digital

COLORWRITER LSR 2000 PRINTER

SERVICE GUIDE

Part Number EK-LSRCW-SV.A01

Digital Equipment Corporation
Maynard, Massachusetts

This document was created with FrameMaker 4.0.4

First Printing, January 1996

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FCC (Federal Communications Commission) Notice

WARNING: FCC Regulations state that any unauthorized changes or modifications to this equipment not expressly approved by the manufacturer could void the user's authority to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult a dealer or an experienced radio or television technician for help.

Modifications: The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Digital Equipment Corporation may void the user's authority to operate the equipment.

Cables: Connections to this device must be shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

DOC Compliance Notice

This equipment does not exceed the Class B limits for radio noise emissions as described in the Radio Interference Regulations of the Canadian Department of Communications.

DOC Avis de Conformation

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B préscrites dans le Règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

Acoustics

Declared values per ISO 9296 and ISO 7779:

Sound Power Level	**Sound Pressure Level**
L_{WAd}, B	L_{pAm}, dBA (bystander positions)

Product	Idle	Operate	Idle	Operate
LNC01 (color)	6.2	7.0	44	53
LNC01 (b&w)	6.2	6.9	44	52
(1 B = 10 dBA)				

Current values for specific configurations are available from Digital representatives.

Schallemissionswerte

Werteangaben nach ISO 9296 und ISO 7779/DIN EN27779:

Schalleistungspegel			**Schalldruckpegel**	
L_{WAd}, B			L_{pAm}, dBA (bystander positions)	
Gerät	**Leerlaug**	**Betrieb**	**Leerlauf**	**Betrieb**
LNC01 (color)	6,2	7,0	44	53
LNC01 (b&w)	6,2	6,9	44	52
(1 B = 10 dBA)				

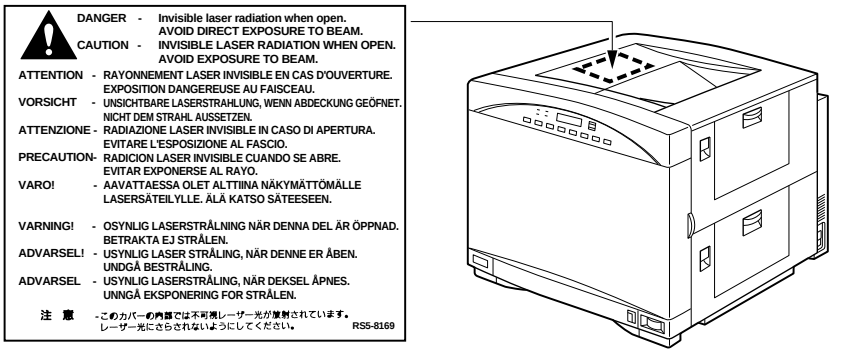
Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Digital Equipment Vertretungen erhältlich.

Class 1 Laser Product (100-120V/220-240V models)

Laser radiation could be hazardous to the human body. For this reason, laser radiation emitted inside this printer is hermetically sealed within the protective housing and external cover. In the normal operation of the product by the user, no radiation can leak from the machine.

This printer is certified as Class 1 laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. (This means that the printer does not emit hazardous laser radiation.)

The label shown below is attached to this printer.



WARNING: When servicing the machine or laser module, follow the procedures specified in the manual so that there are no hazards from the laser. The use of controls, adjustments, or performance of procedures other than those specified in this manual may result in hazardous laser radiation exposure.

WARNING: The label shown above is intended as a warning to persons disassembling the Raster Laser Scanner unit for internal alignment or repair purposes. It does not apply to any of the maintenance procedures specified in this manual.

CDRH Regulations

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 1, 1976. These regulations apply to laser products marketed in the United States. The label on the printer indicates compliance with the CDRH regulations and must be attached to laser products marketed in the United States.

Contents

Preface

The*Colorwriter LSR 2000 Printer Service Guide* is intended for certified printer technicians installing or servicing a Colorwriter LSR 2000. If you have not received installation and service certification, you should not attempt to service the Colorwriter.

This guide is divided into the following sections:

- “Preface” gives general information about this guide and general information that you should know before you attempt to install a Colorwriter.
- Chapter 1, “Introduction”, provides general information about the Colorwriter.
- Chapter 2, “Using the Control Panels”, provides overview of the Colorwriter Control Panel and the Density Control Panel.
- Chapter 3, “Operation”, provides detailed information on how the printer functions.
- Chapter 4, “Service Procedures”, describes removal and replacement procedures for Colorwriter components.
- Chapter 5, “Troubleshooting Procedures”, identifies the source of common problems that may occur with the printer and suggests ways of correcting them.

Colorwriter customers should not use the technical service documentation. Please don’t leave your copy of the *Colorwriter LSR 2000 Printer Service Guide* behind after you make a service call.

About the illustrations in this guide

The illustrations in this guide reflect the version of the Colorwriter at the time of publication. Components shown in these illustrations are subject to change. To receive information about any Colorwriter components that do not match illustrations in this guide, contact your authorized service/support center.

Terminology and conventions

The term *network administrator* refers to the person responsible for maintaining the network at the customer site.

The term *display window* refers to the LCD (liquid crystal display) in the Colorwriter printer control panel.

The term *printer control panel* is used to describe the area on the front of the Colorwriter that includes the activity lights, display window, and the buttons below the display window.

The *density control panel* describes the area on the back of the printer that allows you to change color density, print test patterns, adjust separation voltage control designation and to adjust edge registration.

The term *PC-compatible* refers to any IBM PC-compatible computer capable of running MS-DOS® version 5.0 or later.

The term *PC-based server* refers to any device that may be connected to the Colorwriter for parallel printing.

The arrow highlights important notes and additional information.

The caution icon indicates a need for special care and safety when handling the equipment.

Important safety information

This printer is a high-precision electronic device. Be sure to read these safety instructions fully before you begin.

Follow all warnings and instructions marked on the printer and consumables, such as the toner cartridges and silicone oil bottles.

Handling the printer

Do not place this printer on an unstable cart, stand, or table. The printer alone weighs approximately 110 lb (50 kg). It should always be moved by two or more people. Do not attempt to move it by yourself.

- When installing the printer, carefully observe the location requirement described in this manual.
- Never place the printer near or over a radiator, heat emitter, or flame.
- When the printer is in use, the fixing assembly and delivery areas become extremely hot. Be careful not to touch these areas.

- When moving the printer, be sure to turn the power off before unplugging the power cable.
- Handle all PCBs (printed circuit boards) by their edges only, but avoid touching the contacts on the edge of the board.

Choosing a location for the Colorwriter

- Do not expose the printer to a wet environment.
- Do not directly expose the printer to a chemical environment, for example, an experimental laboratory. The exterior of the printer is made of plastic, and the outside covering may fade, become deformed, or melt.
- Do not install the printer where it is exposed to smoke or steam or sun.
- The printer should never be placed near or over a radiator or heat register. This printer should not be placed in a built-in installation unless proper ventilation is provided.

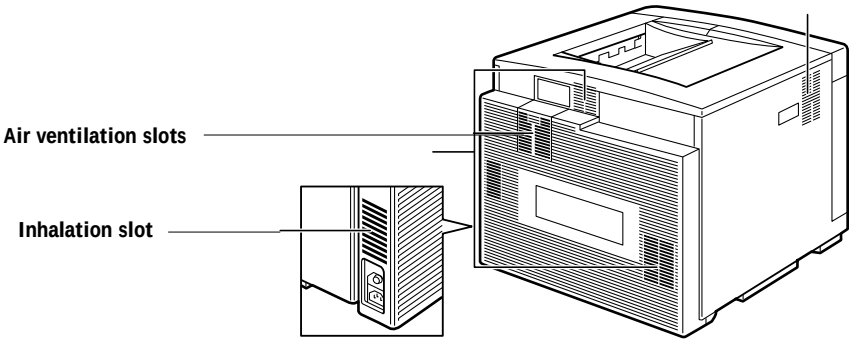
Unpacking and setting up the Colorwriter

- Report any shipping damage. If there is any evidence of shipping or handling damage to the Colorwriter packing boxes or their contents, save the damaged boxes and parts, call the shipper immediately to file a claim, and notify your authorized service/support center.
- Do not operate the printer until all packaging materials (packing tape, spacers, and styrofoam molds) have been removed.
- Before connecting the printer to a power source, check the voltage rating label at the back of the printer to ensure that the printer voltage matches that of the power source. The voltage rating label is located on the rear of the printer. If the voltage label is missing, contact the nearest authorized dealer or your place of purchase.
- Be sure to unravel the power cord prior to plugging it in. Using it tied up may lead to damage, overheating, a short-circuit, or fire.
- Be sure to plug the power cord well into the power outlet, as any flammable material caught between an opening may result in fire.
- Avoid using an extension cord. If it is unavoidable, be sure to take the following precautions. Failure to do this may lead to overheating, fire, or cause flickering due to a drop in voltage.
    - Be sure not to exceed the allowed rating current of the extension cord. Make sure that the total ampere rating of the products plugged into the extension cord does not exceed the extension cord ampere rating.
    - Use a short extension cord. Do not connect several extension cords together.
- Be sure to connect the printer to a ground terminal.
- The power cord should be routed so that it is not likely to be walked on or pinched by items placed on or against it. Pay particular attention to the plug, the receptacle, and the point where the cord exits the unit.
- When connecting cables or disconnecting cables from the printer, make sure that the power switch is in the off position.
- Keep the power cord and cables away from children.
- Do not handle plugs with wet hands.

- Be sure to turn off the power before unplugging or plugging in the printer power cord or interface cable.
- Be sure to use a surge suppressor on the Colorwriter.

Operating the Colorwriter

- Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the printer and protect it from overheating, these openings should never be blocked or covered.



- The printer is equipped with a 3-wire grounding type plug, which has a third (grounding) pin. This plug will fit only into a grounding-type power outlet. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.
- If the printer will not be used for a long period of time, turn the power off and unplug the power cord.
- Unplug the printer from the wall outlet before cleaning. Use a damp cloth for cleaning. Do not spray liquid cleaners or aerosol cleaners directly on the cabinet or the openings, as the spray could penetrate inside the printer and contaminate internal parts.
- Never push objects of any kind into the printer through openings in the enclosure, as the objects may touch dangerous voltage points or short out parts. This could cause a fire or electrical shock.
- Never spill any liquids into the printer.
- The outlet should always be free from any obstacles so as to allow easy access.
- When unplugging the printer, always disconnect the power cord by pulling on the plug, not the cord itself.

- Any misuse of electrical equipment is hazardous. Do not allow children to handle power cords or cables.
- Avoid operating the printer when the waste toner bottle and/or silicone oil bottle is not installed; otherwise the printer may be damaged.
- Do not attempt to modify the printer.
- Do not remove the warning or instruction labels on the printer.
- Do not dispose of the used waste toner box or the silicone oil box into a fire.

Network precautions

- Never alter an existing network without permission from the network administrator. The Colorwriter will probably be connected to an existing Local Area Network (LAN) based on Ethernet® hardware. The network is the link between the customer's computer other equipment. Never disturb the LAN by breaking or making a network connection, altering termination, installing or removing networking hardware or software, or shutting down networked devices without the knowledge and express permission of the system or network administrator or the shop supervisor.
- Never enter an IP address in Colorwriter Network Setup. Only the network administrator should enter an IP address on a network device. Assigning a Colorwriter an incorrect IP address can cause unpredictable errors on any or all devices connected to the network.

Protecting the LCD display

The Colorwriter has a liquid crystal display (LCD) that is made of glass and can break. Do not subject the Colorwriter to strong shocks.

If the display window breaks and the liquid crystal material leaks out, do not inhale, ingest, or touch it. If the material gets on your skin or clothing, wash it off with soap and water immediately.

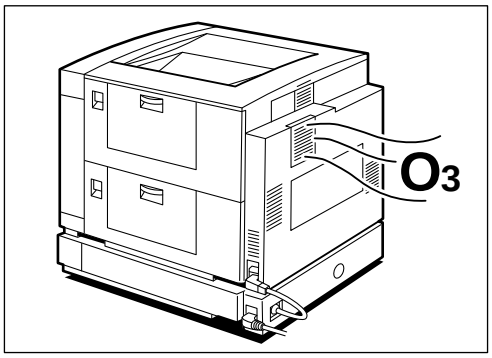
Ozone emission

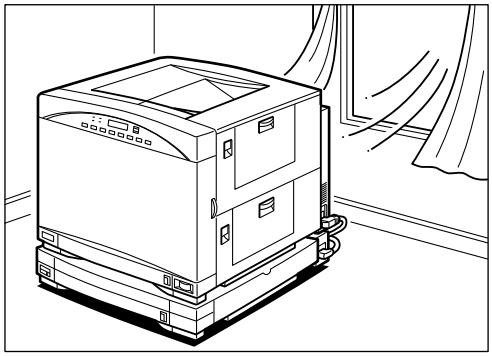
This printer meets the requirements for ozone emission of the applicable standard published by Underwriters' Laboratories, Inc. (UL). Ozone (O_3) is a colorless gas by-product of the

electrophotographic process. Ozone is discharged only while the printer is printing, and is emitted through the exhaust port on the rear, left side of the printer.

Those who are particularly sensitive to ozone odor may rarely feel sick if exposed to it excessively. To avoid this, make sure that the following measures are taken.

- Install the printer in a well ventilated room.





- Avoid using multiple laser printers simultaneously.
- Avoid facing the exhaust port directly toward users.
- Replace a disposable ozone filter after about 60,000 prints.
- Avoid using the printer without a filter.

Laser safety

An invisible laser beam is radiated in the laser/scanner unit and could be hazardous to the human body if exposed to it. For this reason you should not disassemble the laser/scanner unit and it should not be adjusted in the field. The following warning is attached to the cover of the laser/scanner unit.

Toner safety

Toner is a harmless substance. If you get toner on your skin or clothes, remove as much as possible with a dry tissue and then wash it with cold water. Do not use hot water; the toner may gel and become hard to remove. Toner easily decomposes vinyl material; therefore you should not let it come into contact with this material.

Chapter 1: Introduction

The Colorwriter LSR 2000 printer is a full-color laser beam printer based on the standard CMYK (cyan, magenta, yellow, and black) color model. The Colorwriter has the following features:

- Toner cartridges separate from photosensitive drum

  The four color toner cartridges (cyan, magenta, yellow, and black) are installed separately from the photosensitive drum. When a toner cartridge is used up, just replace the toner cartridge with a new one of the same color.

- Flexible color range

  The four color toner cartridges offer output in full color, a single color only (monocolor), or the traditional true black (using the black toner cartridge).

- High resolution

  The 600-dpi resolution gives you crisp, clean, and laser sharp output in full color.

- High print speed

  The printer prints at 3 letter-sized pages per minute in full color, or 12 letter-sized pages per minute in monocolor (using one of the toner cartridges). Overhead transparencies are printed at 1 page per minute.

- Flexible paper handling

  The supplied paper cassette preset (A4 or letter-size, depending on the voltage package) can hold about 250 sheets (at 80 g/m2) of plain paper. The multipurpose tray accepts transparency films as well as plain paper. You can also purchase a universal paper cassette which can hold various paper sizes—Letter, A4, B5, or legal. For higher volume, the optional paper feeder unit can be used.

The Colorwriter enables users of Macintosh® computers, PC-compatibles, and UNIX workstations to:

- Send images over AppleTalk®, TCP/IP, Novell® networks, and through a parallel (Centronics®) port to print to the Colorwriter.
- Spool print jobs and select a printing priority for each job. Users can also control spooled print jobs sent to the Colorwriter with remote utility software running on networked Macintosh and PC-compatible computers.
- Print PostScript and EPS files in color and grayscale.
- Use 39 resident fonts. The customer can download additional PostScript Type 1 or Type 3 fonts as needed.

How the Colorwriter operates

The basic operation of the Colorwriter can be divided into four blocks: the overall control system, the laser/scanner system, the image formation system, and the pick-up/feed system.

- Overall control system—is controlled by the video controller PCB, terminal PCB, DC controller PCB and the mechanical controller PCB. When the video controller board receives a print command from an external networked device, the command is sent to the DC controller and the mechanical controller which begins the printing process. These boards control the engines that perform the printing process.
- Laser/Scanner system—once printing has begun the DC controller begins to stabilize the intensity of the laser beam. The laser beam strikes the scanning mirror which rotates at a constant speed. The laser beam reflected by the scanning mirror focuses on the photosensitive drum after passing through the focusing lens and being reflected by the reflection mirror. When the scanning mirror rotates at a constant speed, the laser beam scans at an even speed across the photosensitive drum. A latent image is formed on the photosensitive drum as it is also rotating at a steady speed.
- Image formation system—is made up of the photosensitive drum, transfer drum, developing unit, primary charging roller, and other components. The primary charging roller negatively charges the entire surface of the photosensitive drum while the laser beam is radiated onto the surface of the photosensitive drum. The latent image formed across the photosensitive drum is made visible by the toner, and is transferred to the paper on

the transfer drum. These steps are taken for each color. The paper is rotated on the transfer drum until the color transfer process is completed.

The paper is then separated from the transfer drum and delivered to the fixing unit. The surface of the photosensitive drum is cleaned with the cleaner blade for removal of remaining toner, and the drum potential is kept uniform by the primary charging roller in preparation for forming a new latent image. The transfer drum surface is cleaned with the cleaning brush for removal of remaining toner and the discharge roller removes the surface charge.

This printer is also equipped with toner cartridge installation detection, toner-low detection, toner stirring, and photosensitive drum life detection functions.

Note: The cleaning brush is activated after 100 prints.

- Pick-up/Feed system—When a print job is sent to the printer a sheet of paper is picked up by either the cassette or manual feeding pick-up roller, fed by the feed rollers. Any skew in the paper is corrected by the registration roller, and then the paper stops at the leading edge detection position. The temporarily stopped paper is fed so that its leading edge will match the gripper on the transfer drum as well as the leading edge of the image on the photosensitive drum. Subsequently, the paper passes through the transfer, separation, fixing, and delivery units to the face-down or face-up tray.

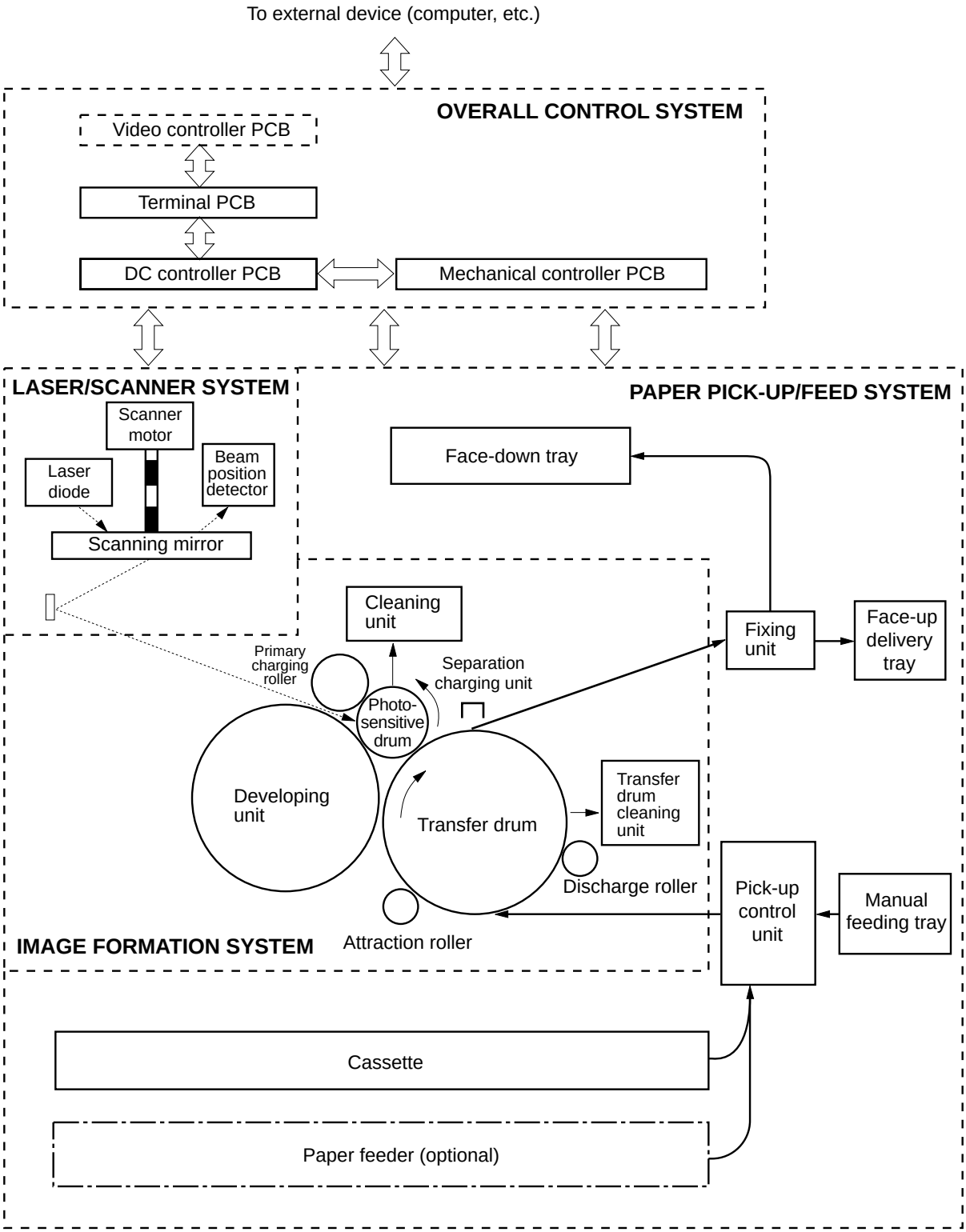
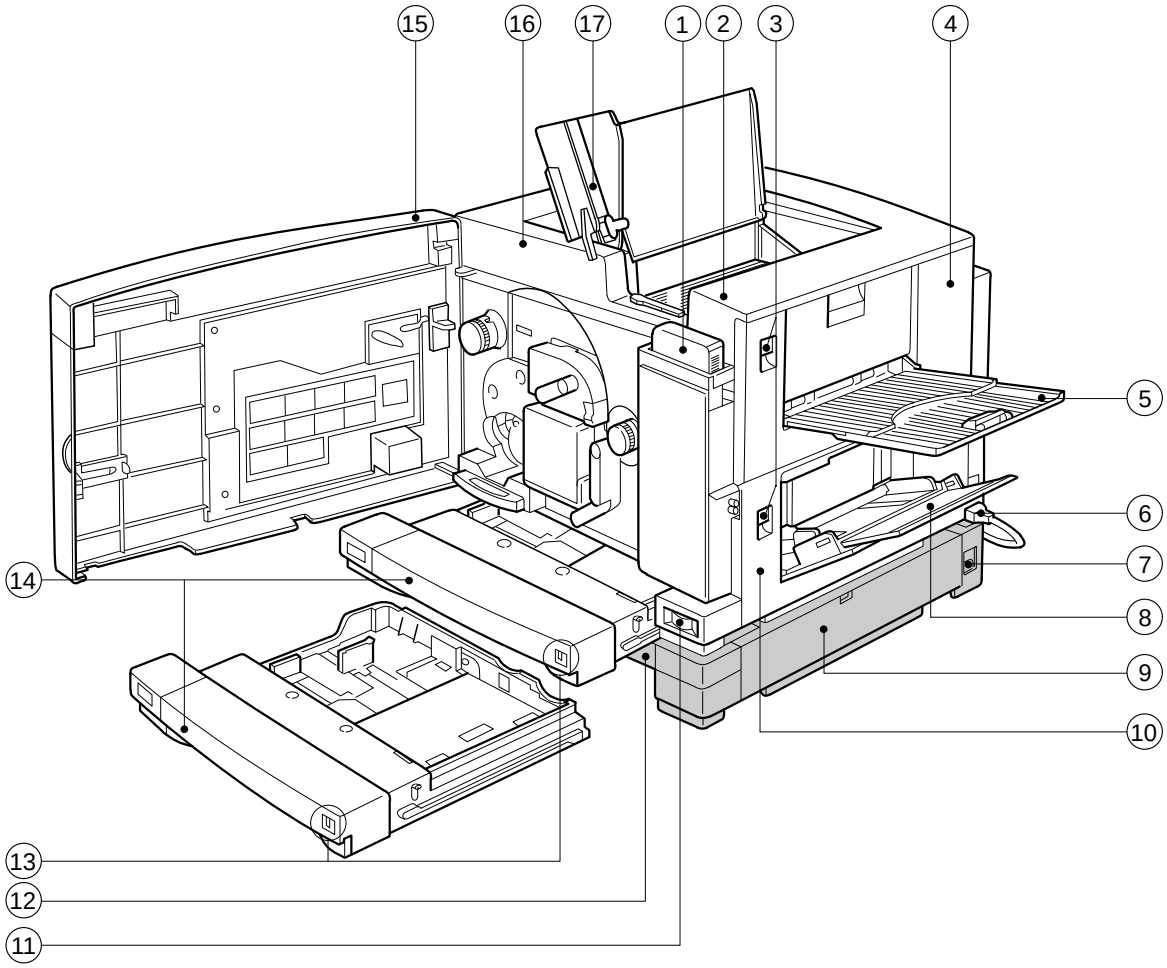


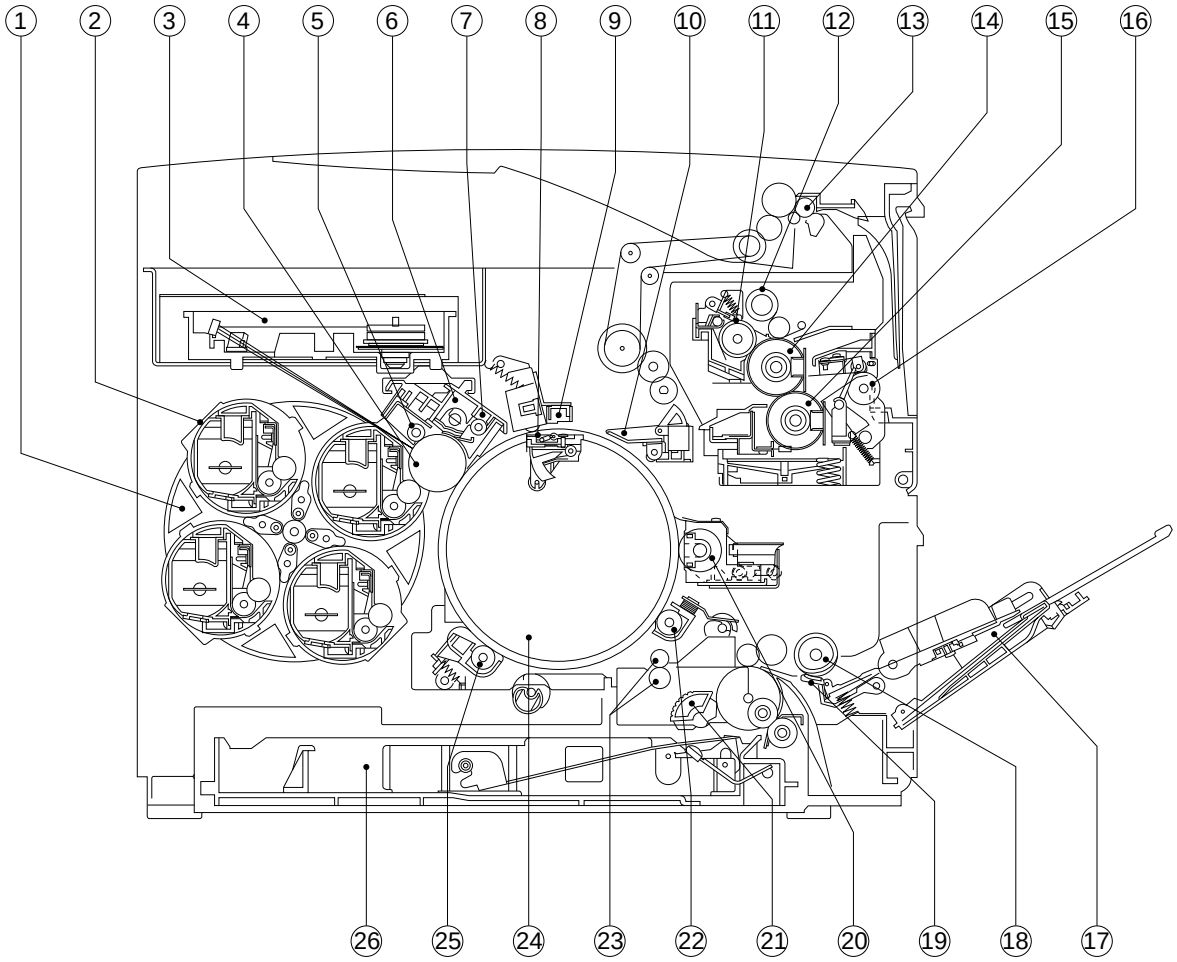
Figure 1-1 Colorwriter functional diagram

Parts of the printer



1—Oil bottle
2—Upper cover
3—Release knob
4—Fixing unit cover
5—Face-up tray
6—Power cable
7—Power receptacle
8—Manual feeding tray
9—Paper feeder (right door)
10—Pick-up cover
11—Power switch
12—Paper feeder
13—Paper capacity indicator
14—Cassette
15—Front door
16—Printer Control Panel
17—Face-down tray

Figure 1-2 Printer — external view



1—Developing rotary unit
2—Toner cartridge
3—Laser/scanner unit
4—Photosensitive drum
5—Primary charging roller
6—Drum cartridge
7—Cleaning unit
8—Gripper
9—Separation charging unit
10—Separation claw
11—Oil applying roller
12—Cleaning belt
13—Face-down delivery roller
14—Fixing upper roller
15—Fixing lower roller
16—Fixing delivery roller
17—Manual feeding tray
18—Manual feeding pick-up roller
19—Separation pad
20—Cleaning brush
21—Cassette pick-up roller
22—Discharge roller
23—Registration rollers
24—Transfer drum
25—Attraction roller
26—Cassette

Figure 1-3 Printer — cross sectional view

Print options

The Colorwriter's efficient PostScript capabilities allow customers to use a variety of applications to create printed pages with text, images, or a combination of text and images, and print them in Contone or Halftone mode. The Colorwriter operates over a network or by printing directly to the Colorwriter's parallel port. RIP-While-Print™ allows the printer to print an image while processing the next image.

The Colorwriter offers an efficient way to print files that have been saved in PostScript or EPS (Encapsulated PostScript) format. These files can be downloaded directly to the Colorwriter using the Fiery XJ Downloader, one of the remote utilities provided with Colorwriter.

With the parallel port option, customers can print documents directly from applications running on a PC-compatible computer or a server that is connected to the Colorwriter's parallel port. PostScript files can also be printed to the parallel port from the DOS prompt or the Windows File Manager.

Client utility software

Colorwriter users who are working with Macintosh and PC-compatible computers using AppleTalk can download fonts and flies, scan color images, and control spooled print jobs using client software delivered with the Colorwriter. The network administrator at the customer site is responsible for loading software onto computers that will use the Colorwriter over the network.

The Colorwriter user software floppy disks (for Macintosh or PC-compatible computers) contain the following software:

- The Fiery XJ Downloader™ is a utility that allows the user to download PostScript or EPS files directly to the Colorwriter without opening the file or the application that created the file. The Fiery XJ Downloader also allows the customer to manage the printer fonts installed on the Colorwriter's hard disk.
- The Fiery XJ Spooler™ is a utility that allows a user to control Colorwriter print jobs from a networked Macintosh or PC computer. It allows the user to view the order and priority of jobs, delete jobs, and move jobs between queues.
- A set of Adobe Macintosh screen fonts that correspond to the PostScript printer fonts resident on the Colorwriter.

- Printer description files that allow remote users to access PostScript Level 2 features when printing.
- Printer drivers for Macintosh and Windows that allow applications to communicate with the Colorwriter and use all the PostScript Level 2 printing features of the Colorwriter.
- Color reference pages allow users to print CMYK and PANTONE color swatches to view the range of colors available on the Colorwriter.

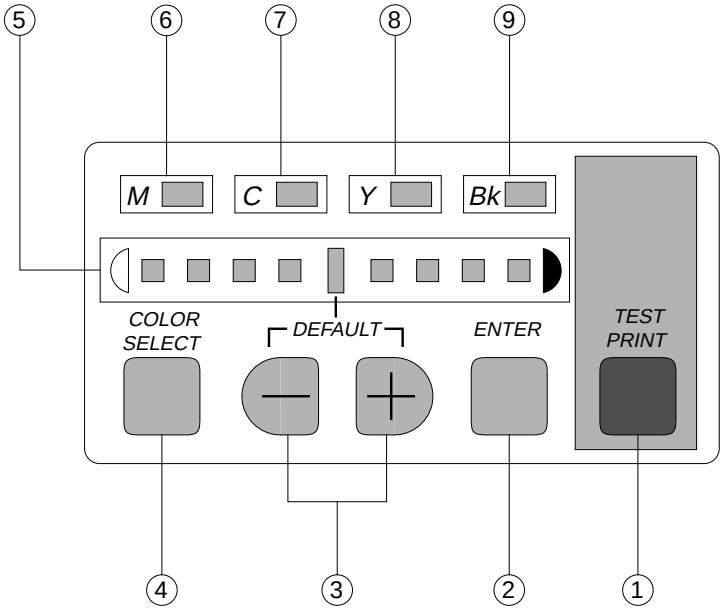
The CD-ROM contains the Fiery Print Calibrator™ , printer calibration software that runs on the Macintosh. The CD includes an online user guide for the Fiery Print Calibrator, and Adobe Acrobat Reader software for viewing and printing the user guide. Instructions for installing the Fiery Print Calibrator and Acrobat Reader are included in the accompanying booklet.

Chapter 2:
Using the Control Panels

The Colorwriter has two control panels: the density control panel and the printer control panel. The density control panel on the back of the printer can be used to change color density settings, change test pattern pages, adjust separation voltage control designation, and to adjust edge registration. The printer control panel on the front of the printer allows you to set options and view information about print jobs and display status information about the printer.

Using the density control panel

This section describes the density control panel on the back of the printer. Once the printer is installed and powers up correctly, you can use the density control panel to change color density settings, test pattern pages, and separation voltage control designation, or to adjust edge registration.



1—TEST PRINT key
2—ENTER key
3— +/- key
4—COLOR SELECT key
5—Density gauge

COLOR SELECT indicators:
6—M LED
7—C LED
8—Y LED
9—Bk LED

Figure 2-1 Density control panel

- TEST PRINT—Prints one of the available test patterns (solid color, solid white, gradation, horizontal lines, vertical lines, or grid) and allows you to check the results of a density change.
- ENTER—After you select a new density for one of the color select indicators (M, C, Y, Bk), press this key to save the new density for the selected color indicator.
- +/- —Use these keys to change the density or to select a new test pattern for the TEST PRINT function.
- COLOR SELECT—Press this key to select one of the color select indicators (M, C, Y, Bk) in order to change the density.
- Density gauge—Indicates the currently selected color density or test print pattern.
- M—The color indicator lights when Magenta has been selected.
- C—The color indicator lights when Cyan has been selected.
- Y—The color indicator lights when Yellow has been selected.
- Bk— The color indicator lights when Black has been selected.

Density adjustment

Use the following procedure to customize the color density for printed pages. Note that you can change the color density while your job is busy printing.

To adjust color density

1. **Press the COLOR SELECT key to select a color to change.**

   The LED lights up indicating the selected color and density (see Figure 2-2 below).

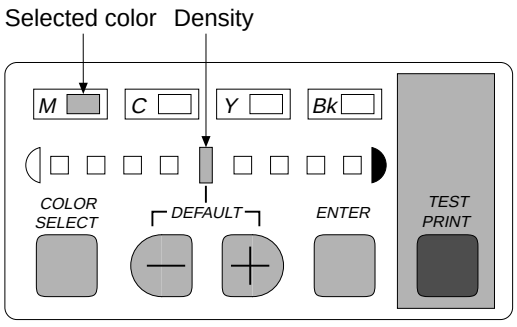


Figure 2-2 Color density mode

2. **Press the + or - key to change the density.**

   When you change the density from the current setting, the density gauge LED flashes.

3. **Press the ENTER key to save the new density setting.**

   The density gauge LED stops flashing when the new color density settings have been saved. Turning the printer on and off does not change the color density settings. The new settings remain in memory until they are changed.

   When the printer is on, or the density control panel is not used for at least 30 seconds, it enters OFF mode. In OFF mode, the COLOR SELECT indicators go OFF and only the density gauge default LED (middle) lights if all the colors are set at the factory-shipping value. Otherwise all LEDs will go OFF.

   If you press the + and - keys for at least 5 seconds, all color densities are initialized to the default settings and the panel enters OFF mode.

Test patterns

When the printer is Ready (or idle), you can print a test pattern to check printer color quality. Six test patterns are available and can be selected using the density control panel. When you change the test pattern the Fault button on the printer control panel flashes and no jobs can be printed to the printer. Note that turning off the printer resets the test pattern to the default page (horizontal lines). The test pattern is printed from the main cassette and differs from the Test Page printed from the printer control panel.

To change the test pattern

1. **Press the ENTER key eight times while holding down the COLOR SELECT key.**

   All color indicator LEDs will flash to indicate the shift to the test pattern setting mode (see Figure 2-3 below).

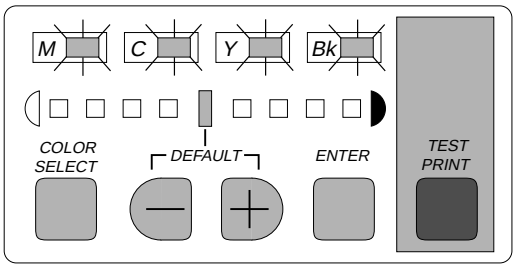


Figure 2-3 Test pattern setting mode

2. **Press the + and - keys to select a test pattern. See Figure 2-4 below for the correspondence between the density gauge LEDs and the test patterns available.**

   If you select a test pattern different from the one currently selected, the density gauge LED for the selected pattern will flash.

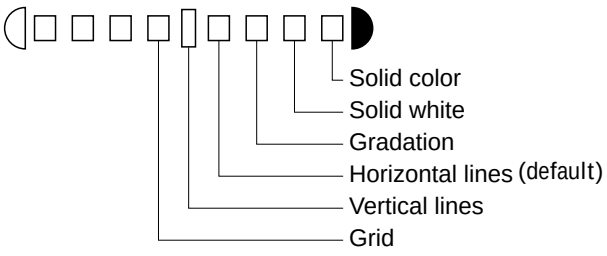


Figure 2-4 Density gauge LEDs for test patterns

3. **Press the ENTER key to save the changes.**

   The LED stops flashing to indicate that the new test pattern has been saved.

Separation voltage control designation

To change the voltage control designation

1. **While holding down the COLOR SELECT key, press the ENTER key three times.**

   The Y and Bk color indicator LEDs flash to indicate that separation voltage control designation mode has been entered (see Figure 2-5 below).

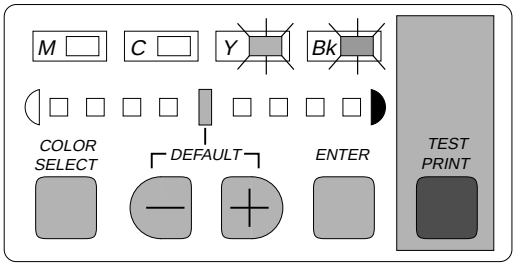


Figure 2-5 Separation voltage control designation mode

2. **Press the + or - keys to select the separation voltage control method. See Figure 2-6 below for the correspondence between the density gauge LEDs and the available separation voltage control methods.**

   If you change the current selection, the density gauge LED flashes.

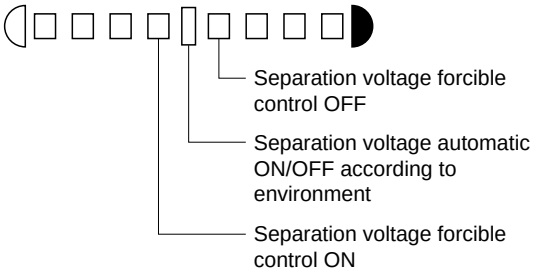


Figure 2-6 Density gauge LEDs for separation voltage control

3. **Press the ENTER key to save changes.**

   The density gauge LED stops flashing to indicate that the new the separation voltage control method has been saved.

Edge registration

You can use the density control panel to change the manual feeding tray edge registration, cassette edge registration and the leading edge registration.

To adjust edge registration

1. **If the printer is on, turn the power switch off.**
2. **Press and hold the TEST PRINT key and then turn on the power switch to enter edge registration adjustment mode.**

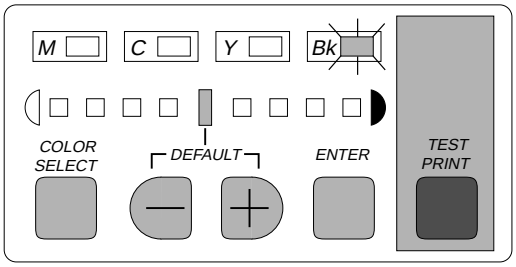


Figure 2-7 Edge registration adjustment mode

3. **Press the COLOR SELECT key to select one of the adjustment options (see Figure 2-8 below).**

   As you select the different options, their adjustment value appears on the density gauge.

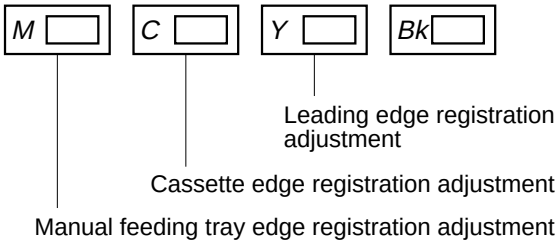


Figure 2-8 Color select LEDs for adjustment options

4. **Press the + and - keys to change the edge registration adjustment value.**

   If you change the edge registration adjustment value, the density gauge LED flashes.

   The relationship between each adjustment item and value is as follows:

   - For leading edge registration adjustment— pressing the + or - key adjusts the value by 0.3mm.

- For cassette and manual feeding tray side registration adjustment—pressing the + or - key adjusts the edge registration value by 0.425mm.

5. **Press the ENTER key for each adjustment option to save changes.**

   The density gauge LED stops flashing to indicate the new value has been saved.

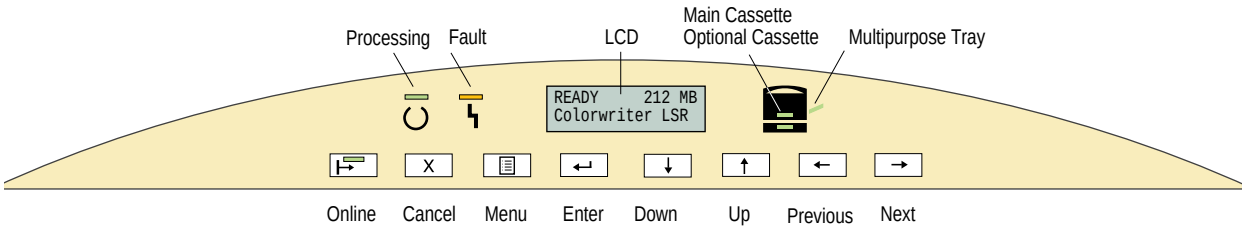
   When the printer is turned ON, or the density adjustment panel is not operated for more than 30 seconds, it will enter the OFF mode. In OFF mode, the COLOR SELECT LEDs will go OFF, and only the density gauge DEFAULT LED (middle) will light up if all adjustment values are at the ROM default value. Otherwise all will go OFF.

   Press only the + and - keys for at least five seconds to initialize all adjustment values as default and the panel will enter the OFF state.

Using the printer control panel

The printer control panel on the front of the printer enables you to set options and view information about print jobs, in addition to displaying status information about the printer. It is comprised of the following parts:

- Activity lights that indicate printer status
- Display window showing status information and options for setting up the printer
- Buttons



Activity lights

The activity lights indicate printer status. They have the following meanings:

Lit when the printer is ready to accept and process new jobs.

Off when the printer is on and there is no activity. Flashes when the printer is receiving data, processing, or printing.

Lit when the printer requires operator intervention. Flashes when there is an error that prevents printing. Solid when there is a warning that allows printing to continue (for example a low toner message).

Lit when the main (upper) paper cassette is selected as the default tray or requested by the current print job.

Lit when the optional (lower) paper cassette is selected as the default tray or requested by the current print job.

Lit when multipurpose tray is selected as the default tray or requested by the current print job.

Display window

The display window is an LCD panel on the printer control panel that provides information about the status of the printer, enables you to print special pages, and enables you to view and edit information in Printer Setup. For information about Printer Setup, see the *User Guide*.

Buttons

The buttons have the following meanings:

Suspends and resumes printing.

Cancels the “oldest” job processing or printing. This button is only active when the Process or Print message appears.

At startup, displays the setup menus. In the setup menus, takes you back to the SELECT MENU screen. When the printer is on line, switches between the status windows and the Print Pages menu (and the warning window if a message is displaying).

Selects the currently displayed choice on the second line of the display window and proceeds to the next option.

↓ Takes you to another entry in the list. In a fixed-length list, takes you to the previous item in the list. When entering text, decrements to the previous character in the alphabet. Hold down the button to decrement rapidly.

↑ Takes you to the another entry in the list. In a fixed-length list, takes you to the next item in the list. When entering text, increments to the next character in the alphabet. Hold down the button to increment rapidly.

← In the Setup menus, backspaces the cursor to the previous text-entry position. In a text field, deletes the last character.

→ In the Setup menus, advances the cursor to the next text-entry position.

Status messages

When the printer is printing normally, status information about current jobs appears in the display window. The messages are:

- Initializing—Displays the free disk space and software version while the printer is initializing.
- Ready—Displays when the printer is ready to print but is not processing or printing a job. The free disk space and software version also appear.
- Processing—Displays the name of the job currently processing.
- Printing—Displays the name of the job currently printing.
- Canceling Job—Displays when you cancel a print job.

Error messages

If there is a problem with printing, the Fault light flashes, and an error message appears in the display window. You can press the Menu button while the Error message is displayed to see other Display window screens. If the Fault light is solid, it means that the printer requires attention but printing can continue (for example, a low toner message).

Menu options

You can press the Menu button to display a list of special pages to print to the printer. Use the Scroll Up and Down arrows to select the page you want to print, and then press the Enter button.

The pages you can print are:

- Test Page—Prints a test page (this is different from the test pattern pages printed from the density control panel). This enables you to confirm that the printer is properly connected and allows you to view samples of color and grayscale to troubleshoot problems with the printer. The following information also appears: printer name, product name, system, software version, memory configuration, Ethernet address, default paper size, and whether the optional cassette is installed.
- Job Log—Prints the log of the last 40 jobs. For information on the fields in the Job Log and on printing it in other forms, see the section on using the job log with the Macintosh or Windows Fiery XJ Spooler in the *User Guide*.
- Configuration—Prints the configuration page, which gives the current device configuration. This page lists the selected options for all Setup settings.
- Help Map—Prints an overview of the screens you can access from the printer control panel.
- Color Pages—Prints the color reference charts. These pages display the RGB, CMY, and PANTONE colors available from the printer.

Chapter 3: Operation

This chapter describes how the printer operates. Printer operation can be divided into the following four systems:

- Overall control
- The image formation
- The laser/scanner
- Paper pick-up/feed

The following conventions are used throughout this chapter:

- Mechanical linkages in the diagrams are indicated by black and white lines. The flow of control signals are indicated by solid arrows, and the flow of groups of signals are indicated by outlined arrows.
- “H” or a signal name without a slash in front of it (such as PSNS) indicates active-high signals. “L” or a signal name with a slash in front of it (such as /SCNON) indicates active low signals.

Note: The internal operation of the microcomputer in the Colorwriter cannot be checked and therefore information on it is not described in this manual.

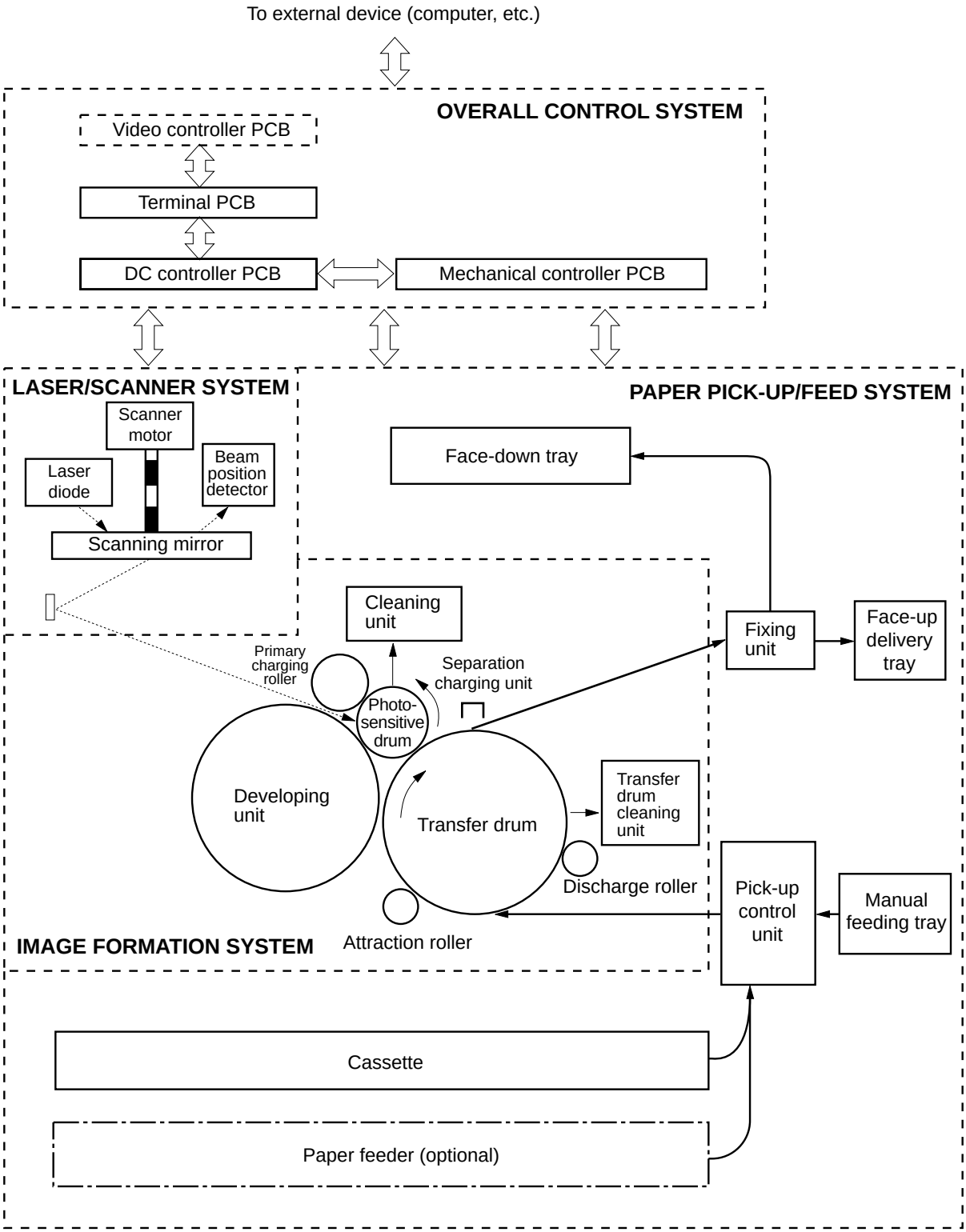


Figure 3-1 Colorwriter functional diagram

Overall control system

The operation sequence for the Colorwriter is controlled by the video controller PCB, terminal PCB, DC controller PCB and the mechanical controller PCB. When the printer is turned on and enters the STANDBY state, the microcomputer on the DC controller sends signals to drive the laser diode, fixing heaters, and other components in response to the print signal from the video controller.

The video controller board receives the data to be printed from a networked device over AppleTalk®, TCP/IP, Novell® networks, or through the parallel (Centronics®) port. The video controller board includes a MIPS R4600 RISC (Reduced Instruction Set Computer) CPU with a built-in floating point accelerator that runs the CPSI (Configurable PostScript Interpreter). The CPSI (an implementation of Adobe's PostScript language) interprets the PostScript page description file to produce the image pattern in memory. The Fiery RipChips™ on the video controller board control data management and other system functions, freeing up the CPU for efficient image data processing. The video interface chips on the video controller board then transfer the image data to the DC controller and the mechanical controller to begin the printing process.

These boards control the engines that perform the printing process. The microcomputer on the DC controller sends the print sequence command to the mechanical controller and the mechanical controller outputs the signals for driving the various loads including the high-voltage power supply, motors, and solenoids.

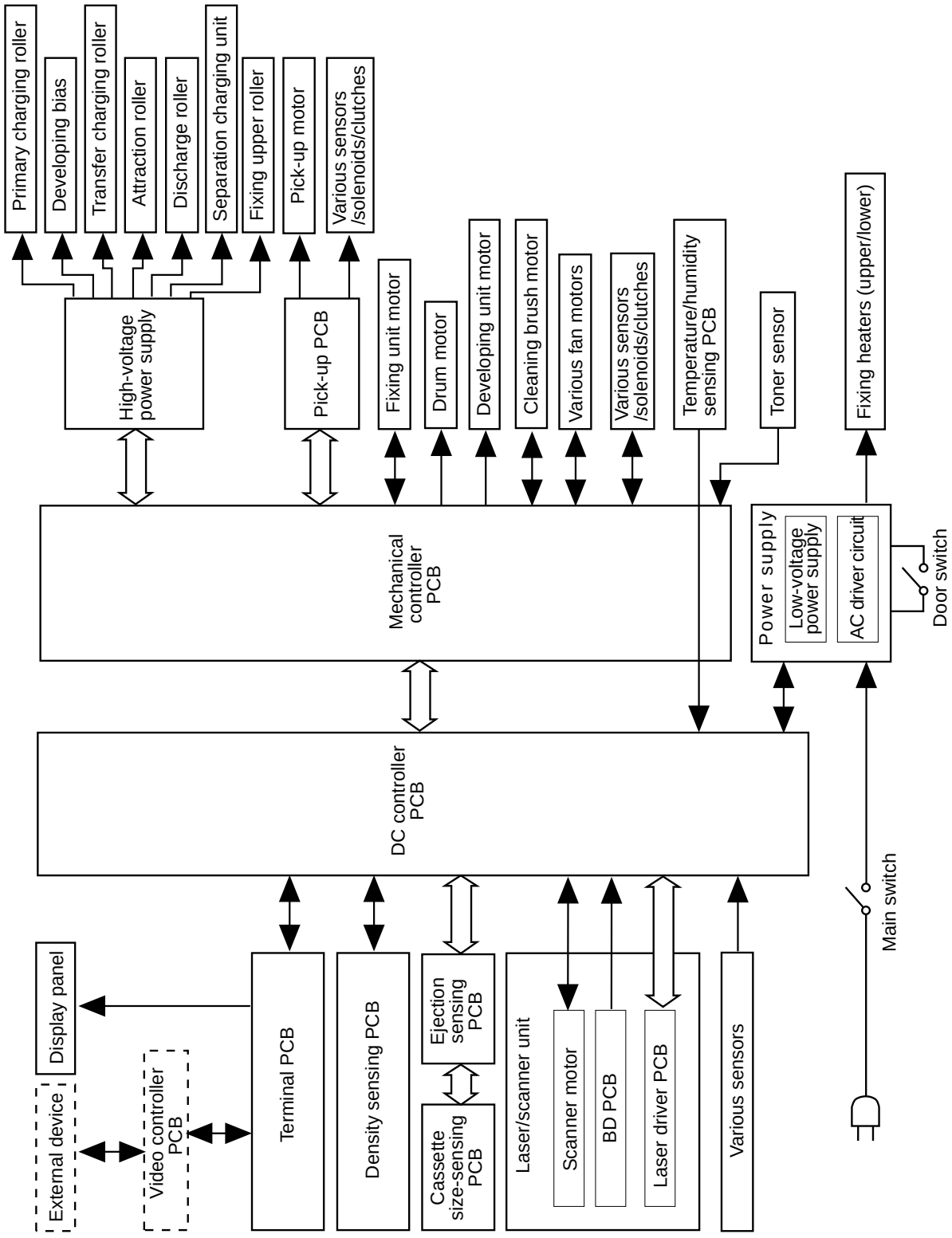


Figure 3-2 DC and mechanical controller PCB functional diagram

Main PCBs

This section describes the functions of the DC controller PCB and the mechanical controller PCB.

DC controller PCB

When the PRINT signal is received from the video controller, the DC controller sends the print sequence command to the mechanical controller, which then starts controlling the various loads.

The DC controller also provides:

- Laser/scanner control (see “Laser/scanner system” on page 3-16)
- Image stabilization control (see “Image quality stability control” on page 3-69)
- Fixing temperature control (see “Fixing and delivery unit” on page 3-95)
- Power-OFF time measurement
- Various detection functions
- Video interface control

Mechanical controller PCB

The mechanical controller PCB controls the various loads in response to signals received from the DC controller PCB. The mechanical controller then returns the status signals back to the DC controller.

The mechanical controller controls the pick-up PCB, the high-voltage power supply PCB, and the paper feeder driver PCB via serial communication.

The mechanical controller also provides:

- Drive for the various motors including fan motors (see “Drive system” on page 3-12)
- Control of the developing unit (see “Developing unit control” on page 3-58)
- Control of the fixing unit (see “Fixing and delivery unit” on page 3-95)
- Control of the transfer drum and peripheral units (see “Transfer drum and peripheral components” on page 3-86)
- Control of the pick-up PCB (see “Paper pick-up” on page 3-76), the high-voltage PCB (see “High-voltage control” on

page 3-45), and the paper feeder driver PCB (see “Paper feeder” on page 3-124)

- Toner stirring function, toner-low detection, and toner cartridge detection (see “Toner cartridge” on page 3-29)
- Photosensitive drum life detection (see “Photosensitive drum life detection” on page 3-54)
- Waste toner collect system control (see Figure 3-33 on page 3-44)
- Power-saving mode control (see “Power supply” on page 3-121)

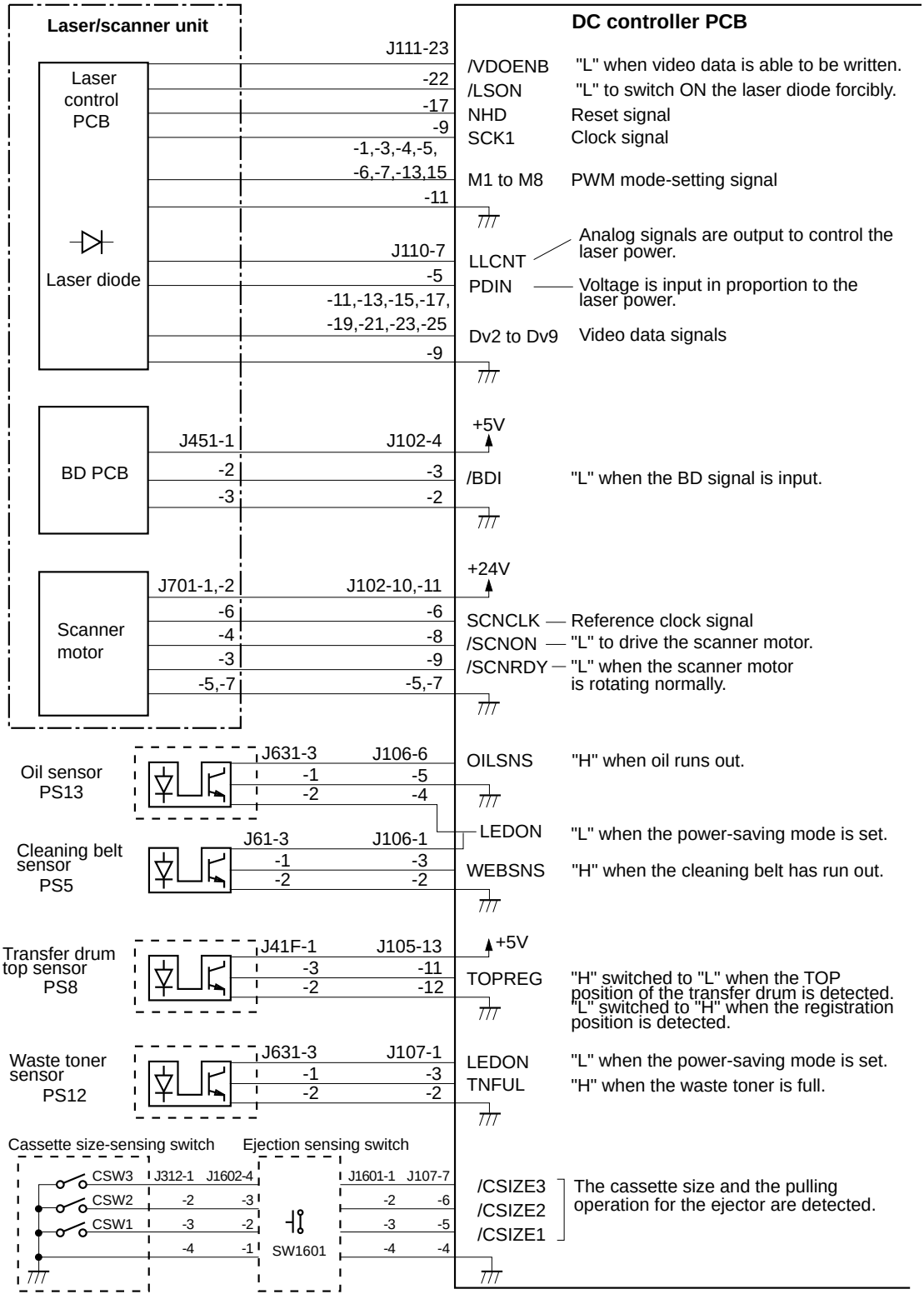


Figure 3-3 DC controller input/output signals (1 of 3)

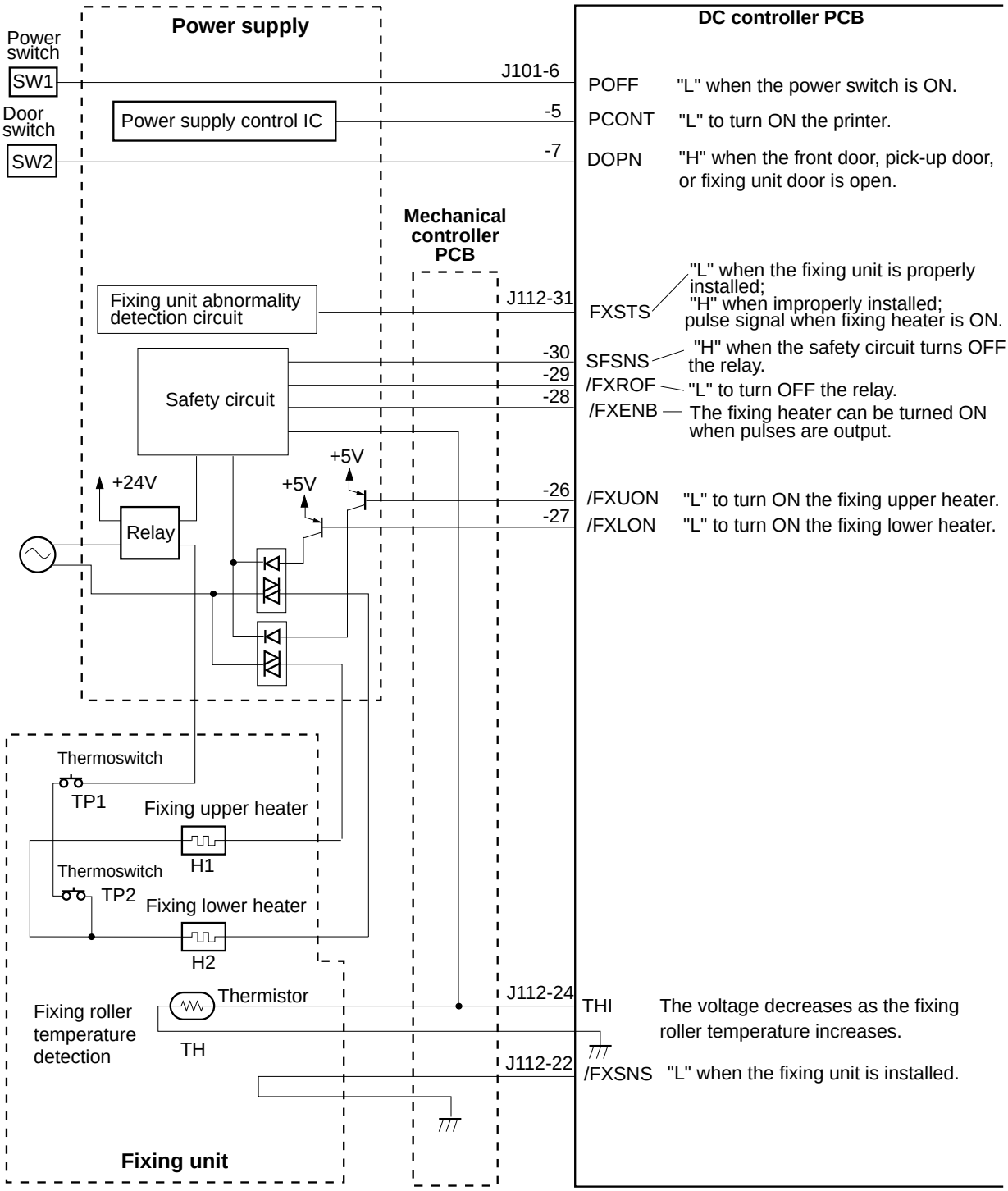


Figure 3-4 DC controller input/output signals (2 of 3)

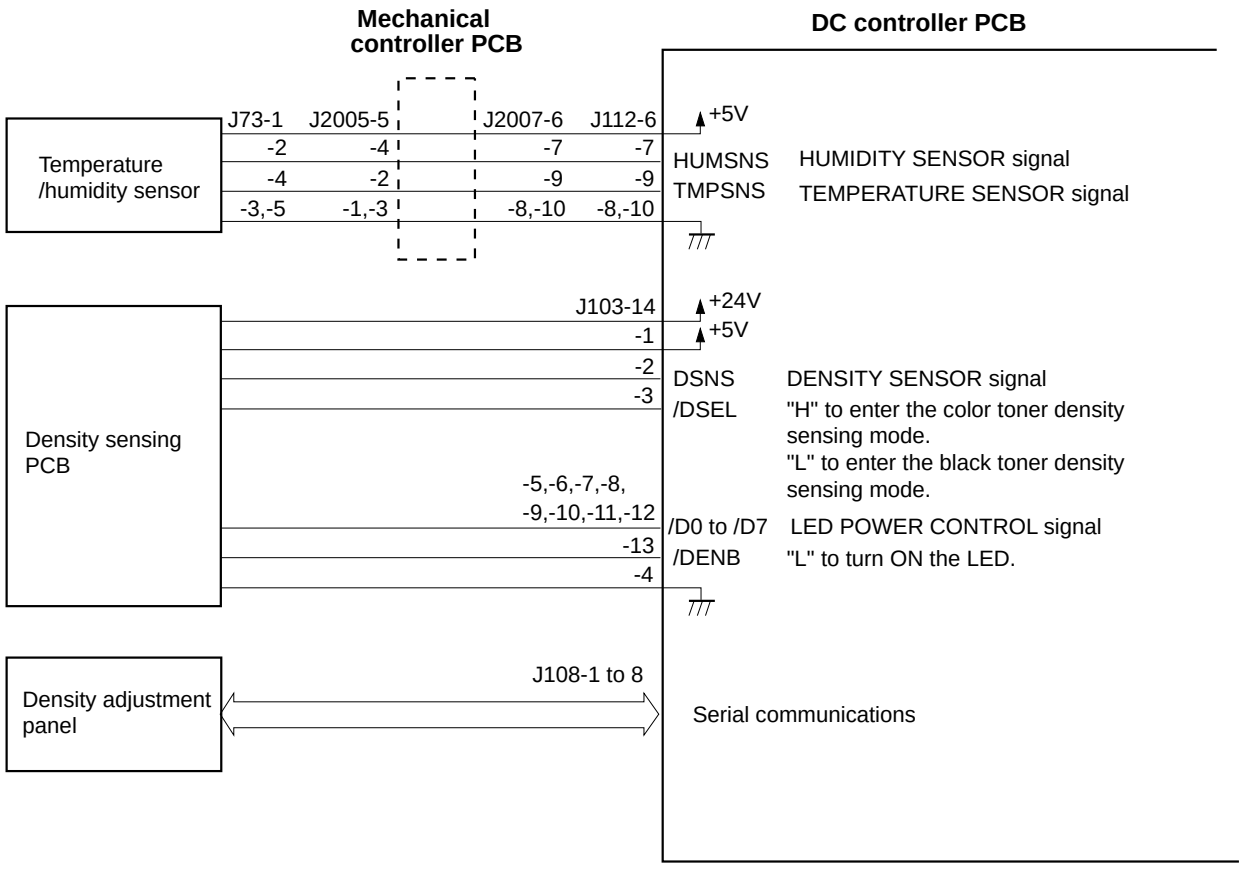


Figure 3-5 DC controller input/output signals (3 of 3)

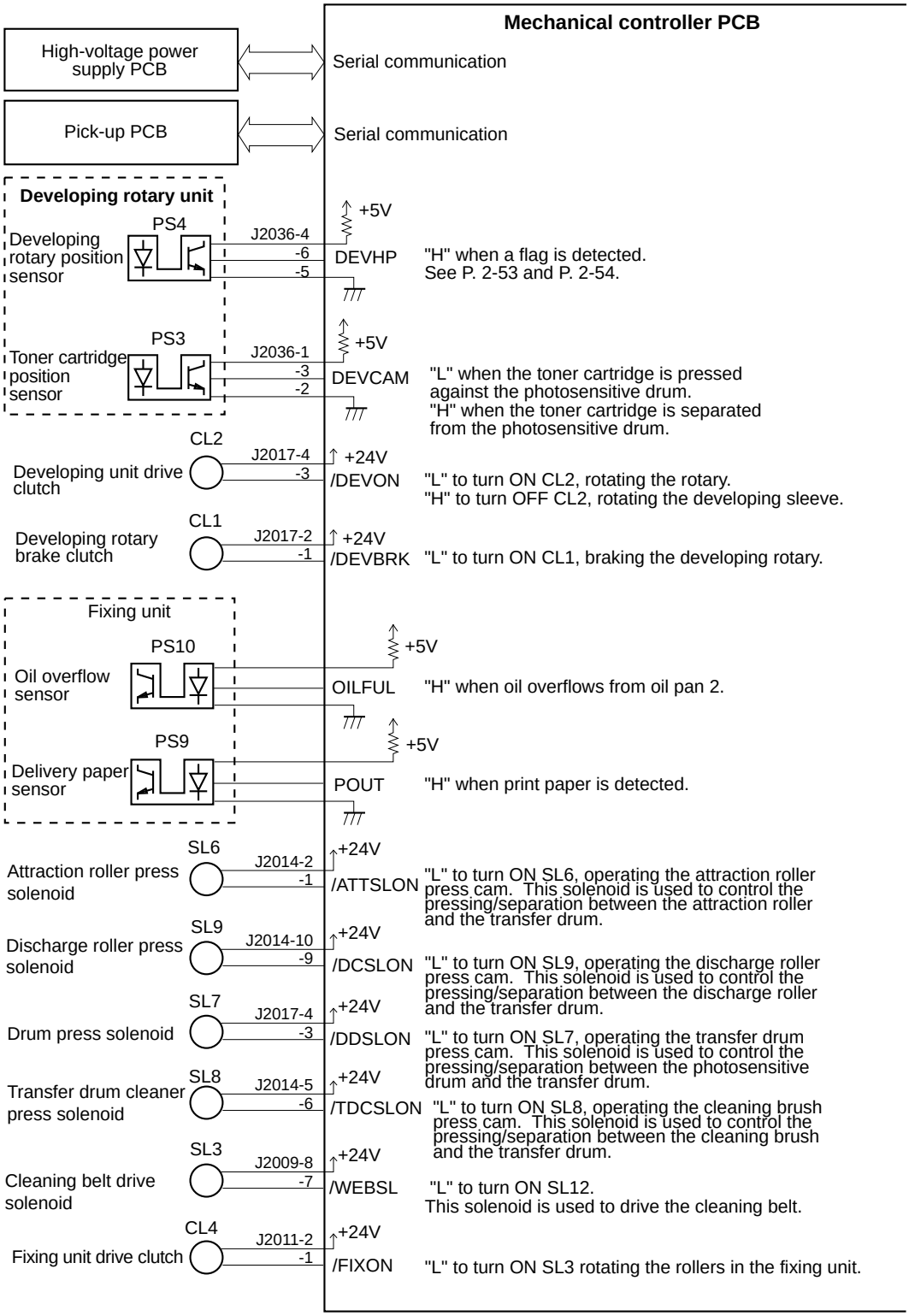


Figure 3-6 Mechanical controller input/output signals (1 of 2)

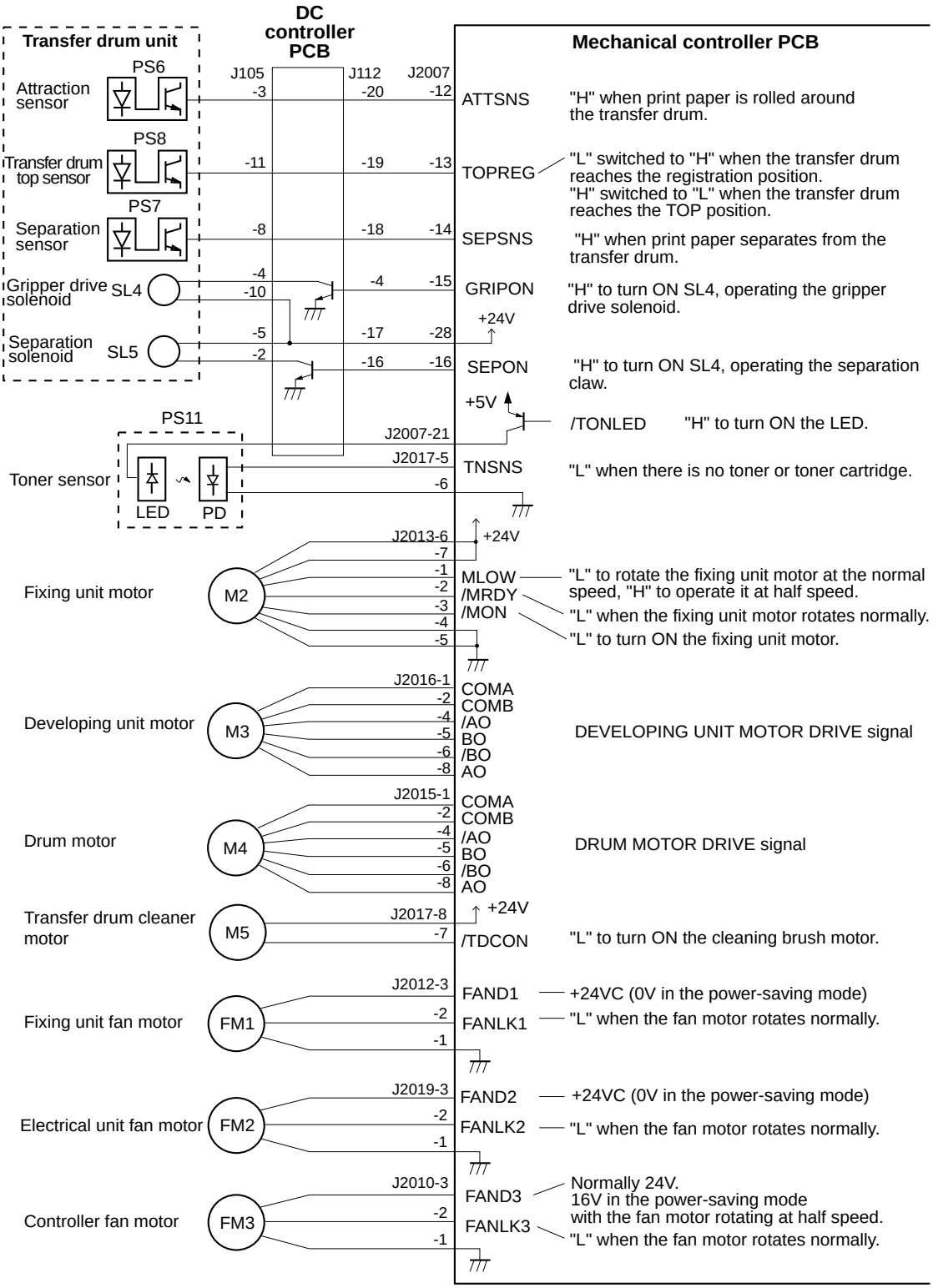


Figure 3-7 Mechanical controller input/output signals (2 of 2)

Drive system

The Colorwriter has six motors: the pick-up motor, fixing unit motor, drum motor, developing unit motor, cleaning brush motor, and scanner motor.

Pick-up motor

The pick-up motor is a two-phase stepping motor located in the pick-up unit. It is controlled by the pick-up PCB to operate the pick-up unit.

The pick-up motor is responsible for operating the following loads:

- Cassette pick-up roller
- Separation roller
- Registration roller
- Manual feeding pick-up roller
- Manual feeding paper lifting cam
- Feed rollers 1 and 2

Fixing unit motor

The fixing unit motor is a DC brushless motor. It is controlled by the CPU on the mechanical controller PCB to operate the fixing unit, the face-down delivery unit, the transfer drum, and their peripheral components.

The fixing unit motor is responsible for operating the following loads:

- Fixing upper and lower rollers
- Face-down delivery roller
- Fixing unit delivery roller
- Oil applying roller
- Oil pump
- Waste toner screw
- Attraction roller press cam
- Drum press cam
- Cleaning brush press cam
- Discharge roller press cam

Drum motor

The drum motor is a two-phase stepping motor. It is controlled by the drum motor driver on the mechanical controller PCB.

The drum motor is used to operate the photosensitive drum and the transfer drum.

Developing unit motor

The developing unit motor is a two-phase stepping motor. It is controlled by the developing unit motor driver on the mechanical controller PCB. It is used to operate the developing rotary and the sleeve in the toner cartridge.

Cleaning brush motor

The cleaning brush motor is a DC motor. It is controlled by the CPU on the mechanical controller PCB to operate the cleaning brush.

Scanner motor

The scanner motor is a three-phase, eight-pole DC brushless motor with a built-in Hall element. Located in the laser/scanner unit, it is controlled by the CPU in the DC controller via the gate array. The scanner motor rotates its incorporated scanning mirror to scan the laser beam, which has been emitted from the laser diode, in the horizontal scanning direction.

Basic sequence of operation

Table 3-1 Printer sequence

	Period	Purpose	Remarks
INITIALIZATION	From power-ON until the WAIT period	To: • Run video controller diagnostics • Display startup screens to allow you to enter Setup • Scan boot device • Warm up—waiting for fuser temperature to reach equilibrium. • Calibrate the printer—prints primary colors (CMY) patches directly on the transfer drum mylar sheet causing the rotary to move into each primary color position, cam each toner to the photodrum, which is then followed by the transfer drum cleaning brush. • Print startup page	If a development motor, transfer drum brush motor, or transfer drum brush cam mechanism malfunction occurs during this phase it is not reported to the control panel.
WAIT (WAIT period)	From the end of INITIALIZATION period until the fixing roller temperature reaches the target value. This period finishes within 5 minutes, at a room temperature of 20°C.	To warm up the fixing roller and put the printer in a STANDBY state.	During this period, the printer checks for jammed paper and whether the toner cartridge is installed. It stabilizes the image, along with other controls.
STBY (STANDBY)	From the end of the WAIT period until the /PRINT signal is input from the video controller. Or from the end of the LSTR period until the /PRNT signal is input from the video controller or until the power switch is turned OFF.	To maintain the fixing roller at the target temperature so the printer is always ready to print.	If the printer stays in the STANDBY state for 30 minutes or more, it drives the main motor for 0.5 seconds to rotate the fixing roller, so that the fixing roller will not become deformed.

Table 3-1 Printer sequence

	Period	Purpose	Remarks
INTR (INITIAL ROTATIONS period)	After the /PRNT signal has been input from the video controller until the transfer drum rotates to the TOP position of the first color.	To stabilize the sensitivity of the photosensitive drum in preparation for printing.	When the scanner motor reaches the target speed, the DC controller sends the print sequence command to its mechanical controller.
PRINT (Print)	From the end of the INTR period and the subsequent completion of transfer until the transfer drum rotates to its registration position.	To form an image on the photosensitive drum according to the /VDO signal input from the video controller and to transfer the image onto paper.	
LSTR (LAST ROTATIONS period)	From the end of the PRINT period until the main motor stops.	To deliver the last print, and to discharge the transfer drum.	Cleaning of the transfer drum following the prescribed number of prints.

Laser/scanner system

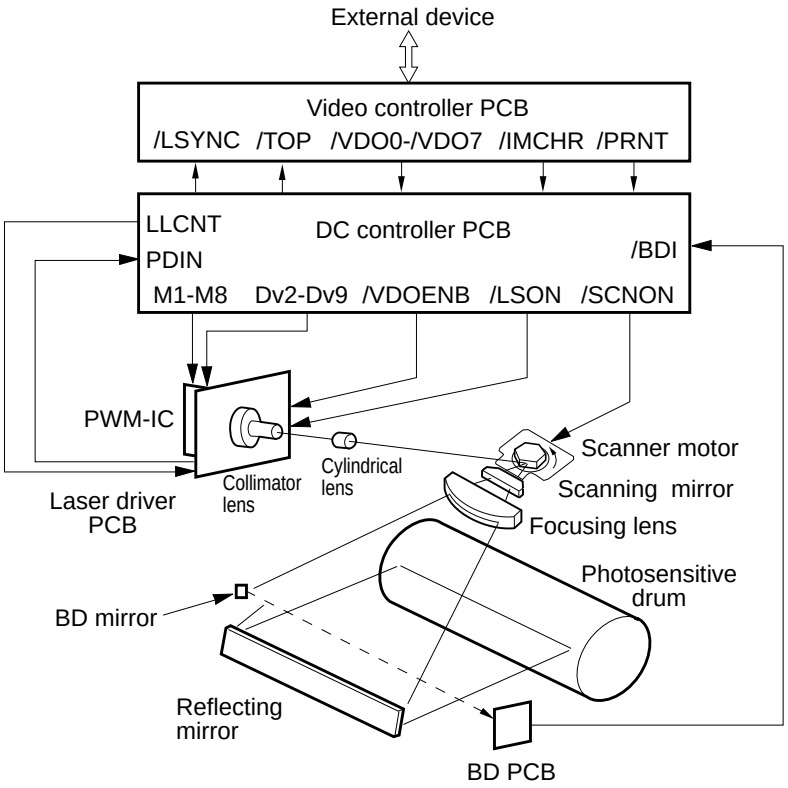


Figure 3-8 Laser/scanner system

When the /PRNT signal is sent from the video controller, the DC controller performs Automatic Photoemission Control (see “Initial APC” on page 3-20) to stabilize the intensity of the laser beam. Upon completion of APC, the DC controller generates 8-bit video data signals (Dv2-Dv9) in accordance with the video signals (/VDO0-/VDO7) sent by the video controller and then sends them to the PWM-IC in the laser/scanner unit. According to the laser drive signal (internal signal in the laser/scanner unit) output from the PWM-IC, the laser driver circuit turns the laser diode on and off to produce the modulated laser beam.

The modulated laser beam is converted to a parallel beam with the collimator lens and cylindrical lens. The beam then strikes the scanning mirror which is rotating at a constant speed.

The laser beam, reflected by the scanning mirror, focuses on the photosensitive drum after it passes through the focusing lens and reflects off the reflection mirror.

When the scanning mirror rotates at a constant speed, the laser beam scans at an even speed across the photosensitive drum. A latent image is formed on the photosensitive drum as it also is rotating at a steady speed.

Video data processing

The video data supplied by the video controller is comprised of 8-bit video signals (/VDO0-/VDO7) for each of the four colors: M (Magenta), C (Cyan), Y (Yellow), and Bk (Black), and the image mode select signal (/IMCHR) used to set either the text mode (binary mode) or the image mode (half-tone mode). See Figure 3-9 on page 3-18.

In the image data of the Colorwriter there is both full-color mode and mono-color mode. In the full-color mode, the video controller sends the video signals in the order of M, C, Y, and Bk to the DC controller. In the mono-color mode, it only sends the video signals for a single color.

The video signals (/VDO0-/VDO7) and the /IMCHR signal sent to the DC controller by the video controller are sent to the gate array (IC109) via IC111 (line memory). IC109 processes /VDO0-/VDO7 to perform the image masking (see Figure 3-11 on page 3-22), half-tone correction (see Figure 3-9 on page 3-18). Subsequently, they are converted to 8-bit video data signals (Dv2-Dv9) and mode setting signals (M1-M8) in IC109 and then sent to the PWM PCB in the laser/scanner unit. The Dv2-Dv9 signals are video data signals containing halftone information. The M1-M8 signals control the image mode selection.

The PWM circuit modulates the Dv2-Dv9 signals into PWM signals and sends them as laser drive signals to the laser driver PCB.

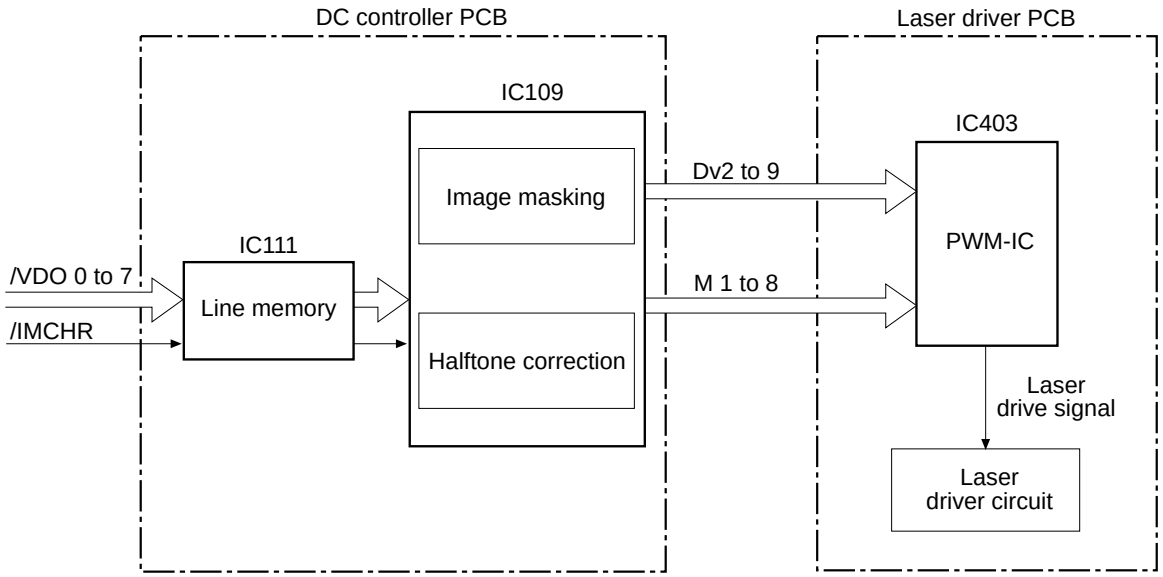


Figure 3-9 Video data processing signals

Image mode selection
In order to ensure that text and half-tone images are properly printed, the Colorwriter switches its image mode between text mode and halftone image mode via the /IMCHR signal sent by the video controller.

Half-tone correction
This printer incorporates the half-tone correction table in the DC controller so that the ideal half-tone image can be obtained. This allows the video signals (/VDO0-/VDO7) sent by the video controller to be corrected and converted to the video data signals (Dv2-Dv9). Subsequently, they are output to the laser driver.

Note: The Colorwriter includes a function whereby a distinctive pattern stored in the DC controller is invisibly marked on every printout. If this printer should be used for printouts such as paper money, it can be identified immediately.

Laser control circuit

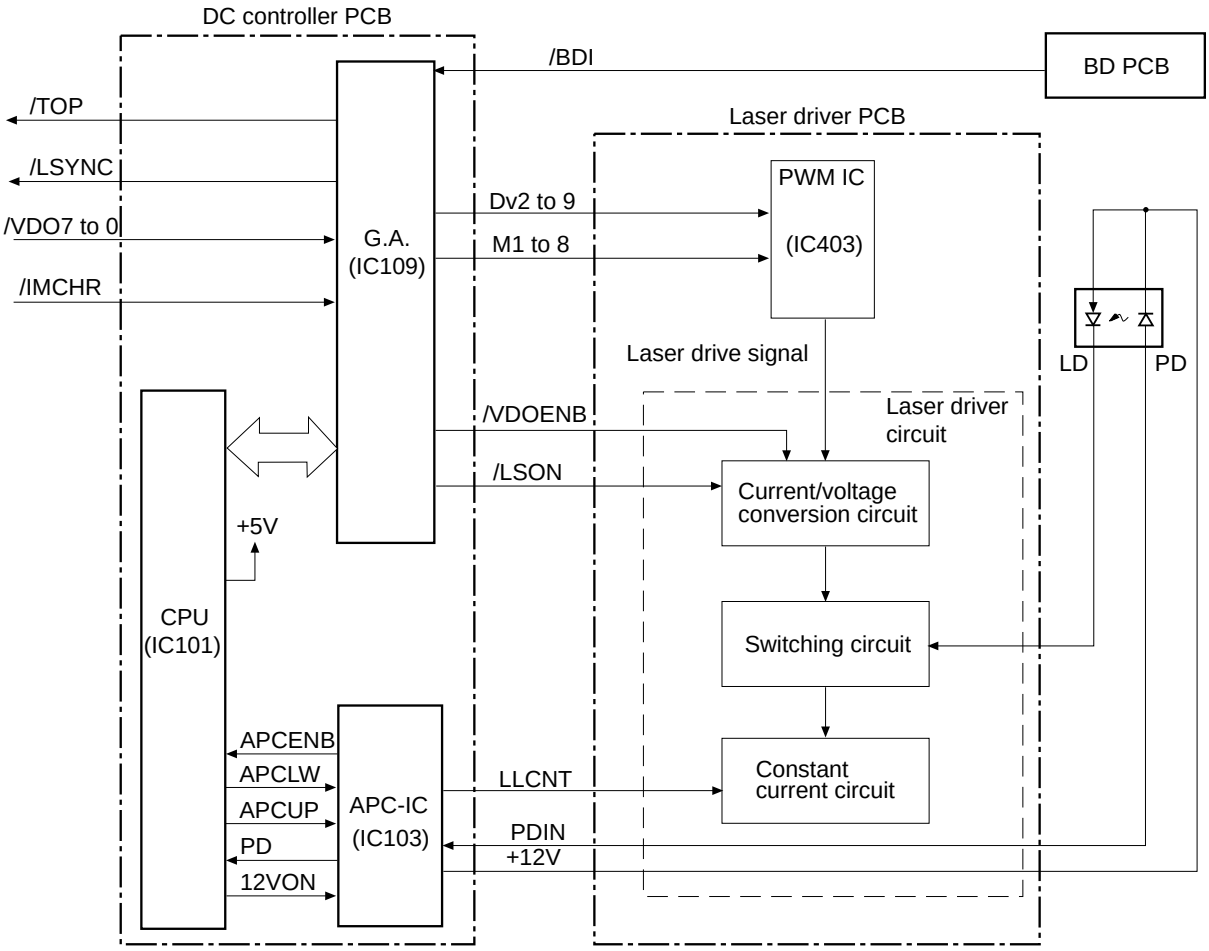


Figure 3-10 Laser control circuit diagram

Laser emission

The DC controller generates 8-bit video data signals (Dv2-Dv9) and mode setting signals (M1-M8) in the gate array (IC109) in accordance with the video signals (/VDO0-/VDO7) and image mode select signal (/IMCHR) sent by the video controller. It sends those signals to the PWM-IC in the laser driver PCB. Based on the above signals, the PWM-IC produces laser drive signals with a pulse width corresponding to the half-tone, and then sends them to the laser driver circuit. At this time, when the forcible laser on signal (/LSON) sent to the laser driver circuit is “H” and the video enable

signal (/VDOENB) is “L,” the laser driver PCB turns the laser diode ON in accordance with the laser drive signal.

Note: The APC-IC monitors the voltage levels of the 5V and 24V power supplies. If both voltage levels exceed the specified value, the laser driver PCB-use 12V power supply produced from the 24V power supply will not be supplied.

Laser intensity control

The CPU in the DC controller controls the intensity of the laser beam by using the APCUP signal for rough control and the APCLW signal for fine control. The APC-IC (IC103) adds the APCUP and APCLW signals to produce the laser beam intensity control signal (LLCNT), which is then output to the laser driver circuit in the laser/scanner unit.

The CPU performs automatic power control (APC) of the laser diode and adjusts the LLCNT signal so that the laser diode will emit the laser beam at a constant intensity.

The APC is comprised of initial APC and between-pages APC.

Initial APC

This printer performs the initial APC in the following steps while it is executing the initial rotations.

- When the APC enable signal (/APCENB) is “L,” the CPU decreases the output values of the laser power control signals (APCLW and APCUP) to zero. After resetting the laser current, the CPU rotates the scanner motor.

Note: The /APCENB signal becomes “L” when the 5V and 24V power supplies are at the specified voltage.

- The CPU sets the forcible laser on signal (/LSON) to “L” and the video enable signal (/VDOENB) to “L” via the gate array. It changes the D/A output value of the APCUP signal and gradually increases the laser diode current. When the laser current increases, the laser diode starts emitting the laser beam.

  The intensity of the laser beam emitted by the laser diode is detected by the photodiode (PD) and its output voltage is fed back as the laser power detect signal (PDIN) to the APC-IC.

- The CPU monitors the PDIN signal, until its value reaches the specified value stored in the CPU.
- The between-pages APC described below is subsequently performed during the remaining period of the initial rotations to correct the offset from the target value.

- The CPU sets the /LSON signal to “H” to complete the initial APC and then proceeds to the between-pages APC.

Between-pages APC

Immediately after the initial APC, this printer performs the between-pages APC for pages and colors.

The CPU sets the /VDOENB signal to “H” during the unblanking period. This causes the laser diode to emit the laser beam at the intensity set during the initial APC. To ensure that the PDIN signal is at the specified value, the APCLW signal (8-bit) is changed to correct the LLCNT signal so as to compensate for the offset from the target value.

Note: In order to detect the /BDI signal, the laser diode is turned ON even during the period that it does not scan the laser beam across the drum. It is called “unblanking period.”

Horizontal sync control

There is a small fixed mirror (BD mirror) in the optical path of the laser beam. Upon reaching the scanning start position, the laser beam is reflected by the BD mirror to the BD PCB in the laser/scanner unit during the unblanking period.

On receiving the laser beam, the BD PCB generates the beam detect input signal (/BDI) and then sends it to the gate array in the DC controller PCB. The gate array produces the horizontal Sync signal (LSYNC) based on the /BDI signal and then sends it to the video controller.

Laser diode emission control

The laser driver circuit turns ON/OFF the laser diode in accordance with the laser drive signal received from the PWM-IC when the video enable signal (/VDOENB) is “L” and the forcible laser on signal (/LSON) supplied by the DC controller is “H.”

The gate array (IC109) applies left/right and top/bottom margin masking to the video signals (/VDO7-/VDO0) in accordance with the paper size data, and then sends them as Dv2-Dv9 signals to the PWM-IC in the laser/scanner unit.

The paper size data is supplied to the CPU by the cassette-size sensing switch for cassette paper feed or by the paper size specification command issued by the video controller for manual paper feed.

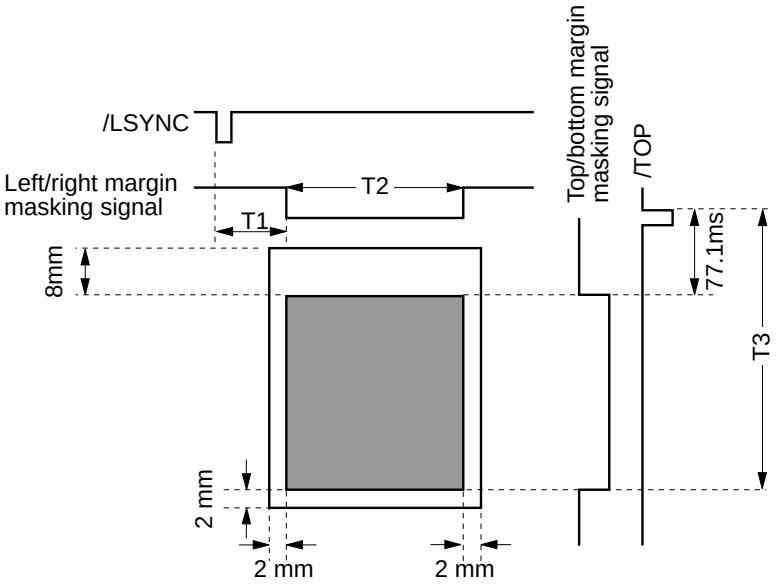


Figure 3-11 Image masking

- The shaded area is where the laser beam is permitted to write.
- Times T1 and T2 vary depending on the paper size.
- If no paper size is specified by the paper size specification command from the video controller for manual feed, the printer does not recognize the paper width. So the T1 and T2 values are assumed to be legal size, the maximum paper width for this printer.

  When the leading edge of the paper has passed through the paper top sensor (PS303), the CPU determines the paper size that has been fed from the paper length detected by (PS303). Subsequently, the image is masked based on the detected paper size.

Scanner system

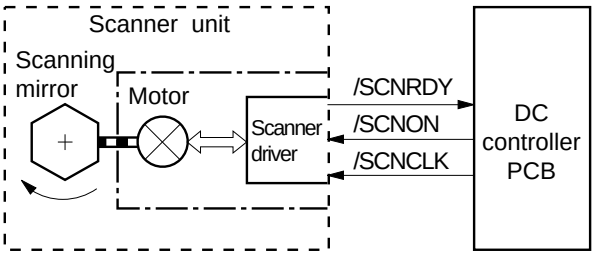


Figure 3-12 Scanner system

The scanning mirror is a crucial part of the scanner unit. It is mounted on the scanner motor shaft and rotates with the scanner motor.

The rotation of the scanner motor is controlled by the scanner driver, so that the laser beam reflected by the scanning mirror scans across the photosensitive drum at a constant speed.

When the scanner motor drive signal (/SCNON) and the scanner clock signal (SCNCLK) are sent to the scanner driver by the DC controller, the scanner driver rotates the scanner motor.

Scanner motor circuit

The scanner motor is a three-phase, 8-pole DC brushless motor with a hall element. It is incorporated in a single unit with the scanner driver which controls it to rotate at a constant speed.

When the printer is turned ON, the oscillation frequency of the crystal oscillator (X103) is divided by the gate array (IC109) and the resulting signal is sent as the SCNCLK signal to the scanner driver.

When the /PRNT signal that is sent to the CPU (IC101) on the DC controller becomes “L,” the CPU sets the /SCNON signal to “L” via the gate array and rotates the scanner motor.

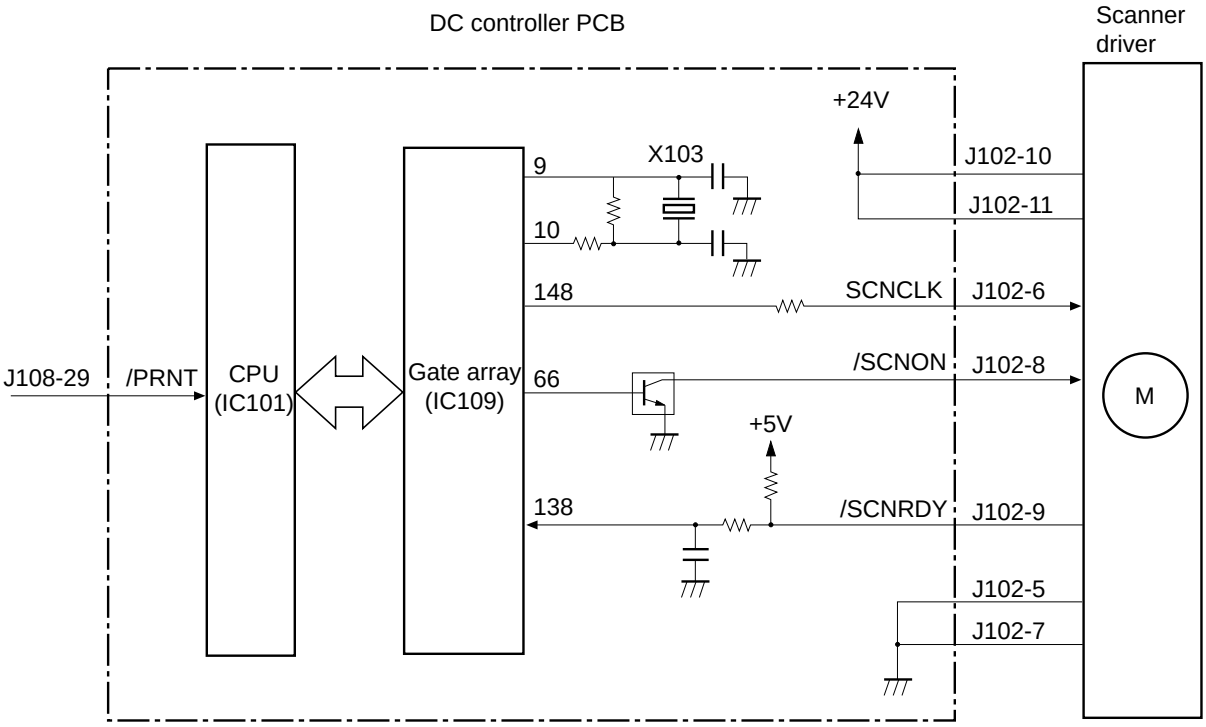


Figure 3-13 Scanner motor control circuit

When the scanner motor reaches the specified speed, the scanner motor ready signal (/SCNRDY) becomes “L.” The CPU on the DC controller issues the print sequence command to the CPU on the mechanical controller when the /SCNRDY signal becomes “L.”

The CPU on the DC controller monitors the /SCNRDY signal via the gate array to determine whether or not the scanner motor is rotating at the specified speed.

If the scanner motor fails to reach the specified speed within 30 seconds after it starts rotation, the CPU will stop it and notify the video controller of a scanner failure.

Image formation system

The nucleus of the printer, the image formation system is comprised of the photosensitive drum, transfer drum, developing unit, primary charging roller and other components.

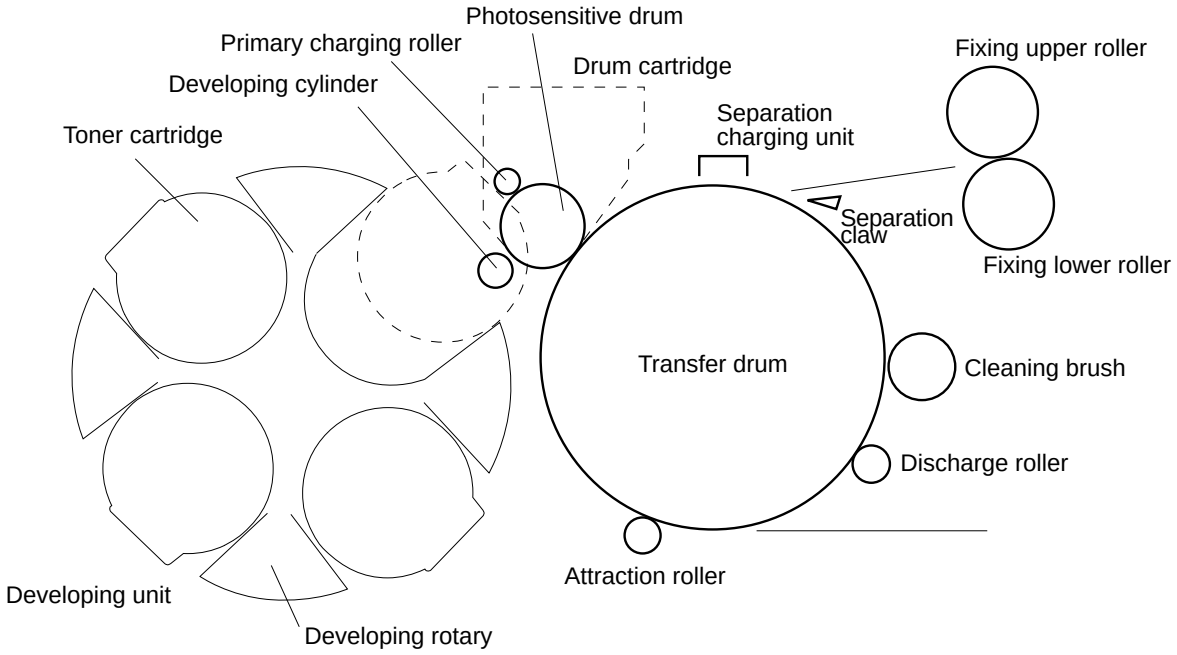


Figure 3-14 Image formation system components

Upon receiving the /PRNT signal from the video controller, the DC controller completes the designated processing and sends the print sequence command to the mechanical controller. The mechanical controller drives various motors and the press cams, thus driving the photosensitive drum, developing unit, primary charging roller, attraction roller, discharge roller, and transfer drum in sequence.

The primary charging roller negatively charges the entire surface of the photosensitive drum uniformly while the laser diode irradiates the laser beam modulated by the video data signals (8 bits) onto the surface of the photosensitive drum. The latent image formed across the photosensitive drum is made visible by the toner from the toner cartridge, and is transferred to the paper on the transfer drum.

These steps are taken for each color. The paper is rotated on the transfer drum and remains wrapped around it until the single- or

four-color transfer process has been completed. The paper is then separated from the transfer drum and delivered to the fixing unit.

The surface of the photosensitive drum is cleaned with a cleaner blade. It removes any remaining toner so the drum potential is kept uniform by the primary charging roller in preparation for forming a new latent image. The transfer drum surface is also cleaned with a cleaning brush that removes remaining toner. The discharge roller removes the surface charge.

The Colorwriter is also equipped with toner cartridge installation detection, toner-low detection, toner stirring, and photosensitive drum life detection functions.

Note: The transfer drum cleaning brush is activated after a prescribed number of prints.

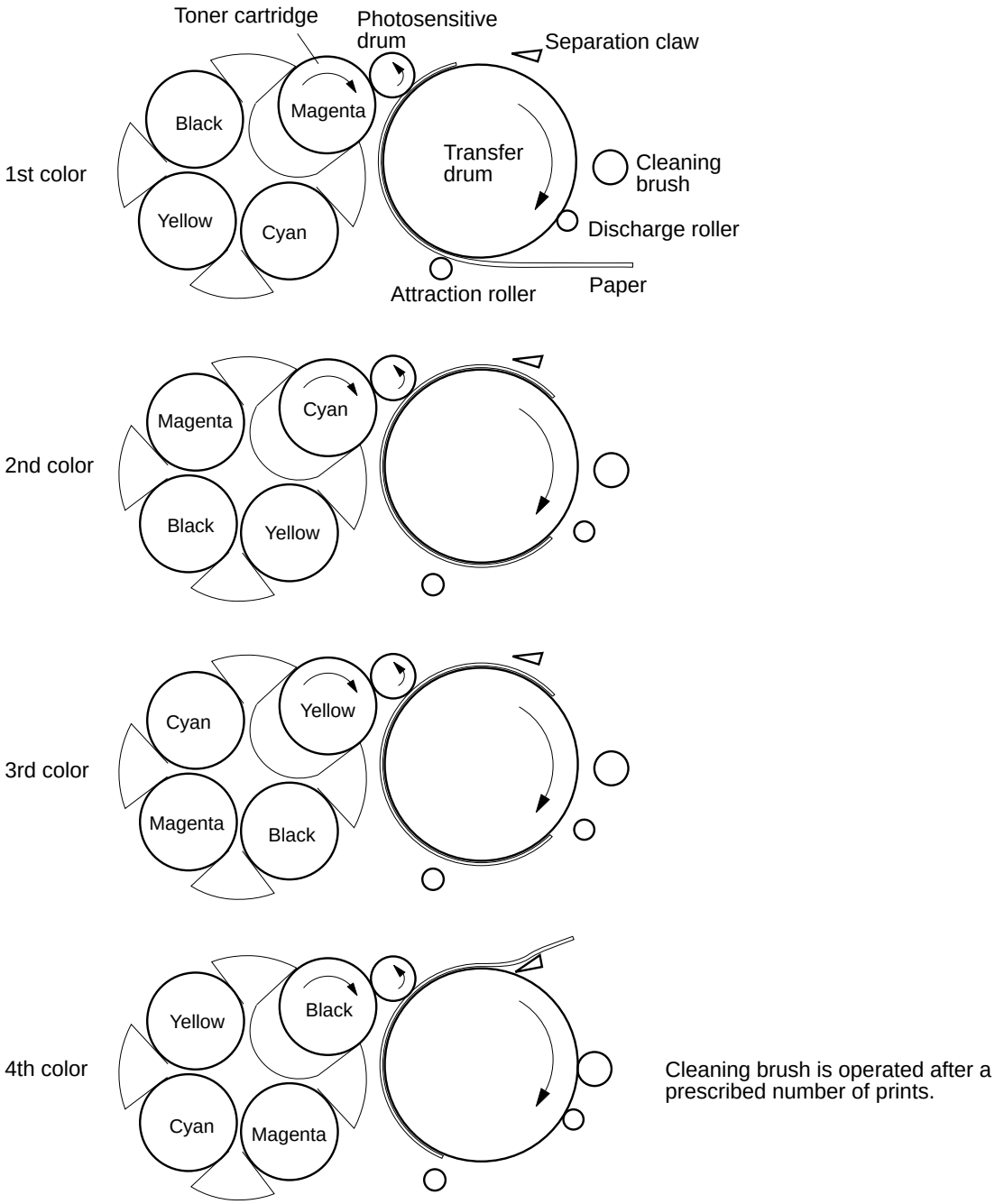


Figure 3-15 Four-color transfer process

Image formation configuration

This section shows the configuration of the major components of the image formation system.

Drum cartridge

The drum cartridge is comprised of the primary charging roller, photosensitive drum, and cleaner unit.

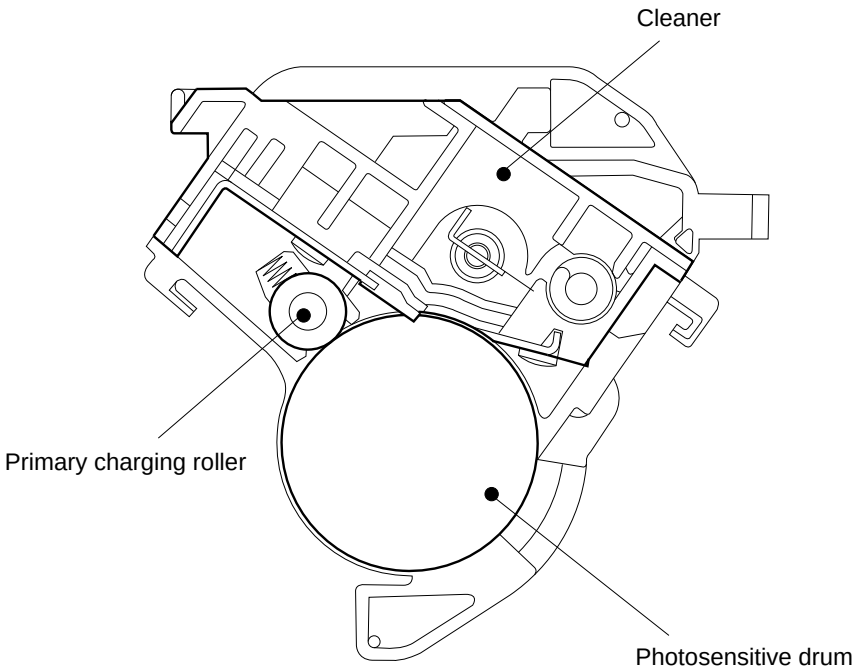


Figure 3-16 Drum cartridge (side view)

The external surface of the photosensitive drum is a photoconductive layer with an organic photoconductive (OPC). The inner side is an aluminum substrate.

The primary charging roller is made of a medium resistance rubber, and operates in coordination with the photosensitive drum.

Toner cartridge

As shown in Figure 3-17 on page 3-29, the toner cartridge includes a developing cylinder, a rubber blade, toner container, toner feed roller, and stirring plate.

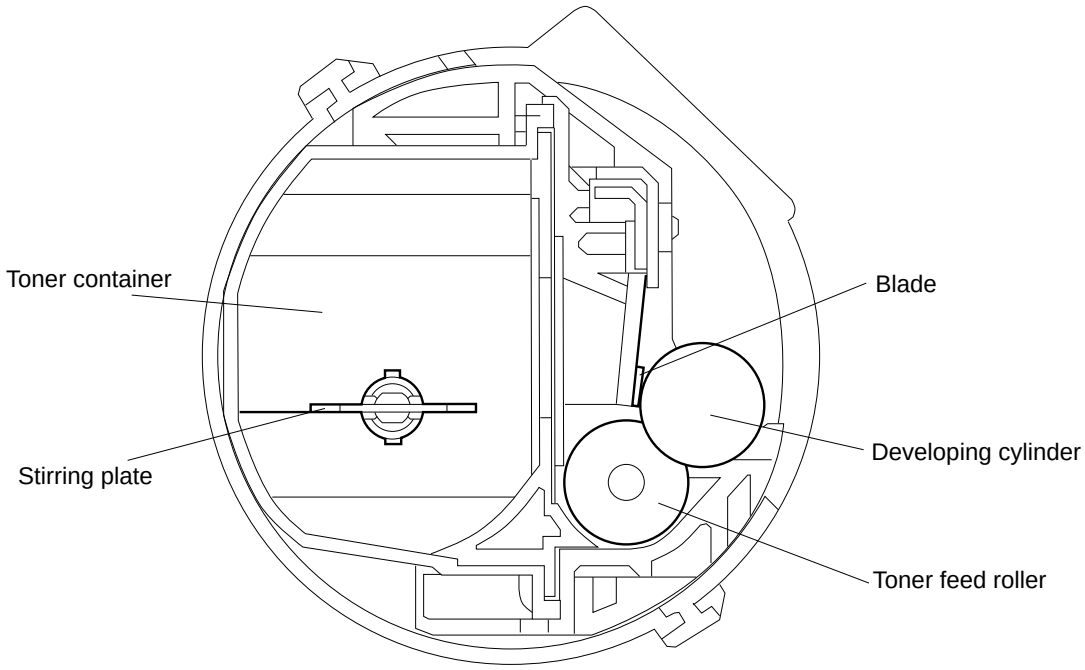


Figure 3-17 Toner cartridge (inside view)

Toner stirring function

The toner cartridge is equipped with a stirring mechanism in order to continuously supply toner to the cylinder from the toner container. The stirrer consists of a stirring plate and a toner feed roller. The toner feed roller applies the toner to the developing cylinder, as well as scraping the undeveloped toner off the cylinder.

The toner stirring command is sent from the DC controller to the mechanical controller after power ON or after replacing the toner cartridge. The 4 color toner cartridges then make contact with the photosensitive drum in sequence, the developing cylinder rotates and the toner is stirred.

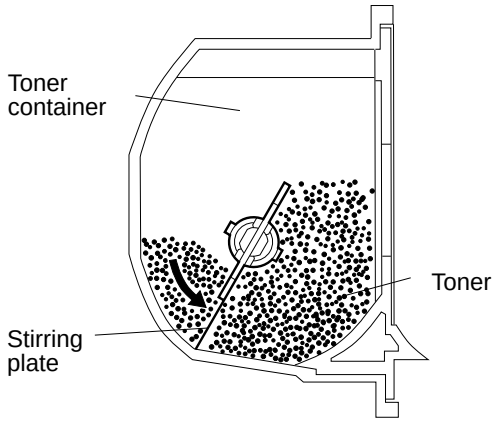


Figure 3-18 Toner stirring plate

Toner-low detection/toner cartridge installation detection

The toner cartridge has toner cartridge installation and toner-low detecting functions. Light emitted from the LED of the toner sensor (PS11) on one side of the printer is projected through the toner cartridge sensor window via the optical guide within the developing rotary. The stirring plate inside the toner container scrapes the toner near the window so as to let the light pass through the cartridge. The light then passes through the toner container and is detected by photodiode of PS11 on the developing rotary. The time required for the toner to build up enough to cover the window, so light cannot pass through the window, is measured.

If the amount of time for light to pass through exceeds a fixed period, the mechanical controller determines that the toner is low and notifies the DC controller of it. The DC controller notifies the video controller that toner is low.

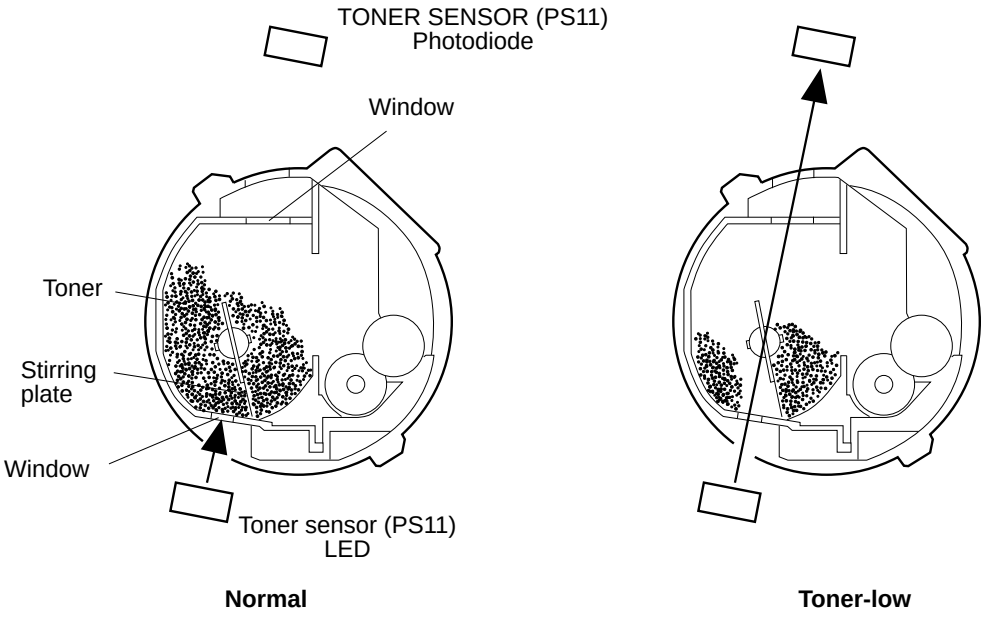


Figure 3-19 Toner sensors detecting low toner

PS11 also detects that the toner cartridge is installed. When the cartridge is in its detection position, light emitted from the LED of PS11 is intercepted by the cartridge, therefore not able to reach the photodiode of PS11. If the light is detected at the photodiode, the video controller is notified of a toner cartridge absence failure.

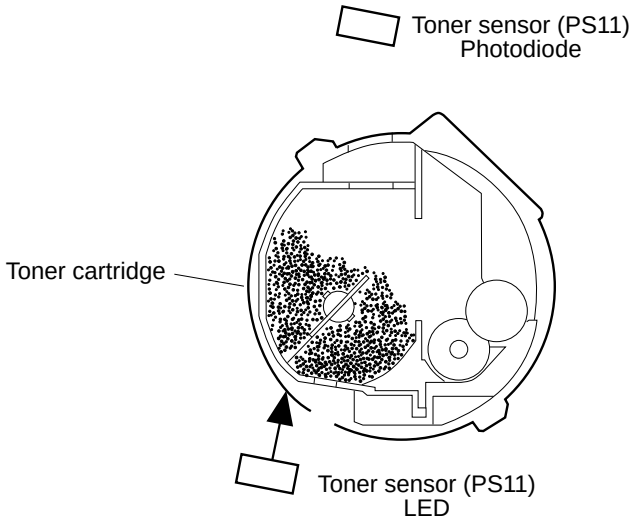


Figure 3-20 Toner cartridge installation detection

Print process

The print process is divided into the six blocks shown below.

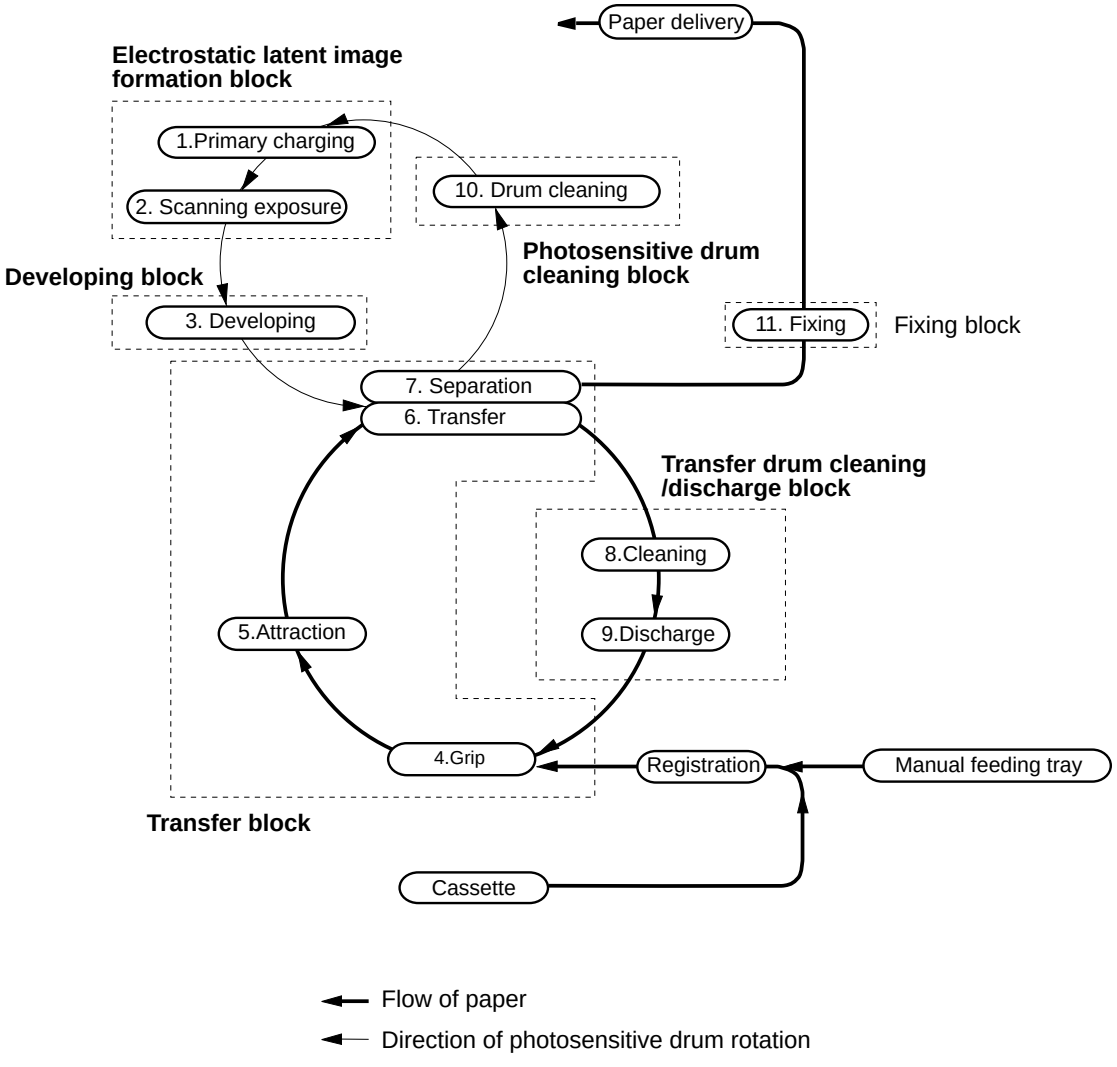


Figure 3-21 Overview of printing process

Electrostatic latent image formation block

This block is comprised of two step which form electrostatic latent images on the photosensitive drum: primary charging and laser beam exposure.

Upon completion of the last step in this block, a negative charge remains on the dark area of the drum surface where the laser beam has not irradiated. The irradiated light drum surface is neutralized of its negative charge.

The image formed on the drum surface caused by this negative charge is invisible, and is thus referred to as an electrostatic latent image.

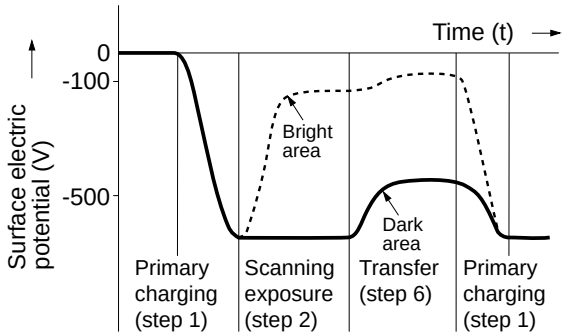


Figure 3-22 Electrostatic latent image formation

Step 1: Primary charging

As a preliminary step for forming the latent image, the surface of the photosensitive drum is uniformly charged with negative potential. The primary charging is done by directly imparting charges onto the photosensitive drum.

In order to keep the surface potential uniformly charged on the surface of the photosensitive drum, AC bias is superimposed on the primary charging roller in addition to the DC bias.

The AC bias (current value) varies according to the environment-change correction control (see “Environment-change correction control” on page 3-69) in order to prevent toner from fusing onto the charging roller.

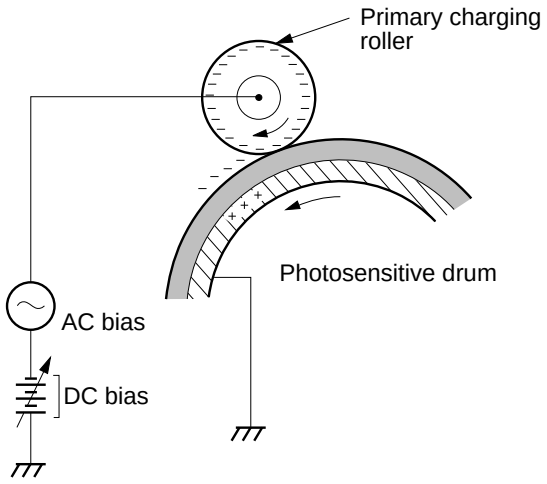


Figure 3-23 Primary charging

Step 2: Laser beam exposure

When the laser beam is scanned across the photosensitive drum surface, the charge in the light area is neutralized and becomes an electrostatic latent image.

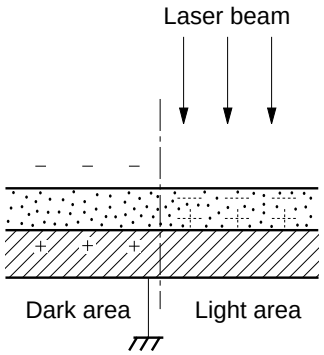


Figure 3-24 Laser beam exposure

Developing block

In this block, the toner is on the electrostatic latent image on the photosensitive drum, making the image visible. The Colorwriter performs toner projection development by means of a single component developing process.

Step 3: Developing

The toner (developer) used by the Colorwriter is a single-component non-magnetic toner composed of resin. This toner is unique for its insulating property, and is charged with negative potential by friction between the rotating cylinder and the blade surface.

The toner comes in four colors - magenta, cyan, yellow and black - each contained in its own toner cartridge. Each toner cartridge is housed within the developing rotary and is sequentially directed to the photosensitive drum in line with the rotation of the rotary (see “Developing unit control” on page 3-58).

Because the laser-beam-irradiated area on the photosensitive drum is higher in potential than the toner negatively charged on the cylinder, the toner jumps across and adheres to the drum surface due to the difference in potential.

This effect is called toner projection development and makes the electrostatic latent image on the photosensitive drum surface visible.

AC bias is applied to the developing cylinder for ease in projecting toner to the photosensitive drum surface and to improve the contrast of the output image. DC bias varies in response to image maximum density correction control (see “Maximum density control” on page 3-69) and the operation of the Density Control Panel.

Note: For reference purposes, Figure 3-25 on page 3-36 shows the light area of the photosensitive drum, which actually has negative potential, as having positive potential to indicate that it is higher in potential than that of the cylinder.

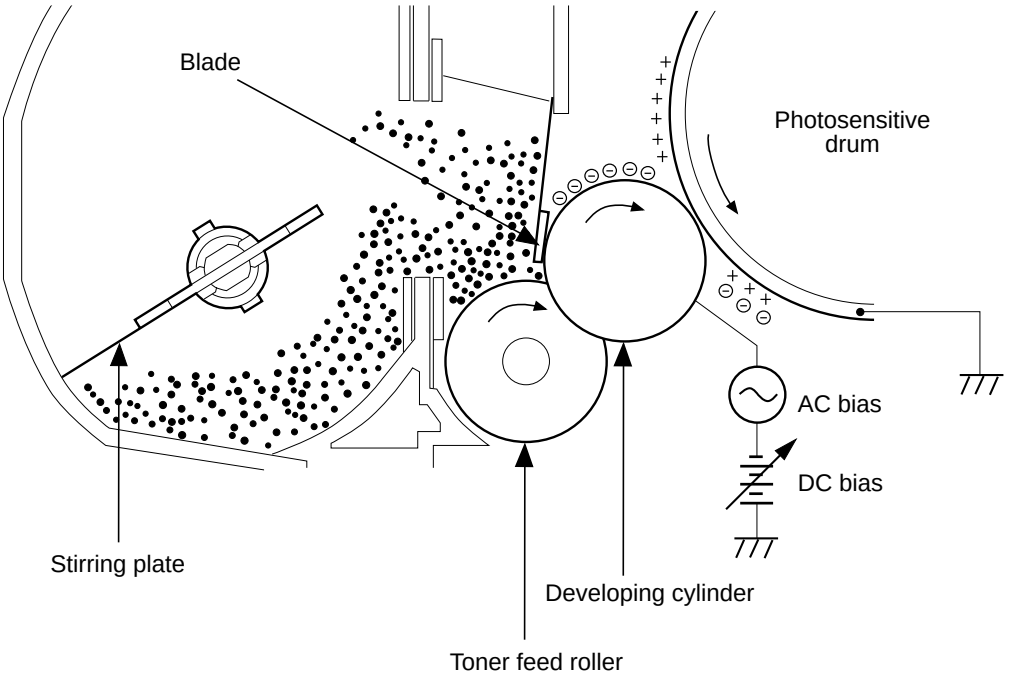


Figure 3-25 Light area of photosensitive drum

Transfer block

This block is designed to map the toner image on the photosensitive drum onto the paper.

Step 4: Paper held by gripper

When the paper reaches the transfer drum, its leading edge is held by the gripper so that the paper is retained on the transfer drum surface.

The leading edge of the paper is held by the gripper, therefore approximately 8mm from the leading edge remains blank.

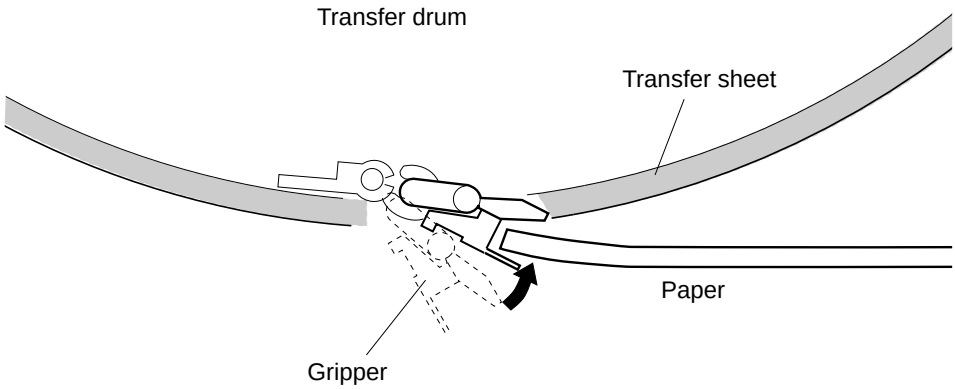


Figure 3-26 Paper held by gripper

Step 5: Attraction

The attraction roller imparts negative charges onto the paper and helps retain the paper on the transfer drum surface by means of an electrostatic force. The attraction roller is engaged only for the first color and withdraws from the transfer drum upon completion of the transfer operation of the first color. For mono-color and continuous print operation, the attraction roller is separated from the transfer drum upon completion of a single-page transfer, and returns to the drum before the transfer step for the next page starts.

DC bias is applied to the attraction roller. The value of the DC bias varies according to the environment change correction control (see “Environment-change correction control” on page 3-69).

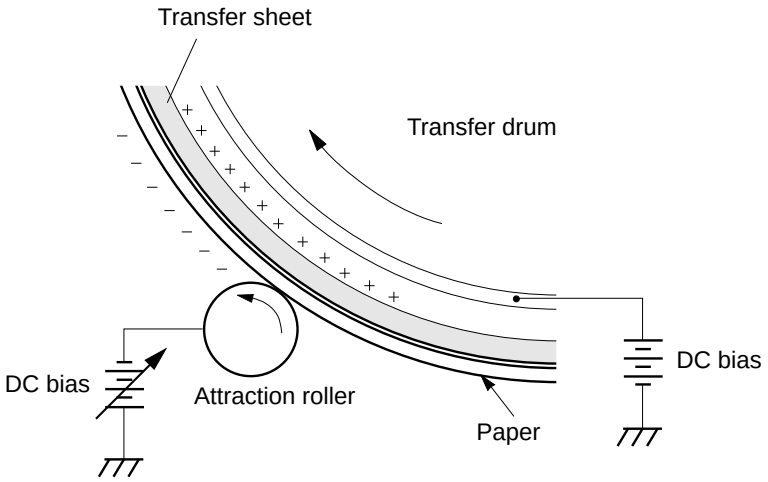


Figure 3-27 Attraction roller charge

Step 6: Transfer

The paper attracted to the transfer drum is transported in correspondence with its rotation. At this time, positive charges are applied to the reverse side of the transfer sheet to transfer the toner on the photosensitive drum over to the paper. This process is repeated for each color (M, C, Y, Bk) in sequence.

The transfer drum is comprised of an internal aluminum cylinder covered with a conductive elastic sponge layer and an external insulating transfer sheet.

DC bias is applied to the transfer drum. The value of the DC bias varies according to the environment change correction control (see “Environment-change correction control” on page 3-69).

In full-color mode, as the transfer steps proceed with the first color, second color, and so on, the transfer force weakens due to an increase in negatively-charged toner particles on the paper. To counteract this effect, transfer bias is gradually increased for the second and subsequent colors.

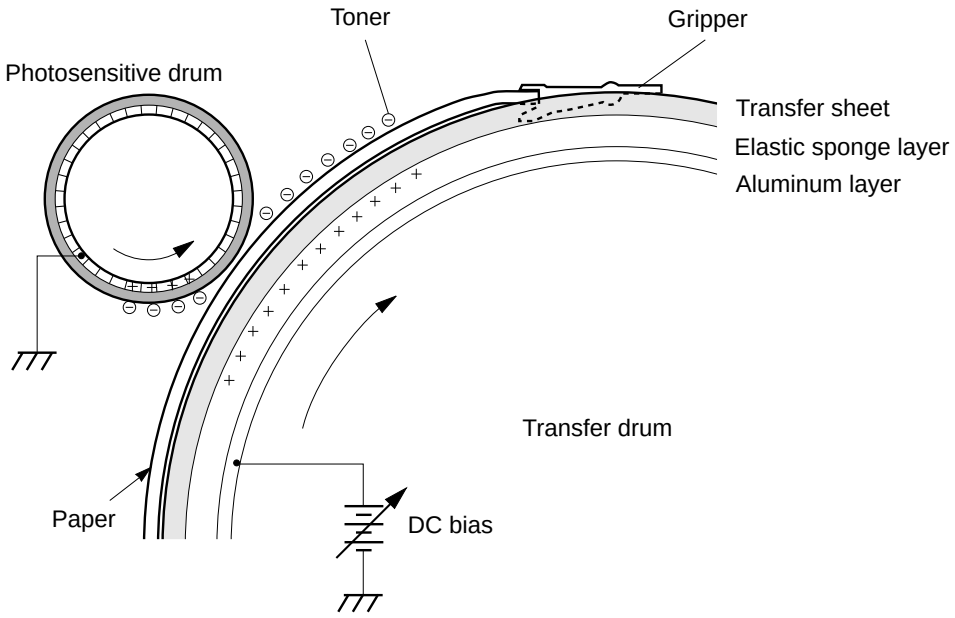


Figure 3-28 Transfer process

Step 7: Separation

Paper is separated from the transfer drum by the gripper and separation claw.

After passing through the separation charging unit, the leading edge of the paper is pushed up by the gripper and the paper is separated from the transfer drum surface by the separation claw.

In a low temperature/low humidity environment, the separation charging unit is activated following the transfer operation to produce AC corona charges for the prevention of image deformation.

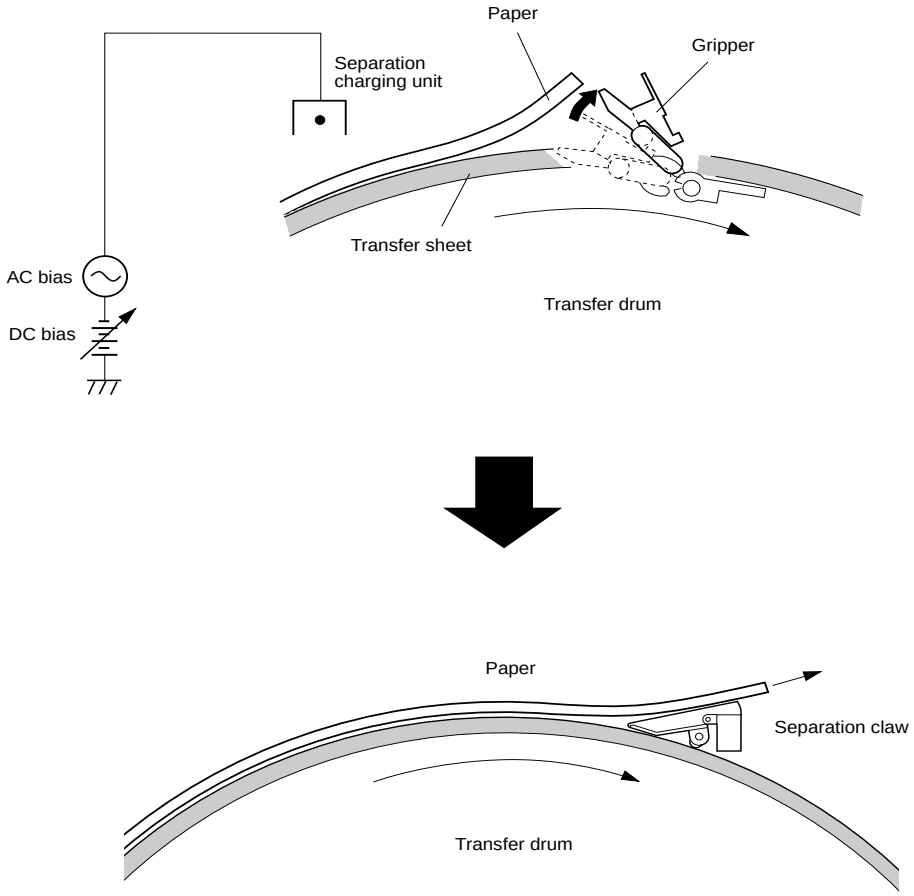


Figure 3-29 Paper separation process

Transfer drum cleaning/discharge block

In the event of a paper jam, or if the image on the photosensitive drum has not been completely transferred onto the paper, or if image quality stability control (see “Environment-change correction control” on page 3-69) is completed, the toner has adhered to the transfer drum. In this block, the transfer drum surface is cleaned to eliminate any chances of smearing on the reverse side of the paper or to prevent faulty attraction.

Also, even when the paper has separated, electric charges remain on the transfer drum surface. This will result in faulty attraction and poor transfer, therefore discharging is another function of this block.

Step 8: Transfer drum cleaning

The cleaning brush is used to scrape the remaining toner off the transfer drum surface and clean the drum following the prescribed number of prints. The scraped toner is collected in the filter of the transfer drum cleaner.

The cleaning brush is usually separated from the transfer drum. When the transfer process ends and the paper leaves the transfer drum, the cleaning brush makes contact with the drum. The cleaning brush is separated from the transfer drum again after the toner is removed from the drum.

When the image density detection is completed, the transfer drum is rotated twice to clean the density sensing pattern off. (See “Maximum density control” on page 3-69).

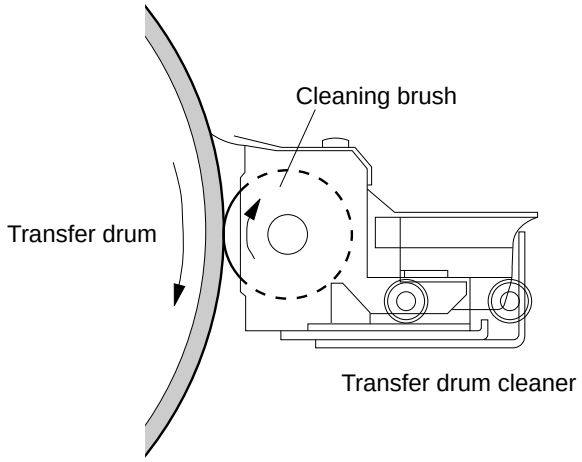


Figure 3-30 Transfer drum cleaning

Step 9: Discharge

AC bias is applied by the discharge roller to eliminate any charges remaining on the transfer drum surface after separation of the paper. The value of the AC bias varies according to the environment change correction control (see “Environment-change correction control” on page 3-69).

The discharge roller is usually separated from the transfer drum. The roller comes into contact with the transfer drum before and after the transfer step. The roller leaves the drum again after discharging the drum surface.

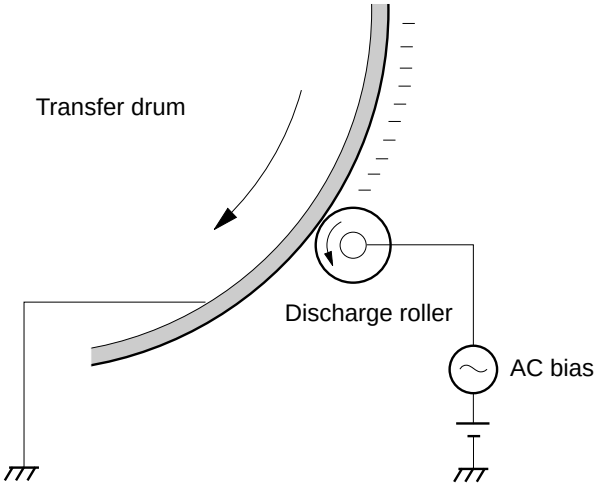


Figure 3-31 Discharge roller

Photosensitive drum cleaning block

During the transfer step, some of the toner that was not transferred onto the paper remains on the photosensitive drum. The photosensitive drum cleaning block cleans the photosensitive drum surface in preparation for the next print operation in order to obtain crisp images.

Step 10: Photosensitive drum cleaning

In preparation for the next printing operation, the toner remaining on the photosensitive drum surface is scraped by the cleaner blade to clean the drum. The scraped off toner particles are trapped with the sweeper strip and collected in the waste toner bottle. The toner transport plate and the waste toner transport screw move the toner to the waste toner bottle. The waste toner transport screw is driven by the fixing unit motor.

When the photosensitive drum door opens, the shutter lever is released, and the waste toner shutter of the drum cartridge closes, so that the waste toner can no longer be discharged.

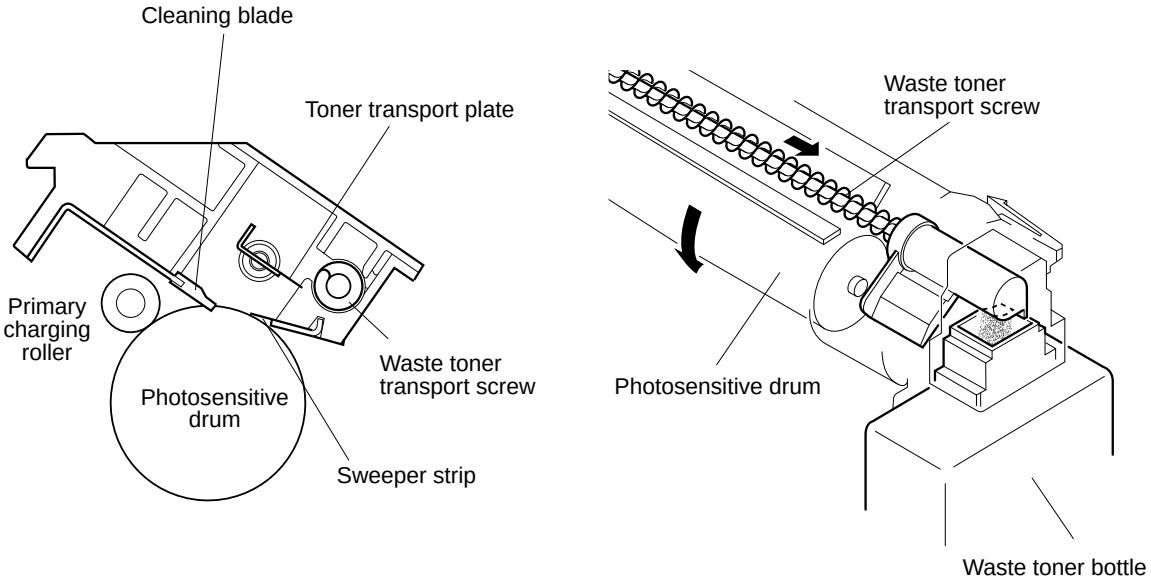


Figure 3-32 Photosensitive drum cleaning

The waste toner level is detected by the waste toner sensor (PS12) housed in the photosensitive drum door. When the waste toner bottle fills, the DC controller notifies the video controller of the waste toner full condition.

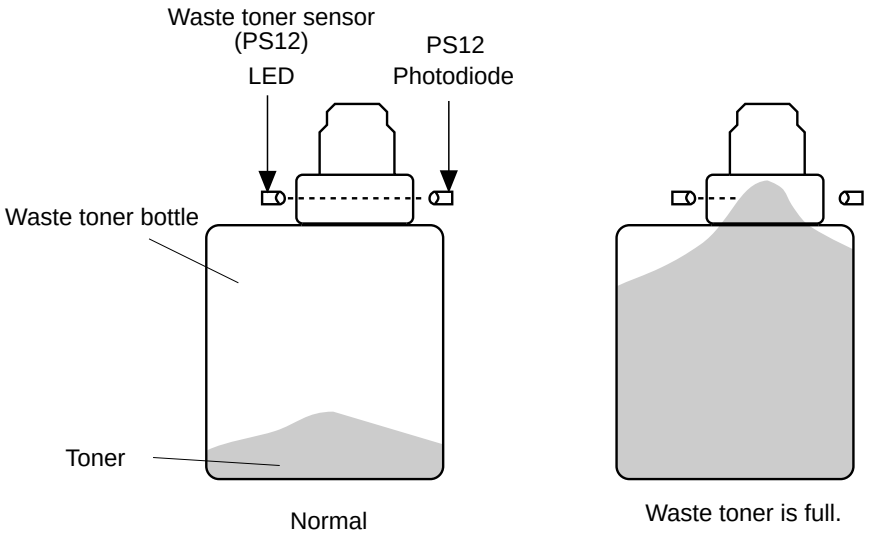


Figure 3-33 Waste toner collection

Fixing block

In the transfer block, the toner image transferred onto the paper barely adheres to it by means of static electricity, and is susceptible to distortion when touched by hand.

The paper and the four colored toners are therefore fused and mixed on the paper to create a permanent image.

Step 11: Fixing

The surface of the fixing roller is coated with a silicone layer, which has an excellent offset prevention performance. The cleaning belt is used to remove toner stains from the fixing upper roller surface.

The thermistor makes contact with the fixing lower roller to detect the fixing temperature. The lower roller has a cleaning blade which prevents oil and the offset toner from adhering to the thermistor.

The upper roller is charged with DC bias for preventing image deformation.

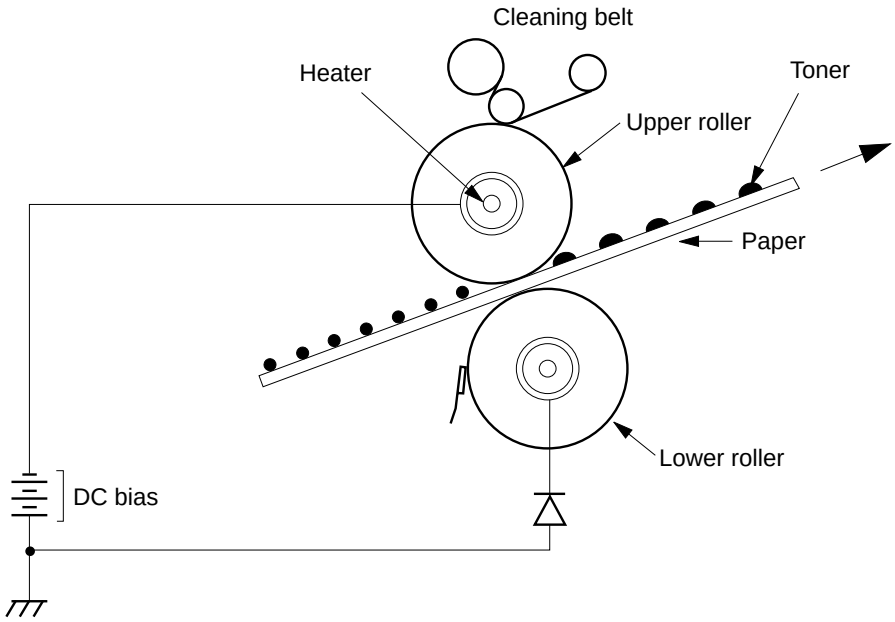


Figure 3-34 Fixing unit

This printer has a fixing unit installation detection function. When the presence of a fixing unit is not detected, the DC controller notifies the video controller.

High-voltage control

The high-voltage power supply of the printer is controlled by the high-voltage control IC (IC1003). IC1003 communicates with the mechanical controller and applies voltage to the primary charging roller, developing cylinder, transfer drum, attraction roller, discharge roller, separation charging unit, and fixing upper roller in response to the commands from the mechanical controller.

The primary charging roller, developing cylinder, and separation charging unit are charged with superimposed DC and AC voltages. The transfer drum is charged with a positive DC voltage. The attraction roller is charged with voltage with negative DC voltage being superimposed onto the transfer voltage. The discharge roller is charged with voltage with AC voltage being superimposed onto the transfer voltage. The separation charging unit is normally charged with only DC voltage and is charged with voltage with AC voltage superimposed on DC voltage only in a low temperature/low humidity environment. The fixing upper roller is charged with DC voltage.

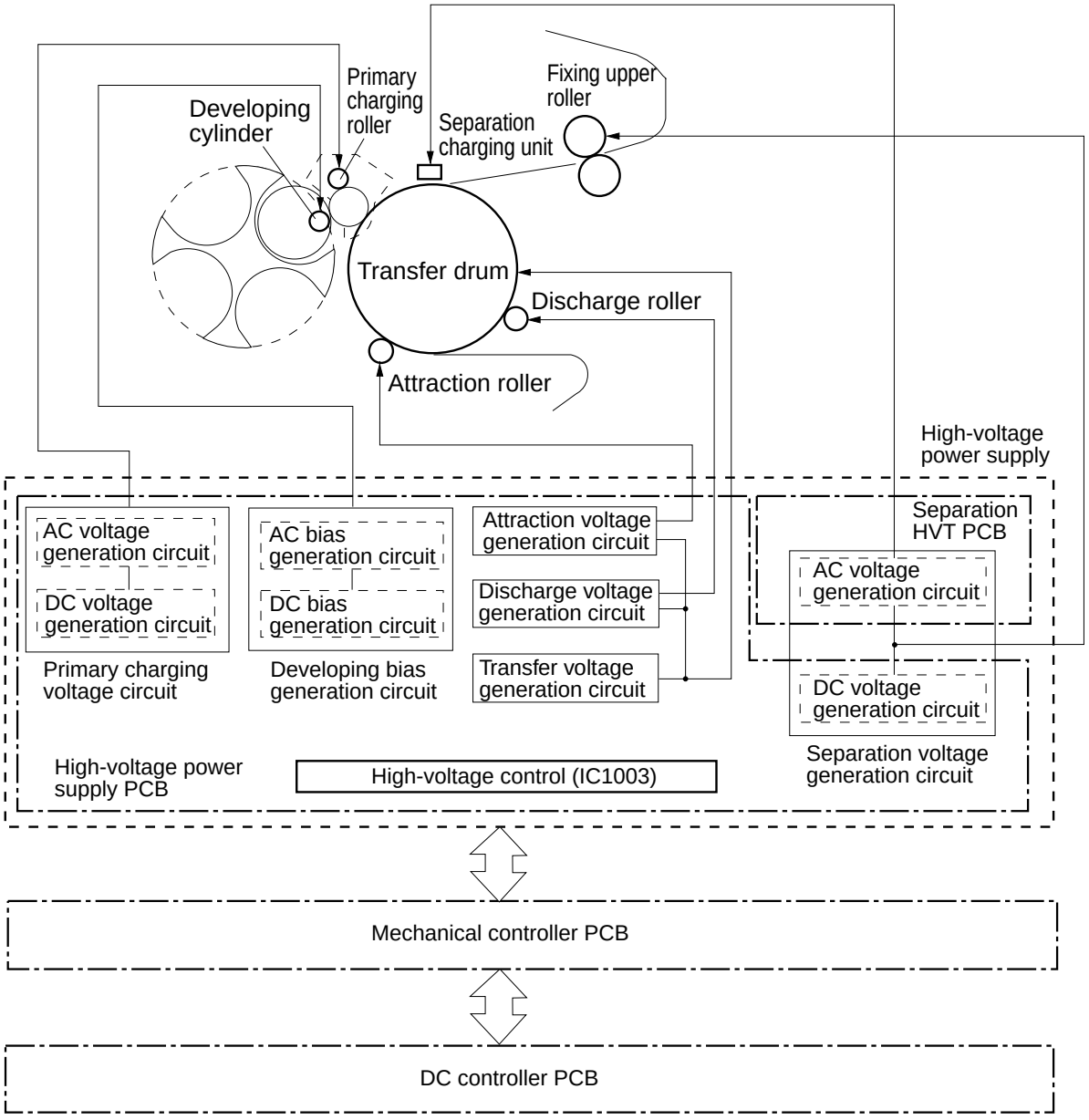


Figure 3-35 High voltage control

Operation

When the /PRNT signal sent from the video controller goes “L,” and the print sequence command is entered from the DC controller to the mechanical controller, the mechanical controller rotates the drum motor and controls the high-voltage control IC (IC1003) on the high-voltage power supply PCB as follows.

Generation of voltage applied to the primary charging roller

The high-voltage control IC (IC 1003) on the high-voltage power supply PCB outputs the primary charging dc voltage drive signal (/HV1DC1), primary charging ac voltage drive signal (/HV1AC1), primary charging dc voltage select signal (/HV1DC0), primary charging ac voltage select signal (/HV1AC0), and density adjustment signal (for primary charging voltage) (/HV1PWM) to control the high-voltage power supply.

The /HV1DC1 signal and /HV1AC1 signal turn the primary charging voltage (DC, AC) ON or OFF. The /HV1DC0 signal selects the printing bias or the between-colors bias/between-pages bias.

The /HV1AC0 signal alters the primary charging voltage AC current value according to the environment detected by the environment change correction control (see “Environment-change correction control” on page 3-69). The output value of the /HV1PWM signal remains constant.

		/HV1DC0	/HV1DC1	/HV1AC0	/HV1AC1
OFF		—	H	—	H
Between-colors bias/between-pages bias		L	L	—	H
Print bias	AC Current: Low	H	L	H	L
	AC Current: High	H	L	L	L

For the initial rotations, IC1003 sets the /HV1DC1 signal to “L” and the /HV1DC0 signal to “L” to apply between-colors bias/between-pages bias to the primary charging roller. Then, the /HV1DC1 signal goes “L” and the /HV1AC1 signal goes “H” so that the primary charging roller is charged with the print bias with the primary charging voltage AC bias and DC bias superimposed. For between-colors/between-pages, the /HV1AC1 signal is set to “H” and only the DC bias is applied while the AC bias is turned OFF.

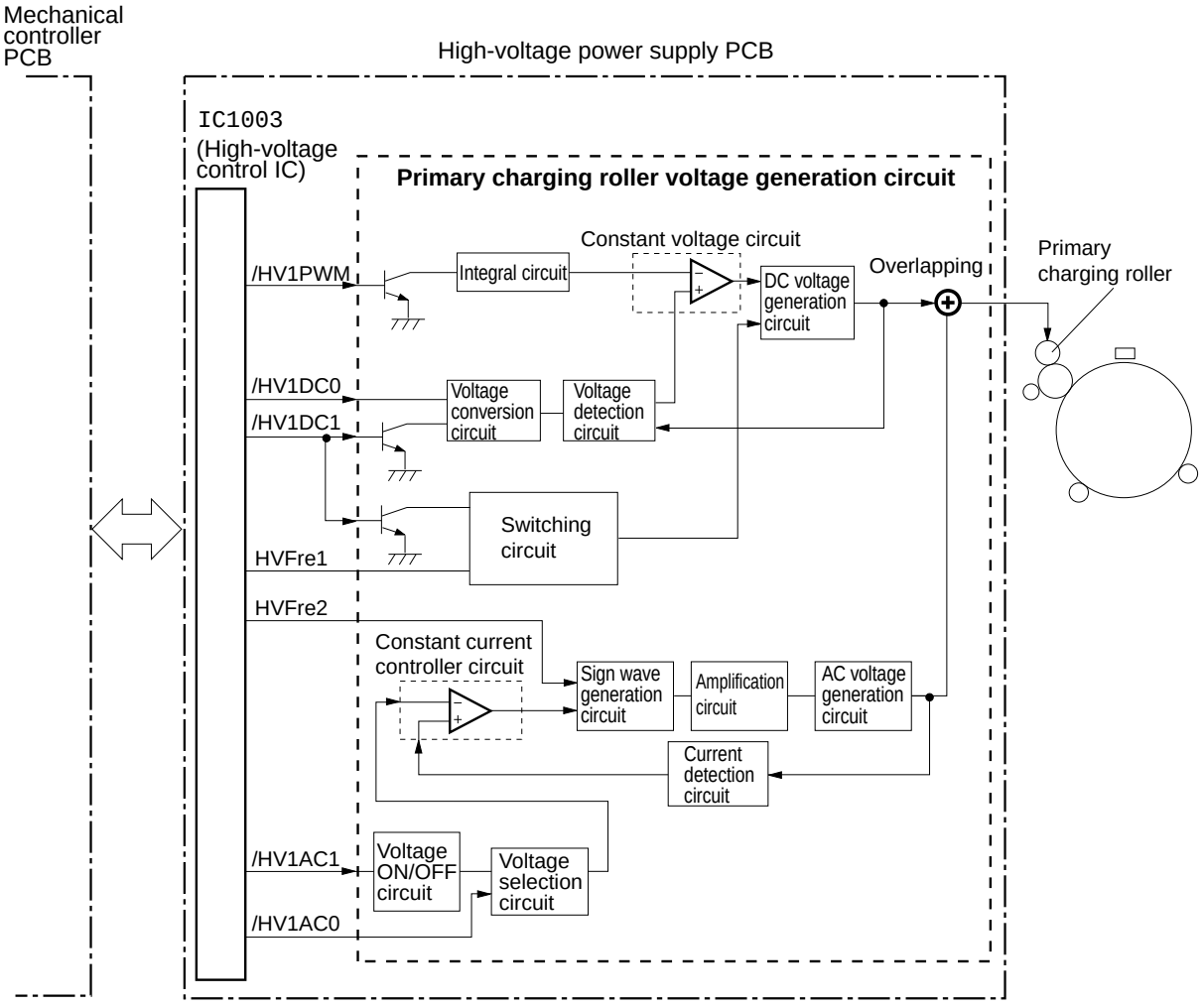


Figure 3-36 Voltage applied to primary charging roller

Generation of developing bias

When the print sequence starts, the primary charging voltage (AC/DC) is applied and the toner cartridge is pressed against the photosensitive drum and the developing cylinder is rotated. Then the high-voltage control IC (IC1003) on the high-voltage power supply PCB sets the developing bias dc drive signal (/DEVDC) to “L” and applies the developing DC bias to the developing cylinder. After the specified period of time has elapsed, the developing bias ac drive signal (/DEVAVE) goes “L” and the voltage superimposing

developing AC bias onto developing DC bias is applied to the developing cylinder.

The developing bias is applied only when the toner cartridge is pressed against the photosensitive drum. Before the toner cartridge leaves the drum, the /DEVDC signal and /DEVAVE signal are set to “H” to turn OFF the developing bias.

The density adjustment signal (for the developing bias) (/DEVPWM) adjusts image density according to density instructions from the mechanical controller, and IC1003 changes the amplitude value of the developing DC bias and the developing AC bias. The /DEVPWM signal varies according to image density correction control and the Density Control Panel.

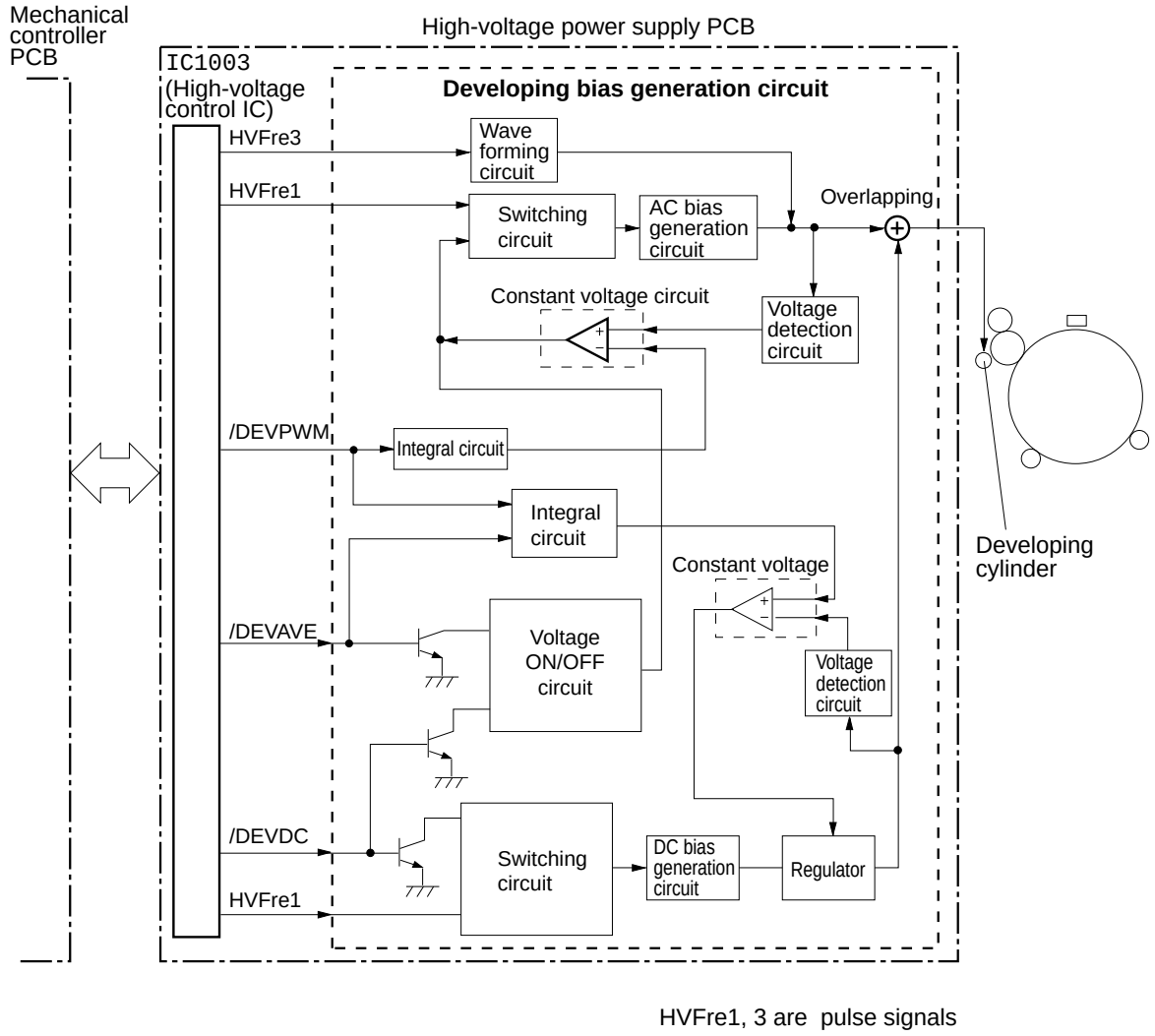


Figure 3-37 Generation of developing bias

Generation of voltage applied to transfer drum

The transfer drum is charged with print bias and between-colors bias according to each print sequence.

For print bias, positive voltage is applied to the transfer drum in order to transfer the toner on the photosensitive drum surface onto the paper. For full-color transfer, the transfer force weakens as the number of negatively charged toner particles on the paper increases as the transfer proceeds from the first color, second color and so on. To counteract this effect, the transfer bias is gradually increased for the second and subsequent colors. Also, the transfer bias control signal (/TRPWM) is changed according to the environment change

correction control (see “Environment-change correction control” on page 3-69) to apply an appropriate print bias.

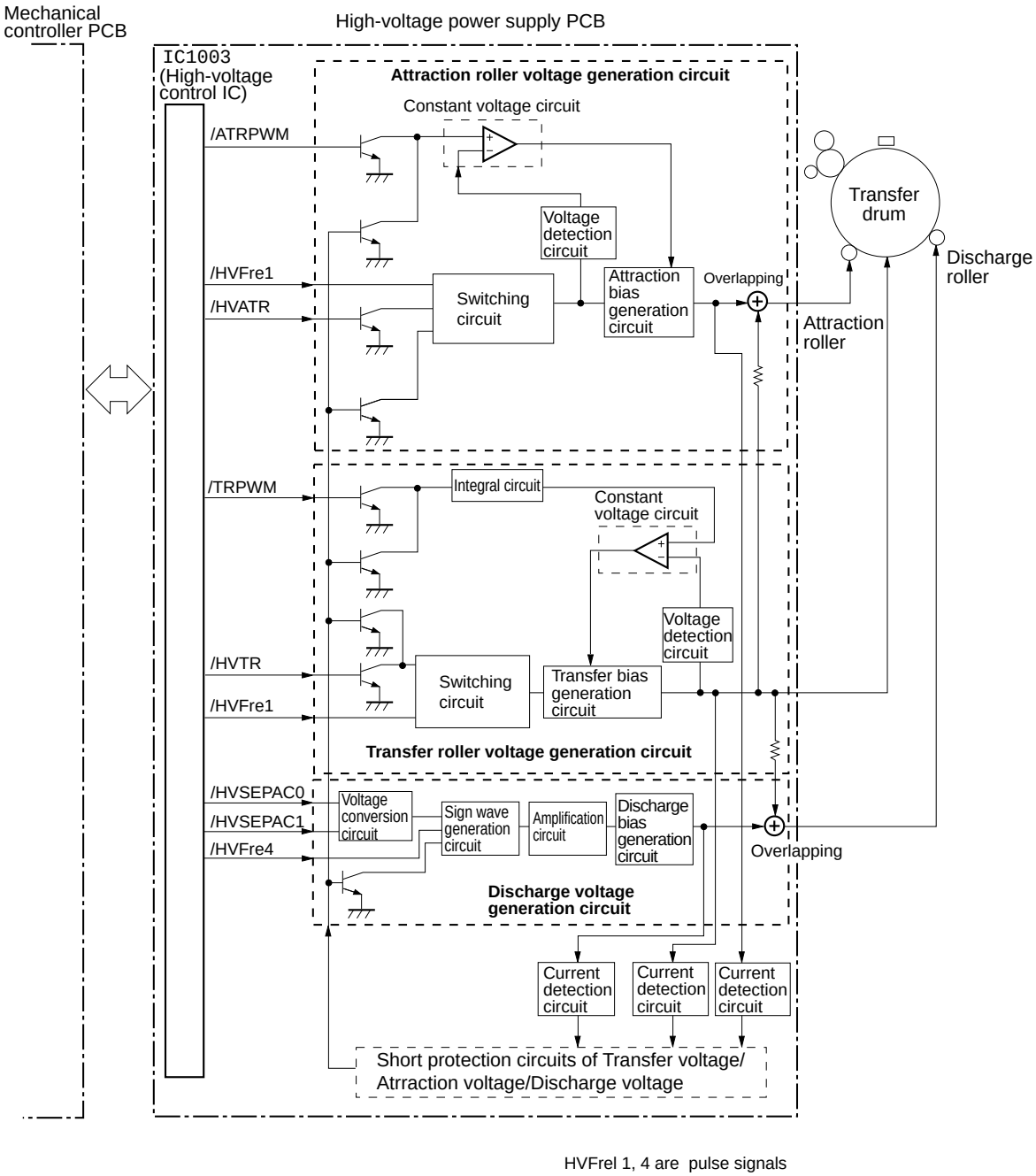


Figure 3-38 Voltage applied to transfer drum

The between-colors bias, with a voltage value smaller than that of the print bias, is applied between colors to minimize the damage of the photosensitive drum.

When the drum motor begins to rotate, the high-voltage control IC (IC1003) on the high-voltage power supply PCB is charged with transfer bias by setting the transfer voltage drive signal (/HVTR) to "L." At the same time, the print bias and between-colors bias for each color are applied by varying the /TRPWM signal.

Generation of voltage applied to the attraction roller

For full-color transfer, the high-voltage control IC (IC1003) on the high-voltage power supply PCB applies attraction voltage to the attraction roller by setting the attraction voltage drive signal (/HVATR) to "L" before transference of the first color image. Also, an appropriate attraction bias is applied by varying the attraction bias value control signal (/ATRPWM) according to the environment detected by the environment change correction control (see "Environment-change correction control" on page 3-69). After the attraction roller contacts the transfer drum for a specified period of time, /HVATR signal is set to "H," and the attraction bias to OFF.

Generation of voltage applied to the discharge roller

When the paper is separated, the high-voltage control IC (IC1003) on the high-voltage power supply PCB applies the discharge bias, which is output in response to the combination of the discharge bias (AC) SELECT signals (/HVSEAC0, /HVSEAC1), to the discharge roller in order to discharge the transfer drum surface.

The discharge bias changes the combination of the /HVSEAC0 and /HVSEAC1 signals according to the environment change correction control (see "Environment-change correction control" on page 3-69) to switch the discharge bias value.

	/HVSEAC0	/HVSEAC1
OFF	H	H
Discharge bias: low	L	H
Discharge bias: middle	H	L
Discharge bias: high	L	L

Generation of voltages applied to the separation charging unit

Separation AC voltage is applied to the separation charging unit for prevention of image distortion only when a low temperature/low humidity environment is sensed by the environment detection function. Separation DC voltage is usually applied to the fixing upper roller and the separation charging unit during PRINT period.

The high-voltage control IC (IC1003) on the high-voltage power supply PCB sets the separation dc voltage drive signal (/HVSEP) to "L" and generates the voltage in the separation DC voltage generation circuit in the high-voltage power supply PCB. The separation DC voltage is input once to the separation HVT PCB, and applied to the fixing upper roller and the separation charging unit. On the other hand, when the separation ac voltage drive signal (/HVSEPAC) input from the mechanical controller goes "L," the separation AC voltage generation circuit in the separation HVT PCB generates the separation AC voltage, and applies it to the separation charging unit upon superimposing it onto the separation DC voltage.

Even if a low temperature/humidity environment is sensed, the separation charging unit can be turned OFF from the density adjustment panel.

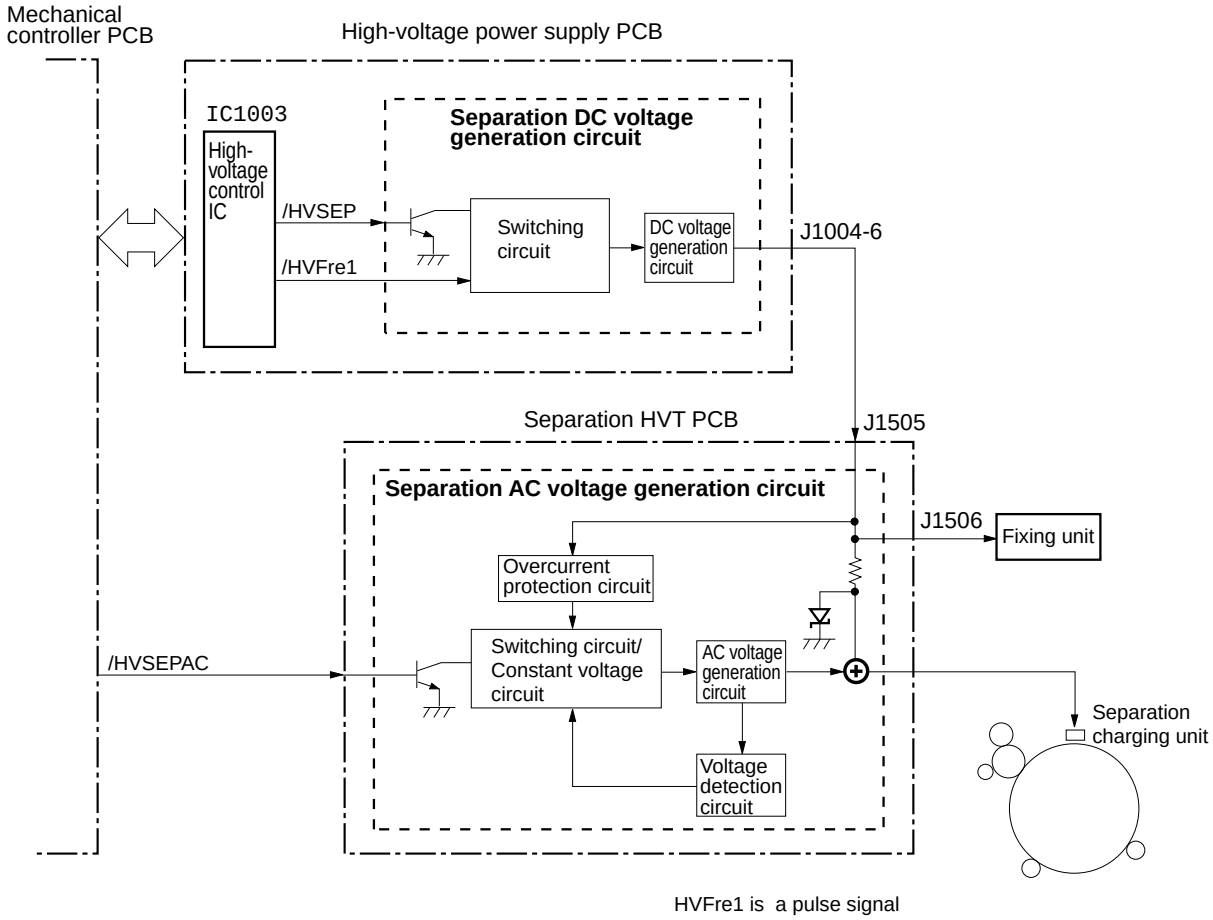


Figure 3-39 Voltages applied to separation charging unit

Photosensitive drum life detection

The printer has a function in which it is able to detect the prescribed replacement intervals of the drum cartridge. After the drum cartridge is replaced, the CPU in the DC controller counts the number of prints corresponding to the color mode (mono-color/full-color) and stores the count in the EEPROM. When the prescribed number of prints is reached, the DC controller assesses that the end of the drum life has been reached, and notifies the video controller of a warning to replace the photosensitive drum.

The printer also executes the photosensitive drum thickness detection upon power-ON and door-open in order to prevent the occurrence of faulty detection resulting from replacement of the drum cartridge. At the time of power-ON and door-open, the CPU compares the drum thickness data with the back-up thickness data

and determines whether the photosensitive drum has been replaced with a new one. If not, the printer proceeds with the WAIT sequence. When the photosensitive drum is replaced with a new one, the counter for the number of prints is reset.

The thickness of the photosensitive drum is checked every time a certain number of prints have been made. The back-up thickness data is then updated.

As well as the drum thickness, the printer also determines whether there is a drum cartridge installed in the printer. If no drum cartridge is installed, the DC controller notifies the video controller.

Note: If you replace a drum cartridge with an old one, the drum life cannot be detected correctly. Install new cartridges only.

Photosensitive drum thickness detection circuit

The thickness of the photosensitive drum is detected upon power-on, door-open, and each time a certain number of prints have been made. Drum thickness is detected by measuring the discharged current value after charging the photosensitive drum with the primary charging roller. For a correct measurement of the current value, the photosensitive drum and the transfer drum are separated from each other and the check detection is performed.

The photosensitive drum thickness detection circuit is in the high-voltage power supply PCB. After the power and the fixing unit motor are turned on, the drum press solenoid (SL7) is turned ON, the photosensitive drum and the transfer drum are separated. Then the drum motor is turned on, the primary charging dc voltage drive signal (/HV1DC1) and the primary charging ac voltage drive signal (/HV1AC1) are set to “L,” the primary charging ac voltage select signal (/HV1AC0) set to “L,” and the primary charging dc voltage select signal (/HV1DC0) is set to “H” to apply the primary charging voltage to the photosensitive drum.

After charging for a specified period of time, the /HV1DC1 signal is set to “H,” the application of the primary DC voltage is stopped, and the discharging current value is measured by the photosensitive drum thickness detection circuit in the high-voltage power supply PCB. The measured current value is sent from the high-voltage control IC to the mechanical controller as the DRUM THICKNESS SENSE signals (SENSE0 and SENSE1). The mechanical controller converts these signals into the corresponding time data and sends them to the DC controller. Based on these signals, the CPU on the DC controller determines whether the photosensitive drum has been replaced with a new one or whether a drum cartridge is installed in the printer.

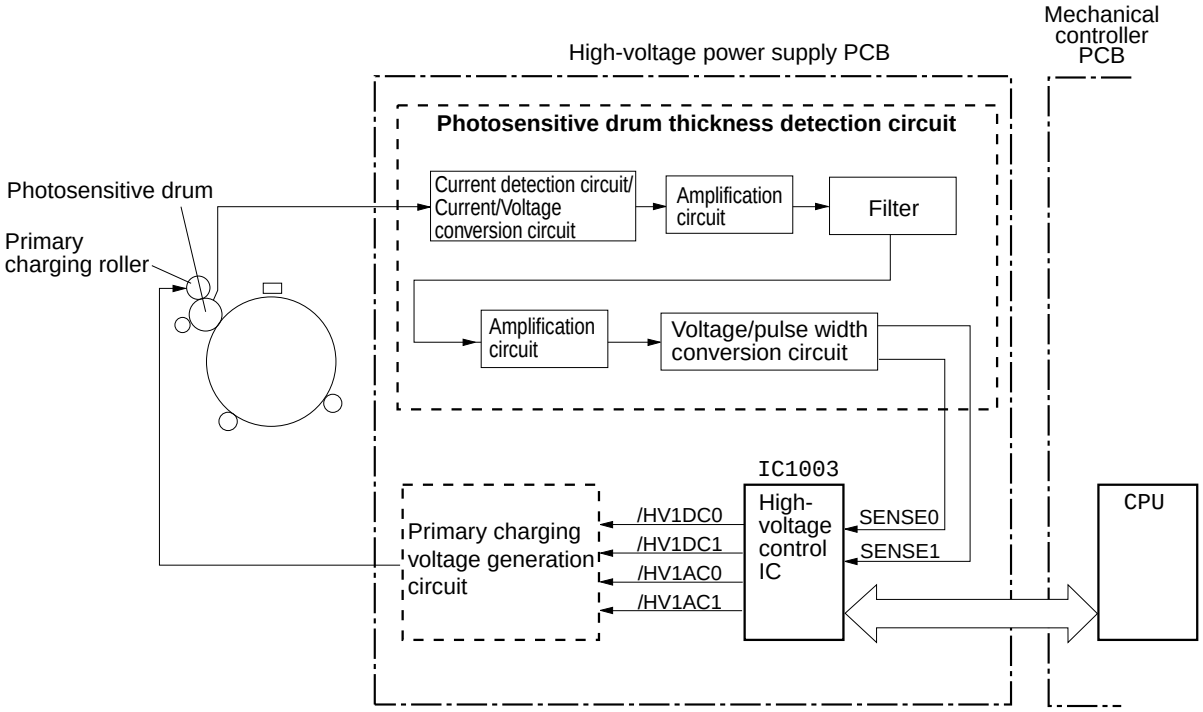


Figure 3-40 Photosensitive drum thickness detection circuit

Drum separation

The photosensitive drum and the transfer drum are separated when the photosensitive drum thickness detection is performed, the OHP mode is activated, or the drum cartridge is being replaced.

When the mechanical controller sets the drum press signal (/DDSLON) to “L,” the drum press solenoid (SL7) is turned ON and drum press cam 1 activates to move the transfer drum away from the photosensitive drum.

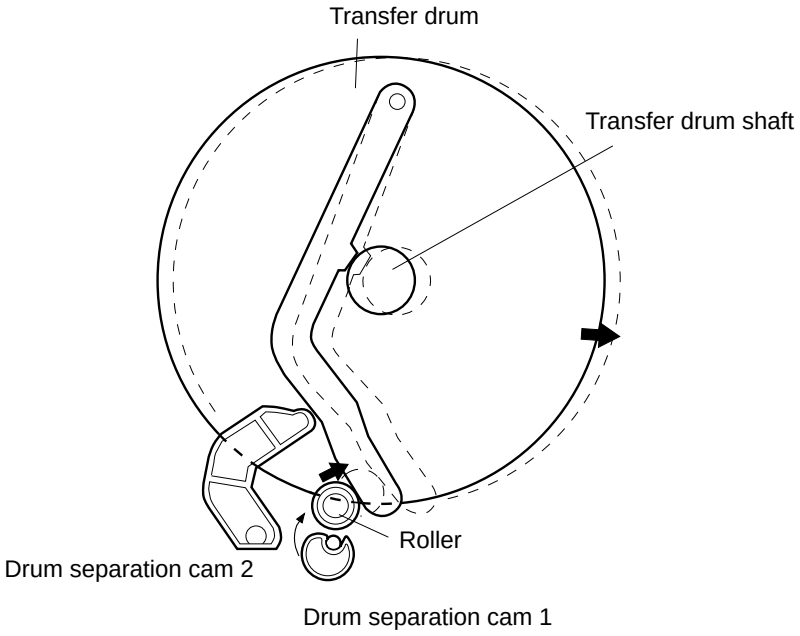


Figure 3-41 Drum separation

Also, operation of the transfer drum lever can activate cam 2 to move the transfer drum away from the photosensitive drum.

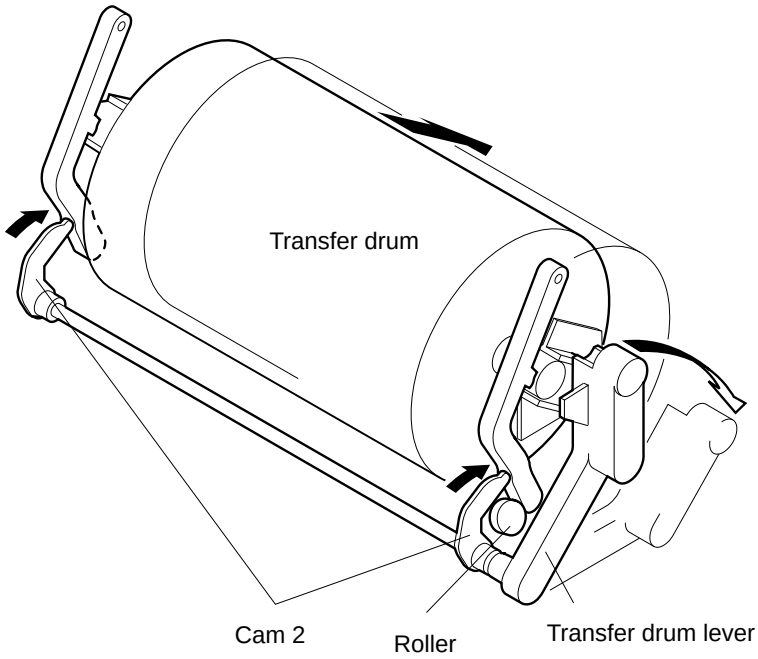


Figure 3-42 Transfer drum Cam 2

Developing unit control

The developing unit consists of four color toner cartridges (magenta, cyan, yellow and black) and the developing rotary which houses these cartridges.

The developing rotary contains magenta, cyan, yellow and black arranged clockwise in that order. The developing rotary turns counterclockwise to keep the four color toner cartridges in sequential order to the photosensitive drum. Each toner cartridge maintains its posture independent of the rotational position of the rotary to prevent toner from scattering.

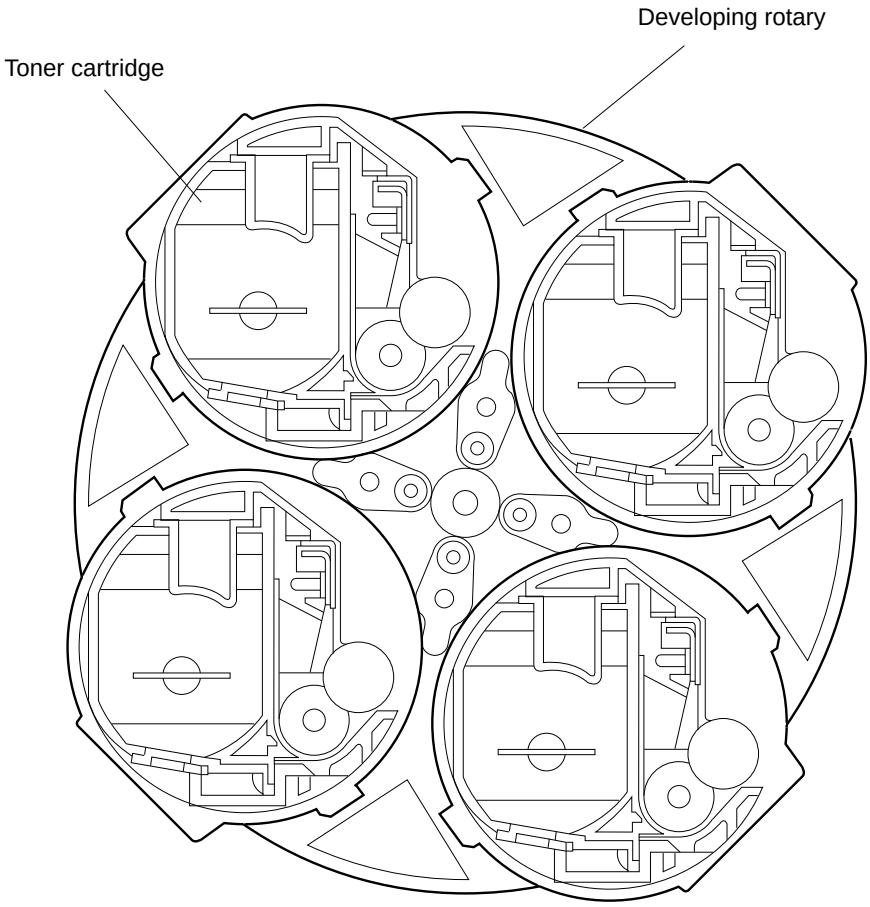


Figure 3-43 Developing unit

Do *not* touch the photosensitive drum as the rotary rotates. Only when the toner cartridge faces the drum surface, are they forced to make contact with the photosensitive drum by the press cam. The drive force of the developing unit motor is transmitted to the developing cylinder in the toner cartridge only when the cylinder makes contact with the photosensitive drum.

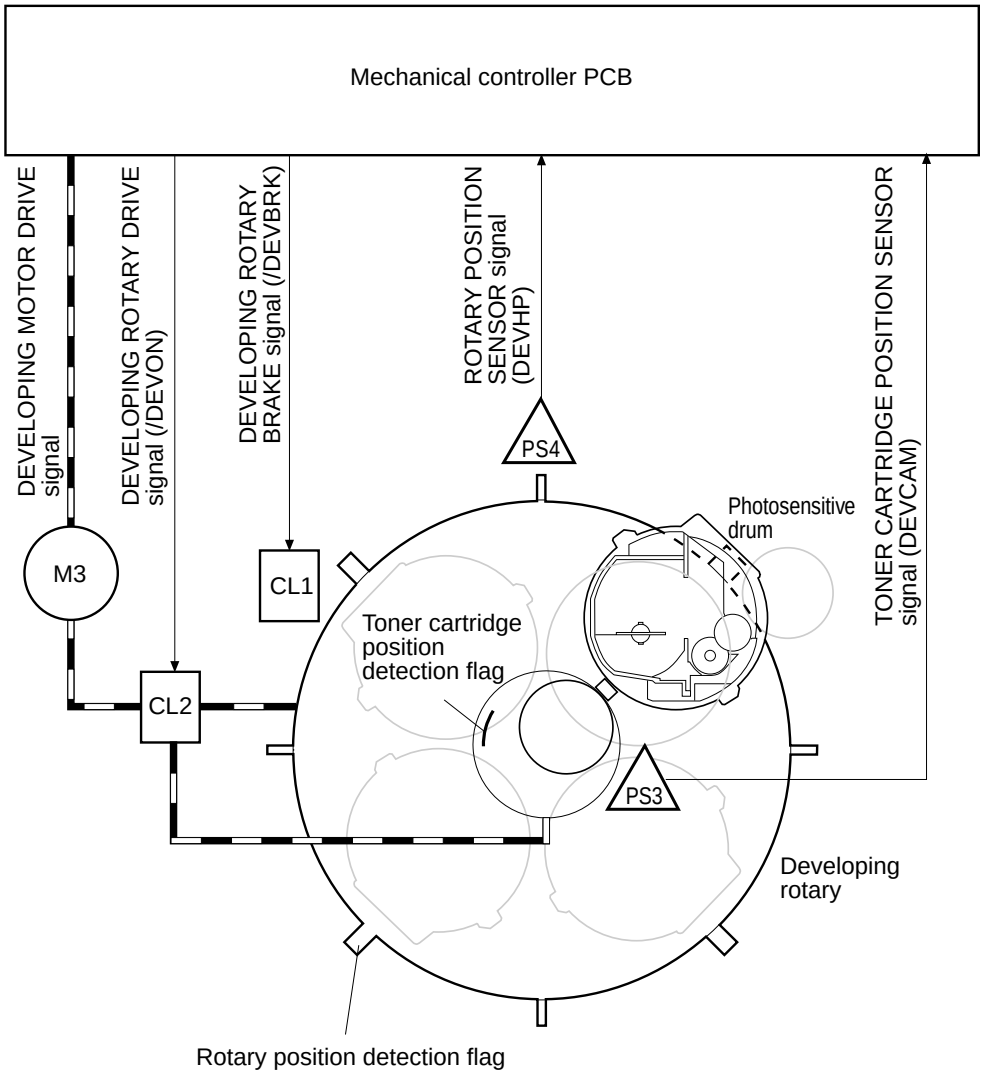


Figure 3-44 Developing unit operation

The sequence in driving the developing unit includes the rotation of the developing rotary, press/separation of the toner cartridge, and the rotation of the developing cylinder. The sequences are changed by a combination of the rotational direction of the developing unit motor and the operation of the developing unit drive clutch (CL2).

	Developing motor	Developing unit clutch (CL2)
Developing rotary rotation	Normal	ON
Toner cartridge press/separation	Reverse	OFF
Developing cylinder rotation	Normal	OFF

Rotation of the developing rotary

When the print sequence command is received from the DC controller, the mechanical controller sets the developing rotary brake signal (/DEVBRK) to “H,” and the developing rotary brake clutch (CL1) to OFF to release the brake. At the same time, the developing rotary drive signal (/DEVON) is set to “L” and the developing unit drive clutch (CL2) is turned on. Then the developing unit motor starts driving the rotation of the developing rotary.

The developing unit position sensor (PS4) monitors the number of flags passed in order to detect the rotational position of the developing rotary.

When the mechanical controller detects that the rotary has rotated to the specified position, it stops the developing unit motor and thus the developing rotary. Then /DEVBRK signal is set to “L” and CL1 turned ON to apply a brake, and /DEVON signal is set to “H” to turn CL2 OFF.

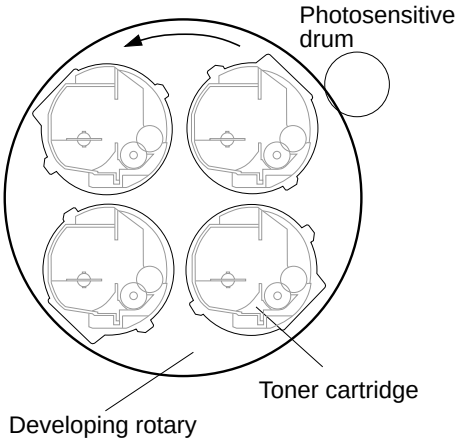


Figure 3-45 Developing rotary

Toner cartridge pressing

The toner cartridge is pushed against the photosensitive drum.

After the specified toner cartridge comes to a stop, facing the photosensitive drum, the mechanical controller rotates the developing unit motor in reverse. The cartridge press cam is driven by the developing unit motor to press the cartridge against the photosensitive drum with the push slider. When the press cam begins to move, the mechanical controller sets the rotary brake signal (/DEVBRK) to “H,” and turns the developing rotary brake clutch (CL1) off to release the brake. When the mechanical controller detects (with the toner cartridge position sensor, PS3) that the toner cartridge has begun to leave the drum, it measures the amount of drive to the pressing position, and stops the developing unit motor according to that timing.

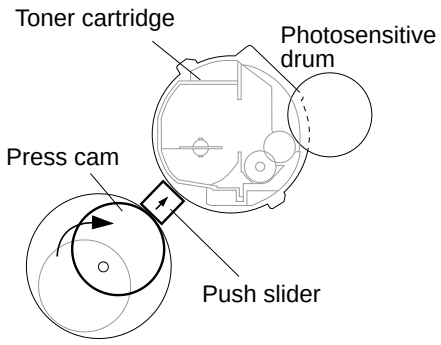


Figure 3-46 Toner cartridge pressing

Developing cylinder drive

Rotates the developing cylinder in the toner cartridge. (Developing process)

After the toner cartridge is pressed against the photosensitive drum, the mechanical controller rotates the developing unit motor which drives the developing cylinder to rotate it. Upon completion of a developing process for the designated color, the mechanical controller sets the developing rotary brake signal (/DEVBRK) to “L” turns and the developing rotary brake clutch (CL1) on in order to apply the brake. The developing unit motor then stops and the developing cylinder ceases to rotate.

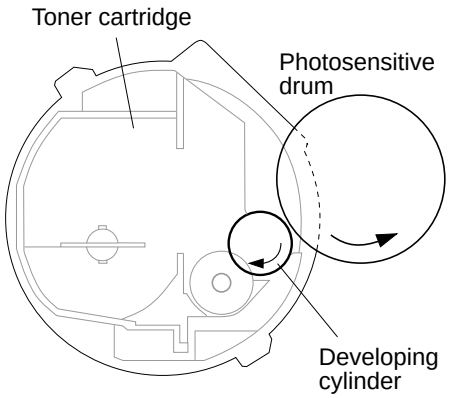


Figure 3-47 Developing cylinder drive

Toner cartridge separation

Separates the toner cartridge from the photosensitive drum after the development process.

After the developing cylinder ceases to rotate, the mechanical controller rotates the developing unit motor in reverse. The developing unit motor drives the operation of the cartridge press cam so that the pressure on the push slider is released and the toner cartridge separates from the photosensitive drum. When the press cam begins to operate, the mechanical controller sets the developing rotary brake signal (/DEVBRK) to “H” and turns the developing rotary brake clutch (CL1) off. When the toner cartridge position sensor (PS3) detects the cartridge has begun to leave the drum, the mechanical controller sets /DEVBRK to “L” and turns CL1 on again, stopping the developing unit motor.

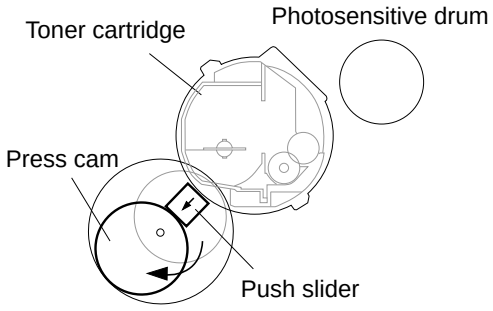


Figure 3-48 Toner cartridge separation

Developing rotary manual rotation

By turning the rotary manual knob, the rotary can be turned by hand. The rotary manual unit is pushed out when the front door is opened, engaging the gear in the rotary side plate. A stopper drops down simultaneously to prevent the rotary manual unit from being pushed back and disengaging from the rotary side plate. By pushing the knob and turning it in the direction of the arrow on the knob the rotary rotates.

The rotary manual unit is also fitted with a reverse rotation prevention mechanism in which a one-way gear prevents the rotary manual unit from turning in the opposite direction.

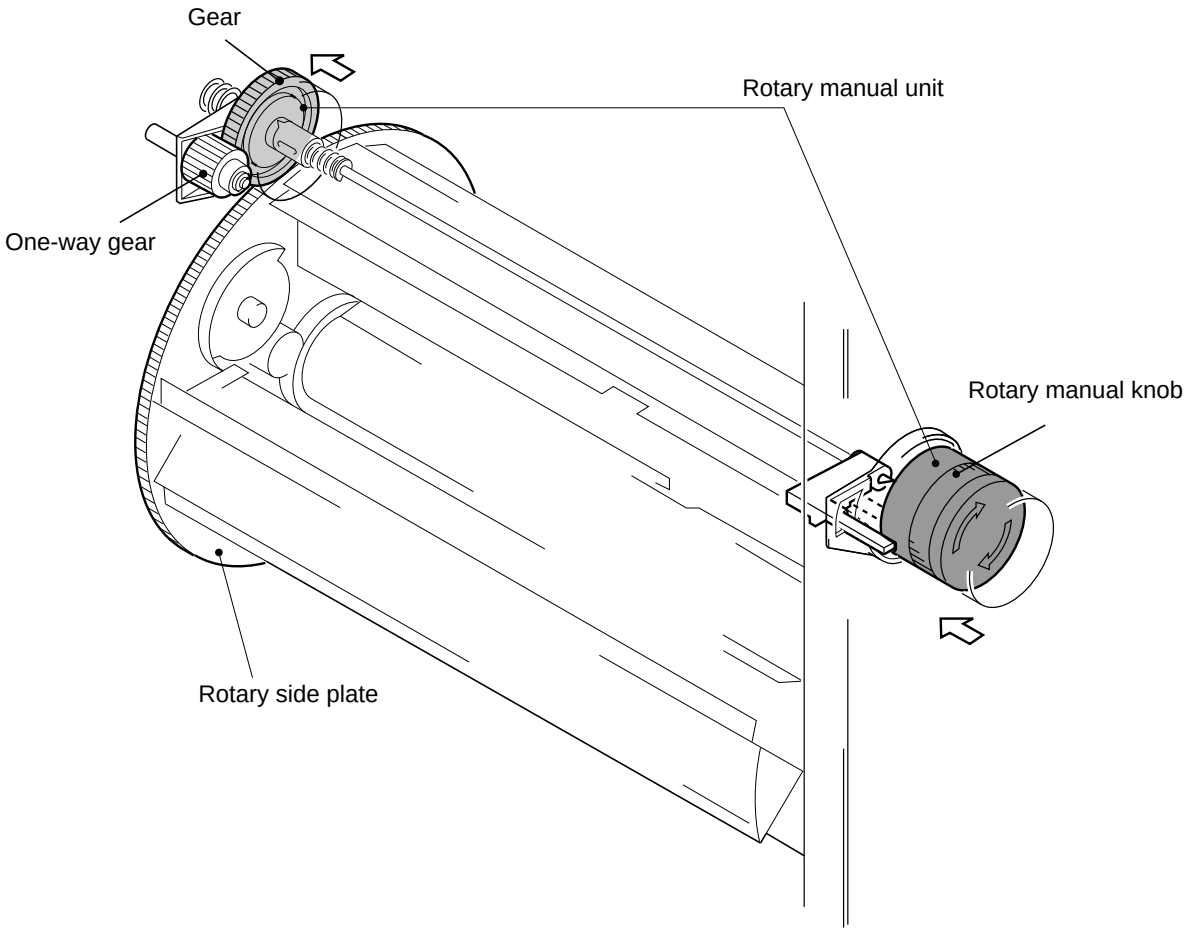


Figure 3-49 Developing rotary manual rotation

When the front door is closed, the back panel of the door lifts the stopper and pushes in the knob, releasing the developing rotary gear.

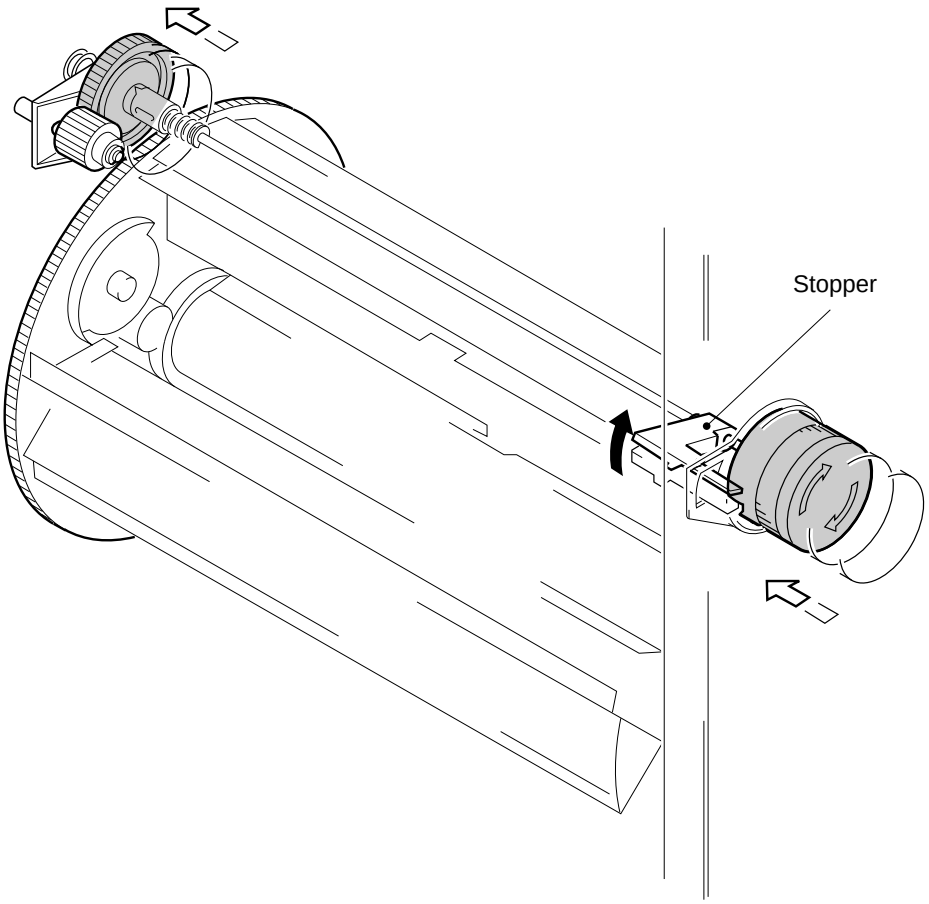


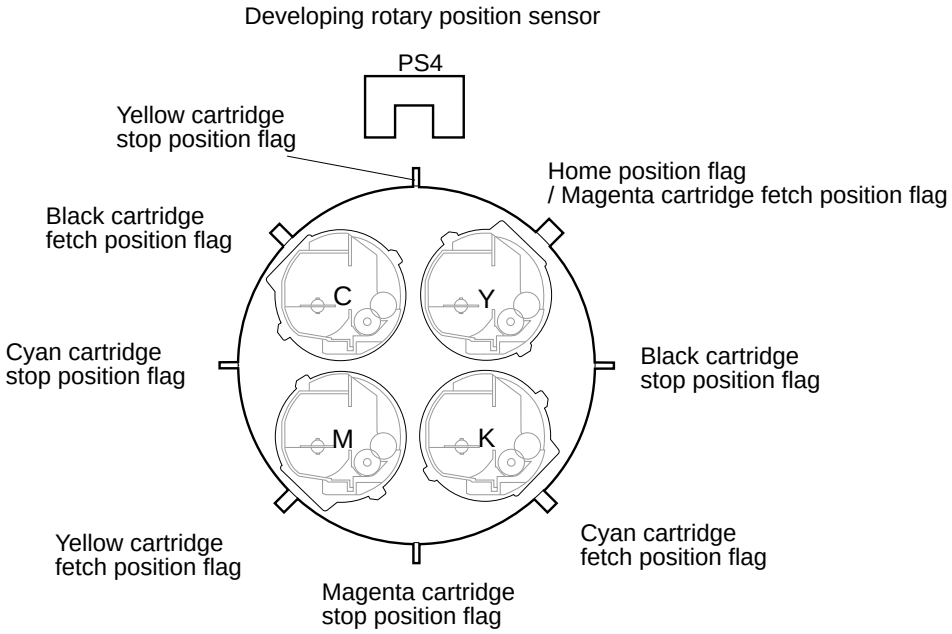
Figure 3-50 Rotary stopper

Developing rotary rotational position detection

The rotational position of the developing rotary is detected by the developing rotary position sensor (PS4) by monitoring the number of passing rotational position flags. The eight rotational position flags include the home position flag (also serves as a magenta cartridge fetch position flag), the other 3 colors fetch position flags and the stop position flag for each color.

When PS4 detects a flag, the developing rotary position sensor signal (DEVHP) is set to “H.” The CPU on the mechanical controller recognizes which flag (the home position flag, stop

position flag, or fetch position flag) is being detected based on the time during which the DEVHP signal is set to “H.”



An example of the yellow cartridge in the stop position (the position facing the photosensitive drum)

Width of flags and distance between flags

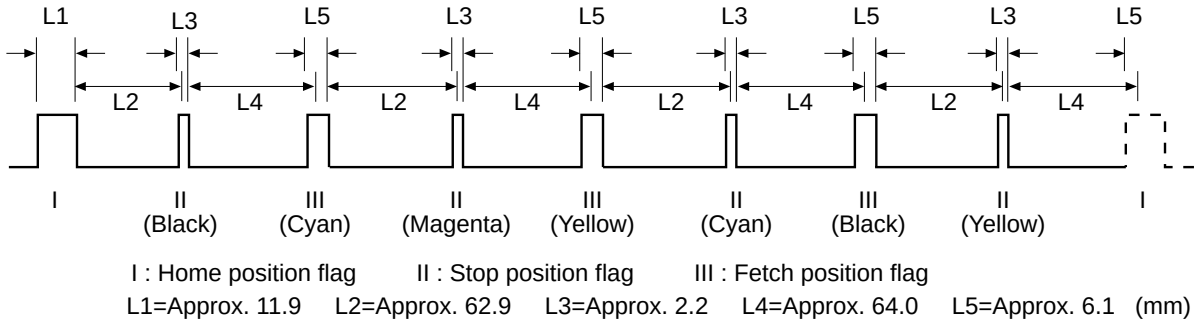


Figure 3-51 Developing rotary rotational position detection

Toner cartridge position detection

The press/separation of the toner cartridge is detected by the toner cartridge position sensor (PS3) through monitoring the position detection flag. When the cartridge is separated from the drum, the flag interrupts PS3 and the toner cartridge position SENSOR signal (/DEVCAM) is set to "L." When the cartridge is pressed against the drum, the flag leaves PS3 and /DEVCAM is set to "H." The relationship between the cartridge press cam, press detection flag, and the press sensor is shown in the figure below.

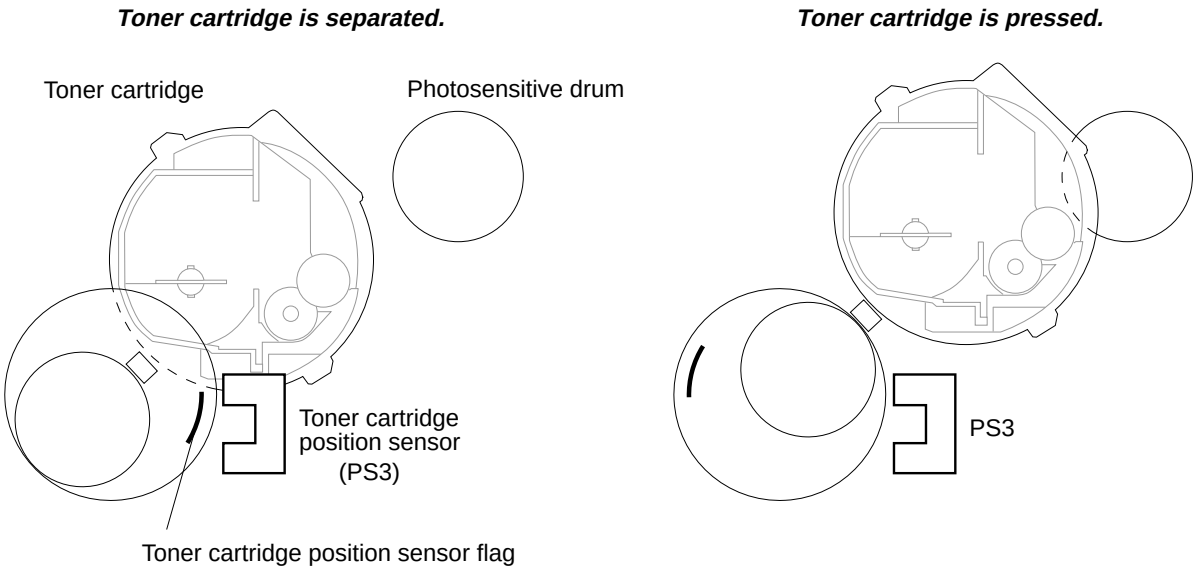


Figure 3-52 Toner cartridge position detection

Developing unit fault detection

Rotary rotation failure

When the following phenomena are detected by the developing rotary position sensor (PS4), the DC controller is notified by the mechanical controller which assesses them as rotary rotation failures. The DC controller notifies the video controller of the faults.

- PS4 does not detect the rotational position flag even though the developing unit motor rotates.
- PS4 detects an error in the width of the rotational position flag.

- PS4 detects a flag width differing from that of the specified rotational position flag.
- PS4 does not detect the rotational position flag when the press operation starts.

Toner cartridge pressure/separation failure

When the following phenomena are detected by the toner cartridge position sensor (PS3), the DC controller is notified by the mechanical controller which assesses them as toner cartridge pressure/separation failures. The DC controller notifies the video controller of the faults.

- PS3 stays on for a certain period of time after the press operation starts.
- PS3 stays OFF for a certain period of time after the separation operation starts.

Developing unit motor drive circuit

The developing unit motor (M3) uses a four-phase stepping motor. The developing unit motor is controlled by the developing unit motor driver (Q2003) on the mechanical controller.

The developing unit motor transmits the driving force to the developing rotary and the toner cartridge press cam.

When the print sequence command is received, the CPU (Q2001) in the mechanical controller sends the developing unit motor control signals (DEVPHA, /DEVPHA, DEVPHB, /DEVPHB) and the developing unit motor rotation rate select signal (DEVICH) to the drum motor driver (Q2003) 0.2 second after the fixing unit motor starts. Based on those signals, Q2003 supplies the drive signal to the developing unit motor. 24VC is supplied for the drive power supply.

When none of the toner cartridges have been installed, more rotational force than usual is required because the rotary's center of gravity has moved away from the middle. As the mechanical controller cannot recognize whether or not all cartridges are present during operation of the toner cartridge detection function, the CPU reduces the developing rotary rotation rate by setting the DEVICH signal to “H” to drive the developing unit motor at half-speed.

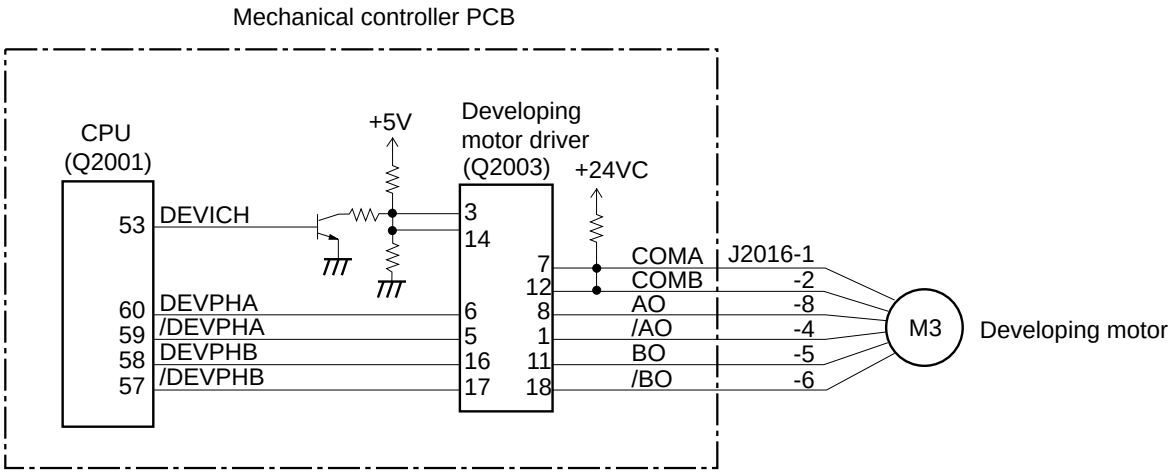


Figure 3-53 Developing unit motor drive circuit

Image quality stability control

The printer is protected by image quality stability control to minimize fluctuations in image density due to environmental changes, deterioration of the photosensitive drum and toner.

Environment-change correction control

The printer has a temperature/humidity sensor PCB installed under the ejection unit. The DC controller monitors the thermal/humidity sensors to control temperature and humidity within the printer. This allows the printer to obtain optimum image quality.

Environment-change correction control controls the following high-voltage values:

- Primary charging voltage
- Transfer bias
- Attraction bias
- Discharge AC bias
- ON/OFF of the separation charging unit

Maximum density control

Maximum density control is performed to stabilize the maximum density for each color. This determines an optimum developing bias.

Half-tone correction control

The gate array (IC109) in the DC controller contains a half-tone correction table used to correct the laser output in order to obtain the optimum half-tone image. See Figure 3-54 on page 3-70. The half-tone correction control modifies the half-tone correction table to accommodate changes in the present environment, the total number of prints or the condition of the toner and the photosensitive drum.

The image quality stability control is performed in the following cases:

- When the power is turned ON.
- When the printer encounters an abrupt environmental change.
- Following a prescribed number of prints.
- When the toner cartridge is installed or removed.
- When a new drum cartridge is installed.

In addition, the environment-change correction control is performed every 30 minutes while the power is turned ON.

Note: Half-tone correction table

The laser output and the image density of the printer do not change in a linear relationship.

Therefore, when the laser image is output according to the half-tone specified by the video data signal sent from the video controller, an optimum half-tone image would not be obtained on the actual prints. In order to obtain the optimum half-tone image, the DC controller is equipped with the half-tone correction table used to correct the output value of the laser diode.

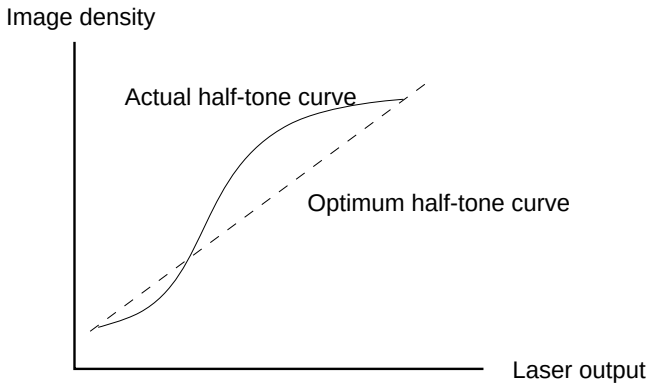


Figure 3-54 Half-tone correction table

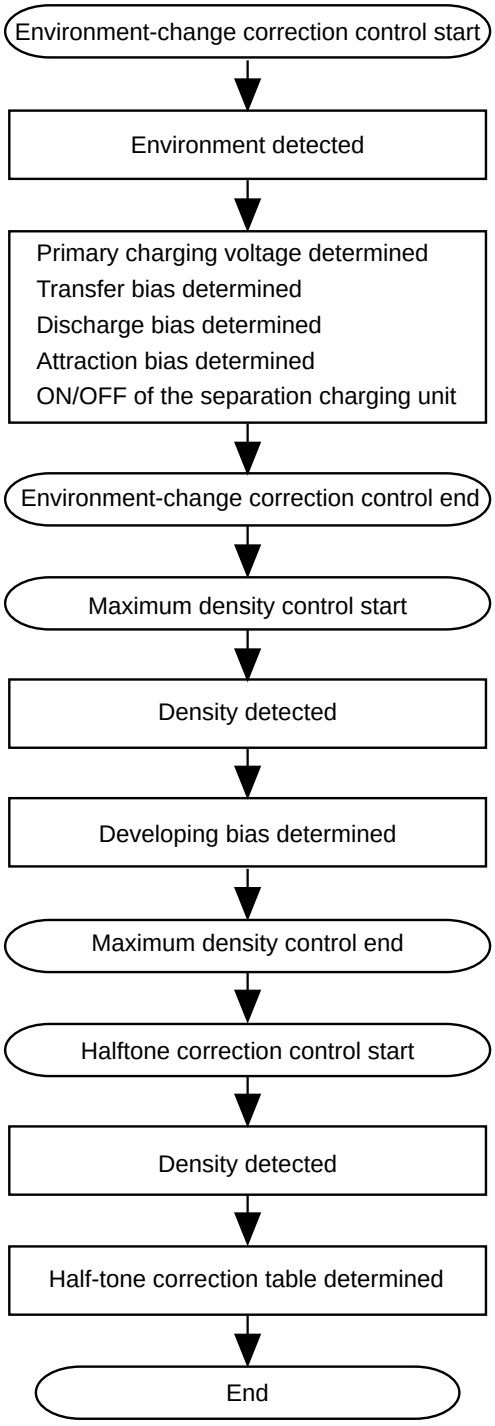


Figure 3-55 Environment-change correction control

Density sensing circuit

Maximum density and half-tone correction are controlled using the density sensor (PS14). The density sensor checks the density of the density sensing pattern formed on the transfer drum. The density sensor is located on the density sensor PCB above the transfer drum. The light emitted by the LED is reflected by the density sensing pattern and received by the photodiode.

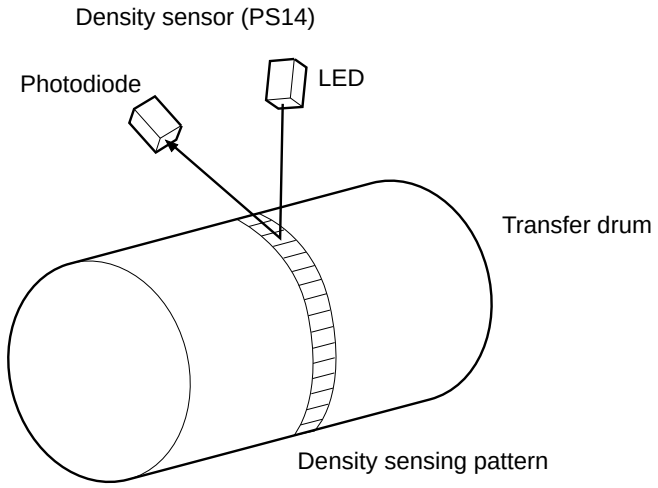


Figure 3-56 Density sensor

The characteristics of colored toner and black toner towards light differ. Therefore, this sensing circuit uses the density sense mode select signal (/DSEL) to switch between the colored toner and black toner density sensing modes.

When the density sense enable signal (/DENB) becomes “L”, the LED emits light with an intensity set by the led power control signal (/D0-7). The photodiode senses the light, which is reflected by the density sensing pattern onto the transfer drum. The density sensing PCB outputs the density to the DC controller as the toner sensor signal (DSNS).

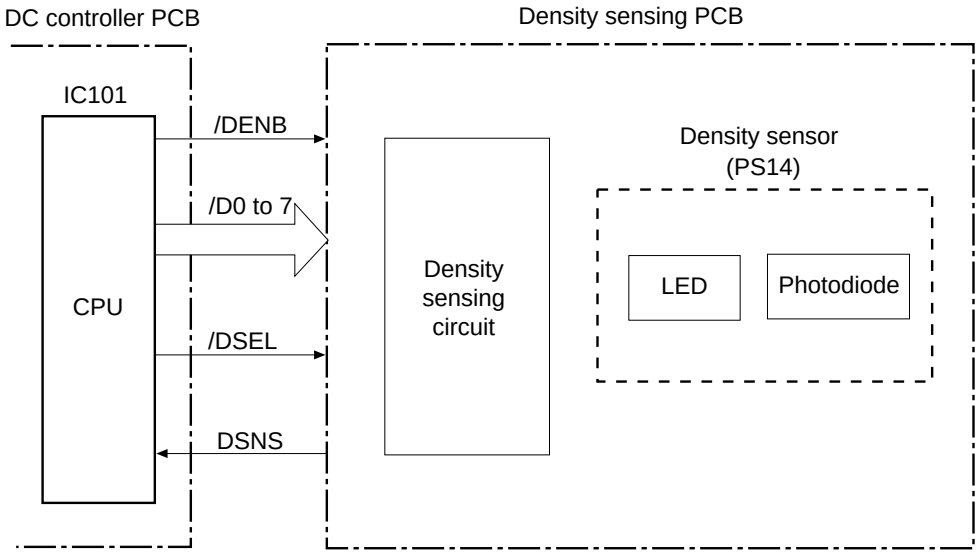


Figure 3-57 Density sensing circuit

Pick-up/Feed System

When the /PRNT signal is sent to the DC controller by the video controller and the scanner motor is put in READY mode, the DC controller issues a print sequence command to the mechanical controller, which then starts the print operation. After a sheet of paper is picked up by either the cassette or manual feeding pick-up roller, it is fed by the feed rollers. After any skew in the paper is corrected by the registration roller, it stops at the leading edge detection position. The temporarily stopped paper is re-fed so that its leading edge will match the gripper on the transfer drum as well as the leading edge of the image on the photosensitive drum. Subsequently, the paper passes through the transfer, separation, fixing, and delivery units to the face-down or face-up tray.

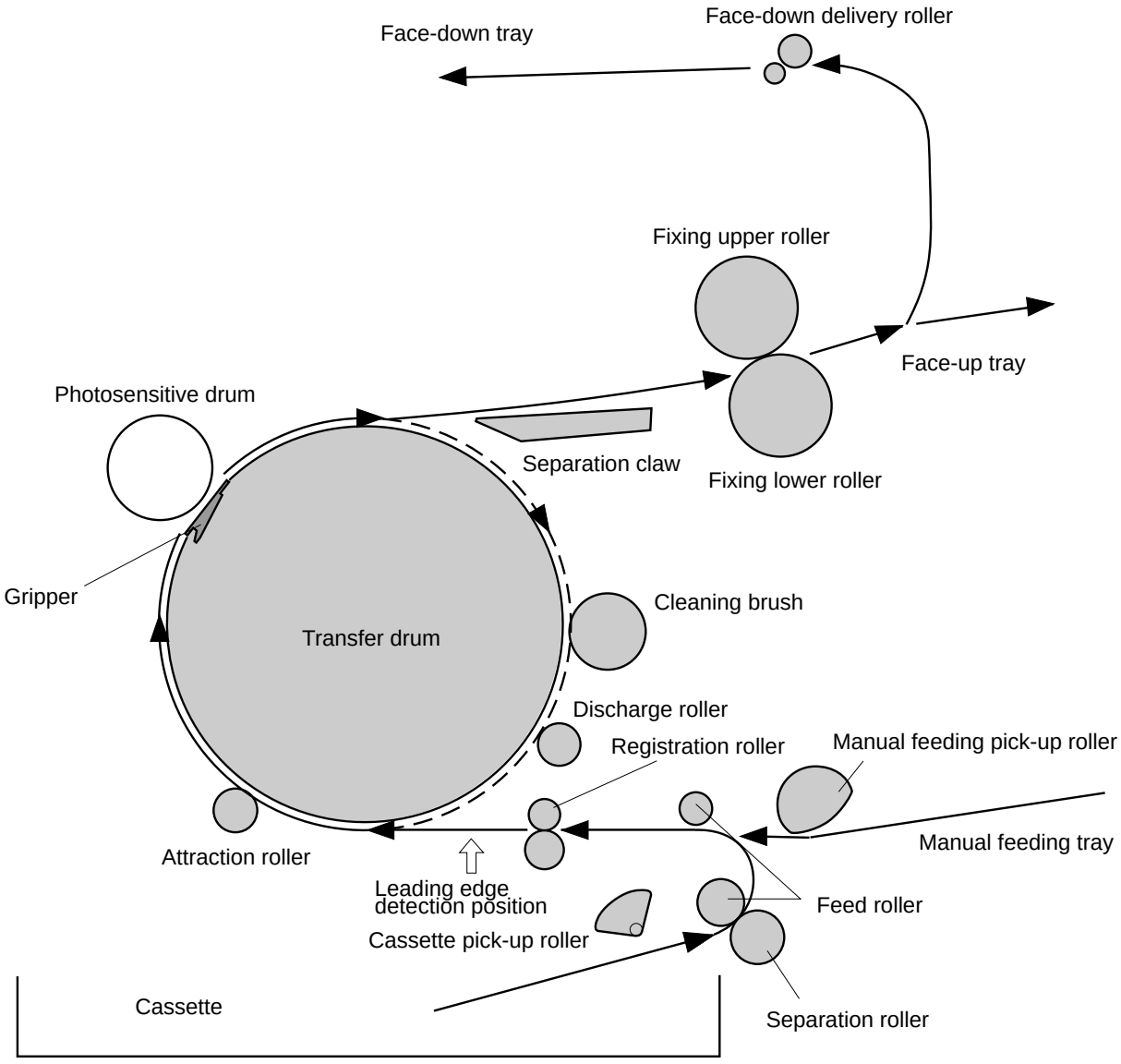


Figure 3-58 Paper pick-up/feed system

Paper pick-up

Cassette feeding

The presence of paper in the cassette is detected by the cassette paper sensor (PS301).

When the print sequence command is received, the mechanical controller drives the fixing unit motor (M2), then after 0.2 seconds, drives the drum motor (M4) and the pick-up motor (M1). Simultaneously, the pick-up solenoid (SL1) is turned on and the drive of the pick-up motor is transferred to the pick-up roller, feed rollers, and separation roller. After any multi-feed of the paper picked up by the pick-up roller has been eliminated by the separation roller, the paper is fed into the printer by feed rollers 1 and 2.

After passing through the registration paper sensor (PS302), the paper reaches the registration roller. The registration roller is not rotating at this time, so the paper temporarily stops in the registration roller position. Its leading edge is curled and any skew is corrected. A certain time period elapses after the paper has passed through PS302, the registration roller clutch (CL3) is turned ON to resume feeding the paper. When the paper reaches the paper top sensor (PS303), the pick-up motor stops, stopping the paper.

The DC controller and the mechanical controller detect the registration position of the transfer drum with the transfer drum top sensor (PS8). Subsequently, this timing is used as reference for executing the print sequence. The mechanical controller starts driving the pick-up motor at a certain time after detecting the registration position of the transfer drum. Therefore, the temporarily stopped paper resumes being fed so that its leading edge will match the gripper on the transfer drum and the leading edge of the image on the photosensitive drum.

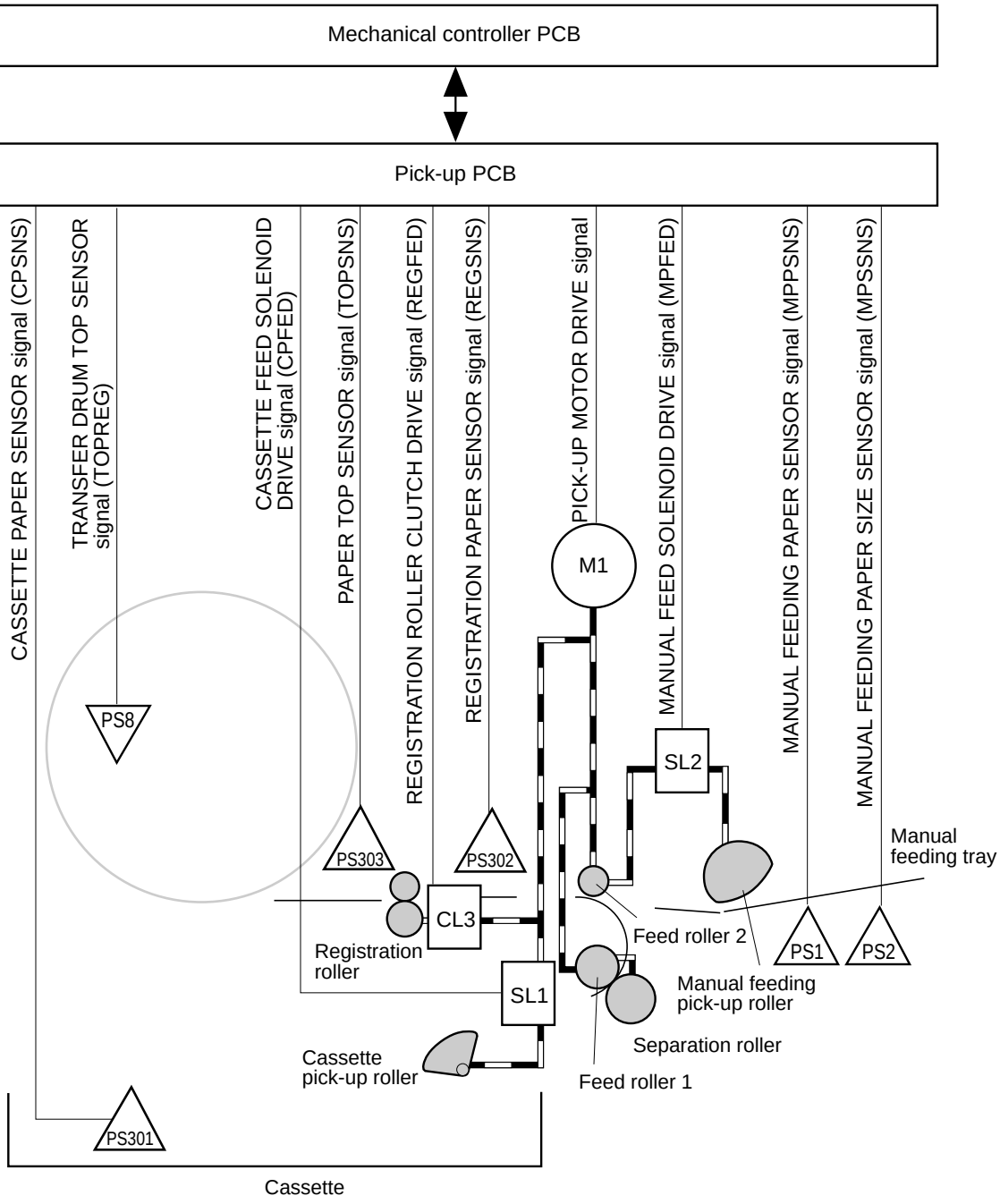


Figure 3-59 Paper pick-up and cassette feeding

Multi-feed prevention mechanism

For cassette feeding, this printer uses the separation roller to prevent multi-feeding. Normally, the separation roller is imparted with rotational force reverse to that of the feed roller. However, the separation roller is equipped with a torque limiter that rotates with the feed roller through transmission of its rotational force via the transported paper. If multiple sheets of paper are picked up, the low friction force between those sheets results in a weak rotational force being transmitted to the separation roller from the feed roller. As a result, the separation roller's own rotational force separates the extra sheets.

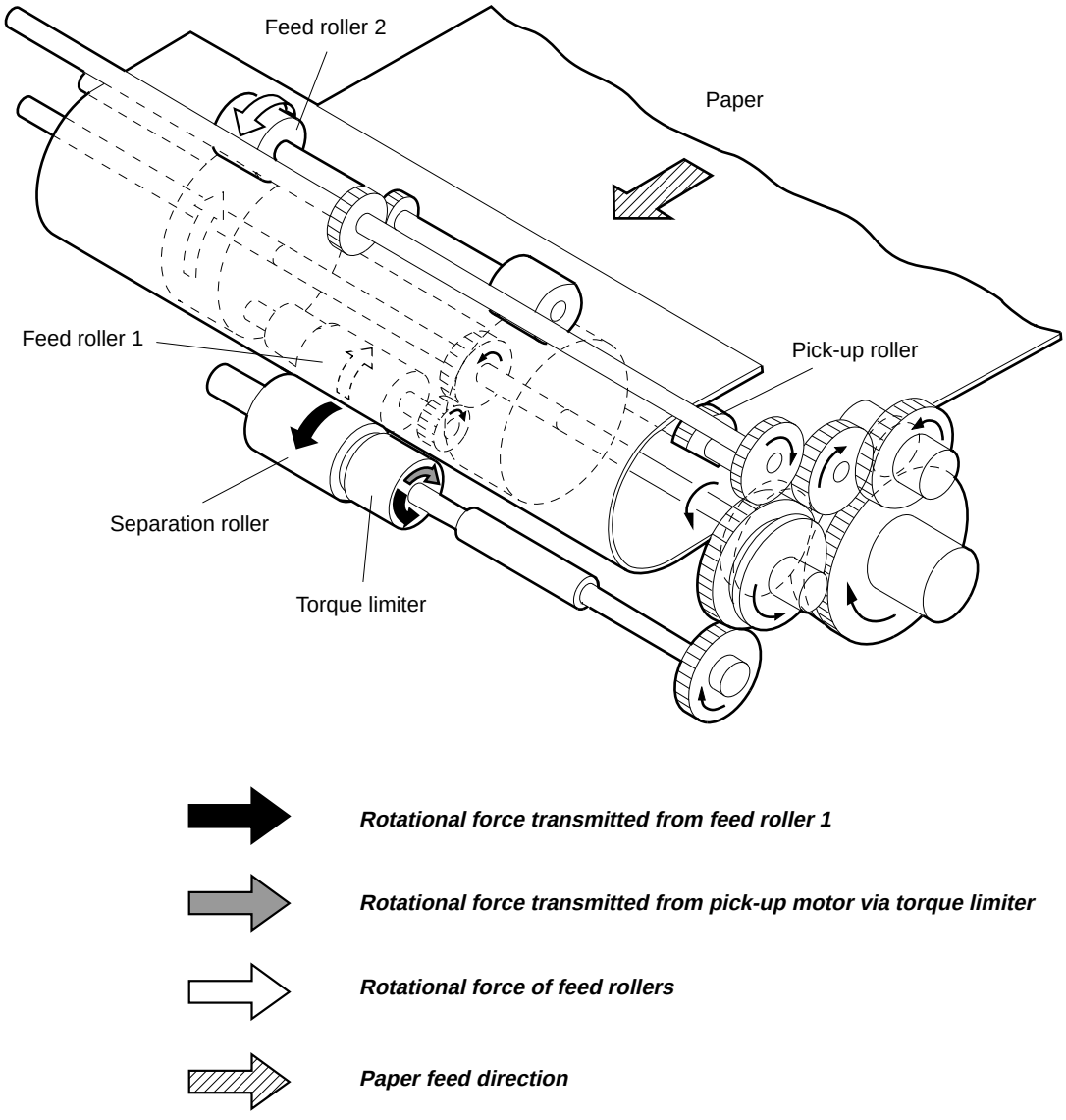


Figure 3-60 Multi-feed prevention mechanism

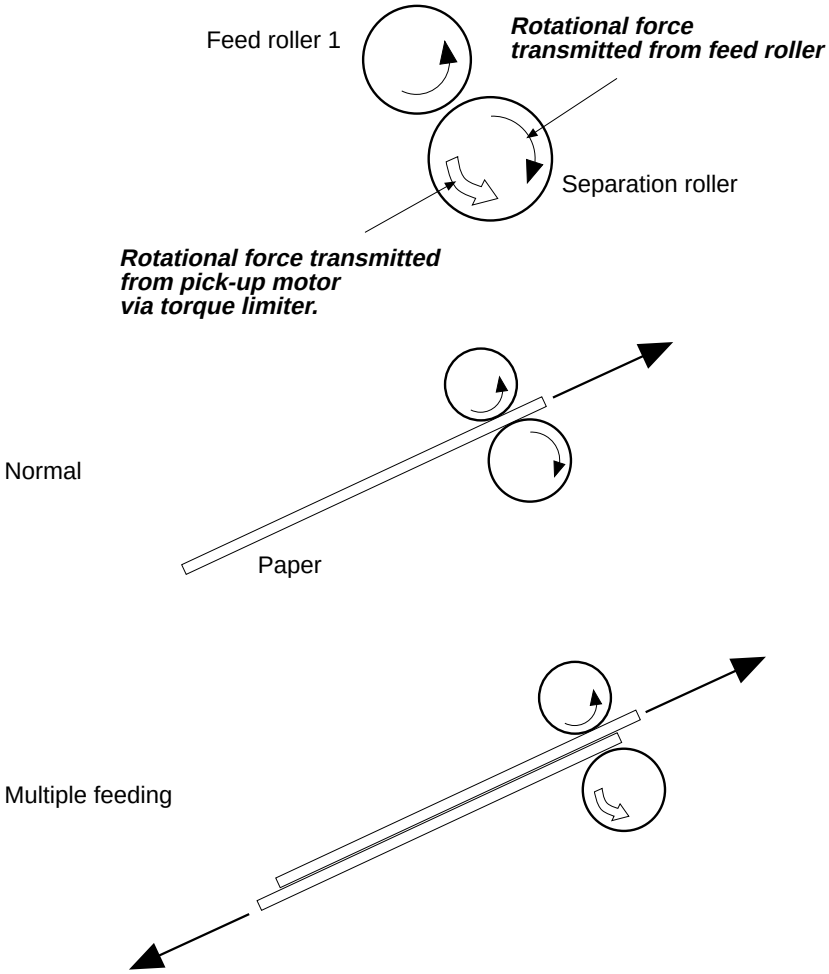


Figure 3-61 Multi-feed rollers

Manual feeding

The presence of paper in the manual feeding tray is detected by the manual feeding paper sensor (PS1).

Upon receiving the print sequence command, the mechanical controller drives the fixing unit motor (M2) and 0.2 seconds later drives the drum motor (M4) and the pick-up motor (M1). After 0.5 seconds, the manual feed solenoid (SL2) is turned on to transmit the rotational force of the pick-up motor to the manual feeding pick-up roller. As the pick-up roller rotates, the paper lifting plate press cam is released and the spring force pushes up the paper lifting plate. Thus, the paper is pressed against the pick-up roller and picked up by its rotation. After the paper is separated from any extra

sheets by the separation pad, it is fed into the printer by feed roller 2. The subsequent operations are as described for cassette feeding.

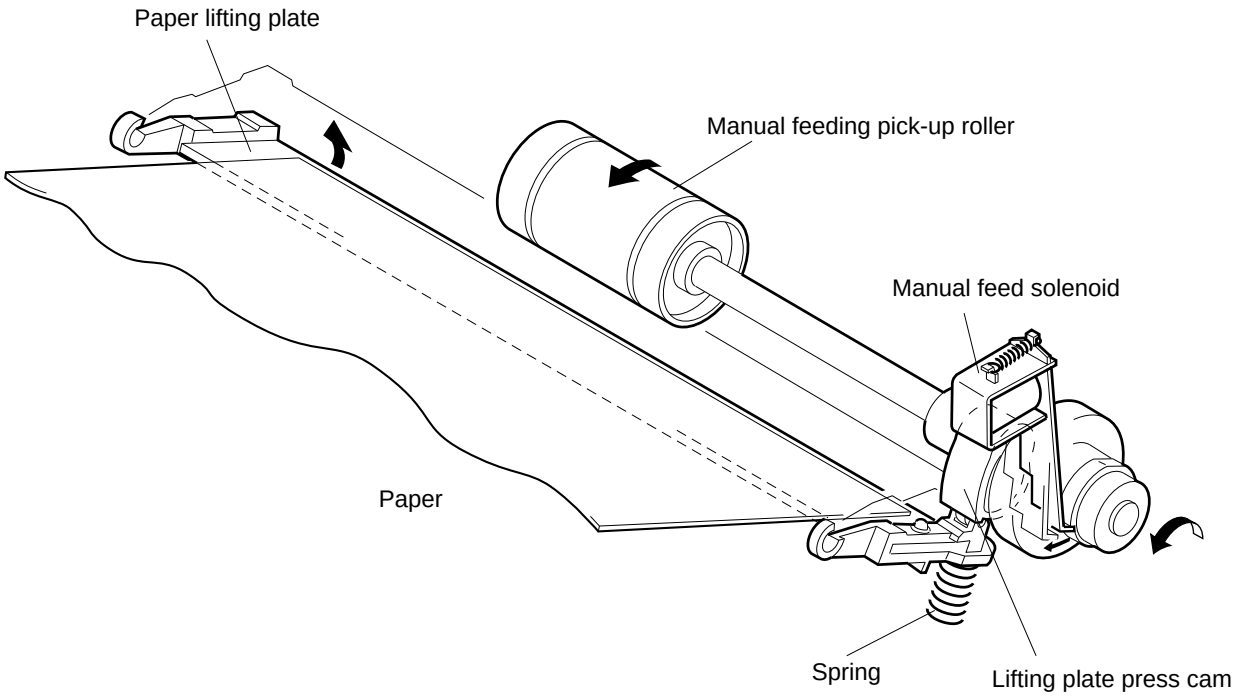


Figure 3-62 Manual feeding

Paper size

The paper size in the cassette is detected by the cassette size-sensing switches (CSW1, 2, and 3) on the cassette size-sensing PCB. Loading the cassette onto the cassette mount will turn ON/OFF the switches as applicable. The CPU on the DC controller detects the presence of the cassette and its size by this ON/OFF combination.

	Cassette size-sensing switch		
Cassette	**CSW1**	**CSW2**	**CSW3**
A4	OFF	ON	ON
B5	ON	OFF	ON
LTR	OFF	OFF	ON
LGL	ON	OFF	OFF
Cassette absent	OFF	OFF	OFF

For the universal cassette, the actuators that press the cassette size-sensing switches are linked with the paper guide in the cassette. When the paper guide is set to the paper size, the positioning of the projections change accordingly.

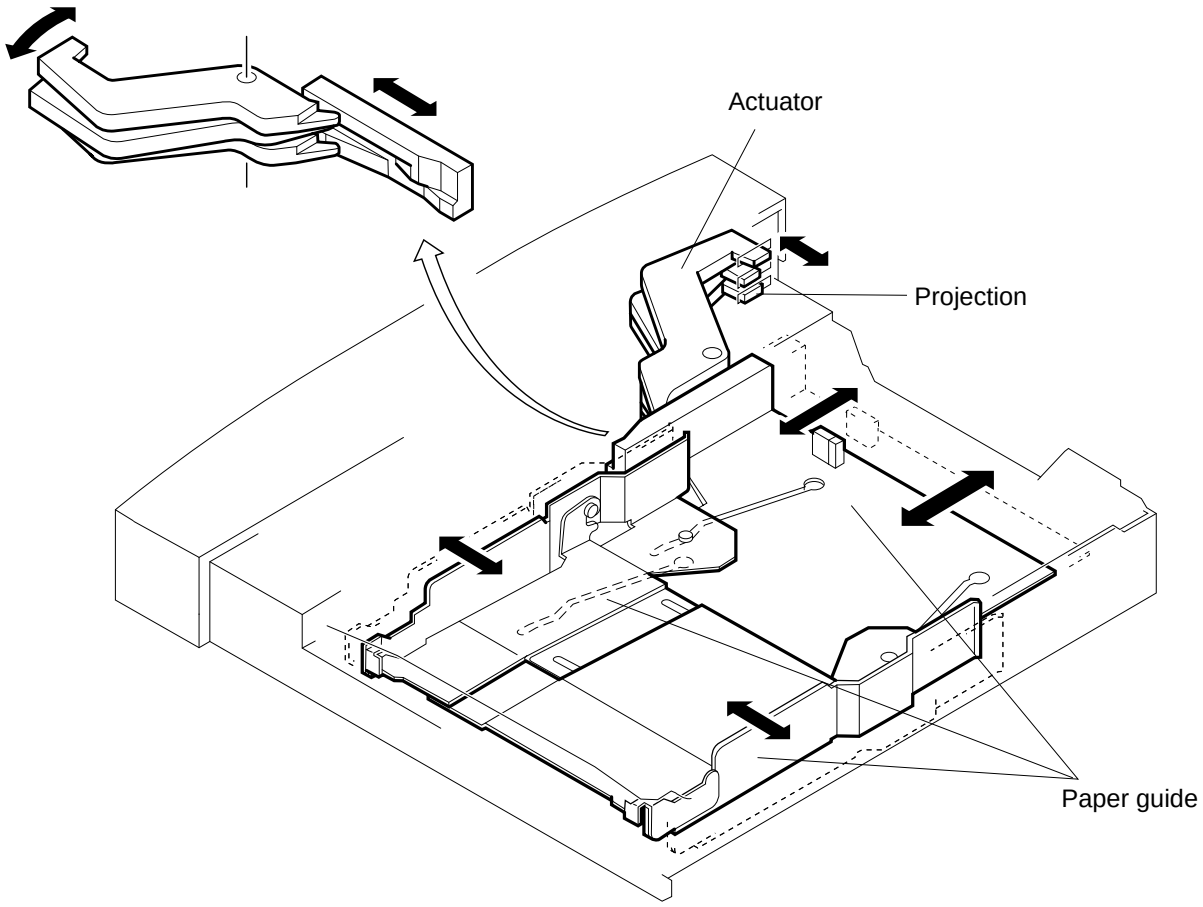


Figure 3-63 Universal cassette paper sensing

Note: If the eject lever is pulled out, the ejection sensing switch (SW1601) is turned ON. Irrespective of the cassette size, the DC controller will set all the cassette size signals (/CSIZE1, /CSIZE2 and /CSIZE3) to “L”. When the DC controller detects that the eject lever has been pulled out during door-open, it performs image quality stability control after the eject lever is once again inserted and the front door closed.

OHP (Overhead projector) sheet detection

When an OHP sheet is used in this printer, the dedicated A4/letter size OHP sheets must be used with a white band on the leading edge. The following assumptions are made by measuring the period of time the that light emitted from the paper top sensor (PS303) is shielded by this band:

- Whether it is the dedicated OHP sheet, other OHP, or paper.
- Whether it is placed properly.
- Whether it is placed with the proper edge leading.

If any non-dedicated OHP sheet is used or the dedicated OHP sheet is placed with the wrong side up or the wrong edge leading, the mechanical controller will notify the DC controller which will detect a paper jam.

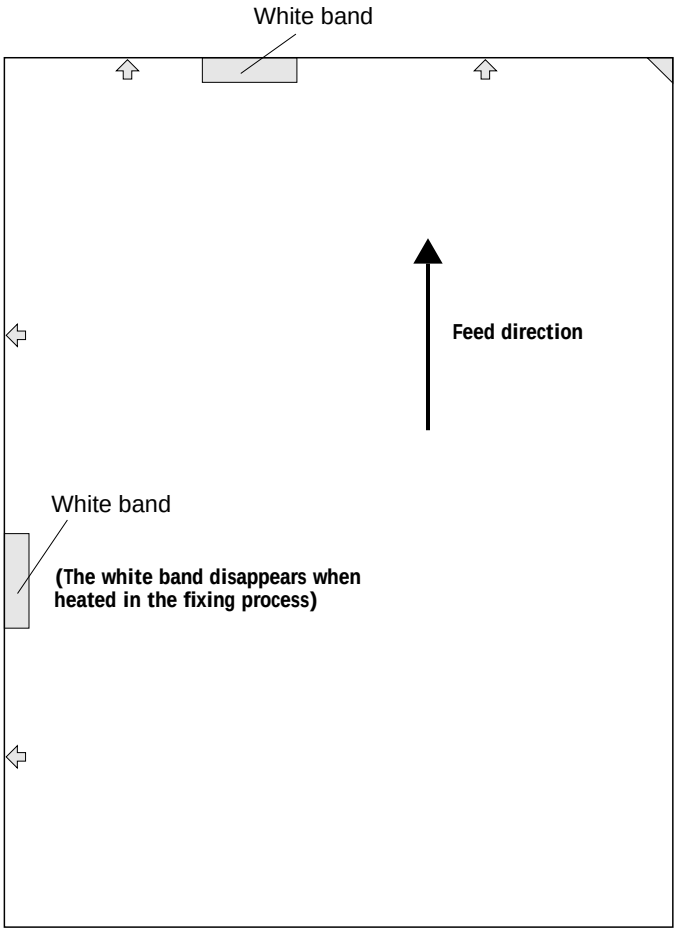


Figure 3-64 OHP sheet

Note: The paper top sensor is a reflective type sensor. In order to prevent the sensor from malfunctioning due to the deterioration of the LED, this printer detects the intensity of light emitted by the LED during the initial rotations. The paper pick-up PCB sets the detection level based on the intensity detected.

The emission level of the LED of the sensor is changed in two steps using the led power select signal (LEDDRV). If it detects that the intensity is low due to the deterioration of the LED, IC301 will change the LEDDRV signal to increase the intensity.

Paper pick-up PCB

The paper pick-up PCB carries out serial communication with the mechanical controller to control the pick-up operation.

- IC301: Controls communication with the mechanical controller and the operation of the paper pick-up PCB.
- IC302: Controls the operation of the pick-up motor.
- PS301: Cassette paper sensor on the pick-up PCB

  When there is no paper in the cassette, the cassette paper sensor signal (CPSNS) becomes “H.”
- PS302: Registration paper sensor on the pick-up PCB

  This sensor is located in front of the registration roller. When paper is detected, the registration paper sensor signal (REGSNS) becomes “L.”
- PS2: Manual feeding paper size sensor

  When paper loaded on the manual feeding tray is B5-size or smaller, the manual feeding paper size sensor signal (MPSSNS) becomes “H”; when it is larger than B5-size, the signal becomes “L.”
- PS1: Manual feeding paper sensor

  When there is no paper on the manual feeding tray, the manual feeding paper sensor signal (MPPSNS) becomes “H.”
- PS303: Paper top sensor

  This sensor is located in front of the transfer drum. When paper is detected, the paper top sensor signal (TOPREG) becomes “H.” For an OHP sheet, the signal remains “H” only while the white band on its leading edge is detected. The intensity of light may be changed using the led power select signal (LEDDRV).
- M1: Pick-up motor

  This is a two-phase stepping motor.

- SL1: Cassette feed solenoid

  This solenoid turns on/off the transmission of the rotation of the pick-up motor to the cassette pick-up roller. When the cassette feed solenoid drive signal (/CPFED) becomes “L,” the solenoid is turned on.

- SL2: Manual feed solenoid

  This solenoid turns on/off the transmission of the rotation of the pick-up motor to the manual feeding pick-up roller. When the manual feed solenoid drive signal (/MPFED) becomes “L,” the solenoid is turned on.

- CL3: Registration roller clutch

  This clutch turns on/off the transmission of the rotation of the pick-up motor to the registration roller. When the registration roller clutch drive signal (/REGFED) becomes “L,” the clutch is engaged.

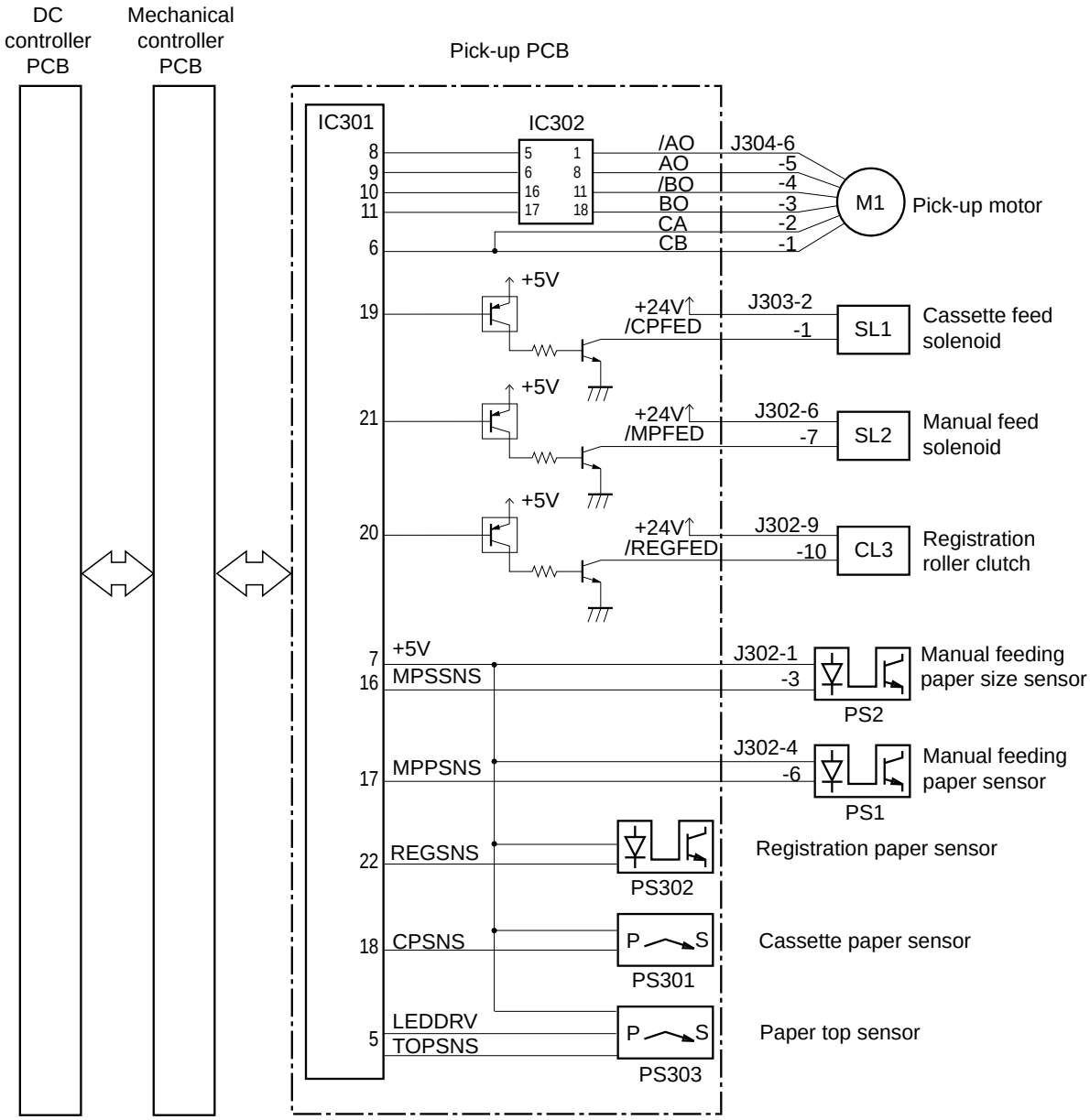


Figure 3-65 Paper pick-up PCB

Pick-up motor drive circuit

The pick-up motor is a four-phase stepping motor, located in the pick-up unit and controlled by the pick-up PCB. This motor drives the cassette pick-up roller, the manual feeding pick-up roller, the separation roller, the registration roller, feed rollers 1 and 2, and the paper lifting plate press cam.

The pick-up motor is controlled by the pick-up motor driver (IC302) on the pick-up PCB. IC302 sets the pick-up motor drive signal to “L” to drive the fixing unit motor 0.2 seconds after starting it. IC302 selects the rotational speed as the normal speed, the initial speed, or the grip speed.

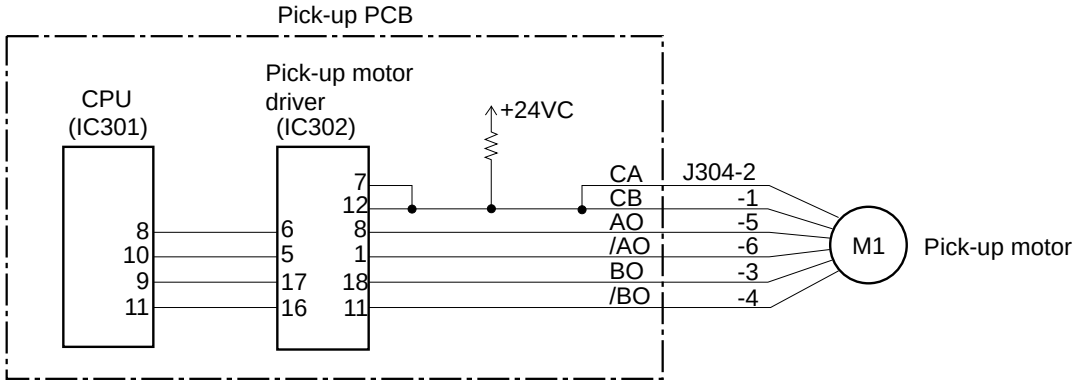


Figure 3-66 Pick-up motor drive circuit

Note: The pick-up roller rotates to the initial position at power-on and door-open/close.

Transfer drum and peripheral components

Using electrostatic force imparted by the attraction roller, the transfer drum takes paper up onto it by clamping the leading edge of the paper with the gripper. In full-color mode, four transfers occur, while in mono-color mode, a single transfer occurs. The paper is then fed to the fixing unit. As shown in Figure 3-67 on page 3-87, the transfer drum is surrounded by the attraction roller, the photosensitive drum, the discharge roller, the cleaning brush, and the separation claw. These components are controlled by the mechanical controller.

When the paper temporarily stopped in the position of the paper top sensor (PS303) resumes being fed, the gripper drive signal

(GRIPON) turns “H” and the gripper solenoid (SL4) is turned ON to open the gripper on the transfer drum. The paper is then fed 1.3 times faster than the transfer drum speed so that its leading edge will be pushed into the opened gripper. When the leading edge of the paper reaches the gripper, SL4 is turned OFF and the gripper is closed to clamp the paper top.

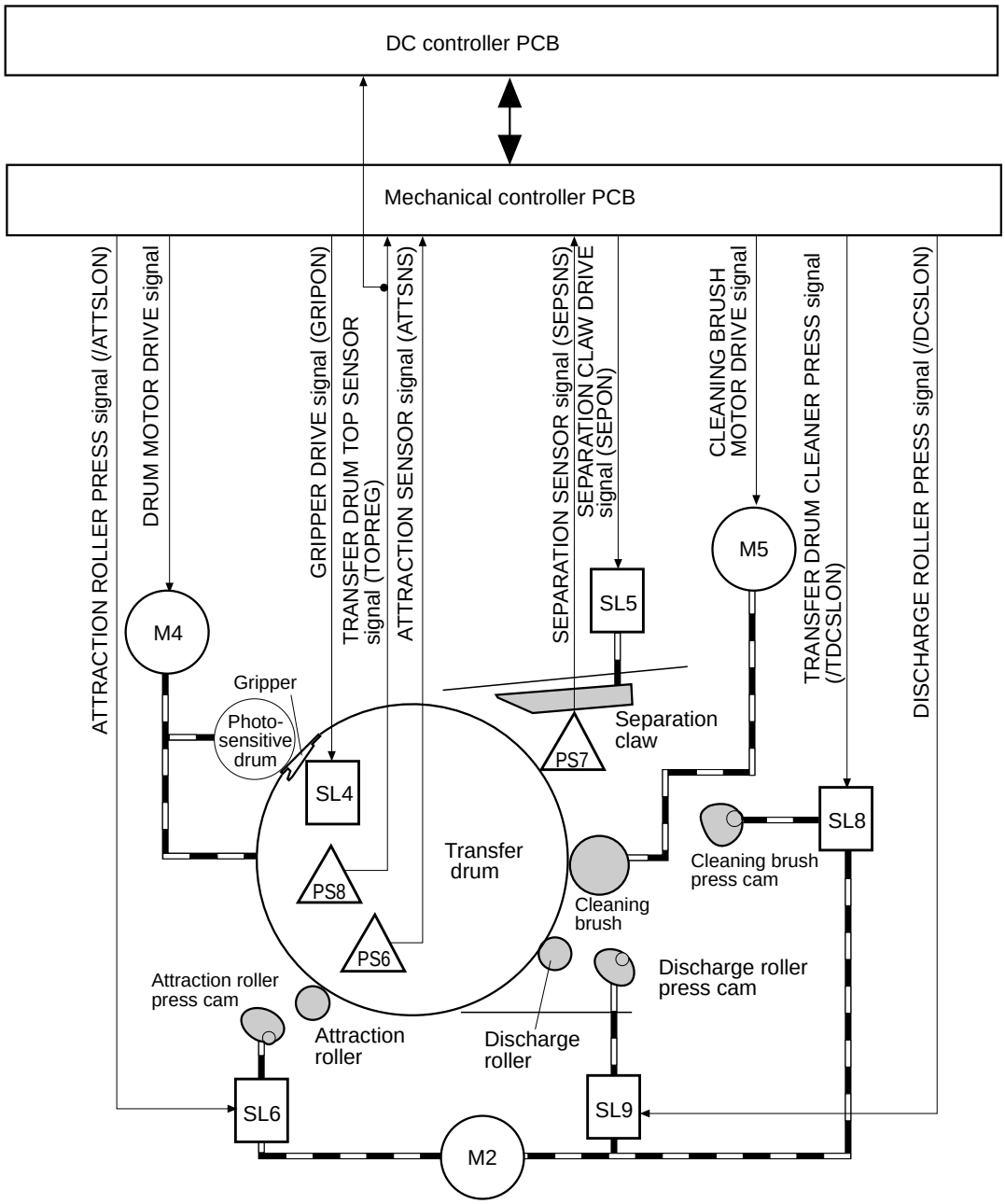


Figure 3-67 Transfer drum and peripheral components

Simultaneously, the attraction roller press signal (/ATTSLON) turns “L” and the attraction roller press solenoid (SL6) is turned on when the separation claw drive signal (SEPON) becomes “H” in order to actuate the press cam to press the attraction roller against the transfer drum. Attraction roller voltage is applied to the attraction roller while the paper is passing through it. This gives negative electric charge to the surface of the transfer drum, electrostatically attracting the paper to the surface.

Subsequently, toner is transferred to the paper and then SL4 is turned on to open the gripper. The separation claw drive solenoid (SL5) is also turned on to actuate the separation claw. The paper is separated from the transfer drum and then fed to the fixing unit.

If the paper fails to reach or pass through each sensor within the specified time, the CPU on the DC controller determines that a jam has occurred and notifies the video controller.

Gripper control

The opening and closing of the gripper is controlled by the gripper drive signal (GRIPON) sent from the mechanical controller.

When the GRIPON signal turns “H,” the gripper solenoid (SL4) is turned on, pressing the gripper drive cam. Meanwhile, the gripper drive arm in the transfer drum rotates around the transfer drum shaft with the transfer drum rotation. When the gripper arm is pressed against the cam projection, it pushes up the gripper lever (≠) to open the gripper (Æ).

The gripper drive cam projection separates from the drive arm in accordance with the rotation of the transfer drum, closing the gripper. Moreover, since the cam is separated from the gripper arm while the GRIPON signal is “L,” the gripper does not open.

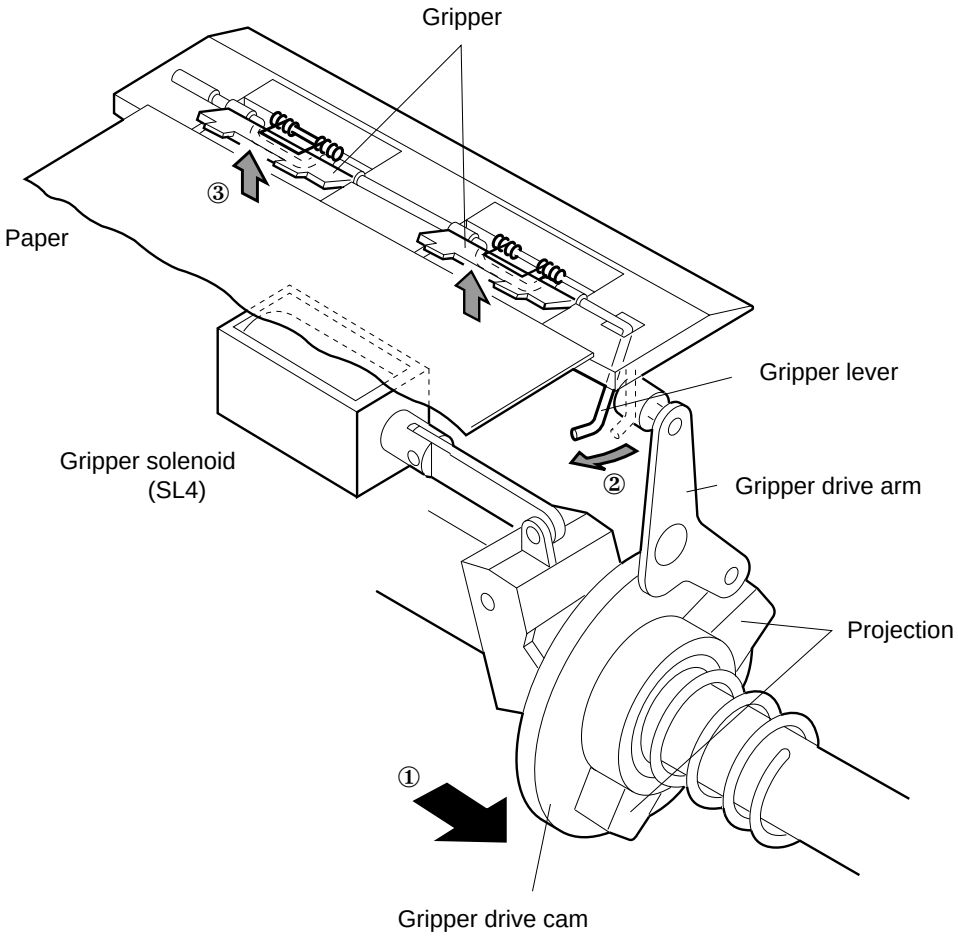


Figure 3-68 Gripper control mechanisms

Attraction roller

The attraction roller is normally separated from the transfer drum and it is pressed against it when necessary.

After the gripper solenoid (SL4) is turned on and the paper top is clamped by the gripper, the attraction roller press solenoid (SL6) is turned on. The rotation of the fixing unit motor actuates the attraction roller press cam to press the attraction roller against the transfer drum. The attraction of the paper is detected by the attraction sensor (PS6).

The attraction roller is not driven by any motor, but rotates along with the transfer drum. When the paper reaches the attraction roller, the attraction voltage corresponding to one cycle of the

transfer drum is applied to the attraction roller. Thus, the paper is electrostatically attracted by the transfer drum.

In full-color mode, the attraction roller rotates for the first color only. When the paper for the first color passes through the attraction roller, SL6 is turned off to separate the attraction roller from the transfer drum.

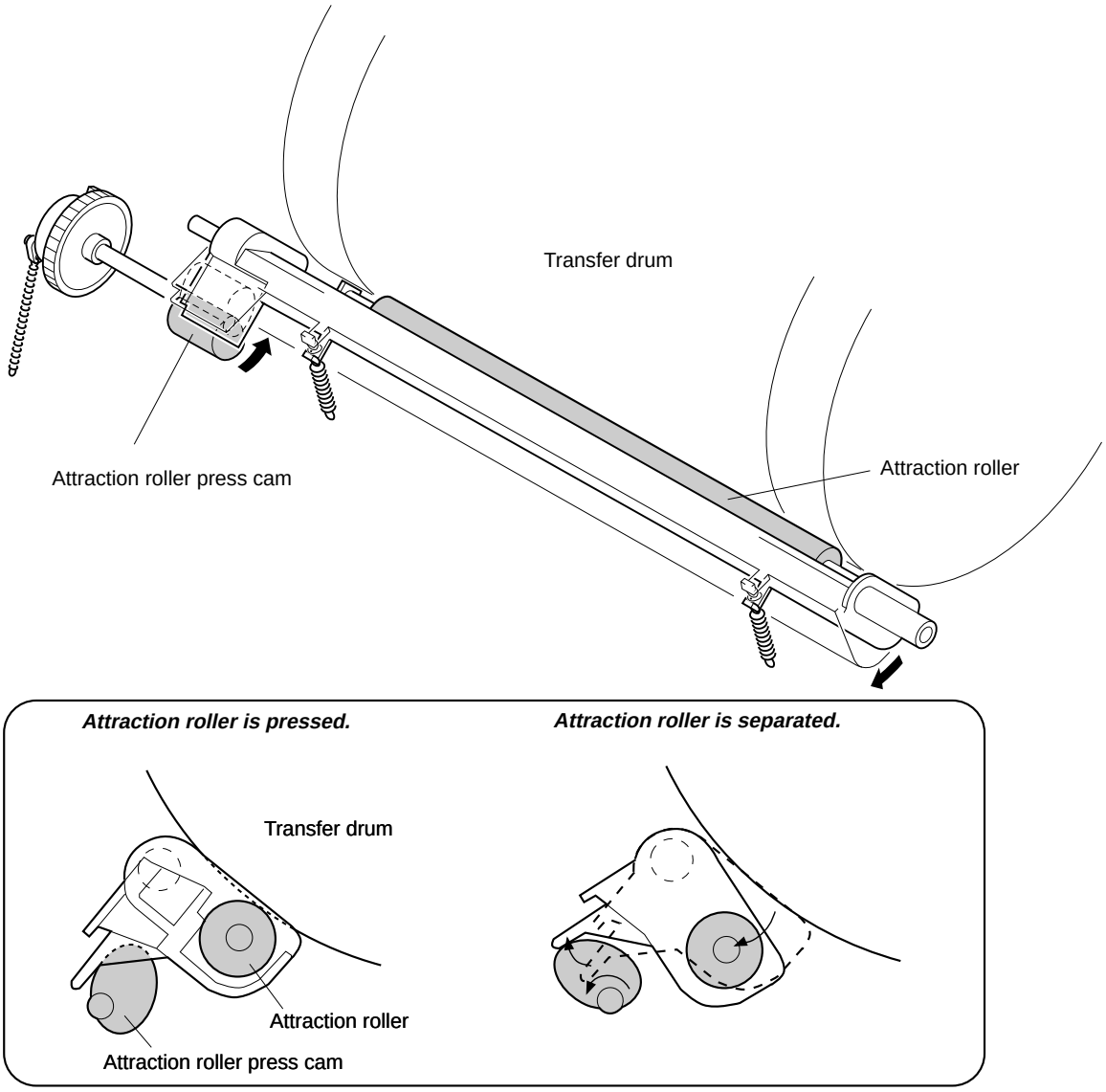


Figure 3-69 Attraction roller operation

Separation

Upon completion of the transfer, the gripper solenoid (SL4) is turned on and the gripper opens to raise the leading edge of the paper. The separation claw solenoid (SL5) is also turned on to actuate the separation claw, which then scoops up the leading edge of the paper to separate the paper from the transfer drum. The separation of the paper is detected by the separation sensor (PS7).

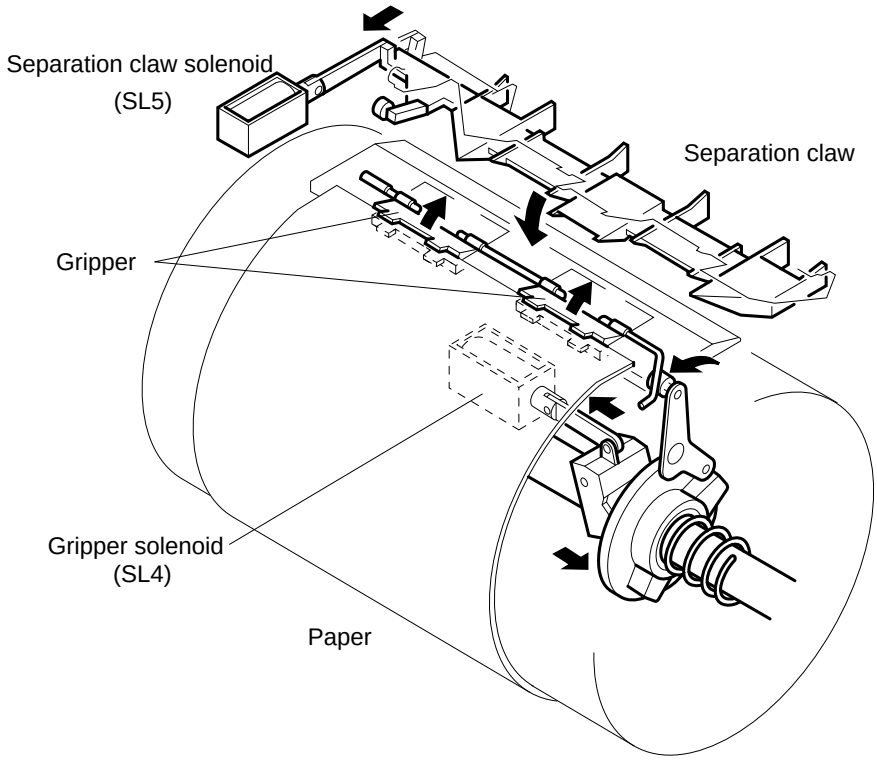


Figure 3-70 Separation mechanism

Transfer drum cleaner

The transfer drum cleaner is operated following the prescribed number of prints, at power-on, door-open/close or cleaning of the density detection pattern after image quality stability control.

The transfer drum cleaner is normally separated from the transfer drum. After the transfer is completed and the paper is separated, the transfer drum cleaner press solenoid (SL8) is turned on to actuate the transfer drum cleaner press cam to press the cleaning brush against the transfer drum. When the cleaning brush motor (M5) is turned on, the cleaning brush starts rotating. After this cleaning is

completed, SL8 is turned off to release the cam, and the spring force separates the cleaning brush from the transfer drum. Simultaneously, the cleaning brush motor is turned off.

For continuous printing, the cleaning brush rotates only after the transfer occurs for the last sheet.

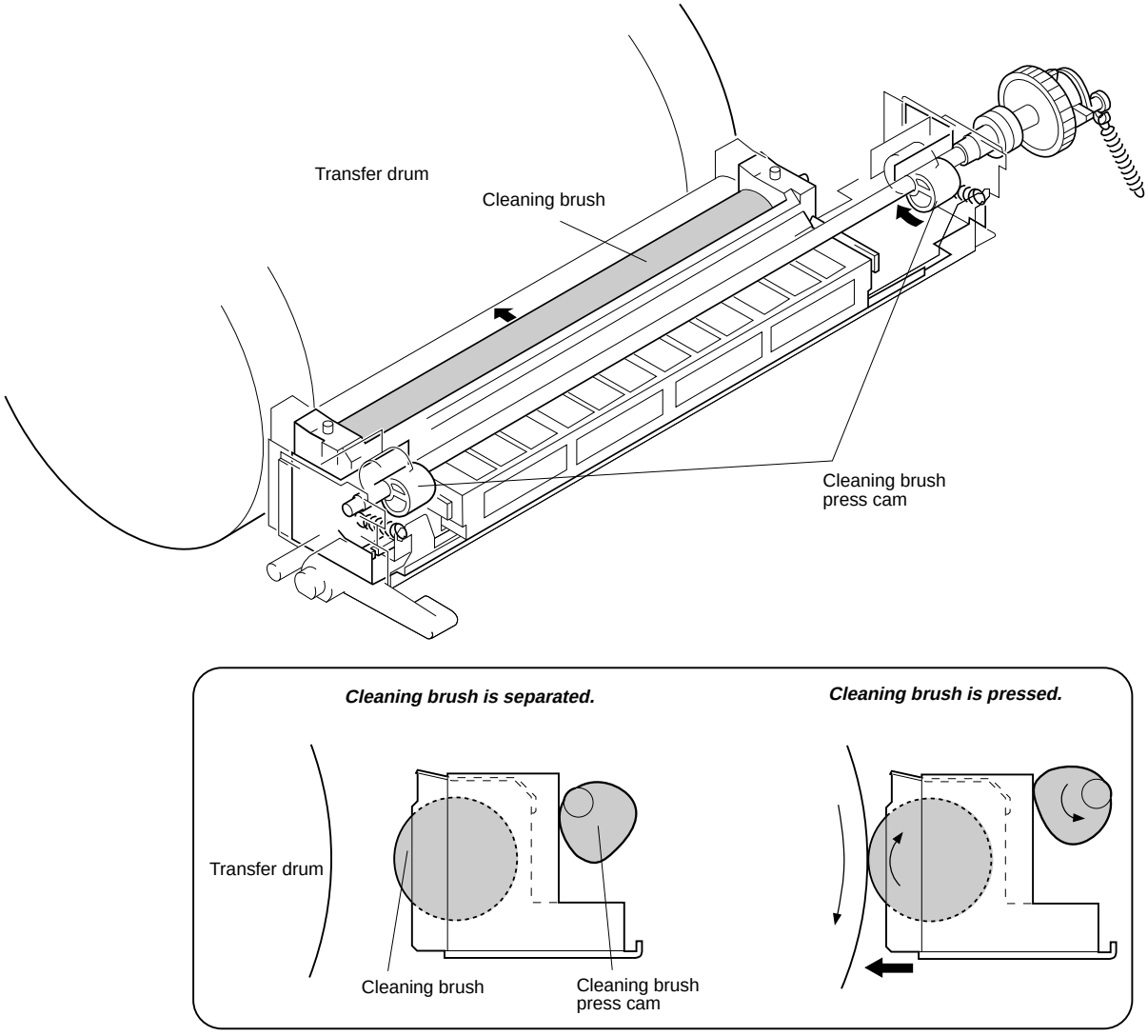


Figure 3-71 Transfer drum cleaning mechanism

Discharge roller

The discharge roller is normally pushed up by the discharge roller press cam so that it is separated from the transfer roller. After the paper is separated from the transfer drum, the discharge roller press solenoid (SL9) is turned on to release the cam and thus press the discharge roller against the transfer drum. After the discharge, SL9 is turned off to actuate the cam to push the discharge roller up, and then separate it from the transfer drum.

The discharge roller is not driven by any motor, but rotates along with the transfer drum. The discharge voltage corresponding to one cycle of the transfer drum is applied to the discharge roller to neutralize the electric charge remaining on the transfer drum surface.

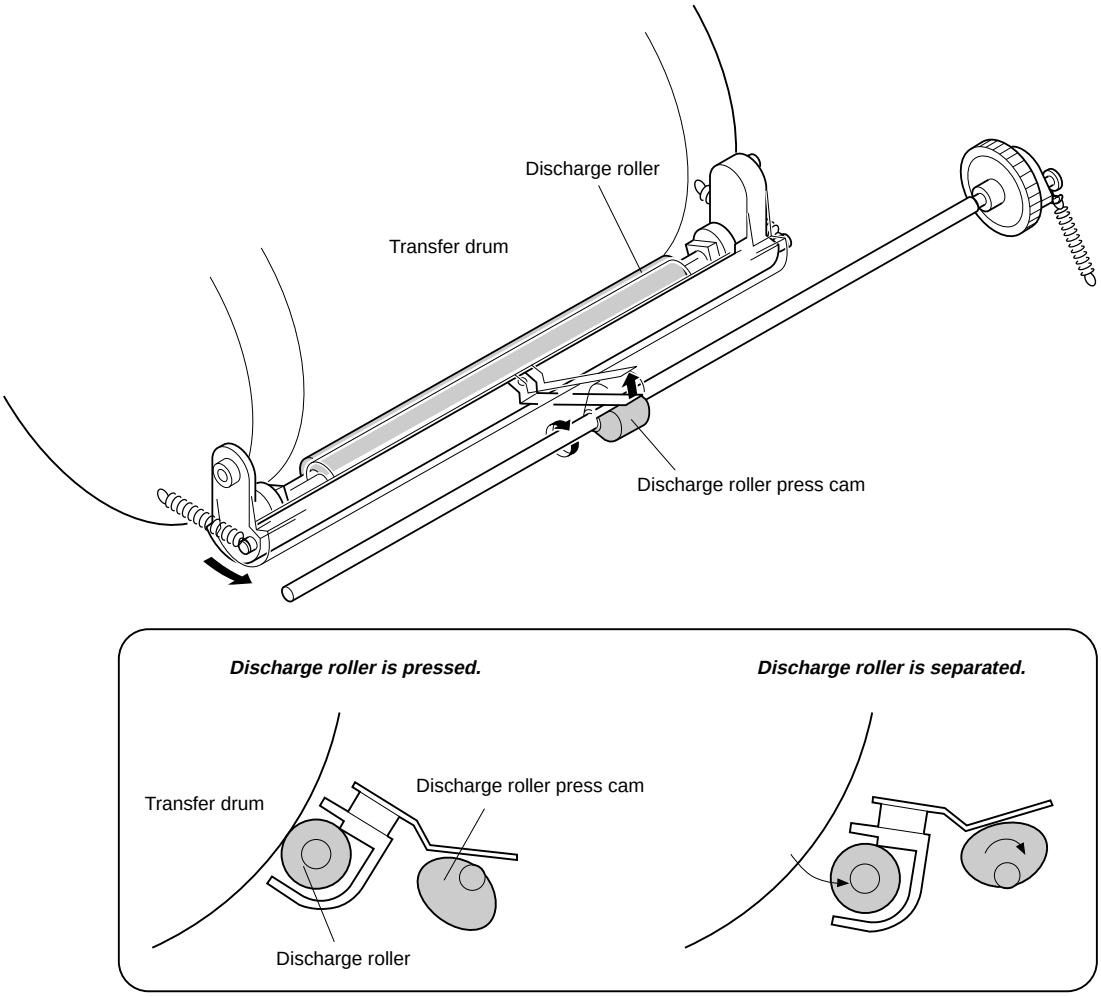


Figure 3-72 Discharge roller

Drum motor drive circuit

The drum motor is a four-phase stepping motor controlled by the drum motor driver (Q2002) on the mechanical controller. It drives the photosensitive drum and the transfer drum.

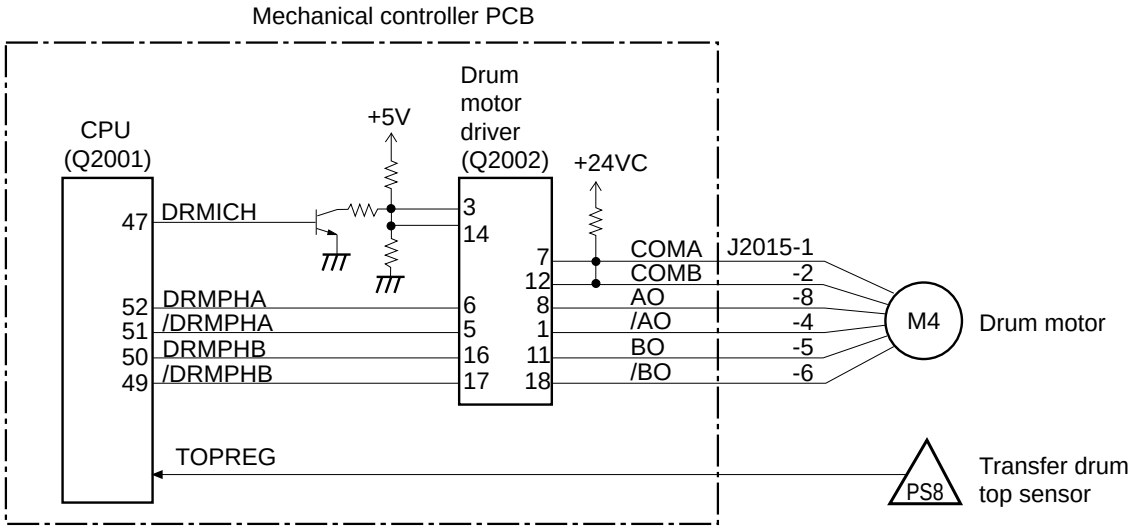


Figure 3-73 Drum motor drive circuit

Upon receiving the print sequence command, the CPU (Q2001) in the mechanical controller sends the drum motor control signals (DRMPHA, /DRMPHA, DRMPHB, and /DRMPHB) and the drum motor rotation rate select signal (DRMICH) to the drum motor driver (Q2002) 0.2 seconds after the fixing unit motor starts. The Q2002 sends the drive signal to the drum motor based on these signals. 24VC power supply is used to drive the drum motor.

In order to slow down the paper feed speed through the fixing unit in OHP mode, the CPU sets the DRMICH signal to “H” to drive the drum motor at a low speed.

If the transfer drum top sensor signal (TOPREG) remains unchanged for six seconds or more (12 seconds in OHP mode), the CPU assesses it as a drum motor error.

Cleaning brush motor drive circuit

The cleaning brush motor is a DC brushless motor. Controlled by the CPU on the mechanical controller, it is used to drive the cleaning brush.

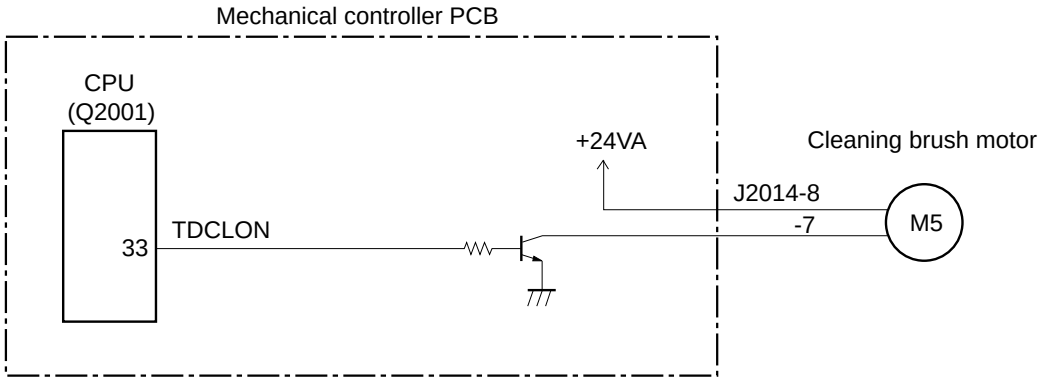


Figure 3-74 Cleaning brush motor drive circuit

Upon power-on, door-open/close or cleaning of the density detection pattern after image quality stability control or after the paper is separated following the prescribed number of prints, the CPU sets the cleaning brush motor drive signal (TDCON) to “L” to drive the cleaning brush.

Fixing and delivery unit

The paper separated from the transfer drum is fed into the fixing unit and delivered after passing through the fixing upper and lower rollers and the fixing unit delivery roller. Delivery from the fixing unit is detected by the delivery paper sensor (PS9). For the face-up tray, the paper is delivered without passing over any additional roller, while for the face-down tray, it is delivered after passing over the face-down delivery roller. The deflector that selects face-up delivery or face-down delivery is automatically switched by opening or closing the face-up tray.

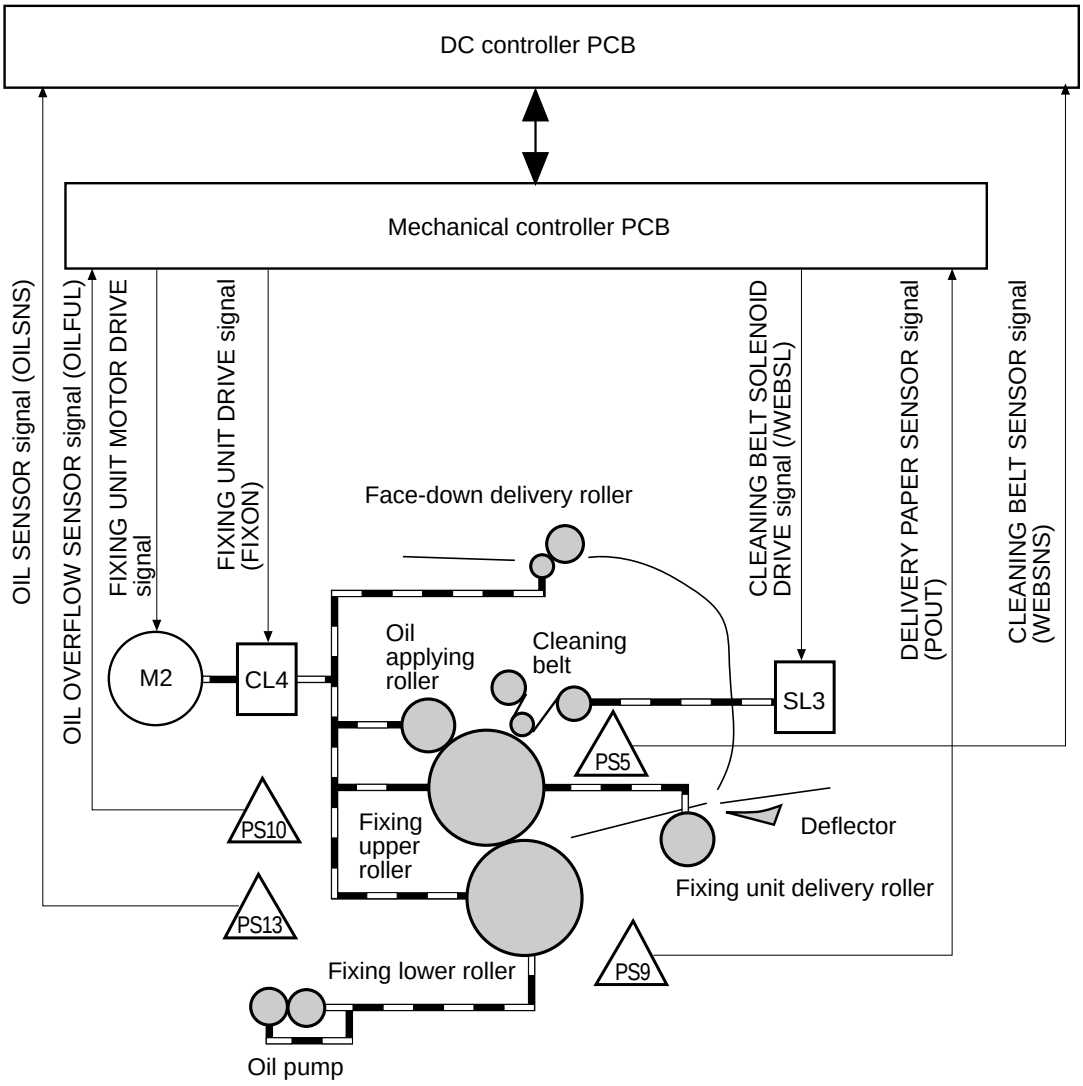


Figure 3-75 Fixing and delivery unit

The fixing upper/lower rollers, the fixing unit delivery roller, the oil applying roller, the face-down delivery roller, and the oil pump are driven by the fixing unit motor (M2). The cleaning belt is driven by the cleaning belt drive solenoid (SL3).

When the registration position for the fourth color in full-color mode or the first registration position in mono-color mode is detected on the transfer drum, the mechanical controller turns on the fixing unit drive clutch (CL4). This transmits the rotation of the fixing unit motor to the fixing upper and lower rollers, the fixing delivery roller, the oil applying roller, and the oil pump.

The fixing upper and lower rollers each have one built-in fixing heater (H1: 485W/100-120V; 430W/220-240V) that heats the roller. The fixing temperature is detected by the thermistor (TH) in the center of the lower roller surface. The thermoswitches are in contact with the respective shafts of the fixing upper and lower rollers.

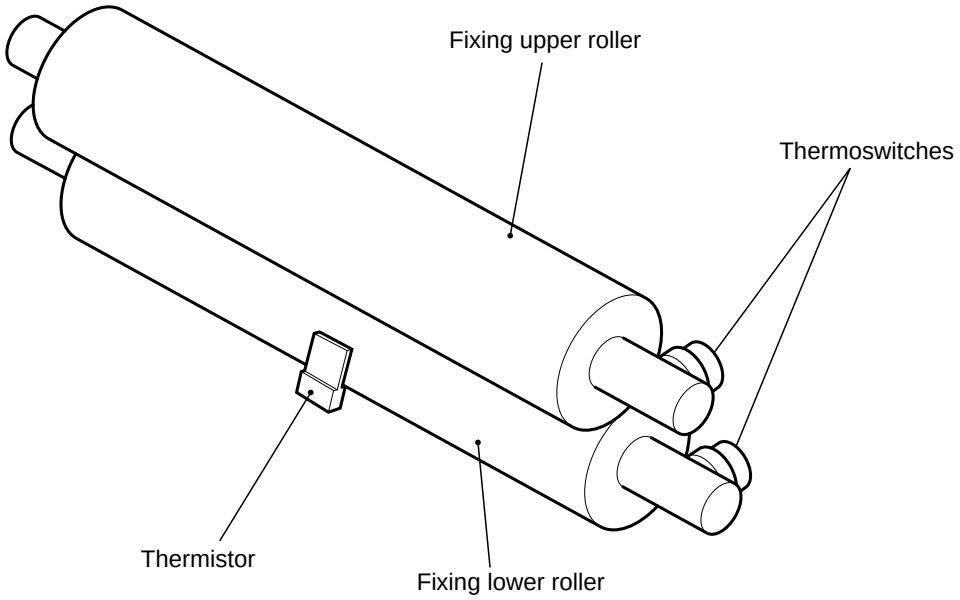


Figure 3-76 Fixing rollers and thermistor

This printer has a mechanism to detect the absence of the fixing unit. If the fixing unit is not installed, the DC controller notifies the video controller of this error.

In order to prevent any offset, a mechanism applies oil to the surfaces of the fixing rollers. Also, the cleaning belt makes contact with the fixing rollers to clean them.

OHP (Overhead projector) sheet mode

The fixing ability of OHP sheets is poorer than that of normal paper sheets. To raise the fixability level, the feed speed for an OHP sheet is slowed down to half that of normal paper while the OHP sheet is passing through the fixing unit.

The distance between the transfer drum and the fixing unit is short. So the trailing edge of the paper is still in the transfer process when the leading edge has reached the fixing unit. If the rotational speed

of only the fixing roller is slowed down to half of its normal speed without changing that of the transfer drum, the feed speed differs between the leading and trailing edges of the paper. In this case, the image is distorted as the paper curls. To deal with this problem, the OHP sheet is not separated immediately after the transfer is complete, but the transfer drum rotates one additional turn with the OHP sheet on it. After the transfer is complete up to the trailing edge of the OHP sheet, the rotational speed of the transfer drum is slowed down to half of its normal speed. At this time, the photosensitive drum is separated from the transfer drum so that the toner image on the OHP sheet is not disturbed. Subsequently, the OHP sheet leaves the transfer drum and then proceeds to the fixing unit.

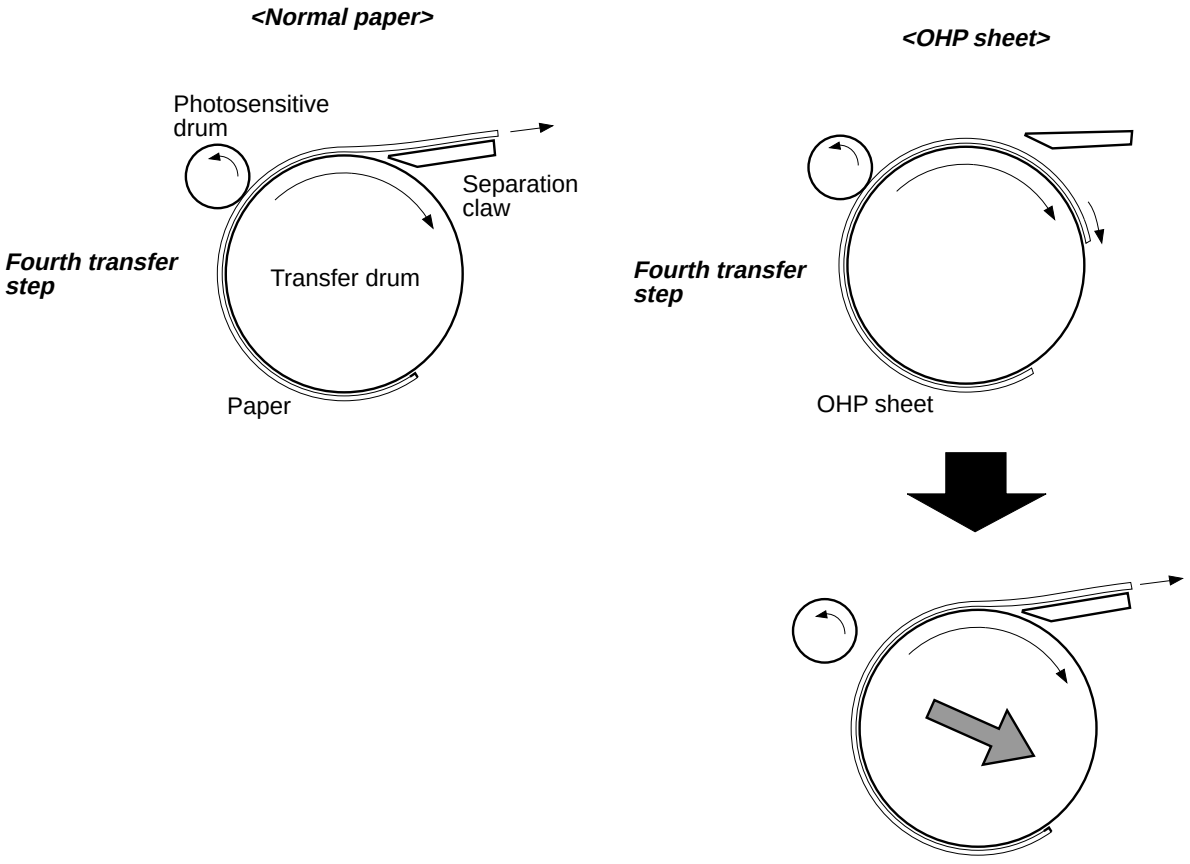


Figure 3-77 OHP sheet mode

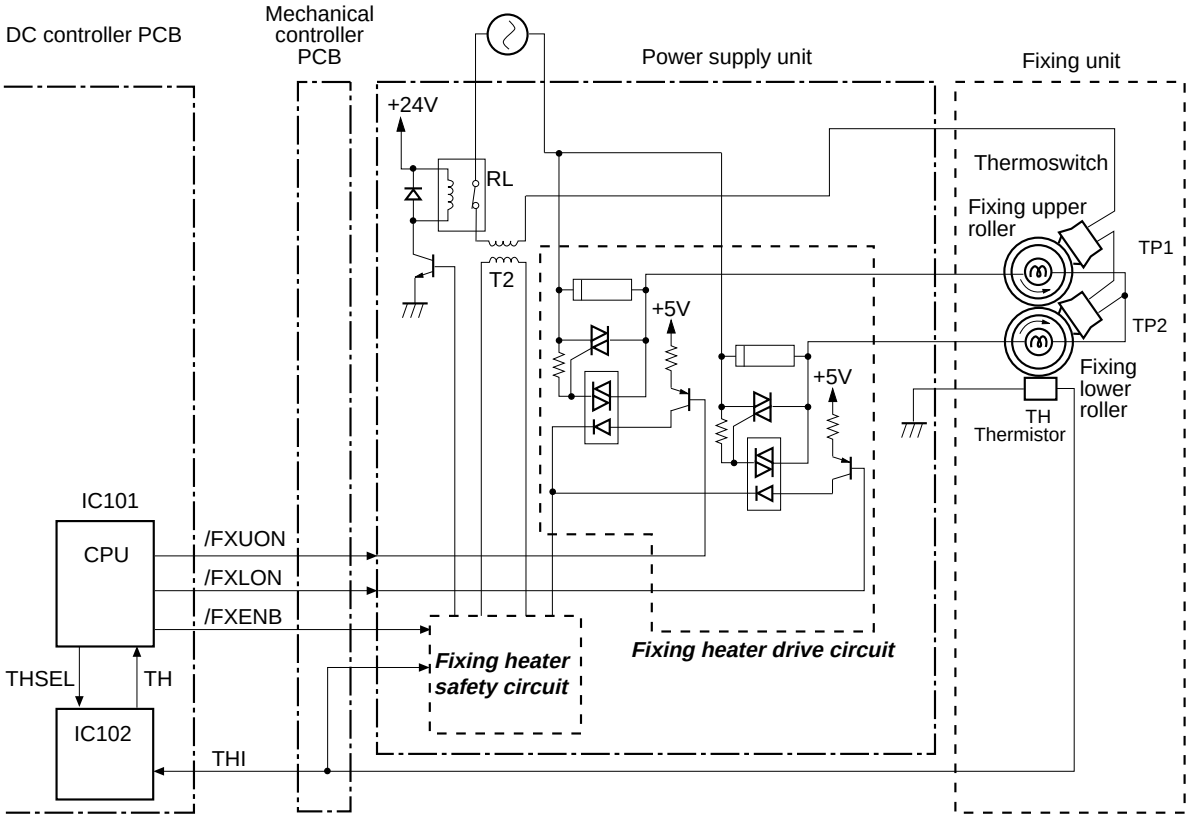


Figure 3-78 Fixing temperature control

The fixing temperature is detected by the thermistor (TH) on the fixing lower roller surface. As the surface temperature of the fixing lower roller rises, the resistance value of TH lowers and the voltage of the fixing temperature detect signal (THI) sent to the IC102 in the DC controller and the safety circuit in the power supply unit decreases.

When the DC controller outputs pulses as the fixing temperature control enable signal (/FXENB) to the fixing heater safety circuit, it controls the fixing temperature. The microcomputer (CPU) on the DC controller controls the fixing heater drive signals (/FXUON and /FXLON) so as to maintain the fixing temperature at the specified value based on the voltage of the THI signal.

The fixing temperature varies depending on the image gloss modes.

This printer starts rising the fixing temperature while it is in the WAIT period, and when it reaches the target value the printer enters the STANDBY state.

If the fixing temperature is less than 100°C when it starts being increased, the target temperature is set to a value higher than normal. After a certain period of time, the value is returned to the normal target temperature.

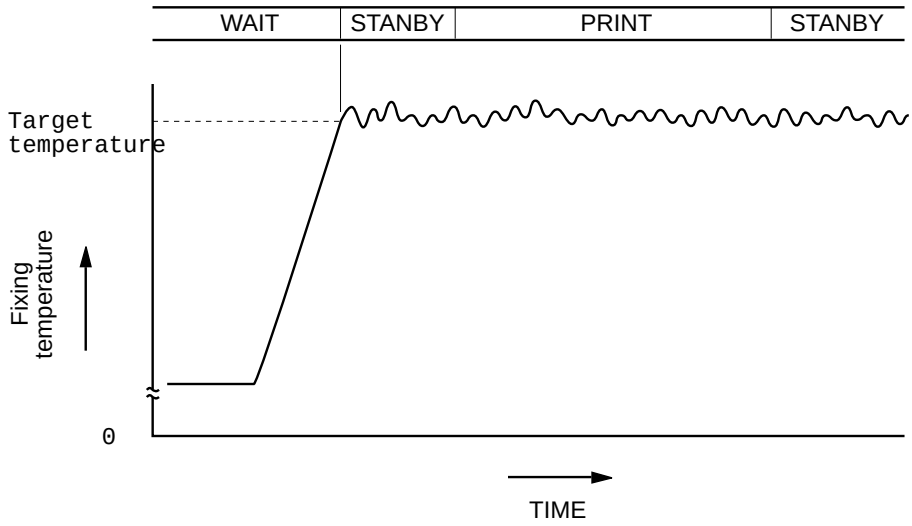


Figure 3-79 Fixing temperature

Notes:

- Image gloss

  This printer allows the image gloss to be changed in three steps by signals from the video controller.

Image gloss mode	Low-gloss mode	Normal-gloss mode	High-gloss mode
Target temperature	162°C	167°C	173°C

- Even if the fixing temperature reaches the target value while image quality stability control and toner cartridge detection are still in progress, the printer will not enter the STANDBY state.

Detecting fixing unit errors

Preventing malfunctions of the fixing heater

In order to prevent the fixing heater from malfunctioning, the Colorwriter provides the following safety functions:

- The CPU monitors the voltage of the fixing temperature detect signal (THI). If it detects any abnormal value, it will notify the video controller of a fixing heater error and then shut off the power supplied to the heater.
- If the fixing temperature rises abnormally and the temperature detected by the thermistor exceeds 217°C, the safety circuit will shut off the power supplied to the fixing heater irrespective of the output from the CPU. Simultaneously, the CPU recognizes it as a power supply error and notifies the video controller.
- If the fixing temperature abnormally increases and the temperature of the thermoswitch exceeds about 230°C, the thermoswitch will be turned off to shut off the power supplied to the fixing heater.

Detecting fixing unit errors

Fixing unit errors are detected by:

- The CPU on the DC controller
- Fixing heater safety circuit within the power supply circuit
- Fixing unit abnormality detection circuit within the power supply circuit

If the CPU on the DC controller detects a fixing heater error

If the fixing unit is abnormally heated or the fixing unit does not reach the specified temperature for some reason, the DC controller will store a fixing heater error and then shut off the power supplied to the heater.

The DC controller notifies the video controller of this fixing heater error. The DC controller measures the time elapsed after the power is turned off. If a fixing heater error occurs and then the power is turned ON within 30 minutes after having been turned off, the CPU will determine that the temperature of the fixing heater is not low enough and keep the fixing heater off.

The CPU recognizes any of the following situations as a fixing heater error:

- When the power is turned on, a fixing unit error is found stored in the DC controller.
- Sixty seconds after the power is turned on, the value of the fixing temperature detect signal (THI) sent to the CPU on the DC controller has not changed.
- After the fixing heater is turned on, any of the following phenomena occur:
  - The temperature of the fixing heater does not reach 40°C even after 130 seconds have elapsed.
  - The temperature of the fixing heater does not reach 60°C even after 80 seconds have elapsed since it reached 40°C.
  - The temperature of the fixing heater does not reach 80°C even after 80 seconds have elapsed since it reached 60°C.
  - The temperature of the fixing heater does not reach 100°C even after 80 seconds have elapsed since it reached 80°C.
  - The temperature of the fixing heater does not reach 120°C even after 80 seconds have elapsed since it reached 100°C.
  - The temperature of the fixing heater does not reach the target value even after 160 seconds have elapsed since it reached 120°C.
- The temperature of the fixing heater decreases below 120°C after it reaches the target value once.
- The temperature of the fixing heater exceeds 200°C during the STANDBY or PRINT period. (The fixing heater malfunctions).
- When the THI signals are compared after changing the sensitivity of the thermistor from the high range to the low range, there is almost no difference recognized (the wiring for the thermistor is broken).

Notes:

- If a malfunction occurs in the fixing heater, do not turn on the printer power switch for about 30 minutes. Even if the power switch is turned on during this time period, the CPU assesses that a fixing heater malfunction has occurred and the fixing heater will not be turned on to prevent it from overheating.
- OFF time measurement

  The off-timer circuit on the DC controller PCB can measure the elapse of time after the power is turned off. The measured time is used to release fixing unit errors and the environment-change correction control.

While the power is turned on, the CPU (IC101) sets the off-timer charge signal (/TCCHG) to be output to IC102 to “L” to charge C106. After the power is turned off, C106 begins to discharge.

When the power is turned ON again, the CPU detects the voltage of C106 with the off-time sense signal (OFTMR), and sets the TCCHG signal to “L” and charges C106 to the specified voltage. Then the off-timer discharge signal (TCDIS) is set to “H” and C106 is forcibly discharged to the voltage level measured at the time of power-on, and the required time is measured. Based on this measured time, the time during which the power was turned off is calculated.

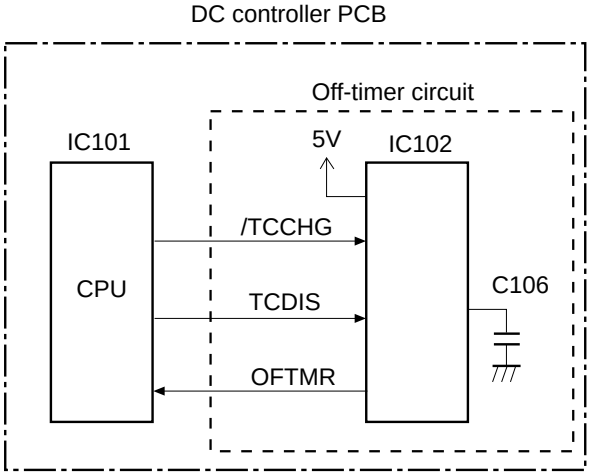


Figure 3-80 Off-timer circuit for fixing heater errors

- Changing the thermistor sensitivity

  The sensitivity of the thermistor differs between its high and low temperature ranges. In order to increase the detection accuracy in either range, the CPU in the DC controller uses the thermistor sensitivity select signal (THSEL) to switch the thermistor sensitivity between the mode in which the detection accuracy is higher at low temperatures and that in which it is higher at high temperatures. When the THSEL signal becomes “H,” the thermistor is put in the low temperature detection mode, and when “L,” in the high temperature detection mode.

If the fixing heater safety circuit detects a malfunction in the fixing heater

The fixing heater safety circuit in the power supply unit will shut OFF the power supplied to the fixing heater if the fixing temperature rises abnormally.

The operation of this circuit is shown in Figure 3-81 on page 3-105.

The safety circuit IC (Z4) in the power supply unit monitors the fixing temperature detect signal (THI) sent to pin No. 14. If the voltage output from the thermistor becomes about 1.6V with an increase in the fixing temperature, the safety circuit IC will set the output of pin No. 5 to “L” and turn off the relay (RL) to shut off the power supplied to the fixing heater.

Simultaneously, the safety circuit sensing signal (SFSNS) sent to the CPU on the DC controller becomes “H.” With this setting, the CPU assesses that a failure has occurred in the fixing unit and notifies the video controller of a power supply failure.

To reset this circuit, first turn off the printer for about 30 minutes, and then turn it on again.

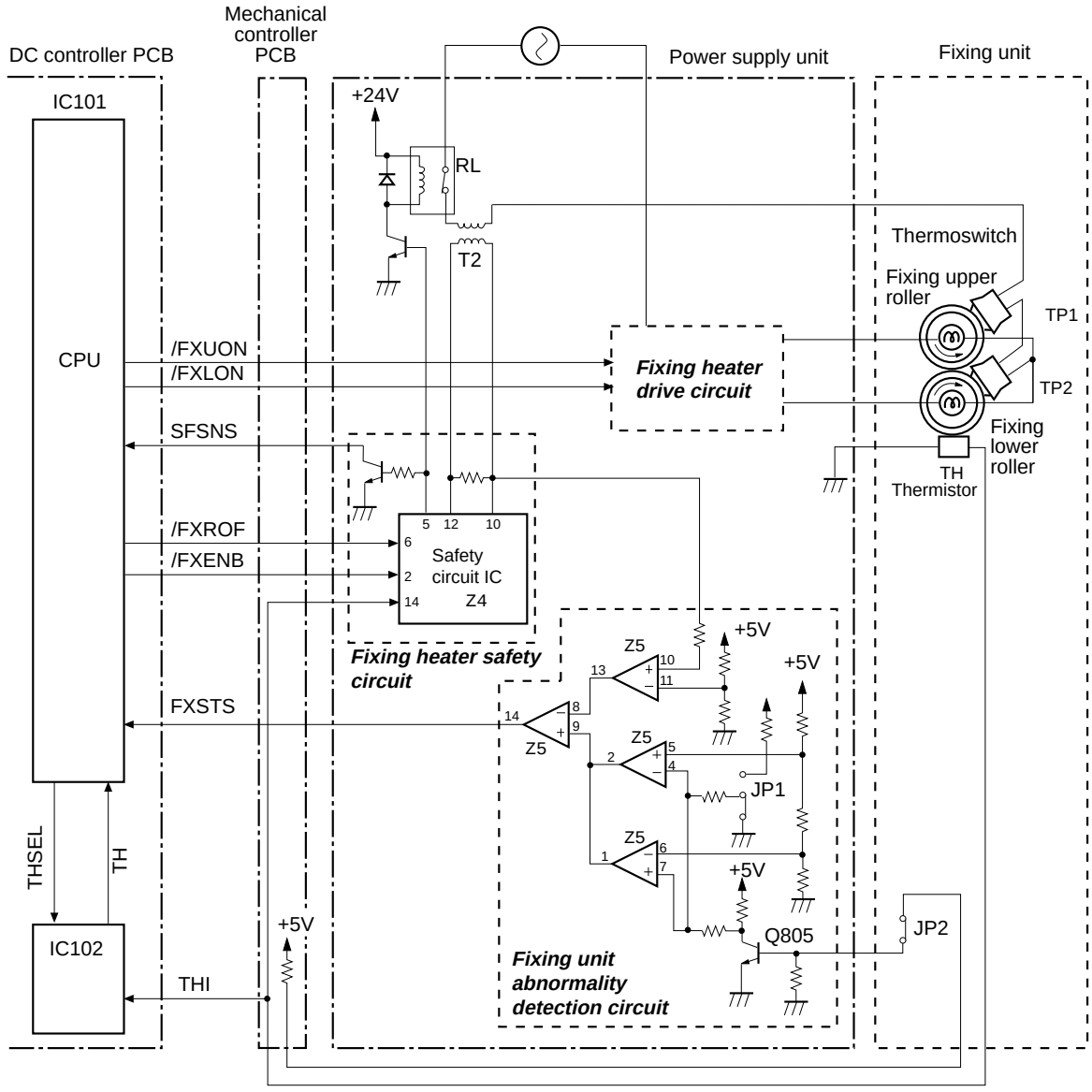


Figure 3-81 Fixing heater safety circuit

Fixing unit abnormality detection circuit detects a failure

Located in the power supply unit, this circuit monitors the fixing unit for incorrect installation and the fixing heater for broken wires.

- Incorrect installation of the fixing unit

  The fixing unit abnormality detection circuit checks that the rated voltage of the power supply unit matches that of the fixing

unit. For example, if the fixing unit for 220V is connected to the power supply for the 100V version, the circuit will recognize it as a mismatch in rated voltage due to incorrect installation of the fixing unit. In this case, the CPU on the DC controller notifies the video controller of it as a power supply failure.

The rated voltage of the power supply unit is set with jumper JP1 and is monitored at pin No. 4 on Z5. The specified voltage of the fixing unit is set with jumper JP2 within the fixing unit and monitored at pin No. 7 on Z5. Pin No. 2 on Z5 becomes "L" when the rated voltage of the power supply unit matches that of the fixing unit; it becomes "H" when it does not. If there is a mismatch, the fixing unit abnormality detect signal (FXSTS) output from pin No. 14 on Z5 becomes "H," and the CPU detects the incorrect installation of the fixing unit as a result.

- Breakage of the fixing heater

  When starting the temperature control, this printer individually turns on the fixing upper and lower heaters and monitors them for breakage with the FXSTS signal.

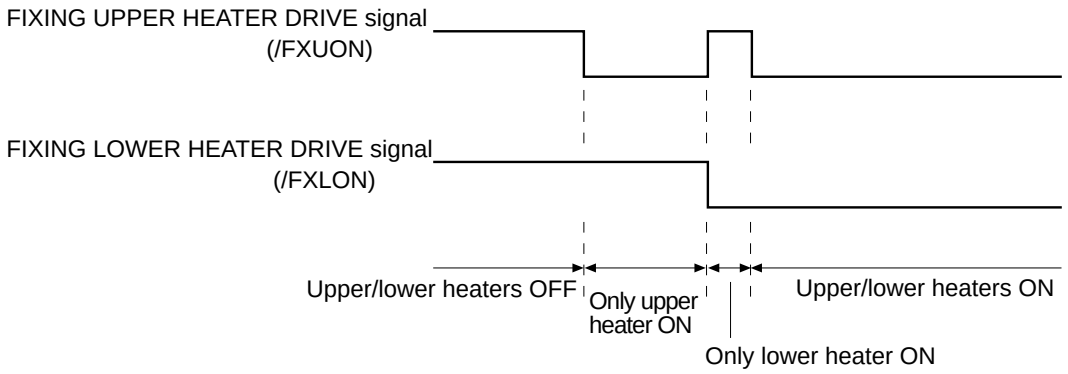


Figure 3-82 Fixing heater drive signal timing

The fixing unit abnormality detection circuit detects the AC current flowing in the fixing heater. If no AC current flows, the CPU on the DC controller will determine that the fixing heater wires are broken, notify the video controller of a fixing unit failure, and then turn off the power.

An abnormality in the AC current sent to the fixing heater is detected by the voltage generated by T2. The voltage value generated by T2 is monitored at pin No. 10 on Z5. If the fixing heater is broken and no AC current flows, Z5-13 will become "H" and the fixing unit abnormality detect signal (FXSTS) output at pin No. 14 on Z5 becomes "L." Whereas when the

AC current flows normally, the FXSTS signal alternates between "H" and "L" at a certain frequency. Thus, the CPU can detect that the fixing heater is broken by the FXSTS signal.

Note: To reset the fixing unit abnormality detection circuit after it is actuated, first turn off the printer, allow it to stand for about 30 minutes, and then turn it on again.

Oil circulation system

In order to prevent offsetting, this printer uses the oil applying roller to apply oil to the fixing rollers. The oil applying roller remains in contact with the fixing upper roller. When the fixing unit drive clutch (CL4) is engaged, the fixing unit motor drives the fixing upper and lower rollers, the oil applying roller, and the oil pump.

The oil sent from the oil bottle to the oil bottle case is collected using the pump and then dropped from the oil nozzle down to the oil applying roller. Very small amounts of oil remain on the oil applying roller and the oil applying blade. As the applying roller rotates, the oil blade controls the amount of oil and then the oil is applied to the fixing upper roller. Any excessive oil drops from both ends of the applying blade down to the oil pan and then drops down to the oil catch tray after passing through a pipe. The oil catch tray has a filter that filters out dust and other foreign matter. The filtered oil is sucked by the pump into the oil bottle for re-use.

The remaining amount of oil is detected by the oil sensor (PS13) outside the fixing unit. A floating ball in the oil bottle blocks the light emitted by PS13 as the oil level decreases and then the oil sensor signal (OILSNS) becomes "H." If the CPU on the DC controller detects that oil is low, it will issue an oil-low notice to the video controller. Subsequently, about 50 sheets of paper can be printed and then the CPU determines that oil has run out and stops the printer.

The oil catch tray is equipped with an oil overflow sensor (PS10). A floating ball with an arm is floated in the oil catch tray, and as the oil level increases, the sensor is blocked by the arm. Then, the oil overflow sensor signal (OILFUL) sent to the mechanical controller becomes "H." When the DC controller is notified of the overflow of oil by the mechanical controller, it stops the printer and issues oil-overflow to the video controller. If the OILFUL signal continues to be "H" for 2 seconds or more, the DC controller notifies the video controller that an oil overflow failure has occurred.

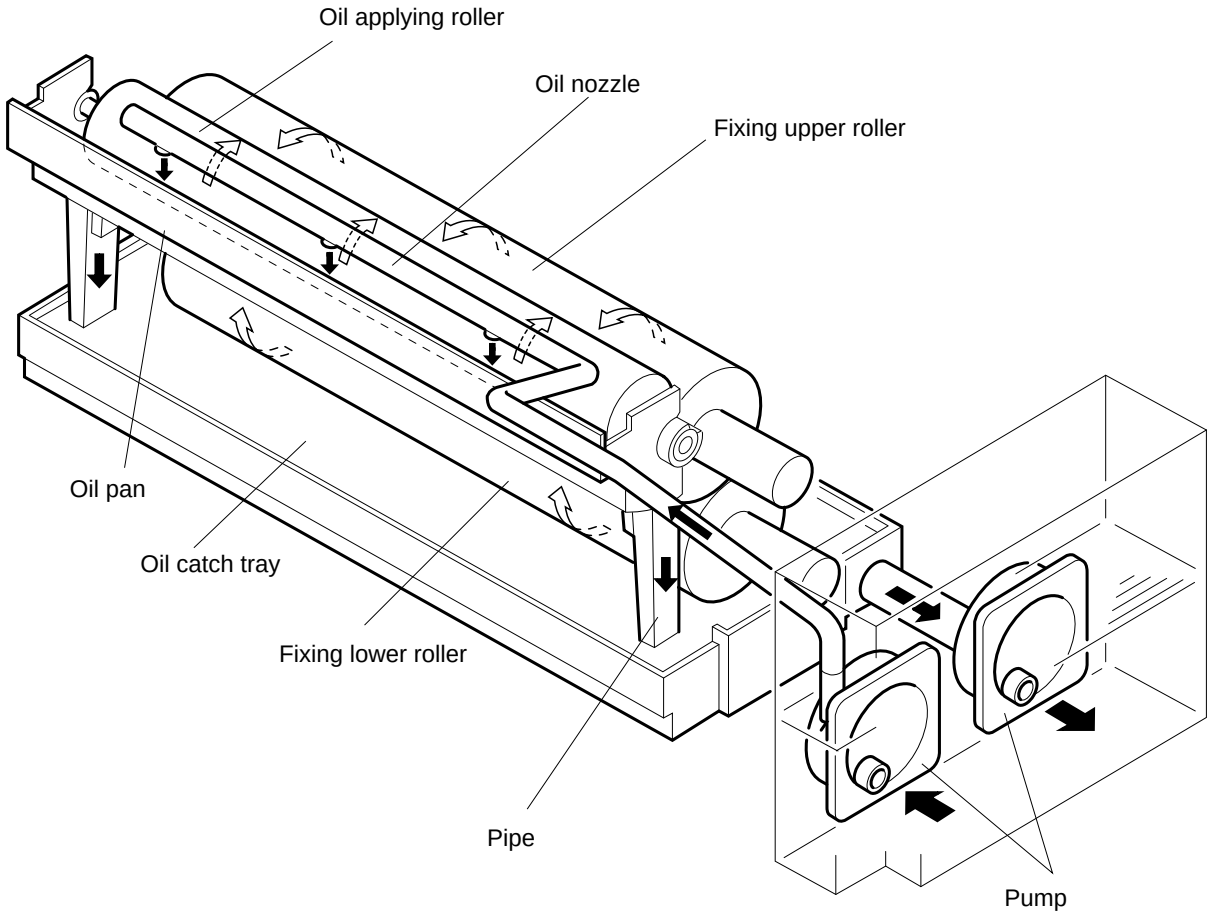
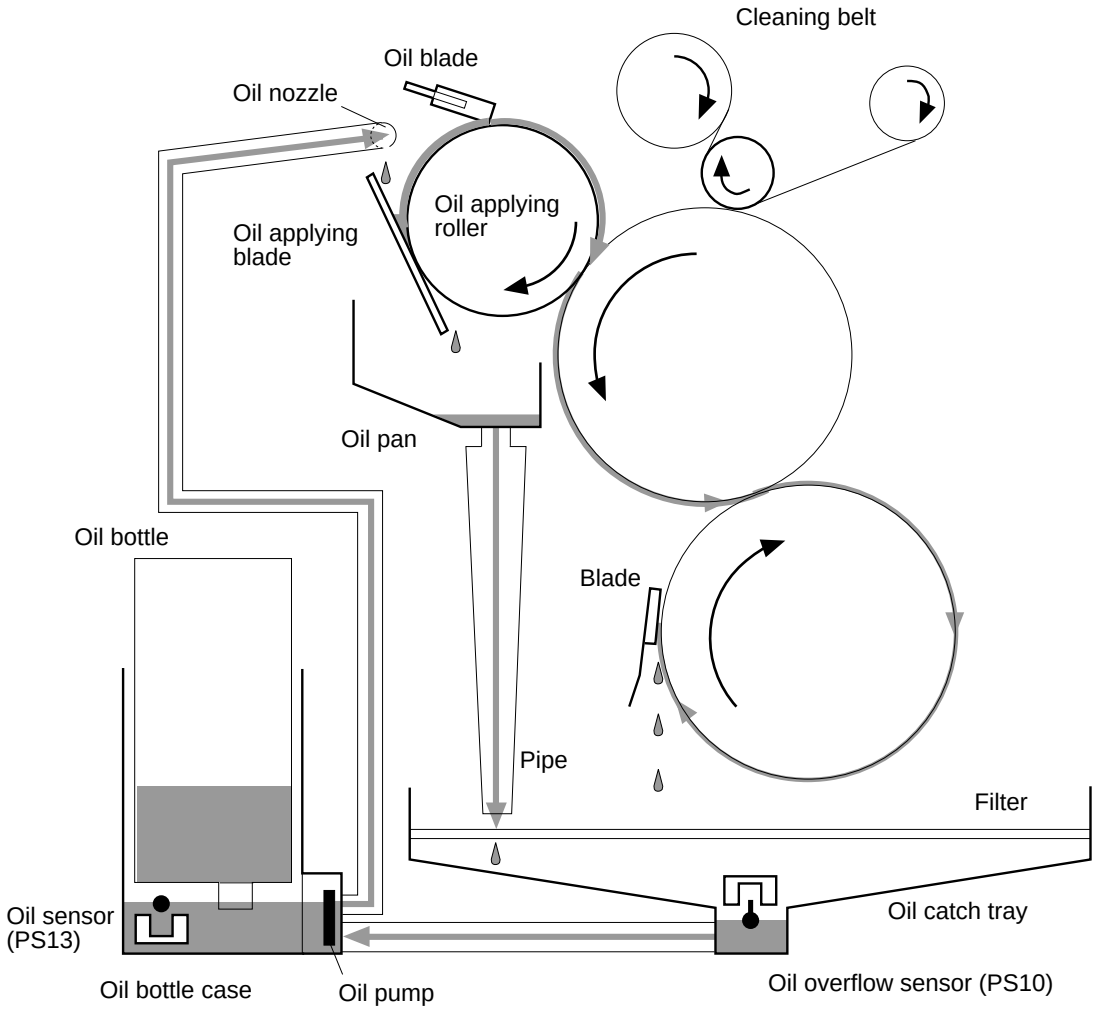


Figure 3-83 Oil system components



For the oil sensor (PS13), only its floating ball is inside the oil bottle case while its sensor unit is outside the fixing unit.

Figure 3-84 Oil circulation system

Fixing cleaner unit

The Colorwriter uses the fixing cleaner unit to clean the fixing upper roller.

The fixing cleaner unit is comprised of a cleaning belt winding roller, a cleaning belt roller, and a rolled cleaning belt. Every time a certain number of prints have been made, the cleaning belt winding roller rotates and the contact surface of the cleaning belt moves to clean the fixing upper roller. Normally, the cleaning belt moves by

one step each time the cleaning belt drive solenoid (SL3) is turned on/off. In OHP sheet mode it moves two steps.

The cleaning belt has a notch about 30cm from its trailing edge. When this notch is detected by the cleaning belt sensor (PS5), the cleaning belt sensor signal (WEBSNS) becomes “H” and the DC controller notifies the video controller that the cleaning belt is almost out. The DC controller will notify the video controller of no cleaning belt and stop the printer after about 500 more prints are output providing the fixing unit is not replaced.

Note: As this printer detects the life span of the fixing upper/lower rollers by the remaining cleaning belt, when you replace the cleaning belt be sure to also replace the fixing upper/lower rollers.

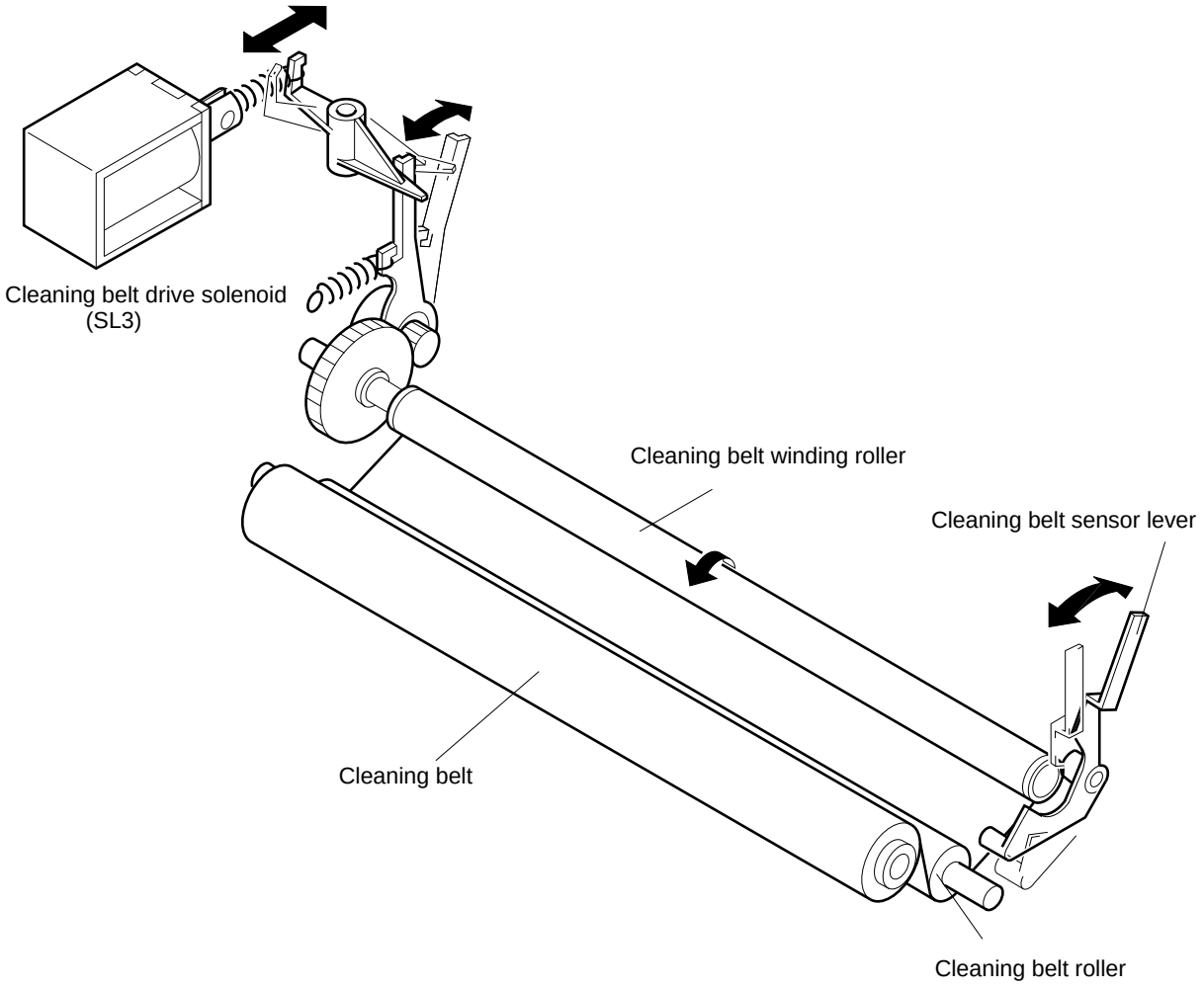


Figure 3-85 Fixing cleaner unit

Fixing unit motor drive circuit

The fixing unit motor is a DC brushless motor controlled by the CPU on the mechanical controller and used to drive the loads peripheral to the transfer drum and the fixing/delivery unit.

Those loads include:

- Fixing upper/lower rollers
- Face-down delivery roller
- Fixing unit delivery roller
- Oil applying roller
- Oil pump
- Waste toner screw
- Attraction roller press cam
- Drum press cam
- Cleaning brush press cam
- Discharge roller press cam

When the print sequence command is received, the CPU (Q2001) in the mechanical controller sets the fixing unit motor drive signal to “L” to drive the fixing unit motor.

The mechanical controller monitors the fixing unit motor ready signal (/MRDY) to check whether the fixing unit motor is rotating at the specified speed. If the fixing unit motor reaches the specified value, the /MRDY signal will become “L.” When the /MRDY signal becomes “H” for two seconds or more continuously, the CPU will determine that a fixing unit motor failure has occurred.

In the OHP sheet mode, the CPU sets the fixing unit motor rotation rate select signal (MLOW) to “H” to slow down the rotational speed to half the normal speed and thus improve the fixability.

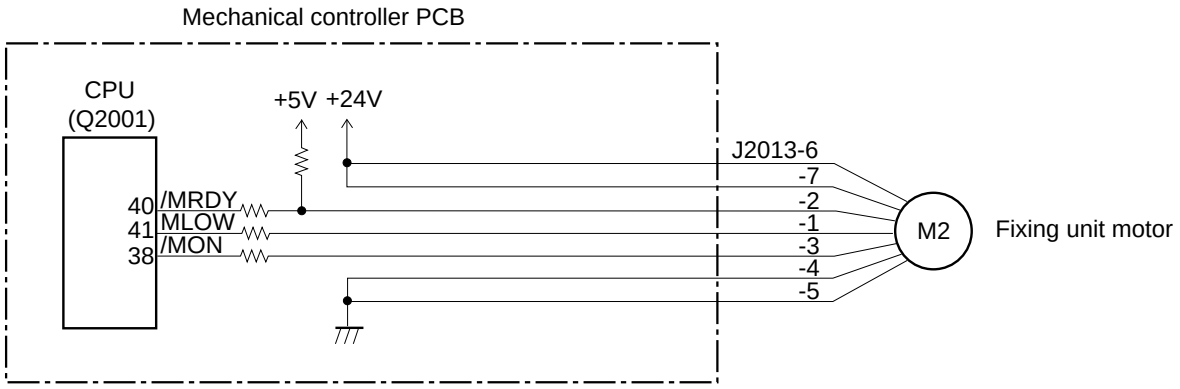


Figure 3-86 Fixing unit motor drive circuit

Paper jam detection

The following paper sensors are provided to detect whether paper is present and whether the paper is fed normally:

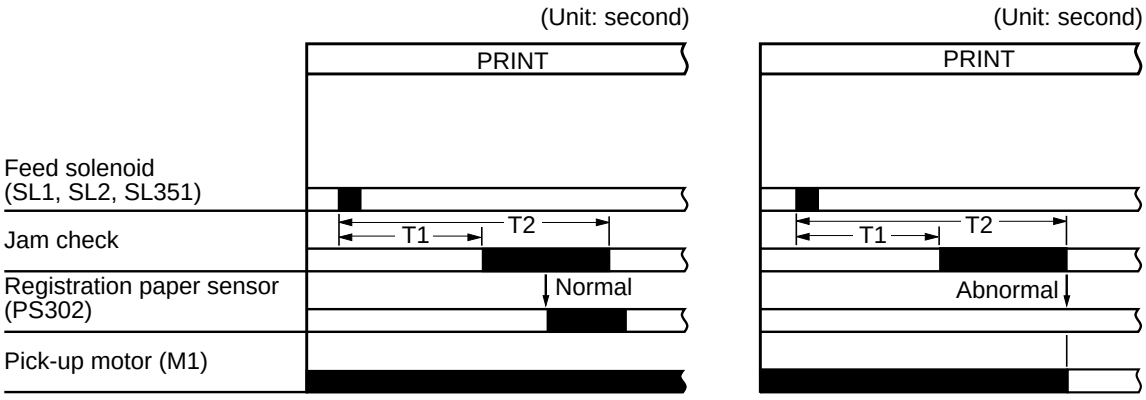
- PS302 Registration paper sensor on the pick-up PCB
- PS303 Paper top sensor on the pick-up PCB
- PS6 Attraction sensor
- PS7 Separation sensor
- PS9 Delivery paper sensor

The CPU in the mechanical controller determines if a paper jam has occurred by checking for the presence of paper in the sensor at the timing preset in its CPU.

If the CPU determines that a jam has occurred, it will report the jam to the DC controller and stop the print operation. The DC controller then notifies the video controller that a jam has occurred.

Pick-up delay jam

The CPU determines that a pick-up delay jam has occurred if the paper has not reached the registration paper sensor (PS302) within a specified period of time after the feed solenoid is engaged.



T1=0.83 (Cassette feed, Manual feed), 1.17 (Paper feeder)

T2=2.57 (Cassette feed, Paper feeder), 2.07 (Manual feed)

Figure 3-87 Pick-up delay jam timing

Paper top position delay jam

The CPU determines that a paper top position delay jam has occurred if the paper does not reach the paper top sensor (PS303) within a specified period of time after the registration paper sensor (PS302) detects the leading edge of the paper.

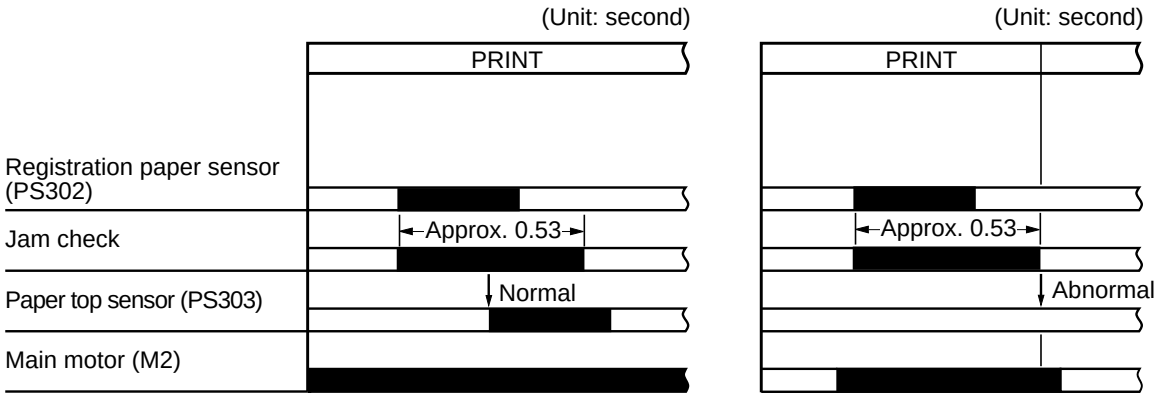


Figure 3-88 Paper top position delay jam timing

Grip jam

The CPU determines that a grip jam has occurred if the attraction sensor (PS6) does not detect the paper a specified period of time after transfer drum registration position detection (in the full-color mode, the registration position for the fourth color is detected).

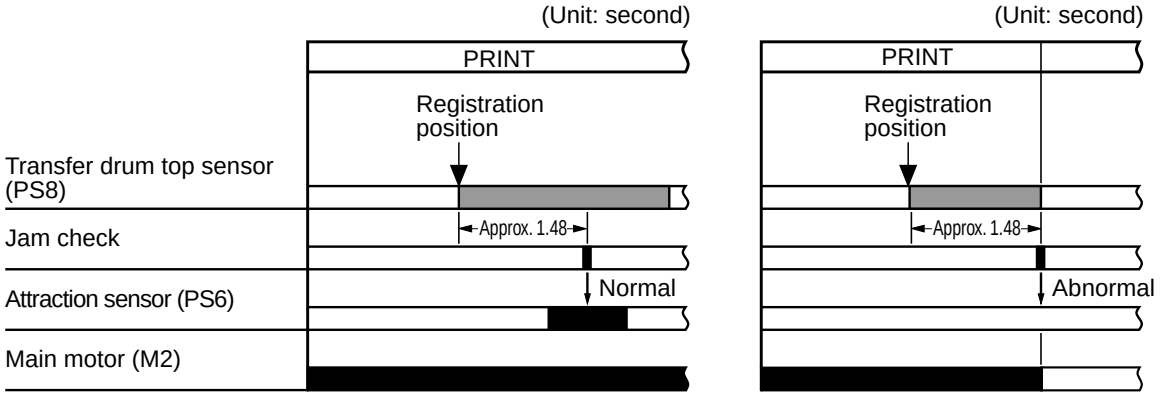
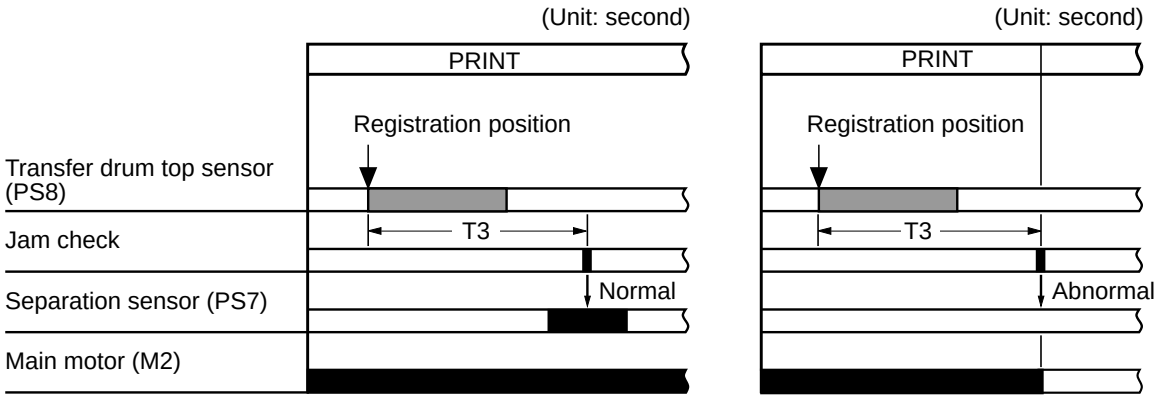


Figure 3-89 Grip jam timing

Separation delay jam

The CPU determines that a separation delay jam has occurred if the paper does not reach the separation sensor (PS7) a specified period of time after transfer drum registration position detection (in the full-color mode, the registration position for the fourth color is detected).

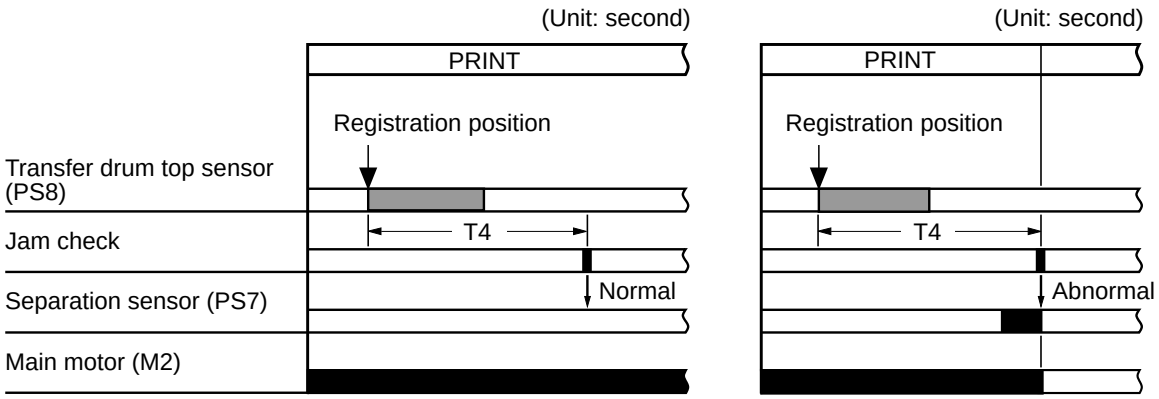


T3=4.17 (6.88 in case of OHP)

Figure 3-90 Separation delay jam timing

Separation stationary jam

The CPU determines that a separation stationary jam has occurred if the paper is detected by the separation sensor (PS7) a specified period of time after transfer drum registration position detection (in the full-color mode, the registration position for the fourth color is detected).

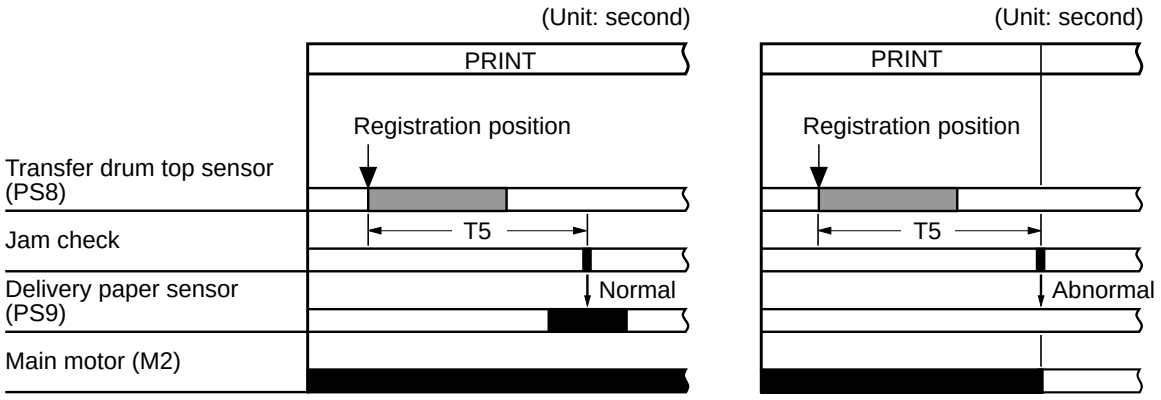


T4=3.4 (5.3 in case of OHP)

Figure 3-91 Separation stationary jam timing

Delivery delay jam

The CPU determines that a delivery delay jam has occurred if the paper does not reach the delivery paper sensor (PS9) a specified period of time after transfer drum registration position detection (in the full-color mode, the registration position for the fourth color is detected).

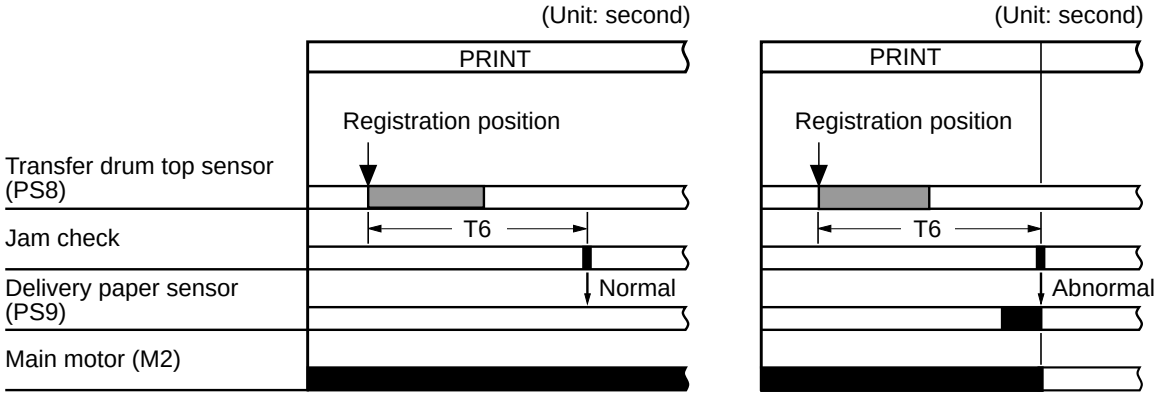


T5=5.23 (8.99 in case of OHP)

Figure 3-92 Delivery delay jam timing

Delivery stationary jam

The CPU determines that a delivery stationary jam has occurred if the paper does not pass through the delivery paper sensor (PS9) a specified period of time after transfer drum registration position detection (in the full-color mode, the registration position for the fourth color is detected).



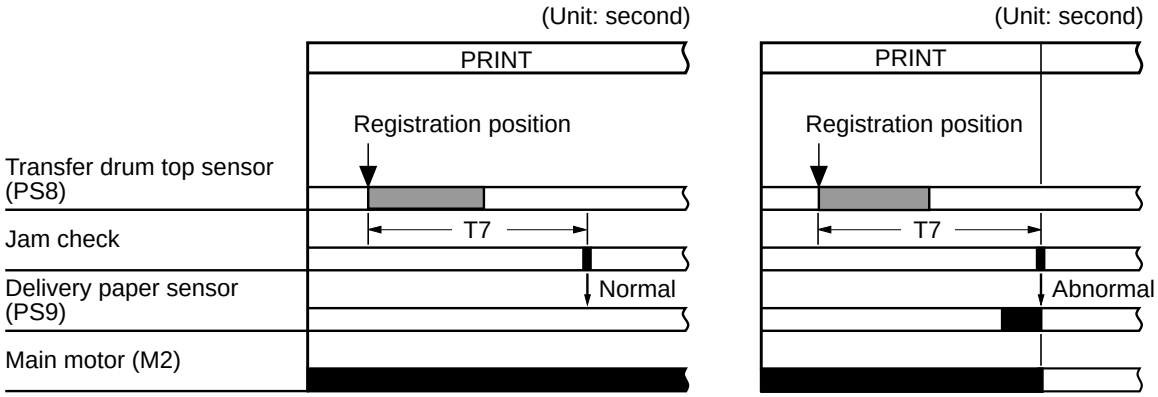
T6=8.91 (15.06 in case of OHP)

Figure 3-93 Delivery stationary jam timing

Multi-feed paper stationary jam

The CPU determines that multi-feed paper sheets remain in the printer when the following situation has occurred.

The CPU determines that a multi-feed paper stationary jam has occurred if the delivery paper sensor (PS9) detects paper a specified period of time after transfer drum registration position detection (in the full-color mode, the registration position for the fourth color is detected).



T7=0.5, 1.0, 2.0, 3.0

Figure 3-94 Multi-feed paper stationary jam timing

Non-dedicated OHP sheet jam

The CPU determines that an OHP sheet other than the dedicated one has been fed when the following situation has occurred.

The CPU determines that a non-dedicated OHP sheet jam has occurred (1) if the OHP sheet (white band on the leading edge of the OHP sheet) is not detected by the paper top sensor (PS303) a specified period of time after transfer drum registration position detection (in the full-color mode, the registration position for the first color is detected) or (2) if it is detected after a specified time subsequent to that.

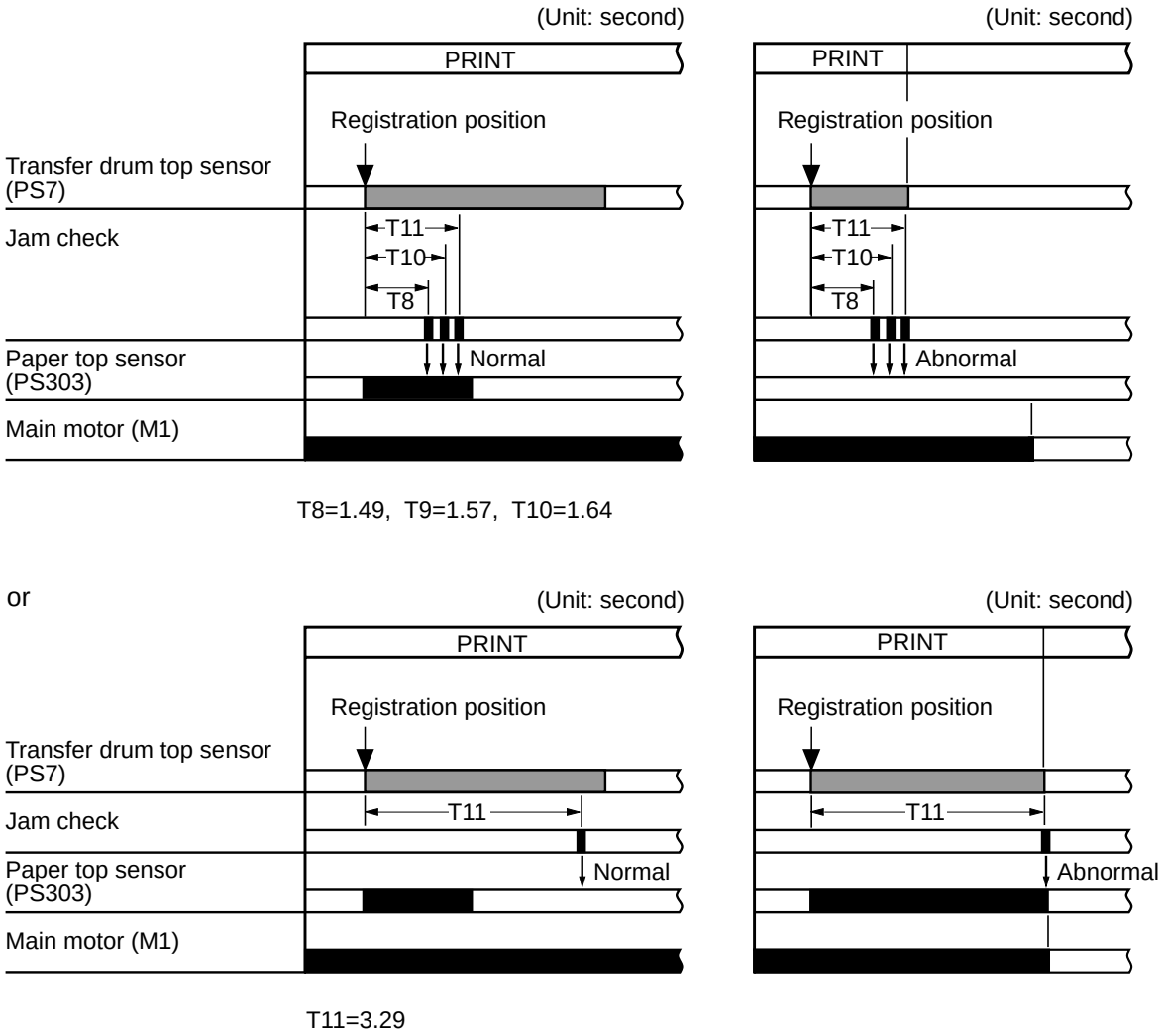


Figure 3-95 Non-dedicated OHP sheet jam timing

Wrong paper size feed jam

The CPU detects the paper size with the paper top sensor (PS303).

It determines that a wrong paper size feed jam has occurred if it detects that a paper shorter than 230 mm or longer than 380 mm has been fed.

Initial residual jam

The CPU determines that an initial residual jam has occurred:

- If the following sensors detect the paper a specified period of time (0.5 or 2.27 seconds) after the power switch is turned on:

registration paper sensor (PS302), paper top sensor (PS303), separation sensor (PS7), delivery sensor (PS9).

- After the power switch is turned on, and the transfer drum rotates, if the attraction sensor (PS6) detects the paper a specified period of time (1.48 seconds) after transfer drum registration position detection.

System interface

The video controller in this printer converts the print data sent by external devices including the host computer into dot data, which is then output from the video controller to the DC controller.

The types of interface signals transmitted between the video controller and the DC controller as well as an outline of the operation of this printer using the interface signals are described below.

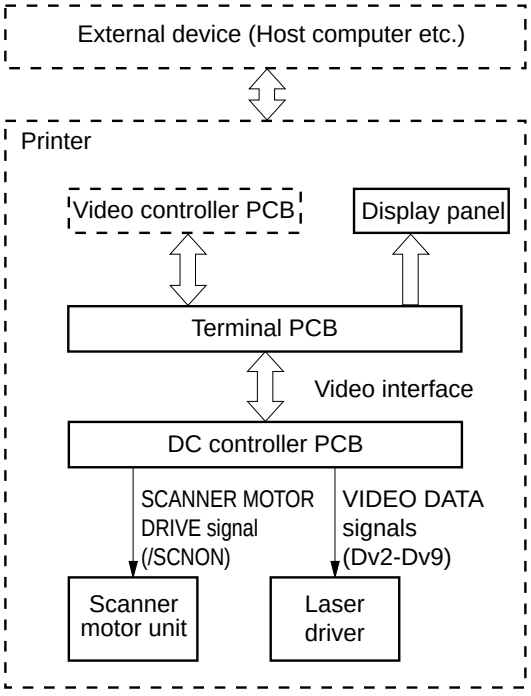


Figure 3-96 System interface functional diagram

Video interface

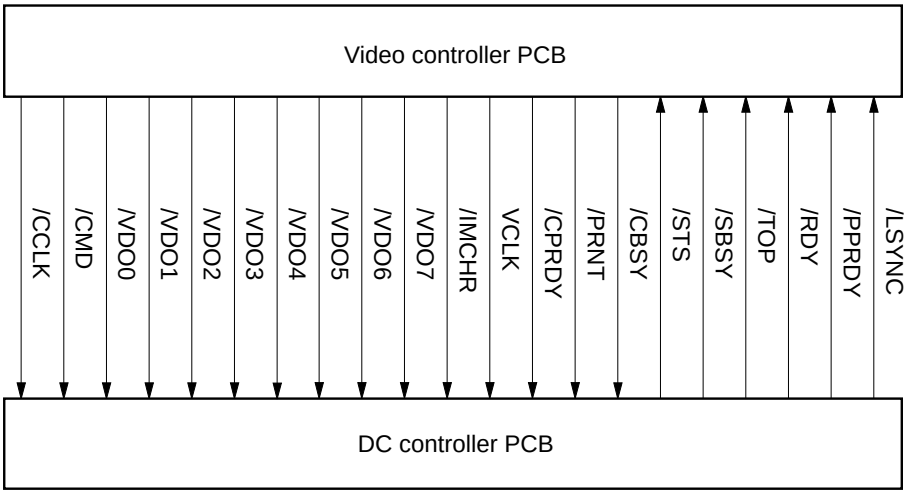


Figure 3-97 Types of video interface signals

When power is turned on, the printer enters the WAIT state.

At the end of the WAIT state, the DC controller sends the READY signal (/RDY) to the video controller to inform it that the printer is ready to print.

When the /RDY signal becomes “L” and the data for printing one page is available, the video controller sends the PRINT signal (/PRNT) to the DC controller.

Upon receiving the /PRNT signal, the DC controller issues the print sequence command to the mechanical controller and starts the initial rotations (INTR) sequence.

At the end of the INTR sequence, the DC controller sends the vertical sync signal (/TOP) to the video controller within the specified time.

The video controller sends the video signals (/VDO7-0), which synchronize with the horizontal sync signal (/LSYNC) and the /TOP signal sent from the DC controller, to the DC controller. In full-color mode, the video controller sends the M (magenta), C (cyan), Y (yellow), and Bk (black) video signals to the DC controller, in that order. In the mono-color mode, the video controller sends only the video signals for mono-color.

The DC controller generates 8-bit video data signals (Dv2-Dv9) in accordance with the video signals (/VDO0-/VDO7) sent by the video controller, and then sends them to the PWM-IC in the laser/scanner unit. The laser drive circuit turns on/off the laser diode in accordance with the laser drive signal (internal signal in the laser/scanner unit) output from the PWM-IC, to generate the modulated laser beam.

The laser beam emitted by the laser diode by the laser drive signal is scanned across the photosensitive drum to create a latent image on the drum.

The latent image on the photosensitive drum is transferred to plain paper. The paper is then delivered onto the face-down tray or the face-up tray.

While printing a page, the DC controller checks whether or not the /PRNT signal has been sent by the video controller.

If no /PRNT signal has been sent, the printer terminates the PRINT sequence with the current page and initiates the last rotations. At the end of the last rotations, the printer enters the STANDBY (STBY) state.

On the other hand, if the /PRNT signal has been sent, the printer continues the print sequence.

Power supply

The power switch of this printer uses a remote switch method. When the power switch (SW1) is turned on, the power supply circuit informs the DC controller. The DC controller turns ON the control IC in the power supply circuit, and the AC power supply is sent to the power supply circuit via the circuit breaker, the noise filter, etc. When the front door, the fixing unit cover, and the pick-up cover are closed, the door switch (SW2) is automatically turned on and the power supply is sent to the driving loads.

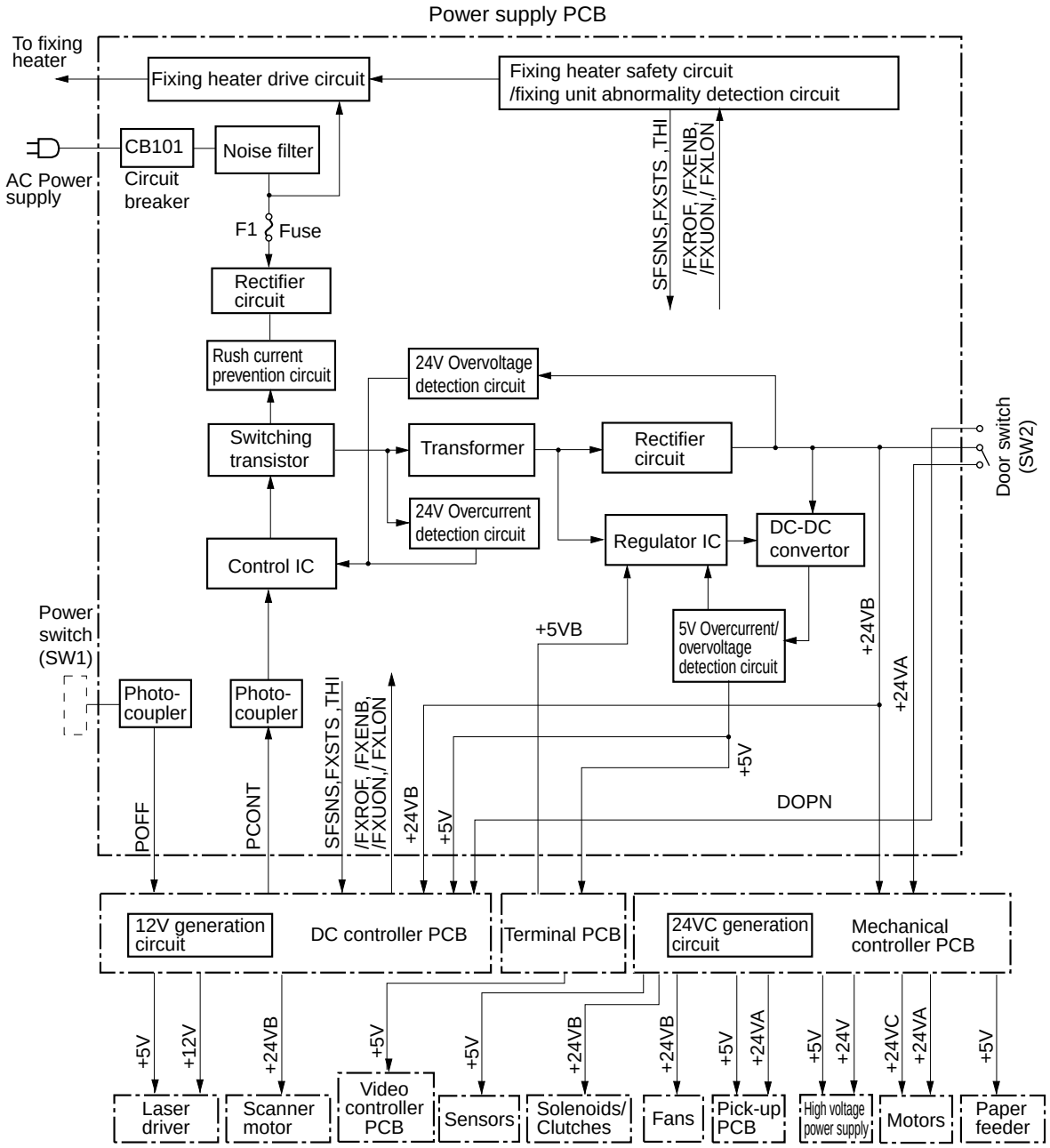


Figure 3-98 Power supply circuit

This circuit also supplies +24VDC and +5VDC, which are required for the printer itself. +24VDC is supplied for the motors, the exhaust fans, the clutches and other driving components, as well as the pick-up PCB and the high-voltage power supply PCB. The 12V power is generated in the DC controller to drive the laser diode.

+24VDC consists of:

- Normal +24VA, which is shut off when SW2 is turned off by opening the front door, the fixing unit cover, or the pick-up cover; and
- +24VB, which is always on whether SW2 is turned on or off.
- +24VC, which is shut off in the power-saving mode or when the cover is opened, is generated in the mechanical controller PCB.

The 5V power supplied to the video controller is monitored using the 5VB signal fed back from the terminal PCB to ensure it always will be supplied.

Note: This printer enters the power-saving mode when receiving the command from the video controller. It returns to the normal mode when a command is received from the video controller to cancel the power-saving mode.

Remote switch

When the power switch on the printer is turned OFF, the power supply circuit sets the power off signal (POFF) sent to the DC controller to “H.” When the printer is ready to be turned off, the DC controller sets the power off control signal (PCONT) to “L.” This stops the switching regulator for the power supply circuit and turns off the printer.

Protection function

The power supply circuits for +24VDC and +5VDC have an overcurrent/overvoltage detection function which is activated if some problem has occurred. If this function is activated, it automatically shuts off the output voltage to protect the power supply circuit. If no DC voltage is output from the power supply circuit because the overcurrent protection function has been activated, turn OFF the power switch (SW1), disconnect the power cable, rectify the problem with the loads, and then turn the power switch on again. Do not turn on the printer for about two minutes after turning it off.

If overcurrent flows in the AC line, the circuit breaker on the circuit is turned off to shut off the output voltage.

Paper feeder

Electrical circuit

The paper feeder is electrically controlled by the paper feeder driver PCB in the paper feeder.

This PCB provides serial communication with the mechanical controller in the printer and outputs signals to drive the loads of the motors and the solenoids.

The power supply for the paper feeder consists of +24V DC generated by the internal power source and +5V DC supplied by the printer.

The following block diagram shows the correlation between the paper feeder and the printer.

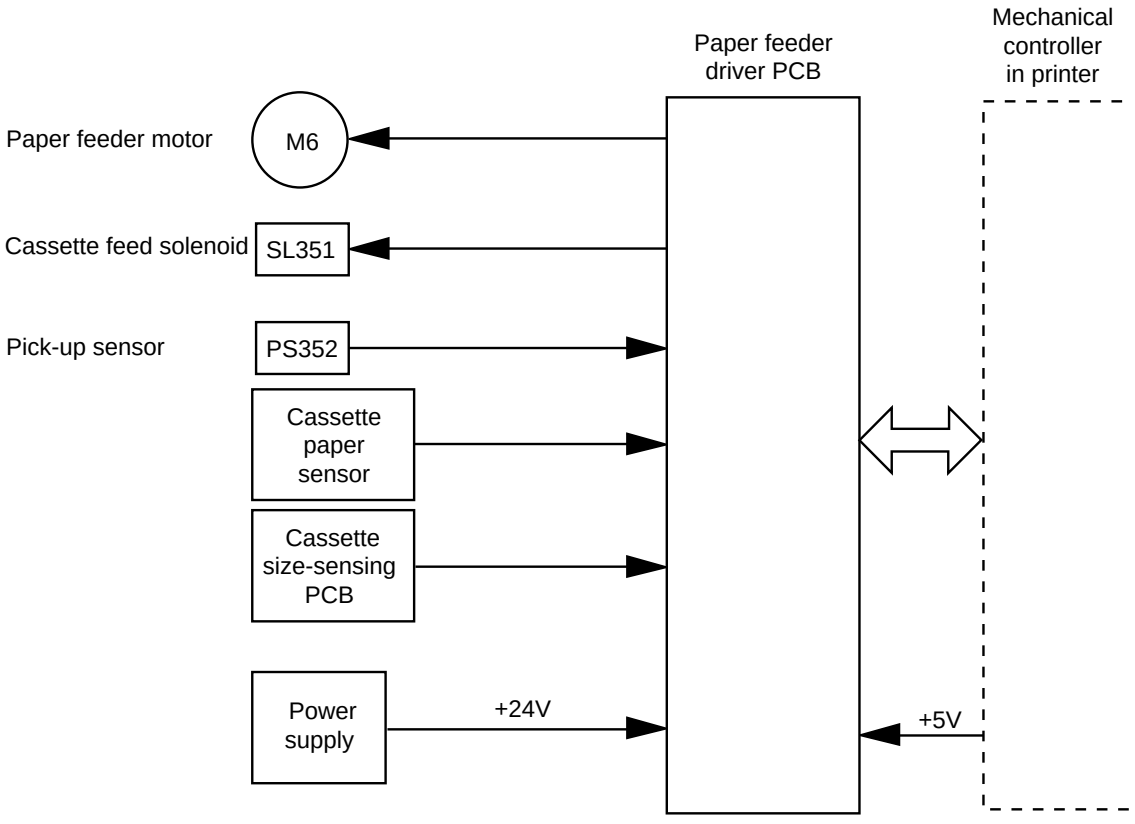


Figure 3-99 Correlation between paper feeder and printer

Paper feeder driver input/output

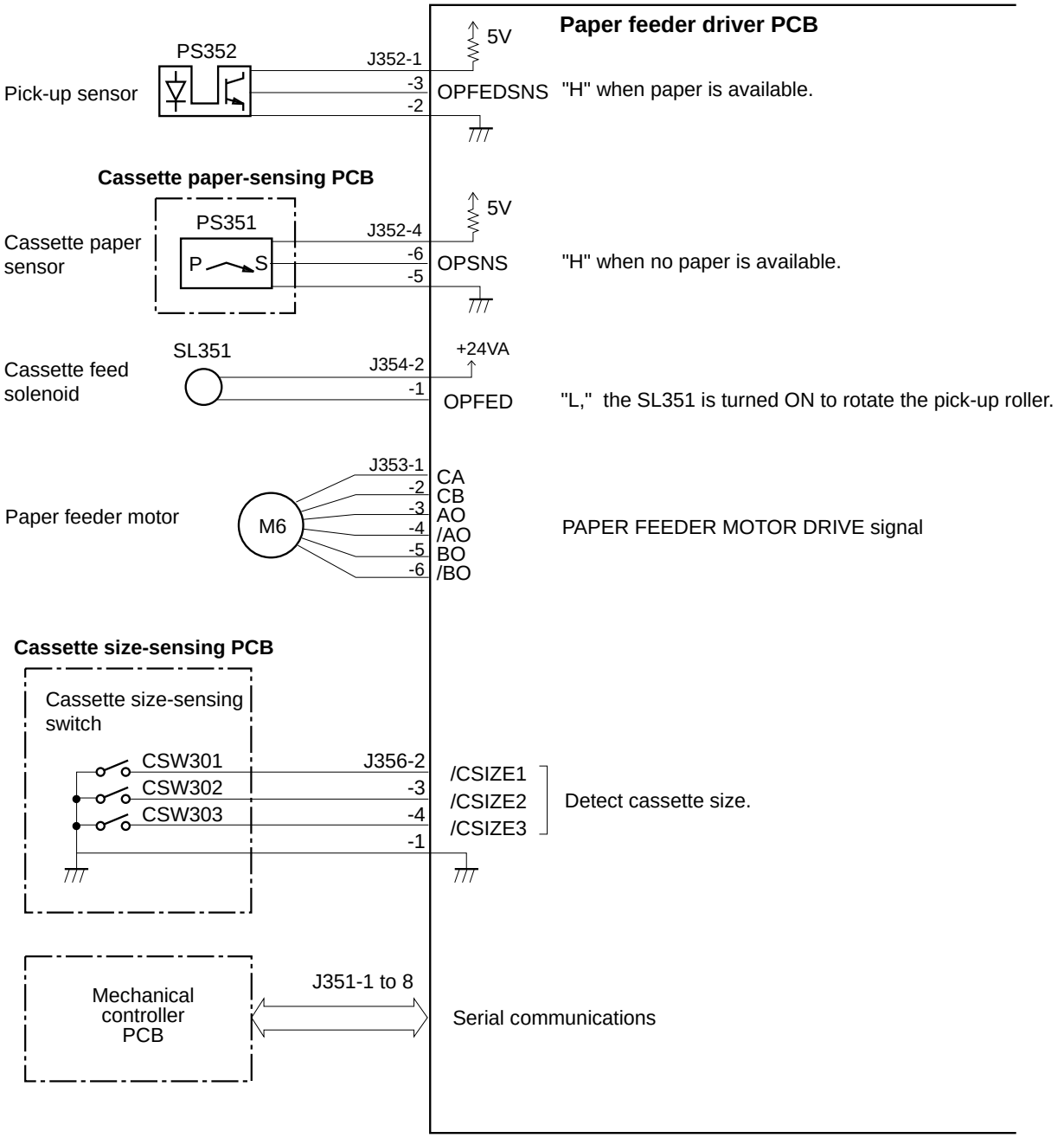


Figure 3-100 Paper feeder driver input/output

Pick-up/feed system

The paper feeder pick-up roller is driven by the paper feeder motor (M6). The paper feeder motor is controlled by the paper feeder motor driver IC in the paper feeder driver PCB. The solenoid is controlled by the paper feeder driver IC in the paper feeder driver PCB.

Pick-up operation

When the print sequence command is received, the mechanical controller in the printer rotates the fixing unit motor (M2). The paper feeder driver PCB in the paper feeder rotates the paper feeder motor (M6) at high speed. Simultaneously, it turns the cassette feed solenoid (SL351) on to rotate the paper feeder pick-up roller. Thus, paper is picked up. After any multi-feed sheets are separated by the separation roller, the paper is fed into the printer by the feed roller. The paper feeder driver PCB detects the paper leading edge with the pick-up sensor in the feeder, and changes the speed of the paper feeder motor to normal when the paper reaches feed roller 2 in the printer pick-up unit. Therefore, one sheet of paper is picked up from the cassette in the paper feeder.

The following table shows the settings of the cassette size-sensing switch corresponding to each cassette size and no-cassette.

	Cassette size-sensing switch		
Cassette	**CSW1**	**CSW2**	**CSW3**
A4	OFF	ON	ON
B5	ON	OFF	ON
LTR	OFF	OFF	ON
LGL	ON	OFF	OFF
Cassette absent	OFF	OFF	OFF

Detecting a jam

Jams during the pick-up and feed from the paper feeder are detected in the same manner as in the printer.

Power supply

The power supply for the paper feeder consists of +24V DC generated by the internal power source and +5V DC supplied by the printer.

The power source in the printer uses a remote switch. The CPU in the paper feeder driver PCB outputs the REMOTE signal to the power source in accordance with a command from the printer and turns the power supply ON/OFF.

+5V DC is used by the sensors and the ICs in the paper feeder driver PCB, while +24V DC is used to drive the motors and the solenoids.

The right door switch (SW302) is on the paper feeder driver PCB. When the right door is opened, this switch is turned OFF to shut off +24V supplied to the drive loads.

With the paper feeder installed in the printer, the AC power supply is sent to the power source in the printer via that in the paper feeder. If the power cable is connected to the AC inlet on the printer by mistake, the AC power supply is not sent to the power in the paper feeder, nor is +24V DC for the feeder generated. The paper feeder driver PCB monitors the supply of 24V DC from the power source and if 24V DC is not generated, it informs the mechanical controller CPU in the printer of this error as a paper feeder 24V failure. The mechanical controller notifies the DC controller, which then reports it as an internal communication failure to the video controller.

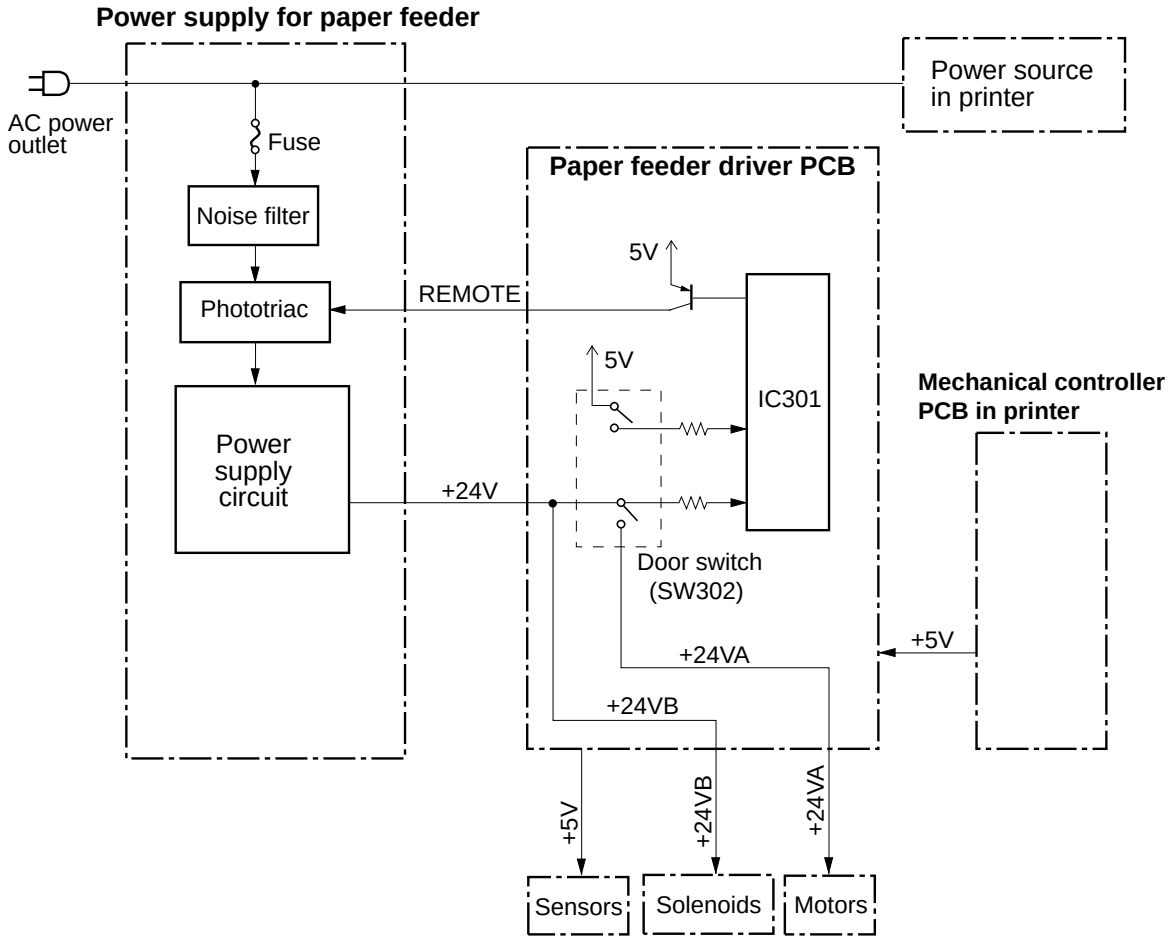


Figure 3-101 Power supply for paper feeder

Chapter 4:
Installation Overview

Before you begin installing the printer, unpack the box and check the contents. For information on unpacking the printer and choosing a location, see the *Getting Started Guide*.

The actual installation process involves the following procedures:

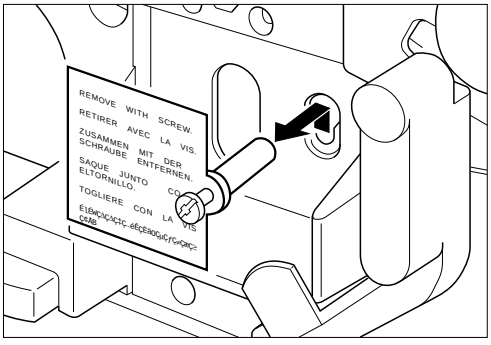
- Removing printer shipping materials
- Installing the photosensitive drum
- Installing the waste toner bottle
- Installing the toner cartridges (for information on storing and handling toner cartridges, see the *User Guide*)
- Installing the silicon oil bottle

For information on connecting the printer to an AC outlet and the network see the *Getting Started Guide*.

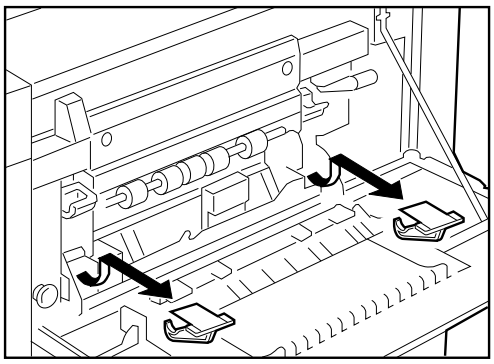
Note: In many of the illustrations in this manual, the optional paper feeder unit is included. If you do not have the optional paper feeder unit installed, your printer will not look exactly like the illustrations. If you have the optional paper feeder unit see "Attaching the optional paper feeder unit" on page 4-13 for installation information.

Removing printer shipping materials

1. **Pull the paper cassette out of the printer and remove the lifting plate retainer.**
2. **Open the front door and remove the tape and the protective sheet. Remove the fixing screw holding the transfer drum.**



3. **Open the fixing unit cover to remove the right and left pressure release spacers.**



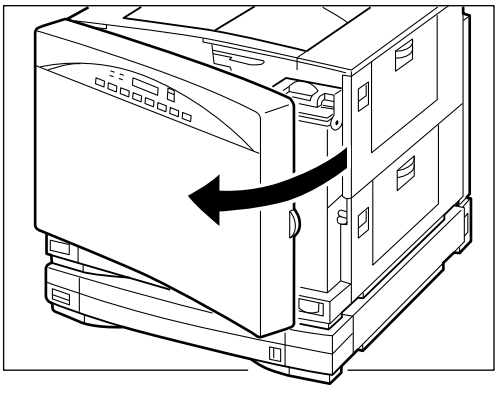
Installing the photosensitive drum

The photosensitive drum is used for toner image formation and transfer onto the paper being processed (which will subsequently be fixed at the fixing assembly).

The drum cartridge is extremely sensitive to light and may deteriorate if exposed to light. Therefore, do not open the protective bag or the drum cartridge cover until you are ready to install the drum cartridge, as follows.

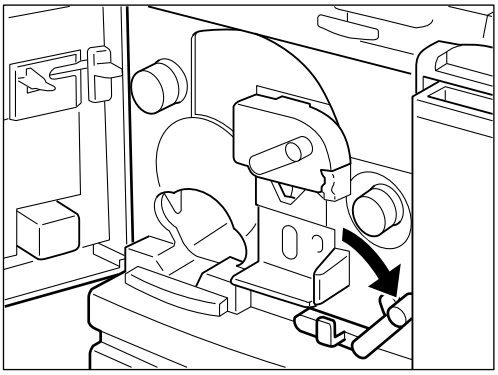
To install the photosensitive drum

1. **Open the front door.**



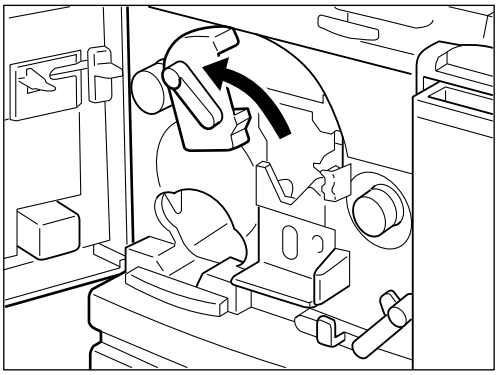
2. **Before pushing down the release handle, make sure the toner cartridge turret is properly positioned for installing or removing the toner cartridge.**

3. **Push down the transfer drum release handle.**



Note: Before replacing the waste toner bottle and the photosensitive drum, make sure the release handle is pushed all the way down.

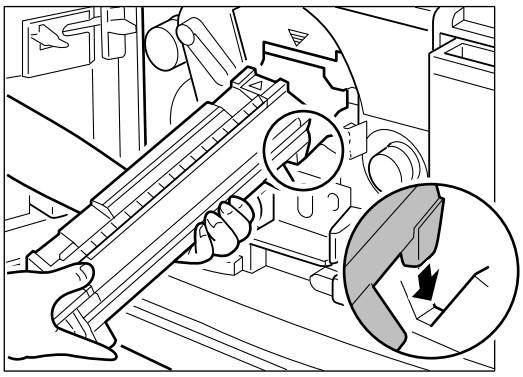
4. **Push the handle on the drum cartridge door in the direction of the arrow to open the door fully.**



5. **Remove the drum cartridge from its protective bag.**

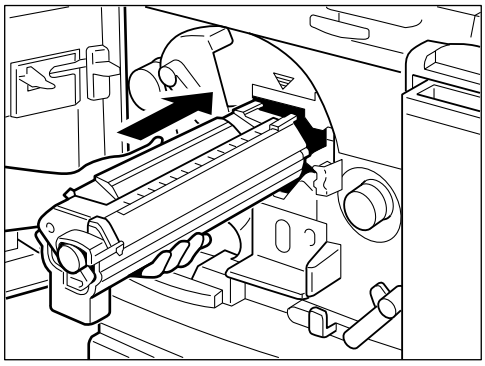
Note: Do not open the protective bag or drum cartridge cover until you are ready to install it. Do not expose the drum cartridge to direct sunlight.

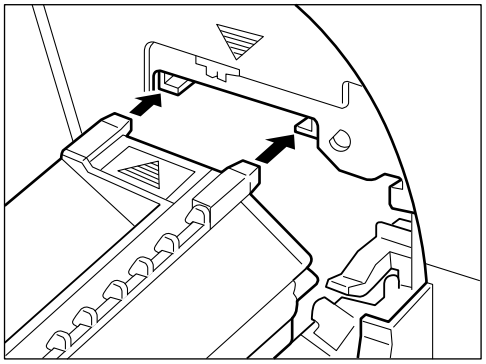
6. **Insert the end with the ▽ mark into the V-shaped opening, as shown below.**



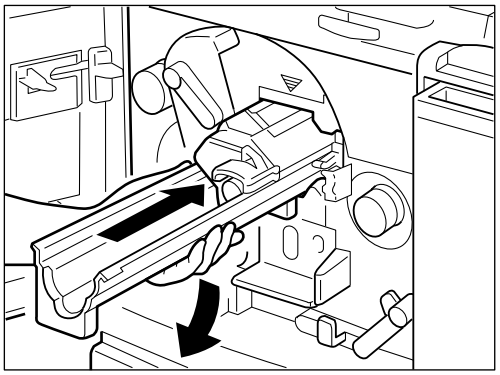
Note: Do not apply excessive force to the protective cover while handling the drum cartridge. Otherwise, the photosensitive drum may be scratched.

7. **While holding the cover with one hand and the cartridge horizontally, gently slide the drum into the compartment, letting the drum rest on the rails of the compartment.**





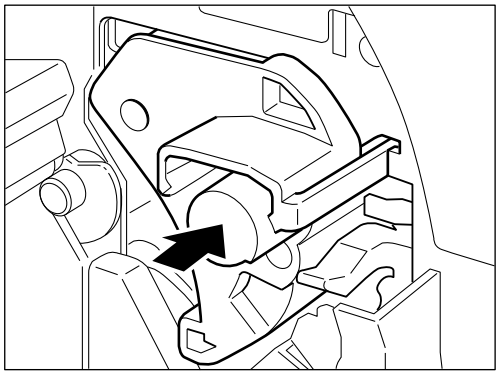
8. **When the drum cartridge is completely inside the printer, remove the cover.**



Note: Keep the drum cartridge cover to protect the used photosensitive drum later.

Avoid touching the surface of the photosensitive drum with your fingers when removing the drum cartridge cover.

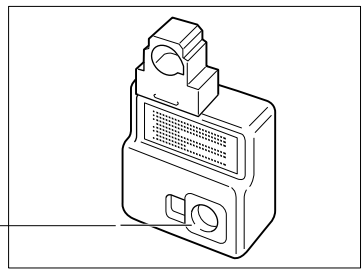
9. **Push the drum all the way in until the black tab on its end is locked.**



This completes the drum cartridge installation. Do not close the drum door now, but proceed to the next section.

Installing the waste toner bottle

The waste toner bottle collects waste toner obtained in each print cycle. At the end of the toner image formation and transfer onto the paper, any toner still remaining on the photosensitive drum surface is scraped by the photosensitive drum cleaner and forwarded to the waste toner bottle.

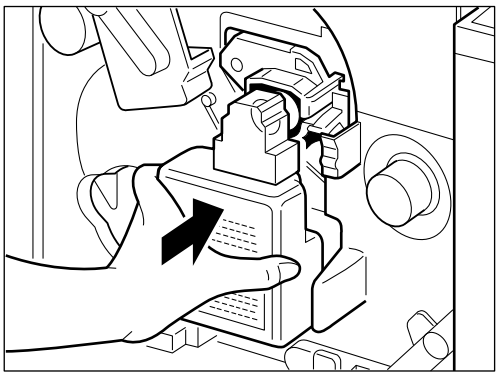


After you have installed the drum cartridge, immediately take out the new waste toner bottle from the drum cartridge package and install the bottle. Read the caution label on the waste toner bottle and then install it as follows.

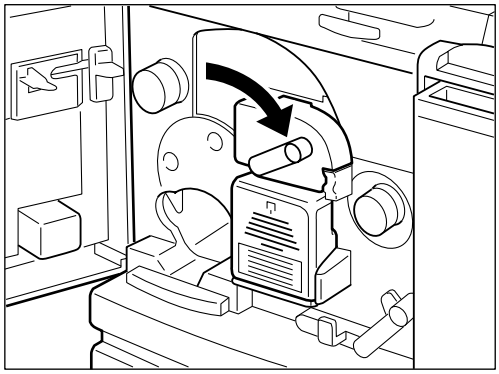
To install the waste toner bottle

1. **With the opening facing the printer, attach the new waste toner bottle to the printer.**

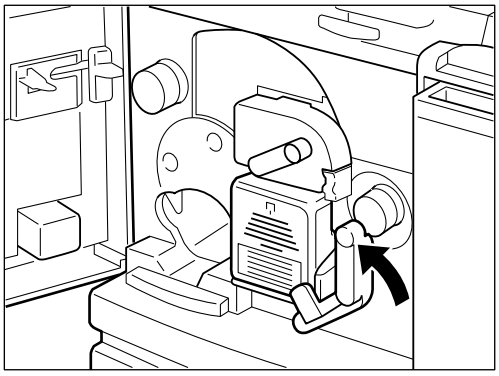
   Note: Before attaching the waste toner bottle to the printer, make sure the release handle is pushed all the way down.



2. **Close the drum cartridge door immediately.**



3. **Push up the release handle to lock the drum cartridge.**



This completes the waste toner bottle installation.

Installing the toner cartridges

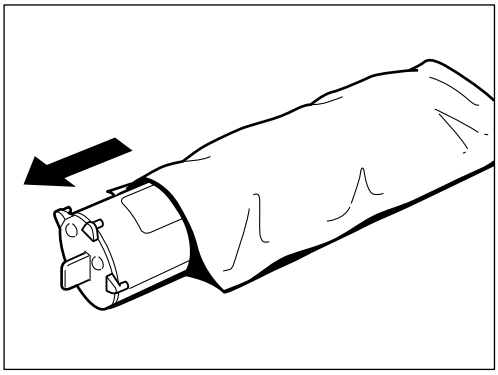
The printer requires four toner cartridges: cyan, magenta, yellow, and black. Each toner cartridge supplies the corresponding color toner for image formation and transfer onto the paper during the print cycle.

Each toner cartridge fits into a specific place inside the rotary unit, so you can't place cartridges in the wrong location. Colored tabs indicate which cartridge belongs in each position.

Note: For information on storing and handling toner cartridges, see the *User Guide*.

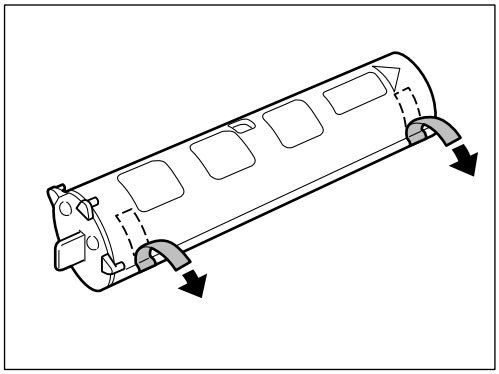
To install the toner cartridges

1. **Remove one of the toner cartridges from its protective bag.**

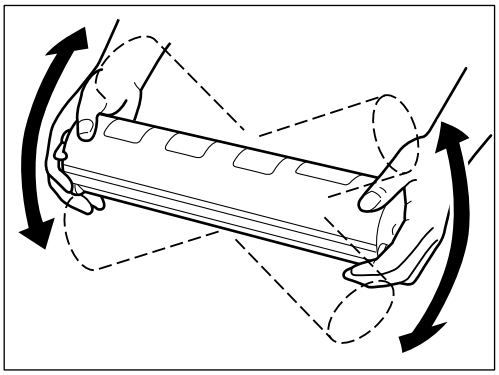


Note: Avoid touching the windows on the top and bottom of the cartridge.

2. **Remove the two protective tapes on the toner cartridge.**

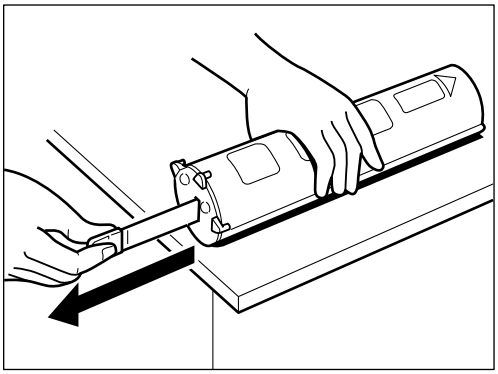


3. **Rock it up and down five or six times to distribute the toner evenly.**



Note: Do not try to redistribute the toner in a used or unsealed cartridge —the toner may leak.

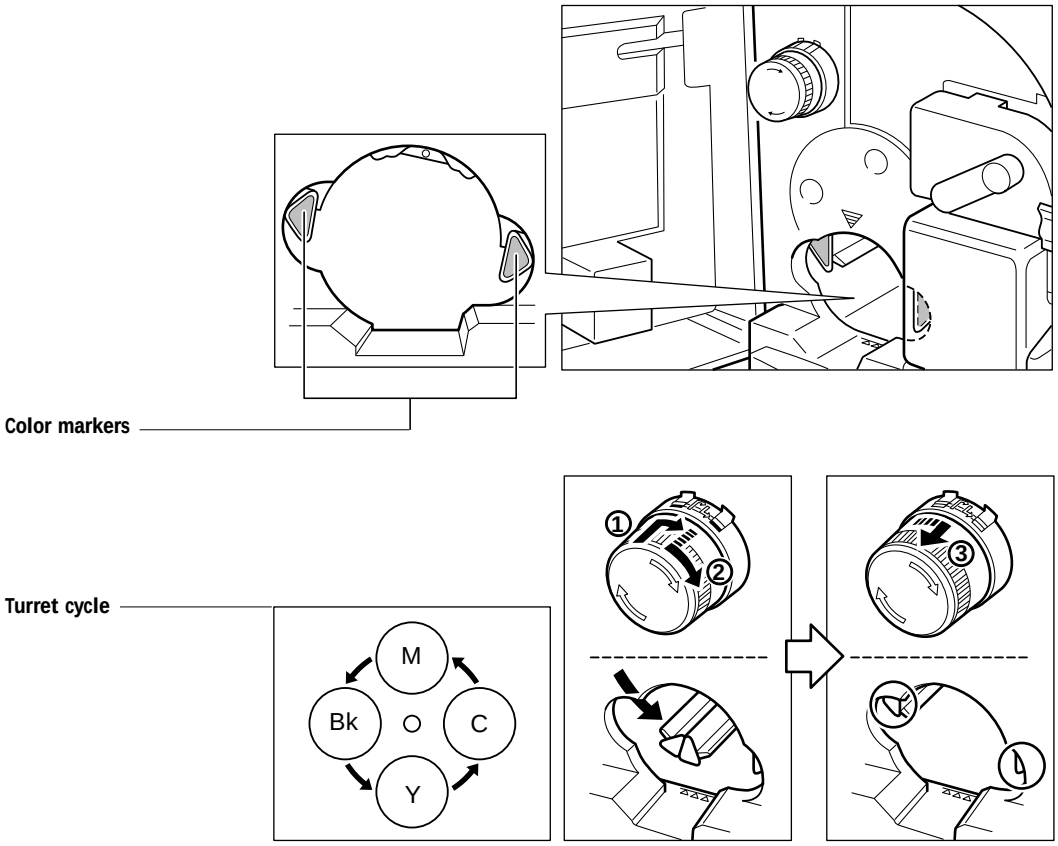
4. **Place the toner cartridge on a flat surface, and then pull the sealing tape completely out in the indicated direction.**



Note: The tape may break if not pulled out in the direction indicated.

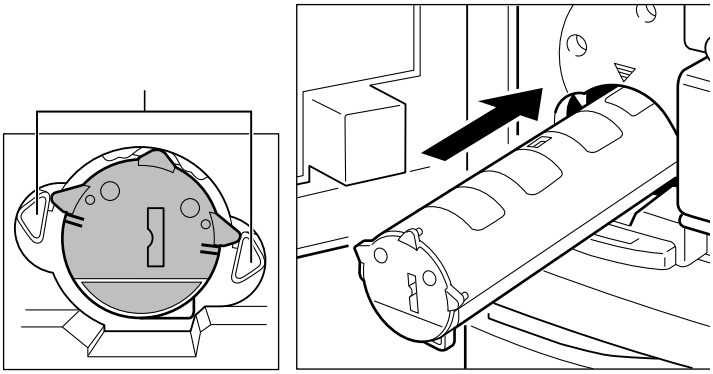
5. **While pressing the turret knob ①, turn it in the direction of the arrow ② until the desired color markers for the toner cartridge appear in the opening.**

   Make sure the two color markers are fully visible before installing the toner cartridge.



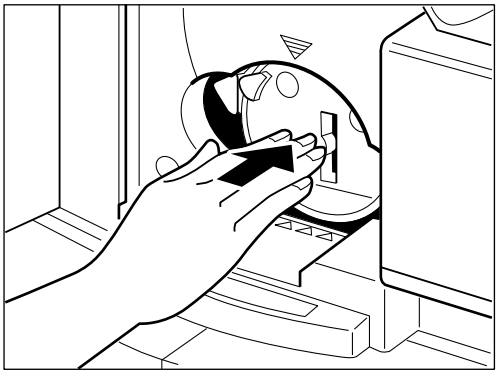
   The turret knob pops out and is locked ③.

6. **Using the ▽ mark as a guide, hold the cartridge with the arrow label facing up, then slide it completely into the turret until it snaps into place.**



7. **Press the toner cartridge two or three times so that it is inserted all the way into the printer.**

   Make sure the end of the cartridge is aligned with the marks.



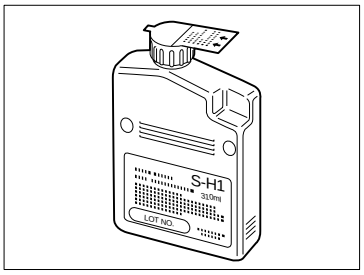
8. **Repeat the steps above to install the remaining three toner cartridges.**

   Note: Make sure the toner cartridges are installed in the turret in the correct order (step 5). Misplaced toner cartridges may cause printing problems.

   Note: Each color toner cartridge typically prints about 4,000 A4 or Letter size pages (when printing is done at the default print density and at 4.5% dot ratio). The actual cartridge life, however, depends on how much toner of each toner cartridge is used for each print. For details, see the section on installing toner cartridges beginning on page 4-7.

Installing the silicone oil bottle

The oil bottle supplies silicone oil to the fixing assembly.



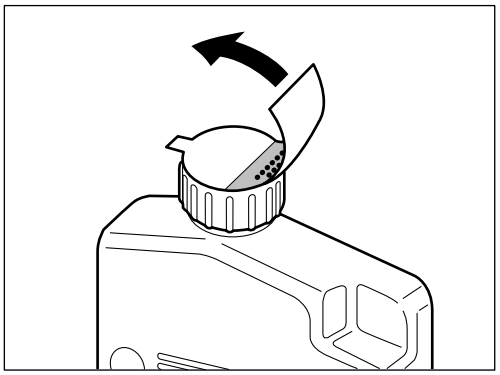
Follow these guidelines when you are installing silicone oil:

- Do not use any oil other than the recommended silicone oil.
- Do not operate the printer if there is no silicone oil bottle installed; otherwise the printer may be damaged.
- Do not incinerate the used silicone oil bottle.

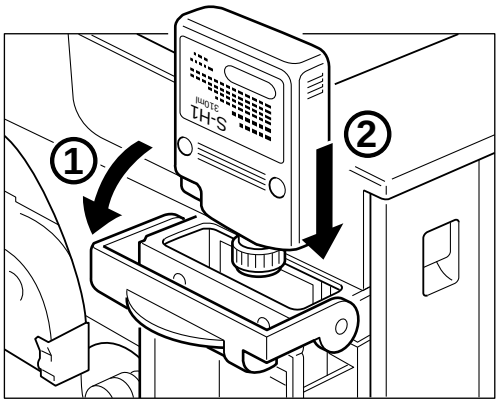
To replace a silicone oil bottle

1. **Read the caution label on the bottle, and peel off the seal from a new silicone oil bottle.**

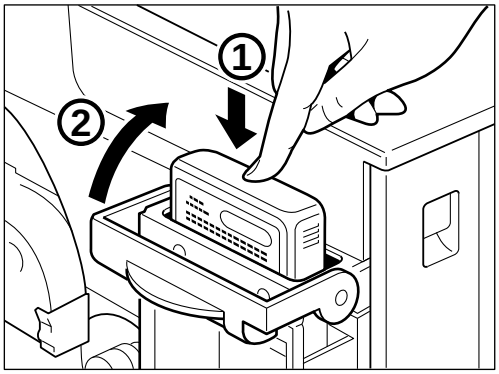
   Do not shake the bottle or the oil may spill out.



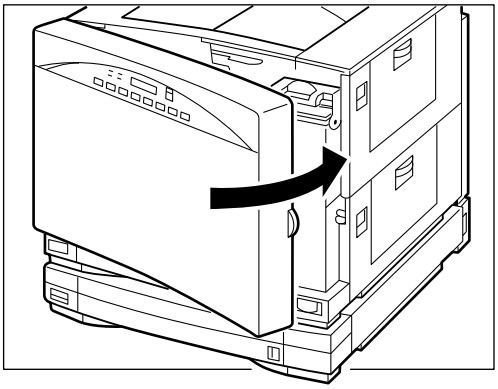
2. **Open the stopper completely ① and then insert the bottle into the compartment with the head facing down and toward the right ②.**



3. **Press down on the bottle ① until it goes completely into the compartment, and then close the stopper securely ②.**



4. **Close the front door.**



This completes the silicone oil bottle installation.

The oil is very slippery, and may present a skidding or slipping hazard. After a spill or leak, use absorbent material to contain and collect excess oil for disposal. Thoroughly clean the floor or other contaminated surface of all traces of the oil. Use an all-purpose alkaline cleaner, or have the surface (including carpeting) cleaned commercially. Petroleum distillates may be used, except on plastic or vinyl surfaces. Dispose of absorbed material in accordance with applicable federal, state and local requirements.

Attaching the optional paper feeder unit

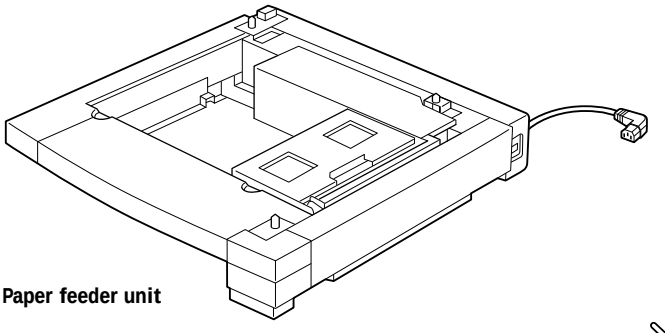
After choosing a location for the printer, attach the optional paper feeder unit. Be sure to perform the side margin adjustment procedure before using the paper feeder unit.

Checking the package contents

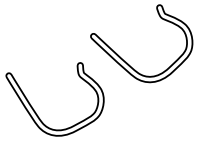
The optional paper feeder unit package includes the following items:

- Paper feeder unit
- Two locking pins
- Universal cassette
- Safety information sheet R-IE-273
- Caution sheet R-IM-282

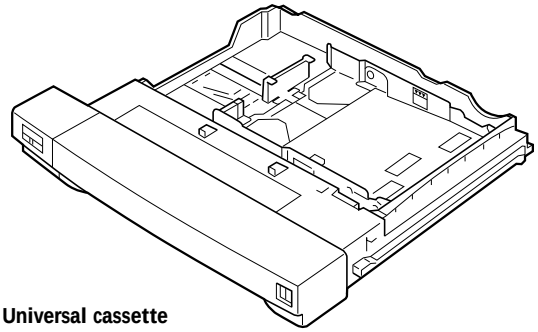
Some of these items are illustrated on the following page.



Paper feeder unit



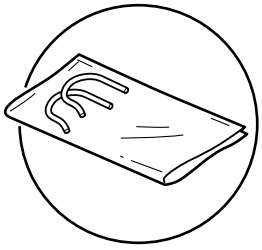
Locking pins (2)



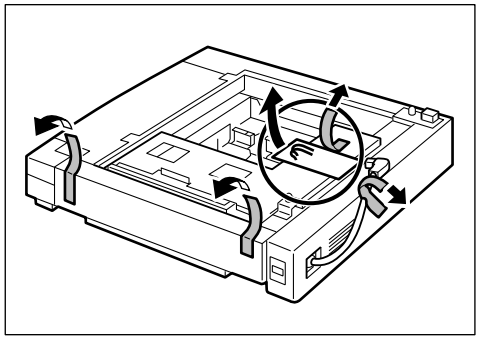
Universal cassette

To set up the paper feeder unit

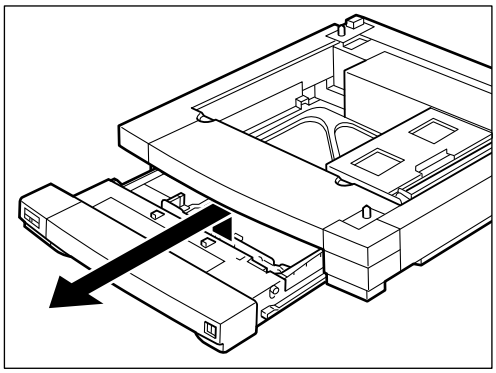
1. Remove the tapes and store the two locking pins for later use.



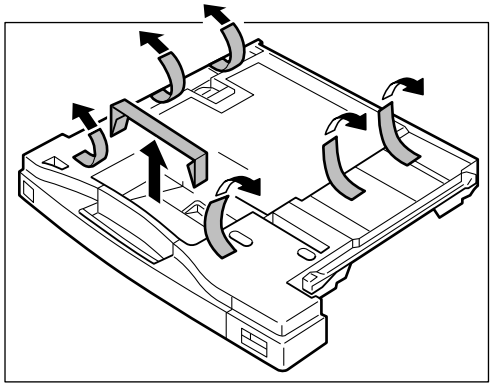
Locking pins in vinyl



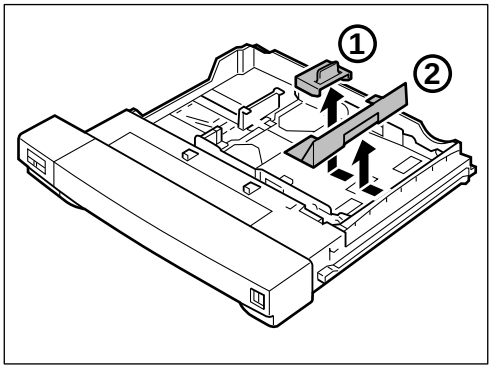
2. **While pushing up the handle on the underside of the cassette, pull out the paper cassette.**



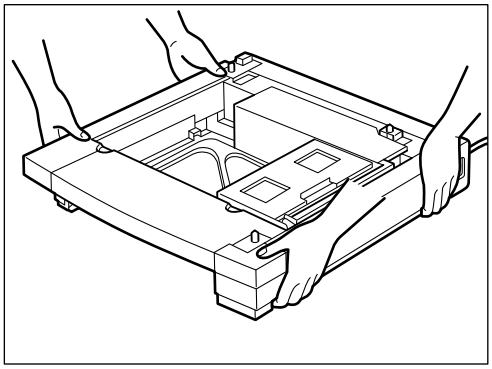
3. **Turn the cassette upside down and remove the tapes and the spacer on it.**



4. **Reverse the cassette again. Then remove the spacer inside the cassette.**

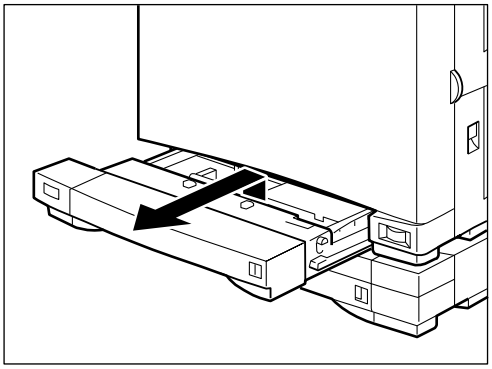


5. **With a person on each side, reach into the two pockets on the bottom of the two sides of the feeder unit and lift up both sides at the same time. Carry it to the location selected.**

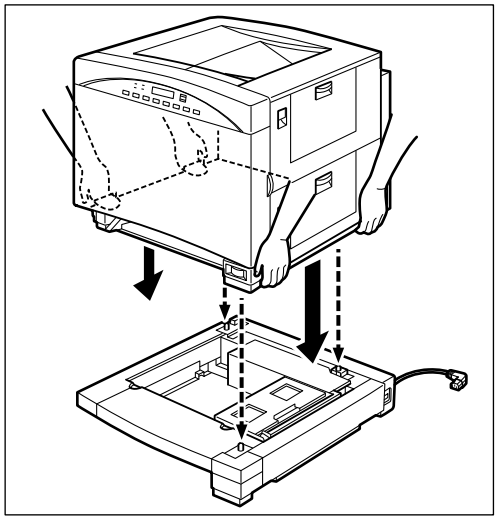


Note: The paper feeder unit weighs about 20 lbs (9.2 kg) and can be carried by one person.

6. **While pushing up the handle on the underside of the cassette, pull out the paper cassette from the printer.**



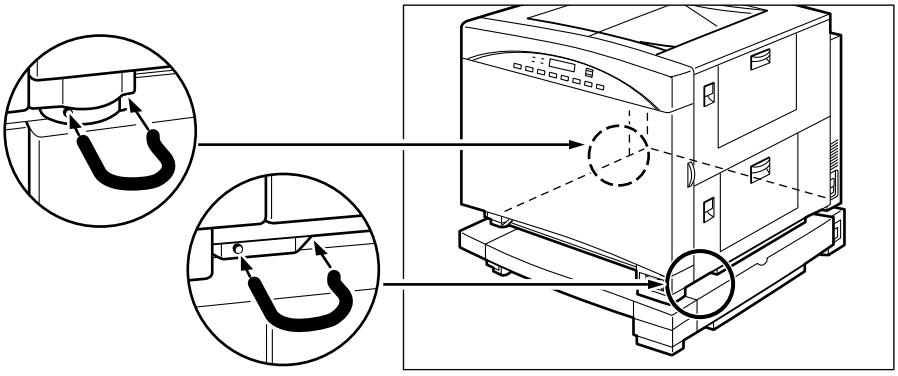
7. **Position the printer above the feeder unit, making sure the paper cassette compartment of the printer as well as the feeder unit are in the same direction. Use the two positioning poles on the feeder unit for alignment.**



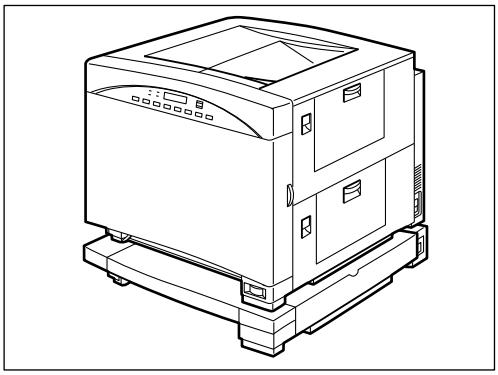
The printer weights about 110 lbs (50 kg) and, therefore, requires two or more persons to carry. Do not attempt to carry the printer by yourself; a personal injury may result.

Note: When installing, make sure the power cord and plug are not caught between the printer and feeder.

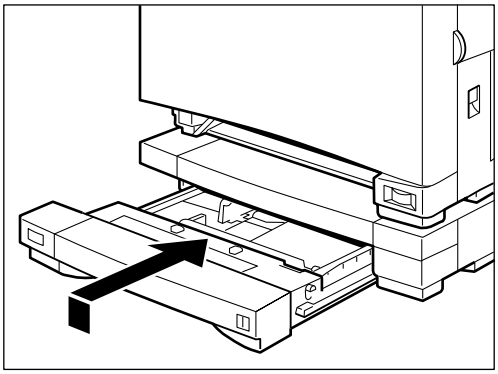
8. **Insert the two locking pins into the printer body, as shown below to secure the feeder unit to the printer body.**



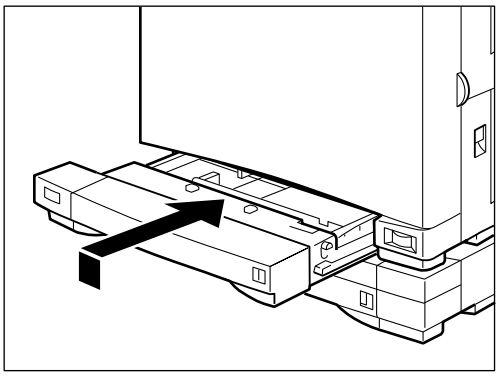
Make sure the printer body and the feeder unit are correctly aligned.



9. **While pressing the handle upward, slide the cassette (removed from the feeder unit in step 2) all the way into the feeder unit until it snaps into place.**



10. **While pressing the handle upward, slide the cassette (removed in step 6) all the way into the printer until it snaps into place.**



Chapter 5:
Service Procedures

Servicing the Colorwriter

Use the procedures in this chapter to inspect, remove, and replace major hardware components. This chapter includes information on servicing the following printer systems:

- Drive
- Paper transport
- Exposure
- Charging
- Developing
- Fixing unit
- Electrical components
- Paper feeder

For information on regular maintenance procedures for the Colorwriter, see Appendix B.

When performing the service procedures described in this chapter, follow the precautions listed in “Important safety information” on page *xiv*.

The tools required to service the Colorwriter are listed in “Tools you will need” in Appendix B.

Software service

Colorwriter system software is installed on the video controller hard disk drive at the factory. For more information, see “Installing system software” on page 5-170.

Accessing Colorwriter's internal components

Use the following procedures to access the internal parts of the printer when cleaning, checking or repairing the printer. If the Colorwriter is turned on, shut down the system first and then remove the necessary covers and panels.

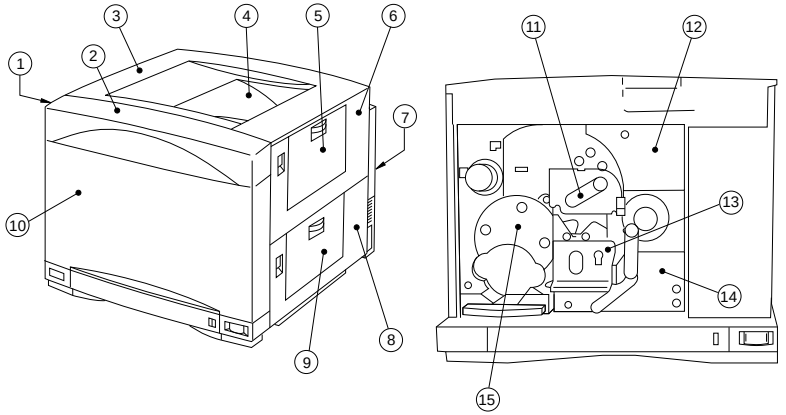
To shut down the Colorwriter

Always verify that the Colorwriter is not being used before you power down or restart it. Make sure that Ripping or Printing does not appear in the Colorwriter display window.

1. **Make sure that the Colorwriter display reads Ready.**
2. **Turn off the Colorwriter.**
3. **Disconnect all cables from the back of the printer.**

   Always obtain permission from the network administrator before you take the Colorwriter off the network.

Removing covers and panels



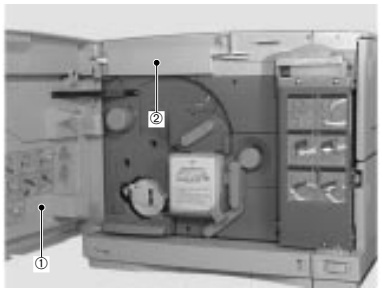
1—Left cover (2)
2—Display panel
3—Upper cover (2)
4—Face-down tray
6—Fixing unit cover
7—Rear cover
8—Pick-up cover
9—Multi-purpose tray
11—Photosensitive drum door (1)
12—Inner cover 1 (1)
13—Transfer drum cover (4)
14—Inner cover 3 (1)

The numbers in parentheses indicate the number of screws mounted.

Figure 5-1 Colorwriter covers and panels

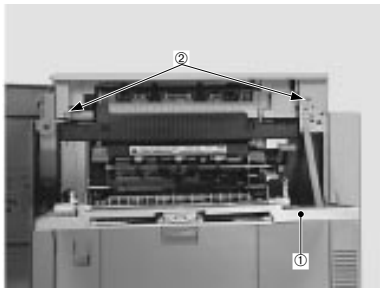
To remove the upper cover

1. Open the front door and remove the cable cover.



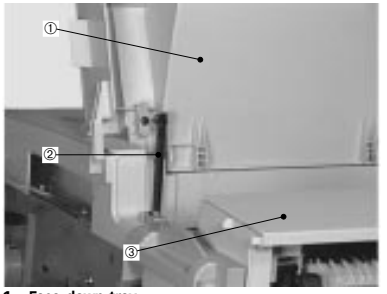
1—Front door
2—Cable cover

2. Open the fixing unit cover and remove the two screws.



1—Fixing unit cover
2—Screws

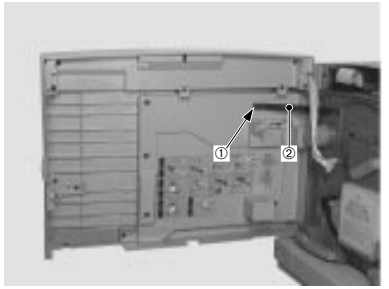
3. Open the face-down tray, disengage the lever, and remove the upper cover.



1—Face-down tray
2—Lever
3—Upper cover

To remove the front door

1. Disconnect the display panel cable connector from the terminal PCB according to the procedure on page 5-17.
2. Remove the screw to take off the strap.



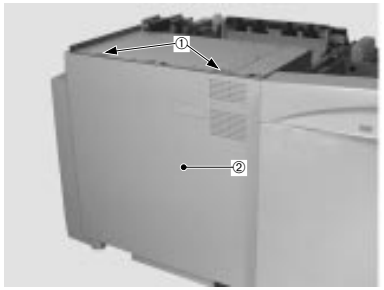
1—Screw
2—Strap

3. Lift the front door in the direction of the arrow to dislodge it.

1—Front door

To remove the left cover

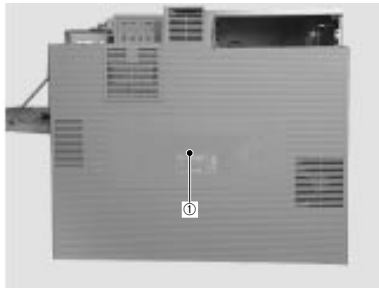
1. Open the front door more than 90°.
2. Remove the upper cover.
3. Remove the two screws, then the left cover.



1—Screws
2—Left cover

To remove the rear cover

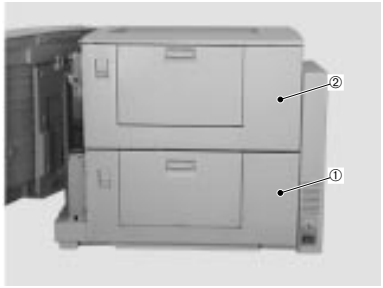
1. Remove the left cover.
2. Disengage the claw holding the rear cover to remove.



1—Rear cover

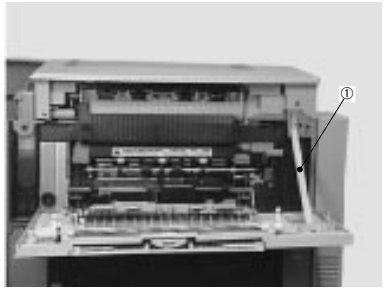
To remove the fixing unit cover

1. Open the front door.
2. Open the pick-up cover and the fixing unit cover.



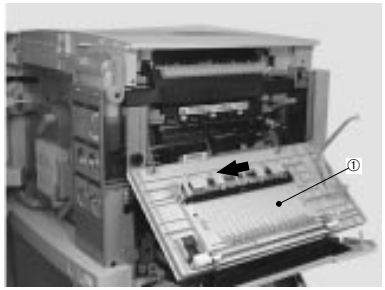
1—Pick-up cover
2—Fixing unit cover

3. Remove the strap.



1—Strap

4. To remove fixing unit cover, slide in the direction of the arrow.



1—Fixing unit cover

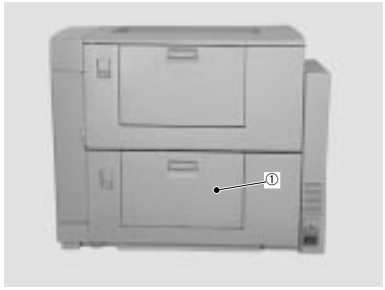
To remove the face-up tray

1. Open the face-up tray, disengage the claws, and pull the tray out toward you.

1—Face-up tray

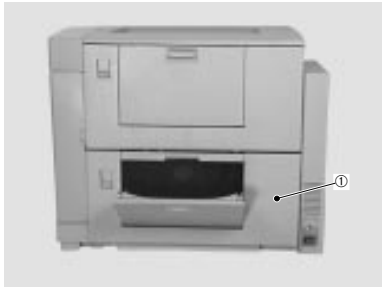
To remove the pick-up cover

1. Open the manual feeding tray.



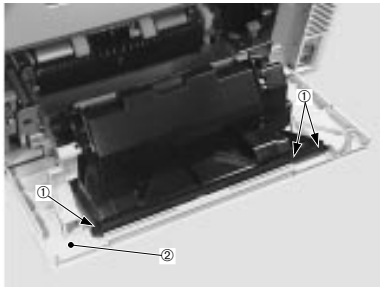
1—Manual feeding tray

2. Open the pick-up cover.



1—Pick-up cover

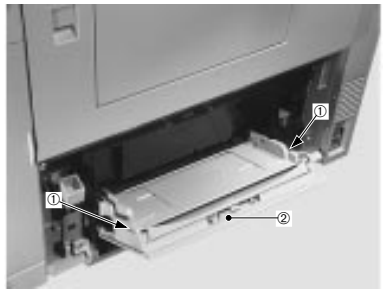
3. Remove the three screws to remove the pick-up cover.



1—Screws
2—Pick-up cover

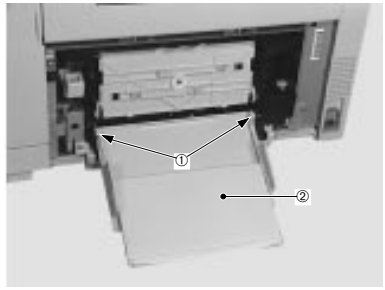
To remove the manual feeding tray

1. Remove the pick-up cover.
2. Disengage the claw holding the cover unit of the manual feeding tray.



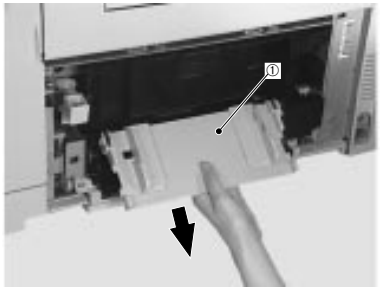
1—Claw
2—Cover unit

3. Disengage the other claw holding the manual feeding tray cover unit to remove.



1—Claw
2—Cover unit

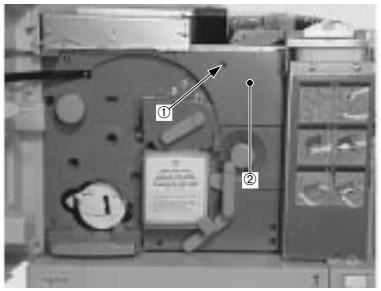
4. Pull out the tray unit of the manual feeding tray downward.



1—Tray unit

To remove inner cover 1

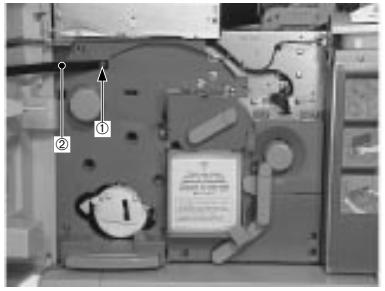
1. Remove the upper cover.
2. Remove the screw, and then inner cover 1.



1—Screw
2—Inner cover 1

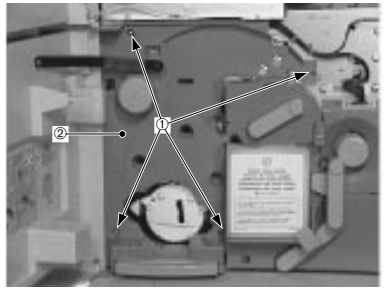
To remove inner cover 2

1. Remove inner cover 1.
2. Remove the screw and strap.



1—Screw
2—Strap

3. Remove the four screws and inner cover 2.

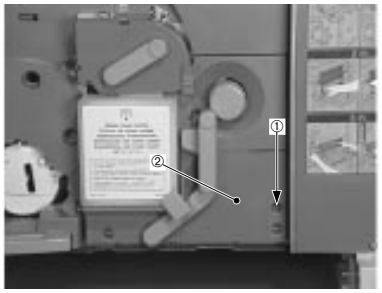


1—Screws
2—Inner cover 2

To remove inner cover 3

1. Remove the cassette.
2. Open the front door.

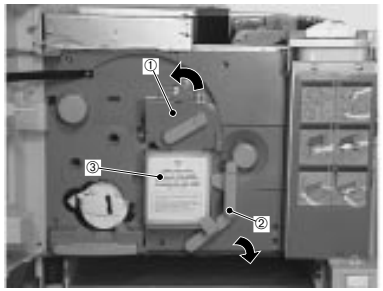
3. Remove the screw and inner cover 3.



1—Screw
2—Inner cover 3

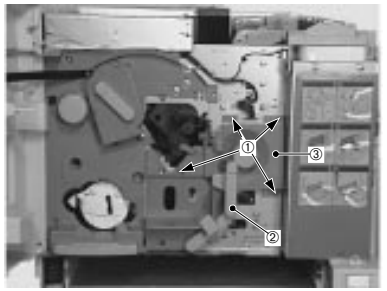
To remove the transfer drum cover

1. Remove the cassette.
2. Remove the upper cover.
3. Lift the photosensitive drum door in the direction of the arrow and drop the transfer drum lever to the right.
4. Remove the waste toner bottle.



1—Photosensitive drum door
2—Transfer drum lever
3—Waste toner bottle

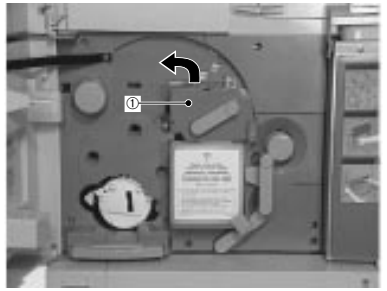
5. Lift the transfer drum lever and remove inner cover 1 and inner cover 3.
6. Drop the transfer drum lever to the right and remove the four screws and remove the transfer drum cover.



1—Screws
2—Transfer drum lever
3—Transfer drum cover

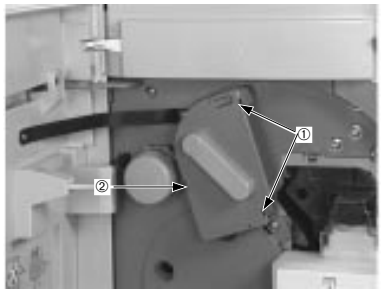
To remove the photosensitive drum door

1. Open the front door.
2. Lift the photosensitive drum door in the direction of the arrow.



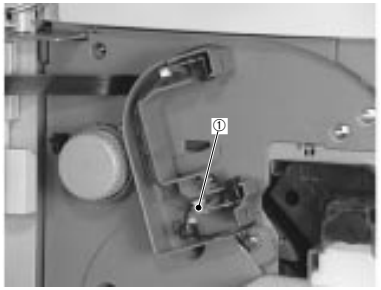
1—Photosensitive drum door

3. Disengage the claws holding the photosensitive drum cover to remove the cover.



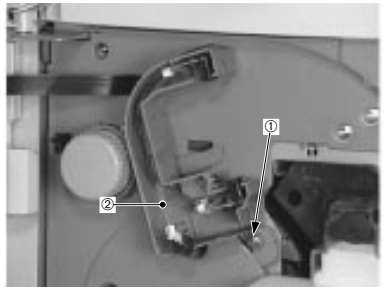
1—Claws
2—Photosensitive drum cover

4. Disconnect the connector.



1—Connector

5. Remove the screw, and take off the photosensitive drum door.

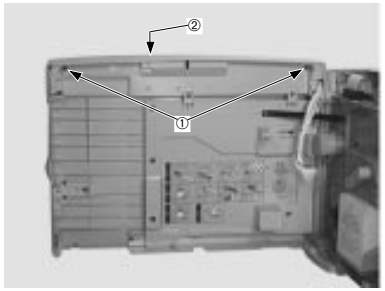


1—Screw
2—Photosensitive drum door

Display panel

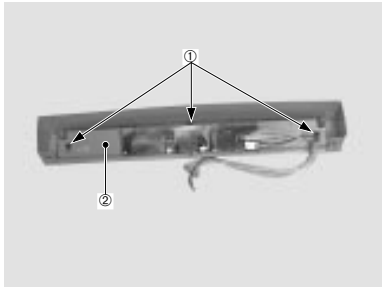
To remove the display panel

1. Remove the display panel cable connector and screw on the terminal PCB.
2. Open the front door and remove the two screws to take off the display unit.



1—Screws
2—Display unit

3. **Remove the screws and the display panel.**

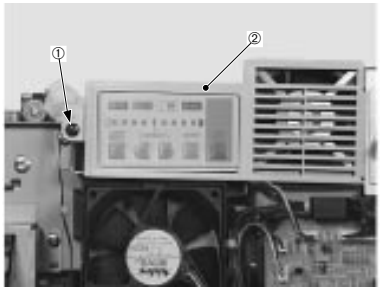


1—Screws
2—Display panel

Density Control Panel

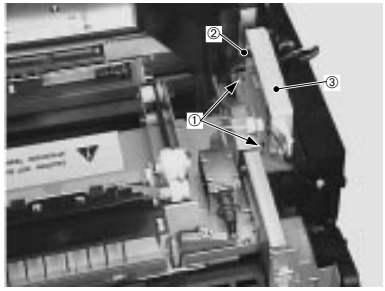
To remove the Density Control Panel

1. **Remove the rear cover.**
2. **Remove the nine screws and the shield plate.**
3. **Remove the screw and the fan cover.**



1—Screw
2—Fan cover

4. **Remove the two screws and disconnect the connector to remove the Density Control Panel.**



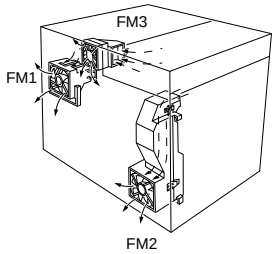
1—Screws
2—Connector
3—Density Control Panel

Exhaust Fan

The three fan motors installed in this printer work to prevent a rise in the internal temperature. The role of each fan is as follows:

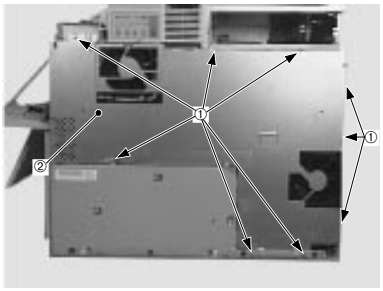
- Fixing unit fan (FM1)—Blows air from around the fixing unit out of the printer.
- Electrical unit fan (FM2)—Blows air from around the various PCBs and the laser/scanner unit out of the printer.

- Controller fan (FM3)—Blows air from around the video controller out of the printer.



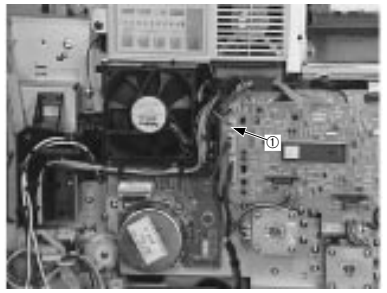
To remove the fixing unit fan

1. **Remove the rear cover.**
2. **Remove the nine screws and the shield plate.**



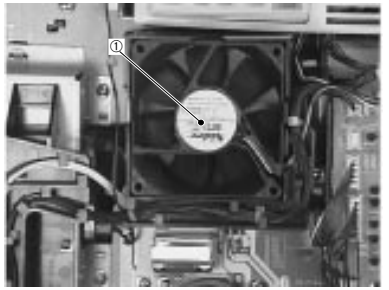
1—Screws
2—Shield plate

3. **Disconnect the connector.**



1—Connector

4. **Disengage the claw holding the fixing unit fan to remove the fan.**



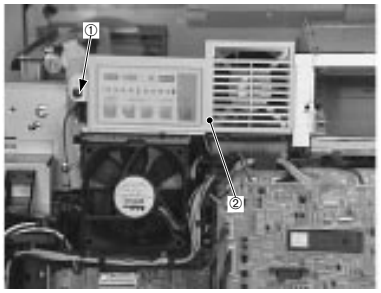
1—Fixing unit fan

Note: Reassemble the fan so that the manufacturer's label is facing you

To remove the controller fan

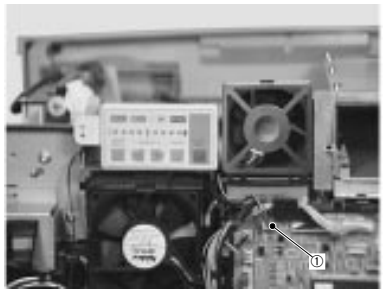
1. **Remove the rear cover.**
2. **Remove the nine screws and the shield plate.**

3. **Remove the screw and the fan cover.**



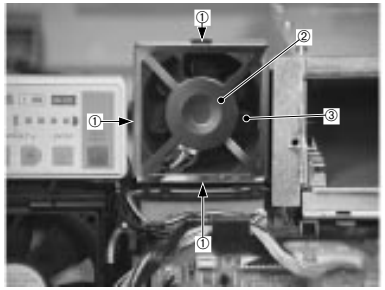
1—Screw
2—Fan cover

4. **Disconnect the connector.**



1—Connector

5. **Disengage the claw holding the fan duct plate to remove the duct plate and the controller fan.**

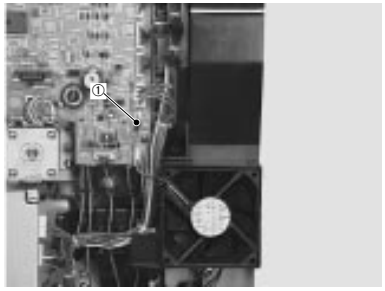


1—Claws
2—Fan duct plate
3—Controller fan

Note: Reassemble so that the manufacturer's label is facing you.

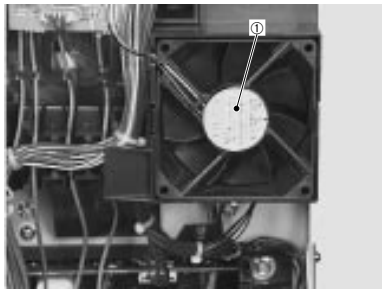
To remove the electrical unit fan

1. **Remove the rear cover.**
2. **Remove the nine screws and the shield plate.**
3. **Disconnect the connector.**



1—Connector

4. **Disengage the claw holding the electrical unit fan to remove the fan.**



1—Electrical unit fan

Note: Reassemble so that the manufacturer's label is facing you.

Drive System

The drive system consists of the following parts:

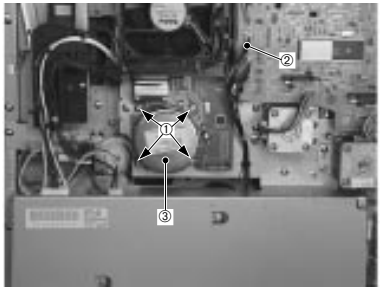
- Fixing unit motor
- Developing unit motor
- Drum motor
- Drive unit
- Rotary manual unit
- Transfer drum cleaner press drive
- Discharge roller press drive unit
- Drum press drive unit
- Attraction roller press drive unit
- Delivery drive unit

Fixing unit motor

To remove the fixing unit motor

1. **Remove the rear cover.**
2. **Remove the nine screws and the shield plate.**

3. Disconnect the connector and remove the four screws to remove the fixing unit motor.



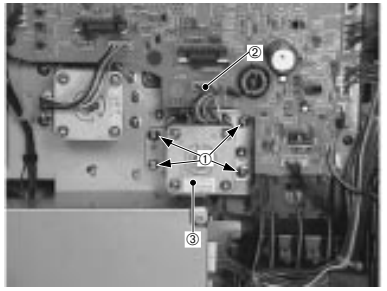
1—Screws 3—Fixing unit motor
2—Connector

Developing unit motor

To remove the developing unit motor

1. Remove the rear cover.
2. Remove the nine screws and the shield plate.

3. Disconnect the connector, and remove the four screws and the developing unit motor.

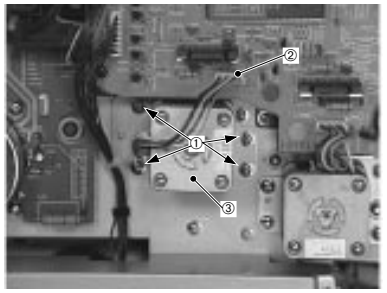


1—Screws 3—Developing unit motor
2—Connector

Drum motor

To remove drum motor

1. Remove the rear cover.
2. Remove the nine screws and the shield plate.
3. Disconnect the connector and remove the four screws and the drum motor.

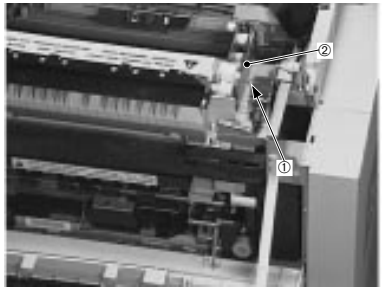


1—Screws 3—Drum motor
2—Connector

Drive unit

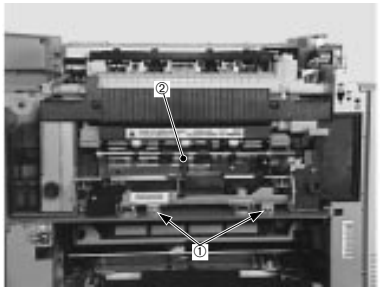
To remove the drive unit

1. **Remove the upper cover.**
2. **Remove the power supply according to the procedure on page 5-140.**
3. **Remove the screw and the delivery drive unit.**



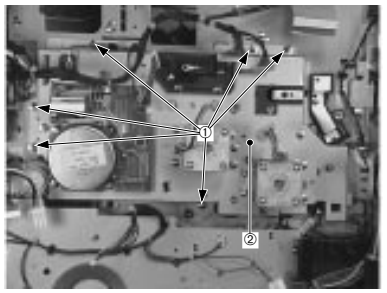
1—Screw
2—Delivery drive unit

4. **Open the pick-up cover. Remove the fixing oil bottle. Loosen the two screws and pull the fixing unit forward.**



1—Screws
2—Fixing unit

5. **Remove the separation high-voltage power supply according to the procedure on page 5-143.**
6. **Remove the six screws and the drive unit.**



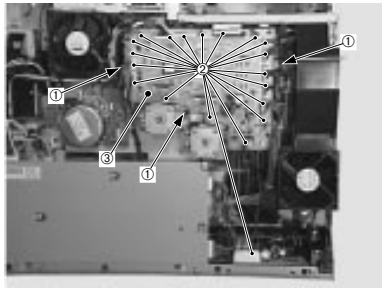
1—Screws
2—Drive unit

Note: Be careful not to damage the cable and gear when removing the drive unit.

Rotary manual unit

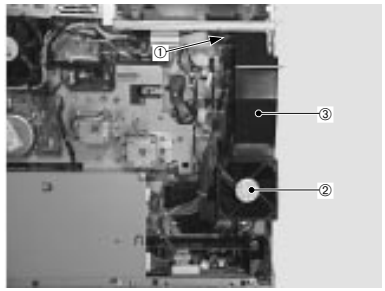
To remove the rotary manual unit

1. **Remove the three screws and disconnect the 20 connectors, and then remove the mechanical controller PCB along with the frame.**



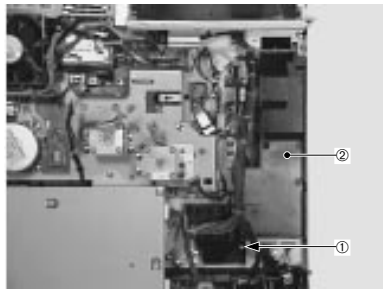
1—Screws **3—Mechanical controller PCB**
2—Connectors

2. **Remove the screw and the duct cover with the electrical unit fan.**



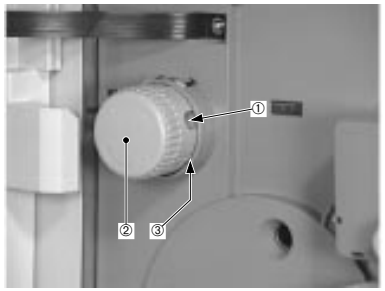
1—Screw **3—Duct cover**
2—Electrical unit fan

3. **Remove the screw and the duct.**



1—Screw
2—Duct

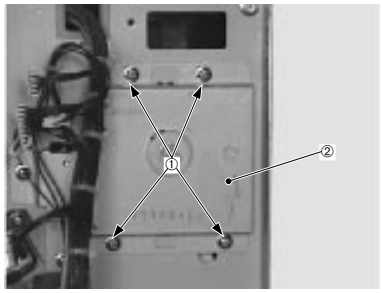
4. **Remove the inner cover 2.**
5. **Remove the screw, take off the knob and the circular plate.**



1—Screw
2—Knob
3—Plate

Note: Be careful not to lose the spring.

6. Remove the four screws and the rotary manual unit.

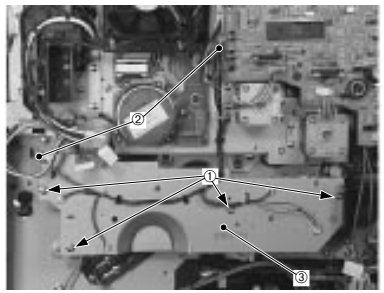


1—Screws
2—Rotary manual unit

Transfer drum cleaner press drive unit

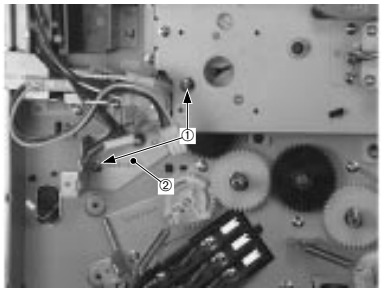
To remove the transfer drum cleaner press drive unit

1. Remove the power supply according to the procedure on page 5-140.
2. Remove the four screws and disconnect the two connectors, then take off the solenoid unit.



1—Screws
2—Connectors
3—Solenoid unit

3. Remove the fixing unit motor according to the procedure on page 5-25.
4. Remove the two screws and the transfer drum cleaner press drive unit.



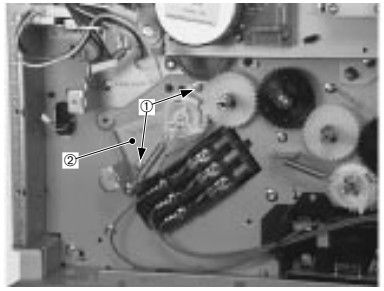
1—Screws
2—Transfer drum cleaner press drive unit

Discharge roller press drive unit

To remove the discharge roller press drive unit

1. Remove the power supply according to procedure on page 5-140.
2. Remove the solenoid unit according to step 2 of the transfer drum cleaner press drive unit on page 5-32.
3. Remove the transfer drum holder unit according to the procedure on page 5-58.
4. While pinching the lock levers on the left and right of the pick-up unit, pull the unit out of the printer.

5. Remove the two screws and the discharge roller press drive unit.



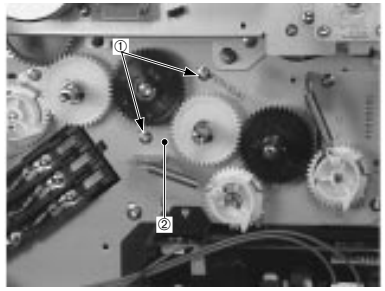
1—Screws
2—Discharge roller press drive unit

Drum press drive unit

To remove the drum press drive unit

1. Remove the power supply according to the procedure on page 5-140.
2. Remove the solenoid unit according to step 2 of the transfer drum cleaner press drive unit on page 5-32.
3. Remove the transfer drum holder unit according to the procedure on page 5-58.

4. Remove the two screws and the drum press drive unit.



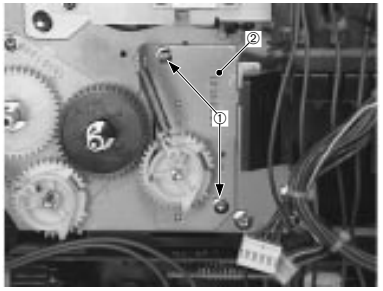
1—Screws
2—Drum press drive unit

Attraction roller press drive unit

To remove the attraction roller press drive unit

1. Remove the power supply according to the procedure on page 5-140.
2. Remove the solenoid unit according to step 2 of the transfer drum cleaner press drive unit on page 5-32.

3. Remove the two screws and take out the attraction roller press drive unit.

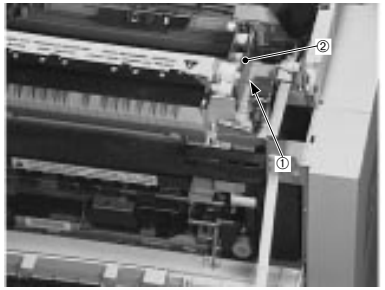


1—Screws
2—Attraction roller press drive unit

Delivery drive unit

To remove the delivery drive unit

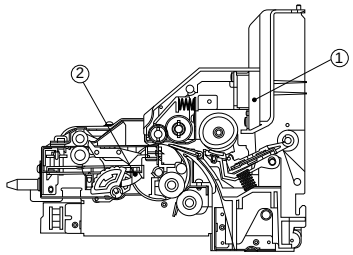
1. Remove the upper cover.
2. Remove the screw and the delivery drive unit.



1—Screw
2—Delivery drive unit

Paper transport system

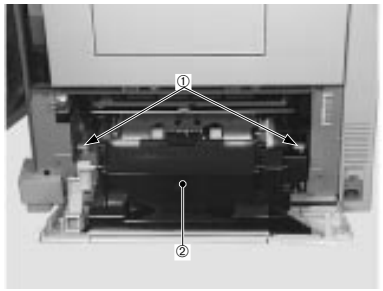
Pick-up unit



1—Manual feeding tray pick-up unit
2—Cassette pick-up unit

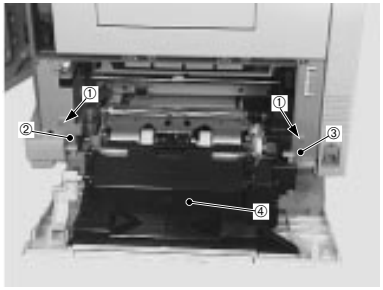
To remove the pick-up unit

1. Open the front door and the pick-up cover.
2. While pinching the lock levers on the left and right of the pick-up unit, pull the unit out toward you.



1—Lock levers
2—Pick-up unit

3. Take out the two screws and the left and right stoppers to remove the pick-up unit.

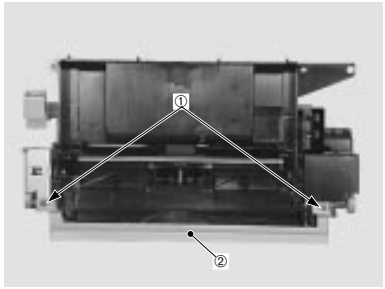


1—Screws
2—Left stopper
3—Right stopper
4—Pick-up unit

Separating the manual feeding tray pick-up unit from the cassette pick-up unit

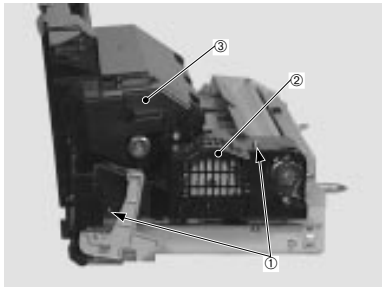
To separate the manual feeding tray pick-up unit from the cassette pick-up unit

1. Remove the pick-up unit from the printer.
2. Open the pick-up cover.
3. Remove the three screws and take off the pick-up cover.
4. Remove the manual feeding tray
5. Remove the two screws and the lower cover.



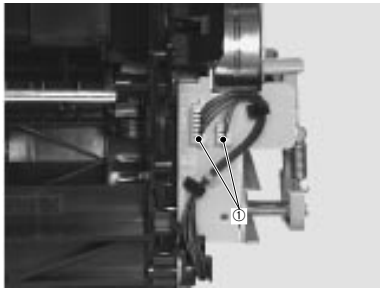
1—Screws
2—Lower cover

6. **Remove the two screws, and open the manual feeding tray pick-up unit to take off the motor cover.**



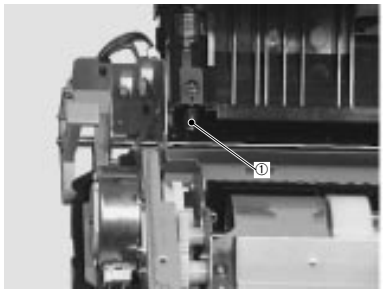
1—Screws
2—Motor cover
3—Manual feeding tray pick-up unit

7. **Disconnect the two connectors.**



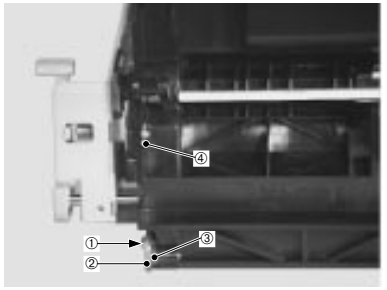
1—Connectors

8. **Remove the spring.**



1—Spring

9. **Remove the screw, the shaft and the spring. Then remove the E-ring to disassemble the pick-up unit into the manual feeding tray pick-up unit and the cassette pick-up unit.**

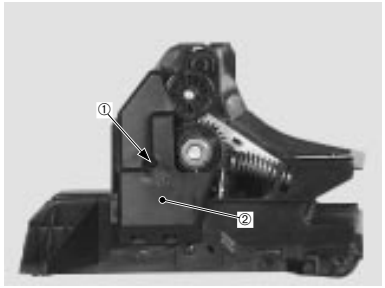


1—Screw
2—Shaft
3—Spring
4—E-ring

Manual feed solenoid

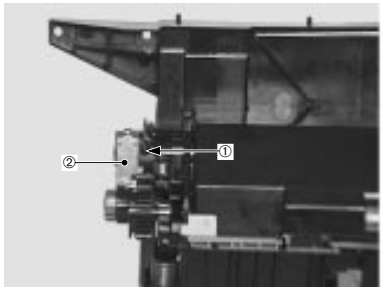
To replace the manual feed solenoid (manual feeding tray pick-up unit)

1. **Remove the screw fixing the solenoid cover, and remove the cover.**



1—Screw
2—Solenoid cover

2. **Remove the screw and the manual feed solenoid.**

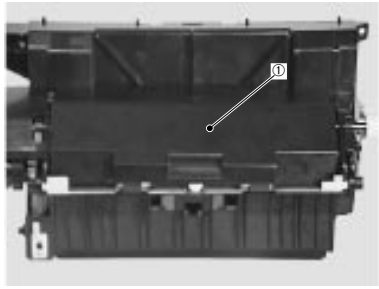


1—Screw
2—Manual feed solenoid

Manual feeding pick-up roller

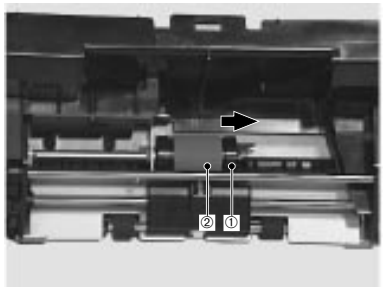
To replace the manual feeding pick-up roller (manual feeding tray pick-up unit)

1. **Remove the manual feeding cover.**



1—Manual feeding cover

2. **Slide idler collar in the direction of the arrow to remove it and the manual feeding pick-up roller.**

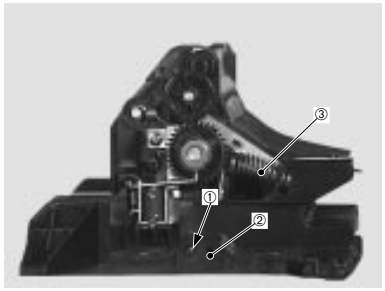


1—Idler collar
2—Manual feeding pick-up roller

Separation pad

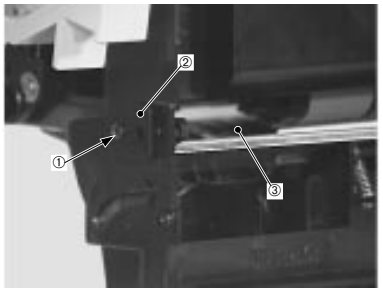
To replace the separation pad (manual feeding tray pick-up unit)

1. **Remove the screw fixing the solenoid cover, and remove the cover.**
2. **Remove the screw and the shaft, and then remove the spring.**



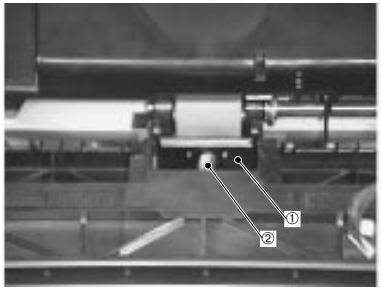
1—Screw
2—Shaft
3—Spring

3. **Remove the screw, disconnect the shaft and remove the paper lifting plate.**



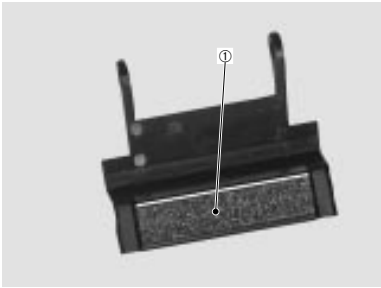
1—Screw
2—Shaft
3—Paper lifting plate

4. **Disengage the claw fixing the separation pad unit and remove the unit and the spring.**



1—Separation pad unit
2—Spring

5. **Use a flat-bladed screwdriver to remove the separation pad from the unit.**

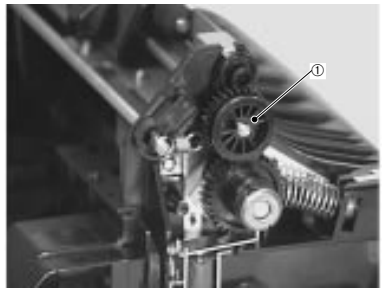


1—Separation pad

Feed roller unit 2

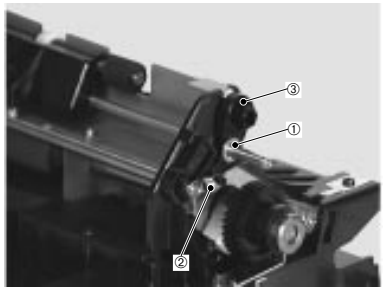
To replace the feed roller unit 2 (manual feeding tray pick-up unit)

1. Remove the manual feeding cover.
2. Remove the screw fixing the solenoid cover, and then remove the cover.
3. Disengage the claw fixing the idler gear and remove the gear.



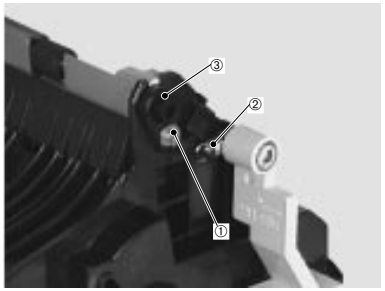
1—Idler gear

4. Remove the E-ring and the spring, and then the right lock link.



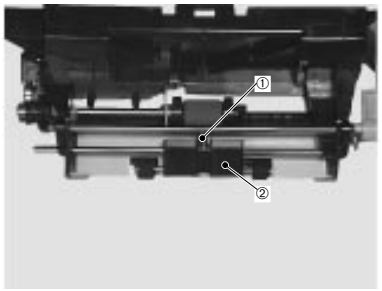
1—E-ring
2—Spring
3—Right lock link

5. Remove the E-ring and the spring, and then the left lock link.



1—E-ring
2—Spring
3—Left lock link

6. Remove the spring to remove feed roller unit 2.

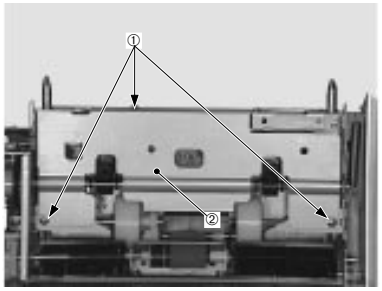


1—Spring
2—Feed roller unit 2

Pick-up motor

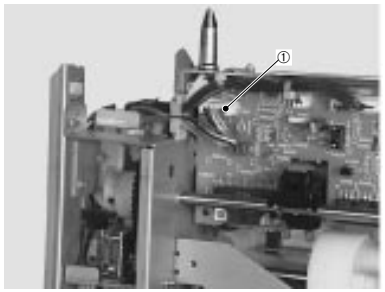
To remove the pick-up motor
(cassette pick-up unit)

1. Remove the three screws and the PCB cover.



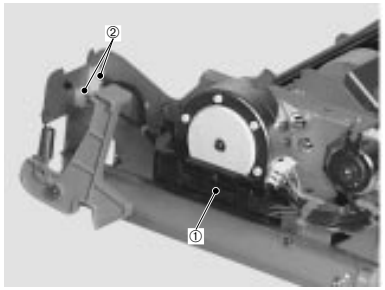
1—Screws
2—PCB cover

2. Disconnect the connector.



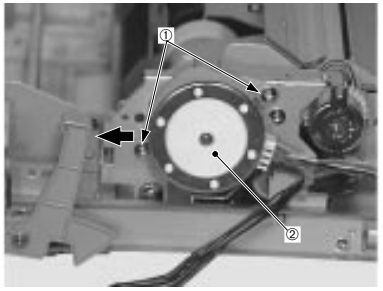
1—Connector

3. Disconnect the two connectors and disengage the claw fixing the cable mount to remove the mount.



1—Cable mount
2—Connectors

4. Remove the two screws, and slide off the pick-up motor in the direction of the arrow.

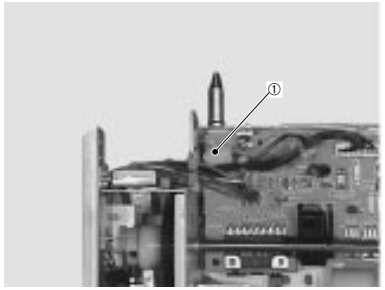


1—Screws
2—Pick-up motor

Registration roller clutch

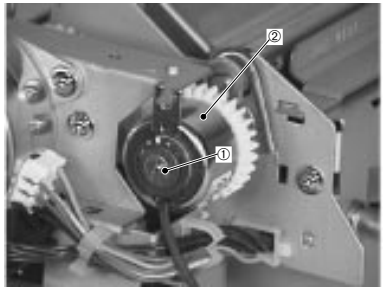
To remove the registration roller clutch (cassette pick-up unit)

1. Remove the three screws to remove the PCB cover.
2. Disconnect the connector.



1—Connector

3. Remove the E-ring and the registration roller clutch.

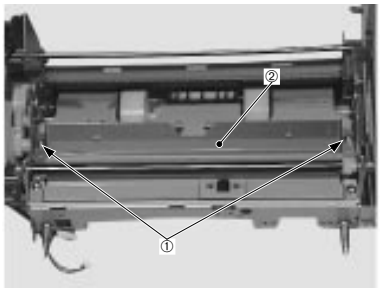


1—E-ring
2—Registration roller clutch

Registration upper/lower rollers

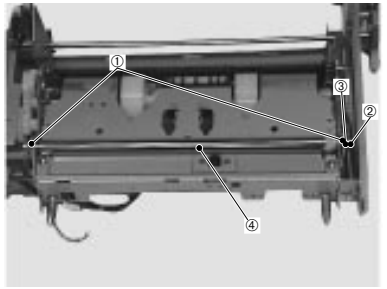
To remove registration upper/lower rollers (cassette pick-up unit)

1. Remove the pick-up PCB according to the procedure on page 5-132.
2. Remove the registration roller clutch according to the procedure on page 5-51.
3. Remove the two screws and the registration guide.



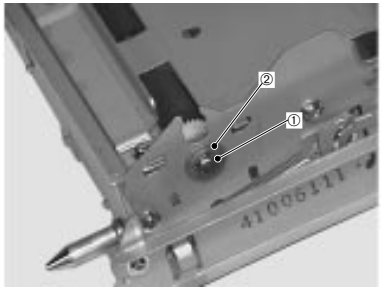
1—Screws
2—Registration guide

4. Next remove the two springs, the E-ring and the bearing, and then the registration upper roller.



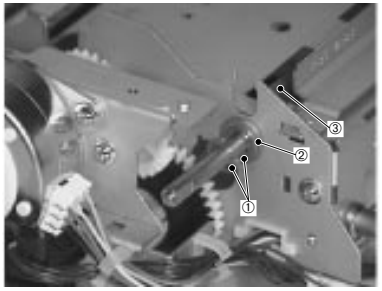
1—Springs
2—E-ring
3—Bearing
4—Registration upper roller

5. Remove the E-ring and the bearing.



1—E-ring
2—Bearing

6. Remove the two E-rings and the bearing, and finally the registration lower roller.

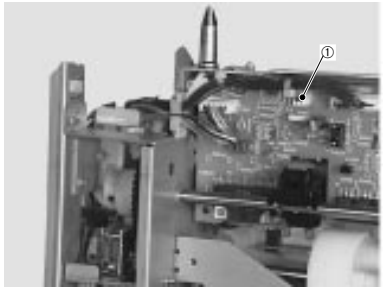


1—E-rings 3—Registration lower roller
2—Bearing

Cassette feed solenoid

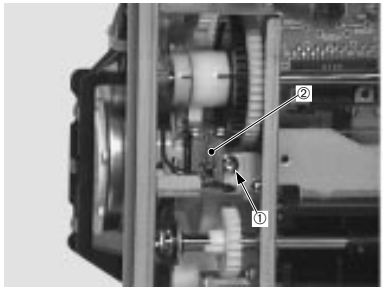
To remove the cassette feed solenoid (cassette pick-up unit)

1. Remove the three screws to remove the PCB cover.
2. Disconnect the connector.



1—Connector

3. Remove the screw and the cassette feed solenoid with the solenoid mount.



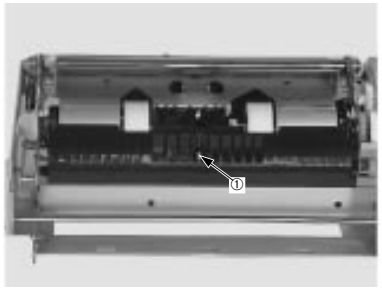
1—Screw
2—Cassette feed solenoid

4. Remove the screw and the cassette feed solenoid from the solenoid mount.

Separation roller

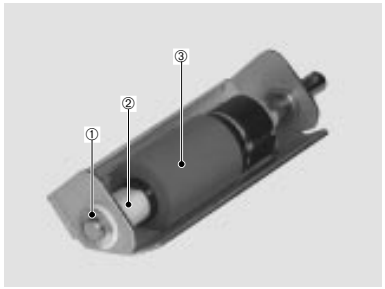
To remove the separation roller (cassette pick-up unit)

1. **Remove the screw and the separation roller unit.**



1—Screw

2. **Remove the E-ring and the bearing and then the separation roller.**

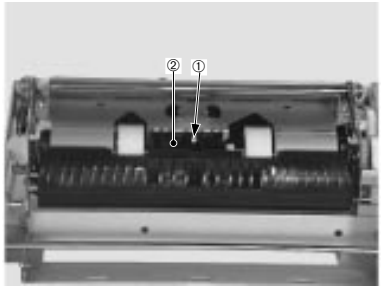


1—E-ring
2—Bearing
3—Separation roller

Feed roller 1

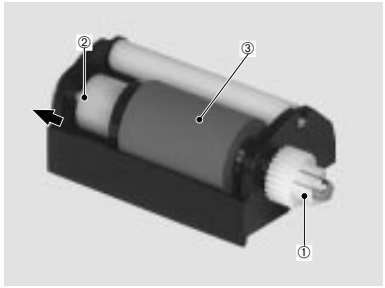
To remove feed roller 1 (cassette pick-up unit)

1. **Remove the separation roller unit according to the procedure on page 5-56.**
2. **Remove the screw and the feed roller unit 1.**



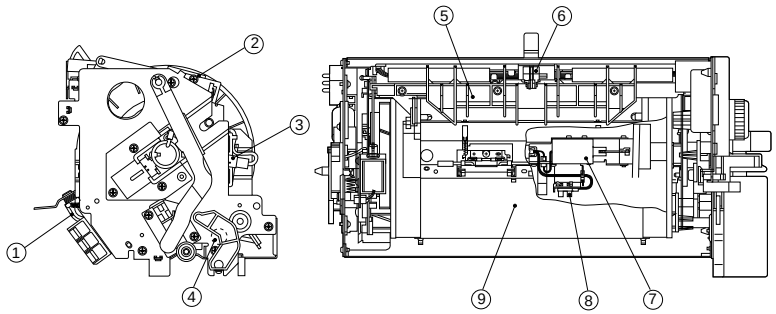
1—Screw
2—Feed roller unit 1

3. **Disengage the claw fixing the gear to remove the gear, and then pull out the shaft in the direction of the arrow to remove feed roller 1.**



1—Gear
2—Shaft
3—Feed roller 1

Transfer Drum Holder Unit

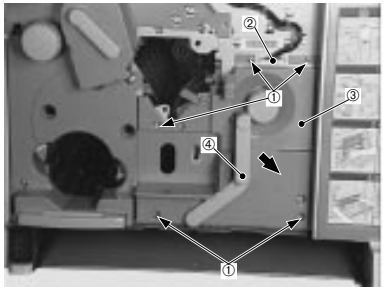


1—Discharge roller
2—Separation claw solenoid
3—Transfer drum top sensor
4—Attraction roller
5—Separation claw unit
6—Separation sensor
7—Gripper solenoid
8—Attraction sensor

Figure 5-2 Transfer drum holder unit configuration

To remove the transfer drum holder unit

1. **Remove the cassette.**
2. **Remove inner cover 1.**
3. **Remove the drum cartridge.**
4. **Remove the toner cartridge.**
5. **While pinching the lock levers left and right of the pick-up unit, pull the unit out of the printer.**
6. **Remove the five screws and disconnect the connector, and then drop the transfer drum lever in the direction of the arrow to remove the transfer drum holder unit.**

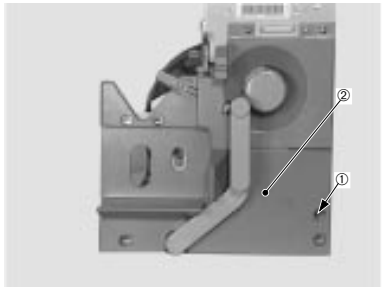


1—Screws
2—Connector
3—Transfer drum holder unit
4—Transfer drum lever

Note: Do not touch the transfer sheet surface with your hand. Also, do not damage it or contaminate it with trash, soil, oil, etc. If the sheet becomes soiled, use lint-free paper to clean it.

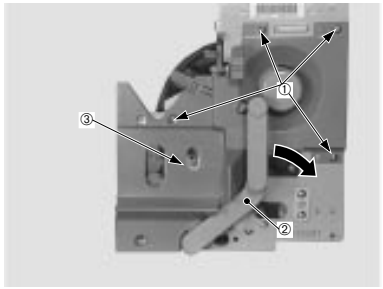
To replace the transfer drum unit

1. **Remove the screw and inner cover 3.**



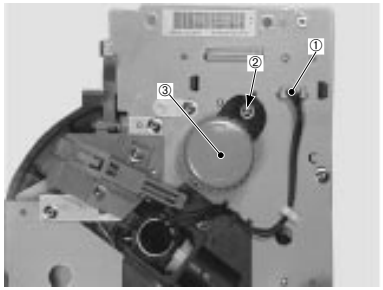
1—Screw
2—Inner cover 3

2. Drop the transfer drum lever in the direction of the arrow to remove the four screws and the transfer drum cover.



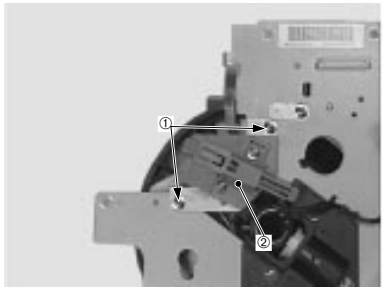
1—Screws
2—Transfer drum lever
3—Transfer drum cover

3. Disconnect the connector and remove the screw to remove the knob unit.



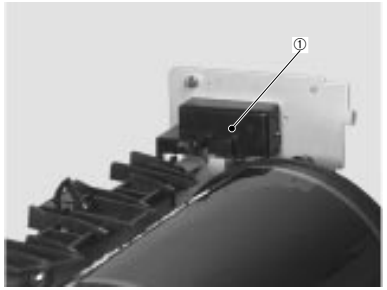
1—Connector
2—Screw
3—Knob unit

4. Remove the two screws and the drum cartridge lock holder.



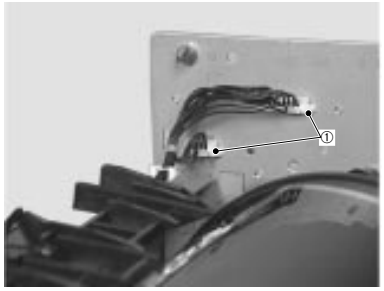
1—Screws
2—Drum cartridge lock holder

5. Disengage the claw fixing the connector cover to remove the connector cover.



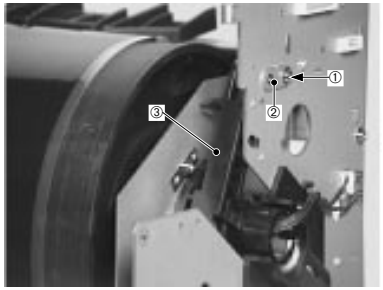
1—Connector cover

6. Disconnect the two connectors.



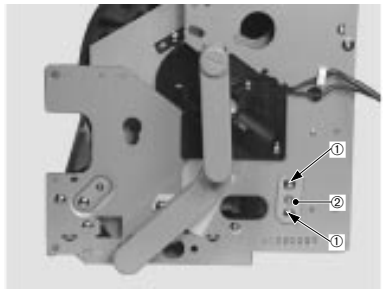
1—Connectors

7. Remove the screw, and disconnect the shaft to remove the front lever.



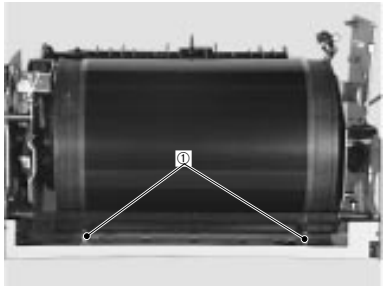
1—Screw
2—Shaft
3—Front lever

8. Remove the screws and disconnect the shaft.



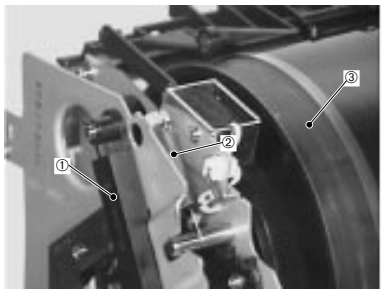
1—Screws
2—Shaft

9. Remove the two springs of the attraction roller unit.



1—Springs

10. Disengage the claw fixing the rear lever, and remove the lever. Then remove the spring and the transfer drum unit.

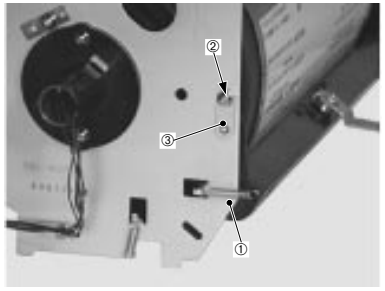


1—Rear lever
2—Spring
3—Transfer drum unit

Note: Do not touch the transfer sheet surface with your hand. Also, do not damage it or contaminate it with trash, soil, oil, etc. If the sheet becomes soiled, use lint-free paper to clean it.

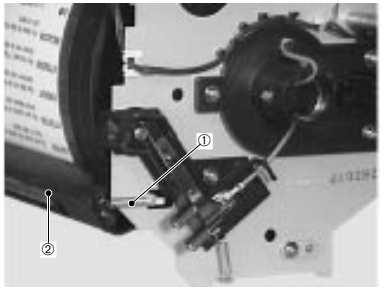
To remove the discharge roller

1. Remove the spring and the screw, and disconnect the shaft.



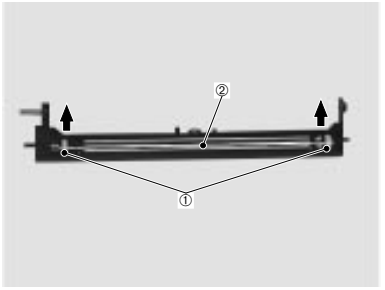
1—Spring
2—Screw
3—Shaft

2. Remove the spring, and then the discharge roller unit.



1—Spring
2—Discharge roller unit

3. Finally, pull out the discharge roller in the direction of the arrow while holding the collars on both sides.

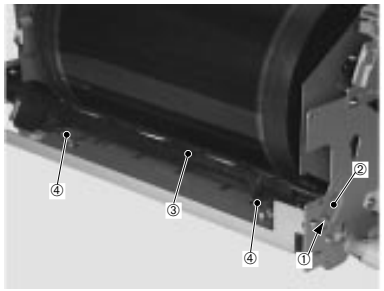


1—Collars
2—Discharge roller

Note: Use gloves to pull out the discharge roller so as to not touch it with your hands. Also, be careful not to contaminate it with oil, foreign matter, etc. If the discharge roller becomes soiled, use lint-free paper to clean it.

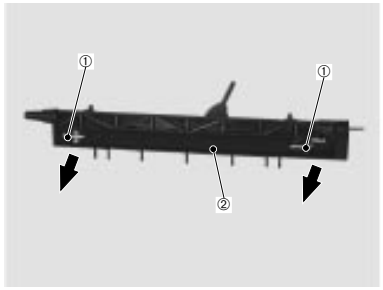
To remove the attraction roller

1. **Remove inner cover 3 and the transfer drum cover.**
2. **Remove the screw, the shaft and the two springs to remove the attraction roller unit.**



1—Screw **3—Attraction roller unit**
2—Shaft **4—Springs**

3. **Then lift out the attraction roller while holding the collars on both sides.**



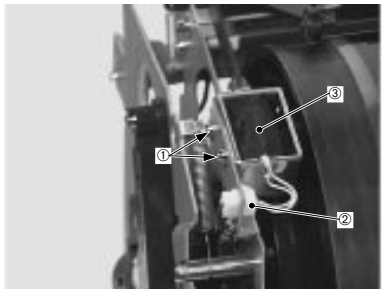
1—Collars
2—Attraction roller

Note: Use the spring hook when reassembling the attraction roller because its spring can become damaged easily.

Use gloves to pull out the attraction roller so as to not touch it with your hands. Also, be careful not to contaminate it with oil, foreign matter, etc.

To remove the separation claw solenoid

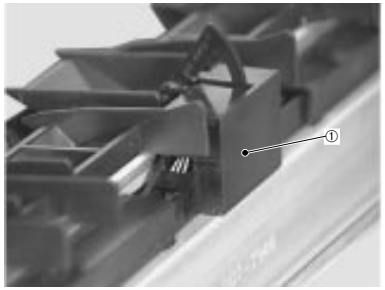
1. **Remove the two screws and disconnect the connector, and remove the separation claw solenoid.**



1—Screws
2—Connector
3—Separation claw solenoid

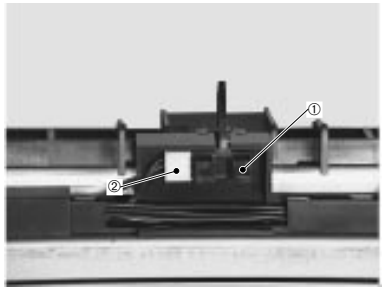
To remove the separation sensor

1. **Disengage the claws fixing the separation sensor cover, and remove the cover.**



1—Separation sensor cover

2. **Disconnect the connector and disengage the claw fixing the separation sensor, and remove the sensor.**

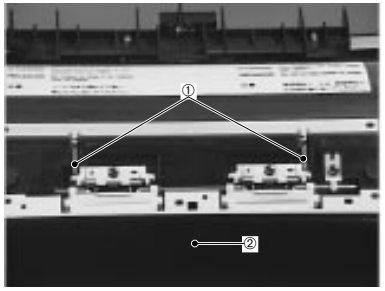


1—Separation sensor
2—Connector

Note: Be sure to not touch the transfer sheet surface with your hand.

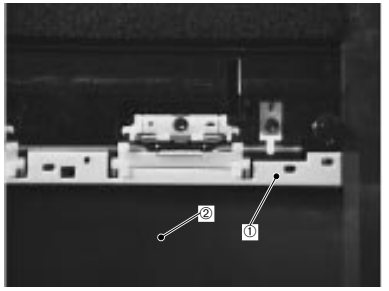
To remove the transfer sheet

1. **Remove the two springs. The sheet will come off by rotating the transfer drum once.**



1—Springs
2—Transfer drum

2. **Then peel off the two-sided tape to remove the transfer sheet.**

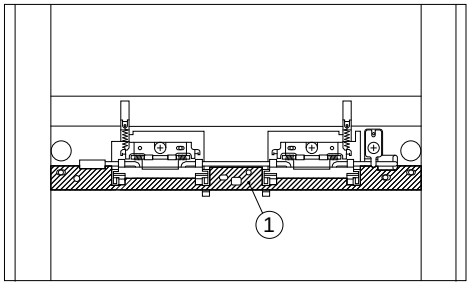


1—Two-sided tape
2—Transfer sheet

Note: Use gloves to remove the transfer sheet so as to not touch it with your hands. If the discharge roller becomes soiled, use lint-free paper to clean it.

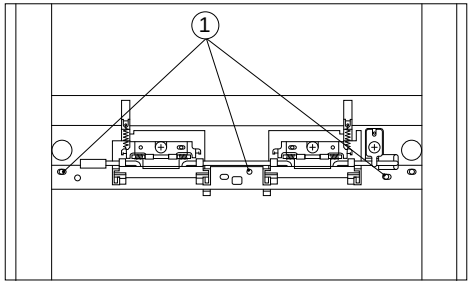
To replace the transfer sheet

1. **Use alcohol to clean the surface where the two-sided tape was applied, and then apply new two-sided tape.**



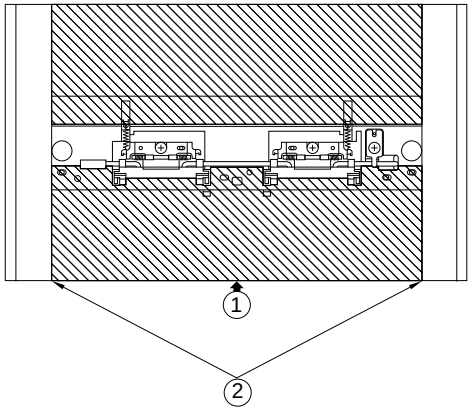
1—Two-sided tape application surface

2. When mounting the transfer sheet, confirm that the holes at the edge of the transfer sheet securely enter the three designated projections of the gripper unit.



1—Designated projections

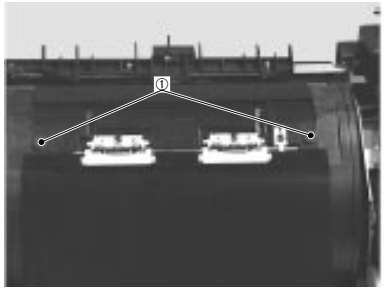
3. Take care so that the transfer sheet does not slack and float in the center or at the edges.



1—Transfer sheet center
2—Transfer sheet edges

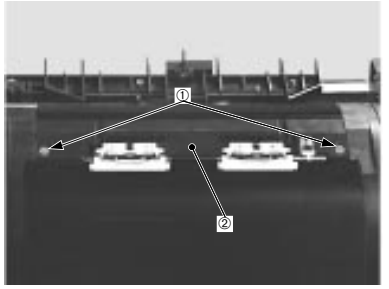
To remove the gripper unit

1. Remove the transfer sheet according to the procedure on page 5-68.
2. Remove the two caps.



1—Caps

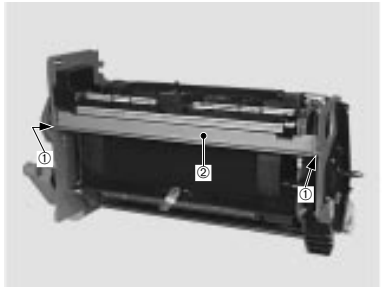
3. Use a precision screwdriver to remove the two screws, and remove the gripper unit.



1—Screws
2—Gripper unit

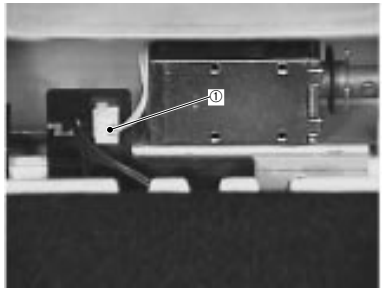
To remove the gripper solenoid

1. Remove the gripper unit according to the procedure on page 5-71.
2. Remove the two screws and the crossmember.



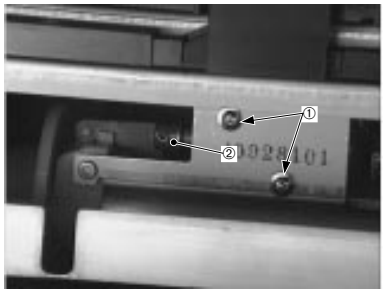
1—Screws
2—Crossmember

3. Disconnect the connector.



1—Connector

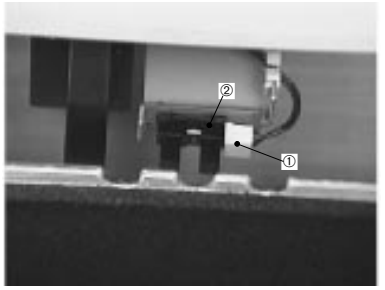
4. Remove the two screws and the gripper solenoid.



1—Screws
2—Gripper solenoid

To remove the attraction sensor

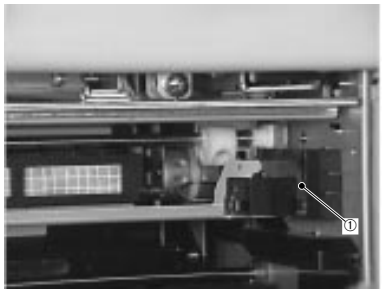
1. Remove the gripper unit according to the procedure on page 5-71.
2. Disconnect the connector and disengage the claw fixing the attraction sensor to remove the sensor.



1—Connector
2—Attraction sensor

To remove the transfer drum cleaner unit

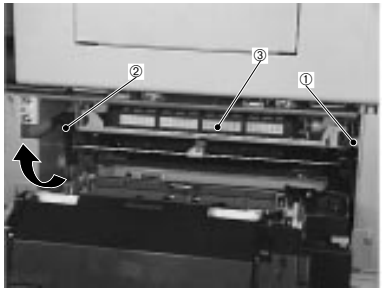
1. **Open the pick-up cover.**
2. **Disengage the claw fixing the connector cover to remove the cover.**



1—Connector cover

3. **Disconnect the connector, and remove the transfer drum cleaner unit by pulling the lock lever upward in the direction of the arrow.**

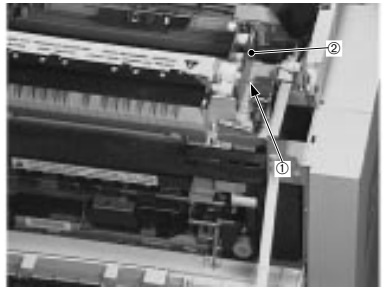
   The lock lever must first be pulled away from the chassis as it rests in a notch in the chassis.



1—Connector
2—Lock lever
3—Transfer drum cleaner unit

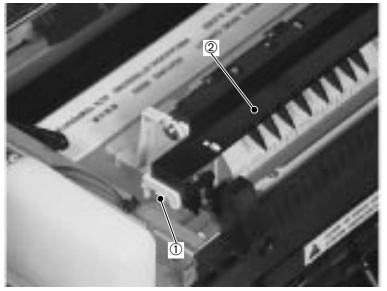
To remove the face-down delivery unit

1. **Remove the upper cover.**
2. **Remove the screw and the delivery drive unit.**



1—Screw
2—Delivery drive unit

3. **Disconnect the connector.**



1—Connector
2—Face-down delivery unit

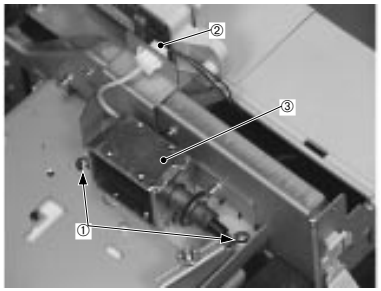
4. **While holding up the claw fixing the face-down delivery unit, slide the face-down delivery unit out in the direction of the arrow.**

1—Face-down delivery unit

Note: Be careful to not break or bend the static charge eliminator.

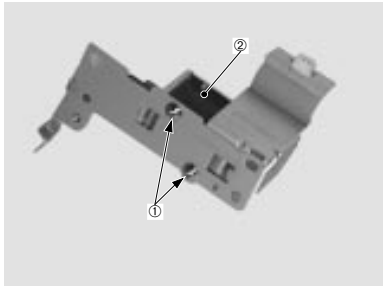
To remove the cleaning belt drive solenoid

1. **Remove the upper cover.**
2. **Remove the two screws and disconnect the connector, and then remove the cleaning belt drive solenoid unit.**



1—Screws
2—Connector
3—Cleaning belt drive solenoid unit

3. **Remove the two screws and the cleaning belt drive solenoid.**

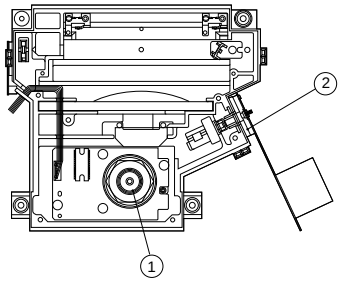


1—Screws
2—Cleaning belt drive solenoid

Exposure system

Laser/scanner unit

The laser/scanner unit is the part that sweeps the laser beam across the photosensitive drum. The configuration of the laser/scanner unit is shown below.

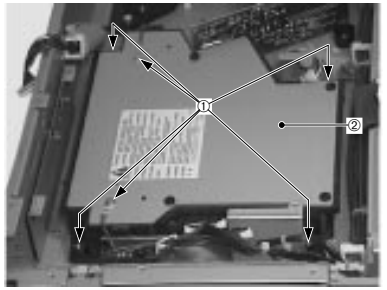


1—Scanner unit
2—Laser unit

Figure 5-3 Laser/scanner unit configuration

To remove the laser/scanner unit

1. **Remove the DC controller PCB according to the procedure on page 5-127.**
2. **Then remove the six screws and the laser /scanner unit.**



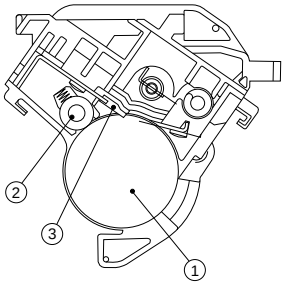
1—Screws
2—Laser/scanner unit

Note: Do not disassemble the laser/scanner unit, as it cannot be adjusted in the field.

Charging system

Drum cartridge

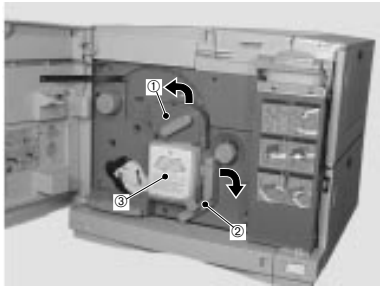
The drum cartridge is comprised of the photosensitive drum, the primary charging roller, and a rubber blade. As part of the printing process, a visible image is formed on the photosensitive drum surface based on the printing data.



1—Photosensitive drum
2—Primary charging roller
3—Blade

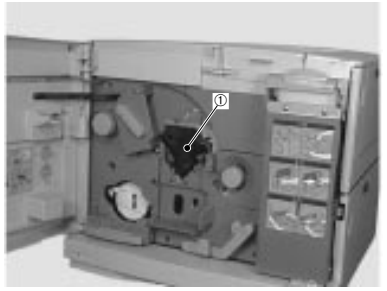
To remove the drum cartridge

1. **Open the front door.**
2. **Lift the photosensitive drum door in the direction of the arrow and drop the transfer drum lever in the direction of the arrow. Remove the waste toner bottle.**



1—Photosensitive drum door
2—Transfer drum lever
3—Waste toner bottle

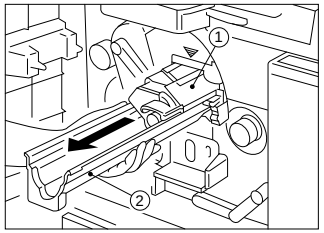
3. **Remove the drum cartridge.**



1—Drum cartridge

4. **Store the drum cartridge in the drum cover.**

   Be careful when handling the drum cartridge.

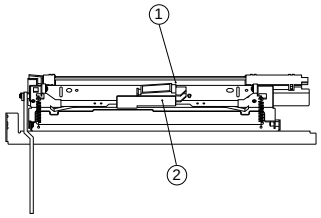


1—Drum cartridge
2—Drum cover

5. **Use a flannel cloth to clean the drum, as lint-free paper can damage it.**
6. **Since exposing the drum to light for an extended period of time can result in an undesirable influence on images, clean it as quickly as possible.**
7. **When replacing the drum cartridge, clean the separation charging unit and the density sensor window with the special brush.**

Density sensor unit

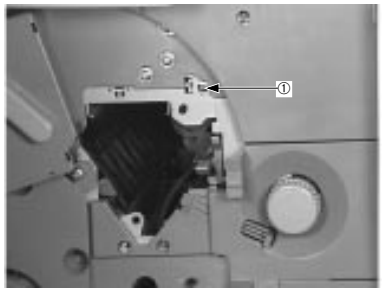
This sensor is comprised of a separation charging unit and a density sensor.



1—Separation charging unit
2—Density sensor

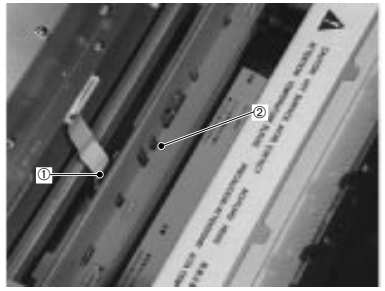
To remove the density sensor unit

1. **Remove the drum cartridge.**
2. **Remove the screw.**



1—Screw

3. **Disconnect the connector to remove the density sensor unit.**

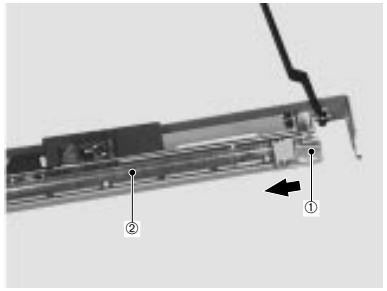


1—Connector
2—Density sensor unit

To separate the separation charging unit from the density sensor

1. **Grasp the handle and slide off the separation charging unit in the direction of the arrow.**

   The remaining unit is the density sensor.



1—Handle
2—Separation charging unit

Notes:

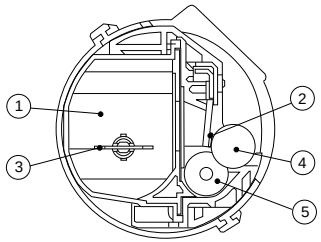
- The density sensor is position-adjusted when shipped from the factory. Do not disassemble it in the field.
- Be sure to clean the density sensor only with the designated brush mounted in the printer and nothing else. Do not use water or solvents.
- Do not touch the surface of the density sensor with your bare hand as it will not function properly when dirty.

Developing system

Toner cartridge

The toner cartridge is comprised of the developing cylinder and rubber blade, the toner container, the toner feed roller, and the stirring plate.

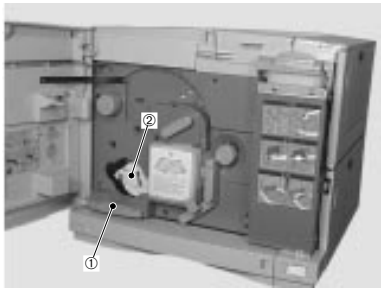
The developing cylinder and the toner feed roller receive drive from the developing unit motor to rotate.



1—Toner container
2—Blade
3—Stirring plate
4—Developing cylinder
5—Toner feed roller

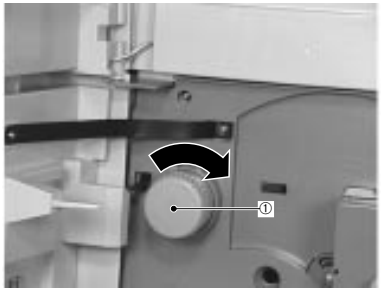
To remove the toner cartridge

1. **Open the front door, and then pull out the ejection lever toward you to remove the toner cartridge.**



1—Ejection lever
2—Toner cartridge

2. **After pushing the rotary manual knob back against the rear, release the lock and turn the knob in the direction of the arrow until it becomes stationary.**



1—Rotary manual knob

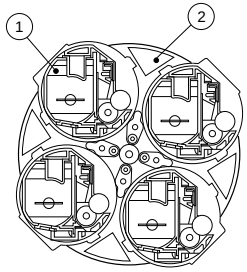
3. **Pull the ejection lever toward you to remove the toner cartridge. Remove the four toner cartridges by repeating steps 2 and 3 three times each.**

Developing rotary unit

The developing unit consists of four color toner cartridges (magenta, cyan, yellow, and black) and the developing rotary which houses these cartridges.

The developing rotary contains magenta, cyan, yellow, and black arranged clockwise in that order. The developing rotary rotates counter-clockwise to keep the four color toner cartridges in sequential order in respect to the photosensitive drum.

Each toner cartridge maintains its posture independent of the rotational position of the rotary to prevent toner from scattering.

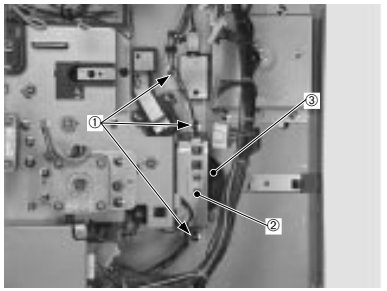


1—Toner cartridge
2—Developing rotary

To remove the developing rotary unit

1. **Remove the rear door.**
2. **Remove the nine screws and the shield plate.**
3. **Remove the mechanical controller PCB as well as the frame and the electrical unit fan along with the duct according to rotary manual unit steps 1 to 3 on page 5-30.**

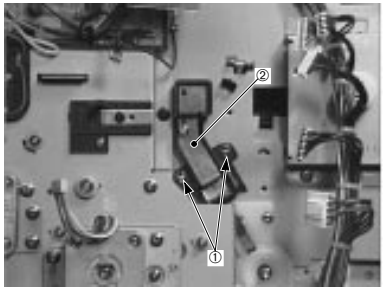
4. **Remove the toner cartridges, the drum cartridge and inner cover 1.**
5. **Remove the three screws, and then the sensor plate and the gear.**



1—Screws
2—Sensor plate
3—Gear

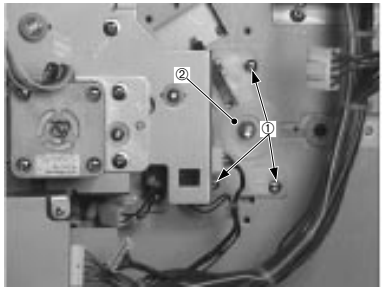
When reassembling, make sure the toner cam in the rotary unit is not in the out position by turning the gear until the tab blocks the photosensor on the sensor plate. If the rotary unit is in the out position the toner cartridges will neither fit nor operate properly.

6. **Remove the two screws and the holder.**



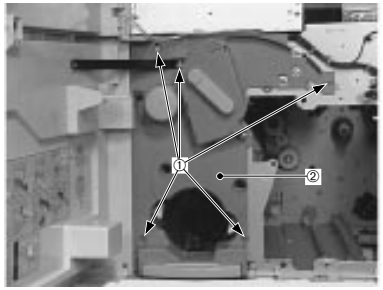
1—Screws
2—Holder

7. Then remove three more screws and the bushing on the rear side.



1—Screws
2—Bushing

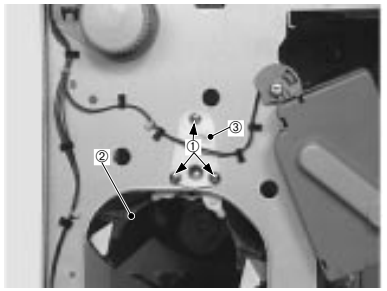
8. Remove the five screws and inner cover 2.



1—Screws
2—Inner cover 2

9. Remove the three screws to the bushing on the front side, then the developing rotary unit.

Push the rotary manual knob in to aid removal of the developing rotary unit.

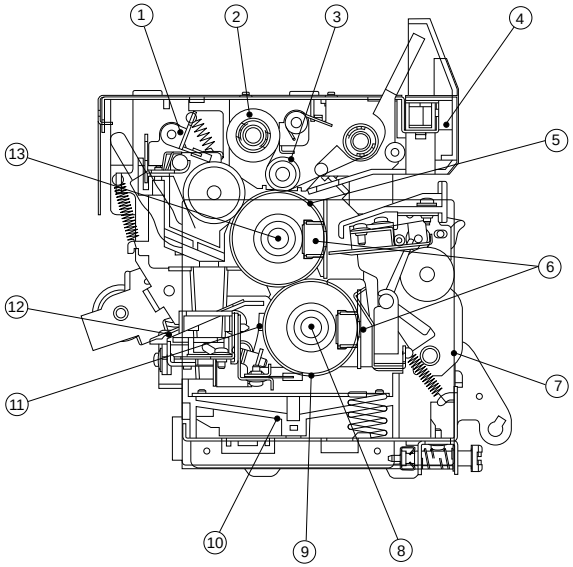


1—Screws
2—Developing rotary unit
3—Bushing

Fixing system

Fixing unit

A cross-sectional view of the fixing unit, a device for fusing the toner to the paper, is shown below.



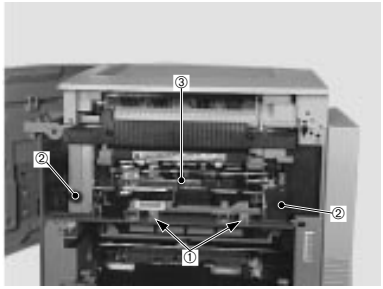
1—Oil applying unit
2—Cleaning belt
3—Cleaning belt roller
4—Delivery guide
5—Fixing upper roller
8—Fixing lower heater
9—Fixing lower roller
10—Oil tray unit
11—Thermistor
12—Fixing entrance guide

Figure 5-4 Fixing unit configuration

To remove the fixing unit

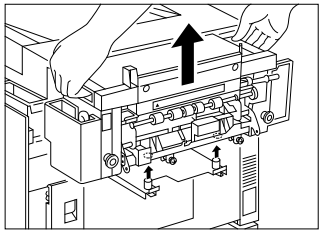
Note: In order to avoid oil spillage into the printer, the oil bottle should be temporarily removed any time the printer is shifted, moved or relocated.

1. **Open the front door, and remove the oil bottle.**
2. **Remove the fixing unit cover.**
3. **Loosen the two screws, pull the handles of the fixing unit toward you and lift the fixing unit straight up and out.**



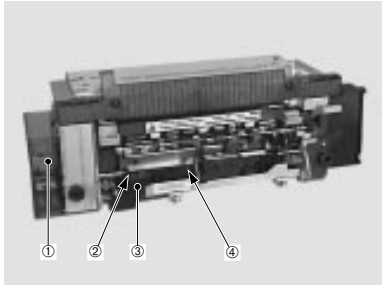
1—Screws
2—Handles
3—Fixing unit

Note: Since there is a possibility of spilling oil when removing the fixing unit, lift it out slowly and evenly. If you spill oil, wipe it up with a towel.



To withdraw oil from the fixing unit

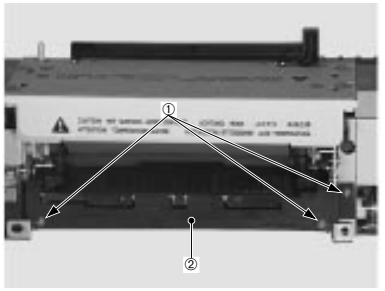
1. **Withdraw the oil from within the bottle case with the designated oil removing tool and transfer it to the oil storage bottle.**
2. **Remove the cover and cleaning cap. Remove any oil from the oil catch tray with the oil removing tool and transfer it to the oil storage bottle.**
3. **Move the lever up and down about 50 times. Following this, remove any oil in the bottle case and oil catch tray again. Repeat this three times.**



1—Bottle case
2—Cleaning cap
3—Cap cover
4—Oil catch tray

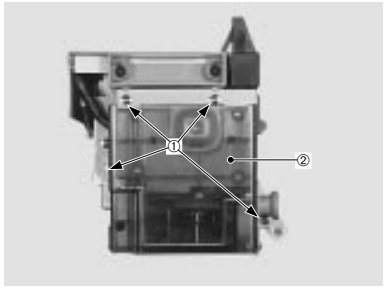
To remove fixing upper/lower heaters

1. **Remove the three screws and the fixing entrance cover.**



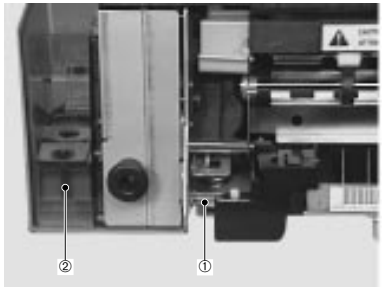
1—Screws
2—Fixing entrance cover

2. **Remove the four screws.**



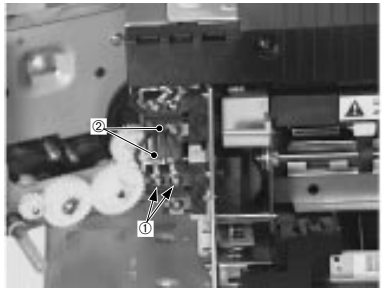
1—Screws
2—Bottle case unit

3. Sever the tie-wrap fixing the tube with wire cutters to remove the bottle case unit.



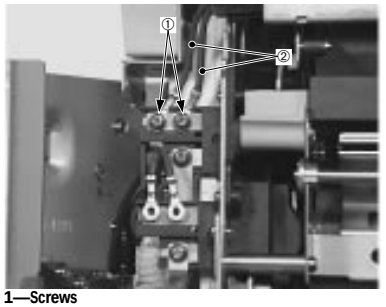
1—Tie-wrap
2—Bottle case unit

4. Remove the two screws, as well as the two heater terminals of the fixing heater.



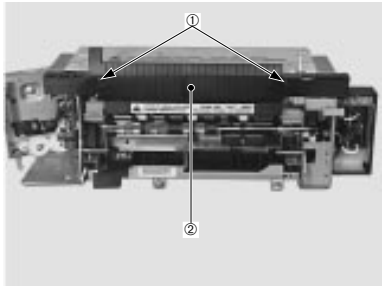
1—Screws
2—Heater terminals

5. Remove the two screws and the terminals.



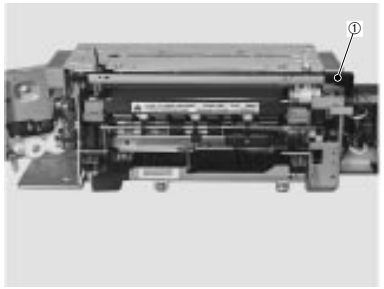
1—Screws
2—Terminals

6. Remove the two screws and the delivery guide.



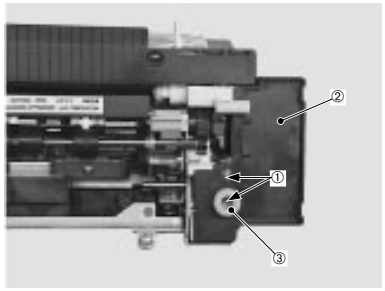
1—Screws
2—Delivery guide

7. **Disengage the claw fixing the cord holder, and remove the holder.**



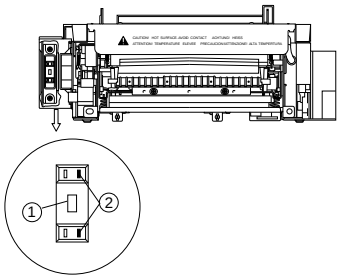
1—Cord holder

8. **Remove the two screws, and then the connector cover and the fixing handles.**



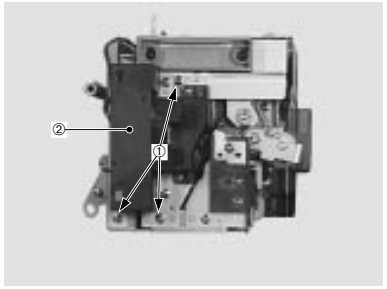
1—Screws
2—Connector cover
3—Fixing handles

9. **Disconnect the connector, and use the contact extraction tool to remove the two heater contacts.**



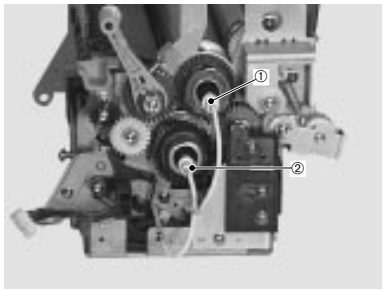
1—Connector
2—Heater contacts

10. **Remove the three screws, as well as the heater cover along with the heater fixing plate.**



1—Screws
2—Heater cover

11. Gently pull out the fixing upper and lower heaters.



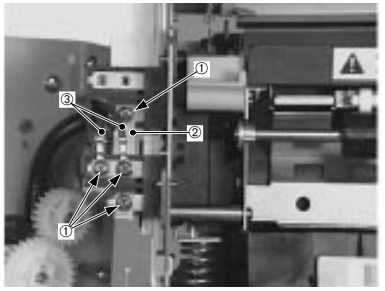
1—Fixing upper heater
2—Fixing lower heater

Note: When fixing the terminal of the fixing heater lead wire with a screw, fix the terminal in the same direction as before disassembly without applying unnecessary force to the lead wire.

To remove the thermoswitch

1. Remove the fixing cleaning unit according to the procedure on page 5-106.

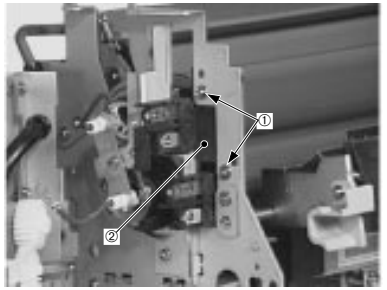
2. Remove the four screws, the connecting plate and the heater terminal.



1—Screws
2—Connecting plate
3—Heater terminal

3. Open the fixing delivery unit.

4. Remove the two screws and the thermoswitch.



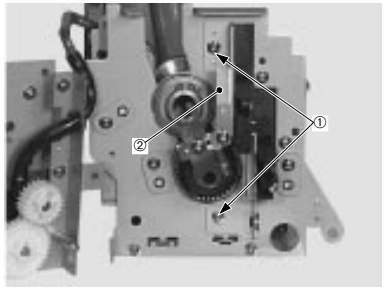
1—Screws
2—Thermoswitch

To remove the fixing upper roller

1. Remove the fixing upper/lower heaters according to the procedure page 5-93.

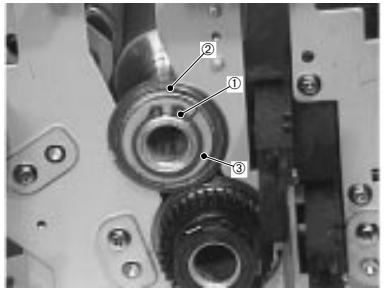
2. Remove the fixing cleaning unit according to the procedure on page 5-106.

3. **Remove the two screws and the grounding contact mount.**



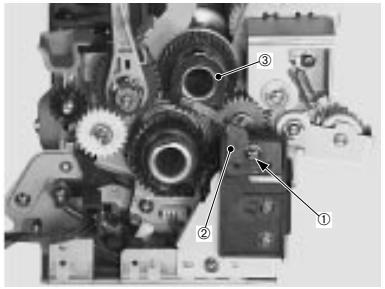
1—Screws
2—Grounding contact mount

4. **Remove the C-ring as well as the bearing and the bushing.**



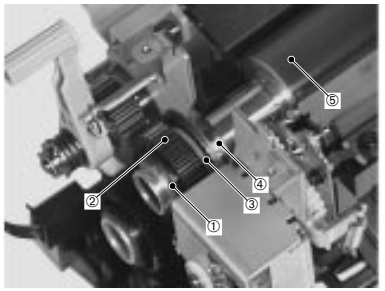
1—C-ring
2—Bearing
3—Bushing

5. **Remove the screw and then the fixing high-voltage contact and the grounding ring.**



1—Screw
2—Fixing high-voltage contact
3—Grounding ring

6. **After removing the C-ring, the fixing roller gear, the bushing, and the bearing, remove the fixing upper roller.**

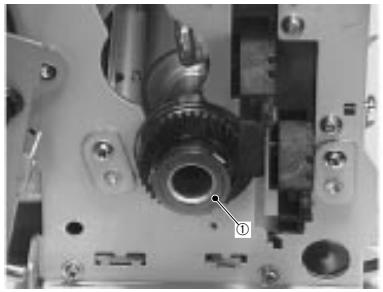


1—C-ring
2—Fixing roller gear
3—Bushing
4—Bearing
5—Fixing upper roller

Note: This printer detects the end of the cleaning belt, which also signifies the life span of the fixing upper/lower rollers. When replacing the upper roller be sure to replace the cleaning belt and the fixing lower roller also.

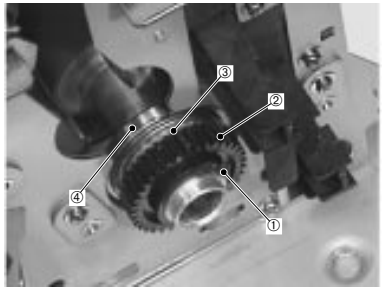
To remove the fixing lower roller

1. **Remove the fixing upper roller according to the procedure on page 5-99.**
2. **Remove the grounding ring.**



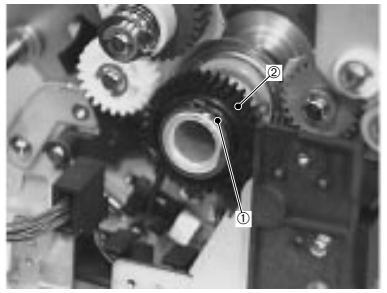
1—Grounding ring

3. **Remove the C-ring, and then the fixing roller gear, the bushing and the bearing.**



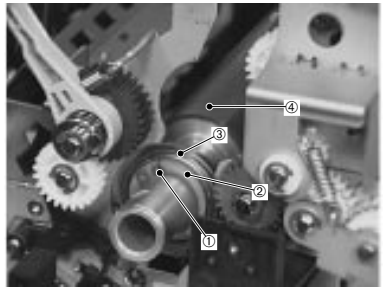
1—C-ring
2—Fixing roller gear
3—Bushing
4—Bearing

4. **Remove the C-ring and the fixing roller gear.**



1—C-ring
2—Fixing roller gear

5. **Remove the C-ring, and then the bushing and the bearing to remove the fixing lower roller.**

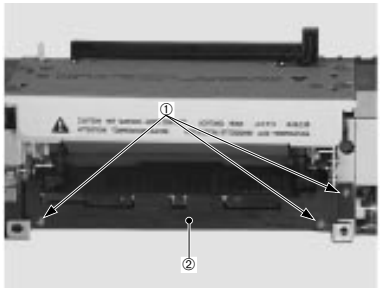


1—C-ring
2—Bushing
3—Bearing
4—Fixing lower roller

Note: This printer detects the end of the cleaning belt, which also signifies the life span of the fixing upper/lower rollers. When replacing the fixing lower roller be sure to replace the cleaning belt and the fixing upper roller also.

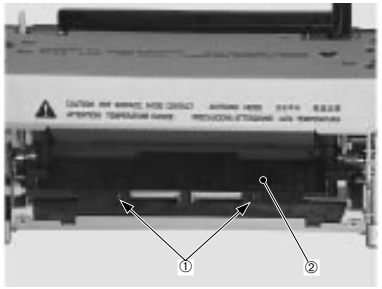
To remove the thermistor

1. **Remove the three screws and the fixing entrance cover.**



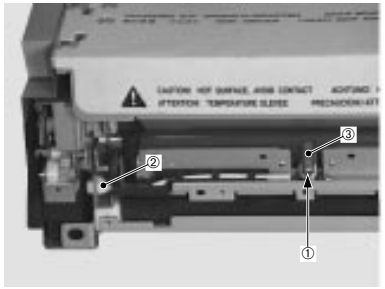
1—Screws
2—Fixing entrance cover

2. **Remove the two screws and the fixing entrance lower guide.**



1—Screws
2—Fixing entrance lower guide

3. **Remove the screw and disconnect the connector, and remove the thermistor.**

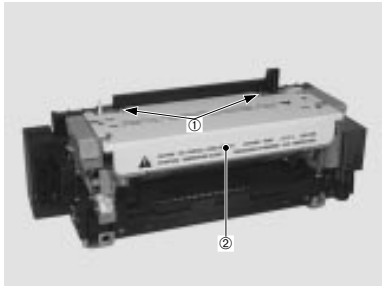


1—Screw
2—Connector
3—Thermistor

Fixing Cleaning Unit

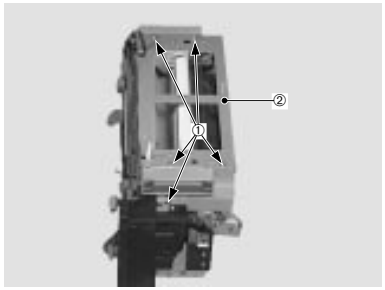
To remove the fixing cleaning unit from the fixing unit

1. **Remove the fixing unit from the printer according to the procedure on page 5-91.**
2. **Remove the two screws and the fixing cover.**



1—Screws
2—Fixing cover

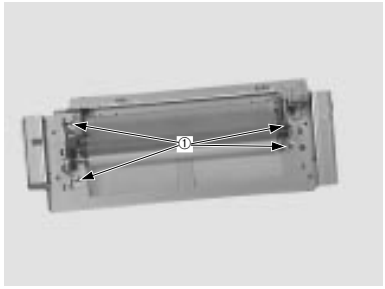
3. **Remove the cord holder, the bottle case unit and the fixing unit cable according to steps 1 to 4 and 6 to 8 for the fixing upper/lower heaters on page 5-93.**
4. **Remove the five screws and the fixing cleaning unit.**



1—Screws
2—Fixing cleaning unit

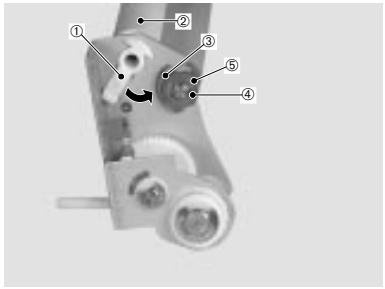
To remove the cleaning belt

1. **Remove the four screws.**



1—Screws

2. **After removing the spring, the E-ring and the bearing, slide the cleaning belt bearing in the direction of the arrow to remove the belt.**

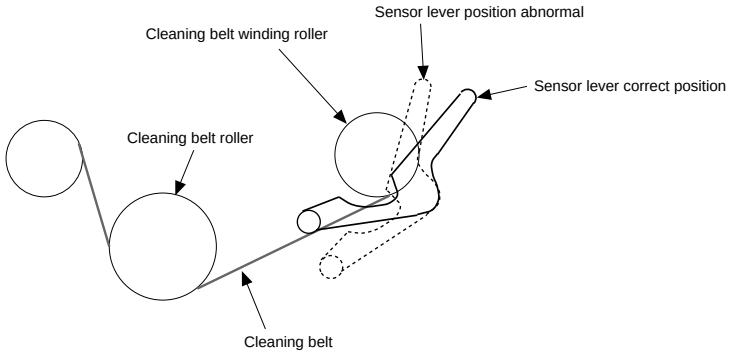


1—Spring
2—E-ring
3—Bearing
4—Cleaning belt bearing
5—Cleaning belt

Note: This printer detects the end of the cleaning belt, which also signifies the life span of the fixing upper/lower rollers. When replacing the cleaning belt be sure to replace the fixing upper/lower rollers also.

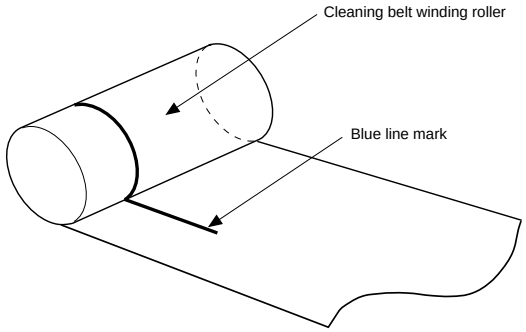
To reassemble the cleaning belt

1. **Insert the sensor lever to the inner side of the cleaning belt.**



2. **Wind the cleaning belt until the blue line mark disappears.**

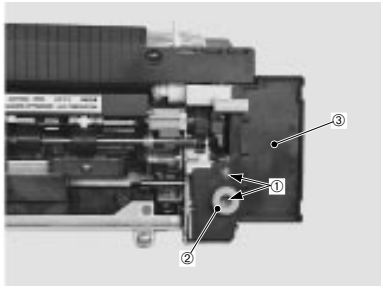
   Do not leave any slack or wrinkles in the cleaning belt.



Fixing delivery unit

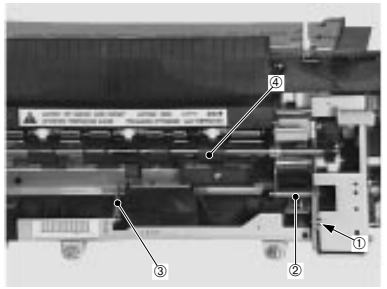
To remove the fixing delivery unit from the fixing unit

1. **Remove the fixing unit.**
2. **Remove the two screws, and then the fixing handles and the connector cover.**



1—Screws
2—Fixing handles
3—Connector cover

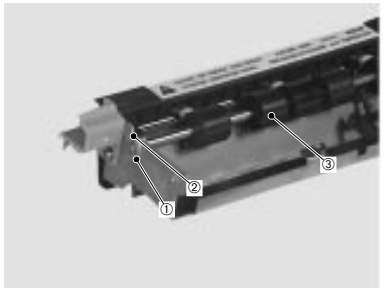
3. **Remove the screw to take off the shaft while also removing the spring. Then, remove the spring to take off the fixing delivery unit.**



1—Screw **3—Spring**
2—Shaft **4—Fixing delivery unit**

To remove the fixing delivery roller

1. **Remove the E-ring and the bearing, and then the fixing delivery roller.**



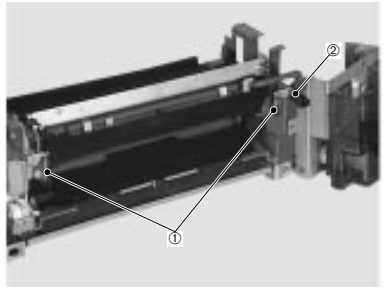
1—E-ring
2—Bearing
3—Fixing delivery roller

Oil applying unit

To remove the oil applying unit from the fixing unit

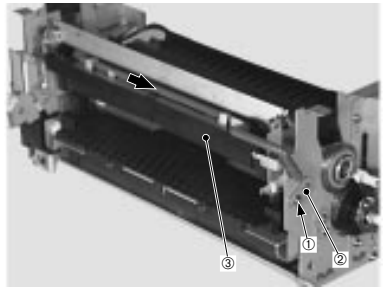
1. **Remove the fixing cleaning unit according to the procedure on page 5-106.**

2. **Remove the two springs and the tube.**



1—Springs
2—Tube

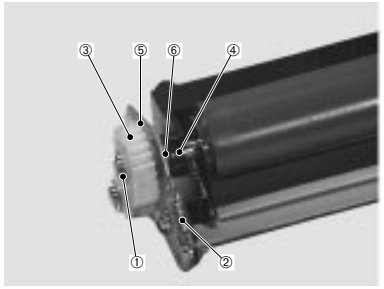
3. **Remove the screw and the shaft, and slide off the oil applying unit in the direction of the arrow.**



1—Screw
2—Shaft
3—Oil applying unit

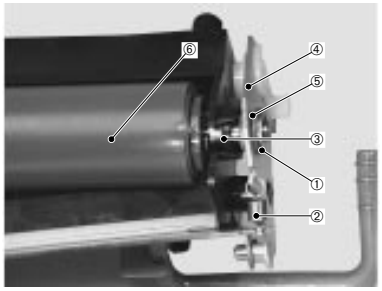
To replace the applying roller

1. Remove the E-ring, and then the spring, the applying roller gear, the spacer, the right plate and the bushing.



1—E-ring
2—Spring
3—Applying roller gear
4—Spacer
5—Right plate
6—Bushing

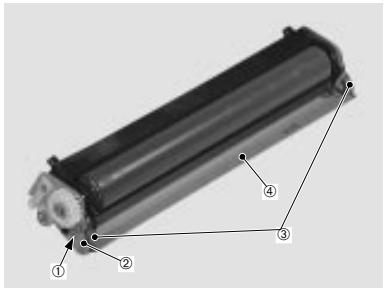
2. Remove the E-ring, the spring, the spacer, the left plate, and the bushing. Then remove the applying roller.



1—E-ring
2—Spring
3—Spacer
4—Left plate
5—Bushing
6—Applying roller

To remove the applying blade

1. Remove the screw, the shaft and the two springs to remove the applying blade.



1—Screw
2—Shaft
3—Springs
4—Applying blade

Bottle case unit

This printer has the oil circulation system to apply oil to the fixing rollers.

Oil pump A pumps the oil from the oil bottle case to supply the applying roller. Any excessive oil drops down to the oil catch tray. Oil residing in the oil catch tray is pumped into the oil bottle case by oil pump B.

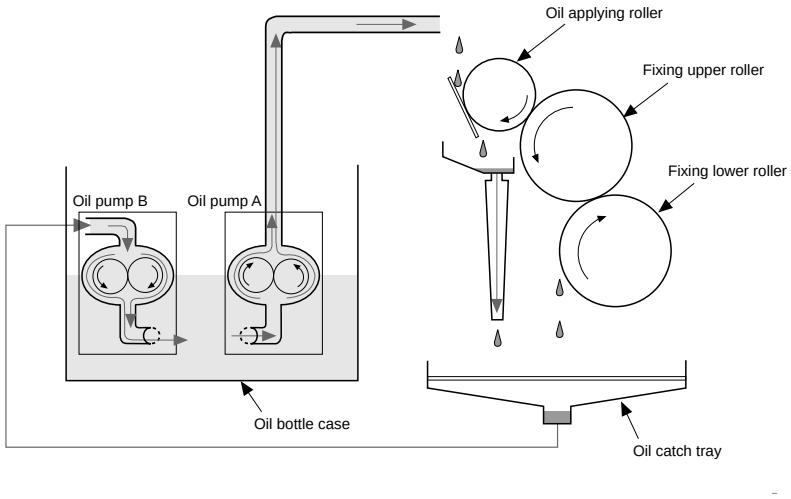
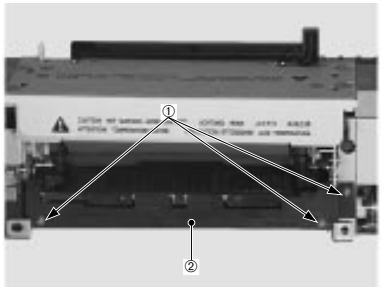


Figure 5-5 Bottle case unit

To remove the oil bottle case unit from the fixing unit

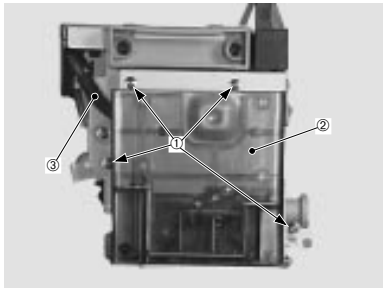
1. **Remove the fixing unit.**
2. **Remove the oil from the fixing unit.**

3. **Remove the three screws and the fixing entrance cover.**



1—Screws
2—Fixing entrance cover

4. **Remove the four screws, the tube and the bottle case unit.**



1—Screws
2—Bottle case unit
3—Tube

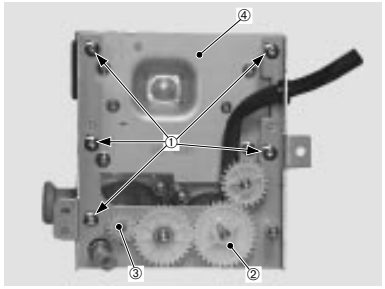
To remove the oil from the unit

1. **Withdraw the oil from within the bottle case with the designated oil removing tool and transfer it to the oil bottle.**

2. Remove the cover and cleaning cap. Remove any oil from the oil catch tray with the oil removing tool and transfer it to the oil storage bottle.
3. To stop oil which couldn't be withdrawn with the oil removing tool from leaking, block off the tube joining the oil catch tray unit and the bottle case with paper. Lay paper beneath the fixing unit as well in the event that oil leaks.

To remove oil pump A

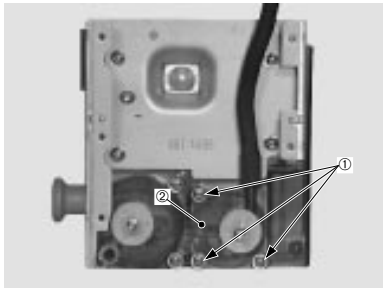
1. Remove the five screws, gears A and B, and then the side plate.



1—Screws
2—Gear A
3—Gear B
4—Side plate

2. Remove the tube.

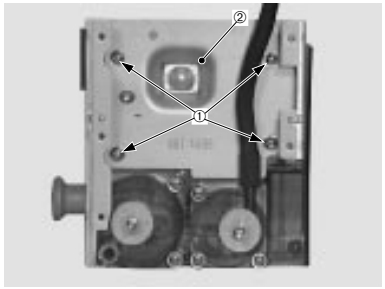
3. Remove the three screws and oil pump A.



1—Screws
2—Oil pump A

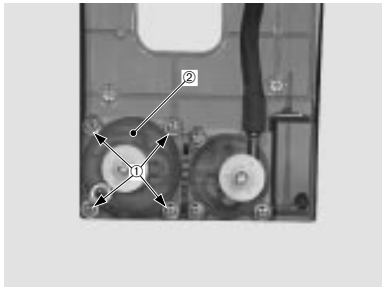
To remove oil pump B

1. **Remove the pump drive plate according to step 1 for removing oil pump A on page 5-116.**
2. **Remove the four screws and the bottle case side plate.**



1—Screws
2—Bottle case side plate

3. **Then remove the four screws and oil pump B.**



1—Screws
2—Oil pump B

Electrical components

The electrical components consist of the following parts:

- Video controller PCB
- DC controller PCB
- Mechanical controller PCB
- Pick-up PCB
- Terminal PCB
- Cassette-size sensing PCB
- Waste toner sensor PCB
- Toner-low detect beam PCB
- DC controller PCB
- Toner low detect receive PCB
- Power supply
- High voltage power supply
- Separation HVT PCB
- Temperature/humidity sensor
- Oil overflow sensor
- Oil sensor PCB
- Ejection PCB

Video controller PCB

The video controller PCB controls the image data transferred from a users workstation to the printer. The video controller PCB also controls hard disk drive functions and the communication between the printer and external devices. This board has eight SIMM sockets capable of holding 4, or 8MB SIMM strips (see “SIMMs on the video controller PCB” on page 5-124). See the following figure for the layout of components on the video controller PCB.

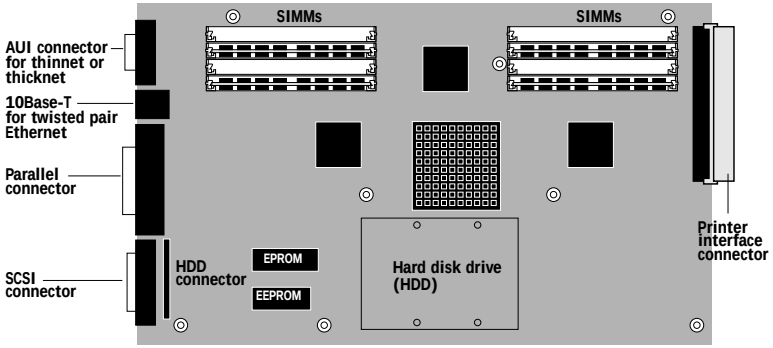
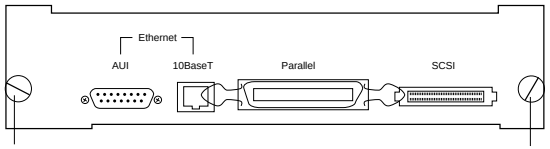


Figure 5-6 Diagram of the video controller PCB

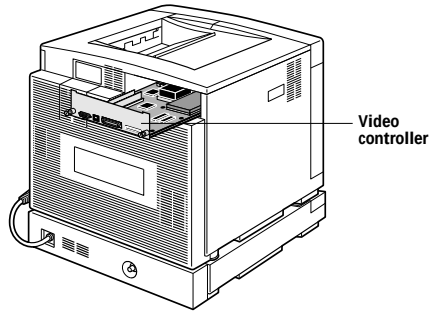
To remove the video controller PCB

1. **Turn the printer OFF.**
2. **Disconnect cables connected to the Ethernet, Parallel, and SCSI connectors on the back of the printer.**
3. **Loosen the panel fasteners that secure the video controller board to the slot in the back of the printer (see below).**



Video controller back panel

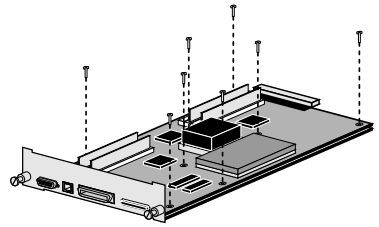
4. **Carefully pull the video controller out of its slot in the printer.**



To replace the video controller PCB

The video controller board is mounted on a bracket. In order to replace the board you will need to remove the video controller PCB from the bracket and install the new video controller PCB on the bracket.

1. **Remove the eight screws that secure the video controller PCB to the bracket.**

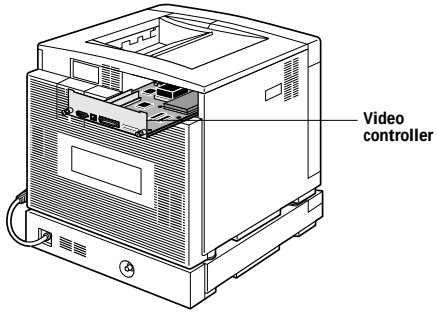


2. **Align the replacement video controller PCB over the screw holes on the bracket.**

   Make sure the connectors on the front of the board fit into the connector cutouts in the bracket.

3. **Secure the eight mounting screws that attach the video controller PCB to the bracket.**
4. **Insert the video controller PCB into the slot on the back of the printer and tighten the panel fasteners (see the following figure).**

   Make sure the interface connector on the edge of the board is securely seated in the connector on the printer.



Replacing the HDD on the video controller PCB

Factory-installed HDDs (hard disk drives) are thoroughly tested and burned in before shipment. Hard disk drives are formatted and loaded with all XJE software. Additionally, the hard disk drive is used to store spooled print jobs. Available space on the hard disk drive is displayed on the Control Panel.

To remove the HDD

1. **Turn OFF the printer.**

   Use ESD precautions when handling internal printer components.
2. **Remove the video controller PCB from the printer (see “To remove the video controller PCB” on page 5-120).**

3. **Remove the SCSI ribbon cable that connects the HDD to the video controller J5 connector.**
4. **On the bottom of the video controller bracket, remove the four screws that secure the HDD to the video controller PCB.**
5. **Place the HDD in a antistatic bag.**

   Do not touch the drive with magnetic objects (such as magnetic screwdrivers) and avoid placing items such as credit cards an employee ID cards that are sensitive to magnets near the HDD.

To install a new HDD

Replacement drives are shipped with XJE system software already installed.

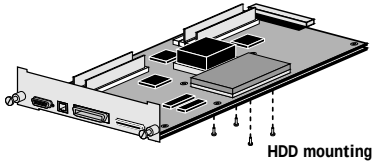
1. **Unpack the new HDD. With the rounded side down, place the drive on a flat surface or on your palm.**

   Do not touch the HDD with magnetic objects or place objects sensitive to magnets near the drive.

2. **Orient the HDD on the video controller PCB so that the HDD SCSI connector faces the SCSI, Parallel, and Ethernet connectors on the back of the PCB.**

3. **Attach the SCSI ribbon cable to connector J5 on the video controller PCB. The other end of the cable should be attached to the connector on the HDD.**

4. **Supporting the HDD against the video controller PCB, align the four holes in the HDD with the holes in the PCB and attach it with the four screws.**



5. **Insert the video controller into the slot on the back of the printer and tighten the panel fasteners.**

   Make sure the interface connector on the edge of the board is securely seated in the connector on the printer.

SIMMs on the video controller PCB

The video controller PCB is capable of holding two banks of memory with four SIMMs installed in each bank. Each SIMM provides 4 or 8MB of memory, depending on the requirements of the printer. When replacing or upgrading SIMMs, always install the largest capacity SIMMs in the lowest bank. For example if the printer is configured for

48MB of memory, the 8MB SIMMs must be installed in sockets J6-J9 (bank 0) and the 4MB SIMMs must be installed in sockets J10-J13 (bank 1).

Replacement SIMMs or memory upgrades are available from your service/support center. Video controller PCB SIMMs are not interchangeable with off-the-shelf SIMMs.

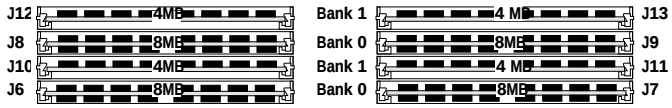


Figure 5-7 Example of 48MB SIMM configuration

To identify the different size SIMM strips look for the following indicators:

- 4MB—chips on one side of the SIMM strip
- 8MB—yellow stripe on the outside edge of the SIMM strip

To replace a SIMM

1. **Turn the printer OFF.**

2. **Disconnect cables connected to the Ethernet, Parallel, and SCSI connectors on the back of the printer as well as the power cable.**

3. **Loosen the panel fasteners that secure the video controller board to the slot in the back of the printer and pull out the video controller.**

4. **To release a SIMM strip on the video controller PCB, push outward on one of the spring clips. Then while supporting the SIMM, push outward on the other spring clip. (See Figure 5-8).**

Figure 5-8 Releasing SIMM spring clips

5. **Slide the SIMM strip out of the slot at a 45-degree angle.**

   In order to release a SIMM, you need to either push up or down on the SIMM; it depends on the SIMM socket installed on the video controller PCB (see Figure 5-9 on page 5-126).

   Remove SIMMs in sequence. Start at the center of the PCB and work your way toward the outer edge of the motherboard for SIMMs released at a down angle. Start at the outer edge of the motherboard and work your way toward the center of the motherboard for SIMMs released from an up angle.

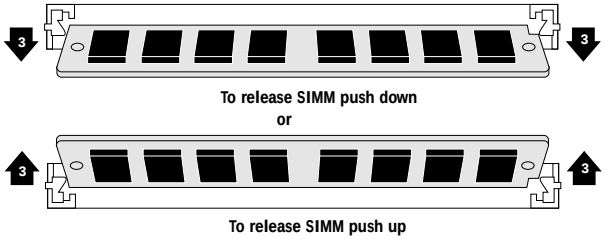


Figure 5-9 Releasing a SIMM strip

6. **To replace a SIMM strip, slide the SIMM strip into the socket at a 45-degree angle and lock it into place.**

   Make sure that the spring clips close securely around the ends of the SIMM strip and that each strip is fully seated in its slot.

   Note that SIMMs fit the socket only one way. The index notch at one end of each SIMM (near pin1) fits in the right side of the socket.

   Insert SIMMs in sequence. Start at the outer edge of the motherboard and work your way toward the center of the motherboard for SIMMs replaced from a down angle. Start at the center of the motherboard and work your way toward the outer edge of the motherboard for SIMMs replaced from an up angle.

7. **Insert the video controller PCB back into the printer and tighten the panel fasteners. Replace cable connections.**

DC controller PCB

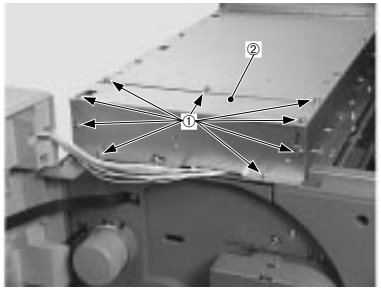
The DC controller PCB controls the following:

- Laser/scanner
- Image stabilization
- Fixing temperature
- Power-OFF time measurement
- Various detection functions
- Video interface control

To remove the DC controller PCB

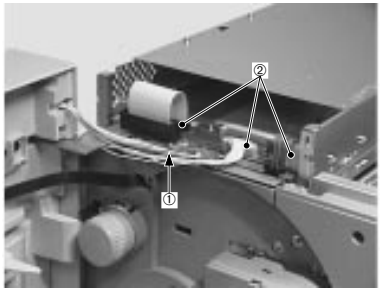
1. **Remove the rear cover.**
2. **Remove the nine screws and the shield plate.**
3. **Remove the cable according to step 1 and 3 for removing the front door on page 5-5.**

4. Remove the nine screws, and then the top plate cover.



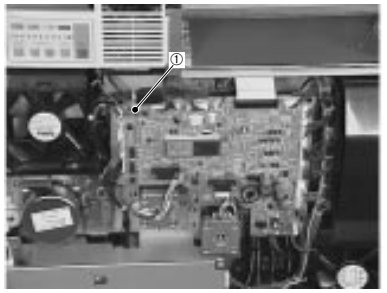
1—Screws
2—Top plate cover

5. Disconnect the screw and the three connectors from the terminal PCB.



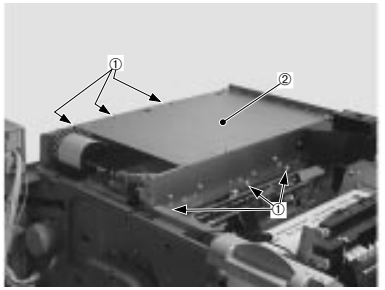
1—Screw
2—Connectors

6. Disconnect the controller fan connector.



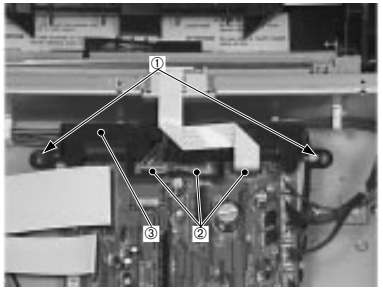
1—Connector

7. Remove the six screws fixing the shield plate, and remove the plate.



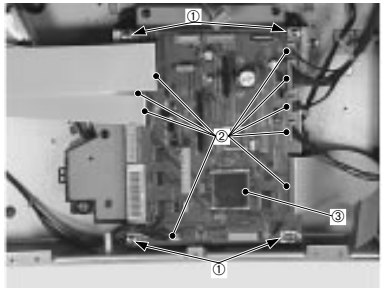
1—Screws
2—Shield plate

8. Remove the two screws and disconnect the three connectors, and remove the DC controller cover.



1—Screws
2—Connectors
3—DC controller cover

9. Remove the four screws and disconnect the nine connectors, and finally remove the DC controller PCB.



1—Screws
2—Connectors
3—DC controller PCB

Note: Various data for the printer are written in EEPROM on the DC controller PCB. Thus, when replacing the DC controller PCB, read the various data written in it with the Printer Driver Tester (if it is available), and then write the data into the EEPROM on the new DC controller PCB.

Mechanical controller PCB

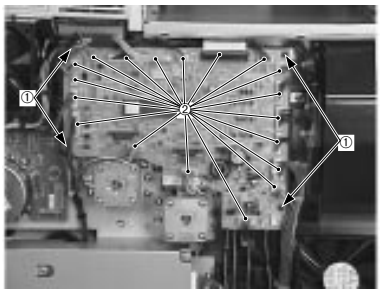
The mechanical controller PCB controls the following:

- Pick-up PCB
- High-voltage power supply
- Paper feeder PCB
- Drive for motors and fans
- Developing unit
- Fixing unit
- Transfer drum and peripheral units
- Toner stirring function, toner-low detection and toner cartridge detection
- Photosensitive drum life detection
- Waste toner collect system control
- Power-saving mode control

To remove the mechanical controller PCB

1. **Remove the rear cover.**
2. **Remove the nine screws and the shield plate.**

3. Remove the four screws and disconnect the 19 connectors, and remove the mechanical controller PCB.

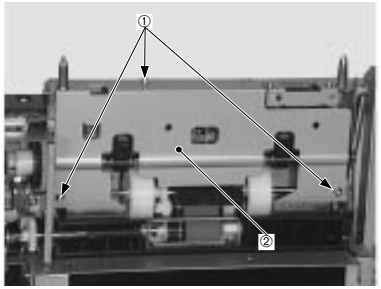


1—Screws
2—Connectors

Pick-up PCB

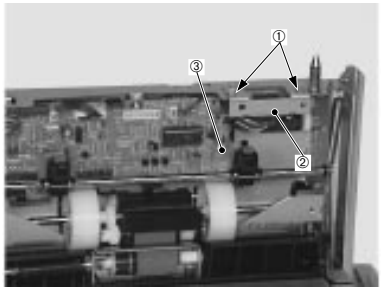
To remove the pick-up PCB

1. Remove the pick-up unit according to the procedure on page 5-38.
2. Remove the three screws and the PCB cover.



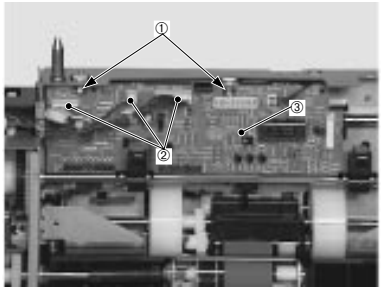
1—Screws
2—PCB cover

3. Remove the two screws and disconnect the connector to remove the connector mount.



1—Screws
2—Connector mount
3—Connector

4. Next, remove the two screws and disconnect the four connectors, and remove the pick-up PCB.



1—Screws
2—Connectors
3—Pick-up PCB

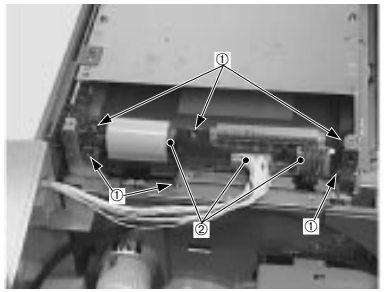
Note: Do not damage or dirty the sensor section.

Terminal PCB

To remove the terminal PCB

1. Remove the upper cover.

2. Remove the top plate cover along with the display unit according to steps 3 to 4 for removing the DC controller PCB on page 5-127.
3. Remove the six screws and the three connectors to take off the terminal PCB.



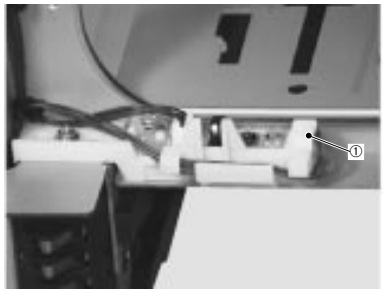
1—Screws
2—Terminal PCB

Cassette-size sensing PCB

To remove the cassette-sizing PCB

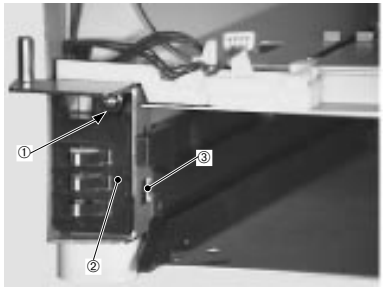
1. Remove the cassette.
2. Remove the ejection unit according to steps 1 to 4 for removing the temperature/humidity sensor on page 5-145.

3. Disconnect the connector.



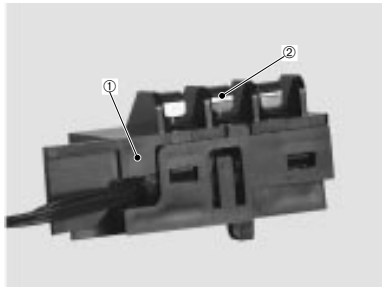
1—Connector

4. After removing the screw, press the claw to remove the cassette-size sensing PCB holder.



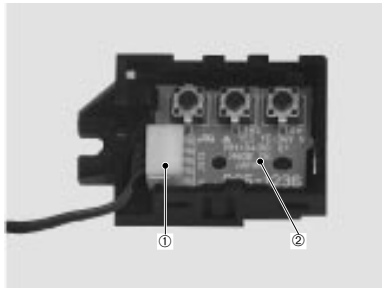
1—Screw
2—Cassette-size sensing PCB holder
3—Claw

5. Disengage the claw fixing the cassette-size sensor cover, and remove the cover and the leaf spring.



1—Cassette-size sensor cover
2—Leaf spring

6. Disconnect the connector, and then remove the cassette-size sensing PCB.

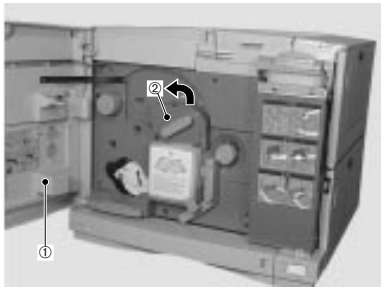


1—Connector
2—Cassette-size sensing PCB

Waste Toner Sensor PCB

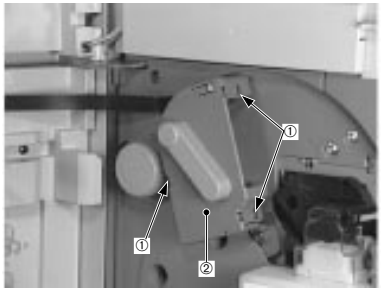
To remove the waste toner sensor PCB

1. Open the front door and raise the photosensitive drum door in the direction of the arrow.



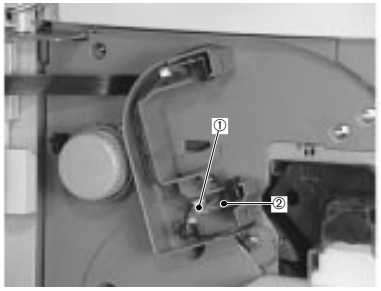
1—Front door
2—Photosensitive drum door

2. Disengage the claws fixing the photo-sensitive drum door, and remove the door.



1—Claws
2—Photosensitive drum door

3. Disconnect the connector and disengage the claws fixing the waste toner sensor PCB to remove the PCB.

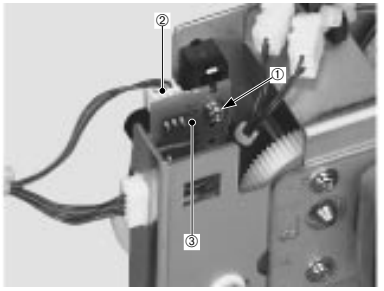


1—Connector
2—Waste toner sensor PCB

Toner-low detect beam PCB

To remove the toner-low detect beam PCB

1. Remove the drive unit according to the procedure on page 5-28.
2. Remove the screw and disconnect the connector to remove the toner-low Detect beam PCB.



1—Screw
2—Connector
3—Toner-low Detect beam PCB

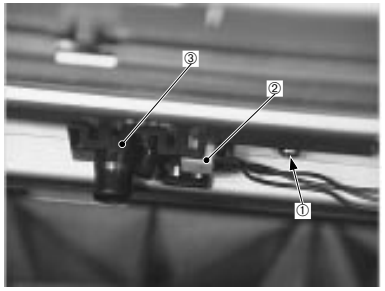
Note: Do not touch the sensor unit with your bare hand. If the sensor unit is dirty, use lint-free paper to clean it.

Toner-low Detect Receive PCB

To remove the toner-low detect receive PCB

1. Remove the toner cartridge.
2. Remove the transfer drum holder according to the procedure on page 5-58.

3. **Remove the screw and disconnect the connector to remove the toner-low detect receive PCB.**



1—Screw
2—Connector
3—Toner-low detect receive PCB

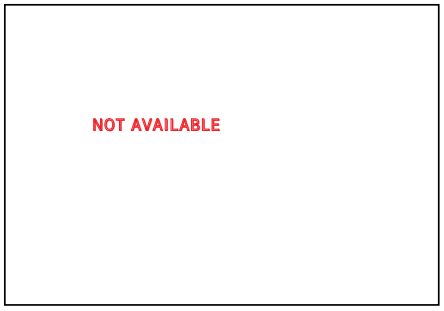
Note: Do not touch the sensor unit with your bare hand. If the sensor unit is dirty, use lint-free paper to clean it.

Power Supply

To remove the power supply

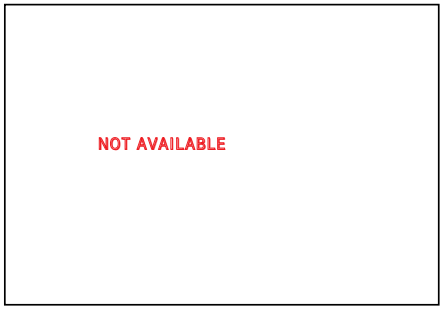
1. **Pull the pick-up unit out toward you.**

2. **Remove the connector cover.**



1—Connector cover

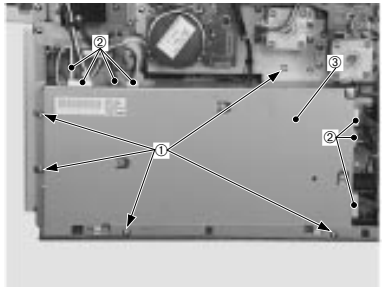
3. **Disconnect the connector.**



1—Connector

4. **Remove the rear cover.**
5. **Remove the nine screws and the shield plate.**

6. **Remove the five screws and disconnect the seven connectors to remove the power supply.**

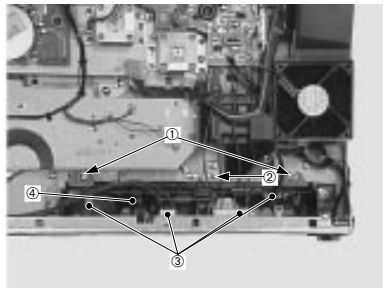


1—Screws
2—Connectors
3—Power supply

High-voltage Power Supply

To remove the high-voltage power supply

1. **Remove the power supply according to the procedure on page 5-140.**
2. **Remove the two screws and the grounding screw. Disconnect the four connectors to remove the high-voltage power supply.**

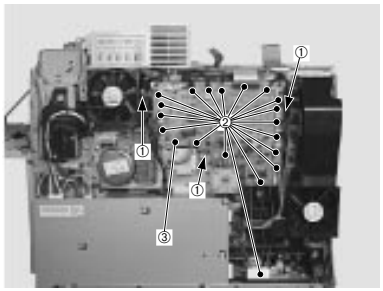


1—Screws
2—Grounding screw
3—Connectors
4—High-voltage power supply

Separation HVT PCB

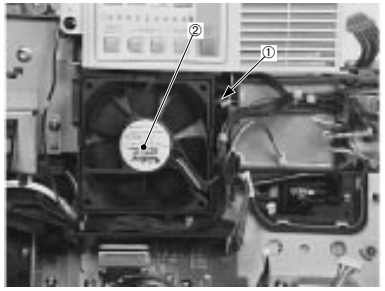
To remove the separation HVT PCB

1. **Remove the shield plate according to steps 1 to 7 for removing the DC controller PCB on page 5-127.**
2. **Remove the three screws and disconnect the 20 connectors, and then remove the mechanical controller PCB along with the frame.**



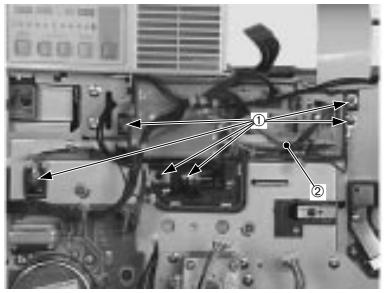
1—Screws
2—Connectors
3—Mechanical controller PCB

3. **Remove the screw and then the fixing unit fan along with the duct.**



1—Screw
2—Fixing unit fan

4. **Remove the six screws and the separation HVT PCB.**



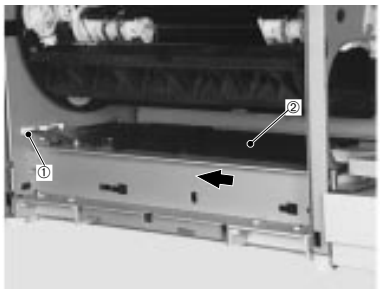
1—Screw
2—Separation HVT PCB

Temperature/humidity sensor

To remove the temperature/humidity sensor

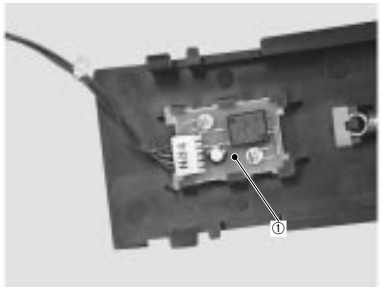
1. **Remove toner cartridge according to the procedure on page 5-85.**
2. **Remove inner cover 2 according to the procedure on page 5-13.**
3. **Remove the two screws and the left cover.**

4. **Disconnect the connector and disengage the claw fixing the ejection unit, and then slide the ejection unit off in the direction of the arrow.**



1—Connector
2—Ejection unit

5. **Disengage the claw fixing the temperature/humidity sensor to remove the sensor.**



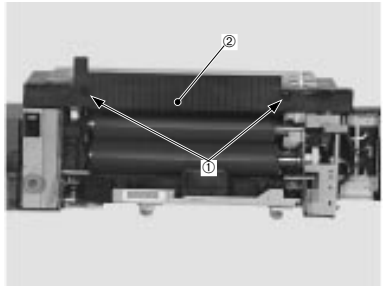
1—Temperature/humidity sensor

Note: Do not touch the sensor unit with your hand. If the sensor unit is soiled, use lint-free paper to clean it.

Oil overflow sensor

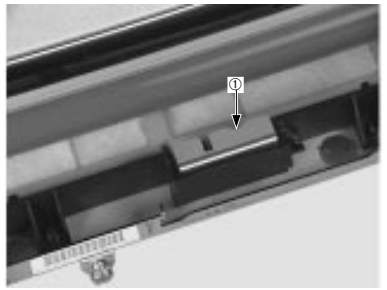
To remove the oil overflow sensor

1. **Remove the fixing delivery unit according to the procedure on page 5-109.**
2. **Remove the two screws and the delivery guide.**



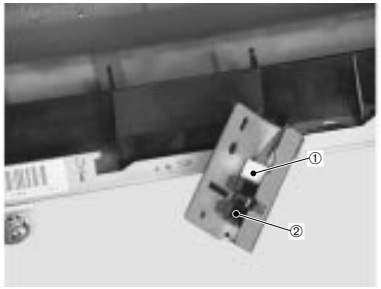
1—Screws
2—Delivery guide

3. **Remove the screw.**



1—Screw

4. Disconnect the connector, and then remove the oil overflow sensor.

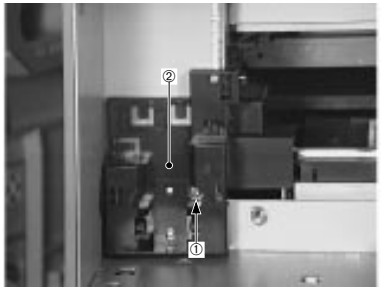


1—Connector
2—Oil overflow sensor

Oil sensor PCB

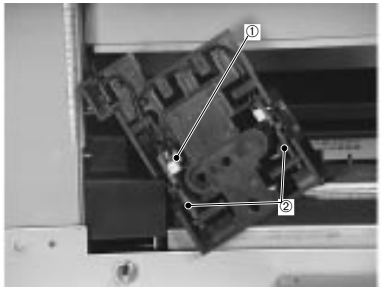
To remove the oil sensor PCB

1. Remove the fixing unit according to the procedure on page 5-109.
2. Remove the screw and then the oil sensor PCB along with the sensor cover.



1—Screw
2—Sensor cover

3. Disconnect the connector and disengage the claw fixing the oil sensor PCB to remove the PCB.

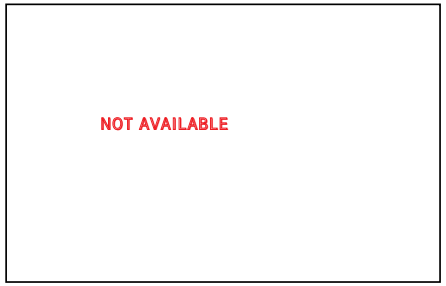


1—Connector
2—Oil sensor PCB

Ejection PCB

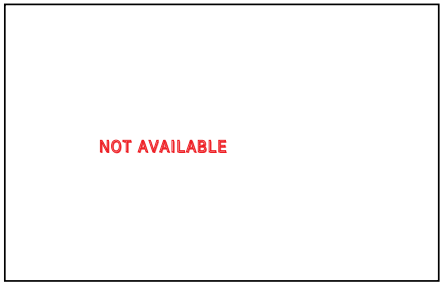
To remove the ejection PCB

1. Remove the ejection unit according to steps 1 to 4 for removing the temperature/humidity sensor on page 5-145.
2. Remove the cassette.
3. Remove the screw and disconnect the two connectors to remove the ejection PCB along with the ejection cover.



1—Screw
2—Connectors
3—Ejection PCB

4. Remove the screw and the ejection PCB from the ejection cover.



1—Screw
2—Ejection PCB

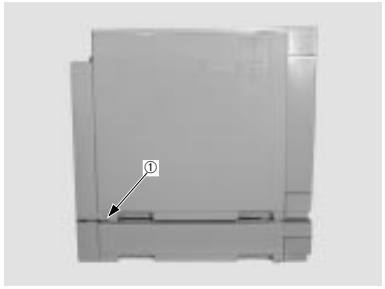
Paper Feeder

To remove the paper feeder from the printer

1. **Pull out the power cord from the lower right corner of the right side of the printer.**

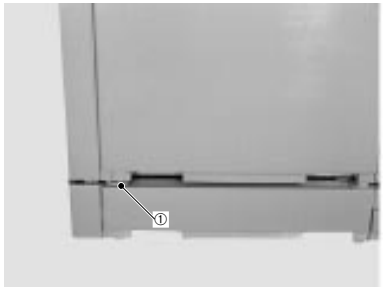
1—Power cord

2. **Remove the lock pin fixing the paper feeder to the printer.**



1—Lock pin

3. **Remove the other lock pin fixing the paper feeder to the printer.**



1—Lock pin

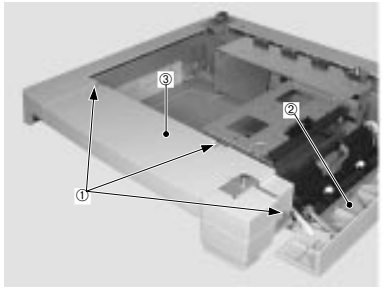
4. **Two persons should firmly hold the sides (in relation to the cassette installation slot) to remove the printer feeder from the paper feeder.**

External paper feeder covers

To remove the front cover

1. **Remove the cassette.**
2. **Open the right door.**

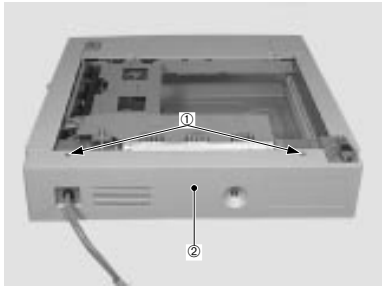
3. Remove the three screws and then the front cover.



1—Screws
2—Front cover
3—Right door

To remove the rear cover

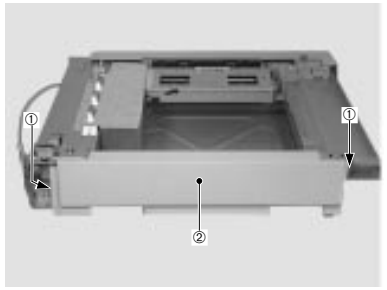
1. Remove the cassette.
2. Remove the two screws and then the rear cover.



1—Screws
2—Rear cover

To remove the left cover

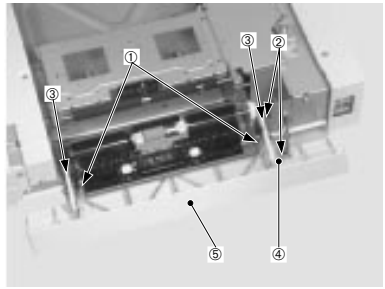
1. Remove the front cover and the rear cover.
2. Remove the two screws and then the left cover.



1—Screws
2—Left cover

To remove the right door

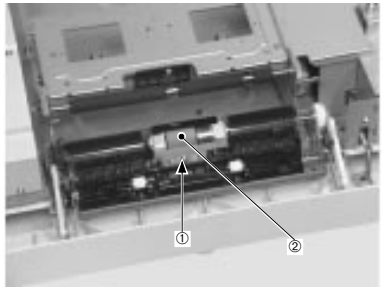
1. Remove the cassette.
2. Open the right door.
3. Remove the two E-rings and the two screws, and then remove the right door hinges and the connecting plate to remove the cover.



1—E-rings
2—Screws
3—Right door hinges
4—Connecting plate
5—Right door

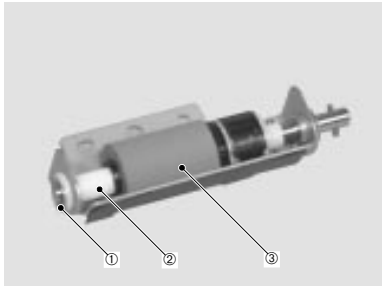
To remove the separation roller

1. Remove the cassette.
2. Open the right door.
3. Remove the screw and then the separation roller unit.



1—Screw
2—Separation roller unit

4. Remove the E-ring and the bushing to remove the separation roller.

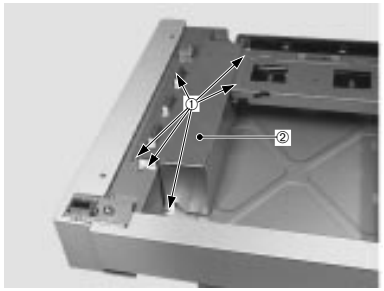


1—E-ring
2—Bushing
3—Separation roller

Pick-up unit

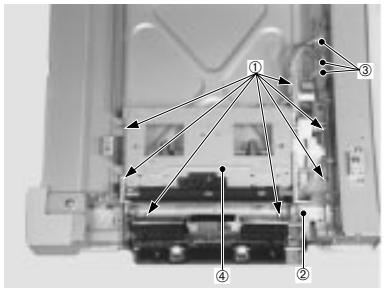
To remove the pick-up unit

1. Remove the front cover and the right door.
2. Remove the six screws and then the gear cover.



1—Screws
2—Gear cover

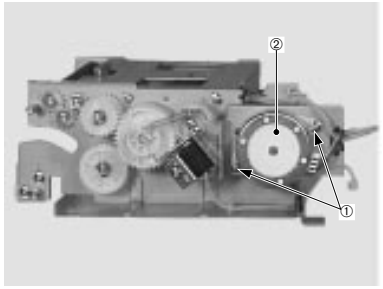
3. Remove the seven screws and disconnect the three connectors to remove the pick-up unit.



1—Screws
2—E-ring
3—Connectors
4—Pick-up unit

To remove the paper feeder pick-up motor

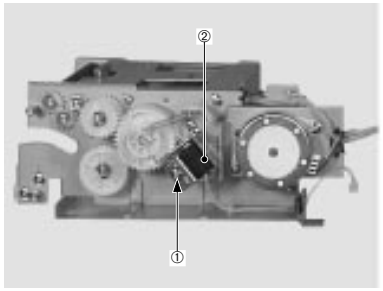
1. **Remove the two screws and then the pick-up motor.**



1—Screws
2—Pick-up motor

To remove the paper feeder cassette feed solenoid

1. **Remove the screw and then the cassette feed solenoid.**

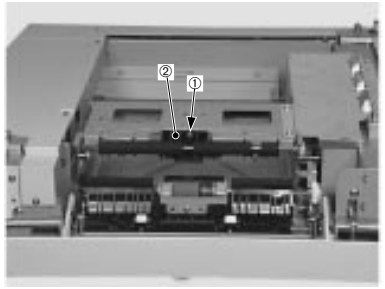


1—Screw
2—Cassette feed solenoid

To remove feed roller 1

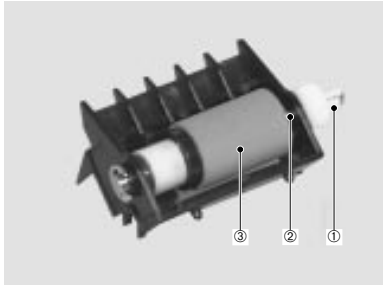
1. **Remove the cassette.**
2. **Open the right door.**

3. **Remove the screw and then the feed roller unit 1.**



1—Screw
2—Feed roller unit 1

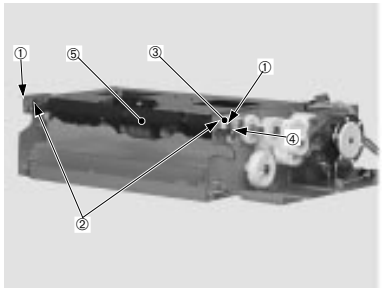
4. **Disengage the claw fixing the gear, and remove the gear and the shaft to remove the feed roller 1.**



1—Gear
2—Shaft
3—Feed roller 1

To remove feed roller 2

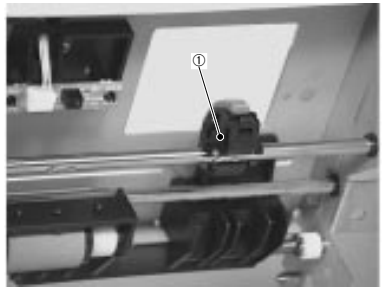
1. Remove the two E-rings, the two bearings, the gear and the dowel pin to remove the feed roller 2.



1—E-rings
2—Bearings
3—Gear
4—Dowel pin2
5—Feed roller

To remove the pick-up roller

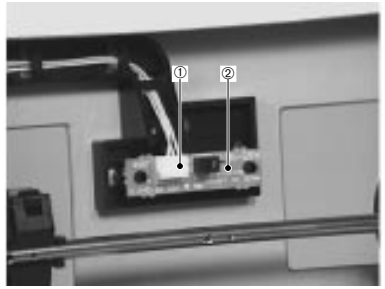
1. Disengage the claw fixing the pick-up roller to remove the roller.



1—Pick-up roller

To remove the cassette paper sensor PCB

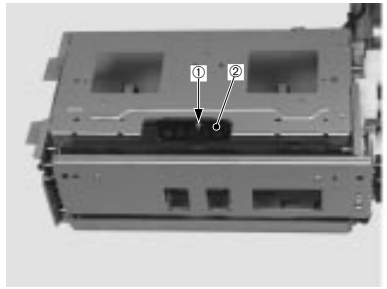
1. Disconnect the connector and disengage the claw fixing the cassette paper sensor PCB to remove the PCB.



1—Connector
2—Cassette paper sensor PCB

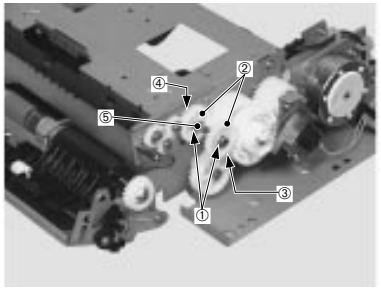
To remove the pick-up sensor

1. Remove the screw fixing the feed roller unit 1.

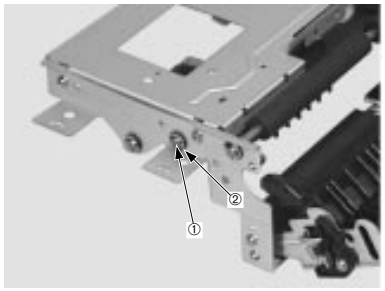


1—Screw
2—Feed roller unit 1

2. **Remove the three E-rings, dowel pin, the two bushings and the two gears. Then remove the shaft.**

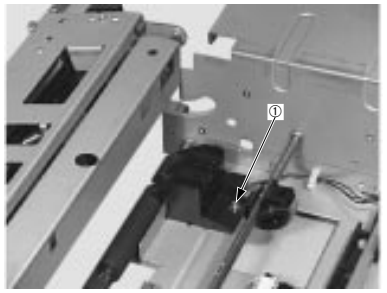


1—E-rings
2—Gears
3—Dowel pin
4—Bushings
5—Shaft



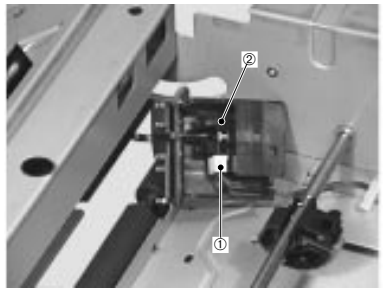
1—E-rings
2—Bushings

3. **Remove the screw.**



1—Screw

4. **Disconnect the connector to remove the pick-up sensor.**

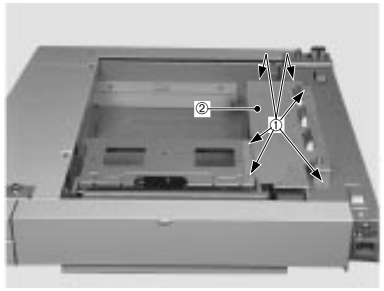


1—Connector
2—Pick-up sensor

Paper feeder PCB

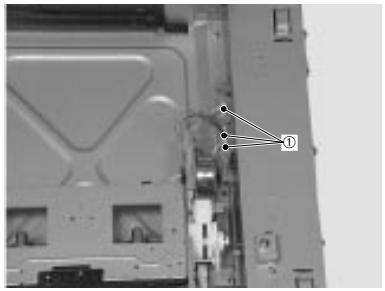
To remove the paper feeder PCB

1. Remove the rear cover.
2. Remove the six screws and the gear cover.



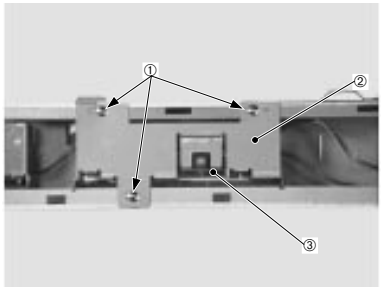
1—Screws
2—Gear cover

3. Disconnect the three connectors.



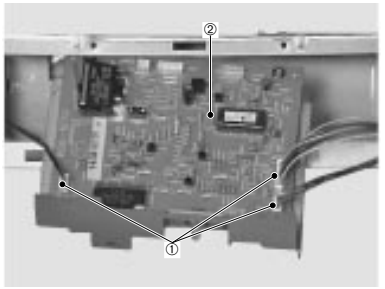
1—Connectors

4. Remove the three screws and then pull the paper feeder PCB along with the PCB mounting plate out toward you.



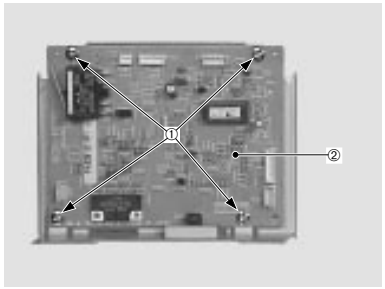
1—Screws
2—PCB mounting plate
3—Paper feeder PCB

5. Disconnect the three connectors and remove the paper feeder PCB along with the PCB mounting plate.



1—Connectors
2—Paper feeder PCB

6. **Remove the four screws and the paper feeder PCB from the mounting plate.**



1—Screws
2—Paper feeder PCB

Note: If you install the paper feeder while the right door is closed, the paper feeder microswitch interferes with the switch rod. Thus, be sure to install the paper feeder PCB with the right door open.

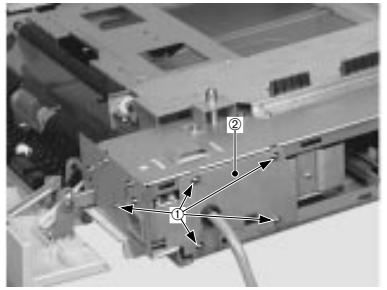
(Note for replacement): When installing a new paper feeder PCB, install it after matching the value of the side registration adjustment switch with that of the old PCB.

Power Supply

To remove the power supply

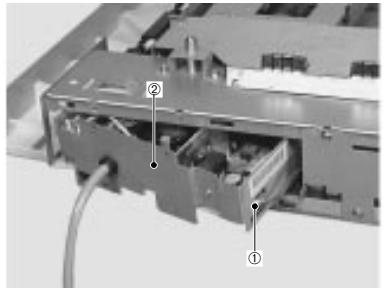
1. **Remove the rear cover.**
2. **Open the right door.**

3. **Remove the four screws and pull the power supply out toward you.**



1—Screws
2—Power supply

4. **Disconnect the connector and remove the power supply.**



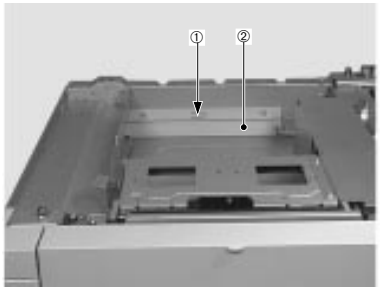
1—Connector
2—Power supply

Cassette-size sensing PCB

To remove the cassette-size sensing PCB

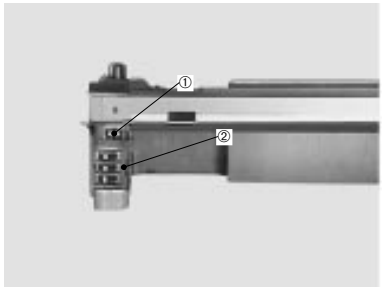
1. **Remove the cassette.**
2. **Remove the left cover.**

3. Disengage the claw fixing the cassette left rail to remove the rail.



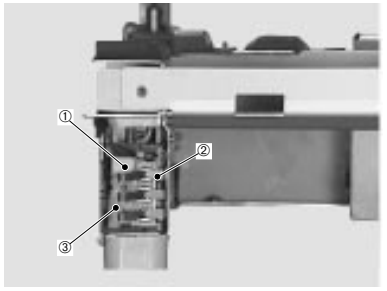
1—Claw
2—Cassette left rail

4. Remove the screw and the holder cover.



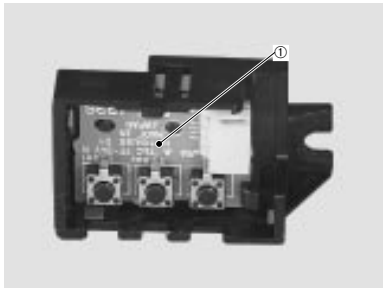
1—Screw
2—Holder cover

5. Disconnect the connector and remove the leaf spring to remove the cassette-size sensing unit.



1—Connector
2—Leaf spring
3—Cassette-size sensing unit

6. Disengage the claw fixing the cassette-size sensing PCB to remove the PCB.



1—Cassette-size sensing PCB

Installing system software

The Software Service Kit enables you to reformat the video controller hard drive and reinstall system software. Use this kit when:

- You replace the video controller hard disk drive with a new or optional hard disk drive
- You need to upgrade to a more recent version of the system software

The Software Service Kit includes the system software and fonts on a CD.

Installing system software

These steps must be followed exactly in order to successfully install system software.

Note that installing system software deletes the list of jobs in the Job Log, any jobs in the queues, and all Setup settings. The site system administrator can save a current list of jobs from the Job Log using the Fiery XJ Spooler.

To install XJE system software

1. **If you have not done so already, run Setup and record the customer's settings or print the Configuration Page (if possible).**

   Setup settings are lost when new software is installed.

2. **With the printer turned off, connect a CD-ROM drive to the SCSI port on the back of the printer.**

   Squeeze the sides of the micro-SCSI connector as you plug it into the back of the printer.

   CD-ROM drives that have been tested with the installation of XJE system software are:

- NEC CD 210
- Sanyo CRD-4001
- Sony CDU6511
- Lion drives
- Plextor CD DM-xx28
- Sony CDV-8003A
- Apple CD-300
- Hitachi 6550S

3. **Turn on the CD-ROM drive, make sure it is free of, and then push the eject button and insert the System Software CD.**

   The System Software CD *must* be inserted into the CD-ROM drive before you turn on the printer.

4. **Make sure the CD-ROM drive is free of activity and is ready, then turn on the printer.**

   Allow the printer to perform its startup diagnostics.

5. **As soon as you see the message, PRESS MENU FOR SETUP, press the left and right arrow buttons simultaneously to enter the install software menus.**

   Pressing the left and right arrow buttons to access the system software install menus is a hidden key sequence that is available for service technicians only.

   The printer displays Scanning Files... and then SELECT FUNCTION in the display window.

6. **Before you install system software, you need to reformat the hard disk drive. Use the down arrow button to scroll to Format Disk and then press the Enter button.**

7. **At the next screen, FORMAT DISK?, use the up or down arrow button to display Yes and then press the Enter button.**

   The next screen gives you the choice of a High Level or Low Level format.

8. **Scroll down to Low Level and then press the Enter button.**

   You will need to format the disk using the High Level format as well.

9. **Select Format Disk again and then select a High Level format.**
10. **Once the disk is reformatted, use the up arrow to scroll to Install Software and then press the Enter button.**
11. **The next screen allows you to confirm that you want to install software; use the up and down arrow buttons to display Yes and then press the Enter button.**

    The printer displays Scanning and then INSTALLING.... with a progress bar while it copies the system software from the CD. If the installation is successful, you will be prompted to reboot the printer.
12. **Press the Enter button.**
13. **printer enter the customer's Setup configuration.**

Chapter 6:
Troubleshooting Procedures

This chapter identifies the source of common problems that may occur with the printer and suggests ways of correcting them.

Preliminary on-site checkout

Your goal in the preliminary on-site checkout is to eliminate obvious problems such as loose or missing cables and connectors.

Checking the cables

Before you remove any of the printer covers to check internal components:

- Check that all cables to the system are plugged into the proper connectors on the back panel of the printer (see Figure 6-1 below).
- Make sure the power cable is plugged into the wall supply.
- Make sure that the printer power switch is turned on.

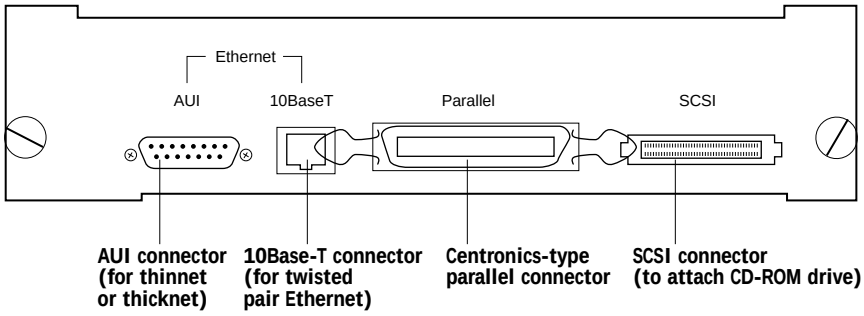


Figure 6-1 Back panel of printer showing connectors

If all the connectors are properly in place and the power is on, continue to check the rest of the items in the preliminary on-site checkout.

Checking the installation environment

Make sure the printer is installed in an environment that conforms to the following environmental standards:

- The power supply voltage is ±10% the rated voltage.
- The printer is securely set on a level surface.
- The surrounding temperature is 15-32.5°C (59-90.5°F) and humidity is 20-80%.
- Site is not located in or adjacent to ammonia gas, high temperature or high humidity (e.g., water faucets, kettles, humidifiers), cold spaces, open flames, or anywhere dusty.
- Printer is not exposed to direct sunlight. If this is unavoidable, advise the customer to hang curtains.
- Printer is installed in a well-ventilated area.

Checking the print paper

- Check that the print paper being used is the one recommended for this printer (see Appendix E: “Accessories and Supplies”).
- Make sure the paper is not damp. Print with paper from a newly opened package and check results.

Checking consumable materials

- Is the waste toner bottle full?
- Is one end of the lever of the cleaning belt sensor on the belt?
- Is the fixing oil out?

  If any of these situations occur, prepare new materials for use. If blank spots appear on an output image, the toner probably is not level. Rock the toner cartridge as shown in the *User Guide* and then do a test print to make sure the toner is even.

Checking the charging unit

- Make sure the separation charging unit is not soiled and that the corona wire is normal.
- Make sure the separation charging unit is set completely.
- Make sure the separation charging unit spring is not rusted.

Other

During winter, particularly when bringing the printer into a warm room from a cold location, such as a warehouse, condensation can appear in the printer's parts if you unpack it immediately. The condensation could cause the following conditions:

- Exposure of the optical system (six-faced mirror, lens, etc.) causes printed output to be light.
- Since the photosensitive drum is cold, the resistance of the photoconductive layer will rise. The result is a loss of contrast on output images.

  When condensation appears on the printer, you should dry each part with a dry cloth, or leave the printer ON for 10-20 minutes.

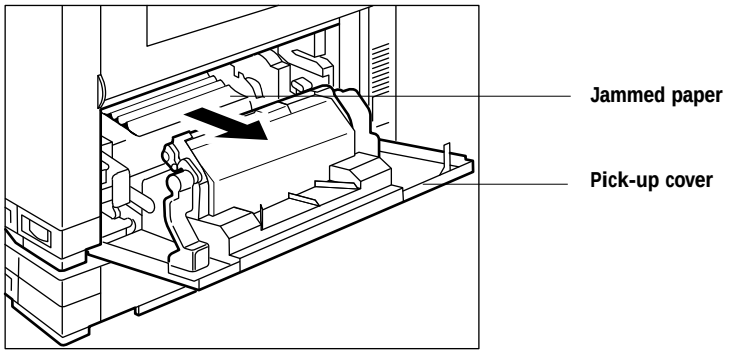
  Also note that toner cartridges if stored in a cold place and then brought into a warm room and immediately installed in the printer can cause poor image quality. In this case, make sure the customer unseals it only after it has sufficiently acclimatized to the room temperature (1-2 hours).

Checking for paper jams

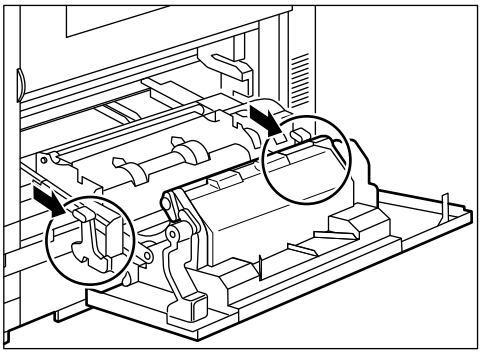
When a paper jam occurs, the warning LED on the Control Panel flashes to indicate a paper jam. Check all paper jam positions as described below and remove any paper jammed in the printer according to the following procedures.

Pick-up unit paper jam

1. **If the manual feeding tray is open, close it.**
2. **Open the pick-up cover.**
3. **If you can locate the jammed paper, remove it.**



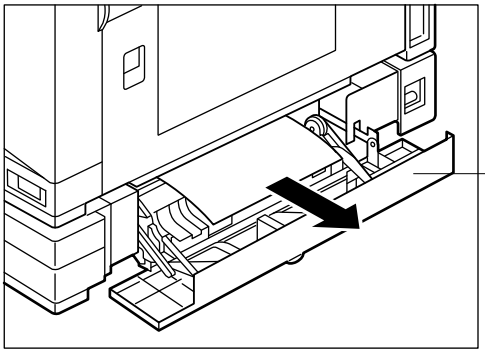
4. If you cannot find the jammed paper, pull the green right/left levers to remove the pick-up unit, and remove the jammed paper.



5. After removing the paper, load the pick-up unit into the printer and close the pick-up cover.

Optional paper feeder unit paper jam

1. Open the paper feeder right door.
2. Remove the jammed paper.

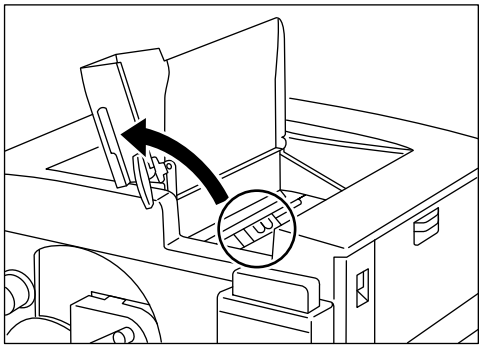


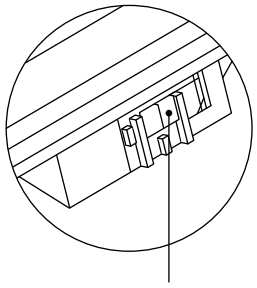
3. Close the right door after taking out the paper.

Transfer drum unit paper jam

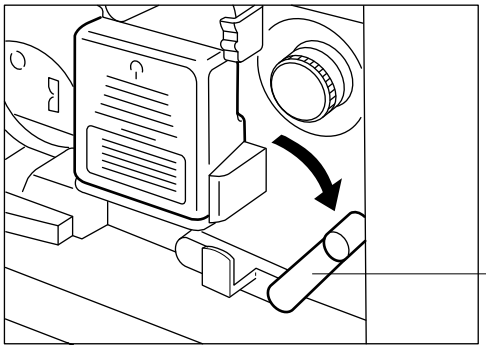
1. Open the front door.
2. Open the upper cover.

At this time, be careful to not touch the window on the density sensor.



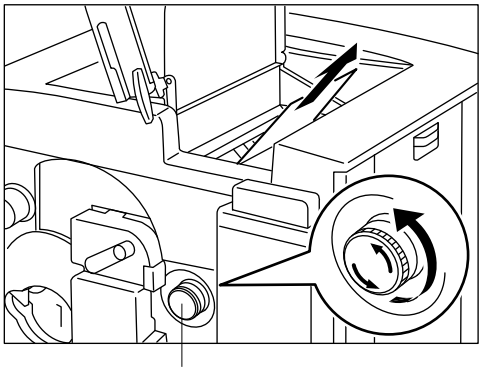


3. **Push the green lever down to the right, and release the transfer drum lock.**



4. **Rotate the green knob to the left, and remove the jammed paper.**

   Non-fixing toner will be on the paper, so take care not to dirty the density sensor when removing the paper.



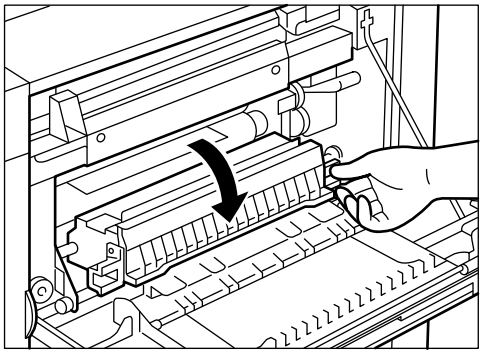
Transfer drum knob

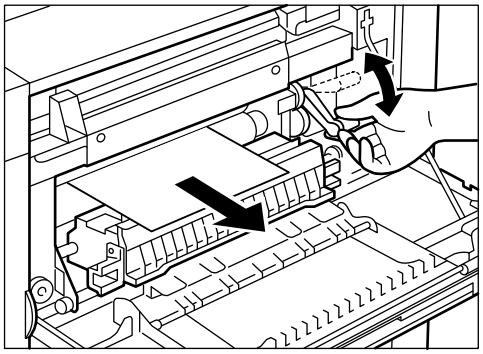
5. **After removing the paper, close the upper cover and return the green lever to its original position.**
6. **Close the front door.**

Fixing unit paper jam

1. **Close the face-up tray if it is open.**
2. **Open the fixing unit cover.**
3. **If you can locate the jammed paper, remove it.**

   If you cannot find it, open the fixing delivery unit, move the green lever up/down, and remove the jammed paper.





Push up and down on the green lever to remove the jammed paper.

4. **Close the fixing unit cover after removing the paper.**

Start-up diagnostics and error messages

When you turn on the printer or reboot, the system goes through a series of diagnostic tests that check components on the video controller board. While the diagnostic tests are running, the name of the test appears in the display window.

Note: Press the Cancel button while the tests are running to skip all the startup tests.

If a SIMM in bank 0 is missing or is not properly seated, the startup diagnostics will not run. The diagnostics can be run manually, see “Selecting video controller extended diagnostics” on page 6-9.

If an error occurs during the Start-up diagnostics, the orange activity light on the Control Panel flashes and an error screen will appear in the display window indicating the test that failed and an associated error code. You can use the up and down arrow buttons to scroll through the list. To exit the error screen, press the CANCEL button and the printer will continue the boot sequence.

If you encounter an error condition, turn off the printer and inspect the video controller board for an obviously loose part or wire. Then check the other components as suggested in Table 6-1 on page 6-8.

If the problems you experience are intermittent, you can also run the video controller PCB diagnostics manually. See “Selecting video controller extended diagnostics” on page 6-9 for details.

Table 6-1 lists the diagnostic tests that are run at startup, the corresponding error codes for a failed test, the area of the video

controller PCB being tested, and the suggested corrective action for the failing test.

Table 6-1 Possible errors during Start-up diagnostics

Test name	Error code	Area tested on video controller PCB	Suggested action
EPROM	100	U5—EPROM	• Make sure the EPROM is installed correctly. • If the problem persists, you may need to replace the EPROM.
EEPROM	200	U11—EEPROM	• Make sure the EEPROM is installed correctly. • If the problem persists, you may need to replace the EEPROM.
MIPS FPU	900	U3—CPU	• Replace the video controller PCB.
RTC SELF	700	U9—Real Time Clock chip	• Replace the video controller PCB.
RTC R/W REG	710		
RTC START	730		
RTC SET	740		
DRAM SIMM	310	J6-J13—SIMMs on video controller PCB	• Locate the faulty SIMM. • When you locate the faulty SIMM, reseat the SIMM in its socket. • If the problem persists, clean the gold contacts on the edge of the strip with a pencil eraser and insert the SIMM into another socket. If the SIMM fails in the second location, replace it.
DRAM SLOT	320		
DRAM CONFIG	330 or 350		
	D00	J6-J9—SIMMs on video controller PCB	
DRAM	340	J6-J13—SIMMs on video controller PCB	
ACA DMA CNFG	B00	U40—RipChip	• Replace the video controller PCB.
ACA DMA ADR	B10		
ACA CNTL REG	A00		
ACA VADR REG	5A0		
ACA VCNT REG	B50		
ETH FUSE	400	FU2—Ethernet fuse	• Make sure the fuse is installed. • If the fuse is installed and the problem persists, replace the fuse.
ETH QUIET	410	U16—Ethernet controller chip	• Replace the video controller PCB.
ETH IDLE	420		
ETH SELF	450		
ETH INTLPBK	440-442, 460-462, 470-472, 490, 4A0-4A2, 4B0-4B3, 4D0, 4E0, 4F0	U16—Ethernet controller chip	• Replace the video controller PCB.

Table 6-1 Possible errors during Start-up diagnostics *(continued)*

Test name	Error code	Area tested on video controller PCB	Suggested action
SCSI FUSE	600	FU1—SCSI fuse	• Make sure the fuse is installed. • If the fuse is installed and the problem persists, replace the fuse.
SCSI QUIET	650	SCSI cable or U15—SCSI controller chip	• Check cable connections to the hard disk drive and the video controller PCB. • If the problem persists you may need to replace the video controller PCB.
SCSI CMD REG	640		
SCSI R/W REG	630		
SCSI RUPT RST	610		
SCSI RUPT II	611		
SCSI FIFO	621		
SCSI DEVICE	660	Checks for the hard disk drive	• Check connections to the hard disk drive. • If all connections are in place and the problem persists, you may need to replace the drive.

Selecting video controller extended diagnostics

Extended diagnostics allow you to run individual tests in loopback mode in order to identify and isolate problems with the video controller PCB. Extended diagnostic options include the set of tests run at startup, as well as an external Ethernet test and a more detailed set of SIMM tests. When you run the extended tests, a scrolling list of tests appears in the display window. For a complete list of extended tests, see Table 6-2 on page 6-10.

To run extended diagnostics manually

1. **If the printer is on, turn the power switch off.**
2. **Press and hold the up arrow button on the front of the Status Control Panel.**
3. **Turn on the printer.**
4. **Release the up arrow button as soon as you see the DIAG SELECTION display window.**

   Pressing the Menu button at this point displays an information screen with the following information: EPROM revision and video controller PCB Ethernet address.
5. **Select the tests that you want to run (see Table 6-2 on page 6-10 for a list of all the tests). Use the up and down arrow buttons to scroll through the list and the Online button to select a particular test.**

   An asterisk appears next to the each of the selected tests. If you decide you don't want to run a test that is already selected, press

the Online button again when the test is displayed in the display window. The test will no longer be selected.

6. **Press the Enter button when you are finished selecting the tests you want to run.**
7. **At the next screen, REPETITIONS, use the up and down arrow buttons to select how many times you want to run the tests. Press the Menu button to begin running the tests.**
8. **If any of the tests fail to shut off the printer, perform the recommended service for the failed test or replace the failed component.**

   An error screen will appear in the display window indicating the faulty test and an associated error code. You can use the up and down arrow buttons to scroll through the list. To exit the error screen, press the CANCEL button and reboot the printer.
9. **If the extended diagnostics all pass, the display window indicates that DIAGS PASSED PLEASE REBOOT. To reboot the printer, turn off the printer using the ON/OFF switch.**

Table 6-2 Video controller extended diagnostics

Test name	Error code	Area tested on video controller board	Suggested action
EPROM	100	U5—EPROM	• Make sure the EPROM is installed correctly. • If the problem persists, you may need to replace the EPROM.
EEPROM	200	U11—EEPROM	• Make sure the EEPROM is installed correctly. • If the problem persists, you may need to replace the EEPROM.
MIPS FPU	900	U3—CPU	• Replace the video controller PCB.
RTC SELF	700	U9—Real Time Clock chip	• Replace the video controller PCB.
RTC R/W REG	710		
RTC START	730		
RTC SET	740		

Table 6-2 Video controller extended diagnostics *(continued)*

Test name	Error code	Area tested on video controller board	Suggested action
DRAM SIMM	310	J6-J13—SIMMs on the video controller PCB	• Locate the faulty SIMM. • When you locate the faulty SIMM, reseat the SIMM in its socket. • If the problem persists, clean the gold contacts on the edge of the strip with a pencil eraser and insert the SIMM into another socket. If the SIMM fails in the second location, replace it.
DRAM SLOT	320		
DRAM CONFIG	330 or 350		
DRAM	340	J6-J13—SIMMs on the video controller PCB	
DRAM CB			
DRAM AD			
DRAM RA			
DRAM RD			
DRAM MMP			
DRAM IFA			
ACA DMA CNFG	B00	U40—RipChip	• Replace the video controller PCB.
ACA DMA ADR	B10		
ACA CNTL REG	A00		
ACA VADR REG	5A0		
ACA VCNT REG	B50		
ETH FUSE	400	FU2—Ethernet fuse	• Make sure the fuse is installed. • If the fuse is installed and the problem persists, replace the fuse.
ETH QUIET	410	U16—Ethernet controller chip	• Replace the video controller PCB.
ETH IDLE	420		
ETH SELF	450		
ETH INTLPBK	440-442, 460-462, 470-472, 490, 4A0-4A2, 4B0-4B3, 4D0, 4E0, 4F0	U16—Ethernet controller chip	• Replace the video controller PCB.
ETH EXT TDR	480, 481	U16—Ethernet controller chip U46—Ethernet transceiver chip F1—Ethernet filter (for twisted pair Ethernet connector) T1—Ethernet transformer (for AUI Ethernet connector) Checks the Ethernet network connections. **Note:** The printer must be connected to one of the network connectors in order to get accurate results from this test.	• If all other Ethernet tests pass, there may be a problem with the network. Ask the network administrator at the customer site to connect a functioning printer to that node in the network. • If the printer does work, there may be a problem with the printer's Ethernet connection and you may need to replace the video controller board in the printer. • If the printer doesn't work, there may be a problem with the network.
SCSI FUSE	600	FU1—SCSI fuse	• Make sure the fuse is installed. • If the fuse is installed and the problem persists, replace the fuse.

Table 6-2 Video controller extended diagnostics *(continued)*

Test name	Error code	Area tested on video controller board	Suggested action
SCSI QUIET	650	SCSI cable or U15—SCSI controller chip	• Check SCSI cable connections to the HDD and the video controller PCB. • If the problem persists you may need to replace the video controller PCB.
SCSI CMD REG	640		
SCSI R/W REG	630		
SCSI RUPT RST	610		
SCSI RUPT II	611		
SCSI FIFO	621		
SCSI DEVICE	660	Checks for the hard disk drive	• Check connections to the hard disk drive. • If all connections are in place and the problem persists, you may need to replace the drive.

Basic troubleshooting procedures

When a faulty image or malfunction occurs in the printer, after conducting the initial checks, search for and eradicate the cause of the problem according to the following described procedures.

- If a faulty image occurs, see “Image Defects” on page 6-22.
- When a malfunction occurs, see “Troubleshooting malfunctions” on page 6-38.

Note: When attempting to diagnose a problem, it may be helpful to remove the top cover of the Colorwriter to observe the developing and printing process. To interrupt the developing or printing process, open one of the printer doors.

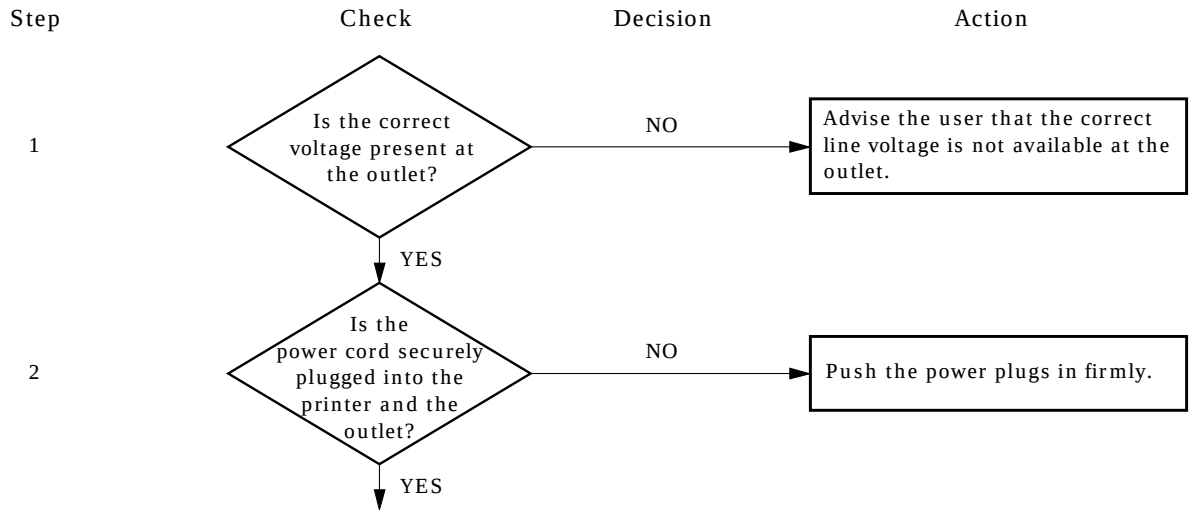
How to read the troubleshooting procedure table

The troubleshooting procedure table in this chapter is a variation of a general flowchart. An explanation of how to read the table follows with an example.

Table 6-3 Example: No AC power

Cause	Step	Check	Decision	Action
Line voltage	1	Is the correct voltage present at the outlet?	NO	Advise the user that the correct line voltage is not available at the outlet.
Power plug	2	Is the power cord securely plugged into the printer and the outlet?	NO	Push the power plugs in firmly.

- If you wish to know only the cause of a problem (the potentially defective part), refer to the Cause column. In the above table No AC power, the cause is suspected to be the line voltage or the power cord is unplugged.
- When you wish to know the check or action for a particular problem, read the Check item next to the Step item number, confirm the result as YES or NO, and execute the relative measure. If your decision is not mentioned, proceed to the next Step and check in the same manner.



Printer Driver Tester (PDT)

The printer driver tester can independently drive the printer to check its operation.

Note: The PDT is available only in central locations and should not be used for routine service calls.

Throughout this section procedures refer to using the printer driver tester for troubleshooting various printer malfunctions. If the printer driver tester is not available, these troubleshooting procedures should be used as a guideline.

Equipped with the following seven modes, the tester also is used when troubleshooting and replacing the DC controller PCB.

- SENSOR
- ACTUATOR
- READY CONTROL
- TEST PRINT
- PRINTER STATUS
- ADJUSTMENT
- DISCHARGE
- NIP WIDTH MEASUREMENT

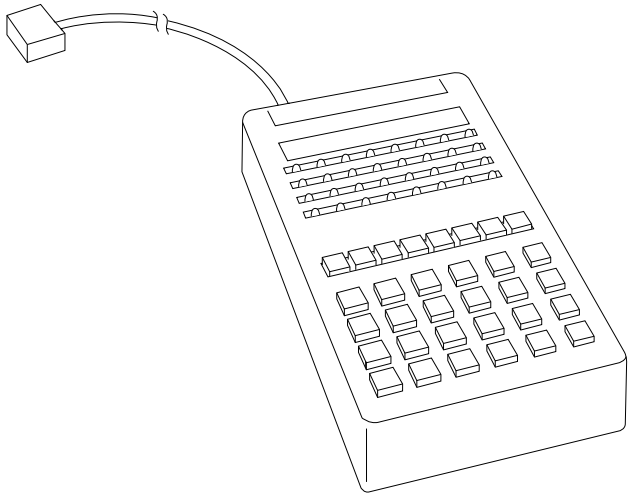


Figure 6-2 Printer driver tester

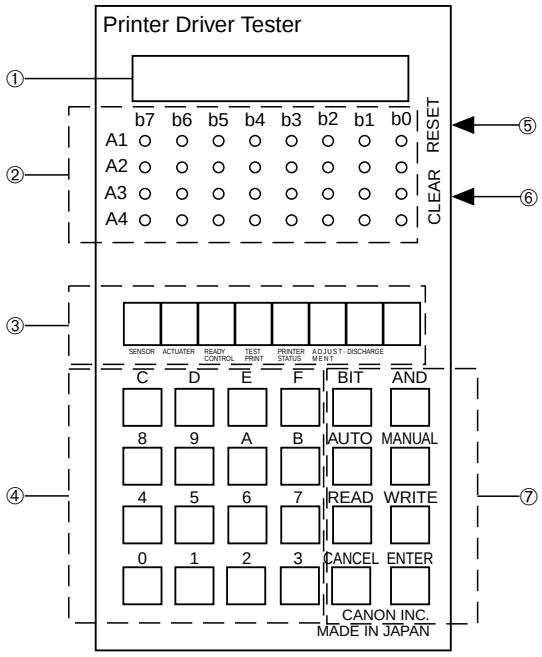
Operation panel

The tester operates in the following seven modes. For details, refer to the printer driver tester manual.

- 1—SENSOR: Monitors the operation of each sensor.
- 2—ACTUATOR: Monitors and controls the operation of each actuator.
- 3—READY CONTROL: Sets the printer in the Ready state even when there is an error (READY INHIBIT mode).

Note: Since data for this mode would otherwise be retained, when you are ready to quit the mode press the Clear button to clear the data.

- 4—TEST PRINT: Executes each type of test print.
- 5—PRINTER STATUS: Monitors the condition of printer malfunctions.
- 6—ADJUSTMENT: Used when replacing the DC controller PCB. In this mode, the tester reads the various data written into the DC controller PCB EEPROM, and writes those data into the new DC controller PCB.
- 7—DISCHARGE: Normally, when a fixing Failure occurs, you must turn the printer power OFF for at least 30 minutes to cancel the failure state. This mode invalidates that requirement.
- 8—NIP WIDTH MEASUREMENT: Used when confirming the nip width of the fixing unit.



1—Display unit: Shows the condition of each mode in 6-column LEDs.

2—LEDs: Show the condition of each mode by lighting or not lighting.

3—Mode select keys: Used to enter each mode.

4—Numeral keys: Used to input a numerical value in each mode.

5—Reset button

6—Clear button: Press the Reset and Clear buttons simultaneously to reset this tool.

7—Command keys: Used to input commands for each mode.

Figure 6-3 Printer driver tester operation panel

Measurement and adjustment

Mechanical system adjustments

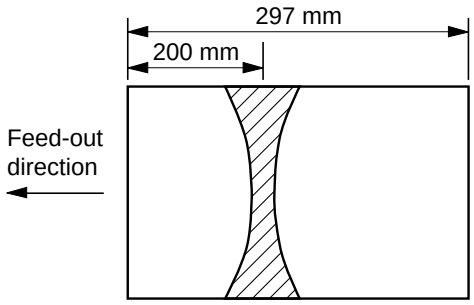
To check fixing lower roller engagement (nip width)

Although the printer cannot adjust the fixing unit nip width, a fixing malfunction may occur if the nip width is incorrect. Confirm the nip width using the following procedures:

1. **Prepare CLC-SK or DK/A4 print paper.**
2. **Output an all-black print using an EP-E cartridge, and take it with you. (Use the printer driver tester to output the print.)**
3. **Set the all-black print in the manual feeding tray with the black side down.**

4. **Turn the printer power switch OFF, and connect the printer driver tester to the printer.**
5. **While holding down the TEST PRINT key on the Density Control Panel, turn the power switch ON.**
6. **Use the NIP WIDTH MEASUREMENT mode of the printer driver tester to pick up print paper from the manual feeding tray. All-black print paper will be picked up, temporarily stopped at the fixing unit, and then delivered.**
7. **Turn the printer power switch OFF.**
8. **Measure the width of the toner luster section on the print paper to confirm that it is within the range shown in the figure below.**

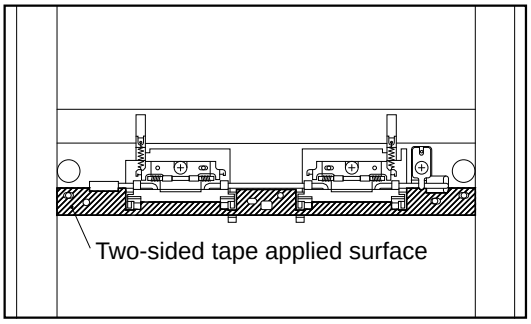
- Central section: 5.8±0.6mm
- Left/right sections: -0.2mm to +1mm central section width



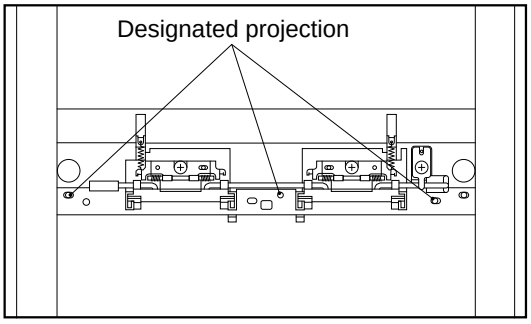
CLC-SK or DK/A4 all-black print

To replace the transfer sheet

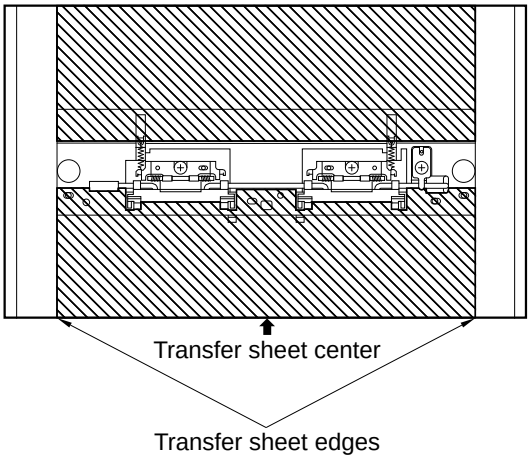
1. **Use alcohol to clean the surface where the two-sided tape was applied, and then apply a new strip of two-sided tape.**



2. **When mounting the transfer sheet, confirm that the holes at the edge of the transfer sheet securely enter the three designated projections of the gripper unit.**



3. **Take care so that the transfer sheet does not slack and float in the center or at the edges.**



Electrical system adjustments

To replace the DC controller

Various data are written into the EEPROM on the DC controller PCB. Thus, when replacing the DC controller PCB, read the data written in it with the printer driver tester, and then write the data into the new EEPROM on the DC controller PCB.

Use the ADJUSTMENT mode of the tester to write the data. It can be used in Auto or Manual mode. In Auto mode, the data written in the EEPROM are read collectively, simplifying the procedure for writing the data into the new DC controller, while Manual mode reads and writes the data individually.

The Auto procedure is shown below. Refer to the printer driver tester manual for the Manual procedure.

1. **After connecting the printer driver tester to the printer, turn the printer power switch ON while holding down the TEST PRINT key on the Density Control Panel.**
2. **Press the ADJUSTMENT key to select ADJUSTMENT mode.**
3. **Press the AUTO key to select AUTO mode. Press the READ key and then the ENTER key. AAAA appears on the display unit if the data are being read, and FFFF if they are not being read.**
4. **Connect the printer driver tester to the new DC controller after it has been installed, and turn the printer power switch ON.**
5. **Press the ADJUSTMENT key to select ADJUSTMENT mode.**
6. **Press the AUTO key to select AUTO mode. Press the WRITE key and then the ENTER key. AAAA will appear on the display unit if the data are being written, and FFFF if they are not being written.**

To adjust leading edge registration

This adjustment can be performed by either the Density Control Panel or the printer driver tester. The procedure using the printer driver tester is described below. Refer to “Using the density control panel” on page 2-1 for the procedure using the Density Control Panel.

1. **After connecting the printer driver tester to the printer, turn the printer power switch ON while holding down the TEST PRINT key on the Density Control Panel.**
2. **Press the ADJUSTMENT key to select the ADJUSTMENT mode.**
3. **Press the MANUAL key to select the MANUAL mode. Then press the keys in the following order:**

- WRITE key
- Input AA01 using the NUMERAL keys
- BIT key
- Input the adjustment numerical value using the NUMERAL keys. 67-93 (6.7mm-9.3mm)
- ENTER key

  AAAA will appear on the display unit if the data is being written, and FFFF if the data is not being written.

  If you strike a key by mistake, press the CANCEL key.

To adjust manual feeding tray side registration

This adjustment can be performed using either the Density Control Panel or the printer driver tester.

The procedure for using the printer driver tester is described below. Refer to “Using the density control panel” on page 2-1 for the procedure using the Density Control Panel.

1. **After connecting the printer driver tester to the printer, turn the printer power switch ON while holding down the TEST PRINT key on the Density Control Panel.**
2. **Press the ADJUSTMENT key to select the ADJUSTMENT mode.**
3. **Press the MANUAL key to select the MANUAL mode. Then input keys in the following order:**

- WRITE key
- Input AA02 by the NUMERAL keys.
- BIT key
- Input the adjustment numerical value by the NUMERAL keys. 05-35 (0.5mm-3.5mm)
- ENTER key

  AAAA will appear on the display unit if the data are being written, and FFFF if they are not being written.

  If you strike a key by mistake, press the CANCEL key.

To adjust cassette side registration

This adjustment can be performed by using either the Density Control Panel or the printer driver tester.

The procedure using the printer driver tester is described below. Refer to “Using the density control panel” on page 2-1 for the procedure using the Density Control Panel.

1. **After connecting the printer driver tester to the printer, turn the printer power switch ON while holding down the TEST PRINT key on the Density Control Panel.**
2. **Press the ADJUSTMENT key to select the ADJUSTMENT mode.**
3. **Press the MANUAL key to select the MANUAL mode. Then input keys in the following order:**

   - WRITE key
   - Input AA03 by the NUMERAL keys.
   - BIT key

- Input the adjustment numerical value by the NUMERAL keys. 05-35 (0.5mm-3.5mm)
- ENTER key
- AAAA will appear on the display panel if the data are being written, and FFFF if they are not being written.

  If you strike a key by mistake, press CANCEL key.

To adjust paper-feeder cassette side registration

It is necessary to adjust the side registration when the paper feeder is mounted. After mounting it, use the side registration adjustment switch to adjust the side registration. Adjust according to the following procedure so that when you output a test print the side registration will be 2mm.

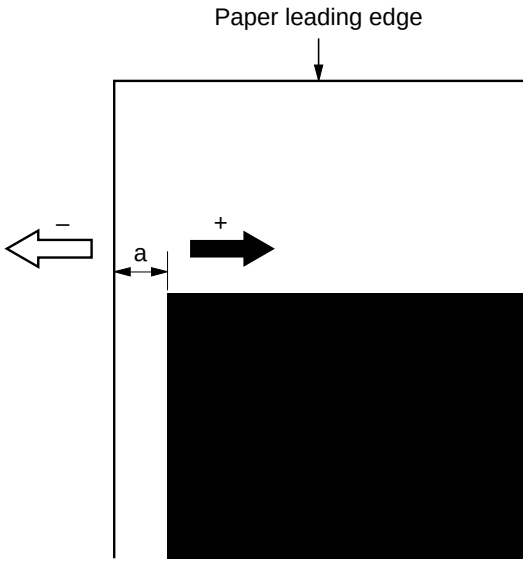
1. **Mount the paper feeder to the printer.**
2. **Set print paper in the paper feeder cassette.**
3. **After the printer is turned ON and enters the Ready state, switch the pick-up slot to the paper feeder.**
4. **Make an all-black test print.**
5. **Measure the span ('a' in the figure below) between the left edge of the paper and the printed pattern.**
6. **Adjust the side registration adjustment switch so that the value measured in Step 5 is 2.0mm.**

   Graduated on a scale from 0 to 9, the switch is set at 5 when shipped from the factory. Increase the scale by 1 and the side registration value will increase by about 0.4mm (10 dots). Likewise, the side registration value will decrease by 0.4mm if you decrease the scale by 1.

   For example, if the value measured in Step 5 is 2.8mm, the difference is 0.8mm, and the switch should be turned from 5 to 3. Thus, the side registration value will decrease by 0.8mm to become 2.0mm.

7. **Make another test print to confirm the side registration is 2mm.**

   If the adjusted value is not about 2mm, execute steps 4-7 over again.



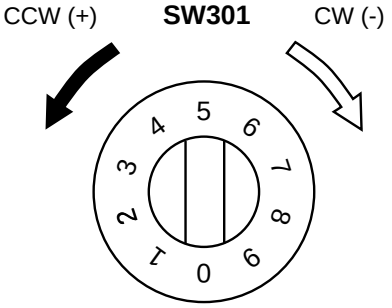


Image Defects

Test patterns

This printer has six types of test patterns that can be used in diagnosing image abnormalities.

- Grid test pattern

  The grid test pattern largely can confirm skewing.

- Vertical lines/horizontal lines/solid color/solid white test pattern

  These test patterns largely can diagnose image abnormalities.

- Gradation test print

  The Gradation test pattern can confirm gray balance, tone, fogging, etc.

Note: A test page can also be printed from the Control Panel on the front of the printer. See “Test patterns” on page 2-3.

When an image defect appears, you can identify the problem by making a test pattern. The test pattern can be performed using either the Density Control Panel or the printer driver tester.

The procedures for using the printer driver tester are described below. Refer to “Test patterns” on page 2-3 for the procedures using the Density Control Panel.

Use the printer driver tester TEST PRINT mode to make a test pattern. This function can be used in either Auto mode or Manual mode. For Auto mode, after pressing the TEST PRINT key, press the AUTO key and then the ENTER key to make a test pattern. This test pattern will be executed in Full color, Gradation pattern, Paper size A4 or letter, and 1-page print.

Note: You can put either A4 or letter size print paper in the cassette. If you enter a code by mistake, press the CANCEL key to clear it. If due to some irregularity you cannot select this mode or cannot operate in it, or if print paper other than A4 or letter size is used, FFFF will be displayed.

For Manual mode, press the TEST PRINT key and then the MANUAL key. Next, input codes in order, and then press the ENTER key to make a test print.

For example, input the following codes in order for Black mono-color, Solid color, Paper size A4, 1-page print, and Manual feeding tray.

A 5 AND B 3 AND C 1 AND D 2 AND E 2 ENTER

Note: Color mode can be selected only when the video controller is not installed. If due to some irregularity you cannot select this mode or operate in it, FFFF will be displayed.

- Color mode selection:

  Full color (Default) A1

  Yellow mono-color A2

  Magenta mono-color A3

  Cyan mono-color A4

  Black mono-color A5

- Test pattern selection:
  Vertical lines B1
  Horizontal lines B2
  Solid color B3
  Solid white B4
  Gradation B5
  Grid B6
- Paper size selection:
  A4 C1
  B5 C2
  Letter C3
  Legal C4
- Print form:
  Consecutive print D1
  1-page print D2
- Pick-up selection:
  Cassette E1
  Manual feeding tray E2
  Paper feeder E3

Notes:

- Press the CANCEL key when you want to stop continuous printing, or to clear a code you have input by mistake.
- When cassette or paper feed is specified, the paper size is determined automatically.
- When manual feed is specified, be sure to specify the paper size. If the size is not specified and print paper smaller than A4 is picked up, there is a risk of soiling the transfer drum. Once it is dirty, open and close the front door to automatically clean it with the cleaning brush.

Troubleshooting image defects

The tables in this section help you troubleshoot the following image defects:

- Light (Table 6-4 on page 6-25)
- Dark (Table 6-5 on page 6-26)
- Completely blank (Table 6-6 on page 6-27)
- All black (Table 6-7 on page 6-28)
- Dirt on back of paper (Table 6-8 on page 6-29)
- Dirty (Table 6-9 on page 6-30)
- Vertical lines (Table 6-10 on page 6-31)
- White vertical lines (Table 6-11 on page 6-32)
- White horizontal lines (Table 6-12 on page 6-33)
- Blank spots (Table 6-13 on page 6-34)
- Poor fixing (Table 6-14 on page 6-34)
- Distortion (Table 6-15 on page 6-35)
- BD failure (Table 6-15 on page 6-35)
- Color aberration (Table 6-16 on page 6-35)
- Streaking (Table 6-17 on page 6-36)
- Toner scatter (Table 6-18 on page 6-37)

Table 6-4 Image defect—light

Cause	Step	Check	Decision	Action
	1	Does it improve when you adjust the image density?	YES	Use the printer driver tester or the Density Control Panel to adjust the density.
Density sensor unit	2	Is the lens of the density sensor unit soiled?	YES	Clean it with the designated brush.
Lack of toner	3	Does it improve when you replace the toner cartridge?	YES	Replace the cartridge.
	4	Open the front cover during printing. Is the toner image on the photosensitive drum surface being sufficiently transferred?	YES	Proceed to Step 8.
Paper	5	Does the print image darken when you use new print paper?	YES	Replace the paper and advise the user on paper storage.
Poor contact High-voltage cable Resistor	6	Is the continuity good between the transfer drum-use contact and the high-voltage PCB?	NO	Clean the high-voltage contact and ensure the continuity. Or replace the defective part.

Table 6-4 Image defect—light *(continued)*

Cause	Step	Check	Decision	Action
Transfer sheet	7	Does the print image darken when you replace the transfer sheet?	YES	Replace the transfer sheet.
Poor contact	8	After cleaning the developing bias-use contact and the toner cartridge contact, does the image density improve when you print a test pattern?	YES	Clean the contacts and ensure their connections.
High-voltage power supply PCB Mechanical controller PCB			NO	Replace and check in the following order: • High-voltage power supply PCB • Mechanical controller PCB

Table 6-5 Image defect—dark

Cause	Step	Check	Decision	Action
	1	Does it improve when you adjust the image density?	YES	Operate the external device or Density Control Panel to adjust the density.
Density sensor unit	2	Is the lens of the density sensor unit dirty?	YES	Clean it with the designated brush.
Poor contact	3	After cleaning the drum grounding use contact and the cartridge contact, does the image density improve when you print a test pattern?	YES	Clean the contacts and ensure their connections.
Poor contact	4	After cleaning the primary charging voltage-use contact and the drum cartridge contact, does the image density improve when you print a test pattern?	YES	Clean the contacts and ensure their connections.
High voltage power supply PCB (Primary charging voltage) Mechanical controller PCB			NO	Replace and check in the following order: • High-voltage power supply PCB • Mechanical controller PCB

Table 6-6 Image defect—completely blank pages

Cause	Step	Check	Decision	Action
Front door back panel	1	Is there damage on the laser beam shutter open-close boss of the front door back panel?	YES	Replace the front door back panel.
Laser beam shutter Shutter arm	2	Does the laser beam shutter open completely when you press the shutter arm?	NO	Replace the damaged part.
Poor contact	3	After cleaning the developing bias-use contact and the toner cartridge contact, does the image density improve when you print a test pattern?	YES	Clean the contacts and ensure their connections.
Poor contact	4	Are the developing bias contact plate and the developing bias-use contact firmly connected?	NO	Clean the contacts and ensure their connections.
High-voltage power supply PCB (Developing bias) Mechanical controller PCB	5	Is there continuity between the developing bias contact plate and the high-voltage power supply PCB?	YES	Replace and check in the following order: • High-voltage power supply PCB • Mechanical controller PCB
High-voltage cable/Resistor			NO	Replace the defective part.

Table 6-7 Image defect—all black

Cause	Step	Check	Decision	Action
Drum cartridge	1	Does it improve when you replace the drum cartridge?	YES	Replace the cartridge.
Poor contact	2	After cleaning the primary charging voltage contact spring and the drum cartridge contact, does it improve when you print a test pattern?	YES	Clean the contacts and ensure their connections.
Poor contact	3	Are the primary charging-voltage contact plate and the primary charging-voltage contact spring firmly connected?	NO	Clean the contacts and ensure their connections.
High-voltage power supply PCB (Primary charging voltage) Mechanical controller PCB	4	Is there continuity between the primary charging-voltage contact plate and the high-voltage power supply PCB?	YES	Replace and check in the following order: • High-voltage power supply PCB • Mechanical controller PCB
High-voltage cable/Resistor			NO	Replace the defective part.

Table 6-8 Image defect—dirt on back of paper

Cause	Step	Check	Decision	Action
Fixing lower roller Attraction roller Discharge roller Cleaning brush	1	Is the back of the paper periodically soiled?	YES	Refer to Table 6-19 on page 6-37 to pinpoint the dirty roller and clean it. Replace it if you cannot clean it.
Poor attraction Poor discharge	2	Is recommended paper being used?	NO	Advise the user to use recommended paper (see user guide).
	3	Is the attraction roller or the discharge roller deformed or dirty?	YES	Replace the deformed roller.
	4	Is the high-voltage contact of the attraction roller or the discharge roller dirty or burnt?	YES	Clean the contact. Replace it if it cannot be cleaned.
	5	Is the spring pressing the attraction roller or the discharge roller against the transfer drum stretched?	YES	Replace the stretched spring.
Feed guide Fixing entrance guide	6	Use the printer driver tester to rotate the cleaning brush motor. Does it rotate?	YES	Clean the feed guide or the fixing entrance guide.
Cleaning brush motor	7	Are the connections of cleaning brush motor connector J55 and mechanical controller PCB connector J2014 good?	YES	Replace and check as follows: • Cleaning brush motor • Mechanical controller PCB
Poor connection			NO	Reconnect it.

Table 6-9 Image defects—dirty

Cause	Decision	Step	Check	Action
Cleaning belt	1	Is the cleaning belt being wound correctly?	NO	Check the fixing cleaner unit.
Fixing upper roller Drum cartridge Toner cartridge Attraction roller	2	Does dirt appear periodically?	YES	Refer to Table 6-19 on page 6-37 to pinpoint the soiled roller and clean it. Replace it if you cannot clean it.
Poor attraction Poor discharge	3	Is recommended paper being used?	NO	Advise the user to use recommended paper (see user guide).
	4	Is the attraction roller or the discharge roller deformed or dirty?	YES	Replace the concerned roller.
	5	Is the high-voltage contact of the attraction roller or the discharge roller dirty or burnt?	YES	Clean the contact. Replace it if it cannot be cleaned.
	6	Is the spring pressing the attraction roller or the discharge roller against the transfer drum stretched?	YES	Replace the concerned spring.
Paper	7	Is dirty paper being used?	YES	Replace it with new paper.
Feed guide Fixing entrance guide			NO	Clean the feed guide or the fixing entrance guide.

Table 6-10 Image defects—vertical lines

Cause	Step	Check	Decision	Action
Toner cartridge	1	In which colors do the vertical lines appear?	YES	Replace the cartridges of the colors that are appearing.
Separation corona wire	2	Does it improve when you clean the separation corona wire?	YES	Clean it.
Drum cartridge	3	Remove the drum cartridge. Is the circumference of the photosensitive drum flawed?	YES	Replace the drum cartridge.
Fixing unit	4	Is toner collected near the fixing entrance guide?	YES	Replace the fixing entrance guide.
	5	Is the circumference of the fixing upper roller flawed	YES	After eliminating the cause of the flaw, replace the roller.
	6	Is the cleaning belt winding mechanism operating abnormally?	YES	Replace the defective part.
			NO	Check whether the oil applying mechanism is abnormal.

Table 6-11 Image defects—white vertical line

Cause	Step	Check	Decision	Action
Toner cartridge	1	Does a white vertical line appear for all colors?	NO	Remove the cartridge of the color for which it appears from the printer. Shake the cartridge as shown in Chapter 4, and put it back in the printer. Replace the cartridge if the line reappears.
Separation corona wire	2	Does it improve when you clean the separation corona wire?	YES	Clean it.
Drum cartridge	3	Remove the drum cartridge. Is the circumference of the photosensitive drum flawed?	YES	Replace the drum cartridge.
Fixing unit	4	Is the fixing entrance guide dirty?	YES	Clean the guide.
	5	Is the circumference of the fixing upper roller flawed, dented, etc.?	YES	After eliminating the cause of the flaw, replace the roller.
	6	Is the cleaning belt winding mechanism operating abnormally?	YES	Replace the defective part.
	7	Is the oil applying mechanism abnormal?	YES	Replace the defective part.
Mirror	8	Is there dirt, paper dust, etc. on the mirror in the laser/scanner unit?	YES	Replace the laser/scanner unit.
Foreign matter	9	Is foreign matter such as hair attached to the printer laser emission hole or the cartridge laser incidence hole?	YES	Remove the foreign matter.
			NO	Check whether parts are making contact while the print paper is winding on the transfer drum.

Table 6-11 Image defects—white vertical line *(continued)*

Cause	Step	Check	Decision	Action
System software corruption	7	Does it improve when you reinstall system software?	YES	Reinstall system software.
SIMMs on video controller PCB	8	Are SIMMs seated properly on the board?	NO	Check each SIMM and make sure it is properly seated on the board.
		Are any SIMMs faulty?	YES	Run the video controller diagnostics to determine if any SIMMs are bad. Replace bad SIMMs.

Table 6-12 Image defects—white horizontal line

Cause	Step	Check	Decision	Action
Fixing upper roller Drum cartridge Toner cartridge	1			Refer to Table 6-19 on page 6-37 to replace the fixing upper roller, the drum cartridge or the toner cartridge.
System software corruption	7	Does it improve when you reinstall system software?	YES	Reinstall system software.
SIMMs on video controller PCB	8	Are SIMMs seated properly on the board?	NO	Check each SIMM and make sure it is properly seated on the board.
	9	Are any SIMMs faulty?	YES	Run the video controller diagnostics to determine if any SIMMs are bad. Replace bad SIMMs.

Table 6-13 Image defects—Blank spots

Cause	Step	Check	Decision	Action
Paper	1	Is recommended paper being used?	NO	Print with recommended paper. If the outcome is good, ask the user to use recommended paper (see user guide).
	2	Is the paper damp?	YES	Replace the paper. Ask the user to wrap the paper in wrapping paper to prevent moistening.
Toner cartridge	3	Does it appear for a specific color only?	YES	Replace the toner cartridge of the color for which it appears.
Transfer sheet	4	Are dirt, deformations, etc. visible on the transfer sheet?	YES	Replace the transfer sheet.
Drum cartridge			NO	Replace the drum cartridge.

Table 6-14 Image defect—poor fixing

Cause	Step	Check	Decision	Action
Fixing upper roller/Fixing lower roller	1	Does the poor fixing appear vertically and in a line?	YES	Check for flaws on the upper and lower rollers.
Fixing upper roller	2	Is the fixing lower roller dirty?	YES	Clean the roller. Replace it if you cannot clean it.
Oil applying unit	3	Is oil uniformly applied to the fixing upper roller?	NO	Check the operation of the oil applying unit.
Paper	4	Is the fixing nip width within the standard?	YES	Print with recommended paper. If the outcome is good, ask the user to use recommended paper.
Fixing unit		4	NO	Replace the fixing unit.

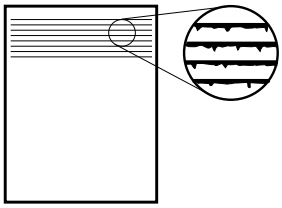
Table 6-15 Image defect—distortion/board failure

Cause	Step	Check	Decision	Action
Poor connection	1	Is the connection good between DC controller PCB connector J208 and connectors J102, J110 and J111?	YES	Reconnect them.
Poor connection	2	Is the connection good between laser/scanner unit connectors J401, J402, J451 and J701?	NO	Reconnect them.
Laser/scanner unit DC controller PCB			YES	Replace and check in the following order: • Laser/scanner unit • DC controller PCB

Table 6-16 Image defects—color aberration

Cause	Step	Check	Decision	Action
Gripper Gripper spring	1	Is the transfer drum gripper damaged? Or is the gripper spring deformed?	YES	Replace the damaged part.
Transfer sheet	2	Is the transfer sheet gouged or torn off?	YES	Replace the transfer sheet.
Gear	3	Is the photosensitive drum gear or the transfer drum gear worn or loose?	YES	Replace the gear.
Transfer drum			NO	Check for nonuniformity or chattering of the transfer drum rotation.

Table 6-17 Image defects—streaking



Cause	Step	Check	Decision	Action
	1	Did the same type of image appear again even after correcting it the previous time by performing the following steps?	YES	Use the printer driver tester to change the separation environment control zone value. Refer to the printer driver tester manual for details on the alteration method.
Paper	2	Is the paper damp?	YES	Replace the paper. Ask the user to wrap the paper in wrapping paper to prevent moistening.
Separation voltage	3	Does it improve when you forcibly turn OFF the separation voltage from the Density Control Panel?	YES	Finished.
Paper	4	Was toner scattered on the print image after performing Step 3?	YES	Replace the paper with new one.
Separation charging unit Fixing unit			NO	Replace and check as follows: • Separation charging unit • Fixing unit

Table 6-18 Image defects—toner scatter

Cause	Step	Check	Decision	Action
	1	Did the same type of image appear again even after correcting it the previous time by performing the following steps?	YES	Use the printer driver tester to change the separation environment control zone value. Refer to the printer driver tester manual for details on the alteration method.
Paper	2	Is recommended paper being used?	YES	Print with recommended paper. If the outcome is good, ask the user to use recommended paper (see user guide).
Separation voltage	3	Does it improve when you forcibly turn ON the separation voltage from the Density Control Panel?	YES	Finished.
Paper	4	Was streaking on the print image even after performing Step 3?	YES	Replace the paper with new one.
Separation charging unit Fixing unit			NO	Replace and check as follows: • Separation charging unit • Fixing unit

Table 6-19 Periods of appearance of dirt, blank spots on images

			Problem			
Possible location	Diameter (mm)	Period on image (mm)	Dirt	Blank spot	Dirt on back of paper	Poor fixing
Fixing upper roller	40	About 134	X			X
Fixing lower roller	40	About 134			X	X
Photosensitive drum	41	About 129	X			
Developing cylinder	16	About 50	X	X		
Primary charging roller	12	About 38	X	X		
Attraction roller	16	About 50	X		X	
Discharge roller	16	About 50			X	
Cleaning brush	30	About 94			X	

Troubleshooting malfunctions

Prepare the printer driver tester (if available) for executing the troubleshooting malfunctions described in this section.

Note: The printer driver tester is available from a central location and is not available for routine service procedures.

The PRINTER STATUS mode of the tester monitors the condition of printer malfunctions.

When the printer enters a malfunction condition, connect the tester to the printer and press the PRINTER STATUS key to select the PRINTER STATUS mode and display the details of the failure in code. Perform the recommended service that corresponds to the displayed code. If due to some irregularity you cannot select this mode, FFFF will appear on the display unit.

Furthermore, use the SENSOR mode to monitor the operations of each sensor, and the ACTUATOR mode for operation and monitoring of each actuator.

When executing the recommended service procedures described in this section, be sure to pay close attention to the following points:

- When measuring the voltage at the specified terminal of a connector, definitely check whether the connector is causing a faulty connection.
- When you replace the DC controller PCB, use the printer driver tester to read the various data written into the EEPROM and then write the data into the EEPROM of the new DC controller.

Note: The error codes listed in the table correspond to the error code displayed on the printer driver tester.

Table 6-20 E001/E005 Fixing failure (Abnormal warm-up/Temperature low)

Cause	Step	Check	Decision	Action
Poor connection	1	Are DC controller PCB connector J112 and mechanical controller PCB connector J2007 connections good?	NO	Reconnect them.
Thermistor wire break	2	Turn the power switch OFF, remove the fixing unit, and measure the resistance between fixing unit connectors J21-5 and J21-6. Is it between 180kΩ and 280kΩ (normal temperature)?	NO	Check the wiring between DC controller connector J112 and the thermistor, and if it is normal replace the thermistor.
Fixing upper heater Thermoswitch	3	Is there continuity between fixing unit connectors J21-1 and J21-2 when the fixing unit is removed?	NO	Check the continuity of each the fixing upper heater and the thermoswitch, and replace defective parts.
Fixing lower heater Thermoswitch	4	Is there continuity between fixing unit connectors J21-3 and J21-4 when the fixing unit is removed?	NO	Check the continuity of the fixing lower heater and the thermoswitch, and replace defective parts.
Thermistor mounting	5	Is the thermistor uniformly connected to the fixing lower roller?	NO	Remount it.
Thermistor dirty	6	Is the thermistor surface contacting the fixing roller dirty?	YES	Clean it.
Power supply unit	7	Does it improve when you replace the power supply unit?	YES	Replace the power supply unit.
DC controller PCB Mechanical controller PCB			NO	Replace and check as follows: • DC controller PCB • Mechanical controller PCB

Table 6-21 E002 Fixing failure (Temperature high)

Cause	Step	Check	Decision	Action
Thermistor short	1	Turn the power switch OFF, and remove the fixing unit. Measure the resistance between fixing unit connectors J21-5 and J21-6. Is it 1kΩ or less?	YES	Check the wiring between DC controller PCB connector J112 and the thermistor. If it is normal, replace the thermistor.
DC controller PCB Mechanical controller PCB			NO	Replace and check as follows: • DC controller PCB • Mechanical controller PCB

Table 6-22 E003 Fixing failure

Cause	Step	Check	Decision	Action
	1			Use the DISCHARGE mode of the printer driver tester to release the error memory flag. Next, use the PRINTER STATUS mode to monitor the failure status, and troubleshoot in correspondence with the failure code.

Table 6-23 E004 Fixing failure (Heater wire breakage)

Cause	Step	Check	Decision	Action
Fixing upper heater Thermoswitch	1	Turn the power switch OFF, and remove the fixing unit. Is there continuity between fixing unit connectors J21-1 and J21-2?	NO	Check the continuity of the fixing upper heater and the thermoswitch, and replace defective parts.
Fixing lower heater Thermoswitch	2	Is there continuity between fixing unit connectors J21-3 and J21-4 when the fixing unit is removed?	NO	Check the continuity of the fixing lower heater and the thermoswitch, and replace defective parts.
Power supply unit	3	Does it improve when you replace the power supply unit?	YES	Replace the power supply unit.
DC controller PCB Mechanical controller PCB			NO	Replace and check as follows: • DC controller PCB • Mechanical controller PCB

Table 6-24 E006 Oil overflow failure

Cause	Step	Check	Decision	Action
Poor connection	1	Are oil overflow sensor connector J29, fixing unit connector J21 and mechanical controller PCB connector J2009 connections good?	NO	Reconnect them.
Fixing unit oil supply route	2	Is trash stopping up the hose between the oil catch tray and the oil pump?	YES	Remove the trash or replace the parts.
Fixing unit	3	Does it improve when you replace the fixing unit?	YES	Replace the fixing unit.
Mechanical controller PCB DC controller PCB			NO	Replace and check as follows: • Mechanical controller PCB • DC controller PCB

Table 6-25 E007/E008 Fixing unit motor failure

Cause	Step	Check	Decision	Action
Poor connection	1	Are mechanical controller PCB connector J2013 and fixing unit motor connector J58 connections good?	NO	Reconnect them.
Door switch	2	Disconnect connector J7 from the power supply unit. When you turn the door switch (SW2) ON, is there continuity between connectors J7-1 (+24VB) and J7-2 (+24VA)?	NO	Replace the door switch.
Fixing unit motor	3	About one minute after turning the power switch ON, does the voltage between mechanical controller PCB connectors J2013-3 (/MON) and J2013-4 (GND) change from about 5VDC to 0V?	YES	Replace the main motor.
Mechanical controller PCB			NO	Replace the mechanical controller PCB.

Table 6-26 E010 Drum motor failure

Cause	Step	Check	Decision	Action
Poor connection	1	Is the mechanical controller PCB connector J2015 connection good?	NO	Reconnect it.
Door switch	2	Disconnect connector J7 from the power supply unit. When you turn the door switch (SW2) ON, is there continuity between connectors J7-1 (+24VB) and J7-2 (+24VA)?	NO	Replace the door switch.
Drum motor Mechanical controller PCB	3	Use the printer driver tester to rotate the drum motor. Does it rotate?	NO	Replace and check as follows: • Drum motor • Mechanical controller PCB
Transfer drum top sensor DC controller PCB	4	Is the transfer drum top sensor connector J43 connection good?	YES	Replace and check as follows: • Transfer drum top sensor • DC controller PCB
Poor connection			NO	Reconnect it.

Table 6-27 E020 Rotary rotation failure

Cause	Step	Check	Decision	Action
	1	Does the developing rotary rotate?	YES	See check from Step 5.
Poor connection	2	Is the mechanical controller PCB connector J2016 connection good?	NO	Reconnect it.
Door switch	3	Disconnect connector J7 from the power supply unit. When you turn the door switch (SW2) ON, is there continuity between connectors J7-1 (+24VB) and J7-2 (+24VA)?	NO	Replace the door switch.
Developing rotary brake clutch Developing unit drive clutch Mechanical controller PCB	4	Use the printer driver tester to rotate the developing unit motor. Does it rotate?	YES	Replace and check as follows: • Developing rotary brake clutch • Developing unit drive clutch • Mechanical controller PCB
Developing unit motor Mechanical controller PCB			NO	Replace and check as follows: • Developing unit motor • Mechanical controller PCB
Developing rotary position sensor Mechanical controller PCB	5	Are the mechanical controller PCB connector J2006 and developing rotary position sensor connector J60 connections good?	YES	Clean the sensor. If it is not possible to clean it, replace and check as follows: • Developing rotary position sensor • Mechanical controller PCB
Poor connection			NO	Reconnect them.

Table 6-28 E021 Toner cartridge engagement/separation failure

Cause	Step	Check	Decision	Action
Poor connection	1	Is the mechanical controller PCB connector J2016 connection good?	NO	Reconnect it.
Door switch	2	Disconnect connector J7 from the power supply unit. When you turn the door switch (SW2) ON, is there continuity between connectors J7-1 (+24VB) and J7-2 (+24VA)?	NO	Replace the door switch.
Developing unit motor Mechanical controller PCB	3	Use the printer driver tester to engage to the developing unit. Does the developing unit motor rotate?	NO	Replace and check as follows: • Developing unit motor • Mechanical controller PCB
Developing rotary position sensor Toner cartridge position sensor Mechanical controller PCB	4	Are connections between the mechanical controller PCB connector J2006, toner cartridge position sensor connector J59 and the developing rotary position sensor J60 good?	YES	Replace and check as follows: • Toner cartridge position sensor • Developing rotary position sensor • Mechanical controller PCB
Poor connection			NO	Reconnect them.

Table 6-29 E110 BD failure

Cause	Step	Check	Decision	Action
Laser/scanner unit DC controller PCB	1	Are the DC controller connectors J102, J110 and J111 connections good? Are the laser driver PCB connectors J401 and J402 connections good? Is the BD PCB connector J451 connection good?	YES	Replace and check as follows: • Laser/scanner unit • DC controller PCB
Poor connection			NO	Reconnect them.

Table 6-30 E111 Laser failure

Cause	Step	Check	Decision	Action
Laser/scanner unit DC controller PCB	1	Are the DC controller PCB connectors J110 and J111 connections good? Are the laser driver PCB connectors J401 and J402 connections good?	YES	Replace and check as follows: • Laser/scanner unit • DC controller PCB
Poor connection			NO	Reconnect them.

Table 6-31 E112/E113 Scanner motor failure

Cause	Step	Check	Decision	Action
Poor connection	1	Is the DC controller PCB connector J102 connection good?	NO	Reconnect it.
Power supply unit	2	Are there about 24VDC between DC controller PCB connectors J102-10 (24VB) and J102-5 (GND)?	NO	Check whether +24VDC is being supplied between DC controller PCB connectors J101-4 (24VB) and J101-3 (GND). If it is not, replace the power supply unit.
Laser/scanner unit	3	Print a test pattern. Does the voltage between DC controller PCB connectors J102-8 (/SCNON) and J102-7 (GND) change from about 5VDC to 0V?	YES	Replace the laser/scanner unit.
DC controller PCB			NO	Replace the DC controller PCB.

Table 6-32 E190 DC controller failure (EEPROM abnormal)

Cause	Step	Check	Decision	Action
DC controller PCB	1			Replace the DC controller PCB.

Table 6-33 E191 DC controller failure (5V/24V)

Cause	Step	Check	Decision	Action
Power supply unit DC controller PCB	1	Are the DC controller PCB connector J101 and power supply unit connector J4 connections good?	YES	Replace and check as follows: • Power supply unit • DC controller PCB
Poor connection			NO	Reconnect them.

Table 6-34 E192 DC controller failure (IC abnormal)

Cause	Step	Check	Decision	Action
DC controller PCB	1			Replace the DC controller PCB.

Table 6-35 E193 Temperature/humidity sensor PCB failure

Cause	Step	Check	Decision	Action
Temperature/humidity sensor unit Mechanical controller PCB DC controller PCB	1	Are the temperature/humidity sensor unit connector J73, connector J15, and mechanical controller PCB connector J2005 connections good?	YES	Replace and check as follows: • Temperature/humidity sensor unit • Mechanical controller PCB • DC controller PCB
Poor connection			NO	Reconnect them.

Table 6-36 E194 Density sensor failure

Cause	Step	Check	Decision	Action
Density sensor unit DC controller PCB	1	Are the density sensor unit connector J501 and DC controller PCB connector J103 connections good?	YES	Replace and check as follows: • Density sensor unit • DC controller PCB
Poor connection			NO	Reconnect them.

Table 6-37 E700 Internal communication failure

Cause	Step	Check	Decision	Action
DC controller PCB Mechanical controller PCB	1	Are the DC controller PCB connector J112 and mechanical controller PCB connector J2007 connections good?	YES	Replace and check as follows: • Mechanical controller PCB • DC controller PCB
Poor connection			NO	Reconnect them.

Table 6-38 E702 Pick-up communication failure

Cause	Step	Check	Decision	Action
Pick-up PCB Mechanical controller PCB	1	Are the mechanical controller PCB connector J2002, transit connector J13, transit connector J31, and pick-up PCB connector J301 connections good?	YES	Replace and check as follows: • Pick-up PCB • Mechanical controller PCB
Poor connection			NO	Reconnect them.

Table 6-39 E703 Paper feeder communication failure

Cause	Step	Check	Decision	Action
Paper feeder driver PCB Mechanical controller PCB	1	Are the mechanical controller PCB connector J2003, transit connectors J16/J357 and paper feeder driver PCB connector J351 connections good?	YES	Replace and check as follows: • Paper feeder driver PCB • Mechanical controller PCB
Poor connection			NO	Reconnect them.

Table 6-40 E704/E705/E706/E707 Printer driver tester communication failure

Cause	Step	Check	Decision	Action
Printer driver tester DC controller PCB	1	Are the printer driver tester connector J109 and DC controller PCB connector J109 connections good?	YES	Replace and check as follows: • Printer driver tester • DC controller PCB
Poor connection			NO	Reconnect them.

Table 6-41 E800 Controller fan failure

Cause	Step	Check	Decision	Action
Poor connection	1	Is the mechanical controller PCB connector J2010 connection good?	NO	Reconnect it.
Controller fan	2	Disconnect mechanical controller PCB connector J2010, Immediately after turning the power switch ON, does the voltage between mechanical controller PCB connectors J2010-3 (FAND3) and J2010-1 (GND) change from 0V to about 22VDC?	YES	Replace the controller fan.
Mechanical controller PCB			NO	Replace the mechanical controller PCB.

Table 6-42 E801 Fixing fan failure

Cause	Step	Check	Decision	Action
Poor connection	1	Is the mechanical controller PCB connector J2012 connection good?	NO	Reconnect it.
Fixing unit fan	2	Disconnect mechanical controller PCB connector J2012. Immediately after turning the power switch ON, does the voltage between mechanical controller PCB connectors J2012-3 (FAND1) and J2012-1 (GND) change from 0V to about 24VDC?	YES	Replace the fixing unit fan.
Mechanical controller PCB			NO	Replace the mechanical controller PCB.

Table 6-43 E802 Electrical unit fan failure

Cause	Step	Check	Decision	Action
Poor connection	1	Is the mechanical controller PCB connector J2019 connection good?	NO	Reconnect it.
Electrical unit fan	2	Disconnect mechanical controller PCB connector J2019. Immediately after turning the power switch ON, does the voltage between mechanical controller PCB connectors J2019-3 (FAND2) and J2019-1 (GND) change from 0V to about 24VDC?	YES	Replace the electrical unit fan.
Mechanical controller PCB			NO	Replace the mechanical controller PCB.

Table 6-44 E803 Power supply failure

Cause	Step	Check	Decision	Action
Wrong fixing unit installed	1	Turn the power switch OFF, and remove the fixing unit. Do the power supply rated voltage and fixing unit rated voltage correspond?	NO	Replace the fixing unit so that it corresponds to the power supply rated voltage.
Fixing upper heater Thermoswitch	2	Is there continuity between fixing unit connectors J21-1 and J21-2 when the fixing unit is removed?	NO	Check the continuity of each the fixing upper heater and the thermoswitch, and replace defective parts.
Fixing lower heater Thermoswitch	3	Is there continuity between fixing unit connectors J21-3 and J21-4 when the fixing unit is removed?	NO	Check the continuity of each the fixing lower heater and the thermoswitch, and replace defective parts.
Power supply unit	4	Does it improve when you replace the power supply unit?	YES	Replace the power supply unit.
DC controller PCB Mechanical controller PCB			NO	Replace and check as follows: • DC controller PCB • Mechanical controller PCB

Table 6-45 E900 Paper feeder 24V failure

Cause	Step	Check	Decision	Action
Power plug misconnection	1	Is the power plug from the wall socket connected directly to the printer even though the paper feeder is installed?	YES	Correctly re-connect.
Poor connection	2	Are the paper feeder driver PCB connector J355 and power supply unit connector J361 connections good?	NO	Reconnect them.
Power supply unit	3	Does it improve when you replace the paper feeder power supply unit?	YES	Replace the power supply unit.
Paper feeder driver PCB Mechanical controller PCB DC controller PCB			NO	Replace and check as follows: • Paper feeder driver PCB • Mechanical controller PCB • DC controller PCB

Table 6-46 No AC power

Cause	Step	Check	Decision	Action
Power supply voltage	1	Is rated voltage supplied at the outlet?	NO	Inform the user that rated voltage is not supplied at the outlet.
Power cord unplugged	2	Is the power cord firmly plugged into the printer, the paper feeder and the outlet?	NO	Replug it.
Circuit breaker	3	Is the circuit breaker OFF?	YES	According to the note below, press the button of the circuit breaker to turn it ON. If the circuit breaker turns OFF again immediately after turning the power switch ON, check whether the AC power supply line is shorted.
Wiring	4	Unplug the power cord. When you place the lead rod between the power switch terminals, does it measure 0Ω while the switch is ON and ∞Ω while it is OFF?	YES	Check the AC line wiring.
Power supply unit			NO	Replace the power supply unit.

Note: Wait at least 30 seconds after the circuit breaker operates before turning it ON.

Before the connecting the power cord to the receptacle, turn the power switch ON and definitely use the tester to check for an AC line circuit short as well as confirm the return condition of the circuit breaker (continuity/connection resistance).

Table 6-47 No DC power

Cause	Step	Check	Decision	Action
Overcurrent/overvoltage sensing	1	Does it improve when you turn the power switch OFF/ON?	YES	Determine the reason the power supply unit's overcurrent/overvoltage sensing circuit operated.
AC power supply	2	Unplug the power cable. Is AC power being supplied to this cable?	NO	Check according to Table 6-46 on page 6-53.
Wiring DC load	3	Turn the power switch OFF, and disconnect connectors J3, J4 and J5. Plug in the power cable, and turn the power switch ON. Are the above-mentioned power supply unit connectors correctly outputting DC power? Take care not to cause a short.	YES	Turn the power switch OFF, connect 1 of the disconnected connectors, and turn the power switch ON. Repeat this for all the connectors, and investigate the connector operating the protection circuit, checking the wiring from that connector and the DC load.
Fuse Wiring	4	Is the power supply unit fuse blown?	YES	Replace the fuse.
Power supply unit			NO	Replace the power supply unit.

Table 6-48 No pick-up (Manual feed)

Cause	Step	Check	Decision	Action
Video controller PCB	1	Use the printer driver tester to print a test pattern from the manual feeding tray. Is the paper picked up?	YES	Replace the video controller PCB.
Gear	2	Is the pick-up motor drive properly transmitted by the gears?	NO	Check the gears, and replace any damaged ones.
Pick-up motor Pick-up PCB	3	Use the printer driver tester to rotate the pick-up motor. Does it rotate?	NO	• Check the connection of pick-up PCB connector J304, and if it is normal replace the pick-up motor. • Replace the pick-up PCB.
Pick-up PCB	4	Turn the power switch OFF, remove the pick-up unit, and disconnect the connector J33. Measure the resistance between cable connectors J33-1 and J33-2. Is it about 100Ω?	YES	Replace the pick-up PCB.
Manual feed solenoid			NO	Replace the manual feed solenoid.

Table 6-49 No pick-up (Cassette feed)

Cause	Step	Check	Decision	Action
Video controller PCB	1	Use the printer driver tester to test print a page from the cassette. Is the paper picked up?	YES	Replace the video controller PCB.
Gear	2	Is the pick-up motor drive properly transmitted by the gears?	NO	Check the gears, and replace any damaged ones.
Pick-up motor Pick-up PCB	3	Use the printer driver tester to rotate the pick-up motor. Does it rotate?	NO	• Check the connection of pick-up PCB connector J304, and if it is normal replace the pick-up motor. • Replace the pick-up PCB.
Pick-up PCB	4	Turn the power switch OFF, remove the pick-up unit, and disconnect pick-up PCB connector J303. Measure the resistance between cable connectors J303-1 and J303-2. Is it about 100Ω?	YES	Replace the pick-up PCB.
Cassette feed solenoid			NO	Replace the cassette feed solenoid.

Table 6-50 No pick-up (Paper feeder pick-up)

Cause	Step	Check	Decision	Action
Video controller PCB	1	Use the printer driver tester to print a test pattern from the paper feeder. Is the paper picked up?	YES	Replace the video controller PCB.
Gear	2	Is the paper feeder motor drive properly transmitted by the gears?	NO	Check the gears, and replace any damaged ones.
Paper feeder motor Paper feeder driver PCB	3	Use the printer driver tester to rotate the paper feeder motor. Does it rotate?	NO	• Check the connection of paper feeder driver PCB connector J353, and if it is normal replace the paper feeder motor. • Replace the paper feeder driver PCB.
Paper feeder driver PCB	4	Turn the power switch OFF, remove the paper feeder, and disconnect paper feeder driver PCB connector J354. Measure the resistance between cable connectors J354-1 and J354-2. Is it about 130Ω?	YES	Replace the paper feeder driver PCB.
Cassette feed solenoid			NO	Replace the cassette feed solenoid.

Table 6-51 Registration roller does not rotate

Cause	Step	Check	Decision	Action
Gear	1	Is the pick-up motor drive properly transmitted by the gears?	NO	Check the gears, and replace any damaged ones.
Pick-up PCB	2	Turn the power switch OFF, remove the pick-up unit, and disconnect the connector J34. Measure the resistance between cable connectors J34-1 and J34-2. Is it about 145Ω?	YES	Replace the pick-up PCB.
Registration roller clutch			NO	Replace the registration roller clutch.

Table 6-52 Insufficient high-voltage power supply output

Cause	Step	Check	Decision	Action
High-voltage contact	1	Are the high-voltage contact terminals soiled or burnt?	NO	Clean the high-voltage contacts.
High-voltage power supply PCB	2	Does the trouble disappear when you replace the high-voltage power supply PCB?	YES	Replace the high-voltage power supply PCB.
Mechanical controller PCB DC controller PCB			NO	Replace and check as follows: • Mechanical controller PCB • DC controller PCB

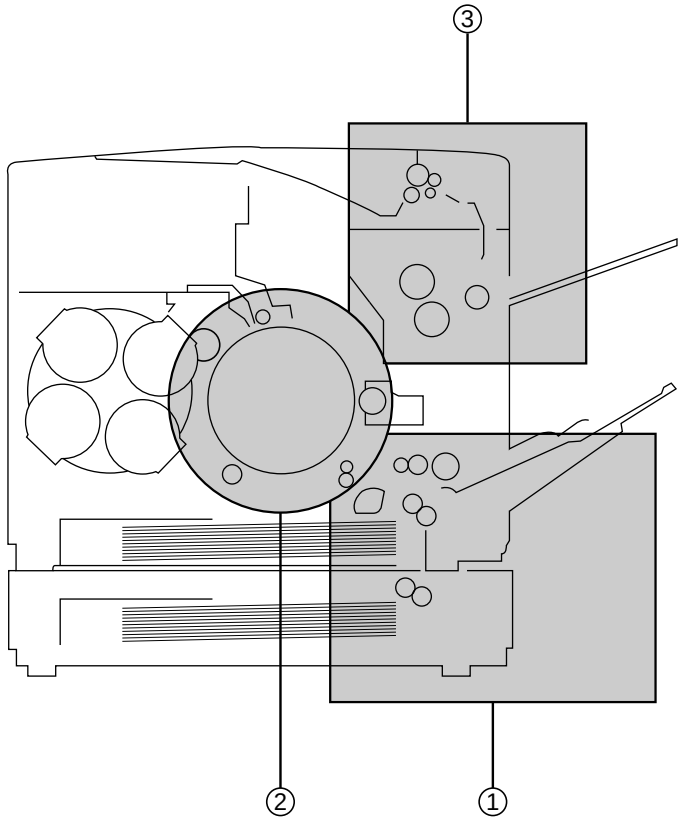
Paper Transport Troubleshooting

Paper Jams

The paper transport route can be divided into 3 sections:

- Pick-up unit
- Transfer drum unit
- Fixing/delivery unit

Accordingly, measures to counter frequent jamming are explained separately for each block.



1—Pick-up unit
2—Transfer drum unit
3—Fixing/delivery unit

Figure 6-4 Paper transport route

Table 6-53 Pick-up unit

Cause	Step	Check	Decision	Action
Paper	1	Is recommended paper being used?	NO	Advise the customer to use recommended paper (see *User Guide*).
	2	Is the paper deformed with curls, waves, etc.?	YES	Replace the paper. Advise the user on the storage method.
	3	Did it occur in the manual feed unit?	YES	See check from Step 8.
	4	Did it occur in the cassette feed unit?	YES	See check from Step 11.
Registration roller clutch	5	Is the registration roller clutch operating properly?	NO	Check the registration roller clutch.
Registration roller	6	Is the registration roller worn, deformed or dirty?	YES	Clean the roller if it is dirty. Replace it if worn or deformed.
Prism	7	Is the paper top sensor prism soiled?	YES	Clean it. Replace it if it cannot be cleaned or is flawed.
Sensor			NO	Replace the pick-up PCB.
OHP sheet	8	Is dedicated OHP sheet being used, and is it set correctly?	NO	Advise the user to use dedicated OHP sheet, and to set it correctly.
Excessive paper in manual feeding tray	9	Is more paper set in the manual feeding tray than prescribed?	YES	Advise the user not to set more than the prescribed amount of paper in the tray.
Pick-up roller	10	Does the pick-up roller rotate during printing?	YES	Replace the pick-up roller.
Faulty pick-up			NO	Check according to Table 6-48 on page 6-55.
Cassette	11	Is the cassette set properly?	YES	Set it properly.
Paper set incorrectly	12	Is the paper correctly set against the cassette claw?	NO	Set it correctly.
Paper	13	Is the paper folded?	YES	Replace the paper.

Table 6-53 Pick-up unit *(continued)*

Cause	Step	Check	Decision	Action
Excessive paper in cassette	14	Is more print paper set in the cassette than prescribed?	YES	Advise the user not to set more than the prescribed amount of paper in the cassette.
Cassette pickup roller Separation roller Feed roller	15	Is the cassette pick-up roller, the separation roller, or the feed roller worn or deformed?	YES	Replace the respective roller.
Faulty pick-up			NO	Check according to Table 6-49 on page 6-56 or Table 6-50 on page 6-57.

Table 6-54 Transfer drum unit

Cause	Step	Check	Decision	Action
Gripper	1	Is the gripper damaged?	YES	Replace the gripper.
	2	Does the gripper properly open and hold the print paper?	NO	Check as follows: • Whether the gripper hold-down spring is deformed or disconnected, • Whether the gripper lever is bent, • Whether the operation of the gripper drive mechanism within the transfer drum is smooth, • Whether the gripper solenoid connector is disconnected.
Attraction roller	3	Is the attraction roller worn or deformed?	YES	Replace the attraction roller.
Discharge roller	4	Is the discharge roller worn or deformed?	YES	Replace the discharge roller.
High-voltage contact	5	Is the high-voltage contact of the attraction roller or the discharge roller dirty or burnt?	YES	Clean the high-voltage contact. Replace it if it cannot be cleaned.
Spring	6	Is the spring pressing the attraction roller or the discharge roller against the transfer drum stretched?	YES	Replace the relative spring.
Transfer sheet	7	Is the transfer sheet dirty or deformed?	YES	Replace the transfer sheet.
High-voltage power supply PCB			NO	Replace the high-voltage power supply PCB.

Table 6-55 Fixing/delivery unit

Cause	Step	Check	Decision	Action
Fixing roller drive unit	1	Do the fixing rollers rotate smoothly?	NO	Check the fixing roller drive unit.
Fixing rollers	2	Is the fixing upper roller or the fixing lower roller deformed or flawed?	YES	Replace the roller.
Fixing entrance guide	3	Is the entrance guide soiled? Is there a protrusion due to a flaw or toner adhesion?	YES	Clean the entrance guide.
Nip width	4	Is the fixing lower roller engagement (nip width) as prescribed?	NO	Replace the fixing unit.
Cleaning belt	5	Is the cleaning belt being wound correctly?	NO	Check the fixing cleaner unit.
Fixing separation guide	6	Is the fixing separation guide soiled? Or is there a protrusion due to a flaw or toner adhesion?	YES	Clean the guide.
Delivery paper sensor lever	7	Does the delivery paper sensor lever move smoothly?	NO	Adjust it so that it moves smoothly.
Delivery paper sensor	8	Does the delivery paper sensor operate correctly?	NO	Replace the sensor.
Oil applying unit	9	Is the fixing delivery roller rotating smoothly? Or is the face-down delivery roller rotating smoothly?	YES	Check the operation of the oil applying unit.
Delivery drive unit			NO	Check the delivery drive units, and replace the damaged part.

Incomplete Paper Feed

Table 6-56 Multi-feed

Cause	Step	Check	Decision	Action
Paper	1	Is recommended paper being used?	NO	Advise the user to use recommended paper (see *User Guide*).
	2	Does it occur in the manual feeding tray?	YES	See check from Step 5.
Cassette	3	Is the print paper set properly against the cassette claw?	NO	Set the paper correctly.
Separation roller	4	Is the separation roller worn or deformed?	YES	Replace the separation roller.
Spring			NO	Replace the spring pulling the separation roller.
Separation pad	5	Is the separation pad surface worn?	YES	Replace the separation pad.
Spring			NO	Replace the separation pad spring.

Table 6-57 Wrinkles

Cause	Step	Check	Decision	Action
Paper	1	Is recommended paper being used?	NO	Advise the user to use recommended paper (see *User Guide*).
	2	Do the wrinkles disappear when you use new paper?	YES	As the paper probably was moist, advise the user on the storage method.
Pick-up unit	3	Open the front door while the paper is between the pick-up and fixing units. Is the paper wrinkled? Or is it being transported with a skew?	YES	Check the pick-up unit.
Paper guide	4	Is toner or other foreign matter adhered to the paper guide?	YES	Clean the guide.
Fixing entrance guide	5	Is the fixing entrance guide dirty?	YES	Clean the guide.
Fixing unit			NO	Replace the fixing unit.

Table 6-58 Leading-edge fold

Cause	Step	Check	Decision	Action
Paper	1	Is recommended paper being used?	NO	Advise the user to use recommended paper (see *User Guide*).
	2	Is the paper curled or otherwise deformed?	YES	Replace the paper. Advise the user on the storage method.
Excessive paper set	3	Is more paper set at the pick-up slot than prescribed?	YES	Advise the user not to set more than the prescribed amount of paper.
Paper setting	4	Is the paper set properly against the cassette claw?	NO	Set the paper correctly.
Cassette claw	5	Is the cassette claw deformed?	YES	Replace the cassette claw.
			NO	Check the paper feed unit, and replace any flawed or deformed parts.

Table 6-59 Skewing

Cause	Step	Check	Decision	Action
Paper	1	Is recommended paper being used?	NO	Advise the user to use recommended paper (see *User Guide*).
Cassette	2	Is the cassette set properly?	NO	Set it correctly.
Excessive paper set	3	Is more paper set at the pick-up slot than prescribed?	YES	Advise the user not to set more than the prescribed amount of paper.
Paper setting	4	Is the paper set properly against the cassette claw?	NO	Set the paper correctly.
	5	Is the paper placed against the manual feeding tray abutment?	NO	Properly set the paper on the manual feeding tray.
Cassette claw	6	Is the cassette claw deformed?	YES	Replace the cassette claw.
Paper dust, trash	7	Is paper dust or trash collected at the registration roller or feed guide?	YES	Remove the paper dust and trash.
Registration roller			NO	Replace the registration roller.

Locations/roles of electrical parts

Switches

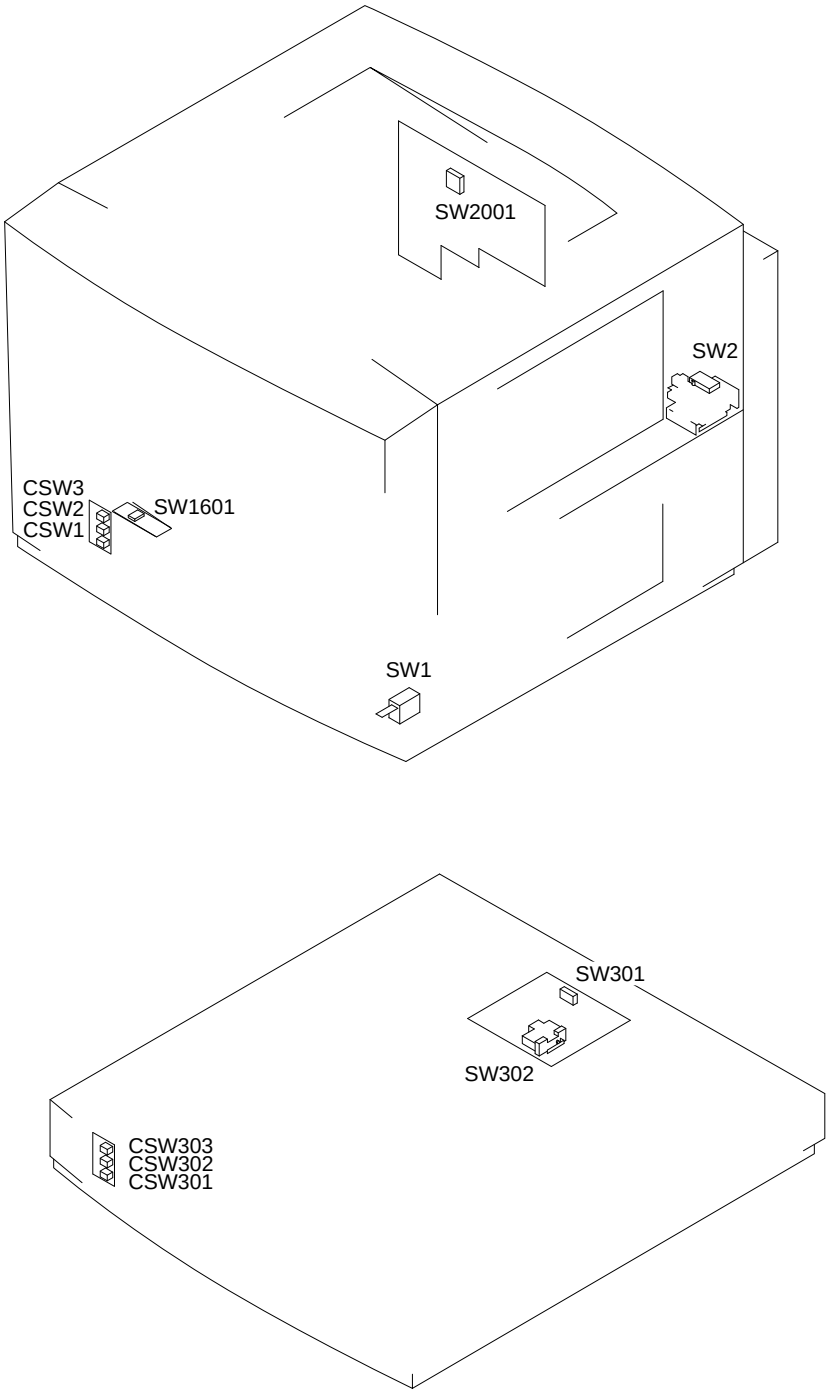


Figure 6-5 Location of printer switches

Table 6-60 Description of switches

Switch Code	Role
SW1	Power switch
SW2	Door switch
SW1601	Ejection sensing switch
SW2001	Reset switch for mechanical controller PCB
CSW1	Cassette-size sensing switch 1
CSW2	Cassette-size sensing switch 2
CSW3	Cassette-size sensing switch 3
SW301	Side registration adjustment switch (paper feeder)
SW302	Right door switch (paper feeder)
CSW301	Cassette-size sensing switch 1 (paper feeder)
CSW302	Cassette-size sensing switch 2 (paper feeder)
CSW303	Cassette-size sensing switch 3 (paper feeder)

Sensors

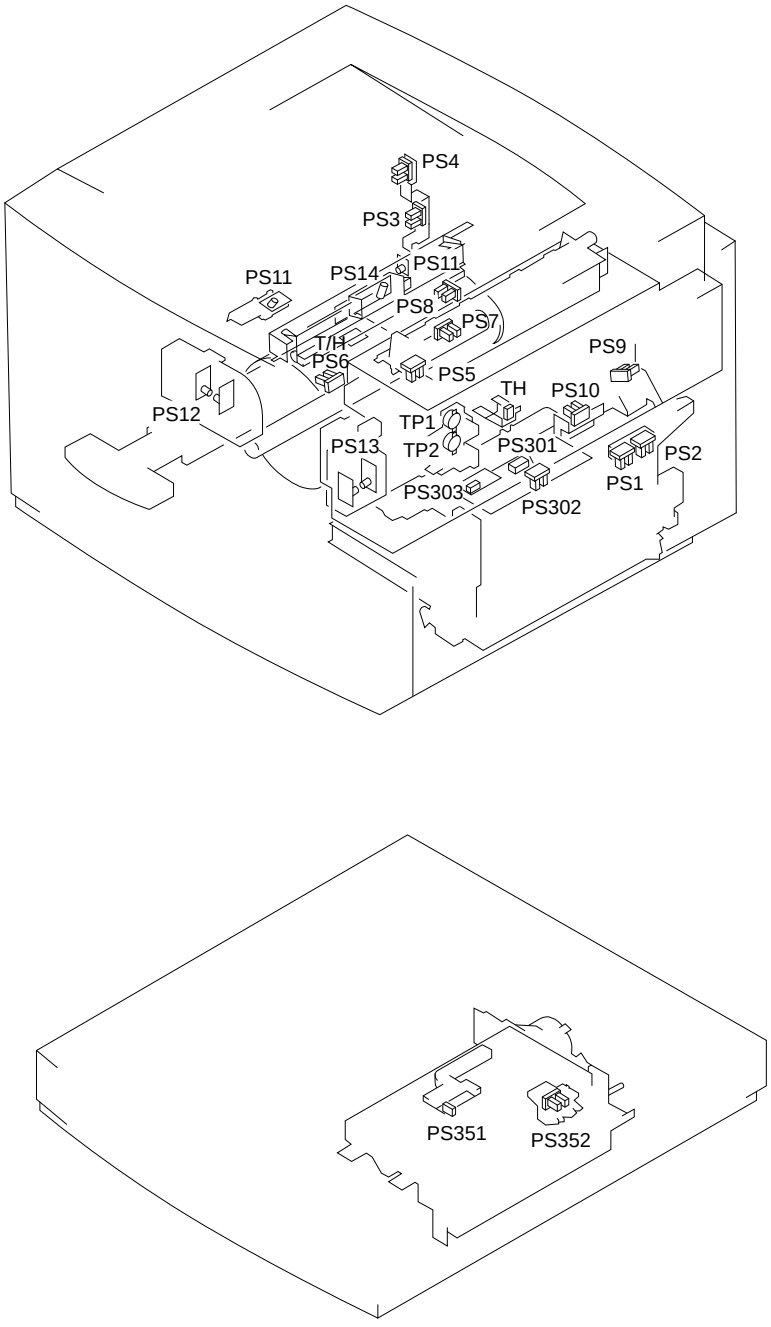


Figure 6-6 Location of printer sensors

Table 6-61 Description of printer sensors

Name	Code	Role	Parts Catalog Figure No.
Photointerrupter	PS1	Manual feeding paper detect sensor	312-22
	PS2	Manual feeding paper size sensor	312-22
	PS3	Toner cartridge position sensor Senses toner against OPC (L) or not (H)	108-8
	PS4	Developing rotary position sensor Senses toner home or fetch and stop flags	108-9
	PS5	Cleaning belt sensor	350-7B
	PS6	Attraction sensor H when paper is rolled over the transfer drum	531-36 fig 1
	PS7	Separation sensor H when detects paper separated from the transfer drum	531-36 fig 2
	PS8	Transfer drum top sensor L when at top position and L when at registration	531-46 fig 2
	PS9	Delivery paper sensor Senses paper detected (H)	810-46 fig 1
	PS10	Oil overflow sensor Senses overflow (H) from oil pan 2 **Note:** When moving the printer, an oil spill can easily disable the oil overflow and delivery paper sensors. Take extra care when moving or shifting the printer, and clean the sensors if they are dirty.	810-53F fig 2
	PS302	Registration paper sensor	940
	PS352	Pick-up sensor (Optional paper feeder)	R91
Photoreflector	PS301	Cassette paper detect sensor	940
	PS303	Paper top sensor (near t-drum)	940
	PS351	Cassette paper sensor (Optional paper feeder)	R92
Photosensor	PS11	Toner sensor	973/974
	PS12	Waste toner sensor	972, 103-10J
	PS13	Oil sensor	972, 103-15C
	PS14	Density sensor	580-6

Table 6-61 Description of printer sensors *(continued)*

Name	Code	Role	Parts Catalog Figure No.
Thermistor	TH	Detects the fixing lower roller surface temperature	
Thermoswitch	TP1	Detects the fixing upper roller abnormal temperature	
	TP2	Detects the fixing lower roller abnormal temperature	
Sensor	T/H	Temperature/humidity sensor	103-14

Clutches/Solenoids

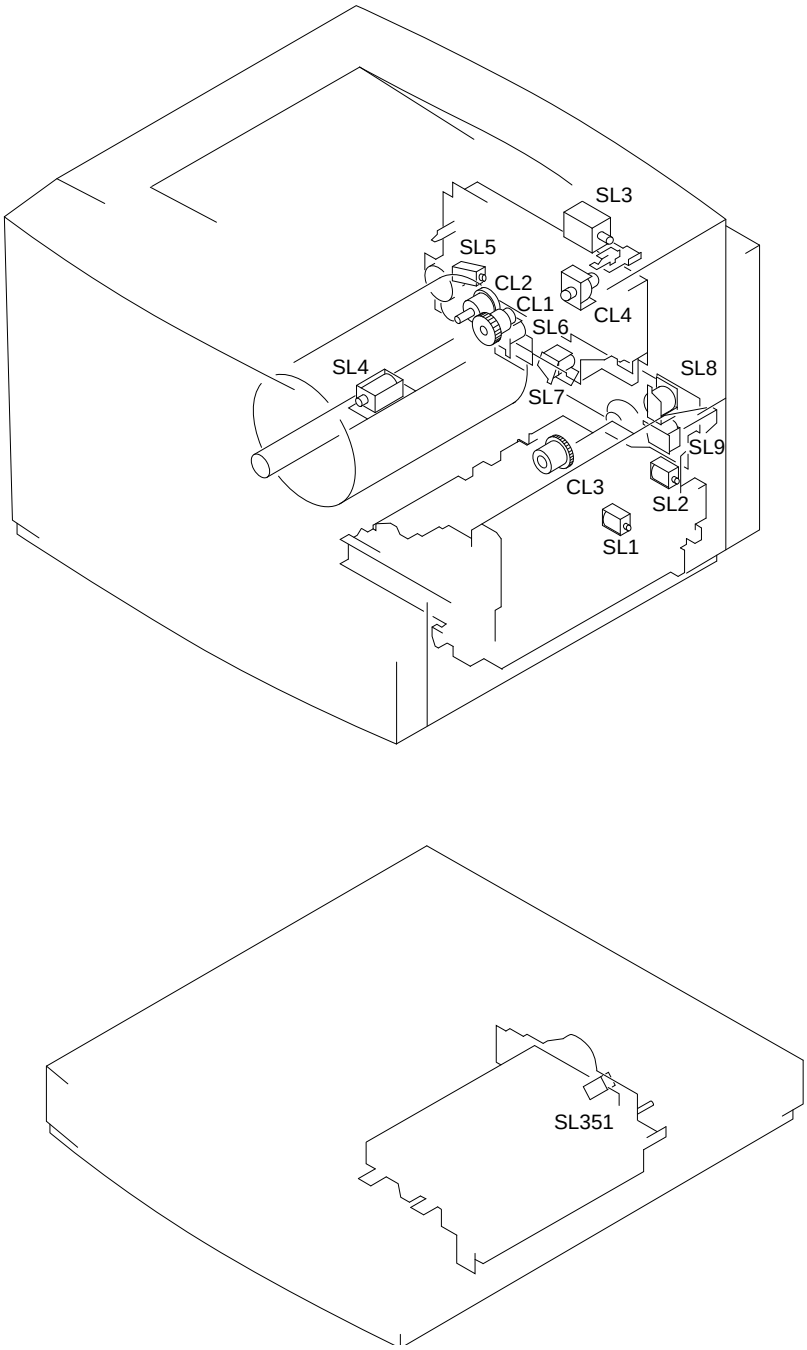


Figure 6-7 Location of printer clutches and solenoids

Table 6-62 Description of printer clutches and solenoids

Name	Code	Role
Clutch	CL1	Developing rotary brake clutch Brakes rotation of the rotary
	CL2	Developing unit drive clutch On rotates the rotary, off rotates the OPC
	CL3	Registration roller clutch
	CL4	Fixing unit drive clutch L to turn on SL3 rotating rollers in fuser
Solenoid	SL1	Cassette feed solenoid
	SL2	Manual feed solenoid
	SL3	Cleaning belt drive solenoid L to turn fuser/fixing unit cleaning belt
	SL4	Gripper drive solenoid H allows gripper to open when the t-drum rotates
	SL5	Separation claw solenoid H to push the separation claw down to turn the sheet
	SL6	Attraction roller press solenoid L to turn cam to press transfer drum
	SL7	Drum press solenoid L to turn cam to press transfer drum away from OPC
	SL8	Transfer drum cleaner press solenoid L to turn cam to press transfer drum
	SL9	Discharge roller press solenoid L to turn cam to press transfer drum
	SL351	Cassette feed solenoid (paper feeder)

Motors

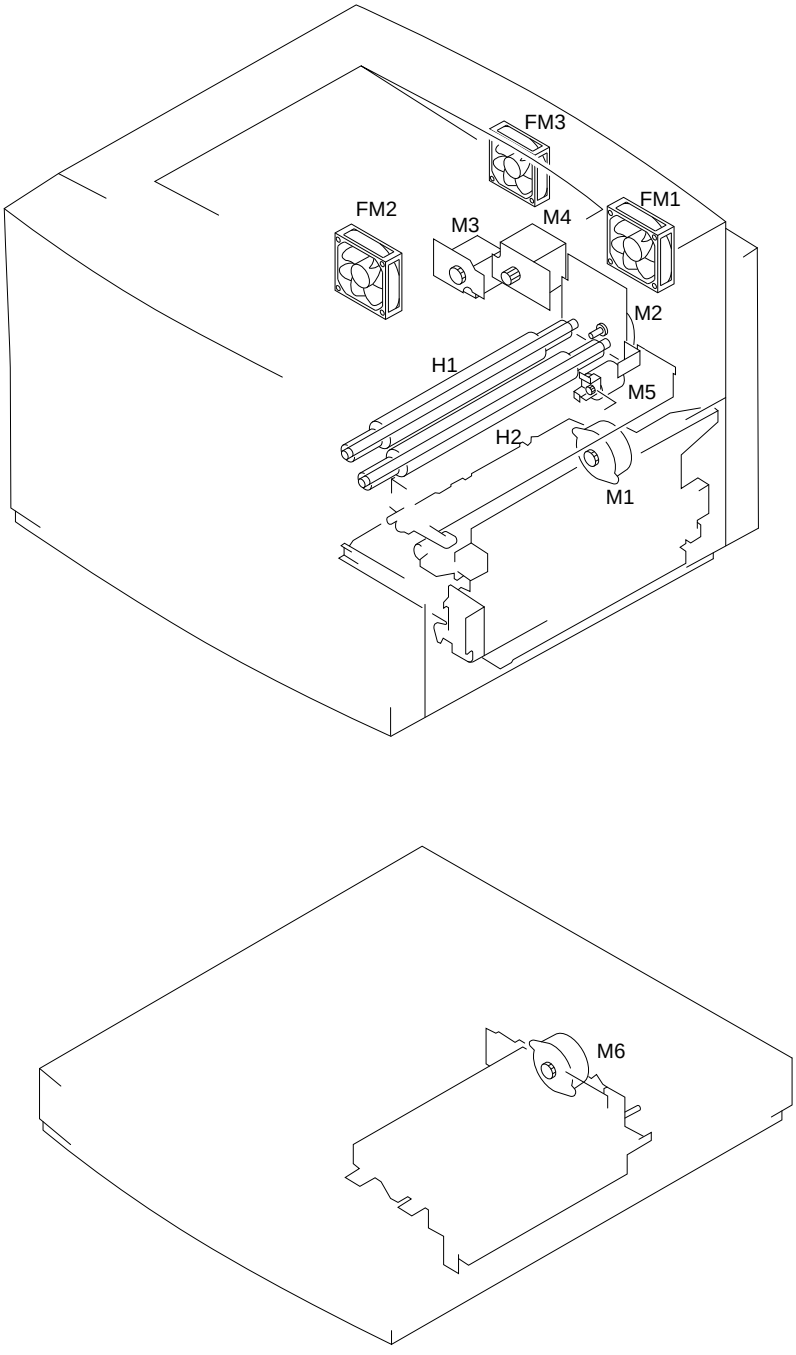


Figure 6-8 Location of motors and fixing heater

Table 6-63 Description of printer motors

Name	Code	Role
Motor	M1	Pick-up motor
	M2	Fixing unit motor
	M3	Developing unit motor
	M4	Drum motor
	M5	Cleaning brush motor
	M6	Paper feeder motor (Paper feeder)
Fan motor	FM1	Fixing unit fan
	FM2	Electrical unit fan
	FM3	Controller fan
Fixing heater	H1	Fixing upper heater
	H2	Fixing lower heater

PCBs

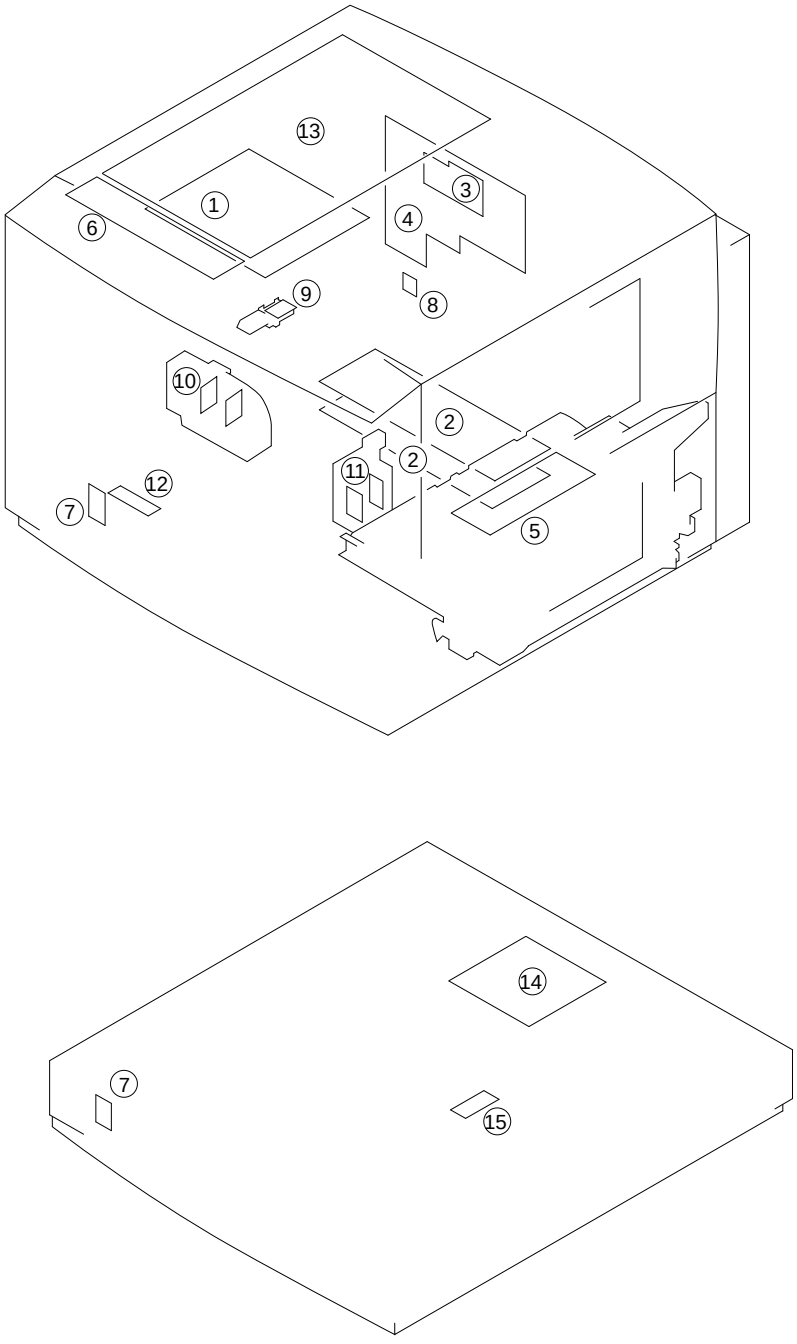


Figure 6-9 Location of printer PCBs

Table 6-64 Description of printer PCBs

No.	Name	Role
1	DC Controller PCB	Controls printer functions (Laser/scanner control, image stabilization control, fixing unit temperature control, video interface control, other various detection functions).
2	High-voltage power supply PCB	Applies voltage in sequential correspondence with primary charging, developing, transfer, discharging, attraction, and separation.
3	Separation HVT PCB	Outputs separation output to the fixing unit and the separation charging unit.
4	Mechanical controller PCB	Controls the various loads and various detection functions (motors, developing unit, fixing unit, transfer drum peripherals, pick-up/high voltage/paper feeder, etc.).
5	Pick-up PCB	Controls the pick-up system loads.
6	Terminal PCB	Relays signals between the DC controller and the video controller.
7	Cassette size-sensing PCB	Detects the cassette size.
8	Toner-low detect beam PCB	Detects the toner amount (Emitting unit)
9	Toner-low detect receive PCB	Detects the toner amount (Receiving unit)
10	Waste-toner sensing PCB	Detects the waste toner is full.
11	Oil-sensing PCB	Detects the oil amount.
12	Ejection-sensing PCB	Detects pulling of the ejection lever.
13	Video controller PCB	Processes inputting/outputting between the printer and the external device as well as various data.
14	Paper feeder driver PCB	Drives the solenoids and the motors in the paper feeder driver.
15	Cassette paper sensor PCB	Detects the cassette is out of paper.

Connectors

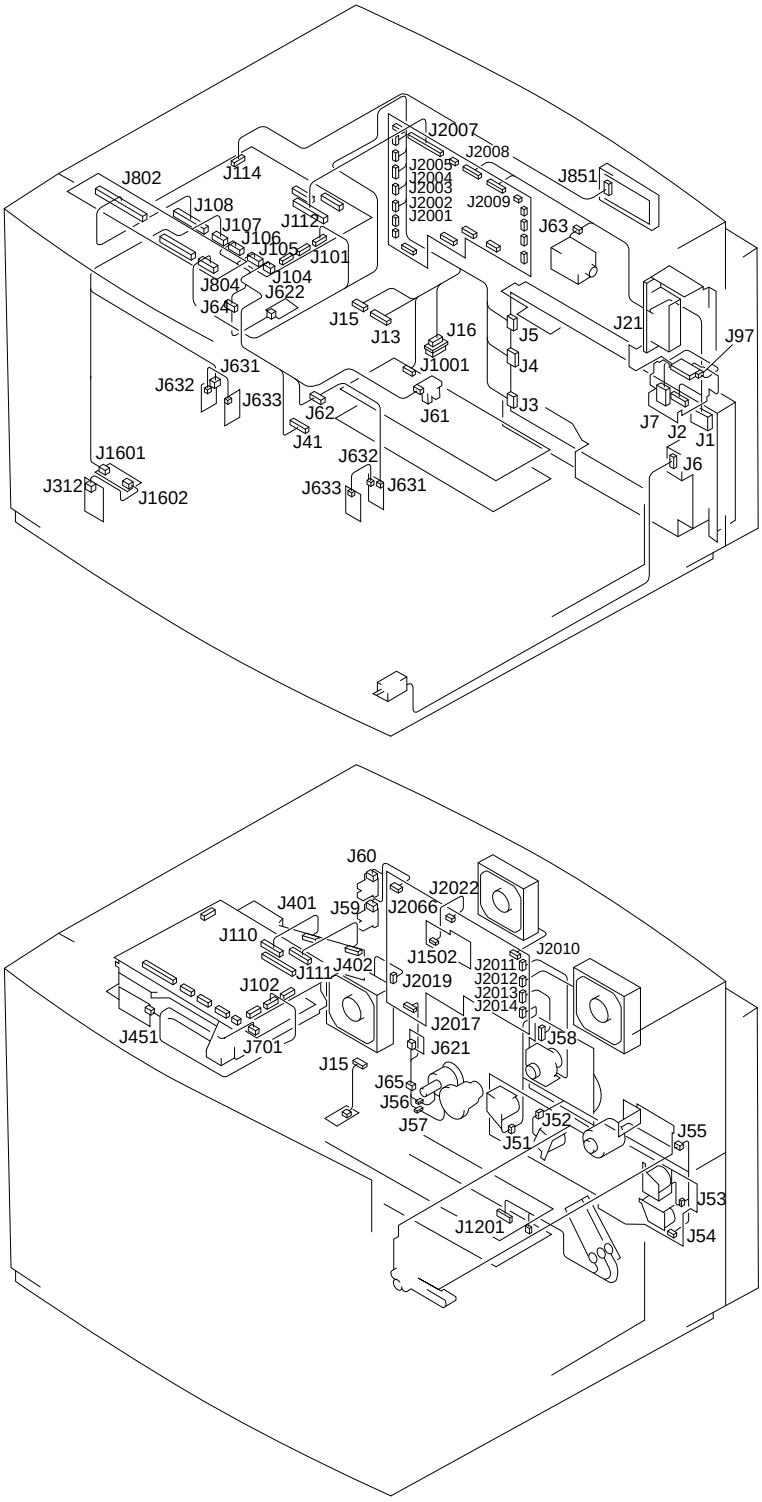


Figure 6-10 Location of printer connectors (1 of 3)

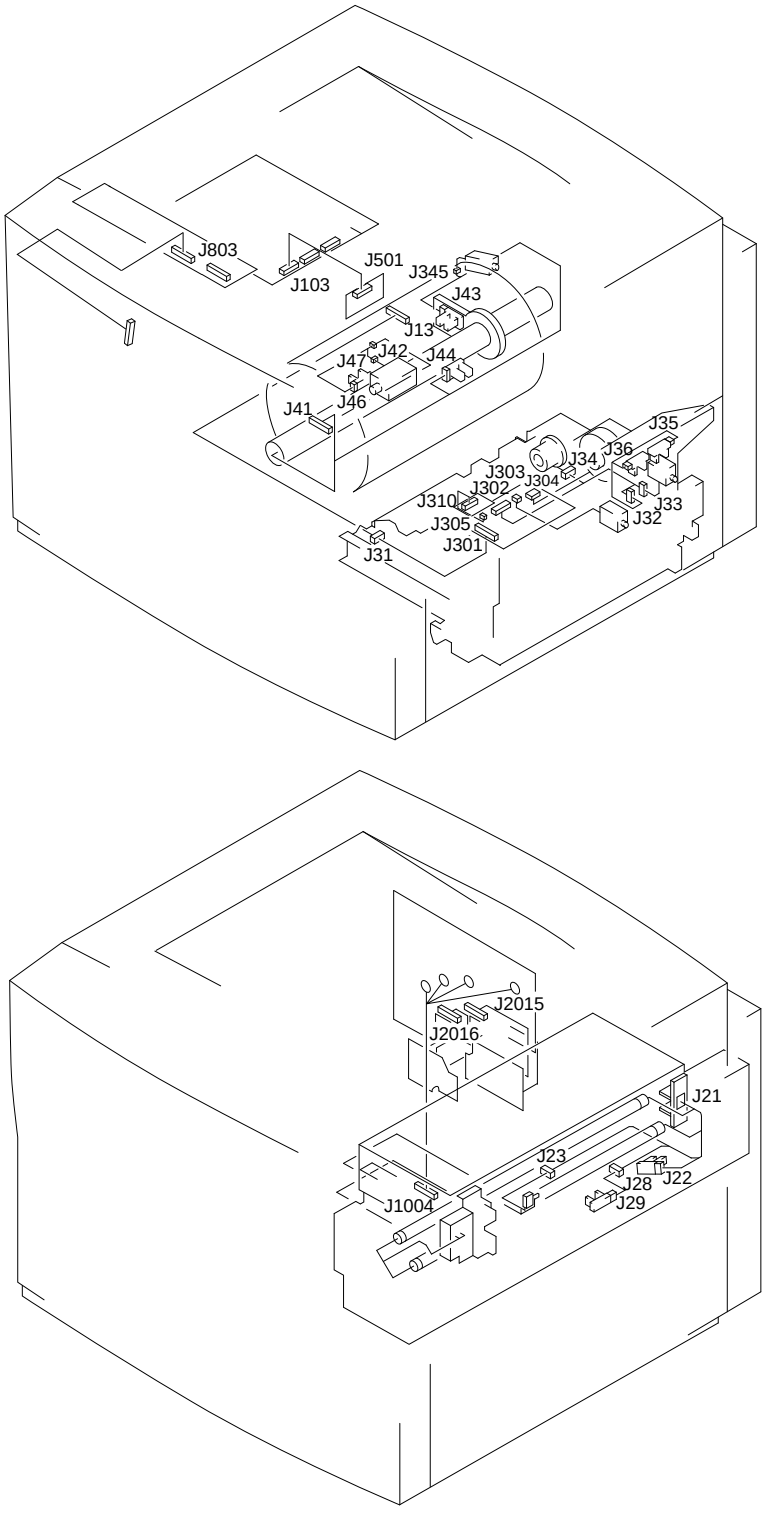


Figure 6-11 Location of printer connectors (2 of 3)

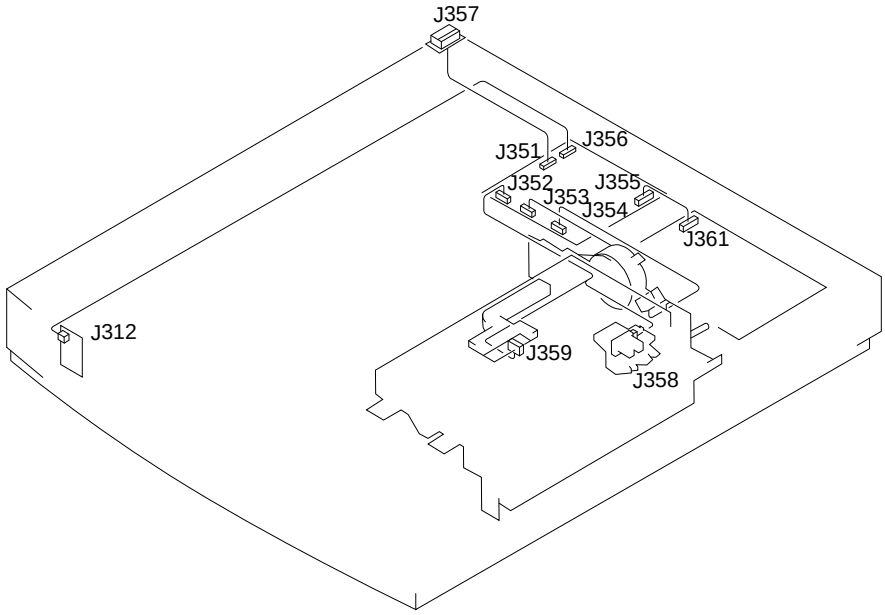


Figure 6-12 Location of paper tray connectors (3 of 3)

Variable Resistors (VR), LEDs, Test Pins, Jumpers, and Switches on PCB

Among the variable resistors (VR), LEDs, test pins, jumpers, and switches installed in this printer, only those that need to be serviced in the field are shown below.

The VRs, test pins, etc., not mentioned in the list are for factory use only, usually requiring adjustment and checking with high precision tools and adjusters. Thus, do not touch them, even with your hand, in the field.

Note the following:

- Since leakage current flows in some LEDs that are good, keep in mind that they may faintly emit light even when OFF.
- Field-serviceable VR
- Field-non-serviceable VR

DC controller PCB

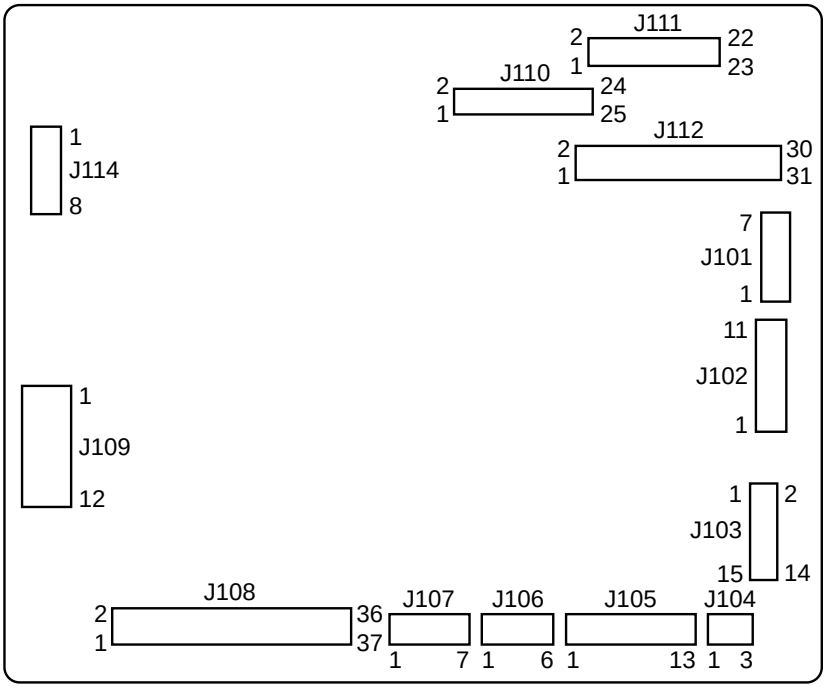


Figure 6-13 Diagram of DC controller PCB

Video controller PCB

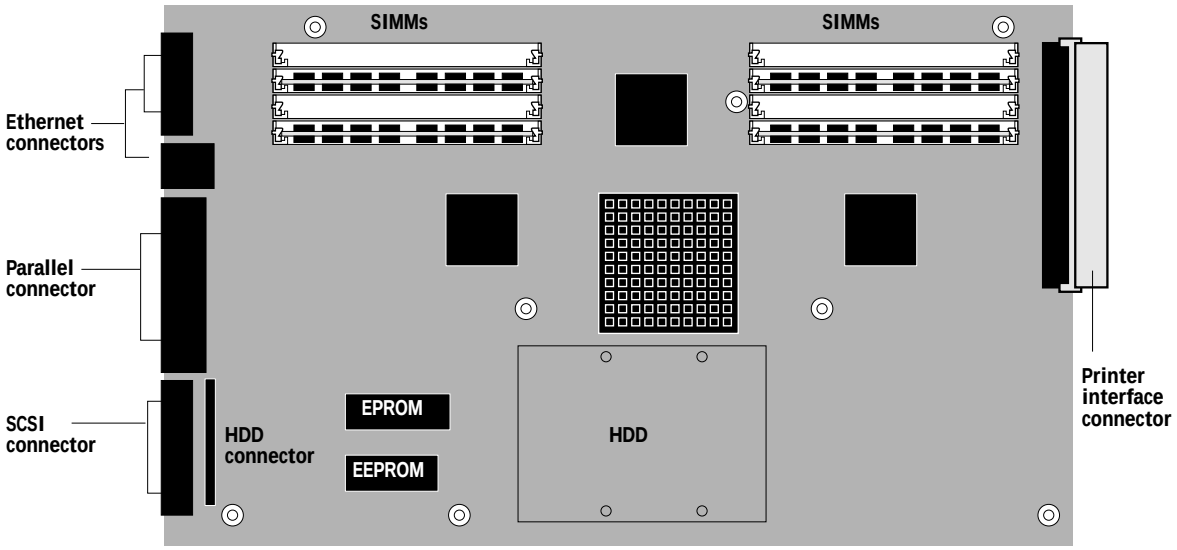
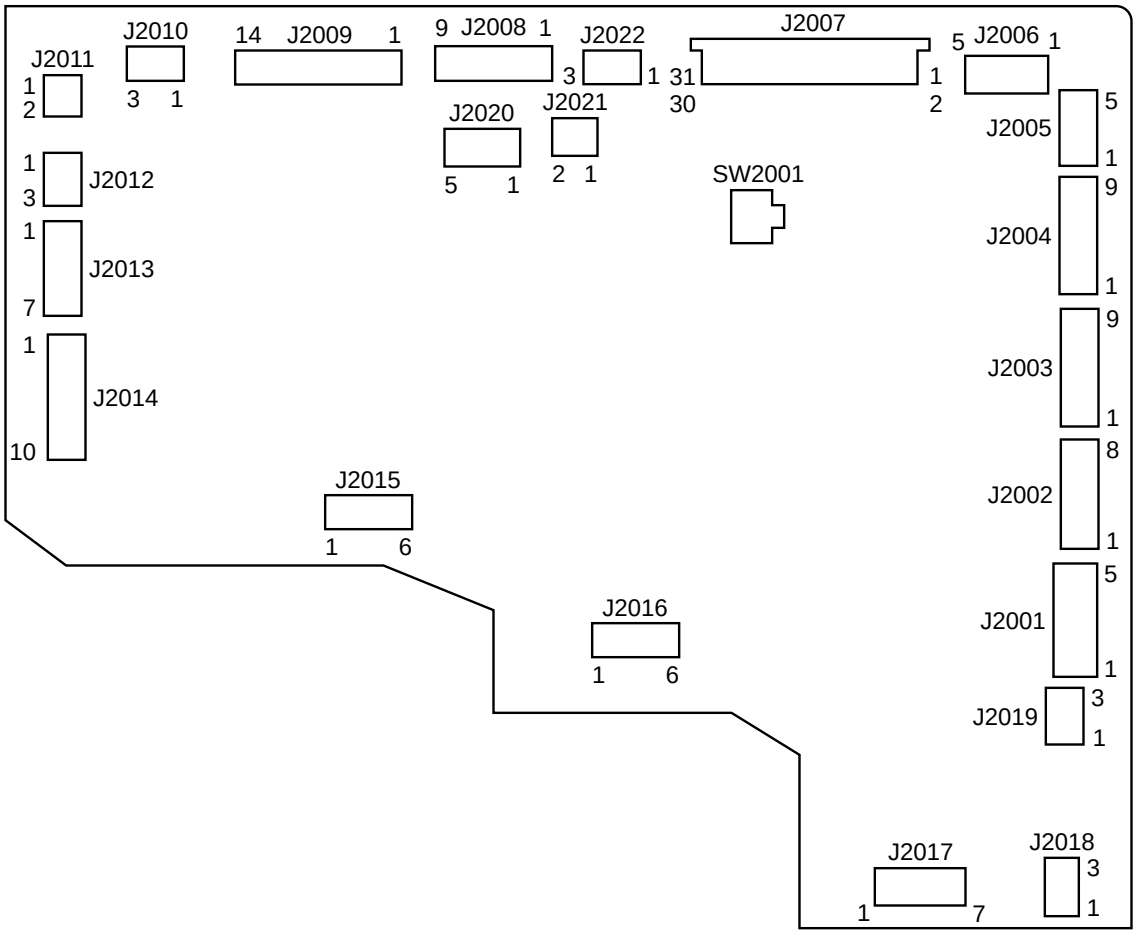


Figure 6-14 Diagram of video controller PCB

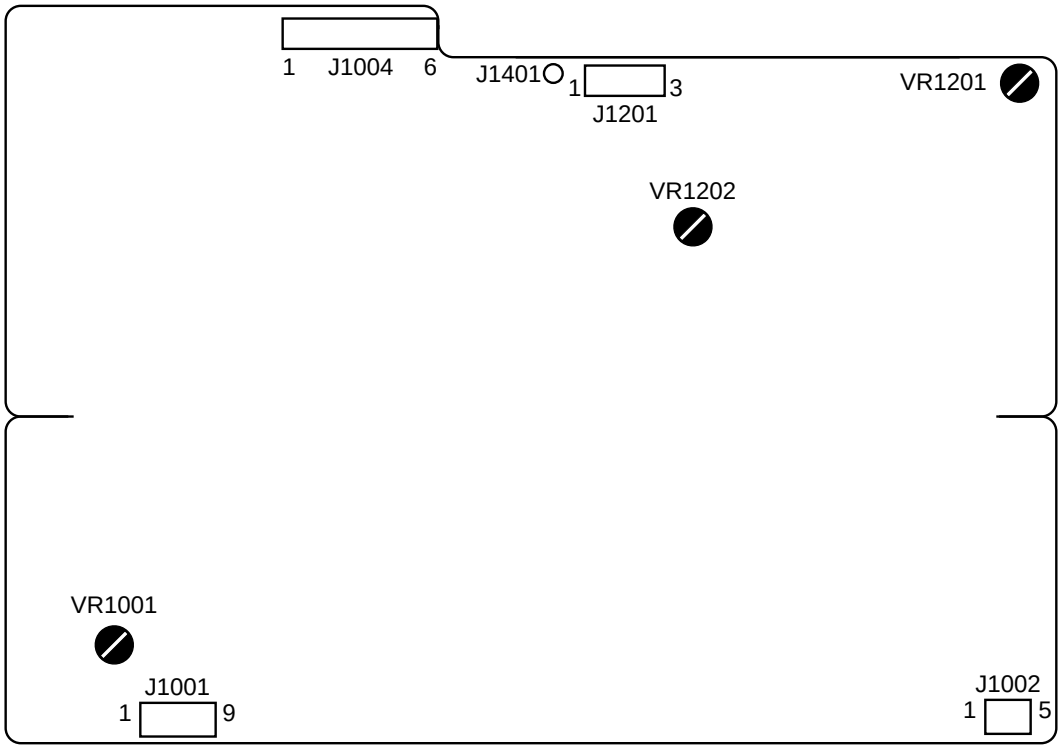
Mechanical controller PCB



SW No.	Role
SW2001	Reset switch

Figure 6-15 Diagram of the mechanical controller PCB

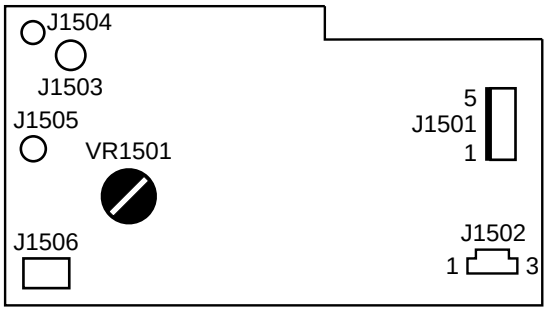
High-voltage power supply PCB



VR No.	Role
VR1001	Factory use
VR1201	
VR1202	

Figure 6-16 Diagram of the high-voltage power supply PCB

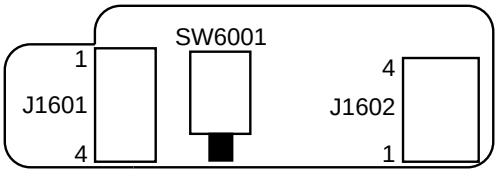
Separation HVT PCB



VR No.	Role
VR1501	Factory use

Figure 6-17 Diagram of the separation HVT PCB

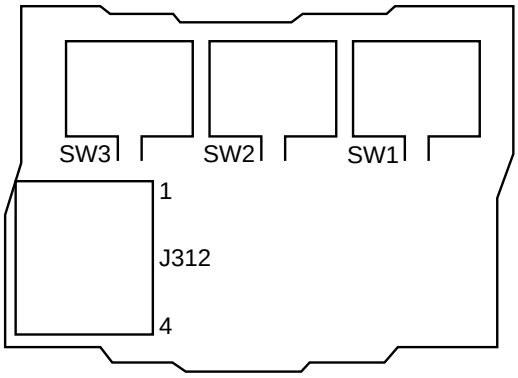
Ejection sensing PCB



SW No.	Role
SW6001	Ejection sensing switch

Figure 6-18 Diagram of the ejection sensing PCB

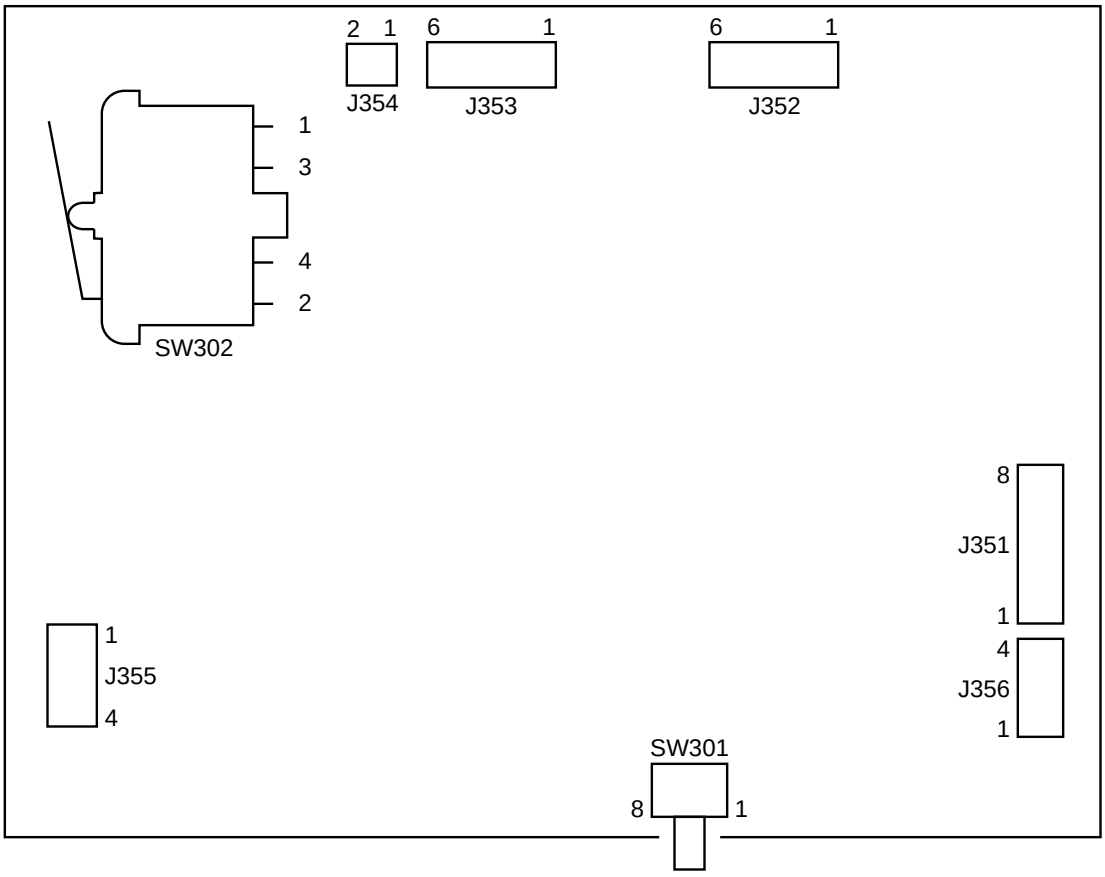
Cassette size-sensing PCB



SW No.	Role
SW1	Cassette-size sensing switch (See Page 2-65).
SW2	
SW3	

Figure 6-19 Diagram of the cassette size-sensing PCB

Paper feeder driver PCB



SW No.	Role
SW301	Right door switch
SW302	Side registration adjustment switch

Figure 6-20 Diagram of the paper feeder driver PCB

Checking network connections

After the printer is connected to networked computers, printing problems may arise if the network hardware or software is not set up properly or doesn't match network settings configured in printer Setup. Problems may also arise when printing from a specific application or printing a particular file.

Most of these problems show up as printing problems, and do not necessarily indicate a printer malfunction. The customer's network administrator can eliminate many printing problems without requiring you to make a service call. The network administrator deals with:

- Some printer error conditions.
- Network connection problems that result in the printer not appearing in the list of printers on the customer's workstation.

  If the printer does not appear in the list of printers on the network, there may be another device on the network with the same Ethernet hardware address.
- Conflicting network settings in the Setup and on the customer's workstation.
- Printing problems caused by the inappropriate choice of Setup options.
- Application-specific printing errors caused by missing or incorrectly placed printer description files.

Appendix A: Specifications

Note: Specifications are subject to change with product improvement.

Hardware features

The printer has the following hardware/software features:

- Video controller PCB with 32MB or 48MB of memory (Compression technology allows most pages to print at 600 dpi)
- Electronics for Imaging, Inc. RipChips
- Supports AppleTalk, TCP/IP, and IPX protocols simultaneously
- Adobe PostScript Level 2013.114 CPSI
- Parallel (Centronics) port for direct connection printing

  Video controller PCB controls ACK and BUSY signals. Uses standard TTL logic on the interface with no termination.
- Hard disk drive, 514MB standard
- Control panel: 8 buttons, 6 LED's and a 2x16 LCD display
- Print Technology: 4 Color (CMYK) Monocomponent Toner Laser Xerography
- Processor: 32-bit RISC processor (100 MHz Mips 4600)
- Resolution:
  - 600x600 dots per inch - standard
  - 200 lpi contone (1-4 useful bits per pixel)
- Monthly Usage: 2,500 pages/month
- Paper Types: cutsheet (U.S.A., European A4, B5 & legal), transparencies and colored paper

Networking and connectivity

The printer has the following networking features:

- AUI connector for thin or thick Ethernet
- RJ-45 connector that supports twisted pair network connectivity
- Novell network servers and other PC-based servers can be connected to the printer via parallel port
- A CD-ROM drive can be connected to the printer via the video controller's SCSI port

Style

- Type: Desktop page printer
- Printing method: Electrophotography
- Optical system

  Laser: Semiconductor laser

  Scanning system: Rotating six-faced prism mirror
- Scanning pitch

  Horizontal: 600 dots/inch

  Vertical: 600 raster lines/inch
- Photosensitive drum: OPC
- Charging: Roller charging
- Exposure method: Laser scanning system
- Toner: Non-magnetic single-component dry toner
- Development: Toner projection system
- Toner supply: Replaceable cartridge
- Feeding: Manual feed, cassette feed (feeding possible from upper and lower cassettes with optional paper feeder installed)
- Image transfer: Transfer drum (transfer sheet)
- Separation: Electrostatic separation and separation claw
- Cleaning: Cleaning blade
- Fixing method: Heated rollers (485W x 2:120V, 430W x 2:240V)
- Print delivery: Face-down, face-up

Options

- Paper feed unit with universal cassette
- Cassette universal
- 16 or 32MB SIMM upgrades

Supplies

- Toner cartridge
- Drum cartridge
- OHT
- Silicon oil bottle

Paper

Feeder

- Cassette types: Universal
- Cassette capacity: 25mm stack (about 250 pages of 75g/m^2 paper)
- Power supply: Universal voltage (100-240V, 50/60Hz)

  (Voltage tolerance: ±10%)
- Dimensions (W x D x H): 21.3" x 22.4" x 4.1" (540mm x 570mm x 105mm)

  Shipping box for Feeder Kit — 25.9" x 27.3" x 9.1" (658mm x 694mm x 230mm)
- Weight: 21 lb (9.4kg)

Types

Plain paper, OHP film

Paper Weights:

- 17-28 lb (64-105 g/m^2) in multipurpose tray
- 17-24 lb (64-90 g/m^2) in all cassettes

Qualified Paper:

- US Letter & Legal: LN01X-AB, Hammermill LaserPrint 24 lb
- Japan A4 & B5: Nihonseishi/Canon NP-dry paper 80g/mm
- Europe A4: Neusiedler or Aussydat-lay 100g/mm

Qualified Transparencies:

- Digital LNC1X-AG Letter Size (50/bx) & LNC1X-AH A4 Size (50/bx)

  Note: Transparencies should be used only in the multipurpose tray.

Handling

Up to three co-resident media input trays (two cassette and one multipurpose) are available; two are standard.

- Standard:
  - 250-sheet (21lb) universal internal cassette

    Letter 8.50" x 11.0" (216mm x 279mm)

    A4 8.27" x 11.69" (210mm x 297mm)

    Legal 8.50" x 14.0" (216mm x 357mm)

    B5 (JIS) 7.17" x 10.12" (182mm x 257mm)
  - 100-sheet (21lb) multipurpose tray (side tray)

    182mm to 216mm LEF

    257mm to 357mm SEF
- Optional:

  250-sheet feeder with another universal cassette

Simplex Deliveries:

- Delivery capacity

  Face-down tray: 10mm stack (about 100 pages of 75g/m^2 paper)

  Face-up tray: 2mm stack (about 20 pages of 75g/m^2 paper)

Notes:

- For OHP printing, use the dedicated OHP paper and feed it from the manual feeding tray, which can accommodate up to 20 sheets.
- For delivery, the face-down tray can accommodate up to 50 OHP sheets, while each sheet must be removed individually by hand when delivered face-up.

Fonts

39 Adobe Type 1 PostScript fonts (additional fonts can be employed using RAM or the Hard Disk).

Functions

- Printing speed

  About 3 prints/min. (A4, full color)

  About 12 prints/min. (A4, mono-color)

  About 2.5 prints/min. (A4, full color, fine-mode)

  Note: In fine-mode, the image quality of full-color prints is better than that in normal mode.

- First print time:

  40 sec. or less (A4, full color)

  25 sec. or less (A4, mono-color)

  45 sec. or less (A4, full color, fine-mode)

  Note: The time from the reception of the print signal from the video controller until the delivery of an A4 size print when the printer is in ready state at a room temperature of 20°C.

- Wait time:

  4.5 min. or less (100V, 220V)

  3.5 min. or less (120V, 240V)

  Note: The time from power-ON until the printer finishes the wait state with rated voltage and a room temperature of 20°C.

- Duplex printing: not available

Additional functions

- Image quality mode: for color registration/mode to change the number of rotations of the transfer drum — 4 or 5 times
- Gloss switching mode: to change gloss — H,M,L setting

Product life

- 5 years in use
- Total print volume: 150,000 pages (A4/letter size, full color mode)
- Toner/drum: approximately 4,000 pages at 5% toner coverage/page
- Cartridge life: approximately 10,000 pages color at continuous printing

Environmental

- Operating temperature and humidity

  15-30 °C (59-86 °F), 10-80%RH, except between 15-20 °C (59-68 °F) %RH goes 20-10: %RH = -2 (Temp °C) +50
- Non-operating temperature and humidity

  0-35 °C, 10-80%RH
- Operating and non-operating altitude

  74.6 to 101.3 kPa (560 to 760 mmHg)

  0 to 2500m sea level
- Storage and transport (main unit without supplies)

  Normal storage: 0-35 °C, 35-85%RH

  Severe storage: -20-60 °C, 10-95%RH, except between 45-60 °C %RH goes 95-50: %RH = -3 (Temp °C) +230

  Altitude: 61.3 to 101.3 kPa (460 to 760mmHg) 0 to 3000m sea level
- Storage and transport (Supplies)

  Normal storage: 0-35 °C, 35-85%RH

  Severe storage: -20-40 °C, 10-95%RH (except normal storage area)

  Altitude: 61.3 to 101.3 kPa (460 to 760mmHg) 0 to 3000m sea level
- Power consumption

  Does NOT meet EPA Energy Star specifications for energy efficiency.

  - Maximum:

    100-120 VAC 10A 1100W

    220-240 VAC 5A 1010W

  - Average: printing A/A4 paper

    100-120 VAC 535W

    220-240 VAC 524W

- Acoustic noise level (officially announced noise level based on ISO 9296)
  - Sound power level (1B=10dB): 7.0 B or less (printing), 6.2 B or less (standby)

    Note: When the paper feeder is installed, the sound power level is 6.7B or less.

  - Sound pressure level (bystander position): 53dB or less (printing), 44dB or less (standby)

    Note: When the paper feeder is installed, the sound pressure level is 53dB or less.

- Dimensions (W x D x H)

  Printer only installed — 21.3" x 22.8" x 18.1" (540mm x 580mm x 460mm)

  Printer with 250 feeder only — 21.3" x 22.8" x 22.2" (540mm x 580mm x 565mm)

  Shipping box on pallet w/printer — 26.5" x 28.7" x 33.3" (674mm x 730mm x 846mm)

  Shipping box with out pallet — 26.5" x 28.7" x 30.75" (674mm x 730mm x 781mm)

- Weight

  Printer only unloaded — 110 lb (50.0kg)

  Printer & optional feeder only — 131 lb (59.4 kg)

  Shipping box with printer & kits — 154 lb (70 kg) (125.4 lb (57 kg) without pallet)

  Shipping box for 500 feeder & tray kit — 58 lb (26.4 kg) (the 2nd tray is ordered separately)

  Drum cartridge — 2 lb (0.91 kg)

  Toner cartridge — 2 lb (0.93kg)

  A4/LTR cassette — 4.4 lb (2kg)

  Universal cassette — 5.7 lb (2.6kg)

- Power supply

  100-120V (50/60Hz)

  220-240V (50Hz)

  (voltage tolerance: ±10%)

- DC Power for image controller

  40 watts

  5V at 8A

  12V at 0.6A

  The total voltage variations, including load regulation, ripple and noise shall not exceed +-5% for 5 volts, +-8% for 12 volts

EMC standards

The LNC01(Colorwriter LSR 2000) meets the following standards for EMC:

- LNC01-C2 & A2 — FCC Class B, DOC Class B, VCCI Class 2
- LNC01-C3 & A3 — VDE Class B, CISPR Class A

(FCC Part 15 Class B, VDE 0871 Class B & EN55022 (CISPR 22))

Immunity

- EN 50082-1 tested per IEC 801.2 level 4 (1991), 801.5 level 2 and will have the CE Mark.
- Discharge a charged capacitor of 200 pF to the frame through resistance of 400 ohm, and print out the internal pattern.
  - Operations, displays, and print images shall be normal when the capacitor is charged at +-5 kV.
  - There shall be no component damage when the capacitor is charged at +-15 kV.

Momentary interruption of power

While a printer is operating independently at -10% below the rated voltage, a 100% power cut for 0.2 cycle shall not cause any abnormal operations and displays.

AC line noise

Operations and displays shall be normal when the following line noise is applied for 5 minutes.

- Voltage: 800 V at 50 ohm load
- Pulse width: 100 ns and 800 ns
- Polarity: + and -
- Pulse repetition rate: line frequency

Surge voltage

Per IEC 801.5 level 2

- Surge voltage: +- 2.0 kV
- Surge waveform: 1.2 x 50us
- Surge polarity: +/-
- Applied mode: common, normal
- Applied phase: R/S (in common mode only)

The printer must operate normally when the surge is applied five times during standby and while printing.

Packaging

Vibration

Acceleration: 9.8 m/s/s(1G)

Vibration direction: three directions — X, Y and Z (main unit: Z direction only)

Frequency: 10 Hz to 100 Hz

Sweep time per cycle: 5 minutes

Application time: 1 hour in each direction, total 3 hours (main unit: Z direction only, total 1 hour)

Paper cassette, drum cartridge, toner cartridge: X, Y, Z direction (1 hour in each direction, total 3 hours)

Shock

Drop tests (Drop height / number of drops)

- Main unit — 20 cm / 1 corner, 3 edges, 3 faces
- Toner cartridge — 60 cm
- Drum cartridge — 60 cm / 1 corner, 3 edges, 3 faces
- Silicon oil bottle — 60 cm
- OHT — 60 cm / 6 faces, 4 corners
- Options paper cassette — 60 cm
- Option feeder 55 cm

Safety approvals

The LNC01 (Colorwriter LSR 2000) meets the following standards:

- LNC01-C2 and A2 — CSA 950, UL 1950
- LNC01-C3 and A3 — EN60950, IEC 950

(CE mark will be included on the LNC01-A3 model)

AC input power specifications: LNC01-A2

Parameter	Minimum	Type	Maximum	Units	Symbol
Nominal voltage	—	115	—	volts	V
Operational voltage range	90	—	132	volts	V
Nominal frequency	—	50/60	—	hertz	Hz
Frequency range	48	—	62	hertz	Hz
Number of phases	—	1	—	none	NA
Input current (steady state) phase A	—	—	5.5	amperes	A
*Ride-through time	—	—	50	milliseconds	ms
*Inrush current	—	—	120	amperes peak	A

* 240 amps peak for less than 5.0 ms

Leakage current

Line Voltage	Line Frequency	Resistance	Leakage Current
100V	50/60Hz	1K ohm	1 mA or less
120V	60Hz	1.5K ohm	3.5 mA or less

Dielectric strength

When the following voltage is applied to a printer for one minute, electric breakdown shall not occur:

Test voltage			
Line voltage	Frequency primary	Primary body of equipment	Secondary
100V	50/60Hz	AC 1000V	AC 1000V
120V	60Hz	AC 1250V	AC 1250V

Insulation resistance

When 500 Volts DC is applied to the primary line & frame for one minute.

Parameter	Minimum	Type	Maximum	Units	Symbol
Start-up current	—	—	9.5	rms amperes	A
Power consumption	—	—	1080	watts	W
Apparent power	—	1200	—	volt amperes	VA
Fuse rating	—	10.0	—	amperes	A
Power factor	—	.95	—	none	PF

- Power cord type: detachable
- Power inlet type: IEC 320 C14 65 °C

Power cord

- LNC01-CA — North America
  Includes one power cord 15A @125V 2.5 meters
  Plug type NEMA 5-15P

AC input power specifications: LNC01-A3

Parameter	Minimum	Type	Maximum	Units	Symbol
Nominal voltage	—	230	—	volts	V
Operational voltage range	198	—	264	volts	V
Nominal frequency	—	50/60	—	hertz	Hz
Frequency range	48	—	62	hertz	Hz
Number of phases	—	1	—	none	NA
Input current (steady state) phase A	—	—	2.6	amperes	A
*Ride-through time	—	—	50	milliseconds	ms
*Inrush current	—	—	60	amperes peak	A

* 120 amps peak for less than 5.0 ms

Leakage current

Line Voltage	Line Frequency	Resistance	Leakage Current
220/240V	50Hz	1.5K ohm	3.5 mA or less

ESD

When the following voltage is applied to a printer for one minute, electric breakdown shall not occur:

Line voltage	Frequency primary	Primary body of equipment	Secondary
220/240V	50Hz	AC 1500V	AC 3000V

Insulation Resistance

When 500 Volts DC is applied to the primary line & frame for one minute

Parameter	Minimum	Type	Maximum	Units	Symbol
Start-up current	—	—	4.3	rms amperes	A
Start-up current duration	—	—	—	seconds	s
Power consumption	—	—	1010	watts	W
Apparent power	—	1050	—	volt amperes	VA
Fuse rating	—	5.0	—	amperes	A
Power factor	—	.99	—	none	PF
Crest factor	—	—	—	none	CF
AC power output, voltage	—	—	—	amperes	A
AC power output, output type					

- Power cord type: detachable
- Power inlet type: IEC 320 C14 65 °C

Power cords:

- LNC01-AD — Denmark
  Includes one power cord 10A @250V 2.5 meters
  Plug type Afsnit 107
- LNC01-AE — United Kingdom
  Includes one power cord 10A @250V 2.5 meters
  Plug type BS1363A
- LNC01-AG — Germany
  Includes one power cord 10A @250V 2.5 meters
  Plug type CEE Pub 7, Sheet VII
- LNC01-AI — Italy
  Includes one power cord 10A @250V 2.5 meters
  Plug type CEI 23-16
- LNC01-AS — Spain
  Includes one power cord 10A @250V 2.5 meters
  Plug type CEE Pub 7, Sheet VII
- LNC01-AT — Israel
  Includes one power cord 10A @250V 2.5 meters
  Plug type SI 32

- LNC01-AZ — Australia and New Zealand
  Includes one power cord 10A @250V 2.5 meters
  Plug type AS3112 male 1981
- LNC01-CB — Switzerland
  Includes one power cord 10A @250V 2.5 meters
  Plug type SEV 1011
- LNC01-CC — Sweden, Finland, Norway, and Portugal
  Includes one power cord 10A @250V 2.5 meters
  Plug type CEE Pub 7, Sheet VII
- LNC01-CD — Belgium, Holland and France
  Includes one power cord 10A @250V 2.5 meters
  Plug type CEE Pub 7, Sheet VII

Remote utility software

A complete description of remote utility software is provided in the *User Guide*. For optimal performance, current versions of the remote utility software should be maintained on every network computer that might print to the Colorwriter.

Note: Remote utility software requires a direct AppleTalk protocol connection.

Maintenance by serviceperson

Consumable parts to be replaced when problems occur.

Appendix B:
Maintenance Requirements

This appendix provides the following information:

- Service maintenance
- 60K service maintenance
- Roller replacement
- Service checkpoints
- Customer maintenance and checks
- Tools needed when servicing the printer and any special tools that may be useful
- List of lubricants and cleaners

Note: Because the printer uses fuser oil, it should not be shipped or moved with the fuser oil and fuser intact.

Service maintenance

Like all printers in its class, the Colorwriter requires cleaning and preventive maintenance determined by usage. Total Call Concept (TCC) procedures should include the following steps:

- Discuss option performance with the customer
- Test option
- Inspect printer for broken or worn components
- Vacuum and clean printer
- Perform any needed/required preventative or corrective maintenance actions
- Clean printer exterior surfaces and ensure the work area is clean
- Document work performed
- Test printer before leaving the customer site

There is one planned service maintenance at the fuser replacement interval of 60K pages.

Note: 60K maintenance is not available as a kit. The following items must be ordered separately: ozone, air filter, separation corona wire assembly, transfer drum cleaner unit, and fuser (110v or 220v). 60K service maintenance assumes letter size pages are printed in full color.

Also see the *Getting Started Guide* and *User Guide* for further maintenance and operations requirements.

60K service maintenance

The table below shows the average life expectancies (number of prints) of parts that may need to be replaced due to degradation or damage during the 60K service maintenance. See the following table and replace the following parts as needed.

Table B-1 60K maintenance kit

No.	Part name	Qty.	Service Life	Part Number	Remarks
1	Fixing unit	1	60,000 sheets	RG5-1511-000	100V-120V
			60,000 sheets	RG5-1537-000	220V-240V
			Note: A warning message is displayed on the printer control panel when this part requires replacement. After the message is displayed, the printer will continue to print 500 sheets before stopping completely.		
2	Air filter	1	60,000 sheets	RB1-4515-000	
3	Transfer drum cleaner unit	1	60,000 sheets	RG5-1156-000	
4	Separation charging unit	1	60,000 sheets	RG5-1152-000	
5	Ozone filter	1	60,000 sheets	RB1-4578-000	

Note: The above values are estimates only and subject to change based on future data.

Roller replacement

During the 60K maintenance service check printer rollers and replace as needed.

Table B-2 Service life of rollers

No.	Part name	Qty.	Service Life	Part Number	Remarks
1	Feed roller unit 1 (separation roller upper or front)	1	100,000 sheets	RG5-1164-000	Replace feed roller unit 1 and separation roller unit together.
2	Separation roller unit (lower or rear)	1	100,000 sheets	RG5-1163-000	
3	Manual feeding pick-up roller	1	100,000 sheets	RB1-4256-000	Replace manual feed roller and separation pad together.
4	Separation pad	1	100,000 sheets	RF5-0891-000	
5	Cassette pick-up roller	2	200,000 sheets	RG5-1168-000	

Before you begin replacing any of the rollers, first follow the procedure “To remove the pick-up unit” on page 5-38 to remove the pick-up unit from the printer. After you remove the pick-up unit be sure to place it on a flat surface.

To replace the rollers

1. Feed roller 1 (separation upper or front)

- Remove the lower or rear separation roller first. Then see “To remove feed roller 1 (cassette pick-up unit)” on page 5-57.
- Remove the rear screw as shown in the procedure feed roller unit 1 (same as the separation roller upper or front unit).

2. Separation roller unit (lower or rear)

- Open MP feed door, which swings down.
- Remove the front screw as shown in “To remove the separation roller (cassette pick-up unit)” on page 5-56.
- Replace the feed roller 1 (separation roller upper or front) before putting the new separation lower or rear unit in and remember to align the pin in the shaft.

3. Manual feeding pick-up roller

- Open MP feed door, which swings down.

- Remove manual feeding cover by pulling the cover from the top outward. Once the cover is removed the roller is visible. See step 1 of “To replace the manual feeding pick-up roller (manual feeding tray pick-up unit)” on page 5-43. (Note that the picture shows view inverted).
- Unsnap the end plastic cap and slide off the shaft (the roller should not follow).
- Replace the separation pad with the roller removed before replacing this roller.
- Reattach the cover by first placing the notches in the bottom ribs then the cover will snap back on the shaft.

4. Separation pad

Follow the procedure “To replace the separation pad (manual feeding tray pick-up unit)” on page 5-44.

5. Cassette pick-up rollers

- Place the pick-up unit on its cover on a flat surface (see “To remove the pick-up motor (cassette pick-up unit)” on page 5-48).
- Press in the D-shaped rollers on the cover/flat-surface side in order to get them to rotate. When they've been rotated so the round side is outward, you can pull them off and on for replacement.

Service checkpoints

Before leaving the customer site it is a good idea to note the following service checkpoints.

Table B-3 Service checkpoints

Part	Point	Tool/solvent	Remarks
Fixing Unit	Delivery guide	MEK	Clean lightly to remove adhered toner.
	Separation claw unit	MEK	Clean carefully as tip breaks easily.
	Entrance guide	MEK	Clean.
Cassette pick-up unit	Feed roller Separation roller	Well-wrung damp towel, or alcohol	Clean.
Transfer drum holder unit	Transfer sheet	Lint-free paper	Clean only when very dirty. Do not use water or solvents. Do not touch the sheet surface with your hand. Take care not to contaminate it with solvents or oil.
Registration roller unit	Registration roller unit	Soft cloth	Clean in the manner shown below when wastepaper collects at the boundary between the registration roller and sheet. After wiping up the wastepaper with a soft, soaked cloth, dry the unit with a soft cloth.
Manual feeding tray pick-up unit	Separation pad	Dry towel	Clean.
Density sensor unit	Density sensor window Separation charging unit	Designated brush	Clean when replacing the drum cartridge.
Drum cartridge	Photosensitive drum	Toner	As a general rule, do not touch it with your hand or clean it. Clean only when very dirty. Do not use water, solvents to clean. Also, since the photosensitive drum is sensitive to strong light, do not expose the drum cartridge to direct sunlight or strong light. When removing the drum cartridge from the printer, store it in the drum cover.

Customer maintenance/checks

Maintenance points that should be performed by the customer to maintain the printer at optimum level are listed below.

Table B-4 Customer maintenance procedures

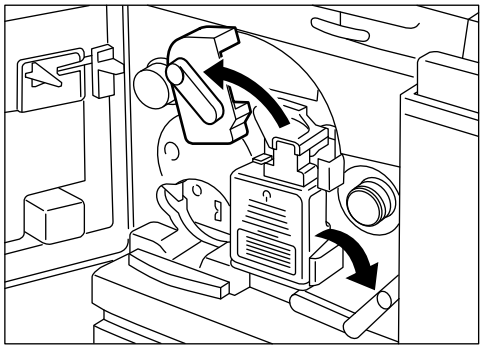
Item	Customer maintenance
Toner cartridge	Shake or replace the cartridge as required.
Drum cartridge	Replace as required.
Waste toner bottle	Replace as required (see below).
Oil bottle	Replace as required.
Registration roller unit (cassette pick-up unit)	Clean when wastepaper collects at the boundary between the metal registration roller and sheet. After wiping up the wastepaper with a soft, soaked cloth, dry the unit with a soft cloth.
Separation charging unit	Clean the corona wire with the cleaning brush included in the printer.
Density sensor	Clean the sensor window with the special brush included in the printer.

The customer is also responsible for:

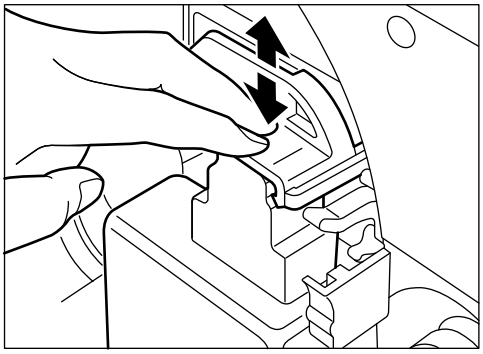
- Clearing any jammed paper
- Cleaning external covers and internal parts on demand (Internal parts include: mylar sheet on the registration roller, window of the density sensor, separation discharger)
- Vacuuming the printer

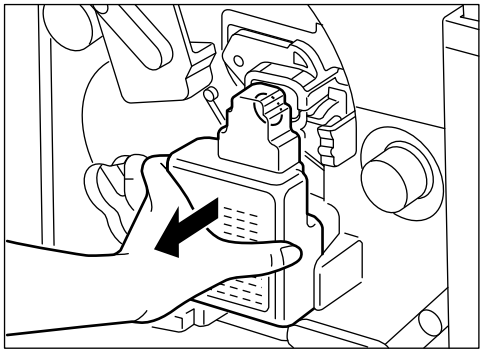
To replace the waste toner bottle

1. Open the front door.
2. Open the photosensitive drum door.
3. Move the green lever downward to the right and release the transfer drum lock.

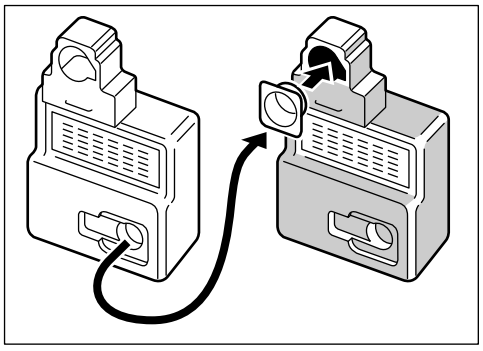


4. Lightly tap the end of the photosensitive drum several times to drop the waste toner into the waste toner bottle, and then pull it out.

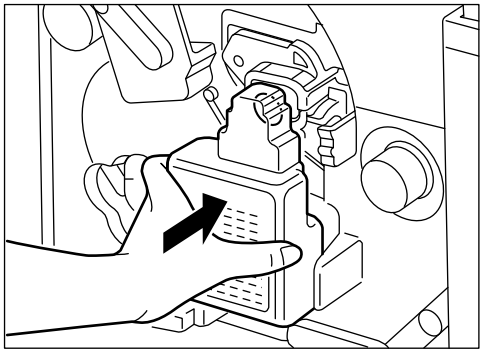


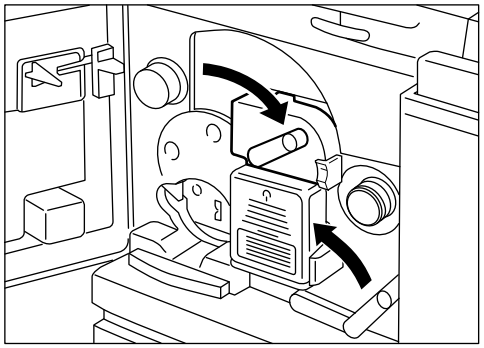


5. **Remove the cap from the new waste toner bottle, and put it in the old bottle.**



6. **Set the new waste toner bottle in place, close the photosensitive drum door, and return the green lever to its original position.**





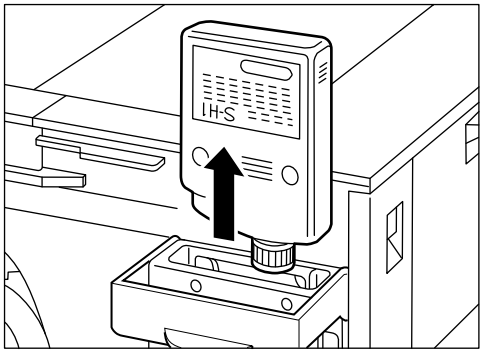
7. **Close the front door.**

To replace the fixing oil

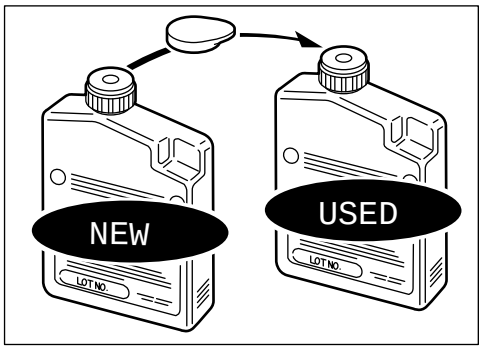
Note: In order to avoid oil spillage into the printer, the oil should be temporarily removed any time the printer is shifted, moved or relocated.

1. **Open the front door.**
2. **Pull out the used oil bottle.**

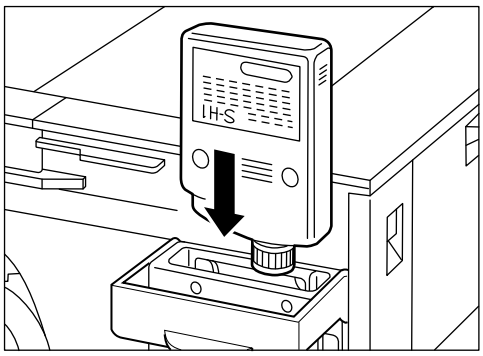
   At this time, take care to not spill the oil.



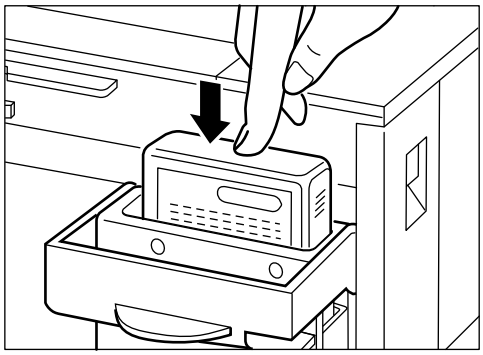
3. **Remove the cap from the new bottle, and put it on the used one.**



4. Mount the new oil bottle with the label-attached side facing you.



5. Push the oil bottle until it has entered completely.



6. Close the front door.

Metrics

Metric	Value	Unit	Comments
MTTI	0.5	hours	One person
MTTR	0.4	hours	Customer interface, diagnostics, r &r
MTBF	19.1K	hours	or 26.2 months
MTBPR	39.8	months	Fuser pm
MTBC	5.0	years	Includes repairs, nmu and PM
NMU	40.0	%	
MPBF	100K	pages	Full color; 200K
AMPV	2500	pages	Average print pages per month
Support Ratio	0.5	%	
Life	150K	pages	Full color; 300K mono
Life	5	years	

Usage model

- Power on time = 480 hrs per month or about 24 hrs/day x 20 days
- 125 pages per day for 20 days per month
- Duty Cycle: 125 pages/day at 12ppm takes 21 minutes or about 1/3 hour

Paper feed reliability

Problems occurrence ratio

	Plain Paper	OHT
Paper jams	1/2,000 pages	1/200 pages
Multi-feed	1/1,000 feeds	1/100 feeds
Others (creases, dog-ears, torn paper)	1/2,000 pages	1/200 pages

The following conditions, however, shall be satisfied:

- Digital-recommended paper is used
- Specified maintenance is done
- The printer is used in Operating Environment Zone A (20-27.5 C, 40-70%RH)

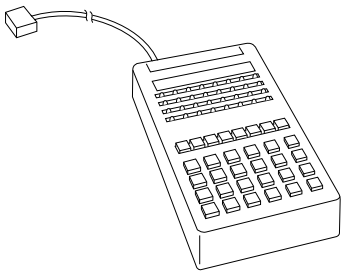
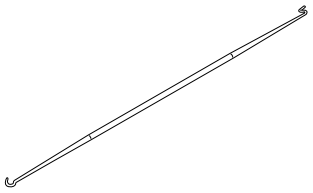
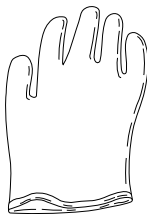
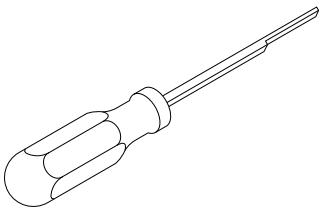
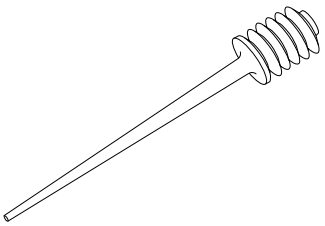
Tools you will need

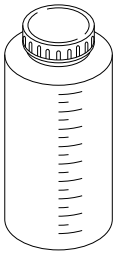
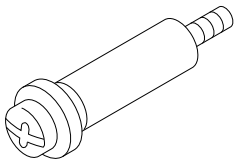
To install or service the printer, you should have the following:

Tool name	Use/Remarks
Tool case	
Jumper wire	With clips
Thickness gauge	0.02mm-0.3mm
Compression spring scale	To check cassette spring strength: 0-600g
Phillips screwdriver	M4, M5 Length: 363mm
Phillips screwdriver	M3, M4 Length: 155mm
Phillips screwdriver	M4, M5 Length: 191mm
Phillips screwdriver	M4, M5 Length: 85mm
Flat-bladed screwdriver	
Precision flat-bladed screwdriver set	Set of 6
Precision screwdriver, Phillips head	d=2.9mm, Length: 114mm
Allen wrench set	Set of 5
Fine file	
Allen (hex) screwdriver	M4, Length of 107mm
Diagonal cutting pliers	
Needle-nose pliers	
Pliers	
Retaining ring pliers	
Crimper	
Tweezer	
Ruler	For 150mm measurements
Soldering iron	100V, 30W
Plastic-head mallet	
Brush	
Penlight	
Plastic jar	100cc
Solder	ø1.5(mm)x1(mm)
Desoldering wick	1.5mm
Lint-free paper	500SH/PKG
Oiler	30cc
Plastic bottle	30cc
Digital multimeter	
Soldering iron	240V, 30W
Antistatic wrist strap	
Flannel cloth	

Special tools

The following tools are recommended for servicing this printer in addition to the standard tools.

Tool name	Shape	Rank	Use/Remarks
Printer driver tester		A	Used for checking the printer operation, or reading/writing the DC controller internal data. This tool is available in a central location and is not available for routine service calls.
Spring hook		B	Used when removing/installing the spring of the attraction roller in the transfer drum unit, etc.
Gloves		B	Used for handling the transfer drum unit.
Contact extraction tool		B	Used for removing the upper/lower heater contacts of the fixing unit.
Oil removing tool		B	Used for withdrawing the oil from the fixing unit.

Tool name	Shape	Rank	Use/Remarks
Oil storage bottle		B	Used for storing oil.
Transfer drum fixing screw		B	Used for fixing the transfer drum in place during distribution.

Note: Ranks

A—Each service technician should carry one.
B—A group of about five service technicians should share one.

List of Lubricants, Cleaners

No.	Material name	Components	Use	Remarks
1	Alcohol: ethyl (pure or denatured) or isopropyl (pure or denatured)	C_2H_5OH, $(CH_3)_2CHOH$	Cleaning: plastic, rubber, external parts	• Purchase locally • Flammable: keep away from flame
2	MEK (methyl ethyl ketone)	$CH_3CO\text{-}C_2H_5$	Cleaning: oil and toner stains	• Purchase locally • Highly flammable: keep away from flame
3	Lubricating oil	Petroleum mineral oil	Apply between gear and shaft	• 100 ml bottle
4	Lubricating material	Special oil Special solid lubricating material Lithium soap	Apply to gear	• 20 g tube

Appendix C:
Moving the printer

Before moving the printer, follow these guidelines:

- Open the photosensitive drum door and remove the waste toner bottle.
- Drop the transfer drum lever and remove the drum cartridge. Store the drum cartridge in the drum cover.
- Remove the toner cartridges.
- Fix the transfer drum unit with the transfer drum fixing screw.
- Open the front door and remove the oil bottle. Remove oil from the fixing unit.
- Tape shut the transfer drum lever and the photosensitive drum door.
- Tape shut the front door, the fixing unit cover, and the pick-up cover.

Before moving the printer to a new location, be sure to remove any silicone oil in the printer with the oil pump included in the printer package. Also remove the drum cartridge, the four toner cartridges, and the waste toner bottle.

Remove any oil from the oil catch tray with the oil removing tool and transfer the oil to the oil storage bottle. Move the lever up and down about 50 times. Then remove any oil in the bottle case and oil catch tray again. Repeat this three times.

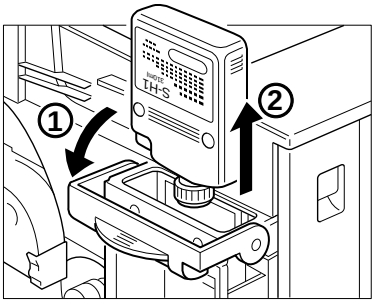
To remove the oil, follow the procedure in this section. Wash off any silicone oil from your hands with a mild detergent.

Neglecting this operation will cause oil leakage inside the printer and may damage the unit.

To remove the fixing unit

1. **Make sure the power switch is off, then open the front door.**
2. **Remove the oil bottle.**

   Be careful as oil may drip from the bottle. Store it on a flat level surface, away from direct sunlight.



3. **Open the feeder door.**
4. **Open the fixing unit cover.**
5. **Remove the strap on the right side by pulling down the top tab and then lifting the strap from the slot in the engine chassis.**
6. **Slide the door to the left off the hinges.**
7. **Loosen the two large screws near the door hinges, pull the black handles of the fixing unit toward you, and lift the fixing unit straight up and out. Be sure to keep the fixing unit level while you lift it.**

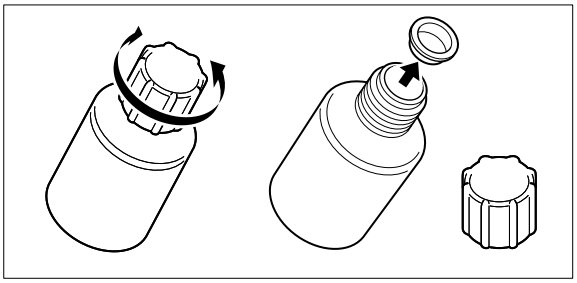
   Note: Since there is a possibility of spilling oil when removing the fixing unit, lift it out slowly and evenly. If you spill oil, wipe it up with a towel.

8. **Place the fixing unit on paper that is on a level surface.**

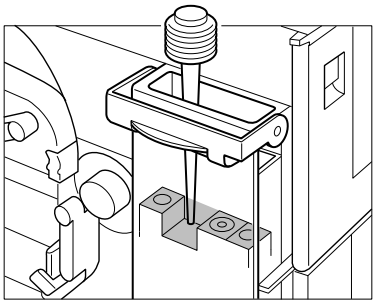
To remove oil from the fixing unit

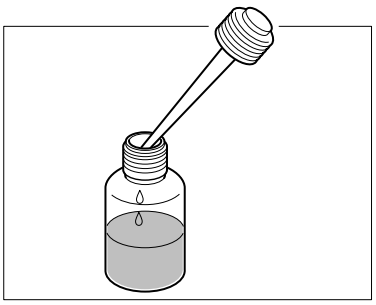
1. **Remove the cover and cleaning cap of the oil storage bottle.**

   Place the bottle on a flat, level surface, away from direct sunlight.

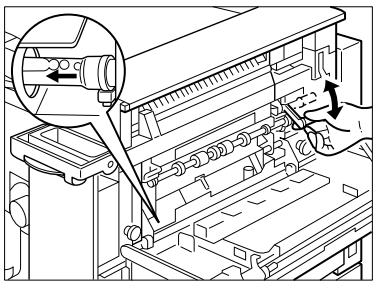


2. **Withdraw the oil from within the bottle case with the oil removing tool that comes with the printer. Transfer the oil to the oil storage bottle.**





3. **Remove the black snap-on device to the left of the bar code and then remove any oil from the oil catch tray with the oil removing tool and transfer it to the oil storage bottle.**
4. **Move the green lever up and down about 50 times. Then remove any oil in the bottle case and oil catch tray again. Repeat this three times.**



5. **Replace the cap on the oil storage bottle.**

   Note: Do not add any oil to the printer other than what was removed.

The oil is very slippery and may cause skidding or slipping if spilled. Use an absorbent material to contain and collect spilled oil for disposal. Thoroughly clean any oily surface with an all-purpose alkaline cleaner, or have the surface (carpeting, for example) commercially cleaned. Except for cleaning plastic and vinyl surfaces, petroleum distillates can be used. Dispose of absorbed material according to federal, state and local regulations.

Note: Do not incinerate the used oil recycle bottle or the oil pump. Never use any oil other than the suggested one. Do not operate the printer without the silicone oil bottle installed; otherwise the printer may be damaged. Keep the oil recycle bottle and oil pump clean, free of any foreign object when handling or storing.

Appendix D:
Spare Parts

See below for a list of Electronics for Imaging, Inc. manufactured spare parts. The Electronics for Imaging, Inc. vendor code for these spares is 0105116694.

DEC part number	EFI part number	Description
29-33061-01	10021157	Video controller PCB (without mounting plate or SIMMS)
29-33055-01	10032068	Mounting plate
29-33054-01	00022028	514MB SCSI HDD, unformatted
29-33056-01	10031065	SCSI-HDD 50-pin ribbon cable
29-33052-01	10021172	4MB memory SIMM
29-33053-01	10021173	8MB memory SIMM
29-33057-01	10011320	English doc & diskette kit
29-33058-01	10006137	English doc pack
29-33059-01	10011317	English Mac user software disk pack
29-33060-01	10011327	English Windows user software disk pack
LNC1X-UD	10007437	16MB memory upgrade kit
LNC1X-UE	10007438	32MB memory upgrade kit
n/a	70001279	Colorwriter product ID logo
n/a	70001277	Control panel overlay
n/a	70001128	Fiery Driven & Adobe label
TBD	70001400	1.0 system software on CD-ROM

See below for a list of Canon manufactured spare parts. The Canon vendor code for these spares is 0018877000.

DEC part number	Canon part number	Description	Parts Catalog number
Outer Covers			
n/a	RB1-4500-000	Cover, front door	100-8B
n/a	RG5-1144-000	Front door with display	100-8
n/a	RB1-4511-000	Plate switch (front door)	100-8C
n/a	RB1-4527-000	Frame reinforcement (front door)	100-8D
n/a	RB1-4862-000	Cover, rear	100-2
n/a	RB1-4863-000	Cover, side left	100-3
n/a	RB1-4864-000	Cover, upper	100-4
n/a	RG5-1509-000	Fixing unit cover	100-10
n/a	RB1-4873-000	Face-up tray	100-10B
n/a	RB1-4872-000	Face-up tray cover	100-10C
n/a	RB1-4867-000	Pick-up cover	100-5
n/a	RG5-1205-000	Manual tray cover	100-6
n/a	RG5-1204-000	Manual feed tray	100-7
n/a	RB1-4854-000	Manual tray slider	100-1
Inner Covers			
n/a	RB1-4480-000	Inner cover 1	103-17
n/a	RB1-4479-000	Inner cover 2	103-3
n/a	RB1-3976-000	Inner cover 3	530-41
n/a	RB1-3968-000	Transfer drum cover	530-9
n/a	RB1-4696-000	Photosensitive drum door cover	103-10A
n/a	RG5-1532-000	Waste toner sensor & door	103-10
n/a	RB1-4498-000	Rear frame plate	104-15
Fans			
29-32939-01	RH7-1225-000	Fuser fan	107-7
n/a	RF5-0991-000	Fuser fan duct	107-1
29-32940-01	RH7-1226-000	Controller fan	105-11
29-32941-01	RH7-1227-000	Laser/engine fan	107-8
n/a	RB1-4571-000	Laser/engine fan duct, lower	107-2
n/a	RB1-4554-000	Laser/engine fan duct, upper	107-3

DEC part number	Canon part number	Description	Parts Catalog number
29-32942-01	RB1-4578-000	Ozone filter	107-31
29-32943-01	RB1-4515-000	Air filter	107-1A
Panels			
29-32944-01	RH6-0116-000	Front display unit	100-8L
29-32945-01	RH6-0111-000	Density control panel	108-35
Drive System			
29-32946-01	RH7-1220-000	Main motor	107-6 (includes PCB)
29-32947-01	RH7-1222-000	Developing motor	250-38
29-32948-01	RH7-1221-000	Transfer drum motor	250-37
29-32949-01	RG5-1503-000	Delivery drive unit	264 all
29-32950-01	RG5-1491-000	Drive unit	250 all
n/a	RB1-3969-000	Rotary manual unit knob	530-33C
n/a	RG5-1186-000	Rotary manual unit assembly	150 all
n/a	No part number	Drive solenoid unit	141 all
29-32951-01	RG5-1494-000	T-Drum cleaning press drive	260 all
29-32952-01	RG5-1495-000	Discharge roller press drive	261 all
29-32953-01	RG5-1496-000	Drum press drive unit	262 all
29-32954-01	RG5-1497-000	Attraction roller press drive	263 all
n/a	No part number	Door switch upper assembly	120 all
n/a	No part number	Door switch lower assembly	121 all
Paper Transport System			
29-32955-01	RG5-1146-000	Paper pick-up assembly	310 all
29-32956-01	RG5-1189-000	Manual tray pickup unit	312 all
29-32957-01	RG5-1162-000	Cassette tray pickup unit	311 all
29-32958-01	RH7-5102-000	Manual feed solenoid	312-25
29-32959-01	RB1-4256-000	Pickup roller	312-4
29-32960-01	RF5-0891-000	Manual feed separation pad	312-16
29-32961-01	RB1-4258-000	Manual separation sheet	312-24D

DEC part number	Canon part number	Description	Parts Catalog number
n/a	RG5-1170-000	Manual feed roller unit 2	312-17
29-32962-01	RH7-1223-000	Cassette pickup motor	311-34B
29-32963-01	RH7-5103-000	Cassette registration roll clutch	311-39
n/a	RB1-4178-000	Cassette registration lower roller	311-10
n/a	RB1-4179-000	Cassette registration upper roller	311-11
29-32964-01	RH7-5101-000	Cassette feed solenoid	311-38
29-33003-01	RG5-1163-000	Cassette separation roller unit	311-32
n/a	No part number	Cassette separation roller	311-32
29-32965-01	RG5-1164-000	Cassette feed roller unit 1	311-33
29-32966-01	RG5-1168-000	Cassette pickup rollers	311-1
FD-29651-01	WG8-0291-000	Manual feed paper detect sensor	312-22 (PS1)
FD-29651-01	WG8-0291-000	Manual feed paper size sensor	312-22 (PS2)
Electrical PCBs			
See EFI list above	n/a	Video controller PCB assembly	
n/a	RB1-4540-000	DC controller top plate	105-1
n/a	RB1-4551-000	DC controller mount 1	108-25
n/a	RB1-4552-000	DC controller mount 2	108-26
n/a	RB1-4570-000	DC controller mount 3	108-28
n/a	RB1-4532-000	DC controller shield plate	105-3
n/a	RB1-4560-000	DC controller plastic cover	108-27
29-32968-01	RG5-1223-000	DC controller PCB	930 all
n/a	RB1-4555-000	Mechanical PCB mount	107-18
29-32969-01	RG5-1233-000	Mechanical PCB	935 all

DEC part number	Canon part number	Description	Parts Catalog number
29-32970-01	RG5-1234-000	Pick-up PCB	940 all
29-32971-01	RG5-2184-000	Terminal PCB	941 all
29-32972-01	RG5-1216-000	Cassette-size sensor assembly	103-9
n/a	RG5-1236-000	Cassette size sensing PCB	971 all, 103-9, & R91
29-32973-01	RG5-1226-000	Waste toner sensor PCB	972 & 103-10J (PS12)
29-32974-01	RG5-1225-000	Toner-low detect beam PCB	973 all (1/2 PS11)
29-32975-01	RG5-1224-000	Toner-low detect receive PCB	974 all (1/2 PS11)
29-32976-01	RH3-2158-000	LVPS box unit 110V	107-4
29-32977-01	RH3-2159-000	LVPS box unit 220V	107-4
n/a	No part number	LVPS PCB	
29-32978-01	RG5-1214-000	HV supply assembly	102-7
n/a	No part number	HVPS PCB	
29-32979-01	RG5-1241-000	Separation HVT PCB	103-12
29-32980-01	RH7-7060-000	Temperature/ humidity sensor	103-14
FD-29651-01	WG8-0291-000	Oil overflow sensor	108-8 (PS10)
29-32973-01	RG5-1226-000	Oil sensor PCB	972 all (PS13)
n/a	No part number	Ejection PCB	
29-32981-01	RG5-1237-000	Ejection PCB assembly	975 all
Transfer Drum Holder Unit			
29-32982-01	RG5-1134-000	Transfer drum holder assembly	530 all
29-32983-01	RG5-1126-000	Transfer drum assembly	530-45 & 531 all
n/a	WG8-0182-000	Transfer drum top sensor	531-46 (PS8) fig 2
29-32984-01	RF5-1008-000	Discharge roller	531-51
29-32985-01	RB1-4018-000	Attraction roller	530-27
29-32986-01	RH7-5104-000	Separation claw solenoid	531-34
29-32987-01	RB1-4010-000	Cam sensor	531-29
FD-29651-01	WG8-0291-000	Separation sensor	531-36 (PS7) fig 2
29-32988-01	RF5-0859-000	Sheet, transfer drum	530-42
29-32989-01	RG5-1127-000	Gripper unit	531-24

DEC part number	Canon part number	Description	Parts Catalog number
29-32990-01	RH7-5105-000	Gripper solenoid	531-64
FD-29651-01	WG8-0291-000	Attraction sensor	531-36 (PS6) fig 1
29-32991-01	RG5-1156-000	Transfer drum cleaner unit	710 all
29-32992-01	RG5-1510-000	Face-down delivery unit	350 all
FD-29651-01	WG8-0291-000	Cleaning belt sensor	350-7B (PS5)
n/a	RH7-5111-000	Cleaning belt drive solenoid	142-3 (SL3)
Exposure System			
29-32993-01	RG5-1115-000	Laser/scanner assembly	106-2
Charging System			
LNC1X-AE	R74-3011-000	LNC01 drum cartridge kit	Not shown (has two waste toner bottles)
29-32994-01	RG5-1158-000	Density sensor unit	580-6 (PS14)
n/a	No part number	Separation charging/ density	580 all
29-32995-01	RG5-1152-000	Separation corona assembly	580-5
n/a	RB1-4156-000	Density sensor cover	580-10
Developing System			
See Miscellaneous items on page B-20.		Toner cartridge(s)	Not shown
n/a	RB1-4445-000	Rotary unit sensor plate	108-4
n/a	RS5-0435-000	Rotary unit gear	107-9
n/a	RB1-4362-000	Developing rotary unit crossmember (holder)	500-1
n/a	RB1-4441-000	Developing rotary unit rear bushing	102-4
29-32996-01	RG5-1181-000	Developing rotary unit	500 all
29-32997-01	RG5-1185-000	Ejection unit	140 all
FD-29651-01	WG8-0291-000	Toner cart position sensor	108-8 (PS3)
n/a	WG8-0182-000	Developing rotary position sensor	108-9 (PS4)
Fuser			
29-32998-01	RG5-1511-000	Fuser unit 110V	810 all
29-32999-01	RG5-1537-000	Fuser unit 220V	810 all

DEC part number	Canon part number	Description	Parts Catalog number
n/a	RH7-7059-000	Thermistor	810-41
n/a	RG5-1523-000	Cleaning belt unit	810-76 & 830 all
n/a	RB1-5100-000	Cleaning belt fixing roller	830-1 (Replacement)
LNC1X-AF	RF5-0944-000	LNC01 oil bottle	Not shown
FD-29651-01	WG8-0291-000	Delivery sensor	810-46 (PS9) fig 1
n/a	RH7-4060-000	110V lamp	810-55
n/a	RH7-4065-000	220V lamp	810-55
Paper Feeder			
LNC1X-TA	R95-5001-700	LNC01 paper feeder option	R10 & R11
n/a	RB1-5849-000	Front cover	R10-4
n/a	RB1-5850-000	Rear cover	R10-5
n/a	RB1-5847-000	Left cover	R10-2
n/a	RB1-5848-000	Right cover	R10-3
n/a	RB1-5851-000	Open/close cover	R10-6
n/a	RG5-1663-000	Separation roller unit	R13-7
n/a	RB1-4212-000	Separation roller	R13-7A
n/a	RG5-1662-000	Feed roller unit 1	R12-16
n/a	RB1-4212-000	Feed roller 1	R12-16B
n/a	RB1-5808-000	Feeder roller	R12-9
n/a	RG5-1660-000	Paper pickup assembly, front	R12 all
29-32962-01	RH7-1223-000	Stepping motor	R12-19 (Paper feeder pickup motor)
n/a	RH7-5070-000	Cassette feed solenoid	R12-20
n/a	RB1-5822-000	Paper feed roller	R12-7 (Feed roller 2)
29-32966-01	RG5-1168-000	Cassette pickup rollers	R12-1
n/a	RG5-1216-000	Cassette-size sensor assembly	R11-13
n/a	RG5-1236-000	Cassette size sensing PCB	R11-13C
n/a	RG5-1670-000	Paper feeder PCB	R11-25
n/a	RH3-2156-000	Power supply	R11-17
FD-29651-01	WG8-0291-000	Pick-up sensor	R12-35 (PS352)
n/a	RG5-1671-000	Cassette paper sensor PCB	R12-17 & R92 (PS351)

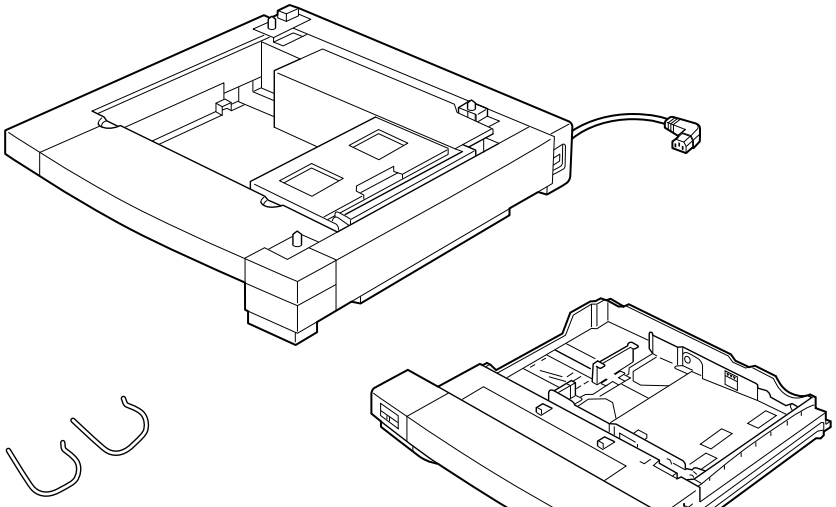
DEC part number	Canon part number	Description	Parts Catalog number
Miscellaneous			
29-33000-01	RY9-0100-000	Hypodermic syringe	
29-33001-01	RY9-0101-000	Oil bottle	
29-33002-01	RY7-0018-000	Transfer drum fixing screw	
29-33004-01	RY9-0095-000	Printer driver tester	
29-33005-01	RH7-5106-000	Solenoid, various	141-3
29-33006-01	RH7-5109-000	Solenoid	141-4
LNC1X-TB	R95-4000-700	LNC01 universal cassette	
LNC1X-AG	R95-6003-700	LNC01 OHT A size (50/bx)	
LNC1X-AH	R95-6002-700	LNC01 OHT A4 (50/bx)	
LNC1X-TA	R95-5001-700	LNC01 paper feeder (includes universal cassette)	
LNC1X-AA	R74-3015-000	LNC01 toner cartridge - K	
LNC1X-AB	R74-3014-000	LNC01 toner cartridge - C	
LNC1X-AC	R74-3013-000	LNC01 toner cartridge - M	
LNC1X-AD	R74-3012-000	LNC01 toner cartridge - Y	
LNC1X-AE	R74-3011-000	LNC01 drum cartridge kit (has two waste toner bottles)	
LNC1X-AF	R95-6004-000	LNC01 silicon oil	

Appendix E:
Accessories and Supplies

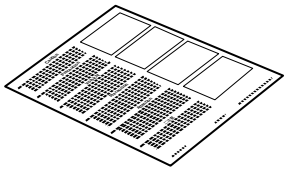
This appendix includes information on optional parts and accessories.

Optional paper feeder unit

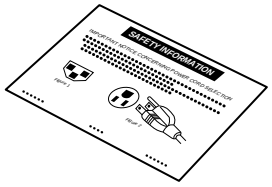
This option (LNC1X-TA) comes with the paper feeder unit, an optional (universal) cassette, and two locking pins to secure the paper feeder unit to the printer body.



Locking pins (2)



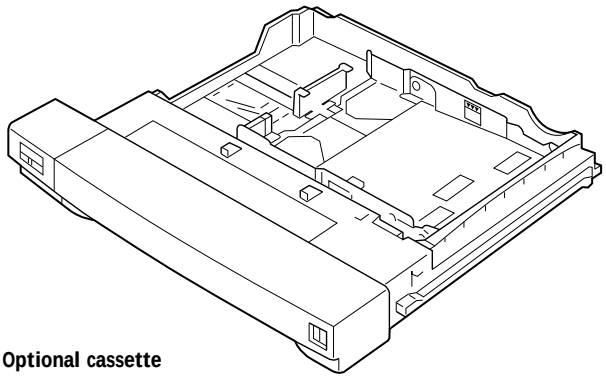
Caution sheet



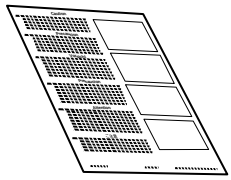
Safety information

Optional paper cassette

You can purchase a universal paper cassette (LNC1X-TB) which can hold any size from 216 x 356 mm to 184 x 267 mm, including Letter, A4, Legal, and B5 paper. You can load only plain paper from 16- to 24-lb (61 to 90 g/m^2) into a paper cassette, and the maximum capacity is about 250 sheets at 20 lb (75 g/m^2).



Optional cassette



Caution sheet

Memory upgrade kits

The following memory upgrade kits are available:

Memory upgrade kit	SIMM configuration	Part Number
16MB	Four 4MB	LNC1X-UD
32MB	Four 8MB	LNC1X-UE

Instructions for installing the SIMMs are included in the kit itself.

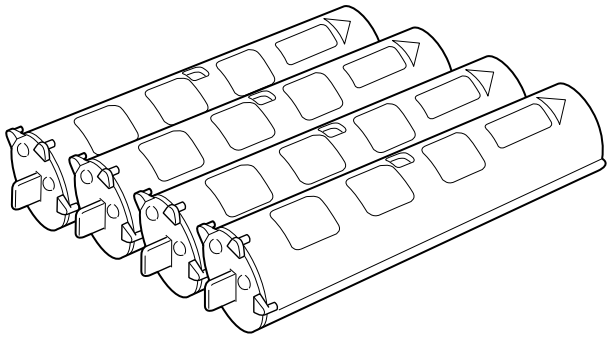
Ordering consumables

You will want to keep a supply of the following consumables on hand—especially if your site has more than one printer in service.

Toner cartridges

Use of the genuine toner cartridges designed for this printer is recommended. Four types of color toner cartridges are available: cyan, magenta, yellow, and black.

Description	Part Number
Cyan toner cartridge	LNC1X-AB
Magenta toner cartridge	LNC1X-AC
Yellow toner cartridge	LNC1X-AD
Black toner cartridge	LNC1X-AA



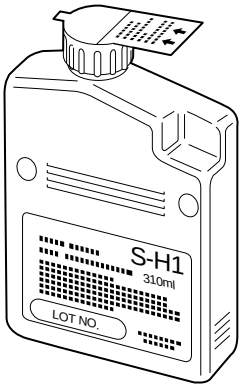
Note: Each color toner cartridge typically lasts for about 4,000 prints of A4- or Letter-size paper (when printing at 5% print density). The actual cartridge life, however, depends on how much toner of each toner cartridge is used for each print; the more toner from a particular toner cartridge is used for each print, the shorter the cartridge life for the particular color toner cartridge will become.

A Material Safety Data Sheet is available for toner cartridges.

Before installing a toner cartridge, be sure to remove the two pieces of protective tape.

Silicone oil

Silicone oil is used in the final fixing process before the paper comes out of the printer. To prevent toner offset caused by toner on the fixing rollers, the upper roller remains in contact with the cleaning belt impregnated with silicone oil supplied from the silicone oil bottle (LNC1X-AF).



You will probably need to replace the silicone oil after about 10,000 pages of full color.

A Material Safety Data Sheet is available for silicone oil.

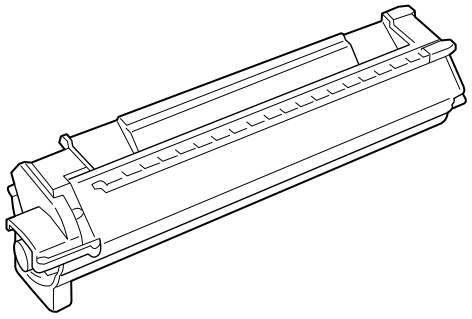
The oil is very slippery, and may present a skidding or slipping hazard. Following a spill or leak, use absorbent material to contain and collect excess oil for salvage or disposal. Thoroughly clean the floor or other contaminated surface (such as a ladder) and do not leave any traces of the oil.

Use an all-purpose alkaline cleaner, or have the surface (including carpeting) cleaned commercially. Petroleum distillates may be used, except on plastic or vinyl surfaces. Dispose of absorbed material in accordance with applicable federal, state and local requirements.

- Do NOT use any other than the specified silicone oil.
- Do not dispose of the used silicone oil bottle in a flame of any kind.
- Do not operate the printer when no silicone oil bottle is installed; otherwise the printer may be damaged.

Drum cartridge kit

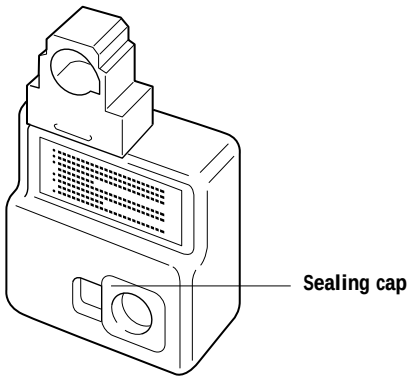
Each drum cartridge kit (LNC1X-AE) contains a drum cartridge and two waste toner bottles. When you replace the drum cartridge, be sure to always replace the waste toner bottle as well.



You will probably need to replace the drum cartridge after about 10,000 pages of full color.

Note: The frequency with which you will need to replace the drum cartridge depends upon various factors, including: the mix of color images and black-only images printed, the frequency of printer calibration, and the amount of continuous versus intermittent printing.

After you remove the cap from the new waste toner bottle, be sure to use this sealing cap to recap the used waste toner bottle before storing it away.



Transparency film

For optimum printing results, use only the transparency film specifically for the Colorwriter LSR 2000. Under no circumstances should this type of transparency film be used with other laser printers In addition, remember to feed transparencies via the multipurpose tray only.

Description	Quantity	Part Number
Letter-size transparencies	50 sheets	LNC1X-AG
A4-size transparencies	50 sheets	LNC1X-AH

Paper

While most 17–28 lb paper is usable, high brightness print media, such as Hammermill's LaserPrint 24 lb paper, is recommended for this color laser printer. Also, Teslin™ for laser printers and colored paper are acceptable. It is a good idea to experiment using different types or brands of paper (as long as it complies with these specifications). Make sure you are satisfied with the results before purchasing large quantities of paper.

Note: Do not attempt to print labels on the printer.

Appendix F:
Related Documentation

The list below contains Digital documents associated with PostScript and the Colorwriter LSR 2000 printer and their respective order numbers.

Document title/description	Order number
English	
Whole kit	EK-LSRCW-DK
Getting Started	EK-LSRCW-GS
User Guide	EK-LSRCW-UG
Quick Reference card	EK-LSRCW-RC
Service Guide	EK-LSRCW-SV
PostScript Language Addendum	EK-LSRCW-PS
Release Notes	EK-LSRCW-RN
Registration card	EK-PRNTR-RC
Warranty card	EK-PR9OE-WC
Italian	
Whole kit	EK-LSRCI-DK
Getting Started	EK-LSRCI-GS
User Guide	EK-LSRCI-UG
Quick Reference card	EK-LSRCI-RC
PostScript Language Addendum	EK-LSRCI-PS
Release Notes	EK-LSRCI-RN
German	
Whole kit	EK-LSRCG-DK
Getting Started	EK-LSRCG-GS
User Guide	EK-LSRCG-UG
Quick Reference card	EK-LSRCG-RC
PostScript Language Addendum	EK-LSRCG-PS
Release Notes	EK-LSRCG-RN
French	
Whole kit	EK-LSRCF-DK
Getting Started	EK-LSRCF-GS
User Guide	EK-LSRCF-UG
Quick Reference card	EK-LSRCF-RC
PostScript Language Addendum	EK-LSRCF-PS
Release Notes	EK-LSRCF-RN

Document title/description	Order number
Spanish	
Whole kit	EK-LSRCS-DK
Getting Started	EK-LSRCS-GS
User Guide	EK-LSRCS-UG
Quick Reference card	EK-LSRCS-RC
PostScript Language Addendum	EK-LSRCS-PS
Release Notes	EK-LSRCS-RN
Japanese	
Whole kit	EK-LSRCJ-DK
Getting Started	EK-LSRCJ-GS
User Guide	EK-LSRCJ-UG
Quick Reference card	EK-LSRCJ-RC
PostScript Language Addendum	EK-LSRCJ-PS
Release Notes	EK-LSRCJ-RN

In addition to the specific Colorwriter LSR 2000 printer documentation listed above, the following documents provide general PostScript language information:

- *PostScript Language Reference Manual Supplement for Version 2013* by Adobe Systems Incorporated, March 31, 1993. Available through the Adobe Systems Developer Support organization.
- *PostScript Language Reference Manual, Second Edition* by Adobe Systems Incorporated, ISBN 0-201-18127-4. Available in bookstores.

Technical support

If you need help deciding which documentation best meets your needs call 1-800-DIGITAL (1-800-344-4825) for technical assistance.

Electronic orders

If you wish to place an order through your account at the Electronic Store, dial 1-800-234-1998 using a modem set to 2400- or 9600-baud. You must be using a VT terminal or terminal emulator set at 8 bits, no parity. If you need assistance using the Electronic Store, call 1-800-DIGITAL (1-800-344-4825) and ask for an Electronic Store specialist.

Telephone and direct mail orders

Customers can order additional documents by phone or by mail:

- In the U.S.A. call DECdirect 1-800-DIGITAL (1-800-344-4825) or write:

  Digital Equipment Corporation
  Merrimack Communications Center
  P.O. Box 9501
  Merrimack, NH 03054

  Fax:1-800-513-4778

- In Puerto Rico, call 809-781-0505 or write:

  Digital Equipment Corporation, Inc.
  3 Digital Plaza, 1st Street
  Suite 200
  Metro Office Park
  San Juan, Puerto Rico 00920

  Fax: 809-749-8300

- In Canada call 1-800-344-4825 or write:

  Digital Equipment of Canada Ltd.
  100 Herzberg Road
  Kanata, Ontario, Canada K2K 2A6
  Attn: DECdirect Sales

  Fax: 613-591-4021

For internal orders, call DTN 264-4446 or (603) 884-4446; or write:

U.S. Software Supply Business
Digital Equipment Corporation
10 Cotton Road
Nashua, NH 03063-1260

Note: For software documentation orders, call to request an Internal Software Order Form (EN-01740-07).

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