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V-C3 TECHNICAL TRAINING

FULL COURSE

Slide 1

This course is for technicians who have not worked with the V-C1/V-C2 color copiers.

Introduction:

- **This machine is a high-speed network multi-functional color copier.**
  - Based on the GW Architecture.
  - Provides the following:
    - » Network Scanning
    - » Local Storage
    - » Copying
    - » Scanning
    - » Fax
    - » Printing

Slide 2

No additional notes

Objectives

- **Install the machine and its peripherals in the field.**
- **Understand how the machine and the peripherals work.**
- **Understand and perform routine maintenance.**
  - Understand the PM table and counters.
  - Understand the SP codes.
- **Troubleshoot and repair this product in the field.**

Slide 3

No additional notes

Course Overview

- Product Outline
- Installation
- Maintenance
- Machine Overview
- Automatic Document Feeder
- Scanner
- Image Processing
- Laser Unit

Slide 4

PRODUCT OUTLINE

- The model will be introduced.
- The optional peripherals will be introduced.
- The product concept, sales points, and targets will be presented.
- The main specifications will be mentioned during this section of the course.

INSTALLATION

- Study how to install the machines and the peripherals.
- Study how to access SP modes and user tools.
- Study how to update the firmware.

MAINTENANCE

- PM is described briefly.

MACHINE OVERVIEW

- The components will be discussed.
- The paper feed path and copying process will be outlined.
- The machine's organization and overall PCB structure will also be covered.

DOCUMENT FEED

- The ADF is a standard component of the machine.
- This section of the course will explain the ADF's mechanisms.

SCANNER

- The scanner mechanism will be discussed.

IMAGE PROCESSING

- This section briefly explains the image processing done inside this machine.

LASER UNIT

- The laser diode circuits and laser optics will be described.

Course Overview

- ❑ Processes Around the Drum
- ❑ Toner Supply Mechanisms
- ❑ Waste Toner Collection
- ❑ Process Control
- ❑ Paper Feed
- ❑ Transfer and Separation
- ❑ Fusing
- ❑ Paper Exit/Duplex

Slide 5

PROCESSES AROUND THE DRUM

- ❒ This section describes the drum and the processes around it, including quenching, charge corona unit, and drum cleaning.

TONER SUPPLY

- ❒ The toner supply mechanism will be described.
- ❒ The toner near-end and toner end detection methods will be discussed.

WASTE TONER COLLECTION

- ❒ Waste toner collection will also be discussed. There is no recycling.

PROCESS CONTROL

- ❒ This section explains the basic points about how the machine controls the copy process to compensate for changes in operating conditions.

PAPER FEED

- ❒ The paper feed mechanism for the main body will be described. The optional LCTs will be dealt with in later sections.

TRANSFER & SEPARATION

- ❒ Image transfer and paper separation mechanisms will be described.

FUSING

- ❒ Fusing will be described.

PAPER EXIT/DUPLEX

- ❒ The paper feed out and duplex mechanisms will be described.
- ❒ The duplex tray is a standard component of this model.

Course Overview

- Large Capacity Tray (B473)
- A3/DLT Large Capacity Tray (D350)
- A3/DLT Kit for Tandem Tray (B331)
- Cover Interposer (B704) – this has one tray
- Mailbox (B762)
- Cover Interposer (B835) – this has two trays
- Multi-folding Unit (D454)

Slide 6

LARGE CAPACITY TRAY (B473)

- The optional A4/LT LCT will be described in this section.
- There are two LCTs for this model.
- This one is the same that was used with the V-C2.

A3/DLT LARGE CAPACITY TRAY (D350)

- The optional A3/DLT LCT will be described in this section.
- This is based on the one that was used with the B234 series (Katana-C1).

A3/DLT KIT FOR TRAY 1 (B331)

- This optional kit for the tandem tray will be described here. This is the same as the one used in the V-C2.

COVER INTERPOSER TRAY (B704)

- This optional cover sheet feeder will be described in this section.
- This model has one tray.
- It is the same as the cover interposer that was used with the V-C2.
- There is another optional cover interposer, and that one has two trays.

MAILBOX (B762)

- This is the same as the one used in the V-C2.

COVER INTERPOSER TRAY (B835)

- This optional cover sheet feeder will be described in this section.
- This model has two trays.
- It is the same as the cover interposer that was used with the B234 series.

MULTI-FOLDING UNIT (D454)

- This is the same as the folder that is used with the MT-C4 series.

Course Overview

- 3,000-sheet Finisher with 100-sheet stapler (B830)
- 2,000-sheet Booklet Finisher (D373) and 3,000-sheet Finisher (D374)
- Ring Binder (D392)
- Fax Unit (D498)

Slide 7

3,000-SHEET FINISHER WITH 100-SHEET STAPLER (B830)

- This finisher is the same as the one that was used with the B234 series (Katana-C1).
- This finisher has an optional punch unit (B831) and a built-in jogger unit.

2,000-SHEET BOOKLET FINISHER/3,000-SHEET FINISHER (D373/D374)

- These are based on the finishers that were used with the B234 series.
- They have an optional jogger unit (B703) and an optional punch unit (B702).

RING BINDER (D392)

- This is the same as the one that is used with the V-C2.

FAX UNIT

- This is similar to the V-C2 series fax unit.

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V-C3 TRAINING
COPIER ENGINE

PRODUCT OVERVIEW

Slide 8

PURPOSE OF THIS SECTION

- ❒ The model will be introduced.
- ❒ The optional peripherals will be introduced.
- ❒ The product concept, sales points, and targets will be presented.

Product Overview

Overview of the Machine

Slide 9

No additional notes

Target Markets

- This machine is targeted for the office environment, and for the light production market.
- Two basic configurations of options are available to meet each of these needs.

Slide 10

No additional notes

Product Appearance – For the Office Environment

Slide 11

- Here is a view of the copier with some of the important options attached.
- The ADF is a standard part of the machine.
- The Booklet Finisher is an option.

Product Appearance – For the Light Production Market

Slide 12

- Here is a view with a different set of options installed.
- There is one limitation for this market: the machine cannot handle 13 inch paper.

Operation Panel

- The operation panel has also been re-designed.

Slide 13

No additional notes

How many models?

- **D081: V-C3a SP**
- **D082: V-C3b SP**
- **The difference between these models is the output speed.**
  - V-C3a: FC: 60 cpm, B/W: 65 cpm
    - » V-C2a: FC: 55 cpm, B/W: 60 cpm
  - V-C3b: FC: 70cpm, B/W: 75cpm
    - » This is the same as the V-C2b.
- **Both models have a built-in scanner/printer unit.**
- **The VM card is inserted in the lower slot at the factory. The new App 2 Me feature is built into this VM card, but must be enabled at installation.**
- **Both models have a 320 GB hard disk and 2 GB of RAM.**
  - There is no optional extra memory.

Slide 14

- App 2 Me is a new feature that allows you to carry your preferred operation panel configuration from machine to machine. It is a connectivity feature, so it is not explained in this course in detail.

Product Overview

Features

Slide 15

No additional notes

Paper Weights

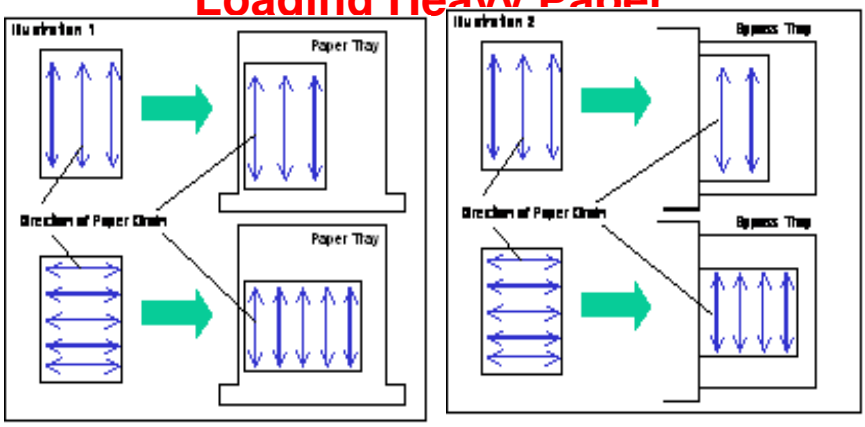
Std Tray	52.3-216
	14lbs.Bond~90lbs.Index
Std Tray 3	52.3-256
	14lbs.Bond~90lbs.Index
Bypass	52.3-300
	14lbs.Bond~110lbs.Cover
Duplex Unit	60-216
	17lbs.Bond~90lbs. Index
A4/LT LCT	52-128
	14-34lbs
A3/DLT LCT	52.3-300
	14lbs.Bond~110lbs.Cover

- **Standard Trays 164g/m²-216g/m² and Bypass/Wide LCT Tray 280 g/m²-300 g/m² need the following conditions:**
  - All the paper should be stored in the same place where the room temperature is 20-25 degrees and the humidity is 30-65%
  - Any curls in the paper should be smoothed out before loading it.
  - When loading thick paper in paper trays 1-3, or the wide LCT, set the paper direction according to the grain, as shown in the illustration on the next slide.
  - When loading thick paper in the bypass tray, set the paper direction according to the grain, as shown on the following slide.

Slide 16

- Note that tray 3 can handle heavier paper than the other two standard trays. This is explained after the next slide.

Loading Heavy Paper

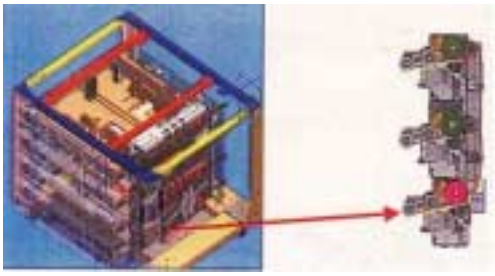


- Load paper so that the grain is in the correct orientation.

Slide 17

No additional notes

Improved Thick Paper Handling

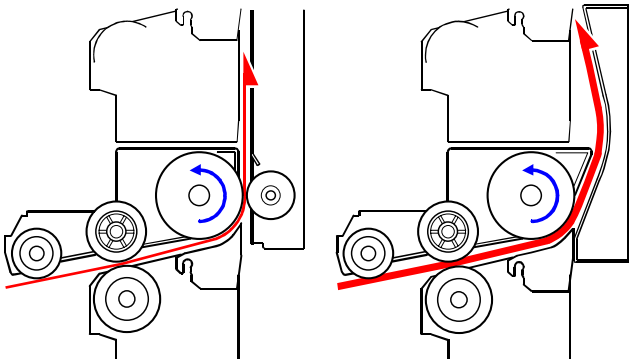


- **All of the trays can handle paper of weight up to 216 g/m² but Tray 3 can handle thicker paper up to 256 g/m².**
  - There is a wider gap where the right edge of Tray 3 opens at the bottom of the vertical paper feed path. Also, the curvature of the paper feed path is not as sharp (see the next slide).
  - This makes it easier for paper up to 256 g/m² thick to pass through the junction to the vertical paper feed path.
  - The gap has been widened for Tray 3 only, so thicker paper (up to 256 g/m²) should be loaded in Tray 3.

Slide 18

- This large junction point makes it easier for thick paper to feed into the vertical feed path and reduces the occurrence of paper jams. The large gap also makes it easier to remove jams if they do occur in the vertical feed path.

Improved Thick Paper Handling



V-C1, V-C2
V-C3: Trays 1 and 2

V-C3: Tray 3

- The bend at the exit from the tray is smoother in Tray 3.
  This allows the tray to feed thick paper 2 without problems.

Slide 19

No additional notes

Copy Speed for each Paper Weight

Model	Mode	Paper Thickness		BK CPM	FC CPM
		gsm	lbs		
C3a	Thin Paper	52.3~65.9		**65**	60
	Plain Paper	66~99.9		**65**	60
	Middle Thick	100~127.4		**60**	**60**
	Thick Paper 1	127.5~163.9		37.5	37.5
	Thick Paper 2	164~249.9		**37.5**	**37.5**
	Thick Paper 3	250~300		30	30
	OHP, 1200dpi printing, High gloss paper※1			30 37.5 ※Depends on the thickness	30 37.5 ※Depends on the thickness
C3b	Thin Paper	52.3~65.9		**75**	**70**
	Plain Paper	66~99.9		**75**	**70**
	Middle Thick	100~127.4		**60**	**60**
	Thick Paper 1	127.5~163.9		37.5	37.5
	Thick Paper 2	164~249.9		**37.5**	**37.5**
	Thick Paper 3	250~300		30	30
	OHP, 1200dpi printing, High gloss paper※1			30 37.5 ※Depends on the thickness	30 37.5 ※Depends on the thickness

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- gsm: grams per square meter

Short Warm-up Time

First Copy Time		C3a: Less than 5.7, C3b: Less than 4.9
(seconds)		C3a: Less than 7.5, C3b: Less than 6.4
Warm-up Time	US	C3a: Less than 70, C3b: Less than 60
(seconds)	EU/Asia/Taiwan	Less than 60
	China	Less than 60

- **Due to a thinner pressure roller core, warm-up time is faster than the V-C2 series copiers (V-C2: 75 seconds).**

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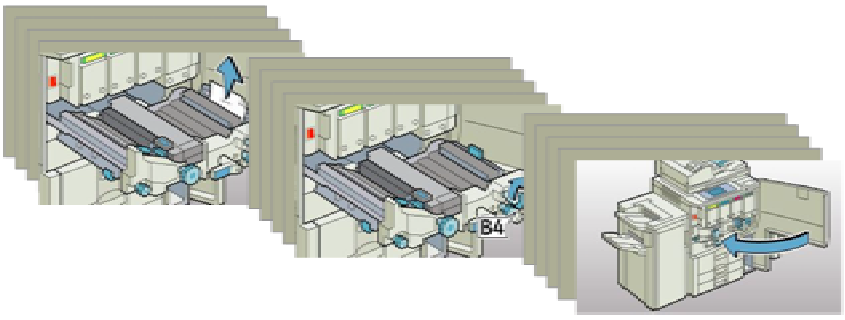
No additional notes

Improved Animation

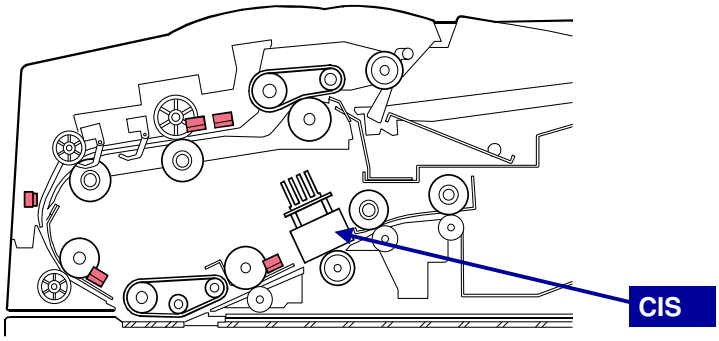


- Animation helps the user solve problems inside the machine.

Slide 22

No additional notes

High-speed Duplex Scanning

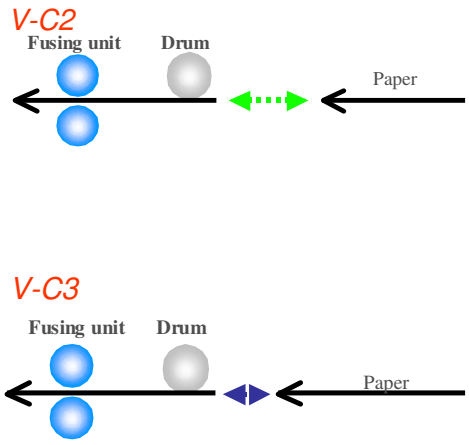


- **A CCD (inside the scanner unit, below the ADF) scans the front side, and a CIS (inside the ADF) scans the rear side.**
- **Scanning speed:**
  - Single-sided: Color 70 ppm, B/W 82 ppm (same as V-C2)
  - Duplex: Color 90 ppm, B/W 130 ppm (V-C2 was Color 53ppm, B/W 60ppm)

Slide 23

- This is the same idea as the MT-series black-and-white copiers.
- The ADF is the same as the MT-C4.

Faster Printing for V-C3a

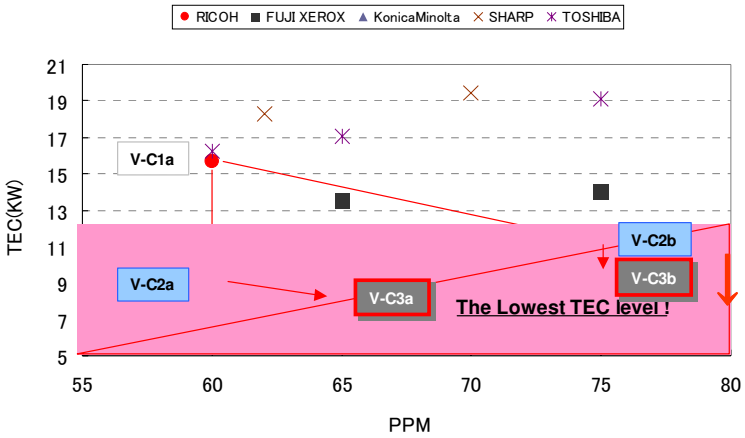


- **The gap between sheets has been reduced.**
  - The line speed is the same as for V-C2a.
- **Printing speeds**
  - V-C2a
    - B/W: 60 ppm
    - Full color: 55 ppm
  - V-C3a
    - B/W: 65 ppm
    - Full color: 60 ppm
  - V-C2b/V-C3b
    - B/W: 75 ppm
    - Full color: 70 ppm

Slide 24

- This increase in productivity has been accomplished by adjusting paper feed timing to narrow the gap between sheets of paper in the paper path. The line speed for both models is not changed from the V-C2 series models.
  - This is only done for the V-C3a. For the V-C3b, the speed is the same as the V-C2b.
- The V-C3b (same speed as the V-C2b) could not be given a higher copy speed. It is already at a line speed of 352 mm/s, and it is not possible to reduce the gap between sheets any more.
- With either the V-C3a or V-C3b if production quality cannot be maintained, the machine will drop into the CPM down mode.

Lower Energy Consumption

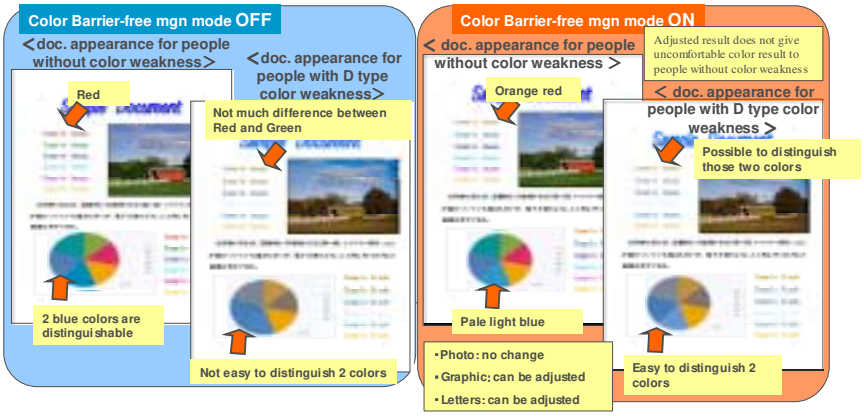


- **The typical electricity consumption (TEC) is lower than previous models in this series, and lower than competitors' models.**

Slide 25

- The maximum power consumption is not changed, but the warm-up time is less, and less energy is consumed in Sleep Mode.
  - North America: V-C3a: 8.72kWh/w, V-C3b: 9.66kWh/w
  - EU/Asia/TWN/China: V-C3a: 8.07kWh/w, V-C3b: 9.66kWh/w

Color Weakness Management Mode

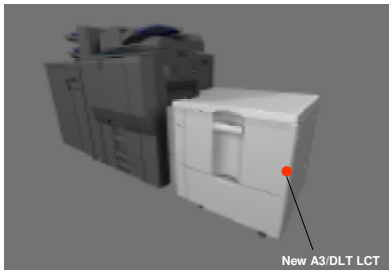


- **This mode can be selected at the printer driver to help people with color weakness to distinguish between red and green.**

Slide 26

- Color weakness is also known as partial color blindness. For example, some people cannot distinguish red from green; both colors appear as a yellowish brown, as shown on the slide.
  - It is said that between 5 and 10% of Caucasian males are red-green color blind.
  - There is another form of color weakness, involving yellow and blue, but this is more rare.
- This feature is available with PCL6 or PS3, operating on MS Office 2007.

A3/DLT Large Capacity Tray Option



- **Maximum size: A3 (12”x18”) paper**
- **Maximum thickness: 300g/m² thick paper**
- **Paper feeds in through the bypass tray entrance (the bypass tray is removed when this LCT is installed).**
- **The paper capacity (for 80g/m² paper) is 2,000 sheets.**
- **Air assisted paper feed helps separate sheets of thick paper.**
  - See the next slide for details.

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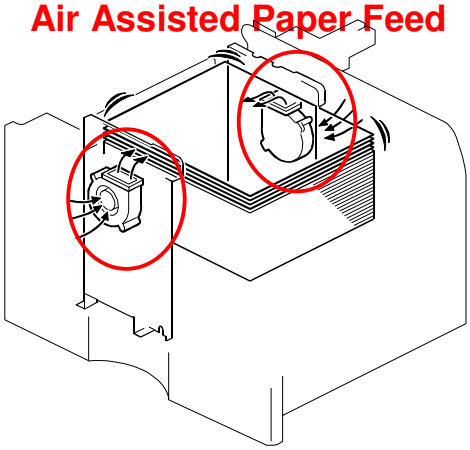
- This LCT can hold paper sizes up to the following:
  - Max length 482.7 mm, max width 330.2 mm
  - 13” x 19.2”, A3+
- However, the V-C3 cannot handle the largest paper sizes, so the maximum paper sizes that can be put in this tray are A3 and 12” x 18”

A3/DLT Large Capacity Tray Option

Air Assisted Paper Feed



- Air from two fans float the top sheet of paper. This helps to separate the top sheet from the stack.
- This only works for the following paper types: Thick 2, Thick 3, Special 2

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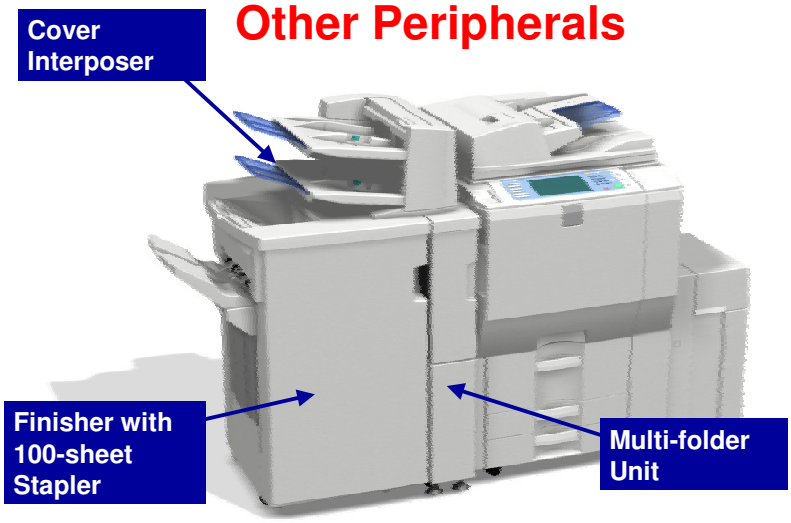
No additional notes

Other Peripherals



- These three are also used on the B-C4 series.

Slide 29

- B-C4 (Katana-C2)

Product Overview

Options

Slide 30

No additional notes

Paper Trays

- **11”x17” / A3 Tray Unit**
  - A3/11”x17” Tray Type 2105
  - Lets you convert tray 1 from a tandem A4/LT tray to an A3/DLT tray
- **Tab Sheet Holder Unit**
  - Tab Sheet Holder Type 3260
  - Lets you feed tab sheets from tray 2 or 3
  - Same as the V-C2

Slide 31

No additional notes

Large Capacity Trays

- **A3/DLT LCT (D350)**
  - RT4000
  - Same as the one that is used with the V-C2.
- **A4/LT LCT (B473)**
  - RT43
  - Also used with the V-C2
  - Feeds 8.5 x 11” SEF and A4 SEF. Holds 4,000 sheets.
- **LCT Adapter**
  - LCT Adapter Type B
  - Must be used when you install the A4/LT LCT on the V-C3.
- **LG Unit for A4/LT LCT**
  - 8.5”x14” Paper Size Tray Type 1075
  - Lets you feed 8.5 x 14” and B4 paper from the LCT, in addition to 8.5 x 11” SEF and A4 SEF
  - Also used with the V-C2

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- You can install one of these LCTs.

Finishers

- **3,000-sheet finisher with 50-sheet stapler (D374)**
  - SR4030
  - New item, based on the finisher for the V-C2
- **2,000-sheet finisher with saddle-stitching (D373)**
  - SR4040
  - New item, based on the finisher for the V-C2
- **3,000-sheet finisher with 100-sheet stapler (B830)**
  - SR5000
  - Also used with the V-C2.
- **Copy tray**
  - Copy Tray Type 2075
  - Also used with the MT-C4
  - Install this if the customer does not want a finisher

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No additional notes

Options for the D373/D374 Finishers

- **Punch Units**
  - Punch Unit Type 3260 NA 3/2, for North America
  - Punch Unit Type 3260 EU 2/4, for Europe
  - Punch Unit Type 3260 SC, for Scandinavia
- **Jogger Unit**
  - Output Jogger Unit Type 3260
- **These are all the same as the ones that are used in the V-C2.**

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No additional notes

Options for the B830 Finisher

- **Finisher Adapter**
  - Finisher Adapter Type C
  - Must be used when you install the B830 finisher on the V-C3.
- **Punch units**
  - Punch Unit Type PU5000 NA 3/2, for North America
  - Punch Unit Type PU5000 EU 2/4, for Europe
  - Punch Unit Type PU5000 SC, for Scandinavia
  - These are also used on the Katana-C1.
- **No optional jogger unit**
  - Built into the finisher

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No additional notes

Other Finishing Options - 1

- **9-bin Mailbox**
  - CS391
  - Same as the one used with the V-C2.
  - Can only be installed with the D373/D374 finishers. Cannot be installed on the same machine as the B830 finisher.
- **Multi-folding Unit**
  - Same as the MT-C4 and Katana-C2.
  - Can be installed with the D373 and B830 finishers. Cannot be installed on the same machine as the D374 finisher
- **Ring Binder**
  - RB5000
  - Also used with the V-C2, Katana-C2
    - » Was introduced for V-C2 after product launch

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No additional notes

Other Finishing Options - 2

- **Cover Interposer (one tray)**
  - Cover Interposer Tray Type 3260 (B704)
  - Same as the one used with the V-C2.
  - Can be installed with the D373/D374 finishers but not with the B830.
  - The mailbox and the cover interposer cannot be installed on the same machine at the same time
- **Cover Interposer (two trays)**
  - CI5000 (B835)
  - Same as the one that is used with the Katana-C1.
  - Can be installed with the B830 finishers but not with the D373/D374.

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Cover Interposer

- Installed between the copier and the finisher. Because of this, you cannot copy images onto the cover sheets. These must be prepared before you put them in the cover interposer.
- This feeder cannot be used to put slip sheets between OHPs.

Optional Controller

- **Fiery controller**
  - Fiery color utilities and advanced PostScript functions
- **The GW printer/scanner controller is built-in as standard equipment.**

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No additional notes

Printer/Scanner Options

- **PostScript3 Unit Type C7501: New item**
- **Interface Units**
  - IEEE1284 Interface Unit Type A: Also used with the V-C2
  - IEEE802.11a/g Interface Unit Type J, IEEE802.11g Interface Unit Type K: Also used with the V-C2
  - Bluetooth Interface Unit Type 3245: Also used with the V-C2
  - Gigabit Ethernet Unit Type B: Also used with the V-C2

  - From the IEEE1284, IEEE802.11b, Bluetooth, and File Format Converter units, only one can be installed in the same machine at the same time.
  - The machine cannot communicate by IEEE802.11 at the same time as the Ethernet NIB. The LAN type (IEEE802.11 or Ethernet) must be selected with a user tool.

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No additional notes

Security Options

- **Data Overwrite Security System Type H**
  - Also used with the V-C2
- **Copy Data Security Unit Type F**
  - Also used with the V-C2
- **HDD Encryption Unit Type A**
  - Also used with the V-C2

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No additional notes

Fax Board

- **Fax Option Type C7501**
  - New Item
- **G3 Interface Unit Type C7500**
  - Also used with the V-C2
- **Memory Unit Type B 32MB**
  - Used with other models

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No additional notes

Memory Options

- **There are no memory options.**
  - Memory and hard disks are standard equipment

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No additional notes

Heaters

- **There is an optional anti-condensation heater.**
- **The tray heaters for the paper trays are standard components.**
  - For the main copier, these trays must be connected during installation, if the customer wants to use them.
  - For the LCT, the tray heater is supplied as a service part. The heater should be connected during installation, if the customer wants to use it.
- **This machine also has a heater below the image transfer belt, to remove moisture in the transfer area.**
  - This is a standard component of the machine, but this heater must be connected during installation, if the customer wants to use it.
- **There is also a scanner heater for this machine. But the scanner heater is supplied as a service part. The heater should be connected if the customer wants to use it.**

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No additional notes

Other Options

- **Copy Connector Type 3260**
  - Also used with the V-C2
- **File Format Converter Type E**
  - Also used with the V-C2
- **Browser Unit Type E**
  - Also used with the Katana-C2
- **Optional Counter Interface Unit Type A**
  - Also used with the V-C2
- **Key Counter Bracket Type 1027**
  - Also used with the V-C2
- **Key Card Bracket Type B**
  - Also used with the V-C2
- **USB2.0/SD Card Option Type D**
  - New item

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There is no VM card option: A VM card is shipped with the machine in the lower SD card slot.

Optional USB/SD Card Slot

- USB 2.0/SD Slot Type D (D505) can be installed on the right end of the operation panel.
- This device enables easier access to USB and SD card slots at the front of the main machine.
- This option can be installed for the SD card only, or for both SD cards and USB.

Slide 45

No additional notes

Optional USB 2.0/SD card slot

- **This optional unit allows use of the new Scan to USB and Scan to SD features.**
- **This allows users to scan documents and save them in electronic format on an SD card and/or USB memory device.**
  - If the USB device or SD card is then connected to a computer, the scanned files can then be viewed, printed, or processed.
- **You cannot print or send files from this SD/USB slot with the operation panel. You must connect the USB device/SD card to a computer.**
- **This USB slot cannot be used as a printer interface.**

Slide 46

- Files saved on a removable memory device will not appear in the list of stored files.
- Files saved on a removable memory device cannot be printed or sent using the machine's operation panel.To perform operations on files saved on a removable memory device, you must use an application on a client computer.
- Files saved on a removable memory device will not appear in the list of stored files.
- Files saved on a removable memory device cannot be printed or sent using the machine's operation panel.To perform operations on files saved on a removable memory device, you must use an application on a client computer.
- You cannot specify where the data is saved. Files are saved in the root directory of the removable memory device.
- Up to 2 GB of data can be saved. However,depending on the number of files already stored on the removable memory device, new files might not be saved,even if there appears to be sufficient free space.
- If the removable memory device is partitioned,files are saved on the first partition.

Optional USB 2.0/SD card slot

- **Up to 2 GB of data can be saved.**
  - However, depending on the number of files already stored on the removable memory device, new files might not be saved, even if there appears to be sufficient free space.
- **This machine supports FAT16 format USB memory devices and SD cards. Other forms of removable memory device are not compatible.**
- **Saving might fail if the USB memory device has password protection or other security features.**
- **To save files on a removable memory device, you must attach the optional USB 2.0/SD card slot to the machine.**
- **File formats that can be used:**
  - Single page TIFF/JPEG/PDF (including high compression PDF)
  - Multipage TIFF/PDF (including high compression PDF)

Slide 47

No additional notes

Optional USB 2.0/SD card slot

- **After you install this option, you must enable it with Scanner SP Mode 1013.**
  - Change the SP setting from 0 to 1.

Slide 48

App 2 Me

- **App 2 Me is included on the VM card.**
- **However, it must be enabled at installation.**
  - The procedure is in the field service manual for the main machine.
    - » At the end of the section for installing the main machine, see the ‘Enabling App2 Me on VM/Calypso SD Card’ section.

Slide 49

No additional notes

SD Card Slots – Upper Slot

- **Empty when shipped**
- **Use for the following options (keep the card in the slot after installation)**
  - Data Overwrite Security Unit
  - PostScript
    - » If you want to install more than one of these, copy them onto one SD card.
    - » You cannot copy the PostScript card. However, you can copy the other SD cards to the PostScript card.
- **Also use this slot to install the following SD card options (remove the card from the slot after installation).**
  - HDD encryption unit
  - Browser unit
    - » During the installation procedure, the HDD encryption or browser software is copied to the hard disk inside the machine.

Slide 50

No additional notes

SD Card Slots – Lower Slot

- Contains the VM card (with App 2 Me) when shipped.
- Use this slot for service procedures, such as firmware update and NVRAM backup.
- When doing the above, remove the VM card, do the procedure (see the service manual), then put the VM card back in.

Slide 51

No additional notes

Lower Slot – Important Note (1)

- **VM card applications such as App 2 Me must be halted if you need to remove the VM card.**
  - Normally, you need to remove the VM card at these times:
    - » To update the firmware
    - » To back up the NVRAM
    - » To install the browser unit or the HDD encryption unit.
    - » To update the App 2 Me application firmware
- **To halt the VM card applications, do the following steps:**
  - 1. Push the “User/Tools” key.
    - » If an administrator setting is registered for the machine, step 2 and 3 are required. Otherwise, skip to step 4.
  - 2.Push the “Login/Logout” key.
  - 3.Login with the administrator user name and password.
  - 4.Touch “Extended Feature Settings” twice on the LCD.
  - 5. Touch each application until the status changes to “Stop”.
    - » It is necessary to stop each application that is running before you remove the VM card.
  - 6. Turn off the machine. And then remove the VM Card.

Slide 52

- You have to remove the VM card to execute a service procedure, such as those listed on the slide.
- After the firmware update, or whatever, then you have to enable App 2 Me and the other extended features again. To do this, see the next slide:

Lower Slot – Important Note (2)

- **After the firmware update, NVRAM backup, etc, then you have to enable App 2 Me and the other extended features again. To do this:**
  - 1. Put the VM card in its slot.
  - 2. Turn the main power on.
  - 3. Press the "User Tools“ key on the operation panel.
    - » If an administrator setting is registered for the machine, steps 4 and 5 are required. Otherwise, skip to step 6.
  - 4. Push the “Login/Logout” key.
  - 5. Login with the administrator user name and password.
  - 6. Touch the "Extended Feature Settings“ button twice.
  - 7. Touch the each application that you use. The status will change to ‘On’.
  - 8. Touch the "Exit“ button.
  - 9. Exit the "User Tools/Counter“ settings.

Slide 53

RICOH

RICOH

V-C3 TRAINING
COPIER ENGINE

INSTALLATION

Slide 54

PUROPSE OF THIS SECTION

- ❒ To learn how to install the machine and peripherals.
- ❒ There are a lot of notes and cautions for the installation procedures for this model. We will study the important ones before we start to install the machine.
- ❒ Also, learn how to install the latest firmware.

Overview

- **Main Copier**
  - Important Notes for Installation
  - Install the machine
- **Options**
  - A3/DLT Tray (goes into tray 1, to replace the tandem tray)
  - Two LCTs (A4/LT, A3/DLT)
  - LG/B4 tray for the A4/LT LCT
  - Finishers, cover interposers, mailbox, folder
    - » Two basic configurations to install
- **Connectivity options**
- **Update firmware**

Slide 55

This slide shows what we shall do in this section.

- There are a lot of important notes. We must explain them before we start to install the machine. Or, you can install the machine step by step, and stop when you get to one of the important points.

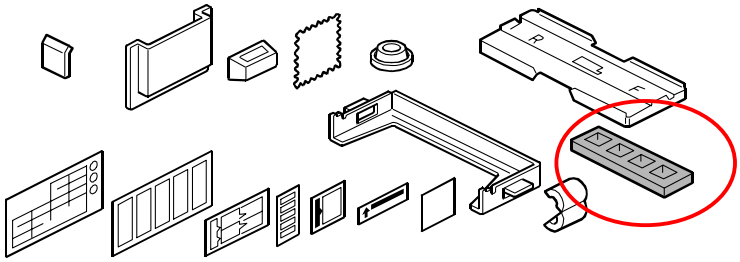
Main Copier Installation Important Points

Packing Materials and Retainers

Slide 56

- These slides show the most important points of the installation procedure. They are not the full procedure. To do the full procedure, you must use the manual.
- First, study these important points. Then install your machines.
- If you do not study these important points first, you could damage the machines, and could get hurt.

Accessories Kit

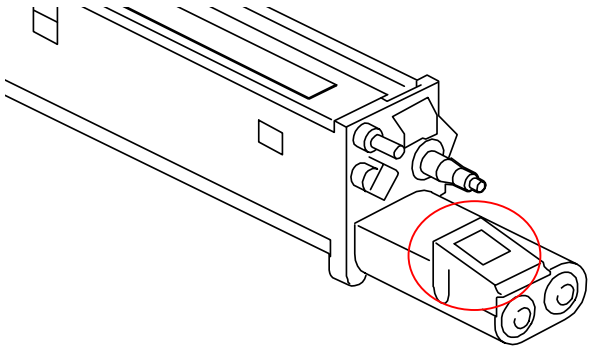


- If you send PCUs to the factory or warehouse, use these caps to prevent toner from spilling out.
  - They are not used during installation.
- There is one cap for each PCU. It goes over the toner supply port (see the next slide).
- These caps are needed when you replace developer. They plug the toner supply ports when you take the PCU out of the machine. This prevents toner from spilling out.

Slide 57

No additional notes

Toner Supply Port



- The toner supply port is here (in the red circle).

Slide 58

No additional notes

Toner and Developer

- The toner for this machine is clearly marked D081/D082.
- The developer for this machine is clearly marked D081.
- Do not use any other types of toner or developer with this machine.
- Please instruct the customer to use only toner cartridges that are produced for this machine.

Slide 59

No additional notes

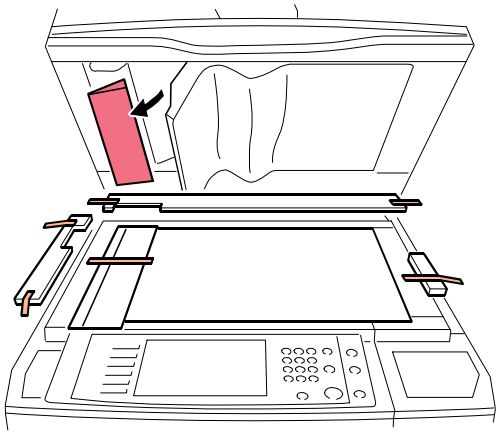
SP Mode Factory Setting List

- This list is under the ADF cover. Remove it.
- Keep it safely for future reference. Do not throw it away.

Slide 60

No additional notes

Remove the Red Paper

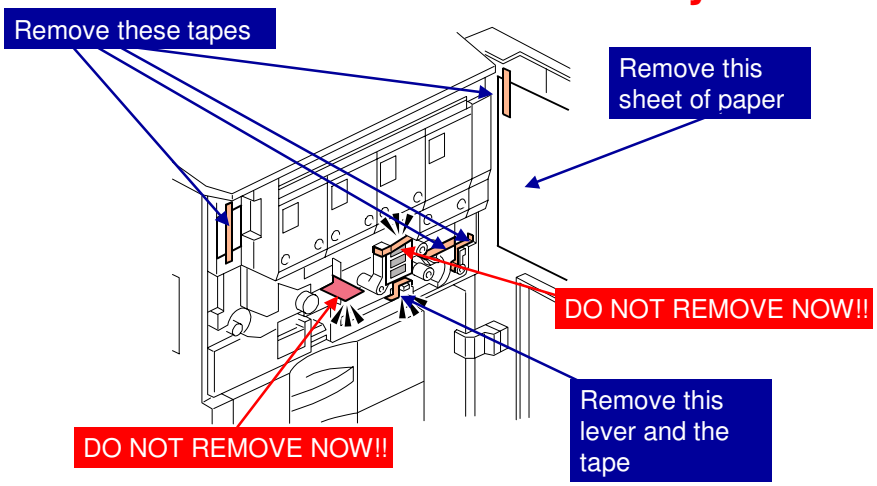


- Pull away the white plate and remove the red paper.

Slide 61

No additional notes

Remove These Items Only!!

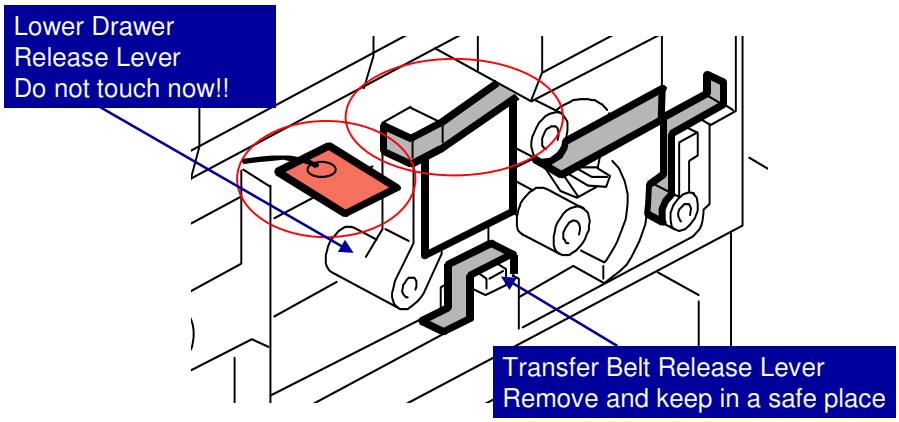


- **Do not remove anything else at this time!**
  - See the next slide for details.

Slide 62

No additional notes

Do Not Remove These Items Now!!



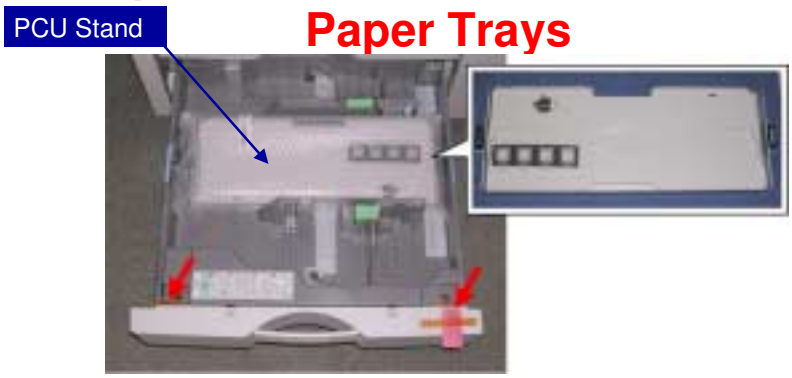
- **At this time, do not remove the two retainers shown in red circles, and do not try to pull out the drawer unit.**
- **Remove the tape that holds the transfer belt release lever, and remove the lever. We will use this later during installation.**

Slide 63

V-C3 field service manual, Installation, Copier, Installation, Internal Tapes and Packing Material

- This is what you see when you open the front cover.
- The transfer belt release lever is taped in a temporary shipping location, as shown here. We remove it now and put it in the correct position later.
- The other lever in the diagram is the lower drawer release lever.
- Normally during installation, you tear out all the retainers. But do not do this for this machine.
- If you pull out the two retainers that are shown above, you will damage the image transfer belt. This is because, at this time, the belt is not under tension, and if you pull the drawer unit out, you will damage the belt.
- We remove these retainers after we remove the faceplate.

Unpack the Accessories from the Paper Trays

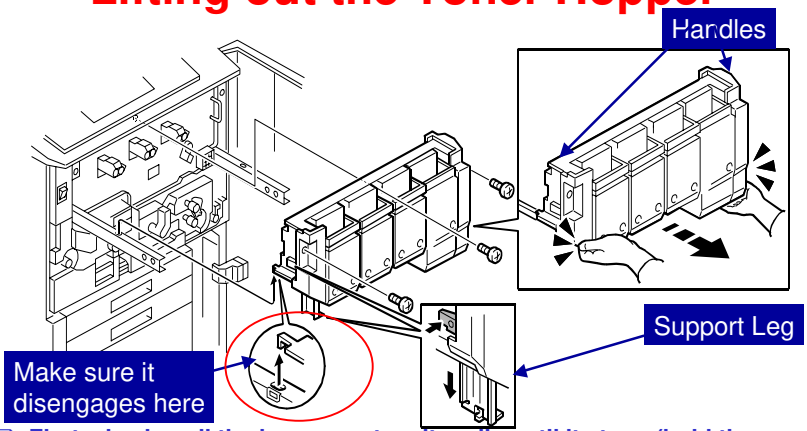


- **The PCU stand is in Tray 2.**
  - This is the same as the PCU stand for the V-C2.
  - The correct storage location for this is explained later in the course.
- **Tray 3 also contains accessories. Unpack them as shown in the manual.**

Slide 64

- The V-C3 PCU stand is the same as the V-C2 PCU stand. You can use a V-C2 PCU stand if the V-C3 stand is not available.

Lifting out the Toner Hopper



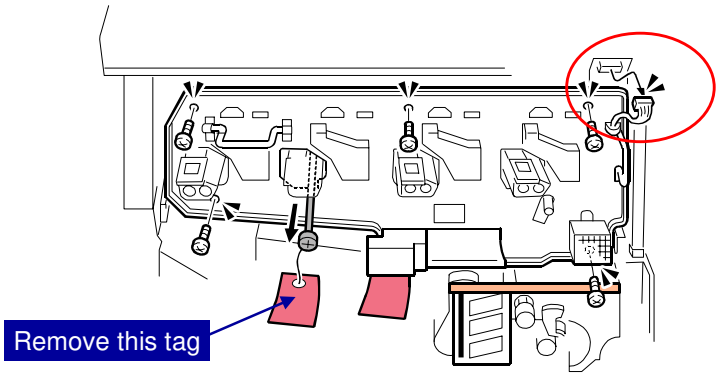
- **First, slowly pull the hopper out on its rails until it stops (hold the bottom front corners of the hopper as shown).**
  - Note: When you pull the hopper out, it can easily slip off the rails.
- **Pull down and lock the support leg.**
- **Lift the hopper off the rail. Use the handles at the top. The hopper is heavy, so make sure that it disengages fully (see the red circle).**

Slide 65

V-C3 field service manual, Installation, Copier, Installation, Shipping Retainer Removal

- Do not use the handles at the top until the final step. If you pull the hopper out of the machine at the start with the handles, the hopper can come off the machine and fall on your feet.
- After this, we remove the faceplate. The manual explains how to do this.

Removing the Faceplate



- Remove the indicated tag. Then disconnect a connector and remove the faceplate.

Slide 66

No additional notes

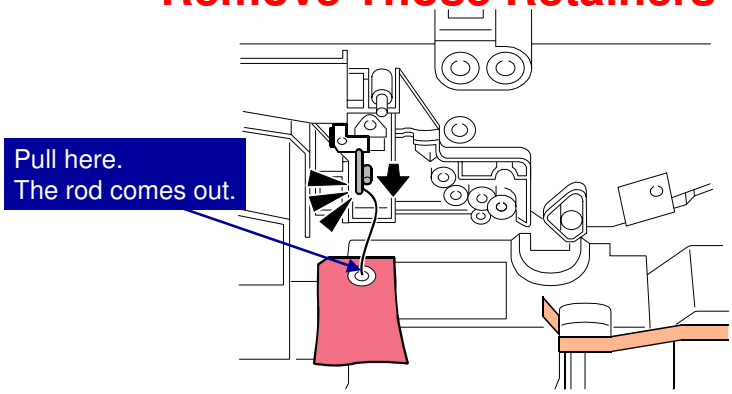
Do not Remove the PCUs

- For this model, we do not need to remove the PCUs during installation.
- Developer is installed without removing the PCUs as we shall see later.

Slide 67

No additional notes

After Removing the Faceplate – Remove Those Retainers



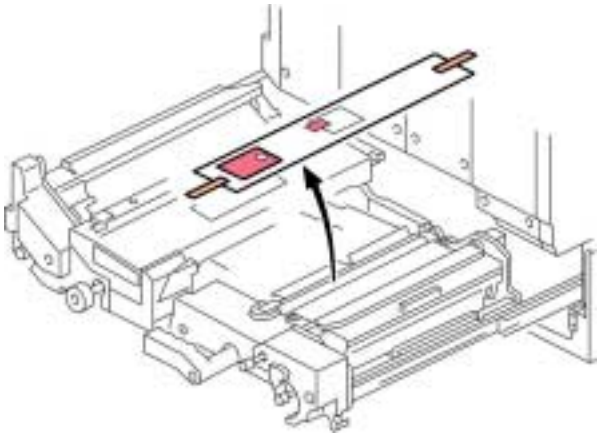
- **Do not pull the drawer unit out until after you remove the stabilizing rod (attached to the red tag).**
- **Pull the tag by the reinforced ring part. If not, you could pull the wire off.**

Slide 68

V-C3 field service manual, Installation, Copier, Installation, Shipping Retainer Removal

- The rod releases the cleaning blade for the transfer belt. It also protects the ITB and PTR during shipping.

Drawer Unit



- **Now you can open the drawer unit, and remove the protective sheet of paper from the drawer.**
  - Do this exactly as described in the service manual.

Slide 69

V-C3 field service manual, Installation, Copier, Installation, Remove Remaining Retainers and Packing Material

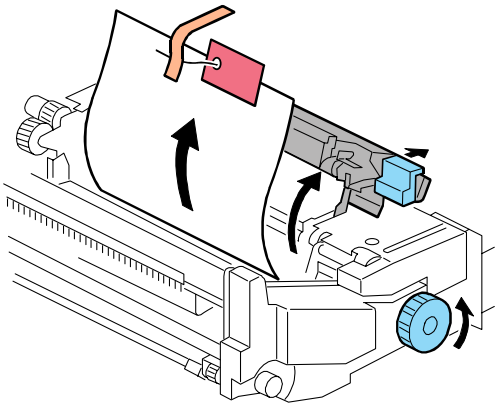
Instruction Sheet

- This sheet protects the PTR during shipping.
- It also reminds you that the stabilizing rod should have been removed already, If not, do it now, before you remove this sheet.
- Do not slide the drawer back in until after you have removed the rod, or the ITB and PTR will be damaged.

Slide 70

No additional notes

Fusing Unit

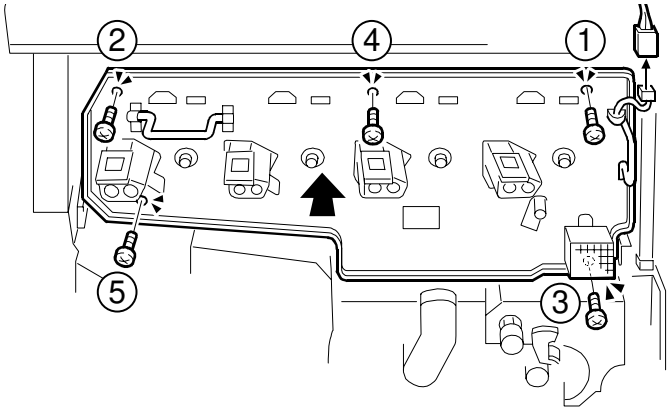


- **Now remove the protective sheet of paper from the fusing unit.**

Slide 71

V-C3 field service manual, Installation, Copier, Installation, Remove Remaining Retainers and Packing Material

Re-attach the Faceplate



- **Attach the screws in the correct sequence. Do not tighten them strongly.**

Slide 72

V-C3 field service manual, Installation, Copier, Installation, Reattach the Faceplate

Main Copier Installation
Important Points

Developer

Slide 73

- These slides show the most important points of the installation procedure. They are not the full procedure. To do the full procedure, you must use the manual.
- First, study these important points. Then install your machines.
- If you do not study these important points first, you could damage the machines, and could get hurt.

Installing Developer

Overview

- **We do not remove the PCU from the machine, so we do not need the PCU stand.**
- **First, we install each developer bottle on a port at the front of each PCU.**
- **Then we remove the seals from each bottle, and make sure that the developer can flow freely from each bottle.**
- **Then, we use SP mode to transfer the developer from the bottles to the PCUs.**
  - The SP installs all 4 developers at once.
  - There are SPs to install individual colors also, but at installation, we can do them all at once.
- **Then we check that the developer was installed correctly.**
  - There is an SP to check for errors.
  - Also, we check visually to see if developer remains in the bottle.

Slide 74

- This slide shows the steps in outline. The next few slides explain these steps in more detail.

Installing Developer

Notes

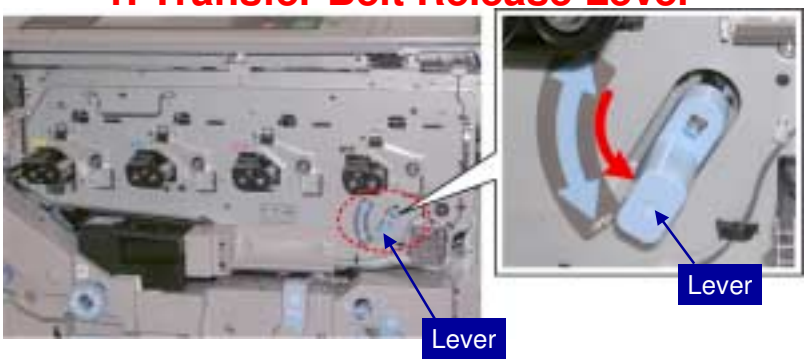
- Do the procedure in the order described in the service manual.
- Do not turn the machine on or off, or open or close the front door, until you are instructed to do so in the installation procedure.
- The toner hopper unit must be off the machine (already done, if you followed the procedure correctly).

Slide 75

No additional notes

Installing Developer

1. Transfer Belt Release Lever



- Attach the lever to the tip of the shaft.
- Rotate the lever down.
- This separates the transfer belt from the surfaces of the PCU drums.

Slide 76

V-C3 field service manual, Installation, Copier, Installation, Filling the PCU Units with Developer

- We removed this lever earlier, with all the retainers.

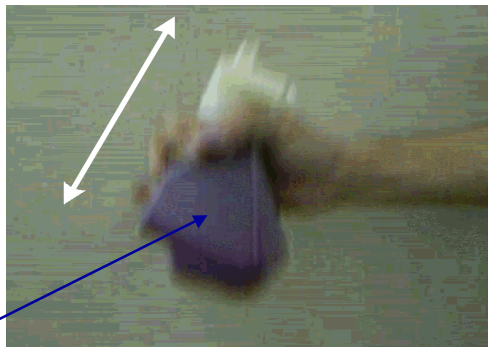
Installing Developer
2. Find the Y Developer Bottle

- **Make sure that it is marked D081 as shown.**
  - There are two models in the V-C3 series: D081, and D082. For both models, the developer is marked D081.

Slide 77

No additional notes

Installing Developer
3. Loosen the Developer



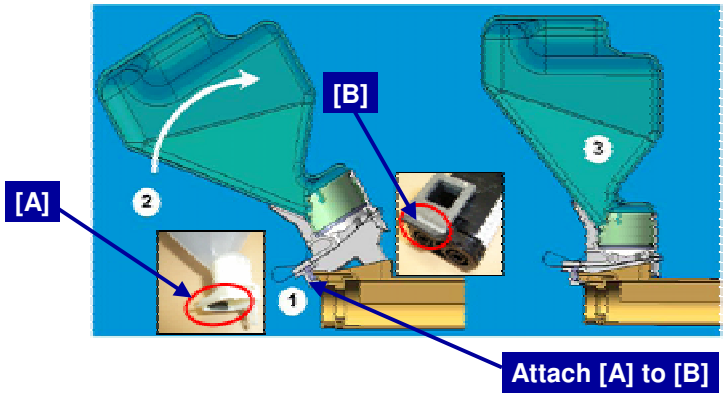
- **Hold the bottle upside down as shown.**
- **Shake the bottle up and down 10 to 15 times.**
  - The opening must point up when you do this.

Slide 78

❒ This is necessary because the developer settles and solidifies during transportation and storage.

Installing Developer

4. Mounting the Developer Bottle on the PCU



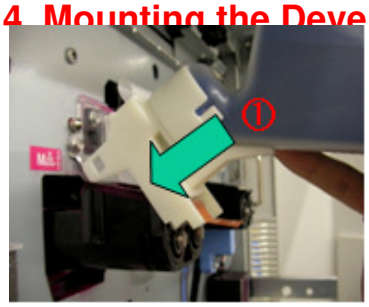
- **Set the opening of the bottle as shown (1).**
  - Make sure that you attach [A] firmly to [B].
- **Swing the bottle up (2) until it snaps into place (3).**
- **The order from left to right is Y C M K**

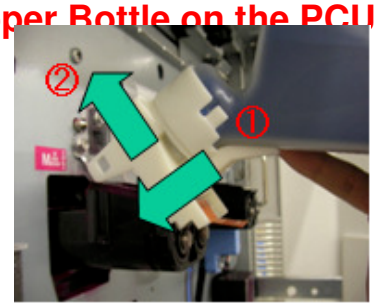
Slide 79

- The next two slides show this procedure in detail.

Installing Developer

4. Mounting the Developer Bottle on the PCU





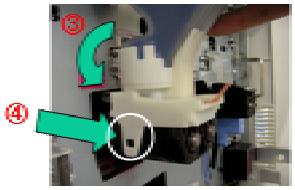
- Rest the neck of the developer bottle on the PCU, as shown in the photo on the left.
- While keeping the contact between the neck of the developer bottle and the PCU, slide the neck upward in the direction of the arrow marked “2”.

Slide 80

No additional notes

Installing Developer

4. Mounting the Developer Bottle on the PCU



Tab

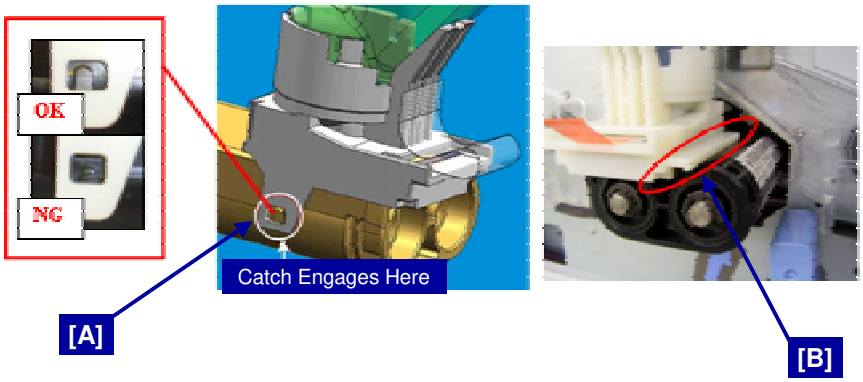
- Rotate the developer bottle up in the direction of the arrow marked “3”, and lock the neck of the bottle into the PCU.
- Check the tab and make sure the bottle is locked in place. If it is not locked in place, push the neck of the bottle in the direction of the arrow marked “4” until it locks.

Slide 81

No additional notes

Installing Developer

4. Mounting the Developer Bottle on the PCU



- **[A] Make sure that the neck of each bottle has snapped into place.**
  - If it is out of place, developer will spill out after the seal is removed.
- **[B] Make sure there is no gap between the developer and the PCU.**

Slide 82

- Then, install the M, C, K bottles in the same way as described on the previous few slides.

Installing Developer

5. Remove the Seals

- Pull out all four seals.
- Hold the bottle with one hand and slowly pull out the seal with the other.
- Tap the side of each bottle to make sure that developer flows freely.

Slide 83

No additional notes

Installing Developer

6. Make sure that the Lever is Down

- The lever must be down before you start the SP modes.
- If the lever is up, SP3814 (fill the PCUs with developer from the bottles) will fail.

Slide 84

No additional notes

Installing Developer
7. SP Mode

- **CLOSE THE FRONT DOOR, THEN TURN THE MACHINE POWER ON.**
- **Wait for the machine to beep twice.**
  - This indicates that the fusing unit is ready.
  - If you do not wait for the beeps, SP3814 (fill the PCUs with developer from the bottles) will fail.
- **Do SP 3814-1.**
  - This moves the developer from the bottles to the development units.
  - It takes about 3 minutes.
  - When “Completed” appears on the display, press “Exit”.
- **Do SP3815.**
  - This checks that SP 3814-1 was executed correctly.
  - If all is correct, you should see “1111” on the display.
  - If another number is shown, see the service manual.
    - » For example, if “1191” is displayed, this could mean that the tape was not removed from the C bottle.

Slide 85

CLOSE THE DOOR BEFORE YOU TURN THE POWER ON.

- This is required by the software.
- In other color products, we keep the door open to prevent initial process control.
- However, for this machine, it is different. How does the machine detect that it is not time to start process control? At this time, the toner hopper has been removed. The machine detects the absence of the electrical connection to the toner hopper, and when it detects this, it does not start the initial process control.

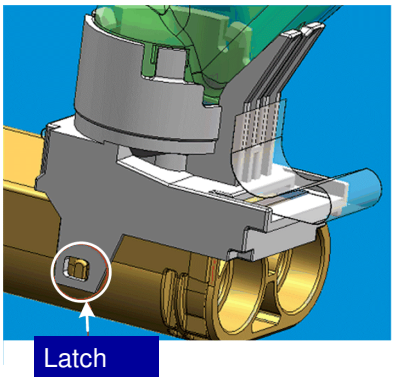
Installing Developer
8. Check Each Bottle

- **Even if SP 3815 shows no errors, there may be developer remaining in the bottle.**
- **Touch Exit twice, then open the front door.**
- **Shine a light through the neck of the bottle to make sure that the bottle is empty.**
  - Try this with a full bottle and an empty bottle, and make sure that you can understand the difference between them.
- **If developer remains in the bottle, do SP 3814 for that color again.**
  - See after the next slide for more details.

Slide 86

- What to do if a bottle is not empty?
  - See after the next slide.

Installing Developer
8. Check Each Bottle



- **If all bottles are empty, turn the machine power off and disconnect the power cord.**
- **Remove the empty developer bottles.**
  - It may be necessary to use a small screwdriver to disconnect the bottle at the latch.

Slide 87

- What to do if a bottle is not empty?
  - See the next slide.

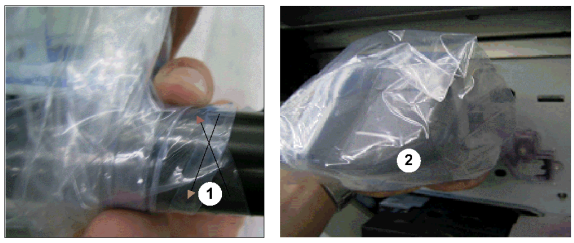
If the Bottles are not Empty - 1

- **First, check you removed the tapes and that the bottles are attached correctly.**
- **Use SP3814 again.**
  - Do SP3814-1 to 6 for the color of whichever PCU is to be filled with developer.
    - » These SP codes fill the PCUs with developer from the developer bottle.
  - Hold the bottle to prevent it from coming off, then tap the bottle gently a few times.
  - Open the front door, then turn on the main power switch.
  - When you see the door open message on the screen, close the door.
  - Wait about 40 sec. until the SC code appears on the screen, then turn off the power switch.
  - Repeat this procedure until the bottle becomes empty.
  - After 10 attempts if the bottle is still not empty, do the procedure on the next slide.

Slide 88

V-C3 field service manual, Removal and Adjustment, PCU, Developer Replacement, Handling Problems with Developer Filling

If the Bottles are not Empty - 2



temp_devbotoff

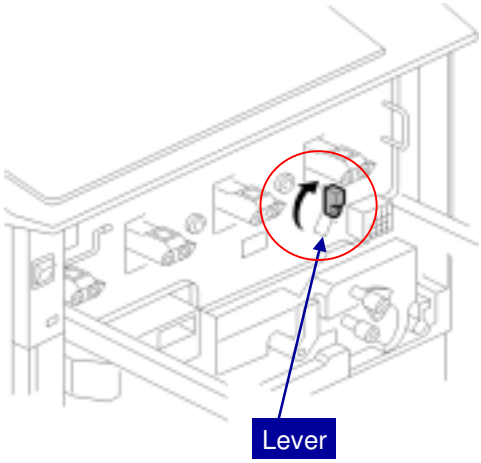
- **The developer has probably clogged inside the bottle, so you must remove the developer bottle and the PCU.**
  - Cover the toner bottle with a plastic bag and seal the mouth of the bag with your hand (1).
  - Remove the bottle (2).
  - Remove the faceplate and remove the PCU from the machine.
  - Open the top of the development unit
  - Pour remaining developer from the bottle into the development unit.

Slide 89

No additional notes

Transfer Belt Release Lever

- **Then turn the transfer belt release lever to the vertical position until it locks.**
  - DO NOT FORGET THIS, OR YOU WILL GET AN SC CODE!!

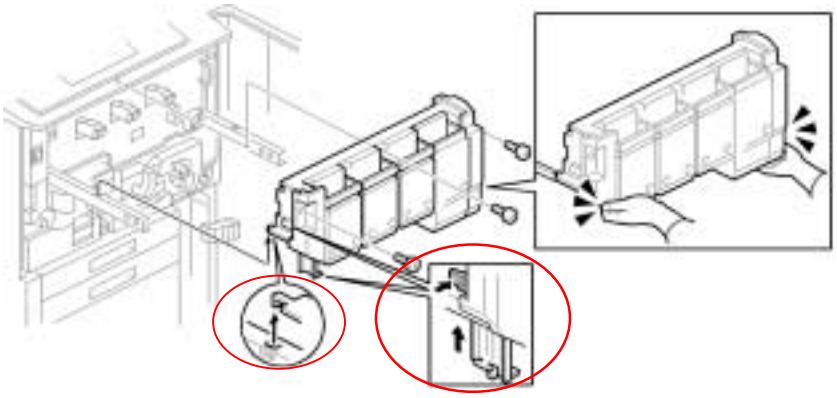


Slide 90

V-C3 field service manual, Installation, Copier, Installation, Reinstall the Toner Hopper

- If you forget to turn it to the vertical position, you will get an SC code, as shown in the service manual.

Install the Toner Hopper



- Make sure that the support leg is up and locked before you push the toner hopper into the machine.
- Never press in on the top of the toner hopper.

Slide 91

V-C3 field service manual, Installation, Copier, Installation, Reinstall the Toner Hopper

Install the Toner Hopper

- The transfer belt release lever must be turned up and locked before you install the toner hopper.
- If the transfer belt release lever is down, the toner hopper cannot be closed completely against the faceplate.
- If the transfer belt release lever [A] is not attached, this will cause an image transfer roller position error (SC447).

Slide 92

No additional notes

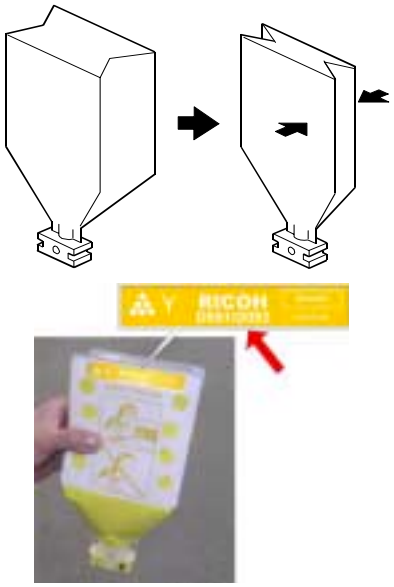
Main Copier Installation
Important Points

Toner

Slide 93

- These slides show the most important points of the installation procedure. They are not the full procedure. To do the full procedure, you must use the manual.
- First, study these important points. Then install your machines.
- If you do not study these important points first, you could damage the machines, and could get hurt.

Toner Cartridges



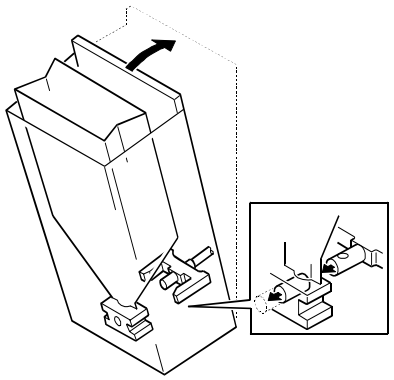
- This type of cartridge is called an STC (Soft Toner Cartridge).
- The cartridge walls collapse slowly when toner is used.
- Make sure that the cartridge is marked D081/D082. Do not use another type of toner.

Slide 94

No additional notes

Toner Cartridge

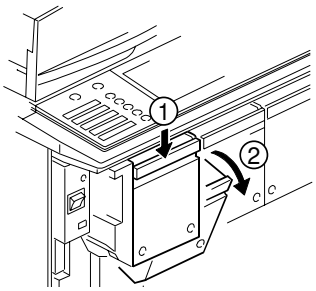
- **When you put a cartridge in the hopper and close the cover, a plug opens a port in the bottom of the cartridge, and toner can go out through the bottom.**

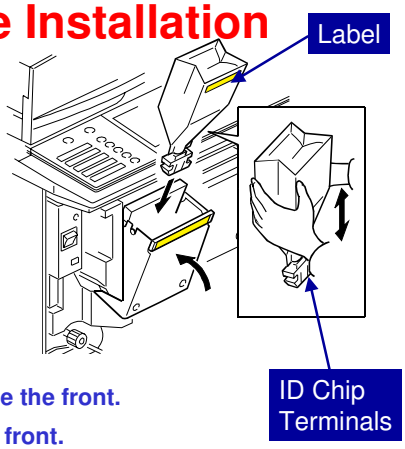


Slide 95

- At elevations 1,000 meters (3,280 ft.) above sea level, the toner cartridge packs may expand, and prevent you from installing them in their bins.
- After approximately 24 hours, the cartridges should shrink to normal size.
- But if you cannot wait, there is a service part to bleed off the pressure inside the cartridge before you install it.

Toner Cartridge Installation





- **The label on the cartridge must face the front.**
- **The ID chip terminals also face the front.**
- **Shake the cartridge up and down (not side to side) 10 times.**
  - Do not squeeze. This will form clumps in the toner.
  - Do not hold the cartridge upside down.
- **Make sure that you install the cartridges in the correct bins.**
  - There are decals on each bin.

Slide 96

V-C3 field service manual, Installation, Copier, Installation, STC (Soft Toner Cartridge) Installation

Main Copier Installation Important Points

Initializing Developer and Toner

Slide 97

- These slides show the most important points of the installation procedure. They are not the full procedure. To do the full procedure, you must use the manual.
- First, study these important points. Then install your machines.
- If you do not study these important points first, you could damage the machines, and could get hurt.

Important Note about Initialization

- When installing this machine, we use SP 3811 to initialize the TD sensor after adding developer.
- SP3811 does a number of things, including initialization of the TD sensor.
- You must not initialize the TD sensor again.
- Do SP3811-1 only once.
- SP 3801 also initializes the TD sensor. Never do SP3801-1 (Init TD Sensor) after doing SP3811. If the TD sensor is initialized twice this will cause a fatal error in toner supply control.

Slide 98

No additional notes

Comparing SPs 3801 and 3811

- SP 3801 initializes the TD sensor for the new developer.
- SP 3811 does the same, but it also sends toner to the sub hopper of the PCU, covers the drum with a layer of toner (to prevent the cleaning blades from flipping, or damaging the drums), and does process control. It takes about 4.5 minutes.
- During installation, and after replacing the PCU, we use SP 3811.
- After replacing developer only, we use SP 3801.
- After using SP 3801 or 3811, do not use them again until the next time you replace the developer. Otherwise, you will cause toner scattering inside the machine. To cure this, you must replace the developer.
- Only use the SP modes for initializing the TD sensor at the times stated in the service manual.

Slide 99

No additional notes

Initializing Developer and Toner

Overview

- **The procedure must be done exactly as stated in the manual.**
- **You must open the front door before you turn the power on.**
  - This prevents initial process control from starting automatically.
  - If you forget, then you must change all the developers.
- **Turn the power on. Then, 'Open Cover' will be shown on the display. Then, you can close the front door.**
- **After you close the front door, you can do SP 3811 001.**
- **This adds toner, initializes the TD sensor, and does process control.**
  - Do not use SP 3801 or 3811 again, to initialize the TD sensors again, until the next time you replace the developer. Otherwise, you will cause toner scattering inside the machine. To cure this, you must replace the developer.
  - Only use the SP modes for initializing developer at the times stated in the service manual.

Slide 100

V-C3 field service manual, Installation, Copier, Installation, Initializing Developer and Toner

❒ This slide shows the important points about initializing the machine.

Initializing Developer and Toner
1. Open the Front Door

- **Open the front door, then turn the power on.**
  - Then, the machine will not start the initial process control self-check.
  - If the front door is not open, the drums will turn with no toner in the PCUs.
  - If the drums turn with no toner in the PCUs, this can cause the cleaning blades to catch on a dry drum and cause damage to the drum surfaces.
- **Then, 'Open Cover' will be shown on the display. Then, you can close the front door.**
  - You can hear a motor before you close the cover. This is the fusing unit. The PCUs do not turn at this time.

Slide 101

- You have to open the door this time.

Initializing Developer and Toner

2. Wait 2 Minutes

❑ **Wait for the machine to warm up.**

- This should be about 2 minutes.

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❒ Wait until the normal machine ready display appears.

Initializing Developer and Toner
3. SP Modes

- **Do SP 3811 001.**
  - This sends toner to the sub hopper of the PCU, covers the drum with a layer of toner (to prevent the cleaning blades from flipping, or damaging the drums), initializes the TD sensor, and does process control. It takes about 4.5 minutes.
  - If 'Failed' appears immediately after you start, the machine is not warmed up. Wait 2 minutes then do SP 3811 001 again.
- **Then check that the initialization was done correctly. To do this, use SP 3812.**
  - If the display is not '1111', see 'Special Procedures' in the Troubleshooting section of the manual.
- **Then check that the initial process control was done correctly. To do this, use SP 3821 001.**
  - If the display is not '10101010', see 'Special Procedures' in the Troubleshooting section of the manual.

Slide 103

- Forced MUSIC is done later with a user tool.

SPs 3801 and 3811 - Very Important!!!!

- **Only initialize the TD sensor at these times:**
  - At installation, exactly as explained in the procedure.
  - After you replace developer (only initialize the TD sensor for the colour that you replaced)
  - As instructed in specific troubleshooting procedures.
- **Only initialize the sensor one time. Do not do it more than one time.**
- **Never do SP 3801 after doing SP 3811. If the TD sensor is initialized twice for the same batch of developer, a fatal error will occur with toner supply control.**
- **If you do not obey the above instructions, you will get toner scattering inside the machine.**
  - It is possible that many instances in the field of toner scattering are caused by initializing the TD sensor more than one time.
- **To repair the machine, you must replace the developer (after you clean the machine!).**

Slide 104

- If a technician initializes the sensor more than one time, the developer must be replaced. But it is not easy to know that a mistake was made until toner scattering occurs inside the machine. Then it is too late.
- A common source of error is to replace one developer (for example, black), but then do the TD sensor initialization for all colours. Then you have to replace the C, M, and Y developers.

Why should we not initialize the TD sensor more than once?

- See “Handout 1 - Do not Initialize the TD Sensor More than One Time!”

Problems Related to Developer Installation

- **The following symptoms are related to developer installation:**
  - 1. Image density is too light
  - 2. The toner end alert does not turn off after one or more brand-new toner cartridges are installed
  - 3. Toner scattering inside the machine
- **If you face these symptoms, please check that you did the developer installation correctly, and refer to Special Procedures in the Troubleshooting section of the service manual.**

Slide 105

No additional notes

Main Copier Installation
Important Points

Completing the Installation

Slide 106

- These slides show the most important points of the installation procedure. They are not the full procedure. To do the full procedure, you must use the manual.
- First, study these important points. Then install your machines.
- If you do not study these important points first, you could damage the machines, and could get hurt.

Add Paper to Trays 1-3

- **Tray 1: Tandem Tray**
  - The default is set for each region (for example, A4 for Europe/Asia).
- **Trays 2 and 3: These are universal trays. They can detect a lot of standard paper sizes, but you must put the side and end fences in the correct positions.**
- **To use a non-standard or custom size, you must input the required size with a user tool.**
  - The default setting of this user tool is 'Auto Detect'. This uses the input from the sensor.
  - We will see this again in the Paper Feed section of the course. At this time, please use a standard paper size and move the fences to the correct positions.
  - Put A3 or DLT paper in one of the trays. We need it for the next step.

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V-C3 field service manual, Installation, Copier, Installation, Load the Paper Trays

Notes concerning Trays 2 and 3

- **If the user does not put the fences at the correct position, a jam can occur.**
- **To use a paper size that is not in this table, select the size with this user tool: System Settings> Tray Paper Settings >Tray Paper Size.**
  - If the paper size is not the same as the setting, a jam can occur.
- **Note that SP 5112 must be set to 'enabled' or non-standard sizes cannot be selected for trays 2 and 3.**

Slide 108

No additional notes

Make a Test Color Print

- **Make a color copy of a C-4 color chart.**
  - It must be on A3 paper, and you should use a sample of the paper that the customer will normally use for color copies.
- **If the color is not good, do the ACC procedure.**
  - This is described in the installation procedure.

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V-C3 field service manual, Installation, Copier, Installation, Make a Test Color Print

Color Registration (MUSIC)

- **Do a forced MUSIC adjustment with the following user tool.**
  - User Tools > Maintenance > Color Registration
  - Touch ‘OK’ to do the procedure.
- **If the adjustment is successful, "Color Registration is completed." is displayed. If it does not appear, try again.**

Slide 110

- This is now a user tool.
- MUSIC (Mirror Unit for Skew and Interval Correction) – This process is explained in more detail in the Laser Exposure section of the course.

Set the Counter Type

- **SP5045 001 can change the counter type for the display. If you want to change this, change it before you make the SMC report.**
  - The default for the counter is ‘developments’.
- **Then you can print an SMC report. Keep it in a safe location.**

Slide 111

V-C3 series service manual, Installation, Copier, Installation, Counter Display Setting

- In the V-C2, you cannot change this setting back to ‘developments’ if you change it to ‘pages’, unless you use an SSP mode.
- For the V-C3, you can change it again at any time.

SP Settings (1)

- **Service Tel. No. Setting: SP5-812-001 through 004**
  - 001: Service station telephone number
  - 002: Service station fax number. This number is printed on the counter list when meter charge mode is selected. This lets the user fax the counter data to the service station.
  - 003: Supplier of consumables
  - 004: Sales representative
- **For machines with built-in hard disks (color scanner models): At installation, it is not necessary to format the hard disk or transfer the stamp data.**
  - However, if the hard disk is replaced, you must transfer the stamp data (SP 5853), format the hard disk (SP 5832 001), and copy the address book from the backup on an SD card (SP SP5846-052).
    - » Normally, it is a good idea to make a backup of the address book on an SD card with SP 5846 051 whenever you visit the customer.

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- Some of these do not appear in the service manual.
- The note for the hard disk only applies to models with a color scanner. The monochrome scanner model does not have a hard disk.

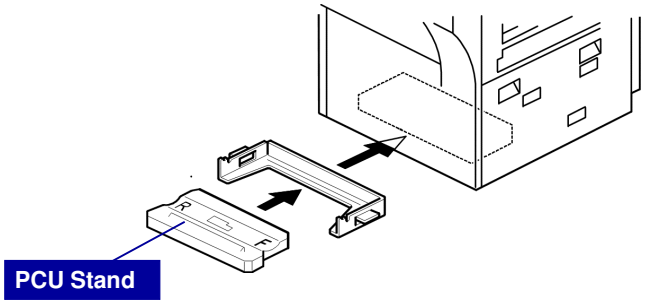
SP Settings (2)

- You must enable USB with SP 5985-2.

Slide 113

No additional notes

Others

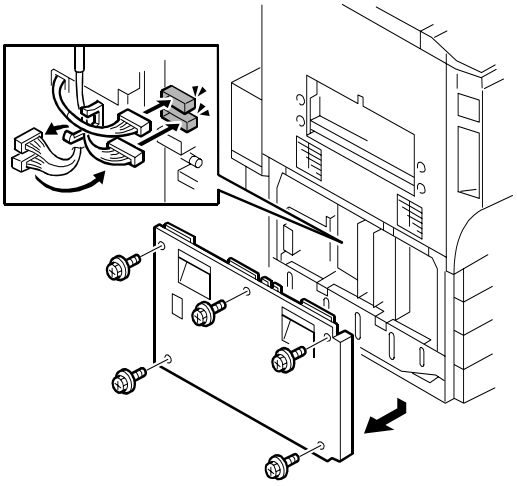


- **Make the machine level.**
- **Store the PCU stand inside the machine.**
  - Make sure that the special tool is there.
- **Print an SMC report and keep it with the machine.**
  - Keep it with the SP Mode factory Setting sheet you removed earlier.

Slide 114

No additional notes

Connect the Tray Heaters

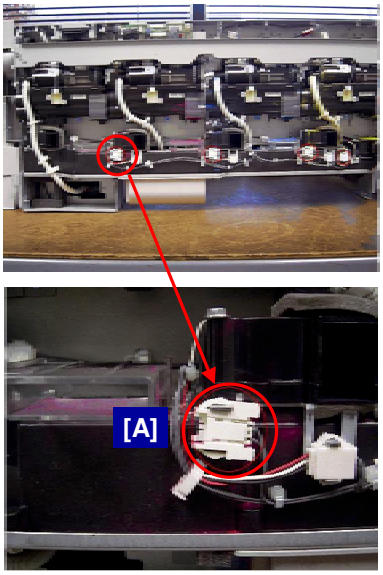


- If the location has high humidity, you should connect these heaters.
- Ask the customer first. The customer may not want the extra energy expenses.

Slide 115

V-C3 series service manual, Installation, Copier, Installation, Connect the Upper and Lower Tray Heaters

Connecting the Tray Heaters



- Do not connect the connector [A] for the Black PCU Fan Motor.
- This connector is disconnected on purpose, for the following reason:
- A certain amount of toner scatters inside the machine, which is normal. However, sometimes, the black PCU cooling fan blows some of this toner onto the ID sensor.
- This can generate an SC error.
- This does not happen with the PCU fan motors for the other colors, because these fans are located far from the ID sensor.

Slide 116

No additional notes

Inkjet Paper Caution Decals

- **Do not use inkjet paper in this machine.**
- **To remind the user, attach the decals to each paper tray (and for the optional LCTs) as shown in the manual.**
- **The example above shows where to attach the decal for tray 1 (tandem tray).**

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- An English decal is already attached to the tray. If you wish to attach a decal for another language, just put the new decal on top of it.
- Do not try to remove the English decal.

Installation

Paper Feed Options

Slide 118

No additional notes

Installing the A4/LT Large Capacity Tray (B473)

- **First, you must install the LCT Adapter.**
  - This procedure removes the casters from the LCT. This makes it more difficult to move the machine.
- **Then install the LCT.**
  - Do not put the LCT on its right side (the open side), or you will bend the ground plate
- **The side fences are set for A4. If you want to change this to LT, to the procedure as shown in the service manual.**
  - The customer cannot do this.
- **Select the correct paper size with SP 5959 002.**

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V-C3 series service manual, Installation, LCT (B473)/LCT Adapter (B699)

- This is the same LCT as the MT-C2.
- But in the V-C1/V-C2, the paper feed slot is at a different position at the side of the machine. Because of this, we must install the LCT adapter first. If not, the LCT feeds the paper into the metal plate at the side of the machine.

Installing the LG/B4 tray for the A4/LT LCT

- **This lets the LCT feed paper up to LG/B4 size.**
- **After you install this tray, select the correct paper size with SP 5959 002.**

Slide 120

V-C3 series service manual, Installation, LG Unit for A4/LT LCT (B474)

- This is the same unit as the MT-C2.

Installing the A3/DLT LCT (D350)

- **Two people are necessary to move this unit.**
- **You must remove the bypass tray from the machine. The LCT uses the paper feed inlet for the bypass tray.**
  - Keep it in case the customer wants to uninstall the LCT later.
- **There is no SP adjustment for the paper size setting with this LCT.**
- **If the customer wants to change the paper size, the fences have to be moved.**
  - This is in the Operating Instructions (Troubleshooting manual).

Slide 121

V-C3 series service manual, Installation, LCIT RT4000 (D350)

- LCIT: Large Capacity Input Tray

Tray Heaters for the D350 LCT

- **There are two types.**
  - 120V Model: Both connector harnesses are WHITE.
  - 208V-240V Model: Both connector harnesses are RED.
- **Make sure to install the correct heater**
  - Note for –17 copier models: D081 is 120V, D082 is 240 V

Slide 122

No additional notes

Install the A3/DLT Tray

- Install this tray in the tandem tray.
- This converts the tandem tray to an A3/DLT tray.
- After you install the tray, use SP 5959 001 to select the correct paper size.

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V-C3 series service manual, Installation, A3/11" X 17" Paper Size Tray (B331)

Installing Finishing Options

Overview

Slide 124

No additional notes

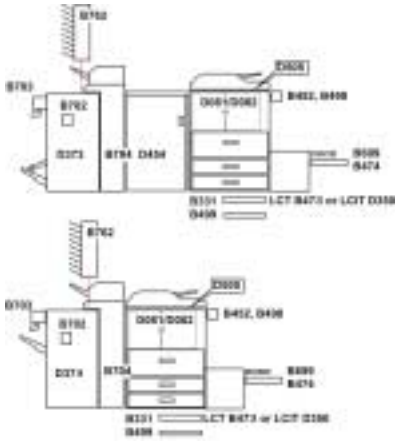
Two Basic Configurations

- **Two basic configurations**
  - Configuration 1: With D373/D374 finisher
  - Configuration 2: With B830 finisher

Slide 125

No additional notes

Configuration 1



- The D454 Multi Folder can be used with the D373 Finisher (and the B830 Finisher) but not with the D374 Finisher.
- The Mailbox (B762) and the Cover Interposer (B704; one tray) cannot both be installed on the same machine.

Slide 126

This configuration features either the D373 Finisher (SR4040 with saddle-stitching) or D374 Finisher (SR4030 no saddle-stitching).

Configuration 1 - Notes

- **Install the items in the order shown on the previous slide.**
  - 1. Copier
  - 2. LCTs – install one of these.
    - One is a new LCT that can handle larger and thicker paper.
    - The other is an older A4/LT model. It requires an adapter for installation on this machine. It also has an optional LG tray.
  - 3. Copy tray – only if no finisher will be installed.
  - 4. Folder – the D373 finisher must be installed
    - You cannot install the folder with the D374 finisher.
  - 5. Mailbox or Cover Interposer – a finisher must be installed
    - The cover interposer unit is installed on the finisher
  - 6. D373 or D374 finishers:
    - D373: 2000-sheet, booklet folding and stapling.
    - D374: 3000-sheet, corner stapling only.
    - These have an optional punch unit and an optional jogger unit.
    - No finisher adapter is necessary.
    - Connect the cover interposer to the finisher, then dock the cover interposer/finisher assembly to the copier.

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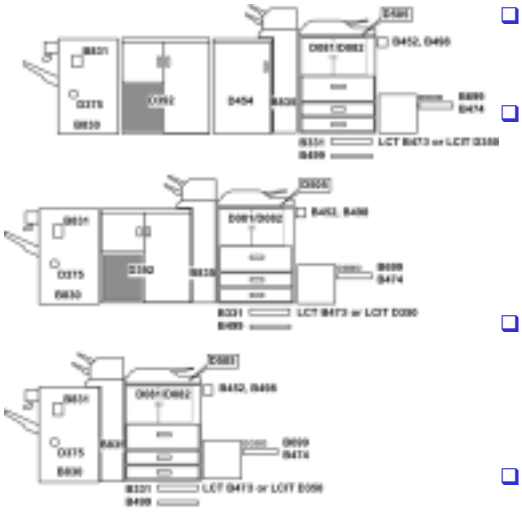
Other units; install in any order

- A3/11"x17" Tray Type: Option for tandem tray
- Tab Sheet Holder: Option for tandem tray
- LG Unit for A4/LT LCT: Option for LCT B473
- Punch Unit: For either finisher D373 or D374
- Output Jogger Unit: For either finisher D373 or D374
- Key Counter Bracket: Counter option
- Card Reader Bracket: Counter option

Configuration 2



- **The Ring Binder (D392) can be used with or without the Multi Folder (D454).**
- **The Ring Binder can be installed only with the Finisher B830 (SR5000).**
  - It cannot be installed with either the Finisher D373 (SR4040) or Finisher D374 (4030).
- **In all three configurations, the Cover Interposer (B835; two trays) must be installed on the left side of the main machine.**
- **The mail box cannot be installed.**

Slide 128

This configuration features the SR5000 Finisher.

- The cover interposer tray (B835) is different from the one in Configuration 1. It has two trays.
- Note that the position of the folder is different when installed with this finisher.

Configuration 2 - Notes

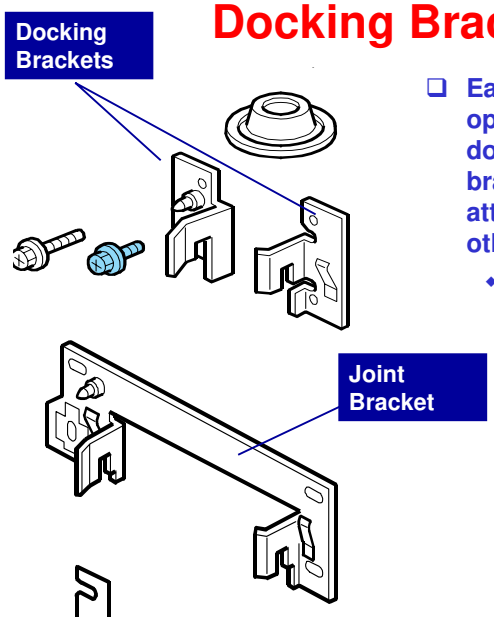
- **Install the items in the order shown on the previous slide.**
  - 1. Copier
  - 2. LCTs – install one of these.
    - One is a new LCT that can handle larger and thicker paper.
    - The other is an older A4/LT model. It requires an adapter for installation on this machine. It also has an optional LG tray.
  - 3. Copy tray – only if no finisher will be installed.
  - 4. Cover Interposer – a finisher must be installed
    - The cover interposer tray is installed on the folder, not the finisher. So, the order of installation is different from Configuration 1.
  - 5. Folder – the B830 finisher must be installed
  - 6. B830 finisher – a finisher adapter must also be installed
    - 3000-sheet, corner stapling only, jogger built-in.
    - Optional punch unit

Slide 129

Other units; install in any order

- Same as configuration 1, except for the punch option (different) and the jogger option (built-in)

Docking Brackets

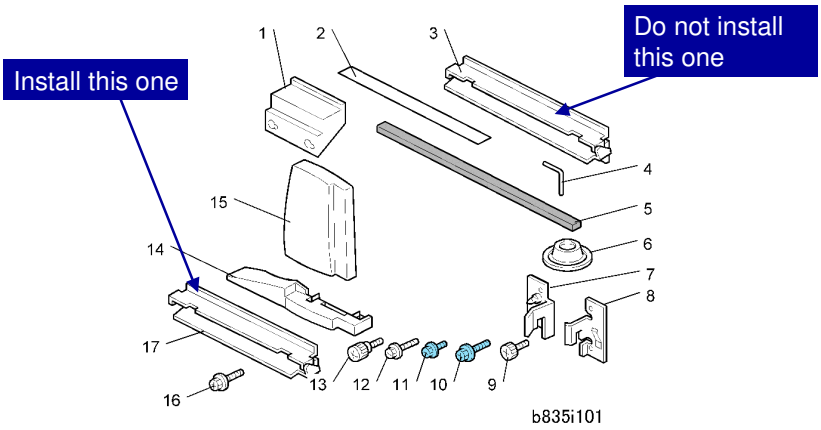


- **Each of the finishing options comes with docking brackets or joint brackets that are used to attach the devices to each other.**
  - The docking procedures are explained in the installation procedures for each device.

Slide 130

- The joint bracket that is packed with the B830 finisher can be used with all other models that use this finisher, such as the B234 (Katana-C1) series.

Paper Guides



- **Many of the peripherals have two entrance guide plates packed with the accessories.**
- **For the V-C3 series, always use the short one.**

Slide 131

- The example shown here is the B835 cover interposer.

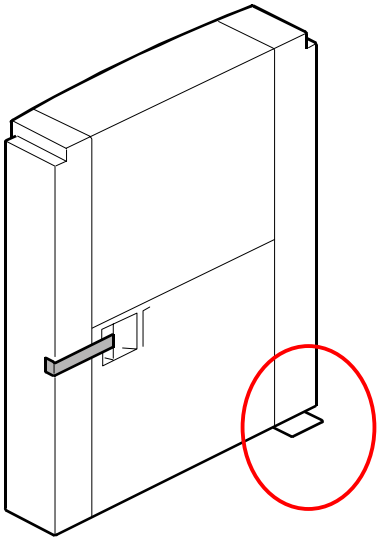
Installing Finishing Options

Installing Configuration 1

Slide 132

No additional notes

Installing the Mailbox

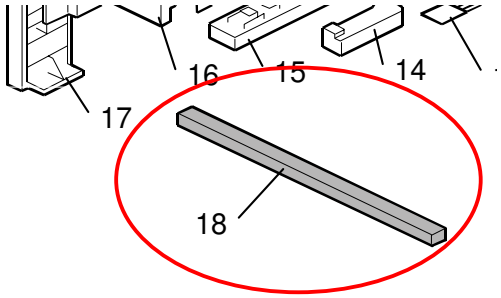


- Be careful when you move the mailbox.
- Do not damage the corner leaf plate.

Slide 133

V-C3 field service manual, Installation, Mail Box (B762)

Installing the Cover Interposer (B704)



- In some cases, you will install this unit on a machine that already has a D373 or D374 finisher attached to it.
- The sponge strip must be removed from the finisher. Keep it and attach it later to the cover interposer tray.
- Install the cover interposer on the finisher.

Slide 134

V-C3 field service manual, Installation, Cover Interposer Tray (B704)

Install the 2000/3000-sheet Finisher (D373/D374)

- **First, remove shipping retainers and packing material from the finisher**
- **Then dock the finisher with the copier.**
  - The details of this procedure depend on whether you will install the cover interposer tray.
  - The sponge cushion must not block the air duct (see the diagram in the manual).
  - Be careful not to damage the entrance guide plates when you move the finisher against the copier.
- **Attach the trays**
- **Make the finisher level, and attach the support tray.**
- **Select the staple supply names for the two types of stapler.**
  - These names are a reference for the customer when they need to order new staples.
  - The names appear on the screen if they press User Tools – Inquiry.

Slide 135

V-C3 field service manual, Installation, 2000/3000 Sheet Finishers (D373/D374)

- The support tray makes the outputs flat. This is necessary because if the paper curls in the output tray, then the tray full sensor will turn on too early.
- Install the Punch Unit (B702) and the Jogger Unit (B703) for these finishers.

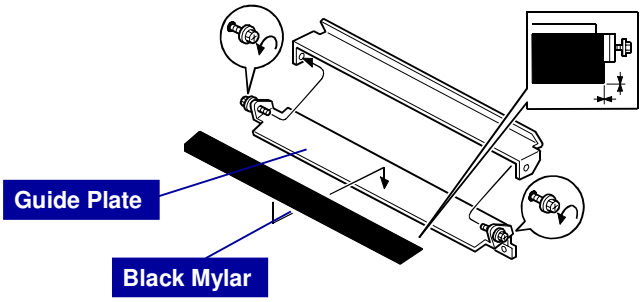
Installing Finishing Options

Installing Configuration 2

Slide 136

No additional notes

Attaching the Mylar and Guide Plate

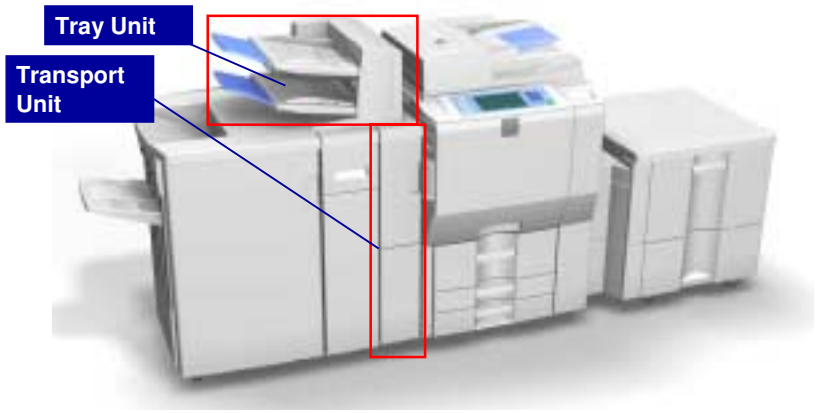


- Attach the black Mylar (included with the cover interposer to the guide plate of the peripheral to the left of the cover interposer.

Slide 137

No additional notes

Cover Interposer (B835)



- **The cover interposer tray contains two units, as shown above**
  - Tray unit
  - Transport unit

Slide 138

No additional notes

Installing the Cover Interposer

- **First, dock the transport unit of the cover interposer to the copier.**
  - Important: Do not put the tray unit on the top of the cover interposer at this time.
- **Then, install and dock the next device to the left of the cover interposer.**
  - This can be the folding unit or the B830 finisher.
  - In this course, it will be the folding unit.
- **Finally, attach the tray unit to the top of the cover interposer.**
  - The tray unit is supported by the cover interposer, and the next unit to the left.
  - Do not attach the feed unit to the top of the cover interposer until after you dock the next device to the left of the cover interposer.

Slide 139

V-C3 field service manual, Installation, Cover Interposer Tray CI5000 (B835)

Important Note about the Cover Interposer

- **Always remove the tray unit from the transport unit at the following times:**
  - Before you disconnect either the cover interposer tray or the next peripheral device to the left
  - Before you do any maintenance on either the cover interposer tray or the next peripheral device to the left.
- **Otherwise, you could bend the frame of the tray unit and damage its alignment.**

Slide 140

No additional notes

Multi-folding Unit (D454)

- **After you install this unit, do the following:**
  - Make sure that the unit is level and at the correct height.
  - Test the breaker switch in this unit.
  - Check for skew and side-to-side registration errors.

Slide 141

No additional notes

Installing the B830 Finisher

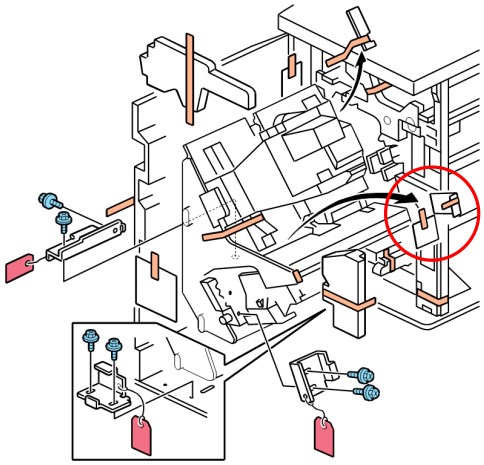
- **First, install the D375 finisher adapter.**
  - This contains a bracket and timing belt assembly to match the finisher with the line speed of the D014 copier.
  - The bracket is identical to the one that is installed in the finisher, but the one in the finisher must be removed and discarded.
- **Then install the finisher.**
- **Then dock it to the next unit (z-folding unit, cover interposer, or copier).**
- **Update the firmware for the finisher.**
  - Download the latest firmware from the website and copy it to the SD card.
  - The SD card that comes with the finisher may contain firmware that is out of date. Do not use this one unless you have no choice.
- **Install the punch unit (B831).**

Slide 142

V-C3 series service manual, Installation, 3000-Sheet Finisher (B830)/Finisher Adapter (D375)

- This finisher was designed for a different product. So the finisher adapter is needed.
- The procedure for the punch unit is the same as the one for the B234 series (Katana-C1)

Installing the B830 Finisher

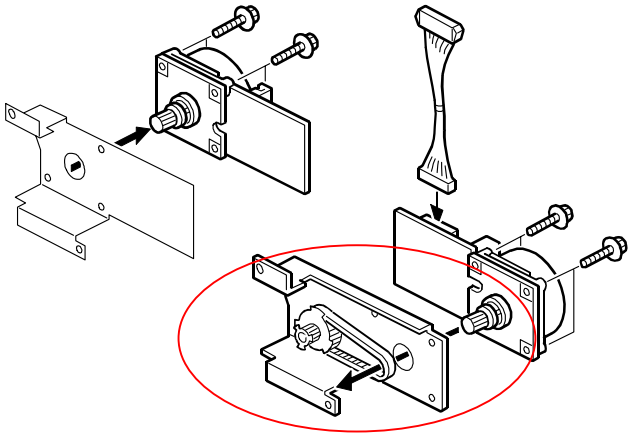


❑ **Remove these two sheets of paper (in the red circle).**

Slide 143

❒ This is a new step in the installation procedure for this finisher.

Finisher Adapter

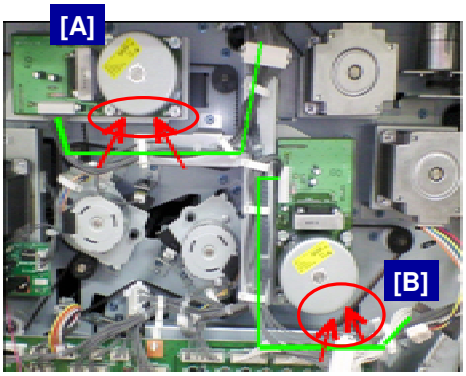


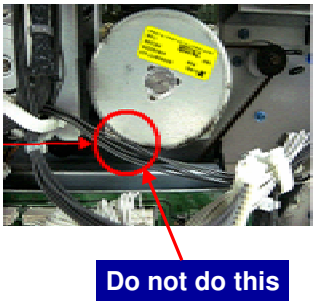
- This gear and timing belt in the finisher adapter kit mechanically adjusts the finisher to match the paper feed speed of this copier.
- The finisher adapter kit also contains an SD card containing firmware for the finisher.

Slide 144

No additional notes

Finisher Adapter





- When installing the D375 finisher adapter, route the harnesses along the green lines in the diagram.
- The harnesses must not touch the motors at [A] and [B]. This will damage the harness,

Slide 145

No additional notes

Installing Finishing Options

Skew and Registration Adjustment

Slide 146

Service manual, Installation, Common Adjustments, Skew and Side-to-Side Registration

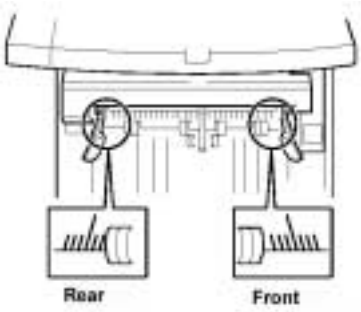
Skew and Registration Adjustment

- The paper feed path is extremely long when all the finishing options are installed.
- In such a long path, the cumulative effect of paper skew and deviation in side-to-side registration may require adjustment.

Slide 147

No additional notes

Where Skew and Side-to-Side Registration Are Measured



- At the exit of the copier and some peripherals, you can measure the skew and registration at two locations, as shown above.
- At both locations, use the two scales to measure the amount of skew or deviation in side-to-side registration.
- Important! There are two scales. The one at the rear is for DLT paper, and the one at the front is for A3 paper. Use the correct scale.

Slide 148

❒ To get access to the measurement point in the booklet finisher, you must remove the upper cover of the booklet finisher.

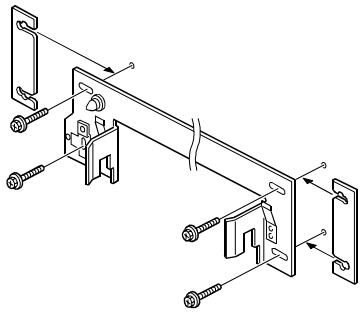
Where Skew and Side-to-Side Registration Are Adjusted

- **Both skew and side-to-side registration adjustment are possible at the outputs of these units:**
  - Cover interposer (two trays; B835)
  - Multi-folder unit
  - Ring binder

Slide 149

No additional notes

Adjustment Bracket



- There is a bracket like this at the locations mentioned on the previous slides.
- To adjust skew, we can insert spacers under one end of the bracket.
- To adjust registration, we can move the bracket from side to side.

Slide 150

- The class will get a chance to try the adjustment later.

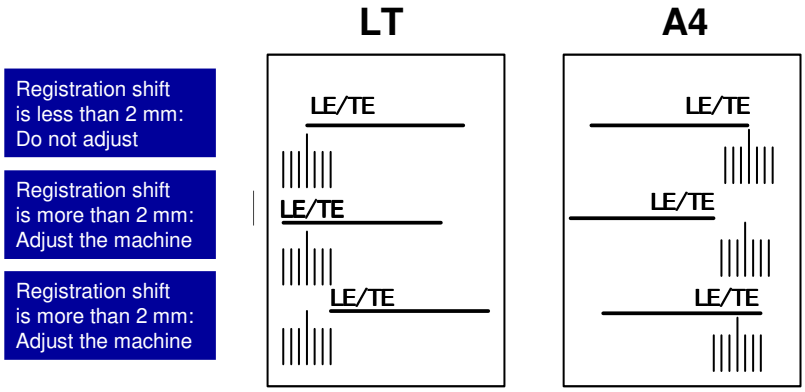
General Rules

- Skew and side-to-side correction can be done only where the unit is docked to the upstream unit with the adjustment bracket (see the previous slide).
- After installing each peripheral device, do some test prints. Check for skew, and check that side-to-side registration is correct.
- If you detect a problem with skew or side-to-side registration, do the adjustment on the adjustment bracket attached to the peripheral unit upstream of the unit where the problem occurred.

Slide 151

- Upstream: Towards the copier exit

When Registration Should Be Adjusted



- If the error is more than ±2 mm, you should adjust the machine.
- The order is not important, but if possible, adjust for registration shift first, then for skew.

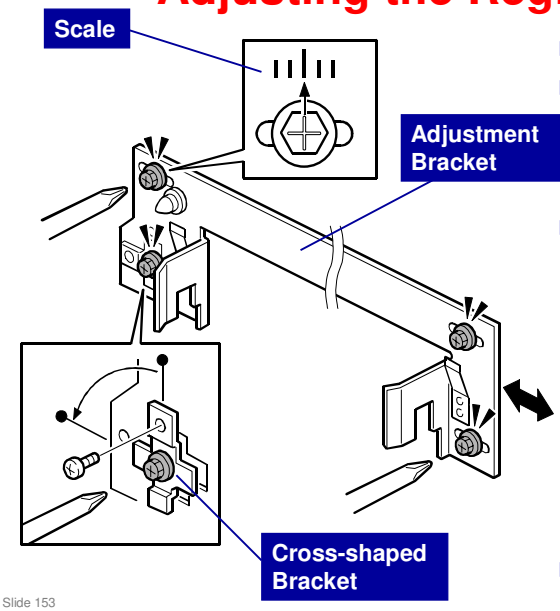
Slide 152

- LE: Leading edge
- TE: Trailing edge

To check for registration shift

- Look at the scale when the leading edge comes by and when the trailing edge comes by. Check where the side edge of the paper is on the scale.
- If the side of the paper is within 2 mm of the central line on the scale, there is no registration shift.
- If the side of the paper is more than 2 mm from the central line on the scale, you should adjust the machine.

Adjusting the Registration



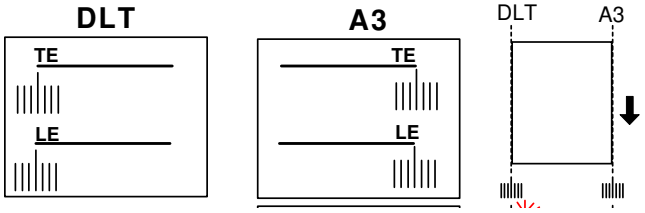
Slide 153

- Loosen the screws.
- Remove the 'cross-shaped' bracket, turn it by 90 degrees, then tighten the screw to secure this bracket.
- Move the adjustment bracket by the same amount as the registration shift.
  - Use the scale to make sure that you move the bracket by the correct amount.
  - If the registration shift was toward the front of the machine, slide the adjustment bracket to the front.
- Then secure the adjustment bracket

Service manual, section 1.13.2

❒ If you move the adjustment bracket, you cannot turn the small cross-shaped bracket back 90 degrees at the end of the procedure, so do not try it.

When Skew Should Be Adjusted - 1



- **Look at the scale when the leading edge comes by and when the trailing edge comes by.**
- **Check where the side edge of the paper is on the scale.**
  - If the side of the paper comes past at the same place on the scale, there is no skew.
  - The above diagram shows an example where no adjustment is necessary.
- **If the error is more than ±2 mm, you should adjust the machine.**
- **Adjust for skew first, then for registration shift.**

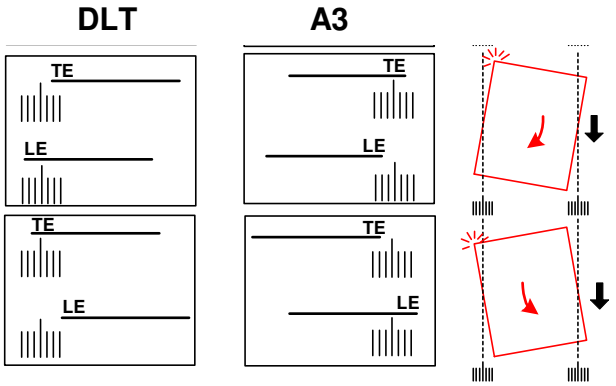
Slide 154

- LE: Leading edge
- TE: Trailing edge

To check for skew

- Look at the scale when the leading edge comes by and when the trailing edge comes by. Check where the side edge of the paper is on the scale.
- If the side of the paper comes past at the same place on the scale, there is no skew.
- If the difference is more than 2 mm, you should adjust the machine.

When Skew Should Be Adjusted - 2



- **In these examples, skew is present. The machine must be adjusted.**
  - The red diagram on the right shows the type of skew.
  - The diagram in the middle shows how this type of skew appears on the A3 scale.
  - The diagram in the middle shows how this type of skew appears on the DLT scale.

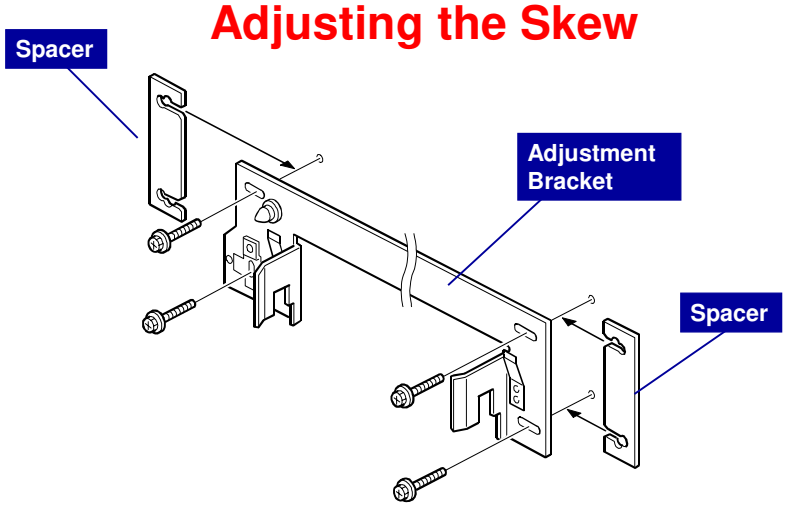
Slide 155

- LE: Leading edge
- TE: Trailing edge

To check for skew

- Look at the scale when the leading edge comes by and when the trailing edge comes by. Check where the side edge of the paper is on the scale.
- If the side of the paper comes past at the same place on the scale, there is no skew.
- If the difference is more than 2 mm, you should adjust the machine.

Adjusting the Skew



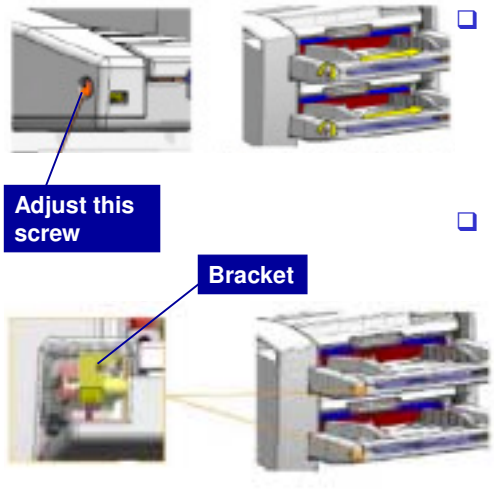
- **Insert spacers below the adjustment bracket.**
  - The service manual shows you where to find the spacers inside the machine.

Slide 156

Service manual, section 1.13.2

❒ If the trailing edge skews towards the rear, insert the spacer at the rear side of the machine.

Adjusting Registration at the Entrance of the B835



- **Adjust the screw at the side of the tray**
  - Turn clockwise: The tray moves to the front
  - Turn anti-clockwise: The tray moves to the rear
- **The tray can be moved a maximum of 2 mm in either direction.**
  - To see the current setting, remove the tray cover and look at the scale on the bracket.

Slide 157

- This slide shows how side-to-side registration can be adjusted at the entrance of the cover interposer.
  - The adjustment is made on the trays, not on the bracket between the peripherals.
- There is no skew adjustment here. Skew can only be adjusted at the exit from the cover interposer (see the previous slide)

Installation

Connectivity Options

Slide 158

No additional notes

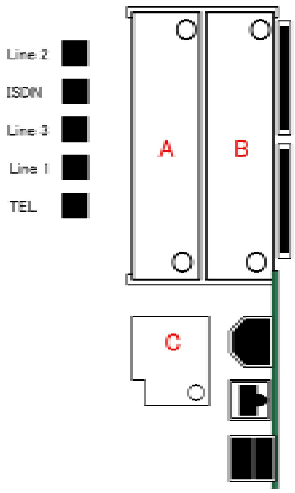
Handling DIMMs and SD Cards

- **Study the correct procedure for handling SD cards and DIMMs.**
  - See the service manual.
- **Static electricity can damage these components. Be careful when you install them.**

Slide 159

V-C3 field service manual, Installation, MFP Controller Options, Handling DIMMs and SD Cards

SD Card Slots



- **Upper slot: All application SD cards**
  - If more than one SD card application is used, it must be merged to the card in the upper slot.
  - The PostScript 3 card must not be copied. If PostScript 3 is installed, the PostScript 3 card must stay in the upper slot and other applications must be merged to it.
  - Browser unit, HDD encryption unit (the SD card is removed after installation)
- **Lower slot: A VM card is inserted here at the factory. This slot is also used for service procedures**
  - Firmware updates
  - NVRAM downloads
  - As the source when merging applications on one SD card.

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V-C3 field service manual, Installation, MFP Controller Options, Overview

- Other cards can be copied to the card in the upper slot. But if Postscript 3 is installed, put the Postscript 3 card in the upper slot and move the other applications to the Postscript card.

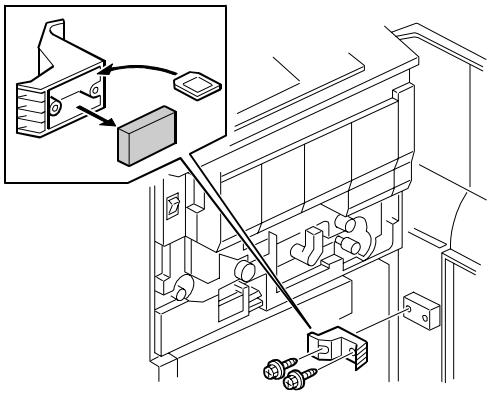
Notes concerning SD Card Slots

- **The card in the upper slot is the target for merge operations.**
- **The VM card must be kept in the lower slot except during service procedures.**
  - The VM card can be removed from the lower slot, in order to update firmware for example. To resume normal operation, just put the VM card back in the lower slot.
  - Before you remove the VM card, you must halt the App 2 Me application if it has been enabled.
    - » For information on how to do this, see the 'App 2 Me – Important Note' slide earlier in the course.

Slide 161

- Procedure: V-C3 series field service manual, Service Tables, Installation, MFP Controller Options, Moving Applications to One SD Card

SD Card Storage Location



- **After you copy a card from the lower slot to the upper slot, the card in the lower slot is disabled.**
- **Do not throw it away. The customer needs to keep it as proof of purchase.**
- **Keep the copied card in the location shown in the diagram.**
  - This is behind the front door.
  - Label each card carefully.

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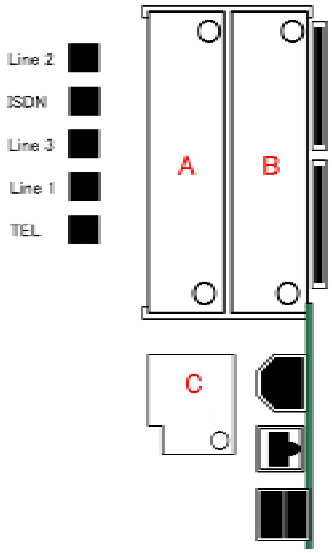
V-C3 field service manual, Installation, MFP Controller Options, Moving Applications to One SD Card

Board Slots



Slot A: Copy Connector (B328) only

Slot B: One of the following:

- IEEE1284 (B679)
- File Format Converter (D377)
- IEEE802.11a/g (D377)
- Bluetooth (B826)

Slot C: Gigabit Ethernet (D377).

- The EFI (Fiery) controller is connected through Gigabit Ethernet.

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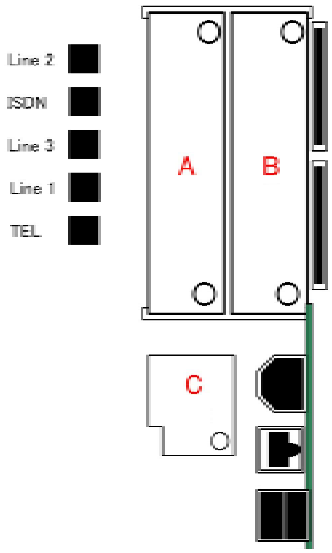
V-C3 field service manual, Installation, MFP Controller Options, Overview

Fax Unit Slots



Line 1: Line out for the Fax Option

Line 2: Line out for an optional G3 Interface Unit

Line 3: Line out for another optional G3 Interface Unit

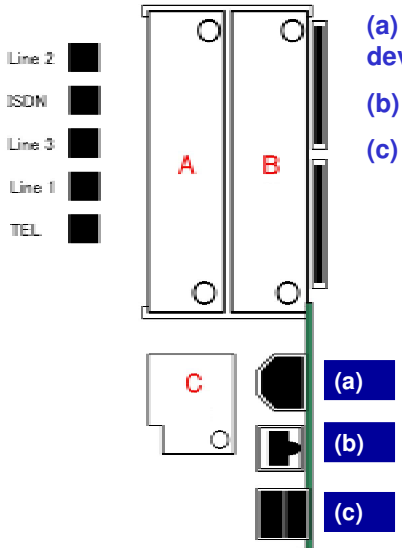
TEL: Telephone connection

ISDN: ISDN connection (Japan only)

Slide 164

V-C3 field service manual, Installation, MFP Controller Options, Overview

Ethernet/USB Slots



(a) Built-in for connection of USB devices.

(b) Standard LAN connection point.

(c) For future use

Slide 165

V-C3 field service manual, Installation, MFP Controller Options, Overview

Installing The Controller Options - 1

General Notes

- Unplug the machine's power cord before you install a controller option.
- After you install a controller option, check that the machine can detect it.
  - » User Tools > Printer Settings > List Test Print > Configuration Page
  - » All installed options are shown in the “System Reference” column.

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No additional notes

Installing The Controller Options - 2

❑ Copy Data Security Unit

- Copy Data Security Unit Type F is attached to the IPU inside the controller box.
- Set the following user tool to 'On':
  - » System Settings > Administrator Tools > Data Security for Copying
- If the customer removes this unit, and turns the power on, the machine will issue an SC165 error if the "Data Security for Copying" feature is set to "ON".
  - » This prevents unauthorized users from removing the unit and trying to make copies of protected documents.

Slide 167

What does the Copy Data Security Unit do?

❒ The machine makes gray-out output and sounds the buzzer when making copies of prints that are printed with the RPCS driver with "Unauthorized Copy Prevention".

Installing The Controller Options - 3

- **Data Overwrite Security Unit: Must be type H**
  - Make sure that you have a type H unit.
  - Before you can install this unit, the customer must store some names and passwords related to authentication.
  - Check the box to make sure that the VOID marks are not visible on the packing tape.
  - Enable the unit with SP 5878 001.
    - » If you have installed the wrong type by mistake, you will see 'Failed' on the display when you do this SP. Do the installation procedure again with the correct type of DOS unit.
  - Follow the procedure in the service manual carefully, or the installation will fail.

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No additional notes

Installing The Controller Options - 4

- **Browser Unit**
  - During the installation procedure, you must put an SD card with the browser unit firmware into the upper slot.
  - The machine copies firmware from the SD card to the hard disk during the installation procedure.
  - You must remove the SD card from the upper slot after you install the browser unit
- **HDD Encryption Unit**
  - Before you can install this unit, the customer must store some names and passwords related to authentication.
  - Check the box to make sure that the VOID marks are not visible on the packing tape.
  - Enable the unit with SP 5878 002.
  - Remove the SD card from the upper slot after installation.

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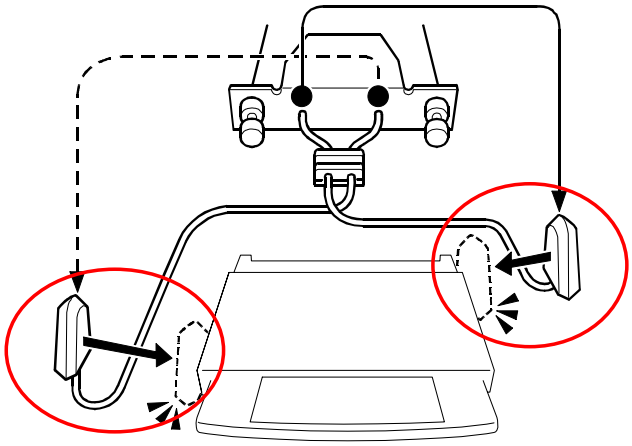
No additional notes

Installing The Controller Options - 5



- **IEEE802.11a/g, g interface**
  - Make sure to install the antennas correctly, as described in the manual.

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No additional notes

Other SPs

- **5024: mm/inch display**
- **5907: Plug and play setting**
- **5967: Disables the document server and deletes all images from the temporary area of the hard disk.**
  - User Tools – System Settings – Administrator Tools – Delete All Files in Document Server: Deletes all files in the document server
- **5974: Input the version of Scan Router**
  - Lite or Professional

Slide 171

- 5024: Turn the power switch off/on after changing the value.
- 5967: This is a security feature for those who worry that their hard disks could be stolen during transportation. Files can be removed from the storage areas of the disk using Desk Top Binder, but there may still be image data in the temporary area of the disk. This SP deletes this data.
  - For the best security, remove the hard disks from the machine and don't let them out of your sight until the machine is ready to use again at the new location. Then reinstall them.
- 5974: Scan Router Lite is shipped with the machine. The Professional version must be bought separately.

Updating the Firmware

Slide 172

V-C3 field service manual, Removal and Adjustment,
Firmware Update

Procedure – Important Notes

- **Turn the machine power off.**
- **Then disconnect the network cable and other interface cables.**
- **Remove the VM card from the lower slot.**
  - Before you remove the VM card, you must halt the App 2 Me application if it has been enabled.
    - » For information on how to do this, see the 'App 2 Me – Important Note' slide earlier in the course.
- **Put the SD card with the new firmware in the lower SD card slot.**
- **Open the front door, then turn the machine power on.**
- **You will see "Please Wait" then "Preparing to start firmware update."**
- **The first screen appears after about 90 sec.**
- **You can select 'Engine' and one 'OpePanel' at the same time.**

Slide 173

No additional notes

While the Update Is in Progress…

- **Remain with the machine. Do not leave it unattended.**
- **Do not close the front cover during firmware update.**
- **The [Start] key flashes RED during firmware update, and then lights GREEN when the update is finished.**
- **Never switch the machine off while the [Start] key is flashing RED.**
  - If the machine is switched off or accidentally unplugged before the update is finished, do not remove the SD card. Just switch the machine on again.
  - The firmware update should restart automatically. If the firmware update does not recover, order another System SD card.
- **If a power failure occurs during the firmware update, turn the machine power off/on without removing the SD card. The firmware update procedure should start again.**

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- During operation panel update and engine update, the operation panel changes as shown in the service manual.
- If the update procedure fails, try again. It is normally not necessary to replace the controller.

RICOH

RICOH

V-C3 TRAINING
COPIER ENGINE

MAINTENANCE

Slide 175

PURPOSE OF THE SECTION

- ❒ This section is about machine PM.

In this section, you will learn how to:

- ❒ Use the PM Table.

When you complete this section, you will know the answers to these questions.

- ❒ What is the PM interval?
- ❒ What counters must you reset after maintenance?

PM Interval

- **The basic PM interval is 150k.**
  - It is not necessary to replace all the PM parts every 150 K. Many can be replaced at 300k.
  - A few parts in the PCU have replacement intervals of 200 k or 400 k.
  - Note that with the PCUs, for some components, the interval for K is different from the interval for CMY.

Slide 176

- Study the PM table in the service manual.
- Part numbers of lubricants are listed in the maintenance section of the manual.

Lubrication - Copier

- **Always use Lubricant Powder (B1329700) (composed of Zinc Stearate).**
  - One exception: After replacing the lubricant brush roller in the PCU, use G104 Yellow Toner (D0159500) and Zinc Stearate D0159501 to lubricate the new roller.
    - » Zinc Stearate D0159501 was introduced after the V-C2 was launched.
- **Never use the previous Setting Powder (54429101) in any service procedure for the V-C3.**
- **Some procedures require that you use yellow toner as a lubricant. Never use V-C2 or V-C3 yellow toner as a lubricant.**
  - The yellow toner for these models contains carrier, and this will damage the drum and other components.
  - The yellow toner for the V-C1 models is required for the maintenance of this model, when the lubricant brush roller in the PCU is replaced.

Slide 177

- B132 series yellow toner is needed when you replace the lubricant brush roller in the PCU. The B132 series was not sold in some areas, but the toner is available as a service part (see below).
- Part numbers of required lubricants
  - G104 YELLOW TONER (D0159500) – this is the V-C1 yellow toner

    G104 yellow toner – this is just the name. It has nothing to do with a model code G104!
  - ZINC STEARATE (D0159501) – this is for the PCU lubricant brush rollers
  - ZINC STEARATE (B1329700) – this is for the other procedures that require zinc stearate.

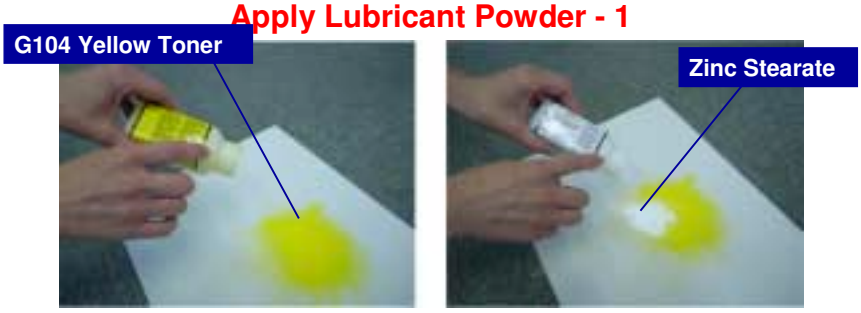
Lubricant Brush Roller Replacement

- **After you replace this part, you must apply lubricant.**
- **Apply a mixture of yellow toner (from the V-C1 series) and lubricant powder, as explained in the service manual.**
  - Lubricant powder: Use Zinc Stearate (D0159501) for this procedure, and for this procedure only.
- **The yellow toner must come from a bag of fresh toner, and not from the toner supply port of a V-C1 series model. This could contain developer, and will damage the drum and ITB.**
- **DO NOT USE YELLOW TONER FROM THE V-C2 OR V-C3 SERIES. THIS CONTAINS CARRIER AND WILL DAMAGE THE MACHINE.**

Slide 178

The next few slides show how to apply the lubricant powder.

Lubricant Brush Roller Replacement
Apply Lubricant Powder - 1



- **After installing a new roller, lubricate as follows:**
  - 1. Place a sheet of clean paper on a flat surface.
  - 2. Pour a small amount of G104 Yellow Toner (D0159500) from its bottle onto the paper.
    - » This is V-C1 series yellow toner.
    - » Do not use V-C2 or V-C3 yellow toner; this contains developer
  - 3. Pour the same amount of Zinc Stearate (D0159501) from its bottle onto the paper.

Slide 179

- G104 yellow toner – this is just the name. It has nothing to do with a model code G104!
- The ratio of the two powders in the mixture should be 1:1.

V-C3 field service manual, Removal and Adjustment, PCU, PCU Blades and Rollers, After Replacement

- This slide and the next one shows how to mix the two powders.
- Why yellow toner? Yellow toner is the least visible. But you can use cyan toner for the cyan PCU, and magenta toner for the magenta PCU, etc. There is nothing magic about yellow toner.

- The V-C1 series was not sold in some areas, but the toner is available as a service part (see below).
- Part numbers of required lubricants
  - G104 YELLOW TONER (D0159500) – this is the V-C1 yellow toner

    G104 yellow toner – this is just the name. It has nothing to do with a model code G104!
  - ZINC STEARATE (D0159501) – this is for the PCU lubricant brush rollers
  - ZINC STEARATE (B1329700) – this is for the other procedures that require zinc stearate.

Lubricant Brush Roller Replacement

Apply Lubricant Powder - 2

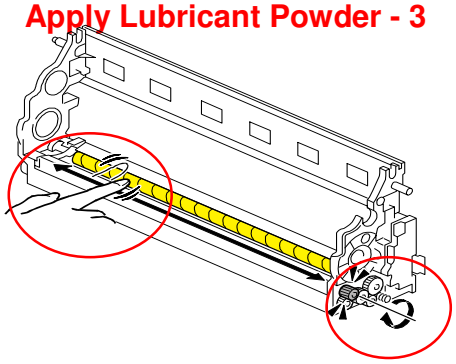
- 4. Mix the G104 Yellow Toner and Zinc Stearate together evenly.

Slide 180

No additional notes

Lubricant Brush Roller Replacement

Apply Lubricant Powder - 3



- 5. Apply the mixture of powders as shown by the arrow.
- 6. At the same time, turn the gear as shown, so that lubricant is applied to the whole surface of the roller.

❑ **IMPORTANT:**

- 1. Use a brush to apply the powder if one is available. If a brush is not available, use your finger.
- 2. Only use this mixed powder for the PCU lubricant brush roller of the V-C2 or V-C3. Never apply this powder to another part or another model.

Slide 181

V-C3 field service manual, Removal and Adjustment, PCU, PCU Blades and Rollers, After Replacement

❒ The slide shows how to apply the mixture of powders to the lubricant brush roller. See the service manual for detailed instructions.

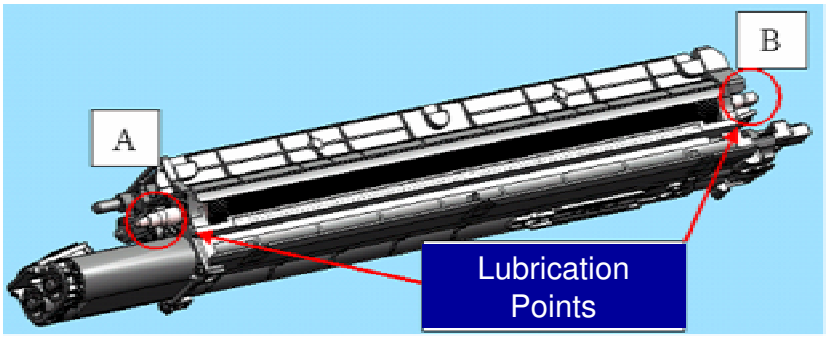
Development Unit Sleeve Shaft - 1

- **Use the following grease when you lubricate the development unit sleeve shaft:**
  - Grease-KS660B, P/N: D0149800
- **This new grease is conductive, and is completely different from any of the existing types (e.g. Grease-KS660, Silicone Grease 501, Grease Barierta-S552R).**
  - The existing types are not conductive.
- **This new grease, Grease-KS660B, was specially designed for use on the V-C2, and is compatible with the V-C3.**
- **NEVER use this new grease on the V-C1 series.**

Slide 182

No additional notes

Development Unit Sleeve Shaft - 2

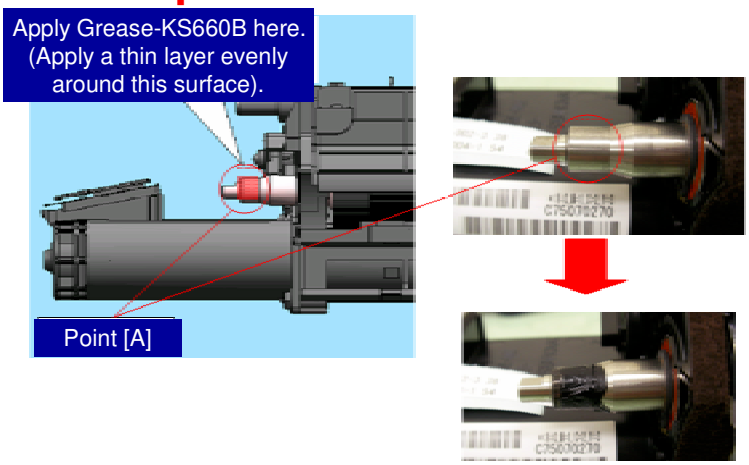


- This shows where to apply this new grease.
- The next two slides show close-ups of these lubrication points.

Slide 183

No additional notes

Development Unit Sleeve Shaft - 3

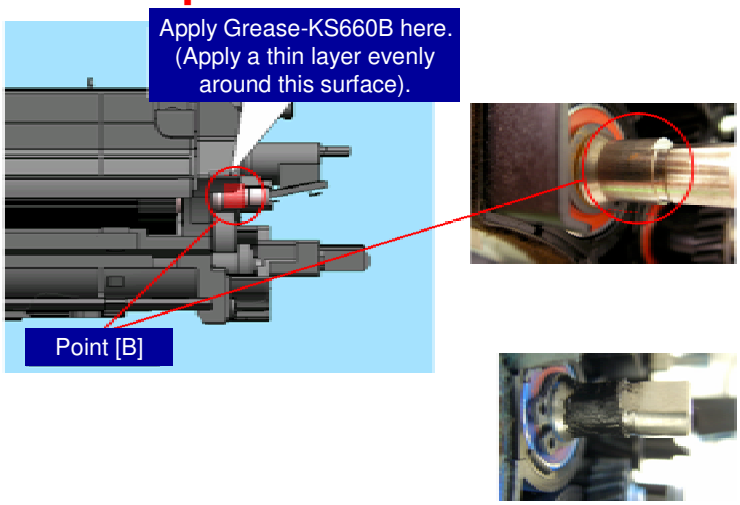


- This shows lubrication point [A].

Slide 184

No additional notes

Development Unit Sleeve Shaft - 4



- This shows lubrication point [B].

Slide 185

No additional notes

Charge Corona Unit (K)

- **From V-C3, the K corona wire assembly is listed as individual parts in the PM table.**
  - For V-C2, you cannot replace the K corona wire as an individual part, because the grid cannot be removed and replaced.
- **These can be replaced separately or as a unit, but the individual spare parts are cheaper than the complete unit.**

Slide 186

No additional notes

Lubrication – Fusing Unit

- **There are lubrication points in the fusing unit.**
  - Lubricate the idle gears every 150K.
    - » Lubrication applied to these gears will lubricate the other gears during fusing unit operation.
  - Lubricate all bearings after replacement of the hot roller, pressure roller, and/or heating roller.
  - Use Barrierta S552R
- **For details, see the V-C3 series field service manual, Preventive Maintenance, Lubrication Points, Fusing Unit.**

Slide 187

V-C3 series field service manual, Preventive Maintenance, Lubrication Points, Fusing Unit

Reset the Counter

- **After you do PM for a part, reset the counter for that part.**
  - See ‘PM counter’ in the Maintenance section of the service manual.
- **After you do PM, do the forced MUSIC process (SP 2111).**

Slide 188

No additional notes

Used Toner Bottle

- We recommend that you give customers a spare used toner bottle, so that they can replace the bottle when it becomes full.
- The service technician can collect the full bottle at the next scheduled service call.
- This eliminates EM visits in response to SC484 (Used Toner Bottle Full) errors.

Slide 189

No additional notes

RICOH

RICOH

V-C3 TRAINING
COPIER ENGINE

MACHINE COMPONENT OVERVIEW

Slide 190

PURPOSE OF THIS SECTION

- ❒ The components will be discussed.
- ❒ The paper feed path and copying process will be outlined.
- ❒ The machine's organization and overall PCB structure will also be covered.

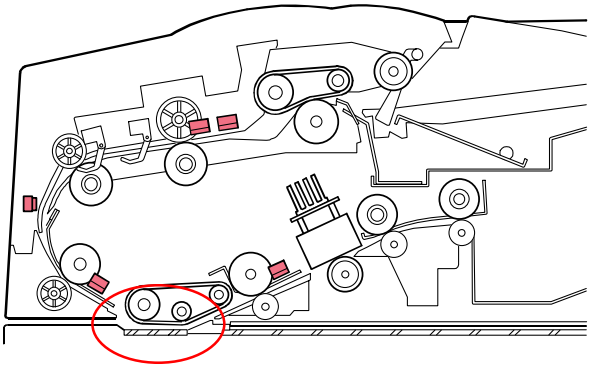
Machine Component Overview

Machine Layout

Slide 191

No additional notes

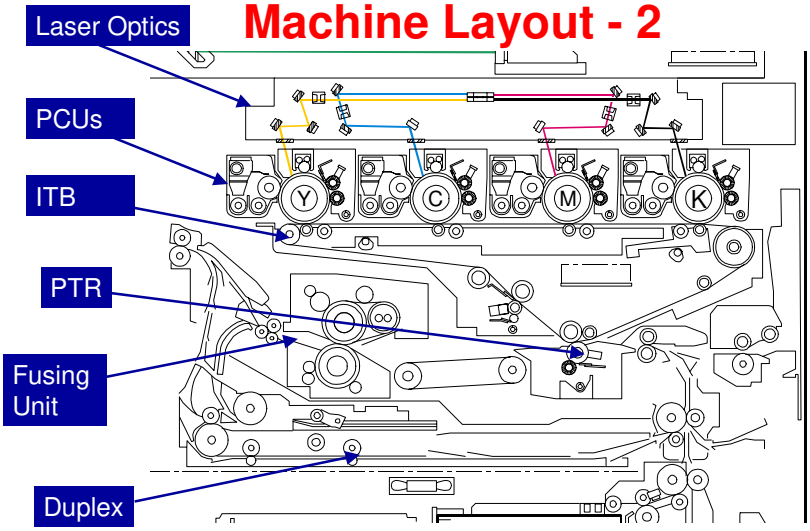
Machine Layout - 1



- **The ADF is a standard part of the machine, and not an option.**
- **Two exposure glasses: One for book/platen mode, and one for ADF mode**
  - The ADF exposure glass is shown in the red circle above.

Slide 192

- This ADF is the same as the MT-C4.



- Four PCUs: Y, C, M, K from left to right.
- The four colors are transferred to the paper at the same time.

Slide 193

This is a V-C1 diagram. But the basic layout is the same.

- This shows the printer engine, immediately below the scanner.
  - The paper feed trays are on the next slide.
- Starting from the top, we have:
  - Laser Optics. You can see the laser beams for K, C, M, and Y
  - Four PCUs

    For the CMY PCUs, there is a charge roller.

    For the K PCU, there is a charge corona unit.
  - Image transfer unit, with a transfer belt to receive the four toner images from the PCUs, and a transfer roller below.

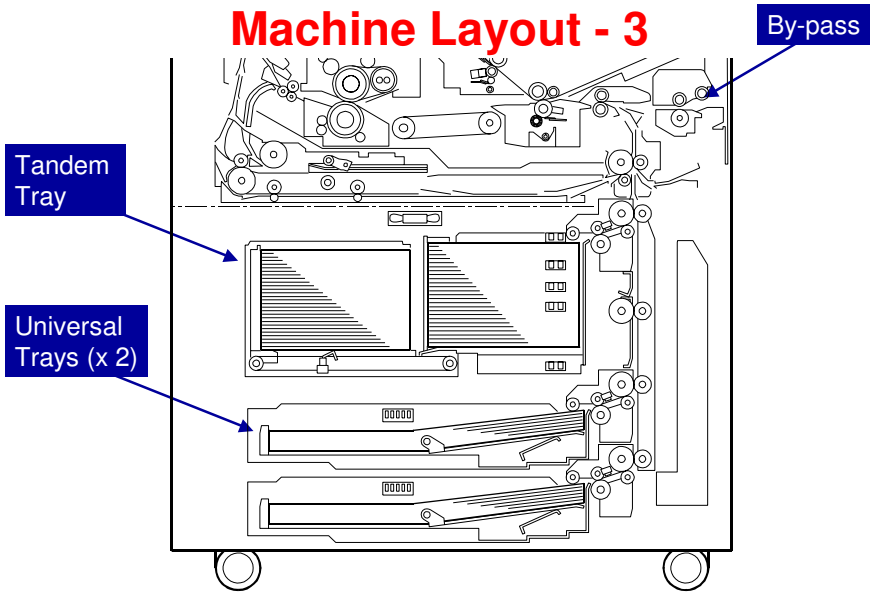
    The four images are transferred to the paper at the same time.

    The transfer current is applied at the roller inside the image transfer belt unit (immediately above the paper transfer roller), and not at the paper transfer roller.

    ITB: Image Transfer Belt

    PTR: Paper Transfer Roller
  - Fusing Unit: This uses a fusing belt system
  - Duplex tray: This is a standard part of the machine, and not an option.

Machine Layout - 3

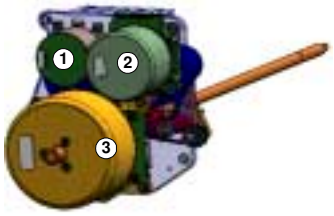


Slide 194

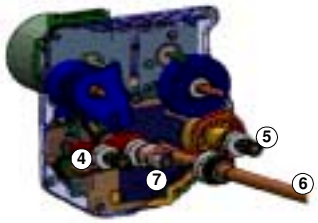
This is a V-C1 diagram. But the basic layout is the same.

- This shows the paper feed section.
- The bypass tray is a standard component, and not an option (100 sheets).
- The top tray is a tandem tray (1550 sheets x 2 stacks). It can be converted to an A3/DLT tray
- Trays 2 and 3 are universal trays (550 sheets each).

Motors - PCU



Front



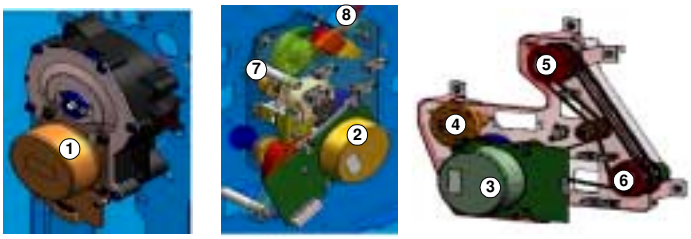
Rear

- **Each PCU has 3 motors**
  - 1. Development Motor
  - 2. Drum Cleaning Motor
  - 3. Drum Motor
  - 4. Development Coil Shaft
  - 5. Drum Cleaning Motor Shaft
  - 6. Drum Motor Shaft
  - 7. Development Roller

Slide 195

No additional notes

Motors - Other

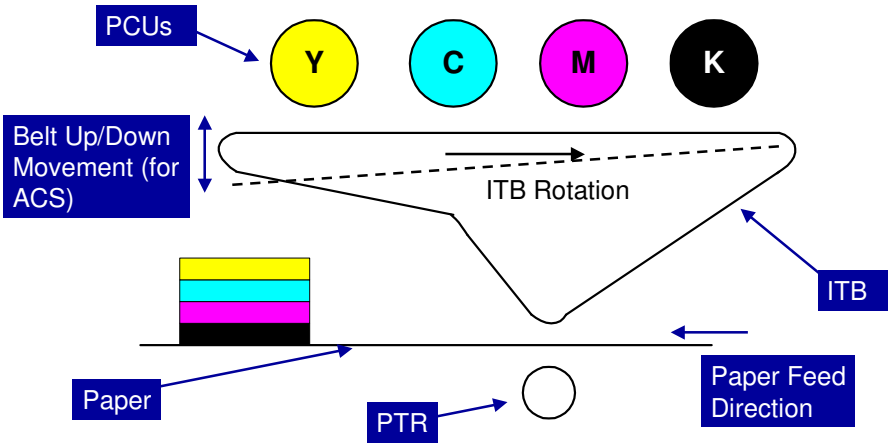


- 1. ITB Drive Motor
- 2. PTR Motor
- 3. Fusing/Exit Motor
- 4. Paper Transport Belt Drive Shaft
- 5. Fusing Unit Drive Shaft
- 6. Duplex Unit Drive Shaft
- 7. ITB Cleaning Unit Drive Shaft
- 8. Used Toner Drive Shaft

Slide 196

No additional notes

Development Order – V-C1/V-C2/V-C3

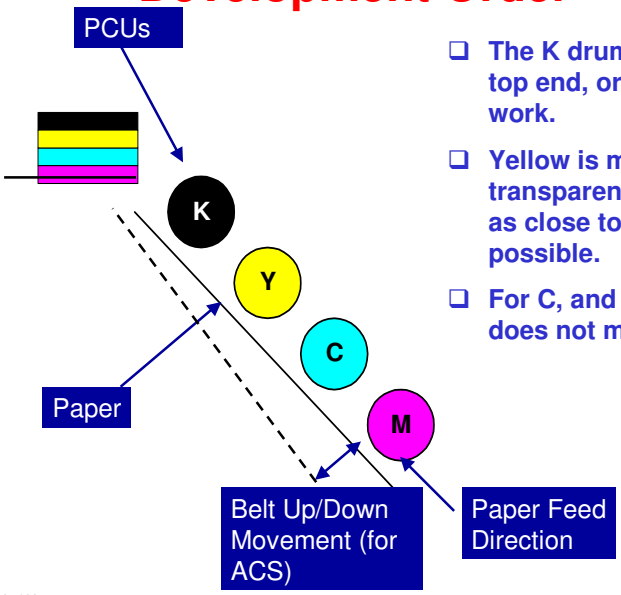


- Development order is K, M, C, Y
- Yellow on top is best (yellow is more transparent)
- The K drum must be at the right-hand end, or ACS cannot work.
- For C, and M, the order does not matter

Slide 197

❒ When a black output is detected and ACS is enabled, the ITB moves away from the Y, C, and M drums, as shown by the dotted line in the diagram.

Development Order – J-C1

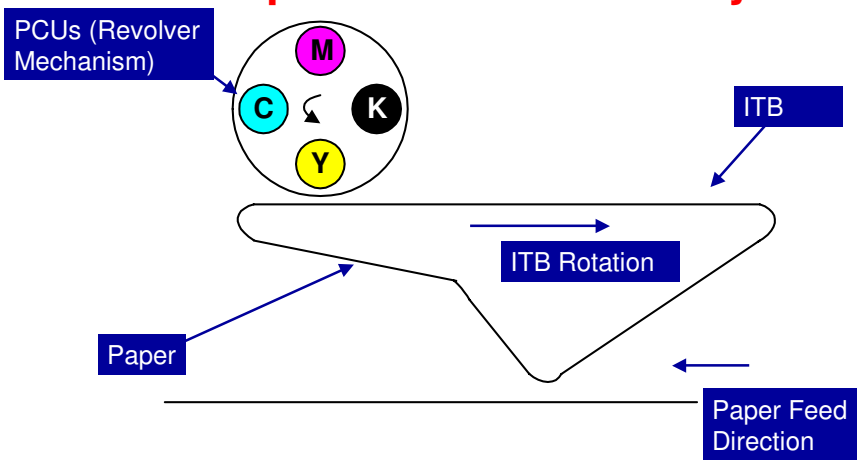


- The K drum must be at the top end, or ACS cannot work.
- Yellow is more transparent. It should be as close to the top as possible.
- For C, and M, the order does not matter

Slide 198

❒ This slide shows the development order for the J-C1/P1 series. Here, black is on the top because of the way that the ACS mechanism operates.

Development Order – Cattleya

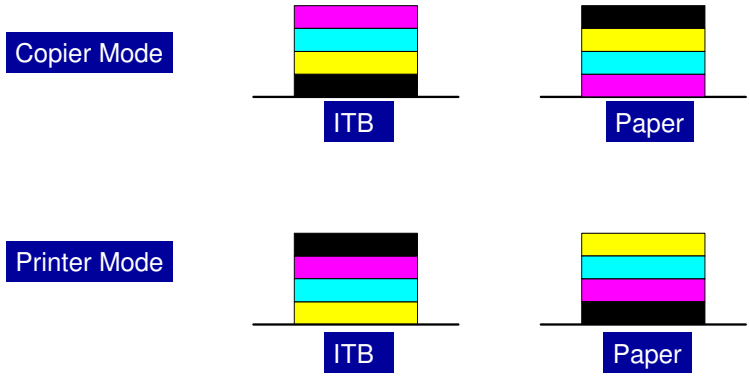


- The revolver mechanism is flexible, and the machine can change the order of development.

Slide 199

This shows the Cattleya.

Development Order – Cattleya



- **Copier mode: Black-and-white copies are more common. As a result, K must be first.**
  - If another color is first, and black-and-white copies are made, the revolver takes a longer time to get from the standby position, and the 1st copy time is longer
- **Printer mode: Yellow is on top (yellow toner is more transparent)**

Slide 200

No additional notes

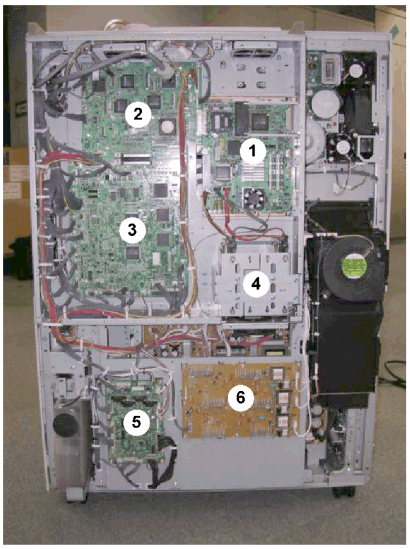
PCB Functions

- VBCU: This is the main board. It controls the engine and contains driver circuits for motors etc.
- Controller: This is a GW controller. It contains sockets for SD cards, and for optional interface kits.
- IPU: This contains image processing circuits.
- SBU: This contains the CCD

Slide 201

- If you wish to know what the names of the boards mean, look at the manual. It is better to spend time to learn what the boards do, not what the letters mean.

Controller Box Layout - Closed

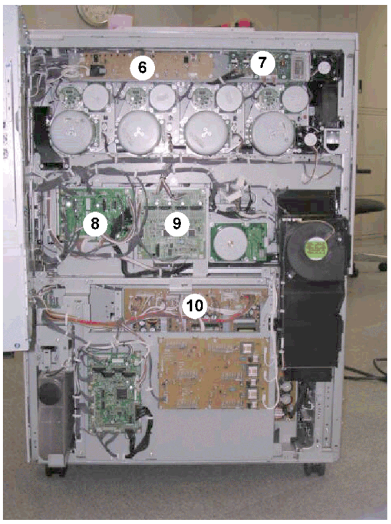


1. **Controller Board**
2. **IPU**
3. **VBCU**
   - The controller board must be removed before the IPU and VBCU can be taken out
4. **HDD Unit**
5. **PFB (Paper Feed Board)**
6. **HVPS (High Voltage Power Supply)**

Slide 202

No additional notes

Controller Box Layout - Open



ra_1098

6. Charge Roller Power Pack
7. Potential Sensor Power Pack
8. DRB (Motor Drive Board)
9. DTMB (Drum Transfer Motor Board)
10. PSU

Slide 203

No additional notes

Component Differences for Different Power Supplies

- **The following components are different, depending on the power supply.**
  - Power supply cord
  - AC drive board
  - Fusing unit
  - Anti-condensation heaters
    - » Paper trays
    - » Paper transfer section
    - » Scanner heater (option)
    - » LCT (B473) heater (option)
    - » LCIT (D350) heater (option)

Slide 204

No additional notes

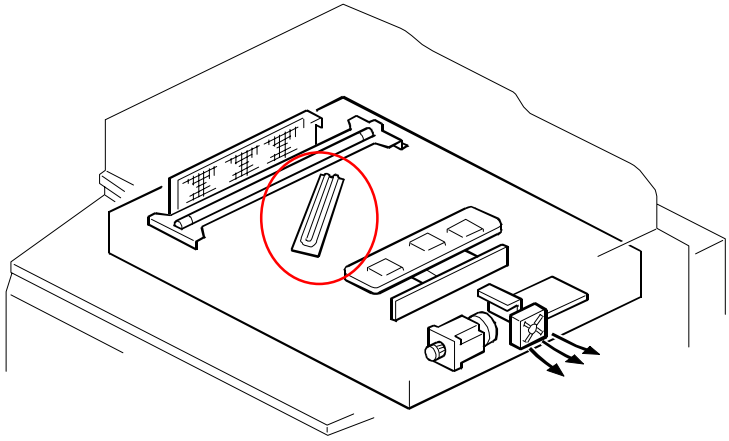
Machine Component Overview

Heaters

Slide 205

No additional notes

Scanner: Anti-condensation Heater

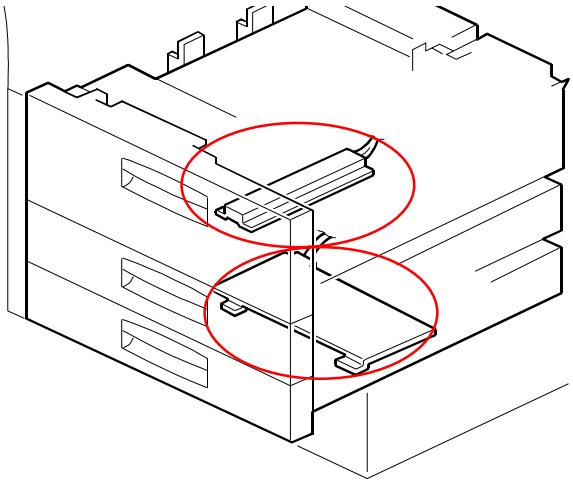


❑ **This is a service part. Connect this if the user needs it.**

Slide 206

- Condensation on the mirrors can cause:
  - Running, smearing and image borders
  - Printing completely black or gray pages
- Fans
  - The scanner cooling fans (front, rear) pull cool air into the scanner unit.
  - The scanner exhaust fan expels hot air from the scanner unit
- Anti-condensation heater turns on:
  - When the main power switch is turned off.
  - When the operation switch is turned on.
  - When the machine enters the auto off mode.

Paper Trays: Anti-condensation Heaters

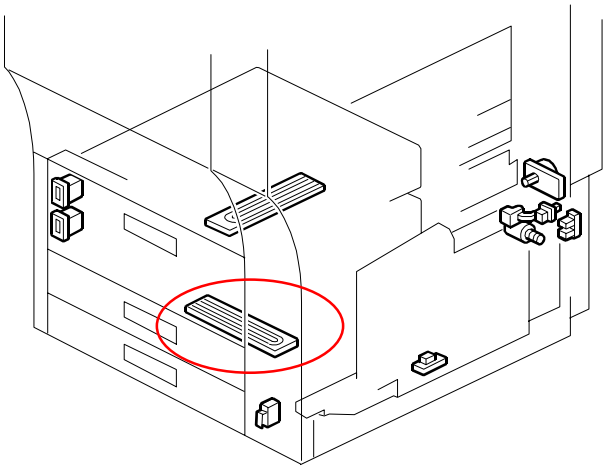


❑ **These two heaters must be connected during the installation procedure for the copier, if the customer wants to use them.**

Slide 207

- ❒ Note the locations of these two heaters.
- ❒ They turn on automatically, at the following times.
  - ➢ When the main power switch is turned off
  - ➢ When the machine enters auto off mode
- ❒ In this machine, the heaters are not optional.
- ❒ During the Installation section of the course, we learned that we must connect these heaters during the installation procedure for the copier. They are disconnected at the factory to meet Energy Star requirements.

Transfer Unit: Anti-condensation Heater



- This is connected at the factory.

Slide 208

No additional notes

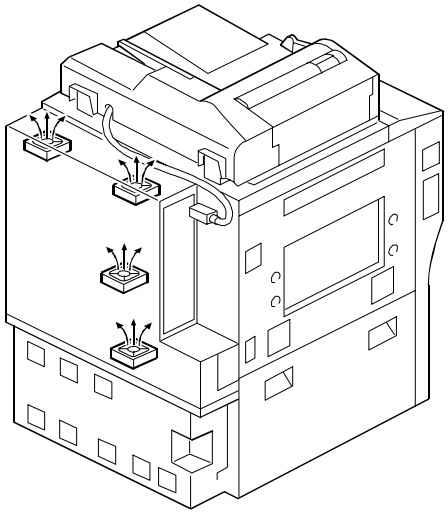
Machine Component Overview

Ventilation and Cooling

Slide 209

No additional notes

Controller Box

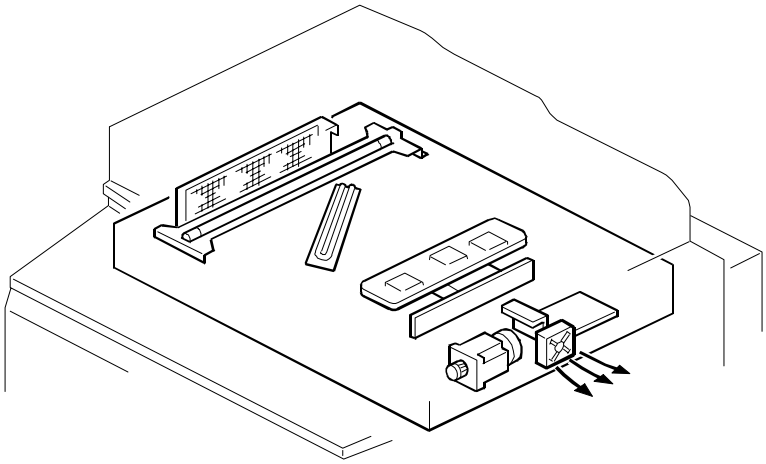


- Four fans

Slide 210

No additional notes

Scanner

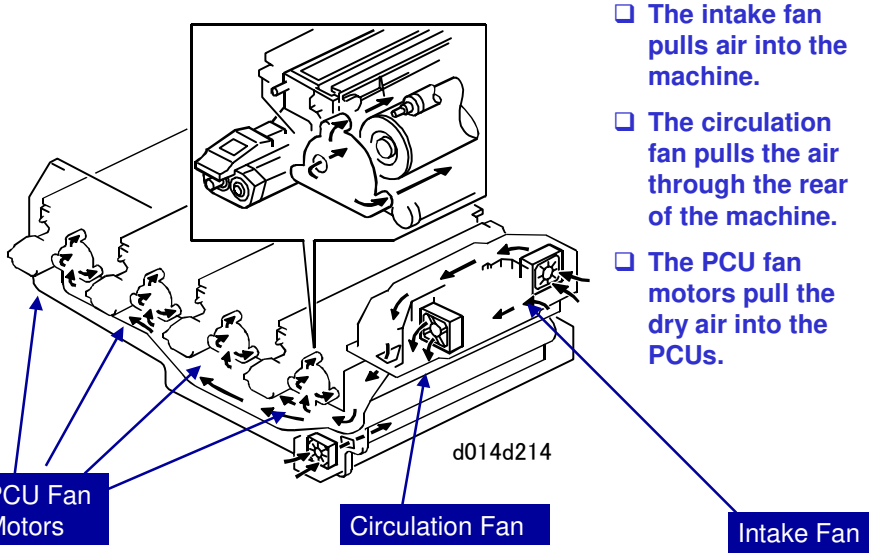


- One fan

Slide 211

No additional notes

Air Flow Around the Drum

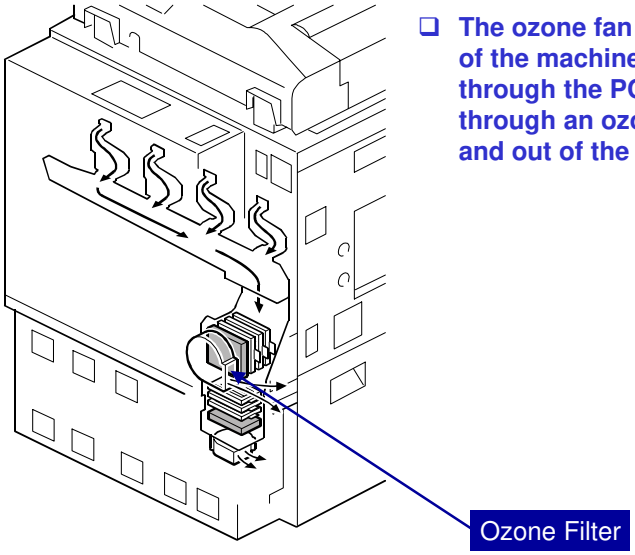


- The intake fan pulls air into the machine.
- The circulation fan pulls the air through the rear of the machine.
- The PCU fan motors pull the dry air into the PCUs.

Slide 212

- An ozone fan at the rear of the machine pulls the air through the PCUs, through an ozone filter, and out of the machine.

Ozone Removal from the PCUs

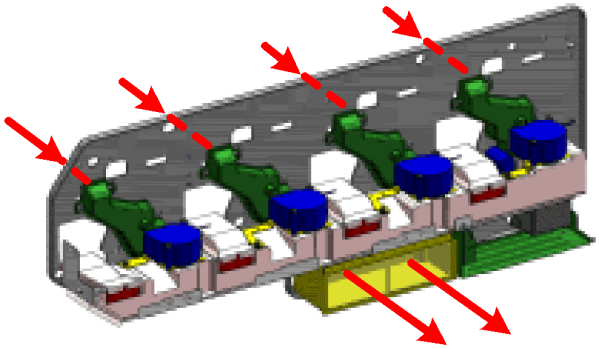


- The ozone fan at the rear of the machine pulls air through the PCUs, through an ozone filter, and out of the machine.

Slide 213

No additional notes

Development Unit Cooling

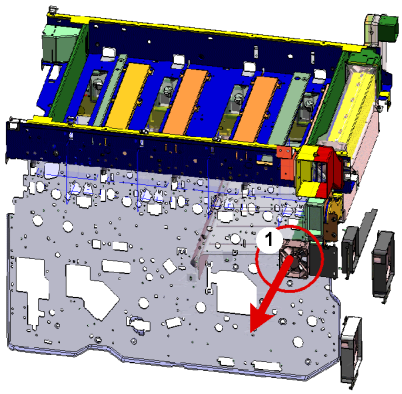


- A fan near the front door draws fresh air into the machine.
- Each development unit has its own separate fan.
- The toner in this machine has a low melting point, so the development units must be kept cool.

Slide 214

- The toner will be explained a bit more in the next section of the course.

Paper Feed Unit

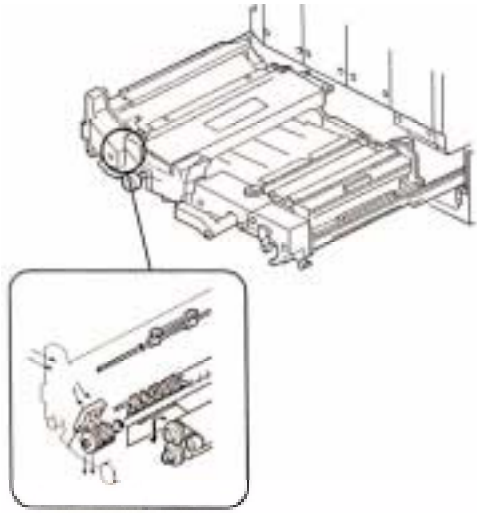


- There is a fan in the paper feed unit.

Slide 215

No additional notes

Image Transfer Belt (ITB)

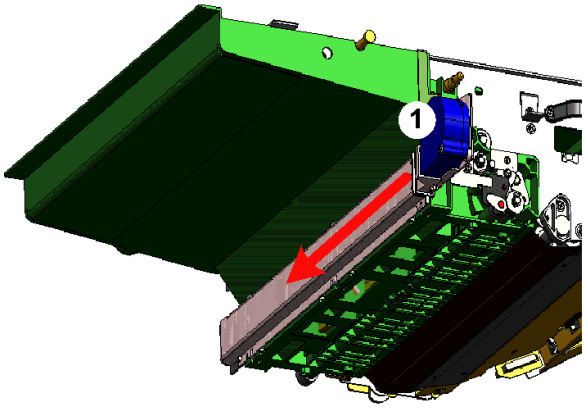


- **Image transfer fan: Cools the top of the ITB. The ITB touches the PCUs at this location.**

Slide 216

No additional notes

ITB Cleaning Unit

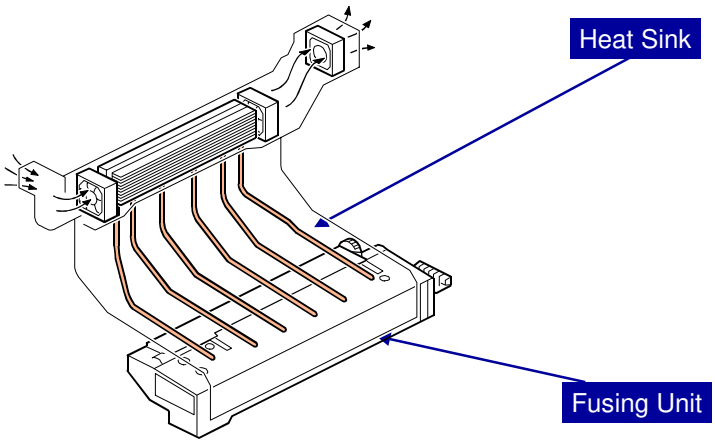


- An air duct is added to the ITB cleaning unit

Slide 217

No additional notes

Fusing Unit



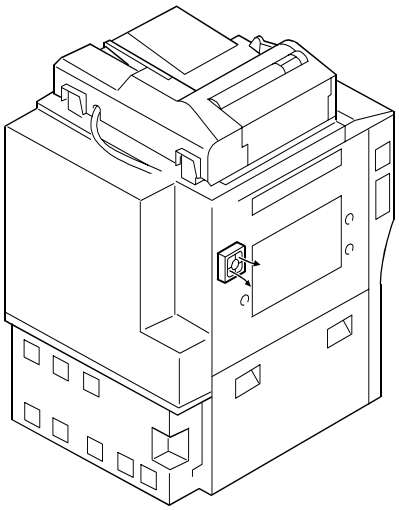
- **Heat from the fusing unit goes up to the heat sink**
  - The heat sink has pipes containing water (shown in pink in the diagram)
- **Two fans send air through the heat sink.**

Slide 218

No additional notes

Paper Exit

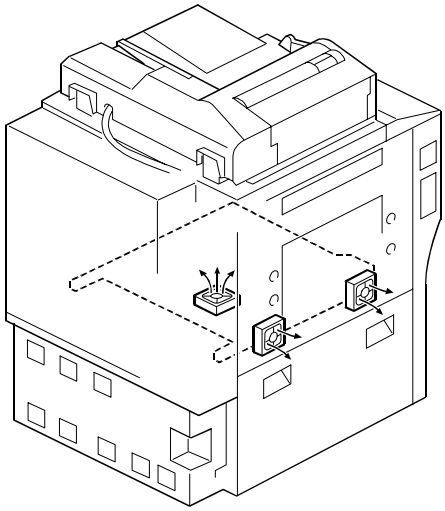
- One fan



Slide 219

No additional notes

Duplex Unit



- The duplex unit has three fans.

Slide 220

No additional notes

Machine Component Overview

Sensors, and Other Components

Slide 221

No additional notes

Temperature/Humidity Sensors

- **There are three of these.**
  - Above the magenta PCU (machine internal temperature)
    - » Corrects the charge applied to the charge roller
    - » Adjusts the length of time that the developer is agitated
  - Near the waste toner bottle motor (room temperature)
    - » Corrects the charge applied to the ITB and PTR
    - » Corrects the fusing temperature
    - » Adjusts the length of time for fusing idling
  - In the laser optics unit, two sensors
    - » Used for the MUSIC process, to prevent color registration errors

Slide 222

No additional notes

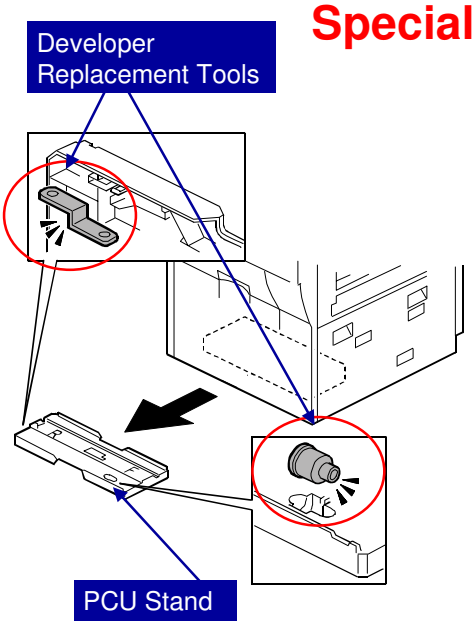
Machine Component Overview

Special Tools for Replacement and Adjustment

Slide 223

No additional notes

Special Tools



Slide 224

- **These tools are included with the PCU stand.**
  - You must make sure that the tools are here during the installation procedure.
- **They are used for developer replacement.**
  - They are not used for the installation procedure.

- This is the same as the PCU stand for the V-C2, but different from the V-C1. Do not use the V-C1 PCU stand for this model.
- The correct storage location for this is explained later in the course.

Machine Component Overview

Common Procedures During Replacement

Slide 225

No additional notes

Common Procedures

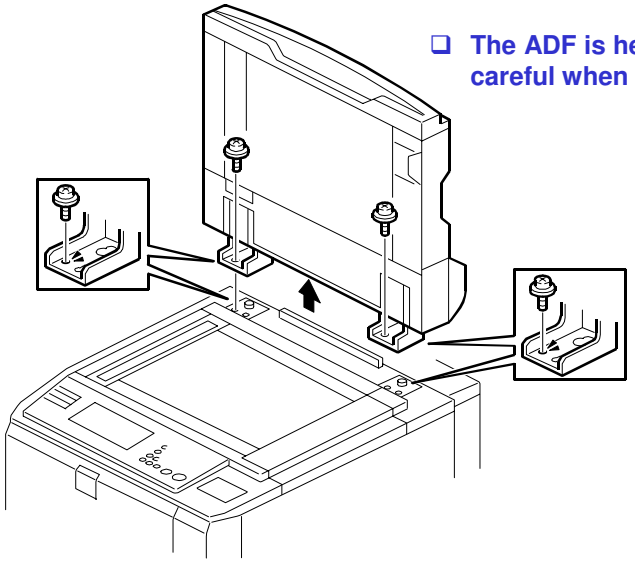
- **We will study these procedures from the following section of the service manual: Replacement and Adjustment, Common Procedures**
  - ADF
  - Toner hopper, faceplate, PCU
  - Image Transfer Unit
  - Drawer unit
  - Controller box cover
  - SD card storage

Slide 226

No additional notes

ADF

- The ADF is heavy. Be careful when you lift it.

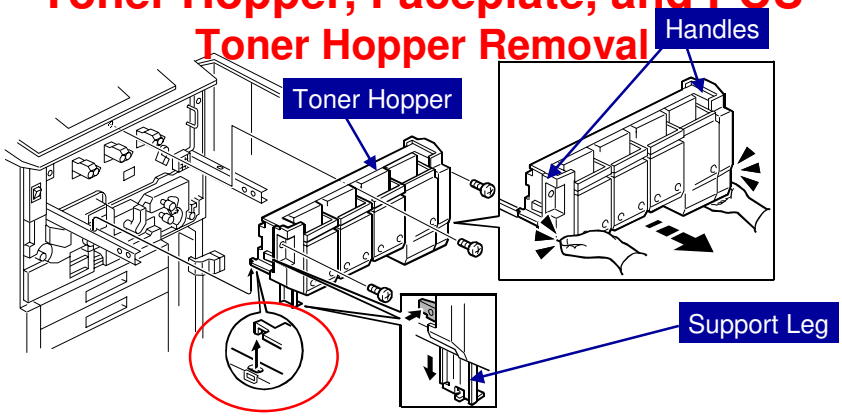


Slide 227

No additional notes

Toner Hopper, Faceplate, and PCU

Toner Hopper Removal



- **First, slowly pull the hopper out on its rails until it stops (hold the bottom front corners of the hopper as shown).**
  - Note: When you pull the hopper out, it can easily slip off the rails.
- **Pull down and lock the support leg.**
- **Lift the hopper off the rail. Use the handles at the top.**

Slide 228

- We studied the toner hopper, faceplate, and PCU during installation. The next 6 slides remind you of the important points.
- Hold the bottom left and right of the hopper when you lift it.
- Do not use the handles at the top until the final step. If you pull the hopper out of the machine at the start with the handles, the hopper can come off the machine and fall on your feet.

Toner Hopper, Faceplate, and PCU

Toner Hopper Removal

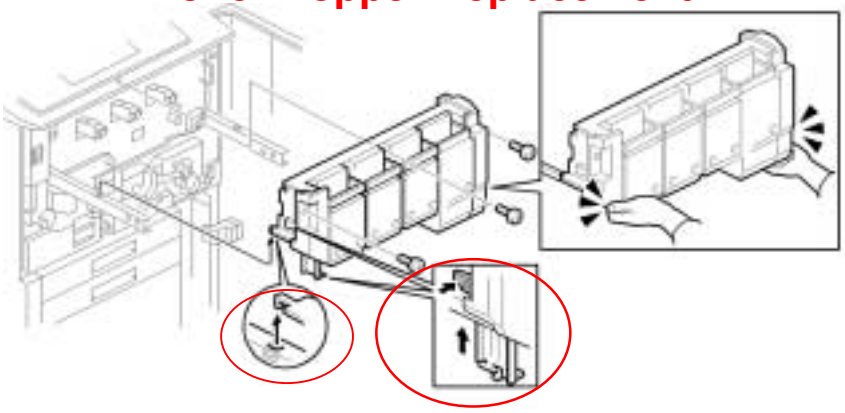
- The hopper is heavy! Lift it carefully, and make sure that it disengages completely from the rails on the left and right (red circle).

Slide 229

No additional notes

Toner Hopper, Faceplate, and PCU

Toner Hopper Replacement



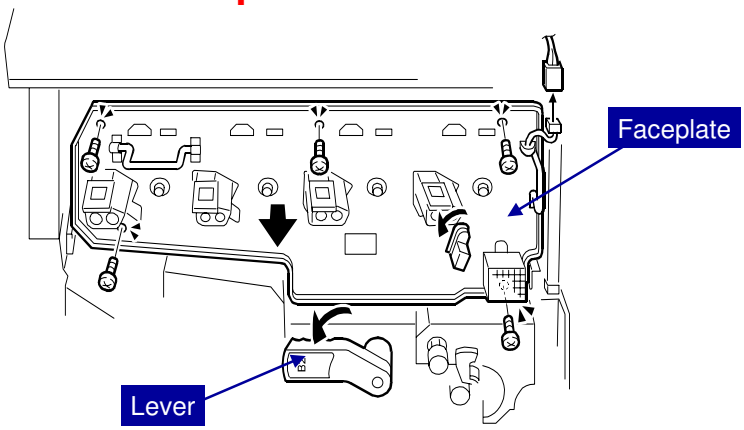
- Make sure that the support leg is up and locked before you push the toner hopper into the machine.
- Never press in on the top of the toner hopper.

Slide 230

No additional notes

Toner Hopper, Faceplate, and PCU

Faceplate Removal



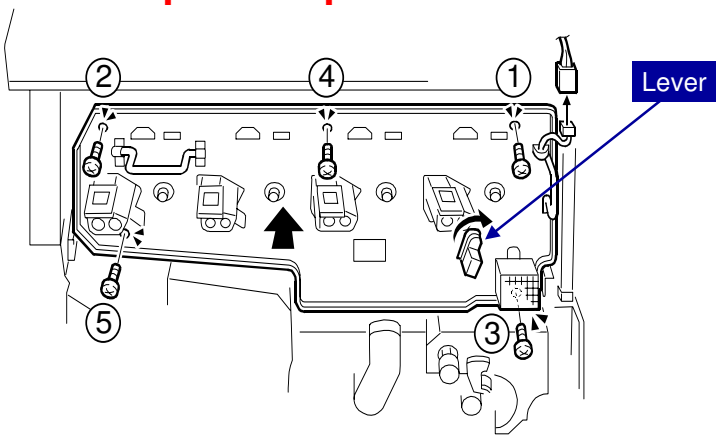
- Turn the transfer belt lever counterclockwise until it stops.

Slide 231

No additional notes

Toner Hopper, Faceplate, and PCU

Faceplate Replacement



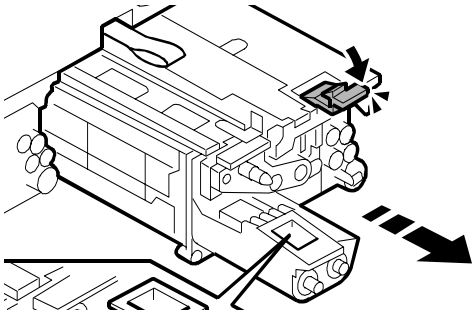
- When you put the faceplate back, attach the screws in the order that is shown in the manual.
  - Do not tighten the screws strongly.
- Put the transfer belt release lever back to the vertical position.

Slide 232

No additional notes

Toner Hopper, Faceplate, and PCU

PCU Removal - 1

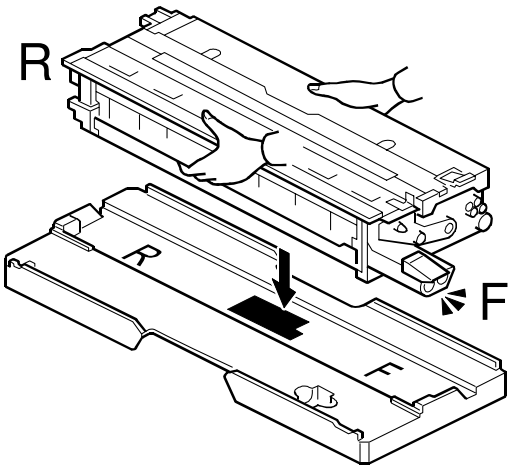


- **Before you start to remove a PCU, turn the main power off and disconnect the power cord.**
- **The OPC drum is exposed on the bottom of the PCU.**
- **Do not put your hand under the PCU.**
- **Do not put the PCU on a surface other than the PCU stand.**
  - The PCU stand is mounted on a rack attached to the bottom of the copier with magnets. You must take it out and put it on a flat surface.

Slide 233

No additional notes

Toner Hopper, Faceplate, and PCU
PCU Removal - 2

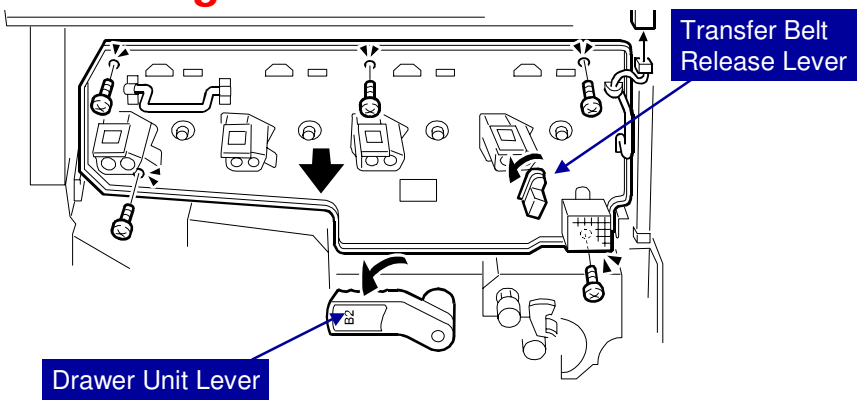


- This shows how to put the PCU on the PCU stand.
- In the diagram, F is front, and R is rear.
- Only use the PCU stand for the V-C2/V-C3 series. If you use the PCU stand for the V-C1 series, you will damage the drum.

Slide 234

- The V-C3 PCU stand is the same as the V-C2 PCU stand. You can use a V-C2 PCU stand if the V-C3 stand is not available.

Image Transfer Belt Unit - 1

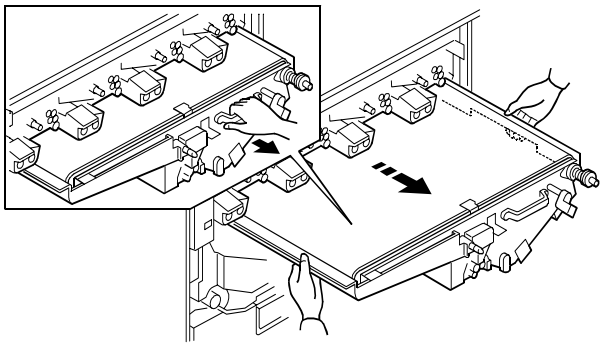


- Cover the floor or a table with paper to prepare a place to put the image transfer unit.
- Remove the toner hopper then turn the transfer belt release lever to the left until it stops.
- Remove the faceplate then turn the drawer unit lever (B2) to the left.

Slide 235

No additional notes

Image Transfer Belt Unit - 2

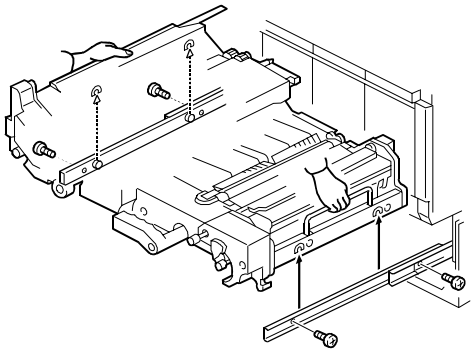


- **Remove the unit carefully. The image transfer unit is heavy and not attached to the rails with screws.**
- **Always keep the unit flat. Do not tilt it. Do not stand it on its side.**
  - If you tilt the unit, toner will come out inside the unit.
- **Put the unit in the machine slowly and carefully. Take care that the belt does not catch on the frame of the machine, or on the toner cap of the yellow PCU on the far left.**

Slide 236

No additional notes

Drawer Unit

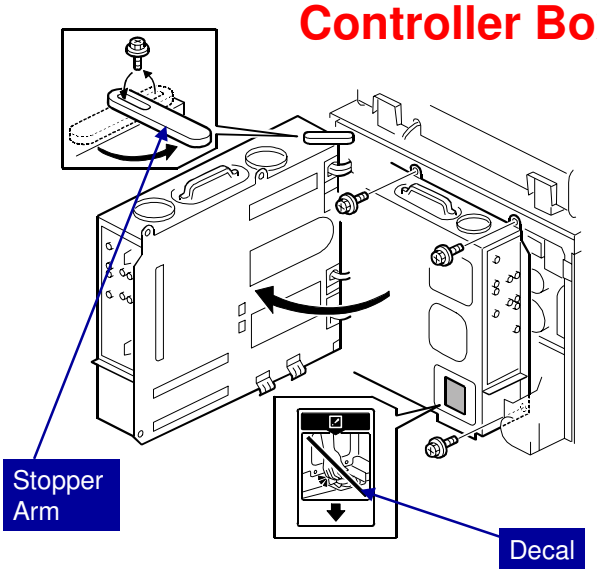


- Turn the lever down and pull the unit out. Then remove the screws that attach it to the rails.
- Be careful. This unit is heavy.
- Push the rails into the machine after you remove the unit.
- When you put the unit back, make sure that the hooks engage the rails correctly.

Slide 237

No additional notes

Opening and Locking the Controller Box

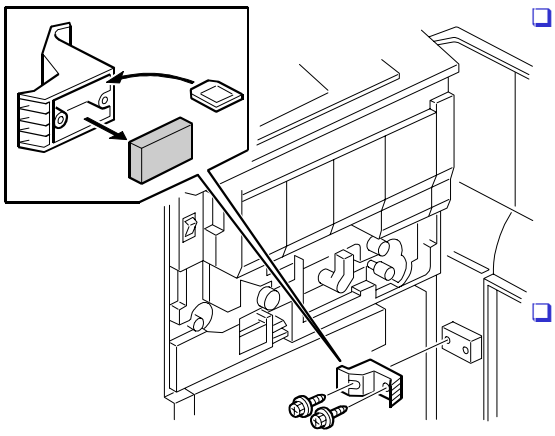


- **Use the stopper arm to lock the box in the 'open' position.**
- **Do not touch the fan blades (see the warning decal).**
  - You should turn the power off and disconnect the power cord before you start the procedure anyway.

Slide 238

- Always lock the controller box, to prevent injury to yourself and damage to the machine.

SD Cards in the Front Door



- **After you copy an SD card, keep the original card here.**
  - The card does not function after you copy it, but you must keep the card as proof of purchase.
- **If you must replace the front door, move the SD cards to the storage location in the new door.**

Slide 239

No additional notes

Replacing Boards and Motors

Slide 240

V-C3 field service manual, Replacement and Adjustment, Boards

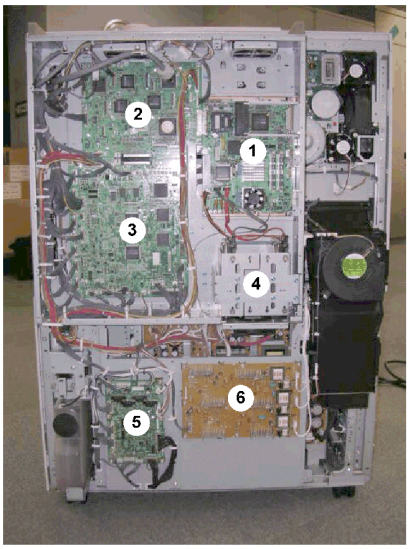
Boards

- The AC drive boards of the 120V and 240V machines are different. The boards are clearly marked "120V" or "240V" in the center of the board to prevent installing the wrong type of board.
- The controller board must be removed before the IPU/VBCU boards can be removed.

Slide 241

No additional notes

Controller Box Layout - Closed

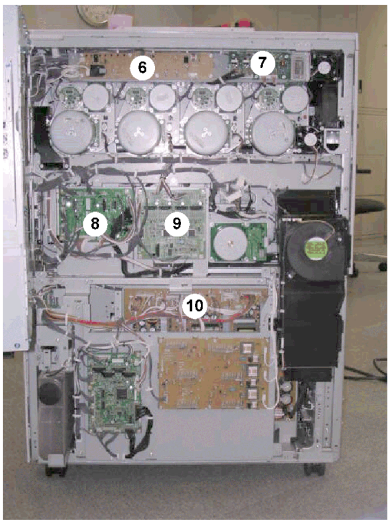


1. **Controller Board**
2. **IPU**
3. **VBCU**
   - The controller board must be removed before the IPU and VBCU can be taken out
4. **HDD Unit**
5. **PFB (Paper Feed Board)**
6. **HVPS (High Voltage Power Supply)**

Slide 242

No additional notes

Controller Box Layout - Open



ra_1098

6. Charge Roller Power Pack
7. Potential Sensor Power Pack
8. DRB (Motor Drive Board)
9. DTMB (Drum Transfer Motor Board)
10. PSU

Slide 243

No additional notes

Behind the Left Lower Cover

- AC Drive Board

Slide 244

No additional notes

Controller Replacement - 1

- Study this procedure: V-C3 series field service manual, Replacement and Adjustment, Boards, Controller Board
- Do the procedure if you think that you need to practice.
- Pay attention to all notes, cautions, and warnings in the procedure.
  - See the next slide for a list of important things to do.

Slide 245

No additional notes

Controller Replacement - 2

- Before you remove the controller board, you must remove the controller box cover, so that the controller board can be disconnected.
- Never attempt to pull the controller unit out of the machine until you have removed the box cover and disconnected the controller board.
- If you attempt to pull the controller unit out of the machine without first disconnecting the board, you will break or damage the connectors.

Slide 246

No additional notes

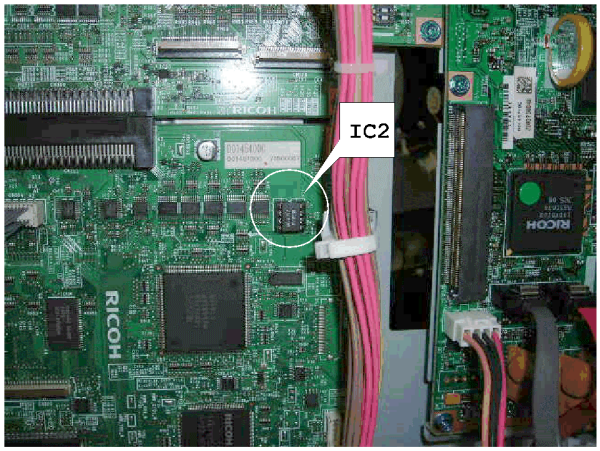
Controller Replacement - 3

- **When you install a new controller board, take the NVRAMs from the old board and install them on the new board.**
  - Before you remove the NVRAM, upload the contents to an SD card if possible
- **If there is an HDD encryption unit installed, restore the encryption key.**

Slide 247

- The following items cannot be uploaded from NVRAM to the SD card: Total counter values, the C/O, P/O counter values, the Duplexing, A3/DLT/Over 420 mm counter values, stapler counter values, scanner counter values, and Engine SP settings.

VBCU Replacement - 1



- Take the EEPROM (IC2) from the old board and put it on the new board.

Slide 248

No additional notes

VBCU Replacement - 2

- Make sure that the dip switch settings on the new board are correct, as shown above.

Slide 249

No additional notes

Hard Disk Replacement - 1

- **Study this procedure: V-C3 series field service manual, Replacement and Adjustment, Boards, HDD**
- **Pay attention to all notes, cautions, and warnings in the procedure.**
  - See the next slide for a list of important things to do.

Slide 250

No additional notes

Hard Disk Replacement - 2

- **Before you replace the hard disk:**
  - Put an SD card in the lower SD card slot.
  - Do SP5846 51 to upload the address book data to the SD card.
- **Always replace both disks as a unit. Do not replace only one disk.**
- **Mark the harness connectors before you disconnect them. They must be reconnected at the correct connection points.**
  - If the HDD is connected incorrectly, the machine will issue an HDD error at power on.
    - » This will not harm the HDD or corrupt data on the disk. Just power the machine off and reconnect the HDD correctly.

Slide 251

- Normally, it is a good idea to make a backup of the address book on an SD card with SP 5846 051 whenever you visit the customer.
- In this model, the address book is kept on a memory chip on the controller. It does not have to remain on an SD card plugged into the machine.

Hard Disk Replacement - 3

- **After you install the new disk:**
  - Format the hard disk (SP 5832 001).
  - Do SP5853 to copy the preset stamp data from the firmware to the hard disk. Then turn the main power switch off/on.
  - If you successfully retrieved the address book data from the disk with SP5846 51, do SP5846 52 to restore the address book data to the new disk.
- **If the HDD encryption unit is installed, the user must copy the encryption key from the controller to the new hard disk.**
  - This is not a service procedure, so it is not in the service manual.

Slide 252

No additional notes

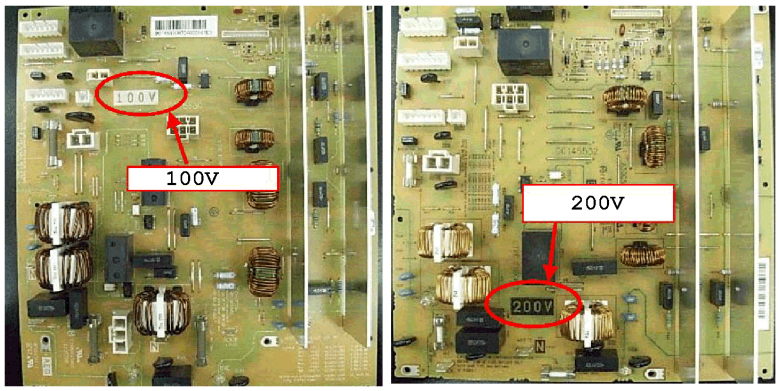
Hard Disk Replacement - 4

- **Do not take an old hard disk unit away from the customer, unless the customer gives you permission to do this.**
  - The disk contains the customer's data. The customer should dispose of the defective disks, to prevent security problems.
- **The customer will lose some data if a new hard disk unit is installed. Tell the customer about this.**
  - The replacement procedure in the service manual contains details about the data items that are lost.
- **If the customer uses the DOS unit option, this option must be set up again after a new hard disk is installed.**

Slide 253

No additional notes

AC Drive Board



- **Make sure that you have the correct type of board for the machine (100 V or 200 V).**

Slide 254

- The white rectangle in the the diagram shows where the voltage rating is indicated.

NVRAM Replacement

- **If you change a defective NVRAM, you can put back the settings to their previous condition (except for the copy counters and some other settings).**
  - But you can only do this if you made a backup of the NVRAM to an SD card on a previous visit.
  - But you cannot get back settings that were made after that visit.
  - If you do not have a backup copy on an SD card, then the memory reset (SP 5801 001) resets the memory to the defaults. Then you can input the necessary changes to the defaults.
- **Study the procedure in the manual.**

Slide 255

V-C3 series field service manual, Replacement and Adjustment, Boards, NVRAM

- The following items cannot be uploaded from NVRAM to the SD card: Total counter values, the C/O, P/O counter values, the Duplexing, A3/DLT/Over 420 mm counter values, stapler counter values, scanner counter values, and Engine SP settings.

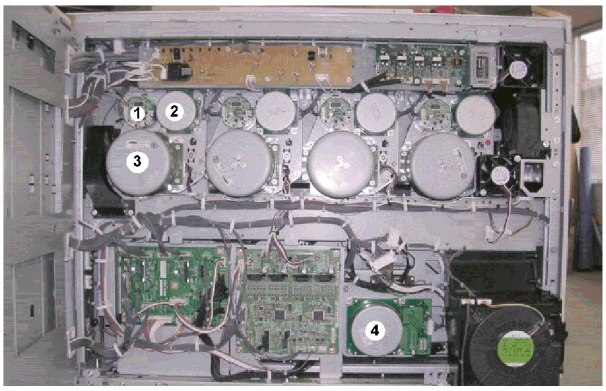
NVRAM Replacement

- **If the HDD encryption unit is installed, the user must copy the encryption key from the controller to the new NVRAM.**
  - This is not a service procedure, so it is not in the service manual.

Slide 256

No additional notes

Motors



1. Development Motor
2. Drum Cleaning Motor
3. Drum Motor
4. Fusing/Exit Motor

Slide 257

No additional notes

Motors

- **Before you remove a drum motor, it is best to remove the ITB unit.**
  - This is to prevent the tip of the drum motor shaft from scratching the surface of the ITB when the motor is removed or reinstalled.
- **In order to remove the K PCU motor, you must first loosen a duct.**
- **Before removing the Y PCU motor, you must first loosen a fan.**

Slide 258

No additional notes

RICOH

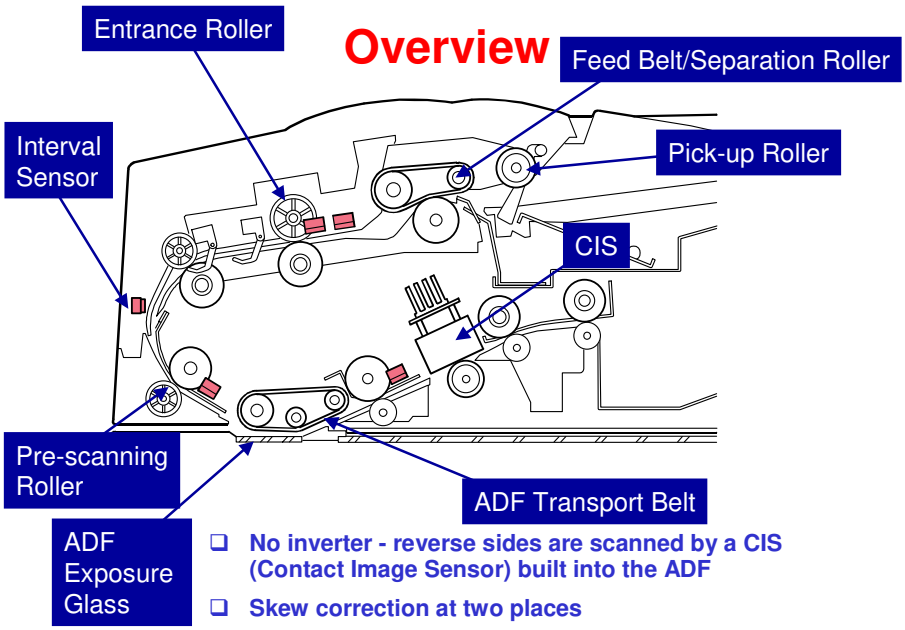
RICOH

V-C3 TRAINING
COPIER ENGINE

DOCUMENT FEEDER

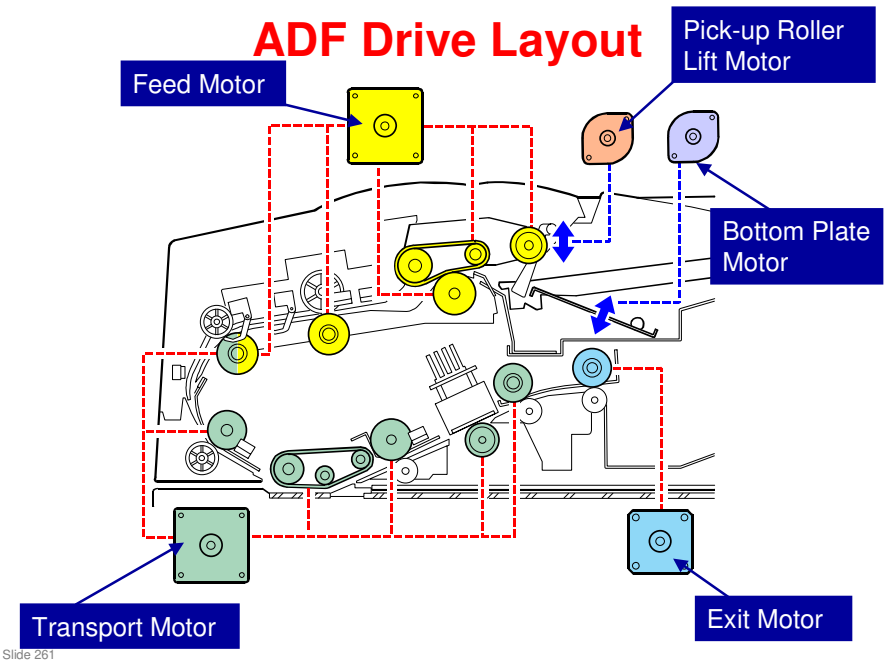
Slide 259

- The ADF is a standard component of the machine. It is based on the ADF of the MT-C4 series copiers.
- This section of the course will explain the ADF's mechanisms.



- The most important points are on the slide.
  - The entrance roller is also known as the grip roller. Late name change from designers – no time to check all documents.
- Here is a brief overview of how the ADF works.
  - The pick-up roller feeds the original to the feed belt and separation roller. Skew is corrected at the entrance roller, but only for small original sizes (B6, A5, HLT), or for duplex scanning (any size).

    For sizes larger than A5, the pre-scanning roller slows, which buckles the paper and corrects skew (the entrance roller is still turning at the original speed, which is now faster than the pre-scanning roller, so the paper buckles and skew is corrected).
  - When the skew correction sensor detects the leading edge of the original, the pre-scanning roller starts. Skew is also corrected at the pre-scanning roller.
  - The CCD is below the ADF exposure glass, where the original is scanned.
  - For two-sided original scanning, the CIS scans the reverse side while the original leaves the ADF.



Pick-up roller lift motor: Drives the pick-up roller lift mechanism.

Feed motor: Drives the following:

- ❒ Pick-up roller and feed belt drive gear
- ❒ Entrance roller and 1st transport roller

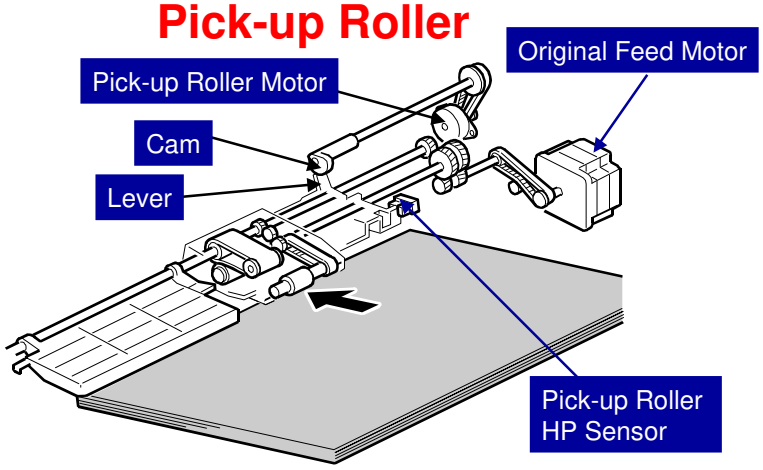
Bottom plate motor: Drives the bottom plate lift mechanism.

Transport motor: Drives the following:

- ❒ Pre-scanning roller
- ❒ Scanning roller
- ❒ 2nd transport roller
- ❒ White platen roller
- ❒ 3rd transport roller

Exit motor: Drives the exit roller.

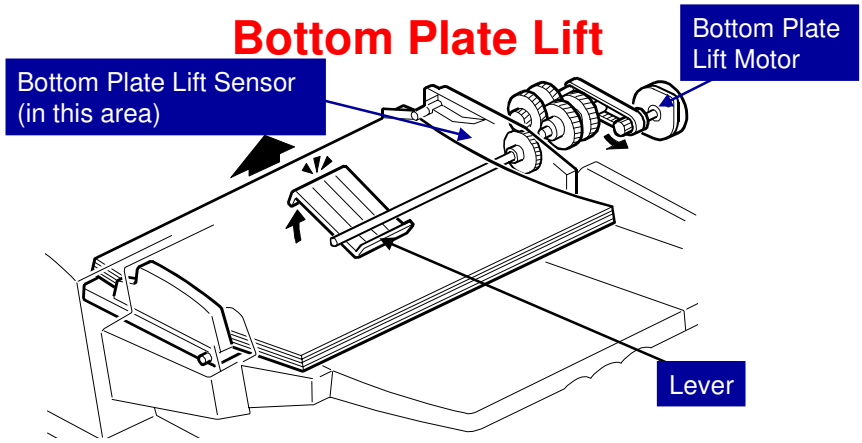
Pick-up Roller



- **Pick-up roller motor: Drops the pick-up roller onto the stack of originals**
- **Feed motor: Rotates the pick-up roller**

Slide 262

- Just after the original set sensor detects an original, the pick-up roller motor switches on, to drop the pick-up roller onto the original stack.
- When the leading edge of the original reaches the skew correction sensor, the pick-up roller motor switches on again, to lift the pick-up roller away from the original stack.
  - Home position is detected by the pick-up roller HP sensor.
- When the trailing edge of the original passes the skew correction sensor, and there are still some originals on the tray, the pick-up roller is again dropped onto the stack of originals.
- Details of the mechanism are as follows:
  - When there are no originals: The pick-up roller remains up (this is the home position).
  - When an original is placed on the tray: The original set sensor switches on, and this switches the motor on. The cam releases a lever. The lever rises and the pick-up roller drops onto the stack of paper. Then the pick-up roller feeds the paper to the feed belt and separation roller.
  - When the leading edge of the original reaches the skew correction sensor: The motor switches on again. The cam pushes the lever down until the actuator enters the sensor and switches off the motor. This stops the pick-up roller at the home position.
  - When the trailing edge of the paper passes the skew correction sensor with originals still waiting for scanning: The motor switches on to feed in the next sheet.

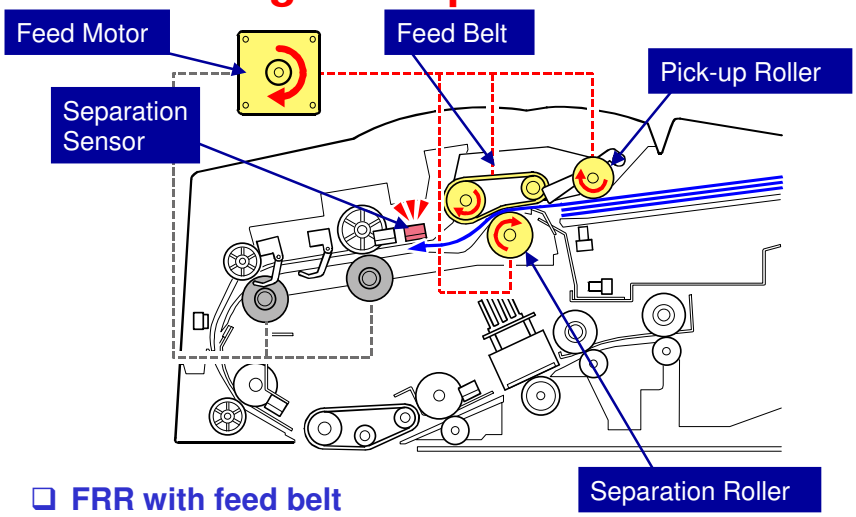


- **The bottom plate lift motor lifts the bottom plate at the following times:**
  - Just after the original set sensor detects an original
  - When some originals have been fed, and the top of the stack needs lifting

Slide 263

- The timing for the bottom plate motor to lift the bottom plate can be changed with SP 6900. The default is when an original is detected (as shown on the slide). However, this can be changed to after the Start key is pressed.
- The bottom plate sensor determines whether the plate needs lifting.
  - When an original is placed on the original tray: The original set sensor switches on, the pick-up roller drops, and the sensor (on the pick-up roller assembly) switches off. Then, the motor lifts the lever, raising the bottom plate.
  - When the bottom plate reaches the correct feed position: The sensor switches off and the motor stops.
  - During the job, when the top of the stack becomes too low: When the pick-up roller drops low enough to switch the sensor on again, the motor switches on again to raise the stack to the correct feed position.

Original Separation



- FRR with feed belt
- Simplified feed path (no inverter mechanism)

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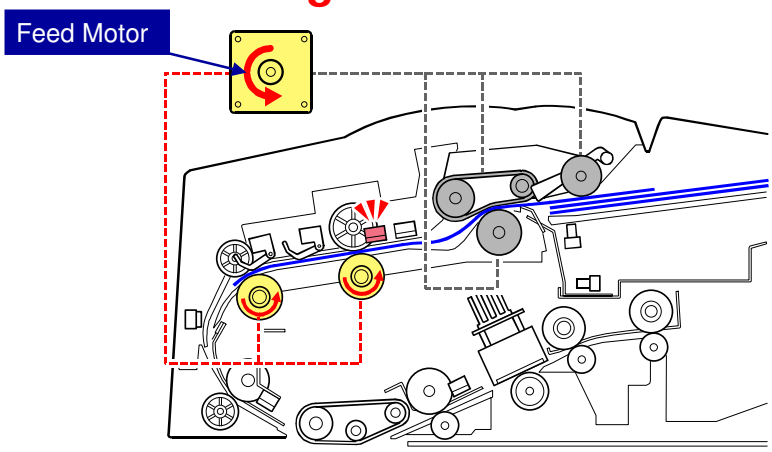
- This mechanism prevents feeding more than one sheet at a time.

Original Feed-in



❑ **The feed motor turns in the other direction to drive these rollers.**

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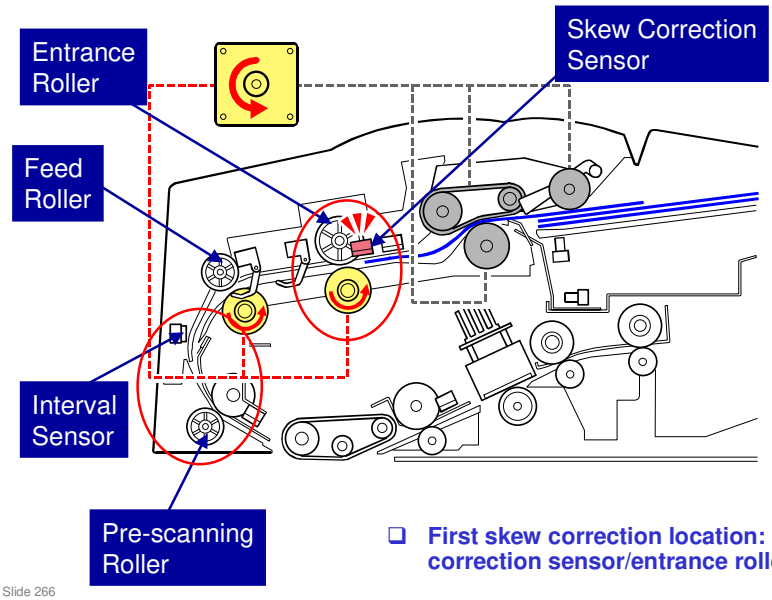
❒ Remember that there is no inverter. The second side is scanned by the CIS, which is near the exit roller.

Skew Correction - 1

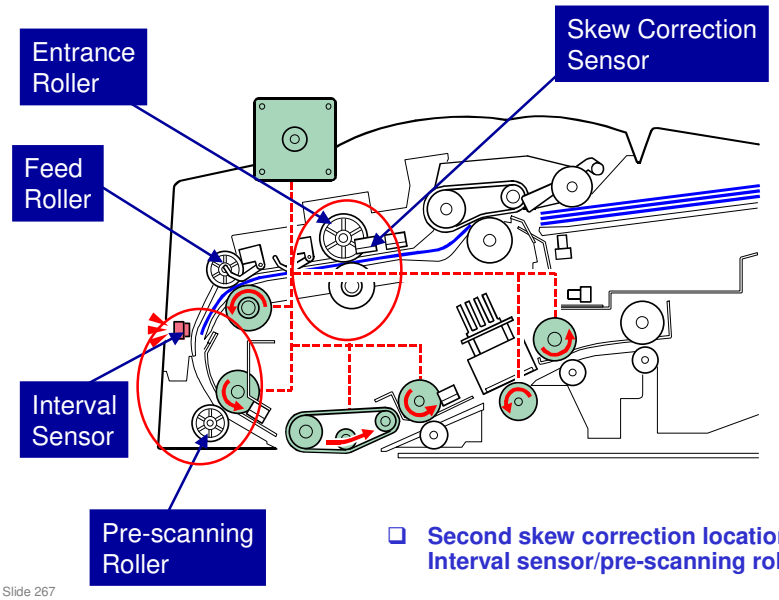


- Skew correction is done at the two circled locations.
  - Skew correction sensor/entrance roller: When the sensor detects the leading edge of the original, the roller stops for a certain period. This buckles the original and corrects the skew.
  - Interval sensor/pre-scanning roller: The actual method depends on the paper size, and whether both sides will be scanned.

    For single-sided scans larger than A5, after the entrance roller starts rotating, the feed motor increases the speed of the feed roller to reduce the interval between the original just fed and the original ahead being scanned. When the interval sensor detects the leading edge of the original approaching the pre-scanning roller, the pre-scanning roller slows down slightly. The feed roller is still feeding the paper faster than the pre-scanning roller, and this slows the original at the leading edge and corrects skew. If SP6020 is changed from the default, the roller will stop (like for other job types), for more precise skew correction.

    For other types of job, the pre-scanning roller stops. All duplex scans are stopped at this roller, for the best possible skew correction. This is because both sides are scanned at the same time, by sensors on opposite sides of the paper. Any skew in the ADF would therefore be noticeable on the copy.
- The rollers are driven by different motors, which makes it possible for one roller to stop or be slower while the other one is still going.
  - Entrance roller, Feed roller (1st transport roller): : Driven by the feed motor
  - Pre-scanning roller: Driven by the transport motor
- The amount of buckle at each location can be adjusted with SP 6006.
  - 6006 005: Corrects the amount of buckle at the entrance roller
  - 6006 006: Corrects the amount of buckle at the pre-scanning roller

Skew Correction - 2



- Second skew correction location: Interval sensor/pre-scanning roller

Here is a summary of the skew correction methods.

1. Skew correction sensor/entrance roller

	B6, A5, HLT	Larger Than A5
Duplex Scanning	Yes	Yes
Simplex Scanning	Yes	Yes

Note

Skew is always corrected with method **1** for every job, regardless of the paper size and mode.

2. Interval sensor/pre-scanning roller stop correction

	B6, A5, HLT	Larger Than A5
Duplex Scanning	Yes	Yes
Simplex Scanning	Yes	No

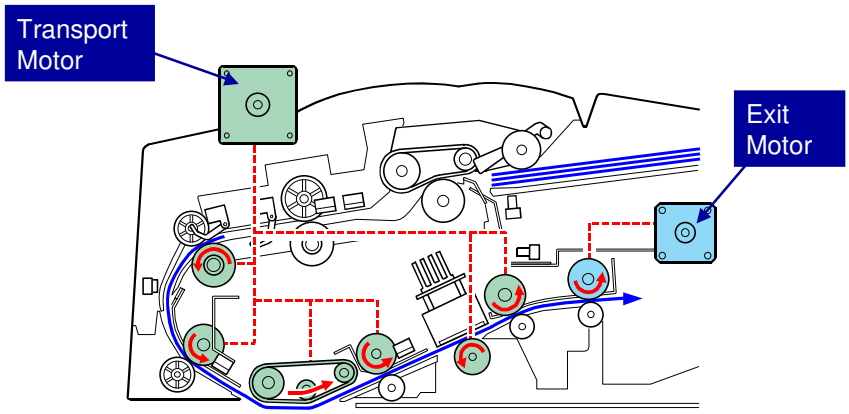
Note

Use SP6020 (ADF Contact Mode In/Out) to enable skew correction method **2** for all jobs to ensure accurate original feeding. However, switching this feature on slows original feed slightly.

3. Interval sensor/pre-scanning roller slow-down correction

	B6, A5, HLT	Larger Than A5
Duplex Scanning	No	No
Simplex Scanning	No	Yes

Original Transport and Exit



- The transport and exit motors control paper feed through this part of the ADF.

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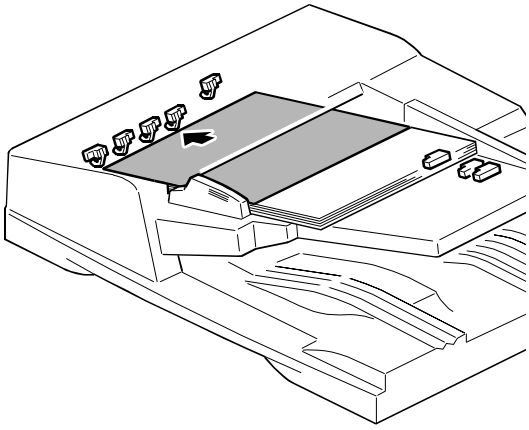
No additional notes

Original Size Detection



❑ **Original length and width are read when the original passes the separation sensor**

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- The original width sensors cannot detect the width until the original has passed the entrance roller.
- Some small sizes cannot be detected by the sensors (A5SEF, B6SEF, B6LEF), because the sensor outputs for these sizes are identical (all sensors are off). In this case, the length is detected using the separation sensor and clock pulse counts from leading edge to trailing edge.
- The machine cannot tell the difference between certain original sizes, such as DLT (11 x 17") and 11 x 15". The machine assumes such originals are 11 x 17. To change this, use SP 6016 and SP 5126.
  - North America: There are two sets of four sizes. To switch from the default set to the other, input 120. The other set of four sizes will then be detected. To change back again, input 0.
  - Europe: There are two sets of three sizes. To switch from the default set to the other, input 7. The other set of three sizes will then be detected. To change back again, input 0.
  - It is not possible to change just one of the settings. All three (or all four in the case of N. America) must be changed at the same time.

    Test this, using the paper sizes that you will encounter in your market. The description in the manual could be incorrect. Perhaps you have to enter a decimal number equivalent to the 0/1 settings of an 8-bit register. Look at the accompanying file 'SP6016-alternativemethod.doc' for what may actually happen.
- The maximum length of an original in the ADF is 440 mm (17"). This can be changed to 1260 mm (49.5") with the Special Original function at the operation panel.
- In the scanner below the exposure glass, there are also some sensors, as in previous models.
- There are some differences between the Europe and North America versions
  - EU: Length sensor x 1, NA: Length sensor x 2

Original Size Detection

- The machine cannot tell the difference between certain original sizes, such as DLT (11” x 17”) and 11” x 15”. The machine assumes such originals are 11” x 17.
- To change this, use SP 6016 and SP 5126.

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❒

Changing the Default Selection with SP6016 and SP5126

Here is a list of paper sizes that can be set for the default to enable detection. The bold sizes are the default settings, and the italic sizes are the alternate settings.

North America			Europe/Asia		
Bit 6	DLT SEF	11" x 15"	Bit 2	8 K	DLT SEF
Bit 5	LT LEF	Exec LEF	Bit 1	16 K SEF	LT SEF
Bit 4	LT SEF	8" x 10" SEF	Bit 0	16 K LEF	LT LEF
Bit 3	LG SEF	Set by SP 5126			

To change the default settings:

1. Enter the SP mode.
2. Select SP6016.

On the screen you will see an 8-digit binary setting bar: 00000000
The default settings are all "0".
In North America, the size recognition is changed with Bits 6 to 3 (other bits are ignored):

	Bit6	Bit5	Bit4	Bit3
0	DLT SEF	LT LEF	LT SEF	LG SEF
1	11" x 15" SEF	EXE LEF	8" x 10" SEF	SP 5126 (default = F4 SEF)

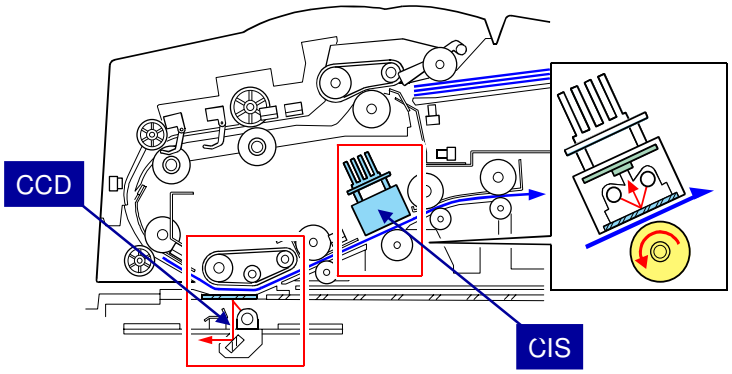
In Europe, the size recognition is changed with Bits 2 to 0 (other bits are ignored):

	Bit2	Bit1	Bit0
0	DLT SEF	LT SEF	LT LEF
1	8 Kai SEF	16 Kai SEF	16 Kai LEF

SP 5126

This SP controls the alternative paper sizes that are detected for LG SEF (USA) or 8.5 x 13" (Europe/Asia).

CIS



- **The CIS scans the reverse side of the original, if two-sided scanning has been selected.**
  - This means that for two-sided scanning, the original feeds though the scanner one time only.
- **The resolution is 600 dpi, the same as the CCD.**
- **The white roller below CIS is used as a white reference point**

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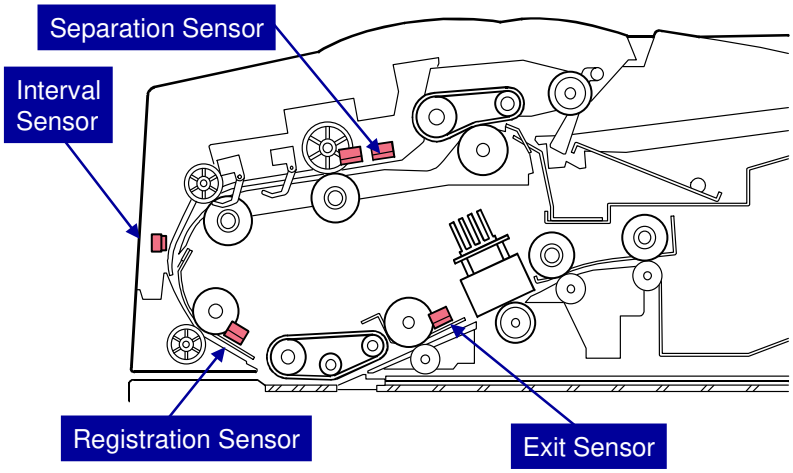
- The CIS can scan a line 306 mm (12") wide at 600 dpi. To increase the scanning speed, the sensors are divided into 13 parallel blocks.

Feed Timing and Jam Detection



- Feed timing controlled by the separation and registration sensors
- Jam detection at the skew correction, separation, interval, registration, and exit sensors

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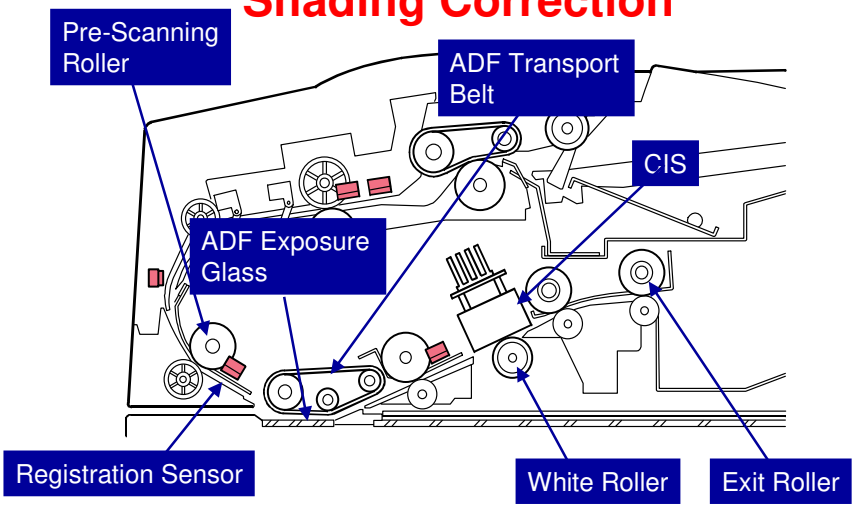
❒

Jam Type		Cause
Separation sensor	Check in failure	Remains off after enough time for the original to feed twice the distance from the original setting position to the separation sensor.
Skew correction sensor	Check in failure	Remains off after enough time for the original to feed twice the distance from the separation sensor to the skew correction sensor.
Interval sensor	Check in failure	Remains off after enough time for the original to feed twice the distance from roller [F] to the interval sensor.
Registration sensor	Check in failure	Remains off after enough time for the original to feed twice the distance from the skew correction sensor to the registration sensor.
Exit sensor	Check in failure	Remains off after enough time for the original to feed twice the distance from the registration sensor to the exit sensor.
Separation sensor	Check out failure	Remains on after enough time for a 610 mm (24") original to feed (except when the user is feeding custom-sized originals, which can be up to 1260 mm).
Skew correction sensor	Check out failure	Remains on after enough time for the original to feed twice the distance from the separation sensor to the skew correction sensor.
Interval sensor	Check out failure	Remains on after enough time for the original to feed twice the distance from the interval sensor to the skew correction sensor.
Registration sensor	Check out failure	Remains on after enough time for the original to feed twice the distance from the skew correction sensor to the registration sensor.
Exit sensor	Check out failure	Remains on after enough time for the original to feed twice the distance from the registration sensor to the exit sensor.

Note

If a problem occurs in the ADF, either SC700 or SC701 will be issued.

Shading Correction



- CCD scanning: Uses the white plate above the ADF exposure glass
- CIS scanning: Uses the white roller below the CIS.

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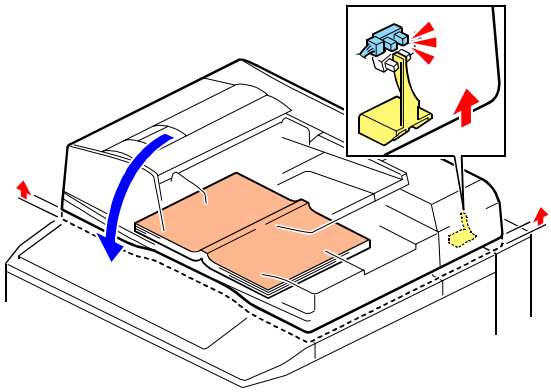
- Shading correction, which attempts to compensate for slight distortions caused by the differences in brightness of the light elements due to wear, temperature variation, or distortion by the lenses, is done for the first sheet:
  - The original is fed for a few clock pulses after the registration sensor detects the leading edge of the original.
  - The original is then delayed slightly at the ADF exposure glass while the CPU uses the white plate (above the ADF exposure glass when the ADF is closed) to determine the white peak level for the job.
  - The pre-scanning roller, ADF transport belt, and transport rollers feed the original over the ADF exposure glass and under the CIS, until it reaches the exit roller.
  - If the reverse side of the original is to be scanned, the CPU uses the surface of the white platen roller to determine the white peak level for the job.

ADF Lift Detection



- When you set a thick original, such as a book, the ADF lifts, the actuator leaves the sensor, and the sensor turns off.
- When the sensor is off, the ADF cannot feed any originals.

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No additional notes

Dust Detection – Overview

- **This function checks the ADF exposure glass for dust that can cause black lines in copies.**
- **The dust check is done before the first original is scanned.**
  - This is done only once at the beginning of a job. The check is not done for originals added during a long scanning job.
- **If dust is detected, a message is displayed on the operation panel, but the machine does not stop.**

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No additional notes

Dust Detection (SP 4020)

- **SP 4020 001: Enable/disable (default – disabled)**
- **SP 4020 002: Sensitivity adjustment**
- **SP 4020 003: Adjusts image processing parameters to remove thin vertical lines caused by dust**
  - A speck of dust on the ADF exposure glass causes a thin vertical line on the scanned image. This is because the ADF feeds the paper over the exposure glass during scanning. Dust on the glass appears on each line of the scanned image.
- **SP 7852: Counts how many times the machine detected dust on the ADF.**

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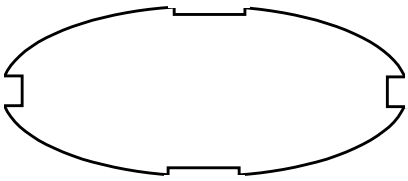
No additional notes

Dust Detection – Method



- **To detect dust on the ADF exposure glass, the ADF feed belt turns and the CCD scans this belt.**
  - No paper is present. The CCD scans the belt.
- **The ADF feed belt has four grooves cut across it in the main scan direction.**
- **These grooves are not easily contaminated with dust. Because of this, they are used as reference points during dust detection.**

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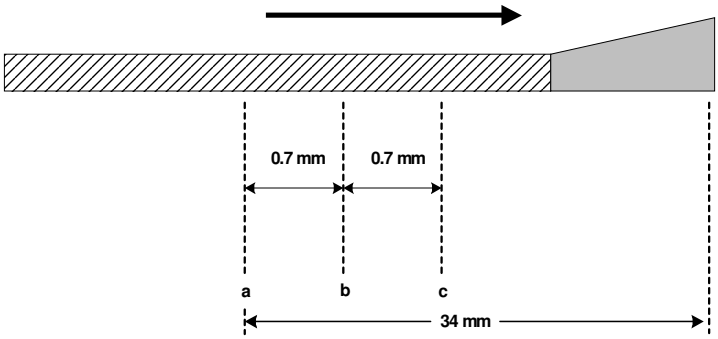
No additional notes

Dust Detection – Action Taken



- If dust is detected, the scanner carriage position for ADF scanning is moved by 0.7 mm, in the direction of the left scale.
- The next time that dust is detected, the scanning position is moved again by 0.7 mm, in the direction of the left scale.
- The third time that dust is detected, the scanning position is not moved. An alert message is displayed but the job does not stop.

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- If dust is detected after the scanner has been moved two times, an alert is displayed, but the job does not stop.
- Then, at the start of the next job, the scanner stays at the same position as the end of the previous job. But if dust is detected there, the scanner goes back to home position and the dust detection process starts again.

Replacement

- **The ADF is heavy. Remove it carefully.**

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- The V-C2 has a special tool to adjust the belt tension when you install an ADF transport belt. However, the V-C3 does not have this special tool.

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SCANNER

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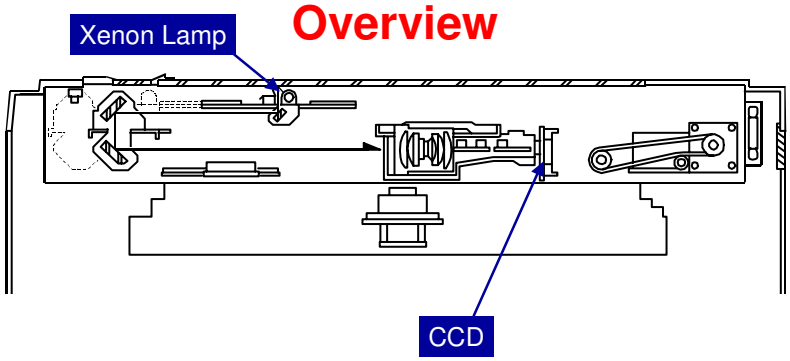
- The scanner mechanism will be discussed in this section.
  - It only covers the movable scanner inside the main body of the machine, and not the ADF.

Overview



- **600-dpi CCD**
  - Makes three analog signals (one for red, one for green, one for blue)
- **Xenon exposure lamp**
- **Two exposure glasses**
  - Platen mode, ADF mode

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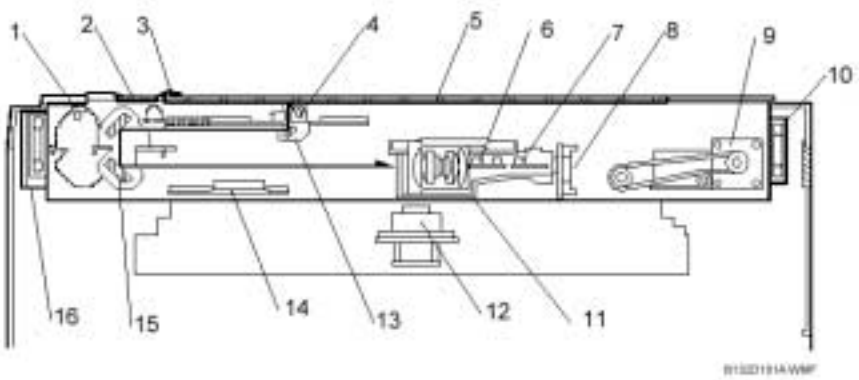
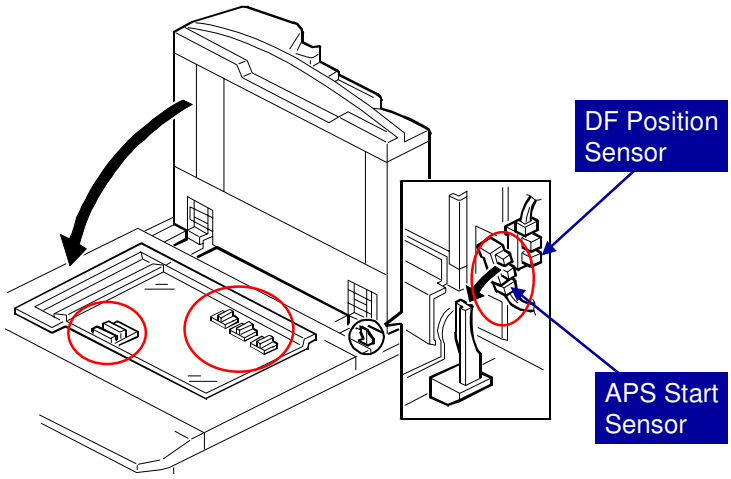
- This is a typical CCD scanner mechanism.
- For the main components, see the diagram below.
- In this machine, there is an ADF exposure glass. In ADF mode, the scanner moves below this glass and scans the original while the ADF feds it past this glass.
- There is also an optional anti-condensation heater for the scanner.
  - The heaters for the paper trays and transfer unit are standard equipment.



1. Scanner HP Sensor
2. ARDF Exposure Glass
3. White Plate
4. Exposure Lamp (Xenon)
5. Exposure Glass
6. APS2 (Org. Length Sensors 1, 2)
7. APS3 (Org. Length Sensor 3)
8. SBU (CCD: 600 dpi)
9. Scanner Motor
10. Scanner Fan Motor - Right
11. Lens Block
12. Polygon Mirror Motor
13. 1st Scanner
14. APS1 (Org. Width Sensors 1, 2)
15. 2nd Scanner
16. Scanner Fan Motor - Left

Original Size Detection



- 3 length sensors
- 2 width sensors

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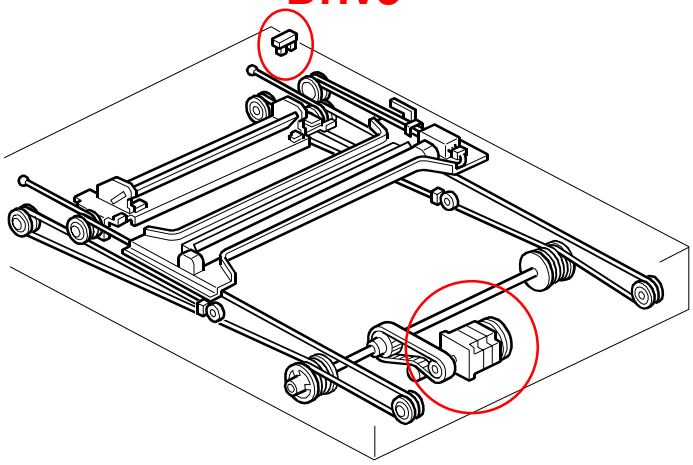
- If the original is small (such as A5-LEF), all sensors are off and the machine shows that the original size cannot be detected. However, you can force the machine to detect A5/HLT in this situation if you adjust SP4303 (there are settings for A5/HLT SEF and A5/HLT LEF).
- When the power is on, the APS sensors are always active, but the CPU checks their signals only after the platen is lowered.
  - The other sensor near the APS start sensor detects when the ADF is open or closed (DF position sensor).
- Book (ADF open): The CPU checks the sensors when the Start key is pressed.
- ADF: The CPU checks the sensors when the cover is lowered (detected by the APS start sensor)
- By-pass Mode: The APS sensors are ignored when copy paper is fed from the by-pass tray, but the by-pass tray can handle a variety of sizes and orientations. To accomplish this:
  - The machine always assumes short-edge feed for paper on the by-pass tray.
  - Width is measured by a sensor inside the by-pass tray.
  - The bypass tray cannot measure length, so the registration sensor determines length of the paper using clock pulses.

A4/A3	LT/DLT	L3	L2	L1	W1	W2	SP4301 Display
A3	11" x 17"	1	1	1	1	1	000 11111
B4	—	1	1	1	1	0	000 11110
A4 SEF	8½" x 11"	0	1	1	0	0	000 01100
	8½ x 14"	1	1	1	0	0	000 11100
A4 LEF	11" x 8½"	0	0	0	1	1	000 00011
B5 SEF	—	0	0	1	0	0	000 00100
B5 LEF	—	0	0	0	1	0	000 00010
A5 SEF	5½" x 8½"	0	0	0	0	0	000 00000
A5 LEF	8½" x 5½"	0	0	0	0	0	000 00000

Drive



- Scanner motor: Drives the scanners
- Scanner home position sensor: Detects when the scanner is at home position

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- The main points are on the slide.
- The scanner speed depends on the reproduction ratio. The speed is double the normal speed when returning to home position.
- The first scanner contains the exposure lamp, reflectors, and the 1st mirror. The second scanner contains the 2nd and 3rd mirrors.
- The second scanner moves at half the speed of the first scanner. This is to maintain the focal distance between lens and original.
- In this machine, wires are used instead of timing belts. These are more difficult to replace, but copy quality is better (less jitter).

Replacement

- After you replace the lens block, you must do some adjustments. See the service manual for details.

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No additional notes

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IMAGE PROCESSING

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- This section briefly describes the image processing done inside this machine.
- There are not many adjustments, so image processing is not described in detail. We will explain enough to understand the user tool and SP adjustments.

Components

- **SBU**
  - Contains the CCD
  - Sends analog RGB data to the IPU
- **IPU**
  - Does the image processing

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No additional notes

Halo Effect

- **Images printed with the GW controller may show a "halo" effect when printing in 2-bit mode (1800x600dpi) and in 4-bit mode (9600x600dpi).**
  - This problem is most visible when text is overlaid onto halftone areas. The greater the difference in image density between text and halftone areas, the more noticeable the halo effect.
  - This problem is also evident when the mode is changed to 2-bit mode. (The default dithering pattern for 2-bit mode is designed to improve gradation, but this can also make the halo effect more visible.)

With the default dither matrix

With the 'low halo effect' dither matrix

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V-C3 service manual, Troubleshooting, Handling Errors, Special Procedures

- Please refer to "Special Procedures" in the Troubleshooting section for troubleshooting procedures.

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LASER UNIT

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- This section explains how the laser unit converts the image data signal into laser pulses for writing the latent image on the OPC.

Overview

- **Four drums**
- **Four LD units, with two laser diodes for each colour**
- **One polygon mirror motor**
  - Two mirrors, each has six sides
- **600 dpi**
  - 1200 dpi is available in printing mode
- **Image position correction is done by reading sensor patterns on the ITB and adjusting speeds and positions of some components.**
  - This is known as MUSIC (Mirror Unit for Skew and Interval Correction).

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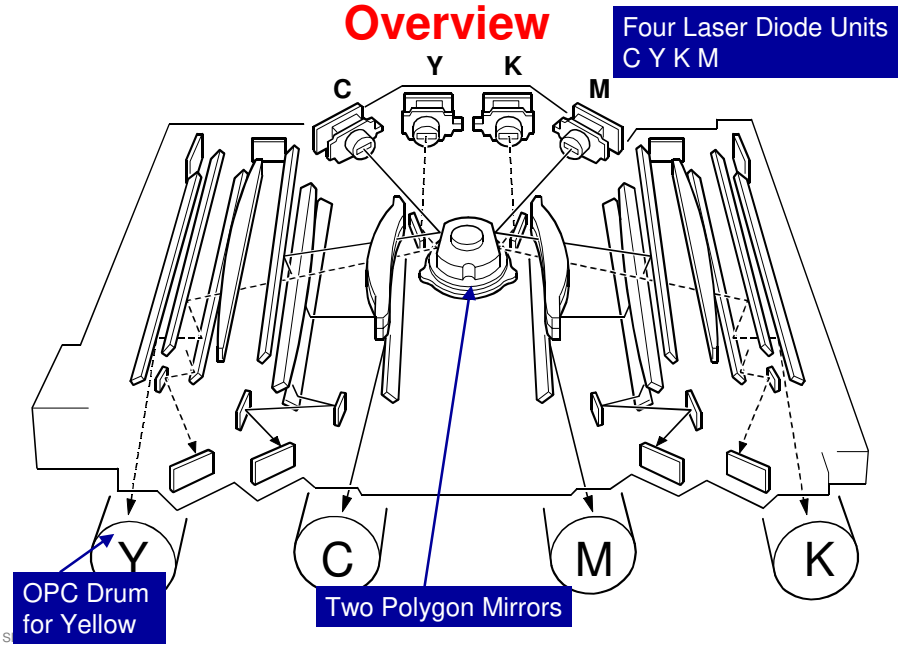
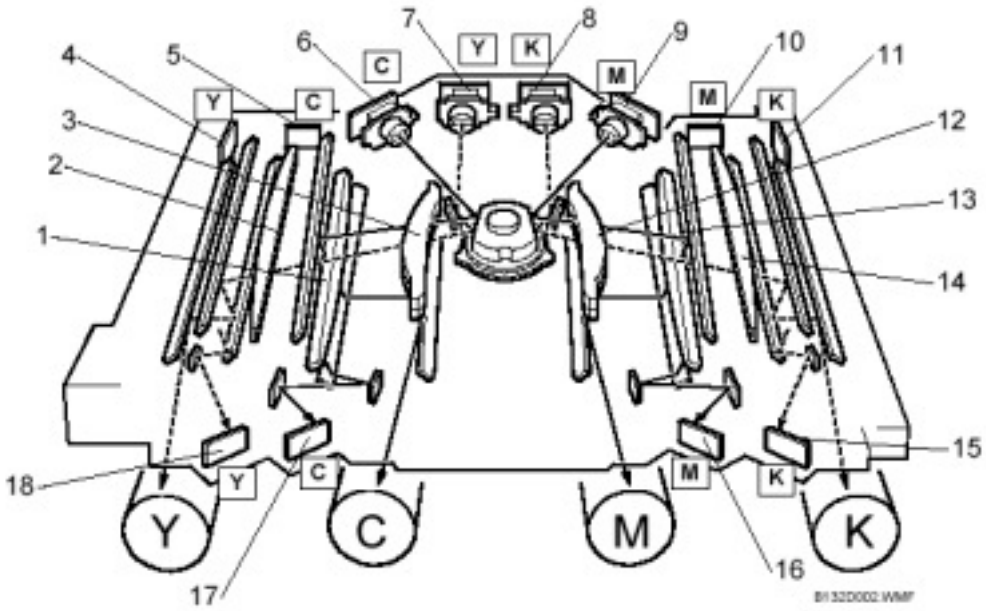
❒ On the next slide, we can see the components of the laser optics unit.

Overview



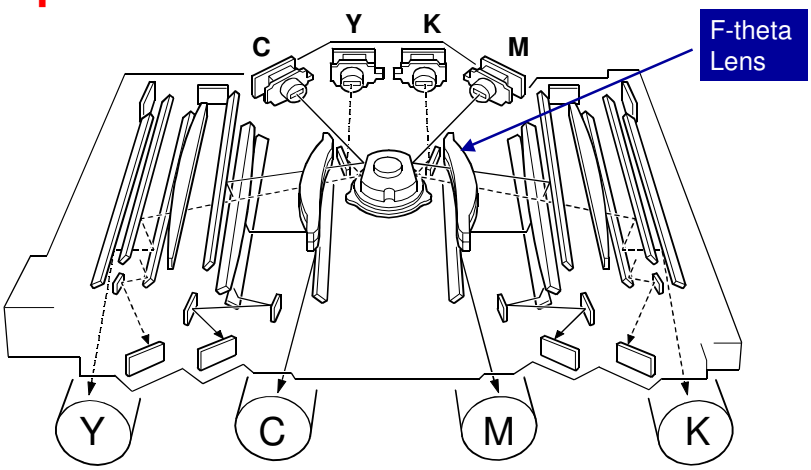
❒ See below for the names of all the components.



NOTE: LSDB = Laser Synchronization Detection Board

1. WTL Lens (C)
2. WTL Lens (Y)
3. Dual-Layer fθ Lens (C, Y)
4. LSDB (Y Front)
5. LSDB (C Front)
6. LD Unit (C)
7. LD Unit (Y)
8. LD Unit (K)
9. LD Unit (M)
10. LSDB (M Rear)
11. LSDB (K Rear)
12. Dual-Layer fθ Lens (M, K)
13. WTL Lens (M)
14. WTL Lens (K)
15. LSDB (K Front)
16. LSDB (M Front)
17. LSDB (C Rear)
18. LSDB (Y Rear)

Optical Path – LD to F-theta Lens



- K: LD unit - LD mirror - Lower polygon mirror - F-theta lens
- Y: LD unit - LD mirror - Lower polygon mirror - F-theta lens
- M: LD unit - Upper polygon mirror - F-theta lens
- C: LD unit - Upper polygon mirror - F-theta lens

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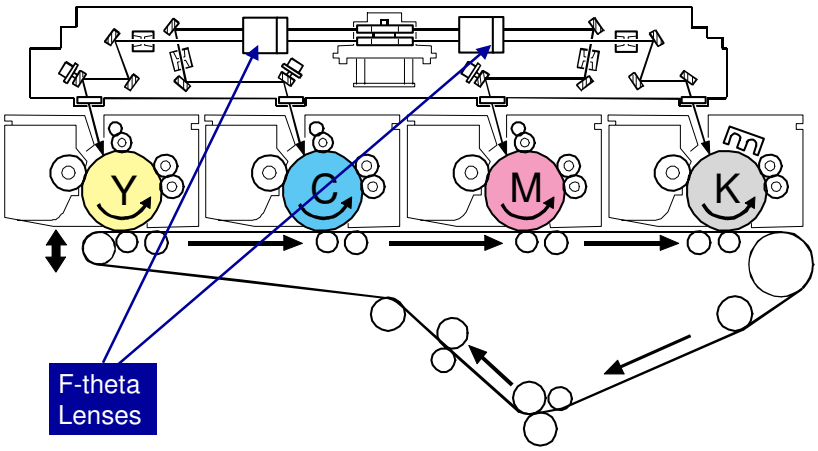
Point out the four LD units.

- From left to right: C, Y, K, M

Indicate the optical paths using the following explanations.

- The beams from the M and C units go directly to the upper polygon mirror.
- The beams from the K and Y units are deflected downwards to the lower polygon mirror by the LD mirrors.
  - K and Y each have an LD mirror.
  - These mirrors help to keep the optics unit as compact as possible.
- The polygon mirror then reflects the beams through the F-theta lenses.
  - The lens on the left takes the beams from the Y and C units.
  - The lens on the right takes the beams from the K and M units.
- After the F-theta lenses, each beam has its own set of optics. This is shown on the next slide.
- The Core Technology Manual has more information on laser optics components.

Optical Path – F-theta Lens to Drum



- F-theta Lens → 1st Mirror (C and M only) → WTL → 2nd Mirror → 3rd Mirror → Dust Shield Glass → Drum

Slide 292

- Each beam has a separate set of five components between the f-theta lens and the drum.

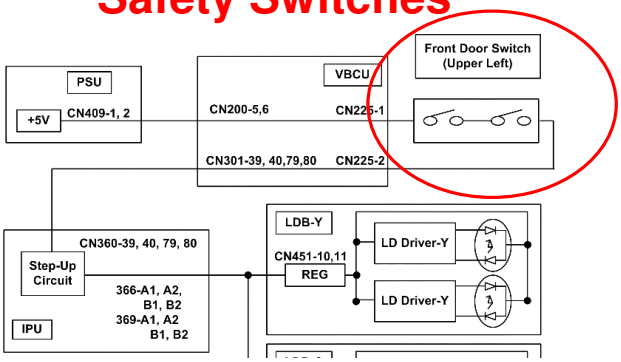
WTL

- The WTL ensures that the main scan goes straight across the drum.
- Without this lens, the main scan would bend out at the centre.
- The lens is adjusted at the factory (a screw bends the lens out at the middle). It cannot be adjusted in the field.
- There is one of these for each color.
- What does WTL mean?: The 'W' stands for a long and complicated Japanese word (wankyoku-jiku-gata - bent axis type). If you need an English name, 'warped' is close enough. The TL part means 'toroidal lens'.

Third mirror

- The machine adjusts the angles of the third mirrors for Y, C, and M to make sure that there is no skew relative to the main scan line for black. This adjustment is part of the MUSIC process.

Safety Switches



- When the front cover is open, the 5V line to the laser diodes is disconnected.
- There is no shutter mechanism.

Slide 293

No additional notes

Image Position Correction (MUSIC)

What is Done?

- **Three MUSIC sensors read three MUSIC sensor patterns that were made with C, M, Y and K toner on the ITB.**
- **The machine uses the results to adjust:**
  - Main scan adjustment: The main scan start timing of the laser beam
    - » If skew is detected, the positions of the 3rd scanner mirrors for C, M, and Y are also adjusted
  - Sub scan adjustment: The speeds of the drum motors to correct the intervals between the patterns.
- **This adjustment prevents color registration errors.**
  - What is a color registration error? This is when the four toner images are not put exactly on top of each other on the ITB.
- **The MUSIC adjustment is done for each color (Y, M, C, K).**
- **MUSIC normally takes about 25 seconds minimum. But it can take up to 100 seconds if the machine has to do MUSIC more than one time, if it cannot adjust correctly the first time.**

Slide 294

- MUSIC is "Mirror Unit for Skew and Interval Correction". But other components are used (temperature sensors, motor speed), so the name is a bit confusing.

Image Position Correction (MUSIC)
When is it Done? - 1

- **Immediately after the machine is turned on or returns from an energy saver mode.**
- **At the start of a job**
  - Only done if the laser unit temperature changed since the end of the previous job by the amount set with SP 2153 020 (Default: 1.5 ºC).
- **After process control (enable/disable with SP 2153 002).**

Slide 295

No additional notes

Image Position Correction (MUSIC)
When is it Done? - 2

- **Every 100 pages during a long job (you can change the interval with SP2153 024)**
  - Only done if the laser unit temperature changed since the end of the previous job by the amount set with SP 2153 020 (Default: 1.5 ºC).
- **Forced MUSIC (manually by the user or a technician)**
  - User Tools – Maintenance – Color Registration
  - SP 2111

Slide 296

No additional notes

Image Position Correction (MUSIC)

Important Notes

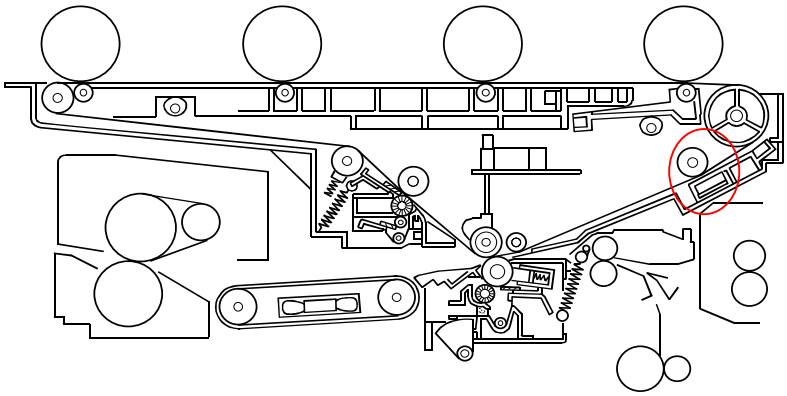
- Immediately after the machine is turned on, MUSIC requires time to complete processing. But you can do a black-and-white job immediately.
- If a job is started before the MUSIC process has completed, a message ("Now Self Checking") will appear on the operation panel display.
- The job will not be done until the MUSIC process is finished. Wait for MUSIC to complete.

Slide 297

- ‘Now Self Checking’: This notice appears during MUSIC, ACC, and process control. There is no display to show the amount of remaining time.

Image Position Correction (MUSIC)

Location of the Sensors

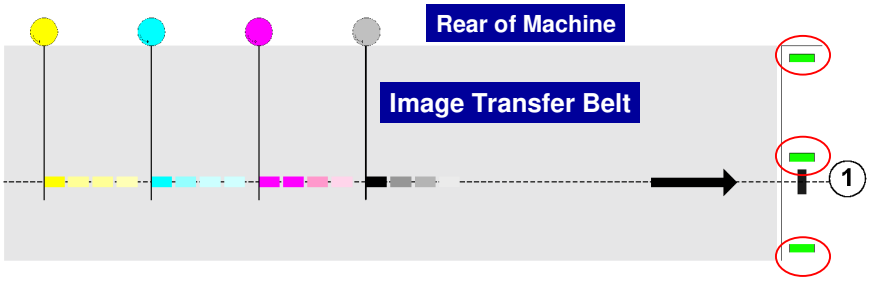


- A roller opposite the sensors pushes the transfer belt against the sensors.
- This makes sure that the sensors read the patterns accurately.

Slide 298

No additional notes

Image Position Correction (MUSIC)
Location of the Sensors



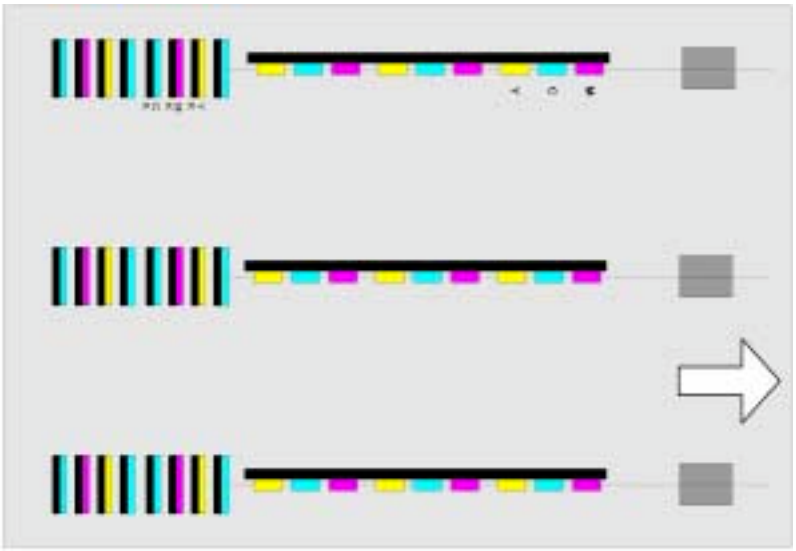
- The sensors are below the ITB (image transfer belt)

Slide 299

- The other sensor in this assembly is the ID sensor. We will study this in the Process Control section of the course.

Image Position Correction (MUSIC)

MUSIC Pattern

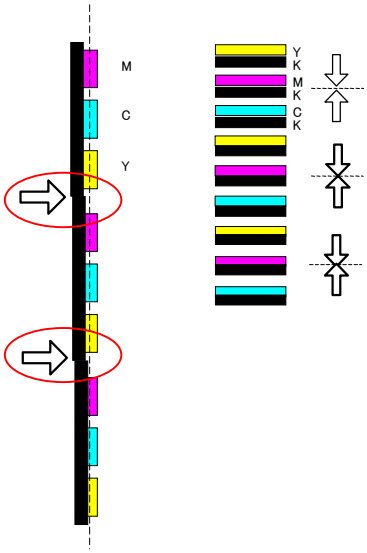


Slide 300

❒ This is the pattern that is made on the ITB.

Image Position Correction (MUSIC)

MUSIC Pattern – Main Scan Correction



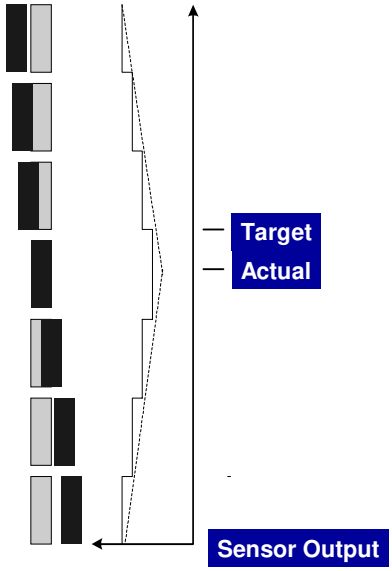
- The MUSIC sensors check for skew in the main scan direction.
- In this example, the red circles show locations where skew is detected in the main scan direction.

Slide 301

- In this diagram, the dotted line is just a reference, to make the skew in this example more easy to see. The sensors can detect a wider area of the transfer belt than this dotted line.

Image Position Correction (MUSIC)

MUSIC Pattern – Main Scan Correction



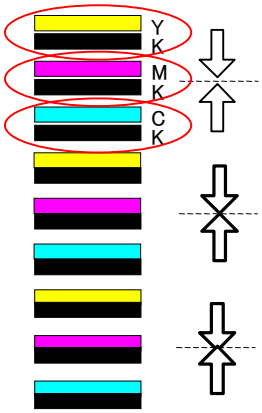
Slide 302

- This diagram shows a close-up view of the main-scan test pattern.
- K is the reference, and the positions of CMY are adjusted with reference to the K pattern.
- The CMY patterns are vertical (shown in grey in the diagram), but the K pattern overlaps the CMY patterns as shown.

❒ The MUSIC sensor response is measured. The output is the lowest when the K pattern fully overlaps the color pattern (the dotted lines in the diagram cross at this point). This is the “Actual” position as shown in the diagram. But there is a “Target” value in the machine’s software (an example is shown on the diagram; this is not the real target, it is just an example to explain the process). The machine compares the “Actual” and “Target” values, and adjusts the laser timing in response to the results of this comparison.

Image Position Correction (MUSIC)

MUSIC Pattern – Sub-scan Correction



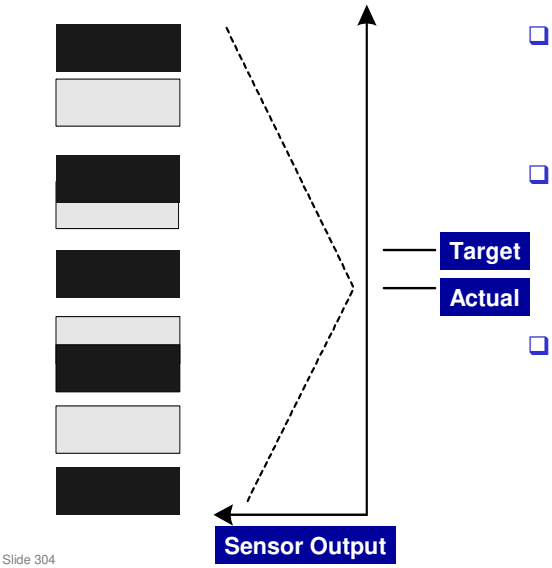
- The MUSIC sensors check for skew in the sub scan direction.
- The thickness of the patches, and intervals between them is measured in the sub scan detection.
- In this example, the red circles show locations where skew is detected in the sub scan direction.

Slide 303

No additional notes

Image Position Correction (MUSIC)

MUSIC Pattern – Sub-scan Correction



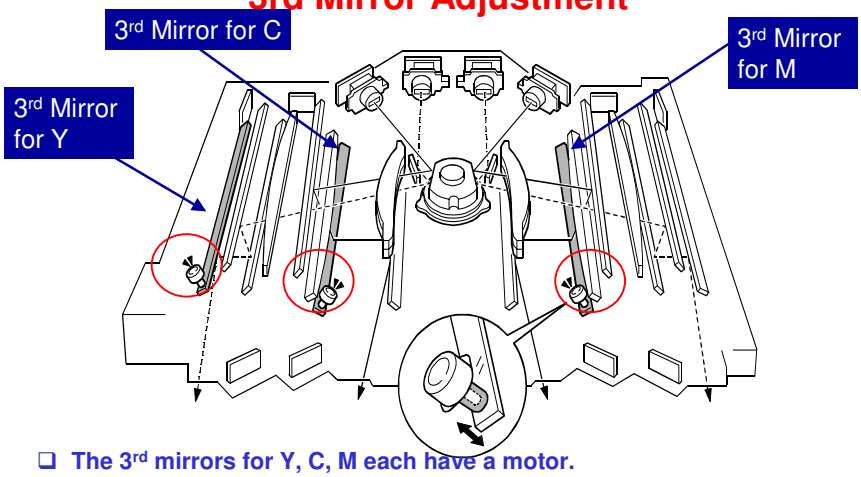
- This diagram shows a close-up view of the sub-scan test pattern.
- K is the reference, and the positions of CMY are adjusted with reference to the K pattern.
- The CMY patterns are at constant intervals, but the K pattern overlaps the CMY patterns as shown.

Slide 304

- The MUSIC sensor response is measured. The output is the lowest when the K pattern fully overlaps the color pattern (the dotted lines in the diagram cross at this point). This is the “Actual” position as shown in the diagram. But there is a “Target” value in the machine’s software (an example is shown on the diagram; this is not the real target, it is just an example to explain the process). The machine compares the “Actual” and “Target” values, and adjusts the main motor speed in response to the results of this comparison.

Image Position Correction (MUSIC)

3rd Mirror Adjustment



- The 3rd mirrors for Y, C, M each have a motor.
- With this motor, the position of a mirror can be adjusted to correct colour registration errors in the main scan direction.
- K is used as the reference for the adjustment, and the 3rd mirror for K does not have a motor.

Slide 305

- The motors are shown by red circles in the diagram on the slide. The mirrors that are controlled by these motors are shaded grey.
- The adjustment is done during the MUSIC process.
- The output from temperature sensors inside the laser optics unit also has an effect on this adjustment. This is because changes in temperature can change the shape of the optics components. During the MUSIC process, the mirror positions are adjusted to compensate for these changes.

Operation Panel Display during MUSIC

- It is difficult to know what procedure the machine is doing.
- This is because the same message is displayed on the screen for each of these processes:
  - MUSIC
  - ACC
  - Process control
- Often, these processes are all done in a sequence. But the machine does not tell you which process it is now doing.

Slide 306

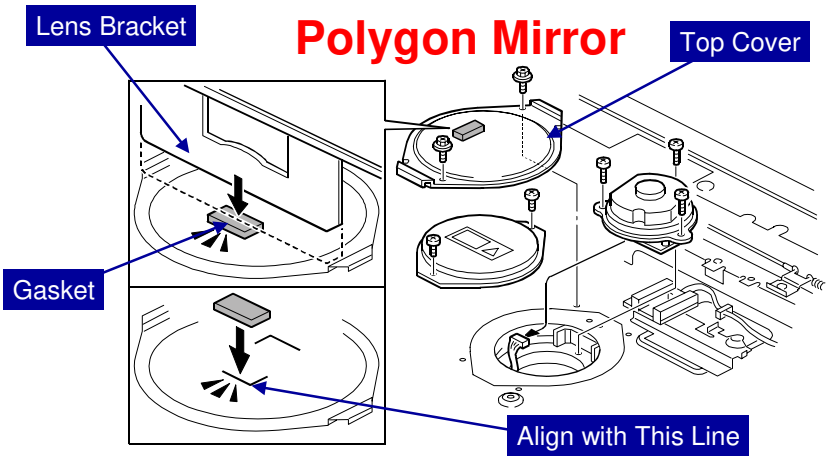
No additional notes

Replacement

- Because of its high rotation speed, the mirror continues to turn for about 3 minutes after the machine is turned off. Allow enough time for the mirror to stop before you start to remove the polygon motor .
- Never work on the laser unit with the main power turned on. Laser beams can damage the eyes.
- Read the service notes for the laser unit in the service manual (Removal and Adjustment, General Cautions).
- Do not touch the paint-locked screws on the lens block.

Slide 307

V-C3 field service manual, Removal and Adjustment, Laser Unit



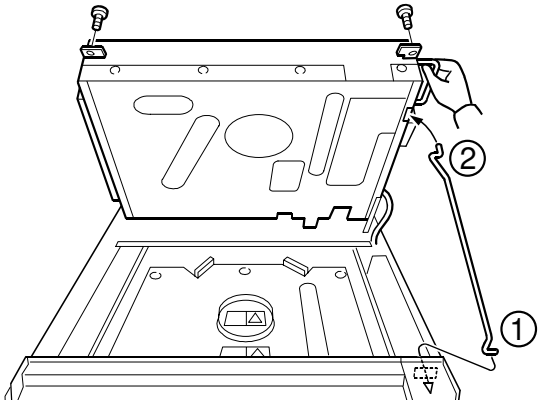
- Take care when you put the top cover back.
- Set the top cover so that the gasket touches the lens bracket.
- If the top cover is not positioned this way, the unit could generate electrical noise.
- If the gasket peeled off during removal, install a new gasket aligned with the line on the top cover.

Slide 308

V-C3 field service manual, Removal and Adjustment, Laser Unit, Polygon Mirror

❒ A replacement gasket is available as a service part.

Lock the Scanner Unit

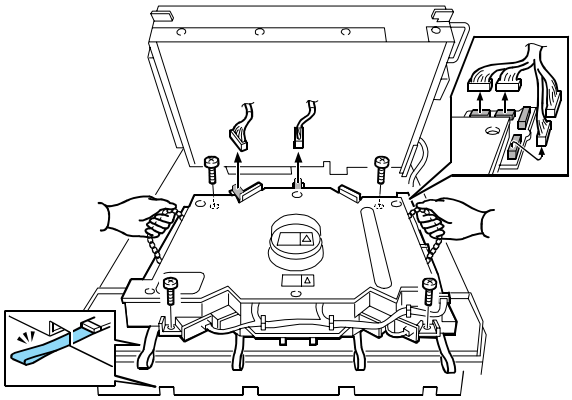


- To work on the laser unit, you must open the scanner unit.
- The scanner unit is heavy. You must lock it in the 'open' position with the support rod, until you finish your work on the laser unit..

Slide 309

V-C3 field service manual, Removal and Adjustment, Laser Unit, Laser Unit (step 3)

Lifting the Laser Unit



- Hold the chains when you lift the laser unit out of the machine.

Slide 310

No additional notes

Installing a New Laser Unit

- There are four tapes at the front of the laser unit. When you install them, make sure that you do not tuck them under the laser unit.
- Be sure to reconnect the ground wire at the right rear corner of the machine.

Slide 311

No additional notes

Adjustment

- **After you replace the laser unit:**
  - Input the SP data (see the next slide).
  - Check for color registration errors. If there are color registration errors after you install a new laser unit, then do the color correction tests and adjustments.
  - Do the skew adjustment if skew occurs after you install a new laser unit.

Slide 312

V-C3 field service manual, Removal and Adjustment, Laser Unit, Laser Unit

- After you replace a laser unit, the machine does the MUSIC process. This should remove color registration errors. The color correction adjustment is required very rarely.

Laser Unit Replacement – SP Modes

- Each new laser unit is delivered with a sheet of A5 paper.
- Only input the numbers that are explained in the service manual.
- Then print a test sheet (SP 2109-2, pattern 14) to confirm that the machine is working correctly.

Slide 313

V-C3 field service manual, Removal and Adjustment, Laser Unit, SP Adjustments after Laser Unit Replacement

Laser Synchronization Detectors

- **These cannot be replaced in the field.**
  - This is because factory adjustment is needed after installation of new sensors. This cannot be done in the field.
- **If these sensors are defective, you must replace the laser unit.**

Slide 314

No additional notes

RICOH

RICOH

V-C3 TRAINING
COPIER ENGINE

PHOTOCONDUCTOR UNITS

Slide 315

- This section will explain the mechanisms in the photoconductor units.
- The photoconductor units contain the OPC and the development unit.
- This section will also explain the toner supply mechanism to the development unit.
- There are four units (one for each color).

PCUs

Overview

Slide 316

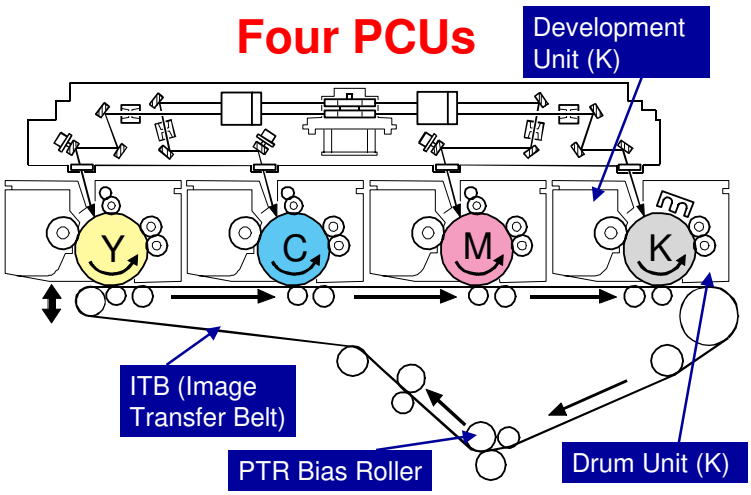
No additional notes

Overview

- **The method of charge is not the same for each drum.**
  - The C, M, Y drum units have a charge roller.
  - The K drum unit has a charge corona unit.
- **The lubricant bar unit in the cleaning unit for K is different from the one for CMY.**
  - The spring that pushes the lubricant bar against the lubricant brush roller is different for the K unit
- **A new developer mixing method is used, to ensure even image density across the page.**
- **The PCU stand and special tools for developer replacement are different from the V-C1 series.**
- **The SP modes to be used after replacing components are different from the V-C1 series.**

Slide 317

❒ The V-C3 PCU stand is the same as the V-C2 PCU stand. You can use a V-C2 PCU stand if the V-C3 stand is not available.



- Four PCUs. Each one contains a drum and a development unit
- The four toner images are transferred to the ITB at the same time.
- The PTR bias roller transfers the image from the ITB to the paper.

Slide 318

- This diagram shows the four PCUs.
- The development unit is on the left. The OPC and its cleaning unit is on the right.
- The laser hits the PCU at the top, and the image is transferred to the image transfer belt at the bottom.
- PTR: Paper Transfer Roller

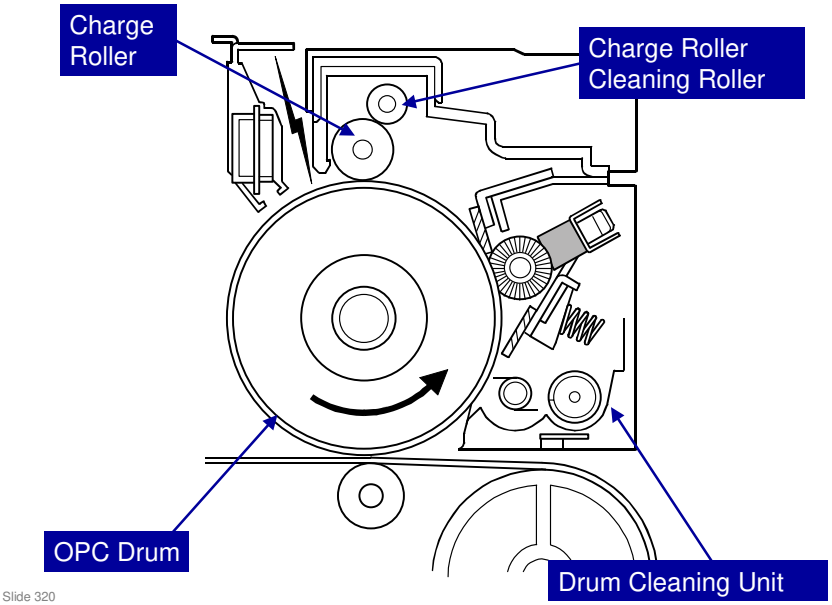
PCUs

Drum Units

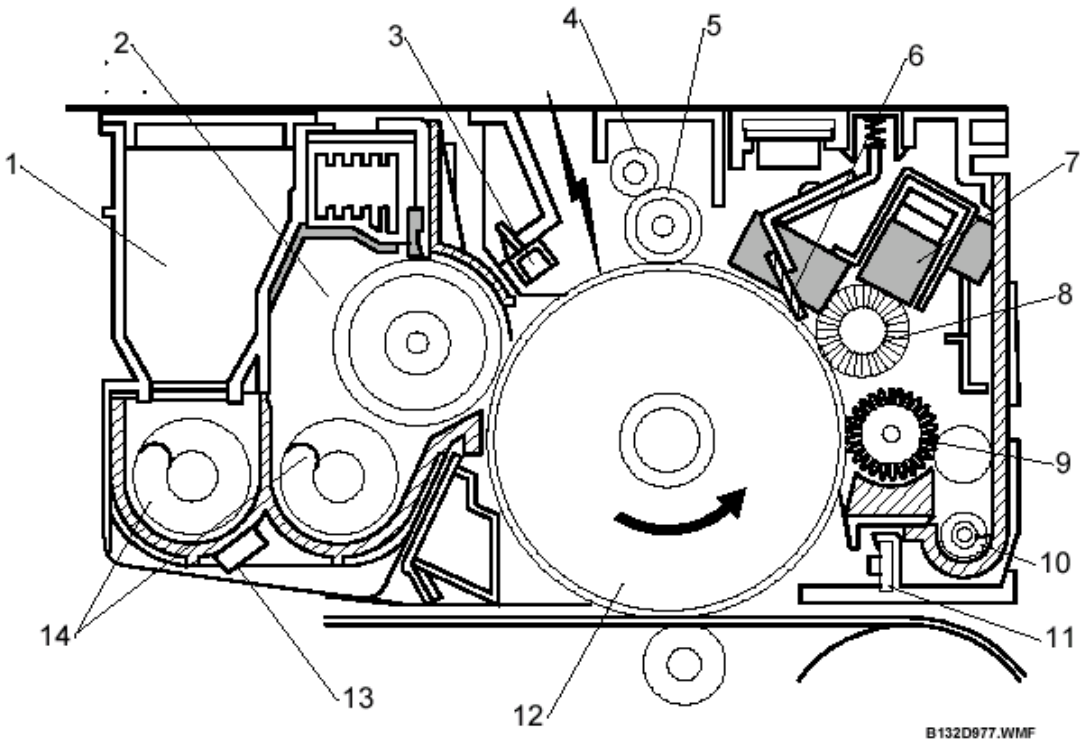
Slide 319

No additional notes

Drum Unit Contents - CMY

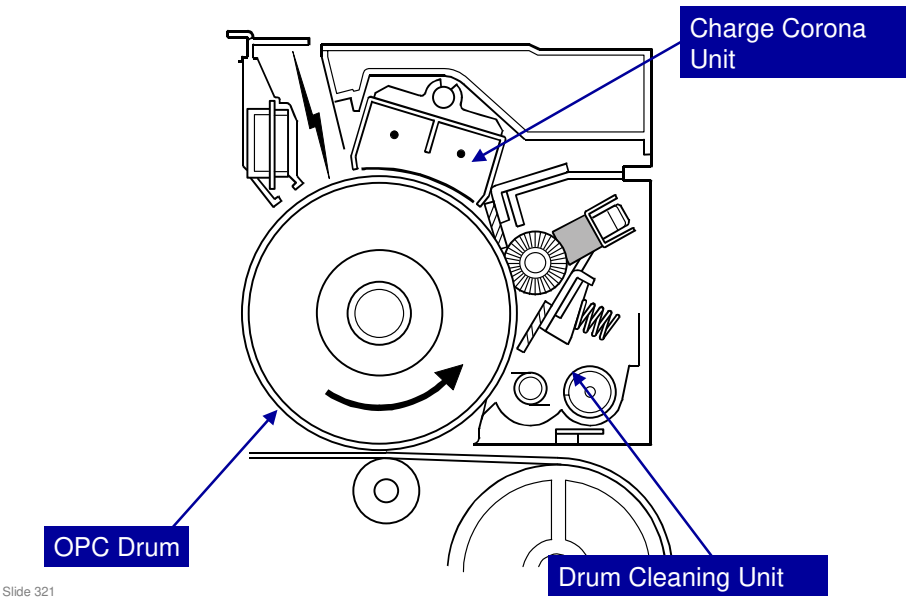


- The laser hits the PCU at the top, and the image is transferred to the image transfer belt at the bottom.
- See below for a full list of all the components.



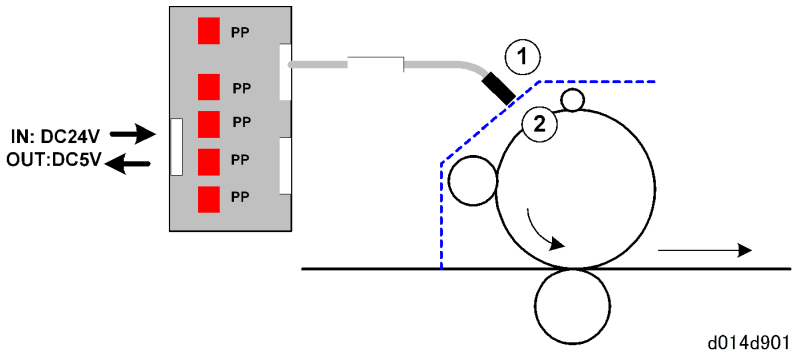
1. Developer Cartridge
2. Development Roller
3. Potential Sensor
4. Charge Roller Cleaning Roller
5. Charge Roller
6. Cleaning Blade
7. Lubricant Bar
8. Lubricant Brush Roller
9. Cleaning Brush Roller
10. Waste Toner Collection Coil
11. Quenching Lamp (QL)
12. Drum
13. TD Sensor
14. Developer Augers

Drum Unit Contents - K



- The K unit has a charge corona unit, as explained earlier.
- The charge corona unit is a Scorotron type.
- Note that there are no ID sensors near the drum. These are near the ITB, and the machine writes the ID sensor patterns on the ITB.

Potential Sensor

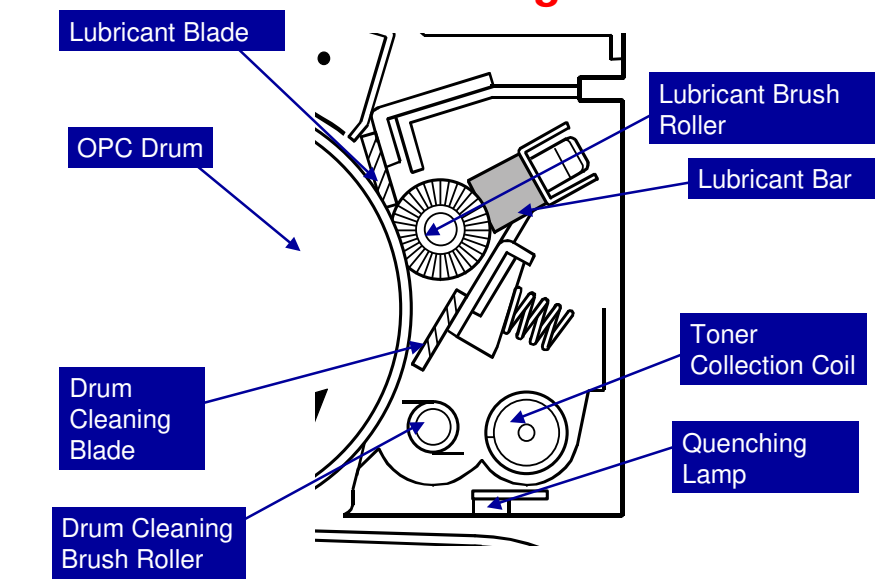


- Not inside the drum.
- This keeps dust and toner away from the sensor.

Slide 322

- In the diagram, the area to the right of the dotted line is inside the PCU. The area to the left is inside the main body of the copier.

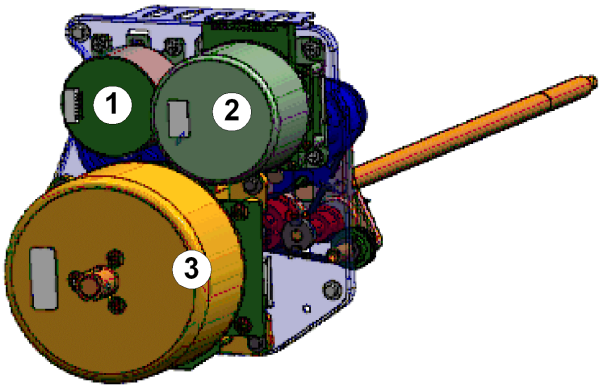
Drum Cleaning Unit



Slide 323

- The cleaning units are the same in each PCU, except for one difference:
  - The spring that pushes the lubricant bar against the lubricant brush roller is different for the K unit (more about this later).
- Note that there is no ID sensor near the drum. This is near the ITB, and the machine writes the ID sensor patterns on the ITB.

Motors in the PCU



- Each PCU has three motors.

Slide 324

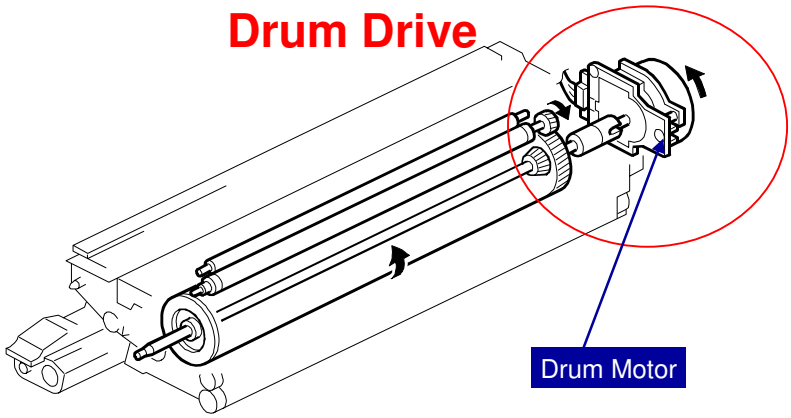
1. Development Motor
2. Drum Cleaning Motor
3. Drum Motor

Motors in the PCU

Front Rear

Slide 325

- Here is a view of the drive gears and shafts that are attached to the motors.
  - 1. Development Motor
  - 2. Drum Cleaning Motor
  - 3. Drum Motor
  - 4. Development Coil Shaft
  - 5. Drum Cleaning Motor Shaft
  - 6. Drum Motor Shaft
  - 7. Development Roller

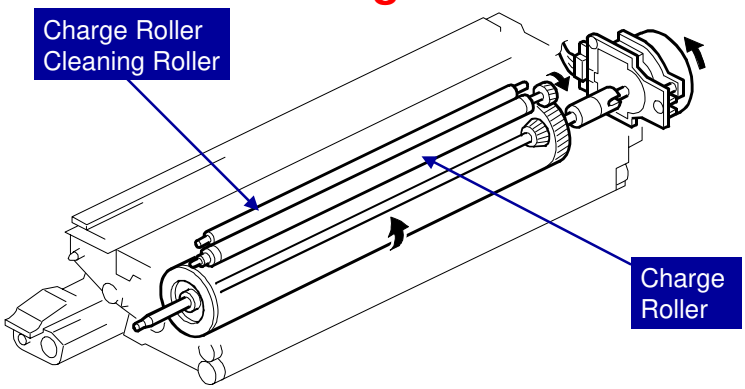


- **Each PCU has three motors.**
  - The drum motor drives the drum. It controls no other component.
- **The drum motor connects to the drum through a shaft and a coupling.**
- **During black-and-white copying and printing, only the black drum (K) rotates. The other color drums (Y, M, C) do not rotate.**

Slide 326

- Three motors:
  - Drum motor, development motor, drum cleaning motor (see the previous slide)
- There is no special tool to lock the drum shaft at the front end in order to remove the drum motor.
- The straight line connection of the drum shaft and motor enables a precise drum speed and rotation.

Drum Charge - CMY



- A charge roller charges the drum.
- When the drum turns, a gear turns the charge roller.

Slide 327

- The charge is applied to the roller at the rear end of the roller.
- The charge roller power pack supplies the charge.
- The machine contains a lift mechanism for the charge roller, but it is not used.

Charge Roller Cleaning

- **The cleaning roller rotates in the opposite direction to the charge roller.**
  - It is driven by the charge roller.
- **SP 2220-2 controls when the charge rollers for C, M, and Y are cleaned.**
  - 0: OFF
  - 1: With process control and at intervals selected with SP2221
  - 2: At intervals selected with SP2221 only.
- **To clean the charge roller at any time, SP 2222-2, -3, -4, or -5 can be used.**

Slide 328

No additional notes

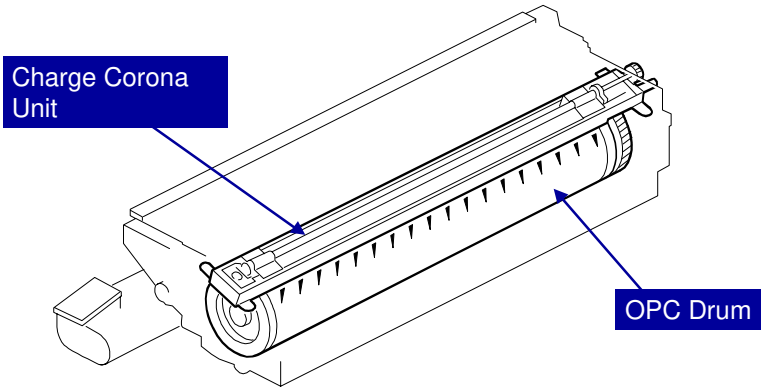
Why is AC applied to the charge roller?

- There is a gap of 50 μm between the charge roller and the drum.
- Because of this gap, the ac is applied to the charge roller to get the drum to the target potential more quickly.

Slide 329

No additional notes

Drum Charge - K

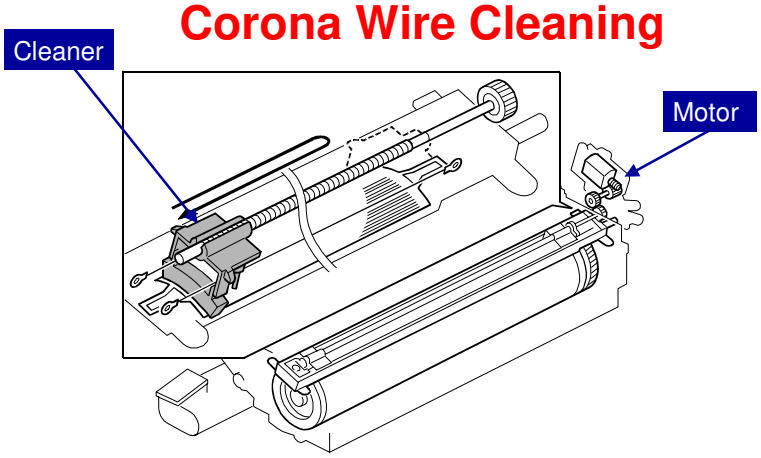


- **The CGB power pack (a constant dc power pack) applies a high electrostatic charge to the corona wires.**

Slide 330

- The K unit has a charge corona unit, as explained earlier.
- The charge corona unit is a Scorotron type.
- This system generates more ozone than a charge roller system, so the ozone filter is larger than the V-C1, and more fans are added.

Corona Wire Cleaning



- The charge wire cleaning motor moves the charge wire cleaning pad forward and back. This keeps the wires free of dirt and ensures a uniform charge corona.

Slide 331

No additional notes

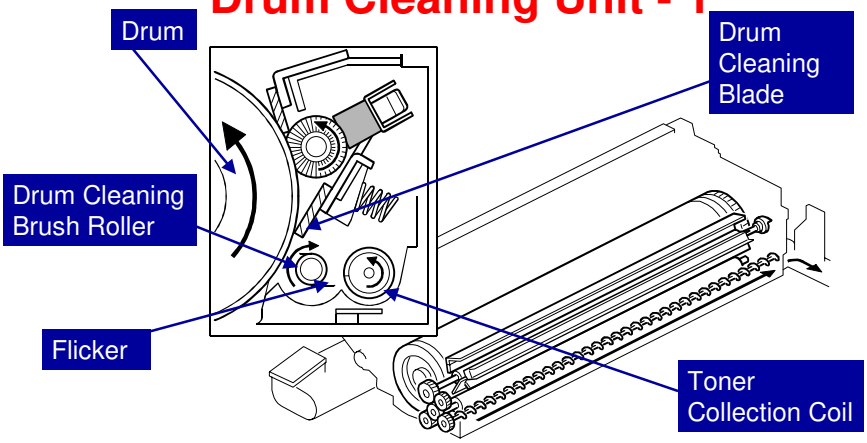
Corona Wire Cleaning

- **SP 2220-1 controls when the wire is cleaned.**
  - 0: OFF
  - 1: With process control and at intervals selected with SP2221
  - 2: At intervals selected with SP2221 only.
- **To clean the corona wire at any time, SP 2222-1 can be used.**

Slide 332

No additional notes

Drum Cleaning Unit - 1

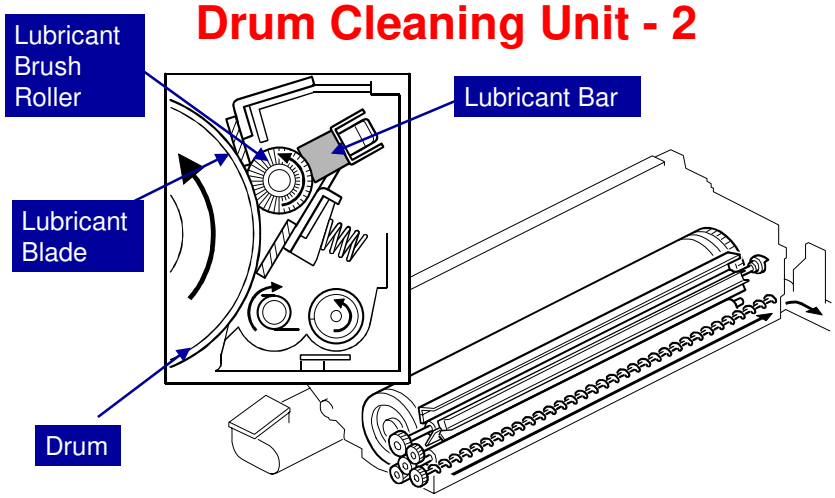


- This unit removes remaining toner from the drum after image transfer.
- First, the cleaning brush roller removes toner. This toner goes to the waste toner collection coil, and to the waste toner collection bottle.

Slide 333

- The drum turns counter clockwise as shown above.
- The flicker cleans the drum cleaning brush roller.

Drum Cleaning Unit - 2



- Then, the lubricant blade removes remaining toner after this.
- The lubricant brush roller increases the efficiency of the cleaning blade, and applies lubricant to the drum surface.

Slide 334

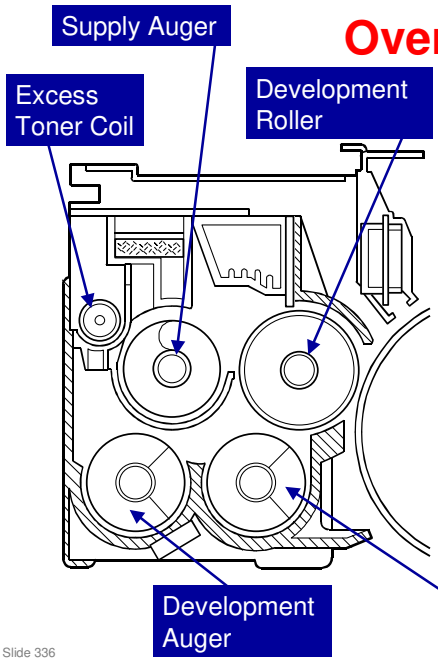
- The lubricant bar is Zinc Stearate (shown as ZnSt for short; this is not a chemical formula, it is an abbreviation)

PCUs

Development Units

Slide 335

No additional notes

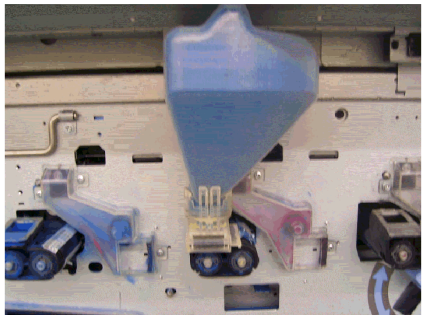


Overview

- **Dual-component development (toner/carrier)**
- **Development roller with magnetic brush**
- **The augers mix the developer with the toner from the toner cartridge.**
  - The toner from the toner cartridge contains 10% carrier (by weight).
- **The development roller applies toner to the latent image on the drum.**

No additional notes

Installing Developer



- Developer is supplied in a bottle that is attached to a port at the front of the development unit. The bottle is removed and discarded after installation.
- It is not necessary to remove the PCU in order to install developer.

Slide 337

No additional notes

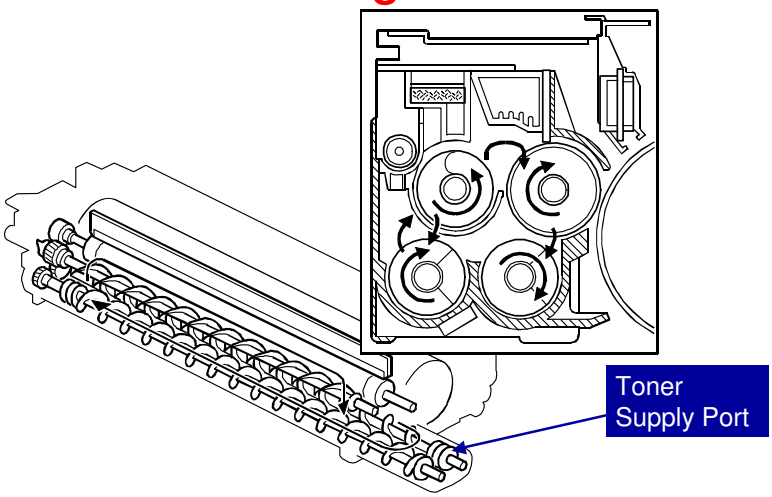
Fresh Toner Contains Developer

- In the V-C1, there is a problem when printing many pages with a high proportion of solid image areas.
- To counteract this, in this new model, fresh developer is always added with fresh toner.
- As a result, the life of the developer is increased to 400k (in the V-C1, it was 150 K).
  - 5 pages per job, 5% coverage

Slide 338

No additional notes

Mixing – 1

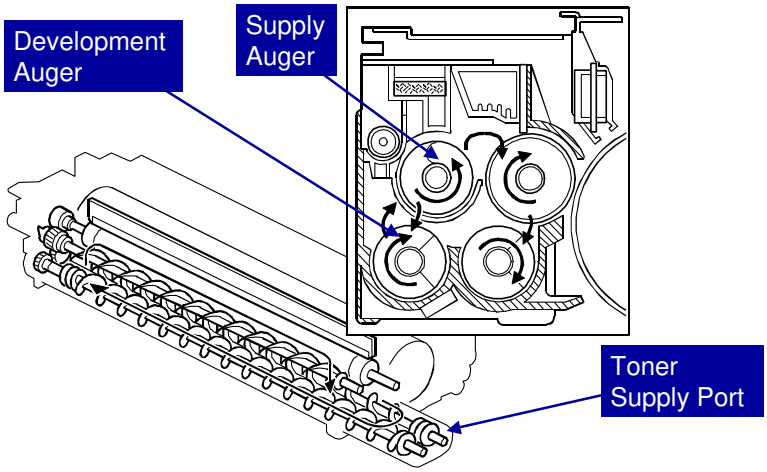


- Fresh toner (which contains 10% carrier by weight) comes in at the toner supply port.

Slide 339

No additional notes

Mixing – 2

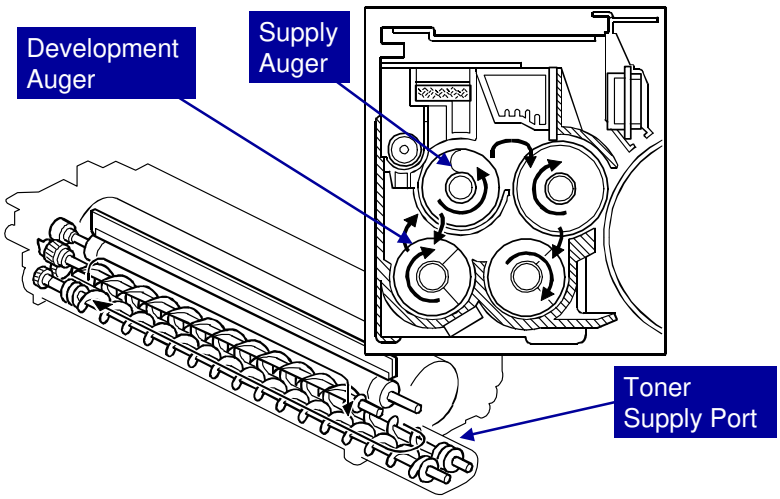


- **The development auger mixes this with the developer in the development unit. Then sends it to the supply auger.**
  - This means that there is always fresh developer coming in with the toner, and mixed with the existing developer.

Slide 340

No additional notes

Mixing – 3

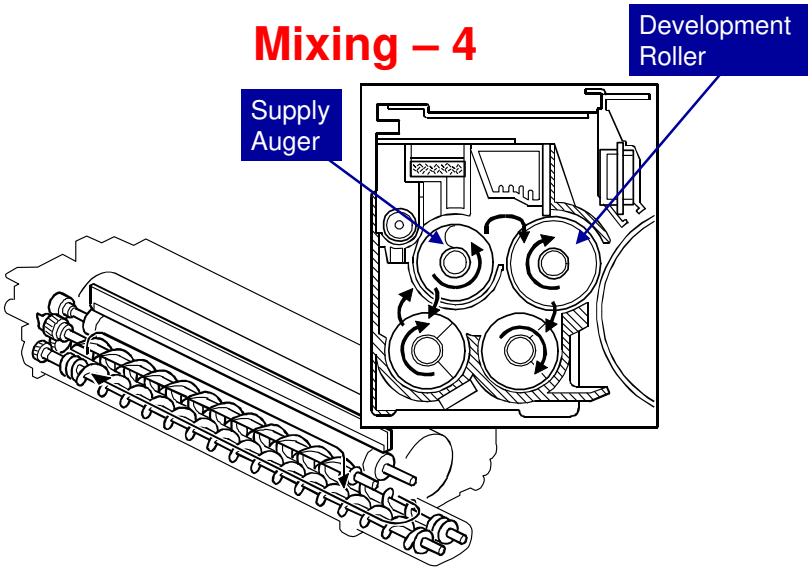


- **The toner/developer mixture is circulated in one direction by the development auger and the supply auger.**

Slide 341

- The arrows in the three-dimensional part of the diagram show the circulation of toner.

Mixing – 4

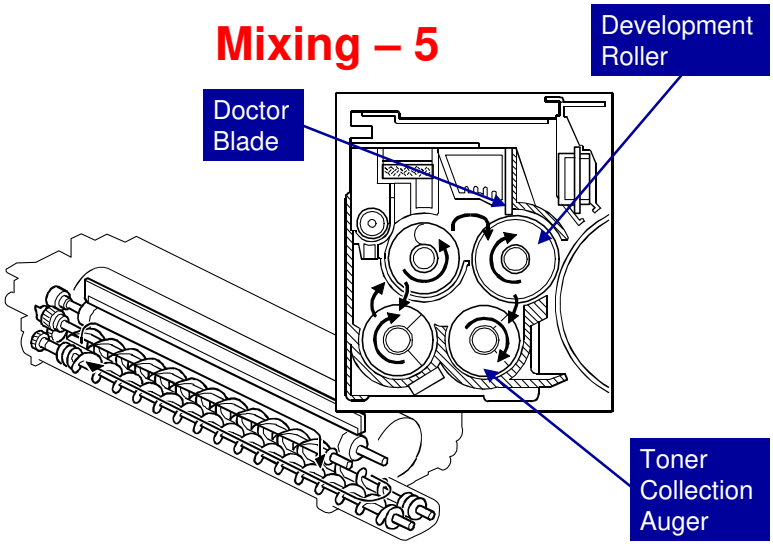


- Toner is supplied from the supply auger to the development roller.

Slide 342

No additional notes

Mixing – 5

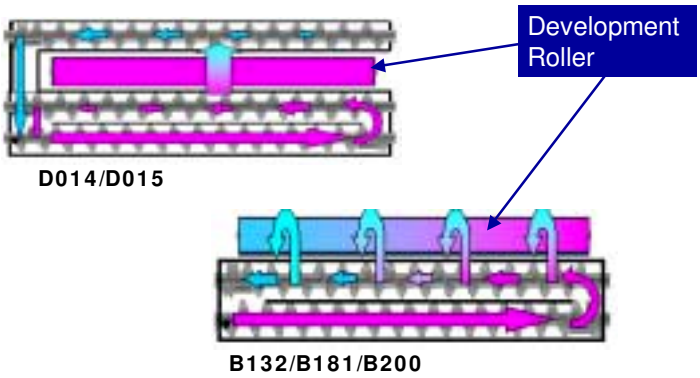


- **The doctor blade trims off excess toner from the development roller. The excess toner falls onto the toner collection auger.**
  - This auger sends the excess toner back to the area where fresh toner comes in from the toner supply port.

Slide 343

- As a result of this new mixing system, a constant amount of toner is applied across the development roller.
- In the V-C1, there is more variation in image density across the page.

Comparing the V-C1 and V-C2/V-C3

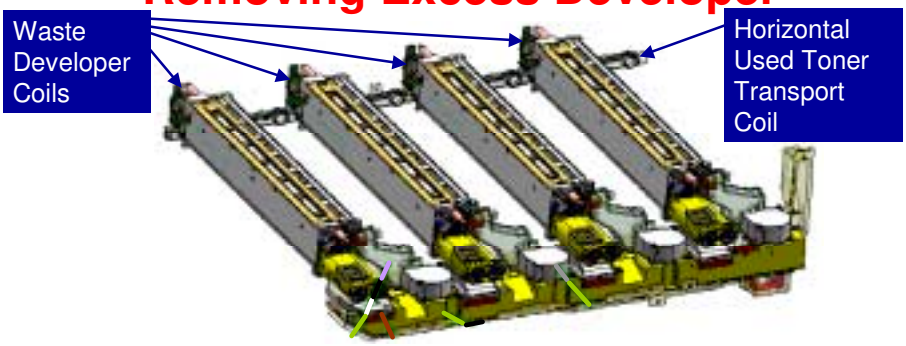


- In the V-C2/V-C3 series, the path for fresh developer is separate from the path for excess toner scraped from the development roller by the doctor blade.
- In the V-C1 series, the excess toner mixes with fresh toner.
- The V-C2/V-C3 series achieves a more even coating of toner on the drum and uses only fresh toner/developer. This means the density of the image is more uniform.

Slide 344

- This is a schematic view.
- The one-direction flow of developer in the V-C2/V-C3 series development unit improves image quality.
- Fresh developer: pink
- Excess toner: pale blue
- V-C2/V-C3: Carrier goes to the development sleeve and on to the drum
- V-C1 series: Carrier goes to the development sleeve and comes back again. Then it is mixed with fresh developer, but the older carrier has less chargeability, and this can cause image density to vary across the page.

Removing Excess Developer



- Fresh toner contains 10% carrier (by weight) in this model.
- So, developer builds up in the development unit when fresh toner is supplied, and waste developer must be removed.
- Excess developer goes out through a port at the top of the development unit.
- It then goes to the excess developer coil, and from there to the horizontal used toner transport coil.

Slide 345

- The horizontal used toner transport coil is part of the waste toner disposal mechanism at the rear of the machine (see the Waste Toner section of the course). The excess developer goes to the waste toner collection tank with the waste toner from the PCUs and the transfer belt.
- The excess developer is not necessarily used developer. Fresh developer is always being added from the toner cartridge, and this can overflow to the waste developer coil.

TD Sensor

- The TD sensor is of new design and extremely sensitive (calibrated at the factory).
- This TD sensor cannot be replaced in the field as an individual part.

Slide 346

No additional notes

PCUs

Replacement Procedures

Slide 347

- First, we shall study the important points about the replacement procedures.
- Then do the procedures.

Replacement - General

- The OPC and development unit must be separated for servicing.
- The K PCU is different from the other PCUs.
  - Do not install a K PCU in the Y, M, or C position.
- A sheet is packed with each new PCU to explain the SP codes to do after you replace a PCU.
- There is no special tool to lock the drum shaft at the front end in order to remove the drum motor.

Slide 348

No additional notes

SP Modes

- **Do the SP modes exactly as explained in the manual.**
- **If you replace the developer, initialize the TD sensor only for that colour which you replaced.**
  - Use SP 3801 to initialize the sensor.
    - » SP 3811 also initializes the TD sensor, but it does other things also.
- **SP 3801 and SP 3811 both initialize the TD sensor. If the TD sensor is initialized twice for the same batch of developer, a fatal error will occur with toner supply control.**
  - Also, if you initialize a TD sensor more than once, this will cause toner scattering.
- **After replacing any component of the PCU, you must do SP 2111 (forced MUSIC adjustment).**
  - See the service manual for the correct procedure for each component.

Slide 349

- SP 3811 sends toner to the sub hopper of the PCU, covers the drum with a layer of toner (to prevent the cleaning blades from flipping, or damaging the drums), initializes the TD sensor, and does process control. It takes about 4.5 minutes.

Lubricant Powder

- **When you dust the surface of a new drum, cleaning blade, or transfer belt, use only Lubricant Powder B1329700 (specially designed for this machine).**
- **After replacing the lubricant brush roller in the PCU, use Zinc Stearate D0159501 to lubricate the new roller. – This lubricant was introduced after the V-C2 was launched.**
- **Do not use the yellow toner from this machine because it contains developer. The developer will damage the drum and ITB.**
- **The yellow toner for the V-C1 series is required for the maintenance of this model, when the lubricant brush roller in the PCU is replaced.**

Slide 350

- The V-C1 series was not sold in some areas, but the toner is available as a service part (see below).
- Part numbers of required lubricants
  - G104 YELLOW TONER (D0159500) – this is the V-C1 yellow toner

    G104 yellow toner – this is just the name. It has nothing to do with a model code G104!
  - ZINC STEARATE (D0159501) – this is for the PCU lubricant brush rollers
  - ZINC STEARATE (B1329700) – this is for the other procedures that require zinc stearate.

PCU Stand

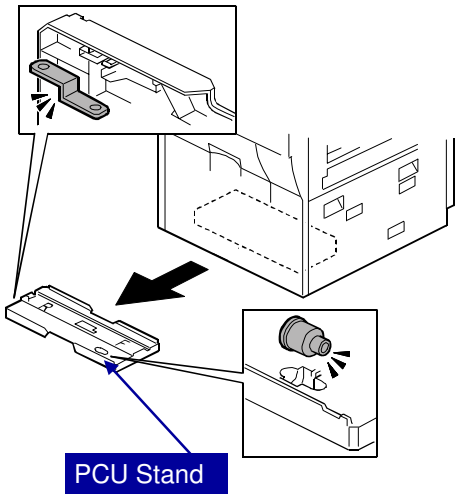
- **The PCU stand is stored under the machine.**
- **Use this when you disassemble the PCU:**
  - It protects the drum from damage and exposure to light while the PCU is out of the machine
  - It keeps the OPC aligned correctly so the development unit can be reattached.
- **The shape is different from the stand for the V-C1. Do not use a V-C1 stand for this new machine, or you could damage the drum.**
  - The color is also different (V-C1: grey, V-C2/V-C3: off-white)
- **The PCU stand for this machine stores only two special tools (required for developer replacement).**
  - There is no special tool for drum motor replacement.
- **The PCU stand must remain attached to the bottom of the main machine at the customer site.**

Slide 351

❒ If a PCU stand for the V-C3 is not available, you can use a PCU stand for the V-C2 (it is identical). But do not use a PCU stand for the V-C1.

PCU Stand

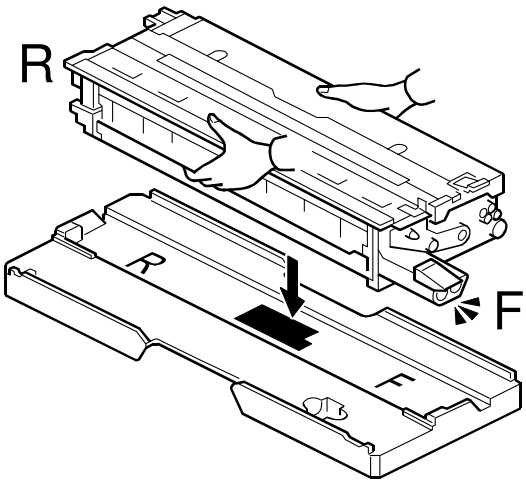
- The PCU stand is stored under the machine.



Slide 352

No additional notes

Removing the PCU
Use the PCU Stand



- Put some paper on the floor to prevent toner getting on the floor.
- Take out the PCU and put it on the stand.
- This shows how to put the PCU on the PCU stand.
- Do not use the PCU stand for the V-C1. This could damage the drum.
- In the diagram, F is front, and R is rear.

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V-C3 series field service manual, Replacement and Adjustment, PCU

Installing a New PCU - 1

- **Remove the seal with the bar codes. Use these numbers later to input into the SP mode**
  - SP 3010, 3011, 3012, or 3013, depending on the PCU color.
  - These are TD sensor calibration characteristics.
  - You can attach the seal to a sheet of paper that comes with the new PCU, as a convenient means of reference.
- **The settings must be made if you install a new development unit or a new PCU.**
- **Do these SPs before you do the developer initialization.**

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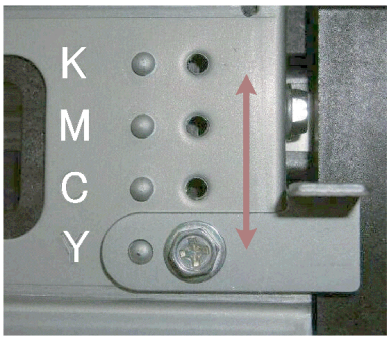
- The settings are on the SMC list, so that they can be input again in the case of NVRAM failure.

Installing a New PCU - 2



temp_0939

- **Before you install the new PCU, make sure that you adjust this plate to the correct position.**
- **In a K PCU, this is always fixed at the K position.**
- **In a CMY PCU, it is always fixed at the Y position. You must move the plate to the correct position, or you will not be able to install the PCU.**
  - A bracket in the machine blocks a pin on the PCU if the plate is not set correctly.
  - This is to prevent PCUs from being installed in the wrong positions.

Slide 355

- The CMY units are interchangeable, but the K PCU is different.
  - The CMY PCUs have a charge roller. The K PCU has a corona wire.
- Make sure that you have the correct type of PCU.

Installing a New PCU - 3

- **After you install a new PCU, you must add developer and initialize the TD sensor.**
  - The procedure to follow and SPs to use are the same as when installing the machine. See the Installation section of the service manual for details.
- **You must also do SP 2111-1 (MUSIC).**
- **Follow the procedure in the service manual.**

Slide 356

No additional notes

K PCU Charge Wire Replacement

- **The main points to remember are as follows.**
  - The corona wires are thin and break easily. If a wire breaks, remove all the pieces from the machine.
  - Do not use alcohol to clean the charge corona unit.
  - Do not touch the surface of the new grid mesh.

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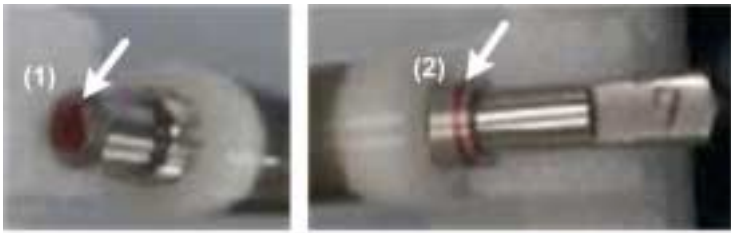
- As in the V-C2, the K PCU uses a corona wire. The other PCUs use a charge roller.

Charge Roller Replacement

- **The Y, M, and C charge rollers should always be replaced together as a set, even if you only have to replace one of them.**
- **The charge rollers are marked on the tip of one end with a red stamp (1) and with a red ring around the sleeve on the other end (2).**
  - These markings distinguish the D081/D082 YMC PCU units from PCU units of previous machines.
  - Always replace a PCU unit with a unit that has these markings. Do not use a PCU unit for a previous machine.



Slide 358

- Replace all three charge rollers as a set: Tests have shown that this is the best way to avoid some image problems that are caused by the charge roller.

Drum and Cleaning Blade Replacement

- ❑ **Re-install the front end of the drum first.**
- ❑ **Do not rotate the drum after you re-install it.**
- ❑ **Use the correct lubricant powders.**
- ❑ **Some SPs must be done.**

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V-C3 series field service manual, Replacement and Adjustment, PCU, Separating Drum/Cleaning Unit / Removing the OPC Drum

V-C3 series field service manual, Replacement and Adjustment, PCU, SP Codes After Replacements

- ❒ The V-C1 series was not sold in some areas, but the toner is available as a service part (see below).
- ❒ Part numbers of required lubricants
  - ➢ G104 YELLOW TONER (D0159500) – this is the V-C1 yellow toner

    G104 yellow toner – this is just the name. It has nothing to do with a model code G104!
  - ➢ ZINC STEARATE (D0159501) – this lubricant powder is for the PCU lubricant brush rollers
  - ➢ ZINC STEARATE (B1329700) – this is for the other procedures that require lubricant powder.

Drum and Cleaning Blade Replacement

Applying Lubricant Powder

- **Coat the new drum with Lubricant Powder (B1329700) before you install it.**
  - The Lubricant Powder (B1329700) is specially designed for this machine.
- **Do not use the previous Setting Powder (54429101) when you work on this machine.**
  - If you use Setting Powder (54429101) on this machine, you will cause damage to the drum charge roller and cause problems with image quality.
- **Do not use the yellow toner from this machine as a lubricant, because it contains carrier, and this will damage the drum and ITB.**
- **The yellow toner for the V-C1 is required for the maintenance of this model, when the lubricant brush roller in the PCU is replaced.**

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V-C3 series field service manual, Replacement and Adjustment, PCU, Separating Drum/Cleaning Unit / Removing the OPC Drum

- The lubricant powder B1329700 is made from zinc stearate. The old setting powder (54429101) has a completely different composition.
- The lubricant powder is applied with a bag that contains the powder. This bag can get covered with toner. But this is not a problem.
- This new lubricant powder is also used when you replace the image transfer belt (ITB).
- The V-C1 series was not sold in some areas, but the toner is available as a service part (see below).
- Part numbers of required lubricants
  - G104 YELLOW TONER (D0159500) – this is the V-C1 yellow toner

    G104 yellow toner – this is just the name. It has nothing to do with a model code G104!
  - ZINC STEARATE (D0159501) – this lubricant powder is for the PCU lubricant brush rollers
  - ZINC STEARATE (B1329700) – this is for the other procedures that require lubricant powder.

Drum and Cleaning Blade Replacement

Procedure

- **Re-install the front end of the drum first.**
- **Do not rotate the drum after you re-install it.**
- **After replacement, do only these SP modes, in this order.**
  - Drum only: 3820-2, 2111-1
  - Drum and cleaning blade: 3820-2, 2111-1
  - Drum and developer: 3801, 3802, 2111-1
  - Drum, developer, and cleaning blade: 3811, 3812, 2111-1
  - Cleaning blade and/or lubricant brush roller (without replacing drum or developer): 3810, 2111-1

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The aim of SP3810 is to send toner to the PCU to coat the drum with toner. This prevents the cleaning blades from bending and scouring the drums. Therefore, SP3810 should be performed after replacing the drum cleaning roller or drum cleaning blade.

SP3810 does the same as SP3811 except for the developer set up function.

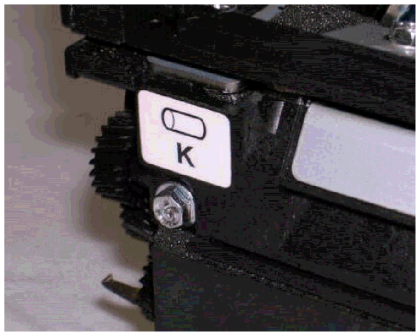
SP3811 does the following:

- Checks and confirm each PCU is installed and filled with developer.
- Switches on toner supply and sends toner to the sub hopper of each PCU.
- Sends toner to the PCU to coat the drum with toner. This prevents the cleaning blades from bending and scouring the drums.
- Initialize the TD sensors.
- Starts the process control self check to set the target for development gamma and adjusts toner density.
- Starts the MUSIC sequence to check and correct color image offset.

SP3810 does the following:

- Checks and confirm each PCU is installed and filled with developer.
- Switches on toner supply and sends toner to the sub hopper of each PCU.
- Sends toner to the PCU to coat the drum with toner. This prevents the cleaning blades from bending and scouring the drums.

Lubricant Bar Unit



- **The strength of the spring behind the lubricant bar is different for K than for the YMC units.**
  - The color of the spring for K is different.
  - The lubricant bar unit for the black PCU is marked 'K' as shown above. The unit for the color PCUs has no label. Always install the correct unit.
- **Do SP 2111-1 if you replace the drum lubricant bar or drum lubricant blade.**

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No additional notes

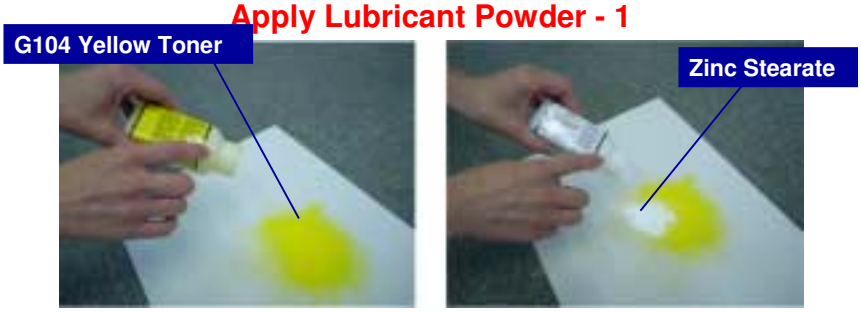
Lubricant Brush Roller Replacement

- **After you replace this part, you must apply lubricant.**
- **Apply a mixture of yellow toner (from the V-C1 series) and lubricant powder, as explained in the service manual.**
  - Lubricant powder: Use Zinc Stearate (D0159501) for this procedure, and for this procedure only.
- **The yellow toner must come from a bag of fresh toner, and not from the toner supply port of a V-C1 series model. This could contain developer, and will damage the drum and ITB.**
- **DO NOT USE YELLOW TONER FROM THE V-C2 OR V-C3 SERIES. THIS CONTAINS CARRIER AND WILL DAMAGE THE MACHINE.**
- **At the end of the procedure, do SP 2111-1.**

Slide 363

The next few slides show how to apply the lubricant powder.

Lubricant Brush Roller Replacement
Apply Lubricant Powder - 1



- **After installing a new roller, lubricate as follows:**
  - 1. Place a sheet of clean paper on a flat surface.
  - 2. Pour a small amount of G104 Yellow Toner (D0159500) from its bottle onto the paper.
    - » This is V-C1 series yellow toner.
    - » Do not use V-C2 or V-C3 yellow toner; this contains developer
  - 3. Pour the same amount of Zinc Stearate (D0159501) from its bottle onto the paper.

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- G104 yellow toner – this is just the name. It has nothing to do with a model code G104!
- The ratio of the two powders in the mixture should be 1:1.

V-C3 field service manual, Removal and Adjustment, PCU, PCU Blades and Rollers, After Replacement

- This slide and the next one shows how to mix the two powders.
- Why yellow toner? Yellow toner is the least visible. But you can use cyan toner for the cyan PCU, and magenta toner for the magenta PCU, etc. There is nothing magic about yellow toner.

- The V-C1 series was not sold in some areas, but the toner is available as a service part (see below).
- Part numbers of required lubricants
  - G104 YELLOW TONER (D0159500) – this is the V-C1 yellow toner

    G104 yellow toner – this is just the name. It has nothing to do with a model code G104!
  - ZINC STEARATE (D0159501) – this is for the PCU lubricant brush rollers
  - ZINC STEARATE (B1329700) – this is for the other procedures that require zinc stearate.

Lubricant Brush Roller Replacement

Apply Lubricant Powder - 2

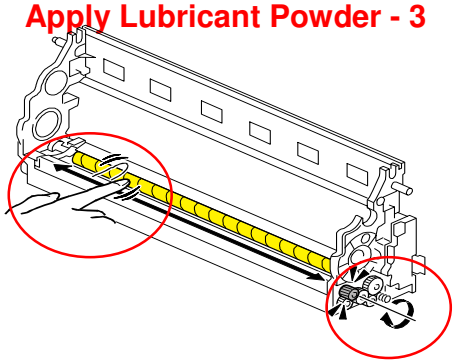
- 4. Mix the G104 Yellow Toner and Zinc Stearate together evenly.

Slide 365

No additional notes

Lubricant Brush Roller Replacement

Apply Lubricant Powder - 3



- 5. Apply the mixture of powders as shown by the arrow.
- 6. At the same time, turn the gear so that lubricant is applied to the whole surface of the roller.

❑ **IMPORTANT:**

- 1. Use a brush to apply the powder if one is available. If a brush is not available, use your finger.
- 2. Only use this mixed powder for the PCU lubricant brush roller of the V-C2 or V-C3. Never apply this powder to another part or another model.
- 3. Rotate the gear in the direction shown in the diagram.

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V-C3 field service manual, Removal and Adjustment, PCU, PCU Blades and Rollers, After Replacement

❒ The slide shows how to apply the mixture of powders to the lubricant brush roller. See the service manual for detailed instructions.

Developer Replacement

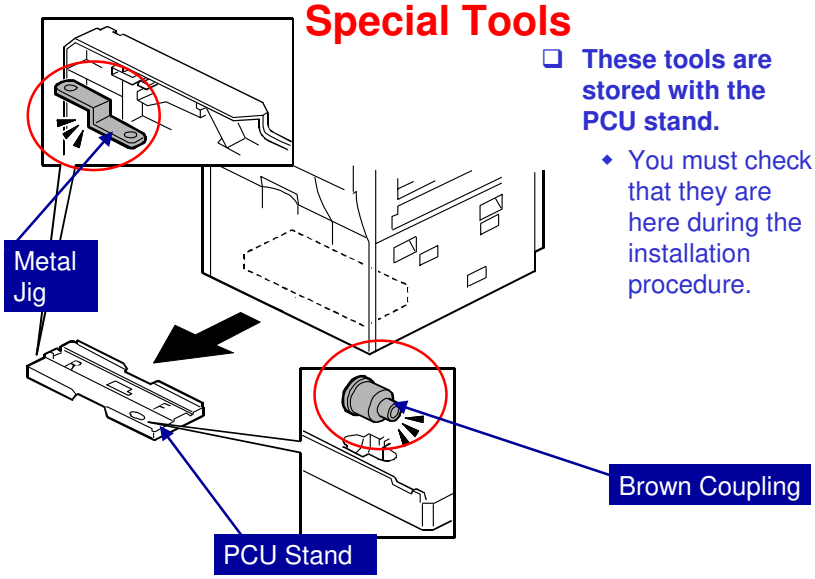
- **Developer must be replaced for each PCU every 450K.**
- **However, developer can be replaced for only one PCU if a problem occurs.**
  - For example, the C_PCU can be replaced if Cyan is too light.

Slide 367

No additional notes

Developer Replacement – 1

Special Tools



- **These tools are stored with the PCU stand.**
  - You must check that they are here during the installation procedure.

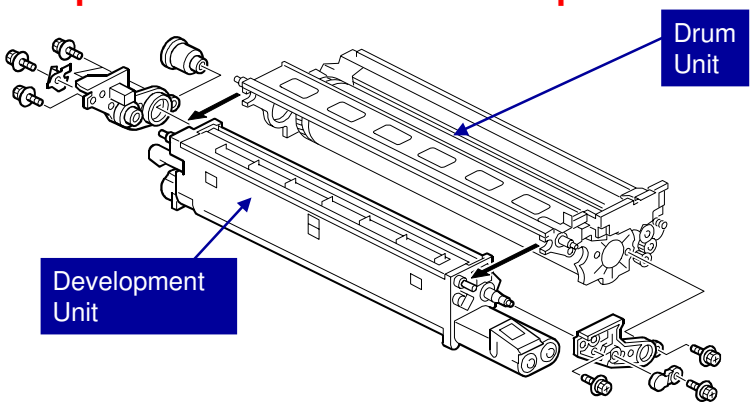
Slide 368

V-C3 series field service manual, Replacement and Adjustment, PCU, Developer Replacement

❒ You will need these tools during developer replacement.

Developer Replacement – 2

Separate the Drum and Development Units



- **Put the PCU on the PCU stand.**
  - The method was explained earlier in this section.
- **Cover the drum with paper.**

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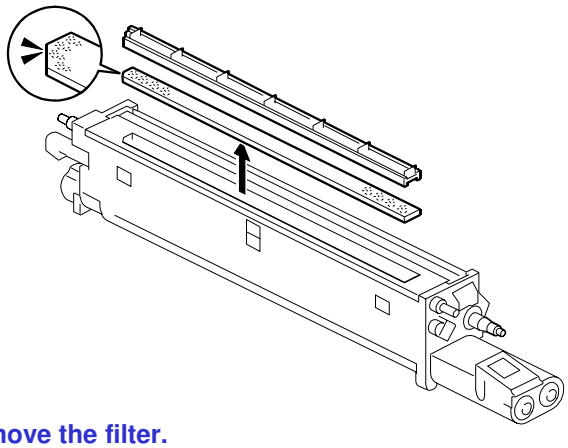
V-C3 series field service manual, Replacement and Adjustment, PCU, Developer Replacement

- The next few slides go over the main points of developer replacement.

Developer Replacement – 3

Remove the Filter



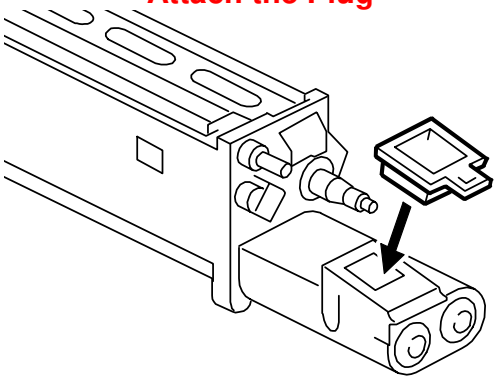
- **Remove the filter.**
  - The filter must be replaced every time the developer is replaced.

Slide 370

No additional notes

Developer Replacement – 4

Attach the Plug



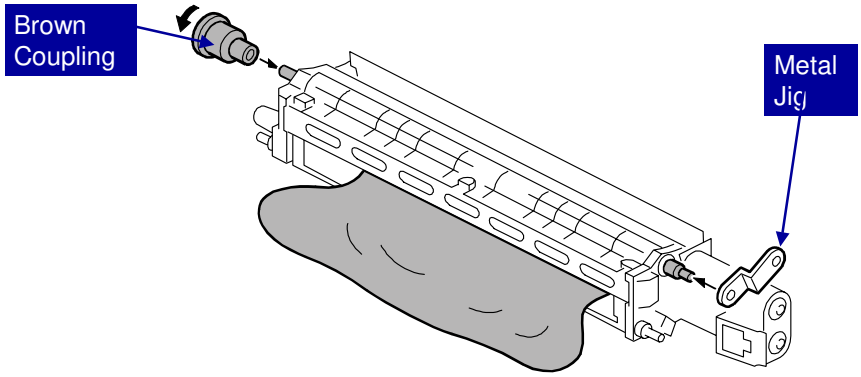
- Fit the plug into the toner supply port. This prevents toner from spilling out during servicing.
- This plug comes with the accessories that are packed with the machine.

Slide 371

No additional notes

Developer Replacement – 5

Remove the Old Developer (Use the Tools)



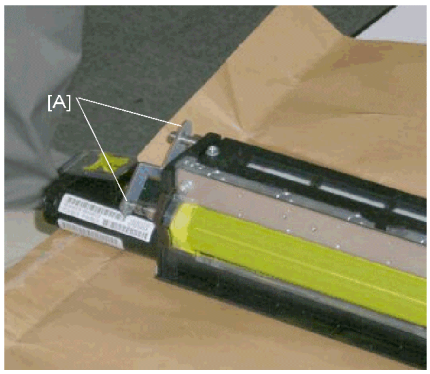
- **Attach the two tools as explained in the service manual.**
  - Make sure that the angle of the jig is correct.
  - Always use the brown coupling, to prevent wear on the PCU components.
- **Attach and rotate the brown coupling as shown to remove the developer.**

Slide 372

V-C3 series field service manual, Replacement and Adjustment, PCU, Developer Replacement

- This removes most of the developer but not all of it. Do the procedure in the manual to remove all the developer.
- Then clean the development unit. The ends must be completely free of old developer.

Developer Replacement – 6
Install New Developer



temp_0779a

- **Put the PCU back in the machine.**
  - Remove the brown coupling first, but attach the metal jig at the two points [A] as shown here.
  - The jig must be pointing down as shown.
- **After this, install the new developer.**
  - This was described in the Installation section.

Slide 373

V-C3 series field service manual, Replacement and Adjustment, PCU, Developer Replacement

- See the installation section if you want to review the installation procedure for new developer again.

Developer Replacement – 7

SP Modes

- **After replacement, do only these SP modes, in this order.**
  - Developer only: 3801, 2111-1
  - Developer and cleaning blade: 3811, 3812, 2111-1
  - Drum, developer, and cleaning blade: 3811, 3812, 2111-1
  - Drum and developer: 3801, 3802, 2111-1

Slide 374

No additional notes

TD Sensor Initialization – Very Important!!!!

- **Only initialize the TD sensor at these times:**
  - At installation, exactly as explained in the installation procedure.
  - After you replace developer (only initialize the TD sensor for the colour that you replaced)
  - As instructed in specific troubleshooting procedures.
- **Only initialize the sensor one time. Do not do it more than one time.**
- **If you do not obey the above instructions, you will get toner scattering inside the machine.**
- **To repair the machine, you must replace the developer (after you clean the machine!).**

Slide 375

- If a technician initializes the sensor more than one time, the developer must be replaced. But it is not easy to know that a mistake was made until toner scattering occurs inside the machine. Then it is too late.
- A common source of error is to replace one developer (for example, black), but then do the TD sensor initialization for all colours. Then you have to replace the C, M, and Y developers.

Why should we not initialize the TD sensor more than once?

- See the handout called “Do not Initialize the TD Sensor More than One Time!”

Troubleshooting Note

- **If the image density is too light, or if there is toner scattering, or if the machine fails to release the "Toner End" alert, this can be caused by one of the following problems:**
  - Developer Filling (SP3814) was not successful.
  - Developer Setup (SP3811) or TD sensor initialization (SP3801) was not done or was not done correctly after Developer Filling (SP3814).
  - Developer Setup (SP3811) or TD sensor initialization (SP3801) was done more than once.
- **Please refer to "Special Procedures" in the Troubleshooting section.**

Slide 376

V-C3 service manual, Troubleshooting, Handling Errors, Special Procedures

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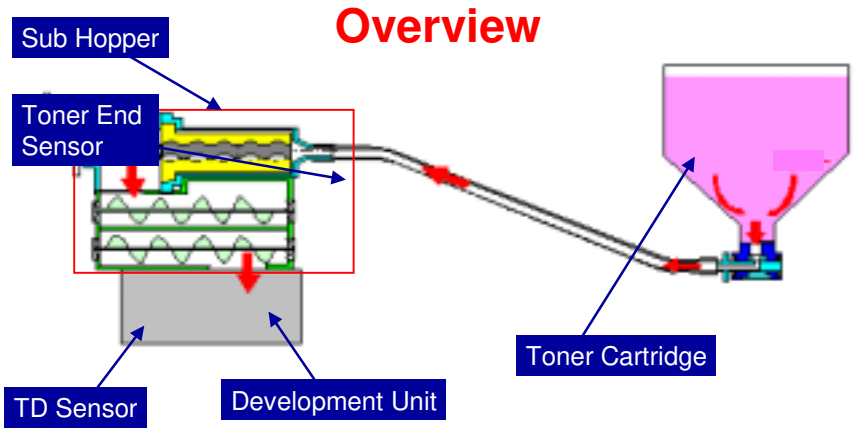
COPIER ENGINE

TONER SUPPLY

Slide 377

- This section will explain the toner supply mechanism.



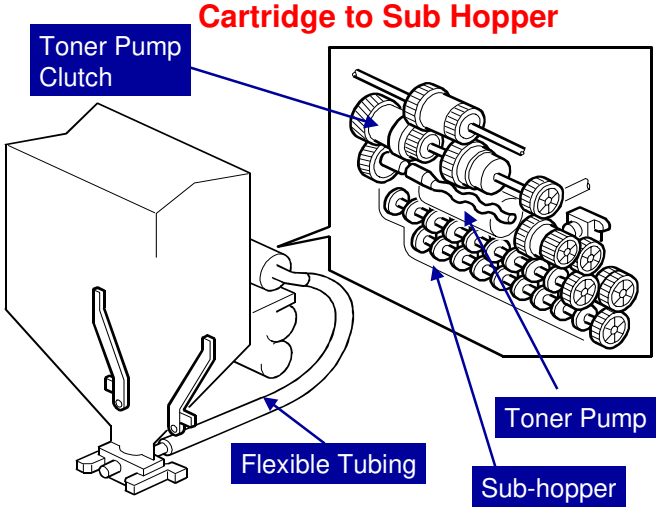
- A pump in the toner hopper pulls toner from the cartridge.
- The toner supply coils move toner to the development unit.

Slide 378

- The sub hopper is shown in the red square in the diagram. Why is this called the 'sub hopper'? The development unit has a hopper also. The designers call this the main hopper, and they call the hopper that connects to the flexible tube the 'sub hopper'.

Toner Supply from Cartridge to Dev. Unit

Cartridge to Sub Hopper

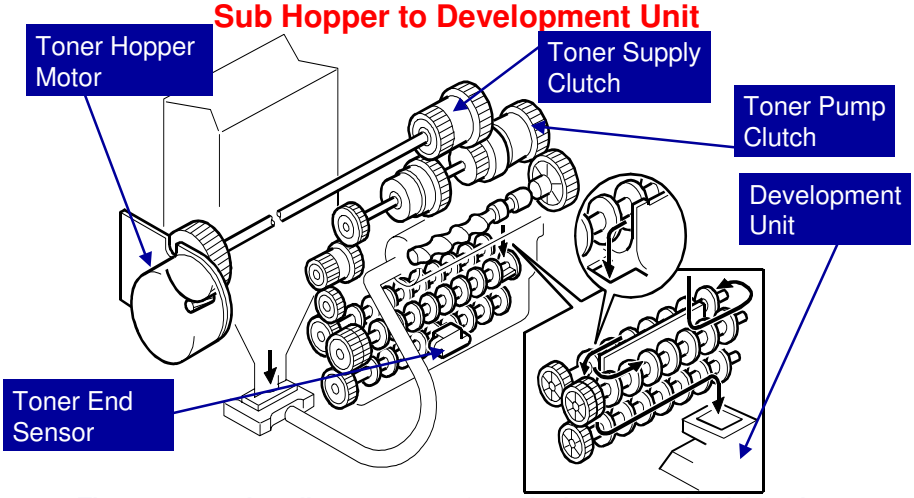


- The toner pump pulls toner into the hopper from the toner cartridge, through the flexible tube.
- The toner hopper motor controls the mechanism, through the toner pump clutch.

Slide 379

❒ The toner supply motor is shown on the next slide.

Toner Supply from Cartridge to Dev. Unit
Sub Hopper to Development Unit



- The toner supply coils move toner from the hopper to the dev. unit.
- The toner hopper motor controls the mechanism, through the toner supply clutch.
- The toner end sensor detects to send more toner from the cartridge.

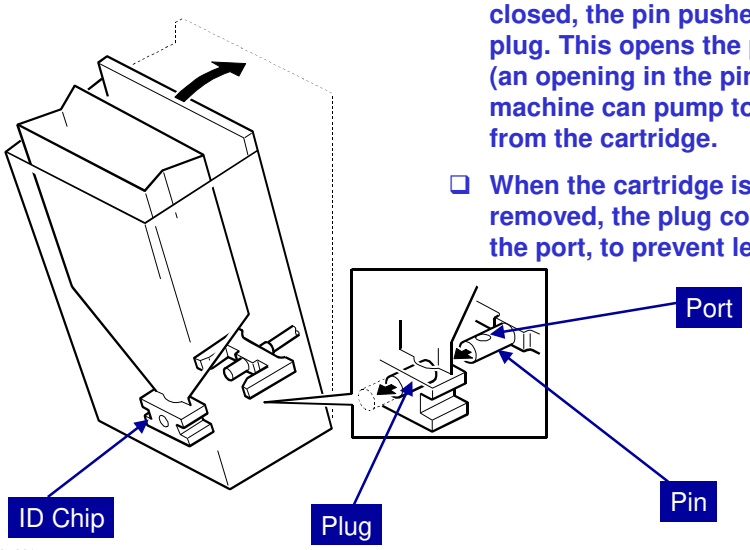
Slide 380

The toner hopper motor supplies power to all four toner hoppers. There is only one motor.

- The toner hopper motor is at the left side of the machine.
- The shaft from the motor goes across the front of the machine, through all four toner hoppers.

Toner Cartridge

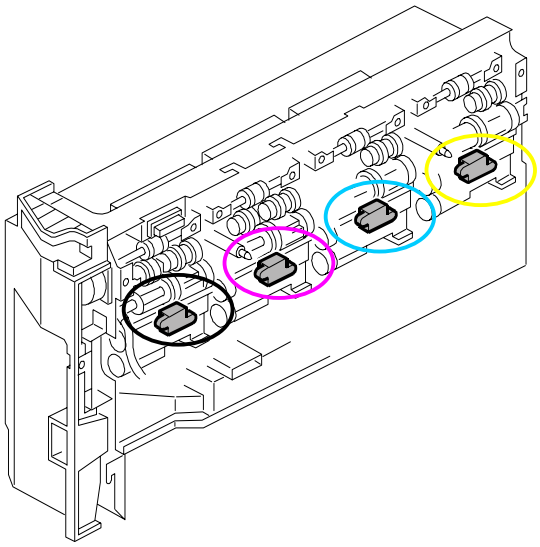
- When the bin door is closed, the pin pushes the plug. This opens the port (an opening in the pin). The machine can pump toner from the cartridge.
- When the cartridge is removed, the plug covers the port, to prevent leaks.



Slide 381

- We studied these cartridges already in the Installation section.

Toner End Sensors



- There is a toner end sensor on the side of each sub hopper.

Slide 382

No additional notes

Toner Near-end and Toner End

Toner Near-end

- **When a toner end sensor cannot detect toner in a sub hopper, the toner pump is engaged for 2 seconds, and the machine tries to supply toner from the cartridge.**
- **If toner is not detected for 10 consecutive readings, then toner near-end occurs.**
  - This number of readings can be changed with SP 3411 001 (K) and 002 (color).

Slide 383

No additional notes

Toner Near-end and Toner End

Toner End

- **After a toner near-end alert is output, toner end detected is when one of these conditions occurs:**
  - Page count: After the machine prints 600 pages (SP 3412 003-004).
    - » A minimum of 10 pages at 5% coverage (SP 3412 001-002) is guaranteed after toner near-end.
  - Pixel count: After the machine prints the equivalent of 30 A4/LT pages at 100% coverage (SP 3412 005-006)
  - If the machine prints many small jobs in the near-end condition, the pixel count condition will occur first, and toner end will occur.

Slide 384

- So, if the user prints a lot of pages with low coverage, up to 600 pages can be printed.
- But, if the user's outputs have a high coverage, then the pixel count will be reached first, and toner end will occur before 600 pages are output.

Toner Near-end and Toner End
Toner End Recovery

- **After a new cartridge is installed, the machine supplies toner from the new cartridge to the sub hopper.**
- **If the toner end sensor detects that toner was supplied, the machine goes out of the toner end condition.**
  - If no toner is detected (for example, if the user just opened and shut the cover), the machine does not go out of the toner end condition.

Slide 385

No additional notes

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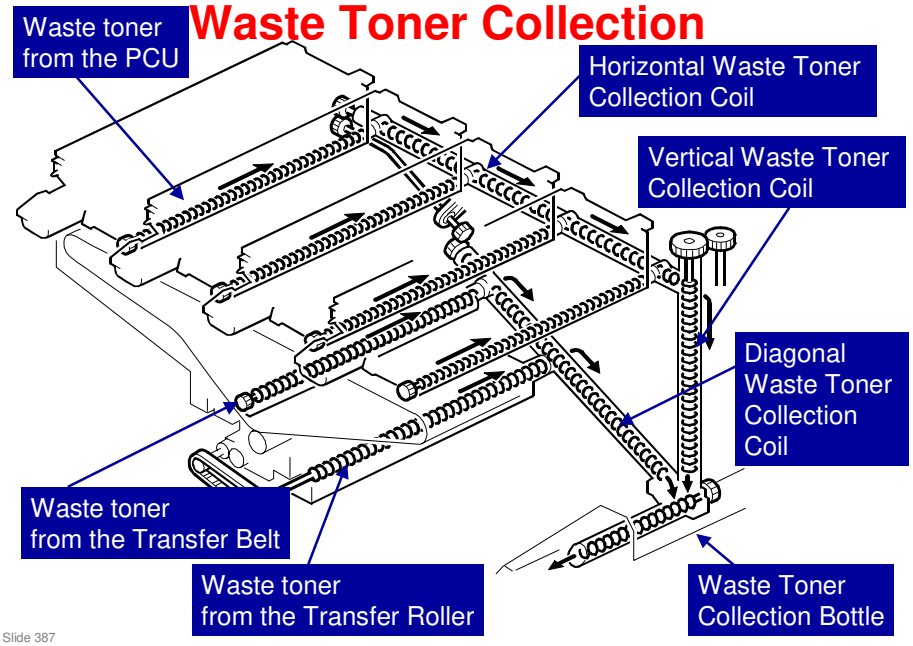
WASTE TONER COLLECTION

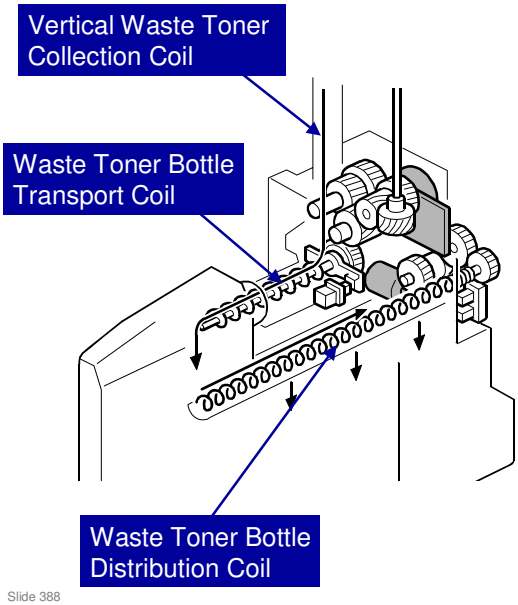
Slide 386

- This section will explain the waste toner collection mechanism.
- Waste developer collection from the development unit was covered in the PCU section of the course. The waste developer enters the waste toner collection system described in the next few slides.



- This diagram shows how waste toner is collected from the PCUs, the transfer belt cleaning unit, and the transfer roller cleaning unit.
  - Waste toner from the four PCUs: The cleaning unit of each PCU has a coil for waste toner. The horizontal waste toner collection coil collects waste toner and developer from the four PCUs. The waste toner then goes to the vertical waste toner collection coil, and into the collection bottle.
  - Waste toner from the transfer belt and transfer roller cleaning units: The waste toner goes to the diagonal waste toner collection coil, and into the collection bottle.
- Which motors control these coils?
  - Waste toner collection coils from the PCU: PCU motors
  - Waste toner collection coils from the transfer belt and transfer roller: PTR motor
  - Horizontal Waste Toner Transport Coil: PTR motor
  - Vertical Waste Toner Transport Coil: Driven by a parallel vertical shaft connected to the waste toner bottle transport motor
  - Diagonal Waste Toner Transport Coil: PTR motor

Waste Toner Collection Bottle

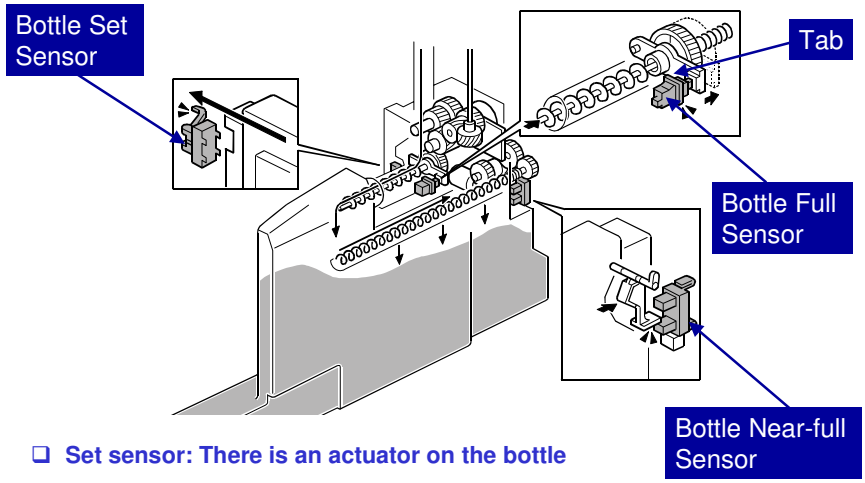


- Toner comes in at the top, through the vertical waste toner collection coil.
- The waste toner bottle transport coil releases the waste toner into the bottle, at the top of the bottle.
- The waste toner distribution coil makes sure that the level of toner in the bottle is flat.

Slide 388

- This diagram shows the coils that move toner in the waste toner bottle.
- Which motors control these coils?
  - Waste Toner Bottle Transport Coil: Waste toner bottle transport motor
  - Waste Toner Bottle Distribution Coil: Waste toner bottle near full motor

Waste Toner Collection Bottle



- Set sensor: There is an actuator on the bottle
- Near-full sensor: The top of the toner pushes an actuator into the sensor
- Full sensor: When the torque on the transport coil is too high, the tab is pushed away from the switch, and the switch turns off

Slide 389

- This shows the sensors for the waste toner bottle.

Waste Toner Bottle Set Sensor

- This sensor detects the position of the waste toner bottle, and checks if it is set correctly. When the bottle is set in the machine, it pushes the feeler away from the sensor and turns the sensor on.
- The machine issues SC487 if the waste toner bottle is not installed or if it is not installed correctly.

Waste Toner Bottle Near-Full Sensor

- When the level of the waste toner rises high enough:
  - The pressure of the top of the stack of waste toner pushes a piece of silicone rubber, then the film pushes a feeler into the gap of the sensor.
  - The sensor is blocked when the waste toner bottle is nearly full.
  - The machine issues a near-full alert and switches off the waste toner distribution motor.

Waste Toner Bottle Full Sensor

- Monitors the level of the waste toner in the waste toner bottle. Signals an alert when the pressure of the waste toner releases the bottle full sensor.
- After the alert is issued, the machine can print up to 100 additional copies. After 100 copies, the machine issues SC484.

Waste Toner Lock Sensor

- This sensor is located on the PTR motor bracket. It detects when the waste toner bottle transport coil locks and stops rotating because of clogged toner in the waste toner transport path. The machine issues SC488 if there is no change 3 seconds after the lock occurs.

Waste Toner Bottle Transport Motor

- If the waste toner bottle transport motor does not turn for 600 ms, the motor control board sends a motor lock signal to the CPU and the machine issues SC485.

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PROCESS CONTROL
TONER SUPPLY CONTROL

Slide 390

- This section will explain process control briefly.
- The course will concentrate on important items, such as the components that are used, and the adjustments that can be made.
- A handout is provided if people who are enthusiastic about process control, and who insist on asking detailed questions that probably have no practical application to servicing the machine in the field.
  - Handout 2 – Process Control Details
  - The details of process control are similar for previous high-end colour copiers (for example, the Cattleya).

Process Control

Components used During Process Control

Slide 391

No additional notes

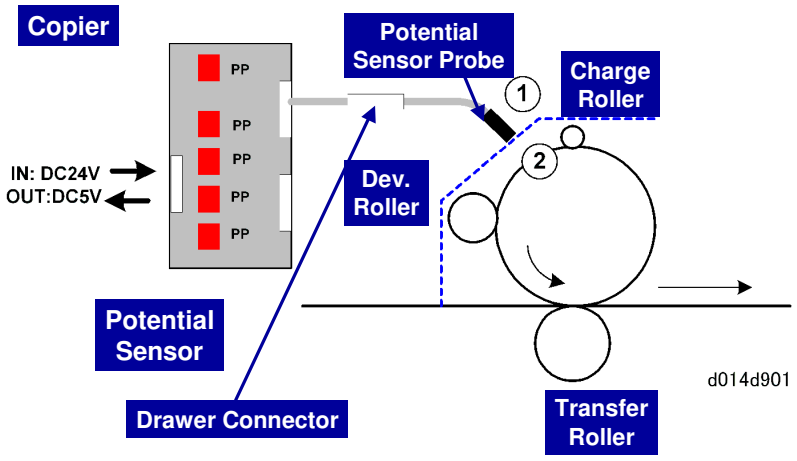
Which Components are Used?

- **Potential Sensors**
  - One for each PCU
- **ID Sensor**
  - One sensor, near the ITB
- **TD Sensors**
  - One in each development unit
- **Temperature/humidity sensor**
  - Near the drum potential sensor above the M PCU.
  - The machine uses the readings from this sensor to correct the ac charge applied to the charge roller of each PCU.

Slide 392

- The machine contains additional temperature/humidity sensors in other locations (see below). They are not used for process control.
  - Laser optics cavity
  - Used toner bottle

Potential Sensors

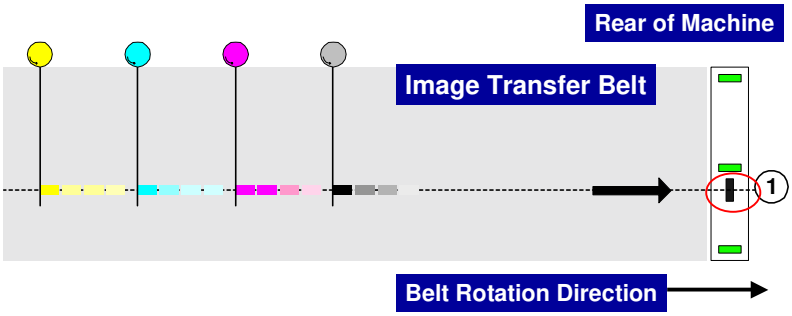


- In the V-C3, this is not inside the drum.
- This location keeps dust and toner away from the sensor.

Slide 393

- In the diagram, the area to the right of the dotted line is inside the PCU. The area to the left is inside the main body of the copier.

ID Sensors

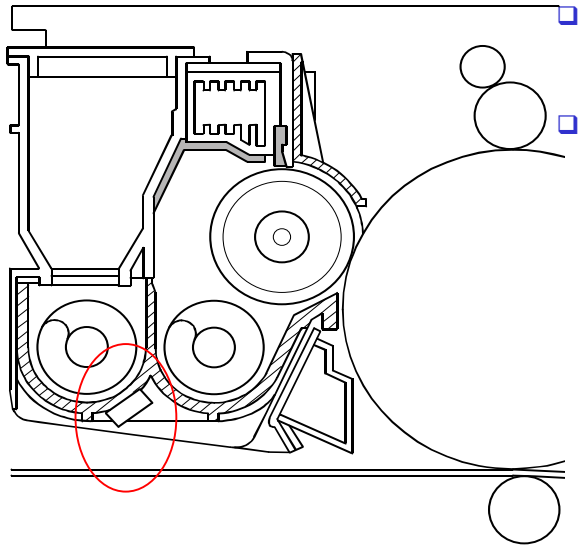


❑ One ID sensor (circled in red)

Slide 394

❒ This is a color ID sensor, containing a direct reflection sensor and a diffused reflection sensor.

TD Sensors

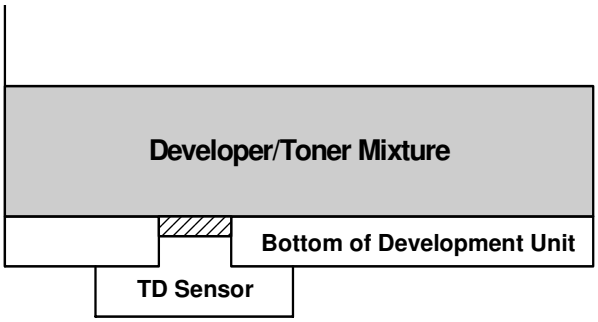


- Each development unit has a TD sensor.
- It does not contact the developer/toner mixture directly.

Slide 395

No additional notes

TD Sensors – Old Type

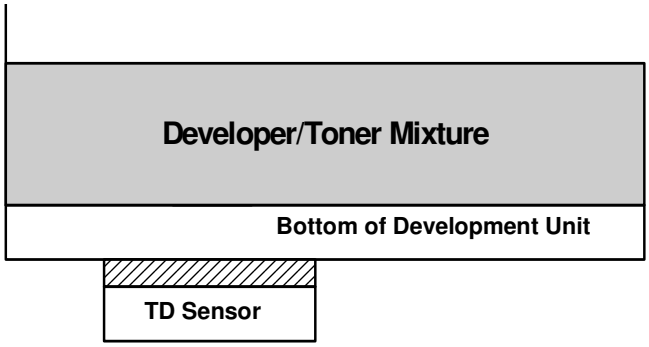


- A hole is cut in the development unit.
- The sensor contacts the developer/toner mixture directly.
- If the sensor is removed, developer comes out.

Slide 396

- This shows how a hole is cut in the base of the development unit.
- The shaded part on top of the sensor is the sensor cover (about 0.3 mm thick).

TD Sensors – V-C1/V-C2/V-C3



- If this new type of sensor is removed, toner does not come out of the development unit.
- The sensor does not contact the developer directly.
  - The density is measured using magnetic fields. The sensor measures the difference in response from the initialized sensor.

Slide 397

No additional notes

Process Control

When is it done?

Slide 398

No additional notes

Overview

- **Timing**
  - Initial process control self-check
  - During a job (default: off)
  - At the end of a job
  - After a specified idle time
  - Before ACC (Auto Color Calibration)
  - After TD sensor initialization
  - Forced process control self-check

Slide 399

No additional notes

When is Process Control Done? - 1

- **Initial process control self-check**
  - After the machine is turned on, if one or more conditions existed just before the machine was turned off (set with SP3554).
  - This self-check is not done after the machine is turned on if the front door is open.
- **During a job**
  - A job is interrupted for process control if the job is longer than a certain number of pages, that depend on SP 3552
  - Default: Disabled
- **At the end of each job, if the number of pages since the previous process control is more than the value of SP 3551**
  - There are separate counters for black-and-white and for colour.
    - » Black-and-white: After 250 pages (adjust with SP3551 001)
    - » Color: After 250 pages (adjust with SP3551 002)
  - Default: Disabled

Slide 400

No additional notes

When is Process Control Done? - 2

- **After a specified idle time (set by SP 3540-2), if certain conditions are met (controlled by SP 3555)**
- **Before ACC (Auto Color Calibration)**
  - When the user does the ACC procedure, process control is automatically done before ACC starts.
    - » This takes between 10 seconds and 180 seconds.
  - SP3501 004 can disable this process control. It can also make the machine do only the potential control adjustment before ACC (the toner density adjustment is not done in this case).
- **After TD sensor initialization**
  - The TD sensor is initialized after SP3801 or SP3811 is executed.
    - » SP 3811 and 3801 are done after replacing certain combinations of parts – see Replacement and Adjustment – PCU.
    - » SP 3811 is also done during the installation procedure.

Slide 401

No additional notes

When is Process Control Done? - 3

- **Forced process control self-check, potential control only**
  - SP3820 001
- **Forced process control self-check, potential control and toner density adjustment**
  - SP3820 002
  - Do this after you replace the drum, if you do not replace the developer at the same time
  - If you replace the developer, and other components at the same time, see the replacement procedure in the service manual for the correct SPs to do.
- **Forced process control followed by ACC**
  - SP 3820 003

Slide 402

No additional notes

Toner Supply Control

Slide 403

No additional notes

What Methods are there?

- **PID control: this is the default setting**
  - Uses pixel count
  - Uses the ID sensor
  - Uses the TD sensor
- **Fixed control**
  - Toner is supplied at a fixed rate each page
  - Used only for machine testing, and in certain troubleshooting procedures. Do not use in the field for other purposes.
- **Do not use SP 3301 to change to fixed supply mode if the TD and/or ID sensor is broken**
  - The machine will continue to use PID but with pixel count only.

Slide 404

- SP 3301 has three settings. But settings 1 and 2 are the same.
- PID: Proportional Integral Differentiation – a type of feedback control

When is Toner Supply Adjusted?
Overview

- **At the end of each job, if the number of pages since the previous process control is more than the value of SP 3551**
  - This is done immediately after potential control, and uses the development gamma calculated during potential control.
  - There are separate counters for black-and-white and for colour.
    - » Black-and-white: After 250 pages (adjust with SP3551 001)
    - » Color: After 250 pages (adjust with SP3551 002)
- **Every 10 pages using an ID sensor pattern (Vtref adjustment)**
- **Every page using the TD sensor (toner supply quantity adjustment)**

Slide 405

No additional notes

When is Toner Supply Adjusted? - 1

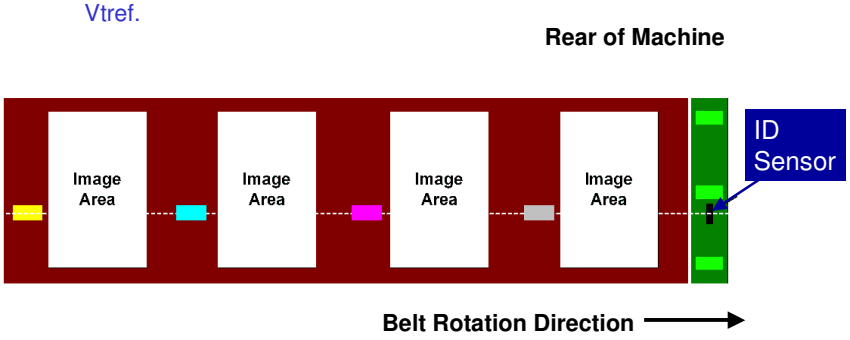
- **At the end of each job**
  - Done if the number of pages since the previous process control is more than the value of SP 3551 001 (black-and-white, default 250) or SP 3551 002 (colour, default 250).
  - This uses the development gamma that was calculated during potential control.
    - » If the development gamma during process control is too low, the toner concentration is increased.
    - » If the development gamma during process control is too high, the toner concentration is decreased.

Slide 406

No additional notes

When is Toner Supply Adjusted? - 2

- **Every 10 pages using an ID sensor pattern; Vtref adjustment**
  - An ID sensor pattern is made on the ITB (see below)
  - If the pattern is too dark, Vtref is increased. As a result, toner supply will be decreased, because toner supply is based on Vt – Vtref.
  - If the pattern is too pale, Vtref is decreased. As a result, toner supply will be increased, because toner supply is based on Vt – Vtref.



Slide 407

- There is a TD sensor for each colour, but only one ID sensor for C M and Y. This Vtref adjustment gives an independent adjustment for each colour
- The same Vtref is used for 10 pages. Then the process is done again.
- The 10-page interval can be changed with SP 3102.
- This feature can be switched off with SP 3042 001

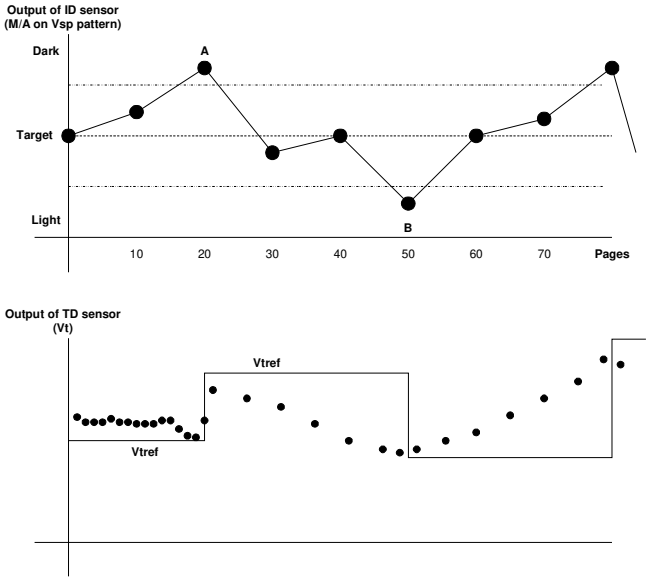
When is Toner Supply Adjusted? - 3

- **Every page using the TD sensor; toner supply quantity adjustment**
  - If Vt < Vtref, the toner supply amount is decreased.
  - If Vt > Vtref, the toner supply amount is increased.

Slide 408

No additional notes

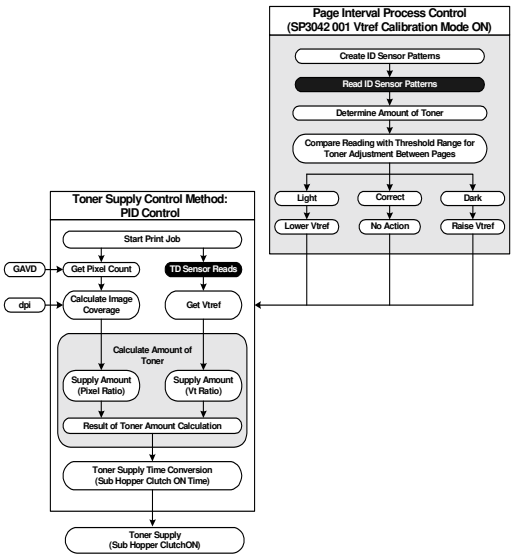
Summary of Toner Supply Control



Slide 409

- This diagram shows how the ID sensor and TD sensor control the toner supply.
- The upper diagram shows that the ID sensor measures the amount of toner (M/A) on the Vsp pattern every 10 pages.
- If the M/A is too high, then the machine increases Vtref. An example is point A in the diagram. Note that Vtref is increased at this time (see the bottom diagram).
- If the M/A is too low, then the machine decreases Vtref. An example is point B in the diagram. Note that Vtref is decreased at this time (see the bottom diagram).
- The bottom diagram shows the Vt readings (made every page – not all data points are shown).
- Toner supply amount is based on (Vt – Vtref), which is shown in the bottom diagram.

Summary of Toner Supply Control



Slide 410

- This flow chart explains toner supply control, with SP 3042 01 set to ‘enabled’, and PID control mode.
- Vtref calibration is done every 10 pages. The Vtref value from this process is picked up by the PID control algorithm (‘Get Vtref’ in the diagram). The PID control algorithm is done every page, to control the toner supply.

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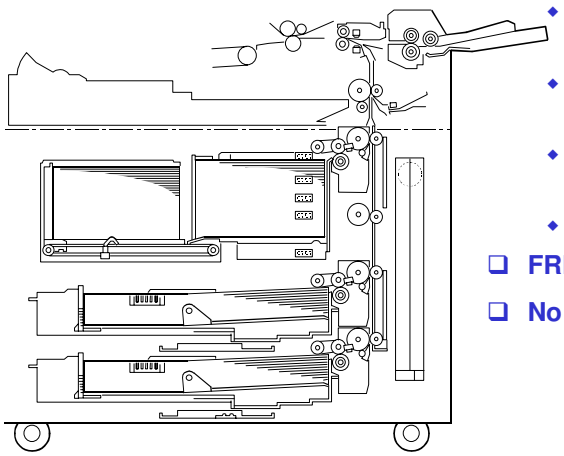
PAPER FEED

Slide 411

- Paper feed mechanisms built into the machine will be described in this section.
- The optional LCTs will be covered in separate sections.

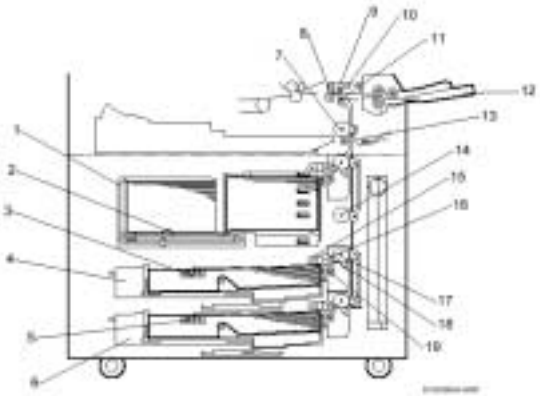
Overview



- **Four trays**
  - Tray 1 - Tandem feed tray (1550 x 2)
  - Tray 2 - Universal tray (550 sheets)
  - Tray 3 - Universal tray (550 sheets)
  - Bypass tray - 100 sheets
- **FRR feed system**
- **No size sensor in tray 1**

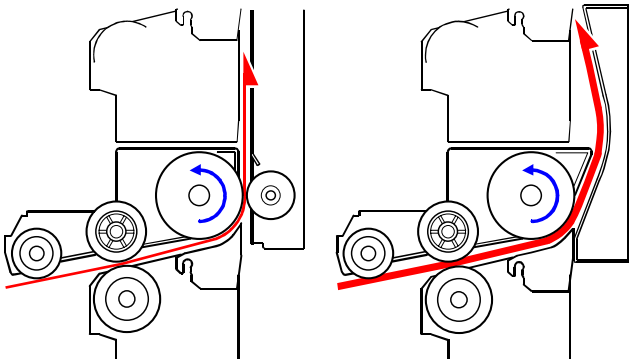
Slide 412

- The diagram shows the four built-in feed stations.
- There are no clutches. Each feed station has a motor.
- Note the locations of the following parts:
  - Feed/separation rollers (in trays 1, 2, and 3)
  - Grip rollers (in trays 1, 2, and 3) - these pull the paper out into the vertical feed path
  - Vertical feed path - vertical transport rollers opposite the grip rollers
  - Lower relay roller - this is needed to feed paper between the 2nd and 1st feed stations
  - Upper relay roller - this is needed to feed paper between the 1st feed station and the registration roller
  - Registration roller



1. Tandem Tray (Tray 1)
2. Left Tray Paper Sensor
3. Paper Size Switch (Tray 2)
4. Universal Tray (Tray 2)
5. Paper Size Switch (Tray 3)
6. Universal Tray (Tray 3)
7. Upper Relay Roller
8. Registration Roller
9. Double Feed Sensor
10. Registration Sensor
11. Double Feed Detection LED
12. By-pass Tray
13. Relay Sensor
14. Lower Relay Roller
15. Pick Up Roller
16. Feed Roller
17. Grip Roller
18. Paper Feed Sensor
19. Separation Roller

Improved Thick Paper Handling



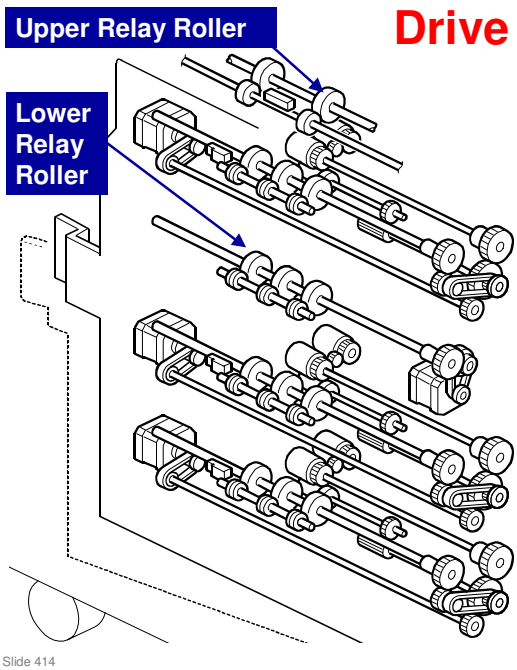
V-C1, V-C2
V-C3: Trays 1 and 2

V-C3: Tray 3

- The bend at the exit from the tray is smoother in Tray 3.
  This allows the tray to feed thick paper 2 without problems.

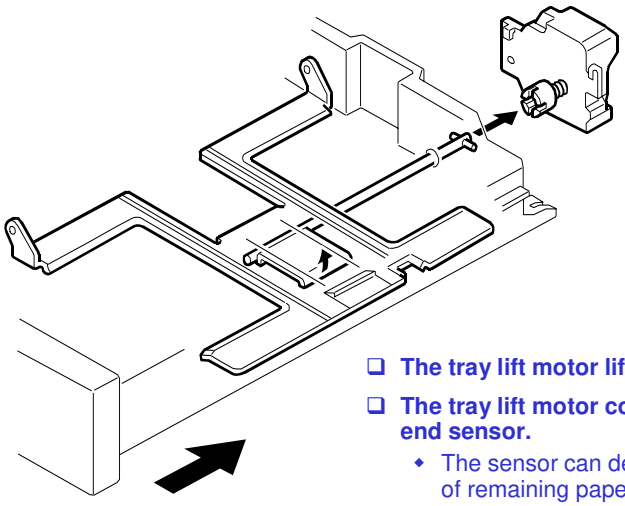
Slide 413

No additional notes



- The slide shows the motors involved in paper feed from the trays.
  - The by-pass feed motor is not shown here. We will see it later.
- Each tray has a motor. The motor drives the pick-up, feed, separation, and grip rollers at each station.
  - The grip roller pulls the paper out of the tray and feeds it into the vertical transport path.
- Pick-up and feed timing is controlled by two solenoids in each tray, except in the bypass tray, where there is a solenoid and a clutch.

Tray Lift (Trays 2 and 3) - 1

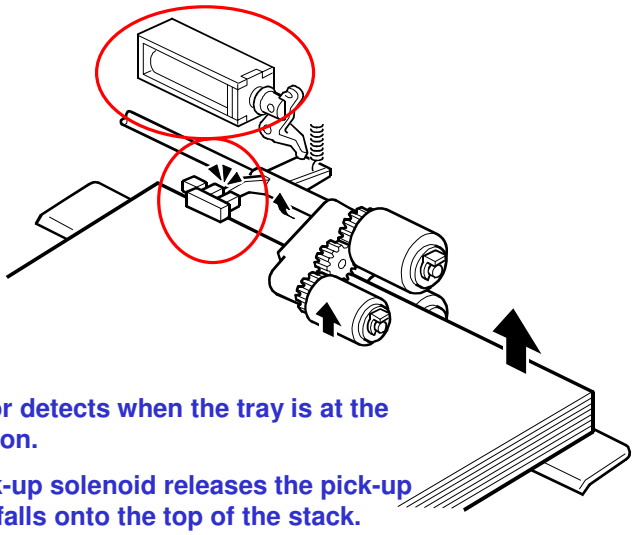


- **The tray lift motor lifts the tray.**
- **The tray lift motor contains a near-end sensor.**
  - The sensor can detect four levels of remaining paper.

Slide 415

- The lift motor raises the tray.
- The machine detects that the tray is in place as follows:
  - 1st tray – Electrical connection between tray and main body
  - 2nd and 3rd trays – Paper size switch
- The motor contains a near-end sensor. When the amount of remaining paper changes, the angle of the shaft changes. An actuator attached to the shaft changes the output from the sensor. The sensor can detect four levels of remaining paper.

Tray Lift (Trays 2 and 3) - 2

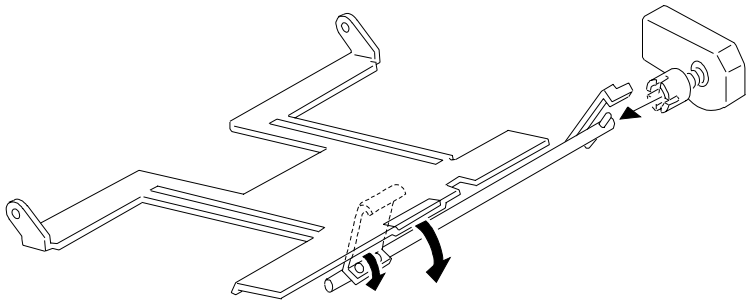


- The lift sensor detects when the tray is at the correct position.
- Then the pick-up solenoid releases the pick-up roller, which falls onto the top of the stack.

Slide 416

- The lift sensor detects when the paper stack is at the correct height.
- The paper height sensor and tray lift motor keep the top of the stack at the correct height for paper feed.

Tray Lift (Trays 2 and 3) - 3



❑ **The bottom plate drops under its own weight when the tray is pulled out of the copier.**

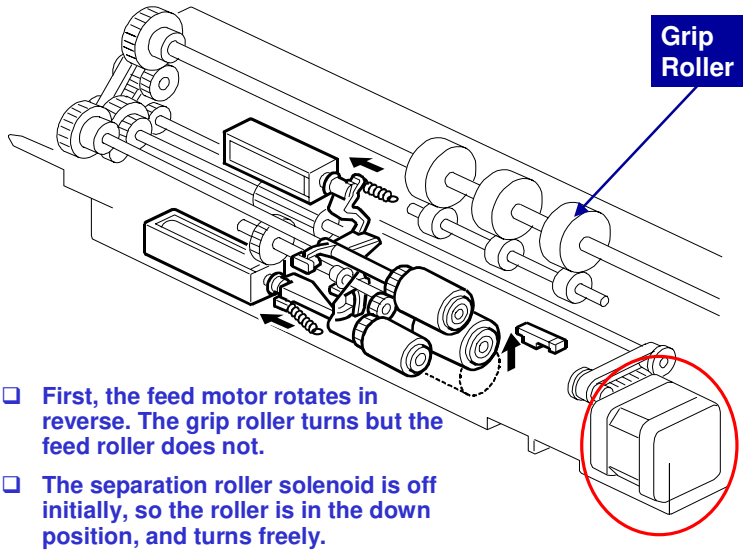
Slide 417

❒ Study what happens when you pull out the tray.

- ➢ In the 2nd and 3rd trays, the bottom plate lowers under its own weight when the tray is pulled out.
- ➢ For the 1st tray, this mechanism is more complex, because of the tandem tray mechanism. A later part of this section will describe this mechanism.

Pick-up and Feed

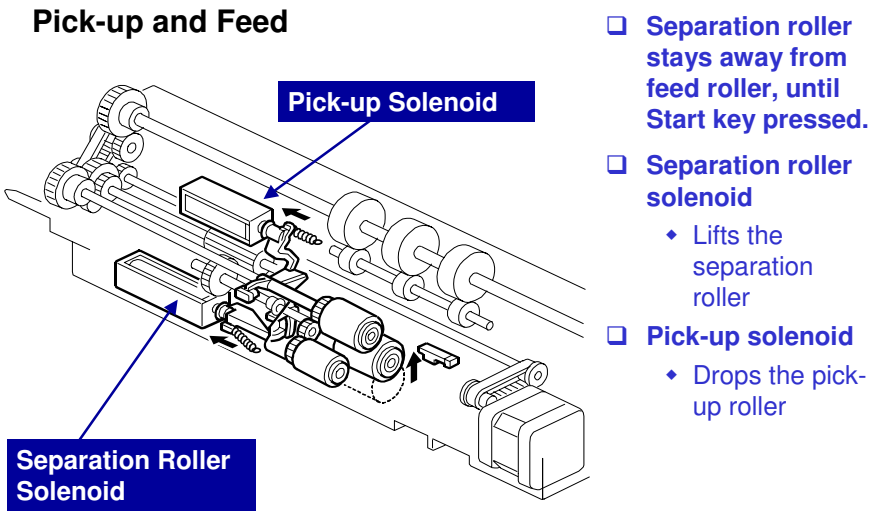
Before the first page, and between pages



Slide 418

- Between pages, the grip roller has to turn, because there may still be some paper in the vertical feed path.
- However, the feed roller must not turn, so that paper does not leave the tray.
- An arrangenent of clutches on the roller shafts ensures that if the feed motor reverses, the feed roller will not turn.

Pick-up and Feed



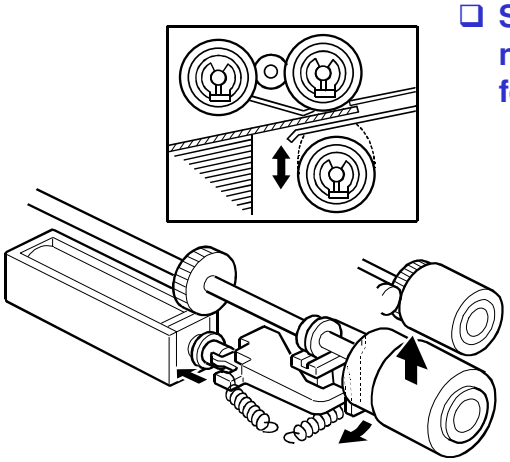
- Study this mechanism.
  - To start paper feed, the separation roller solenoid and pick-up solenoid both turn on. There is no feed clutch, because each tray has its own motor.

    When the separation roller solenoid turns on, the separation roller contacts the paper feed roller.

    When the pick-up solenoid turns on, the pick-up roller drops onto the top sheet of the paper stack.
  - The feed motor turns forwards, to drive both the feed roller and the grip roller.
  - When the paper feed sensor detects the leading edge of the paper, the pick-up solenoid switches off and the pick-up roller lifts.
- Paper is separated using the FRR principle.

Pick-up and Feed

Separation Roller Release



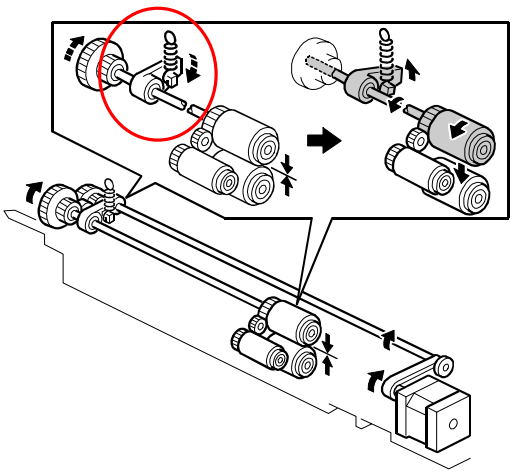
❑ **Separation roller normally away from feed roller**

Slide 420

- ❒ The separation roller is normally away from the feed roller.
- ❒ The advantages of this are:
  - ➢ Reduced wear on rollers – no contact between rollers when another tray is in use
  - ➢ Less chance of damage to paper stuck between rollers
  - ➢ Easier jam removal

Pick-up and Feed

Separation Roller Release

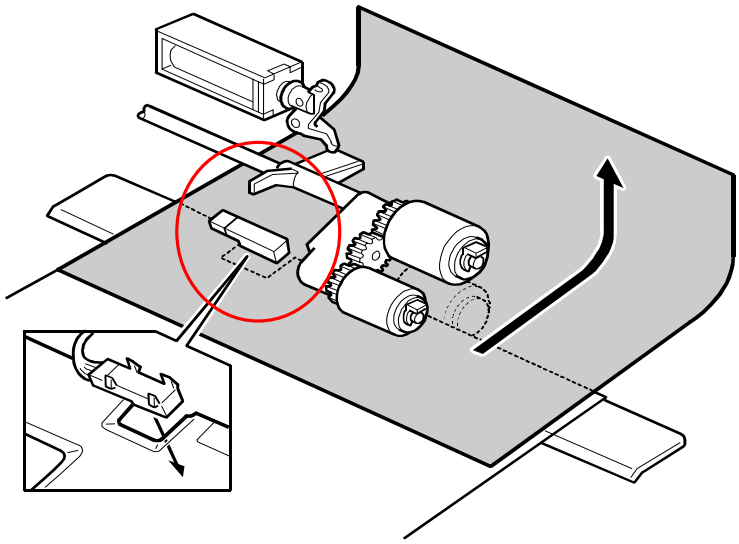


- If the feed roller starts to reverse, an arm comes down, which moves the feed roller forward slightly, to pull it away from the separation roller

Slide 421

- This new mechanism ensures that the feed and separation rollers do not stick together at the start of a job just after the machine leaves standby mode.
- When the feed roller reverses at the start of the job, a small arm pushes the feed roller slightly forward so that it comes away from the separation roller.
- If the rollers stay stuck together, the motor may not be able to turn the rollers. When reversing at the start of the job, only a small amount of power is applied from the motor, and this may not be enough to unstick the rollers.

Paper End Detection



Slide 422

❒ When paper runs out, a feeler drops through the cutout in the bottom plate.

Paper Size Detection

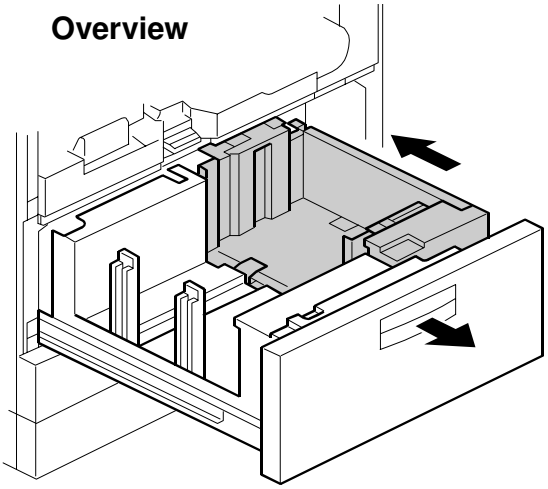
- **Tray 1 does not have a size sensor.**
  - Input the paper size with SP5959 001.
- **Trays 2 and 3: If the correct paper size cannot be detected, or the user wants to use a custom size, the user can select the paper size with User Tools - System Settings - Tray Paper Settings - Tray Paper Size**
  - The 'custom size' button only appears if SP 5112 is enabled

Slide 423

- Trays 2 and 3 can be set up for a wide range of paper sizes with a User Tool.
  - The user tool setting is 'Auto Detect', which means that the machine takes the paper size from the sensors. If the correct paper size is not detected, change the user tool setting.
  - If the fence position is incorrect (in the case of Auto Detect) or if the size is not the same as set with the User Tool, jams will occur.
  - Note SP 5112 however: The machine default is 'disabled' which means the user cannot use non-standard paper sizes.

Tandem Feed Tray

Overview



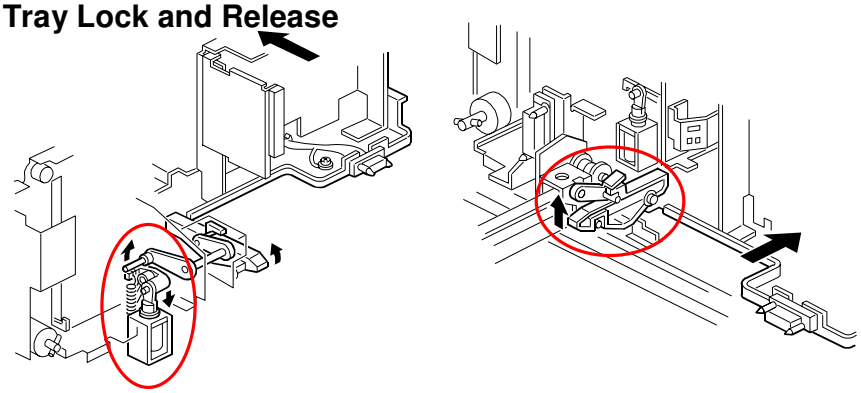
- Two paper stacks in one tray
- Paper feeds from the right tray
- When the paper in the right tray runs out, the stack in the left tray is moved across to the right tray
- After that, paper feed resumes
- Paper can be added to the left tray without interrupting copying

Slide 424

- Study the tandem tray system (see the slide).
- Study how the trays lock together until the left-hand paper stack moves across to the right. Then the left tray is released so that paper can be added without interrupting copying.

Tandem Feed Tray

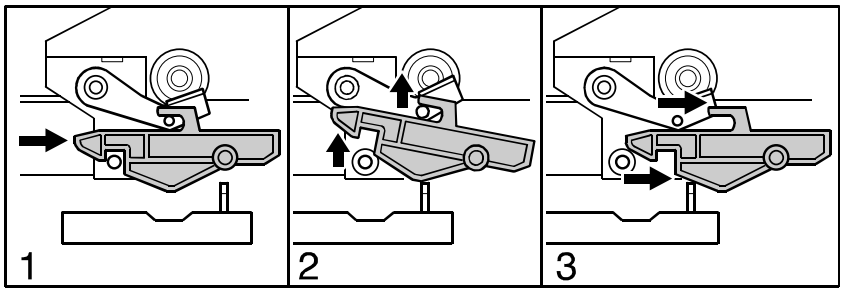
Tray Lock and Release



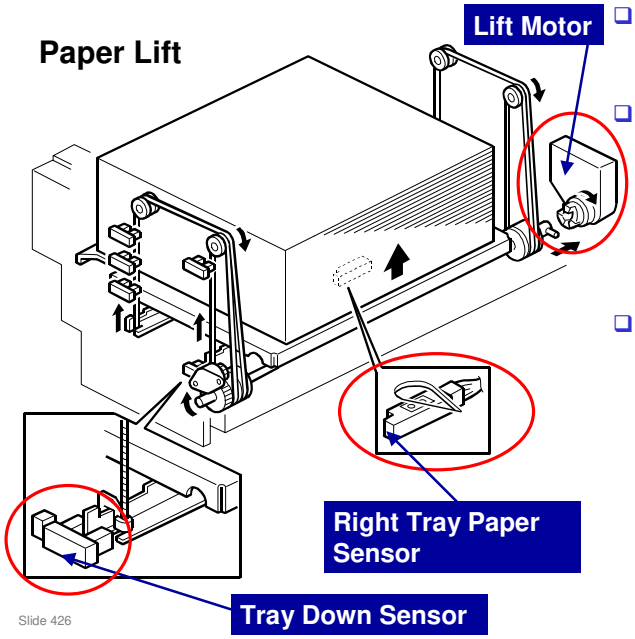
- If there is paper in the left tray: The lock holds the two trays together
- If there is no paper in the left tray: Right tray lock solenoid releases the lock
  - The user can add paper to the left tray, even while paper is feeding from the right tray

Slide 425

- The main points are on the slide.
- See below for a diagram that shows how the lock is released.



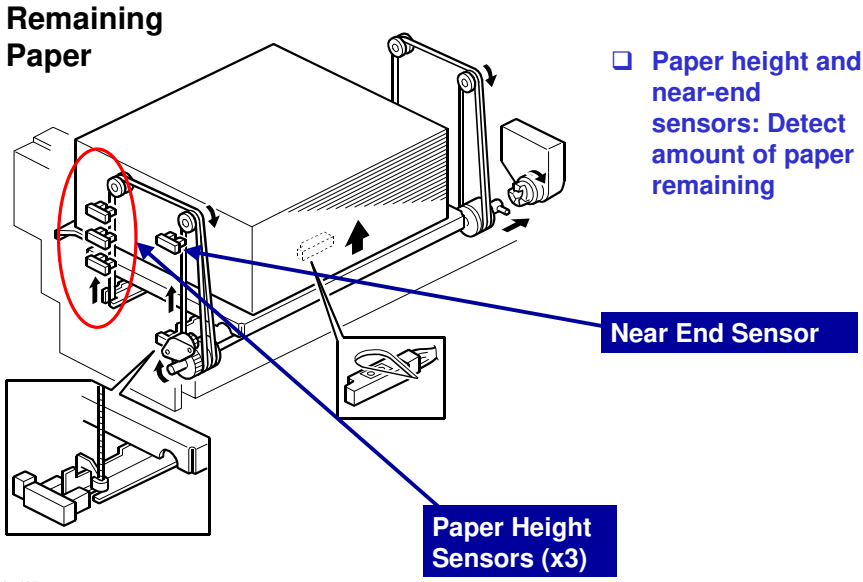
Tandem Feed Tray



- **Tray connector: Informs when tray has been inserted**
- **1st tray lift motor: Lifts the tray**
  - If paper is present in the right tray (detected by right tray paper end sensor)
- **Tray lift stops when:**
  - Paper end sensor (at top of tray) is activated
  - Pick-up roller is pushed up, and activates lift sensor

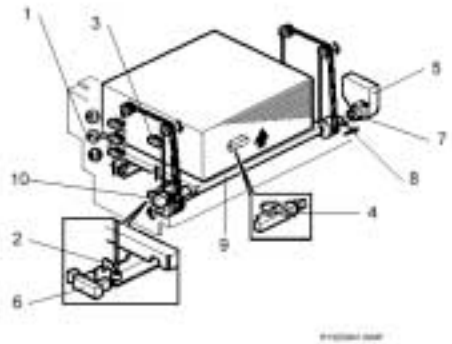
- The sensor at the bottom of the tray (right tray paper end sensor) saves time when checking if the tray has any paper or not before starting to lift the tray to the paper feed position.
- There are two tray lowering mechanisms.
  - Mechanism 1. When the user pulls the tray out, the tray falls under its own weight, slowed by a damper.
  - Mechanism 2. When the stack in the right side has finished, the tray bottom plate must lower automatically before the stack in the left side can move across. The tray lift motor lowers the plate until the tray down sensor detects the actuator on the bottom plate. Then the stack in the left side can move across.

Tandem Feed Tray



Slide 427

- These four sensors detect the amount of remaining paper.
- These sensors cannot detect when the tray is empty. When the tray is at the top, the height sensor actuation status is the same for a full tray (the actuator is outside all three sensors).
- See the next slide for how paper end is detected.



Paper remaining: The amount of paper remaining in the tray is detected by which combination of the three paper height sensors [1] ❶, ❷, ❸ are actuated by the actuator on the left rail as the bottom plate rises.

- With the actuator below paper height sensor ❶ (the bottom sensor), no sensor is actuated and the display indicates the tray is full.
- When the actuator passes paper height sensor, the display indicates 50% of the paper supply remaining.
- When the actuator passes paper height sensor ❷ (the middle sensor), the display indicates 30% of the paper supply remaining.
- When the actuator passes paper height sensor ❸ (the top sensor), the display does not change. This prevents the signal from returning to the off state, which would indicate 100% of the paper remaining (the same state as when the sensor is below paper sensor 1.

Paper near-end: Detected when the actuator [2] on the right rail activates the paper near end sensor [3]. When the actuator passes this sensor, the display indicates 10% of the paper supply remaining.

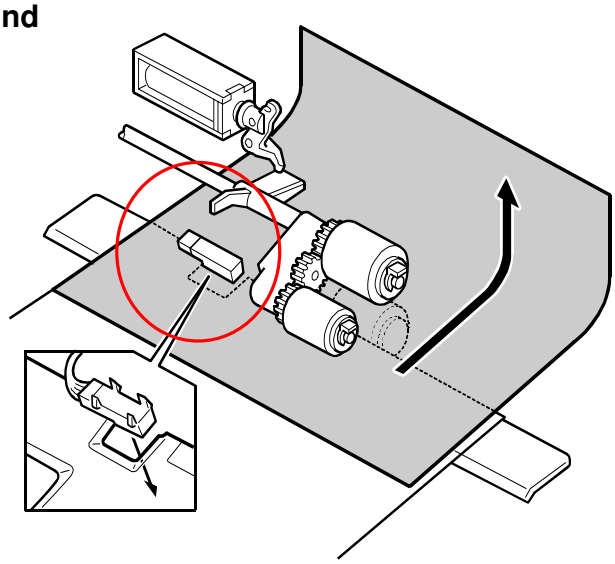
Paper end: After the last sheet feeds, the right tray paper sensor [4] below the bottom of the tray actuates and signals paper end. When paper runs out in the right tray, the stack must be moved across from the left tray. To do that, the tray must first be lowered. The 1st tray lift motor [5] reverses until actuator [2] activates the right tray down sensor [6].

When removing the tray manually, if paper is still present, the tray lowers under its own weight as follows:

- Coupling [7] separates from pin [8] ➔ Tray bottom plate [9] moves down.
- Damper [10] lets the tray bottom plate drop slowly.

Tandem Feed Tray

Paper End

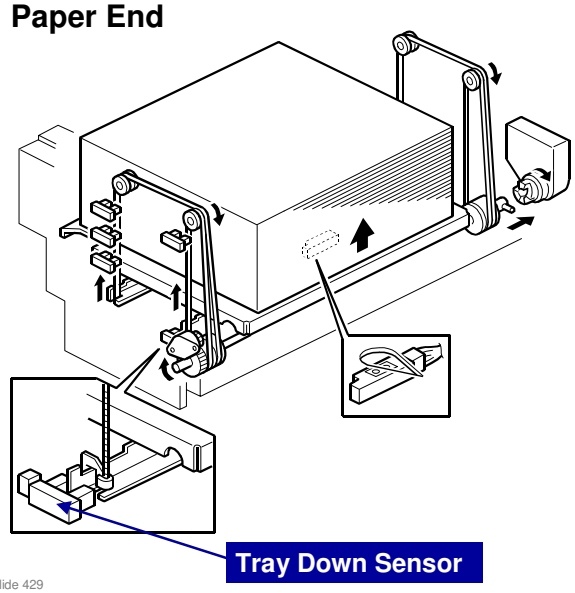


Slide 428

- When paper runs out, a feeler drops through the cutout in the bottom plate. This is the same as for trays 2 and 3.
- The end sensor under the bottom plate is for other purposes, as explained earlier.

Tandem Feed Tray

Paper End



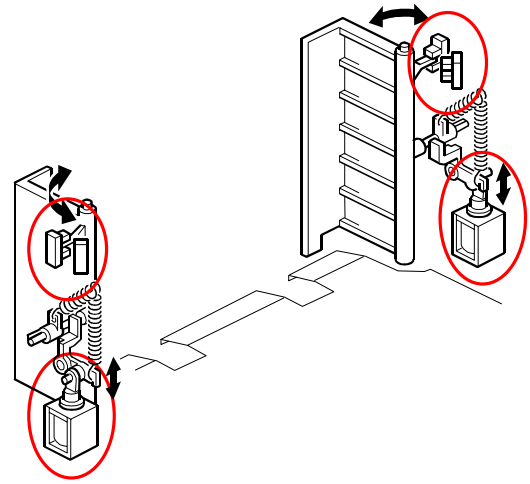
Slide 429

- **Tray down sensor: Detects when the tray has been lowered all the way**

- When paper runs out, the tray must be lowered, so that the stack in the left tray can be moved across to the right tray.
  - The lift motor reverses to lower the tray. The tray down sensor detects when the tray has been lowered all the way down.
  - This was explained on a previous slide.

Tandem Feed Tray

Side Fence Drive



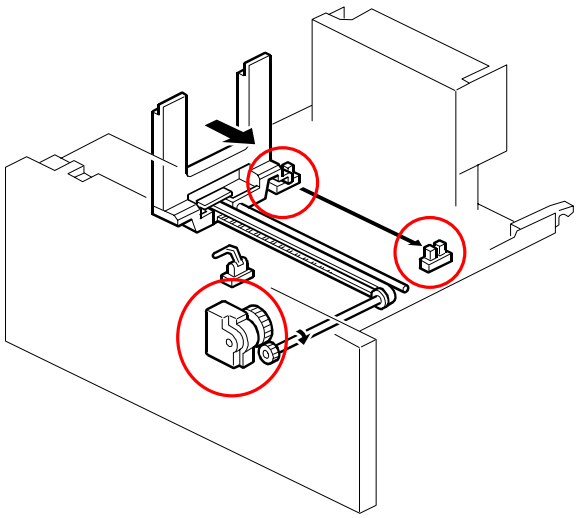
- **Side fence solenoids**
  - Open and close the fences
- **Side fence open/closed sensors**
  - Detect the open and closed positions

Slide 430

- The side fences open only when the stack of paper in the left tray is moving across to the right tray.
- Study how the side fence solenoids open the side fences.
  - The side fence open sensor detects when the fences are open fully.
- The motor closes the fences again after the stack has moved across.
  - The side fence close sensor detects when the fences are closed.
- The user can then load some paper into the left side of the tandem tray (even during copying).

Tandem Feed Tray

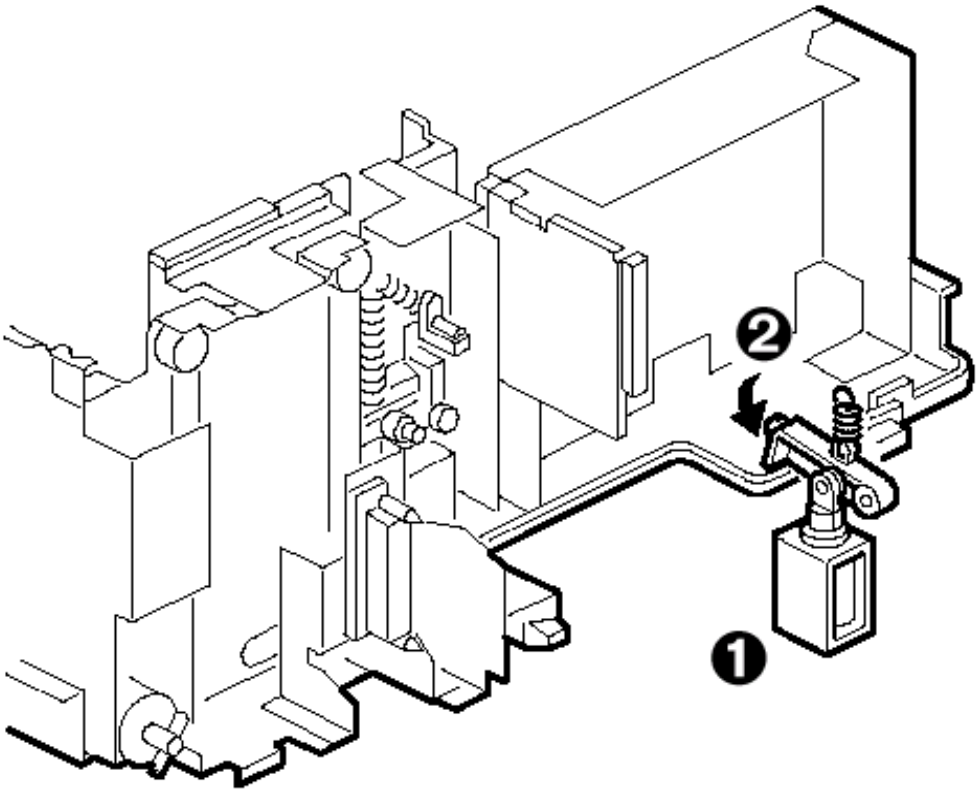
Rear Fence Drive



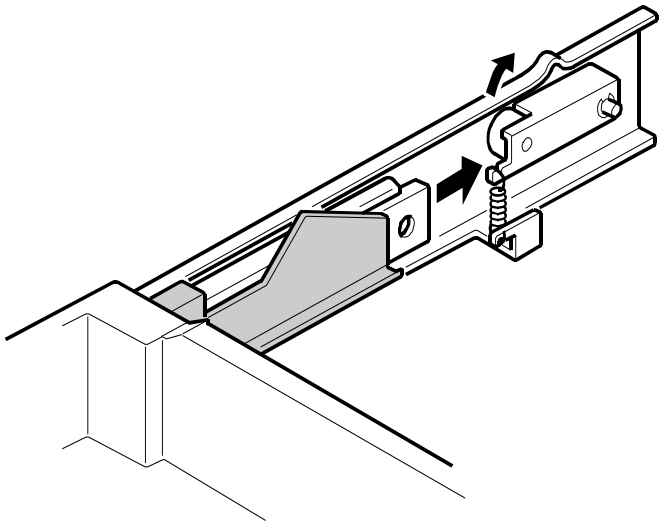
- Rear fence drive motor: Pushes the paper stack into the right tray
- Rear fence home position/return sensors: Detect the rear fence home and return positions

Slide 431

- If the right tray is empty but the left tray is full, the paper in the left tray is moved across to the right tray.
- The rear fence drive motor pushes the paper stack into the right tray.
- The return sensor detects when the fence is as far as it can go.
- The rear fence home position sensor detects when the rear fence moves back to home position.
- While the paper stack is being moved across, the left tray is locked using the left tray lock solenoid, as shown below. This stabilizes the left tray while the stack is being pushed across.



Tray Positioning

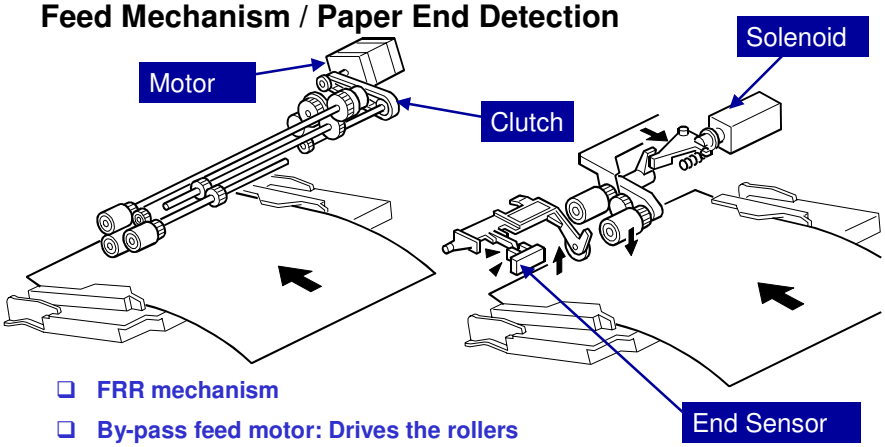


Slide 432

❒ This is the same for all three trays.

By-pass Feed Table

Feed Mechanism / Paper End Detection



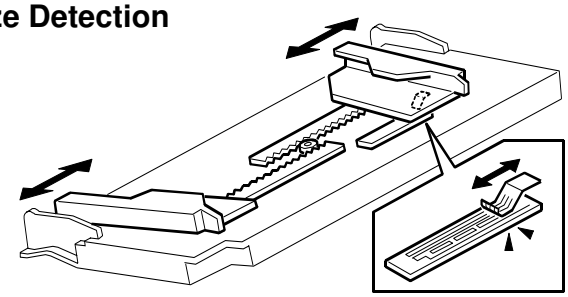
- FRR mechanism
- By-pass feed motor: Drives the rollers
- Pick-up solenoid: Drops the pick-up roller and moves the stopper out of the feed path
- By-pass feed clutch: Starts the feed roller
- Paper end sensor: Detects paper end

Slide 433

No additional notes

By-pass Feed Table

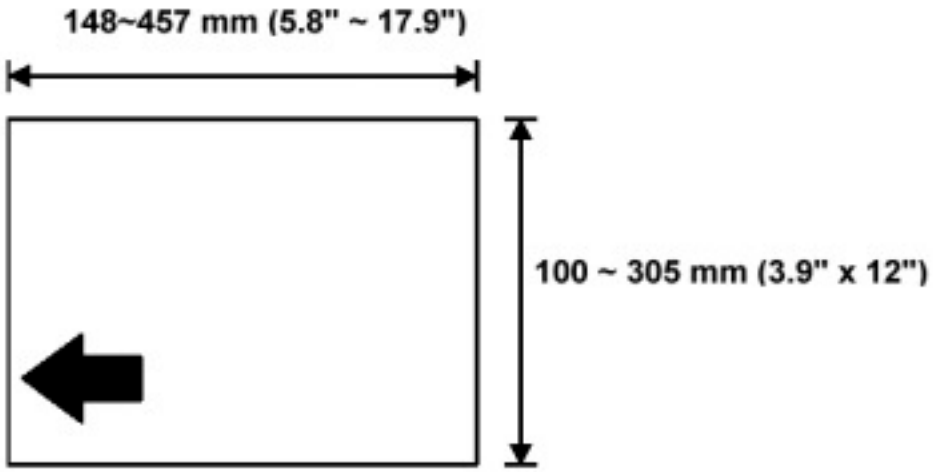
Paper Size Detection



- By-pass paper width sensor: Electrical resistance changes when the guides move to a different position
- Paper length: Detected using the registration sensor and a pulse counter
- When 8.5"-width paper is fed from the by-pass tray, the paper size is first detected as 8.5" x 14". Then, if the paper length is detected as 11", not as 14", the machine changes the detected paper size to 8.5" x 11".

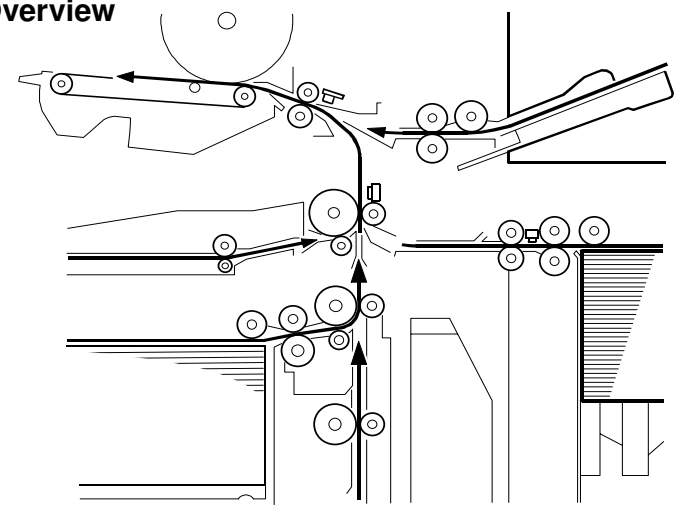
Slide 434

- This sensor is the same type as used in many recent models.
- Non-standard sizes must be specified by the user at the operation panel. The range of acceptable sizes is shown below.
- SP 5150 can be used to enable paper length up to 600 mm (23.6").
- SP 1006 can be used to check if there is skew. This SP shows the paper size that is detected in the bypass tray. If the display is not correct, then there could be skew.
- Use SP1905 to adjust the by-pass feed clutch operation if thick paper often jams at the registration roller.



Paper Registration

Overview

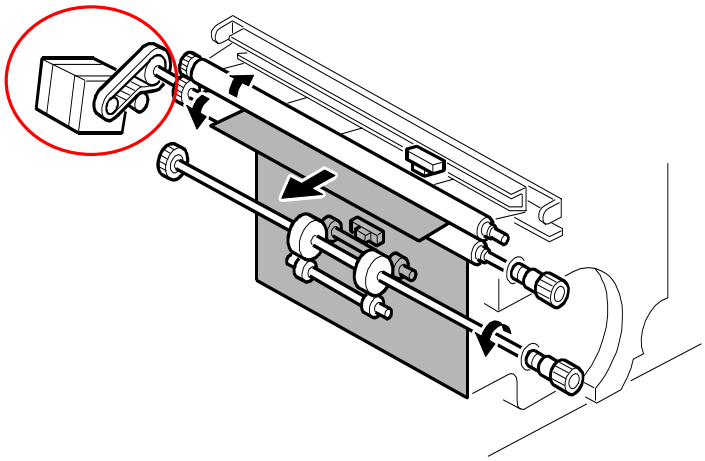


Slide 435

- The diagram shows the path of paper from all trays, including the duplex unit and optional LCT.
- The registration roller is driven by a motor dedicated to this task.
- The registration sensor also detects jams.

Paper Registration

Registration Drive Mechanism



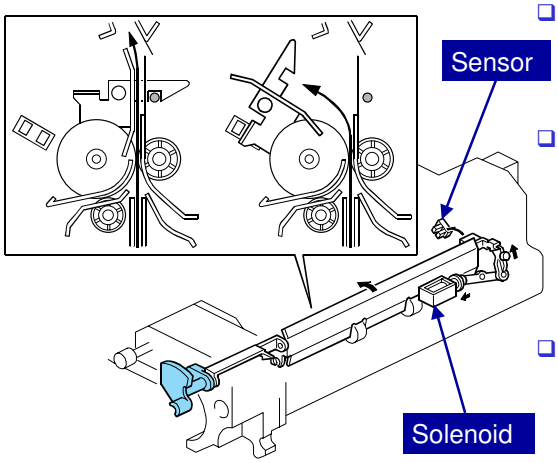
❑ **The registration motor drives the lower registration roller.**

Slide 436

- ❒ The registration roller has a dedicated motor, instead of a clutch. The shock of a clutch turning on can agitate the toner on the latent image. This causes jitter near the leading edge.
- ❒ The motor drives the lower roller.
- ❒ There is a paper dust remover (made from two mylar plates) by the upper roller.

Paper Registration

Guide Plate Release Mechanism

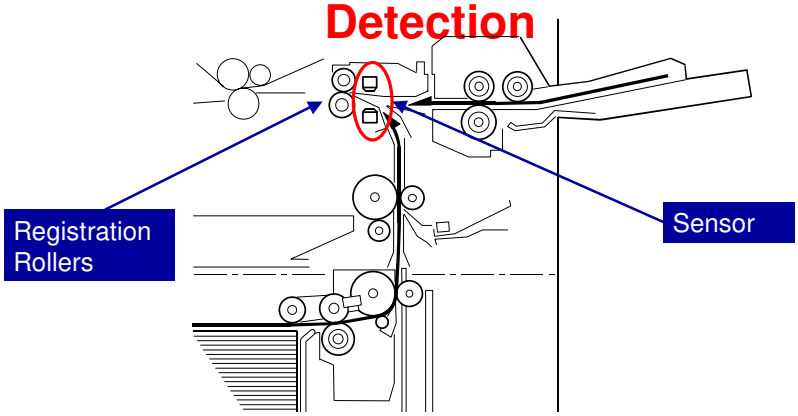


- The guide plate opens if the registration sensor does not detect paper at the correct time.
- The guide plate blocks the paper path and diverts the next sheet of paper into the duplex tray, to prevent a pile-up between the registration roller and the vertical transport rollers.
- The user must remove jammed paper in the vertical feed path, the sheet in the duplex tray, and manually close the guide plate.

Slide 437

- This mechanism stops paper piling up when a jam has occurred in the vertical feed path before reaching the registration roller.
  - When a jam occurs here, the next sheet is already on its way up from the paper tray, and must be stopped before it gets to the jam location.
- Go over the points on the slide.
- Study how the guide plate solenoid opens the guide plate.
- The guide plate diverts any paper that is coming along the feed path into the duplex tray until the jam is cleared.
- Copying is disabled while the guide plate is open.
  - Detected by the guide plate position sensor.
- The user has to close the guide manually after the jam is removed. If the user forgets, a message appears on the LCD panel.
  - Also detected by the guide plate position sensor.

Paper Type and Double-feed Detection



- **Immediately after registration, the sensor measures the light that goes through the paper.**
- **If the light is not in the correct range for the paper type that is selected by the user, the machine stops the job and a copy jam error is displayed.**
  - This is because a double-feed has occurred, or paper of a different type is fed.

Slide 438

- This function could make it hard for casual walk up use to make quick color copies on thick paper for example. Some users do not make the correct paper type setting at the operation panel.
- But if the users do not make the correct paper type setting, the machine parameters will not be correct for the best output quality on that paper type.
  - Incorrect fusing temperature – insufficient fusing can occur
  - Incorrect transfer and separation current – toner may not be transferred properly, and the paper may not separate from the ITB
- What happens in slip sheet mode? The user must disable the feature for the tray that feeds the slip sheets, or an error will occur.

Replacement Procedures

- **The feed motor cannot be replaced easily. Because of this, an assembly is available as a spare part.**
- **The FRR rollers for trays 1, 2, and 3 are the same. But the rollers for the bypass tray and the ADF are different from these rollers.**

Slide 439

Tandem tray paper size change

- The users cannot do this themselves.
- Don't forget to change the SP mode setting after changing the size. The users do not have a user tool to do this if you forget.
- Do the copy adjustments after changing the paper size.

Pick-up, feed, and separation rollers

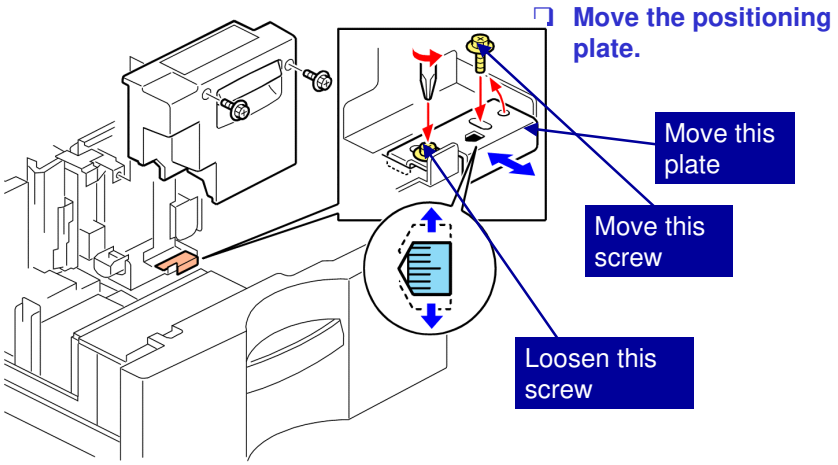
- The rollers in trays 1 to 3 are different from those in the by-pass tray and optional LCT.

Separation roller pressure adjustment

- Note the use of this adjustment to solve feed problems at the feed-in area.

Tandem Feed Tray

Side-to-side Registration



Slide 440

- 1. Open the tandem tray.
- 2. Remove the front cover of the right tray.
- 3. Loosen one screw.
- 4. Remove the other screw from the round hole and move it to the oval hole.
- 5. Look at the scale through the cut-out.
- 6. Shift the plate forward or back, check the position on the scale, and then tighten both screws to set the plate at the new position.

RICOH

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V-C3 TRAINING
COPIER ENGINE

IMAGE TRANSFER BELT
PAPER TRANSFER ROLLER

Slide 441

No additional notes

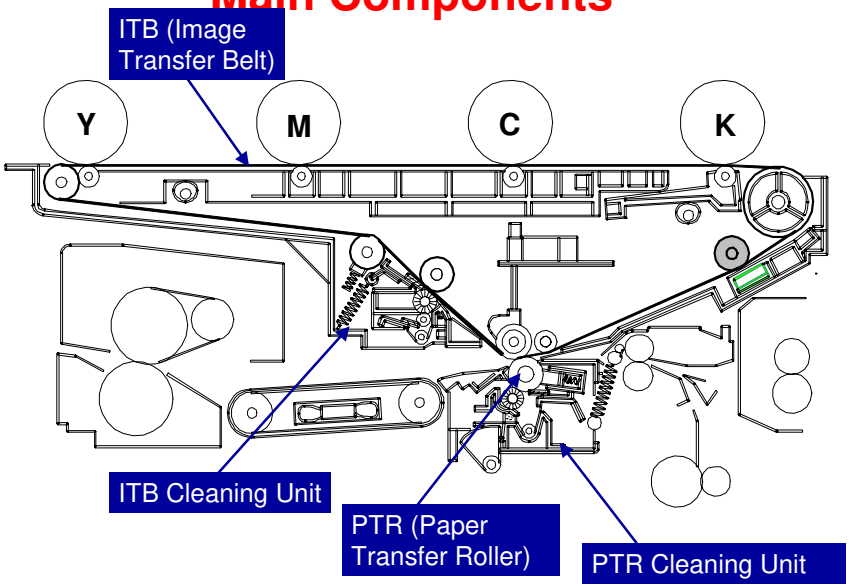
Transfer

Overview

Slide 442

No additional notes

Main Components



Slide 443

- The ITB cleaning unit is not shown correctly in this diagram. A correct diagram is shown later in this section.
- For a description of all the components, see Handout 3 – Transfer Unit Components.pdf

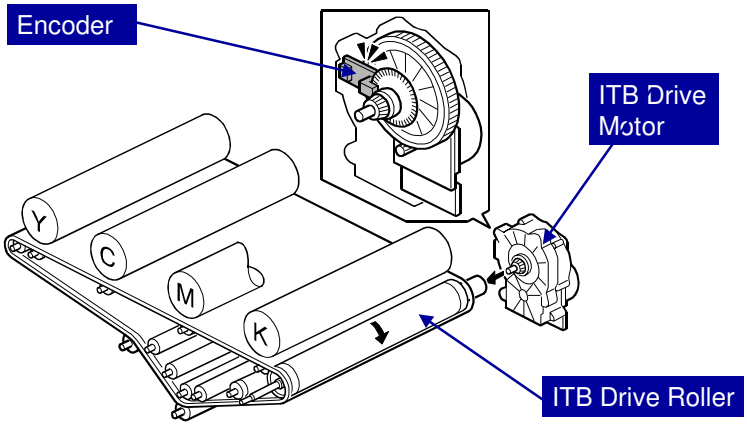
Transfer

Image Transfer Belt (ITB)

Slide 444

No additional notes

ITB Drive



- The ITB motor turns the ITB drive roller, and this roller turns the ITB.
- All the other rollers turn with the ITB (there are no gears or timing belts).
- The encoder inside the ITB motor unit controls the motor.

Slide 445

No additional notes

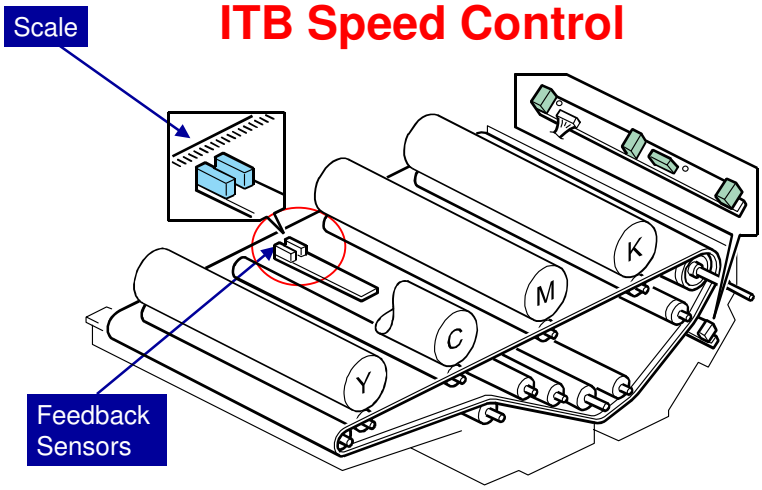
The Drum is Slower than the ITB

- **The drum is 0.3% slower.**
- **Why?**
  - There is a small amount of friction between the drum and the ITB.
  - If the drum and ITB are the same speed, toner is not transferred correctly for thin vertical lines in the image.
  - Because of this, the drum is 0.3% slower.
  - Thin lines are better in the output, but there is more wear on the drum and the ITB because of the speed difference.

Slide 446

No additional notes

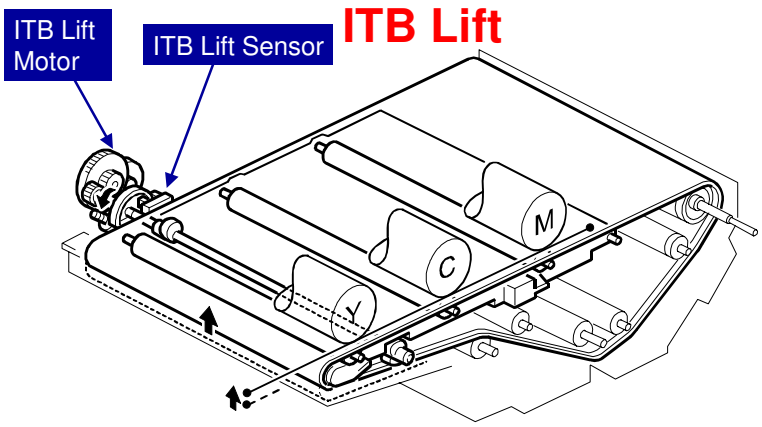
ITB Speed Control



- **The feedback sensors do these things:**
  - Measure the speed of the belt. To do this, one of the sensors monitors the scale when the belt turns.
  - Check for stretches in the belt. The number of marks in the interval between the sensors must be constant.

Slide 447

- Belt speed: The following is a list of items that can cause the belt speed to not be constant. The machine adjusts the ITB drive motor speed to compensate.
  - Eccentricity of the image transfer roller
  - Differences in the thickness of the belt
  - Belt slippage
  - The load placed on the ITB by friction between the rollers at paper transfer
- Stretching: If stretching is detected, the machine adjusts the ITB drive motor speed to compensate.



- **ITB lift motor: Lifts and lowers the ITB through a cam**
- **ITB lift sensor: Detects when to stop the motor**
  - Actuator goes in sensor: The belt is up, and touches all four PCUs. This is the full-color position.
  - Actuator goes out of sensor: The belt is down, and touches the K PCU only. This is the black-and-white printing position.

Slide 448

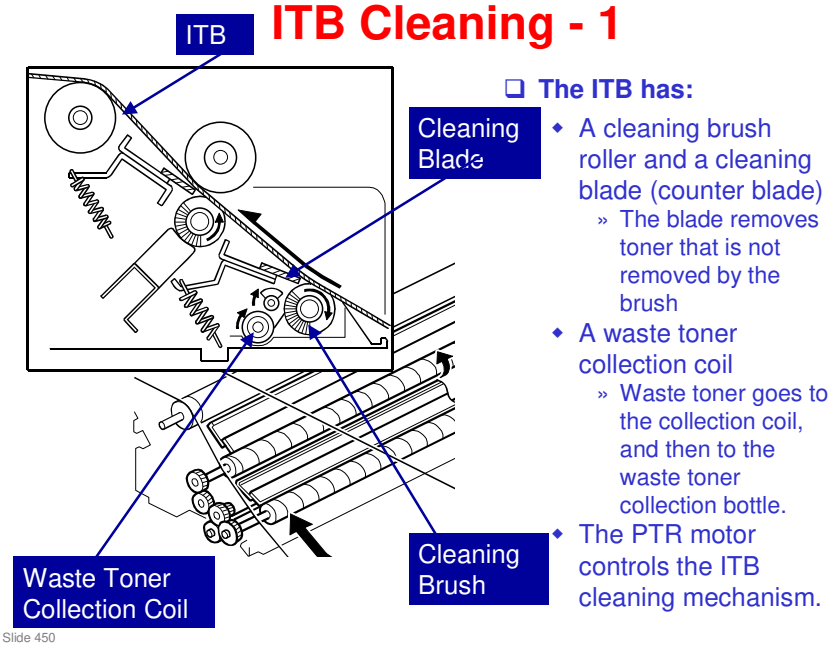
- There is a motor in the machine called the Bk ITB Lift Motor (not shown here)
- This motor lowers the black image transfer roller away from the ITB and PCU drum during automatic developer installation.
- However, it is not used at this time (October 2007).

ITB Lift

- **Full-colour jobs**
  - The ITB is lifted until it touches all four PCUs.
- **Black-and-white jobs**
  - The ITB is lowered until it touches only the K PCU.
- **If the job has color pages and black-and-white pages, the ITB operation is controlled by SP 3930.**
  - The default is 1: The ITB moves away from the color PCUs if a black-and-white page appears in a color job (this gives low productivity but decreases wear on the color PCUs).
  - If you change the setting to 0, the ITB will not move away from the color PCUs if a black-and-white page appears during a color job. This makes faster printing, but increases wear on the color PCUs.
  - If you change the setting to a value between 2 and 99, then the ITB will move away from the color PCUs if the number of black-and-white pages in the middle of the job is the same as or more than the SP setting.

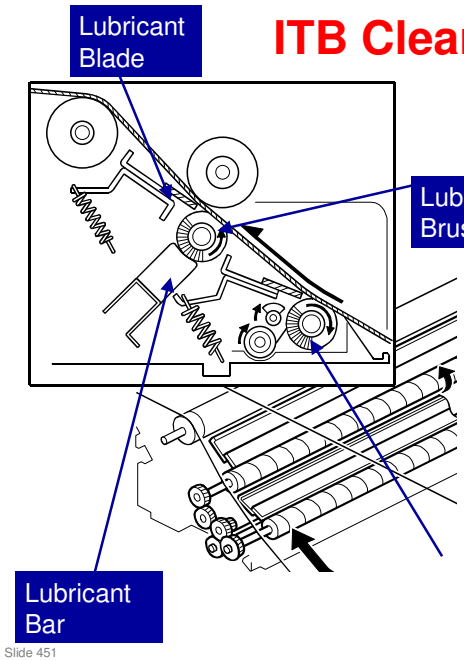
Slide 449

- The above only occurs if the user selected Auto Color Selection at the operation panel.
- Auto Color Selection is one of the five color-mode keys near the left side of the operation panel.



❒ The cleaning brush also has a cleaning roller.

ITB Cleaning - 2



Slide 451

- **The ITB has:**
  - Lubricant bar: Prevents scratching on the ITB surface.

No additional notes

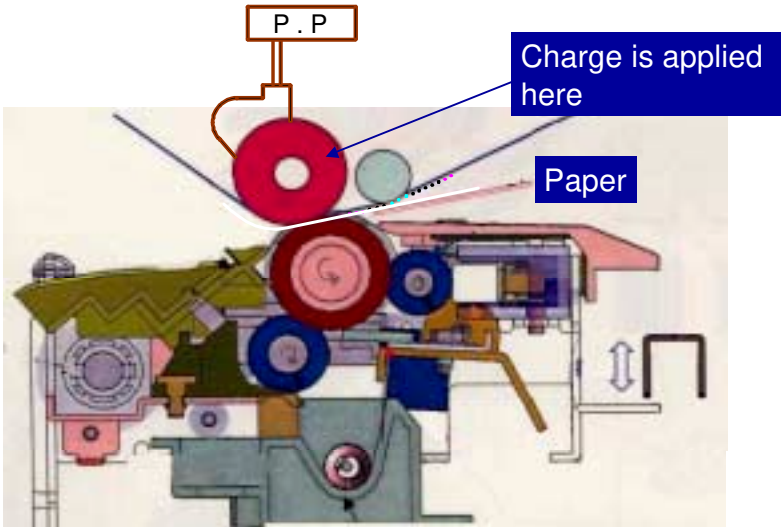
Transfer

Paper Transfer Roller (PTR)

Slide 452

No additional notes

Paper Transfer



Slide 453

- Charge is applied from above, not at the PTR.
  - The roller that is charged is called the ‘ITB Bias Roller’.
- This system is better against moisture in the paper.

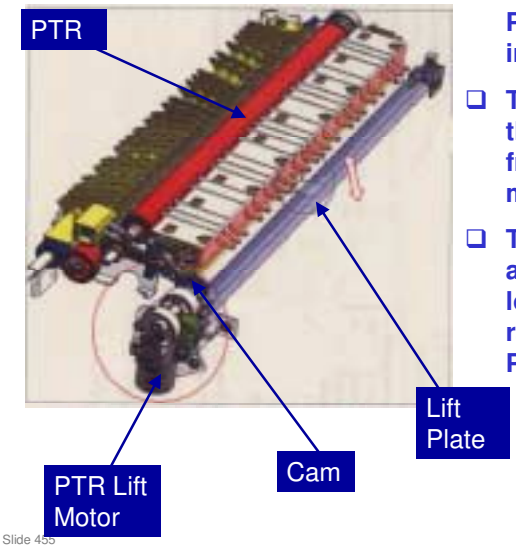
PTR Cleaning

- **The PTR has:**
  - A cleaning brush roller and a cleaning blade (counter blade)
    - » The blade removes toner that is not removed by the brush
  - A lubricant bar and a lubricant brush roller
    - » The brush roller reduces scratching on the PTR.
  - A waste toner collection coil
    - » Waste toner goes to the collection coil, and then to the waste toner collection bottle.

Slide 454

No additional notes

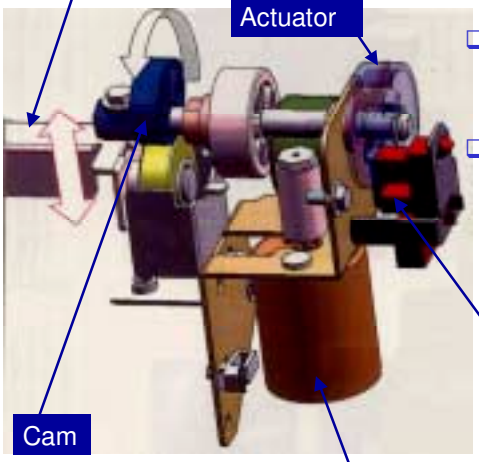
PTR Lift Mechanism



- The mechanism raises the PTR against the ITB for image transfer.
- The mechanism lowers the PTR and pulls it away from the ITB when the machine is not printing.
- The PTR lift motor rotates a cam. The cam raises and lowers the lift plate, which raises and lowers the PTR.

- This mechanism is necessary because the roller in the ITB unit that opposes the PTR is made of a softer material than in the V-C1. The PTR will deform this roller if it always contacts it.

PTR Lift Mechanism



- The PTR lift motor rotates a cam. The cam raises and lowers the lift plate.
- The PTR lift sensor detects the actuator, and the machine uses this to control the lift mechanism.

Slide 456

No additional notes

Others

- **Reverse bias is applied in the intervals between sheets from the PTR.**
- **The ITB motor can be set to reverse slightly at the end of every job to remove paper dust that may have collected on the belt cleaning blade.**
  - This feature can be set with SP2906 (Stop Time Reverse Ctrl). (Default: Off).

Slide 457

No additional notes

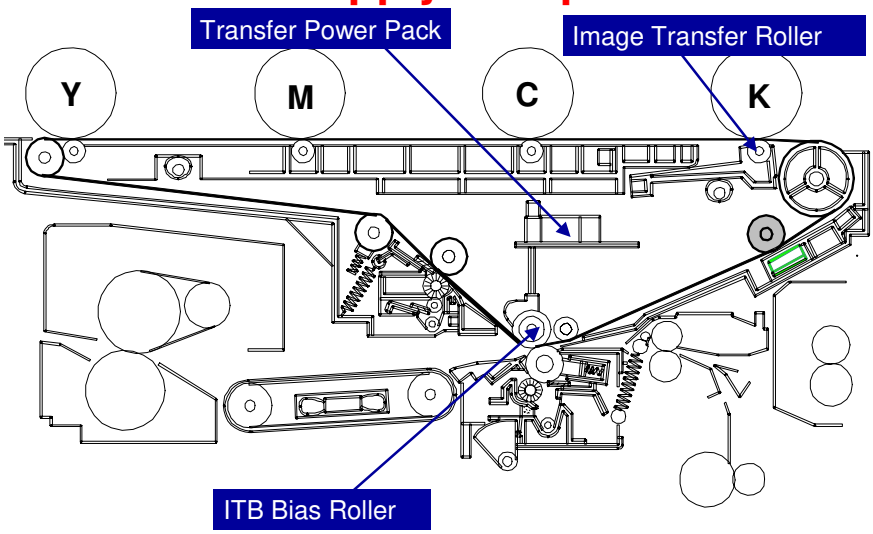
Transfer

Power Supply

Slide 458

No additional notes

Power Supply Components

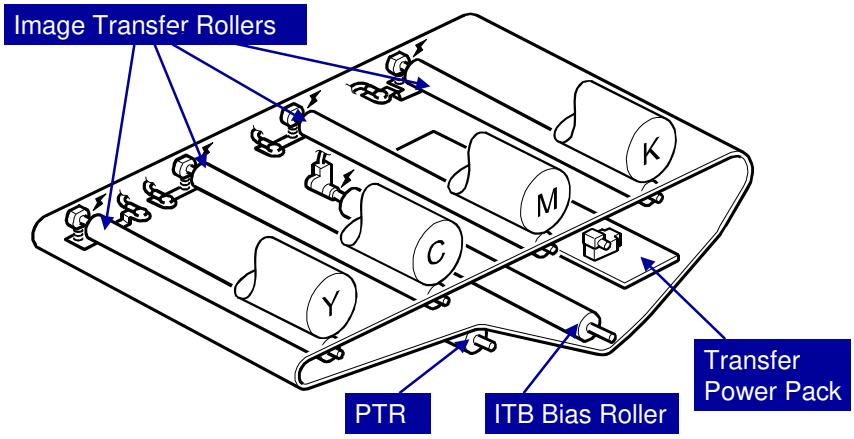


- Image transfer rollers: Power is applied at this roller, below each PCU
- ITB bias roller: Power is applied here, and not at the PTR

Slide 459

- Power is applied at the image transfer rollers (for the ITB), and at the ITB bias roller (for paper transfer).

Transfer Power Pack



- **Image transfer rollers: A +ve charge pulls toner from the PCUs to the transfer belt**
- **ITB bias roller: A –ve charge pushes the toner from the transfer belt to the paper/**
  - The PTR is grounded.

Slide 460

- This diagram shows the power pack, the rollers, and the terminals.
- The transfer power pack supplies the positive charge for image transfer to the ITB and the negative charge for image transfer from the ITB to paper.
- A temperature/humidity sensor under the waste toner bottle motor controls the amount of charge applied to the image transfer and ITB bias rollers.
- To transfer the images from drum to ITB:
  - The transfer power pack supplies a positive charge (1 kV 24 to 30 µA) to the image transfer roller terminals.
  - The four terminals charge the image transfer rollers, which transfer the charge to the back of the ITB.
  - The positively charged ITB pulls the negatively charged toner off the drums and onto the ITB.
- To transfer the images from ITB to paper:
  - The transfer power pack supplies a negative charge to the ITB bias roller terminal.
  - The terminal applies the negative charge to the ITB bias roller.
  - The high negative charge of the ITB bias roller is applied to the back of the ITB.
  - This repulses the low negative charge of the toner, forcing the images onto the paper.

Correction for Temperature and Humidity

- There is a temperature/humidity sensor under the waste toner bottle motor.
- The machine uses the readings from this sensor to correct the charge on the ITB and on the PTR.

Slide 461

No additional notes

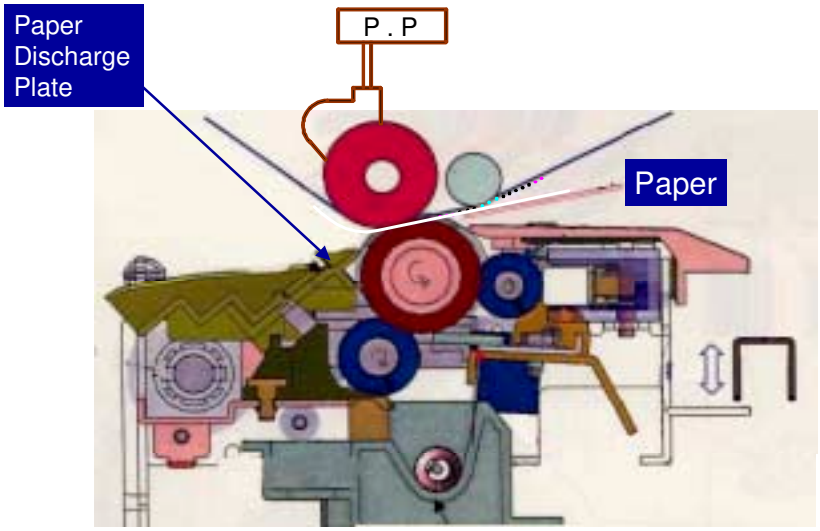
Transfer

Paper Separation

Slide 462

No additional notes

Paper Separation



Slide 463

- The separation power pack supplies ac and dc to the separation plate.
- After that, the weight of paper separates the paper from the ITB.

Practical Work
PTR Unit

Slide 464

No additional notes

Replacement Procedures – PTR Unit

- After you replace components in this section, you must do the forced MUSIC adjustment with SP 2111 in many cases. Check the manual when you work on the PTR unit.

Slide 465

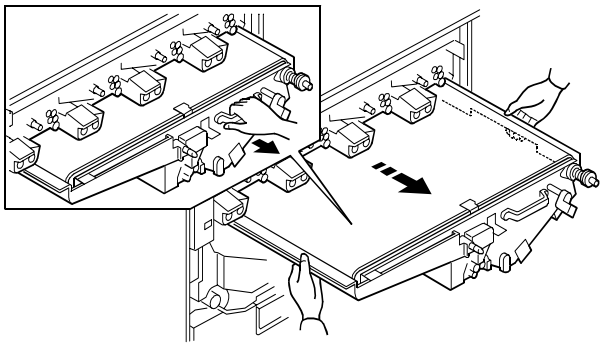
No additional notes

Practical Work
ITB Unit

Slide 466

No additional notes

Image Transfer Belt Unit Removal

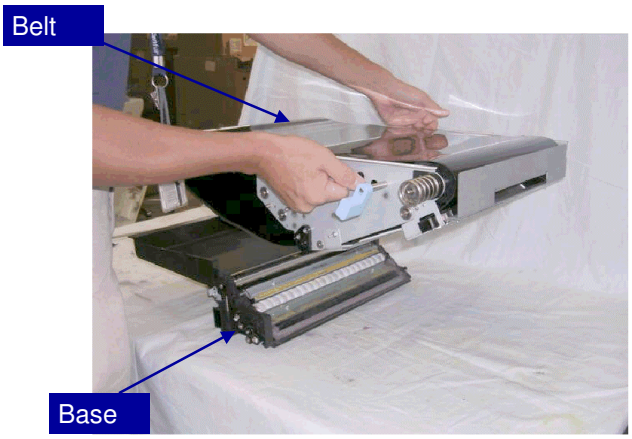


- **Remove the unit carefully. The image transfer unit is heavy and not attached to the rails with screws.**
- **Always keep the unit flat. Do not tilt it. Do not stand it on its side.**
  - If you tilt the unit, toner will come out inside the unit.

Slide 467

V-C3 field service manual, Removal and Adjustment, Common Procedures, Image Transfer Unit

Separate the Belt from the Base



- **After you separate the belt from the base of the unit, you can tilt the belt. But keep the base of the unit flat.**

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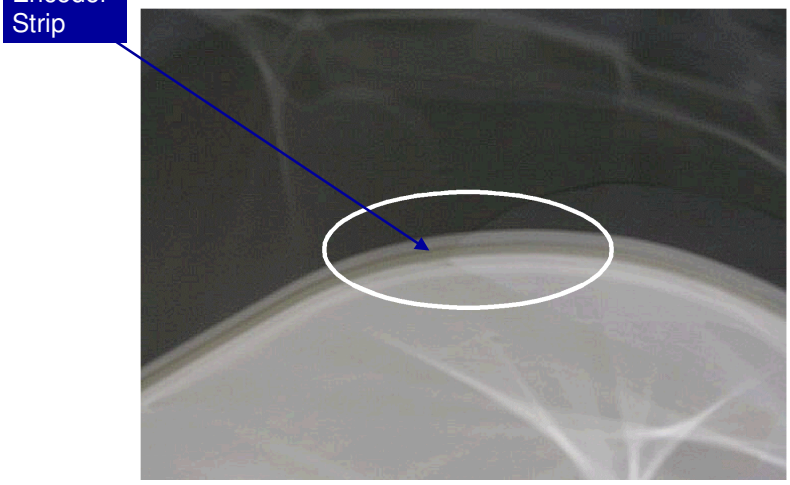
V-C3 field service manual, Removal and Adjustment, Image Transfer Unit, Separating the Belt Unit and Belt Cleaning Unit

- The base of the ITB is the cleaning unit. It contains waste toner, so be careful not to spill it.

Install a New Belt - 1

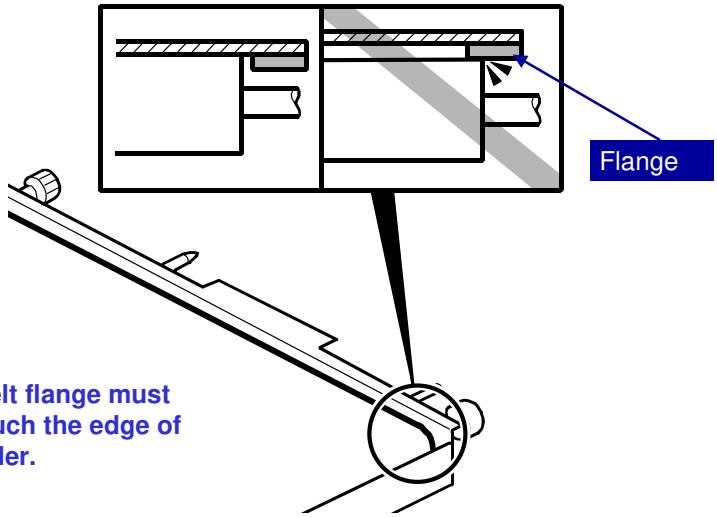


- **The encoder strip (silver) must be at the rear of the machine.**

Slide 469

V-C3 field service manual, Removal and Adjustment, Image Transfer Unit, Reassembling the Belt Unit and Belt Cleaning Unit

Install a New Belt - 2



- The belt flange must not touch the edge of the roller.

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V-C3 field service manual, Removal and Adjustment, Image Transfer Unit, Reassembling the Belt Unit and Belt Cleaning Unit

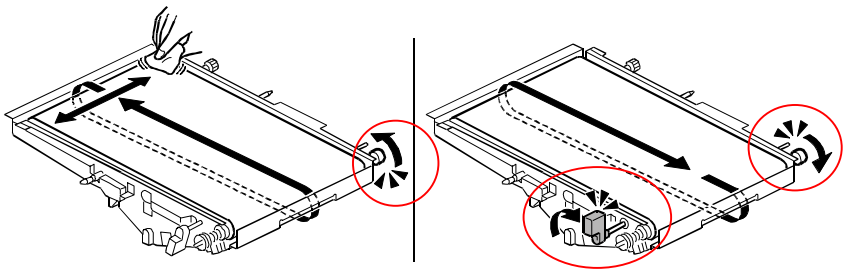
Assembling the ITB Unit

- Put one sheet of paper in the cleaning unit, under the lubricant blade, to protect the corner seals of the ITB cleaning unit.
- Then put the belt unit on the cleaning unit.
- Then remove the paper.
- Is the paper damaged? If so, separate the ITB and cleaning unit, and inspect the seal. If the seal is damaged, you must replace it.

Slide 471

V-C3 field service manual, Removal and Adjustment, Image Transfer Unit, Reassembling the Belt Unit and Belt Cleaning Unit

Applying the Lubricant Powder to the ITB



- **First, apply lubricant while you turn the knob anti-clockwise.**
  - The belt must be turned one complete rotation.
  - The lubricant powder goes past the cleaning blade, and is not removed by the blade.
- **Then, turn the lever to the 'up' position.**
- **Then turn the knob clockwise for one rotation**
  - This makes sure that the edge of the cleaning blade gets sufficient lubricant.
  - The cleaning blade removes the powder.

Slide 472

V-C3 field service manual, Removal and Adjustment, Image Transfer Unit, Reassembling the Belt Unit and Belt Cleaning Unit

- The lever should be up for clockwise rotation.
- For the anti-clockwise rotation, the lever can be up or down

Lubricant Powder

- **When you dust the surface of a new drum, cleaning blade, or transfer belt, use only Lubricant Powder B1329700 (specially designed for this machine).**
- **Do not use the setting powder that was used for previous machines.**
- **Do not use the yellow toner from this machine because it contains carrier. The carrier will damage the drum and ITB.**
- **However, the yellow toner of the V-C1 series can be used for lubrication.**

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- This was explained in the PCU section.
- The V-C1 series was not sold in some areas, but the toner is available as a service part (see below).
- Part numbers of required lubricants
  - G104 YELLOW TONER (D0159500) – this is the V-C1 yellow toner

    G104 yellow toner – this is just the name. It has nothing to do with a model code G104!
  - ZINC STEARATE (D0159501) – this is for the PCU lubricant brush rollers
  - ZINC STEARATE (B1329700) – this is for the other procedures that require zinc stearate.

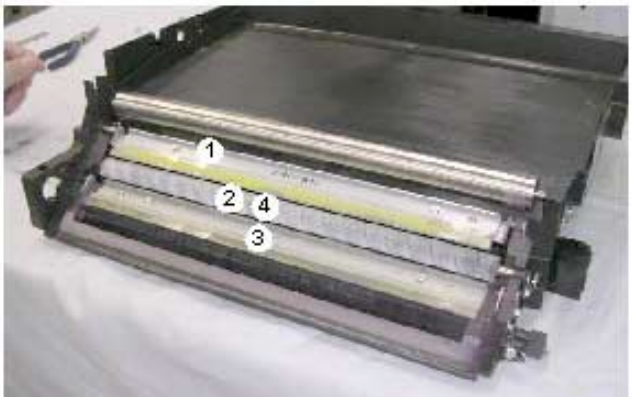
Image Transfer Belt Unit Replacement

- Put the unit in the machine slowly and carefully.
- Take care that the belt does not catch on the frame of the machine, or on the toner cap of the yellow PCU on the far left.
- Do the forced MUSIC adjustment after you finish the replacement (SP 2111).

Slide 474

No additional notes

ITB Cleaning Unit



- **The ITB lubricant blade (1) and ITB cleaning blade (3) are not interchangeable.**
- **Every 300 k: Items 1 to 3 and the lubricant bar should be replaced together.**

Slide 475

V-C3 field service manual, Removal and Adjustment, Image Transfer Unit, ITB Cleaning Unit

- 1. ITB Lubricant Blade
- 2. ITB Lubricant Brush Roller
- 3. ITB Cleaning Blade
- 4. Not a PM part, but must be removed in order to remove the ITB Lubricant Bar (this is a PM part). The lubricant bar is under the lubricant brush roller (item 2).

Belt Position Sensor Replacement

- **After you replace this sensor, do the following SPs (press Execute in each case):**
  - SP2912-1 (Encoder Sn:Adj Light)
  - SP2914-1 (Encoder Sn Get 1st Phase)
  - SP2111-1 (Forced MUSIC Adjustment)

Slide 476

No additional notes

Replacement Procedures – ITB Unit

- Do the steps in the service manual to apply lubricant powder to the transfer belt.
- After you replace components in this section, you must do the forced MUSIC adjustment with SP 2111 in many cases. Check the manual when you work on the ITB unit.

Slide 477

V-C3 field service manual, Removal and Adjustment, Image Transfer Unit

RICOH

RICOH

V-C3 TRAINING
COPIER ENGINE

FUSING

Slide 478

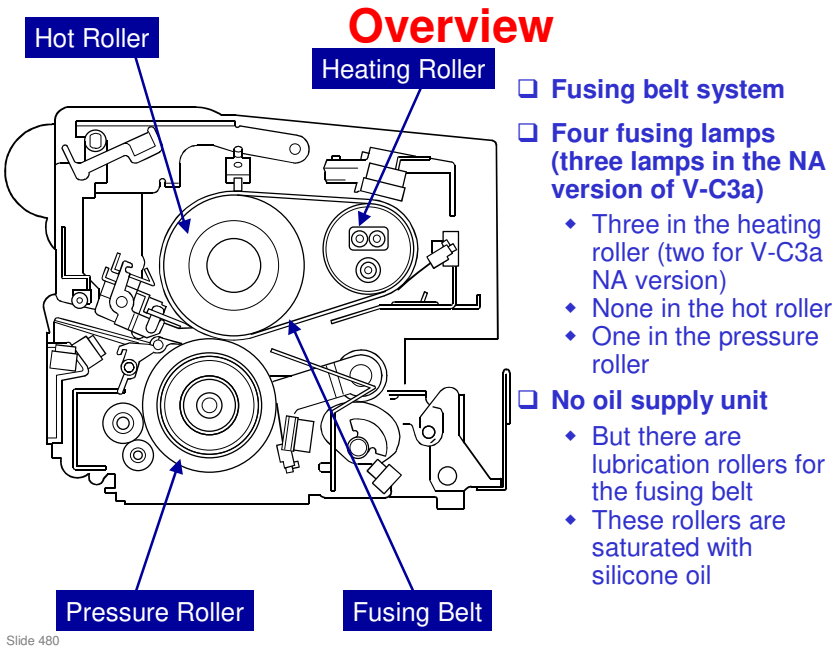
No additional notes

Fusing Unit

Mechanisms

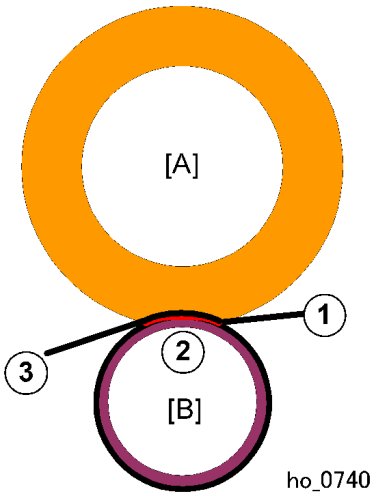
Slide 479

No additional notes



❒ The main points are on the slide. There is more detail in the handout titled Handout 4 – Fusing Unit Components.pdf.

Hot Roller



- The hot roller [A] is composed of a soft sponge.
- When the pressure roller [B] pushes against the hot roller, the nip is wider that for a hard hot roller.
- The additional curvature of the paper at the nip improves separation of paper from the fusing belt.
- The heating roller (not shown here) is thinner, so the fusing belt heats up the rollers more quickly.
  - As a result of this, and the low melting point of the toner, the warm-up time is faster than the V-C1 series.

Slide 481

No additional notes

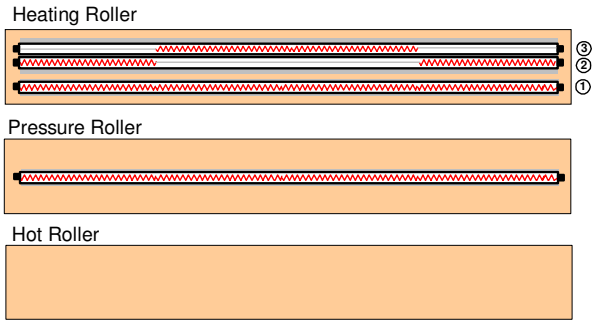
Two Types of Fusing Unit

- There are two fusing units: a 120V unit and 240 V unit.
- The fusing lamp connectors of the 120V unit are BLUE, and those of the 240V unit are PINK.
- If the wrong type of fusing unit is installed in the machine, the machine will detect this and issue a warning. There is no danger of damaging the fusing unit or the machine.

Slide 482

No additional notes

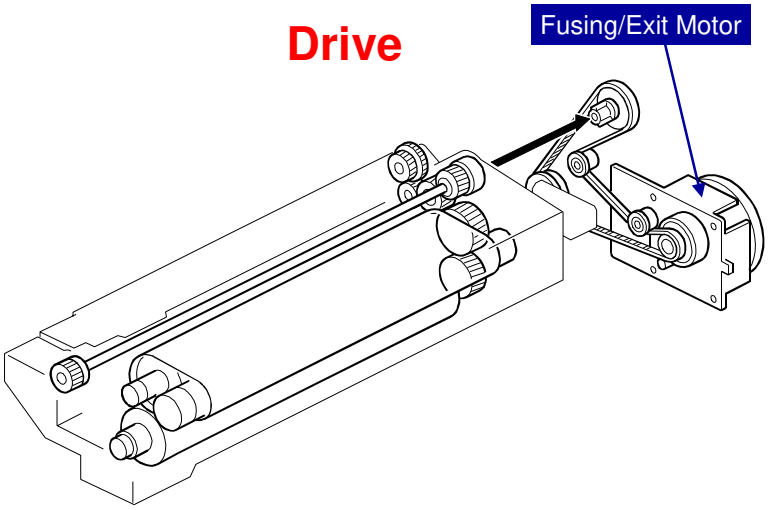
Fusing Lamps



- **Heating roller:**
  - Lamp 1 heats the entire length of the fusing belt.
  - Lamp 2 heats only the ends of the fusing belt. (Used only for large paper sizes.)
  - Lamp 3 heats only the center of the fusing belt. (Used for smaller, thick paper sizes; lamp 2 is not used.)

Slide 483

- The NA version of V-C3a does not have the heating roller fusing lamp that heats the full length of the heating roller (lower lamp in the diagram).

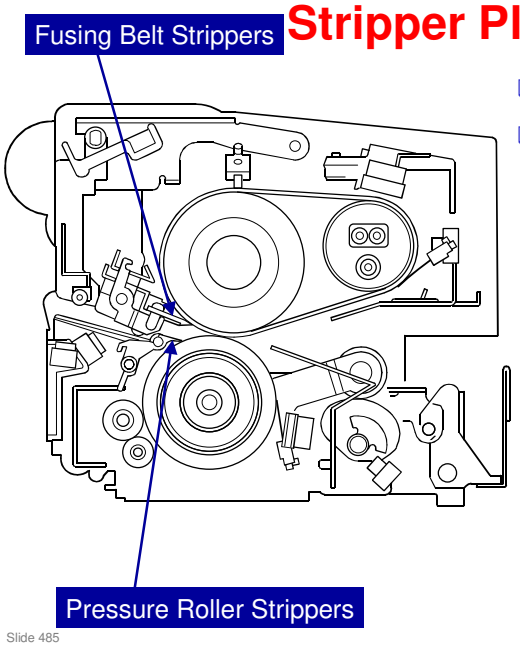


- The fusing/exit motor controls the rollers in the fusing unit.
- The speed depends on the paper type.

Slide 484

No additional notes

Stripper Plates

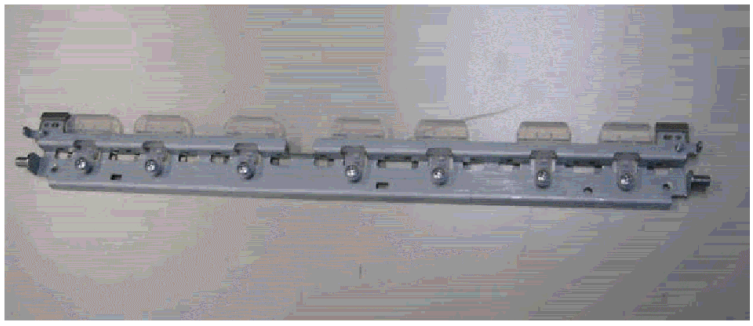


- Two strippers.
- For the fusing belt strippers, a new plate-type of design is used, and not pawls.

Slide 485

❒ See the next slide for more on the new type of strippers.

Stripper Plates

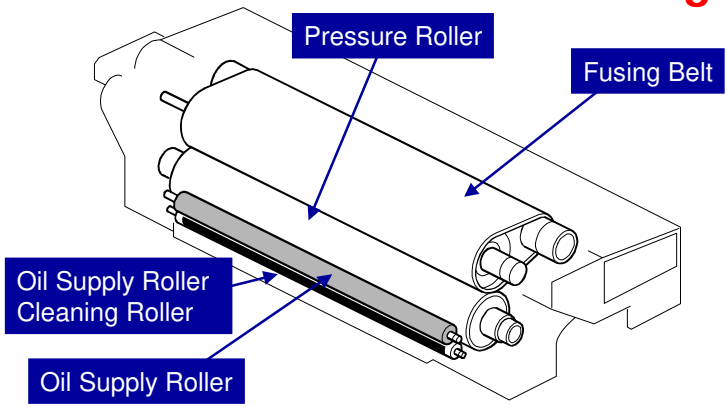


- The strippers are flat resin plates.
- In older models, the stripper pawls are pointed, and these are more likely to leave marks on the paper.

Slide 486

No additional notes

Lubrication and Cleaning

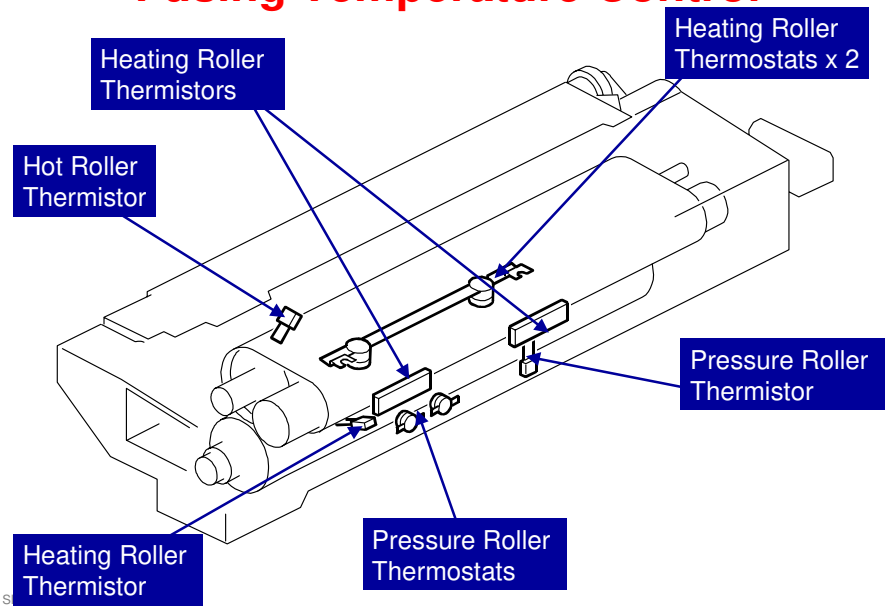


- The oil supply roller contains silicone oil.
- It applies silicone oil to the pressure roller.
- The pressure roller pushes up against the fusing belt.
- Lubricant transfers to the pressure roller and on to the fusing belt.

Slide 487

No additional notes

Fusing Temperature Control



No additional notes

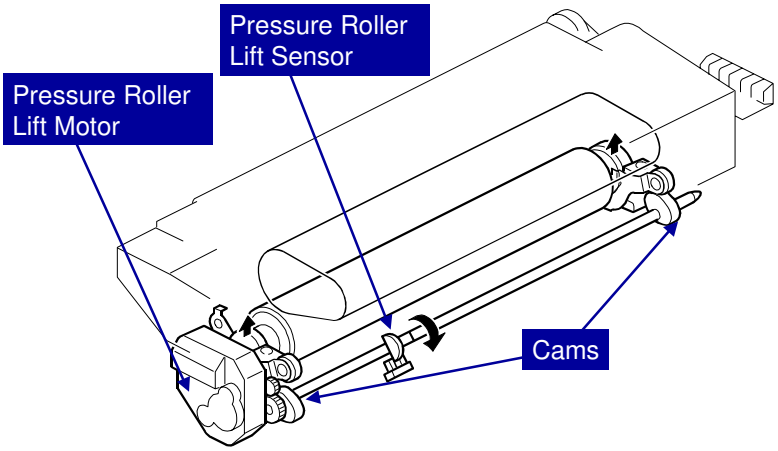
Functions disabled during warm-up

- **These functions have been disabled during warm-up:**
  - SP3820 (Manual process control)
  - Auto Color Calibration (User Tools)
  - Color Registration (User Tools)

Slide 489

No additional notes

Pressure Roller Lift Mechanism



- At the start of a job, the lift motor turns the cam shaft. The cams lift the pressure roller up to the hot roller and fusing belt.
- The lift motor detects when to stop the motor.
- At the end of the job, the motor reverses and the pressure roller moves away from the hot roller.

Slide 490

- The pressure roller and hot roller are only in contact during printing. This increases the life of the rollers.
- If the pressure roller remains pressed up against the soft sponge material of the hot roller while the machine is idle, this could permanently warp the shape of the soft hot roller and cause problems during image transfer from belt to paper.

Fusing Unit

Replacement Procedures

Slide 491

No additional notes

Order the Correct Components

- **The following parts for the D014/D015 and D081/D082 fusing units are not the same; they cannot be substituted for one another when servicing these machines:**
  - Hot roller
  - Pressure roller
  - Pressure roller bearing
  - Oil supply roller
- **These three parts are physically interchangeable with the V-C2 parts. But always use the correct parts for the machine (do not use V-C3 parts in a V-C2, for example).**
- **If you use the wrong parts, copy quality cannot be guaranteed.**

Slide 492

Details follow on the next few slides.

Order the Correct Components

- The following table shows the reasons for the changes.
- Please refer to the parts catalogs for the part numbers.

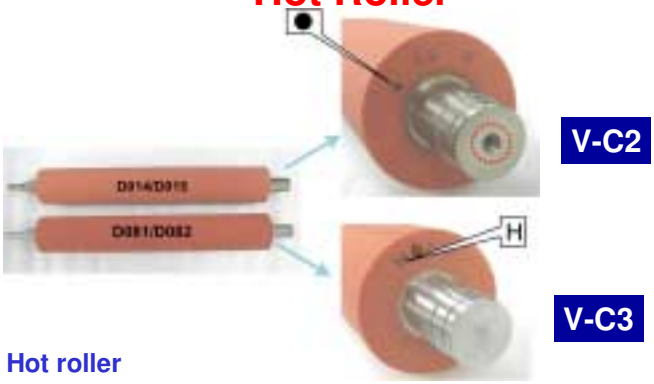
Part Name	Reason for Change
Hot Roller (ϕ52)	To extend service life by 150K (300K to 450K)
Pressure Roller (ϕ50)	Lighter roller core to shorten warm-up time to first copy/print.
Pressure Roller Bearing ϕ20x ϕ32x7	To double service life (600K to 1200K)
Oil Supply Roller (ϕ16)	To extend service life 150 K (300K to 450K)

Slide 493

No additional notes

Order the Correct Components

Hot Roller



- **Hot roller**
  - The marks on the ends of the two rollers are different.
  - The shaft of the V-C2 roller has a hole in the end

Slide 494

- The next few slides show how to tell the difference between the old and new components.

Order the Correct Components

Pressure Roller

- **Pressure roller**
  - The shapes of the ends of the shafts are different.
    - » V-C2: One step, V-C3: Two steps

Slide 495

No additional notes

Order the Correct Components
Pressure Roller Bearing

- **Pressure roller bearing**
  - The V-C3 bearing is blue.

Slide 496

No additional notes

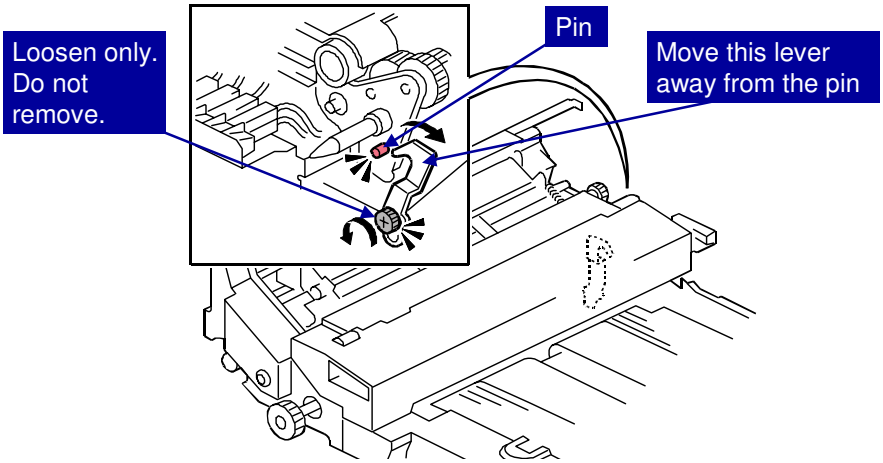
Order the Correct Components
Oil Supply Roller

- **Oil supply roller**
  - The numbers printed on the rollers are different.
    - » V-C2: The last two digits are "42" or "90".
    - » V-C3: The last two digits are "15".

Slide 497

No additional notes

Fusing Unit - 1

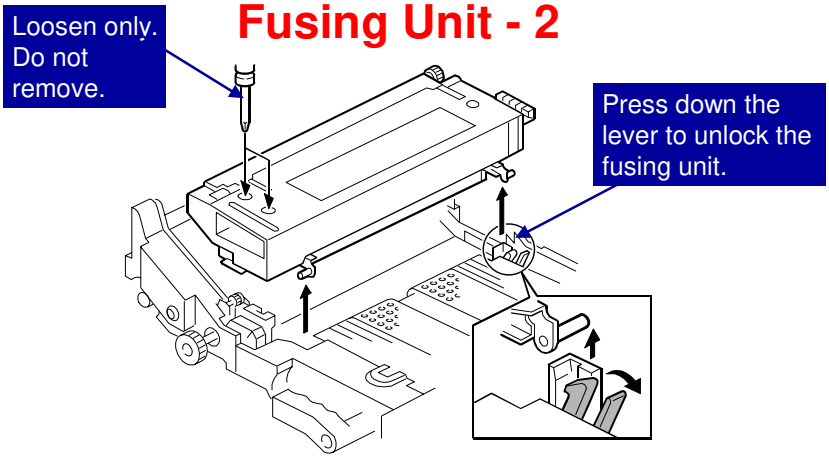


- **Before you remove the fusing unit, loosen the screw, then rotate the lever away from the pin, Then tighten the screw again.**
  - After you reinstall the fusing unit, return the lever to the original position.

Slide 498

V-C3 field service manual, Removal and Adjustment, Fusing Unit, Removing the Fusing Unit

Fusing Unit - 2



- **Press the lock/unlock levers at the front and rear to release the fusing unit.**
  - After you re-install the fusing unit, do not forget to lock the levers again.

Slide 499

V-C3 field service manual, Removal and Adjustment, Fusing Unit, Removing the Fusing Unit

- See the next slide for more about this lever.

If you forget to Move the Lock/Unlock Lever Back

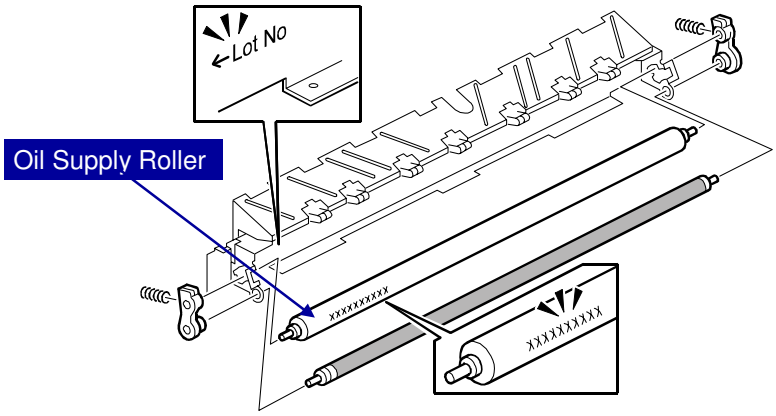
- **This could cause a problem if power is turned off accidentally during copying.**
  - If this occurs, the drawer unit can be pulled out, but the user may not be able to push it back in because the fusing unit is still pressed up by the cam.
  - To cure this problem, see the final part of the “Removing the Fusing Unit” procedure.

Slide 500

V-C3 field service manual, Removal and Adjustment, Fusing Unit, Removing the Fusing Unit

- The cam in the pressure roller lift mechanism must be reset. The procedure in the service manual shows you how to do this.

Oil Supply Roller



- The end with the serial number must be at the front of the cleaning unit.

Slide 501

No additional notes

After Replacing the Hot Roller

- **After replacement of the hot roller, the gap between the fusing belt strippers and the fusing belt may need to be adjusted.**
- **Make sure that the fusing unit is cool before you start this procedure. If the fusing unit is still warm when the adjustments are done, the gap adjustment may not be within specification.**
- **Normally this procedure is not required. Do this procedure only when:**
  - Paper has been frequently sticking to the fusing belt and jamming the fusing unit.
  - Streaking caused by fusing belt stripper pawls has been occurring frequently in solid image areas.

Slide 502

V-C3 field service manual, Removal and Adjustment, Fusing Unit, Fusing Unit Rollers/Fusing Belt, Adjusting the Gap Between Fusing Belt Strippers and Fusing Belt

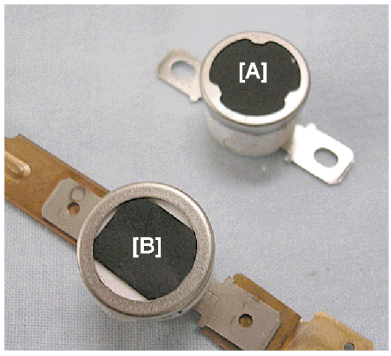
Lubrication after Replacement

- Lubricate all bearings after replacement of the hot roller, pressure roller, and/or heating roller.
- For details on the lubrication points, please refer to ‘Lubrication Points’ in the ‘Preventive Maintenance’ section of the V-C3 series field service manual.

Slide 503

No additional notes

Thermostats



- The old type of thermostat [A] has been replaced with a new type [B].
- Do not try reset a thermostat with a screw driver, or by smacking it against the table.
- Resetting a thermostat manually could cause a failure to detect overheating in the fusing unit, and this can cause a fire hazard.

Slide 504

No additional notes

Others

- The V-C1 series and V-C2/V-C3 series fusing belts are not interchangeable. The V-C2/V-C3 series belt is longer.

Slide 505

No additional notes

Replacement Procedures

- **Make sure that the fusing unit is cool before you start to do work on the machine.**

Slide 506

V-C3 field service manual, Removal and Adjustment, Fusing Unit

Fusing lamps

- The connectors and lamps have matching colours. Also, the front and rear terminals of the lamps have different shapes. Because of this, it is not possible to make mistakes when you install the lamps.

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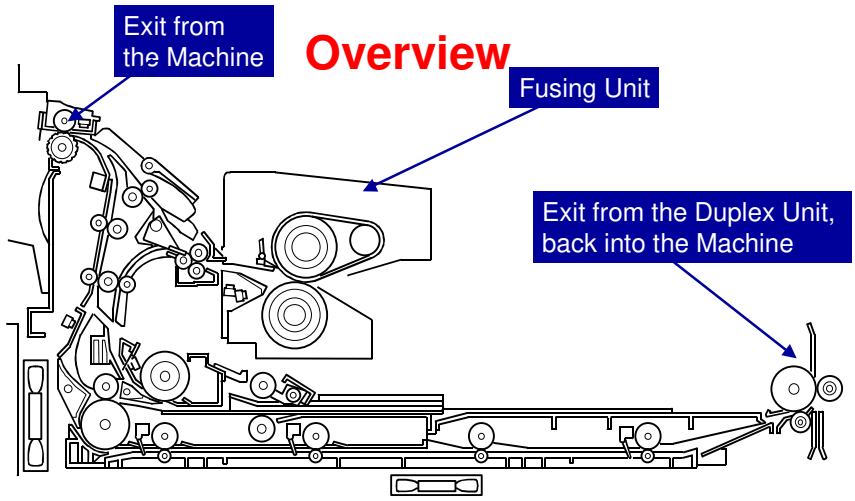
PAPER EXIT AND DUPLEX

Slide 507

No additional notes

Overview



- Face-up output: The page goes out of the fusing unit to the tray directly.
- Face-down output: The page goes to the inverter before being fed out to the tray.
- Duplexing: The page goes through the inverter to the duplex tray.

Slide 508

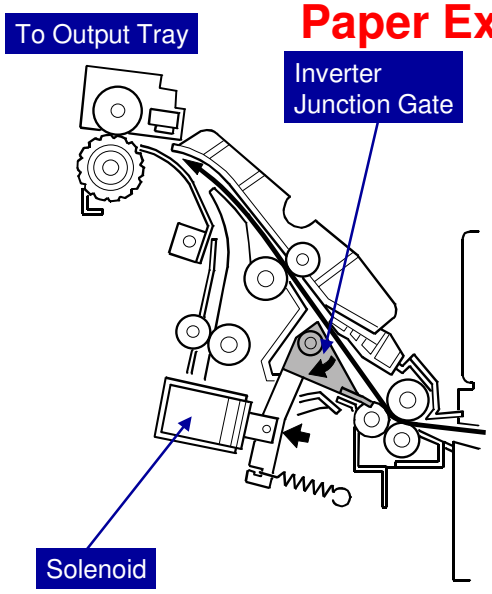
- The default is face-down output.
- The machine feeds each sheet through the inverter, to make it come out of the machine face-down.

Exit

Slide 509

No additional notes

Paper Exit - 1

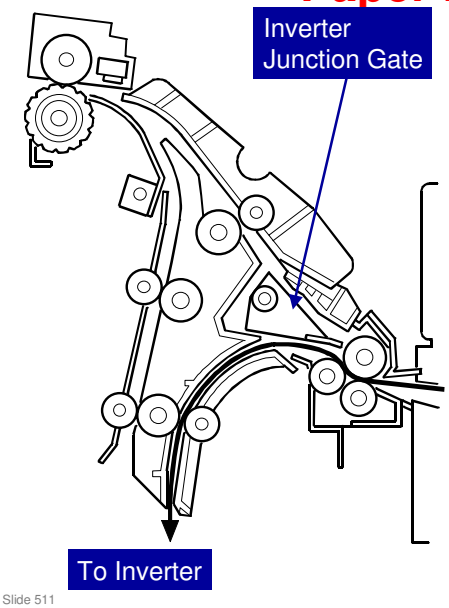


- **When the inverter is not used (face-up output, or when paper was fed from the bypass tray):**
  - Duplex junction gate solenoid on
  - Duplex junction gate closed
  - Paper goes up to the output tray

Slide 510

No additional notes

Paper Exit - 2

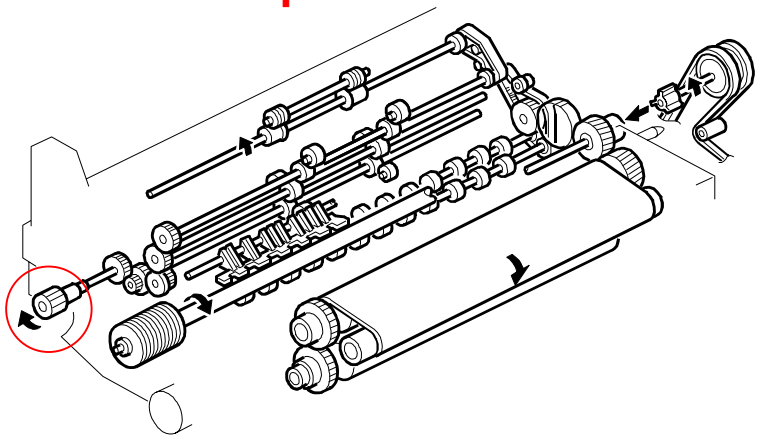


Slide 511

- **When the inverter is used (duplex mode, or face-down output):**
  - Inverter junction gate open
  - Inverter junction gate solenoid off
  - Paper goes down to the inverter

No additional notes

Paper Exit Drive

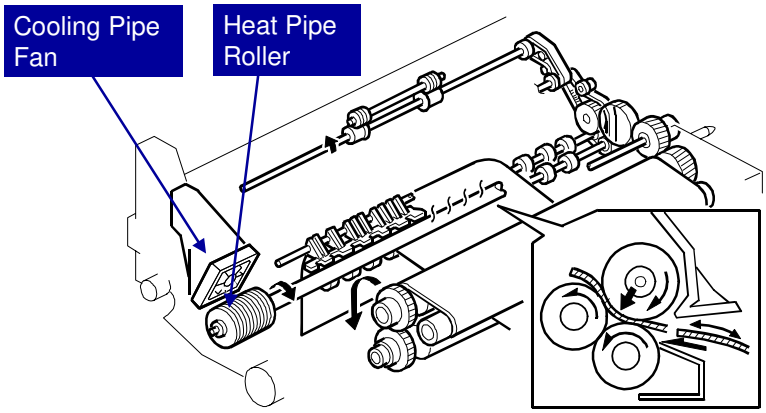


- The fusing/exit motor controls this mechanism.
- The knob (in the red circle) is to remove jams in the exit.

Slide 512

No additional notes

De-curling and Heat Removal



- **These three rollers remove curl in the paper that comes out of the machine.**
- **The heat pipe roller also removes heat from the paper.**
  - The fins at the front of the heat pipe roller radiate heat.
- **The cooling pipe fan cools the heat pipe roller.**

Slide 513

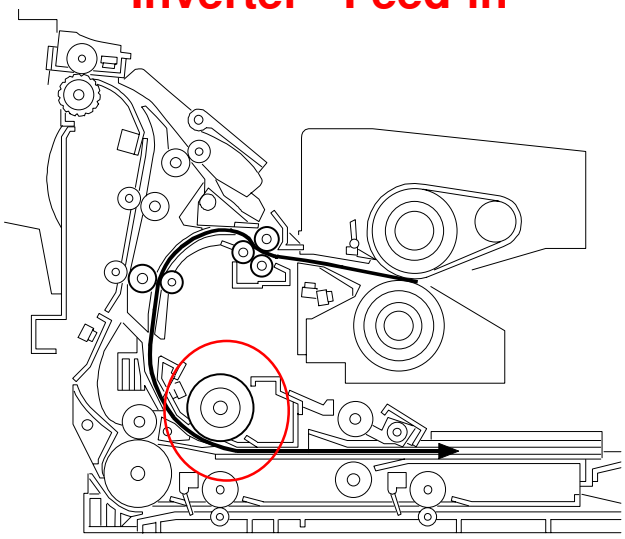
No additional notes

Inverter/Duplex Tray

Slide 514

No additional notes

Inverter - Feed-in

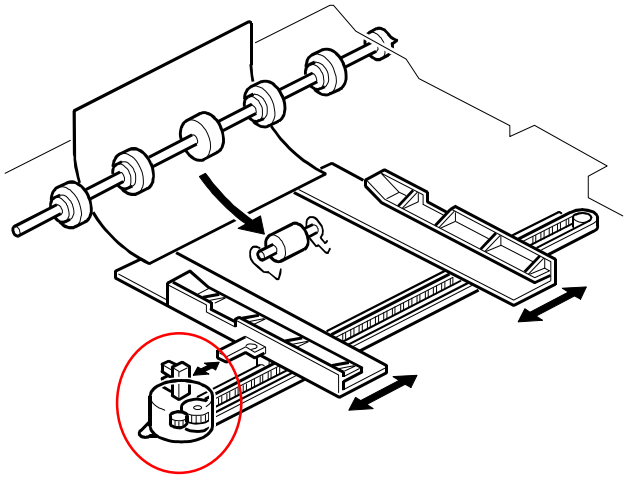


❑ **Inverter entrance roller: Feeds paper into the inverter**

Slide 515

- ❒ If the paper exit mechanism directed the paper down towards the inverter, the inverter entrance roller passes it to the jogger unit.
- ❒ The weight of the paper pushes down the junction gate. A spring lifts the gate again after the paper has gone through. There is no solenoid.

Inverter - Jogging

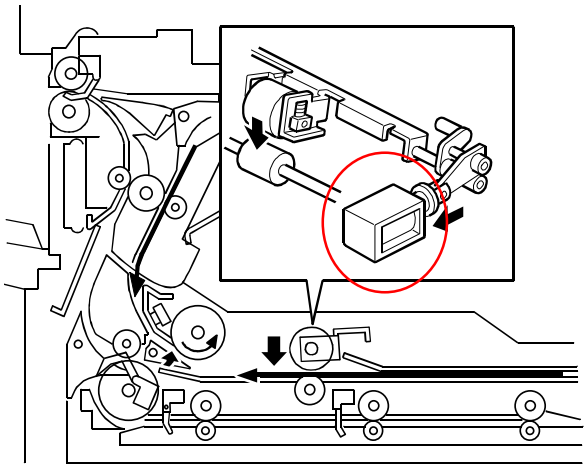


- Jogger motor: Moves the jogger fences
- Jogger home position sensor: Detects the jogger fence home position

Slide 516

- Jogging ensures that the paper is straight.
- The motor and sensor are in the red circle.

Inverter - Feed-out 1

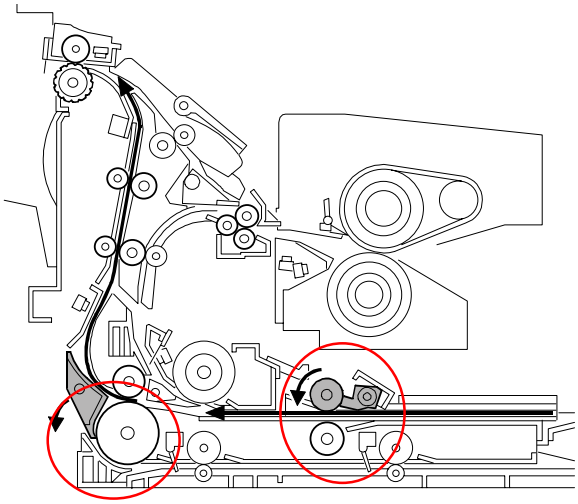


- Reverse roller solenoid: Lowers the reverse trigger roller

Slide 517

- The next two slides show how paper is fed out of the inverter unit.

Inverter - Feed-out 2

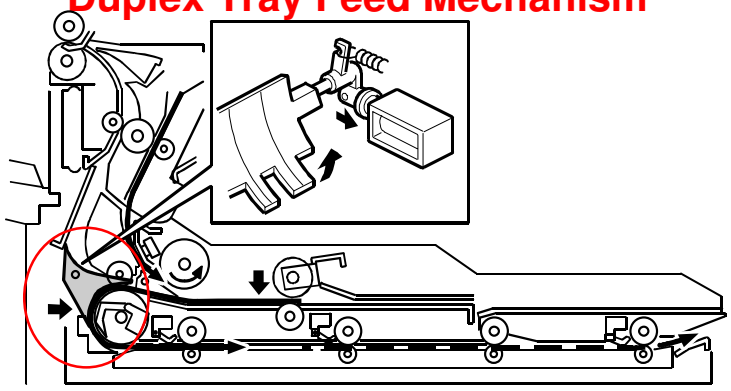


- Reverse roller: Feeds the paper back
- Inverter unit paper exit roller: Feeds the paper upwards

Slide 518

- In the red circle, it is not easy to see, but the inverter sensor is just past the inverter roller, so this sensor detects when the paper has just been caught by this roller. Then, the reverse roller stops and is lifted away from the paper.

Inverter – Feed-out 3
Duplex Tray Feed Mechanism

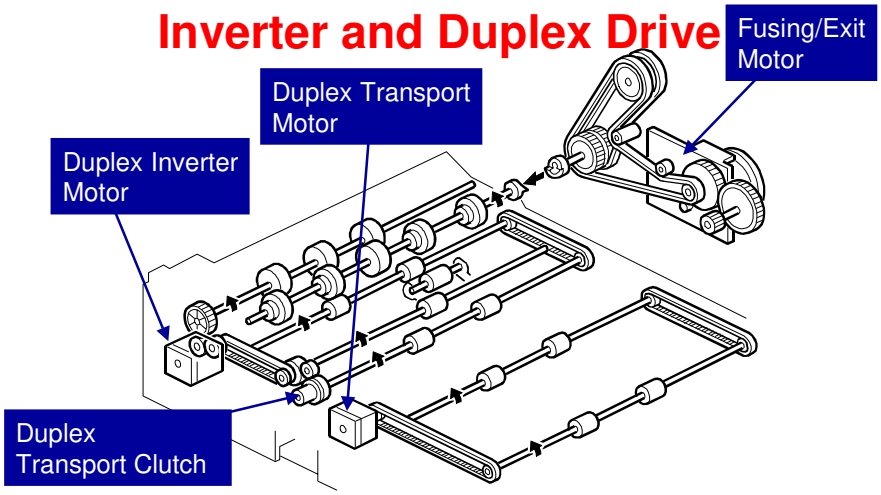


- If duplex mode was selected, the machine does not feed the paper out. The duplex inverter solenoid moves the junction gate, and sends the paper down to the duplex tray
- The duplex transport rollers feed the paper through the duplex tray, and back to the registration roller area.

Slide 519

- In duplex mode, the junction gate switches and the inverter feeds the paper down into the duplex unit instead of back up to the machine.

Inverter and Duplex Drive



- Fusing/exit motor: Drives the inverter
- Duplex inverter and transport motors: Drive the duplex transport rollers
- Duplex transport clutch: Stops the first two transport rollers when needed by paper feed timing

Slide 520

❒ Handout 5 - Duplex and Inverter Motors explains the functions of the three motors and the duplex transport clutch.

Interleaving

- For A4/LT LEF or shorter, three pages can be in the machine at the same time.
- For paper longer than A4/LT LEF, two pages can be in the machine at the same time.

Slide 521

No additional notes

Replacement Procedures

- Make sure that the fusing unit is cool before you start to do work on the machine.

Slide 522

No additional notes

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ENVIRONMENTAL CONSERVATION FEATURES

Slide 523

No additional notes

Environmental Conservation

Technology for Environmental Conservation

Energy Saving

Paper Saving

Slide 524

- This section explains the technology used in this machine for environmental conservation, and the default settings of related functions.

Technology for Environmental Conservation

◎: New or modified function
○: Has this function
Blank: Does not have this function

Environmental Technology/Feature	Description	New model V-C3	Previous model V-C2
1. QSU	- Reduction of warm-up time (Energy saving) - Reduction of CO2 emissions	◎	○
2. Hybrid QSU	- Reduction of warm-up time (Energy saving) - Reduction of CO2 emissions		
3. IH QSU	- Reduction of warm-up time (Energy saving) - Reduction of CO2 emissions		
4. Paper-saving features	Allows documentation to be managed digitally, cutting down on paper consumption. Improves machine productivity when printing out duplex (double-sided) images.	○	○
5. High-speed duplex copying	Improves machine productivity when printing out duplex (double-sided) images.	◎	○
6. Ozone reduction design	- Low ozone emissions	○	○
7. PxP (polymerized) toner	- Energy saving - Conservation of materials/resources (reduced toner consumption)	○	○
8. Noise reduction design	- Low noise	○	○
9. Minimization of harmful substances	- Minimization of harmful substances	○	○
10. Environmentally-friendly toner bottle	- Conservation of materials/resources	○	○
11. Toner recycling	- Conservation of materials/resources		
12. Recycle-friendly design	- Conservation of materials/resources	○	○

Slide 525

❒ This slide explains what technologies are used for conserving the environment in this product.

Brief Descriptions of the Technologies

- **1. QSU (Quick Start-up)**
  - This technology reduces both the amount of energy consumed while in Standby mode (the Ready condition) is reduced, as well as the time it takes for the machine to warm up to the Read condition.
  - This is made possible through the utilization of dual fusing lamp heating, low fusing point toner, a pressure roller with a "sponge" surface layer, and a thin surface layer hot roller.
- **2. Hybrid QSU**
  - This technology adds a capacitor to conventional QSU Technology, which allows the benefits of reduced energy consumption and reduced warm-up time described above to be extended to high-speed machines.

Slide 526

No additional notes

Brief Descriptions of the Technologies

- **3. IH QSU**
  - This technology incorporates IH (Inductance Heating) technology into conventional QSU technology, which allows the benefits of reduced energy consumption and reduced warm-up time to be extended to color machines.
- **4. Paper-saving features**
  - 1) The duplex (double-sided) and Combine features reduce paper consumption.
    2) The Document Server and other electronic document management features reduce paper consumption by offering an electronic method for storing and managing important documents.

Slide 527

No additional notes

Brief Descriptions of the Technologies

- **5. High-speed duplex copying**
  - 1) Enables high-speed duplex printing through the utilization of the Duplex Interleaf and high-speed Inverter Transport features.
  - 2) Enables quick printing of duplex jobs through the use of Duplex Scanning.
- **6. Ozone reduction design**
  - Greatly reduces the machine's ozone emissions to near-zero levels by utilizing:
    1) A charge roller/belt instead of a corona wire
    2) An image transfer roller/belt instead of a corona wire-based transfer system

Slide 528

No additional notes

Brief Descriptions of the Technologies

7. PxP (polymerized) toner

- "PxP toner" is a fine-particle, polyester resin based toner, manufactured using a Ricoh-original polymerization method instead of the conventional pulverization method.
- This allows the toner to fuse at a lower temperature, which reduces the impact on the environment and contributes to achieving even higher image quality than before.
- PxP toner also has other benefits, including a reduction in the amount of toner needed to develop the image, as well as an approximate 35% reduction in CO_2 emissions during the toner manufacturing process.

Slide 529

No additional notes

Brief Descriptions of the Technologies

- **8. Noise reduction design**
  - 1) The machine and its components are designed to minimize the overall noise generated by the machine. As a result, all noise levels conform to the local laws and regulations as well as user requirements in each market in which the products are sold.
  - 2) Reduces the noise generated by the polygon mirror motor.
- **9. Minimization of harmful substances**
  - 1) Products sold in the EU conform to the RoHS Directive.
  - 2) Products sold in China conform to China's version of the RoHS Directive.
  - 3) In addition, Ricoh imposes strict internal standards for limiting the presence of harmful substances.

Slide 530

No additional notes

Brief Descriptions of the Technologies

- **10. Environmentally-friendly toner bottle**
  - A changeover from PS/PP/HDP to PET plastics allows approximately 40 percent by weight of the toner bottle to be recycled, and also reduces CO_2 emissions that occur during the toner bottle manufacturing process.
- **11. Toner recycling**
  - Enables effective use of resources by recycling (reusing) the toner left over on the drum surface after image transfer.
- **12. Recycle-friendly design**
  - To maximize the recycling ratio of machine and component materials, as well as the ease of performing the recycling in the field, machine sections and components are designed so that the recyclable parts can be separated out easily.
  - In addition, components are designed so that they can be reused for as long as possible after the machine has reached its operational lifetime.

Slide 531

No additional notes

Quick Start-up

- **QSU reduces the operating temperature, because of these improvements in fusing unit technology**
  - The thickness of the metal core in the hot roller has been reduced from 1.5 mm to 1.0 mm. This allows the core to reach the ready temperature much faster.
- **This also means that the warm-up time is reduced.**
  - Warm-up time (V-C3a:90sec=>70sec, V-C3b:75sec=>60sec)

Slide 532

- Through major reductions in warm-up time and recovery time from energy saver modes (Low power, Off/Sleep), QSU (Quick Start Up) Technology has eliminated the traditional trade-off between energy saving and convenience of speed.

High-speed duplex copying

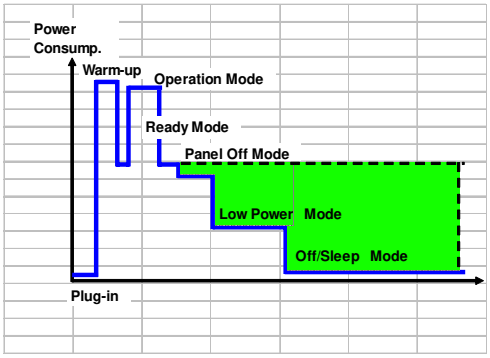
- **New Duplex Scan feature has been adapted.**
  - A CCD (inside the scanner unit, below the ADF) scans the front side, and a CIS (inside the ADF) scans the rear side.
- **This also means that the duplex scan speed is improved.**
  - Duplex: Color 90 ppm, B/W 130 ppm (V-C2 was Color 53ppm, B/W 60ppm)

Slide 533

- Through major reductions in warm-up time and recovery time from energy saver modes (Low power, Off/Sleep), QSU (Quick Start Up) Technology has eliminated the traditional trade-off between energy saving and convenience of speed.

2. Energy Saving

2.1 Overview – 1

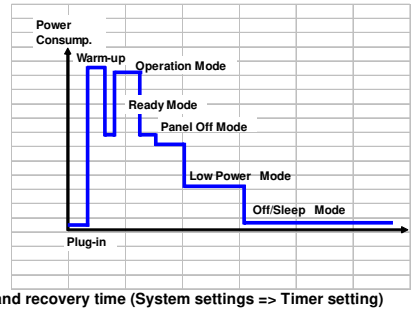


Energy Saver Modes	Description
Energy Saver Mode (Panel Off)	The machine is still in the Copy Ready condition. Level 1: Panel off only Level 2: Panel off and lower the fusing temperature.
Low Power Mode	The fusing temperature is lowered to the prescribed temperature (below ready temperature).
Sleep Mode	When a printer/scanner or fax unit is installed: No power is supplied to the printing engine, and almost none to the controller.

Slide 534

- When the machine is not being used, the machine enters energy saver mode to reduce the power consumption by turning off the LCD of the operation panel and lowering the fusing temperature.
- The area shaded green in this diagram represents the amount of energy that is saved when the timers are at the default settings. If the timers are changed, then the energy saved will be different. For example, if the timers are all set to 240 minutes, the green area will disappear, and no energy is saved before 240 minutes expires.

2. Energy Saving
2.2 Overview – 2 (System Settings)



1) Timer settings and recovery time (System settings => Timer setting)

Mode	Timer	Defult	Setting range	Recovery time
Panel off Mode	Panel Off Timer	60 sec.	10 sec to 240 min.	3 sec.
Low Power Mode	Energy Saver Timer	15 min.	1 to 240 min.	45 sec.
Off/Sleep Mode	Auto Off Timer	30 min.	1 to 240 min.	a:90, b:75 sec

Specified values for timers	Panel Off	Low Power	Auto Off
Panel Off > Energy Saver > Auto Off	Can start	Can start	Can start
Panel Off = Energy Saver = Auto Off	Cannot start	Cannot start	Can start
Panel Off < Energy Saver < Auto Off	Cannot start	Cannot start	Can start

2) Energy saver level setting (System setting => Administrator Tools => Energy saver level)

Level 1	Panel off only
Level 2	Panel off and lower the fusing temperature to recovery time within 10sec.

Slide 535

- ・Energy Saver Level
- The user can set these timers with User Tools
  MFP/ Priport: User Tools > System settings > Timer Setting
  Printer : User Tools > System settings > Energy Saver Timer
- Normally, Panel Off timer < Energy Saver timer < Auto Off timer.
- But, for example, if Auto Off timer < or = Panel Off timer and Energy Saver timer, the machine goes immediately to Off mode when the Auto Off timer expires. It skips the Panel Off and Energy Saver modes.
- Example
  - Panel off: 1 minute
  - Low power: 15 minutes
  - Auto Off: 1 minute
  - The machine goes to Off mode after 1 minute. Panel Off and Low Power modes are not used.
- We recommend that the default settings should be kept.
  - If the customer requests that these settings should be changed, please explain that their energy costs could increase, and that they should consider the effects on the environment of extra energy use.
  - If it is necessary to change the settings, please try to make sure that the Auto Off timer is not too long. Try with a shorter setting first, such as 30 minutes, then go to a longer one (such as 60 minutes) if the customer is not satisfied.
  - If the timers are all set to the maximum value, the machine will not begin saving energy until 240 minutes has expired after the last job. This means that after the customer has finished using the machine for the day, energy will be consumed that could otherwise be saved.
  - If you change the settings, the energy consumed can be measured using SP8941, as explained later in this presentation.

2. Energy Saving
2.2 Energy Saver Mode: Condition of LEDs

❑ Condition of LEDs on the operation panel

Mode	Operation Switch LED	Energy Saver LED	Main Power LED
Panel off Mode	On	On	On
Low Power Mode	Off	On	On
Off/Sleep Mode	Off	Off	On

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No additional notes

2. Energy Saving
2.2 Energy Saver Mode: Panel Off Mode – 1

- **The machine enters panel off mode when one of the following is done.**
  - The panel off timer runs out after the last job.
    - » The panel off timer is controlled by User Tools: Timer settings.
  - The Energy Saver key is held down for a second.
- **The machine is still in the stand-by (ready) condition, but turns off the LCD of the operation panel.**
- **The machine recovers to the ready condition if one of the following occurs:**
  - The Energy Saver key is pressed
  - An original is placed in the ADF
  - The ADF is lifted
  - The user touches the operation panel
  - The front door is opened or closed

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- In some MFP models, when it takes 1 minute to return from Off/Sleep mode, there may be no Panel Off Mode
- Also, there is no Panel Off Mode in printers.

2. Energy Saving
2.2 Energy Saver Mode: Panel Off Mode – 2

❑ **Important**

There are two levels of Panel Off Mode:

- **Level 1:**
  Panel off only (No recovery time)
- **Level 2:**
  Panel off and lower the fusing temperature.
  Recovery time should be within 10 seconds

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❒ Level 2 was created so that it is possible for the machine to recover within 10 seconds.

2. Energy Saving
2.2 Energy Saver Mode: Low Power Mode

- **The machine enters low power mode when the energy saver timer runs out after the last job.**
- **When the machine enters low power mode, the fusing temperature is lowered to the prescribed temperature (below the machine ready temperature).**
- **The machine recovers to the ready condition if one of the following occurs:**
  - The Energy Saver key is pressed
  - An original is placed in the ADF
  - The ADF is lifted
  - The user touches the operation panel
  - The front door is opened or closed
- **The recovery time depends on the model and the region.**
  - Model V-C3a: 45 seconds
  - Model V-C3b: 45 seconds

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No additional notes

2. Energy Saving

2.2 Energy Saver Mode: Sleep Mode – 1

- **Sleep mode is used instead of auto off mode when a printer/scanner or fax unit is installed.**
- **The machine enters sleep mode when one of the following is done.**
  - The auto off timer runs out after the last job.
  - The operation switch is pressed to turn the power off.
- **When the machine enters sleep mode, no power is supplied to the printing engine, and almost none to the controller.**
- **Recovery time**
  - Model V-C3a: Less than 90 seconds
  - Model V-C3b: Less than 75 seconds

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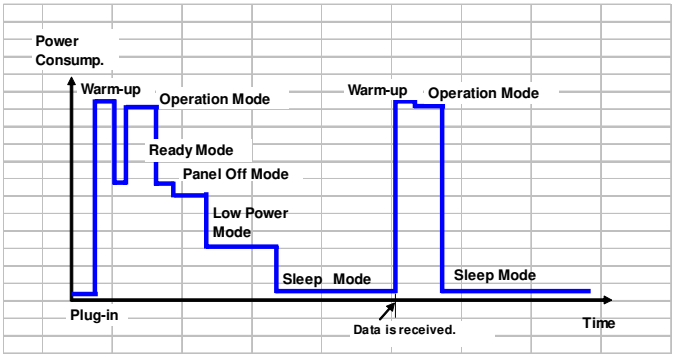
No additional notes

2. Energy Saving
2.2 Energy Saver Mode: Sleep Mode – 2

- **The machine recovers to the ready condition:**
  - **If data is received**
    - » After warm-up, the job starts, but the operation panel stays dark.
    - » Then, after the job is completed, the machine returns to sleep mode immediately. Panel Off and Low Power modes are skipped.



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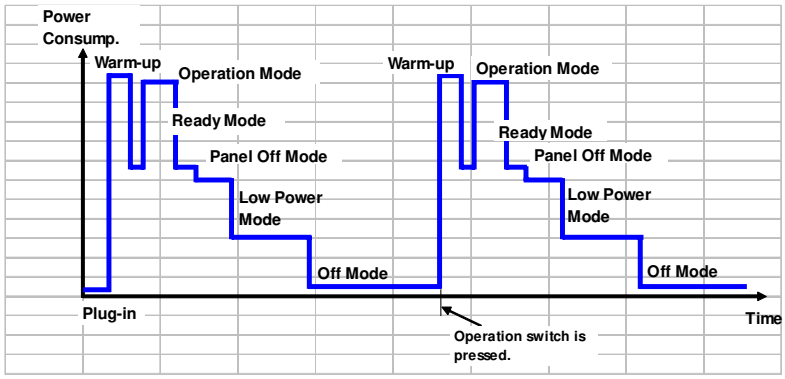
No additional notes

2. Energy Saving
2.2 Energy Saver Mode: Sleep Mode – 3

- **The machine recovers to the ready condition:**
  - **If the operation switch is pressed**
    - » The operation panel lights. When warm-up is finished, the machine goes to the ready condition.
    - » Then, after the job is completed, the machine returns to sleep mode when the auto off timer runs out or the operation switch is pressed.



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❒ This timing chart shows what happens if the data is received while the machine in sleep mode.

2. Energy Saving

2.3 Energy Save Effectiveness – 1

- **With the data from SP 8941:Machine Status, and the power consumption values from the specifications, we can estimate the amount of energy that is used by the machine.**
  - 8941-001: Operating mode
  - 8941-002: Standby mode
  - 8941-003: Panel off mode
  - 8941-004: Low power mode
  - 8941-005: Off/sleep mode
- **This should only be used as a reference value, because the power consumption specifications are measured in a controlled environment with a constant power supply.**
- **To get an exact measurement at the customers site, a watt meter must be used to measure the actual energy consumed.**

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No additional notes

2. Energy Saving

2.3 Energy Save Effectiveness – 2

(1) At the start of the measurement period, read the values of SP 8941:001-005 (Machine Status).

(2) At the end of the measurement period,read the values of SP 8941:001-005 (Machine Status).

(3) Find the amount of time spent in each mode.
(Subtract the earlier measurement from the later measurement and convert the result to hour.)

(4) Power consumption figures for each model are acquired from “Publication System of MSDS_&_PEI (PRODUCT ENVIRONMENT INFORMATION)” database.
Example:

Mode/condition	Power consumption:
Operating mode	1081.8W
Ready mode / Energy Save	214W
Low power mode	146W
Off/Sleep mode	7W

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No additional notes

2. Energy Saving
2.3 Energy Save Effectiveness – 3

(5) Multiply this by the power consumption spec for each mode and convert the result to kWh (kilowatt hours)

(6) This is a simulated value for power consumed.

Example calculations:

Mode /condition	SP8941: Machine Status	Time at Start (min.) ①	Time at End (min) ②	Running time (hour) (②−①)/60=③	Power Consumption Spec.(W) ④	Power consumption .(KWH) (③x④)/1000=⑤
Operating	001: Operating Time	21089	21386	5.0	1081.8	5.35
Stand by (Ready)	002: Standby Time	306163	308046	31.4	214.0	6.72
Energy save	003 Energy Save Time	71386	75111	62.1	214.0	13.29
Low power	004: Low power Time	154084	156340	37.6	146.0	5.49
Off/Sleep	005: Off mode Time	508776	520377	193.4	7.0	1.35
Total⑥						32.20

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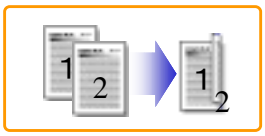
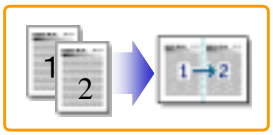
No additional notes

3. Paper Saving
3.1 Measuring the Paper Consumed – 1

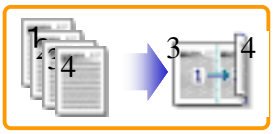
1. Duplex: Reduce paper volume in half!



2. Combine: Reduce paper volume in half!



3. Duplex + Combine: Using both features together can further reduce paper volume by 3/4!



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No additional notes

3. Paper Saving
3.1 Measuring the Paper Consumed – 2

- **To check the paper consumption, look at the total counter and the duplex counter.**
  - Total counter : SP 8581 001
  - Single-sided with duplex mode : SP 8421 001
  - Double-sided with duplex mode : SP 8421 002
  - Book with with duplex mode : SP 8421 003
  - Single-sided with combine mode : SP 8421 004
  - Duplex with combine mode : SP 8421 005
- **The total counter counts all pages printed.**
- **The duplex and combine counter counts all pages printed with duplex and combine mode.**

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No additional notes

3. Paper Saving

3.1 Measuring the Paper Consumed – 3

- **How to calculate the paper reduction ratio, when compared with Single-sided copying, with no 2-in-1 combine mode**
- **Paper reduction ratio (%) = Number of sheets reduced: A/Number of printed original images: B x 100**
  - Number of sheets reduced: A
    =Output pages in duplex mode/2＋ Number of pages in Single-sided with combine mode + Number of pages in Duplex with combine mode x 3/2
    A = (②+③+④)/2 + ⑤+⑥ x 3/2
  - Number of printed original images: B
    =Total counter＋ Number of pages in Single-sided with combine mode ＋ Number of pages in Duplex with combine mode
    B = ①+⑤+⑥

① **Total counter**	**: SP 8581 001 (pages)**
② **Single-sided with duplex mode**	**: SP 8421 001 (pages)**
③ **Double-sided with duplex mode**	**: SP 8421 002 (pages)**
④ **Book with with duplex mode**	**: SP 8421 003 (pages)**
⑤ **Single-sided with combine mode**	**: SP 8421 004 (pages)**
⑥ **Duplex with combine mode**	**: SP 8421 005 (pages)**

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In the above formula:

- Sheet: A sheet of paper
- Page: A side of a sheet of paper. In duplex mode, one sheet is two pages
  - Output page: One side of a sheet of output paper
- Original Image: An image of one original page (or, an image of one side of a two-sided original)
  - For one sheet of output paper in two-in-one copying, four original pages are copied onto two output pages.