

APOLLON-P1 TRAINING

PRODUCT OUTLINE

Slide 1

- ☐ The model will be introduced to the class.
- ☐ The optional peripherals will be introduced to the class.
- ☐ The product concept, sales points, and targets will be presented.

INTRODUCTION

Slide 2

No additional notes

Appearance



Slide 3

- ❑ Here is a view of the machine with two optional peripherals installed.
- ❑ There are other options, as we will see later.

How many models?

- **One model:**

- ♦ AP-P1d (G133): 40 cpm (black and white, color)

Slide 4

No additional notes

SALES POINTS

Slide 5

No additional notes

Main Sales Points - 1

□ High image quality

- ◆ Multi-bit gradation processing (600 X 600, 1-bit, 2-bit, or 4-bit)
- ◆ Smaller, more uniform toner particles
- ◆ Precise sRGB color matching
- ◆ Ricoh color profile for PANTONE

□ Heavy stock capability

- ◆ Thick paper up to 216 g/m² from paper trays, up to 253 g/m² from the bypass
- ◆ Thick paper up to 163 g/m² in duplex mode.

Slide 6

No additional notes

Main Sales Points - 2

□ High productivity

- ◆ High speed color output (40 ppm color/monochrome)
- ◆ Quick 1st print: 8 sec. for monochrome, 9 sec. for color
- ◆ Short warm up time: less than 60 sec.
- ◆ High performance controller with Intel Celeron 866MHz CPU
- ◆ Shorter down time: Short calibration
- ◆ Large Paper Capacity: Max 3,200
- ◆ Optional finishers, including booklet finisher
- ◆ Tandem LCT: LCT can be refilled during feeding from the LCT itself.

Slide 7

- Faster warm-up: The IH coil heating system makes it quick for thick paper as well as standard plain paper.

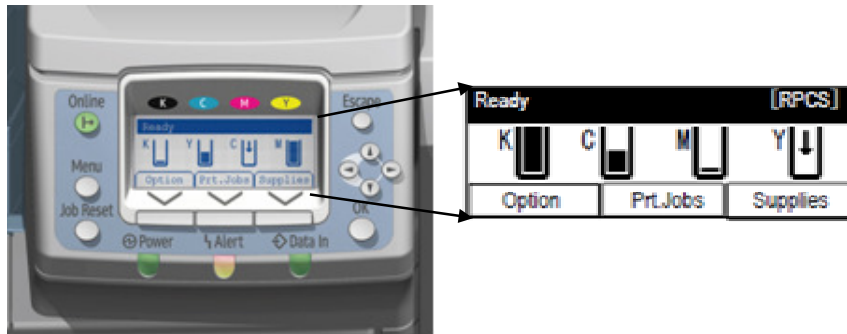
Main Sales Points - 3

- ❑ **High reliability**
 - ◆ Fewer paper jams (shorter paper path)
 - ◆ Longer yield for the fusing unit
 - ◆ More reliable supply yield
- ❑ **Usability and Accessibility**
 - ◆ Simple paper path makes it easier to recover jams
 - ◆ New operation panel shows the status of consumables at a glance.
 - ◆ 4-line LCD
 - ◆ Lower height than the model J-P series
 - ◆ Easy to operate the paper tray
 - ◆ Easy replacement of consumables
- ❑ **Latest controller and security technology**

Slide 8

- ❑ There are a lot of connectivity and security features, which we will not explain in this class. We will limit ourselves to the engine in this course.

New Operation Panel



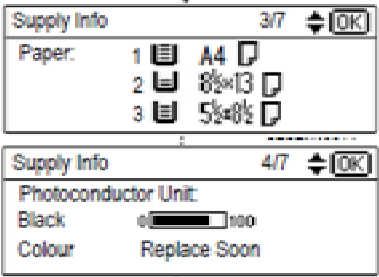
❑ Three buttons

- ◆ Option: Form feed, Error log
- ◆ Prt Jobs: Job lists for sample print jobs, locked print jobs, etc
- ◆ Supplies: Gives information the remaining quantity or remaining time for each consumable supply.

Slide 9

Display for Consumable Supplies

- These are examples of the display if you press the 'Supplies' button on the operation panel.



Slide 10

Easy Jam Removal



- ❑ Simple paper path
- ❑ All jams can be removed from the right side of the machine.
 - ◆ If the finisher is installed, jams can occur in the finisher.

Slide 11

- ❑ The photo on the left shows that the path through the machine is simple.

Paper Tray Handle



- ❑ The handle can be pulled easily with an 'overhand' or 'underhand' grip.

Slide 12

No additional notes

Replacing Toner is Easy



- ❑ Toner cartridges can be changed with one hand, and with one movement.

Slide 13

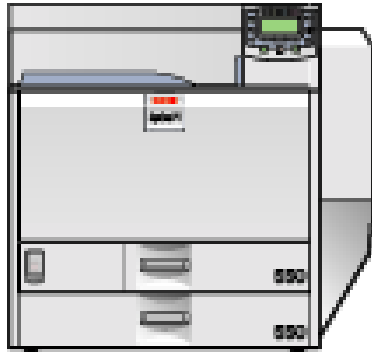
No additional notes

EQUIPMENT

Slide 14

No additional notes

Mainframe, with No Options



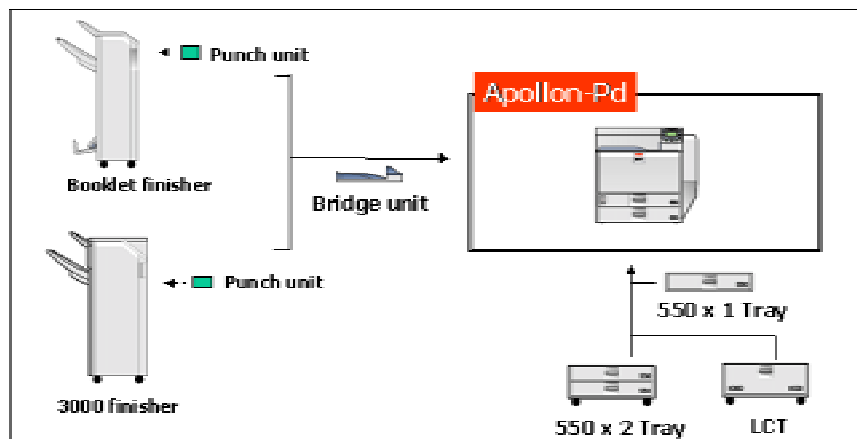
☐ **The machine has this equipment built in.**

- ◆ Duplex
- ◆ Bypass tray
- ◆ 2x500-sheet trays
- ◆ 500-sheet output tray
- ◆ USB 2.0 and Ethernet
- ◆ 256MB Memory, upgradable to 512MB
- ◆ 40GB HDD
- ◆ RPCS, PCL5c, PCL6, PostScript 3, PDF

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- ☐ This slide shows what you get with the base machine.

Paper Handling Options



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- ❑ You can install the following:
 - One of the two finishers (a finisher requires the bridge unit)
The finishers also require the LCT or paper tray unit.
 - The two-tray paper feed unit (also called a 'paper bank') or the LCT
 - There is no optional one-bin tray

Paper Handling Options

- ☐ **To install a finisher, the bridge unit must be installed.**
- ☐ **There are two finishers.**
 - ◆ The punch units for each finisher are different. Be careful to install the correct one.
- ☐ **If the 3000-sheet or booklet finisher is installed, you must also install the LCT or paper feed unit.**
 - ◆ If not, the paper exit from the copier will not be at the correct height to go into the finisher.
- ☐ **There is no optional one-bin tray.**

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- ☐ There is no optional jogger unit for the finishers.

Printer/Scanner Options (1)

- ☐ **USB 2.0 and Ethernet are built in.**
- ☐ **PostScript 3 is built in.**
- ☐ **NRS (Cumin) is built in (embedded in the controller).**
- ☐ **Options: One of the following can be installed**
 - ♦ **Wireless LAN (IEEE 802.11b): Same as G-P2**
 - ♦ **IEEE 1284: Same as G-P1**
 - ♦ **Bluetooth: Same as G-P2**
 - ♦ **Gigabit Ethernet: Same as G-P2**
 - » The gigabit Ethernet board has a USB port, but it is not used in this machine. Use the standard USB 2.0 port built into the machine.
- ☐ **There is no IEEE1394 option.**

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No additional notes

Printer/Scanner Options (2)

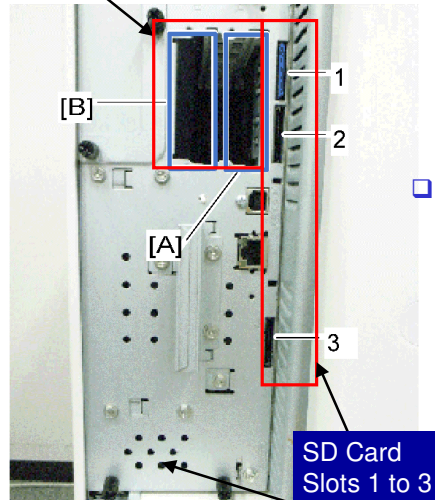
- ☐ **USB Host: Same as G-P2**
 - ◆ Required to attach PictBridge
- ☐ **PictBridge: New**

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No additional notes

Printer/Scanner Options

Board
Slots A and B



□ Board Slots

- ♦ Slot A: USB Host interface
- ♦ Slot B: IEEE1284, IEEE802.11, Bluetooth, or Gigabit Ethernet

□ SD Card Slots

- ♦ Slot 1: System card
- ♦ Slot 2: Applications
 - » Data Overwrite Security Unit, PictBridge
- ♦ Slot 3: Service (for example, updating the firmware).

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No additional notes

Security Options

- **HDD Data Overwrite Security Unit: Type G, same as MT-P2**
 - ◆ Install the correct type, or you will have to replace the NVRAM on the controller board.

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No additional notes

Other Options

- ❑ Java VM Card: Same as G-P2

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No additional notes

TARGETS

Slide 23

No additional notes

Reliability Targets

- ☐ **Unit life (2 prints per job): 3000K or 5 years**
- ☐ **Average Print Volume per month:8K**
- ☐ **Max Print Volume per month: 50K (Target Color Ratio: 70%)**

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No additional notes

Yield Targets - 1

□ Toner

- ♦ Three types of toner cartridge (high yield, low yield, starter)
- ♦ Yield (prints per cartridge)
 - » High yield cartridge: Black 20K, Color 15K
 - » Low yield cartridge: Black 10K, Color 8K
 - » Starter cartridge: Black 10K, Color 8K

□ Staples

- ♦ 5,000 staples per cartridge
- ♦ For the booklet finisher, you order staples, not a new cartridge

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- The toner bottles are not compatible with other products.

Yield Targets - 2

- ☐ **PCU: 40K prints**
- ☐ **Fusing Unit: 120K prints**
- ☐ **Used Toner Bottle: 40K prints**
- ☐ **Transfer unit: 160K prints**

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- ☐ The consumables are not compatible with other products.

Replacement for PCU Components

- ☐ You must replace the PCU as a complete unit.
- ☐ You cannot replace the individual components (drum unit, development unit, developer).

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- ☐ This is different from the Apollon-C1.

APOLLON-P1 TRAINING

SPECIFICATIONS

Slide 28

- ☐ Go through the machine's specifications, using the slides. Emphasize the points listed below.

General Specifications 1

- ☐ Resolution: 600 dpi
- ☐ Gradation: 4 bits/pixel, 2 bits/pixel, 1 bits/pixel

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- ☐ The next few slides show the basic engine specifications.
- ☐ For more detailed specifications, see the service manual.

General Specifications 2

□ Print Paper Size:

- ◆ Tray 1: A4/8.5" x 11" (LEF)
- ◆ Tray 2: Min A5 (LEF)/8.5" x 11", Max A3/11" x 17"
- ◆ By-pass: Min 90 x 148 mm, Max 305 x 600 mm/12" x 23.6"
- ◆ Optional Tray: Min A5 (LEF)/8.5" x 11", Max A3/11" x 17"
- ◆ LCT: A4/8.5" x 11" (LEF)

□ Printing Paper Weight:

- ◆ Standard tray: 60 to 216 g/m² (16 to 57 lb.)
- ◆ Optional paper tray: 60 to 216 g/m² (16 to 57 lb.)
- ◆ By-pass tray: 52 to 253 g/m² (14 to 67 lb.)
- ◆ Duplex unit: 60 to 169 g/m² (16 to 45 lb.)

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Print Paper Size

- For details, refer to "Supported Paper Sizes" in the service manual.

General Specifications 3

- ❑ **Print Paper Capacity (80 g/m², 20 lb):**
 - ◆ Standard tray: 500 sheets x 2
 - ◆ By-pass tray: 100 sheets
 - ◆ Optional paper feed tray: 500 sheets x 1, 2, or 3
 - ◆ LCT: 2000 sheets
- ❑ **Output Paper Capacity:**
 - ◆ Standard exit tray: 500 sheets minimum (face down)
 - ◆ 1000-sheet booklet finisher: 250 + 1000 sheets (80 g/m²)
 - ◆ 3000-sheet finisher: 250 + 3000 sheets (80 g/m²)

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- ❑ There are two optional paper feed units: One-tray and two-tray. You can also install one of each, to have three optional trays.

General Specifications 4

□ Print speed (color/black & white)

- ◆ Normal (ADF 1 to 1, LT/ A4 LEF): 40 ppm
- ◆ Thick 1 (169 g/m2 or less): 25 cpm (color/black & white)
- ◆ Thick 2 (220 g/m2 or less): 17.5 cpm (color/black & white)
- ◆ Thick 3 (253 g/m2 or less): 15 cpm (color/black & white)
- ◆ Thick 4, 5, 6: These settings are designed for special types of paper that are found in the Japanese market.

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General Specifications 5

- ❑ **First print (normal mode):**
 - ◆ Color: 9 seconds or less (A4/LT LEF)
 - ◆ Black & white: 8 seconds or less (A4/LT LEF)
- ❑ **Warm-up time:**
 - ◆ 60 seconds or less (23 ° C, 50%)

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General Specifications 6

□ Memory

- ◆ RAM: 256 MB
 - » Optional additional 256 MB, for a total of 512 MB
- ◆ Hard disk: 40 GB

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About 'Thin Paper'

- ❑ This machine does not support thin paper.
- ❑ 'Thin paper' is an additional paper weight setting that the user can select at the operation panel if the 'plain paper' setting causes problems.
 - ◆ For example, if a certain type of paper is being curled because the fusing temperature is too high, then you can ask the customer to use the 'thin paper' setting.
 - ◆ Then you can use SP mode to reduce the fusing temperatures that are used for the 'thin paper' setting.
 - ◆ You can also change the transfer current settings, if the transfer of toner is insufficient.

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- ❑ This is the same situation as for the Athena-C1 series. But the fusing unit is different, so the types of problems that occur will be different from the Athena-C1.
- ❑ Copy quality is not guaranteed for thin paper, and wraparound jams can occur in the fusing unit.

APOLLON-P1 TRAINING

INSTALLATION

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- ☐ In this section, get the trainees to install the machine and all the options.
- ☐ Normally, the customer installs the machine, but some customers may need assistance, so the class members should know how to install the machine.
- ☐ Install at least one machine with all options as a complete system.
- ☐ Make sure that the class follows all notes and cautions in the procedures.

OVERVIEW

Slide 37

No additional notes

Who is Responsible for Installation?

- ☐ **The customer installs the printer, the LCT, the paper feed units, and the controller options.**
 - ♦ The LCTs and paper feed units are heavy, so some users may require assistance.
- ☐ **The technician installs the finishers and the bridge unit.**

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No additional notes

What do I do first?

- ☐ First install the paper tray unit or LCT.
- ☐ Then install the copier.
- ☐ Then install the controller options.
- ☐ Then install the finisher.
 - ◆ To install a finisher, you must install:
 - » Bridge unit
 - » Either the LCT or two-tray paper feed unit.

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G133 Service Manual, Installation, Copier Installation,
Installation Flow Chart

PAPER TRAY UNIT, LCT

Slide 40

No additional notes

Possible Combinations

- ❑ **You can install one of these possible combinations of paper trays.**
 - ♦ Machine + one-tray paper feed unit (total 3 trays)
 - ♦ Machine + two-tray paper feed unit (total 4 trays)
 - ♦ Machine + large capacity tray (total 3 trays)
 - ♦ Machine + one-tray paper feed unit + two-tray paper feed unit (total 5 trays)
 - » The one-tray unit must be on top of the two-tray unit.
You cannot install the two-tray unit on top of the one-tray unit.
- ❑ **The trays are numbered 1 to 5, from the top (main body, upper tray) to the bottom.**
 - ♦ SP adjustments use this tray numbering.

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- ❑ The machine has two trays.
- ❑ The maximum possible number of trays is 5.

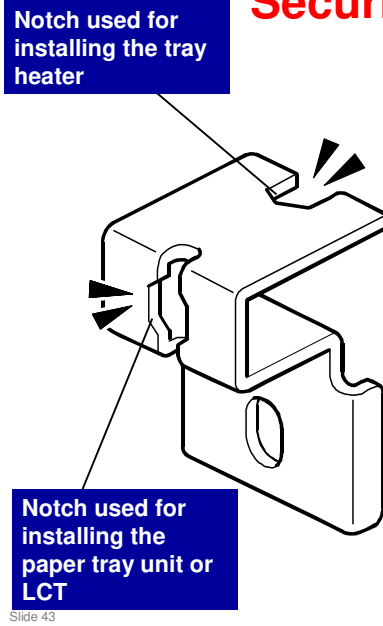
Important Notes

- ❑ **You must lift the copier and put it on top of the paper tray unit or LCT.**
 - ♦ Always lift with two persons. The copier is too heavy for one person.
 - ♦ Do not try to lift the copier with the paper tray unit or LCT installed. You will damage the lifting handles.
- ❑ **The customer is required to do this procedure. Please note that some customers may have problems with the heavy lifting.**

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No additional notes

Securing Brackets



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- The securing bracket contains two notches.
 - ♦ One of these notches is used as a tool when you install the paper tray unit or LCT.
 - ♦ The other notch is used as a tool when you install the tray heater.
 - ♦ So, do not install the securing brackets until after you install the tray heater.
 - » Or, if the customer already installed the paper tray/LCT, you remove the bracket when you install the tray heater.

No additional notes

Install the Paper Tray Units and LCT

- ❑ **Do the procedures in the operating instructions.**
 - ◆ Hardware Guide – Installing Options – Attaching the Optional Paper Tray Unit
- ❑ **Install a tray heater in each unit:**
 - ◆ Procedure: G133 Service Manual, Installation, Tray Heater

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G133 Operating Instructions, Hardware Guide, Installing Options, Attaching the Optional Paper Tray Unit

- ❑ Ask the class to install the Paper Tray Units and the LCT.
- ❑ Make sure that all students get a chance to install each unit.

G133 Service Manual, Installation, Tray Heater

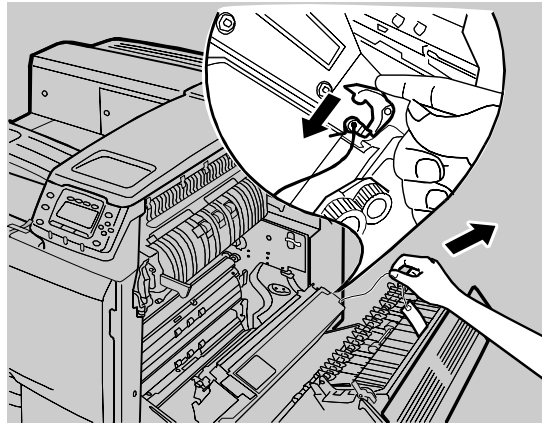
- ❑ Install a tray heater in each unit, so that the class understands how to use the securing bracket (see the previous slide).
- ❑ If the location has a high humidity, it may be necessary to install tray heaters.

PRINTER – IMPORTANT POINTS ABOUT INSTALLATION

Slide 45

- ☐ First, we will look at important points about installing the printer.
- ☐ Then you will install your printer.

Securing Pin

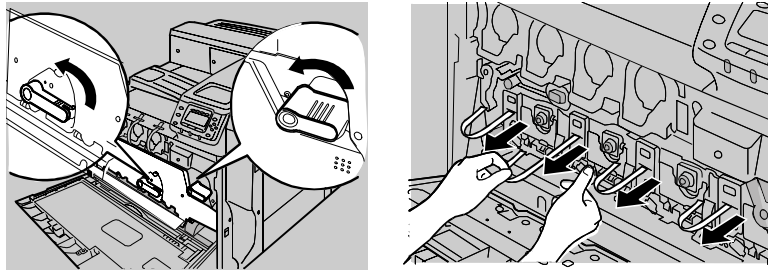


- ☐ Remove the securing pin.
- ☐ This pin holds the paper transfer roller away from the image transfer belt.

Slide 46

No additional notes

Levers and Tape

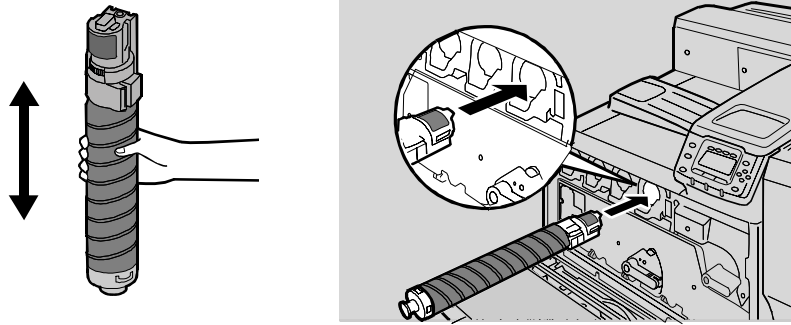


- ❑ Turn the two levers as shown.
- ❑ Remove the tape from all four development units.
 - ◆ Hold the development unit with your hand, then pull the tape.
 - ◆ **IMPORTANT:** Remove the tape from all four development units before you turn the main switch on.
 - ◆ The development units can be severely damaged if you do not remove the tape.
- ❑ Then put the two levers back in their original positions.

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- ❑ The lever on the left is the drum positioning plate lever.
- ❑ The lever on the right is the transfer belt lever.

Toner Bottles

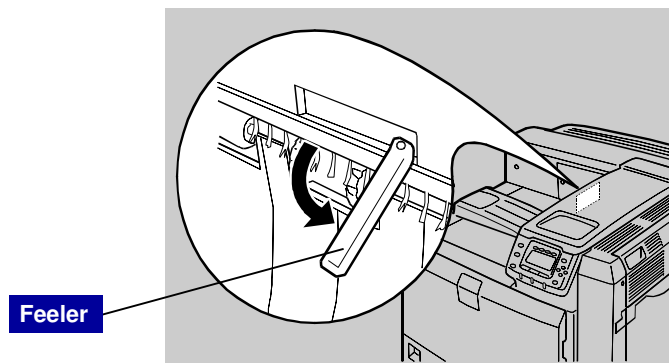


- Shake each bottle up and down 5 or 6 times before you install it.

Slide 48

No additional notes

Paper Trays



- ❑ Make sure the guides are at the correct positions for the paper size used by the customer.
 - ♦ The service manual explains how to adjust the guides.
- ❑ Pull out the feeler for the output tray full detection mechanism.

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No additional notes

Initializing the Developer

- ❑ This is done automatically after you turn the power on for the first time.
- ❑ Do not turn off the power switch until initializing is completed. Otherwise, the machine may malfunction.
- ❑ When it is finished, 'Ready' appears on the screen.
 - ◆ If the initialization does not finish correctly, you can use SP 3014 001 to see what the problem is.
- ❑ **Make some test prints.**
 - ◆ The installation procedure in the service manual shows you how to print a test page.

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G133 Service Manual, Troubleshooting, Process Control Error Conditions

- ❑ When you turn on the machine, it is not necessary to check if the cover is open or closed.
- ❑ SP 3014 001: A code is displayed. See the above section of the service manual for details.

Accessing Service Mode

- ❑ Practise entering and exiting service mode.

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G133 Service Manual, Service Tables, Service Program
Mode

- ❑ Make sure that everybody knows how to access SP mode.

Meter Charge Mode

- ❑ **Basically, there are two ways to set up this function.**
 - ◆ Meter click charge enabled (SP 5-930-001 set to 'enabled'): The counter can be displayed and printed by the customer. The technician can then call the customer and ask them to read the counter.
 - ◆ Meter click charge disabled (SP 5-930-001 set to 'disabled'; this is the default setting): The counter cannot be displayed or printed by the customer. To check the counter, the technician must print the SMC report (SP 5-990).

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How to set up meter charge mode?

- ❑ SP5-930-1 (Meter Charge) controls whether meter charge mode is enabled or disabled.
- ❑ The meter charge mode setting must be done before the user starts to make printouts. As a result, this must be done before, during, or immediately after installation.
- ❑ If meter charge is off, counters start at 0 (prints only, not developments).
- ❑ If meter charge is on, the counters can be in prints only or in developments only.
 - The technician can change the type at installation, with SP5-045 (Counter Method). This must be done before the user starts to print. The counter method can only be changed one time.

The counter method can be changed at a different time if necessary, but it is better to change it only at installation. This is to prevent problems with the counter value. (If you change from developments to prints, the counter starts again from the current value. The current value is not divided by 4.)
- ❑ If meter charge mode is enabled, the Counter menu is in the user tools menu.
- ❑ The user can then tell the technician the counter values by telephone, or can print a report and send it by fax.
- ❑ The fax number can be input with SP5-812-2 (FAX TEL No).
- ❑ After you replace the controller NVRAM, reset the meter charge settings.

Meter Charge Mode

- ❑ If the user has a service contract that uses the development or print counters, meter charge must be switched on (SP 5-930-1).
 - ◆ Set this before the user starts to print the first job.
- ❑ If meter charge is switched on, the counter type (developments or prints) must be set (SP 5-045).
 - ◆ Set this before the user starts to print the first job.
 - ◆ If you change the setting from "Prints" (default) to "Developments", then you cannot change the setting to "Prints" again with SP mode.

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- ❑ The fax number can be input with SP5-812-2 (FAX TEL No).
- ❑ After you replace the controller NVRAM, reset the meter charge settings.

Other SPs to Use When Setting Up a Service Contract

- ❑ **5-104-1 (Double Count): Double count for A3/DLT, on/off**
 - ♦ This is an SSP mode. Ask your supervisor for help if you need to adjust this SP.
- ❑ **5-930-10, -14, -16: User warnings for PM kit replacement when replacement time arrives, off/on**
 - ♦ PCU, transfer belt unit, fusing unit
 - ♦ Warning intervals: SP 7904
- ❑ **5-988: Use this to input the contract type**
 - ♦ Yearly contract, or meter click

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No additional notes

Other SP Settings

- ☐ **Service Tel. No. Setting: SP5-812-001 and 002**
 - ◆ 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.
- ☐ **Hard disk: At installation, it is not necessary to format the hard disk.**

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No additional notes

INSTALL THE PRINTER

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- ☐ The class will now install their machines.

Install the Machine

□ Procedure:

- ♦ G133 Service manual, Installation, Printer Installation

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- First, have the trainees install their machines.
- Make sure that the class follows all notes and cautions in the procedures.

INSTALLING THE CONTROLLER OPTIONS

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No additional notes

Why do we Install These Now?

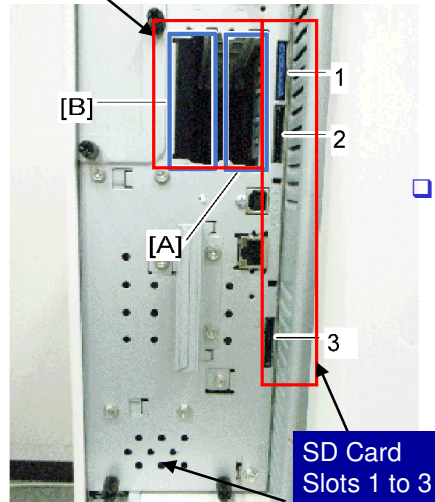
- If you install a finisher first, it will be necessary to remove it before you can install the controller options.
 - ♦ Some of the slots for controller options will be impossible to access, and you must remove the finisher to install the controller options.

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No additional notes

Purpose of the Slots

Board
Slots A and B



□ Board Slots

- ◆ Slot A: USB Host interface
- ◆ Slot B: IEEE1284, IEEE802.11, Bluetooth, or Gigabit Ethernet

□ SD Card Slots

- ◆ Slot 1: System card
- ◆ Slot 2: Applications
 - » Data Overwrite Security Unit, PictBridge
- ◆ Slot 3: Service (for example, updating the firmware). Also used when installing the VM card.

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- There is no IEEE1394 option.

SD Card Slots

❑ Slot 1

- ♦ The system card goes here.
- ♦ Do not remove this card.

❑ Slot 2

- ♦ One of these can be installed.
 - » Data Overwrite Security Unit, PictBridge
- ♦ To install more than one, you must merge the software onto one card.
 - » Procedure: We will study later in this section

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- ❑ Slot 2 is the only SD card slot available for applications.
- ❑ You can copy applications from slot 3 to a card in slot 1 or slot 2. If you use slot 1, you can only copy to the system card that is already in slot 1. Do not put another SD card in slot 1.

SD Card Slots

□ Slot 3

- ♦ It is used for installing new firmware.
- ♦ It is also used during the installation procedure for the VM card.
 - » The machine copies firmware from the SD card to the hard disk during the procedure.
 - » You must remove the SD card from slot 3 after you install the VM card.

Slide 62

- Slot 2 is the only SD card slot available for applications.

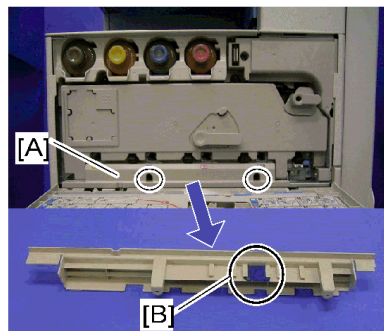
Copying Applications

- ❑ There are only 3 SD card slots, but only one slot for applications (slot 2).
- ❑ If you want to use more than one application, you must copy the application from the original card to another SD card.
- ❑ See the service manual for the detailed procedure.
- ❑ **Basic point:**
 - ◆ Put the source card in slot 3, and copy it to the card in slot 2.

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Procedure: G133 Service Manual, Installation, Controller, SD
Card Appli Move

Storing the Original SD Cards after Merging



- ❑ After you copy an application, the original SD card is deactivated.
 - ♦ It can be re-activated with the 'Undo Exec' procedure in the service manual.
 - » Put the original card in slot 3, and copy back from slot 2.
- ❑ But the customer must keep it as a proof of purchase.
- ❑ The original cards can be stored in a secret compartment at the front of the machine.
 - ♦ Remove cover [A] and store them at [B].

Slide 64

G133 service manual, Installation, Controller Options, SD Card Appli Move

Install 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.
 - » Menu Key > List/Test Print > Config. Page
 - » All installed options are shown in the "System Reference" column.

Slide 65

G133 service manual, Installation, Controller Options

- Have the class install these options. They should study the installation procedures, and do as many of them as possible.

Install The Controller Options (2)

❑ Data Overwrite Security Unit: Must be type G

- ♦ Make sure that you have a type G unit.
 - » If you have installed the wrong type by mistake, you must replace the controller NVRAM inside the copier before you install the correct DOS unit. After you install the unit, print an SMC report and check that you have installed the correct type.
- ♦ Follow the procedure in the service manual carefully, or the installation will fail.

Slide 66

G133 service manual, Installation, Controller Options

- ❑ Have the class install these options. They should study the installation procedures, and do as many of them as possible.

TRANSPORTING THE MACHINE

Slide 67

G133 Service manual, Installation, Copier Installation

Moving the Machine a Short Distance

- ☐ Remove all trays from the optional feed unit or LCT.

Slide 68

G133 Service manual, Installation, Copier Installation,
Moving the Machine

Moving the Machine a Long Distance

- ☐ Remove the toner bottles.
- ☐ Remove the paper from the paper trays, and secure the bottom plates with tape.
- ☐ Empty the toner collection bottle, and secure the bottle with tape.
- ☐ Attach shipping tape to the covers, or tightly wrap the machine with shrink-wrap.

Slide 69

G133 Service manual, Installation, Copier Installation,
Transporting the Machine

- ☐ To move the shift tray to the shipping position, you can also use dip switches, as explained in the service manual for the booklet finisher.
- ☐ There are no SP or dip switch settings for the other finishers.

After Moving the Machine a Long Distance

- ❑ **Do the "Auto Color Registration" as follows. This optimizes color registration.**
 - ◆ First, do "Forced Line Position Adj. Mode c" (SP2-111-3).
 - ◆ Then, do "Forced Line Position Adj. Mode a" (SP2-111-1).
- ❑ **To check if SP 2-111-1 was successful, watch the screen during the process. A message is displayed at the end.**
 - ◆ Also, you can check the result with SP 2-194-10 to -12.
- ❑ **Make sure that the side fences in the trays are correctly positioned, to prevent color registration errors.**

Slide 70

- ❑ SP 2111-1 and -3 are used at other occasions, after replacing certain parts. We will see this again.

G133 Service Manual, Troubleshooting, Process Control
Error Conditions

G133 Service Manual, Troubleshooting, Troubleshooting
Guide

- ❑ For SP 2194, see these sections of the service manual.

PAPER HANDLING OPTIONS – IMPORTANT POINTS

Slide 71

No additional notes

What Order do I Install These In?

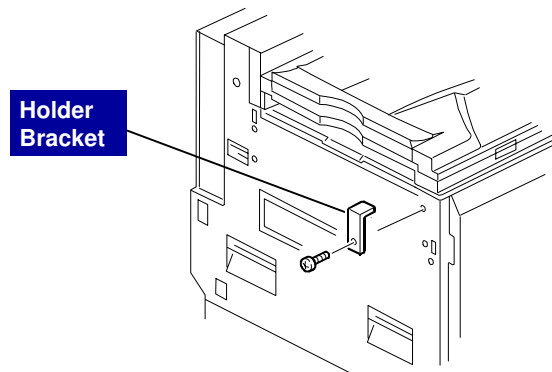
☐ **The best order is as follows:**

- ♦ Bridge unit
 - » Must be installed if you will install a finisher, or the paper cannot be fed to the finisher.
- ♦ Finisher (and Punch Unit if applicable)

Slide 72

☐ No additional notes

Installing the Bridge Unit



- ☐ If you cannot install the finisher immediately, install the holder bracket as shown.
- ☐ If you do not do this, then the user could damage the bridge unit if they pull up the bridge unit tray.
- ☐ When you install the finisher, you will need this bracket during the installation procedure.

Slide 73

- ☐ The holder bracket is item 4 in the accessories. This is used in the finisher installation. But, we should install this bracket when we install the bridge unit, if we do not install a finisher immediately. If not, the users could break the bridge unit if they push the machine using the bridge unit as a pushing place.

Before you Install a Finisher

- ❑ **Before you install a finisher, you must install the following:**
 - ◆ Bridge unit
 - ◆ Two-tray paper feed unit or LCT (needed so that the machine is at the correct height to feed paper into the finisher).

Slide 74

- ❑ All finishers require the bridge unit.
- ❑ If the finisher does not have the paper feed unit or LCT, the paper exit from the copier main body is not at the correct height to feed paper into the finisher.

INSTALL THE PAPER HANDLING OPTIONS

Slide 75

No additional notes

Install the Paper Handling Options

❑ Install these options:

- ◆ Bridge unit
- ◆ Finisher and Punch Unit
 - » There are no finisher adapters.
 - » Install the correct punch unit.
 - The B702 punch unit is for 3000-sheet finisher (B805).
 - The B807 punch unit is for the booklet finisher (B793).

Slide 76

- ❑ Now, have the trainees install the options, in the order given on the slide.
- ❑ Ensure that all members of the class practice installing each option.
- ❑ Make sure that the class follows all notes and cautions in the procedures.

UPDATING THE FIRMWARE

Slide 77

UPDATING THE FIRMWARE

G133 service manual, service tables, Firmware Update

- ☐ The class will now install the latest firmware in the machine.

Downloading New Firmware

- ❑ All firmware is on SD cards.
- ❑ The firmware SD card plugs into SD card slot 3.
- ❑ Update the firmware.
 - ◆ It is recommended to update only one module at a time.
 - ◆ Verify the update was successful (print the configuration page: Menu Key > List/Test Print > Config. Page)
- ❑ Update the operation panel firmware.
 - ◆ Controller firmware and operation panel firmware cannot be updated at the same time.

Slide 78

- ❑ Make sure that the class reads the 'Before you Begin' section, which explains how to handle SD cards.
- ❑ The 'Updating Firmware' section has the main firmware download procedure. Have the class try it on their machines.
 - If an error occurs, an error code appears. A table in the manual explains these codes (Handling Firmware Update Errors section).
 - If power fails during the update, insert the card once again and switch on the machine to continue the firmware download automatically from the card. The menu will not appear on the screen, because an error message will be displayed.

Notes

- ❑ The Engine module contains firmware for the line position adjustment process.

Backing Up NVRAM Data

- ☐ **Copy the data to an SD card.**
- ☐ **The SD card plugs into slot 3.**
- ☐ **Use SP5824 001**
 - ◆ SP 5825 001 copies the data from the SD card to the machine.
- ☐ **The data is copied to a folder in the SD card, into a file with the filename taken from the machine's serial number**
 - ◆ Example, Serial Number "B2340017", filename is NVRAM\B2340017.NV
 - ◆ This ensures that data from a different machine is not copied back by accident.
 - ◆ An SD card can hold NVRAM data from more than one machine.
- ☐ **Write the machine's serial number on the card for reference when you wish to copy the data back.**

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G133 service manual, service tables, Firmware Update,
NVRAM Data Upload/Download

- ☐ Write the serial number of the machine on the card, so that you will be able to copy the correct data back to the machine.
- ☐ Data cannot be copied back to the machine if the machine's serial number does not match the file name on the card.

APOLLON-P1 TRAINING

MACHINE OVERVIEW

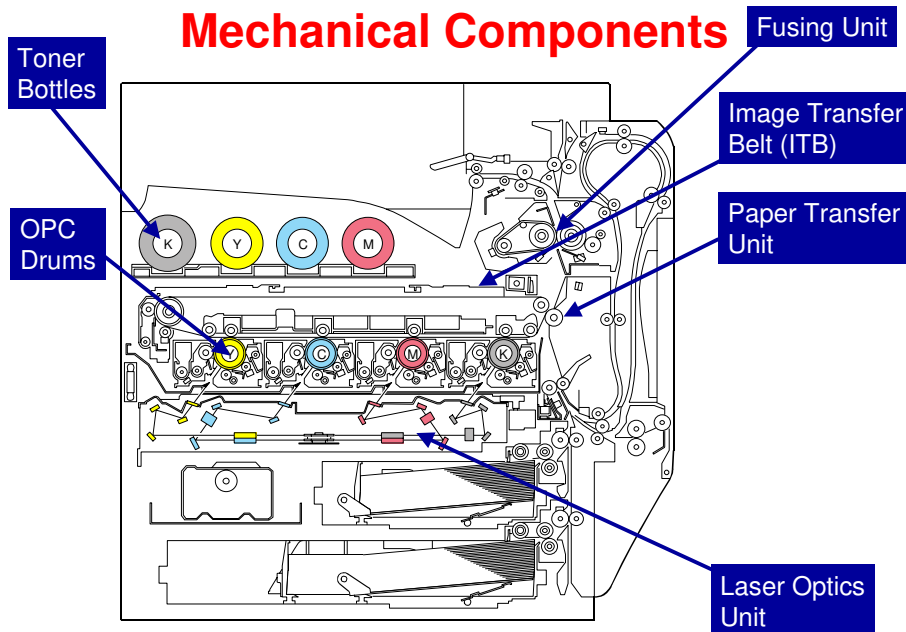
Slide 80

- ☐ In this section, we will take a quick look at the machine.
- ☐ Also, we will see the main differences between this machine and the Apollon-C1 (B222) series copiers.

Introduction to the Apollon-P1 Engine

Slide 81

No additional notes



Slide 82

G133 service manual, Detailed Section Descriptions, Overview

- ☐ This is a view of the internal structure of the machine.
- ☐ There are 4 OPC drums.
- ☐ Laser beams write latent images on the drums. There are two laser beams for each colour.
- ☐ Four toner images are transferred from the OPC drums to the image transfer belt, on one rotation of the belt.
- ☐ At the paper transfer unit, the four toner images are pushed off the belt onto the paper.
- ☐ The paper feeds up to the fusing unit, and out of the machine.

This looks weird - Why are the toner bottles in a different order, from left to right, than the OPC drums?

- ☐ The black toner bottle is bigger, so it cannot be put at the right hand end of the toner bottle rack (the bottle is too big), so it is at the left end.

Mechanical Component Overview (1)

❑ Laser optics unit

- ♦ There are four laser diode units, and four sets of optics. One laser diode unit for each toner color (KYCM), and two beams for each colour. Each polygon mirror reflects light from two LD units.

❑ PCU

- ♦ There are four units, one for each toner color. Each PCU includes a drum unit and a development unit.

❑ Toner bottles

- ♦ Toner is supplied from the toner bottles to the development units by toner supply pumps (one for each colour).

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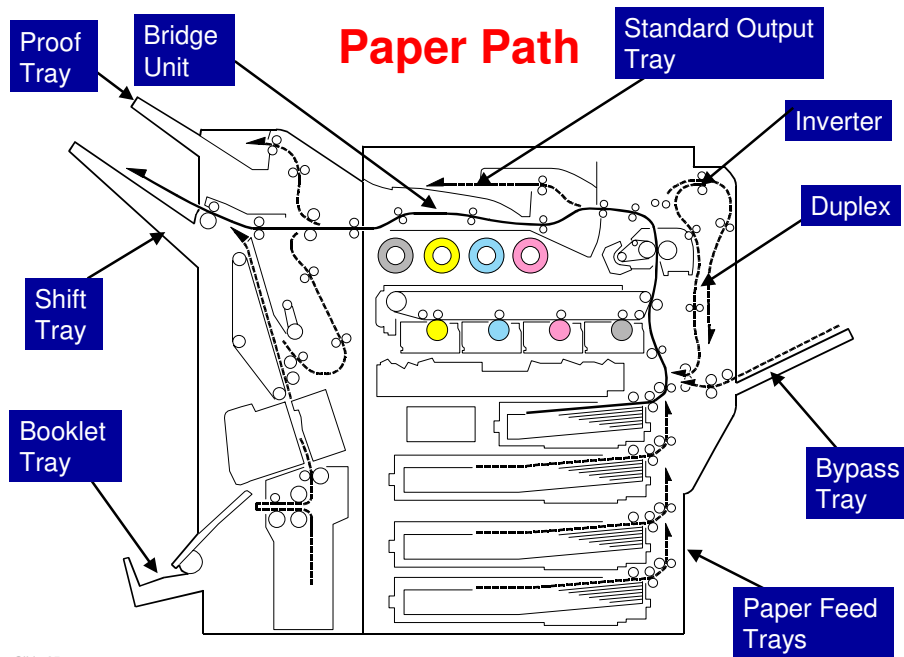
No additional notes

Mechanical Component Overview (2)

- ❑ **Image transfer unit**
 - ◆ Bias rollers opposite the OPC drums transfer toner from the drums to the transfer belt. Four toner images are super-imposed onto the belt.
- ❑ **Paper transfer roller unit**
 - ◆ The ITB drive roller pushes the toner from the transfer belt to the paper (the transfer roller is an idle roller).
- ❑ **Fusing unit**
 - ◆ This is a belt-type fusing unit. A heating roller, out of the paper feed path heats a belt. Then the belt heats the hot roller. This type of unit warms up the rollers more quickly than a conventional two-roller system.
 - ◆ The fusing belt is heated by an induction heating (IH) system, not a fusing lamp. The pressure roller contains a fusing lamp.

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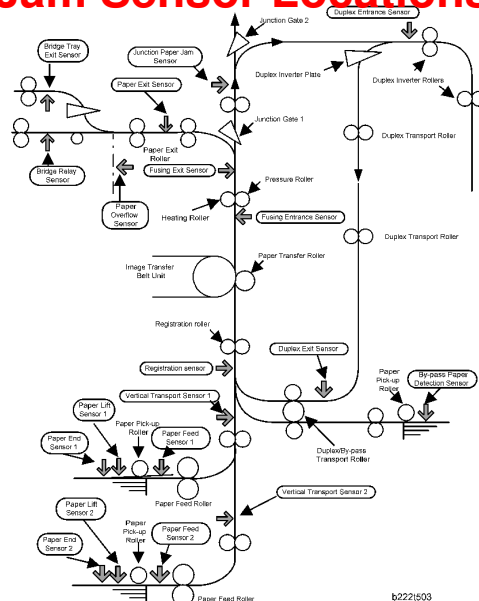
No additional notes



G133 service manual, Detailed Section Descriptions,
Overview, Paper Path

- ❑ This shows the path of paper through the machine, with an optional booklet finisher installed.
- ❑ Demonstrate the following feed paths on the diagram.
 - Up from the paper feed trays
 - In from the bypass tray
 - Out at the top of the machine (to the standard output tray)
 - To the duplex unit, via the inverter
 - To the finisher, via the bridge unit.
 - Out through the finisher's proof tray, shift tray, and booklet tray.

Jam Sensor Locations



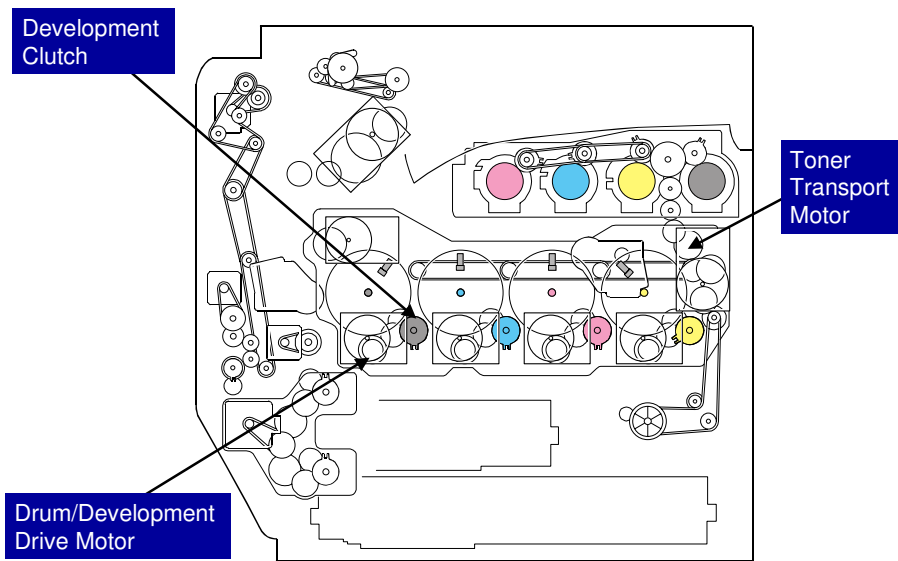
Slide 86

b2221503

G133 service manual, Troubleshooting, Jam Detection

- ❑ The class should be aware of this diagram. It shows the locations of the sensors in the machine that detect paper jams.
 - The grey arrows show the sensors.

Drive Layout

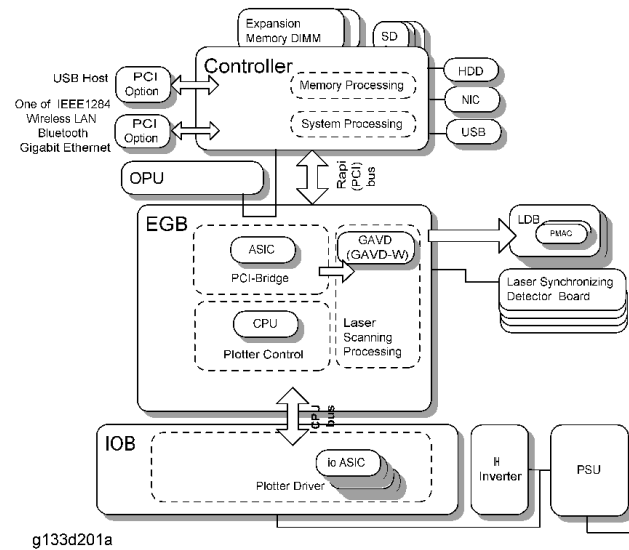


Slide 87

G133 service manual, Detailed Section Descriptions, Overview, Drive Layout

- ❑ This shows the main motors in the machine.
- ❑ The service manual describes the functions of each of these motors, and other components not shown on this slide. Also, we shall see each mechanism in detail during the training course.
- ❑ Notes:
 - There is a development clutch for each colour, because, for each colour the same motor controls the PCU and the development unit.
 - This motor is the drum/development drive motor. There is one of these motors for each colour.
 - The toner transport motor does a lot of things. It drives the toner attraction pumps and the toner collection coils from the PCUs, from the transfer belt unit, and inside the toner collection bottle. Also rotates the toner bottles.

Board Structure



Slide 88

G133 service manual, Detailed Section Descriptions, Overview, Board Structure

- ❑ This shows a schematic of the electrical layout of the machine.
- ❑ The service manual has details about what the components do, and what the acronyms mean (such as EGB). The main points are on the next slide.

Main Boards

- ☐ The EGB is the main board. It controls the machine.
- ☐ The controller handles the network and printer interfaces, and the operation panel.
- ☐ The IOB contains driver circuits for motors.

Slide 89

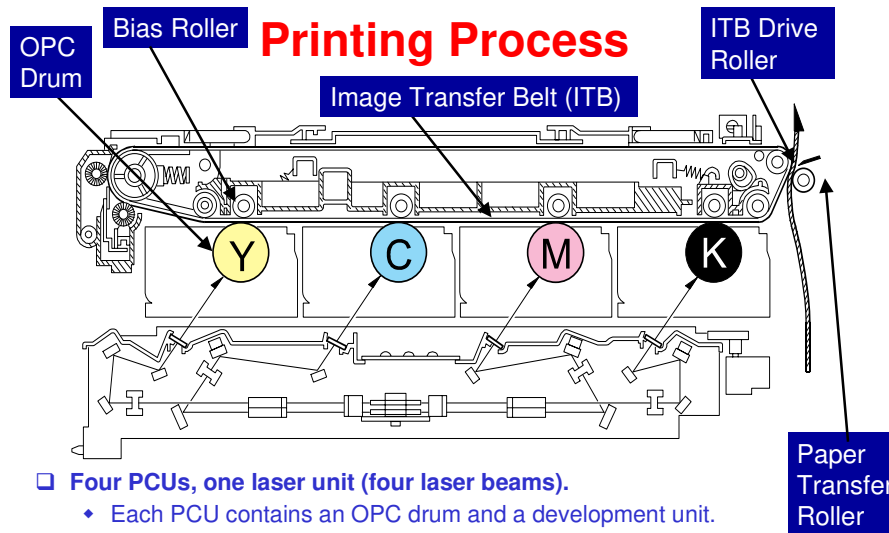
No additional notes

The diagram illustrates the system architecture, centered around a **Controller** which houses **ASIC 1** and **ASIC 2**. **ASIC 1** interfaces with **DDR RAM 256 MB**, **ATA I/F**, and **Engine I/F**. **ASIC 2** interfaces with **NV RAM 256KB**, **PHY**, **Network I/F**, **USB I/F**, and three **SD Slots** (#1, #2, #3). The **Controller** also manages **SDRAM DIMM I/F**, **Flash ROM 1 MB**, **ICH3-M**, **GMCH**, and **CPU**. The **ICH3-M** connects to the **Flash ROM** and **PCI I/F**. The **PCI I/F** connects to external components: **USB Host**, **IEEE802.11b**, **Gigabit Ethernet**, and **IEEE1284 I/F**. The **Engine I/F** connects to the **HDD**. The **SD Slots** are connected to **SD Card (System)** and **PictBridge** (Data Overwrite, Security Unit).

❑ This is a GW controller with an 866 MHz Celeron CPU.

Slide 90

No additional notes



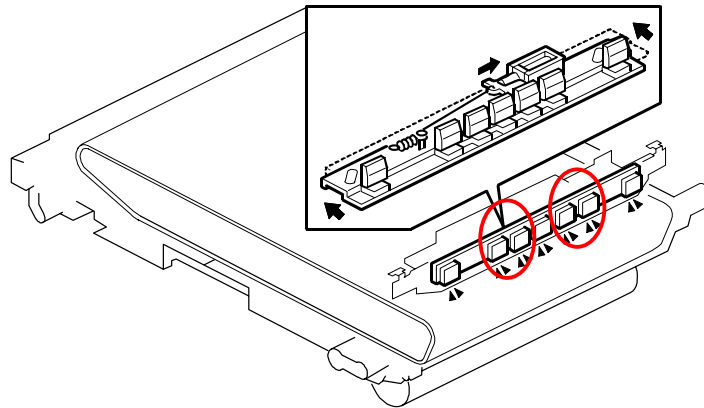
- ❑ **Four PCUs, one laser unit (four laser beams).**
 - ◆ Each PCU contains an OPC drum and a development unit.
- ❑ **Bias rollers above each OPC drum pull the four developed toner images to the ITB, to deposit a four-colour image on the ITB.**
- ❑ **The four colours are transferred to the paper at the same time by the ITB drive roller. The paper transfer roller does not have a charge.**

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G133 service manual, Detailed Section Descriptions,
Overview, Printing Process

- ❑ Here is a close-up of the main print engine.
- ❑ More details of the printing process are in this section of the manual.
- ❑ The ITB drive roller pushes the toner from the ITB onto the paper. The paper transfer roller does not pull the toner.

ID Sensors



- ❑ **Seven ID sensors, on the ID sensor board:**
 - ◆ Three for line position adjustment: Left end, middle, right end
 - ◆ Four for process control: In the red circles as shown above
- ❑ **When the sensors are not used, the solenoid moves the shutter to cover the sensors. This prevents dust on the sensors.**

Slide 92

No additional notes

Process Speeds

- ❑ **Plain paper, middle thick paper**
 - ◆ 600 x 600 dpi (1-bit, 2-bit): 205 mm/s (40 ppm)
 - ◆ 600 x 600 dpi, 4-bit: 77 mm/s (17 ppm)
- ❑ **OHP/Thick 1, 2, 3 paper**
 - ◆ 600 x 600 dpi (1-bit, 2-bit): 115 mm/s (25 ppm)
 - ◆ 600 x 600 dpi, 4-bit: 77 mm/s (17 ppm)

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B222 service manual, Detailed Section Descriptions, Paper Feed, Paper Feed Line Speed

- ❑ The process speed is the feed speed from registration roller to the fusing unit.
- ❑ The process speed affects various machine parameters, as can be seen if you take a quick look through the SP tables.
- ❑ What is 'middle thick paper'? See the next slide.
- ❑ Some SP modes also have adjustments for 'FINE'. This refers to 600 x 600 dpi 4-bits per pixel resolution (some people will call this 9000 dpi resolution).
- ❑ Thick 4, 5, 6: These settings are designed for special types of paper that are found in the Japanese market.
- ❑ The machine has two laser beams per colour. This allows the faster line speed. Only one beam per colour is used for OHP/thick paper.
 - At 600 x 600 dpi 4-bit, only one laser beam is used per colour.
- ❑ In the printer driver, there are three quality settings.
 - High Speed: This is the same as 600 x 600 1-bit
 - Speed: This is the same as 600 x 600 2-bit
 - Quality: This is the same as 600 x 600 4-bit

Paper Weights

- ☐ Thin paper: Less than 60 g/m² (16 lb)
- ☐ Normal plain paper: 60 – 90 g/m² (16 – 24 lb.)
- ☐ Middle Thick: 90 – 105 g/m² (24 – 28 lb.)
- ☐ Thick 1: 105 – 169 g/m² (28 – 45 lb.)
- ☐ Thick 2: 169 – 220 g/m² (45 – 58 lb.)
- ☐ Thick 3: 220 – 253 g/m² (58 – 67 lb.)
- ☐ Thick 4, 5, 6: These settings are designed for special types of paper that are found in the Japanese market.

Slide 94

- ☐ This machine does not support thin paper.
- ☐ 'Thin paper' is an additional paper weight setting that the user can select at the operation panel if the 'plain paper' setting causes problems.
- ☐ These specifications are not exactly the same as the Athena-C1 (B230) series copiers.
 - The maximum weight for plain paper (90 g/m²) is different.

New Unit Detection Mechanisms

❑ Image Transfer Belt Unit, Fusing Unit

- ◆ These units each have a fuse.
- ◆ When the machine detects that the fuse is intact, the machine determines that a new unit is installed.
- ◆ Then a short time later, the fuse blows.

❑ PCU, Development Unit

- ◆ The development unit (as part of the PCU, or as a separate development unit) contains an ID chip.
- ◆ The ID chip contains information that tells the machine that the unit is new.

❑ Toner Collection Bottle

- ◆ The machine uses the 'bottle full sensor' to determine if the bottle was replaced.
- ◆ This only works if the bottle is in a 'full' or 'near-full' condition.

Slide 95

- ❑ The ID chip in the development unit contains all the counters for the PCU (drum unit counters, development unit counters).
- ❑ If we replace the development unit as a separate unit, the new ID chip does not contain the drum counters for the drum unit that is still in the machine. (You can see them as 'previous unit counters', stored in SP7906, but these will not be updated when the new drum is used).
- ❑ Normally, the development unit is replaced at 320k, and the drum unit is replaced at 80k. So this should normally not be a problem, unless the development unit breaks. This counter storage method may be changed for future models.

Comparing the Apollon-P1 with the Apollon-C1

Slide 96

No additional notes

Engine Changes

☐ Board Layout:

- ♦ The main board is the EGB board (Engine Control Board).
- ♦ There is no mother board.

☐ Memory and Hard disk specs

- ♦ Apollon-C1: 1024 MB memory (no optional memory), 80GB hard disk
- ♦ Apollon-P1: 1024 MB memory (no optional memory), 40GB hard disk

☐ Laser: Two beams per colour

- ☐ Exit: There is no one-bin tray option for the export model, so only one of the junction gates operates.

Slide 97

No additional notes

Options - 1

- ❑ **There are two optional paper feed units: One-tray and two-tray. You can also install one of each, to have three optional trays.**
 - ◆ There is also an optional large capacity tray.
- ❑ **There is no one-bin tray unit.**
- ❑ **The optional finishers are different:**
 - ◆ 1000-sheet finisher (B408): Used with the Apollon-C1, but not the Apollon-P1.
 - » Instead, the 1000-sheet booklet finisher (B793, same as the Athena-C1) is used.
 - ◆ 2000-sheet booklet finisher (B804): Used with the Apollon-C1, but not the Apollon-P1.
 - ◆ 3000-sheet finisher (B805): Used with the Apollon-C1, and also with the Apollon-P1.

Slide 98

No additional notes

Options - 2

- ☐ A Gigabit Ethernet unit is added. The USB port on this option cannot be used. There is another USB port on the controller board, and this one is used.
- ☐ There is no IEEE1394 option.
- ☐ The DOS unit is type G. Make sure that you install the correct type.

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No additional notes

Important New SPs

- ❑ **2907: Transfer belt contact and release timing (for black-and-white pages in color jobs)**
 - ◆ The default setting is different, and SP 2907 002 was added. See the Image Transfer section of the course for details.
- ❑ **2960: If printing becomes slow when printing a sequence of small jobs, you can adjust this SP.**
- ❑ **5996: Allows printing over the complete area of the paper (no margins)**

Slide 100

- ❑ SP 2960: This will be described in more detail in the Troubleshooting section.

PM

- ❑ **The PCU, fusing unit, and transfer belt unit are replaced as complete units.**
 - ♦ The user replaces all PM parts inside the machine. The parts are available as PM kits.
- ❑ **These individual parts are not PM parts, and cannot be replaced individually in the field.**
 - ♦ Drum
 - ♦ Developer
 - ♦ Development unit
 - ♦ Image transfer belt cleaning unit
- ❑ **The fusing unit is not disassembled at PM. The fusing unit is replaced as a complete unit.**
- ❑ **There is no fixed PM interval for the technician. Clean the components listed in the service manual every time you visit the customer to work on the machine.**

Slide 101

No additional notes

Installation Procedure

- ☐ **Main engine: Similar. Done by the user**
- ☐ **Paper handling options:**
 - ♦ Similar. Done by the user, except bridge unit and finishers
- ☐ **Controller options**
 - ♦ Similar. Done by the user

Slide 102

No additional notes

Replacement Procedures

- ❑ **The following sections have some changes in the procedures and some additional procedures.**
 - ◆ Exterior covers (top covers, paper exit cover, ozone filter for charge unit are mainly new procedures)
 - » The ozone filter for the charge unit is in a different location from the Apollon-P1.
 - ◆ PCU: There are no individual replacement procedures for the drum, development unit, and developer.
 - » The PCU is always replaced as a complete unit.
 - ◆ Waste toner bottle: The customer replaces this component.
 - ◆ Fusing unit: Thermopile
 - ◆ Electrical components
 - » Controller board, hard disk: Small changes
 - » BCU: This is replaced by the EGB board. The replacement procedure is similar.
- ❑ **If you replace a component of a PM part (for example, part of the fusing unit), do not reset the PM counters for the PM part.**

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- ❑ No additional notes

Practical Work

Slide 104

No additional notes

Practical Work

- ❑ **Look at the following diagrams**
 - ◆ Point-to-point
 - ◆ Electrical component layout

Slide 105

- ❑ Introduce the point-to-point and electrical component layout diagrams.
- ❑ Have the trainees locate the electrical components on the machines and on the p-to-p diagram.
 - We will discuss all the major components in the relevant sections of the course. There is no need to study this in detail now.
- ❑ Have the trainees remove the covers and locate the major components of the copier main body.
- ❑ Point out as many of the components on the list as you think necessary.

Replacement (1)

- ☐ **Do the procedures in this section:**
 - ♦ Removal and Adjustment, Exterior Covers

Slide 106

- ☐ Have the trainees remove and replace the parts in these sections of the manual.
- ☐ Remind them to follow all notes and cautions in the manual.

Replacement of Electrical Components

- ❑ **Take care when replacing these parts. Follow the instructions in the manual.**

Slide 107

- ❑ The next few slides will go over the important points. Then the class will remove the parts.

Replacing an NVRAM (1)

- ❑ **Before you replace an NVRAM, try to do the following:**
 - ◆ Print the SMC report
 - ◆ Copy the contents of the NVRAM to an SD Card (SP 5824 001)
- ❑ **If you cannot do this, then after installing the new NVRAM, you can use a backup that you made 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.

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No additional notes

Replacing an NVRAM (2)

- ❑ **To copy data back from the SD card to NVRAM, you must use SP 5825 001.**
 - ◆ There are two NVRAMs in this model, but the same SPs are used to make backups of each NVRAM.
 - ◆ You can store data from both NVRAMs on the same card. The machine understands which is the correct data when you restore the data to the NVRAM from the SD card.
- ❑ **IMPORTANT: If you replace the NVRAM on the controller board, the Data Overwrite Security Unit will not work. The user must buy a new one.**

Slide 109

No additional notes

Hard Disk Removal

- ❑ Remove the hard disk.
- ❑ After installing the new disk:
 - ◆ It is not necessary to format the hard disk.
 - ◆ If the customer is using the Data Overwrite Security feature, the DOS function must be set up again.

Slide 110

- ❑ Have the class remove and replace the hard disk.

Disposal of HDD Units

- ❑ **Never remove an HDD unit from the work site without the consent of the client.**
- ❑ **If the customer has any concerns about the security of any information on the HDD, the HDD must remain with the customer for disposal or safe keeping.**
- ❑ **The HDD may contain proprietary or classified (Confidential, Secret) information.**
 - ◆ Specifically, the HDD contains data stored in temporary files created automatically during job sorting and jam recovery.
 - ◆ Such data is stored on the HDD in a special format so it cannot normally be read but can be recovered with illegal methods.

Slide 111

No additional notes

Replacement (2)

- ❑ **Do the procedures in this section: Removal and Adjustment, Electrical Components**
 - ◆ **EGB, Controller Board:**
 - » Remove the NVRAM from the old board and install it on the new board.
 - » The dip switches on the new board must be the same as on the old board. Do not change the dip switch settings.
 - ◆ **NVRAMs**
 - » There are two NVRAMs, one for the EGB and one for the controller. The replacement procedures are different.

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- ❑ Have the trainees remove and replace the parts in the Electrical Components section.
- ❑ Remind them to follow all notes and cautions in the manual.

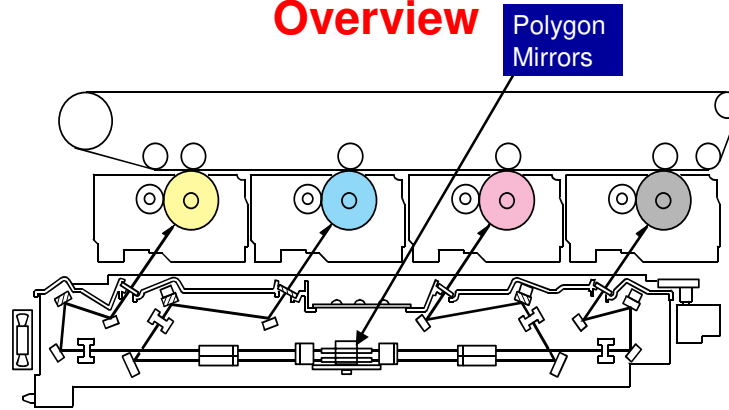
APOLLON-P1 TRAINING

LASER EXPOSURE

Slide 113

- ☐ The optics and electronics in the laser unit will be described in this section.

Overview

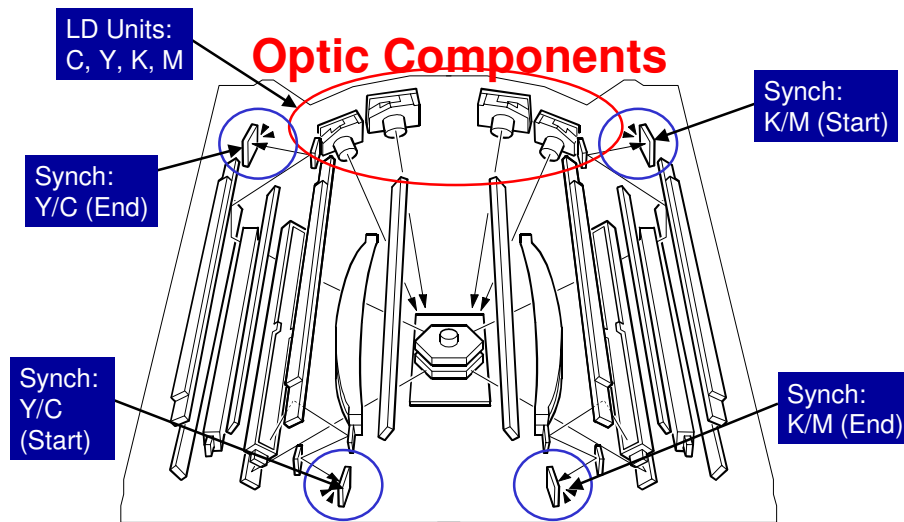


- ❑ Two laser beams per colour (except for OHP/Thick paper, and for all paper types at 600 x 600 dpi 4-bit mode)
- ❑ Maximum resolution is 600 dpi
- ❑ Two polygon mirrors attached to the same motor.
 - ♦ The upper mirror reflects yellow and black.
 - ♦ The lower mirror reflects magenta and cyan.

Slide 114

G133 service manual, Detailed Section Descriptions, Laser Exposure, Overview/Optical Path

- ❑ Have the class look at the diagram in the manual. The optical components should be familiar to those who have worked on recent models.
- ❑ This diagram does not show the LD units. A more complete diagram of the optics is on the next slide.
- ❑ The machine has two laser beams. The machine adjusts the laser beam pitch automatically. There is no adjustment for the technician.



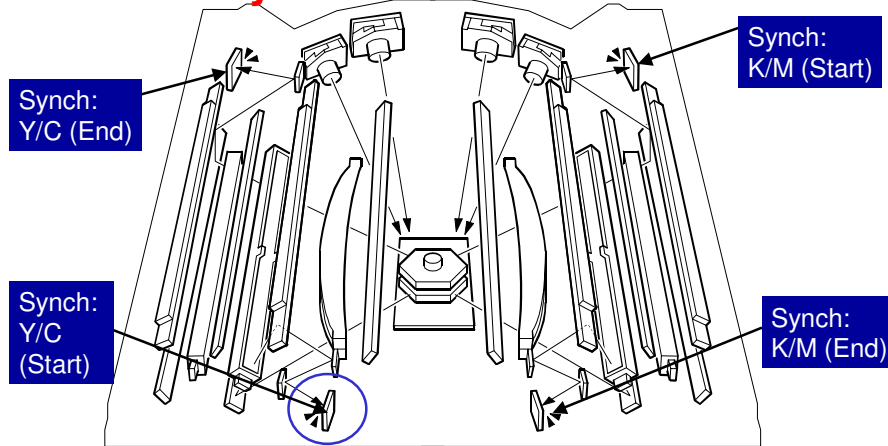
- ❑ Four LD units, one for each colour.
- ❑ Four laser synchronization detector boards:
 - ◆ Each board is used by 2 colours
 - ◆ Each colour is detected at the start and at the end of the main scan

Slide 115

G133 service manual, Detailed Section Descriptions, Laser Exposure, Overview/Optical Path

- ❑ The LD units (shown in the red circle) are Y, C, K, M from left to right in the diagram.
- ❑ The lasers go immediately to the polygon mirrors.
 - Laser exposure for black and magenta starts from the rear side of the drum. But for yellow and cyan it starts from the front side of the drum. This is because the LD units for black and magenta are on the other side of the polygon mirror from the units for yellow and cyan.
- ❑ The four laser synch detector boards (shown in blue circles) will be explained in more detail on the next slide.

Laser Synchronization Detectors



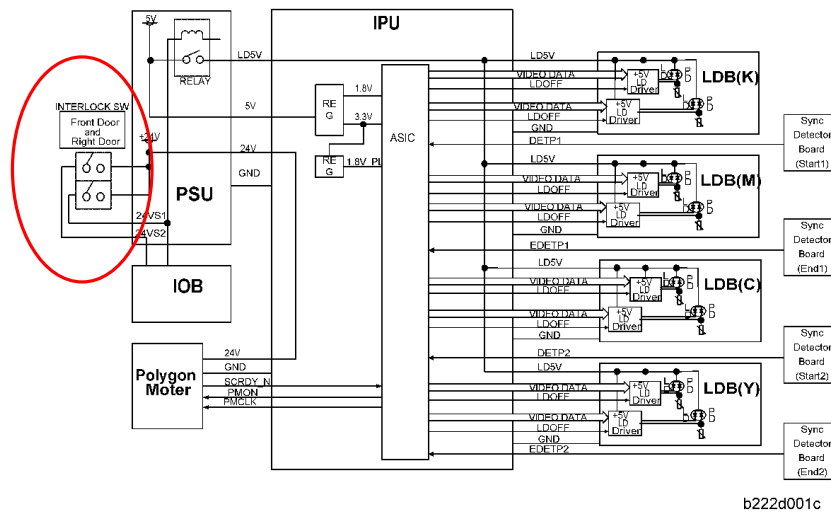
- ❑ Scanning start and end detection for each colour.
- ❑ Each board handles two colours.
 - ◆ To determine which colour beam hits the board, the machine checks the timing.

Slide 116

G133 service manual, Detailed Section Descriptions, Laser Exposure, Laser Synchronization Detectors

- ❑ For magenta and black, the LSD at the rear detects the start of the main scan.
- ❑ For yellow and cyan, the LSD at the front detects the start of the main scan.
- ❑ With a detector at the start and at the end, it is possible to make sure that the number of pulses for each colour is the same. This reduces colour registration errors in the main scan direction.
- ❑ To do this, the machine measures the number of clock pulses between start and end detection.
- ❑ If the number is not correct, the LD clock frequency is adjusted automatically.
 - If the board at the end position is defective, you must disable the detection feature with SP2-186-1, until you can replace the defective part.

LD Safety Switches

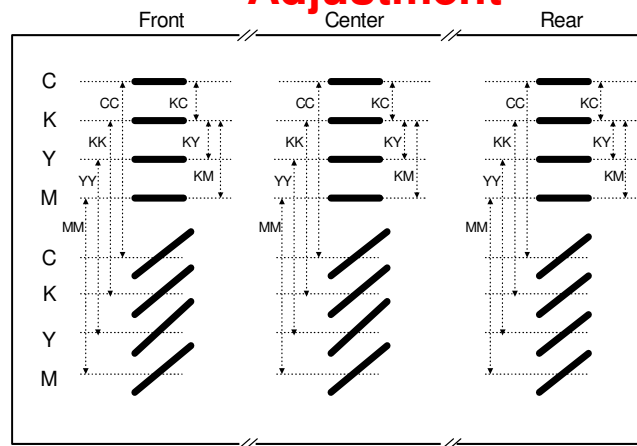


Slide 117

G133 service manual, Detailed Section Descriptions, Laser Exposure, LD Safety Switches

- ☐ Make sure that the class understands how the cover switches cut the laser power.
- ☐ The switches used are the front and right front door.
- ☐ Have the class follow the circuit on the diagram.

Automatic Line Position Adjustment



- ❑ During automatic line position adjustment, the line patterns above are created eight times on the transfer belt.

Slide 118

G133 service manual, Detailed Section Descriptions, Laser Exposure, Automatic Line Position Adjustment

- ❑ The spaces between the lines (CC, KK, YY, MM, KC, KY, KM) are measured by the front, center, and rear ID sensors. The controller takes the average of the spaces. Then it adjusts the following positions and magnification.
 - Sub scan line position for CMY
 - Main scan line position for CMY
 - Magnification ratio for KCMY
 - Skew for CMY
- ❑ The transfer belt-cleaning unit cleans the transfer belt after the patterns are measured. SC 285 shows if an error is detected three times consecutively.

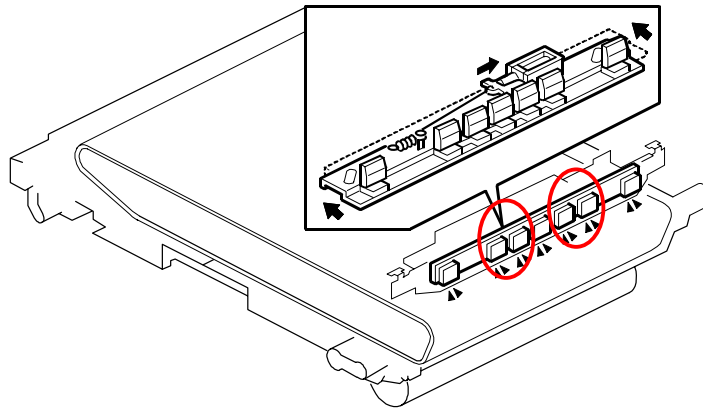
Automatic Line Position Adjustment

- ❑ The spaces between the lines (CC, KK, YY, MM, KC, KY, KM) are measured by the front, center, and rear ID sensors. The controller takes the average of the spaces. Then it adjusts the following positions and magnification.
 - ◆ Sub scan line position for CMY
 - ◆ Main scan line position for CMY
 - ◆ Magnification ratio for KCMY
 - ◆ Skew for CMY
- ❑ This process prevents:
 - ◆ Color registration errors
 - ◆ Skew

Slide 119

- ❑ Color registration errors: These are when the four colour toner images (CMYK) are not written exactly on top of each other
 - Sometimes, this type of error is called 'color shift'. This is not the correct term. Color shift is a change in the actual colour.
 - In this model, the improved mechanisms have reduced color registration errors a lot. This means that the default setting for 'black overprint' is changed to 'off'.
 - When black overprint is on, if there is black superimposed on a color image, the black toner is superimposed on the colour toner image. This means that a lot of toner is deposited on the paper and scattering can occur.
 - When black overprint is off, if there is black superimposed on a color image, colour toner is not deposited on the places where black toner will be. This reduces the quantity of toner. But, if color registration is not good, a white gap could appear at the border between the colour toner area and the black toner area.
- ❑ Skew: The main scans of the four laser beams across the OPCs must be parallel. If not, the four color toner images will be skewed in relation to each other.

ID Sensors



- ❑ **Seven ID sensors:**
 - ◆ Three for line position adjustment: Left end, middle, right end
 - ◆ Four for process control: In the red circles as shown above
- ❑ **When the sensors are not used, the solenoid moves the shutter to cover the sensors. This prevents dust on the sensors.**

Slide 120

More about the Adjustments (1)

☐ Sub scan line position for CMY

- ♦ The adjustment of the sub-scan line position for YCM is based on the line position for K (color registration).
 - » The machine measures the gaps between the lines of each color in the pattern on the transfer belt.
 - » If the gaps for a color are not correct, the machine moves the image of the color up or down the sub scan axis.
 - » To do this, it changes the laser write timing for that color.

☐ Main scan line position for CMY

- ♦ If the machine detects that the image is out of position in the main scan direction, it changes the laser write start timing for each scan line.



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More about the Adjustments (2)

- ❑ **Magnification adjustment for KCMY**
 - ◆ If the machine detects that magnification adjustment is necessary, it changes the LD clock frequency for the required color.
- ❑ **Skew for CMY**
 - ◆ The adjustment of the skew for YCM is based on the line position for K.

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Adjustment Conditions (1)

□ Initial:

- ♦ Immediately after the power is turned on, or when the machine recovers from the energy saver mode.
- ♦ Done either once or twice (or not done), depending on:
 - » Time since the previous line position adjustment
 - » Temperature change since the previous line position adjustment
- ♦ The machine checks the above conditions at power on/recovery. Then, line position adjustment is done if one of the conditions occurs.

Slide 123

- The service manual explains the SP settings that can be used to adjust the behaviour of the machine.

Adjustment Conditions (2)

□ During a job:

- ♦ The job is interrupted and the adjustment is done once, depending on:
 - » Time since the previous line position adjustment
 - » Temperature change since the previous line position adjustment
 - » Number of prints since the previous line position adjustment
- ♦ The machine checks the above conditions every 30 pages (SP 3512 001). Then, line position adjustment is done if one of the conditions occurs.

Slide 124

- The service manual explains the SP settings that can be used to adjust the behaviour of the machine.

Adjustment Conditions (3)

□ At the end of a job:

- ♦ The adjustment is done once, depending on:
 - » Time since the previous line position adjustment
 - » Temperature change since the previous line position adjustment
 - » Number of prints since the previous line position adjustment
- ♦ The machine checks the above conditions at the end of each job. Then, line position adjustment is done if one of the conditions occurs.

Slide 125

- The service manual explains the SP settings that can be used to adjust the behaviour of the machine.

Adjustment Conditions (4)

- **When the front door is opened and closed:**
 - ♦ The adjustment is done once, depending on:
 - » Time since the previous line position adjustment
 - » Temperature change since the previous line position adjustment
 - ♦ The machine checks the above conditions after the front door is opened/closed. Then, line position adjustment is done if one of the conditions occurs.

Slide 126

- The service manual explains the SP settings that can be used to adjust the behaviour of the machine.

Adjustment Conditions (5)

□ In standby mode (but not in energy saver mode):

- ♦ The adjustment is done once, depending on:
 - » Time since the previous line position adjustment
 - » Temperature change since the previous line position adjustment
 - » Number of prints since the previous line position adjustment
- ♦ The machine checks the above conditions in standby mode every 10 minutes (SP 3512 002). Then, line position adjustment is done if two of the conditions occurs.
 - » Time and number of prints, or temperature and number of prints

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Adjustment Conditions (6)

□ New PCU or transfer belt unit

- ◆ When the machine detects a new PCU or Image Transfer Belt Unit, line position adjustment is automatically done twice.

□ If the main scan magnification changes

- ◆ This is detected by the main scan synchronization detectors at each end of the scan line for each color.
- ◆ If the magnification changes by more than 1% (SP2-193-010), line position adjustment is done.

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Adjustment Conditions (7)

❑ Forced line position adjustment:

- ♦ You can do this at any time with SP 2111.
 - » It must be done after installing a new laser optics unit or polygon mirror, or after moving the machine.
- ♦ There are three adjustments.
 - » 2111 001: Fine adjustment, twice
 - » 2111 002: Fine adjustment, once
 - » 2111 003: Rough adjustment, once
- ♦ Normally, do SP 2111 003 first. Then do SP 2111 001.
 - » The screen displays the results of SP 2111 001. Also, you can see SP 2194 010 to 012.
 - » If you do the rough adjustment, then you must follow immediately with the fine adjustment.

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- ❑ If the error is more than 1.4 mm, the fine adjustment cannot correct it. The rough adjustment must be done, followed by the fine adjustment.

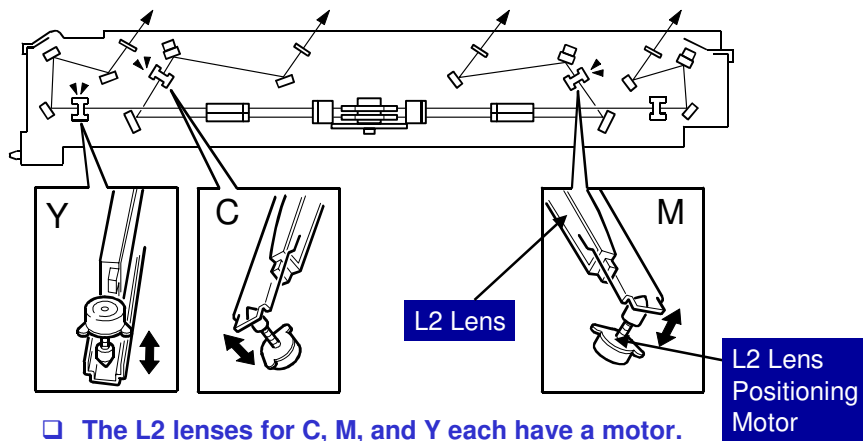
Line Position Adjustment and Process Control

- ❑ Sometimes, the conditions for the process control self check and for line position adjustment both occur at the same time.
- ❑ In these cases, the following occurs:
 - ♦ The process control pattern is developed on the transfer belt first.
 - ♦ Then the line position adjustment pattern is developed on the belt.
 - » In some cases, this pattern is made twice, as we saw earlier.
 - ♦ The process control and line position adjustment patterns on the belt go past the ID sensors, and the ID sensors read the patterns as they go past.
 - ♦ As a result, the process control and line position adjustment procedures are done at about the same time.

Slide 130

- ❑ The line position adjustment pattern is made twice in some cases, as we saw earlier (see the Adjustment Conditions slides 1 and 6).
- ❑ In theory, the two processes can be done at the same time:
 - The ID sensors used for process control are different from the sensors used for line position adjustment
 - Because of this, the sensor patterns for both processes can both be put on the transfer belt at the same time. (the patterns do not overlap)
- ❑ But, the laser cannot adjust its strength quickly enough across the main scan to put the patterns on the belt at the required image densities.

Main Scan Skew Correction

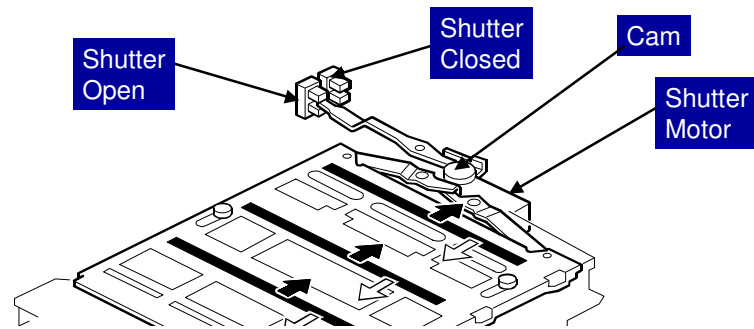


- ❑ The L2 lenses for C, M, and Y each have a motor.
- ❑ The angle of each L2 lens can be adjusted by these motors.
- ❑ The angle of the L2 lens for black is not changed.

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- ❑ The L2 lens positioning motors for magenta, cyan, and yellow adjust the angle of the L2 lenses for these three colours, based on the L2 lens position for black.

Shutter



- ☐ The shutter stops dust and toner from entering the laser optics unit.
- ☐ The shutter opens when the polygon motor starts, and closes after the polygon motor stops.
- ☐ The motor moves the shutter through a cam.
- ☐ Two sensors detect when the shutter is open and closed.

Slide 132

G133 service manual, Detailed Section Descriptions, Laser Exposure, Shutter Mechanism

- ☐ This mechanism makes sure that the shutter is only open when the laser is writing. At all other times, the shutter is closed, to stop dust and toner getting in.

Service Remarks

- ☐ SWITCH THE POWER OFF AND UNPLUG THE POWER CORD BEFORE STARTING WORK ON THE LASER UNIT
- ☐ Do not loosen the LD board securing screws.
- ☐ Do not adjust any of the VRs.
- ☐ Do not open the optical housing unit except when absolutely necessary for servicing.
- ☐ Do not touch the faces of the polygon mirrors.
- ☐ To avoid damage to the polygon motor, switch the machine off and wait 3 minutes to allow the motor to stop rotating before removing it.

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Laser Optics Housing Unit Replacement (1)

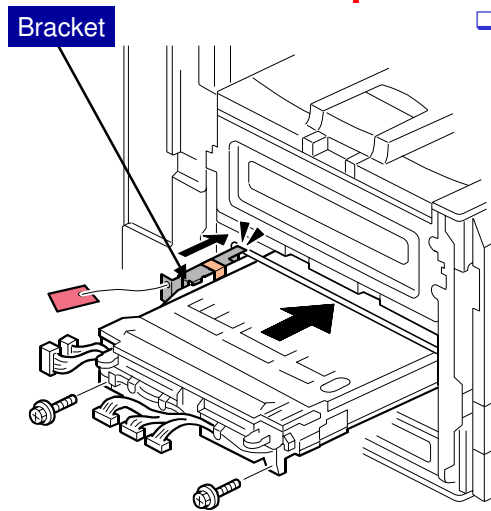
- ❑ **First, prepare the new laser optics housing unit.**
 - ◆ Remove the tag and sponge padding.
- ❑ **Then, before you switch the machine off, you must make some SP adjustments.**
 - ◆ These adjustments move the L2 lens positioning motors back to home position.
 - ◆ If this is not done, the motors in the new unit will be at the home position, but the SP setting could be different. This could cause errors in skew correction.
 - ◆ After you install the new unit, you will do the forced line position adjustment, and this will set up the motors and SPs correctly.
- ❑ **Note: If you forget to do these SP adjustments, there is a recovery procedure in the manual.**
- ❑ **Then you can remove the old unit and install a new one.**
- ❑ **After you install the new unit, do the SP adjustments, and the line position adjustment, as explained in the manual.**

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G133 Service Manual, Replacement and Adjustment, Laser
Optics

- ❑ This is a bit tricky, so go over the main points with the class, on this slide, before they start the procedures.

Laser Optics Housing Unit Replacement (2)



- When you install the new unit, do not remove the bracket until near the end of the installation procedure (the correct time is stated in the manual).
- ◆ This bracket protects a capacitor on the unit. If the bracket is removed too early, you can break the capacitor on the corner of the main frame when you install the new unit.

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Laser Optics Housing Unit
Replacement (3)

Input data for SP modes

Main Scan Length Detection Disp. Bk SP 2-185-001: 247975

Color Registration Correction Bk SP 2-101-001: -031

[A]

[B]

OK

1

- ❑ The sheet that is packed with the new laser optics housing unit clearly shows which numbers to store in the SP modes.
- ❑ If that is not enough, look at the replacement procedure in the service manual for a full explanation.

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Replacement (1)

☐ **Do the following procedures**

- ♦ Laser Unit Components: G133 Service Manual, Replacement and Adjustment, Laser Optics
- ♦ Image Adjustments (Registration): G133 Service Manual, Replacement and Adjustment, Image Adjustments
 - » These image adjustments must be done after replacing the laser optics housing unit or the polygon mirror motor.

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- ☐ Have the trainees remove and replace the parts in this section of the manual.
- ☐ Remind them to follow all notes and cautions in the manual.
- ☐ See the next slide for more notes.

Replacement (2)

❑ Laser Optics Housing Unit

- ◆ When you install the new unit, do not remove the bracket until near the end of the installation procedure (the correct time is stated in the manual).
- ◆ After you install a new unit, you must input values from a decal and make test prints, as explained in the manual.
- ◆ Then you must do the forced line position adjustment (SP 2111 003, then 2111 001).

❑ Polygon Mirror Motor

- ◆ After you install a new unit, you must do the forced line position adjustment (SP 2111 003, then 2111 001).

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- ❑ Have the trainees remove and replace the parts in this section of the manual.
- ❑ Remind them to follow all notes and cautions in the manual.

SP Modes

- ❑ **2193: Conditions for line position adjustment**
- ❑ **2194: Displays the results for automatic line position adjustment**

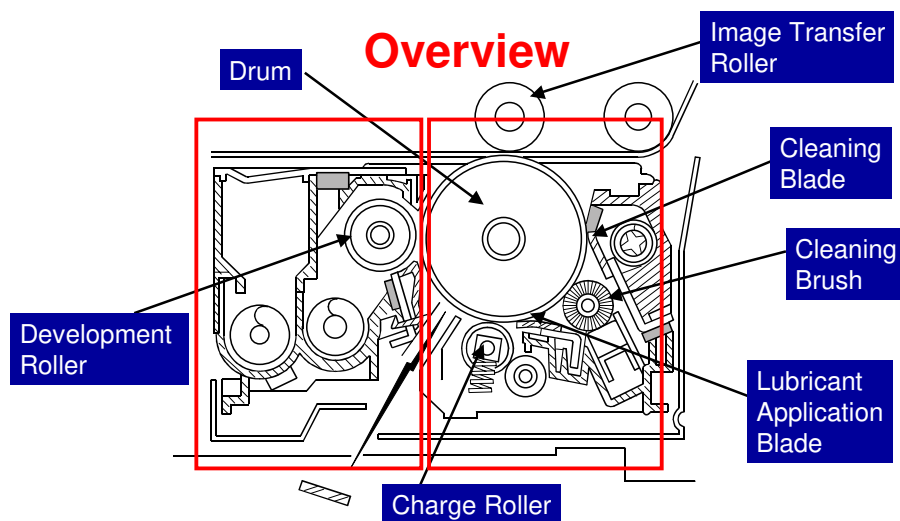
Slide 139

APOLLON-P1 TRAINING

PCU

Slide 140

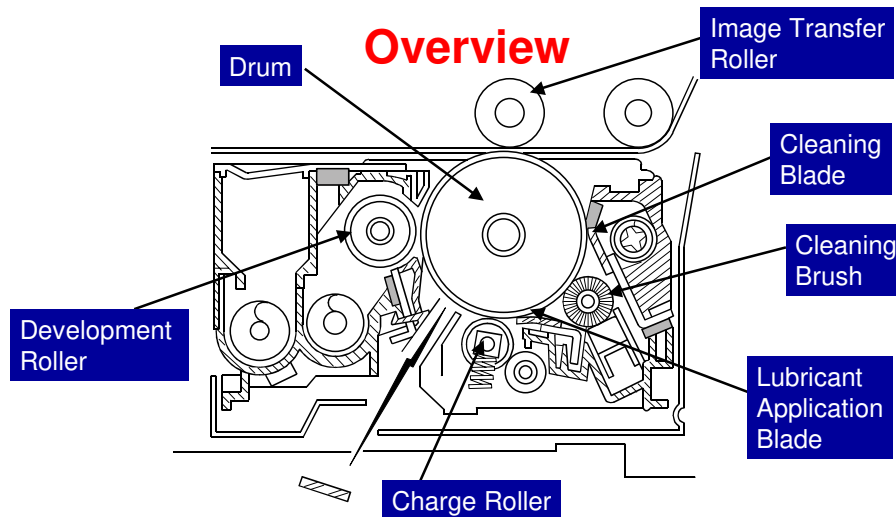
☐ No additional notes



❑ **PCU = Development unit + Drum unit**

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- ❑ The PCU is divided into two parts, as shown by the red boxes on this slide. These two parts are the development unit (on the left) and the drum unit (on the right).



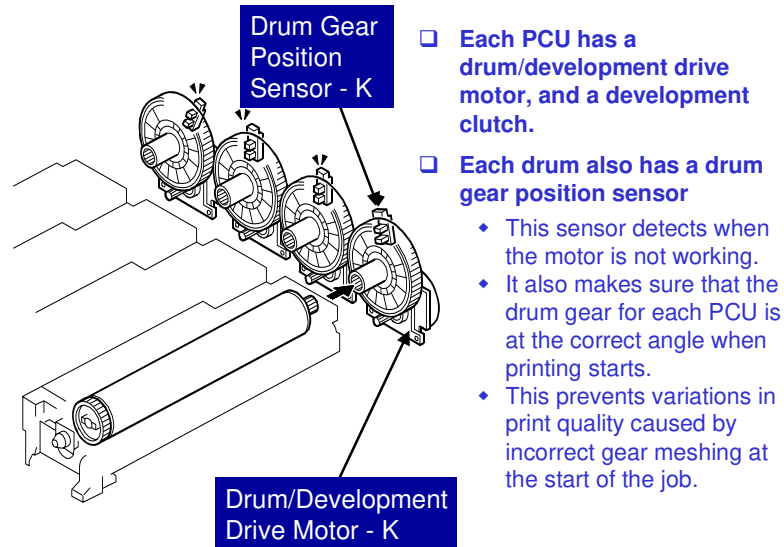
- ❑ **One PCU for each colour.**
 - ◆ Each PCU has the same components, but they are not interchangeable (you cannot use a PCU for yellow in the cyan position, for example).
- ❑ **Four colours are developed at the same time.**

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G133 Service Manual, Detailed Section Descriptions, PCU, Overview

- ❑ This shows the most important components of the PCU.
- ❑ The image transfer roller pulls the toner off the PCU and onto the transfer belt.
- ❑ Interchangeability of units: The drum units for Y, C, and M are the same (except for the labels on the front), but the front panel for the K drum unit is different.

Drum Drive



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G133 Service Manual, Detailed Section Descriptions, PCU, Around the Drum, Drum Drive

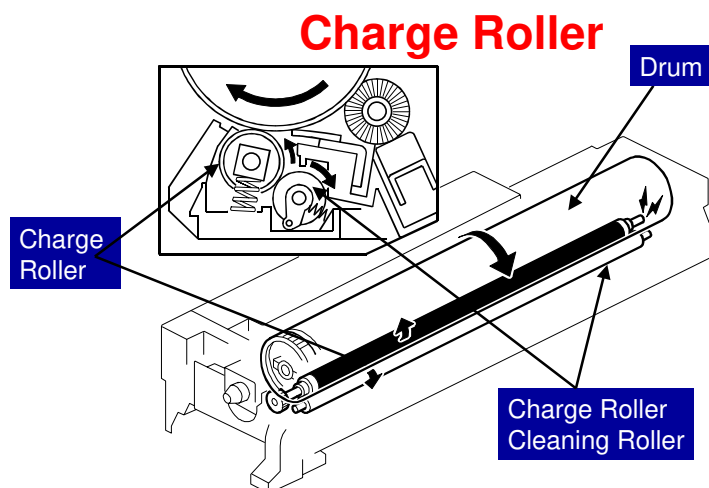
- The drum units are not interchangeable. We do not recommend that you install a C drum in the location for M, for example.
- SC380 occurs if the sensors detect that the drums are not turning.
- In the B230 series (Athena-C1), the three color PCUs are all driven by the same motor. This is also a good method for preventing color registration errors, and it is better for reduced energy consumption. However, with one motor for each colour, the adjustment can be more precise. But this is a difficult mechanism to implement and calibrate in the factory, so it is only employed for higher spec models, such as the G133 series.

When are the Drum Gear Positions Checked?

- ❑ **The machine automatically checks the drum gear position at these times. This is called the 'drum phase adjustment'.**
 - ◆ When a new PCU is installed.
 - ◆ When a new image transfer belt unit is installed.
 - ◆ If the machine detects a shift in the drum positions during the automatic line position adjustment.
- ❑ **Can also be done manually with SP 1902.**
 - ◆ Must be done after you take out and put back the drive unit.
 - ◆ See the SP table for full details on this SP.

Slide 144

No additional notes



- ☐ The roller does not contact the drum (there is a very small gap between roller and drum).
- ☐ The cleaning roller always contacts the charge roller.

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G133 Service Manual, Detailed Section Descriptions, PCU,
Around the Drum, Drum Charge and Quenching

Charge Roller Voltage

- ❑ The charge roller gives the drum surface a negative charge.
- ❑ An ac voltage is also applied to the charge roller, at a constant current.
 - ◆ The ac voltage helps to ensure that the charge given to the drum is as uniform as possible.
- ❑ The high voltage supply board - C.B, at the rear of the machine, supplies the ac and dc to the charge roller.
- ❑ The machine automatically controls the charge roller voltage if automatic process control is enabled (this occurs if SP3-041-1 is set to "CONTROL").
- ❑ However, if process control is switched off, (this occurs if SP3-041-1 is set to "FIXED"), the dc voltage is the value stored in SP2-005-1 to -12 (do not adjust in the field unless advised to do so).

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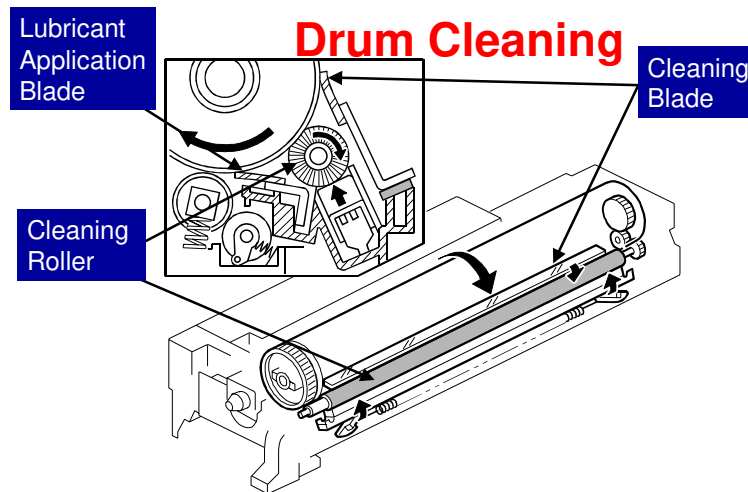
G133 Service Manual, Detailed Section Descriptions, PCU,
Around the Drum, Drum Charge and Quenching

Quenching

- ❑ The laser exposes all areas of the drum at the end of each job.
- ❑ This removes any charges remaining on the drum.

Slide 147

G133 Service Manual, Detailed Section Descriptions, PCU,
Around the Drum, Drum Charge and Quenching



- ❑ The cleaning blade removes remaining toner from the drum.
 - ◆ This toner falls onto a collection coil, and is discarded.
- ❑ The cleaning roller applies lubricant to the drum.
- ❑ The lubricant application blade makes sure that the lubricant is applied evenly.

Slide 148

G133 Service Manual, Detailed Section Descriptions, PCU,
Around the Drum, Drum Cleaning

- ❑ The toner collection mechanism from the PCU is on the next slide.

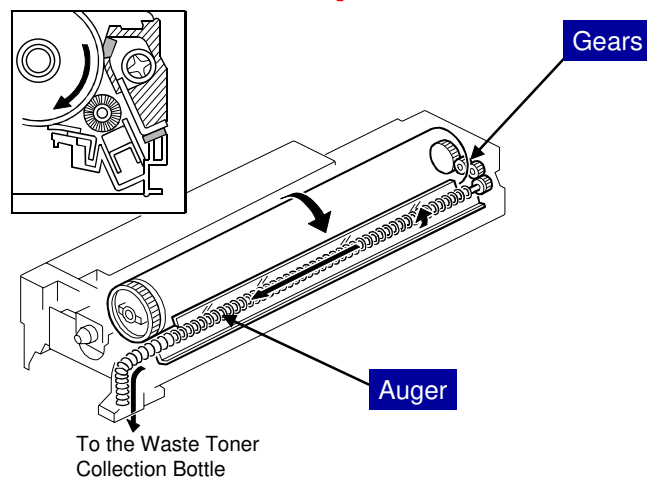
Drum Cleaning – Reverse Rotation

- ❑ **At 0.5 seconds after the end of the job, the image transfer belt motor reverses for 40 ms.**
 - ◆ This removes toner at the edge of the cleaning blade.
 - ◆ This reverse rotation is done if the temperature is above the value of SP 3517 (default 40 °C)

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- ❑ The reverse rotation at the end of the job is controlled by SP2901 and 2902 (do not adjust, DFU).
 - It is also done for the image transfer belt at the same time, for the same purpose.

Waste Toner Transport from PCU

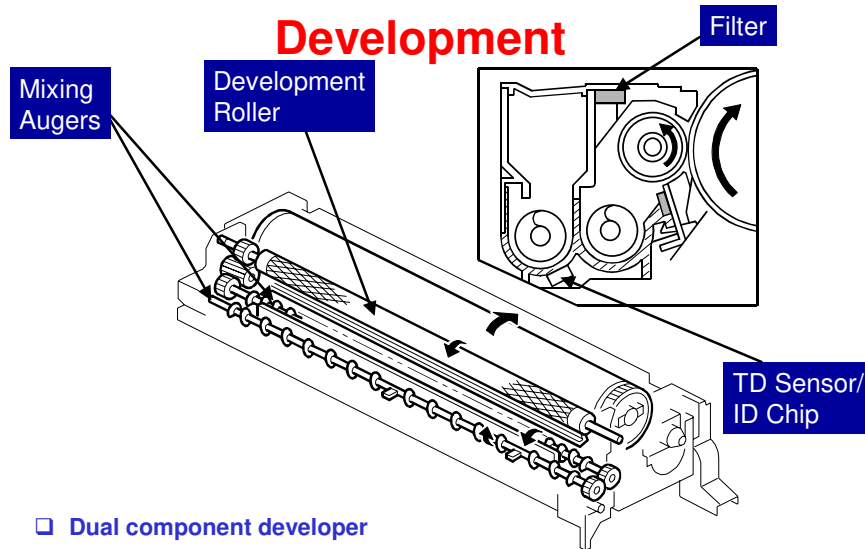


- ❑ The gears at the end of the drum drive the toner collection auger.

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G133 Service Manual, Detailed Section Descriptions, PCU,
Around the Drum, Drum Cleaning

- ❑ The waste toner collection bottle and collection mechanism is described in a later section.

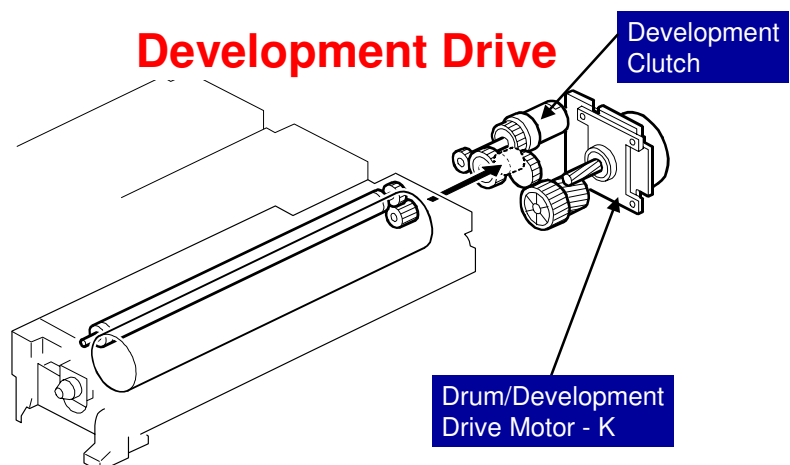


- ❑ **Dual component developer**
- ❑ **TD sensor in each development unit**
 - ◆ The TD sensor contains the ID chip that contains information about the PCU.

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G133 Service Manual, Detailed Section Descriptions, PCU,
Development, Development Operation

- ❑ The filter makes sure that pressure does not build up inside the development unit.

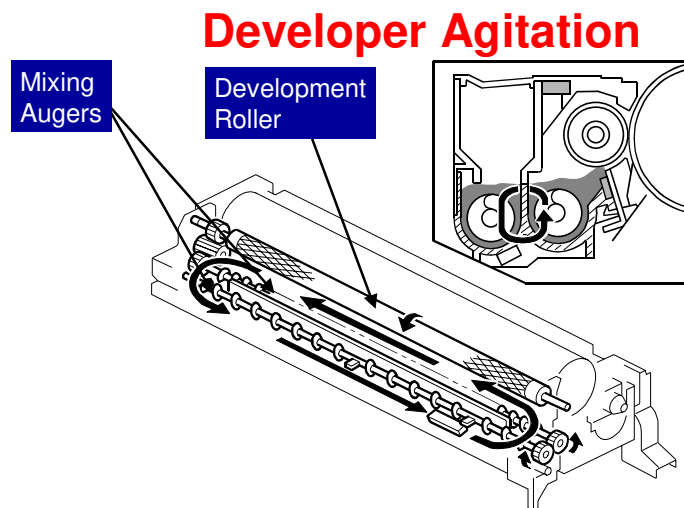


- ❑ For each PCU, the drum/development drive motor controls the development unit.
 - ◆ This motor also controls the drum, so a clutch is necessary.
 - ◆ Each PCU has a motor and a clutch.

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G133 Service Manual, Detailed Section Descriptions, PCU, Development, Drive

- ❑ The mechanism for black is shown as an example.



- ❑ Two augers circulate the toner in the development unit during developer initialization, during toner supply, and during process control self checks.

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G133 Service Manual, Detailed Section Descriptions, PCU,
Development, Developer Agitation

- ❑ This diagram shows how the augers move the toner around inside the development unit.

Developer Damage during Storage

- ☐ If the developer was stored at more than 50 °C, the developer can become solid.
- ☐ If this occurs, you will get a developer initialization error at installation.
- ☐ At this time, you must do the following procedure:
 - ◆ You should also do this procedure when you install a new development unit.
- ☐ 1. Remove the (old) PCU.
- ☐ 2. Keep the (new) PCU level and shake it several times from side to side.
- ☐ 3. Install it in the machine.

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No additional notes

Refresh Mode

- ❑ While making prints with low coverage, the developer is agitated with less toner consumption and the toner carrier attraction tends to increase. This may cause low image density or poor transfer (white dots).
- ❑ To prevent this, the coagulated toner or overcharged toner must be consumed. To do this, 'refresh mode' is done when the total number of prints with low coverage gets to a certain level.
- ❑ In 'refresh mode', the machine makes a band for each color to consume some of the toner in the development unit and add fresh toner from the cartridge.

Slide 155

- ❑ SP 3516 controls this feature. Do not adjust.

New Unit Detection

- ❑ **The TD sensor assembly contains the ID chip for the PCU. This chip tells the machine if the PCU is new or not.**
- ❑ **When the machine detects a new PCU, the machine automatically does the following:**
 - ◆ PM counter clear for items related to the PCU
 - ◆ Developer initialization
 - ◆ Charge roller voltage control
 - ◆ Process control
 - ◆ Line position adjustment
- ❑ **You cannot replace the drum, development unit, or developer as individual parts.**

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G133 Service Manual, Detailed Section Descriptions, PCU,
Development, New Unit Detection

- ❑ SP 3901: Turns new PCU detection off

ID Chip

- ❑ The ID chip is part of the TD sensor assembly.
- ❑ The ID chip contains counters and other data about the PCU, drum unit, and development unit.
- ❑ If you replace the development unit with a new one, the counter information for the drum unit is not kept on the new ID chip.

Slide 157

- ❑ This is a machine limitation. It may change in the future.

Replacement and Adjustment (1)

☐ Do the following procedures

- ◆ G133 Service Manual, Replacement and Adjustment, Image Creation
 - » Do the PCU replacement procedure.
 - » The counter is reset automatically when the machine detects a new PCU (the ID chip in the development unit is used to detect a new PCU). Also, developer initialization is done.
 - » In this model, there are no Drum Unit and Development Unit, and Developer procedures. Individual components of the PCU cannot be replaced.

Slide 158

Replacement

- ☐ Have the trainees remove and replace the parts in this section of the manual.
 - ☐ Remind them to follow all notes and cautions in the manual.
- Troubleshooting, Process Control Error Conditions
- ☐ An explanation of the codes displayed by SP3014 001 is in this section of the service manual.

Replacement and Adjustment (2)

□ Do the following procedures

- ♦ G133 Service Manual, Removal and Adjustment, Drive Unit
 - » Gear unit: Do the drum phase adjustment with SP 1902 after you put the drive unit back in the machine.
 - Do it every time you put the gear unit back, not only when you install a new one. The machine must check that the unit is installed correctly.

Slide 159

No additional notes

APOLLON-P1 TRAINING

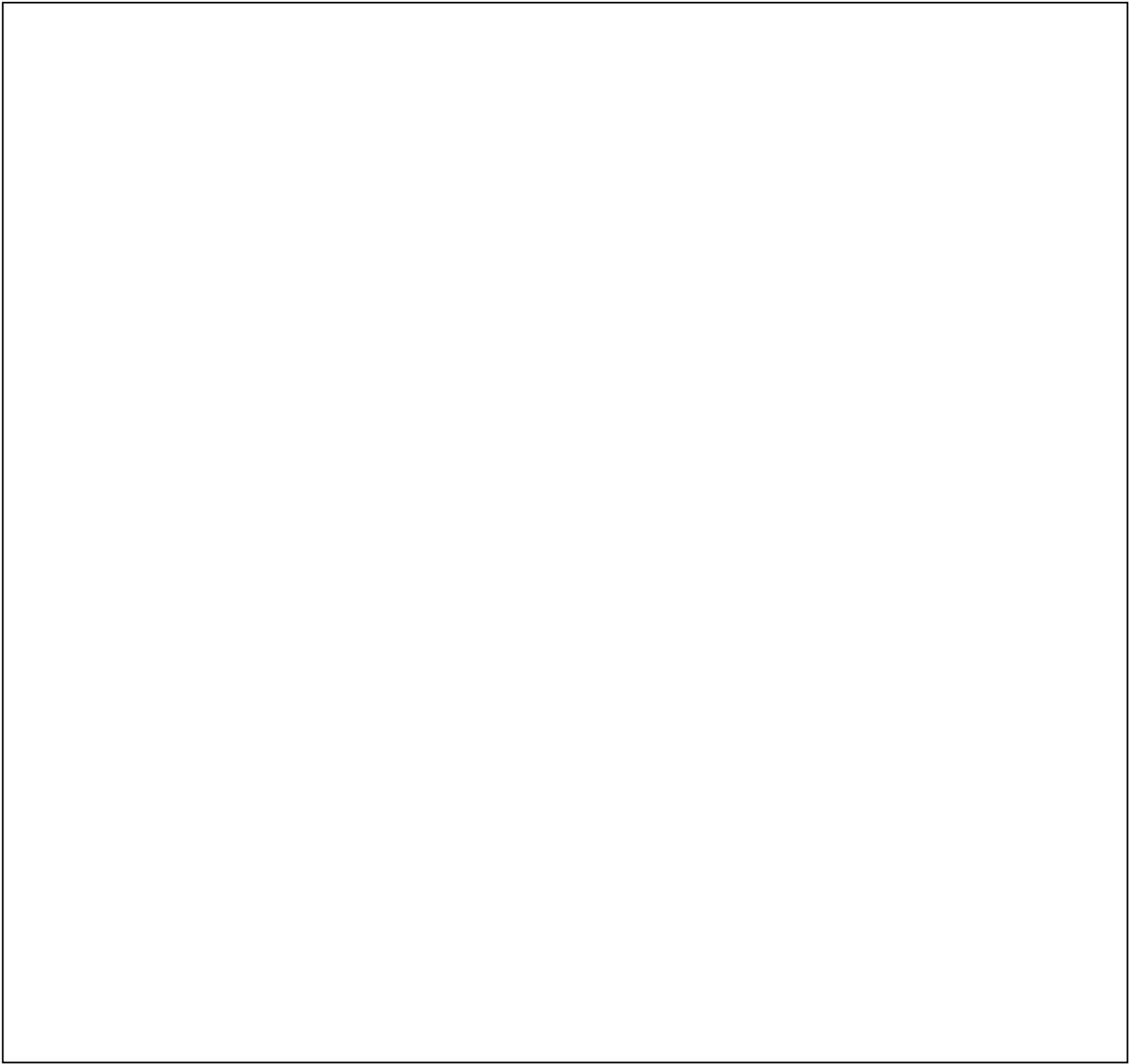
PROCESS CONTROL

Slide 160

- ☐ Process control will be described briefly in this section.

Overview

Slide 161



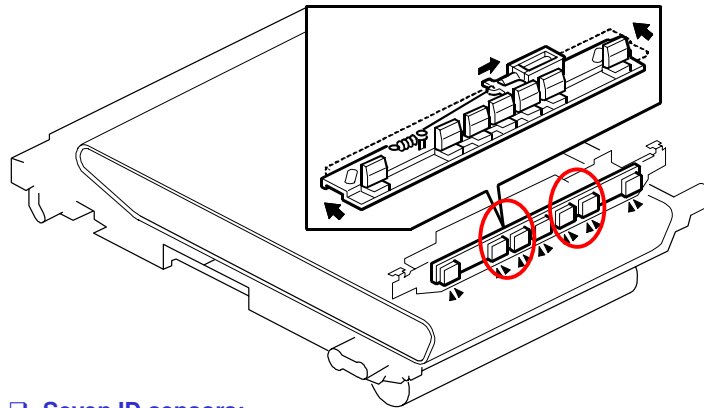
What is Done?

- ❑ **This machine has two forms of process control.**
 - ♦ Potential control
 - ♦ Toner supply control
- ❑ **Process control uses these components:**
 - ♦ Seven ID sensors
 - » Four sensors are used for process control. Another three sensors are used for automatic line position adjustment
 - ♦ Toner density sensor

Slide 162

- ❑ **Line position adjustment:** This process prevents color registration errors and skew. It is described in the Laser Exposure section.

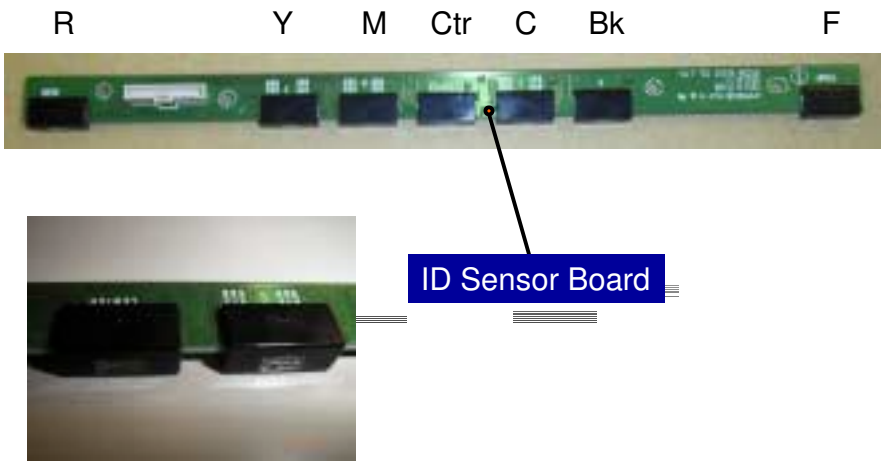
ID Sensors



- ❑ **Seven ID sensors:**
 - ◆ Three for line position adjustment: Left end, middle, right end
 - ◆ Four for process control (one for each colour toner): In the red circles as shown above
- ❑ **When the sensors are not used, the solenoid moves the shutter to cover the sensors. This prevents dust on the sensors.**

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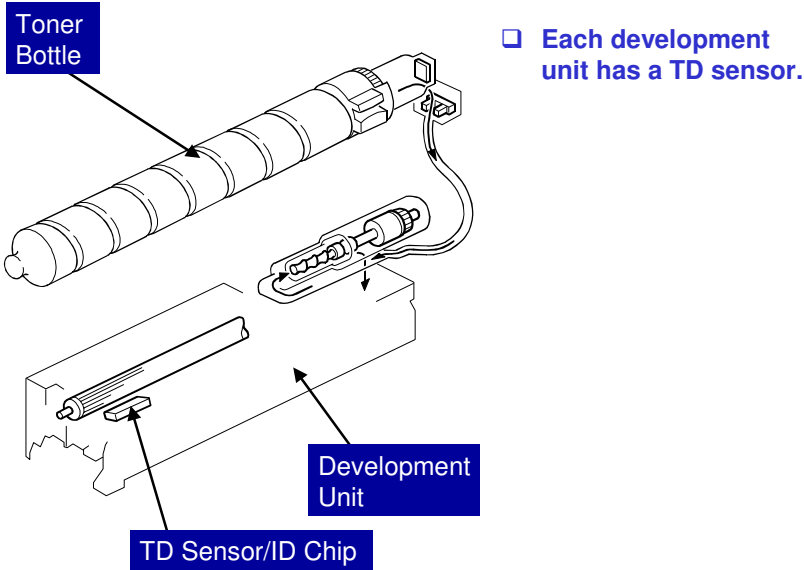
ID Sensors



Slide 164

❑ R: Rear, F: Front

TD Sensor



Slide 165



Potential Control

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No additional notes

Overview

- **The machine determines the best possible V_D , V_B , and V_L , based on current machine conditions.**
 - ◆ V_D : Drum potential without exposure – to adjust this, the machine adjusts the charge roller voltage.
 - ◆ V_B : Development bias
 - ◆ V_L : Drum potential at the strongest exposure – to adjust this, the machine adjusts the laser power
- **At the same time, the machine also determines V_{TREF} : Reference TD sensor output, used for toner supply control.**

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No additional notes

When is it Done? (1)

❑ Initial:

- ♦ Immediately after the power is turned on, or when the machine recovers from the energy saver mode.
- ♦ Done if one of these conditions occurs:
 - » Temperature has changed by more than a certain amount since the previous adjustment.
 - » Humidity has changed by more than a certain amount since the previous adjustment.
 - » 200 b/w or 100 full colour prints were made since the previous adjustment (SP 3511 005/006).
 - » The machine was not used for more than 6 hours (SP 3522 002).

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- ❑ The threshold levels are set by SP modes, as explained in the service manual.
- ❑ No process control before or after ACC.

When is it Done? (2)

- ❑ **At the end of a job:**
 - ♦ Done if 250 b/w or 100 full colour prints were made since the previous adjustment (SP 3515 001/002).
- ❑ **During a job:**
 - ♦ Done if 500 b/w or 200 full colour prints were made since the previous adjustment (SP 3515 003/004).
 - » The machine checks the above condition every 30 pages (SP 3512 001). Then, line position adjustment is done if the condition occurs.

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- ❑ The intervals are set by SP modes, as explained in the service manual.
- ❑ You cannot adjust the intervals with SP 3515 001 to 004. These SPs only show the current settings. To change the current settings, you must adjust SP 3511 001 to 004 (base value) and SP 3511 022 to 029 (coefficients)

When is it Done? (3)

□ In standby mode (but not in energy saver mode):

- ♦ Done if one of these conditions occurs:
 - » Temperature has changed by more than a certain amount since the previous adjustment.
 - » Humidity has changed by more than a certain amount since the previous adjustment.
 - » 200 b/w or 100 full colour prints were made since the previous adjustment (SP 3511 005/006).
 - » The machine was not used for more than 6 hours (SP 3531 001).
- ♦ The machine checks the above conditions in standby mode every 10 minutes (SP 3512 002). Then, process control is done if one of the conditions occurs.

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No additional notes

When is it Done? (4)

- ☐ After toner end recovery
- ☐ After developer initialization:
 - ◆ Developer initialization occurs automatically after a new PCU has been installed
- ☐ Forced (manual execution):
 - ◆ Use SP 3011 001
 - ◆ Process control counters (SP 3510) are not reset after a forced execution

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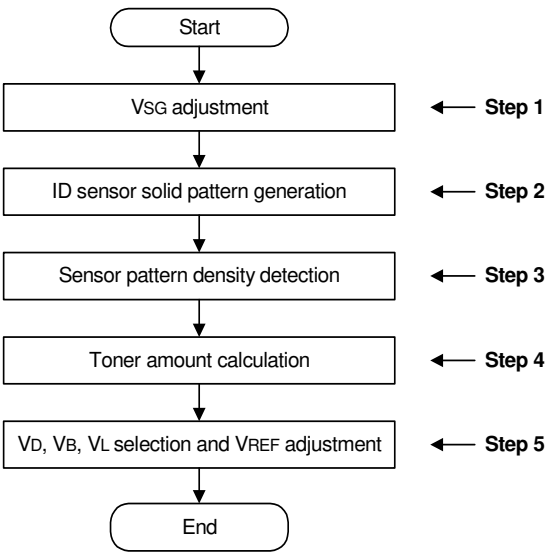
- ☐ No additional notes

What Values are used if Potential Control is Disabled?

- ❑ If potential control is disabled (SP3-041-001 is set to 0), V_D and V_B are fixed by SP mode settings.
 - ◆ SP2-005 for V_D , SP2-229 for V_B
 - ◆ For toner supply: Fixed supply mode is used (V_{TREF} is not used)
- ❑ If LD power control is disabled (SP3-041-002 is set to 0), the LD power is fixed by an SP mode setting.
 - ◆ SP2-221 for V_L

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What is Done?



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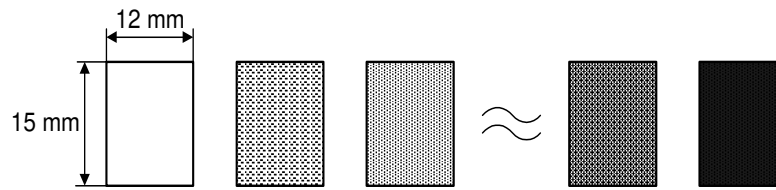
Step 1: Vsg Adjustment

- ❑ **ID sensor: Calibrated so that the signal when reading the bare transfer belt is 4.0 ± 0.5 Volts**
 - ◆ This compensates for changes in the image transfer belt and ID sensor.
 - ◆ All 7 sensors on the ID sensor board are calibrated at this time.
 - ◆ SP 3325: Displays the results of the calibration
- ❑ **This step is always done during initial process control.**
- ❑ **But it is not always done during a job or at job end.**
 - ◆ More than 500 prints (SP3-511-007) must be made since the last VSG adjustment. This is to reduce the total time used for process control.
- ❑ **SC400 is displayed if VSG is out of adjustment range sequentially 3 times.**
- ❑ **SP3321: Forced VSG Adjustment for each sensor**

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- ❑ SP 2140 to 2145 are for designer use only. They cannot be used in the field to troubleshoot problems with the ID sensor.

Steps 2 to 4: Toner Amount for Each Grade



- ❑ 10 solid grades between white and 100% C, M, Y, or K
- ❑ Each grade is made by changing the development bias and charge roller voltage.
 - ◆ The difference between development bias and charge roller voltage is always the same. But the development potential changes for each grade.
- ❑ ID sensor: Measures the light reflected from each grade
- ❑ The machine calculates the amount of toner per unit area required to make each grade.

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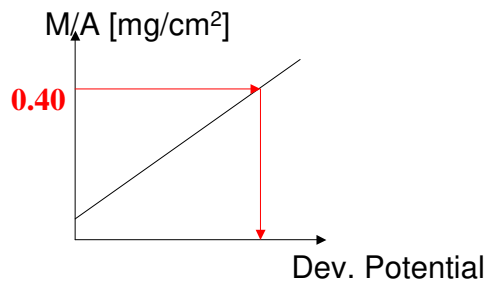
More On Steps 2-4

- ❑ **The machine makes a 10-grade pattern on the image transfer belt.**
- ❑ **The development potential changes for each grade.**
 - ◆ The development potential is the difference between the development bias and the charge remaining on the drum where the laser writes a black area.
 - ◆ The development bias changes for each grade, so the development potential also changes.
- ❑ **The ID sensor measures the light reflected from each pattern.**
 - ◆ From this, the machine can calculate how much toner is deposited on the transfer belt for each of the 10 grades.
 - ◆ This is expressed as M/A (mass per unit area), in mg/cm².

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Step 5: Determining VD, VB, and VL

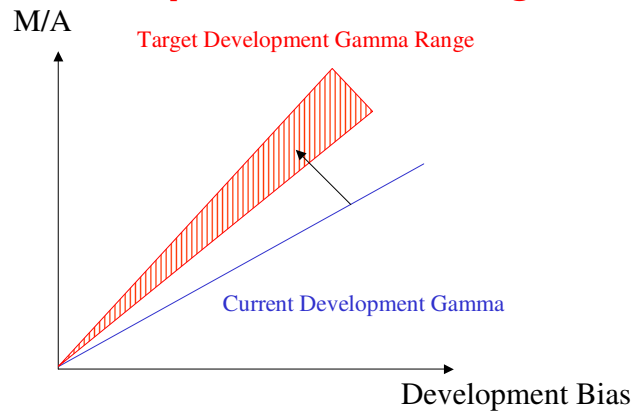
- ❑ The machine plots the 10 calculations of M/A against the development potential that was used to make each of the grades, and draws a line through them.
- ❑ Then, it determines the development potential that would be required to deposit 0.40 mg/cm² of toner. 0.40 is known as the 'target M/A'.
 - ♦ SP3-501 adjusts this but it is not recommended.
- ❑ This development potential is then used to determine the best values of VD, VB, and VL to use with the machine in its current condition. This process ensures that enough toner is deposited to make black pixels.



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- ❑ SP 3241: These settings determine how the machine sets the charge roller voltage, based on the development bias
 - Default: Charge roller voltage = Dev bias + 140 V
- ❑ SP 3242: These settings determine how the machine sets the LD power, based on the charge voltage. These SPs set the coefficients that are used in the calculation. There is no further information on this.

Step 5: Determining VTREF



- ❑ The development gamma must be within the range indicated above in red.
- ❑ VTREF is adjusted so that development gamma falls within this range.

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- ❑ The slope of the line is the development gamma, which is equivalent to the development potential.
- ❑ If the slope is too steep, the development potential will be too high, and the applied development bias will cause the mass of toner per area to be too high.
- ❑ If the slope is too shallow, the development potential will be too low, and not enough toner will be attracted to the latent image with the standard development bias.

VTREF Correction

- ❑ In this model, VT_{REF} compensation is not done by generating the pattern during a print job.
- ❑ In this model, VT_{REF} is corrected for pixel coverage.
 - ♦ The correction is done during process control.
 - ♦ It is based on these three factors:
 - » Average coverage since the previous process control
 - » Change in development gamma since the previous process control
 - » Change in VT since the previous process control

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Details about Vtref correction

- ❑ At the process control self check, Vtref is corrected as follows.
- ❑ New Vtref = Vtref at developer initialization + Vtref correction.
 - SP 3222 001 to 004 displays new Vtref
 - SP 3222 005 to 008 displays Vtref at developer initialization
 - SP 3222 009 to 012 displays the Vtref correction.
- ❑ To get the new Vtref, the Vtref correction is always applied to the 'Vtref at developer initialization'. It is not applied to the current Vtref (the Vtref that was determined at the previous process control).
- ❑ For more, see the notes page for the next slide (blank slide)

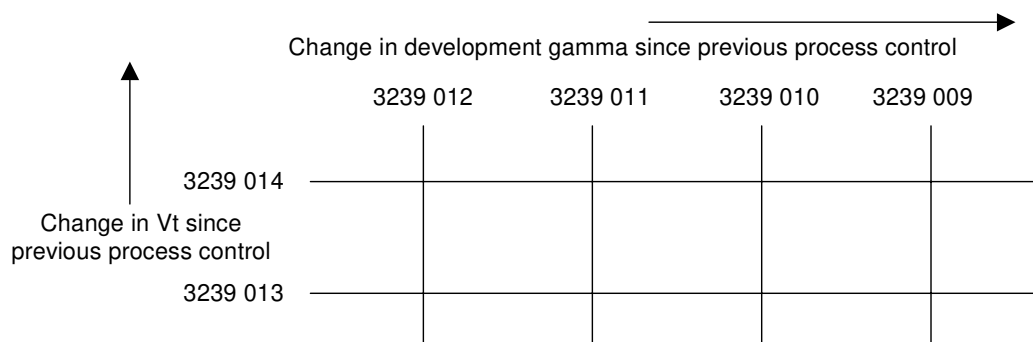
Blank Slide

- This is a blank slide

Slide 180

How is the V_{tref} correction calculated?

- At process control, the machine determines the changes in development gamma and in V_t since the previous process control.
- The ranges of these two factors are divided up by threshold levels (two for V_t , and four for gamma) as shown below. The result can be thought of as an array of squares. As shown below
- Then, in each of the 'squares' in the diagram below, there is a different correction to apply to V_{tref} .



- Finally, a correction is applied, based on average pixel coverage since the previous process control.
 - The correction is a multiplication coefficient. It depends on the settings of SP 3224.
 - Low coverage: SP 3224 005 to 008
 - Medium coverage: No correction
 - High coverage: SP 3224 001 to 004

Toner Density Adjustment Mode

Overview

- ☐ Process control adjusts the toner density so that the density of each color in the image is correct.
- ☐ But, sometimes, process control adjusts the toner density too slowly, and the first few copies after process control have incorrect toner densities.
- ☐ Users of older models have complained about this.
- ☐ In this new model, a new process was included to take care of this. It is called 'toner density adjustment mode'.
- ☐ It brings toner concentrations to the correct values much more quickly.

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Toner Density Adjustment Mode

What is Done?

- ❑ The machine makes sensor patterns and checks the current development gamma.
- ❑ Development gamma too low: If the following condition occurs, the machine increases the toner density. To do this, it supplies toner to the development unit.
 - ♦ Current gamma < Target gamma - 0.2 (SP3-239-012)
- ❑ Development gamma too high: If the following condition occurs, the machine decreases the toner density. To do this, it consumes some of the toner in the development unit.
 - ♦ Current gamma ≥ Target gamma + 0.2 (SP3-239-009)

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These two methods of toner density adjustment are called 'toner supply mode' (confusing!), and toner consumption mode.

Toner Density Adjustment Mode

When is it Done?

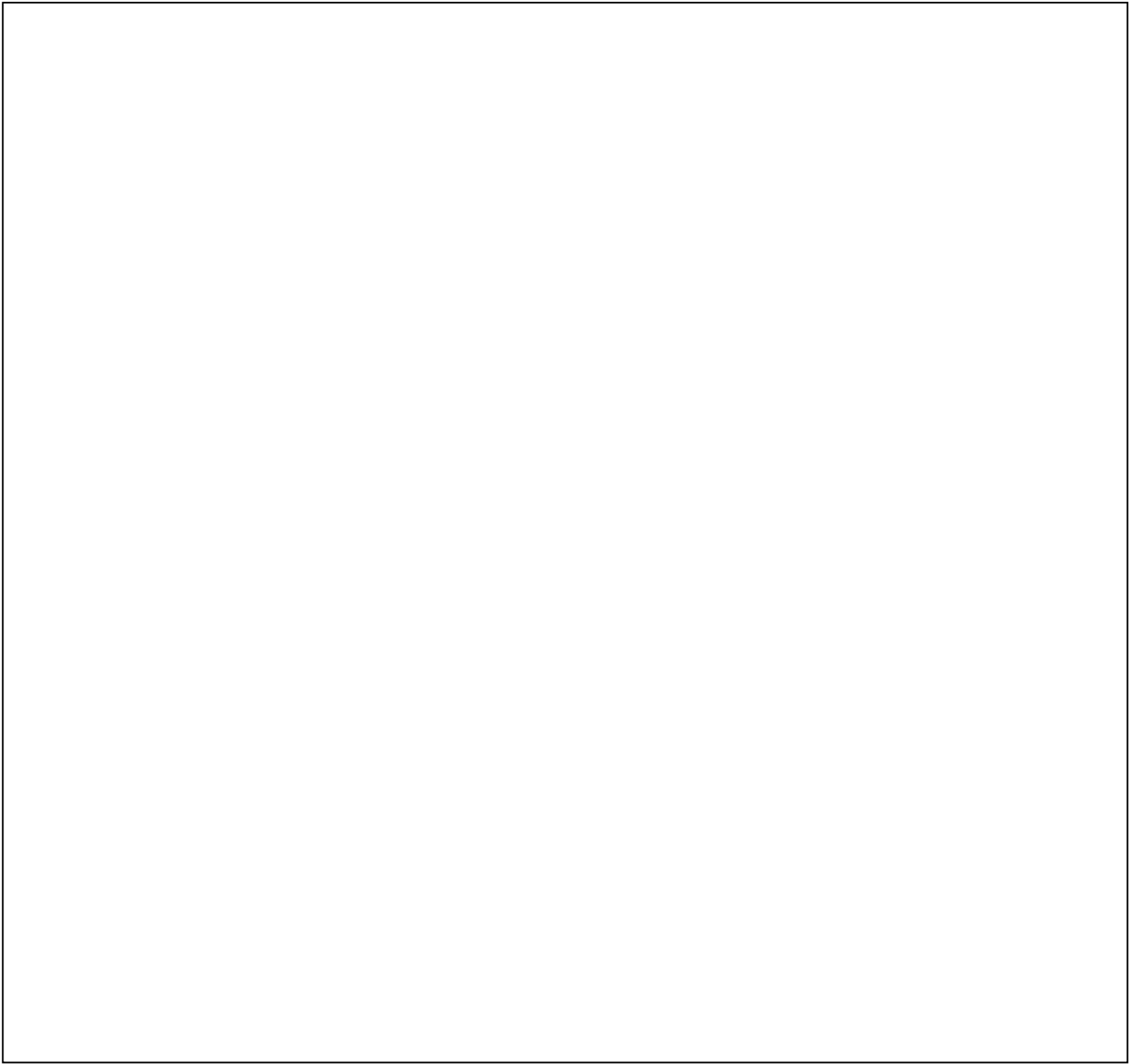
- ☐ **After power-on (toner supply mode only, no consumption): SP 3043 001**
- ☐ **Developer initialization: SP 3043 002**
- ☐ **Before ACC: SP 3043 004**
 - ♦ In this way, the customer can execute the toner density adjustment mode, if they think that colour balance is not good. It becomes part of the ACC process.
- ☐ **At end of job (toner supply mode only, no consumption): SP 3043 006**
- ☐ **The machine has a forced toner density adjustment mode (SP 3011 002).**

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- ☐ SP 3043 can be adjusted to control when toner density adjustment mode is done, or disable the feature at each of the times listed on the slide.
- ☐ In addition to the times stated on the slide, it is possible to do toner density adjustment in standby mode (3043 003).

Toner Supply Control

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Overview

- ❑ **Uses these components:**
 - ◆ TD sensor: Detects how much toner there is in the developer
 - ◆ ID sensor: Measures the density of standard sensor patterns during process control.
 - ◆ Pixel counter: Counts pixels to determine how much toner for each colour is used on the page
- ❑ **The result of toner supply control determines how long the toner supply clutch turns on for.**
 - ◆ This determines the amount of toner supplied.
- ❑ **This is done before every development for each color.**

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Toner Supply Control Modes (1)

- ❑ **This machine uses 3 toner supply modes.**
 - ◆ PID control mode
 - ◆ PID control mode with fixed VTREF
 - ◆ Fixed supply mode
- ❑ **The mode used depends on SP3-044-001 to –004.**
 - ◆ You can select a different mode for each colour, if necessary.

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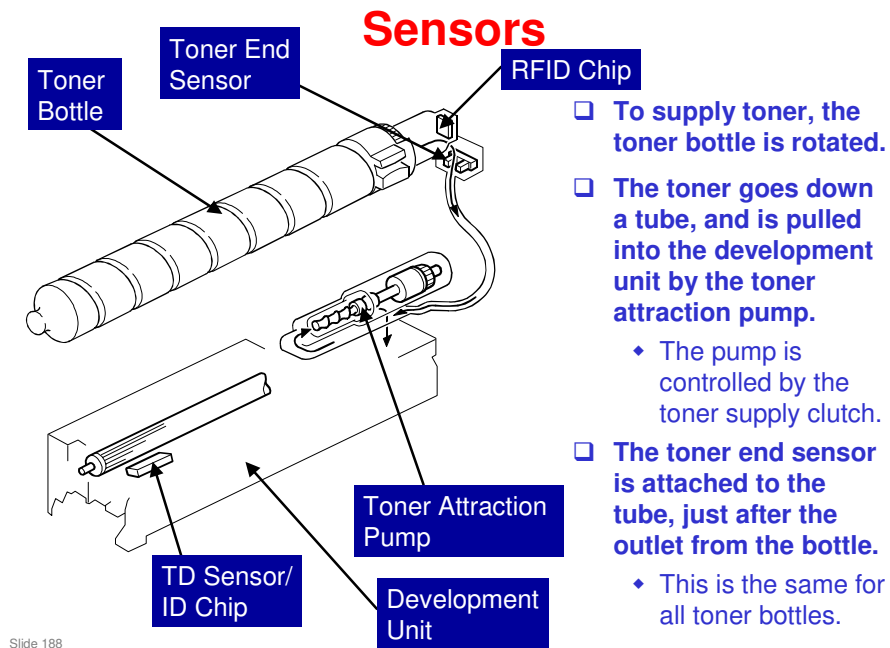
- ❑ PID: Proportional Integral Differential

Toner Supply Control Modes (2)

- ❑ **PID control mode: This is the default mode.**
 - ◆ Uses the TD sensor, ID sensor, and pixel count.
 - ◆ VTREF is adjusted by process control.
- ❑ **PID control mode with fixed VTREF**
 - ◆ The machine changes to this mode if the ID sensor breaks.
 - ◆ Uses only the TD sensor.
 - ◆ VTREF is fixed at the value stored in SP3-222-001 to –004.
- ❑ **Fixed supply mode**
 - ◆ The machine changes to this mode if the TD sensor breaks.
 - ◆ The amount of toner supply depends on SP3-401-001 to –004.
 - » The default is 70% of normal supply, to prevent excessive supply of toner.

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- ❑ **PID: Proportional Integral Differential**



G133 service manual, Detailed Section Descriptions, Toner Supply, Overview

- ❑ This mechanism is the same for each of the four toner bottles in the machine.
- ❑ The TD sensor contains an ID chip that contains information about the PCU, development unit, and drum unit, such as counters.
 - We discuss this in the PCU section.
- ❑ The RFID chip in the toner bottle contains data on the amount of toner consumed from the bottle, and is used for toner bottle detection (the machine uses it to detect if the bottle installed or not).

Toner Near-end Detection

- ❑ To detect toner near-end, the machine uses the following counters:
 - ◆ Operation time counter of the toner attraction pump
 - ◆ Pixel counter
- ❑ If one (or both) of these counters detect that the remaining toner amount is 50 g or less, the machine enters the near-end condition.

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- ❑ The two counter values on the slide are stored in the RFID chip on the toner cartridge, and copied to the NVRAM on the EGB.
- ❑ The toner attraction pump is part of the toner supply mechanism. It pulls toner down from the toner bottle and into the development unit. We will see the mechanism in more detail in the 'Toner Supply' section of the course.

Toner End Detection

- ❑ **To detect toner end, the machine uses the TD sensor (there is one below each toner bottle).**
 - ♦ Toner end is detected if both of these conditions occur:
 - » $VT - VTREF \geq 0.5$ (SP3-101-021)
 - » $SUM(VT - VTREF) \geq 10$ (SP3-101-026)
- ❑ **The machine must be in a toner near-end condition. If it is not, then the machine does not check for toner end.**

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What Happens if Toner End is Detected?

- ❑ If toner end is detected for black, the toner bottle must be replaced or the machine cannot print.
- ❑ If toner end is detected for C, M, or Y, the machine can print in black and white only. Color print jobs cannot be started.
 - ◆ If C, M, or Y toner ends during a color-printing job, the job is suspended until toner is supplied.
 - ◆ If new color toner is not installed, the user can print black-and-white jobs only.

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Toner End Recovery

- ❑ The machine assumes that the toner cartridge was replaced if either of the following occurs when the near-end or end status exists:
 - ◆ The front door is opened and closed.
 - ◆ The main switch is turned off and on.
- ❑ Then the machine starts to supply toner to the development unit.
- ❑ Then, the machine clears the toner near-end or end status if the toner end sensor detects that toner was supplied.
- ❑ The machine tries to supply toner for a maximum of 5 times (SP 3-102). If the sensor still does not detect toner, there is no recovery from toner end.

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Developer Initialization

- ❑ Developer initialization must be done if developer or the development unit is replaced.
- ❑ The machine performs developer initialization automatically when it detects a new development unit or PCU.
- ❑ But, it must be done manually when replacing developer.
 - ◆ The procedure was explained in the PCU section of the course.
- ❑ Steps
 - ◆ The machine agitates the developer for 30 s (SP 3021-001 to 004: do not adjust)
 - ◆ The machine adjusts Vcnt (control voltage for TD sensor) so that Vt (TD sensor output) becomes within 2.7 ± 0.2 .
 - » The machine keeps this as Vtref if it is successful. SC372 to SC375 is displayed if it fails sequentially 3 times.
 - ◆ The result of developer initialization can be checked with SP3-014.

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- ❑ During developer initialization, the machine forcibly supplies toner because there is no toner inside the toner transport tube at installation. Then the machine does the process control self check.

SP Modes

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- ❑ A lot of SPs were already discussed. Here are other SPs related to process control.

Temperature and Humidity Settings (1)

- **SP 2013 007, 008, 009: Displays the current temperature and relative humidity, and the absolute humidity**
 - ♦ This absolute humidity is now being used by the machine to correct the charge roller current.
 - ♦ The machine uses a scale of 5 levels of absolute humidity, and applies the corrections that are set for that level.
 - » The corrections can be adjusted with SP mode.
 - ♦ These levels are called LL, ML, MM, MH, and HH.
 - ♦ The current level is displayed with SP 2013 001.

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Temperature and Humidity Settings (2)

- ❑ **SP 2013 003 to 006: These thresholds determine the thresholds between the five levels. Defaults are:**
 - ♦ Below 4.3 g/m³: LL
 - ♦ 4.3 to 11.3 g/m³: ML
 - ♦ 11.3 to 18 g/m³: MM
 - ♦ 18 to 24 g/m³: MH
 - ♦ Above 24 g/m³: HH
- ❑ **SP 2013 002: This can be used to force the machine to detect one of the five levels**
 - ♦ The temperature and humidity sensors will not be used in this case.

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- ❑ Transfer current uses different SPs to set the thresholds, as explained in the Transfer section of the course.

Potential Control – Charge Roller

- ❑ **2005: Charge roller dc voltage if potential control is disabled with SP 3041 001**
 - ◆ 3631: Displays the current dc voltage
- ❑ **2006: Charge roller ac voltage, if SP 2012 is set to 1. Otherwise, this is decided by process control.**
 - ◆ 3641: Displays the current ac voltage
- ❑ **2007 to 2011: Charge ac current adjustment for environmental conditions**
 - ◆ Environmental conditions are detected with the temperature and humidity sensors, and determined by the settings of SP 2013.
- ❑ **3241: These settings determine how the machine sets the charge roller voltage, based on the development bias**
 - ◆ Default: Charge roller voltage = Dev bias + 140 V

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Potential Control – Laser Power

- ❑ **2221: Adjusts the laser power, if LD power control is disabled with SP 3041 002**
 - ◆ 3651: Displays the current laser power
- ❑ **3242: These settings determine how the machine sets the LD power, based on the charge voltage**

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Potential Control – Development Bias

- 2229: Development bias if potential control is disabled with SP 3041 001
 - ◆ 3621: Displays the current bias

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Potential Control – TD Adjustment

- 3043: Controls toner density adjustment
 - ♦ Already discussed

Slide 200

Potential Control – Execution Timing

- ❑ 3511, 3512, 3522, 3531: Execution intervals and thresholds
 - ◆ Explained already
- ❑ 3513, 3514, 3515: Displays the intervals and conditions currently used to determine when to do the next process control

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Potential Control – Others

❑ 3611: Displays the current and target development gammas

❑ Enable/disable

- ◆ 3041 001: Potential control, enable/disable
- ◆ 3041 002: LD power control, enable/disable
- ◆ 3041 003: What type of process control is done before ACC (default: TD adjustment only)

❑ Forced process control

- ◆ 3011 001: Normal process control, manual execution
- ◆ 3011 002: Toner density adjustment mode, manual execution
- ◆ 3321: ID sensor initialization

❑ Results

- ◆ 3012: Process control results
- ◆ 3014: Developer initialization results (4 digits, YMCK)
- ◆ 3325: ID sensor initialization result

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- ❑ In this machine, the TD sensor is not initialized, except during developer initialization. This is because the sensor is in a place where it does not get dust/toner on it.
- ❑ If the machine cannot bring the development gamma within the target range, nothing happens (no SC code), because the machine cannot detect the current gamma after adjusting V_{tref} .

Toner Supply

- ❑ **3044: Toner supply method (one setting for each colour)**
- ❑ **3401: Toner supply rate for fixed supply mode**
- ❑ **3411: Displays the current toner supply rate**

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Toner Supply

- ❑ **Forced toner supply**
 - ◆ 3015: Execution, supplies toner to the development unit
 - ◆ 3016: Duration of forced toner supply
- ❑ **3201: Displays Vt (SP 3238: Vt target)**
- ❑ **3221: Displays Vtcnt**
- ❑ **3222: Displays Vtref**

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Toner Near-end/End

- ❑ **3045: Disables the toner end alert on the display panel.**
- ❑ **3101 013 to 016: Toner near-end threshold (near-end detected if remaining toner falls below this amount: default 50 g)**
- ❑ **Consumed/remaining toner**
 - ◆ 3101 005 to 008: Displays the consumed amount of each color toner, calculated by toner pump activation
 - ◆ 3101 009 to 012: Displays the remaining amount of each color toner, calculated by toner pump activation
 - ◆ 3101 028 to 031: Displays the consumed amount of each color toner, calculated by pixel count
 - ◆ 3101 032 to 035: Displays the remaining amount of each color toner, calculated by pixel count
 - ◆ 3101 040 to 043: Pixel mass per unit area, used to calculate toner consumption by pixel count

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Toner Near-end/End

- ❑ **Near-end detection thresholds**
 - ◆ 3101 021: $V_t - V_{tref}$ threshold for near-end detection
 - ◆ 3101 026: Delta V_t sum threshold for near-end detection
- ❑ **3102: Number of attempts to supply toner for toner end recovery**
- ❑ **3131: Number of times toner end was detected for each colour**

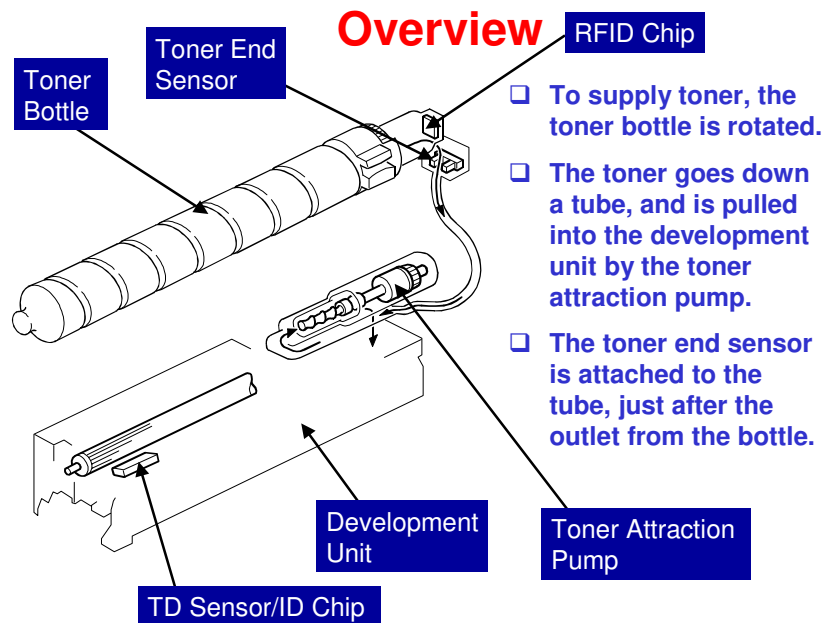
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APOLLON-P1 TRAINING

TONER SUPPLY

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- ☐ In this section, the mechanical components of the toner supply system will be described.
- ☐ Toner supply control was explained in the Process Control section of the course.

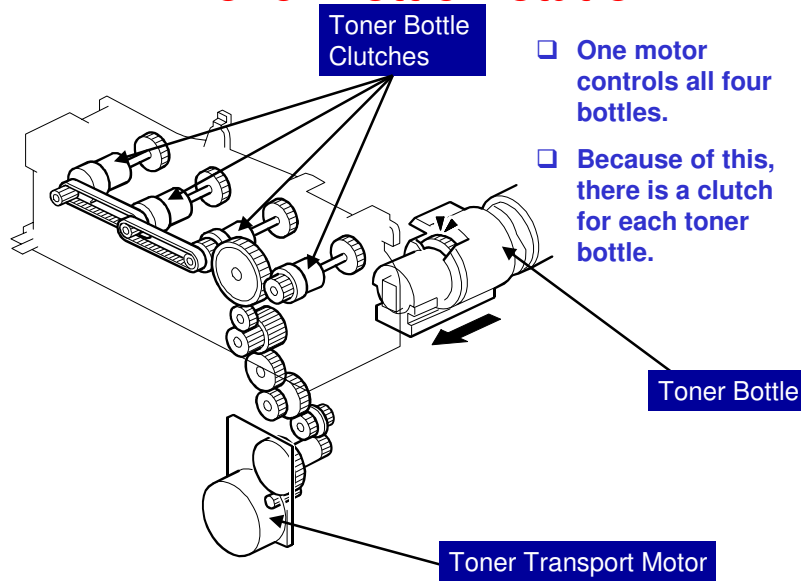


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G133 service manual, Detailed Section Descriptions, Toner Supply, Overview

- ❑ This mechanism is the same for each of the four toner bottles in the machine.
- ❑ The TD sensor contains an ID chip that contains information about the PCU, development unit, and drum unit, such as counters.
 - We discussed this in the PCU section.
- ❑ The RFID chip in the toner bottle contains data on the amount of toner consumed from the bottle, and is used for toner bottle detection (the machine uses it to detect if the bottle installed or not).

Toner Bottle Rotation

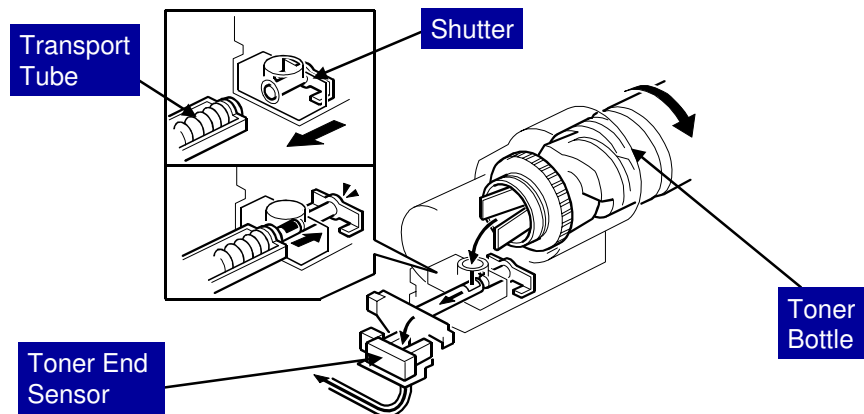


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G133 service manual, Detailed Section Descriptions, Toner Supply, Toner Supply Mechanism

- The name of the clutch is the 'toner bottle clutch'. The toner supply clutches control the toner attraction pumps, as we shall see later.

Toner Bottle



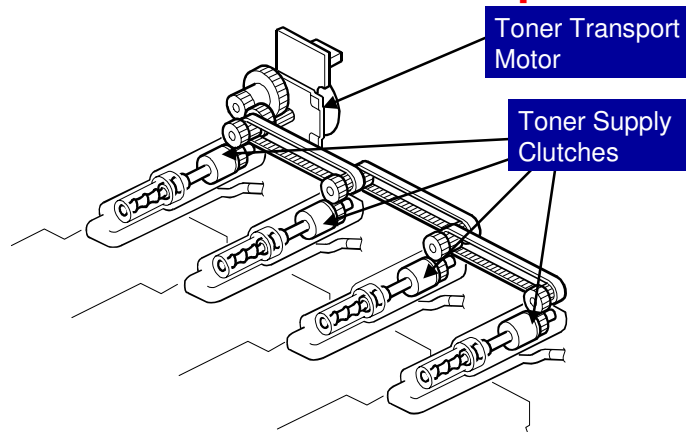
- ☐ When the toner bottle is installed, the transport tube pushes the shutter. This opens the bottle, and toner can leave the bottle.
- ☐ The spiral grooves in the bottle help to feed toner out of the rotating bottle.
- ☐ The toner goes through the toner end sensor.

Slide 210

G133 service manual, Detailed Section Descriptions, Toner Supply, Toner Supply Mechanism

- ☐ This slide shows how toner is supplied from the toner bottle.
- ☐ Toner near-end and end detection were discussed in the Process Control section of the course.

Toner Attraction Pumps

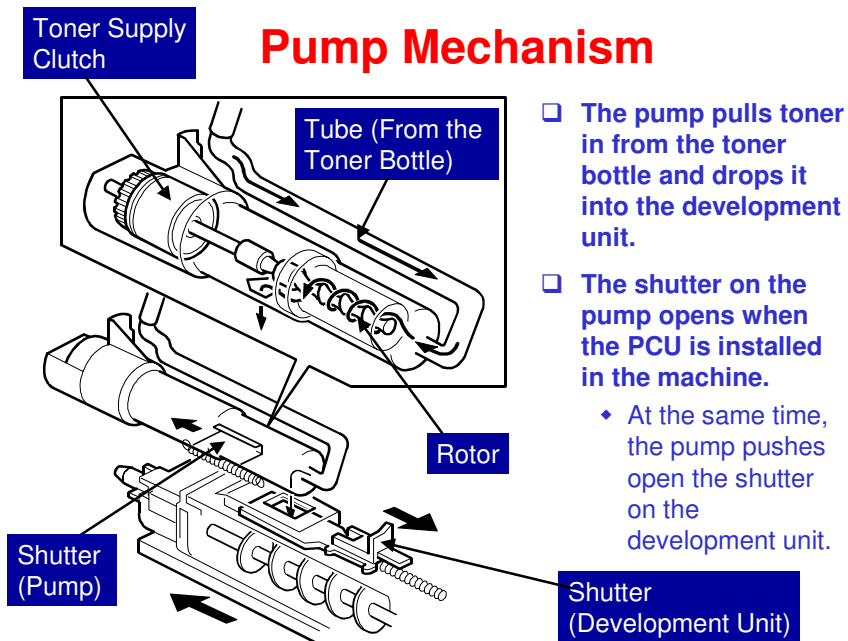


- ❑ One motor controls all four pumps.
- ❑ Because of this, there is a clutch for each pump.

Slide 211

G133 service manual, Detailed Section Descriptions, Toner Supply, Toner Supply Mechanism

- ❑ This is the same motor that rotates the toner bottles.

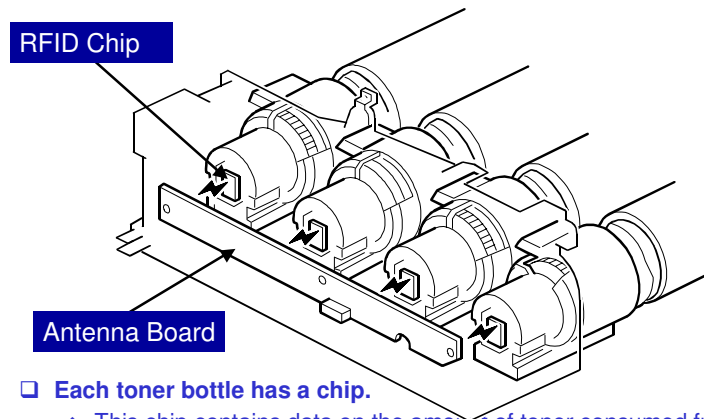


Slide 212

G133 service manual, Detailed Section Descriptions, Toner Supply, Toner Supply Mechanism

- ❑ The four pumps are the same.
- ❑ Springs close the two shutters when the PCU is pulled out of the machine.

Radio Frequency ID Chip



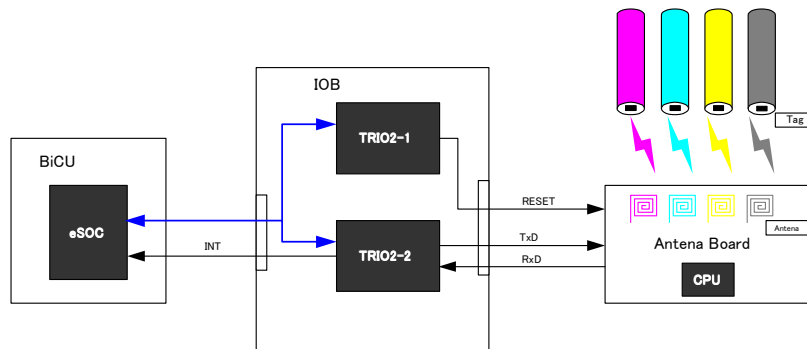
- ❑ **Each toner bottle has a chip.**
 - ◆ This chip contains data on the amount of toner consumed from the bottle, and is used for toner bottle detection (the machine uses it to detect if the bottle installed or not).
- ❑ **It sends its data to the RFID antenna board.**
- ❑ **There is no electrical contact. The data is sent by wireless communication.**

Slide 213

G133 service manual, Detailed Section Descriptions, Toner Supply, Toner Cartridge

- ❑ The chip stores the time for the toner supply clutch, not the toner bottle clutch.
- ❑ The toner supply clutch controls the amount of toner that is transferred. The toner bottle clutch only rotates the bottle.

Radio Frequency ID Chip Diagram



Slide 214

- ❑ Here is a schematic diagram of the RFID circuit.

Replacement

□ Do the following procedures

- ◆ G133 Service Manual, Replacement and Adjustment, Image Creation
 - » Do the Toner Pump Unit, and Toner End Sensor procedures.

□ Toner Pump Unit

- ◆ Use a sheet of paper as described in the manual.
 - » This sheet of paper prevents toner and screws from falling into the laser optics housing unit through cutouts in the frames.
- ◆ There are many notes and cautions in this procedure. Follow them carefully.

Slide 215

No additional notes

SP Modes

- ❑ **3045: Disables the toner end alert on the display panel.**
- ❑ **3101 005 to 008: Displays the consumed amount of each color toner, calculated by toner pump activation**
- ❑ **3101 009 to 012: Displays the remaining amount of each color toner, calculated by toner pump activation**
- ❑ **3101 028 to 031: Displays the consumed amount of each color toner, calculated by pixel count**
- ❑ **3101 032 to 035: Displays the remaining amount of each color toner, calculated by pixel count**

Slide 216

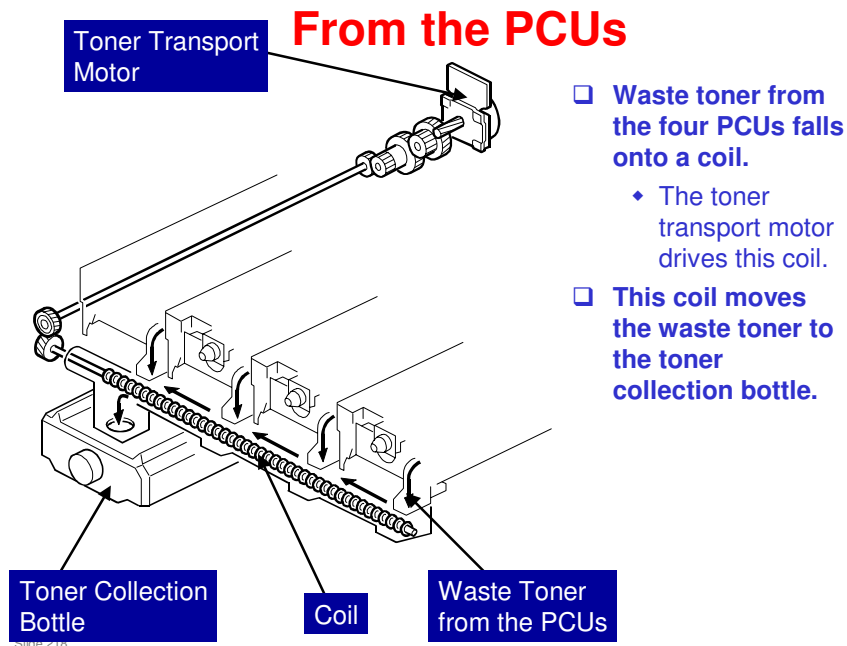
No additional notes

APOLLON-P1 TRAINING

WASTE TONER COLLECTION

Slide 217

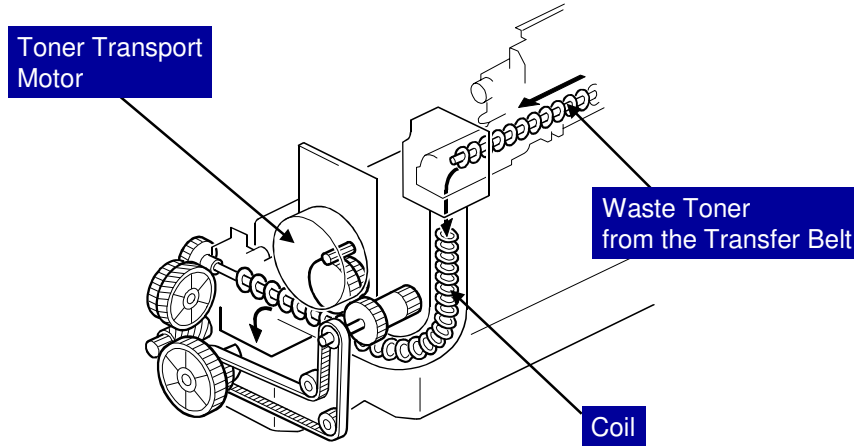
- ☐ In this section, the mechanical components of the toner supply system will be described.
- ☐ Toner supply control was explained in the Process Control section of the course.



G133 service manual, Detailed Section Descriptions, Waste Toner Collection, Toner Collection Path and Drive

- ❑ For details on how waste toner is collected inside the PCUs, see the PCU section of the course.
- ❑ The PCUs are from left to right: Y, C, M, K

From the Image Transfer Belt



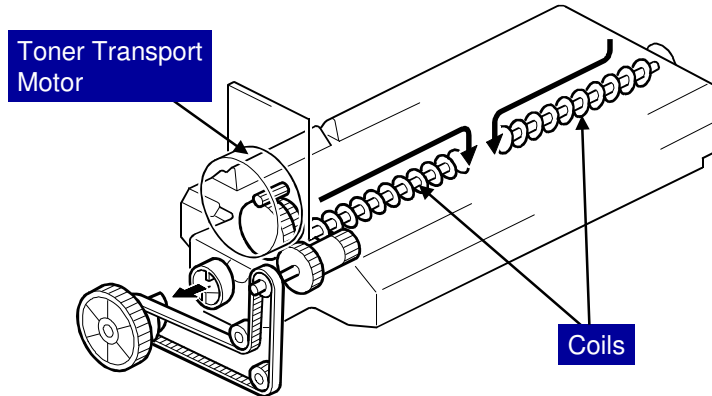
- ❑ Waste toner from the transfer belt falls into a coil.
 - ◆ The toner transport motor drives this coil.
- ❑ This coil moves the waste toner to the toner collection bottle.

Slide 219

G133 service manual, Detailed Section Descriptions, Waste Toner Collection, Toner Collection Path and Drive

- ❑ For details on how waste toner is collected inside the transfer unit, see the Transfer section of the course.

Toner Distribution in the Bottle



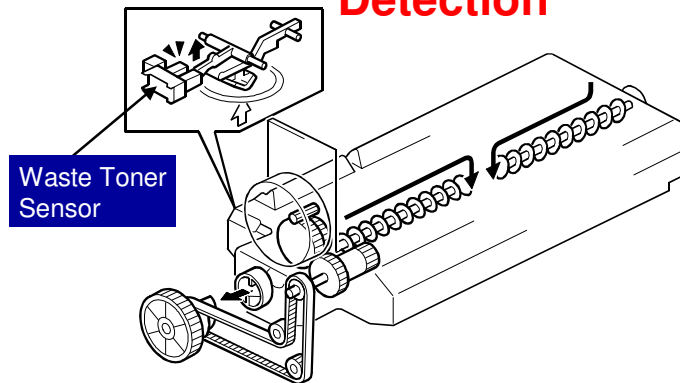
- ❑ The two coils in the bottle distribute the toner evenly inside the toner collection bottle. This makes sure that toner does not pile up at the ends of the bottle.
 - ◆ The toner transport motor drives the coils.
- ❑ This is necessary because the waste toner from the PCUs comes in at one end of the bottle and the waste toner from the transfer belt comes in at the other end.

Slide 220

G133 service manual, Detailed Section Descriptions, Waste
Toner Collection, Toner Collection Path and Drive

- ❑ The coils pull the toner in from the ends of the bottle and move it to the center.
- ❑ This makes sure that toner does not pile up at the ends of the bottle.
- ❑ The toner transport motor is a very busy motor.

Toner Bottle Detection/Full Detection



- ❑ A projection on the bottle activates the bottle set switch (at the rear of the machine).
- ❑ When the waste toner sensor detects the actuator, the 'near-full' condition occurs.
- ❑ The machine can make 500 more copies. Then the 'full' condition occurs and the machine stops.

Slide 221

G133 service manual, Detailed Section Descriptions, Waste
Toner Collection, Toner Bottle Detection/Full Detection

- ❑ The bottle set switch mechanism is not shown. It is at the rear of the machine (same as the waste toner sensor).
 - Show the projection on the bottle to the class. Also, go to the machine and show them the sensor, inside the machine at the rear.

Replacement

- ❑ The user replaces the bottle. There is no procedure in the service manual.

Slide 222

No additional notes

SP Modes

- ☐ **3800: Displays some data concerning the toner collection bottle**
- ☐ **3900: Disables bottle-full detection for the toner collection bottle**

Slide 223

No additional notes

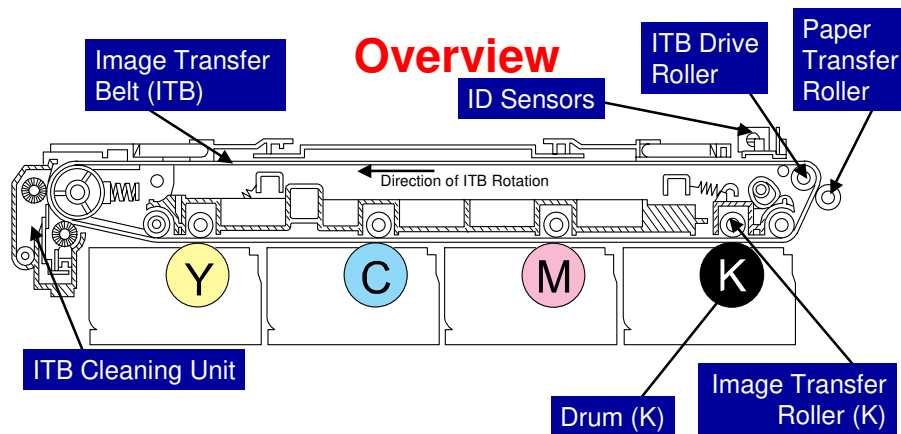
APOLLON-P1 TRAINING

TRANSFER

Slide 224

- ☐ In this section, the image transfer, paper transfer, and paper separation mechanisms will be described.

Date of change	Version History	Description
09-sep-2006	1.1	slide 4, notes page, note 1

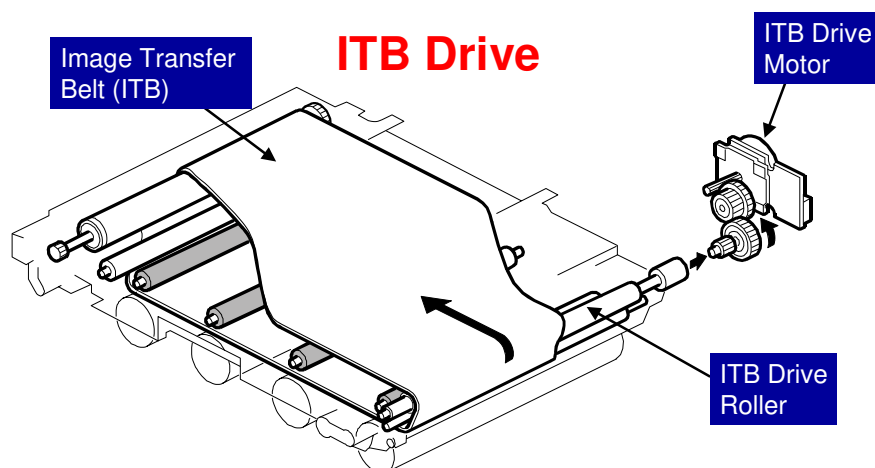


- ❑ For each color, the image transfer roller pulls the developed toner image off the drum.
- ❑ This makes a four-colour toner image on the ITB.
- ❑ The ITB drive roller pushes the four-toner image from the ITB onto the paper.
 - ◆ The paper transfer roller is an idle roller, and is not charged.

Slide 225

G133 service manual, Detailed Section Descriptions, Image Transfer and Paper Separation, Image Transfer, Overview

- ❑ All four colour toners are pulled onto the ITB on the same rotation of the ITB.
- ❑ The paper transfer roller does not pull the toner off the ITB. In this machine, the ITB drive roller pushes the toner off the ITB and onto the paper.
- ❑ Used toner collected by the ITB cleaning unit goes to the used toner collection bottle.

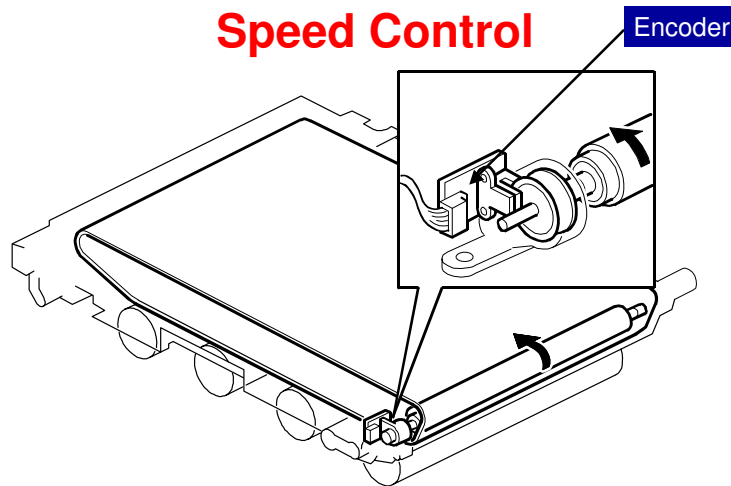


- This motor drives the transfer belt and its cleaning unit at the same time.

Slide 226

G133 service manual, Detailed Section Descriptions, Image Transfer and Paper Separation, Image Transfer, ITB Drive

- Drive for the transfer belt cleaning unit is shown in more detail later in this section.



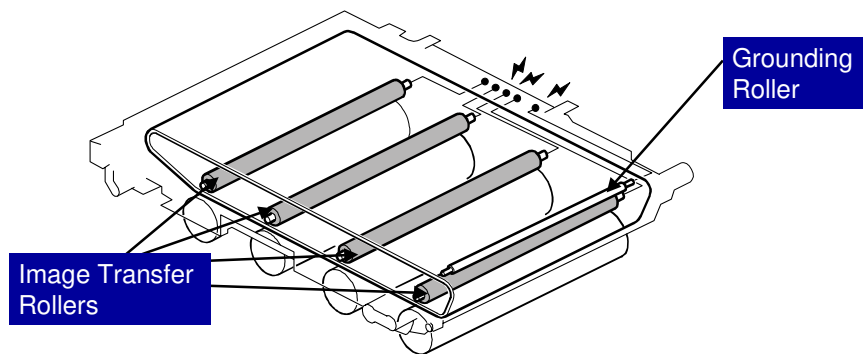
- ❑ The encoder monitors the belt speed.
- ❑ The machine adjusts the motor speed, based on the output from the encoder.

Slide 227

G133 service manual, Detailed Section Descriptions, Image Transfer and Paper Separation, Image Transfer, ITB Drive

- ❑ The speed of the belt depends on the process speed (see 'Process Speeds' in the Machine Overview section of the course).
- ❑ The machine ignores unusually high or low readings from the encoder that exist only for a short time.
 - The service manual shows this in more detail.

Current Supplied to the ITB

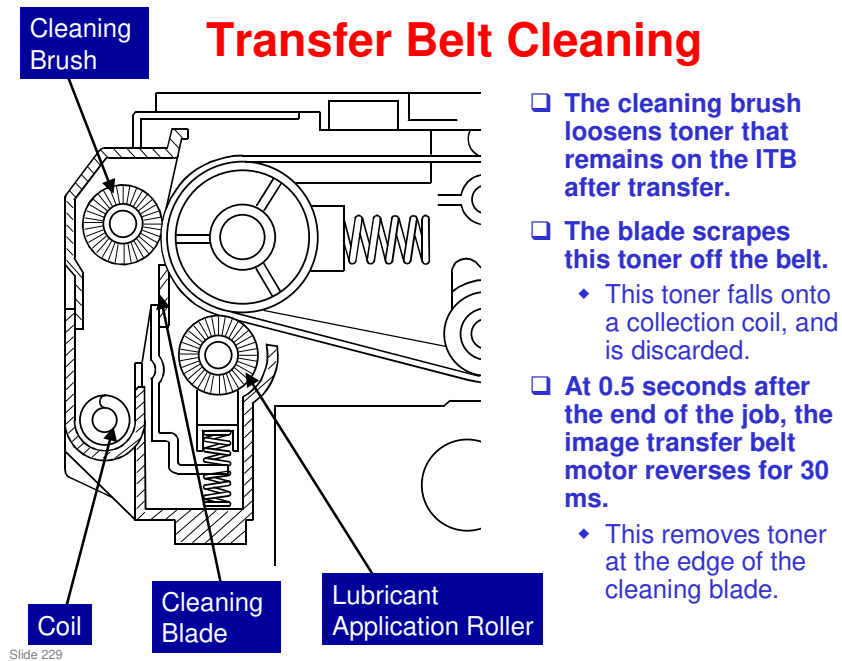


- ❑ The image transfer rollers pull the toner off the drum.
- ❑ The grounding roller grounds the transfer belt.
- ❑ The terminals from the high voltage supply board come in at the rear of the ITB unit.
- ❑ The current is automatically corrected for paper size, temperature, and humidity.

Slide 228

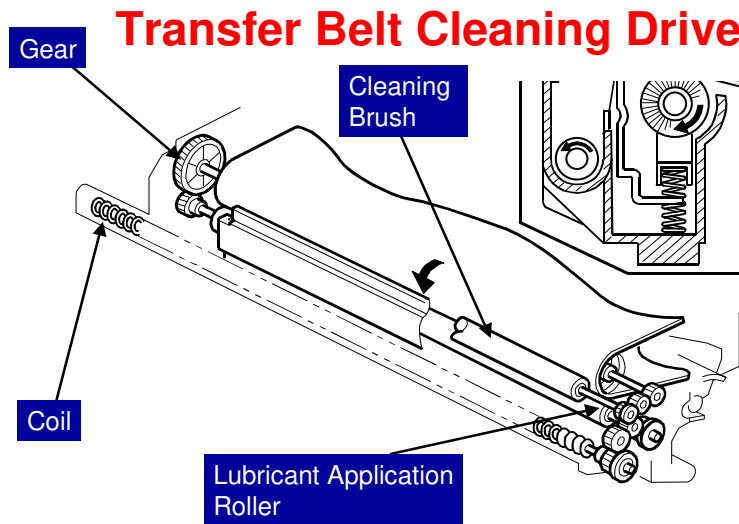
G133 service manual, Detailed Section Descriptions, Image Transfer and Paper Separation, Image Transfer, ITB Current

- ❑ The temperature/humidity sensor is at the rear lower right side of the machine. See the component layout diagrams.
- ❑ We will look at the supply to the ITB drive roller again later in this section.



G133 service manual, Detailed Section Descriptions, Image Transfer and Paper Separation, Image Transfer, Transfer Belt Cleaning

- ❑ The waste toner collection bottle and collection mechanism were described in an earlier section.
- ❑ The reverse rotation at the end of the job is controlled by SP2903 and 2904 (do not adjust, DFU).
 - It is also done for the OPCs at the same time, for the same purpose.



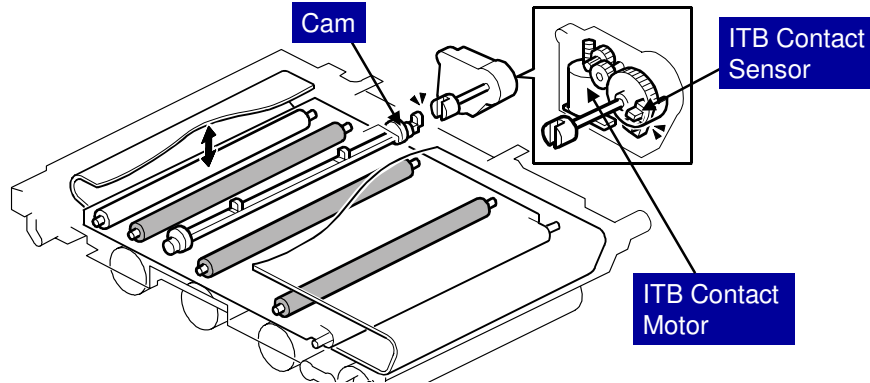
- ❑ The ITB drive motor drives the cleaning unit components through a gear at the rear left.

Slide 230

G133 service manual, Detailed Section Descriptions, Image Transfer and Paper Separation, Image Transfer, Transfer Belt Cleaning

- ❑ This shows how the gear at the rear left of the transfer belt drives the cleaning unit..

ITB Contact and Release - 1



- ❑ **The belt always contacts the K drum.**
 - ◆ To move the belt away from the K drum, turn the release lever counterclockwise. Do this to remove the transfer belt unit, or you will damage the K drum.
- ❑ **The belt contacts the CMY drums for color printing only.**
 - ◆ If a black-and-white page comes in the middle of a colour job, the belt does not move away from the CMY drums.

Slide 231

G133 service manual, Detailed Section Descriptions, Image Transfer and Paper Separation, Image Transfer, ITB Contact

- ❑ If a black-and-white page comes in the middle of a colour job, the belt does not move away from the CMY drums.
 - This keeps the printing speed at the maximum, because it takes time for the motor to move the belt up and down.
 - This operation can be changed by adjusting SP 2907, as shown on the next slide.
- ❑ If a color page appears in the same job after black-and-white pages, the machine waits until the previous page has left the transfer unit. Then it moves the belt up against all four drums.
- ❑ The ITB contact sensor detects the status of the ITB (contacting K only, or contacting all four drums).

ITB Contact and Release - 2

- **SP 2907 002: Enables/disables the contact and release mechanism. (This setting can also be changed with a user tool.)**
 - ♦ The default setting is 'disabled'. If a black-and-white page comes in the middle of a colour job, the belt does not move away from the CMY drums.
 - ♦ If you set SP 2907 002 to 'enabled', then the behaviour of the machine depends on the setting of SP 2907 001.

Slide 232

- SP 2907 001 is explained on the next slide.

ITB Contact and Release - 3

- ❑ **SP 2907 001: Default setting is 1**
 - ◆ The belt moves away for the first black-and-white print in the middle of a colour job.
 - ◆ This is essentially the same as the default setting.
- ❑ **Change the SP to 2:**
 - ◆ The belt moves away for the second consecutive black-and-white print in the middle of a colour job.
 - ◆ It does not move away for the first black-and-white print.
- ❑ **Change the SP to 3:**
 - ◆ The belt moves away for the third consecutive black-and-white print in the middle of a colour job.
 - ◆ It does not move for the first or second black-and-white print.
- ❑ **Change the SP to 0:**
 - ◆ If a black-and-white page comes in the middle of a colour job, the belt does not move away from the CMY drums.

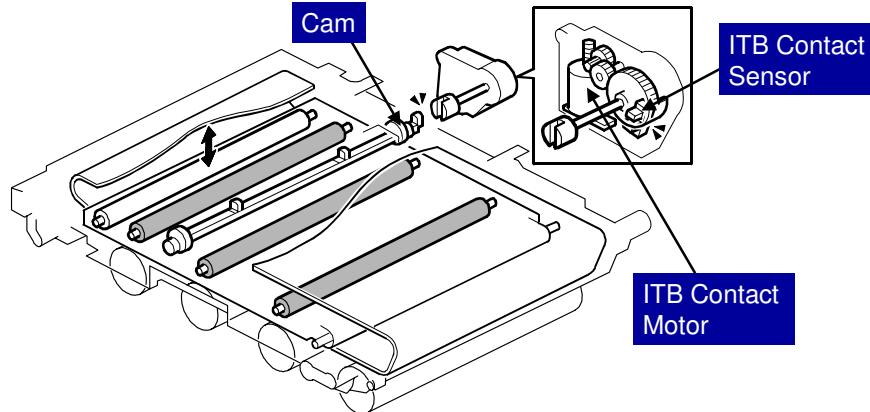
Slide 233

This shows how the machine can be set up for different operations when black-and-white prints come in the middle of a set of color pages.

- ❑ If you change the SP to a higher value, the machine will operate faster, but there will be more wear and tear on the color drums.
 - It takes about 2 seconds to move the ITB away from the colour drums, and about 5 seconds to move the ITB into contact with the colour drums.

For colour pages, the ITB always contacts all drums. If one colour page comes in the middle of a black-and-white job, the ITB immediately moves into contact with the color drums. SP 2907 has no effect in this case.

ITB Contact and Release - 3

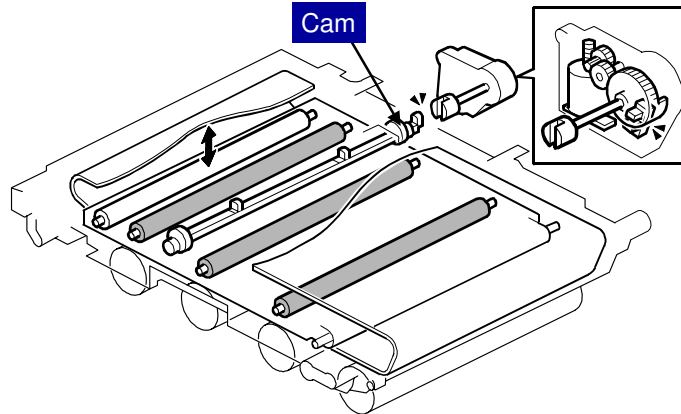


- ❑ The motor moves the left end of the belt up and down, through a cam.
 - ◆ Up: The belt contacts all four drums
 - ◆ Down: The belt contacts the K drum only
- ❑ The sensor detects when the belt contacts all four drums.
 - ◆ Sensor off: ITB contacts all drums

Slide 234

- ❑ The service manual explains how the sensor and motor operate to initialize the machine, and during different types of printing.
 - See the 'Transfer Belt Sensor' section.

ITB Contact and Release - 4

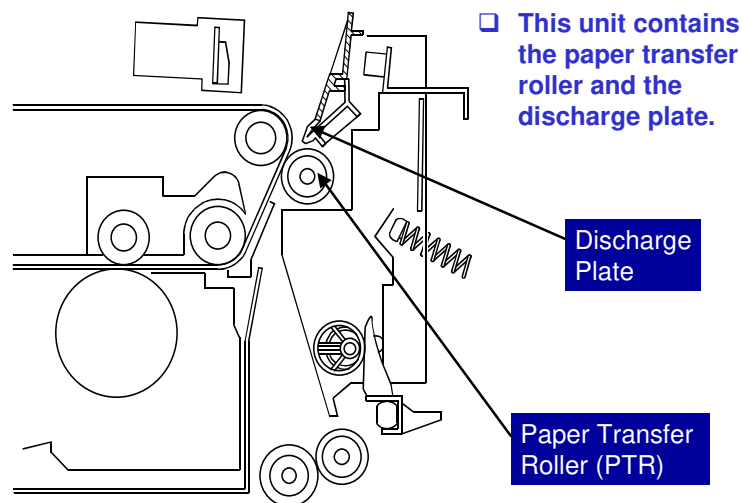


- ☐ If a power failure occurs with the belt touching all 4 drums, the belt stays in this position, and you cannot remove the ITB.
- ☐ Open out the controller box, then turn the cam until the belt is fully lowered.

Slide 235

No additional notes

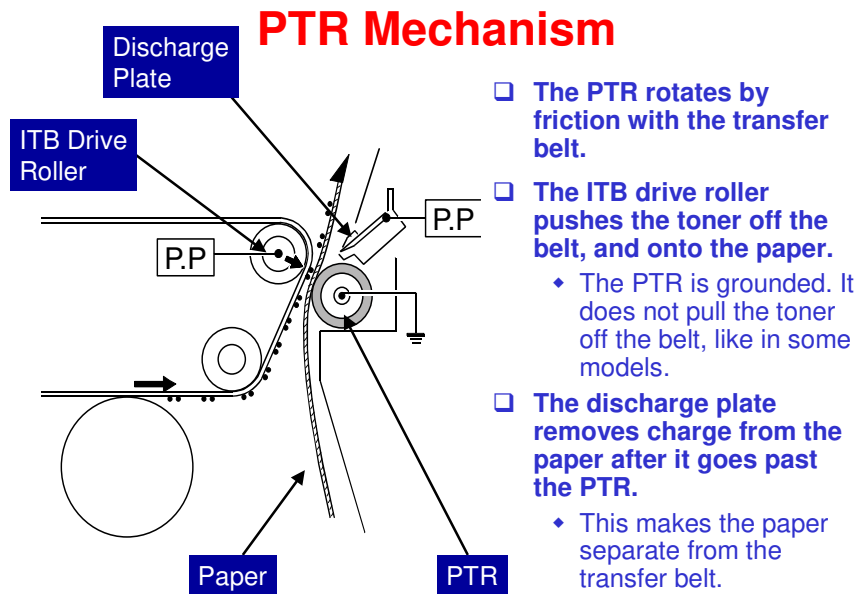
Paper Transfer Unit



Slide 236

G133 service manual, Detailed Section Descriptions, Image Transfer and Paper Separation, Paper Transfer and Separation, Overview

- The discharge plate removes charges from the paper, and this makes it easier to separate from the transfer belt.

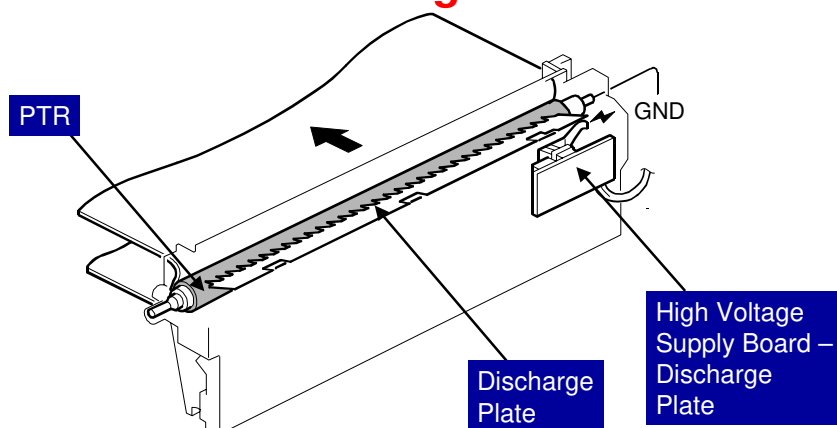


Slide 237

G133 service manual, Detailed Section Descriptions, Image Transfer and Paper Separation, Paper Transfer and Separation, PTR Drive

- ❑ Note that there are two power packs (P.P. in the diagram).
 - The high voltage supply board supplies the ITB drive roller. It also supplies the image transfer rollers above each drum.
 - Image transfer rollers - positive charge
 - ITB drive roller – negative charge
 - The high voltage supply board – discharge plate supplies the discharge plate with ac and dc voltage.

Discharge Plate

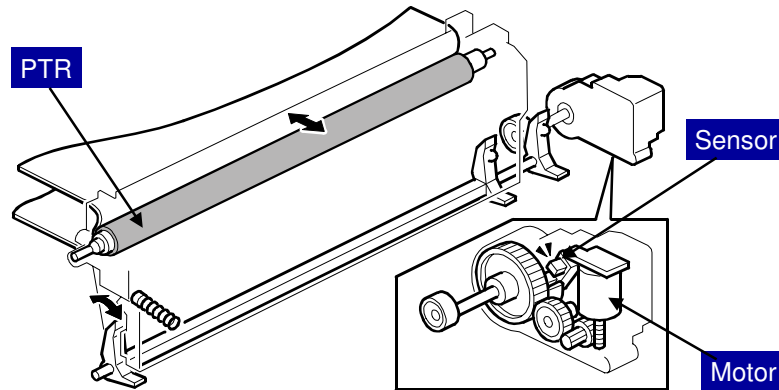


- ❑ The PTR is grounded.
- ❑ The high voltage supply board – discharge plate supplies ac and dc to the discharge plate.

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G133 service manual, Detailed Section Descriptions, Image Transfer and Paper Separation, Paper Transfer and Separation, PTR Drive

PTR Contact Mechanism



- ❑ Paper transfer roller contact motor: Moves the PTR into contact and away from the transfer belt, through a spring.
- ❑ Paper transfer roller HP sensor: Detects when the PTR contacts the transfer belt.
- ❑ The PTR contacts the transfer belt at all times, except during line position adjustment and process control.

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G133 service manual, Detailed Section Descriptions, Image Transfer and Paper Separation, Paper Transfer and Separation, PTR Contact and Separation

- ❑ During line position adjustment and process control, patterns are developed on the transfer belt. The PTR is moved away from the belt at this time, or the PTR will remove the patterns before they get to the ID sensors.

New Unit Detection

- **The new unit contains a fuse, that blows a short time after the new unit is installed.**
 - ◆ If the machine detects an intact fuse, followed shortly by a blown fuse, the machine automatically detects the new unit and resets the counters.
 - ◆ This is necessary because the customer replaces the transfer unit.

Slide 240

No additional notes

Temperature and Humidity Settings

- ❑ The image transfer, paper transfer, and separation plate currents are affected by temperature and humidity.
 - ◆ The machine uses readings of ambient temperature and humidity (relative humidity) to calculate the absolute humidity.
 - ◆ Then the machine adjusts the currents based on the calculation.

Slide 241

- ❑ These temperature and humidity readings are also used by process control, as described in the Process Control section of the course.

Other Correction Factors (1)

☐ Paper width

☐ Paper weight

- ◆ Thin paper: 60 g/m² (16 lb)
- ◆ Normal plain paper: 60 – 81 g/m² (16 – 22 lb.)
- ◆ Middle Thick: 82 – 105 g/m² (22 – 28 lb.)
- ◆ Thick 1: 106 – 169 g/m² (28.5 – 44.9 lb.)
- ◆ Thick 2: 170 – 219 g/m² (45 – 58 lb.)
- ◆ Thick 3: 220 – 253 g/m² (58.5 – 67 lb.)
- ◆ Thick 4, 5, 6: These settings are designed for special types of paper that are found in the Japanese market.

Slide 242

- ☐ Some of these corrections can be adjusted. The adjustments will be explained at the end of this section, in the SP mode slides.

Thin paper

- ☐ This machine does not support thin paper.
- ☐ 'Thin paper' is an additional paper weight setting that the user can select at the operation panel if the 'plain paper' setting causes problems.
 - For example, if a certain type of paper is being curled because the fusing temperature is too high, then you can ask the customer to use the 'thin paper' setting.
 - Then you can use SP mode to reduce the fusing temperatures that are used for the 'thin paper' setting.
 - You can also change the transfer current settings, if the transfer of toner is insufficient.

Other Correction Factors (2)

☐ Print type (black-and-white, full colour)

- ♦ For the image transfer, different currents are applied for each toner colour.
- ♦ Higher currents are applied for C and Y, because these two are applied last.
- ♦ K and M toner already on the paper mean that more current is needed to transfer the C and Y toners correctly.

☐ Leading and trailing edges

- ♦ These may require a different current than the image area, to ensure that paper separates correctly.

☐ Side 1, Side 2 (duplex)

Slide 243

- ☐ Some of these can be adjusted. The adjustments will be explained at the end of this section, in the SP mode slides.

Replacement – Image Transfer Unit (1)

□ Do the following procedures

- ♦ G133 Service Manual, Replacement and Adjustment, Image Transfer

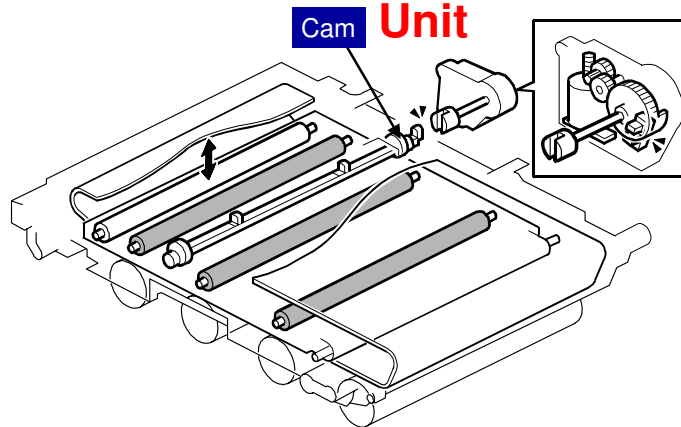
□ Image Transfer Belt Unit

- ♦ The ITB is in contact with the K drum before you turn the switch off. Take care not to damage the K drum.
 - » To release the ITB from the K drum, you must turn the image transfer belt unit lock lever counterclockwise before you remove the unit. If you do not do this, you will damage the K drum.
- ♦ If the power failed in the middle of a colour job, with the ITB in contact with all four drums, then the belt touches all 4 drums, and you cannot remove the ITB.
 - » Open out the controller box, then turn the cam until the belt is fully lowered. (see the next slide). After that, the ITB contacts the K drum only.

Slide 244

No additional notes

Cam for the Image Transfer Belt Unit



- ☐ If a power failure occurs with the belt touching all 4 drums, the belt stays in this position, and you cannot remove the ITB.
- ☐ Open out the controller box, then turn the cam until the belt is fully lowered.

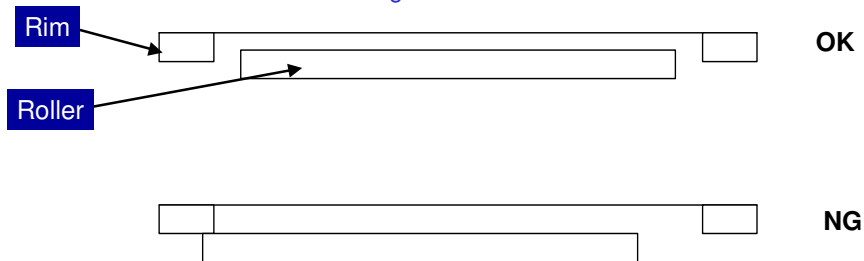
Slide 245

No additional notes

Replacement – Image Transfer Unit (2)

❑ Image Transfer Belt

- ♦ When you install the belt, make sure that you clean the rollers and install it correctly, as explained in the service manual.
- ♦ The belt has a rim at the front and a rim at the rear. All the rollers in the ITB unit must be between these two rims. The rims must not be riding on the rollers.



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- ❑ The diagram gives you a general idea – it isn't particularly accurate.

Replacement – Image Transfer Unit (3)

□ Image Transfer Belt (continued)

- ♦ The painted number on the belt must be at the rear side.



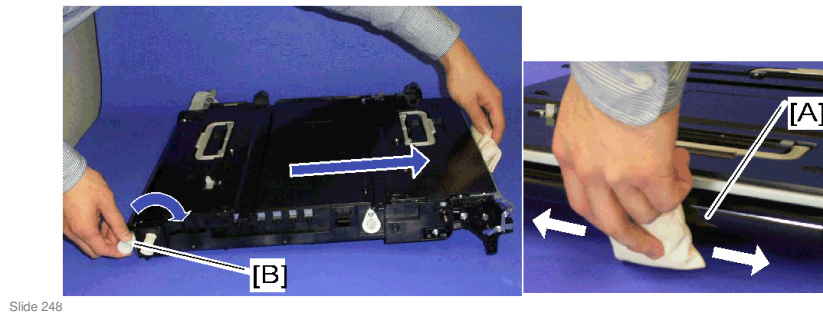
Slide 247

No additional notes

Replacement – Image Transfer Unit (4)

□ Image Transfer Belt (continued)

- ♦ Put "Lubricant Powder" (B132 9700) on the surface of the image transfer belt [A], while you turn the drive gear [B] at a constant speed, as shown.
 - » The straight arrow in the picture shows belt movement direction.
 - » Lubricant powder prevents the image transfer cleaning blade from turning up.



Slide 248

No additional notes

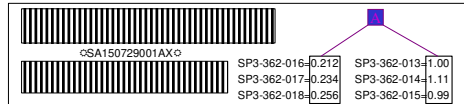
Replacement – Paper Transfer Unit

□ Do the following procedures

- ◆ G133 Service Manual, Replacement and Adjustment, Paper Transfer

□ ID Sensor Board

- ◆ Note the cleaning procedure (every time you visit the machine).
- ◆ If you install a new board, input the values from the decal into SP 3362 as shown in the service manual.



Slide 249

No additional notes

SP Modes – Temperature and Humidity Settings (1)

- **SP 2241: Displays the current temperature and relative humidity, and the absolute humidity**
 - ♦ This absolute humidity is now being used by the machine to correct the image and paper transfer currents.
 - ♦ The machine uses a scale of 5 levels of absolute humidity, and applies the corrections that are set for that level.
 - » The corrections can be adjusted with SP mode.
 - ♦ These levels are called LL, ML, MM, MH, and HH.

Slide 250

No additional notes

SP Modes – Temperature and Humidity Settings (2)

- ❑ **SP 2302 003 to 006: These thresholds determine the thresholds between the five levels. Defaults are:**
 - ◆ Below 4.3 g/m³: LL
 - ◆ 4.3 to 11.3 g/m³: ML
 - ◆ 11.3 to 18 g/m³: MM
 - ◆ 18 to 24 g/m³: MH
 - ◆ Above 24 g/m³: HH
- ❑ **SP 2302 002: This can be used to force the machine to detect one of the five levels**
 - ◆ The temperature and humidity sensors will not be used in this case.

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- ❑ Process control uses different SPs to set the thresholds, as explained in the Process Control section of the course.

SP Modes – Paper Width Thresholds

- ❑ The machine corrects the paper transfer current for paper width.
- ❑ There are five ranges for paper width. A different correction can be applied for each width.
 - ♦ S1: 297 mm or more
 - ♦ S2: From 257 to 297 mm
 - ♦ S3: from 210 to 257 mm
 - ♦ S4: From 148 to 210 mm
 - ♦ S5: 148 mm or less
- ❑ **SP 2308: Controls the thresholds between the five paper width ranges.**

Slide 252

No additional notes

SP Modes – Image Transfer (1)

- ❑ **2351: ITB current for black-and-white prints**
 - ◆ There are settings for different paper weights.
- ❑ **2357: ITB current for full color prints**
 - ◆ There are settings for different paper weights, and for each toner colour.
- ❑ **2381 to 2385: Corrections to the ITB current for absolute humidity**
 - ◆ These corrections are applied to the values of SP 2351, 2357, and 2314.

Slide 253

- ❑ ITB: Image transfer belt

SP Modes – Image Transfer (2)

- ☐ **2311 001: Correction for ITB current for non image areas (applied between pages)**
- ☐ **2314: ITB current used for making ID sensor patterns**
- ☐ **2316 001: Current applied to the ITB immediately after power on or the cover open/closed**

Slide 254

No additional notes

SP Modes – Paper Transfer (1)

- ❑ **2403: Basic PTR current, plain paper, black-and-white prints**
- ❑ **2407: Basic PTR current, plain paper, full colour prints**
- ❑ **Corrections to 2403 and 2407:**
 - ◆ 2411: Corrections based on paper width, for size ranges S1 to S5
 - ◆ 2421: Corrections for the leading edge
 - » 2422: Switchover timing from leading edge to main image area
 - ◆ 2423: Corrections for the trailing edge
 - » 2424: Switchover timing from main image area to trailing edge.
 - ◆ 2431 to 2435: Corrections for absolute humidity (five ranges LL to HH)

Slide 255

- ❑ PTR: Paper transfer roller
- ❑ S1 to S5: Five paper width ranges, described earlier in this section.
- ❑ LL, ML, MM, MH, HH: Five humidity ranges, described earlier in this section.

Adjustments for other paper weights

- ❑ Thin paper
 - Basic PTR current: 2453 (black-and-white), 2457 (colour)
 - Paper width correction: 2461
 - Leading edge correction: 2471 (switchover timing: 2472)
 - Trailing edge correction: 2473 (switchover timing: 2474)
 - Absolute humidity correction: 2481 to 2485
- ❑ Thick 1 paper
 - Basic PTR current: 2502 (black-and-white), 2507 (colour)
 - Paper width correction: 2511
 - Leading edge correction: 2521 (switchover timing: 2522)
 - Trailing edge correction: 2523 (switchover timing: 2524)
 - Absolute humidity correction: 2531 to 2535
- ❑ Thick 2 paper
 - Basic PTR current: 2553 (black-and-white), 2558 (colour)
 - Paper width correction: 2561
 - Leading edge correction: 2571 (switchover timing: 2572)
 - Trailing edge correction: 2573 (switchover timing: 2574)
 - Absolute humidity correction: 2581 to 2585

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❑ OHP

- Basic PTR current: 2603 (black-and-white), 2608 (colour)
- Paper width correction: 2611
- Leading edge correction: 2621 (switchover timing: 2622)
- Trailing edge correction: 2623 (switchover timing: 2624)
- Absolute humidity correction: 2631 to 2635
- No corrections for side 2 duplex – most people don't make duplex copies on OHPs

❑ Thick 3 paper

- Basic PTR current: 2651 (black-and-white), 2652 (colour)
- Paper width correction: 2653
- Leading edge correction: 2654 (switchover timing: 2655)
- Trailing edge correction: 2656 (switchover timing: 2657)
- Absolute humidity correction: 2658 to 2662

❑ Special 1 paper

- Basic PTR current: 2753 (black-and-white), 2757 (colour)
- Paper width correction: 2761
- Leading edge correction: 2771 (switchover timing: 2772)
- Trailing edge correction: 2773 (switchover timing: 2774)
- Absolute humidity correction: 2781 to 2785

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Slide 257

- ❑ Thick 4 paper
 - Basic PTR current: 2671 (black-and-white), 2672 (colour)
 - Paper width correction: 2673
 - Leading edge correction: 2674 (switchover timing: 2675)
 - Trailing edge correction: 2676 (switchover timing: 2677)
 - Absolute humidity correction: 2678 to 2682
- ❑ Thick 5 paper
 - Basic PTR current: 2691 (black-and-white), 2692 (colour)
 - Paper width correction: 2693
 - Leading edge correction: 2694 (switchover timing: 2695)
 - Trailing edge correction: 2696 (switchover timing: 2697)
 - Absolute humidity correction: 2698 to 2702
- ❑ Thick 6 paper
 - Basic PTR current: 2711 (black-and-white), 2712 (colour)
 - Paper width correction: 2713
 - Leading edge correction: 2714 (switchover timing: 2715)
 - Trailing edge correction: 2716 (switchover timing: 2717)
 - Absolute humidity correction: 2718 to 2722

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Slide 258

❑ Special 2 paper

- Basic PTR current: 2803 (black-and-white), 2807 (colour)
- Paper width correction: 2811
- Leading edge correction: 2821 (switchover timing: 2822)
- Trailing edge correction: 2823 (switchover timing: 2824)
- Absolute humidity correction: 2831 to 2835

❑ Special 3 paper

- Basic PTR current: 2852 (black-and-white), 2857 (colour)
- Paper width correction: 2861
- Leading edge correction: 2871 (switchover timing: 2872)
- Trailing edge correction: 2873 (switchover timing: 2874)
- Absolute humidity correction: 2881 to 2885

SP Modes – Paper Transfer (2)

- ❑ **2311 002: Correction for PTR current for non image areas (applied between pages)**
- ❑ **2326: Current applied for cleaning the PTR**
 - ◆ This is done at the end of each job.
- ❑ **2930 to 2942: These control the upper limit voltages for the PTR**
 - ◆ 2930: Threshold between high and low resistance at the PTR.
 - » This is measured at the start of each job.
 - The paper transfer current used to measure this can be adjusted with SP 2311 003.
 - » It affects the upper limit voltage for the PTR.
 - ◆ 2931 to 2942: Upper limit voltages for the PTR, for each paper weight, and for high and low resistance.

Slide 259

No additional notes

SP Modes – Discharge Plate

- ❑ **2401: Separation DC voltage for plain paper**
- ❑ **Corrections to 2401:**
 - ◆ 2421: Corrections for the leading edge
 - » 2422: Switchover timing from leading edge to main image area
 - ◆ 2431 to 2435: Corrections for absolute humidity

Slide 260

Adjustments for other paper weights

- ❑ **Thin paper**
 - Basic DC voltage: 2451
 - Leading edge correction: 2471 (switchover timing: 2472)
 - Absolute humidity correction: 2481 to 2485
- ❑ **Thick 1 paper**
 - Basic DC voltage: 2501
 - Leading edge correction: 2521 (switchover timing: 2522)
 - Absolute humidity correction: 2531 to 2535
- ❑ **Thick 2 paper**
 - Basic DC voltage: 2551
 - Leading edge correction: 2571 (switchover timing: 2572)
 - Absolute humidity correction: 2581 to 2585
- ❑ **OHP**
 - Basic DC voltage: 2601
 - Leading edge correction: 2621 (switchover timing: 2622)
 - Absolute humidity correction: 2631 to 2635

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Slide 261

Adjustments for other paper weights

- ❑ Thick 3
 - Basic DC voltage: 2650
 - Leading edge correction: 2654 (switchover timing: 2655)
 - Absolute humidity correction: 2658 to 2662
- ❑ Special 1 paper
 - Basic DC voltage: 2751
 - Leading edge correction: 2771 (switchover timing: 2772)
 - Absolute humidity correction: 2781 to 2785
- ❑ Special 2 paper
 - Basic DC voltage: 2801
 - Leading edge correction: 2821 (switchover timing: 2822)
 - Absolute humidity correction: 2831 to 2835
- ❑ Special 3 paper
 - Basic DC voltage: 2851
 - Leading edge correction: 2871 (switchover timing: 2872)
 - Absolute humidity correction: 2881 to 2885

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Slide 262

Adjustments for other paper weights

❑ Thick 4

- Basic DC voltage: 2670
- Leading edge correction: 2674 (switchover timing: 2675)
- Absolute humidity correction: 2678 to 2682

❑ Thick 5

- Basic DC voltage: 2690
- Leading edge correction: 2694 (switchover timing: 2695)
- Absolute humidity correction: 2698 to 2702

❑ Thick 6

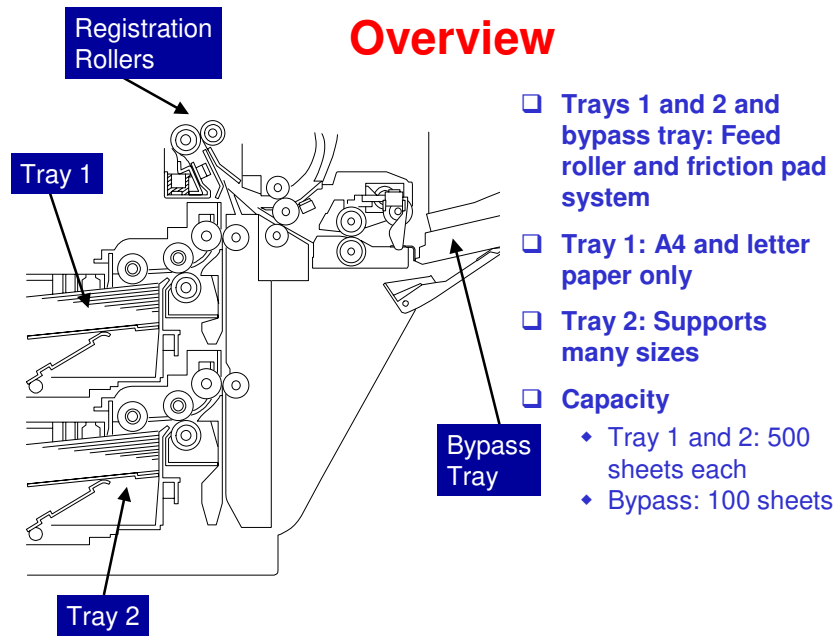
- Basic DC voltage: 2710
- Leading edge correction: 2714 (switchover timing: 2715)
- Absolute humidity correction: 2718 to 2722

APOLLON-P1 TRAINING

PAPER FEED

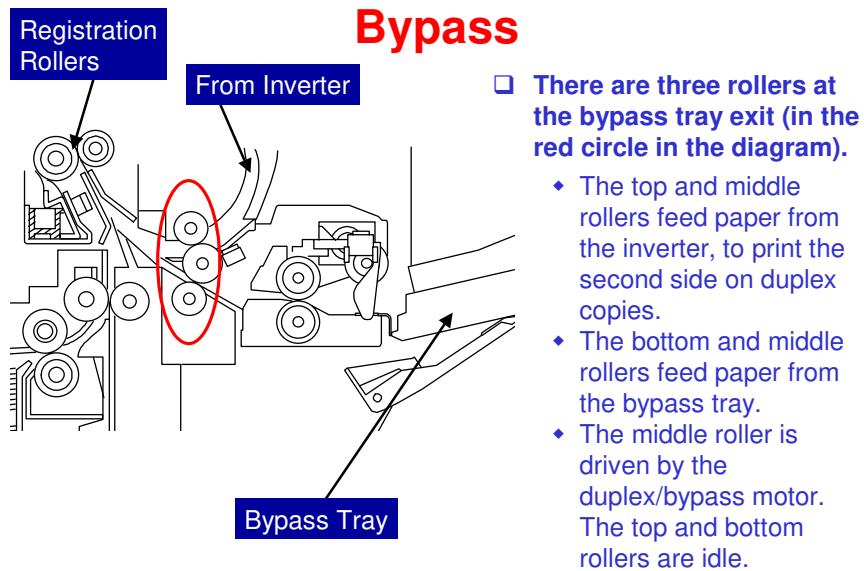
Slide 263

- ☐ In this section, the paper feed mechanisms in the copier will be described.
- ☐ The optional paper feed units will be described in separate sections.



Slide 264

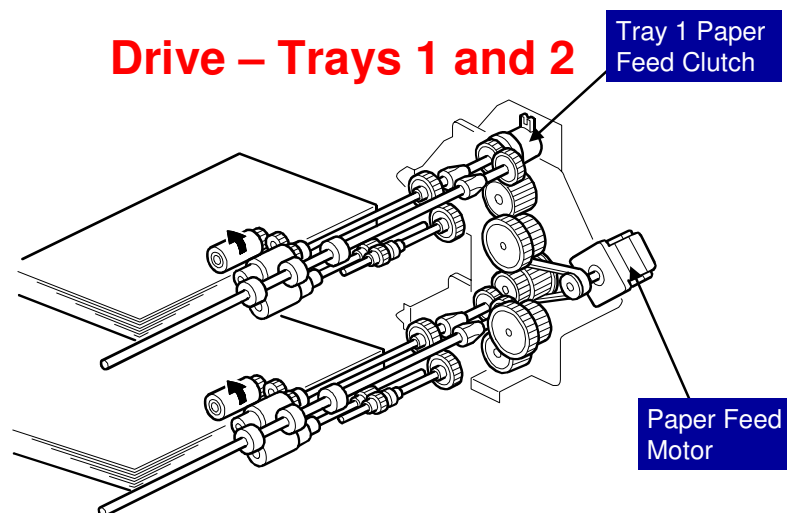
G133 service manual, Detailed Section Descriptions, Paper Feed, Overview



Slide 265

- ❑ This is a close-up view of the bypass tray exit.

Drive – Trays 1 and 2

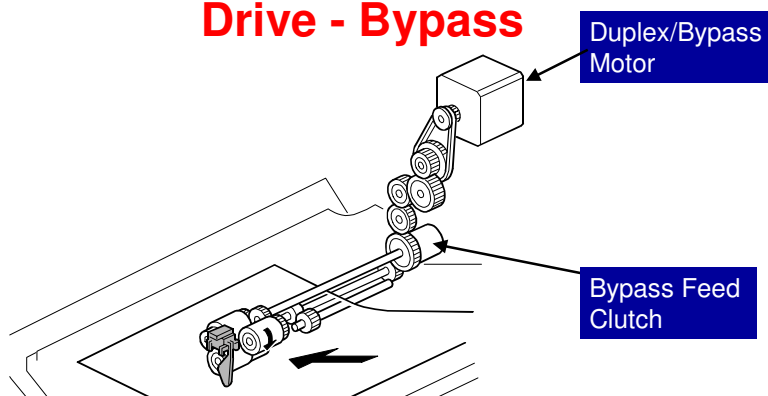


- ❑ One motor controls the two trays. Each tray has a clutch.
 - ♦ During paper feed, the clutch stays on until the registration sensor detects the paper.
- ❑ If the tray is in the machine, the pick-up roller always touches the top sheet of paper.

Slide 266

G133 service manual, Detailed Section Descriptions, Paper Feed, Drive

Drive - Bypass

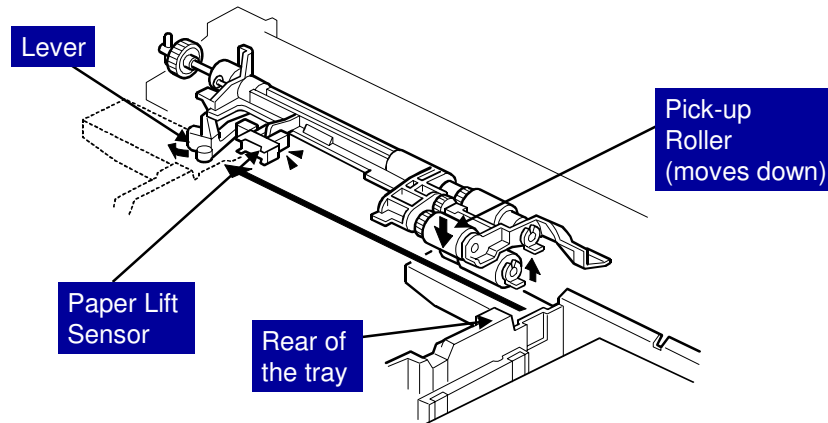


- ❑ The duplex/bypass motor drives the feed roller, through the bypass feed clutch.
- ❑ When the bypass solenoid turns on, the pick-up roller drops onto the top sheet of paper and feeds it into the machine.

Slide 267

G133 service manual, Detailed Section Descriptions, Paper Feed, Drive

Tray Detection – Trays 1 and 2



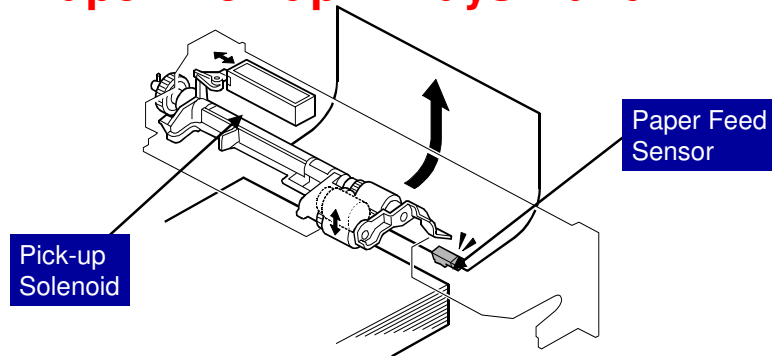
- ☐ The tray set switch (part of the paper size switch) detects when the tray is inserted.
- ☐ The rear of the tray pushes the lever, and the pick-up roller drops on top of the top sheet of paper.

Slide 268

G133 service manual, Detailed Section Descriptions, Paper Feed, Paper Pick-up

- ☐ The tray set switch is in the center of the tray at the rear. It is shown on the slide for the Paper Size Detection mechanism.

Paper Pick-up – Trays 1 and 2



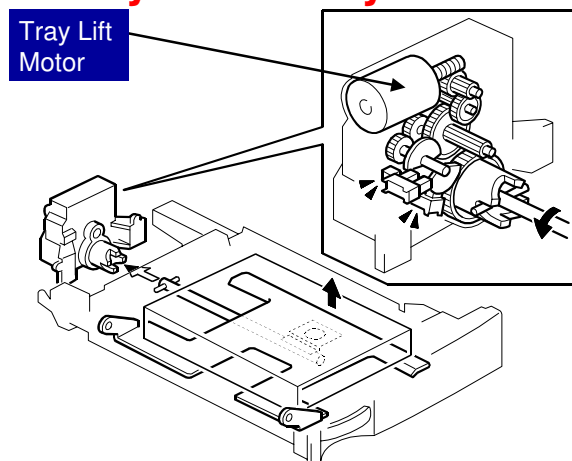
- ❑ When the paper feed sensor detects the trailing edge of the paper as it goes into the machine, the pick-up solenoid turns on and off briefly.
 - ◆ 10 mm before the trailing edge gets to the feed sensor, the solenoid turns on. When the trailing edge gets to the feed sensor, the solenoid turns off.
- ❑ This lifts and lowers the pick-up roller.
- ❑ This action improves pick-up.

Slide 269

G133 service manual, Detailed Section Descriptions, Paper Feed, Paper Pick-up

- ❑ Note that the action of the solenoid is different from the bypass tray.
 - Trays 1 and 2: When the solenoid turns on, the pick-up solenoid moves up away from the top sheet of paper.
 - Bypass tray: When the solenoid turns on, the pick-up roller moves down onto the top sheet of paper.

Tray Lift – Trays 1 and 2



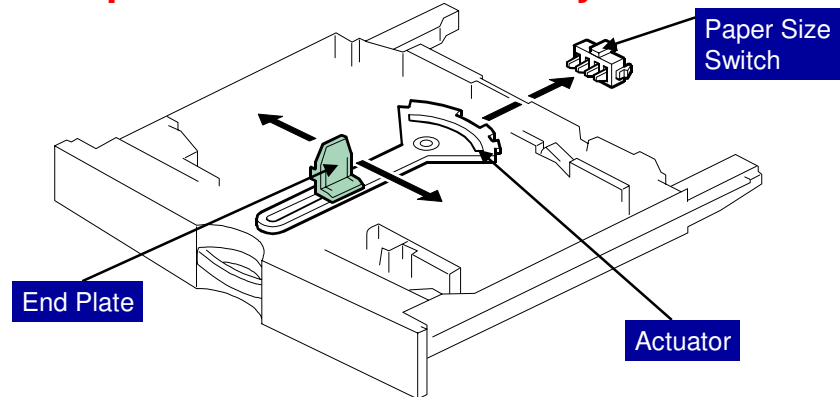
- ❑ When the tray is detected, the tray lift motor turns on until the paper lift sensor detects the top of the stack.

Slide 270

G133 service manual, Detailed Section Descriptions, Paper Feed, Paper Lift

- ❑ The paper lift sensor is shown on an earlier slide.

Paper Size Detection – Trays 1 and 2



- ❑ Tray 2: The sensor detects the paper size. The actuator position depends on the end plate position.
- ❑ Tray 1 can only have A4 or LT.
 - ◆ Depends on SP 5-181-1.
 - ◆ The sensor functions only as a tray set switch.

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G133 service manual, Detailed Section Descriptions, Paper Feed, Paper Size Detection (Trays 1 and 2)

- ❑ The sensor functions as a tray set switch and a size detector in tray 2.
 - The three switches on the left detect paper size. The switch on the right is a tray set sensor.
- ❑ Only the length is detected directly.
- ❑ The actuator has patterns of studs on the rear.
- ❑ These studs turn the paper size switches on/off.
 - This also tells the cpu that the tray is in the machine.
 - The settings of SP 5-181 determine how the machine interprets the sensor readings for paper sizes that are almost the same. See the table in the service manual for details.

There are two sets of paper sizes in this table: North America, and Europe/Asia. SP 5131 determines which of these sets of sizes is used.

If the customer uses paper sizes that are not in the table, the size must be selected with a user tool: System Settings - Tray Paper Settings - Tray Paper Size (Tray 2).

- ❑ If the fence is moved, a different set of studs moves to the switches, and the machine detects a different paper size.

Size Detection – SP Modes

□ SP 5181

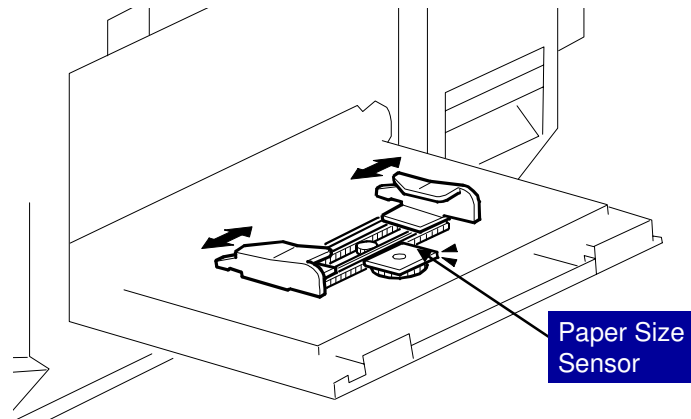
- ♦ Some paper sizes are almost the same and cannot be distinguished by the sensors.
- ♦ To select which size is detected, use SP 5181.
 - » Tray 2: SP 5181 002 to 005

□ SP 5131

- ♦ There are two sets of paper sizes in this table: North America, and Europe/Asia. SP 5131 determines which of these sets of sizes is used.

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Paper Size Detection – Bypass Tray



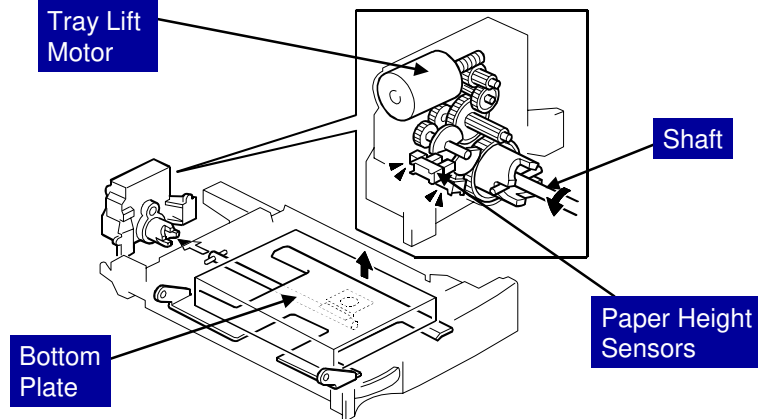
- ❑ The position of the side plates determines that size that is detected by the paper size sensor.

Slide 273

G133 service manual, Detailed Section Descriptions, Paper Feed, By Pass Paper Size Detection

- ❑ If the detected size is less than 8.5 inches in width, the sensors cannot detect the size.
- ❑ SP 1007 tells the machine what size to detect in this case (either Letter or Legal SEF).

Remaining Paper Detection – Trays 1 and 2



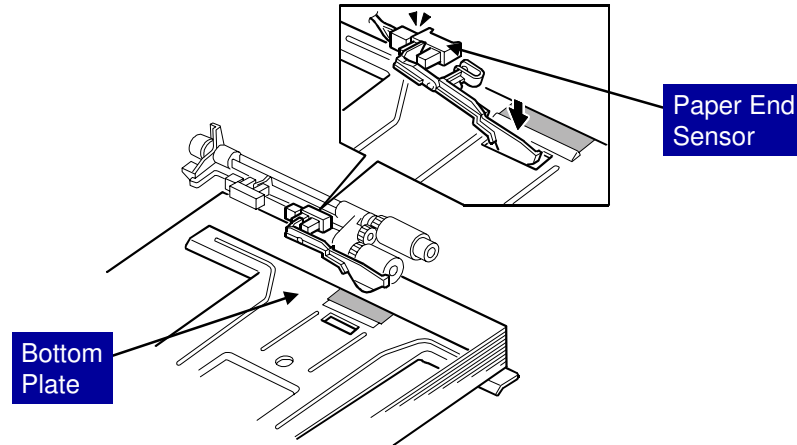
- ❑ The lift motor assembly contains two height sensors, and two semi-circular actuators.
- ❑ When paper is used up, the bottom plate is lifted and the shaft rotates. This changes the positions of the actuators.

Slide 274

G133 service manual, Detailed Section Descriptions, Paper Feed, Paper Height Detection

- ❑ The manual shows how the machine interprets the readings from the height sensors.

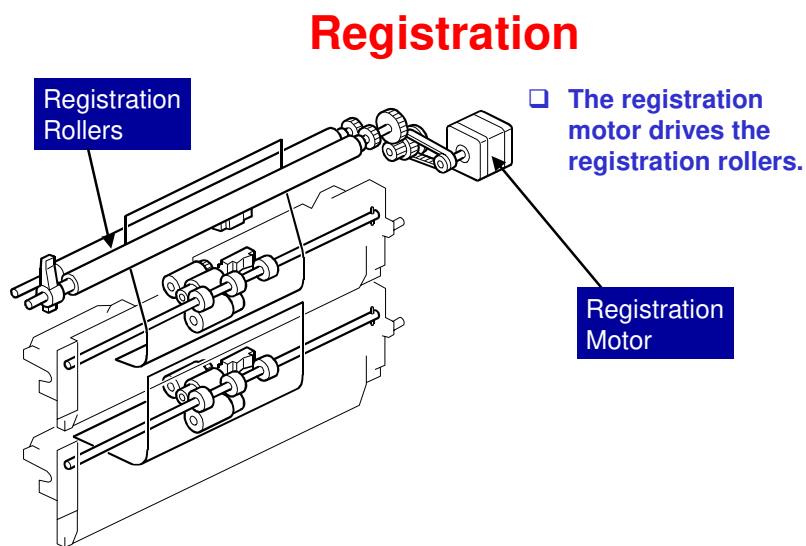
Paper End Detection – Trays 1 and 2



- When there is no paper, the feeler drops into the slot in the bottom plate. Then the actuator enters the paper end sensor.

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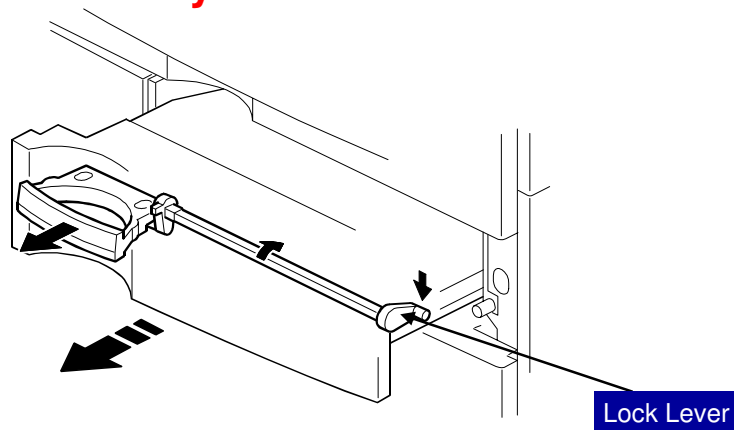
G133 service manual, Detailed Section Descriptions, Paper Feed, Paper End Detection



Slide 276

G133 service manual, Detailed Section Descriptions, Paper Feed, Registration

Tray Lock - Front



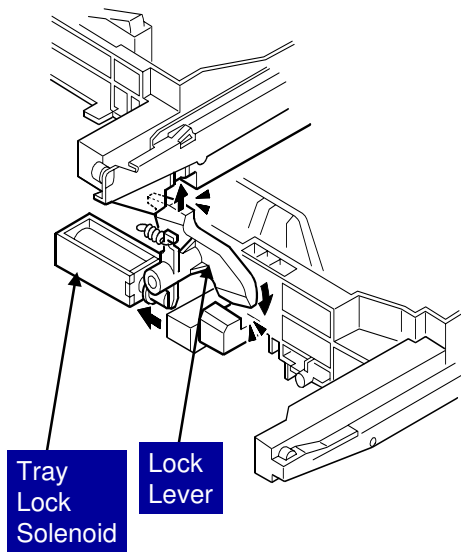
- ❑ This lock prevents the tray from coming out during shipping.
- ❑ Pull the handle to release the lock.
 - ◆ The lock lever drops when you pull the handle.

Slide 277

G133 service manual, Detailed Section Descriptions, Paper Feed, Tray Lock Mechanism

- ❑ Demonstrate this on the machine.

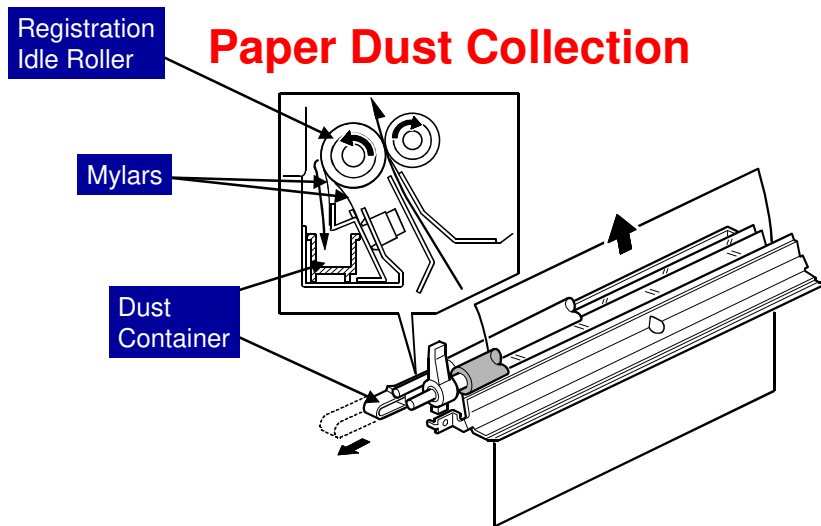
Tray Lock - Rear



Slide 278

- ❑ If the user pulls out a tray when there is a paper jam, the paper tears, and it is difficult to get the jammed paper out of the machine.
- ❑ So, if there is a paper jam, the tray lock solenoid turns on and the trays cannot be removed.
 - ♦ The lever turns counter-clockwise (as shown in the diagram) and locks both trays at the same time.
- ❑ The lock only activates when a jam occurs.
 - ♦ Occurs for all types of copy jams in the main copier.
- ❑ The lock is released when the machine detects that the jam is removed.

G133 service manual, Detailed Section Descriptions, Paper Feed, Tray Lock Mechanism



- The mylars remove paper dust from the registration idle roller.

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G133 service manual, Detailed Section Descriptions, Paper Feed, Paper Dust Collection

Replacement

- ❑ **Do the following procedures**
 - ◆ G133 Service Manual, Replacement and Adjustment, Paper Feed
- ❑ **Notes**
 - ◆ Bypass paper size switch: Take care to install the switch correctly. After installation, test that the switch was installed correctly. There is a procedure in the manual.

Slide 280

- ❑ Have the trainees remove and replace the parts in this section of the manual.
- ❑ Remind them to follow all notes and cautions in the manual.

SP Modes

- ❑ **1003: Paper buckle at the registration roller**
- ❑ **5179: Paper size error message for the by-pass tray, on/off**
 - ◆ If this is changed to 'on', a paper size error message is displayed when a paper jam occurs because the user put the paper in the bypass tray the wrong way around (LEF instead of SEF, for example)

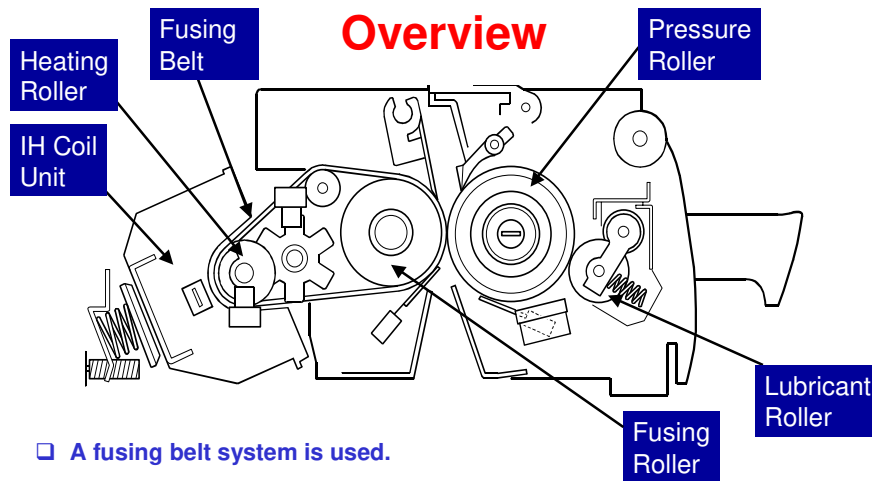
Slide 281

APOLLON-P1 TRAINING

FUSING

Slide 282

- ☐ In this section, the fusing unit will be described.



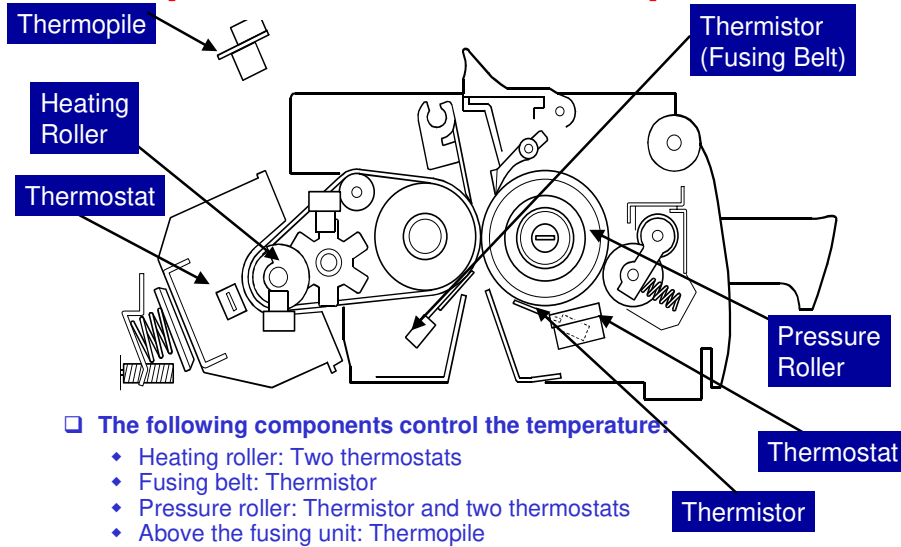
- ❑ A fusing belt system is used.
- ❑ The pressure roller contains a lamp.
- ❑ The heating roller is heated by an IH (induction heating) coil.
- ❑ The fusing belt heats the fusing roller.
- ❑ The lubricant roller supplies oil to the pressure roller. This reduces friction with the thermistor (the thermistor contacts the roller).

Slide 283

G133 service manual, Detailed Section Descriptions, Fusing, Overview

- ❑ The lubricant roller has a cleaning roller, to remove toner.
- ❑ The IH coil heats the heating roller more quickly than a fusing lamp system.
- ❑ The pressure roller thermistor contacts the pressure roller, so lubrication is necessary to reduce friction.
 - The other thermistor is near the heating roller/fusing belt, but does not contact.

Temperature Control Components

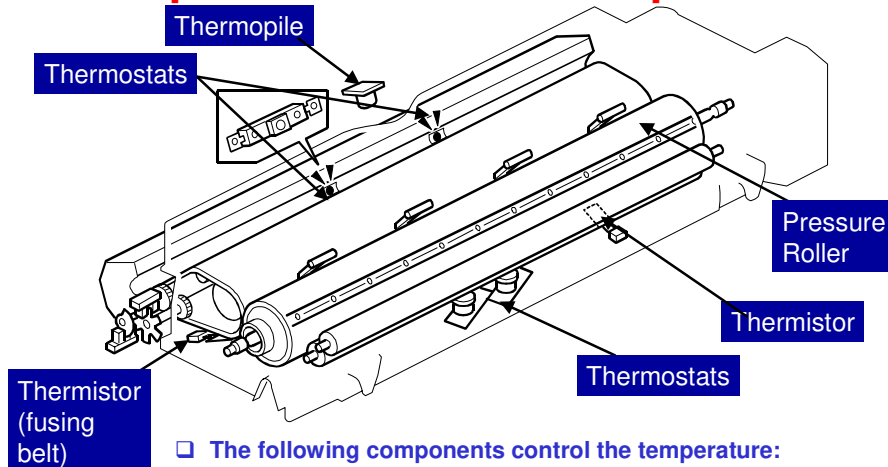


Slide 284

G133 service manual, Detailed Section Descriptions, Fusing, Overview

- The thermopile detects the temperature at the center of the fusing unit, and the thermistors detect the temperature at the ends.

Temperature Control Components



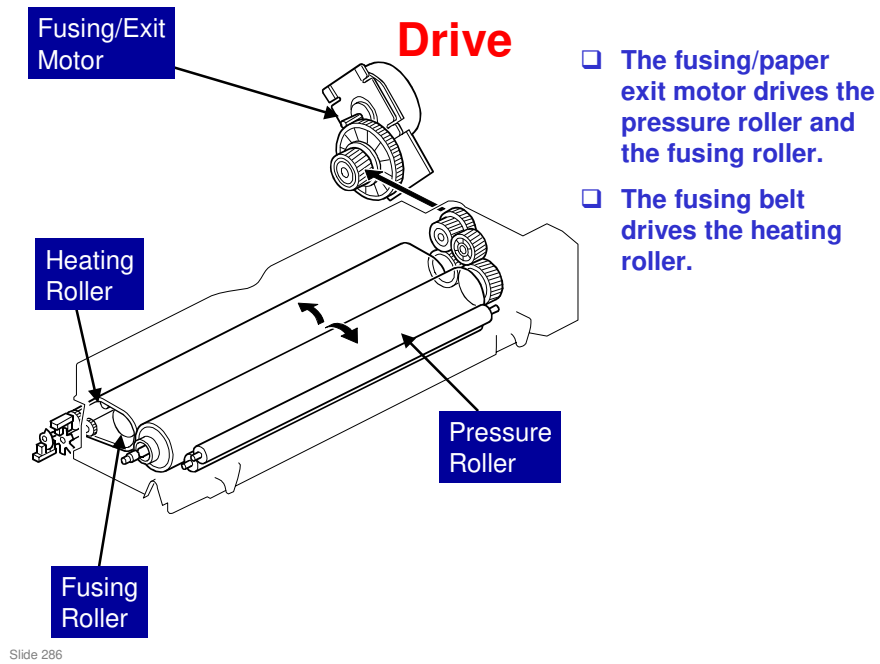
☐ The following components control the temperature:

- ◆ Heating roller: Thermostat
- ◆ Fusing belt: Thermistor
- ◆ Pressure roller: Thermistor and two thermostats
- ◆ Above the fusing unit: Thermopile

Slide 285

G133 service manual, Detailed Section Descriptions, Fusing, Fusing Temperature Control

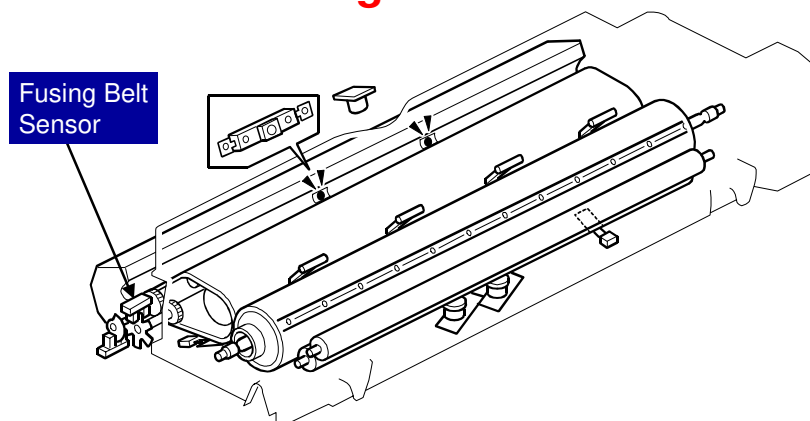
- ☐ Here is a three-dimensional drawing of the fusing unit.
- ☐ The thermopile detects the temperature at the center of the fusing unit, and the thermistors detect the temperature at the ends.
- ☐ The fusing belt thermistor does not contact the fusing belt.
- ☐ The pressure roller thermistor does contact the pressure roller, so there is a lubrication roller.



G133 service manual, Detailed Section Descriptions, Fusing,
Fusing Unit Drive

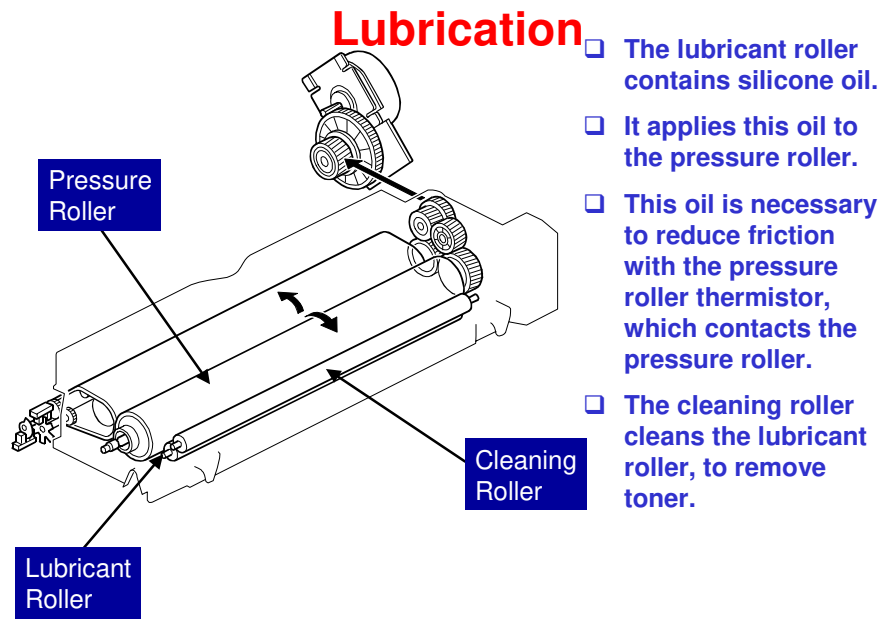
- Paper passes vertically through the fusing unit, between the fusing roller and the pressure roller.

Fusing Belt Sensor



- ❑ The fusing belt sensor detects if the heating roller stops rotating.

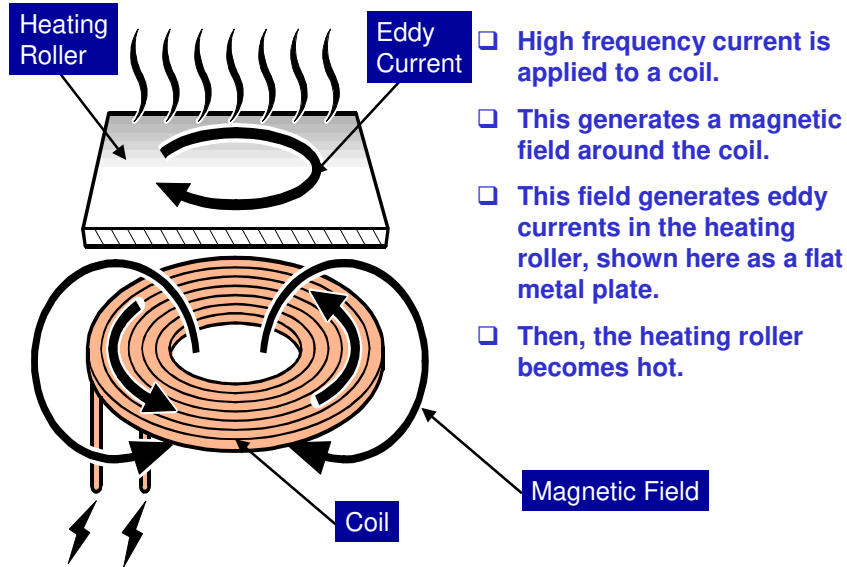
Slide 287



Slide 288

G133 service manual, Detailed Section Descriptions, Fusing,
Fusing Unit Drive

IH (Induction Heating) System - Theory

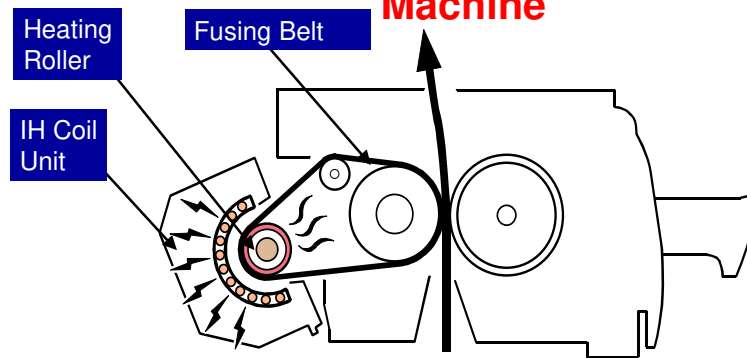


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G133 service manual, Detailed Section Descriptions, Fusing,
IH (Induction Heating) System

- ☐ This slide shows the basic theory.
- ☐ The surface of the heating roller is represented here by a flat metal plate.

IH (Induction Heating) System – This Machine

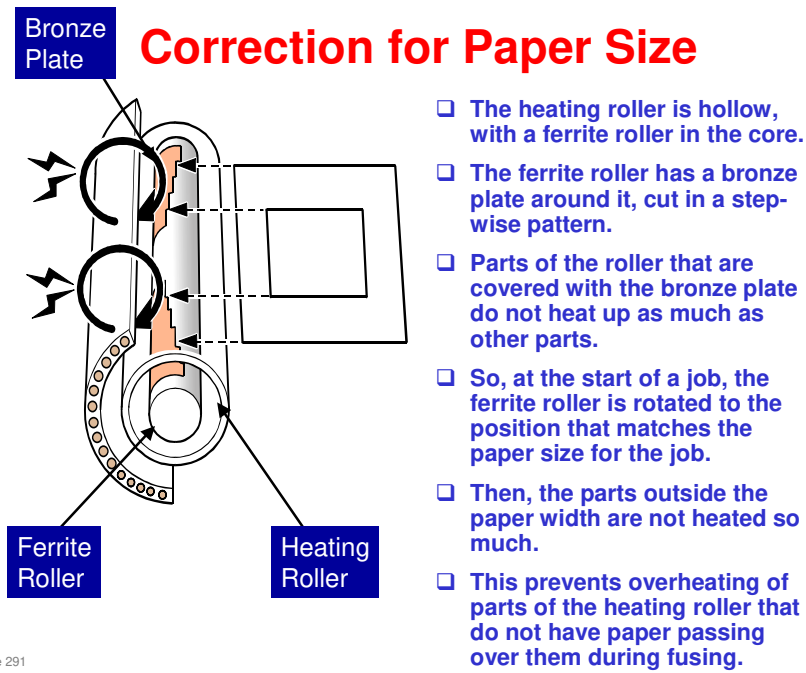


- ❑ **The IH coil unit heats the heating roller.**
 - ◆ During warm-up, 1250 W is applied to the IH coil unit.
 - ◆ During paper feed/copying, 950 W is applied
- ❑ **The heating roller heats the fusing belt.**

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G133 service manual, Detailed Section Descriptions, Fusing,
IH (Induction Heating) System

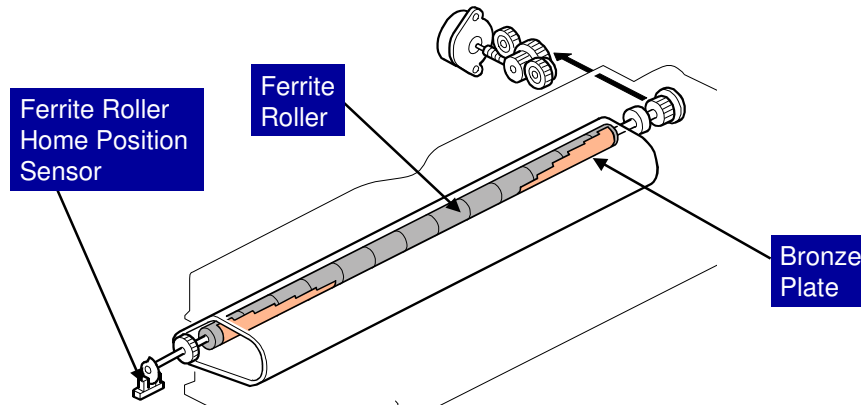
- ❑ This slide shows how the IH coil system heats up the fusing unit in this machine.



Slide 291

G133 service manual, Detailed Section Descriptions, Fusing, IH (Induction Heating) System

Correction for Paper Size



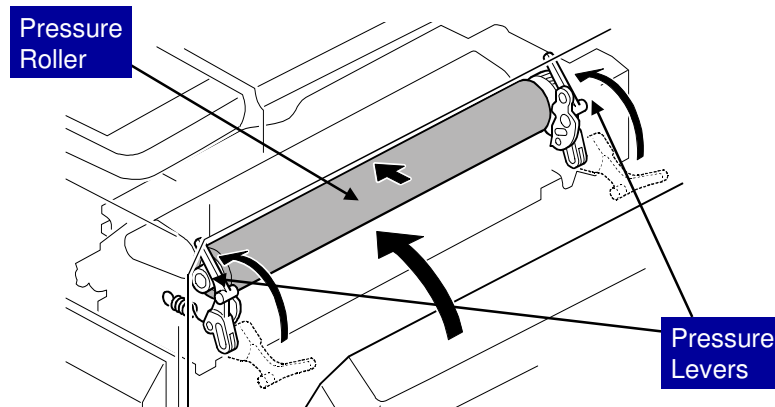
- ❑ The ferrite roller motor rotates the ferrite roller to the correct position at the start of the job. This depends on the paper size.
- ❑ The ferrite roller does not rotate during printing.
- ❑ At the end of the job, the ferrite roller rotates to home position, detected by the home position sensor.

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G133 service manual, Detailed Section Descriptions, Fusing, IH (Induction Heating) System

- ❑ There are seven different positions for the ferrite roller, corresponding to seven different paper sizes. See the service manual for details.
- ❑ Ferrite roller home position: In addition to the information on the slide, home position is detected after the roller rotates 40 times, and after 500 sheets are printed (controlled by SP 1917).

Pressure Release

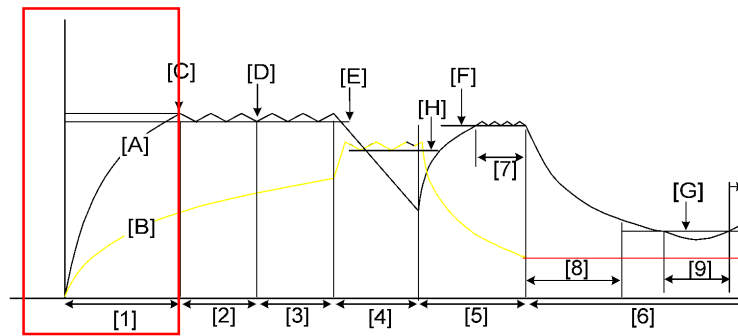


- ❑ The pressure levers apply the correct pressure from the pressure roller.
- ❑ When the cover is opened, the pressure is released, and paper jams can be removed easily.

Slide 293

G133 service manual, Detailed Section Descriptions, Fusing,
Pressure Release Mechanism

Fusing Temperature Control - 1



□ [1] Warmup mode

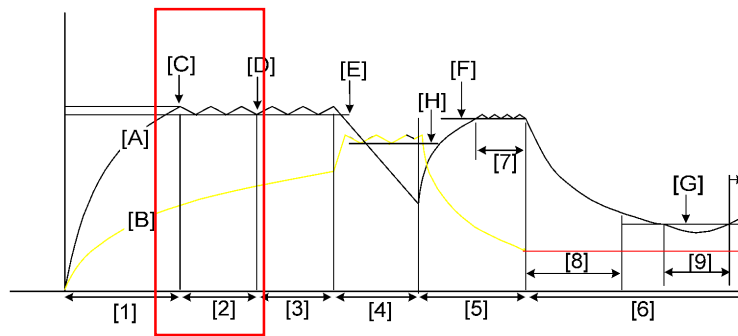
- ◆ The IH coil unit warms up the heating roller.
- ◆ The target temperature depends on the room temperature.
- ◆ When the thermopile and the two thermistors detect the set temperature, warmup mode ends.

Slide 294

G133 service manual, Detailed Section Descriptions, Fusing, Fusing Temperature Control

- Explain the phases of temperature control briefly, as shown on the next few slides.
 - This is a simplified summary.
 - The service manual has full details, including information on the SPs that can be used to change the target temperatures, corrections, and so on.
- Key to symbols in the diagram
 - [A]: Heating roller temperature
 - [B]: Pressure roller temperature
 - [C]: Heating roller target temperature for the ready condition
 - [D]: Extra idling target temperature
 - [E]: Idling target temperature
 - [F]: Heating roller target temperature for the print condition
 - [G]: CPM down threshold temperature
 - [H]: Pressure roller target temperature
 - [1] to [9]: Stages 1 to 9, as explained in the following slides

Fusing Temperature Control - 2



□ [2] 'Extra' idling

- ◆ This is idling after warmup. The 'extra' probably means that it is not the same as the idling that is done during standby mode (after the machine gets to the ready condition, and between jobs), controlled by SP 1115.
- ◆ The IH coil controls the temperature of the heating roller during this phase.
- ◆ The target temperature depends on the room temperature.

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G133 service manual, Detailed Section Descriptions, Fusing, Fusing Temperature Control

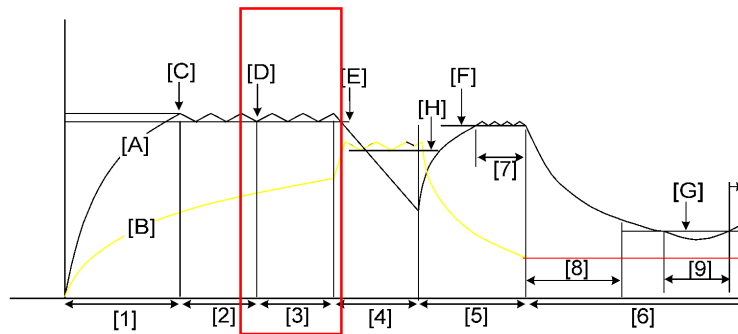
□ Key to symbols in the diagram

- [A]: Heating roller temperature
- [B]: Pressure roller temperature
- [C]: Heating roller target temperature for the ready condition
- [D]: Extra idling target temperature
- [E]: Idling target temperature
- [F]: Heating roller target temperature for the print condition
- [G]: CPM down threshold temperature
- [H]: Pressure roller target temperature
- [1] to [9]: Stages 1 to 9, as explained in the following slides

□ Duration of extra idling:

- Depends on the ambient temperature, and the settings of SP 1103 016 to 018

Fusing Temperature Control - 3



□ [3] Maintain mode for ready condition

- ◆ The IH coil controls the temperature of the heating roller during this phase.
- ◆ The room temperature is not used during this phase.
- ◆ This phase lasts for 60 seconds after the target temperature of phase [2] is reached. Then, the machine has got to the ready condition, and it goes to phase [4].

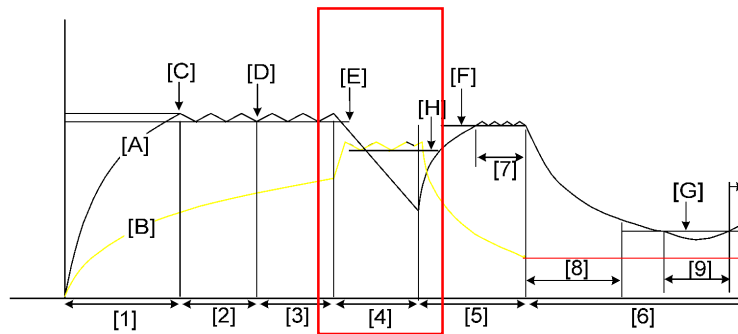
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G133 service manual, Detailed Section Descriptions, Fusing,
Fusing Temperature Control

□ Key to symbols in the diagram

- [A]: Heating roller temperature
- [B]: Pressure roller temperature
- [C]: Heating roller target temperature for the ready condition
- [D]: Extra idling target temperature
- [E]: Idling target temperature
- [F]: Heating roller target temperature for the print condition
- [G]: CPM down threshold temperature
- [H]: Pressure roller target temperature
- [1] to [9]: Stages 1 to 9, as explained in the following slides

Fusing Temperature Control - 4



□ [4] Standby mode

- ◆ During this phase, the IH coil turns off, and the pressure roller fusing lamp is used.
- ◆ The pressure roller is kept at a target temperature.
- ◆ Idling is done for 0.7 s every 60 minutes (adjustable with SP 1115).

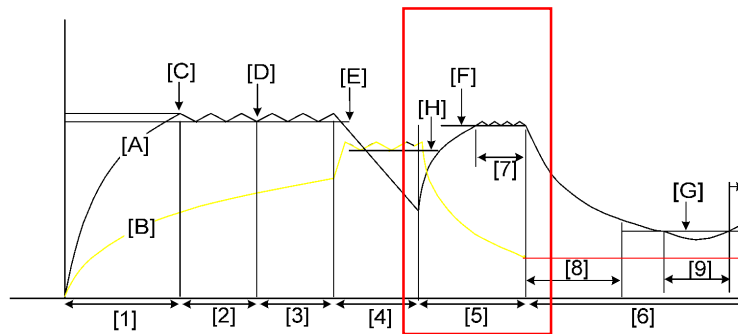
Slide 297

G133 service manual, Detailed Section Descriptions, Fusing,
Fusing Temperature Control

□ Key to symbols in the diagram

- [A]: Heating roller temperature
- [B]: Pressure roller temperature
- [C]: Heating roller target temperature for the ready condition
- [D]: Extra idling target temperature
- [E]: Idling target temperature
- [F]: Heating roller target temperature for the print condition
- [G]: CPM down threshold temperature
- [H]: Pressure roller target temperature
- [1] to [9]: Stages 1 to 9, as explained in the following slides

Fusing Temperature Control - 5



□ [5] Print ready mode

- ◆ This phase begins when a new job starts.
- ◆ The pressure roller lamp turns off and the IH coil unit turns on.
- ◆ When the job starts, the IH coil heats the fusing unit. The target temperature depends on the room temperature and the paper type.
- ◆ When the thermopile detects the required temperature, the machine waits for a short interval ([7], set by SP 1910, 5 sec for middle thick paper, 0 sec for others). Then paper feed and image creation start.

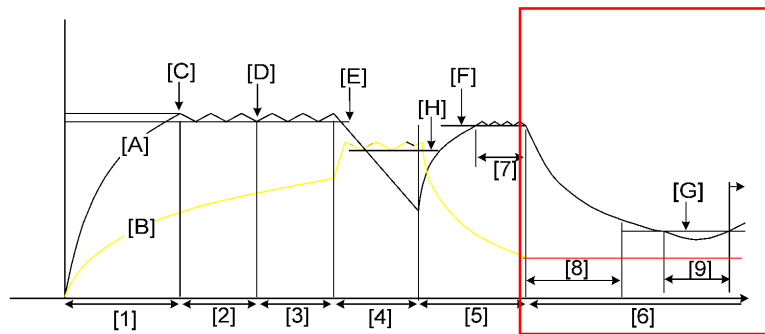
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G133 service manual, Detailed Section Descriptions, Fusing,
Fusing Temperature Control

[5] Print ready mode – additional note

- During this recovery period, the engine rotates at 77 mm/sec (SP 1911)
- If a job does not come within 10 seconds after the start of phase 5, the machine goes back to phase [4] standby mode (the IH coil turns off, and the pressure roller fusing lamp is used).
- Key to symbols in the diagram
 - [A]: Heating roller temperature
 - [B]: Pressure roller temperature
 - [C]: Heating roller target temperature for the ready condition
 - [D]: Extra idling target temperature
 - [E]: Idling target temperature
 - [F]: Heating roller target temperature for the print condition
 - [G]: CPM down threshold temperature
 - [H]: Pressure roller target temperature
 - [1] to [9]: Stages 1 to 9, as explained in the following slides

Fusing Temperature Control - 6



□ [6] Print mode

- ◆ The IH coil unit maintains the correct temperature.
- ◆ During interval [8], the copy speed is not reduced.
- ◆ Then, during interval [9], if the temperature is too low, CPM is reduced to prevent insufficient fusing, which could cause offset (partially fused toner spots on the paper). This mode is only used at line speeds of 205 mm/s (plain/middle thick paper, 600 x 600 dpi).

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G133 service manual, Detailed Section Descriptions, Fusing,
Fusing Temperature Control

[6] Print mode – additional note

- The target temperature is increased for the first print. See SP 1915 for details.
- Remember the correction for paper size that we discussed earlier, with the ferrite roller. This is how the machine corrects for paper size.
- Key to symbols in the diagram
 - [A]: Heating roller temperature
 - [B]: Pressure roller temperature
 - [C]: Heating roller target temperature for the ready condition
 - [D]: Extra idling target temperature
 - [E]: Idling target temperature
 - [F]: Heating roller target temperature for the print condition
 - [G]: CPM down threshold temperature
 - [H]: Pressure roller target temperature
 - [1] to [9]: Stages 1 to 9, as explained in the following slides

Fusing Temperature Control

- ❑ The fusing temperatures for each paper type and operating mode are set with SP 1105.
- ❑ The components that are used to control the temperature depend on the machine's operating mode.
 - ◆ During machine ready mode: Heating roller and pressure roller thermistors.
 - ◆ During standby mode, and energy saver mode: Pressure roller thermistor only.
 - ◆ During printing, and in print ready and paper feed ready modes: Heating roller thermistor only.

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G133 service manual, Detailed Section Descriptions, Fusing,
Fusing Temperature Control

- ❑ The service manual has a table that shows the default fusing control temperatures for different paper types and operating modes.
 In addition, SP 9911 controls the pressure roller temperature upper and lower limits, if the IH coil receives more than 93% of full power.
- ❑ Machine ready: After the power switch is turned on, the machine warms up. When the machine ready temperatures are detected, jobs can start.
- ❑ Paper feed ready: The machine can feed paper (for example, after recovery from energy saver mode).
- ❑ Print ready: A job can start (for example, after recovery from energy saver mode).
- ❑ Standby mode: This is between jobs, before energy saver mode starts.

Fusing Temperature Corrections

- ❑ **Corrections for ambient temperature (SP 1112)**
 - ◆ If the room temperature is below 17 ° C, the heating roller temperature is increased by 5 ° C (default).
 - ◆ If the room temperature is above 30 ° C, the heating roller temperature is decreased by 0 ° C (default).
- ❑ **If the room temperature is below 17 ° C, and plain paper is used, the fusing temperature is decreased 10 minutes after the job starts (SP 9965 003).**
 - ◆ The amount of the temperature decrease is 5 ° C (adjustable with SP 9965 004 to 007 for different paper types and room temperature conditions).
 - » This prevents overheating, because the machine previously increased the fusing temperature by 5 ° C (SP 1112, see above).
 - ◆ If the interval between jobs is 30 seconds or more (SP 9965 001 and 002), this fusing temperature decrease is cancelled.
 - » Also cancelled if the paper type changes to thick or OHP, or if a paper jam occurs.

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CPM Down Mode

- ☐ If the temperature of the fusing unit is too low, this could cause offset (partially fused toner spots on the paper).
- ☐ To prevent this, CPM is reduced.
- ☐ To do this, the machine adjusts the gaps between each sheet of paper.
- ☐ This mode is only used for the maximum line speed.
 - ♦ 205 mm/s (plain/middle thick paper, 600 x 600 dpi)
- ☐ CPM down mode can be turned on or off with SP1-916-025 (default: "ON").

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G133 service manual, Detailed Section Descriptions, Fusing,
CPM Down System

CPM Down Mode

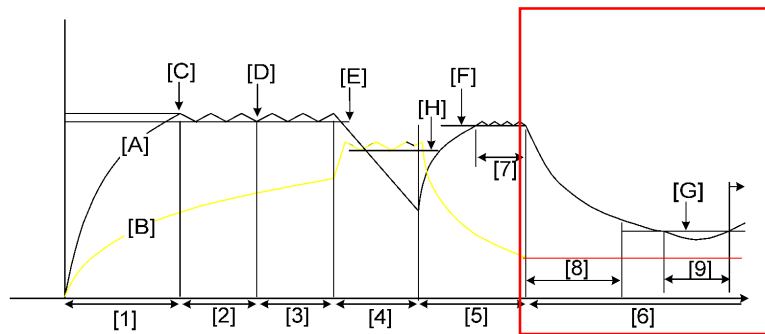
□ There are 2 steps.

- ♦ Step 1: Only for full color mode using middle thick paper
 - » The power to the IH coil and the room temperature are monitored.
 - The efficiency of the IH coil depends on the amount of power that it receives.
 - » CPM is reduced if certain combinations of IH coil power and room temperature measurement are detected.
 - Reduced to 30 ppm.
 - » Step 1 lasts for 20 seconds (SP 1916-023), then step 2 starts.
- ♦ Step 2: All jobs on plain or middle thick paper at full line speed
 - » CPM is reduced if the fusing temperature goes below the set temperature for the paper type.
 - Reduced to 30 cpm.

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- The amount of speed reduction is controlled by SP settings, as explained in the service manual.

CPM Down Mode



- ❑ CPM down mode only activates during interval [9].
 - ♦ If the temperature is too low, CPM is reduced.
- ❑ This mode is only used at line speeds of 205 mm/s (plain/middle thick paper, 600 x 600 dpi).

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G133 service manual, Detailed Section Descriptions, Fusing, Fusing Temperature Control

- ❑ This slide shows when CPM down mode is done.
- ❑ It is not done until the start of interval [9].
- ❑ At what temperature does CPM down start? How low is 'too low'? This is specified by the settings of SP 1916 017 (plain paper), 018 (middle thick, b/w), and 019 (middle thick, colour)

Overheat Protection

- ❑ **The heating roller or pressure roller temperature becomes higher than 215 ° C for one second or more**
 - ◆ SC 543 and SC 553 for the heating roller or SC 563 for the pressure roller.
- ❑ **The heating roller or pressure roller temperature reaches 220 ° C.**
 - ◆ SC 544 and SC 554 for the heating roller or SC 564 for the pressure roller.
- ❑ **If the thermistors/thermopile fail, then the thermostats and thermofuse are additional safety measures.**
 - ◆ See the service manual for temperature cut-off information.

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New Unit Detection

- ❑ **The new unit contains a fuse, that blows a short time after the new unit is installed.**
 - ◆ If the machine detects an intact fuse, followed shortly by a blown fuse, the machine automatically detects the new unit and resets the counters.
 - ◆ This is necessary because the customer replaces the fusing unit.
- ❑ **If individual components of the fusing unit are replaced, and not a complete unit, the machine does not detect them automatically.**
 - ◆ But, for this machine, do not reset the PM counters for the fusing unit with SP 3902.

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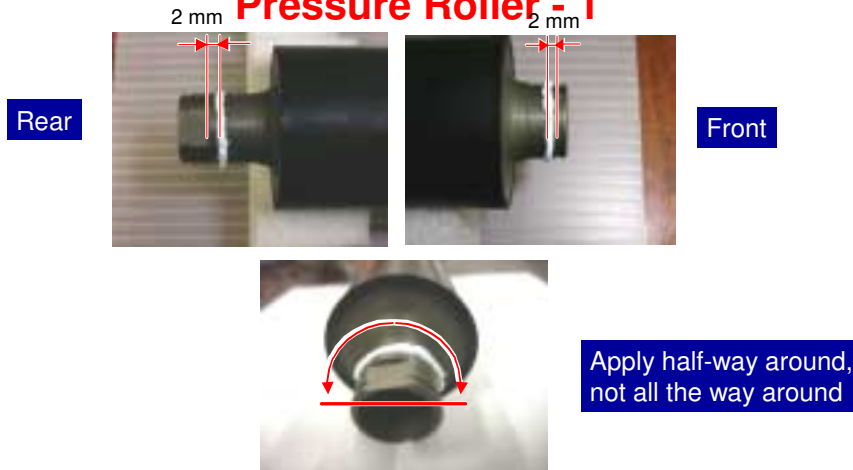
Replacement

- ❑ **Do the following procedures**
 - ◆ G133 Service Manual, Replacement and Adjustment, Fusing
- ❑ **IMPORTANT: Turn off the main switch and wait until the fusing unit cools down before you start. The fusing unit can cause serious burns.**
- ❑ **Notes**
 - ◆ Pressure roller, bushings for fusing unit rollers: Make sure that you install these correctly, as shown in the manual.

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- ❑ Have the trainees remove and replace the parts in this section of the manual.
- ❑ Remind them to follow all notes and cautions in the manual.
- ❑ Turn off the main switch and wait until the fusing unit cools down before beginning any of the procedures in this section. The fusing unit can cause serious burns.
- ❑ There is only one fusing lamp.

Notes for Replacement Pressure Roller - 1



□ Barrierta S552R

- ♦ Front: 2 mm from the notch
- ♦ Rear: 2 mm from the step

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G133 Service Manual, Replacement and Adjustment, Fusing,
Pressure Roller and Pressure Roller Bearing

Notes for Replacement Pressure Roller - 2

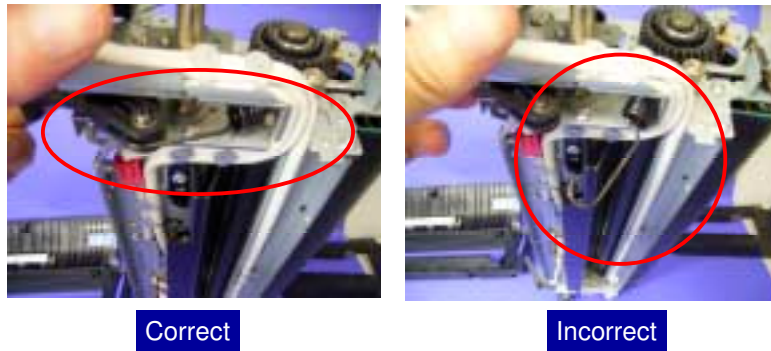


- At the front side, set the bushing correctly.

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G133 Service Manual, Replacement and Adjustment, Fusing,
Pressure Roller and Pressure Roller Bearing

Notes for Replacement Pressure Roller - 3



- ❑ Hook the spring on the upper frame correctly.

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G133 Service Manual, Replacement and Adjustment, Fusing,
Pressure Roller and Pressure Roller Bearing

Notes for Replacement Fusing Roller

Rear

Front



□ Barrierta S552R

- ♦ Front: 3 spots, 3 mm in diameter, 2-3 mm from the notch
- ♦ Rear: 3 spots, 3 mm in diameter, 2-3 mm from the step

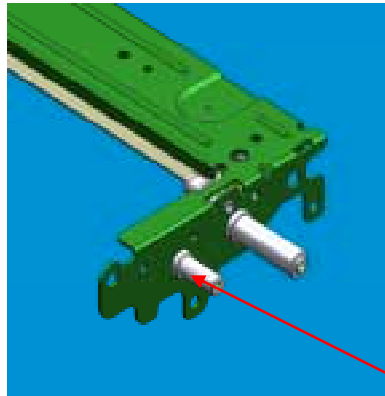
Slide 311

G133 Service Manual, Replacement and Adjustment, Fusing,
Fusing Belt, Heating Roller, Heating Roller Bushing and
Fusing Roller

Notes for Replacement Fusing Roller Idle Gear

□ Barrierta S552R

- ◆ 1 spot, 3 mm in diameter, on the idle gear shaft



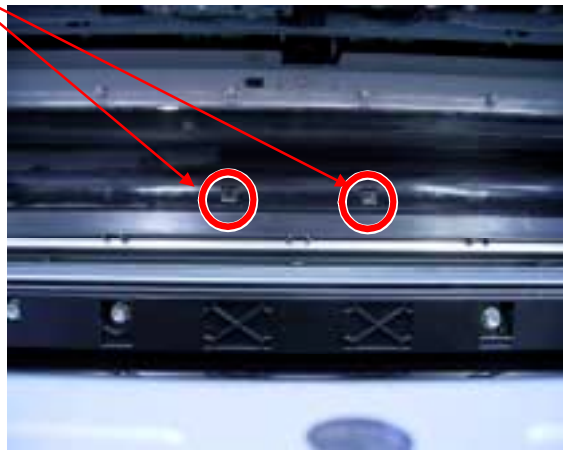
Idle Gear
Shaft

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G133 Service Manual, Replacement and Adjustment, Fusing,
Fusing Roller One-way Clutch and Idle Gear

Notes for Replacement IH Coil Unit

Thermostats



- ❑ Do not push the thermostats on the IH coil unit. They break easily.

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G133 Service Manual, Replacement and Adjustment, Fusing,
IH Coil Unit

Notes for Replacement Fans

- ❑ Make sure that you install all the fans the correct way round, as shown in the manual.
- ❑ If you install a fan the wrong way around, the fusing unit will not have sufficient air flow through it.

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- ❑ Each procedure in the manual has instructions on how to install the fan correctly.

SP Modes - 1

□ Fusing Idling

- ♦ 1115 001: Interval between idling when in standby mode (default 60 minutes)
 - » This prevents hot roller deformation
- ♦ 1115 002: Duration of idling in standby mode (default 2 seconds)

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SP Modes - 2

- ❑ **1106: Displays the temperatures inside the fusing unit**
- ❑ **1109: Nip band test**
 - ◆ If the nip band width is not correct, replace the pressure roller or add a new fusing unit. There is no nip band width adjustment.
- ❑ **1113: Interval before the machine goes to standby mode after getting to ready mode or after recovering from energy saver mode**
 - ◆ Default: After 60 seconds if no job starts after getting to the ready mode from standby mode (1113 001)
 - ◆ Default: After 10 seconds if no job starts after getting to the ready mode from energy saver mode (1113 001)

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Fusing Unit Jams

- ❑ Normally, the user will remove fusing unit jams.
- ❑ But, if SP 1159 is changed to 'on', the machine stops if a jam occurs in the fusing unit for three consecutive paper feeds. Then, SC559 appears. The technician must remove the jam.

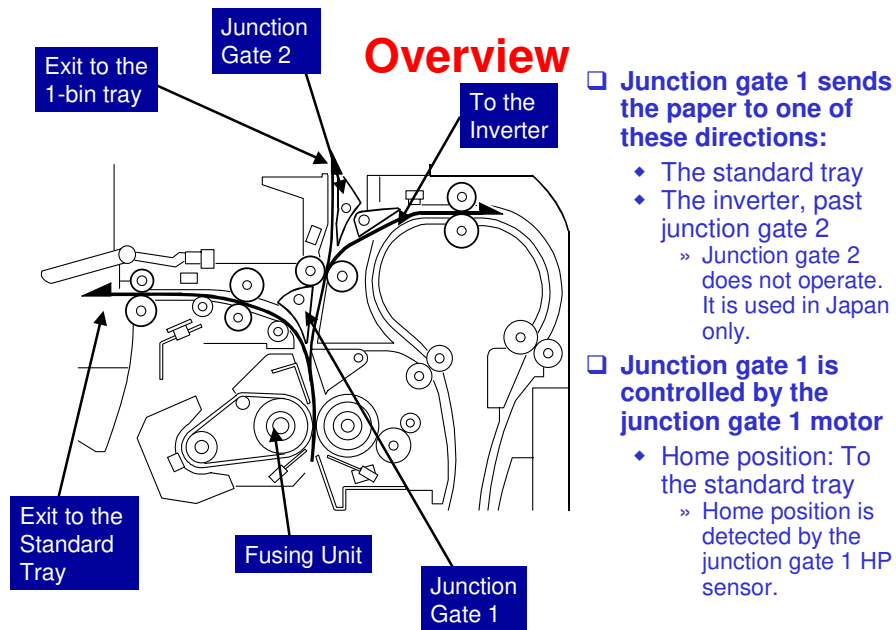
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APOLLON-P1 TRAINING

PAPER EXIT

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- ☐ In this section, the paper exit mechanism will be described.

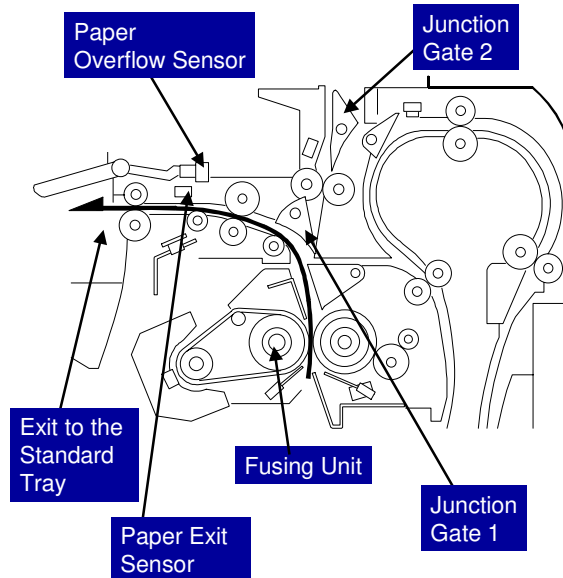


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G133 service manual, Detailed Section Descriptions, Paper Exit, Overview

- ❑ We will discuss the inverter in the Duplex section of the course.
- ❑ Junction gate 2 is controlled by a solenoid in the optional one-bin tray. It does not operate in this machine because the optional one-bin tray is not provided for the export model.

Junction Gate – To the Standard Tray



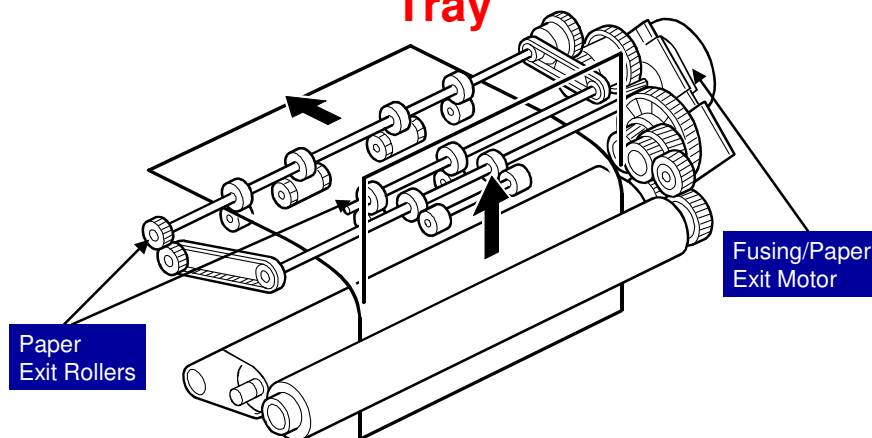
- ❑ To feed paper to the standard tray, the junction gate is at the default position.
- ❑ The paper exit sensor detects jams.
- ❑ If the paper overflow sensor remains activated, the machine detects that the tray is full.

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G133 service manual, Detailed Section Descriptions, Paper Exit, Junction Gate Mechanism

- ❑ This diagram shows the junction gate configuration when paper goes to the standard tray.

Junction Gate – To the Standard Tray



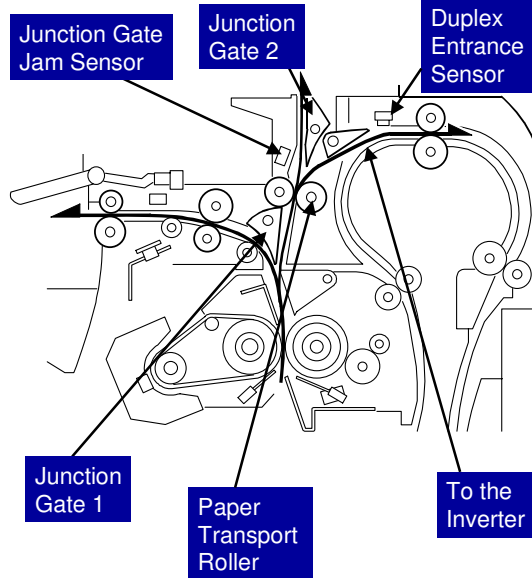
- ❑ The fusing/paper exit motor drives the paper exit rollers.

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G133 service manual, Detailed Section Descriptions, Paper Exit, Junction Gate Mechanism

- ❑ Here is a three-dimensional view of the mechanism.

Junction Gate – To the Inverter



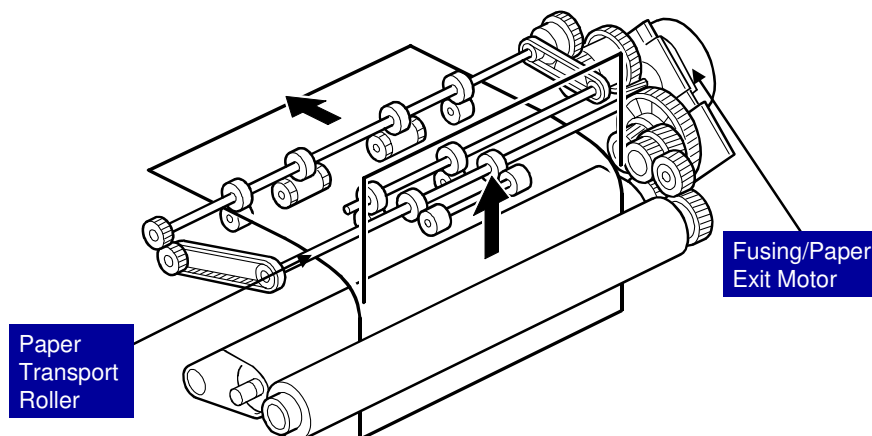
- ❑ To feed paper to the inverter tray, junction gate 1 moves away from home position.
- ❑ Junction gate 2 does not operate. Paper always goes out to the inverter.

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G133 service manual, Detailed Section Descriptions, Paper Exit, Junction Gate Mechanism

- ❑ Duplex entrance sensor: Detects jams in the inverter path
- ❑ Junction gate jam sensor: Detects jams in the exit to the one-bin tray

Junction Gate – To the Inverter



- ❑ The paper transport roller feeds the paper up to the inverter.
- ❑ The fusing/paper exit motor drives the paper transport roller.

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G133 service manual, Detailed Section Descriptions, Paper Exit, Junction Gate Mechanism

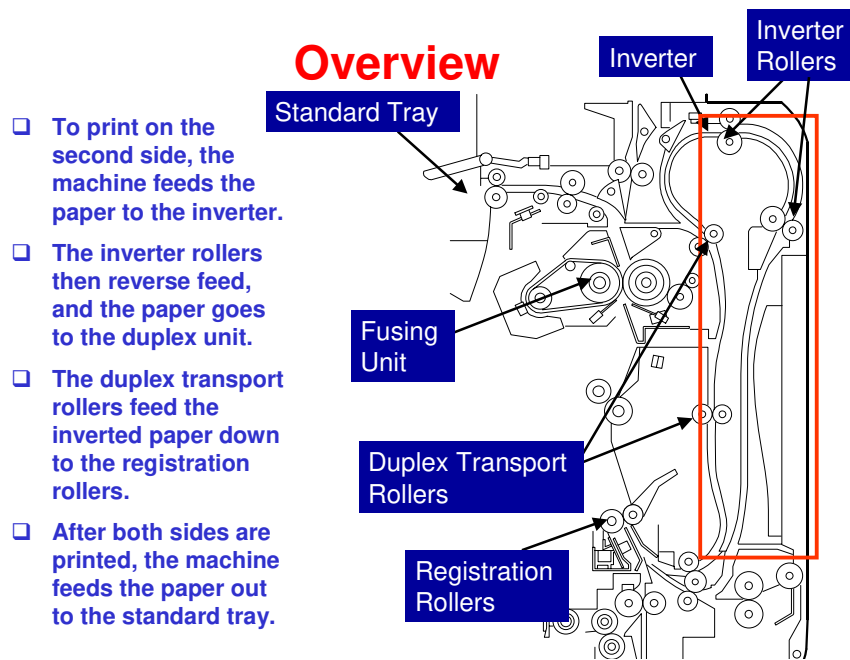
- ❑ Here is a three-dimensional view of the mechanism.

APOLLON-P1 TRAINING

DUPLEX

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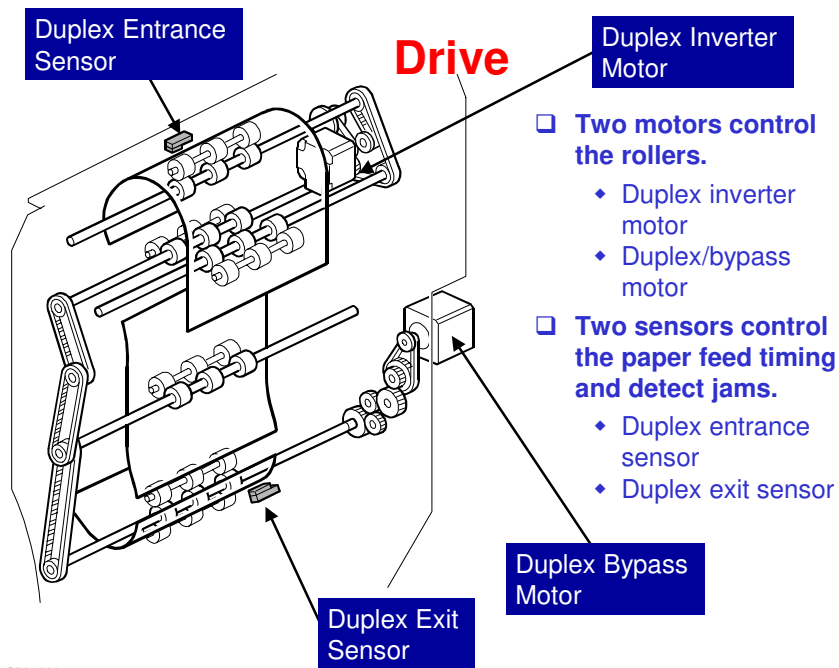
- ❑ In this section, the duplex mechanism will be described.



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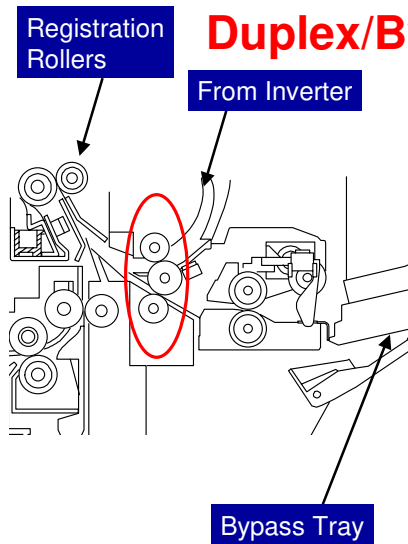
G133 service manual, Detailed Section Descriptions, Duplex Unit, Overview

- ❑ The duplex unit is shown in a red box in the above diagram.



G133 service manual, Detailed Section Descriptions, Duplex Unit, Duplex Drive

- With interleaving, there can be three sheets of paper in the machine at the same time.
- Observant members of the class may notice that one of the rollers is driven by both of these motors. The service manual briefly explains the reason for this mechanism, to control interleave timing for longer paper sizes.

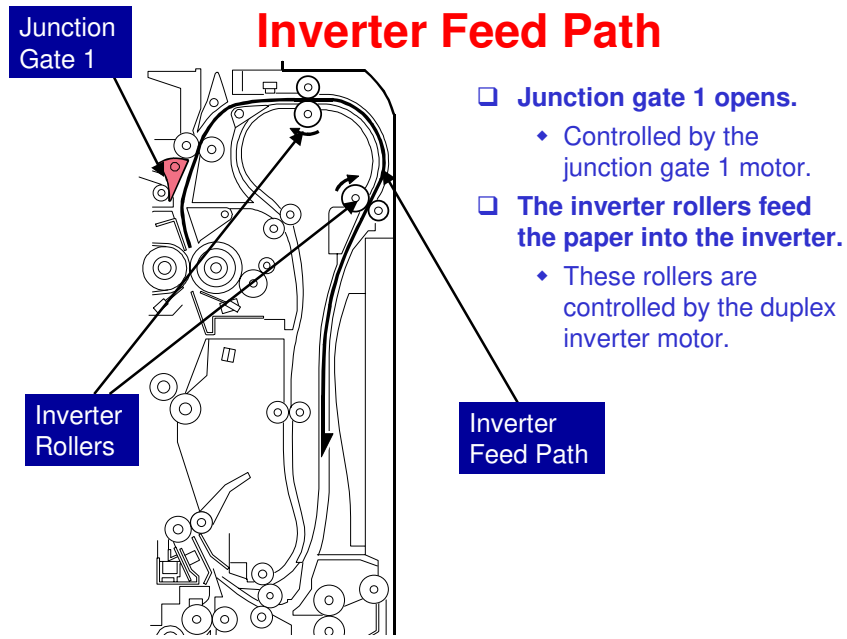


Duplex/Bypass Motor

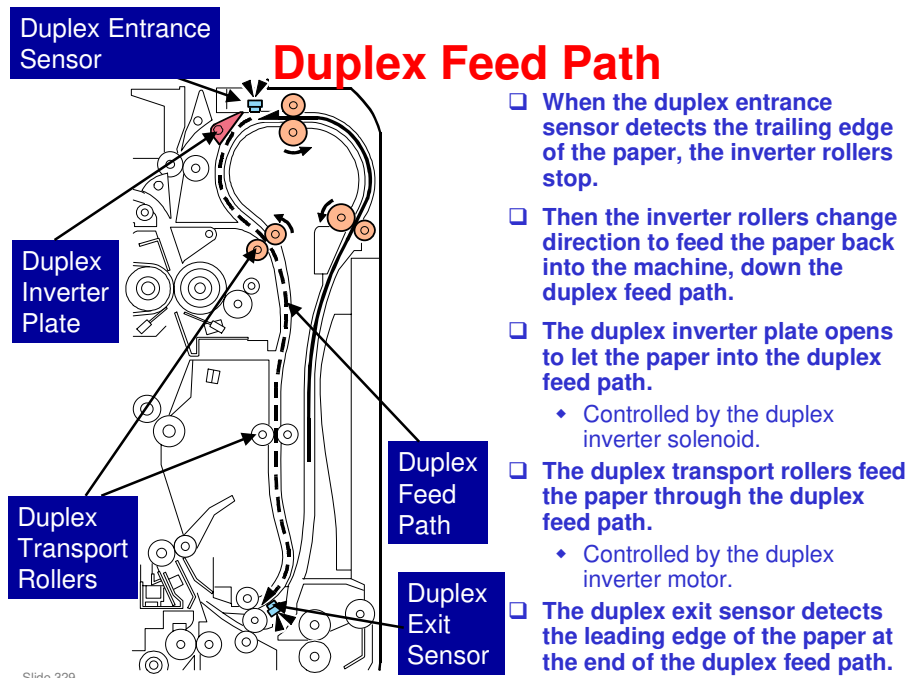
- ❑ There are three rollers at the bypass tray exit (in the red circle in the diagram).
 - ♦ The top and middle rollers feed paper from the inverter.
 - ♦ The bottom and middle rollers feed paper from the bypass tray.
 - ♦ The middle roller is driven by the duplex/bypass motor.
 - » The top and bottom rollers are idle.
 - ♦ Because of this, the duplex/bypass motor can turn in both directions.
 - » Clockwise: Feed from bypass tray
 - » Counter-clockwise: Feed from inverter
 - ♦ But the bypass tray cannot be used in duplex mode.

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- ❑ This is a close-up view of the bypass tray exit.



No additional notes



No additional notes

Interleaving

- ❑ The number of sheets of paper that can be in the paper feed path at the same time depends on the paper length.
 - ◆ Up to A4/LT LEF: Three sheets
 - ◆ From A4/LT LEF to 400 mm long: Two sheets
 - ◆ Longer than 400 mm: One sheet (no interleaving)

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G133 service manual, Detailed Section Descriptions, Duplex
Unit, Duplex Operation

- ❑ The service manual shows details of how interleaving is done in this model.

Replacement

- ❑ **Do the following procedures**
 - ◆ G133 Service Manual, Replacement and Adjustment, Duplex Unit

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- ❑ Have the trainees remove and replace the parts in this section of the manual.
- ❑ Remind them to follow all notes and cautions in the manual.

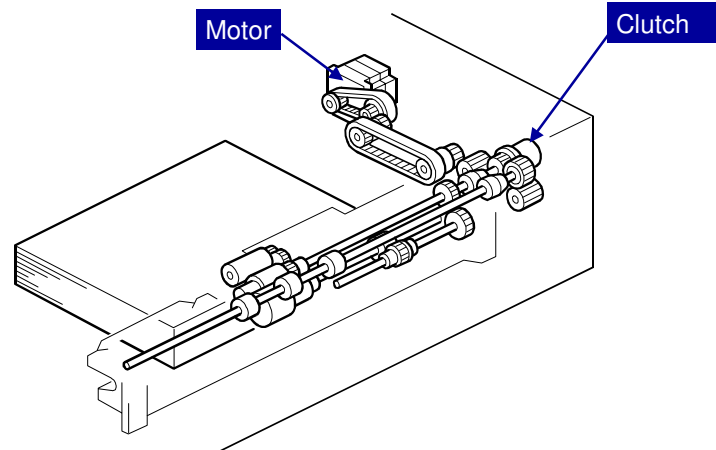
OPTIONS

One-tray Paper Tray Unit

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- ☐ This is the same as the one that is used in the AP-P1.
- ☐ The mechanisms are similar to those in the At-C1 engine.

Paper Feed and Separation

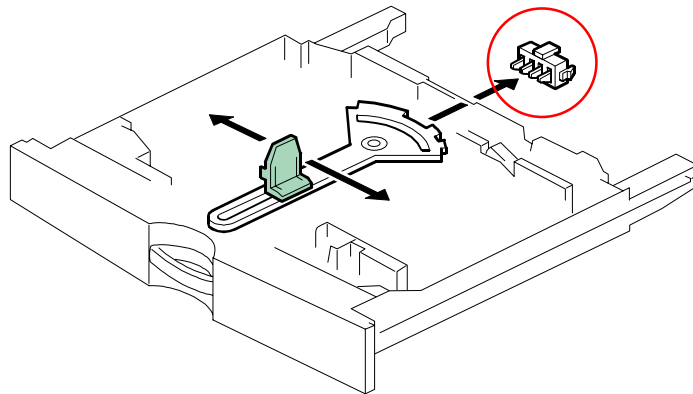


- ❑ The paper feed motor and clutch control all the rollers.
- ❑ The machine uses an FRR (feed and reverse roller) system.

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- ❑ The paper feed motor controls all the rollers.
- ❑ The clutch transfers power to the paper feed rollers at the correct times.

Paper Size Detection



- ❑ Both the trays are universal trays.
- ❑ Paper size switches: Detect the paper length
 - ♦ The position of the sensor actuator is controlled by the position of the end fence

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- ❑ Only the length is detected directly.
- ❑ The actuator has patterns of studs on the rear.
- ❑ These studs turn the paper size switches on/off.
 - This also tells the cpu that the tray is in the machine.
 - If a paper size is used that cannot be detected by the sensors, the operator must select that size with a user tool.
- ❑ If the fence is moved, a different set of studs moves to the switches, and the machine detects a different paper size.

Size Detection – SP Modes

□ SP 5181

- ♦ Some paper sizes are almost the same and cannot be distinguished by the sensors.
- ♦ To select which size is detected, use SP 5181.
 - » Tray 3: SP 5181 006 to 009
 - » Tray 4: SP 5181 010 to 013

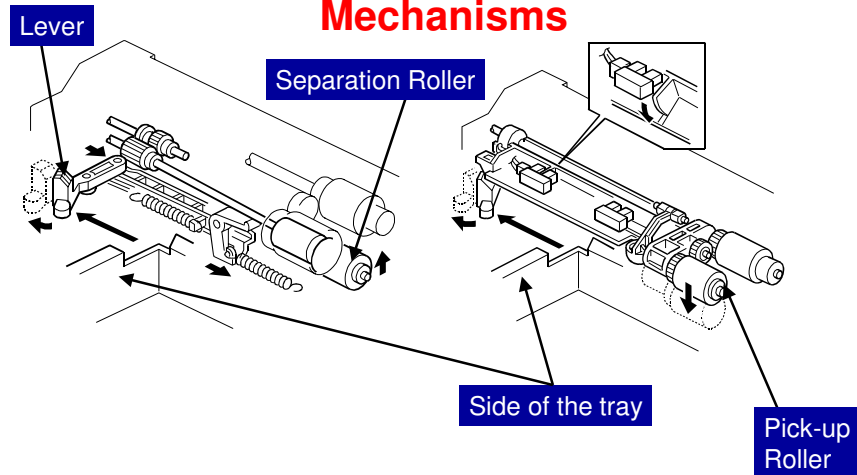
□ SP 5131

- ♦ There are two sets of paper sizes in this table: North America, and Europe/Asia. SP 5131 determines which of these sets of sizes is used.

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No additional notes

Separation and Pick-up Roller Release Mechanisms

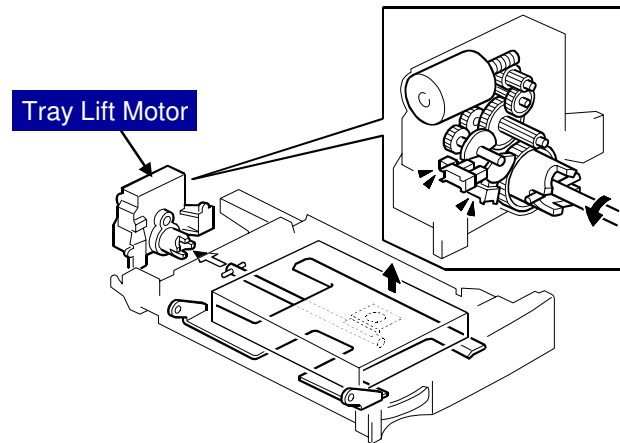


- ❑ The side of the tray pushes the lever.
- ❑ The lever moves the pick-up and separation rollers.

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- ❑ When the paper tray is removed, the separation roller moves away from the paper feed roller, and the pick-up roller moves up.
 - These mechanisms prevent damage to paper that is between the pick-up and separation rollers when the tray is pulled out.
- ❑ When the tray is put in the machine, the tray pushes a lever. This moves the separation roller into contact with the feed roller, and moves the pick-up roller down onto the stack of paper.

Tray Lift

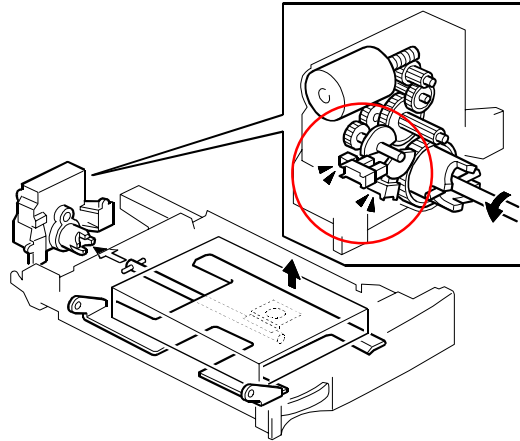


- ❑ **After the tray is detected:**
 - ◆ Tray lift motor: Lifts the tray until the lift sensor detects the top of the stack at the feed position

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- ❑ The main points are shown above.
 - Lift sensor: see the electrical component layout.

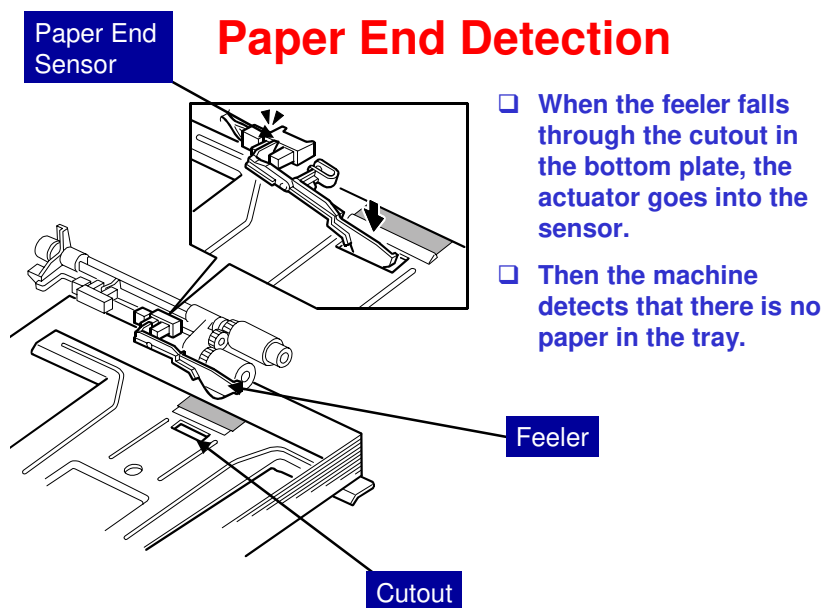
Paper Height Detection



- ❑ **Two paper height sensors: Detect the quantity of paper in the tray**

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- ❑ After paper is used, the tray moves up, and the actuator on the shaft turns anti-clockwise (as seen on the diagram).
- ❑ The semi-circular actuators move in and out of the sensors. The machine detects the outputs from the sensors, and displays the remaining paper amount on the operation panel.



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No additional notes

Replacement

- ☐ **Read the following procedures**
 - ♦ B800 Service Manual, Replacement and Adjustment
- ☐ **Do any of the procedures that you think that you need to practice.**
- ☐ **Pay attention to all notes, cautions, and warnings in the manual.**

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No additional notes