RICOH

This training course provides service technician training for the PE-MF3/PE-P2 series.

The differences between this series and the previous PE-MF2/PE-P1e series are also explained.

RICOH

RICOH

Service Training
M099/M100, M095/M096

Product Overview

Slide 2

This section provides an overview of the machine, and the options that can be installed.

What Models are there in the Series?
PE-MF3

- **PE-MF3a (M099)**
  - 16 ppm (color and b/w)
  - DDST (GDI)
  - Memory: 256 MB
  - '4-in-1' (Print/Copy/Fax/Scan)
- **PE-MF3c (M100)**
  - 20 ppm (color and b/w)
  - PCL/PS
  - Memory: 256 MB
  - '4-in-1' (Print/Copy/Fax/Scan)

Slide 3

- No hard disk and no optional memory for either model
- Difference from PE-MF2: Both models were 20 ppm in the PE-MF2 series, and optional memory was available for the PE-MF2c.
- Print speeds are for A4

What Models are there in the Series?
PE-P2

- **PE-P2a (M095)**
  - 16 ppm (color and b/w)
  - DDST (GDI)
  - Memory: 64 MB
- **PE-P2c (M096)**
  - 20 ppm (color and b/w)
  - PCL/PS
  - Memory: 256 MB

Slide 4

- No hard disk and no optional memory for either model
- Difference from PE-P1e: Both models were 20 ppm in the PE-P1e series, and optional memory was available for both models.
- Print speeds are for A4
  - For LT, the speeds are 16.5 and 21 cpm

Appearance – MFP Models

PE-MF3a

PE-MF3c

- **Note that the two models have different color schemes.**

Slide 5

- These machines have a built-in ADF.

Appearance – Printer Models

PE-P2a

PE-P2c

- Note that the two models have different color schemes.

Slide 6

No additional notes

Standard Equipment

- **This equipment is built-in for all models.**
  - 35-sheet automatic document feeder (MF models only)
  - 250-sheet paper feed unit
  - 1-sheet bypass feed
  - Duplex
  - Ethernet: 10Base-T/100base-TX
  - USB 2.0
  - Fax
- **Memory**
  - PE-MF3a: 256 MB
  - PE-MF3c: 256 MB
  - PE-P3a: 64 MB
  - PE-P3c: 256 MB
- **No optional memory**
- **No hard disk (built-in or optional) for any model**

Slide 7

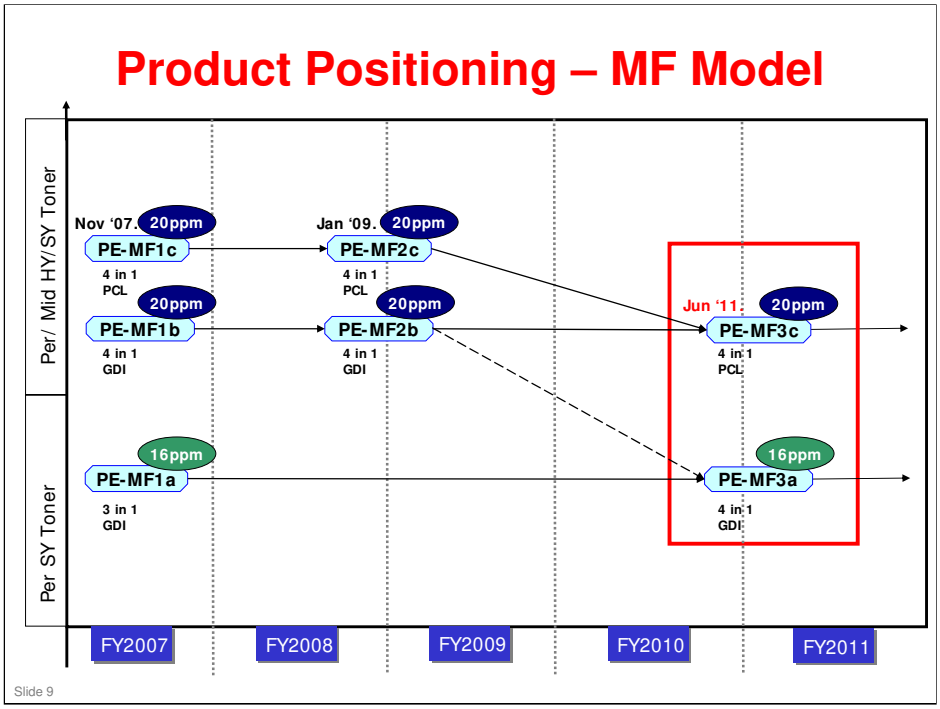
- Duplex can be used for printing and copying. In some earlier models in this series, duplex could not be used for copying.

Optional Equipment

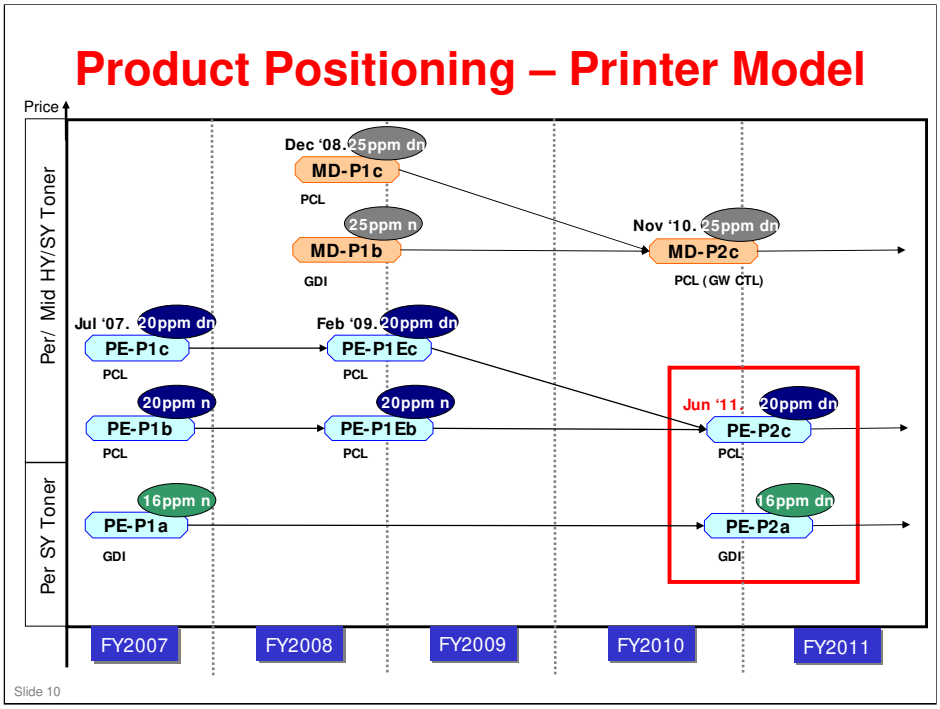
- **TK1010 Paper Feed Unit, G849**
  - Available for all models
  - Also used in the PE-MF1/MF2/P1/P1E series
- **No optional memory**

Slide 8

- Some of the previous models in this series also had optional memory.



No additional notes



No additional notes

Summary of Differences from Previous Products
PE-MF3 – Specifications

- **Warm-up time:**
  - PE-MF3c: 30 sec (PE-MF2c: 48 sec)
  - PE-MF3a: 30 sec (PE-MF1a: 51 sec)
  - The hot roller has a thin wall, which makes the warm-up time faster and allows lower energy consumption.
- **Typical Energy Consumption (TEC)**
  - PE-MF3a: approx. 2.8kWh (PE-MF1a: 4.5kWh)
  - PE-MF3c: approx. 3.3kWh (PE-MF2c: 5.9kWh)
- **Durability**
  - Estimated unit life: This is higher for MF3c (180k prints) than previous models in this series (90k prints).

Slide 11

No additional notes

Summary of Differences from Previous Products
PE-MF3 – Features

- **Operation panel: The following were added**
  - 4-line LCD, improved from the previous model (2 line LCD)
  - USB port, for Scan to USB and PictBridge
  - ID Card Copy button
  - Fax Received indicator
  - Easy-to-see lamps: The operation panel angle is raised so that users can see the alert lamps even while seated
- **Economy Color**
  - Provides a slightly lighter output with lower printout cost
- **Reduced Toner Usage**
  - Motor operation stops during sleep mode recovery
- **Fax**
  - Internet fax has been added (PE-MF3c only)
  - Speed Dial: 200 locations (previous model was only 50)
  - JBIG compression has been added
    - » This allows a transmission time of 2 seconds per page (previous maximum speed, with MMR compression, was 3 seconds per page)
  - Authorized reception and paperless fax reception are new features for this series
- **Network**
  - IPv6 supported (not supported in previous models)

Slide 12

No additional notes

Summary of Differences from Previous Products
PE-P2 – Specifications

- **Auto duplex for all models (PE-P1a: manual duplex only)**
- **Warm-up time**
  - PE-P2c: 30 sec (PE-P1E: 48 sec)
  - PE-P2a: 30 sec (PE-P1a: 51 sec)
  - The hot roller has a thin wall, which makes the warm-up time faster and allows lower energy consumption.
- **Typical Energy Consumption (TEC)**
  - PE-P2c: 3.1kWh (PE-P1Ec: 4.6kWh)
  - PE-P2a: 2.3kWh (PE-P1a: 3.2kWh)
- **Durability**
  - Estimated unit life: This is higher for P2c (180k prints) than previous models in this series (90k prints).

Slide 13

No additional notes

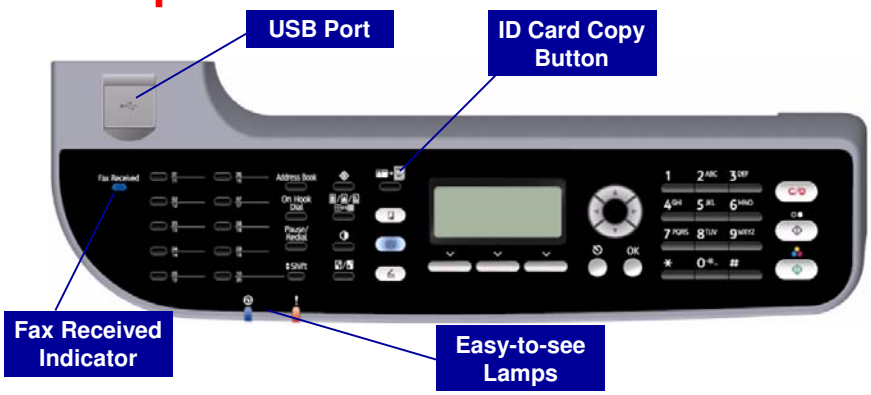
Summary of Differences from Previous Products
PE-P2 – Features

- **Operation panel**
  - Easy-to-see lamps: The operation panel angle is raised so that users can see the alert lamps even while seated
- **Economy Color**
  - Provides a slightly lighter output with lower printout cost
- **Reduced Toner Usage**
  - Motor operation stops during sleep mode recovery
- **Network**
  - IPv6 supported (not supported in previous models)
- **PictBridge**
  - Supported at the rear USB socket.
- **SOM (Smart Organizing Monitor)**
  - This is not used. The technician does not need to use a computer to access service mode. Operation is the same as the MF models.

Slide 14

No additional notes

Operation Panel – MFP Model



- **4-line display (previous model: 2 lines)**
- **New features for this series:**
  - USB port, for Scan to USB and PictBridge
  - ID Card Copy button
  - Fax Received indicator
  - Easy-to-see lamps: The operation panel angle is raised so that users can see the lamps even while seated

Slide 15

- ID Card Copy
  - Use for printing 2-sided originals, such as an ID card, on one sheet. One side of the original is printed on the upper half of the paper and the other side is printed on the lower half.

Operation Panel – Printer Model

- Two-line LCD (same as PE-P1e)
- Easy-to-see lamps: The operation panel angle is raised so that users can see the lamps even while seated

Slide 16

No additional notes

LED Lamps – Comparison with Older Models

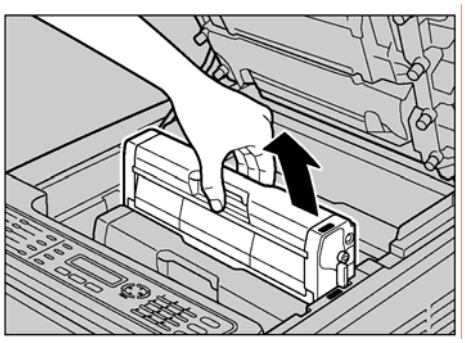
PE-MF1 PE-MF3

PE-P1 PE-P2

Slide 17

No additional notes

AIO Cartridge



- **The OPC, charge roller, and development unit are all in an AIO cartridge.**
  - AIO: All-in-one
- **The cartridge can be removed with one hand.**
- **The cartridges are the same as used in previous models.**
  - See the next slide for details.

Slide 18

No additional notes

Types of AIO (Print) Cartridge

- **Pe-MF3a, PE-P2a**
  - Starter
    - » 1 k prints per cartridge
  - Short Yield
    - » 2 k prints per cartridge
      - – Same cartridges as **PE-MF1**
- **Pe-MF3c, PE-P2c**
  - Starter
    - » 1 k prints per cartridge
  - Short Yield
    - » 2.5 k prints per cartridge
      - – Same cartridges as **PE-MF2**
  - Long (High Yield) – Pe-MF3c and Pe-P2c only
    - » 6.5 k prints per cartridge (BK)
    - » 6.0 k prints per cartridge (CMY)
      - – Same cartridges as **PE-MF2**

Slide 19

- AIO yield measurements are based on ISO 19798, except for PE-MF3a/P2a, which is based on 5% 24P/J
- Note that different cartridge types are used for the short yield AIO.
  - PE-MF3a/P2a uses the PE-P1/PE-MF1 type AIO. PE-MF3c/P2c uses PE-P1e/PE-MF2/MD-P1/MD-P2 type AIO.

Other Consumables

- **Waste Toner Tank**
  - Approximately 25 k prints per tank
    - » Same tank as previous models
- **All consumables can be replaced by customers.**

Slide 20

- The waste toner tank is the same as the one that is used for previous models in this series.
- Waste toner tank yield measurement based on 5%, 3P/J, 50% color ratio
  - Color ratio: 50% means that half the jobs are black-and white, and half are color
  - Compatible with Pe-P1, Pe-MF1, Pe-MF2, and Md-P1

Targets

- **Monthly Print Volume**
  - MF3a, P2a: Average 0.65K prints, Maximum 1.5K prints
  - MF3c: Average 1.1K prints, Maximum 3K prints
  - P2c: Average 0.8K prints, Maximum 3K prints
- **Estimated Unit Life**
  - MF3a, P2a: 5 years or 90K prints whichever comes first
  - MF3c, P2c: 5 years or 180K prints whichever comes first

Slide 21

- Estimated unit life: MF3c and P2c are more durable than previous models in this series (increased from 90k to 180k).

Service Modes

- Printer models and MFP models are all accessed at the machine's operation panel through menus
- There is no SOM (Smart Organizing Monitor).
- Technicians do not need a PC in order to use the service mode.

Slide 22

No additional notes

This section provides an overview of the main specifications and explains improvements over the previous models in the PE series.

Main Specifications – MFP Model (1)

- **Warm-up time:**
  - PE-MF3c: 30 sec (PE-MF2c: 48 sec)
  - PE-MF3a: 30 sec (PE-MF1a: 51 sec)
- **First copy speed: 30 seconds**
- **First print speed: Less than 14 seconds**
- **Paper Input Capacity:**
  - 250 sheets (standard tray)
  - 1 sheet (bypass tray)
  - 500 sheets (optional paper tray unit)
- **Paper Output Capacity: 150 sheets**
- **Paper Weight**
  - Standard and bypass trays: 60 - 160g/m2, 16lb - 40lb Bond
  - Optional paper tray unit: 60 - 105g/m2, 16lb - 28lb Bond
  - Duplex: 60 - 90g/m2, 16lb - 24lb Bond

Slide 24

- These specs are the same as the previous model, except for the warm-up time. The reason for the faster warm-up time will be explained later.
- Why is 1st copy time so much slower than the 1st print time?
  - Scanner initialization and movement to the start position takes more time.
- Duplex printing speed is about 60% of the normal printing speed)
  - Duplex printing cannot be done for thick paper (more than 90 g/m^2).
- Printing on OHP transparencies is not possible.

Main Specifications – MFP Model (2)

- **Typical Energy Consumption (TEC)**
  - PE-MF3a: approx. 2.8kWh (PE-MF1a: 4.5kWh)
  - PE-MF3c: approx. 3.3kWh (PE-MF2c: 5.9kWh)
- **Recovery from Energy Saver Mode**
  - Normal (Energy Saver Mode 2): 30 seconds or less
  - Quick (Energy Saver Mode 1): 10 seconds or less
- **PDLs**
  - PE-MF3a: DDST (GDI)
  - PE-MF3c: PCL5c/6, PostScript 3 emulation
- **Network Protocol**
  - TCP/IP, IPP, Bonjour

Slide 25

No additional notes

Main Specifications – Printer Model (1)

- **Warm-up time**
  - PE-P2c: 30 sec (PE-P1E: 48 sec)
  - PE-P2a: 30 sec (PE-P1a: 51 sec)
- **First print speed: Less than 14 seconds**
- **Paper Input Capacity:**
  - 250 sheets (standard tray)
  - 1 sheet (bypass tray)
  - 500 sheets (optional paper tray unit)
- **Paper Output Capacity: 150 sheets**
- **Paper Weight**
  - Standard and bypass trays: 60 - 160g/m2, 16lb - 40lb Bond
  - Optional paper tray unit: 60 - 105g/m2, 16lb - 28lb Bond

Slide 26

- These specs are the same as the previous model, except for the warm-up time. The reason for the faster warm-up time will be explained later.

Main Specifications – Printer Model (2)

- **Typical Energy Consumption (TEC)**
  - PE-P2c: 3.1kWh (PE-P1Ec: 4.6kWh)
  - PE-P2a: 2.3kWh (PE-P1a : 3.2kWh)
- **Recovery from Energy Saver Mode**
  - Normal (Energy Saver Mode 2): 30 seconds or less
  - Quick (Energy Saver Mode 1): 10 seconds or less
- **PDLs**
  - PE-P2a: DDST (GDI)
  - PE-P2c: PCL5c/6, PostScript 3 emulation
- **Network Protocol**
  - PE-P2a: TCP/IP
  - PE-P2c: TCP/IP, IPP, Bonjour

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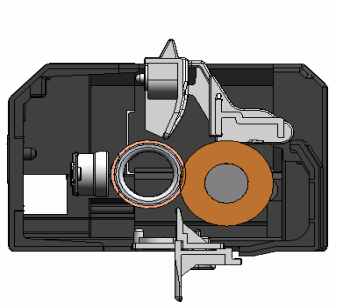
No additional notes

Warm-up Time, Energy Consumption



- **The fusing unit has been modified to reduce energy consumption and to improve the ease of maintenance.**
- **The hot roller is a thin-roller type.**
- **This means that less power is needed to operate the fusing unit, and the unit can warm up quickly.**

Slide 28

- Warm-up: Less than 30sec
- Typical Energy Consumption (TEC):
  - PE-MF3a: 2.8kWh
  - PE-MF3c: 3.3kWh
  - PE-P2a: 2.3kWh
  - PE-P2c: 3.1kWh

Economy Color

Full Color | Economy Color | Monochrome

- **Balances cost and output quality**
  - Costs less than full-color printing and looks better than monochrome printing

Slide 29

No additional notes

Bypass Tray Priority

- **In the previous machine, if the driver setting for paper size is different from the machine setting, then a jam occurs.**
- **In this machine, we can select from three settings for [Tray Paper Settings] - [Bypass Tray Priority].**
  - Machine Settings: Machine settings are used, but if the driver setting is different, an error occurs.
  - Any Size/type: If there is a difference, driver settings will be used
  - Any Custom Size/type: If there is a difference, driver settings will be used, except when a standard paper size is used (in which case, a jam occurs)
- **Size Mismatch Detection must be enabled with user tools or this function will not work.**

Slide 30

To enable Size Mismatch Detection:

- First access the following special user tool, by pressing these buttons.
  - [OK] → [ESC] → [MENU] → Size Mismatch Detection → [ON] or [OFF] (Default ON)
- Then, select Bypass tray priority settings.
  - [MENU] → [System Settings] → [Tray Paper Settings] → [Bypass Tray Priority] → [Machine Settings] or [Any Size/Type] or [Any Custom Size/Type]

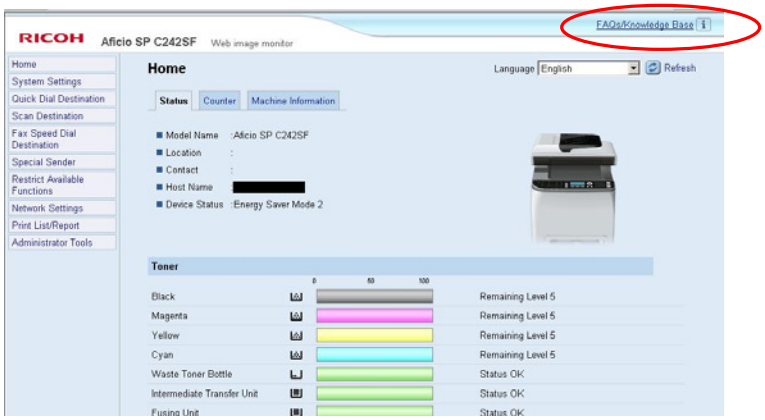
Reduced Toner Consumption

- In the previous model, the AIO drive motors operated while recovering from sleep mode, in order to maintain machine and print out quality. However, this operation consumes toner.
- Tests have shown that quality can be maintained without motor operation.
- So, for this model, the motors do not operate when the machine recovers from sleep mode.

Slide 31

No additional notes

FAQs/Knowledge Base (1)

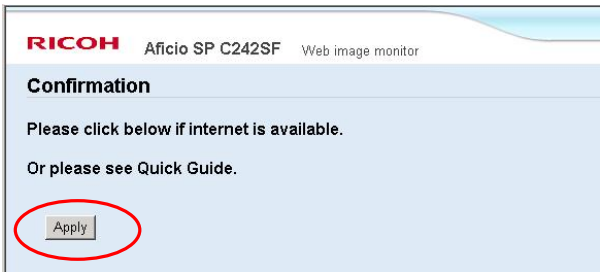


- **Customers can access the FAQs and knowledge base for this model through Web Image Monitor.**
  - http://machine's_IP_address
  - Click 'FAQ/Knowledge Base' at the top right of the screen.

Slide 32

No additional notes

FAQs/Knowledge Base (2)



- After you click 'FAQ/Knowledge Base', the above screen appears.
- Click 'Apply'.
- The knowledge base is not available in all languages.

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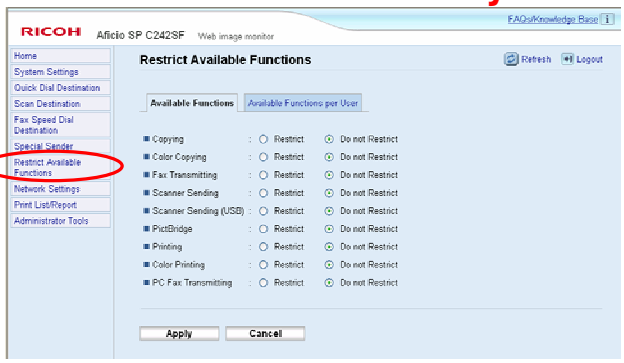
No additional notes

Additional Security



- **The following functions can be restricted using Web Image Monitor:**
  - Copying
  - Color copying (new for this model)
  - Sending using fax or scanner
  - Scanning to USB memory (new for this model)
  - PictBridge (new for this model)
  - Printing
  - Color printing (new for this model)
  - Sending using PC-Fax (new for this model)

Slide 34

- 'New for this model' – security has been added to this feature for the first time in this series.
- Printer models only have PictBridge, Printing, and Color Printing on this page.

Adjustable Louvers for the Fans

- The customer can now adjust the direction of air that is blown out of the machine.

Slide 35

No additional notes

Maintenance Page

- **There are two changes compared with previous models:**
  - The maintenance page has color areas for CMYK, to see if an AIO is defective. No separate color test chart is needed.
  - At the bottom, there are four rows of numbers. These are the contents of the ID chip in the AIO, in hex code.
    - » If a customer asks, explain that this is machine status code data for troubleshooting and other purposes.

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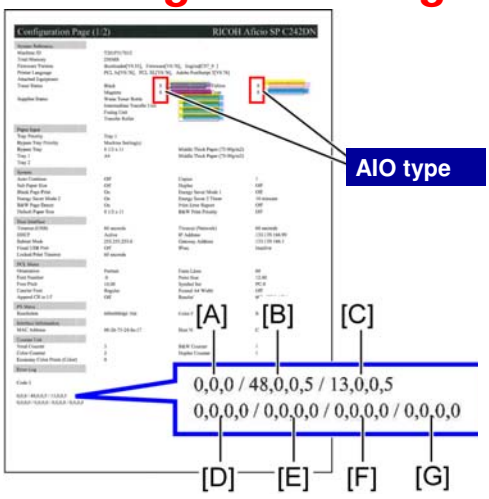
To print this page:

- MF models: Menu button, Printing Lists/Reports
- Printer models: Menu button, List/Test Print

Configuration Page (Printer Models)



- [A]: Jam counters
- [B]: Recent coverage (K,C,M,Y)
- [C]: Accumulated coverage (K,C,M,Y)
- [D]: Consumed high yield AIOs (K, C, M, Y)
- [E]: Consumed short yield AIOs (K, C, M, Y)
- [F] High yield AIO replacement counter (K, C, M, Y)
- [G] Short yield AIO replacement counter (K, C, M, Y)
- AIO Type
  - S: Short Yield AIO
  - H: High Yield AIO

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To print this page:

- MF models: Menu button, Printing Lists/Reports
- Printer models: Menu button, List/Test Print
- Printer models also have a Test Page in the List/Test Print menu.

New Maintenance Mode
Reset Counters for Yield Parts

- **Image transfer belt unit, paper transfer roller, fusing unit: Lasts for the machine life if the estimated APV is kept.**
  - Estimated machine life: 5 years or 90k prints
- **At 90k, the ITB unit, fusing unit, and transfer roller unit should be changed.**
- **But with normal use, the machine will not make 90k, so these parts are normally not replaced.**
- **However, in cases of heavy use, 90k may be reached, so these parts are called 'yield parts'.**
- **After replacing, reset the counters with these new maintenance modes.**
  - They are in the Engine Maintenance menu.

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No additional notes

New Maintenance Mode
PM Parts Replacement Notice

- **There are four settings:**
  - 0: At 90k, “Replace Now” appears but the engine does not stop.
  - 1: At 90k, no notice appears and the engine does not stop.
  - 2 (default): At near end, “Replace Soon” appears but the engine does not stop. At 90k, “Replace Now” appears but the engine does not stop.
  - 3: At near end, “Replace Soon” appears but the engine does not stop. At 90k, “Replace Now” appears and the engine stops.

Slide 39

No additional notes

Black Printing Priority Mode

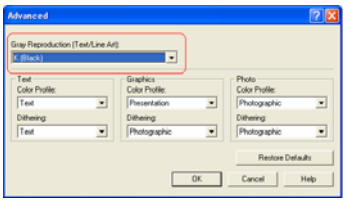
- **If this feature is enabled, process control for color is not done during b/w printing.**
  - This reduces the consumption of color toner, because toner is consumed during process control.
  - However, when the operator switches to full-color mode for the first time after the main power switch is turned on, the machine requires some time before it is ready to accept a job. This is because the machine is doing process control for the colors.
- **In the new models, this feature can be turned on/off with a user tool (System Settings, B & W Printing Priority).**
  - In previous models of this series, the availability of the function depends on which firmware version is installed.

Slide 40

- MF model: This can be found in the System Settings menu.
- Printer model: This can be found in the System menu.

Others

- **Blank Page Print**
  - This function eliminates useless paper output by preventing the machine from printing blank paper.
  - It is available for both GDI and PCL/PS models
    - » In the GDI model, this function is enabled with the driver.
    - » In the PCL/PS model , this function is enabled at the machine's operation panel or with Web Image Monitor.
- **Improvement of Black Print Quality of MAC (GDI)**
  - PE-MF3/P2 has added a printing method to print black and gray data using black toner only.
    - » This is an improvement request from the customer because the current black is bluish black.
  - When the color value of C, M and Y are the same, K is used for printing black and gray.
  - The operation is the same as the Windows GDI driver.



Slide 41

No additional notes

No additional notes

Hardware Installation Procedure

- The customer installs the machine and options.

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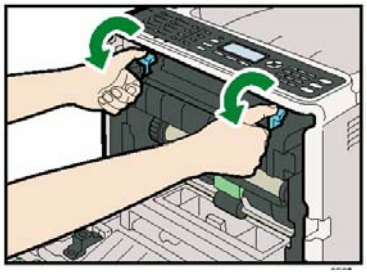
No additional notes

Important Point for the User



- **If the user leaves the machine for a long period (days, weeks, months), move these levers down.**
  - In the 'down' position, the fusing pressure is reduced. This prevents the hot roller from deforming if the machine is turned off for a long period.
  - For normal operation, it should be at the 'up' position.

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- If the machine power is kept on, the fusing unit will idle every 24 hours to prevent damage to the hot roller. But if the machine is turned off with pressure still applied, the hot roller could deform.

No additional notes

Overview

- **Printer Models and MF Models**
  - To enter the service program mode, access the "Maintenance Mode Menu" or "Fax Service Menu“ (MF models only) at the machine’s operation panel.
  - Many of the important adjustments are in the "Engine Maintenance" menu within the "Maintenance Mode Menu".
- **There is no SOM (Smart Organizing Monitor) utility. Technicians do not need a PC in order to use the service mode.**

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Service Manual – Service Tables – Service Program – Overview

Engine Maintenance Mode

- **To enter Engine Maintenance Mode**
  - MF models: Press these keys in the following order: Clear/Stop, 1, 0, 7, Color Start.
  - Printer models: While holding the Stop/Start and Escape keys, turn on the main switch.
  - "Maintenance Mode" is displayed on the LCD.
- **Selecting an Item**
  - To select an item, press the "Up" or "Down" key.
- **Going into the Next Level/Returning to the Previous Level**
  - To go into the next level of an item, select an item then press the "OK" key.
  - To return to the previous level of an item, press the "Return" key.
- **Exiting the Engine Maintenance Mode Menu**
  - To exit the maintenance mode menu, press the "Clear/Stop" or "Return" key until the "Ready" display appears.

Slide 47

- In previous models of this series, the procedure for MF models was different from printer models. But this series does not use SOM, so the procedures are the same.

Copier Models – Fax Service Mode

- **To enter Fax Service Mode**
  - Turn on the machine while pressing the "Fax" key.
- **Selecting an Item**
  - To select the item, press the "Up" or "Down" key.
- **Going into the Next Level/Returning to the Previous Level**
  - To go into the next level of an item, select an item then press the "OK" key.
  - To return to the previous level of an item, press the "Return" key.
- **Exiting the Maintenance Mode Menu**
  - To exit the maintenance mode menu, press the "Clear/Stop" or "Return" key until the "Ready" display appears.

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No additional notes

No additional notes

Procedures

- **The procedures for the MF models and the printer models are the same.**
  - In previous models of this series, these procedures were different.
- **Connect the machine to a PC with USB or an Ethernet crossover cable, and follow the procedures in the manual.**
- **There are two procedures.**
  - One for engine firmware, and one for controller firmware.

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Service Manual – Service Tables – Firmware Updating

Cautions

- **Follow all notes and cautions in the manual.**
- **Do not turn off the main power of the machine during firmware updating.**
  - If you switch the power off, the EGB board and/or controller board may be damaged.
- **If power failed during the download, try again. If you still cannot download the firmware, it may be necessary to change the EGB and/or the controller board.**

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No additional notes

Cautions

- **The machine displays a message to indicate that download is complete.**
- **If this message does not appear, the download failed. Try again.**
  - You can also switch from an Ethernet connection to a USB connection (or the other way around) and see if that works.
- **If you still cannot download the firmware, it may be necessary to change the EGB and/or the controller board.**

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No additional notes

No additional notes

Procedures

- **The following maintenance procedures are done by the user.**
  - Replacing the Print Cartridges
  - Replacing the Waste Toner Bottle
- **To see the current status of the consumables:**
  - MF models: Menu, System Settings, Supplies Status
  - Printer models: Print the configuration page (Menu, List/Test Print, Config Page)
- **There are no PM procedures for the technician to do.**

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New Maintenance Modes

- **The following items are added to the Engine Maintenance menu.**
  - Reset Transfer Unit: Resets the transfer unit life counter.
  - Reset Fuser Unit: Resets the fusing unit life counter.
  - Reset 2nd Transfer Unit: Resets the transfer roller life counter.

Slide 55

No additional notes

Machine Exchange and Replace Procedure

- **If machine exchange and replacement is required, arrange to send the machine without the four print cartridges (AIO) to the customer site.**
- **Instruct the customer to do the following before the substitute machine gets to the customer site**
  - Print the configuration page.
- **Instruct the customer to do the following when the substitute machine gets to the customer site**
  1. Remove the four print cartridges (AIO) from the problem machine.
  2. Install the four print cartridges (AIO) into the substitute machine.
  3. Restore the customer settings which are printed on the configuration page by using a web browser.
  4. Send back the problem machine to the repair center.
- **Note the procedure for cleaning the machine after it arrives at the depot.**

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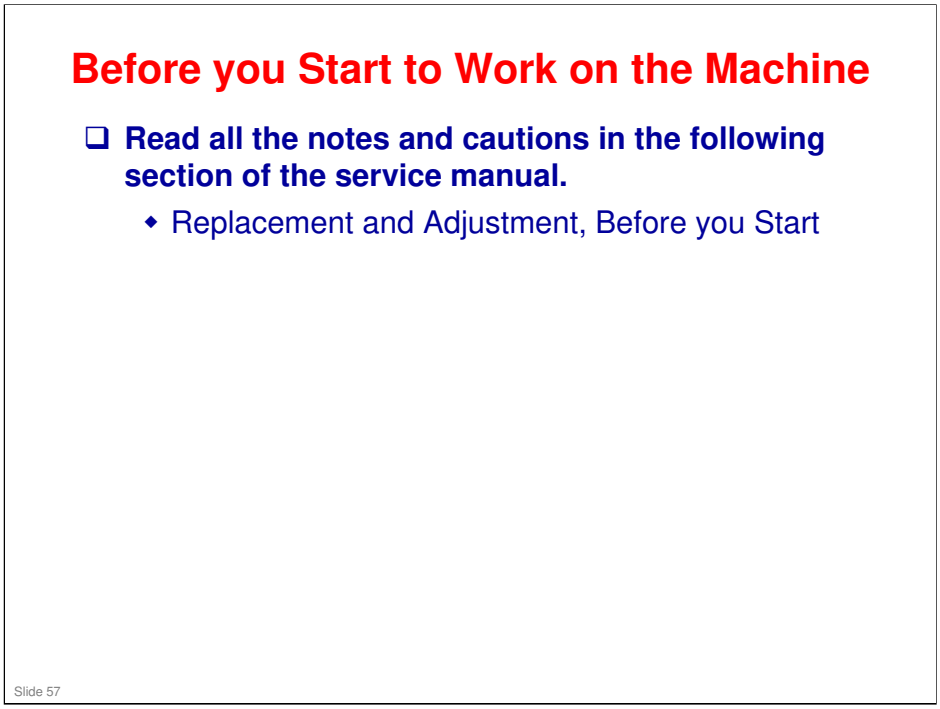
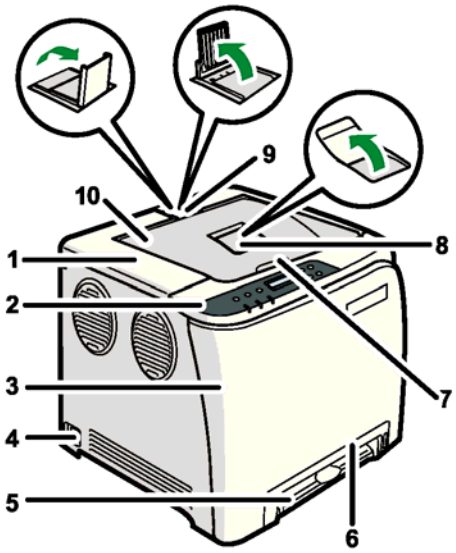
Service Manual, Appendix 5: Machine Swap



No additional notes

No additional notes

Printer Model - Front View



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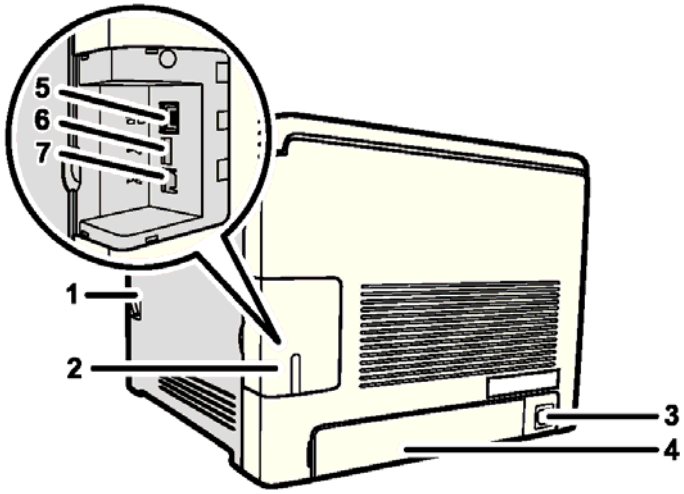
Operating Instructions – Hardware Guide - 1. Guide to the Printer

- 1. Top Cover: Open this cover to replace the print cartridge.
- 2. Operation Panel
- 3. Front Cover: Open this cover to replace the waste toner bottle or remove jammed paper.
  - To open this cover, pull the lever on the right side of the printer.
- 4. Power Switch
- 5. Bypass Tray: 1 sheet
- 6. Tray 1: Up to 250 sheets of plain paper
- 7. Top Cover Open Lever
- 8. Standard tray extension
  - Use this to support sheets that come out curled after they are printed.
  - Flip open the extension by pushing down on the end that is toward the rear of the machine.
- 9. Stop Fences: Use these to stop legal-size or A4-size prints falling behind the machine.
  - For legal-size prints, raise the rear fence.
  - For A4-size prints, raise the forward fence.
- 10. Standard Tray: Output is stacked here with the print side down.

Printer Model - Rear View

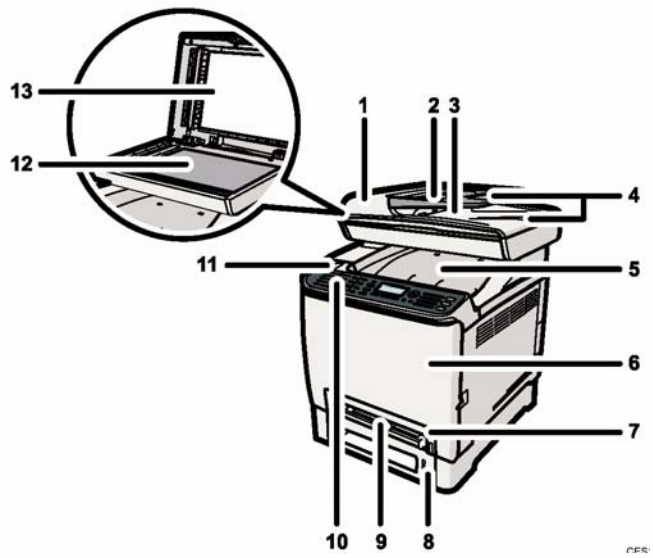


Slide 60

Operating Instructions – Hardware Guide - 1. Guide to the Printer

- 1. Front Cover Open Lever
- 2. Cable cover
- 3. Power Socket
- 4. Rear cover: Remove this cover when you load paper larger than A4 in the paper tray.
- 5. Ethernet Port: Use a network interface cable to connect the printer to the network.
- 6. USB Host Interface: Use a USB cable to connect a digital camera to the printer. You can print images directly from a digital camera, without having to connect to a computer.
  - The camera must support PictBridge.
- 7. USB Port: Use a USB cable to connect the printer to the host computer.

MF Model - Front View

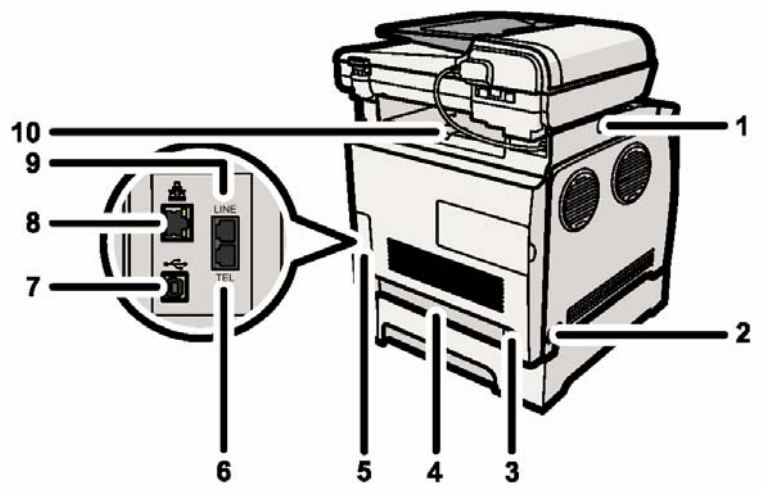


Slide 61

Operating Instructions – User Guide - 1. Guide to the Machine - Guide to Components

- 1. ADF (Auto document feeder) Cover
- 2. Input Tray for the ADF: Up to 35 sheets.
- 3. Output Tray for the ADF: Printed paper is output here.
- 4. Extender for the ADF Trays: For paper longer than A4 in the ADF.
- 5. Top Cover/Output Tray: Open this cover to replace the print cartridges. Up to 150 sheets of plain paper can be stacked here. Also, open here to replace the print cartridges.
- 6. Front Cover: Open this cover to replace the waste toner bottle or remove jammed paper.
- 7. Tray 1: Up to 250 sheets.
- 8. Tray 2 (option): Up to 500 sheets.
- 9. Bypass Tray: One sheet only
- 10. Operation Panel
- 11. USB Port: Insert a USB flash disk for using the Scan to USB function or connect a digital camera using a USB cable for PictBridge printing. Compare with the USB port on the rear of the machine.
- 12. Exposure Glass
- 13. Cover for the Exposure Glass

MF Model - Rear View



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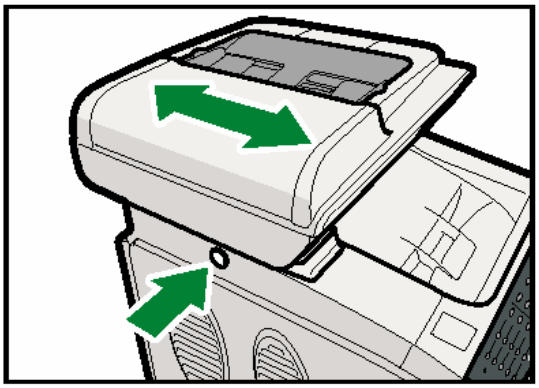
Operating Instructions – User Guide - 1. Guide to the Machine - Guide to Components

- 1. Button for Sliding the ADF: Press to slide the ADF towards the rear of the machine and hold it in that position, if paper output to the output tray is difficult to retrieve.
  - Explained in more detail later.
- 2. Power Switch
- 3. Power Socket
- 4. Rear Cover: Remove this cover when loading paper longer than A4 in tray 1.
- 5. Cable Cover: Remove this cover when connecting cables to the machine.
- 6. External Telephone Connector
- 7. USB Port: For connecting the machine to a computer using a USB cable. Compare with the USB port on the front of the machine.
- 8. Ethernet Port
- 9. G3 Fax Line Interface Connector (G183/G184 only)
- 10. Stop Fences: Raise this fence to prevent paper falling off when printing a large job. The fence can be adjusted at the A4/Letter or Legal size position.
  - Explained in more detail on the next two slides.

MF Model – Sliding the ADF



- Slide the ADF towards the rear of the machine and hold it in that position, if paper output to the output tray is difficult to retrieve.
- Slide the ADF only when the exposure glass cover or ADF is closed.
- Be careful not to trap your fingers when sliding.

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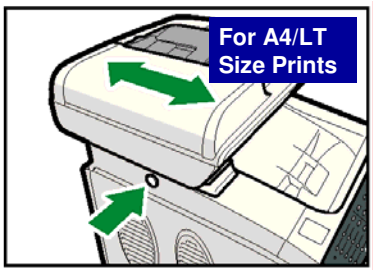
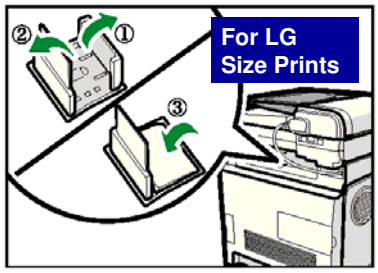
No additional notes

MF Model – Stop Fences





- Raise the fence as shown to prevent prints from falling off.

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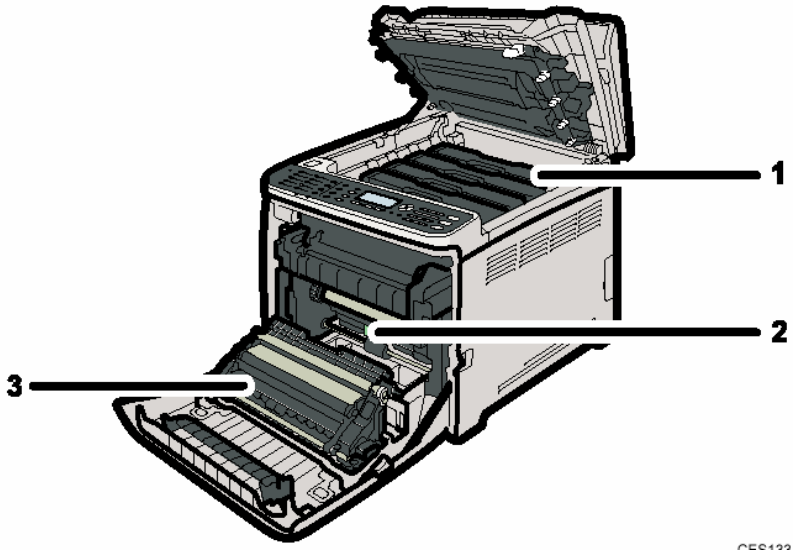
No additional notes

All Models - Interior



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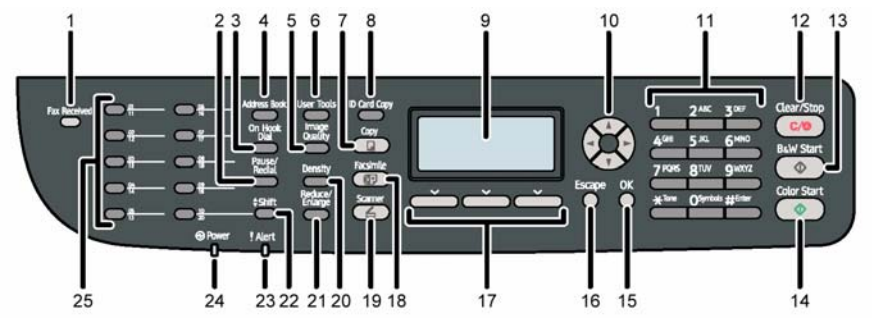
- 1. AIO Print Cartridges: Load from the machine rear, in the order of cyan (C), magenta (M), yellow (Y), and black (K). Messages appear on the screen (MF models) or an indicator lights on the operation panel (printer model) when print cartridges need to be replaced.
- 2. Waste Toner Bottle: Collects excess toner during printing. Messages appear on the screen when the waste toner bottle needs to be replaced.
- 3. Transfer Unit: Remove this unit when replacing the waste toner bottle.

MF Model – Operation Panel



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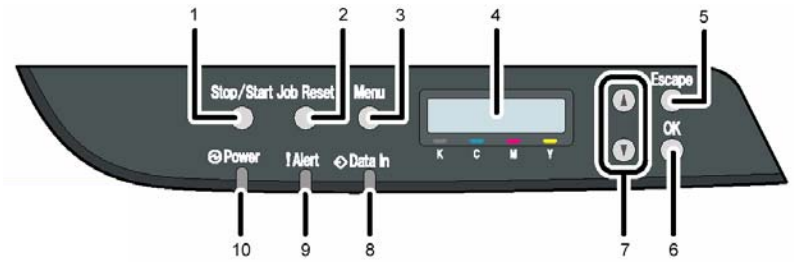
Operating Instructions – User Guide - 1. Guide to the Machine - Guide to Components

- See the operation manual for details.
- Note the following.
  - 10. Scroll keys: Press any of these four keys to enter the user tools menu. Use the keys to navigate around the menu.
  - 13. {B&W Start} key: Press to scan or copy in black and white, or start sending a fax.
  - 14. {Color Start} key: Press to scan or copy in color.
  - 22. {Shift} key: Press if you want to use Quick Dial entries Nos. 11 to 20 when specifying a scan or fax destination.
  - 25. One Touch Buttons: Press to select a scan or fax destination using entries registered as Quick Dial in the Address Book.

Printer Model – Operation Panel



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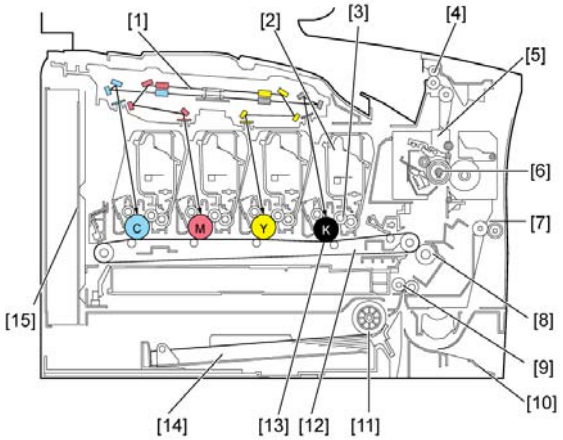
Operating Instructions – Hardware Guide - 1. Guide to the Printer

- 1. {Stop/Start} key: If you press this key, the printer stops receiving data, and printing is not possible. Press the {Stop/Start} key again to return to the ready condition.
  - You can also use this key to print the configuration page. See the operation manual for details.
- 2. {Job Reset} key: Press this key to cancel a job that is printing out.
- 8. Data In Indicator: Flashes when the printer is receiving data from a computer. The data indicator is lit if there is data to be printed.
- 9. Alert Indicator: Lights up in red whenever printer error occurs. Use display to check the error. Flashes in yellow when toner is nearly empty.
- 10.Power Indicator: Remains lit while the power is on. It is unlit when the power is off.

Component Layout



- AIO: Drum, development unit, charge roller, waste toner tank in one disposable unit.
- Four toner images are put on the belt. Then the transfer roller transfers them all at the same time to the paper.
- Waste toner from the drum stays in the AIO: No recycling. There is also another waste toner tank in the image transfer belt unit.

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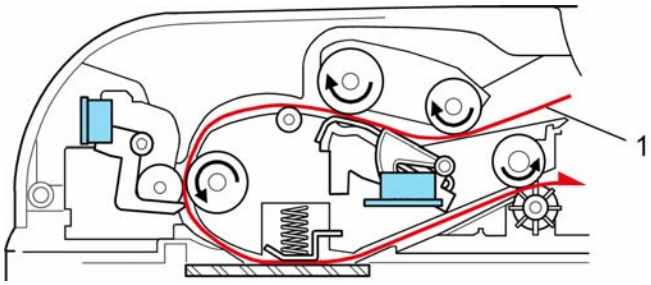
- 1. Laser Optics Housing Unit
- 2. Print Cartridge (AIO) – AIO means 'All-in-one'
- 3. Development Roller (AIO)
- 4. Paper Exit
- 5. Fusing Unit
- 6. Fusing Lamp
- 7. Duplex Path
- 8. Transfer Roller
- 9. Registration Roller
- 10. By-pass
- 11. Paper Feed Roller
- 12. ITB (Image Transfer Belt) Unit
- 13. OPC (AIO)
- 14. Tray 1
- 15. EGB/Controller

Original Feed Path



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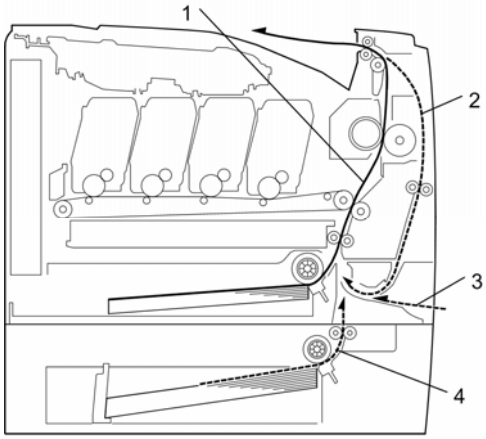
- 1. Original feed path

Paper Feed Paths



- **All models have the duplex motor which can reverse the paper into the duplex path.**

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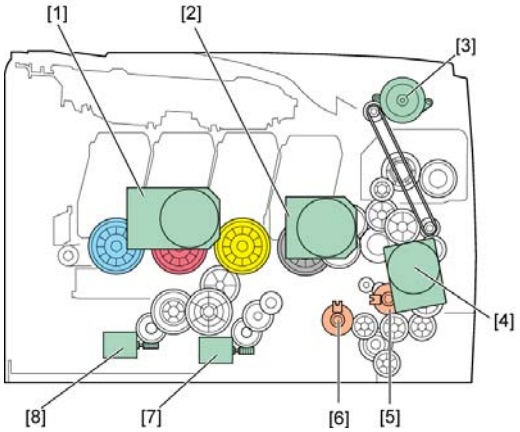
- 1. Paper path from tray 1
- 2. Duplex path
- 3. By-pass tray
- 4. Paper path from tray 2 (optional)

Drive Layout - 1



- **Color AIO Motor: Drives the components in the three color AIOs (C, M, Y)**
- **Black AIO Motor: Drives the components in the Black AIO. Also drives the image transfer belt**

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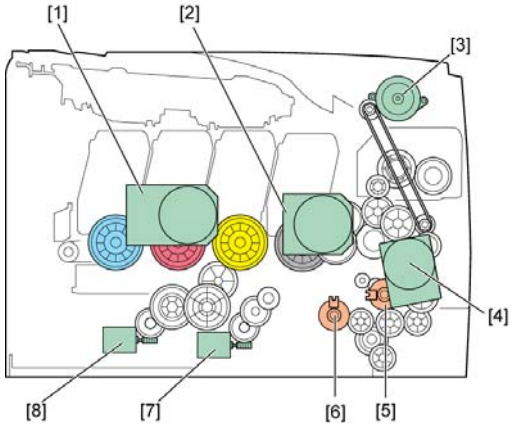
- 1.Color AIO Motor
- 2.Black AIO Motor
- 3.Duplex Motor
- 4.Transport/Fusing Motor
- 5.Registration Clutch
- 6.Paper Feed Clutch
- 7.Agitator Motor
- 8.ITB (Image Transfer Belt) Contact Motor

Drive Layout - 2



- **Duplex Motor: Drives the paper exit roller and reverses the paper into the duplex feed path.**
- **Transport/Fusing Motor: Drives the paper feed/registration rollers and the fusing unit.**

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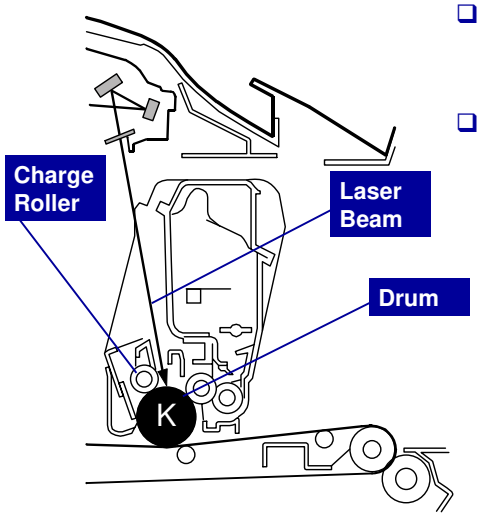
- 1.Color AIO Motor
- 2.Black AIO Motor
- 3.Duplex Motor
- 4.Transport/Fusing Motor
- 5.Registration Clutch
- 6.Paper Feed Clutch
- 7.Agitator Motor
- 8.ITB (Image Transfer Belt) Contact Motor

Printing Process - 1



- The charge roller gives the drum a negative charge.
- The laser beam writes the latent image on the drum.

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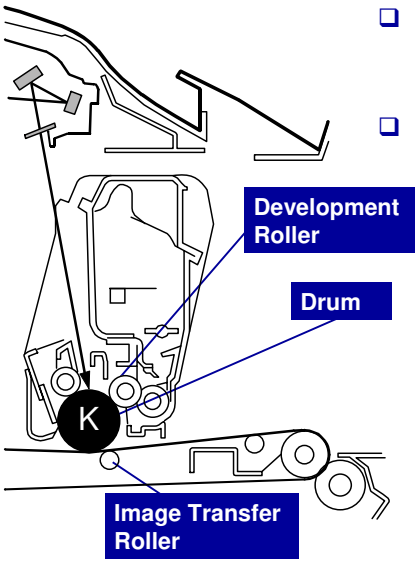
- This machine uses four AIOs and four laser beams for color printing. Each AIO contains a drum, charge roller, cleaning brush, blade, development roller and mixing auger.

Printing Process - 2



- The development roller applies toner to the latent image on the drum.
- The image transfer roller pulls the developed toner image onto the image transfer belt.

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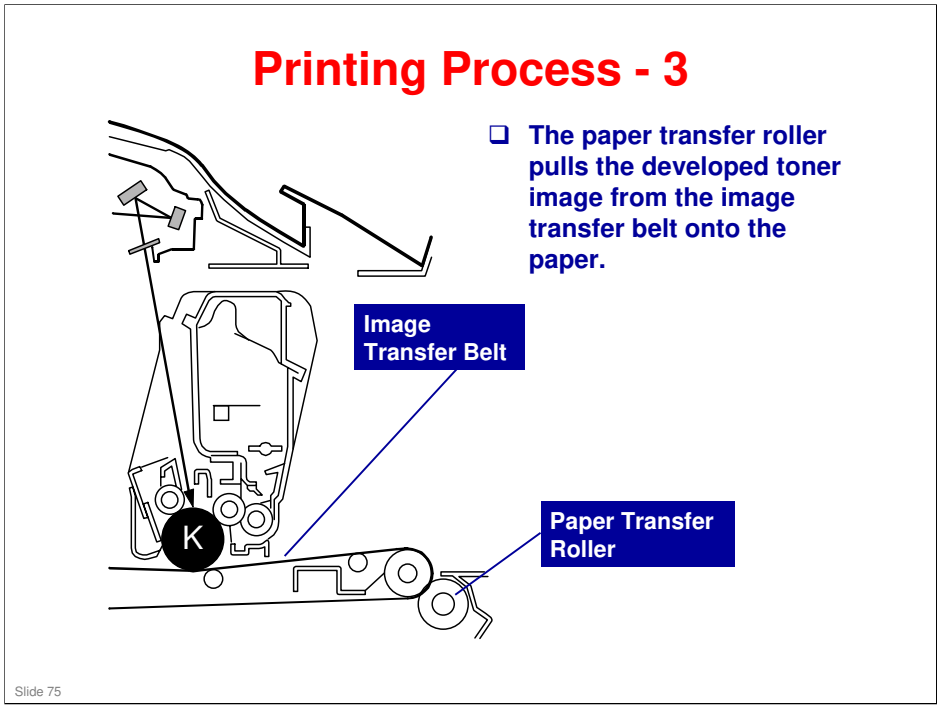
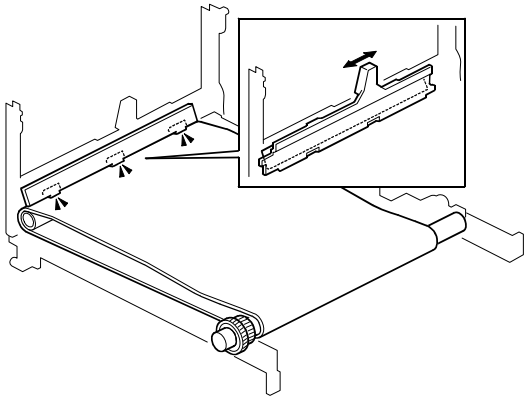
- The charge that is applied to the image transfer roller pulls the toner from the drum to the transfer belt.
- Four toner images are put on the paper at the same time.



- Toner transfers from the image transfer belt to the paper when the paper is fed between the image transfer belt and transfer roller. After transfer, the paper separates from the image transfer belt, because of a discharge plate immediately after the transfer roller.

TM Sensors



- **The central TM sensor is used for process control and toner end detection.**
- **The other two TM sensors are used for MUSIC and other internal adjustments.**

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- The TM sensor board contains three TM sensors (one at the left, one at the center, and one at the right). The center TM sensor detects the density of the sensor patterns on the transfer belt. The TM sensor output is used for process control and for automatic line-position adjustment, skew, and color registration adjustments for the latent image.
- MUSIC: This is the internal process used by the machine to automatically correct for color registration errors (to make sure that the colors are deposited in the exact positions on the transfer belt).

Process Control Summary

- **What is done?**
  - The machine calibrates the TM sensors
  - The machine makes a 9-grade pattern on the belt, and the central TM sensor scans these patterns.
  - The machine can then calculate the correct development bias and laser diode power.
  - MUSIC: The machine then checks for color registration errors. To do this it makes lines at the left, center, and right of the transfer belt and scans these lines with the TM sensors.

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Process control uses these components:

- Central TM (Toner Mark) sensors
- Temperature/humidity sensor at the rear right of the machine. This is used to determine whether the conditions have changed significantly enough so that process control must be done.

Process control flow

- 1. TM sensor correction (Vsg adjustment)
  - The center TM sensor checks the bare transfer belt's reflectivity and the machine calibrates the TM sensors.
- 2. Development bias control
  - The machine makes a 7-gradation pattern on the transfer belt for each toner color. The pattern has 9 squares (the sequence is as follows: 7 yellow squares, 7 cyan squares, 7 magenta squares and 7 black squares). Each of the squares is 10 mm x 17 mm, and is a solid-color square. To make the squares, the machine changes the development bias and charge roller voltage. The difference between development bias and charge roller voltage is always the same.
  - The center TM sensor detects the densities of the 7 solid-color squares for each color. The machine calculates an appropriate development bias from this data.
  - This process takes about 33 seconds to be completed.
- 3. LD power control
  - For LD power control, the machine does the same sequence described in "2 Development bias control". Finally, the machine calculates an appropriate LD power.
- 4. MUSIC (Mirror Unit Skew and Interval Control)
  - The machine uses the TM sensors to measure sample lines deposited on the ITB, and corrects color image registration adjustment based on the sensor readings. Sample lines are made on the left, center and right of the ITB.
  - This process takes about 22 seconds to be completed.

Process Control Summary

- **When is it done?**
  1. Initial Power-ON
  2. Recovery form Sleep Mode
  3. Front or Top Cover Open/Close
  4. Ready Status
  5. Before Job
  6. Page End
  7. Job End

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There are three execution modes: a) Development Bias Control and MUSIC (approx. 55 seconds), b) MUSIC only (approx. 22 seconds), c) No Execution

The one that is used depends on conditions as described below.

- 1. Initial
  - Toner amount control and MUSIC start automatically immediately after the power is turned on, if one of the following conditions occurs.
    1) New AIO detection
    2) New ITB (Image Transfer Belt) unit detection (after transfer unit life counter is reset with SP mode)
    3) Environment (temperature and humidity) change detection.
  - MUSIC starts automatically immediately after the power is turned on (there is toner amount control) if conditions other than described above occur.
- 2. Recovery from Sleep Mode
  - Toner amount control and MUSIC start automatically when the machine comes back from energy saver mode, if one of following conditions occurs.
    Same as 1), 2), 3) for 1. Initial.
  - MUSIC starts automatically (there is toner amount control) when the machine comes back from energy saver mode, if the previous MUSIC was done when there was a high temperature inside the machine.
- 3.Immediately after the front or top cover is closed
  - No adjustment is done when the front or top cover is closed, if one of following conditions occurs.
    1) After paper jam detection and New AIO detection
    2) New ITB unit detection (after transfer unit life counter is reset with SP mode)
    3) No environment change
  - Toner amount control and MUSIC start automatically when the front or top cover is closed, if conditions other than described above occur.
- 4.Ready status:
  - Toner amount control and MUSIC start automatically when the machine stays in the ready condition and the environment has changed.
- 5.Before a job:
  - MUSIC starts automatically before a job if the previous MUSIC was done when there was a high temperature inside the machine and a specified time has elapsed.
  - MUSIC starts automatically before a job if the machine is turned on in a low temperature condition and a specified time has elapsed.
- 6.Page end:
  - Toner amount control and MUSIC start automatically between pages when the machine detects an environment change.
  - Toner amount control and MUSIC start automatically between pages when the machine has copied/printed 200 pages since the previous process control.
  - Toner amount control and MUSIC interrupt a job and start automatically between pages when the machine has copied/printed 250 pages since the previous process control.
  - MUSIC starts automatically between pages when the machine has copied/printed 100 pages in the same job since the previous process control.
  - MUSIC starts automatically between pages when the polygon motor has been rotating for 180 seconds.
  - MUSIC interrupts a job and starts automatically between pages when the polygon motor has been rotating for 300 seconds.
- 7.Job end:
  - Toner amount control and MUSIC start automatically after a job when the machine gets a request to execute the toner amount control and MUSIC.
  - MUSIC starts automatically after a job when the machine gets a request to execute MUSIC.

Boards

- **EGB (Engine Board): This is the main board. It controls the engine, the controller interface, image processing, MUSIC, input/output, interfaces with the optional units, and the operation panel.**
- **Controller:**
  - This controls the interface between the OPU and EGB, ADF, scanner unit and applications.
  - The controller connects to the EGB through the PCI Bus (Peripheral Component Interconnect Bus).
- **LD Drive Board: This is the laser diode drive circuit board.**
- **OPU (Operation Panel Unit): This controls the display panel, the LED, and the keypad.**

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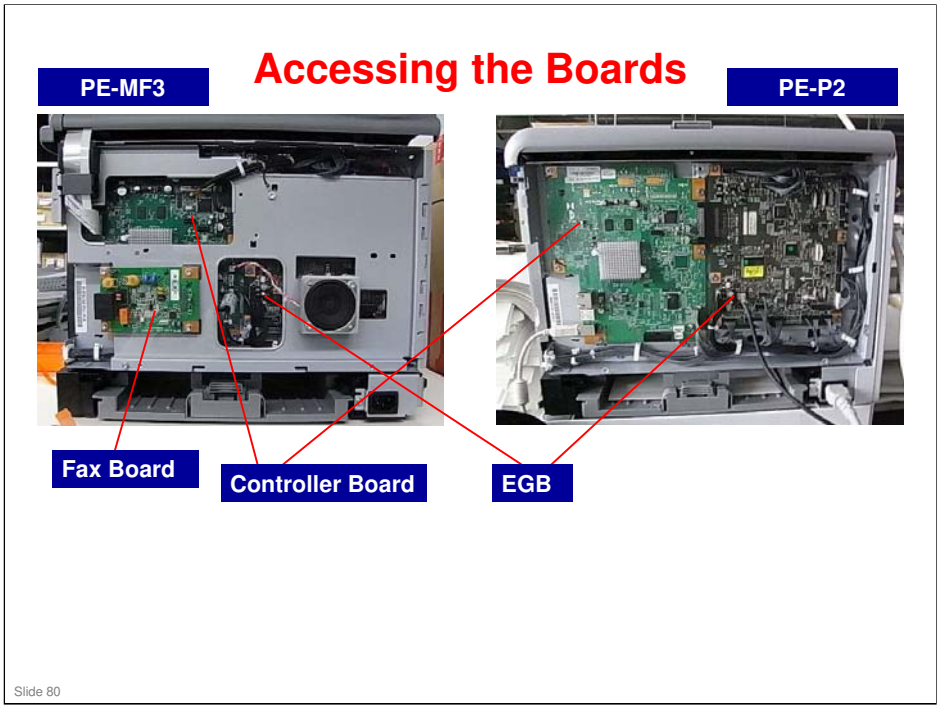
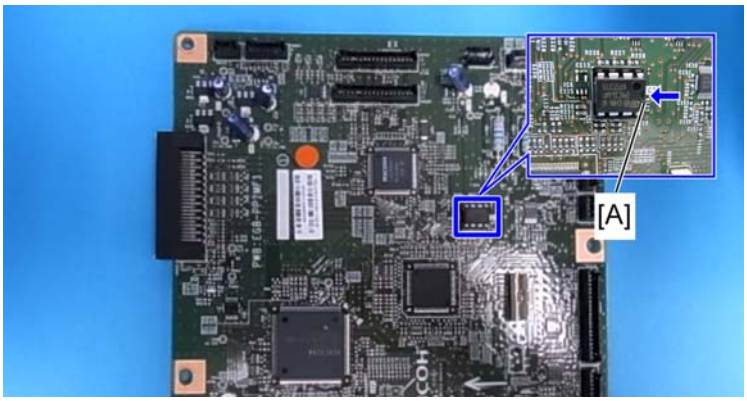
- MUSIC (Mirror Unit for Skew and Interval Correction).
- MUSIC is also called Automatic Line Position Adjustment.



- The EGB boards for the P2 and MF3 are identical.
- The controllers for the P2 and MF3 are not identical, but use many common parts.

Replacing Boards

- The EEPROM on the controller cannot be removed.
- The EEPROM on the EGB board can be removed.
- Take the EEPROM from the old EGB board and install it on the new one. The mark must point to the right side [A].



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Service Manual – Replacement and Adjustment – Electrical Components – EGB (Engine Board)

Replacing the EEPROM

- **After you replace the EEPROM, do the procedure in the service manual.**
- **The procedures for the MF models and printer models are the same.**
  - Previous models: The printer models have SOM (Smart Organizing Monitor) software for adjusting settings.
  - Service Manual – Replacement and Adjustment – Electrical Components – EEPROM

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- Serial Number:
  - You must ask your supervisor how to input this number.
- LSU Adjustment:
  - Input the values from the sheet that comes with the laser optics housing unit.
- What does Transfer Belt Adjust do?
  - The new transfer belt may not be exactly the same length as the old one. With this SP mode, the machine calibrates the motor speed for the new belt (the speed is checked with a TM sensor pattern).
- Fuser SC Detect:
  - This is normally OFF.
  - If you turn this ON, the machine will issue SC559 and stop working if three consecutive paper jams occur in the fusing unit. Then, the technician must visit the machine and reset the SC code and check the fusing unit.
  - If a sheet of paper feeds correctly, the counter is cleared – the SC only appears if there are three consecutive jams on three successive sheets.
- 2nd Transfer Front/Back:
  - Normally all settings are 0.
  - You may need to change the settings in unusual environmental conditions, for example if the humidity is low.

Color Registration

- Performs the MUSIC adjustment

Check that MUSIC was done successfully.

- See ‘After you Replace the Laser Optics Housing Unit’ for details on this.

Power Supply Unit (PSU)

- The PSU contains a fuse.
- This fuse can be replaced. Always use the correct type of fuse, or the machine could be damaged.
- See the service manual for the correct type of fuse to install.

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Service Manual – Replacement and Adjustment – Electrical Components – PSU

Error Codes

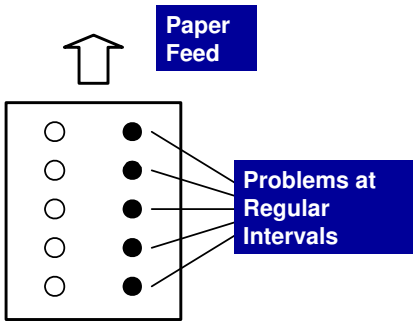
- **Error codes can be seen on the operation panel.**
- **Fusing related SCs: To prevent damage, the machine cannot be operated until the SC has been reset by a technician.**
  - Enter the engine maintenance mode.
  - Press "O.K" in "Fuser SC Reset" with engine maintenance mode, and then turn the main power switch off and on.

Slide 84

Service Manual – Appendix 3. Troubleshooting Guide – Service Call Conditions

- There is no SOM (Smart Organizing Monitor) in this series.

Image Problems

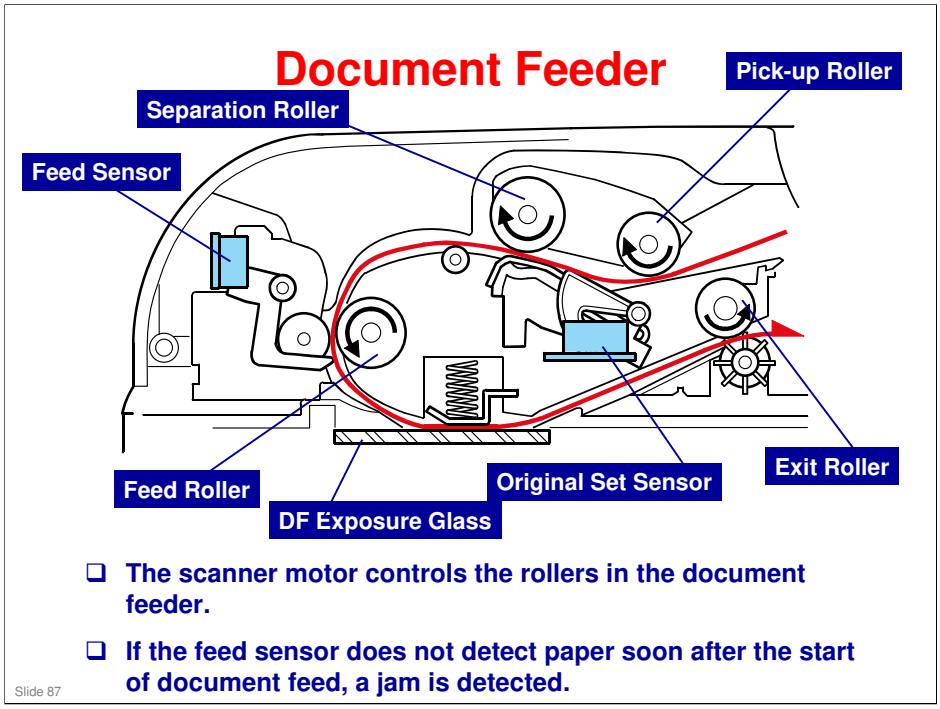


- Abnormal image at 23.5 mm intervals: Paper feed roller.
- Abnormal image at 59 mm intervals: Paper transfer roller
- Abnormal image at 25 mm intervals: Image transfer belt unit (image transfer roller)
- Abnormal image at 30 mm intervals: Charge roller.
- Abnormal image at 38 mm intervals: Registration roller
- Colored spots at 27 mm intervals: AIO cartridge (Development roller)
- Abnormal image at 61 mm intervals: Image transfer belt unit (Drive roller)
- Colored spots at 76 mm intervals: AIO cartridge (OPC drum), or the Fusing unit (Heat roller)
- Abnormal image at 95 mm intervals: Fusing unit (Pressure roller)

Slide 85

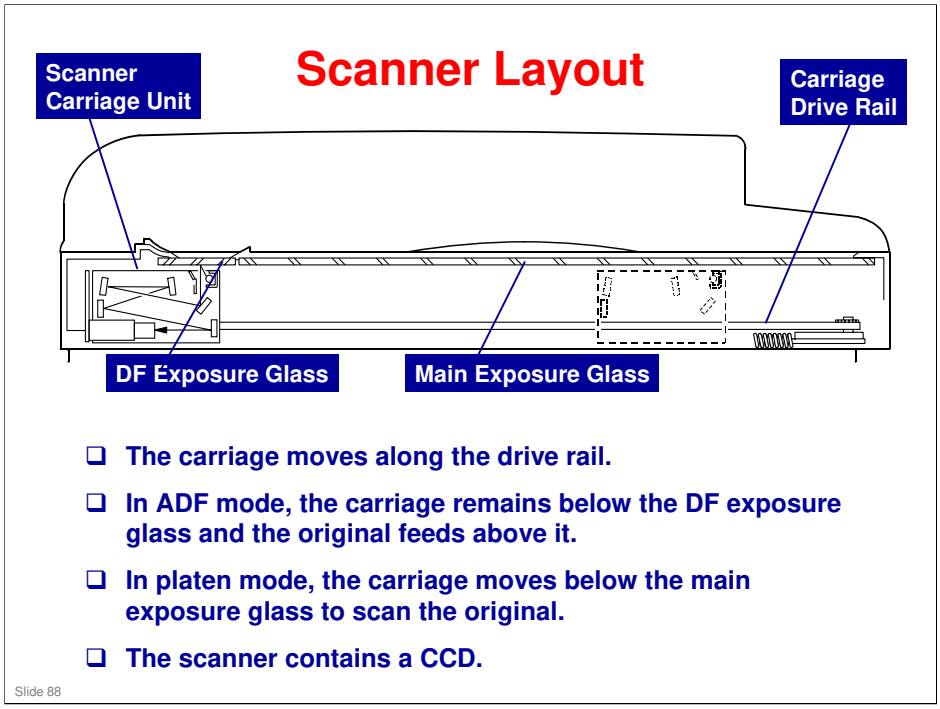
Service Manual – Troubleshooting – Image Problems

No additional notes

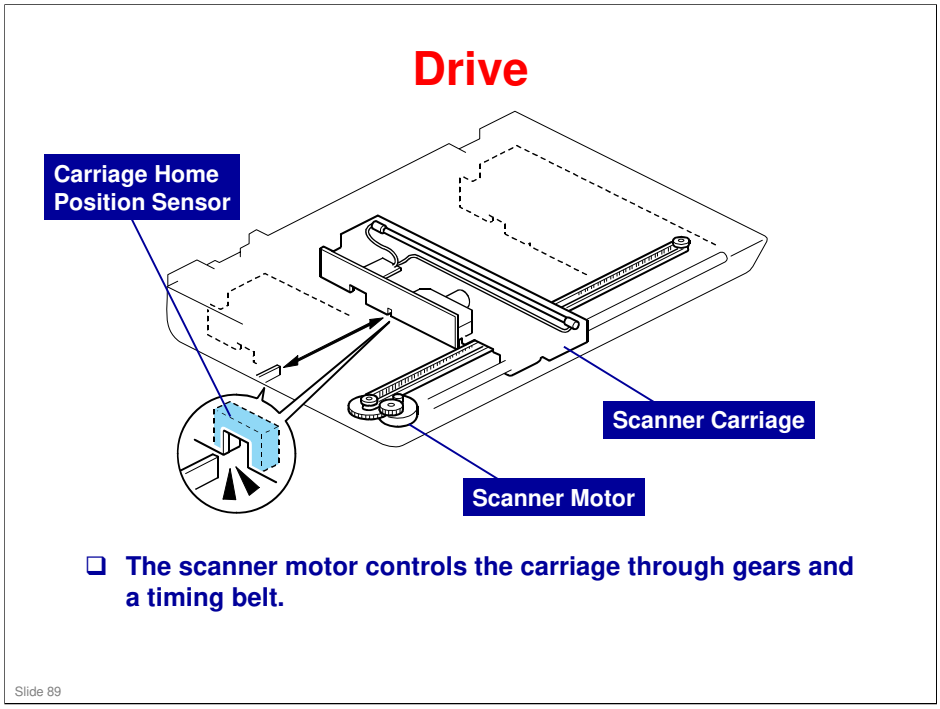


- The original feed path is shown in red.
- The separation roller and pick-up roller are included in an assembly that is called the ADF Feed Unit.

- After the original set sensor has detected an original and the machine has got a copying or scanning job, the ADF motor rotates to pick up and feed a sheet of the original to the feed sensor. If the feed sensor does not detect paper after this sequence, the machine determines an original jam has occurred.
- The ADF motor stops when the feed sensor detects paper, and then starts to rotate again. After scanning, the ADF motor stops again, and then starts to rotate to feed out the paper.



No additional notes



- The carriage home position sensor [E] in the scanner carriage unit detects the home position when initializing the scanner or before/after scanning. The scanner carriage unit moves to read the white plate every scan to adjust white level (ADS).

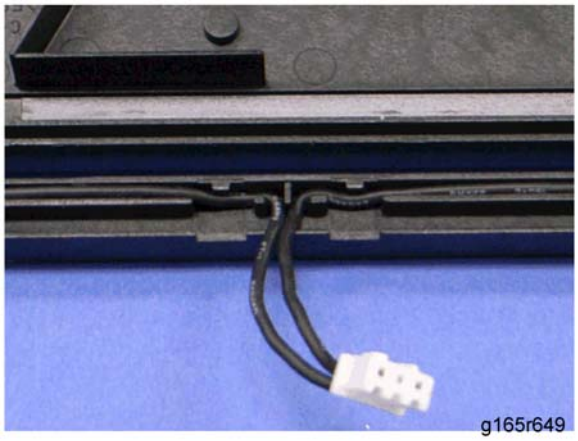
Shipping the Machine

- **Do the following user tool to move the scanner to the shipping position, before you move the machine.**
  - Menu key – System settings – Scanner carriage - Execute

Slide 90

No additional notes

Replacing the Exposure Lamp

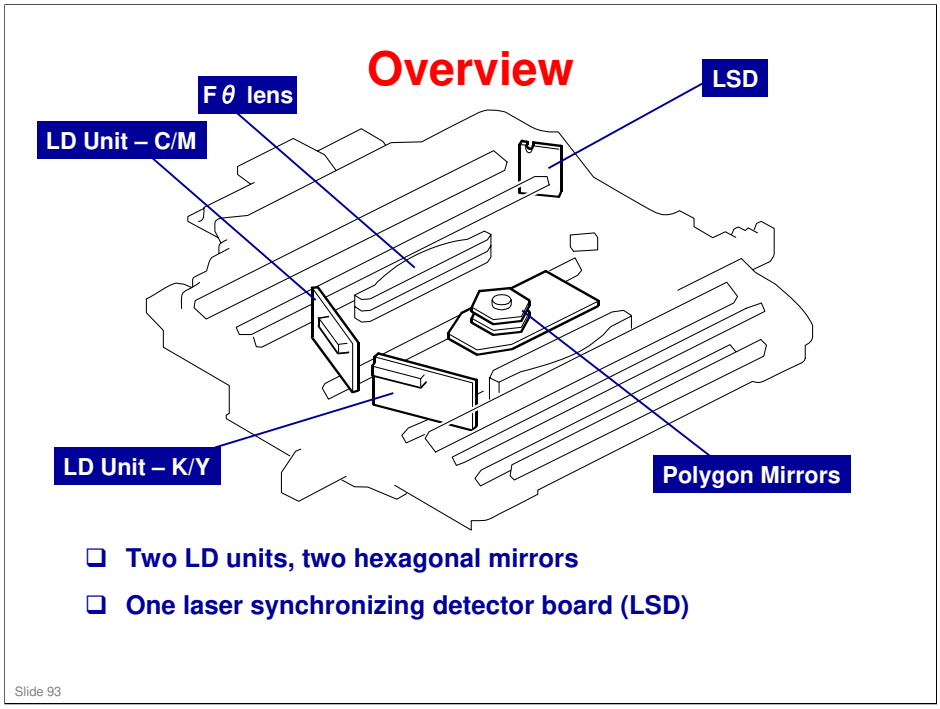


- Install the cables as shown, to avoid damage to the cables when the top cover of the carriage unit is attached.

Slide 91

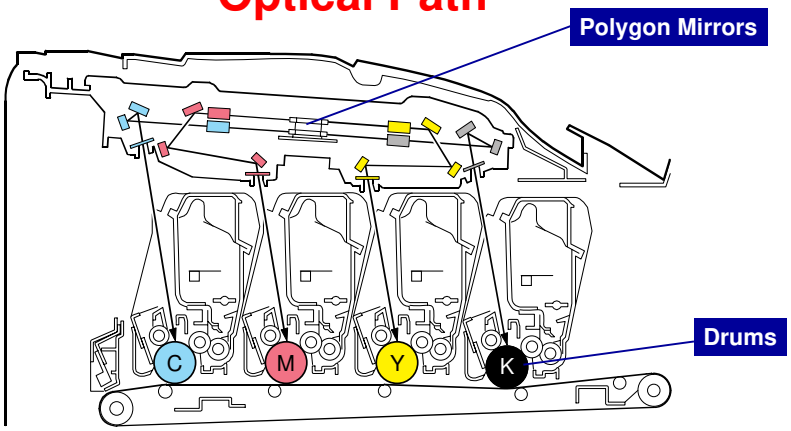
No additional notes

No additional notes



- This machine uses two LDB units and one polygon mirror motor to produce latent images on four OPC drums (one drum for each color toner).
- There are two hexagonal mirrors. The polygon mirror motor rotates the mirrors clockwise and each mirror reflects beams from LD unit.
- The laser beam from the LD unit - C/M is directed to the F θ lens at rear side by the polygon mirrors. The laser beam from the LD unit - K/Y is directed to the F θ lens at front side by the polygon mirrors.
- Laser exposure for magenta and cyan starts from the left side of the drum, but for yellow and black it starts from the right side of the drum. This is because the units for magenta and cyan are on the other side of the polygon mirror from the units for yellow and black.
- The machine has one laser synchronizing detector board (LSD) as shown above. The board detects four colors. The LSD detects the start of the main scan.

Optical Path

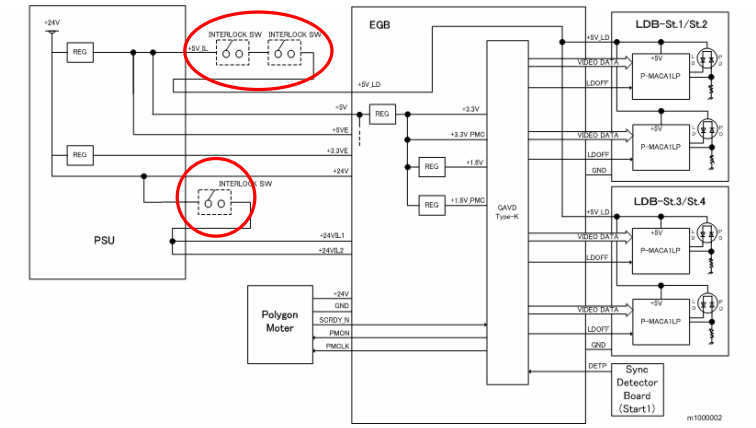


- The laser beams for magenta and yellow are sent to the upper part of the polygon mirror.
- The laser beams for cyan and black are sent to the lower part of the polygon mirror.

Slide 94

No additional notes

Safety Switches

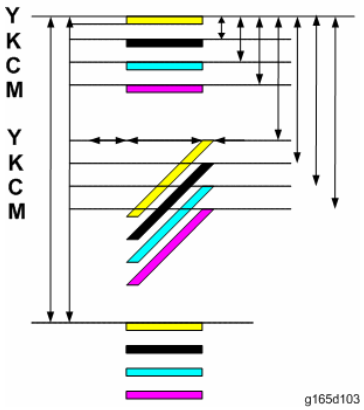


- A safety switch disconnects power to the laser diodes when the front cover or the top cover is opened.

Slide 95

No additional notes

MUSIC Pattern



- **During MUSIC, this pattern is made on the transfer belt 16 times for the fine adjustment or 8 times for the rough adjustment.**
- **The spaces between the lines (YY,KK,CC,MM,KY,KC,KM) are measured by the front, center, and rear TM sensors.**
- **The controller reads the average of the spaces, and adjusts these items:**
  - Sub scan line position for YCM
  - Main scan line position for KYCM
  - Magnification ratio for KYCM
  - Phase control
- **The transfer-belt-cleaning unit cleans the transfer belt after the patterns are measured.**

Slide 96

- MUSIC is done at the times explained in the process control section of the course.

General Caution

- Turn off the main power switch and unplug the printer before you start to work on the laser unit. Laser beams can cause serious eye injury.

Slide 97

No additional notes

Laser Optics Housing Unit

- Always use two hands when carrying the laser optics housing unit. Be sure not to drop the laser optics housing unit.

Slide 98

No additional notes

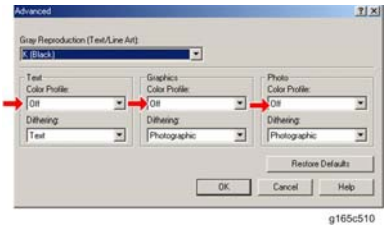
After you Replace the Laser Optics Housing Unit (1)

- **Important: First, open the front cover and turn on the machine.**
  - Do the following 2 steps with the front cover of the machine open.
- **On the LCD, access “LSU Adjustment” inside the “Engine Maintenance” menu.**
- **Manually input the corresponding LSU data from your supervisor into the space provided on the LCD.**
- **Close the front cover.**
- **Execute "Color Registration" in the "Engine Maintenance" menu.**
- **Turn the main switch off/on.**
- **MUSIC will be performed automatically.**

Slide 99

No additional notes

After you Replace the Laser Optics Housing Unit (2)

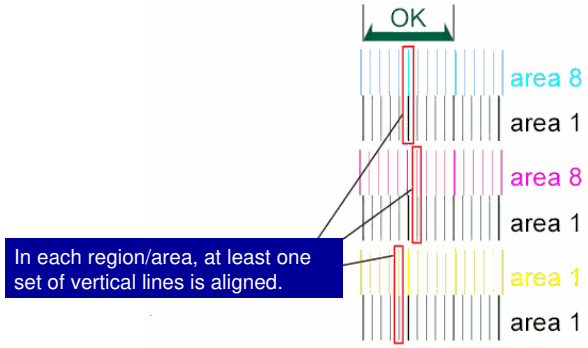


- **Print out the test chart and make sure that MUSIC was performed successfully.**
  1. Click the "Properties" tab inside the printer driver.
  2. Click the "Print Quality" tab.
  3. Select the "Manual" radio button.
  4. Click [Advanced…].
  5. Select “Off” for the three Color Profile pull-down menus shown (i.e. for Text, Graphics, and Photo modes).
  6. Click [OK] twice to print out the test chart.

Slide 100

No additional notes

After you Replace the Laser Optics Housing Unit (3)

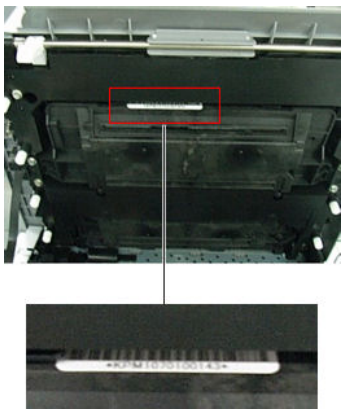


- **The test chart is printed. An example is shown above. Make sure that MUSIC was performed successfully.**
- **Four sets of vertical lines appear on the test chart (C and k, M and k, Y and k…). In each set, look for vertical lines that are aligned within the region defined by "OK".**
- **If all sets have at least one set of vertical lines that are aligned, MUSIC was successful.**
  - If MUSIC was successful, skip the steps on the next slide (4). Go to slide (5)

Slide 101

No additional notes

After you Replace the Laser Optics Housing Unit (4)



- **If MUSIC was not successful, do the following.**
  1. Open the upper cover and check the lot number of the laser optics housing unit.
  2. Check to see if this lot number is listed in any of the Excel files that are supplied periodically. If it is, then do the rest of this procedure.
  3. Open the front cover and turn on the machine.
  4. Input the setting values for the laser optics housing unit with "LSU Adjustment" in the "Engine Maintenance" menu.
  5. Close the front cover.
  6. Execute "Color Registration" in the "Engine Maintenance" menu.
  7. Turn the main switch off/on. MUSIC will be performed automatically.

Slide 102

- Steps 3 to 7 are a repeat of slide 1 of this procedure, except that we use the numbers from the excel file, and not from the printed sheet that comes with the unit.

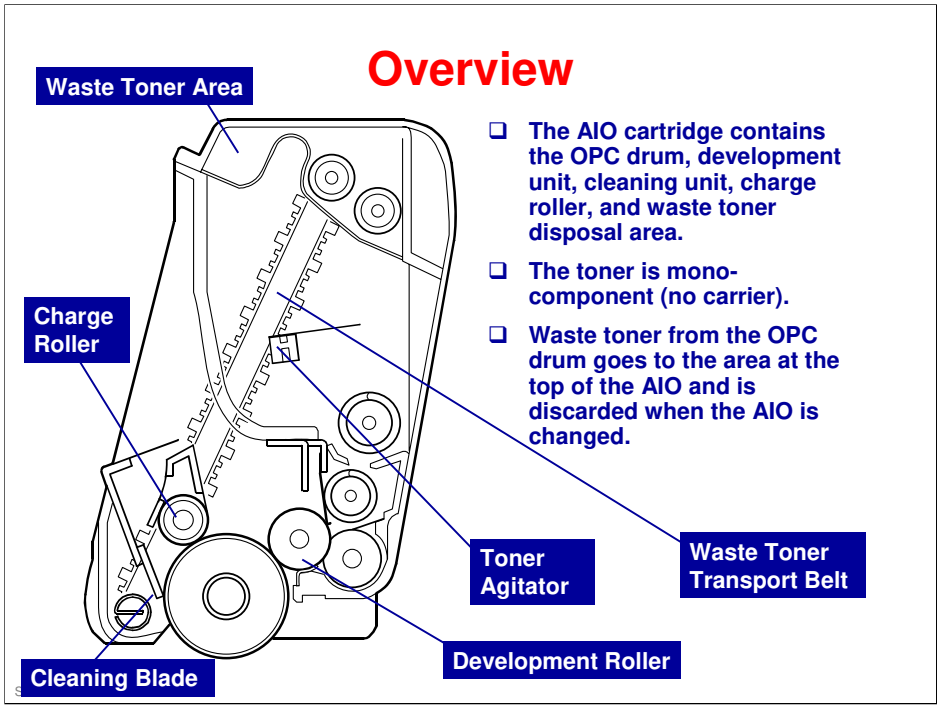
After you Replace the Laser Optics Housing Unit (5)

- **Adjust the registration settings for each tray and for the front and rear side of the paper if necessary.**
  - “Registration” in the "Engine Maintenance" menu.

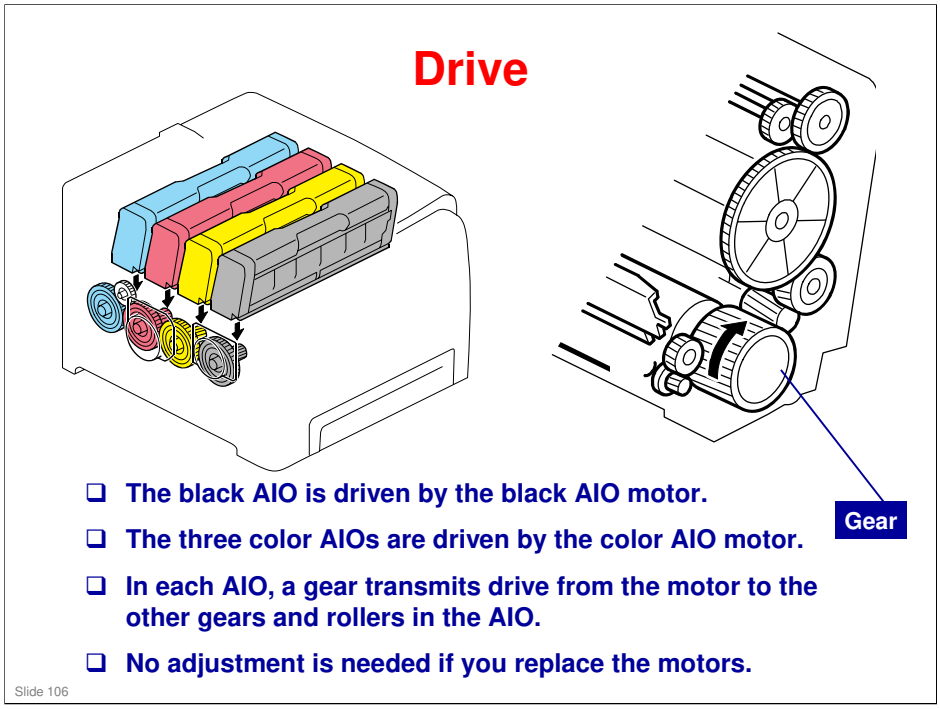
Slide 103

No additional notes

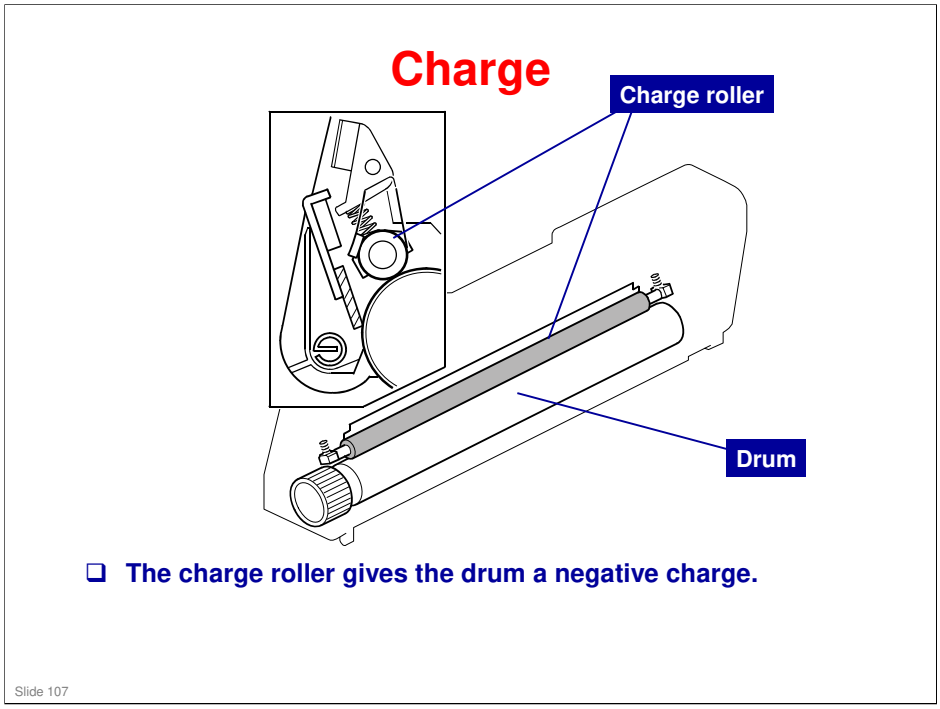
No additional notes



- The term AIO means 'All-in-One'. All image creation components are in one easily-replaceable unit.
- Each AIO consists of the waste toner tank, print cartridge, development unit, and PCU. This gives the user easy replacement procedures and helps to make the engine module more compact.
- The waste toner bottle is smaller than other full-color printers because the waste toner from the OPC is collected in the waste toner tank of each AIO.

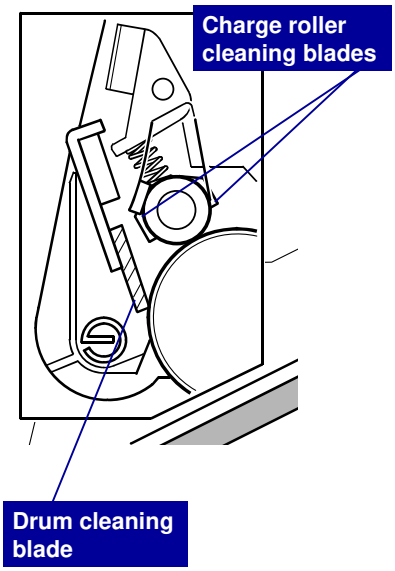


❑ The color AIO motor drives the central gear, as shown in the diagram below.



- The high voltage supply board, which is at the left side of the machine, applies a dc and ac voltage (at a constant current) to the roller. The ac voltage helps to make sure that the charge given to the drum is as constant as possible.
- The machine automatically controls the charge roller voltage when process control is done.

Cleaning

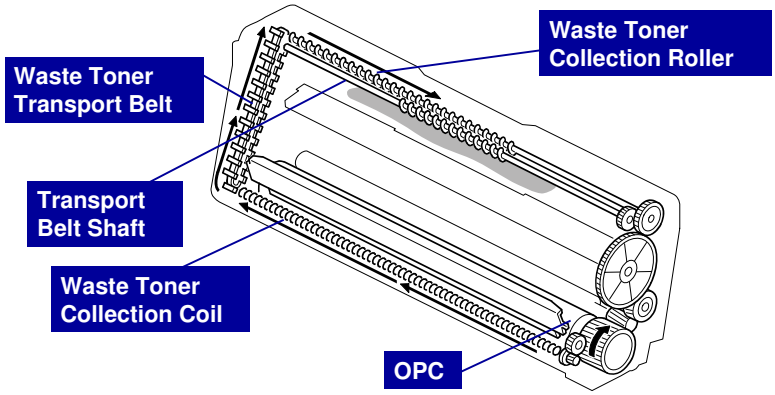


- The drum and the charge roller both have cleaning blades. They always touch the charge roller.
- Waste toner from cleaning goes to the toner collection coil.
- The toner collection coil moves the toner to the waste toner transport belt.

Slide 108

- We will see the toner transport belt on the next slide.

Waste Toner Collection - 1

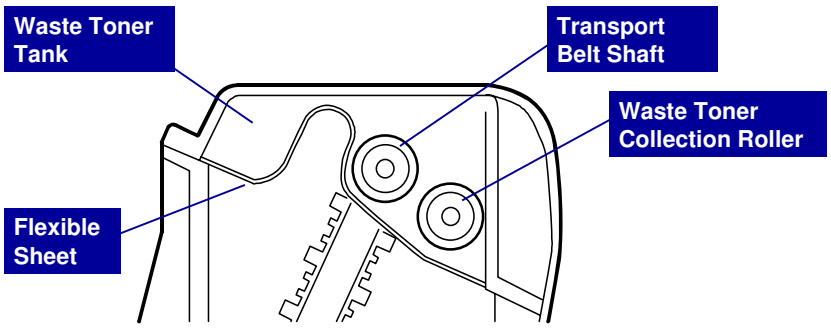


- The waste toner collection coil moves waste toner from the OPC to the right side of the AIO.
- Then, the waste toner transport belt (driven by the transport belt shaft) lifts the waste toner up to the waste toner tank (at the top of the AIO).
- The collected waste toner is moved to the left side of the AIO by the waste toner collection roller and transfer belt shaft.

Slide 109

- See the next slide for more about the waste toner tank.
- There is another toner collection mechanism for the image transfer unit, and a separate collection bottle. This is explained in another section.

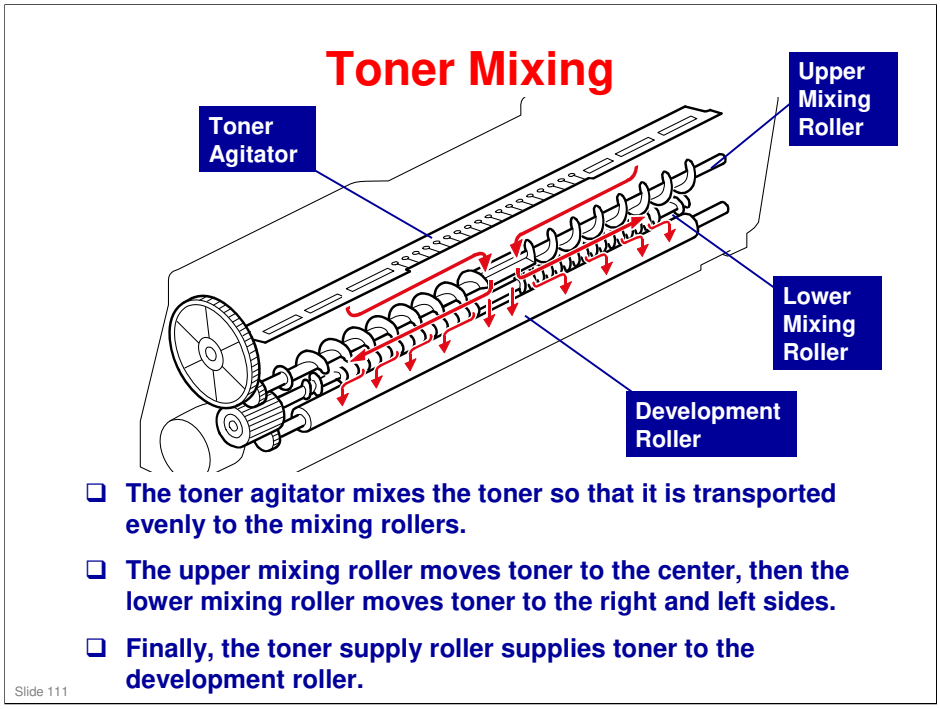
Waste Toner Collection - 2



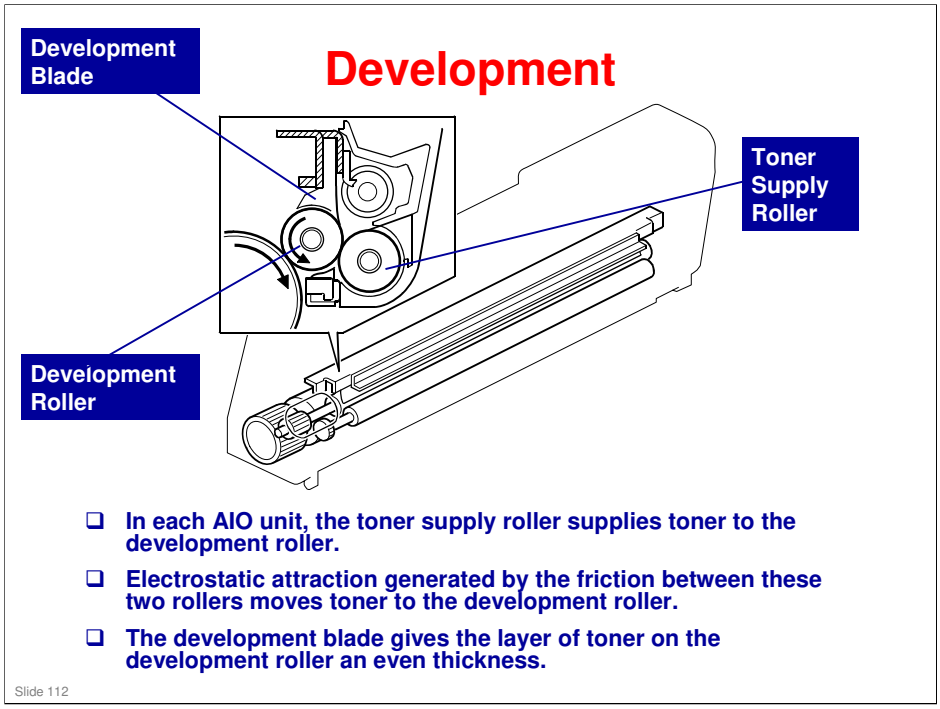
- A flexible sheet separates the unused toner area from the waste toner area.
- The waste toner area becomes larger when toner is consumed.
- This toner is not recycled.

Slide 110

No additional notes.

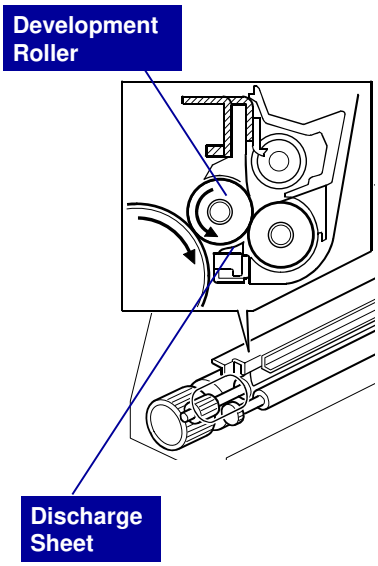


- This mixing mechanism prevents toner hardening and uneven image density in the outputs.



- This machine uses mono-component toner, with no carrier, so a TD sensor is not necessary.

Development Roller Discharge



- The discharge sheet removes charge from the development roller after it has turned past the drum.

Slide 113

- This system is used instead of a quenching lamp.

Toner Near-end and End Detection

- **The machine uses the following to detect toner near-end:**
  - Pixel count since the new toner was installed.
  - AIO rotation distance (machine copy speed x rotation time)
- **After toner near-end, about 200 sheets can be printed (A4, 5% coverage) until toner end occurs.**
  - New for this series: This can be changed from 200 to either 100 or 300 sheets.

Slide 114

- These two figures are stored in the memory chip in the AIO.
- Toner near-end: If you change from the default 200 sheets, the near-end detection point is moved earlier (in the case of 300 sheets) or later (in the case of 100 sheets)
- How to change the 200-sheet limit to 100 or 300?
  - User tools > System settings > Notify Toner Almost empty > Sooner (100) Normal (200) Later (300)

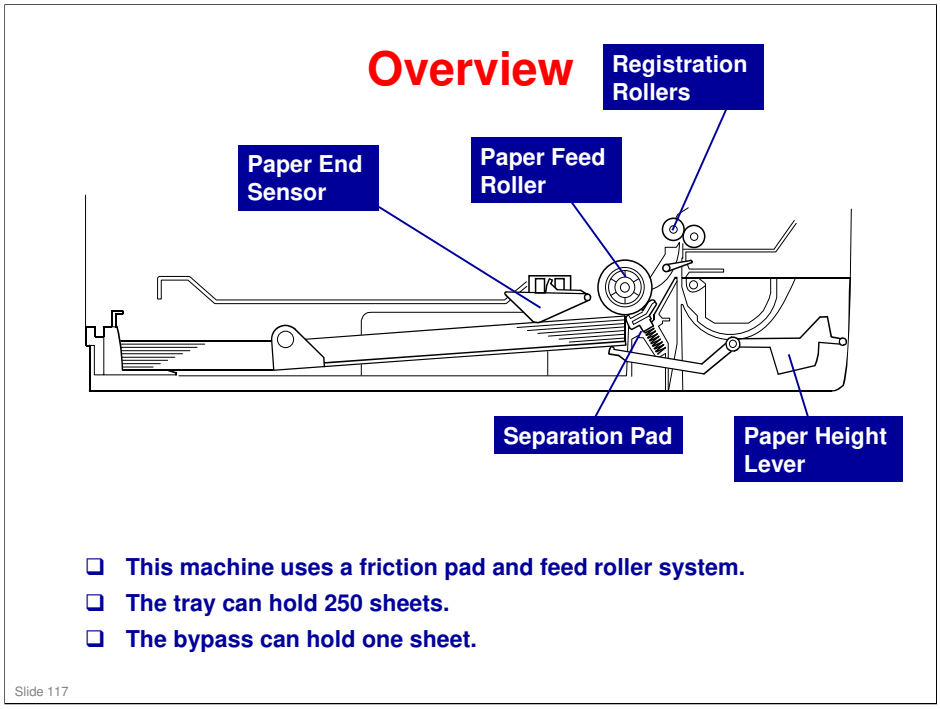
New AIO Detection

- There is a new unit detection mechanism for the AIO. It uses the ID chip that is built into each AIO.
- Other units do not have new detection mechanisms.
  - For example, after the ITB is replaced, SP modes must be done.

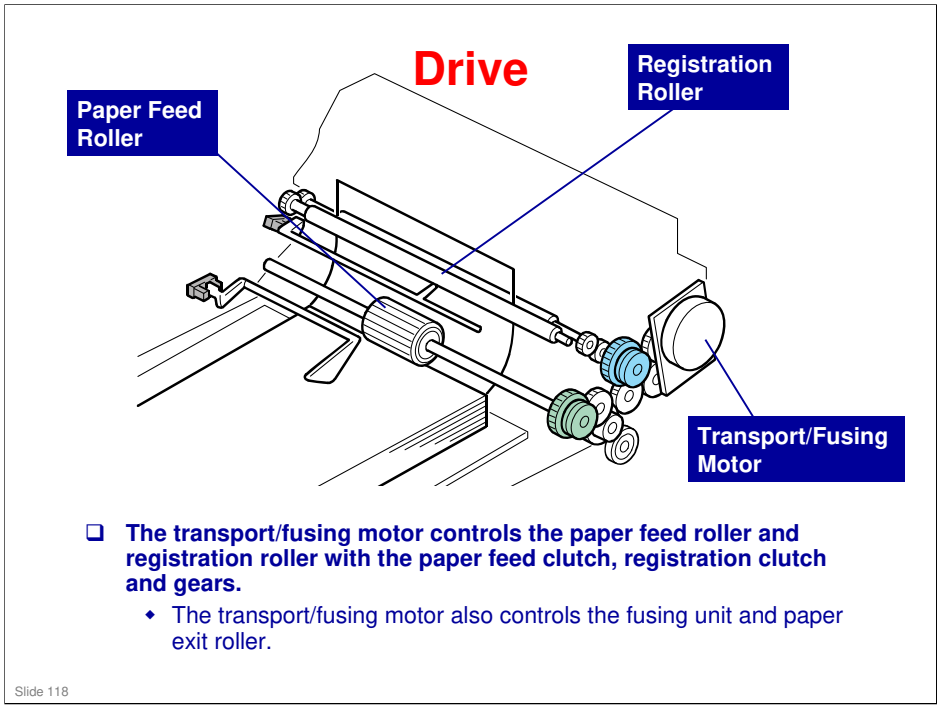
Slide 115

No additional notes

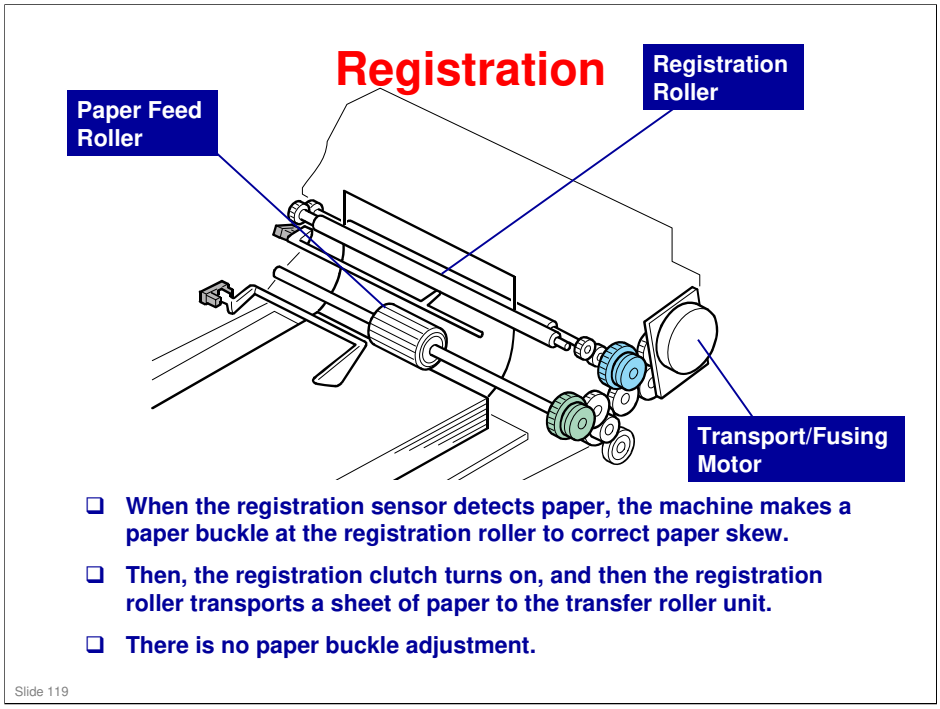
No additional notes



- The paper end sensor detects whether paper is installed in the tray and whether the tray is set in the machine.
  - This machine does not have a tray set sensor.
- This machine also does not have automatic paper size detection.
  - The machine determines the paper size from the on-off timing of the registration sensor.
  - If the paper type which is selected at the PC does not match the paper size measured by the registration sensor, the machine issues a paper jam alert and stops the motors.

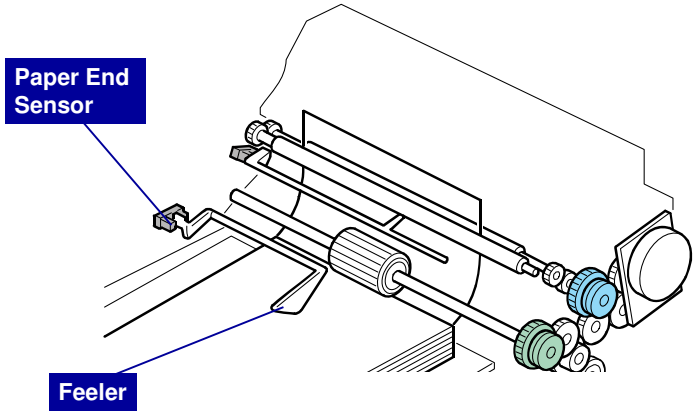


- The clutches are shown in blue.



- No additional notes

Paper End Detection



- When the paper is finished, the feeler falls through a cutout in the bottom of the tray, and the sensor detects paper end.

Slide 120

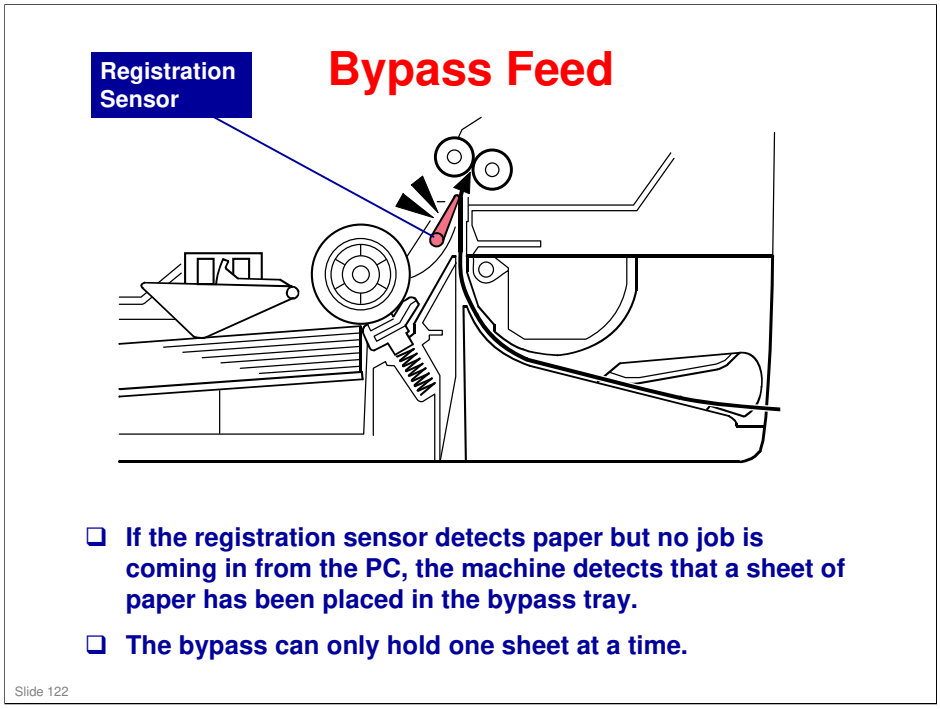
No additional notes

Tray Lift

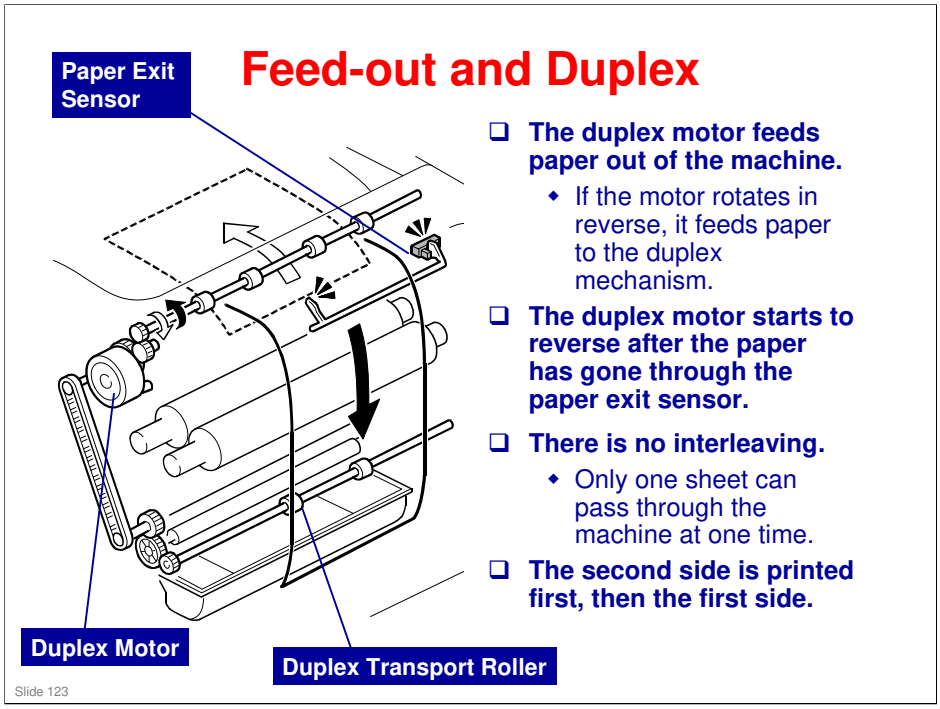
- **When the tray is installed in the machine, a lock lever is released, and springs lift the bottom plate.**
- **There is no mechanism to lower the tray. You must push the bottom plate down.**

Slide 121

- A projection at the right side of the tray set location releases the lock lever when the tray is installed in the machine.

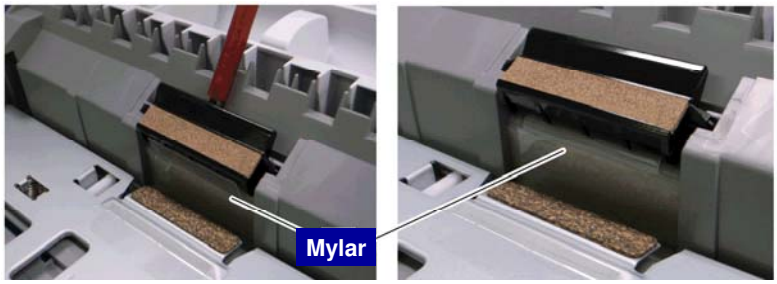


No additional notes



No additional notes

Replacing the Separation Pad



Correct

Incorrect

- When reinstalling the separation pad, make sure that the mylar is not placed under the separation pad.

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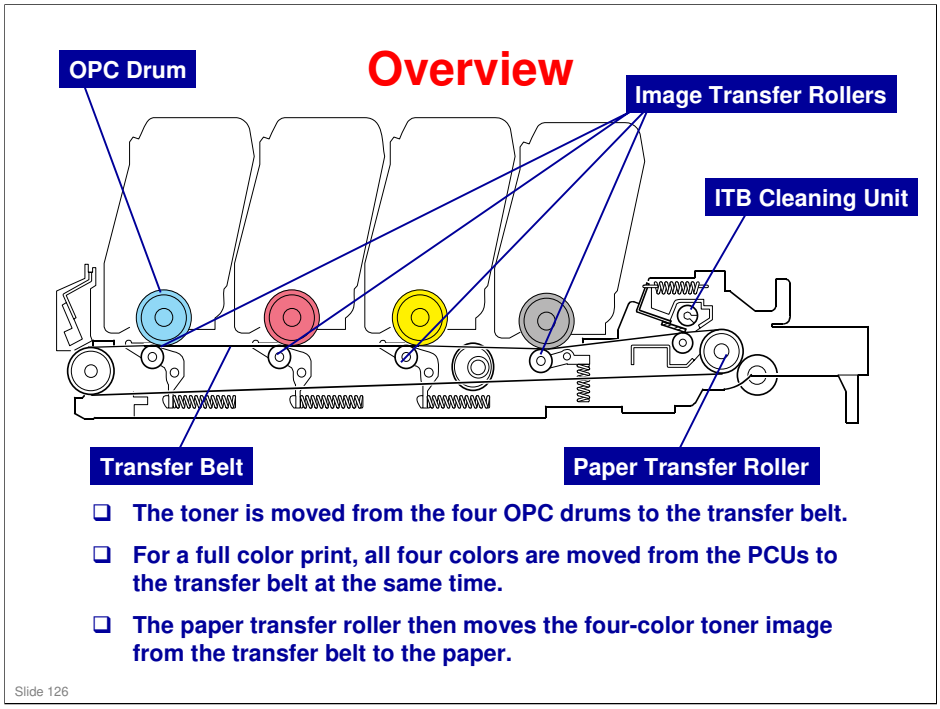
No additional notes

No additional notes



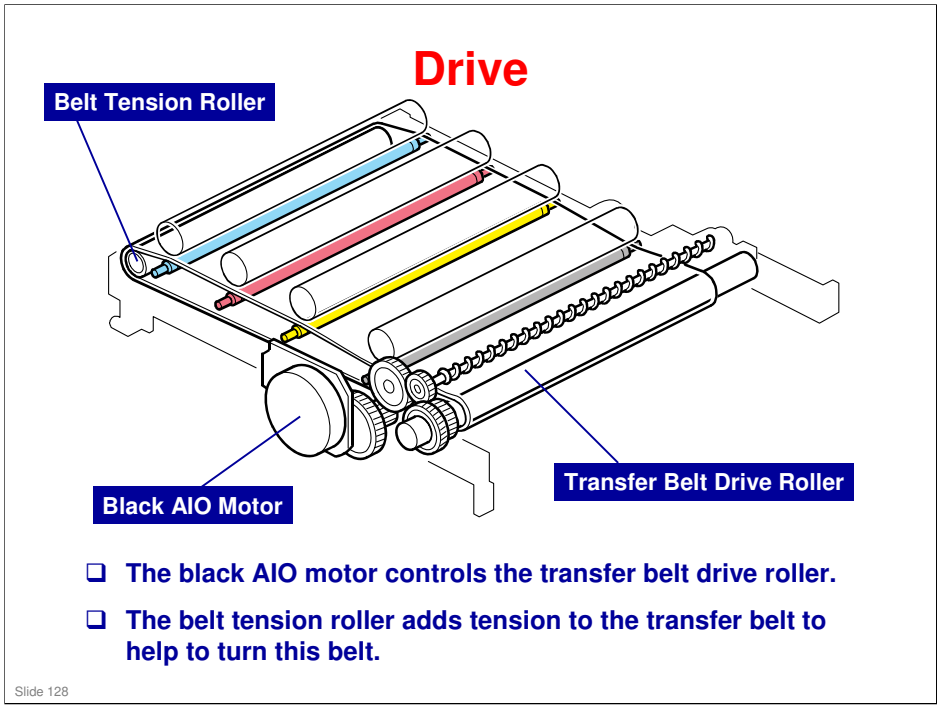
No additional notes

Differences from the Previous Model

- **The ITB unit and transfer roller unit are different parts from the previous model.**
  - Transfer roller unit: Improved cleaning function

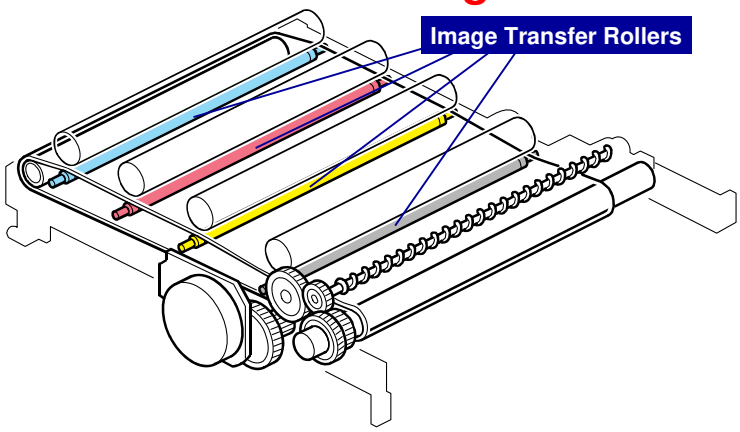
Slide 127

No additional notes



No additional notes

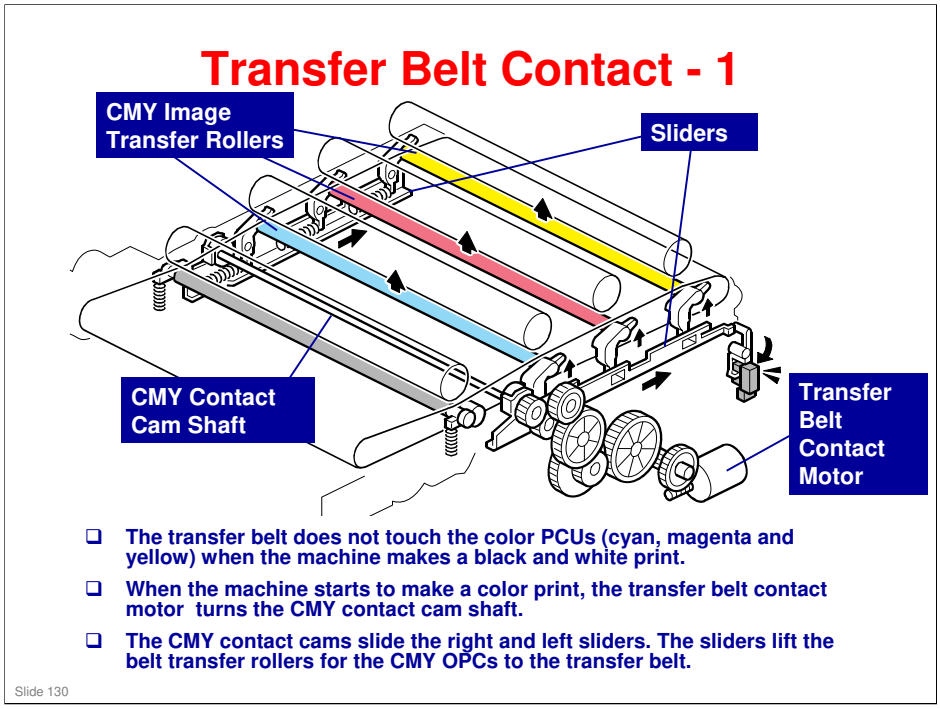
Transfer Voltage



- The image transfer rollers move the toner from the PCUs to the image transfer belt.

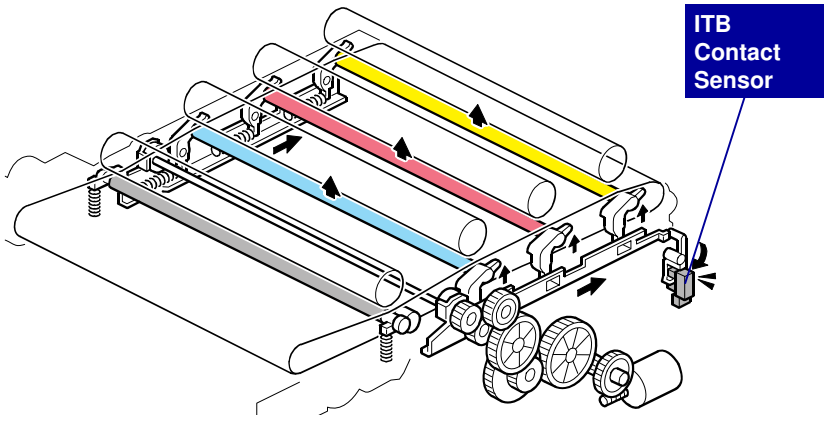
Slide 129

No additional notes



- Because of this mechanism, the life of the transfer belt is longer (it is not necessary for the transfer belt to touch the color PCUs when the machine makes a black and white print).
  - However, if the customer selects "Off" with the "ACS" setting, the four OPC drums always touch the image transfer belt.

Transfer Belt Contact - 2

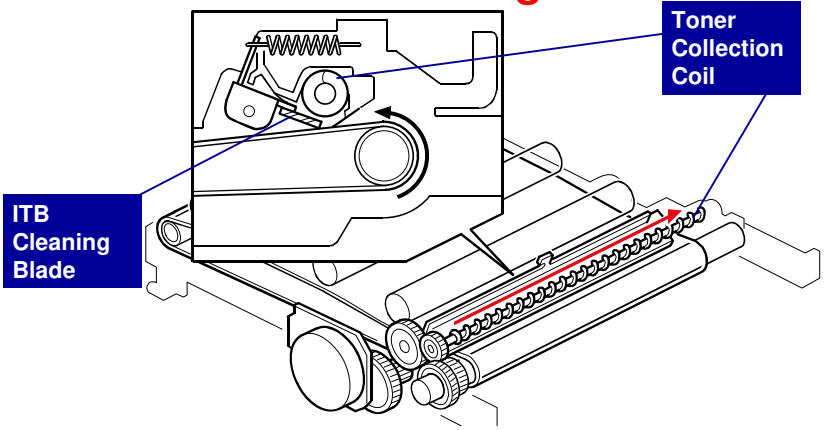


- The ITB contact sensor detects if the transfer roller unit for each OPC (CMY) touches the transfer belt.
- If it does not touch the transfer belt during color printing, the machine stops and shows SC 445, 446, or 447.

Slide 131

No additional notes

ITB Cleaning Unit

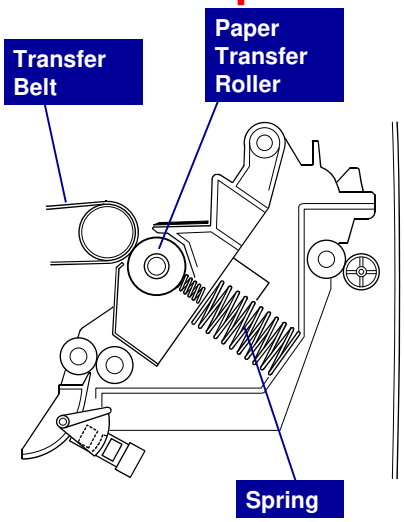


- The toner collection coil moves waste toner from the ITB to the waste toner bottle.
- A shutter in the ITB cleaning unit closes when the ITB unit is removed. This prevents toner from falling out.

Slide 132

- We will see more about the waste toner collection mechanism for the ITB later in this section.

Paper Transfer Roller

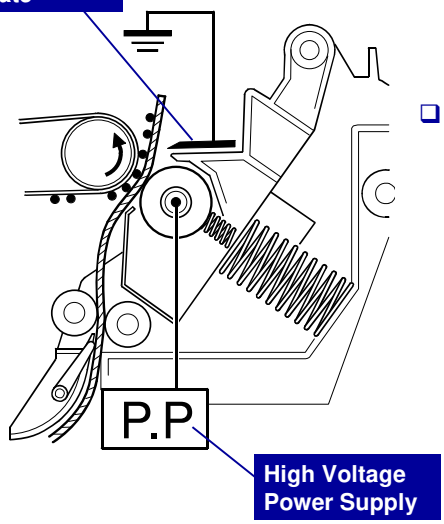


- The transfer roller is always pressed against the image transfer belt by pressure from a spring.
- The transfer roller moves the toner image from the transfer belt to the paper.
- When a sheet of paper goes between the transfer roller and the transfer belt, the transfer roller turns with the paper.

Slide 133

- In some places, you will see the term '2nd Transfer'. This refers to what the transfer roller does (transfer from belt to paper).

Paper Transfer and Discharge

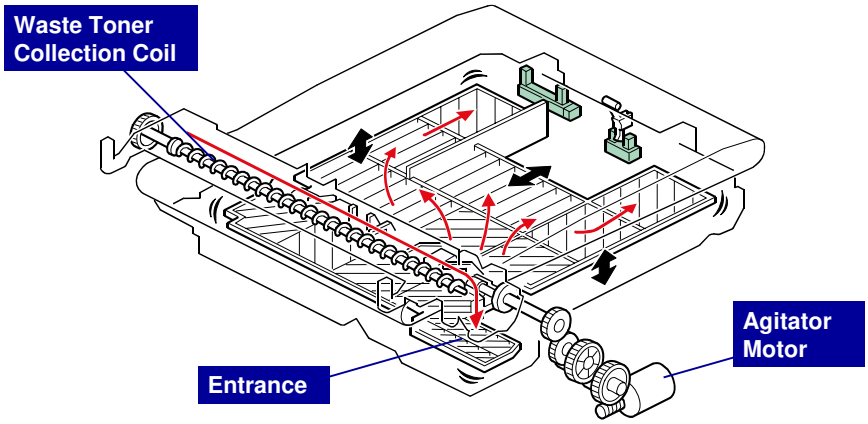


- The transfer roller receives a positive charge from the high voltage power supply.
- The discharge plate removes charge that was applied to the paper during paper transfer. This helps paper move away from the transfer roller.

Slide 134

- The right end of the transfer unit is attached to the terminal from the high voltage power supply when you close the front cover.

Waste Toner Collection - 1

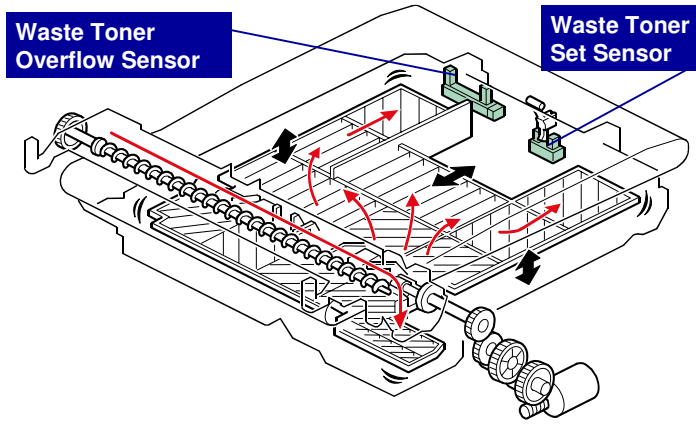


- The waste toner collection coil moves waste toner from the transfer belt to the entrance of the waste toner bottle.
- The agitator plate makes sure that the waste toner is evenly distributed. The agitator motor controls this plate.

Slide 135

No additional notes

Waste Toner Collection - 2



- The waste toner bottle set sensor detects whether the waste toner bottle is set.
- The waste toner overflow sensor detects whether the waste toner bottle is full.
- When the machine detects that the bottle is full, 400 more pages can be printed. Then the machine stops.

Slide 136

- If the bottle is not set or if it is full, an error message appears on the LCD.

- Waste toner overflow and bottle set sensors: These are for the waste toner bottle that collects toner from the transfer belt. The waste toner from the drums is collected inside each AIO.

After you Replace the Image Transfer Belt

- **Important: First, open the front cover and turn on the machine.**
- **Execute "Reset Transfer Unit Life Counter“ in the "Engine Maintenance" menu.**
- **Close the front cover.**
- **Execute "Trans. Belt Adjust“ in the "Engine Maintenance" menu.**
- **Adjust the registration settings for each tray and for the front and rear side of the paper if necessary.**
  - “Registration” in the "Engine Maintenance" menu

Slide 137

- Normally, the life of the transfer belt unit is the same as the life of the machine. It should only be necessary to replace this unit if it becomes defective.
- What is the Transfer Belt Unit Life Counter?
  - The resistance of the belt changes during its life. The machine automatically compensates for this by adjusting the transfer voltage. For a new belt, the life counter must be reset so that the machine applies the correct voltage for a new belt.
- What does Transfer Belt Adjust do?
  - The new transfer belt may not be exactly the same length as the old one. With this SP mode, the machine calibrates the motor speed for the new belt (the speed is checked with a TM sensor pattern).

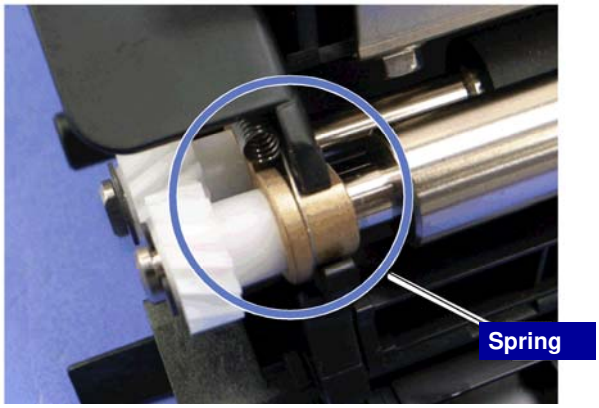
After you Replace the Paper Transfer Roller or Transfer Roller Unit

- Execute "Reset 2nd Transfer Unit" with the "Engine Maintenance" menu.

Slide 138

No additional notes

Installing the Registration Roller



- Make sure that you hook the spring correctly.

Slide 139

No additional notes

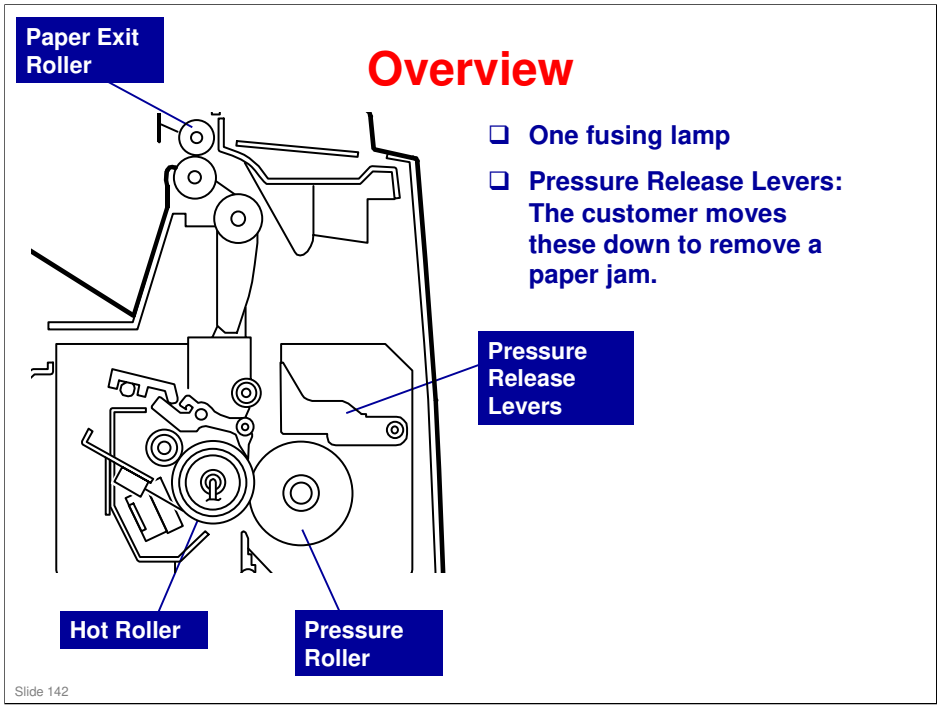
Other Notes

- **The ITB cleaning unit contains waste toner. When you remove the ITB cleaning unit, put it on a sheet of paper.**
  - A shutter mechanism inside the unit should prevent toner from falling out. But a small amount may already be on the exterior.
- **Waste toner bottle set sensor, waste toner overflow sensor: Make sure to connect these up to the correct connectors, as explained in the manual.**

Slide 140

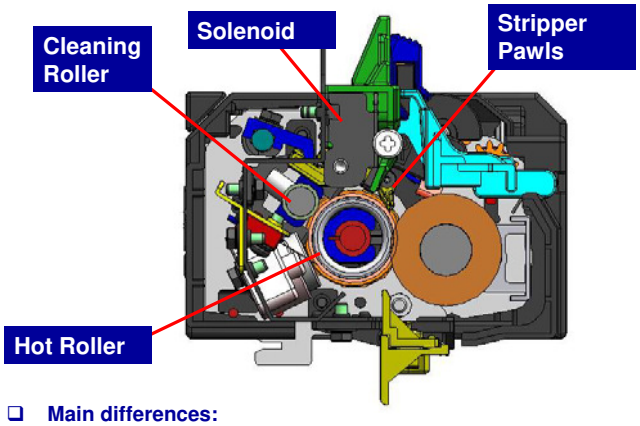
No additional notes

No additional notes



- Springs always apply the correct pressure to the nip between the pressure roller and hot roller. When releasing the pressure release levers, the pressure roller moves away from the hot roller. If a paper jam occurs in the fusing unit, releasing these levers make it easy to remove jammed paper.
- Pressure release levers: Also known as the envelope levers in this machine, because they are used to release pressure between the fusing unit rollers when envelopes are used.

Differences from the Previous Model



- **Main differences:**
  - The hot roller has a thin wall.
  - With a thin-wall hot roller, it can be difficult to pull paper off, so stripper pawls are added (the previous model did not have these). A solenoid operates these pawls (see the next slide).
  - A cleaning roller was added to remove toner/dust transferred from the separator pawls to the hot roller

Slide 143

No additional notes

Fusing Stripper Pawl

- The stripper pawls prevent paper from wrapping around the hot roller.
- The fusing stripper pawl solenoid detaches the stripper pawl from the hot roller until contact is necessary.
- This is to prevent stripper pawl lines from appearing in the printed image and to prevent the hot roller surface from being damaged.

Slide 144

No additional notes

Two Printing Modes

Normal

Envelope

- **There are two modes: normal printing, and envelope printing.**
- **The mode can be changed by moving the two blue levers (pressure release levers).**
  - Levers up: Normal mode
  - Levers down: Envelope mode
- **If the levers are not set correctly (i.e., one lever up and one lever down), then the following will occur:**
  - Displayed error message: Check Env. Lever Position
  - Paper or envelopes are fed with skew, so the image appears skewed on the paper
  - Insufficient fusing on one side of the paper
  - Wrinkling

Slide 145

- Normally this lever should be up.
- A larger gap is needed for envelopes, which are thicker than paper.
- Lower the lever to increase the size of the gap between the hot roller and pressure roller. This prevents jams and wrinkling when printing on envelopes.
- Raise the lever to reduce the gap for all other print jobs.

Fusing Pressure Release Sensor

- This is a new sensor for this model.
- The sensor detects the status of the levers. If the position does not match the paper type, a warning appears on the display.

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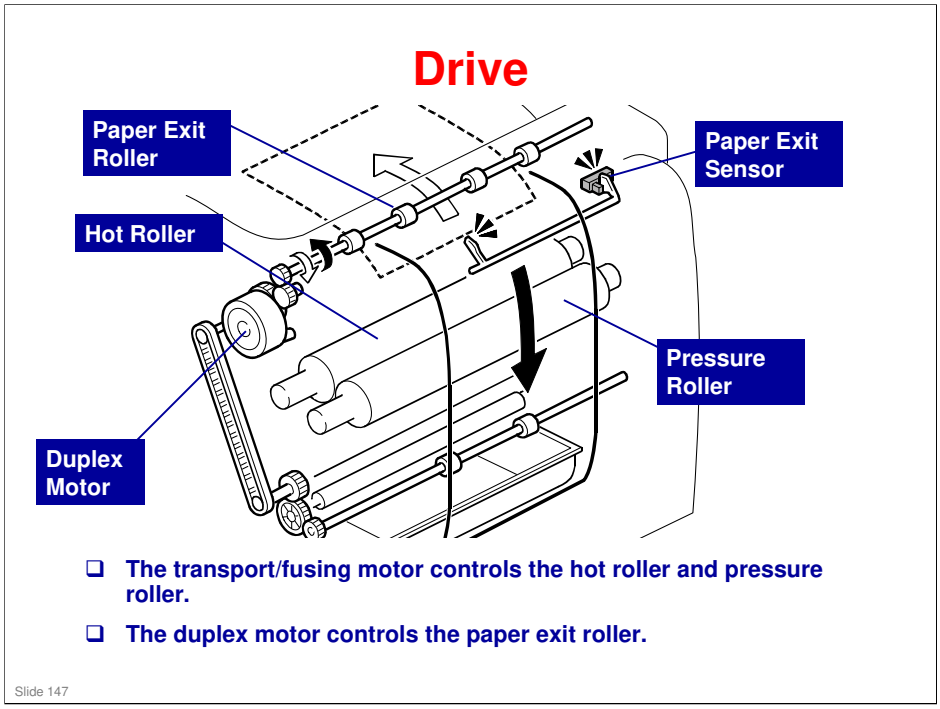
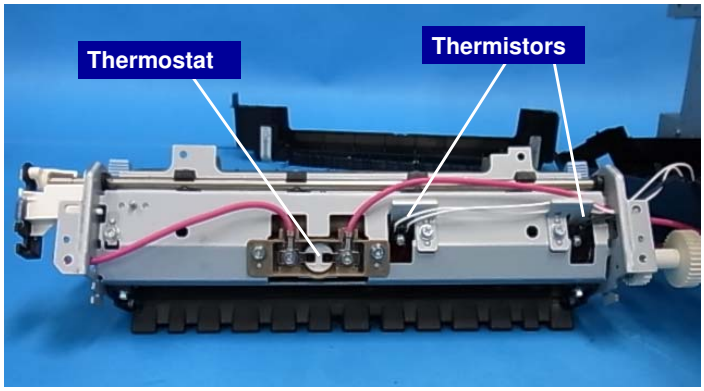
No additional notes



No additional notes

Fusing Temperature Control - 1/3



- **Two thermistors, one thermostat**
  - Fusing temperature control is based on measurements from the thermistor at the center.
- **The thermostat cuts power to the fusing lamp.**
- **The machine turns power off and enters sleep mode if the machine is idle for 10 minutes.**

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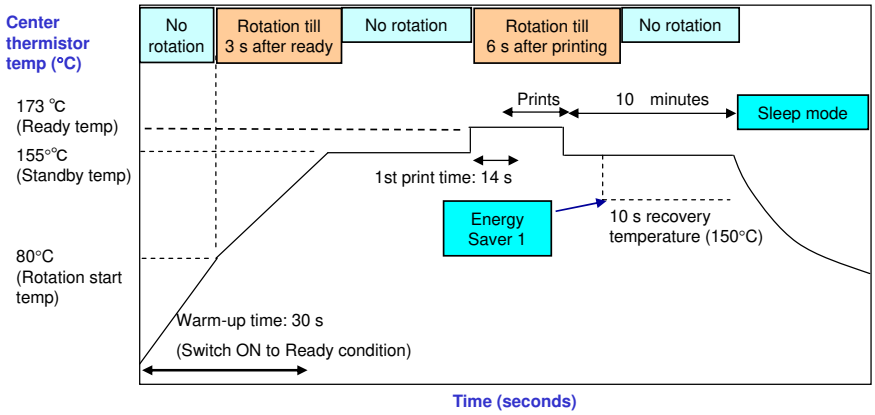
No additional notes

Fusing Temperature Control - 2/3



- The center thermistor controls the fusing temperature.
- The above chart shows the relationship between temperature and fusing belt rotation.

Slide 149

No additional notes

Fusing Temperature Control - 3/3

- **This chart shows the fusing temperature and print speed for each mode setting.**
  - Environment temperature greater than 16°C.

Paper	Speed	Temp
Thin (60 to 65g/m2)	1	170°C
Plain (66 to 74 g/m2)	1	173°C
Middle thick (75 to 90 g/m2)	1	177°C
Recycled	1	177°C
Plain /Middle thick/ recycled	1	177°C
Color paper	1	177°C
Preprinted	1	177°C
Letterhead	1	177°C
Prepunched	1	177°C
Thick 1 (91 to 105 g/m2)	1/2	160°C
Thick 2 (106 to 160 g/m2)	1/2	165°C
Cardstock	1/2	165°C
Bond	1/2	160°C
Envelope	1/2	196°C

Slide 150

No additional notes

Fusing Unit SCs

- SC541, 542, 543, and 545
- To prevent damage to the machine, the machine cannot be operated until the fusing related SC has been reset by a technician.
- To reset the machine:
  - "Engine Maintenance" menu, "Fuser SC Reset", press ‘OK” then turn the main power switch off and on

Slide 151

No additional notes

Humid Environments

- **To reduce paper curl in high temperature and humidity environments, the fusing unit does idle rotation before a job, if the customer enables this function in the user mode.**
  - Mode 1: No fusing idling, transfer roller voltage is increased
  - Mode 2: Fusing unit rotates for 30 seconds before a job, transfer roller voltage is increased.
  - Mode 3: Fusing unit rotates for 60 seconds before a job, transfer roller voltage is increased.

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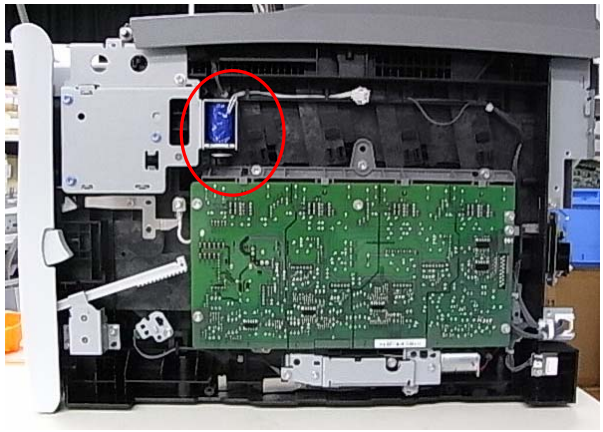
- Lab tests: Fusing idling mode 2 should be enough in most cases

- Menu – Machine Settings – High Humidity Mode

Stripper Pawl Solenoid



- This is a new component for this series.

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No additional notes

Replacement

- Make sure that the fusing unit is cool before you touch it.
- Make sure to restore the insulators, shields, etc after you service the fusing unit.

Slide 154

No additional notes

Removing the Fusing Unit

- **Changed from the previous model:**
  - To remove the fusing unit, it is not necessary to remove both left and right covers. Remove the left cover only.
    - » This is because the thermistor harness is only on the left side in the new machine.

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- The red circle shows the thermistor harness.

After Replacing the Fusing Unit

- Execute "Reset Fuser Unit" with the "Engine Maintenance" menu if the fusing unit is replaced.

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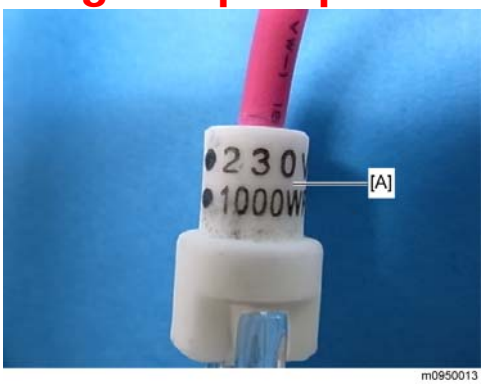
No additional notes

Fusing Lamp Replacement



- The end of the lamp [A], which shows the voltage and power rating, must be placed at the left side of the fusing unit.
- The thermistors and thermostat cannot be replaced in the field. The position of these components is adjusted precisely in the factory with special tools.

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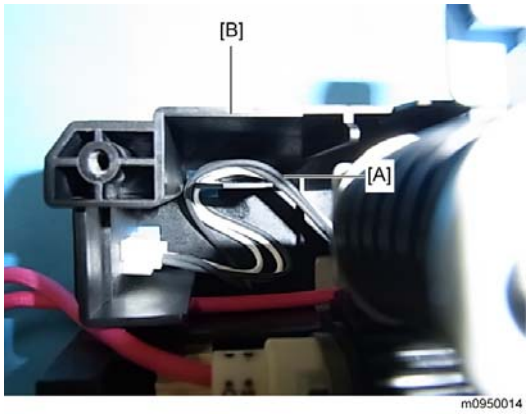
- This is different from PE-MF2.

Reassembling the Fusing Unit



- Route the harness [A] as shown above when reinstalling the back cover [B].

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No additional notes

Fusing Unit Jams

- Normally, the user will remove fusing unit jams.
- But, if the service program 'Fuser SC Detect' 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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No additional notes

RICOH

RICOH

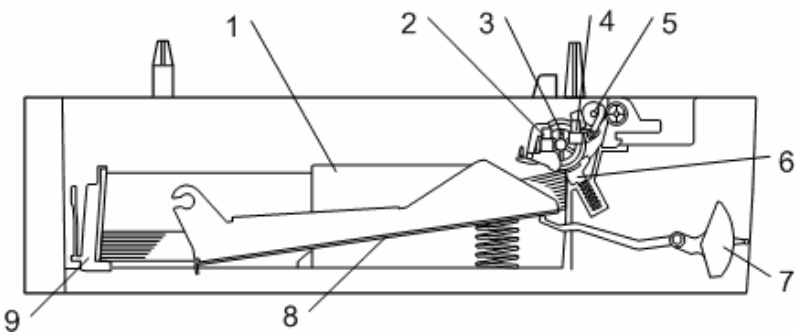
Service Training
M099/M100, M095/M096

Optional Paper Tray Unit (G849)

Slide 160

No additional notes

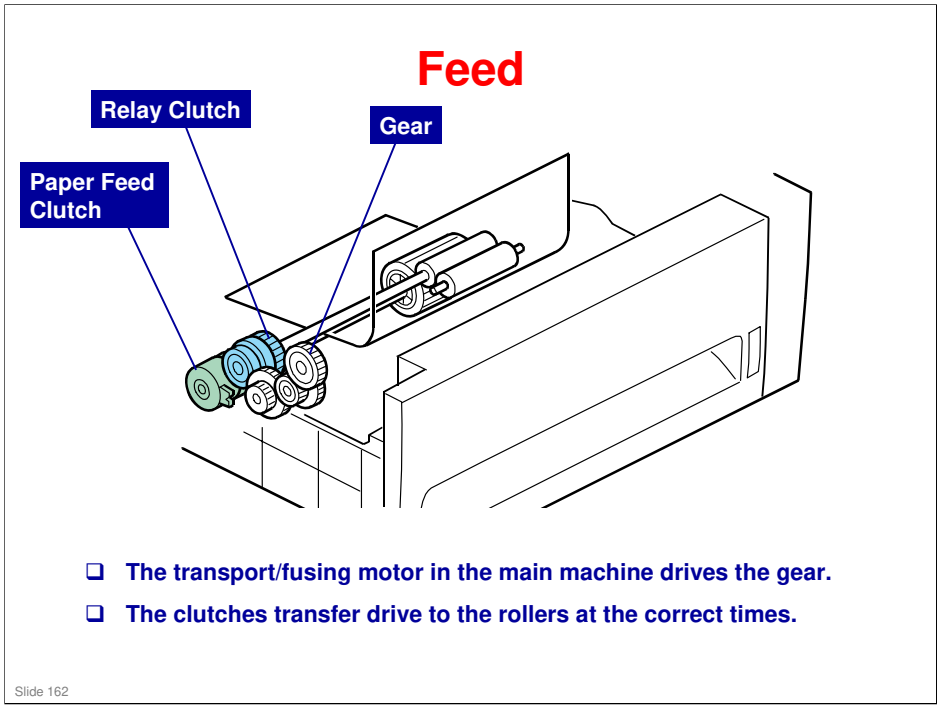
Overview



- Capacity: 500 sheets
- Feed roller and friction pad

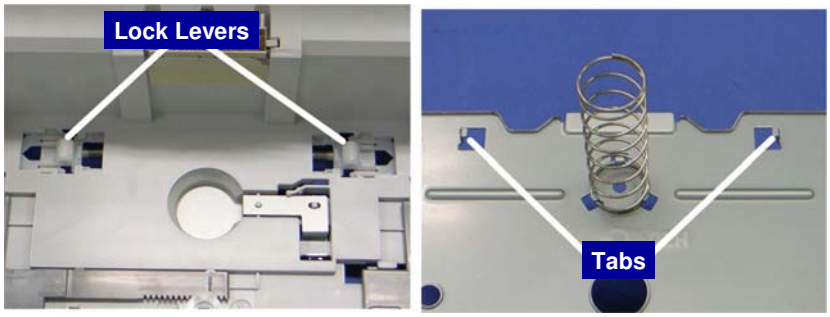
Slide 161

1. Side Fence
2. Paper End Sensor
3. Paper Feed Roller
4. Relay Sensor
5. Relay Roller
6. Friction Pad
7. Paper Height Lever
8. Bottom Plate
9. Rear Fence



No additional notes

Paper Lift - 1



- The spring pushes the bottom plate up. So, you must press the bottom plate down before you put the tray in the machine.
- After the bottom plate is pressed down, the tabs hold the lock levers.

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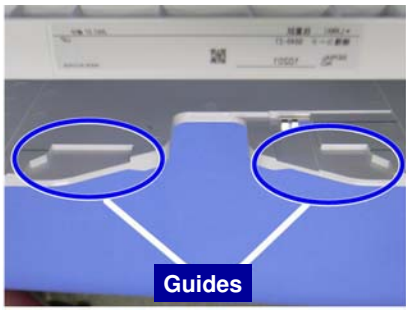
- The next slide shows what happens after you put the tray in the machine.

Paper Lift - 2

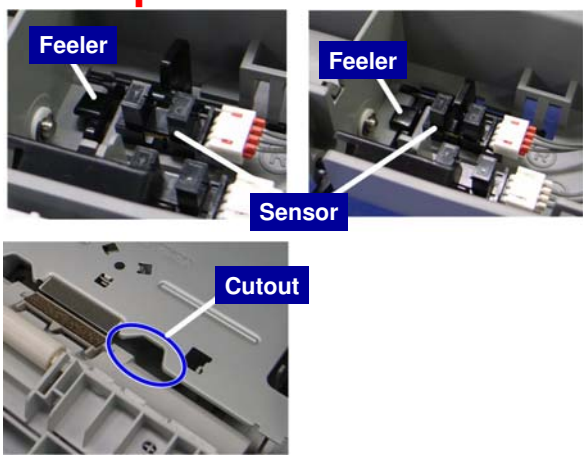


- When you put the tray in the machine, the guides in the main body of the paper tray unit push the lock levers, and the lock levers release the tabs.
- Then, the spring lifts the bottom plate.

Slide 164

No additional notes

Paper End Detection



- When there is no paper in the tray, a feeler drops through a cutout in the bottom plate, and the actuator attached to the feeler enters the paper end sensor.

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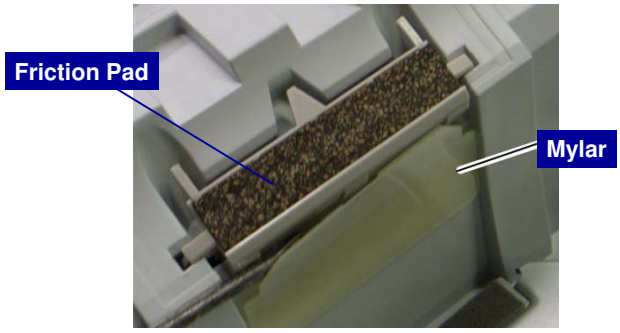
No additional notes

Reinstalling the Friction Pad



- When re-installing the friction pad, make sure that the Mylar does not go under the friction pad.

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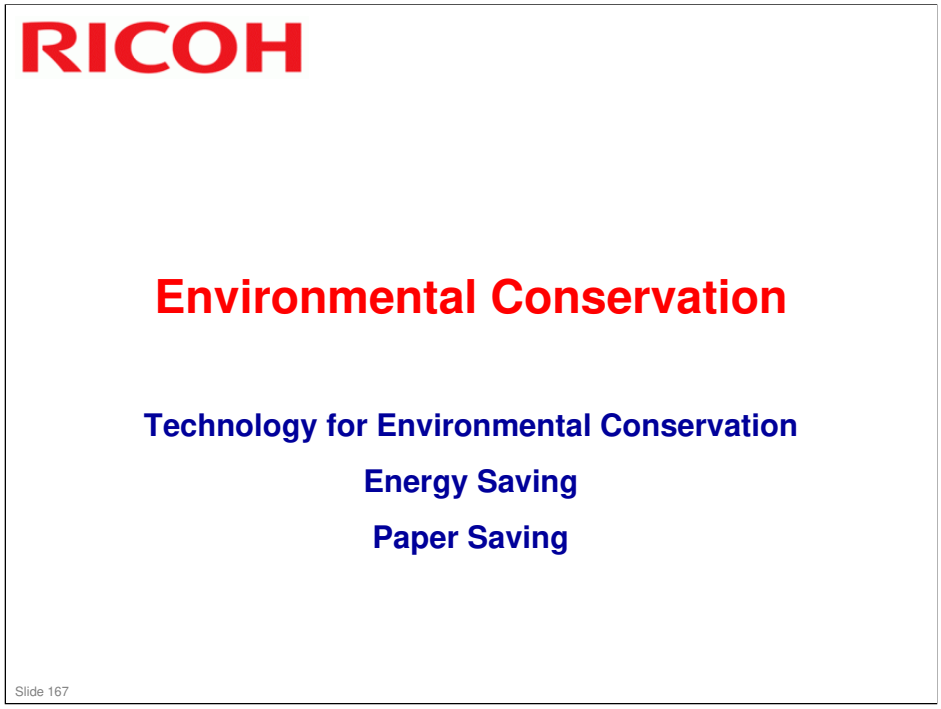
G849 Service Manual – Replacement and Adjustment – Paper Feed Unit – Friction Pad



- This section explains the technology used in this machine for environmental conservation, and the default settings of related functions.

Technology for Environmental Conservation

◎: New or modified function
○: Has this function
Blank: Does not have this function

Environmental Technology/Feature	Description	New model PE-P2/MF3	Previous model PE-P1/MF2
1. QSU	- Reduction of warm-up time (Energy saving) - Reduction of CO2 emissions	◎	○
2. Hybrid QSU	- Reduction of warm-up time (Energy saving) - Reduction of CO2 emissions		
3. IH QSU	- Reduction of warm-up time (Energy saving) - Reduction of CO2 emissions		
4. Paper-saving features	Allows documentation to be managed digitally, cutting down on paper consumption. Improves machine productivity when printing out duplex (double-sided) images.	○	○
5. High-speed duplex copying	Improves machine productivity when printing out duplex (double-sided) images.	○	○
6. Ozone reduction design	- Low ozone emissions	○	○
7. PxP (polymerized) toner	- Energy saving - Conservation of materials/resources (reduced toner consumption)		
8. Noise reduction design	- Low noise	○	○
9. Minimization of harmful substances	- Minimization of harmful substances	○	○
10. Environmentally-friendly toner bottle	- Conservation of materials/resources	–	–
11. Toner recycling	- Conservation of materials/resources		
12. Recycle-friendly design	- Conservation of materials/resources	○	○

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- This slide explains what technologies are used for conserving the environment in this product.

Brief Descriptions of the Technologies

- **1. QSU (Quick Start-up)**
  - This technology reduces both the amount of energy consumed while in Standby mode (the Ready condition) is reduced, as well as the time it takes for the machine to warm up to the Read condition.
  - This is made possible through the utilization of dual fusing lamp heating, low fusing point toner, a pressure roller with a "sponge" surface layer, and a thin surface layer hot roller.
- **2. Hybrid QSU**
  - This technology adds a capacitor to conventional QSU Technology, which allows the benefits of reduced energy consumption and reduced warm-up time described above to be extended to high-speed machines.

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No additional notes

Brief Descriptions of the Technologies

- **3. IH QSU**
  - This technology incorporates IH (Inductance Heating) technology into conventional QSU technology, which allows the benefits of reduced energy consumption and reduced warm-up time to be extended to color machines.
- **4. Paper-saving features**
  - 1) The duplex (double-sided) and Combine features reduce paper consumption.
    2) The Document Server and other electronic document management features reduce paper consumption by offering an electronic method for storing and managing important documents.

Slide 170

No additional notes

Brief Descriptions of the Technologies

- **5. High-speed duplex copying**
  - 1) Enables high-speed duplex printing through the utilization of the Duplex Interleaf and high-speed Inverter Transport features.
  - 2) Enables quick printing of duplex jobs through the use of Duplex Scanning.
- **6. Ozone reduction design**
  - Greatly reduces the machine's ozone emissions to near-zero levels by utilizing:
    1) A charge roller/belt instead of a corona wire
    2) An image transfer roller/belt instead of a corona wire-based transfer system

Slide 171

No additional notes

Brief Descriptions of the Technologies

- **7. PxP (polymerized) toner**
  - "PxP toner" is a fine-particle, polyester resin based toner, manufactured using a Ricoh-original polymerization method instead of the conventional pulverization method.
  - This allows the toner to fuse at a lower temperature, which reduces the impact on the environment and contributes to achieving even higher image quality than before.
  - PxP toner also has other benefits, including a reduction in the amount of toner needed to develop the image, as well as an approximate 35% reduction in CO_2 emissions during the toner manufacturing process.

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No additional notes

Brief Descriptions of the Technologies

- **8. Noise reduction design**
  - 1) The machine and its components are designed to minimize the overall noise generated by the machine. As a result, all noise levels conform to the local laws and regulations as well as user requirements in each market in which the products are sold.
  - 2) Reduces the noise generated by the polygon mirror motor.
- **9. Minimization of harmful substances**
  - 1) Products sold in the EU conform to the RoHS Directive.
  - 2) Products sold in China conform to China's version of the RoHS Directive.
  - 3) In addition, Ricoh imposes strict internal standards for limiting the presence of harmful substances.

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No additional notes

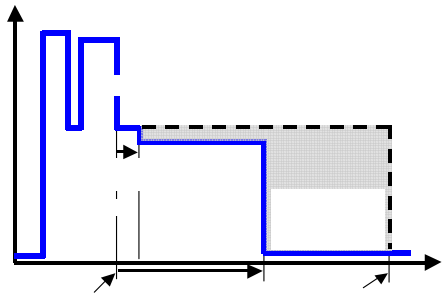
Brief Descriptions of the Technologies

- **10. Environmentally-friendly toner bottle**
  - A changeover from PS/PP/HDP to PET plastics allows approximately 40 percent by weight of the toner bottle to be recycled, and also reduces CO_2 emissions that occur during the toner bottle manufacturing process.
- **11. Toner recycling**
  - Enables effective use of resources by recycling (reusing) the toner left over on the drum surface after image transfer.
- **12. Recycle-friendly design**
  - To maximize the recycling ratio of machine and component materials, as well as the ease of performing the recycling in the field, machine sections and components are designed so that the recyclable parts can be separated out easily.
  - In addition, components are designed so that they can be reused for as long as possible after the machine has reached its operational lifetime.

Slide 174

No additional notes

2. Energy Saving
2.1 Overview – 1



Energy Saver Modes	Description
Energy Saver Mode 1 Default Off	Lower the fusing temperature.
Energy Saver Mode 2 (Sleep Mode)	No power is supplied to the printing engine, and almost none to the controller.

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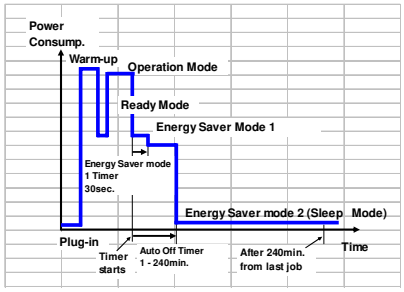
- When the machine is not being used, the machine enters energy saver mode to reduce the power consumption by turning off the LCD of the operation panel and lowering the fusing temperature.
- The area shaded green in this diagram represents the amount of energy that is saved when the timers are at the default settings. If the timers are changed, then the energy saved will be different. For example, if the timers are all set to 60 minutes, the green area will disappear, and no energy is saved before 60 minutes expires.
- In this model, there is no Off Mode, because a printer unit is built in. Sleep mode is used instead. Also, there is no Low Power Mode.

2. Energy Saving
2.2 Overview – 2 (System Settings)



1) Timer settings and recovery time (System settings => Timer setting)

Mode	Timer	Defult	Setting range	Recovery time
Energy Saver 1 Default: Off	Enegy saver mode 1 Timer	30 sec.	Cannot be adjusted	10 sec.
Energy Saver Mode 2 (Sleep Mode)	Energy saver mode 2 Timer	10 min.	1 to 240 min.	30 sec.

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- The user can set these timers with Menu key
  : User Tool key > Admin. Tools > Energy Saver mode (MF)
  : Menu key > System > Energy Saver mode (Printer)

- We recommend that the default settings should be kept.
  - If the customer requests that these settings should be changed, please explain that their energy costs could increase, and that they should consider the effects on the environment of extra energy use.
  - If it is necessary to change the settings, please try to make sure that the Auto Off timer is not too long. Try with a shorter setting first, such as 30 minutes, then go to a longer one (such as 60 minutes) if the customer is not satisfied.
  - If the timers are all set to the maximum value, the machine will not begin saving energy until 60 minutes has expired after the last job. This means that after the customer has finished using the machine for the day, energy will be consumed that could otherwise be saved.
  - If you change the settings, the energy consumed can be measured using SP8941, as explained later in this presentation.

2. Energy Saving
2.2 Energy Saver Mode: Condition of LEDs

❑ **Condition of LEDs on the operation panel**

Mode	Operation Switch LED	Energy Saver LED	Power Indicator LED
Energy Saver 1	-	-	On
Energy Saver 2 (Sleep Mode)	-	-	On

Energy Saver mode 1: “Energy Saver mode 1” is displayed in the operation panel LCD.
Energy Saver mode 2 (Sleep mode): “Energy Saver mode 2” is displayed in the operation panel LCD.

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No additional notes

2. Energy Saving
2.2 Energy Saver Mode 1

- **The machine enters energy saver mode 1 when the energy saver mode 1 timer (30 seconds) runs out after the last job.**
  - » The timer cannot be adjusted. The default setting of energy saver mode 1 is off.
- **The machine lower the fusing temperature and energy saver mode 1 is displayed on the LCD of the operation panel.**
- **The machine recovers to the ready condition if one of the following occurs:**

  MF version
  - The machine receives a print job, prints a received FAX.
  - The [Copy], [Color Start], or [B&W Start] key is pressed.

  Printer version
  - The machine receives a print job
  - [Stop/Start] key on the control panel is pressed.

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No additional notes

2. Energy Saving

2.2 Energy Saver Mode 2: Sleep Mode – 1

- Sleep mode is used instead of auto off mode.
- The machine enters sleep mode when the energy saver mode 2 timer runs out after the last job.
- When the machine enters sleep mode, no power is supplied to the printing engine, and almost none to the controller.
- Recovery time
  - Less than 30 seconds

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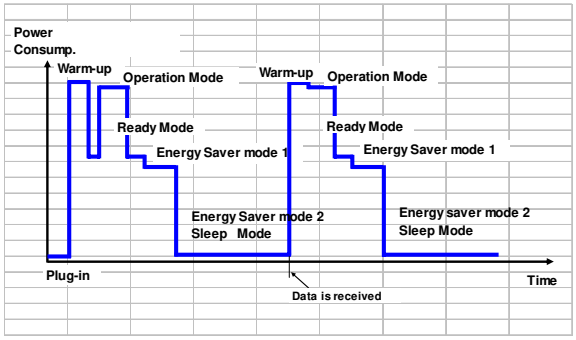
No additional notes

2. Energy Saving

2.2 Energy Saver Mode 2: Sleep Mode – 2

- **The machine recovers to the ready condition:**
  - **If data is received**
    - » After warm-up, the job starts, the operation panel stays light.
    - » Then, after the job is completed, the machine returns to energy saver mode 1 and 2 (sleep mode) in the same routine.



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No additional notes

2. Energy Saving
2.3 Energy Save Effectiveness – 1

- There are no SP modes to keep a log of the amount of time that the machine spends in each mode.
- To get an exact measurement at the customers site, a watt meter must be used to measure the actual energy consumed.

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No additional notes

2. Energy Saving

2.3 Energy Save Effectiveness – 2

- Power consumption figures for each model are acquired from "Publication System of MSDS_&_PEI (PRODUCT ENVIRONMENT INFORMATION)" database.
  Example:

Mode/condition	Power consumption:
Operating mode	410 W
Ready mode (Stand-by)	90 W
Energy saver mode 1	80 W
Energy saver mode 2 (Sleep mode)	10 W

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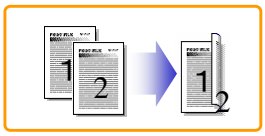
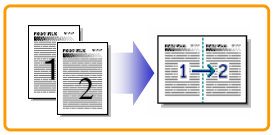
No additional notes

3. Paper Saving
3.1 Measuring the Paper Consumed – 1

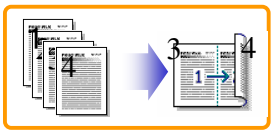
1. Duplex: Reduce paper volume in half!



2. Combine: Reduce paper volume in half!



3. Duplex + Combine: Using both features together can further reduce paper volume by 3/4!



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No additional notes

No additional notes