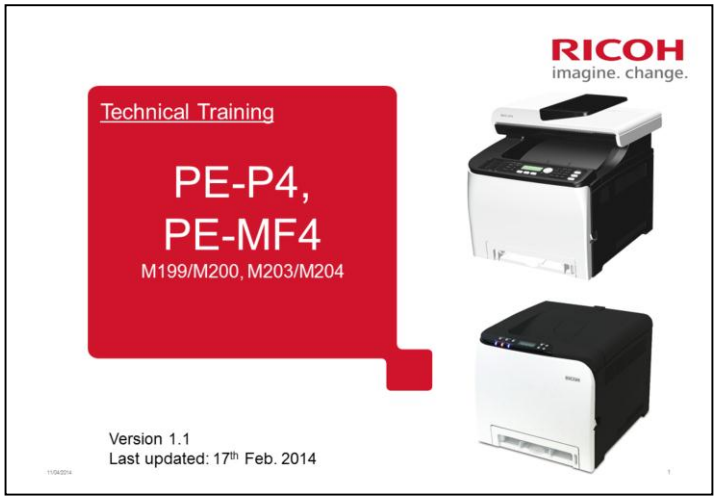


This training course provides service technician training for the PE-MF4/PE-P4 series.

The differences between this series and the previous PE-MF3/PE-P2 series are also explained.

Revision History

- Version1.2 (Revised 9th Apr. 2014)

  Slide 12:

  Updated Monthly Average Print Volume

  MF4a:0.7K prints

  MF4c:0.8K prints

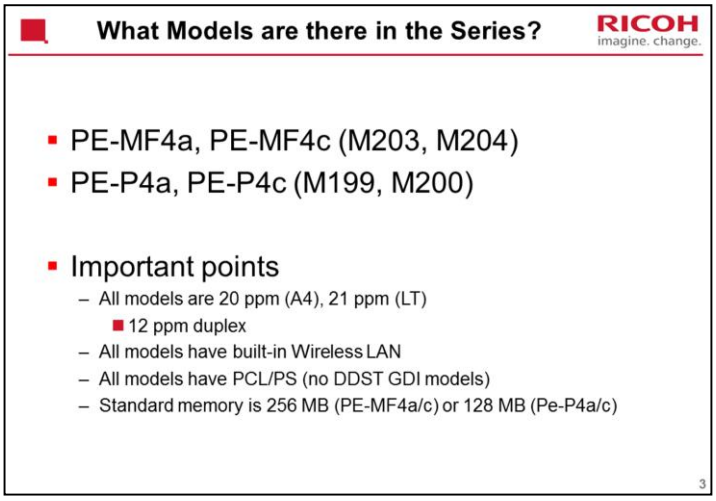
  P4a:0.4K prints

  P4c:0.5K prints

- Version1.1 (Revised 17th Feb. 2014)

  Slide 10: Long (High Yield) AIO will be available for NA, EU, AP, CN models.

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



Pe-MF3a was 16 ppm.

Pe-MF3a/P2a were GDI models.

Memory specs are changed from PE-MF3/P2.

Built-in Wireless LAN is a new feature. It was not available in previous models.

Appearance

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imagine. change.

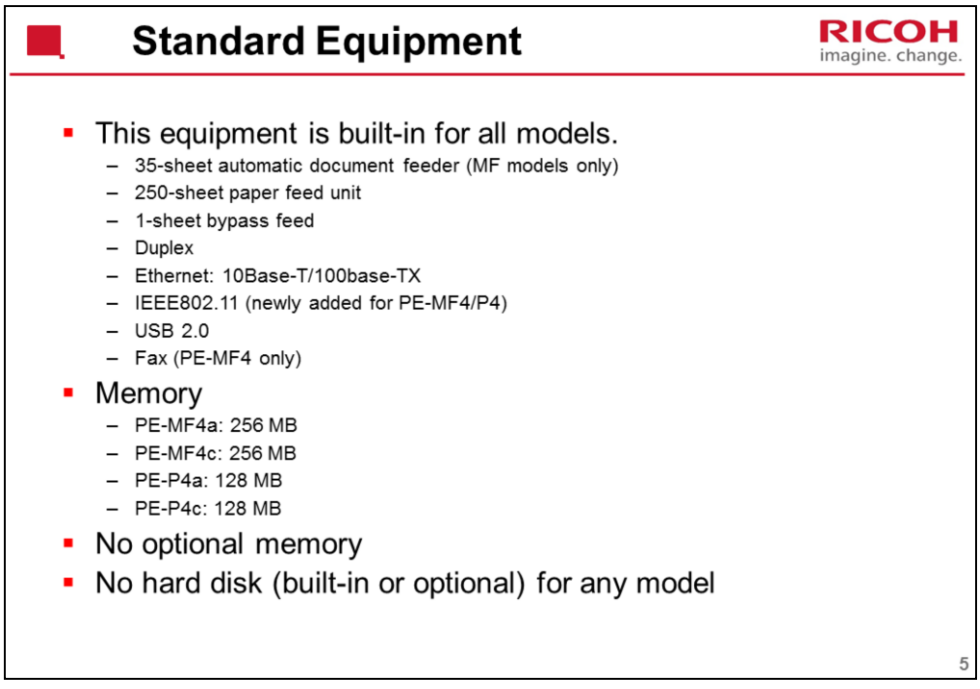
PE-MF4

PE-P4

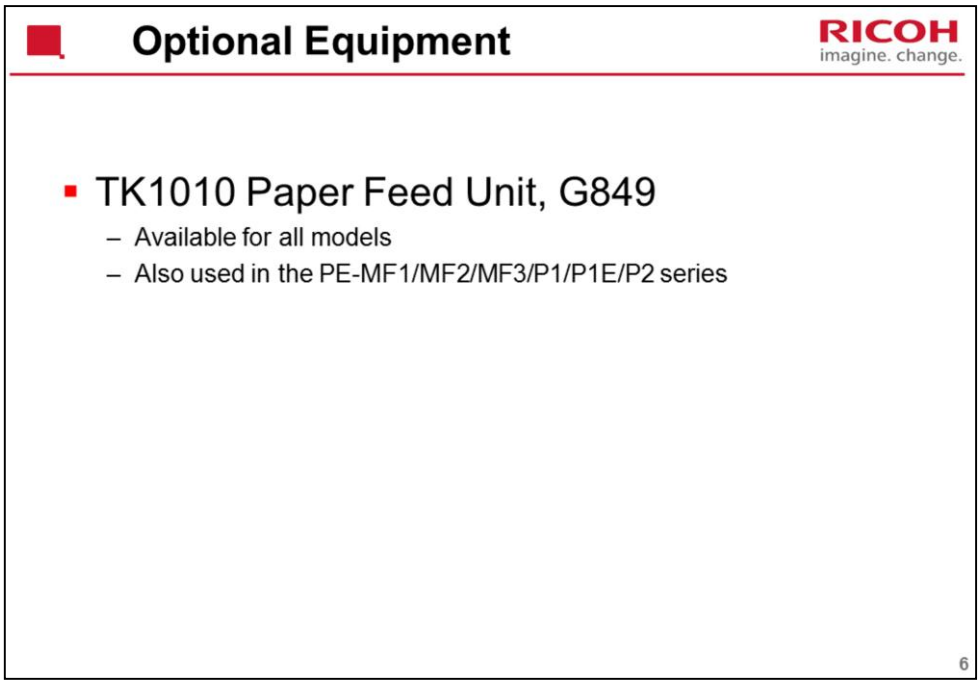
- The PE-MF4a/c have a built-in ADF.

4

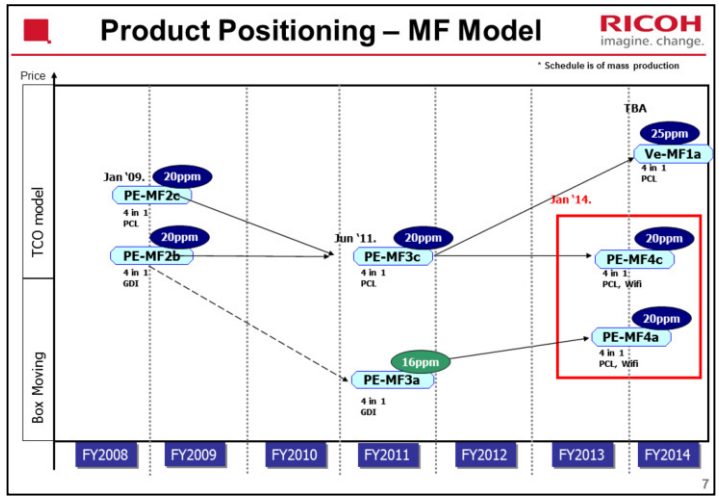
No additional notes



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



No additional notes



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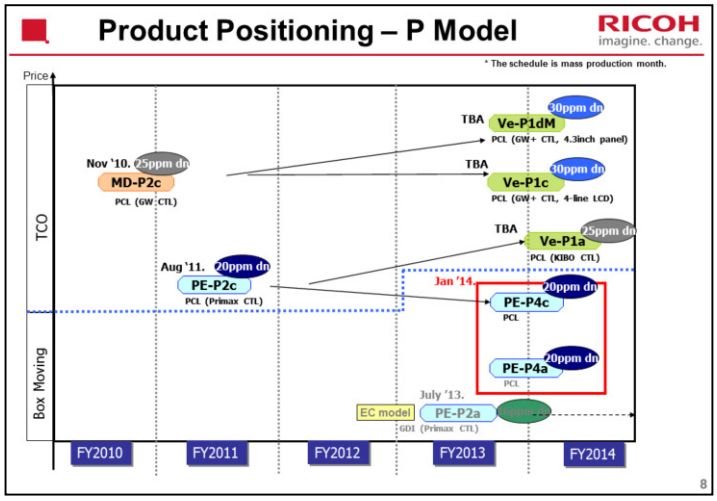

No additional notes

AIO Cartridge

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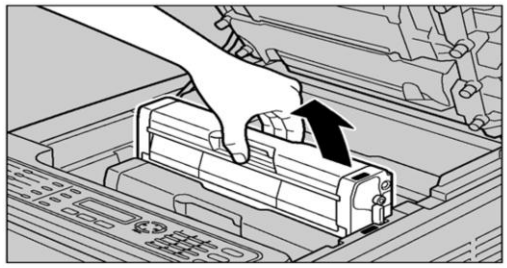
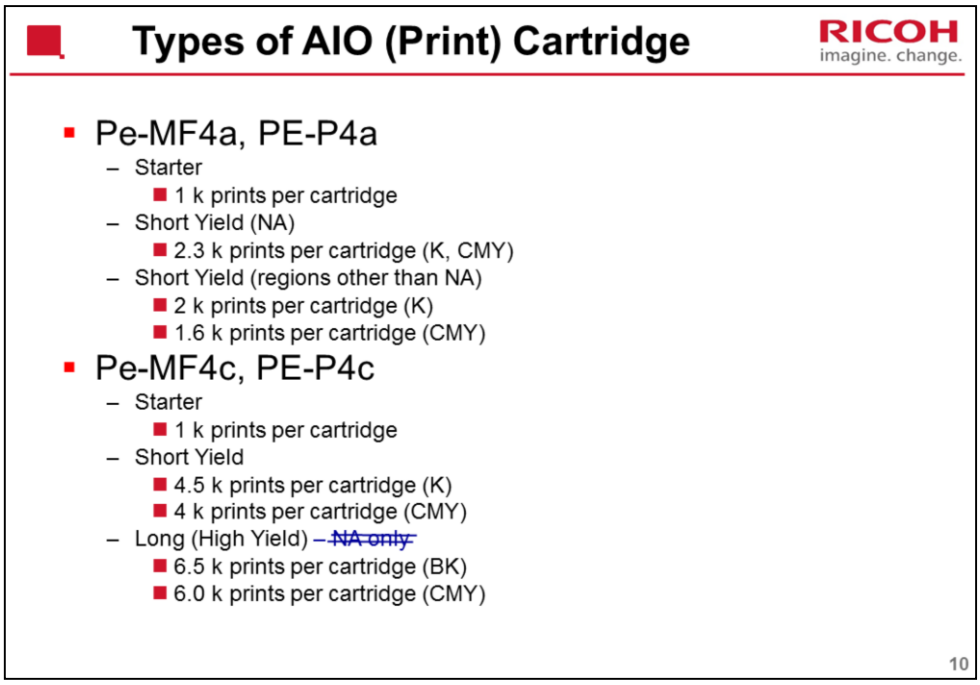


- The OPC, charge roller, and development unit are all in an AIO cartridge.
  - AIO: All-in-one
- The cartridge can be removed with one hand.
- The cartridges are incompatible with previous models.
  - See the next slide for details.

9

No additional notes



Based on ISO 19798

Revised 17th Feb. 2014

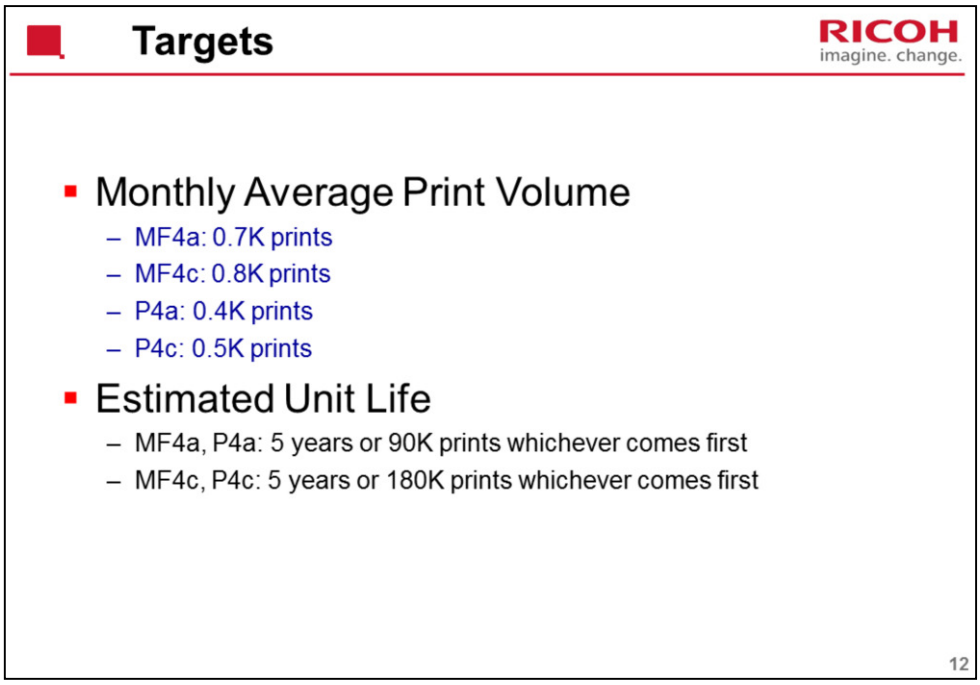
- Long (High Yield) AIO will be available for NA, EU, AP,CN models.

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, Pe-P2, and Pe-MF3



Same as the PE-MF3/P2 series.

Revised 9th Apr. 2014

-Updated version

MF4a:0.7K prints

MF4c:0.8K prints

P4a:0.4K prints

P4c:0.5K prints

-Previous version

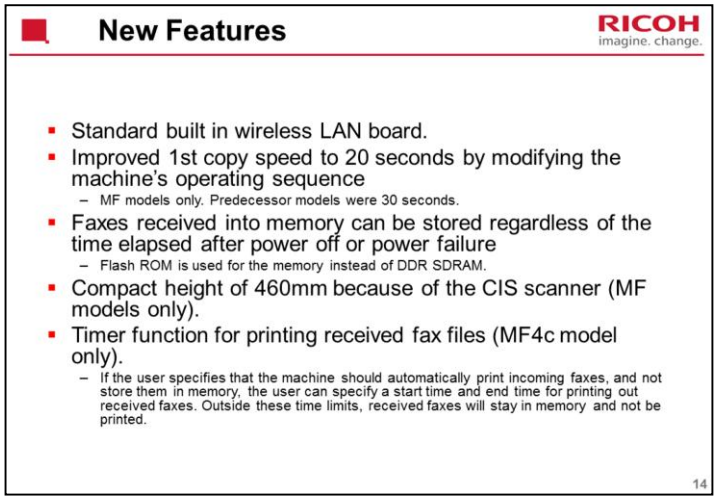
Monthly Average Print Volume

MF4a, P4a: 0.65K prints

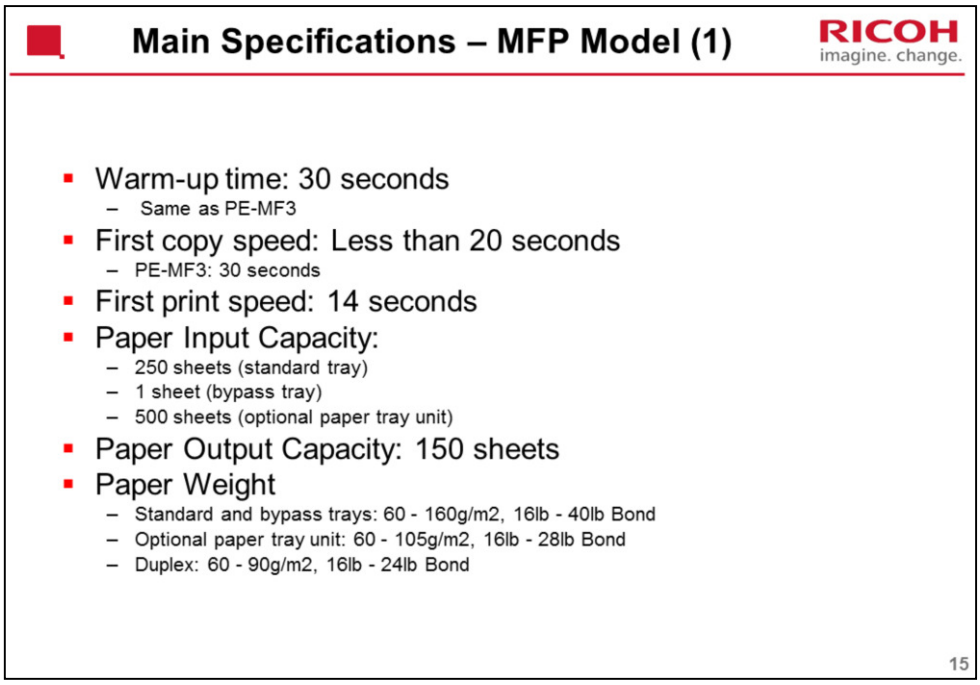
MF4c: 1.1K prints

P4c: 0.8K prints

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



No additional notes



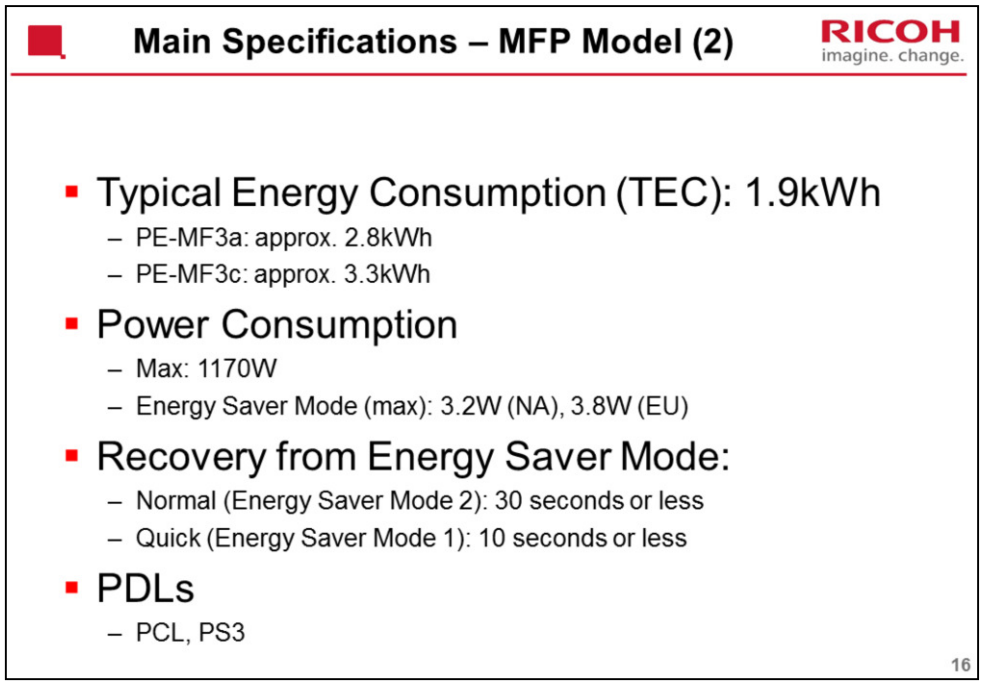
Same as PE-MF3, except where mentioned.

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 cannot be done for thick paper (more than 90 g/m^2).

Printing on OHP transparencies is not possible.



PDL for PE-MF3a: DDST (GDI)

Main Specifications – Printer Model (1)

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- Warm-up time: 30 seconds
  - Same as PE-P2
- 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

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These specs are the same as PE-P2, except where mentioned.

Main Specifications – Printer Model (2)

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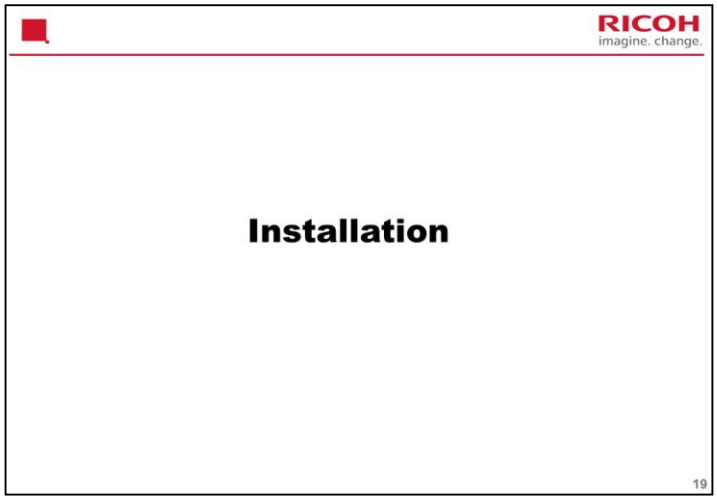
imagine. change.

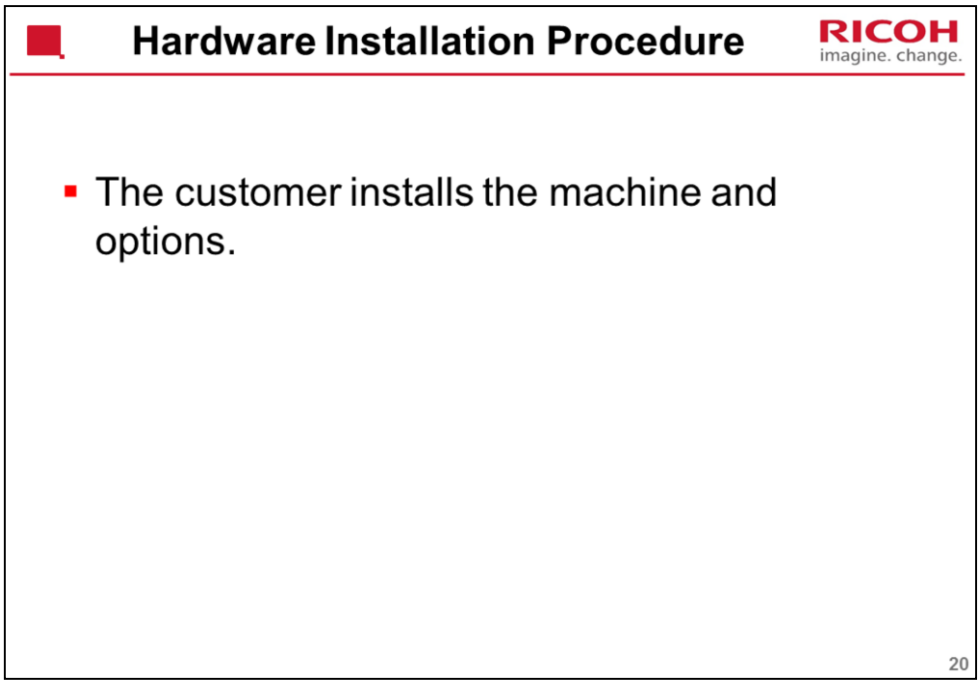
- Typical Energy Consumption (TEC): 1.8kWh
  - PE-P2c: 3.0kWh
  - PE-P2a: 2.1kWh
- Power Consumption
  - Max: 1170W
  - Energy Saver Mode (max): 2.7W (NA), 3.8W (EU)
- Recovery from Energy Saver Mode:
  - Normal (Energy Saver Mode 2): 30 seconds or less
  - Quick (Energy Saver Mode 1): 10 seconds or less
- PDLs
  - PCL, PS3

18

PDL for PE-P2a: DDST (GDI)



No additional notes



No additional notes

Important Point for the User

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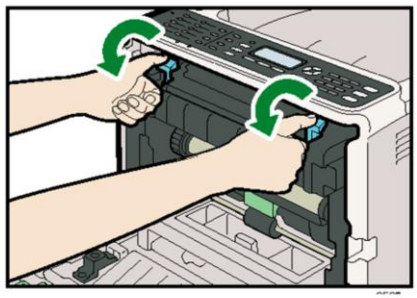
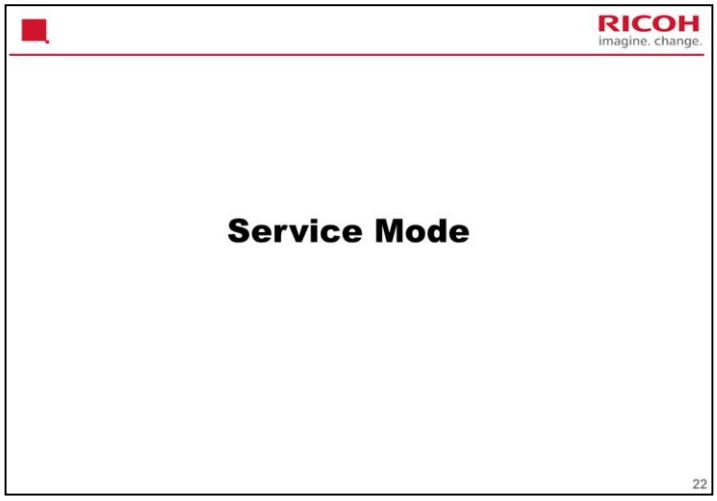


- If the user leaves the machine for a long period (days, weeks, months), move these levers down.
  - In the 'down' position, the fusing pressure is reduced. This prevents the hot roller from deforming if the machine is turned off for a long period.
  - For normal operation, it should be at the 'up'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

21

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.



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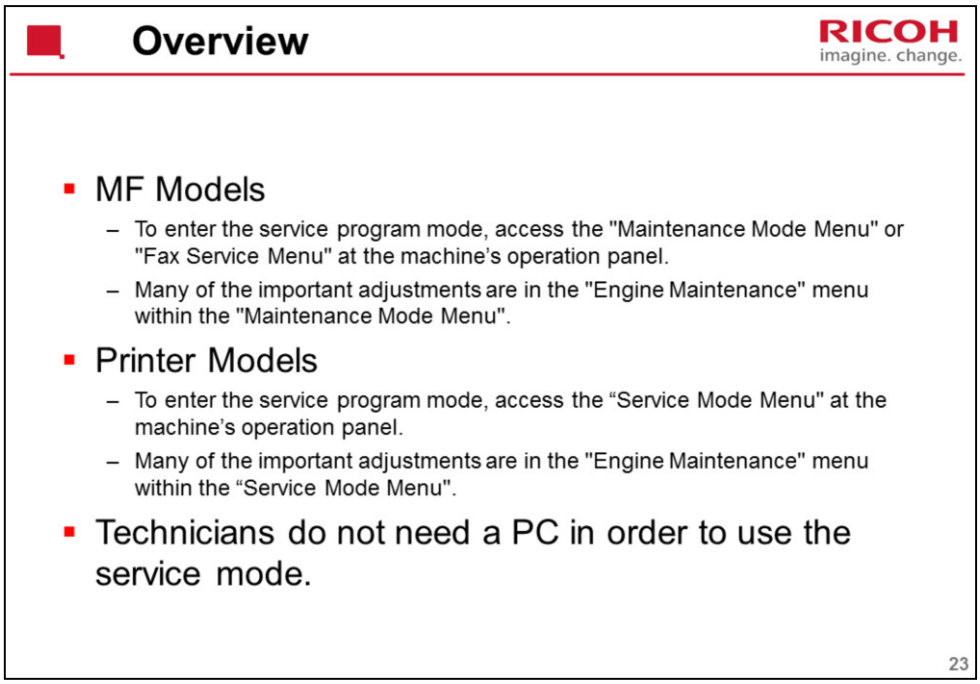

No additional notes

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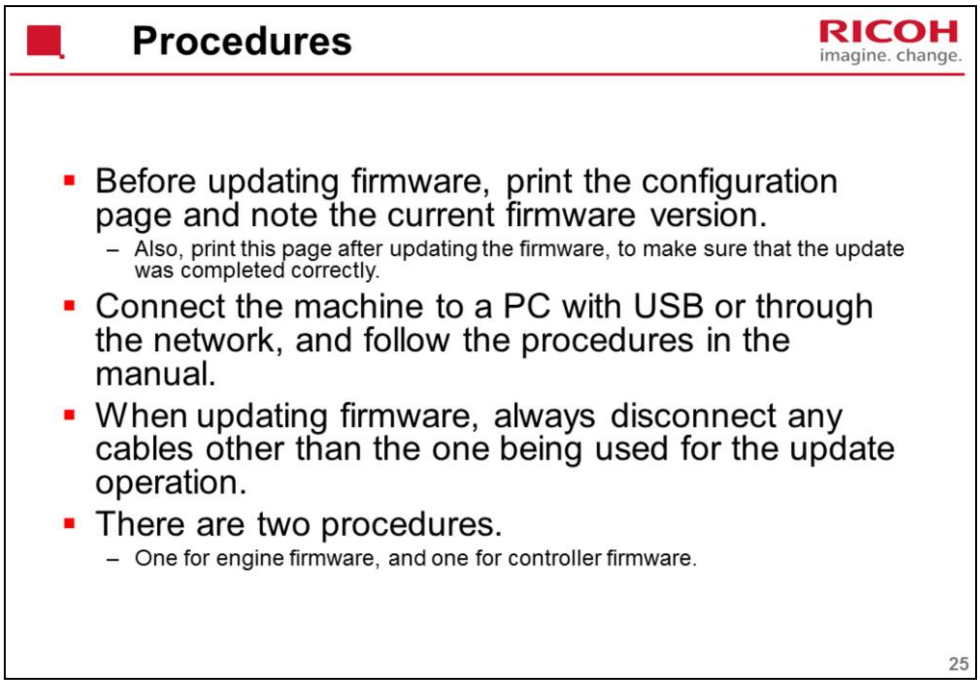
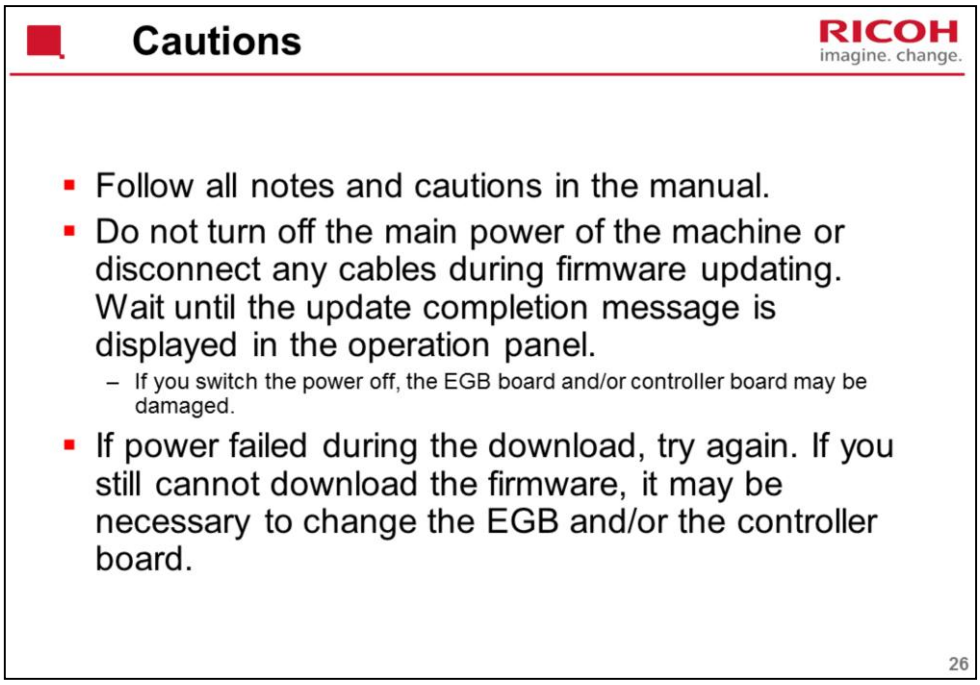


Service Manual – 5. System Maintenance Reference – Firmware Updating



No additional notes

Cautions

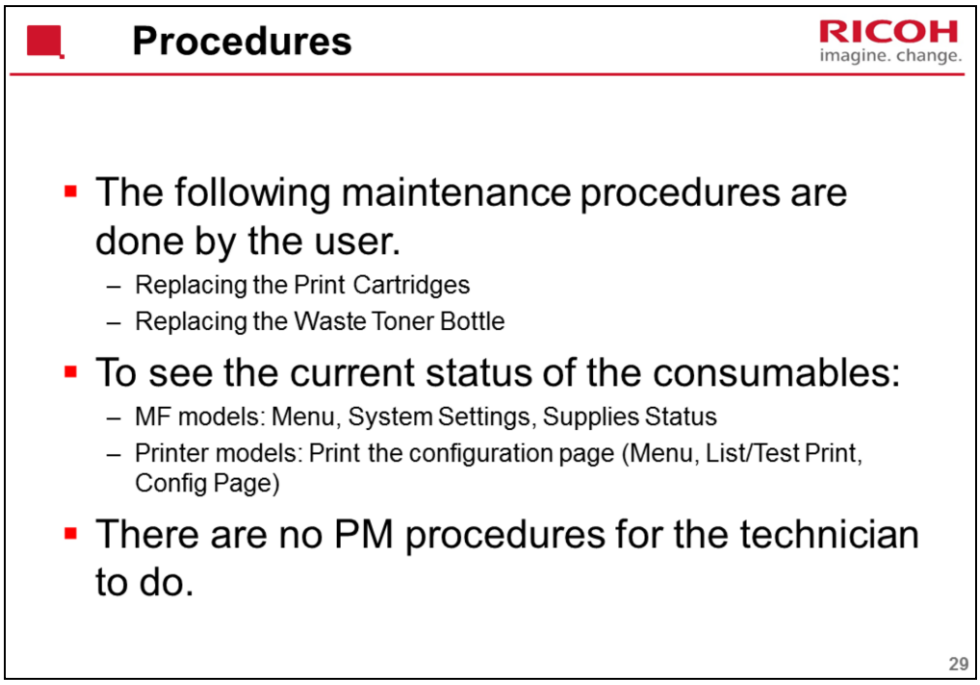
RICOH
imagine. change.

- 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.

27

No additional notes

No additional notes


Procedures
RICOH
imagine. change.
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.
29

Reset Counters for Yield Parts - 1

RICOH imagine. change.

- Image transfer belt unit, paper transfer roller, fusing unit
- PE-MF4a, PE-P4a: 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 (MF4a/P4a), the machine will not make 90k, so these parts are normally not replaced.
  - PE-MF4a, PE-P4a: The machine does not issue an alert for end of life for these parts.
  - PE-MF4c, PE-P4c: The machine does issue an end of life alert.
- However, in cases of heavy use, 90k may be reached, so these parts are called 'yield parts'.
- After replacing, reset the counters.
  - See the next slide
  - This applies for all models in the PE-MF4/P4 series.

30

PE-MF4c/P4c has an expected life of 180k.

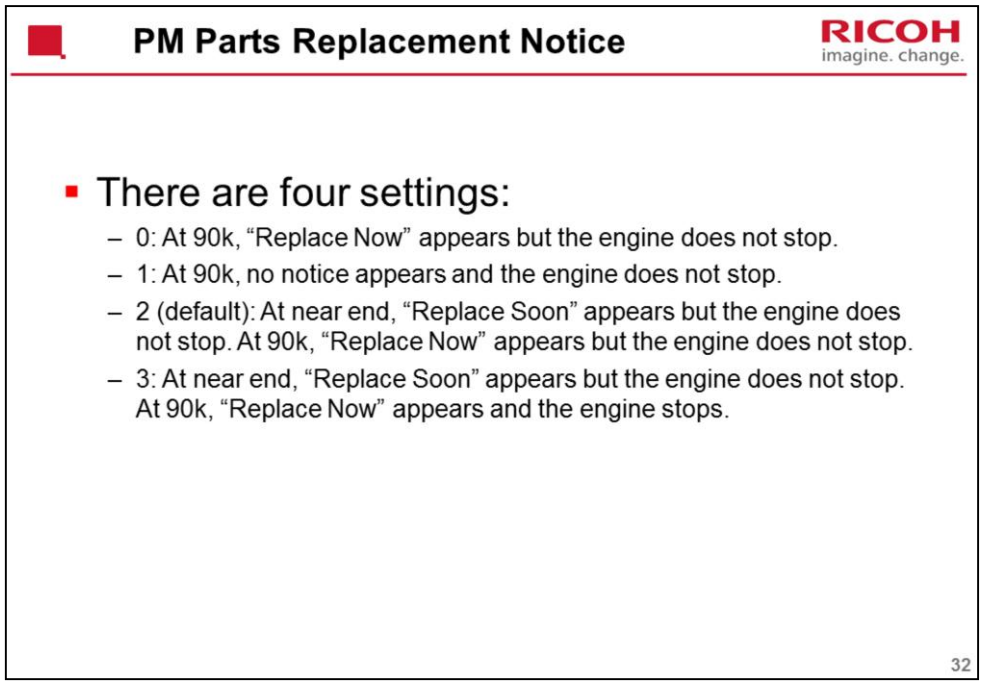
Reset Counters for Yield Parts - 2

RICOH imagine. change.

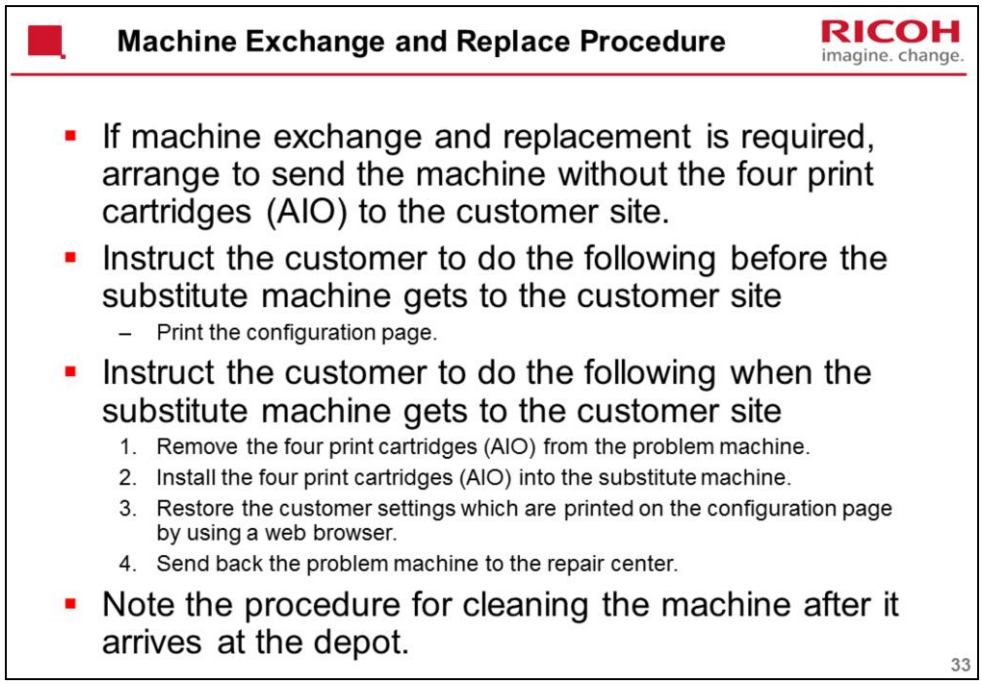
- The following counter reset procedures in Engine Maintenance menu must be done when you replace the transfer unit, fusing unit, or paper transfer roller (2nd transfer unit).
  - Reset Transfer Unit: Resets the transfer unit life counter.
  - Reset Fuser Unit: Resets the fusing unit life counter.
  - Reset 2nd Transfer Unit: Resets the transfer roller life counter.

31

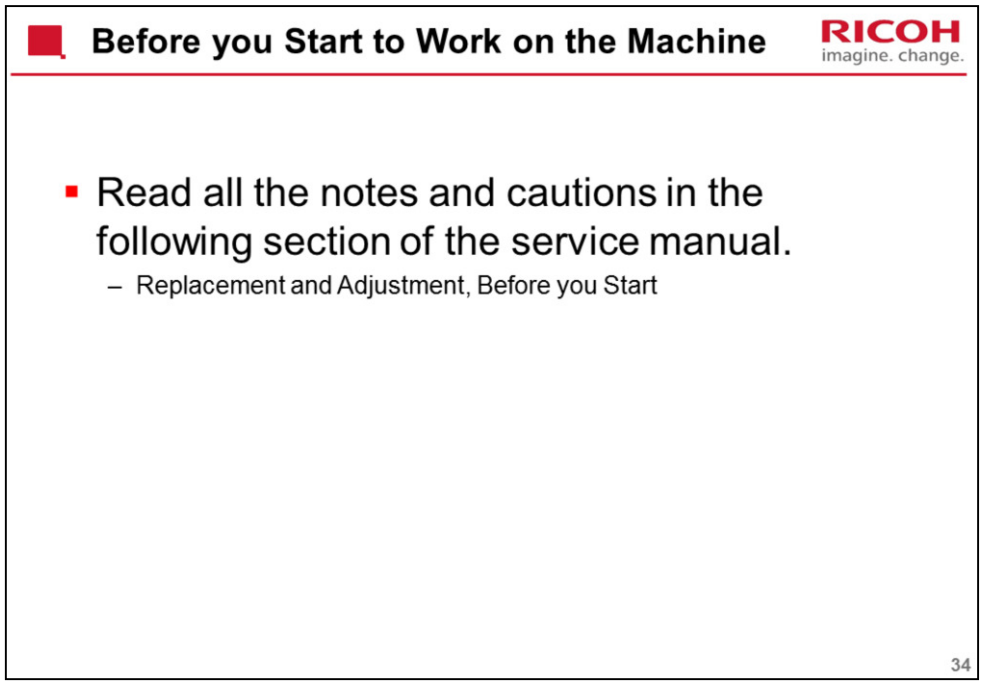
The expected yield of these parts is 90k.



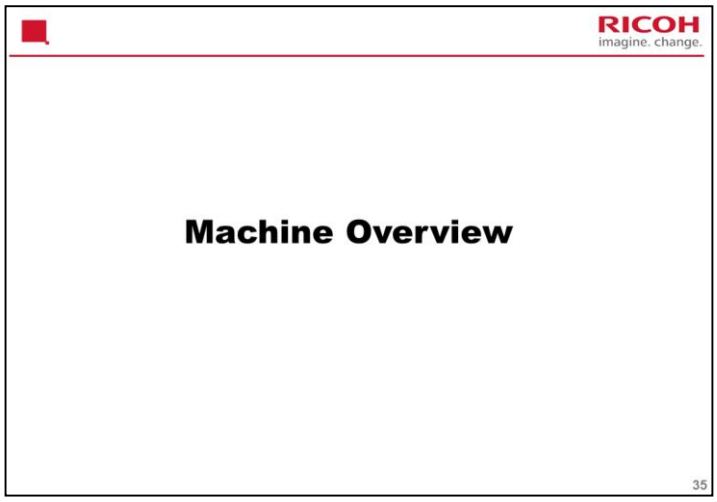
No additional notes



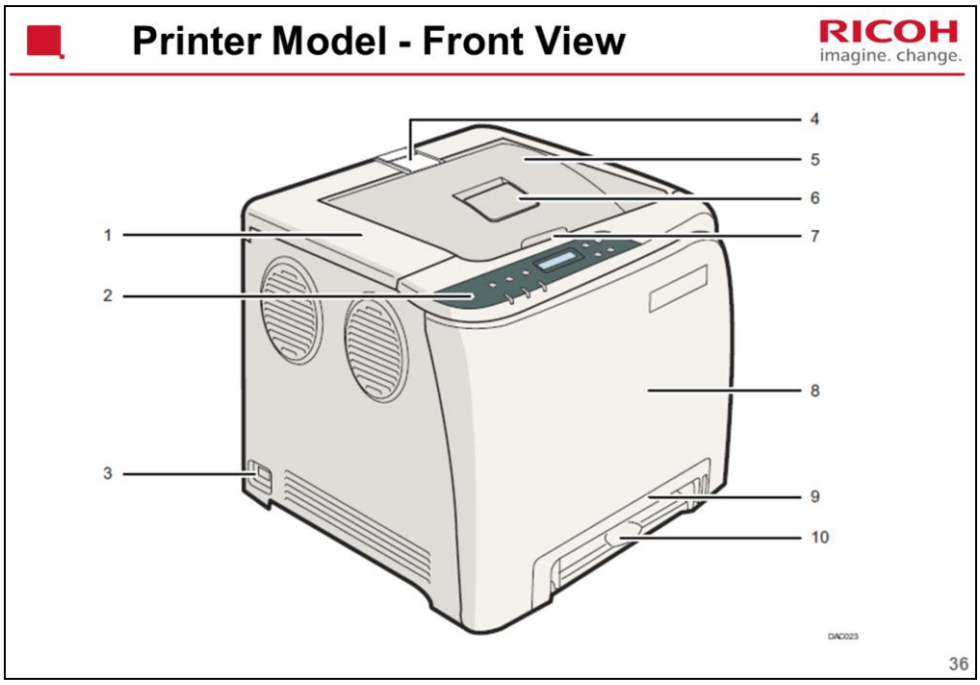
Service Manual, Appendix 5: Machine Swap



No additional notes



No additional notes



Operating Instructions – 1. Getting Started - Guide to Components

1. Top Cover: Open this cover to replace the print cartridge.

2. Control Panel: Contains keys for machine control and indicators that show the machine status.

3. Power Switch: Use this switch to turn the power on and off.

4. Stop Fences: Pull up this fence to prevent paper falling off when printing a large amount of paper at a time. The fence can be adjusted at the A4/Letter or Legal size position.

5. Standard Tray: Delivered sheets are stacked here with the print side down.

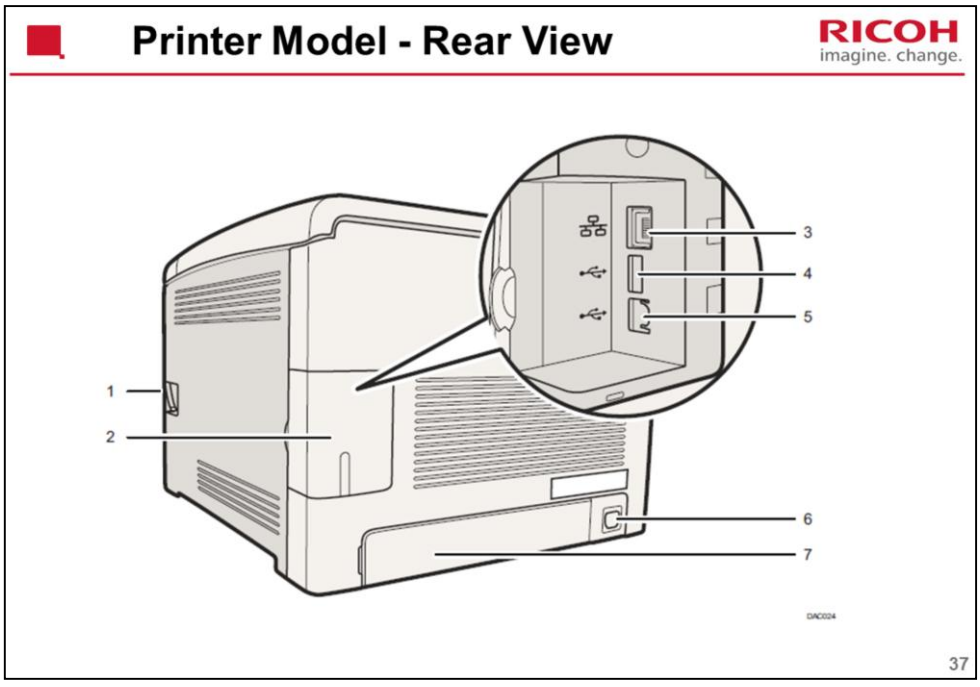
6. Standard Tray Extension: Use this to support sheets that come out curled after they are printed. Flip open the extension by pushing down on the end that is toward the rear of the machine.

7. Top Cover Open Lever: Open here to replace the print cartridges.

8. Front Cover: Open this cover to replace the waste toner bottle or remove jammed paper.

9. Tray 1: This tray can hold up to 250 sheets of plain paper.

10. Bypass Tray: Load paper here sheet by sheet.



Operating Instructions – 1. Getting Started - Guide to Components

1. Front Cover Open Lever: To open the front cover, pull this lever on the right side of the machine.

2. Cable Cover: Remove this cover when connecting cables to the machine.

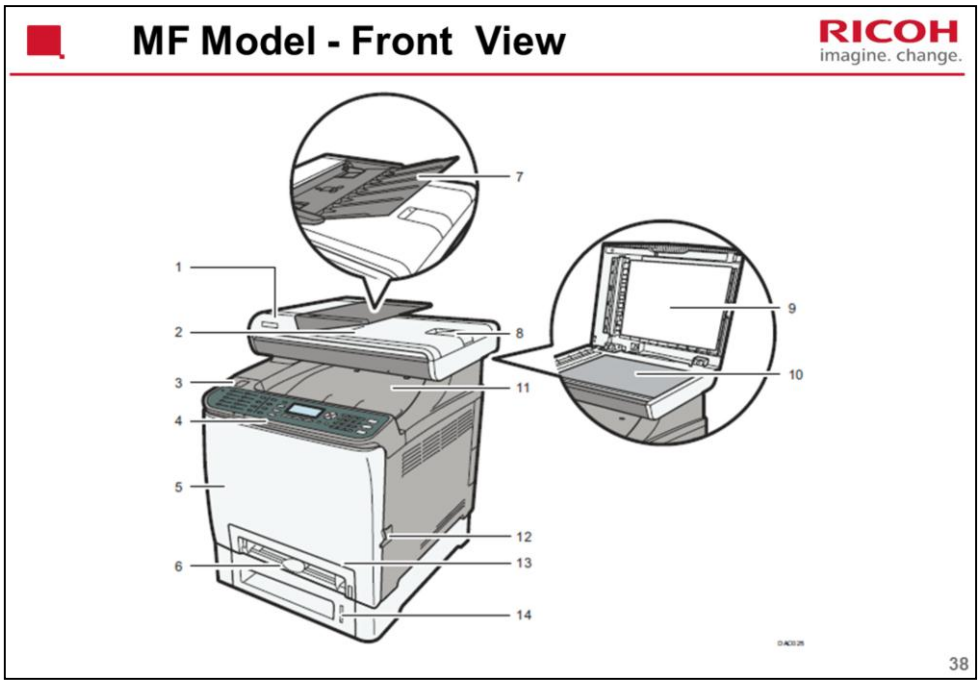
3. Ethernet Port: For connecting the machine to the network using a network interface cable.

4. USB Host Interface: Use a USB cable to connect the digital camera to the machine. You can print images directly from a digital camera, without having to connect to a computer.

5. USB Port: For connecting the machine to a computer using a USB cable.

6. Power Socket: For connecting the power cord to the machine.

7. Rear Cover: Remove this cover when loading paper longer than A4 in Tray 1.



Operating Instructions – 1. Getting Started - Guide to Components

1. ADF (Auto document feeder) Cover

2. Output Tray for the ADF: Scanned sheets are fed here.

3. USB Flash Disk 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.

4. Control Panel: Contains a screen and keys for machine control.

5. Front Cover: Open this cover to replace the waste toner bottle or remove jammed paper.

6. Bypass Tray: Load paper here sheet by sheet.

7. Input Tray for the ADF: Place stacks of originals here. They will feed in automatically. This tray can hold up to 35 sheets of plain paper.

8. Extender for the ADF Tray: Extend these when placing paper longer than A4 in the input tray for ADF.

9. Cover for the Exposure Glass: Open this cover to place originals on the exposure glass.

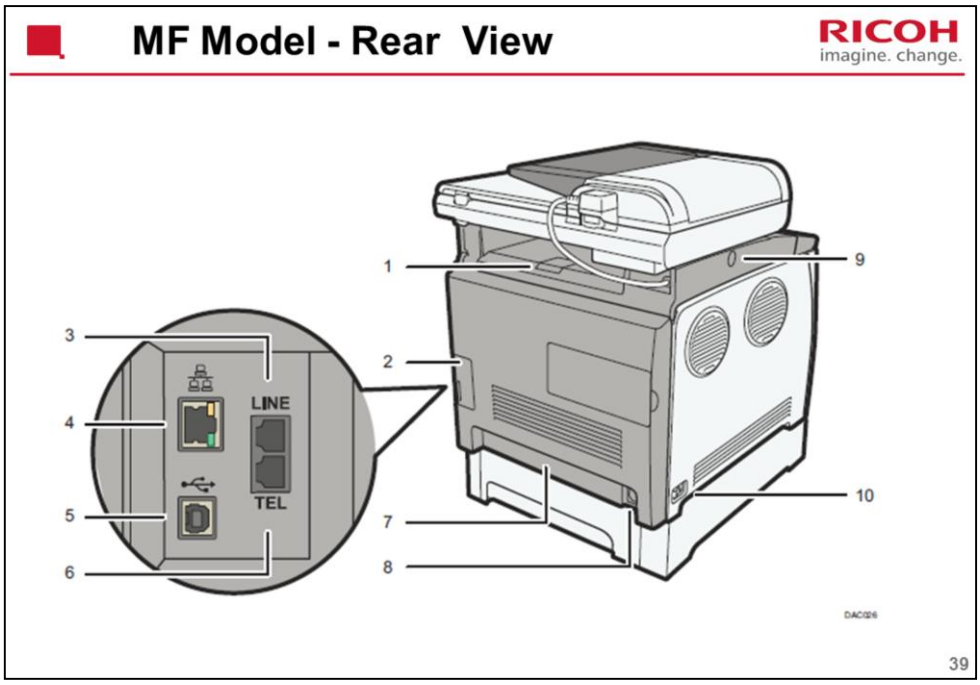
10. Exposure Glass: Place originals here sheet by sheet.

11. Standard Tray/Top Cover: Printed paper is delivered to this tray. Up to 150 sheets of plain paper can be stacked here. Open this to replace the print cartridges.

12. Front Cover Open Lever: To open the front cover, pull this lever on the right side of the machine.

13. Tray 1: This tray can hold up to 250 sheets of plain paper.

14. Tray 2 (option): This tray can hold up to 500 sheets of plain paper.



Operating Instructions – 1. Getting Started - Guide to Components

1. Stop Fences: Pull up this fence to prevent paper falling off when printing a large amount of paper at a time. The fence can be adjusted at the A4/Letter or Legal size position.

2. Cable Cover: Remove this cover when connecting cables to the machine.

3. G3 (analog) Line Interface Connector: For connecting a telephone line.

4. Ethernet Port: For connecting the machine to the network using a network interface cable.

5. USB Port: For connecting the machine to a computer using a USB cable.

6. External Telephone Connector: For connecting an external telephone.

7. Rear Cover: Remove this cover when loading paper longer than A4 in Tray 1.

8. Power Socket: For connecting the power cord to the machine.

9. 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.

10. Power Switch: Use this switch to turn the power on or off.

MF Model – Sliding the ADF

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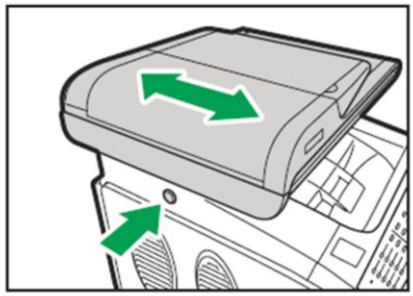
imagine. change.



- 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.

40

No additional notes

MF Model – Stop Fences

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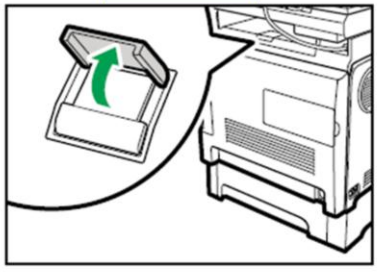
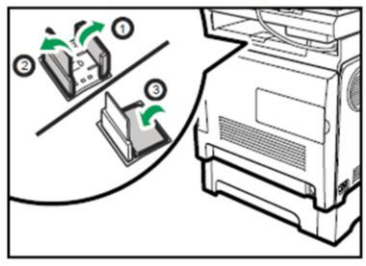
For A4/LT Size Prints



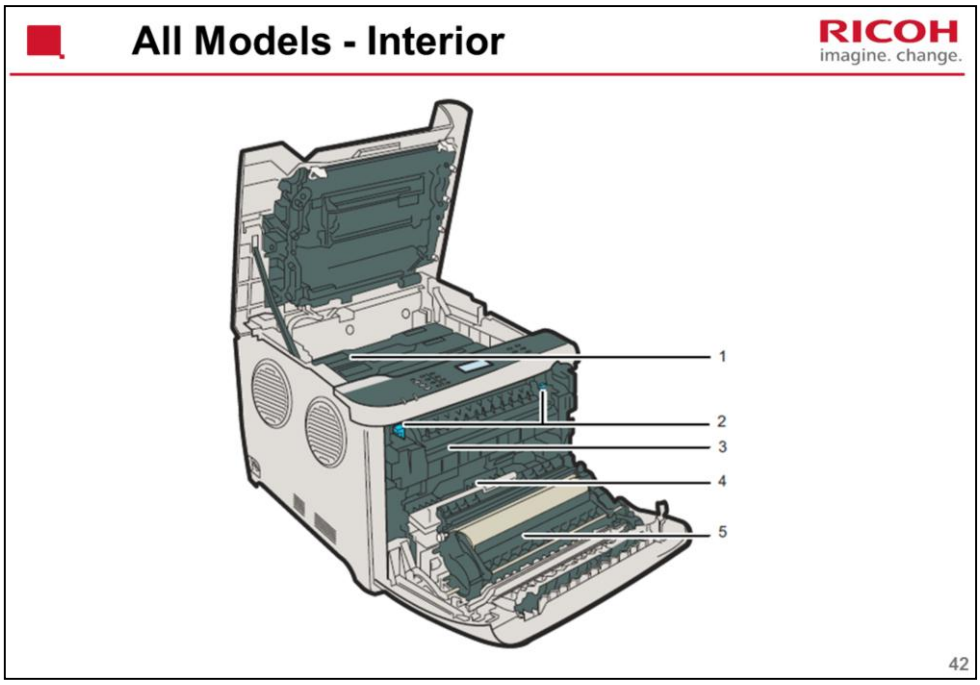
For LG Size Prints



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

41

No additional notes



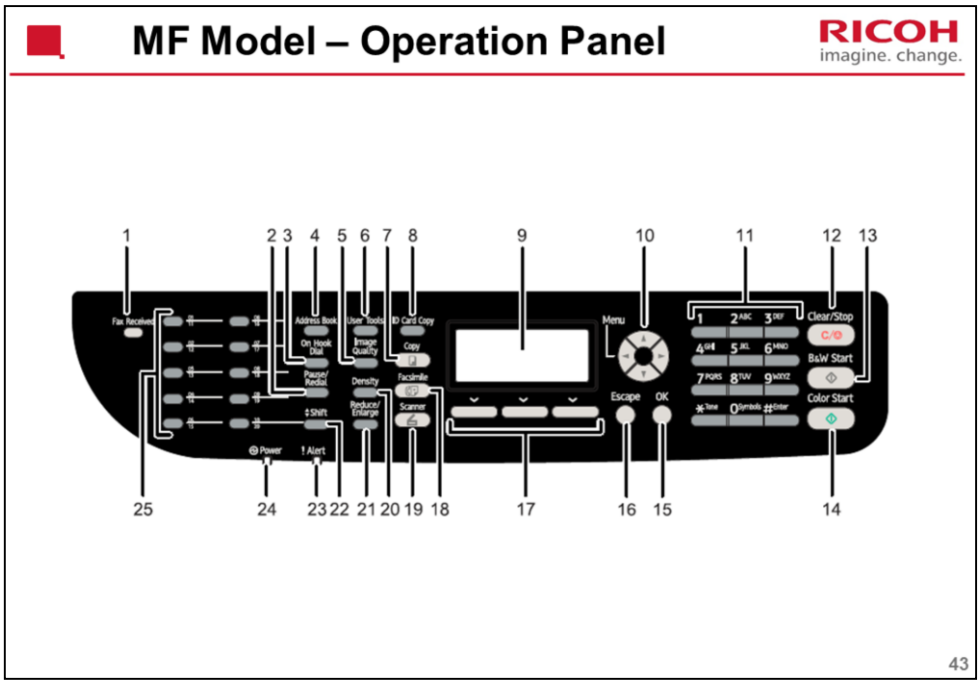
1. Print Cartridges: Install the print cartridges from the machine rear, in the order of cyan (C), magenta (M), yellow (Y), and black (K). Messages appear on the screen when print cartridges need to be replaced, or new ones need to be prepared.

2. Fusing Unit Lever: Lower both the left and right levers when you print on an envelope.

3. Fusing Unit: Fuses toner to the paper. You might have to move this unit to check for or remove jammed paper.

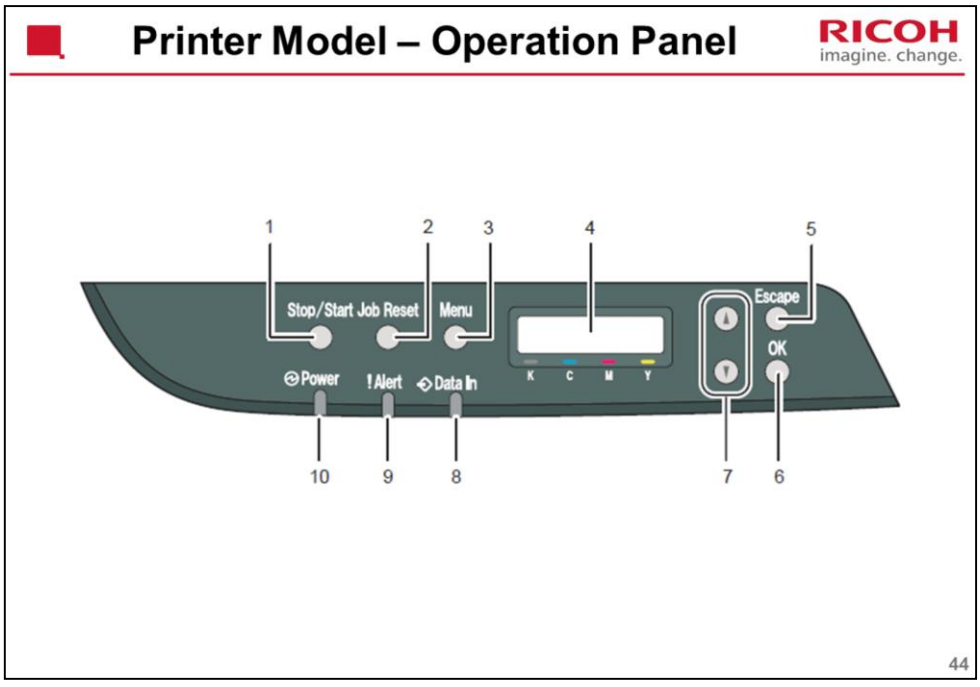
4. Waste Toner Bottle: Collects toner that is wasted during printing.

5. Transfer Unit: You need to remove this when you replace the waste toner bottle.



Operating Instructions – 1. Getting Started

See the operation manual for details.



Operating Instructions – 1. Getting Started

See the operation manual for details.

Note the following.

1. [Stop/Start] key: Press this key to stop receiving incoming data from the computer.

2. [Job Reset] key: Press this key to cancel a job that is currently being printed or received.

Component Layout

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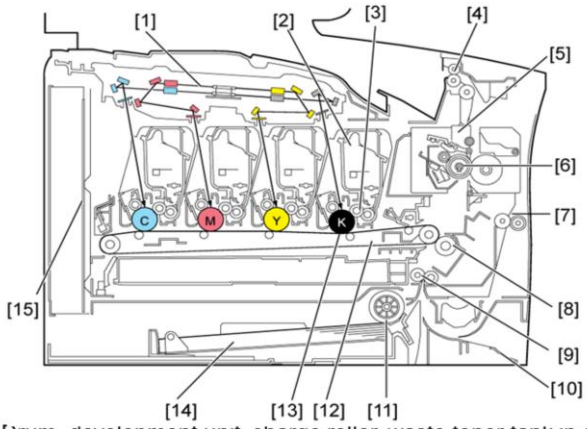
imagine. change.



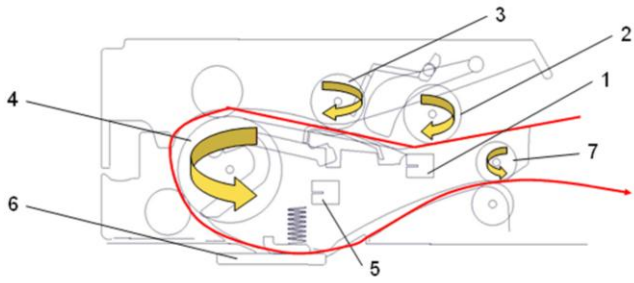
- AIO: Drum, development unit, charge roller, waste toner tank in one disposable unit.
- Four toner images are put on the belt. Then the transfer roller transfers them all at the same time to the paper.
- Waste toner from the drum stays in the AIO: No recycling. There is also another waste toner tank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

45

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

RICOH
imagine. change.



m1562027

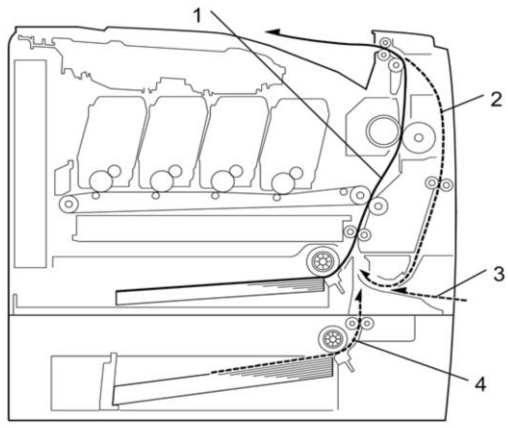
1. Document sensor
2. Pick-up roller
3. Separation roller
4. Feed roller
5. Feed sensor
6. DF exposure glass
7. Output roller

46

No additional notes

Paper Feed Paths

RICOH
imagine. change.



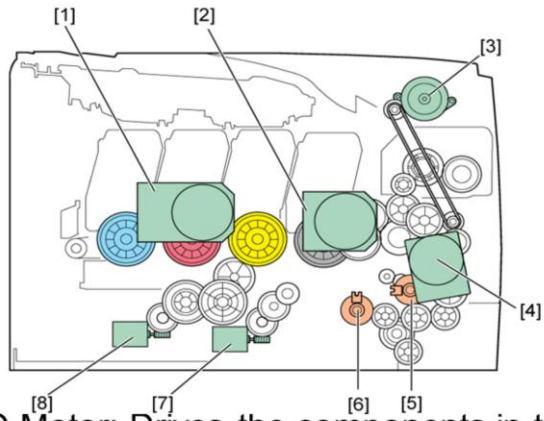
- All models have the duplex motor which can reverse the paper into the duplex path.

47

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

Drive Layout - 1

RICOH
imagine. change.



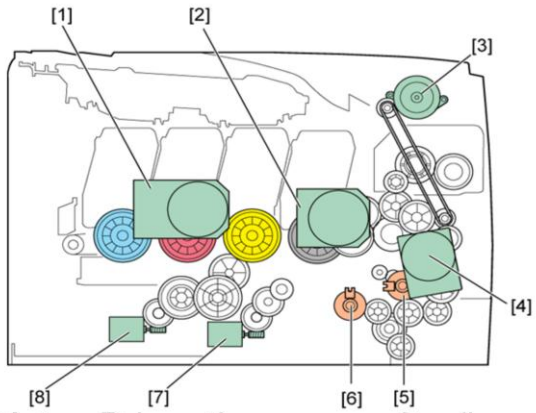
- Color AIO Motor: Drives the components in the three color AIOs (C, M, Y)
- Black AIO Motor: Drives the components in the Black AIO. Also drives the image transfer belt

48

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

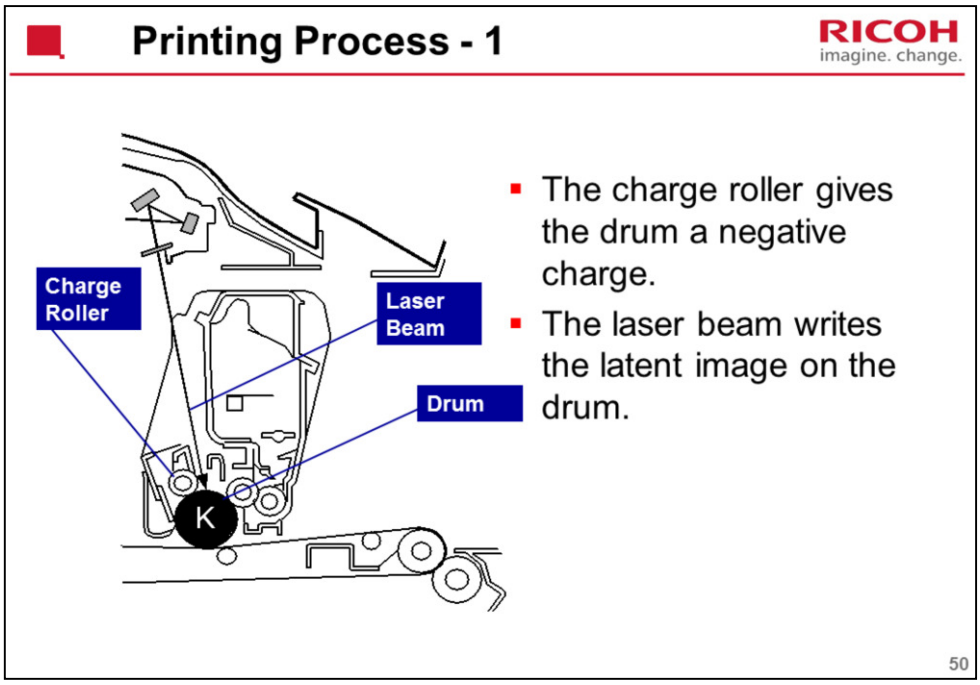
RICOH
imagine. change.



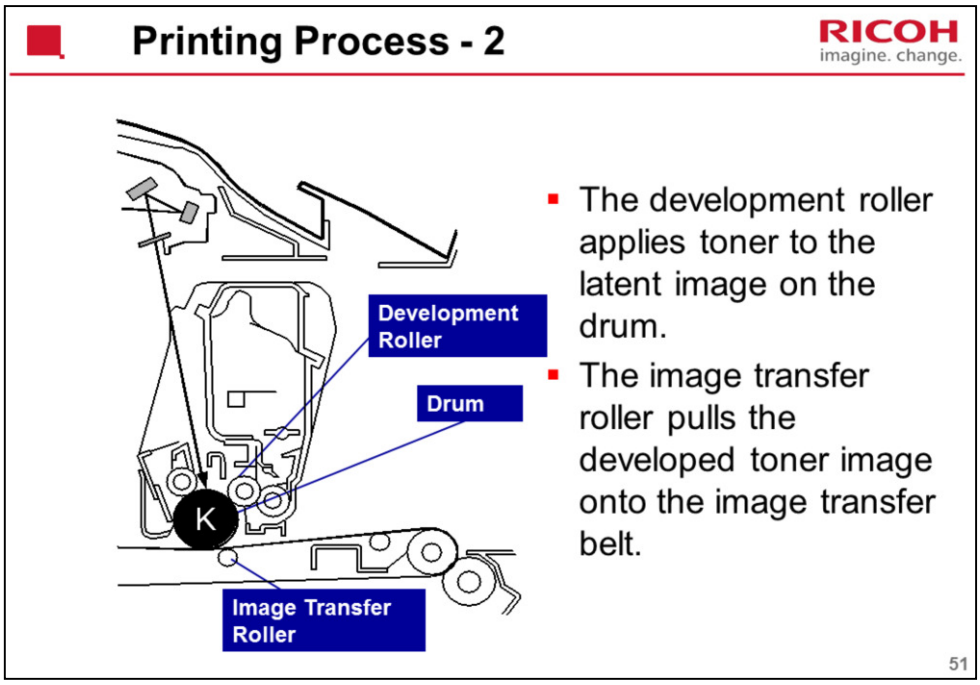
- Duplex Motor: Drives the paper exit roller and reverses the paper into the duplex feed path.
- Transport/Fusing Motor: Drives the paper feed/registration rollers and the fusing unit.

49

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

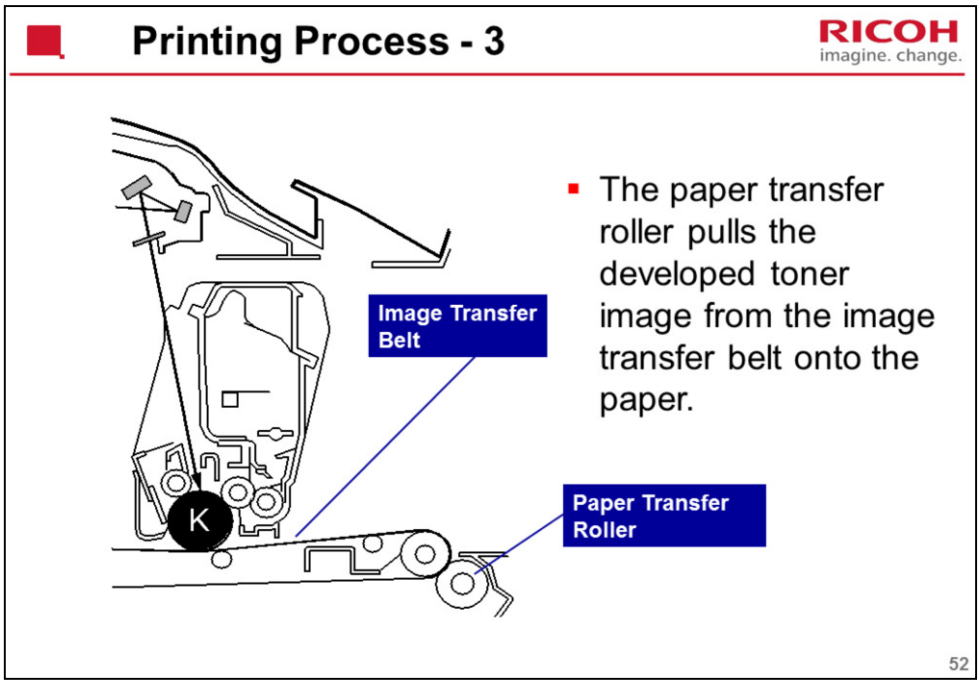


This machine uses four AIOs and four laser beams for color printing. Each AIO contains a drum, charge roller, cleaning brush, blade, development roller and mixing auger.



The charge that is applied to the image transfer roller pulls the toner from the drum to the transfer belt.

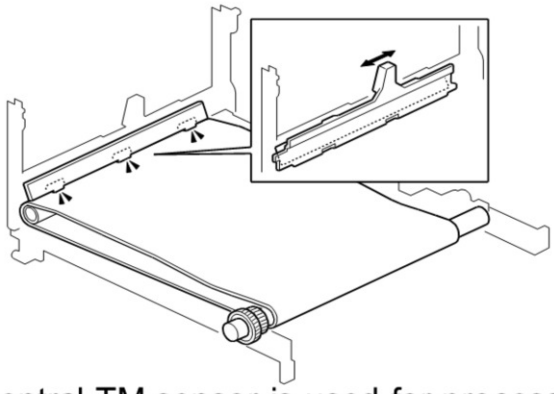
Four toner images are put on the paper at the same time.



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

RICOH
imagine. change.



- 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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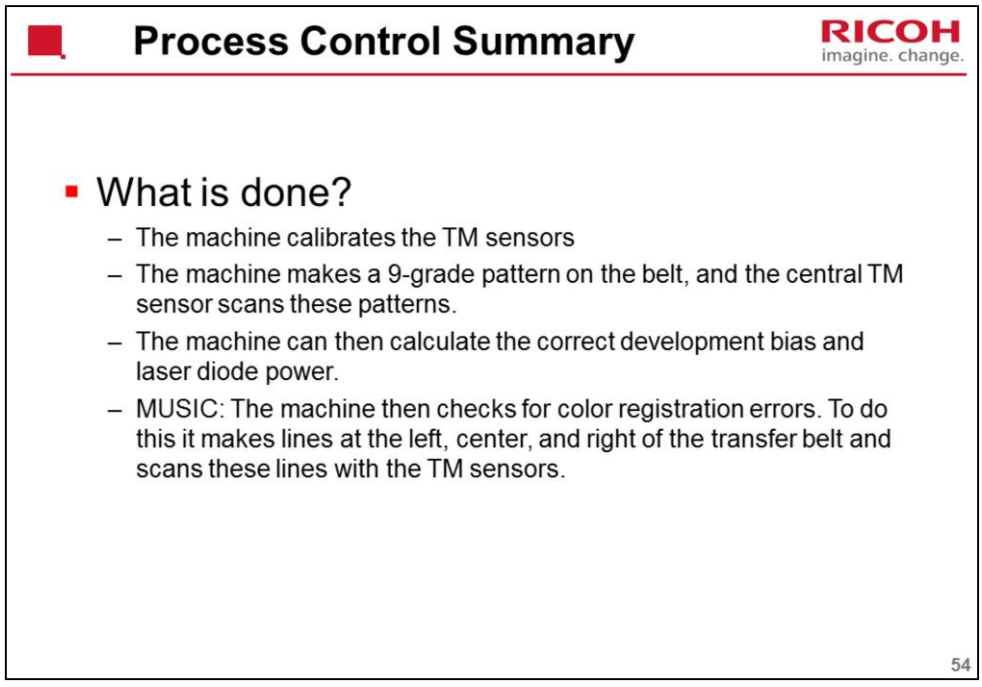
The TM sensor board contains three TM sensors (one at the left, one at the center, and one at the right). The center TM sensor detects the density of the sensor patterns on the transfer belt. The TM sensor output is used for process control and for automatic line-position adjustment, skew, and color 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 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.

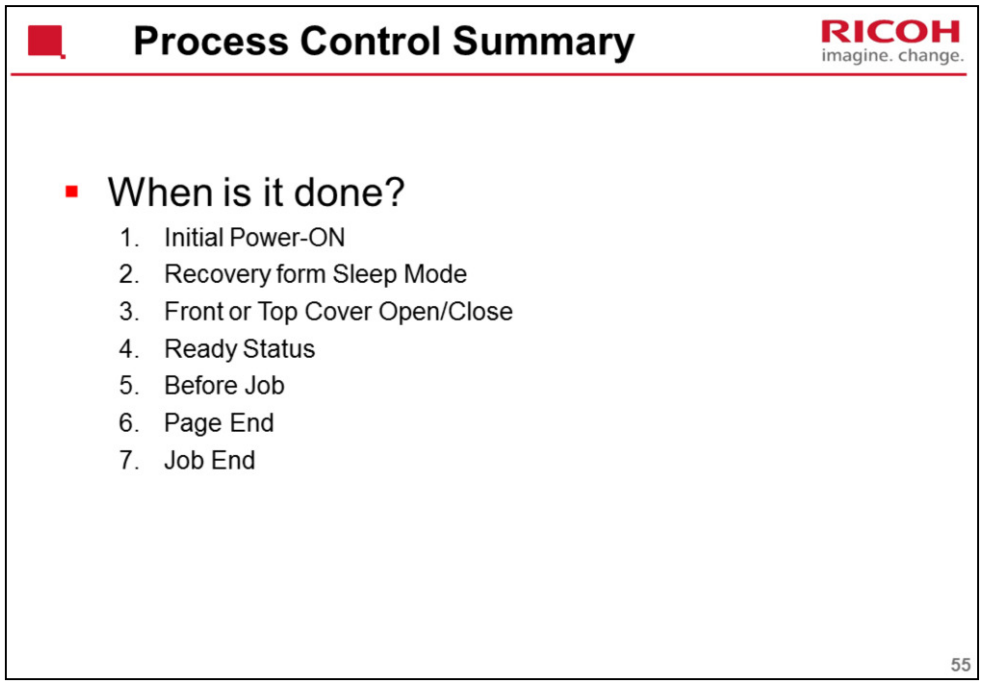
3. LD power control

   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.



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.

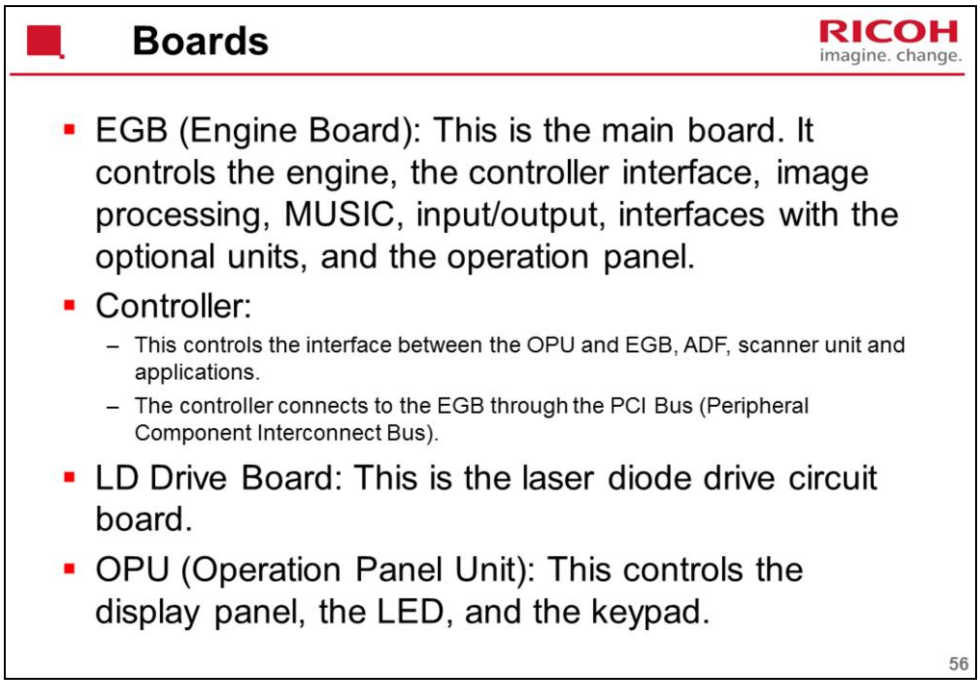
MUSIC starts automatically between pages when the polygon motor has been rotating for 180 seconds.

MUSIC interrupts a job and starts automatically between pages when the polygon motor has been rotating for 300 seconds.

7.Job end:

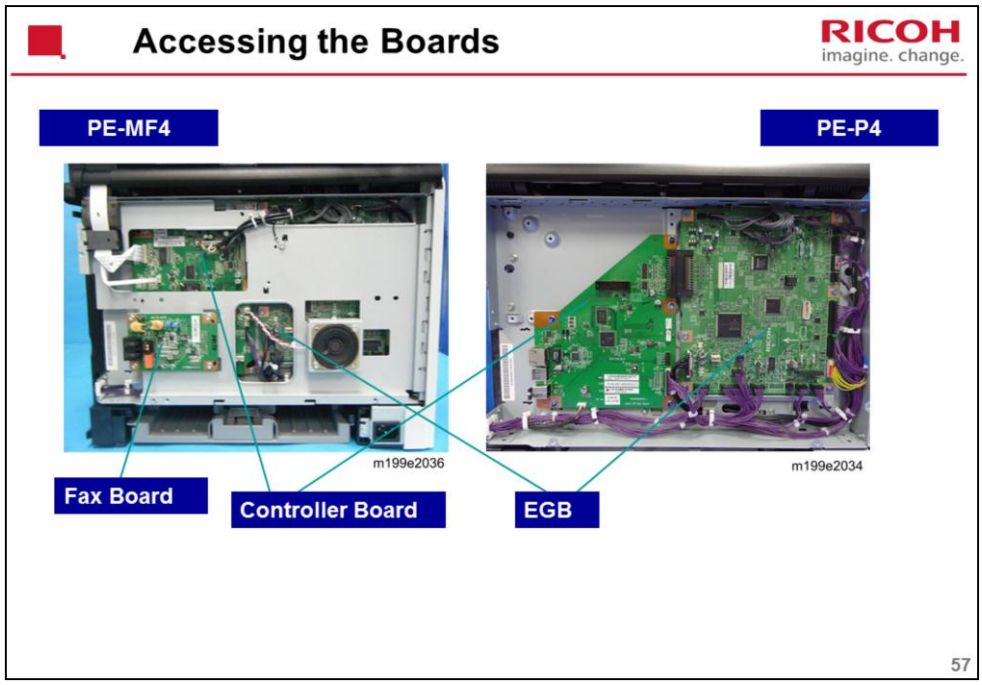
Toner amount control and MUSIC start automatically after a job when the machine gets a request to execute the toner amount control and MUSIC.

MUSIC starts automatically after a job when the machine gets a request to execute MUSIC.



MUSIC (Mirror Unit for Skew and Interval Correction).

MUSIC is also called Automatic Line Position Adjustment.



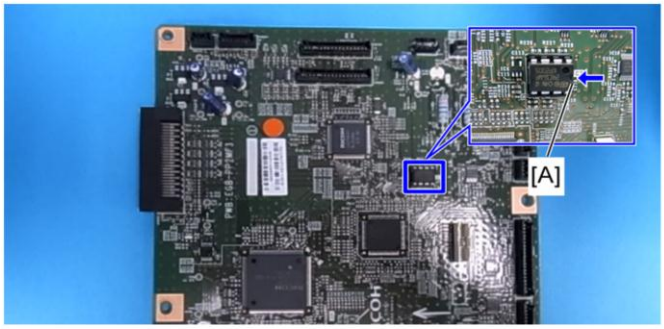
The EGB boards for the P4 and MF4 are identical.

The controllers for the P4 and MF4 are not identical, but use many common parts.

Replacing Boards

RICOH
imagine. change.

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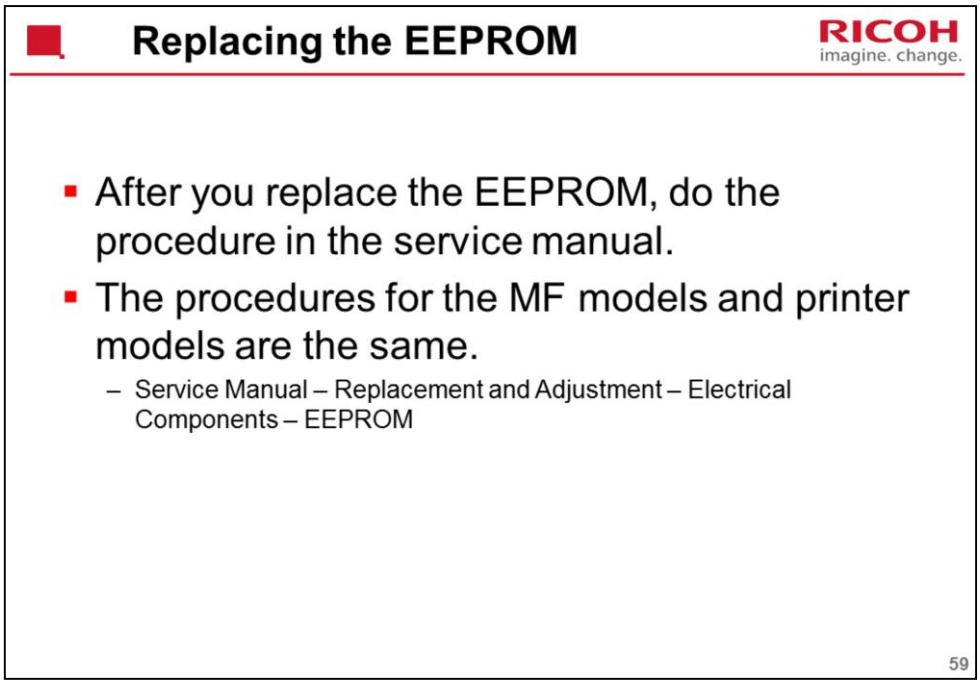
Service Manual – Replacement and Adjustment – Electrical Components – EGB (Engine Board)



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.

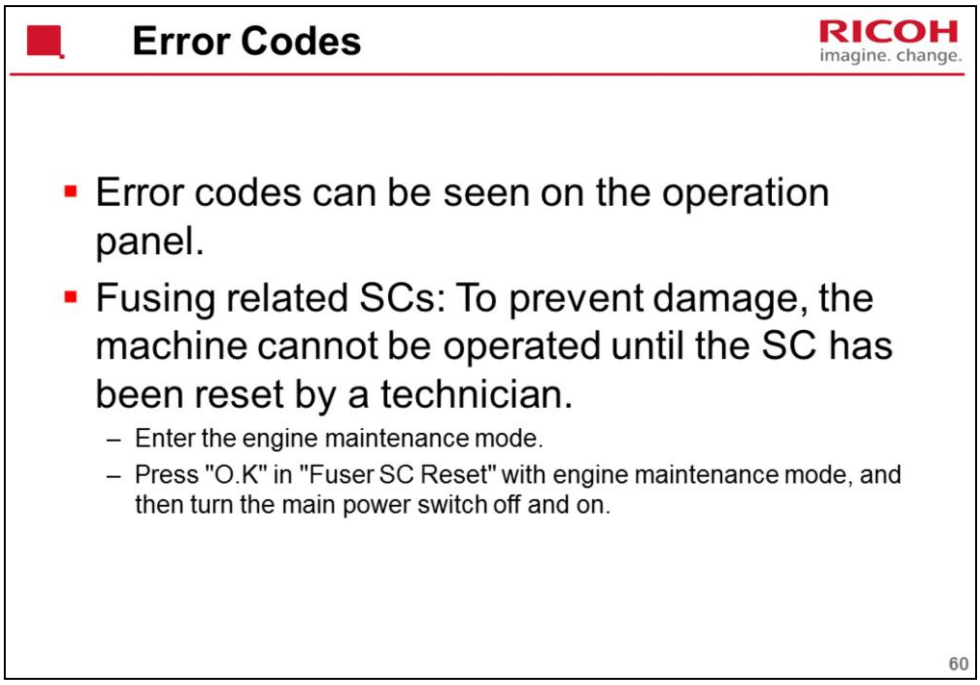
You may need to change the settings in unusual environmental conditions, for example if the humidity is low.

Color Registration

Performs the MUSIC adjustment

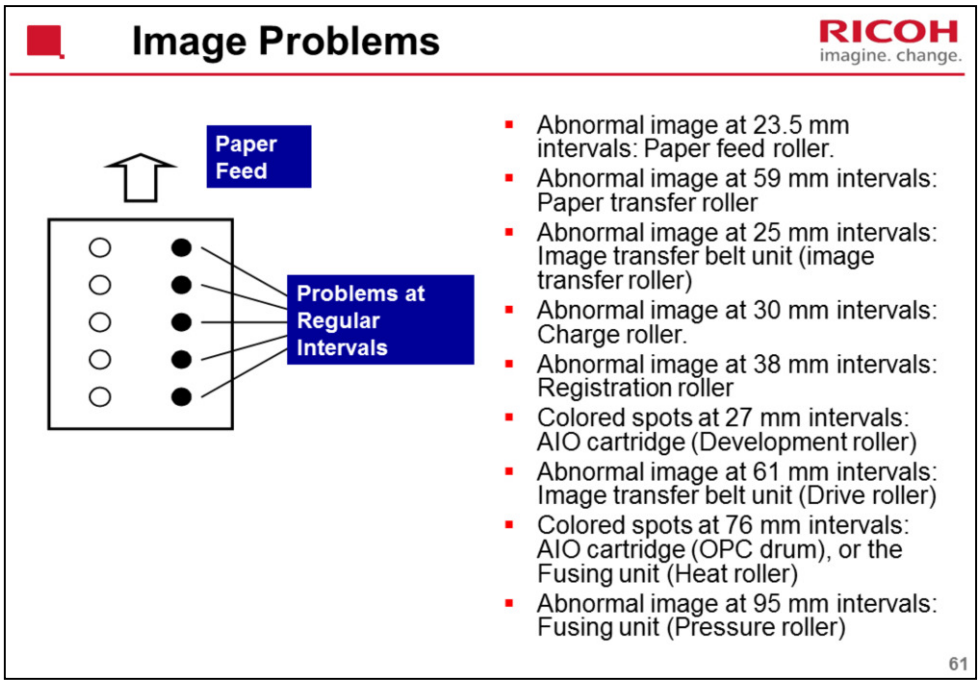
Check that MUSIC was done successfully.

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

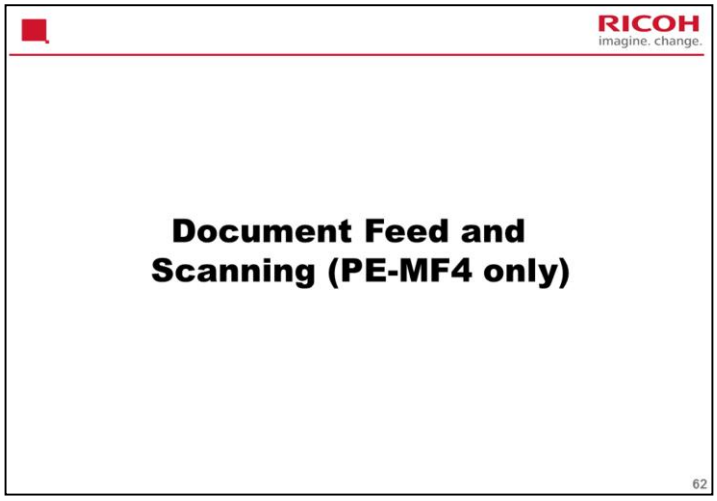


Service Manual – Appendix 3. Troubleshooting Guide – Service Call Conditions

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



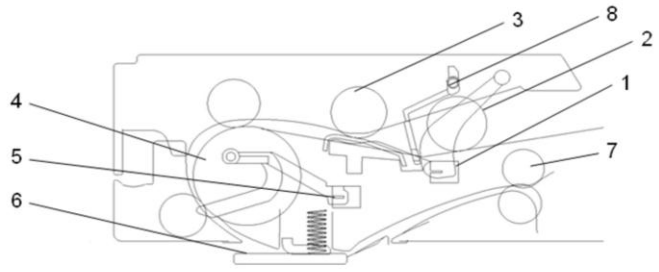
Service Manual – Troubleshooting – Image Problems



These mechanisms are the same as in the RM-MF1 series.
The previous models in this series used a CCD scanner.

ADF Components

RICOH
imagine. change.



m1562026

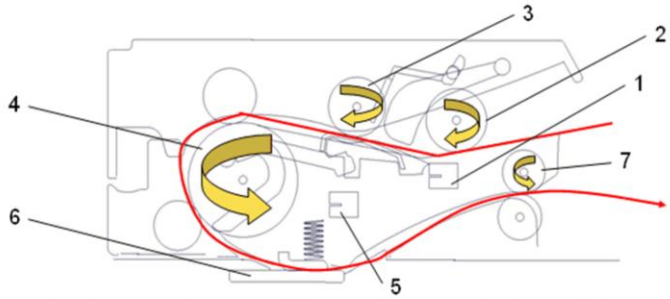
1. Document Sensor
2. Pick-up Roller
3. Separation Roller
4. Feed Roller
5. Feed Sensor
6. DF Exposure Glass
7. Output Roller
8. Original Stopper

63

No additional notes

Paper Path

RICOH
imagine. change.



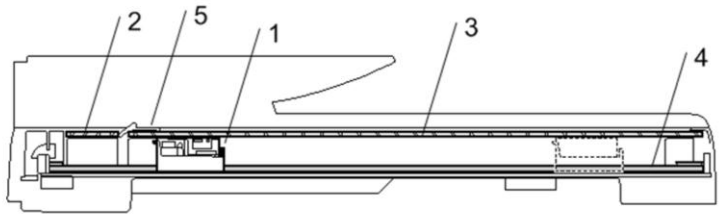
- When the document sensor [1] detects an original, the ADF motor rotates to drive the pick-up roller [2], separation roller [3] and feed roller [4] to feed the original to the feed sensor [5].
- If the feed sensor [5] does not detect the paper, the machine determines that an original jam has occurred.
- If the feed sensor [5] detects paper, then scanning starts by the CIS through the DF exposure glass [6].
- After scanning, the output roller [7] will eject the paper.

64

No additional notes

Scanner Overview

RICOH
imagine. change.



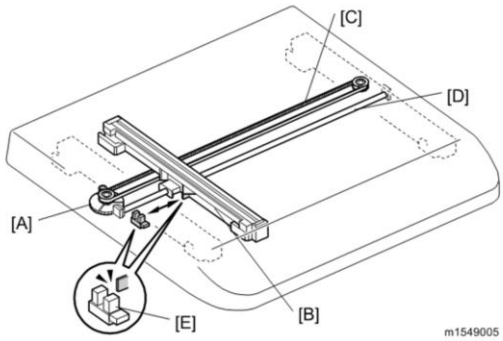
1. CIS Carriage Unit
2. DF Exposure Glass
3. Scanner Exposure Glass
4. Carriage Drive Shaft
5. White Sheet

- Do not disassemble the scanner unit in the field.

65

No additional notes

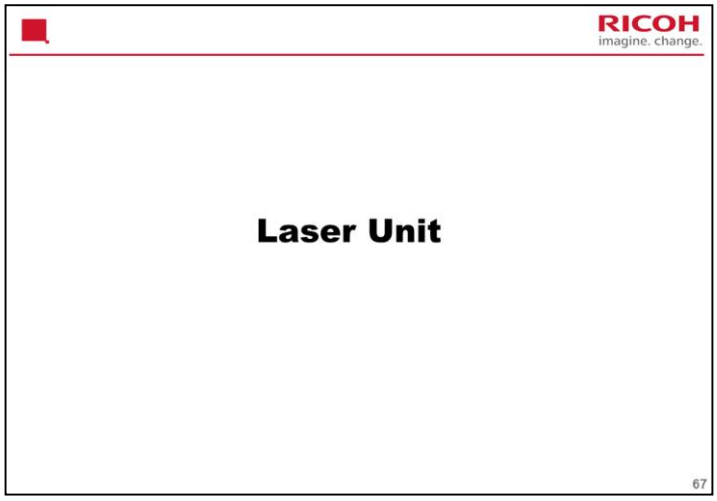
Scanner Drive



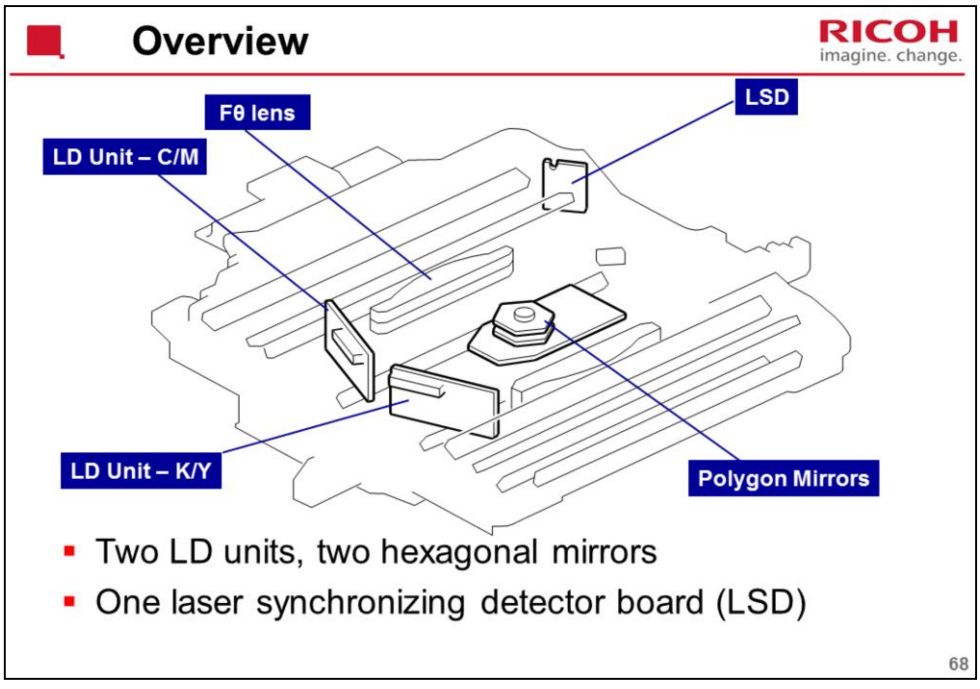
- Scanner motor [A]: Drives the CIS carriage unit [B] through gears and a timing belt [C].
- CIS carriage unit: Moves along the carriage drive shaft [D].
- Carriage home position sensor [E]: Detects home position when initializing the scanner or before/after scanning.
- The scanner carriage unit moves to read the white sheet (see the previous slide) before every scan to adjust white level.

66

No additional notes



This is the same as the PE-MF3/P2.



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.

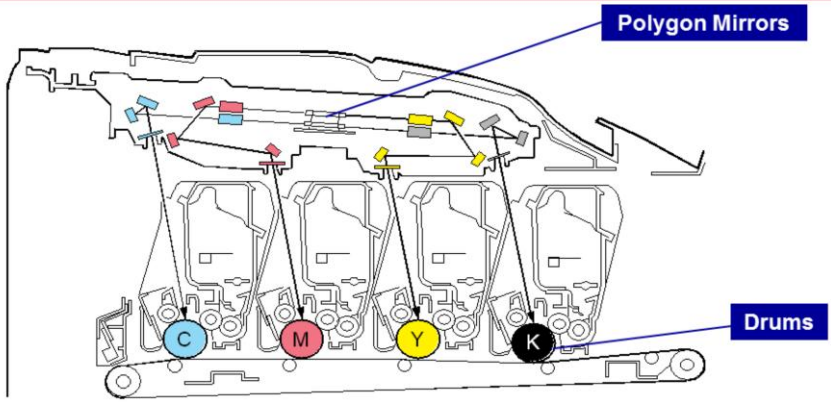
The laser beam from the LD unit - C/M is directed to the Fθ lens at rear side by the polygon mirrors. The laser beam from the LD unit - K/Y is directed to the Fθ lens at front side by the polygon mirrors.

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

RICOH
imagine. change.



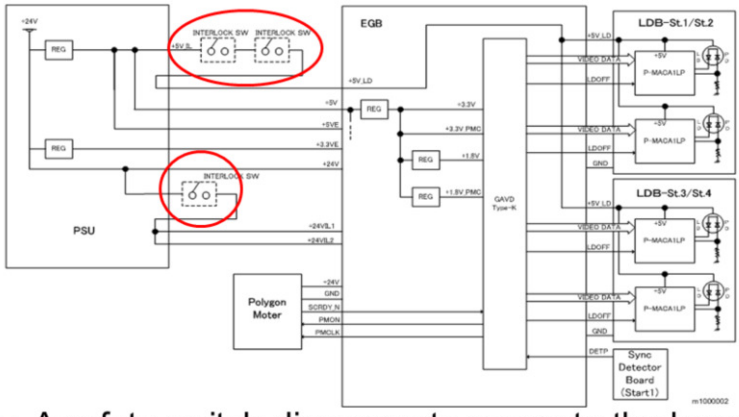
- The laser beams for magenta and yellow are sent to the upper part of the polygon mirror.
- The laser beams for cyan and black are sent to the lower part of the polygon mirror.

69

No additional notes

Safety Switches

RICOH
imagine. change.



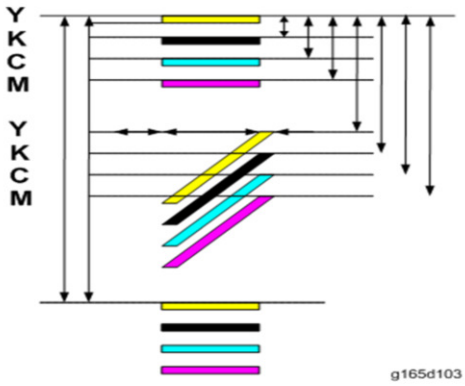
- A safety switch disconnects power to the laser diodes when the front cover or the top cover is opened.

70

No additional notes

MUSIC Pattern

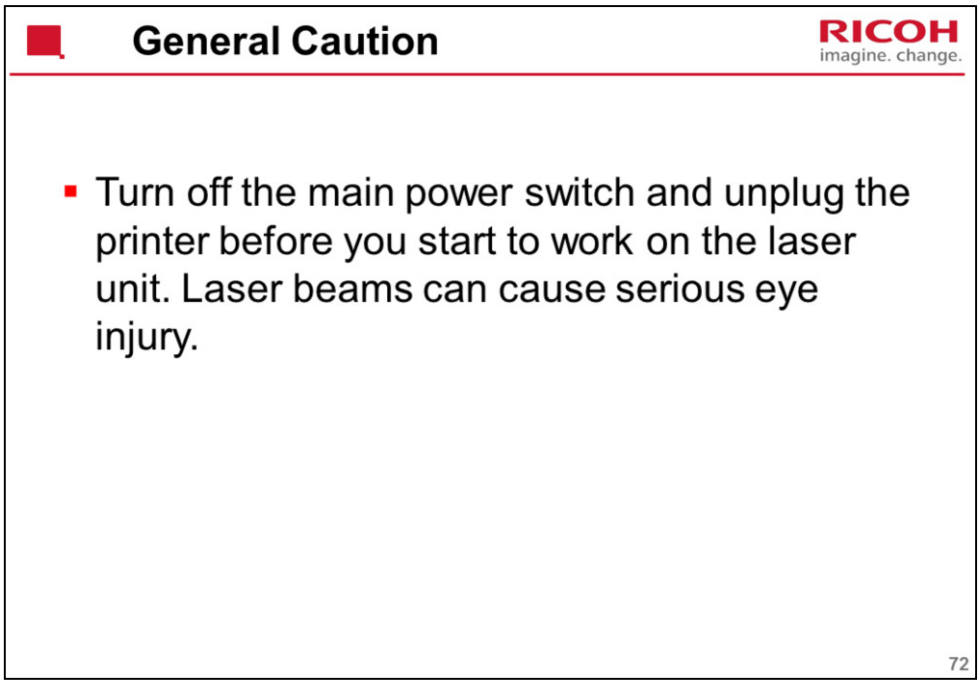
RICOH
imagine. change.



- 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.

71

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



No additional notes

Laser Optics Housing Unit

RICOH
imagine. change.

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

73

No additional notes

After you Replace the Laser Optics Housing Unit (1)

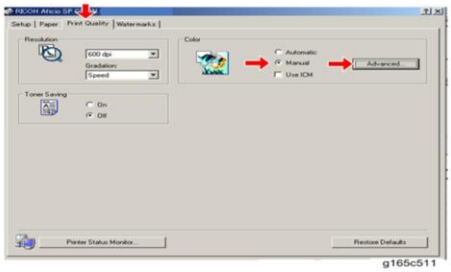
RICOH imagine. change.

- 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.

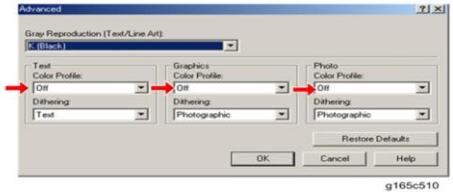
74

No additional notes

After you Replace the Laser Optics Housing Unit (2)



g165c511



g165c510

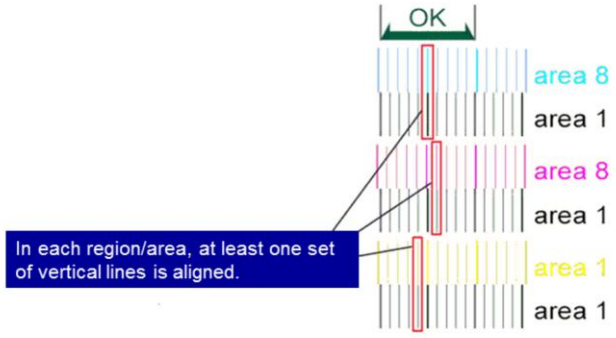
- Print out the test chart and make sure that MUSIC was performed successfully.
  1. Click the "Properties" tab inside the printer driver.
  2. Click the "Print Quality" tab.
  3. Select the "Manual" radio button.
  4. Click [Advanced…].
  5. Select “Off” for the three Color Profile pull-down menus shown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

75

No additional notes

After you Replace the Laser Optics Housing Unit (3)

RICOH imagine. change.



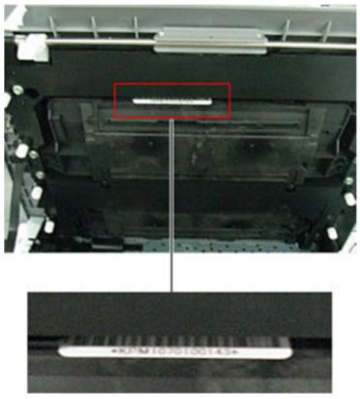
- The test chart is printed. An example is shown above. Make sure that MUSIC was performed successfully.
- Four sets of vertical lines appear on the test chart (C and k, M and k, Y and k…). In each set, look for vertical lines that are aligned within the region defined by "OK".
- If all sets have at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

76

No additional notes

After you Replace the Laser Optics Housing Unit (4)

RICOH imagine. change.



- 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.

77

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.

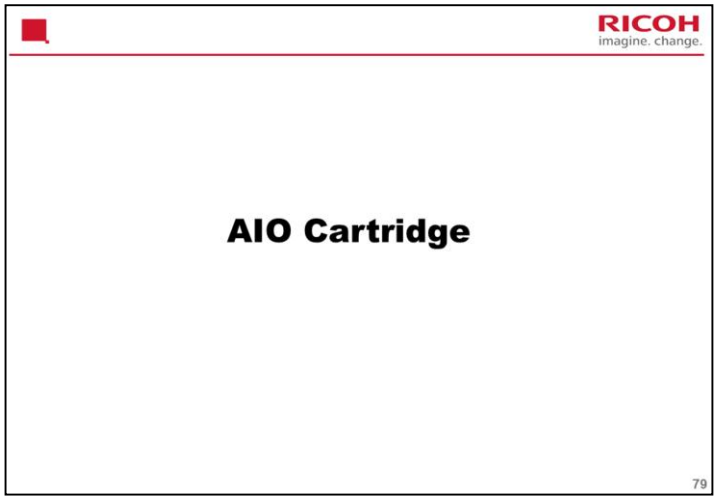
After you Replace the Laser Optics Housing Unit (5)

RICOH imagine. change.

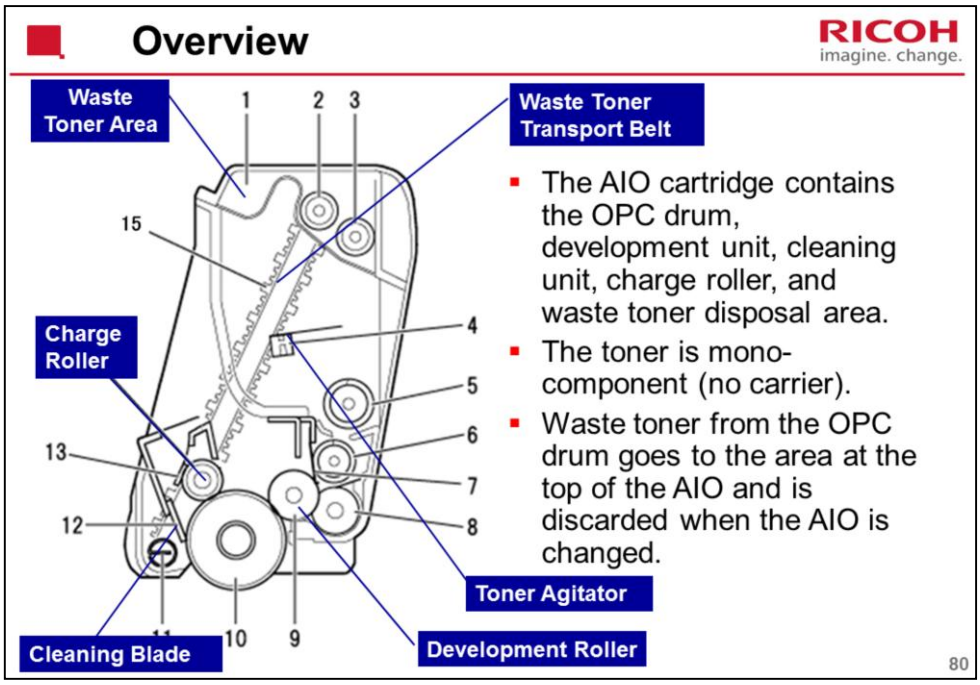
- Adjust the registration settings for each tray and for the front and rear side of the paper if necessary.
  - "Registration" in the "Engine Maintenance" menu.

78

No additional notes



The mechanism is the same as the PE-MF3/P2.



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.

Components of the AIO

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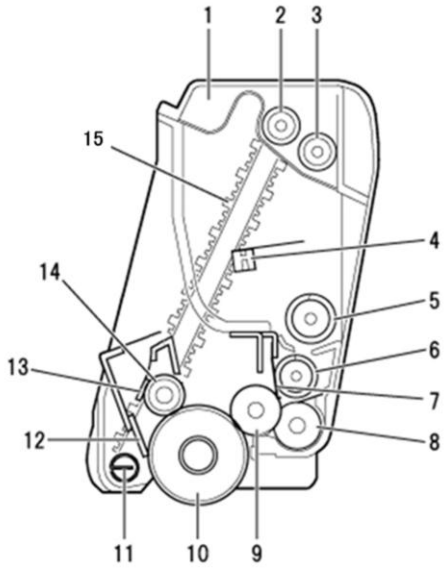
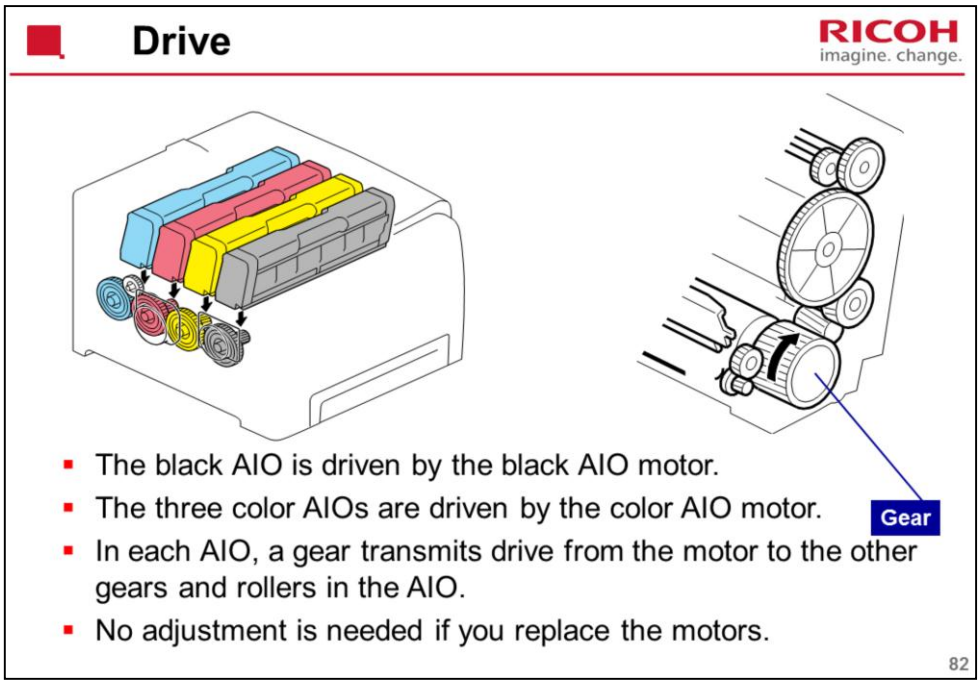


1. Waste Toner Container
2. Transport Belt Shaft
3. Waste Toner Collection Coil
4. Toner Agitator
5. Upper Mixing Roller
6. Development Blade
7. Lower Mixing Roller
8. Toner Supply Roller
9. Development Roller
10. OPC
11. Waste Toner Collection Coil
12. OPC Cleaning Blade
13. Charge Roller Cleaner
14. Charge Roller
15. Waste Toner Transport Belt

81

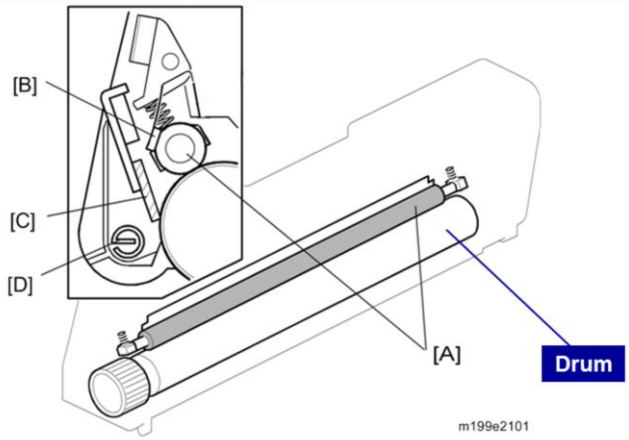
Difference from previous model: There is only one cleaning blade for the charge roller in this new model.



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

Charge

RICOH
imagine. change.



- The charge roller [A] gives the drum a negative charge.

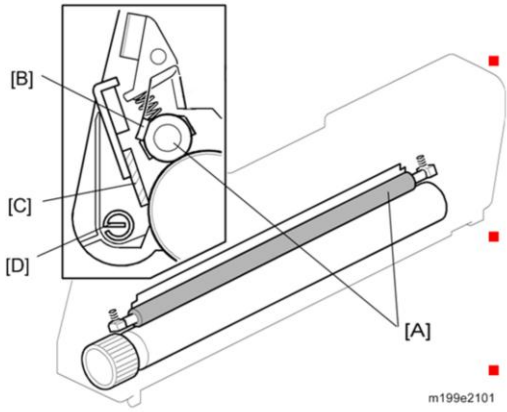
83

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

RICOH
imagine. change.

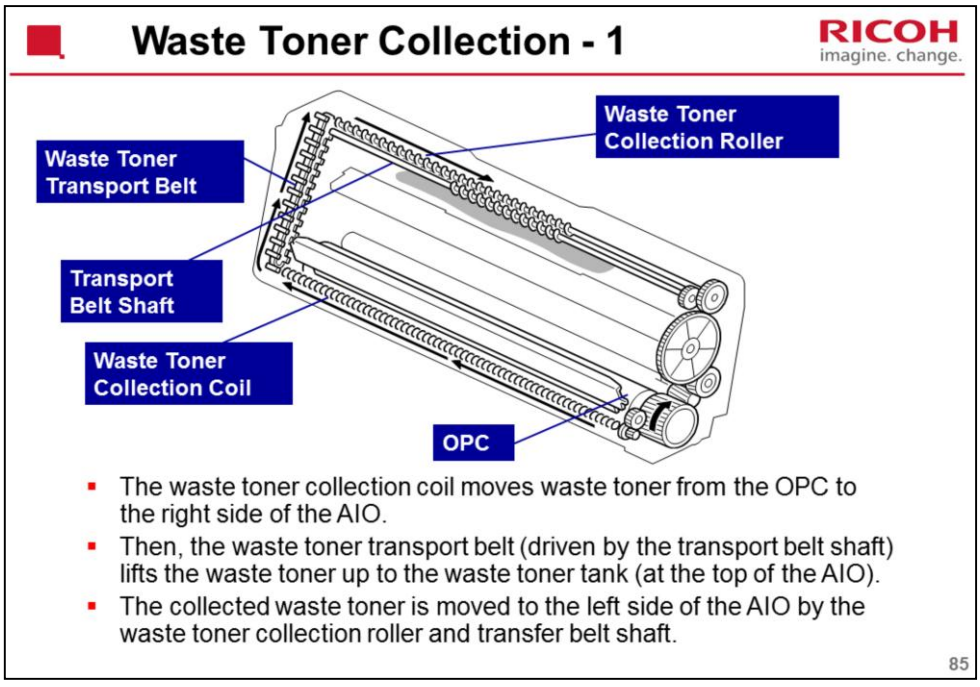


- The drum has a cleaning blade [C].
- The charge roller [A] has one cleaning blade [B]. It always touches the charge roller.
- Waste toner from cleaning goes to the toner collection coil [D].
- The toner collection coil moves the toner to the waste toner transport belt.

84

Difference from previous model: There is only one cleaning blade for the charge roller in this new model.

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

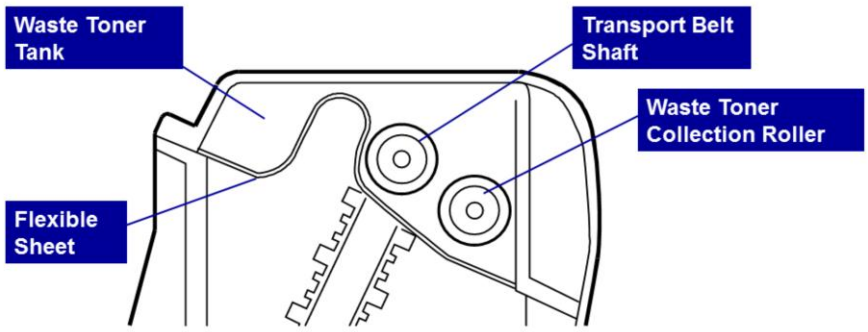


See the next slide for more about the waste toner tank.

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

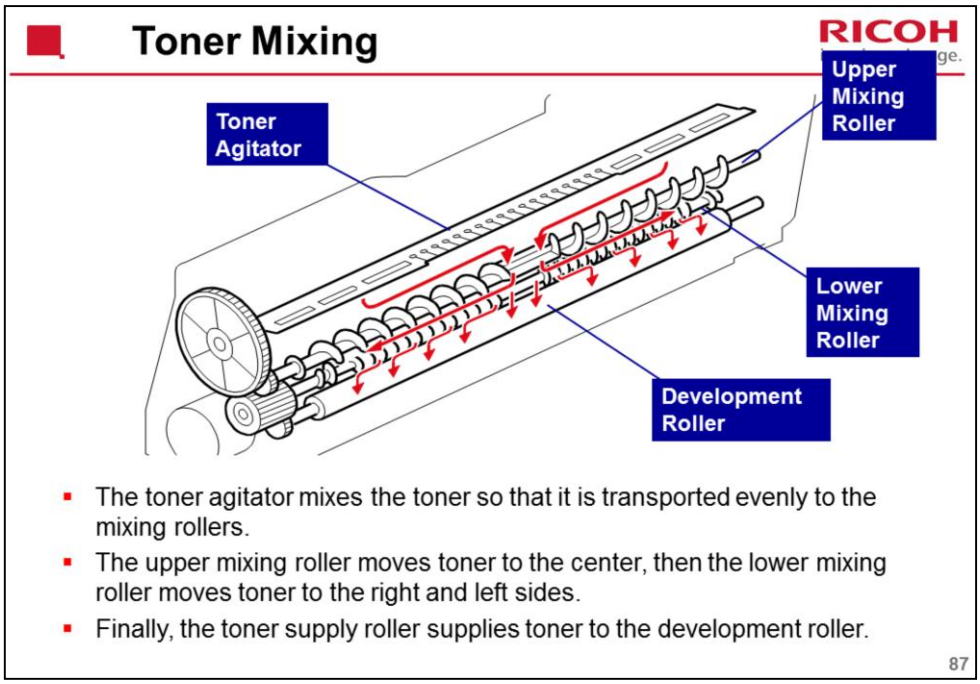
RICOH
imagine. change.



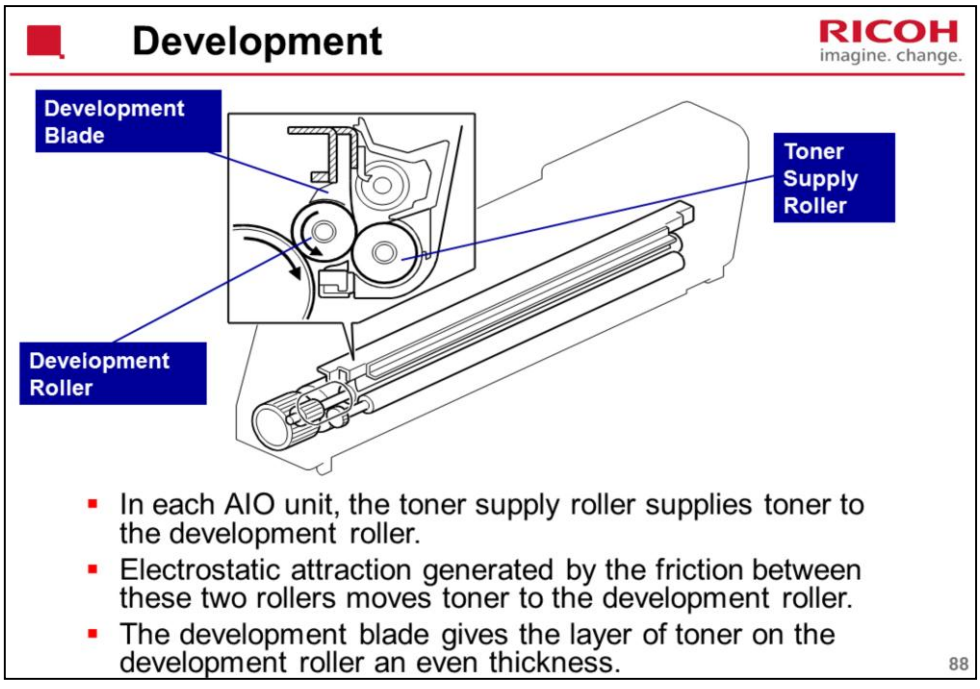
- A flexible sheet separates the unused toner area from the waste toner area.
- The waste toner area becomes larger when toner is consumed.
- This toner is not recycled.

86

No additional notes.



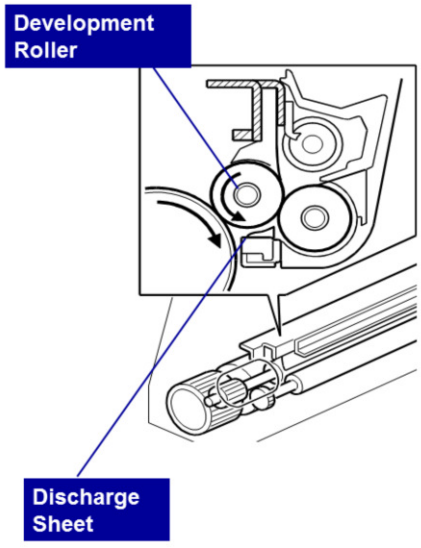
This mixing mechanism prevents toner hardening and uneven image density in the outputs.



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

Development Roller Discharge

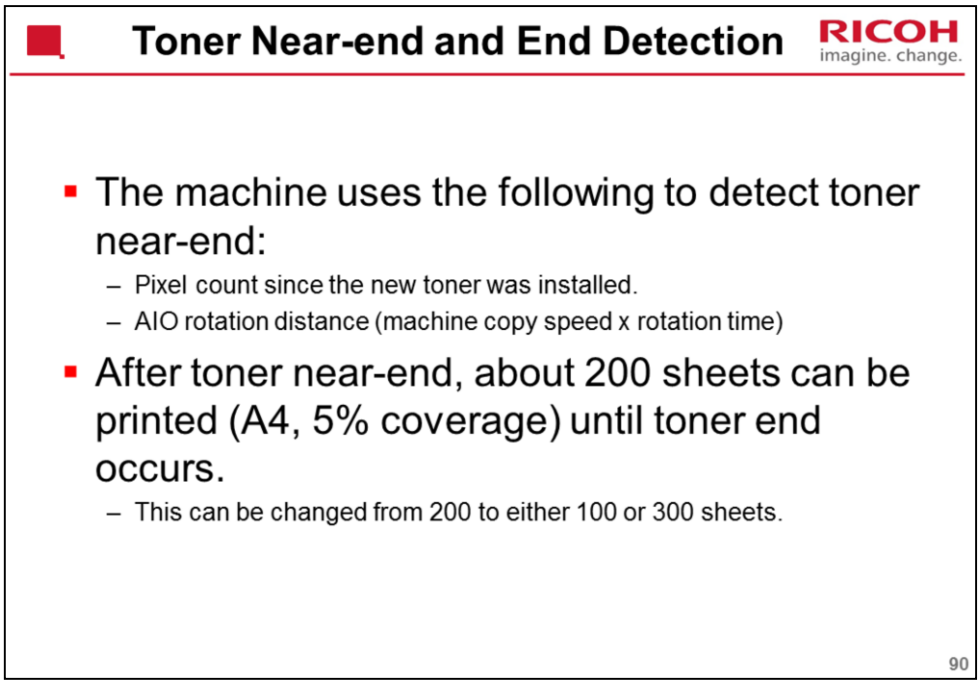
RICOH
imagine. change.



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

89

This system is used instead of a quenching lamp.



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)

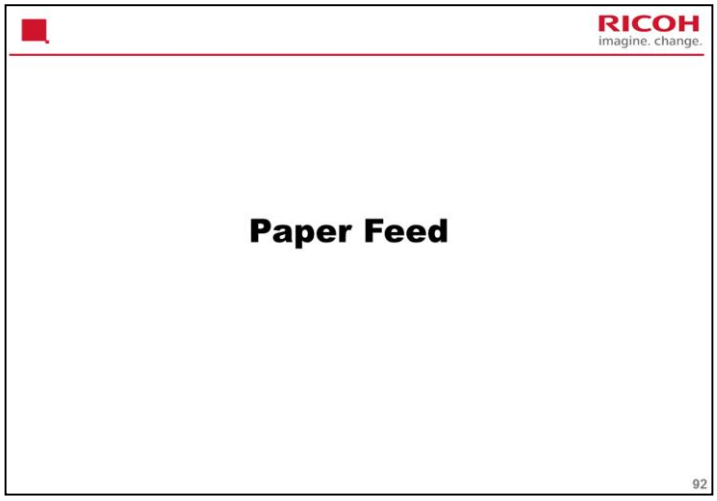
New AIO Detection

RICOH
imagine. change.

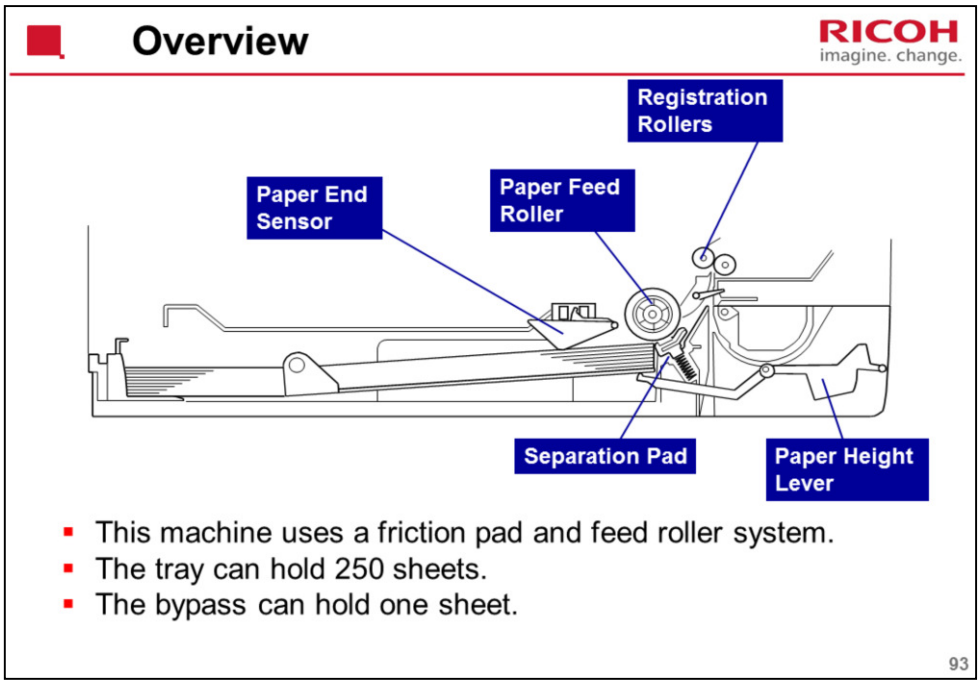
- There is a new unit detection mechanism for the AIO. It uses the ID chip that is built into each AIO.
- Other units do not have new detection mechanisms.
  - For example, after the ITB is replaced, SP modes must be done.

91

No additional notes



This is the same as the PE-MF3/P2.



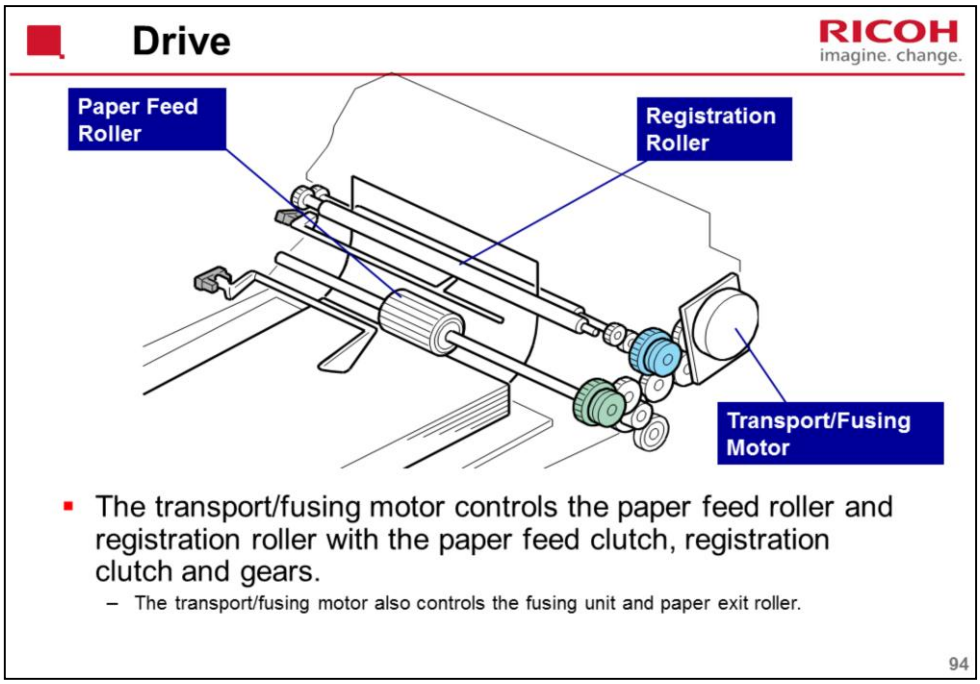
The paper end sensor detects whether paper is installed in the tray and whether the tray is set in the machine.

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.

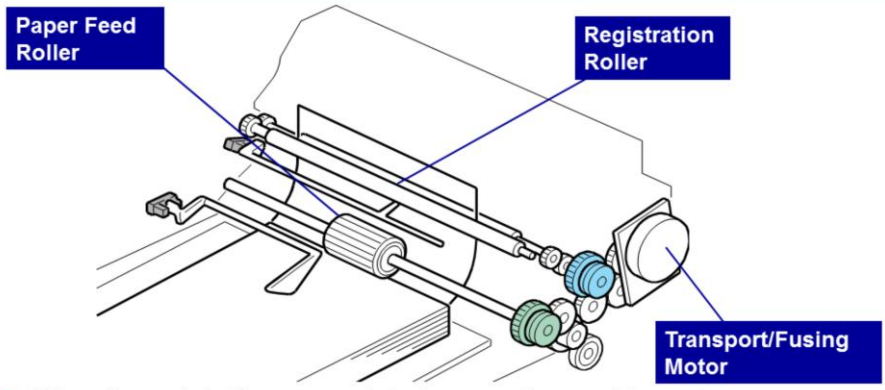
If the paper type which is selected at the PC does not match the paper size measured by the registration sensor, the machine issues a paper jam alert and stops the motors.



The clutches are shown in blue.

Registration

RICOH
imagine. change.



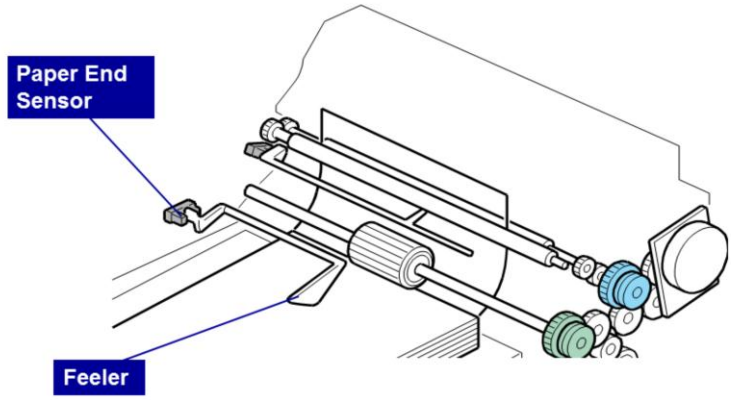
- When the registration sensor detects paper, the machine makes a paper buckle at the registration roller to correct paper skew.
- Then, the registration clutch turns on, and then the registration roller transports a sheet of paper to the transfer roller unit.
- There is no paper buckle adjustment.

95

No additional notes

Paper End Detection

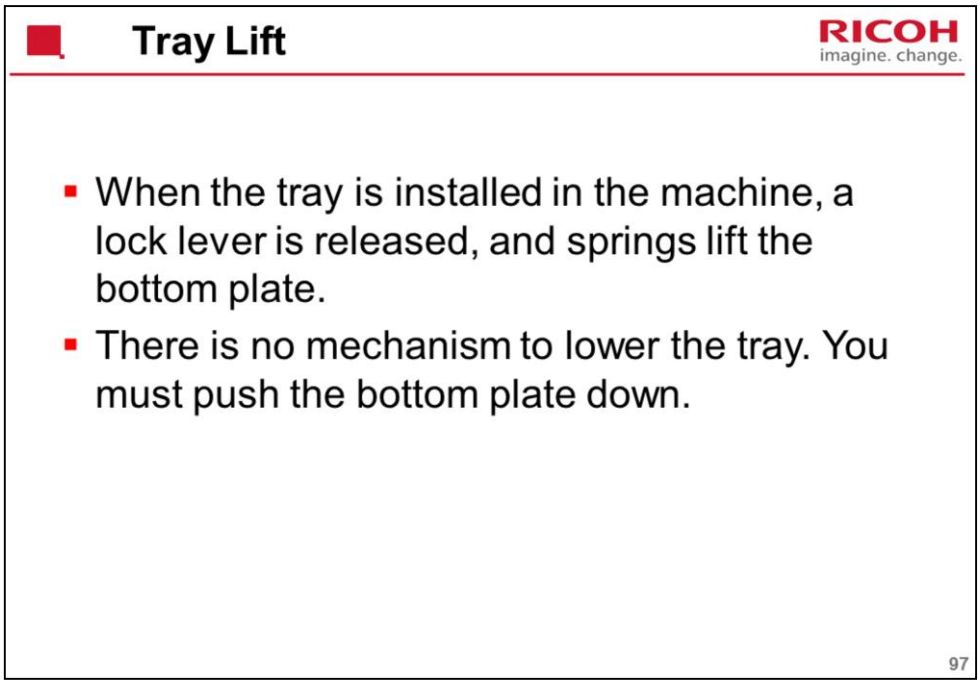
RICOH
imagine. change.



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

96

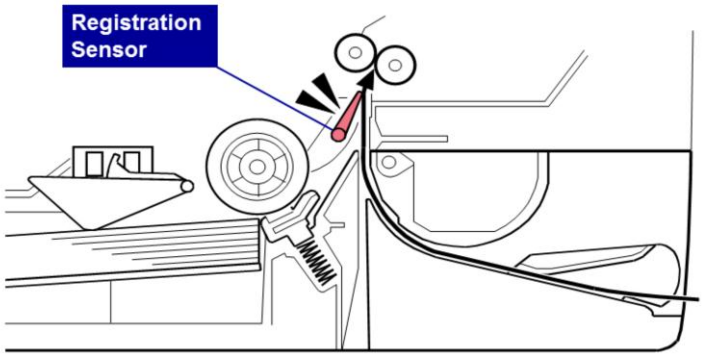
No additional notes



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

Bypass Feed

RICOH
imagine. change.



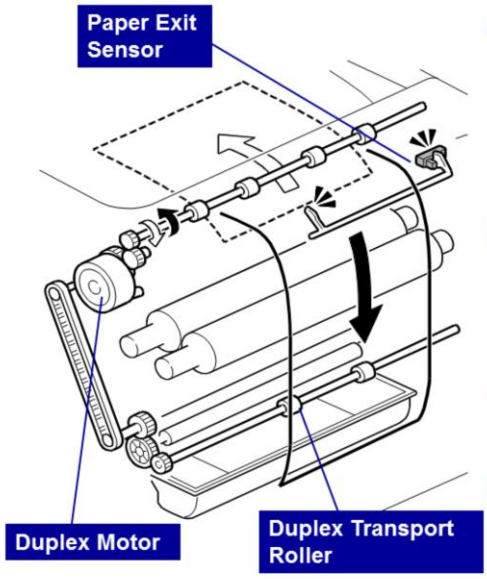
- If the registration sensor detects paper but no job is coming in from the PC, the machine detects that a sheet of paper has been placed in the bypass tray.
- The bypass can only hold one sheet at a time.

98

No additional notes

Feed-out and Duplex

RICOH
imagine. change.



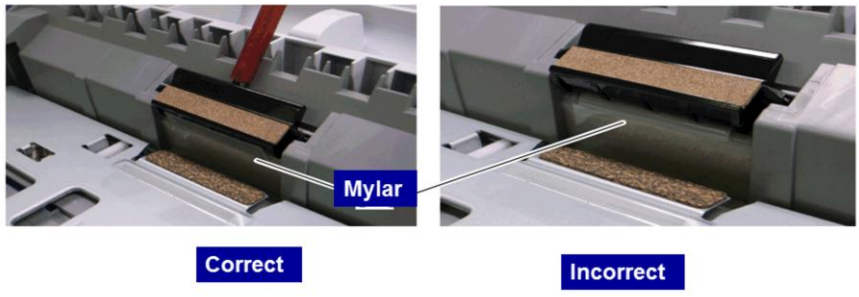
- The duplex motor feeds paper out of the machine.
  - If the motor rotates in reverse, it feeds paper to the duplex mechanism.
- The duplex motor starts to reverse after the paper has gone through the paper exit sensor.
- There is no interleaving.
  - Only one sheet can pass through the machine at one time.
- The second side is printed first, then the first side.

99

No additional notes

Replacing the Separation Pad

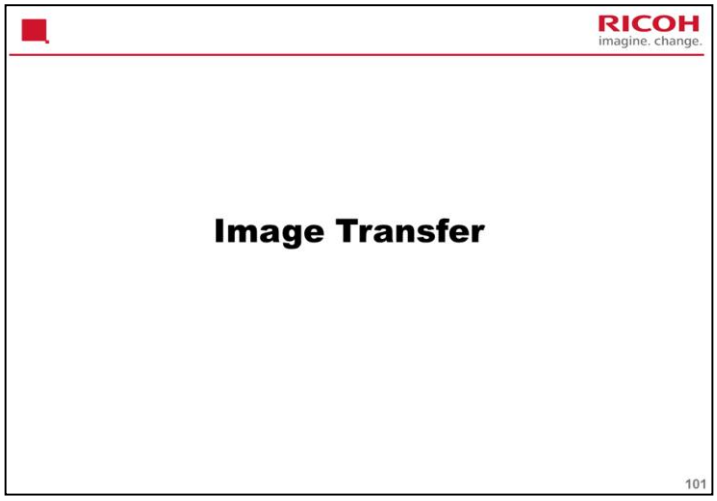
RICOH
imagine. change.



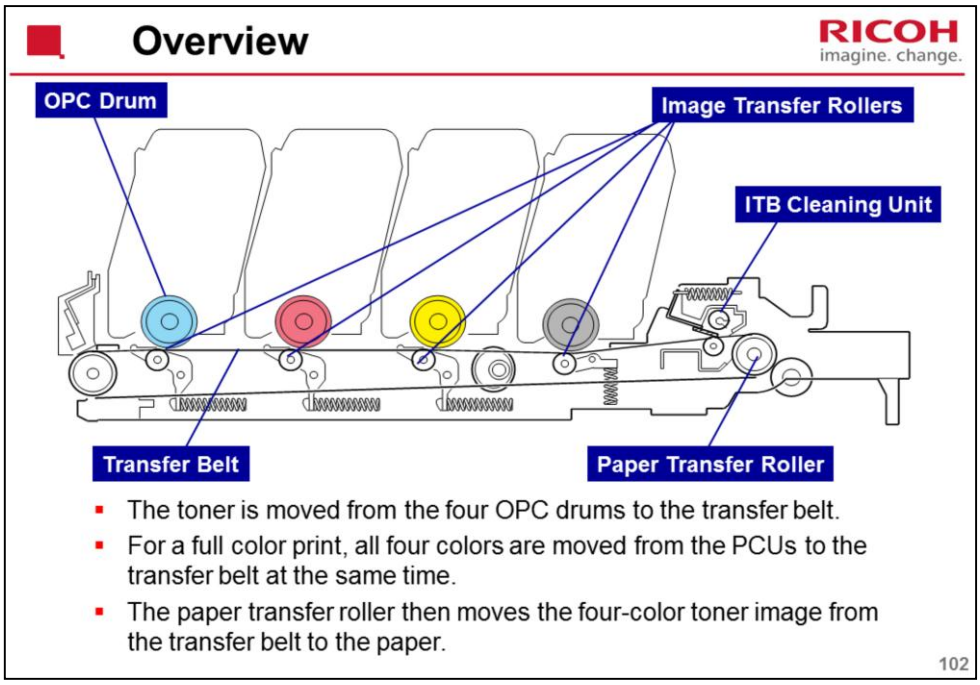
- When reinstalling the separation pad, make sure that the mylar is not placed under the separation pad.

100

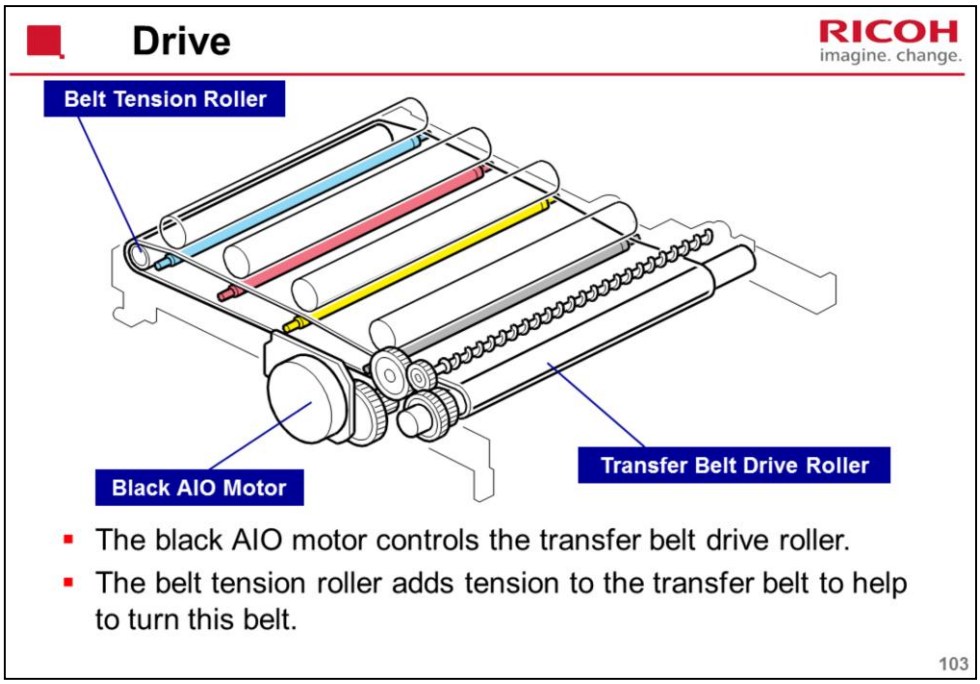
No additional notes



This is the same as the PE-MF3/P2.



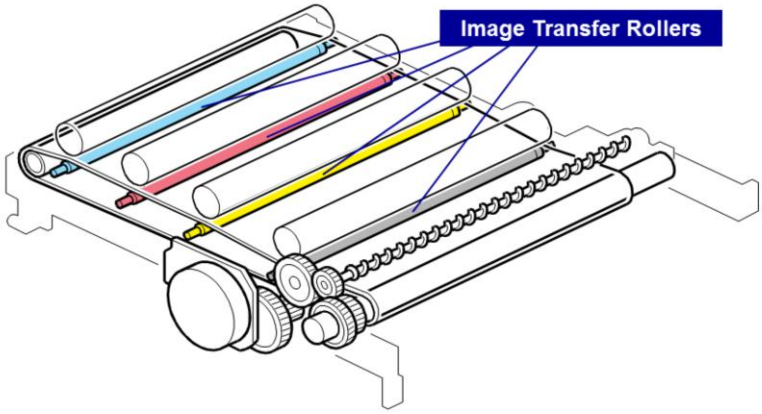
No additional notes



No additional notes

Transfer Voltage

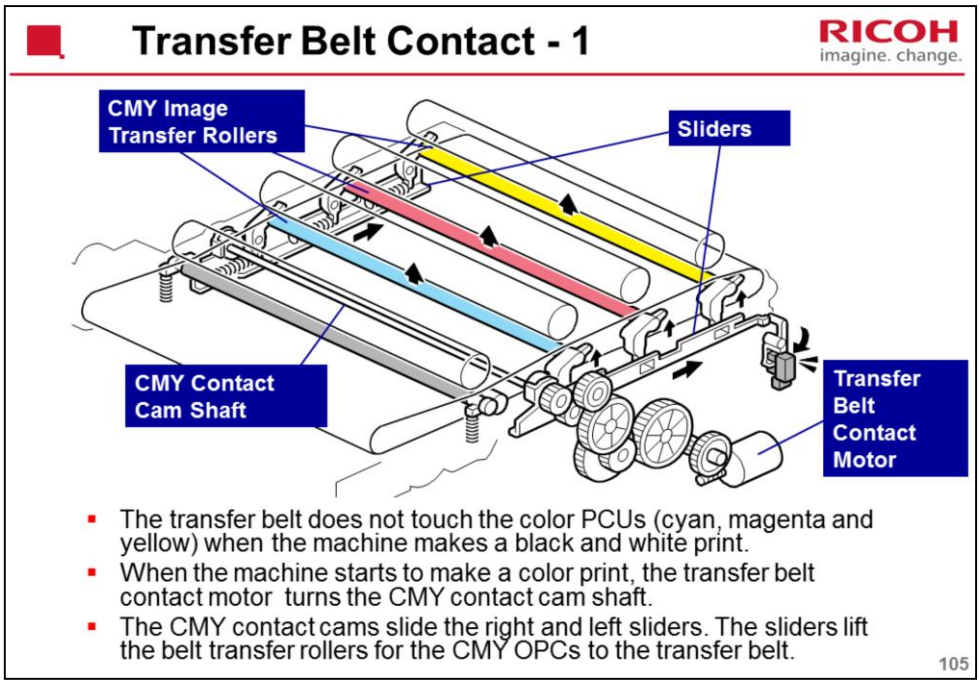
RICOH
imagine. change.



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

104

No additional notes

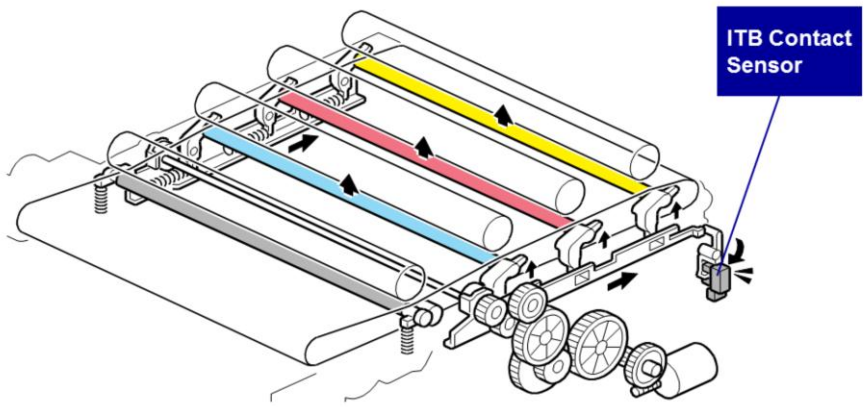


Because of this mechanism, the life of the transfer belt is longer (it is not necessary for the transfer belt to touch the color PCUs when the machine makes a black and white print).

However, if the customer selects "Off" with the "ACS" setting, the four OPC drums always touch the image transfer belt.

Transfer Belt Contact - 2

RICOH
imagine. change.



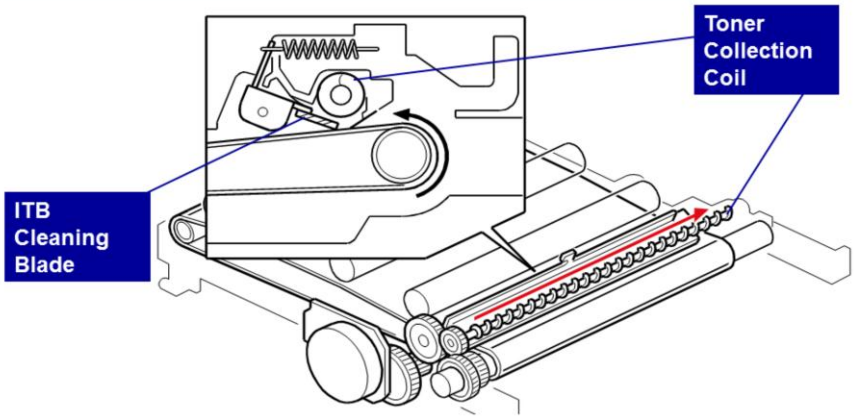
- The ITB contact sensor detects if the transfer roller unit for each OPC (CMY) touches the transfer belt.
- If there is a problem with the transfer belt contact mechanism, SC 445 occurs.

106

No additional notes

ITB Cleaning Unit

RICOH
imagine. change.



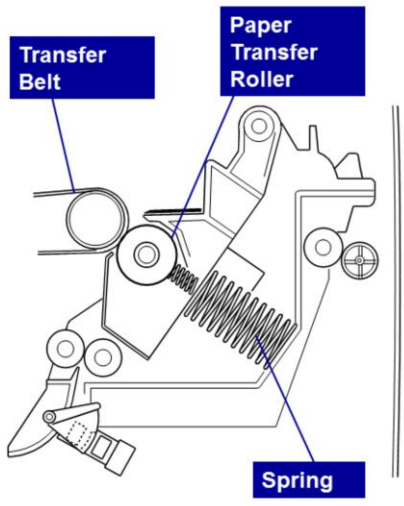
- The toner collection coil moves waste toner from the ITB to the waste toner bottle.
- A shutter in the ITB cleaning unit closes when the ITB unit is removed. This prevents toner from falling out.

107

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

Paper Transfer Roller

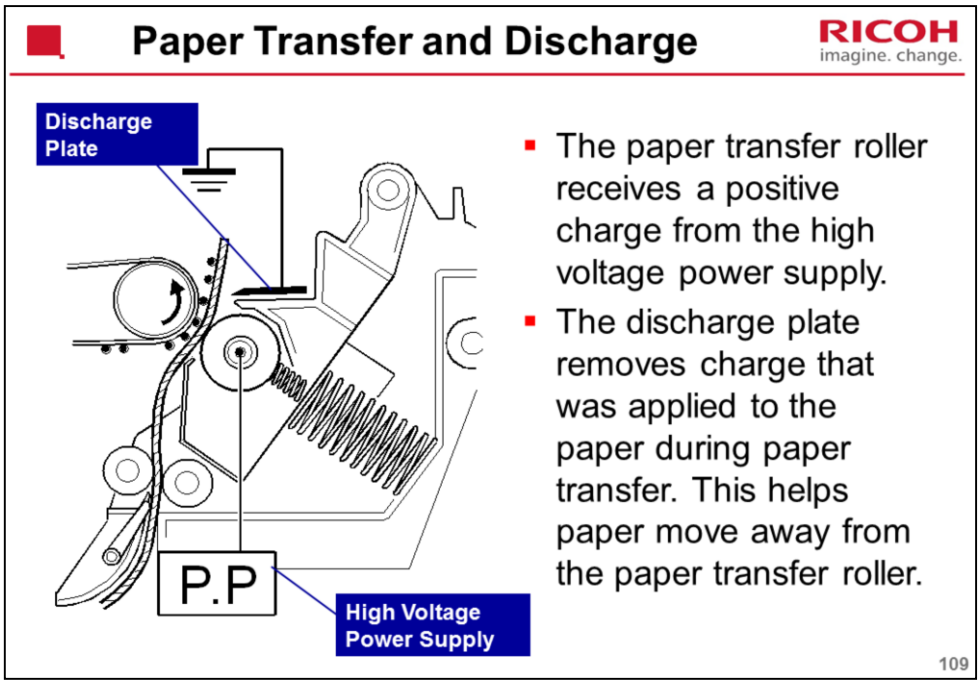
RICOH
imagine. change.



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

108

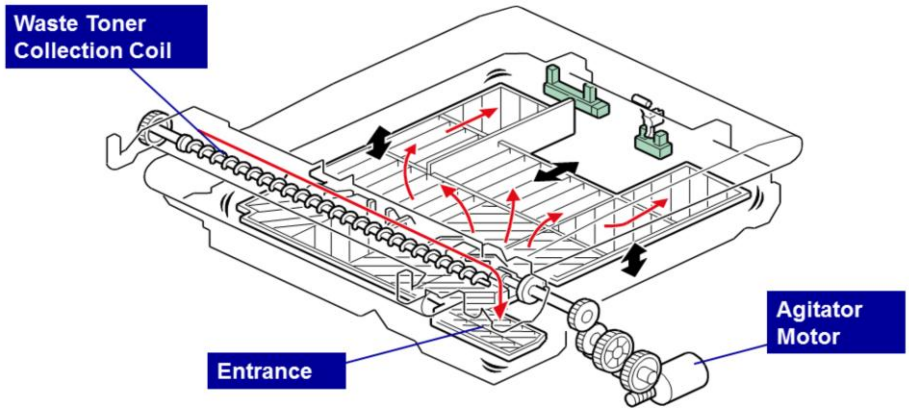
In some places, you will see the term '2nd Transfer'. This refers to what the paper transfer roller does (transfer from belt to paper).



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

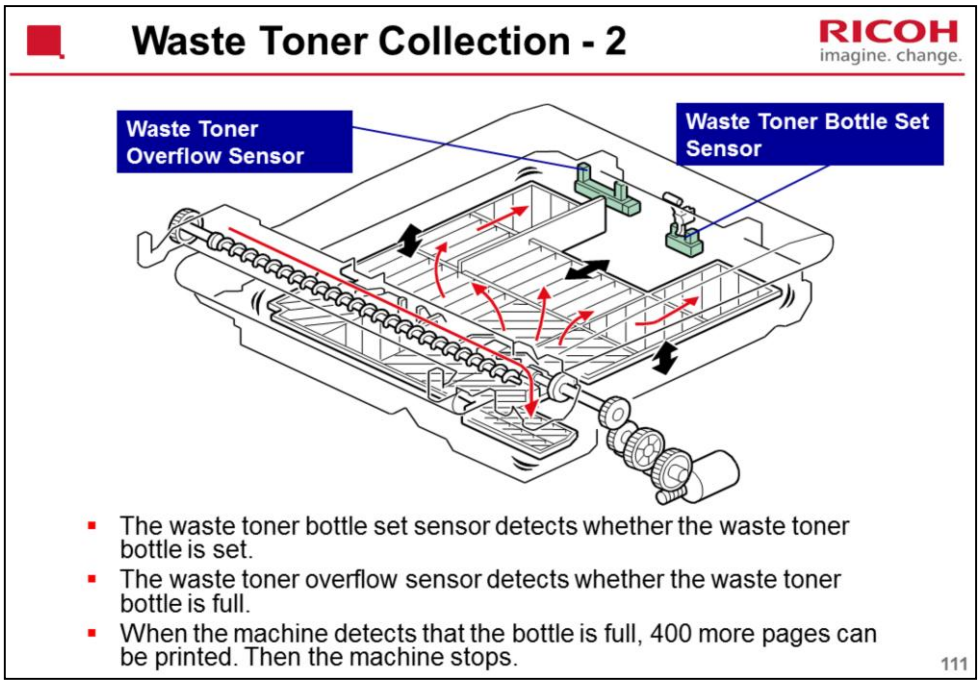
RICOH
imagine. change.



- 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.

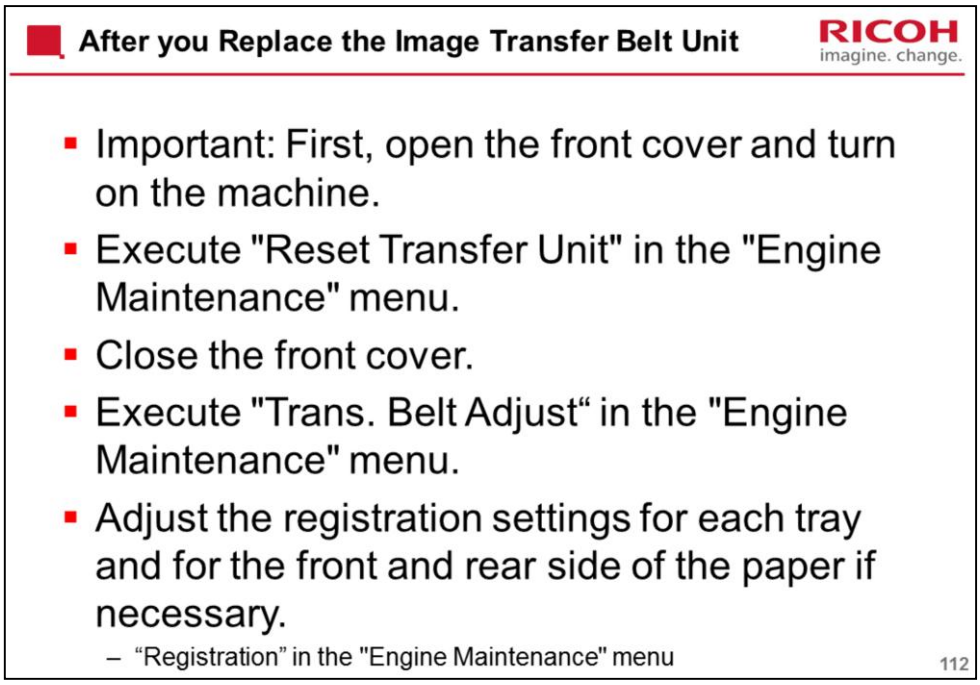
110

No additional notes



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.



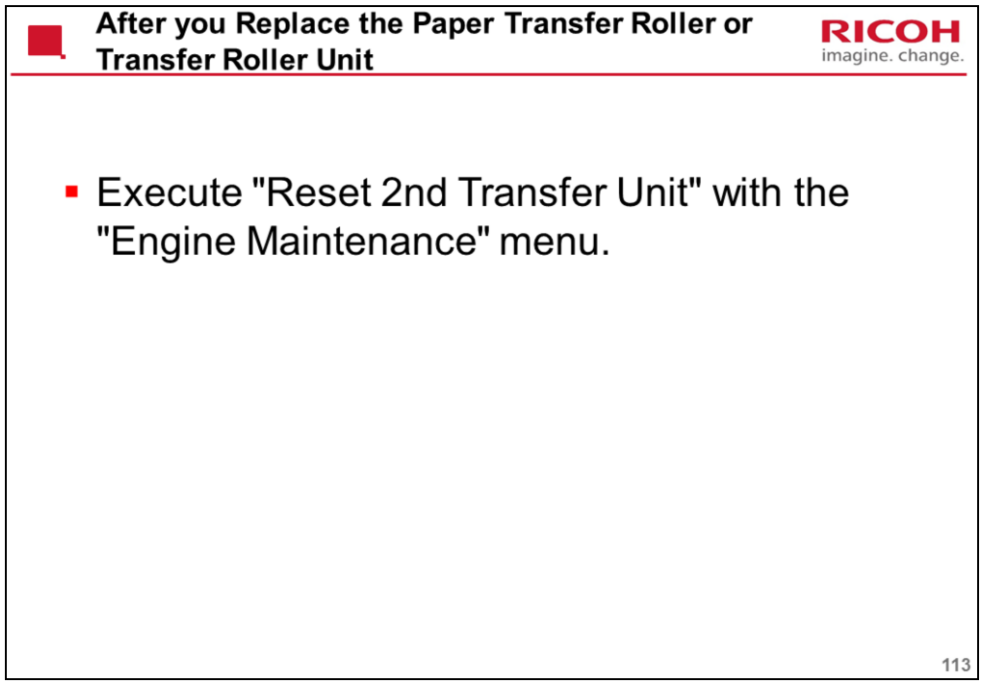
Normally, the life of the transfer belt unit is the same as the life of the machine. It should only be necessary to replace this unit if it becomes defective.

What is the Transfer Belt Unit Life Counter (Reset Transfer Unit)?

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?

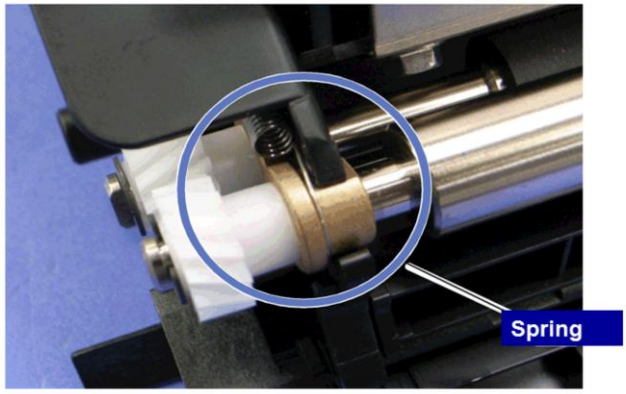
The new transfer belt may not be exactly the same length as the old one. With this SP mode, the machine calibrates the motor speed for the new belt (the speed is checked with a TM sensor pattern).



Transfer Roller Unit: Contains the paper transfer roller

Installing the Registration Roller

RICOH
imagine. change.



- Make sure that you hook the spring correctly.

114

No additional notes

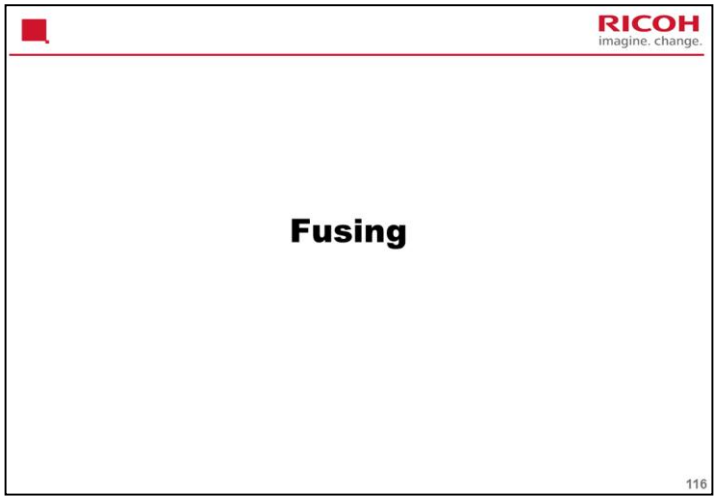
Other Notes

RICOH
imagine. change.

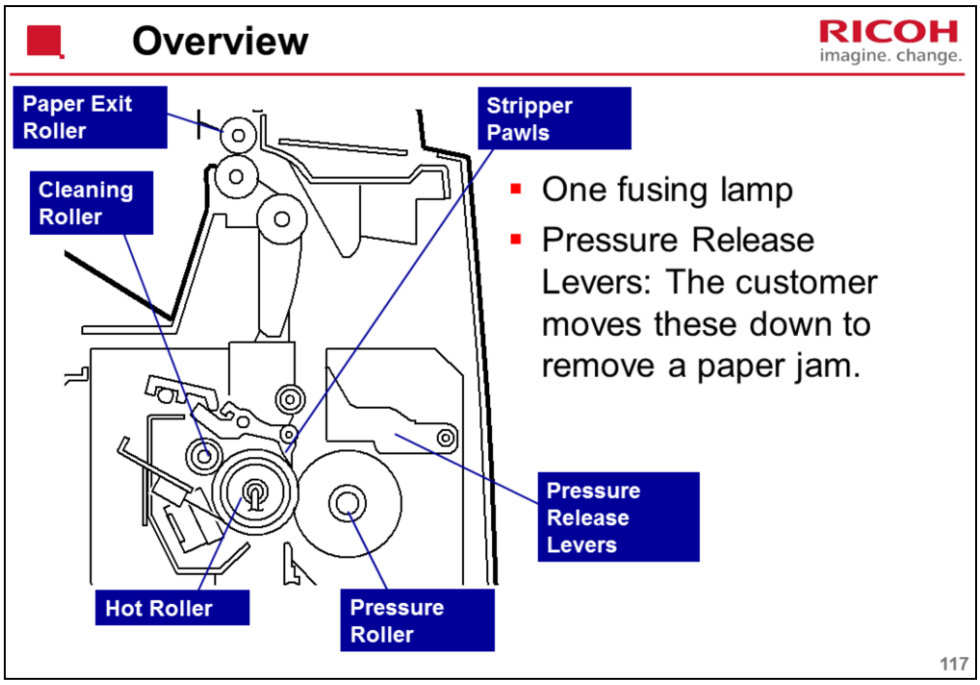
- The ITB cleaning unit contains waste toner. When you remove the ITB cleaning unit, put it on a sheet of paper.
  - A shutter mechanism inside the unit should prevent toner from falling out. But a small amount may already be on the exterior.
- Waste toner bottle set sensor, waste toner overflow sensor: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

115

No additional notes



This is the same as the PE-MF3/P2.



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.

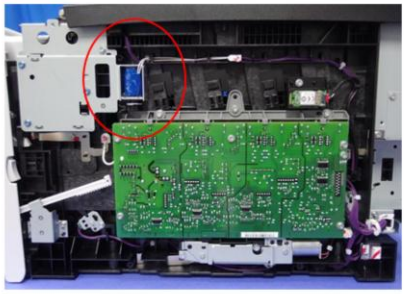
The hot roller has a thin wall.

> 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 removes toner/dust transferred from the pawls to the hot roller

Fusing Stripper Pawl

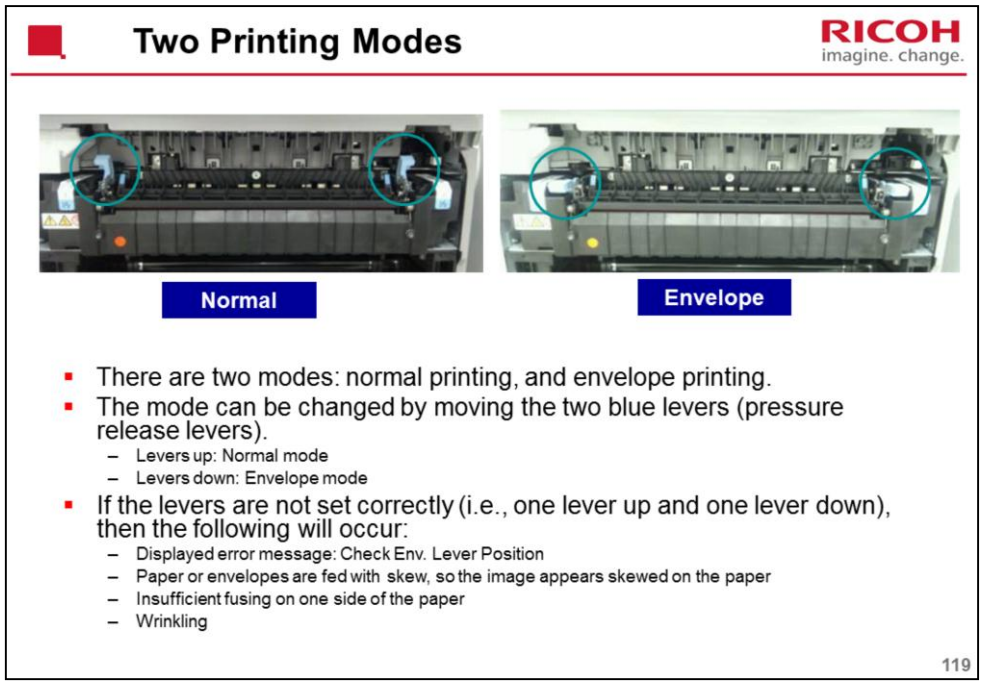
RICOH
imagine. change.

- 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.



118

No additional notes



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.

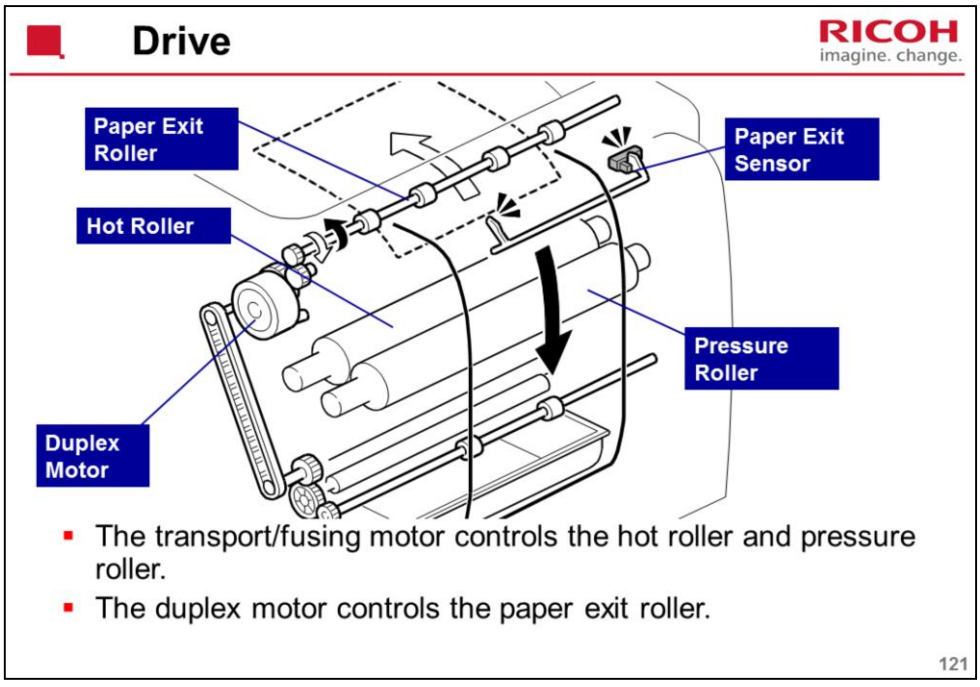
Fusing Pressure Release Sensor

RICOH
imagine. change.

- The sensor detects the status of the levers. If the position does not match the paper type, a warning appears on the display.

120

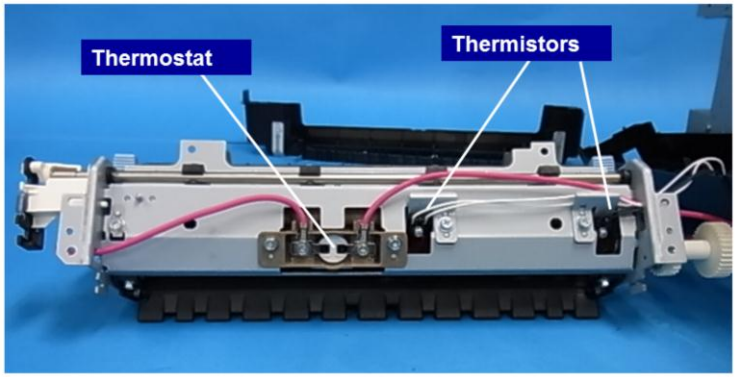
No additional notes



No additional notes

Fusing Temperature Control - 1/3

RICOH
imagine. change.

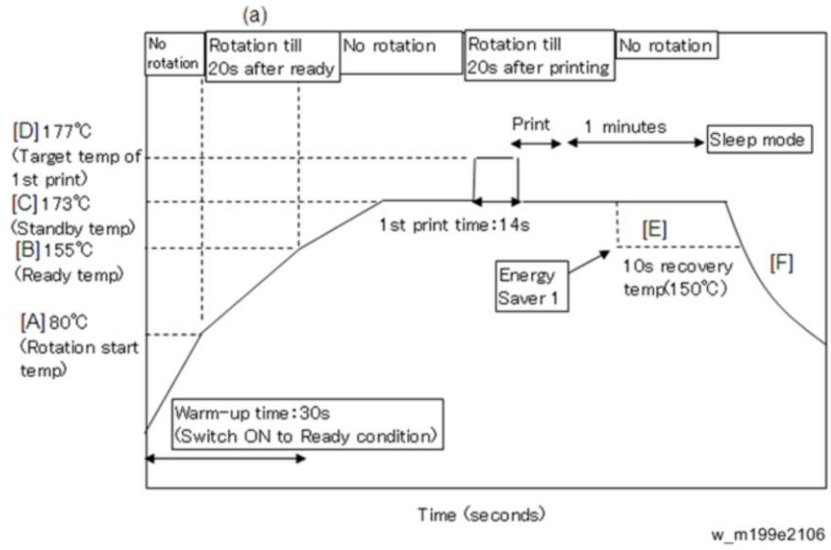


- Two thermistors, one thermostat
  - Fusing temperature control is based on measurements from the thermistor at the center.
- The thermostat cuts power to the fusing lamp.
- The machine turns power off and enters sleep mode if the machine is idle for 10 minutes.

122

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.

No additional notes

Fusing Temperature Control - 3/3

RICOH imagine. change.

- 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

124

No additional notes

Fusing Unit SCs

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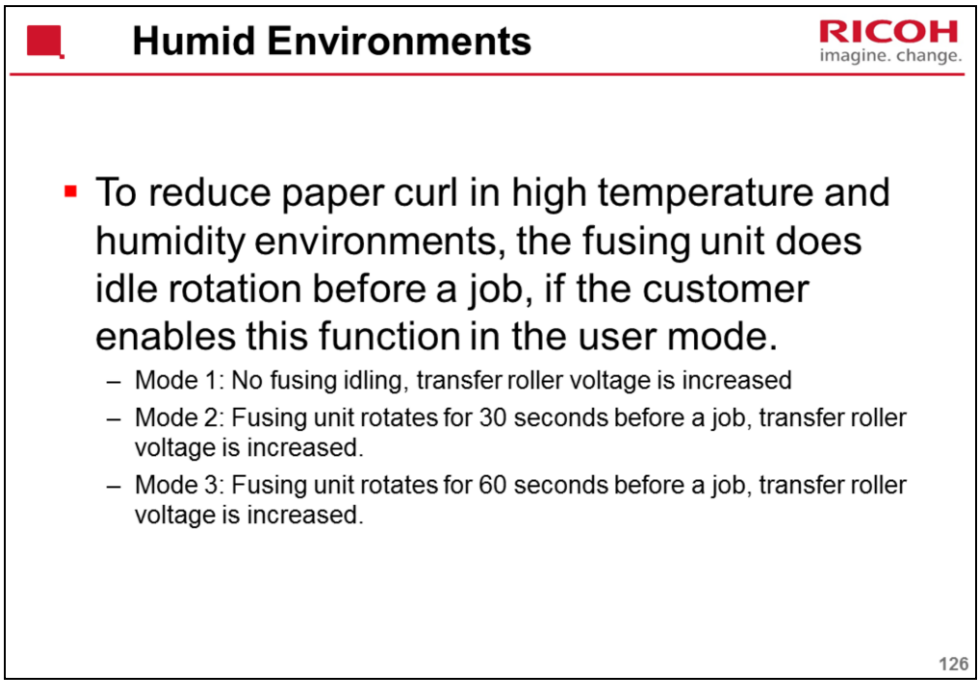
imagine. change.

- 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

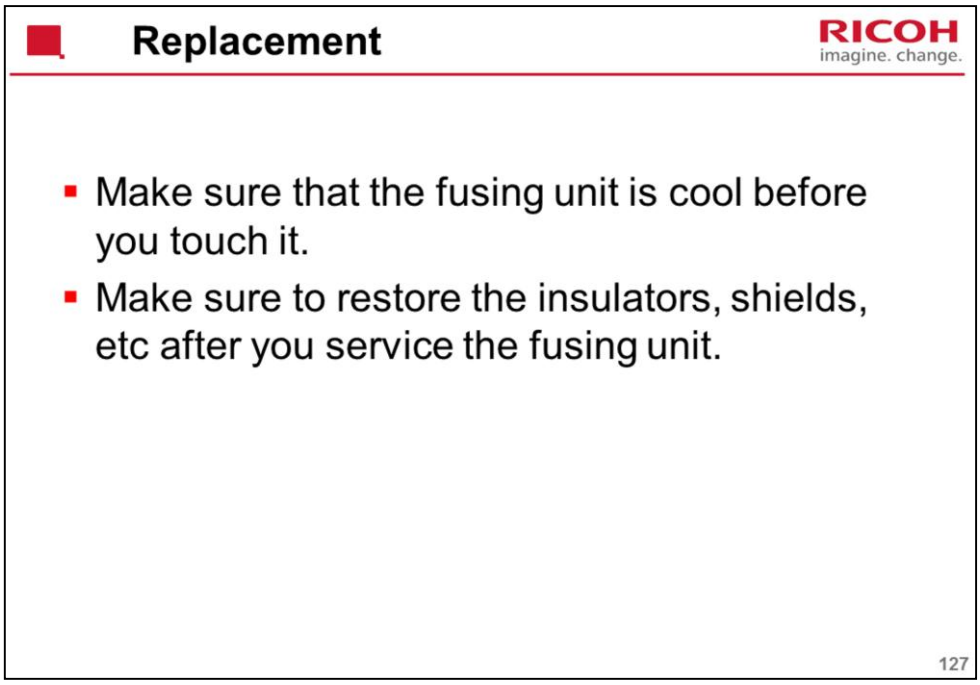
125

No additional notes



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

Menu – Machine Settings – High Humidity Mode



No additional notes

After Replacing the Fusing Unit

RICOH
imagine. change.

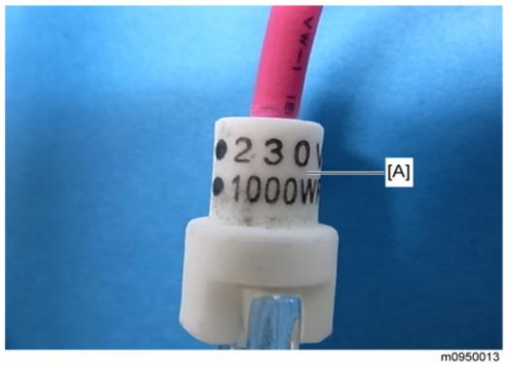
- Execute "Reset Fuser Unit" with the "Engine Maintenance" menu if the fusing unit is replaced.

128

No additional notes

Fusing Lamp Replacement

RICOH
imagine. change.



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- 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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No additional notes

Reassembling the Fusing Unit

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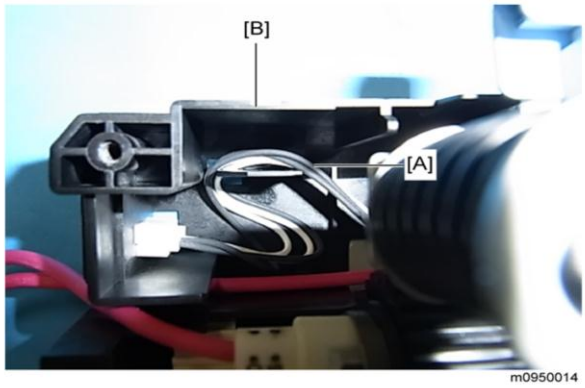

- Route the harness [A] as shown above when reinstalling the back cover [B].

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No additional notes

Fusing Unit Jams

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imagine. change.

- 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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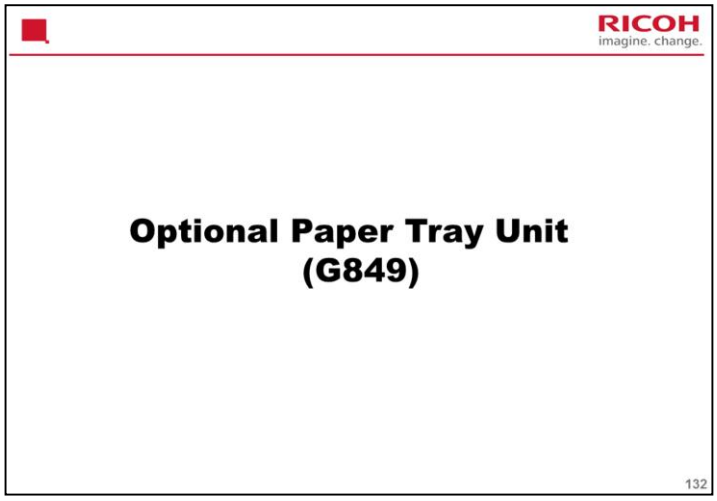
No additional notes



This is the same as the PE-MF3/P2.

Overview

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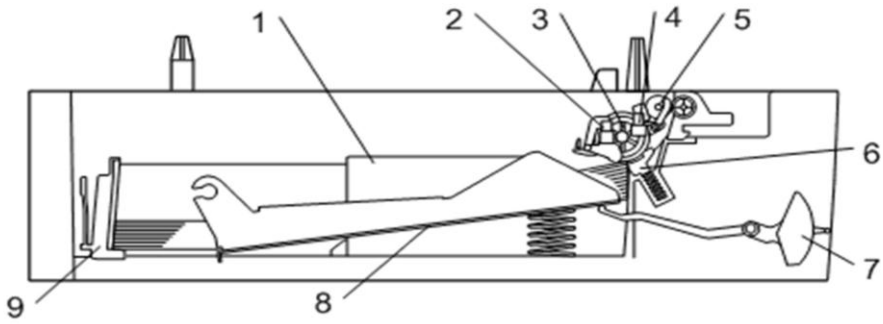
imagine. change.



- Capacity: 500 sheets
- Feed roller and friction pad

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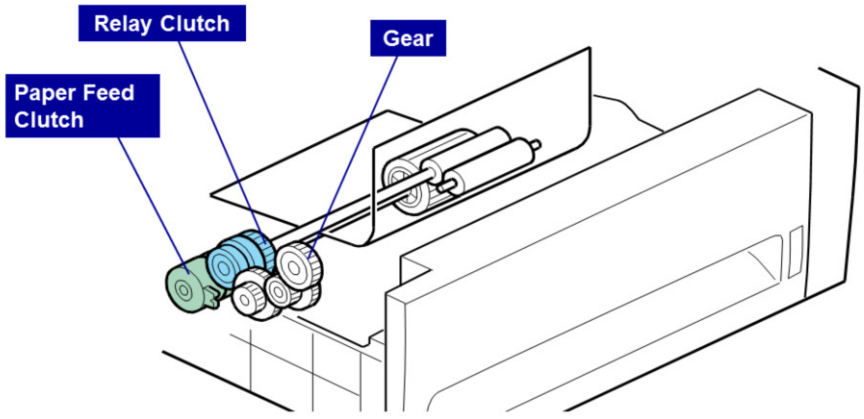
1. Side Fence
2. Paper End Sensor
3. Paper Feed Roller
4. Relay Sensor
5. Relay Roller
6. Friction Pad
7. Paper Height Lever
8. Bottom Plate
9. Rear Fence

Feed

RICOH
imagine. change.



- The transport/fusing motor in the main machine drives the gear.
- The clutches transfer drive to the rollers at the correct times.

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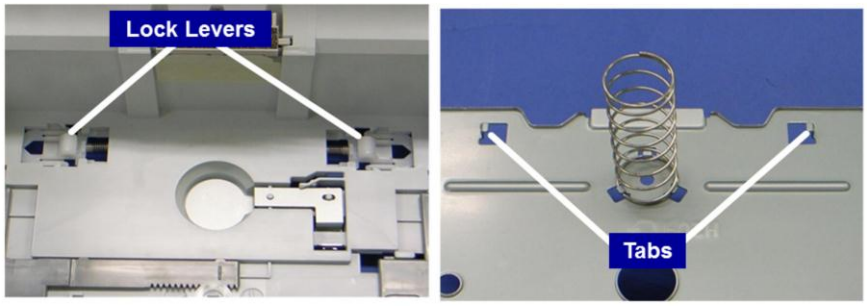
No additional notes

Paper Lift - 1

RICOH
imagine. change.



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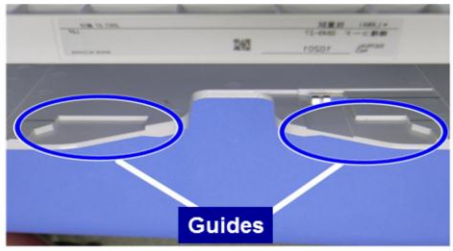
The next slide shows what happens after you put the tray in the machine.

Paper Lift - 2

RICOH
imagine. change.



- 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.

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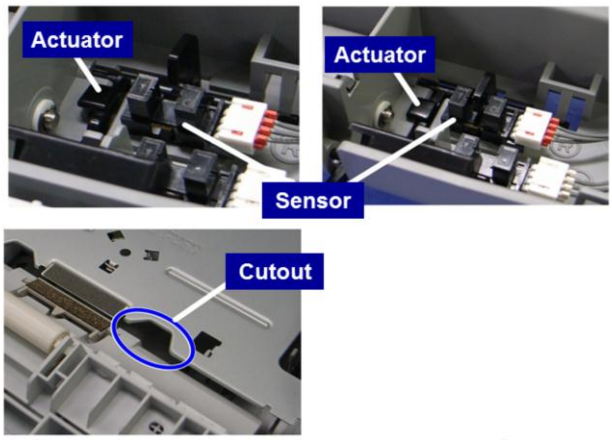
No additional notes

Paper End Detection

RICOH
imagine. change.



- 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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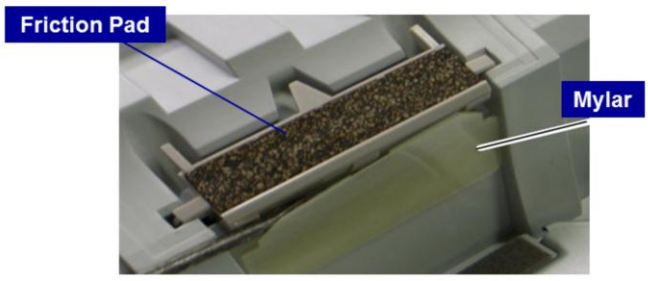
No additional notes

Reinstalling the Friction Pad

RICOH
imagine. change.



- 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

The End