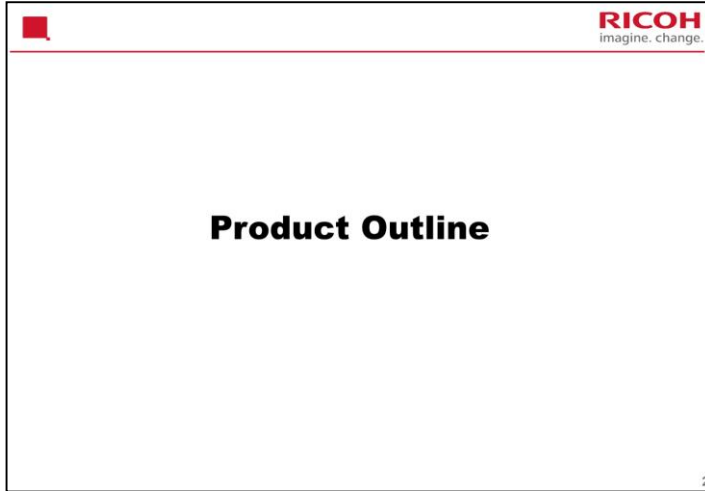




This course explains the low-end color A4 printer Ve-P1.



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



## What Models are there in the Series?

**RICOH**  
imagine. change.

- Ve-P1d (M136) SP C352DN
  - GW+ controller, 30 ppm (single-sided prints), 28 ppm (duplex)
- Low-end A4 printers
- GW+ Controller (15S)
- Contains PostScript3, Gigabit Ethernet, duplex unit, and bypass tray as standard equipment.

3

No additional notes



## Main Points

- LED print head
- QSU fusing unit
- Eco night sensor
- Installation and maintenance can be done by users
  - Including installation of optional paper tray units.

No additional notes



## Appearance

**RICOH**  
imagine. change.



One paper tray  
is standard

- Up to three one-tray feed units can be installed (not shown here).
- Duplex and bypass are standard.
- There are no finishers.
- There is an external USB/SD card slot by the operation panel.
  - The cover below the operation panel (in the red circle) slides up to reveal these slots.

5

No additional notes

**Options: Paper Feed**

|                               |     | Also used with these new models: | Similar to: | Note       |
|-------------------------------|-----|----------------------------------|-------------|------------|
| Paper Feed Unit TK1230 (M407) | New |                                  |             | 250 sheets |
| Paper Feed Unit TK1240 (M408) | New |                                  |             | 500 sheets |
|                               |     |                                  |             |            |
|                               |     |                                  |             |            |
|                               |     |                                  |             |            |
|                               |     |                                  |             |            |
|                               |     |                                  |             |            |
|                               |     |                                  |             |            |

There are no finishers.

## Options: Printer

|                                         | Note   |
|-----------------------------------------|--------|
| M500: Camera Direct Print Card Type P10 |        |
| M500: XPS Direct Print Option Type P12  |        |
| M500: Hard Disk Drive Option Type P12   | 160 GB |
| M500: PostScript3 Type P12              |        |
| D3BC: USB Device Server Option Type M19 |        |

There is no RPCS driver.

## Options: Controller

|                                           |  | Also used with these new models: | Note                            |
|-------------------------------------------|--|----------------------------------|---------------------------------|
| D3C0: IEEE 1284 Interface Board Type M19  |  |                                  |                                 |
| M500: IEEE 802.11 Interface Unit Type M24 |  |                                  |                                 |
| M500: VM Card Type P8                     |  |                                  | Requires the optional hard disk |
|                                           |  |                                  |                                 |

No Bluetooth option

VM card: requires optional HDD





## Controller Options Memory Upgrade Options


**RICOH**  
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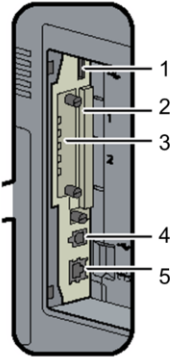
- Optional hard disk
  - 250 GB
- Memory
  - Standard memory: 512MB
  - Upgrades: 1 GB or 1.5GB memory card option
    - There is only one slot for memory. To upgrade, remove the standard 512 MB memory and install the 1 GB or 1.5GB memory option.
  - Max possible memory: 1.5 GB

9

No additional notes

## Ports on the Controller Board





1. USB port A: Connect external devices such as a digital camera, a card authentication device, etc.
  - Use of a digital camera requires the Camera Direct Print option.
2. Expansion card slots: Remove the cover to install SD cards.
3. Optional interface board slot: Insert an optional wireless LAN interface board or IEEE 1284 interface board.
4. USB port B: Use a USB cable to connect the printer to a computer.
5. Ethernet port: Use a network interface cable to connect the printer to a network.

10

Board Slot: One of the following can be installed.

IEEE 802.11a/g Interface Unit Type J or IEEE 802.11g Interface Unit Type K

IEEE 1284 Interface Board Type A

The SD Card slots are discussed in more detail on the next few slides.

Use of a digital camera requires the Camera Direct Print SD card option.

There is a mini USB slot behind the screw above item 4 in the diagram. This is for designer purposes only.



## SD Card Slots (1)

- Slot 1 (upper slot):
  - The slot is empty when shipped
  - Use when installing the following options
    - Camera direct print
    - SD card for Netware printing
    - VM card
  - If the number of options that you wish to install is more than the number of available SD card slots, move them onto one SD card.
    - Destination card: SD slot 1
  - If more than one SD card options must be merged, and the VM card is one of them, the VM card must be the target SD card.
    - The VM card option cannot be moved.

See Installation > Controller Options

PDF Direct/PCL/PostScript 3 are pre-installed in the Controller Firmware.



## SD Card Slots (2)

**RICOH**  
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- Slot 2 (lower slot)
  - The slot is empty when shipped.
  - Use this slot for service procedures, such as firmware update and NVRAM backup.

12

No additional notes



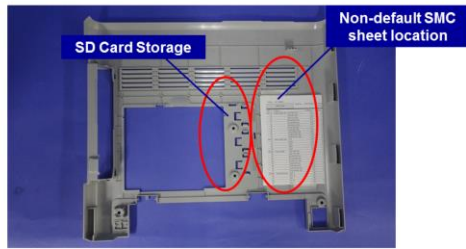
- These features are built into the controller board for all models.
  - There is no Security SD Card.

No additional notes



## SD Card Storage Location

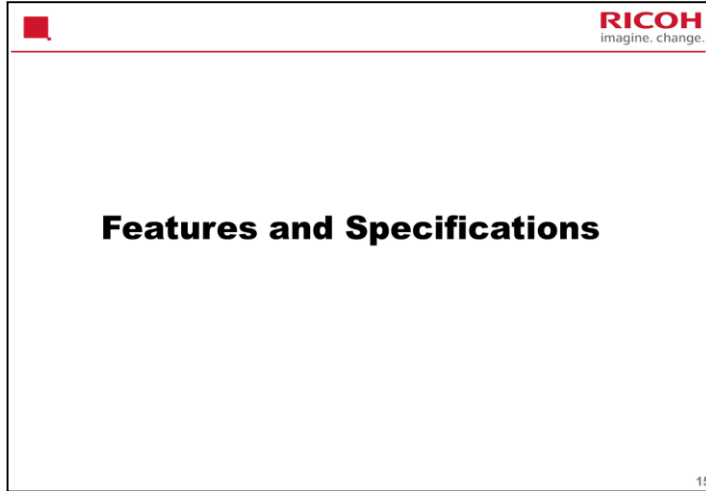
**RICOH**  
imagine. change.



- Store the original SD cards here (back side of the rear cover) after you move the application to another card.
- The non-default page is attached to the back side of the rear cover.

14

The rear cover must be removed to access these storage locations.



This section provides an overview of the main specifications.



## General Specifications – 1

**RICOH**  
imagine. change.

- Printing Speed (A4, 8 1/2" x 11" SEF): 30 ppm
  - Duplex: 28 ppm
- First Print Time (A4/8 1/2" x 11" SEF):
  - B&W: 6.9 sec
  - Color: 8.9 sec
- Warm-up Time
  - 20 sec or less

16

No additional notes





## General Specifications – 2

**RICOH**  
imagine. change.

- Resolution (Engine):
  - 600 dpi x 600 dpi, 1,200 x 1,200dpi,  
600 dpi x 1,200 dpi equivalent, 600 x 2,400dpi equivalent,
- Power Consumption:
  - Maximum: 1500W (all regions)
  - Energy Saver: 1.0 W or less (in Sleep mode)

17

No additional notes



# Resolution

**RICOH**  
imagine. change.

|                           | 600x600dpi             | 600x1200dpi equivalent | 600x2400dpi equivalent                                    | 1200x1200dpi                                       |
|---------------------------|------------------------|------------------------|-----------------------------------------------------------|----------------------------------------------------|
| 1 Characteristic          | High speed transaction | -                      | Variety of gradation                                      | High resolution                                    |
| 2 Print speed             | Normal                 | Normal                 | Normal                                                    | Normal                                             |
| 3 Real resolution         | 600dpi                 | 600dpi                 | 600dpi                                                    | 1200dpi                                            |
| 4 Gradation (Bit pattern) |                        |                        |                                                           |                                                    |
| 4 Line per inch           | 134 LPI                | 134 LPI                | 168 LPI                                                   | 190 LPI                                            |
| 5 Photograph              | Not suitable           | Just about acceptable  | Rich gradation, most suitable for photographs and images. | Suitable                                           |
| Character/Line            | Just about acceptable  | Just about acceptable  | Just about acceptable                                     | Fine dots, most suitable for characters and lines. |

18

No additional notes



## General Specifications – 3

**RICOH**  
imagine. change.

- Input Tray Capacity
  - Standard Tray: 500 sheets
  - Bypass tray: 100 sheets
  - Optional Paper Feed Unit: 250 or 500 sheets
  - Maximum
    - 1,850 sheets total capacity (Std tray + Option x 3 + Bypass)
- Output Tray Capacity (Face down)
  - Up to 200 sheets

19

No additional notes



## General Specifications – 4

**RICOH**  
imagine. change.

- Paper Size:
  - Standard tray: A4/LT SEF – A6/HLT LEF
    - Non-standard sizes: Width: 82.5 - 216 mm (3.25" – 8.5"), Length: 148 - 356 mm (5.8" - 14.0")
  - Optional tray: A4/LT SEF – A5/HLT LEF
    - Non-standard sizes: Width: 139.7 - 216 mm (5.5" – 8.5"), Length: 210 - 356 mm (8.3" - 14.0")
  - Bypass tray: A4/LT SEF – A6/HLT LEF
    - Non-standard sizes: Width: 64 - 216 mm (2.5" – 8.5"), Length: 127 - 1260 mm (5.0" - 49.6")
  - Duplex: A4/LT SEF – A6/HLT LEF
    - Non-standard sizes: Width: 100 - 297 mm (3.9" - 11.7"), Length: 148 - 432 mm (5.8" - 17.0")
- Paper Weight
  - Standard Tray: 56 - 220 g/m2 (15 lb. Bond - 80 lb. Cover)
  - Bypass tray: 56 - 220 g/m2 (15 lb. Bond - 80 lb. Cover)
  - Duplex: 56 - 163 g/m2 (15 lb. Bond - 90 lb. Index)
  - Optional Paper Feed Unit: 56 - 220 g/m2 (15 lb. Bond - 80 lb. Cover)

20

No additional notes



## General Specifications – 5

**RICOH**  
imagine. change.

- Memory: 2 GB
- HDD: Optional 250 GB
- Interface
  - Standard: Gigabit Ethernet (1000/100/10BASE-T),  
USB2.0, USB2.0-Host
  - Options: IEEE1284, IEEE802.11a/b/g/n
- PDL
  - Standard: PDF Direct, PCL6/5c, PostScript3
  - Option: PictBridge, IPDS

21

No additional notes

## ■ Targets

|                                    | P1d (GW+)                             |
|------------------------------------|---------------------------------------|
| APV, per month                     | 1.5k                                  |
| Color Ratio                        | 50%                                   |
| MPBF (Mean Prints Between Failure) | 70k                                   |
| Call ratio (Mainframe)             | 0.021                                 |
| Estimated Unit Life                | 450k or 5 years whichever comes first |

22

No additional notes



## Yield of Consumables

**RICOH**  
imagine. change.

- Toner
  - K: 7k
  - CMY: 6k
- Maintenance Parts
  - See the 'Maintenance Parts' slide later in the course.

23

Yields measured with these conditions: 5% coverage, 3p/j



## Black-and White Priority Mode

**RICOH**  
imagine. change.

- If this function is switched on with a user tool, color process control is not done for black-and-white printing. It is only done when the customer starts a color printing job.
  - Menu button > System > B&W Print Priority (Default: Off)

24

This function is the same as the Pe and Md series.





## Curl Prevention Mode

- If the customer switches this function on:
  - Pre-rotation of the fusing unit is done before the first print.
  - Printing speed is reduced.
  - Menu button > Maintenance > Quality Maintenance > Curl prevention (Default: Inactive)

No additional notes

**Eco Night Sensor - 1**

**RICOH**  
imagine. change.

- The machine saves electricity by automatically turning off the main power (or entering sleep mode) when the room is dark.
  - Ambient light is detected by the Eco Night Sensor on the operation panel.
  - The sensor is a translucent circular window 4 mm in diameter
- This will prevent waste of electricity when people forget to turn off the machine.
- The feature has been improved; you can now also have the machine turn the power on when the room gets lighter.

26

No additional notes



## Eco Night Sensor - 2

- The Eco night sensor function can be enabled or disabled with the following user tool.
  - Enable/disable with [Menu button] > [System] > [ECO Night Sensor] > [Mode Setting]
  - There are three settings:
    - Inactive: The sensor is not used
    - Power off: The machine uses the sensor to detect when to turn off the power (this is the default setting)
    - Power off then on: The machine uses the sensor to detect when to turn off the power, and when to turn it back on again
- The timer to turn off the power is set from 1 to 120 min.
  - Select with [Menu button] > [System] > [ECO Night Sensor] > [Timer to Turn Off]
  - The timer is reset if the ambient light level increases, printing is done, or any key is pressed before the specified time elapses.
  - There is a similar setting (Timer to Turn On) to fix the time waited by the machine to turn on after an increase in light is detected.
- The Eco night sensor has five brightness sensitivity levels (trigger thresholds).
  - Select with [Menu button] > [System] > [ECO Night Sensor] > [Brightness Sensor Level]
  - 1 is the darkest setting
  - There is a setting for turning off the power and another setting for turning it on.

No additional notes



### Eco Night Sensor - 3

**RICOH**  
imagine. change.

- If the controller is executing a process, the Light Detect Function activates after the process is completed.
- Light Detect also cannot activate if printing stopped due to a lack of paper or a paper jam.
- If a spooled print job is stored in the machine, the machine cannot activate Light Detect.
- After the Light Detect Function turns off the power, the machine cannot power on by itself if Timer to Turn On is disabled. To power on the machine, the main power switch has to be turned on manually.
  - If Timer to Turn On is enabled, then the machine will turn itself on when the ambient light increases above a set level.

28

No additional notes



## Weekly Timer

- This new feature allows you to set times for when the machine automatically turns the power on and off. You can set different times for each day of the week.
- Control this feature with [Menu button] > [System] > [Weekly Timer].
  - Daily (Web Preset Time): Only one set of times can be input, and these are used for each day of the week.
  - Day of Week (Preset Time): Different times can be input for each day of the week.
  - Inactive: Default setting. This feature is not used.
  - If you select 'Daily' or 'Day of the Week', you have to input the power on and power off times with Web Image Monitor.

No additional notes



## Safe Shutdown



m112m0143

- This is the only power switch [A] on the machine.
- When you use this to turn the power off, 'Please Wait' is displayed, while the machine checks the following:
  - File system in HDD, memory, SD card, USB memory are safe.
  - Paper is not left in the machine's paper path (except if a jam occurred immediately before the power off).
  - All print jobs and access logs are saved.
- Then the power turns off.

No additional notes



## Forced Shutdown



m112m0143

- If the machine freezes, hold this switch [A] down for 6 seconds.
- However, this method can damage the hard disk or controller board, or cause data loss.
- Forced shutdown should only be carried out when in contact with a call center operator, or by a technician, after explaining the risk of the operation to the customer.
- If the normal shutdown process will not function correctly, an ASIC on the CTL board might be broken. In this case, a technician visit is necessary.

No additional notes



**RICOH**  
imagine. change.

---

# **Maintenance**

32

No additional notes





## PM by User or Technician

**RICOH**  
imagine. change.

- **User PM:** This product has been designed for user maintenance. The maintenance parts on the next slide have been prepared as supplies. User maintenance is basically done by replacing these supplies.
- **Technician PM:** If the printer is used at its target APV (2.0k prints), parts with a life of 120k or more will not need to be replaced within the normal life of the machine. For high PV users, however, technicians should replace the parts when the counters reach their targets.

33

No additional notes

| <b>Maintenance Parts</b> |                                                                                                                                                                 | <b>RICOH</b><br>imagine. change. |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| ▪                        | PCDU <ul style="list-style-type: none"><li>– K: 15k, CMY: 12k (User PM)</li><li>– K: 23k, CMY: 18k (Technician PM)</li></ul>                                    |                                  |
| ▪                        | Transfer Unit (contains ITB, paper transfer roller, air filter) <ul style="list-style-type: none"><li>– 100k (User PM)</li><li>– 115k (Technician PM)</li></ul> |                                  |
| ▪                        | Fusing Unit <ul style="list-style-type: none"><li>– 150k (User PM)</li><li>– 180k (Technician PM)</li></ul>                                                     |                                  |
| ▪                        | Waste Toner Bottle <ul style="list-style-type: none"><li>– 13k (User and Technician PM)</li></ul>                                                               |                                  |

Toner yields: 5% coverage, 3p/j

Other service parts with PM intervals

Paper Feed Roller: (Mainframe & Option): 150K

Friction Pad (Mainframe & Option): 150K

Paper Feed Roller (Bypass): 100K

Friction Pad (Bypass): 100K

User PM: This product has been designed for user maintenance. The maintenance parts in the slide above have been prepared as supplies. User maintenance is basically done by replacing these supplies


Technician PM: If the printer is used at its target APV (2.0k prints), technicians do not need to replace any PM parts. For high PV users, however, technicians should replace the above maintenance parts when the counters reach their targets.

Near-end for the maintenance parts can be selected by a user tool. The settings are:

0: Notify Sooner: 665 pages before the end

1 (default): Normal: 475 pages before the end

2: Notify Later: 285 pages before the end

 **Near-end Alert for Maintenance Parts****RICOH**  
imagine. change.

- Near-end for the maintenance parts can be selected by a user tool.
  - Menu button > Maintenance > General Settings > Replacement Alert
- The settings are:
  - Notify Sooner
  - Normal (default)
  - Notify Later
- The settings can be made for the following parts:
  - Toner, PCDU (black), PCDU (color), waste toner bottle, transfer belt unit, fusing unit

35

Approximate number of prints that can be made with each setting:

0: Notify Sooner: 665 pages before the end

1 (default): Normal: 475 pages before the end

2: Notify Later: 285 pages before the end

The number of prints is a reference value based on the following conditions: A4, SEF, Color ratio 50%, 3 prints/job, Each color 5% on the original, Serial printing. The actual amount (replacement cycle) fluctuates due to conditions such as: paper size, paper type, page orientation, contents of original, number of pages per job in serial printing, and the number of times that process control and MUSIC are done. The numbers are based on drum rotation.

For example, if there are fewer prints per job, the part will need to be replaced earlier.



## What Happens at the End Alert?

**RICOH**  
imagine. change.

- For toner cartridges and the waste toner bottle, when the end limit arrives, the machine stops and printing is prohibited.
- For the PCDUs, image transfer unit, and fusing unit, printing can continue even after the end limit (end of life).
- Alert messages are shown in all cases except the following:
  - Meter click setting is off (default): Alert message always shown
  - Meter click setting is on: Alert message not shown for PCDUs, image transfer unit, and fusing unit
    - Alerts for these can be enabled with SP mode.

36

No additional notes



## Other PM - PM Table

- Do the following, depending on the type of service contract.
  - Cleaning at 100k
    - Components in the paper feed path
    - Do not use alcohol.
    - See the PM table in the service manual for details.
  - Replacement at 100k
    - Bypass feed roller and friction pad
  - Replacement at 180k
    - Main feed roller and friction pad

No additional notes



## Updating Firmware

**RICOH**  
imagine. change.

- The procedure uses SD cards and is the same as for other GW models.
- RFU (Remote Firmware Update) is also available.

38

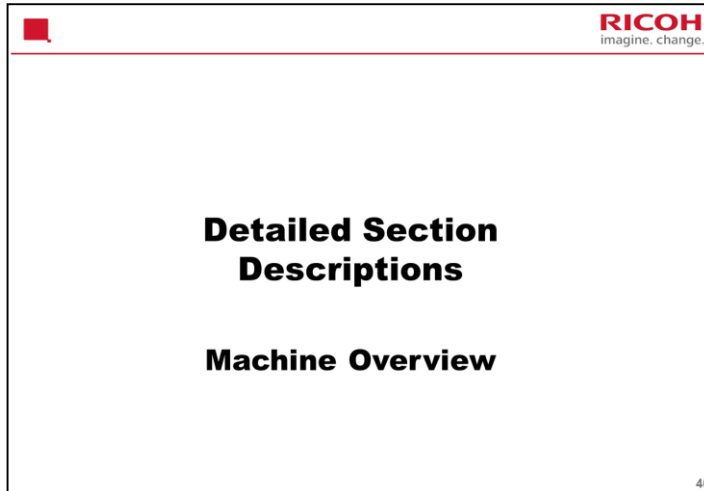
No additional notes



## Machine Life

- The target APV is 1.5k per month.
- The life of the machine is 5 years, which the same as 90K with the above APV.
- So parts with a life of more than 90K will not need to be replaced within the normal life of the machine.

No additional notes



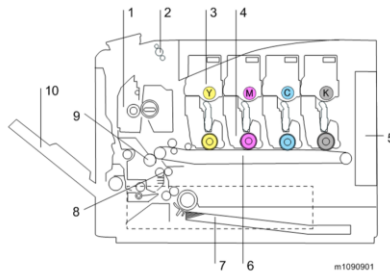
Now we have a look inside the machine. This first section has a quick look at where the main components are located.





## Component Layout

**RICOH**  
imagine. change.



1. Fusing Unit
2. Paper Exit/Reverse Roller
3. Toner Cartridge
4. PCDU
5. Engine Board and Controller Board
6. Image Transfer Belt Unit
7. Paper Feed Tray
8. Registration Roller
9. Paper Transfer Roller
10. Bypass Tray Unit

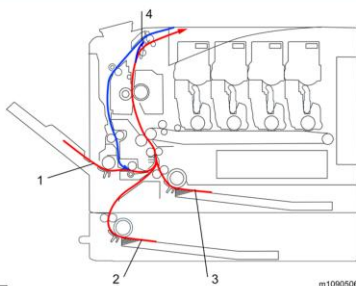
41

No additional notes



## Paper Path

**RICOH**  
imagine. change.



1. Bypass Tray
2. Optional Paper Feed Tray
3. Standard Paper Feed Tray
4. Duplex Feed Path

m1090506

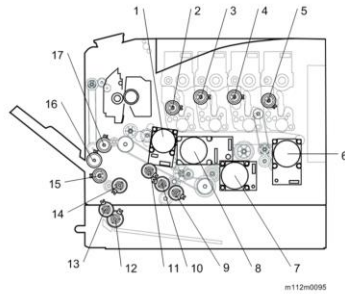
42

No additional notes



## Drive Components

**RICOH**  
imagine. change.



1. Transfer/Transport Motor
2. Toner Supply Clutch (Y)
3. Toner Supply Clutch (M)
4. Toner Supply Clutch (C)
5. Toner Supply Clutch (K)
6. Drum Motor: K
7. Fusing Motor
8. Drum Motor: CMY
9. ITB (Image Transfer Belt) Contact Clutch
10. Paper Feed Clutch
11. Registration Clutch
12. Optional Paper Feed Clutch
13. Grip Roller Clutch
14. Duplex Paper Exit Clutch
15. Bypass Feed Clutch
16. Bypass Bottom Plate Clutch
17. Duplex Intermediate Clutch

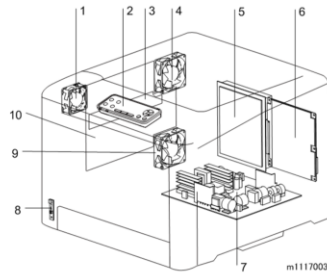
43

No additional notes



## Major Electrical Components

**RICOH**  
imagine. change.



1. Fusing Fan
2. Operation Panel
3. New PCDU Detection Board
4. Cooling Fan
5. Controller Board (CTL)
6. Engine Board (EGB)
7. PSU
8. Main Power Switch
9. PSU Fan
10. High Voltage Supply Board (HVP)

44

No additional notes



## Main Circuit Boards

**RICOH**  
imagine. change.

- EGB (Engine Board): Controls the engine, the controller interface, image processing, color registration adjustment (MUSIC), input/output, interfaces with the optional units, and the operation panel.
- CTL (GW+ Controller): Controls the interface between the operation panel and EGB, and applications. The controller connects to the EGB through the PCI Bus
- PSU: This unit supplies DC voltage.
- HVP (High Voltage Power supply): This unit supplies high voltages.
  - There are two boards. A small separate board provides power to the discharge plate, which separates paper from the transfer belt and paper transfer roller.

45

No additional notes



## Before Servicing the Machine

**RICOH**  
imagine. change.

- Before you start to remove parts from the machine, do the following for your safety and to prevent damage to the machine:
  - Turn off the power using the safe shutdown procedure.
  - Then disconnect the power cord and press the power switch again to discharge the remaining current.

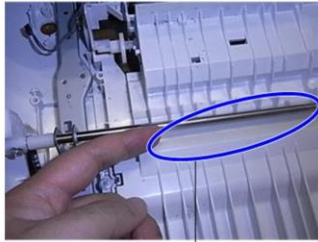
46

If you are in a training class, or have access to the machine while doing this course, look through these next few slides before you do the procedures, to make sure you are familiar with these important points.



## Removing the Front Cover Unit

**RICOH**  
imagine. change.



[A] m1092129

- This is a long procedure. It is only needed if the front cover must be replaced. But we include it in the service manual just in case.
- The main point is to make sure that you don't break the mylar [A].

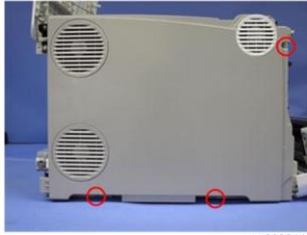
47

The mylar is available as a service part.



## Removing the Left Cover

**RICOH**  
imagine. change.



m1092014

- Remove the waste toner bottle before you remove the left cover. Otherwise the waste toner bottle could fall over and toner may be spilled.

48

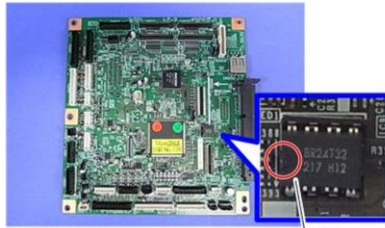
No additional notes





## Replacing the EGB

**RICOH**  
imagine. change.



m1099171.jpg

[A]

- Remove the EEPROM from the old EGB and install it on the new EGB.
- The mark [A] must point to the left side of the board.

49

No additional notes



## Don't Touch These Screws

**RICOH**  
imagine. change.



- This photo shows some screws painted in white.
- You can see these after the fusing unit is removed from the printer.
- The wire is connected to the front cover. The tension is determined by the screws. They should not be loosened.

50

No additional notes

- When replacing the EEPROM on the Engine Board, please check the following points:
  - If a near end alert for the fusing unit, paper transfer roller unit, or PCPU is displayed, replace them with new units before carrying out EEPROM replacement. Not doing so may cause image quality problems or SC490.
  - If the Waste Toner Bottle is near full, replace it with a new one. Not doing so may cause toner overflow.
  - After replacing the EEPROM, check that there is no image quality problem. If an image quality problem occurs, do not try to fix it by putting the old EEPROM back, but make adjustments so that they are stored in the new EEPROM.

No additional notes



## Replacing EEPROM on the EGB - 2

**RICOH**  
imagine. change.

- If the EEPROM download/upload feature cannot be used, do the following:

1. Login to the machine using the factory SP mode (Cover open).

Set these SPs in the factory SP mode.

5-807-001 "Machine Type Area Selection" <- 1: DOM (JPN), 2: NA, 3: EU, 4: Asia, 5: CHN, 6: TWN, 7: KOR  
5-807-002 "Machine Type Model Selection" <- 1: Ve-P1a, 2: Ve-P1b, 3: Ve-P1c, 4: Ve-P1d  
5-930-001 "Meter Click Charge" <-Set the value on the latest SMC sheet  
5-988-001 "Maintenance ID" <-Set the value on the latest SMC sheet  
5-988-002 "Brand ID" <-Set the value on the latest SMC sheet  
5-811-001 "Machine Info Set: Serial No." <-input the 5-811-002 value from the SMC sheet  
5-801-002 Execute "Engine Memory Clear"

2. Power OFF, then power ON. Login to the normal SP mode.

Input values from the latest SMC sheet

3-333-001 to 3-333-006 "TM (ID) sensor (right) adjustment value"  
3-334-001 to 3-334-006 "TM (ID) sensor (left) adjustment value"  
1-001-013 to 1-001-020 "Sub scan direction registration"  
1-002-001 to 1-002-003 "Main scan direction registration"  
1-003-001 to 1-003-012 "Paper buckle adjustment"

3. Close Cover, then do the following steps in this order.

2-111-002 Execute "Line position adjustment factory mode"  
3-011-001 Execute "Normal Process Control"  
2-185-002 Input "1" in "Margin Position: Base Calculation Flag"  
2-111-001 Execute "Line position adjustment normal mode"  
2-185-002 Input "1" in "Margin Position: Base Calculation Flag"  
2-111-003 Execute "Line position adjustment Black mode"

Ready to use the machine

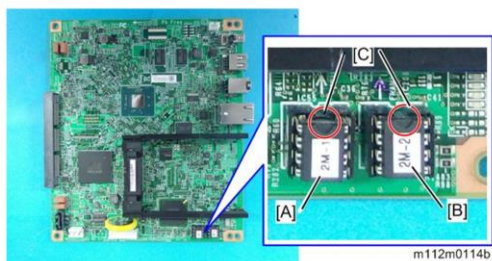
52

After doing this, the machine will work. However, the counters for the supply parts will be wrong. So, to get the counters to match the machine condition, all supply parts (PCDU, toner, ITB, PTR, fusing unit) should be replaced and the counters reset.



## Replacing the Controller Board

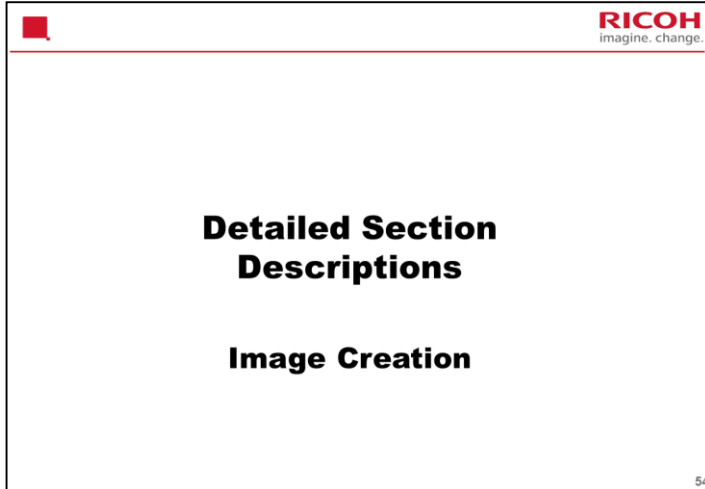
**RICOH**  
imagine. change.



- Remove the NVRAMs from the old board and install them on the new one. Make sure they go in the correct slots.
- The mark [C] must point up.
- Do not change any of the DIP switch settings.

53

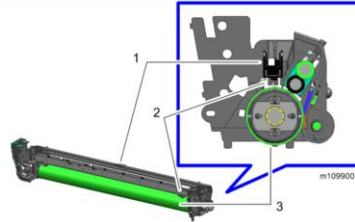
No additional notes



This section explains how a latent image is written on the drum.



## Overview



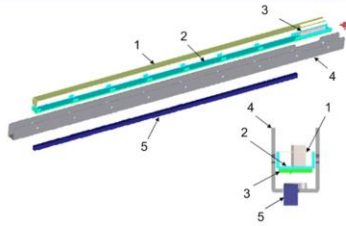
- An LED array [1] writes the latent image on the OPC [3].
- Each OPC (K, C, M, Y) has its own LED array.
  - These arrays are identical.
- A spacer [2] on the drum keeps the LED array at the correct distance from the OPC for correct focus.
- The LED writing method contributes to machine downsizing, and is superior to the LD writing method in image quality, noise reduction, and energy saving.

No additional notes



## Components of the LED Array

**RICOH**  
imagine. change.



- The LED array consists of the following parts.
  1. Sheet
  2. Base
  3. LED board
  4. Frame
  5. SLA (Self-focusing Lens Array)
- The LED array is replaced as one complete unit. The individual components shown above cannot be replaced in the field.

56

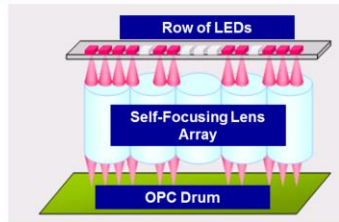
No additional notes





## Detailed Structure of the LED Array

**RICOH**  
imagine. change.



- Tiny LEDs capable of creating images at 1200 dpi are arranged in a line. Light beams emitted by the LEDs are focused using the Self-focusing Lens Array (SLA), creating an image on the OPC drum.
- Each LED head has 26 LED chips on board, and each chip has a line of LEDs 8mm in length.
- If a vertical line 8mm in width appears on the image parallel to the direction of paper feed, it may be caused by a broken LED chip. Exchange the LED head with one of the other colors to troubleshoot the symptom.

57

No additional notes



## Notes Concerning the LED Array

**RICOH**  
imagine. change.

- Image position adjustment
  - Horizontal (main scan): Adjusted by moving the image position
  - Vertical (sub scan): The timing for the start of writing is changed.
  - There are no mechanical adjustments.
  - Start timing can be adjusted
- LED light intensity
  - An EEPROM on the LED head contains data which controls the light intensity of each element.
  - There is no adjustment.
- Adjustment after replacement
  - The EEPROM on the new LED array contains data on the characteristics of the LED array. No adjustment is needed by the technician.

58

No additional notes



- The LED heads are the same for all CMYK colors.
  - So it is possible to find which LED head has the problem by swapping them with one another.
- The LED spacer contacts the OPC to keep the correct distance between the LED head and the drum for focusing.
  - The spacer contacts the OPC, so it will gradually wear out. If the PCDU is used for longer than its normal yield, the LED may gradually start to lose its focus.

No additional notes



## Removing an LED Head

**RICOH**  
imagine. change.



m1092191

- After you open the upper inner cover, cover the PCDUs with a sheet of paper, to prevent foreign objects from falling into the PCDUs.

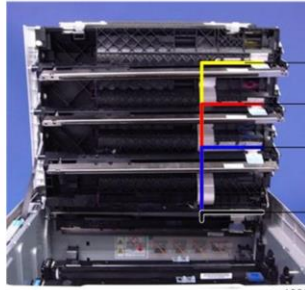
60

If you are in a training class, or have access to the machine while doing this course, look through these next few slides before you do the procedures, to make sure you are familiar with these important points.



## Connecting the LED Arrays

**RICOH**  
imagine. change.

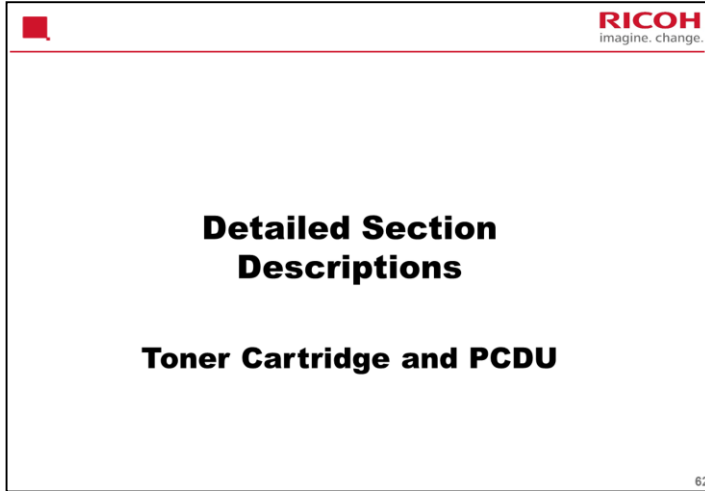


m1092141

- [A] When you connect up the flat cables from the EGB to the LED arrays, make sure that you arrange them correctly.
- [B]
- [C]
- [D]

61

No additional notes

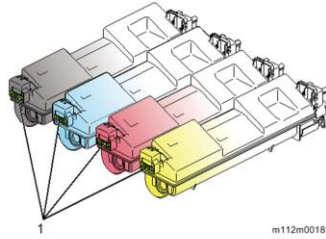


This section explains the components of the toner cartridge and the PCDU.



## Toner Cartridges

**RICOH**  
imagine. change.



- Each toner cartridge contains the toner bottle and toner supply mechanisms.
- Projections on the right side of the toner cartridge ensure each cartridge is always inserted into the correct position.
- The toner cartridges are arranged in the order of Y, M, C, and K as viewed from the front of the machine.
- Each toner cartridge has an ID chip [1] that contains information such as product information and the number of prints. This ID chip also informs the machine when the cartridge is a new one.

63

ID chip information can be checked in SP mode.

SP7-931: Toner Bottle Bk

SP7-932: Toner Bottle C

SP7-933: Toner Bottle M

SP7-934: Toner Bottle Y



## Shutters

- Each cartridge has two shutters. Toner will not leave the cartridge until both shutters are open.
- The first shutter opens when the cartridge is installed in the machine. A projection on the machine opens the shutter.
- The second shutter is controlled by the toner supply solenoid.
- Each cartridge has its own toner supply solenoid.

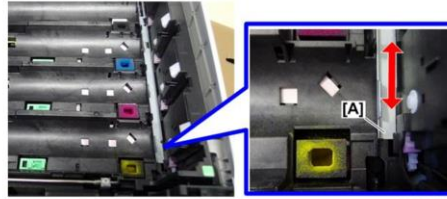
No additional notes





## Toner Supply Solenoid & Shutter

**RICOH**  
imagine. change.



m111d4411

- If you have to remove the solenoid and/or shutter [A], check how the shutter is installed and how it connects to the solenoid before you disassemble. This will make it easier to put it back correctly.

65

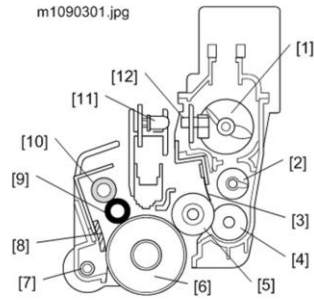
No additional notes



## PCDU Layout

**RICOH**  
imagine. change.

m1090301.jpg



- The PCDU contains the charge roller, photoconductor, development mechanism, and cleaning unit.

1. Upper Mixing Coil
2. Lower Mixing Coil
3. Development Blade
4. Toner Supply Roller
5. Development Roller
6. OPC Drum
7. Waste Toner Collection Coil
8. OPC Cleaning Blade
9. Charge Roller
10. Charge Roller Cleaner
11. Toner End Sensor (mounted on the LED array)
12. Toner End Detection Window

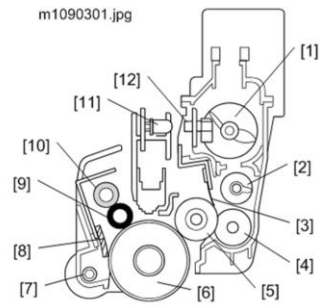
66

No additional notes



## Toner Supply Mechanism

**RICOH**  
imagine. change.



- When the toner supply clutch turns on, a coil in the toner cartridge rotates to transfer toner to the bottle exit and then the PCDU. Toner which falls into the PCDU is transferred to the development section by the upper mixing coil [1].

67

No additional notes

- The TE sensors are mounted on the LED arrays.
- They monitor toner supply through the TNE detection windows in the PCDUs.
- TNE is detected when the TE sensor detects non-supply of toner. Then the near-end status is written to the ID chip.
  - TNE is only detected after a certain amount of toner has been supplied from the bottle.
  - If non-supply is detected before this amount has been supplied, it means something is wrong with toner supply from that bottle, and SC332 is generated.

No additional notes

- After TNE, the toner end alert is shown after a certain number of prints is made (the following are reference values based on 3 prints/job, color ratio 50%, 5% coverage for each color).
  - Normal (Before 5 days): 475 pages
  - Notify Later (Before 3 days): 285 pages
  - Notify Sooner (Before 7 days): 665 pages
  - Users can set "Normal / Notify Sooner / Notify Later". The default is "Normal".
- Then, the toner end status is written to the ID chip.

Approximate number of prints that can be made with each setting:

0: 665 pages before the end

1 (default): 475 pages before the end

2: 285 pages before the end

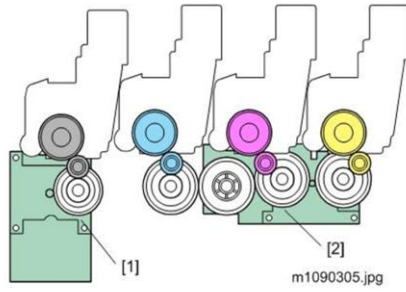
The number of prints is a reference value based on the following conditions: A4, SEF, Color ratio 50%, Each color 5% on the original, Serial printing. The actual amount (replacement cycle) fluctuates due to conditions such as: paper size, paper type, page orientation, contents of original, number of pages per job in serial printing, and the number of times that process control and MUSIC are done. The numbers are based on drum rotation.

For example, if there are fewer prints per job, the toner will need to be replaced earlier.



## PCDU Drive

**RICOH**  
imagine. change.



- The PCDUs are driven by the drum motor (K) [1], and the drum motor (CMY) [2].

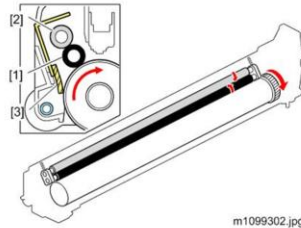
70

No additional notes



## Drum Charge and Cleaning

**RICOH**  
imagine. change.



- This machine uses a charge roller [1]. The charge roller gives the drum surface a negative charge.
- The machine automatically controls the charge roller voltage when process control is executed.
- The charge roller cleaner [2] which always touches the charge roller, cleans the charge roller.
- The OPC cleaning blade [3] removes the waste toner on the OPC.

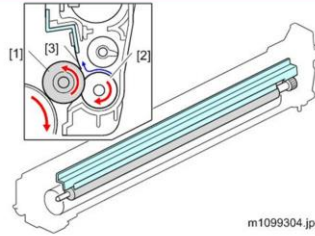
71

The high voltage supply board, which is at the left side of the machine, applies 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.



## Development

**RICOH**  
imagine. change.



- The development mechanism contains the development roller [1], the toner supply roller [2], and the development blade.
- The toner supply roller [2] provides the development roller [1] with toner.
- The development blade [3] keeps the toner attached to the development roller [1] flat.

72

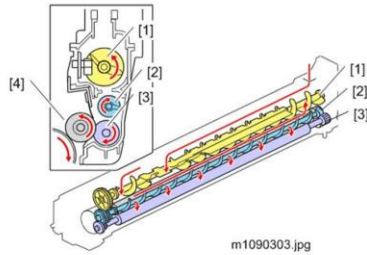
An idle gear between the drive gears of the development roller and toner supply roller ensures that they rotate in the same direction.





## Mixing

**RICOH**  
imagine. change.



m1090303.jpg

- The toner moves as shown in the above drawing.
- The upper mixing coil [1] moves the toner to the left side.
- The lower mixing coil [2] moves toner to the right side.
- Finally, the toner supply roller [3] supplies toner to the development roller [4].

73

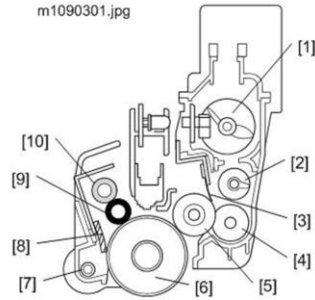
No additional notes



## Waste Toner Collection

**RICOH**  
imagine. change.

m1090301.jpg



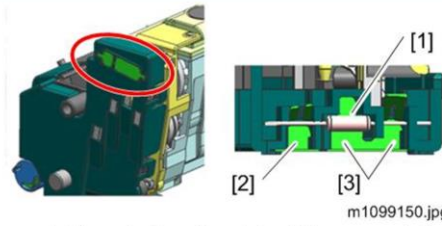
- Toner waste within each PCDU is collected by the waste toner collection coil [7] and sent down to the waste toner bottle.

74

The waste toner collection mechanism will be explained in more detail later.



## New PCDU Detection



- A three-point terminal on the side of the cover detects when a new PCDU is inserted.
- If a new PCDU comes into contact with the terminal, a fuse resistor is opened, and the machine detects the new PCDU.
- When either the user or technician installs a new PCDU, the counter resets automatically. There is no need to reset any counters.

75

1. Fuse Resistor

2. New PCDU Detection

3. Set Detection and New PCDU Detection



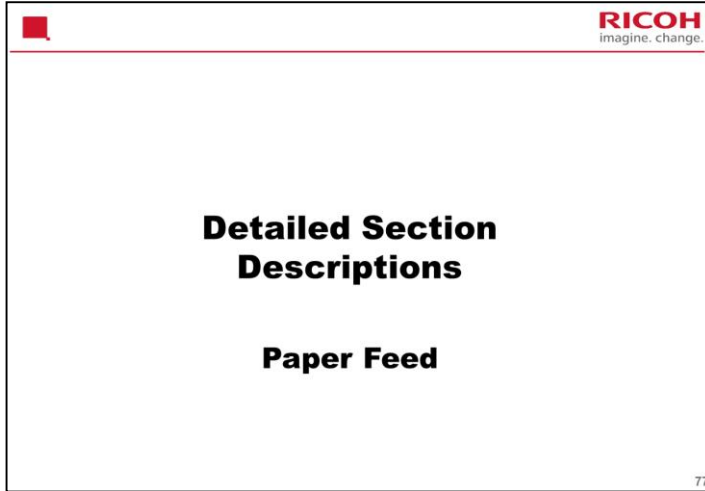
## Replacing the Toner End Sensor

**RICOH**  
imagine. change.

- The toner end sensor is built into the LED print head. If you need to replace the toner end sensor, you have to replace the LED print head.

76

No additional notes

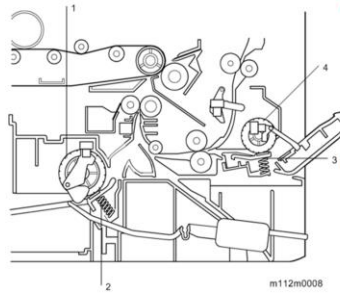


This section explains how paper is fed through the machine.



## Overview

**RICOH**  
imagine. change.



- The machine has a paper tray and a bypass tray.
  1. Paper Feed Roller
  2. Friction Pad
  3. Bypass Feed Roller
  4. Bypass Friction Pad
- The rollers are replaced by technicians only. They are not part of the user PM procedure. There are no counters to reset.

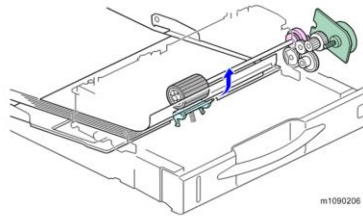
78

No additional notes



## Drive

**RICOH**  
imagine. change.



- To start paper feed, the machine turns on the paper feed clutch, and the paper feed roller rotates (driven by the transfer/transport motor).
- The friction pad ensures that only the top sheet is fed.
- When the paper activates the registration sensor, the paper feed clutch turns off.
- When the toner image on the transfer belt is at the correct position, the registration clutch turns on to feed the paper to the image transfer unit.

79

The motor in this diagram is at the wrong angle. For the correct orientation of this motor, please see the diagram on slide 93 (Image Transfer Belt Unit).



## Paper End Detection

**RICOH**  
imagine. change.

- If the tray becomes empty, a feeler enters a cutout in the bottom plate, and the paper end sensor at the other end of this feeler turns on.

80

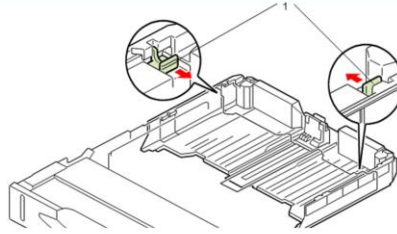
No additional notes





## Tray Extension

**RICOH**  
imagine. change.



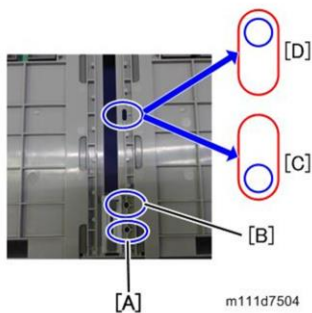
- When shipped from the factory, sizes up to A4 SEF can be loaded in the cassette.
- To support paper sizes larger than A4 SEF and up to LG size, unlock the tray extension lock ([1]) to extend the tray.

81

No additional notes



## Securing the End Fences



▪ There are 3 screw holes in the paper tray, to fix the end fences.

- [A]: Normal: A4 SEF / Extension: LG SEF
- [B]: Normal: LT SEF
- [C]: Normal: HLT SEF
- [D]: Normal: A5 SEF

No additional notes



## Securing the Side Fences

**RICOH**  
imagine. change.



m111d7503

- There are 2 screw holes in the paper tray, to fix the side fences.
  - [A]: A4 SEF
  - [B]: LG SEF/LT SEF

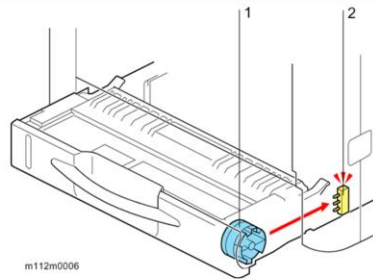
83

No additional notes



## Paper Size Detection

**RICOH**  
imagine. change.



m112m0006

- The paper size switch [2] detects actuators attached to the paper size dial [1].
- The customer must select the correct paper size with this dial.

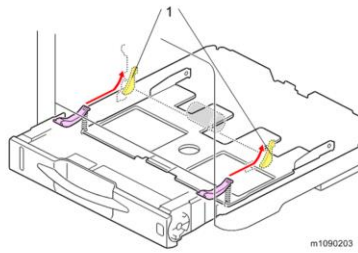
84

No additional notes



## Bottom Plate Lift

**RICOH**  
imagine. change.



- When you slide the paper feed tray into the unit, the bottom plate arm [1] slides along the sloping guide of the main frame, and then the bottom plate is pushed upward by the spring.
- As a result, the lifted bottom plate presses the sheet on the top of the stack up against the paper feed roller.

85

No additional notes



## Bypass Feed Bottom Plate Mechanism

**RICOH**  
imagine. change.

- The bottom plate has an automatic lifting system.
- When the bypass bottom plate clutch turns on, a cam (on the left as you face the machine) starts rotating to lift the bottom plate up and down.
- The bottom plate position sensor detects up/down movement of the bottom plate by detecting a sensor actuator on the left side of the cam.
  - Sensor ON: Bottom plate is down
  - Sensor OFF: Bottom plate is rising

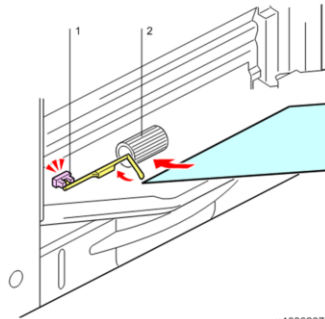
86

No additional notes



## Bypass Feed

**RICOH**  
imagine. change.

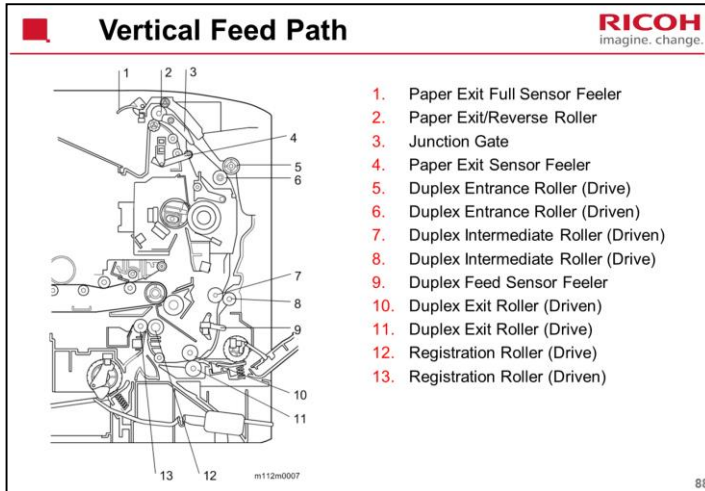


m1090207

- Bypass feed uses a feed roller and friction pad mechanism.
  1. Bypass Paper End Sensor
  2. Bypass Feed Roller
- When paper is loaded into the tray, the end sensor turns on (the light beam passes through).
- When the sensor is on, the bottom plate goes down. When it is off, the bottom plate goes up.

87

No additional notes



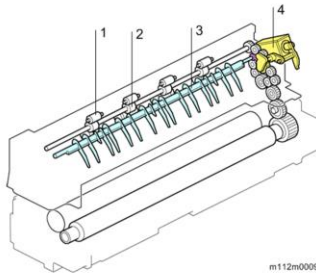
No additional notes





## Duplex and Exit

**RICOH**  
imagine. change.



1. Driven Roller (Relay)
2. Paper Exit/Reverse Roller
3. Duplex Junction Gate
4. Duplex Inverter Solenoid

- The fusing motor drives the fusing and paper exit rollers.
- The paper feed/transport motor drives the duplex entrance, intermediate, exit rollers.
- The paper exit/reverse roller has no clutch, and is driven by the fusing motor.
- The solenoid controls movement of the junction gate and rotation of the paper exit/reverse roller.
- The same roller does exit and reverse, so route switching for the next sheet cannot begin before the current sheet has been fed out. Because of this, productivity for A4 and LT size duplex printing drops to 90%.

89

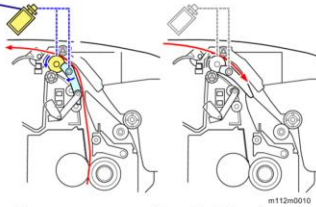
1. Driven Roller (Relay)
2. Paper Exit/Reverse Roller
3. Duplex Junction Gate
4. Duplex Inverter Solenoid



## Solenoid

**RICOH**  
imagine. change.

Duplex inverter  
solenoid



- Before starting reverse feed: Duplex inverter solenoid is on
- Feed back into the machine for duplex printing: Solenoid is off

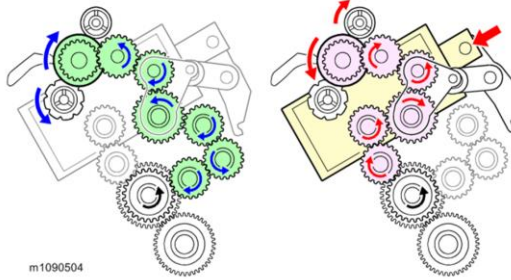
90

No additional notes



## Solenoid

**RICOH**  
imagine. change.

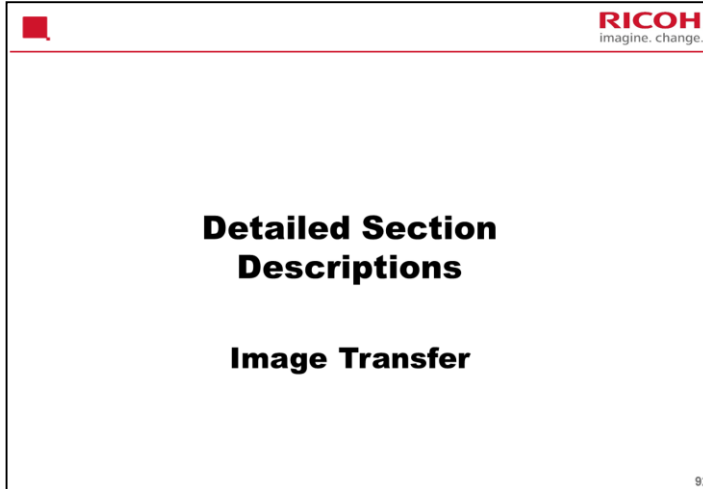


m1090504

- This diagram shows how the direction of the drive gears changes whether the solenoid is on or off.

91

No additional notes

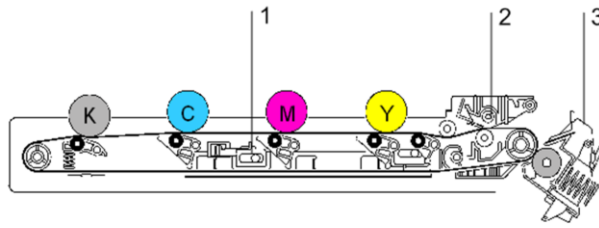


This section explains how the developed image is transferred from the drum to the paper.



## Overview

**RICOH**  
imagine. change.



m1090001

- The transfer section consists of three units: the Image Transfer Unit [1], the Image Transfer Belt Cleaning Unit [2], and the Transport Unit [3].

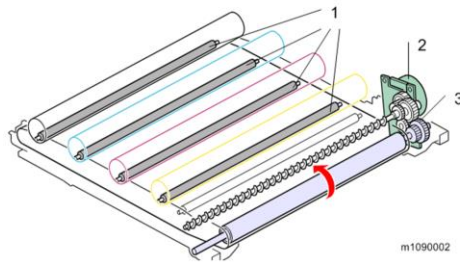
93

No additional notes



## Image Transfer Belt Unit

**RICOH**  
imagine. change.



- The transfer/transport motor [2] drives the ITB drive roller [3] via a gear to drive the image transfer belt.
- The image transfer belt rollers [1] apply transfer bias to pull toner from the photoconductor to the paper.

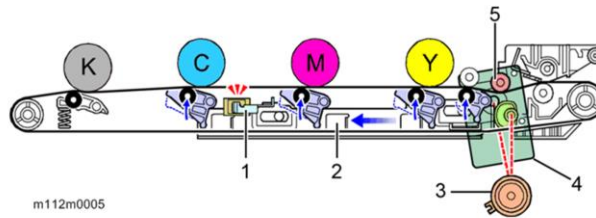
94

No additional notes



## Transfer Belt Contact Mechanism

**RICOH**  
imagine. change.



m112m0005

- For monochrome printing, the image transfer belt is disengaged from the color drums.
- The transfer belt contact sensor [1] detects the status of the image transfer belt.
- The transfer belt contact clutch [3] transfers the drive from the ITB/transport motor [4], and drives the mechanism through a cam [2], to move the transfer belt into contact or away from the color drums.

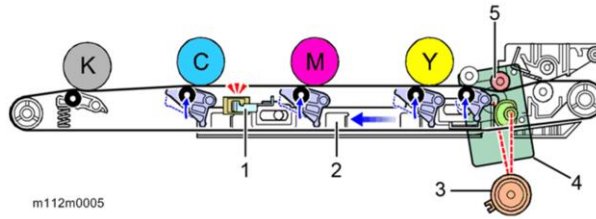
95

No additional notes



## Belt Guide Roller

**RICOH**  
imagine. change.



- In previous models, this roller [5] was inside the ITB unit. However, for this machine, there is no room inside the unit, so it is added at the location shown above.
- This roller keeps the belt under tension, and prevents the belt from moving to the left or right on the axis of the drive roller.

96

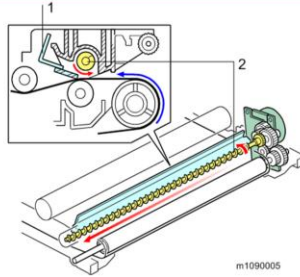
Lab tests have shown that this roller does not require cleaning at PM.





## Transfer Belt Cleaning

**RICOH**  
imagine. change.



- The transfer cleaning blade [1] removes remaining toner from the belt surface.
- The waste toner transport coil [2] carries this toner to the left side of the ITB unit.

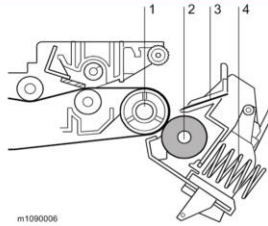
97

No additional notes



## Paper Transfer Roller Unit

**RICOH**  
imagine. change.



m1090006

- The bias applied to the paper transfer roller [2] pulls the toner off the ITB and onto the paper.
- The paper transfer roller is always pressed into contact with the ITB by a spring [4].
- When a sheet of paper goes between the transfer roller and the transfer belt, the transfer roller turns with the paper.
- The discharge plate [3] removes static charge from the paper that was applied during transfer.

98

No additional notes



## Transfer Roller Cleaning

**RICOH**  
imagine. change.

- Toner may transfer to the roller surface following a paper jam or if the paper is smaller than the image. Periodic cleaning of the roller is required to prevent this toner from migrating back to the rear of new printouts.
- The machine cleans the roller at the following times:
  - After initial power on.
  - After clearing of a copy jam
- The machine first supplies a negative cleaning current (about -4 mA) to the transfer roller, causing negatively charged toner on the roller to move back to the transfer belt. It then applies a positive cleaning current (+5 mA) to the roller, causing any positively charged toner to migrate back to the transfer belt.

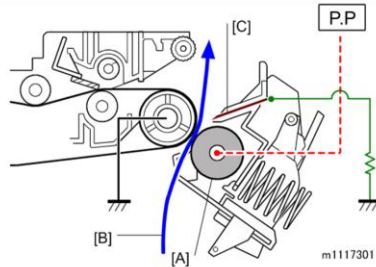
99

No additional notes



## Paper Separation

**RICOH**  
imagine. change.

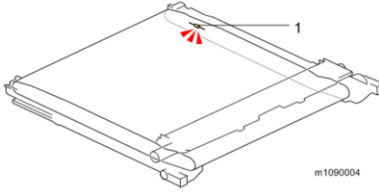


- During paper transfer, the transfer roller [A] applies a static charge to the paper [B].
- The discharge plate [C] grounds any remaining static charge after passing the transfer roller unit.

100

P.P.: Power pack

**New ITB Unit Detection** **RICOH**  
imagine. change.



m1090004

- The following new unit detection mechanism is not present in the service part. It is only in the supplied part that is installed by the user. If a technician replaces this part, the PM counter for this part must also be reset (see a later slide for more information).
  - If the machine detects an unbroken fuse [1] immediately after the ITB unit is installed, the machine blows the fuse, and resets the life counter for the ITB.
  - Immediately after this, the machine detects a blown fuse, and the life counter starts.
  - The paper transfer roller is also replaced at the same time, if the user PM kit is used.
  - However, if the only one of the parts is changed, counters must be reset as explained later in this part of the course.

101

The machine checks for replacement detection at the following three times:

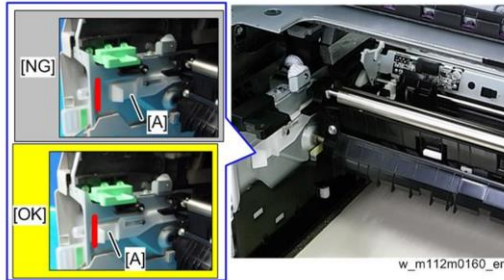
Turning on the Main power

Returning from sleep mode

Closing the Front Cover or Upper Cover

The fuse is not present in the service part. It is only in the supplied part that is installed by the user.

**Putting the ITB Unit Back in the Machine** **RICOH**  
imagine. change.



- Before you install the image transfer belt, make sure that the white lever [A] is pulled out to the position shown by the red line in the 'OK' part of this photo.

102

If you are in a training class, or have access to the machine while doing this course, look through these next few slides before you do the procedures, to make sure you are familiar with these important points.



## Installing a New ITB Unit

**RICOH**  
imagine. change.

- Print out the logging data using SP5-990-004 before you replace the part.
- The counter for the Image Transfer Belt Unit must be reset after installing a new one.
  1. Execute SP7-804-017 and SP7-804-060
  2. Turn off the power of the machine, and then turn it back on.
- This only applies to parts installed by service technicians.
- The part for replacement by users has a new unit detection mechanism (the fuse, as explained earlier).

103

If you are replacing the image transfer belt unit

SP7-804-017 (PM Counter Clear ITB Unit)

SP7-804-060 (PM Counter Clear Life: ITB Unit)

If you are replacing the image transfer belt unit, you should execute SP7-804-017, for correct control depending on the rotation distance. But, if you execute only SP7-804-017, the counter for displaying the unit life is not cleared. So you must also clear the counter by executing SP7-804-060 (PM Counter Clear Life: ITB Unit).



## Installing a New Paper Transfer Roller

**RICOH**  
imagine. change.

- Print out the logging data using SP5-990-004 before you replace the part.
- The counter for the Paper Transfer Roller must be reset after installing a new one.
  1. Execute SP7-804-022 and SP7-804-061
  2. Turn off the power of the machine, and then turn it back on.
- This only applies to replacement by service technicians.
- The Paper Transfer Roller as a supply part is in the same kit as the Image Transfer Belt unit and does not require counter reset, because it will be replaced at the same time as the Image Transfer Belt Unit.

104

If you are replacing the paper transfer roller

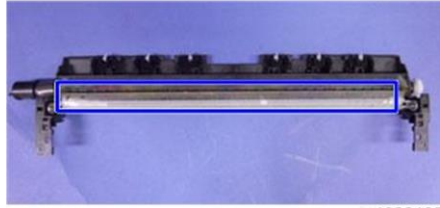
SP7-804-022 (PM Counter Clear PTR Unit)

SP7-804-061 (PM Counter Clear Life: PTR Unit)

If you are replacing the paper transfer roller, you should execute SP7-804-022, for correct control depending on the rotation distance. But, if you execute only SP7-804-022, the counter for displaying the unit life is not cleared. So you must also clear the counter by executing SP7-804-061 (PM Counter Clear Life: PTR Unit).



■ Installing a New Transfer Belt Cleaning Unit **RICOH**  
imagine. change.



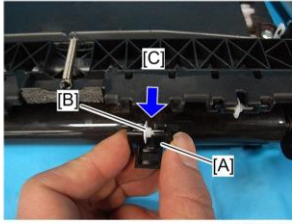
m1092105

- When you change the transfer belt cleaning unit, dust the new one with toner as a lubricant.

105

No additional notes

## ■ Installing a New Transfer Belt Cleaning Unit **RICOH** imagine. change.

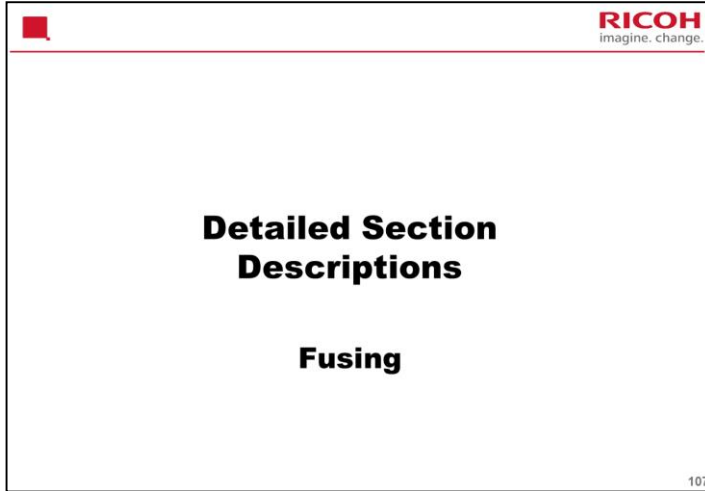


m112m0149

- When you remove the transfer belt cleaning unit back in the machine, remove the paper guide holders [A] and spurs [B] first.
- Also, do not reinstall the holders and spurs until after you reinstall the cleaning unit. Otherwise, the ITB might be damaged.

106

No additional notes

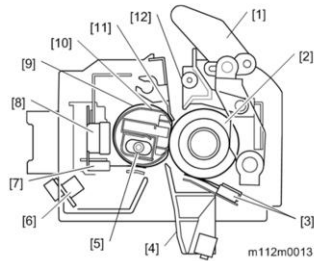


This section explains how the image is fused to the paper.



## Overview

**RICOH**  
imagine. change.

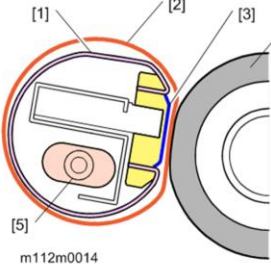


- This machine uses a QSU (Quick Start Up) type of fusing unit.
  - One fusing lamp [5] inside a pipe [10] heats a fusing belt [9].
- This type of fusing saves energy and allows the use of a wider range of paper types than a traditional fusing unit.
- Also, the larger nip reduces image blurring.

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1. Pressure Release Lever
2. Pressure Roller
3. Pressure Roller Thermistors (Center/End)
4. Fusing Entrance Guide
5. Fusing Lamp
6. Thermopile
7. Thermistor (End of the fusing belt)
8. Thermostat
9. Fusing Belt
10. Heating Pipe
11. Stripper Plate
12. Fusing Exit Guide

**Quick Start-up (QSU) System** **RICOH**  
imagine. change.



**1. Heating Pipe**  
– Conducts heat from the fusing lamps to the fusing belt.

**2. Fusing Belt**  
– Rotates by friction with the pressure roller. The space between the heating pipe and the fusing belt is lubricated to reduce friction, so that the belt will rotate smoothly.

**3. Nip Band Shaping Parts**  
– Located beneath the fusing belt to shape the nip band where the fusing belt contacts the pressure roller.

**4. Pressure Roller**  
– The pressure roller is driven by the fusing exit motor. At the contact with the fusing belt, the pressure roller fuses the image to the paper and feeds the paper out of the fusing unit.

**5. Fusing Lamp**  
– This consists of one halogen heater to heat the center and both ends.

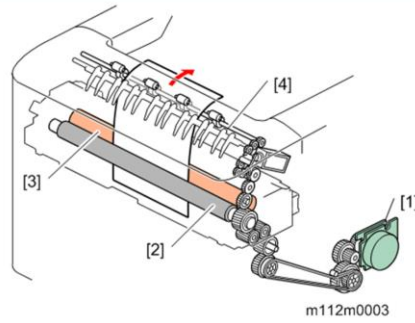
m112m0014 109

No additional notes



## Fusing Unit Drive

**RICOH**  
imagine. change.



- The fusing motor [1] drives the pressure roller [2], fusing belt [3], and the exit roller [4].

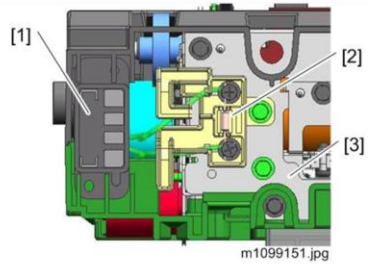
110

No additional notes



## New Unit Detection

**RICOH**  
imagine. change.



- This is done using a fuse [2] on the rear frame [3] of the fusing unit. [1] is the fusing unit drawer.
- There is no service part; the technician uses the same part as the user PM kit to replace the fusing unit. So there is no counter to reset.

111

[1] is the fusing unit drawer.



## Pressure Release

- A pressure release mechanism makes it easy to remove paper jams in the fusing unit.
- The pressure lever is released when the front cover opens, and the pressure roller separates from the fusing belt due to a spring.

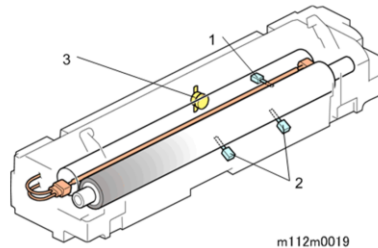
No additional notes





## Fusing Temperature Control

**RICOH**  
imagine. change.



- A thermostat [3] and a non-contact thermistor [1] monitor the fusing belt temperature.
- Two contact thermistors [2] monitor the pressure roller temperature.
- The thermostat is a safety switch.

113

No additional notes



- Fusing warm-up begins after the machine power is switched on.
- The fusing lamps heat without roller rotation until the temperature reaches the “pre-rotation start temp.”
  - There is no roller rotation, in order to heat the lubricant between the heating pipe and the fusing belt so that the pressure roller rotation will move the belt.
- Then, the fusing motor turns on, until the fusing temperature reaches the “start-up temperature” (also called the “reload temperature”).

No additional notes



- The fusing temperature increases to the “print ready temperature”, and printing starts.
- To reduce energy consumption, the fusing lamps turn off before the last sheet of paper passes completely through the fusing nip band.
- After printing, the roller continues to turn, to prevent temperature overshoot after printing.
- After a certain time, the mode changes to the wait mode.

No additional notes



## Fusing Temperature Control Wait Mode

**RICOH**  
imagine. change.

- The fusing lamps and the fusing motor turn OFF after a certain time passes after the temperature has fallen to the print ready temperature.
- At regular intervals, the fusing motor rotates for a short time at slow speed.
- The fusing motor stops when the machine is in Sleep Mode.

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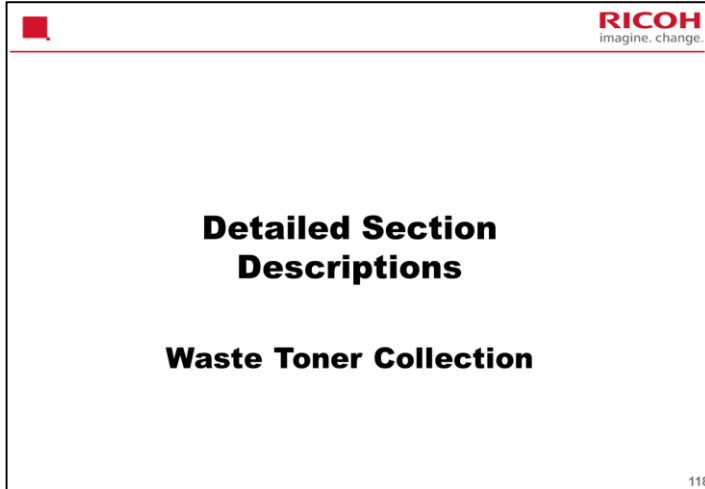
No additional notes



**Fusing Temperature Control**  
**PPM Down Mode**

- PPM down control changes the feed timing to create a wider interval between the sheets of paper feeding through the fusing unit.
- This is done in some specific conditions to prevent image problems.

No additional notes

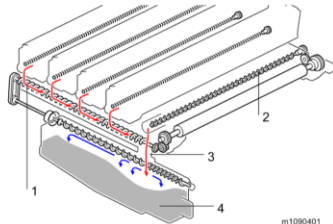


This section explains how the unused toner is collected from the drum and the master belt.



## Overview

**RICOH**  
imagine. change.



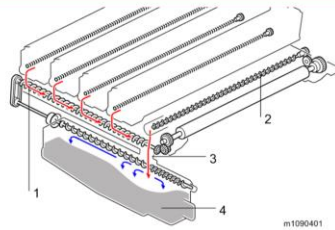
- Toner waste from the PCDUs is carried to the waste toner duct [1], and then to the front of the unit by a coil, and from there, it is moved down to the waste toner bottle.
- Toner waste from the ITB Unit is carried to the left side of the unit by the ITB waste toner collection coil [2] and then down to the waste toner bottle [4] via the same opening [3] as used for toner waste from the PCDUs.

119

No additional notes



## Drive



- The ITB waste toner collection coil [2] is driven via the drive roller in the image transfer unit.
- The coil in the waste toner duct [1] is driven via the gear on the left of the image transfer unit.
- The coil inside the waste toner bottle distributes the toner evenly inside the bottle.

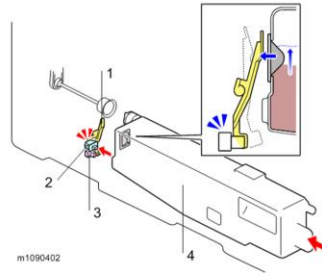
No additional notes





## Waste Toner Bottle Set Sensor

**RICOH**  
imagine. change.



m1090402

- The waste toner bottle set sensor [2] detects the presence of the waste toner bottle [4].
- There is no bottle replacement detection feature. If the bottle full sensor is off and the bottle set sensor is on, the machine indicates that the waste toner bottle is usable.

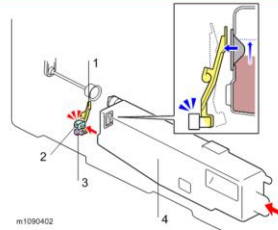
121

For details on items 1 and 3 in the diagram, see the next slide.



## Waste Toner Bottle Full Sensor

**RICOH**  
imagine. change.



- When waste toner exceeds a certain amount, the rubber portion on the inner part of the waste toner bottle swells. This exerts pressure on the feeler [1], and the waste toner bottle full sensor [3] is turned on. At this time, the machine detects that the bottle is nearly full.
- After the bottle is detected to be nearly full, the machine uses a pixel count to detect when the waste toner bottle is full.
- The required pixel count between near-full and full can be adjusted with an SP3-800-017 or a User Tool.

122

No additional notes



## Toner Bottle Full

**RICOH**  
imagine. change.

- The pixel count corresponds to a number of sheets that can be printed after indicating near full. However, these are reference values based on certain specified machine use conditions.
  - Normal: 475 pages
  - Notify Later: 285 pages
  - Notify Sooner: 665 pages
- The default is Normal. Users can change with a user tool.
  - Maintenance > General Settings > Replacement Alert:

123

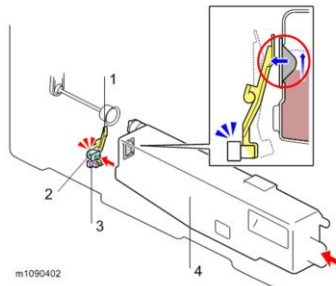
The number of sheets that can be printed is a reference value when performing continuous printing of A4-size SEF originals at a coverage of 5% for each color and at a color ratio of 50%.

The actual replacement frequency depends on usage, and is influenced by factors including paper size, paper type, paper feed direction, content, the number of sheets continuously printed per job and adjustments to maintain the quality of printing.



## Lubricant

**RICOH**  
imagine. change.



- A small amount of yellow toner is applied to the rubber component shown above with a red circle.
- Do not touch this rubber, or you may remove the lubricant. If you do wipe it off, apply some yellow toner.

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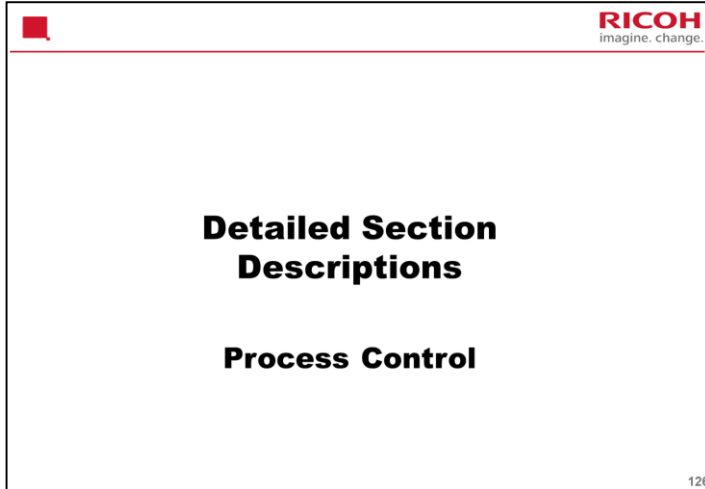
No additional notes



## Replacement

- Either the customer or the technician can replace this.
- The counter resets automatically.
  
- Attach the waste toner bottle with the left cover installed.
  - If not, the waste toner bottle is not positioned accurately, which may cause clogging of waste toner, because the lid between the waste toner duct and the waste toner bottle may not open.

No additional notes

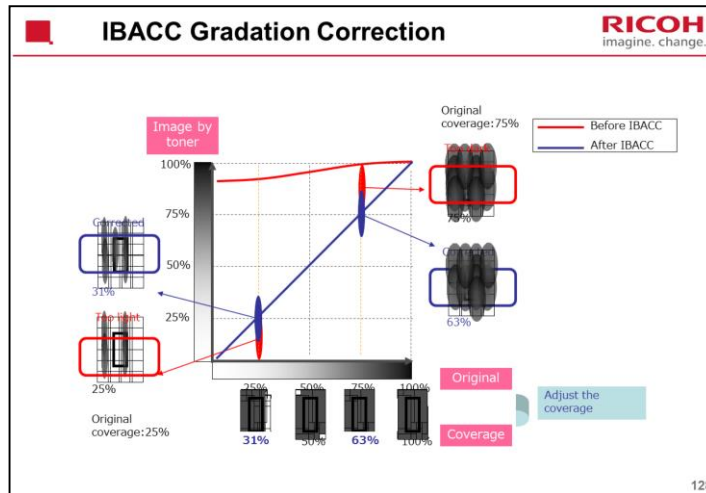


This section briefly explains Auto Color Calibration (ACC) and MUSIC.



- Process control
  - Development bias control
  - Toner supply control
- MUSIC
  - The toner mark sensors (TM (ID) sensors) read patches made on the ITB, and the machine corrects color image registration based on the sensor readings.
  - The patches are made on the left and right of the ITB.
  - MUSIC is done automatically at specific times.
- IBACC (Image transfer Belt ACC)
  - IBACC does halftone correction by detecting the density of a gradation patch formed on the Image Transfer Belt.
  - While conventional ACC (Auto Color Calibration) prints a test chart and feeds back the density detected by the scanner, IBACC does all the operations inside the printer.
  - The TM (ID) sensors are used for this function.
  - IBACC can be executed by the user at any time, using the Auto Color Calibration function. At this time, MUSIC is done, then process control, then IBACC.

No additional notes

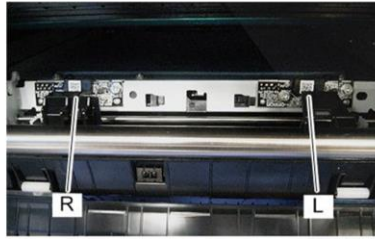


Before IBACC, the machine's response is shown by the red curve. IBACC changes the response so that it is more linear, as shown by the blue line. However, the machine's response may drift away from linear with time. At this time, IBACC should be done again.





## TM (ID) Sensors



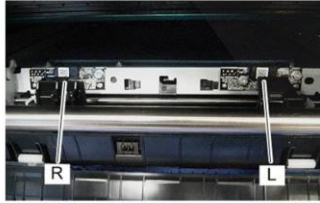
m112m0100

- Below the image transfer belt, there are two TM (ID) (Toner Mark) sensors.
- These are used for MUSIC. They also act as ID sensors for use during process control and IBACC.

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No additional notes

## TM (ID) Sensors



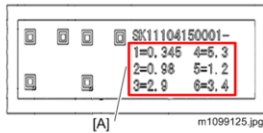
- Note that the sensor seen on the left [L] (as viewed from the front of the machine) is called the right TM (ID) sensor (TM sensor: R), and the one on the right [R] is called the left TM (ID) sensor (TM sensor: L).
  - This will be important when we replace the TM (ID) sensors.
- Sensors can be replaced individually (the service part consists of one sensor).

No additional notes



## Replacing the TM (ID) Sensors - 1

**RICOH**  
imagine. change.



- Before replacement:
  - Each sensor has a label with some numbers on it [A].
  - These numbers must be input into SP mode before you turn off the power and replace the old TM (ID) sensor.
  - **As you look from the front of the machine:**
    - The sensor on the left is TM (ID) sensor: R. These values must be input into SP 3-333.
    - The sensor on the right is TM (ID) sensor: L. These values must be input into SP 3-334.
  - After this, there are some other SP settings to initialize before replacement. See the procedure in the service manual for details.

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No additional notes



- After replacement:
  - Execute SP3-011-004 (Adjustment manual exe. Full Music / process control)
  - If there is something wrong with the image after SP execution, make sure that input values are registered in the correct SPs.

No additional notes



The End