

RICOH



**Model GIM-P1 (M158/M159)
Model GIM-MF1 (M160/M161)
Service Training**



Slide 1 Version 1.0

This course teaches about how to service this new series of black-and-white printers and copiers.

RICOH

**GIM-MF1, GIM-P1
Service Training**

Machine Overview

Slide 2

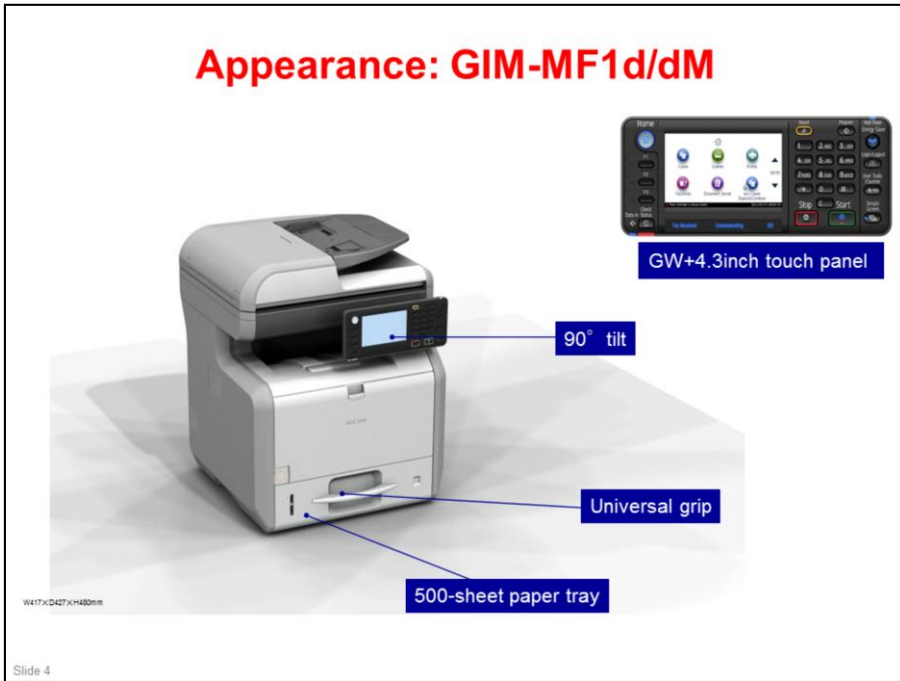
No additional notes

How Many Models?

- ❑ **GIM-P1c (M158): SP 4510DN**
 - ◆ GW+ controller
 - ◆ Four-line LCD panel
 - ◆ PM by the customer
- ❑ **GIM-P1dM (M159): SP 4520DN**
 - ◆ GW+ controller
 - ◆ 4.3-inch touch panel
 - ◆ Meter click model (PM by technicians)
- ❑ **GIM-MF1d (M160): SP 4510SF**
 - ◆ GW+ controller
 - ◆ 4.3-inch touch panel
 - ◆ PM by the customer
- ❑ **GIM-MF1dM (M161): MP 401SPF**
 - ◆ GW+ controller
 - ◆ 4.3-inch touch panel
 - ◆ Meter click model (PM by technicians)

Slide 3

- ❑ Availability
 - M158: North America, Europe, China
 - M159: North America, Europe
 - M160: North America, Europe
 - M161: North America, Europe, Asia/Pacific
- ❑ The machine can be switched between user PM and meter click mode by SP mode as usual. However, there is no need to do this because we have two models, one for meter click and one for user PM.



No additional notes

Appearance: GIM-MF1d/dM with Options

250-sheet
paper tray



500-sheet
paper tray



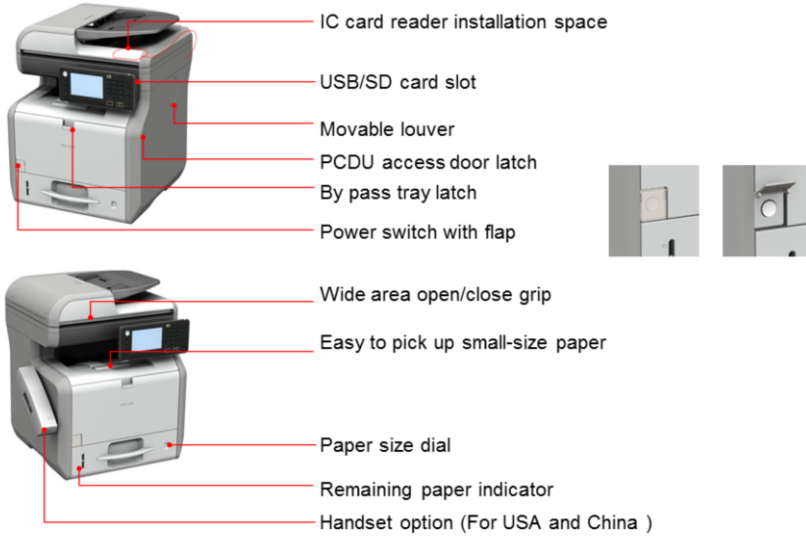
250-sheet
paper tray x 2



Slide 5

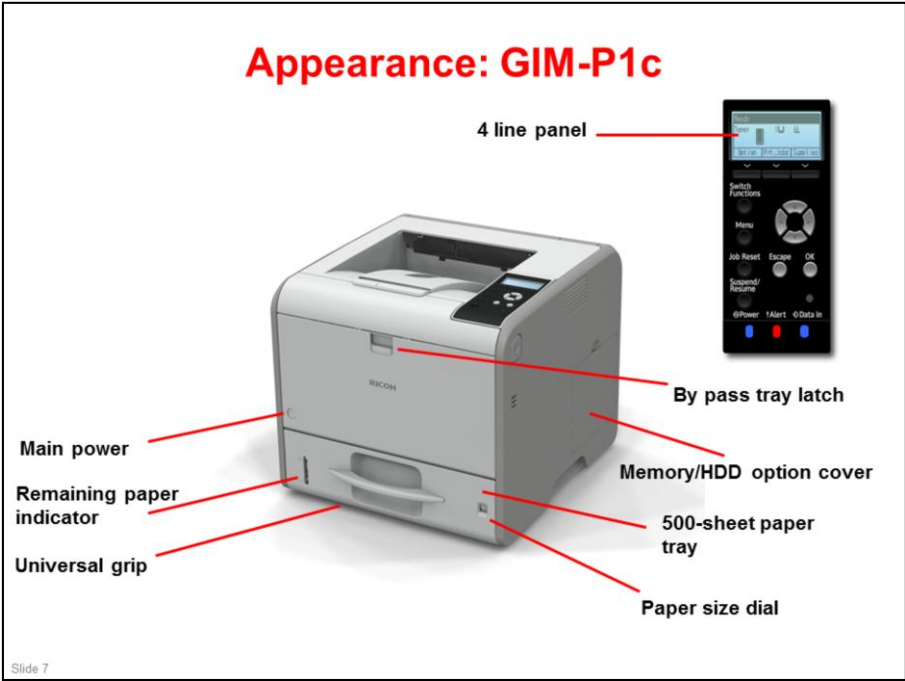
No additional notes

Appearance: GIM-MF1d/dM External Components

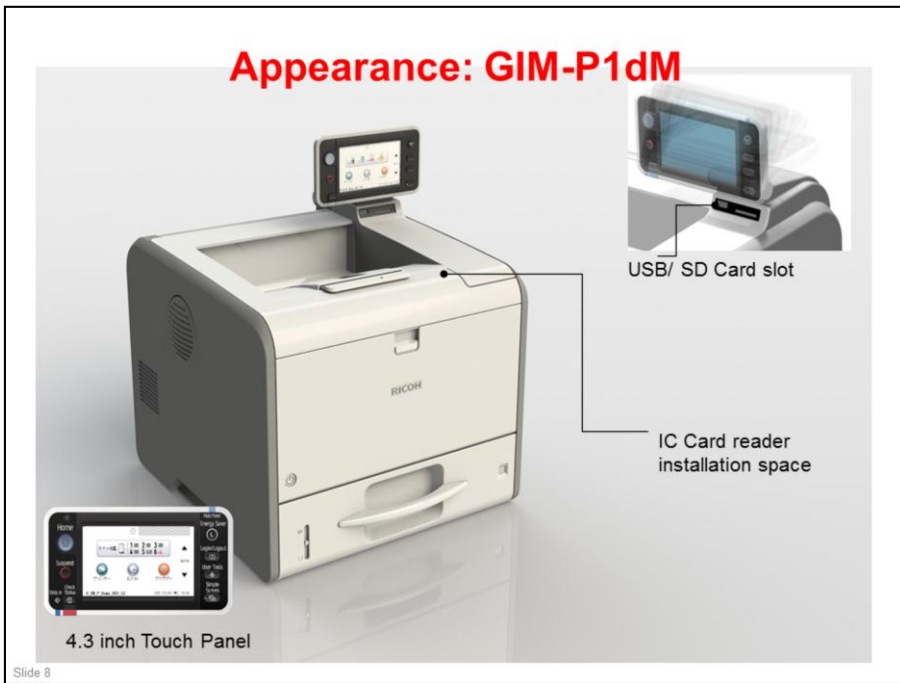


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No additional notes



No additional notes



No additional notes

Main Points about this Machine

1

Smaller machine footprint

- Paper is fed from back to front, which allows the machine to have a smaller footprint than S-C5.
- This machine has the smallest footprint in the mid range of A4 MFP.

2

Supports 1200 dpi printing

- S-C5 and Sh-MF1 don't support 1200dpi resolution for printing.
- Gim-MF1 supports 1200dpi without slowing down, thanks to the new LED technology.

3

Enhanced paper capability

- The machine supports paper weights from 52g/m² to 162 g/m² not only with bypass, but also with the optional paper bank, and duplex.

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No additional notes

Paper Capability Compared with S-C5

Paper weight

Model	Duplex	Bypass	Paper Bank
S-C5	60-90g/m2	60-157g/m2	60-90g/m2
Gim-MF1dM	52-162g/m2	52-162g/m2	52-162g/m2

Paper Size

Model	Standard tray	Optional tray	Platen	Bypass
S-C5	A5-A4	A4-LG	216x356mm (LG)	W:90-216mm L:139-600mm
Gim-MF1dM	A6-LG	A6-LG	216x297mm (A4)	W:60-216mm L:127-900mm

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No additional notes

Main Specifications - 1

- ❑ **Print Speed**
 - ◆ Simplex: 40 ppm (A4/ SEF), 42 ppm (LT/ SEF)
 - ◆ Duplex: 35 ppm (A4 SEF), 36 ppm (LT SEF)
- ❑ **First Copy (GIM-MF1): 6.0 s or less**
- ❑ **First Print (GIM-P1): 5.0 s or less**
- ❑ **Warm-up: 19 s or less**
- ❑ **Memory**
 - ◆ GIM-MF1
 - » Standard: 1024 MB
 - » Maximum: 1536 MB
 - ◆ GIM-P1
 - » Standard: 512 MB
 - » Maximum: 1024 MB Default 512 MB memory must be removed when upgrading to 1024 MB
- ❑ **HDD: Option only, 320 GB (GIM-MF1), 320 GB (GIM-P1)**

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No additional notes

Main Specifications - 2

❑ Input Paper Capacity

- ◆ Standard Tray: 500 sheets, (80g/m², 20lb. Bond)
- ◆ Bypass: 100 sheets
- ◆ Option: 250 or 500 sheets (Max 2 trays)
- ◆ Maximum: Up to 1600 sheets total capacity (Std tray + Option x 2 + Bypass)

❑ Paper Size

- ◆ Standard Tray: A4, B5, A5, B6, A6, Legal, Letter, HLT, Executive, F, Foolscap, Folio, 16K
 - » Custom size: Min. 3.93" x 5.82", Max. 8.46" x 14.0", Min. 100 mm x 148 mm, Max. 216 mm x 356 mm
- ◆ Bypass: A4, B5, A5, B6, A6, Legal, Letter, HLT, Executive, F, Foolscap, Folio, 16K
 - » Custom size: Min. 2.36" x 8.50", Max. 5.00" x 35.43", Min. 60 mm x 216 mm, Max. 127 mm x 900 mm"
- ◆ Option: A4, B5, A5, B6, A6, Legal, Letter, HLT, Executive, F, Foolscap, Folio, 16K
 - » Custom size: Min. 3.93" x 5.82", Max. 8.46" x 14.0", Min. 100 mm x 148 mm, Max. 216 mm x 356 mm"

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No additional notes

Main Specifications - 3

- ❑ **Paper Weight: 52-162 g/m² (14-43 lb), All trays, simplex or duplex**
- ❑ **Paper Type**
 - ◆ Standard Tray: Recycled Paper, Color Paper, Letterhead, Preprinted Paper, Plain1, Plain2, Special1, Special2, Thick1, Thick2, Thin
 - ◆ Optional Tray: Recycled Paper, Color Paper, Letterhead, Preprinted Paper, Plain1, Plain2, Special1, Special2, Thick1, Thick2, Thin
 - ◆ Bypass: Thick Paper, Middle Thick Paper, OHP (Transparency), Recycled Paper, Color Paper, Letterhead, Preprinted Paper, Plain1, Plain2, Special1, Special2, Thick1, Thick2, Thin, Labels, Envelopes
- ❑ **Output Paper Capacity (80g/m², 20lb. Bond): Up to 250 sheets**

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No additional notes

Main Specifications - 4

- ❑ **Maximum Power Consumption**
 - ◆ GIM-MF1
 - » US: 1180W (Full system)
 - » EU, Asia, China: 1140W (Full system)
 - ◆ GIM-P1
 - » US: Less than 1150W (Full system)
 - » EU, Asia, China : Less than 1110W (Full system)
- ❑ **Output Volume**
 - ◆ Average: 3.0k, Maximum: 10k
- ❑ **Estimated Life: 5 years or 600k prints whichever comes first**

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No additional notes

Printer Drivers

❑ Gim-MF1

- ◆ Standard: PCL5e, PCL 6, Adobe Postscript 3, XPS
- ◆ Option: None

❑ Gim-P1

- ◆ Standard: PCL6/5e, PostScript3, PDF Direct
- ◆ Option: IPDS, XPS (Embedded)

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No additional notes

Specifications Compared with S-C5

Model		Gim-MF1d/dM	S-C5
PPM (A4)	Simple	40ppm	30cpm
	Duplex	More than 33ppm	18cpm
Warm up time		19 sec	23 sec
First Copy		Less than 6 s	Less than 6 s
Recovery from sleep mode		Less than 10 s	Less than 10 s
Resolution		1200×1200dpi	600 x 600dpi
Paper capacity	Standard	500 + 100 sheets	250 + 100 sheets
	Max.	1,600 sheets (including 500 x 2 optional bank)	1,350 sheets (including 500 x 2 optional bank)
Paper output		250 sheets	250 sheets
Paper weight	Bypass	52-162g/m ²	60-90g/m ²
	Bank	52-162g/m ²	60-157g/m ²
Paper size	Bypass	Width:60-216mm, Length:127-900mm	Width:90-216mm, Length:139-600mm
	Platen	A4	LG/A4
	Bank	A6 - LG	A5 - A4 *LG is only available with option bank
Dimensions	WxDxH	419×427×484	476×450×451
	Foot print	0.18m ²	0.21m ²
Weight		Less than 22.5 Kg	26Kg
Panel		4.3inch Color touch panel	4.3inch Color touch panel
TEC		Less than 2.0kWh	1.5kWh
Scan Speed (BW/FC)		30ipm/20ipm	30ipm/20ipm

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- ❑ Areas shaded yellow show improvements over S-C5.

Specifications Compared with Si-P3

1st print

> 6.9 sec -> 5.0 sec

TEC

> 2.34 kWh -> 2.0 kWh

Operation

> LCD operation panel : 2-line -> 4-line (P1c) / 4.3-inch (P1d)

Compactness

> 388(W) - 450 (D) - 345 (H) mm -> 370(W) - 392 (D) - 306 (H) mm

Resolution

> 1200 x 600 dpi -> 1200 x 1200 dpi

Paper weight

> 60-130g/m2 (16-34lb) -> 52-162g/m2 (14-43lb)

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No additional notes

Consumables

❑ Toner

- ◆ For user PM machines (measured with ISO/IEC19752)
 - » Starter: Approx. 6K pages
 - » Low yield: Approx. 3K pages
 - » Mid yield: Approx. 6K pages
 - » High yield: Approx. 12K pages
- ◆ For meter click mode machines (technician PM) (measured at A4/6% chart, 3P/J)
 - » Starter: Approx. 10.4K pages
 - » Regular yield: Approx. 10.4K pages

❑ PCDU:

- ◆ User PM: Approx. 20K pages
- ◆ Meter click (technician PM): Approx. 40K pages

❑ Maintenance kit: Approx. 120K pages

- ◆ Contains the fusing unit, transfer roller, and feed rollers and friction pads

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- ❑ Toner yield is measured at standard temperature and humidity. The yield may change depending on the circumstances and printing conditions.
- ❑ If you change the SP setting from meter click to user PM (or vice versa), you still have to use the original toner cartridges and PCDU for the base machine. This is because it is not possible to install a meter click PCDU or toner cartridge in a user PM machine, or vice versa.

Options: Paper Feed

		Also used with these models:	Similar to:	Note
M441: Paper Feed Unit PB1060	New		Ti-P1	250 sheets; up to two of these can be installed
M440: Paper Feed Unit PB1070	New		Ti-P1	500 sheets; only one of these can be installed

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No additional notes

Options: Memory

		Also used with these models:	Similar to:	Note
M444: Hard Disk Drive Option Type M6	New			For GIM-MF1
M444: Hard Disk Drive Option Type P1	New			For GIM-P1
D701: Memory Unit Type M1 1.5GB	New			For GIM-MF1; to upgrade, remove the existing memory module and install this option
M417: Memory Unit Type N1 1.0GB	New			For GIM-P1; to upgrade, remove the existing memory module and install this option

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No additional notes

Options: Controller

		Also used with these models:	Similar to:	Note
M444: IPDS Unit Type M6	New			For GIM-MF1
M444: IPDS Unit Type P1	New			For GIM-P1
M444: SD card for Netware printing M6	New			For GIM-MF1
M444: SD card for Netware printing P1	New			For GIM-P1
M444: Browser Unit Type M6	New			For GIM-MF1
M444: Browser Unit Type P1	New			For GIM-P1
M444: XPS Direct Print Option Type M6	New			For GIM-MF1
M444: XPS Direct Print Option Type P1	New			For GIM-P1

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No additional notes

Options: Controller

		Also used with these models:	Similar to:	Note
D164: IEEE 802.11 Interface Unit Type O		Ti-P1	Similar to those used with other models	
D166: OCR Unit Type M2		CH-C1, MET-C1, OR-C2		
B679: IEEE 1284 Interface Board Type A		Used with many other models		
D566: Bluetooth Interface Unit Type D		Used with many other models		
M417: VM Card Type W		Ti-P1		Optional hard disk and memory must both be installed.
D377: File Format Converter Type E		Used with many other models		
D640: Copy Data Security Unit Type G		Used with many other models		
D641: SD Card for Fonts Type D		Used with many other models		
B869: Unicode Font Package for SAP®		Used with many other models		
D362: Data Overwrite Security Unit Type I		S-C4, DI-C1, OR-C2		For CC certification

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No additional notes

Options: Fax

		Also used with these models:	Similar to:	Note
D593: Handset HS1010				

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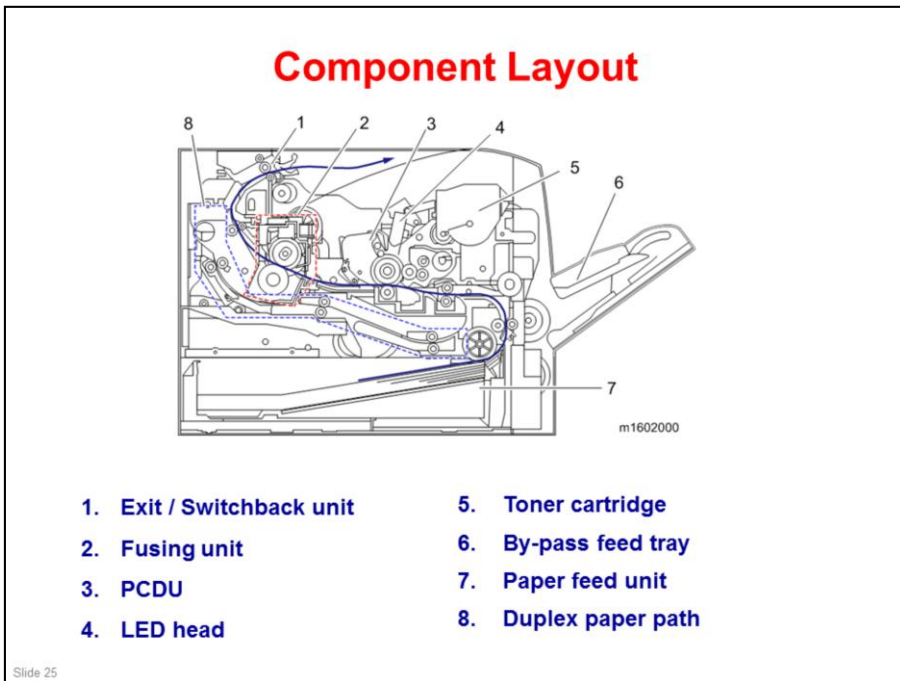
No additional notes

Options: Other

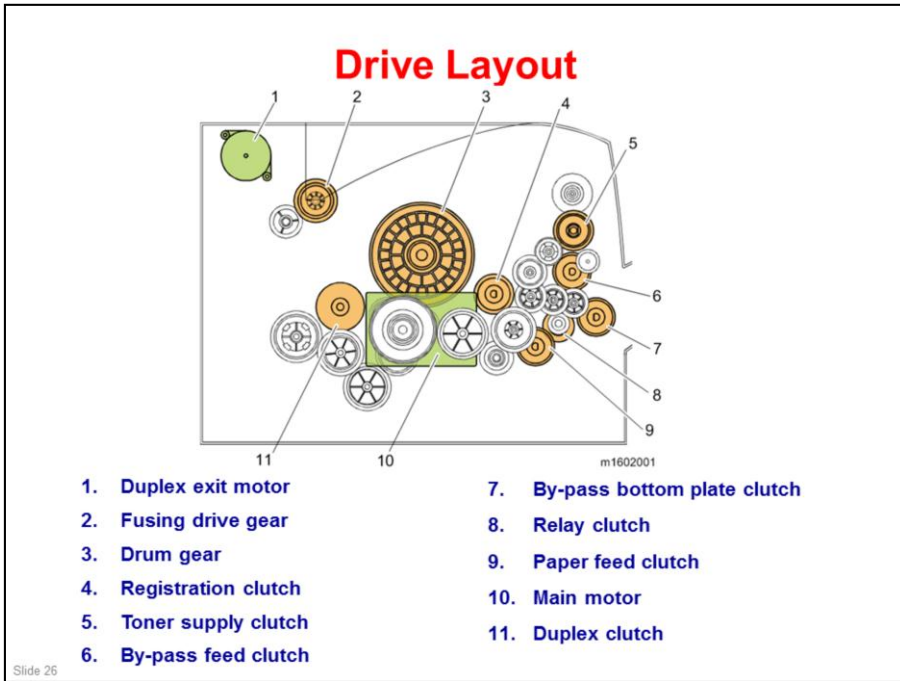
		Also used with these models:	Similar to:	Note
B870: Optional Counter Interface Unit Type A		In use with many models		

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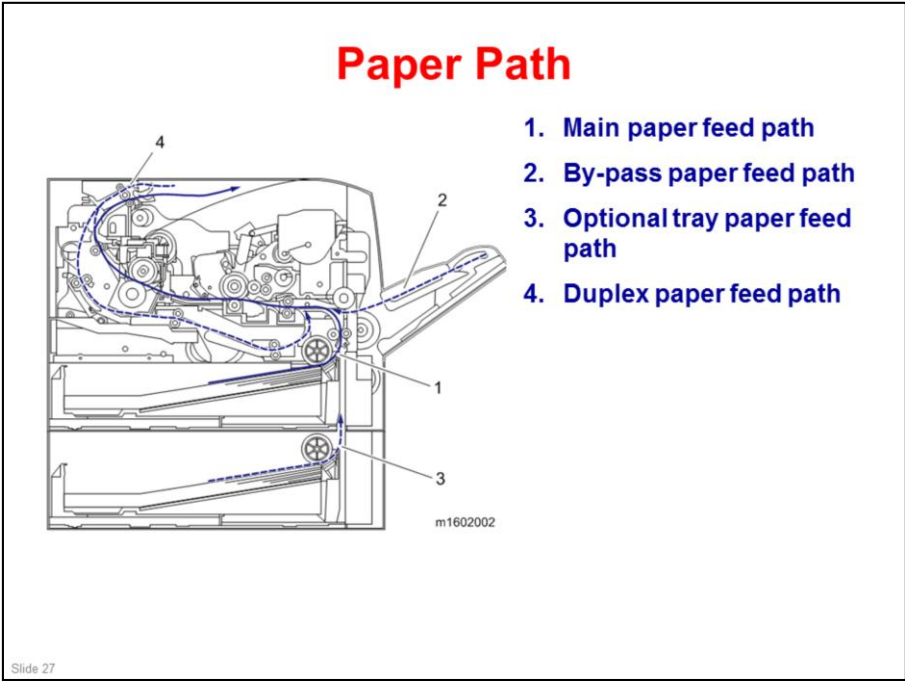
No additional notes



☐ This slide shows the major components. Details will be covered later.



No additional notes



No additional notes

Boards - 1

- ❑ **BICU (Engine Board): Controls the following functions:**
 - ◆ Engine sequence
 - ◆ Timing control for peripherals
 - ◆ Image processing, video control
 - ◆ In the P1 model, this board is called the BCU.
- ❑ **CTL (Controller Board): Controls the following functions:**
 - ◆ SDRAM
 - ◆ 10Base-T/100Base-Tx/Giga Ethernet
 - ◆ USB2.0
 - ◆ NV-RAM
 - ◆ Operation panel interface
- ❑ **PSU (Power Supply Unit)**
 - ◆ Generates DC power from the AC power supply
- ❑ **HVPS (High-Voltage Power Supply)**
 - ◆ Generates the high-voltage power required for process control.
- ❑ **FCU: Controls the fax program.**

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No additional notes

Boards - 2

- ❑ **PCDU Set Detection Board**
 - ◆ Detects whether or not the PCDU is installed correctly.
- ❑ **ID Chip Relay Board**
 - ◆ Relays the ID chip data of the toner cartridge.
- ❑ **DC Switch**
 - ◆ Controls the on/off operation of the DC power supply.
- ❑ **Toner End Detection Board (Toner End Sensor)**
 - ◆ Detects whether the toner has run out.

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No additional notes

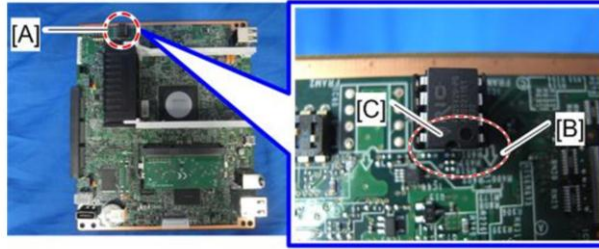
Replacing the Controller Board, BICU, Hard Disk

- ❑ See the following section of the manual for full details:
 - ◆ Replacement and Adjustment > Electrical Components

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- ❑ ESA: This is sometimes called SDK

Replacing the NVRAM on the Controller Board



d1824054

- ❑ See the following section of the manual for full details:
 - ◆ Replacement and Adjustment > Electrical Components > NVRAM on the Controller Board
- ❑ When replacing the controller board, remove the NVRAM from the old controller board. Then install it at the same position on the new controller board.
- ❑ The indentation [C] on NVRAM [A] must face the direction of the arrow [B] that is printed on the controller board.

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No additional notes

Replacing the BCU or BICU

MF1 Model



P1 Model

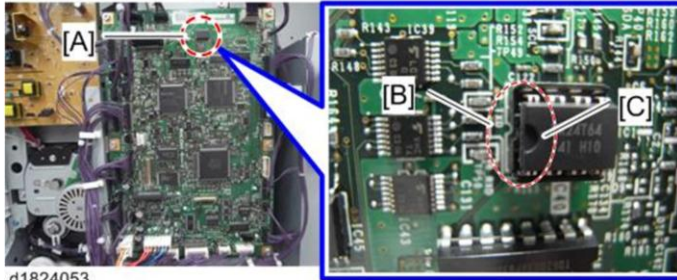


- ❑ This board is called the BCU in the P1 models, and the BICU in the MF1 models.
- ❑ Remove the EEPROM [A] from the old board and install it on the new board.
 - ◆ Install so that the indentation [B] on EEPROM is facing the direction of the dent [C] that is printed on the BICU board.
- ❑ Set the DIP switches on the new board to the same settings as the old board.
- ❑ After you install the new board, enter the serial number of the new board.
 - ◆ If the BICU serial number is not entered correctly, SC995-01 (serial number entry error) appears.

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No additional notes

Replacing the EEPROM on the BCU Board



d1824053

- ❑ See the following section of the manual for full details:
 - ◆ Replacement and Adjustment > PCBs and Other Items > EEPROM on the BCU
- ❑ Install the EEPROM [A] the correct way around.
 - ◆ The indentation [C] must point in the direction of the indentation [B] that is printed on the board.

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No additional notes

Caution Before Removing Components



m171m0003

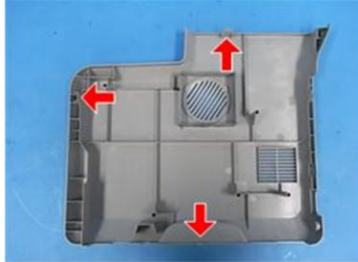
- ❑ **Even if you turn the power switch off, +5V is still supplied. So do the following before you start work.**
 1. Push the power switch [A] on the machine.
 2. Wait 3 minutes to shut down.
 3. Take out the power cord.
 4. Do either of the following:
 - » Wait several minutes
 - » Push the power switch [A] again to remove the residual charge.

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No additional notes

Covers

- ❑ To improve the appearance of the machine, screw holes are mostly not visible. This means that the covers are held in place by a lot of tabs.
- ❑ The locations of these tabs are explained in the removal procedures. Pay attention to these diagrams, so that you do not damage the tabs.
 - ◆ Example: Left cover



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No additional notes

Starting the Machine Again

- ❑ To start the machine, press the main power switch.
- ❑ If you press the main power switch between the beginning and the end of a shutdown, the machine will not start.

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No additional notes

Forced Shutdown

- ❑ In case normal shutdown does not complete for some reason, the machine has a forced shutdown function.
- ❑ To make a forced shutdown, press and hold the main power switch for 6 seconds.
- ❑ In general, do not use the forced shutdown. Forced shutdown may damage the hard disk and memory, and can cause damage to the machine. Use a forced shutdown only if it is unavoidable.

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No additional notes

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**GIM-MF1, GIM-P1
Service Training**

Installation

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No additional notes

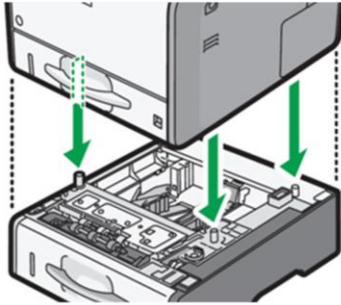
Who Installs the Machine?

- ❑ The Gim-MF1dM and Gim-P1dM are installed by technicians.
- ❑ The Gim-MF1d and Gim-P1c are installed by users, but in some cases, a technician must install.
- ❑ The procedures are easy. Please refer to the service manual for full details.

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No additional notes

Optional Paper Tray Units



- To attach two one-tray units at the same time, first stack them one on top of the other, and then attach them as a single unit to the machine.

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No additional notes

SD Card Applications

- ❑ Do not attempt to move the OCR option or the VM card option to another SD card.
- ❑ The VM card stays in slot 1 after installation.

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No additional notes

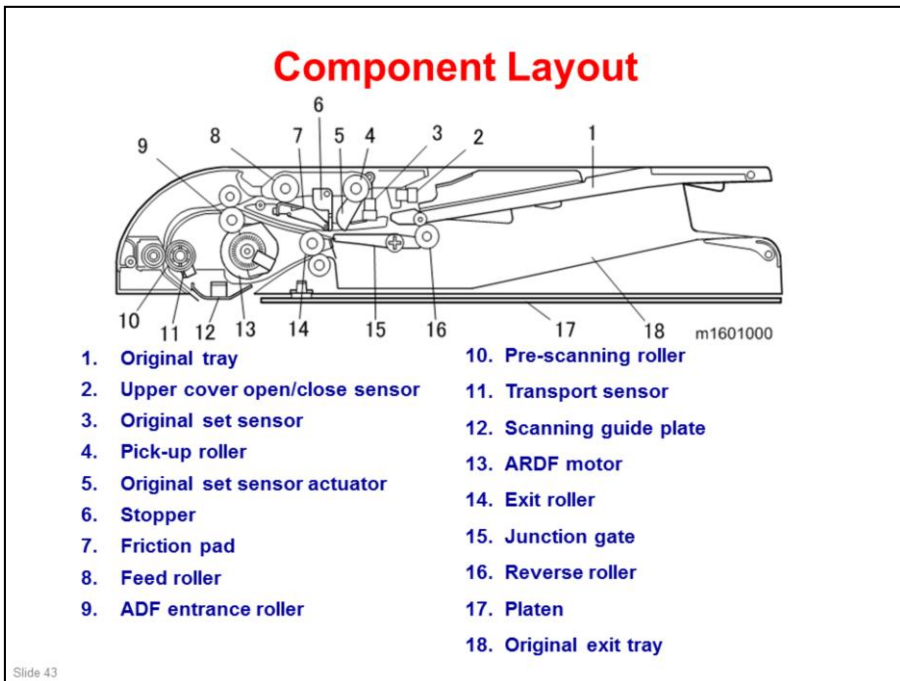
RICOH

**GIM-MF1, GIM-P1
Service Training**

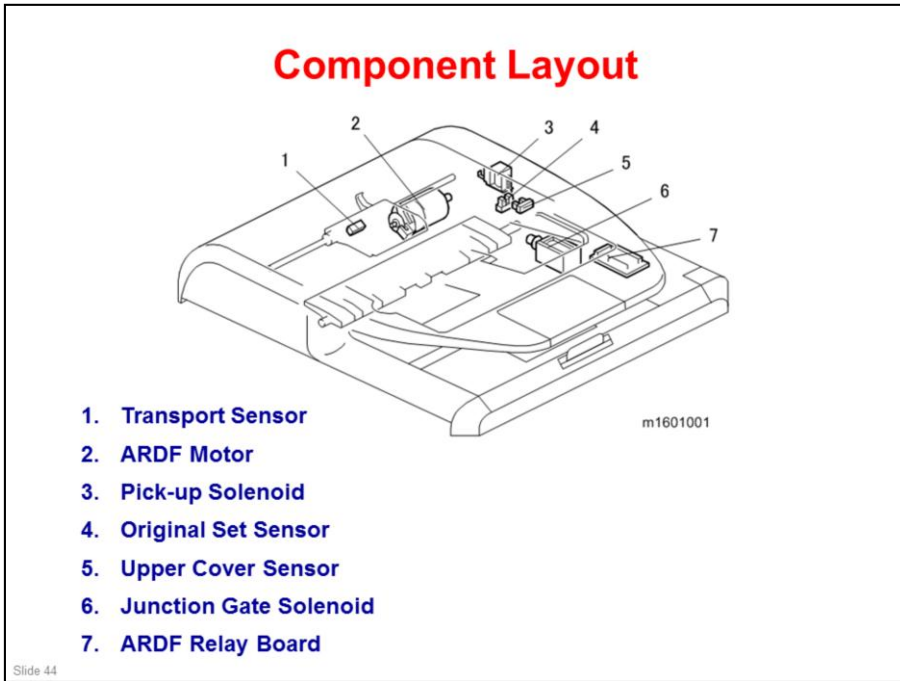
**Engine Details
ARDF**

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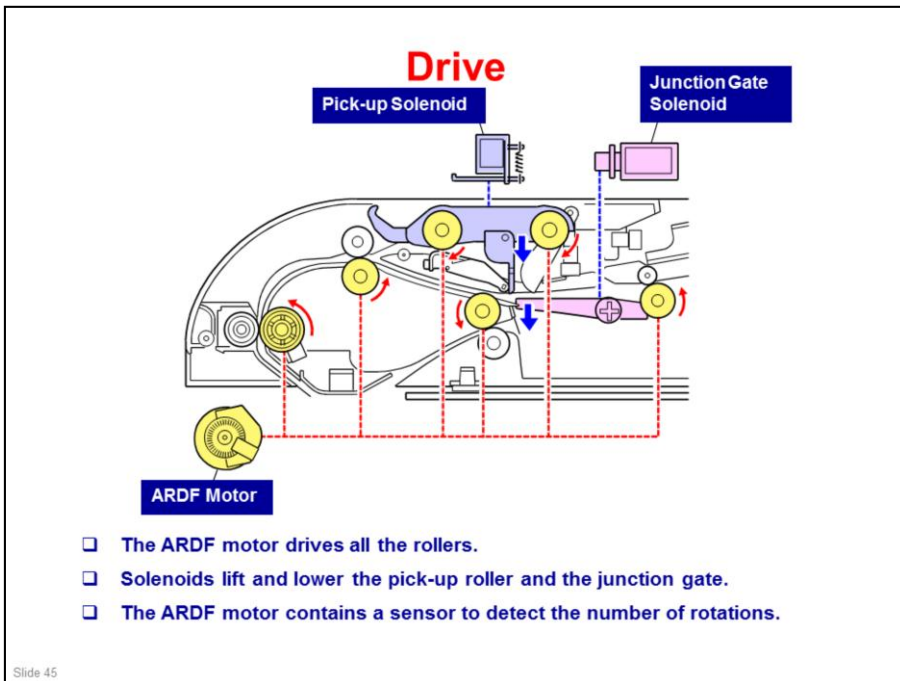
The ARDF is the same as used in the D117 series (Gr-C1).



- ❑ There is only one motor (13).

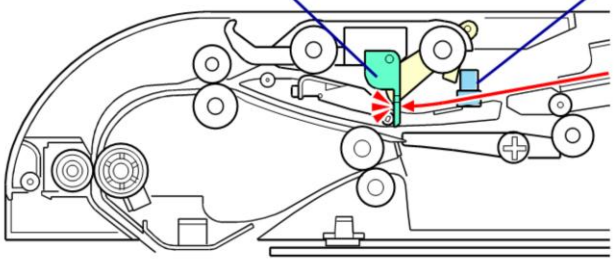


No additional notes



No additional notes

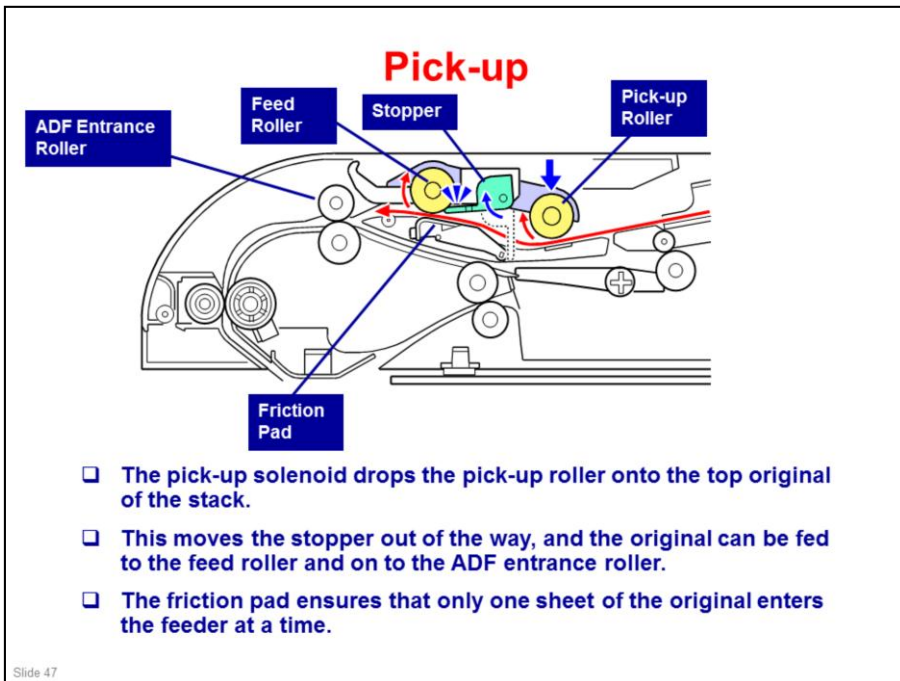
Original Detection



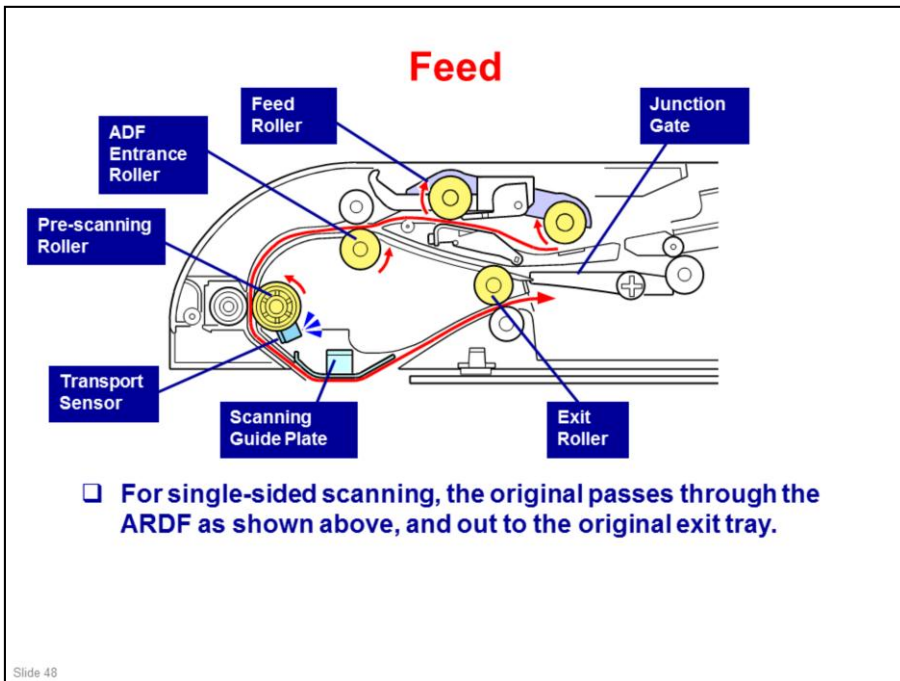
- ❑ The stopper prevents the user from placing originals too far into the feeder.
- ❑ Original feed control starts when the original set sensor detects originals.

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No additional notes



No additional notes



No additional notes

Duplex Mechanism

- ❑ The junction gate solenoid drops the junction gate, and the original feeds up towards the reverse roller, instead of down into the exit tray.
 - ◆ At this time, the reverse roller is idle.
- ❑ When the trailing edge of the original has passed the exit roller, the junction gate solenoid turns off, and the reverse roller feeds the original back into the ARDF.
- ❑ The second side is scanned.
- ❑ After scanning the second side, the machine inverts the original again, so that it is stacked correctly in the exit tray.

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No additional notes

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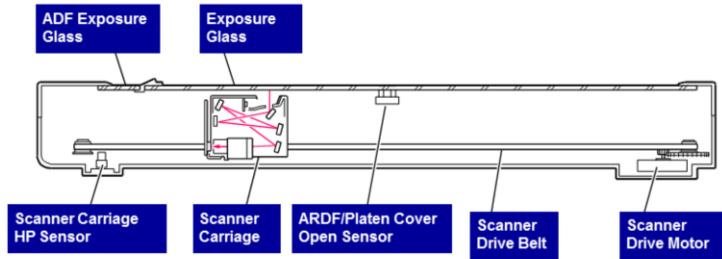
**GIM-MF1, GIM-P1
Service Training**

Engine Details
Scanner

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The scanner is the same as used in the D117 series (Gr-C1).

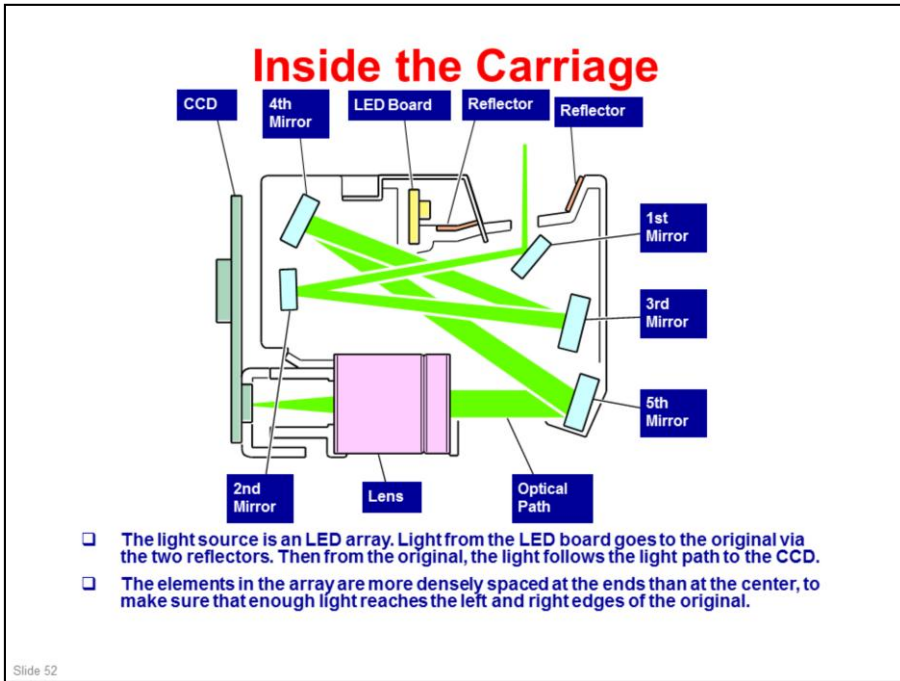
Overview



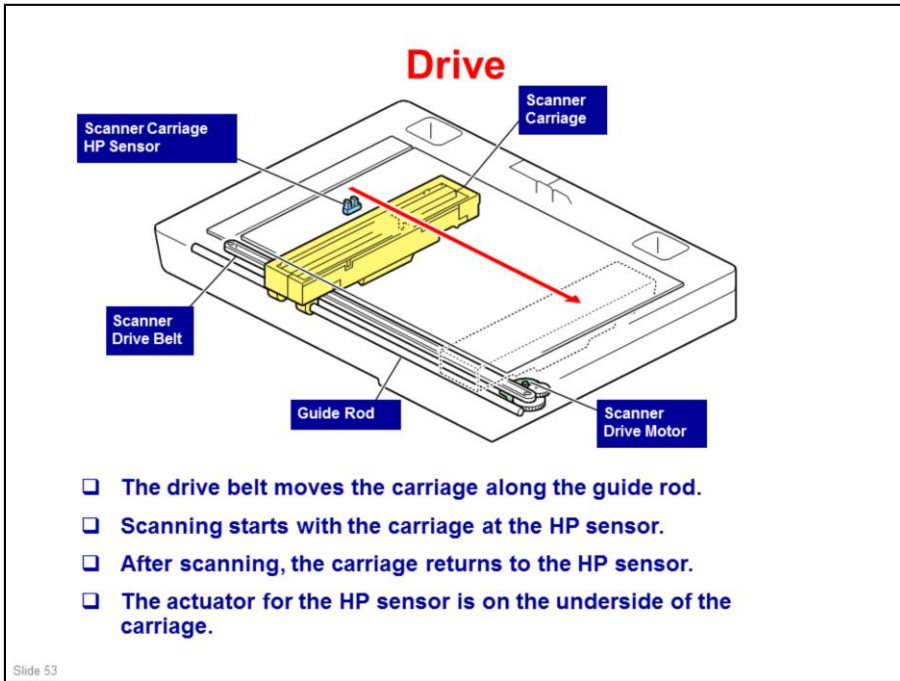
- All scanner optics are included inside one carriage.
- When you wish to move the carriage, use the drive belt. Do not pull the carriage directly.

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No additional notes

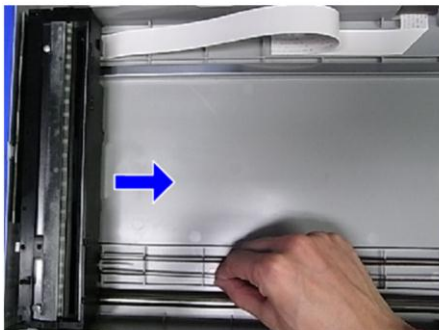


- ❑ The green line shows how the light reflected from the original goes to the CCD.



No additional notes

Moving the Carriage by Hand

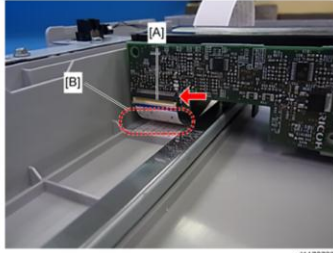


- When you wish to move the carriage, move the belt, as shown above.
- Do not pull the carriage directly.

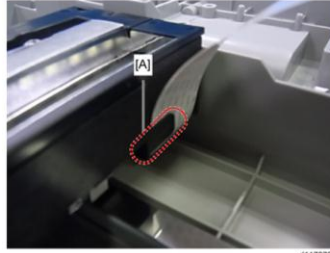
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No additional notes

Reinstalling the Carriage



d1170737



d1170738

- ❑ **Connect the flat cable as shown above [A] (diagram on the left). It must not be too slack at [B], or it will become worn.**
 - ◆ It must be connected straight, and not at an angle.
- ❑ **Hook the cable under the hook [A] (diagram on the right).**
- ❑ **If the cable is not connected correctly, the BICU and other electronic components may be damaged.**

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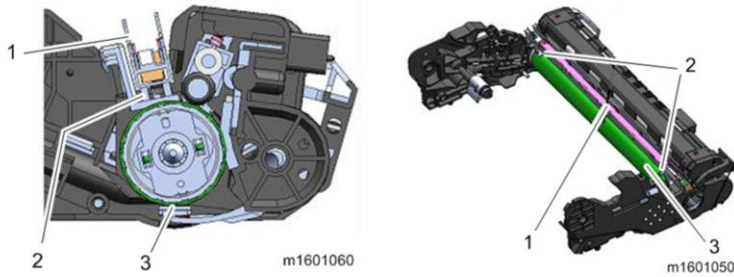
- ❑ These photos are taken from the GR-C1. The principle is the same on the GIM-MF1, but details may be different.

RICOH**GIM-MF1, GIM-P1
Service Training****Detailed Section Descriptions
Image Creation**

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**This section explains how a latent image is written on the drum.
The method is the same as the Ti-P1 (M109).**

Overview

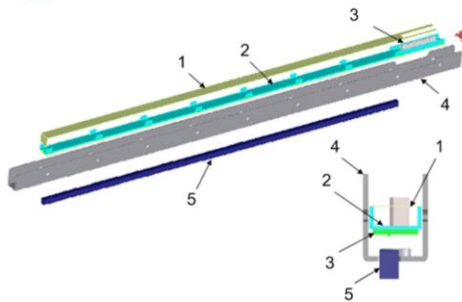


- ❑ An LED array [1] writes the latent image on the OPC [3].
- ❑ A spacer [2] on the drum keeps the LED array at the correct distance from the OPC for correct focus.
- ❑ The LED writing method contributes to machine downsizing, and is superior to the LD writing method in image quality, noise reduction, and energy saving.

Slide 57

No additional notes

Components of the LED Array

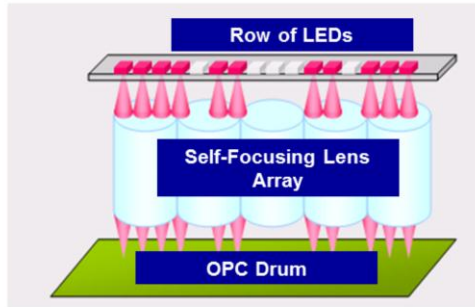


- ❑ **The LED array consists of the following parts.**
 1. Sheet
 2. Base
 3. LED board
 4. Frame
 5. SLA (Self-focusing Lens Array)
- ❑ **The LED array is replaced as one complete unit. The individual components shown above cannot be replaced in the field.**

Slide 58

No additional notes

Detailed Structure of the LED Array



- ❑ 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.

Slide 59

No additional notes

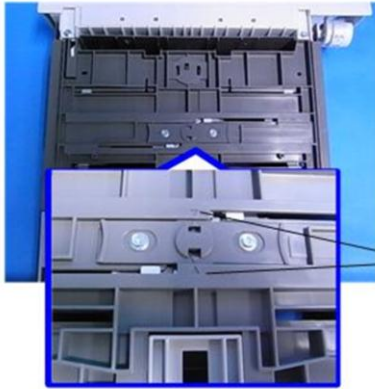
Notes Concerning the LED Array

- ❑ **Image position adjustment**
 - ◆ Horizontal (main scan): Adjusted by moving the image position
 - ◆ Vertical (sub scan): The timing for the start of writing is changed.
 - ◆ No mechanical adjustments
- ❑ **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.

Slide 60

No additional notes

Moving the Image Position



m1601016

Slide 61

- ❑ Loosen the screws on the bottom of the tray, and then move the holder to the right or the left (maximum adjustment: 2mm).
- ❑ When at the default (± 0) position, the holder is at the location marked by a triangle [A].

No additional notes

After Replacing the LED Unit

- After replacing the LED unit, clean the lens of the new unit.**
- Also clean the lens after working inside the machine around the LED unit.**
- If springs become disengaged when removing the LED unit, refer to the replacement procedure in the service manual for the correct way to reattach the springs.**

Slide 62

No additional notes

RICOH**GIM-MF1, GIM-P1
Service Training****Detailed Section Descriptions
Toner Cartridge and PCDU**

Slide 63

**This section explains the components of the toner cartridge and the PCDU.
The method is the same as the Ti-P1 (M109).**

Removing the Toner Cartridge and PCDU



m1600207



m1600216

- Open the front cover.
- To take out both PCDU and toner cartridge, pull the green handle.
- To take out only the toner cartridge, push the green button on the right and pull the green handle.

Slide 64

No additional notes

Toner Cartridges



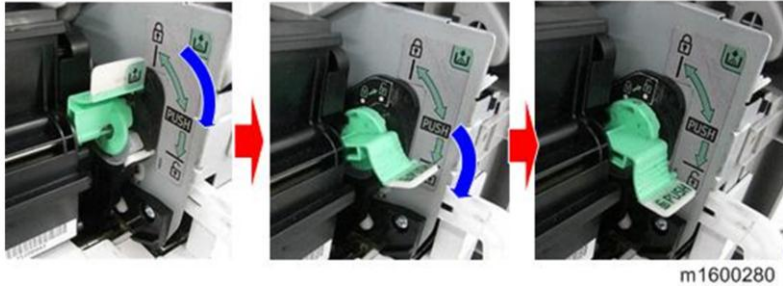
w_m1601021

- ❑ The toner cartridge contains the toner bottle, toner supply mechanisms, and the used toner collection box.
- ❑ The toner cartridge can separate from the PCDU (see the next slide) and can be replaced.
- ❑ The toner supply port on the toner cartridge has a shutter that opens when the toner cartridge is installed in the PCDU.

Slide 65

No additional notes

Toner Cartridge Release Lever



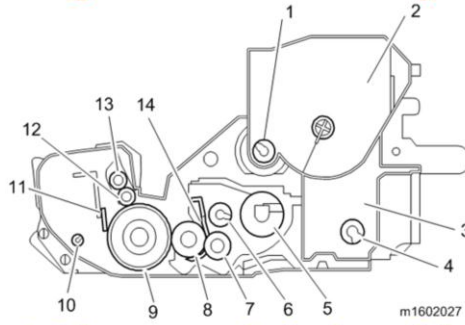
m1600280

- ❑ This lever releases the toner cartridge from the PCDU.
- ❑ The lever works in two steps. First, push the lever down to the horizontal position. Then stop there, then push the lever down to release the cartridge.

Slide 66

No additional notes

Toner Cartridge/PCDU Assembly Components

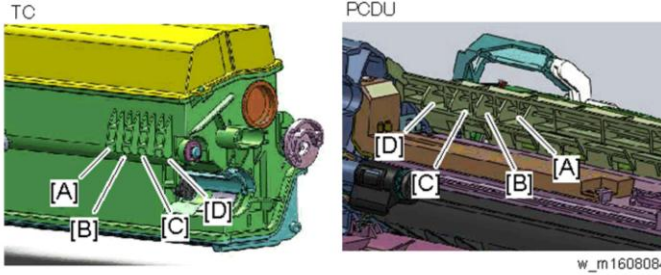


- | | |
|------------------------------|---------------------------------|
| 1. Toner Supply Coil | 8. Development Roller |
| 2. Toner Box | 9. OPC |
| 3. Used Toner Collection Box | 10. Waste Toner Collection Coil |
| 4. Used Toner Transport Coil | 11. OPC Cleaning Blade |
| 5. 1st Mixing Coil | 12. Charge Roller |
| 6. 2nd Mixing Coil | 13. Charge Cleaning Roller |
| 7. Toner Supply Roller | 14. Development Blade |

Slide 67

No additional notes

Two Types of Cartridge

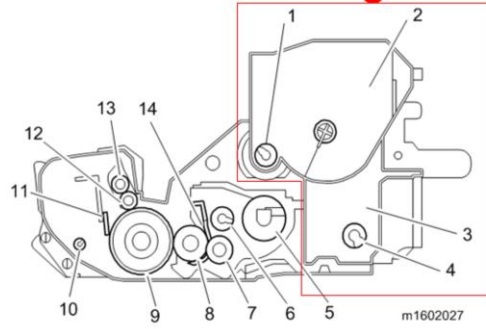


- ❑ **There are two types of cartridge.**
 - ◆ Service Maintenance Model (M159, M161): One type only,
 - » 10,400 pages (6%, 3P/J)
 - ◆ User Maintenance Model (M158, M160): Three types of toner cartridge.
 - » 3,000 / 6,000 / 12,000 pages (ISO)
- ❑ **The protrusions [A to D] on the cartridges are different. If you try to put the wrong type of cartridge in the machine, you will find that the toner cartridge does not fit properly into the PCDU on one side, preventing the front cover from closing.**
 - ◆ Just in case somebody manages to defeat this mechanism, the machine also has a function to use the data from the ID chip to detect incompatibility.

Slide 68

- ❑ This is different from Ti-P1.

Toner Cartridge

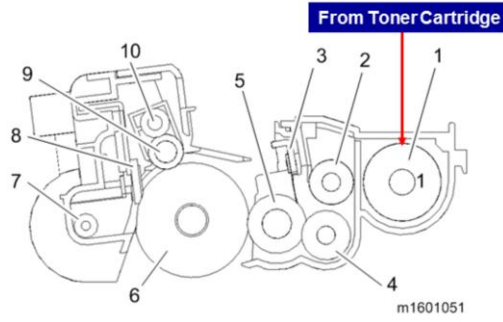


- ❑ The toner cartridge contains the toner box [2], toner supply coil [1], and the used toner collection box [3].
- ❑ The toner supply port shutter in the cartridge opens when the toner cartridge is installed in the PCDU.

Slide 69

No additional notes

Toner Supply Mechanism

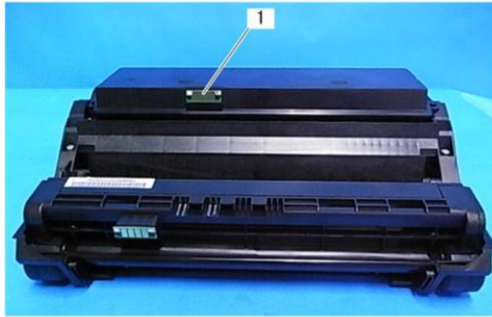


- When the toner supply clutch turns on, a coil in the toner cartridge rotates to transfer toner to the cartridge exit and then the PCDU. Toner which falls into the PCDU is transferred to the development section by the 1st mixing coil [1].

Slide 70

No additional notes

ID Chip



- ❑ Each toner cartridge has an ID chip 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.

Slide 71

No additional notes

Toner Near End (TNE), Toner End (TE)

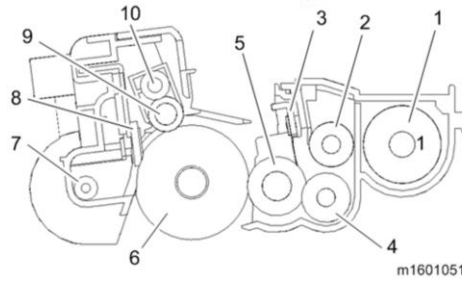
- ❑ **Toner near-end: A counter determines when the toner has almost run out by calculating the remaining toner, based on the initial amount of toner and subsequently replenished toner.**
 - ◆ Default setting: Toner near-end occurs when about 700 more pages can be printed before toner runs out. This should take about 5 days (assuming 3000 prints per month).
 - ◆ Near-end detection can be set to “Normal”, “Notify Sooner”, or “Notify Later”. The default is “Normal”.
 - » User Maintenance Models: [User Tools] key > Maintenance > Replacement Alert
 - » Service Maintenance Models: SP3-098-001
- ❑ **Toner end: A sensor checks whether toner is being added to the PCDU. If it cannot see that toner is being replenished, then the machine detects that toner has actually run out, and the machine cannot print.**

Slide 72

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

- ❑ Standard models: In accordance with ISO/IEC19752 and A4 paper and with the print density set to the initial factory setting
- ❑ Meter Click models: When continuously printing the test chart on A4 paper at 6% coverage.
- ❑ For example, if there are fewer prints per job, the toner will need to be replaced earlier.

PCDU Layout



m1601051

- **The PCDU contains the charge roller, photoconductor, development mechanism, and cleaning unit.**
 1. 1st Mixing Coil
 2. 2nd Mixing Coil
 3. Development Blade
 4. Toner Supply Roller
 5. Development Roller
 6. OPC
 7. Waste Toner Collection Coil
 8. OPC Cleaning Blade
 9. Charge Roller
 10. Charge Roller Cleaning Roller

Slide 73

No additional notes

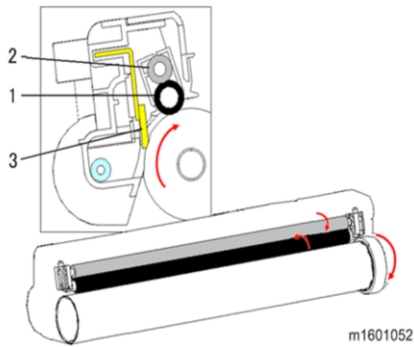
PCDU Drive

- The PCDU is driven by the main motor through a coupling.

Slide 74

No additional notes

Drum Charge and Cleaning

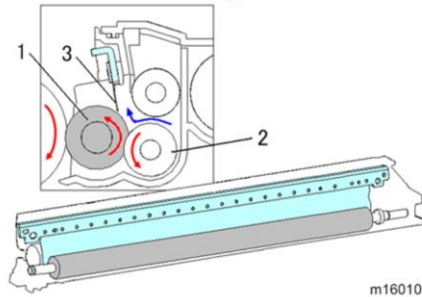


- ❑ **The charge roller [1] gives the drum surface a uniform negative charge.**
 - ◆ The charge roller [1] rotates in the same direction as the OPC drum.
- ❑ **If the charge roller [1] is dirty, the applied electric charge becomes uneven. Therefore, the charge roller is always in contact with the cleaning roller [2].**
- ❑ **The OPC cleaning blade [3] removes waste toner from the OPC.**

Slide 75

No additional notes

Development



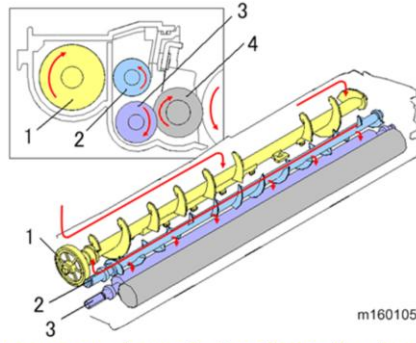
m1601054

- ❑ The development mechanism contains the development roller [1], the toner supply roller [2], and the development blade [3].
- ❑ 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] at an even thickness.

Slide 76

No additional notes

Mixing



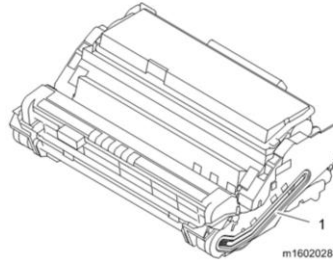
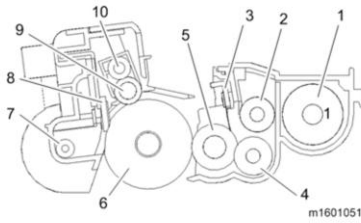
m1601053

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

Slide 77

No additional notes

Waste Toner Collection

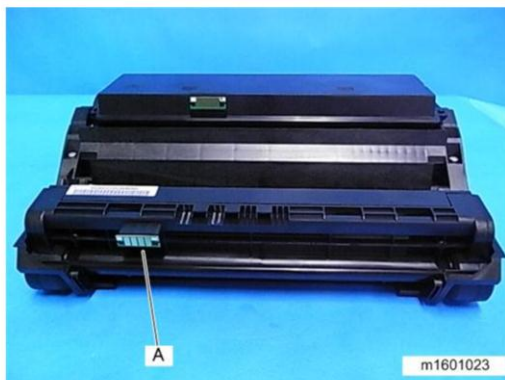


- ❑ **Toner waste is collected by the waste toner collection coil [7 in the diagram on the left] and sent down to the waste toner bottle.**
- ❑ **The waste toner goes down the path shown by [1] in the diagram on the right**

Slide 78

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

New PCDU Detection

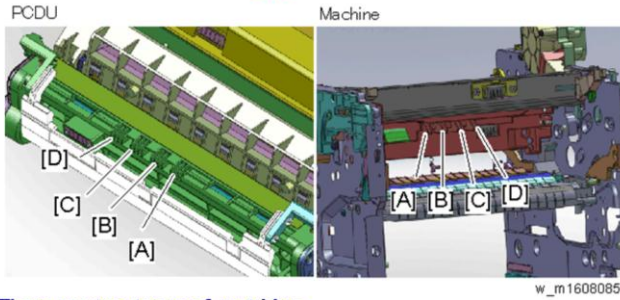


- ❑ When a PCDU is placed in the machine, the ID chip [A] is read. In this way, the machine detects when a new PCDU is inserted.

Slide 79

- ❑ This is different from the Ti-P1.

Two Types of PCDU



- ❑ **There are two types of cartridge.**
 - ◆ Service Maintenance Model (M159, M161): PCDU for Service Maintenance
 - ◆ User Maintenance Model (M158, M160): Photo Conductor Unit SP 4500
- ❑ **The protrusions [A to D] on the PCDU's are different. If you try to put the wrong type of PCDU in the machine, you will find that the PCDU does not fit in properly.**
 - ◆ Just in case somebody manages to defeat this mechanism, the machine also has a function to use the data from the ID chip to detect incompatibility.

Slide 80

No additional notes

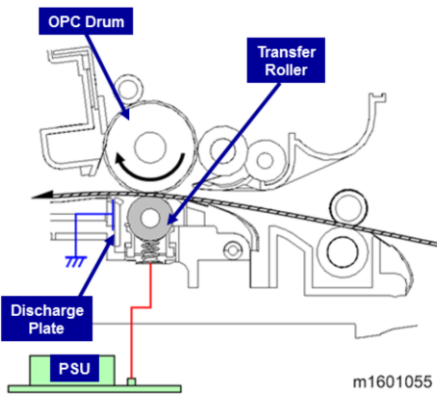
RICOH

GIM-MF1, GIM-P1
Service Training
Transfer & Separation

Slide 81

This is similar to the Rn-MF1 series.

Image Transfer & Paper Separation



- ❑ The transfer roller is pressed against the drum.
- ❑ The PSU supplies a positive charge to the transfer roller, sending toner from drum to paper.
 - ◆ Current is set in accordance with paper type, size, number of prints, and feed tray.
- ❑ Separation of paper from the drum is aided by drum's own curvature and by high AC voltage applied to the discharge plate.

Slide 82

- ❑ OPC – Organic Photo-Conductor (drum)
- ❑ PSU – Power Supply Unit
- ❑ You can adjust the transfer current applied for various situations (SP2-301 T bias control).
 - Increasing a transfer current level may produce ghost images—some part of image near the leading edge reappears in other part of the page.
 - Increasing a transfer current level might damage the OPC drum.

Transfer Roller Cleaning

- ❑ **The transfer roller must be cleaned sometimes to prevent toner that has transferred to the roller surface from moving to the rear side of subsequent prints.**
- ❑ **Cleaning is done at the following times:**
 - ◆ After initial power on
 - ◆ After clearing of a copy jam
 - ◆ At job end
- ❑ **To clean the transfer roller, the PSU does the following:**
 - ◆ First, it applies a negative cleaning current to the transfer roller, causing negatively charged toner on the roller to move back to the drum.
 - ◆ It then applies a positive cleaning current to the roller, causing any positively charged toner to migrate back to the drum.

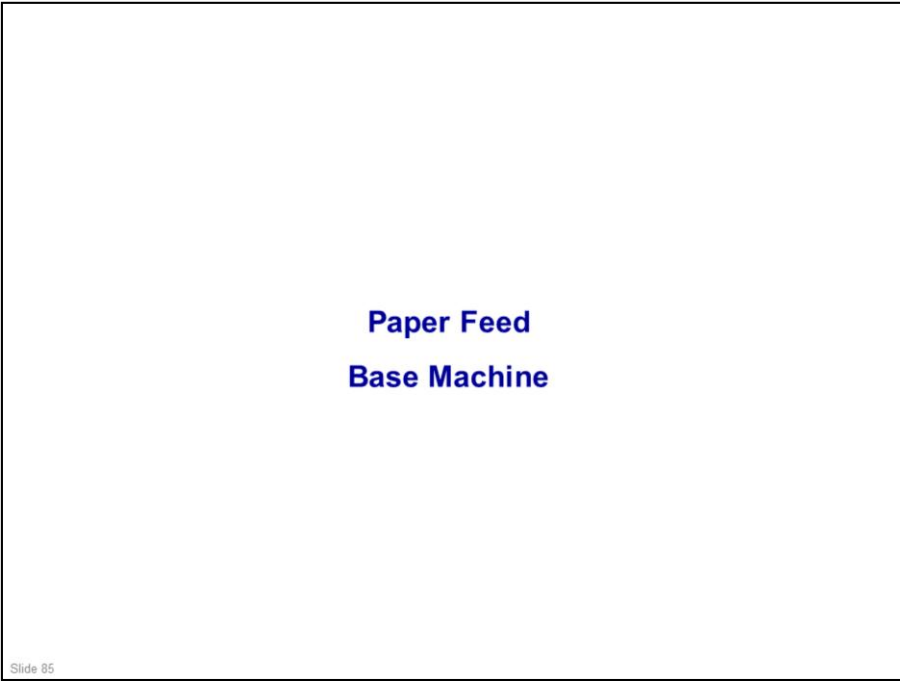
Slide 83

No additional notes

RICOH**GIM-MF1, GIM-P1
Service Training****Detailed Section Descriptions
Paper Feed**

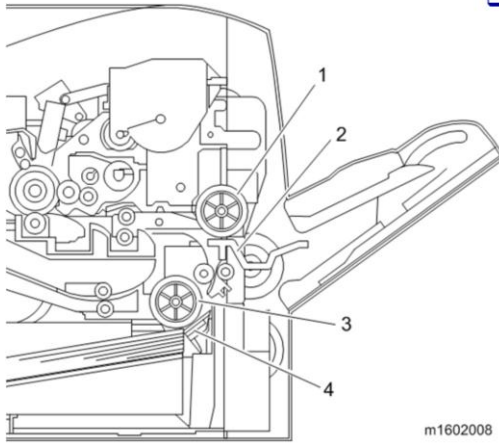
Slide 84

**This section explains how paper is fed through the machine.
The method is the same as the Ti-P1 (M109).**



No additional notes

Overview



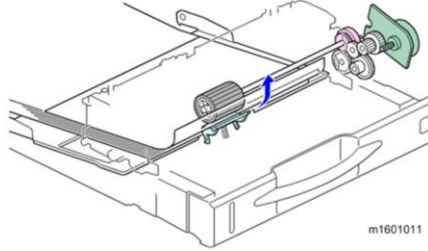
- **The machine has a paper tray and a bypass tray.**
 1. Bypass Feed Roller
 2. Bypass Friction Pad
 3. Tray 1 Paper Feed Roller
 4. Tray 1 Friction Pad

m1602008

Slide 86

No additional notes

Drive



- ❑ To start paper feed, the machine turns on the paper feed clutch, and the paper feed roller rotates.
- ❑ 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.

Slide 87

No additional notes

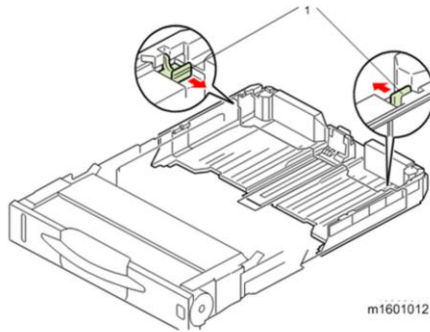
Paper End Detection

- ❑ 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.

Slide 88

No additional notes

Adjustable Cassette



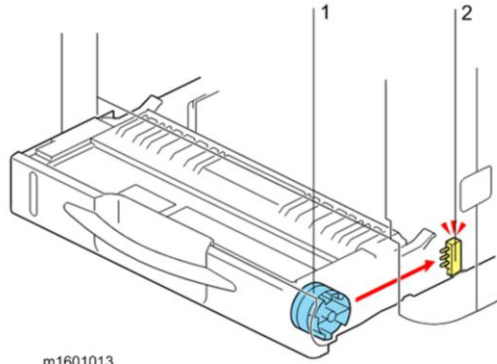
m1601012

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

Slide 89

No additional notes

Paper Size Detection



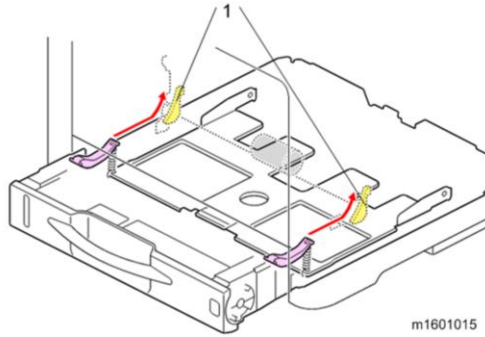
m1601013

- 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.

Slide 90

No additional notes

Bottom Plate Lift



- ❑ 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.

Slide 91

No additional notes

Bypass Feed Bottom Plate Mechanism

- ❑ **The bottom plate has an automatic lifting system.**
 - ◆ When paper is loaded into the tray, the end sensor turns on. When the sensor is on, the bottom plate goes down.
 - » When it is off, the bottom plate goes up.
 - ◆ To start paper feed, the bottom plate moves up (see the next slide).
- ❑ **When the main motor rotates in reverse, a one-way clutch transfers the drive to the bottom plate lifting system of the bypass tray.**
- ❑ **Then, 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

Slide 92

No additional notes

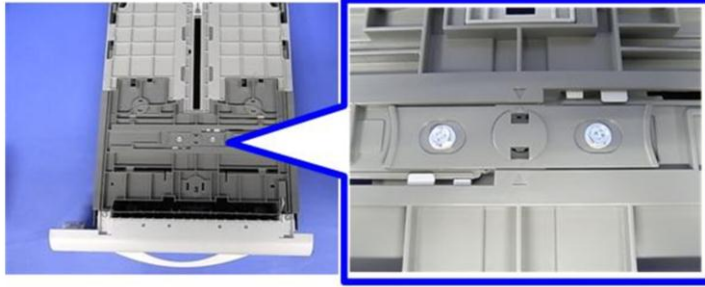
Bypass Feed

- ❑ Bypass feed uses a feed roller and friction pad mechanism.
- ❑ To start feed, the bottom plate goes up, then the bypass feed clutch starts.
- ❑ When the leading edge of the paper is out of the tray, the duplex exit clutch turns on to feed the paper into the machine along the same path as paper from the standard tray.
- ❑ The bypass feed clutch turns off when the paper activates the registration sensor.

Slide 93

No additional notes

Side-to-side Registration Adjustment Built-in Paper Tray



m1601059

- ❑ To adjust side-to-side registration, loosen the two screws on the underside of the tray and move the rack and pinion mechanism of the side guides from side to side.

Slide 94

No additional notes

Side-to-side Registration Adjustment Bypass Tray



m1601058

- ❑ To adjust side-to-side registration, loosen the screw at the right side of the tray and move the bypass bottom plate and side guides from side to side.

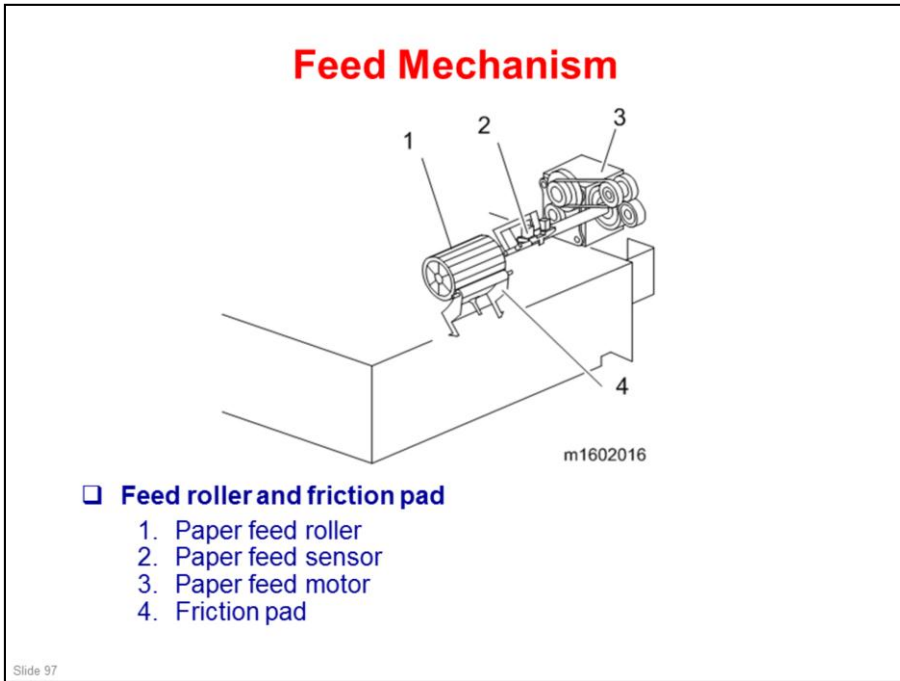
Slide 95

No additional notes

Paper Feed
Optional Paper Feed Units (M440, M441)

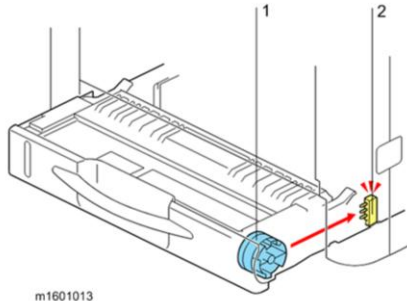
Slide 96

No additional notes

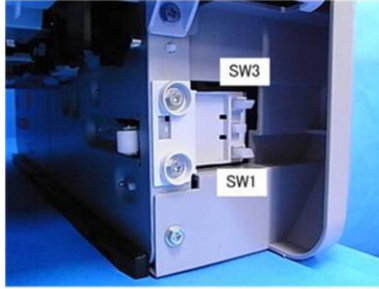


No additional notes

Paper Size Detection



m1601013

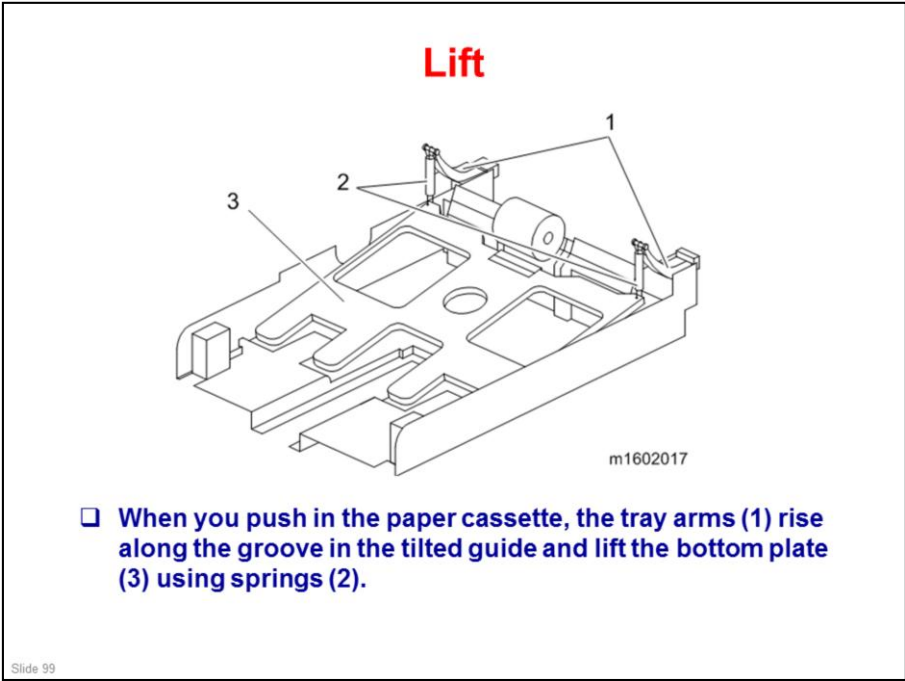


w_m1601014

- Paper size is detected by a combination of three detection switches [2].
- The switches are operated by the dial [1] on the right side of the paper feed tray.

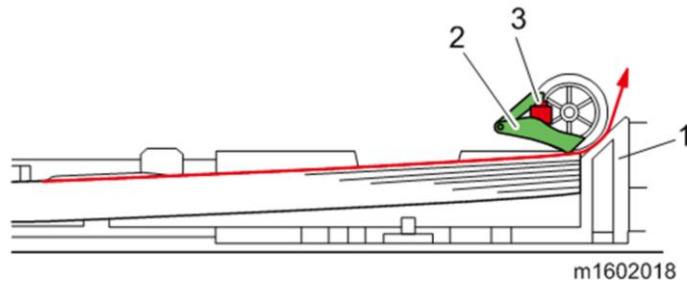
Slide 98

No additional notes



No additional notes

Paper End Detection



- When paper is all finished, the feeler (2) falls through an opening in the bottom plate and the paper end sensor (3) detects paper end.

Slide 100

No additional notes

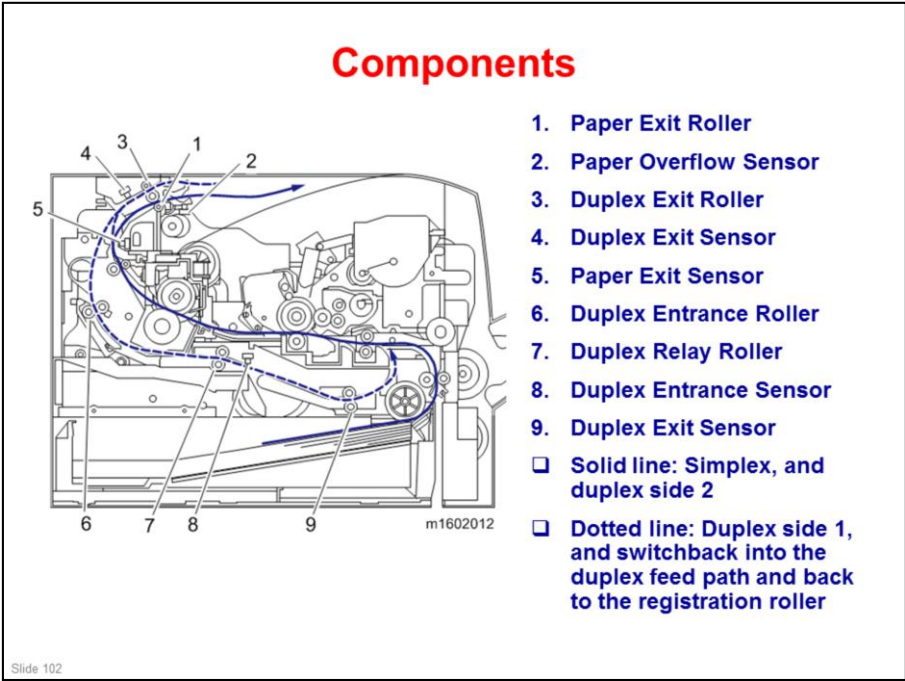
RICOH

**GIM-MF1, GIM-P1
Service Training**

**Detailed Section Descriptions
Duplex Feed**

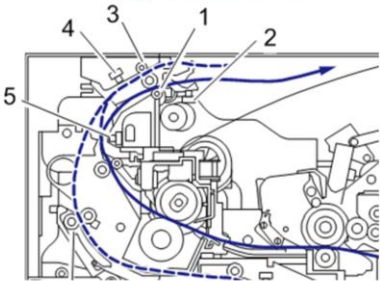
Slide 101

This is the same as the Sh-P1.



No additional notes

Operation



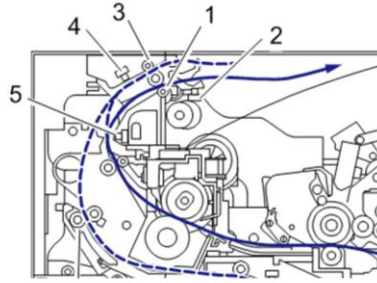
The diagram illustrates the duplex printing mechanism. A paper path is shown with a solid blue line for the first side and a dashed blue line for the second side. The path starts at the top left, goes right, then down, then right again. A junction gate (1) allows the paper to go either over or under. A duplex exit roller (3) is located at the top right. A paper exit sensor (5) is at the bottom left. The paper path ends at the output tray (2) on the right.

- ❑ For duplex printing, the machine turns the paper over by rotating the duplex exit roller in reverse.
- ❑ After the paper's trailing edge passes the paper exit sensor [5], the junction gate returns to its original position before the paper is delivered completely, and the duplex exit roller [3] rotates forward to feed the paper into the paper path for duplex printing.
- ❑ After printing on Side 2, the machine delivers the paper to the output tray.

Slide 103

- ❑ When printing on one side, the paper is fed under the junction gate to the duplex exit roller, and then delivered.
- ❑ When printing on both sides, the paper is fed over the junction gate and duplex exit roller to initiate the switchback operation.
- ❑ The paper exit roller is driven by the paper exit motor. The motor drives forwards or in reverse, depending on which stage of the duplex feed operation the machine is in.
- ❑ The paper exit guide plate holds down the trailing edge of each sheet of paper after it exits, in order to prevent it from obstructing the following sheets of paper as they exit.

Paper Overflow Sensor



- If the height of the paper stacked on the output tray exceeds a certain limit, the paper overflow sensor [2] detects it based on the position of the paper overflow sensor feeler, and then the machine stops printing.

Slide 104

No additional notes

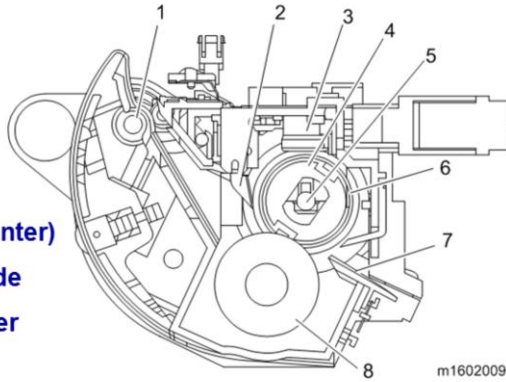
RICOH**GIM-MF1, GIM-P1
Service Training****Detailed Section Descriptions****Fusing**

Slide 105

The mechanism is the same as the Sh-P1, but temperature control is based on the Ti-P1 and Rn-P1.

Overview

1. Fusing exit roller
2. Hot roller strippers
3. Thermostat
4. Hot roller
5. Fusing lamp
6. Thermistor (Edge/Center)
7. Fusing entrance guide
8. Fusing pressure roller



- The hot roller and pressure roller fuse the toner image to the paper.
- After fusing, the paper passes through the fusing exit rollers and the paper exit rollers to the output tray.

Slide 106

- The thermistor detects the temperature of the hot roller to control lamp on/off timing. (See the "Fusing Temperature control" slide.)
- The thermostat provides backup overheat protection.

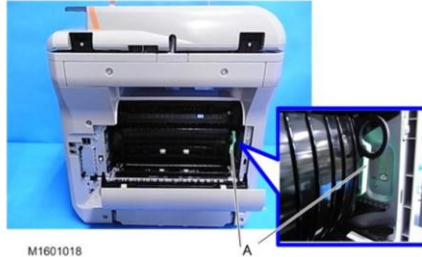
Fusing Unit Drive

- ❑ The main motor drives the fusing unit and the fusing exit rollers.

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No additional notes

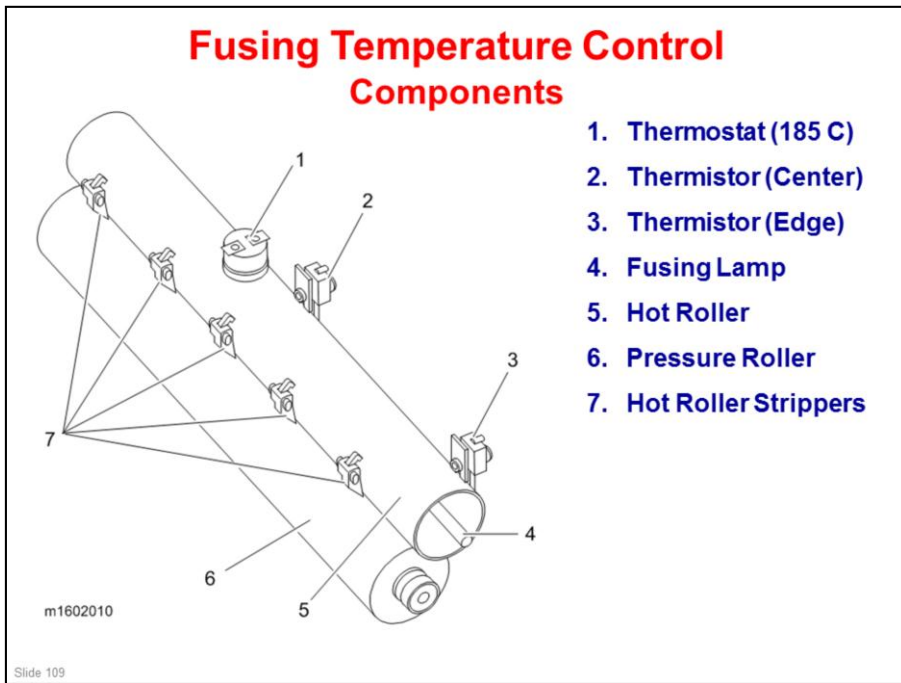
Envelope Lever



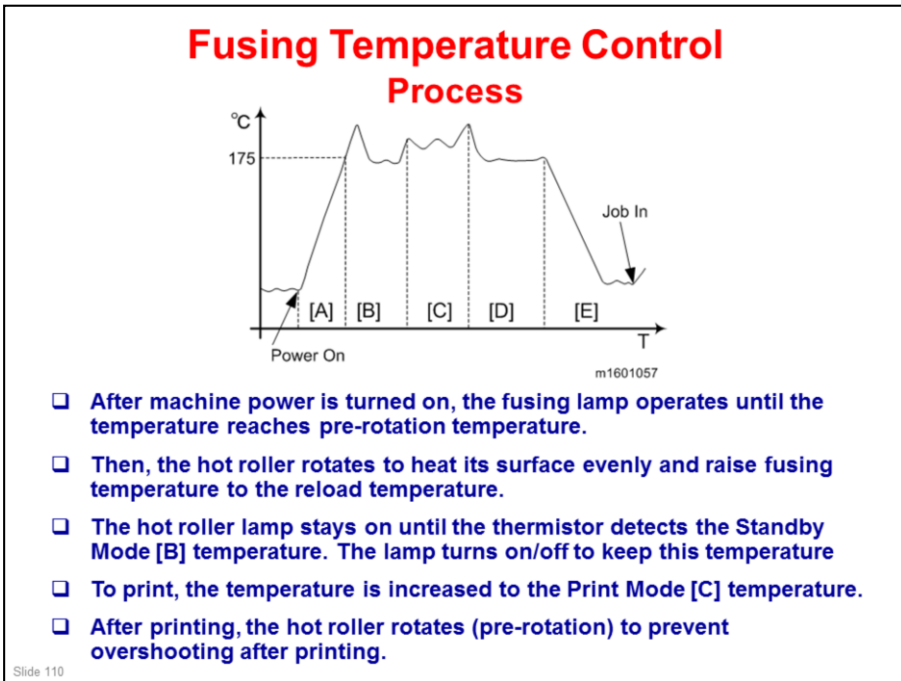
- ❑ The envelope lever [A] is on the right of the fusing unit.
- ❑ Lowering the lever decreases the fusing pressure (to approximately 20% of normal) to reduce wrinkles on envelopes.
- ❑ The machine cannot detect the position of this lever, so raise the lever to its original position after printing on envelopes.
- ❑ When shipped from the factory, the envelope lever is down, to prevent deformation of the hot roller.
- ❑ Keep the envelope lever lowered when not using the machine for a long period (2 weeks or more).

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No additional notes



No additional notes



[A]: Warming Up Mode

[B]: Standby Mode

[C]: Print Mode

[D]: Standby Mode

[E]: Auto Off Mode

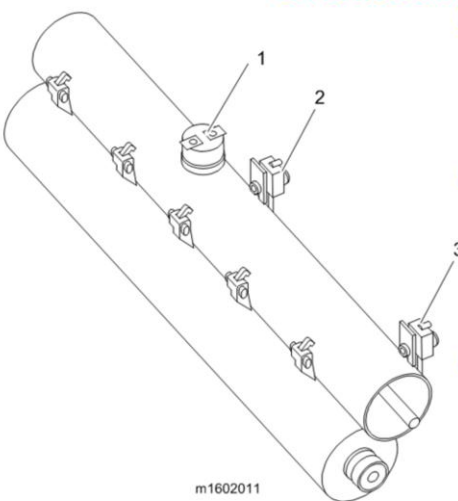
[F]: Energy Saver Mode

The fusing temperature (Celsius) in each mode is as follows:

- Standby Mode: 175
- Energy Saver Mode: Ambient temperature
- Print Mode
 - Plain paper 1: 178
 - Plain paper 2: 183
 - Middle Thick: 187
 - Thick 1: 192
 - Thick 2: 189
 - Thin Paper: 168
 - Envelopes: 200
 - Post Cards: 195
 - Recycled Paper: 178

- The fusing temperature, except for Energy Saver mode, can be adjusted in SP mode.

Fusing Temperature Control Overheat Protection



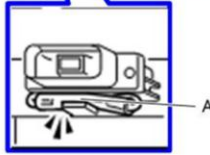
m1602011

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- ❑ **The thermistor [2] checks the surface temperature of the hot roller.**
 - ◆ If the temperature is more than 250 ° C, the power to the fusing lamp is cut.
- ❑ **The thermistor (edge) [3] checks the surface temperature of the hot roller.**
 - ◆ If the temperature is more than 250 ° C, the power to the fusing lamp is cut. SC543 will be generated.
- ❑ **If the thermistor protection fails, a thermostat [1] also checks the hot roller temperature.**
 - ◆ If the thermostat detects more than 185 ° C, the thermostat opens, removing power from the fusing lamp. At this time, the machine stops.

No additional notes

New Unit Detection



M1601019

- ❑ There are two types of fusing unit: one for emergency maintenance (EM) and another for periodical replacement.
- ❑ The fusing unit for periodical replacement has a new unit detection mechanism.
- ❑ When the machine is switched on after replacing the fusing unit, the engine board detects the fuse [A] under the drawer connector of the new fusing unit, and then blows the fuse.

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No additional notes

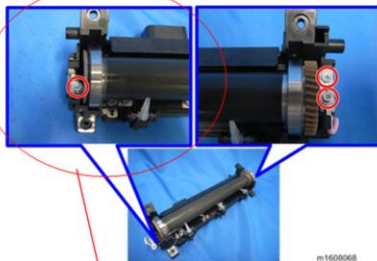
Installing a New Fusing Unit

- ❑ **Service Maintenance Models (M159, M161)**
 - ◆ Install a fusing unit without new product detection capability, and reset PM Counter Fuser setting (engine SP 7-804-003) after replacement.
- ❑ **User Maintenance Model (M158, M160)**
 - ◆ Install a fusing unit with new product detection capability from the Maintenance Kit. (User operation)

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No additional notes

Removing the Fusing Lamp



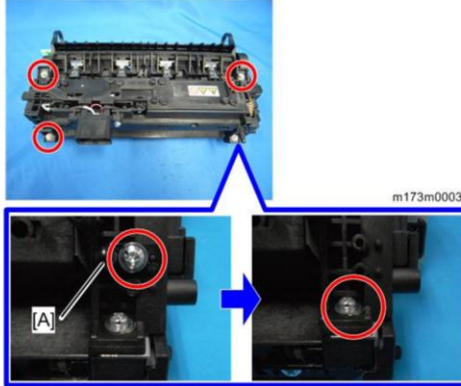
- ❑ Be careful not to break the lamp when removing screws.
- ❑ When removing/attaching lamp securing screws on the side that is away from the drive mechanism, insert a pin or jeweller's screwdriver as shown here, in order to secure the terminal to the upper frame.



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No additional notes

Reassembling the Fusing Unit



- ❑ When reassembling, be sure to attach the pin [A] to the correct position. If not, the fusing unit cannot be attached to the main body properly.

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No additional notes

RICOH

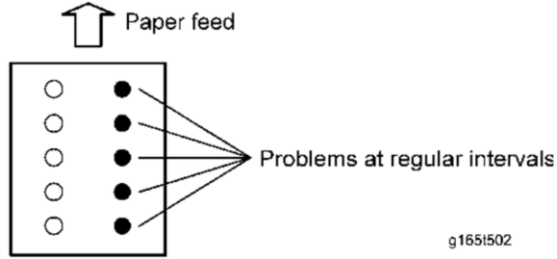
**GIM-MF1, GIM-P1
Service Training**

Troubleshooting

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No additional notes

Problems at Regular Intervals

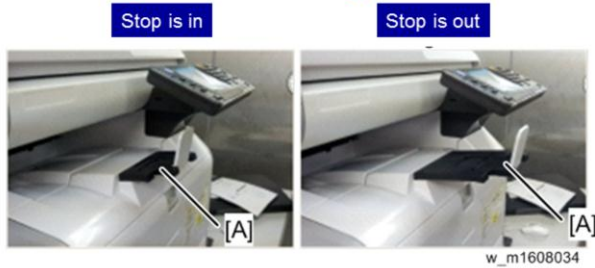


- 29.9 mm: Charge roller
- 37.7 mm: Registration roller
- 45.8 mm: Image transfer roller
- 112 mm: Fusing pressure roller
- 94 mm: Fusing roller
- 100.5 mm: Paper feed roller
- 35.6 mm: Development roller
- 94.4 mm: Drum

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No additional notes

Paper Stacking Problems



- ❑ If the number of stacked sheets is substantial, the stack may start to spill.
- ❑ You can prevent this by adjusting the stop [A]. The stop supports paper up to Legal size.

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No additional notes

Output is Severely Curled

- ❑ If the delivered paper is curled, it cannot be stacked properly. In such a case, raise the paper stop on the output tray and remove the delivered paper frequently.
- ❑ You can also adjust [Curl Prevention] in the UP mode (Maintenance).
 - ◆ If you set [Curl Prevention] to [Active], the machine idles for 20 seconds before it starts printing.
 - » By adding the idle time before printing, it takes longer to print, but paper curling can be reduced.
 - ◆ To stop the 20-second idling, set [Curl Prevention] to [Inactive].

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No additional notes



The end