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- **11. Environmental Conservation**

- A note to the training supervisor -

This course was written assuming the following requirements. Modify as necessary depending on your situation.

- Preparation
 - Prior to starting this course, prepare the following items. -
 - > Training machines in the shipping boxes
 - A set of service tools
 - Field Service Manual
 - User's Manuals
- Requirements for trainees
 - Prior to starting this course, the following training or equivalent should be completed.

Fax basics course

Copier basics course

- The trainee should also be familiar with the Core Technology Manual and be able to reference it during training.
- □ Time required to complete this course: 6 hours or less.

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Model ME-P1/MF1 (M101/M102/M103) Service Training

1. Product Outline



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- □ Other non-visible differences will be covered later in the course.
- □ The M103 has copier, scanner, printer, and fax functions (= 4in1).
- □ The M102 has copier, scanner, and printer functions (= 3in1).
- □ The M101 is a printer only.
- □ The M101 has a very small operation panel with only two buttons and no display. The top of the machine is covered by a plastic maintenance cover.
- □ The M102 has a larger operation panel with more buttons and a 2-digit display. The top of the machine is covered by a platen cover and flatbed scanner unit.
- The M103 has an operation panel with a full array of keys, a 10-key pad, and a 7-digit display. The top of the machine is covered by a ADF that can hold and feed 15 originals for continuous scanning, and a flatbed scanner unit.

External Components – M101 (Printer)					
 7 8	9 10 11				
7 8	9 10 11 7. Output tray extension				
7 8 1. Maintenance cover 2. Input tray	9 10 11 7. Output tray extension 8. Front cover				
7 8 1. Maintenance cover 2. Input tray 3. Power indicator	9 10 11 7. Output tray extension 8. Front cover 9. USB port				
7 8 1. Maintenance cover 2. Input tray 3. Power indicator 4. Resume key	9 10 11 7. Output tray extension 8. Front cover 9. USB port 10. Input tray cover				
7 8 1. Maintenance cover 2. Input tray 3. Power indicator 4. Resume key 5. Cancel key	9 10 11 7. Output tray extension 8. Front cover 9. USB port 10. Input tray cover 11. Power switch				

- □ See the Quick Start Guide for a list of components in the shipping carton.
- □ See the User's Guide for detailed external component descriptions.

External Compo	nents – M102 (3in1)
1 Control panel	6. Output tray extension
2. Exposure glass cover	7. Front cover
2. Exposure glass cover 3. Input tray	7. Front cover 8. Maintenance cover
2. Exposure glass cover 3. Input tray 4. Exposure glass	7. Front cover 8. Maintenance cover 9. USB port

- □ See the Quick Start Guide for a list of components in the shipping carton.
- $\hfill\square$ See the User's Guide for detailed external component descriptions.

External Compo	External Components – M103 (4in1)				
1. Control panel	9. Output tray				
2. ADF cover	10. Maintenance cover				
3. ADF input tray	11. Auto document feeder (ADF)				
4. ADF extension tray	12. Original tray extension				
5. Paper tray	13. USB port				
6. Exposure glass	14. Line and TEL connectors				
7. Paper tray cover	15. Power switch				
8. Output tray extension					

- □ See the Quick Start Guide for a list of components in the shipping carton.
- □ See the User's Guide for detailed external component descriptions.
- □ The output tray becomes the front cover when it is closed.

RICOH **Operation Panel – M102 (3in1) Chinese Version** 1 1. Display screen 6. Stop/Cancel key 2 2. Copy number key 7. Start key 3 40 O C# 3. Density indicator 8. Power indicator 调整扫描浓度 9. Alert indicator 4. Density key 4 0 5. ID copy key ID卡复印 5 à Ì 停止/取消 6 C/Ø 开始 ()7 0 8 9















Names, Codes, and Distribution

Туре	Destination	Brand	Model name	Product name	Product code
ID Chip Model EU/Asia-Pacific China	North America	Ricoh	ME-P1	Aficio SP 100	M101-17
			ME-MF1a	Aficio SP 100SU	M102-17
			ME-MF1b	Aficio SP 100SF	M103-17
		ME-P1	Aficio SP 100	M101-27	
	EU/Asia-Pacific	ic Ricoh	ME-MF1a	Aficio SP 100SU	M102-27
			ME-MF1b	Aficio SP 100SF	M103-27
	China	Ricoh	ME-MF1b	Aficio SP 100SF	M103-21
Non-ID Chip Model Russia, Saudi Arabia, Middle East, Africa, South America, Asia Pacific	China Ric	Disch	ME-P1	Aficio SP 100	M101-21
		Ricoh	ME-MF1a	Aficio SP 100SU	M102-21
	South America	Ricoh	ME-P1	Aficio SP 100	M121-17
			ME-MF1a	Aficio SP 100SU	M122-17
		ME-MF1b	Aficio SP 100SF	M123-17	
		ME-P1	Aficio SP 100	M121-27	
	Arabia, Middle Fast Africa	Ricoh	ME-MF1a	Aficio SP 100SU	M122-27
	South America, Asia Pacific		ME-MF1b	Aficio SP 100SF	M123-27

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Model ME-P1/MF1 (M101/M102/M103) Service Training

2. Specifications

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General	Speci	IICa	lions

□ Resolution:

- Output (print/copy): 600 x 600 dpi
- Scan from exposure glass: 600 x 600 dpi, 600 x 300 dpi
 Scan from ADF: 600 x 300 dpi
- □ Print/Copy speed: 13 ppm (A4/LT SEF)
- □ Warm up time: Less than 25 s at 23° C
- □ First print time:
 - Less than 6.4 s from the start of paper feed until paper exits.
 - Less than 13 s from the time data is received until paper exits.
- □ First copy time: Less than 27 s (ADF feed)
- □ Maximum original & print size: A4, 8¹/₂" x 11"
- □ Input tray capacity: 50 sheets
- Output tray capacity: 10 sheets
- □ ADF capacity: 15 sheets
- □ This slide shows the basic specifications.
- □ For more detailed specifications, see the field service manual.

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Model ME-P1/MF1 (M101/M102/M103) Service Training

3. Installation

Overview

- Generally, the user installs this machine. However, in addition to your maintenance duties, you may also have to install the machine when you are in the field.
- **□** The full installation procedure is in the *Quick Installation Guide*.
- **Before you start installation:**
 - Check the accessories.
 - Confirm the location to install the machine (space, power source, environment).



Install the Machine

□ The following are the main steps to installation. Refer to the Quick Installation Guide (QIG) for details.

- Unpack the machine.
- Take out, shake, and reinstall the AIO (print cartridge).
- Connect the power cord and USB cord.
- Install the printer software in the computer.
- Load paper in the paper tray and open the output tray.
- M103 only
 - » Connect the phone line.
 - » Set up the fax functions.
- The User's Guide contains more information about machine setup options. Familiarize yourself with it in case the user requests your help.

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Model ME-P1/MF1 (M101/M102/M103) Service Training

4. Machine Overview





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LDB = Laser diode board
 Fu Therm = Fusing thermistor
 Regist sensor = Registration sensor
 I/L SW = Interlock switch



LDB = Laser diode board
 Fu Therm = Fusing thermistor
 Regist sensor = Registration sensor
 I/L SW = Interlock switch
 CIS = Contact image sensor



LDB = Laser diode board
 Fu Therm = Fusing thermistor
 Regist sensor = Registration sensor
 I/L SW = Interlock switch
 ADF = Automatic document feeder
 CIS = Contact image sensor



□ The registration sensor sets registration timing. (= Laser on timing)



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Model ME-P1/MF1 (M101/M102/M103) Service Training

5. Maintenance (Maintenance, Service mode, Cleaning)



- This machine designed for user maintenance; so, it does not have a periodic maintenance schedule.
- Refer to the maintenance information in the User Guide.
 - Operating Instructions: User Guide → Maintaining the Machine
- □ Also see the "Using the Service Mode" slide.
Configuring the Machine



Refer to "User Maintenance Mode" in the FSM for details about user access procedures.

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Joing					

□ The method for entering the service mode depends on the function item and the model.

- Refer to the table below.
- The Service Mode PC utility is accessed from within the Smart Organizing Monitor.
- For full details see the FSM.
 FSM → Troubleshooting → Utilities → Smart Organizing Monitor Service Mode

No.	Function	To Enter Service Mode	M103	M102	M101
1	Fax maintenance	From "Ready" state: Stop/Reset > 1 > 0 >7 > Start	Yes	No	No
2	Fax test	Power ON + Copy/Fax key	Yes	No	No
3	Engine maintenance	See the next slide.	Yes	Yes	Yes
4	Counter information		Yes	Yes	Yes
5	Error history		Yes	Yes	Yes

Note: The Service Mode of the Smart Organizing Monitor is your best tool for troubleshooting problems as is a common tool available for all three machines.



Cleaning

- This machine designed for user maintenance; so, it does not have a periodic maintenance schedule.
- As a preventive maintenance measure, you may need to clean machine components during service calls.
- Go to the machine and practice cleaning procedures.
 - Refer to the User Guide for the cleaning procedures.
 - Pay particular attention to the "Cautions when Cleaning" section.

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Model ME-P1/MF1 (M101/M102/M103) Service Training

6. Mechanical Operation



□ This is a typical friction pad feed system. (In this machine the friction pad is called a separation pad.) For a general discussion of the *friction pad* feed process, see the Core Technology Manual.











More Details about the Fusing Unit

- □ Fusing method: Hot & pressure rollers
- □ Fusing lamp: Halogen lamp, 500W
- □ Hot roller diameter: 25 mm
- □ Hot roller surface: 0.7mm thick
- Der Pressure roller diameter: 22 mm
- Fusing unit drive: Main motor
- □ Warm-up time: 25 s (from cold start at 23 C)



- After a cold start at "A" the fusing lamp inside the hot roller switches on.
- □ At "B" the hot roller and pressure roller start to idle so the heat from the fusing lamp is transferred and distributed evenly over the surfaces of these rollers. Once the rollers reach the reload temperature, the machine can start printing.
- □ Once the hot roller reaches the standby temperature at "C" the machine is ready to start printing.
- □ Fusing temperature control keeps the hot roller temperature constant during a print job at "D".
- Once the job is finished, the machine returns to standby mode "C" and is ready to start the next job as soon as it is received.
- □ If a new job is received within 30 sec. the machine starts the new job immediately. If a new job is not received within 30 sec., the machine enters Energy Save Mode 1 at "E".
- □ If a new is received within 60 sec. the machine recovers rapidly and starts printing. If a new job is not received within 60 sec. while the machine is in Energy Save Mode 1, the machine enters Energy Save Mode 2. This mode conserves power consumption while the printer remains idle.
- Notes:
 - Energy Save Mode 1. The machine enters this low power mode if machine remains idle for more than 30 sec. Recovery time is shorter, but machine consumes more power while in energy save mode. This setting is not adjustable.
 - Energy Save Mode 2. The machine enters this mode after the machine remains idle for 60 sec. (This default setting can be adjusted by the operator with User Tools ([1 to 2401/1 min.]. Recovery time is longer, but the machine consumes less power while in energy save mode.





More on scanning

- □ ADF scanning: Document moves across stationary CIS unit
 - Placing a document *face up* in the document support activates the document set sensor, switching to ADF scanning.
 - The CIS unit first moves to the white-level reference film for white level compensation and then to the ADF scanning position. The ADF motor then rotates the document pick-up roller to pull the document into the ADF.
 - The document separation roller feeds the pages one at a time, starting from the top, to the document feed roller, which feeds the sheet through the ADF. The page is scanned as it passes over the CIS unit. The document is then ejected face down on the document cover. Subsequent pages are ejected on top of previous pages, preserving document page order.
- □ Flat-bed scanning: CIS unit moves under stationary document
 - The user places a document *face down* on the exposure glass and closes the document cover.
 - The CIS unit first moves to the white level reference film for white level compensation. It then moves right, scanning as it goes. It returns to its home position after the scan.

CSI Operation Details

- □ The CIS (contact image sensor) is a compact image reading assembly.
- □ Refer to the Core Technology manual for details of CIS structure and operation.





Flatbed Hinge Mechanism (M102, M103)

- One spring-loaded hinge is used to raise and lower the top of the machine.
- □ The hinge is mounted on the top of the left cover and connected to the bottom of the flatbed unit.
 - The hinge locks and holds when the top of the machine is raised.
 - On the M102 only the flatbed unit is raised.
 - On the M103 the ADF and flatbed unit are raised together.
- □ The single hinge is on the left.
 - The top of the hinge is connected to the base of flatbed scanner [1].
 - The support arm [2] has a base [3] support arm base that moves freely through the guide [4] when the top is raised and lowered.
 - The mechanism lies flat in the locked position [5]



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Model ME-P1/MF1 (M101/M102/M103) Service Training

7. Print Processes

Print Processes

- The following cycle is repeated for each sheet of paper.
- The charge roller [1] applies a high negative charge (about -1000 V) to the photoconductive surface of the drum [2].
- The laser beam [3] creates a latent image on the drum.
- A toner from the toner supply unit [4] is picked by the toner supply roller [5] and applied to the development roller [6].
- The doctor blade [7] creates an even coating of negatively charged toner on the development roller.
- The latent image areas on the drum pick up toner from the development roller. Only the areas of the drum exposed to the laser can attract toner from the development roller.



- on the transfer roller pulls the toner off the drum onto the paper to form the image.
- The cleaning blade [10] cleans unused toner from the surface of the drum. The toner cleaned from the drum by the cleaning blade is collected in the waster toner unit [11].
- After passing between the drum and transfer roller, the paper goes to the fusing unit where the toner is fused to the paper.
- Rubbing action between the toner and the doctor blade creates the negative triboelectric charge on the toner particles.
- □ As the development roller rotates past the drum, the toner particles are attracted to the latent image areas of the drum because those areas have the lowest absolute electrical value. (The non-image areas of the drum and the development roller both have higher negative potentials.) This is sometimes referred to as "Negative-Negative" development.

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Model ME-P1/MF1 (M101/M102/M103) Service Training

8. AIO Cartridge



- □ The agitator stirs the toner and directs it to the development area.
- □ The toner paddle moves toner to the supply roller.
- □ Not used in some areas. (See slide xxx.)

Toner End Detection

□ Machines without ID chip in AIO

• These machines have no system to alert the operator when the toner supply of the AIO is at near end or toner end. The operator simply replaces the AIO when printed sheets become faint or blurred.

□ Machines with ID chip in AIO

- These machines have a system to monitor toner consumption using a dot count system by the controller.
- The number of pages that can be printed between the toner near end and toner end alerts is approximately 100 pages.
- Approximately 50 pages can be force printed after the toner end alert.
- Normally this system is enabled but the operator has the option of switching toner level detection off.

More in Notes below

- ❑ After a new AIO has been installed, the operator must perform reset the toner cartridge (User Tools > System Settings > "Reset Toner Cartridge") so the engine knows that a new AIO has been installed. This allows the engine to restart the toner consumption count.
- □ The toner cartridge can be reset only at toner end. (The [Execute] option for "Reset Toner Cartridge" appears only if the machine is in toner end mode.)
- The [Execute] option for "Reset Toner Cartridge" will also not appear if the operator has selected "Continue Printing" for the "Toner End" option in the User Tools menu (User Tools > "System Settings" > "Toner End Option" > "Continue Printing").

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Model ME-P1/MF1 (M101/M102/M103) Service Training

9. Replacement and Adjustment



Removing and Replacing Parts

Disassembly Practice

- Referencing the FSM, go to the machine and practice removing and reinstalling parts.
- Observe all notes and cautions.

Refilling the AIO

- □ The AIO is designed to be easy to refill. (Easily removable caps allow easy toner tank refill and waste toner removal. No screws to remove.)
- Drum life is the limiting factor. The AIO can be refilled 2 or 3 times (depends on use).
- **Genuine refill toner provides cost savings with stable quality.**
- **Study the refill procedure in the FSM. (Practice refilling if practical.)**
 - FSM → Replacement and Adjustment → Refilling the AIO
 - Observe all notes and cautions.

□ Note for M103

 When an AIO is refilled, the amount of toner in the AIO may not be the same as for a new AIO. Therefore, the toner end count may not match the actual amount of toner in the AIO. In such case some users may prefer to have the toner end message turned off. (User Tools → Toner End Option should be set to "Continue Printing" to prevent a false "Out of Toner" message.)



Adjustment after Servicing

Adjustments are required after performing the following service procedures. Refer to the FSM for the details.

- After a fatal fusing error you must execute [Fuser SC Reset] to recover machine operation.
 - » FSM \rightarrow Troubleshooting \rightarrow Fusing Related SC Codes
 - » FSM → Troubleshooting → Utilities → Smart Organizing Monitor
- After refilling the AIO with toner reset the toner counter (M103 only).
 - » FSM \rightarrow Troubleshooting \rightarrow Utilities \rightarrow M103 User Tools
 - » FSM → Replacement and Adjustment → Refilling the AIO
 - » However, see "Note for M103" on the *Refilling the AIO* slide.

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Model ME-P1/MF1 (M101/M102/M103) Service Training

10. Troubleshooting

Error Messages & Codes

□ Error notification depends on the model.

- The three models have different operation panels with different display capability. Error status can be checked on all three models using the Smart
- ٠ Organizing Monitor.
- Refer to the Error Notification Matrix below.
- The notes section has additional information.

□ See the FSM for tables of error codes and error messages.

- FSM → Troubleshooting → SC Tables
 FSM → Troubleshooting → Error Messages

- Error Notification Matrix -

Error Notification Method	M101	M102	M103
Smart Organizing Monitor	Yes	Yes	Yes
Indicator LEDs	Yes	Yes	Yes
Buzzer	No	No	Yes
Seven-segment Display	No	Yes	No
LCD	No	No	Yes

When an Error Occurs

- □ The machines have different operation panels and components so this affects how each machine alerts the operator when a problem occurs.
- U When an error occurs, the alert indicator on the operation panel lights and the machine stops.
- A buzzer will sound an alert on the M103. Press any key on the operation panel to turn the buzzer off. (This is the fax speaker on the M103 that also functions as an error alarm.)
- □ There is no buzzer alert for the M101 or M102 because these machines do not have the fax speaker. The SC number can be displayed on the Service Mode screen of the Smart Organizing Monitor.
- □ The M101 has no panel display. When an error occurs only the alert lamp lights.
- □ The M102 has a 2-segment display. A letter-number code is used to designate an SC code. For example, "C6" designates "SC101". (These 2-digit codes are included in the SC tables in the FSM.)
- □ The M103 has a 7-segment display so the full SC number, "SC101" can be shown on the operation panel display.
- □ For all models of this series, the M101, M102, and M103, the Smart Organizing Monitor can be used to display the most recent SC codes on the Service Mode screen.





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



Technology for Environmental Conservation

**: New or modified function

*: Has this function

Blank: Does not have this function		
Environmental Technology/Feature	Description	M101/ M102/M103
1. QSU	- Reduction of warm-up time (Energy saving)	
2. Hybrid QSU	- Reduction of CO ₂ emissions	
3. IH QSU		
4. Paper-saving features	 Allows documentation to be managed digitally, cutting down on paper consumption. Improves machine productivity when printing out duplex (double-sided) images. 	
5. High-speed duplex output	 Improves machine productivity when printing out duplex (double-sided) images 	
6. Ozone reduction design	- Low ozone emissions	*
7. PxP (polymerized) toner	-Energy saving - Conservation of materials/resources (reduced toner	
8 Noise reduction design		*
9. Minimization of harmful substances	- Minimization of harmful substances	*
10. Environmentally-friendly toner bottle	- Conservation of materials/resources	
11. Toner recycling		
12. Recycle-friendly design		*

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

Brief Descriptions of the Technologies

□ 1. QSU (Quick Start-up)

- This technology reduces both the amount of energy consumed while in Standby mode (the Ready condition) is reduced, as well as the time it takes for the machine to warm up to the Ready condition.
- This is made possible through the utilization of dual fusing lamp heating, low fusing point toner, a pressure roller with a "sponge" surface layer, and a thin surface layer hot roller.

2. Hybrid QSU

 This technology adds an additional circuit to conventional QSU Technology, which allows the benefits of reduced energy consumption and reduced warm-up time described above to be extended to high-speed machines.

Brief Descriptions of the Technologies

3. IH QSU

 This technology incorporates IH (Inductance Heating) technology into conventional QSU technology, which allows the benefits of reduced energy consumption and reduced warm-up time to be extended to color machines.

□ 4. Paper-saving features

1) The duplex (double-sided) and Combine features reduce paper consumption.
2) The Document Server and other electronic document management features reduce paper consumption by offering an electronic method for storing and managing important documents.



Brief Descriptions of the Technologies□ 7. PxP (polymerized) toner

- "PxP toner" is a fine-particle, polyester resin based toner, manufactured using a Ricoh-original polymerization method instead of the conventional pulverization method.
- This allows the toner to fuse at a lower temperature, which reduces the impact on the environment and contributes to achieving even higher image quality than before.
- PxP toner also has other benefits, including a reduction in the amount of toner needed to develop the image, as well as an approximate 35% reduction in CO₂ emissions during the toner manufacturing process.
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Brief Descriptions of the Technologies

8. Noise reduction design

- 1) The machine and its components are designed to minimize the overall noise generated by the machine. As a result, all noise levels conform to the local laws and regulations as well as user requirements in each market in which the products are sold.
- 2) Reduces the noise generated by the polygon mirror motor.

9. Minimization of harmful substances

- 1) Products sold in the EU conform to the RoHS Directive.
- 2) Products sold in China conform to China's version of the RoHS Directive.
- 3) In addition, Ricoh imposes strict internal standards for limiting the presence of harmful substances.

No additional notes

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Brief Descriptions of the Technologies

10. Environmentally-friendly toner bottle

 A changeover from PS/PP/HDP to PET plastics allows approximately 40 percent by weight of the toner bottle to be recycled, and also reduces CO₂ emissions that occur during the toner bottle manufacturing process.

□ 11. Toner recycling

• Enables effective use of resources by recycling (reusing) the toner left over on the drum surface after image transfer.

□ 12. Recycle-friendly design

- To maximize the recycling ratio of machine and component materials, as well as the ease of performing the recycling in the field, machine sections and components are designed so that the recyclable parts can be separated out easily.
- In addition, components are designed so that they can be reused for as long as possible after the machine has reached its operational lifetime.

No additional notes



- When the machine is not being used, the machine enters energy saver mode to reduce the power consumption by turning off the LCD of the operation panel and lowering the fusing temperature.
- □ The Energy Saver Mode cannot be turned off.

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End of Course

No additional notes.