RICOH

Model ME-P2/MF2

M178/M181/M184
M179/M182/M185
M180/M183/M186

Service Training

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Update: 27 February, 2012 (Minor corrections)

Update: 8 March, 2012 (Minor corrections)

Course Contents

- 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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Service Training

1. Product Outline

No additional notes.

Appearance

	ME-P2 (Printer) (M178/M181/M184)	ME-MF2a (3in1) (M179/M182/M185)	ME-MF2b (4in1) (M180/M183/M186)
WW 13/16PPM & CHN 13PPM			
CHN 16PPM			

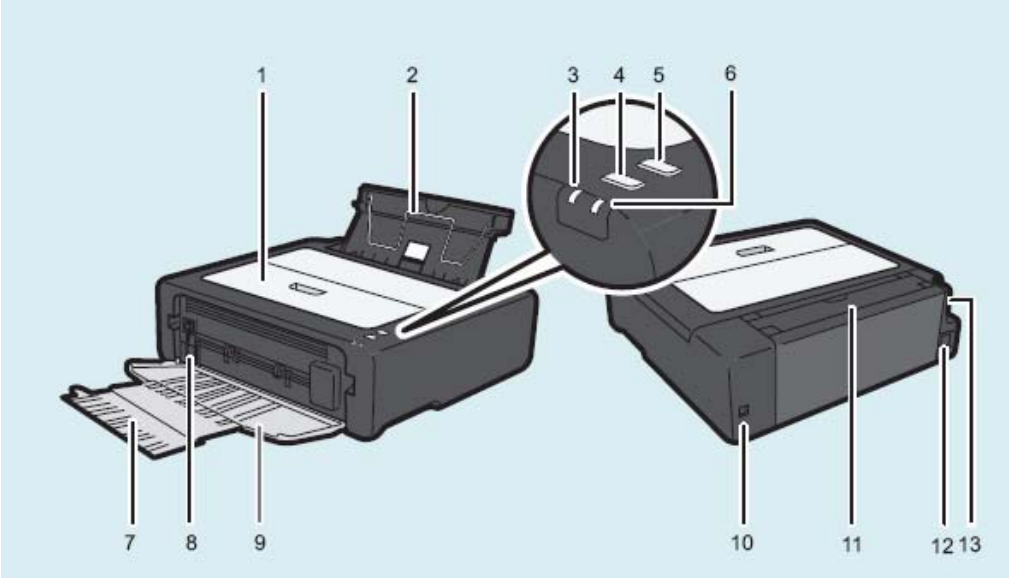
- ❑ **These are the machines you will study in this training course.**
- ❑ **The three models vary in appearance depending on functions. (See notes below.)**

- ❑ 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.

Names, Codes, and Distribution

Abbrev.	Model No.	SN	Product Name	PPM	Refillable	FAX	Scanner (Book mode)	ADF	Display	Toner end detection of Generic AIO	Interface
Printer	M181-21	T99	SP 110 Q	13	NO	NO	NO	NO	2LED	NO	USB
	M181-27		SP 110		YES						
	M181-29										
	M178-21	T98	SP 111	16	YES						
	M178-27										
	M178-29										
	M184-27	X02	SP 112		NO					YES	
	M184-17										
3in1	M182-21	T96	SP 110SU Q	13	NO	NO	YES	NO	2Digit 7Segment	NO	USB
	M182-27		SP 110SU		YES						
	M182-29										
	M179-21	T94	SP 111SU	16	YES						
	M179-27										
	M179-29										
	M185-27	X00	SP 112SU		NO					YES	
	M185-17										
4in1	M183-21	T97	SP 110SF Q	13	NO	YES	YES	YES	2Line LCD	YES	USB
	M183-27		SP 110SF		YES						
	M183-29										
	M180-21	T95	SP 111SF	16	YES						
	M180-27										
	M180-29										
	M186-27	X01	SP 112SF		NO						
	M186-17										

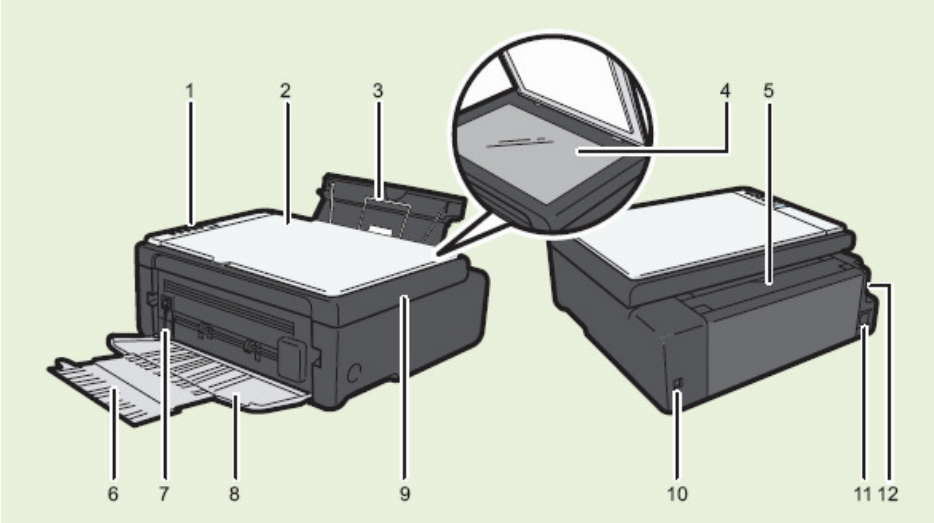
External Components – Printer



1. Maintenance cover	7. Output tray extension
2. Input tray	8. Fusing Pressure Release Lever
3. Power indicator	9. Front cover
4. Form Feed key	10. USB port
5. Job Reset key	11. Input Tray Cover
6. Alert indicator	12. Power Connector
	13. 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.

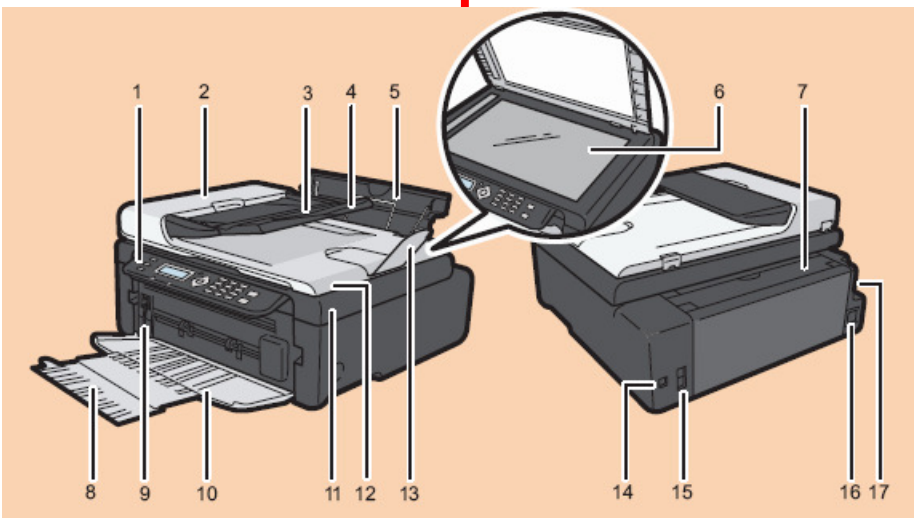
External Components –3in1



1. Control panel	7. Fusing Pressure Release Lever
2. Exposure glass cover	8. Front cover
3. Input tray	9. Maintenance cover
4. Exposure glass	10. USB port
5. Input tray cover	11. Power Connector
6. Output tray extension	12. 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 Components – 4in1

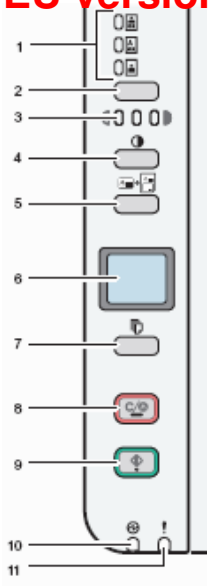


1. Control panel	9. Fusing Pressure Release Lever
2. ADF cover	10. Front cover
3. ADF input tray	11. Maintenance Cover
4. ADF extension tray	12. Auto document feeder (Exposure Glass Cover)
5. Paper tray	13. Original tray extension
6. Exposure glass	14. USB port
7. Paper tray cover	15. Line and TEL connectors
8. Output tray extension	16. Power Connector
	17. Power Switch

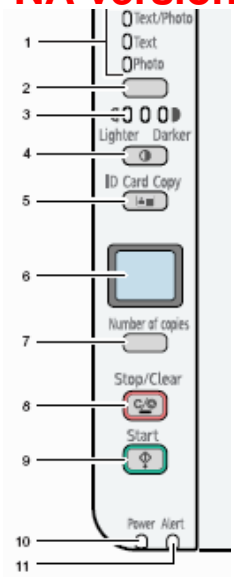
- ❑ See the Quick Start Guide for a list of components in the shipping carton.
- ❑ See the User's Guide for detailed external component descriptions.
- ❑ The output tray becomes the front cover when it is closed.

Operation Panel – 3in1

EU version



NA version



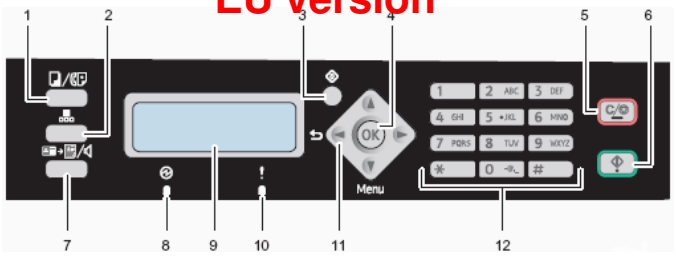
CHN version

1. Display Type Indicator	7. Number of Copies Key
2.Original Type Key	8. Stop/Clear Key
3. Density Indicator	9. Start Key indicator
4. Density Key	10. Power Indicator
5. ID Card Copy Key	11. Alert indicator
6. Screen	

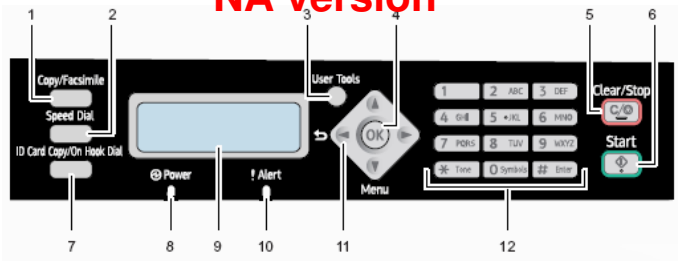
❑ See the User's Guide for detailed operation panel descriptions.

Operation Panel – 4in1

EU version



NA version



CHN version

1. Copy/Fax Key
2. Speed Dial Key
3. User Tool Key
4. OK key
5. Clear/Stop key
7. ID Card copy/On Hook Dial Key
8. Power Indicator
9. Display Screen
10. Alert indicator
11. Scroll keys
12. Number keys

- See the User's Guide for detailed operation panel descriptions.

Market Positioning and Concepts

- **Main Objective**
  - Maintain and expand MIF in the low end market
- **Target Users**
  - Business personal and small office
  - Can double as a small office printer/copier/fax
- **Technical Enhancements (compared to some competitors/predecessors)**
  - Compact
    - » Small footprint
    - » Lowest height
  - Genuine refill toner
  - Fast first print (Less than 6 sec.)

No additional notes.

Reliability Targets

- **AIO yield (Starter): Approximately 500 sheets**
- **AIO yield (Supply):**

  - High yield type: Approximately 2,000 sheets (RCN, RA, RE and RAC)

  - Low yield type: Approximately 1,200 sheets (RA, RE and RAC)

  - When printing A4 or 8.5" x 11" paper in accordance with ISO/IEC 19752.

- **Expected product life: 5 years or 50,000 prints (whichever comes first)**

No additional notes.

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Service Training

2. Specifications

No additional notes.

General Specifications

- **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: 13/16 ppm (A4/LT SEF)**
- **Warm up time: Less than 25 s at 23° C**
- **First print time:**
  - Less than 6 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:**
  - ADF: Less than 27 s/Platen: Less than 32 s
- **Maximum original size:**
  - Platen: A4 (210 x 297mm) / Letter (8 1/2" x 11"; 215.9 x 279.4mm)
  - ADF: Legal (215.9 x 355.6mm)
- **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.

New features

❑ Mainboard and PPM

- The service part Mainboard is different from pre-installed Mainboard.
- Copy/Print speed is decided by the combination of Laser Unit and Mainboard.
- Replace a pre-installed Mainboard to another machine may change its Copy/Print speed.

Laser Unit / Mainboard	16ppm Laser Unit	13ppm Laser Unit
Service part for replacement	16ppm	13ppm
Preinstalled on 16ppm Machine	16ppm	13ppm
Preinstalled on 13ppm Machine	13ppm	13ppm

New features

Toner refill

- All AIO has a ID-Chip for New cartridge detection.
- ME-P2 refillable AIO does not have waste toner output port.
- One AIO can be refilled in three times depends on the waste toner tank capacity and the drum life.

Toner end detection

- Printer and 3in1
  - » Only M184 and M185 can detect toner end. It cannot continue to print until replace another New AIO.
- 4in1
  - » All 4in1 machine has end detect function and stops at toner end as default settings.
  - » Can print after toner end by change [User Tools]>[System Settings]>[Toner End Option]
  - » Toner counter cannot be reset. Machine does not counter for refilled AIO.

New features

- **Paper feed**
  - The mechanism has been adjusted for preventing misfeed and entrance jam.
  - Friction pad can be replaced easily.

- **Fusing unit**
  - The mechanism has been adjusted for preventing paper jam and crease from curl paper.
  - Pressure release lever added to make removing jammed paper more easily.

- **Scanner**
  - Scanner cover can be lift up to Copy/Scan thick original document (Such like book).

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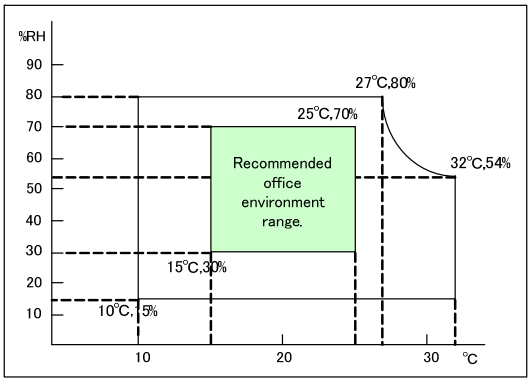
Service Training

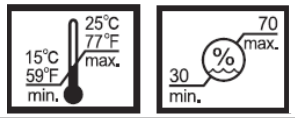
3. Installation

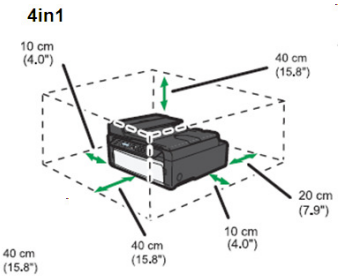
No additional notes.

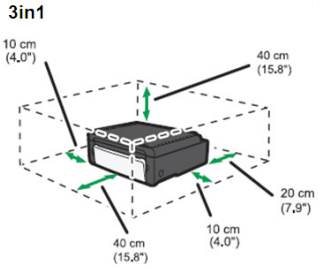
Overview

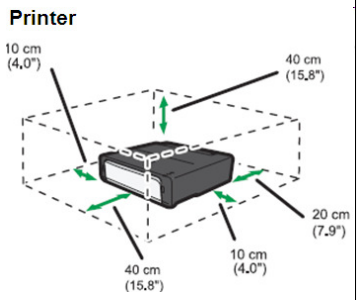
- **Generally, the user installs this machine. However, in addition to your maintenance duties, you may also have to install the machine when you are in the field.**
- **The full installation procedure is in the *Quick Installation Guide*.**
- **Before you start installation:**
  - Check the accessories.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











No additional notes.

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.
  - 4in1 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.

No additional notes.

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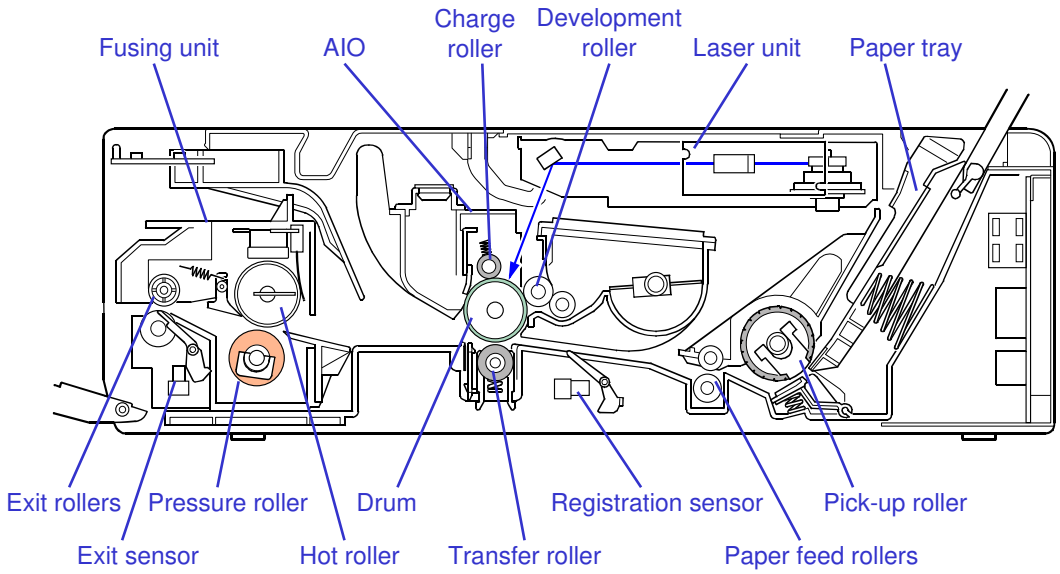
Service Training

4. Machine Overview

No additional notes.

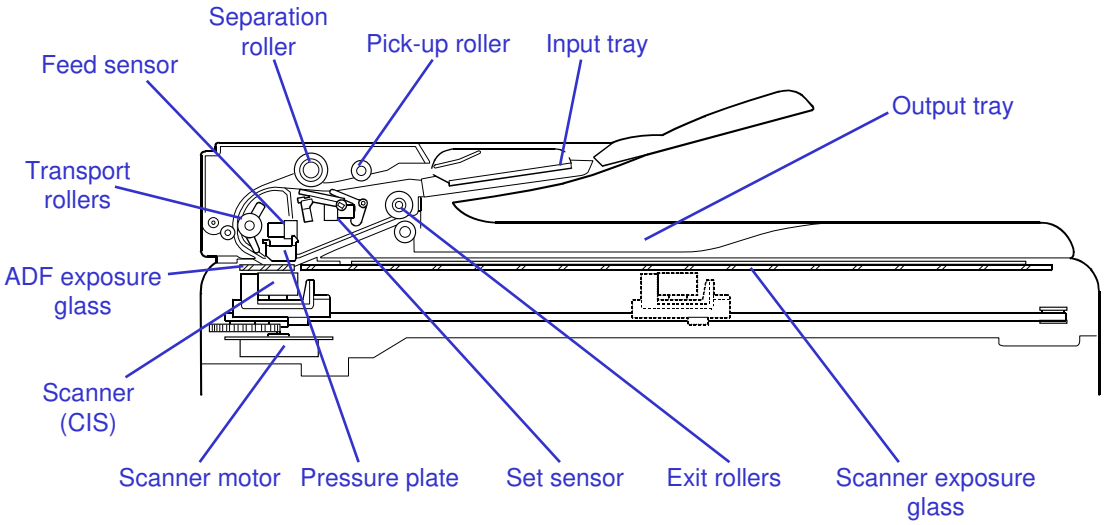
Component Layout



- **Familiarize yourself with the main print engine components shown above.**

No additional notes.

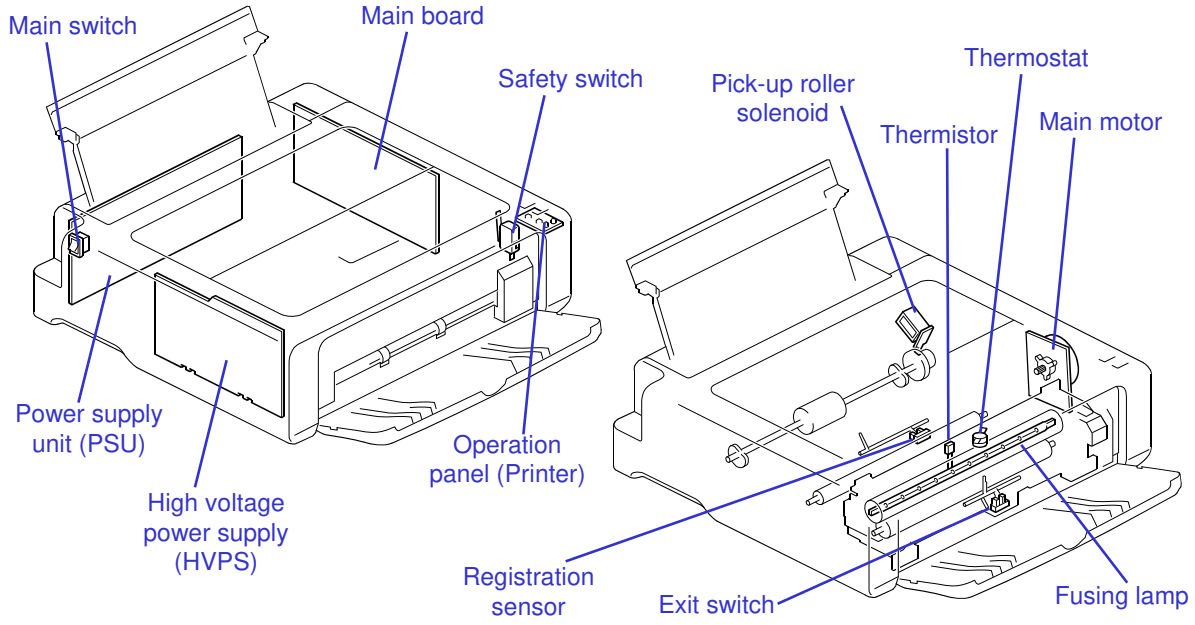
ADF and FB Scanner Component Layout



- **Familiarize yourself with the main ADF and flatbed scanner components shown above.**

No additional notes

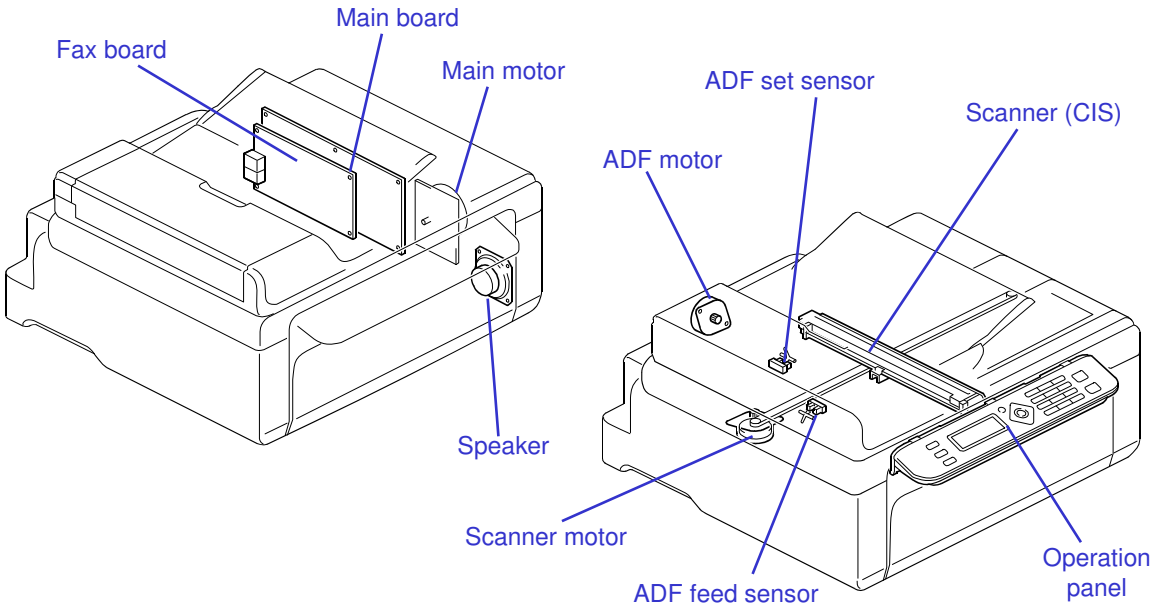
Electrical Component Layout – Main Unit



- **Familiarize yourself with the main electrical components shown above. These components are common to all three models (except the operation panel).**

No additional notes

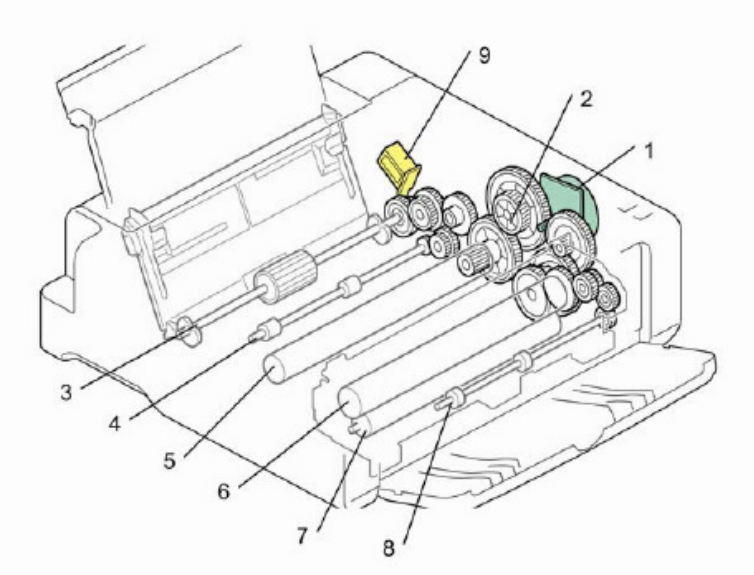
Electrical Component Layout – 4in1



- **Familiarize yourself with the 4in1 electrical components shown above.**

No additional notes

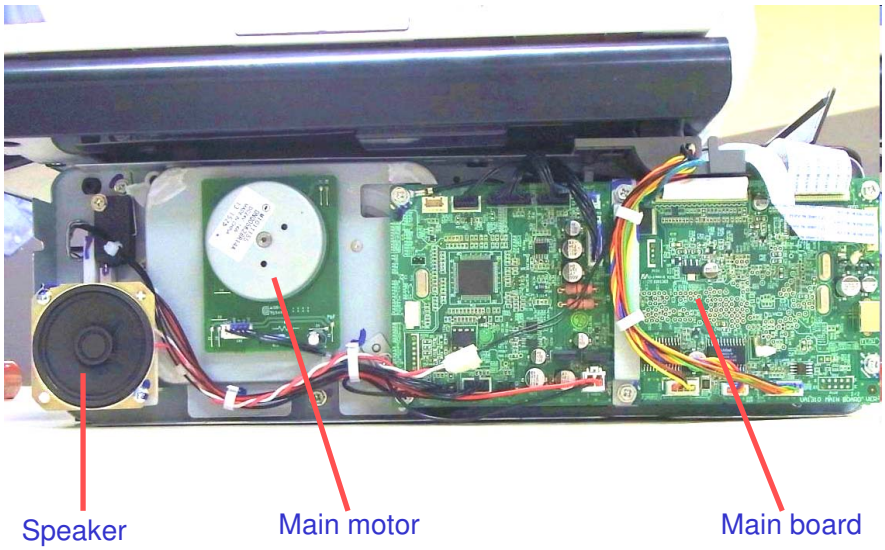
Main Unit Drive



- The main motor (1) and a gear train (2) drive the pickup roller (3), the feed rollers (4), the drum (5, inside the AIO), the hot roller (6), the pressure roller (7), and the exit rollers (8).
- The pickup roller solenoid (9) engages and disengages the rotation of the pickup roller during paper feed.

No additional notes

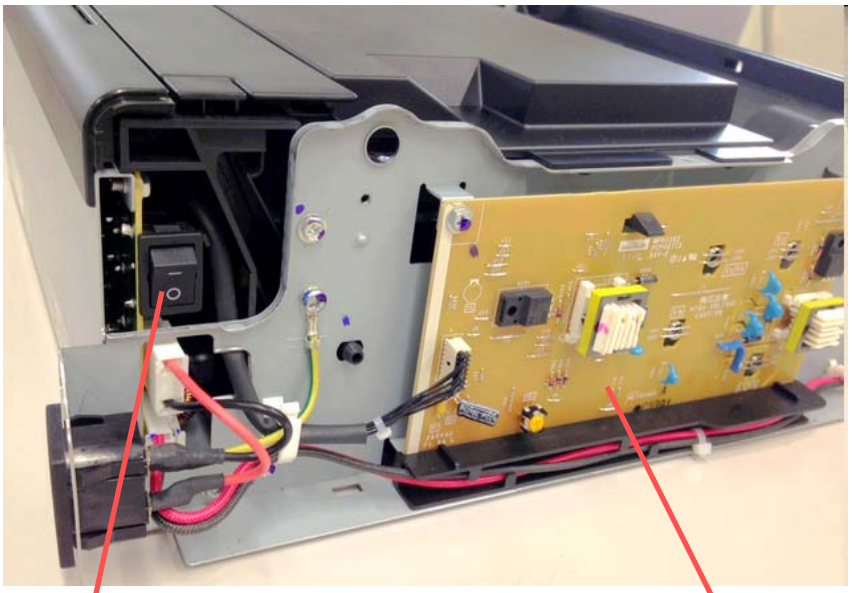
Right Side Cover Off (4in1)



- **The fax board is behind the main board.**

No additional notes.

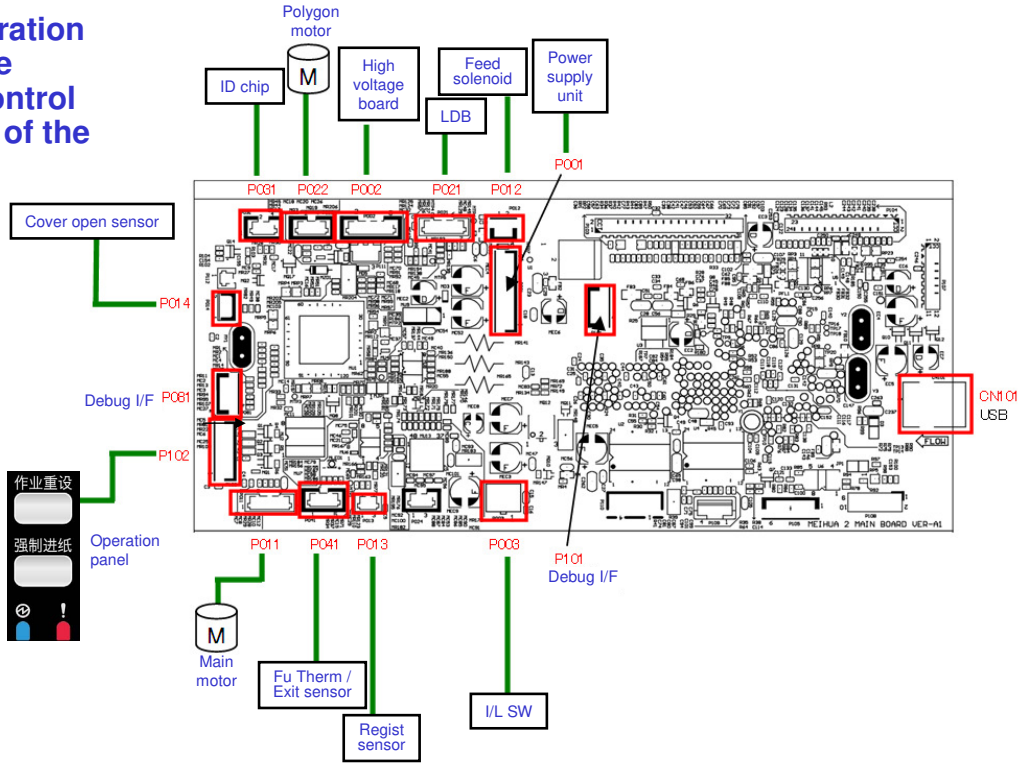
Left Side Cover Off (4in1)



No additional notes.

Control Structure – Printer

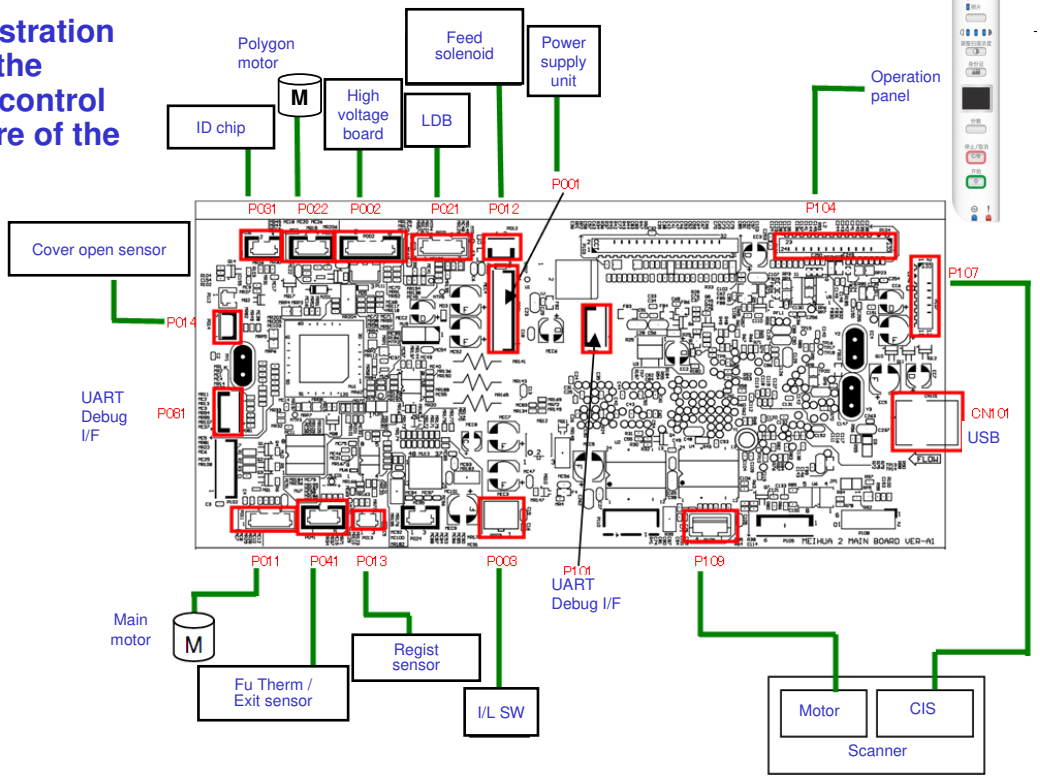
- **The illustration shows the overall control structure of the printer.**



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

Control Structure – 3 in 1

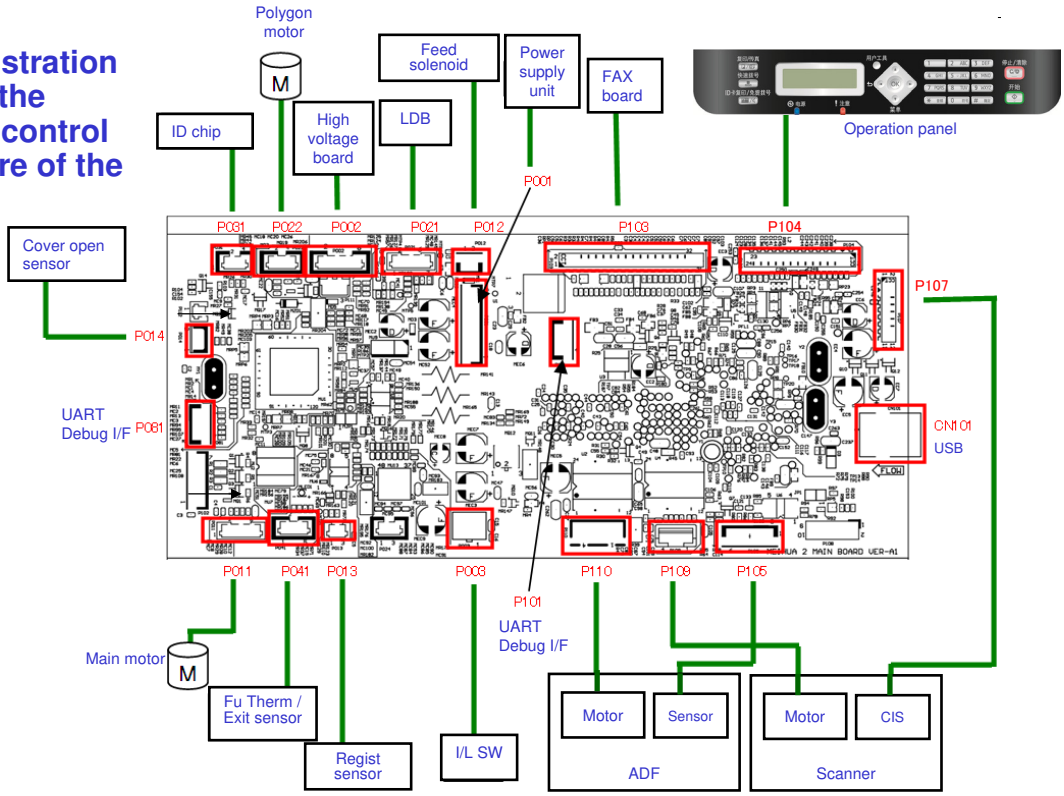
- **The illustration shows the overall control structure of the 3in1.**



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

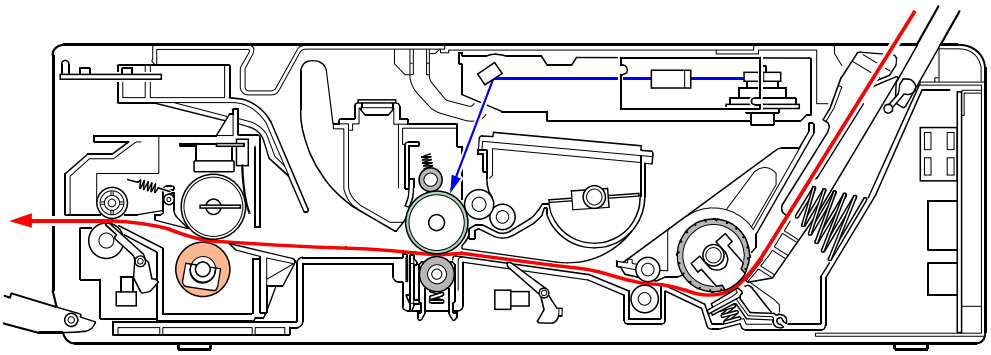
Control Structure – 4 in 1

- **The illustration shows the overall control structure of the 4in1.**



- 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

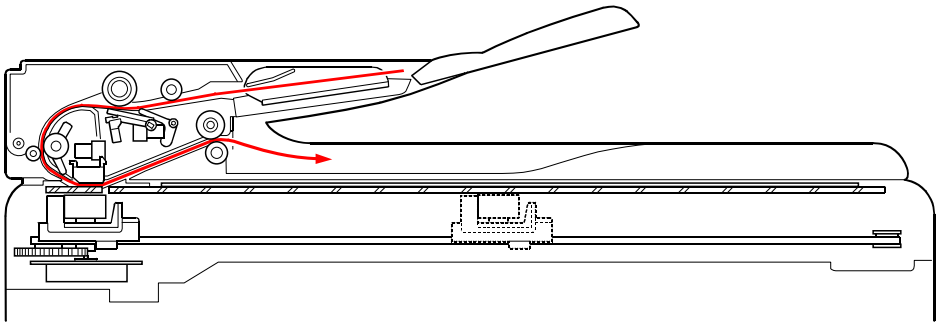
Main Unit Paper Path



- **The red line shows the path that paper takes through the machine.**

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

ADF Paper Path



- The red line shows the path that documents take through the ADF.

No additional notes.

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Service Training

5. Maintenance

(Maintenance, Service mode, Cleaning)

No additional notes.

Maintenance Procedures

- **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.**

No additional notes.

Configuring the Machine

- **4in1 can be configured/set-up from the control panel.**
  - User Guide → Configuring the Machine Using the Control Panel
- **All three models can be configured/set-up using the Smart Organizing Monitor.**
  - User Guide → Configuring the Machine Using the Smart Organizing Monitor

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

Using the Service Mode

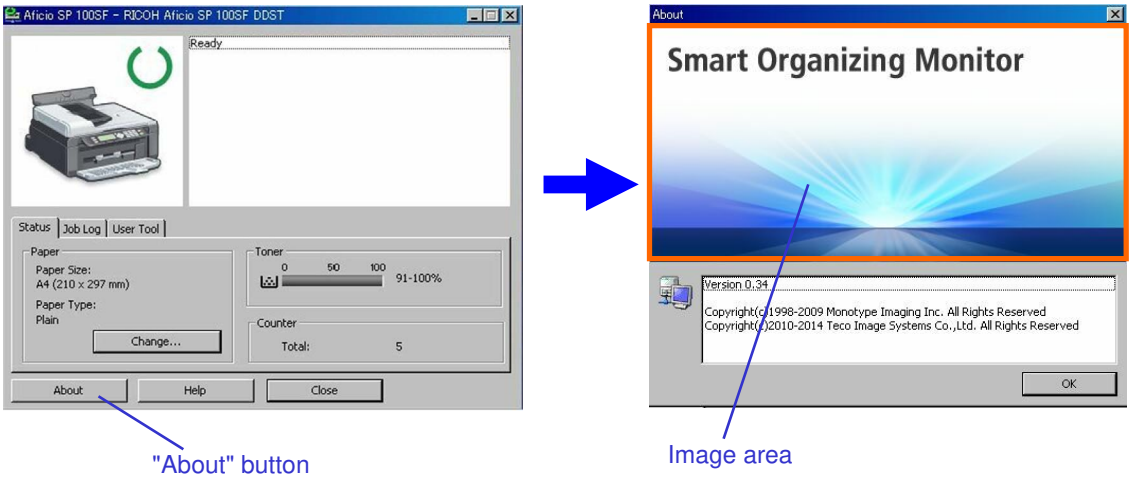
- **The method for entering the service mode depends on the function item and the model.**
  - Refer to the table below.
  - The Service Mode PC utility is accessed from within the Smart Organizing Monitor.
  - For full details see the FSM.
    FSM → Troubleshooting → Utilities → Smart Organizing Monitor Service Mode

No.	Function	To Enter Service Mode	4in1	3in1	Printer
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.
Install correct printer driver before using Smart Organizing Monitor.

No additional notes.

Opening the Service Mode



To open the Service Mode:

Step 1: Click "About".

Step 2: Press Ctrl+Shift and double click the right mouse button in the image area of the Smart Organizing Monitor. (Orange outlined area above.)

No additional notes.

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.

No additional notes.

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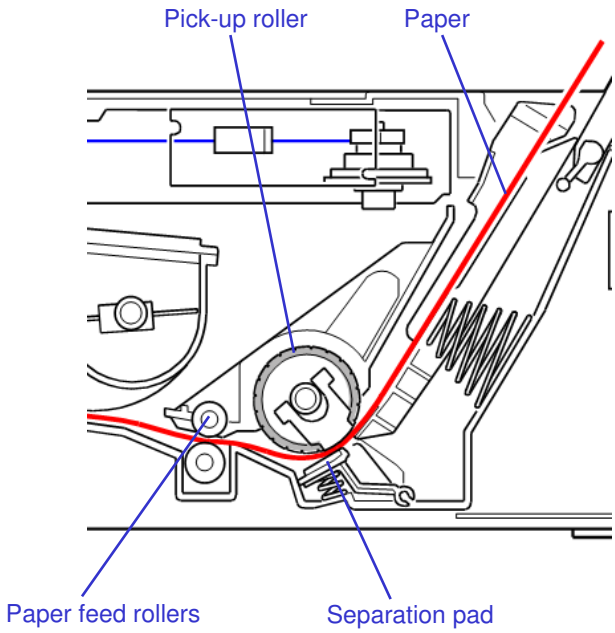
6. Mechanical Operation

No additional notes.

Paper Feed

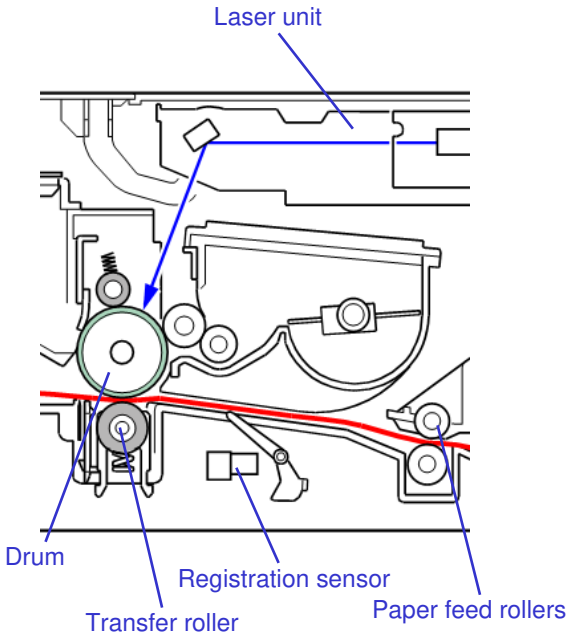
- The pick-up roller solenoid turns on, releasing the pick-up roller clutch. The pick-up roller makes a single rotation.
- The pick-up roller moves a sheet of paper to the paper feed rollers.
- The separation pad allows only the top sheet of paper to pass.
- The pick-up roller has smooth metal on one side. This side faces the paper after the pick-up roller makes one turn, allowing the paper to slide under it easily.
- The paper feed rollers feed the paper past the registration sensor and then between the drum and the transfer roller.



- 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.

Registration

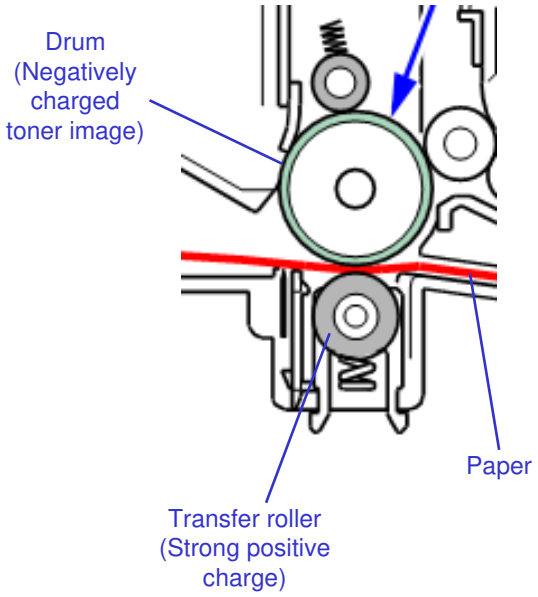
- Registration timing starts when the leading edge of the paper activates the registration sensor.
- At 0.142 second after the registration sensor is activated, the control program starts the laser and writes the image on the drum.



No additional notes.

Image Transfer

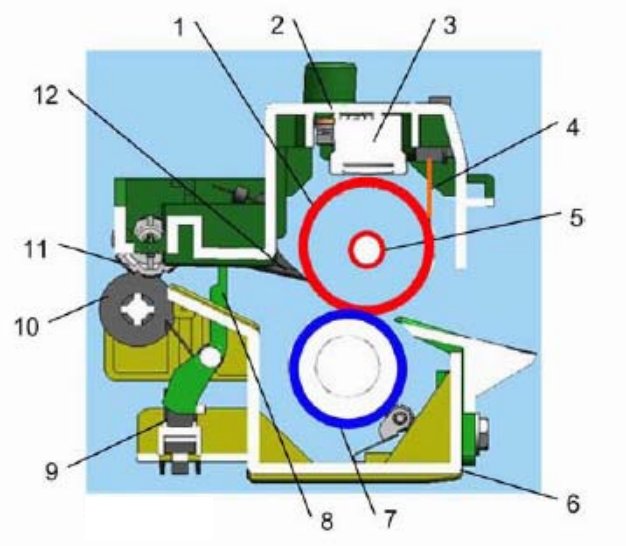
- The positively charged transfer roller attracts the negatively charged toner from the drum to the paper.



No additional notes.

Image Fusing

1. Hot roller
2. Fusing unit casing (upper)
3. Thermostat
4. Thermistor
5. Fusing lamp
6. Fusing unit casing (lower)
7. Pressure roller
8. Exit sensor actuator
9. Exit sensor
10. Lower exit rollers
11. Upper exit rollers
12. Stripper pawls

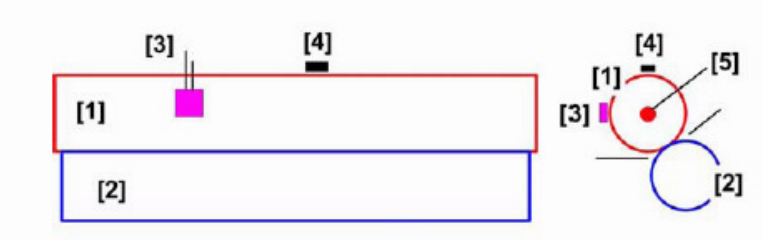


- Toner is fused to the paper by the hot roller and pressure roller.
- The exit sensor detects whether or not paper is ejected from the fusing unit (jam detection).

No additional notes.

Main Parts/Function of the Fusing Unit

1. Hot roller
2. Pressure roller
3. Thermistor
4. Thermostat
5. Fusing lamp



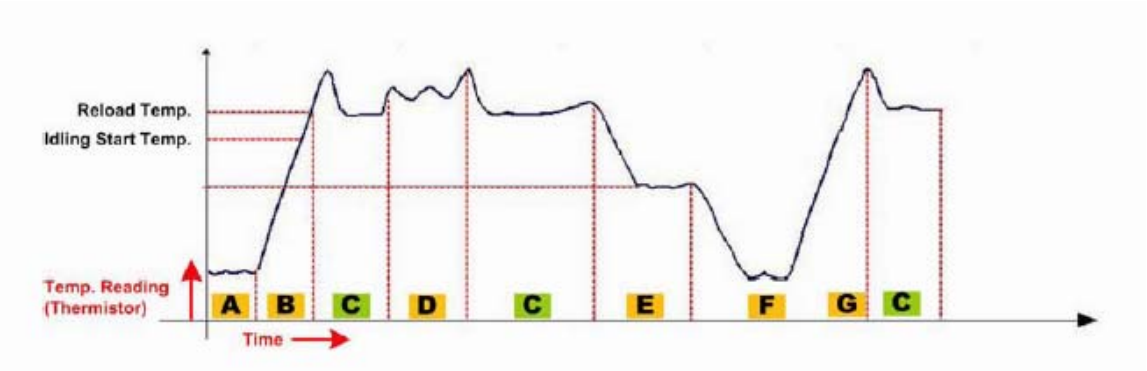
Five basic devices comprise the fusing unit:

- The hot roller [1] applies heat to the toner and paper to fuse the toner on the surface of the paper.
- The pressure roller [2] is mounted below the hot roller. Two springs hooked on the ends of these rollers compress the soft pressure roller against hot roller. The paper is compressed in the nip of the hot roller and pressure roller when the heat from the hot roller fuses the toner onto the surface of the paper.
- The metal blade of the thermistor [3] touches the surface of the hot roller. The thermistor measures the temperature of the hot roller surface every 50 ms. Its sole function is to read and feedback the hot roller temperature so the firmware can adjust and maintain the correct fusing temperature. The thermistor is a contact NTC type. This means that it has a negative temperature coefficient (NTC) so its resistance decreases as the temperature increases.
- A thermostat [4] is mounted above but not touching the surface of the hot roller. The thermostat is rated for 187°C (368.6°F) and detects when the fusing unit overheats (temperature rises above 187°C) and switches the machine off.
- The fusing lamp [5] is a halogen lamp inside the hot roller that heats the the hot roller. The machine uses the readings of the thermistor [3] to alternately switch the fusing lamp on and off as needed to keep the temperature at the optimum level for fusing.

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
- Pressure roller diameter: 22 mm
- Fusing unit drive: Main motor
- Warm-up time: 25 s (from cold start at 23 C)

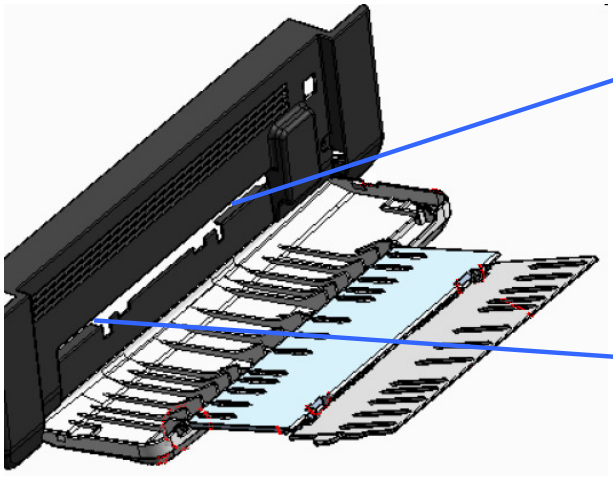
Fusing Temperature Control



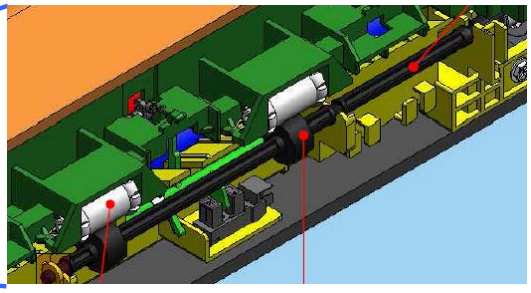
A : Stop (machine idle)
B : Start up
C : Ready (Standby)
D : Printing (paper feeding)
C : Ready (Standby)
E : Energy Save Mode 1 (Default: Machine idle 30 s)
F : Energy Save Mode 2 (Default: Machine idle for 60 s)
G : Recover from energy save mode
C : Ready (Standby)

- 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.

Paper Output



Output tray & Output tray extensions

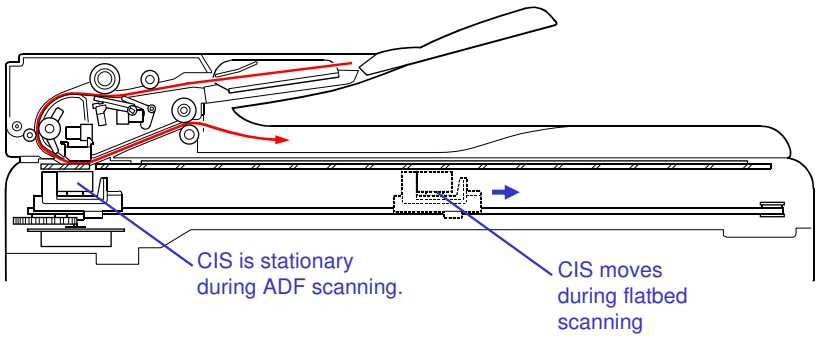


Exit rollers

- Paper moves through the exit rollers to the output tray.
- The output tray folds down away from the front of the machine.
- The extensions fold out and provide extended paper support.
- The output tray and extensions are fragile. They should be down and extended only when printing. Generally leave the output tray closed against the front of the machine to prevent damage.

No additional notes.

Document Scanning



- This machine uses a dual scanning system: ADF scanning and flat-bed scanning.
- In ADF scanning, the document moves past the stationary CIS unit. (4in1 only)
- In flat-bed scanning, the CIS moves under a stationary document. (3in1/4in1)

More on scanning

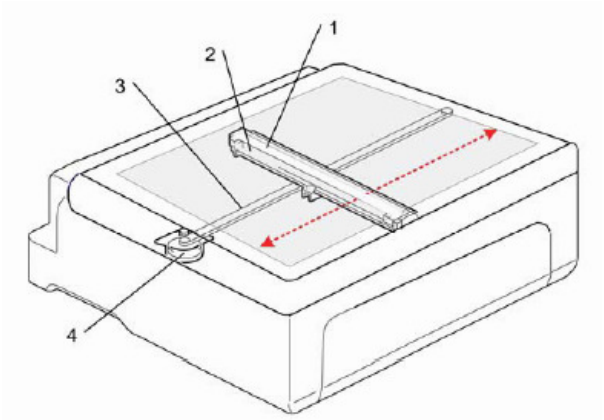
- ADF scanning: Document moves across stationary CIS unit
  - Placing a document ***face up*** in the document support activates the document set sensor, switching to ADF scanning.
  - The CIS unit first moves to the white-level reference film for white level compensation and then to the ADF scanning 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 Scanner

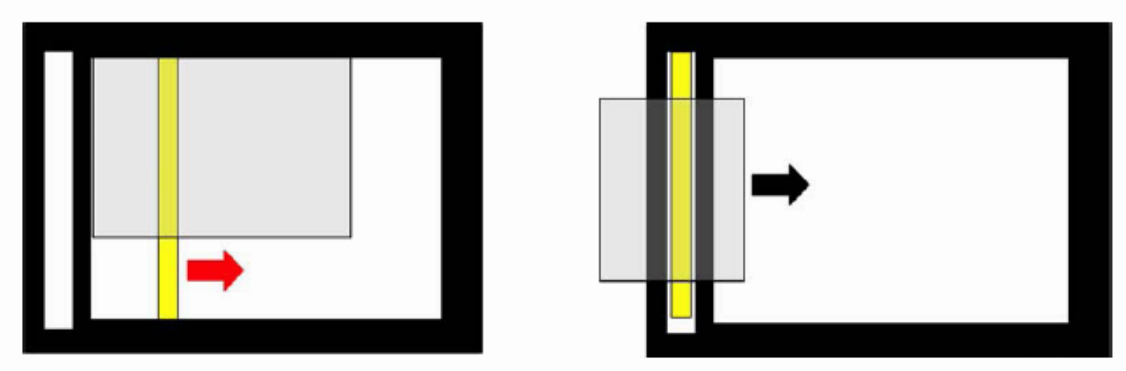
1. CIS
2. Scanner (CIS cradle)
3. Timing belt
4. Scanner motor



- The 3in1 and 4in1 have the flatbed scanner.
- The CIS (1) and flatbed scanner motor (2) are the only two electrical components in the flatbed scanner.

No additional notes.

Flatbed vs ADF Scanning



Flatbed scanning

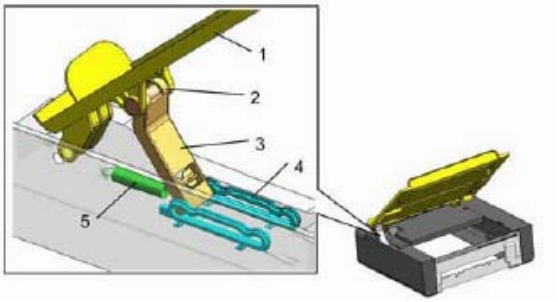
ADF scanning

- For flatbed scanning the original is placed at the left-rear.
- During ADF scanning the original passes over the center of the CIS.
- Flatbed scanning can be done with the 3in1 and 4in1. ADF scanning is only possible with the 4in1.

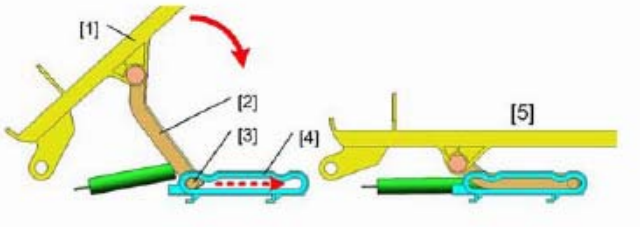
No additional notes.

Flatbed Hinge Mechanism (3in1, 4in1)

- 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 3in1 only the flatbed unit is raised.
  - On the 4in1 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]



1. Flatbed scanner	4. Guides
2. Hinge	5. Spring
3. Support arm	



No additional notes.

RICOH

Model ME-P2/MF2

M178/M181/M184
M179/M182/M185
M180/M183/M186

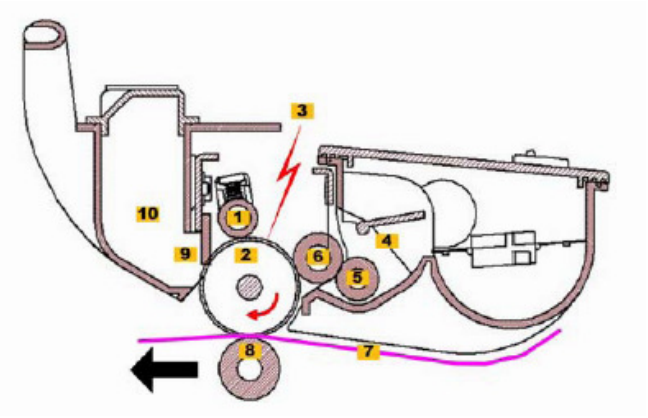
Service Training

7. Print Processes

No additional notes.

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.



- As the paper [8] passes between the drum [2] and transfer roller [9], the positive charge 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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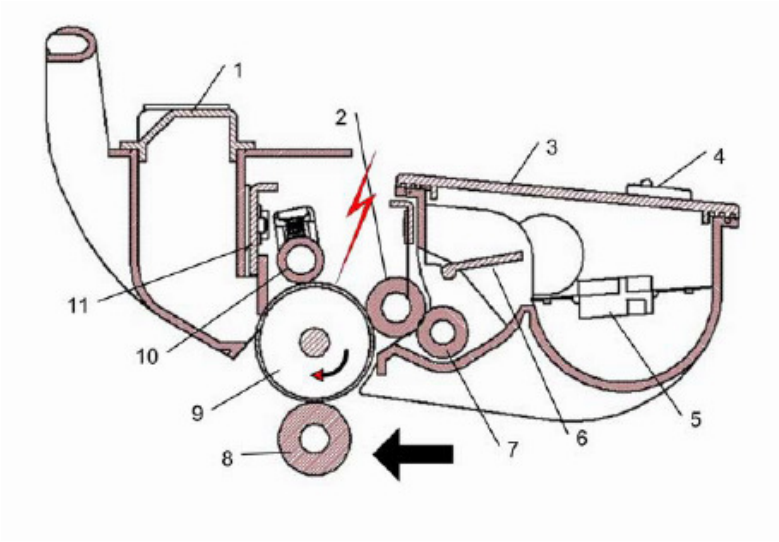
Service Training

8. AIO Cartridge

No additional notes.

AIO Cartridge

1. Waste toner tank
2. Development roller
3. Toner tank
4. ID chip
5. Agitator
6. Toner paddle
7. Toner supply roller
8. Transfer roller
9. OPC Drum
10. Charge roller
11. Cleaning blade



- **The main components of the AIO (all in one) cartridge are shown above.**

- 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

- **M178 / M179 / M181 / M182**
  - There is no toner end detection mechanism. The operator replaces or refills the AIO when printed sheets become faint or blurred.

- **M180 / M183 / M184 / M185 / M186**
  - These machines have a feature called "Toner End Option", which monitors toner consumption using a dot count system (this is done by the controller). However, it only works for new AIOs and not refilled AIOs.
  - About 50 pages can be printed between the toner near end alert and the final toner end alert.
  - For M184 and M185, machine cannot print after toner end detected until a new AIO was replaced.
  - For 4in1(M180, M183 and M186), this system is enabled default, but the operator can switch Toner End Option off with the User Tools.
    - Enabled: User tool is set to 'Stop Printing'
    - Disabled: User tool is set to 'Continue Printing'
      - » When toner end detection is switched off, there will be no warning message when the AIO is about to run out of toner. The operator refills or replaces the AIO when printed sheets become faint or blurred.
        - Customers with the fax unit option have to be careful about this, or they might not be able to read incoming fax messages.

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Model ME-P2/MF2

M178/M181/M184
M179/M182/M185
M180/M183/M186

Service Training

9. Replacement and Adjustment

No additional notes.

Before You Start

❑ Safety Precautions

- It is important to observe the all safety precautions during maintenance work.
- Refer to the safety precautions in the field service manual.
  - » FSM → Safety, Symbols, Trademarks
  - » FSM → Replacement and Adjustment → Before You Begin
- Additionally, pay attention to all notes and cautions related to specific procedures elsewhere in the FSM.

No additional notes.

Removing and Replacing Parts

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

No additional notes.

Refilling the AIO

- **The AIO is designed to be easy to refill. (Easily removable caps allow easy toner tank refill. No screws to remove.)**
- **Drum life is the limiting factor. The AIO can be refilled approximately 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 4in1**
  - Set toner end option to 'Continue Printing' after refilling.
  - The toner level won't be monitored anymore.
  - The machine will continue printing even after toner runs out because the toner near end and toner end alerts will not appear.

No additional notes.

Adjustment after Parts Replacement

- **Adjustments and settings changes are required after replacing the following parts. Refer to the FSM for the details.**
  - Main board
    FSM → Replacement and Adjustment → After Replacing the Main Board
  - Laser unit
    FSM → Replacement and Adjustment → Laser Unit (See "After Replacement" at the end of the removal procedure.)

No additional notes.

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 → Troubleshooting → Fusing Related SC Codes
    - » FSM → Troubleshooting → Utilities → Smart Organizing Monitor

No additional notes.

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Model ME-P2/MF2

M178/M181/M184
M179/M182/M185
M180/M183/M186

Service Training

10. Troubleshooting

No additional notes.

Error Messages & Codes

- **Error notification depends on the model.**
  - There are three different type of operation panels with different display capability.
  - Error status can be checked on all models using the Smart 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	Printer	3in1	4in1
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.
- When an error occurs, the alert indicator on the operation panel lights and the machine stops.
- A buzzer will sound an alert on the 4in1. Press any key on the operation panel to turn the buzzer off. (This is the fax speaker on the 4in1 that also functions as an error alarm.)
- There is no buzzer alert for the printer or 3in1 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 printer has no panel display. When an error occurs only the alert lamp lights.
- The 3in1 has a 7-segment 2-digit 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 4in1 has a 2-line LCD display so the full SC number, "SC101" can be shown on the operation panel display.
- For all models of this series, the printer, 3in1, and 4in1, the Smart Organizing Monitor can be used to display the most recent SC codes on the Service Mode screen.

Troubleshooting

❑ Image Problems at Regular Intervals

- Image problems can occur at regular intervals due to problems with rollers in the machine and inside the AIO. See the table listing roller circumferences.
  FSM → Troubleshooting → Image Problems → Overview

❑ Using Test Pages and Print Patterns

- Use test pages and print patterns to check for image problems.
  FSM → Troubleshooting → Image Problems → Test Page
  FSM → Troubleshooting → Image Problems → Print Patterns

❑ General Troubleshooting Practice:

- Study the Troubleshooting section of the FSM.
  FSM → Troubleshooting
- Also study the Troubleshooting section of the User Guide.
  User Guide → Troubleshooting
- Simulate some of the error conditions on the machine.

No additional notes.

RICOH

Model ME-P2/MF2

M178/M181/M184
M179/M182/M185
M180/M183/M186

Service Training

11. Technology for Environmental Conservation

- 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	ME-P2/MF2
1. QSU	- Reduction of warm-up time (Energy saving) - Reduction of CO_2 emissions	
2. Hybrid QSU		
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 consumption)	
8. Noise reduction design	- Low noise	*
9. Minimization of harmful substances	- Minimization of harmful substances	*
10. Environmentally-friendly toner bottle	- Conservation of materials/resources	
11. Toner recycling		
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.

No additional notes

Brief Descriptions of the Technologies

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

No additional notes

Brief Descriptions of the Technologies

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

No additional notes

Brief Descriptions of the Technologies

7. PxP (polymerized) toner

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

No additional notes

Brief Descriptions of the Technologies

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

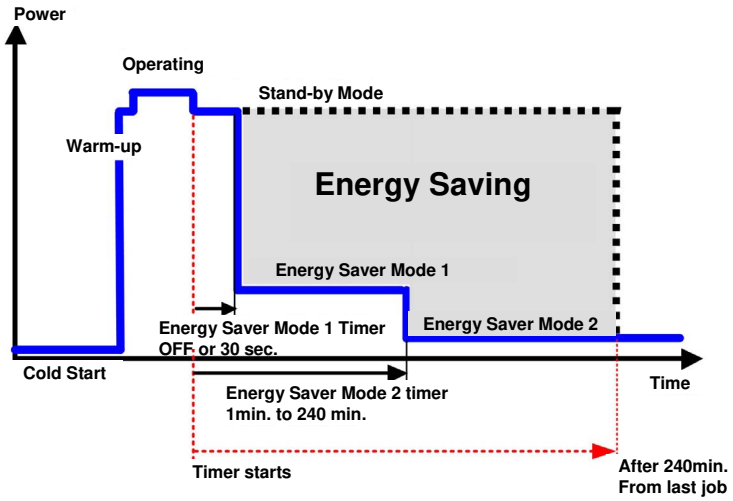
No additional notes

Brief Descriptions of the Technologies

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

No additional notes

Energy Saving
Overview



Timer settings and recovery time (Smart Organizing Monitor → User Tool → Printer Configuration)

Mode	Default	Setting range	Recovery time
Energy Saver Mode	OFF	30 sec. only	10 s
Energy Saver Mode	1 min.	1 to 240 min.	25 s

- 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.

End of Course

No additional notes.