RICOH

M124/M125
Service Training

AP-P3

Slide 1

Version 1.0

This training course provides service technician training for the AP-P3 series. It only explains the differences from the AP-P2, so knowledge of that model is required.

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M124/M125
Service Training

Product Overview

Slide 2

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

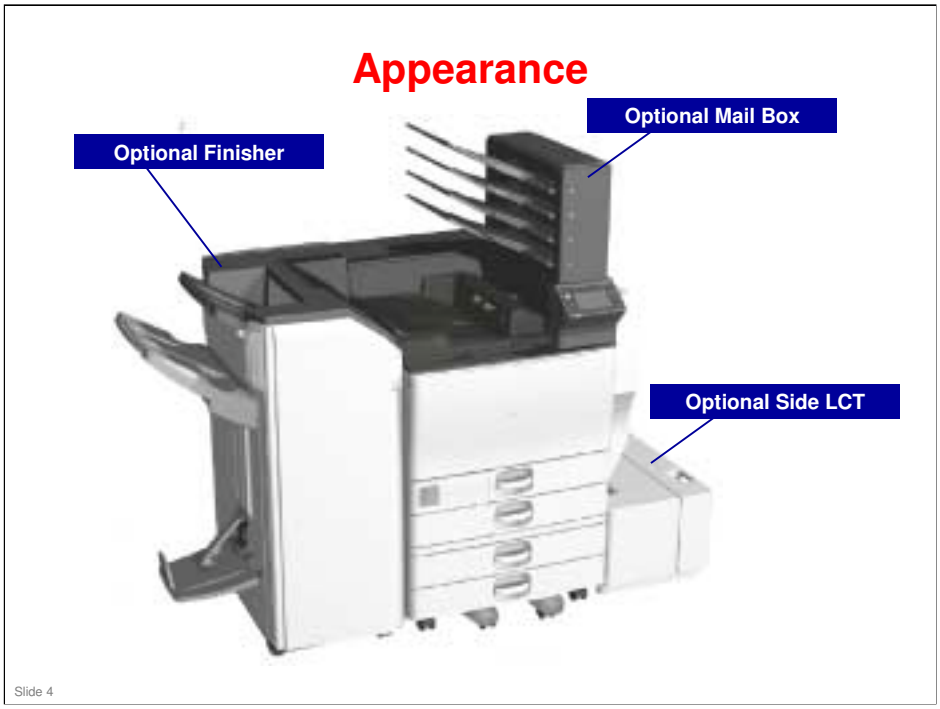
What Models are there in the Series?

- **AP-P3c (M124)**
  - 45 cpm
  - Optional hard disk
- **AP-P3d (M125)**
  - 55 cpm
  - Built-in hard disk

- **All models contain PostScript3, duplex unit, and bypass tray as standard equipment.**

Slide 3

No additional notes



Compared with related models:

- There is no shift tray, side tray, or one-bin tray option.
  - In the AP-P3, a mailbox is used instead. It occupies the same position in the paper feed path as the one-bin tray in the AP-C3.
- AP-P2 uses a 1000-sheet finisher. AP-P3 uses a 2000-sheet finisher.
- A side LCT was not used in AP-P2. It was added to increase the supply of paper to the machine.

Options – Main Changes

- AP-P2 uses a 1000-sheet booklet finisher. AP-P3 uses a 2000-sheet booklet finisher.
- A side LCT (1200 sheets) was not used in AP-P2. It was added to AP-P3 to increase the supply of paper to the machine.

Slide 5

No additional notes

Options: Paper Feed and Finishing

		Also used with these new models:	Similar to:	Note
One-tray paper feed unit (D579): PB3120		OR-C1, AT-C3	AP-P2	See notes page for allowed combinations
Two-tray paper feed unit (D580): PB3130		AL-P2, AP-C3	AP-P2	
Tandem LCT (D581): PB3140		AL-P2, AP-C3	AP-P2	
Side LCT (D631): RT3020		AL-P2, AP-C3		
Mailbox (M413): CS3000	New		AP-P2	
Bridge unit (D634): BU3060		AL-P2, AP-C3	AP-P2	
2000-sheet booklet finisher (D637): SR3110		AP-C3		Requires bridge unit and one of D580 or D581
3000-sheet finisher (D636): SR3120		AL-P2, AP-C3	AP-P2	Requires bridge unit and one of D580 or D581
Output jogger unit (B703): Output Jogger Unit Type 9002A	New	MT-C5, AL-C2	AP-P2	For D636 or D637
Punch unit (D570): Punch Unit PU3030		AL-P2, AP-C3	AP-P2	For D636 or D637

Slide 6

- AP-P2 uses a 1000-sheet finisher. AP-P3 uses a 2000-sheet finisher.
- A side LCT was not used in AP-P2. It was added to increase the supply of paper to the machine.
- There is no one-bin tray. In the AP-P3, a mailbox is used instead. It occupies the same position in the paper feed path as the one-bin tray in the AP-C3.

Permitted combinations of optional paper trays

- Mainframe - 1-tray
- Mainframe - 1-tray - 2-tray
- Mainframe - 1-tray - 2-tray - Side LCT
- Mainframe - 2-tray
- Mainframe - 2-tray - Side LCT
- Mainframe - LCT
- Mainframe - LCT - Side LCT

Permitted combinations if finisher will be installed

- Mainframe - 2-tray - Side LCT + Finisher
- Mainframe - LCT - Side LCT + Finisher

Options: Printer

		Note
M416: IPDS Unit Type C830	New	
M354: Memory Unit Type J 512 MB		Same as AP-P2
M416: Memory Unit Type O 1 GB	New	
M439: Hard Disk Drive Option Type C830	New	For AP-P3c only
D645: Camera Direct Print Card Type J		Same as AP-C3
M416: SD card for NetWare Printing Type O	New	

Slide 7

No additional notes

Options: Controller

		Also used with these new models:	Note
D640: VM Card Type U		AL-P2	
B679: IEEE 1284 Interface Board Type A		AP-C3	
M344: IEEE 802.11a/g Interface Unit Type L		AL-P2	Used with S-C4.5
M344: IEEE 802.11a/g Interface Unit Type M		AL-P2	Used with S-C4.5
M344: IEEE 802.11g Interface Unit Type P		AL-P2	Used with S-C4.5
D377: Gigabit Ethernet Board Type B		AT-C3	
M416: Gigabit Ethernet Board Type D	New		Without ferrite core
D651: Color Controller E-5300	New		

Slide 8

No additional notes

Controller Options
Memory Upgrade Options

- **Hard disk**
  - 190 GB
  - Option for AP-P3c, Standard for AP-P3d
- **Memory**
  - Standard memory: 512 MB
  - Upgrades: 512 MB or 1 GB
  - Max possible memory: 1.5 GB

Slide 9

No additional notes

Board Slots

m1242064

- **Slot A is used for one of the following: IEEE1284, IEEE802.11a/g (Wireless LAN).**
- **Slot B is used for Gigabit Ethernet.**

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

SD Card Slots (1)

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

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- PDF Direct/PCL/PostScript 3 are pre-installed in the controller ROM.

SD Card Slots (2)

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

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No additional notes

SD Card Slots (3)

- **Operation panel SD card slot**
  - Use this for:
    - » SMC data export (SP5992).
    - » Media print/PDF direct print from SD card.

Slide 13

No additional notes

Data Overwrite Security, HDD Encryption

- **These features are built into the controller board for all models.**
  - There is no Security SD Card.
- **The user must switch them on with a User Tool.**
  - For the AP-P3c, the features can be activated after the optional HDD is installed.

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No additional notes

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This section provides an overview of the main specifications and explains improvements over the AP-P2.

Specifications

- **Paper Size - Paper trays:**
  - A3/11" x 17" - A5 LEF
  - Non-standard sizes (not allowed in tray 1):
    - » Width: 182 - 297 mm (7.2" - 11.7"), Length: 148 mm - 432 mm (5.8" - 17")
- **Paper Size - By-pass tray:**
  - 12" x 18", A3/11" x 17" - A6 SEF
  - Non-standard sizes:
    - » Width: 90 - 305 mm (3.6" - 12"), Length: 148 - 1260 mm (5.8" - 49.6")
- **Paper Size - Duplex:**
  - A3/11" x 17" - A6 SEF
  - Non-standard sizes:
    - » Width: 90 - 297 mm (3.6" - 11.7"), Length: 148 - 432 mm (5.8" - 17")
- **Paper Weight**
  - Paper trays: 52 - 256 g/m^2
  - By-pass: 52 - 300 g/m^2
  - Optional trays: 52 - 256 g/m^2 (except 1200-sheet LCT, which is 60 - 216 g/m^2) – improved weight range since Ap-P2 series
  - Duplex: 52 - 169 g/m^2

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- The new fusing unit allows a wider range of paper weights to be used, and thin paper handling is improved.
- A GW+ controller is used.

Comparing Specifications with Previous Models

	AP-P2	AP-P3
Print speed (A4/LT LEF)	P2c: 40 ppm P2d: 50 ppm	P3c: 45 ppm P3d: 55 ppm
First print time	P2c: Color 8 s, b/w 9 s P2d: Color 7 s, b/w 8 s	P3c: Color 5.7 s, b/w 3.7 s P3d: Color 5.1 s, b/w 3.4 s
Warm-up time	P2c: Less than 60 s P2d: Less than 60 s	P3c: Less than 29 s P3d: Less than 25 s

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The highlighted areas show improvements since the previous model.

Targets

	AP-P2	AP-P3
APV, per month	P2c: 6K P2d: 10K	P3c: 5K P3d: 7K
PM Cycle	User PM	User PM
MPBF (Mean Prints Between Failure)	P2c: 121.2K P2d: 137.0K	P3c: 121.0K P3d: 137.0K
Estimated Unit Life	P2c: 1,200k or 5 years whichever comes first P2d: 3,000k or 5 years whichever comes first	3,000k or 5 years whichever comes first

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Conditions

- User maintenance is done at the correct times.
- A4 (LT) short-edge feed
- 5% image coverage ratio
- 3P/J

Yield of Consumables

- **Toner yield: 20K sheets (black), 15K sheets (CMY)**
  - Same as Ap-P2
- **PCDU yield: 60K sheets (KCMY)**
  - Ap-P2: 40K sheets (KCMY)

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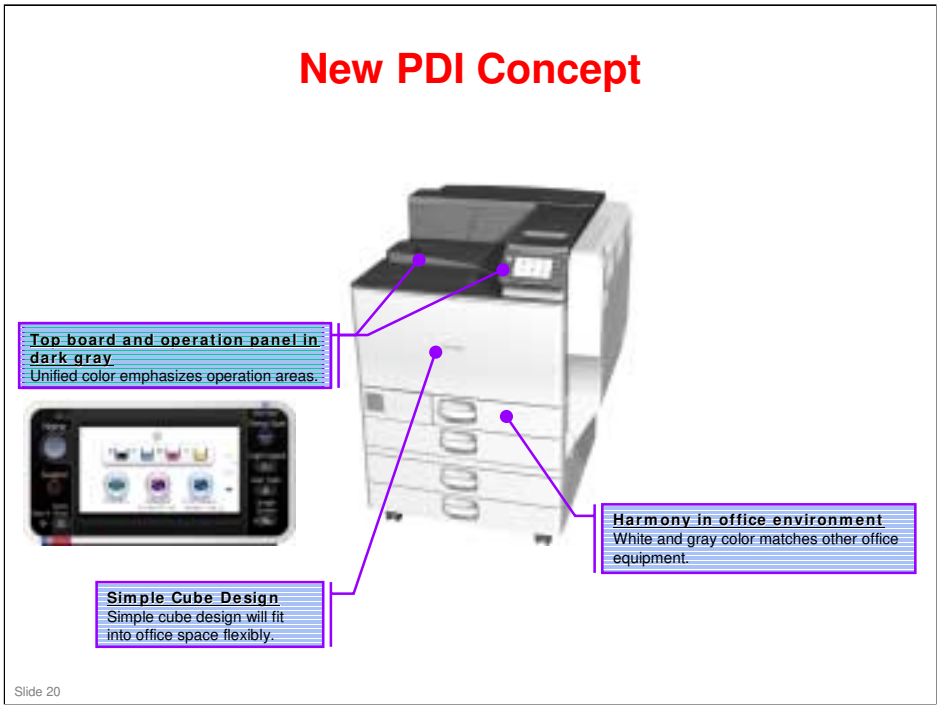
No additional notes



PDI: Product Design Identity

New Operation Panel

- The angle of the operation panel cannot be changed.
- A home button is added. You can return to the home screen from anywhere.
- An SD/USB slot is built-into the right side of the panel as standard equipment (not an optional unit).
- The larger operation panel makes it easier to use IC Card Authentication.

Slide 21

No additional notes

Languages for the Display

- **If you needa multi-lingual operator interface, use the following User Tools to select the languages that you require.**
  - System Settings > Administrator Tools > Select Switchable Languages
    - » Possible languages: Japanese, English, German, French, Italian, Dutch, Swedish, Norwegian, Danish, Spanish, Finnish, Portuguese, Czech, Polish, Hungarian, Simplified Chinese, Russian, Greek, Catalan, Turkish, or Brazilian Portuguese.
- **Then, from these languages, the user can easily switch between them.**

Slide 22

No additional notes

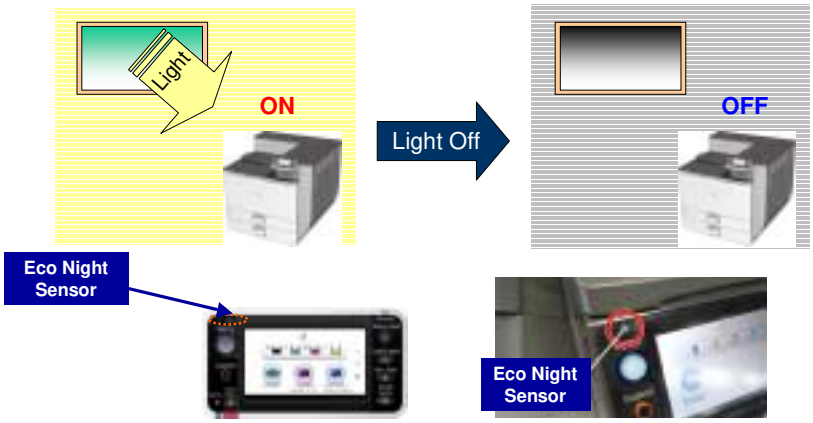
Touch Screen Calibration

- The procedure is different from previous models.
- Also, it must be done after you clear the memory, replace the operation panel, LCDC board or NVRAM.

Slide 23

No additional notes

Eco Night Sensor - 1



- **The machine saves electricity by automatically turning off the main power (or entering sleep mode) when the room is dark.**
  - Ambient light is detected by the Eco Night Sensor on the operation panel.
  - The sensor is a translucent circular window 4 mm in diameter
- **This will prevent waste of electricity when people forget to turn off the machine.**

Slide 24

No additional notes

Eco Night Sensor - 2

- **The Eco night sensor has five brightness sensitivity levels (trigger thresholds).**
  - Select with [User Tools] > [System Setting] > [Administrator Tools] > [ECO Night Sensor] > [Power Off] (or [Sleep Mode]) > [Brightness Sensor Level]
  - 1 is the darkest setting
- **The timer to enter the sleep mode or turn off the power is set from 1 to 120 min.**
  - Select with [User Tools] > [System Setting] > [Administrator Tools] > [ECO Night Sensor] > [Power Off] (or [Sleep Mode]) > [Timer to Turn Off]
  - The timer is reset if the ambient light level increases, printing is done, or any key is pressed before the specified time elapses.
- **The Eco night sensor function can be enabled or disabled with the following user tool.**
  - Enable/disable with [User Tools] > [System Setting] > [Administrator Tools] > [ECO Night Sensor]
  - There are three settings:
    - » Inactive (disabled)
    - » Sleep mode (the machine goes to sleep mode when the timer runs out)
    - » Power off (the machine switches off when the timer runs out)

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No additional notes

Eco Night Sensor - 3

- If the controller is executing a process, the Light Detect Function activates after the process is completed.
- Light Detect also cannot activate if printing stopped due to a lack of paper or a paper jam.
- If a spooled print job is stored in the machine, the machine cannot activate Light Detect.
- After the Light Detect Function turns off the power, the machine cannot power on by itself. To power on the machine, the main power switch has to be turned on manually.

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No additional notes

External USB Keyboard

- **This lets you use a Windows-compatible external USB Keyboard for typing when the software keyboard is displayed in GW applications.**
- **Before you can use an external USB keyboard for GW applications, it must be enabled in SP mode (set SP5075-001 to ON, then cycle the main power off/on).**
  - You cannot type in both SDK applications and GW applications from one keyboard. If the USB keyboard is used for GW applications, it can't be used for SDK applications.
- **The external USB keyboard can be connected to the USB port on the operation panel or the USB port on the back of the controller board.**
- **Keyboards and tables are not provided as options.**

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No additional notes

- This section explains important changes to the installation procedure since R-C5.5.
- Installation for the copier is very similar to the R-C5.5. However, the procedures for the options have some changes. Make sure that you use the correct procedures for the machine you are working on.

Overview

- **Installation for the main machine and peripherals is basically the same as for the AP-P2.**
- **This section of the course shows the main changes.**
- **Some details are different, so always refer to the AP-P3 service manual when installing the machine and peripherals.**
- **The customer is normally expected to install the following peripherals:**
  - Paper tray units
  - 2000-sheet large capacity tray
  - These controller options: IPDS Unit Type C830, SD card for NetWare printing Type O, Gigabit Ethernet Board Type D, Camera Direct Print Card Type J (PictBridge), Hard Disk Drive Option Type C830, IEEE802.11a/g Interface Unit Type L, IEEE1284 Interface Board Type A

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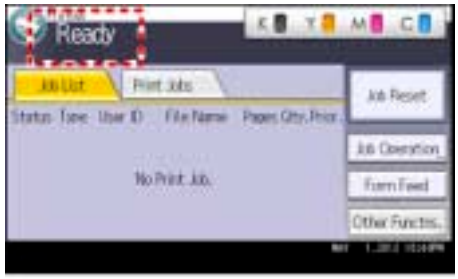
No additional notes

Turning on the Power for the First Time



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- **Do not turn off the power switch until initialization is completed.**
  - 'Ready' appears on the display when initialization is completed.
- **Otherwise, the machine may malfunction.**

Slide 30

No additional notes

1200-sheet LCT Installation

- A procedure has been added to the service manual, to explain how to change the side fence position for different paper sizes (A4 LEF/ LT LEF/ B5 LEF).
- After adjusting the side fences, input the correct paper size with SP5181-018.

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No additional notes

Entering SP Mode

- **Do one of the following.**
  - If the power is already on, press the "Home" and "Simple screen" keys at the same time for more than 3 seconds, and then press the "User tool" key.
  - Press the "Home" and "Suspend" keys at the same time while turning the main switch on.

Slide 32

No additional notes

No additional notes

User or Service Maintenance

- **This model can be maintained either by the user or by a service technician.**
  - User maintenance: No PM visit is required.
  - Service maintenance: Enable Meter click charge mode by changing SP settings. PM visit is required.
- **The yields of PM parts for user maintenance are different from the yields for service maintenance.**

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No additional notes

Changes to the PM Table

	AP-P3		AP-P2
	User PM	Service PM	User PM
PCDU	60k	150k	40k
Waste toner bottle	40k	40k	40k
ITB unit	200k	300k	200k
PTR unit	160k	300k	160k
Fusing unit	160k	300k	160k
Ozone filter	160k	300k	160k
Exhaust filter	160k	300k	160k
Dust filter (Toner Scatterproof Filter)	-	300k	-

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- Ozone Filter/Exhaust Filter: The life was changed from 200k to 300k, this is because this model uses the new SPR-F toner, which reduces the amount of powder dust inside the machine.

New PM Part
Toner Scatterproof Filter

- This filter must be changed every 300k.

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No additional notes

New Yield Parts

- **The toner supply unit (includes pump and toner supply tube) is a new yield part, in order to support the new SPR-F toner.**
  - K: 2000 k (5% coverage)
  - Y, M, C: 1500 k (5% coverage)
- **The machine uses the page counter and the part's operation time counter to determine when the part must be replaced.**
  - This is the same system as for other yield parts.
- **When either of the counters reaches the maximum limit, the machine indicates that the part must be replaced.**

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No additional notes

Fusing Unit

- **There is a new type of fusing unit. The PM interval is 300k.**
  - Counters to set to 1 before removing old parts (not necessary for complete fusing units): There is a new item
    - » Heating sleeve belt unit: SP3902-018
    - » Pressure roller: SP3902-019 (this is the same as the previous model)
- **If the fusing unit is not replaced at 330k, the machine will stop, to prevent the sleeve belt in the fusing sleeve belt unit from breaking.**
  - At 315k, a near-end message appears on the operation panel.
  - At 330k, an end message appears on the operation panel and the machine stops.
  - This is the same as the process for the pressure roller in the previous model.

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No additional notes

SMC List Card Save Function

- **This function saves the SMC lists as CSV files to an SD card inserted into the operation panel card slot.**
  - This data cannot be copied to SD card slots 1 or 2.
- **There are several SP modes, to store all SMC data, or just a part of the SMC data.**
- **It takes 2 to 3 minutes to store the data on the card.**
- **The file name is automatically generated from the following:**
  - Machine serial number
  - Date and time
  - Type of SMC list
- **The file is stored in a folder on the SD card. The name of the folder is based on the machine's serial number.**
- **If an error occurs, press "Exit" to discard the job and return to the ready state.**

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- For the procedure, see SMC List Card Save Function in the service manual.

Updating Firmware

- **Please take note of this new step that must be performed for this model and future models.**
  - Disconnect the Ethernet interface cable, Gigabit Ethernet cable, IEEE1284 interface cable and remove the Wireless LAN interface board before you start the firmware update procedure.

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No additional notes

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Service Training

Changes to the Engine

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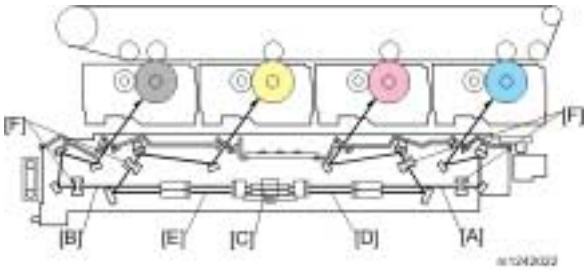
No additional notes

PCU Layout



- Note the order of photoconductors from left to right.

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No additional notes

New Feature for this Series
SPR-F Toner

- This new type of color toner improves the range of color (the color space) that can be produced by the print engine.
- Also, evenness of high density areas has been dramatically improved.
- This toner also has a lower melting point, so energy consumption is reduced.

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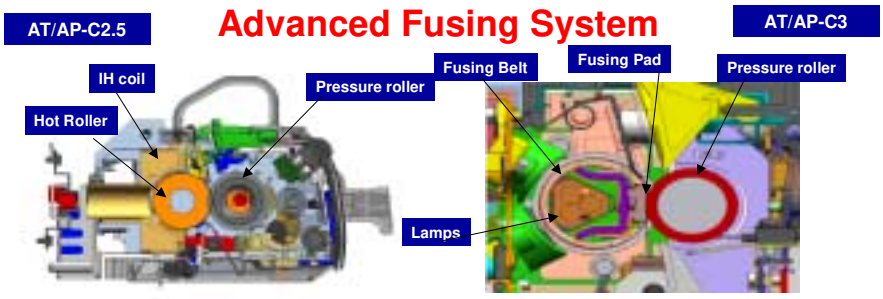
No additional notes

New Feature for this Series
Advanced Fusing System



- This machine uses a Quick Start Up Direct Heating (QSU-DH) fusing system which saves energy and improves print quality.
- The new fusing unit does not have a fusing roller. Instead, there is a thin fusing belt around the lamps.
- The fusing belt is much thinner than the roller, so less electricity is used to heat the belt.
- By using a flat fusing pad, fusing is done on a flat surface without uneven pressure from the pressure roller. This means that there is less damage/wrinkling to the paper. This is especially helpful for envelope printing.

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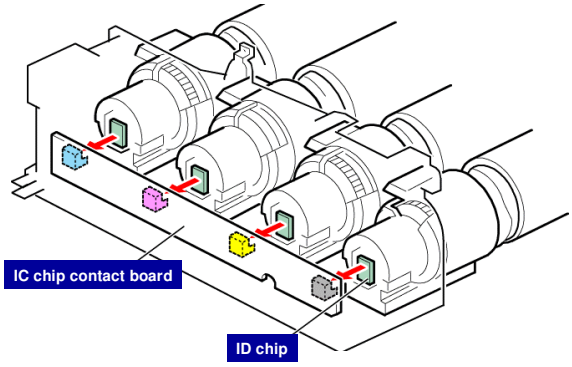
No additional notes

Toner Bottle Detection



- **The toner bottles are unique for this model. They are not compatible with bottles for the previous model.**
- **A new type of ID is used for the toner bottles in this model.**
  - Previous model: RFID detection
  - This model: Direct touch detection

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No additional notes

Removing the Toner Bottle Detection Board

- **The board is [B] in the diagram on the left.**
- **The toner bottle detection board should be pulled out horizontally.**
  - If you ignore this, the toner bottle detection terminals [A in the diagram on the right] may be damaged.

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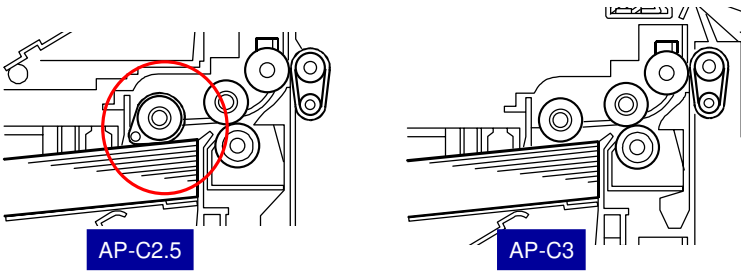
No additional notes

Paper Feed



- The feed method has changed from a feed belt to FRR.

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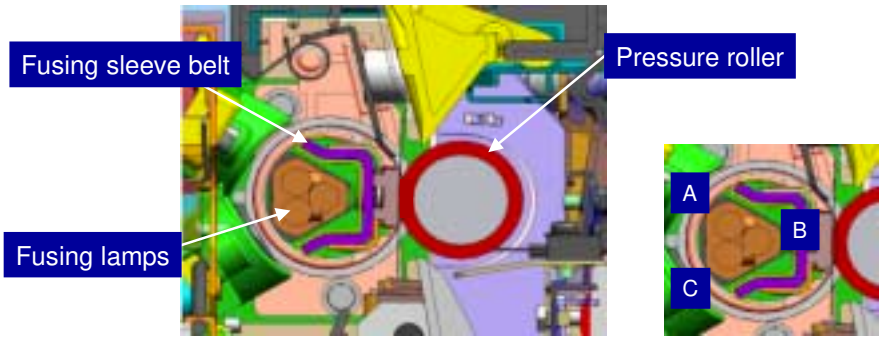
No additional notes

Fusing
Overview



- **A free-belt fusing system is used.**
  - Similar to Di-C1.5; same as At/Ap-C3. (Details on next slide)
- **The fusing sleeve belt unit contains three lamps.**
  - The lamps are in one assembly, and are removed together. The 1st lamp heats the center and the 2nd lamp heats the ends. The 3rd lamp heats when A4/Letter LEF or a postcard is used.

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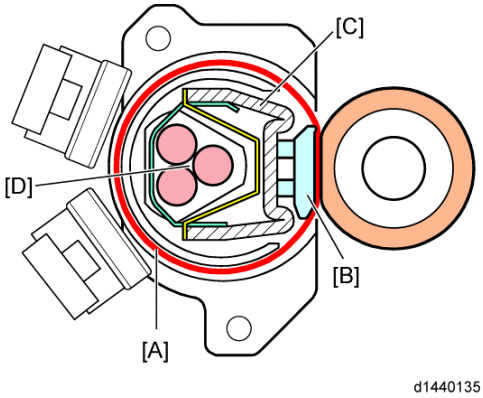
- The on/off lighting pattern of the fusing lamps depend on the machine destination and the printing paper size. The light-on patterns are shown below.
  - Lamp [A]: Letter LEF (NA), A4 LEF (Others)
  - Lamp [B]: Letter SEF (NA), A4 SEF (Others)
  - Lamp [C]: Post card (100 mm)
- The pressure roller is not heated internally.
  - There is no lamp in the pressure roller. (More simple design.)
- There is no decurler after the fusing exit.

Fusing
Free-Belt Fusing System



- **Designed for quick start up (QSU).**
- **Uses a free turning fusing belt.**

(More details below in the Notes section.)

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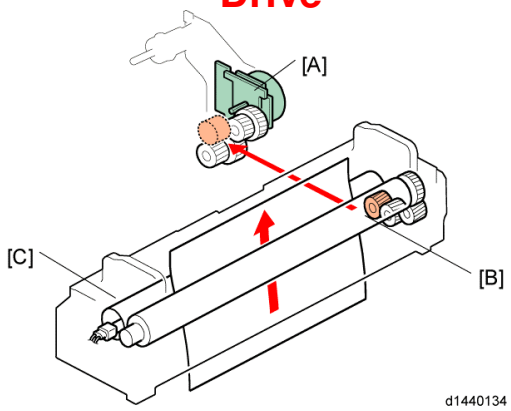
- The heating sleeve [A] rotates freely. It is driven by the pressure roller.
- The nip pad [B] has a low friction cover, and this allows the fusing belt to turn easily.
- The pressure roller presses against the nip pad [B] to form the nip zone, where the image is fused to the paper by heat and pressure.
- The stay [C] holds the nip pad [B] in place.
- The stay has a mirrored surface facing the fusing lamps [D] to concentrate the energy from the lamps directly on the inner surface of the heating sleeve [A].

Fusing
Drive



- The fusing/paper exit motor [A] drives the pressure roller [B].
- The fusing belt [C] around the fusing lamp is driven by the pressure roller.

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No additional notes

Fusing

Cleaning the Heating Sleeve Belt

- The surface of the heating sleeve belt is delicate. Never touch the surface, and do not wipe the surface with anything.
- If the surface of the heating sleeve belt must be cleaned because of offset image for example, feed some sheets of white paper through the fusing unit instead.

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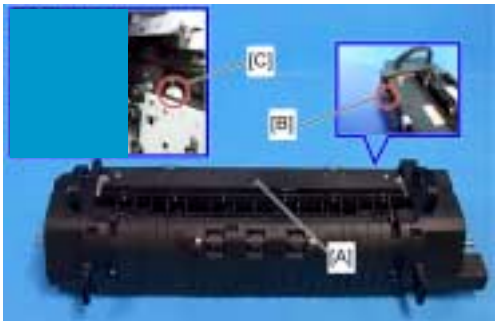
No additional notes

Fusing
Shutter Open/Close Mechanism



- **The fusing unit has a shutter plate [A] to improve energy efficiency.**
- **The fusing unit shutter plate drive motor rotates the shaft inside the fusing unit through the gear [C].**

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- The fusing shutter improves conservation of heat inside the fusing unit. It allows a faster first copy time and a smaller TEC value.
- The shutter operates in conjunction with fusing pressure release, so the timing of opening/closing is as follows.
  - Fusing pressure release: shutter opens
  - Fusing pressure ON: shutter closes

Fusing
Shutter Open/Close Mechanism

- The shaft driven by the motor (see the previous slide) also has a gear at the opposite end of the shaft.
- This gear rotates another shaft with cams [F] through the gear [E] and the belt.
- The cams move the shutter.

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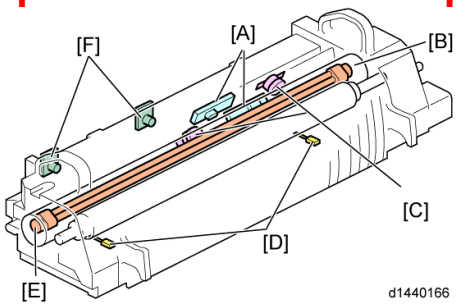
No additional notes

Fusing
Temperature Control Components

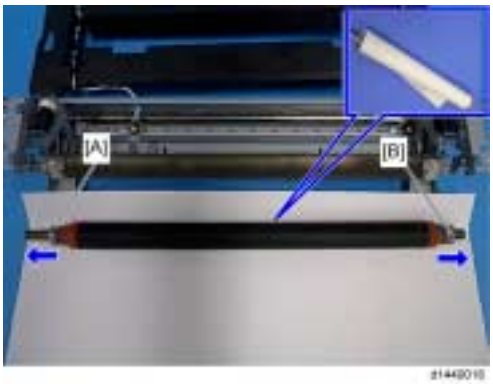


- A: NCU sensors x 2 (Upper/Lower)
- B: Fusing sleeve belt
- C: Thermostat x 2 (Center/End)
- D: Pressure roller thermistor x 2 (Both ends)
- E: Fusing Lamp
- F: Thermopiles x 2 (Center/End)

Slide 54

- When the main switch turns on, the CPU turns on the fusing lamp [E] in the fusing sleeve belt. The fusing lamp stays on until the pressure roller thermistors [D], NC sensors [A] and thermopile [F] detect the standby temperature. Then the CPU raises the temperature to the printing temperature.
- The fusing temperature for each mode is as follows. These are set by SP 1105.
- The thermostats [C] for the heating sleeve belt are used for overheat prevention. These thermostats are opened if the heating sleeve belt temperature is over 250° C.
- The PID control (the phase control) method and On/Off method are adopted as fusing temperature control methods.
- The heating temperature is detected with the thermopile [F] and the NCU sensors [A]. The pressure temperature is detected with the thermistors [D]. The thermostats act as safety switches at the heating sleeve belt unit side.

Fusing
Pressure Roller

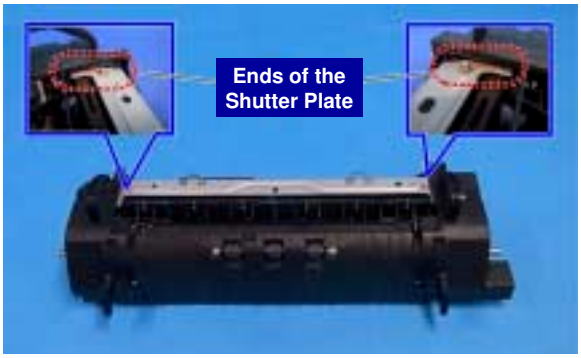


- **The procedure has changed. In particular, lubrication of bearings after replacement is not required.**
- **The surface of the pressure roller is fragile, so the pressure roller must be covered with a sheet of paper when it is placed on a table or floor.**

Slide 55

- [A] and [B] are bearings – you can ignore these for the purpose of this slide.

Fusing
Shutter Plate

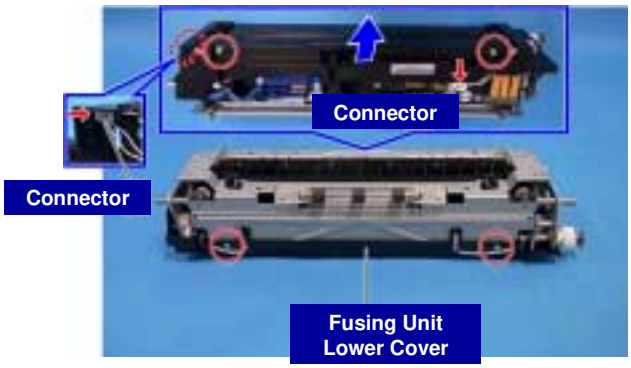


- When you reinstalled the fusing unit upper cover, do not use excessive force .
- Otherwise, the ends of the shutter plate may be damaged and this will result in a problem when opening and closing the shutter.

Slide 56

No additional notes

Fusing
Fusing Unit Lower Cover



- The fusing lower cover cannot be removed from the fusing main body completely before removing the thermistors.
- Therefore, pay extra attention to handling the fusing lower cover when disassembling the fusing unit.

Slide 57

No additional notes

Drive Unit

- To save energy, the motors will be changed from stepper motors to dc motors.

Slide 58

No additional notes

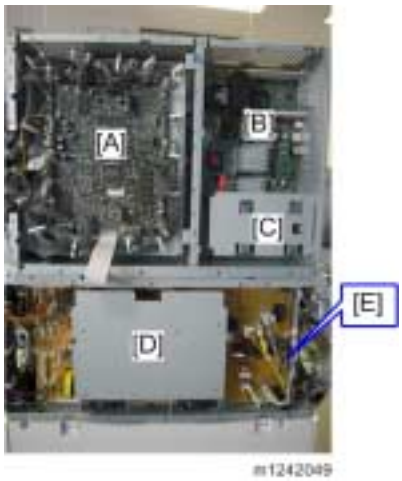
Boards

- **The IPU board of the AP-C3 is replaced by the BB board.**
- **The BB (Bridge Board) does the following:**
  - Receives the image processing signals sent over the PCI bus from the controller memory, processes them and outputs them to the VGAVD.
  - Controls the relay of power and signals to/from the print engine

Slide 59

No additional notes

Board Layout
Controller Box Closed

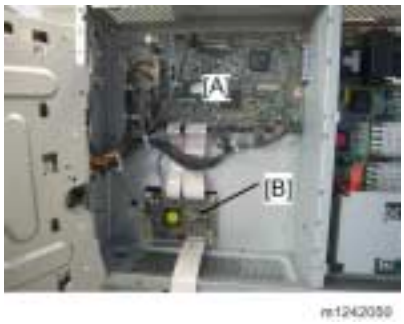


- [A]: IOB
- [B]: Controller Board
- [C]: HDD
- [D]: PSU
- [E]: High Voltage Supply Board (Behind the PSU)

Slide 60

No additional notes

Board Layout
Behind the IOB



- [A]: BB
- [B]: BCU

Slide 61

No additional notes

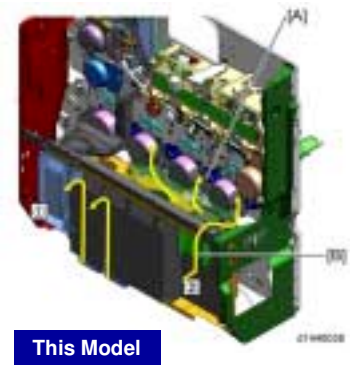
Board Layout
Controller Box Open

- **[A]: ITB Power Supply Board**

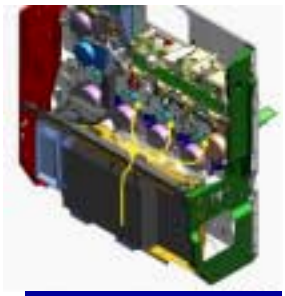
Slide 62

No additional notes

Improved Air Flow - 1



This Model



Previous Model

Slide 63

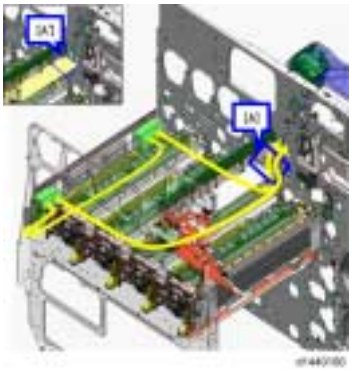
PSU Ventilation

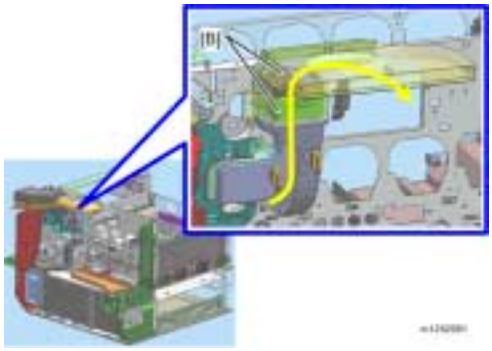
- To prevent rising temperature in the toner supply route [A] due to heat from the PSU, the hot air in the power supply unit will be exhausted to the outside directly (1).
- To do this, a louver ([C] in the overview) is added and the PSU fan is moved.

Toner Supply Section Ventilation

- The previous machine creates the airflow [A] with the PSU fan. In the new model, the louver ([B] in the overview) and the duct [2] are added at the rear of the machine to get the external air in. And, the 1st duct fan is newly added to create the airflow [B] because the PSU fan is used to exhaust only.

Improved Air Flow - 2



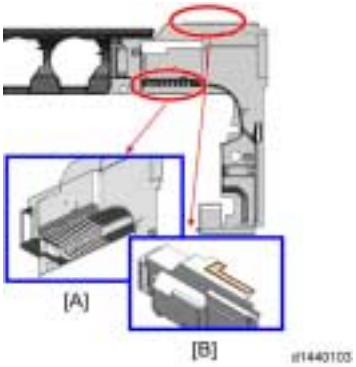


- A cutout [A] is created on the supply guide plate and the 2nd duct fan [B] is doubled in order to exhaust the air from the main fans effectively.
- In the previous model, this was at [A'].

Slide 64

No additional notes

Improved Air Flow - 3

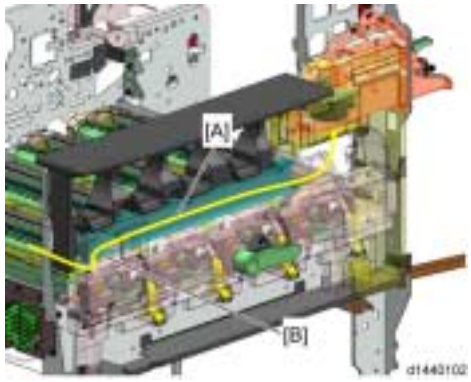


- **A duct is added at the rear of the PCDU face plate. This forms an airflow route, and prevents toner from diffusing around the faceplate and the toner bottles.**
- **Also, the shape of the inner cover is changed**
  - [A] Larger outlet
  - [B] To prevent air leaks

Slide 65

No additional notes

Improved Air Flow - 4



- The new duct [A] and the shape change of the inner cover can guide the airflow from the main fan smoothly to the QSU fan.

Slide 66

No additional notes

Environmental Conservation

Technology for Environmental Conservation

Energy Saving

Paper Saving

Slide 67

- 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	New model AP-P3	Old model AP-P2
1. QSU	- Reduction of warm-up time (Energy saving)	**	*
2. Hybrid QSU		*	*
3. IH QSU	- Reduction of CO_2 emissions		*
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		*	*

Slide 68

- 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.

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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.

Slide 70

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

Slide 71

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.

Slide 72

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.

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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.

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No additional notes

Quick Start-up

- **QSU reduces the operating temperature, because of these improvements in fusing unit technology**
  - Use of the heating sleeve belt
  - Low melting-point toner
- **This also means that the warm-up time and recovery time from energy saver modes are also reduced.**
  - Warm-up time (23 ° C)
    - » AP-P2c: 50 sec or less, AP-P2d: 55 sec or less
    - » AP-P3c: 29 sec or less, AP-P3d: 25 sec or less
  - Recovery time
    - » AP-P2c: 50 sec or less, AP-P2d: 55 sec or less
    - » AP-P3c: 15 sec or less, AP-P3d: 20 sec or less

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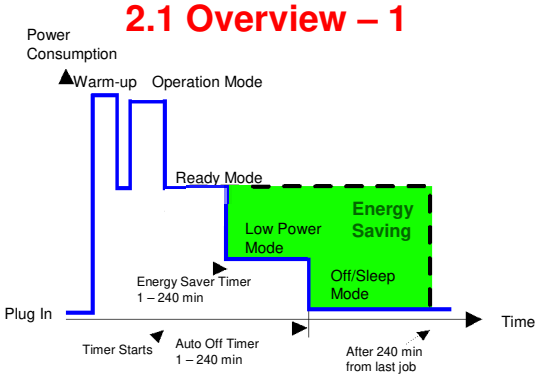
- Through major reductions in warm-up time and recovery time from energy saver modes (Low power, Off/Sleep), QSU (Quick Start Up) Technology has eliminated the traditional trade-off between energy saving and convenience of speed.

2. Energy Saving

2.1 Overview – 1



Energy Saver Modes	Description
Low Power Mode	The fusing temperature is lowered to the prescribed temperature (below ready temperature).
Auto Off/Sleep Mode	No power is supplied to the printing engine, and almost none to the controller.

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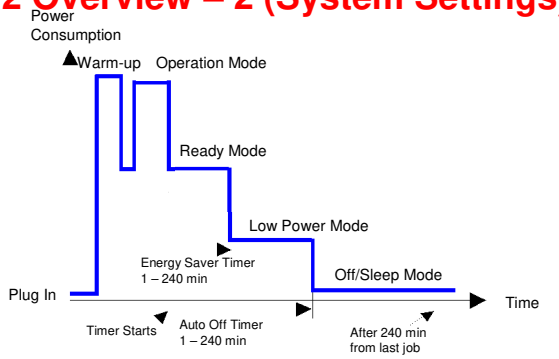
- When the machine is not being used, the machine enters energy saver mode to reduce the power consumption by turning off the LCD of the operation panel and lowering the fusing temperature.
- The area shaded green in this diagram represents the amount of energy that is saved when the timers are at the default settings. If the timers are changed, then the energy saved will be different. For example, if the timers are all set to 240 minutes, the green area will disappear, and no energy is saved before 240 minutes expires.
- Power consumption during warm-up may be much higher than shown in this diagram.

2. Energy Saving

2.2 Overview – 2 (System Settings)



Timer settings and recovery time (System settings => Timer setting)

Mode	Timer	Default	Setting range	Recovery time
Low Power Mode	Energy Saver Timer	Off	1 to 240 min.	P3c: 15 sec. P3d: 20 sec.
Off/Sleep Mode	Auto Off Timer	1 min	1 to 240 min.	P3c: 15 sec. P3d: 20 sec.

Specified values for timers	Low Power Mode	Auto Off Mode
If Energy Saver > Auto Off	This mode cannot start	This mode can start
If Energy Saver = Auto Off	This mode cannot start	This mode can start
If Energy Saver < Auto Off	This mode can start	This mode can start

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- The user can set these timers with User Tools
  MFP/ Priport: User Tools > System settings > Timer Setting
  Printer : User Tools > System settings > Energy Saver Timer
- Normally, Energy Saver timer < Auto Off timer.
- But, for example, if Auto Off timer < or = Energy Saver timer, the machine goes immediately to Off mode when the Auto Off timer expires. It skips the Energy Saver mode.
- We recommend that the default settings should be kept.
  - If the customer requests that these settings should be changed, please explain that their energy costs could increase, and that they should consider the effects on the environment of extra energy use.
  - If it is necessary to change the settings, please try to make sure that the Auto Off timer is not too long. Try with a shorter setting first, such as 30 minutes, then go to a longer one (such as 60 minutes) if the customer is not satisfied.
  - If the timers are all set to the maximum value, the machine will not begin saving energy until 240 minutes has expired after the last job. This means that after the customer has finished using the machine for the day, energy will be consumed that could otherwise be saved.
  - If you change the settings, the energy consumed can be measured using SP8941, as explained later in this presentation.
- Power consumption during warm-up may be much higher than shown in this diagram.

2. Energy Saving
2.2 Energy Saver Mode: Condition of LEDs

❑ Condition of LEDs on the operation panel

Mode	Operation Switch LED	Energy Saver LED	Main Power LED
Low Power Mode	On	Off	On
Off/Sleep Mode	Off	Blinking	On

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No additional notes

2. Energy Saving

2.3 Energy Saver Mode: Low Power Mode

- **The machine enters low power mode when the energy saver timer runs out after the last job.**
- **When the machine enters low power mode, the fusing temperature is lowered to the prescribed temperature (below the machine ready temperature).**
- **The machine recovers to the ready condition if one of the following occurs:**
  - The Energy Saver key is pressed
  - The user touches the operation panel
  - The front door is opened or closed
- **The recovery time depends on the model and the region.**
  - P3c: 15 seconds or less
  - P3d: 20 seconds or less

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No additional notes

2. Energy Saving

2.4 Energy Saver Mode: Auto Off Mode – 1

- **The machine enters auto off mode when one of the following is done.**
  - The auto off timer runs out after the last job.
  - The operation switch is pressed to turn the power off.
- **When the machine enters auto off mode, no power is supplied to the printing engine, and almost none to the controller.**
- **Recovery time**
  - P3c: 15 seconds or less
  - P3d: 20 seconds or less

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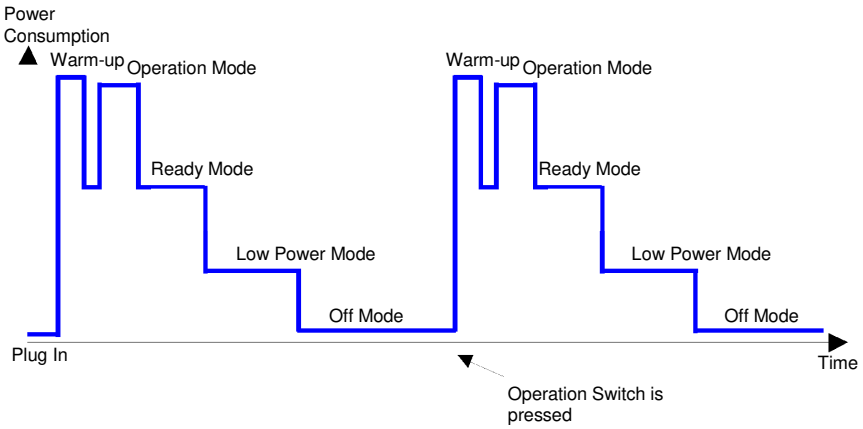
No additional notes

2. Energy Saving

2.4 Energy Saver Mode: Auto Off Mode – 2

- **The machine recovers to the ready condition if the operation switch is pressed.**



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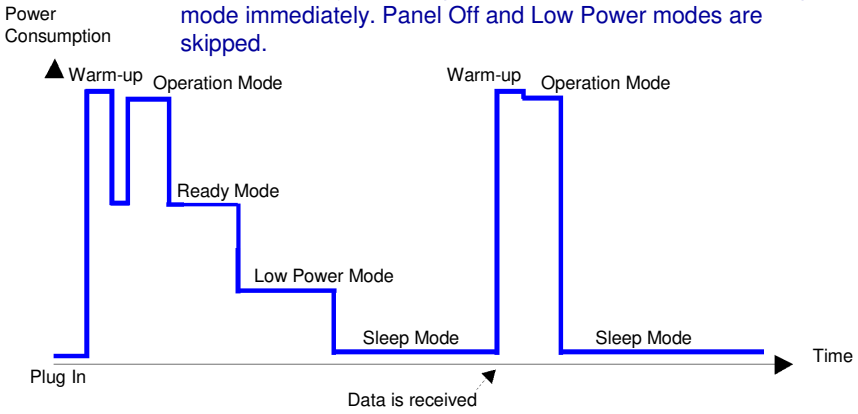
- This timing chart shows what happens if the operation switch is pressed while the machine is in auto off mode.
- Power consumption during warm-up may be much higher than shown in this diagram.

2. Energy Saving

2.5 Energy Saver Mode: Sleep Mode

- **The machine recovers to the ready condition:**
  - **If data is received**
    - » After warm-up, the job starts, but the operation panel stays dark.
    - » Then, after the job is completed, the machine returns to sleep mode immediately. Panel Off and Low Power modes are skipped.



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- This timing chart shows what happens if data is received while the machine is in sleep mode.
- Power consumption during warm-up may be much higher than shown in this diagram.

2. Energy Saving

2.6 Energy Save Effectiveness

- **With the data from SP 8941:Machine Status, and the power consumption values from the specifications, we can estimate the amount of energy that is used by the machine.**
  - 8941-001: Operating mode time
  - 8941-002: Standby mode time
  - 8941-004: Low power mode time
  - 8941-005: Off/sleep mode time
- **This should only be used as a reference value, because the power consumption specifications are measured in a controlled environment with a constant power supply.**
- **To get an exact measurement at the customers site, a watt meter must be used to measure the actual energy consumed.**

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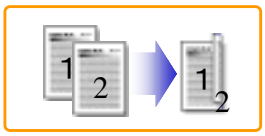
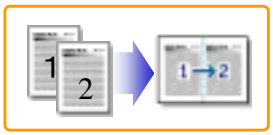
No additional notes

3. Paper Saving
3.1 Measuring the Paper Consumed – 1

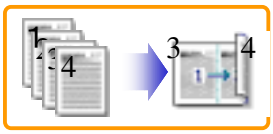
1. Duplex: Reduce paper volume in half!



2. Combine: Reduce paper volume in half!



3. Duplex + Combine: Using both features together can further reduce paper volume by 3/4!



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No additional notes

3. Paper Saving
3.1 Measuring the Paper Consumed – 2

- **To check the paper consumption, look at the total counter and the duplex counter.**
  - Total counter : SP 8581 001
  - Single-sided with duplex mode : SP 8421 001
  - Double-sided with duplex mode : SP 8421 002
  - Book with with duplex mode : SP 8421 003
  - Single-sided with combine mode : SP 8421 004
  - Duplex with combine mode : SP 8421 005
- **The total counter counts all pages printed.**
- **The duplex and combine counter counts all pages printed with duplex and combine mode.**

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No additional notes

3. Paper Saving

3.1 Measuring the Paper Consumed – 3

- **How to calculate the paper reduction ratio, when compared with Single-sided copying, with no 2-in-1 combine mode**
- **Paper reduction ratio (%) = Number of sheets reduced: A/Number of printed original images: B x 100**
  - Number of sheets reduced: A
    = Output pages in duplex mode/2＋ Number of pages in Single-sided with combine mode + Number of pages in Duplex with combine mode x 3/2
    A = (②+③+④)/2 + ⑤+⑥ x 3/2
  - Number of printed original images: B
    = Total counter＋ Number of pages in Single-sided with combine mode ＋ Number of pages in Duplex with combine mode
    B = ①+⑤+⑥

① **Total counter**	**: SP 8581 001 (pages)**
② **Single-sided with duplex mode**	**: SP 8421 001 (pages)**
③ **Double-sided with duplex mode**	**: SP 8421 002 (pages)**
④ **Book with with duplex mode**	**: SP 8421 003 (pages)**
⑤ **Single-sided with combine mode**	**: SP 8421 004 (pages)**
⑥ **Duplex with combine mode**	**: SP 8421 005 (pages)**

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In the above formula:

- Sheet: A sheet of paper
- Page: A side of a sheet of paper. In duplex mode, one sheet is two pages
  - Output page: One side of a sheet of output paper
- Original Image: An image of one original page (or, an image of one side of a two-sided original)
  - For one sheet of output paper in two-in-one copying, four original pages are copied onto two output pages.

RICOH

RICOH

M124/M125
Service Training

Limitations

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This section explains some important product limitations.

Yield of Toner Supply Unit

- **The life of a toner supply unit is the following:**
  - A4, 5% coverage: Bk 2000k, FC 1500k
- **However, yield is shortened under high coverage conditions.**
  - Yield of the toner supply unit is shortened in high coverage conditions because the yield depends on the amount of supplied toner.
- **Change the toner supply unit by estimating the most suitable exchange time. To do this, refer to the PM counter of the toner supply unit.**

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Variations in target yield (pages) due to image coverage ratio

- Target yield figures are set for each PM unit shown in the table below, both in terms of number of pages and usage time (whichever is reached first). The percent of yield currently (% of unit usage) reached can be displayed in SP7803-109 to -113 for pages, and in SP7803-080 to -084 for usage time.
- The timing at which a given PM part will reach its yield depends on the average image coverage ratio conditions under which the customer uses the machine. For example, if the average coverage ratio is over 5%, the usage time counter will reach the target yield before the page counter does. This is because with the high coverage ratio, the toner supplying time will increase (i.e. the usage time is greater).
- Table 1: Target yield when calculated by pages (page counter value, % yield reached)
  - Note: Percent of yield reached (pages) = PM counter value (pages) / Target yield (pages)

	< 5%	5%	10%	20%	30%	40%	50%
Toner Supply Unit - K	> 2000k (> 100%)	2000k (100%)	1000k (50%)	500k (25%)	333k (16%)	250k (12%)	200k (10%)
Toner Supply Unit - YCM	> 1500k (>100%)	1500k (100%)	750k (50%)	375k (25%)	250k (16%)	187k (12%)	150k (10%)

- Table 2: Target yield when calculated by usage time (% yield reached)
  - Note: Percent of yield reached (usage time) = PM counter value (usage time) / Target yield (usage time)

Toner Supply Unit - K	(Less than 100%)		(100%)
Toner Supply Unit - YCM	(Less than 100%)		(100%)

Kink in the Fusing Sleeve Belt

- If a power shutdown occurred during continuous printing of more than 500 P/J, a kink occurs in the center of the fusing sleeve belt, and poor fusing occurs in the center of the page.
- Normally, the machine reduces the heat of the fusing sleeve belt uniformly. This cannot be done when there is a power shutdown, so a difference in temperature between the center of the sleeve belt and other parts occurs, and this causes a kink in the sleeve belt.
- If this happens, change the fusing sleeve belt.

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No additional notes

Output Check for the Fusing Exit Motor

- **If a set procedure is not followed when doing the output check for the fusing exit motor, SC554 (high temperature detection) or a kink in the fusing sleeve belt will occur.**
  - During an output check, a fusing lamp may turn on.
  - Also, if you exit from the screen for the fusing exit motor output check, the fusing exit motor will stop.
- **The output check SP for the fusing exit motor has been moved to Super SP Mode, to prevent technicians from doing this output check in the same way as other output check SPs.**

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Please do the following set procedure when you do the output check for the fusing exit motor.

1. Do one of the following.

- Open the right cover of a paper bank
- Take out one of the toner bottles
- Take out the waste toner bottle half way

2. Go into Super SP Mode.

3. Do the Output Check.

- SP5-804-031: Output check (high speed)
- SP5-804-032: Output check (middle speed)
- SP5-804-033: Output check (low speed)
- SP5-804-035: Output check (slower than low speed)

4. Power switch OFF/ON

5. Restore the machine to the standby condition (reverse what you did in step 1).

CPM Decrease

- When printing on small-width paper from the bypass tray or Envelope Feeder, the CPM decreases automatically.
- This CPM decrease occurs in order to prevent the hot offset image which occurs because of the rise in temperature at the ends of the fusing belt when doing continuous printing with a small paper width.
- If possible, change the paper orientation from SEF to LEF.

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This does not occur with the AT-C3 series.

Here are some examples of the CPM reductions that occur:

- [A]: Within 1 minute of the start of printing
- [B]: After 1 minute from the start of printing

- A5 SEF
  - AP-C3c (NA/EU): BK [A] 5% down [B] 30% down, FC [A] 10% down [B] 35% down
  - AP-C3d (NA/EU): BK [A] 20% down [B] 40% down, FC [A] 25% down [B] 45% down
- HLT SEF
  - AP-C3c (NA/EU): BK [A] 5% down [B] 30% down, FC [A] 10% down [B] 35% down
  - AP-C3d (NA/EU): BK [A] 20% down [B] 40% down, FC [A] 25% down [B] 45% down
- A6 SEF
  - AP-C3c (NA/EU): BK [A] 5% down [B] 20% down, FC [A] 10% down [B] 25% down
  - AP-C3d (NA/EU): BK [A] 20% down [B] 40% down, FC [A] 25% down [B] 45% down

Waiting Time After Feeding Small-width Paper

- After printing some sheets of small-width paper, if you then print on wider paper, waiting time occurs.
- Offset image may occur since the temperature at the ends of the fusing belt rises during printing a number of sheets of small-width paper.
- In order to prevent this, it is necessary to lower the fusing lamp temperature, and waiting time occurs when you need the higher temperature for the wider paper.
- If possible, change the paper orientation from SEF to LEF.

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EU model

- A4 SEF (Middle Thick): 100 sheets or more: 10 seconds
- A5 SEF: 20 sheets or more: (BK) 10 seconds, (FC) 28 seconds

NA model

- LT SEF (Middle Thick): 100 sheets or more: 10 seconds
- LG (Middle Thick): 100 sheets or more: 10 seconds
- A4 SEF: 100 sheets or more: 10 seconds
- A4 SEF (Middle Thick): 40 sheets or more: 10 seconds
- A5 SEF: 20 sheets or more: 30 seconds
- COM10: 40 sheets or more: 15 seconds

The End