RICOH

MODEL Z-C1 TRAINING
Machine Codes: M022/M024/M026/M028
COPIER ENGINE

FULL COURSE

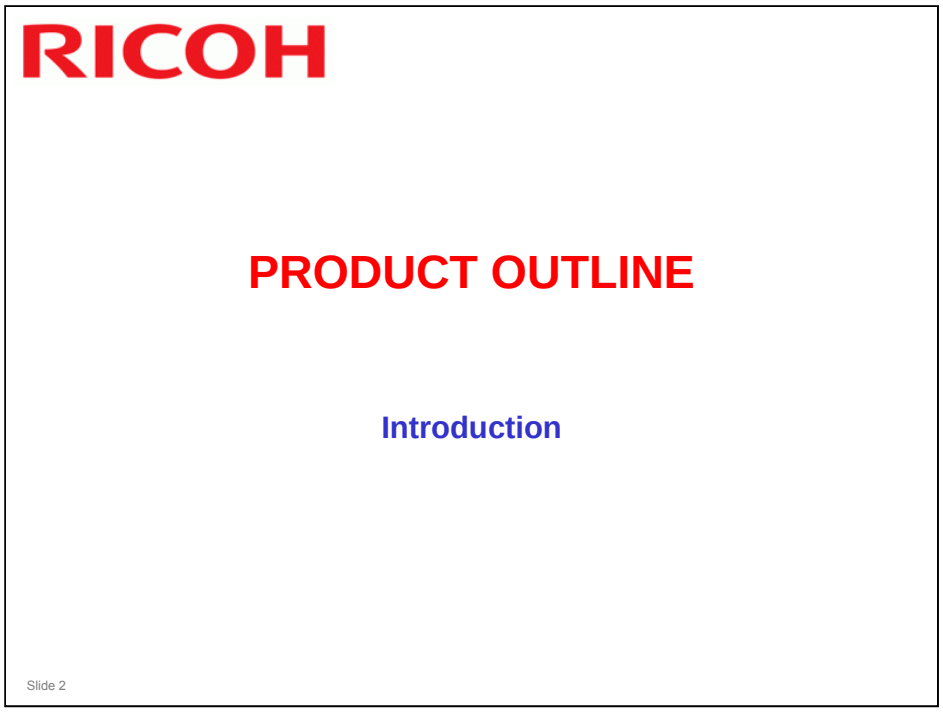
Version 1.1

Slide 1

- This course is for the Z-C1 series of color copiers.
- This is a full course. There is also an upgrade course for those who know the Z-P1 series.

Modifications

- October 13th, 2010
  - Slide 58 - table and notes modified
  - Slide 59 - this is a new slide
  - Slide 184 (183 old numbering) - deleted a spec from notes



No additional notes

How many Models?

- **Four models**
  - Z-C1a standard model (M022)
    - » Includes an ARDF as standard equipment
    - » At least 30 cpm for A4 (or 32 cpm for LT)
    - » Warm-up time: 50s
  - Z-C1a finisher model (M024)
    - » Includes an ARDF and an internal finisher as standard equipment
    - » At least 30 cpm for A4 (or 32 cpm for LT)
    - » Warm-up time: 50s
  - Z-C1b standard model (M026)
    - » Includes an ARDF as standard equipment
    - » At least 40 cpm for A4 (or 42 cpm for LT)
    - » Warm-up time: 50s (60 s for EU)
  - Z-C1b finisher model (M028)
    - » Includes an ARDF and an internal finisher as standard equipment
    - » At least 40 cpm for A4 (or 42 cpm for LT)
    - » Warm-up time: 50s (60 s for EU)
- **All units have the following memory.**
  - Memory: 1.5 GB
  - HDD: 160 GB
  - There is no optional memory, except for the fax memory (32 MB)

Slide 3

No additional notes

Appearance – Finisher Model

- This is the finisher model Z-C1 with a full range of options installed.
- The internal finisher is a standard component of the finisher models (M024, M028), but is not available as an option for the two standard models (M022, M026).
- The ARDF is also a standard component.

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No additional notes

Appearance – Standard Model

- This is the standard model Z-C1 with a full range of options installed.
- The one-bin tray can be installed as an option for the two standard models (M022, M026), but is not available for the finisher models (M024, M028).
- The ARDF is a standard component.

Slide 5

- The side tray can also be installed on the standard model, but is more likely to be installed on the finisher model, because the one-bin tray cannot be installed on that model.

Equipment (1)

	Basic Model	Finisher Model
ARDF	Standard	
One-bin Tray	Option	No
Internal Finisher	No	Standard
Side Tray	Option	Option
550 x 1 or x 2 paper tray unit	Option	Option
USB/SD slot	Standard	Standard

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- This slide shows the available equipment for each model (standard, and built-in)
- Note that the USB/SD card slot is standard, not an option.

Equipment (2)

	Basic Model	Finisher Model
Fax unit, Fax SAF Memory	Option	
Printer/Scanner	Standard	
PS3/PDF Direct	Standard	
PictBridge	Standard	
Media Link Board	Option	
NIC/USB2.0, USB host	Standard	
Gigabit Ethernet	Option	
Browser unit	Option	
IEEE802.11a/g	Option	
HDD data encryption	Standard	
Copy data security unit	Option	
RC Gate, RC Gate A, RC Gate S Pro	Standard	
Data Overwrite Security unit	Standard	
VM Card	Standard	
App2Me	Standard	
Bluetooth	Option	
Key Counter Interface unit	Option	

Slide 7

- This slide shows the available equipment for each model (standard, and built-in).
- HDD encryption and DOS unit are included on the Security and Encryption Unit, which is shipped in SD card slot 1.
- Bluetooth will be available as an option from March 2011, as a USB option (new type of Bluetooth option).
- CAP (Card Authentication Package) and ELP (Enhanced Locked Print) will be available as options after Z-C1 is released.

Important Notice

- **This machine has HDD Data Overwrite and HDD Encryption as standard equipment.**
  - It is in the Security and Encryption Unit, which is an SD card that is shipped from the factory in SD card slot 1.
- **These features have the same functions as the Data Overwrite Security unit (DOS) and HDD Encryption Unit, the current options.**
- **Even though DOS is a standard feature, the current DOS option will continue to be sold for customers who require CC certification.**
- **As for the HDD Encryption Unit, this option itself does not acquire CC certification, but CC certification for the whole MFP system requires the Encryption option to be installed.**

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- The procedures for CC certification will be announced later.

Operation Panel

- 8.5-inch color LCD

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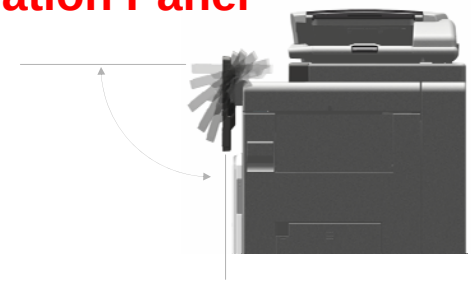
- There are no original size sensors, so there is no Auto Paper Detect mode. The user must input the correct original size before scanning.
- It is not possible to remove individual buttons from the operation panel, but they can be removed in blocks.

Operation Panel



- You can tilt and swing the operation panel.

Tile angle to the left 7°

Tilt angle to the right 13°

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No additional notes

Paper Tray

- The paper tray closes automatically if left open.

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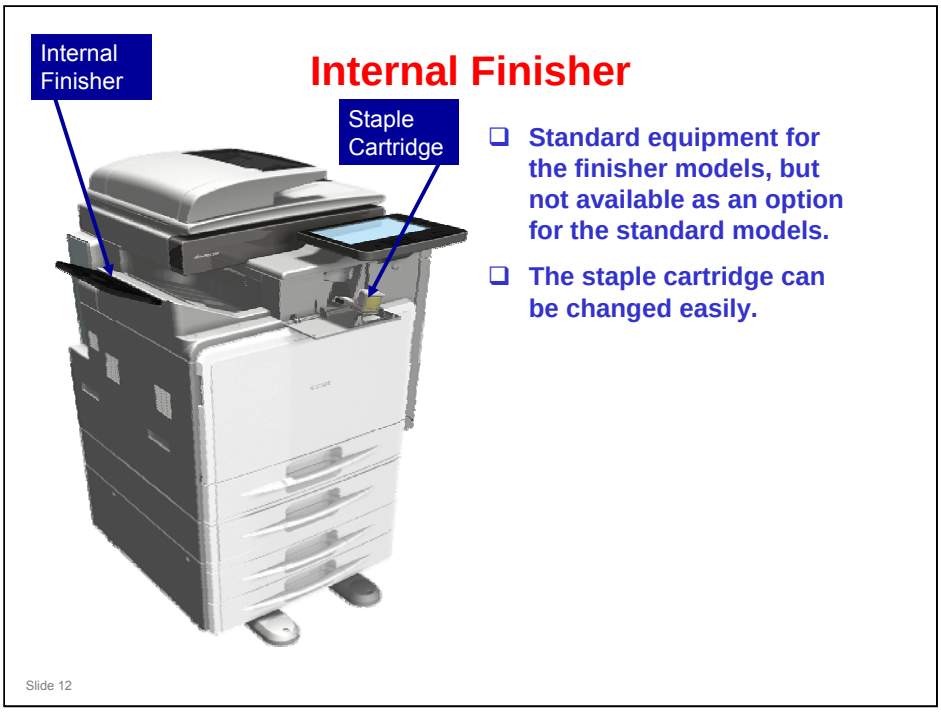
No additional notes



No additional notes

Installing the Card Reader

- Space for installing a card reader is shown above.

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- The IC card reader is not supplied by Ricoh and must be procured locally.
- Card Authentication Package (CAP) will be available as option after Z-C1 is released.

Replacing Toner is Easy

- **Only one step is needed**
  - Decals also make it easy to see where to install each toner cartridge.

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- The toner is the same as the Z-P1, but the cartridge is different.

No additional notes

App2Me

- **This is a new document solutions product.**
  - Among other things, it allows you to take your preferred operation panel setup with you and use it when you operate any other copier that has this capability.
- **App2Me is included on the VM card which is included with the machine in the carton box (not shipped in slot 2).**
- **It must be installed and enabled during machine installation.**
  - The procedure is in the field service manual for the main machine.
    - » Near the end of the section for installing the main machine.

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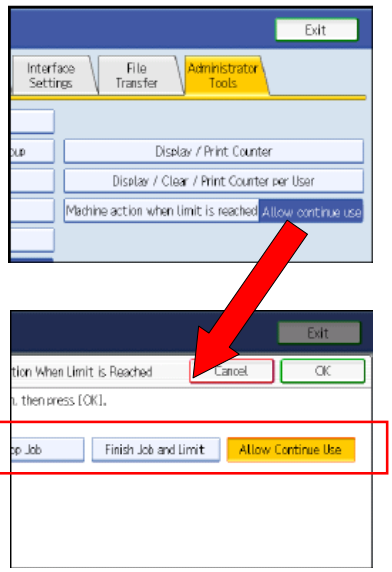
No additional notes

User Account Limiting

- **This function allows the customer to set limits on the number of outputs for each individual user or group.**
- **The following applications can be managed with this function.**
  - Copy
  - Print (including “Print from USB/SD”)
  - Document Server
  - SDK
  - Fax related jobs and “Mail to Print” jobs can’t be limited.
- **User authentication must be enabled.**
- **Possible Settings**
  - Stop Job: When the maximum print volume is reached, both the current job and waiting jobs are canceled.
  - Finish Job and Limit: When the maximum print volume is reached, the current job is allowed to finish, but waiting jobs are canceled.
  - Allow Continue Use (Default setting): Print volume is not limited.



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No additional notes

Scan to Web Mail (SSL over SMTP)

- **This function gives improved security for scan to e-mail.**
  - Gives better security when scanning to web mail.
- **Uses SSL encryption.**

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- If this is enabled, internet fax to Ricoh GW models is not available because GW models do not comply with SSL reception at this time.

Print from USB/SD (Media Print)

Overview

- In previous models, the USB/SD card slot can only be used for scanning data to an SD card or USB device.
- However, in this new series, it is also possible to print from data stored on an SD card or USB device.
- In this model, the USB/SD card slot is standard. Also, Postscript 3 is standard, so there is no problem if the customer wants to print PDF files from the USB/SD card slot.

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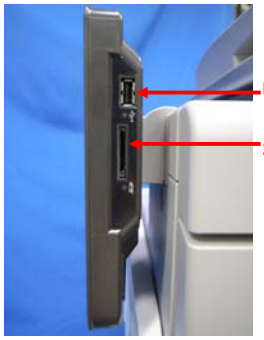
- The next few slides explain how to use this new feature.

- Media slots



- Operation Panel

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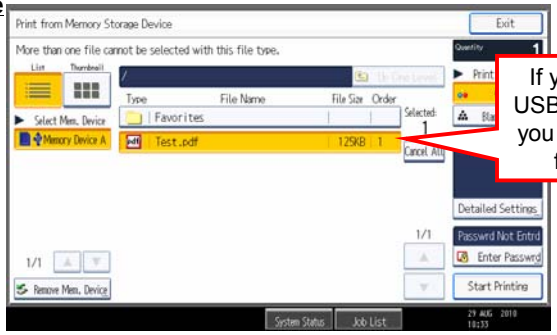
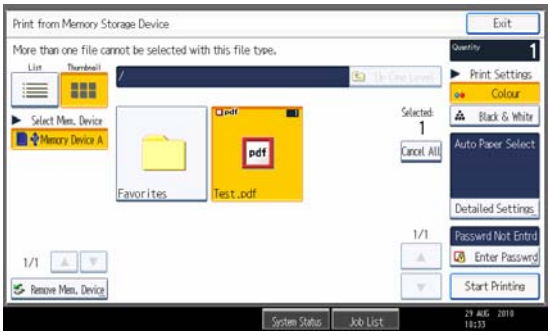
No additional notes

PDF file example

List View

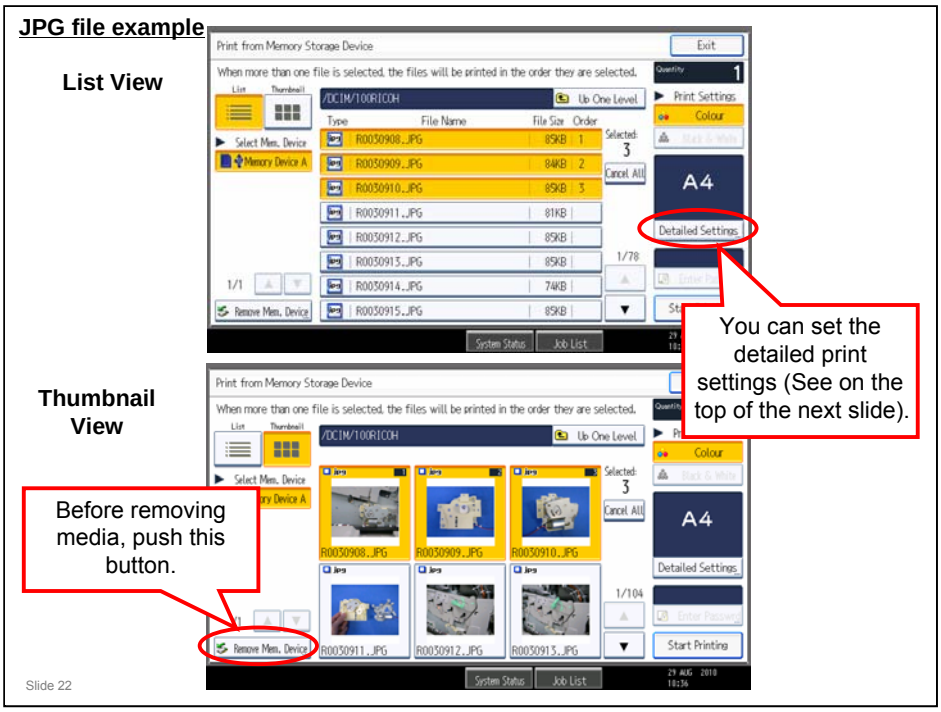


Thumbnail View

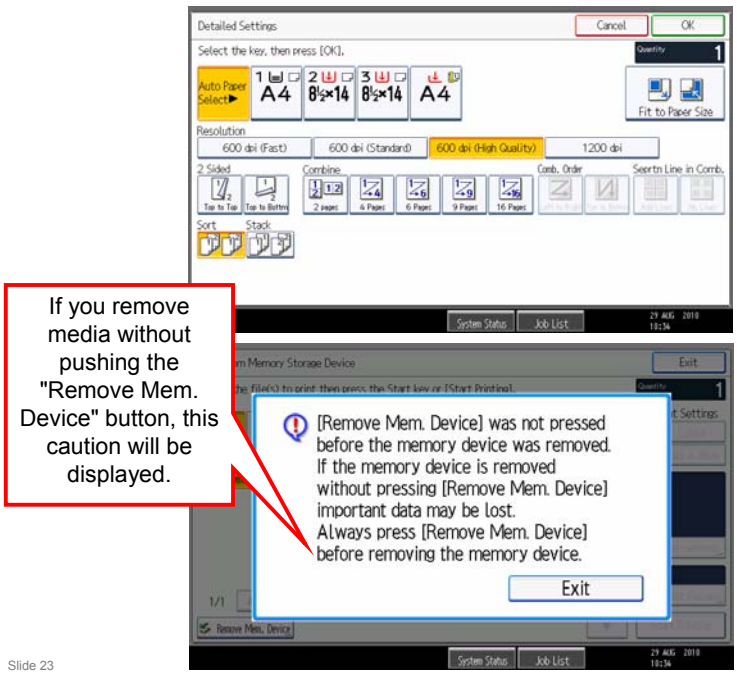


Slide 21

No additional notes



No additional notes



If you remove media without pushing the "Remove Mem. Device" button, this caution will be displayed.

Slide 23

No additional notes

SPs Related to Media Print

- **SP1-110-001 Media Print Function Setting**
  - 0: Disable
  - 1: Enable (default)
  - Note: For other models such as AP/AT-C2.5 or DI-C1.5, the default of this SP is 0 because media print is an option for these machines.
  - The SD card must be formatted with FAT16 or FAT32 (media formatted with NTFS is not supported)
- **Supported Media**
  - USB formatted to FAT16 or FAT32
  - SD card formatted to FAT16 or FAT32
  - Note: Media formatted to NTFS (other than FAT16 or FAT32) is not supported.
- **Supported File Formats**
  - PDF (including High compression PDF and Encrypted PDF)
  - JPEG
  - TIFF

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No additional notes

Printing on Letterhead Paper

- **Printer SP 1001-5, bit 7**
  - 0: The machine operates like previous models.
    - » To print on letterhead paper, two trays must be dedicated (one tray for single-sided prints with paper face up in the tray, and one tray for duplex printing with paper face down in the tray).
    - » This is the default setting.
  - 1: No need to set up two trays. With the correct user tool setting, the desired results can be obtained from one tray, with the letterhead paper set face down in the tray.
- **User tool setting: Printer Features > System > Letterhead Setting.**
  - Off: Simplex pages go through the simplex path and duplex pages go through the duplex path.
    - » This is basically the same as keeping the printer SP setting at 0.
  - Auto Detect: The paper path for simplex jobs with a paper type of "Letterhead", "Pre-printed" or "Pre-punched“ is changed to the duplex path.
  - On (Always): The paper path for all simplex jobs with all types of paper is changed to the duplex path.
- **Simplex pages will still be counted as simplex jobs by the internal counter even if this user tool setting is enabled.**

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No additional notes

High Compression PDF with JPEG 2000

- **Images are processed with MMR compression for text areas and JPEG 2000 compression for image areas.**
- **JPEG 2000:**
  - The image is less noisy
  - There is also less noise around text, making it better for OCR use

Ricoh

Another Maker

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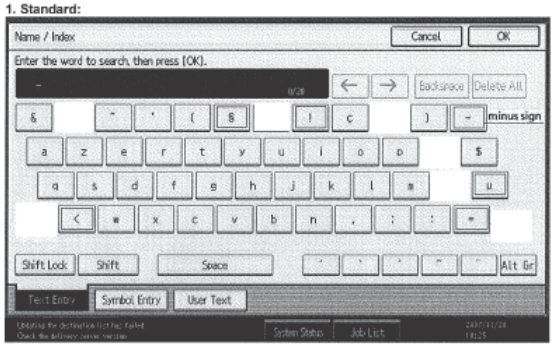
No additional notes

AZERTY Keyboard

1. Standard:



- **If the language is changed to French, the keyboard changes as shown above.**

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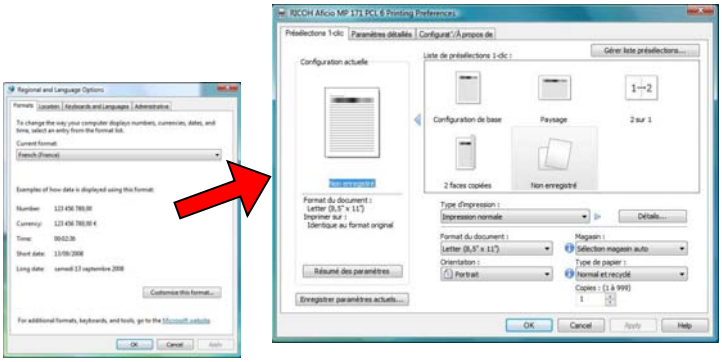
- It is possible to switch to a QWERTY keyboard.
- This feature is for Europe only. The North American model will use the QWERTY keyboard, which is widely used in Quebec.

Multilingual UI

- With this feature, each driver package supports 17 languages.
- This feature also applies to the language displayed in "Printer Driver Help".



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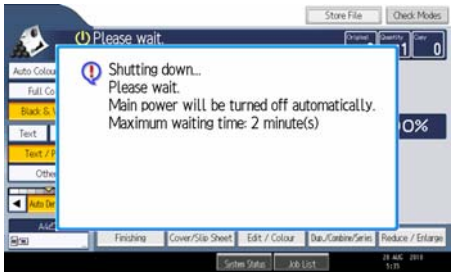
- Multilingual UI will be valuable in the following cases.
  - When an IT manager has to distribute multiple printer drivers with different languages: With Multilingual UI, it is only necessary to manage and distribute one driver.
  - When the language format on a client PC is different from the language installed on the server PC: The language corresponding to the client PC's format is displayed at "Point and Print" without regard to the language installed on the server PC.

- These features are not applicable to PCL5, PS and XPS printer drivers.

Safe Shutdown

- In this machine, a power relay board protects the HDD unit.
- After the main power switch of the machine has been turned off, the power relay board (SDB) keeps the power supply to the controller until the HDD unit has been shutdown safely.
- When shutting down from normal stand-by mode, and the safe shutdown takes more than 2 minutes, there is a problem with the controller board. It may be necessary to replace this board.



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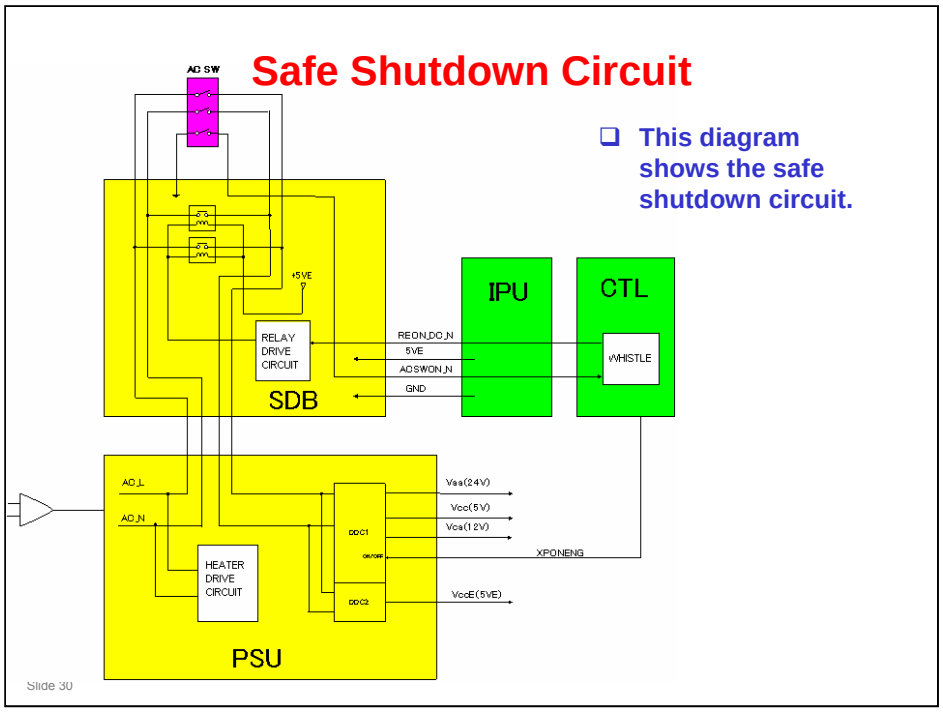
- This table shows how long it takes to shut down from various machine conditions.

Mode	Status	Details	Time to Shut Down
Stand-by	Stand-by	Stand-by Panel off Low power	Less than 15 s
Operation	Scanning Copying/Printing HDD deleting	-	Less than 25 s
	Firmware updating HDD encrypting	-	Less than 5 s
Error	SC issued	SC level A, D	Less than 25 s
		SC level B, C	Less than 15 s
	Application error	Application SD Removed	Less than 60 s
Starting up	Starting up	During 1 min. after application screen is displayed	Less than 85 s
Other cases	During MUSIC or process control		Less than 49 s
	While printing with one or more of these settings	- Tray 4 - Duplex - Thick Paper 2 - Side Tray (Option)	Less than 69 s
	Both of the above cases at the same time		Less than 84 s



- After the AC switch is turned on, the relay turns on at about the same time that the software starts up.
- When the AC switch is turned off, the controller detects the change in the state of the ACSWON_N signal.
- The controller shuts down the hard disk drive in a safe manner.
- Then the controller sends a signal (REON_DC_N) to turn off the relay.

This section explains the important specifications.

Specifications

- **CPM (Black/Color)**
  - Z-C1a: 30 cpm (A4), 32 cpm (LT)
  - Z-C1b: 40 cpm (A4), 42 cpm (LT)
  - ARDF 1 to 1: 30 cpm
- **First Copy Time (A4/LT SEF)**
  - B&W: Less than 10 seconds
  - FC: Less than 15 seconds
- **Warm-up Time (from main switch on)**
  - Z-C1a: 50 seconds
  - Z-C1b: 50 seconds
    - » EU model Z-C1b: 60 seconds
- **Max Power Consumption**
  - US: Less than 1.6 kW (Full system)
  - EU/Asia: Less than 1.65 kW (Full system)

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- Warm-up for EU is longer: In 220V areas, the power supply does not reach maximum so quickly as in 110V areas.
- Warm-up time of Z-C1b compared with Z-P1b:
  - Z-C1b EU: 60s warm-up, 40 CPM (the priority for MFP models is CPM)
  - Z-P1b EU: 50s warm-up, 40 CPM or less (the priority for printers is warm-up time)

Specifications

- **Max Paper Size**
  - By-pass, Optional paper trays : LG
    - » Custom Size : Width 216 mm (8.5 inches), Length 1260 mm (49.6 inches)
    - » Note: The default maximum length is 600mm (23.6 inches). 1260 mm can be used after adjusting SP5150-001
  - Cassettes in the main unit: A4/LT
    - » Custom Size: Width 216 mm, (8.5 inches), Length 297mm (11.6 inches)
- **Paper Feed Capacity (LT/A4, 80g/m2)**
  - Standard: 650 sheets (mainframe tray 550 sheets + by- pass tray 100 sheets)
  - Maximum: 2300 sheets (mainframe tray 550 sheets + optional tray 550 sheets + optional tray 550 sheets x 2 + bypass tray 100 sheets)
- **Paper Output Capacity (LT/A4 , 80g/m2)**
  - Standard models: 500 sheets standard, 650 sheets maximum (standard 500 sheets + 1-bin tray 100 sheets + side tray 50 sheets)
  - Finisher models: 250 sheets standard, 300 sheets maximum (standard 250 sheets + side tray 50 sheets)
- **Paper Weight**
  - Standard Tray: 52-220 g/m2, 14-58 lbs (Bond)
  - Bypass: 52-256 g/m2, 14-68 lbs (Bond)
  - Duplex Unit: 60-163 g/m2, 16-43 lbs (Bond)

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Max paper size is different from Z-P1

Z-P1

- Standard Tray, Optional Tray:
  - Minimum 90 x 148 mm, Maximum 216 x 355.5 mm
- Bypass Tray:
  - Minimum 70 x 127 mm, Maximum 216 x 1260 mm

Paper Weight: Same as Z-P1

Specifications – Print Resolution

	200x200 dpi	300x300 dpi	400x400 dpi	600x600 dpi			1200x1200 dpi
	1-bit	1-bit	1-bit	1-bit	2-bit	4-bit	1-bit
XPS	No	No	No	Yes (Default)	Yes	Yes	Yes
PCL5e PCL5c	No	Yes (B/W only)	No	Yes (Default)	Yes	Yes	No
PCLXL	No	No	No	Yes (Default)	Yes	Yes	Yes
Adobe PS	No	No	No	Yes (Default)	Yes	Yes	Yes
Adobe PDF	No	No	No	Yes (Default)	Yes	Yes	Yes
PictBridge	No	No	No	No	Yes (Default)	Yes	No
Print from SD/USB: TIFF	Yes	Yes	Yes	Yes (Default)	No	No	No
Print from SD/USB : JPEG	No	No	No	No	Yes (Default)	Yes	No

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- Note 1: XPS uses RPCS software. There is no RPCS driver.
- Note 2: Default for PCL5c, PCL6, RPCS, PS3, and MediaPrint TIFF is 600 x 600 dpi (1-bit)

- 1-bit: Output has two levels (white, black)
- 2-bit: Output has four levels (white, black, and two greys)
- 4-bit: Output has 16 levels (white, black, and 14 greys)

Specifications – Scanner Resolution

- **Scanner Resolution**
  - Main exposure glass: 600 x 600 dpi
  - DF: 300 x 600 dpi
- **Laser Engine Resolution**
  - 1200 x 1200 dpi, 600 x 600dpi

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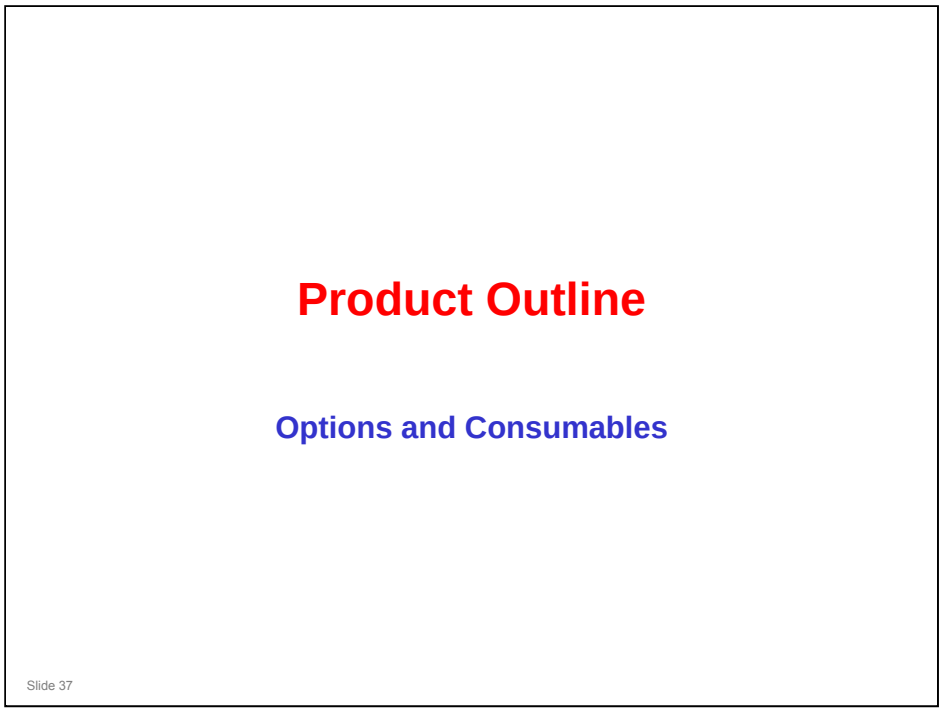
No additional notes

Reliability Targets

- **Average Copy Volume per month**
  - Z-C1a: 4.0k, Z-C1b: 6.5k
- **Maximum Copy Volume per month (5 years)**
  - Z-C1a: 15k, Z-C1b: 20k
- **Duty: 175k**
- **PM Cycle: 60k**
- **MCBC (Mean Copies Between Calls): 38k**
- **MCBF (Mean Copies Between Failure): 108k**
- **Life**
  - Z-C1a: 900k or 5 years, Z-C1b: 1200k or 5 years

Slide 36

No additional notes



No additional notes

Optional Units

- **Paper handling options**
  - Up to 3 x 550-sheet paper feed units (PB1000 [1-tray], PB1010 [2-tray]): New - The mechanism is similar to Ap-C2.
  - One-bin tray (BN1000; available for standard models only): New
  - Side Tray Type C400: New
- **Controller options**
  - Fax Option Type C400: New
  - Memory Unit Type B (32MB), for fax: Used in many other models
  - One of the following:
    - » IEEE802.11a/g Type J: Same as AP-C2.5, V-C3 etc
    - » Gigabit Ethernet Type B: Same as AP-C2.5, V-C3 etc
  - File Format Converter Type E: Same as AP-C2.5, V-C3 etc
  - Copy Data Security Unit Type F: Same as V-C3 etc
  - Optional Counter Interface Unit Type A: Same as AP-C2, V-C3 etc
  - Browser Unit Type E: Same as AP-C2, V-C3 etc

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- There is no IEEE1284 option.
- The paper handling options are all new.
- The fax option is new.
- Card Authentication Package (CAP) will be available as option after Z-C1 is released.

Optional Paper Trays

- **You can install up to three trays as follows**
  - One one-tray unit
  - One two-tray unit
  - One one-tray unit and one two-tray unit (the two-tray unit must be at the bottom)
- **The two-tray unit must always be at the bottom, because it has casters attached to it. Stabilizers must also be attached, as shown below.**

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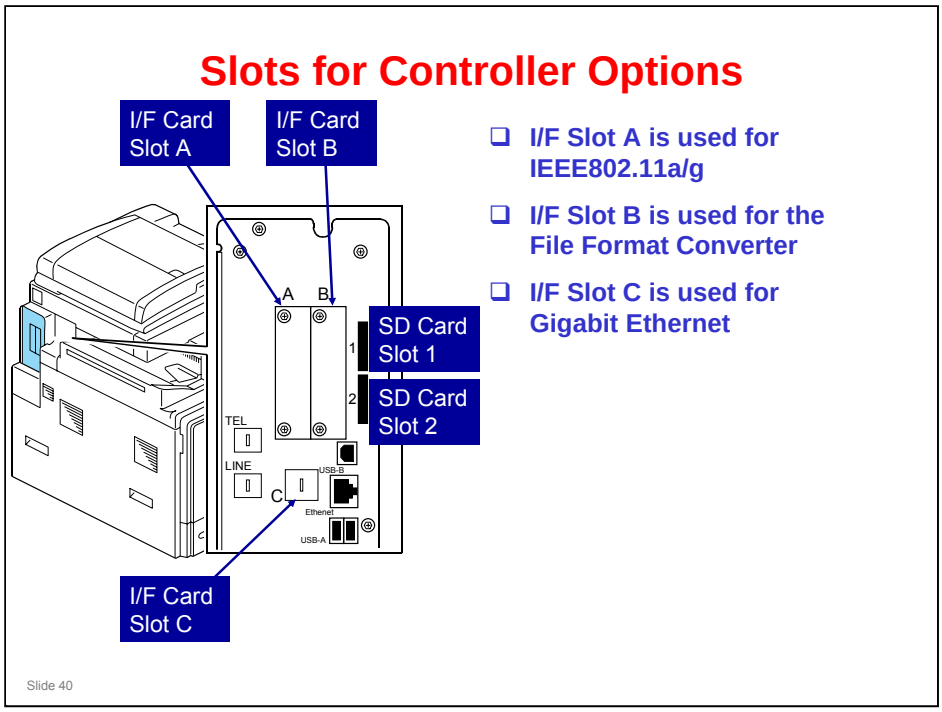
No additional notes



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

SD Card Slots – Slot 1

- **Slot 1 (upper slot)**
  - Contains the Security SD Card (Security and Encryption Unit) when shipped
    - » The Security SD Card contains the Data Overwrite Security unit and HDD Encryption Unit.

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No additional notes

SD Card Slots – Slot 2

- **Slot 2 (lower slot)**
  - Empty when shipped; contains the VM card after the machine's installation procedure.
    - » The VM card with App2Me is packed with the machine.
  - Use this slot for service procedures, such as firmware update and NVRAM backup.
  - Also use this slot to install the browser unit
  - When installing the Browser Unit, if the VM card with App2Me has already been installed, remove it, do the installation procedure for the browser unit (see the service manual), then put the VM card back in.
    - » During the installation procedure, the browser software is copied to the hard disk inside the machine.

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No additional notes

Removing the VM Card

- **To remove the VM card with an active application such as App2Me, just turn off the machine in the normal safe way (first operation switch, then main power switch), then pull the card out.**
- **The procedure used for previous models with App2Me (V-C3, AL-C1.5, R-C5.5) is still recommended, but not necessary.**

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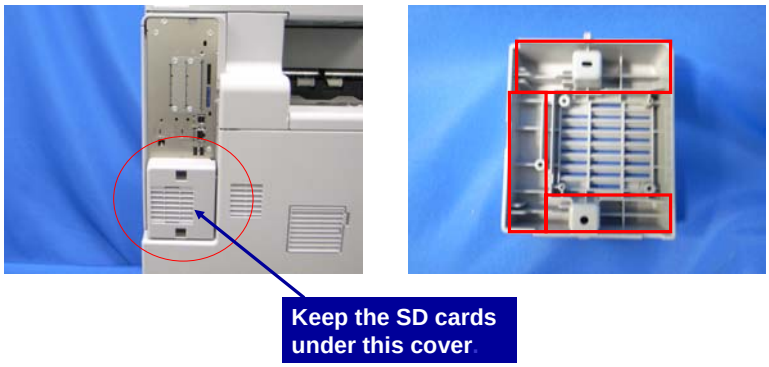
- Recommended procedure for halting VM card applications such as App2Me before you remove the VM card.
  - Normally, you need to remove the VM card at these times: To update the firmware, To back up the NVRAM, To install the browser unit, To update the App2Me application firmware, To execute application move or undo with SP5873
- To halt the VM card applications, do the following steps:
  - 1. Push the “User/Tools” key.

    If an administrator setting is registered for the machine, step 2 and 3 are required. Otherwise, skip to step 4.
  - 2.Push the “Login/Logout” key.
  - 3.Login with the administrator user name and password.
  - 4.Touch “Extended Feature Settings” twice on the LCD.
  - 5. Touch each application until the status changes to “Stop”.

    You must stop each application before you remove the VM card.
  - 6. Turn off the machine. And then remove the VM Card.
- After the firmware update, NVRAM backup, etc, then you have to enable App2Me and the other extended features again. To do this:
  - 1. Put the VM card in its slot. Then turn the main power on.
  - 2. Press the "User Tools“ key on the operation panel.

    If an administrator setting is registered for the machine, steps 3 and 4 are required. Otherwise, skip to step 5.
  - 3. Push the “Login/Logout” key.
  - 4. Login with the administrator user name and password.
  - 5. Touch the "Extended Feature Settings“ button twice.
  - 6. Touch each application that you use. The status will change to ‘On’.
  - 7. Touch the "Exit“ button. 9. Exit the "User Tools/Counter“ settings.

Keeping the SD Cards



- **SD card applications can be copied (merged) onto one card.**
  - Do not try to copy the VM card to another SD card.
- **After moving or copying a program, the original SD card must be kept, as proof of purchase.**

Slide 44

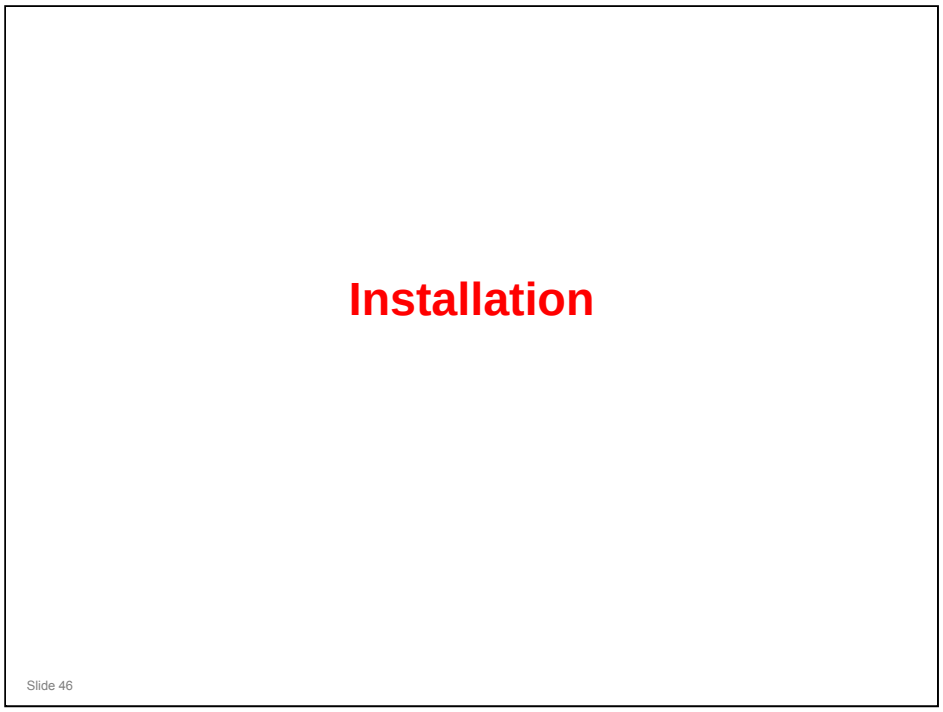
- Keep the cards under this cover, below the controller slots, in any if the areas marked with red squares.
- It looks like there is a fan under this cover, but actually there is no fan.

Consumables

- Toner: 10k (based on a 5% chart)
- Developer: Development unit is replaced at 60k PM (the new unit contains developer)

Slide 45

No additional notes



- The installation procedure is quite simple. Follow the instructions in the service manual.
- This presentation will only explain notable points or steps that need more explanation.

SMC Sheet

- The SMC sheet is under the platen cover in the ARDF.

Slide 47

No additional notes

PCDU Installation

- There are no tapes in the four development units.

Slide 48

No additional notes

Installation – Tray Heater

- **The purpose of this heater is to prevent the paper from getting damp, and preventing jams due to paper curl.**
- **Before installing, make sure that the power source rating of the tray heater is same as the machine.**
- **You can adjust the tray heater switch setting with SP5805-001 as shown below.**
  - 0: Default setting. The heater is on when the main switch is off or when the machine is in energy saver mode.
  - 1: The heater is always on.
  - This SP is used for the mainframe and optional paper tray units.

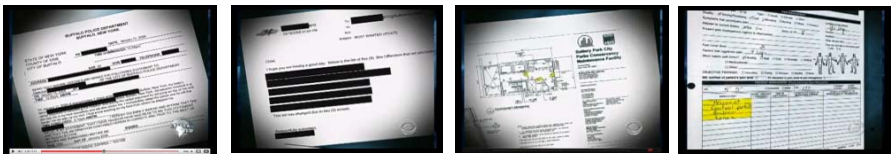
Slide 49

Field service manual, Installation, Tray Heater

Security & Encryption Unit Background

- **Until now, HDD encryption and data overwrite security have been options for MFPs.**
- **However, in response to the following, it was decided to make these options standard on MFPs.**
  - On 19th May, I sent an e-mail to you regarding the news report by CBS in US about the risk of information leakage from hard drive on MFP. After that, RCL have been studying what actions should we take for the news report. Now I would like to give you the Ricoh's direction of the actions as below for you to follow.

http://www.cbsnews.com/video/watch/?id=6412572n&tag=contentBody;featuredPost-PE



Slide 50

No additional notes

Security & Encryption Unit
Action

- **Objectives**
  - To let customers use Ricoh MFPs/Printers without security concerns caused by information leakage from the hard drives of their products. Through these actions, we hope to increase customer retention and product competitiveness, and avoid unnecessary legal challenges from customers.
- **Action Plan**
  - To standardize the Data Overwrite Security feature and the HDD Encryption feature on all future MFPs/Printers.

Slide 51

No additional notes

Security & Encryption Unit Installation

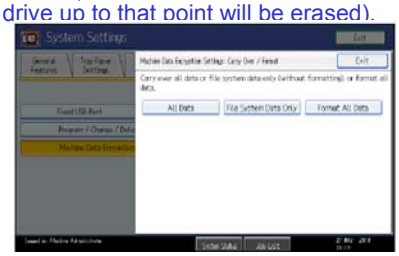
- **The machine contains the Security SD Card (Security and Encryption Unit) in Slot 1 (upper), when shipped.**
  - It is already installed. The technician does not need to do anything.
- **If the user wants to use HDD encryption, they must enable it with user tools.**
  - For details: See Operating Instructions > Security Reference > 5. Securing Information Sent over the Network or Stored on Hard Disk > Encrypting Data on the Hard Disk

Slide 52

No additional notes

Security & Encryption Unit Installation

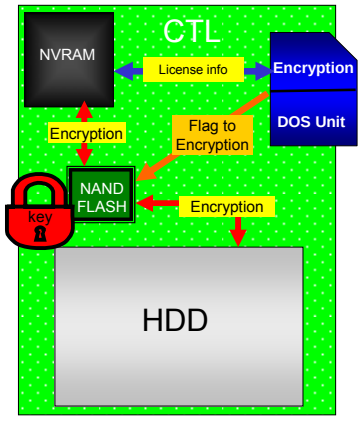
- **If you are installing a new machine, it is recommended to activate the Security Unit by selecting "Format All Data".**
- **Note:** This method is recommended because there is no user data on the hard drive yet (Address Book data, image data, etc.).
- **If the customer wishes to activate the Security Unit on a machine that is already running, it is recommended to activate the unit by selecting "All Data".**
- **IMPORTANT:** Selecting **"All Data"** will preserve the data that has already been saved to the hard drive. (If "Format All Data" is selected, all user data saved to the hard drive up to that point will be erased).



Slide 53

No additional notes

Security & Encryption Unit Mechanism



- SD card and NVRAM : License information linkage
- NAND FLASH on CTL: Encryption key is generated
- CTL and HDD: Encryption is created the dependence of both CTL and HDD
- CTL and NVRAM : Encryption is created the dependence of both CTL and NVRAM

- Encryption creates interdependence between CTL, HDD, NVRAM and SD card

Slide 54

No additional notes

Security & Encryption Unit Troubleshooting

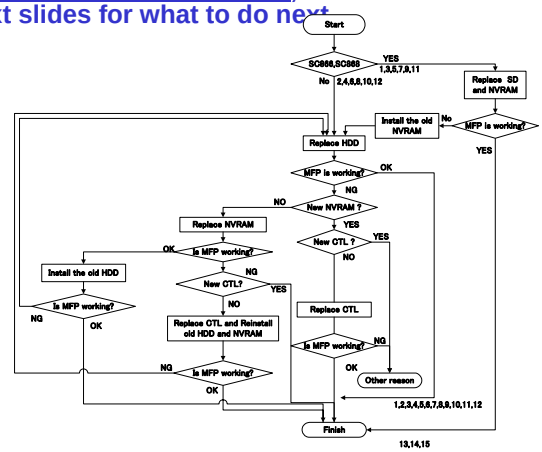
- **The following slides explain troubleshooting for the following symptoms:**
  - SC 861 to 865 (defective HDD)
  - Any SC that indicates a defective controller board
  - 'Please wait' remains on display
- **Replace the SD card and NVRAM if any of the following occurs:**
  - SC866 and SC868
  - 'This SD card is already installed' appears on the display

Slide 55

No additional notes

Security & Encryption Unit Troubleshooting

- To determine which parts are causing the problem, test the machine using this flow chart.
- After you have finished with this flow chart, put the original parts back in the machine, then see the tables on the next slides for what to do next.



Slide 56

No additional notes

Security & Encryption Unit Troubleshooting

- **This table shows what to do in each case.**
  - For example, if only the controller and HDD were found to be defective, then it is case 4.

- **Table 1: Encryption Off**

CTL	HDD	NVRAM	SD Card	Action	No
X	X	X	X	Replace CTL・HDD・SDCARD/NVRAM	1
X	X	X	(X)	Replace CTL・HDD・SDCARD/NVRAM	2
X	X	(X)	X	Replace CTL・HDD・SDCARD/NVRAM	3
X	X	O	O	Replace CTL・HDD	4
X	O	X	X	Replace CTL・SDCARD/NVRAM	5
X	O	X	(X)	Replace CTL・SDCARD/NVRAM	6
X	O	(X)	X	Replace CTL・SDCARD/NVRAM	7
X	O	O	O	Replace CTL	8
O	X	X	X	Replace HDD・SDCARD/NVRAM	9
O	X	X	(X)	Replace HDD・SDCARD/NVRAM	10
O	X	(X)	X	Replace HDD・SDCARD/NVRAM	11
O	X	O	O	Replace HDD	12
O	O	X	X	Replace SDCARD/NVRAM	13
O	O	X	(X)	Replace SDCARD/NVRAM	14
O	O	(X)	X	Replace SDCARD/NVRAM	15

Slide 57

O; Normal parts

X: Defective parts, must replace

(X): Not defective parts but must be replaced

- If the SD card is replaced, the NVRAM must be replaced.
- If the NVRAM is replaced, the SD card must be replaced.

Security & Encryption Unit Troubleshooting

- This table shows what to do in each case.
- Table 2: Encryption On

CTL	HDD	NVRAM	SD Card	Action	
X	X	X	X	Replace CTL・HDD・SDCARD/NVRAM	1
X	X	X	(X)	Replace CTL・HDD・SDCARD/NVRAM	2
X	X	(X)	X	Replace CTL・HDD・SDCARD/NVRAM	3
X	X	O	O	Replace CTL・HDD	4
X	O	X	X	Replace CTL・SDCARD/NVRAM, then the HDD is automatically formatted	5
X	O	X	(X)	Replace CTL・SDCARD/NVRAM, then the HDD is automatically formatted	6
X	O	(X)	X	Replace CTL, then restore the old encryption key, then replace SDCARD/NVRAM	7
X	O	O	O	Replace CTL, then restore the old encryption key	8
O	X	X	X	Replace the HDD, then restore the old encryption key, then replace SDCARD/NVRAM	9
O	X	X	(X)		10
O	X	(X)	X		11
O	X	O	O	Replace HDD, then restore the old encryption key	12
O	O	X	X	Restore the old encryption key, then replace SDCARD/NVRAM	13
O	O	X	(X)	Restore the old encryption key, then replace SDCARD/NVRAM	14
O	O	(X)	X	Restore the old encryption key, then replace SDCARD/NVRAM	15

Slide 58

Note: This table has been modified (rows 9 to 15) since the initial service manual and TTP release. An RTB will be issued.

O: Normal parts, X: Defective parts, must replace

(X): Not defective parts but must be replaced

- If the SD card is replaced, the NVRAM must be replaced.
- If the NVRAM is replaced, the SD card must be replaced.

Cases 1 to 4:

- The HDD is replaced so the old data is gone. The SD card is new, so a new encryption key is made. After you replace the parts, the user must enable encryption. The controller then makes a new encryption key. Then the machine prints the new encryption key.

Cases 5 and 6:

- The NVRAM is defective, so the encryption key cannot be restored, so the data on the HDD cannot be recovered. The HDD is formatted automatically.
- After you replace the parts, the user must enable encryption. The controller then makes a new encryption key. Then the machine prints the new encryption key.

Cases 7 and 8:

- The HDD is not defective but the data is encrypted, and there is no link between the HDD and the new controller, so the old encryption key must be restored to decrypt the data before the new encryption key is made. The NVRAM is normal, so the old encryption key can be restored (in cases 5 and 6, the NVRAM is defective so the old encryption key cannot be restored).
- After you restore the old encryption key (and replace the SD card and NVRAM in case 7), turn the machine power on. The user must then enable encryption. The controller then makes a new encryption key and encrypts the data on the HDD. Then the machine prints the new encryption key.

Cases 9 to 15

- The controller is not replaced, but there is no link between the old controller and the new parts, so the old encryption key must be restored, in the same way as for cases 7 and 8, before the user enables encryption and a new key is made.

Security & Encryption Unit
Troubleshooting

- **Restoring the encryption key**
  1. Prepare an SD card which is initialized.
  2. Make the "restore_key"folder in the SD card.
  3. Make an "nvram_key.txt"file in the "restore_key“ folder in the SD card.
  4. Ask an administrator to input the encryption key (this has been printed out earlier by the user into the "nvram_key.txt"file.
  5. Turn on the main power switch.
  6. Confirm that the prompt on the LCD tells you to install the SD card (storing the encryption key) in the machine.
  7. Turn off the main power switch.
  8. Insert the SD card that contains the encryption key into slot 2.
  9. Turn on the main power switch, and the machine automatically restores the encryption key in the flash memory on the controller board.
  10. Turn off the main power switch after the machine has returned to normal status.
  11. Remove the SD card from slot 2.

Slide 59

The previous slide says that we have to restore the old encryption key sometimes. This slide shows the procedure.

This procedure was in the AP-C2 service manual but was omitted from the AP/AT-C2.5 and Z-C1 manuals.

Security & Encryption Unit
Troubleshooting

- If the SD card and NVRAM are replaced, the HDD encryption unit and the Data Overwrite Security unit must both be re-installed after you complete the actions in the above tables. See the procedures in the service manual.

Slide 60

Installation, Copier Installation, Security and Encryption Card

Security & Encryption Unit Important

- **Immediately after encryption is enabled, the encryption setting process will take several minutes to complete before you can begin using the machine.**
  - If encryption is enabled after data has been stored on the disk, or of the encryption key is changed, this process can take up to three and a half hours.

Slide 61

No additional notes

Security & Encryption Unit Important

- The machine cannot be operated while data is being encrypted.
- Once the encryption process begins, it cannot be stopped.
- Make sure that the machine's main power is not turned off while the encryption process is in progress.
- If the machine's main power is turned off while the encryption process is in progress, the hard disk will be damaged and all data on it will be unusable.
  - The hard disk must be replaced. This is similar to case 5 in the troubleshooting tables.
- Keep the Encryption Key in a safe place.
- If the machine loses the Encryption Key due to damaged components, the controller board, hard disk, NVRAM and this SD Card must all be replaced at the same time.

Slide 62

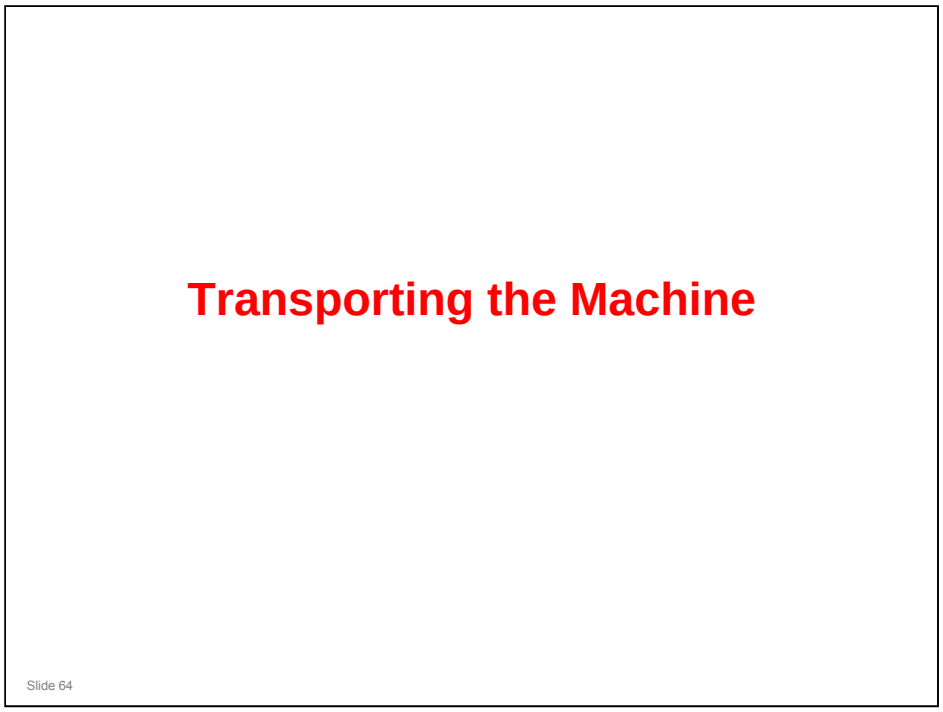
No additional notes

Security & Encryption Unit Merging

- **Slot 1 (upper) contains the Security SD Card (Security and Encryption Unit) when shipped**
  - If you want to install one or more SDK applications, move them onto one SD card.
    - » Remove the security card from slot 1, and put the VM card in slot 1.
    - » Put the SD card with the SDK application into slot 2.
    - » Merge from slot 2 to slot 1. The VM card now has the SDK application on it.
    - » Then put the VM/SDK card in slot 2, and put the security card back in slot 1.

Slide 63

No additional notes



No additional notes

Moving the Machine a Long Distance

- Do SP 4806-001 to move the scanner carriage from the home position.
- Make sure there is no paper left in the paper trays. Then fix down the bottom plates with a sheet of paper and tape.
- Attach shipping tape to the covers and doors, or shrink-wrap the machine tightly.

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Z-C1 field service manual, Installation, Copier Installation, Transporting the Machine

After Moving the Machine a Long Distance

- **Do the "Auto Color Registration" as follows. This optimizes color registration.**
  - First, do "Forced Line Position Adj. Mode c" (SP2-111-3).
  - Then, do "Forced Line Position Adj. Mode a" (SP2-111-1).
- **To check if SP 2-111-1 was successful, watch the screen during the process. A message is displayed at the end.**
  - Also, you can check the result with SP 2-194-10 to -12.
- **Make sure that the side fences in the trays are correctly positioned, to prevent color registration errors.**

Slide 66

❒ SP 2111-1 and –3 are used at other occasions, after replacing certain parts. We will see this again.

Field service manual, Troubleshooting, Process Control Error Conditions

Field service manual, Troubleshooting, Troubleshooting Guide

❒ For SP 2194, see these sections of the field service manual.

❒ Updating firmware is basically the same as for other recent models. This section explains differences.

Operation Panel Firmware

- **In this model, it is possible to update operation panel firmware at the same time as the other firmware.**

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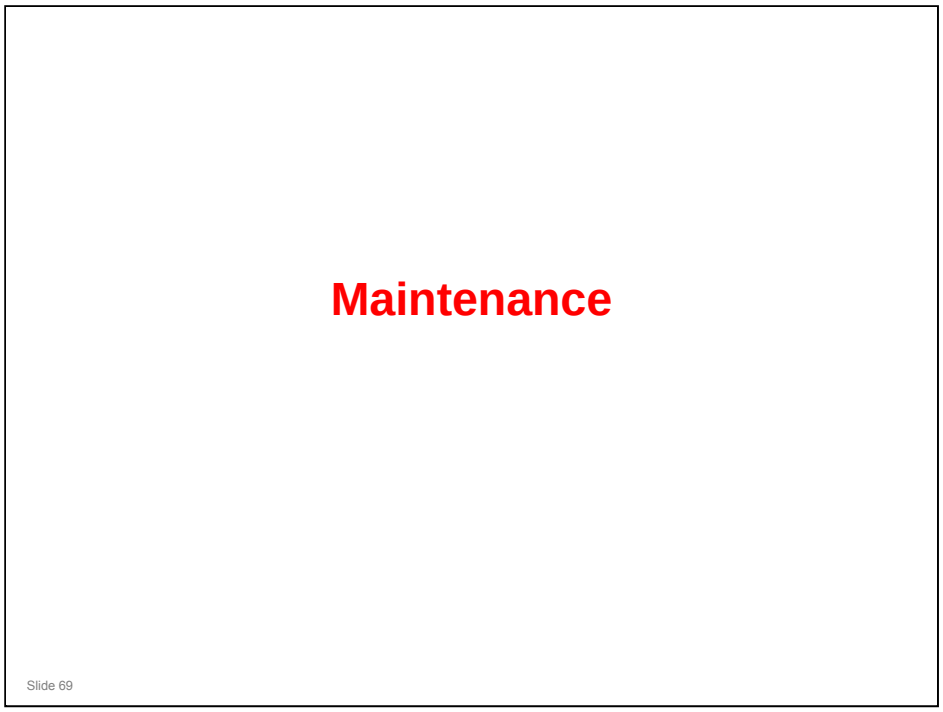
- In older models, this is not possible.



No additional notes

PM Parts

- **PCDU**
  - Black PCU: 60k
  - Black Development Unit: 60k
- **Transfer**
  - Image Transfer Belt Cleaning Unit: 180k
  - Paper Transfer Roller Unit: 180k
- **Fusing**
  - Fusing Belt: 120k
  - Fusing Roller: 120k
  - Pressure Roller: 120k
  - Oil Supply Roller: 120k
  - Cleaning Roller: 120k
  - Tension Roller: 120k
  - Bushing - Tension Roller: 120k
  - Plain Shaft Bearing: Oil Supply Roller: Front and rear: 120k
- **Others**
  - Waste Toner Bottle: 60k
    - » Can be replaced either by a technician or by the user
  - Dust Filter: 120k

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Color PCU and Development Unit

- These are yield parts, not PM parts. (See the next slide)

Waste Toner Bottle

- The yield figures in the above table are based on the following conditions:
- A4 (LT) long-edge feed
- 5% image coverage ratio
- Color ratio: 25%
- 2 print/job

Yield Parts

- **PCDU**
  - Color PCU: 60k
  - Color Development Unit: 60k
- **Transfer**
  - Image Transfer Belt Unit: 240k
- **Fusing**
  - Bearing – Fusing Roller: 240k
  - Bearing – Pressure Roller: 240k
- **ARDF**
  - Friction Pad: 60k originals
  - Pickup Roller: 60k originals
  - Feed Roller: 60k originals

Slide 71

- Color PCU and Development Unit
  - The color development units and color developer are treated as yield parts, because the target yield of these units depends on the target color ratio.
  - The theoretical yield of these units is 60k. So, for a Color ratio of 25%, the target yield is 240k.
  - With an target ACV of 4k (Z-C1a), this means that the unit will not be replaced during the machine's life.
  - So, these parts are 'yield parts'.
- The ITB is a yield part, because its expected yield is relatively long.
- The bearings are yield parts, for the same reason as the ITB.
- The Friction Pad, Pickup Roller, and Feed Roller are treated as yield parts, because the yield of these parts depends on the target 2 C/O (copies/original) ratio and usage ratio.
  - 60k originals will be reached at about the same time as 400k copies, based on 2 copies/original and an ADF usage ratio of 30%:

    60k originals at 2 C/O represents 120k copies

    If the ADF use ratio is 30%, then the total number of copies made will be 120k/0.3 = 400k

New Unit Detection

- **For the following units, there is a new unit detection mechanism. It is not necessary to reset PM counters.**
  - PCDU
  - Image transfer belt unit
  - Fusing unit (when replaced as a complete unit)
  - Waste toner bottle (if full or near-full)
- **For the following units, these SP modes can be used to reset the PM counters.**
  - PCU: SP3-902-009 to 012
  - Development Unit: SP3-902-001 to 004
  - Image Transfer Belt Unit: SP3-902-013
  - Image Transfer Belt Cleaning Unit: SP3-902-017
  - Paper Transfer Roller: SP3-902-018
  - Fusing Unit: SP3-902-014
  - Fusing Roller: SP3-902-015
  - Fusing belt: SP3-902-016
  - Waste toner bottle: SP3-902-020

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No additional notes

PM Counter Reset

- **If you change the following parts, you must set the following SPs to 1 before you turn the machine power off.**
  - PCU: 3902-009 (K), -010 (Y), -011 (C), -012 (M)
  - Development unit: 3902-001 (K), -002 (Y), -003 (C), -004 (M)
  - Image Transfer Belt Unit: 3902-013
  - Image Transfer Belt Cleaning Unit: 3902-017
  - Paper Transfer Unit: 3902-018
  - Fusing Unit: 3902-014
  - Fusing Roller: 3902-015
  - Fusing Belt: 3902-016
  - Waste Toner Bottle (if not full or near-full): 3902-020
- **Then, after you replace the parts, the PM counters will be reset automatically when you turn the main power switch on again.**
- **Check that the PM counters were reset correctly (SP 7-803).**
  - If a PM counter was not reset, you can reset it manually (SP 7-804).

Slide 73

- If you install a new drum unit only, the machine does not detect it automatically.
  - Then, you must reset the PM counter for the drum unit.
  - To do this, set SP 3902 009 (K), 010 (C), 011 (M), or 012 (Y) to 1 before you start to work on the machine.
- If you install a new development unit only, the machine detects it automatically and resets the PM counter. But, the ID chip in the new development unit will also reset the PM counter for the drum if you do not do the following:
  - Set SP 3902 001 (K), 002 (C), 003 (M), or 004 (Y) to 1 before you start to work on the machine.
- If you install a new PCDU, the machine detects it automatically. Do not change SP 3902.

Field service manual, Maintenance, PM Parts Settings

- Study the 'Before removing the old PM parts' and 'After installing the new PM parts' procedures in this section of the manual.

After PM

- **Do the ACC procedure.**
  - User Tools > Maintenance > ACC > Start
- **Do the forced line position adjustment**
  - First do SP2-111-3 (Mode c).
  - Then do SP2-111-1 (Mode a).
  - To check if SP 2-111-1 was successful, watch the screen during the process. A message is displayed at the end.
    - » Also, you can check the result with SP 2-194-10 to -12.

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Field service manual, Maintenance, PM Parts Settings

- ❒ Study the 'Preparation before operation check' procedure in this section of the manual.

Other Notes About PM Counters

- **When only the development unit is replaced, the PCDU counter is not reset, and only the development unit counter is reset.**
- **The fusing unit bearings and bushings are PM parts, but there are no counters.**
  - Please replace the bearings/bushings at the same time as the roller.
    - » "Tension Roller" and "Tension Roller Bushing ": Replace at the same time
    - » "Oil supply roller" and "Plain Shaft Bearing of Oil Supply Roller (Front and rear)": Replace at the same time
- **There is no counter for developer.**
  - The new development unit contains developer.

Slide 75

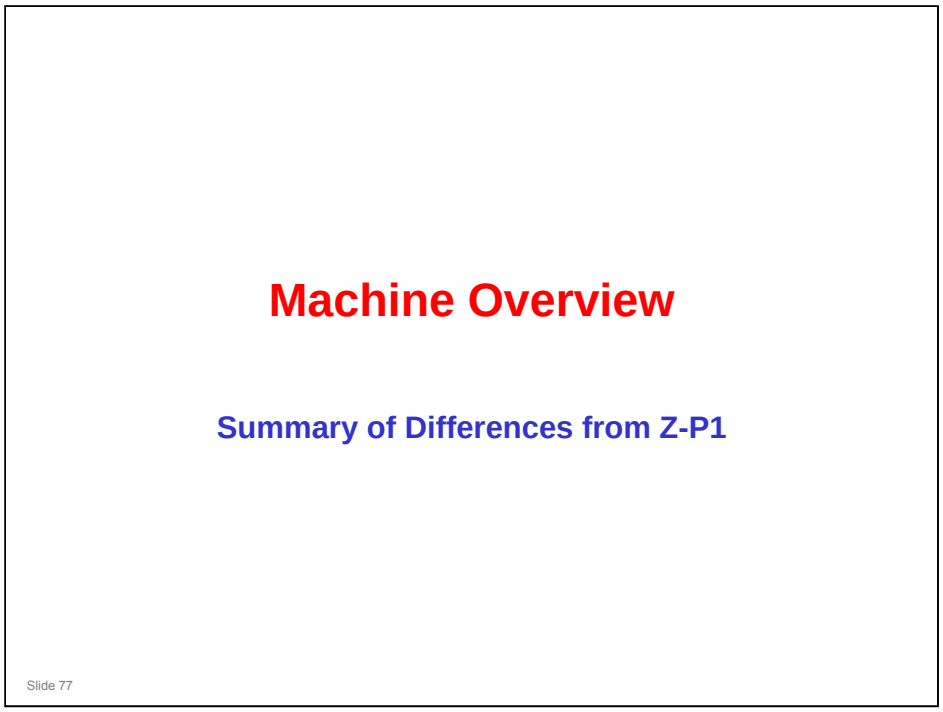
No additional notes

Cleaning

- **Exposure glass:**
  - Use a cloth moistened with water or alcohol.
  - Do not use a dry cloth.
  - If you use alcohol, make sure not to get the alcohol on plastic areas such as the scales.
- **ID sensor:**
  - Use a cloth moistened with water.
  - Do not use a dry cloth.
  - Do not use alcohol.

Slide 76

No additional notes



No additional notes

Differences Between Z-C1 and Z-P1

Differences	➢ Scanner, Paper path, Duplex, Bypass tray, Paper Tray, Operation Panel, CTL, BCU, IPU, HDD, Memory, Toner supply, Toner Bottle ➢ ARDF, Finisher, Paper Feed Bank, 1-Bin Tray, Side Tray ➢ Fax, Controller option, Controller function as standard (Z-C1: Security & Encryption Unit / PS3/PDF direct Option/ Pict bridge, Z-P1b: ELP-NX) ➢ Media Print, Copy procedure, Safe shutdown ➢ Waste toner bottle
Same	➢ PCDU, ITB Unit, Fusing Unit, Laser Unit, Process Control ➢ 09AGW controller ➢ Bypass-tray misfeed prevention

Slide 78

- The print/copy speed for full color is the same as for black-and-white.
- The print/copy speeds for other paper weights are as follows:
  - Thick 1, 2, 3 - 17.5cpm (increased from 16 cpm)
  - Thick 4 is a new paper type (up to 300 gsm) : 17.5 cpm (trays), 15 cpm (bypass)
  - OHP/Glossy - 17.5 cpm (increased from 16 cpm)
- Printing Paper Weight: Duplex and LCT are not changed from the previous model
- Scanning Throughput (ARDF mode) for Scan to E-mail / Folder
  - BW/FC: 51 ipm (A4LEF / BW Text / Line Art / 200dpi /Compression: On (MH)) – previous model was 50 ipm
- TEC: Total Energy Consumption

Difference Between Z-C1 & Z-P1 in Basic Specs

	Z-C1	Z-P1
Print/Copy Speed	30 cpm (C1a) 40 cpm (C1b)	35 ppm (P1a) 40 ppm (P1b)
Warm-up Time	50 s (NA, EU C1a) 60 s (EU C1b 60s)	50 s

Slide 79

No additional notes

Machine Overview

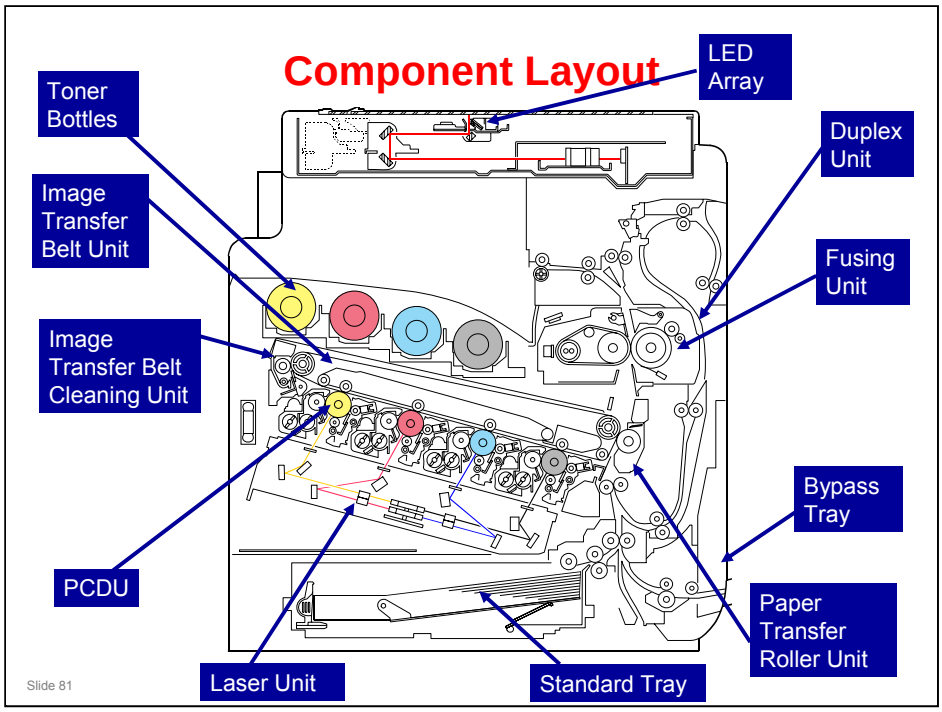
Components

Slide 80

PURPOSE OF THE SECTION

In this section you will :

- ❒ Learn the locations of primary components
- ❒ Learn about the paper feed path



- PCDU: Photoconductor and Development Unit
  - One for each colour.

Dimensions of Major Components

- Abnormal image at 35-mm intervals: Charge roller
- Abnormal image at 795-mm intervals: Image transfer belt unit
- Colored spots at 41-mm intervals: Image transfer roller
- Colored spots at 82-mm intervals: Image transfer belt drive roller or Image transfer belt idling roller
- Colored spots at 33-mm intervals: Development roller
- Abnormal image at 83-mm intervals: Paper transfer roller
- Colored spots at 94-mm intervals: OPC drum
- Spots at 141-mm intervals: Pressure roller
- Spots at 126-mm intervals: Fusing roller
- Spots at 204-mm intervals: Fusing belt

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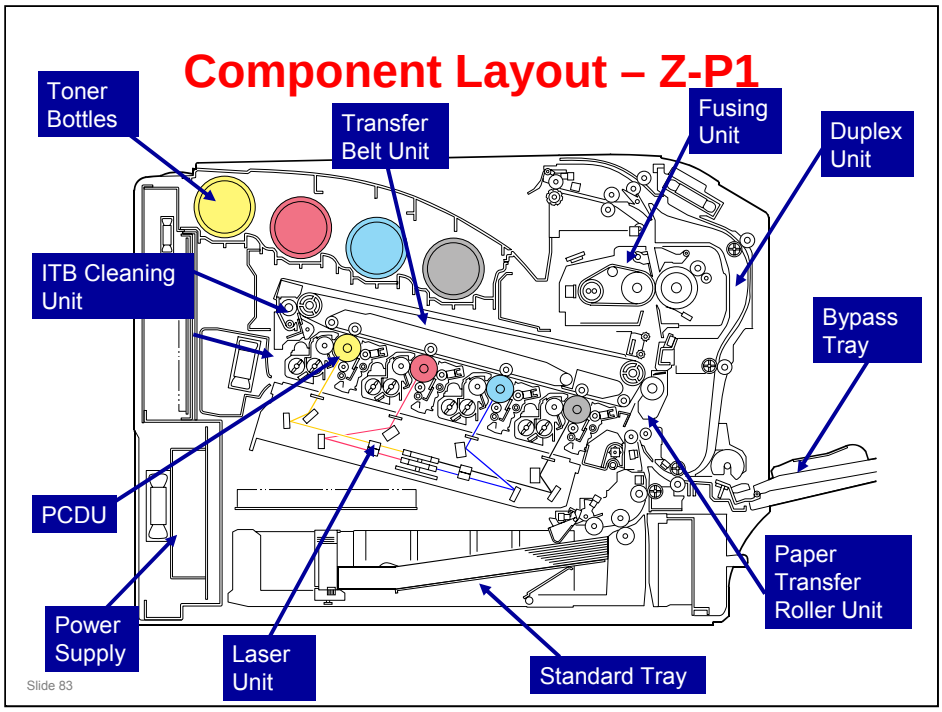
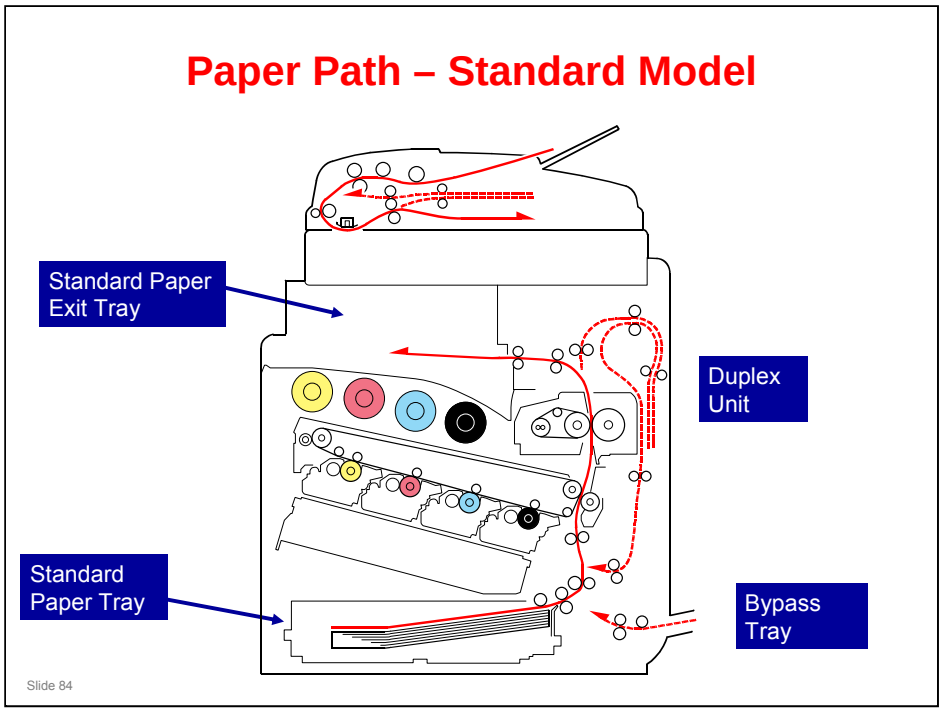
- This list may be useful during troubleshooting.
- These values are the same as the Z-P1.

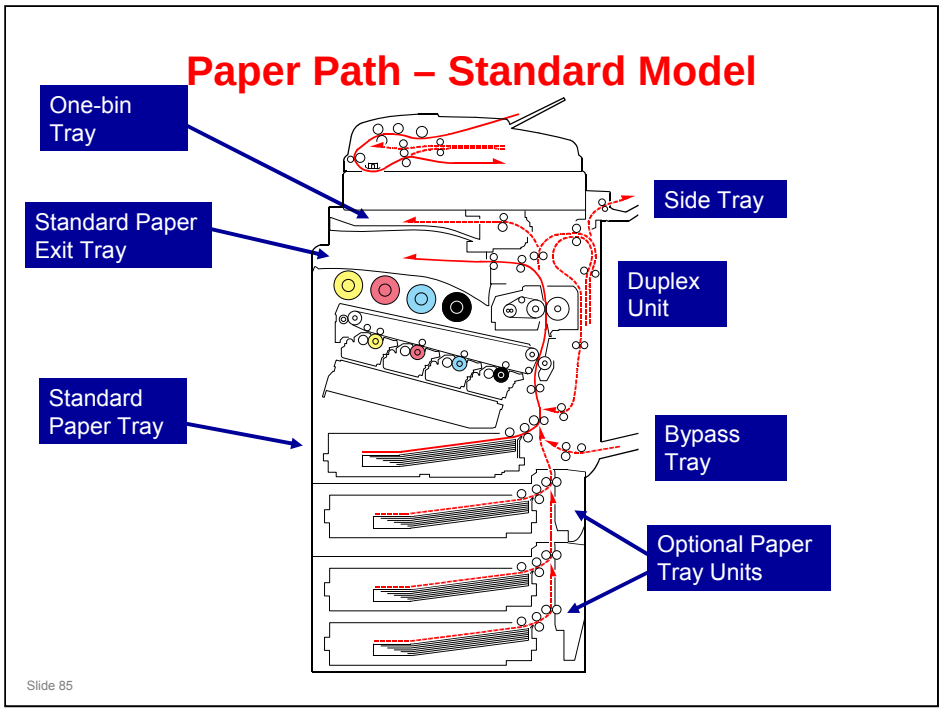
Field Service Manual, Appendix, Troubleshooting Guide, Repeated Spots or Lines on Prints



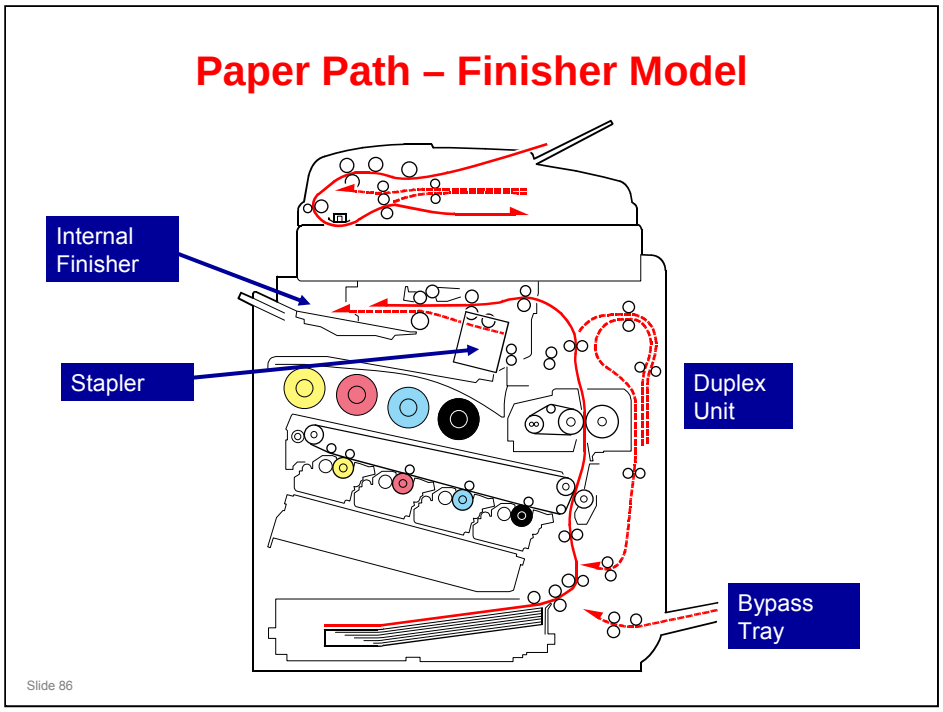
- PCDU: Photoconductor and Development Unit
  - One for each colour.



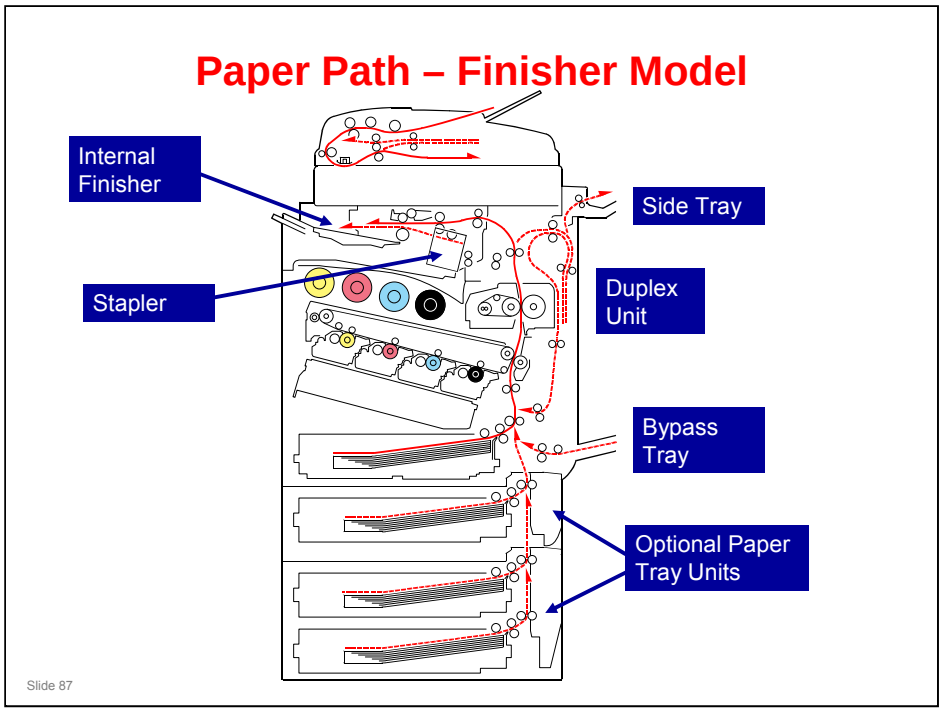
❒ This shows the paper path for the standard model with no options installed.



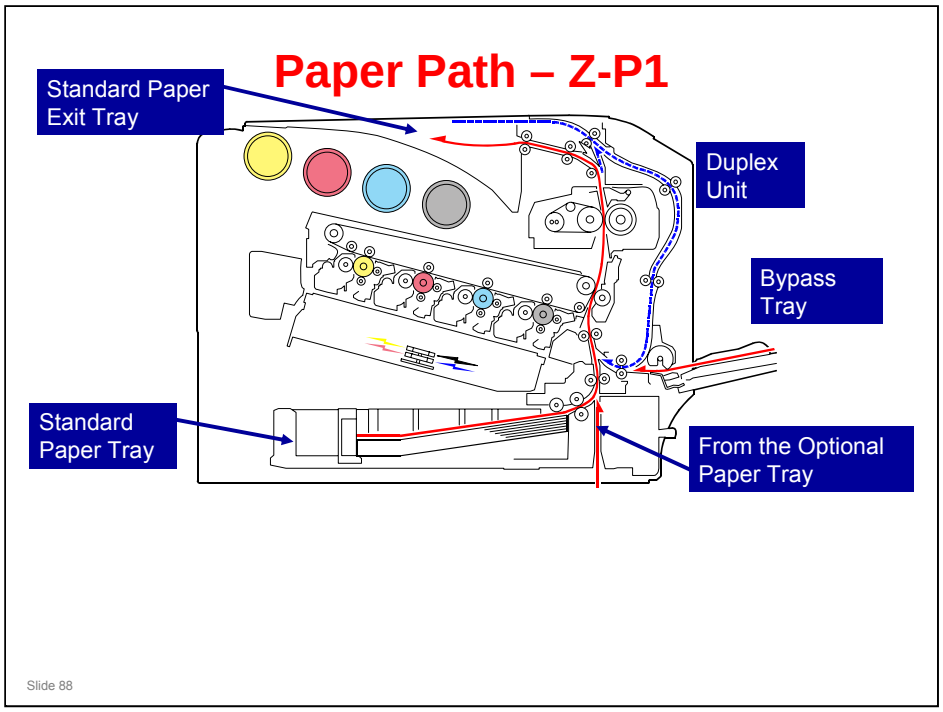
❒ This shows the paper path for the standard model with all options installed.



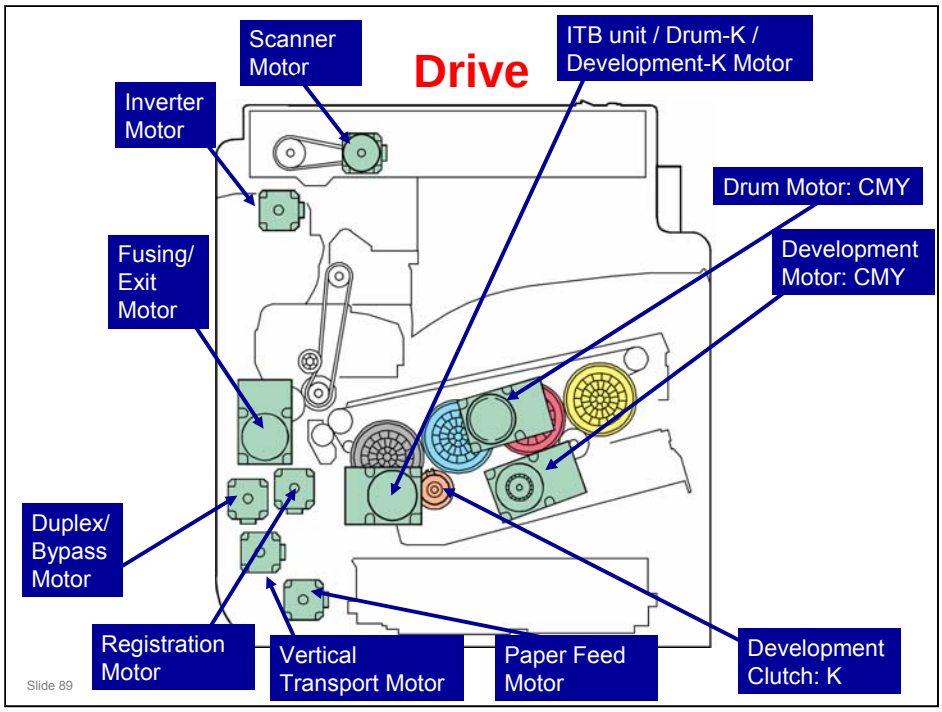
- This shows the paper path for the finisher model with no options installed.
- The stapler is included with the internal finisher.



❒ This shows the paper path for the finisher model with all options installed.



No additional notes



ITB unit / Drum-K / Development-K Motor

- This controls the black OPC, development unit for black, and ITB unit.

Drum Motor: CMY

- This controls the OPCs for cyan, magenta, and yellow.

Development Motor: CMY

- This controls the color development units (cyan/magenta/yellow).

Development Clutch: K

- This controls the drive power to the development unit-K.

Paper Feed Motor

- This controls the paper feed mechanisms (tray 1).

Vertical Transport Motor

- This controls the vertical transport roller.

Registration Motor

- This controls the registration rollers.

Duplex/By-pass Motor

- This controls the duplex entrance, relay, exit, and by-pass feed rollers.

Fusing/Paper Exit Motor

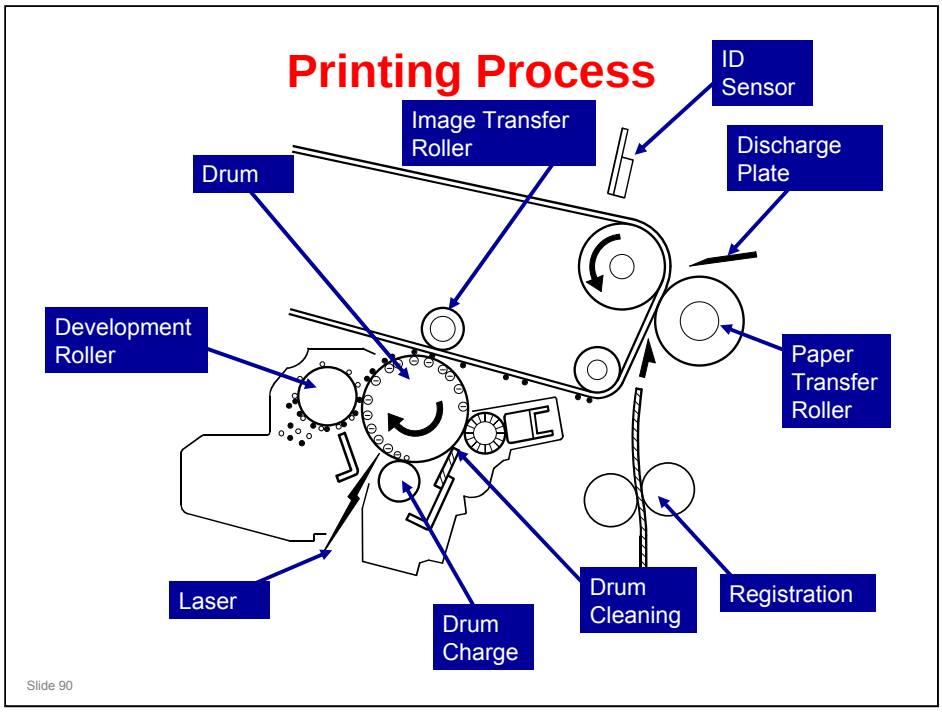
- This controls the fusing unit and paper exit rollers.

Inverter Motor

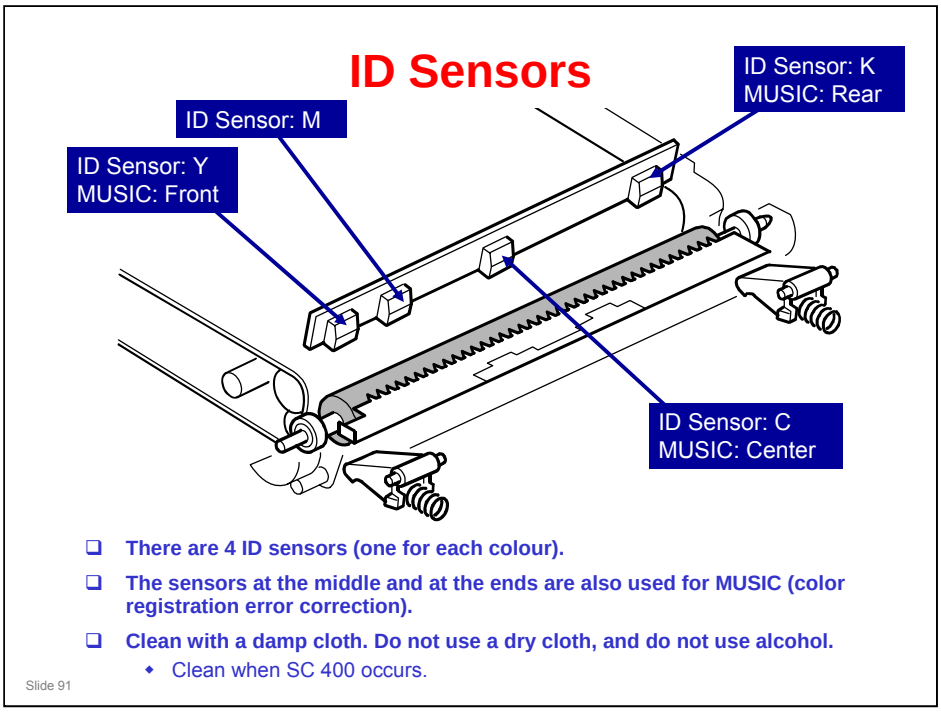
- This controls the inverter roller that feeds the output into the duplex feed path.

Differences from Z-P1

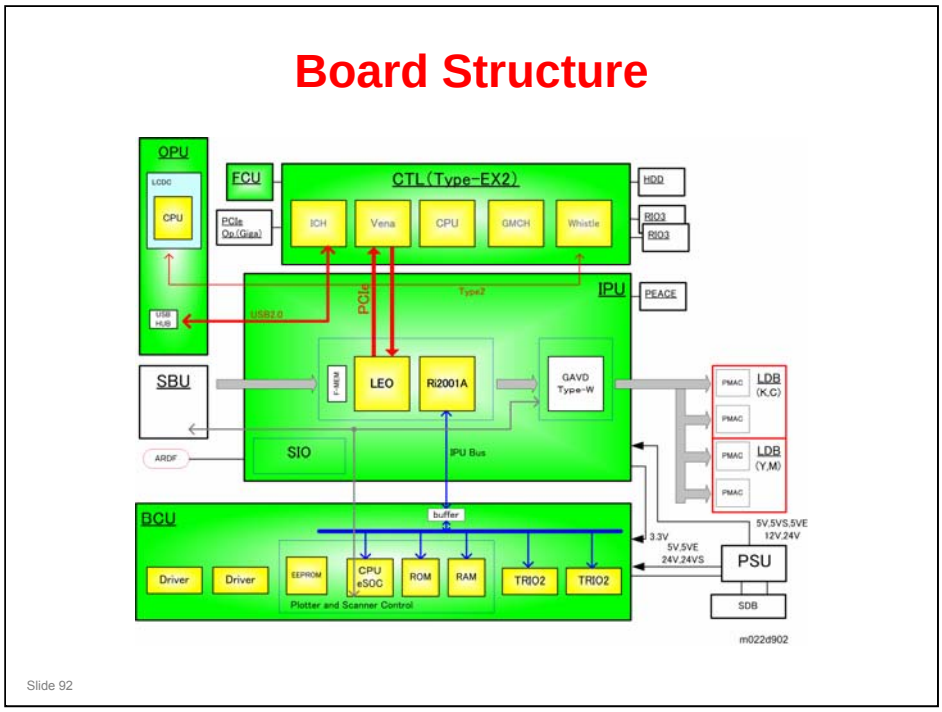
- In the Z-P1, the following 4 motors are all in the same unit.
  - Paper Feed Motor
  - Vertical Transport Motor
  - Registration Motor
  - Duplex/By-pass Motor
- In the Z-C1, the duplex/bypass motor has been separated from the other 3 motors.



- This machine uses four PCDUs, and four laser beams. Each PCDU contains a drum, charge roller, cleaning brush, and blade.
- The toner image on each drum is moved to the transfer belt. The four colors are put on the belt. All four toners are put on the belt at the same time. Then the completed four-color image is moved to the paper.
- Drum charge: The charge roller gives the drum a negative charge
- Laser exposure: To make a latent image on the drum, the machine turns the laser beam on and off.
- Development: The development roller moves negatively-charged toner to the latent image on the drum surface. There are four development units (one for each color).
- Image transfer: The charge that is applied to the image transfer roller pulls the toner from the drums to the transfer belt.
- Paper Transfer and Separation: Toner transfers from the transfer belt to the paper when the paper is fed between the transfer belt and image transfer roller. At this time, the paper also separates from the transfer belt, because of a discharge plate immediately after the transfer roller.
- Cleaning for OPC drum: The cleaning brush and blade remove remaining toner on the drum surface after image transfer to the paper.
- Paper registration: The registration roller controls the paper feed timing to make sure that the image transfers to the correct location on the paper. It also removes skew.
- ID sensors: The ID sensor board contains four ID sensors (one for each color; see the next slide). The ID sensor detects the density of the ID sensor pattern on the transfer belt. The ID sensor output is used for process control and for automatic line-position adjustment, skew, and color registration adjustments for the latent image.



❒ During MUSIC, only three of the sensors are used.



BCU (Base Engine Control Unit):

- The BCU controls all the mechanical components and the following functions:
  - Engine sequence
  - Engine operation

Controller:

- The controller handles the following functions:
  - Operation panel interface
  - Network interface

IPU (Image Processing Unit):

- This board contains large-scale integrated circuits for processing digital signals.

LDB (Laser Diode Board):

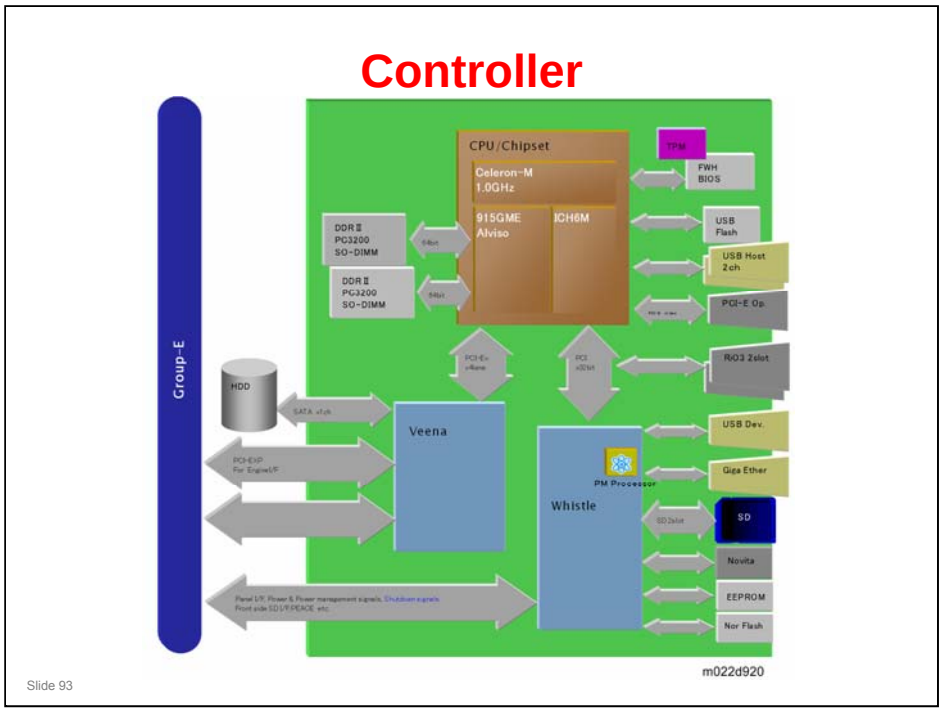
- This is the laser diode drive circuit board.

OPU (Operation Panel Unit)

- This controls the display panel, the LED and the keypad.

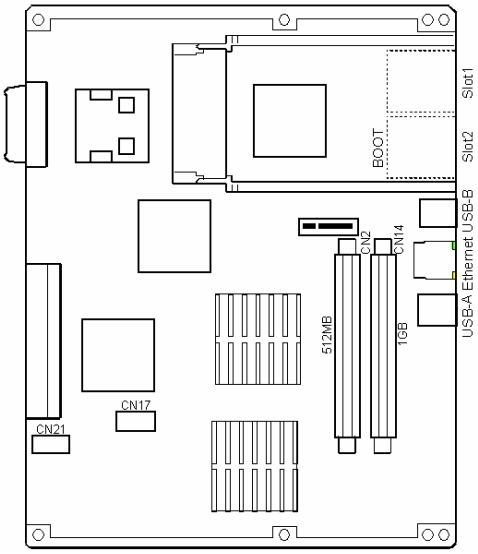
SDB (Shut Down Board)

- Contains the circuits for safe shutdown.



- The controller uses GW architecture (09A version).
- ASIC: GW architecture ASIC
- CPU: Celeron M (1GHz)
- DDR-SDRAM: The image memory (1.5 GB [1 GB x 1, 512 MB x 1]) for image compression, image rotation and other operations.
- Flash Memory: Firmware area, work area for PDF direct print, VM card. Maximum capacity: 128 MB.
- USB Interface: USB 2.0 (Host: 2 slots, Device: 1 slot)
- NIB: 10BASE T/100BASE TX
- Boot ROM: Stores the boot program.
- FRAM: The memory that stores the system configuration and user codes.

Controller Board Layout



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No additional notes

Controller Board Types

- There are two types of controller board.
  - Z-C1a type
  - Z-C1b type
- The standard and finisher models use the same controller board.

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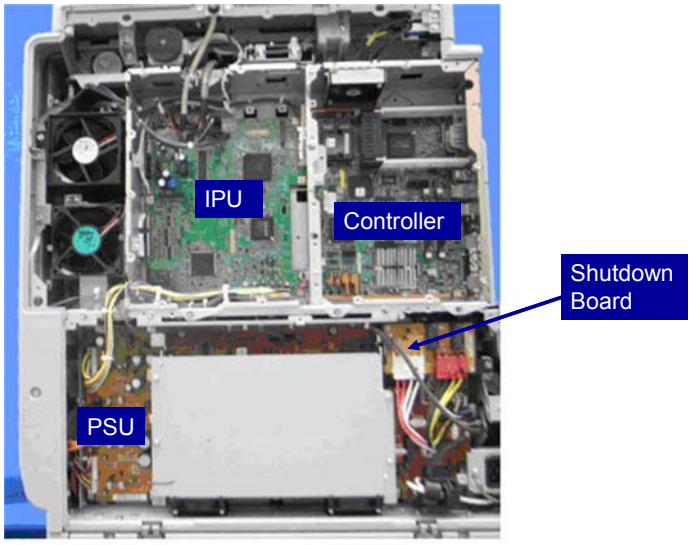
No additional notes

Board Layout
Rear Cover Open



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❒ To remove the BCU, you must remove the PSU box.

Before You Start Work on the Machine

- Turn off the main power switch, check that the shutdown process has finished, then unplug the machine before you start to remove components from the machine.

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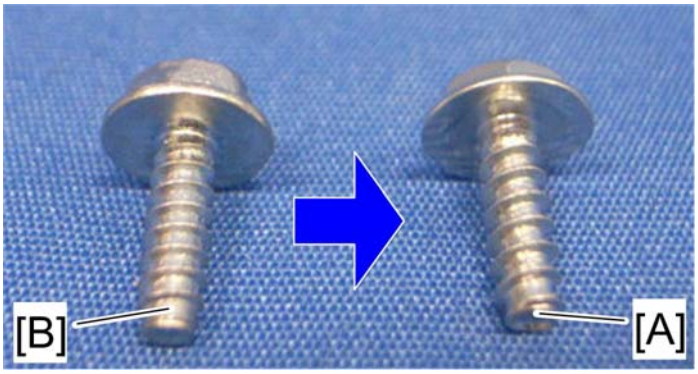
No additional notes

New Screw Type



- About 30% of the tapping screws [B] have been changed to a new type [A] (Eagle Screw [A]).
- The threads have a different pitch, so do not use an Eagle screw in a hole where a tapping screw was removed, and vice versa.

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- Try to remember which holes the screws came out from. If not, use your experience and common sense when putting screws back. If it doesn't feel right, try the other type of screw. Don't force the screw into the hole; it may be the wrong type, and threads could be damaged.

Replacing the Controller

- **Remove the NVRAM and SDRAM from the old board and install it on the new one.**
  - In the new controller board service part, there is no SDRAM.
- **Make sure that you install the correct board.**
  - There are 2 models (30cpm, 40cpm). The controller board is different for each one.
  - If you install the wrong board, the machine will not work.

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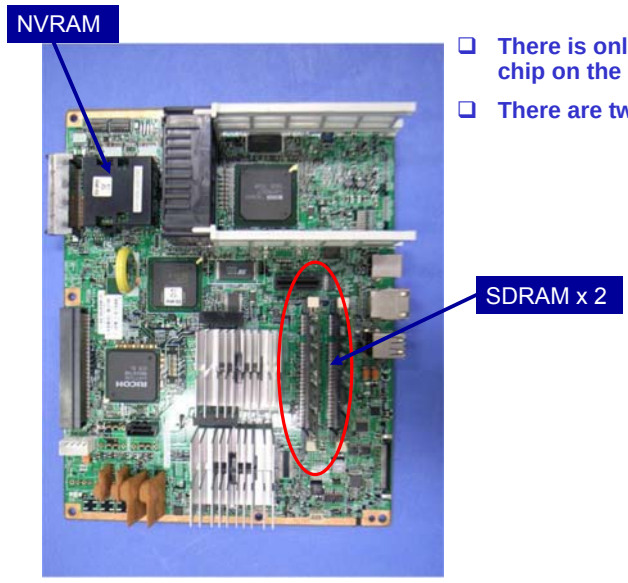
No additional notes

Controller Board NVRAM and SDRAM



- There is only one NVRAM chip on the controller board.
- There are two SDRAMs.

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No additional notes

Replacing the NVRAM on the Controller

- Make sure that you have the SMC report (factory settings). This report comes with the machine.
- Output the latest SMC data (SP5-990-001) if possible.
- Turn the main switch off. Then unplug the power cord.
- Install the new NVRAM on the controller. Then reassemble the machine.
- Turn the main switch on.
- SC995-02 occurs. Ignore it.
- Turn the machine off and on.
- Do the process control self-check.
- Do ACC for the copier application program.
- Do ACC for the printer application program.

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❒ This is the same as the Ap-C2.5/At-C2.5. It is not the same as the Z-P1.

Replacing the BCU

- Remove the EEPROM from the old BCU and install it on the new one.
- Reassemble the machine.
- Turn the machine on.
  - SC995-01 appears. This means that the serial number is not stored.
- Store the serial number with SP 5811-004.
- Cycle the main power off/on.
- There is only one type of BCU. You install the same board in each of the models.

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No additional notes

Replacing the EEPROM on the BCU

- Make sure that you have the SMC report (factory settings). This report comes with the machine.
- Output the latest SMC data (SP5-990-001) if possible.
- Turn the main switch off.
- Install an SD card into SD card slot 2. Then turn the main power on.
- Copy the EEPROM data to an SD card (SP5-824-001) if possible.
- Turn off the main switch. Then unplug the power cord.
- Replace the EEPROM on the BCU and reassemble the machine.
- Plug in the power cord. Then turn the main switch on. SC195 occurs.
- Copy the data from the SD card to the EEPROM (SP5-825-001).
- Turn the main switch off. Then remove the SD card from SD card slot 2.
- Turn the main switch on.
- Make the necessary SP and UP mode settings.
- Do the process control self-check.
- Do ACC for the copier application program.
- Do ACC for the printer application program.

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No additional notes

❒ In this section, you will study the mechanisms of the optional ARDF. This is built into all models of the Z-C1 series.

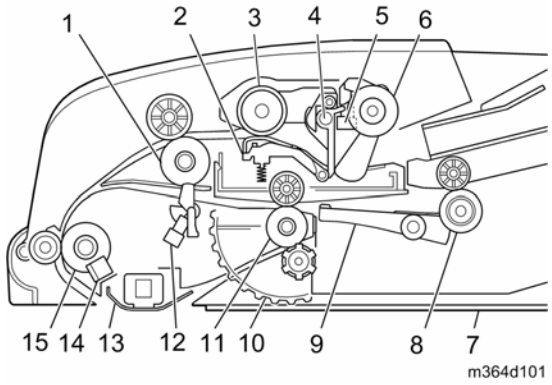
Overview

- Similar to the ARDF for S-C4.
- Feed roller and friction pad system
- Mixed original length mode is not possible
- No original size sensors
- No fax stamp
- Contains a space for storing the card reader (as described earlier)

Slide 105

No additional notes

Component Layout (1)



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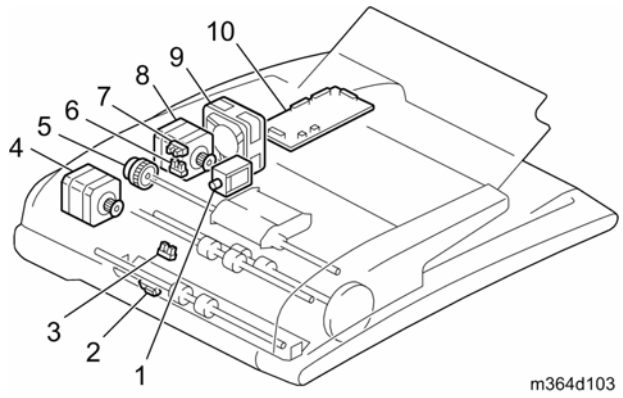
1. Transport Roller
2. Friction Pad
3. Feed Roller
4. Registration Gate
5. Original Set Sensor
6. Pick-up Roller
7. Platen Cover
8. Inverter Roller
9. Junction Gate
10. Jam Removal Knob
11. Exit Roller
12. Inverter Sensor
13. Original Exposure Guide
14. Registration Sensor
15. Registration Roller

Component Layout (2)



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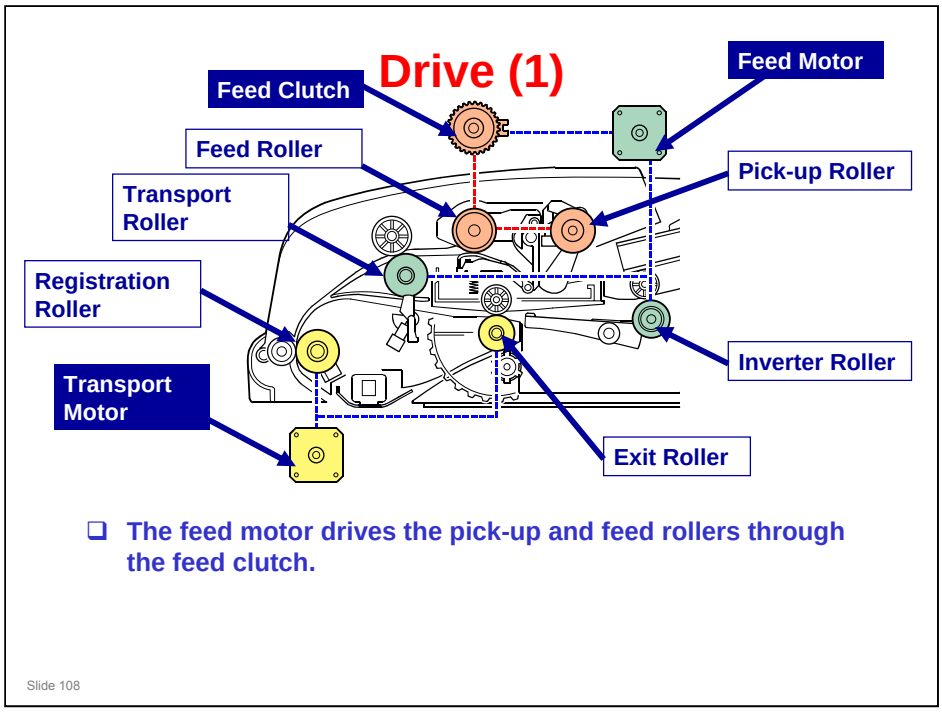
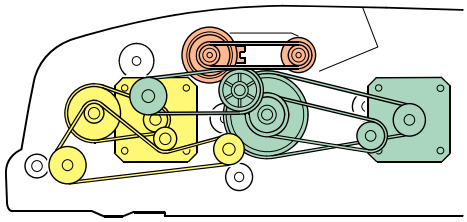
1. Inverter Solenoid
2. Registration Sensor
3. Inverter Sensor
4. Transport Motor
5. Feed Clutch
6. Original Set Sensor
7. Cover Sensor
8. Feed Motor
9. Cooling Fan
10. Drive Board



No additional notes

Drive (2)



- This diagram shows the layout of the pulleys and timing belts.

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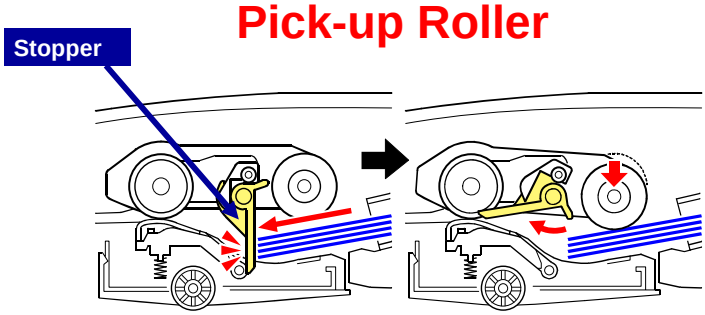
No additional notes

Pick-up Roller



- When the document is set in the feeder, the stopper prevents the pages from entering the scanner.
- When the pick-up roller drops onto the top of the stack, the stopper moves out of the way, and the pick-up roller feeds the top sheet of paper to the feed roller.

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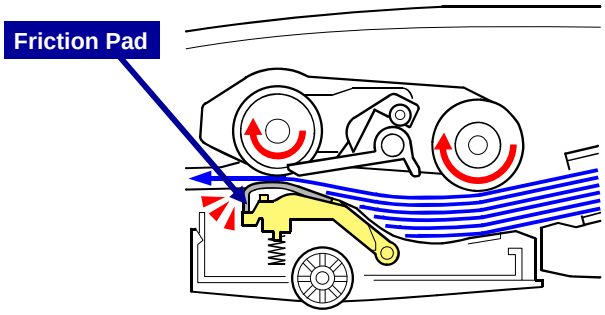
No additional notes

Separation



- The feed roller and friction pad make sure that only one sheet of paper goes into the scanner.

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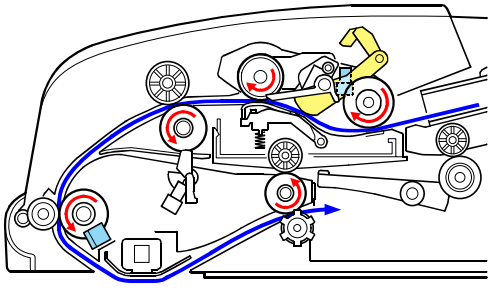
No additional notes

Original Transport and Exit
Single-sided Originals



- The feed motor and transport motor feed the original through the scanner.
- Motor speed depends on the reproduction ratio.

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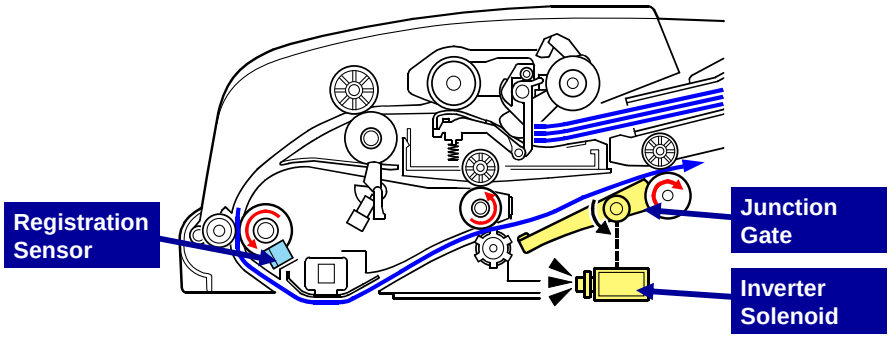
- Scan speed is 30 cpm

Original Transport and Exit
Two-sided Originals (1)



- First, the front side of the original is scanned.
- When the registration sensor detects the leading edge of the original, the inverter solenoid opens the junction gate. The original is then fed to the inverter table.

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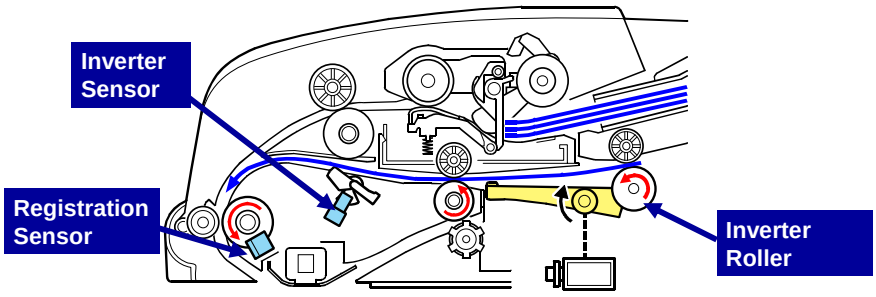
No additional notes

Original Transport and Exit
Two-sided Originals (2)



- After the trailing edge of the original passes the inverter sensor, the junction gate solenoid switches off and the junction gate is closed.
- When the original has been fed onto the inverter table, the feed motor switches on in reverse. The inverter roller and registration roller feed the original to the ADF exposure glass, and the reverse side will be scanned.

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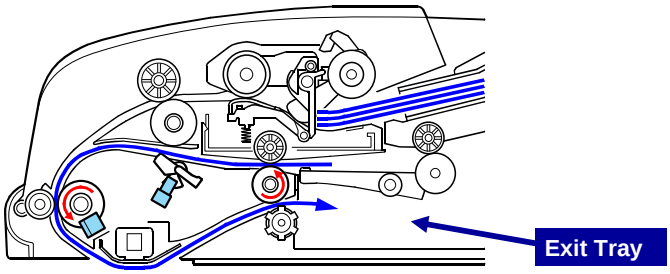
No additional notes

Original Transport and Exit
Two-sided Originals (3)



- The original is then sent to the inverter table again to be turned over.
- This is done so that the duplex copies will be properly stacked front side down in the exit tray in the correct order.

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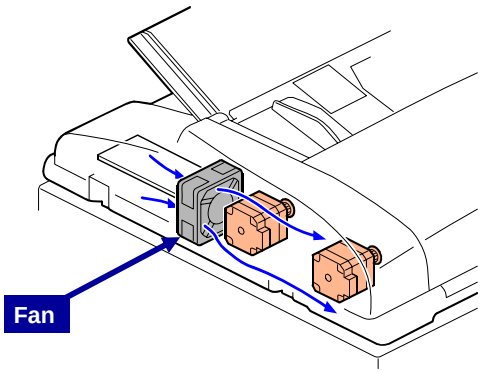
No additional notes

ADF Motor Cooling



- The fan pulls in air to cool the motors.

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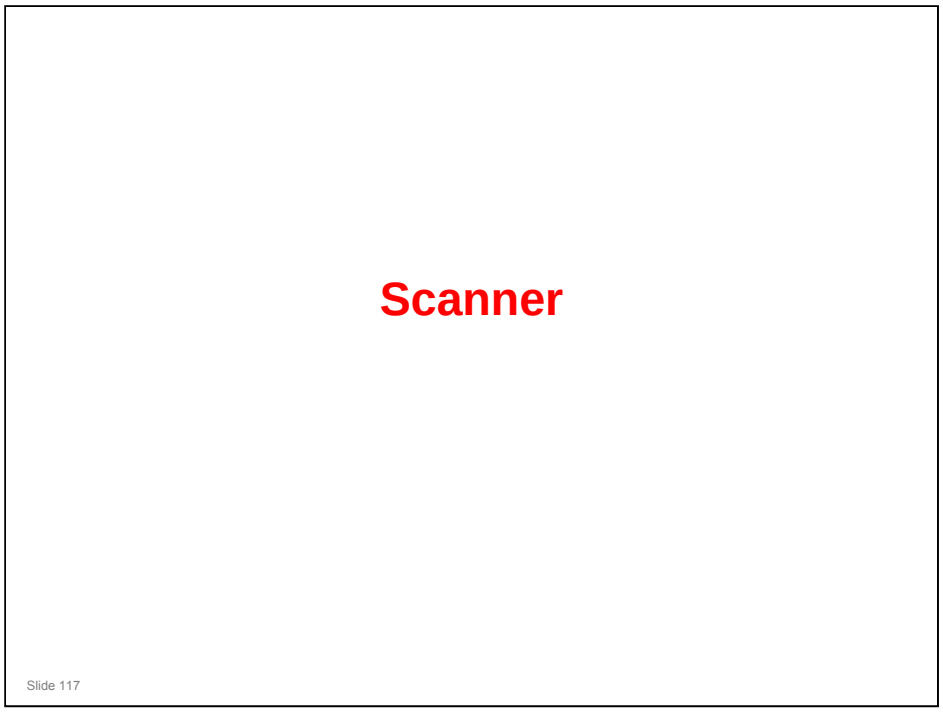
No additional notes



PURPOSE OF THIS SECTION

- This section describes the scanner mechanism.

Overview

- Similar to the Di-C1
- No original size sensors
  - Because of this, the copy display has changed, and the user must be careful to select the correct paper size.
- No coating on the exposure glass
- Additional measures to prevent dust from entering the optics
- No anti-condensation heater (even as an option)

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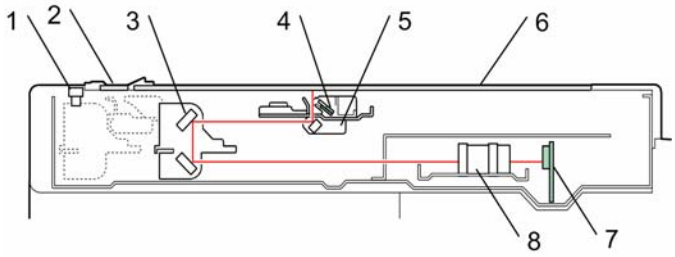
No additional notes

Components



- When the original is manually placed on the exposure glass (6), the scanner motor pulls the 1st and 2nd scanners (5, 3) via mechanical linkage. The original is scanned from left to right.
- When the original is fed from the ARDF, it is fed past the ARDF exposure glass (2), and to the original exit. The original does not stay on the main exposure glass. The 1st and 2nd scanners stay at their home positions.

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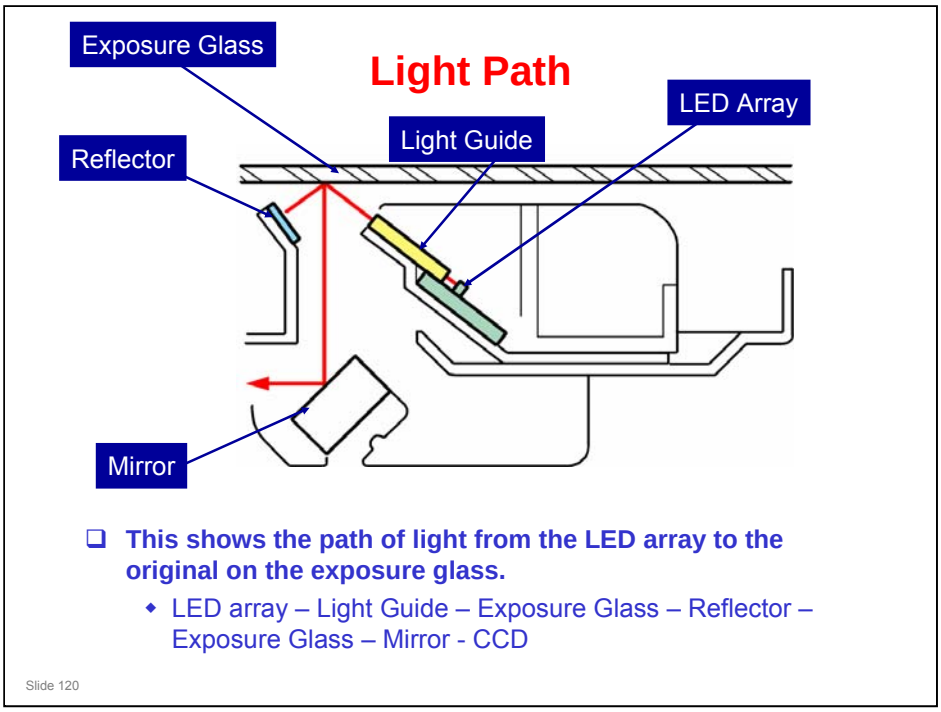
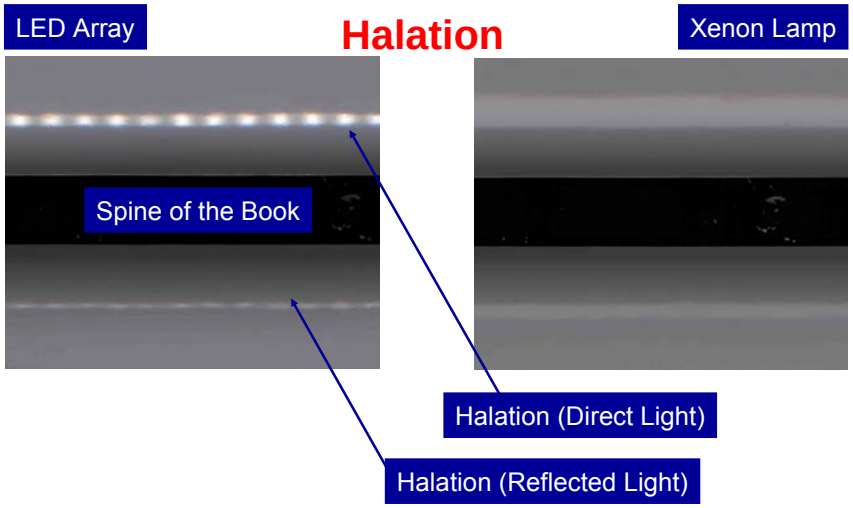
- 1. Scanner HP sensor
- 2. ADF exposure glass
- 3. 2nd scanner (2nd carriage)
- 4. LED array
- 5. 1st scanner (1st carriage)
- 6. Exposure glass
- 7. Sensor board unit (SBU)
- 8. Lens Block
- An anti-condensation heater is not available as an optional unit.



- Light emitting device: White LED
- LED number: 35 pcs
- Light emitting mechanism: Light guide + reflector
- Unit supplied as service parts: LED unit
- Merits of LED compared with Xenon Lamp: Life is long, energy-saving, high-speed warm-up
- Demerits of LED: Low amount of light, Halation (see the next slide)



- This sometimes occurs when an LED array scans a thick book on the exposure glass.

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- The black stripe across the image corresponds to the spine of the book.
- The symptom also occurs with xenon lamps, but it is not so strong.

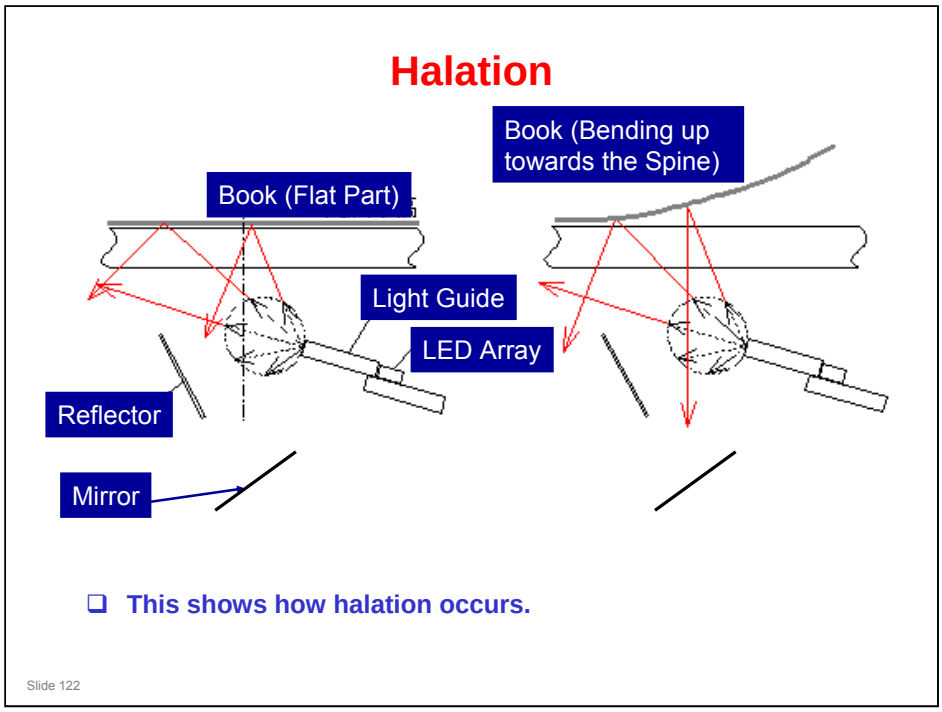
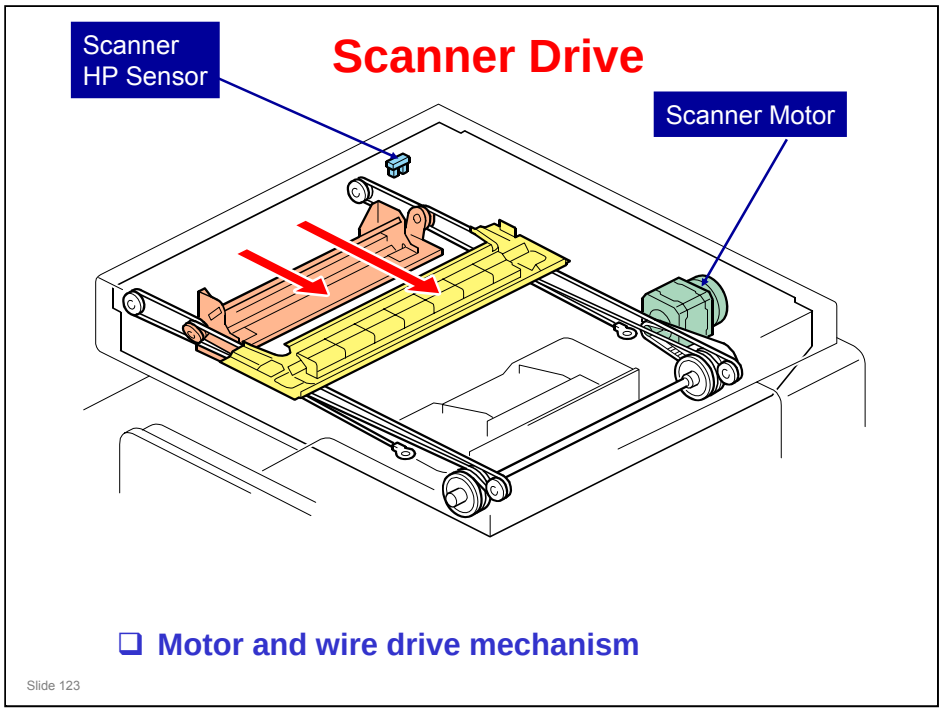


Diagram on the Left

- When the original closely contacts the exposure glass, LED light is reflected normally into the scanner optics.

Diagram on the Right

- When the original curls like the area near the spine of a book, some of the LED light is directly reflected to the mirror and then to the CCD.
- This symptom also occurs with xenon lamps, but appears like a line, because a xenon lamp is a linear source. On the other hand, the LED array consists of point sources of light, so halation occurs.



- The same motor drives the first and second scanners.
  - The first scanner contains the exposure lamp, reflectors, the 1st mirror, and the lamp regulator. The second scanner contains the 2nd and 3rd mirrors.
  - The regulator is mounted on the scanner to reduce the wiring between the lamp and the regulator.
  - The second scanner moves at half the speed of the first scanner. This is to maintain the focal distance between lens and original.
  - In reduction or enlargement mode, the scanning speed depends on the magnification ratio. The returning speed is always the same, whether in full size or magnification mode. The image length change in the sub scan direction is done by changing the scanner motor speed. In the main scan direction it is done by image processing on the BCU board.
  - You can adjust the magnification in the sub-scan direction by changing the scanner motor speed with SP4-008.
- In this machine, wires are used instead of timing belts. These are more difficult to replace, but copy quality is better (less jitter).
- Note that the operation in ADF mode is different from platen mode.
  - In ADF mode, the scanner goes to home position (detected by the home position sensor), and stays there during scanning.
  - The ARDF motor feeds the original through the ARDF. In reduction/enlargement mode, the image length change in the sub-scan direction is done by changing the ARDF motor speed. Magnification in the main scan direction is done in the BCU board. This is the same as for book mode.
  - You can adjust magnification in the sub-scan direction by changing the ARDF motor speed with SP6-017.

Original Size Detection

- There are no width or length sensors in the scanner.
- If the original size is different from the paper in the selected paper tray, the customer must input the correct original size at the operation panel.
- There is no Auto Paper Detect mode.

Slide 124

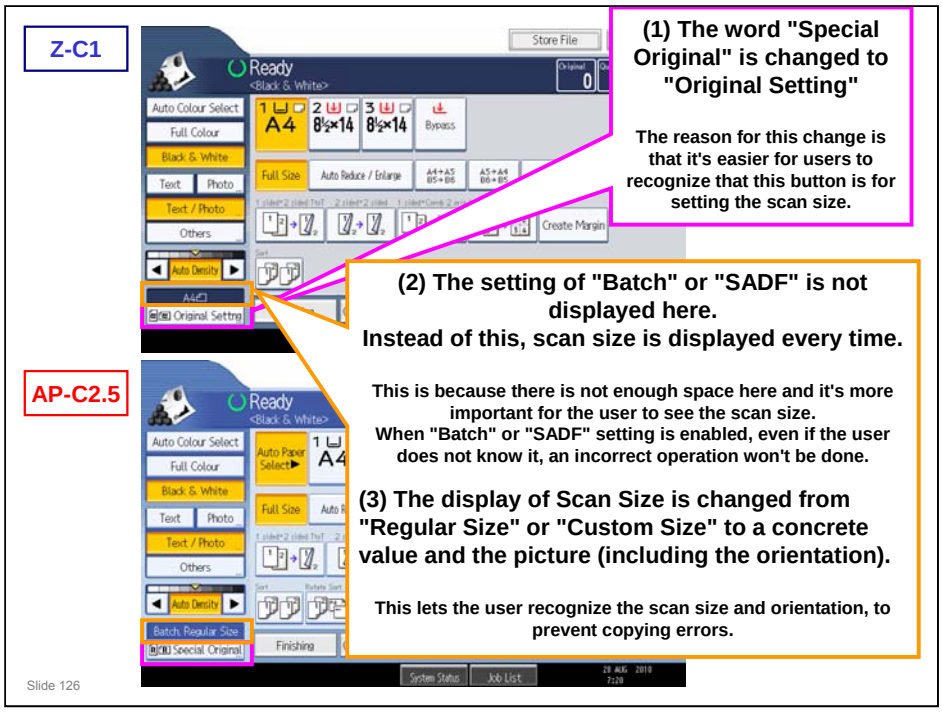
No additional notes

Copy Display is Changed

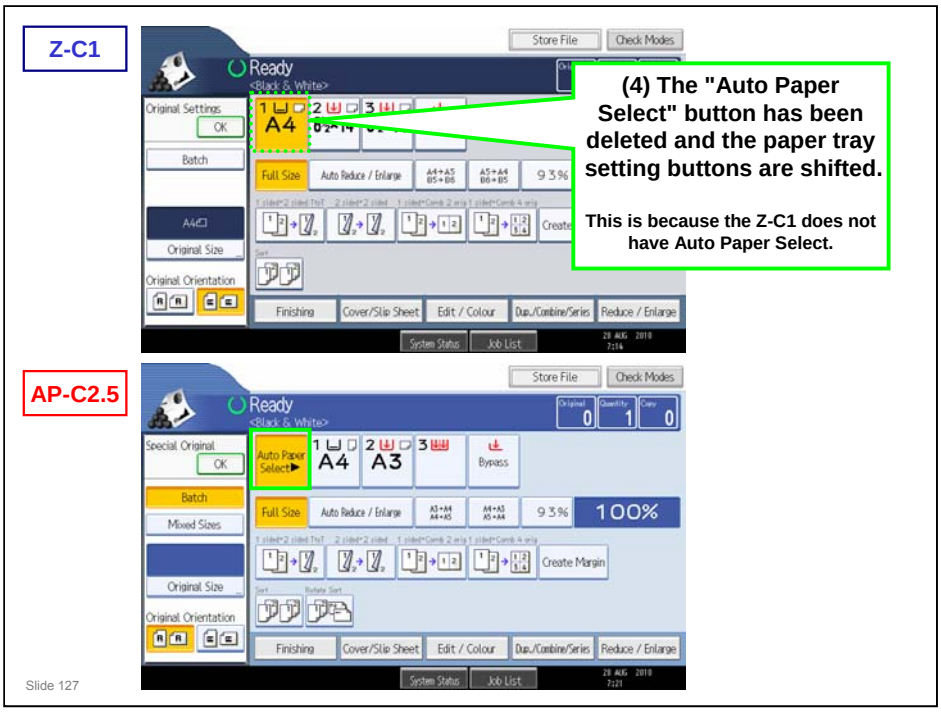
- Because there is no original length or width detection, the Z-C1 cannot detect the original size.
- This means that Z-C1 does not have the Auto Paper Select function.
- Because of the above, the user must input the original size at the start of every job. Therefore, the copy display is different from other models.

Slide 125

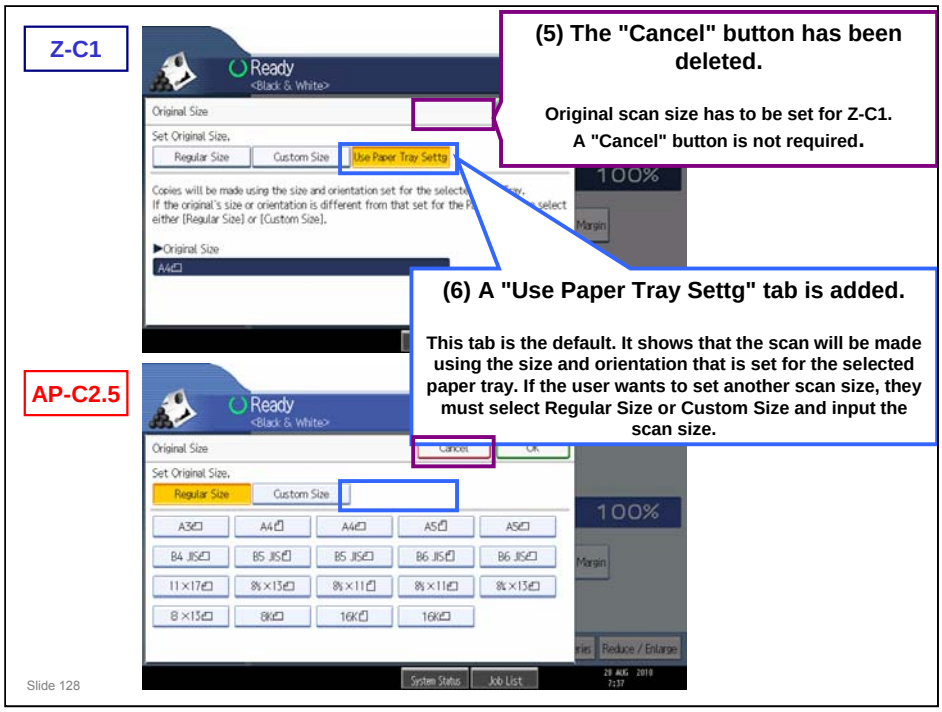
- The next few slides show the changes to the display.



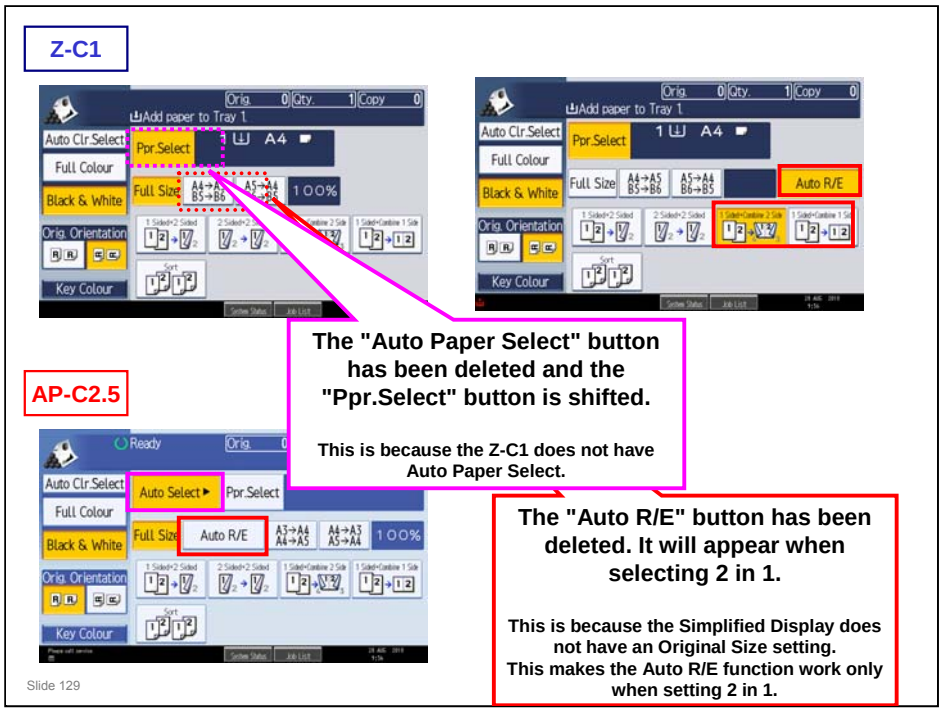
❒ The next 3 slides show changes to the normal display.



No additional notes



No additional notes



This shows the changes to the Simplified Display.

Dust Detection – SP Modes

- **This function is for the ARDF exposure glass only, and not for the main exposure glass.**
- **4020-001: Dust check**
  - Turns the dust check on/off.
    - » 0: OFF (Default), 1: ON
  - The platen cover is white, so black dust is detected, but white dust such as paper dust cannot be detected
  - When dust is detected, the scanning position is shifted in the sub scan direction. An alert is displayed on the operation panel, when dust reoccurs after that.
- **4020-002: Dust Detection**
  - Level 0: lowest detection
  - Level 8: highest detection level
  - Level 4 is the default
  - If the level is higher, the detection level is higher (dust is more likely to be detected)

Slide 130

No additional notes

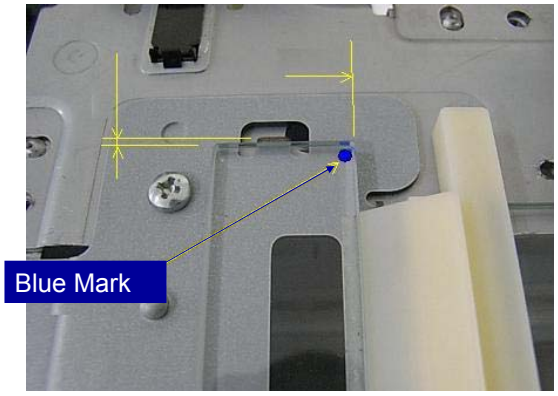
Replacement and Adjustment

- **Exposure Lamps**
  - Do not touch the new lamp directly by hand. Grease spots will cause poor scanning quality.

Slide 131

- Note that the copy adjustments must be done after replacing the lens block, scanner motor or scanner wires.

DF Exposure Glass



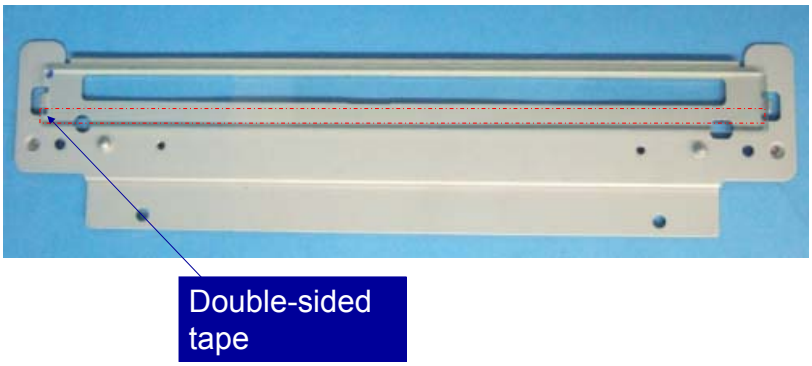
- The blue mark must be at the rear right corner.

Slide 132

No additional notes

DF Exposure Glass: Service Part

- The ARDF exposure glass/bracket assembly is available as a service part.
- The ARDF exposure glass is attached to its bracket with double-sided tape. This tape prevents dust from getting into the scanner.



Slide 133

No additional notes

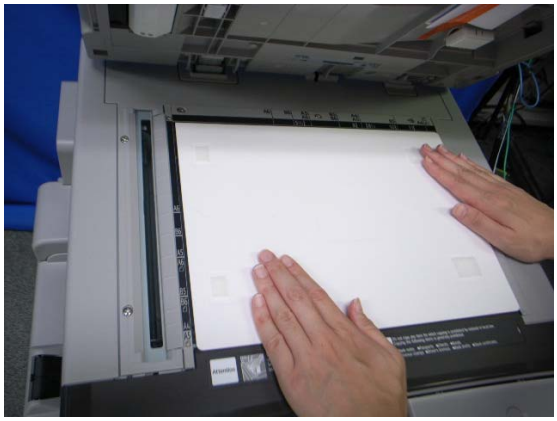
Replacement and Adjustment

- **SBU**
  - Adjust the following SP modes after you replace the sensor board unit:
    - » SP4–008 (Sub Scan Mag): See "Image Adjustment: Scanning".
    - » SP4–010 (Sub Mag Reg.): See "Image Adjustment: Scanning".
    - » SP4–011 (Main Scan Reg): See "Image Adjustment: Scanning".
    - » SP4–688 (DF: Density Adjustment): Use this to adjust the density level if the ID of outputs made in the DF and Platen mode is different.

Slide 134

No additional notes

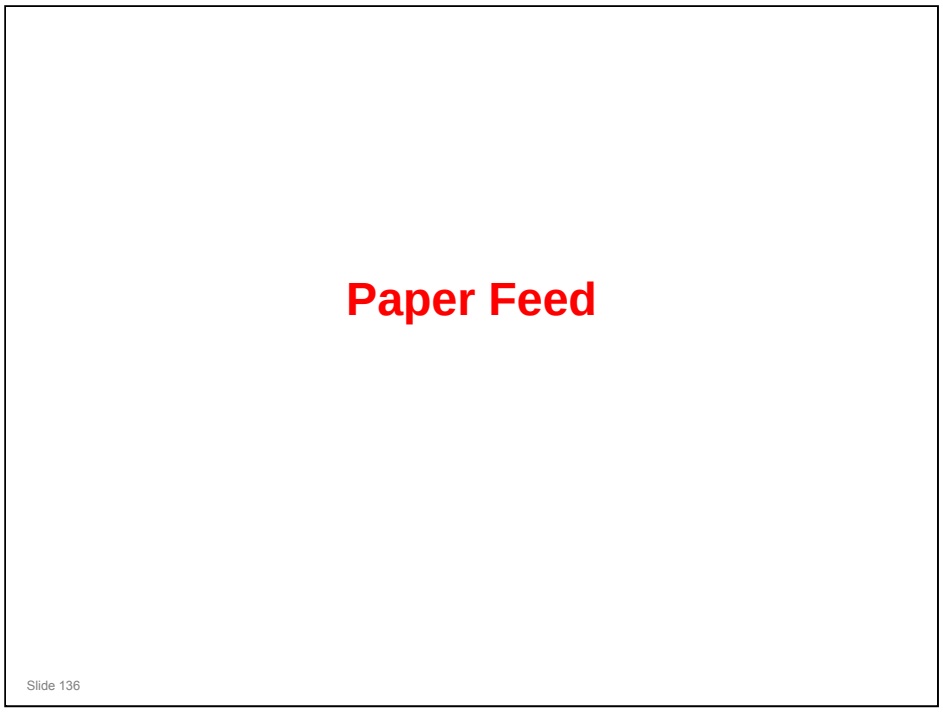
Replacement and Adjustment



- When setting the platen cover, it is necessary to have a 1 to 2 mm gap on the upper side and on the left side.

Slide 135

No additional notes



PURPOSE OF THIS SECTION

- ❒ The paper feed mechanisms for the main body (tray 1, bypass tray) will be described in this section. The optional feed units will be dealt with in a later section.

In this section you will do the following:

- ❒ Learn how the paper feed mechanisms are driven.
- ❒ Learn how paper size is detected.

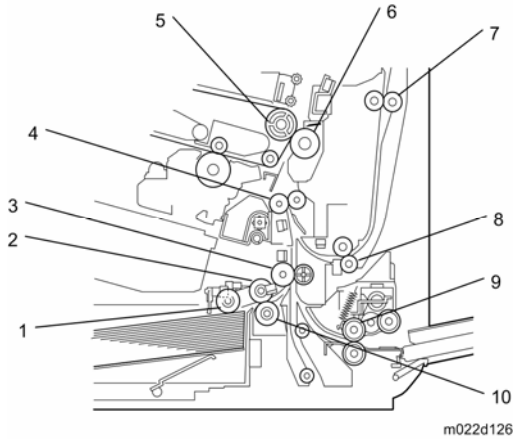
Overview

- **Similar to the At and Ap series, with some common points with the Di series**
- **Feed and reverse roller system**
  - Bypass tray also uses the feed and reverse roller system
- **Height sensors contained in the tray lift motor assembly**
- **Paper dust collector by the registration roller**
  - For normal paper, should not need to be emptied during the life of the machine.
- **The bypass tray does detect paper length, but sensors in the paper feed path measure the length.**

Slide 137

No additional notes

Paper Feed Components



- The trays all use a feed and reverse roller mechanism.

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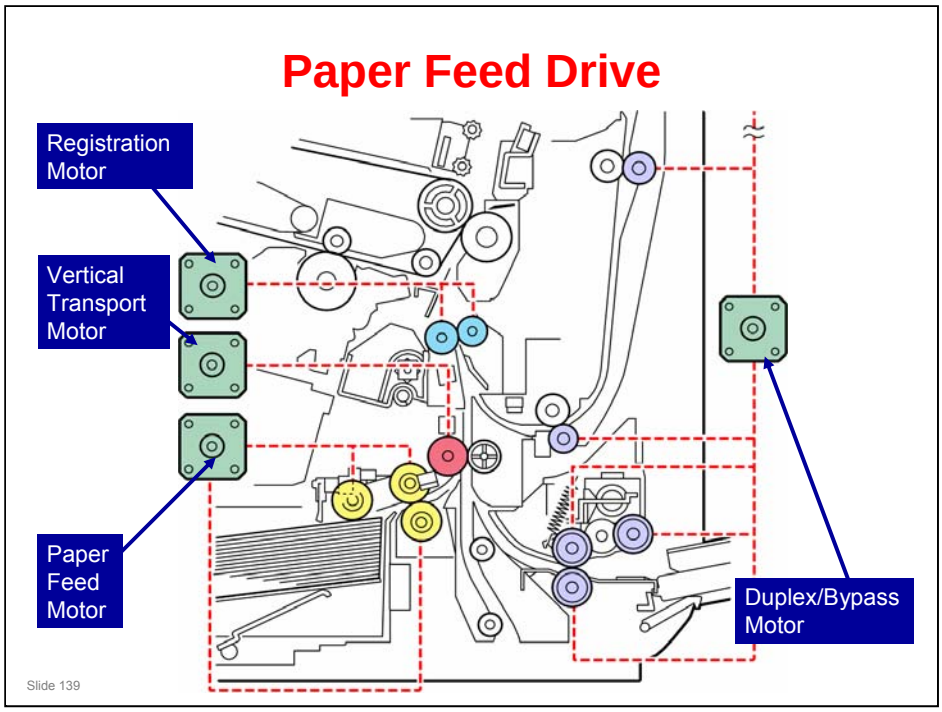
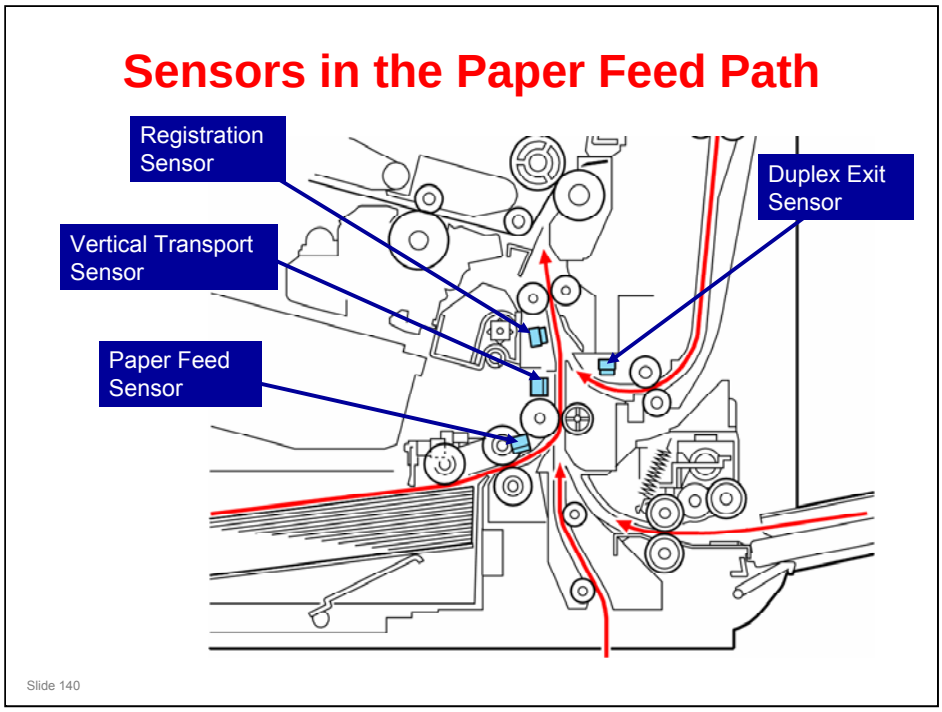
1. Pick up roller
2. Paper feed roller
3. Vertical transport roller
4. Registration roller – can correct skew up to 4 mm
5. Transfer belt drive roller
6. Transfer roller
7. Duplex relay roller
8. Duplex exit roller
9. By-pass feed roller
10. Separation roller

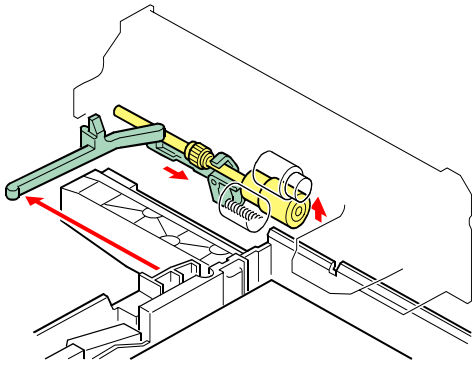


- This diagram shows which motors drive the rollers.
- Note that the separation roller is driven by the vertical transport motor.



- These sensors are used for jam detection and for paper registration.
- There is no bypass entrance sensor. The vertical transport sensor detects paper coming up from the bypass tray.

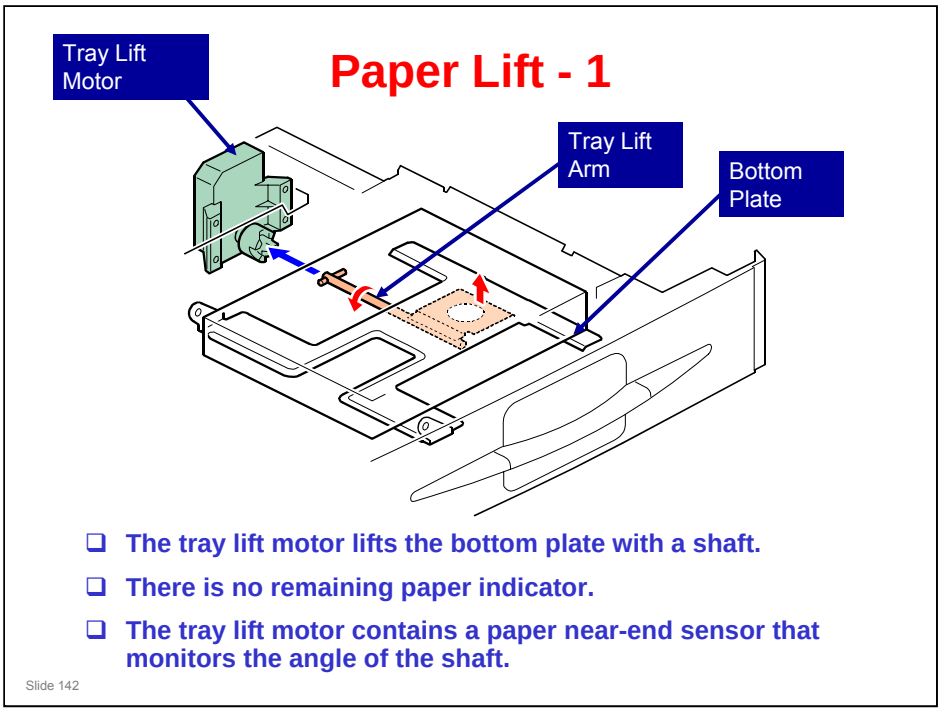
Inserting the Tray



- When the tray is put in the machine, the separation roller is lifted and the pick up roller goes down.

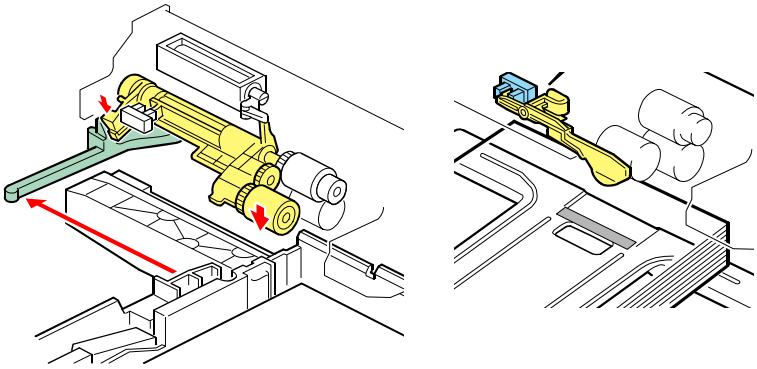
Slide 141

No additional notes



- The rear end of the paper tray pushes the tray set switch (not shown here). As a result, the machine detects that the paper tray is installed.
  - Tray set switch: You can see this later on the 'Paper Size Detection' slide.
- When the machine detects that a tray has been placed in the machine, the tray lift motor drives the lift arm shaft.
- Then the tray lift arm lifts the tray bottom plate (purple in the diagram).
- There is no remaining paper indicator in this model (the Z-P1 has this feature).

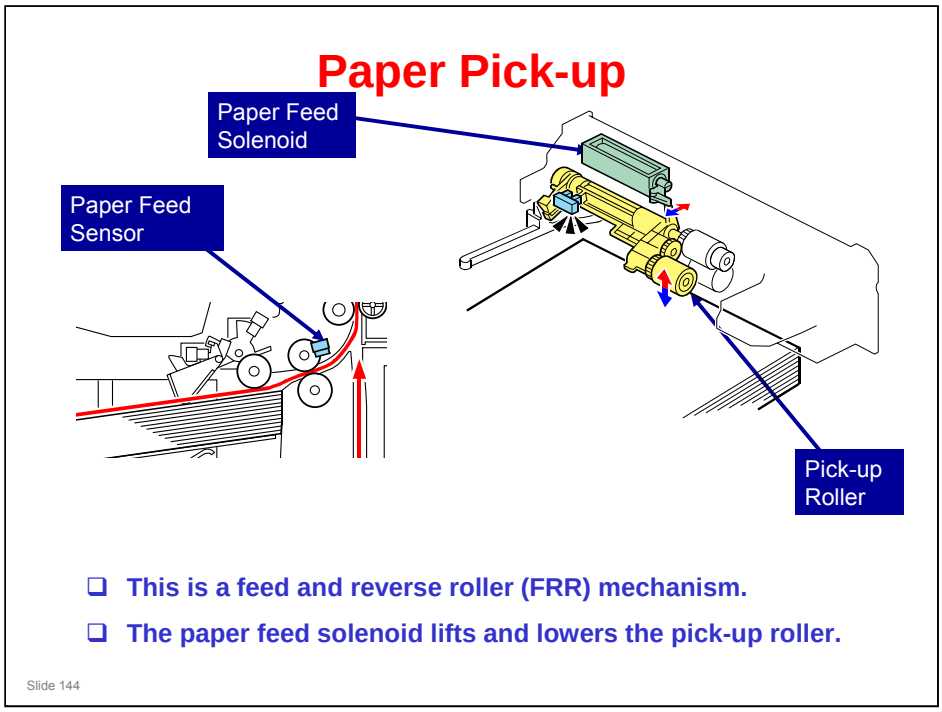
Paper Lift - 2



- The tray lift motor lifts the bottom plate until the paper end sensor detects that the top of the stack is at the paper feed position.

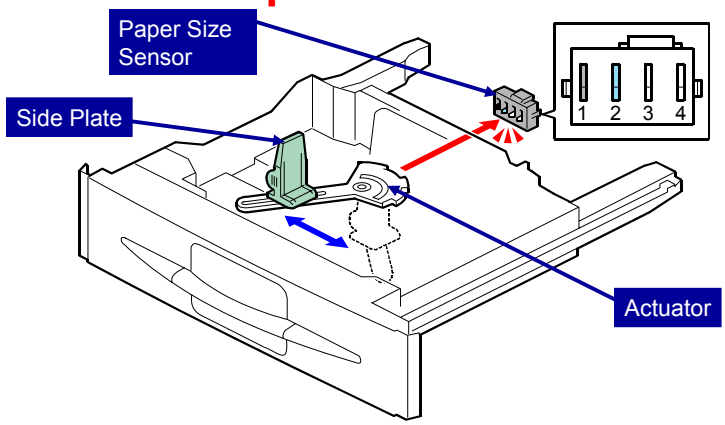
Slide 143

No additional notes



- This is similar to the AP-C1.
- When the paper feed sensor detects the trailing edge of the previous sheet of paper, the paper feed solenoid turns on and off. This lifts the pick-up roller from the top of the stack paper briefly and then releases the pick-up roller. This makes paper pick-up more effective.

Paper Size Detection



- **The paper size sensor is at the rear of the tray. This sensor has four switches.**
  - Switch 1 acts as a tray set switch (detects when the tray is installed).
- **The outputs from the switches detect the paper size. The actuators move when the side plate moves.**

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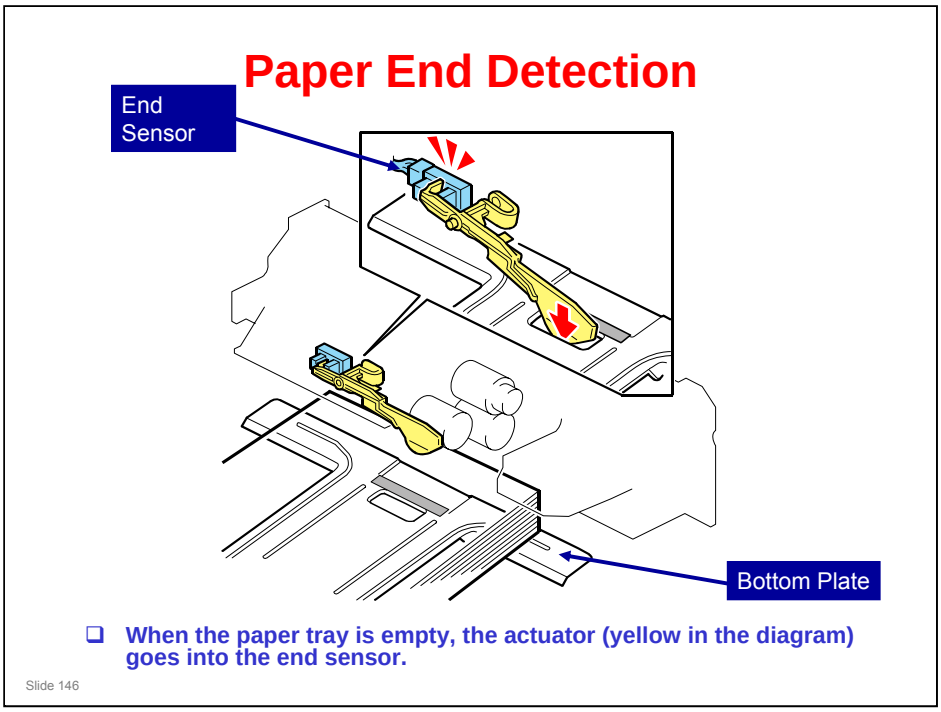
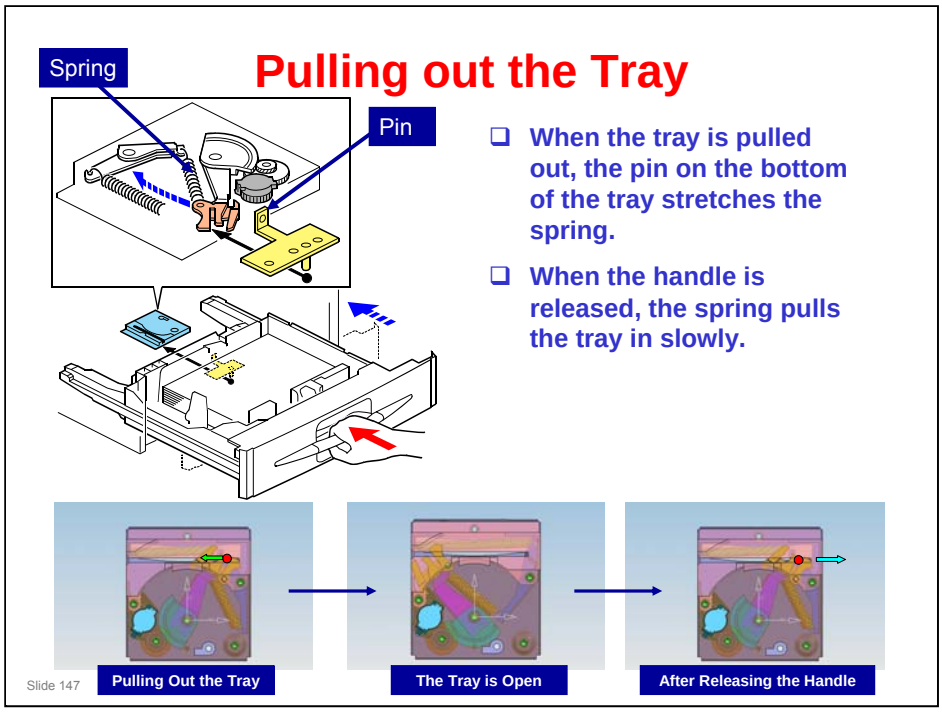
❒ The sensor can detect sizes down to A6.

Paper Size					
NA	**EU**	**AA**	**Sensor 2**	**Sensor 3**	**Sensor 4**
A4	A4	A4	ON	OFF	OFF
LT	LT	LT	OFF	OFF	OFF
Exe	Exe	Exe	OFF	OFF	ON
HLT	A5	A5	ON	ON	ON
-	A6	A6	OFF	ON	ON



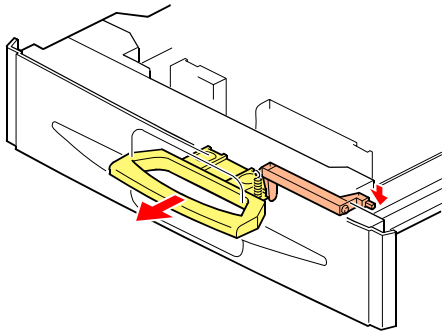
❒ Near-end detection is built into the tray lift motor, as explained earlier.

Remaining paper	Paper height sensor 1	Paper height sensor 2
Full – 350	OFF	OFF
350 – 150	ON	OFF
150 – 50	ON	ON
50 – 0	OFF	ON



No additional notes

Lock Lever



- This lock prevents the tray from coming out during shipping.
- Pull the handle to release the lock. The lock lever is lifted when you pull the handle.

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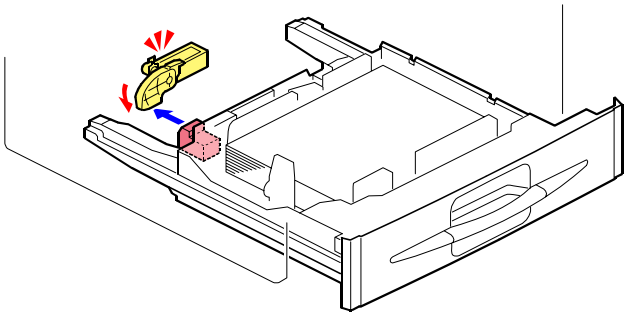
No additional notes

Tray Lock



- **The tray is not locked during printing.**
- **The machine automatically locks the tray when a paper jam occurs.**
  - The machine releases the lock after 10 minutes.

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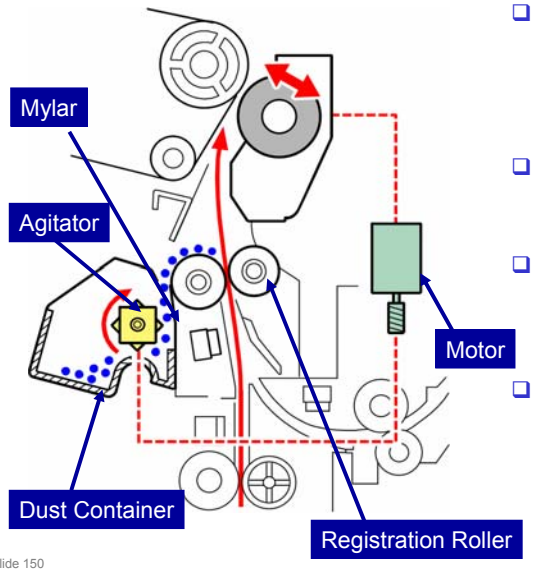
- The mechanism for the optional one-tray paper tray unit is the same as the above.
- The mechanism for the optional two-tray paper tray unit is different.

Paper Dust Collection



- The dust container collects paper dust from the registration idle roller.
  - The mylar removes dust from the roller.
- The paper transfer roller contact motor drives the agitator for the paper dust.
- It only drives the agitator when it is moving the transfer roller away from the ITB.
- When the transfer roller is moving towards the ITB, the agitator does not rotate.

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- The agitator keeps the level of dust in the tank uniform.
- It rotates during process control and immediately after the machine power is turned on.
- The dust container should not need to be emptied during the life of the machine.
- To see the dust container, open the duplex unit. The user cannot remove the container. It is difficult to remove the container; the drive unit and other parts must be removed. However, if you remove the ITB and K PCDU, you can remove a tape and vacuum out the dust (see the next slide).

Cleaning the Paper Dust Container

- The dust container should not need to be emptied during the life of the machine.
- However, some paper types make a lot of dust, so inspect the container and clean with a vacuum cleaner.
- There is no sensor to detect near-full or full.

Slide 151

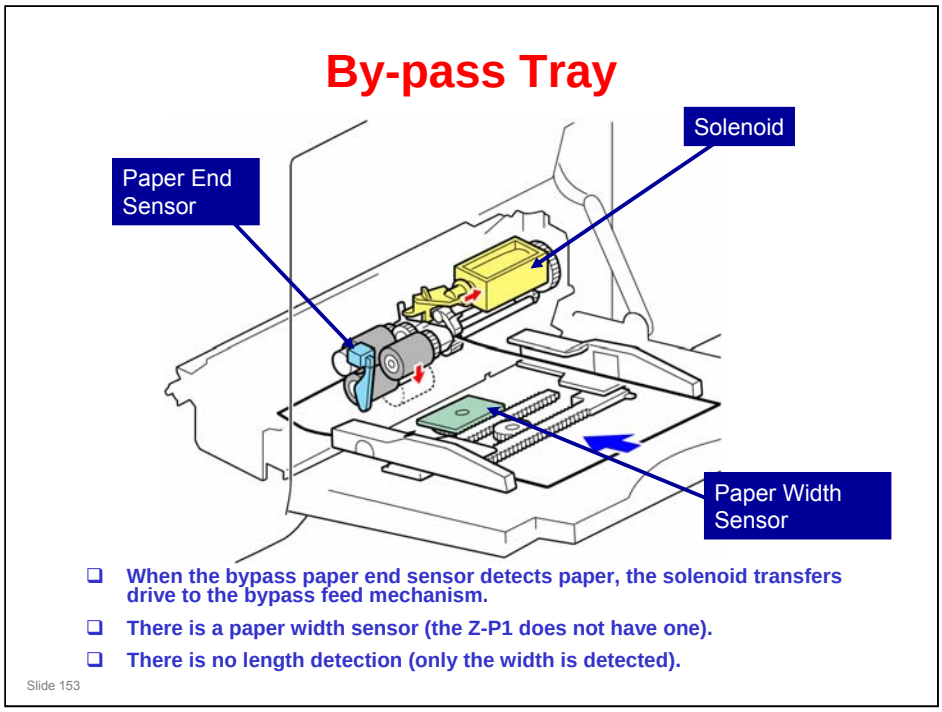
No additional notes

Paper Type Settings

- **This slide shows the correct paper type settings for various paper types.**
  - Recycled paper : Plain Paper 2
  - Special Paper 1: Plain Paper 2
  - Special Paper 2: Thick Paper 1
  - Special Paper 3: Thick Paper 2
  - Glossy paper: Use ‘Thick Paper 1’.
  - Glossy paper (thick): Use ‘Thick Paper 3’.
  - Matte paper: Use ‘Thick Paper 1’.
  - Matte paper (thick): Use ‘Thick Paper 3’.
  - Waterproof paper: Use ‘Thick Paper 1’.
  - Label paper: Use ‘Plain Paper 2’.
  - Envelopes: Use ‘Thick Paper 1’.
  - Letterhead paper: Use ‘Plain Paper 2’.

Slide 152

No additional notes



- When the paper feed sensor detects the trailing edge of the paper, the paper feed solenoid turns on and off. This lifts the pick-up roller from the top of the stack briefly and then releases the pick-up roller. This makes paper pick-up more effective.
- There is no bypass entrance sensor. The vertical transport sensor detects paper coming up from the bypass tray.
- The width sensor can detect the following sizes:
  - EU model: A4, A5, A6
  - NA model: LT, HLT, Exe

By-pass Tray

- Duplex prints cannot be made from the bypass tray, because the duplex and bypass mechanisms use the same motor (duplex/bypass motor)
- The maximum paper size that the bypass tray can hold is Legal size. The customer must secure the paper by hand if they need to use a paper size larger than this.
- There is a paper stopper before the paper feed roller to prevent multiple feeds.

Slide 154

No additional notes

Bypass Tray Paper Misfeed Prevention

- **This function specifies how the machine works in the following situations.**
  - Printer: When the paper size or orientation selected with the driver differs from that loaded on the bypass tray.
  - Copier: When the paper size or orientation selected on the operation panel differs from that loaded on the bypass tray.

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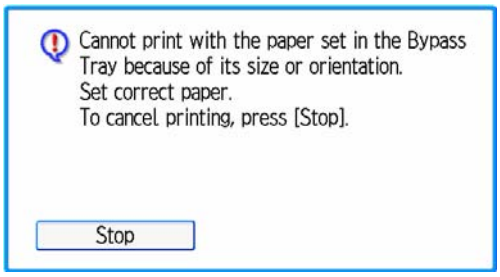
No additional notes

Bypass Tray Paper Misfeed Prevention

- **When this function is enabled, if feeding the wrong size or orientation:**
  - 1) The machine feeds the paper anyway. Note that feeding paper that is very small, very large, very thin, or very thick can cause a jam.
  - 2) The machine displays a caution like the following after printing the first page of the original.
    - » Cannot print with the paper set in the Bypass Tray because of its size or orientation.
    - » Set correct paper.
    - » To cancel printing, press [Stop].



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No additional notes

Bypass Tray Paper Misfeed Prevention

- **Important:**
  - When this function is enabled, CPM will be reduced, because there will be a larger interval between sheets
    - » Reference (Z-P1)
    - » Enabled: 22.8 ppm
    - » Disabled: 29 ppm
  - After the machine displays the caution, if the user resets the paper on the bypass tray, printing will resume. All of the sheets after resuming will be counted.

Slide 157

No additional notes

Default Settings

- **The default setting for Z-C1 is the following.**
  - Copy:
    - » Enabled (The setting can only be changed with User Tools)
  - Printer:
    - » Disabled (The setting can be changed with User Tools and WIM)
  - Fax/SDK/Print from Document Server through WIM
    - » Enabled (Cannot be changed)

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- Fax: Because received data must be printed, it cannot be canceled after the caution is displayed. Resetting the paper on the bypass tray makes printing resume automatically.
- Print from Document Server through WIM: Resetting the paper on the bypass tray makes printing resume automatically.
- Note: Print from Document Server (Without using WIM) is the same as Copy.

Paper Misfeed Prevention Setting for Copy

- **Setting only though Operation Panel**
  - User Tools/Counter -> Copier / Document Server Features -> General Features -> Bypass Tray Misfeed Prevention
    - » Select [ON] (Enabled: Default) or [OFF] (Disabled).

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No additional notes

Paper Misfeed Prevention Setting for Print

- **Setting from Operation Panel or WIM**
- **Operation Panel Setting**
  - User Tools/Counter -> Printing Features -> System -> Tray Setting Priority -> Bypass Tray Select
    - » 1) Driver / Command (Disable: Default)
      2) Machine Setting(s) (Default)
      3) Any Size/Type (Enable)
      4) Auto Custom Size/TypeWIM Setting (Enable)
    - » Select 3) for enabling printing on Regular size paper and 4) for enabling printing on customized size paper

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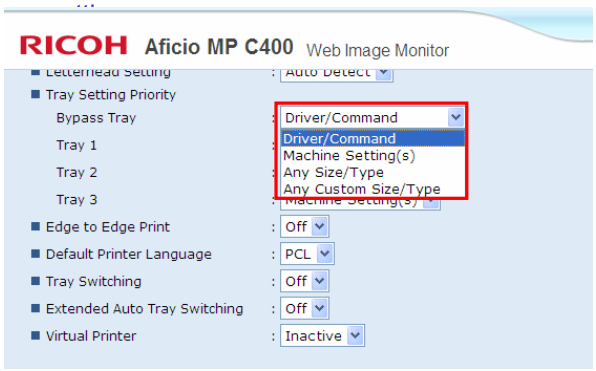
No additional notes

Paper Misfeed Prevention Setting for Print

- **WIM Setting**
  - Login as administrator -> Configuration -> Printer -> Basic Settings -> Tray Setting Priority -> Bypass Tray
    - » The settings are the same as the operation panel



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No additional notes

Paper Misfeed Prevention Setting for Print

- **Each setting details are the following.**

1) Driver / Command
   - This is not a Paper Misfeed Prevention Function setting
   - If not detecting the paper size or thickness that is selected through driver, a pop-up will be displayed on the operation panel.

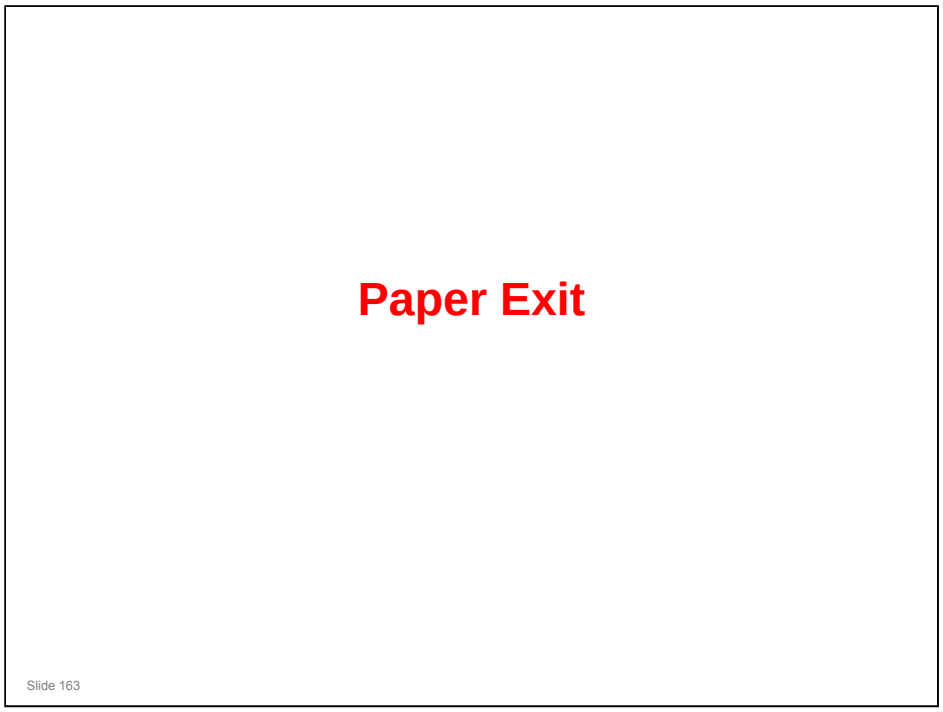
2) Machine Setting(s)
   - This is not a Paper Misfeed Prevention Function setting
   - If the paper size or thickness that is selected through driver and operation panel are different from each other, a pop-up will be displayed on the operation panel.

3) Any Size/Type **Newly added for Z-C1!!**
   - Enable the Paper Misfeed Function for all paper sizes or thicknesses (Both Regular sized paper and Customized sized paper)

4) Auto Custom Size/Type **Newly added for Z-C1!!**
   - Enable the Paper Misfeed Function for only Customized sized paper.
   - After displaying a caution, if regular sized paper will be set on the bypass tray, the caution will displayed again and printing is disabled.

Slide 162

No additional notes



PURPOSE OF THE SECTION

In this section you will:

- ❒ Learn how paper is fed out of the machine

Overview

- Similar to the Di-C1
- Two different types of mechanism:
  - Basic model
  - Finisher model

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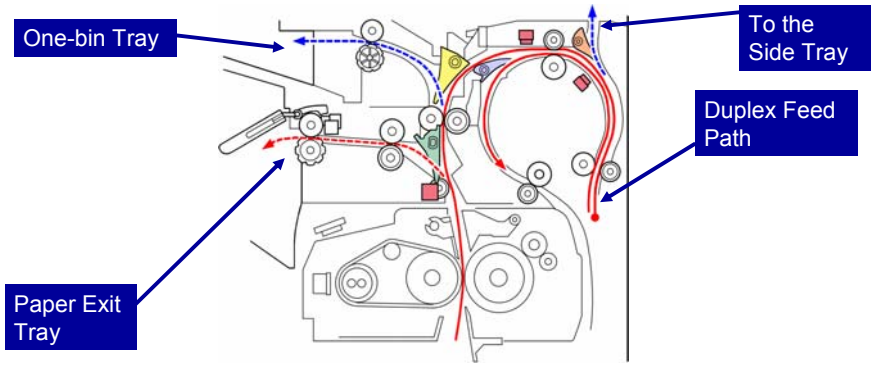
No additional notes

Component Layout – Basic Model



- The four junction gates switch paper feed to one of the following: duplex feed path, side tray, standard paper exit, or one-bin tray.

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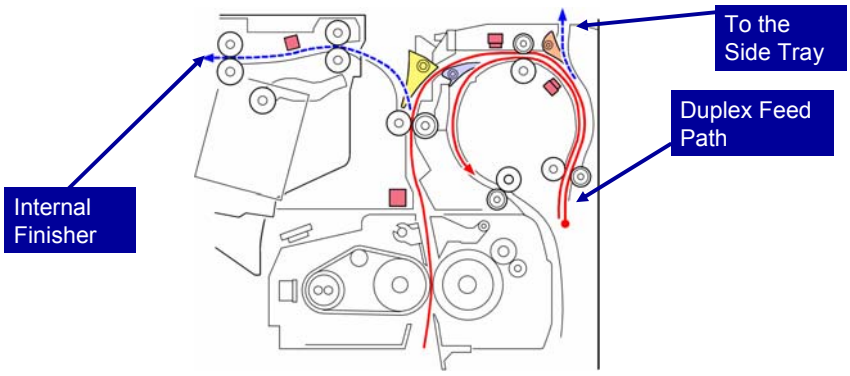
- The green junction gate (Paper Exit Junction Gate 1) is located in the mainframe and is driven by a solenoid.
- The yellow junction gate (Paper Exit Junction Gate 2) is located in the duplex unit and is driven by a solenoid
- The blue junction gate (Duplex Entrance Junction Gate) is located in the duplex unit and is held in place by a spring
- The orange junction gate (Side Tray Junction Gate) is located in the duplex unit and is held in place by a spring

Component Layout – Finisher Model



- In the finisher model, there are only three junction gates.

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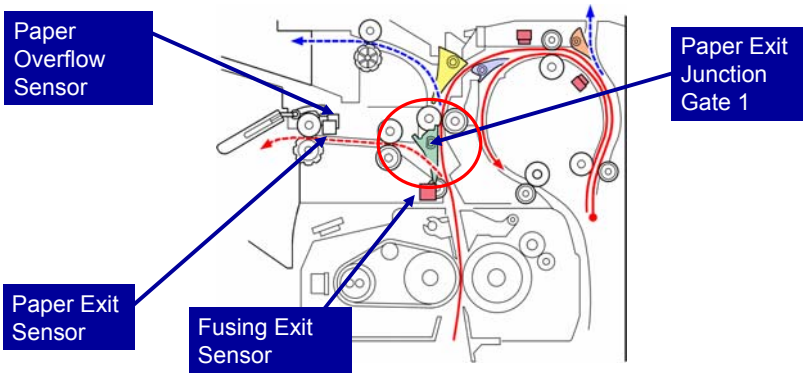
- The yellow junction gate (Paper Exit Junction Gate 2) is located in the duplex unit and is driven by a solenoid
- The blue junction gate (Duplex Entrance Junction Gate) is located in the duplex unit and is held in place by a spring
- The orange junction gate (Side Tray Junction Gate) is located in the duplex unit and is held in place by a spring
- There is no green junction gate after the fusing unit.

Component Layout – Basic Model



- **This junction gate switches the paper feed direction to the standard output tray path or the duplex feed path.**
  - This gate is controlled by the junction gate solenoid. The timing for this solenoid is based on registration sensor activation.
- **When the gate is at home position, the standard output tray path is opened.**
- **The fusing/paper exit motor drives the paper exit rollers.**

Slide 167

❒ This is similar to AP-C1.

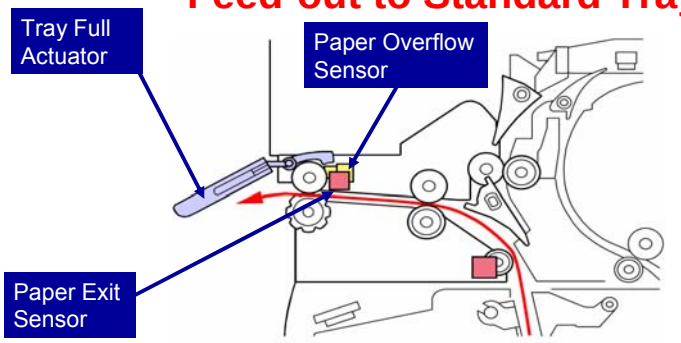
❒ The paper exit rollers feed paper to the standard output tray.
  - ➢ These rollers are driven by the fusing/paper exit motor.

❒ When a sheet of paper stays in the paper exit unit, the paper exit sensor detects a paper jam and a jam alert is displayed.

❒ When outputs push up the tray full actuator, the paper overflow sensor detects that standard output tray is full and a message is displayed after job end.

❒ When duplex mode is selected, the junction gate closes the paper path to the standard tray.

Feed-out to Standard Tray



- **The paper exit rollers feed paper to the standard output tray.**
  - These rollers are driven by the fusing/paper exit motor.
- **When a sheet of paper stays in the paper exit unit, the paper exit sensor detects the paper jam and a jam message is displayed.**
- **When outputs push up the tray full actuator, the paper overflow sensor detects that standard output tray is full of outputs and the machine stops immediately.**

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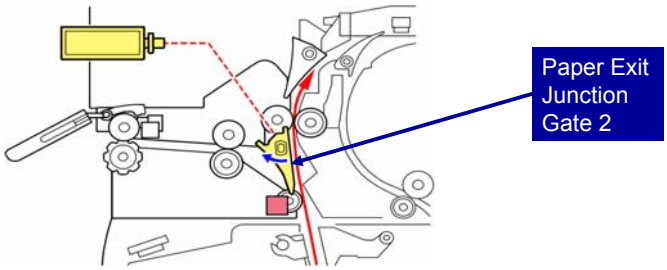
No additional notes

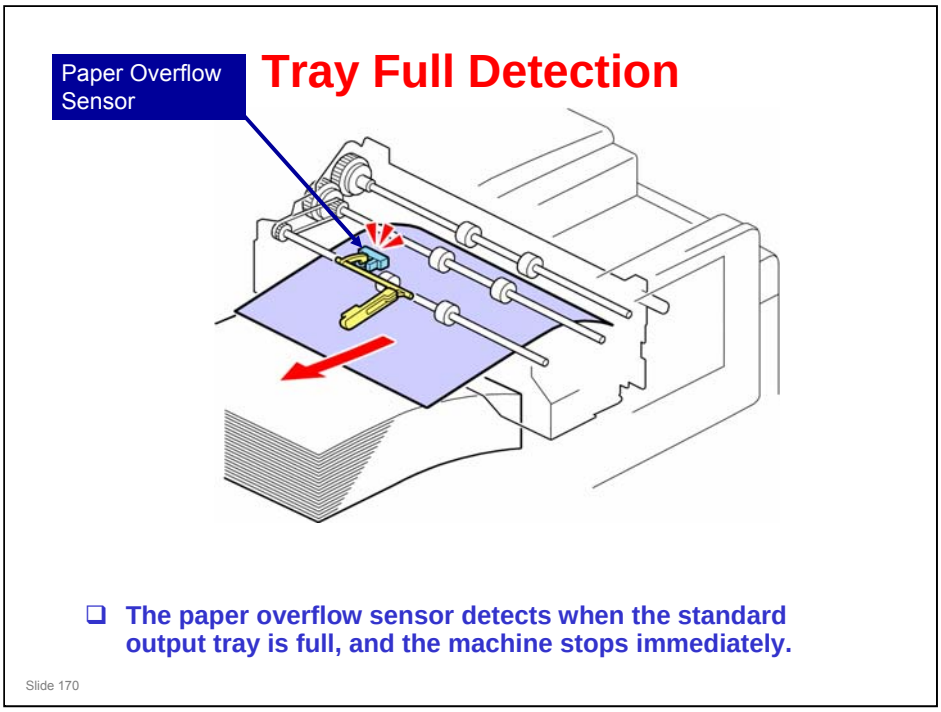
Feed-out to Duplex Feed Path



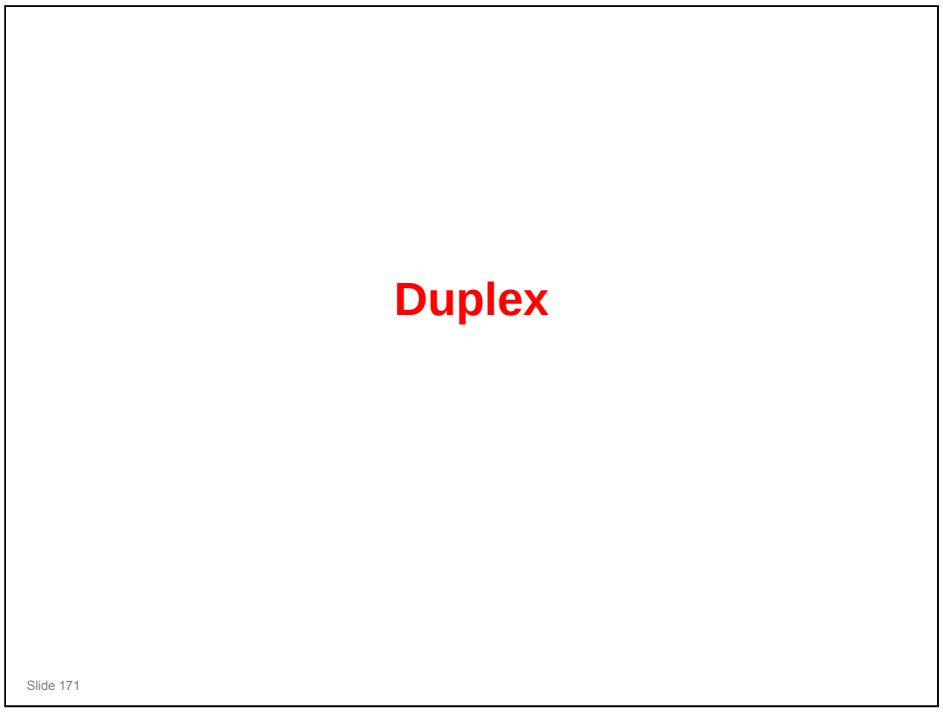
- **When duplex mode is selected, the junction gate closes the paper path to the output tray.**
  - The junction gate also does this when the side tray is selected.

Slide 169

No additional notes



No additional notes



PURPOSE OF THE SECTION

In this section you will:

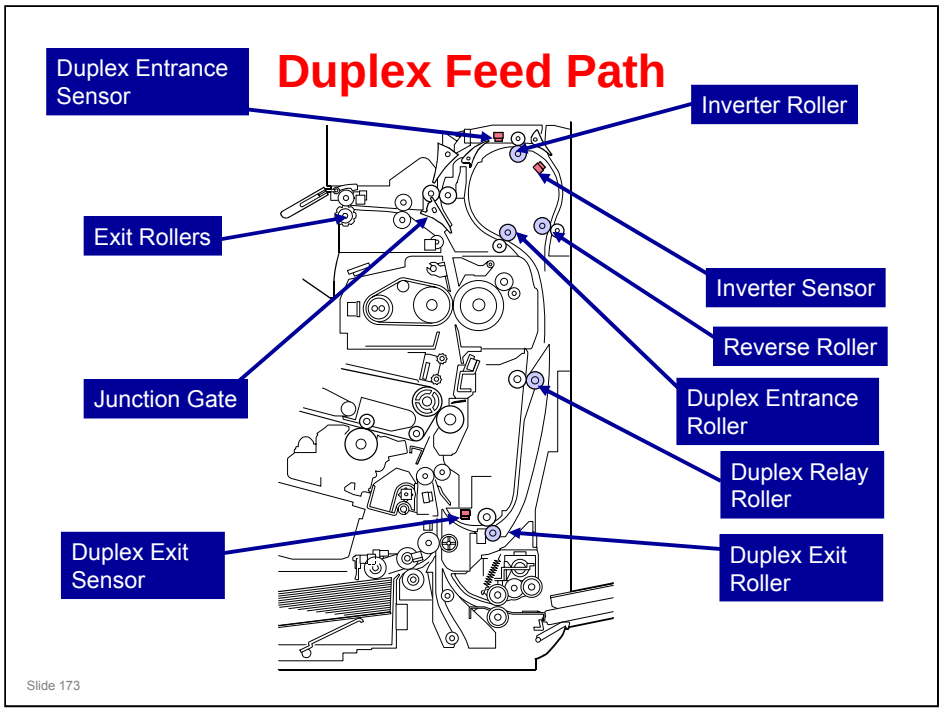
- ❒ Learn how paper is fed in duplex mode.

Overview

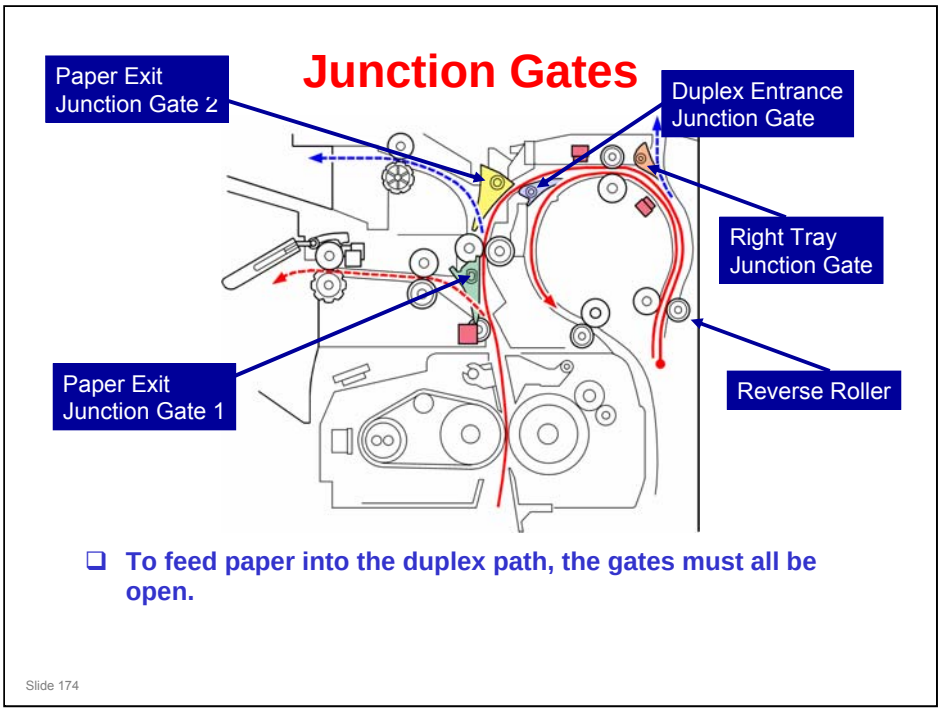
- Feed in: Reverse feeds back into the machine (similar to the Ap series)
- Feed out: Similar to the Di-C1
- Cannot do duplex and bypass feed at the same time.
- The bypass tray stays horizontal when the duplex tray is opened, so that paper does not fall out of the bypass tray.

Slide 172

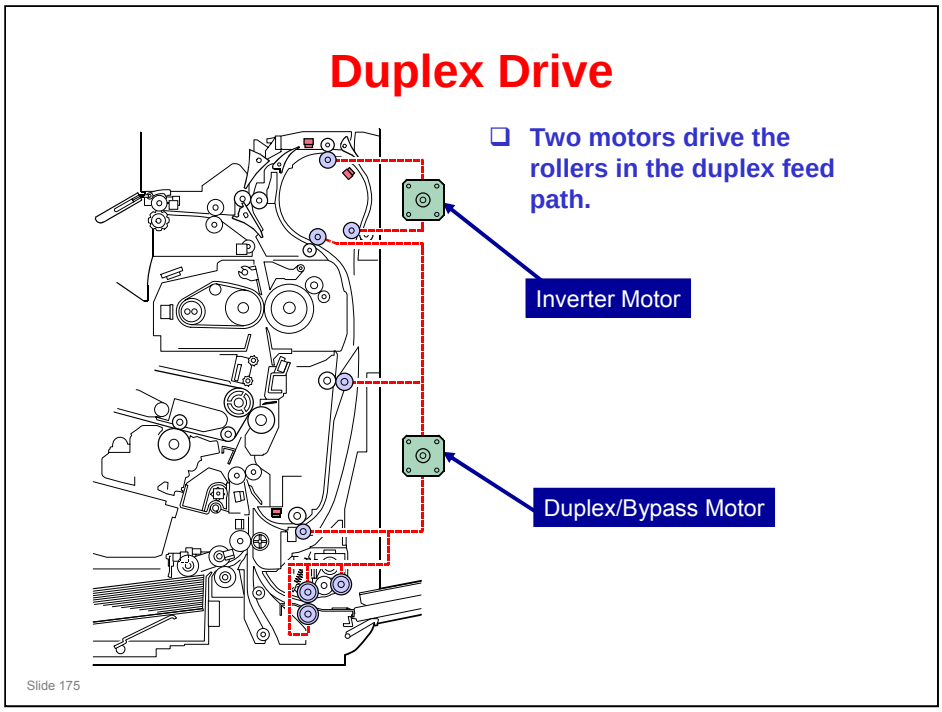
No additional notes



- The duplex exit sensor detects when the paper is ready to feed in to the registration roller to print on the other side of the paper.

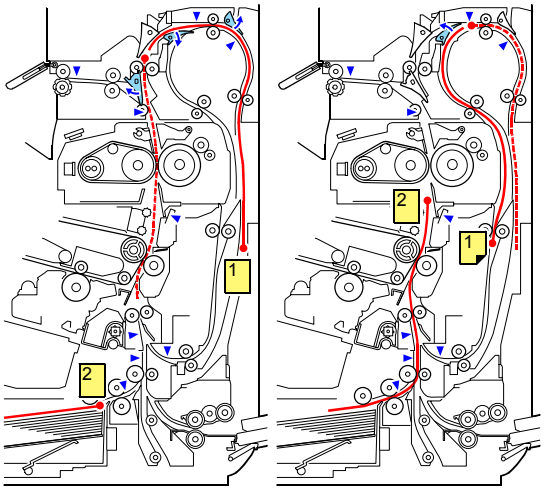


- When a sheet of paper is fed out of the fusing unit, it is fed upwards. The junction gates block the path to the exit rollers, one-bin tray and side tray, so the paper goes to the reverse roller.
- To print on the other side of the paper, the duplex entrance junction gate switches over (to stop the paper from going back into the fusing unit), and the reverse roller feeds the paper back into the machine towards the duplex feed path.



- The inverter motor drives the inverter and reverse rollers.
- The duplex/bypass motor controls the following:
  - Duplex entrance roller (at the start of the duplex feed path)
  - Duplex relay roller (in the middle)
  - Duplex exit roller (at the bottom)
- These rollers transport the sheet of paper from the duplex entrance through to the registration roller.

Duplex Interleaving - 1

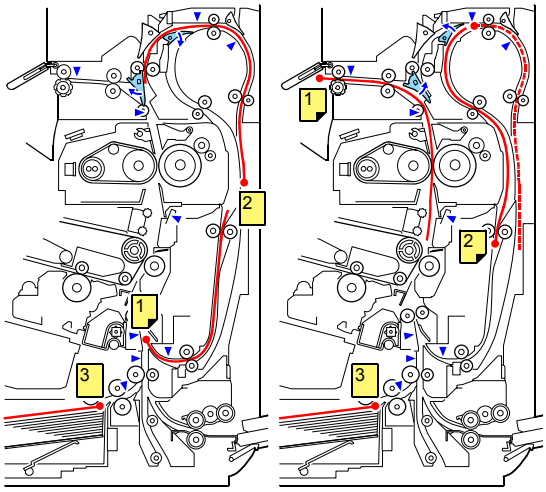


- Two sheets of paper can pass through the machine at the same time.
- Interleaving is not done when the bypass tray is used.

Slide 176

- The machine prints on the reverse side of the first sheet of paper [1].
- Then, the first sheet of paper is fed out of the exit, but not fully.
- Then the reverse roller changes direction and the paper goes to the duplex feed path.
- At the same time, the second sheet of paper [2] is fed from the paper tray between the transfer belt and the transfer roller, and one side is printed.

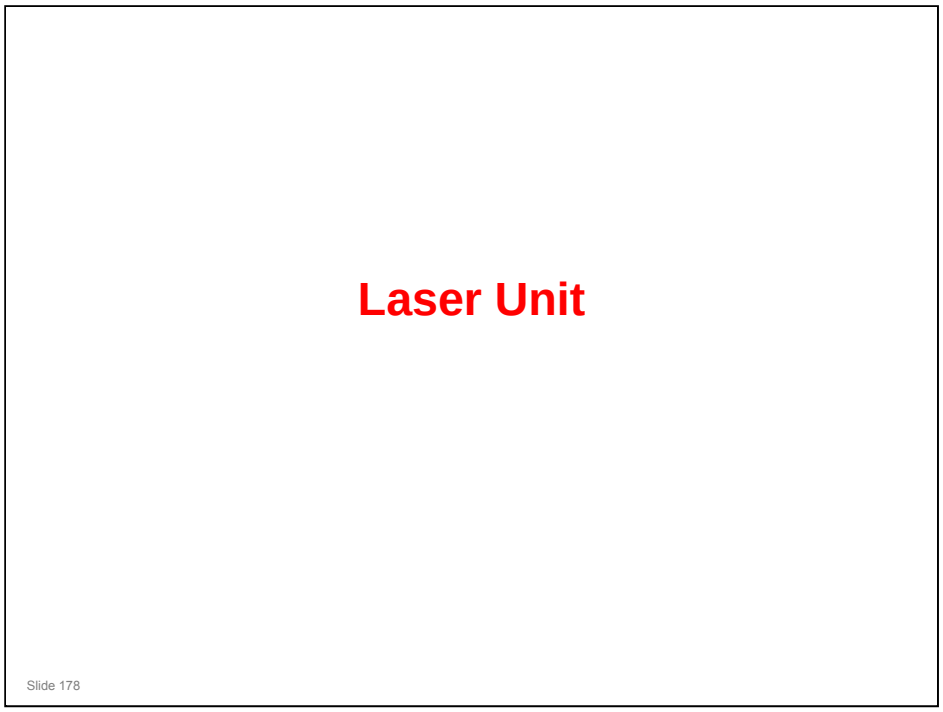
Duplex Interleaving - 2



- Two sheets of paper can pass through the machine at the same time.

Slide 177

- The machine prints on the second sheet of paper [2].
- The second sheet of paper is fed to the paper exit, and into the duplex feed path.
- At the same time, the first sheet of paper [1] is fed between the transfer belt and the transfer roller, and the other side is printed.
- Then the third sheet [3] is fed in from the paper tray.
- The second sheet of paper [2] follows the first sheet of paper in the duplex feed path.



PURPOSE OF THIS SECTION

- ❒ This section describes the laser circuit and safety devices.
- ❒ The unit is the same as in the Z-P1, except that there is no shutter mechanism.

In this section you will:

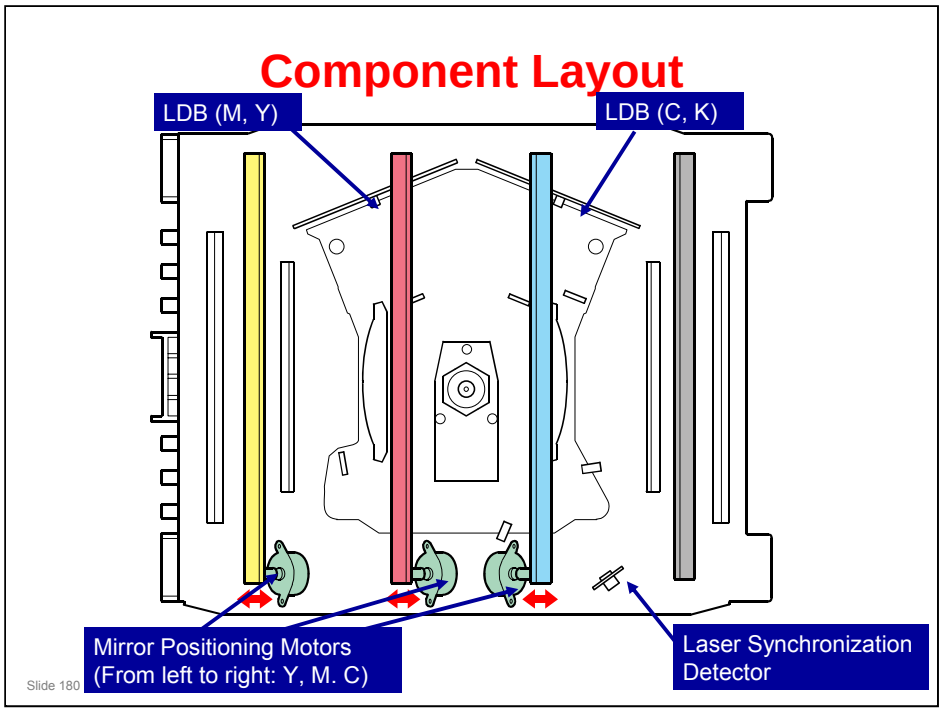
- ❒ Study the optic and electronic components in the laser unit
- ❒ Learn how to do work on the laser unit safely
- ❒ Repair the laser unit

Differences Between Z-C1 and Z-P1

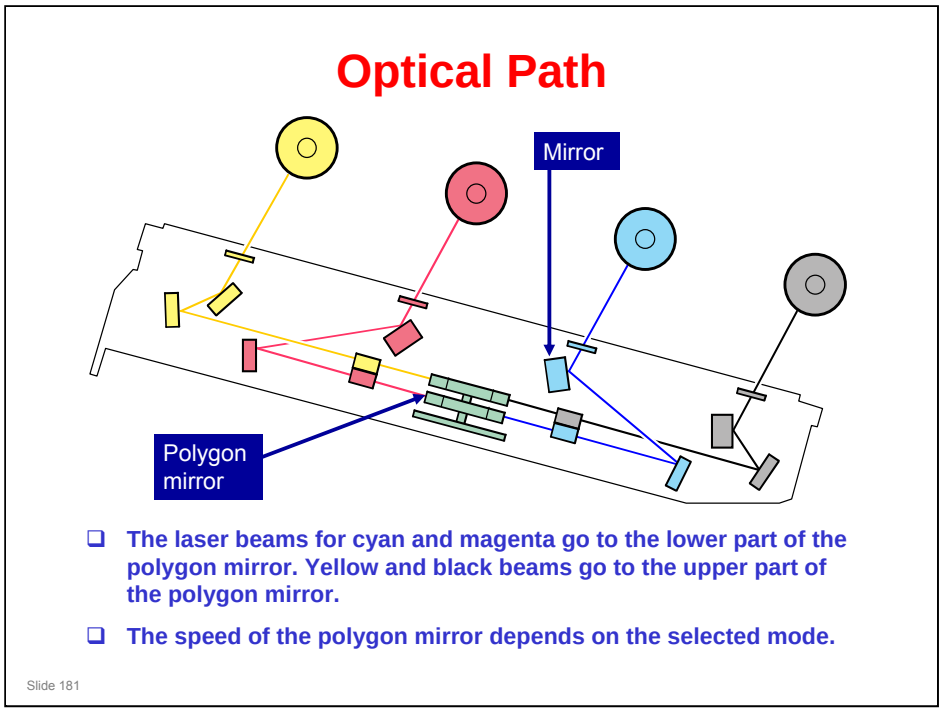
- **Method for Cleaning the Dust Shield Glass**
  - Z-C1: Use the cleaning brush
  - Z-P1: Automatic shutter, with cleaning brush attached
- **The cleaning brush is under the waste toner bottle. So when cleaning, it is necessary to remove the waste toner bottle.**

Slide 179

- The laser unit is similar to the Z-P1.
  - Cannot replace polygon mirror motor
  - Mirror position is adjusted during color registration, not the lens position



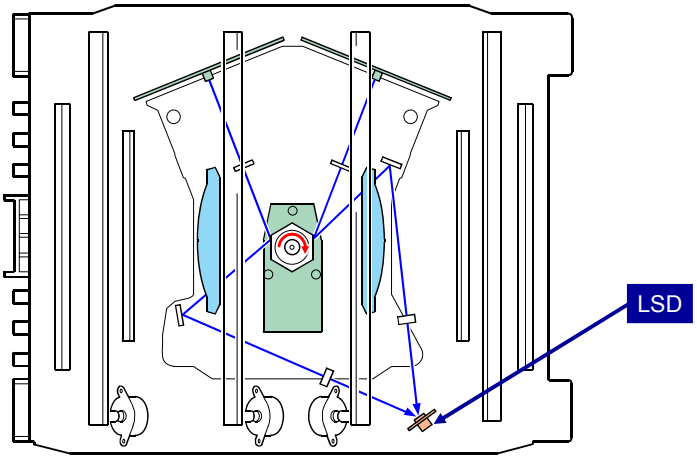
- This machine uses two LDB units and one polygon mirror motor to produce latent images on four OPC drums (one drum for each color toner).
  - Each LDB has two laser diodes.
  - On the LDB (C, K), the laser diode for black is located above the laser diode for cyan.
  - On the LDB (M, Y), the laser diode for yellow is located above the laser diode for magenta.
- There are two hexagonal mirrors. Each mirror reflects beams from two LD units.
- Laser exposure for magenta and yellow starts from the rear side of the drum. But it starts at the front side of the drum for cyan and black. This is because the laser diodes for magenta and yellow are on opposite sides of the polygon mirror from the cyan and black laser diodes.



No additional notes

Mode	Resolution (dpi)	Polygon motor speed (rpm)	Process line speed (mm/s)	Print speed (ppm)
B/W (except OHP/thick paper)	600 x 600	30708.7	260	40
	1200 x 1200	40157.5	85	15
Color (except OHP/thick paper)	600 x 600	30708.7	260	40
	1200 x 1200	40157.5	85	15
OHP/Thick	600 x 600	30708.7	260	40
	1200 x 1200	40157.5	85	15

Laser Synchronizing Detector (LSD)



- The machine has one laser synchronizing detector board. It detects each of the 4 laser beams at the start of the main scan.

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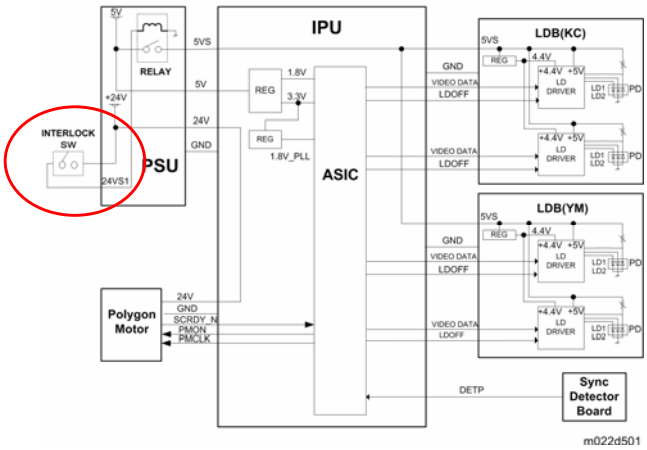
No additional notes

LD Safety Switch

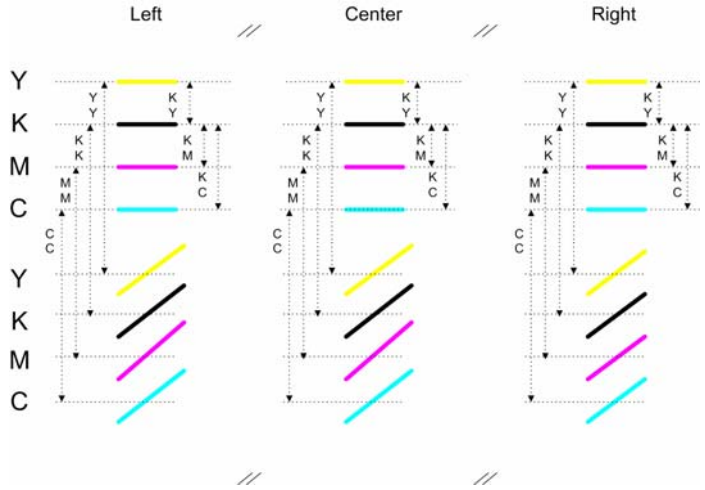


- A safety switch turns off when the front cover is opened.
- As a result, the relay on the PSU cuts off the power supply (+5V) to the two LD boards.

Slide 183

No additional notes

Automatic Line Position (MUSIC)



- YY, KK, CC, MM: Spaces between two lines of the same color
- KY, KC, KM: Spaces between a black line and a colored line

Slide 184

More on Automatic Line Position

- During automatic line position adjustment, the line patterns above are made eight times on the transfer belt. The spaces between the lines (YY, KK, CC, MM, KY, KC, KM) are measured by the left, center, and right ID sensors. The engine reads the average of the spaces, and adjusts the following items:
  - Sub scan line position for YCM
  - Main scan line position for KYCM
  - Magnification ratio for KYCM
  - Skew for YCM

Tolerance specifications for skew and color registration

- Skew
  - Paper width below B5 SEF: 0.6 mm
  - Paper width B5 SEF and higher: 1.1 mm

Adjustment Conditions

- **If SP 2193 1 is set to 'on', then automatic line position adjustment is done at the following times.**
  - Initialization
    - » Immediately after power is turned on
    - » Immediately after recovery from energy saver mode
  - During a job
  - At the end of a job
  - When a door or cover is opened
  - During standby mode
  - When a new PCDU is detected
  - Forced adjustment (can be done with SP mode at any time)

Slide 185

- There is no adjustment after process control.

Initialization

- **The adjustment is done immediately after the main power is turned on or the machine comes back from energy saver mode, if one of the following conditions occurs.**
  - The time after the drum motor stops or the main power was last turned on exceeds a certain value (SP3522-002)
  - The temperature change since the previous line position adjustment exceeds a certain value (SP2193-008/011)
  - The number of prints since the previous line position adjustment exceeds a certain value (SP2193-016)
- **The adjustment is done either once or twice (or not at all), depending on the temperature change since the previous line position adjustment.**

Slide 186

No additional notes

During a Job

- **The job is interrupted and the adjustment is done once, if one of the following conditions occurs:**
  - Number of prints since the previous line position adjustment exceeds 200.
    - » SP 2193-004/005
  - Time since the previous line position adjustment exceeds a certain value
  - Temperature change since the previous line position adjustment exceeds a certain value
- **The machine checks the above conditions every 10 pages (SP 3512 001).**

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No additional notes

At the End of a Job

- **At the end of a job, the adjustment is done once, if one of the following conditions occurs:**
  - Number of prints since the previous line position adjustment exceeds 200 (full color) or 500 (if there are black-and-white pages in the job).
    - » SP 2193-002/003
  - Time since the previous line position adjustment exceeds a certain value
  - Temperature change since the previous line position adjustment exceeds a certain value

Slide 188

No additional notes

After a Cover is Opened and Closed

- **After a cover is opened or closed, the adjustment is done once (or twice), if one of the following conditions occurs :**
  - Time since the previous line position adjustment exceeds a certain value
  - Temperature change since the previous line position adjustment exceeds a certain value

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No additional notes

In Standby Mode

- **In standby mode (but not Energy Saver mode), the adjustment is done once, if one of the following conditions occurs:**
  - Time since the previous line position adjustment exceeds a certain value
  - Temperature change since the previous line position adjustment exceeds a certain value
  - Number of prints since the previous line position adjustment exceeds a certain value.
- **The machine checks the above conditions in standby mode every 10 minutes (SP 3512 002). Then, line position adjustment is done if one of the following conditions occurs:**
  - Time and number of prints have both exceeded a certain value since the previous adjustment.
  - Temperature and number of prints have both exceeded a certain value since the previous adjustment.

Slide 190

No additional notes

New PCDU Detected

- When the machine detects a new PCDU, line position adjustment is automatically done twice.

Slide 191

No additional notes

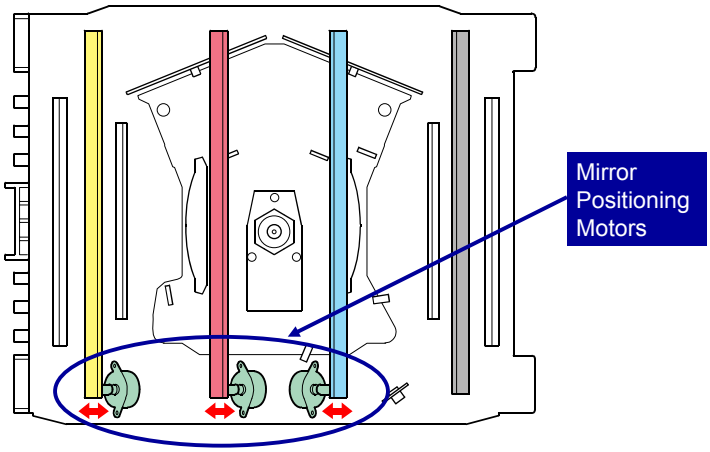
Forced Line Position Adjustment

- **You can do this at any time with SP 2111.**
  - This adjusts the main scan and sub scan.
  - The user tool (called 'Color Registration') only adjusts the main scan.
- **It must be done after installing a new laser optics unit, or after moving the machine.**
- **Normally, do SP 2111 003 first. Then do SP 2111 001.**
  - The screen displays the results of SP 2111 001. Also, you can see SP 2194 007 (0: Successful, 1: Failed).
  - If you do the rough adjustment, then you must follow immediately with the fine adjustment.
- **If the error is more than 1.4 mm, the fine adjustment cannot correct it.**
  - If this happens 4 times, SC285 occurs.

Slide 192

- 2111-002 and 004 are for factory use only.

Main Scan Skew Adjustment



- **The motors automatically adjust the angle of the mirror below the laser exit for each colour, based on the mirror position for black.**
  - The mirror position for black is adjusted in the factory.
- **This mechanism corrects main scan skew.**

Slide 193

- This is similar to Di-C1 and Pe-MF1.
- In the G-P3, there is no automatic adjustment. An adjustment cam for C, M, and Y can be adjusted with a screw driver.

Practical Work

- Turn off the main power switch and unplug the printer before you do the procedures in this section of the machine. Laser beams can cause serious eye injury.

Slide 194

No additional notes

Laser Unit Replacement (1)

- **First, prepare the new laser unit.**
- **Then, before you switch the machine off, you must make some SP adjustments.**
  - These SP adjustments do the following:
    - » Move the mirror positioning motors back to home position.
    - » Reset the main scan start position and laser power settings.
  - Note: If you forget to do these SP adjustments, there is a recovery procedure in the manual. Do this before you do the 'After installing the laser unit' procedure.
- **After you install the new unit, do the SP adjustments, and the line position adjustment, as explained in the manual (also see the next slide).**

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Field Service Manual, Replacement and Adjustment, Laser Optics

- Make sure that you understand the points on this slide before you start the procedures.
- If the mirror positioning motors are not reset, the motors in the new unit will be at the home position, but the SP setting could be different. This could cause errors in skew correction.
- If the main scan start position is not reset, the main scan will start in the wrong place, and this will cause colour registration errors across the page.
- If the laser power settings are not reset, the output for the affected colours will be too bright or too dark.

Laser Unit Replacement (2)

- **The sheet that is packed with the new laser unit clearly shows which numbers to store in the SP modes.**
  - Input the numbers from the lower part of the chart, as shown by the red square in the diagram.
- **If that is not enough, look at the replacement procedure in the field service manual for a full explanation of the SP modes that must be input.**
- **If the SP settings are not input correctly, it may cause color registration errors.**

Slide 196

No additional notes

PCDU (Photoconductor and Development Unit)

OPC Drum

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PURPOSE OF THIS SECTION

- ❒ In this section, you will study the components around the drum. This includes the drum, drum charge, drum cleaning, and toner recycling.

In this section you will:

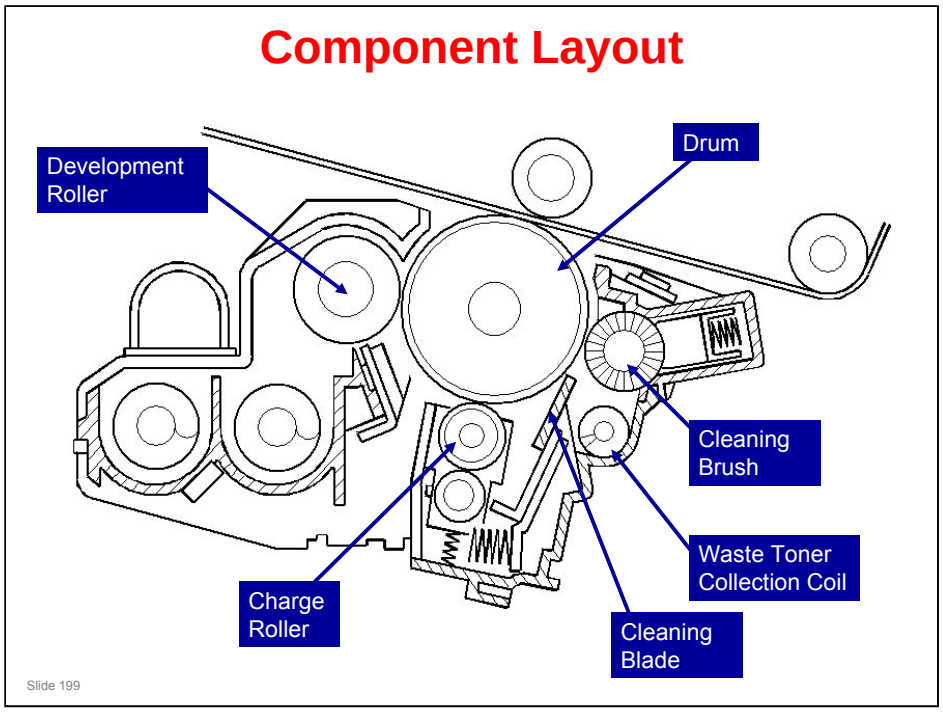
- ❒ Study the components of the PCDU
- ❒ Study the components around the drum

Differences Between Z-C1 and Z-P1

- **Z-C1**
  - Maintenance method: Technician maintenance
  - PCU and Development Unit replaced as separate units
- **Z-P1**
  - Maintenance method: User maintenance
  - PCDU is replaced as one unit

Slide 198

- These are the main differences from the Z-P1. Other differences will be mentioned in the relevant parts of this section.



- The PCDU for this machine is similar to the one for the G104/G160/G190 series printers.
- The machine has four PCDUs, one for each color, and each PCDU has the following.
  - OPC drum
  - Charge roller
  - Cleaning brush
  - Cleaning blade
  - Development unit
- The photoconductor gap between the drum and the corresponding development roller is set by the drum positioning plate. You cannot adjust this in the field.

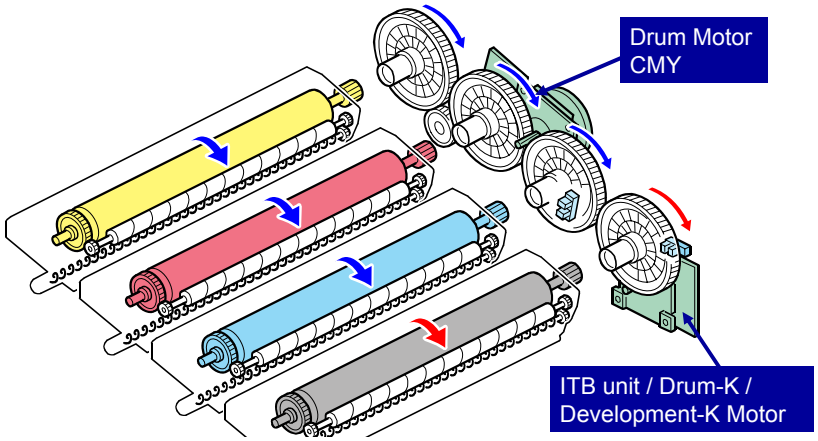
Power Supply to the PCDU

- **Power is supplied through metal plates on the underside of the PCDU.**

Slide 200

- G-P1 series: Power is supplied from the drum positioning plate

Drum Drive

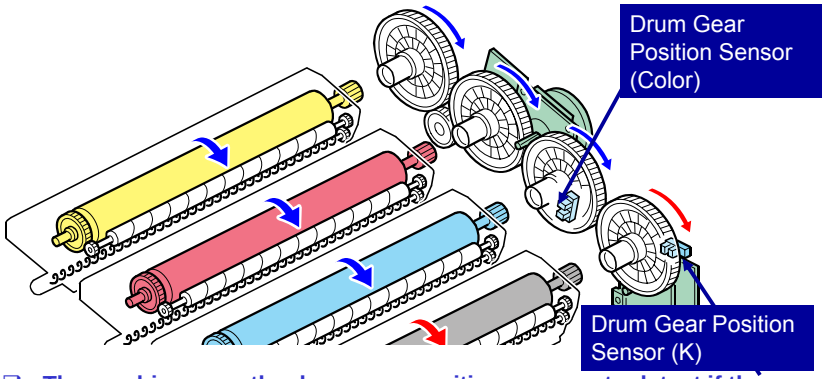


- The ITB unit / Drum-K / Development-K motor controls the PCDU for black.
- The drum motor: CMY controls the PCDUs for magenta, cyan, and yellow. One motor controls these three drums to help reduce the CMY color registration errors.

Slide 201

No additional notes

Drive Gear Position Sensors



- **The machine uses the drum gear position sensors to detect if the drum motors turn.**
  - SC 380 (K) or 381 (CMY) occurs when the drum motor does not move.
- **These sensors also help the machine to initialize the positions of the gears when the main switch is turned on and at initialization.**
  - This prevents changes between printouts in how the gears engage. This can cause changes in copy quality.

Slide 202

- There is an actuator on each of the black and cyan drum gears. The drum gear position sensors detect the positions of these actuators. This mechanism makes sure that output quality does not change. The magenta and yellow drum gears operate with the cyan drum gear because these three drum gears are connected through other gears.
- In the ready condition, if the two actuators are not in the home position, the machine adjusts the position of the black drum gear.
- When a drum gear position sensor has found an error, an SC code is shown. The following shows the steps of the initialization procedure, possible errors, and corresponding SC codes.
  - Step 1: The four drums turn at the same time for seven seconds. The drum position sensors detect the drum gear interrupters several times.

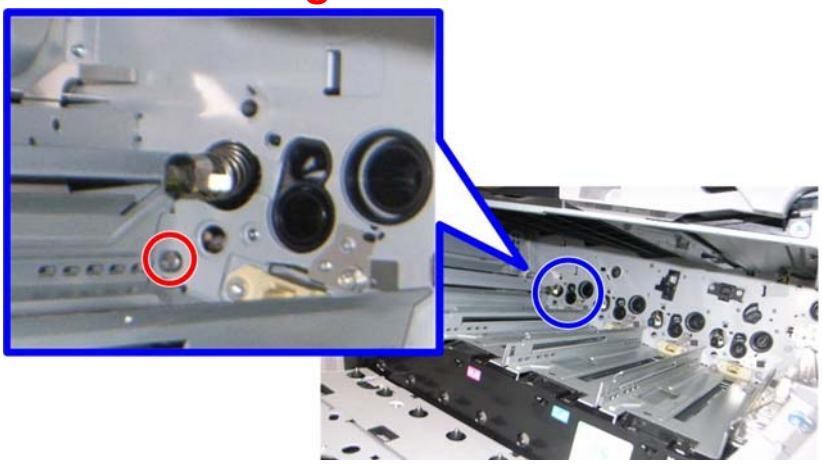
    If the black drum gear actuator is not detected: SC 380

    If the color drum gear actuator is not detected: SC 381

    If both black and color drum gear actuators are not detected: SC 380
  - Step 2: The time lags between detection of the black drum gear interrupter and detection of the color drum gear interrupter are checked. The average time lag is calculated.
  - Step 3: The black drum turns. The position of the gear is adjusted for the average time difference.

    If the black drum gear actuator is not detected: SC 380
- If the connector of the black drum position sensor is connected to the color drum position sensor (and the connector of the color drum position sensor is connected to the black drum position sensor), no errors are detected.

Installing a New Gear Unit

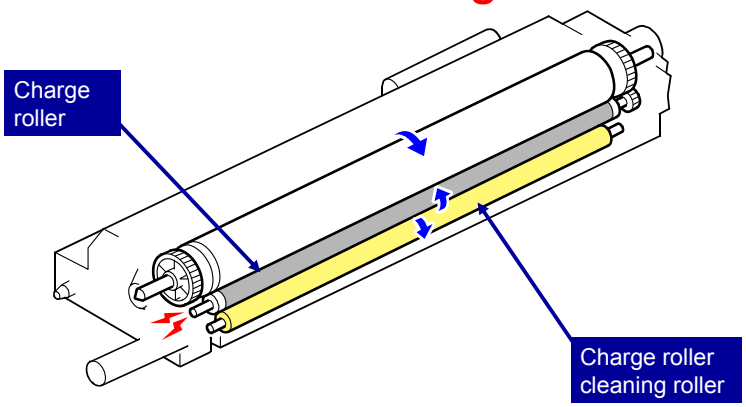


- Make sure that the positioning pin (red circle) is set correctly (blue circle) when installing the gear unit.

Slide 203

- There is no need to do a drive gear position adjustment.
- Also note that when the PCDU or image transfer belt unit is replaced, the drive gear position is adjusted automatically.

Drum Charge



- **The machine uses a charge roller to give the drum surface a negative charge.**
  - The high voltage supply board gives a dc and ac voltage (at a constant current) to the roller. The ac voltage helps to make sure that the charge given to the drum is as constant as possible.

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- The high voltage supply board is at the rear of the machine.
- The charge roller has been improved over previous models, to prevent black streaks on prints.
- The machine automatically controls the charge roller voltage if automatic process control is enabled (SP 3041 1 is set to 1). However, if process control is turned off, (SP 3041 1 is set to 0), the dc voltage is the value stored in SP 2005 1 to 4 (Do not adjust this in the field unless instructed to do so).
- The cleaning roller, which always touches the charge roller, cleans the charge roller.
- There is no quenching lamp.

Charge Roller Voltage

- **The charge roller gives the drum surface a negative charge.**
- **An ac voltage is also applied to the charge roller, at a constant current.**
  - The ac voltage helps to ensure that the charge given to the drum is as uniform as possible.
- **The high voltage supply board - CB, at the rear of the machine, supplies the ac and dc to the charge roller.**
- **The machine automatically controls the charge roller voltage if automatic process control is enabled.**

Slide 205

No additional notes

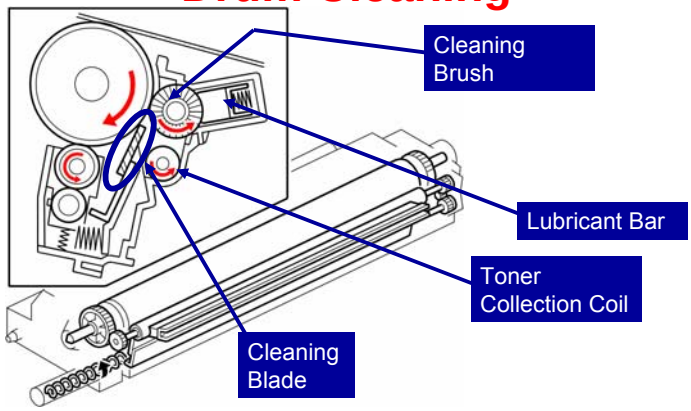
Design Improvement

- In earlier models, there was a problem with uneven image density in halftone images caused by dirt on the charge roller with the passage of time.
- The design has been improved by expanding the gap between the charge roller and the OPC.
  - G-P1 = 19 µm
  - Z-C1, Z-P1 = 34 µm

Slide 206

No additional notes

Drum Cleaning



- The cleaning brush spreads out the waste toner on the drum. The lubricant bar lubricates the brush. Then the cleaning blade removes the waste toner.
- The toner collection coil moves the toner to the waste toner collection duct.

Slide 207

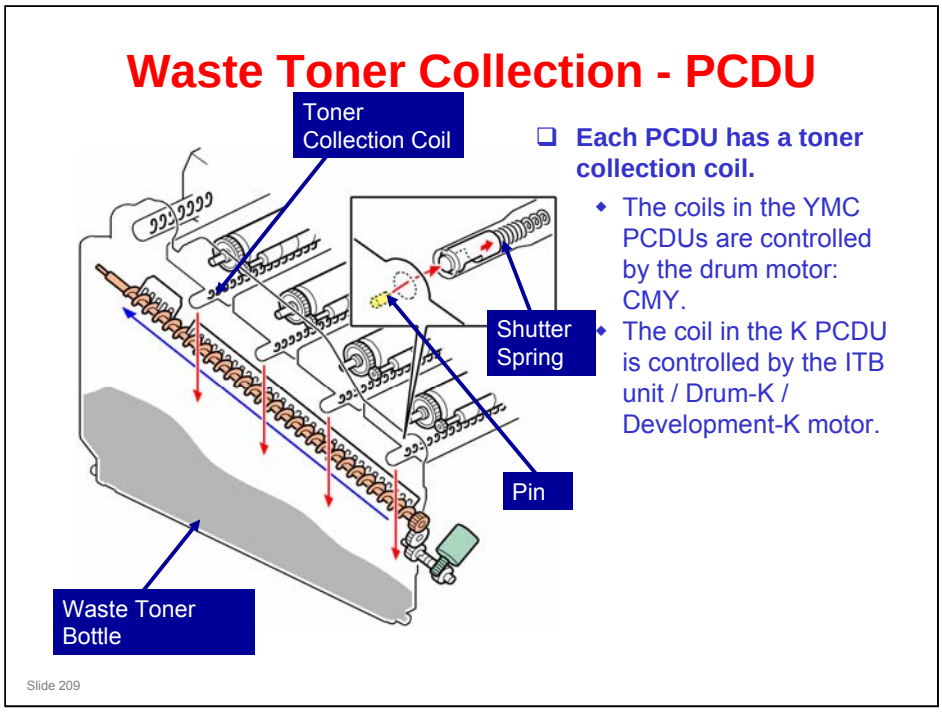
- The lubricant reduces friction between the drum and the cleaning blade, and this makes it easier to remove the waste toner.

Quenching

- **In the G-P3, the laser exposes all areas of the drum at the end of each job.**
  - This removes any charge remaining on the drum.
- **The Z-C1 does not do this, because the OPC drum has been improved to prevent residual charge.**
  - The new OPC material used for this drum makes it difficult for charge to remain on the drum surface after transfer.

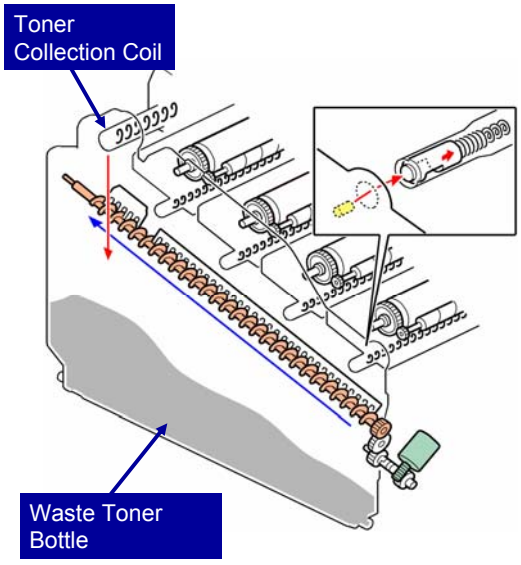
Slide 208

No additional notes



- The waste toner from the collection coils in the four PCDUs falls into the waste toner bottle from the four openings at the front of the PCDUs. The toner collection coils move this waste toner towards the waste toner bottle.
  - There is another opening for the waste toner from the transfer belt unit: see the next slide for more on this.
- The waste toner bottle has five seals (one at each entrance). These do not let the waste toner scatter at the entrances.
- The pin at each waste toner entrance pushes the shutter spring at the front of the PCDU. Because of this, waste toner can fall into the waste toner bottle. If the left cover is open, the waste toner does not come out from the front of the PCDUs.

Waste Toner Collection – Transfer Unit



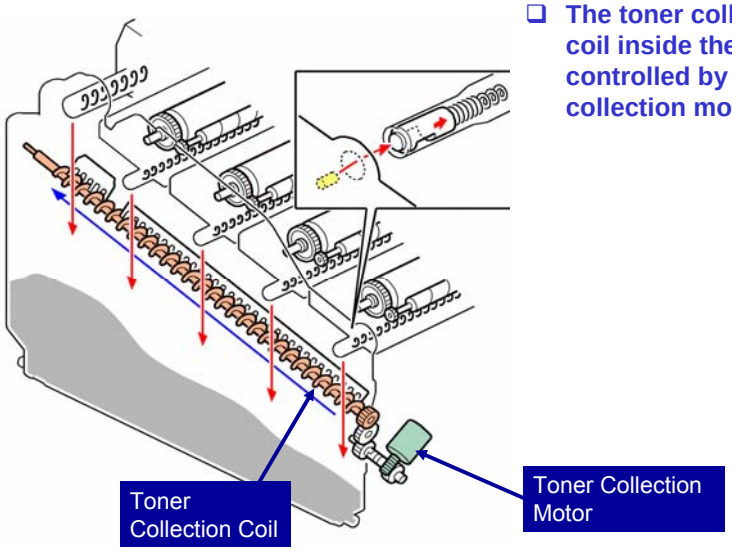
- This waste toner collection coil is driven by paper transfer roller contact motor.

Slide 210

- The waste toner from the transfer belt cleaning unit falls into the waste toner bottle from a different opening.

Waste Toner Collection – Bottle

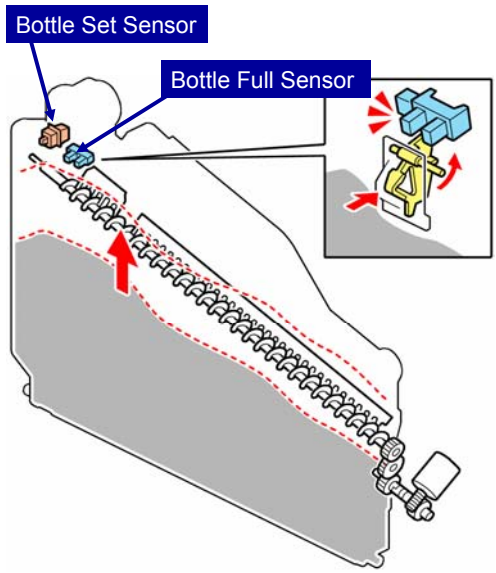
- The toner collection coil inside the bottle is controlled by the toner collection motor.



Slide 211

No additional notes

Waste Toner Bottle Full/Set Detection

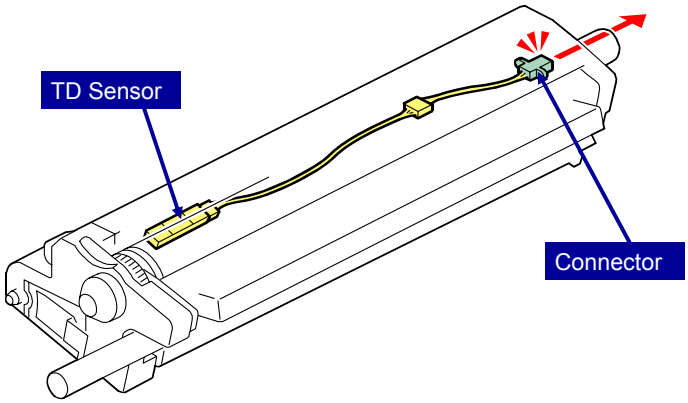


- **Waste toner bottle set sensor: Detects when the left cover is open. It also detects if the waste toner bottle is put in the machine.**
- **Waste toner bottle full sensor: Detects when the bottle is almost full (2000 more pages can be printed).**

Slide 212

- The waste toner bottle set sensor in the main frame detects when the left cover is open. It also detects if the waste toner bottle is put in the machine. If 'Close Front/Left Cover' appears on the LCD when the cover is closed, check if the waste toner bottle is in the machine.
- The waste toner bottle full sensor detects when the bottle is almost full. When the bottle contains a set quantity of waste toner, the sensor turns off. The machine detects that the waste toner bottle is almost full. After that, the machine can print approximately 2000 more sheets. After printing 2000 sheets, “Replace Waste Toner bottle” appears immediately, even if it is not the end of job. At this time, the printer cannot be used until the bottle is replaced or emptied.
- The number of sheets is calculated for a paper size of A4 and an image coverage ratio for each color of 5%.

PCDU Detection



- The machine uses this connector to detect if the PCDUs are in the machine.
- Each PCDU is detected through this connector when the drum positioning plate is attached.

Slide 213

- This mechanism is different from the G-P3.
- The machine uses a circuit in the TD sensor to detect if a new PCDU is installed.

PCDU (Photoconductor and Development Unit)

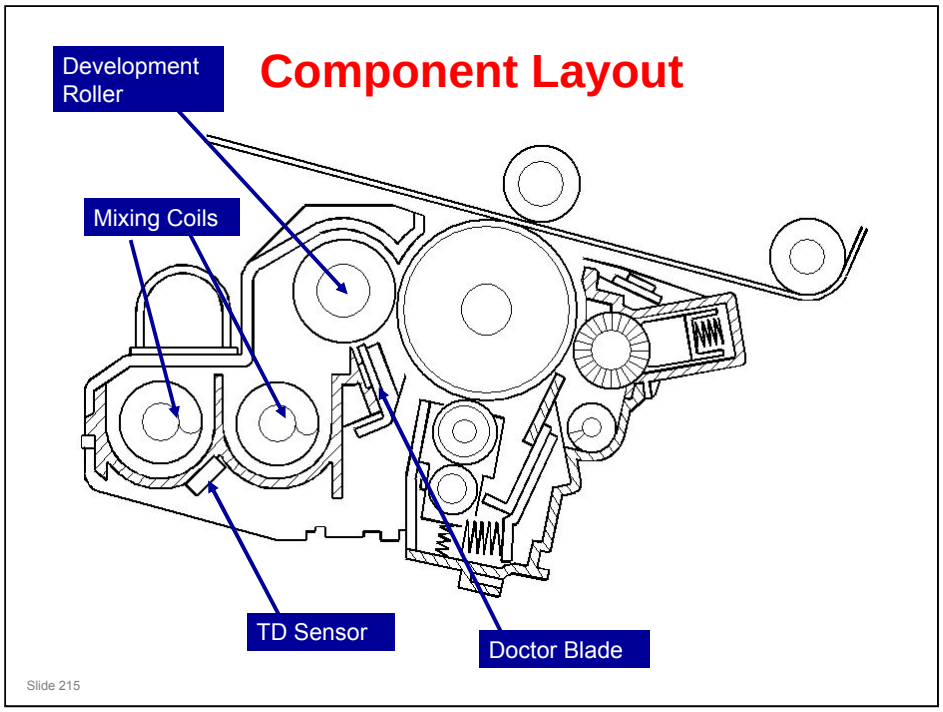
Development

Slide 214

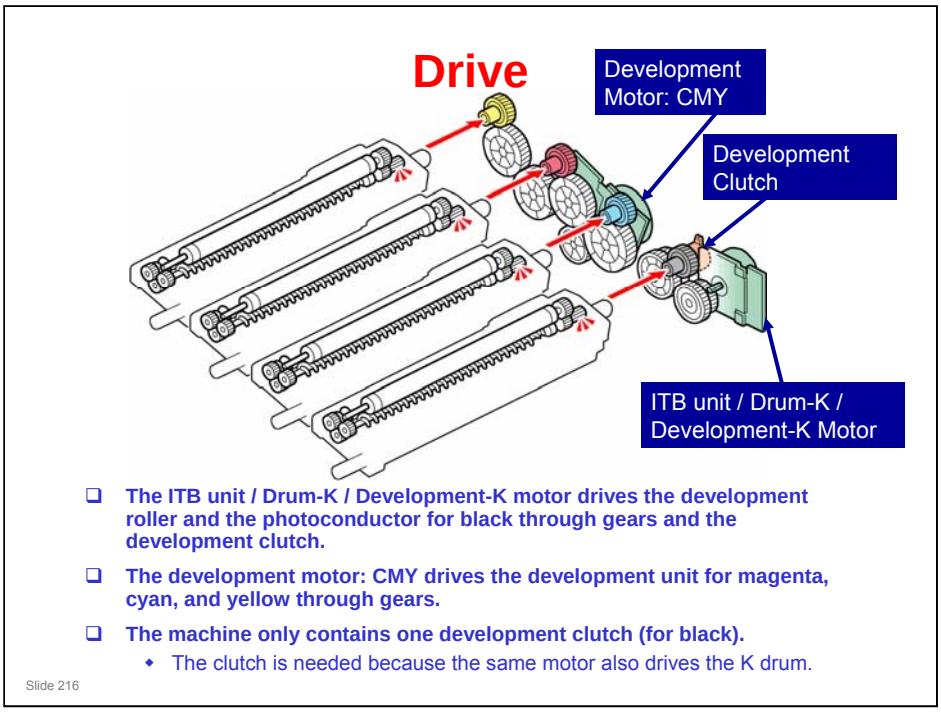
PURPOSE OF THE SECTION

In this section, you will:

- ❒ Learn about the development process.



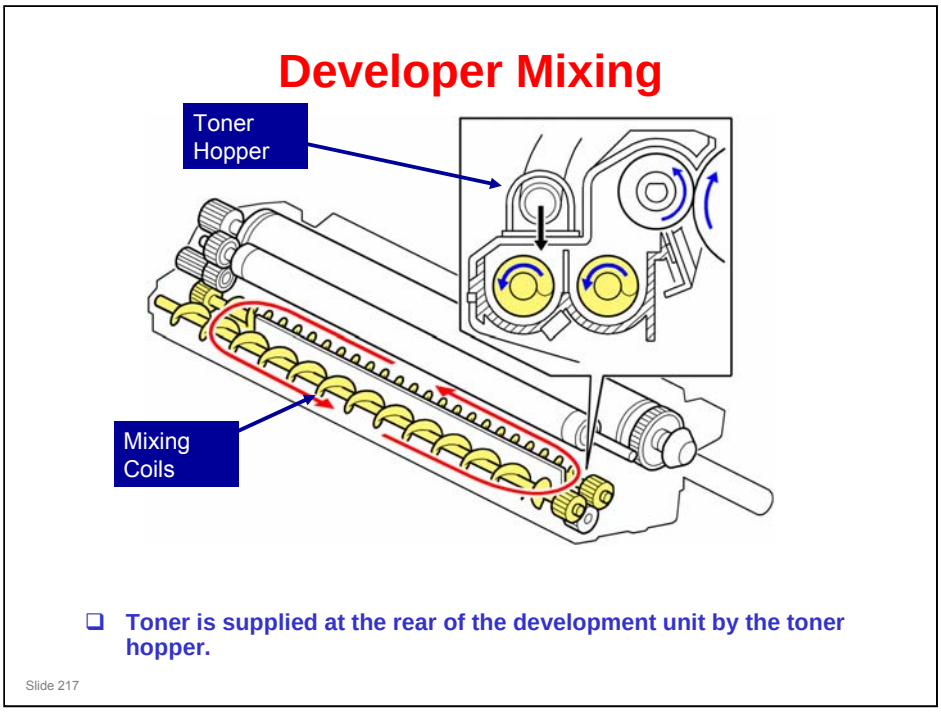
- This machine has four development units, one for each color.
  - The development unit is part of the PCDU.
- The two mixing coils send developer from unit to the development roller. Electrostatic attraction moves the developer to the surface of the roller.
- The drum positioning plate sets the photoconductor gap between the drum and the development roller. You cannot adjust this the field.
- The TD sensor detects toner density. Each development unit has a TD sensor.



- **The ITB unit / Drum-K / Development-K motor drives the development roller and the photoconductor for black through gears and the development clutch.**
- **The development motor: CMY drives the development unit for magenta, cyan, and yellow through gears.**
- **The machine only contains one development clutch (for black).**
  - The clutch is needed because the same motor also drives the K drum.

Slide 216

No additional notes



More on Developer Mixer

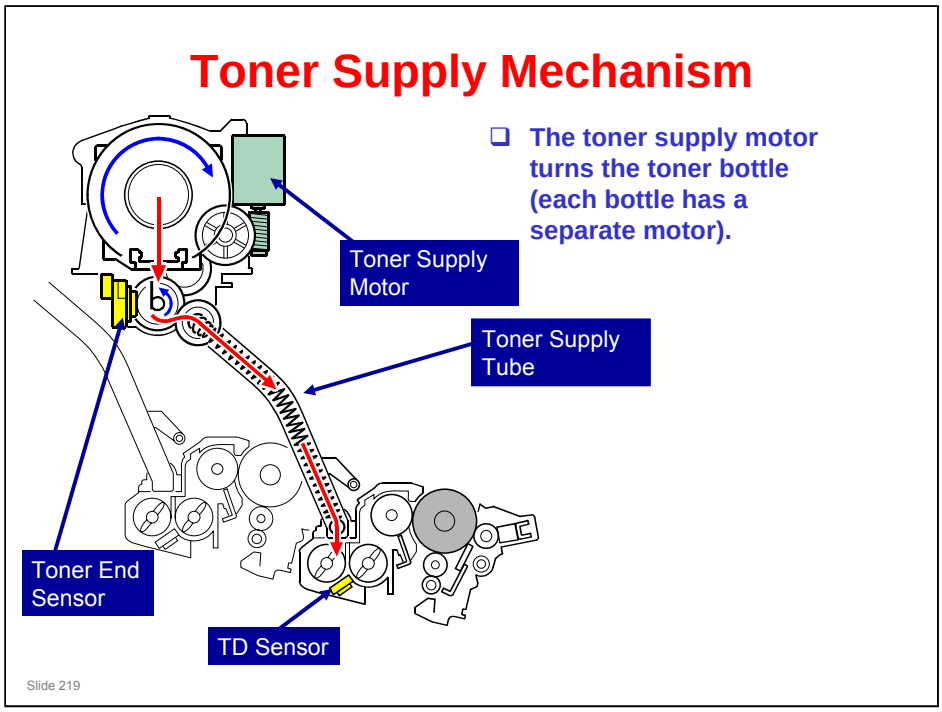
- Two mixing augers coils move the developer forward and rearward to mix the developer at the following times:
  - Immediately after a new PCDU is installed.
  - During the process control self check
  - During toner supply
  - During development.
  - If absolute humidity changes more than ± 6 g/m3 (e.g. from 23° C/ 50% to 27° C/ 70%). You can change the humidity threshold with SP 3522 5.

Development Bias

- The HVPS: CB board supplies development bias to the development roller at the metal plate at the front of each development unit.
- There are ac and dc bias voltages. The ac bias improves toner transfer to the drum.
- The machine automatically controls the dc bias, if automatic process control is enabled. However, if process control is turned off, (SP 3041 1 is set to 0), the dc bias is the value stored in SP 2229 1 to 4.
  - Do not adjust this in the field.

Slide 218

No additional notes



The toner supply tube is different from the Z-P1 (different part number); this is because the length of the tube is different.

- When the toner supply drive mechanism starts, the toner bottles turn and the groove moves toner to the mouth of the bottle. Here, toner spills into a hopper. Mylar blades turn and move the toner to an opening in the side of the hopper. Then the toner falls into the development unit. The quantity of toner that is added is controlled by the length of time that the toner supply mechanism turns.

Toner Near End

- To detect toner near-end, the machine uses:
  - Pixel count (memory chip on the toner bottle)
  - Toner supply motor rotation count

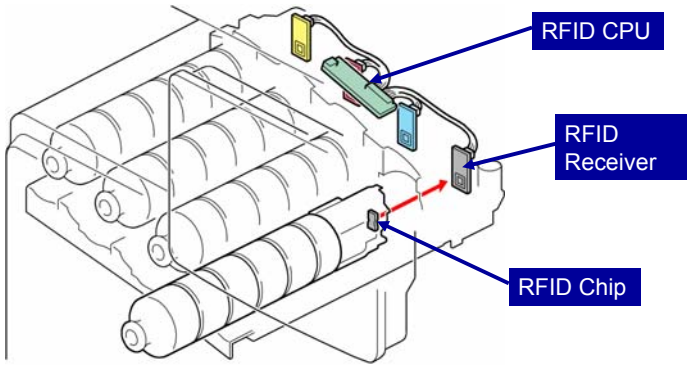
Toner End

- To detect toner end, the machine uses:
  - Output from the toner end sensor

Removing the Toner Supply Mechanism

- In the G-P3, the toner supply tube is full of toner. In the Z-P1, it is not.

Toner Near-end and End Detection



- **To detect toner near-end, the machine uses:**
  - Pixel count (RFID chip on the toner bottle)
  - Toner supply motor rotation count
- **To detect toner end, the machine uses:**
  - Output from the toner end sensor

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❒ Each bottle has a RFID chip.

Toner Near-end Detection

- **To detect toner near-end, the machine uses the following data:**
  - Toner supply motor rotation counter
  - Pixel counter
  - Toner end sensor
- **If one (or both) of the counters detect that the remaining toner amount is less than a set value (see below), the machine enters the near-end condition.**
  - 45 g (1500-3000 sheets at 5% coverage)
- **Also, the toner end sensor checks for the near-end condition when there are only 100 sheets left.**
  - This occurs when the bottle is empty, but a small amount of toner remains in the sub hopper.

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No additional notes

Toner End Detection

- **The toner end sensor checks for toner in the hopper, and if it detects toner, the toner end condition is cancelled.**
  - If toner end is detected for black, the toner bottle must be replaced or the machine cannot print.
  - If toner end is detected for C, M, or Y, the machine can print in black and white only. Colour print jobs cannot be started.
    - » If C, M, or Y toner ends during a colour-printing job, the job is suspended until toner is supplied.
    - » If new colour toner is not installed, the user can print black-and-white jobs only.

Slide 222

No additional notes

Toner End Recovery

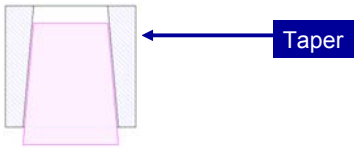
- **The machine assumes that the toner cartridge was replaced if either of the following occurs when the near-end or end status exists:**
  - The front cover is opened and closed.
  - The main switch is turned off and on.
- **Then the machine starts to supply toner to the development unit.**
- **Then, the machine clears the toner near-end or end status if the toner end sensor detects that toner was supplied.**
- **The machine tries to supply toner for a maximum of 100 times. If the sensor still does not detect toner, there is no recovery from toner end.**

Slide 223

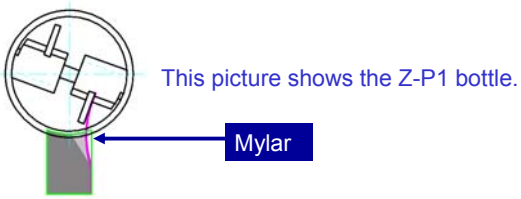
No additional notes

Countermeasures For Toner Packing

- **Countermeasure 1: Change the taper angle of the mouthpiece (Current: 0.1 degree -> 8 degrees) (Z-P1: 5 degrees)**
  - The higher the tapering angle, the wider the cross section at the bottom.
  - This makes toner fall down easier.



- **Countermeasure 2: Mylar in the toner supply mouthpiece**
  - Break the packed toner physically by flipping the mylar when the toner bottle rotates.



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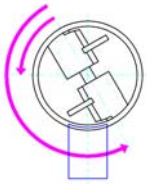
No additional notes

Countermeasures For Toner Packing

- **Countermeasure 3: Increase the time of bottle rotation. (0.1 sec/cycle -> 0.3 sec/cycle)**
  - Drive time: 0.1 sec, rotation angle: 60 degrees
  - Drive time: 0.3 sec, rotation angle: 180 degrees



This picture shows the Z-P1 bottle.

- **Countermeasure 4: Change the maximum number of cycles that are made to supply toner (50 -> 100 cycles)**

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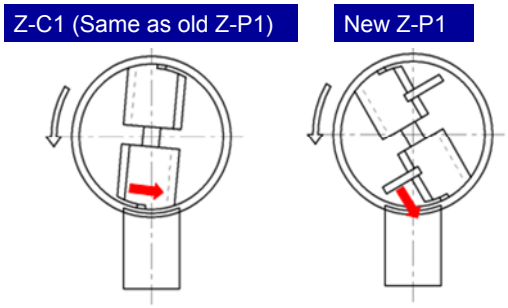
No additional notes

Countermeasures For Toner Packing

- **The Z-P1 bottle has one more countermeasure**
  - Bottle agitator (there is a rib for pushing the toner)
    - » The force applied when pushing the toner out was increased by adding a rib to the agitator.



Slide 226

No additional notes

PCDU (Photoconductor and Development Unit)

Replacement Procedures

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❒ This section covers the main points about replacement procedures for the PCDU section.

Differences from Z-P1

- In the Z-P1, the PCDU is replaced as a complete unit.
- In the Z-C1, the PCU and development units can be replaced separately.

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No additional notes

New Unit Detection (1)

- **The TD sensor assembly contains the ID chip. This chip tells the machine if the PCDU or development unit is new or not.**
- **Note: The TD sensor is attached to the development unit, not the PCU**
- **When the machine detects a new PCDU, the machine automatically does the following:**
  - PM counter clear for items related to the PCDU
  - Developer initialization
  - Charge roller voltage control
  - Process control
  - Line position adjustment

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- SP 3901: Turns new PCDU detection off

New Unit Detection (2)

- **If you install a new drum unit only, the machine does not detect it automatically.**
  - Then, you must reset the PM counter for the drum unit.
  - To do this, set SP 3902 009 (K), 010 (C), 011 (M), or 012 (Y) to 1 before you start to work on the machine.
- **If you install a new development unit only, the machine detects it automatically and resets the PM counter. But, the ID chip in the new development unit will also reset the PM counter for the drum if you do not do the following:**
  - Set SP 3902 001 (K), 002 (C), 003 (M), or 004 (Y) to 1 before you start to work on the machine.
- **If you install a new PCDU, the machine detects it automatically. Do not change SP 3902.**

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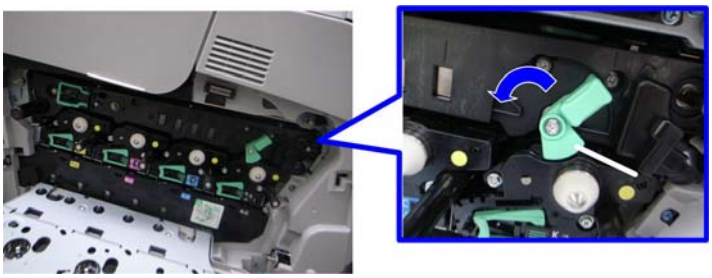
Summary

- If you replace the PCDU, do not change SP 3902
- If you change only the drum unit, set SP 3902 009 (K), 010 (C), 011 (M), or 012 (Y) to 1 before you start to work on the machine.
- If you change only the development unit, set SP 3902 001 (K), 002 (C), 003 (M), or 004 (Y) to 1 before you start to work on the machine.

Before you Remove the K PCDU

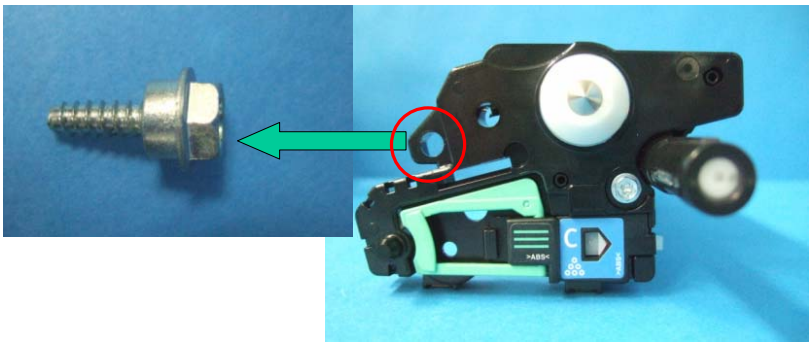


- **Turn the ITB lock lever counterclockwise before you remove the K PCDU. This will separate the ITB unit from the K PCDU.**
  - This step is not needed when you remove only the C, M, or Y PCDUs.

Slide 231

No additional notes

Assembling the PCDU



- In the G-P1 series, the PCU is attached to the development unit in the factory with a special tool.
- In the Z-C1, the technician has to attach them in the field. The screw shown in the diagram secures the two units in the correct position.

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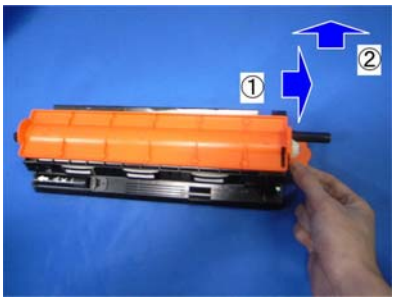
❒ This is a special screw. Keep it in a safe place when you disassemble the machine.

Replacement and Adjustment



- **When installing a new PCDU**
  - Remove the cover and the tape from the new development unit before installing a new PCDU in the machine.
  - There is no tape to remove in the starter PCDU, but the service part and maintenance kit part has tape.

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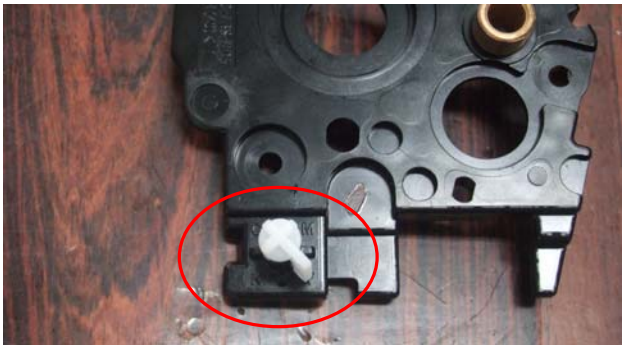
- The PM parts for the PCU and development units are not shipped with this type of cover, which is a type of packing material.
- However, the PCDU service part has this cover as packing material (same as the Z-P1).

PCU Replacement



- When you install a new C, M, or Y PCU, make sure that the white switch is at the correct position for the color.
- On the K PCU, the switch is already at the K position.

Slide 234

No additional notes

Z-C1a vs Z-C1b

- **The PCDU for Z-C1a is the same as for Z-C1b.**
- **However, after developer initialization, the toner density in the Z-C1a development unit is different from in the Z-C1b.**
  - The line speeds of the two models are different, so more toner is added to the development unit for the Z-C1b, so that it can print faster.
- **So, do not use a development unit from a Z-C1b in a Z-C1a.**
  - And do not use a unit from a Z-C1a inside a Z-C1b.

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❒ To implement this, the Vtcnt values are different for each model.

Waste Toner Bottle Replacement

- **The bottle is different from the Z-P1. Make sure that you use the correct bottle.**
- **It is possible for user to replace the bottle.**
- **SP5073-001**
  - 0: Technician replaces
  - 1: User replaces
    - » When the bottle is full, an animation appears to explain how to replace the bottle

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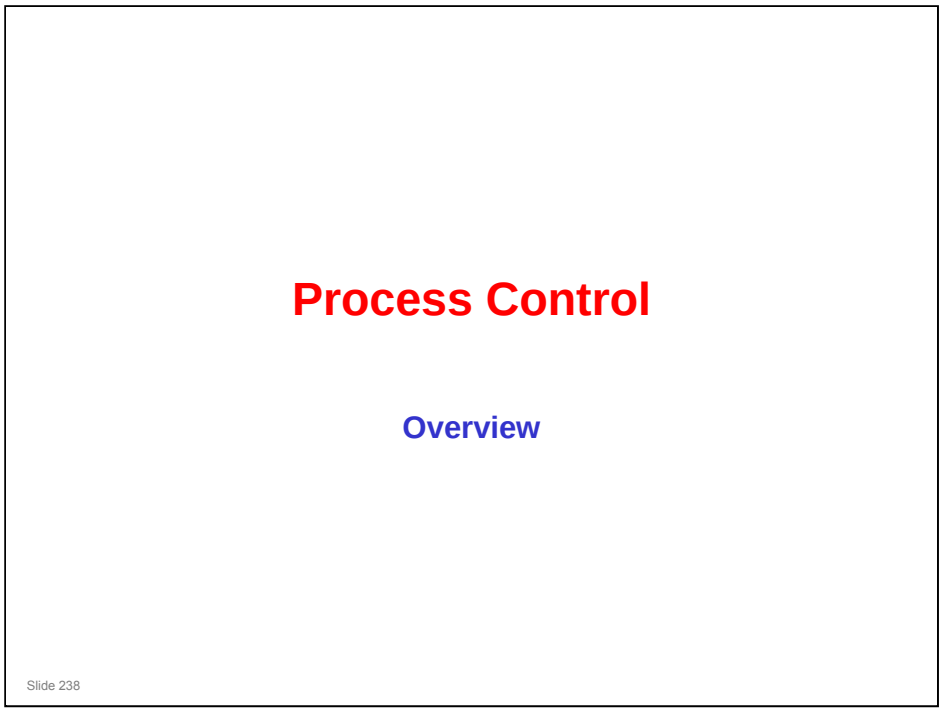
❒ The capacity of the bottle is different from the Z-P1.

Error Messages

- When the machine cannot detect a PCDU, it displays, 'Turn power off, then set the PCDU correctly', and the color(s) that cannot be detected.

Slide 237

No additional notes



PURPOSE OF THE SECTION

In this section, you will:

- ❒ Learn the basic points about process control.
- ❒ It is basically the same as the Z-P1.

Overview

- **This machine has the following two forms of process control:**
  - Potential control
  - Toner supply control
- **Process control uses the following components:**
  - Four ID (image density) sensors. These ID sensors are used for process control, line positioning.
  - TD (toner density) sensor in each development unit.

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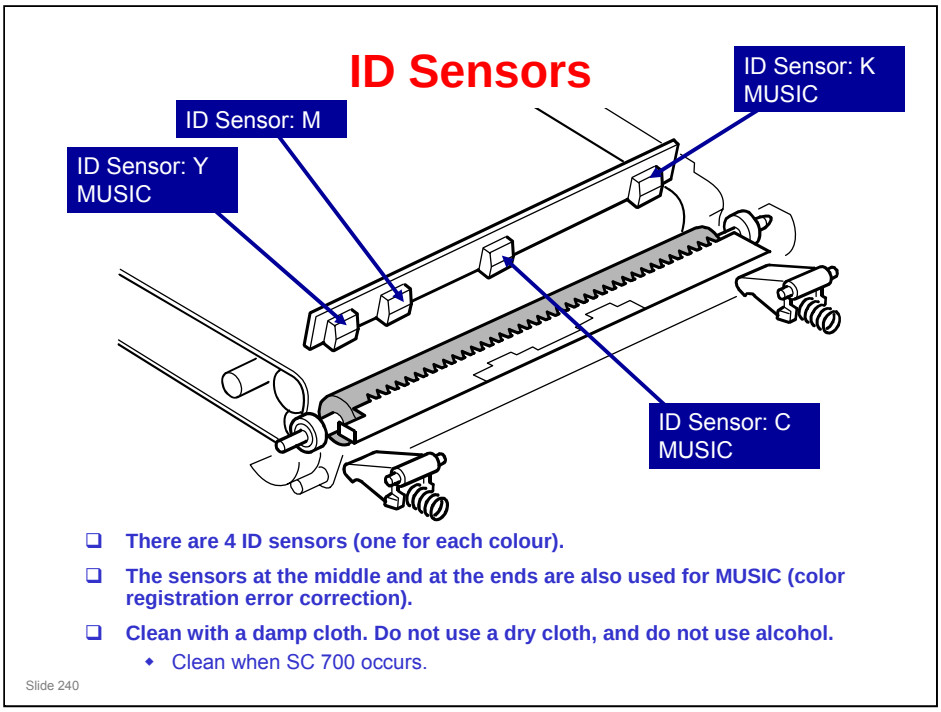
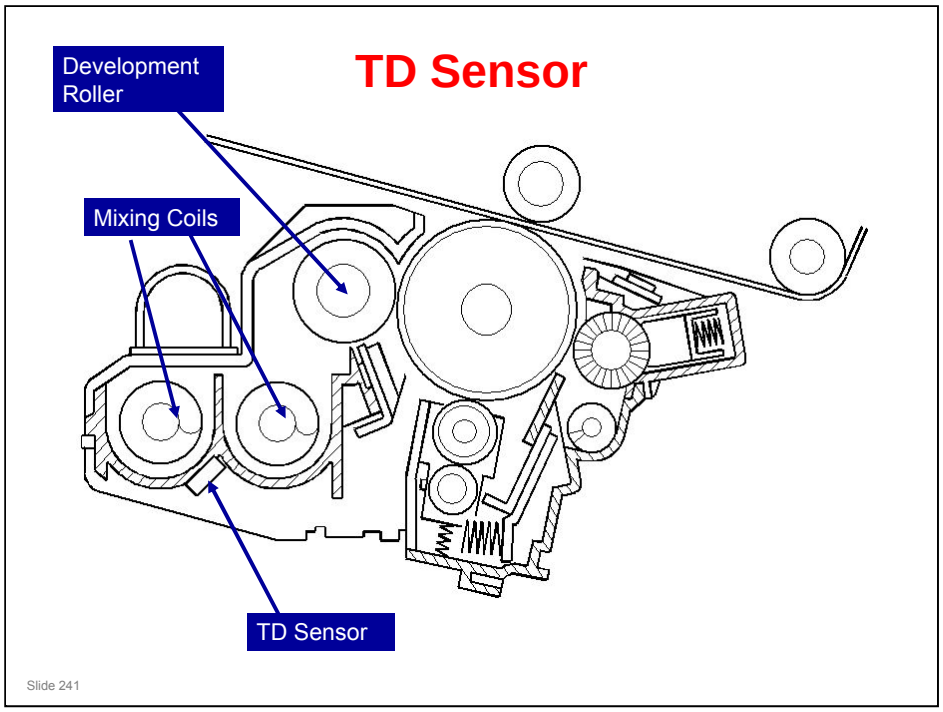
No additional notes



❒ The ID sensors are the direct reflection type.



❒ The TD sensor detects toner density. Each development unit has a TD sensor.

Time Required for Process Control and MUSIC

- **Initial start-up**
  - Process control: approx. 30 seconds
- **During a job**
  - Process control: approx 15 seconds
  - At low process speeds (85 or 182 mm/s): approx 20 seconds
- **At the end of a job**
  - Full-colour job-end process control: approx. 15 seconds
  - B&W job end process control: approx. 15 seconds
  - After a full-color job with low coverage ratio: 15-60 seconds

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- Process Speeds – see the slide on Transfer Belt Unit Detection

- Process control and MUSIC are done together. These times show how long the machine stops for these processes.

No additional notes

Overview

- **The machine determines the best possible V_D, V_B, and V_L, based on current machine conditions.**
  - V_D: Drum potential without exposure – to adjust this, the machine adjusts the charge roller voltage.
  - V_B: Development bias
  - V_L: Drum potential at the strongest exposure – to adjust this, the machine adjusts the laser power.
- **At the same time, the machine also determines V_{TREF}: Reference TD sensor output, used for toner supply control.**

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No additional notes

Process Control Self Check

- **Potential control is done with the process control self check. It is done at the following times.**
  - Initial process control
  - At the end of a job
  - During a job
  - After installing a new ITB unit or PCDU
  - Forced (manual execution)
  - Before ACC (process control is done first, then ACC)

Slide 245

No additional notes

Initial Process Control

- **Immediately after the power is turned on, or when the machine recovers from the energy saver mode.**
- **Done if one of these conditions occurs:**
  - Temperature has changed by more than a certain amount after the drum motor stopped.
    - » Power-on: SP 3522 003, Recovery from energy saver: SP 3531 002
  - Humidity has changed by more than a certain amount after the drum motor stopped.
    - » Power-on: SP 3522 004/005, Recovery from energy saver: SP 3531 003/004
  - 250 b/w or 85 full colour prints were made since the previous adjustment (SP 3511 005/006).
- **And**
  - The machine was not used for more than 6 hours (SP 3522 002).

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No additional notes

At the End of a Job

- Done if 250 b/w or 85 full colour prints were made since the previous adjustment (SP 3511 001/002).

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No additional notes

During a Job

- **Done if 500 b/w or 200 full colour prints were made since the previous adjustment (SP 3511 003/004).**
  - The machine checks the above condition every 10 pages (SP 3512 001). Then, potential control is done if the condition occurs.
- **Done every 20 pages (approximately) if the following the condition occurs:**
  - Pixel coverage is more than 30% (SP 3-224-010) for any one colour.

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No additional notes

After Replacement of Parts

- **After replacing any of these parts, process control occurs automatically.**
  - ITB unit
  - PCDU
  - Fusing unit
  - Waste toner bottle

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No additional notes

Forced (Manual Execution)

- Use SP 3011 001
- Process control counters (SP 3510-001/002) are not reset after a forced execution

Slide 250

No additional notes

Five Steps in the Self-Check

- **The process control self check has five steps:**
  - Step 1: V_{SG} Adjustment
  - Step 2: ID Sensor Solid Pattern Generation
  - Step 3: Sensor Pattern Detection
  - Step 4: Toner Amount Calculation
  - Step 5: V_D, V_B, V_L Selection and V_{TREF} Adjustment

Slide 251

No additional notes

VSG Adjustment

- The ID sensor checks the bare transfer belt's reflectivity and the machine calibrates the ID sensor until its output (known as VSG) is as follows.
  - V_{SG} = 4.0 ± 0.5 Volts
- This calibration adjusts for the transfer belt's condition and the ID sensor condition, for example, dirt on the belt or ID sensor.

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No additional notes

ID Sensor Solid Pattern Generation

- **The machine mixes the developer and then makes a gradation pattern on the transfer belt for each toner color.**
  - The solid pattern has one square (the sequence is as follows: one black square, one cyan square, one magenta square, and one yellow square).
  - To make the squares for the gradation pattern, the machine keeps the laser power constant, and changes the development bias and charge roller voltage. The difference between development bias and charge roller voltage is always the same.
  - Dimensions of the squares:
    - » Z-C1a: 21.84 x 10 mm
    - » Z-C1b: 31.2 x 10 mm (same as Z-P1)

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No additional notes

Sensor Pattern Detection

- The ID sensor detects the densities of the one solid-color square for each color. This data goes to memory.

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No additional notes

Toner Amount Calculation

- The quantity of toner on the transfer belt (M/A, mass per unit area, mg/cm^2) is calculated for each of the 10 gradations of the sensor pattern.
- To do this, the machine uses the ID sensor output value from each gradation of the pattern.

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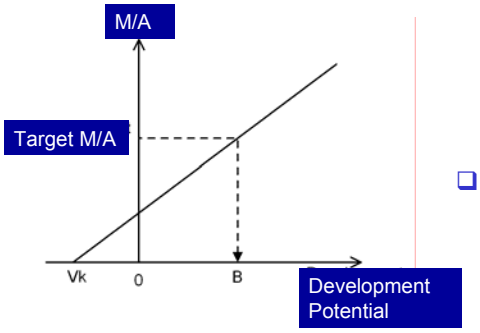
No additional notes

V_D, V_B, V_L Selection and V_{REF} Adjustment (1)



- The machine makes a plot of the 10 values of M/A against the development potential that was used to make each of the gradations. Then it makes a line through the 10 points.
- Then, it finds the development potential that is necessary to put the 'target M/A' of toner on the OPC.

Slide 256

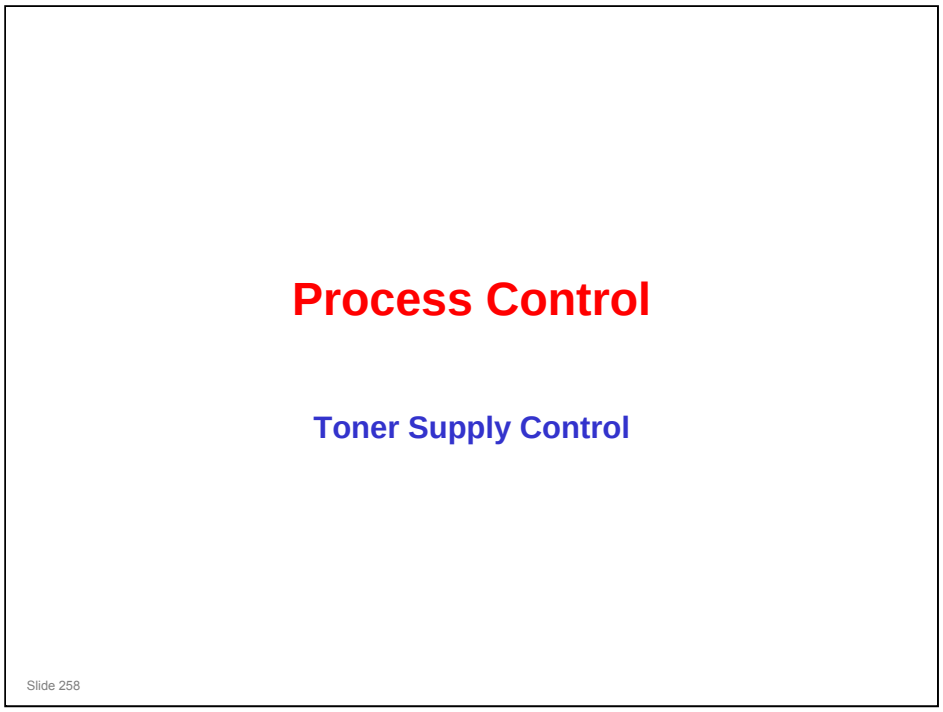
No additional notes

V_D, V_B, V_L Selection and V_{REF} Adjustment (2)

- **This development potential is then used to find the best values of development bias, charge roller voltage and laser power for the machine in its current condition.**
  - To do this, it refers to a table in memory.
- **The machine also adjusts V_{REF} (toner density target) at the same time.**
  - As a result, the development gamma detected by process control will be the value stored in SP 3561 1 to 4 (do not adjust in the field unless told to do this).
- **After that, the transfer belt cleaning unit cleans the transfer belt.**

Slide 257

No additional notes



No additional notes

Overview

- **Uses these components:**
  - TD sensor: Detects how much toner there is in the developer
  - ID sensor: Measures the density of standard sensor patterns during process control.
  - Pixel counter: Counts pixels to determine how much toner for each colour is used on the page
- **The result of toner supply control determines how long the toner supply motor turns on for.**
- **This determines the amount of toner supplied.**
- **This is done before every development for each colour.**

Slide 259

No additional notes

Five Toner Supply Modes (1)

- **There are 5 toner supply modes. The mode used depends on SP3-044-001 to –004.**
- **1. PID control mode**
  - Uses the TD sensor, ID sensor, and pixel count.
  - V_{TREF} is adjusted by process control.
- **2. PID control mode with fixed V_{TREF}**
  - Change to this mode if the ID sensor breaks.
  - This mode uses only the TD sensor.
  - V_{TREF} is fixed at the value stored in SP3-222-001 to –004.
- **3. Fixed supply mode**
  - Change to this mode if the TD sensor breaks.
  - The amount of toner supplied depends on SP3-401-001 to –004.
  - The default is 70% of normal supply, to prevent excessive supply of toner.

Slide 260

No additional notes

Five Toner Supply Modes (2)

- **4. MBD control mode: This is the default mode.**
  - Uses the TD sensor, ID sensor, and pixel count.
  - V_{TREF} is adjusted by process control.
- **5. MBD control mode with fixed V_{TREF}**
  - Change to this mode if the ID sensor breaks.
  - This mode uses only the TD sensor.
  - V_{TREF} is fixed at the value stored in SP3-222-001 to –004.
- **You can select a different mode for each colour, if necessary.**
  - Use SP 3-044 if the TD sensor and/or ID sensor breaks and no spare part is available.
  - After replacing the part, return the SP setting to the default.

Slide 261

No additional notes

Process Control

Toner Density Adjustment Mode

Slide 262

No additional notes

Overview

- Process control adjusts the toner density so that the density of each colour in the image is correct.
- But, sometimes, process control adjusts the toner density too slowly, and the first few copies after process control have incorrect toner densities.
- Toner density adjustment mode brings toner concentrations to the correct values much more quickly.

Slide 263

No additional notes

What is Done? - 1

- **The machine makes sensor patterns and checks the current development gamma in the following 4 cases (A, B, C, D).**
  - A) Development gamma low during process control: If the following condition occurs, the machine increases the toner density. To do this, it supplies toner to the development unit.
    - » Current gamma < Target gamma - 0.50 (SP3-239-012)
  - B) Development gamma very high during process control: If the following condition occurs, the machine decreases the toner density. To do this, some of the toner in the development unit is sent to the waste toner bottle during process control.
    - » Current gamma ≥ Target gamma + 0.50 (SP3-239-009)

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❒ See the next slide for cases C and D.

What is Done? - 2

- **Continued from the previous slide**
  - C) Development gamma too low immediately after power is switched on: If the following condition occurs, the machine increases the toner density. To do this, it supplies toner to the development unit.
    - » Current gamma < Target gamma - 0.75 (fixed value; no SP adjustment)
  - D) Low image area coverage (less than 18 cm^2 per meter of development roller rotation): Some of the toner in the development unit is sent to the waste toner bottle at the end of the job.
    - » To do this, toner is transferred to the drum, and removed by the OPC cleaning unit. The toner is not transferred to the transfer belt.
    - » This mode is Toner Refresh Mode.

Slide 265

- Case D: Note that case D will not come into effect unless the coverage is very low. Even in economy color mode, this should not be very often.
  - Toner that stays in the development unit during printing with low image area coverage becomes damaged and is not easily attracted to carrier. So it is necessary to refresh the toner if there is low image coverage. This is the reason for the toner density adjustment mode for case D.

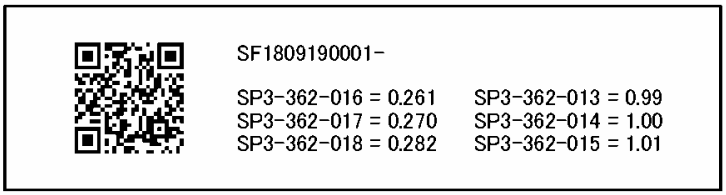
When is it Done?

- **Automatic**
  - After power-on (toner supply only, no consumption)
    - » Done if case C or D occurs
  - After new unit detection/after toner end recovery
    - » Done if case A, B, or C occurs
  - At end of job (toner supply only, no consumption)
    - » Done if case C occurs
- **The machine also has a forced toner density adjustment mode (SP 3011 002).**

Slide 266

No additional notes

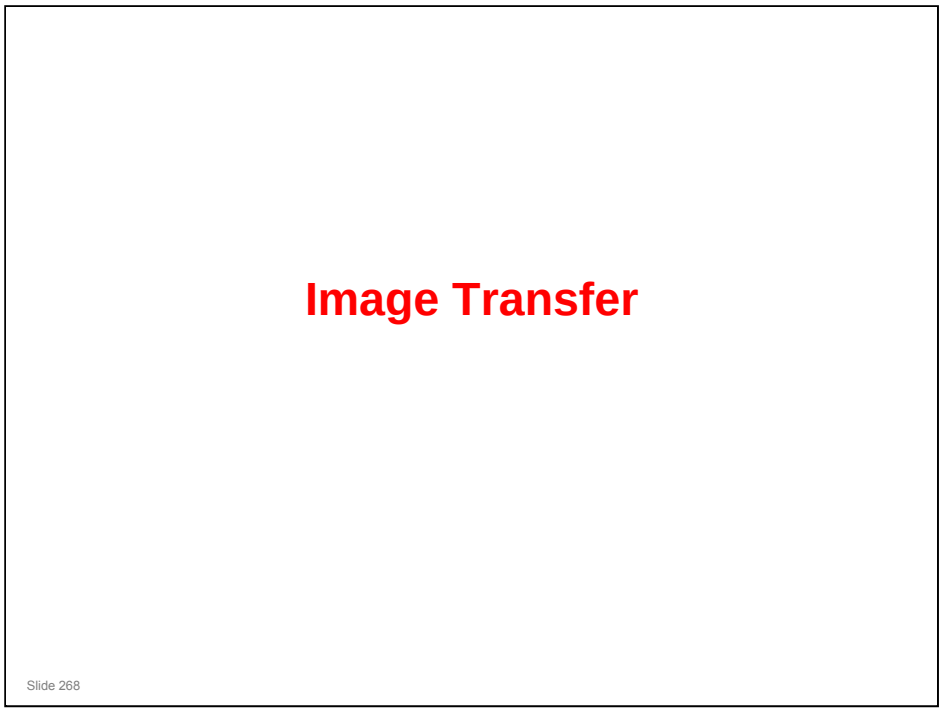
Replacing the ID Sensor



- **The ID sensor unit contains all 4 ID sensors.**
- **If you install a new ID sensor unit, input the values from the decal into SP mode as shown in the field service manual.**
- **Clean the ID sensor every EM. Use a cloth moistened with alcohol.**
  - Do not use a dry cloth. Otherwise, the ID sensors may get more dirty due to static electricity.

Slide 267

❒ The decal is similar to the Di-C1 copiers.



PURPOSE OF THIS SECTION

In this section you will do the following:

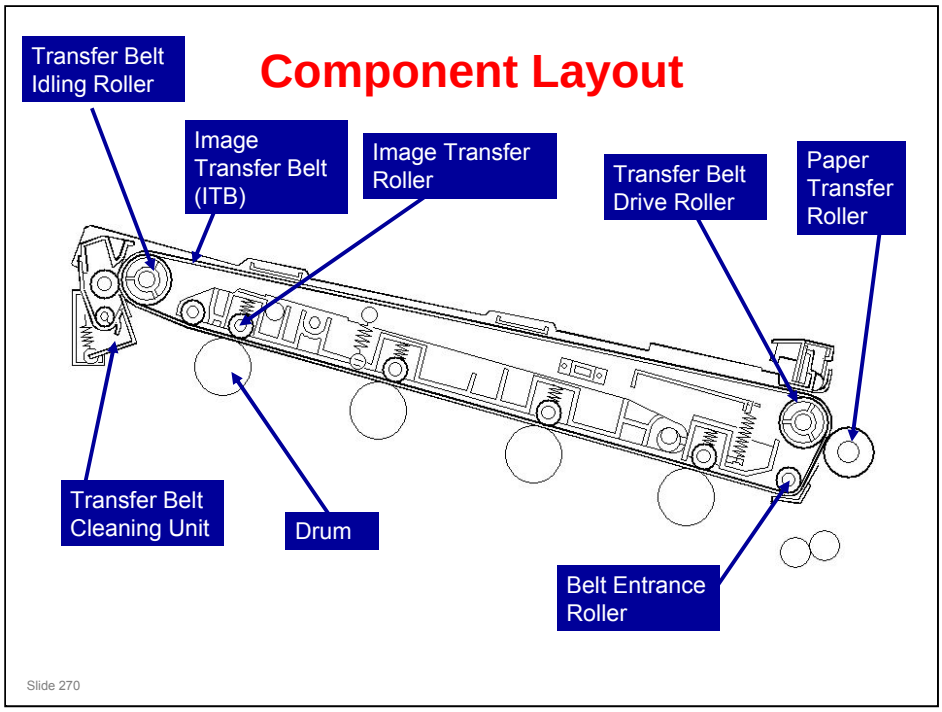
- ❒ Learn about the transfer belt.

Differences Between Z-C1 and Z-P1

- **Z-C1**
  - Maintenance method: Technician maintenance
  - Separate replacement of image transfer belt unit, image transfer belt cleaning unit, and paper transfer roller unit
- **Z-P1**
  - Maintenance method: User maintenance
  - Transfer unit is replaced as a unit

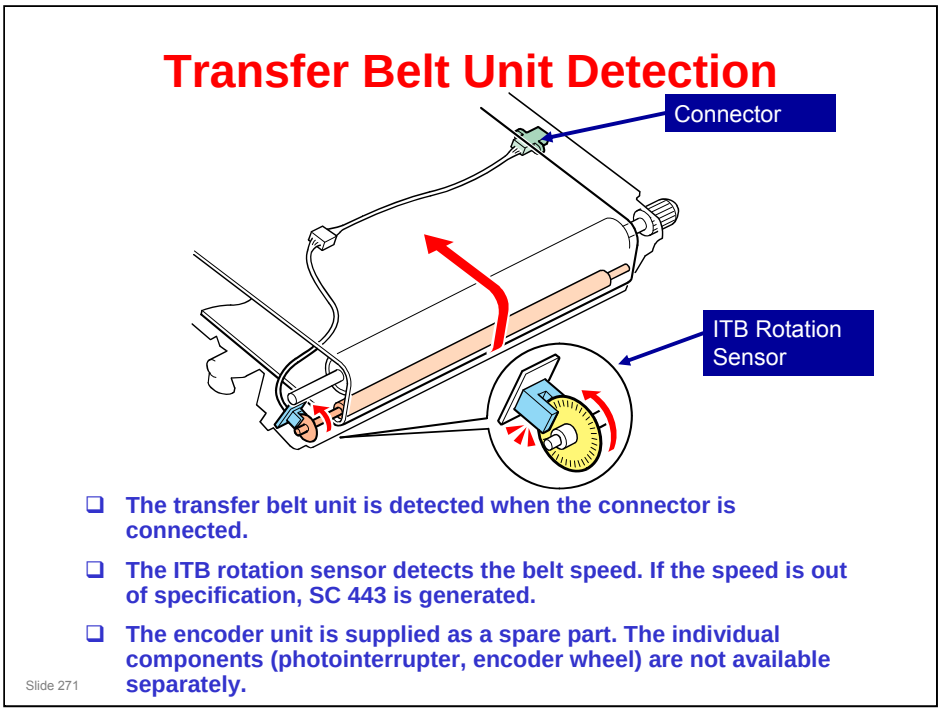
Slide 269

No additional notes



- The toner is moved from the four OPC drums to the transfer belt. For a full color print, all four colors are moved from the PCDUs to the transfer belt at the same time.
- The paper transfer roller then moves the four-color toner image from the transfer belt to the paper.

- The joint, the connector, and the material of transfer belt idling roller are different from the G-P3. This roller a has a mylar in the Z-P1.



- The transfer belt rotation sensor detects when the transfer belt entrance roller turns. It also detects the belt speed. To do this, it monitors an encoder wheel attached to the shaft.
  - In the G-P3, there is no encoder wheel. The sensor monitors black and white markings on the shaft.
- Changes in temperature have an effect on the transfer belt drive roller. This can cause changes in belt speed. Color registration errors occur if belt speed is not constant. The rotation sensor detects the speed change and the machine keeps the transfer belt speed constant.
- You can enable or disable this belt speed correction with SP 2153 8.

The speed of the belt depends on the process speed.

- Process speed: See the next slide

Process Speed

Mode	Paper Weight (g/m^2)	Process Speed (mm/s)		Print speed (ppm)	
		600 dpi	1200 dpi	600 dpi	1200 dpi
Plain paper	61 to 80	C1a: 182 C1b: 260	85	C1a: 30 C1b: 40	15
	81 to 90	C1a: 182 C1b: 260	85	C1a: 30 C1b: 40	15
Middle thick	91 to 105	C1a: 182 C1b: 260	85	C1a: 30 C1b: 40	15
Thick 1	106 to 130	182	85	30	15
Thick 2	131 to 163	85	85	15	15
Thick 3	164 to 220	85	85	15	15
Thick 4	221 to 256	85	85	15	15
Thin	52 to 60	C1a: 182 C1b: 260	85	C1a: 30 C1b: 40	15
OHP	-	85	-	15	-

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❒ Process speed depends on the print resolution, and/or type of paper selected.

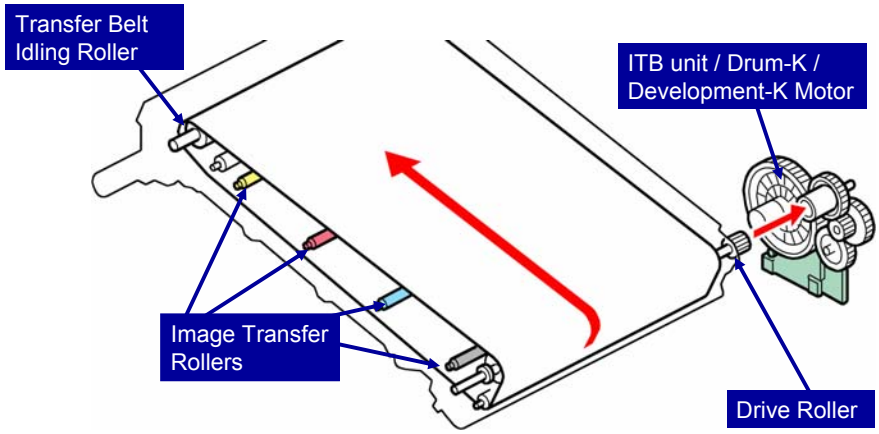
New Transfer Belt Unit Detection

- The transfer belt has a fuse when the transfer belt unit is new.
- The fuse is blown when the machine is turned on. At this time, it is detected as a new transfer belt unit.

Slide 273

No additional notes

Drive and Transfer Belt Roller Voltage



- The ITB unit / Drum-K / Development-K motor controls the transfer belt drive roller.
- The transfer belt idling roller adds tension to the transfer belt to help to turn this belt. The speed of transfer belt drive is set by the process line speed.

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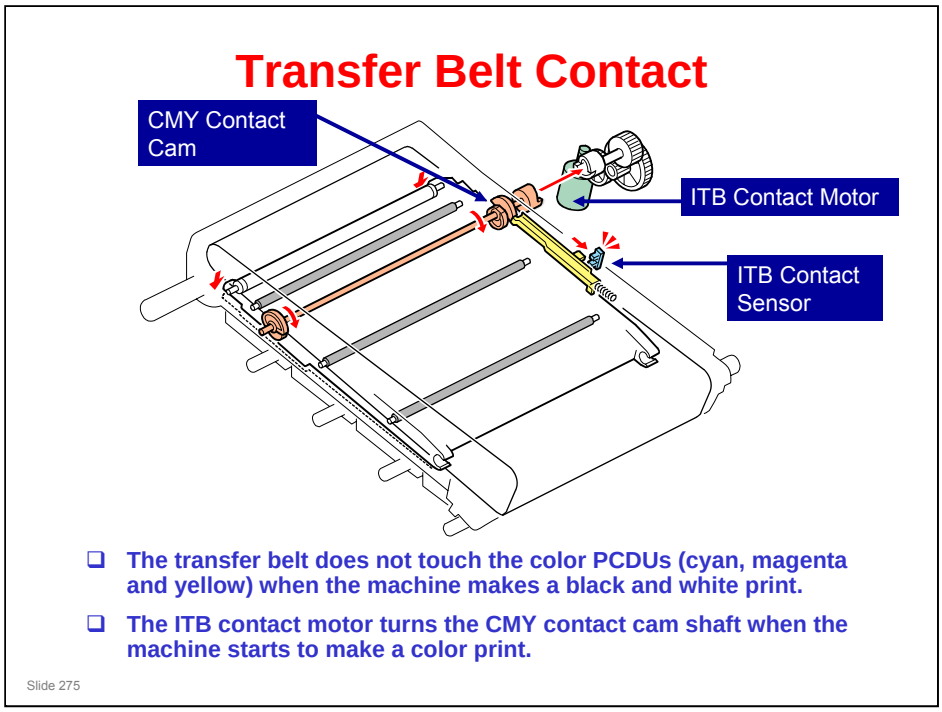
❒ The image transfer rollers are charged from terminal plates. Then they move the toner from the PCDUs to the transfer belt.



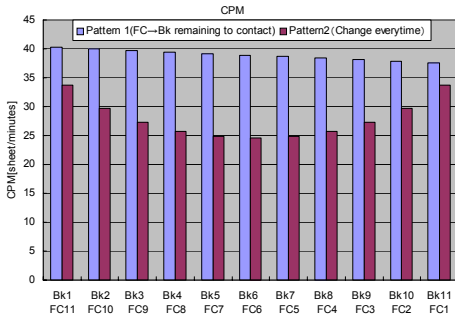
- The transfer belt does not touch the color PCDUs (cyan, magenta and yellow) when the machine makes a black and white print.
- The ITB contact motor turns the CMY contact cam shaft when the machine starts to make a color print. The CMY contact cam lifts the image transfer roller unit for CMY into contact with the transfer belt. Because of this mechanism, the life of the transfer belt is longer. It is not necessary for the transfer belt to touch the color PCDUs when the machine makes a black and white print.
- The ITB contact sensor detects if the image transfer roller unit for CMY touches the transfer belt. If it does not touch the transfer belt during color printing, the machine stops and shows SC 442.

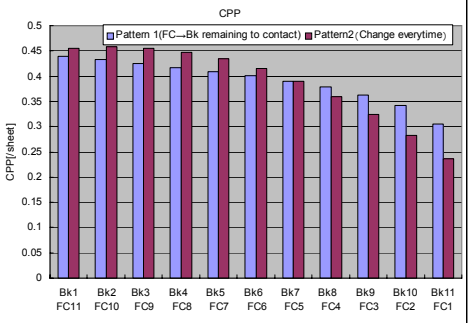
How long does it take to change the transfer belt position?

- It is much faster than for the older models such as J-P1.
- Examples:
  - 12 sheets, one black-only, 11 full-colour: If the transfer belt does not change position for the black-only page, the print speed is 40 ppm. If the transfer belt does change position, the print speed for the job changes to 34 ppm.
  - 12 sheets, 6 black-only, 6 full-colour (alternate black-only and full-colour pages): If the transfer belt changes position between each page, the print speed for the job changes to 25 ppm.

Auto Color Selection (ACS)

- Note that with pattern 2 (moving the ITB for every change of page type), the cpm can drop below 25 if there is a sequence of alternating page types (one color page followed by one b/w page, then one color page, etc).
- The default for Z-C1 is pattern 1 (ITB stays in contact with all 4 drums).





	Ap/At	V	Di	G-P	Z-P/C
Pattern1	Default		Default		Default
Pattern2		Default		Default	

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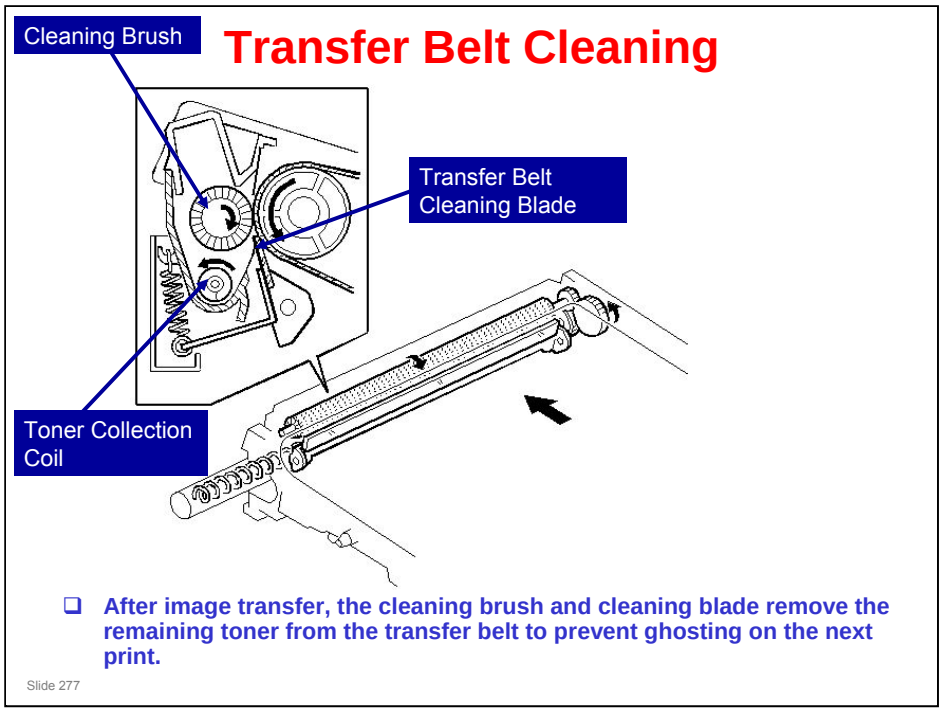
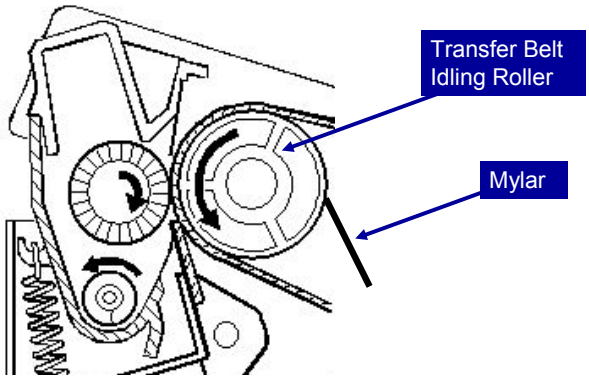
- CPM: Copies per minute
- CPP: Cost per page
- In B&W mode, B&W pages printed after a color page are counted as black and white. In ACS mode, these pages are counted as color mixed pages.
- By default, once the ITB (image transfer belt) unit has moved into contact with all the color drums to print a color page, it remains in this position throughout the end of the job, even if there are B&W pages following the color page. For example, when sending 10 copies of 5 originals as one job and only the second page contains color data, the ITB unit moves into contact with all the color drums just before printing the second page. It then remains in contact with the drums until all 50 pages have been printed out.



- The pressure spring pushes the center of the blade holder.
- The toner collection coil moves the waste toner to the waste toner bottle.

Transfer Belt Idling Roller



- A mylar was added to remove toner or other material from the transfer belt idling roller.
- This prevents black spots from appearing on outputs at 82mm intervals.

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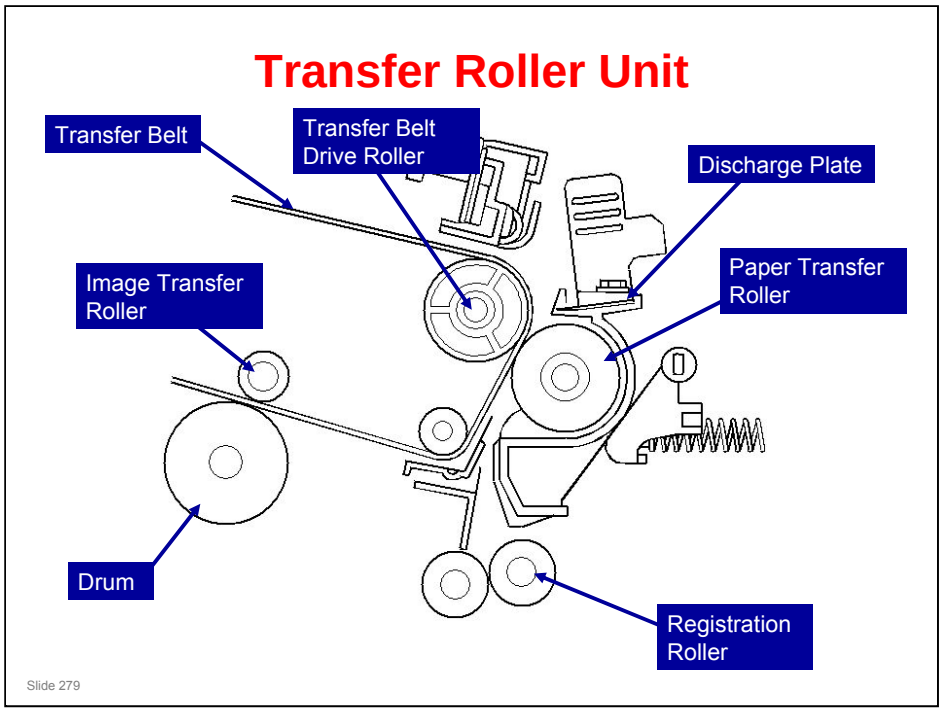
No additional notes



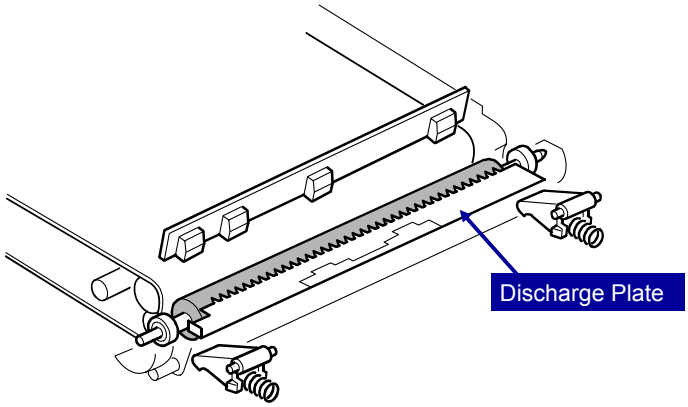
Transfer to the Belt

- The image transfer roller is given a positive voltage. This pulls the toner from OPC drum to the transfer belt.
- After all four layers of toner are transferred to the transfer belt, the registration roller turns on and feeds the paper to the paper transfer roller. Paper feed is timed to align the leading edge of the toner image on the belt at 4.2 mm from the leading edge of the paper. The paper moves at the same speed as the transfer belt.

Transfer to the Paper

- Charged with a negative voltage, the transfer belt drive roller pushes the toner from the transfer belt to the paper. This voltage is automatically corrected for the ambient temperature and humidity, print speed, and paper type.
- To clean the paper transfer roller, positive and negative voltages are applied to this roller to pull toner particles from the transfer roller to the belt. The belt-cleaning mechanism then removes this toner from the belt.

Discharge



- The positive charge on the discharge plate removes remaining charge from the printed paper.
- As a result, the paper separates from the transfer belt.

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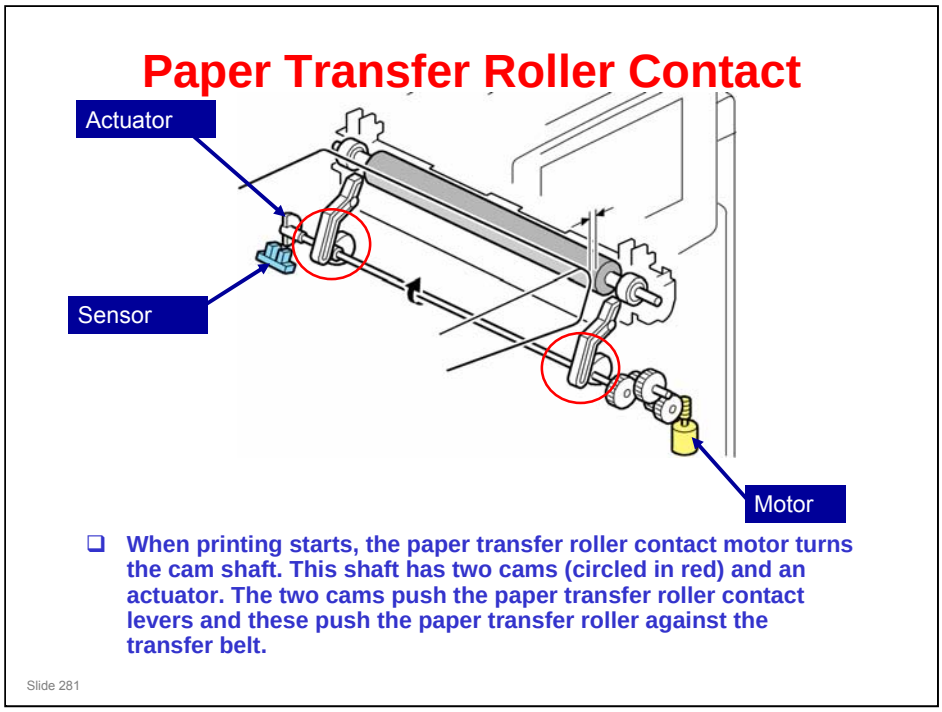
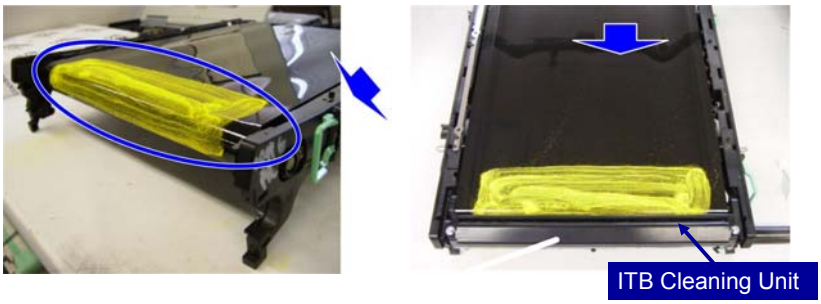
No additional notes



- The paper transfer roller is kept away from the transfer belt during the machine ready condition.
- When printing starts, the paper transfer roller contact motor turns the cam shaft. This shaft has two cams (circled in red) and an actuator. The two cams push the paper transfer roller contact levers and these push the paper transfer roller against the transfer belt.
- The actuator turns on the paper transfer roller contact sensor when the cam shaft turns. Then, the machine detects that the paper transfer roller touches the transfer belt.

Installing a New Transfer Belt



- **Lubricate a part of the surface of the image transfer belt with yellow toner as shown above left.**
  - Use fresh Z-P1 yellow toner, or the provided service part: D0159500 (G104 Yellow Toner)
  - Do not use lubricant powder, developer, or waste toner.
- **Then turn the image transfer belt to the position shown above left.**
- **Install the ITB cleaning unit, and then collect the yellow toner by turning the image transfer belt.**

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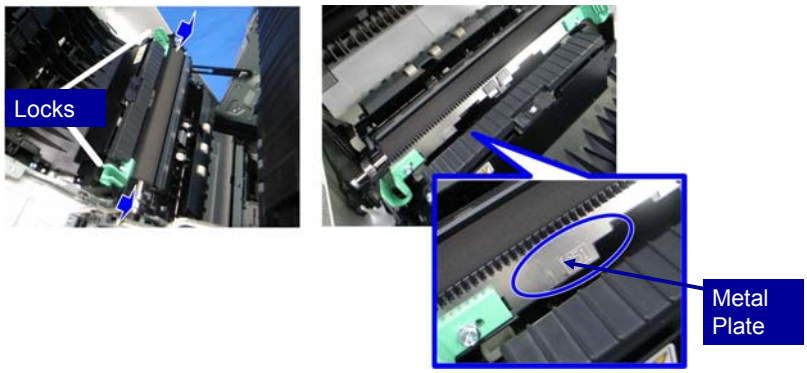
- The toner must not contain developer. So, use fresh yellow toner from a Z-P1 toner bottle. This does not contain developer.
  - You can also use the provided service part: D0159500 (G104 Yellow Toner). This is yellow toner from the G-P1 series.
- Note that toner from the toner bottles in some other models may contain developer (for example, V-C2, V-C3).

Installing a New Paper Transfer Roller Unit



- When you install a new unit, pinch the two green locks while you push the unit back into position.
- Do not insert objects between the metal plate and its black plastic base.

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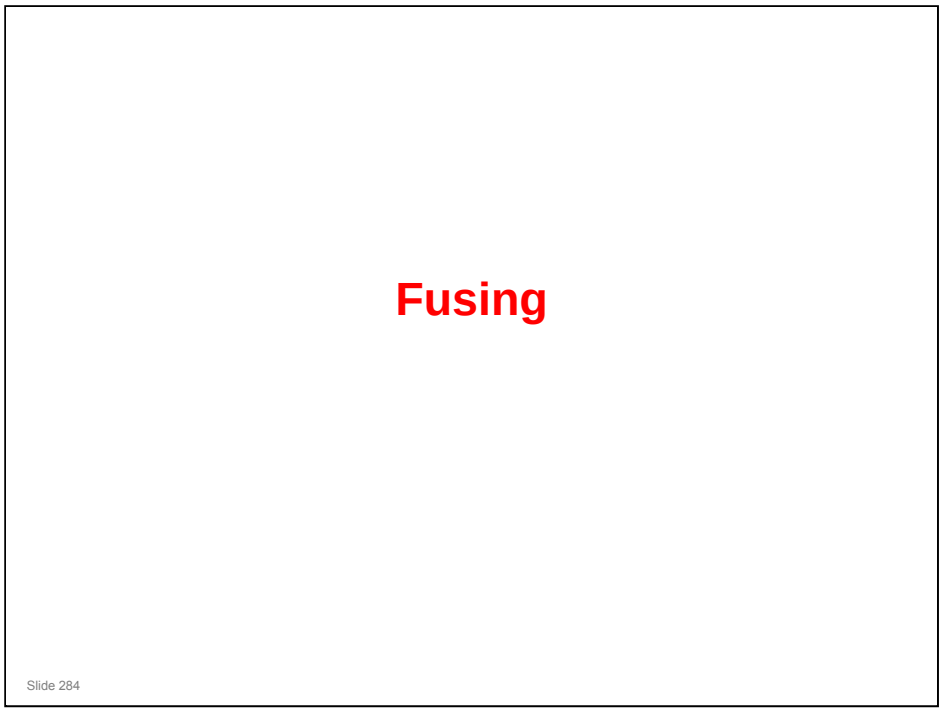
- In this model, it is easy for objects to get between the metal plate and the plastic below it. This will distort the plate and may prevent it from being grounded properly.
- The grounding is done through the main body of the printer, and objects inserted here can break continuity between this unit and the main body.



PURPOSE OF THE SECTION

In this section you will:

- ❒ Learn how the fusing unit works

Differences Between Z-C1 and Z-P1

- **Z-C1**
  - Maintenance method: Technician maintenance
  - Separate replacement of parts
- **Z-P1**
  - Maintenance method: User maintenance
  - Fusing unit is replaced as a unit

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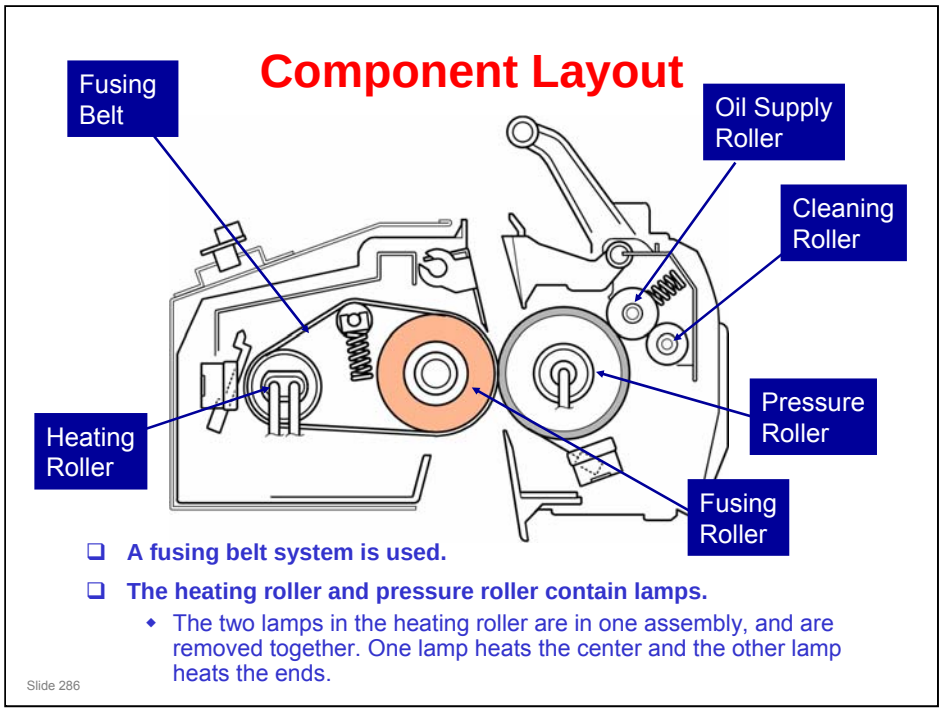
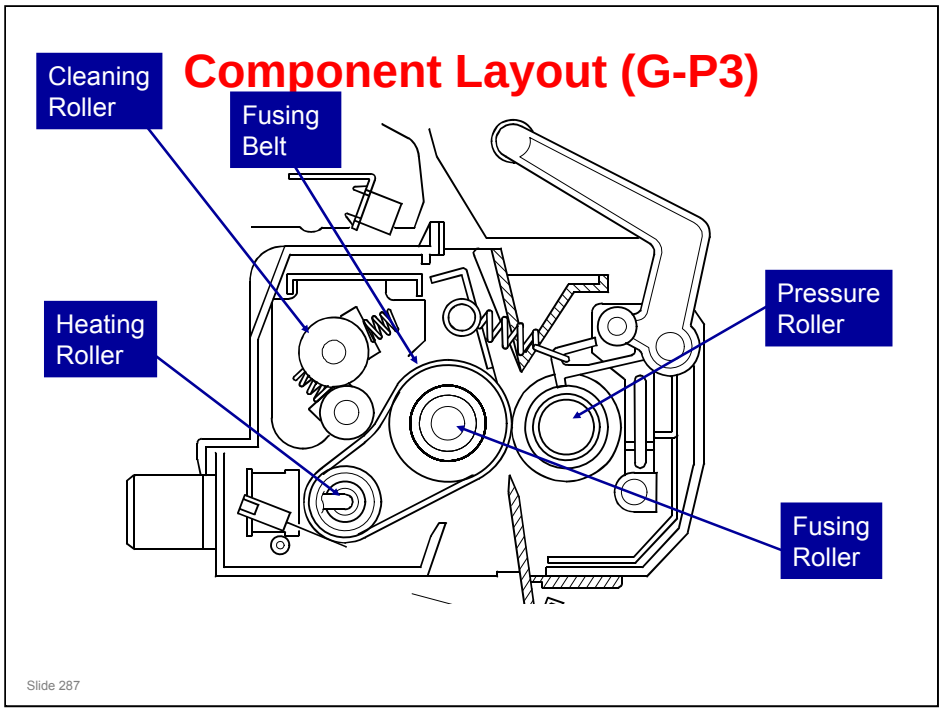
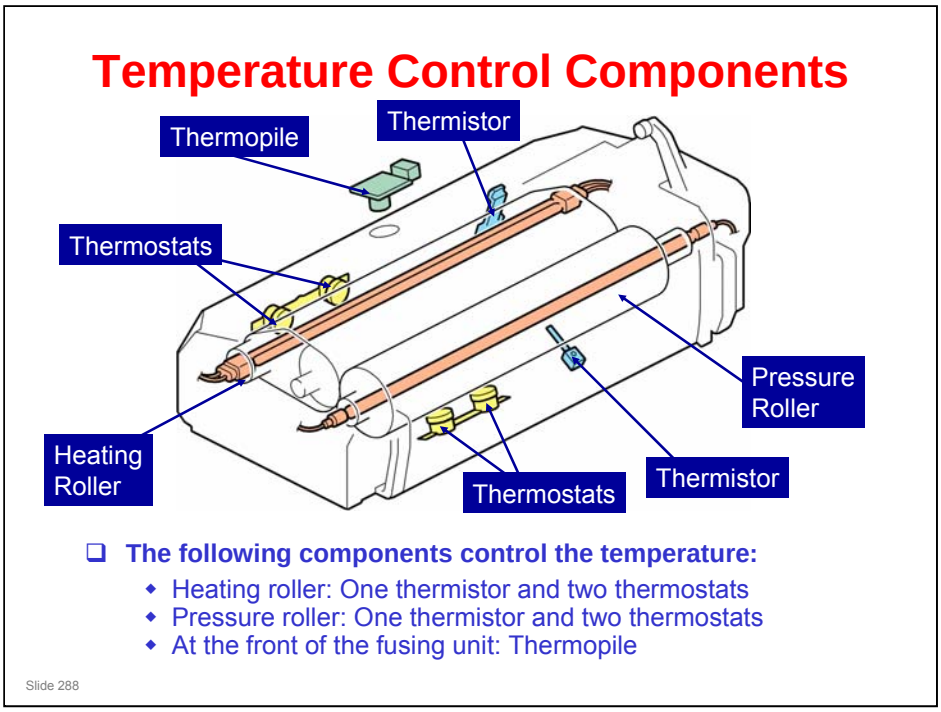
No additional notes



- After the toner image is transferred to the paper it goes through the fusing unit. The heating lamp applies heat to the heating roller, which applies heat to the fusing belt to melt the toner on the paper. The paper receives pressure between the fusing belt and the pressure roller, and melted toner bonds to the paper.
- The two lamps in the heating roller are in one assembly, and are removed together.
  - This system is similar to the Di-C1 and At-C2.
- A belt fusing system is used. This has a faster warm-up time than a standard hot and pressure roller system.
- The heating roller is made of aluminum to increase the temperature of the fusing belt quickly.
- The fusing roller is made of sponge, which becomes a little flat, and this increases the fusing nip. This roller does not contain a heating lamp.
- The heating roller thermistor controls the temperature of the lamp.
- Each new fusing unit contains a fuse. Immediately after a new fusing unit is installed, this fuse blows. When this occurs, the machine detects that a new fusing unit is installed.



❒ This slide shows the G-P3 fusing unit for comparison.



- Here is a three-dimensional drawing of the fusing unit.
- The thermopile detects the temperature at the center of the fusing unit, and the thermistor detects the temperature at the end.

Overheat Protection

- If the heating roller thermistor detects less than 0 ° C for six seconds, SC541 occurs.
- If the heating roller temperature is higher than 245 ° C for 1 second, the power to the fusing lamp is cut off and SC543 occurs.
  - If 250 ° C is detected, SC 544 occurs.
- If the heating lamp gets full power for 30 seconds after the heating roller gets to the print ready temperature, SC545 occurs.

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No additional notes

Overheat Protection

- **SC 54* Heating Roller: Center: Thermopile**
  - 541 Disconnected thermopile,
  - 542 The heating roller temperature does not reach the ready temperature
  - 543 Heating roller fusing lamp overheat (software error)
  - 544 Heating roller fusing lamp overheat (hardware error)
  - 545 Heating roller fusing lamp consecutive full power
- **SC 55* Heating Roller: Rear: Non-Contact Thermistor**
  - 551 Disconnected thermistor
  - 552 The heating roller temperature does not reach the ready temperature
  - 553 Heating roller fusing lamp overheat (software error)
  - 554 Heating roller fusing lamp overheat (hardware error)
  - 545 Heating roller fusing lamp consecutive full power
- **SC 56* Pressure Roller: Center: Contact Thermistor**
  - 561 Disconnected thermistor
  - 562 Pressure roller temperature does not reach the ready temperature
  - 563 Pressure roller fusing lamp overheat (software error)
  - 564 Pressure roller fusing lamp overheat (hardware error)
  - 565 Pressure roller fusing lamp consecutive full power
- **Defective Thermostat: SC542, SC545**
- **Defective Thermistor: SC551, SC561**

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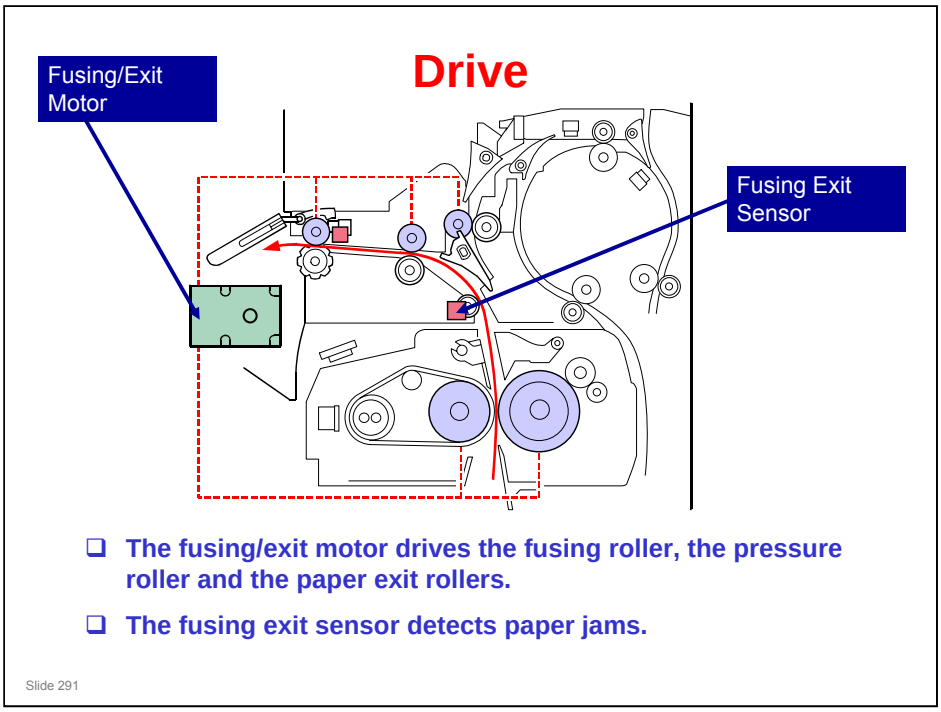
No additional notes



No additional notes

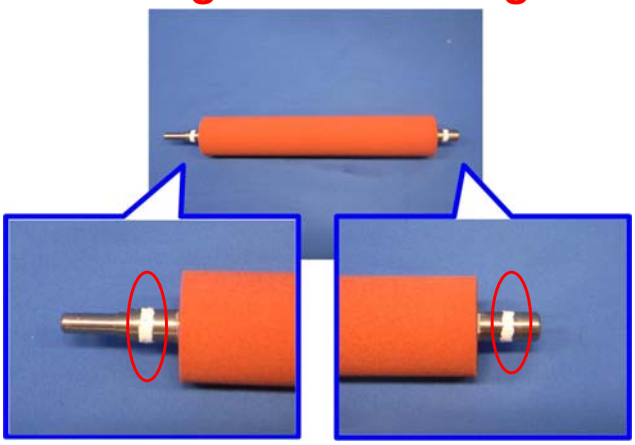
Practical Work

- **In the Z-P1, the fusing unit is replaced as a complete unit.**
- **In the Z-C1, the parts of the fusing unit are replaced separately.**
- **Make sure that the fusing unit is cool before you touch it. The fusing unit can be very hot.**
- **Make sure to restore the insulators, shields, etc after you service the fusing unit.**
- **Do not re-use a thermostat that is already open. Safety is not guaranteed if you do this.**
  - SC codes related to defective thermostats
    - » Defective thermostat for heating roller
      - – SC542
      - – SC552
      - – SC545
      - – SC555
    - » Defective thermostat for pressure roller
      - – SC565

Slide 292

No additional notes

Installing a New Fusing Roller



- Apply "Barrierta S552R" to the left and right ends of the roller as shown above.

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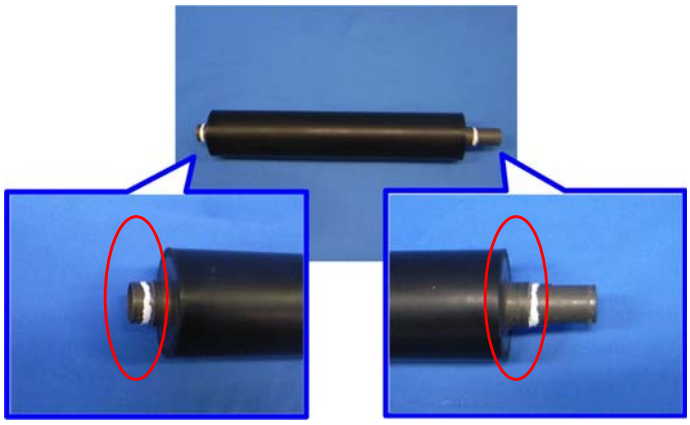
- Apply 0.1 to 0.2 g of grease at each end.

Installing a New Pressure Roller

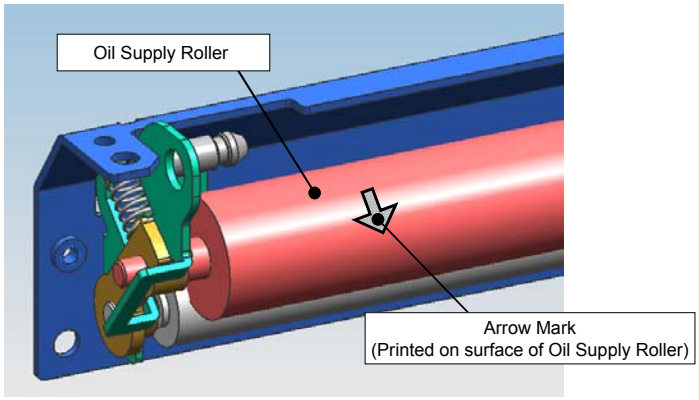


- Apply "Barrierta S552R" to the left and right ends of the roller as shown above.

Slide 294

- Apply 0.15 to 0.25 g of grease at each end.

Installing a New Oil Supply Roller



- **Check the arrow and install the roller the correct way around. If not correct, the film on the oil supply roller will come off.**

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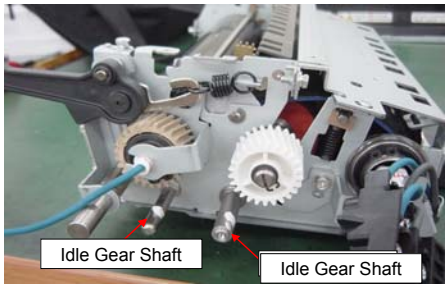
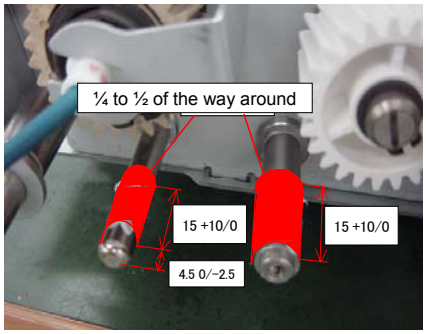
No additional notes

Lubricate the Shafts of the Idle Gears



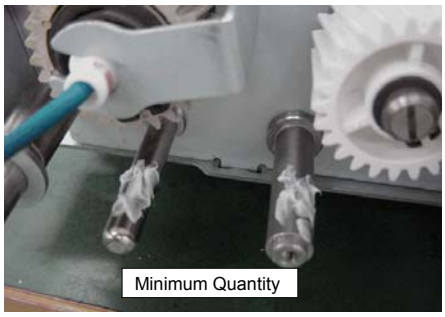


- The slide shows the size of the area where Barrierta S552R should be applied.

Slide 296

No additional notes

Lubricate the Shafts of the Idle Gears



- Quantity to apply: 0.05 g to 0.15 g
- Width to apply: 3.7 to 5.3 mm

Slide 297

No additional notes

Cleaning the Temperature Control Components

- It is normally not necessary to clean the thermopile, thermostat, and thermistors.
- If you do need to clean the thermopile, please use a dry cloth.

Slide 298

No additional notes

Troubleshooting

- **Offset: Measure the nip band (SP1109) – Default width 12.5 mm**
  - Set a type of OHP which becomes clouded when heated on the bypass tray.
  - Execute 1:ON with SP1-109-001
  - Feed this OHP from the bypass tray. Stop it when it reaches the fusing unit. Stop it for 15 seconds there and feed it from the paper exit.
  - The OHP becomes white in an area equal to the width of the nip.
  - If the white nip band is too large: Curling, wrinkling, and fusing offset occur.
  - If it is too narrow: Poor fusing occurs.
  - The nip band cannot be adjusted in the field.
  - Replace the hot roller, pressure roller, or the fusing unit. when the nip band is out of specification.
- **Black spots: Replace the cleaning roller and the oil supply roller.**

Slide 299

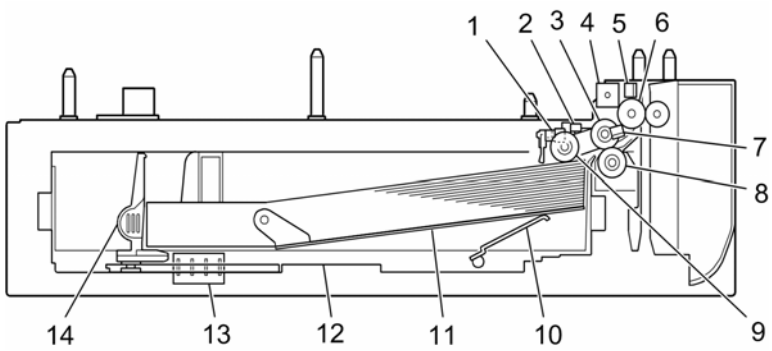
No additional notes

Optional One-tray Paper Tray Unit (M367)

Slide 300

- In this section, you will study the mechanisms of the optional one-tray paper tray unit.
- There are similarities with the optional trays for the Z-P1 and the Ap/At series.

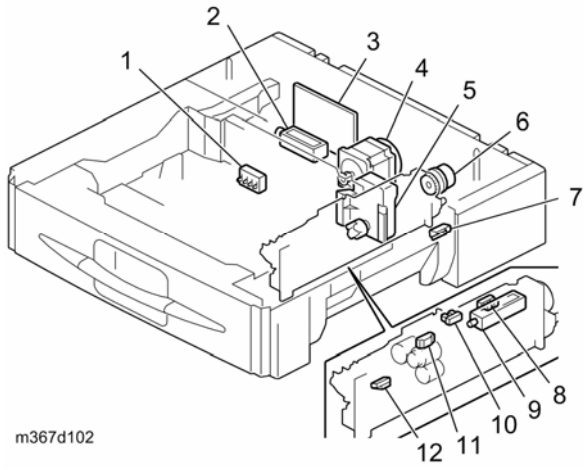
Component Layout



Slide 301

1. Paper end sensor
2. Paper lift sensor
3. Paper feed roller
4. Paper feed solenoid
5. Vertical transport sensor
6. Vertical transport roller
7. Paper feed sensor
8. Separation roller
9. Paper pick-up roller
10. Tray lift arm
11. Bottom plate
12. Paper tray
13. Paper size switch
14. End fence

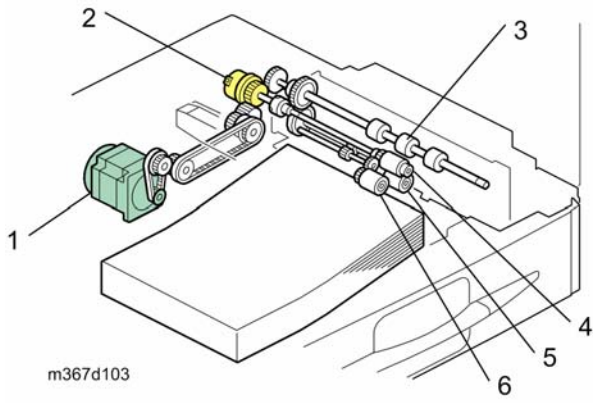
Component Layout



Slide 302

1. Paper size switch
2. Tray lock solenoid
3. Drive board
4. Paper feed motor
5. Tray lift motor
6. Paper feed clutch
7. Cover sensor
8. Paper lift sensor
9. Paper feed solenoid
10. Paper end sensor
11. Vertical transport sensor
12. Paper feed sensor

Drive Layout



- The mechanisms are the same as the tray in the Z-C1 mainframe.

Slide 303

1. Paper feed motor
2. Paper feed clutch
3. Vertical transport roller
4. Paper feed roller
5. Separation roller
6. Paper pick-up roller

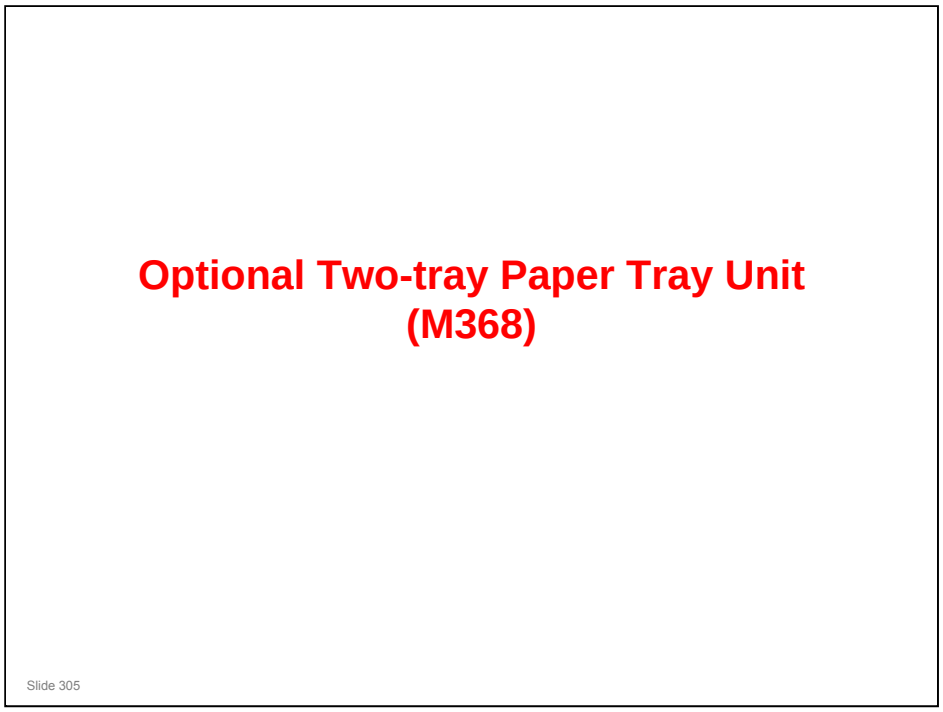
Paper Size Detection

- The sensor signals in the optional one-tray and two-tray paper feed units are the same as each other but different from the tray in the Z-C1 mainframe.

Slide 304

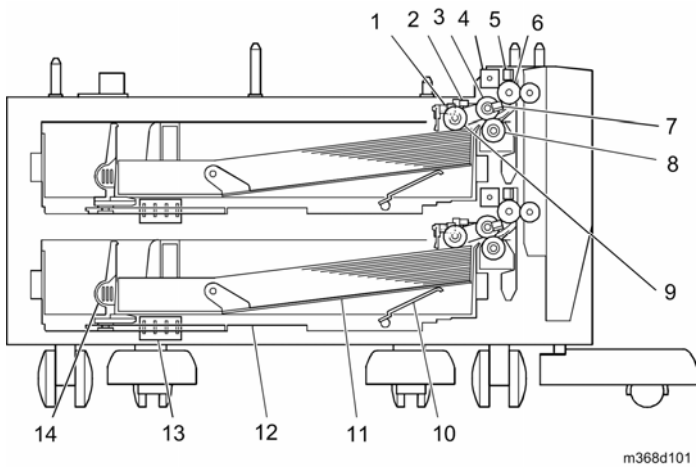
- The following table shows the sensor signals for each paper size.
- It is different from the tray in the mainframe.

Paper Size					
NA	**EU**	**AA**	**Sensor 2**	**Sensor 3**	**Sensor 4**
LG	LG	LG	0	0	0
A4	A4	A4	0	1	1
HLT	A5	A5	0	1	0
LT	LT	LT	1	1	1
Exe	Exe	Exe	1	1	0
A6	A6	A6	0	0	1
B6, B5	B6, B5	B6, B5	1	0	0



- In this section, you will study the mechanisms of the optional two-tray paper tray unit.
- There are similarities with the optional trays for the Z-P1 and the Ap/At series.

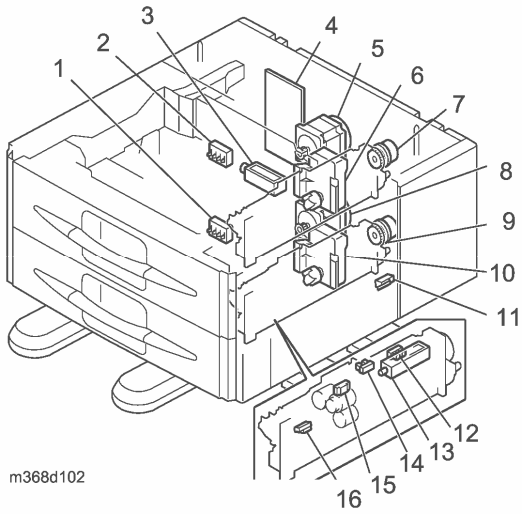
Component Layout



Slide 306

1. Paper end sensor
2. Paper lift sensor
3. Paper feed roller
4. Paper feed solenoid
5. Vertical transport sensor
6. Vertical transport roller
7. Paper feed sensor
8. Separation roller
9. Paper pick-up roller
10. Tray lift arm
11. Bottom plate
12. Paper tray
13. Paper size switch
14. End fence

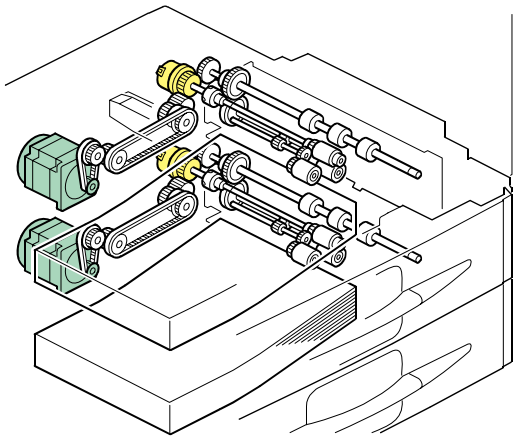
Component Layout



Slide 307

1. Paper size switch 2
2. Paper size switch 1
3. Tray lock solenoid
4. Drive board
5. Paper feed motor 1
6. Tray lift motor 1
7. Paper feed clutch 1
8. Paper feed motor 2
9. Paper feed clutch 2
10. Tray lift motor 2
11. Cover sensor
12. Paper lift sensor
13. Paper feed solenoid
14. Paper end sensor
15. Vertical transport sensor
16. Paper feed sensor

Drive Layout



- The mechanisms are the same as the tray in the Z-C1 mainframe.

Slide 308

1. Paper feed motor
2. Paper feed clutch
3. Vertical transport roller
4. Paper feed roller
5. Separation roller
6. Paper pick-up roller

Paper Size Detection

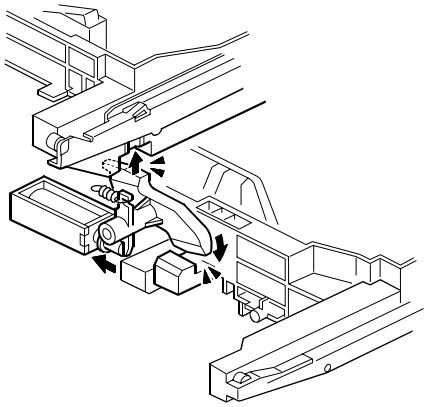
- The sensor signals in the optional one-tray and two-tray paper feed units are the same as each other but different from the tray in the Z-C1 mainframe.

Slide 309

- The following table shows the sensor signals for each paper size.
- It is different from the tray in the mainframe.

Paper Size					
NA	**EU**	**AA**	**Sensor 2**	**Sensor 3**	**Sensor 4**
LG	LG	LG	0	0	0
A4	A4	A4	0	1	1
HLT	A5	A5	0	1	0
LT	LT	LT	1	1	1
Exe	Exe	Exe	1	1	0
A6	A6	A6	0	0	1
B6, B5	B6, B5	B6, B5	1	0	0

Tray Lock



- This is the same as the At-C1.
- The solenoid locks both trays at the same time.
- The tray is not locked during printing.
- The machine automatically locks the tray when a paper jam occurs.

Slide 310

No additional notes

Internal Finisher (M024/M028 only)

Slide 311

PURPOSE OF THIS SECTION

- In this section, you will study the mechanisms of the internal finisher. This is built into the M024 and M028 models. It is not available as an option for the other models.
- It is a much simpler unit than the one in the Di-C1 series.

Comparison with the Di-C1

	Z-C1	Di-C1
Availability	Standard (finisher model only)	Option
Productivity	40 cpm	25 cpm
Paper size	LG – A6 SEF	A3/DLT – B6 SEF
Output tray capacity	250 sheets	500 sheets
Stapling positions	1	2
Punching	No	Yes
Shift-sorting	With roller (faster than jogger method)	With jogger
Reverse roller	Sponge (less likely to get dirty)	Rubber (grips the paper strongly)
Jogger	At the rear; moves paper to the front	Front and rear joggers Staple mode: Front jogger moves the paper Shift sorting: Front and rear joggers move the paper alternately

Slide 312

No additional notes

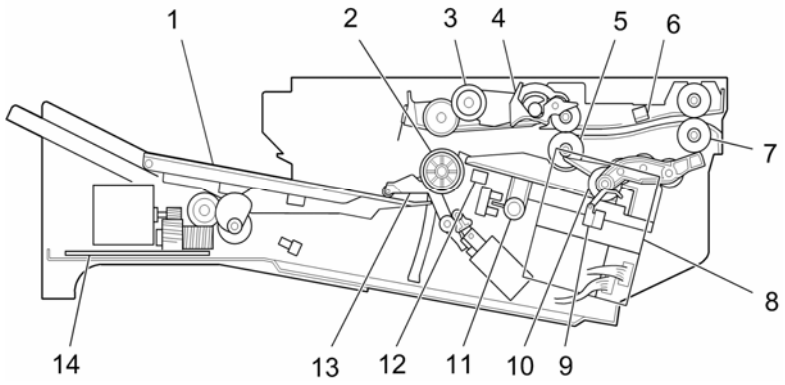
Specifications

- **Number of sheets in stapled set**
  - Paper length less than 300 mm: 50 sheets
  - Paper length 300 mm or more: 30 sheets
- **Size of paper that can be stapled**
  - Width: 182.0 mm to 216.0 mm
  - Length: 254.0 mm to 356.0 mm
    - » To staple on paper that is longer than 297 mm, the optional paper tray unit must be used to feed the paper.
- **Weights of paper that can be stapled**
  - 52 to 90 g/m^2
- **Number of stapling positions**
  - 1 position
- **Tray Capacity: 250 sheets (80 g/m^2)**

Slide 313

No additional notes

Component Layout

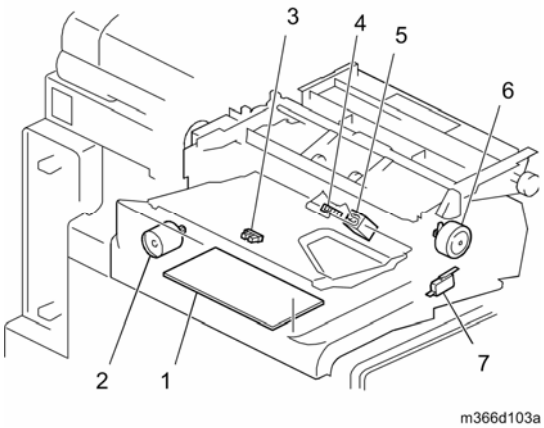


❑ The first few slides show the locations of the components.

Slide 314

- ❒ 1. Output Tray
- ❒ 2. Paper Exit Roller
- ❒ 3. Gathering Roller
- ❒ 4. Paper Trailing Edge Guide
- ❒ 5. Shift Roller
- ❒ 6. Entrance Sensor
- ❒ 7. Entrance Roller
- ❒ 8. Stapler
- ❒ 9. Staple Tray Paper Sensor
- ❒ 10. Reverse Roller
- ❒ 11. Jogger Fence
- ❒ 12. Paper Exit Sensor
- ❒ 13. Paper Sensor Arm
- ❒ 14. Main Board

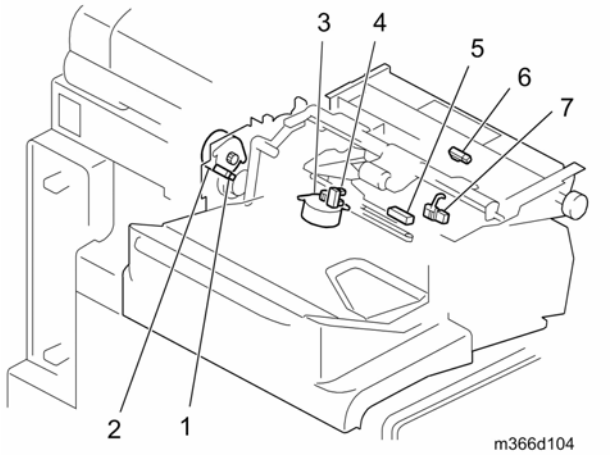
Component Layout



Slide 315

- 1. Main Board
- 2. Tray Lift Motor
- 3. Tray Lower Limit Sensor
- 4. Paper Sensor
- 5. Pick-up Solenoid
- 6. Exit Guide Plate Motor
- 7. Interlock Switch
  - Turns off when the Inner Finisher front cover is opened.
  - As a result, the relay on the PSU cuts off the power supply to the Inner Finisher

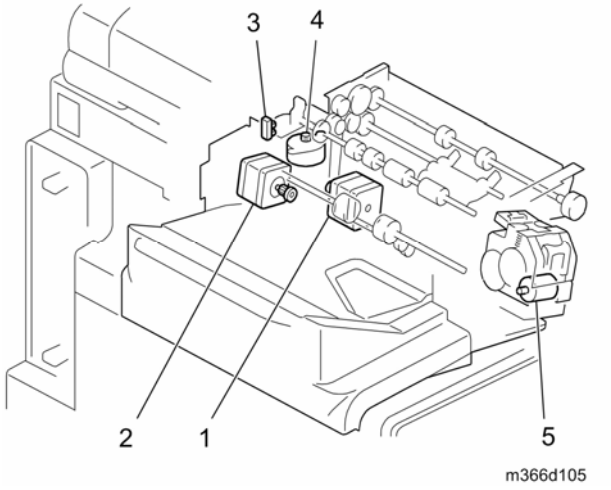
Component Layout



Slide 316

- 1. Gathering Roller HP Sensor
- 2. Gathering Roller Motor
- 3. Jogger Motor
- 4. Jogger Fence HP Sensor
- 5. Paper Exit Sensor
- 6. Entrance Sensor
- 7. Staple Tray Paper Sensor

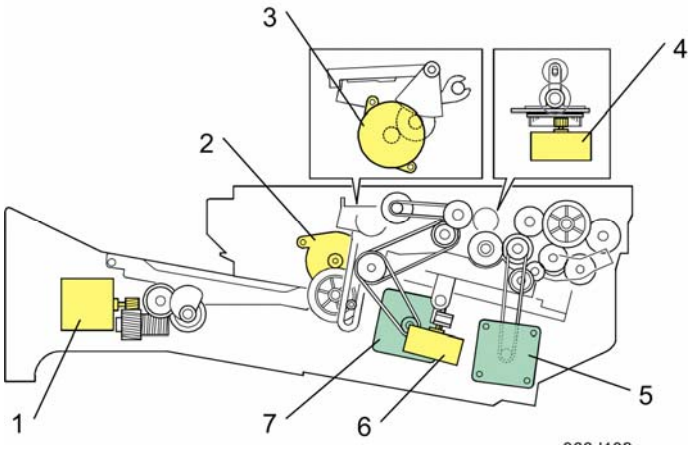
Component Layout



Slide 317

- 1. Transport Motor
- 2. Paper Exit Motor
- 3. Shift Roller HP Sensor
- 4. Shift Roller Motor
- 5. Stapler Motor

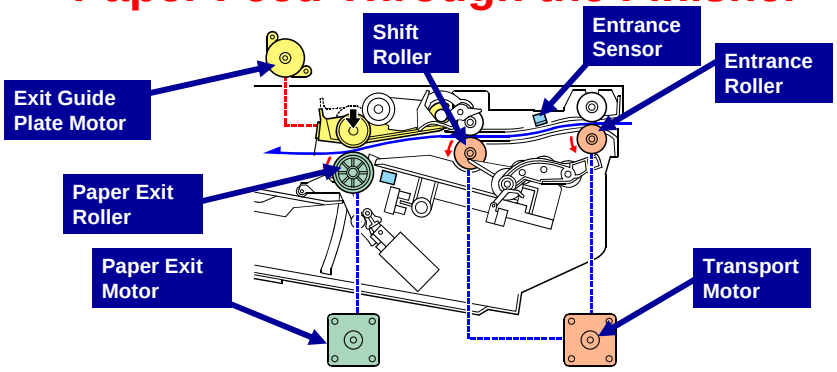
Drive Layout



Slide 318

- 1. Tray Lift Motor
- 2. Gathering Roller Motor
- 3. Exit Guide Plate Motor
- 4. Shift Roller Motor
- 5. Transport Motor
- 6. Jogger Motor
- 7. Paper Exit Motor

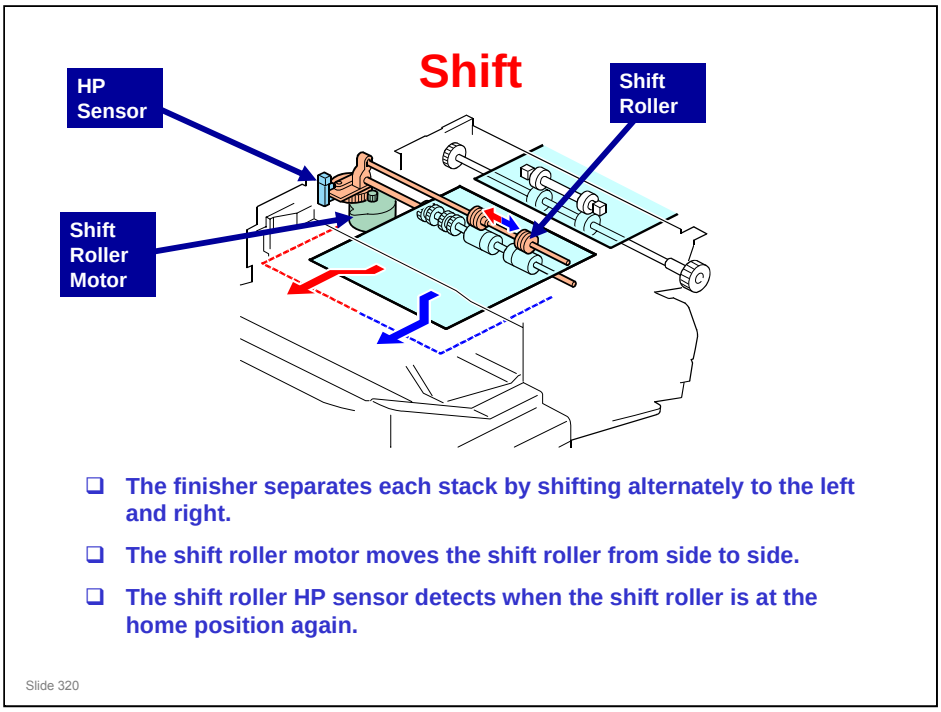
Paper Feed Through the Finisher



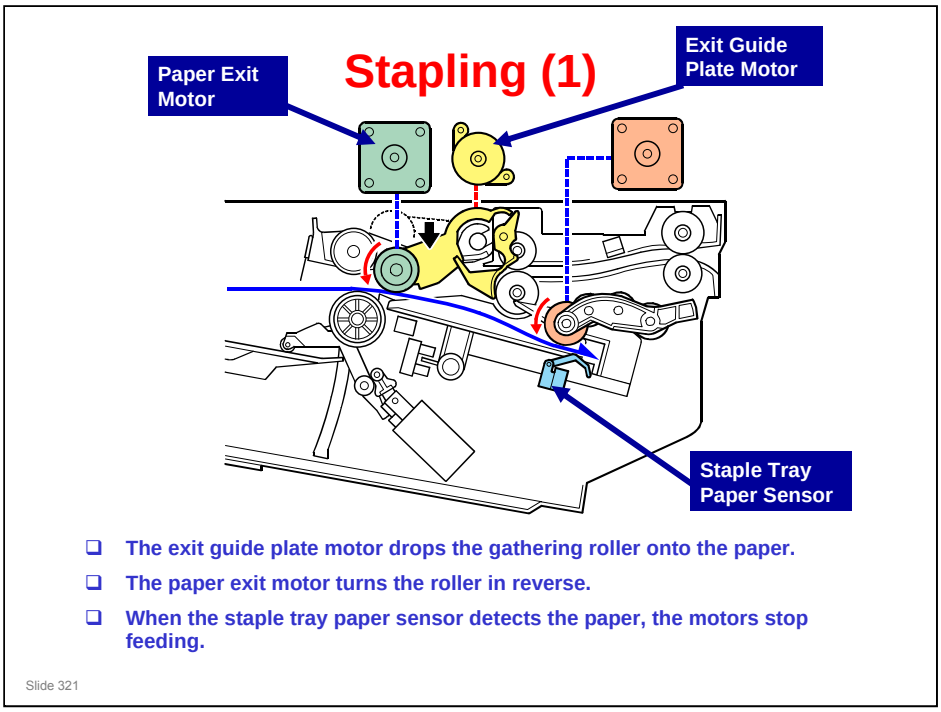
- Transport motor: Drives the entrance roller and the shift roller.
- Paper exit motor: Drives the paper exit roller.
- When the entrance sensor detects the leading edge of the paper, the exit guide plate lowers the exit guide plate unit from its home position.
- The paper exit roller feeds the paper through to the output tray.

Slide 319

❒ This shows paper feed without stapling.

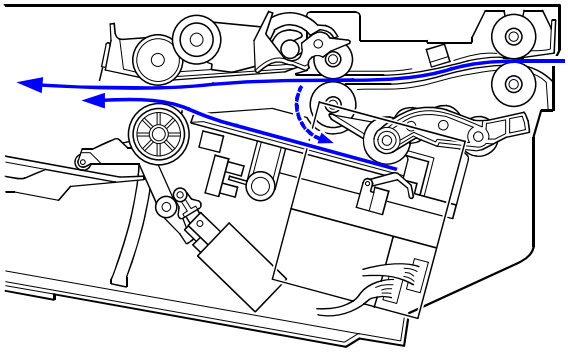


No additional notes



❒ This shows how the machine reverse-feeds the sheet of paper into the stapler.

Stapling (2)

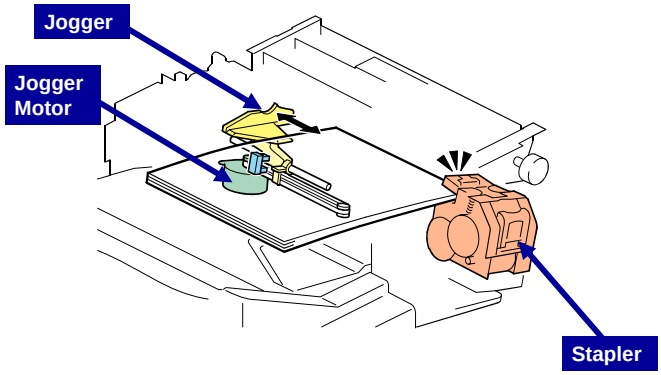


- The next sheet is fed into the finisher, then reversed into the stapler tray.

Slide 322

No additional notes

Stapling (3)

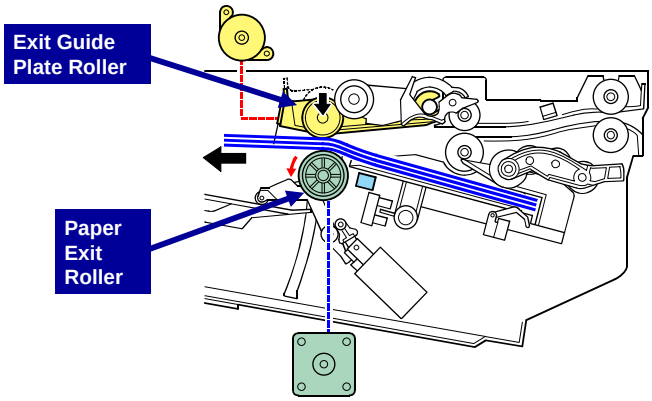


- The jogger motor drives the jogger.
- There is only one stapling position, and no stapler rotation.

Slide 323

No additional notes

Stapling (4)



- After stapling, the exit guide plate roller drops onto the top of the stack.
- The paper exit roller feeds out the stack.

Slide 324

No additional notes

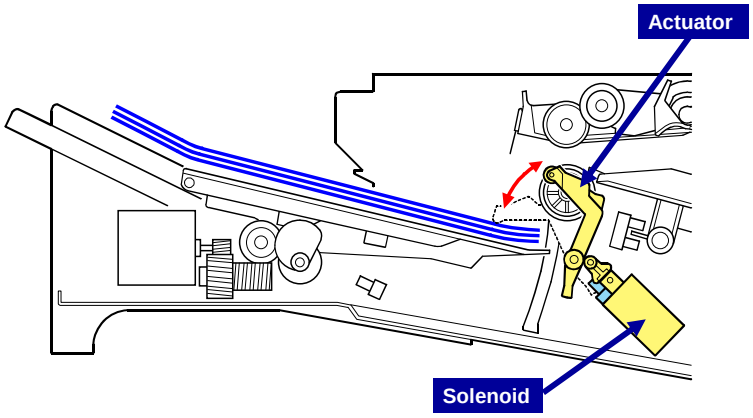
Jogger Fence Fine Adjustment

- **You can adjust the jogging position of the jogger fence with the following SPs (from -1.0 mm to 1.0 mm).**
  - A4: 6132-003
  - B5: 6132-005
  - Legal: 6132-008
  - Letter: 6132-009
  - Other: 6132-012

Slide 325

No additional notes

Tray Full Detection (1)

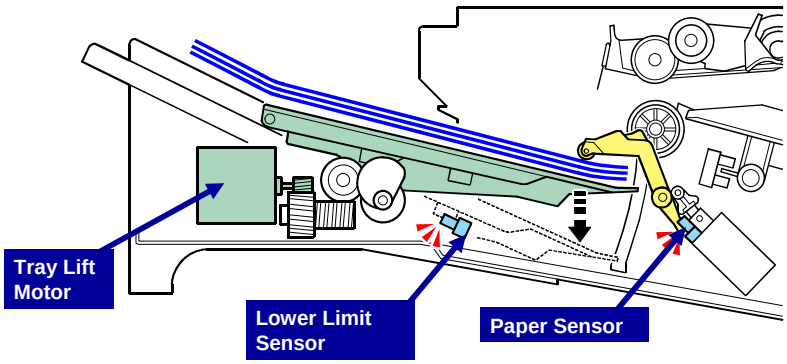


- The paper sensor solenoid moves the actuator until it touches the top of the stack.

Slide 326

No additional notes

Tray Full Detection (2)



- When the sensor detects the actuator, the tray lift motor lowers the end of the tray nearest the exit. This makes room for more paper on the tray.
- If the tray lower limit sensor is activated, the tray cannot be lowered any more.

Slide 327

No additional notes

Finisher Free Run

- **You can make a finisher free run with the following SPs. No paper is required when executing these SPs.**
  - 6137-001: Free Run 1 (Shift mode)
  - 6137-002: Free Run 2 (Staple mode)
  - 6137-003: Free Run 3 (Packing mode: Output tray descends to the lowest position.)
  - 6137-004: Free Run 4 (Not assigned)
- **You can also make a free run with dip switches (SW101)**

1	2	3	4	mode
OFF	OFF	OFF	OFF	Normal mode
ON	OFF	OFF	OFF	Shift mode
OFF	ON	OFF	OFF	Staple mode
OFF	OFF	ON	OFF	Packing mode: Output tray descends to the lowest position

Slide 328

No additional notes

LED on Main Board

- **You can check the finisher status with the LEDs on the Main Board.**

LED	Status
OFF	Machine Power OFF
Blink (per 1.0 sec)	Working Free Run (Shift mode, Staple mode, Packing mode)
Blink (per 0.5 sec)	Error Occurring
ON	Normal operation

Slide 329

No additional notes

Jam Removal

- If you can see the jammed paper from the left side, just pull the paper out.
- If you cannot see it from the left side, open the duplex unit and pull out the paper.

Slide 330

No additional notes

Replacement Procedures

- **The following parts can be removed without removing the finisher from the machine:**
  - Stapler
  - Exit guide plate motor
  - Interlock switch

Slide 331

No additional notes

Replacing the Main Board

- Check the DIP switch (SW100) on the old main board. If the settings on the new main board are different from the old main board, change the settings on the new board (they must be the same as the settings on the old board).

Slide 332

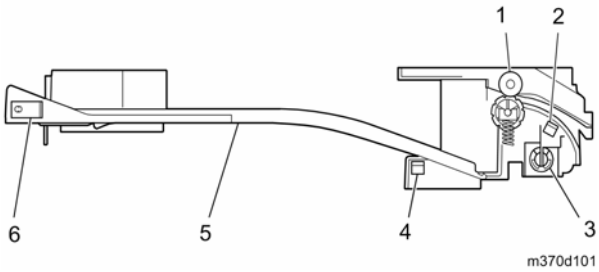
No additional notes

Optional One-bin Tray (M370)

Slide 333

- In this section, you will study the mechanisms of the optional one-bin tray.
- This unit is similar to the unit that is used in the Athena-C1/C2.

Overview



- This unit adds an output tray. It does not replace the tray that is supplied with the machine.
- It is not a sorter, because the tray and/or the rollers do not move from side to side.
- With more than one output tray, the user can (for example) send copy-mode outputs to the standard output tray, and fax-mode outputs to the 1-bin tray.
- In the finisher model, the one-bin tray cannot be installed.

Slide 334

1. Exit Roller

2. 1-Bin Tray Exit Sensor

3. Junction Gate Solenoid

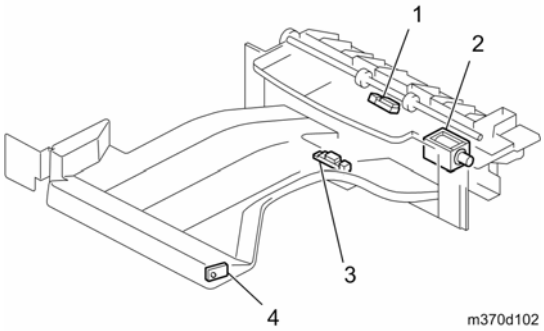
4. Paper Sensor

5. Paper Tray

6. LED Board

- To send output to a different output tray for each mode, the user adjusts this user tool: User Tools - System Settings - General Features - Output: Copier, Output: Facsimile, etc
  - The one-bin tray is called 'Internal Tray 2'.

Components



- The main motor in the copier operates the tray. There is no motor in the tray.
- The junction gate solenoid in the paper exit mechanism of the main copier sends paper to this tray.
- The paper sensor in the one-bin tray checks if there is paper in the tray. Then, if there is paper, the LED on the side of the tray lights.

Slide 335

1. 1-Bin Tray Exit Sensor
2. Junction Gate Solenoid
3. Paper Sensor
4. LED Board

LED on the One-bin Tray

- This LED lights when an output arrives on the one-bin tray.
- If the one-bin tray is set up to receive fax messages, then the LED tells the customer when a fax message has been printed.

Slide 336

No additional notes

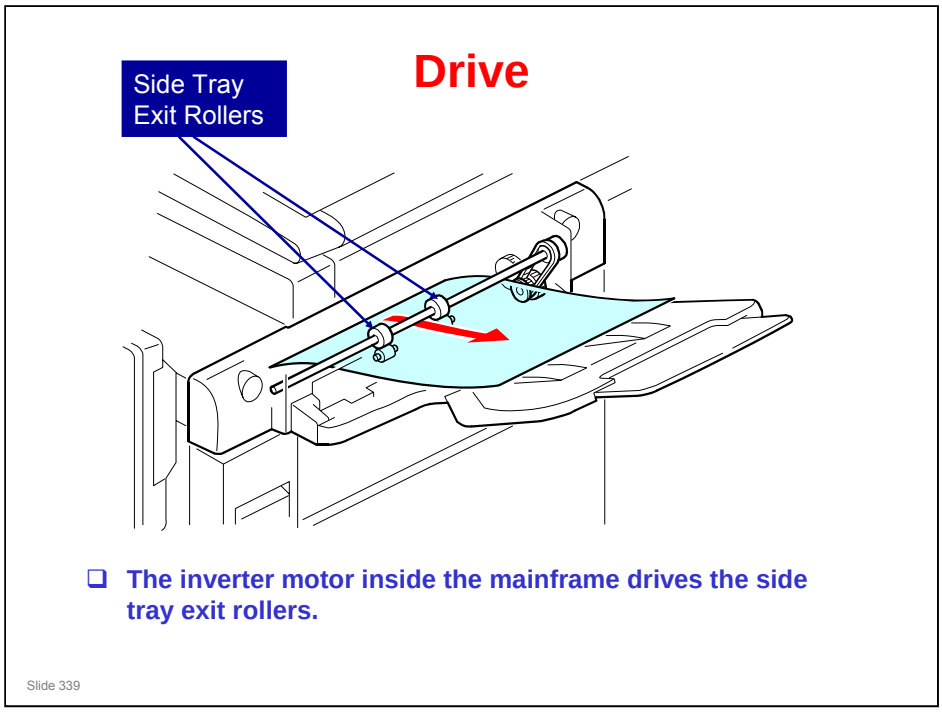
❒ In this section, you will study the mechanisms of the optional side tray.

Overview

- The side tray is an additional output tray.
- For example, on the finisher model, the user can send copy-mode outputs to the finisher tray, and fax-mode outputs to the side tray.
- This is because, in the finisher model, the one-bin tray cannot be installed.

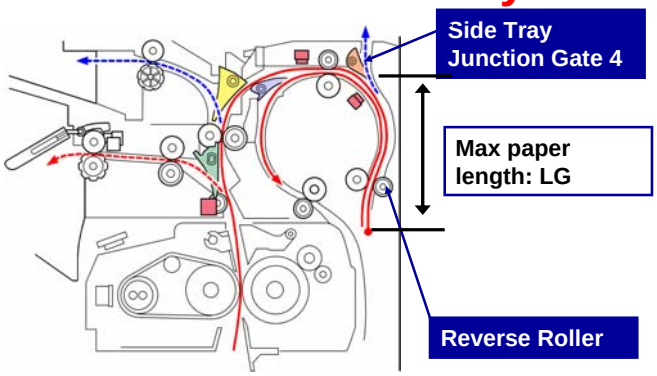
Slide 338

No additional notes



No additional notes

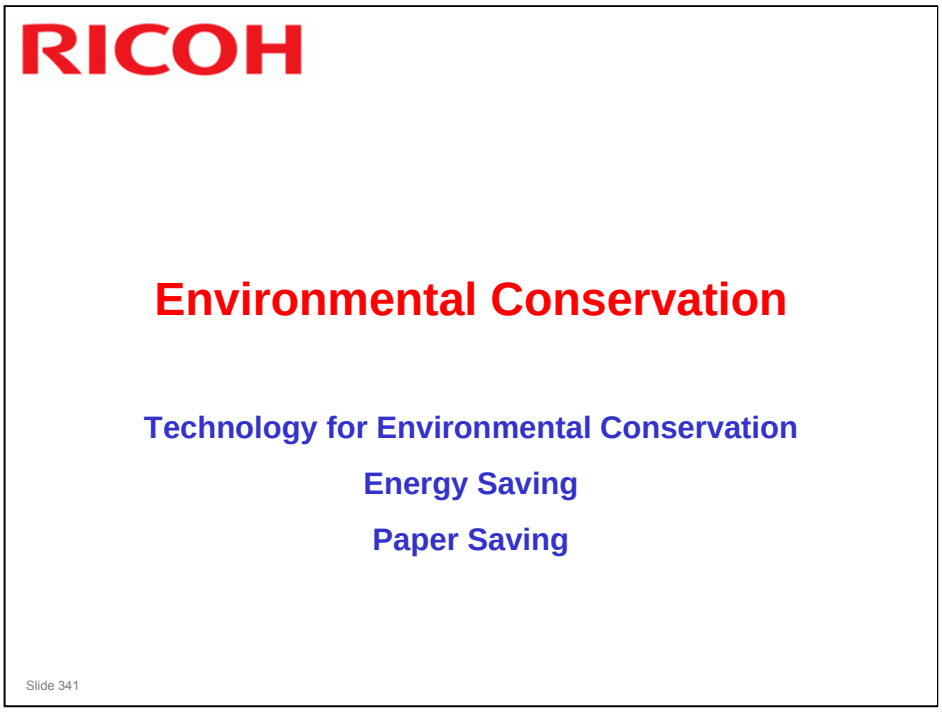
Feed-out to the Side Tray



- The paper pushes the side tray junction gate open.
  - The gate is normally closed by spring tension.
- After the trailing edge of the paper passes the inverter junction gate, the gate closes.
- Then, the reverse roller rotates in reverse. The paper feeds up to the side tray.
- Paper size: A4 SEF - A6 SEF, HLT-LG (the reverse paper path for the side tray cannot hold paper that is longer than Legal size as shown above)
- Paper weight: 60-163 g/cm²

Slide 340

No additional notes



❒ 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 Z-C1	Old model Z-P1
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		*	*

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❒ 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.

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No additional notes

Brief Descriptions of the Technologies

- **5. High-speed duplex output**
  - Enables high-speed duplex printing through the utilization of the Duplex Interleaf and high-speed Inverter Transport features.
- **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

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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.

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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

- **The warm-up time and recovery time from energy saver modes are as follows.**
  - Warm-up time (Z-C1: 60 sec, Z-P1: 50 sec)
  - Recovery time
    - » Energy Saver Mode:
      - – 3 sec (full color, b/w) Level 1: Panel Off only
      - – 9 sec (full color, b/w) Level 2: Panel off and lower the fusing temperature
    - » Low Power Mode:
      - – 18 sec
    - » Sleep Mode:
      - – 45 sec

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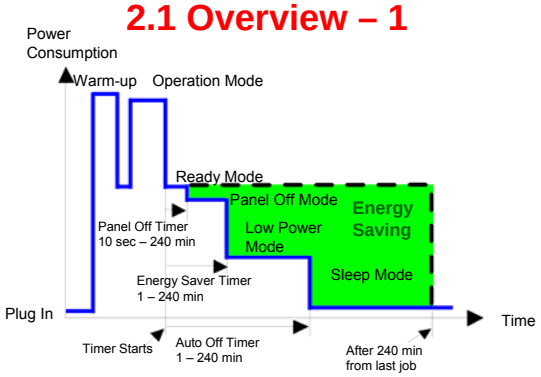
- Through major reductions in warm-up time and recovery time from energy saver modes (Low power, Sleep), QSU (Quick Start Up) Technology has eliminated the traditional trade-off between energy saving and convenience of speed.

2. Energy Saving

2.1 Overview – 1



Energy Saver Modes	Description
Energy Saver Mode (Panel Off)	The machine is still in the Copy Ready condition. Level 1: Panel Off only Level 2: Panel off and lower the fusing temperature.
Low Power Mode	The fusing temperature is lowered to the prescribed temperature (below ready temperature).
Sleep Mode	No power is supplied to the printing engine, and almost none to the controller.

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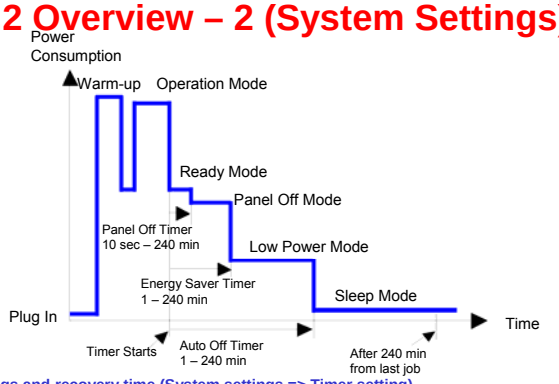
- When the machine is not being used, the machine enters energy saver mode to reduce the power consumption by turning off the LCD of the operation panel and lowering the fusing temperature.
- The area shaded green in this diagram represents the amount of energy that is saved when the timers are at the 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)



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

Mode	Timer	Default	Setting range	Recovery time
Panel off Mode	Panel Off Timer	1 min.	10 sec to 30 min.	9 sec.
Low Power Mode	Energy Saver Timer	5 min.	1 min to 30 min.	18 sec.
Sleep Mode	Auto Off Timer	11 min.	1 min to 60 min.	45 sec.

Specified values for timers	Panel Off Mode	Low Power Mode	Sleep Mode
If Panel Off > Energy Saver > Auto Off	This mode cannot start	This mode cannot start	This mode can start
If Panel Off = Energy Saver = Auto Off	This mode cannot start	This mode cannot start	This mode can start
If Panel Off < Energy Saver < Auto Off	This mode can start	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, Panel Off timer < Energy Saver timer < Auto Off timer.
- But, for example, if Auto Off timer < or = Panel Off timer and Energy Saver timer, the machine goes immediately to Sleep mode when the Auto Off timer expires. It skips the Panel Off and Energy Saver modes.
- Example
  - Panel off: 1 minute, Low power: 15 minutes, Auto Off: 1 minute
  - The machine goes to Sleep mode after 1 minute. Panel Off and Low Power modes are not used.
- 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	Main Power LED	Energy Saver LED
Panel off Mode	On	On
Low Power Mode	On	On
Sleep Mode	On	Off

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No additional notes

2. Energy Saving
2.2 Energy Saver Mode: Panel Off Mode – 1

- **The machine enters panel off mode when one of the following is done.**
  - The panel off timer runs out after the last job.
    - » The panel off timer is controlled by User Tools: Timer settings.
  - The Energy Saver key is held down for a second.
- **The machine is still in the stand-by (ready) condition, but turns off the LCD of the operation panel.**
- **The machine recovers to the ready condition if one of the following occurs:**
  - The Energy Saver key is pressed
  - An original is placed in the ARDF
  - The ARDF is lifted
  - The user touches the operation panel
  - The front door is opened or closed
  - The user sends a job to the MFP

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- In some MFP models, when it takes 1 minute to return from Sleep mode, there may be no Panel Off Mode

2. Energy Saving
2.2 Energy Saver Mode: Panel Off Mode – 2

❑ **Important**

There are two levels of Panel Off Mode:

- **Level 1:**
  Panel off only (No recovery time)
- **Level 2:**
  Panel off and lower the fusing temperature.
  Recovery time should be within 10 seconds

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❒ Level 2 was created so that it is possible for the machine to recover within 10 seconds.

2. Energy Saving
2.2 Energy Saver Mode: Panel Off Mode – 2

- **Important**

  How to change the of Panel Off Mode level :

  1) Push the "UserTools/Counter" hard key on the operation panel.
  2) Push "System Setting" -> Push "Administrator Tools" -> Push "Next" twice (go to 3/4 page) -> Push "Energy Saver Level"-> Select "Level1" or "Level2"

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No additional notes

2. Energy Saving
2.2 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
  - An original is placed in the ARDF
  - The ARDF is lifted
  - The user touches the operation panel
  - The front door is opened or closed
  - The user sends a job to the MFP
- **Recovery time**
  - Less than 18 seconds

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No additional notes

2. Energy Saving

2.2 Energy Saver Mode: Sleep Mode – 1

- **The machine enters sleep 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 sleep mode, no power is supplied to the printing engine, and almost none to the controller.**
- **Recovery time**
  - Less than 45 seconds

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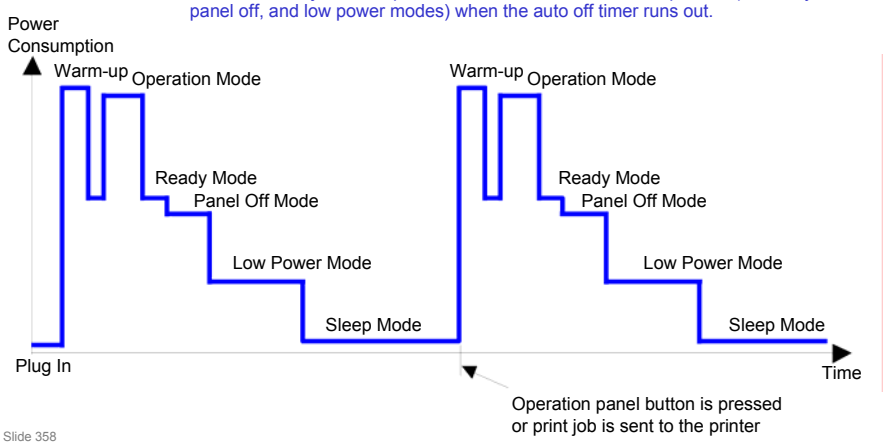
No additional notes

2. Energy Saving

2.2 Energy Saver Mode: Sleep Mode – 2

- **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.
    - » Then, after the job is completed, the machine returns to sleep mode (via ready, panel off, and low power modes) when the auto off timer runs out.



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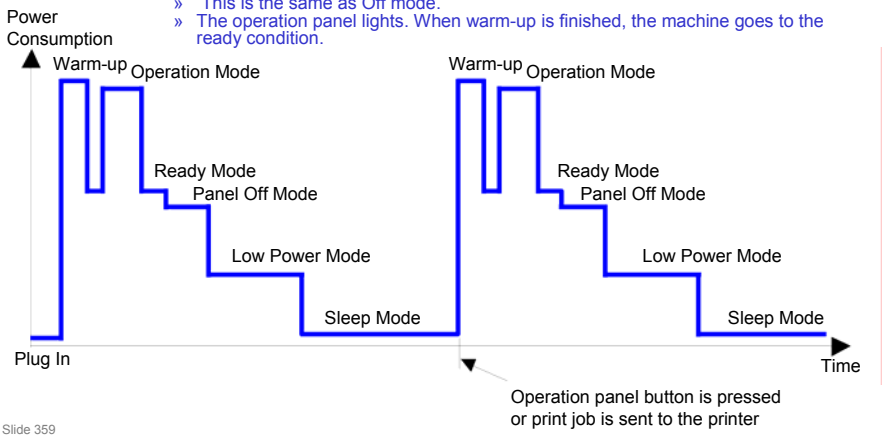
- This timing chart shows what happens if the operation switch is pressed while the machine in sleep mode.
- Power consumption during warm-up may be much higher than shown in this diagram.

2. Energy Saving
2.2 Energy Saver Mode: Sleep Mode – 2

- **The machine recovers to the ready condition:**
  - **If the operation switch is pressed**
    - » The operation panel lights. When warm-up is finished, the machine goes to the ready condition.
    - » Then, after the job is completed, the machine returns to sleep mode when the auto off timer runs out or the operation switch is pressed.
    - » This is the same as Off mode.
    - » The operation panel lights. When warm-up is finished, the machine goes to the ready condition.



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

2. Energy Saving

2.3 Energy Save Effectiveness – 1

- 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 time
  - 8941-002: Standby time
  - 8941-003: Energy Save time
  - 8941-004: Low power time
  - 8941-005: 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

2. Energy Saving
2.3 Energy Save Effectiveness – 2

(1) At the start of the measurement period, read the values of SP 8941:001-005 (Machine Status), measured in minutes.

(2) At the end of the measurement period,read the values of SP 8941:001-005 (Machine Status), measured in minutes.

(3) Find the amount of time spent in each mode.
(Subtract the earlier measurement from the later measurement and convert the result to hours.)

(4) Power consumption figures for each model are acquired from "Publication System of MSDS_&_PEI (PRODUCT ENVIRONMENT INFORMATION)" database.

Mode/condition	Power consumption:
Operating mode	Z-C1a: 764 W Z-C1b: 898 W
Standby mode	179W
Energy Saver mode (Panel Off)	148.09W
Low power mode	111W
Sleep mode	1.8W

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No additional notes

2. Energy Saving

2.3 Energy Save Effectiveness – 3

(5) Multiply this by the power consumption spec for each mode and convert the result to kWh (kilowatt hours)

(6) This is a simulated value for power consumed.

Example calculations (Z-P1b):

Mode/condition	SP8941: Machine Status	Time at Start (min.) (1)	Time at End (min) (2)	Running time (hour) (2) – (1)/60 = (3)	Power Consumption Spec. (W) (4)	Power consumption (KWH) (3) x (4)/1000 = (5)
Operating	001: Operating Time	21089	21386	4.95	898.00	4.45
Stand by (Ready)	002: Standby Time	306163	308046	31.38	179.00	5.62
Energy save	003: Energy Save Time	74000	75111	18.52	148.09	2.74
Low power	004: Low power Time	148000	150333	38.88	111.00	4.32
Sleep	005: Sleep mode Time	508776	520377	193.35	1.80	0.35
Total (6)						17.47

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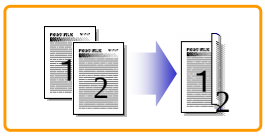
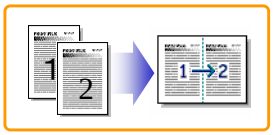
No additional notes

3. Paper Saving
3.1 Measuring the Paper Consumed – 1

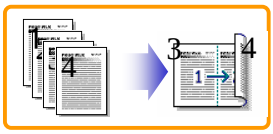
1. Duplex: Reduce paper volume in half!



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.