



**This training course provides service technician training for the Mo-C1. This is a new engine, so the training course is a full course.**

**Version 1.1 modifications**

- Initializing the New Paper Roll (starting at slide 207)
- Removing a Roll (starting at slide 215)
- Controlling the Ink Supply to the Sub Tanks: Monitoring the Sub Tank During Printing (slide 259)
- Controlling the Ink Supply to the Sub Tanks: What Happens if Air is Detected? (slide 260)



**This section provides an overview of the sections of the training course.**

## Contents of the Course

- ❑ **Product Overview**
- ❑ **Main Specifications**
- ❑ **Installation**
- ❑ **Maintenance**
- ❑ **Machine Overview**
- ❑ **Scanner**
- ❑ **Image Processing**
- ❑ **Paper Feed**
- ❑ **Ink Supply and Printing**
- ❑ **Maintenance Unit**
- ❑ **Troubleshooting for the Printer Engine**

Slide 3

- ❑ The Operation Details section contains detailed descriptions of certain procedures, such as power on initialization, paper roll initialization, and so on.

**RICOH**

**D124**  
**Service Training**

**Product Overview**

Slide 4

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

## What Models are there in the Series?

- ❑ **MO-C1 (D124)**
  - ◆ Output speed (A1 LEF, high speed mode, copying):
    - » 3.4 ppm (black-and-white), 1.1 ppm (color)
    - » 5 sheets A1 LEF in 109 s (black-and-white), 293 s (color)
      - 5 sheets D LEF in 116 s (black-and-white), 318 s (color)
    - » First copy: Less than 31 s
  - ◆ Warm-up time: Less than 40 s (23 degrees C)
  - ◆ Paper thickness: 51 to 220 g/m<sup>2</sup>
  - ◆ Durability: 72 km
  - ◆ Paper Size:
    - » Width: 210 to 914.4 mm (8.3 to 36 in)
    - » Length 210 to 15,000 mm (8.3 to 591 in.)
- ❑ **Contains scanner and printer kits as standard equipment**
- ❑ **Contains one roll unit, bypass feed, an original stacker and a printout exit stacker as standard equipment.**
- ❑ **Supports SDK solutions such as Global Scan NX.**

Slide 5

- ❑ The warm-up time includes time for the controller to start up.
- ❑ Output speed: For printing, there are three types: standard, quality, and high speed, selectable with the printer driver. For copying, there is high speed and standard only.

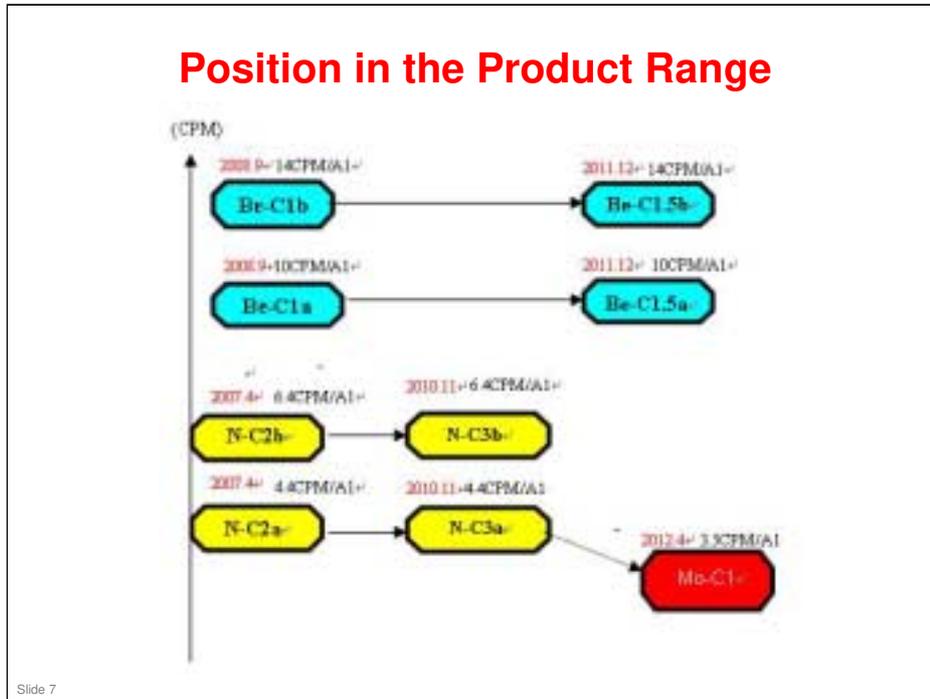
## **Product Concepts**

- ❑ **Enhanced controller**
  - ◆ USB/SD Media to Print (STD)
  - ◆ Scan to USB/SD (STD)
- ❑ **High Productivity**
  - ◆ The black heads have a staggered layout that makes b/w printing faster.
- ❑ **New operation panel**
  - ◆ Full Color Wide VGA touch screen
- ❑ **Environmentally Friendly**
  - ◆ Power Consumption 90% of N-C3
  - ◆ Short warm up time (less than 40 seconds)
  - ◆ Complies with RoHS Directive
- ❑ **Paper Handling**
  - ◆ Built-in exit stacker (10 sheets A0 SEF/A1 LEF, A1 SEF/A2 LEF, plain/inkjet/glossy paper)
  - ◆ 1 roll + manual feed (1 additional roll option)

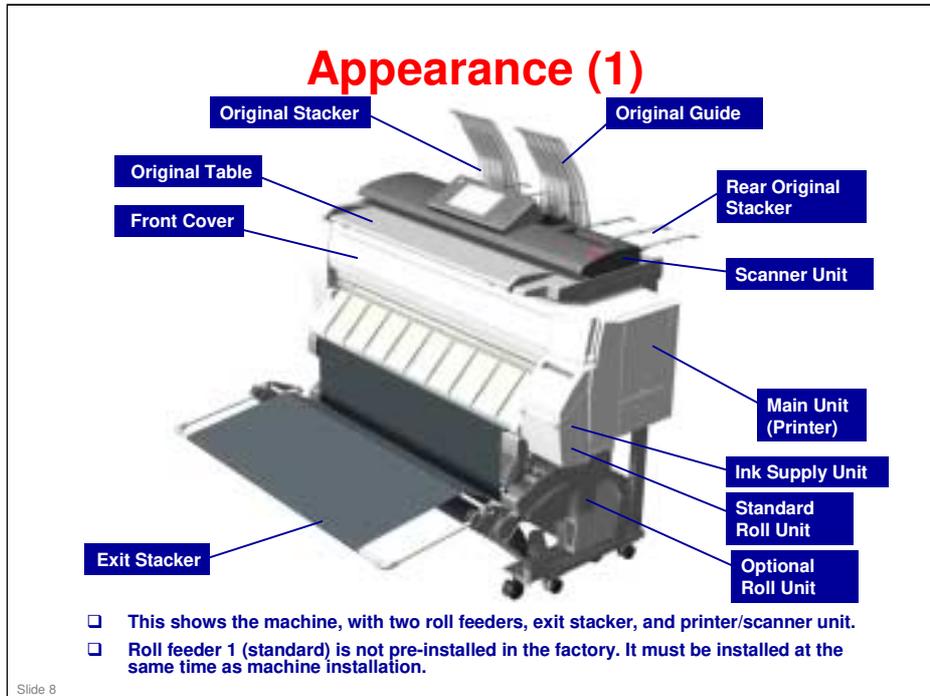
Slide 6

### **Additional Features**

- ❑ Full front operation
- ❑ Increased languages from N-C3 (Brazilian Portuguese and Greek support)
- ❑ HDD overwrite/encryption functions are standard

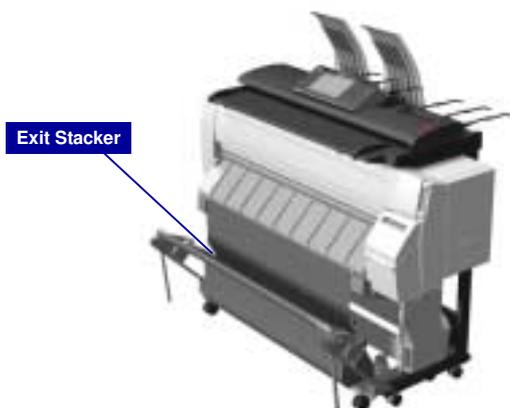


- ❑ This is an office color machine, not a professional color machine.



- In this photo, the standard roll unit is obscured by the ink supply unit.
- Roll unit: Also known as a roll feeder unit.

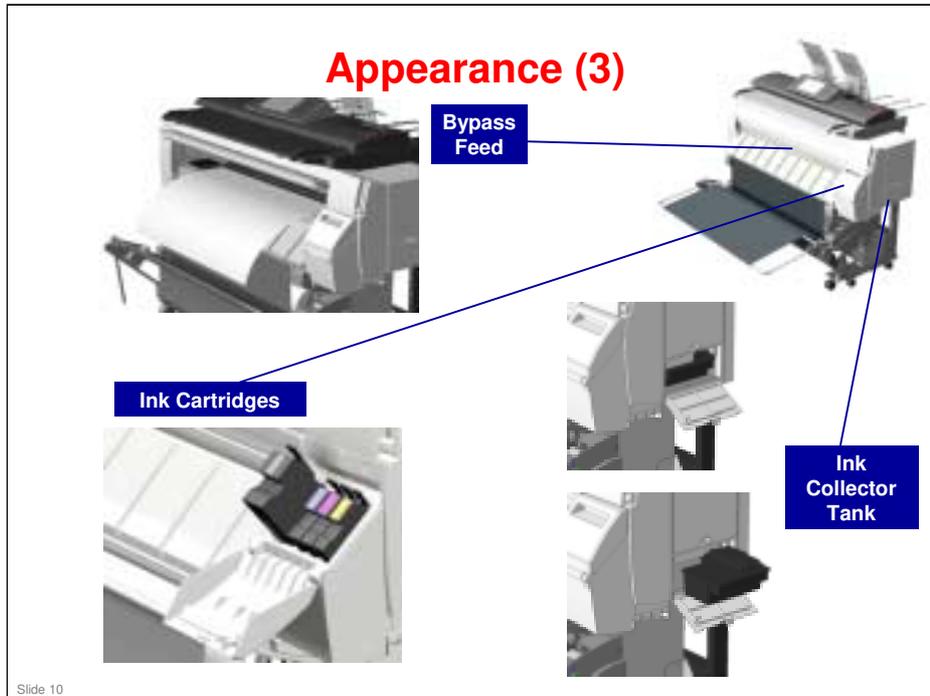
## Appearance (2)



- ❑ The exit stacker can be folded.
- ❑ The operation panel and scanner unit can be separated from the main unit and put on a table or a separate stand.
  - ◆ This is a lot easier to do than in the Be-C1/C1.5 series.

Slide 9

- ❑ The operation panel and scanner unit cannot be turned around so that the exit is the other side of the machine from the operator.



**Ink Collector Tank**

- ❑ Capacity: 425 cc
- ❑ Replace every 8,000 m (APV: 360m, Color ratio: 10%, Coverage: B/W 6%, CMYK 5% each)
- ❑ Replaced by users

**Ink cartridges**

- ❑ Cartridge Capacity: Black 180ml, CMY 80m
- ❑ Target Yield (A1 LEF, APV = 360m, 1P/J, Coverage B/W= 6% Color= 5%x4C=20%, Usage ratio Black 90% Color 10%):
  - Black: 774 Copies, 460 m
  - Cyan: 342 Copies, 203 m
  - Magenta: 347 Copies, 206 m
  - Yellow: 355 Copies, 211 m
- ❑ Warranty period
  - Unopened: 24 months
  - Opened: 6 months
- ❑ Environment
  - Storage: Temperature -30 to 43 degrees Celsius, Humidity 15 to 80%
  - Use: Temperature 10 to 32 degrees Celsius, Humidity 15 to 80%
  - Transport: Temperature -30 to 50 degrees Celsius, Humidity 15 to 90%

## Front View



1. Original Stacker
2. Operation Panel
3. USB Cable
4. Scanner Unit
5. Original Table
6. Front Cover
7. Paper Exit Guide
8. Paper Holding Lever
9. Ink Cartridge Cover
10. Exit Stacker

Slide 11

**No additional notes**

## Original Stacker



- ❑ As each original is scanned, the original guide (1) guides it to the original stacker (2) on top of the machine.
- ❑ If the original guide is removed, the original feeds out to the rear.

Slide 12

**No additional notes**

## Operation Panel



- ❑ Three screws hold the operation panel cover in place.
- ❑ These screws can be removed easily and reinserted to change the angle of the operation panel to reduce glare on the operation panel LCD.
  - ◆ There are three different positions.

Slide 13

**No additional notes**

## USB Cable, USB/SD Card Slots



- ❑ A USB cable [1] is permanently attached to the back of the operation panel.
- ❑ The end of this USB cable is plugged into the USB Host slot of the machine controller on the right side of the machine.
- ❑ Two slots are provided to input scanned documents, an SD card slot [2] and a USB memory device slot [3].
- ❑ These slots are used for the scan-to-media and media-to-print features.
  - ◆ Scan-to-media: Scanned documents can be stored on memory devices inserted into the side of the operation panel.
  - ◆ Media-to-print: The user can print documents that are stored on memory devices inserted into the side of the operation panel.

Slide 14

**No additional notes**

## Scanner Unit Cover



- ❑ The scanner unit opens easily for removal of paper jams (1).
- ❑ It can also be opened to the full vertical position (2) for servicing
  - ◆ This requires disconnection of the arms on the left and right.

Slide 15

**No additional notes**

## Original Table



- ❑ The plates on the original table of the scanner unit can be adjusted to accept originals up to 914.4 mm (36 in.) for scanning.
- ❑ Original length is limited to 15 m (49 ft.)

Slide 16

- ❑ The SMC list from the factory is attached under the right hand side of the original table.

## Front Cover - 1



- ❑ The front cover can be easily raised to expose the platen for cleaning and jam removal.
- ❑ The front cover locks in place and remains open after it has been raised, as shown on the left.
- ❑ Two sensors (micro-switches) on each end of the front cover detect when the cover is opened and closed.
- ❑ To open the front cover, lift it and then fold the bottom into the machine so that it locks and remains open, as shown on the right.
- ❑ Do not open during operation, or copying/printing will stop.

Slide 17

**No additional notes**

## Front Cover - 2

The diagram shows a perspective view of the front cover assembly. A blue box labeled 'Front Cover' points to the main cover. Another blue box labeled 'Front Cover Track Switch' points to a switch on the left side. A blue box labeled 'Left Front Cover Switch' points to a switch on the left side. A blue box labeled 'Right Front Cover Switch' points to a switch on the right side.

- The front cover can be raised to remove paper jams and to load paper for bypass feeding.
- The left and right front cover switches (push switches) detect when the front cover is raised and lowered.
- The guide pins on either end of the front cover are set in tracks which guide the cover into the correct closed position.
- The front cover track switch (a push-switch) ensures that the carriage does not stop suddenly, which could damage it (see the next slide for details).
- The machine cannot operate until the front cover is down and all three of these switches are closed.

Slide 18

**No additional notes**

### Front Cover - 3

The diagram shows a perspective view of the front cover assembly. A blue box labeled 'Front Cover' points to the top surface. A blue box labeled 'Front Cover Track Switch' points to a switch on the left side. A blue box labeled 'Left Front Cover Switch' points to a switch on the bottom left. A blue box labeled 'Right Front Cover Switch' points to a switch on the bottom right.

- If the front cover is opened during copying, the front cover track switch opens first. When the machine detects this, the carriage slows down.
- Then, when the left and right cover switches open, the carriage stops.
- This mechanism ensures that the carriage will not stop suddenly if the cover is opened.
- The carriage will not start again until the track switch closes again.

Slide 19

**No additional notes**

## Front Cover - 4



- ❑ Front cover track switch: When the pin on the left of the front cover is inserted correctly into its track [A], it slides down and pushes a micro-switch [B] to the rear. This signals that the front cover is installed correctly.
- ❑ If the switch stays open when the front cover is down, this indicates that the cover is not correctly set in the track.

Slide 20

**No additional notes**

## Front Cover - 5



d124308

- ❑ When you close the front cover, push it in and make sure that it locks.

Slide 21

**No additional notes**

## Paper Exit Guide - 1



- ❑ This guides printed paper from the machine into the exit stacker at the front of the machine.
- ❑ Two magnets on either end of the guide hold it in place when it is open.
- ❑ A microswitch on the right detects when the guide is opened and closed.
- ❑ Do not open during operation, or copying/printing will stop.

Slide 22

**No additional notes**

## Paper Exit Guide - 2



- ❑ A torque limiter on the right hinge of the paper exit guide acts as a damper to slow the descent of the guide after it is separated from the lock magnet above.
- ❑ This prevents the guide from falling abruptly.

Slide 23

**No additional notes**

## Paper Holding Lever



- ❑ The right side of the platen functions as the bypass feed station.
- ❑ If you lift the paper holding lever [1], the idle rollers above the registration rollers [2] lift, so that cut-sheet paper can be loaded on the right side of the platen.
- ❑ Lowering the lever [3] clamps the paper in position for paper feed.

Slide 24

**No additional notes**

## Ink Cartridge Cover



- ❑ The ink cartridge cover can be opened and closed to insert and remove the four ink cartridges.
- ❑ A small sensor (micro-switch) detects when this cover is opened and closed.

Slide 25

**No additional notes**

Basket Mode

Exit Stacker



#124008

- ❑ **The exit stacker, attached to the front of the machine, can have two positions: Basket mode and Stack mode**
  - ◆ Basket Mode (for standard sized paper). The exit stacker is shortened so that the stacker forms a small well to hold the outputs.
  - ◆ Stack Mode (for A0 SEF/A1 LEF). The exit stacker is extended to the front until it is flat. It can hold up to 10 stacked sheets.
- ❑ **When using A1 SEF/A2 LEF Paper, two wire guides can be attached to the rear rod. It can also hold up to 10 stacked sheets.**
  - ◆ See the Installation section of the Field Service Manual.
- ❑ **After configuring the exit stacker, always check the ends of the rods to confirm that they are set correctly.**

Stack Mode



#124008

Slide 26

- ❑ Basket mode: Capacity depends on paper size. Here are some test results.
  - A0 SEF: 2 sheets
  - A1 SEF: 6 sheets

## Right Side View



- ❑ The optical cloth holder [1] holds the accessory optical cloth [2] which can be used to clean the exposure glass.
- ❑ The scanner stand [3] holds the scanner unit above the main unit.
- ❑ The ink collector tank cover [4] can be opened and closed to insert and remove the ink collector tank [5].

Slide 27

**No additional notes**

## Left Side View

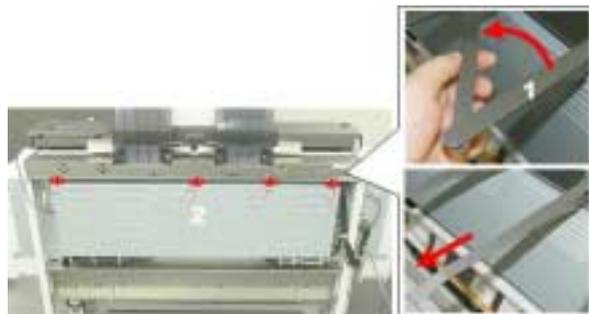


- ❑ The power cord [1], power switch [2], and manual pocket [3] are on the left side of the machine.
- ❑ This is the only power switch that can cycle the machine off and on.
- ❑ After the power switch is turned off, the system does a safe shut down. 'Please wait' appears on the operation panel. This prevents hard disk damage and makes sure that the carriage gets back to home position.

Slide 28

**No additional notes**

## Rear View



#124017

- ❑ Four rear output guides [1] can be attached to the back of the machine to hold originals that exit from the back of the machine.
- ❑ The PCB box cover [2] covers the area where the controller board and all other PCBs are mounted on the back of the machine.
- ❑ Four braided ground harnesses are connected with screws to the back of the scanner unit and the PCB box cover.

Slide 29

**No additional notes**

**Operation Panel**

The diagram shows the Ricoh MO-C1 operation panel. A blue callout box labeled 'Home Button' points to a circular button on the left side of the panel. Another blue callout box labeled 'SD/USB Slots' points to a slot on the right side of the panel. The panel itself features a central screen, a numeric keypad, and several function keys.

- The angle of the operation panel can be changed, as explained earlier.
- With the Home button, you can return to the home screen at any time.
- There are 5 function keys, which you can program with your own designated functions.
- There is an SD/USB slot on the right side of the panel.
  - ◆ You can scan to or print from an SD or USB device.

Slide 30

**No additional notes**

## Options: Paper Feed

		Also used with these new models:	Similar to:	Note
Roll Unit RU6520 (D622)	New			2 <sup>nd</sup> roll unit
Roll Holder Unit Type M5 (D627)	New			This is a spool for the paper roll.

Slide 31

**No additional notes**

**Options: Controller**

		Also used with these new models:	Similar to:	Note
D377-01, -02: IEEE 802.11a/g Interface Unit Type J		OR-C1, AL-C2, AP-C3		
D377: IEEE 802.11g Interface Unit Type K		OR-C1, AL-C2, AP-C3		
D377-21: Gigabit Ethernet Board Type B		AP-C3		
D624: Browser Unit Type M5	New			

Slide 32

**No additional notes**

**Options: Other**

		Also used with these new models:	Similar to:	Note
D377-22: Data Overwrite Security Unit Type H				For CC certification
D625: File Format Converter Type M5	New			
B829-07: Copy Data Security Unit Type F		AP-C3, AT-C3		

Slide 33

- ❑ In the N-C3, a file format converter was necessary when scanning an original. However, in the Mo-C1, it is only necessary when scanning long originals.

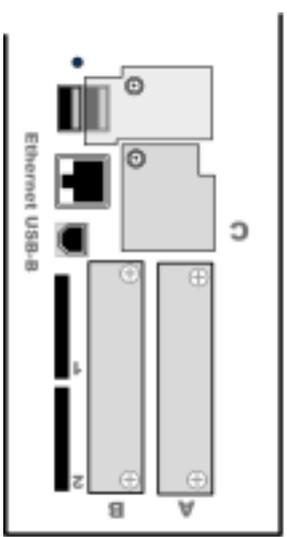
## SD Cards

- ❑ **Shipped with the machine in SD card slot 1: Contains scanner, printer, PDF Direct, PS3, PS3 fonts, VM card, and others**
  - ◆ PDF Direct, VM, PS fonts: Do not move these modules.
- ❑ **Browser unit**
  - ◆ Merge to SD card in slot 1, or keep in SD card slot 2.
  - ◆ Do not remove after installation.
- ❑ **Data Overwrite Security, HDD Encryption: Standard (no Security SD card)**
  
- ❑ **Slot 1 is the upper slot and slot 2 is the lower slot.**

Slide 34

**No additional notes**

## Slots



- ❑ **Board slots**
  - ◆ Slot A: File Format Converter
  - ◆ Slot B: Wireless LAN
  - ◆ Slot C: Gigabit Ethernet
- ❑ **SD card slots**
  - ◆ Slot 1: Option slot
  - ◆ Slot 2: Service slot, option slot

Slide 35

**No additional notes**

## Data Overwrite Security, HDD Encryption

- ❑ These features are built into the machine for all models.
  - ◆ There is no Security SD Card.
- ❑ These features are enabled at the factory. It is not necessary to enable them at installation.

Slide 36

**No additional notes**

## Target Reliability

	Mo-C1	N-C3
<b>Estimated Unit Life</b>	72,000m / 236,000 ft or 5 years	180,000m or 5 years
<b>APV (Manufacturer's target PV)</b>	360m / 1,180ft	N-C3a: 360m, 1,180ft N-C3b: 540m, 1,771ft
<b>Max PV</b>	1,200m / 3,930 ft	3,000m / 9,840 ft
<b>Target MCBF</b>	4,286m, including 2 <sup>nd</sup> roll unit	3,125m
<b>PM Cycle</b>	10,000m / 32,778 ft or 16,840 copies (A1/D LEF)	5,500m or 9,300 copies (A1/D LEF)

Slide 37

**No additional notes**

## Consumables

### □ Ink Collector Tank

- ◆ Capacity: 425 cc
- ◆ Replace every 8,000 m (APV: 360m, Color ratio: 10%, Coverage: B/W 6%, CMYK 5% each)
- ◆ Replaced by users

### □ Ink Cartridges

- ◆ Cartridge Capacity: Black 180ml, CMY 80m
- ◆ Target Yield (A1 LEF, APV = 360m, 1P/J, Coverage B/W = 6% Color = 5%x4C=20%, Usage ratio Black 90% Color 10%):
  - » Black: 774 Copies, 460 m
  - » Cyan: 342 Copies, 203 m
  - » Magenta: 347 Copies, 206 m
  - » Yellow: 355 Copies, 211 m

Slide 38

**No additional notes**

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Service Training**

**Main Specifications**

Slide 39

**No additional notes**

## Specifications - 1

- ❑ **Configuration**
  - ◆ Stand mounted console
- ❑ **Printing Method**
  - ◆ On-demand ink jet printing technology
  - ◆ Pigment-based ink
- ❑ **Power Consumption**
  - ◆ 120 W or less
- ❑ **Dimensions (W x D x H), with original guides attached and exit stacker extended**
  - ◆ 1384 x 1760 x 1214 mm
- ❑ **Weight**
  - ◆ 120 kg (264 lb) or less
- ❑ **Memory**
  - ◆ 3 GB memory, 250 GB hard disk
  - ◆ No optional extra memory

Slide 40

- ❑ See the FSM for additional specifications and details.
- ❑ The print head is similar to the BRG-G1.

## Specifications - 2

- ❑ **Warm-up Time**
  - ◆ 40 seconds or less
- ❑ **Printer Languages**
  - ◆ PostScript3, HP-GL, HP-GL2
- ❑ **First Print Speed (A1 LEF)**
  - ◆ Standard Mode
    - » BW: 44 seconds or less
    - » Color: 121 seconds or less
  - ◆ Speed Priority Mode
    - » BW: 32 seconds or less
    - » Color: 77 seconds or less
- ❑ **Print Speed (A1 LEF, Speed priority mode)**
  - ◆ Output speed (A1 LEF, high speed mode):
    - » Copying: 3.4 ppm (black-and-white), 1.1 ppm (color)
    - » Printing: 3.2 ppm (black-and-white), 1.1 ppm (color)
- ❑ **Paper Size:**
  - ◆ Width: 279.4 to 914.4 mm (11 to 36 in)
  - ◆ Length 210 to 15,000 mm (8.3 to 591 in.)
    - » Bypass: Maximum length 2,000 mm
- ❑ **Paper Feed**
  - ◆ Standard: 1st roll unit and by-pass
  - ◆ Optional: Paper roll unit (D622)

Slide 41

- ❑ Target color ratio is 9:1 (b/w ; color).
- ❑ 15,000 mm maximum length only applies to paper widths 841 mm or wider (and must be plain paper or recycled paper). For other paper types, the maximum is 3,600 mm.
- ❑ See the FSM for additional specifications and details.

**Compared with D093/D094**

Item	D124	D093/D094
Controller	GW+	GW
Color scanning	Yes	Yes
HDD overwrite/encryption	Yes (Std.)	Yes (Std.)
Scan to media, media to print	Yes (Std.)	No
Scanner and printer functions	Standard	Option
Memory (Standard)	3 GB + 250 GB HDD	Max 2GB + 160 GB HDD
SDK	Yes	Yes (With Printer Option)
Scanning Speed (600 dpi)	80 mm/s (B/W) 26.7 mm/s (FC)	80 mm/s (B/W) 26.7 mm/s (FC)
WSD (Web Services on Devices)	Yes	No

Slide 42

**No additional notes**

A presentation slide with a black border. At the top left is the RICOH logo in red. In the center, the text 'D124 Service Training' is written in red, and 'Installation' is written in blue below it. At the bottom left corner, the text 'Slide 43' is written in a small font.

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**D124  
Service Training**

**Installation**

Slide 43

- This section explains the main points of the installation procedure.
- For full details, refer to the Installation section of the Field Service Manual.

## Overview

- ❑ This section goes over only the important or difficult points of the installation procedures.
- ❑ For details on all the steps, see the Installation procedures in the Field Service Manual for this machine.

Slide 44

**No additional notes**

## Installation Location

- ❑ **Avoid placing the machine near a window to prevent sunlight from entering the machine and causing problems in images like uneven density.**
- ❑ **The back of the scanner unit should never be exposed to strong light.**
- ❑ **If the windows near the machine are provided with blinds or curtains, close them.**

Slide 45

- ❑ The back of the scanner has a sheet that protects against sunlight, but the sun can get in if the angle is wrong.
- ❑ This can cause image problems such as white lines on scanned images.

## Recommended Order of Installation

1. Assemble the Scanner Stand
2. Assemble the Main Unit Stand
3. Mount the Scanner Unit
4. Mount the Main Unit
5. Install the Roll Unit 1 (Standard)
6. Install the Roll Unit 2 (Option)
7. Install the Controller Options
8. Connect the Scanner and the Main Unit
  - ◆ Connect Harnesses, Install Brackets, Connect the Host USB Cable
  - ◆ Connect and Clamp the Power Cord, Clamp the Main Harness
9. Remove Tapes and Shipping Materials
10. Install the Original Stacker and Guides
11. Attach the Ink Collector Tank Storage Shelf
12. Assemble and Install the Exit Stacker
13. Ink Filling
14. Set Roll Paper
15. Check the Printing: Nozzle Check Pattern
16. Final Adjustments: Adjust Head Position, Paper Feed, and Print Position
17. Final Settings: Paper Type, Date/Time, Enable MFP options/DOS unit
18. After Installation: Copy the factory setting sheet, copy the NVRAM data to an SD card

Slide 46

**No additional notes**

## **Tools Needed**

- Allen key (2.5 mm)**
  - ◆ One is provided but you may need extra keys if two or more people are working on the installation.
- Screwdriver 300 cm (12 in.) or longer**
- Flashlight**
- Small scale or ruler**

Slide 47

**No additional notes**

## Mounting the Scanner Unit - 1



- ❑ **Mount the scanner unit immediately after you remove it from the pallet and open the box. Don't leave it lying around while you go off for a break.**
- ❑ **Two people must mount the scanner unit on the stand.**
- ❑ **Remove the orange tape from both sides of the scanner unit before you mount the scanner unit.**
- ❑ **When you mount the scanner unit, keep the harnesses at the front as shown in the photo above.**

Slide 48

- ❑ There are at least three separate boxes (scanner stand, scanner unit, main unit, and each box contains a lot of screws). Each unit should be unpacked in the order of installation and then installed immediately to prevent mixing screws, brackets, parts, etc. If all the boxes are opened up and the contents all mixed up before starting the installation, you could have some problems.
- ❑ Also, it is not a good idea to lay the scanner unit down with the exposed CIS glass on the bottom.

## Mounting the Scanner Unit - 2



d124i203

- ❑ **Remove the Factory Settings Sheet from under the front right end of the scanner unit.**
  - ◆ Make a copy of the Factory Settings Sheet and leave the original with the machine for future reference.

Slide 49

**No additional notes**

## Mounting the Main Unit - 1

- ❑ Mount the main unit immediately after you remove it from the pallet and open the box. Don't leave it lying around while you go off for another break.
- ❑ To avoid damage to the bottom of the main unit, never set the main unit on the floor.
- ❑ Do not place the main unit on a table or desk, even for a short time.

Slide 50

- ❑ Note that some items needed for installing this are packed with the roll feeder unit.

## Mounting the Main Unit - 2



- ❑ Look for the carrying handles on the left and right sides of the main unit.

Slide 51

**No additional notes**

**Mounting the Main Unit - 3**



- ❑ Lift with two people holding the left end [A] and right end [B] with their hands positioned as shown above.
- ❑ If you lift in the area shown with the red circle in the above photos, the cover could be damaged.

Slide 52

- ❑ Important: Use the handles as shown above.

## Mounting the Main Unit - 4



- ❑ Position the main unit over the top of the stand so that the triangle marks at the rear are aligned.

Slide 53

**No additional notes**

## Mounting the Main Unit - 5

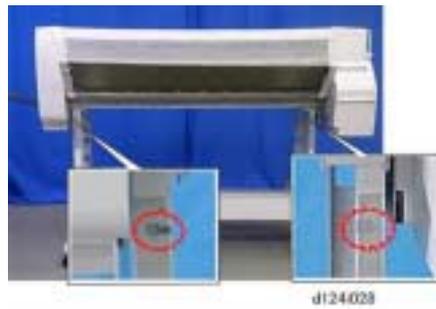


- **Under the stand, tighten these three Allen screws.**
  - ◆ Tighten them strongly. Otherwise, you may lose these screws when you move the machine.

Slide 54

**No additional notes**

## Installing the 1<sup>st</sup> Roll Unit - 1



- ❑ Locate the upper set of cutouts in the left and right legs of the main unit stand. You will install the 1<sup>st</sup> roll unit here.

Slide 55

**No additional notes**

## Installing the 1<sup>st</sup> Roll Unit - 2



d124030

- **While holding the unit with both hands:**
  - ◆ Set the positioning pins on the left and right ends of the roll feed unit into the cut-outs in the supports
  - ◆ Push the roller feeder in.
  - ◆ Slide it slightly to the right to lock the unit in place.

Slide 56

**No additional notes**

## Installing the 1<sup>st</sup> Roll Unit - 3



- ❑ Behind the stand on both sides, make sure that the holes of the roll feed unit and the stand frame are aligned.
  - ◆ Pass a long, thin screwdriver (30 cm: 12 in.) through each pair of holes to make sure that they are aligned.

Slide 57

**No additional notes**

## Installing the 1<sup>st</sup> Roll Unit - 4



- When fasten the roll feed unit to the stand, be sure to use the screws with the washers attached.

Slide 58

**No additional notes**

## Installing the 1<sup>st</sup> Roll Unit - 5



- There are two pegs on each end of the paper transport guide. Make sure that they fit properly into the cut-outs on the left [A] and right [B].

Slide 59

**No additional notes**

## Installing the 1<sup>st</sup> Roll Unit - 6



- ❑ There are six mylar tongues.
- ❑ Use a thin edge (like the end of a metal scale) to push them up and behind the plate.
- ❑ Paper will not feed from the roll correctly if these mylars not pushed behind the plate.

Slide 60

**No additional notes**

## Installing the 2<sup>nd</sup> Roll Unit - 1



d124i088a

- **Before installing the optional roll unit on a machine that has been installed already, remove the stacker and its base plates on both sides.**
  - ◆ The roll unit is heavy and difficult to position. Remove the plastic base plates of the exit stacker to prevent damaging them.

Slide 61

**No additional notes**

## Installing the 2<sup>nd</sup> Roll Unit - 2



- ❑ Locate the lower set of cutouts in the left and right legs of the main unit stand. You will install the 2<sup>nd</sup> roll unit here.

Slide 62

**No additional notes**

## Installing the 2<sup>nd</sup> Roll Unit - 3



- ❑ Behind and under the machine, hold the guide plate as shown (above left). Then, at the top, set the cut-outs in the left and right over the pegs.
- ❑ Lift the guide slightly, and then insert the bottom pegs into the cut-outs at the lower left and lower right corners.
- ❑ Check each corner of the plate to be sure that each peg is installed properly in its cut-out.
- ❑ Make sure that you know how to do this because it is a bit tricky.

Slide 63

**No additional notes**

## Installing the 2<sup>nd</sup> Roll Unit - 4



- ❑ **After installing the optional roll unit, check the clamps and harnesses.**
  - ◆ Make sure that the clamps are closed and that there is absolutely no slack in the harnesses.
  - ◆ The harnesses must be flat up against the bottom of the PCB box to prevent them from interfering with paper in the bypass feed path.
    - » The cables must not hang below the red line in the photo above.

Slide 64

- ❑ During bypass feed, the trailing edge of the paper comes out from the back of the machine, and then reverse feeds back into the machine.

## Connecting the Operation Panel USB Cable



- ❑ The USB cable [A] (permanently attached to the back of the operation panel) must be connected to the controller box [B] on the back of the machine.
- ❑ Do this before you connect the scanner stand to the main unit stand.

Slide 65

**No additional notes**

## Connecting the Scanner and the Main Unit - 1



- ❑ The scanner unit is top heavy and unstable. It can fall over easily.
- ❑ Grip the supports below the scanner unit and push it slowly when you move it.

Slide 66

**No additional notes**

## Connecting the Scanner and the Main Unit - 2



d124035

- ❑ Before you put the rear cover back on, install the controller options.

Slide 67

**No additional notes**

**Connecting the Scanner and the Main Unit - 3**



- ❑ Make sure that the harness is inside and behind the left support of the stand.
- ❑ If the harness is wrapped around the outside in front of the support, the harness will be pinched between the stand and back of the machine when the scanner stand is docked to the back of the machine.

Slide 68

**No additional notes**

## Installing the File Format Converter (MLB)



- ❑ During the procedure, you have to take out the mother board and install another one.

Slide 69

**No additional notes**

## Installing the Wireless LAN Option



d124/t36

- ❑ The positions of the antennas are important.
- ❑ Follow the instructions in the manual.

Slide 70

**No additional notes**

## Ink Collector Tank Storage Shelf

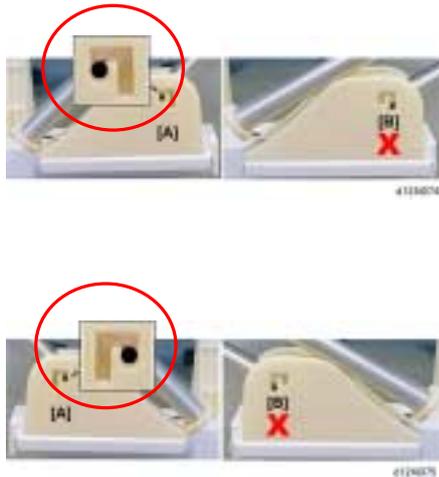


- ❑ **The ink collector tank storage shelf [A] is attached to the bottom cross-piece of the scanner stand.**
- ❑ **Set the extra ink collector tank on the shelf.**
  - ◆ When the ink collector tank becomes full, the machine will stop.
  - ◆ The operator can remove the full tank and replace it with the empty tank.
  - ◆ At the next PM visit, the service technician can swap the full tank with another empty tank.

Slide 71

- ❑ The PM interval for the machine is 10,000 m. But the ink collector tank fills up at about 8,000 m (depending on the image contents of the printouts that have been made).
- ❑ The user can replace this tank easily, so when you arrive at 10,000 m, you can take away the old tank from the shelf and put a new empty one on the shelf in its place.

## Installing the Exit Stacker



- ❑ When you attach the shaft to the feet, attach it at [A], not [B].
- ❑ When assembling the rods and the cloth, follow the steps in the service manual carefully. It is easy to get confused while assembling this component.

Slide 72

**No additional notes**

## Ink Filling - 1

- ❑ **Before a machine leaves the factory, the ink supply tubes, sub tanks, and print heads are filled with priming fluid.**
  - ◆ This priming fluid prevents the seams of the joints and connections of the ink supply system from drying out during shipping and storage.
- ❑ **The priming fluid must be drained completely from the ink supply tubes, ink tanks, and print heads at installation before they are filled with ink.**
- ❑ **To do this, special cartridges, called 'primer fluid drain cartridges', must be loaded into the ink supply unit to collect this fluid. Then the machine reverse pumps the fluid out into these empty cartridges.**
  - ◆ The drain cartridges are packed with the machine in the carton box.
  - ◆ To avoid confusion with the starter ink cartridges, the drain cartridges have no color sticker on them.

Slide 73

- ❑ Also, bubbles form in the fluid between the cartridge and the print head. If these go out through the nozzles, they can damage the nozzles. So the fluid must be drained back into empty cartridges, not out through the nozzles.

## Ink Filling - 2



#1241003

- ❑ **Insert the primer fluid drain cartridges, then close the ink cartridge cover.**
- ❑ **Turn the machine power on, wait for the machine to beep twice, and make sure that SP2012-001 is set to "9".**
- ❑ **Next, set SP2100-004 to "15" and press #.**
  - ◆ The ink pumps start operating in reverse to draw the fluid out of the print heads and the tubes.
  - ◆ This takes about 7 min. and 20 sec.
- ❑ **When the display shows that the operation is finished, turn the machine off.**
- ❑ **If draining does not start, there is an alternative procedure (explained later).**

Slide 74

- ❑ At the end of the procedure, the machine disables the primer cartridges so that they can no longer be used.

### **Ink Filling - 3**



d1241004

- ❑ **Remove the primer fluid drain cartridges and replace them with the starter ink cartridges.**
  - ❑ Left to right: K > C > M > Y.
- ❑ **Close the cartridge cover.**

Slide 75

- ❑ Obey the local laws and regulations regarding the disposal of items such as the primer fluid drain cartridges.

## Ink Filling - 4

- ❑ **Turn the machine on.**
  - ◆ The ink filling sequence will start automatically.
  - ◆ This takes about 20 min. "Initializing Unit" is displayed during filling, alternately with a near-end message.
  - ◆ If you do not see a message that tells you filling has started, cycle the machine off/on and try again.
  - ◆ When "Initializing Unit" is not shown any more, this means that the filling sequence is finished.
  - ◆ After filling, the machine may display the near end alert for one or more of the color ink cartridges. This is normal. The accessory cartridges do not contain a large amount of ink. (This pre-near end alert is not displayed for the black ink cartridge )
- ❑ **Never switch the machine off or try to use the operation panel during ink filling.**
- ❑ **Do not touch the machine during ink filling.**
- ❑ **After the procedure is completed, make sure that SP2012-001 has been set to "0".**
  - ◆ The machine should have already done this automatically. If it did not do this, there is not enough ink in the cartridge, or something is wrong with the ink supply mechanism.
- ❑ **Discard the filled primer fluid drain cartridges.**

Slide 76

**No additional notes**

## Alternative Ink Filling Procedure

- **If one or more of the ID chips on the drain cartridges is damaged, the draining operation may not start when you set SP2100-004 to "15".**
  1. Open SP2012-001 and set it to "3".
  2. Turn the machine off.
  3. Remove the drain cartridges, and then replace them with the ink starter cartridges.
  4. Close the ink cartridge cover.
  5. Turn the machine on.
    - » Ink filling starts.
    - » The ink and primer fluid are purged from the tubes, ink sub tanks and the print heads into the ink collector tank.
  6. After the operation is completed, flush all the print heads three times. ([User Tools> Maintenance> Flush Print Heads> Select all]).
    - » At the end of filling and purging of ink and fluid into the ink collector tank, SP2012-001 resets automatically to "0"
  7. Print a Nozzle Check Pattern to check the condition of the print heads.

Slide 77

**No additional notes**

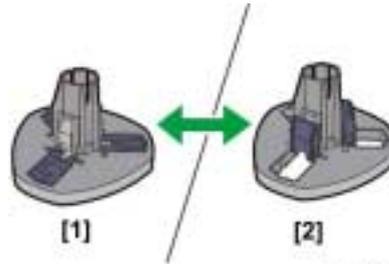
## Setting a Paper Roll - 1

- ❑ If you replace a partially used roll with another roll of paper, be sure to store the replaced roll on a flat level surface.
- ❑ If possible, keep the paper roll package.
  - ◆ If the machine remains idle for a long period where the temperature and humidity are extremely low or high, the rolls should be removed and stored in their original packing.

Slide 78

**No additional notes**

## Setting a Paper Roll - 2

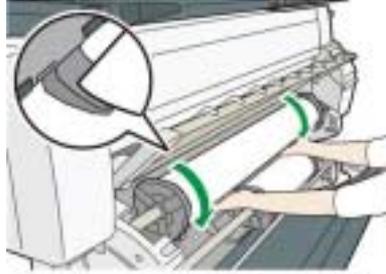


- ❑ **Before you install the roll, do Paper Type Selection at the operation panel. Select a paper type for each paper feed station.**
  - ◆ User Tool > System Settings > Tray Paper Setting > Next > Paper Type: Tray n
- ❑ **Set the stopper for the size of the roll core of the paper roll.**
- ❑ **Both stoppers must be set identically.**
  - ◆ For a 2-in. core, lower the levers [1] of both stoppers so that they are flat.
  - ◆ For a 3-in. core, raise the levers [2] of both stoppers.

Slide 79

- ❑ Paper size is detected automatically by the machine by the DRESS sensor, as will be explained later.

## Setting a Paper Roll - 3



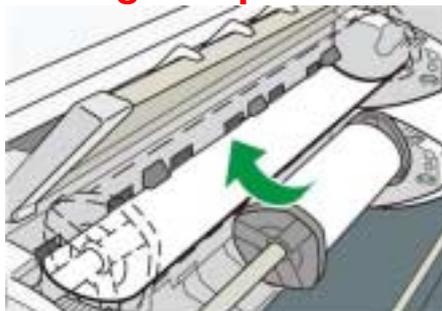
d124099

- ❑ **Set the left and right ends of the rolls in the roll feeder sockets, then pull the leading edge of the paper slightly so that it hangs down.**
  - ◆ Always feed the paper from the bottom of the roll, not the top.
    - » Feeding paper from the top of the roll places an excessive load on the paper feed rollers, and could cause problems with paper feed and cutting.
    - » Also, feeding the paper from the top sets the paper against the direction of paper curl, which causes the paper to rise and rub against the print heads, leading to poor copy quality and damage to the print heads.
- ❑ **While holding both sides of the leading edge of the paper, rotate and feed the paper up about 1/3 the distance into the machine.**
- ❑ **Make sure that the leading edge of the paper passes over the top of the paper guide inside the machine (see the upper left part of the diagram).**

Slide 80

**No additional notes**

## Setting a Paper Roll - 4



d124i100

- **Insert the leading edge of the roll paper below the roller at the feed slot, and then feed the paper into the machine until the machine grabs and pulls the paper slightly.**
  - ◆ When the machine detects the leading edge of the paper, it will grab it and then sound a buzzer.

Slide 81

**No additional notes**

## Setting a Paper Roll - 5

- ❑ **When the message on the operation panel asks 'Cut' or 'No Cut':**
  - ◆ Touch [Cut] to make a clean edge if the paper has been cut manually or is damp.
  - ◆ Touch [Do Not Cut] if you do not want a fresh cut on the leading edge of the paper.
  - ◆ It is strongly recommended to select [Cut].
- ❑ **The next message prompts you to confirm the paper type and thickness.**
  - ◆ Touch [Match] if the displayed Paper Type and Paper Thickness Settings match those of the paper loaded in the machine.
  - ◆ Touch [Does Not Match] if the displayed Paper Type and Paper Thickness Settings do not match those of the paper loaded in the machine. Then input the correct settings.
- ❑ **The roll paper feeds into the machine.**
- ❑ **Next, the paper will feed out of the machine, reverse feed, and then automatically stop at the registration standby position.**
- ❑ **If [Cut] was selected, then the leading edge of the paper is cut off.**

Slide 82

**No additional notes**

### Caution about Paper Rolls

- ❑ **If the machine will not be used for a long period where the temperature and humidity are high or low, remove the paper rolls from the machine and store them (in their original packing if possible).**
  - ◆ Paper exposed to a high or low temperature or high humidity can absorb or lose moisture causing it to curl and ripple, wrinkle, or fold.
- ❑ **If the rolls cannot be removed and stored, then before the machine is used again, feed the leading edge of the roll about 1,000 mm (39 in.) and cut it off.**

Slide 83

- ❑ In previous models such as N-C3, the roll feeder unit is an enclosed space, so the paper roll will not be exposed to the air outside the machine.
- ❑ In the Mo-C1, the interior of the roll unit is exposed to the air, so if the rolls will not be used for a long time, they should be put back in their original packaging.
- ❑ If this cannot be done, feed the paper one or two rotations and cut off the paper, as explained above.

## Removing a Roll - 1



#124204

- ❑ **You need to rewind the roll before removing it for temporary storage or swapping it for another roll.**
  - ◆ Press and hold the rewind button on the right side for 2 seconds or more.
  - ◆ The roll will reverse feed out of the machine onto the roll.
- ❑ **The paper rolls installed in the machine are not enclosed and remain exposed to ambient temperature and humidity.**
- ❑ **If the machine has remained idle for a long time, before you use the machine it is recommended that you rewind the roll, cut off the equivalent of two full roll rotations, and then reload the paper.**

Slide 84

- ❑ If the paper leading edge is at the print waiting position, 2 seconds should be long enough. However, if the paper leading edge is at the registration roller, you may have to press the rewind button one more time.

## Removing a Roll - 2



d124-012

- ❑ Avoid touching the paper with your hands. Grip the roll at the plastic holders on both ends, and then lift the paper roll out of the machine.
- ❑ Lay the roll horizontally on a flat clean surface.

Slide 85

**No additional notes**

## User Tools – Maintenance Menu



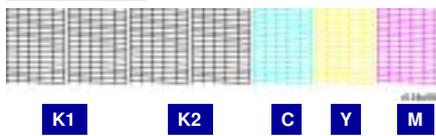
- ❑ In the User Tools, select **Maintenance**.
- ❑ You will use some of the tools shown above (on the right) to print the test pattern and adjust the machine.
  - ◆ Print Nozzle Check Pattern: Prints the test pattern
  - ◆ Clean Print Heads, Flush Print Head: You need to use these if the test pattern output is not perfect.

Slide 86

*Replacement and Adjustment > Print Head Cleaning and Adjustment*

## Printing the Nozzle Check Pattern - 1

### No Problems



### Cleaning Required



□ The Nozzle Check Pattern ensures that the print heads are operating normally.

1. Press [User Tools] on the operation panel.
2. Touch [Maintenance] and then select "Print Nozzle Check Pattern".
3. Follow the prompts to start printing the pattern.
4. Use a loupe or magnifying glass to check the condition of the pattern.
  - ◆ If the pattern shows no broken lines, the machine is ready for operation.
  - ◆ If any of the lines are broken, identify the patterns where the broken lines exist, and then clean the print heads.

Slide 87

**No additional notes**

## Printing the Nozzle Check Pattern - 2

5. Press [User Tools] on the operation panel.
6. Touch [Maintenance]
7. Touch [Clean Print-heads]
8. Select the print head(s) to clean then touch [Start], and then follow the prompts to complete the cleaning.
9. **Print another Nozzle Check Pattern, then check the results.**
  - ◆ If the patterns have no broken lines, you have finished.
  - ◆ If there are still broken lines in one or more of the patterns, clean the print heads again, and print another Nozzle Check Pattern.
- **If lines still exist after the 3rd cleaning attempt, touch [Exit], and then flush the print heads.**
  - ◆ Flushing the print heads consumes a large amount of ink. Never execute print head flushing until you have executed print head cleaning at least 3 times.
10. Touch [Flush Print-heads].
11. Follow the prompts to complete print head flushing.

Slide 88

**No additional notes**

## If the Nozzle Check Pattern is No Good Even After Three Cleanings and One Flushing

1. **Make sure that the ambient temperature and humidity are within the acceptable range:**
  - ◆ Temperature Range: 10° C to 27° C (50° F to 81° F)
  - ◆ Humidity Range: 15% to 80% Rh
2. **Execute print head cleaning once, and then print a Nozzle Check Pattern.**
3. **If the Nozzle Check Pattern is abnormal, let the machine remain idle for 10 minutes.**
4. **Execute two more cleanings and one flushing.**
  - ◆ Be sure to print a Nozzle Check Pattern after each cleaning and the flushing.
  - ◆ Any time that you see an unbroken Nozzle Check Pattern, you can stop.
5. **If the Nozzle Check Pattern is still not perfect, let the machine remain idle for 8 hours.**
6. **Execute three more cleanings and one flushing.**
  - ◆ Be sure to print a Nozzle Check Pattern after each cleaning and the flushing.
  - ◆ Any time that you see an unbroken Nozzle Check Pattern, you can stop

Slide 89

**No additional notes**

## If the Nozzle Check Pattern is No Good Even After Three Cleanings and One Flushing

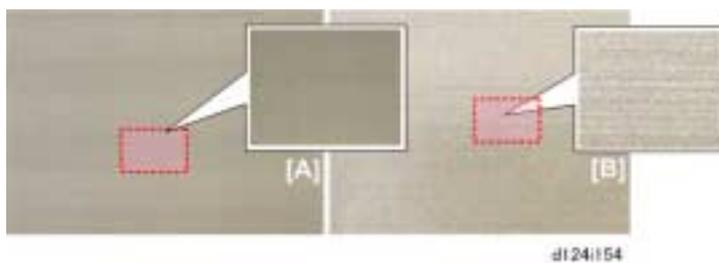
### 7. If the results are still not satisfactory, open SP2100-002.

- ◆ Enter the number of the print head that is abnormal.
  - » Head 1, K1 (Black), enter 1
  - » Head 2, K2 (Black), enter 2
  - » Head 3, C (Cyan), enter 4
  - » Head 4, YM (Yellow/Magenta), enter 8
  - » All, (K, C, Y, M), enter 15
  - » If you need to flush more than one head (but not all), add their entry numbers and then enter the sum.
  - » For example, to clean Head 2 and Head 3, add 2 + 4 and enter "6".

Slide 90

**No additional notes**

## Halftone Check



- ❑ **Leftover primer fluid can cause streaking in halftone areas. Do this check to confirm that all of the primer fluid has been drained from the from the ink sub tanks and ink supply tubes.**
  - ◆ User Tools > Printer Features > List/Test Prints > [Color Sample].
- ❑ **The color sample may require a minute or so to finish printing.**
- ❑ **Check some of the blocks on the printout**
  - ◆ If the pattern is like [A], no adjustment is necessary.
  - ◆ If the pattern is streaked with light streaks [B], primer fluid did not drain completely.
- ❑ **If you detect streaking, flush the print head of the color where you see the problem.**
  - ◆ User Tools > Maintenance > Flush Print-heads: Do it 3 times.

Slide 91

**No additional notes**

## Other User Tool Adjustments



- ❑ **After checking the nozzle check pattern, make sure that the machine is level and that the casters are set correctly.**
- ❑ **Then do the following three adjustments in this order:**
  - ◆ Manual Adjust Head Position
  - ◆ Adjust Paper Feed
  - ◆ Adjust Print Position

Slide 92

*Replacement and Adjustment > Print Head Cleaning and Adjustment*

## Manual Adjust Head Position - 1

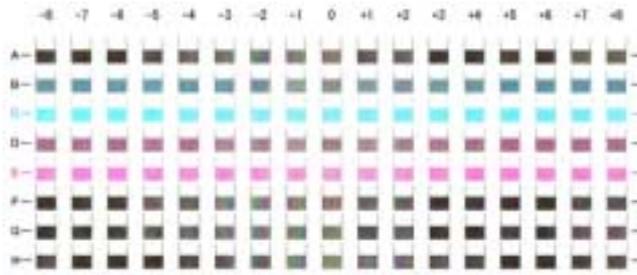


- ❑ **Select a Paper Source and a Resolution, and touch [Start Printing].**

Slide 93

**No additional notes**

## Manual Adjust Head Position - 2

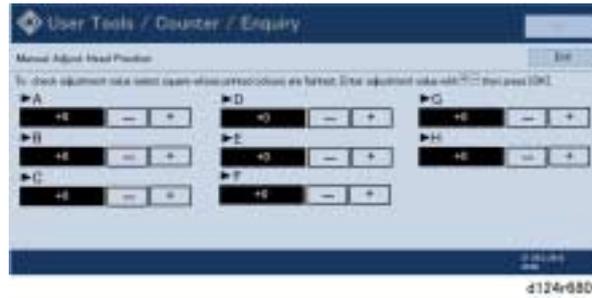


- ❑ Look at the test pattern.
- ❑ In each row (A to H), Identify the number of the column where the square is faintest, or select the square where the internal lines overlap to form a solid color.
  - ◆ The number above the square is the adjustment value.
  - ◆ If you still cannot determine the adjustment value, select the square that is between the straightest vertical lines.

Slide 94

**No additional notes**

## Manual Adjust Head Position - 3



- ❑ Touch [Adjustment].
- ❑ Input a value for each row.
  - ◆ Use the + and – buttons.
- ❑ Print another test pattern to make sure that the adjustment is correct.
  - ◆ The numbers that you just entered must correspond to the condition of the patches on the new test chart, as explained on the previous slide.

Slide 95

**No additional notes**

## Adjust Paper Feed - 1

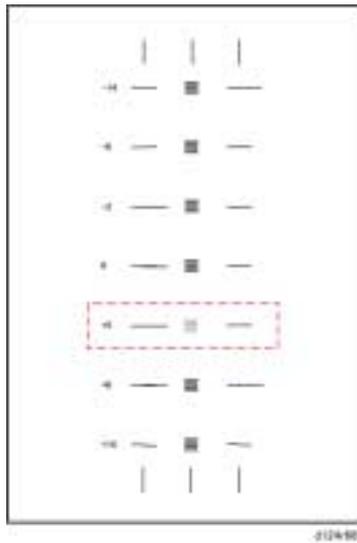


- ❑ **Adjust paper feed if you see these problems in the prints:**
  - ◆ Broken horizontal lines
  - ◆ Patchy images (uneven filled areas)
  - ◆ White lines at regular intervals
- ❑ **Select [Print Test Sheet] for the required paper feed source.**

Slide 96

**No additional notes**

## Adjust Paper Feed - 2

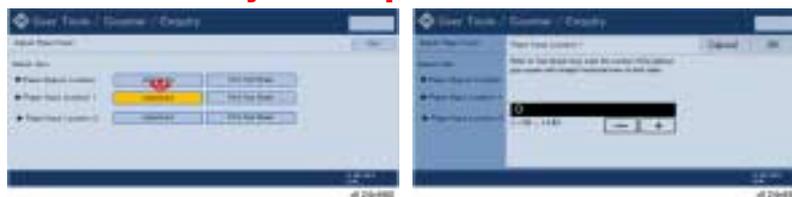


- The adjustment value appears to the left of the lightest gray square with straight horizontal lines on both sides.

Slide 97

**No additional notes**

## Adjust Paper Feed - 3



- Touch [Adjustment].
- Touch the plus or minus key to enter the value from the test print.

Slide 98

**No additional notes**

## Adjust Print Position - 1



- ❑ Do this procedure to check and adjust the print start position at the upper left corner of each sheet.

Slide 99

**No additional notes**

## Adjust Print Position - 2



- ❑ A test pattern prints. The black arrow indicates the direction of paper feed.
- ❑ Rotate the test sheet 180 degrees. [A] is the top margin and [B] is the left margin.
- ❑ Touch the arrow keys to adjust the margins.
  - ◆ Increasing the value for the top and left margin moves the print position down and to the right.
  - ◆ You will see the blue square move as you change the settings, so you can confirm the effect of the changes.

Slide 100

**No additional notes**

## Settings after Installation

- ❑ **Date, Time Setting: Check the date and time setting. If they are not correct, set the correct date and time.**
  - ◆ User Tool > System Settings > Timer Settings > Set Date, Set Time

Slide 101

- ❑ Paper size is detected automatically by the machine by the DRESS sensor, as will be explained later.

## Back Up the NVRAM

- ❑ **After you have finished installing the machine, back up the NVRAM to an SD card.**
  - ◆ Insert an SD card in SD card Slot 2.
  - ◆ Do SP5824 to upload the contents of the NVRAM to the SD card.
  - ◆ Keep the SD card in a safe place.
  
- ❑ **Also, do this after every service visit.**

Slide 102

**No additional notes**

## Moving the Machine - 1

- ❑ **When moving the machine to another location in the same room or the same building:**
  - ◆ Two people are required to move the machine to a new location.
  - ◆ To prevent ink spillage, never lift or tip the machine from the level position.
  - ◆ Make sure that the four screws that connect the scanner stand to the main unit stand are attached and securely fastened.
    - » Never attempt to move the machine with the scanner stand detached from the main unit.
  - ◆ The scanner stand and scanner unit assembly is extremely top heavy and can tip over easily.
  - ◆ Make sure that the four casters of the main unit stand and scanner stand are unlocked.
  - ◆ It is not necessary to remove the ink cartridges.
  - ◆ Position your hands at base of the main unit and then push it slowly to the new location.

Slide 103

- ❑ Before ink is installed, the machine can be tilted by 70 degrees, such as when carrying the machine up stairs. However, after the machine has been used, the machine should not be tilted by more than 45 degrees, or ink could come out from the ink sump.

## Moving the Machine - 2

### □ When shipping the machine to a new location:

- ◆ Disassemble the machine and pack it in its original boxes.
- ◆ Make sure that the main unit is packed level and strapped securely.
- ◆ Pack and tape some shipping material against the carriage to prevent the carriage from slipping out of position.



Slide 104

- The caps in the maintenance unit should hold the print heads in place during transportation. However, you can put some packing to the left of the carriage unit to prevent it from sliding across, as a safety measure.

## Don't Tilt the Machine While Moving

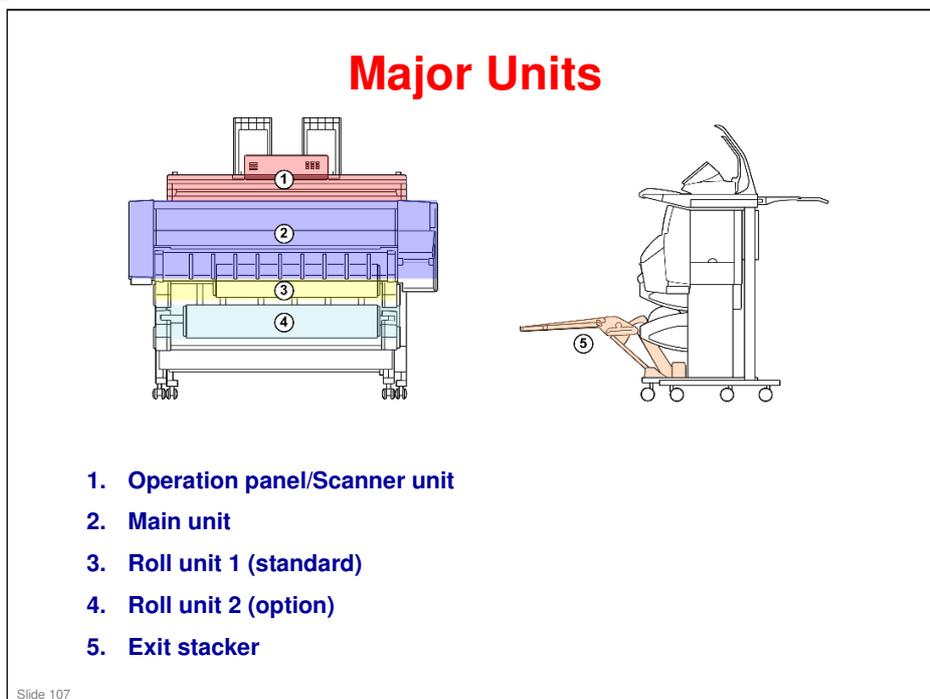
- **To avoid ink spillage, never tilt the machine when you are moving it.**
  - ◆ Before ink is installed, the machine can be tilted by 70 degrees, such as when carrying the machine up stairs. However, after the machine has been used, the machine should not be tilted by more than 45 degrees, or ink could come out from the ink sump.

Slide 105

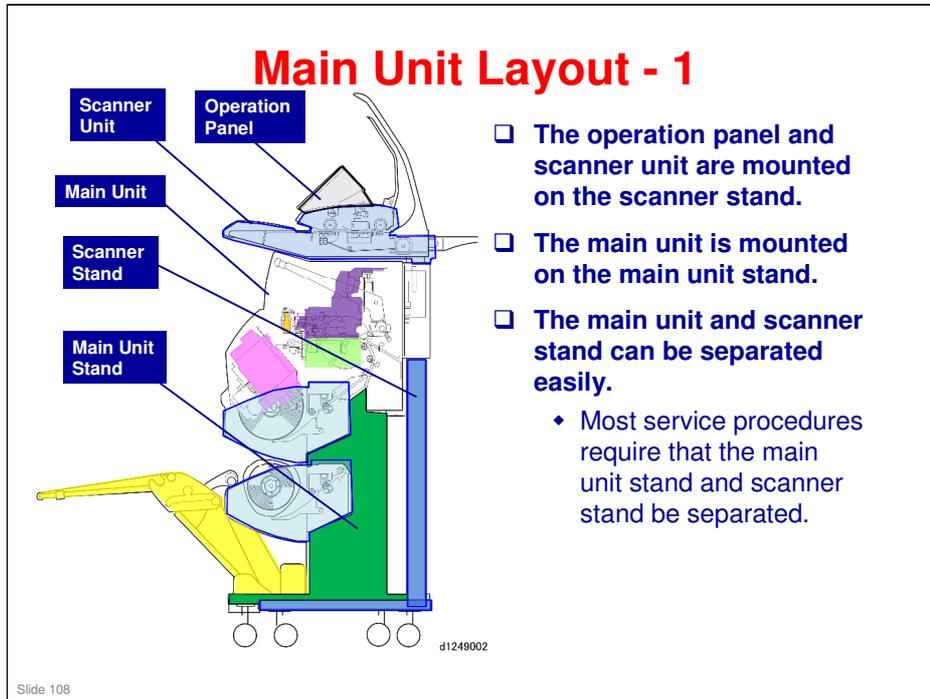
**No additional notes**



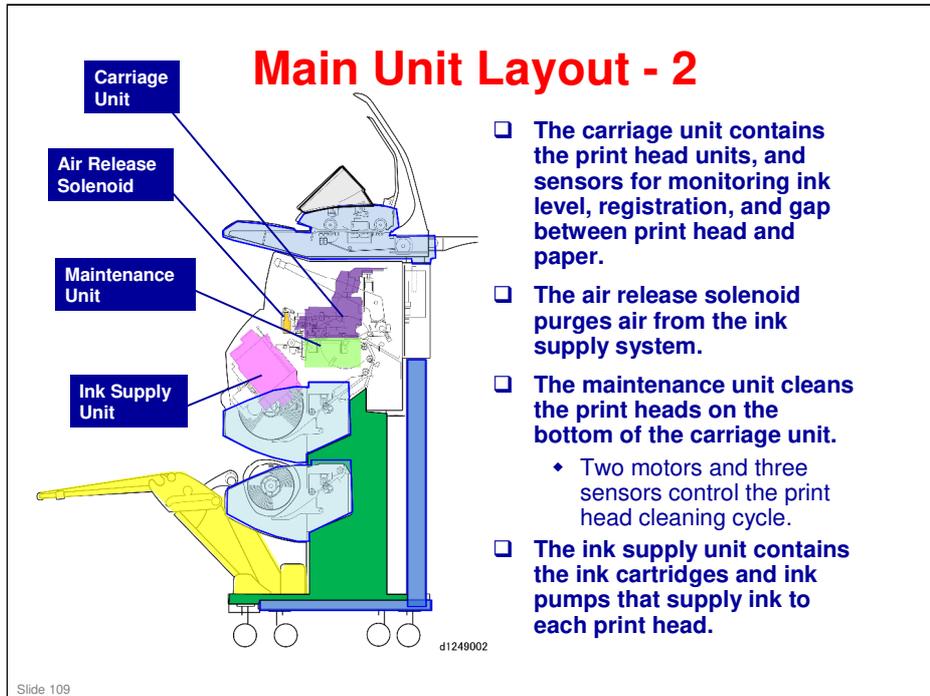
- ❑ This section introduces the mechanisms of this engine. Details will be explained in later sections.



- The scanner unit and main unit are mounted on separate racks.
- The units can be easily separated for servicing, or for placing the scanner on a low table or desk so that it can be operated from a sitting position.

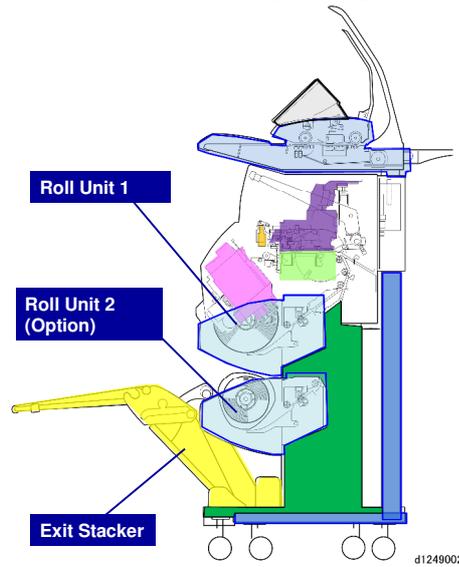


**No additional notes**



**No additional notes**

## Main Unit Layout - 3

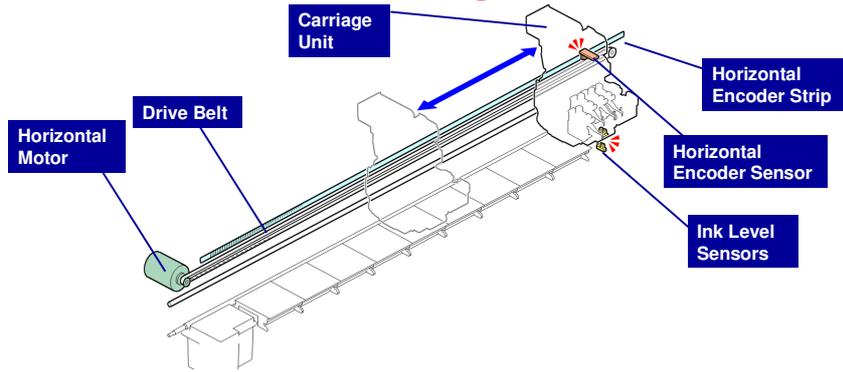


- ❑ **Roll Unit 1: Holds one roll of paper.**
  - ◆ The stoppers can be adjusted easily to accept different widths of roll paper.
- ❑ **Roll Unit 2: Holds one roll of paper.**
  - ◆ Its stoppers can also be adjusted easily to adjust for different roll core sizes.
- ❑ **The exit stacker must be installed on the front of the machine.**
  - ◆ The exit stacker can be folded in when it is not being used (or for stacking in a well-type structure) or extended for output of long sheets.

Slide 110

**No additional notes**

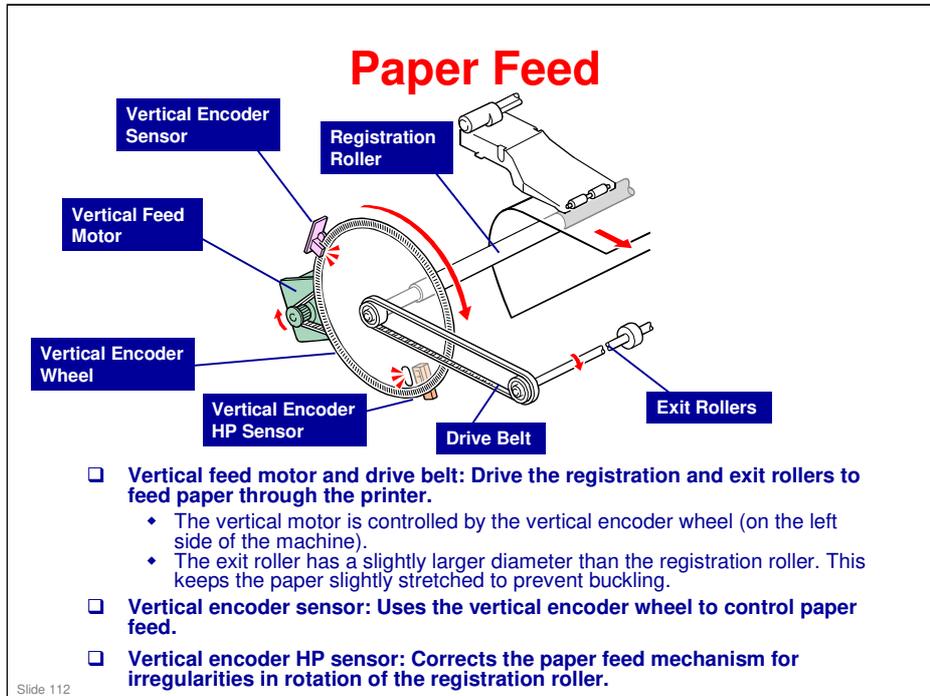
## Horizontal Carriage Movement



- ❑ **Horizontal motor and drive belt: Drive the carriage unit and print heads from left to right.**
  - ◆ The horizontal motor is controlled by a long horizontal encoder strip stretched across the width of the main unit.
  - ◆ The carriage unit contains 5 print heads (K x 2, C, M, Y)
- ❑ **Horizontal encoder sensor (on the back of the carriage unit): Uses the encoder strip to control operation of the motor and carriage unit.**

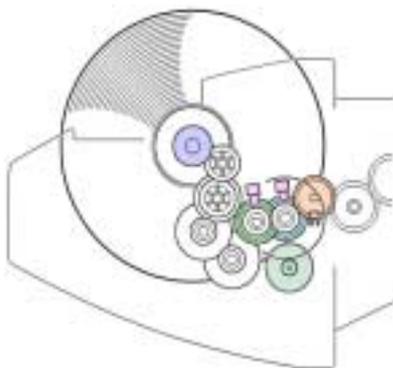
Slide 111

**No additional notes**



- ❑ **Vertical encoder HP sensor:** Home position of the paper feed mechanism is determined by the print standby position and paper feed standby positions for the two rolls. However, if the registration roller is slightly off center, the amount of paper fed for a set amount of motor rotation may be different from normal. By giving the encoder wheel a set home position, and determining the amount of paper fed (by monitoring the time that the leading edge gets to the sensors), the machine can correct for these errors.

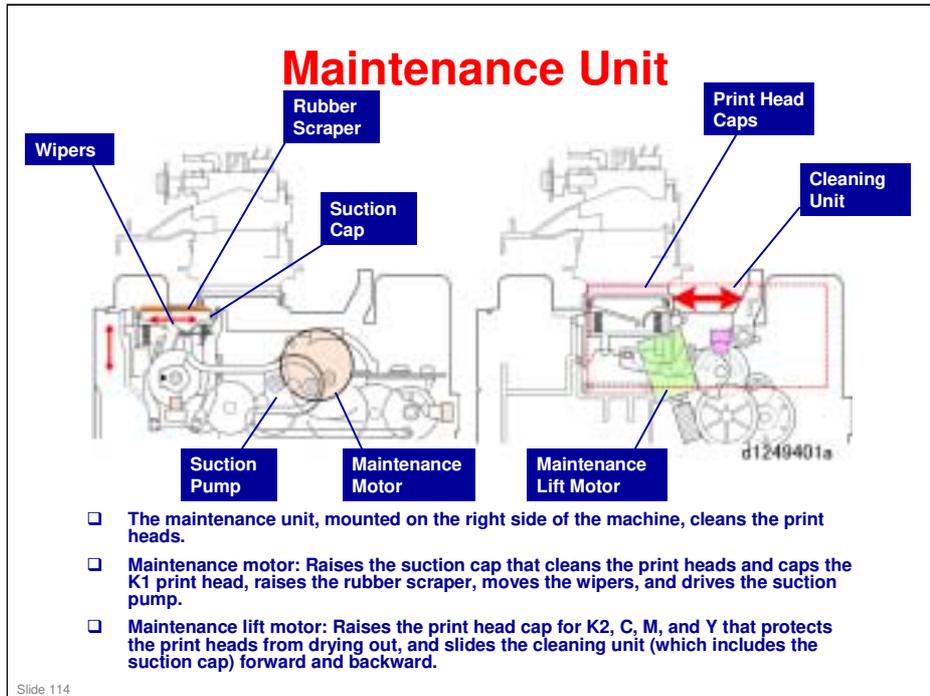
## Paper Feed Control



- ❑ A DSP control (Digital Signal Processing) system controls paper feed with encoder wheels.
- ❑ It assures accurate roll paper feed and constantly monitors the amount of paper remaining on the rolls.

Slide 113

**No additional notes**



- ❑ Previous ink jet machines had only one motor, the maintenance motor.
- ❑ The maintenance lift motor and the sliding cleaning unit are new. These and other features of the maintenance unit are explained in a later section.
- ❑ Why move the cleaning unit forward and backward?
  - The print heads are not all in a line. This will be explained later.

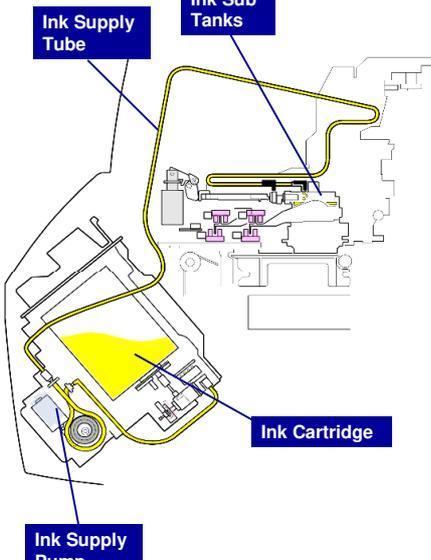
## Print Head Cleaning

- ❑ The maintenance unit cleans the print heads to prevent them from becoming clogged with paper dust or other foreign matter.
  - ◆ Cleaning is done occasionally during print jobs and can also be executed manually by the operator.
- ❑ The ink collector unit and right ink sump collect waste ink taken from the print heads by the maintenance unit.
- ❑ At infrequent intervals, the machine will force the carriage unit to pause over the left ink sump so that ink can be purged from the print heads to prevent clogging.
  - ◆ This is controlled by the firmware and cannot be done by the operator.

Slide 115

**No additional notes**

## Ink Supply



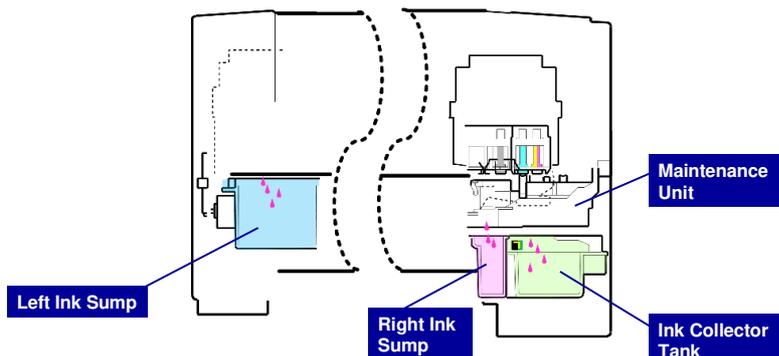
The diagram illustrates the ink supply system. It shows an ink supply pump at the bottom left, connected via ink supply tubes to four ink sub tanks located above the print head. Each sub tank is connected to an ink cartridge. The ink supply unit is located on the right side of the machine.

- ❑ The ink supply unit on the right side of the machine holds four ink cartridges (KCMY).
- ❑ Ink supply pumps: Pump ink through ink supply tubes to the ink sub tanks above each print head.
  - ◆ The sub tanks each contain 6 ml of ink.
- ❑ Each ink cartridge has an ID chip.
  - ◆ The ID chips remember the amount of ink sent to each sub tank in the carriage unit.

Slide 116

**No additional notes**

## Waste Ink Collection

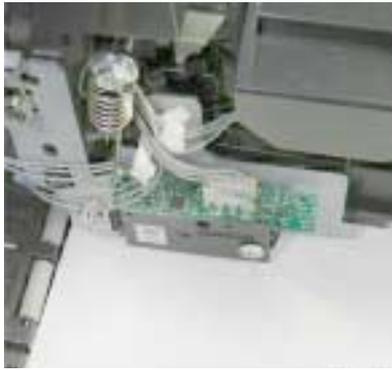


- ❑ Waste ink collector tank (on the right side of the machine): Collects the ink removed from the print heads by the maintenance unit during print head cleaning. The ink collector has an ID chip, which keeps count of the amount of ink in the tank (a message appears when the tank must be replaced).
- ❑ Right ink sump: Catches waste ink that is scraped from the surfaces of the print heads during print head cleaning.
- ❑ Left ink sump: (on the left side of the machine): Collects ink that is occasionally vented from the print heads during printing. This primes the print heads and prevents them from clogging.

Slide 117

**No additional notes**

## DRESS Sensor - 1

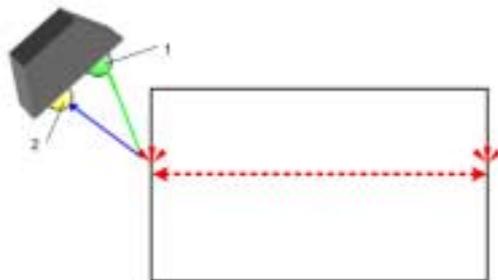


- ❑ Here is a closer look at the DRESS sensor.
- ❑ It is mounted on the left side of the carriage unit.
- ❑ The machine uses it for the following:
  - ◆ Paper width detection: The sensor checks the right and left edges of the paper on the platen to check the size of the paper. These readings are used to position the image between the right and left margins.
  - ◆ Paper registration (leading edge and side-to-side) Every time paper is fed to the registration standby position, it detects the leading edge of roll paper. It also checks the right edge of the paper twice to correct paper skew.
  - ◆ Skew correction: See above
  - ◆ Dot position correction

Slide 118

- ❑ DRESS: Direct Realization Edge Scanning Sensor
- ❑ Dot position correction: Because the carriage unit is moving sideways during printing, the ink drops do not fall vertically. In bi-directional printing (when the data is printed both when the carriage moves right-to-left and left-to-right), it is important to deposit the ink in the same position across the page when moving in each direction. The DRESS sensor is used for this process. The amount of the correction will also depend on the print head height setting, paper thickness, and the speed of the carriage. This correction also handles color registration, to make sure that the dots of each color ink are deposited in exactly the right positions on the paper when making colors in the printout.

## DRESS Sensor - 2



- The DRESS sensor contains an LED (1) and receiver (2). The sensor detects the edge of the paper when it picks up the change in reflectivity between the paper and platen at the edges.

Slide 119

**No additional notes**

### Staggered Print Heads - 1

The diagram illustrates the staggered arrangement of print heads. On the left, two black ink print heads, K1 and K2, are shown in a staggered configuration. Blue arrows point to each head. On the right, a color print head is shown, which is shared by Yellow and Magenta. The diagram shows how the staggered arrangement of the black heads increases the area of coverage for black-and-white printing.

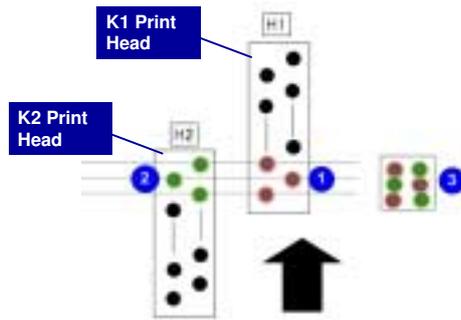
- ❑ Two black ink print heads, arranged in a staggered configuration, increase the area of coverage for black-and-white printing.
- ❑ This arrangement of black print heads increases the printing speed for large black-and-white documents.
- ❑ There are two print heads for black (K1, K2) and one independent print head for Cyan (C).
- ❑ Yellow and Magenta (YM) share one print head.
- ❑ Note that during color printing, the K1 print head is not used.

Slide 120

### Staggered Print Heads

- ❑ This is why the cleaning unit has to move back and forward. The cleaning unit is level with the K1 print head (the K1 suction cap is also the K1 print head cap). To clean the other heads, the cleaning unit must move back.
- ❑ In some situations, the K1 print head will be moved back level with the other four before cleaning starts. Cleaning will be explained in detail later.

## Staggered Print Heads - 2



- ❑ The K1 print head sits forward of the K2 print head in the direction of paper feed.
- ❑ Three nozzles at the rear section of K1 (1) and three nozzles at the front section of K2 (2) overlap the same area on the paper.
- ❑ However, the arrangement of the nozzle ports is staggered (3), so the positions of the nozzles complement one another when ink is put down on the paper.

Slide 121

**No additional notes**

### Print Head vs Print Head Unit

The diagram illustrates the internal structure of two print head units. The left unit, labeled 'Black Print Head Unit', contains two black print heads: 'K1 Print Head' and 'K2 Print Head'. The right unit, labeled 'Color Print Head Unit', contains two color print heads: 'C Print Head' (Cyan) and 'YM Print Head' (Yellow/Magenta). Blue arrows indicate the direction of ink flow from the units to the heads.

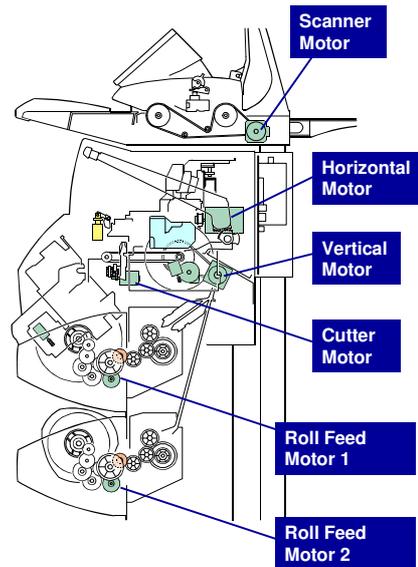
- ❑ This machine has 4 print heads (K1, K2, C, Y, M).
- ❑ There are two print heads for black (K1, K2) and one independent print head for Cyan (C).
- ❑ Yellow and Magenta (YM) share one print head.
- ❑ There are 2 print head units. One contains the K1 and K2 print heads, the other contains the C and MY print heads.

Slide 122

**No additional notes**

## Drive Components - 1

- ❑ **Scanner motor:** Drives the original entrance rollers and original exit rollers of the scanner unit.
- ❑ **Horizontal motor:** Drives the timing belt that moves the carriage unit to the left and right during printing.
- ❑ **Vertical motor:** Drives the registration and paper exit rollers in the main unit that feed paper through the printer.
- ❑ **Roll feed motor 1:** Feeds paper from Roll Unit 1.
- ❑ **Roll feed motor 2:** Feeds paper from Roll Unit 2.
- ❑ **Cutter motor:** Drives the circular cutter from left to right during paper cutting.

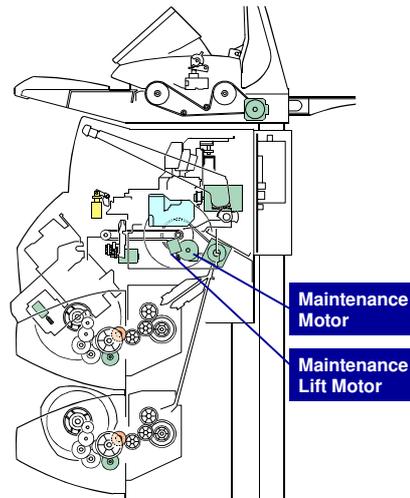


Slide 123

**No additional notes**

## Drive Components - 2

- ❑ **Maintenance motor (in the maintenance unit):**
  - ◆ Lifts and lowers the left print head cap to cap and uncap the K1 print head
    - » The left print head cap is also used for cleaning all print heads, not just K1.
  - ◆ Operates the waste ink pump that sucks ink from the print head being cleaned
- ❑ **Maintenance lift motor (also in the maintenance unit):**
  - ◆ Lifts the right print head cap to cap and uncap the K2, C, and YM print heads
  - ◆ Moves the left print head cap that holds the cleaning components (suction cap, wipers) to the front and rear.

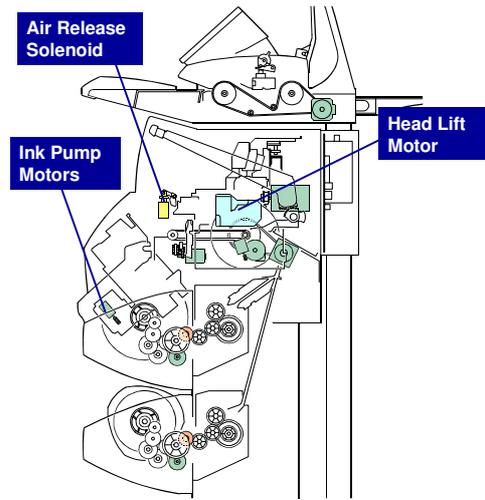


Slide 124

**No additional notes**

## Drive Components - 3

- ❑ **Ink pump motors (x5, one for each print head):** Drive the pumps that supply ink to the print heads.
- ❑ **Air release solenoid:** Purges air from the ink sub tanks when excess air is detected.
  - ◆ This one solenoid is used to purge all the tanks. The heads are moved sideways until the required tank is opposite the solenoid.
- ❑ **Head lift motor (on the right side of the main unit frame, and controlled by two lift sensors in the carriage unit):** Raises and lowers the carriage unit to adjust the gap between the paper and the print heads for different thicknesses of paper.
  - ◆ This prevents the print heads from rubbing the surface of thick paper during printing.



Slide 125

**No additional notes**

### Original Feed Paths

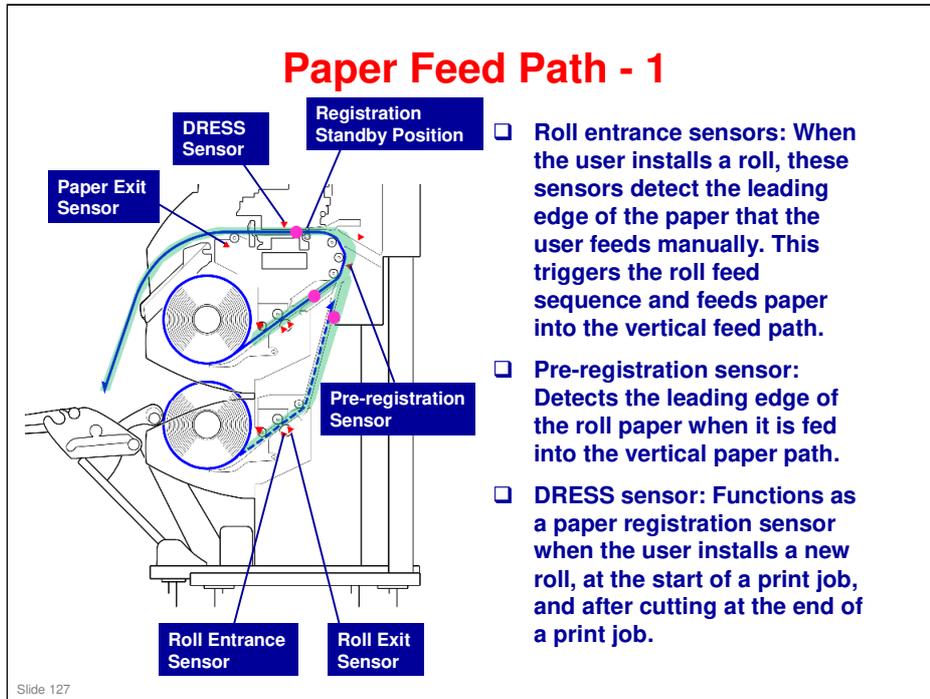
The diagram illustrates the original feed paths of a scanner. It shows a top-down view of the scanner's internal rollers and sensors. A blue line represents the path of an original document as it moves from left to right. Key components labeled include:
 

- Set Sensor:** Located at the beginning of the feed path.
- Width Sensors:** Two sensors positioned to detect the width of the original.
- Registration Sensor:** Detects the leading edge of the original.
- Exit Sensor:** Detects the trailing edge of the original.
- Original Guide:** A guide that directs the original towards the rear exit.
- Original Exit (Upper):** The exit point when the original guide is installed.
- Original Exit (Rear):** The exit point when the original guide is removed.

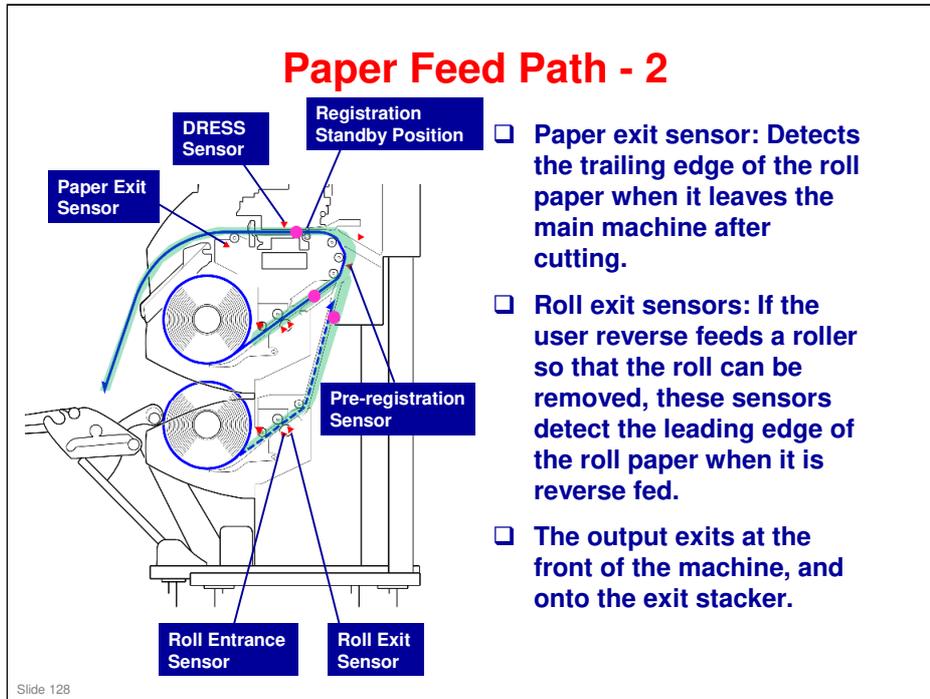
- ❑ **Original width sensors:** Detect the width of the original on the original table.
- ❑ **Original set sensor:** Detects when an original is set on the original table. Also functions as an original width sensor.
- ❑ **Original registration sensor:** Detects the leading edge of the original and stops the original feed roller. The user can then manually make the original straight if it is out of position.
  - ♦ This sensor also detects the leading and trailing edges of the original as it passes during scanning.
- ❑ **Original exit sensor:** Detects when the trailing edge of the original exits the scanner unit.
  - ♦ The original exits to the upper exit if the original guide is installed, and exits to the rear if the original guide is removed.

Slide 126

**No additional notes**

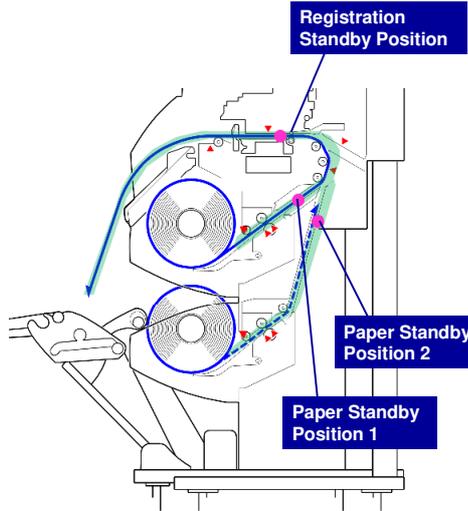


- ❑ DRESS: Direct Realization Edge Scanning Sensor



**No additional notes**

### Paper Feed Path - 3

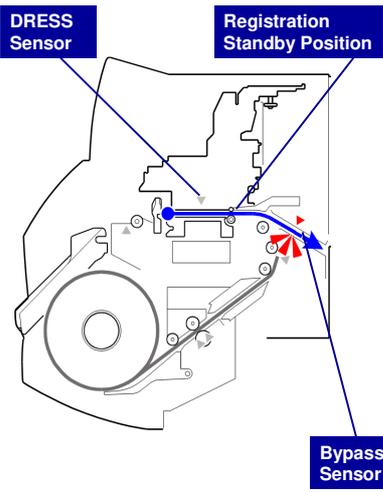


- ❑ There are two standby positions.
- ❑ If Roll Unit 2 or bypass feed is selected for a job, but paper from Roll Unit 1 is at the registration standby position, the machine rewinds roll 1 to paper standby position 1.
- ❑ Similarly, if Roll Unit 1 or bypass feed is selected for a job when paper from Roll Unit 2 is at the registration standby position, the machine rewinds roll 2 to paper standby position 2.
- ❑ Both the paper standby positions are 51.5 mm away from the pre-registration sensor.

Slide 129

**No additional notes**

### Bypass Feed Path - 1

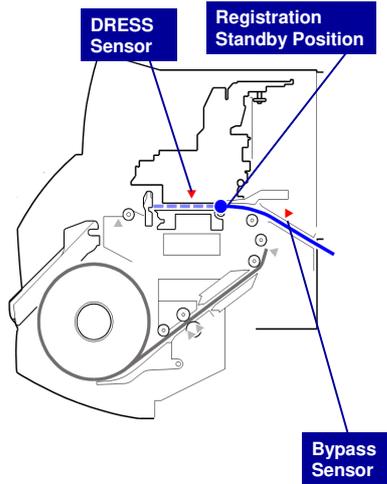


- ❑ For bypass feed, the user manually feeds a sheet of paper into the front of the machine.
- ❑ When the bypass sensor detects the paper, the machine grabs the paper and feeds it through the machine.
- ❑ When the DRESS sensor detects the other edge of the paper (nearest the front of the machine), paper feed stops.
  - ◆ This edge will become the leading edge during printing. So, the user must feed the paper in trailing edge first.
- ❑ Then the vertical feed motor continues to feed the paper through until the print leading edge is at the registration standby position.

Slide 130

**No additional notes**

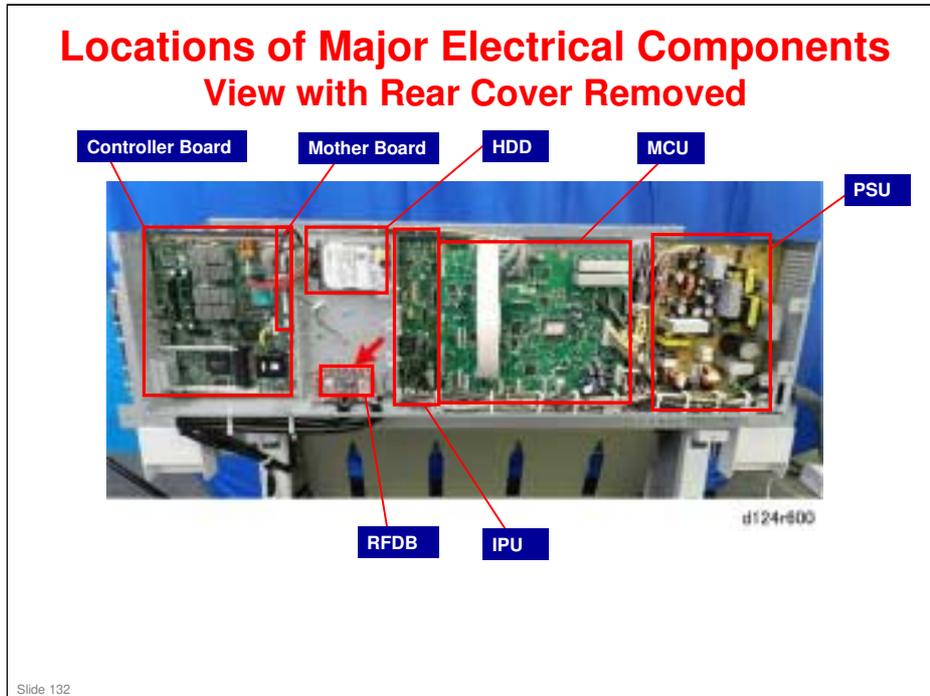
## Bypass Feed Path - 2



- ❑ The carriage unit makes one pass over the paper so that the DRESS sensor can detect the width of the paper.
- ❑ The machine knows the paper length from the paper size that the user inputs with the operation panel.
  - ◆ The user must input the correct size before using bypass feed.

Slide 131

- ❑ The bypass sensor does not detect paper length.



- ❑ The motherboard is mounted sideways between the controller board and the HDD bracket, so it is not easy to see.
- ❑ The IPU is mounted behind the MCU and the HDD bracket, so only part of it is visible in this photo.
- ❑ The HRB board is inside the carriage unit.

## Functions of Main Boards

- ❑ **MCU (Main Control Unit):** This is the engine control board.
- ❑ **Controller:** GW+ controller
- ❑ **SIB (Scanner Interface Board):** Located at the left rear corner of the scanner unit, interfaces with five CIS elements. Sends scanned image data to the IPU.
- ❑ **IPU (Image Processing Unit):** Controls image processing.
- ❑ **HRB (Head Relay Board):** Relays signals to the control board from the horizontal encoder sensor, DRESS sensor, thermistors, ink collection tank, and K2/C/Y/M print heads.
- ❑ **PSU:** Supplies power to the components of the machine.
- ❑ **HDD:** Hard disk
- ❑ **Mother board:** Connects boards within the machine.
- ❑ **RFDB:** Drive board for optional roll unit 2.

Slide 133

**No additional notes**

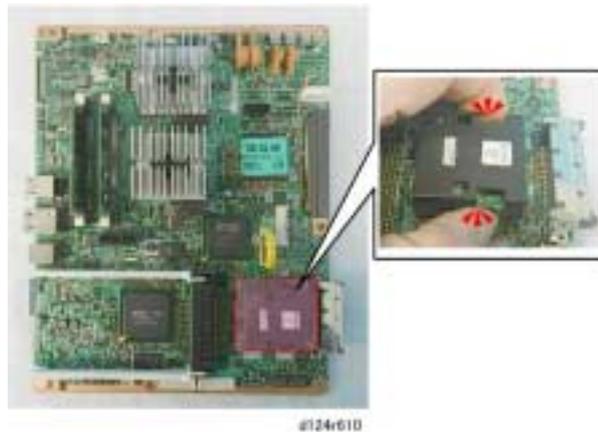
**MCU Board**

- ❑ If you install a new MCU, you must remove the EEPROM from the old MCU and install it on the new MCU.

Slide 134

**No additional notes**

## Controller Board



- ❑ If you install a new controller board, attach the NVRAM from the old board to the new controller board.

Slide 135

**No additional notes**

## **General Operation Sequence Overview**

- **The general operation sequence is composed of these steps:**
  1. Power ON
  2. Scanning
  3. Paper Feed
  4. Printing
  5. Cutting
  6. Paper Exit and Job End

Slide 136

**No additional notes**

## General Operation Sequence

### 1. Power On Initialization Process

1. The machine checks for paper jams, and issues a jam alert if one is detected.
2. The print head caps in the maintenance unit are lowered to uncap the print heads.
3. The horizontal motor switches ON and moves the carriage to the start position and then back to the maintenance unit.
4. The positions of the print head OCFS actuators are checked to determine whether sufficient ink remains in each sub tank.
5. The print head sub tanks are air purged and filled as needed, then the print heads are cleaned.
6. The print heads are capped.
7. The printer beeps twice when it is ready for operation.

Slide 137

- ❑ OCFS, air purging: These will be explained in detail later
- ❑ OCFS basically checks the level of ink in the sub tanks.

## **General Operation Sequence**

### **1. Notes about Power On Initialization**

- ❑ **When the machine is powered on, especially after a cold start, the machine automatically checks temperature, ink level, and air sensors. Then it cleans and re-fills the print heads. This can require more time, depending on how long the machine has been off.**
- ❑ **If the machine temperature is below the operational range (below 10 C), the machine will not execute the start up cycle until it has warmed up and reached the correct minimum temperature for operation.**

Slide 138

**No additional notes**

## General Operation Sequence

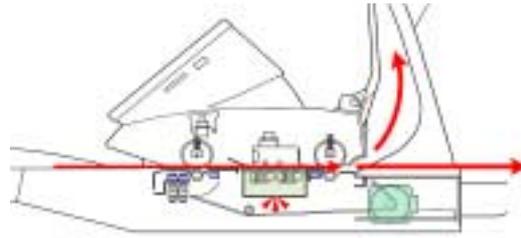
### 1. Notes about Power On Initialization

- **If the machine is accidentally unplugged from the wall power socket, or if a power outage occurs during the cleaning cycle after power on, the cycle will not resume from where it was interrupted after power is restored. You must do cleaning with the user tools after power is restored.**
  - ♦ If power cannot be restored soon after a power outage, check the position of the carriage immediately. The print heads must not be allowed to dry out.
    1. If the carriage is out of its home position, open the front cover and push it all the way to the right.
    2. Remove the ink collector tank cover and right cover.
    3. Use a screw driver to raise the suction cap and other print caps until they cover the print heads. This procedure is described in the Common Procedures section of the Field Service Manual under "Unlock and Move the Carriage Unit".
  - ♦ Customers cannot do the above procedure. If the machine loses power while no technician is present, the operator should check the position of the carriage.
    - » If the carriage is not at its home position on the right side of the machine, the print heads may dry out if they remain uncapped for too long.
    - » As soon as power is restored, the operator should print a Nozzle Check Pattern to check the condition of the print heads. The print heads should be cleaned if the pattern is abnormal.
    - » If the power is not restored with 24 hours, the operator should call for service. It may be necessary to replace the print heads.

Slide 139

**No additional notes**

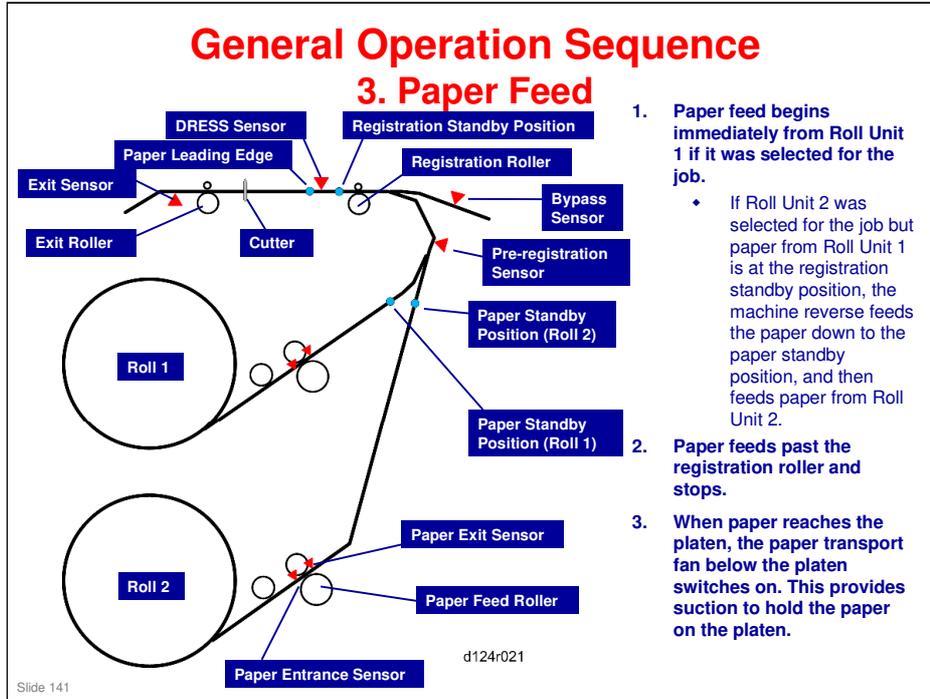
## General Operation Sequence 2. Scanning



1. The operator selects the paper feed station.
2. The original is laid face down on the original table.
3. The scanner unit grabs the original and feeds it a short distance.
4. The original set sensor detects the presence of the original and the array of original width sensors detect its width.
5. The scanner motor switches on and rotates the original entrance roller and original exit roller to feed the paper past the CIS unit, which is below the original path
6. The original is fed to the upper exit. If the original guide has been removed, the original feeds straight out the back of the machine.

Slide 140

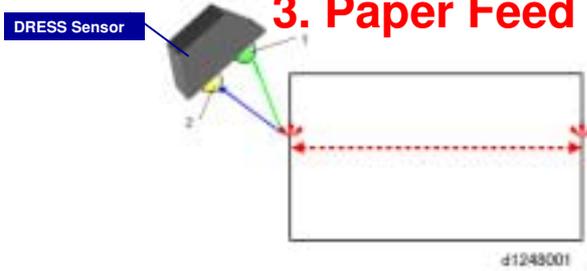
**No additional notes**



- DRESS: Direct Realization Edge Scanning Sensor

## General Operation Sequence

### 3. Paper Feed

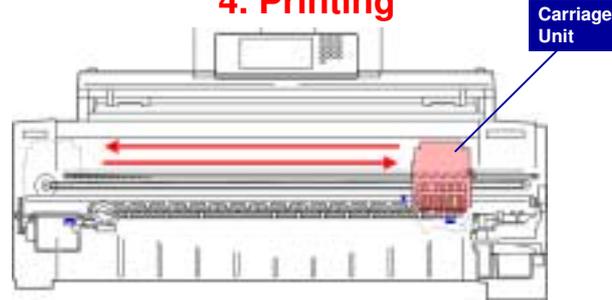


- **To check for paper skew:**
  - The carriage moves to the left and the DRESS sensor, mounted on the left side of the carriage, checks the right edge of the paper. The machine feeds more paper and then the sensor checks the right edge again.
  - If the 1st and 2nd readings deviate by more than  $\pm 10$  mm, this indicates excessive skew.
  - The paper is rewound and the operator must set the paper again.
  - If no skew is detected, the paper is fed into the machine. Then the paper feed motor reverses while the vertical motor continues to feed the paper forward. This takes up slack in the paper, and then both motors turn OFF.
  - Then skew is checked again, but the tolerance this time is  $\pm 5$  mm.
  - If the deviation is within  $\pm 5$  mm, paper registration ends and the paper is reverse fed as far as the registration roller. This is the registration standby position and the machine is ready to start printing.
  - If the deviation is not within  $\pm 5$  mm, the paper is released, the machine rewinds the paper and then fed again, slack is removed again, and  $\pm 5$  mm skew checked again.
- **During the above process, the carriage moves to the left side of the machine and the DRESS sensor detects the left edge of the paper. This detection of the right and then the left edge of the paper is for paper width detection and image registration.**

Slide 142

**No additional notes**

## General Operation Sequence 4. Printing



- ❑ **The carriage unit moves left and right.**
  - ◆ The print heads mounted on the carriage unit lay down ink on the paper.
  - ◆ Each print head unit in the carriage contains sub tanks that hold the ink.
  - ◆ The paper transport fan remains on and holds the paper tightly on the platen, so it does not shift during printing.
  - ◆ If black-and-white printing was selected, only the first two print heads K1 and K2 (both black) are used.
  - ◆ If color printing was selected, then the K2, C, Y, and M print heads are used. (K1 is not used.)
  - ◆ If uni-directional printing is selected, then the print heads lay down ink only when the carriage unit passes from right to left. If bi-directional printing was selected, the print heads lay down ink on both passes, right to left and then left to right.

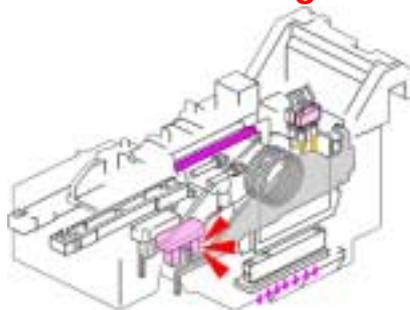
Slide 143

### Uni-directional vs bi-directional printing.

- ❑ For copy jobs, the type of printing depends on the paper type, and for paper types that require uni-directional printing (translucent, matte film, coated, or special paper types), the setting cannot be changed.
- ❑ Print jobs always use uni-directional printing, and cannot be switched to bi-directional.
- ❑ Bi-directional printing is not allowed if the print heads are raised (if either the "Strong" or "Weak" setting is selected).
  - For more on raising the print heads, see 'Print Head Gap Adjustment ' in 'Ink Supply and Printing'.

## General Operation Sequence

### 4. Printing



- During printing, an actuator arm on each sub tank, with actuators paired with OCFS (On Carriage Filling Sensors), constantly monitor the condition of each sub tank above the print heads.

Slide 144

**No additional notes**

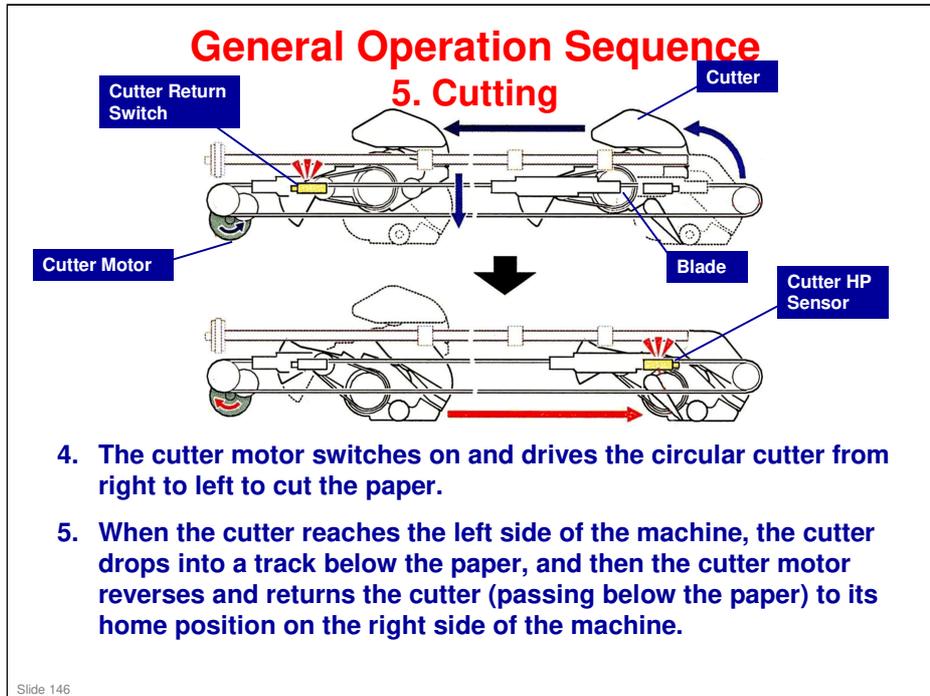
### General Operation Sequence

#### 5. Cutting

1. **When printing is finished, the print head moves away from the platen, so that the cutter can cut the paper.**
  - If the last line printed ends on the left side, the carriage moves to the left side of the machine.
  - If the last line printed ends on the right side (bi-directional printing), the carriage moves the right to its home position.
2. **Paper feeds a short distance and stops.**
3. **Normally, there is no delay before the cut is done, except for tracing paper (15 s delay).**
4. **If you need a delay to allow the ink on the paper to dry before it is cut, adjust with SP 3140 (Ink Drying Time Setting). There is a setting for each paper type.**
  - If a long delay (more than 30 sec.) has been specified by the operator, the horizontal motor will switch ON and move the carriage back to its home position so that the print heads can be capped to prevent them from drying out.

Slide 145

No additional notes



**No additional notes**

## General Operation Sequence

### 6. Paper Exit and Job End

1. After the paper has been cut and the cutter has returned to its home position, the machine feeds the paper out of the machine.
2. When the exit sensor detects the trailing edge of the paper, this signals job end.
3. The paper transport fan switches off and the paper is reverse fed to the registration standby position by the registration roller.
4. The machine is ready for the next job.
5. If the machine remains idle for more than 1 minute, the machine goes to Low Power Mode.
  - ◆ If the machine is idle for more than 14 minutes (default), it will enter the Sleep Mode.

Slide 147

**No additional notes**

## Power Off Sequence

- ❑ **There is a wait time of up to 2 minutes (depending on controller condition) after the machine has been switched off.**
  - ◆ This prevents damage to the hard disk, and lets the machine cap the print heads.
- ❑ **A message is displayed, and goes off after the machine completes its shutdown sequence.**
- ❑ **The actual delay may be up to two minutes or much shorter.**
  - ◆ Power off at Standby. Powers off quickly because print heads are already capped.
  - ◆ Power off during maintenance cycle. Power off does not wait for the maintenance cycle to complete. The cleaning cycle stops, and the maintenance unit caps the print heads.
  - ◆ Power off during printing. Power goes off as soon as the job stops and the print heads are capped.
  - ◆ Power outage. If the machine goes off due to a power outage, the operator should check the position of the carriage immediately.
    - » If power is restored within one day, the customer should print a nozzle check pattern, and if there is a problem with the print heads, try to recover them using the print head cleaning and flushing procedures described in the Installation section of the course.
    - » If the print heads are out of position for more than one day, the customer should call for service. The print heads may need to be replaced.

Slide 148

### SW11: Horizontal Motor Interlock Switch

- ❑ This small switch is attached to the top of the main power switch. If the main power is switched off, this interlock switch will keep the circuit closed until the horizontal motor stops operating, and then it will open the circuit to switch off the power. This ensures that the carriage unit is at rest on the right side of the machine with the print heads capped. (This causes a slight delay and a 2 minute warning when the main power is switched off.)

## Replacement Procedures

- ❑ Before you start working on the machine, read the **General Cautions** at the start of the **Replacement and Adjustment** section of the **Field Service Manual**.

Slide 149

- ❑ These cautions are mentioned in various parts of the training course.

## Service Precautions Rollers

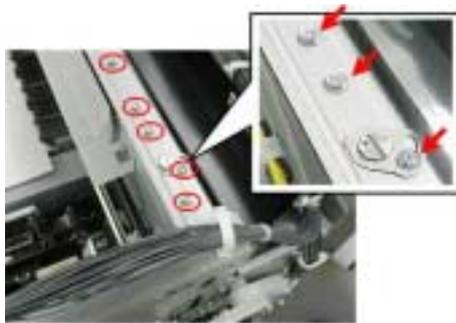


- ❑ The surfaces of the main rollers (original feed roller, original exit roller, registration roller, and exit roller) are covered with a soft urethane coating. This coating can be damaged quite easily (even with a fingernail).
- ❑ Never touch the surface of these rollers with bare hands.
- ❑ Always hold the rollers by the bare ends, where they are not coated.
- ❑ Never use any type of strong organic solvent to clean the surface of these rollers. Use only a cloth very slightly dampened with alcohol or water.

Slide 150

**No additional notes**

## Service Precautions Main Frame Screws



- ❑ There are paint-locked screws across the top of the machine (under the top cover ).
- ❑ These screws are positioned and adjusted at the factory. Never loosen or attempt to adjust these screws.

Slide 151

**No additional notes**

## Service Precautions Right Plate Screws



d1241038

- ❑ You can see the heads of four paint-locked screws around the top of the maintenance unit. These screws hold a reinforcement plate.
- ❑ Never loosen or remove any of these screws.

Slide 152

**No additional notes**

## Service Precautions Maintenance Unit Base Plate



- **The maintenance unit base plate supports the maintenance unit. These screws hold the base plate under the maintenance unit, which must always remain in the same position below the carriage print heads.**
  - ◆ The two base plate screws at the back on the right rear panel should never be loosened or removed.
  - ◆ There are also two paint-locked screws at the front. One screw at the front below the switch bracket [A] on the right. The other screw [B] is to the right of the temperature/humidity sensor above the ink supply unit.

Slide 153

**No additional notes**

## Service Precautions Main Carriage Screws



- ❑ The illustration shows the left cover of the carriage unit removed.
- ❑ It is extremely important you never loosen or remove these screws.
- ❑ Tampering with these screws could cause the carriage unit to fall out of alignment or onto the platen plates.

Slide 154

**No additional notes**

## Service Precautions Platen Plate Guide Rod Screws



- ❑ Never loosen the center screws of the brackets that hold the platen plate guide rod in place. The platen plates should never be removed.

Slide 155

**No additional notes**

## Tools that you Need to Work on the Machine

- Alcohol, clean linen cloths: Cleaning surfaces and rollers**
  - ♦ Follow all notes and cautions to avoid using alcohol when it is not wanted, such as on the covers.
- Allen key (2.5 mm): Removing/attaching hex bolts.**
- Blower brush: Cleaning sensors**
- Clean rags: Wiping up ink, covering disconnected ink tubes**
- Clean waste paper: To place under the maintenance unit and other parts that can leak ink, in order to protect tables and other surfaces**
- Flashlight (small): Checking the position of the suction cap and print head caps of the maintenance unit.**
- Gloves: Handling encoder strips and wheels, and urethane-coated rollers**
- Lens paper: Cleaning the CIS elements**
- Metal scale: Inserting mylars into narrow gaps.**
- Phillips driver – long: At least 30 cm to reach screws inside the machine.**
- Phillips driver – small: Removing small screws**
- Radio pliers: Attaching, reattaching e-rings**
- Tube plugs (dia. 3 mm): Plugging the ends of disconnected ink tubes (provided with new print head units). These are included with the new carriage unit and ink supply unit.**

Slide 156

**No additional notes**

## Before you Start



- ❑ Before doing any procedure, always turn off the power switch and unplug the machine from its power source.
- ❑ To prevent damage to these parts, and to prevent interference with raising and lowering the top of the scanner unit, always remove the following before servicing the machine:
  - ◆ [A] Original guides
  - ◆ [B] Original stacker
  - ◆ [C] Rear output guides

Slide 157

*Replacement and Adjustment > Common Procedures*

## Reinstalling the Original Stacker



- ❑ **Pull out the light shield and confirm that the gap at the top of the scanner unit is completely covered.**
  - ◆ This light shield prevents light from entering the scanner unit.
  - ◆ If this gap is not covered, strong light could enter the back of the scanner unit and cause image distortion during scanning.

Slide 158

*Replacement and Adjustment > Common Procedures*

## Separating the Main Unit and the Scanner Unit

- ❑ To avoid scratching or breaking the original table, never lay anything on the original table while you are working.
- ❑ Move the scanner unit and stand assembly carefully. It is top heavy and can tip over easily.

Slide 159

*Replacement and Adjustment > Common Procedures*

## Removing the Top Cover

- ❑ **To remove the top cover, the covers must be removed in this order:**
  - ◆ Right Cover > Right Upper Cover > Ink Cartridge Cover > Left Cover > Top Cover
- ❑ **Use only a water dampened cloth to clean the covers. To protect the finish of the covers, never use an organic solvent to clean them.**
- ❑ **If you print with the top cover removed, the machine will detect a jam because ambient light hits the exit sensor.**
  - ◆ This also happens when you make test prints with the covers off and the sensors taped over.

Slide 160

*Replacement and Adjustment > Common Procedures*

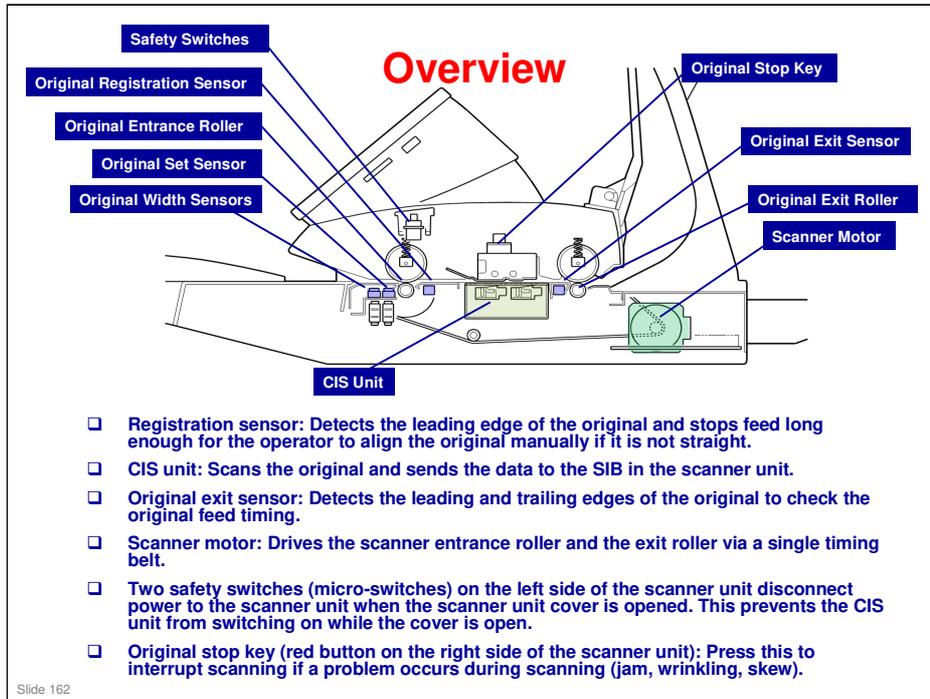
**RICOH**

**D124**  
**Service Training**

**Scanner**  
**Detailed Description**

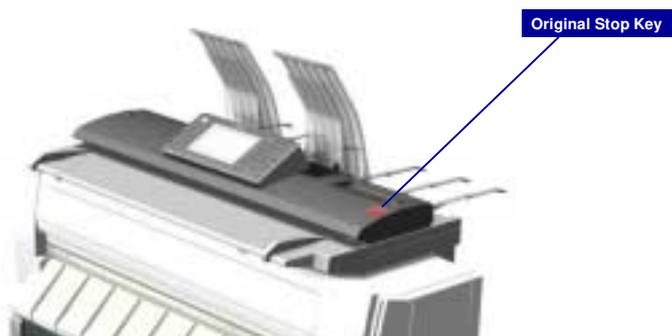
Slide 161

- The scanner is based on the N-C3.
- The original feed and exit rollers are made of a different material.



**No additional notes**

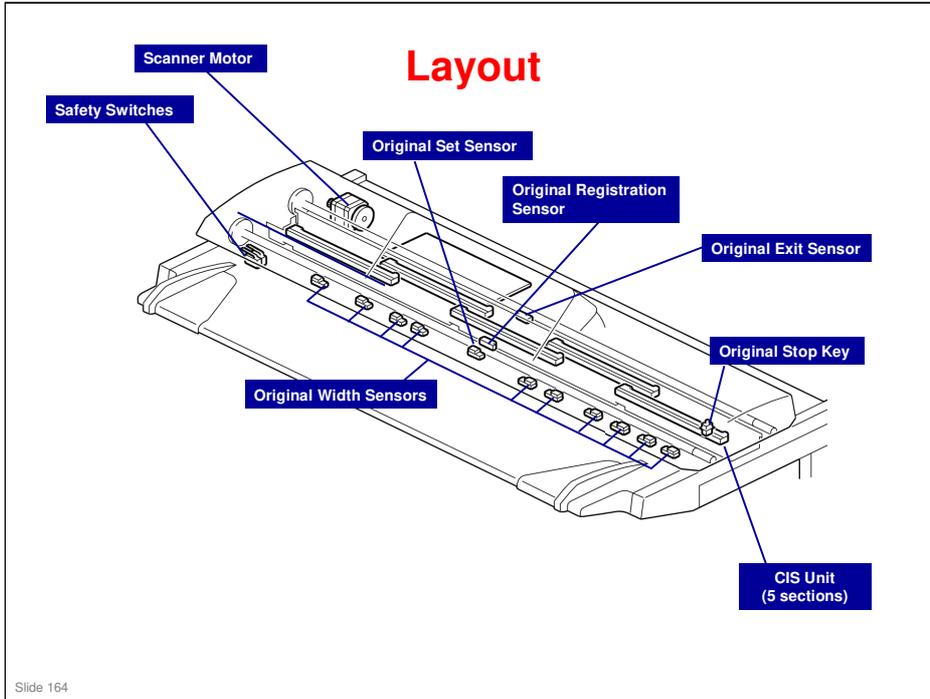
## Original Stop Key



- ❑ Press this to interrupt scanning if a problem occurs during scanning (wrinkling, skew), to prevent damage to the original.

Slide 163

**No additional notes**



**No additional notes**

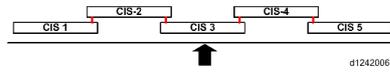
### CIS Structure - 1

- ❑ The CIS unit has 5 contact image sensors linked in a staggered configuration, below the original feed path.
- ❑ Two safety switches cut off the power to the CIS unit when the scanner cover is lifted. This prevents the CIS unit from lighting up accidentally when the cover is open.

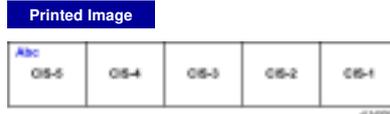
Slide 165

**No additional notes**

## CIS Structure - 2



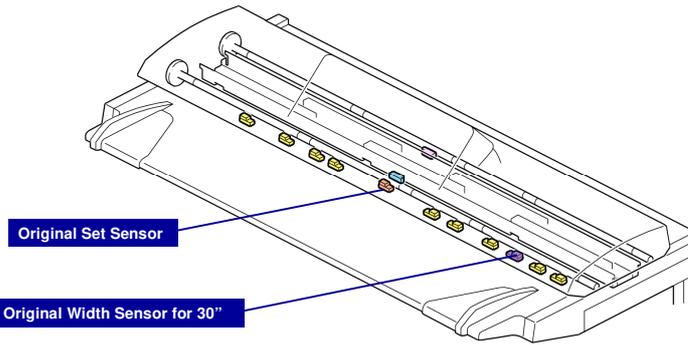
- ❑ The CIS unit is made of 5 contact image sensors connected at 4 joints.
- ❑ From above, the CIS sections are numbered from left to right as CIS-1 to CIS-5.
- ❑ But, when you look at the copy to identify the areas scanned by each section, the numbering is in the opposite sequence, with CIS-5 on the left to CIS-1 on the right.



Slide 166

No additional notes

## Original Width Detection - 1

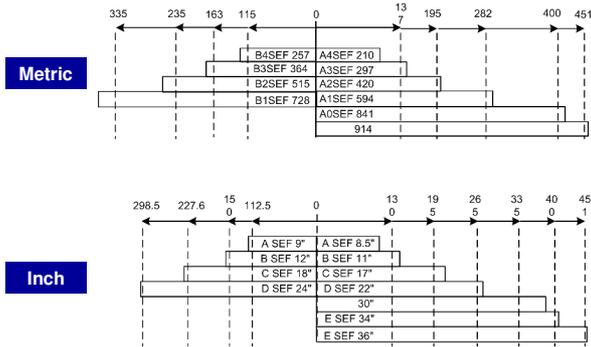


- **These sensors detect the width of the original when it is set on the original table:**
  - ◆ Metric version: 10 sensors (9 original width sensors plus the original set sensor [1], which also functions as a width sensor).
  - ◆ Inch version: 11 sensors (9 original width sensors, the original set sensor [1], and one additional width sensor [2] to detect 30").

Slide 167

**No additional notes**

## Original Width Detection - 2

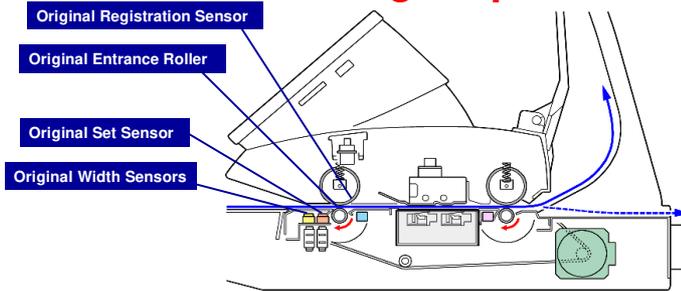


- ❑ The sensors to the left of center (set sensor position "0") detect B series (Metric) or Architecture (USA) sizes.
- ❑ The sensors to the right of center (set sensor position "0") detect A series (Metric) or Engineering (USA) sizes.
- ❑ If only the original set sensor turns on, the machine detects an A4 or 8½" (A size) SEF original.

Slide 168

**No additional notes**

## Scanning Sequence - 1

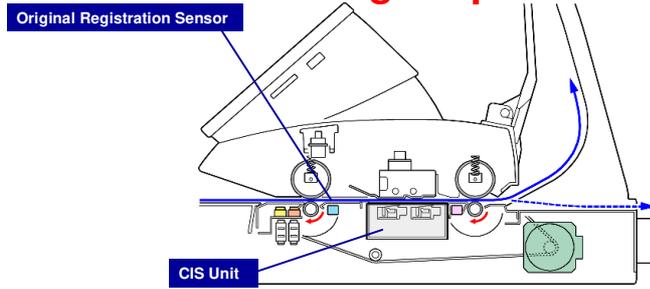


- ❑ First, the original set sensor detects the leading edge of the original and the original width sensors detect the width of the original.
- ❑ The original entrance roller grabs the leading edge, feeds it a short distance and then stops for 1 second.
  - ◆ This is called Delay 1. This gives the operator time to set the paper again if it is not perfectly straight.
- ❑ Then, the original entrance roller feeds the original to the registration sensor.

Slide 169

**No additional notes**

## Scanning Sequence - 2

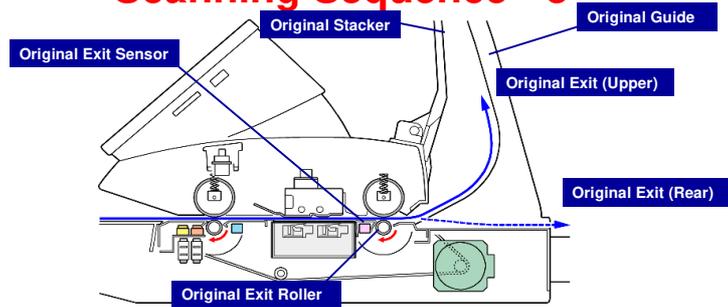


- ❑ **When the registration sensor detects the leading edge of the original, the machine stops original feed again for 1 second.**
  - ◆ This is called Delay 2. This gives the operator another chance to check that the original is straight. If the original is not straight, the user can push the original stop key on the right side of the scanner unit, remove the original, and try again.
  - ◆ The length of time for Delay 1 and Delay 2 to pause can be adjusted with User Tools > System Settings > General Features > Original Feed Delay.
- ❑ **Then the CIS (Contact Image Sensor) scans the original from below.**

Slide 170

**No additional notes**

### Scanning Sequence - 3



- ❑ The original exit sensor checks the time between the leading and trailing edges of the original to make sure that there is no jam.
- ❑ The original exit roller feeds the original out of the scanner unit while the scanned image is processed.
- ❑ The original goes to the upper exit after scanning.
  - ◆ Long originals will curl in the tray.
  - ◆ If the original guide is removed, the original goes out of the rear of the machine.
  - ◆ The user should remove the original guide when scanning thick originals.

Slide 171

**No additional notes**

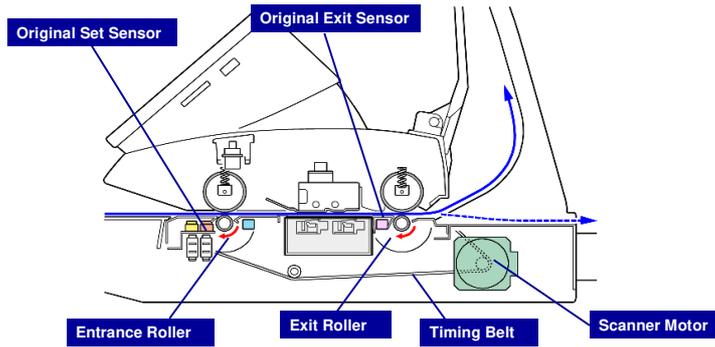
### Auto Image Density Correction

- ❑ **Auto Image Density Correction corrects the background density.**
- ❑ **First, the CIS reads the surface of the white strips on the platen plate.**
  - ◆ There is one white strip mounted above each section of the CIS unit. The machine uses these readings as reference points for density correction.
- ❑ **During scanning, the machine corrects the image density line by line.**
  - ◆ To do this, it uses the central 120 mm of scanned data, starting at 3 mm from the leading edge of the original.

Slide 172

- ❑ Image density correction strip: These positions (3 mm, 60 mm).
  - SP4901-005 Digital AE -Start Position
  - SP4901-006 Digital AE -Left Start Position
  - SP4901-007 Digital AE -Right Start Position

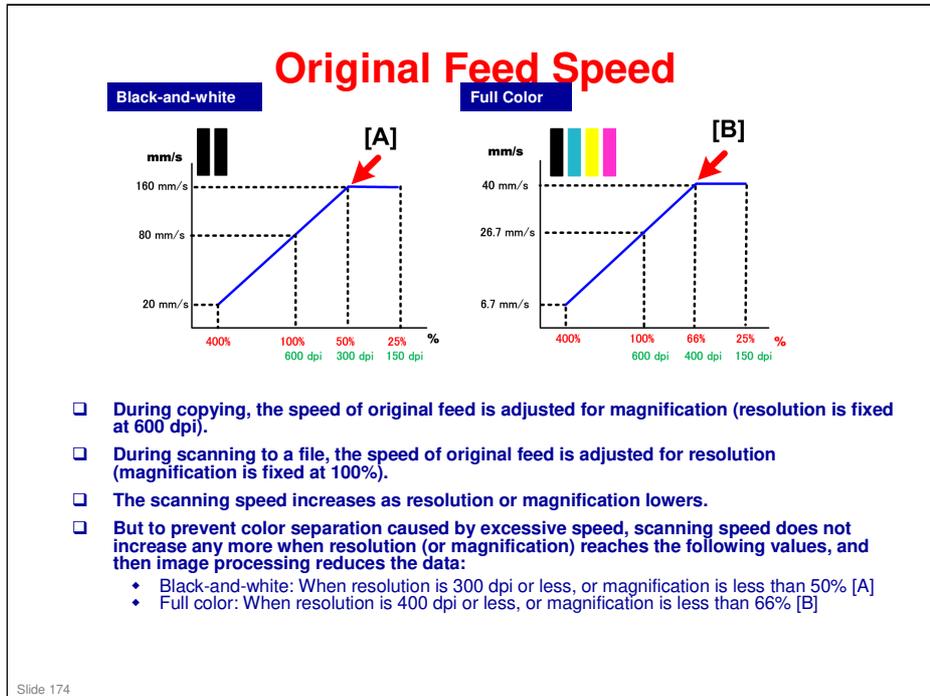
## Scanner Mechanism



- ❑ The scanner motor is a stepper motor. It uses a timing belt to drive the original entrance roller and original exit roller.
- ❑ The original set sensor turns the motor on when an original is set.
- ❑ The exit sensor switches the motor off when the sensor detects the trailing edge of the original.

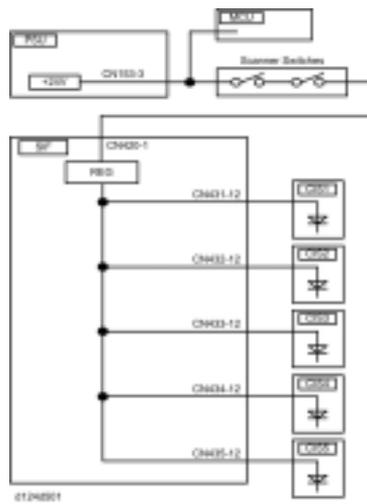
Slide 173

**No additional notes**



- ❑ Black-and-white Standard for Copying
  - Resolution: 600 dpi (fixed). Copy resolution cannot be adjusted.
  - Magnification: 100%
  - Original scanning speed : 80 mm/s
- ❑ Black-and-white Standard for Scan to File
  - Resolution: 200 dpi
  - Magnification: 100% (fixed)
  - Scanning speed: 160 mm/s (with electronic magnification)
- ❑ This graph shows the reciprocal relation between copy magnification and scan job resolution. For example:
  - A copy reduced to 50% (one-half of an image at 100% 600 dpi) is reduced by removing half the pixels.
  - This is the same as a 300 dpi copy at 100%, in other words, the same as a document scanned to a file at 300 dpi.

## Scanner Safety Switches



□ Two switches inside the scanner prevent the LEDs in the CIS from switching on accidentally.

- ◆ When the original feed unit is opened and the switches open, a +24V line connecting each LED driver on the SIB board is disconnected.
- ◆ When the original feed unit is closed and the switches close, the +24V line is re-connected.

Slide 175

No additional notes

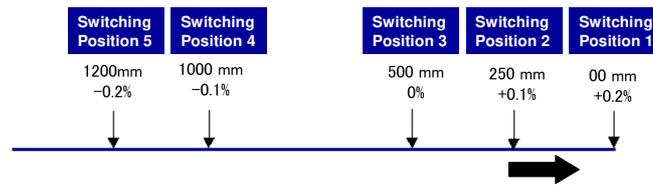
## Scanning Long Originals - 1

- ❑ When long originals (or special originals in a carrier sheet) are fed into the scanner, the scanned portion of the original behind the scanner unit may sag. This can cause the original to slip in the original feed path and interfere with smooth operation of the scanner motor.
- ❑ To correct this, the scanning speed can be changed at designated points:
  - ◆ Up to 15 switching points can be designated for a long original up to the maximum length of 15,000 mm (15 m or approximately 50 ft.).
  - ◆ The first starting point (the reference point) is upstream of the CIS.
  - ◆ The points can be entered with SP codes SP4993 and SP4994
  - ◆ The speed of the scanner motor can be set in the range of  $\pm 10\%$  and it can be adjusted in fine increments ( $\pm 0.1\%$ )

Slide 176

**No additional notes**

## Scanning Long Originals - 2



- **Look at the settings above. Note that as more of the original feeds through the scanner unit, the speed of the scanner motor is decreased slightly.**
  - ◆ "0" means that the speed is 100% of the normal speed of the scanner motor.
  - ◆ If the image is to be magnified, the speed of the vertical motor is automatically adjusted to account for the changes in scanning speed so that magnification will not be affected.

Slide 177

**No additional notes**

## Prevent Originals from Falling

- ❑ The machine can be set up to hold the trailing edge of the original at the end of the scan job.
- ❑ This prevents the original from falling on the floor. The trailing edge is held in the nip of the exit roller until it can be removed manually.
- ❑ This feature can be switched on/off with SP4975 (Prevent Original Falling).

Slide 178

**No additional notes**

**RICOH****D124  
Service Training****Scanner****Replacement and Adjustment: Important Points**

Slide 179

- ❑ This section introduces the mechanisms of this engine. Details will be explained in later sections.

## General Cautions

### Operation - 1

- ❑ To set the original, lay it face down and align the right side guide with the right edge of the original.
  - ◆ This prevents skewing during scanning.
- ❑ Push the leading edge into the scanner. Release it as soon as the machine grabs the leading edge and feeds it partially. To avoid skewing or damaging the original, never attempt to push or pull on the original during this initial feeding.
- ❑ If you see a problem at the beginning of scanning, press the [Stop Original] button to stop original feed, and then open the scanner unit and remove the original.
- ❑ To ensure good print quality and to prevent jams, always remove a thick or long original from the original stacker as soon as it exits.
- ❑ Thick or long originals may not feed correctly. While feeding a thick or long original, you can gently push the sides with both hands during scanning of the first half. You can guide the sides with both hands as the second half scans.

Slide 180

**No additional notes**

## General Cautions

### Operation - 2

- ❑ **When you open the scanner cover, always use both hands, placed on either side of it, as shown on the decal.**
  - ◆ To avoid personal injury or damage to the machine, never open or close the scanner cover with one hand.
- ❑ **To avoid damaging the original table, never lean on the original table and never place anything on the original table when you are working around the machine.**
- ❑ **To avoid damage to the exposure glass below the cover or the white plates attached to the underside of the cover, always check the original path before you close the scanner cover.**

Slide 181

**No additional notes**

## General Cautions

### Operation - 3

- ❑ **During feeding of a thick original (90 g/m<sup>2</sup>), the side guides could skew the image and cause parts of the image to disappear at the points where the CIS elements join.**
  - ◆ In such a case, use the white lines on the original table to guide the original during feeding.
- ❑ **When feeding a thick original (180 g/m<sup>2</sup>), do not push the original after it strikes the original feed roller and starts to feed for scanning.**
  - ◆ The original feed roller has a one-way feed clutch. If the original is pushed in the direction of the leading edge, this could buckle the original and cause it to jam at the original registration sensor.
- ❑ **Originals up to 135 g/m<sup>2</sup> can exit to the original stacker on top of the machine. Thicker originals must feed straight through and exit the back of the machine. Remove the original guide and the original will feed out to the rear.**
- ❑ **Thin or flimsy originals must also feed out to the rear, or accordion jams can occur and the original could be damaged.**
  - ◆ For example, tracing paper (80 g/m<sup>2</sup> or less), or normal thin paper (52.3 g/m<sup>2</sup> or less).

Slide 182

**No additional notes**

## General Cautions

### Operation - 4

- ❑ **The CIS unit has five separate elements, and sometimes image density may appear uneven at the joints where these elements connect.**
  - ◆ When this problem occurs, try scanning in the Photo Mode.
    - » The scanning level may be affected by the original floating away from the exposure glass during scanning. This can also cause inconsistencies in the wavelengths of the CIS unit with color originals and lead to slightly uneven density in the copied image.
  - ◆ If you see white areas in dithered images, switch the machine to the Photo Mode.
  - ◆ If you see fine lines that appear as scratches, change the image density notch adjustment.
- ❑ **Pixels may become misaligned at the joints of the CIS elements.**
- ❑ **In order to compensate for the differences in Generation Copy Mode, try reversing the direction of the original when you insert it, or swap the orientation between LEF and SEF.**
- ❑ **When using a pasted up original, try Text Mode or Photo Mode.**
  - ◆ Shadows can appear in copies because the CIS light source comes from one direction where there are edges (steps) on the pasted up document.

Slide 183

**No additional notes**

## General Cautions

### Service - 1

- ❑ **WARNING: The scanner unit can emit Class 1 M LED radiation when open. Never attempt to view the CIS units with an optical instrument.**
- ❑ **Always turn off the power switch and disconnect the power plug from the power outlet before beginning any disassembly or adjustment procedure for the scanner unit.**
- ❑ **Never touch the safety switches (which will turn on the main power) when the original feed unit is open.**
- ❑ **After finishing every disassembly or adjustment of the scanner unit, always:**
  - ◆ Confirm that the safety switches work correctly
  - ◆ Confirm that opening and closing the original feed unit operates the safety switches.

Slide 184

### Radiation output

- ❑ Blue: Wavelength 452-463 nm and an output of 6.9 mW
- ❑ Green: Wavelength 520-531 nm and an output of 3.9 mW
- ❑ Red: Wavelength 629-634 nm and an output of 4.8 mW

## General Cautions

### Service - 2

- ❑ **Never attempt to disconnect the signal or power connectors at the CIS unit. This could damage the CIS unit or throw it out of adjustment.**
  - ◆ When connecting the CIS unit, connect the FFCs at the SIB board.

Slide 185

**No additional notes**

## Lifting the Left End of the Scanner Unit



- ❑ By disconnecting and lifting the left end of the scanner unit, you can do many procedures on the scanner unit without completely disconnecting the scanner unit and removing it from the machine.
- ❑ If you do this, remove the hex bolts at the left side, but loosen (do not remove) the bolts at the right side.

Slide 186

*Replacement and Adjustment > Common Procedures*

## Lifting off the Scanner Unit



- ❑ After you have removed the screws, to prevent the scanner unit from falling onto the floor, push it over the main unit slowly.
- ❑ Then, slowly, lift the scanner unit and set it on top of the left rear corner of the scanner stand [A].
- ❑ Place the square handle of a screwdriver or a block of wood or cardboard between the front left corner of the unit and the rack frame [B].
  - ◆ A block of wood 10 cm long and 2 cm thick (4 x 1 in.) is ideal.
  - ◆ This block stabilizes the front end and prevents it from falling.

Slide 187

**No additional notes**

**Original Table**



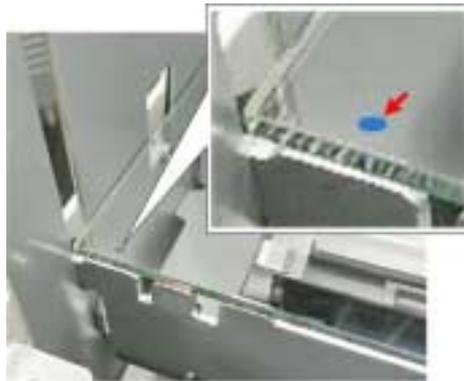
□ **Make sure to put the screws back in the correct places.**

- ◆ Left side [A]: Pivot screw [B].
- ◆ Right side [C]: Tapping screw [D]

Slide 188

*Replacement and Adjustment > Common Procedures*

## Replacing the Exposure Glass



- ❑ The exposure glass is very long and thin. It is very easy to break, so handle it carefully.
- ❑ When you reinstall the exposure glass, set the glass so that the blue dot is on the top surface of the front left corner of the glass.

Slide 189

- ❑ There is no beveled edge on this exposure glass.

## **Replacing the CIS**

### **Cautions**

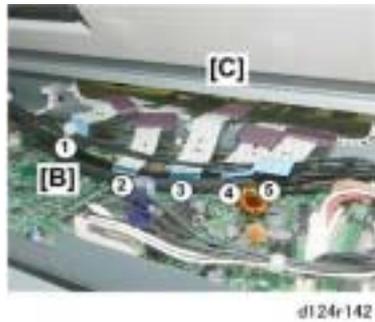
- ❑ **To preserve the alignment of its components and to prevent other damage, always handle the CIS unit carefully to protect it from sudden shock and vibration.**
- ❑ **To prevent fingerprints and smudges, never touch the CIS lens cover with bare hands.**
- ❑ **Clean the CIS lens cover with lens paper only. Never use tissue paper or cloth that could leave lint or other particles on the lenses.**
- ❑ **To preserve the alignment of its components, always disconnect and re-connect the CIS unit at the SIB. Never disconnect the signal or power supply harnesses from the CIS unit.**

Slide 190

**No additional notes**

## Replacing the CIS

### Connecting the CIS to the SIB board



- ❑ When connecting up the cables, look at the CN numbers on the cable and on the printed circuit board.
- ❑ Do not attempt to match the cables to connectors by using CIS numbers.

Slide 191

- ❑ The cable with CIS1 on it connects to the socket marked CIS5 on the PCB, CIS2 connects to CIS4, CIS3 connects to CIS3, CIS4 connects to CIS2, and CIS5 connects to CIS 1.

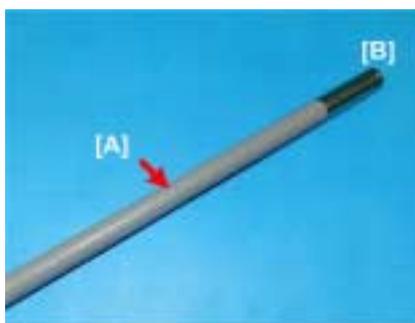
## Replacing the CIS After Replacement

- ❑ Each CIS unit comes with an SD card.
- ❑ After installing a new CIS, insert the SD card in SD card slot 2, and follow the instructions in the field service manual.
- ❑ Then do SP 4417 and print a test pattern on A3 LEF paper, as explained in the field service manual.
- ❑ On the print out, look for misalignments at the CIS joints.
- ❑ If there are misalignments, do the 'CIS Adjustments with SP Mode'
  - ◆ Service Manual > Replacement and Adjustment > Special Adjustment

Slide 192

*Replacement and Adjustment > Scanner > CIS*

## Original Feed Roller, Original Exit Roller



d124r160

- The urethane coating [A] is fragile. Always hold the roller at [B], where its surface does not have a coating.

Slide 193

**No additional notes**

## Removing the Top of the Scanner Unit

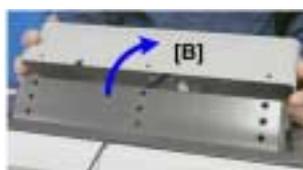


- ❑ After disassembly (see the service manual), lift and remove the top of the scanner unit.
- ❑ The latches on either end can fall off easily. Immediately after you lay the top down, confirm that both these latches are still on the shaft and have not fallen off while lifting and moving the top.

Slide 194

**No additional notes**

## Removing the Operation Panel



d1124r190



d1124r191

- ❑ There are two connectors under the operation panel. Be sure to disconnect these before you try to pull the operation panel away from the machine.

Slide 195

**No additional notes**

## Scan Magnification Correction (Sub-scan)

- ❑ Magnification (enlargement/reduction) in the sub scan (vertical) direction is done by adjusting the speed of the scanner motor with SP2116 (Copier Sub Scan Magnification Setting)
- ❑ Adjustment is done relative to the default setting of 0, which means 100%.
  - ◆ If you reduce the setting, this increases the speed of the scanner motor and the sub-scan length of the image is reduced when it is printed.
  - ◆ If you increase the setting, this reduces the speed of the scanner motor and the sub-scan length of the image is enlarged when it is printed.

Slide 196

**No additional notes**

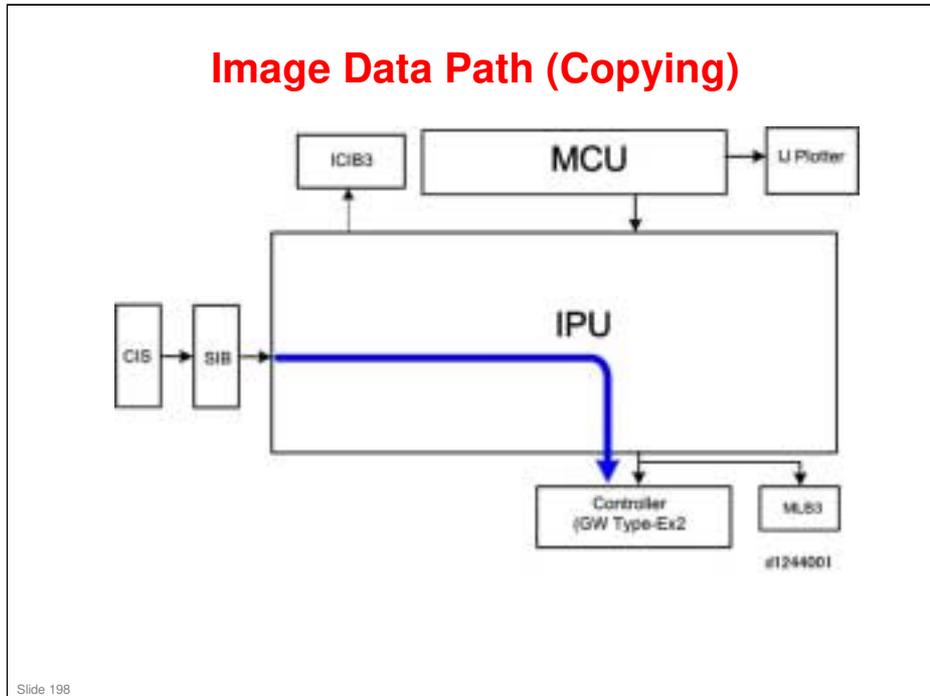
**RICOH**

**D124**  
**Service Training**

**Image Processing**  
**Detailed Descriptions**

Slide 197

**No additional notes**



- ❑ The blue arrows show the path of data through the machine.
- ❑ IJ Plotter: Ink jet print engine

## Copy Mode Image Processing Selections



- Drawing:** For line drawings with fine lines that could easily break up during copying.
- Text:** Mainly text with few or no illustrations.
- Photo:** Glossy photos, photos printed on paper, re-produced photos (generation copies).
- Text/Photo:** Text mixed with photos and drawings.
- Glossy Photo:** Photos or illustrations printed on glossy surface paper.
- Printed Photo:** Printed photos and artwork on magazine pages.
- Copied Photo:** Photos or illustrations copied onto paper and printed in color.
- Background Lines:** Forces background lines of graph paper, for example, to drop out. (Forcing blue to drop out may be difficult.)
- Patched Original:** Text, photos, drawings, pasted up on paper or boards for layout.
- Generation Copy:** Originals copied many times in succession with text letters starting to become distorted.
- Map:** Full color maps with fine lines.
- Highlight Pen:** Text marked with yellow highlight that you do not want to lose in a black-and-white copy.

Slide 199

**No additional notes**

## Print Mode Image Processing Selections

- ❑ **The following can be selected with the printer driver.**
  - ◆ Normal (Default): The target for color reproduction quality in printing is RGB monitor color
  - ◆ Color/Monochrome: Aims for B&W reproduction as detected by the human eye.
  - ◆ CUD Print: Adjusts colors so they are easily distinguished by those with color blindness.
  - ◆ POP Optimization: Best quality of outstanding colors for POP printing.
  - ◆ Ink Save: Best possible print production with less ink, in order to conserve ink.

Slide 200

- ❑ CUD: Color Universal Design
- ❑ POP: Point of Purchase

## Image Processing Problems

- ❑ Photo images that have areas filled with dithering or fine lines frequently exhibit moiré.
- ❑ For images where moiré does not stand out with 1:1 copying, changing the rate of magnification could cause moiré to appear.
- ❑ If 0.5 mm bands occur in halftone areas of uneven density, switch to Photo/Text mode (or Text mode), so that banding does not stand out.
  - ◆ Inconsistencies in the self-focusing lens array of the CIS can cause slight unevenness in image density.
- ❑ The thickness of fine lines (0.1 mm or less), or the lines in enlarged copies of originals previously reduced, may look different in the copies compared with the originals.
  - ◆ This is because the position of the elements in the CIS unit and position of the fine lines in the original may not be consistent.
- ❑ If dirty background still appears in a copy using the Auto Density setting, adjust the notch to a lighter setting.

Slide 201

No additional notes

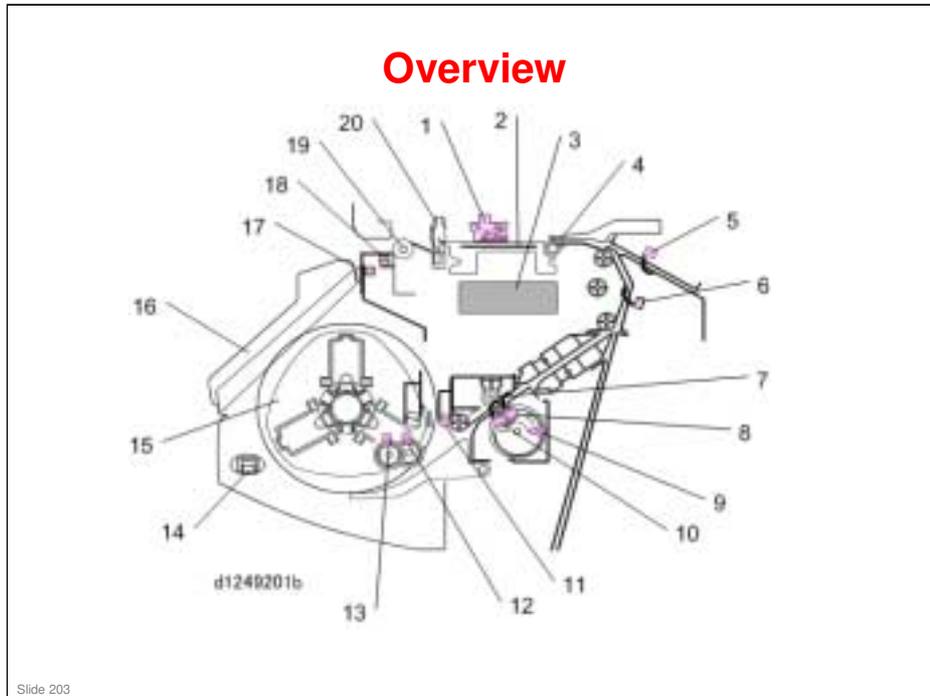
**RICOH**

**D124**  
**Service Training**

**Paper Feed**  
**Detailed Descriptions**

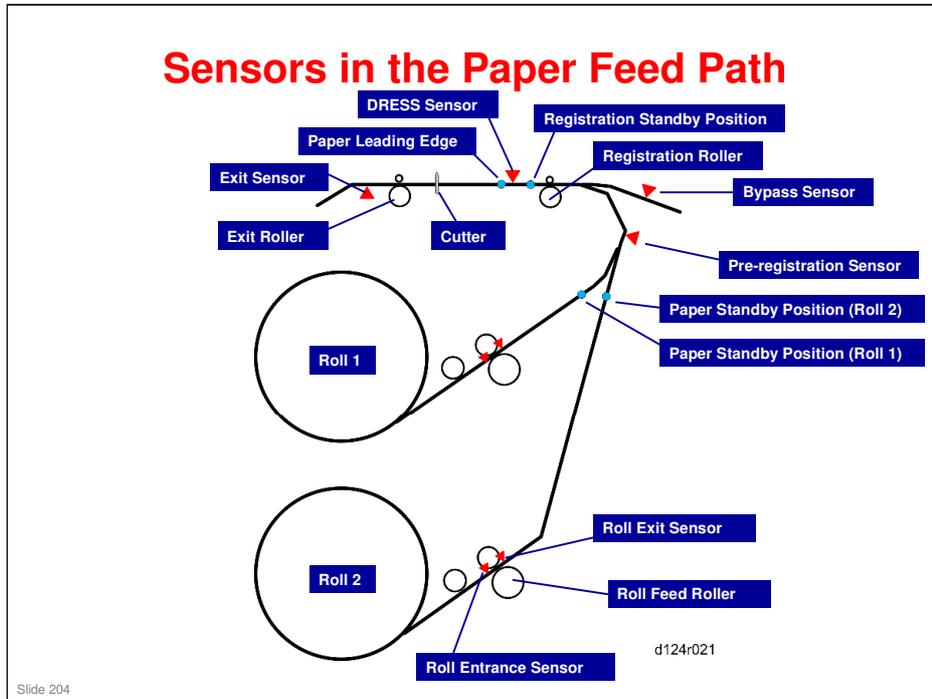
Slide 202

**No additional notes**



- ❑ This slide introduces the main components of the paper feed mechanism. Details for each component will be explained later.

1. DRESS sensor
2. Platen
3. Paper transport fan
4. Registration roller
5. Bypass sensor
6. Pre-registration sensor
7. Feed roller
8. Roll exit sensor
9. Paper release sensor
10. Roll entrance sensor
11. Roll end sensor
12. Encoder sensor 1 (motor)
13. Encoder sensor 2 (paper)
14. Roll rewind switch
15. Spool
16. Paper exit guide
17. Paper exit guide switch
18. Exit sensor
19. Exit roller
20. Cutter



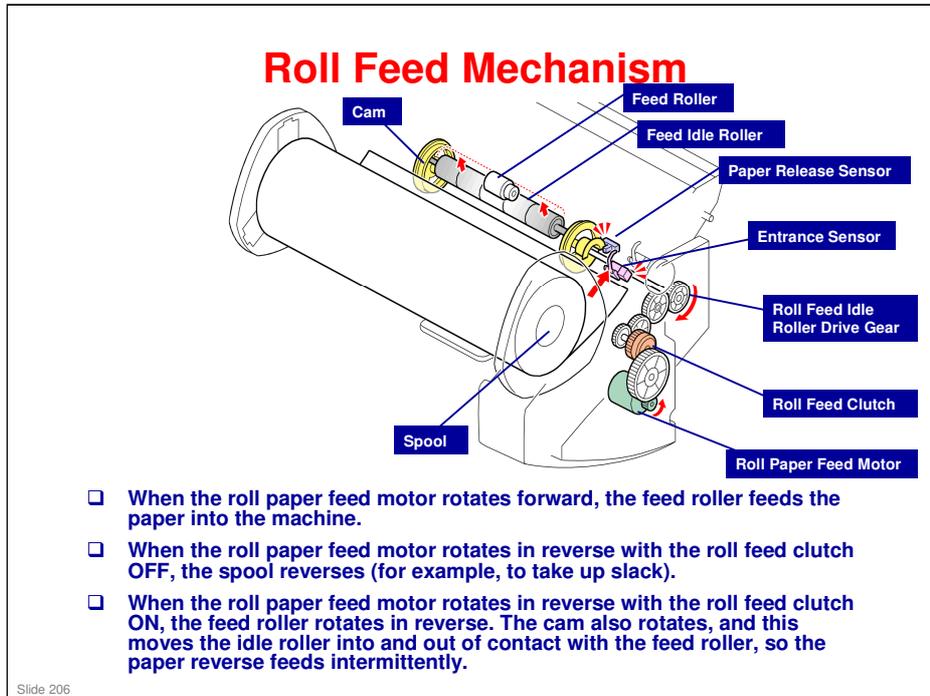
Refer to this slide while studying the next few slides about paper feed mechanisms and timing.

## Mechanical Procedure for Roll Initialization

- ❑ **Just after the machine power is turned on, the nip between the roll feed roller and its idle roller is closed.**
- ❑ **If the user installs a roll, the machine initializes the roll as follows:**
  - ◆ When the paper entrance sensor detects the leading edge, the roll feed motor feeds until the pre-registration sensor detects the leading edge. Then the vertical feed motor turns on.
  - ◆ When the DRESS sensor detects the leading edge, the motors turn off and the machine checks for paper skew.
  - ◆ Then the roll feed motor and clutch turn on and reverse feed.
    - » This process opens the nip between the roll feed roller and its idle roller.
    - » The registration roller now has the paper and the vertical feed motor controls paper feed.
  - ◆ The vertical feed motor feeds the paper to the registration standby position.
  - ◆ The roll feed motor reverse feeds with the clutch off. This rotates the roll spool in reverse to take up slack.

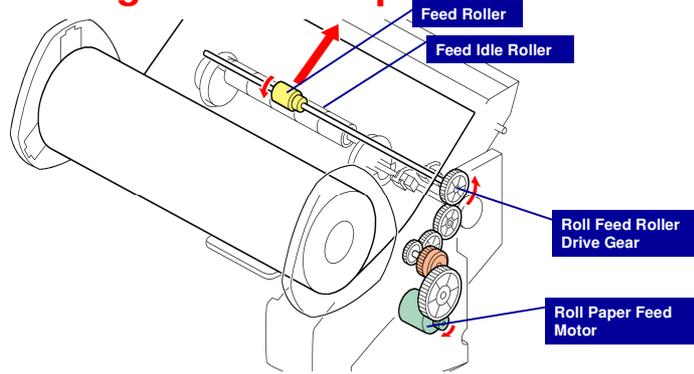
Slide 205

**The details of the mechanisms are explained later. This is just the procedure.**



- ❑ The next few slides explain what happens when the user installs a new or partially used roll in one of the feed stations.
- ❑ The roll feed clutch and the paper release sensor are only used for lifting the idle rollers, not for paper feed.

## Initializing the New Paper Roll - 1

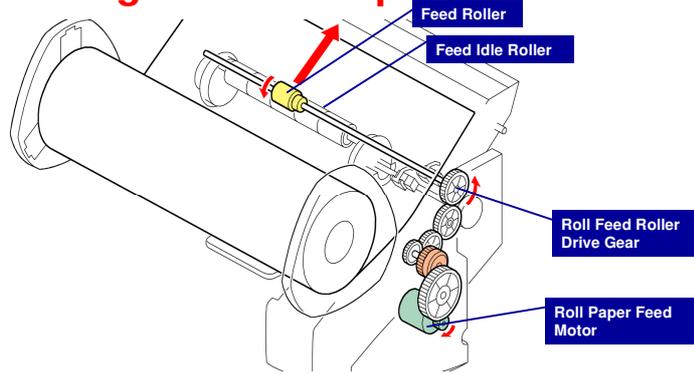


- ❑ The operator manually inserts the leading edge of the roll sheet into the paper path slot of the roll feeder.
- ❑ The roll feed roller rotates briefly. This grabs the paper, and the roll paper feed motor stops.

Slide 207

- ❑ The next few slides explain what happens when the user installs a new or partially used roll in one of the feed stations.
- ❑ The roll feed clutch and the paper release sensor are only used for lifting the idle rollers, not for paper feed.

## Initializing the New Paper Roll - 2

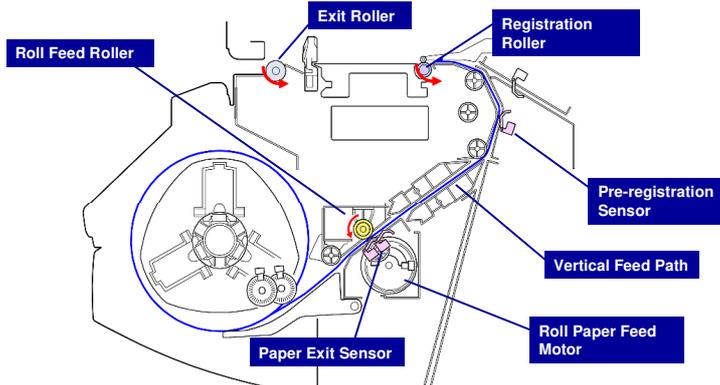


- ❑ A prompt appears on the screen and asks the user if the paper should be cut ("Cut" or "No Cut"). The operator presses "Cut" (recommended).
- ❑ The user then selects Paper Type and Thickness.
- ❑ The roll paper feed motor starts rotating **clockwise**. This turns the shaft of the roll feed roller and feeds the paper.
  - ◆ The roll paper feed motor rotates the roll feed roller via the drive gear.
  - ◆ The paper continues to feed through the nip of the roll feed roller and the idle rollers, which are still lifted into contact with the feed roller.

Slide 208

**No additional notes**

### Initializing the New Paper Roll - 3

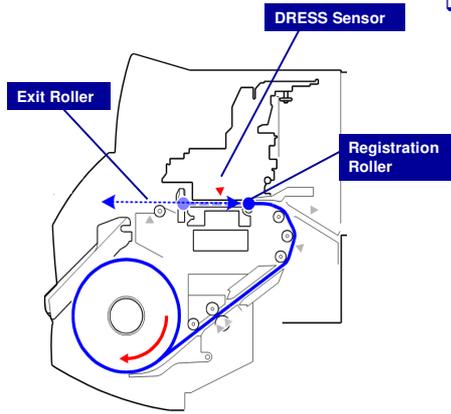


- ❑ The roll feed roller feeds the paper over the feeler of the paper exit sensor and out of the roll feeder into the vertical feed path of the main machine.
- ❑ When the leading edge of the paper reaches the pre-registration sensor, the vertical motor (on the left side of the machine) turns on and rotates the registration roller and exit roller.

Slide 209

**No additional notes**

## Initializing the New Paper Roll - 4

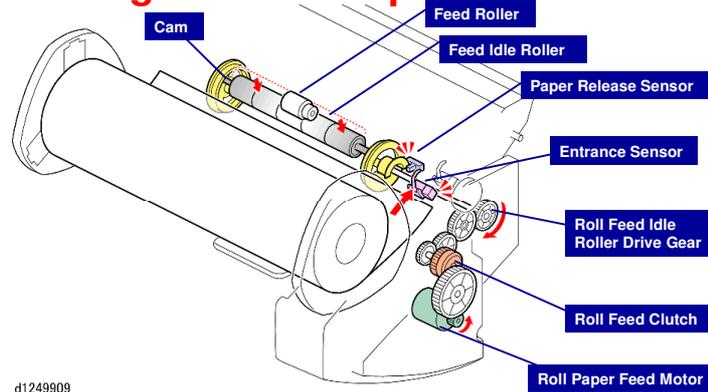


- When the DRESS sensor detects the leading edge of the paper, the vertical motor stops.

Slide 210

**No additional notes**

## Initializing the New Paper Roll - 5



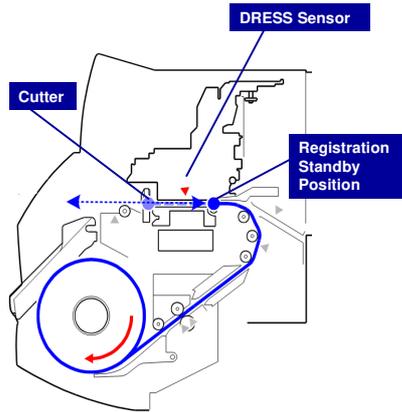
d1249909

- ❑ At the same time, the roll feed motor and clutch also stop.
- ❑ Then the clutch turns on again but the motor rotates counter-clockwise.
- ❑ When the motor turns in this direction, the cam shaft rotates and moves the idle roller down until the paper release sensor turns on.
- ❑ The feed roller and idle roller are now separated.

Slide 211

**No additional notes**

## Initializing the New Paper Roll - 6



- ❑ The vertical motor turns on again, and feeds the paper forward to the cutter.
- ❑ The cutter turns on and cuts the paper.
- ❑ The vertical feed motor turns on again, feeds the paper forward out of the front of the machine a short distance, stops, and then reverses.
- ❑ When the DRESS sensor detects the edge of the paper again, it starts a count, and then stops the paper at the registration standby position above the registration roller.

Slide 212

**No additional notes**

### Initializing the New Paper Roll Loading Roll 2 if Roll 1 Already Loaded

The diagram illustrates the internal paper path of the machine. It shows two roll units, Roll 1 and Roll 2, each with a red arrow indicating the direction of paper feed. A blue line traces the path of the paper from the selected roll, through a pre-registration sensor, to a paper standby position, and finally to a registration standby position. Labels include 'Registration Standby Position', 'Pre-registration Sensor', 'Roll 1', 'Roll 2', and 'Paper Standby Position'. The diagram is identified by the code 'd1244009' and 'Slide 213'.

- ❑ When the user feeds the edge of a roll into Roll Unit 2, as far as the entrance sensor for roll 2, the vertical feed motor and the roll paper feed motor for Roll 1 reverse feed the paper from Roll Unit 1.
- ❑ When the pre-registration sensor detects the edge of the paper, the machine reverse feeds the paper to the paper standby position for Roll Unit 1. Then the motors turn off.
- ❑ "Initializing the New Paper Roll" (described on the previous slides) is executed for the roll paper in Roll Unit 2.
- ❑ The leading edge of the Roll Unit 2 paper stops at the registration standby position at the registration roller.

**Here are some important points to remember:**

- ❑ The last roll feeder loaded (or replaced) remains selected for paper feed.
- ❑ If the other roll is selected, the machine will reverse feed the paper in the paper path to its paper standby position, and then move the leading edge of paper from the selected roll to the registration standby position.
- ❑ If both roll feeders are installed at installation, they do not need to be installed in any particular order.
- ❑ If the machine starts automatic print head cleaning after the machine is turned on, and the operator loads a roll while cleaning is already in progress, the machine waits for cleaning to end before feeding the roll into the machine. The machine will beep twice when cleaning is finished.

## Removing a Roll - 1

- ❑ **Before a roll can be removed, the paper must be rewound onto the roll.**
  - ◆ To do this, the user presses the roll rewind switch for at least 2 seconds and then release it.
- ❑ **After this point, there are two different procedures:**
  - ◆ Reversing a roll from the registration standby position
  - ◆ Reversing a roll from the paper standby position

Slide 214

**No additional notes**

### Removing a Roll - 2

**Roll Rewind Switch**

**Registration Standby Position**

**Pre-registration Sensor**

❑ **From the registration standby position:**

- ♦ The vertical motor and roll feed motor reverse feed the paper from the registration standby position (the roll feed clutch stays off, so only the spool is reversing the paper, and not the roll feed roller).
- ♦ When the edge of the paper passes the pre-registration sensor, the vertical motor stops.
- ♦ When the edge of the paper reaches the roll entrance sensor (or after 5 seconds has passed, whichever is first), the roll feed motor also stops.
- ♦ Then, the roll feed motor reverses briefly with the clutch on. This closes the nip between the roll feed roller and its idle roller. So the next time paper is inserted, the nip is already closed.
- ♦ The operator then turns the roll by hand until the edge of the paper comes out of the machine.

Slide 215

- ❑ If the paper leading edge is at the print waiting position, 2 seconds should be long enough. However, if the paper leading edge is at the registration roller, you may have to press the rewind button one more time.
- ❑ The paper rolls installed in the machine are not enclosed and remain exposed to ambient temperature and humidity.
- ❑ If the machine has remained idle for a long time, before you use the machine it is recommended that you rewind the roll, cut off the equivalent of two full roll rotations, and then reload the paper.

### Removing a Roll - 3

**Roll Rewind Switch**

**Registration Standby Position**

**Pre-registration Sensor**

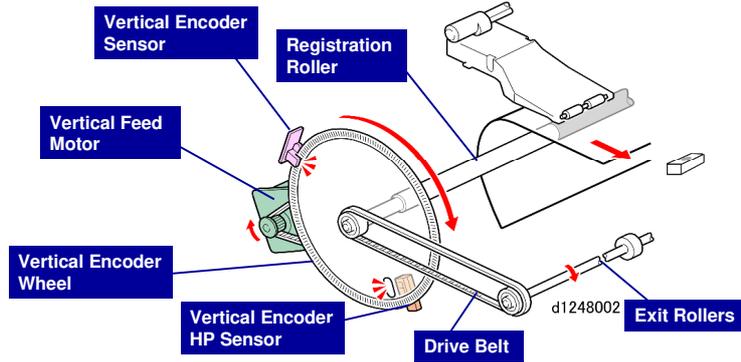
□ **From the paper standby position:**

- ◆ Only the roll feed motor reverse feeds the paper from the paper standby position (the roll feed clutch stays off, so only the spool is reversing the paper, and not the roll feed roller).
- ◆ When the edge of the paper reaches the roll entrance sensor (or after 5 seconds has passed, whichever is first), the roll feed motor stops.
- ◆ Then, the roll feed motor reverses briefly with the clutch on. This closes the nip between the roll feed roller and its idle roller. So the next time paper is inserted, the nip is already closed.
- ◆ The operator then turns the roll by hand until the edge of the paper comes out of the machine.

Slide 216

- The only difference from the previous slide is the first step.

## Vertical Feed Mechanism - 1

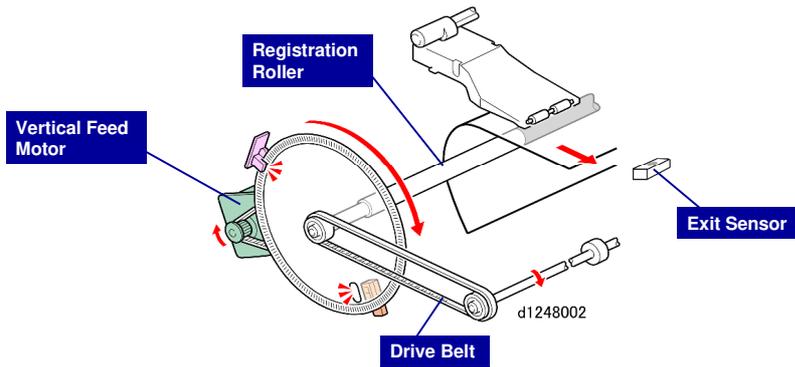


- ❑ Vertical feed motor and timing belt: Drive the registration roller and exit roller through a timing belt, to feed paper through the printer.
- ❑ Vertical encoder sensor: Uses the vertical encoder wheel to control paper feed.
- ❑ Vertical encoder HP sensor: Stops the motor when the wheel reaches the home position at the end of a job.
  - ◆ Home position is when the sensor detects the hole in the encoder wheel.

Slide 217

**No additional notes**

## Vertical Feed Mechanism - 2



- ❑ The registration roller and exit roller are driven by the same motor (vertical feed motor) and timing belt, so they always rotate at the same speed.
- ❑ After cutting, some small sizes of paper do not fall into the exit stacker. The exit roller feeds these sheets away from the machine and into the exit stacker.
- ❑ The exit sensor detects the paper as it leaves the front of the machine.

Slide 218

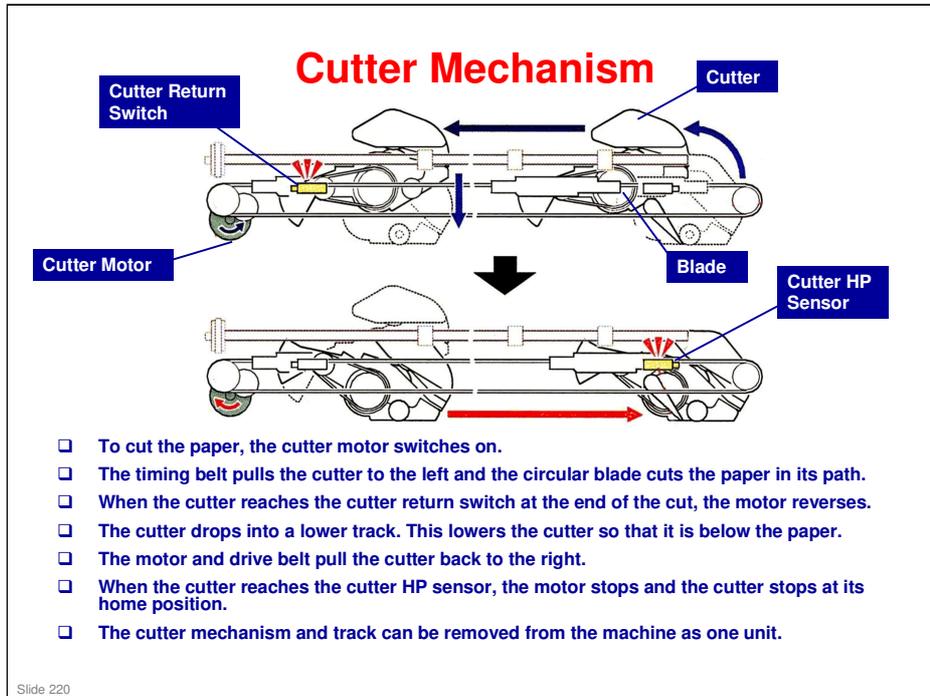
**No additional notes**

## Handling the Vertical Encoder

- ❑ Handle the encoder wheel by its central hub. Never touch the edges of the vertical encoder wheel with bare hands.
- ❑ To clean the edges of the encoder wheel, wipe it with a clean linen cloth dampened with alcohol to remove dust, ink, or fingerprints.
- ❑ Never use a cotton swab, tissue, or any other kind of material that could leave fibers on the surface of the encoder.

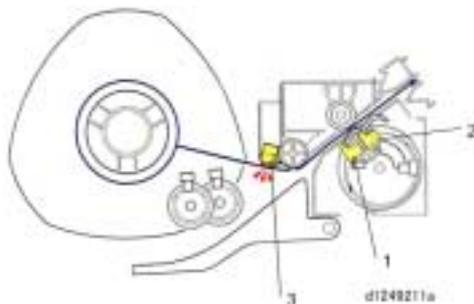
Slide 219

**No additional notes**



**No additional notes**

## Roll End Detection - 1

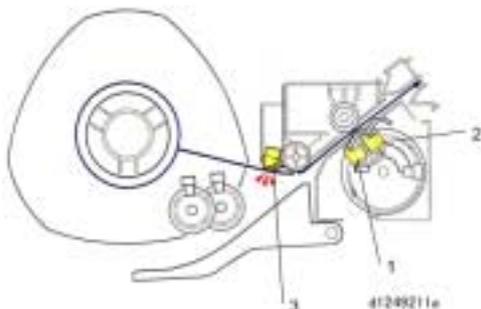


- ❑ **If the trailing edge is not fastened to the roll core:**
  - ◆ The machine signals roll paper end when the trailing edge passes the roll entrance sensor (1) and then the roll exit sensor (2).
  - ◆ Both actuators pop up when the trailing edge of the paper passes.

Slide 221

- ❑ Is the trailing edge fastened to the roll core? It depends on the type of roll.

## Roll End Detection - 2



- ❑ **If the trailing edge is fastened to the roll core:**
  - ◆ At the end of the roll, the trailing edge of the paper remains attached to the roll core, but the paper continues to feed.
  - ◆ The paper is pulled tight, up against the actuator of the roll end sensor (3). This signals paper end and switches off the vertical feed motor and horizontal motor. This shuts down paper feed and printing.

Slide 222

- ❑ Is the trailing edge fastened to the roll core? It depends on the type of roll.

### Remaining Paper Detection - 1

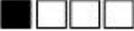
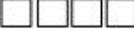
The diagram shows a cross-section of a paper roll. At the center is a blue circle labeled 'Roll Core'. Surrounding it is a green circle labeled 'Encoder Wheel'. An 'Encoder Sensor 2' is positioned to detect the wheel's rotation. A red arrow indicates the roll's rotation direction. A small PCB is also shown near the encoder wheel.

- ❑ The core of the roll and the encoder wheel rotate together.
- ❑ Encoder sensor 2: Counts the rotations of the edge roll core, which depend on how much paper remains on the roll.
  - ◆ The number of rotations increases as the diameter of the paper roll decreases.
  - ◆ This pulse count is used in a calculation to determine how much paper is on the roll.

Slide 223

- ❑ The other encoder wheel in the diagram is used to measure the operating time of the roll feed motor (explained later).
- ❑ The machine calculates the amount of paper remaining on a roll based on the diameter of the roll and the number of rotations made by the core, and then displays the amount of paper remaining as it diminishes.
  - The encoder wheel and sensor, and a small PCB in the roll feeder, measure the amount of paper remaining on the roll.
  - The encoder wheel has 40 slits (spokes) around its center, and is capable of generating 503 pulses with one rotation.
- ❑ The encoder wheel and sensor also count the rotations of the roll core when the machine feeds paper out of the machine, or reverse feeds the leading edge of the paper to the registration standby position. This is done at the following times:
  - When the roll is replaced or exchanged for another roll.
  - When the paper is fed back to the registration standby position after the paper is cut at the end of a job.
  - When the other paper roll is selected for paper feed. For example, if paper from Roll Unit 1 is at the paper registration position, and Roll Unit 2 is selected.

## Remaining Paper Detection – 2 Operation Panel Display

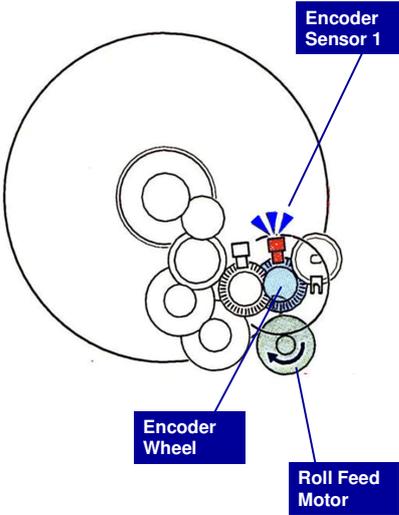
Pulses per Second Detected	Display	Diameter of Remaining Roll	Calculated Amount of Remaining Paper
< 130		123 – 156 mm	50 to 100%
130 – 140		110 – 123 mm	30 to 50%
140 – 165		97 – 110 mm	10 to 30%
> 165		< 97 mm	< 10%
Roll end detected by roll end sensor			No paper remaining

- ❑ **The diameter of the remaining roll is calculated from number of pulses detected by the encoder sensor.**
- ❑ **From this, the amount of remaining paper is calculated using a fuzzy logic algorithm.**

Slide 224

- ❑ After measuring the diameter, the amount of paper remaining depends on the thickness of the paper. This can be calculated by measuring how much the rotation speed increases as paper is used up.
- ❑ However, another factor is the core diameter. This can be either 2 inches or 3 inches. The sensor cannot detect this, so for a 3-inch core, the amount of paper remaining will be less than for a 2-inch core.

## Roll Feed Motor Operation Time



The diagram illustrates the mechanical arrangement of the roll feed motor. A large roll of paper is shown on the left. The roll feed motor assembly is located at the bottom center. It consists of a roll feed motor (1) and an encoder wheel (2) that rotate together. An encoder sensor (1) is positioned to count the rotations of the roll feed motor. The encoder wheel and sensor always monitor the motor while it is operating.

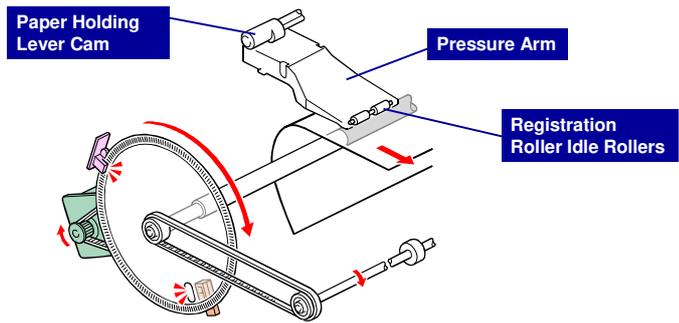
- ❑ **Encoder sensor 1: Counts rotations of the roll feed motor.**
  - ◆ This pulse count is used to measure the operation time of the roll feed motor.
- ❑ **The roll feed motor (1) and encoder wheel 1 (2) rotate together**
- ❑ **The encoder wheel and sensor always monitor the motor while it is operating.**

Slide 225

**Why do we need a separate encoder for this?**

- ❑ During paper feed and printing, the paper is fed through the machine by the vertical motor, not the roll feed motor. So, the amount of roll rotation does not equal the amount of rotation by the roll feed motor.

### Bypass Feed - 1

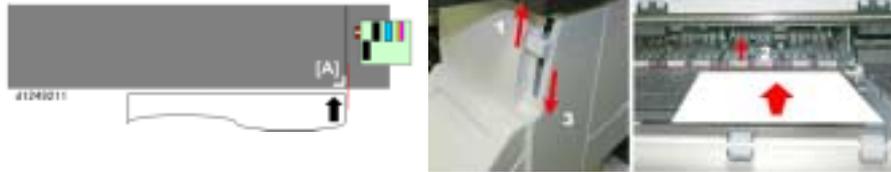


- ❑ When the paper holding lever is down, the pressure arm keeps downward pressure on the registration idle rollers to close the nip at the registration roller.
- ❑ When the paper holding lever on the right side of the machine is raised, the paper holding lever cam rotates down to raise the idle rollers and open the nip. This is done to load paper for bypass feed.
- ❑ The registration release sensor (not shown here) detects whether the lever is up or down.

Slide 226

- ❑ These slides explain how paper is fed to the standby position if bypass feed is selected.

## Bypass Feed - 2



- ❑ If there is roll paper at the registration standby position, the user must press the roll rewind button to rewind the paper to the paper standby position.
- ❑ The user must then set the correct paper size before starting to make the copy/print.
  - ◆ To do this, select Bypass on the Copier screen as the paper feed location, then press # and select the size.
- ❑ The user raises the front cover, and then raises the paper holding lever on the right side of the machine.
- ❑ The user inserts the paper at the front of the machine. The paper must be inserted with the right edge of the paper on the alignment mark [A] on the right end of the platen.
  - ◆ The part of the paper that will be the trailing edge of the print must be fed in first.

Slide 227

**No additional notes**

### Bypass Feed - 3



- The paper is pushed into the machine through the open nip of the registration roller (and out the back of the machine) until the front right corner is at the alignment mark [B].
- Next, the user lowers the paper holding lever, and closes the front cover.
- The paper type settings are displayed, and the user must select whether they match the actual paper used for the job (select **Matches** or **Does Not Match**).
  - ◆ If Does Not Match, input the correct settings then continue.
- The user sets the original.

Slide 228

**No additional notes**

### Bypass Feed - 4

- ❑ The paper transport fan switches on.
- ❑ The vertical motor switches on and reverse feeds the paper 30 mm and then switches off.
- ❑ The carriage unit moves to the right, and the DRESS sensor checks for skew, detects the right edge and right edge of the paper (in order to detect the paper width), and detects the leading edge of the paper.
- ❑ The vertical motor switches on, reverse feeds the paper to the registration standby position, and then switches off.
  - ◆ The machine knows how far to feed the paper because of the setting for bypass paper size. So, the user must input the correct size or the leading edge will not be at the correct position.

Slide 229

**No additional notes**

## Bypass Feed - 5

Trailing Edge  
of the Printout

18 mm

- ❑ **18 mm are blank at the trailing edge.**
  - ◆ Depends on the mode and paper type. For example, it's 21 mm for color and special paper.
- ❑ **This corresponds to the gap between the registration roller and the print heads.**
  - ◆ When the trailing edge has passed the registration roller, nothing is feeding the paper any more, but the trailing edge is still 18 mm short of the print heads.

Slide 230

**No additional notes**

## Paper Holding Lever

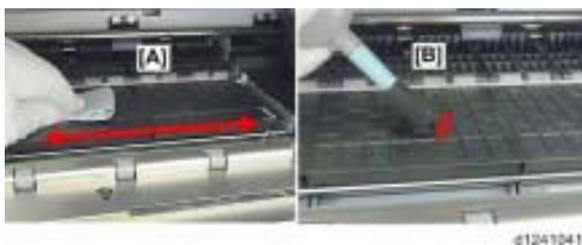


- ❑ The registration release sensor [3] detects whether the paper holding lever [1] is up or down.

Slide 231

**No additional notes**

## Cleaning the Platen



- ❑ There are nine platen plates. It is difficult to adjust their heights correctly after removal, so do not remove the platen plates in the field.
- ❑ **Cleaning the platen plates:**
  - ◆ Open the front cover.
  - ◆ Use a linen cloth dampened slightly with water to clean the surface of the platen [A]. Then wipe with a dry cloth.
    - » **Never use alcohol to clean the platen. This will cause discoloration.**
  - ◆ Use a blower brush to clean the holes in the plates [B].

Slide 232

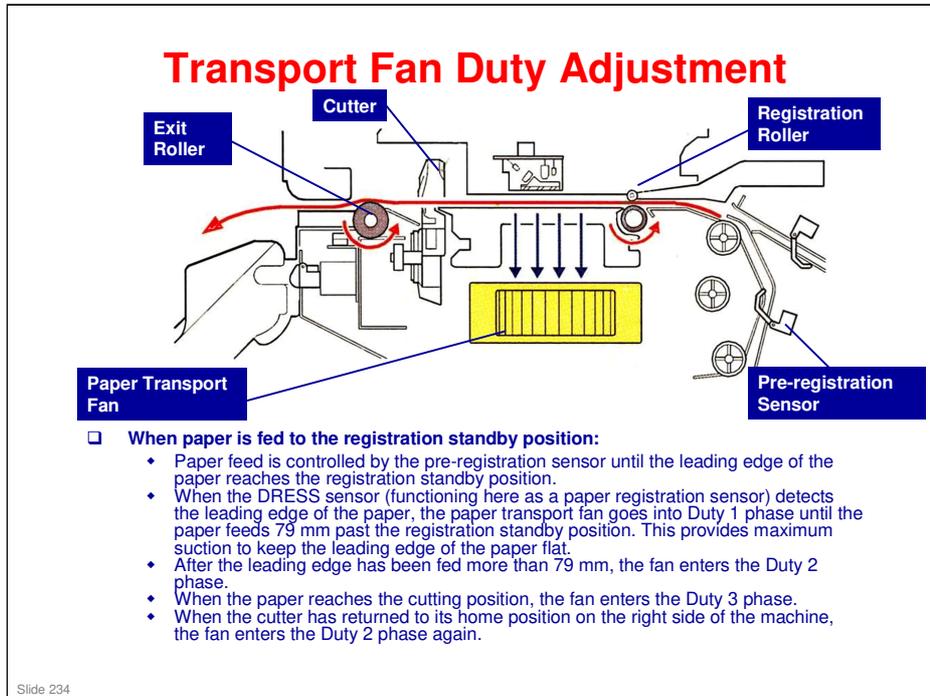
**No additional notes**

**Paper Transport Fan**

- ❑ This fan provides suction to make sure that the paper stays flat on the platen.
- ❑ When the DRESS sensor detects the leading edge of the paper, the paper transport fan turns ON. This pulls the paper down onto the perforated platen plates and keeps it perfectly flat during printing.
- ❑ After the paper is cut, the fan remains ON until the last sheet exits the machine at the end of the job.

Slide 233

- ❑ The machine adjusts the duty of the transport fan automatically for the size and type of paper selected for the job.
- ❑ The duty also changes at different times during paper feed.



- ❑ This shift in the operation of the paper transport motor Duty 1 > Duty 2 > Duty 3 and back to Duty 2 is the same for every size and type of paper. However:
  - The level of the duty, that is, the amount of suction applied by varying the speed of the motor, is different for each paper size (width) and paper type.
  - As a general rule, Duty 1 is the highest setting to ensure that the leading edge of the paper remains flat as it passes over the platen.
  - The Duty settings of thicker paper are much higher than those of thinner, lightweight paper.
  - The Duty settings are selected automatically as soon as paper size and type are selected for the job.
- ❑ SP codes
  - SP1956-001: Use this SP to review the current duty settings.
  - SP1955-001: Adjusts fan DUTY in the range of  $\pm 20\%$  for all duty phases. The firmware checks the current fan operation setting and then uses a lookup table to fetch the specified setting (the percentage to added to current operation level.)
 

*The optimum duty settings for each paper size and type are done at the factory before the machine is shipped.*
  - SP1955-002 to 010: Adjusts fan duty in the range of  $\pm 20\%$  for the duty phases of different types of paper. The firmware checks the current fan operation setting of the motor for the selected paper type, and then uses a lookup table to fetch the specified setting (percentage to added to current operation level.)

*It is important to remember that if an adjustment is done with this SP code for a particular paper type, it will be added to any change previously specified with SP1955-001.*

**RICOH**

**D124**  
**Service Training**

**Paper Feed**

**Replacement and Adjustment: Important Points**

Slide 235

**No additional notes**

## **Roll Feeders**

- The procedures for Roll Unit 1 are different from those for Roll Unit 2.**
- Refer to the service manual for details on each roll feeder.**

Slide 236

**No additional notes**

## Installing a Roll Unit



d124r214a

- ❑ **At the end of the replacement procedure, check the clamps and harnesses at the rear.**
  - ◆ Make sure that the clamps are closed and that there is absolutely no slack in the harnesses.
  - ◆ The harnesses must be tight against the bottom of the PCB box to prevent them from interfering with paper in the bypass feed path.

Slide 237

- ❑ During bypass feed, the trailing edge of the paper comes out from the back of the machine, and then reverse feeds back into the machine.
- ❑ We discussed this during the Installation section.

## Roll Unit Right Covers



dt24r245

- ❑ After attaching the cover, pull the latch forward and then release it, so that it flips back to the rear.
- ❑ Do this a few times to make sure that the cover is not blocking the latch movement.
- ❑ If the latch does not move freely, it may not be possible to install a roll of paper.

Slide 238

**No additional notes**

## Separating the Roller Housing



d124r745

- ❑ **The feed roller housing must be separated from the roll feed unit in order to:**
  - ◆ Service the rollers
  - ◆ Clean (or replace) the entrance or exit sensors.
- ❑ **The procedure to separate the roller housing is slightly different between Roll Unit 1 and Roll Unit 2.**

Slide 239

- ❑ Roll Unit 1 [A] and Roll Unit 2 [B] are the same with the exception of the top covers. Roll Unit 1 has no top cover while Roll Unit [2] has a shiny metal cosmetic cover. This causes some small differences in the procedure to separate the roll feeder housing from the feeder.

## Replacing the Cutter

- ❑ After replacing the cutter unit, execute SP7960-004 to reset the counter for this unit.
- ❑ After replacing the cutter blade, execute SP7960-002 to reset the counter for the blade.

Slide 240

**No additional notes**

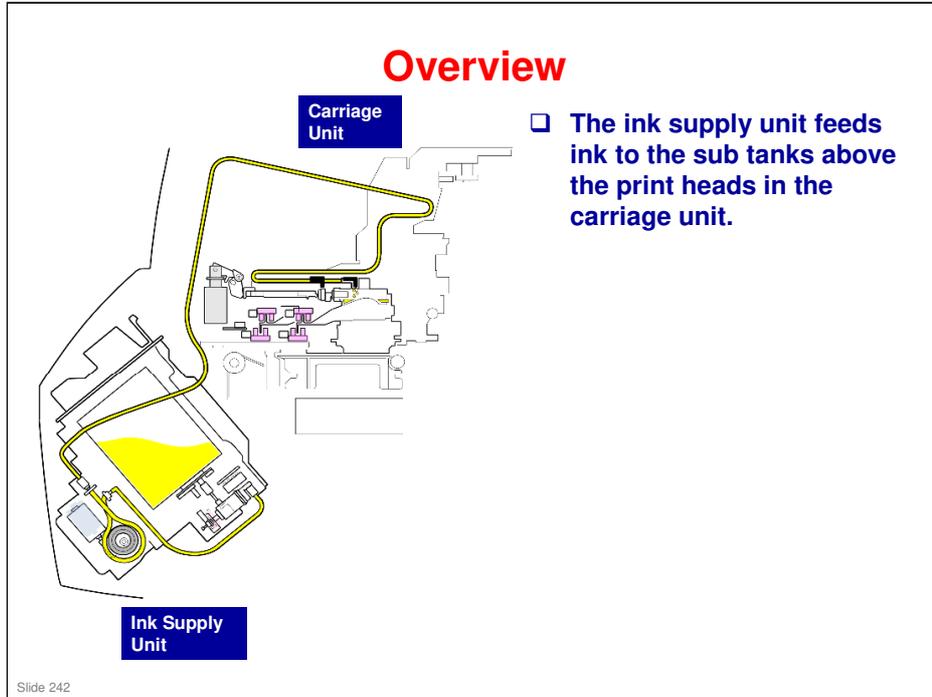
**RICOH**

**D124**  
**Service Training**

**Ink Supply and Printing**  
**Detailed Descriptions**

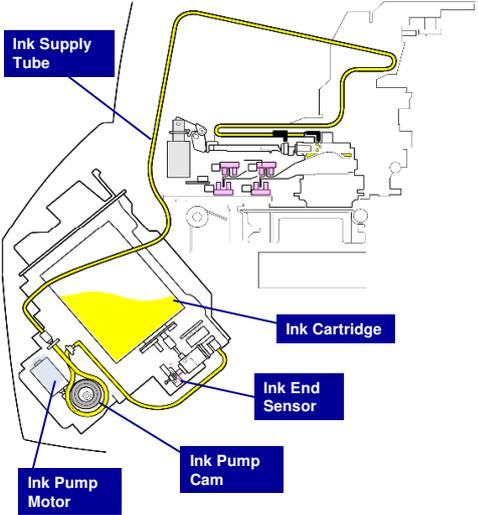
Slide 241

**No additional notes**



**No additional notes**

### Overview – Ink Supply Unit

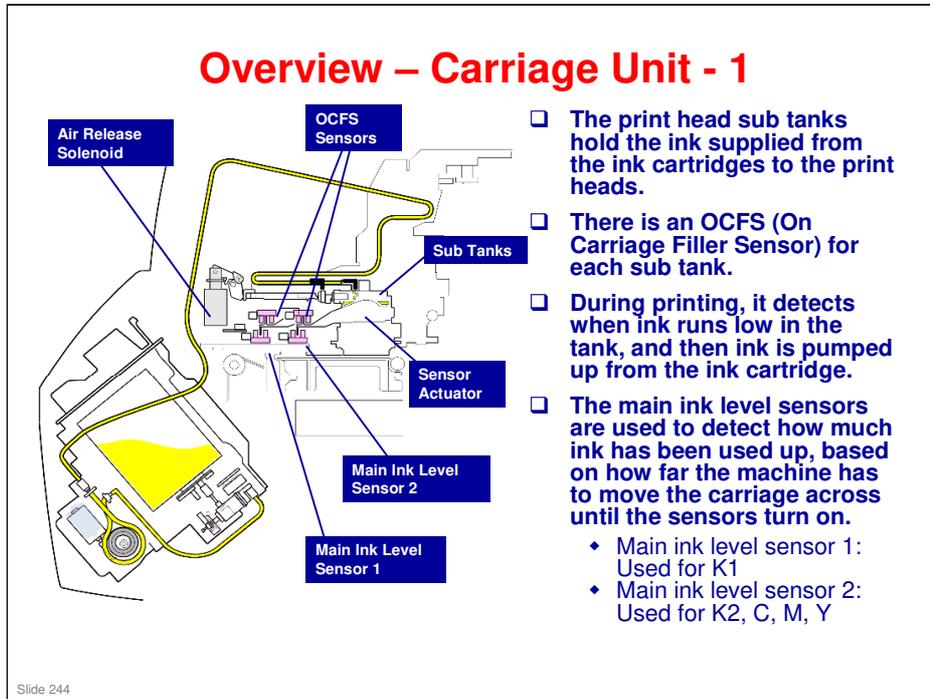


The diagram illustrates the internal components of the ink supply unit. A yellow ink supply tube is shown connecting the ink cartridges to the print heads. Labels point to the Ink Supply Tube, Ink Cartridge, Ink End Sensor, Ink Pump Motor, and Ink Pump Cam. The ink supply tube is shown as a flexible but sturdy tube that prevents kinking and blocking. The ink pump motor rotates the ink pump cam, which forces ink through the tube. The ink end sensor detects when the cartridge is out of ink. The replacement part includes the ink supply tubes.

- ❑ The ink supply unit holds four replaceable ink cartridges, one for each color (K, C, Y, M). The black cartridge is larger than the other three.
  - ◆ Two pumps are connected to the black cartridge to pump ink independently to the K1 and K2 sub tanks.
- ❑ The ink end sensor detects when the cartridge is out of ink.
- ❑ The ink supply tube sends ink from the cartridges to the print heads in the carriage unit. The tube is flexible but sturdy enough to prevent kinking and blocking the flow of ink.
- ❑ The ink pump cam rotates against the ink supply tube to force ink through the tube.
- ❑ The ink pump motor rotates the ink pump cam against the ink supply tube.
- ❑ The replacement part includes the ink supply tubes.

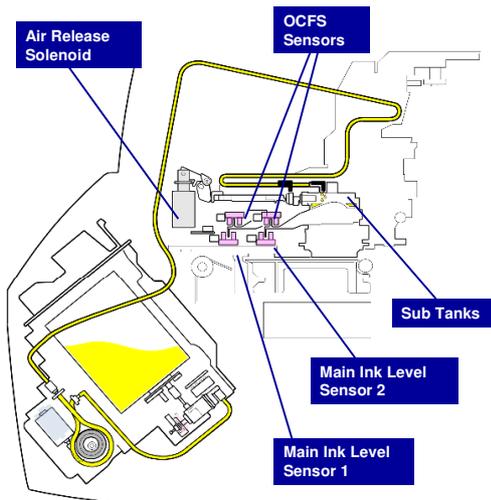
Slide 243

- ❑ There are four short ink supply tubes (one for each cartridge) from the ink cartridge port to the pumps.
- ❑ Before the pump, the black ink supply tube splits into two, one for K1 and one for K2, bringing the total of tubes to 5, and the number of ink pumps is also 5 (one for K1 and one for K2).



- ❑ The sensor actuator has actuators for the OCFS sensors and the main ink level sensors.

## Overview – Carriage Unit - 2



- The air release solenoid releases excess air from the print head sub tanks.
- The machine reads the horizontal encoder to position the carriage at the correct position so that the solenoid can actuate the purge valves.

Slide 245

**No additional notes**

## Overview - OCFS (On Carriage Filler Sensors) - 1



- ❑ The photo above shows the YM print head (1).
- ❑ This unit contains two sub tanks, the Y tank (2) on the left and M tank (3) on the right.
- ❑ The Y actuator arm (4) is attached to the side of the Y sub tank, and the M actuator arm (5) is attached to the side of the M sub tank.
- ❑ Each actuator arm has two vertical actuators on the end of each actuator, one pointing up and one pointing down.
- ❑ When ink is used up in one of the sub tanks, the side of the ink sub tank shrinks inwards, and the end of the actuator moves across.

Slide 246

**No additional notes**

## Overview - OCFS (On Carriage Filler Sensors) - 2

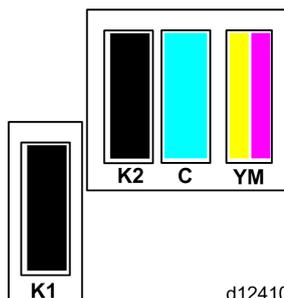


- ❑ During printing, when ink in the sub tank is partly used up, the sides of the tank move the actuator inwards through the sensor. The part of the actuator pointing up (1) interacts with the OCFS (2) above when it swings in and out of the sensor gap.
- ❑ If the actuator leaves the gap in the OCFS, the machine pumps ink from the cartridge to the sub tank.

Slide 247

**No additional notes**

## Overview - Print Heads



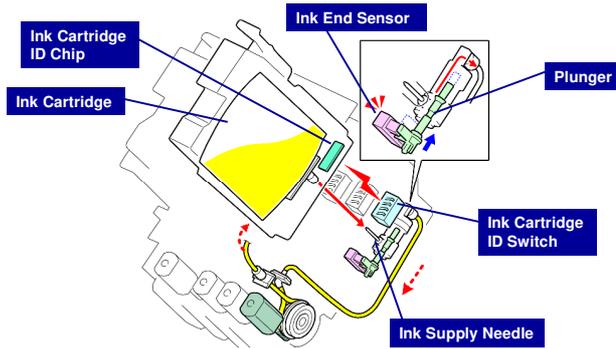
d1241001

- ❑ Two black ink print heads, arranged in a staggered configuration, increase the area of coverage for black-and-white printing.
- ❑ This arrangement of black print heads increases the printing speed for large black-and-white documents.
- ❑ There are two print heads for black (K1, K2) and one independent print head for Cyan (C).
- ❑ Yellow and Magenta (YM) share one print head.

Slide 248

**No additional notes**

## Ink Supply Mechanism - 1

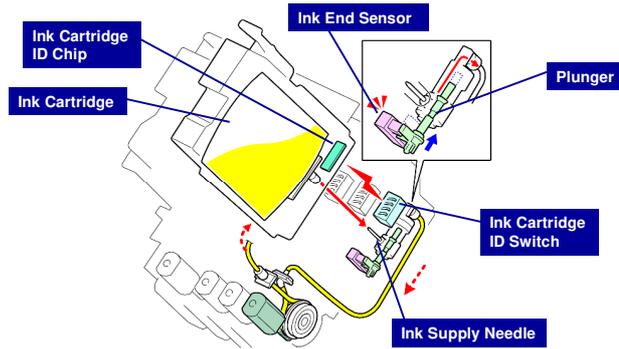


- ❑ When the ink cartridge is inserted, the ink supply needle is inserted and sealed into the ink supply port of the cartridge.
- ❑ Ink flows over the plunger as the ink pump motor pumps ink from the cartridge.
- ❑ While ink is flowing smoothly, the actuator on the end of the plunger remains outside the gap of the ink end sensor.

Slide 249

- ❑ This slide shows the mechanism for yellow. The others are similar.
- ❑ The ink pump cam is explained in more detail later.
- ❑ The flow of ink through the machine is shown by red arrows.

## Ink Supply Mechanism - 2

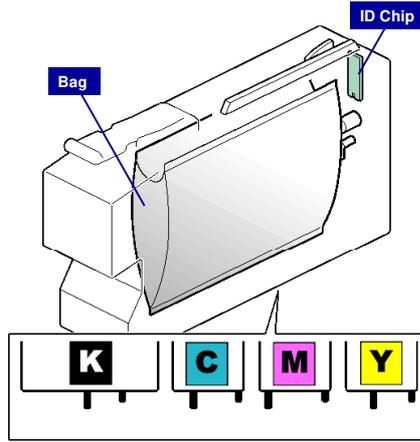


- ❑ When ink runs out, the ink pump motor continues to try to pull ink from the ink port. But with no ink, this creates suction between the pump and the ink cartridge.
- ❑ When the suction becomes strong enough, it pulls the actuator on the end of the plunger into the ink end sensor. Then, the machine detects that the ink cartridge is empty.

Slide 250

- ❑ The ink pump cam is explained in more detail later.

## Ink Cartridge - 1



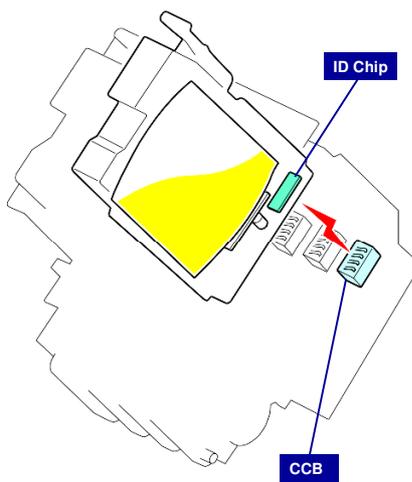
d1249306

- ❑ Ink inside each cartridge is enclosed in an airtight bag that collapses as ink is taken from the cartridge.
- ❑ The unique combination of runners and tracks on the bottoms of the cartridges prevents a cartridge from being installed in the wrong position.
- ❑ Each cartridge has an ID chip. It monitors the amount of ink used.

Slide 251

**No additional notes**

## Ink Cartridge - 2

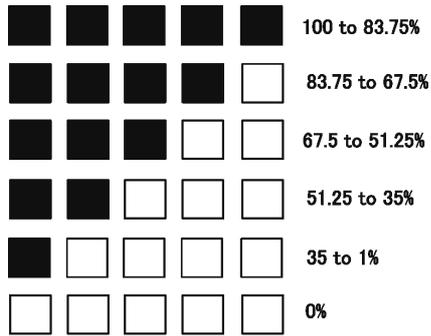


- ❑ When an ink cartridge is inserted, the ID chip contacts a CCB (Cartridge Control Board) at the back of the ink supply unit slot.
- ❑ When the ID chip and CCB make contact, this tells the machine that the cartridge is inserted correctly.
- ❑ Ink usage is based on pulse counts taken during operation of the ink pump motors.
  - ◆ The machine transfers this data to the ID chip in the cartridge.

Slide 252

**No additional notes**

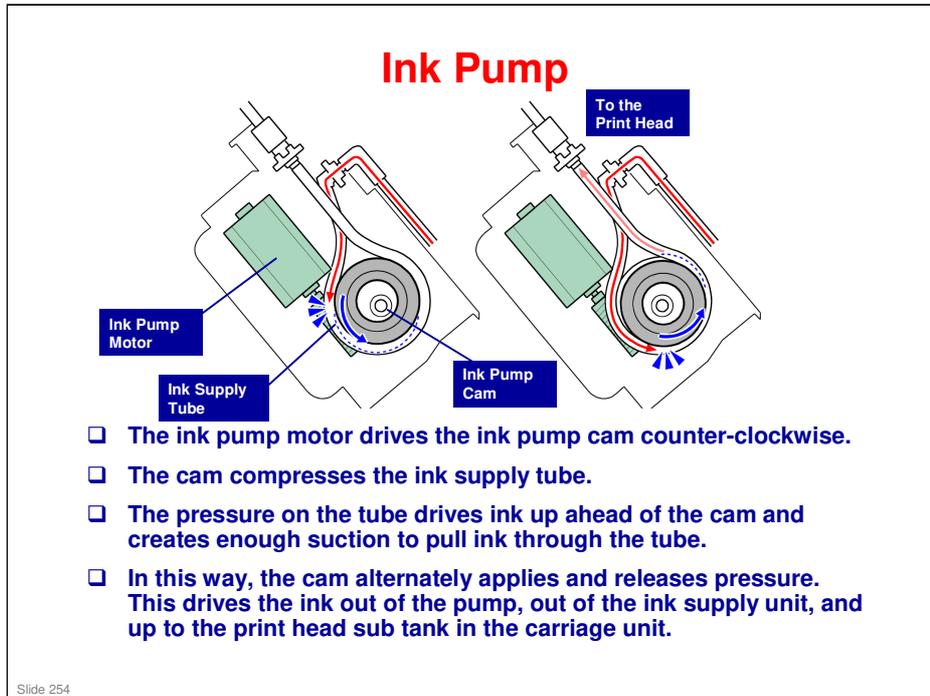
## Remaining Ink Indicator



- The ID chip in each ink cartridge stores data concerning the amount of ink remaining in the cartridge.
- This is displayed on the operation panel as shown here.
- The percentage numbers indicate the amount of ink remaining, but the numbers do not appear on the operation panel.
- At 35%, the machine triggers a pre-near end alert. This tells the operator that ink will run out soon.
- When the level drops to 20%, the machine will trigger the near-end alert. This tells the operator to prepare a new ink cartridge to replace the empty one.
- Printing stops if the level drops to 0%.
- The remaining ink indicator displays for pre-near end and near-end are the same. However, the message on the operation panel is different.

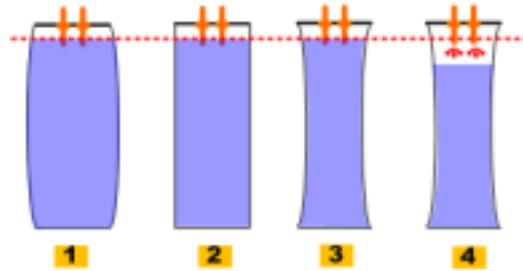
Slide 253

- Even if only a color ink has run out, black-and-white printing is not possible.



**No additional notes**

## Controlling the Ink Supply to the Sub Tanks Structure of the Sub Tank

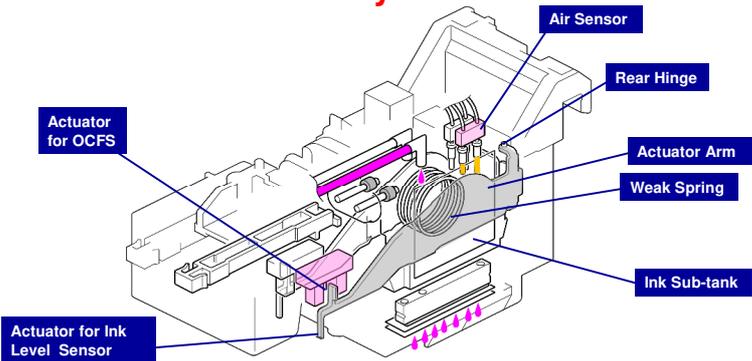


- ❑ The sides of the sub tanks are flexible.
- ❑ The sides may bend out slightly when the tank is full [1], and then gradually collapse as ink is drained from the tank [2] and [3].
  - ◆ The actual level of the ink does not change at [2] and [3] even though there is less ink in the tank.
- ❑ However, if air enters the tank [4], the air sensors at the top of the tank will be exposed and detect air in the tank.

Slide 255

**No additional notes**

## Controlling the Ink Supply to the Sub Tanks OCFS System - 1

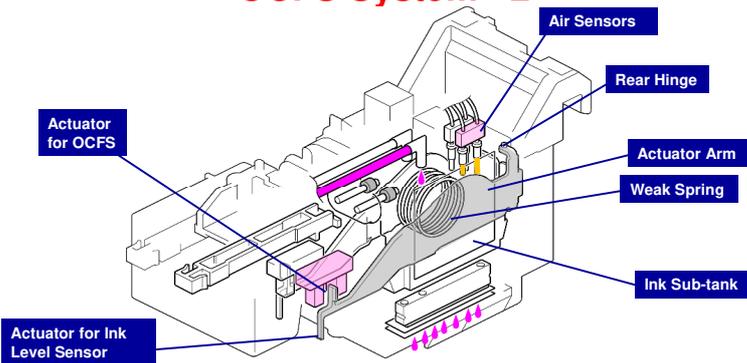


- The OCFS (On Carriage Filler Sensor) system monitors the ink level of each ink sub tank in the print heads.
  - ♦ This is a new system that constantly monitors the level of ink during printing and then signals for a re-fill whenever more ink is needed in one or more of the print heads.
  - ♦ The main advantage of this system is that the sensors are inside the carriage and move with the carriage unit. This ensures that the ink level in each tank is constantly monitored.
    - » Printing does not have to be interrupted to move the carriage to the right to check the ink levels, as in previous ink jet models.

Slide 256

- This shows the mechanism for Magenta. The others are similar.

## Controlling the Ink Supply to the Sub Tanks OCFS System - 2

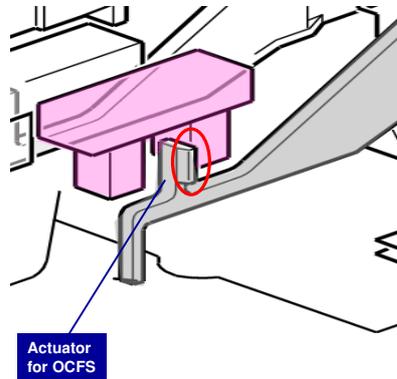


- The OCFS system contains the following parts:
  - ◆ An actuator arm is attached to a hinge at the rear.
  - ◆ The center of the actuator is mounted on a weak spring attached to the flexible side of the ink sub tank.
  - ◆ When the sub tank is full of ink, the actuator on the tip of the actuator arm points straight to the front and remains in the gap of the OCFS.
  - ◆ The air sensors are a pair of vertical terminals attached to the top of the ink sub tank. These sensors detect if there is excessive air in the tank.

Slide 257

- This shows the mechanism for Magenta. The others are similar.

## Controlling the Ink Supply to the Sub Tanks OCFS System - 3

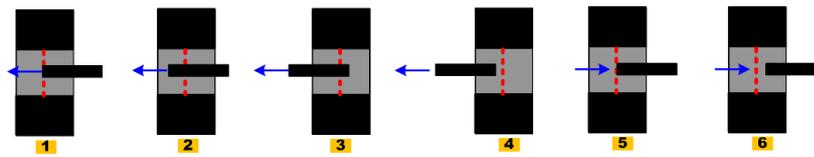


- ❑ Note that the OCFS actuator is not symmetrical.
- ❑ The side of the actuator away from the tank (circled in red) has a wing attached to it.
- ❑ This means that when the actuator moves through the sensor from right to left in the diagram, the actuator takes a long time to clear the sensor than a normal actuator.
- ❑ Keep this in mind when studying the OCFS system, as explained on the next few slides.

Slide 258

**No additional notes**

**Controlling the Ink Supply to the Sub Tanks  
Monitoring the Sub Tank During Printing**



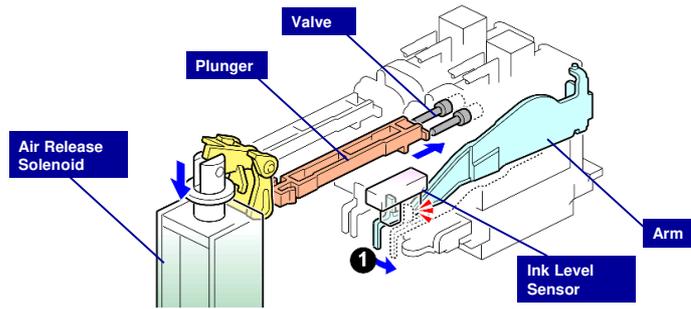
d1241002

- ❑ When ink is consumed, the side of the tank collapses, and the OCFS actuator moves through the OCFS sensor [1] > [2] > [3].
- ❑ When the actuator moves out of the gap at [4], the sensor turns off. This signals low ink. When this occurs, the ink pump motor in the ink supply unit pumps ink to the tank until the sensor is at [5].
  - ◆ The motor pumps a prescribed amount of ink (Wcc) determined by the machine's software to be enough to turn the sensor back on.
  - ◆ After that, the machine continues to pump ink a very short time (tsec).
  - ◆ This is the ink full position [6].

Slide 259

- ❑ "Wcc" is the software count stored for the amount of ink needed to fill each tank at initial ink filling when the machine was installed.
- ❑ At the end of a job, if the amount of ink supplied did not reach Wcc, ink is supplied again before capping.

## Controlling the Ink Supply to the Sub Tanks What Happens if Air is Detected?



- ❑ At the end of the job, the machine moves the carriage unit to the right and stops when the tank to be purged is aligned with the air release solenoid.
  - ◆ The correct position to stop is detected by monitoring the horizontal encoder.
- ❑ When the carriage unit has moved the print head tank to the air release solenoid, the solenoid pushes the plunger.
- ❑ The plunger pushes in the purge valve and the excess air is purged from the sub tank.
- ❑ After the air is purged, the ink supply motor turns on to supply more ink to replace the purged air with ink. The actuator moves in the direction (1) as shown above.

Slide 260

- ❑ This machine uses the same solenoid mechanism used in the previous ink jet machines. However, the duty of the solenoid operation is controlled to cope with high temperatures and to reduce operation noise.
  - The duty for the YM sub tank is higher because there are two sub tanks serviced by only one plunger.
  - The air solenoid duty can be adjusted with SP2910-009 (Maintenance Mode Setting).

## **Controlling the Ink Supply to the Sub Tanks**

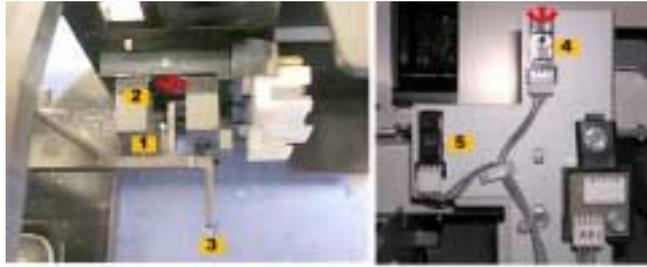
### **What Happens After Air Purging? - 1**

- ❑ **After air has been purged, ink is pumped from the cartridge up to the sub tank.**
- ❑ **Then, 0.6 cm<sup>3</sup> of ink is pumped out by reversing the ink pump.**

Slide 261

**No additional notes**

## Controlling the Ink Supply to the Sub Tanks What Happens After Air Purging? - 2



- ❑ Then, the carriage moves across to the main ink level sensors [4, 5].
- ❑ The carriage stops when the lower actuator [3] on the OCFS sensor feeler enters the main ink level sensor.
  - ◆ Main ink level sensor 2 (4) detects the actuators of K2, C, Y, and M.
  - ◆ Main ink level sensor 1 (5) detects the actuator of K1 only.
  - ◆ Two main ink level sensors are required because the K1 print head is not level with the other 4 print heads.
- ❑ The machine records how much the carriage has moved along the horizontal encoder, and stores this as the new Tank Full Position.
- ❑ At the end of a job, the machine moves the carriage to the main ink level sensor to compare with the most recent Tank Full Position.
  - ◆ This is also done at cleaning and flushing. The carriage does not move to this sensor during printing. Ink level during printing is checked with the OCFS sensors.

Slide 262

**No additional notes**

## Controlling the Ink Supply to the Sub Tanks

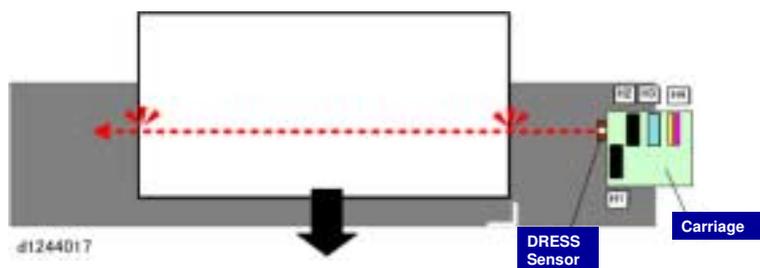
### When is Air Purging Done?

- The air purge, filling, and full position 'learning' sequence is done when one of the following occurs:
  - ◆ Air is detected in a tank. (The purging and filling is not done until the end of the job.)
  - ◆ Before print head flushing
  - ◆ When the temperature/humidity sensor detects a change in humidity of more than 15%
  - ◆ When the temperature/humidity sensor detects a change in humidity of more than 30%

Slide 263

**No additional notes**

## Image Registration – Main Scan (1)

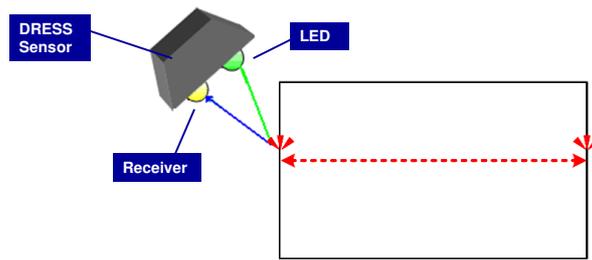


- When a job starts, the horizontal motor switches on and moves the carriage across the paper so that the DRESS sensor can detect the right and left edges of the paper.

Slide 264

**No additional notes**

## Image Registration – Main Scan (2)



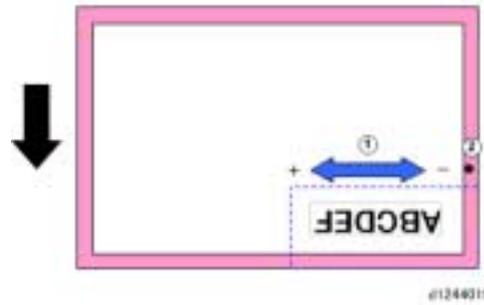
d1244018

- **The DRESS sensor contains an LED and a receptor.**
  - ◆ The strength of the reflection of the light from the paper depends on the surface of the paper.
  - ◆ Printing problems can occur if the same threshold value of reflectivity is used for every type of paper.
  - ◆ For this reason, different threshold values of reflectivity are assigned for different types of paper.

Slide 265

**No additional notes**

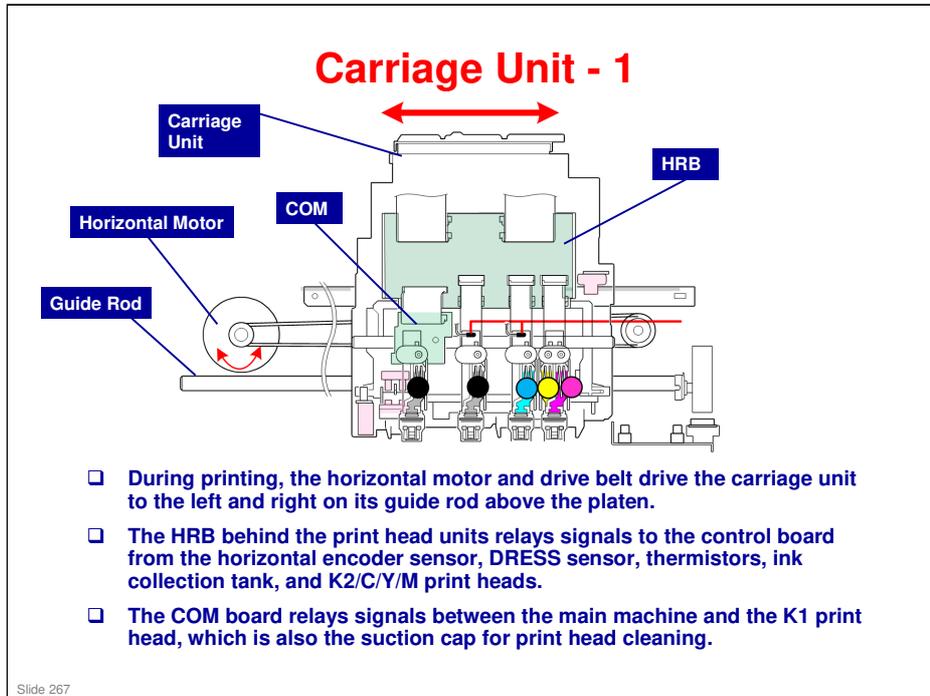
## Image Registration – Main Scan (3)



- ❑ The readings of the DRESS sensor for the left and right margins are used to determine the horizontal placement of the image on paper.
- ❑ This can be adjusted with SP1002 (Print Position Adjustment).
- ❑ This adjustment determines where the carriage starts and ends printing with every horizontal pass across the paper.
  - ◆ A larger setting moves the image to create a wider left margin.
  - ◆ A smaller setting moves the image to create a narrow left margin.

Slide 266

**No additional notes**



- ❑ HRB: Head Relay Board

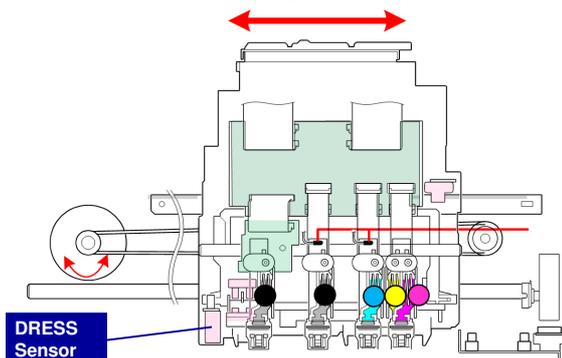
### Carriage Unit - 2

- ❑ The horizontal encoder sensor on the carriage unit reads the lines on the top edge of the strip. This controls the operation of the horizontal motor and movement of the carriage unit.
- ❑ The thermistors measure the temperature of the black (K1, K2) and color print heads (C, YM). These temperature readings are used to adjust the voltage applied to the piezoelectric elements.
  - ◆ There is one piezoelectric element for each print head: K1, K2, C, and YM. An electric charge applied to the element makes it expand and discharge ink through the print head nozzles and onto the paper below.

Slide 268

**No additional notes**

## Carriage Unit - 3

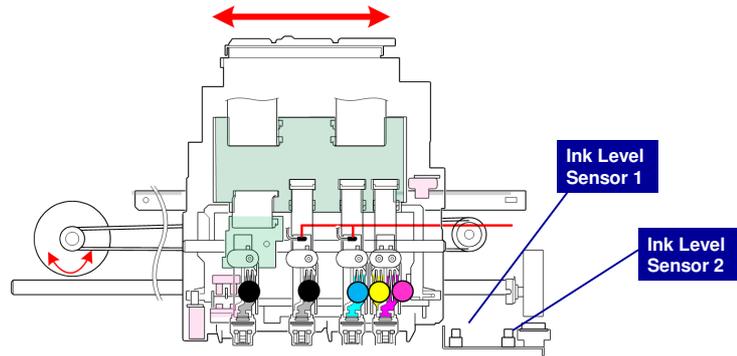


- ❑ At the beginning of a print job, the carriage moves left then back to the right.
- ❑ The DRESS sensor on the side of the carriage detects the side edges of the paper below.
- ❑ Based on these readings, the machine determines the image print start position.

Slide 269

**No additional notes**

**Carriage Unit - 4**



- ❑ Ink level sensor 1 checks the position of the actuator mounted on the side of the K1 ink sub tank.
- ❑ Ink level sensor 2 measures the positions of the actuators on the sides of the K2, C, Y, and M sub tanks.
- ❑ The position of the actuators is used to determine how much ink has been used from the sub tank.
  - ◆ Ink level sensor 1 services only the K1 print head, and ink level sensor 2 services the other four sub tanks.

Slide 270

**No additional notes**

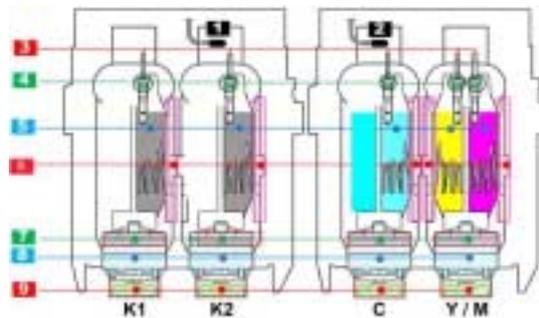
### Carriage Unit - 5

- ❑ The temperature/humidity sensor constantly measures the temperature and humidity inside the machine. The machine uses these readings to adjust its operation.
- ❑ The head lift motor can raise the carriage unit (1 mm, 2 mm) to increase the gap between the print heads and thick paper to prevent abrasion.
  - ◆ Two head lift sensors control this lift mechanism.

Slide 271

**No additional notes**

**Print Head Units - 1**

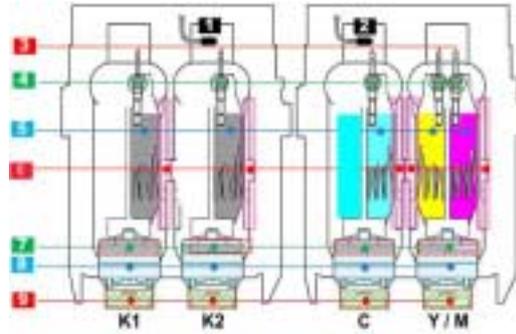


1. Head thermistor (Black) x1
2. Head thermistor (Color) x1
3. Air sensor pairs x5
4. Purge valves x5
5. Ink sub tanks x5 (K1, K2, C, Y, M)
6. Ink sub tank feelers x5
7. Filter units x5
8. Print heads x4 (K1, K2, C, YM)
9. Ink jet arrays x5

Slide 272

**No additional notes**

**Print Head Units - 2**

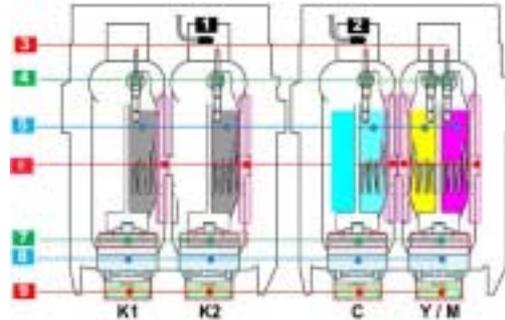


- ❑ The illustration above shows the print head units.
  - ♦ The left print head unit holds the black print heads (K1, K2) and the right print head unit holds the color print heads (C, YM).
- ❑ The black thermistor (1) monitors the heat around the black print head unit, and the color thermistor (2) monitors the heat around the color print head unit.
- ❑ A pair of air sensor terminals (3) is attached to the top of each sub tank.
- ❑ The purge valves (4) allow air to escape from the ink sub tank if an air sensor detects too much air in the tank. The valve is operated by a plunger and the air release solenoid (not shown).

Slide 273

**No additional notes**

### Print Head Units - 3

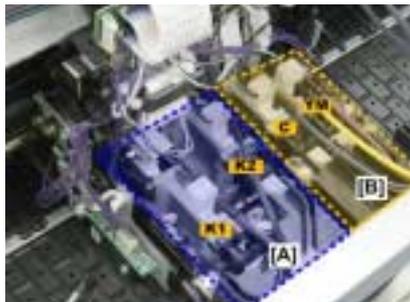


- ❑ The ink sub tanks (5) hold the ink pumped from the ink cartridges by the ink supply unit.
- ❑ One ink sub tank feeler (6) is attached to the side of each ink sub tank.
  - ♦ The OCFS (On Carriage Filler Sensors) and the stationary main ink level sensors on the right side of the machine check the positions of these feelers to determine the level of ink in the sub tanks.
  - ♦ The feeler arms are attached to the right sides of the K1, K2, and C tanks, but the arm is attached to the left side of the Y tank.
- ❑ A filter unit (7) sits on top of every print head (8) as an extra precaution to keep the ink free of dirt, paper dust, etc.
- ❑ Note that the YM print head on the right has two tanks on the same print head, but each tank has its own array of ink ports.
- ❑ The print heads (9) eject the ink onto the paper.

Slide 274

**No additional notes**

## Print Head Units - 4



- ❑ The black print head unit on the left [A] holds the black print heads and sub tanks (K1, K2).
- ❑ The color print head unit on the right [B] holds the color print heads and sub tanks (C, YM).
- ❑ You cannot replace one print head (K1, K2, C, or YM) individually; the entire left or right print head unit must be replaced.
- ❑ The left and right print head units [A] and [B] can be replaced separately or as a pair.

Slide 275

**No additional notes**

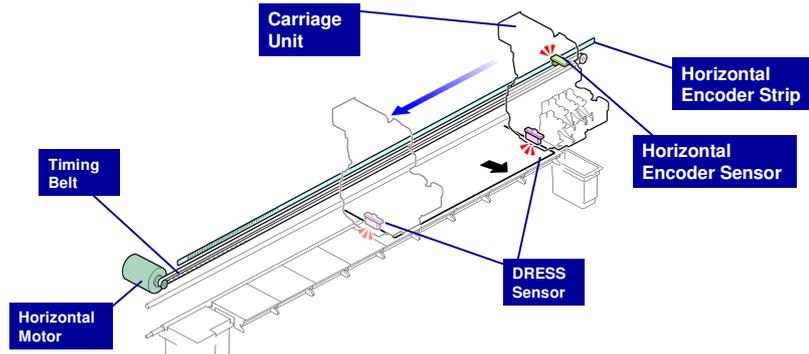
### Print Head

- ❑ Each print head contains these parts.
- ❑ When a small electric charge is applied to the piezoelectric element, this causes it to expand and expel ink under pressure.
- ❑ The vibration plate and flow plate apply the ink evenly to the back of the nozzle array plate.
- ❑ The ink flows evenly through the ports of the nozzle array plate.

Slide 276

**No additional notes**

## Carriage Drive Mechanism



- ❑ The horizontal motor drives the timing belt which is attached to the back of the carriage unit.
- ❑ This moves the carriage unit to the left and right.
- ❑ The horizontal encoder sensor detects the top edge of the horizontal encoder strip. The sensor reads the strip as the carriage is driven by the horizontal motor. This controls the operation of the motor and movement of the carriage unit.
- ❑ The DRESS sensor first detects the leading edge of the paper as it is fed, and then detects the right and left edges of the paper.
  - ◆ It functions as a paper registration sensor and image registration sensor during paper feed and positioning at the start of a job.

Slide 277

**No additional notes**

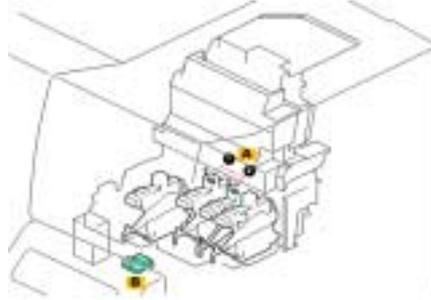
## Handling the Horizontal Encoder

- ❑ Always handle the encoder strip by its ends and edges. Wearing gloves is recommended.
- ❑ Never touch the surface of the horizontal encoder strip with bare hands.
- ❑ To clean the encoder, wipe it with a clean linen cloth dampened with alcohol to remove dust, ink, or fingerprints.
- ❑ Never use a cotton swab, tissue, or any other kind of material that could leave fibers on the surface of the encoder.

Slide 278

**No additional notes**

## Temperature Monitoring - 1

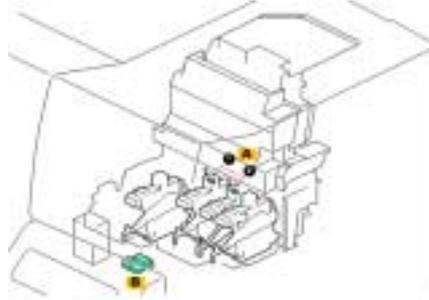


- ❑ There are two thermistors [A]. One is for black ink (K1, K2) and one is for color ink (C, YM).
- ❑ The thermistors measure the temperature around the print head units.
- ❑ The machine uses this information to adjust flow of ink from the print heads.
- ❑ Monitoring the temperature near the print heads is very important because the temperature can affect the viscosity of the ink at the nozzles.

Slide 279

- ❑ At low temperatures, the viscosity of the ink becomes high and can slow ink flow.
- ❑ At high temperatures, the viscosity of the ink becomes low and can cause ink to spill and run.
- ❑ The adjustment is done by changing the strength of electrical charge used to activate the piezoelectric elements that send ink through the nozzles of the print heads. (The amount of ink ejected varies directly with the amount of charge applied to the piezoelectric element.)

## Temperature Monitoring - 2

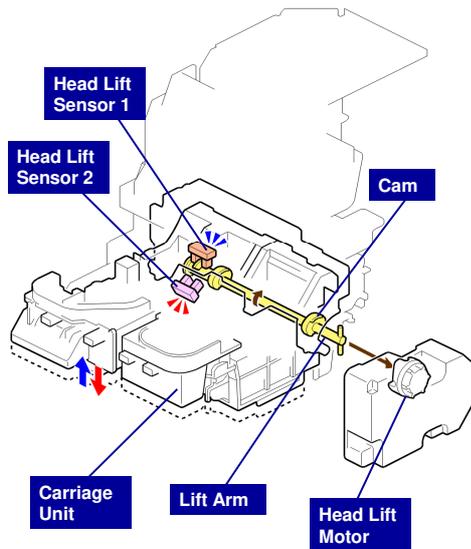


- ❑ **The temperature/humidity sensor [B] is on the right side of the machine above the ink supply unit.**
- ❑ **It controls the operation of the ink cartridge pump motors in the ink supply unit, to keep the amount of ink pumped to the tank constant.**

Slide 280

- ❑ Keeping the amount of ink pumped to the tanks constant: The tubes may expand or contract, so the machine has to compensate for that.
- ❑ The readings of the K2 print head thermistor and the temperature/humidity sensor are used together to calculate the operating temperature of the machine.
  - If the machine overheats and the operating temperature exceeds the maximum temperature, the machine will shut down automatically and will not restart until it has cooled and been cycled off/on. The machine must be cycled off/on, even after it has cooled down to the operational range.
  - If the temperature is too low at a cold start in the morning, for example, the machine will not start the initial cleaning cycle until the machine has warmed up. In this case, the machine does not require cycling off/on. The initial cleaning will start as soon as the machine has warmed up, and then the machine is ready for operation.

## Print Head Gap Adjustment - 1



- ❑ The gap between the print heads and the platen can be changed to prevent the print heads from rubbing the paper during printing.
- ❑ When the user selects a setting to change the height of the carriage, the carriage moves to the right, so that the coupling on the end of the shaft can engage the head lift motor.
- ❑ The head lift motor turns the cam and lifts the carriage, with the cam pushing against the bottom of the carriage.
- ❑ This adjusts the gap between the print heads and the paper on the platen below.
- ❑ There is an actuator on the left end of the lift arm. Head lift sensors 1 and 2 use this actuator to control this mechanism (explained in detail later).
- ❑ When the carriage unit is at the selected height, the cam stops rotating and the carriage unit disengages from the head lift motor.

Slide 281

**No additional notes**

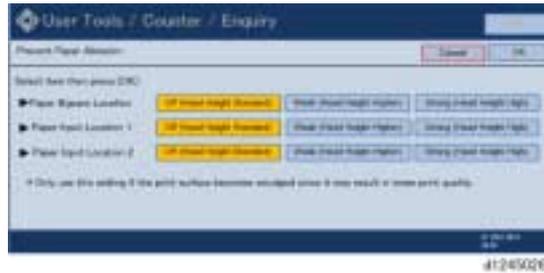
## Print Head Gap Adjustment - 2

- ❑ The print heads can be raised to two high positions (1 mm, 2 mm).
- ❑ The setting must be done before starting the print job.
  - ◆ User Tools > System Settings > Prevent Paper Abrasion

Slide 282

- ❑ At the end of the job, the setting does not return to the default (off). However, a gap of 1 or 2 mm between the head and the cap is within specifications for head capping and the head should not dry out.

### Print Head Gap Adjustment - 3



- ❑ In the User Tools, select [System Settings] > [Next] > [Prevent Paper Abrasion].
- ❑ Three selections are available for each feed station:
  - ◆ Strong (2 mm), Weak (1 mm), Off (standard).

Slide 283

- ❑ After the setting is changed, the following happens:
  - No job in progress. If no job is in progress, the print heads are raised or lowered as soon as the procedure is done.
  - Job in progress. If a signal is sent to raise or lower the print heads while another job is executing, the adjustment will not be done until after completion of the job in progress.
  - Loss of power. If power is lost during the raising or lowering, the machine returns to the position in effect at the start of the procedure (print heads capped).
- ❑ Bi-directional printing is not allowed if the print heads are raised (if either the "Strong" or "Weak" setting is selected).

### Print Head Gap Adjustment - 4

d1245028

- When the user changes the user tool setting, the horizontal motor drives the carriage unit to the right side of the machine, where the coupling of the lift motor engages the lift shaft.
  - ◆ The lift cam and actuator are attached to this shaft.
- When the lift motor rotates the shaft, the actuator passes through the head lift sensors.
- When the actuator reaches the selected position ([A], [B], or [C]), the shaft locks in place.
- Then the carriage moves away from the right side of the machine. This disengages the shaft and lift motor couplings.
- The cam keeps the carriage and print heads raised until the operator returns them to the standard position.

Slide 284

- The illustration shows the position of the actuator and status of the sensors for each selection.
- The following table shows the sensor status for each position.

Above	User Tools	Elevation	Sensor 1	Sensor 2
[A]	Off	Default	OFF	ON
[B]	Strong	2 mm	ON	Either
[C]	Weak	1 mm	OFF	OFF

**RICOH**

**D124**  
**Service Training**

**Ink Supply and Printing**  
**Replacement and Adjustment: Important Points**

Slide 285

**No additional notes**

## Caution

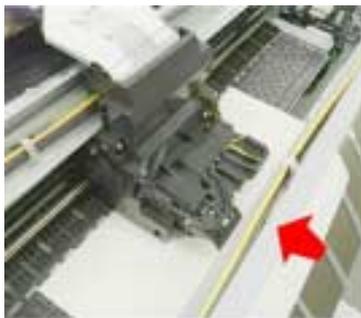


- ❑ If ink spills onto a printed circuit board, the print head unit will become unusable and require replacement.
  - ◆ Note: Individual heads cannot be replaced. The entire print head unit must be replaced.
- ❑ Always follow instructions and work carefully to avoid spilling ink from the ink tubes and from the ink sub tanks.

Slide 286

**No additional notes**

## Protect the Platen from Ink Spills

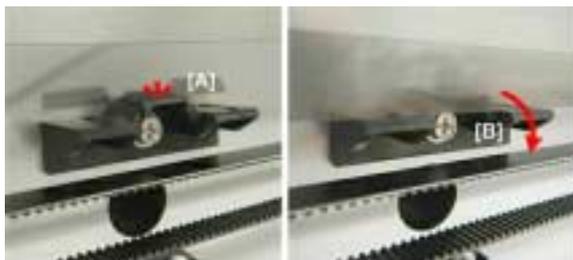


- Always slide a sheet of paper under the carriage unit when you move it to the center. This protects the platen from ink that could drip from the uncapped print heads.

Slide 287

**No additional notes**

## Before you Turn the Power on Again



- **Before you turn on the power switch to return the carriage unit to its home position on the right, check the position of the horizontal encoder strip on the left.**
  - ◆ If the encoder strip is up on the bracket as shown at [A], pull it forward and down so that it is in front of the bracket as shown at [B].
  - ◆ If the machine is turned on with the strip positioned as shown at [A], the movement of the carriage unit may scratch the surface of the encoder strip.

Slide 288

**No additional notes**

## Replacing the Ink Supply Unit Removing the Ink Supply Unit

### ❑ Before you start:

1. Do SP2090-1 to clear the NVRAM setting for the ink supply unit.
2. Move the carriage to the center of the machine with SP2102-4.
3. Turn the machine off.

Slide 289

### *Replacement and Adjustment > Ink Supply*

- ❑ The next few slides show the main points of this procedure. For full details, see the procedure in the field service manual.

## Replacing the Ink Supply Unit Replacement Kit



1. Ink Supply Unit (ink tubes attached)
2. Ink Cartridges (K, C, Y, M)
3. Ink Sump
4. Ink Sump Cap
5. Rubber Caps
6. Plugs

Slide 290

**No additional notes**

## Replacing the Ink Supply Unit Before Disconnecting the Tubes



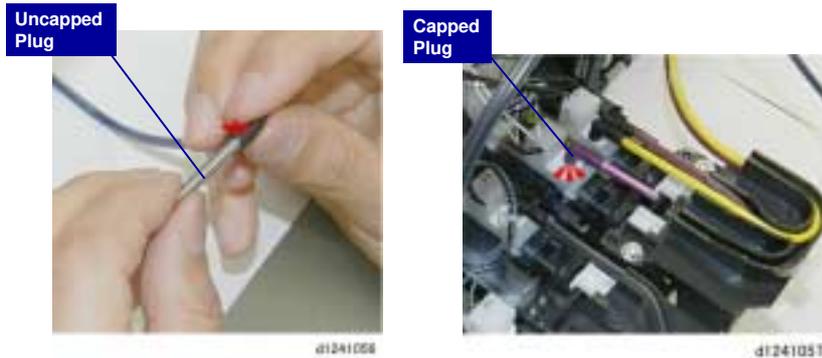
d1241099a

- ❑ Before disconnecting the tubes, press the white plungers to purge air from the ink sub tanks.

Slide 291

**No additional notes**

## Replacing the Ink Supply Unit Plugging the Ink Tubes



- ❑ **Disconnect and plug the tubes in this order: C, Y, M, K2, K1**
  - ◆ Use an uncapped plug to plug the open end of each ink supply tube.
  - ◆ Use a capped plug to plug each open port on top of the ink supply tanks.
  - ◆ These plugs come with the new ink supply unit.

Slide 292

- ❑ The ink supply unit replacement kit contains a set of these plugs.

## **Replacing the Ink Supply Unit**

### **Caution**

- ❑ **To prevent an ink spill, never lift the ink supply unit higher than the carriage unit.**

Slide 293

**No additional notes**

## Replacing the Ink Supply Unit Installing a New Ink Supply Unit - 1



d120410009

- **The following slides show the main points. See the field service manual for full details.**
  - ◆ Service ink cartridges must be installed in the new ink supply unit before you initialize the new unit.
    - » These cartridges come with the new ink supply unit.
    - » These cartridges ensure that the customer's ink is not used for the initialization procedure.
  - ◆ Set the dummy tank on the platen and connect the tubes to the top of this tank.
    - » Ink expelled during initialization will go here.

Slide 294

*Replacement and Adjustment > Ink Supply*

## Replacing the Ink Supply Unit Installing a New Ink Supply Unit - 2

- **Before you start the initialization process, make sure that the ink cartridge cover is open.**
  - ◆ If the machine is powered on with the cover closed, the machine will start the initial filling sequence and try to move the carriage unit to the home position for capping.

Slide 295

**No additional notes**

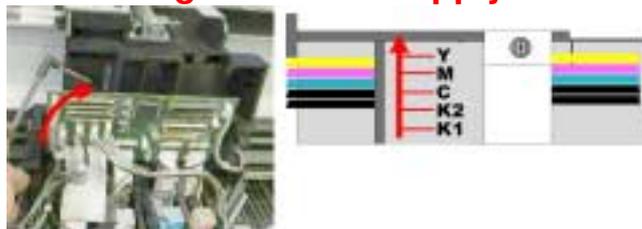
## Replacing the Ink Supply Unit Installing a New Ink Supply Unit - 3

- ❑ Turn on the machine. Ignore the error that appears on the screen.
- ❑ Check the value of SP2012-1. The value must be 9.
  - ◆ If the value is not "9", then change it to 9.
- ❑ Confirm that all five ink supply tubes are connected securely to the dummy tank
- ❑ Do SP2100-5 and input 31.
  - ◆ The ink supply pumps start pumping ink to fill the tanks.
  - ◆ When you see "Completed" pumping is finished.
- ❑ Turn the machine off.
- ❑ Disconnect the ink supply tubes from the dummy tank.
- ❑ Insert a metal plug into the end of each tube to prevent ink leakage.

Slide 296

**No additional notes**

## Replacing the Ink Supply Unit Installing a New Ink Supply Unit - 4



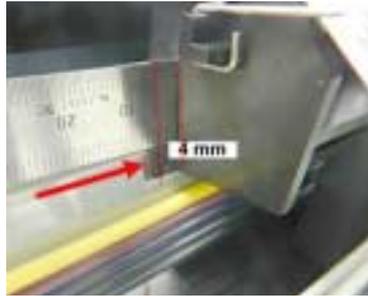
d124-901

- ❑ Make sure the ink supply tubes are flat and stacked correctly.
- ❑ Pass each tube through the top of the carriage unit in this order:  
K1 > K2 > C > M > Y
- ❑ The tubes should enter the left and leave the right side of the carriage unit in the order shown above.
  - ◆ This ensures that the tubes are not crossed inside the carriage unit.
  - ◆ If they are crossed, the tube pressure plate may not set correctly.
- ❑ If the plugged tubes do not pass through the top of the carriage unit easily, use a pair of thin nosed pliers to pull them through.

Slide 297

**No additional notes**

**Replacing the Ink Supply Unit  
Installing a New Ink Supply Unit - 5**



- ❑ Before you tighten the pressure plate, push in the ink supply tube bundle until the "L" notch is 4 mm away from the side of the carriage unit.
- ❑ Reattach the pressure plate.
- ❑ Push the carriage unit to the left and right to make sure that the tubes do not fall off the ink supply tube rail.
- ❑ If tubes fall off the rail, there is too much slack to the left of the carriage unit. Remove the pressure plate and make sure that the tubes are pushed as far as possible against the left side of the carriage unit.

Slide 298

**No additional notes**

**Replacing the Ink Supply Unit  
Installing a New Ink Supply Unit - 6**

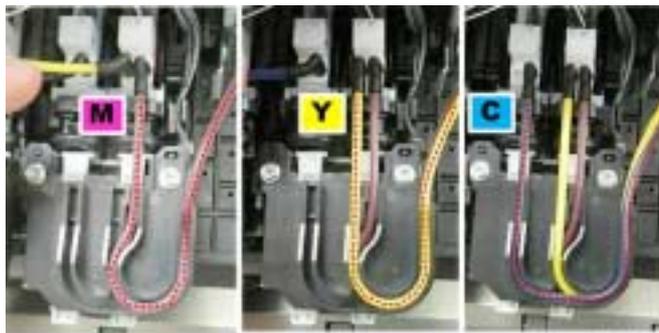


- Connect the ink supply tubes from left to right in this order:
  - ◆ K1 first
  - ◆ K2 over K1 on the left

Slide 299

**No additional notes**

**Replacing the Ink Supply Unit  
Installing a New Ink Supply Unit - 7**

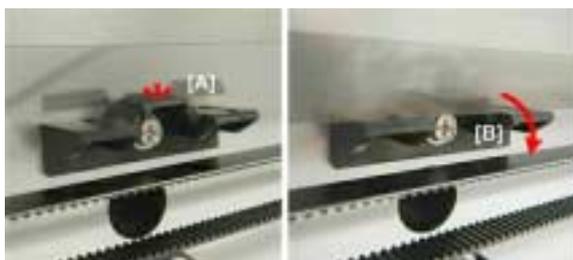


- Connect the ink supply tubes from right to left in this order:
  - ◆ M first
  - ◆ Y over M on the right
  - ◆ C over Y, M on the right

Slide 300

**No additional notes**

## Replacing the Ink Supply Unit Installing a New Ink Supply Unit - 8



- **Before you turn on the power switch to return the carriage unit to its home position on the right, check the position of the horizontal encoder strip on the left.**
  - ◆ If the encoder strip is up on the bracket as shown at [A], pull it forward and down so that it is in front of the bracket as shown at [B].
  - ◆ If the machine is turned on with the strip positioned as shown at [A], the movement of the carriage unit may scratch the surface of the encoder strip.

Slide 301

**No additional notes**

## **Replacing the Ink Supply Unit Completing the Procedure**

- Close the ink cartridge cover.**
- Turn the machine on.**
- Flush the print heads.**
- Print a Nozzle Check Pattern and check the condition of the print heads.**
- Replace the service ink cartridges in the ink supply unit with the customer's cartridges.**

Slide 302

**No additional notes**

## Separating the Carriage Unit from the Maintenance Unit - 1

- ❑ While the machine is idle, the carriage unit is always at the right side of the machine, on top of the maintenance unit, to prevent the print heads from drying out.
- ❑ For some procedures, you must uncap the print heads and move the carriage unit away from the right side of the machine.
- ❑ SP2102-004 is the normal way to do this. But, if there is no power, you can also uncap the print heads and move the carriage unit manually.
- ❑ Details of the procedure are in the service manual.
  - ◆ The next few slides show the main points.

Slide 303

*Replacement and Adjustment > Common Procedures*

## Separating the Carriage Unit from the Maintenance Unit - 2

- ❑ **Moving the carriage unit automatically with 2102-004:**
  - ◆ Set to 1: Lowers the maintenance unit ink caps and uncaps the print heads. The carriage does not move.
  - ◆ Set to 2: Uncaps the print heads and moves the carriage to the left of the platen.
  - ◆ Set to 3: Uncaps the print heads and moves the carriage to the center of the platen. Normally, you will use this setting.
- ❑ **After changing the SP setting, the carriage moves. Then turn the machine off.**
- ❑ **After you reassemble the machine, turn the machine on.**
  - ◆ The carriage will return to the right side (home position), and the maintenance unit will cap the print heads.

Slide 304

**No additional notes**

## Separating the Carriage Unit from the Maintenance Unit - 3

1

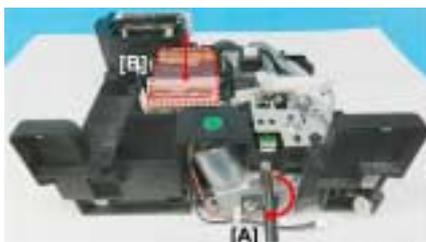


☐ **Moving the carriage unit manually:**

1. Rotate the hex socket at [A] to raise and lower the suction cap [B].

☐ This cap must be lowered before you can move the carriage away from the maintenance unit.

2



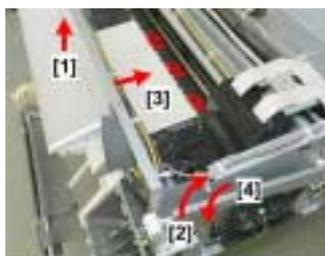
2. Rotate the hex socket at [A] to raise and lower the K2/C/YM print head caps [B].

☐ These caps must be lowered before you can move the carriage away from the maintenance unit.

Slide 305

*Replacement and Adjustment > Common Procedures*

## Separating the Carriage Unit from the Maintenance Unit - 4

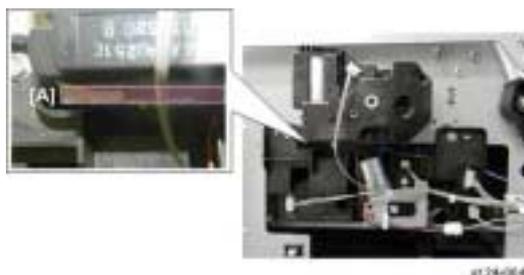


- ❑ **Before you start work:**
  - ◆ Remove the front cover [1].
  - ◆ Raise the paper holding lever [2].
  - ◆ Slide a sheet of paper [3] into the machine as far as the gap between the raised rollers and the platen.
  - ◆ Lower the paper holding lever [4] to hold the paper in place.
- ❑ **This paper protects the platen from ink that may leak from the carriage unit after it is moved away from the right side of the machine.**

Slide 306

*Replacement and Adjustment > Common Procedures*

## Separating the Carriage Unit from the Maintenance Unit - 5

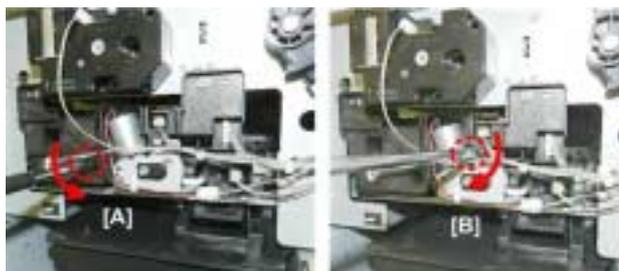


- ❑ To prevent damaging the caps, you must confirm that both the suction cap and K2/color print caps are down before you push the carriage unit away from the home position.
- ❑ Check at [A].
  - ◆ The suction cap and K2/color print head caps should both be down.
  - ◆ Your view should not be blocked by either the suction cap or K2/color print head caps.

Slide 307

- ❑ The suction cap is also the K1 print head cap.

## Separating the Carriage Unit from the Maintenance Unit - 6

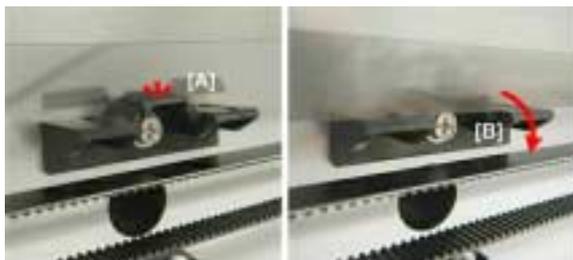


- ❑ **If the caps are not moved down:**
  - ◆ Set a screwdriver in hole [A] and rotate it counter-clockwise to lower the suction cap. Use a flashlight to confirm that the suction cap is down.
  - ◆ Set a screwdriver in hole [B] and rotate it clockwise to lower the K2/color print head caps. Use a flashlight to confirm that the print head caps are down.

Slide 308

**No additional notes**

## Before you Turn the Power on Again



- **Before you turn on the power switch to return the carriage unit to its home position on the right, check the position of the horizontal encoder strip on the left.**
  - ◆ If the encoder strip is up on the bracket as shown at [A], pull it forward and down so that it is in front of the bracket as shown at [B].
  - ◆ If the machine is turned on with the strip positioned as shown at [A], the movement of the carriage unit may scratch the surface of the encoder strip.

Slide 309

**No additional notes**

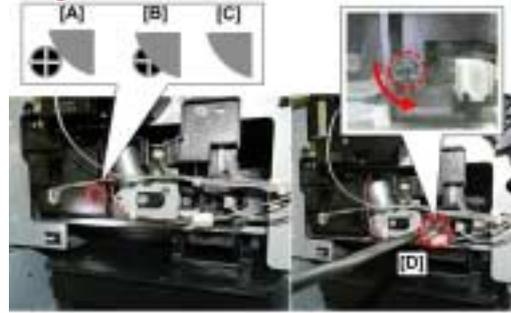
## Capping the Print Heads Manually

- ❑ **Do this procedure only when it is absolutely necessary and the print heads cannot be capped automatically by switching the machine on.**
- ❑ **You may need to move the carriage manually in the following cases:**
  - ◆ If the machine is partially disassembled at the end of the work day, the print heads should be capped manually before leaving the machine to sit for more than an hour.
  - ◆ If the machine was operating when a power outage occurred, leaving the carriage unit out of the home position, you must cap the print heads if power cannot be restored within a short time.
    - » This is explained in the slides in this course called 'Capping the Print Heads Manually'.
- ❑ **In order to prevent damage to the wipers and edges of the print head caps, the print heads must be positioned directly above the print head caps within  $\pm 0.8$  mm.**

Slide 310

**No additional notes**

## Capping the Print Heads Manually - 1

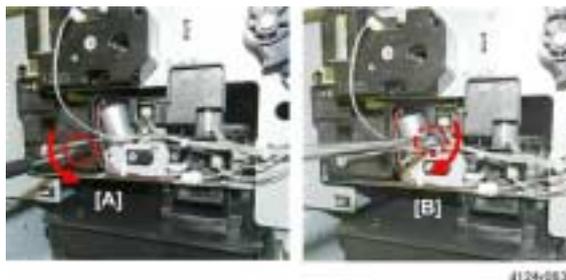


- ❑ Slowly, push the carriage unit to the right side of the machine until it stops. The carriage should be over the maintenance unit.
- ❑ The cleaning unit may be out of position (to the rear) if the machine power was interrupted during the print head cleaning cycle. You must check that it is in the correct position, and move it if necessary, in order to cap the K1 print head.
- ❑ Use a flashlight to look through the hole.
  - ◆ If the hex socket is visible [A], no adjustment is necessary.
  - ◆ If the hex socket is only partially visible or not visible at all (looks like [B] or [C]), then set a screwdriver at [D] and rotate it counter-clockwise to move the cleaning mechanism until you see [A]. This moves the cleaning unit forward so that you can raise the suction cap.

Slide 311

- ❑ If you cannot turn the machine on to return the print heads to their capping positions automatically, do this procedure.
- ❑ This first slide shows you how to make sure that the cleaning unit (K1 print head cap) is in the correct position for capping the K1 print head.

## Capping the Print Heads Manually - 2



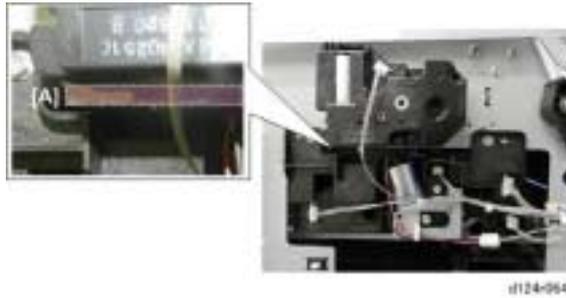
### ❑ To lift the suction caps:

- ◆ Set a screwdriver in hole [A] and rotate it counter-clockwise to raise the suction cap. Use a flashlight to confirm that the suction cap is up.
- ◆ Set a screwdriver in hole [B] and rotate it clockwise to raise the K2/color print head caps. Use a flashlight to confirm that the print head caps are up.

Slide 312

**No additional notes**

### Capping the Print Heads Manually - 3



- ❑ Check at [A] to make sure that the caps are up.
  - ◆ The suction cap and K2/color print head caps should both be up.

Slide 313

**No additional notes**

## Replacing Print Head Units Overview



- ❑ The unit on the left is the Black Print Head Unit (K1, K2) [A]. It holds the black print heads and sub tanks.
- ❑ The unit on the right is the Color Print Head Unit (C, YM) [B]. It holds the color print heads and sub tanks.
- ❑ A single print head (K1, K2, C, or YM) cannot be replaced individually; the entire left or right print head unit must be replaced.
- ❑ The left and right print head units [A] and [B] can be replaced separately or as a pair.

Slide 314

**No additional notes**

**Replacing Print Head Units  
Accessories – Black Print Head Unit**



1. **Black Print Head Unit**
2. **Ink Collector Tank**
3. **Ink Cartridge (K)**
4. **Bracket x 2**
5. **Plug x 2**
  - ◆ Two plugs are also inserted into the ink supply tubes of the print head unit.
6. **Rear Cushion x 1**

Slide 315

**No additional notes**

**Replacing Print Head Units  
Accessories – Color Print Head Unit**



1. **Color Print Head Unit**
2. **Ink Collector Tank**
3. **Ink Cartridges (C, Y, M)**
4. **Bracket x 2**
5. **Plug x 3**
  - ◆ Three plugs are also inserted into the ink supply tubes of the print head unit.
6. **Rear Cushion x 1**

Slide 316

**No additional notes**

## Replacing Print Head Units Removal Procedure - 1



- ❑ **Unlock and move the carriage unit to the center of the platen.**
- ❑ **Separate the main unit from the scanner unit.**
- ❑ **Remove the ink collector tank [A], and then replace it with the ink collector tank provided with the accessories.**

Slide 317

- ❑ We will now look at the most important points of the replacement procedure.
- ❑ For full details, see the field service manual.

*Replacement and Adjustment > Carriage Unit > Black and Color Print Heads*

## Replacing Print Head Units Removal Procedure - 2

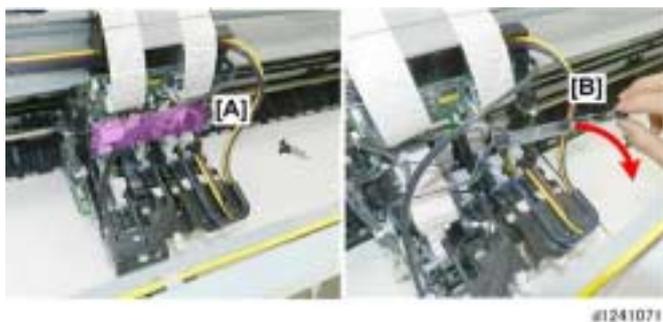


- ❑ Before you start disconnecting harnesses, note the position of thermistor connectors [1] and [2].
  - ◆ [1] is the thermistor connector of K2 on the left.
  - ◆ [2] is the thermistor connector of C on the right.
  - ◆ Make sure that these harnesses are reconnected correctly.

Slide 318

**No additional notes**

### Replacing Print Head Units Removal Procedure - 3



- ❑ **Disconnect the FFCs and harnesses of both print head units [A].**
  - ◆ The FFCs can be discarded.
  - ◆ The OCFS sensor harnesses can be discarded. However, you must keep the air sensor harness and the thermistor harness in order to connect the new unit.

Slide 319

**No additional notes**

## Replacing Print Head Units Removal Procedure - 4



**Black Print Heads**



**Color Print Heads**

- Press in the left and then the right plunger to expel air from the ink sub tanks.
- This equalizes the pressure inside the tanks with the atmosphere. If you forget to do this, ink will come out when you take the tubes off.
- CAUTION:** If any ink or other liquid gets on the PCB in the print head, do not use this print head. When you turn the power on, this PCB, and maybe the MCU and HRB boards will be damaged. Install a new print head unit.

Slide 320

**No additional notes**

## **Replacing Print Head Units Removal Procedure - 5**

- ❑ **Follow the service manual closely for instructions on how to disconnect and reconnect the ink tubes and plugs.**
- ❑ **Also, be sure to purge the air from the units when instructed in the manual. Failure to do so could cause damage to the machine, as explained on the previous slide.**
  - ◆ In addition, when you unpack the new unit, press both plungers to expel any air that has accumulated during storing and shipping.
  - ◆ This will reduce pressure inside the ink sub tanks and prevent ink leakage after the plugs are removed.

Slide 321

**No additional notes**

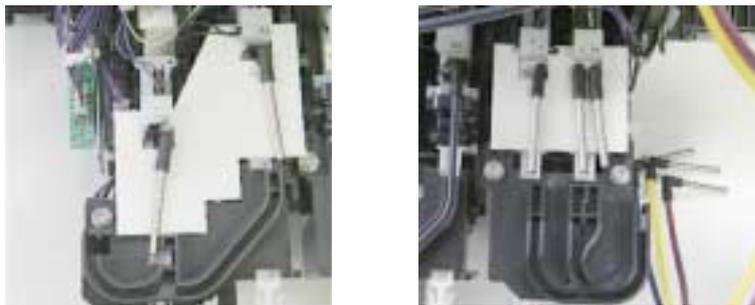
## Replacing Print Head Units Removal Procedure - 6

- ❑ When you remove the old print head unit, put it on a piece of paper, because ink may leak from the bottom of this unit.
- ❑ Discard the old print head unit, along with FFCs, and sensor harnesses.
  - ◆ The OCFS sensor harnesses can be discarded.
  - ◆ However, you must keep the air sensor harness and the thermistor harness in order to connect the new unit. Remove these from the old print head unit and connect them to the new unit.
- ❑ Always obey local laws and regulations regarding the disposal of such items.

Slide 322

**No additional notes**

## Replacing Print Head Units Replacement Procedure - 1

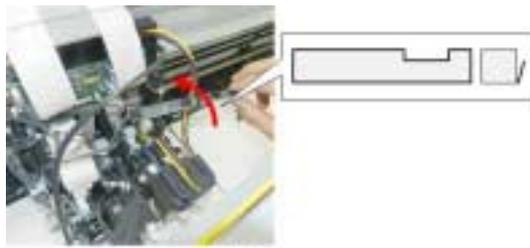


- ❑ The new print head units each have a sheet of paper under the metal plugs to protect against damage from accidental ink spills.
- ❑ Do not remove this paper until all the ink tubes have been connected to the new unit.

Slide 323

**No additional notes**

## Replacing Print Head Units Replacement Procedure - 2



- ❑ **When installing a new print head unit, the rear cushion must be installed below the HRB before the harnesses are re-connected.**
  - ◆ Hold the rear cushion with the cut-out on the right (viewed from above) with the mylar leaf flared from the bottom.

Slide 324

**No additional notes**

**Replacing Print Head Units  
Replacement Procedure - 3**

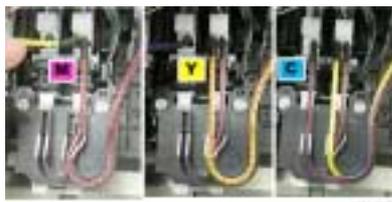


- ❑ On the new print head unit, before you connect the ink supply tubes, press in the plungers to purge air from the sub ink tanks.
- ❑ **CAUTION:** If any ink or other liquid gets on the PCB in the print head, do not use this print head. When you turn the power on, this PCB, and maybe the MCU and HRB boards will be damaged. Install a new print head unit.

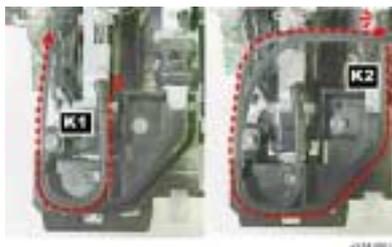
Slide 325

- ❑ The diagram shows the color print heads. The procedure is similar for the black print heads.

## Replacing Print Head Units Replacement Procedure - 4



- Connect the ink tubes to the new units in the correct order.
  - ◆ Color print heads
    - » M first
    - » Y over M on the right
    - » C over Y, M on the right
  - ◆ Black print heads
    - » K1 first
    - » K2 over K1 on the left



Slide 326

**No additional notes**

## Replacing Print Head Units Replacement Procedure - 5

- ❑ Clean the platen and exit rollers with a clean cloth, slightly dampened with water.
  - ◆ Never use alcohol or any other type of organic solvent to clean the platen and rollers.
- ❑ Reassemble the machine.
- ❑ Remove the customer's color ink cartridges, and then load the service cartridges provided with the accessories.
- ❑ Make sure that the ink cartridge cover is open.
- ❑ Turn the machine on.
- ❑ Ignore the error on the operation panel.

Slide 327

**No additional notes**

## Replacing Print Head Units Replacement Procedure - 6

- ❑ **Open SP2400-001.**
- ❑ **Enter the correct number (see below), press [#], and then touch [EXECUTE].**
  - ◆ This SP code resets the counter for the carriage print heads. Choose the correct setting for the replacement.
  - ◆ Enter "0" if you replaced both black and color print heads.
  - ◆ Enter "1" if you replaced the black print heads only.
  - ◆ Enter "2" if you replaced the color print heads only.
- ❑ **Turn the machine off.**
- ❑ **Close the cartridge cover.**
- ❑ **Turn the machine on. The initial fill sequence will begin. The filling sequence requires about 15 min. to complete.**
- ❑ **Wait for the machine to beep twice. This signals the end of the ink filling sequence.**

Slide 328

**No additional notes**

## Replacing Print Head Units Replacement Procedure - 7

- ❑ **Then set User Tools – System Settings – Prevent Paper Abrasion to ‘Strong’**
  - ◆ This raises the print heads to the maximum height.
- ❑ **Then in the Maintenance menu, do the Manual Head Position adjustment. Do the three adjustments (Speed, Standard, Quality).**
  - ◆ Only the first three rows of the pattern will print because the print heads are at maximum height.
  - ◆ The reason for these two steps is because, after putting new print heads in, we are not sure exactly how far above the platen they are. So we set the gap to ‘Strong’, and then the machine moves the print head height to a known setting. Then we make a fine adjustment with the manual adjustment procedure, and the machine should be back to normal.

Slide 329

**No additional notes**

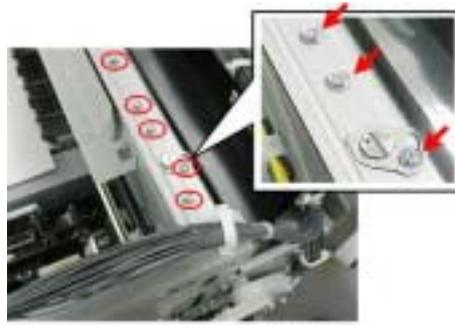
## Replacing Print Head Units Replacement Procedure - 8

- ❑ Next, exit the User Tools and execute SP5884 (Factory Setting – Head Gap Backup) to save the adjusted settings.
- ❑ Exit the SP mode.
- ❑ Lower the print heads.
  - ◆ Press [User Tools] > System Settings > Next > Prevent Paper Abrasion > Off (Head Height Standard).
- ❑ Exit the User Tools and touch [Maintenance].
- ❑ Print three more patterns with Manual Adjust Head Position (one each for "Speed", "Standard", "Quality").
  - ◆ This time all the rows of the pattern will print.
- ❑ Remove the accessory ink cartridges and replace them with the customer's ink cartridges.
- ❑ Remove the accessory ink collector tank and replace it with the customer's ink collector tank.

Slide 330

**No additional notes**

**Removing the Carriage Unit  
Removal Procedure - 1**



- ❑ **There are paint-locked screws across the top of the machine (under the top cover).**
- ❑ **These screws are positioned and adjusted at the factory. Never loosen or attempt to adjust these screws.**

Slide 331

*Replacement and Adjustment > Carriage Unit*

- ❑ Normally, you will not need to do this procedure, unless the horizontal timing belt breaks.
- ❑ It is not necessary to disconnect the ink tubes. Just detach the carriage and move it to one side.
- ❑ This is a long procedure and many components must be removed. The next few slides show a few important points. For full details of the procedure, see the field service manual.
- ❑ You must unlock and move the carriage unit before you can remove the carriage unit.

## Removing the Carriage Unit Removal Procedure - 2



d1241038

- ❑ You can see the heads of four paint-locked screws around the top of the maintenance unit. These screws hold a reinforcement plate.
- ❑ Never loosen or remove any of these screws.

Slide 332

**No additional notes**

## Removing the Carriage Unit Removal Procedure - 3

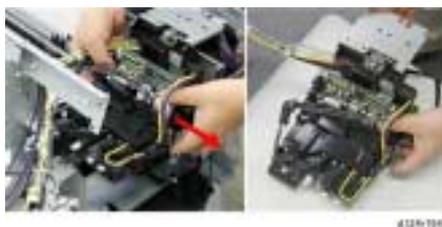


- ❑ Before you remove the ink level sensor bracket, use a pencil or marker to mark the positions of the bosses and screw of the plate.
- ❑ This plate slides forward and back. It must be aligned precisely when it is reinstalled.

Slide 333

**No additional notes**

## Removing the Carriage Unit Removal Procedure - 4



- ❑ **When you are ready to move the carriage unit out of the machine, prepare a flat clean surface, such as a stool or small table covered with paper, at the right side of the machine.**
  - ◆ The ink tubes are still connected to the carriage unit, so there is not much space for moving the carriage unit after it is off the guide rod. Place the table or stand as close as possible to the right side of the main unit.
  - ◆ To avoid ink leakage, always keep the carriage unit higher than the ink supply unit.
- ❑ **Follow the instructions in the service manual carefully when you move the carriage unit.**

Slide 334

**No additional notes**

## Removing the Carriage Unit Replacement Procedure - 1



- At the right side of the machine, note the position of the felt bushing [A] at the bottom and the position of the wheel and race [B] at the top.
  - ◆ This is how the carriage unit must be set when it is reinstalled.

Slide 335

**No additional notes**

## Removing the Carriage Unit Replacement Procedure - 2



- **When you reattach the paper holding lever, make sure that:**
  - ◆ The paper holder lever [1] is level.
  - ◆ The gears are meshed at the first notch of each [2].
  - ◆ Actuator [3] is down and in the gap of the registration release sensor.

Slide 336

**No additional notes**

## Removing the Carriage Unit Replacement Procedure - 3



- ❑ **Make sure the tab is engaged and through the hole in the frame as shown, before you reattach the semi-transparent cover and wires.**

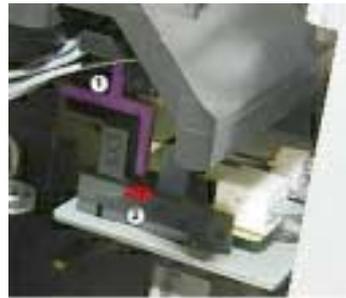
Slide 337

**No additional notes**

## Removing the Carriage Unit Replacement Procedure - 4



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- ❑ **Attach the ink level sensor bracket but do not tighten it.**
- ❑ **Position the plate so that it is aligned with the marks that you drew when you removed it.**
- ❑ **Check the position of the actuators 1 and 2.**
  - ◆ The actuators must be centered in the gaps of the sensors above and below.

Slide 338

**No additional notes**

## Removing the Carriage Unit Replacement Procedure - 5



- **Before you turn on the power switch to return the carriage unit to its home position on the right, check the position of the horizontal encoder strip on the left.**
  - ◆ If the encoder strip is up on the bracket as shown at [A], pull it forward and down so that it is in front of the bracket as shown at [B].
  - ◆ If the machine is turned on with the strip positioned as shown at [A], the movement of the carriage unit may scratch the surface of the encoder strip.

Slide 339

**No additional notes**

## **Removing the Carriage Unit Replacement Procedure - 6**

- Do the Auto Adjust Print Head Position procedure.**
- Open the SP mode and do SP5884-003 (Factory Setting – Head Gap Backup)**

Slide 340

**No additional notes**

## Adjusting the Ink Level Sensors



d1241063



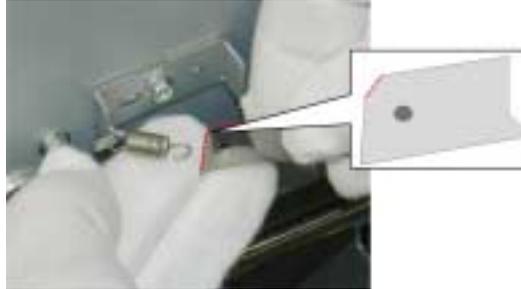
d1241063

- ❑ When you install a new sensor, do not fasten the bracket tightly at first. Some adjustment is needed.
- ❑ Attach the ink level sensor bracket but do not tighten it.
- ❑ Position the plate so that it is aligned with the marks that you drew when you removed it.
- ❑ Check the position of the actuators 1 and 2.
  - ◆ The actuators must be centered in the gaps of the sensors above and below.

Slide 341

**No additional notes**

## Installing a Horizontal Encoder



- ❑ **If it is dirty, clean it with an alcohol damp cloth, and then dry it with a dry linen cloth.**
  - ◆ Never use a cotton ball, cotton swab, or tissue paper to clean the surface of the encoder strip.
- ❑ **Attach the left end of the strip with the beveled corner pointing up (the right end of the strip is square).**
  - ◆ The machine will not operate if the encoder strip is not installed correctly.

Slide 342

### *Replacement and Adjustment > Main Scan*

- ❑ It is not necessary to unlock and move the carriage unit in order to remove this part.

## Installing a Horizontal Encoder Sensor



d124-535

- ❑ **Make sure the top edge of the horizontal encoder strip is inserted into the slot below the horizontal encoder sensor.**

Slide 343

- ❑ You must unlock and move the carriage unit before you can remove the sensor.

## Air Solenoid Bracket



- ❑ The position of the air solenoid bracket is adjusted at the factory. Do not remove this screw.

Slide 344

**No additional notes**

**RICOH**

**D124  
Service Training**

**Maintenance Unit  
Detailed Descriptions**

Slide 345

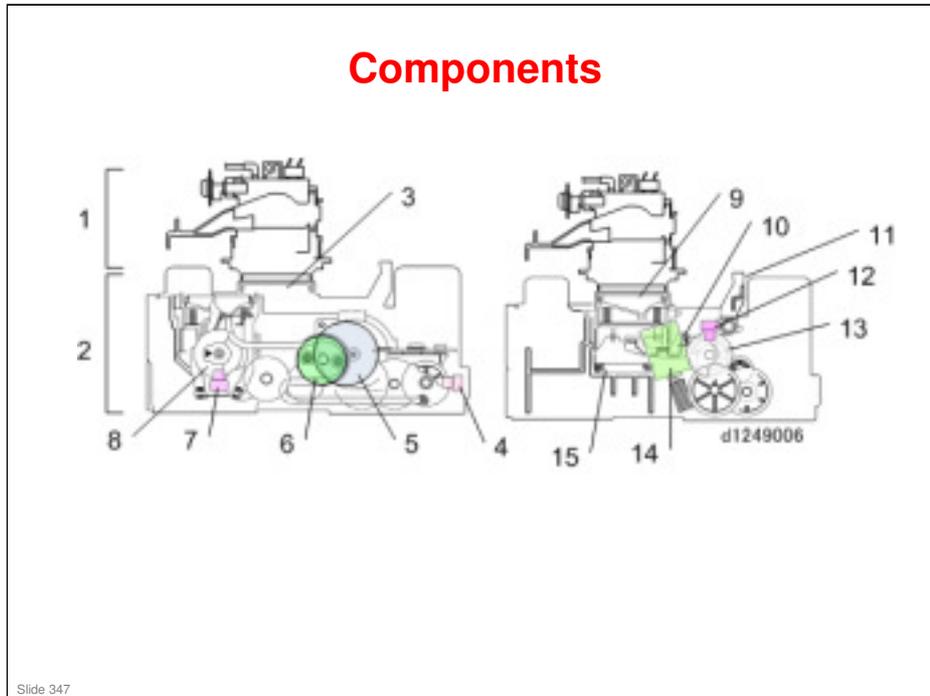
**No additional notes**

## Overview

- **The maintenance unit does the following:**
  - ◆ Lifts the print head caps to cap the print heads, to prevent them from drying out while the machine is idle.
  - ◆ Lowers the print heads at the start of a job to uncap the print heads.
  - ◆ Cleans the print heads when required.

Slide 346

**No additional notes**



1. Carriage unit
2. Maintenance unit
3. Suction cap/K1 print head cap
4. Slide sensor
5. Maintenance motor
6. Suction pump
7. Suction cap sensor
8. Suction cap actuator
9. Color print head caps (K2, C, YM)
10. Lift lever (K2, C, YM)
11. Carriage stopper
12. Lift sensor
13. Lift sensor actuator
14. Lift motor
15. Cap pads (K2, C, YM)

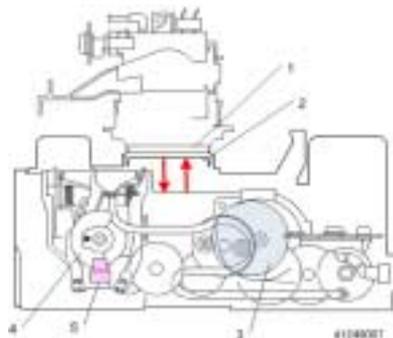
## **Capping and Uncapping Overview**

- ❑ **The K1 print head and the K2, C, YM print heads are uncapped and capped at the same time.**
- ❑ **However, the mechanisms are different.**

Slide 348

**No additional notes**

## Capping and Uncapping K1 Print Head - 1

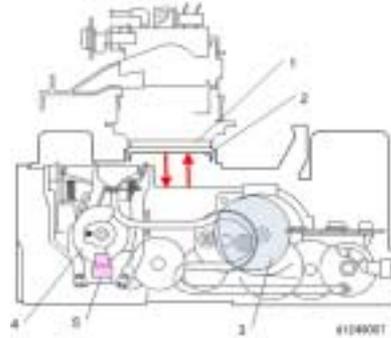


- ❑ The maintenance motor (3) uncaps and caps the K1 print head.
- ❑ While the machine is idle, the K1 print head (1) on the bottom of the carriage unit is capped and sealed by the suction cap (2) to prevent it from drying out.
- ❑ At the start of the next job, the maintenance motor rotates forward and lowers the suction cap to uncap the K1 print head.

Slide 349

**No additional notes**

## Capping and Uncapping K1 Print Head - 2

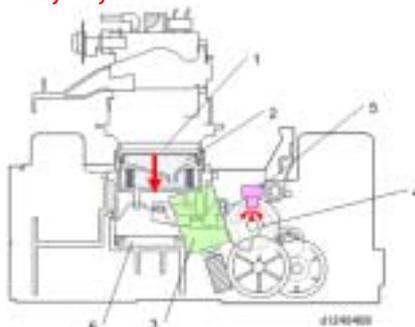


- ❑ At the end of the job, the carriage unit (1) moves to the right and positions itself over the maintenance unit (2).
- ❑ The maintenance motor (3) rotates forward again and raises the suction cap to cap the K1 print head.
- ❑ The rotating suction cap actuator (4) (mounted on a shaft with a lift cam driven by the maintenance motor) and suction cap sensor (5) control the lifting and lowering of the suction cap.

Slide 350

**No additional notes**

## Capping and Uncapping K2, C, MY Print Heads - 1

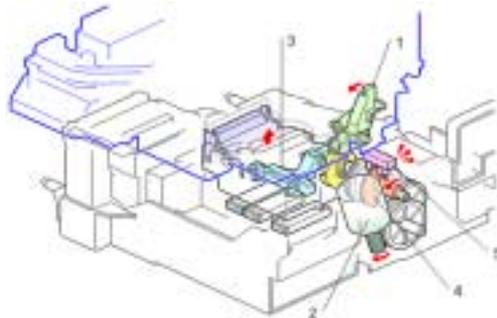


- ❑ The maintenance lift motor uncaps and caps the K2, C, and MY print heads.
- ❑ While the machine is idle, the K2, C, and YM print heads (1) on the bottom of the carriage unit are capped and sealed by the print head caps (2).
- ❑ At the start of the next print job, the lift motor (3) rotates forward and lowers the K2, C, and YM caps to uncap the K2, C, YM print heads.
- ❑ The rotating lift actuator (4) (mounted on a shaft with a cam driven by the lift motor) and lift sensor (5) control the lowering of the three print caps.
- ❑ The caps rest on the absorbent cap pads (6) while they are down.

Slide 351

**No additional notes**

## Capping and Uncapping K2, C, MY Print Heads - 2



- ❑ At the end of a print job, the carriage unit moves to the right and positions itself over the maintenance unit.
- ❑ The carriage stopper (1) positions the carriage unit so that the caps and print heads are aligned.
- ❑ The maintenance lift motor (2), rotating forward, lifts the K2, C, Y,M print head caps (not shown) on the lift lever (3) and covers the print heads to prevent them from drying out.
- ❑ The rotating lift actuator (4) (mounted on a shaft with a lift cam driven by the lift motor) and lift sensor (5) control the raising of the caps.

Slide 352

**No additional notes**

## Cleaning Cycle Overview

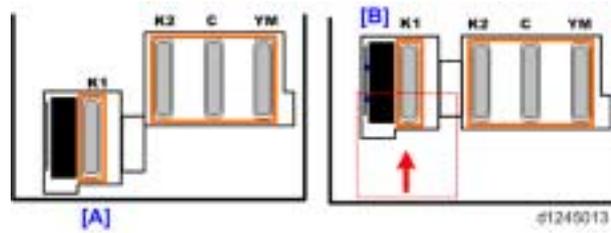
- The four steps of the cleaning cycle are done for each print head that requires cleaning.
  - ◆ 1. Sliding the cleaning unit to the rear
  - ◆ 2. Lifting the suction cap
  - ◆ 3. Suction
  - ◆ 4. Scraping and wiping

Slide 353

**No additional notes**

## Cleaning Cycle

### Step 1. Sliding the Cleaning Unit to the Rear - 1

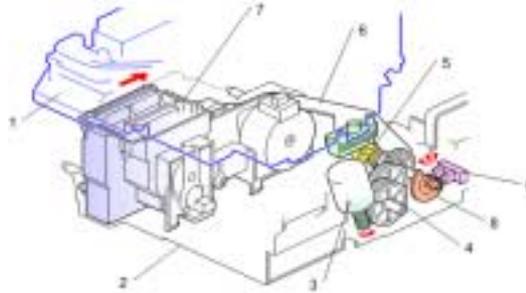


- ❑ This step moves the cleaning unit from [A] to [B] in order to clean the K2, C, and YM print heads.
- ❑ This step is done for cleaning the K2, C, and YM print heads in order to position the suction cap (print head cap for K1) correctly.
- ❑ When the K1 print head is to be cleaned, the cleaning unit is positioned to start cleaning immediately with the suction cap forward at [A].

Slide 354

**No additional notes**

## Cleaning Cycle Step 1. Sliding the Cleaning Unit to the Rear - 2

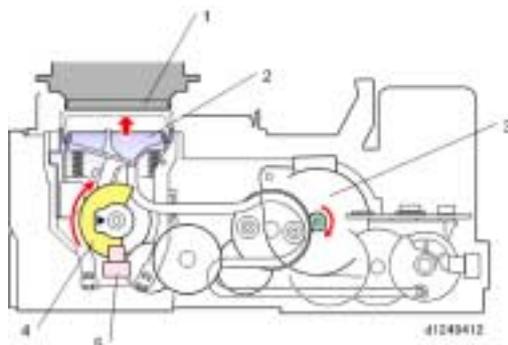


- ❑ At the start of the cleaning cycle, the carriage unit (1) positions itself over the maintenance unit (2).
- ❑ The lift motor (3) rotates in reverse and drives the gear train (4).
- ❑ The gears rotate a shaft with a large cam (5) between two swinging plates attached to the slide arm (6), which is linked to the cleaning unit (7)
- ❑ When the cam pushes the front plate forward, the slide arm and cleaning unit move to the rear.
- ❑ When the slide actuator (8) (attached to the same shaft driven by the lift motor) activates the slide sensor (9), the lift motor switches off.
- ❑ The cleaning unit is now at the rear.

Slide 355

**No additional notes**

## Cleaning Cycle Step 2. Lifting the Suction Cap

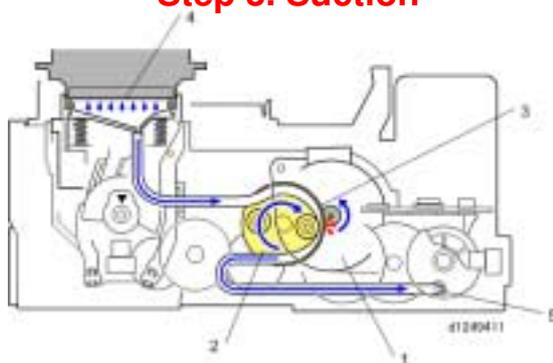


- ❑ The carriage moves to the left and stops when the print head (1) to be cleaned is directly above the suction cap (2).
- ❑ The maintenance motor (3) rotates forward and raises the suction cap.
- ❑ The suction cap actuator (4) and suction cap sensor (5) signal the machine to turn off the motor when the cap is up and sealed on the print head.
  - ◆ The actuator is attached to the shaft with the cam driven by the maintenance motor to raise the suction cap.

Slide 356

**No additional notes**

## Cleaning Cycle Step 3. Suction

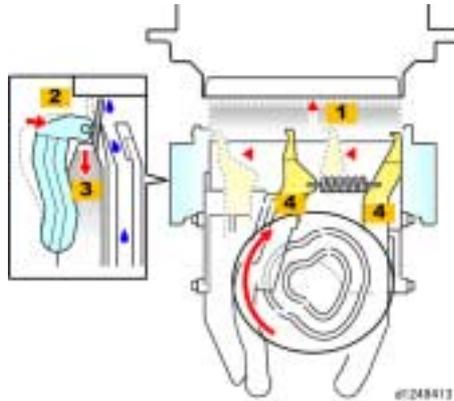


- ❑ The maintenance motor (1) reverses and rotates the cam inside the suction pump (2).
- ❑ The rotation of the cam alternately squeezes and releases the suction tube (3) to create enough pressure to pull ink from the surface of the print head (4).
- ❑ The ink is pulled through the tube which exits at the back of the maintenance unit (5) and continues down to the ink collector tank below the maintenance unit on the right side of the machine.
- ❑ The suction cap lowers away from the print head after suctioning ink for the correct time.

Slide 357

**No additional notes**

## Cleaning Cycle Step 4. Scraping and Wiping



- ❑ After lowering the suction cap, the maintenance motor continues to rotate, and drives the cam and linkages that control the scraping and wiping.
- ❑ The rubber scraper [1] is raised to the surface of the print head.
- ❑ The knock lever [2] taps the edge of the scraper, to scrape ink from the print head. The ink falls into a vent [3] which opens over the right ink sump below the maintenance unit.
- ❑ Next, the linkage cocks the spring loaded wipers [4] to the rear, and then releases them so that they spring forward and flick any remaining ink into the vent. This is done twice.
- ❑ This completes the cleaning cycle.

Slide 358

**No additional notes**

## Manual Print Head Cleaning and Flushing

- ❑ **The operator can use the User Tools to clean and flush the print heads whenever a problem with printing occurs.**
  - ◆ Every execution of print head cleaning and flushing is recorded in NVRAM by a counter (0 to 999999).
  - ◆ The service technician can keep track of how many times the operator is cleaning and flushing the print heads with SP7212 (User Cleaning) and SP7213 (User Refreshing).
  - ◆ Humidity can affect the number of times the print heads require cleaning and refreshing.

Slide 359

- ❑ Details of how to use the User Tools follow later in this training course.

## Automatic Downtime Cleaning - 1

- ❑ Ink can thicken or dry around the nozzles if a print head remains idle for a long time, especially at low temperatures. This can affect the quality of printing.
- ❑ To prevent this, the machine will execute a maintenance cleaning cycle that is appropriate for the length of time that the print heads have remained idle.
- ❑ This is done automatically without intervention by the operator.
  - ◆ It is done automatically at power on, job start, and recovery from sleep mode.
- ❑ Idle (or downtime) refers to the length of time that a print head has not been used.
  - ◆ For example, if the machine is used for extensive black-and-white printing, a count of idle time for the color print heads (C, YM) is maintained.

Slide 360

**No additional notes**

## Automatic Downtime Cleaning - 2

- ❑ **The machine monitors two phases of downtime.**
  - ◆ Idle time 1: Starts after the last sheet exits and all the print heads are capped
  - ◆ Idle time 2: Amount of time each head has remained idle
- ❑ **These idle time counts are used to determine which of these operations to execute:**
  - ◆ Air purging (ink supply and purging, filling and cleaning, and air purging/filling together)
  - ◆ Ink supply sequence
  - ◆ Cleanings and flushing (refreshing)
  - ◆ Ink purging done after idle time
- ❑ **The type of maintenance operation is selected automatically, based on the time that has passed after the start of downtime.**
  - ◆ The maintenance cycle could be brief or require several minutes, depending on ambient conditions and how long the print heads have remained idle.

Slide 361

**No additional notes**

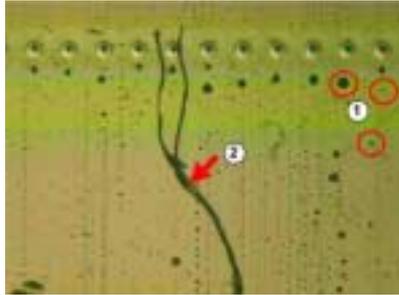
### Automatic Downtime Cleaning - 3

Down Time	Approximate Time	Try to Detect Air?	If air is detected in a print head *1	If no air is detected
< 10 hrs	16 seconds	No	---	---
10 – 24 hrs	9 seconds (power on) 16 seconds (job start)	Yes	Ink supply, air purge/ink fill sequence	Small downtime ink purge
24 hrs – 3 days	3 minutes	Yes	Ink supply, air purge/ink fill sequence	Large downtime ink purge
3 days – 7 days	3 minutes or more	Yes	Ink supply, air purge/ink fill sequence	Large downtime ink purge, three times
7 days – 45 days	30 minutes	Yes	Ink supply, air purge/ink fill sequence, then downtime cleaning	Downtime cleaning
> 45 days	More than 30 minutes	Yes	Ink supply, air purge/ink fill sequence, then downtime cleaning	Ink fill sequence, then downtime cleaning

Slide 362

- ❑ \*1: The operations mentioned in this column are done only for print heads that have air detected.

## Automatic Mist Removal



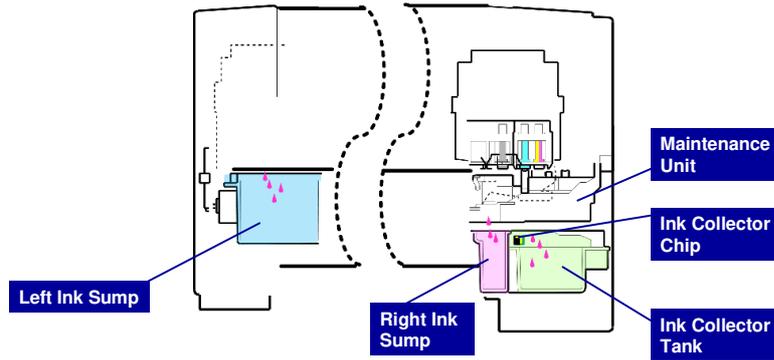
- ❑ Over time, ink can cling to the nozzles and accumulate inside the suction cap and the protective caps of the maintenance unit.
- ❑ Paper dust can also accumulate and interfere with the operation of the nozzles.
- ❑ The illustration above shows droplets of mist (1) and paper fibers/dust (2) that can collect near the nozzles.
- ❑ This condition is corrected with periodic automatic cleaning while the printer is in use, greatly extending the length of time the machine can be used without operator intervention.

Slide 363

### Factors that trigger automatic mist removal

- ❑ Mist count. A "mist count" triggers automatic cleaning. This mist count can be extended to increase the timing between automatic cleanings. The mist count has been doubled for this machine.
- ❑ Count adjustment. The count is automatically adjusted for the width of the paper and total print area.
- ❑ Paper dust count. The paper dust count (the total number of pages printed, cutting count) is used to determine when cleaning is done for paper dust.

## Waste Ink Collection

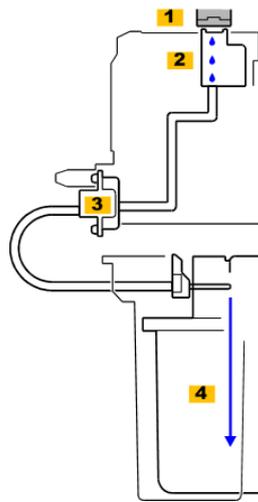


- ❑ The ink collector tank collects the ink taken from the print heads by the suction pump in the maintenance unit.
- ❑ The ink collector chip detects when the ink collector tank is installed correctly. It will signal an error if the tank is not installed correctly, and printing is disabled.
  - This chip also detects when the ink collector tank is full.
- ❑ The right ink sump is directly below the K1 print head cap of the maintenance unit. It collects the ink that is wiped and scraped from the print heads at the end of the cleaning cycle.
- ❑ During printing, the machine occasionally flushes ink through the print head nozzles (with a very small amount of ink) which falls into the left ink sump.
  - This keeps the nozzles primed and in good working condition.
  - This operation is controlled by the machine firmware and is not part of the print head cleaning cycle.

Slide 364

**No additional notes**

### Ink Collector Tank - 1



- The ink collector tank collects ink during print head cleaning.
- Ink taken from the surface of the print head [1] by the suction cap [2] and suction pump [3] flows directly out from the rear of the maintenance unit to the ink collector tank [4].

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Slide 365

**No additional notes**

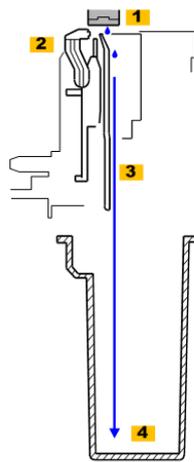
## Ink Collector Tank - 2

- ❑ **The ink collector tank must be replaced after it becomes full.**
  - ◆ The ink collector tank has an ID chip that confirms when the tank was installed, and that it is the correct type of tank for the machine.
  - ◆ The machine cannot operate if the tank is not installed correctly.
  - ◆ The machine informs the operator when the tank is near-full and full. These alerts are triggered by the information stored in the ID chip.
    - » The machine counts the number of times the maintenance unit sucks ink from the print heads during the head maintenance cycle. The count is stored in the ID chip.
    - » The near full alert is triggered at 361 cc and the tank full alert is triggered at 425 cc.
  - ◆ The ink collector tank must be replaced; it cannot be emptied and reused.
    - » After a tank becomes full, an "end history" setting is written into the ID chip to prevent the tank from being used again.

Slide 366

- ❑ The tank near full and full limits can be adjusted with SP2507-001 or 002, but this not recommended.
- ❑ Tank near full. A prompt appears on the operation panel of the machine, and the machine will continue to operate.
- ❑ Tank full. A prompt appears on the operation panel of the machine. If a page is being printed, the job will finish, and then the machine will shut down and cannot be used until after the tank has been replaced.

### Right Ink Sump - 1



- The ink scraped and wiped from the print head [1] by the scraper and wipers [2] flows through a vent [3], to the right ink sump [4].

Slide 367

**No additional notes**

## Right Ink Sump - 2

- ❑ **The machine tells the operator when this tank is near-full and then full.**
  - ◆ The machine counts the usage of the wiper mechanism in the maintenance unit.
  - ◆ Two strokes of the wiper removes ink from the cleaning plate and drops the ink down into the sump below.
  - ◆ The wiper operation count is stored in NVRAM. The right ink sump has no ID chip.
  - ◆ The tank is near full at 125 cc and full at 147 cc. The estimated time between replacements is about 5 years.

Slide 368

- ❑ Tank near full. A prompt appears on the operation panel of the machine, and the machine will continue to operate.
- ❑ Tank full. A prompt appears on the operation panel of the machine. If a page is being printed, the print will finish. Then the machine will shut down. It cannot be used until after the tank has been replaced with a new tank and the counter reset with SP2505-002.

### Right Ink Sump - 3

- ❑ The tank must be replaced when full.
- ❑ The count must be reset with SP2505-002 after the right ink sump has been replaced. There is no sensor to detect when the right ink sump is removed and inserted.
- ❑ Cover the slits of the old ink sump with tape and place it in a sealed plastic bag for disposal.
- ❑ Obey the local laws and regulations regarding disposal of items such as waste ink tanks that contain waste ink.

Slide 369

**No additional notes**

## Left Ink Sump - 1

- ❑ **Occasionally, a printing job will pause long enough for the carriage to move to the left and purge ink over the left ink sump on the left side of the machine.**
  - ◆ The machine refers to a lookup table to determine how to execute purging. The purge intervals and amount of ink released is determined by the ambient temperature and humidity.
    - » Temperature and humidity are always sampled by the temperature/humidity sensor immediately before a scheduled purging.
  - ◆ Normally, purging is done in this order: C, YM, K1, K2, with no delay between color and black purging.
  - ◆ Purging may be slightly slower at cooler temperatures around 15° C (59° F).
- ❑ **The machine tells the operator when this tank is near-full and then full.**
  - ◆ Near full: 425 cc
  - ◆ Tank full: 500 cc
  - ◆ Estimated time between replacements: about 5 years
  - ◆ The left ink sump has no ID chip.

Slide 370

- ❑ Tank near full. A prompt appears on the operation panel of the machine, and the machine will continue to operate.
- ❑ Tank full. A prompt appears on the operation panel of the machine. If a page is being printed, the job will finish, and then the machine will shut down and cannot be used until after the tank has been replaced.

## Left Ink Sump - 2

- ❑ The tank must be replaced when full.
- ❑ The count must be reset with SP2505-001 after the left ink sump has been replaced. There is no sensor to detect when the left ink sump is removed and inserted.
- ❑ Cover the slits on top of the left ink sump with the covers provided with the new unit.
  - ◆ If the covers are not available, cover the slits of the old ink sump with tape and place it in a sealed plastic bag for disposal.
- ❑ Obey the local laws and regulations regarding disposal of items such as waste ink tanks that contain waste ink.

Slide 371

**No additional notes**

**RICOH**

**D124  
Service Training**

**Maintenance Unit  
Replacement and Adjustment: Important Points**

Slide 372

**No additional notes**

## Service Precautions Maintenance Unit Base Plate



- **The maintenance unit base plate supports the maintenance unit. These screws hold the base plate under the maintenance unit, which must always remain in the same position below the carriage print heads.**
  - ◆ The two base plate screws at the back on the right rear panel should never be loosened or removed.
  - ◆ There are also two paint-locked screws at the front. One screw at the front below the switch bracket [A] on the right. The other screw [B] is to the right of the temperature/humidity sensor above the ink supply unit.

Slide 373

**No additional notes**

## Ink Collector Tank



- ❑ Pull the tank [A] straight out of the machine.
- ❑ Lay the tank on a flat surface with port [B] facing up.
  - ◆ The port at [B] is open and will leak ink if the tank is turned on its side or upside down.
- ❑ After replacing the ink collector tank:
  - ◆ Remove and clean the left ink sump.
  - ◆ Clean the suction cap and wiper blade of the maintenance unit.

Slide 374

**No additional notes**

## Ink Collector Tank Sensor



d124-570

- ❑ Make sure that you install the sensor the correct way up.

Slide 375

**No additional notes**

## Maintenance Unit Counters

- You can check the status of the maintenance unit with two counters:
  - ◆ SP2231-003 (PM Counter Indication - Maintenance Unit). Displays the status of the maintenance unit as the amount of usage remaining (a percent).
  - ◆ SP2231-008 (PM Counter Indication - PM Counter Maintenance Unit). Displays the status of the maintenance unit as the distance (mm) of paper fed

Slide 376

**No additional notes**

## Removing the Maintenance Unit



- ❑ A reinforcing plate is mounted inside the inner surface of the right cover, just above the maintenance unit [A].
- ❑ The heads of the screws are visible around the lift motor [B] on the outer surface of the plate.
- ❑ Never loosen or remove these four screws.

Slide 377

**No additional notes**

## Removing the Maintenance Unit

- ❑ Be careful not to hit the caps on the machine frame when you pull the maintenance unit out of the machine.
- ❑ The bottom edges of the maintenance unit are covered with ink and will stain any surface where it is placed.
- ❑ Always set the maintenance unit on a surface covered with paper that will absorb ink and can be discarded later.
- ❑ When you reassemble the machine, clean the maintenance unit after you clean the ink collection unit.
- ❑ If you install a new maintenance unit, do SP2102-001 to reset the maintenance unit counter.

Slide 378

**No additional notes**

## Cleaning Procedures in the User Tools



- ❑ **Clean Print-heads:** Do this when you see broken lines or white patches in the Nozzle Check Pattern. Cleaning consumes ink. Never clean the print heads unless the Nozzle Check Pattern is abnormal.
- ❑ **Flush Print-heads:** Do this only after three consecutive cleanings and three checks of the Nozzle Check Pattern show that the problem has not be corrected.
- ❑ **Auto Adjust Print Head Position:** Do this procedure if you see broken vertical lines or blurred, smeared, or streaked colors.
- ❑ **Manual Adjust Head Position:** Do this procedure if the "Auto Adjust Print Head Position" execution fails.
- ❑ **Print Nozzle Check Pattern.** Print this to detect blockages in the flow of ink from one or more of the print heads. Clean the print heads up to three times. If the third cleaning fails, flush the print heads.
- ❑ **Adjust Paper Feed:** Do this procedure if you see broken horizontal lines, patchy images, or white lines at regular intervals in your printouts.
- ❑ **Adjust Print Position:** Do this procedure to adjust the print start position at the upper left corner of each sheet where printing starts.

Slide 379

*Replacement and Adjustment > Print Head Cleaning and Adjustment*

## Checking the Nozzles - 1



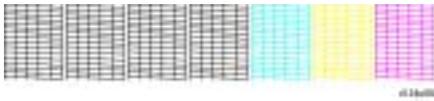
- ❑ **Paper Bypass Location: Bypass feed**
  - ◆ This will not appear if paper is not set for bypass feed.
- ❑ **Paper Input Location 1: Roll Unit 1**
- ❑ **Paper Input Location 2: Roll Unit 2 (Option)**
  - ◆ This will not appear if Roll Unit 2 is not installed.
- ❑ **Select the paper feed station and then touch [OK].**
  - ◆ A message will ask you to wait while the pattern is printing.

Slide 380

**No additional notes**

## Checking the Nozzles - 2

**No Problems**



**Cleaning Required**



- ❑ Use a loupe or magnifying glass to check the condition of the pattern.

- ◆ If the pattern shows no broken lines, the machine is ready for operation.
- ◆ If you see bare patches caused by broken lines, one or more print heads need cleaning or flushing.

Slide 381

- ❑ We already studied this during the Installation section of the course.

## Cleaning the Print Heads



- ❑ **Print head cleaning consumes ink. Do this procedure only if there are broken lines or white patches in the printed Nozzle Check Pattern.**
- ❑ **First, check the ink level indicator in the printer driver to confirm that there is ink in the cartridge.**
  - ◆ If one or more ink tanks are empty, replace the ink cartridge, and then print another Nozzle Check Pattern.
- ❑ **Cleaning one print head takes about 60 s. The Magenta and Yellow print heads require about 120 s.**
- ❑ **After cleaning is finished, print another Nozzle Check Pattern and check the results.**
- ❑ **If one or more pattern is abnormal, repeat the cleaning procedure.**
- ❑ **After cleaning three times, if one or more of the patterns is abnormal, flush the print head where the pattern is abnormal.**

Slide 382

**No additional notes**

## Flushing the Print Heads



- Print head flushing consumes a lot of ink. Never flush the print heads until three print head cleanings have failed to solve the problem.
- Flushing a print head requires about 3 minutes.
- After flushing has finished, print another Nozzle Check Pattern.
- If the pattern is still broken after flushing, do the procedure on the next slide.

Slide 383

**No additional notes**

## If the Nozzle Check Pattern is No Good Even After Three Cleanings and One Flushing

1. **Make sure that the ambient temperature and humidity are within the acceptable range:**
  - ♦ Temperature Range: 10° C to 27° C (50° F to 81° F)
  - ♦ Humidity Range: 15% to 80% Rh
2. **Clean the print heads once, and then print a Nozzle Check Pattern.**
3. **If the Nozzle Check Pattern is abnormal, let the machine remain idle for 10 minutes.**
4. **Execute two more cleanings and one flushing.**
  - ♦ Be sure to print a Nozzle Check Pattern after each cleaning and the flushing.
  - ♦ Any time that you see an unbroken Nozzle Check Pattern, you can stop.
5. **If the Nozzle Check Pattern is still not perfect, let the machine remain idle for 8 hours.**
6. **Execute three more cleanings and one flushing.**
  - ♦ Be sure to print a Nozzle Check Pattern after each cleaning and the flushing.
  - ♦ Any time that you see an unbroken Nozzle Check Pattern, you can stop

Slide 384

- ❑ We saw this already in the Installation section of the course.

## If the Nozzle Check Pattern is No Good Even After Three Cleanings and One Flushing

### 7. If the results are still not satisfactory, open SP2100-004.

- ◆ Enter the number of the print head that is abnormal.
  - » Head 1, K1 (Black), enter 1
  - » Head 2, K2 (Black), enter 2
  - » Head 3, C (Cyan), enter 4
  - » Head 4, YM (Yellow/Magenta), enter 8
  - » All, (K, C, Y, M), enter 15
  - » If you need to flush more than one head (but not all), add their entry numbers and then enter the sum.
  - » For example, to clean Head 2 and Head 3, add 2 + 4 and enter "6".

### 8. If this does not correct the problem, replace the print head unit that holds the defective print head.

Slide 385

- ❑ We saw this already in the Installation section of the course.

## Auto Adjust Head Position - 1



- ❑ **Adjust the print head position if you see these problems in the prints:**
  - ◆ Broken vertical lines
  - ◆ Blurred or streaked colors
- ❑ **Select a Paper Source and a Resolution**
  - ◆ Target Location (Paper Source):
    - » Paper Bypass Location: Bypass paper feed
    - » Paper Input Location 1: Roll Unit 1
    - » Paper Input Location 2: Roll Unit 2
  - ◆ Resolution:
    - » Speed: Draft
    - » Standard: Standard quality
    - » Quality: High quality

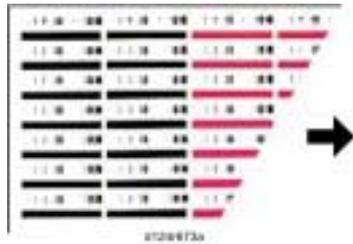
Slide 386

**No additional notes**

## Auto Adjust Head Position - 2



- ❑ Touch [Start Printing].
- ❑ A pattern is printed.
- ❑ If the adjustment succeeded, the pattern will look like this.
  - ◆ The black arrow indicates the direction of paper feed.
- ❑ If the automatic adjustment fails, "Failed to adjust" will appear.
  - ◆ You must do the adjustment manually. (See the next slide.)



Slide 387

**No additional notes**

## Manual Adjust Head Position - 1

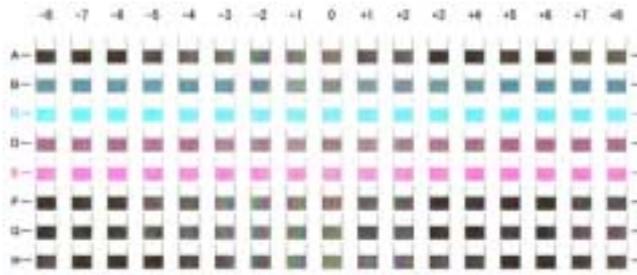


- ❑ **Select a Paper Source and a Resolution, and touch [Start Printing].**

Slide 388

**No additional notes**

## Manual Adjust Head Position - 2

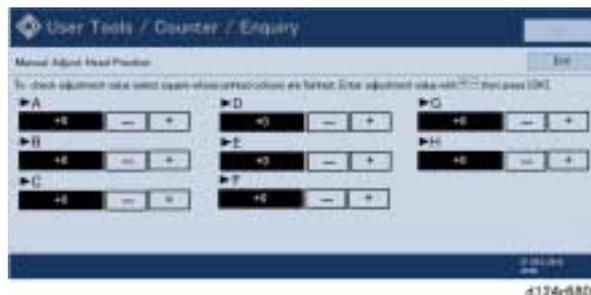


- ❑ Look at the test pattern.
- ❑ In each row (A to H), Identify the number of the column where the square is faintest, or select the square where the internal lines overlap to form a solid color.
  - ◆ The number above the square is the adjustment value.
  - ◆ If you still cannot determine the adjustment value, select the square that is between the straightest vertical lines.

Slide 389

**No additional notes**

## Manual Adjust Head Position - 3



- ❑ Touch [Adjustment].
- ❑ Input a value for each row.
  - ◆ Use the + and – buttons.
- ❑ Print another test pattern to make sure that the adjustment is correct.
  - ◆ The numbers that you just entered must correspond to the condition of the patches on the new test chart, as explained on the previous slide.

Slide 390

**No additional notes**

## Adjust Paper Feed - 1

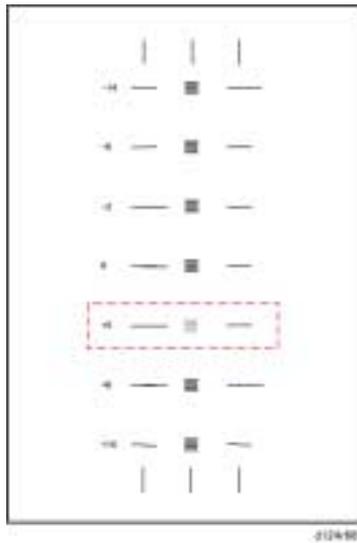


- ❑ **Adjust paper feed if you see these problems in the prints:**
  - ◆ Broken horizontal lines
  - ◆ Patchy images (uneven filled areas)
  - ◆ White lines at regular intervals
- ❑ **Select [Print Test Sheet] for the required paper feed source.**

Slide 391

**No additional notes**

## Adjust Paper Feed - 2



- The adjustment value appears to the left of the lightest gray square with straight horizontal lines on both sides.

Slide 392

**No additional notes**

## Adjust Paper Feed - 3



- Touch [Adjustment].
- Touch the plus or minus key to enter the value from the test print.

Slide 393

**No additional notes**

## Adjust Print Position - 1



- ❑ Do this procedure to check and adjust the print start position at the upper left corner of each sheet.

Slide 394

**No additional notes**

## Adjust Print Position - 2



- ❑ A test pattern prints. The black arrow indicates the direction of paper feed.
- ❑ Rotate the test sheet 180 degrees. [A] is the top margin and [B] is the left margin.
- ❑ Touch the arrow keys to adjust the margins.
  - ◆ Increasing the value for the top and left margin moves the print position down and to the right.
  - ◆ You will see the blue square move as you change the settings, so you can confirm the effect of the changes.

Slide 395

**No additional notes**



**RICOH**

**D124**  
**Service Training**

**Maintenance**

Slide 396

**This section explains the main points about maintenance. For full details about the PM table, and the cleaning and lubrication procedures, see the Maintenance section in the Field Service Manual.**

**PM Table: Important Points to Note**

- ❑ **Replacement**
  - ◆ Maintenance Unit: Replace every 20 km
  - ◆ Print Head Units: Replace every 20 km, if necessary
    - » After replacing a print head unit, print the nozzle check pattern. If defects appear, do the print head cleaning procedure, and the flushing procedure also if needed.
  - ◆ Ink collector tank: Replaced every 8 km. The customer replaces this. Take away the full tank and leave an empty one on the shelf for the customer.
- ❑ **Cleaning:**
  - ◆ Every 10 km: Exposure glass, DRESS sensor, original feed sensors, Ink tube guide, platen (paper feed table), paper feed rollers
    - » If the customer uses tracing paper, or frequently uses Quality Mode, the DRESS sensor should be cleaned every 5 km. Tracing paper has a low reflectivity, so the sensor needs to be more sensitive.
  - ◆ Every 30 km: Original width sensors
  - ◆ Other parts: Clean at scheduled visit or when needed
- ❑ **See the PM table for full details.**

Slide 397

*Service Manual > Maintenance > PM Table*

- ❑ Nozzle check, cleaning, flushing: Was explained in the Installation section.
- ❑ The left ink sump and right ink sump can also be easily replaced but these are not considered as "PM Parts" because their service life will normally extend beyond the service life of the machine.
- ❑ The PM intervals of parts may vary, depending on the amount of coverage in prints and the color usage ratio. The expected color ratio for this machine is 9:1 (9 black-and-white prints for every 1 color print.)

## PM Counters

- **After replacing a PM part, reset the counter.**
  - ◆ Black Print Head Unit (K1, K2): SP 2400-001
  - ◆ Color Print Head Unit (C, YM): SP 2400-001
  - ◆ Ink Collector Tank: ID chip
    - » An ID chip inside the ink collector tank records the count and disables the tank at the end of its service life. The ID chip of the new tank automatically starts a new count. No SP setting is required.
  - ◆ Maintenance Unit: SP 2102-001

Slide 398

**No additional notes**

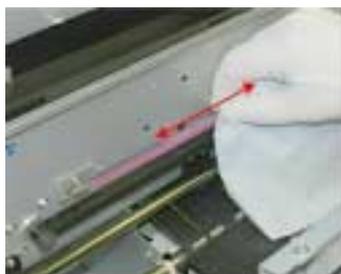
## Cleaning Overview

- ❑ The service manual has detailed procedures for cleaning all components.
- ❑ The next few slides contain some important points about cleaning some of the components that are not normally seen in copiers.
- ❑ See the service manual for full details.

Slide 399

*Service Manual > Maintenance > PM Cleaning Points*

## Cleaning Horizontal Encoder



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- ❑ **Wipe both sides of the encoder strip with a piece of clean linen cloth dampened with alcohol.**
  - ◆ Clean the strip as far as the carriage on the right, move the carriage to the left, and then clean the other end of the strip.
- ❑ **Never touch or handle the surface with bare hands. Never use a cotton swab or cotton ball, tissue paper, or any other material that could shed and leave fibers on the edge of the encoder wheel.**
  - ◆ Smudges, fingerprints, and foreign objects can interfere with the sensor readings.

Slide 400

**No additional notes**

## Cleaning Ink Level Sensors

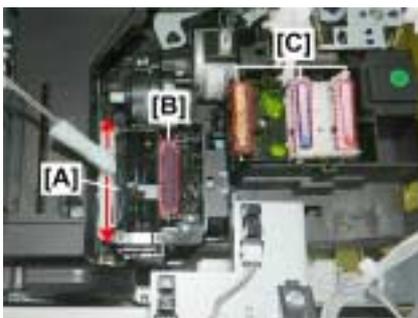


- ❑ Move the carriage unit to the left, using SP 2102-4, as explained earlier.
- ❑ Clean the sensors with a blower brush.

Slide 401

**No additional notes**

## Cleaning Maintenance Unit



- ❑ After replacing the ink collector unit, always remove ink that has hardened around the wiper blade [A], suction cap [B], and three print head caps [C].
- ❑ Use a tightly wrapped linen cloth dampened with water.
- ❑ Never use cotton, tissue, or any other material that could leave fibers around the suction cap or the print head caps.
- ❑ Make sure the cloth is only slightly damp. Do not allow any water near the protective caps [C]. Water on the caps could seep onto the print head nozzles and dilute the ink.

Slide 402

**No additional notes**

## Cleaning Right Ink Sump



- ❑ **Replace the right ink sump when the machine alerts you that it is full.**
  - ◆ Cover the top of the tank with some paper and tape, and then discard it.
  - ◆ Follow the local laws and regulations regarding the disposal of this item.
  - ◆ Never attempt to empty the right ink sump and re-use it.
- ❑ **The count must be reset with SP2505-002 after the right ink sump has been replaced.**

Slide 403

- ❑ The ink sump has a very long service life (longer than the machine life).

## Cleaning Left Ink Sump

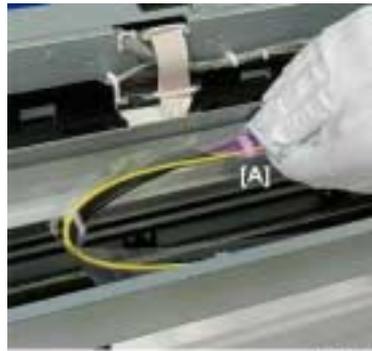


- ❑ Use a dry cloth wrapped around the tip of a small screwdriver to clean around the openings.
- ❑ Use the bare tip of a small screwdriver to remove hardened ink that cannot be removed by wiping with the cloth.
- ❑ Replace the left ink sump when the machine alerts you that it is full.
  - ◆ Follow the local laws and regulations regarding the disposal of this item.
  - ◆ Never attempt to empty the left ink sump and re-use it.
- ❑ The count must be reset with SP2505-001 after the left ink sump has been replaced.

Slide 404

- ❑ The ink sump has a very long service life (longer than the machine life).

## Cleaning Ink Tube Guide

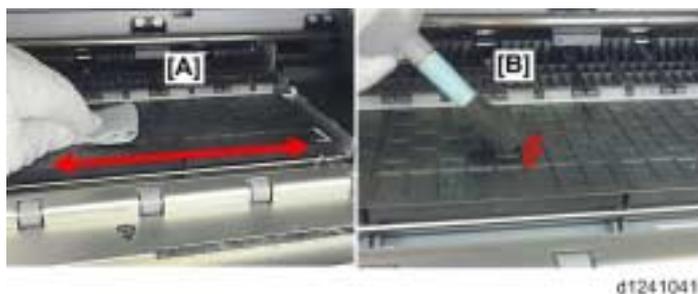


- ❑ Use a damp cloth to clean the back of the guide where it rubs against the frame during operation.

Slide 405

**No additional notes**

## Cleaning Platen



- ❑ Use a linen cloth dampened slightly with water to clean the surface of the platen [A]. Then wipe with a dry cloth.
  - ◆ Never use alcohol to clean the platen.
- ❑ Use a blower brush to clean the holes in the plates [B].

Slide 406

**No additional notes**

## Cleaning Vertical Encoder



- ❑ While turning gear [A] and the wheel, clean the edge of the wheel [B] with a piece of clean linen cloth dampened with alcohol.
- ❑ **Never touch or handle the surface with bare hands. Never use a cotton swab or cotton ball, tissue paper, or any other material that could shed and leave fibers on the edge of the encoder wheel.**
  - ◆ Smudges, fingerprints, and foreign objects can interfere with the sensor readings.

Slide 407

**No additional notes**

## Cleaning Roll End Sensors, Roll Unit Paper Release Sensor

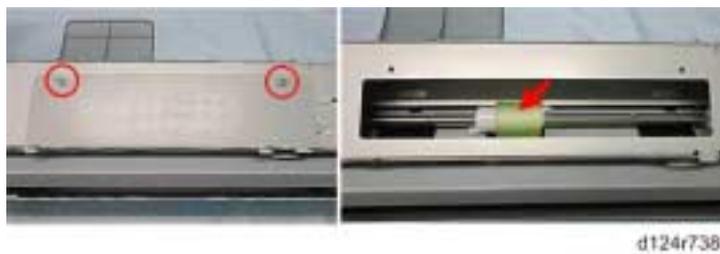


- ❑ Clean these sensors with a blower brush.
- ❑ Paper dust can get on these sensors, especially the roll end sensors.

Slide 408

**No additional notes**

## Cleaning Roll Feed Roller



- ❑ Clean the roller with a dry, clean cloth to remove paper dust.

Slide 409

**No additional notes**

## Cleaning DRESS Sensor

- ❑ Clean with a cotton swab or dry cloth.
- ❑ Ink can build up on this sensor. This can cause errors in width detection and registration when using glossy or translucent paper.
- ❑ The customer cannot clean this sensor.
- ❑ The recommended cleaning interval is 10 km, but if the customer uses tracing paper, or frequently uses Quality Mode, the DRESS sensor should be cleaned every 5 km.
  - ◆ Tracing paper has a low reflectivity, so the sensor needs to be more sensitive.

Slide 410

**No additional notes**

## Ink Collector Tank



#124101

- ❑ The PM interval for the machine is 10 km. But the ink collector tank fills up at about 8 km (depending on the image contents of the printouts that have been made).
- ❑ The user can replace this tank easily, so when you arrive at 10 km, you can take away the old tank from the shelf and put a new empty one on the shelf in its place.

Slide 411

**No additional notes**

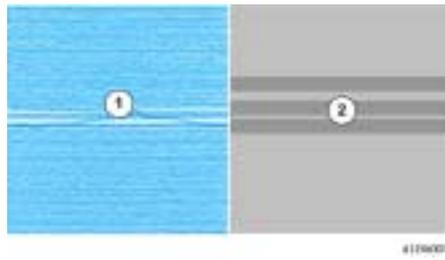
**RICOH****D124  
Service Training****Troubleshooting for the Printer Engine**

Slide 412

*Service Manual > Troubleshooting > Printing Problems*

- ❑ This section gives an outline of troubleshooting steps for various symptoms. Refer to the service manual for full details.

## White Lines or Horizontal Banding



- Print heads may be clogged; do the Clean Print-heads procedure from the Maintenance Menu. Use Flush Print-heads if necessary.
- Do the Adjust Paper Feed procedure from the Maintenance Menu.
- Clean or replace the maintenance unit.
- Inspect the vertical encoder wheel for dirt or damage. Clean or replace.
- Replace the print head unit(s).
- Replace the carriage unit.

Slide 413

### *Replacement and Adjustment > Print Head Cleaning and Adjustment*

- Maintenance Menu: Clean Print-heads, Flush Print-heads, etc were described in the Maintenance section of this course (Cleaning Procedures in the User Tools)

## Horizontal Lines In Margins



d124:002

- If there are horizontal lines in areas (1) and (2):
  - ◆ Replace the print head units.
  - ◆ Replace the carriage unit.

Slide 414

**No additional notes**

## Vertical Banding (White or Colored)

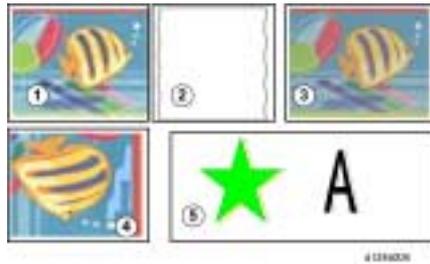


- Print Head Out of Position; do the Adjust Print Head procedure from the Maintenance Menu.
- Check the horizontal encoder strip and make sure that it has been installed correctly.
- Inspect the horizontal encoder strip for dirt or damage. Clean or replace it.

Slide 415

**No additional notes**

**Poor Image Quality**



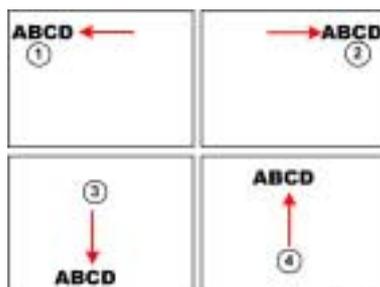
- (1) Image blurred
- (2) Lines not straight
- (3) Overall poor color quality
- (4) Uneven density
- (5) Double lines in graphics or text

- Gap Adjustment:** Make sure that the gap between the carriage and the platen is correct for the type and thickness of the paper.
- Print heads clogged:** Clean the print head(s). Flush them if necessary.
- Paper feed is faulty:** Do the Adjust Paper Feed Procedure
- Horizontal Encoder Strip:** Make sure it has been installed correctly. Clean or replace if dirty or damaged.

Slide 416

**No additional notes**

## Text Out of Position



- Inspect the horizontal encoder strip for dirt or damage. Clean or replace.
- Inspect the vertical encoder wheel for dirt or damage. Clean or replace.
- Inspect the platen for shreds of paper or other obstacles.
- Inspect the platen plates for dirt or damage. Clean or replace.
- Faulty Carriage: Replace the carriage unit.

Slide 417

**No additional notes**

## Ink Scattering

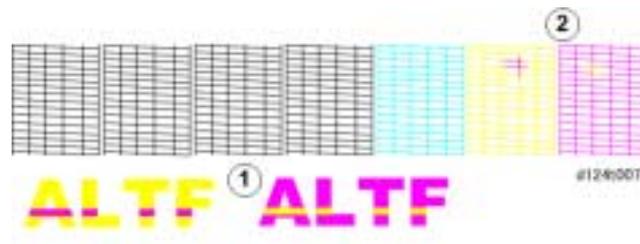


- ❑ **Gap Adjustment:** Make sure that the gap between the carriage and the platen is correct for the type and thickness of the paper.
- ❑ **Print heads clogged:** Clean the print head(s). Flush them if necessary.
- ❑ **Faulty Maintenance Unit:** Clean or replace.
- ❑ **Faulty Carriage Unit:** Replace.

Slide 418

**No additional notes**

## Mixed Colours



- ❑ **Mixed colors means two ink colors and one color seeps into the track of another color.**
  - ◆ This can occur only at the YM print head because the print head is shared.
- ❑ **Print heads clogged: Clean the YM print head. Flush if necessary.**
- ❑ **Faulty Maintenance Unit: Clean or replace.**

Slide 419

**No additional notes**

## Image Abraded, Paper Torn or Dog-eared, Ink Running



- Gap Adjustment:** Make sure that the gap between the carriage and the platen is correct for the type and thickness of the paper.
- Inspect the platen, carriage unit, and maintenance unit for paper fragments.**
- Dirty platen plates.**
- Faulty Carriage Unit: Replace.**

Slide 420

**No additional notes**

## Colour Too Light



- ❑ Make sure the printer driver color settings are set correctly.
- ❑ Enhance the image with an image editor.

Slide 421

**No additional notes**

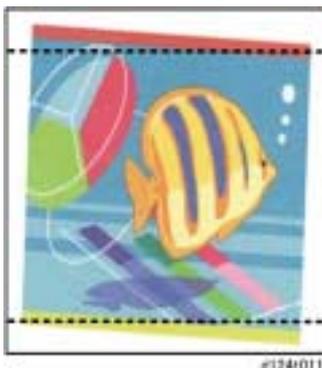
## Part of Image Missing, Text Misaligned



- Make sure that the printer driver settings for paper type match the type of paper loaded.
- Make sure all the print cartridges have sufficient ink.
- Faulty Controller: Replace the controller board.

Slide 422

**No additional notes**

**Skewed Image**

- ❑ **Inspect the platen, carriage unit, and maintenance unit for paper fragments.**

Slide 423

**No additional notes**

## Bold Text Not Printed as Bold

### **Print Head Array**

The print head array consists of tiny ports...



Print Head Array  
The print head array consists of tiny ports...

#126812

- Printer driver: Check the Increase bold with font size checkbox.**
- Make sure that bold was selected in the application.**

Slide 424

**No additional notes**



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

## Promote Use of Energy Saving Features

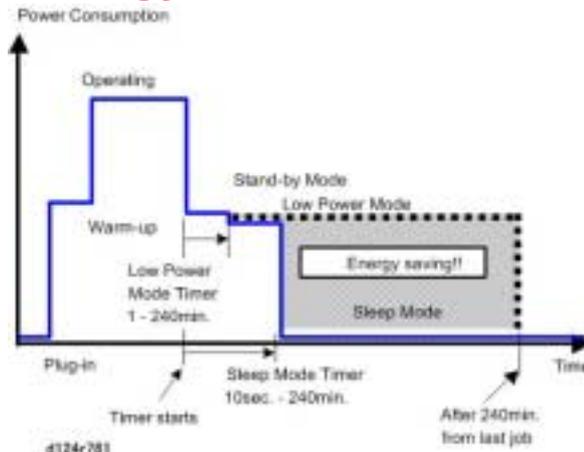
- **Energy Saver Mode**

- ◆ Proper use of energy saver modes saves energy and is environmentally friendly.

Slide 426

**No additional notes**

## Energy Saver Modes - 1/2



- ❑ Energy saver mode should be utilized to save energy & protect environment.
- ❑ Area shaded grey in diagram above represents amount of energy saved.

Slide 427

### Energy Saver Modes

- ❑ Customers should use energy saver modes properly, to save energy and protect the environment.
- ❑ The area shaded grey 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 min., the grey area will disappear, and no energy is saved before 240 min. expires.

## Energy Saver Modes - 2/2

### □ Timer Settings

- ◆ The user can set these timers with User Tools (System settings > Timer setting)
  - » Low power mode timer (1 to 240 min): Default setting: 1 minute
  - » Sleep mode timer (1 to 240 min): Default setting: 14 min.

### □ Return to Standby Mode

- ◆ Low Power Mode
  - » Recovery time: 1 sec.
- ◆ Sleep Mode
  - » Recovery time: 7 sec.

### □ Power Consumption

- ◆ Low power mode: 80W (EU), 70W (NA)
- ◆ Sleep mode: 2W

Slide 428

**No additional notes**



**No additional notes**