

This course explains how to service the Be-C2 series of wide-format blackand-white copiers.

These machines are successors to the Be-C1 and Be-C1.5 series.

The machine is very similar to the older models. However, there are some differences. The important ones are mentioned in this course. Also, see Guidance for Those Familiar with Predecessor Products in the field service manual, where all the differences are described in one section.

30 January: Slide 37 was corrected, and a new slide was added after this slide.









Course Overview	RICOH imagine. change.
<ul> <li>Product Outline</li> <li>Specifications</li> <li>Installation</li> <li>Machine Overview</li> <li>Scanning</li> <li>Processes Around the Drum</li> <li>Exposure</li> </ul>	

## **PRODUCT OUTLINE**

The model will be introduced.

The optional peripherals will be introduced.

The product concept, sales points, and targets will be presented.

### SPECIFICATIONS

The main specifications will be given. Significant items will be stressed.

### INSTALLATION

Installation of the machine and the peripherals will be covered.

Firmware update will be covered.

### MACHINE OVERVIEW

The components will be discussed briefly.

The copy process will be outlined.

The machine's organization and overall PCB structure will also be covered.

## SCANNING

The scanner mechanism and sensors will be described.

The optional document feeders will be dealt with in a later section.

#### PROCESSES AROUND THE DRUM

Drum drive, charge, drum cleaning, quenching, and other processes around the drum will be described

#### **EXPOSURE**

The latent image writing mechanism will be described.

This machine uses LED arrays.

Course Overview	RICOH imagine. change.
<ul> <li>Development and Toner Supply</li> <li>Paper Feed and Cutting</li> <li>Image Transfer, Paper Separation, and Paper Transport</li> <li>Fusing</li> <li>Paper Exit</li> <li>Maintenance</li> </ul>	
<ul> <li>Optional Paper Cassette</li> </ul>	
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## DEVELOPMENT AND TONER SUPPLY

The development process will be described.

Toner supply mechanisms and toner density control will also be described.

Toner end detection will also be described.

## PAPER FEED AND CUTTING

The paper feed mechanisms for the main body will be described.

The cutter will also be described.

The optional feed unit mechanisms are the same as for the main body, so do not require a separate section.

## IMAGE TRANSFER, PAPER SEPARATION, AND PAPER TRANSPORT

Image transfer and paper separation mechanisms will be described.

Transport from the drum to the fusing unit will be explained.

FUSING

Fusing will be described.

### PAPER EXIT

The paper feed out mechanisms will be described.

### MAINTENANCE

PM is described briefly.

## **OPTIONAL PAPER CASSETTE**

This describes the optional paper cassette mechanisms.

### **OPTIONAL FOLDER**

This describes the mechanisms in the optional fan folder and cross folder.



# PURPOSE OF THIS SECTION

The model will be introduced.

The optional peripherals will be introduced.

The product concept, sales points, and targets will be presented.





# APPEARANCE

This slide shows a front view of the machine.

Document feeder: One sheet at a time.

Document exits at top and rear; the rear exit is not shown here

Copy exits at front and rear (rear one not shown in the diagram).

Bypass Tray: One sheet at a time

Roll Tray 1: Contains two paper rolls (rolls 1 and 2)

Roll Tray 2 (Optional): Contains two paper rolls (rolls 3 and 4).



An optional paper cassette can be installed instead of an optional roll feeder. There are two trays.



The table is too high for most wheelchair users.





The blue line represents the USB cable. The red dots represent the points where the cable is connected.





This is the same option that was used with the Be-C1.

Note how this option can be used to stack originals coming out of the rear exit.

The diagram on the right shows how to adjust the tray to match the size of the originals.









If the folder option is installed, a stacker cannot be installed at the rear.



# FRONT VIEW

See Operating Instructions - About the Machine - Getting Started

Copy paper sources

Upper roll tray (item 8): Contains two paper rolls

Lower tray (item 10): Contains two paper cassettes or paper rolls. This tray is an optional item.

Bypass feed tray (item 16): Use this to make a copy on a sheet of cut paper.

To copy on cut paper, you must use the bypass tray or the optional cassette unit.

Paper must be print side up.

### Copy exits

Front exit (item 5)

There is another exit at the rear. It will be shown on the next slide.

For recommendations on which exit to use, see the Operating Instructions.

Copy/Document Server Reference > Basic Copying > Original and Copy Output Locations

### Other items

Note the locations of the power switch (item 6). This is the only power switch

Note the Scanner Stop key (item 11). Use this to stop scanning if the original starts to skew. Also use it to release the original after it has been scanned.

Depending on a user tool setting, the scanner holds on to the

trailing edge of the original after scanning, to prevent it from falling and being damaged. To release the trailing edge, press the Scanner Stop key.



# **REAR VIEW**

See Operating Instructions - About the Machine – Getting Started Original exit

Rear exit (item 1): The original is fed out to this exit.

# Copy exit

Rear exit (item 3): The copy is fed out to this exit.



The diagram shows the upper tray.

1. Anti-humidity heater switch

When humidity is high, paper in the paper tray may absorb moisture, which can affect copy quality. The anti-humidity heater prevents this.

Turn this switch on when humidity is high.

2. Paper holder

The two paper holders grip the paper roll and are mounted on the paper roll tray's roll holder.

3. Paper feed knob

Use when loading paper rolls or clearing paper jams.

4. Cutter knob

Use to manually cut paper if there are paper jams in the cutter area of the machine. Always return the cutter knob to the left or right end.

## 5. Auto feed button

The switch allows the user to feed the leading edge of a new roll into the machine properly. Press the key to feed paper, then release to cut the paper.

Use this to clear misfeeds in the paper feed area. Keep this button pressed to feed the roll paper continuously.

When approximately 100 mm (3.9") of paper length is fed, release the button so that paper will be cut automatically.

## 6. Roll holder

Adjust this to the size of the paper roll you are using. The anti-humidity heaters are not options in this machine. The switches are off by default, to meet Energy Star requirements.



The operation panel layout has been redesigned since the previous model.





Power Switch - 2	H nge.
<ul> <li>Power (+5V) is supplied to the machine, even after the power switch has been turned off.</li> </ul>	
<ul> <li>Before servicing, press the power switch, wait for the LCD and the power indicator on the operation panel to go off, and then disconnect the power cord.</li> </ul>	
<ul> <li>Press and release the power switch again.</li> <li>This second press dissipates any residual charge on the PCBs and makes it safe to remove the rear covers. It also sets the machine to switch on automatically after the power supply cord is connected again</li> </ul>	
<ul> <li>After the power cord has been disconnected, wait at least three minutes before removing any covers. Wait 10 minutes for the fusing unit to cool.</li> </ul>	27







A temperature/humidity sensor has been added below the transfer power pack to control the charge supplied by the transfer and separation power packs.

Sales Points	RICOH imagine. change.
<ul> <li>Sales Points</li> <li>High Speed: 10 ppm (D208) &amp; 14 ppm (D211)</li> <li>High Resolution: 600 dpi</li> <li>Color Scanner</li> <li>"Scan to Color Print" using "PrintCopy Tool" <ul> <li>Requires a color capable printer that can be accessed via net</li> </ul> </li> <li>Color LCD Operation Panel</li> <li>Scanner Separation Unit</li> <li>Support for Document Solutions and @Remote</li> <li>Outstanding Usability <ul> <li>Easy paper jam clearance</li> <li>Animated user guidance on LCD</li> <li>Easy-to-handle paper trays</li> </ul> </li> </ul>	imagine. change.
<ul> <li>Simplified display</li> </ul>	31



There is no IEEE1284 option.

The roll feeder and paper cassette are new options, but the only difference from the previous models is the color of the covers.



There is no Ratio controller for this model.



### Toner

The toner cartridge capacity is 800 g.

The toner is the same as N-C2 and D-C2, but the toner cartridges are unique. The rear flange is different, so that you cannot install the wrong type of toner cartridge.

### Developer

The developer bag contains 1.0 kg. Two bags are added at installation.

The developer is N-type, not D-type.

Developer is a PM part, so it is counted with the length counter.



## **RELIABILITY TARGETS**

Note that the PM cycle is 10 km (length of copies made).


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In case 1, the print adds 594mm to the length counter. In case 2, the print adds 841mm to the length counter. But, in both cases the area counter stays the same.

Because of this, customers who print images in the LEF orientation will get more prints from their service contracts when the machine is set on the length counter. When the machine is set on the area counter there is no difference.



In other machines, you cannot change the unit after you install the machine, because the machine cannot remember the history of changes for the unit.

For example, we start with meters, and print 5 meters. Then we change to feet, and print 6 feet. The total is 5 + 6 feet = 11 feet, which is not correct.

But with this model (same as D-C2), there is a basic counter in the software that counts in mm or mm<sup>2</sup>, and converts this to the required unit. If you change the unit, the value in the basic counter stays the same. So, you can change the unit any time.



# PURPOSE OF THIS SECTION

The most important specifications of the machine will be discussed.

Specifications (1)	Hange.
<ul> <li>Originals: One sheet at a time</li> <li>Max. Original Width: 950 mm (37.4")</li> <li>Max. Original Image Size (W x L) <ul> <li>D208: 914.4 x 15,000 mm, 36" x 590"</li> </ul> </li> </ul>	
<ul> <li>D211: 914.4 x 30,000 mm, 36" x 1180"</li> <li>Min. Original Image Size (W x L): 210 x 210 mm, 8.5" x 8.5"</li> </ul>	
<ul> <li>Min. through-put width: 182 mm (7.2")</li> </ul>	
<ul> <li>Max. through-put width: 950 mm (37.4")</li> </ul>	
<ul> <li>Original Weight</li> </ul>	
<ul> <li>Rear Straight: 20.0 to 157 g/m<sup>2</sup> (5.32 to 41.7 lb.), 30 μm to 1.1 mm</li> </ul>	
<ul> <li>Upper: 20.0 to 104.7 g/m<sup>2</sup> (5.32 to 27,9 lb.)</li> </ul>	41

## Originals

Only one original can be fed at a time. There is no separation mechanism.

**Original Weight** 

Note that the rear straight feed path can be used for heavier paper than the others. This is because there are no twists and turns in the feed path.



# Copy Paper Size

Bypass feed: You cannot feed long sheets without some skew developing, so the maximum spec has been limited to 2 m.

Maximum copy length: This is the same for all rolls.

Minimum copy length: There are no rollers in the paper feed path up from roll 3 and 4 (roll tray 2), after the feed exit roller for the lower tray. Because of this, the minimum copy length is longer (anything shorter would get stuck between trays 1 and 2, with no rollers to push the paper up towards the registration roller.



## Zoom

Note the fine increments on the zoom.

## Resolution

Both scanner and printer are 600 dpi.

## Gradation

Scanning: The capability of the CIS is 256 gradations. However, the output from the IPU is two-bit (4 levels).

Printing: The VDB sends the four-level data to the LED print head. However, the capability of the print head is 32 levels. The machine uses a gamma table to select 2 of these 32 levels to print the data.



Copy Number Input

Note that multi-copying is only available for standard copy sizes.



Copy paper capacity

Don't use rolls with a larger diameter, or they will not turn in the holders.

Output tray capacity

'Application paper' means 'paper for special applications. It really means 'anything except normal plain paper'. Examples would be translucent paper and film.





# PURPOSE OF THE SECTION

To learn how to install the machine and the peripherals.

To learn how to install the latest firmware.

The slides show the important points about the installation procedure. They do not cover the complete procedure, only the important points.

Go over the points on these slides before you start to install the machine. Obey all warnings and cautions in the manual.



This shows the best sequence when you install the copier and all its options. If you do the steps in a different sequence, to install a component, you must remove something that you installed before.





This is a summary of the steps of the installation procedure. Some of these will be explained in more detail. Then we will study the installation procedure.

With the previous machine, it was necessary to execute SP5985-001 (NIC) and SP5985-002 (USB) to enable USB and Ethernet. This is no longer necessary.

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This SP code still exists but both features are enabled before the machine leaves the factory.



This is a summary of the steps of the installation procedure. Some of these will be explained in more detail. Then we will study the installation procedure.



The machine weighs approximately 295 kg (649 lb).



Adjust this panel to decrease reflections from lighting. The customer can do this adjustment.







Emphasize the note - if longer than 2 mm is left sticking above the bottom plate, you cannot pull out or slide in the optional 3<sup>rd</sup>/4<sup>th</sup> roll feeder.

If the machine is not level from left to right, developer will not be distributed evenly across the development unit.



If the breaker switch does not drop to the "O" position:

Make sure that the power cord is securely connected to the power supply.

Push the test button again.

If the breaker switch does not snap down to the 'O' position, the breaker switch must be replaced.

The breaker switch must be at the "I" position for the machine to operate.



There are two 1-kg packs of toner provided. Do not open either pack until you are instructed to do so in the procedure

Each bag contains 1 kg of developer.

Earlier models had a knob which must be turned to distribute developer. In this machine there is no knob. The machine distributes the developer automatically after you turn the power on for the first time. This is explained on the next slide.



Install the toner cartridge before you input lot numbers and initialize developer.

You must shake the toner cartridge to make the toner loose inside the cartridge. If not, torque in the mechanism is too high and the development unit is damaged.

In case you forget, a slip clutch was added to the mechanism between the toner hopper and the toner supply clutch to prevent this damage.



This is a temporary installation. It is needed to continue with the developer installation procedure. The cartridge must be physically in the machine, but toner must not be added. So don't remove the tape.



The drum motor should switch on as soon as the machine warms up. However, the motor may not switch on immediately if the temperature of fusing unit is below  $50^{\circ}$  C (122° F).

After installing the first bag, you must turn on the machine to distribute the developer evenly inside the development unit.

If you do not do this, there is no space for you to add the second bag.

When the machine distributes the developer, the paddle roller moves developer from the front of the unit to the inside of the development unit, and this makes room to add the second bag.





A decal on the left side of the machine explains how to install the toner cartridge.



📕 Inputtin	ng Developer Lot Numbers - 1 Rico	H nge.
<ul> <li>Turn the magnetic strength</li> </ul>	nain power switch on.	
<ul> <li>A screen a</li> </ul>	asks you to set passwords.	
<ul> <li>It is the r</li> </ul>	esponsibility of the site supervisor to set these passwords.	
<ul> <li>The initia set. How installation</li> </ul>	al copy menu will not display until these passwords have been ever, you can bypass this screen temporarily to complete the on.	
<ul> <li>To bypass</li> </ul>	the password screen, execute SP5755-002	
	Program / Charge Administrator	
	Set items, then seess (OK).	
	► Supervisor	
	Administrator	
	Logn Pactword Ourge Hote: R is important that you do not forget this password.	
	Set storing passwords to enhance the mactime's security. We recommend the passwords use combinations of at least to of the following: upper case letters, bover case letters, numbers, and provided such as ', non-	
	The password should also be at least eight charcters long.	
	d176/2100	65





Then do the two SP modes listed on the slide.

Do not attempt to make copies yet.

## SP2801 (Developer Initial Setting)

This prepares the developer for copying by agitating it for about two minutes, which brings the electrostatic charge on the developer to the correct level.

#### SP2923 (Drum Set Mode)

Drum Set Mode coats the drum with toner.

Have a look at the drum; the end of the drum is shiny because there is no toner coating, but the rest of the drum has a coating of toner.

This toner coating acts like setting powder, to ensure that the cleaning blade does not flip over when the drum starts to turn.

In a counter blade system, friction between the blade and the drum can flip the blade over unless setting powder or a toner coating is added.

At this point, the cleaning blade is still not in contact with the drum. When shipped from the factory, the blade is away from the drum.

After drum set mode has finished, you have to move the cleaning blade against the drum, which is its normal operating position.



To send the machine from the factory, the blade is away from the drum.

After Drum Set Mode, move the blade until it touches the drum (move the lever right), where it will stay during standard operation.

The first time that the drum turns, the layer applied during Drum Set Mode will be cleaned off. This layer will lubricate the edge of the cleaning blade, and this makes sure that the blade will not bend in the wrong direction when the drum turns.

If you move the machine a short distance within the same room, it is not necessary to move the cleaning blade back to the transportation position. But, after installation, if you move it a long distance (for example, between a warehouse and the customer location), move the blade to the transportation position.



SP 3001 002

Initializing the ID sensor takes about 6 seconds.

After it is finished, two numbers are displayed. PWM is the power applied to the ID sensor, and Vsg is the output when measuring the light reflected from the bare drum.






This is not important for the rear original exit.











The lever is shown on a previous slide. The shipping position is the left. We move it to the right after installation, but we must move it to the left again before we move the machine.



If you move the machine a short distance within the same room, it is not necessary to do these things. But, after installation, if you move it a long distance (for example, between a warehouse and the customer location), you must do the two steps on the slide.



This unit allows the user to install another two rolls of paper.

Take care when lifting the unit. It is quite heavy and will need up to four people to install.

Go over the next few slides before starting to install the machines.



Study the diagrams and follow the notes in the manual.

This will help you to figure out which rail should go on the left and which on the right, and which way up they should be.

Which way round to install the guide?

See the diagram on the slide.

There are two criteria.

The edge with the pin inserted should be at the top.

The face with the threaded holes should be facing the outside of the machine. The other face has non-threaded holes only.









In particular, take care when lifting the unit. It is quite heavy and will need up to four people to install.





This procedure requires at least two technicians.

The previous model required a scanner relay board and a printer relay board, but these are not needed with this new model.

	RICOH imagine. change.
<ul> <li>Can only be installed on the D211.</li> <li>The scanner is removed from the machine and placed on the table (the table must be assembl</li> <li>Two technicians should perform this installation</li> <li>A cover is installed on top of the machine to rep the removed scanner unit.</li> <li>Procedure <ul> <li>Assemble the table.</li> <li>Remove the scanner unit and install it on the table.</li> </ul> </li> </ul>	ed). ı. blace
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This is an overview of the procedure. See the service manual for the complete procedure.

The procedure is changed a lot from the previous machine.



There is no Ratio controller for this model.



<ul> <li>1. Slot 1, for options on SD cards:</li> <li>Browser Unit M14</li> <li>Data Overwrite Security Type I</li> <li>OCR Unit Type M2</li> <li>SD Card for Network Printing Type M14</li> <li>Slot 2, Service Slot</li> <li>Slot B, Wireless LAN</li> <li>Slot A, IEEE1284 (Japan Only)</li> <li>IEEE 802.11a/g/n Interface Unit Type M2</li> <li>USB-B</li> <li>USB-B</li> <li>USB-A (Japan Only)</li> <li>Debugging Port, for design/factory use only. This port is used by designers to download the engine log.</li> </ul>	Purpose of the Slots	RICOH imagine. change.
	1. 1 1 3 4 2 2 8 8 4 5 Ethernet 6 VUSB-B 7 VUSB-A 8 8 4. 5. 6 7 USB-B 7. 8. 4. 5. 8. 4. 5. 8. 6. 7. 8. 8. 8. 8. 8. 8. 8. 8. 8. 8	Slot 1, for options on SD cards: - Browser Unit M14 - Data Overwrite Security Type I - OCR Unit Type M2 - SD Card for Network Printing Type M14 Slot 2, Service Slot Slot B, Wireless LAN Slot A, IEEE1284 (Japan Only) IEEE 802.11a/g/n Interface Unit Type M2 USB-B USB-A (Japan Only) Debugging Port, for design/factory use only. This port is used by designers to download the engine log.

Applications can be moved to the card in slot 1.

Service Manual, Installation, MFP Options, Before You Begin, Moving Applications onto one SD Card

There is no special location inside the machine to keep SD cards that have been copied.



When you use the 'Undo Exec' procedure, the SD card in Slot 1 must be the original SD card of the application you want to move from Slot 2 to Slot 1. You cannot use any blank SD card in Slot 1. The application can be moved only to the original SD card.













Service manual, System Maintenance Reference, Firmware Update SP 7801: This shows the firmware versions.

If the update procedure fails, you must replace the controller board.



If you move the machine a short distance within the same room, it is not necessary to do these things. But, after installation, if you move it a long distance (for example, between a warehouse and the customer location), you must do the two steps on the slide.



## PURPOSE OF THE SECTION

The components will be discussed briefly.

The machine's organization and overall PCB structure will also be covered.



Important points about the major units are as follows:

1. Image Writing Unit: Uses an LPH (LED Print Head) capable of 32-level gradation to write 2-bit image data.

2. Scanner Unit: Uses a CIS for 256-level scanning.

3. Cleaning Unit: The drum is cleaned with a counter blade.

4. Fusing Unit: Fusing is done using a hot roller containing two halogen lamps. For the paper type/size selected by the user, the machine chooses the most suitable fusing temperature and nip width.

5. OPC Drum, Around the Drum: The units around the OPC drum do the charging, image writing, development, image transfer, paper separation, cleaning, and quenching.

6. Roll Trays (2nd Tray optional): Paper is supplied from continuous rolls.

7. By-pass Tray: The by-pass tray can be used to feed individual sheets of copy paper.

8. Development Unit: Toner is attracted from a single magnetic roller to the areas of low charge on the OPC drum. The ID sensor below the drum on the edge of the idle registration panel controls the toner concentration.

The rollers, sensors, and other smaller components will be described in their appropriate sections.



- 1. Front Copy Tray
- 2. OPC Drum
- 3. Original Table
- 4. Charge Corona Unit
- 5. Cleaning Unit
- 6. Original Feed Rollers
- 7. Original Exit Rollers
- 8. Upper Original Exit Rollers
- 9. Upper Original Exit Guides
- 10. Original Exit Junction Gate
- 11. Upper Exit Rollers
- 12. Fusing Cleaning Roller
- 13. Paper Exit Junction Gate
- 14. Exit Rollers
- 15. Hot Roller
- 16. Pressure Roller
- 17. Rear Copy Tray
- 18. Transfer Roller
- 19. Roll Holder
- 20. 2nd Feed Rollers
- 21. 4th Feed Rollers
- 22. Relay Rollers
- 23. 3rd Feed Rollers
- 24. 2nd Roll Tray (option)
- 25. Cutter Unit 2
- 26. 3rd/4th Feed Exit Roller
- 27. Vertical Feed Rollers
- 28. 1st Feed Rollers
- 29. 1st Roll Tray
- 30. Cutter Unit 1
- 31. 1st/2nd Feed Exit Roller

- 32. Registration Rollers
- 33. Development Unit
- 34. Toner Cartridge



- A) Paper path from the by-pass feed table
- B) Paper path from the 1st/2nd roll tray
- C) Paper path from the 3rd/4th paper tray (option)
- D) Original paths

**Original Feed Paths** 

There are two exits: upper, and rear.

An optional original exit table can be installed behind the machine to catch originals coming out of the machine.

Thick paper must go to the rear original exit, to prevent image jitter during scanning.

Copy Feed Paths

There are three routes into the machine: Roll tray 1, roll tray 2 (optional unit), or the bypass table

The bypass table is used when the customer wishes to make a copy on a sheet of cut paper.

Note that there are two exits: front, and rear.

The rear exit has a long document catcher below it.



This shows the paper path when the optional cassette unit is installed instead of the optional roll feeder.

The diagram shows the Be-C1, which is very similar.





- 1. Original Feed Motor
- 2. Drum Motor (in this new model, this motor drives the transfer roller as well as the drum)
- 3. Registration Motor
- 4. Roll Feed Motor 2
- 5. Roll Feed Motor 1
- 6. Development Motor
- 7. Fusing/Exit Motor

Original feed motor - original feed mechanism

Drum drive motor - drum and transfer roller

Registration motor - registration roller, toner collection coil

Roll feed motors 1 and 2 - rollers in each roll feed unit

Paper inserted in the bypass feeder goes straight to the registration roller.

Development motor - development unit

Fusing/exit motor - transport belts, fusing rollers, and exit rollers



This slide shows the optional paper cassette unit installed instead of the optional roll feeder.

The diagram shows the Be-C1, which is very similar.


#### Boards

The BCU controls the machine.

The IPU controls the image processing.

The IOB controls the mechanical components. It also performs process control, transfers serial data between the machine and peripherals, and controls the fusing unit. Do not adjust the dip switches in the field.

The PSU (Power Supply Unit) supplies direct current for every electrical component in the machine, and controls alternating current input to the fusing lamps and anti-condensation heaters.

File Format Converter (MLB): The file format converter (also called the "Media Link Board" or "MLB") allows you to download copy and print data through via network with Desk Top Binder.

CIS: A contact image sensor is used instead of a CCD. The main scan width is A0. The resolution is 600 dpi.

LPH: This is the LED print head. It consists of three A3-width LED heads, to write a main scan width of A0. The resolution is 600 dpi.

VDB: This drives the LED print head.

RFDB: These control the roll tray units, one for each tray (upper/lower).

FPDB: These control the fusing pressure motors. As stated earlier, the fusing unit adjusts fusing pressure automatically. It uses two motors, which are each controlled by one of these boards.



### Boards (continued)

AC CTL Board: This is the connection point for the main power supply. It controls the power supply to the PSU, fusing lamps, and all heaters.

HVPS: Two power packs (High Voltage Power Supply). The CGB power pack provides is the power supply for the charge, grid, bias applied to the drum. The Transfer power pack and separation power pack supply power for image transfer to paper and paper separation from the drum.

SIB. The Scanner Interface Board controls the scanner, and serves as the signal I/F board between the IOB and IPU.

PFB. The Paper Feed Board inside the optional Paper Cassette controls the components in the paper cassette (sensors, clutches, and motors).

ESB (Eco Switch Board): Receives 5V supplied from the PSU (5V and 5VX) and distributes it to machine components according to what is required for machine operation for maximum efficiency in power consumption.

HVPS. Contains two power packs.

CGB Power Pack. The CGB power pack provides is the power supply for the charge, grid, and bias applied to the drum.

Transfer Power Pack. The power pack is the power supply for voltage that pulls the image transfer off the drum and onto the paper.

Separation Power Pack. The separation power pack provides the power for the voltage to paper and separate the paper separation from the drum after the image has been transferred to paper.

CIS IF. This is a new board attached to the left side of the SIB. The CIS IF provides the interface between the LEDs in the CIS and the

SIB.



# PURPOSE OF THE SECTION

Common procedures will be discussed.

Only the main points will be mentioned here. For full details of all procedures, see the service manual. Follow all the steps carefully, and take note of all notes, cautions, and warnings.

#### Covers

This new machine has the same number of covers as the previous machines. Their removal procedures are the same. However, the color scheme of the machine is slightly different. For this reason, some of the illustrations taken for the previous machine may not look exactly like the new machine in the Replacement and Adjustment section of the field service manual.



How to start from shutdown

To start the machine, press the main power switch. However, if you press the main power switch between the beginning and the end of a shutdown, the machine will not start.













This is a view with the controller box cover removed.



The replacement procedure in the service manual contains a table of switch settings for each area.









The browser unit SD card is linked to its machine (the machine serial number is registered on the SD card). So a card that has already been installed on one machine cannot be used on another.









PURPOSE OF THIS SECTION

This section describes the original feed and scanner mechanisms.



### SCANNER LAYOUT

The diagram shows the dimensions of the scanner.

A 600 dpi CIS (contact image sensor) is used in this machine.

There are ten original size sensors. The original set sensor also takes part in original size detection.

The white platen plate is used for auto shading (to get the standard white level for image processing).

The original registration sensor detects jams in the original feed path, and detects the leading edge of the original, which makes the CIS (Contact Image Sensor) start to scan the original.

The original exit sensor detects jams in the original feed path, and detects the trailing edge of the original at the rear original exit (for straight-through feed).



Only one sheet can be placed in the feeder at a time.

There is no separation mechanism.

There are two original exits.



For recommendations on which exit to use, see the Operating Instructions. Copy/Document Server Reference > Basic Copying > Original and Copy Output Locations



The original set sensor detects A4 or B4 SEF and North American A size originals. The original size sensors detect larger sizes.

The original set sensor is in the centre of the main scan, so it detects any paper that is put in the feeder.





There are two delays to allow the user to correct for skew and other feeding problems before the scan begins.

They are controlled with user tools as shown on the slide.

The machine feeds at 105 mm/s as far as the registration roller.

From that point, the feed speed depends on the reproduction ratio.





SP 4962 can be used to check if the sensor is working. See the SP table for details.



This feature can be switched off and on with SP4975. The default setting is on (the rollers do not release the trailing edges of originals longer than 450 mm).

This SP must be turned off if a rear original stacker is used. Otherwise, only one original can be fed at a time.

The machine does not hold the trailing edge of copies.



The CIS can only be replaced in the field as a unit.

The scanner is controlled by two boards, the CIS IF board and the SIB. The CIS IF provides the interface for the LED arrays with the SIB. The SIB controls the LEDs and the scanning unit sensors.

The CIS is different from previous models. It contains LED arrays, instead of the Xenon lamps used in previous models (unfortunately, the diagram still shows xenon lamps). The voltage regulators used with the Xenon lamps are not needed for this model.

The CIS IF is a new board for this series. It is attached to the left of the SIB.

The new CIS unit is much easier to remove. The CIS harnesses can be disconnected at the front so it can be lifted out of the machine easily. It is not necessary to remove top of the scanner in order to remove the CIS unit, like we have to do with the previous machine.



Each block contains a latch and shift register, so assembling the video signal is 8 times faster than with all the elements in one big block.

Magnification Adjustment	COH e. change.
<ul> <li>The magnification ratio is adjusted automatically to compensate for stretching or shrinking of various paper type as they go through the copier engine.</li> <li>The image is magnified according to the settings done with either the SP or User Tools mode for each type of paper.</li> <li>After a paper source has been replenished with a different type of paper, the paper size and paper type must be enterewith the User Tools.</li> </ul>	es
<ul> <li>The default settings for the magnification adjustment can be adjusted with SP2916.</li> <li>For details about how to do this: Service Manual, Replacement and Adjustment, Important Adjustments, Image Position/Magnification/Margin Adjustments, Printer Magnification Adjustment</li> </ul>	ł
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The base white level (absolute white) is taken from the white platen plate - auto shading.

Then, every line, the machine checks the background and removes that from the image.

The background is checked from a 140 mm wide strip in the middle of the original.

This is not done for the 5 mm at the leading edge of the original.



# PURPOSE OF THE SECTION

Only the main points will be mentioned here. For full details of all procedures, see the service manual. Follow all the steps carefully, and take note of all notes, cautions, and warnings.





# PURPOSE OF THE SECTION

This section will describe drum drive, the charge corona unit, drum cleaning, and quenching.


These are the most important components around the drum.

The paper passes the drum at 120 mm/s (D208) or 170 mm/s (D211); this is the same speed as the previous models in this series. However, the fusing motor pulls a little faster. This will be discussed in the Fusing section of the course.

The drum diameter is 80 mm (same as the previous models in this series).

This means that the circumference is about 251.4 mm.

The charge corona unit has widely-spaced grid wires, like some previous wide-format copiers.

The machine prints with LEDs, not a laser beam. The LPH (LED Print Head) consists of three A3-width LED arrays, to allow A0-width printing.

A single A0 LED array is very costly, so three A3 arrays are used. This is discussed in more detail in the Exposure section of the course.

This machine uses a transfer roller and a discharge plate. Previous machines in the Be series used a transfer/separation corona unit.



In the previous models of this series, the drum motor controlled the drum only.





It's a single wire, but it's looped so there are actually two wires crossing the drum.

The main point to note about this unit is that the grid consists of a number of parallel wires strung along the length of the charge corona unit.

The mesh-type grid system is a better method. However, it is not used in wide format machines. In this type of machine, there may be excessive tension in the grid, deforming the mesh. So the strung-wire system is used.



The motor turns a worm gear. This gear pulls the wire that is attached to the cleaner.

The wire cleaner first goes to home position (at the front, by the motor). Then it moves to the rear (by the sensor), then to the home position again.

The corona wire is cleaned immediately after the main power switch or operation power switch is switched on, if these two conditions occur:

The temperature of the hot roller is less than 50°C (122°F).

600 m of paper fed through the machine since the last wire cleaning.

The 600-m interval can be changed with SP mode 2804.

The interval can be 300, 600, 900, 1200, or 1500 m. The factory setting is 600 m.

To disable cleaning, set the SP to 0.

To enable cleaning immediately after every power-up, set the SP to 1.

There is also a forced wire cleaning procedure - SP 2803. Do this when it is necessary to clean the wire.

This SP also moves the cleaner to home position. Because of this, it is important to use this SP after you change the motor or do some work on the wire cleaning mechanism.

The actuator for the wire cleaner sensor turns while the cleaner moves. The signals from this sensor tell the machine when the cleaning pad moves.

If the wire cleaner stops before it gets to the end, or if stops too long at the far left position, the wire cleaner sensor detects an error.

The machine also uses this sensor to monitor the home position of the cleaning pad.



A counter blade cleans more effectively.

The drum turns anti-clockwise as seen in this diagram.

Also, remember the Drum Set Mode procedure (SP 2923) during installation, in which the cleaning blade is kept away from the drum while the drum is coated with toner. This lubricates the tip of the cleaning blade to prevent it from flipping over when the drum turns against it.

This must also be done after a new drum or cleaning blade is installed. In the diagram, the circular object below the cleaning blade is not touching the drum. It is the toner collection coil drive gear.



Before doing the Drum Set Mode procedure, move the cleaning blade lever to the left (as seen from the front of the machine) to make sure that the blade is away from the drum.

The diagram on this page is a side view. The three-dimensional view at the top right is a rear view, so the handle moves in the opposite direction from the one in the Installation section.

After the Drum Set Mode procedure, move the lever back to the right so that the blade is pressing against the drum.

This was covered in the Installation section.



The capacity of the used toner bottle is 4600 cc (about 25.3 k copies/A1 sideways [LEF] or 15 km at 6% coverage).

The sensor is half way between the spout and the side of the machine, so there should not be many premature alarms caused by piles of toner building up in front of the sensor.

There is no mechanism to shake the bottle and level the waste toner.

Collecting Used Toner	OH change.
<ul> <li>Used toner is not recycled in this machine, because paper dust from the cutter may be present inside the machine and this may get into the excess toner removed from the drum.</li> <li>The technician empties the used toner bottle; the user does not.</li> <li>Important: <ul> <li>After emptying the used toner bottle, you must clean the area inside the bottle where the used toner overflow sensor is located.</li> </ul> </li> </ul>	•
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The lamp contains red LEDs to prevent drum fatigue.

The quenching lamp used in this new machine has 3 elements. The lamp in the previous model has 2 elements.

The angle of the quenching lamp was changed to achieve maximum coverage on the drum.



The heaters are off when the main power is on, and on when the main power switch is off.

These are standard components of the machine, not optional items.



# PURPOSE OF THE SECTION

Only the main points will be mentioned here. For full details of all procedures, see the service manual. Follow all the steps carefully, and take note of all notes, cautions, and warnings.



Cautions when Handling a Drum	H nge.
<ul> <li>After moving the drum from a cold location to a warm location, allow the drum warm up to room temperature. Inspect for condensation on the drum before installing it. If you see condensation of the surface of the drum, allow it to dry. Do not wipe the surface of the drum.</li> </ul>	
<ul> <li>Store extra drums in a clean, dry location. Never remove it from its package until you are ready to install it.</li> </ul>	
<ul> <li>Never store a drum where it will be exposed to ammonia or other airborne corrosive substances.</li> </ul>	
<ul> <li>Never touch the surface of a bare drum.</li> </ul>	
<ul> <li>Avoid exposing a bare drum to light. Cover it with paper while it is out of the machine.</li> </ul>	
<ul> <li>Never clean the drum surface with alcohol or any other organic solvent.</li> </ul>	
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Follow the cautions in the manual.

Make sure that you are aware of the SP modes that must be done after each procedure (they are in the procedures in the manual).



Follow the cautions in the manual.

Make sure that you are aware of the SP modes that must be done after each procedure (they are in the procedures in the manual).





Follow the instructions in the 'Drum, Drum Cleaning Blade Removal' procedure for how to disassemble the drum unit.





# PURPOSE OF THE SECTION

The latent image writing mechanism will be described.

This machine uses LED arrays, and not lasers, so there are no safety switch circuits to describe.



Illuminated areas of the drum drop to - 50 V (with a tolerance of +20V and - 30V). Un-illuminated areas are at -900 V  $\pm40V$ .



There is a small problem with copy quality at the joints between the heads, as will be seen later in this section.



#### SP 2940

- 0: On when motors on (default)
- 1: Always off
- 2: On at same time as fusing lamps

Data Processing	Inge.
<ul> <li>CIS: Eight-bit (256 levels per pixel)</li> <li>Data input to IPU board: Eight-bit (256 levels per pixel)</li> <li>Data output from the IPU to the VDB: Two-bit (4 levels per pixel)</li> </ul>	
<ul> <li>Data output from the VDB to the LED print head (LPH): Five-bit (32 levels per pixel)</li> <li>Only two of these 32 levels are used for any one image.</li> <li>A gamma curve in the VDB board selects which four levels to use for the image.</li> </ul>	
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The LEDs in the print head light at 10% of their full power.

To make the 32 grades, the power is divided into 32 equal intervals.

For example, if the gradation for a certain pixel is 17, the LED for that pixel will be on at 17/32 of the power.

The base (32/32) power is always at 10% of full possible LED power.



# PURPOSE OF THE SECTION

Only the main points will be mentioned here. For full details of all procedures, see the service manual. Follow all the steps carefully, and take note of all notes, cautions, and warnings.







SP settings on the decals

This decal is only on the spare parts, not on the original part installed at the factory. See the factory setting sheet for the original factory settings.

Before re-installing the right copy tray, read the LPH settings from the labels attached to the LPH.

Look for 4 labels, probably on the underside of the unit. See the manual for an example

Input these into the correct SP modes, as explained in the manual.

In the factory, the settings for the installed LPH unit are already made. However, if you do an NV-RAM reset, you may have to re-input these values.

What are these settings?

The LPH consists of three heads joined together.

SP 2952 001 informs the machine where the left and central heads are joined (I.e., at which pixel).

SP 2952 002 informs the machine where the central and right heads are joined.

Now please go to the next slide for an explanation other two SP settings.



## LPH REPLACEMENT AND ADJUSTMENT

What are these settings?, continued

The diagram shows the LPH unit, above the drum.

There are three heads, LPH 1, LPH 2, and LPH 3. LPH 2 is in the centre.

Clearly, they are not in the same position above the drum in the sub scan direction.

Two of the heads (LPH 1 and LPH 3) are almost (but probably not exactly) in the same place, but the gap between these and the central one (LPH 2) is considerably larger.

SP 2952 011 and 012 tell the machine the misalignment between the three heads in the sub-scan direction. The machine will adjust the writing timing for each of the heads, using these settings, to make sure that each scan line of the latent image is written across the drum correctly.

We will see this more clearly later during the adjustment procedure in the manual.



Details are in the following section of the service manual: Replacement and Adjustment, Important Adjustments, LPH Adjustment with SP Codes

Printing the Test Pattern

The pattern appears something like shown on the slide.

Note the faint lines one third and two thirds of the way across. These are the joints.

These lines are typical for a perfectly adjusted LPH. It is impossible to get rid of these faint lines.

Just make sure that the customer is satisfied with a typical printout of something that they will be using frequently (a CAD schematic or something). Keep quiet and see if they notice anything one third and/or two thirds of the way across.

If something is wrong with the factory settings, the lines will look dramatically black or white, as shown in the next slide.



## Adjusting the SP Settings

If the SP settings are as little as one pixel out, you will see a clear white or black line, like in the above example.

On the left, too many LEDs are switched off and the result is a white line.

On the right, too many LEDs are switched on, and the result is a black line.

Adjust the lines until they are faint; the lines cannot be completely erased.

For how to adjust, see the next slide.



## Adjusting the SP Settings

The top diagram shows how the LEDs should light.

The bottom diagram shows not enough LEDs lit at the left joint and too many at the right joint.

On the test pattern, this will cause a white line one-third of the way across, and a black line two-thirds of the way across.

The SPs switch off LEDs in the central segment of the LPH (LPH 2). The LEDs in LPH 1 and LPH 3 are not affected.

Adjusting the SPs up in intervals of 10 (410, 420, etc.) switches off one LED for every interval of 10, and adjusting down 10 switches on one LED.

Adjusting the SPs up less than 10 (411, 412, etc.) decreases the light intensity of the LED at the end of the row of lit LEDs, and adjusting down less than 10 increases the light intensity.

The LED at the border between lit and unlit LEDs will be affected.

To remove a line, adjust by 10 until it goes away. Then adjust the other way by 1 until it just appears again, then adjust back the other way by 1 to finish (the line should have just disappeared). Then make test prints to ensure that the copy quality is tolerable.

Why do we have these intervals of 1/10? The LEDs are not perfectly lined up vertically; this will be explained later.



## LED HEAD MISALIGNMENT

In the example on the slide, the LEDs in head 2 are not directly in line with those in head 1.

A similar situation will occur between heads 2 and 3.

If there is an overlap at the joint, a black line will occur on the printout if both overlapping LEDs are lit.

If there is a gap at the joint, a white line will occur on the printout between the two pixels.

To counteract this, the power of the indicated LED can be adjusted. There are 32 possible power values between off and fully lit (at 10% power).

Note that the heads are physically joined together. This reduces the expansion due to heat.

If the heads were not physically joined together, the gap between two pixels would increase by 100  $\mu m.$ 

With the physical joints, the expansion is less than 20  $\mu$ m.

For comparison, the gap between the dots is 42.3  $\mu m.$ 



Adjusting the SP Settings, continued

The three LED heads are not in a straight line across the page.

See the top diagram - the difference between the two at left and right is exaggerated, but we need to point out that the heads at left and right are also not exactly lined up.

Because of this, the main scan signals for each head have to be timed so that they are output in the correct locations on the drum.

If the timing is incorrect, main scan lines will appear to be disjointed at one third and two thirds of the way across the page, as shown in the lower diagram.

If the values on the decals on the LPH are input into the SP modes as explained in the manual, this problem should not appear.

These SPs adjust the timing of the main scan lines for each head. The head that is positioned furthest 'up the page' will print its part of the line first. Then, as the drum rotates, the other heads will add their segments of the same scan line, at the correct time.

So, the data being output at a particular instant from the LPH to the drum is not a continuous scan line, but segments of three different scan lines. But the output on the page is one continuous line, if the SP settings are correct.



Adjusting the SP Settings, continued

If the test print out is disjointed, adjust SPs 2952 011 and 012 by trial and error until the main scan lines are printed correctly.

Adjust SP 2952 011 first. This takes LPH 1 as the base for the adjustment, and corrects the timing for LPH 2 relative to that.

Make a test print. If the left and central parts of the chart are not lined up properly, adjust SP 2952 011 again until they are lined up correctly.

The right side of the chart may still be not lined up. Adjust SP 2952 012. This corrects the timing of LPH 3 relative to LPH 2, which should now be the same as LPH 1.

Make a test print. Adjust SP 2952 012 again if the right part of the chart is not lined up properly.




## PURPOSE OF THE SECTION

The development process will be described.

Toner supply mechanisms and toner density control will also be described.

Toner near-end and end detection will also be described.



The toner cartridge is installed in the development unit (at the top left in the drawing).



- 1. Auger
- 2. Doctor Blade
- 3. Development Entrance Seal
- 4. OPC Drum
- 5. Development Roller
- 6. Paddle Roller
- 7. Toner Agitator
- 8. Toner Cartridge
- 9. Separator
- 10. Development Filter

The paddle roller picks up developer and transports it to the development roller. Internal permanent magnets in the development roller attract the developer to the development roller sleeve.

The rotation of the sleeve carries developer toward the OPC drum. Developer back spill from the doctor blade goes either to the separator then the agitator, or to the auger then the paddle roller.

A filter relieves the pressure that tends to build up in the development unit.

The toner density is constantly monitored by an ID sensor (there is no TD sensor).

This machine requires two packs of developer. Each pack weighs 1 kg (2.2 lb.)



The development units of these machines and the previous machines are not interchangeable.



This slide shows how toner and developer are mixed in the development unit to make the toner density equal in all parts of the development unit.

The quantity of developer moved right by the backspill plate is the same as the quantity moved left by the mixing auger.

It is the same as cross-mixing mechanisms in other copiers.

The doctor blade position cannot be adjusted.



## Copying

The development bias is -600 V.

**ID Sensor Patterns** 

The main point to note here is that the machine has two ways of making the ID sensor patterns. These are Low Duty Mode and High Duty Mode. The mode used depends on SP 2201 004.

In this machine, there should be no need to change the low/high duty mode setting (see the next slide).



This machine has a higher estimated ACV than the D, so the default setting was changed from low duty mode to high duty mode.

It is thought that it will not be necessary to change this setting in the field for this machine.





This slide shows how toner gets to the development unit from the toner cartridge, and how it mixes with the developer in the development unit.

The toner goes directly to the development unit from the cartridge. There is no hopper between the cartridge and the development unit. But the cover where the cartridge is installed is known as the 'hopper cover', and the area where the cartridge stays is known as the 'hopper'.

The mixing is the same as in other models. Details are as follows:

The toner agitator moves toner from the toner cartridge to the development unit.

The paddle roller gets developer in its paddles and moves it to the development roller. Magnets in the development roller pull the developer to the sleeve of the development roller.

The sleeve turns, and this moves developer to the drum.

The doctor blade adjusts the layer of developer to the correct thickness and makes a backspill to the cross-mixing mechanism.

The movement of the paddle roller and development roller increases the air pressure in the unit. A hole with a filter on top of the unit releases air pressure to decrease toner scattering.

The quantity of toner that is supplied is controlled by the toner supply clutch on/off timing, which in turn is controlled by the ID sensor.

Toner supply control will be explained in this section of the course.



For example, if the first copy after an ID sensor pattern check is 90 cm long, there will be no ID sensor pattern check after the copy (less than 100 cm made). Then, if the next one is 50 cm long, 140 cm will have been copied since the last check, so the ID sensor pattern is checked after printing the 50 cm copy.

The interval can be changed with SP 3920.

For example, you may need to reduce this interval if the user copies originals with a high amount of black, so that the amount of toner in the developer does not run low.

The ID sensor pattern is used for toner supply control and toner nearend/end detection, which will be explained later in this section.

The location of this sensor is different from previous models in this series. It has been moved from the cleaning unit to the registration idle roller panel, so it is below the development unit. The registration idle roller panel must be removed to clean or replace the ID sensor.





The most important point to note is that the machine cannot automatically switch modes when the sensor breaks, or when a new one is installed.

SC400 to 406 will occur if the ID sensor fails. This is a D type code, so copying will still be possible after the machine is switched off/on. However, copy quality will deteriorate because no ID sensor check will be done, and the machine will not switch itself to fixed supply mode automatically.

If the ID sensor cannot be replaced immediately, the technician has to change to a fixed supply mode using SP 2208 003.

Normally, the machine should be used in Detect mode (SP 2208-3 set to 0). The Fixed modes can be used if the ID sensor is defective, and a new ID sensor is not available. Otherwise, a Fixed mode should not be selected with SP2208-3. See the SP table for instructions on which setting to use.

SP 2207: Forced toner supply. For every execution, toner is supplied one time. There is no ID sensor check during forced toner supply, so after doing this SP, make a copy and check the copy density.

SP 2208 002: This can be adjusted to increase or decrease the amount of toner supplied. Refer to the SP table in the service manual for how to use this SP.



Vsp: ID sensor reading from the bare drum

Recovery from Near-end

If Vsp/Vsg drops below SP 2927 001, the machine is released from the near-end condition.



Toner End Recovery	OH . change.
<ul> <li>Recovery starts by replacing the toner cartridge and opening/closing the toner hopper cover.</li> <li>Then the machine detects whether the correct amount of toner is present before it clears the toner end condition.</li> <li>If the toner cartridge is replaced during a long print job, the job can be restarted by pressing the [Resta key.</li> </ul>	t rt]
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There are no field service adjustments, so there is no need to go over the process in in detail.

Changing related SPs could cause developer to get on the drum (which would damage the drum) or on the copies (which would damage the hot roller).

The main point is that you cannot recover the machine by just opening/closing the cover. The machine has to detect the right amount of toner.



## PURPOSE OF THE SECTION

Only the main points will be mentioned here. For full details of all procedures, see the service manual. Follow all the steps carefully, and take note of all notes, cautions, and warnings.



Make sure that you are aware of the SP modes that must be done after each procedure (they are in the procedures in the manual).









Developer RICO	H nge.
<ul> <li>You need one unopened toner cartridge to do this procedure (or, you can tape up the existing cartridge, so that toner cannot get out).</li> </ul>	
<ul> <li>The installation procedure for new developer is similar to the steps in the machine installation procedure for installing developer and toner.</li> </ul>	
<ul> <li>Set a new toner cartridge after you add the first bag of developer (do not remove the tape).</li> </ul>	
<ul> <li>Then turn the power on to distribute the first bag. (This takes about 22 seconds).</li> </ul>	
<ul> <li>Turn the power off.</li> </ul>	
<ul> <li>Then remove the toner cartridge and add the second bag.</li> </ul>	
<ul> <li>Then install a toner cartridge and remove the tape (you can use the old toner cartridge if toner is remaining).</li> </ul>	
<ul> <li>Input lot numbers, initialize the developer, do the drum set mode, and initialize the ID sensor.</li> </ul>	
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Make sure that you are aware of the SP modes that must be done after each procedure (they are in the procedures in the manual).



## PURPOSE OF THE SECTION

The paper feed mechanisms for the main body will be described.

The cutter will also be described.

The optional cassette feed unit will be dealt with in a later section.

The mechanisms for the optional roll feeder are the same as for the main body.



Each roll tray unit contains a cutter.

The cutter cuts the paper after the specified paper length has been fed.

The amount of paper fed is monitored by the cutting sensor.

The starting time of the cutter depends on the cutting mode selected at the operation panel (preset cut, synchro cut, or variable cut)

After paper has been cut, the roll must be reversed to a standby position away from the cutter. This allows the next job to go ahead quickly, if another roll is chosen.

For each tray, there is a sensor called the lead edge sensor. This detects when the paper has been reversed away from the cutter.



- 1. Registration Roller
- 2. By-pass Feed table
- 3. Cutting Sensor 1
- 4. Feed Exit Roller 1
- 5. Cutter 1 (Upper Tray)
- 6. 1st Roll Lead Edge Sensor
- 7. 2nd Roll Lead Edge Sensor
- 8. 1st Feed Roller
- 9. 1st Roll Paper End Sensor
- 10. Relay Rollers
- 11. Cutting Sensor 2
- 12. Feed Exit Roller 2
- 13. Cutter 2 (Lower Tray)
- 14.3rd Roll Lead Edge Sensor
- 15.4th Roll Lead Edge Sensor
- 16.2nd Feed Roller
- 17.3rd Roll Paper End Sensor
- 18. Roll End Sensor 3
- 19.4th Roll Paper End Sensor
- 20.4th Feed Roller
- 21. Roll End Sensor 4
- 22.2nd Roll Paper End Sensor
- 23.2nd Feed Roller

24. Roll End Sensor 2 25. Roll End Sensor 1





A roll holder fits into the end of each roll.

The roll holders can be easily moved to a different place to change the paper size.

There are no paper size sensors attached to this mechanism.



Note the user tools that must be used for paper type and other roll-related displays on the operation panel.

Note how the settings affect the display panel.

Paper type and width affect toner supply and fusing temperature/pressure, so the correct settings should be made.

Paper type

Rolls 1 to 3: Plain, Translucent (tracing paper), Film, Recycled

Bypass: Plain, Translucent (tracing paper), Film

The paper type is not displayed in the machine's default state. If you change the user tool (Tray Paper Settings – Paper Type), you can see the paper type.

Paper thickness: For each paper type, there is a default thickness. You can change this setting with a user tool (Tray Paper Settings – Paper Thickness).

Remaining Paper: The user has to select a remaining paper icon with another user tool (Paper Volume). The machine then automatically counts down the amount of remaining paper, and changes the icon automatically. There are only four possible icons to display the amount of remaining paper, so it is only a rough indication. This is only for the user's reference; the user tool setting does not affect how the machine works.

There is roll end detection. This will be explained later.





Roll 1 is driven by roll feed motor 1 and roll feed clutch 1. Roll 2 is driven by roll feed motor 1 and roll feed clutch 2. Roll 3 is driven by roll feed motor 2 and roll feed clutch 3. Roll 4 is driven by roll feed motor 2 and roll feed clutch 4.



There is no by-pass roller mechanism. The bypass feed sensor is just before the registration roller.

When the bypass feed sensor detects the paper, the registration motor and clutch feed the paper to the registration sensor.

When the paper reaches the registration sensor, the machine makes a beep.

If there is no beep, the paper didn't reach the sensor.

The paper stops at the registration sensor so that the user can adjust the position of the paper.

The delay can be adjusted with SP 1911.



The registration motor also drives the toner collection coil, so both a motor and clutch are needed for the registration roller.



When the trailing edge of the paper is 50 mm before the registration sensor, the speed of the registration roller is increased 2%.

The speed does not reach the speed of the fusing rollers.

Jitter: A type of image distortion caused by toner particles being shaken from their original position on the paper.



There is a cutter for each tray (two cutters in total).

The cutter is a rotary disk that cuts the paper by pressing it against a metal plate and moving across the paper.

The cutter motor moves the cutter across the paper.

The cutter can move in either direction.

The cutter can also be moved across the paper manually.

There is a home position switch at each end of the cutter.

When the cutter moves away from home position, a cam closes the paper holder.

Paper holder: There are two plates, one on each side of the paper path. The cam moves one of these plates across to clamp the paper so that it can be cut.

When the cutter is at home position, the cam opens the paper holder and paper can pass through.

There is a roll feed switch for each roll, on the side of the roll tray.

When this is held down, the machine feeds the paper.

When it is released, the cutter cuts the paper.



The cutter cuts the paper after the specified paper length has been fed.

The amount of paper fed is monitored by the cutting sensor.

The starting time of the cutter depends on the cutting mode selected at the operation panel (preset cut, synchro cut, or variable cut)

After paper has been cut, the roll must be reversed to a standby position away from the cutter. This allows the next job to go ahead quickly, if another roll is chosen.

For each tray, there is a sensor called the lead edge sensor. This detects when the paper has been reversed away from the cutter.


Roll end sensors (circled in red)

These are reflective photosensors.

The paper rolls for this machine have a black core.

So, when paper runs out, light is not reflected from the core back to the photosensors.

Paper end sensors (circled in blue)

Normally, there is always paper at these sensors, unless the roll runs out.

These sensors detect the trailing edge of the paper at the end of the roll.

These sensors are backups for the roll end sensors.

Some users may install paper rolls that do not have black cores. In this case, the roll end sensors may not pick up the end of the roll.

Rolls with taped or glued trailing edges

The trailing edges of some roll paper are attached to the roll core with either glue or tape. In this case:

When the roll reaches the end the paper will pull against the tape or glued end of the paper and the roll rotation will stop.

The machine signals a paper jam. This indicates that the empty roll must be replaced.









There are four heaters for each tray (total 8).

The heaters are standard components, not options.

The switches (circled in red) determine what happens when the main power is off.

These switches are set to OFF before the machine leaves the factory. Each switch is at the rear left corner of the tray. To switch the heaters on/off, open the tray completely and push the switch.

Heater Switch Operation

OFF: Anti-condensation heaters OFF when main power switch is ON/OFF.

ON, Main Power SW OFF: The anti-condensation heaters turn on.

ON, Main Power SW ON: In standby mode and during copying, the anti-condensation heaters are ON, but when both of the fusing lamps are on, the anti-condensation heaters turn OFF.



Make sure that you are aware of the SP modes that must be done after each procedure (they are in the procedures in the manual).

Adjust the cut length with SP 1920 after changing the feed rollers.

There are SPs for rolls 1 to 4. Use the adjustments for the roller that was replaced.

Just test the sizes that are most commonly used by the customer.

Theoretically, there may be some differences in the diameter of the feed roller, due to manufacturing tolerances. Because of this, this adjustment is recommended after changing the roller.

However, there may be no need to make this adjustment in the field, unless the user complains that the paper length is not being cut correctly. This may happen when the roller gets older.

USA models: Note that for many of the SP adjustments, you can only calibrate the machine to either Engineering or Architecture cut lengths, not both.

For example, SP 1920 002 is '1st Roll: 297 mm/11" or 12 ". This means that if the SP is used to calibrate for 11" cut length (Engineering size A), but the user then selects Architecture size A (12") using the preset cut feature, the paper may not be exactly 12", because the machine was calibrated for 11" cut lengths, not 12".

If these types of problems occur, the user will have to use synchro cut for Architecture paper sizes, or ask the technician to calibrate the machine again for Architecture paper sizes.

For the synchro cut feature, SP 4961 can be used to adjust the cut length. This calibrates the synchro cut feature by measuring two lengths (210 & 1000 mm).

Use this in accordance with the procedure in the manual.

Remember that during copying the synchro cut length is affected by the Margin Adjustment user tool setting.



## PURPOSE OF THE SECTION

Image transfer and paper separation mechanisms will be described. Transport from the drum to the fusing unit will be explained.



The strength of the charge on the transfer roller can be adjusted for the type and thickness of the paper in use.



In the previous machine, the transfer voltage and the separation voltage were supplied by a single board, the T&S power pack. However, in this machine there are two boards. A Transfer Power Pack supplies the transfer voltage and a Separation Power Pack supplies the separation voltage.



Transfer Roller Cleaning	RICOH imagine. change.
<ul> <li>The smooth, spongy surface of the transfer always flattened against the hard surface of above.</li> </ul>	roller is the drum
<ul> <li>There is no mechanism to separate drum and tra roller. The drum and transfer roller are always in</li> </ul>	ansfer contact.
<ul> <li>In order to keep the surface of the transfer reclean, and to prevent wrinkling, a charge is a to the transfer roller to send toner and paper from the transfer roller to the drum.</li> </ul>	oller applied · dust
<ul> <li>The counter-blade cleaning mechanism of the collects and disposes of toner on its surface including the material sent from the transfer</li> </ul>	ne drum , roller.
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This sensor is new for this series.





This is a back-up mechanism, in case the separation mechanism fails to separate the paper from the drum.

When the leading edge of the paper on the drum enters the separation corona unit with about 198 mm (7.8") of the paper in contact with the drum, the solenoid switches on.

The pick-off pawl shaft starts to rotate, and the pawls attached to the shaft are held against the drum by a spring.

Previous models in the series only had 2 pawls, but this machine has 4.



The left-hand drawing shows the location of the transport belt and the fans. There are two fans.

The right-hand drawing shows the flow of air out through the ozone filter.

The fans also cool the fusing unit.

The fans stay on during standby mode to keep the machine cool.

The speed of the separation/transport fan accelerates slightly as soon as a job starts with Film Mode 4 selected. The fan speed returns to normal as soon as the last sheet exits the machine.

This function can be adjusted with SP1955-1 (Transport Fan Duty Setting).



## PURPOSE OF THE SECTION

Only the main points will be mentioned here. For full details of all procedures, see the service manual. Follow all the steps carefully, and take note of all notes, cautions, and warnings.









PURPOSE OF THE SECTION

The fusing unit and fusing temperature control will be described.



The arrangement of fusing lamps and thermistors is the same as for the previous model.





No additional units



The wattages of the lamps are different for each model also.

The connectors for the lamps are different, so it is not possible to install the lamp for the wrong machine.

## D211 hot roller

The roller contains three pipes with liquid in them. The liquid circulates when the fusing lamps turn on. This makes sure that the temperature is even all across the lamp (there are small differences in temperature in different places across the lamp due to the coils in the elements – the fluid in the pipes removes these differences).



Other differences between the two machines

Hot Roller

D208: Diameter: 60 mm, thickness: 1.6 mm

D211: Diameter: 60 mm, thickness: 2.1 mm; contains a heat pipe roller

**Pressure Roller** 

Diameter: 65 mm, thickness: 85 mm (same for both models)

**Pressure Motors** 

Automatic pressure adjustment for both.



This is for plain paper mode 3, which is the default condition.

For other paper type settings, the copy ready temperature is the same as the target temperature.



This is also for plain paper mode 3.





Each motor pulls a spring, which moves a lever that applies upward pressure on the end of the pressure roller shaft.

The pressure roller is hollow, so the shaft does not affect the pressure at the ends of the pressure roller. Bushings at the centre of the shaft push upwards, and this applies the upward pressure between the hot roller and pressure roller.

Details of the process for D208 are different from D211.

The release position for removing jams is not the same as the home position.

The output tests (SP 5804) have two different settings: For the home position and for the jam release position



This slide and the next one show the mechanism in more detail.



This slide shows the shaft running through the centre of the pressure roller. The bearings apply upward pressure near the centre of the pressure roller.

This is different from most copiers. Pressure is normally applied between the ends of the shaft.

The bearings are fixed in position with e-rings. There is no field service adjustment for the bearing position.



The graph shows how the nip width changes across the width of the fusing unit.

The dotted line going across the centre shows the ideal nip width.

The vertical dotted line marks the mid-point of the fusing unit, across the paper path.

No fusing pressure applied

See the black line. This is the same for previous models and for this model.

Previous models

See the blue line.

Pressure is applied at the ends of the pressure roller.

The nip width varies widely across the paper.

This model

See the red line.

Pressure is applied nearer the centre (see the previous slide).

The nip width does not vary as much across the paper, and is closer to the ideal nip width than previous models.



There is no oil supply unit. The cleaning roller's coating is saturated in silicone oil, which cleans the hot roller.

Helps prevent problems caused by paper that is coated with calcium carbonate.





Fusing Motor Speed Adjustment	nge.
<ul> <li>During paper feed, the speed of the fusing roller increases slightly, so that the fusing roller rotates faster than the registration roller.</li> </ul>	
<ul> <li>This pulls the paper tight to keep it straight.</li> </ul>	
<ul> <li>The tension on the paper could cause the paper to snap out of the nip of the registration roller and cause "jitter" in the image if the speed is not corrected before the paper leaves the registration roller.</li> </ul>	
<ul> <li>This line speed adjustment is done only for paper sizes narrower than 297 mm.</li> </ul>	
<ul> <li>When the trailing edge of the paper is 50 mm before the nip of the registration roller, the fusing motor slows by -5%.</li> </ul>	
<ul> <li>This can be adjusted with SP1918.</li> </ul>	248

Also, at about the same time, the registration motor speeds up slightly, as described in the Paper Feed section.

The speed control adjustment is not done for paper shorter than 250 mm (9.8 in.)

Fusing starts after the line speed has been slowed and the trailing edge has left the registration roller.

The speed control setting of SP1918 is not done and the speed is increased after the trailing edge clears.


When the paper reaches the fusing unit, the fusing motor starts to pull the paper through the machine and out of the exit.

However, when the paper reaches the fusing unit, if it starts to move past the drum faster, the image will be enlarged in the sub scan direction.

To counter this, the registration motor and fusing motor both slow down by the same amount, to maintain constant magnification.

The fusing unit is faster than the registration roller, to ensure that there is no wrinkling.

The speed change occurs when the leading edge of the paper reaches the exit sensor.

The exit sensor is not on this diagram. The arrow indicates roughly where it is.

The distance between registration roller and exit sensor is about 360 mm (14.2"), so this speed correction is only used when paper is longer than 360 mm.

Alert students may observe that for a short while, the paper is moving past the drum faster (from when the fusing unit grabs the leading edge, until the leading edge reaches the exit sensor).

However, the fusing unit only pulls the paper slightly faster than the registration rollers. The speed difference is about 2%.

Look at a copy and see if you can spot any changes in the sub scan reproduction ratio between the 300 mm and 360 mm mark.



There are three adjustment levers at the center of the fusing unit entrance.

The levers can be moved left and right to adjust the height of the entrance guide plate.

Adjust only when the paper thickness is causing a severe problem at the fusing entrance.

The adjustment cannot be made without removing the fusing unit, so it was not mentioned in the service manual, and should not be attempted unless there is a serious problem.



# PURPOSE OF THE SECTION

Only the main points will be mentioned here. For full details of all procedures, see the service manual. Follow all the steps carefully, and take note of all notes, cautions, and warnings.



Make sure that you are aware of the SP modes that must be done after each procedure (they are in the procedures in the manual).

### **FPDB**

The diagram is a rear view. So, the right FPDB is on the left side of the drawing and vice versa.

#### Thermostats

Make sure that you install them correctly, as shown in the manual.

#### **Fusing Lamps**

The fusing lamps are designed so that it is not possible to install the lamps in the wrong model.

### Hot Roller

It is possible to install the roller in the wrong model. The roller for the D211 is heavier.









PURPOSE OF THE SECTION

The paper exit mechanisms will be described.



When using the front exit, the trailing edge of the paper is grabbed, so that the output does not fall on the floor.





The solenoid directs the paper to either the front or rear copy exit.

The user selects the required exit for the job at the operation panel.

The procedure for the user to switch between the exits was shown in the Machine Overview section of the course.

For recommendations on which exit to use, see the Operating Instructions.

Copy/Document Server Reference > Basic Copying > Original and Copy Output Locations

The user must be careful to select the rear cover for A1 (D) LEF or longer paper. The front exit tray cannot support larger sizes.

The machine does not automatically switch exits if the paper is A1 (D) LEF or longer.







PURPOSE OF THE SECTION

This is a quick overview of PM for this machine.



The PM cycle is 10 km of printouts.

Not all items need PM at 10 km. Some only need PM at 20, 30, 40 km, and so on. See the PM table for details.

Development filter: If this is blocked, air pressure may increase inside the development unit, and this may lead to toner scattering.

Counters - 1	nge.
<ul> <li>When a PM part reaches the end of its service life, the machine indicates that the part should be replaced.</li> </ul>	
<ul> <li>SP7951-002 to 15 (Remaining Days Counter). When a PM part should be replaced within the next 15 days, a near- end message is displayed on the operation panel.</li> </ul>	
<ul> <li>SP7803-002 to 015 (PM Counter Display). This shows the number of sheets and distance for the PM parts before the end message is displayed.</li> </ul>	
This is the count threshold for the interval between the near-end alert and the final end alert.	
<ul> <li>PM Count Clear. The count for the replaced part must be cleared before the machine can resume normal operation. (However, the default is not displayed.)</li> </ul>	
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Counters - 2	RICOH imagine. change.
<ul> <li>SP7804-xxx: PM counter reset</li> </ul>	
<ul> <li>The following parts have PM counters that must be re the part is replaced:</li> </ul>	eset after
– Developer	
<ul> <li>Charge Corona Unit</li> </ul>	
<ul> <li>Transfer Roller</li> </ul>	
<ul> <li>Separation Corona Unit</li> </ul>	
- OPC Drum	
<ul> <li>Cleaning Blade</li> </ul>	
<ul> <li>3rd Feed Roller</li> </ul>	
<ul> <li>4th Feed Roller</li> </ul>	
<ul> <li>Hot Roller</li> </ul>	
<ul> <li>Pressure Roller</li> </ul>	
<ul> <li>Fusing Cleaning Roller</li> </ul>	
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See 'Replacing PM Parts' in the maintenance section of the service manual for the correct way to reset a PM counter.





# PURPOSE OF THE SECTION

This describes the mechanisms in the optional paper cassette.





This slide shows the optional paper cassette unit installed instead of the optional roll feeder.

The cassette feed motor drives both trays.

Each tray has a clutch.



The relay roller in the main body (in the blue circle in the diagram) lets the cassette unit feed short paper (A4 LEF is the minimum)



The tray lift sensor detects the top of the stack and tells the lift motor to stop. This sensor is not shown in the diagram.

The paper near-end sensor detects when the bottom plate is getting high. This means that paper is almost finished. This sensor is shown on the diagram. It is at the edge of the tray, and never touches the paper stack.





The manual shows which sizes are detected automatically. Other sizes must be specified with the user tool.



For example, after the wheel turns 40.5 degrees, the state of CN2 changes to HIGH.



This example shows how the sensor operates for international paper sizes.

For some sizes, the length sensors must be used to detect the correct size, because the rotary switch output is the same.

For A4 LEF and A3 SEF, these widths are the same, so the width sensor cannot distinguish them.

But for B4 LEF and A2 LEF, the widths are different. Why can the sensor not distinguish the difference? This is because the wheel turns more than one time. By coincidence, the wheel position is about the same for these two different paper widths, and the width sensor cannot distinguish them. The length sensor must be used.

Length sensor 2 is only used for USA Architecture paper sizes.







The End