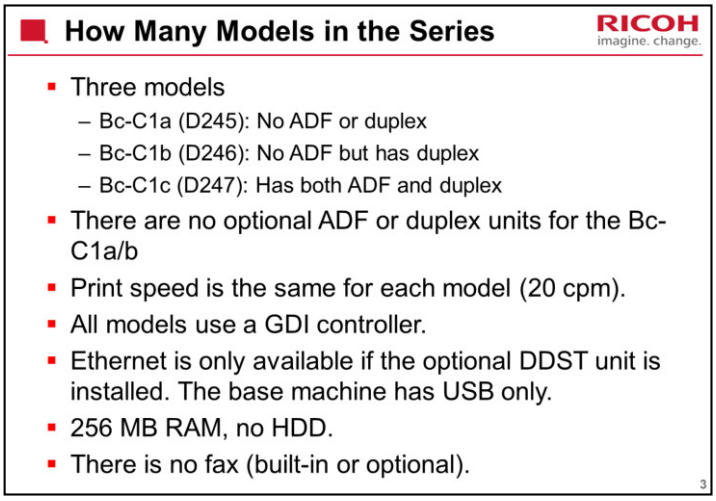
This course explains how to service the Bc-C1 series of A3 black-and-white copiers.

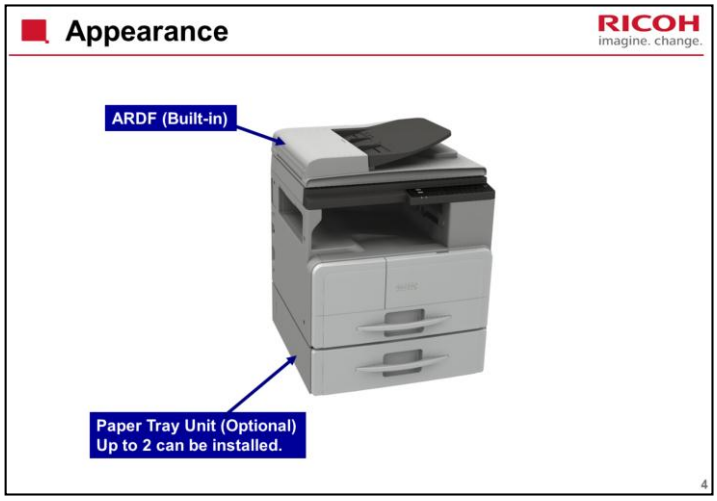
The machine is based on the K-C4L, and uses a GDI controller (not a GW controller).

To learn about this machine, please study the user's guide and the field service manual in addition to this TTP.

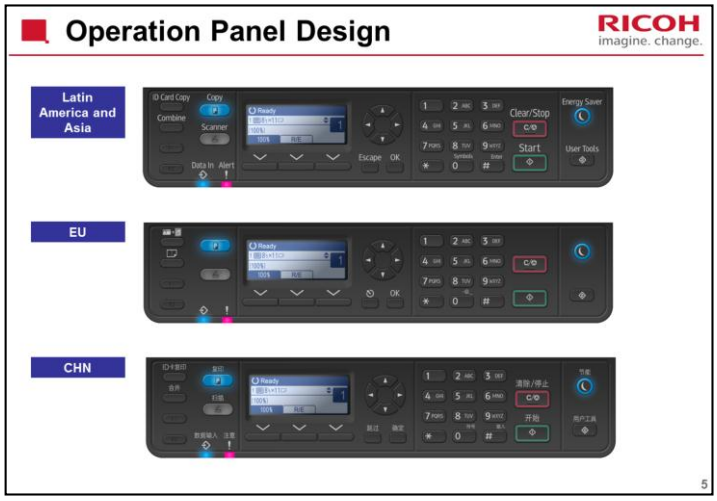
No additional notes



No additional notes



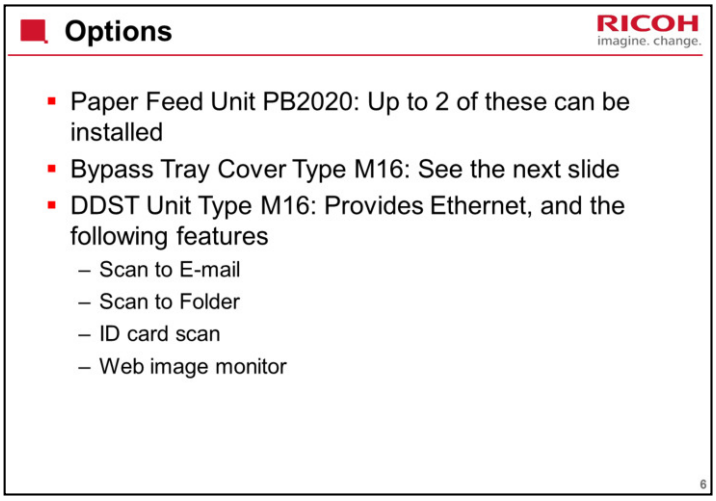
No additional notes



Compared with K-C4L, there are fewer keys.

The display is a 4-line LCD.

The two unlabeled keys at the bottom left, below the Combine button are programmable Shortcut keys.



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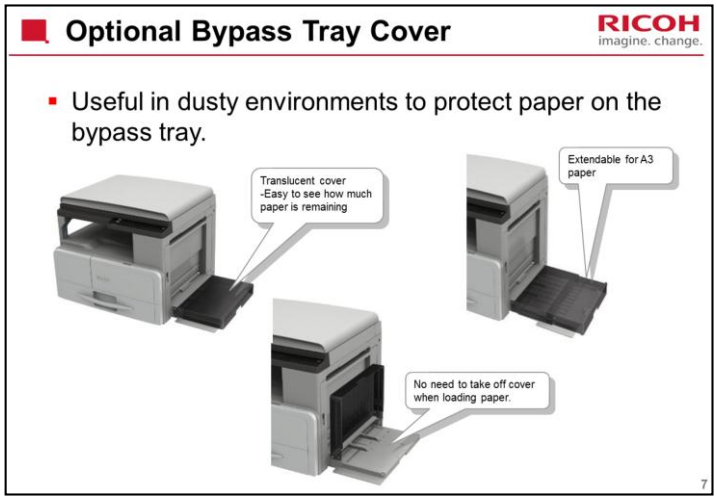

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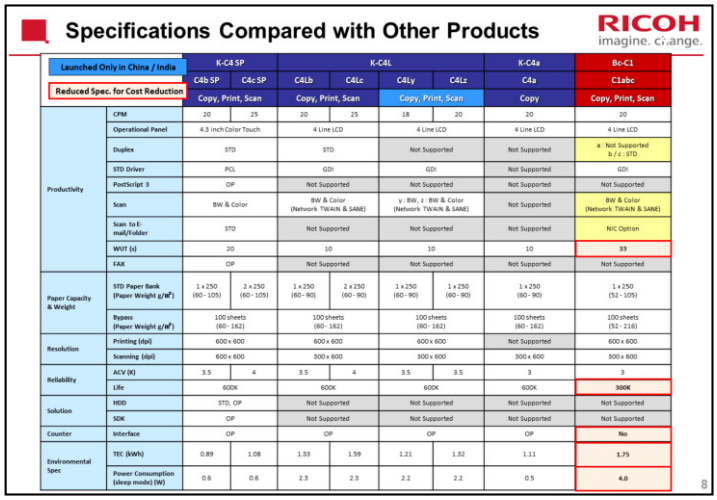
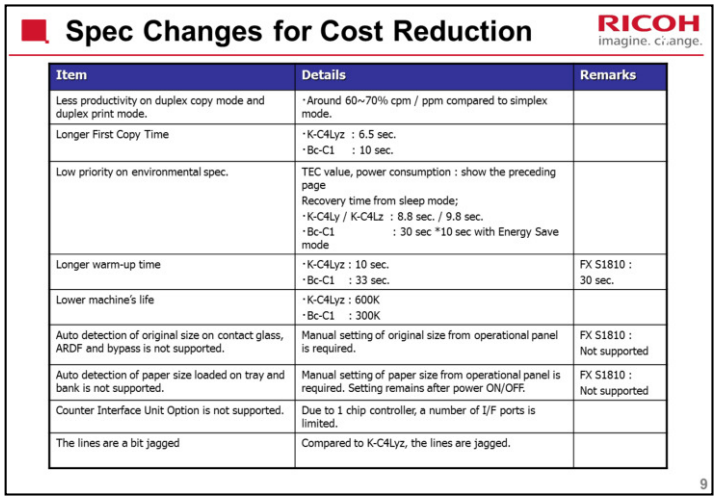


Specifications Compared with Other Products

RICOH imagine. change.

Launched Only in China / India		K-C4 SP		K-C4L				K-C4a	Bc-C1
		C4b SP	C4c SP	C4Lb	C4Lc	C4Ly	C4Lz	C4a	C1abc
Reduced Spec. for Cost Reduction		Copy, Print, Scan		Copy, Print, Scan		Copy, Print, Scan		Copy	Copy, Print, Scan
Productivity	CPM	20	25	20	25	18	20	20	20
	Operational Panel	4.3 inch Color Touch		4 Line LCD		4 Line LCD		4 Line LCD	4 Line LCD
	Duplex	STD		STD		Not Supported		Not Supported	a : Not Supported b / c : STD
	STD Driver	PCL		GDI		GDI		Not Supported	GDI
	PostScript 3	OP		Not Supported		Not Supported		Not Supported	Not Supported
	Scan	BW & Color		BW & Color (Network TWAIN & SANE)		y : BW, z : BW & Color (Network TWAIN & SANE)		Not Supported	BW & Color (Network TWAIN & SANE)
	Scan to E-mail/Folder	STD		Not Supported		Not Supported		Not Supported	NIC Option
	WUT (s)	20		10		10		10	33
	FAX	OP		Not Supported		Not Supported		Not Supported	Not Supported
Paper Capacity & Weight	STD Paper Bank (Paper Weight g/m²)	1 x 250 (60 - 105)	2 x 250 (60 - 105)	1 x 250 (60 - 90)	2 x 250 (60 - 90)	1 x 250 (60 - 90)	1 x 250 (60 - 90)	1 x 250 (60 - 90)	1 x 250 (52 - 105)
	Bypass (Paper Weight g/m²)	100 sheets (60 - 162)		100 sheets (60 - 162)		100 sheets (60 - 162)		100 sheets (60 - 162)	100 sheets (52 - 216)
Resolution	Printing (dpi)	600 x 600		600 x 600		600 x 600		Not Supported	600 x 600
	Scanning (dpi)	600 x 600		300 x 600		300 x 600		300 x 600	300 x 600
Reliability	ACV (K)	3.5	4	3.5	4	3.5	3.5	3	3
	Life	600K		600K		600K		600K	300K
Solution	HDD	STD, OP		Not Supported		Not Supported		Not Supported	Not Supported
	SDK	OP		Not Supported		Not Supported		Not Supported	Not Supported
Counter	Interface	OP		OP		OP		OP	No
Environmental Spec	TEC (kWh)	0.89	1.08	1.33	1.59	1.21	1.32	1.11	1.75
	Power Consumption (sleep mode) (W)	0.6	0.6	2.3	2.3	2.2	2.2	0.5	4.0

No additional notes



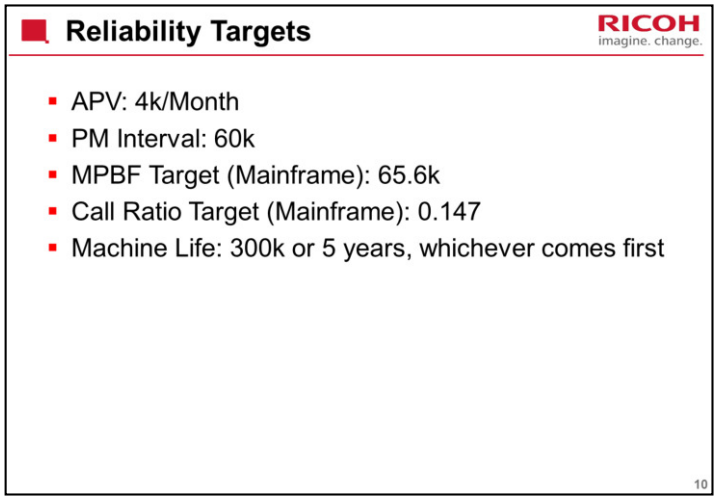
Spec Changes for Cost Reduction

RICOH imagine. change.

Item	Details	Remarks
Less productivity on duplex copy mode and duplex print mode.	·Around 60~70% cpm / ppm compared to simplex mode.	
Longer First Copy Time	·K-C4Lyz : 6.5 sec. ·Bc-C1 : 10 sec.	
Low priority on environmental spec.	TEC value, power consumption : show the preceding page Recovery time from sleep mode; ·K-C4Ly / K-C4Lz : 8.8 sec. / 9.8 sec. ·Bc-C1 : 30 sec *10 sec with Energy Save mode	
Longer warm-up time	·K-C4Lyz : 10 sec. ·Bc-C1 : 33 sec.	FX S1810 : 30 sec.
Lower machine's life	·K-C4Lyz : 600K ·Bc-C1 : 300K	
Auto detection of original size on contact glass, ARDF and bypass is not supported.	Manual setting of original size from operational panel is required.	FX S1810 : Not supported
Auto detection of paper size loaded on tray and bank is not supported.	Manual setting of paper size from operational panel is required. Setting remains after power ON/OFF.	FX S1810 : Not supported
Counter Interface Unit Option is not supported.	Due to 1 chip controller, a number of I/F ports is limited.	
The lines are a bit jagged	Compared to K-C4Lyz, the lines are jagged.	

9

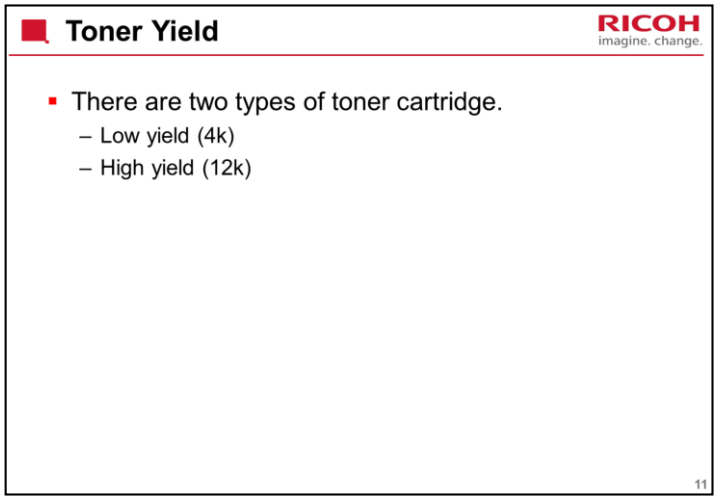
No additional notes



A4 (LT) short-edge feed

5% image coverage ratio

2P/J



No additional notes

Major Selling Points
Easy Jam Removal

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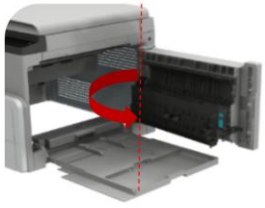
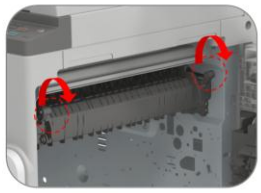
imagine. change.

- The door opens sideways to improve internal visibility and ease of jam removal.
  - Improvement from K-C4L.
- Handles are added to remove jammed paper in the fusing unit.
  - Improvement from K-C4L





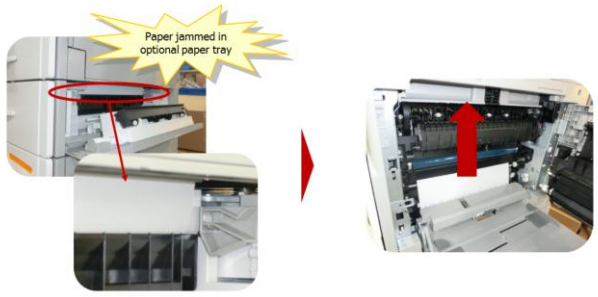
12

No additional notes

Major Selling Points
Easy Jam Removal

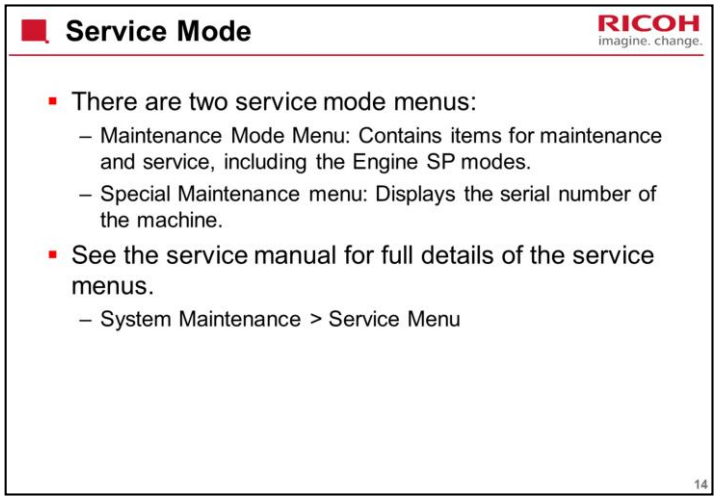
RICOH
imagine. change.

- For the optional paper tray unit, the machine automatically ejects jammed paper when the door is opened, if paper is jammed in the vertical transport area.

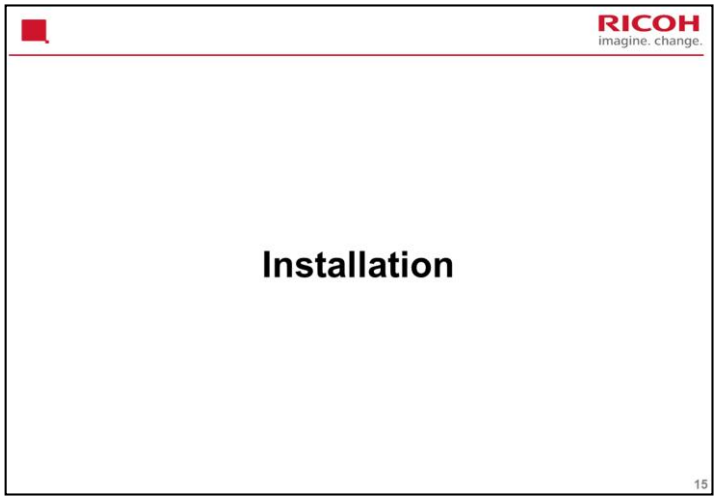


13

No additional notes



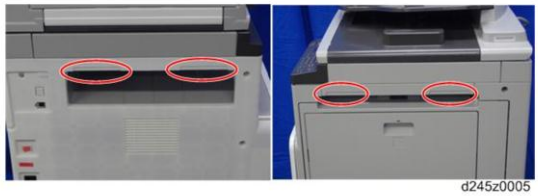
No additional notes



See the service manual for full details of the installation procedures. This course only explains a few important points about the procedures.

Lifting the Machine

RICOH
imagine. change.

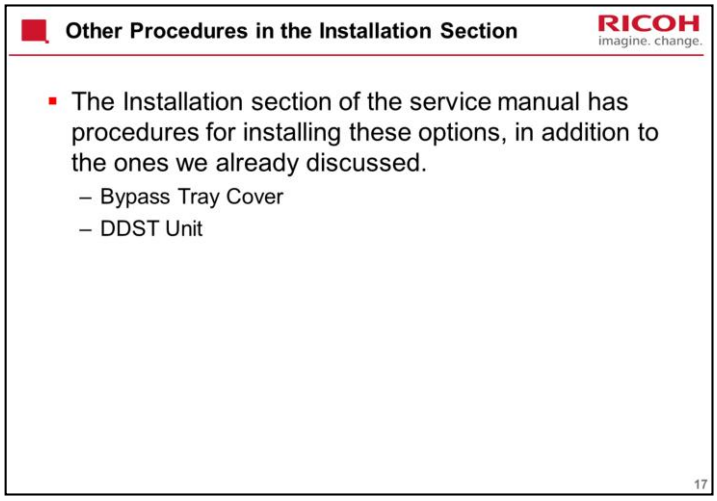


d245z0005

- Two people are required when lifting the machine onto a table or an optional paper feed unit.
- Hold the places circled in red.
- If an optional paper feed unit has already been installed, unscrew it from the main machine before you attempt to lift.
  - Trying to lift when they are still connected is too heavy and the handles may be damaged.

16

No additional notes



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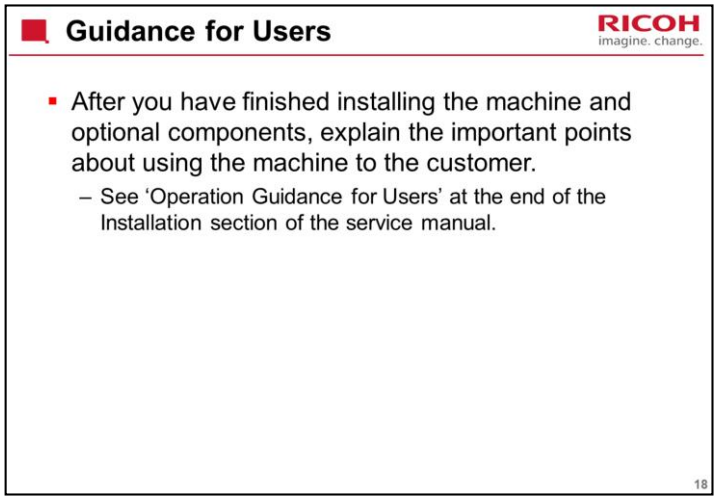
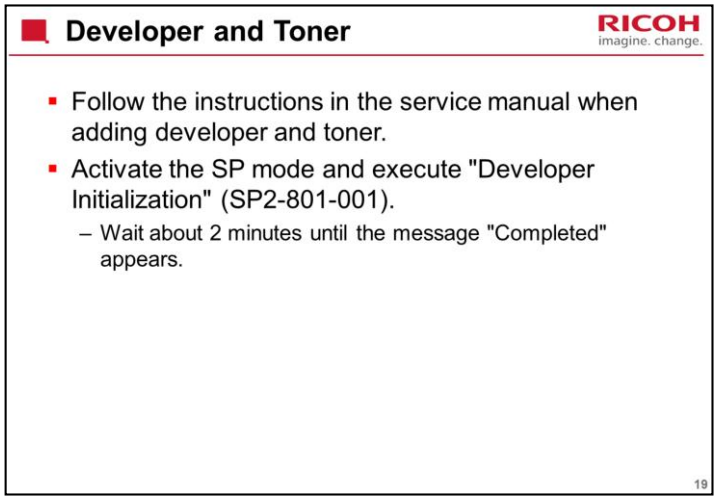


No additional notes



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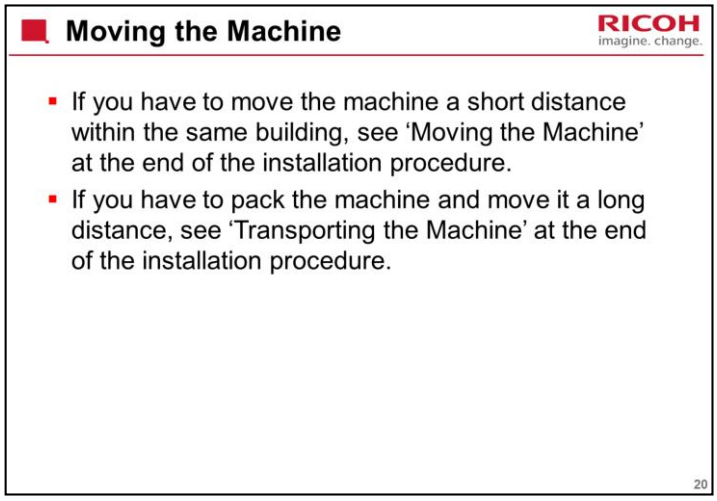

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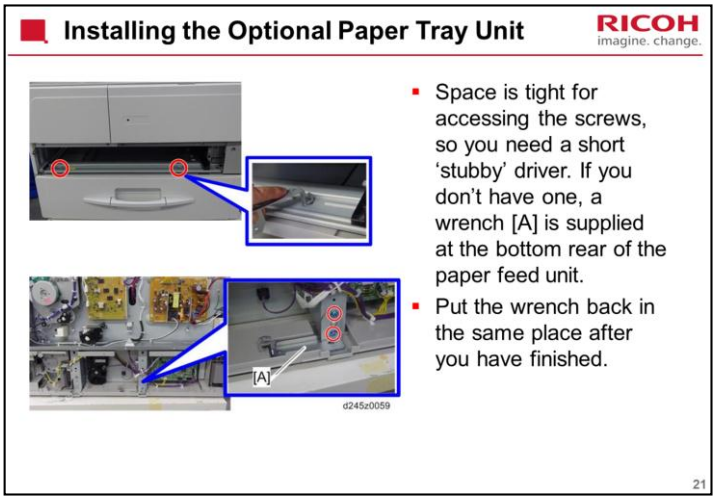
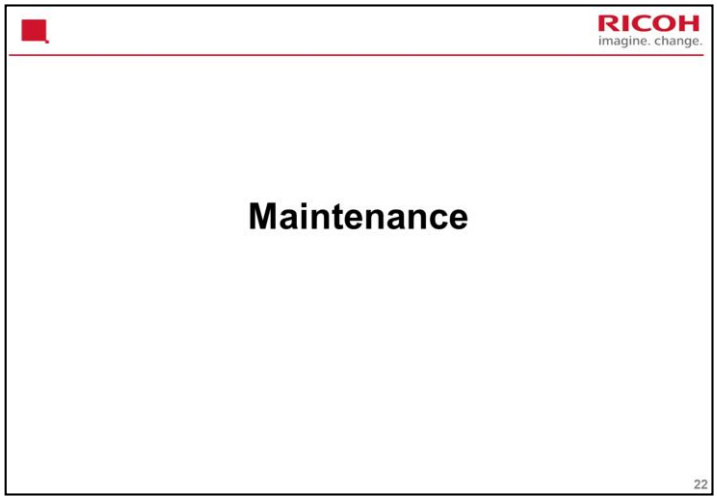
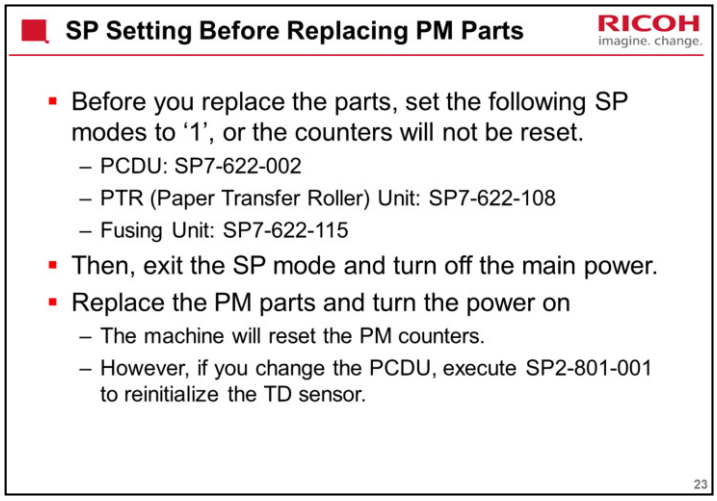


Follow the procedure in the service manual for full details of how to install the optional trays.

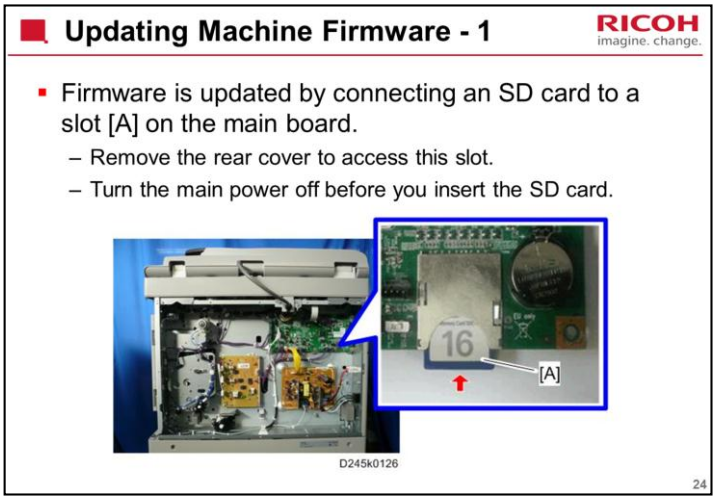


See the PM table in the Appendix of the service manual.



See 'PM Parts Settings' in the Maintenance section of the service manual for full details of how to replace PM parts.

This is different from the K-C4.



For full details of the procedure, see ‘Firmware Update’ in the Service tables section of the service manual.

This machine has only one firmware module (combined engine and controller firmware). The K-C4 series however has two modules (one for the engine, one for the controller).

Updating Machine Firmware - 2

RICOH imagine. change.

- Before you turn the power back on, disconnect the network cable from the machine, and turn on the update switch (SW5) [A].
  - Turn this switch off again at the end of the procedure.
  - See the service manual for full details of the procedure.

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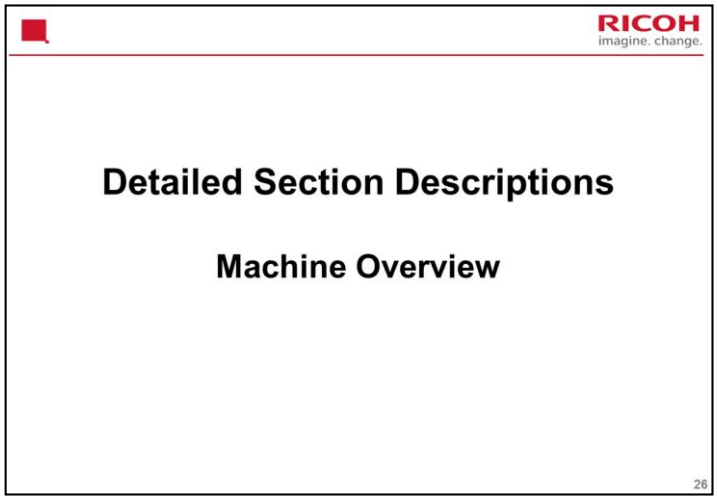
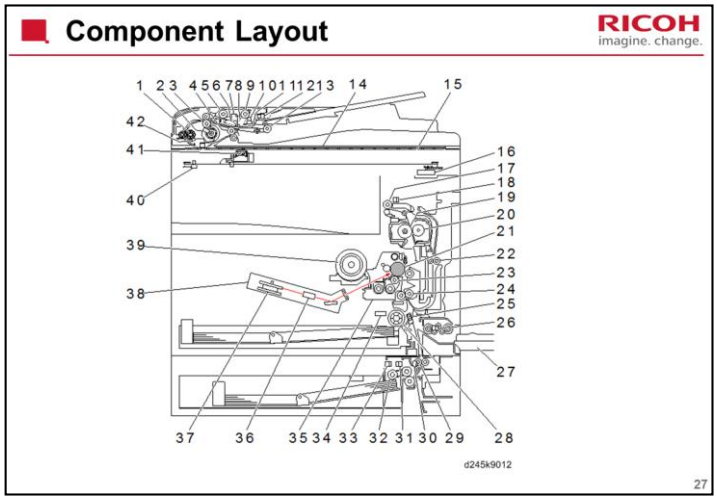
For full details of the procedure, see ‘Firmware Update’ in the Service tables section of the service manual.

This machine has only one firmware module (combined engine and controller firmware). The K-C4 series however has two modules (one for the engine, one for the controller).



For detailed parts layouts, see the following section of the service manual:

1. Product Information > Product Overview

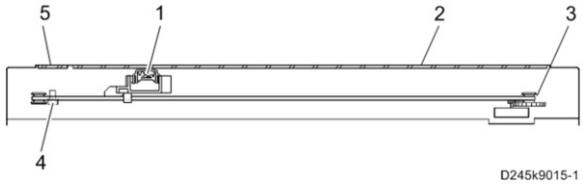


This is the D247 (with ARDF and duplex, and optional paper tray unit).

1. Pre-scanning roller
2. ADF main motor
3. ADF entrance roller
4. Original exit roller
6. ADF friction pad
7. Original stopper
8. Original set actuator
9. Pick up roller
10. Original set sensor
11. Junction gate
12. ADF cover sensor
13. ADF reverse roller
14. Platten cover
15. Exposure glass
16. Scanner motor
17. Paper exit/reverse roller
18. Paper exit sensor
19. Hot roller
20. Pressure roller
21. OPC drum
22. Duplex transport roller
23. Development roller
24. Registration roller
25. Registration sensor
26. By-pass paper end sensor
27. By-pass tray
28. Paper feed roller
29. Vertical transport roller
30. Paper feed sensor
31. Paper end sensor (Option)
32. Pick up roller
33. Tray lift sensor
34. Paper end sensor (Main)
35. PCU
36. WTL
37. Polygon mirror motor
38. Laser unit
39. Toner supply bottle holder
40. Scanner HP sensor
41. CIS unit
42. ADF registration sensor

Component Layout: Scanner

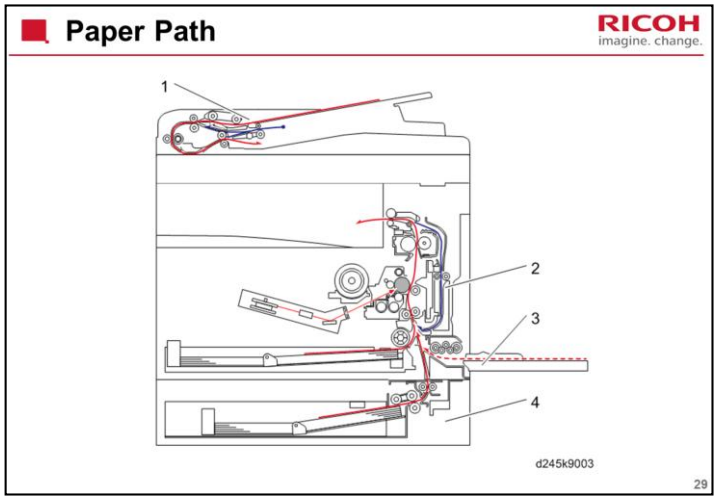
RICOH
imagine. change.



- 1. CIS unit with carriage
- 2. Exposure glass
- 3. Scanner motor
- 4. Scanner HP sensor
- 5. DF exposure glass

28

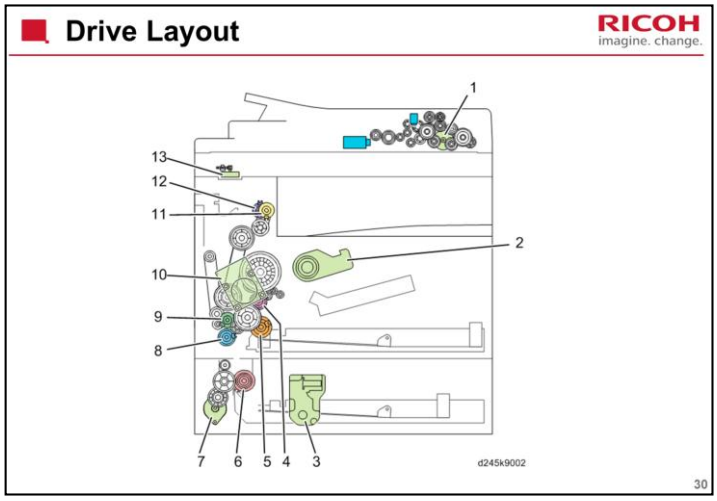
No additional notes



All models have a bypass tray.

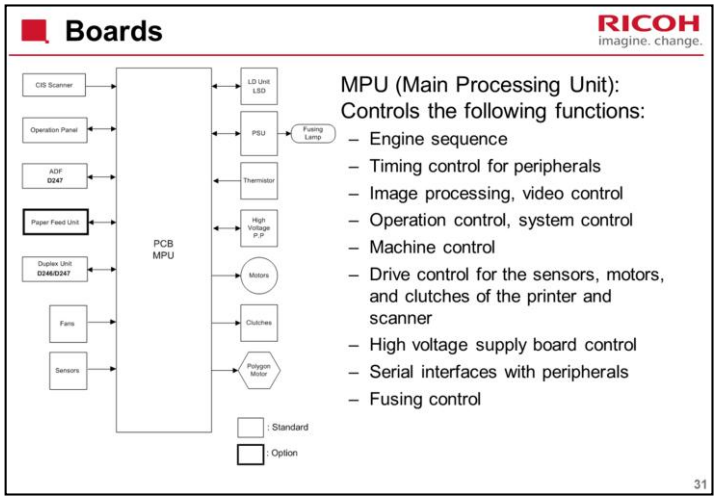
Only the D246 and D247 have the duplex (feed path shown in blue in the diagram)

1. ADF unit (D247 only)
2. Duplex unit (D246/D247 only)
3. By-pass tray
4. Paper feed unit (Option)

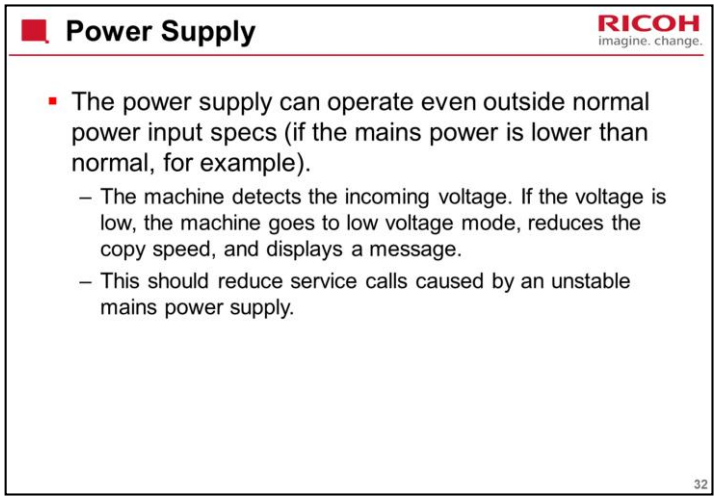


The print engine has only one motor.

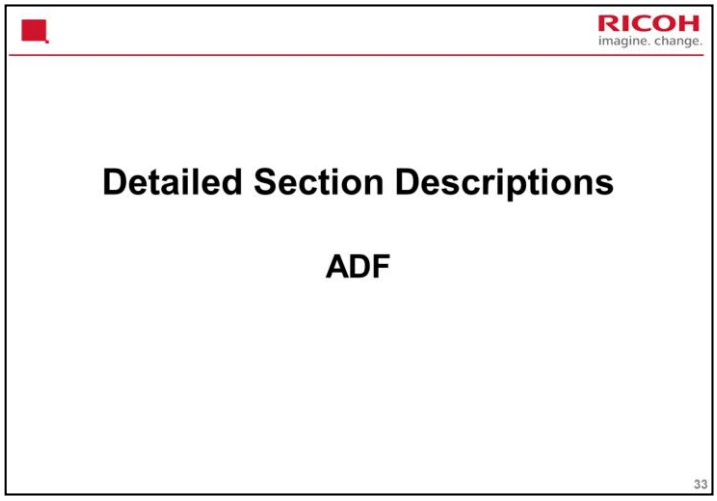
1. ADF main motor (D247 only)
2. Toner supply motor
3. Tray lift motor (option)
4. Registration clutch
5. Paper feed clutch (main)
6. Paper feed clutch (option)
7. Transport motor (option)
8. By-pass paper feed clutch
9. Duplex clutch (D246/D247 only)
10. Main motor
11. Reverse clutch
12. Paper exit clutch
13. Scanner motor



No additional notes



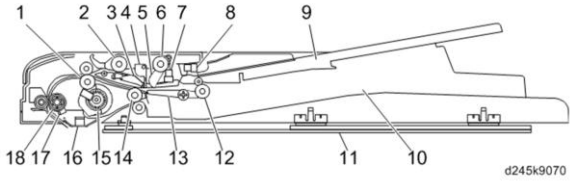
This function is mentioned again in the section of the course about Fusing.



This is almost the same as the K-C4.

Overview (1)

RICOH
imagine. change.



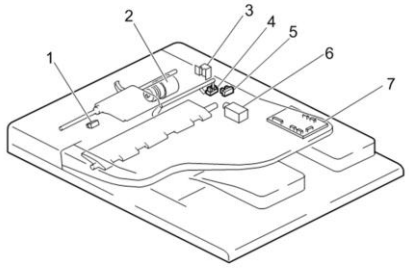
1. ADF entrance roller
2. Original feed roller
3. Friction pad
4. Original stopper
5. Original set actuator
6. Pick up roller
7. Original set sensor
8. ADF cover sensor
9. Original tray
10. ADF exit tray
11. Platen cover
12. Reverse roller
13. Junction gate
14. Original exit roller
15. ADF main motor
16. White plate guide
17. ADF registration sensor
18. Pre-scanning roller

34

No additional notes

Overview (2)

RICOH
imagine. change.



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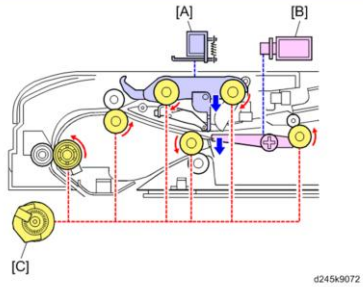
1. ADF registration sensor
2. ADF main motor
3. ADF pick-up solenoid
4. Original set sensor
5. ADF cover sensor
6. ADF inverter solenoid
7. ADF main board

35

No additional notes

Drive



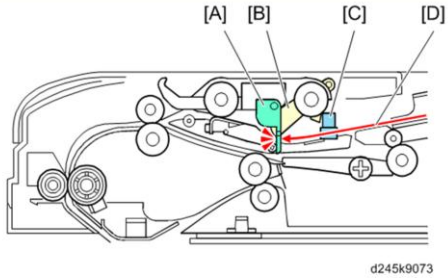
- The ADF main motor [C] drives each roller through gears.
- The ADF pick-up solenoid [A] controls original pick-up.
- The ADF inverter solenoid [B] operates the reverse junction gate.

36

No additional notes

Feed-in Mechanism (1)

RICOH
imagine. change.



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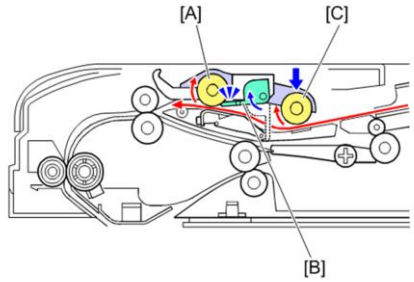
- The stopper [A] prevents the user from placing originals too far into the feeder.
- When the original set sensor [B] detects originals, original transport starts.

37

No additional notes

Feed-in Mechanism (2)

RICOH
imagine. change.



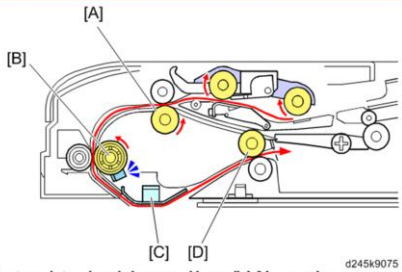
- The ADF pick-up solenoid lowers the pick-up roller [C].
  - The original can reach the original feed roller [A] because the original stopper [B] does not stop the original if the pick-up roller [C] is lowered.

38

No additional notes

Single-sided Scanning

RICOH
imagine. change.



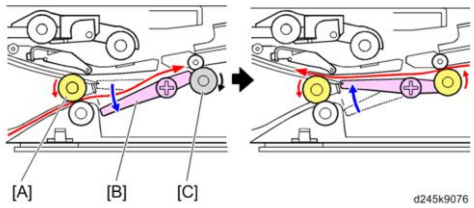
- The original is fed from the ADF entrance roller [A] to the pre-scanning roller [B], and then it passes under the white plate guide [C].
- The original exit roller [D] feeds the original out of the ADF.

39

No additional notes

Duplex Scanning (1)

RICOH
imagine. change.



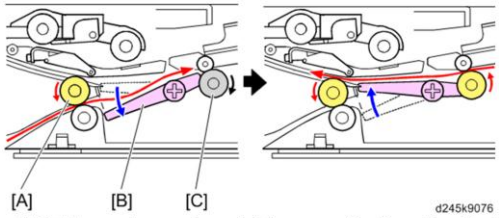
- The ADF inverter solenoid lowers the junction gate [B], and the original is fed to the reverse roller [C].
- Then, the reverse roller [C] feeds the original out of the ADF by rotating in reverse.

40

No additional notes

Duplex Scanning (2)

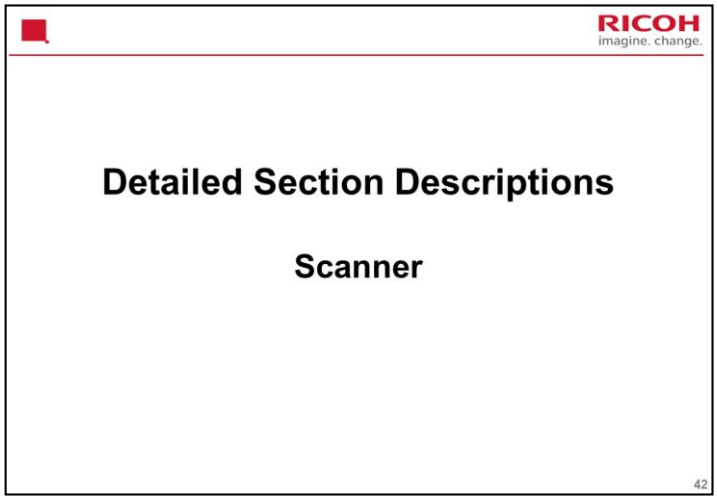
RICOH
imagine. change.



- The ADF inverter solenoid turns off after the trailing edge of the original passes the original exit roller [A], and the reverse roller starts normal rotation. The original comes back into the ADF.
- After the second side is scanned, the ADF reverses the original again and feeds it out face down.

41

No additional notes



Simplified version of the K-C4L scanner

Overview

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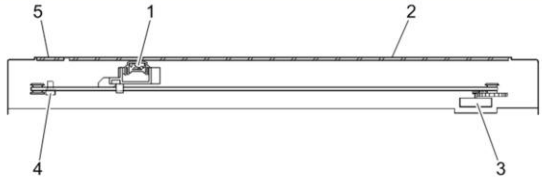
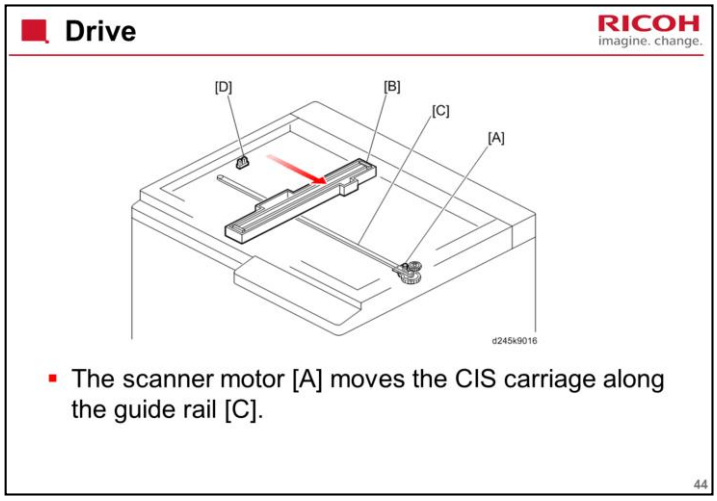


1. CIS unit (with carriage)
2. Exposure Glass
3. Scanner Motor (stepper motor)
4. Scanner HP sensor
5. DF Exposure Glass

- Difference from the K-C4L:
  - No APS sensors

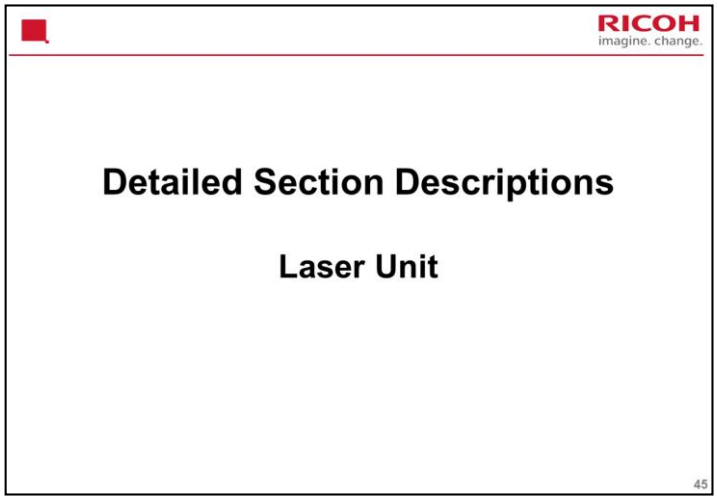
43

No additional notes

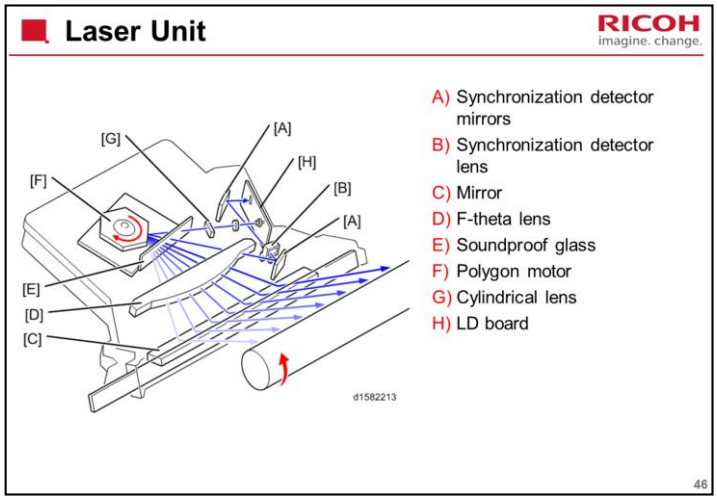


The CIS can be adjusted relative to the main scanning direction using the center guide rail [C]. This is a factory adjustment; do not do this in the field.

Difference from the K-C4L: Three are no side guide rails for raising/lowering the CIS.



Almost exactly the same as K-C4L.



More on Laser Optics

The LSD (laser synchronisation detector) is part of the laser diode unit, and cannot be replaced separately.

Laser beam

There is only one in this model.

Automatic Power Control

Laser power is controlled automatically.

Shutter

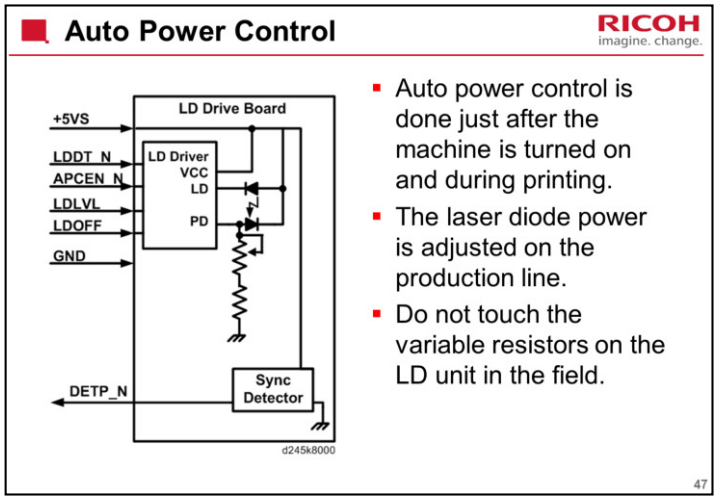
There is no mechanical shutter to stop the laser beam.

Safety Switches

A safety switch stops power to the laser beam if the front or right cover is open.

Soundproof Glass

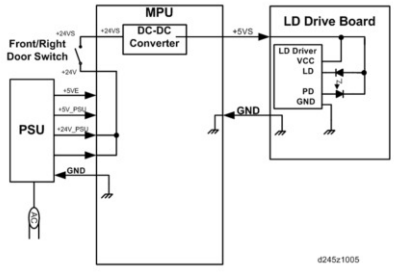
Reduces the effects of vibrations on the operation of the polygon mirror



Auto power control prevents the intensity of the laser beam from changing because of the temperature, the machine monitors the current passing through the laser diode (LD). The machine adjusts the current to the laser diode by comparing it with the reference level from the reference circuit.

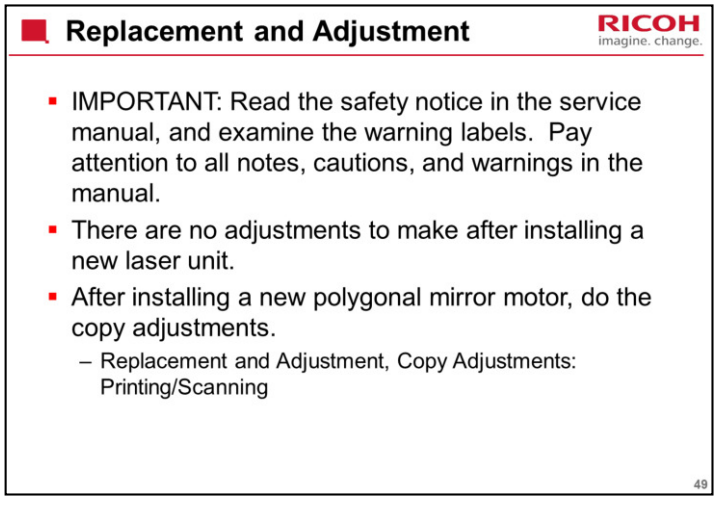
Safety Switches

RICOH
imagine. change.

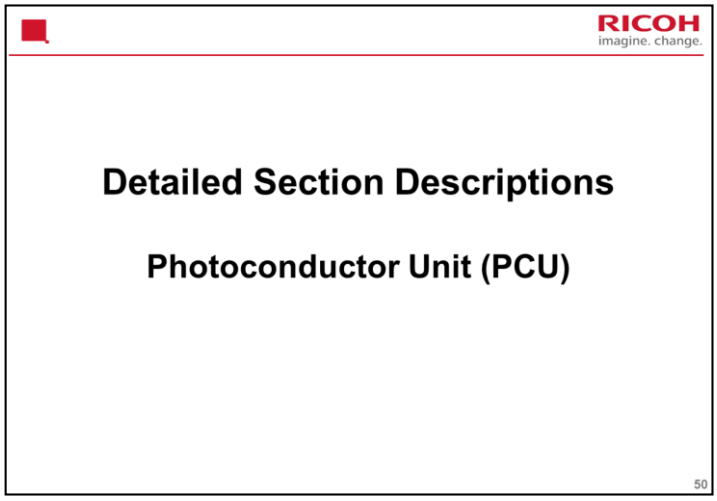


- When the front or right cover is open, a switch cuts power to the laser diode.
- Both covers operate the same switch.

No additional notes



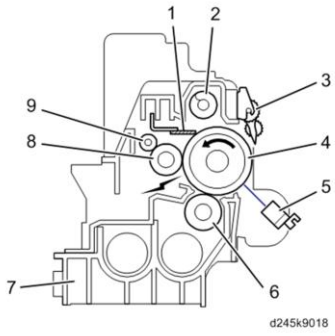
No additional notes



There are some differences from the K-C4L.

Components

RICOH
imagine. change.



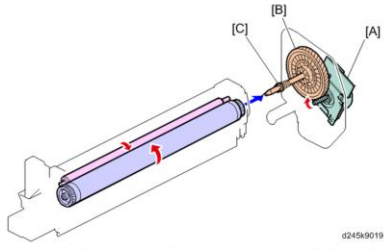
- There is no quenching lamp.
  - The K-C4L has one.
- The ID sensor is not part of the PCU.

- 1. Cleaning blade
- 2. Toner collection coil
- 3. Pick-off pawl
- 4. OPC drum
- 5. ID sensor
- 6. Development roller
- 7. Development unit
- 8. Charge roller
- 9. Charge roller cleaning brush

51

No additional notes

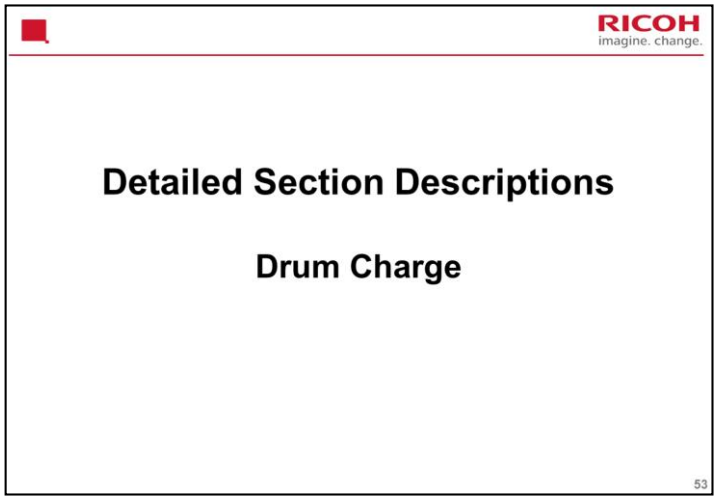
Drive



- The main motor [A] drives the drum gear [B] and the drum drive shaft [C].
  - There is no chain of gears like the K-C4L has.
- The main motor assembly includes a drive controller, which outputs a motor lock signal when the rotation speed is out of the specified range.

52

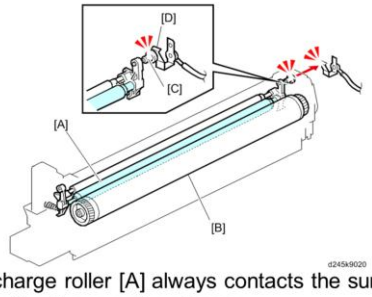
No additional notes



The same as the K-C4L.

Drum Charge Roller

RICOH
imagine. change.



- The drum charge roller [A] always contacts the surface of the drum [B] to give it a negative charge.
- The high voltage supply board gives a negative charge to the drum charge roller through the screw [C] and terminal plate [D].

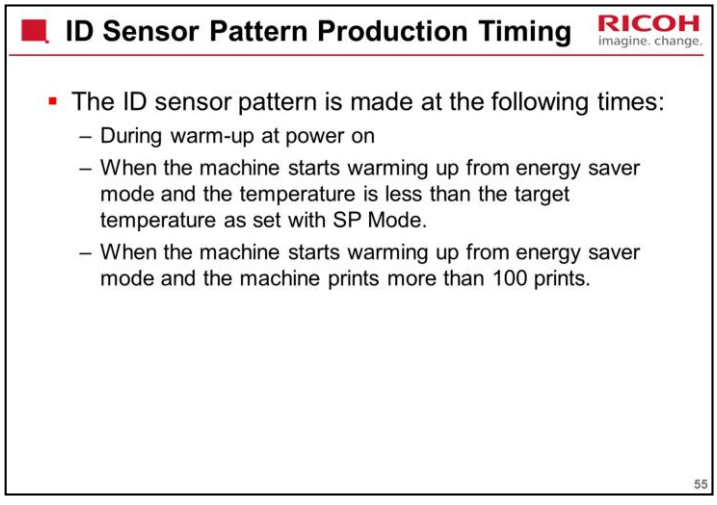
54

More on Drum Charge Roller

The charge roller is part of the PCU unit.

The charge roller turns by friction with the drum.

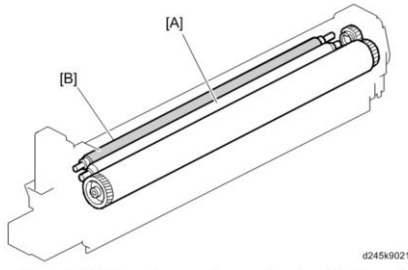
A charge roller does not generate much ozone, so there is no ozone filter



No additional notes

Charge Roller Cleaning

RICOH
imagine. change.

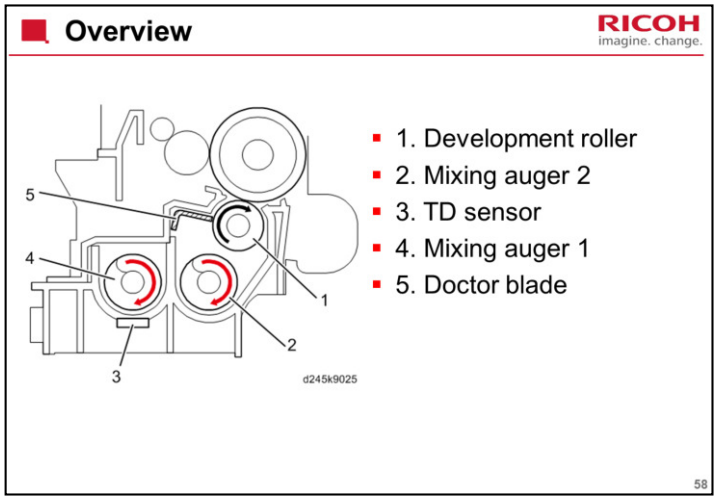


- The cleaning brush [B] is always in contact with the drum charge roller [A].
- A cam gear moves the charge roller from side to side to improve cleaning.
  - This waste toner is not recycled.

56

No additional notes

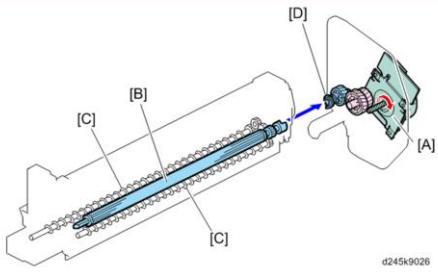
Almost exactly the same as the K-C4L; just a few details, such as applied voltages, are different.



This machine uses a single-roller development system. Two mixing augers mix the developer. The toner density (TD) sensor and image density (ID) sensor (see the illustration in the PCU section) are used to control the image density.

The TD sensor (called a ‘mu’ sensor – greek letter ‘mu’) is placed on the bottom of the development unit. It detects density by measuring the blend ratio of the developer (carrier) and toner in the unit. To do this, it converts changes in magnetic permeability to a frequency.

Drive

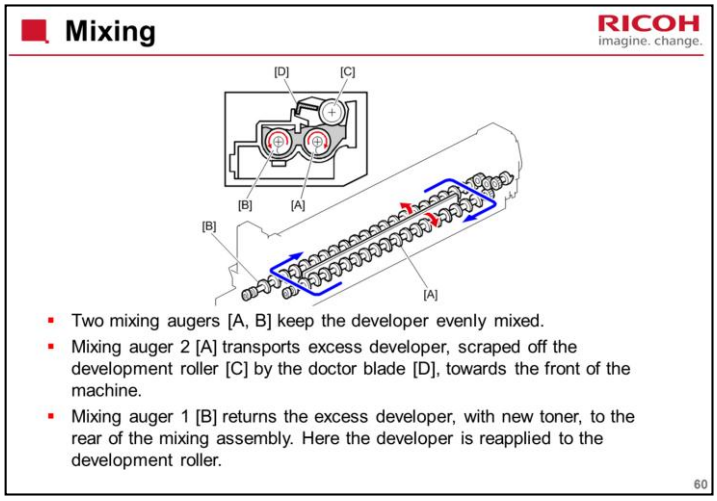


- The main motor [A] drives the development roller [B] and mixing augers [C] through gears and the development drive shaft [D].
- When the PCDU is pushed in, the development drive shaft engages the development roller gear.

59

No development clutch.

Development roller turns whenever the main motor is on.



More on Developer Mixing

Mixing does the following:

Keeps the toner and developer evenly mixed

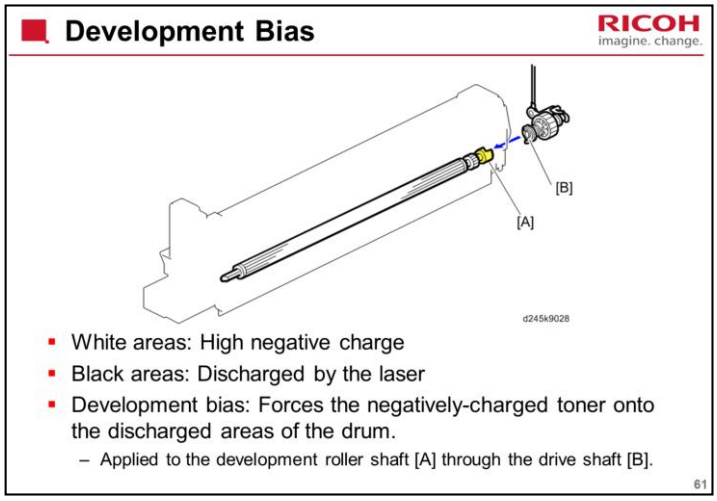
Prevents lumps from forming

Helps create a triboelectric charge on the toner.

The doctor blade splits the developer into the following two parts.

One part goes to the development roller to form the magnetic brush and the latent image on the drum.

The other part is returned to the development unit, where it is mixed with new developer (and recycled toner) and moved back to the development roller.



More on Development Bias

This machine uses a negative-positive development system, in which black areas of the latent image are at a low negative charge (about –154 +/- 50 V) and white areas are at a high negative charge (about –950 V).

To attract negatively charged toner to the black areas of the latent image on the drum, the high voltage supply board applies a bias of -520V to the development rollers throughout the image development process. The bias is applied to the development roller shaft [A] through the drive shaft [B].

The development bias voltage (–520 V) can be adjusted with SP2-201-001.

Toner Bottle Replenishment

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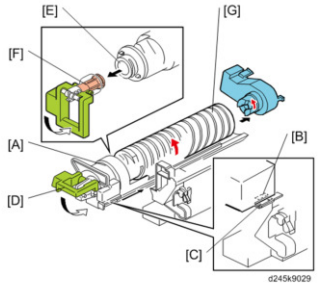

- When bottle is placed in bottle holder [A]:
  - Outlet [B] of the toner bottle holder moves into inlet [C] of the development unit.
- When lever [D] is returned:
  - Cap [E] is pulled away and held by the chuck [F] so that toner can come out.
- The spiral groove [G] helps move toner to the development unit.

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The shutter mechanism of the K-C4 has been replaced.

To add a new toner bottle, first lift the toner bottle holder lever. When this is done, the chuck releases the toner bottle cap into its proper position to prevent toner from scattering.

Toner Supply - Bottle Drive

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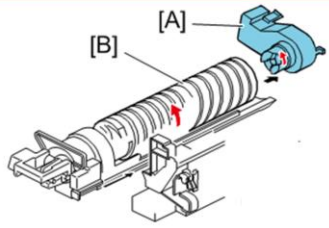
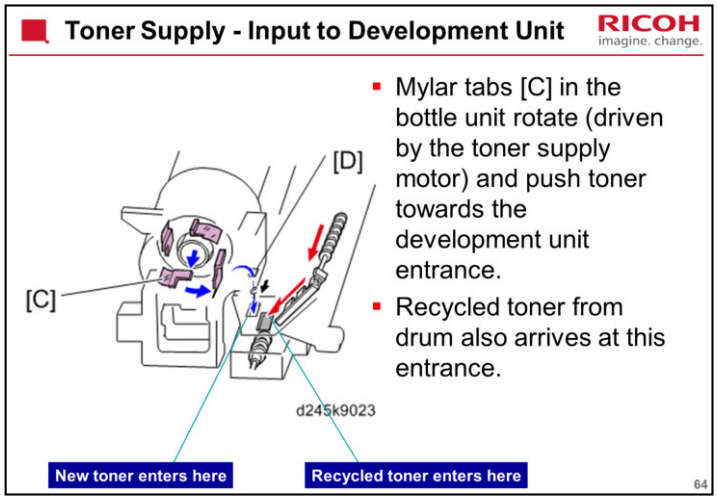
imagine. change.



- Toner supply motor [A] turns the bottle [B]
  - To supply fresh toner to development unit, toner supply motor turns on.
  - Spiral grooves help toner to move towards the bottle exit.

No additional notes

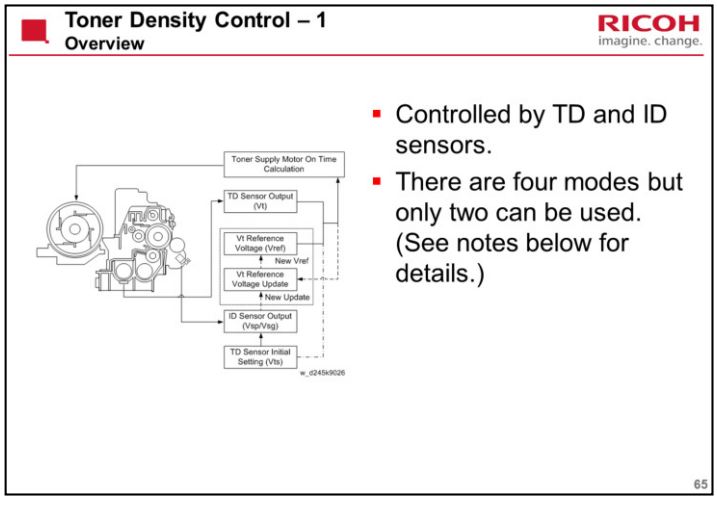


More on Toner Supply Input to the Development Unit

Toner enters the development unit through the outlet [D].

Recycled toner also enters through the same opening. The toner collection coil for recycled toner can be seen at the right side of the drawing.

Toner recycling is covered in the next section of the course.



There are four modes for controlling toner supply which can be changed with by SP 2921. The factory setting is SP2921 = 0.

Basically, the toner concentration in the developer is controlled using the standard TD sensor voltage (Vts), toner supply reference voltage (Vref), actual TD sensor output voltage (Vt), and ID sensor output data (Vsp/Vsg).

The Four Modes

• Sensor Mode 1: SP2921 = 0, Normal sensor control mode

• Sensor Mode 2: SP2921 = 1, Design use only (don't use)

• Fixed Mode 1: SP2921 = 2, Design use only (don't use)

• Fixed Mode 2: SP2921 = 3: Use temporarily if the TD sensor needs to be replaced.

Toner Density Control – 2

RICOH
imagine. change.

- Toner Density Sensor Initial Setting
  - The TD sensor initial setting (SP2801-1: Developer Initialization) procedure must be done after replacing the developer.
  - During TD sensor initial setting, the TD sensor is set so that the TD sensor output is the value of SP 2926 (default 2.5V). This value will be used as the standard reference voltage (Vts) of the TD sensor.
- Toner Concentration Measurement
  - The toner concentration in the developer is detected once every copy cycle. The sensor output voltage (Vt) during the detection cycle is compared with the standard reference voltage (Vts) or the toner supply reference voltage (Vref).

No additional notes

Toner Density Control – 3
Vsp/Vsg Detection

RICOH
imagine. change.

- The ID sensor detects the following voltages.
  - Vsg: The ID sensor output when checking the drum surface
  - Vsp: The ID sensor output when checking the ID sensor pattern
- In this way, the reflectivity of both the drum surface and the pattern on the drum are checked, compensating for any variations in the reflectivity of the ID sensor pattern or the reflectivity of the drum surface.
- The ID sensor pattern is made on the drum by the charge roller and laser diode.
- Vsp/Vsg is not detected every page or job; it is detected during warm-up at power on to decide Vref. This is done if the machine starts warming up when the fusing temperature is less than a certain value after entering night mode or low power mode.

67

No additional notes

Toner Density Control – 4

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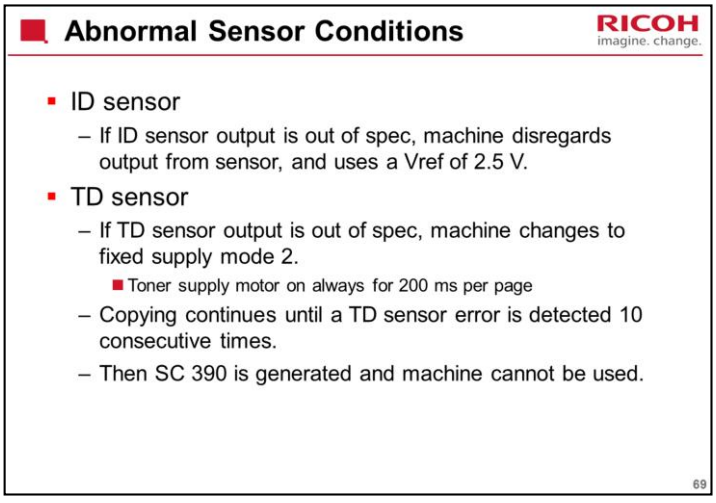
imagine. change.

- Toner Supply Reference Voltage (Vref) Determination
  - The toner supply reference voltage (Vref) is used for toner supply determination (see below). Vref is determined using the following data:
    - ID sensor output (Vsp/Vsg)
    - (Vts or the current Vref) – Vt
- Toner Supply Determination
  - The reference voltage (Vts or Vref) is the threshold voltage for determining whether or not to supply toner. If Vt becomes greater than the reference voltage, the machine supplies additional toner.
  - This can be checked using SP 2220-5.

No additional notes



More on abnormal sensor conditions

ID Sensor

Readings are abnormal if any of the following conditions occur:

• Vsg 2.5V

• Vsg < 3.5V when maximum power (979) is applied

• Vsp 2.5V

• (Vsg – Vsp) < 1.0V

• Vt 4.5V or Vt 0.2V

When this is detected, the machine changes the value of Vref to 2.5 V then does the toner density control process (in a similar way to sensor control mode 2).

No SC code is generated if the ID sensor is defective.

TD Sensor

The TD sensor output is checked every copy. If the readings from the TD sensor become abnormal, the machine changes the toner density control mode to fixed supply mode 2, and the toner supply amount per page is always 200 ms, regardless of the value of SP 2925 (toner supply rate). If the machine detects the TD sensor error condition 10 times consecutively, an SC code is generated (SC390) and the machine must be repaired.

Toner Near-end/End Detection

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imagine. change.

- No near-end or end sensors
- Toner near-end/end are determined by TD sensor output (current and reference voltages).
- If near-end is detected, toner is added for a short period (adjustable with SP 2 923).
- If the toner level does not recover, toner end is after 100 more copies (the number of copies is adjustable with SP 2 213).
- There is no toner end or near-end detection if the machine is in fixed control 2 mode.

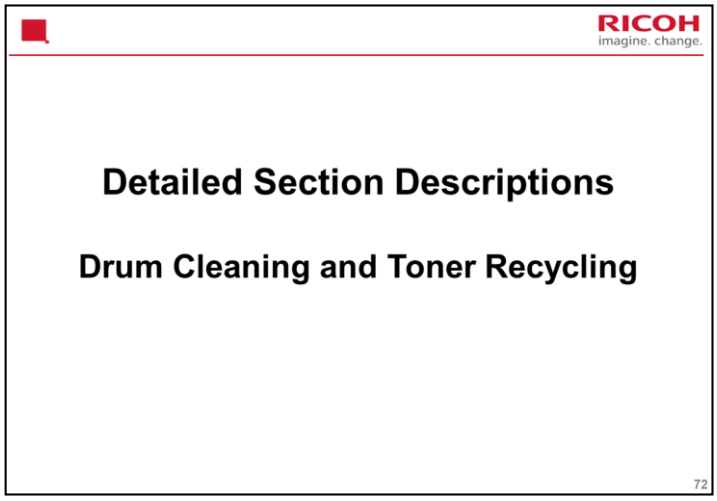
No additional notes

Toner Near-end/End Detection - Details

RICOH imagine. change.

- If Vt level 6 (Vt ≥ (Vts or Vref) + 4S/16) is detected 5 consecutive times, near-end is detected.
- Toner is added after the copy job:
  - If supply recovers to Vt level 5 ((Vts or Vref) < Vt ≤ (Vts or Vref) + 4S/5), near-end is cancelled.
  - Otherwise, toner end occurs after 50 copies
  - Or, if Vt level 7 (Vt ≥ (Vts or Vref) + S) is detected 3 consecutive times, toner end is detected immediately.
- Recovery after adding new toner
  - The machine must recover to Vt level 5 after a new bottle has been added.

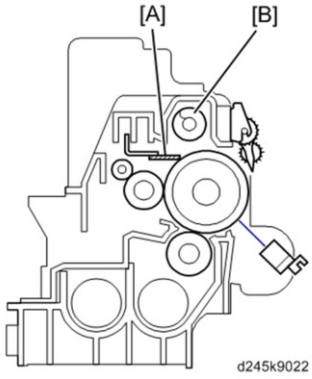
No additional notes



The same as the K-C4L.

Drum Cleaning

RICOH
imagine. change.



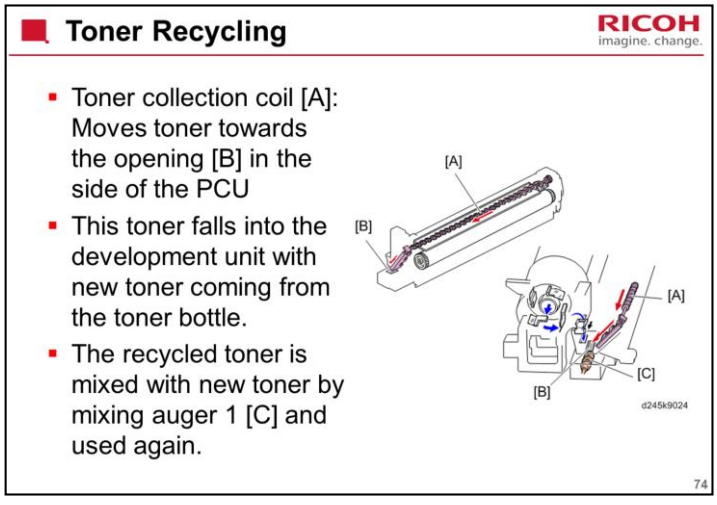
- Counter blade system, no brush
- Drum reverse rotation to clean blade's edge.
- The blade [A] scrapes toner off the drum, and a toner collection coil [C] picks up toner from the top of the pile and carries it back to the development unit.

73

More on Drum Cleaning

This machine uses a counter blade, but no brush.

At the end of every copy job, the drum reverses for 60 ms to scrape toner off the edge of the cleaning blade.



More on Toner Recycling

The slider with the two comb-like appendages on it is always vibrating.

The comb-like appendages break up any blockages of toner.

Note the two slots in the development unit.

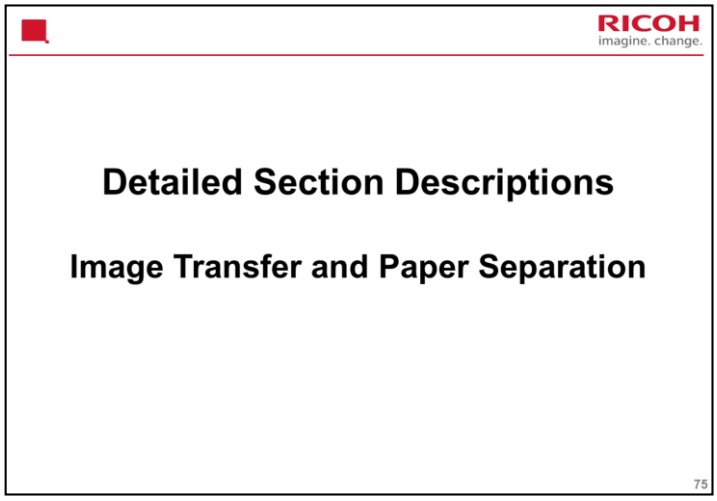
The one on the left receives fresh toner from the cartridge.

The one on the right receives the recycled toner.

New and recycled toner are mixed together in the development unit.

Mixing auger 1 in the development unit mixes the recycled toner with fresh toner from the bottle.

Toner adhering to the transfer roller is sent back to the drum, as we shall see in the Transfer section of the course. This toner is in turn recycled to the development unit. It may contain some small amounts of paper dust.



The same as the K-C4L.

Overview

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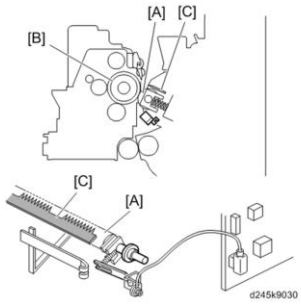


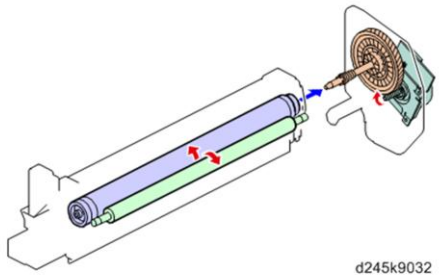
- The transfer roller [A] touches the surface of the drum [B].
- The high voltage supply board supplies a positive current to the transfer roller, which attracts the toner from the drum onto the paper.
  - The current depends on the paper width, paper type, and paper feed tray.
- The curvature of the drum and the discharge plate [C] help the paper to separate from the drum.
  - The discharge plate is grounded.

76

No additional notes

Drive

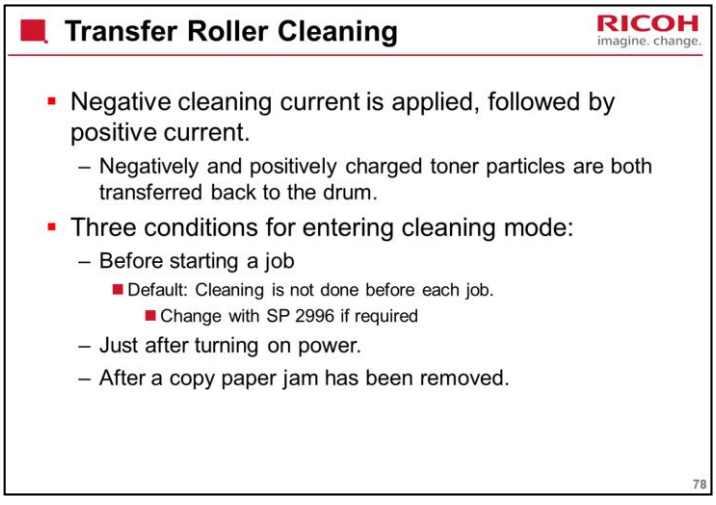
RICOH
imagine. change.



- Friction from the rotating drum turns the transfer roller.

77

No additional notes



More on Transfer Roller Cleaning

Toner may transfer from drum to transfer roller if:

A paper jam occurred

The paper size is smaller than the printed image

The transfer roller must be cleaned to prevent toner from being transferred from the roller to the back side of copies.

There is no mechanism, just the application of positive and negative current to transfer any adhering toner back to the drum.

The negative current pushes negatively-charged particles back to the drum.

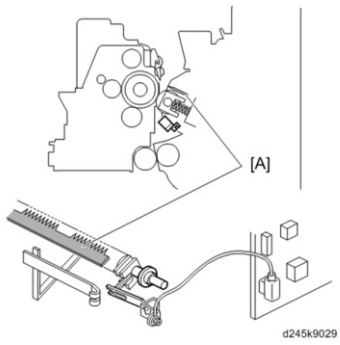
The positive current pushes positively-charged particles back to the drum.

Note that the roller is not cleaned before each job unless the setting of SP2-996 is changed from the default. This is to keep the copy speed as high as possible.

The toner that transfers back to the drum is recycled with the other unused toner. Paper dust may also find its way into the toner because of this.

Paper Separation

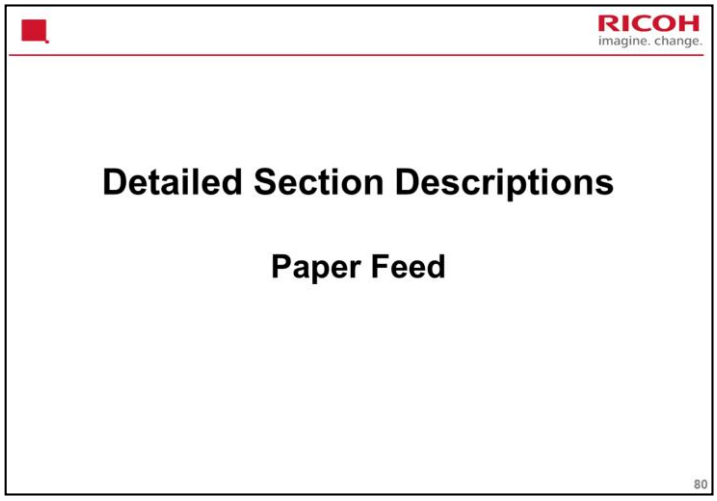
RICOH
imagine. change.



- The discharge plate [A] and the drum curvature of the drum help the paper to separate away from the drum.
- The discharge plate is grounded.

79

No additional notes

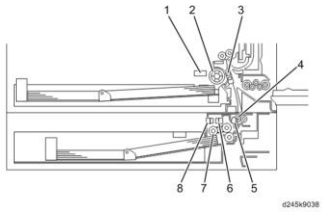


The paper feed tray in the main frame is almost the same as the K-C4L.

The optional paper feed tray works differently and is explained in another section of the course.

Overview

RICOH
imagine. change.



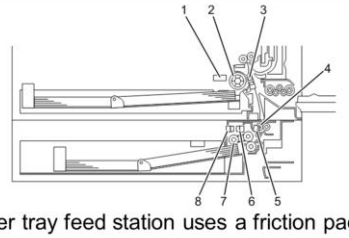
- The main frame has one tray (250 sheets), and one or two optional trays can be installed below.
  - 1. 1st paper end sensor
  - 2. Paper feed roller
  - 3. Registration sensor

81

No additional notes

Overview

RICOH
imagine. change.



- The paper tray feed station uses a friction pad system.
- To prevent paper from getting caught inside the machine when the tray is pulled out, the paper feed roller is part of the mainframe.
- The registration sensor is used for paper jam detection during paper feeding.
- There are no paper size sensors in the main tray or bypass tray.

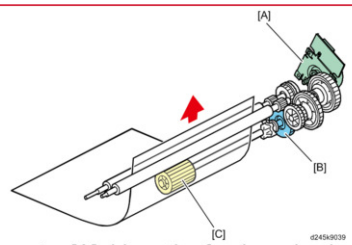
82

No paper size sensors: The K-C4 has size sensors.

Because of this, the customer must set the paper size at the operation panel. If the customer sets the wrong size, a paper size error occurs on the first page (a jam does not occur normally; the machine prints the first page and displays a size mismatch error message).

Drive

RICOH
imagine. change.



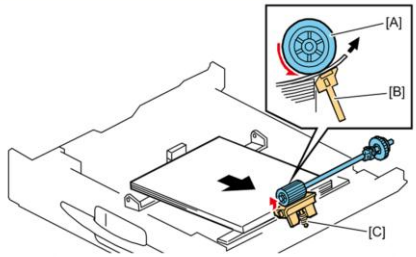
- The main motor [A] drives the feed mechanism. The paper feed clutch [B] transfers drive from this motor to the paper feed roller [C].
- When the paper feed clutch turns on, the feed roller starts to feed the paper. The paper feed clutch stays on until shortly after the registration sensor has been activated.

83

No additional notes

Feed and Separation

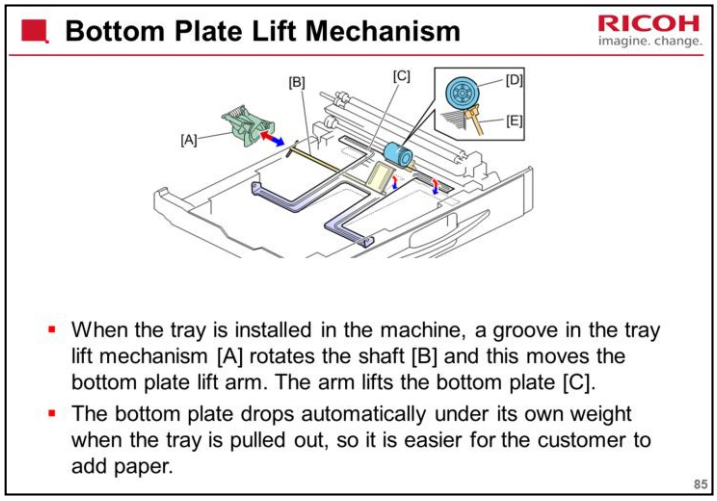
RICOH
imagine. change.



- The paper feed roller [A] feeds the top sheet of paper.
- The friction pad [B] allows only one sheet to feed. The friction pad applies pressure to the feed roller with a spring [C].
- The friction pad pressure cannot be adjusted.

84

No additional notes



This mechanism is different from K-C4.

When the tray is installed in the machine, the shaft [B] for the bottom-plate lift arm fits into the tray lift mechanism [A] on the machine. This mechanism [A] a helical groove and the shaft rotates along with the groove. This causes the arm to push up the bottom plate [C] of the tray, which pushes the paper up against the paper feed roller [D].

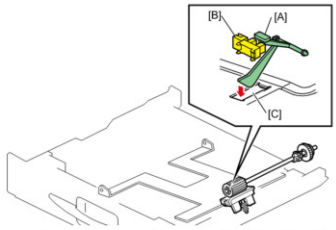
If the paper tray is taken out from the machine, the shaft is released from the mechanism, and the bottom plate descends due to its own weight. In the K-C4, the customer has to push the bottom plate down before adding paper, so the Bc-C1 is easier for the customer.

The paper feed roller is on the machine (not in the tray), which reduces the possibility of paper jamming when installing/pulling out the paper tray.

There is no detection for bottom plate position.

Paper End Detection

RICOH
imagine. change.



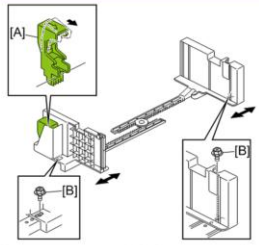
- If there is paper in the tray, the stack lifts the feeler [A], and the paper end sensor [B] is deactivated.
- When the tray runs out of paper, the feeler drops into the cutout [C] in the tray bottom plate and the paper end sensor is activated.
- When the tray is pulled out with no paper in the tray, the feeler is not caught, because of its shape.

86

No additional notes

Side Fences

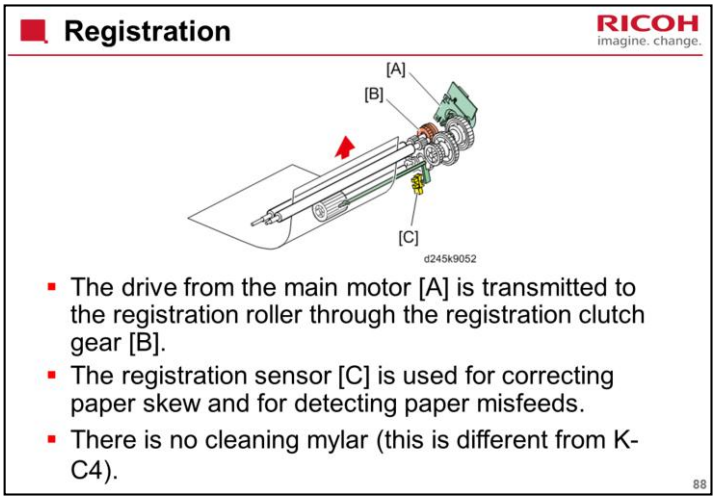
RICOH
imagine. change.



- If the tray is full of paper and it is pushed in strongly, the fences may bend. This may cause the paper to skew or the side-to-side registration to be incorrect. To correct this, the front side fence has a stopper [A].
- The side fence can be secured with a screw, for customers who do not want to change the paper size.

87

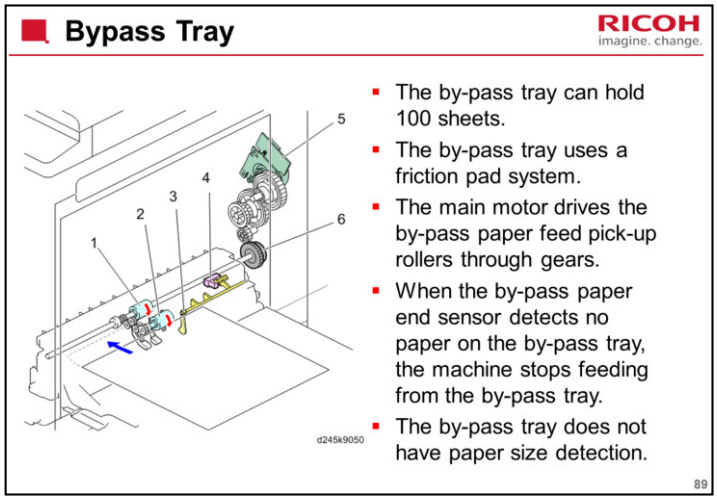
K-C4 has a stopper at the front and the rear. Bc-C1 only has one at the front.



More on Registration

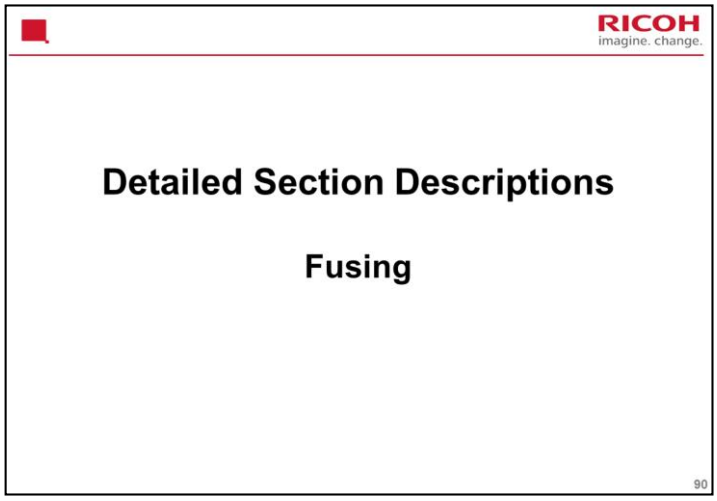
The paper feed clutch stays on slightly after the registration clutch turns off, so that the paper buckles against the registration roller.

SP 1003 can be used to adjust the amount of buckling.



1. By-pass paper feed roller
2. By-pass paper pick-up roller
3. Feeler
4. By-pass paper end sensor
5. Main motor
6. By-pass paper feed clutch

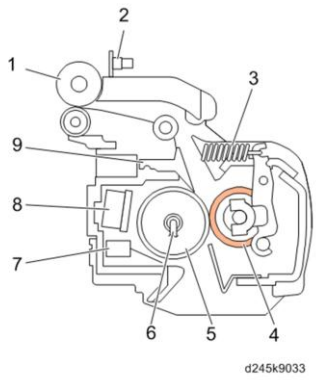
There is no tray lift mechanism.



The fusing unit is a simplified version of the K-C4.

Overview

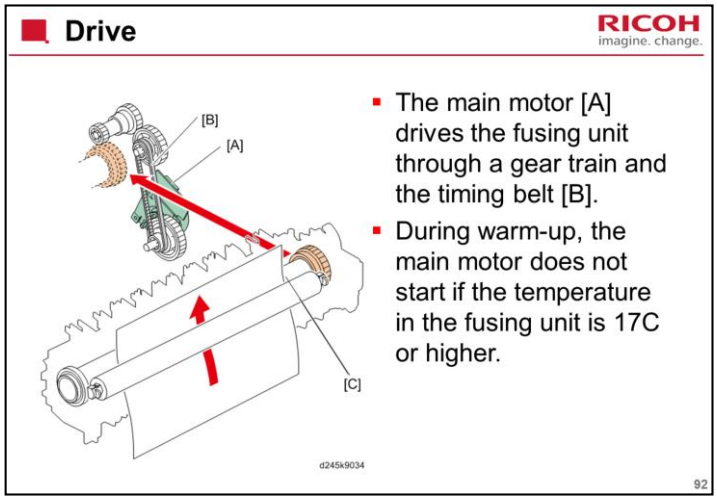
RICOH
imagine. change.



- 1. Paper exit/reverse roller
- 2. Paper exit sensor
- 3. Pressure spring
- 4. Pressure roller
- 5. Hot roller
- 6. Fusing lamp
- 7. Thermistor
- 8. Thermostat
- 9. Hot roller strippers

91

The K-C4 has two fusing lamps.

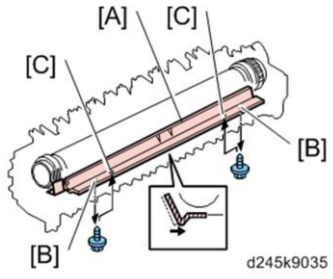


- The main motor [A] drives the fusing unit through a gear train and the timing belt [B].
- During warm-up, the main motor does not start if the temperature in the fusing unit is 17C or higher.

The K-C4 has a drive release mechanism when the right door is open. The Bc-C1 does not.

Fusing Entrance Guide Shaft

RICOH
imagine. change.



- If paper creases in the fusing unit, remove the screws [B] and move the guide [A] to the right.

93

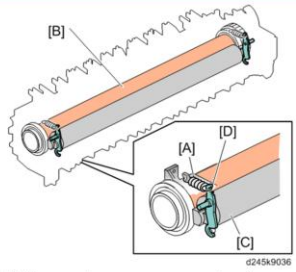
More on Entrance Guide Shaft

The entrance guide can be moved to prevent creasing.

Moving the guide to the right feeds the paper more directly to the gap between the two rollers.

Pressure Roller

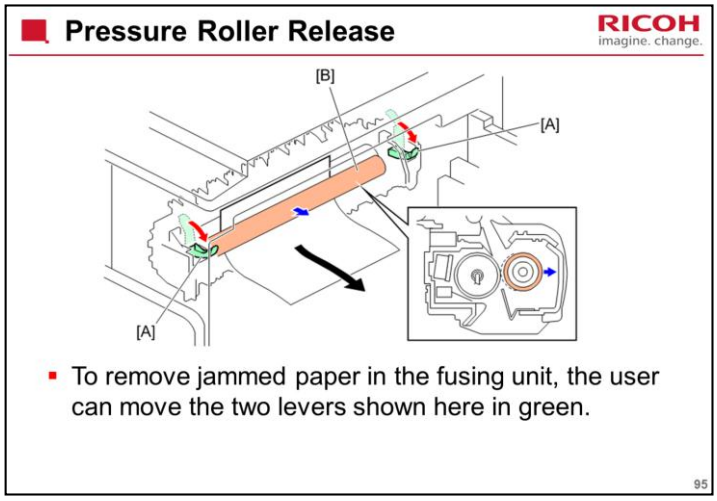
RICOH
imagine. change.



- The springs [A] apply pressure between the hot roller [B] and the pressure roller [C].
- The springs can be moved.
  - The default position is at the end [D].

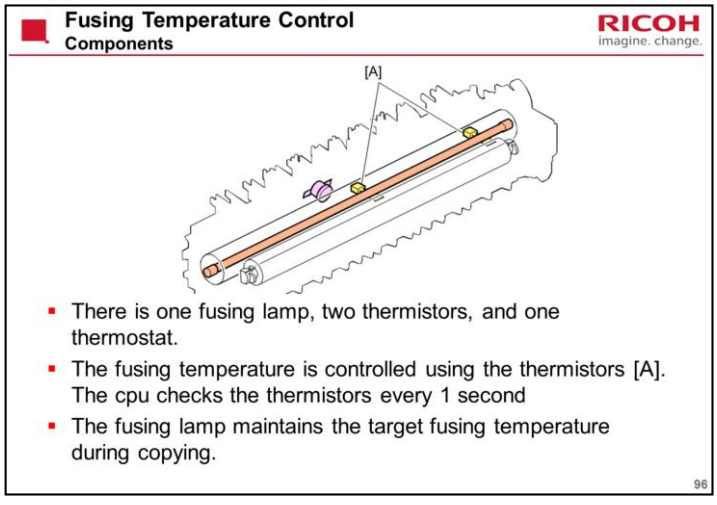
94

No additional notes



In the fusing unit of low-end models, the pressure roller is constantly pressed against the hot roller by a spring. Therefore, when paper is jammed in the fusing unit, the jammed paper is hard to remove.

In this machine, a lever was added to make jam removal easier for users. This is an improvement from K-C4.



K-C4 has two fusing lamps and more thermostats.

Target temperature depends on paper type and can be adjusted with SP 1105.

Thin: 135C

Plain 1: 145C

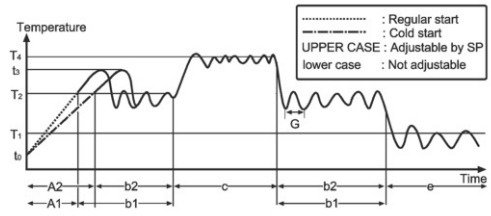
Plain 2: 155C

Medium Thick: 160C

Thick: 175C

Fusing Temperature Control
A1: Regular Start Mode, A2: Cold Start Mode

RICOH
imagine. change.



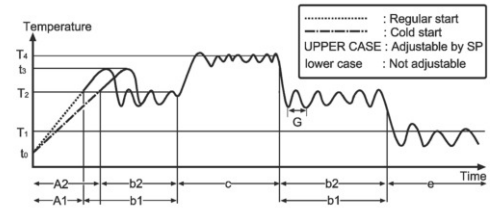
- When machine initialization ends, the fusing temperature is set to one of the following temperatures:
  - The Standby Temperature (T2) when there is no print job.
  - The First Print Temperature when the copier has received a print request during machine initialization.
    - You cannot directly adjust the First Print Temperature. This temperature is 10C higher than the Copying Temperature.

97

This is basically the same as the K-C4. The SP numbers are different.

Fusing Temperature Control
C: Copying Mode

RICOH
imagine. change.



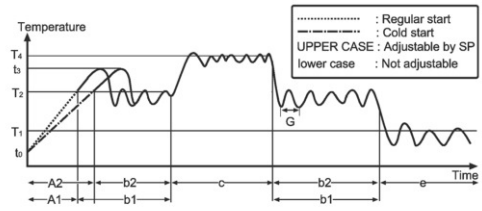
- During copying, the fusing temperature is set to the Copying Temperature (T4).
- You can raise the Warm Up Temperature to improve the fusing quality of the first print.

98

This has been modified from the K-C4.

Fusing Temperature Control
c: Thick Paper Mode

RICOH
imagine. change.



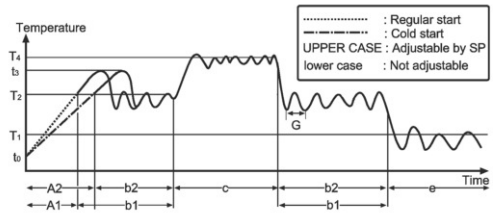
- When the machine is making copies on thick paper, the fusing temperature is set to the Thick Paper Temperature. When thick paper reaches the registration sensor, the copier checks the fusing temperature, and does one of the following:
  - Stops the thick paper at the registration sensor and waits for the fusing temperature to reach 5C lower than the Thick Paper Temperature.
    - The fusing temperature keeps rising until it reaches the Thick Paper Temperature while the thick paper travels from the registration sensor to the fusing unit.
  - Continues feeding paper and executes the print job if the fusing temperature is high enough.

99

This is basically the same as the K-C4. The SP numbers are different.

Fusing Temperature Control
b1/b2: Standby Mode

RICOH
imagine. change.



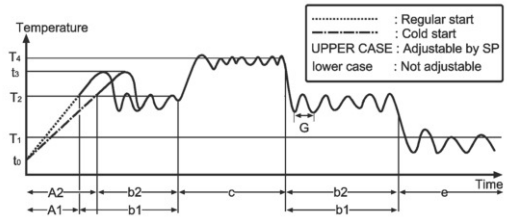
- When the copier is not making copies, the fusing temperature is set to the Standby Temperature (T2).
  - You can adjust this temperature. However, if you have raised this temperature, the MPU may be unable to generate a SC code if a fusing lamp error occurs.
- While in the Standby Mode, the copier checks the fusing temperature every 1 second (G).
  - Turning on and off the fusing lamp may affect the voltage of the power source (in the room), causing the fluorescent lights (in the room) to flicker. To lighten such problems, you can adjust the control period. However, if you increase this period (to two seconds or longer), the MPU may be unable to generate a SC code if a fusing lamp error occurs.

100

This is basically the same as the K-C4. The SP numbers are different.

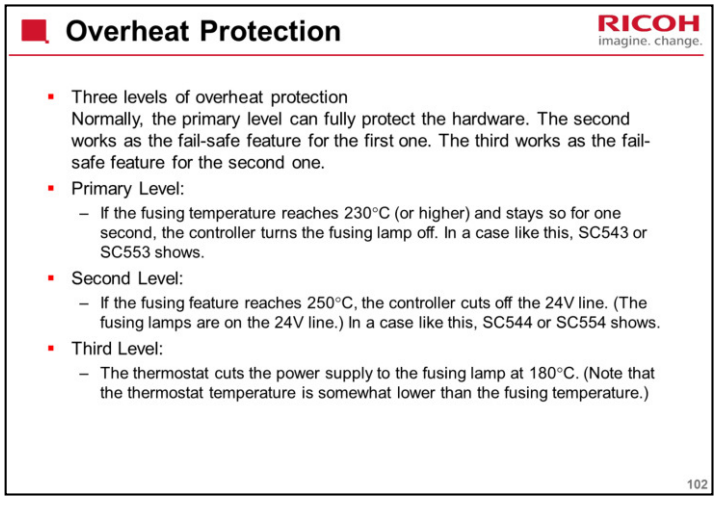
Fusing Temperature Control
e: Low Power Mode

RICOH
imagine. change.

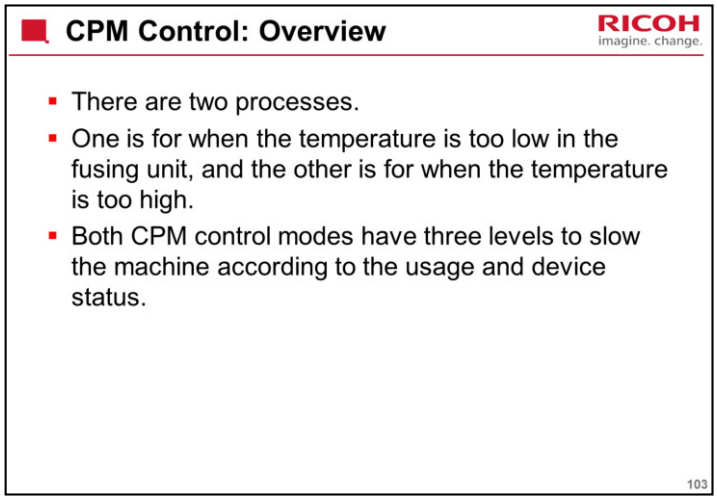


- When the Energy Saver Timer expires, the fusing temperature is set to the Low Power Temperature (T1).

This is basically the same as the K-C4. The SP numbers are different.

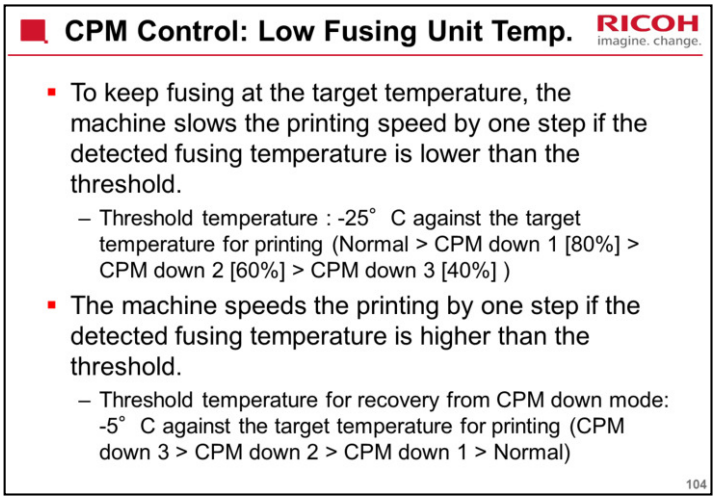


This is based on the K-C4, but the details have been modified.

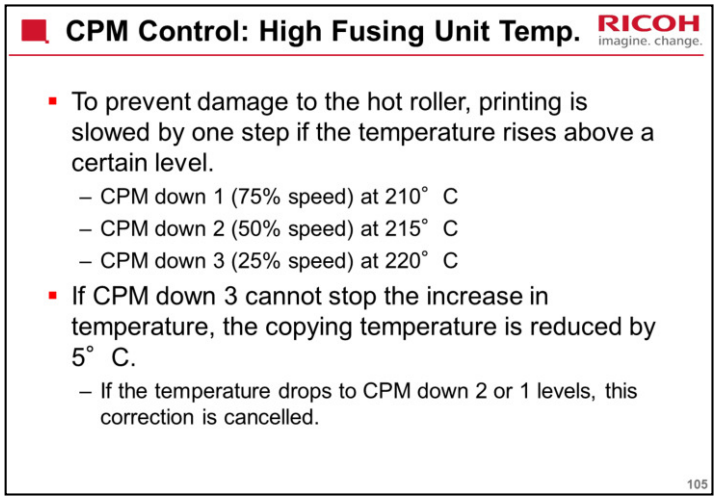


Too low: This happens when a lot of paper has passed through the fusing unit, causing the unit to cool down too much

Too high: If a lot of narrow paper is fed through the fusing unit, the ends of the hot roller can become overheated, because they are not cooled by paper passing over them.



The percentage of speed reduction at each level can be adjusted with SPs.



The percentage of speed reduction at each level can be adjusted with SPs.

Also, the temperature thresholds for various paper sizes and weights can be adjusted with SPs.

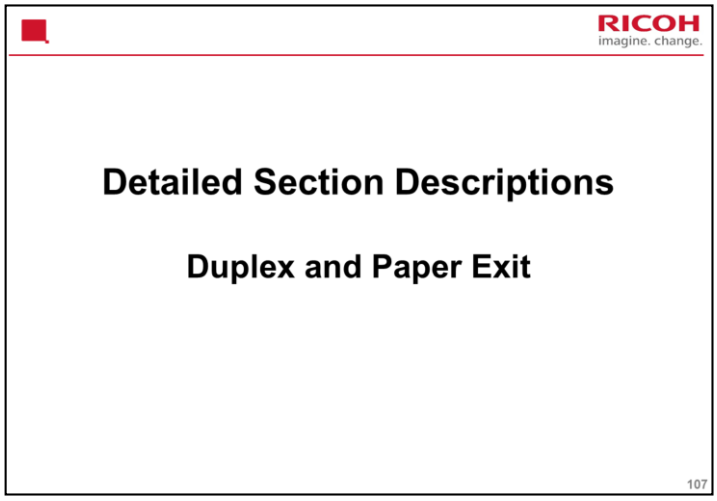
CPM Control if Low Voltage Occurs

RICOH imagine. change.

- If low mains voltage is detected:
  - For thick paper, fusing unit pre-rotation is done for 7 seconds.
  - After pre-rotation (if any), rotation is done until the center and end temperatures of the fusing roller reach the target temperature for printing.
  - If the target temperature for printing cannot reached within 60 seconds, the machine stops with SC549-02 and displays "Low-Voltage". You must turn the power OFF/ON.
  - If the center thermistor temperature becomes too low for 30 seconds after shifting to low voltage CPM down 3, the machine stops with SC549-03 and displays "Low-Voltage". You must turn the power OFF/ON.

106

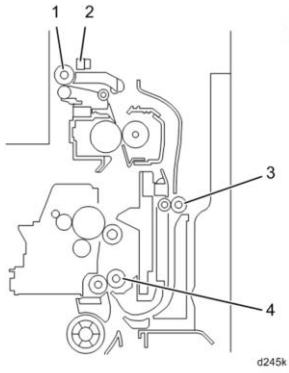
No additional notes



This is different from the K-C4.

Overview

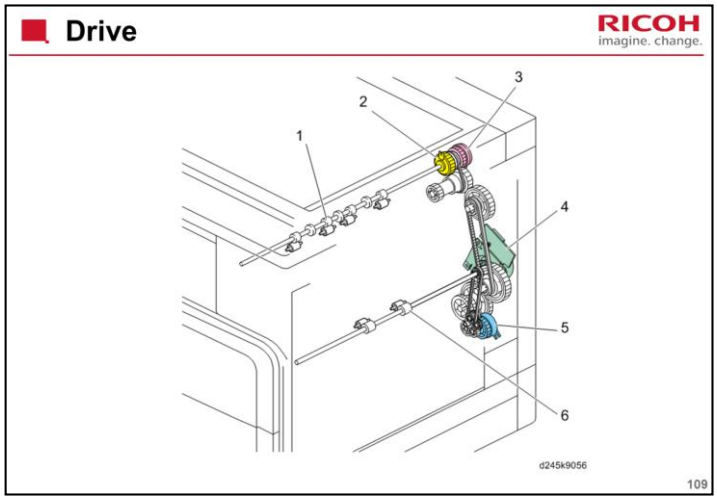
RICOH
imagine. change.



- If the user selects the duplex mode, the printed sheet of paper from the fusing unit goes to the paper exit/reverse roller [1], and then it is reversed through the duplex unit [3], and back into the machine [4] for printing the second side.
  - 1. Paper exit/reverse roller
  - 2. Paper exit sensor
  - 3. Duplex transport roller
  - 4. Registration roller

108

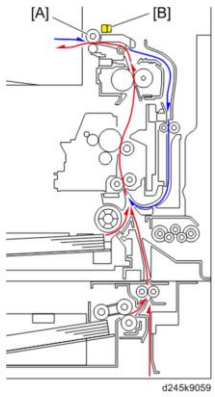
No additional notes



1. Paper exit/reverse roller
2. Paper exit clutch
3. Reverse clutch
4. Main motor
5. Duplex clutch
6. Duplex transport roller

Mechanism

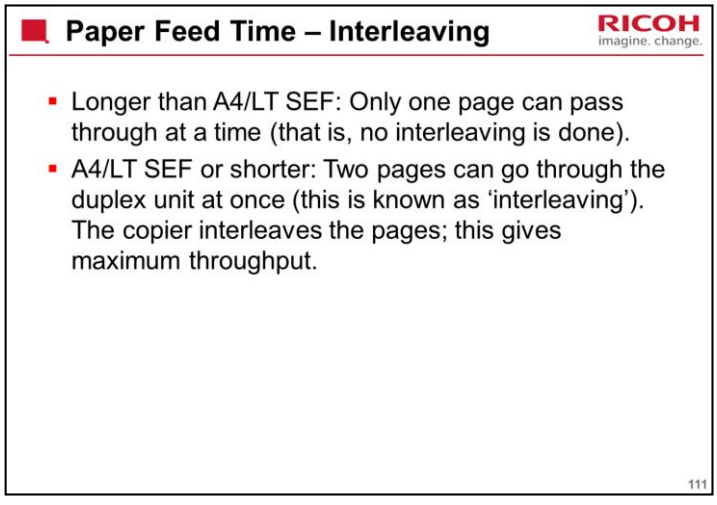
RICOH
imagine. change.



- For duplex printing, the paper exit/reverse roller [A] is reversed by turning off the paper exit clutch and turning on the reverse clutch.
- The paper is then sent to the registration roller by the duplex transport roller to print the reverse side.
- If there are two or more copies being made with A4/81/2" x 11" SEF (or smaller), the next sheet waits at the registration sensor for the current sheet to enter the duplex unit.

110

No additional notes



This is the same as K-C4.

Paper Exit

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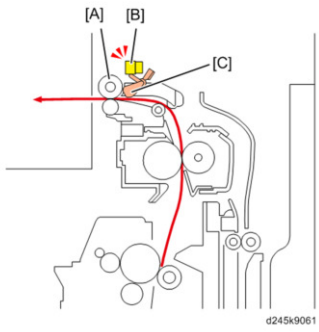
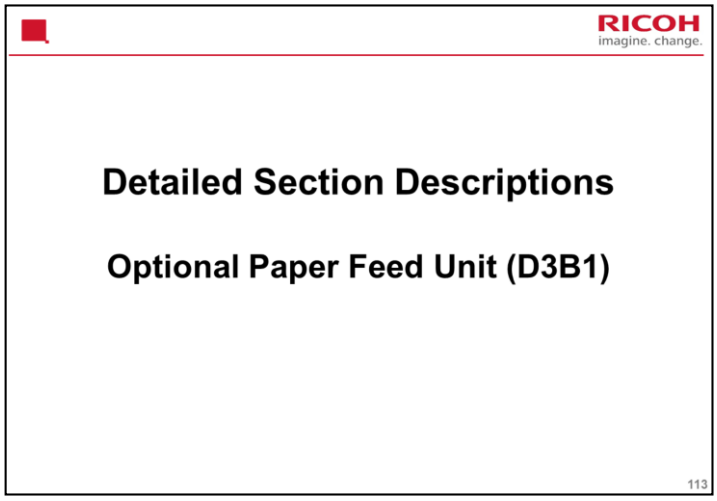
imagine. change.



- The paper exit/reverse roller [A] feeds out paper to the paper exit tray.
- When the paper exit sensor [B] detects the trailing edge of the last page, the machine stops the paper exit clutch, and then stops the main motor.

112

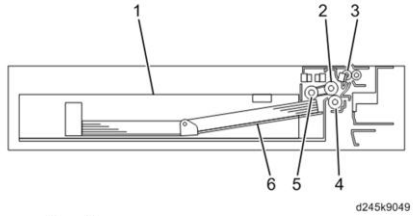
No additional notes



This is a new model, but it is similar to many previous models. There is nothing new here.

Overview

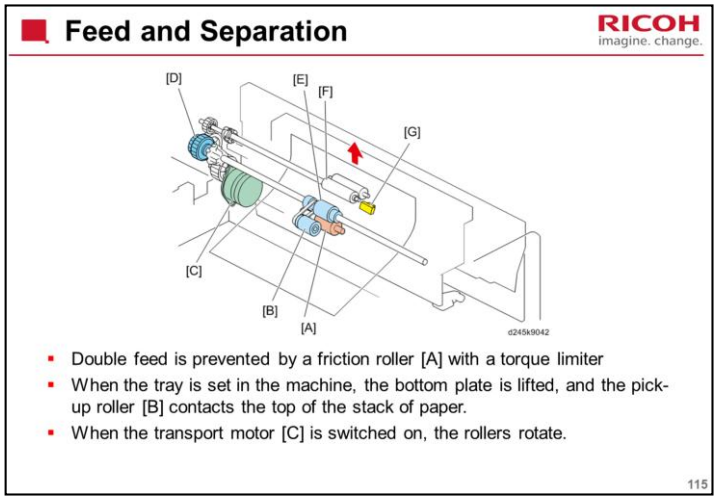
RICOH
imagine. change.



- [A] Paper feed tray
- [B] Paper feed roller
- [C] Vertical transport roller
- [D] Friction roller
- [E] Pick-up roller
- [F] Tray bottom plate

114

Note the difference in mechanism from the feed tray in the main frame, described earlier in the course.



The paper feed unit uses an RF system.

In a conventional FRR system, double feed of paper is prevented by reverse rotation of the separation roller. However, paper separation in the RF system is assisted by the resistance of a friction roller [A] with a torque limiter (reverse drive is not performed).

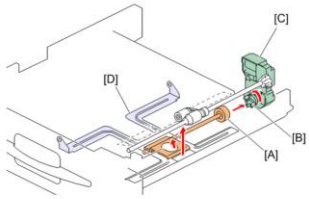
When the paper feed tray is set in the machine, the tray bottom plate is lifted up, and the pick-up roller [B] contacts the top of the stack of paper.

When the transport motor [C] is switched on, the rollers rotate, and then paper is fed.

The roller holder functions as a paper guide and roller clip ring. The roller holder prevents the paper from winding up.

Tray Lift (1)

RICOH
imagine. change.

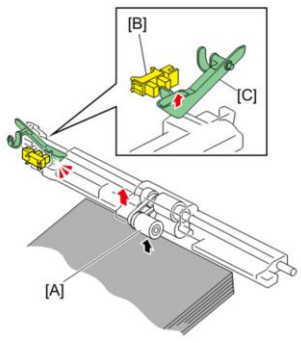


- When the tray is set in the machine, the set switch at the rear of the tray switches on.
- The coupling [B] between the shaft [A] at the rear of the tray and the lift motor [C] then engages, the motor rotates, and the tray bottom plate [D] is lifted.
- When the tray is removed, the coupling is released, and the tray bottom plate moves down. The lift motor then rotates until the coupling returns to the home position.

116

No additional notes

Tray Lift (2)



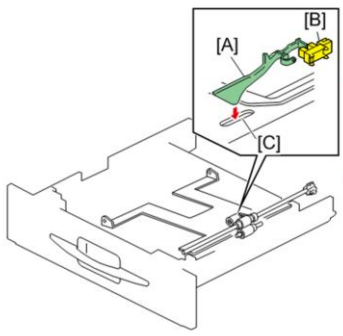
- The tray bottom plate lifts until the paper pushes up the pick-up roller [A]. This moves the tray lift feeler [C] up and the tray lift sensor [B] switches off.
- Then the machine enters the paper feed standby mode.

117

No additional notes

Paper End Detection

RICOH
imagine. change.



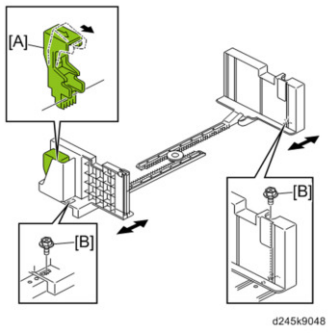
d245k9046

- If there is paper in the paper tray, the paper stack raises the feeler [A] and the paper end sensor [B] is deactivated.
- When the paper tray runs out of paper, the feeler [B] drops into the cutout [C] in the bottom plate and the paper end sensor is activated.
- When the tray is pulled out with no paper in the tray, the feeler is not caught, because of its shape.

118

No additional notes

Side Fences

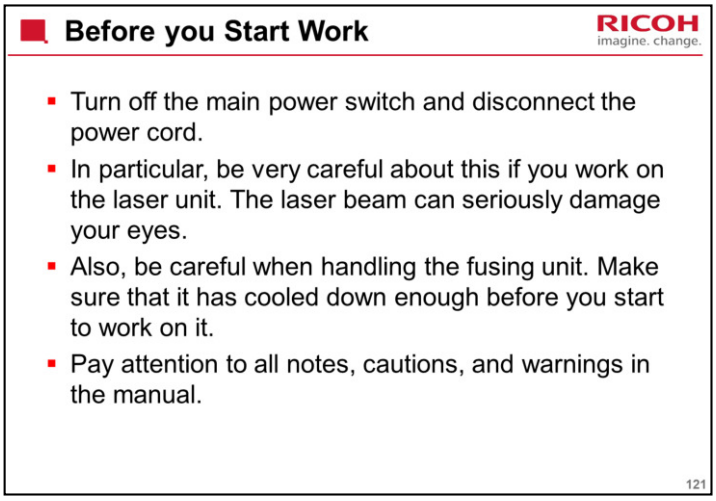


- If the tray is full of paper and it is pushed in strongly, the fences may bend. This may cause the paper to skew or the side-to-side registration to be incorrect.
- To correct this, each side fence has a stopper [A] attached to it.
- Each side fence can be secured with a screw [B], for customers who do not want to change the paper size.

119

No additional notes

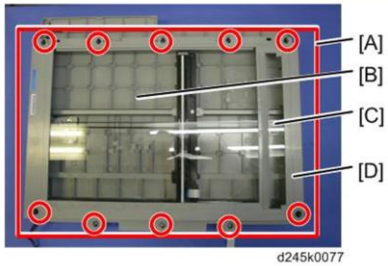
This section of the course covers important points about replacing parts. For full details of all procedures, see the Replacement and Adjustment section of the service manual.



No additional notes

Scanner: Exposure Glass Unit

RICOH
imagine. change.



d245k0077

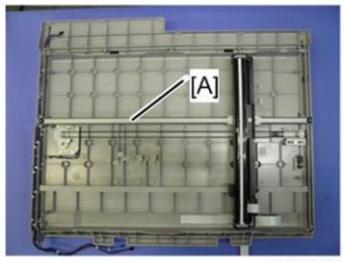
- Exposure glass [B], DF exposure glass [C] and cover [D] are all part of the exposure glass unit [A].
- Do not disassemble this unit into the individual parts.

122

No additional notes

Scanner: CIS Unit

RICOH
imagine. change.

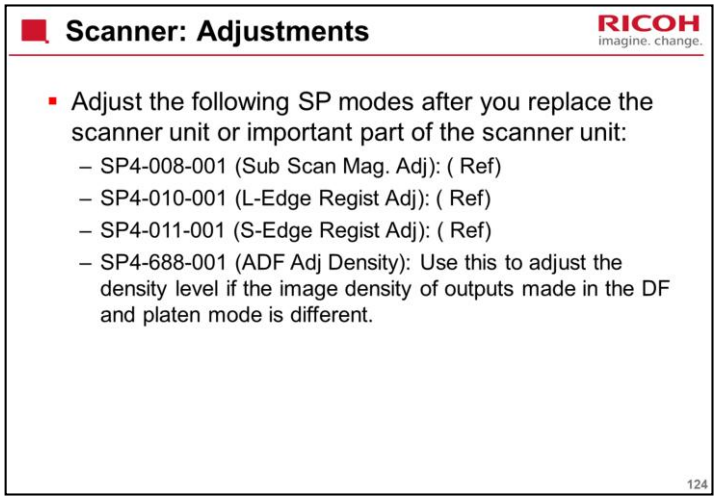


d245k0089

- When replacing the CIS unit or scanner drive belt, be careful not to touch the grease that is applied to the guide rod [A] under the timing belt.

123

No additional notes



For details on these SPs, see ‘Adjustment after Replacement’ at the end of the Replacement and Adjustment section of the service manual.

PCDU: General Cautions

RICOH
imagine. change.

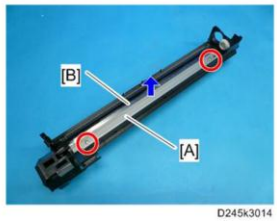
- To prevent damage from toner spillage during the PCDU removal, be sure to place a ground cloth on the floor.
- Do not turn the PCU upside down. This causes toner and developer to spill out.
- To prevent damage from excess light, wrap the OPC drum with protective paper and store the OPC drum in a cool dark place.
- Do not touch the OPC drum, cleaning blade, or any seals or tapes.
- Do not use any alcohols or solvents to clean the OPC drum; Be sure to wipe with a dry cloth. If excess dirt exists, first wipe with a damp cloth, and next wipe off completely with a dry cloth.
- Do not rotate the OPC drum clockwise after the PCDU has been installed.

125

No additional notes

PCDU: Cleaning Blade

RICOH
imagine. change.



D245k3014

- Apply toner to the edge of the new cleaning blade when you replace the cleaning blade. This prevents damage to the OPC drum and blade.
  - After installing the cleaning blade, remove some of the toner from the old blade with your finger.
  - Apply the toner to the edge [B] of the new cleaning blade. Apply the toner evenly along the full length of the new cleaning blade.

126

No additional notes

PCDU: Developer (Summary)

RICOH
imagine. change.

- First, remove all the old developer from the unit.
  - Steps 1 to 12 of the procedure tell you how to do this.
- Then add the new developer to the PCDU and reassemble the machine.
- Turn the power on and do SP2-801-001 to initialize the new developer.
- Notes
  - Make sure no toner or developer stays on the gear. Clean the gears as necessary with a blower brush, etc.
  - Be sure to replace the Mylar at the rear side in the correct position. (The Mylar protects the gears at the rear side from falling toner).

127

No additional notes

PCDU: Developer (1)

RICOH
imagine. change.

- Before adding new developer, note that you must tap the top of the PCU at several locations, as described in step 2 of the procedure.
  - This is to remove recycled toner from the toner collection coil. If this toner is not removed, it may fall into the new developer while the technician is reassembling the machine. Then there will be too much toner in the developer, and this will cause toner spots on copies.
  - This toner may drop into the developer when replacing other parts of the mechanism, but there is no point in tapping the coil because we are not going to remove the old developer. So, to remove the excess toner, the technician has to make skyshot copies after replacing any PCU components, as explained in step 7 of the 'After Replacement or Adjustment' section.

The skyshot copies are not necessary after replacing developer, because the coil was tapped to remove the toner before adding new developer.

Step 1 of the procedure says make 5 copies. These are test copies to check whether we have a problem with excess toner causing spots on copies.

PCDU: Developer (2)

RICOH
imagine. change.

- Note that in step 5, we open and close the cover. This is to activate the cover sensor and trigger the toner supply coil rotation to dislodge toner blockages in the coil.
- SP 2801-1 (developer initialization) must be done after adding new developer, to either an existing PCU or to a new PCU.

No additional notes

PCDU: After Replacing Components

RICOH imagine. change.

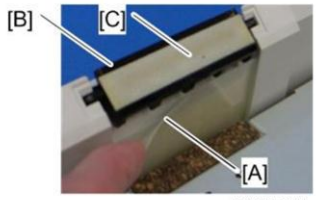
- After you replace any individual components of the PCDU, do the steps in 'After Replacement or Adjustment' at the end of the PCDU chapter of Replacement and Adjustment.
- If you install a complete new PCDU, you do not need to do this. But you must execute SP2-801-001 to reinitialize the TD sensor.

130

No additional notes

Paper Feed: Friction Pad

RICOH
imagine. change.



D245k0170

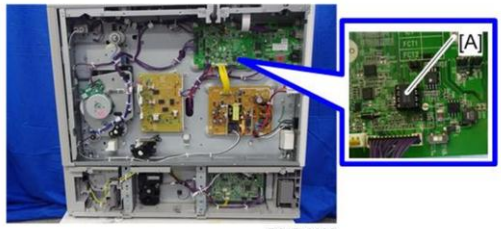
- Make sure that the mylar [A] does not go under the friction pad [B] when reinstalling the friction pad [B].
- Do not touch the upper surface [C] of the friction pad [B] with your bare hands. If you do, clean the upper surface [C] of the friction pad [B] with a damp cloth or alcohol.

131

No additional notes

Boards: MPU

RICOH
imagine. change.



D245k3008

- Remove the EEPROM [A] from the old board and install it on the new one.

132

No additional notes

The End