Paper Feed Unit PB2010
Machine Code: D699

Field Service Manual

December, 2012
Subject to change

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1. Paper Feed Unit PB2010 (D699)

Safety and Symbols

Replacement Procedure Safety

⚠CAUTION

- Turn off the main power switch and unplug the machine before beginning any of the replacement procedures in this manual.

Symbols Used in this Manual

This manual uses the following symbols.

: Clip ring

: Screws

: Connector

: Clamp

: E-ring

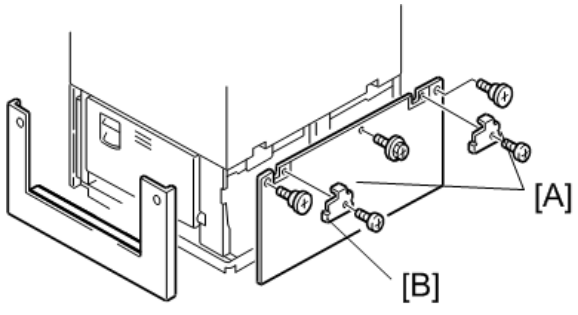
2. Replacement and Adjustment

Covers and Roller

Covers

Rear Cover

1. Hold brackets [A] (x 1 each)
2. Rear cover [B] (x 3)



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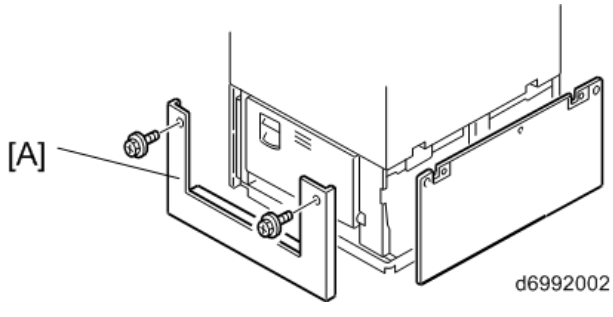
Right Cover

1. Right cover [A] (x 2)



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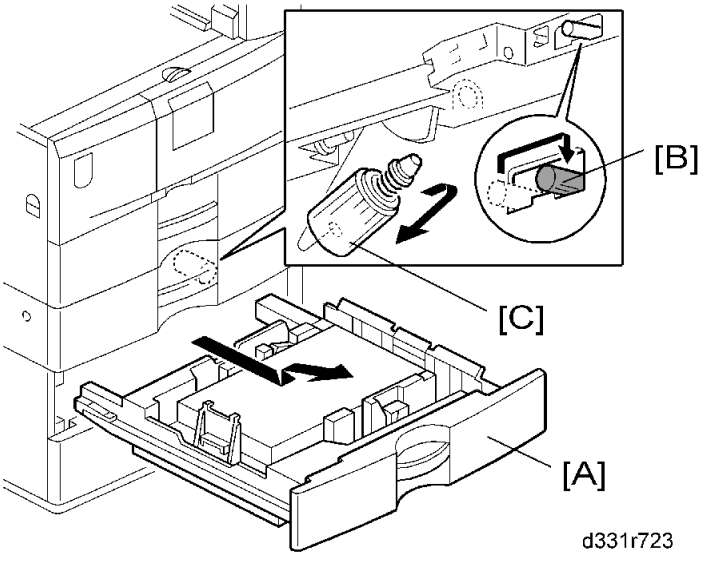
Note

- Do not remove the anti-tip components [A] at the bottom of the unit.

Feed Roller

1. Pull out the tray [A].
2. Release the lock lever [B].
3. Feed roller [C]



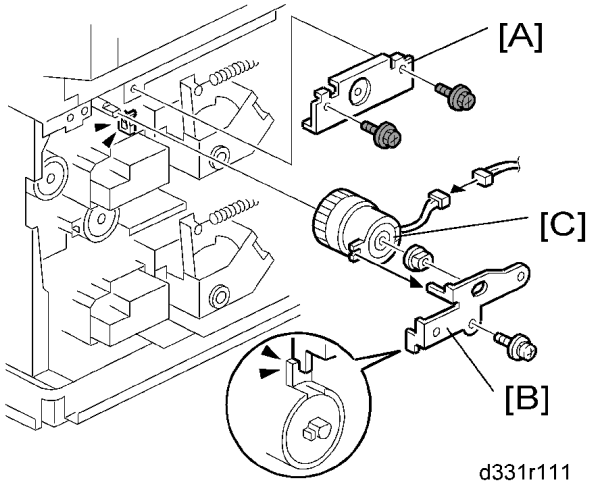
Drive Components

⚠CAUTION

- Turn off the main power switch and unplug the machine before beginning any of the procedures in this section.

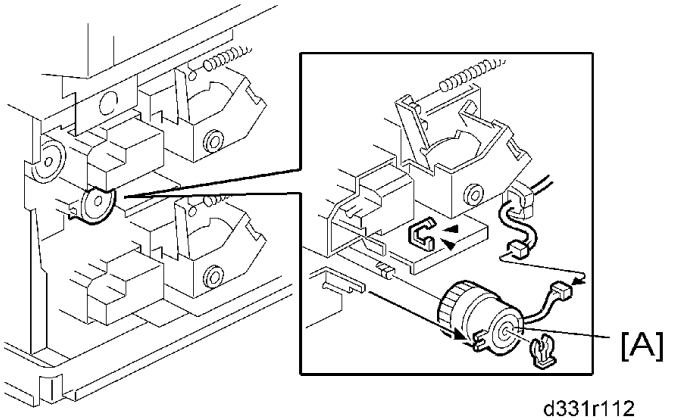
Upper Feed Clutch

1. Rear cover (☛ p.5 "Covers")
2. Bracket [A] (x 2)
3. Hold bracket [B] (x 1, bushing x 1)
4. Upper feed clutch [C] (x 1)



Lower Feed Clutch

1. Rear cover (☛ p.5 "Covers")
2. Lower feed clutch [A] (x 1, x 1, x 1)



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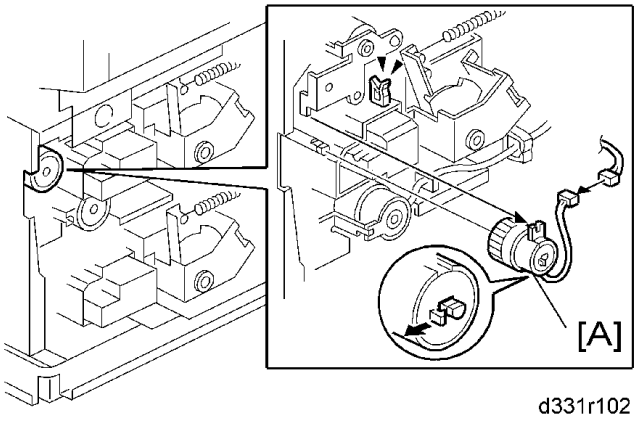
Relay Clutch

1. Rear cover (☛ p.5 "Covers")
2. Relay clutch [A] (x 1, x 1)



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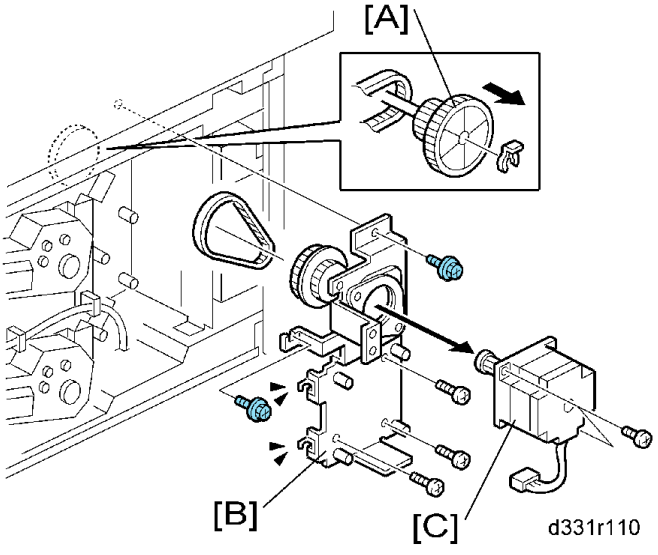
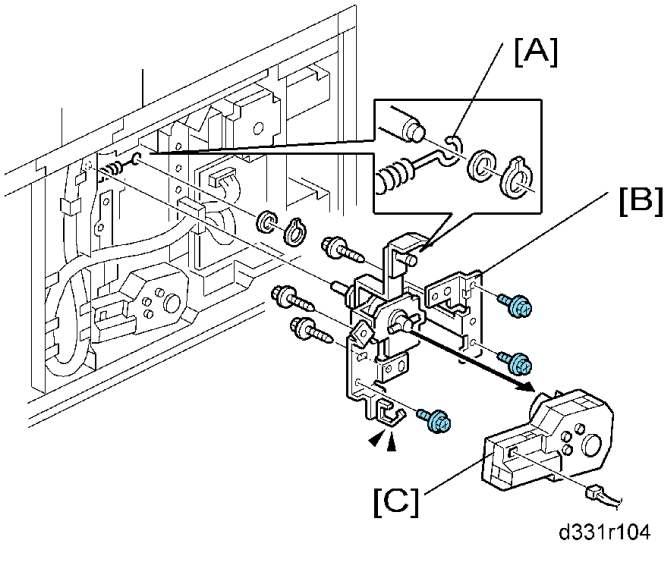
Paper Feed Motor

1. Rear cover (☛ p.5 "Covers")
2. Tray main board (☛ p.12 "Tray Main Board")
3. Gear [A] (x 1)
4. Paper feed motor bracket [B] (x 5)
5. Paper feed motor [C] (x 2)



Lift Motors



Upper Lift Motor

1. Rear cover (p.5 "Covers")
2. Spring [A] (snap ring x 1, spacer x 1)
3. Lift motor bracket [B] (x 3, x 1)

4. Upper lift motor [C] (x 3)

Lower Lift Motor

1. Rear cover (p.5 "Covers")
2. Spring (snap ring x 1, spacer x 1)
3. Lift motor bracket (x 4, x 1)
4. Lower lift motor (x 3)

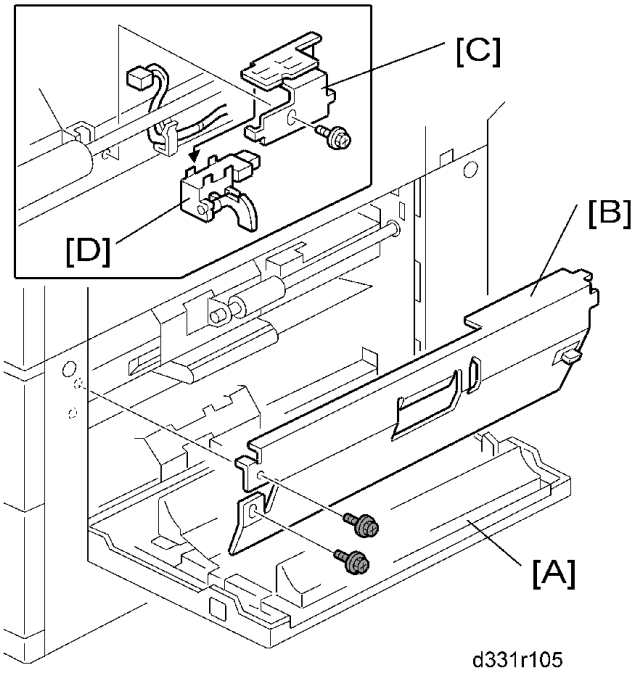
Electrical Components

⚠CAUTION

- Turn off the main power switch and unplug the machine before beginning any of the procedures in this section.

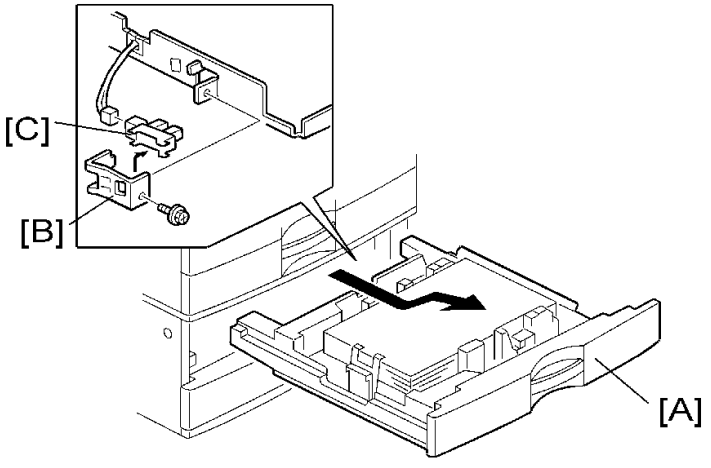
Vertical Transport Sensor

1. Open the tray cover [A].
2. Guide plate [B] (x 2)
3. Sensor bracket [C] (x 1, x 1)
4. Vertical transport sensor [D] (hooks)



Paper End Sensor

1. Pull out the tray [A].
2. Sensor bracket [B] (x 1, x 1)
3. Paper end sensor [C] (hooks)



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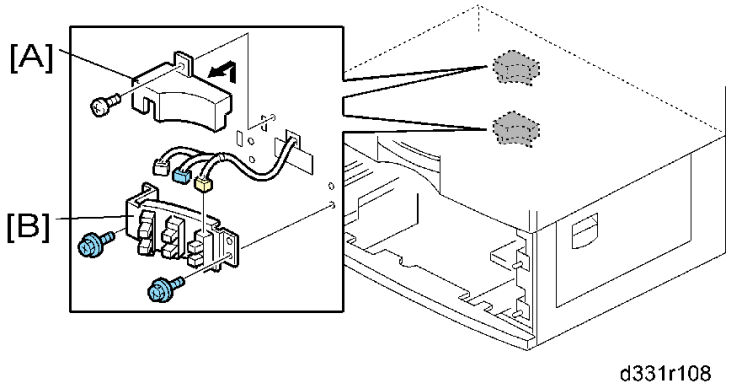
Paper Size Sensors

1. Pull out the two trays.
2. Sensor bracket cover [A] (x 1)
3. Sensor bracket [B] (x 3, x 2)
4. Paper size sensors (hooks)



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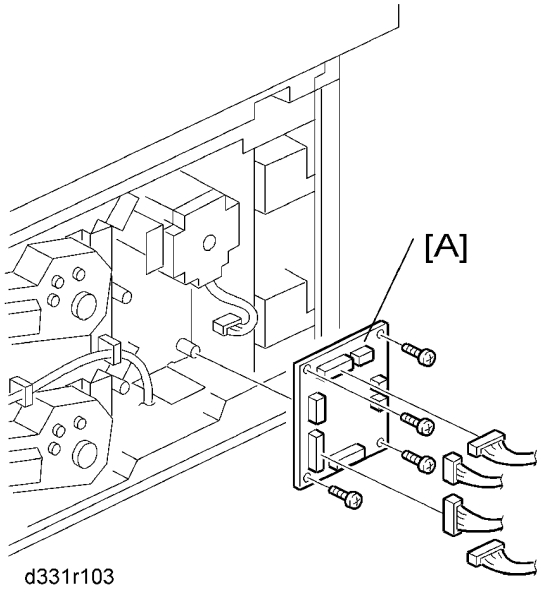
Tray Main Board

1. Rear cover (p.5 "Covers")
2. Tray main board [A] (x 4, all 's)


[A]
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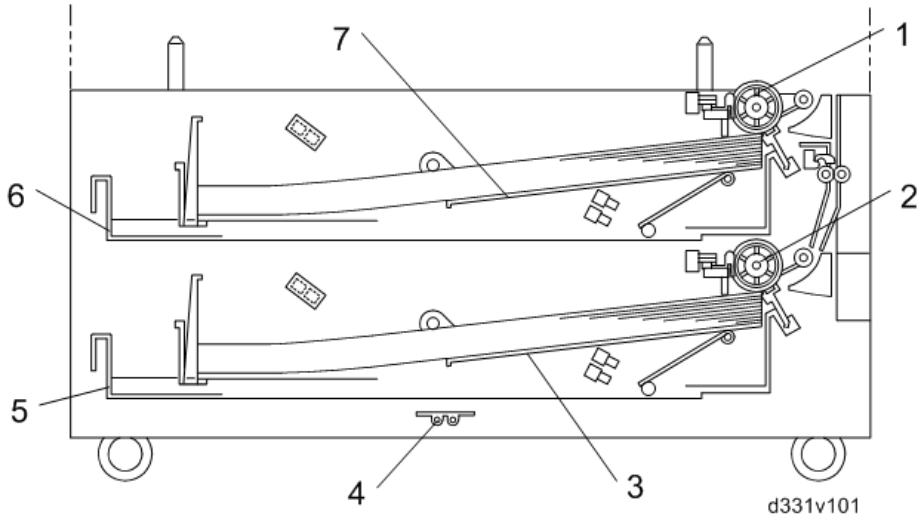
3. Detailed Section Descriptions

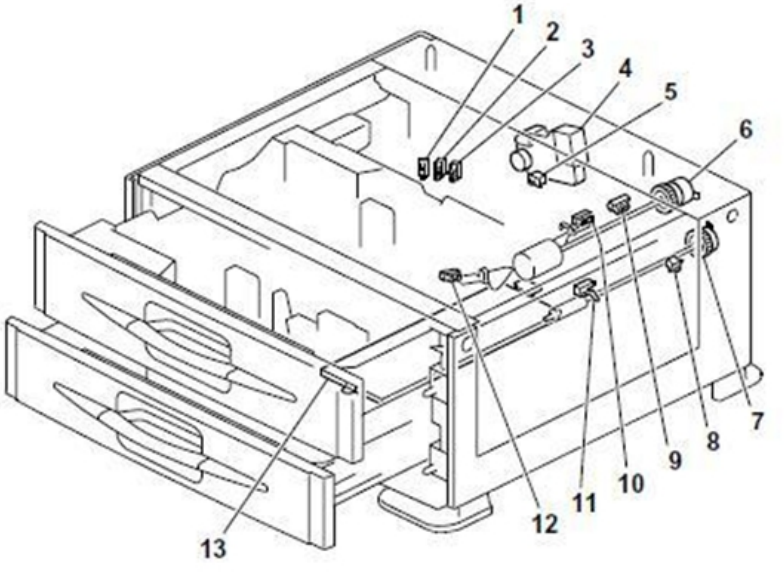
Component Layout

Mechanical Component Layout



1. Upper paper feed roller 2. Lower paper feed roller 3. Lower bottom plate 4. Optional tray heater	5. Lower tray 6. Upper tray 7. Upper bottom plate

Electrical Component Layout



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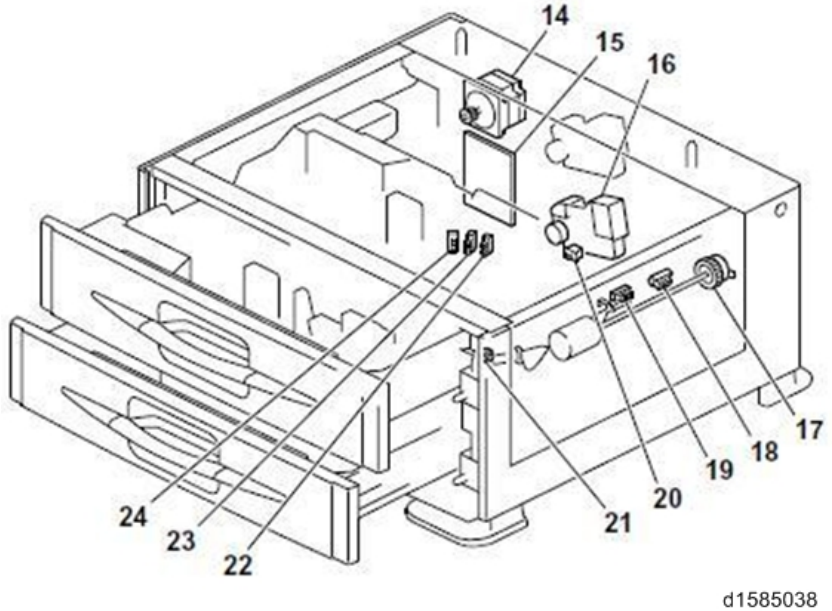

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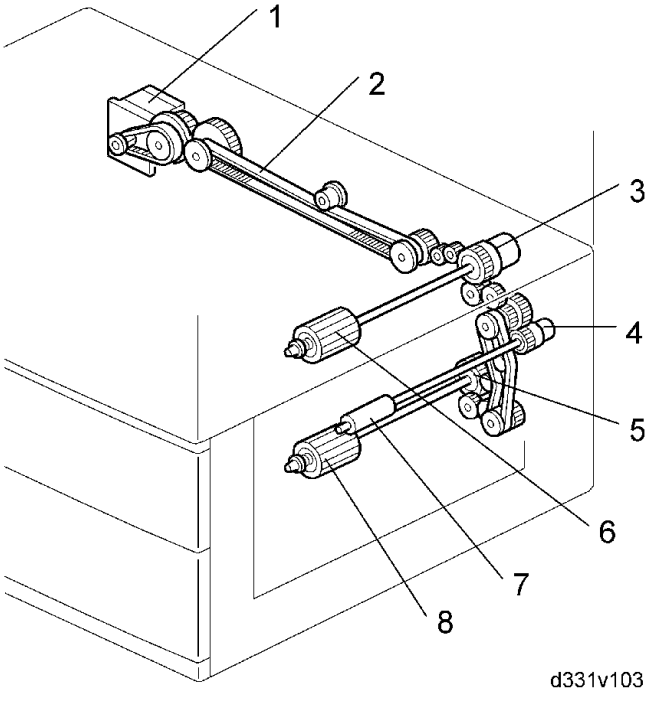
1. Paper size sensor	13. Tray heater (Option)
2. Paper size sensor	14. Transport motor
3. Paper size sensor	15. Main board
4. Tray lift motor	16. Tray lift motor
5. Tray set switch	17. Paper feed clutch
6. Paper feed clutch	18. Paper pressure revision sensor
7. Relay clutch	19. Tray lift sensor
8. Right door switch	20. Tray set switch
9. Paper pressure revision sensor	21. Paper end sensor
10. Tray lift sensor	22. Paper size sensor
11. Relay sensor	23. Paper size sensor
12. Paper end sensor	24. Paper size sensor 2

Electrical Component Description

Symbol	Name	Function	Index No.
Motors			
M1	Transport Motor	Drives all rollers.	14
M2	Tray Lift Motor	Lifts the upper tray bottom plate.	4
M3	Tray Lift Motor	Lifts the lower tray bottom plate.	16
Sensors			
S1	Paper Pressure Revision Sensor	Detects when the paper in the upper tray is at the correct feed height.	9
S2	Paper Pressure Revision Sensor	Detects when the paper in the lower tray is at the correct feed height.	18
S3	Paper End Sensor	Informs the copier/printer when the upper tray runs out of paper.	12
S4	Tray Lift Sensor	Detects the amount of paper in the upper tray.	10
S5	Paper End Sensor	Informs the copier/printer when the lower tray runs out of paper.	21

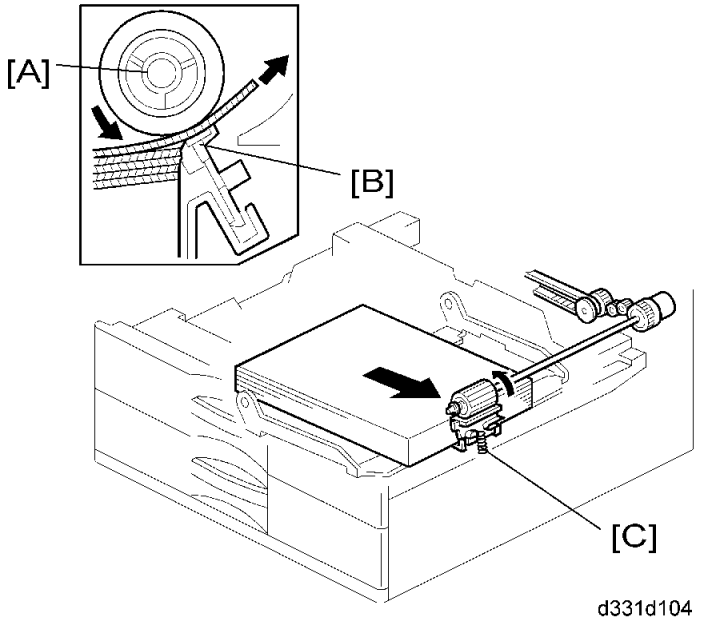
S6	Tray Lift Sensor	Detects the amount of paper in the lower tray.	19
S7	Relay Sensor	Detects misfeeds.	11
S8	Paper Size Sensor	Determines what paper size is in the upper tray.	1
S9	Paper Size Sensor	Determines what paper size is in the upper tray.	2
S10	Paper Size Sensor	Determines what paper size is in the upper tray.	3
S11	Paper Size Sensor	Determines what paper size is in the lower tray.	24
S12	Paper Size Sensor	Determines what paper size is in the lower tray.	23
S13	Paper Size Sensor	Determines what paper size is in the lower tray.	22
Switches			
SW1	Right Door Switch	Detects whether the right door is opened or not.	8
SW2	Tray Set Switch	Detects whether the upper tray is opened or not.	5
SW3	Tray Set Switch	Detects whether the lower tray is opened or not.	20
Magnetic Clutches			
MC1	Paper Feed Clutch	Starts paper feed from the upper tray.	6
MC2	Paper Feed Clutch	Starts paper feed from the lower tray.	17
MC3	Relay Clutch	Drives the relay rollers.	7
PCBs			
PCB1	Main Board	Controls the paper tray unit and communicates with the copier/printer.	15
Others			
H1	Optional Tray Heater	Removes humidity from the paper in the trays.	13

Drive Layout



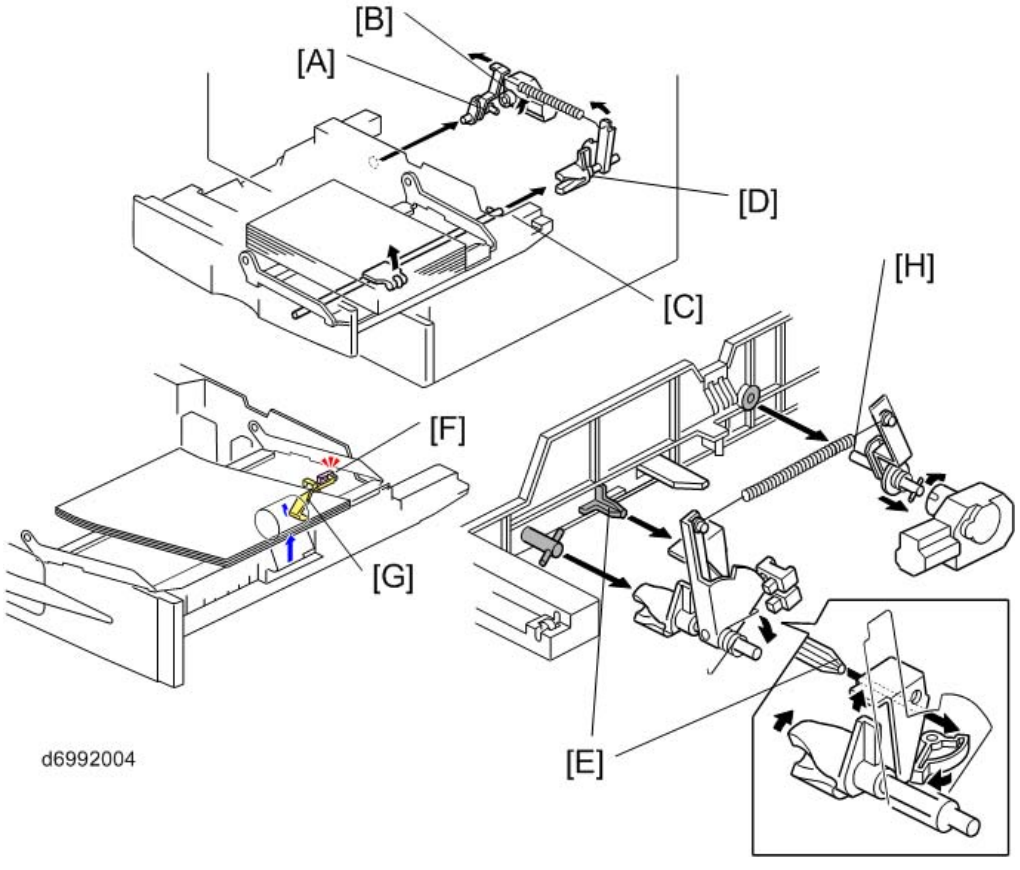
1. Paper feed motor	5. Lower paper feed clutch
2. Drive belt	6. Upper paper feed roller
3. Upper paper feed clutch	7. Relay roller
4. Relay clutch	8. Lower paper feed roller

Paper Feed and Separation Mechanism



The paper tray holds 500 sheets. The paper feed roller [A] drives the top sheet of paper from the paper tray to the copier/printer. The friction pad [B] allows only one sheet to feed at a time. The friction pad applies pressure to the feed roller with a spring [C].

Paper Lift Mechanism



The paper size switch detects when the tray is pushed in.

When the paper tray is pushed into the machine, the pin [A] for the lift motor pressure shaft engages the lift motor coupling [B] and the pin [C] for the bottom plate lift shaft in the tray engages the bottom plate pressure lever coupling [D]. The pin [E] on the rear of the tray pushes the lock lever so that the lift motor can lift the bottom plate pressure lever.

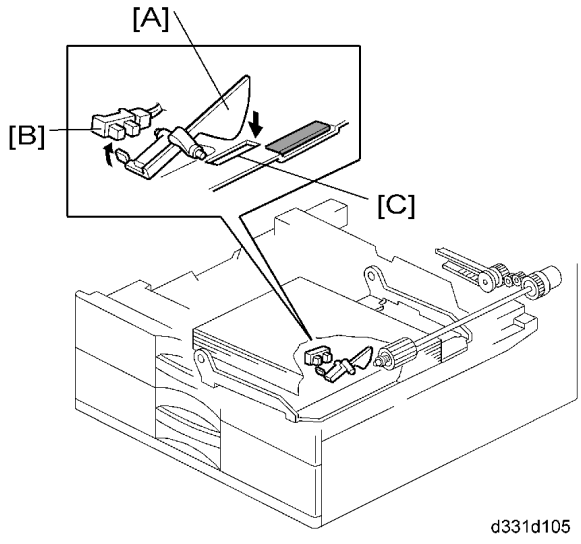
The lift motor turns on, and turns clockwise as viewed on the diagram. The main pressure spring [H] pulls the bottom plate pressure lever, and this lifts the tray bottom plate.

When the top of the stack touches the feed roller, the motor cannot pull up the plate any more, so it pulls the actuator [G] into the tray lift sensor [F].

The pressure of the feed roller on the paper is now too high, so the lift motor reverses to reduce this pressure. It reverses for 300 ms or 600 ms, depending on the paper size. For smaller paper, it reverses the larger amount (600 ms) to reduce the pressure more.

When the paper tray is pulled out, the pins [A, C] disengage from the couplings [B, D], and the bottom plate drops. To make it easier to push the tray in, the lift motor rotates backwards 1.7 seconds to return the bottom plate pressure lever coupling [D] to the original position.

Paper End Detection

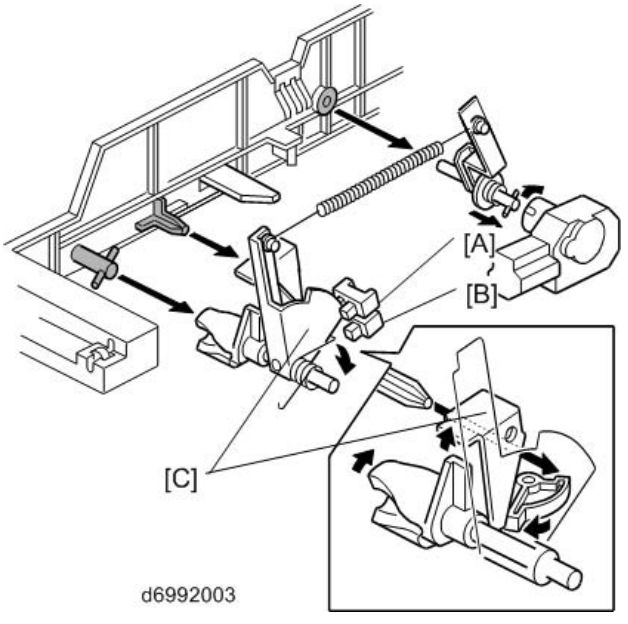


If there is some paper in the paper tray, the paper stack raises the paper end feeler [A] and the paper end sensor [B] is deactivated.

When the paper tray runs out of paper, the paper end feeler drops into the cutout [C] in the tray bottom plate and the paper end sensor is activated.

When the paper tray is drawn out with no paper in the tray, the shape of the paper end feeler causes it to lift up.

Paper Height Detection



The amount of paper in the tray is detected by the combination of on/off signals from two paper height sensors [A] and [B].

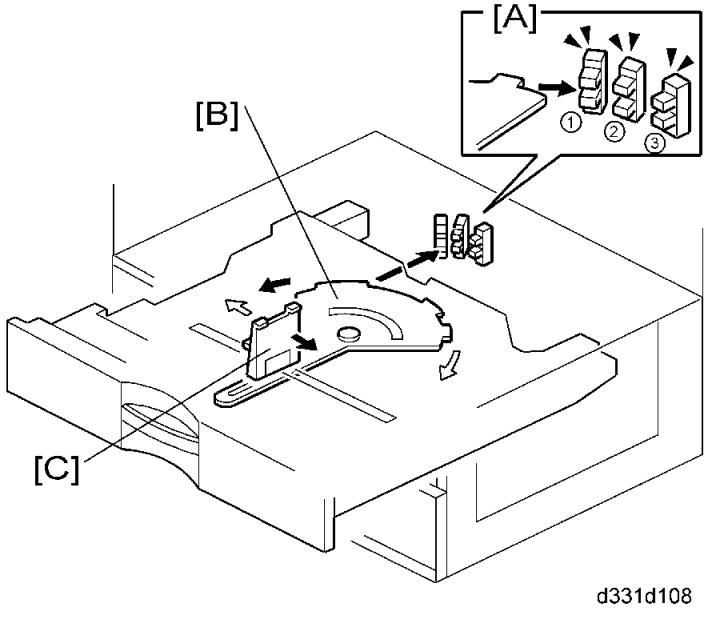
When the amount of paper decreases, the bottom plate pressure lever [C] moves the actuator up.

The following combination of sensor signals is sent to the copier/printer.

Amount of Paper	Paper Height Sensor 1	Paper Height Sensor 2
Near End	OFF	ON
30%	ON	ON
70%	ON	OFF
100%	OFF	OFF

When the tray contains paper of a small width, the paper feed pressure may become too low when the thickness of the remaining stack of paper has decreased. The lift motor rotates forward 300 ms after the sensor detects a certain amount of paper remaining in the tray to increase paper feed pressure, simulating the pressure generated by a full tray.

Paper Size Detection



There are three paper size sensors [A] (SN1, SN2 and SN3) on the paper tray unit. Each paper tray has its own actuator [B], with a unique combination of notches. This actuator is moved when the paper end fence [C] is adjusted for the installed paper. To determine which size has been installed, the CPU reads which paper size sensors the actuator has switched off. Refer to the size detection lists as shown below.

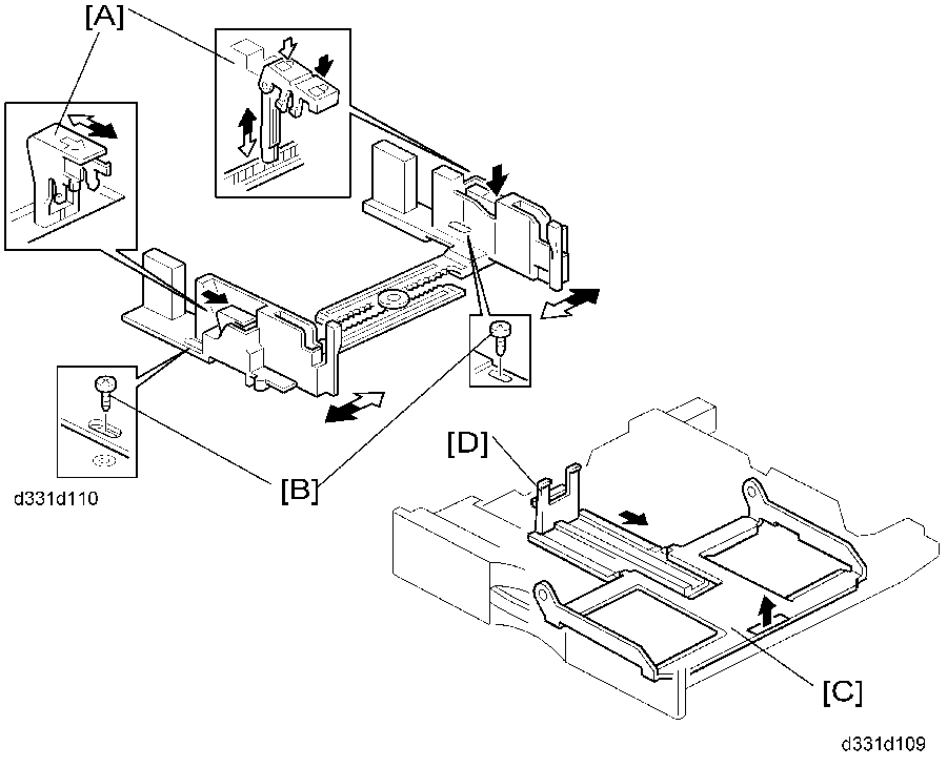
EU/ ASIA Size		SN1	SN2	SN3
A3 LEF	297 x 420	ON	OFF	OFF
DLT LEF*	11" x 17"	ON	ON	OFF
B4 LEF	257 x 364	ON	ON	ON
LG LEF*	$8^1/_2$" x 14"	ON	ON	ON
A4 LEF	210 x 297	OFF	OFF	ON
LT LEF	$8^1/_2$" x 11"	OFF	OFF	OFF
B5 LEF	182 x 257	ON	OFF	OFF
A4 SEF	297 x 210	OFF	ON	ON

LT SEF*	11" x 8 1/2"	OFF	ON	ON
B5 SEF	257 x 182	ON	OFF	ON
EXE SEF*	10 1/2" x 7 1/4"	ON	OFF	ON
A5 SEF	210 x 148	OFF	ON	OFF
NA Size		**SN1**	**SN2**	**SN3**
A3 LEF*	297 x 420	ON	ON	OFF
DLT LEF	11" x 17"	ON	ON	OFF
B4 LEF*	257 x 364	ON	ON	ON
LG LEF	8 1/2" x 14"	ON	ON	ON
A4 LEF	210 x 297	OFF	OFF	ON
LT LEF	8 1/2" x 11"	OFF	OFF	OFF
B5 LEF	182 x 257	ON	OFF	OFF
A4 SEF*	297 x 210	OFF	ON	ON
LT SEF	11" x 8 1/2"	OFF	ON	ON
B5 SEF*	257 x 182	ON	OFF	ON
EXE SEF	10 1/2" x 7 1/4"	ON	OFF	ON
A5 SEF	210 x 148	OFF	ON	OFF

* You can select the paper size using the user tools menu.

The CPU disables paper feed from a tray if the paper size cannot be detected. If the paper size actuator is broken, or if there is no tray installed, the Add Paper indicator will light.

Side and End Fences



Side Fences

If the tray is full of paper and it is pushed in strongly, the fences may deform or 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.

End Fence

As the amount of paper in the tray decreases, the bottom plate [C] lifts up gradually. The end fence [D] is connected to the bottom plate. When the tray bottom plate rises, the end fence moves forward and pushes the back of the paper stack to keep it squared up.

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