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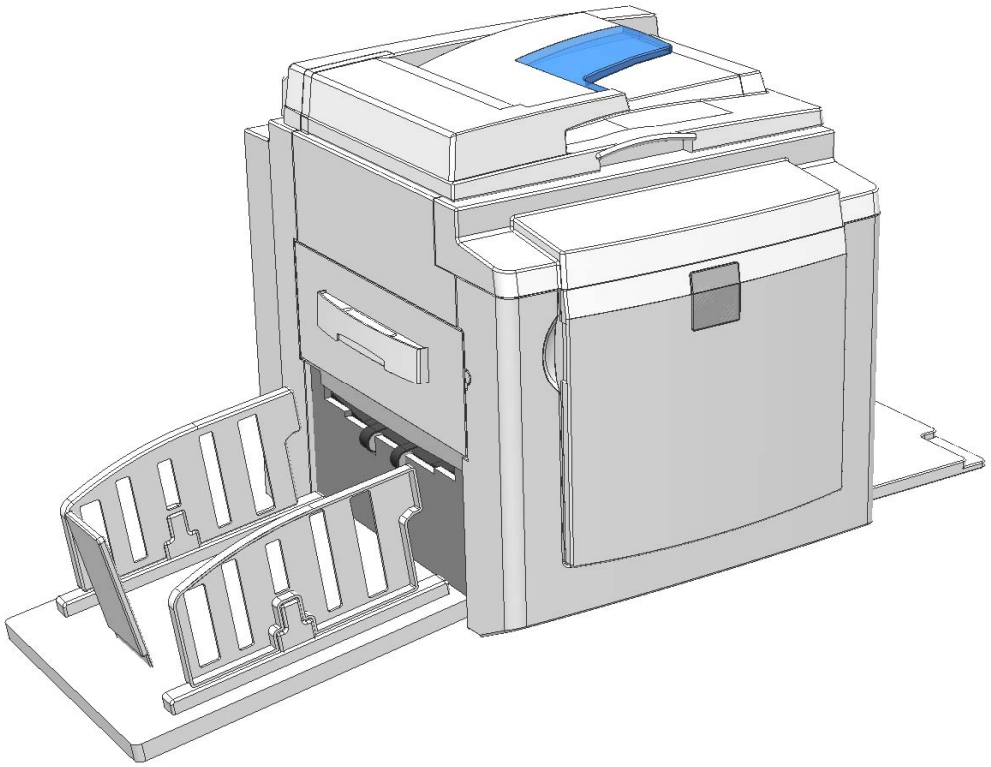

C231/C237/C238/C248/C267
SERVICE MANUAL

000914MIU

Gestetner LANIER RICOH savin

CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

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CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

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CÓPIA NÃO CONTROLADA

WARNING

The Service Manual contains information regarding service techniques, procedures, processes and spare parts of office equipment distributed by Ricoh Corporation. Users of this manual should be either service trained or certified by successfully completing a Ricoh Technical Training Program.

Untrained and uncertified users utilizing information contained in this service manual to repair or modify Ricoh equipment risk personal injury, damage to property or loss of warranty protection.

Ricoh Corporation

CÓPIA NÃO CONTROLADA

LEGEND

PRODUCT CODE	COMPANY			
	GESTETNER	LANIER	RICOH	SAVIN
C231	5306L		JP1030	3150DNP
C237	5308L	LDD020	JP1230	3150eDNP
C238	5430	LDD030	JP3000	3260DNP
C248	5309L		JP1235	3160DNP
C267	CP6143L	LDD120	DX3340	3180DNP

DOCUMENTATION HISTORY

REV. NO.	DATE	COMMENTS
*	7/98	Original Printing
1	8/2000	C237 Addition
2	1/2002	C238 Addition
3	2/2003	C248 Addition
4	6/2006	C267 Addition

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IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

1. Before disassembling or assembling parts of the printer and peripherals, make sure that the power cord is unplugged.
2. The wall outlet should be near the printer and easily accessible.
3. If any adjustment or operation check has to be made with exterior covers off or open while the main switch is turned on, keep hands away from electrified or mechanically driven components.

HEALTH SAFETY CONDITIONS

1. If you get ink in your eyes by accident, try to remove it with eye drops or flush with water as first aid. If unsuccessful, get medical attention.
2. If you ingest ink by accident, induce vomiting by sticking a finger down your throat or by giving soapy or strong salty water to drink.

OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

1. The printer and its peripherals must be installed and maintained by a customer service representative who has completed the training course on those models.

⚠CAUTION

The RAM has a lithium battery which can explode if handled incorrectly. Replace only with the same type of RAM. Do not recharge or burn this battery. Used RAM's must be handled in accordance with local regulations.

⚠ATTENTION

La carte RAM comporte une pile au lithium qui présente un risque d'explosion en cas de mauvaise manipulation. Remplacer la pile uniquement par une carte RAM identique. Ne pas recharger ni brûler cette pile. Les cartes RAM usagées doivent être éliminées conformément aux réglementations locales.

SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

1. Dispose of replaced parts in accordance with local regulations.
2. Used ink and masters should be disposed of in an environmentally safe manner and in accordance with local regulations.
3. When keeping used lithium batteries (from the main processing units) in order to dispose of them later, do not store more than 100 batteries (from the main processing units) per sealed box. Storing larger numbers or not sealing them apart may lead to chemical reactions and heat build-up.

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OVERALL INFORMATION

CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

1. OVERALL INFORMATION

1.1 SPECIFICATION

Configuration:	Desktop
Master Processing:	Digital with 300 dpi thermal head
Scanning (Pixel Density):	Contact image sensor (300 dpi), with xenon lamp * In Fine mode, 400 dpi in the sub-scanning resolution
Printing Process:	Fully automatic one-drum stencil system
Original Type:	Sheet/Book
In Platen Mode:	Document size: Maximum 257 x 364 mm [10.2" x 14.4"] Thickness: Less than 30 mm Weight: Less than 5 kg
In ADF Mode:	Document size: Maximum 257 x 364 mm [10.2" x 14.4"] Minimum 148 x 105 mm [5.8" x 4.1"] Document weight: 50 - 90 g/m^2 [13.3 - 23.9 lb] (40 - 120 g/m^2 [10.6 - 31.9 lb] in single sheet feed) ADF capacity: 30 sheets (using 20 lb or 80 g/m^2 paper)

Reproduction Ratios:

	Inch version	Others
Full Size:	100%	100%
Reduction:	65%	71%
	74%	82%
	77%	87%
	93%	93%
Enlargement:	121%	115%
	129%	122%
	155%	141%

Image Modes:	Letter, Photo, Letter/Photo, Fine, Tint

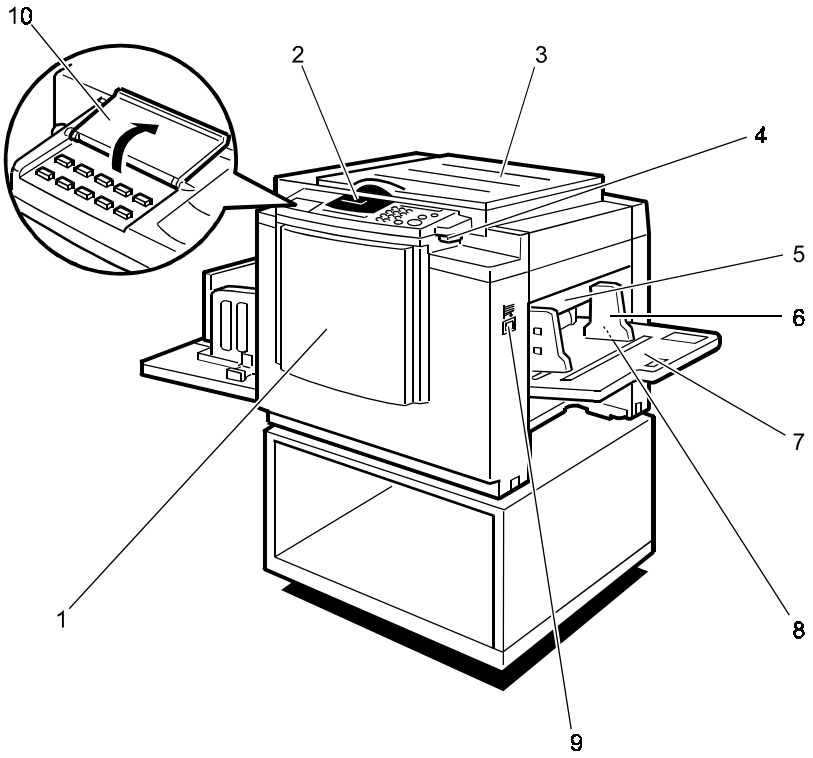
Printing Area: (At 20 °C/ 65 % RH)	B4 size drum models: 250 mm x 355 mm Legal size drum models: 210 mm x 355 mm [8.2" x 13.9"] A4 size drum models: 210 mm x 288 mm [8.2" x 11.3"]
Edge Margins:	Leading edge: 5 ± 3 mm (At the "0" position of Image Shift mode) Trailing edge: 2 mm
Print Paper Size:	Minimum: 90 mm x 148 mm [3.6" x 5.9"] Maximum: 267 mm x 390 mm [10.5" x 15.3"]
Print Paper Weight:	47.1 g/m^2 to 157.0 g/m^2 [12.5 lb to 41.7 lb]
Printing Speed:	80, 100, 120 sheets/minute (3 steps)
Master Process Time:	Platen mode: Less than 28 seconds (A4 paper) ADF mode: Less than 30 seconds (A4 paper)
Master Eject Box Capacity:	40 masters (Normal conditions) (30 masters at low temperatures)
Side Registration Adjustable Range:	± 10 mm
Vertical Registration Adjustable Range:	± 10 mm
Paper Feed Table Capacity:	1000 sheets (80 g/m^2 / 20 lb)
Paper Delivery Table Capacity:	1000 sheets (80 g/m^2/ 20 lb)
Power Source:	110/120 V, 50/60 Hz: 2.5 A 220 - 240 V, 50/60 Hz: 1.5 A
Maximum Power Consumption:	250 W
Noise Emission: (At operation position)	At 80 rpm printing speed: 71 dB At 100 rpm printing speed: 72 dB At 120 rpm printing speed: 72 dB

Weight:	65 kg [143.3 lb] 68 kg [149.9 lb] with ADF
Dimensions: (Width x Depth x Height)	Trays closed: 594 mm x 601 mm x 567 mm With ADF: 594 mm x 601 mm x 617 mm Trays open: 1187 mm x 601 mm x 567 mm With ADF: 1187 mm x 601 mm x 617 mm
Master Type:	<u>Master for B4 drum</u> Thermal master roll type: 280 mm width, 125 m/roll Yield: 260 masters/roll Max run length per master: 2,000 prints <u>Master for A4/Legal drum</u> Thermal master roll type: 240 mm width, 125 m/roll Yield: 300 masters/roll (A4 drum) 260 masters/roll (Legal drum) Max run length per master: 2,000 prints
Master Storage Conditions:	Temperature: 0 °C to 40 °C Humidity: 10% to 95% RH Recommended maximum storage period: One year after production date * Avoid locations exposed to direct sunlight.

Ink Type	600 ml cartridge type Available colors: Black, Red, Blue, Green, Brown
Ink Storage Conditions:	Temperature: -5 °C to 40 °C (Optimum conditions: 15 °C to 25 °C) Humidity: 10% to 95% RH (Optimum conditions: 20% to 70% RH) Recommended maximum storage period: One year after production date * Avoid locations exposed to direct sunlight.
Available Options	• Color Drum • Document Feeder • Key Counter • Tape Marker • PC Controller

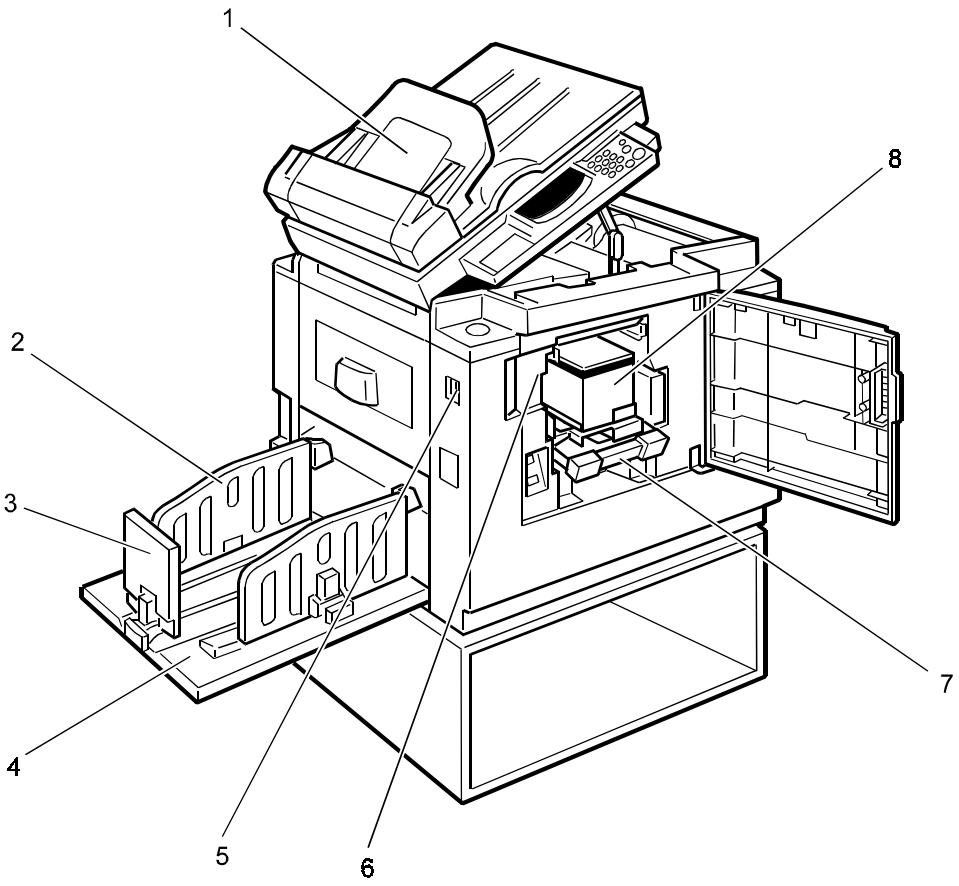
1.2 GUIDE TO COMPONENTS AND THEIR FUNCTION

1.2.1 MACHINE EXTERIOR



1.	**Front Door**	Open for access to the inside of the machine.
2.	**Operation Panel**	Operator controls and indicators are located here.
3.	**Platen Cover**	Lower this cover over an original before printing.
4.	**Original Table Release Lever**	Use to open the original table unit when installing the master.
5.	**Feed Roller Pressure Lever**	Use to adjust the contact pressure of the paper feed roller according to paper thickness.
6.	**Paper Feed Side Plates**	Use to prevent paper skew.
7.	**Paper Feed Table**	Set paper on this table for printing.
8.	**Side Table Fine Adjusting Dial**	Use to shift the paper feed table sideways.
9.	**Paper Feed Table Down key**	Press to lower the paper feed table.
10.	**Behind Cover**	Flip up when you wish to use the keys underneath.

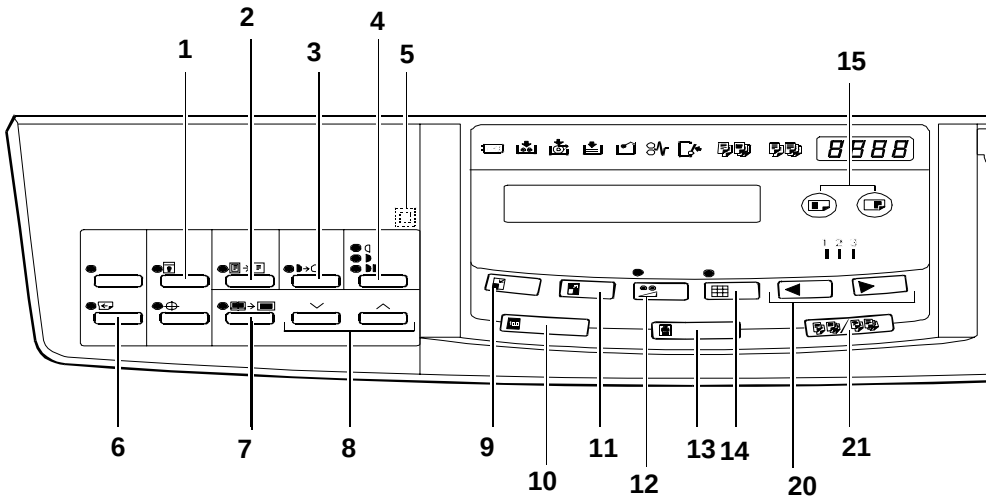
1.2.2 MACHINE INTERIOR



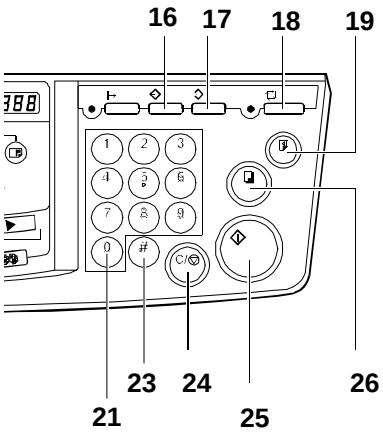
1.	**Document Feeder (Option)**	Originals inserted into the document feeder are individually and automatically fed onto and removed from the exposure glass.
2.	**Paper Delivery Side Plates**	Use to align the prints on the paper delivery table.
3.	**Paper Delivery End Plate**	Use to align the leading edge of prints.
4.	**Paper Delivery Table**	Completed prints are delivered here.
5.	**Main Switch**	Use to turn the power on or off.
6.	**Drum Unit**	The master is wrapped around this unit.
7.	**Drum Unit Lock Lever**	Lift to unlock and pull out the drum unit.
8.	**Ink Holder**	Set the ink cartridge in this holder.

1.2.3 OPERATION PANEL

Keys



1. **Security key**
   Press to make prints of confidential documents.
2. **Paste Shadow Erase key**
   Press to erase the shadows on images of pasted originals.
3. **Tint key**
   Press to make prints in grey. (This is the Tint/Economy key for the China version.)
4. **Image Density key**
   Press to make prints darker or lighter.
5. **Check Indicator**
   This indicator lights when you have selected one or more of the functions accessed by lifting the behind cover and pressing the keys underneath (e. g. Security key, Paste Shadow Erase key etc.). This lets you know whether one or more of these functions is selected, even if the cover is lowered.
6. **Skip Feed key**
   Press to select skip feed printing.
7. **Center/Edge Erase key**
   Press to print book originals that have a solid image on the center or edges.
8. **Scroll keys**
   Press to select size and direction of paper or original for Center/Edge Erase.
9. **Reduce key**
   Press to reduce the image.
10. **Full Size key**
    Press to make full size prints.
11. **Enlarge key**
    Press to enlarge the image.
12. **Economy key**
    Press to save ink. (This is the Combine 2 Originals key for the China version.)
13. **Type of Original key**
    Press to select Letter, Photo, or Letter/Photo mode.
14. **Fine key**
    Press to select fine image mode.
15. **Image Position key**
    Press to shift the image forwards or backwards.



16. Program key
Press to input or recall user programs.

17. Clear Modes key
Press to clear the previously entered job settings.

18. Auto Cycle key
Use to process the master and make prints automatically.

19. Proof key
Press to make proof prints.

20. Speed keys
Press to adjust the printing speed.

21. Memory/Class key
Press to select Memory or Class mode.

22. Number keys
Press to enter the desired number of prints and data for selected modes.

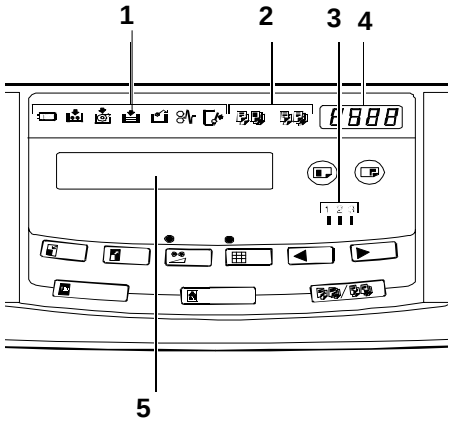
23. # key
Use to enter data in selected modes.

24. Clear/Stop key
While entering numbers, press to cancel a number you have entered. While copying, press to stop copying.

25. Start key
Press to make a master.

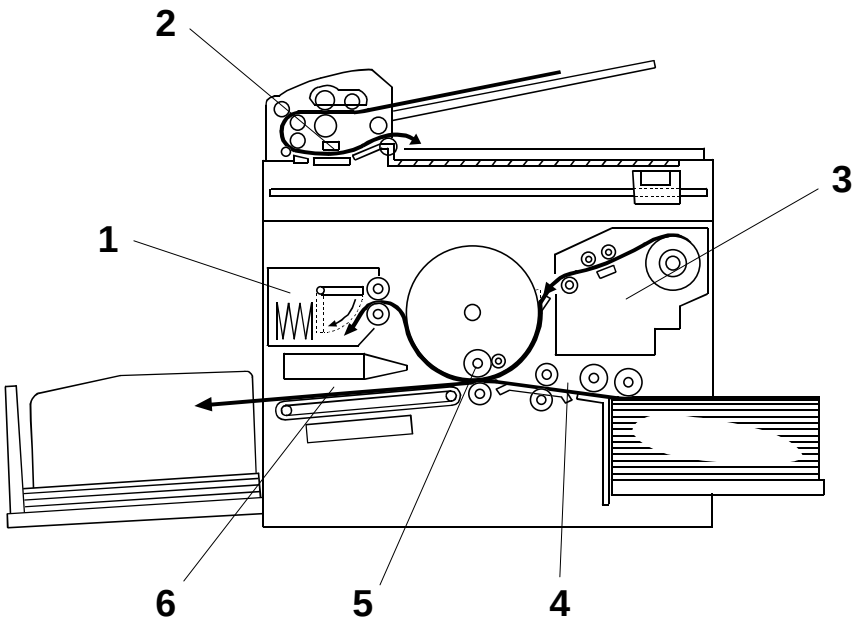
26. Print key
Press to start printing.

Indicators



1. **Error indicators**
   These indicators are lit when a non-standard condition occurs within the machine.
2. **Memory/Class Indicator**
   Shows the number entered in Memory or Class mode.
3. **Speed indicator**
   These indicators show the printing speed that is selected.
4. **Counter**
   Displays the number of prints entered. While printing, it shows the number of prints remaining.
5. **Guidance Display**
   Display the machine's condition.

1.3 PRINTING PROCESS



1. Master Eject: Ejects the used master wrapped around the drum into the master eject box.

↓

2. Scanning: The scanner, which is composed of the contact image sensor (CIS) and xenon lamp, scans the original image.

↓

3. Master Feeding: Converts the image signal read by the CIS into digital signals and sends them to the thermal head to develop the image on the master. The master is then wrapped around the drum.

↓

4. Paper Feeding: Sends paper to the drum section.

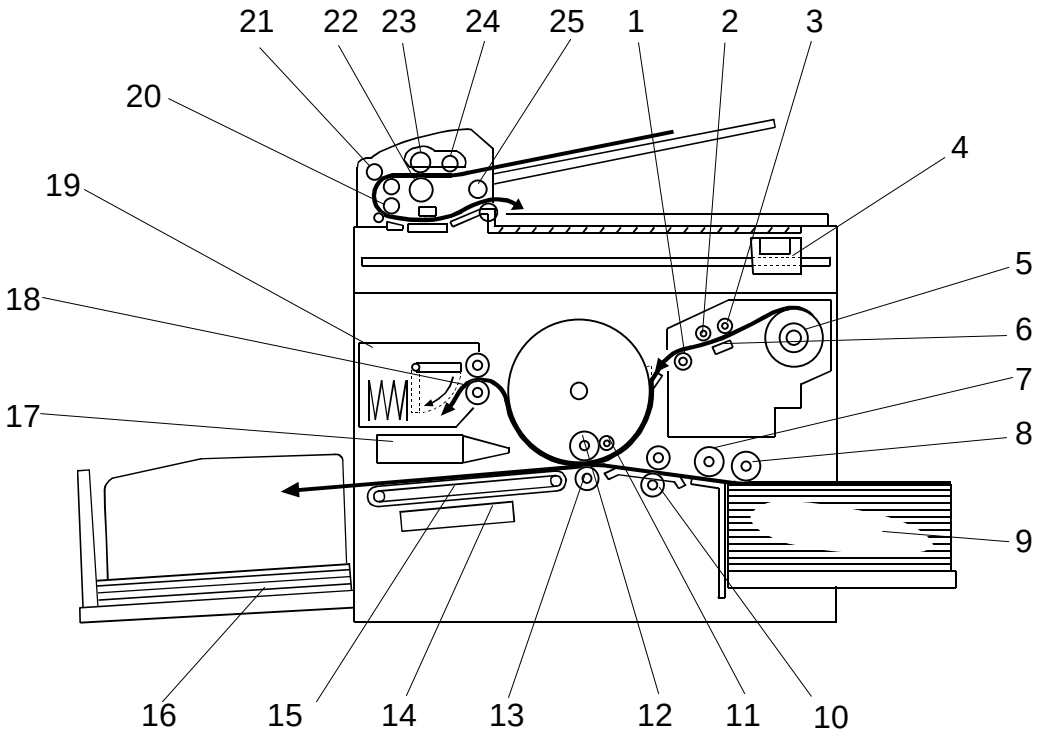
↓

5. Printing: Presses the paper fed from the paper feed section to the drum. This transfers the ink onto the paper through the drum screen and the master.

↓

6. Paper Delivering: Peels the printed paper with the exit pawl and air knife, and ejects the paper onto the paper delivery table.

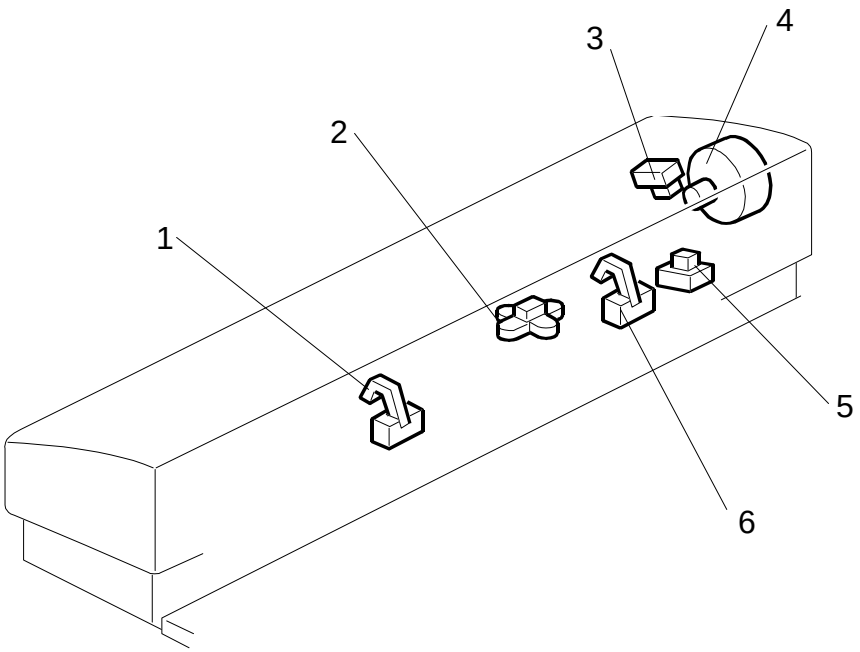
1.4 MECHANICAL COMPONENT LAYOUT



1. Tension Roller
2. Master Feed Roller
3. Platen Roller
4. Scanner
5. Master Roll
6. Thermal Head
7. Paper Feed Roller
8. Paper Pick-up Roller
9. Paper Table
10. Registration Roller
11. Doctor Roller
12. Ink Roller
13. Press Roller
14. Vacuum Fan Motor
15. Transport Belts
16. Paper Delivery Table
17. Air Knife Fan Motor
18. Master Eject Roller
19. Master Eject Box
20. DF R1 Roller
21. DF R0 Roller
22. DF Separation Roller
23. DF Document Feed Roller
24. DF Pick-up Roller
25. DF R2 Roller

1.5 ELECTRICAL COMPONENT LAYOUT

1.5.1 ADF



Motors

Index No.	Name	Function
4	ADF Motor	Drives the original.

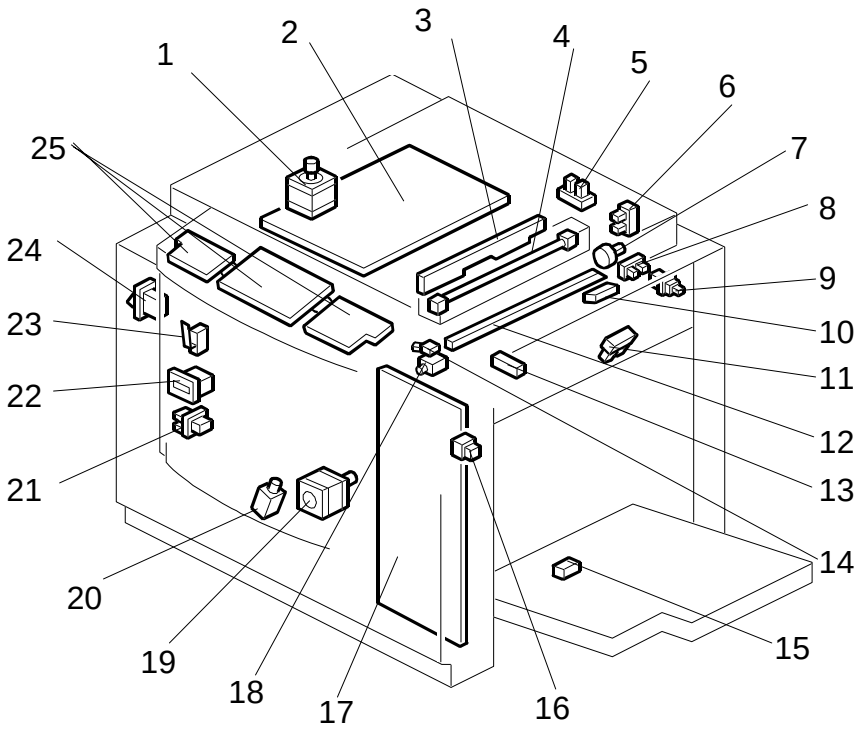
Switches

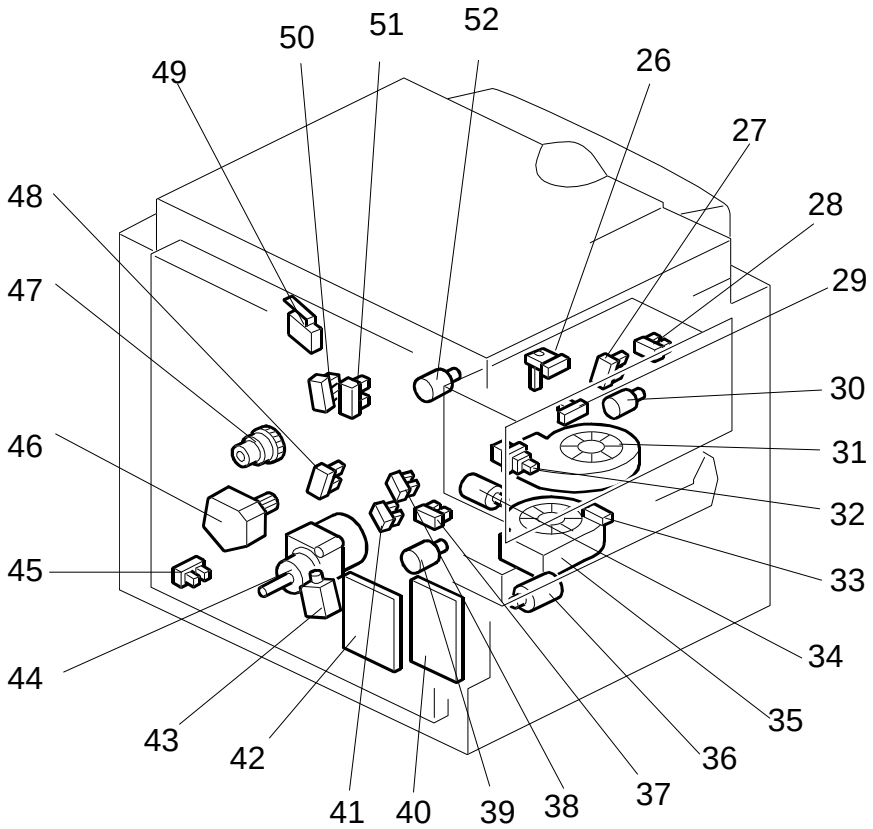
Index No.	Name	Function
3	ADF Cover Switch	Detects whether the ADF cover is open or closed.
5	ADF Switch	Detects whether the ADF unit is open or closed.

Sensors

Index No.	Name	Function
2	Scan Line Sensor	Detects when a page is approaching the auto shading position.
1	Document Sensor	Detects the presence of a document in the feeder.
6	Not Used	

1.5.2 MAIN BODY





Boards

Index No.	Name	Function
2	Main Processing Unit (MPU)	Controls all machine functions both directly and through other boards.
3	Lamp Stabilizer	This supplies power to the xenon lamp.
17	Power Supply Unit	Provides dc power to the system.
25	Operation Panel Boards	These boards control the operation panel.
4	Contact Image Sensor and Xenon Lamp	This sensor reads and converts the light reflected from the document into an analog video signal. It uses an RMLA (Roof Mirror Lens Array) sensor unit. The xenon lamp that illuminates the document is contained in this unit.
40	Noise Filter Board	Filters out electrical noise on the ac power input lines.
42	Main Motor Control Board	Controls the main motor speed.

Motors

Index No.	Name	Function
7	Master Feed Motor	Feeds the master to the drum.
18	Cutter Motor	Cuts the master.
19	Registration Motor	Feeds the paper to align it with the master on the drum.
1	Scanner Motor	Stepper motor drives the book scanner.
30	Master Eject Motor	Sends used masters into the master eject box.
31	Air Knife Fan Motor	Rotates the fan to provide air to separate the leading edge of the paper from the drum.
34	Pressure Plate Motor	Raises and lowers the pressure plate.
35	Vacuum Fan Motor	Provides suction so that paper is held firmly on the transport belt.
36	Paper Transport Motor	Transports the printed paper.
39	Clamper Motor	Opens or closes the drum master clamper.
44	Main Motor	Drives paper feed mechanisms and the drum.
46	Paper Table Motor	Raises and lowers the paper table.
52	Ink Pump Motor	Drives the ink pump.

Solenoids

Index No.	Name	Function
43	Rear Pressure Release Solenoid	Releases the press roller to apply printing pressure.
20	Front Pressure Release Solenoid	Releases the press roller to apply printing pressure.

Switches

Index No.	Name	Function
49	Scanner Unit Safety Switch	Checks whether the scanner unit is properly set.
9	Master Making Unit Cover Safety Switch	Checks whether the cover on the master making unit is properly closed.
16	Table Lowering Switch	Lowers the paper table.
21	Test Switch	Releases the cover safety functions. (See the notes below this table.)
23	Door Safety Switch	Checks whether the front door is properly closed.
24	Main Switch	Turns the power on or off.

NOTE: When you use this test switch, be sure to return it to the default position after servicing.

Sensors

Index No.	Name	Function
50	Master Eject Position Sensor	Detects when the drum is at the master eject position.
51	Paper Exit Timing Sensor	Determines the paper exit misfeed check timing.
48	Feed Start Timing Sensor	Determines the paper feed start timing.
26	Master Eject Sensor	Detects used master misfeeds.
28	Pressure Plate Limit Sensor	Detects if the pressure plate is in the lowest position.
27	Pressure Plate Home Position Sensor	Detects if the pressure plate is at the home position.
29	Drum Master Sensor	Detects if there is a master on the drum.
32	Eject Box Set Sensor	Checks if the master eject box is set.
33	Paper Exit Sensor	Detects paper misfeeds at the exit.
37	2nd Feed Timing Sensor	Determines the paper misfeed check timing at the paper registration area.
38	Clamper Open Sensor	Detects if the clamper is in the open position.
41	Clamper Close Sensor	Detects if the clamper is in the closed position.
45	Table Lower Limit Sensor	Detects when the paper table is at its lower limit position.

Index No.	Name	Function
5	Platen Cover Sensor	Detects whether the platen cover is open or closed.
6	Scanner Home Position Sensor	Detects when the image sensor is at home position.
8	Master Set Cover Sensor	Checks if the master set cover is set.
10	Master End Sensor	Informs the CPU when the master making unit runs out of master roll.
11	Paper Height Sensor	Detects when the paper table reaches the paper feed position.
13	Paper Registration Sensor	Detects paper approaching the registration roller.
15	Paper End Sensor	Informs the CPU when the paper table runs out of paper.
14	Cutter Home Position Sensor (Switch)	Detects when the cutter is at the home position.

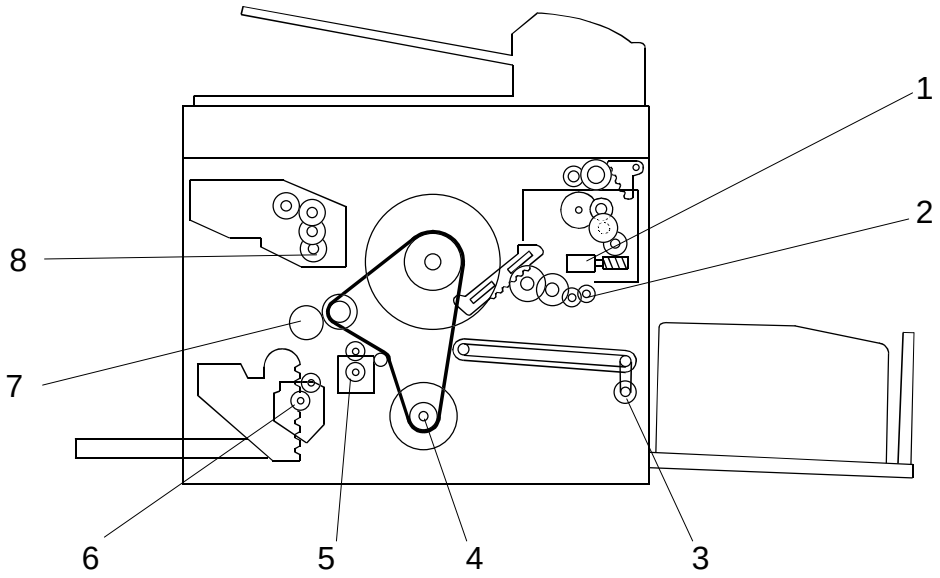
Counters

Index No.	Name	Function
22	Paper and Master Counters	Keep track of the total number of copies and masters made.

Others

Index No.	Name	Function
47	Paper Feed Clutch	Transmits main motor drive to the paper feed roller at the appropriate time.
12	Thermal Head	Burns the image onto the master.

1.6 DRIVE LAYOUT



1. Pressure Plate Motor
2. Clamper Motor
3. Paper Transport Motor
4. Main Motor
5. Registration Motor
6. Paper Table Motor
7. Paper Feed Clutch
8. Master Feed Motor

CÓPIA NÃO CONTROLADA

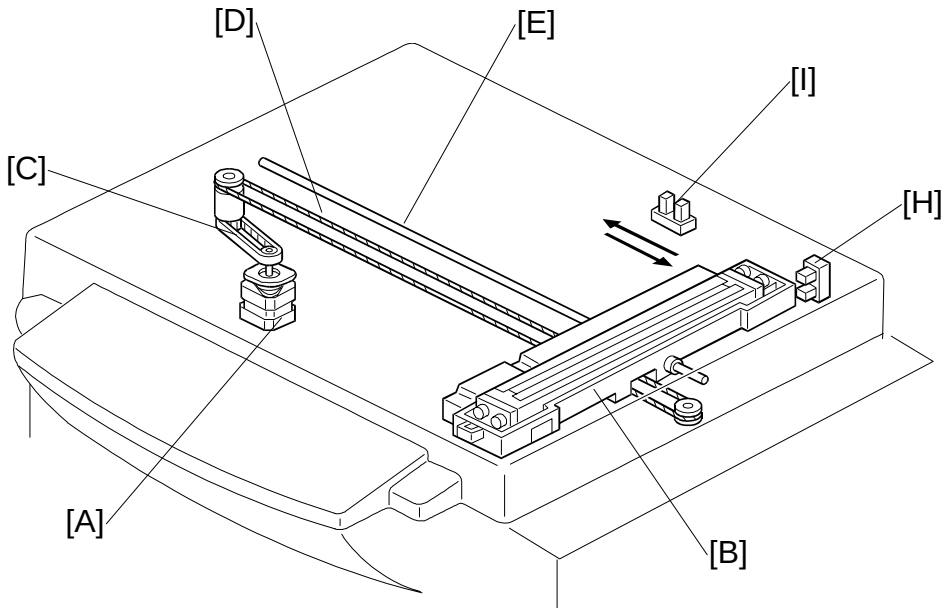
DETAILED SECTION DESCRIPTIONS

CÓPIA NÃO CONTROLADA

2. DETAILED SECTION DESCRIPTIONS

2.1 SCANNER AND OPTICS

2.1.1 BOOK SCANNER OVERVIEW



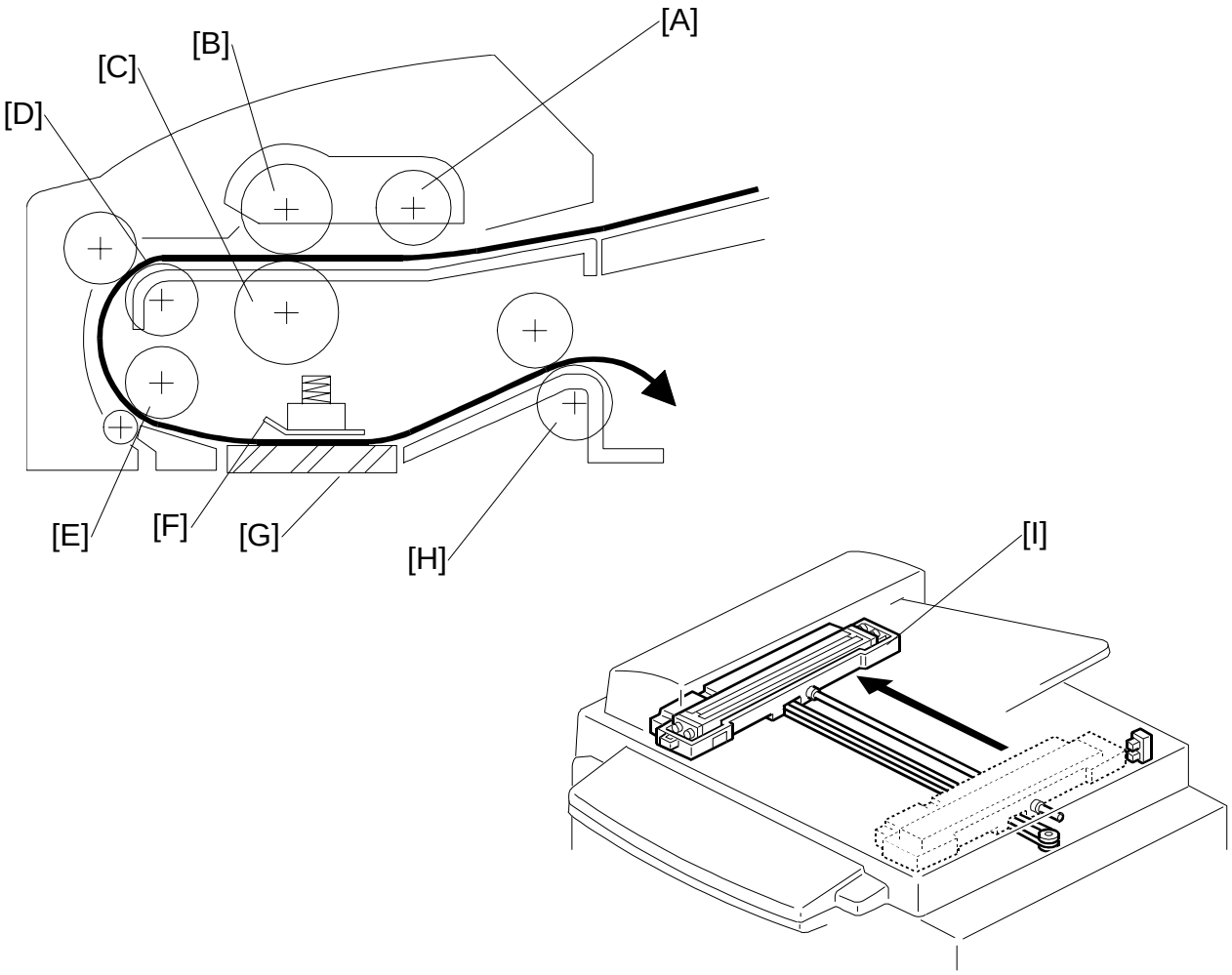
The scanner motor [A] drives the scanner [B] through the timing belt [C] and drive wire [D]. The shaft [E] guides the scanner movement in the sub-scan direction.

The scanner [B] consists of a contact image sensor and a xenon lamp driver.

The scanner home position sensor [H] detects when the scanner returns to the home position after scanning.

The platen cover switch [I] detects the cover status.

2.1.2 ADF OVERVIEW

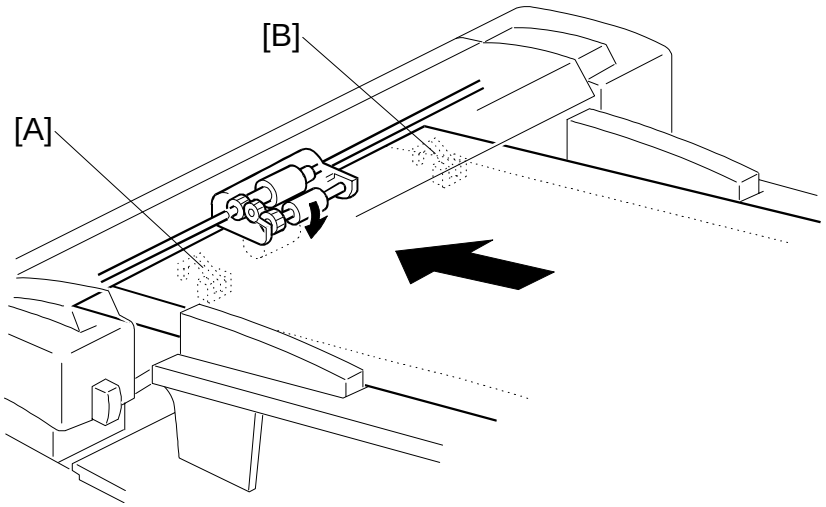


The sheet through-type ADF feeds the document from the top of the document stack.

The pick-up roller [A] and feed roller [B] feed the original into the scanner, and the separation roller [C] helps to feed one sheet at a time. Then, the R0 [D], R1 [E], and R2 [H] rollers feed the document through the scanner.

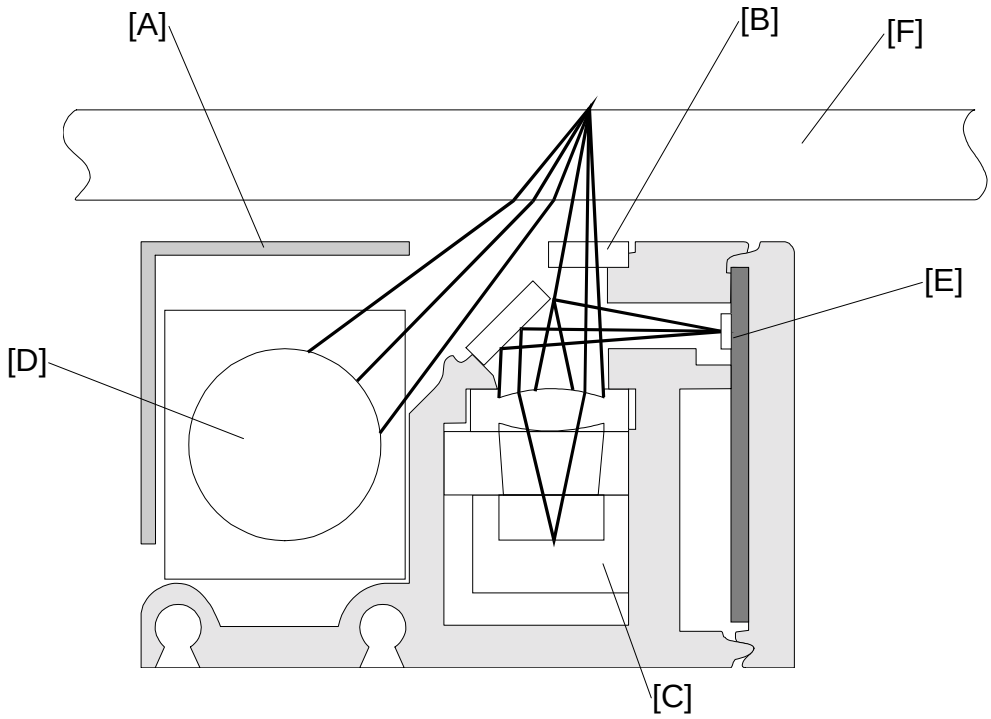
During scanning, the scanner [I] moves to the scanning position under the exposure glass [G]. The shading plate [F] secures the document at the scan line, ensuring that the document is within the image sensor's range of focus.

After scanning, the ADF feeds the document onto the platen cover, and the scanner moves back to its home position.



The document sensor [A] detects when an original is placed in the ADF. The sensor [B] is not used in this unit. The ADF is a common part which is used in other models.

2.1.3 CONTACT IMAGE SENSOR



The contact image sensor (CIS) assembly [A] consists of the exposure glass [B], roof mirror lens array [C], xenon lamp [D], and the image sensor [E].
The CIS moves under the exposure glass when scanning a book original, and remains stationary at the ADF scan line when scanning a sheet original using the ADF.

The image sensor is a row of 4096 photosensitive elements (B4 width x 16 dots/mm). The roof mirror lens array focuses the light reflected from the document onto the image sensor.

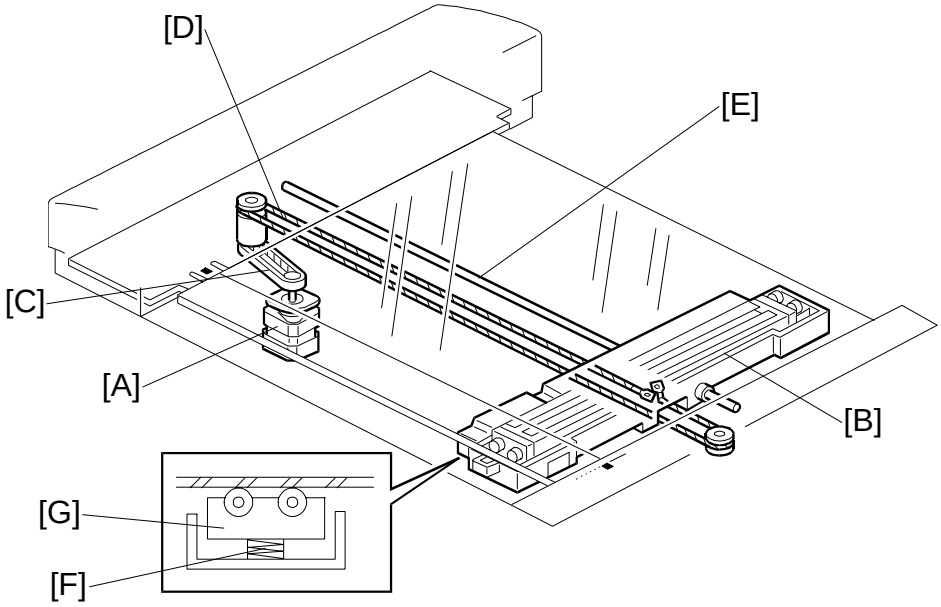
Due to the short optical path of a CIS unit, the focal depth is much shorter than in a CCD type scanner. Because of this, two springs are used to push the CIS against the exposure glass [F], to keep the distance between the CIS and the original constant. In book scanning mode, if the original is out of the CIS focal range, however, the scanned image may be darkened.

NOTE: Due to the characteristics of the CIS, shadows of a paste-up original tend to appear on copies. To counter this, press the paste shadow erase key on the operation panel to use the paste shadow erase mode.

The strength of the paste shadow erase level can be changed with SP no. 28.

2.1.4 DRIVE MECHANISM

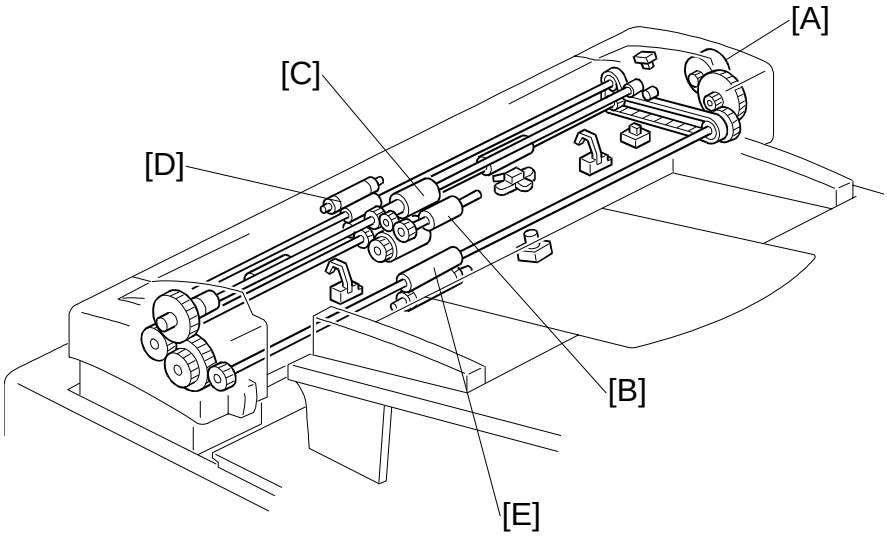
Book Scanner



The book scanner motor [A] drives the scanner [B] via a timing belt [C] and drive wire [D]. The scanner moves along the guide shaft [E].

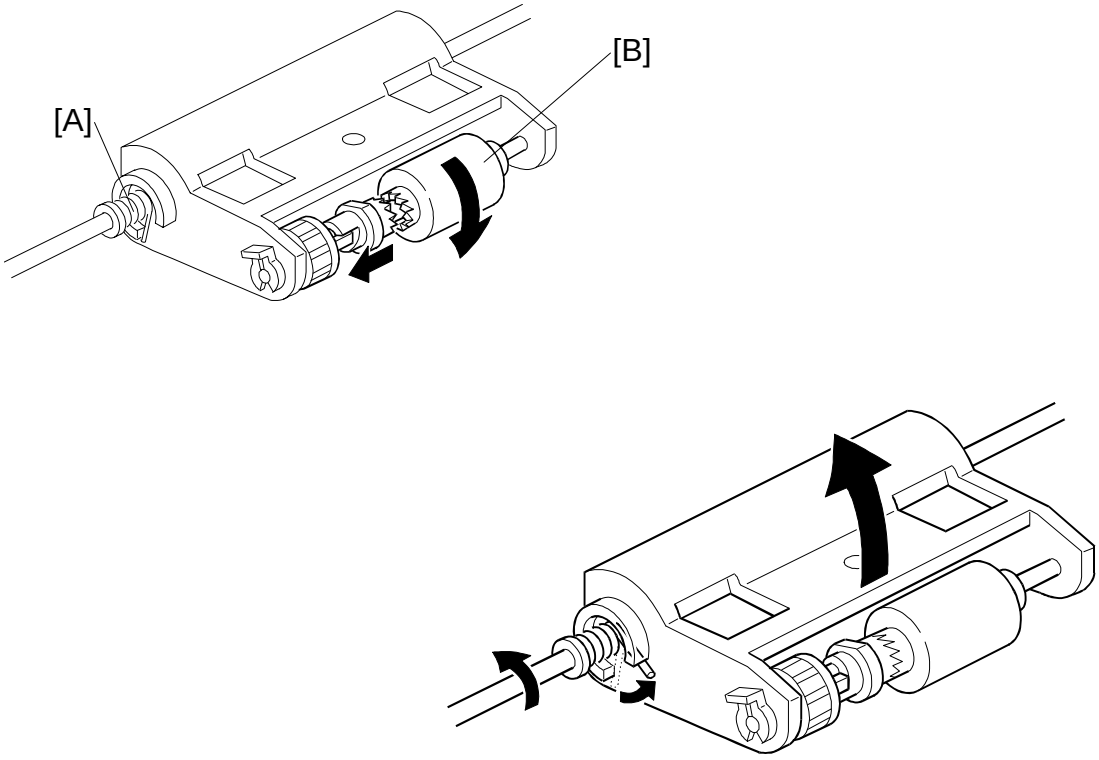
The springs [F] apply pressure to the contact image sensor [G] to ensure that the distance from the image sensor to the exposure glass surface remains constant during scanning.

ADF



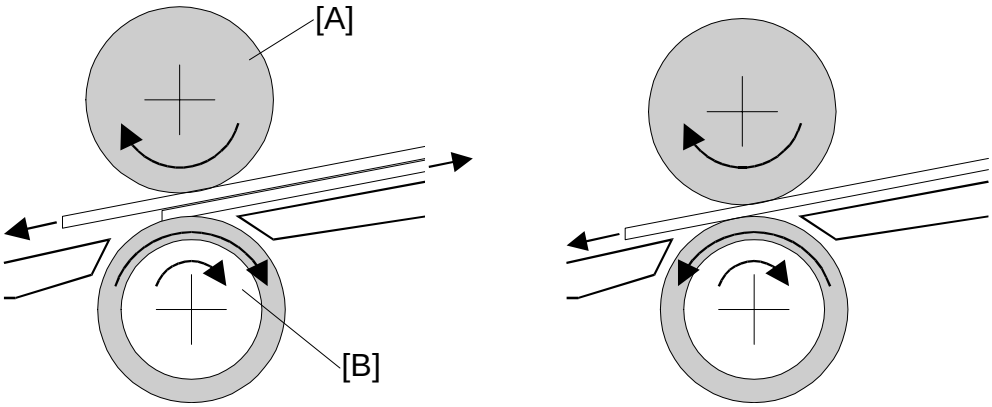
The ADF motor [A] drives the pick-up roller [B], the feed roller [C], the R0 roller [D], the R1 roller (not shown), and the R2 roller [E].

2.1.5 PICK-UP AND FEED (ADF)



When the ADF motor starts, the mechanical clutch [A] engages and lowers the pick-up roller [B] into contact with the document. Then the machine begins feeding the original stack, beginning with the top page. After the last page is scanned, the ADF motor reverses briefly to raise the pick-up roller back to the standby position.

2.1.6 SEPARATION MECHANISM (ADF)



The feed roller [A] and the separation roller [B] prevent more than one sheet of paper from feeding into the scanner at the same time.

When the feed roller feeds a sheet of paper, both the feed and the separation rollers rotate in the feed-in direction. However, if two or more sheets are between these rollers, the separation roller rotates in the feed-out direction to prevent the lower sheet from being fed into the scanner.

2.1.7 ERROR CONDITIONS

Book Scanner

The main CPU detects an error (error code E-13 is displayed) if either of the following conditions occurs.

Condition	Description	Error Code
Home position sensor error condition	The scanner home position sensor does not turn on within 7 seconds after the motor engages.	E-13
	The scanner home position sensor does not turn off within 4 seconds after power on. Otherwise, when the scanner could not return to the home position within 2 seconds of leaving.	

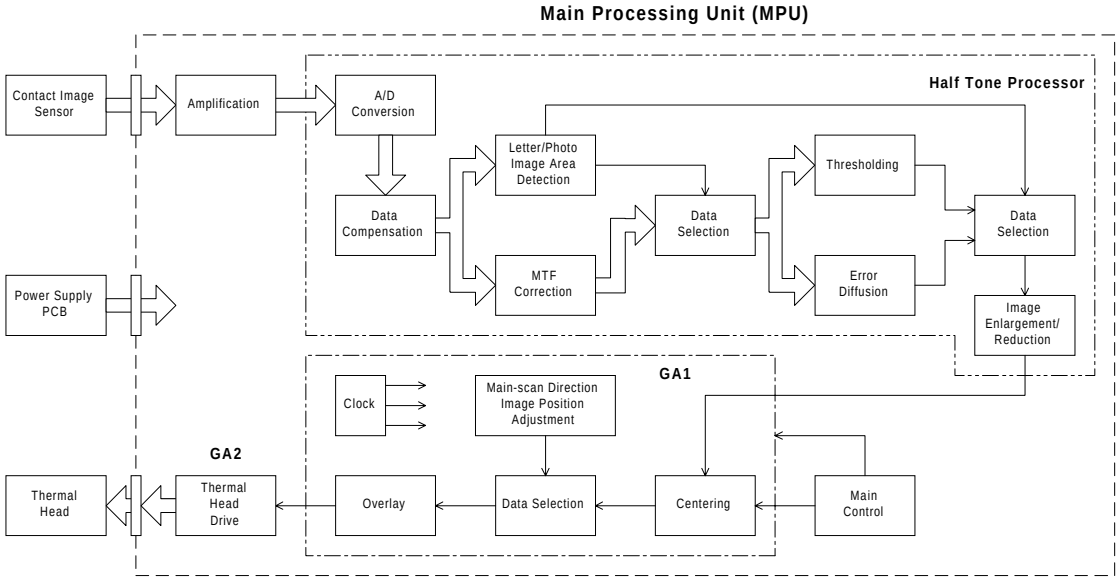
ADF

"Paper feed jam" is displayed if any of the following conditions occurs.

Jam Condition	Description
Non-feed	The scan line sensor does not switch on within 5 seconds after the ADF motor starts.
Misfeed 1	The scan line sensor does not turn off even when the paper (a trial print) reaches the registration area.
Misfeed 2	The ADF motor reverses after the last document feeds out of the scanner or after a jam is cleared. At this time, the misfeed 2 error condition occurs if the document sensor stays on.

2.2 IMAGE-PROCESSING

2.2.1 OVERVIEW



This model uses a contact image sensor (CIS) instead of a CCD. It removes the necessity for the complicated adjustments that are needed for a CCD scanner.

There are three main chips on the main processing unit (MPU) as shown. The halftone processor chip enables the use of Letter/Photo mode in addition to Letter and Photo modes. In Letter/Photo and Photo modes, error diffusion processing produces better copy quality halftone images.

The halftone processor also includes the A/D conversion function, as well as the image processing functions. The thermal head drive function is built into a chip (GA2) on the MPU.

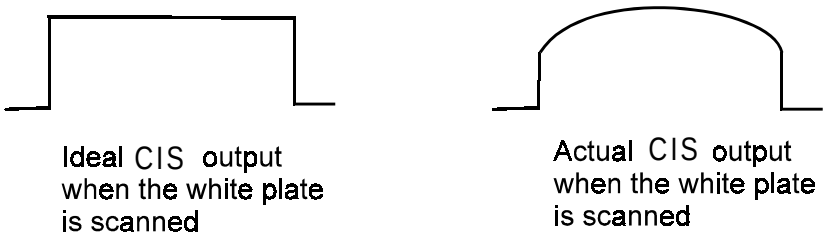
2.2.2 A/D CONVERSION PROCESSING

The analog signal from the contact image sensor is converted into a digital signal that represents 64 grayscale steps. This process is carried out in the halftone processing chip in the MPU.

Shading Distortion Correction

The image data from one main scan line does not exactly represent the line from the original image, because of the following reasons:

1) Loss of brightness towards the ends of the exposure lamp.
2) Variations in sensitivity among elements of the contact image sensor
3) Distortions of the light path



Such distortions in the image data are corrected when they are converted into digital data.

Before scanning the document, the scanner reads the white plate on the back of the original scale. The output of each contact image sensor element is changed to a 6-bit digital value and is stored in the shading distortion memory.

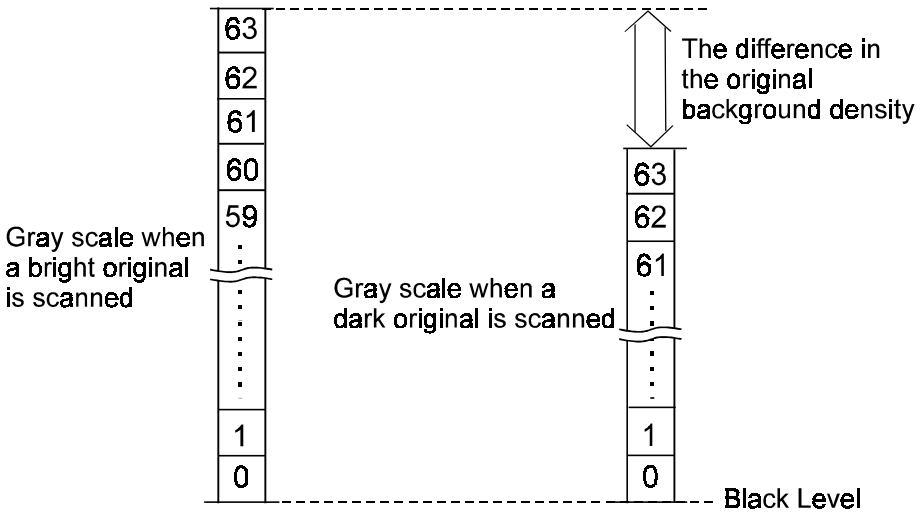
To change the analog shading distortion signals to digital data, a scale of 64 steps is made between the whitest level when the white plate is scanned and 50% of the whitest level. Using this scale, the analog signal is changed to 6-bit digital data.

While an original is scanned, the 6-bit shading distortion value for each pixel is sent, in series, from memory to the D/A converter, synchronizing with the image signal being sent to the A/D converter. The D/A converter changes the distortion value to an electrical current. The current is converted to the voltage to be used as high reference data for A/D conversion. In this way, the high reference voltage for A/D conversion is changed sequentially for each pixel depending on the shading distortion data for that pixel.

Original Background Correction

When an original is scanned, the whitest level of the original background is stored, and that level is used as the white peak level for A/D conversion. The grayscale is made based on the white peak level of the original. As a result, dark background does not appear on the printout.

If the original background correction is disabled, the whitest level when the white plate is scanned is used for the high reference voltage.



Peak Hold

The peak hold circuit holds the voltage for the white peak level. Before scanning an original, it holds the white peak voltage from the white plate to make shading distortion data. When the original is scanned, it stores the white peak level of the original for the original background correction.

NOTE: The white peak level is checked 5 mm from the leading edge of the original set on the exposure glass (and from the central 147-mm width). If the original leading edge is not flush with the original scale and the platen cover stays open, insufficient voltage will be input as the white peak level. If insufficient voltage is detected, a fixed voltage is used as the white peak level to avoid a faint image copy.

2.2.3 BINARY PROCESSING

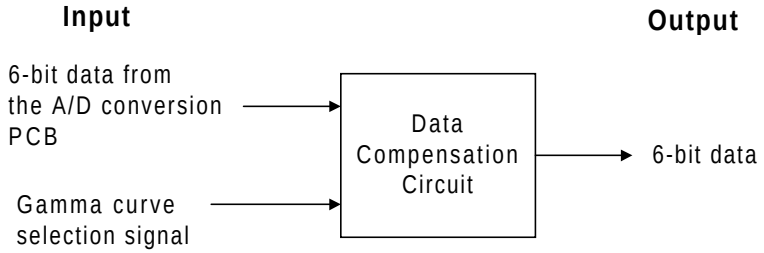
In the halftone-processing chip, the 6-bit digital signal data is generated in the A/D conversion circuit and is sent to the binary processing circuit. At that time the data is inverted to match the binary processing circuit. Therefore, the white peak level becomes 0, and the black level becomes 63.

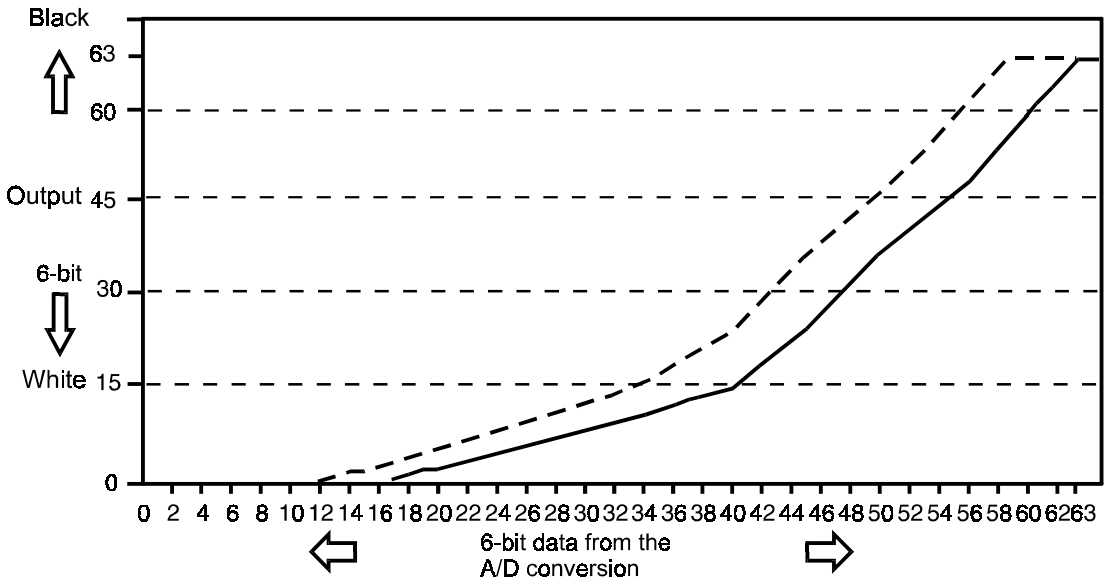
In the binary processing circuit, the 6-bit data is converted into 1-bit data for black or white pixels. The binary processing for the letter and photo is different, as follows:

Letter Mode, Letter areas in Letter/Photo Mode: MTF (Modulation Transfer Function) Correction
Photo Mode, Photo areas in Letter/Photo Mode: Error Diffusion Processing

Data Compensation Processing

In this process, the 6-bit data are converted based on a compensation curve (gamma curve) which corresponds to selected image settings. For example, if a darker image is selected, a compensation curve, which converts each pixel value to a higher number, is selected. The output data is still 6-bit.





MTF Correction

When the original image is converted to electrical signals by the contact image sensor, the contrast is reduced. This is because neighboring black and white parts of the image influence each other. This symptom is typical when the width and spacing between black and white areas are narrow. MTF correction counters this symptom and emphasizes image detail. The value of a target pixel is modified depending on the value of surrounding pixels. The modified data is compared with a threshold level. This determines if the pixel is to be black or white.

After the MTF correction is done, the corrected data is compared with the black or white threshold level. If a pixel value is above the threshold level, it is set to black. If the pixel value is equal or below the threshold level, it is set to white. The threshold level depends on the selected density setting.

Image Density Setting	Threshold Level for Line Mode	Threshold Level for Line Areas in Line/Photo Mode
Lighter	28	35
Normal	35	40
Darker 1	38	42
Darker 2	42	44

Binary Processing in Letter/Photo Mode

In the Letter/Photo mode, the machine checks each pixel of the original to see if the pixel is in a letter area or in a photo area. To distinguish letter and photo areas, the CPU does the calculation on the 6-bit pixel data.

If the CPU recognizes that the pixel is in a letter area of the image, it uses the MTF process to convert the 6-bit value to 1-bit.

If the CPU recognizes that the pixel is in a photo area of the image, the pixel is converted to 1-bit using error diffusion.

To emphasize characters in a photo original when using Letter/Photo mode, a data compensation curve (γ curve) is used to make a darker image.

Error Diffusion

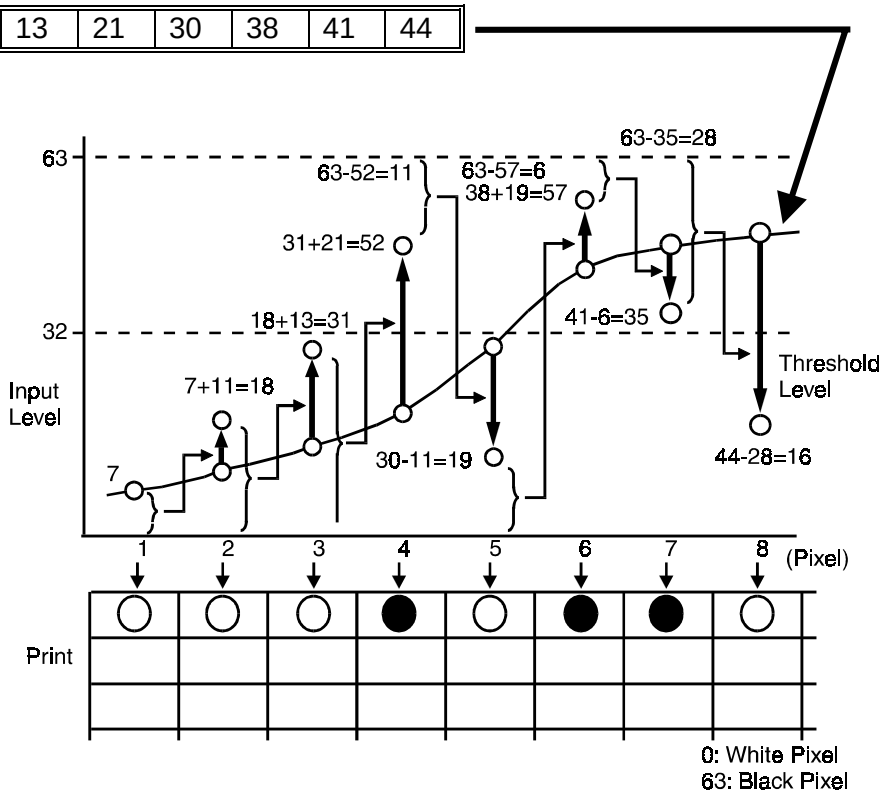
Error diffusion is used to reproduce halftone images in photo mode.

Before a 6-bit image signal is converted into a single-bit signal based on the threshold level, there is a difference between the image signal value and the complete black value (63 for a 6-bit signal) or white value (0). With the error diffusion process, the difference is distributed among the surrounding pixels. (The MTF process simply erases these differences.)

When considering error diffusion in one dimension only (across the page), the 6-bit data shown in the example below produces white and black data output as shown below. In practice, this one-dimensional error diffusion is done in all directions on each pixel (across the page, down the page, etc.).

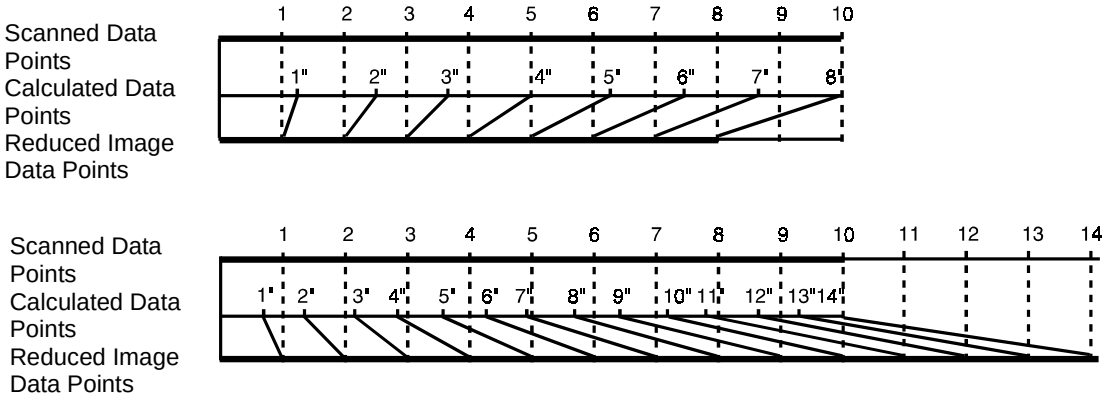
Image data from one scan line

7	11	13	21	30	38	41	44



In each dimension, the difference between the pixel value and the nearest extreme (0 or 63) is transferred to the next pixel. The 1st pixel in the row becomes either black or white, whichever is closest. Then, in the example above, the difference between 7 and 0 is added to the 2nd pixel. The value of the 2nd pixel, which is now 18, is then added to the 3rd pixel. The 4th pixel becomes 52, which is closer to 63 than 0. In such cases, the difference is subtracted (not added) to get the next pixel value. In this example, the difference is 63-52=11, and the next pixel value (30-11) becomes 19.

2.2.4 MAIN SCAN MAGNIFICATION



Changing the original transport speed performs the reduction and enlargement in the sub-scanning direction. Reduction and enlargement in the main scanning direction is handled by the magnification and image shift processing circuits.

Pixels for scanning and master making are generated at fixed intervals (the contact image sensor and thermal head element intervals). The image is scanned at the contact image sensor element interval. If pixels on the master are made at the same interval (by the thermal head elements) then the master image is the same size as the original.

When actual pixels are divided in accordance with a magnification ratio, the magnification processor calculates the imaginary point values that would correspond to new pixels. The proper value for each imaginary point is calculated based on the image data of the surrounding pixel values.

- 80 % Reduction -

For example, the contact image sensor scans data for 10 pixels in a main scan line. Those data are compressed into data for 8 pixels by the magnification processor. As a result, the image is reduced to 80 %.

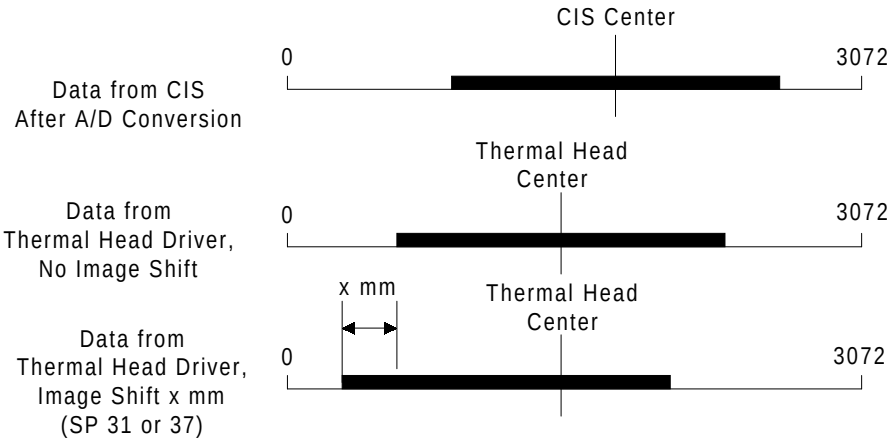
- 140 % Enlargement -

Data for 10 pixels of a main scan line are expanded into data for 14 pixels. As a result the image is enlarged with a 140 % magnification ratio.

2.2.5 IMAGE POSITION ADJUSTMENT IN THE MAIN SCAN DIRECTION

To adjust the image position of the original across the printout, the image can be shifted ± 1.9 mm in the main scan direction using SP mode No. 31 (platen mode) or No. 37 (ADF mode).

The image shift in the main scan direction is done by changing the relationship between the position of the image data on the CIS and on the thermal head. Data for one main scan line is stored in a line memory. When the data is output from memory, the output timing is changed to shift the image.



2.2.6 PASTE SHADOW ERASE MODE

Due to the characteristics of the contact image sensor, shadows of a paste-up original tend to appear on copies. To counter this, the paste shadow erase mode can be used by pressing the paste shadow erase key on the operation panel.

When this mode is selected, the black or white threshold level is slightly lowered. At the same time, the emphasis in the sub-scan direction in the MTF correction process is weakened to make the shadows inconspicuous.

The strength of the paste shadow erase level can be changed with SP No. 28.

2.2.7 THERMAL HEAD

Specifications

- Length 260.2 mm
- Number of thermal head elements 3072 dots
- Density of thermal head elements 300 DPI
- Applied voltage Approximately 21 volts

Thermal Head Control

The thermal head has heating elements at a density of 300 dpi. The thermal heating elements melt the over-coating and polyester film layers of the master, according to the image signal for each pixel.

The power supply unit applies power (VHD) to the thermal heating elements. The power source varies from one head to another since the average resistance of each element varies. Therefore, when the thermal head or power supply unit is replaced, it is necessary to readjust the applied voltage with particular values for each thermal head.

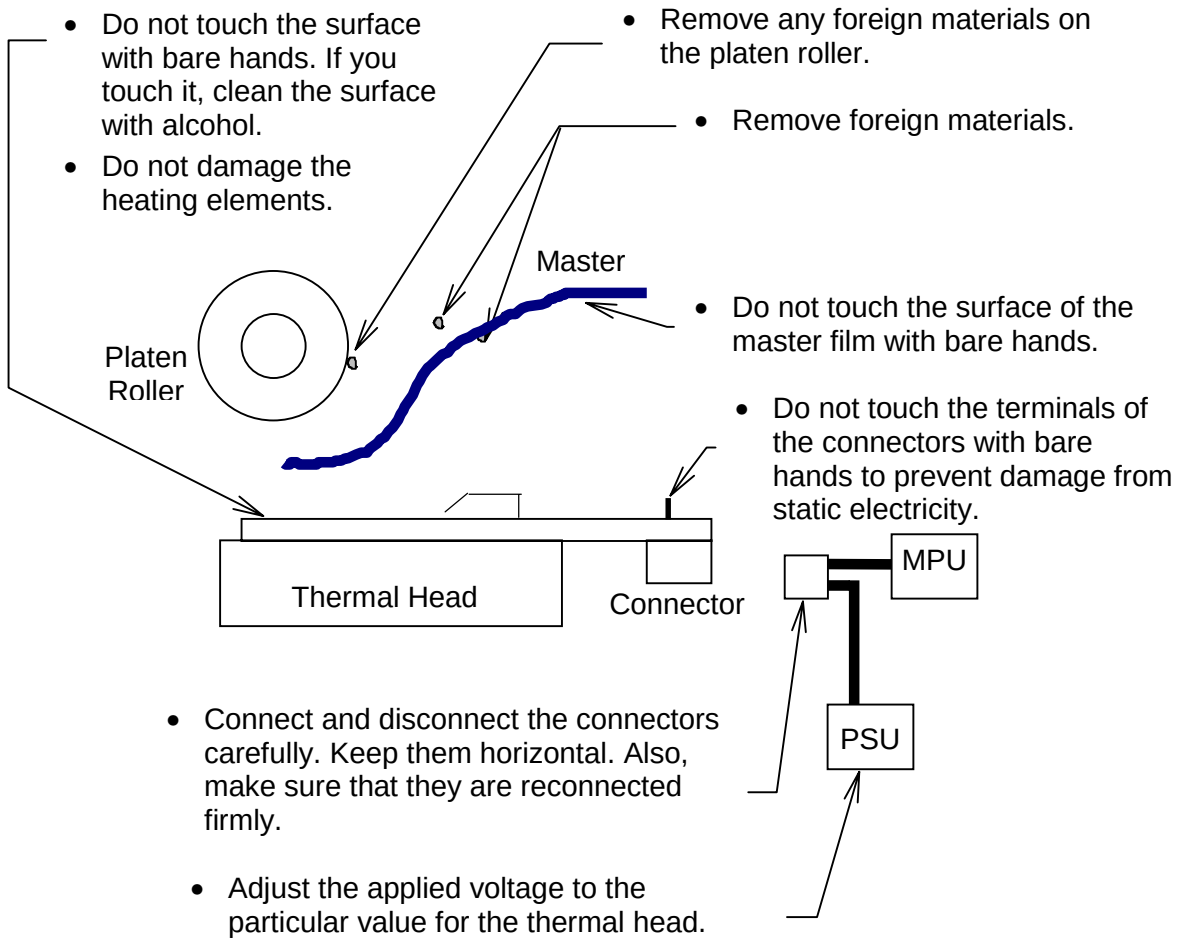
Thermal Head Protection

The thermistor on the thermal head provides thermal head protection, preventing the thermal head from overheating when processing a solid image. The CPU detects any abnormal condition when the Start key is pressed, and displays an SC code on the operation panel as follows:

SC Code	Conditions	Detecting Component
E - 04	Over 54°C	Thermistor
E - 09	Under - 20°C (Normally, this indicates that the thermistor has become open, or a related connector is disconnected.)	Thermistor
E - 10	When the pulse width that controls the thermal head energy becomes abnormal, master making stops and this SC lights.	MPU

Remarks for Handling the Thermal Head

The following remarks must be noted when servicing:

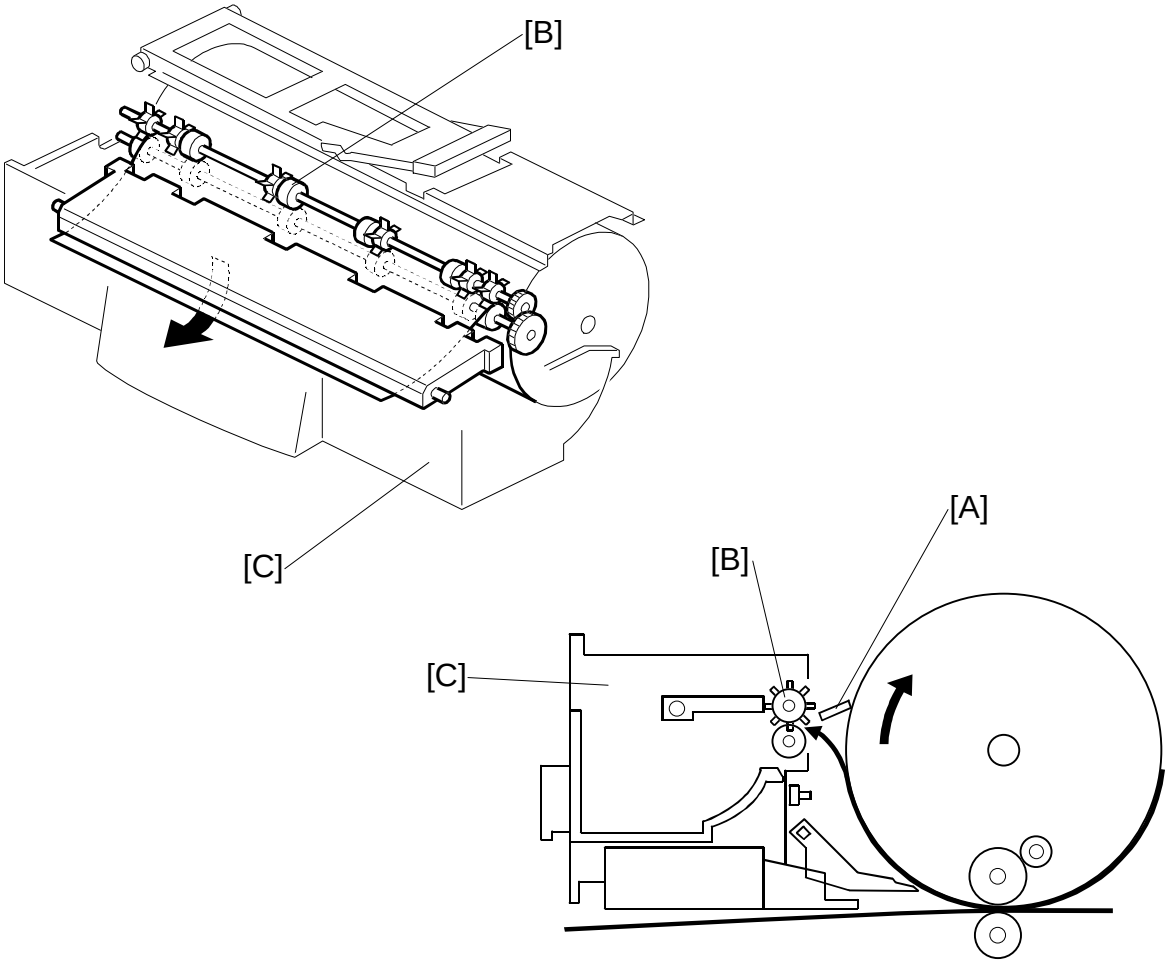


- Other Remarks -

Avoid using the machine under humid conditions. Moisture tends to condense on the thermal head, causing heating element damage.

2.3 MASTER EJECT

2.3.1 OVERALL



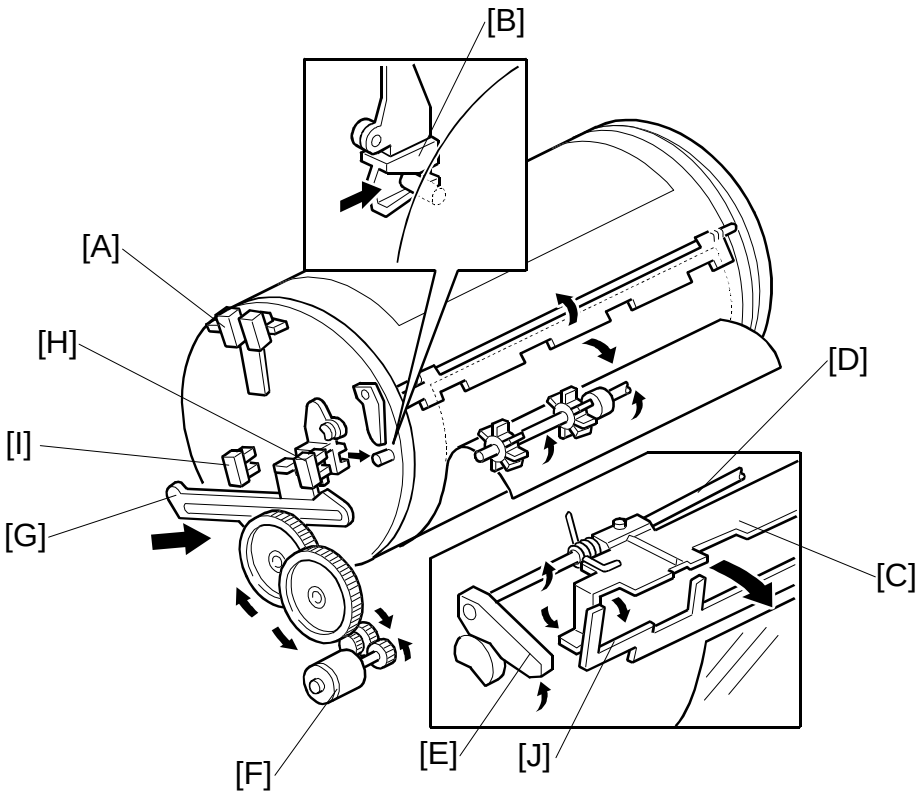
At the end of the printing cycle, the used master remains wrapped around the drum to prevent the ink on the drum surface from drying. When the Master Making key is pressed to make a new master, the used master is removed from the drum.

The machine ensures that the drum is at the master eject position and a master is on the drum by checking the drum master sensor. The master clamper [A] then opens to eject the master. If there is no master on the drum, the machine skips the master eject operation and proceeds to the master making process.

The master eject rollers [B] turn for 0.6 seconds and pick up the master's leading edge. After closing the master clamper, the drum starts rotating at the slowest speed (30 rpm). At the same time the master eject rollers turn to feed the used master into the master eject box [C].

When the drum stops at the master feed position after one and a half turns, the pressure plate drive motor starts turning to compress the used master into the master eject box.

2.3.2 MASTER CLAMPER OPEN MECHANISM



The master eject position sensor [A] ensures that the drum is positioned at the master eject position when the Start key is pressed.

The master clamper has a magnetic plate [C] to secure the master's leading edge in the clamper. The clamper is fixed to the clamper shaft [D], which has a lever [E] at the rear side.

The clamper motor [F] drives the moving link [G] and pushes the clamper lever open [E]. (The link position, the clamper open and close positions, are detected by the clamper open sensor [H] and clamper close sensor [I].)

The master clamper then lifts the master eject arm [J] to release the master's leading edge from the clamper.

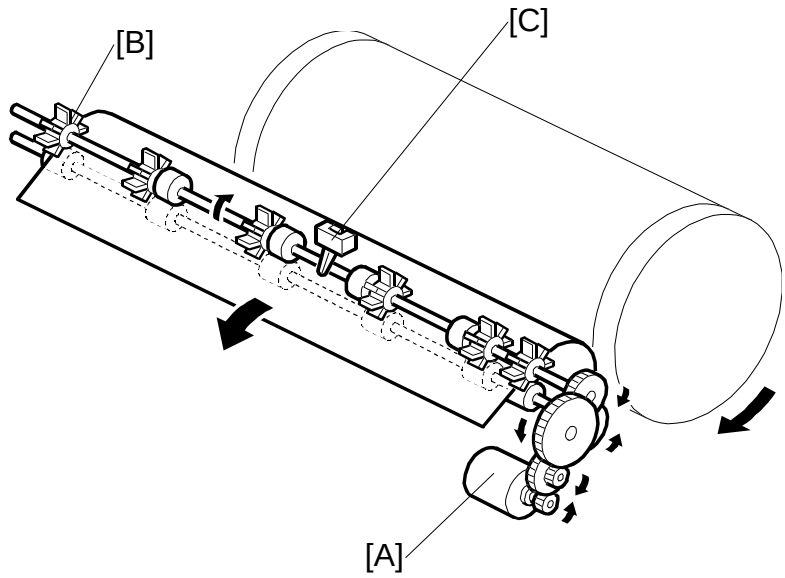
Drum Position Lock Mechanism

When the clamper motor [F] opens the clamper at the master eject position, the drum guide [B] moves and engages the pin on the rear flange of the drum.

The drum guide is moved by the same mechanism that drives the moving link [G]. This means that the drum guide captures the drum at the master eject position when the master clamper is being opened.

When the clamper motor turns on again to close the master clamper, the drum guide also disengages the pin and the drum can now turn.

2.3.3 MASTER EJECT ROLLER MECHANISM



The master eject rollers are driven by the master eject motor [A] through idle gears. The upper eject roller [B] has paddles to assure the master pick-up.

When the master clamper is opened and the master's leading edge is released from the master clamper, the master eject motor turns on for 0.6 seconds to pick up the leading edge of the master.

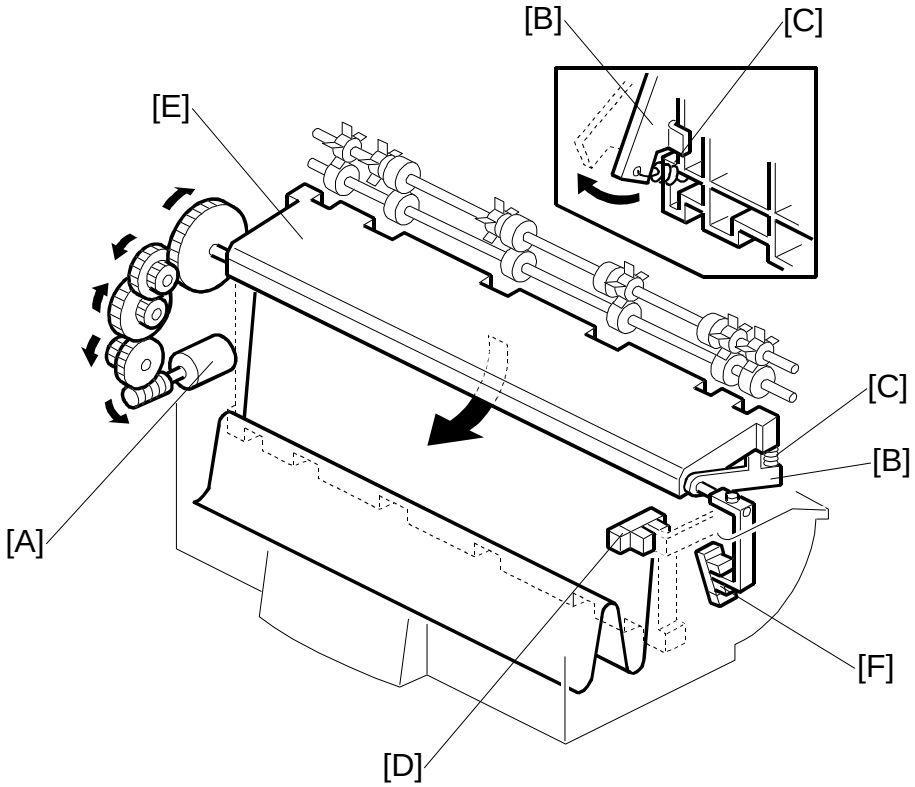
When the master eject motor is turned off, the clamper motor reverses to close the master clamper.

The drum then starts turning at the slowest speed (30 rpm). At the same time, the master eject rollers turn again to feed the master into the master eject box.

After one turn of the drum, the master eject motor stops. The drum turns for an additional half turn, stopping 109 encoder pulses after the feed start timing sensor is actuated (this means that the drum is at the master feed position).

The master eject sensor [C] is used to detect master eject jams.

2.3.4 PRESSURE PLATE MECHANISM



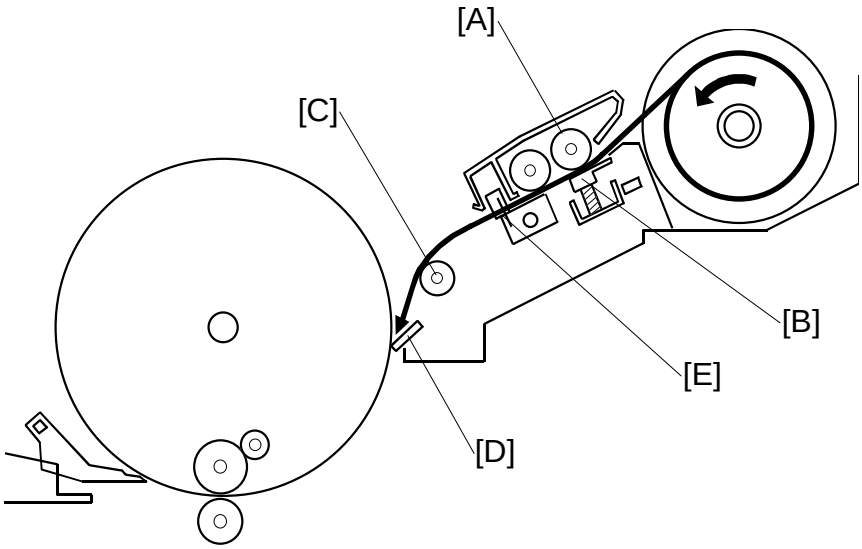
The pressure plate motor [A] drives the pressure plate through the drive arm [B] and the pressure springs [C].

When the master has been ejected into the master eject box, the pressure plate motor turns until the actuator on the pressure plate [E] actuates the pressure plate limit sensor [D]. When the limit sensor is actuated, the motor stops. When master making and cutting are completed, the motor turns in the reverse direction to return the pressure plate to the home position. When the pressure plate home position sensor [F] is actuated, the motor stops.

If the pressure plate limit sensor is not actuated within 2.8 seconds after the pressure plate motor is activated, the machine determines that the eject box is full and that the pressure plate cannot travel any more. In this case, the machine determines that the complete master has been fed into the box and stops the motor (after returning the pressure plate to the home position). The Empty Master Eject Box indicator lights when the drum returns to the home position at the end of the next master making process.

2.4 MASTER FEED

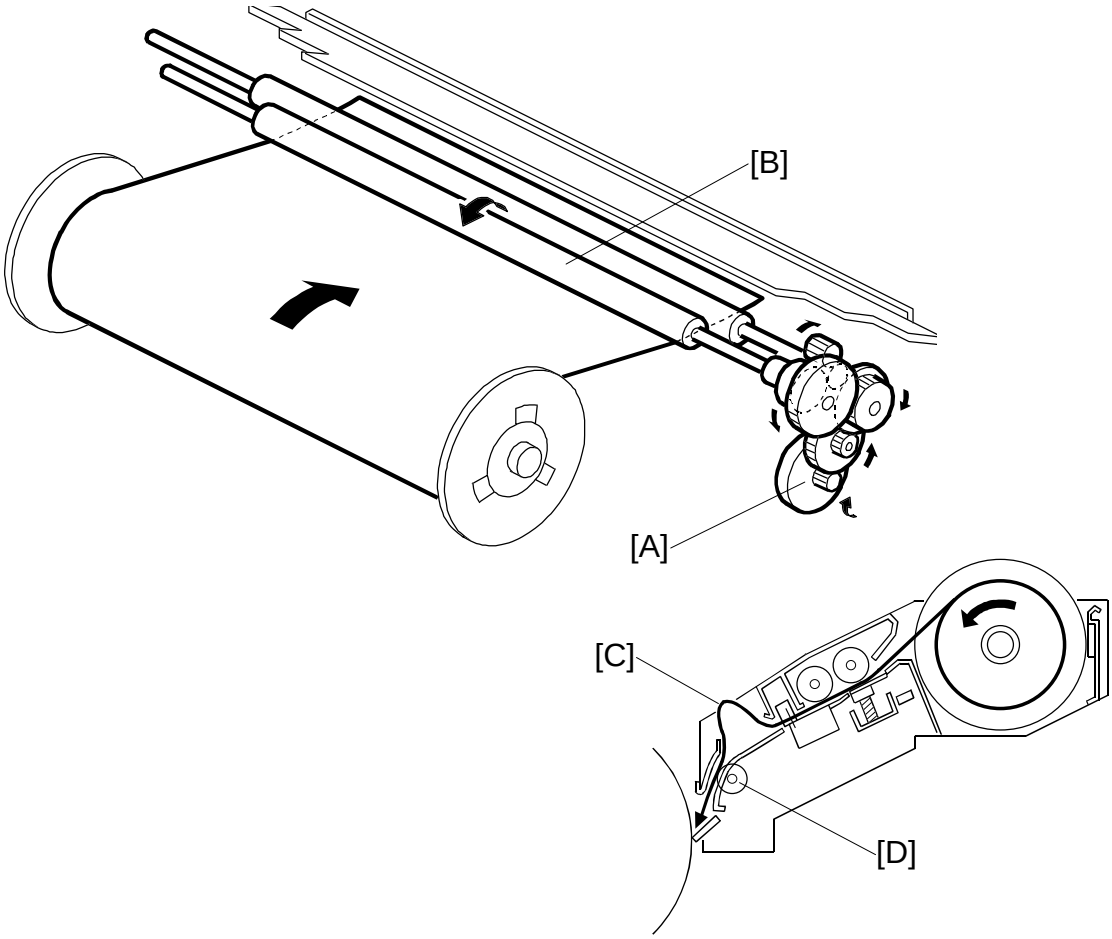
2.4.1 OVERALL



The master is fed by the platen roller [A] while the thermal head [B] develops the image on it. When the drum is at the master feed position and the master clamper is opened, the tension roller [C] is moved away by the master clamper so that the master's leading edge can be fed to the master clamper [D]. The leading edge of the master is clamped by the master clamper, and the master is wrapped around the drum and cut by the cutter [E] to the desired length.

This model uses a new master setting mechanism. This eliminates need for the operator to manually cut the master, unlike the other models.

2.4.2 MASTER FEED MECHANISM



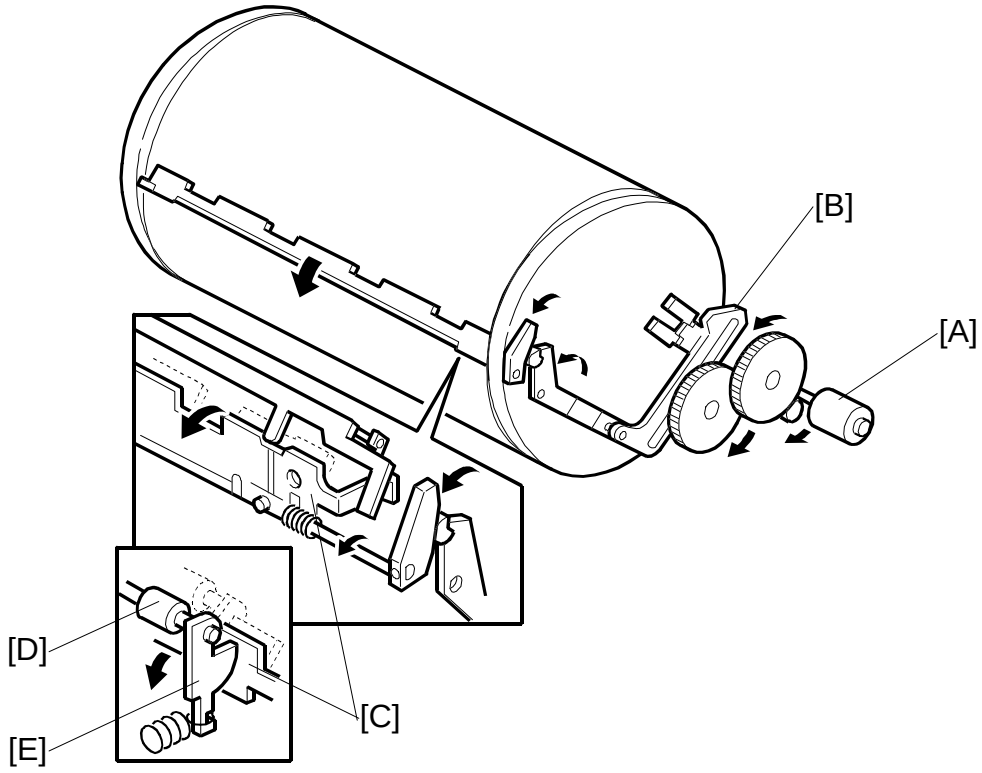
A stepper motor (the master feed motor [A]) drives the platen roller [B]. The thermal head is pressed against the platen roller by the pressure springs. The pressure is applied when the master set cover, which includes the platen roller, is closed.

After the master is ejected, the drum stops at the master feed position and the master clamper opens, ready to clamp the new master.

The leading edge of the master is stopped on the guide plate after the last master cutting operation or after a new master roll has been installed. The master is then fed for 52.4 mm and stopped briefly to synchronize with original feed. The master is fed for a further 67.5 mm before the master clamper is closed. Since the clamper closes after the master's leading edge reaches the clamper, a buckle [C] is made in the master above the master feed guide. This buckle absorbs the shocks from the master clamping operation.

The drum then turns intermittently in the slowest mode (30 rpm) to wrap the master around the drum. The intermittent rotation keeps a buckle in the master above the master feed guide to absorb shocks from the wrapping operation. The tension roller [D] is pressed against the guide plate to keep the master under tension during the master wrapping operation.

2.4.3 MASTER CLAMPER OPERATION AND TENSION ROLLER RELEASE MECHANISM



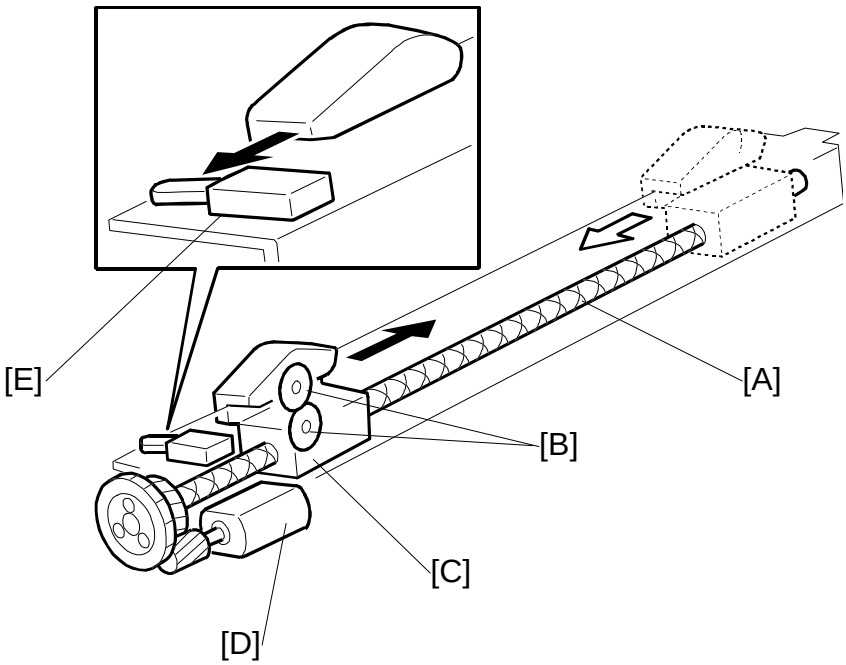
After the master has been ejected, the drum is stopped at the master feed position. At this time, the clamper motor [A] drives the moving link [B] to open the master clamper [C].

The tension roller [D] is normally pressed against the master feed guide plate to apply tension to the master during the master wrapping operation. When the clamper opens, the clamper pushes the tension roller arms [E] and moves the tension roller away from the guide plate to allow the master to be fed into the master clamper.

To close the master clamper, the clamper motor reverses.

NOTE: The clamper open and close sensors identifies the link [B] position. Refer to the Master Eject section for details.

2.4.4 CUTTER MECHANISM



After the master making process finishes, the master feed motor turns off and the cutter starts running to cut the master to the desired length.

The cutter motor [D] drives the screw shaft [A], moving the cutter holder [C] backwards and forwards.

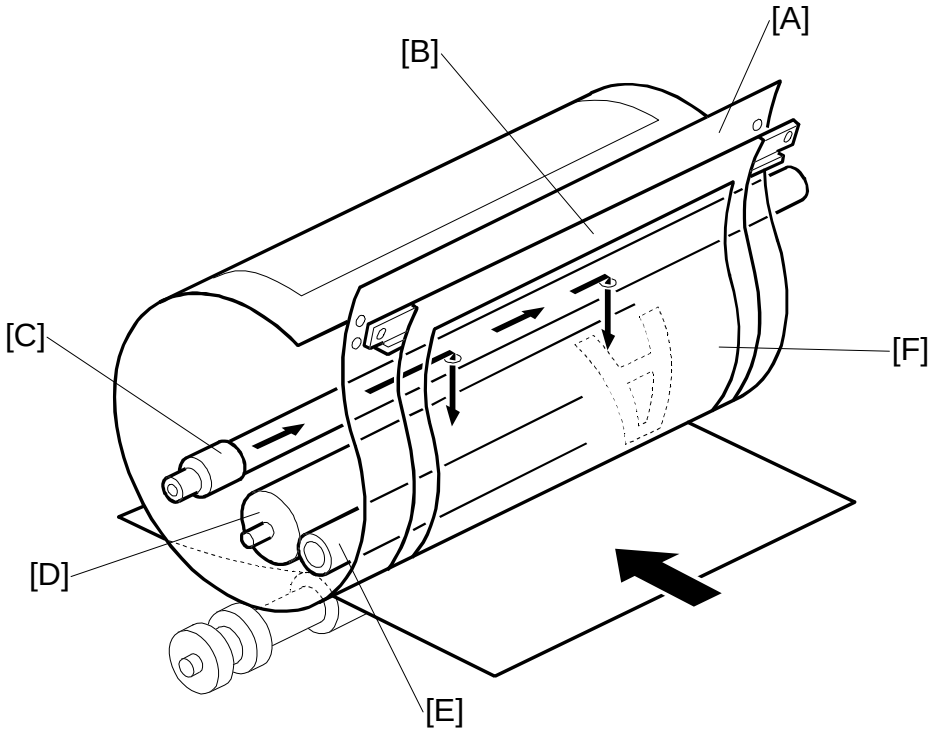
There are two cutter blades [B] in the holder. The master is cut while the cutter holder [C] travels towards the rear (the non-operation side of the machine). The cuter motor keeps turning in one direction. The cutter holder returns to the home position when it reaches the rear end of the cutter unit and reverses direction because of the two different spirals threaded on the screw shaft [A].

When the cutter holder reaches the home position, the holder activates the cutter home position sensor (switch) [E] and the motor stops.

After the master cut operation, the drum starts turning again to wrap the remaining part of the master around the drum. The leading edge of the master that was cut remains at the cutting position, ready to make the next master.

2.5 DRUM

2.5.1 OVERALL

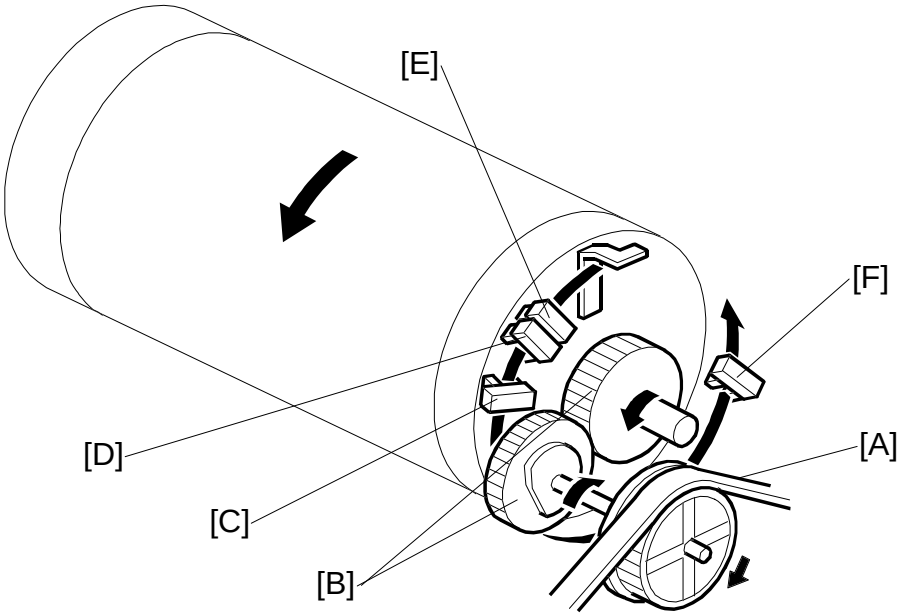


The drum consists of a metal screen [A] and a cloth screen [B].

The ink pump, which is installed inside the drum, supplies ink from the ink cartridge into the drum through the drum shaft [C]. Ink is then evenly spread on the screens by the ink [D] and doctor [E] rollers. Ink passes to the paper through the holes (image) in the master [F], which was made by the thermal head.

The drum is driven by the main motor and turns only clockwise (as viewed from the operator side). The motor speed and the drum stop positions are controlled by monitoring the motor encoder.

2.5.2 DRUM DRIVE MECHANISM



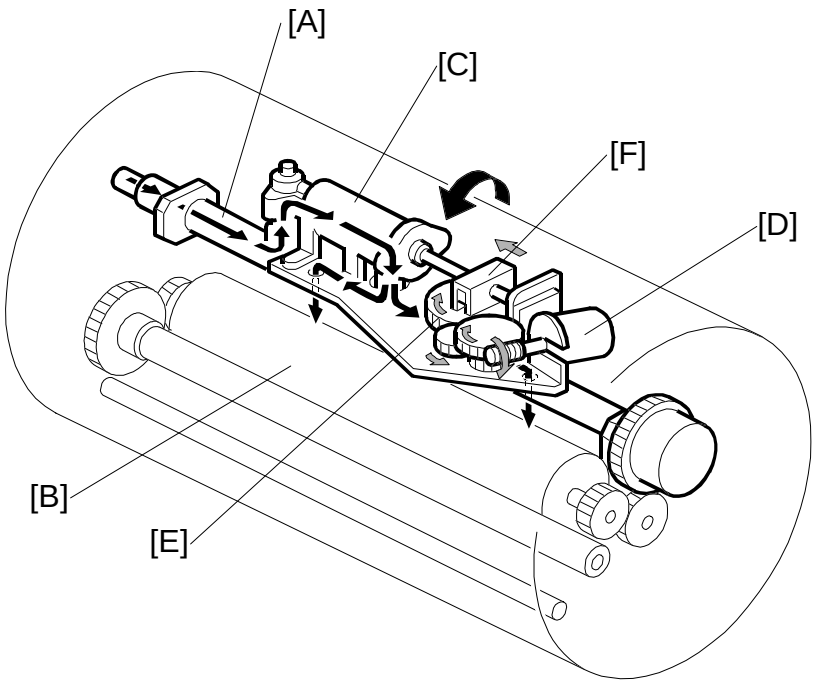
The drum is driven by the main motor (a dc motor) through a timing belt [A] and gears [B]. The main motor has an encoder (not shown) which sends pulses to the main motor control board. The CPU on the board monitors the pulses and controls the drum speed and stop positions.

The drum has two stop positions: the master eject (drum home) position and the master feed position. These stop positions are determined by checking the feed start timing sensor [C]. The CPU starts counting the main motor encoder pulses after the feed start timing sensor is actuated.

When the drum is stopped at the master eject position, the master eject position sensor [D] is actuated. When the master eject operation is started, the CPU confirms that the drum is at the master eject position by checking this sensor.

There are other two sensors that check the drum position. The paper exit timing sensor [E] and 2nd feed timing sensor [F] which are used to send the CPU (on the MPU) the paper jam detection timing signals of the paper exit and the registration area. (The actual jam checking is performed by the paper exit sensor and registration sensor.)

2.5.3 INK SUPPLY MECHANISM

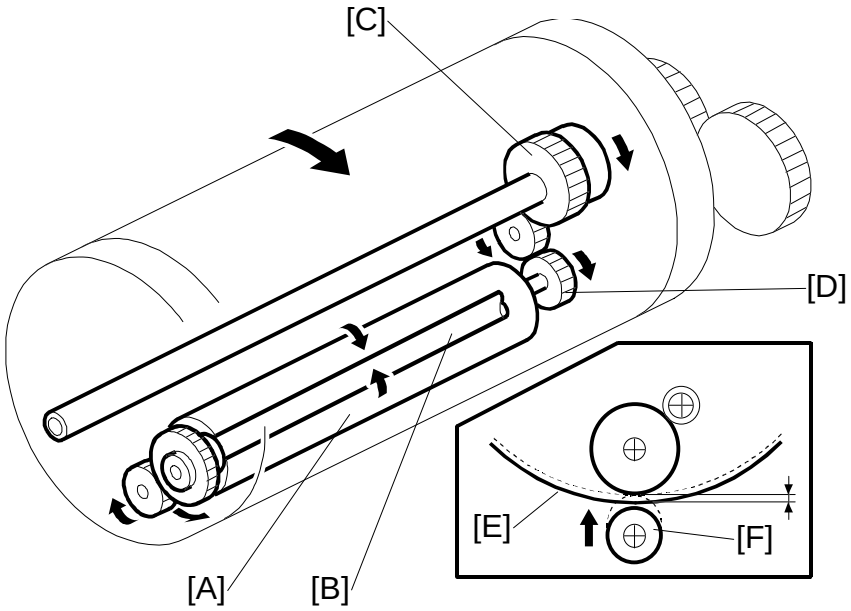


Ink is supplied from the ink cartridge to the ink roller [B] by a pump [C]. The ink pump is driven by the ink supply motor (a dc motor) [D]. There is a pin on the pump drive gear [E] which is coupled with the pin holder [F] on the pump piston shaft. This mechanism converts the gear rotation into a piston motion.

Ink drops through the holes in the drum shaft [A] and onto the ink roller [B].

NOTE: There are 4 holes in the shaft for the B4 size drum models, and two holes for the Legal and A4 drum versions.

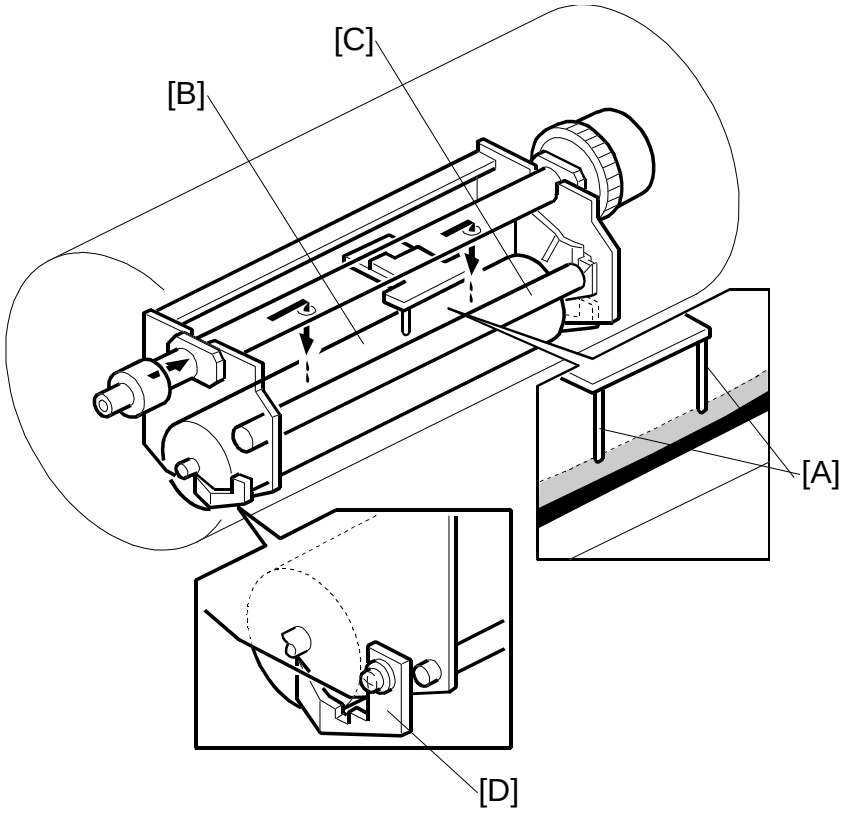
2.5.4 INK ROLLER MECHANISM



The ink roller [A] and the doctor roller [B] are driven by the gear [C] on the drum shaft. Ink on the ink roller is squeezed by the doctor roller to produce an even thickness of ink across the ink roller surface. The ink roller drive gear [D] has a one-way clutch to prevent the ink roller from being turned in the reverse direction when the drum is manually turned in the reverse direction.

The ink roller does not touch the screen [E] when the machine is not printing. However, during the printing process, the ink on the ink roller is applied to the paper through the holes in the screens and the master. This happens when the press roller [F] located underneath the drum moves upward to press the paper, the drum screens and the master against the ink roller.

2.5.5 INK SUPPLY CONTROL



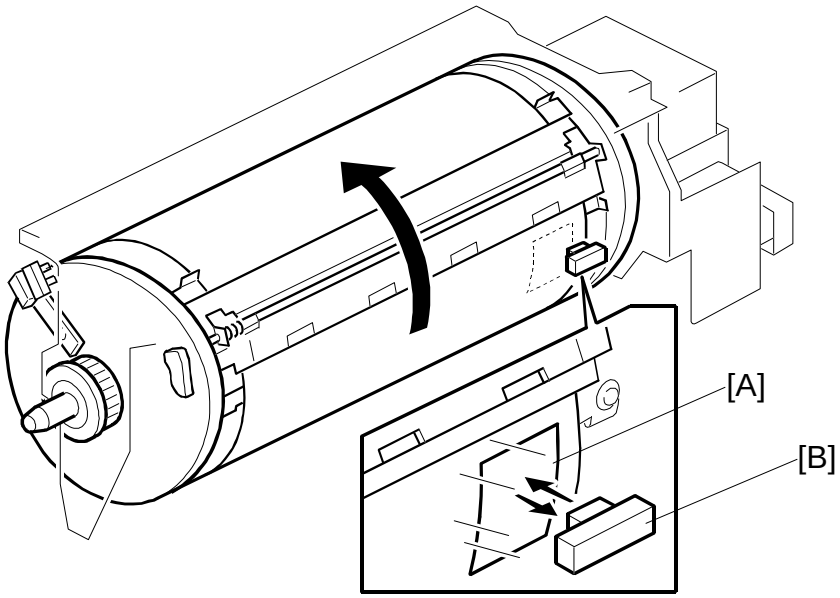
The ink detecting pins [A] work like the electrode of a capacitor and detect the capacitance between the detection pins and the ink [B] located on top of the doctor [C] roller. The capacitance is different when the ink level is high and the pins touch ink, compared to when the ink level is low and the pins do not touch ink. By detecting the capacitance, the ink supply motor is controlled to keep the ink level constant.

If the pins detect an insufficient amount of ink after activating the ink pump motor for 40 seconds, a "no ink condition" is detected. The add ink indicator on the operation panel will light.

NOTE: There is an ink supply mode, which is useful when installing a new drum. When the “Economy Mode” key is pressed while holding down the “0” key, the drum turns 40 rotations, to supply ink inside the drum.

The ink roller blades [D] located on both ends of the ink roller are used to scrape off the built-up ink on the ends of the ink roller.

2.5.6 DETECTION OF MASTERS ON THE DRUM



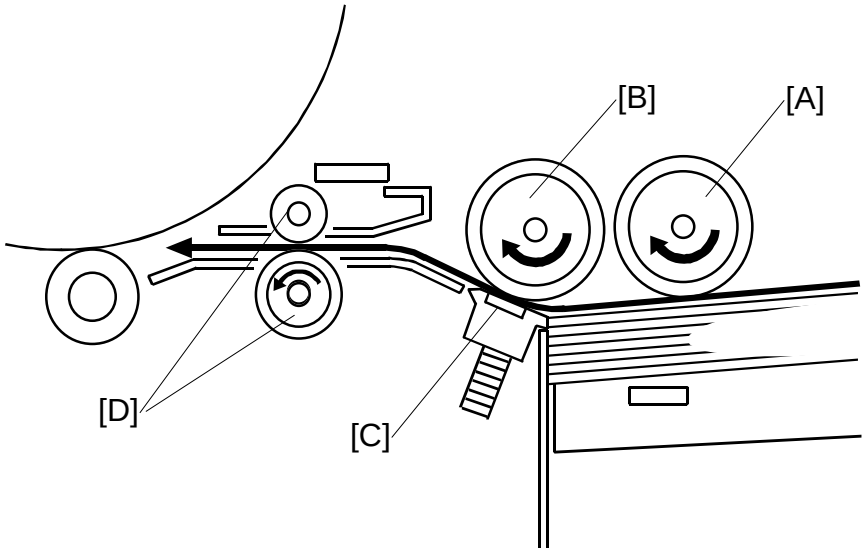
The drum master sensor [B] detects whether a master is on the drum.

When there is a master on the drum, the black patch [A] is covered and the sensor detects the light reflected from the master. Printing starts when the start key is pressed. (If a new original is set, the master ejecting cycle is performed before making a new master.)

When there is no master on the drum, the black patch [A] is exposed. The black patch does not reflect light back to the sensor. Because of this, the master eject process is skipped when a new master is made.

2.6 PAPER FEED

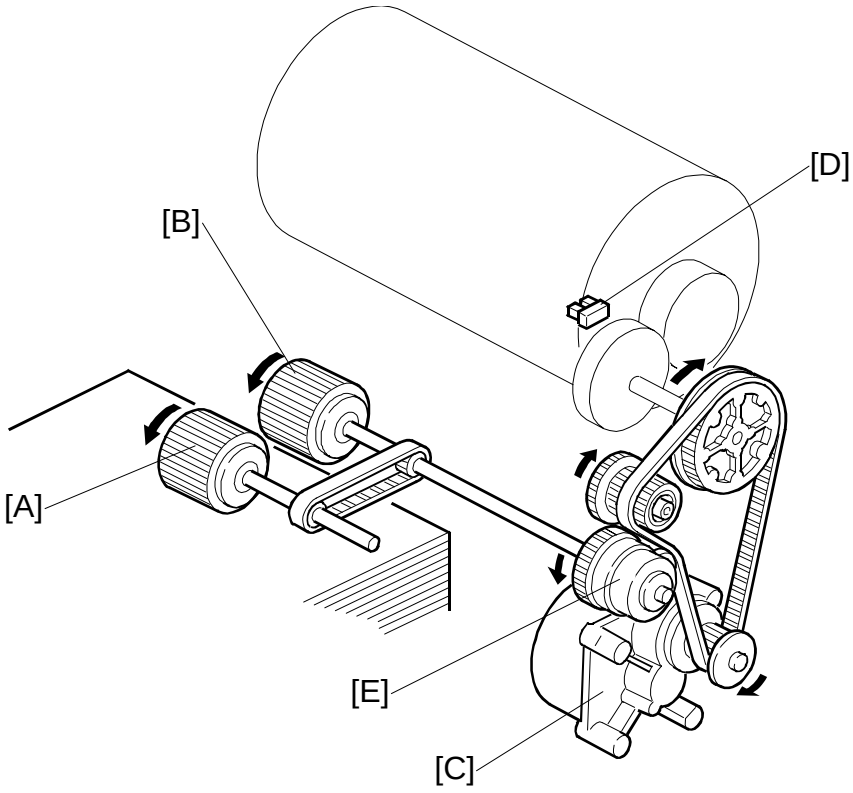
2.6.1 OVERALL



The top sheet of the paper on the paper table is first fed by the pick-up roller [A]. Then, it is separated by the paper feed roller [B] and the friction pad [C], and transported to the registration rollers [D]. The upper and lower registration rollers transport the sheet to the drum.

The paper feed roller is driven by the main motor, and an independent stepper motor is used to control the registration roller. The registration roller synchronizes the paper feed timing with the master on the drum. The registration roller starts rotating after the paper has come into contact with the rollers and has been aligned.

2.6.2 PAPER FEED MECHANISM

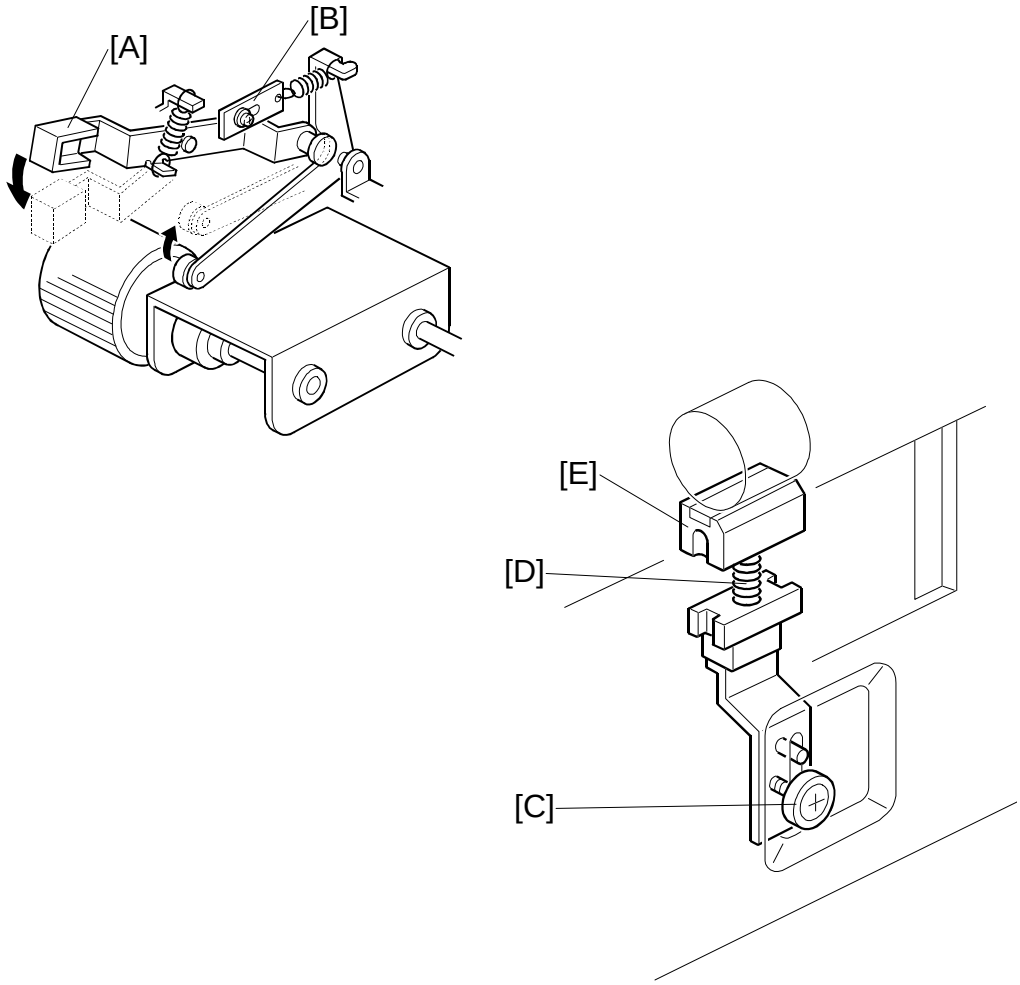


The pick-up roller [A] and paper feed roller [B] are driven by the main motor [C] through gears and a timing belt.

During the printing cycle, when the feed start timing sensor [D] is actuated by the actuator on the drum, the paper feed clutch [E] is energized to transmit the main motor rotation to the paper feed roller shaft. The top sheet of the paper is separated from the paper stack by the friction between the roller and the friction pad (not shown), and is then transported to the registration roller.

A one-way clutch is installed in the paper feed roller so that after the electromagnetic clutch is de-energized, it does not disturb the paper transportation.

2.6.3 PAPER FEED/SEPARATION PRESSURE ADJUSTMENT MECHANISM



The paper feed roller pressure can be changed by the operator by changing the position of the pressure adjustment lever [A]. Normally the lever should be in the lower position. If the thick paper (heavier than 127.9 g/m^2 or 34 lb) is used or paper feed jams frequently occur, the lever should be raised to increase the pressure.

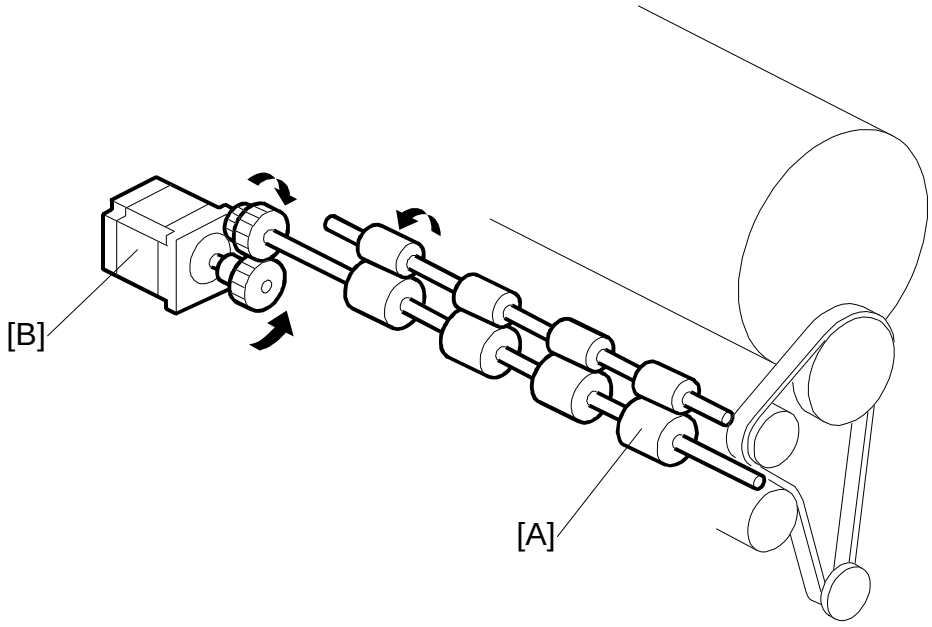
An additional fine adjustment can be done by a technician by changing the position of the feed pressure adjustment plate [B].

If no feed or multi-sheet feed problems still occur, the paper separation pressure can also be adjusted. (This should be done by a technician.)

By loosening then moving the screw [C]up or down, the spring [D], which applies pressure to the friction pad block [E], can be increased or decreased.

NOTE: The default position of the screw [C] is at the lower-most position.

2.6.4 REGISTRATION ROLLER MECHANISM

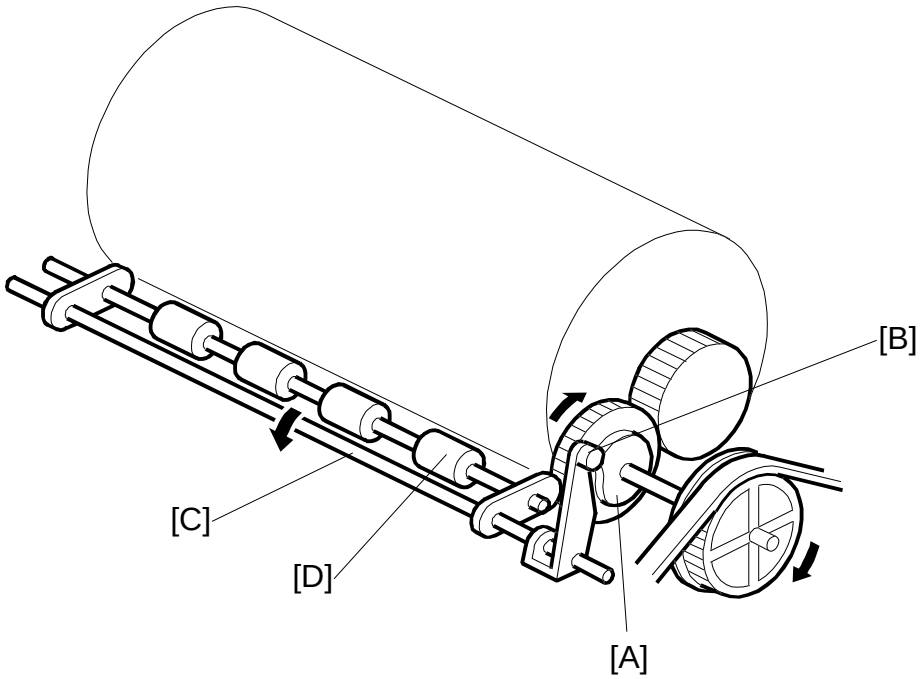


Registration Roller Drive

The lower registration roller [A] is driven by a stepper motor [B] (the registration motor). The CPU controls the registration roller start timing to synchronize the printing paper with the image on the master on the drum.

The stepper motor rotation speed depends on the selected printing speed. By pressing the image position keys on the operation panel, the registration motor start timing is changed.

After the printing paper is caught between the drum and the press roller, the stepper motor stops.

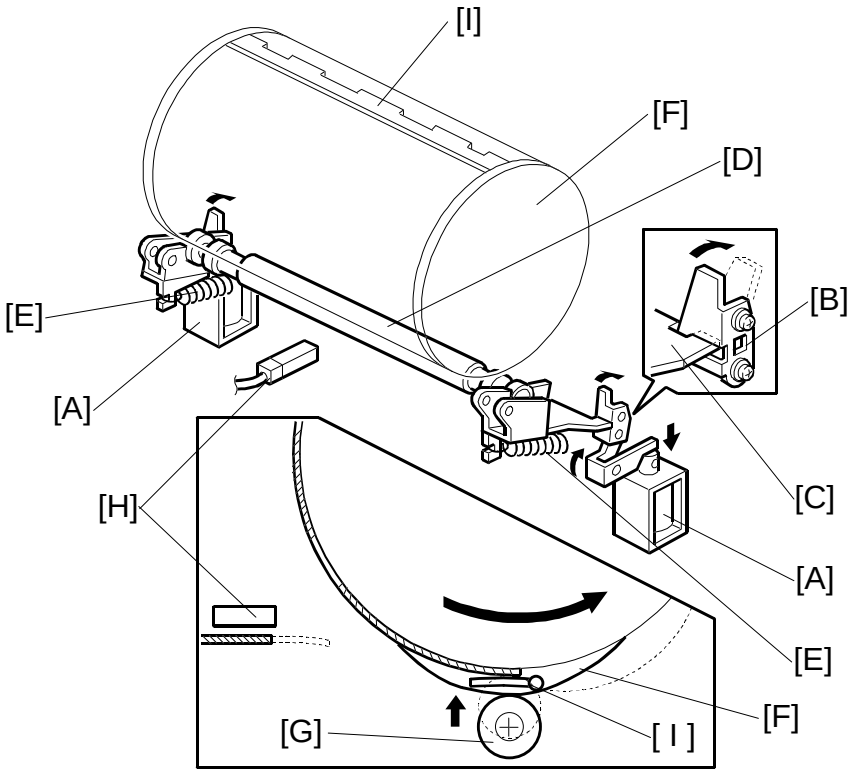


Registration Roller Up/Down Mechanism

After the printing paper is caught between the drum and the press roller, the upper registration roller is released from the lower registration roller. This is to prevent interference from the registration rollers while the paper is transported by the drum and the press roller.

When the high point of the cam [A] on the drum drive gear reaches the cam follower [B], the shaft [C] rotates clockwise (as seen from the operation side) to raise the upper registration roller [D] from the lower registration roller (not shown).

2.6.5 PRINTING PRESSURE MECHANISM



While the machine is not in the printing cycle, the printing pressure release solenoids [A] are off and the stoppers [B] lock the brackets [C] to keep the press roller [D] away from the drum.

When the 1st sheet of paper is fed, the solenoids are energized but the brackets are still locked by the stoppers due to strong tension from the springs [E]. When the high points of the cams [F] on the front and rear drum flanges reach the cam followers [G] on both sides of the press roller shaft, a small clearance is made between the stoppers and the brackets.

There is one solenoid each on the operation side and non-operation side. The two solenoid plungers are pulled down at the same time releasing the stoppers from the brackets. Printing pressure is applied by the tension of the springs when the cam followers are at the high points of the cams.

During the printing cycle, the solenoids stay energized. However, if paper does not reach the registration sensor [H] at the proper time (when the cam follower is on the high point of the cam), the solenoids are de-energized to lock the brackets.

The printing pressure is released when the cams push the cam followers down so that the press roller does not come in contact with the master clamper [I].

After printing is finished, the solenoids are de-energized and the stoppers are returned by the tension of the springs. Before the drum returns to the home position, the brackets are locked by the stoppers again when the cams push the cam followers.

2.6.6 PAPER TABLE MECHANISM

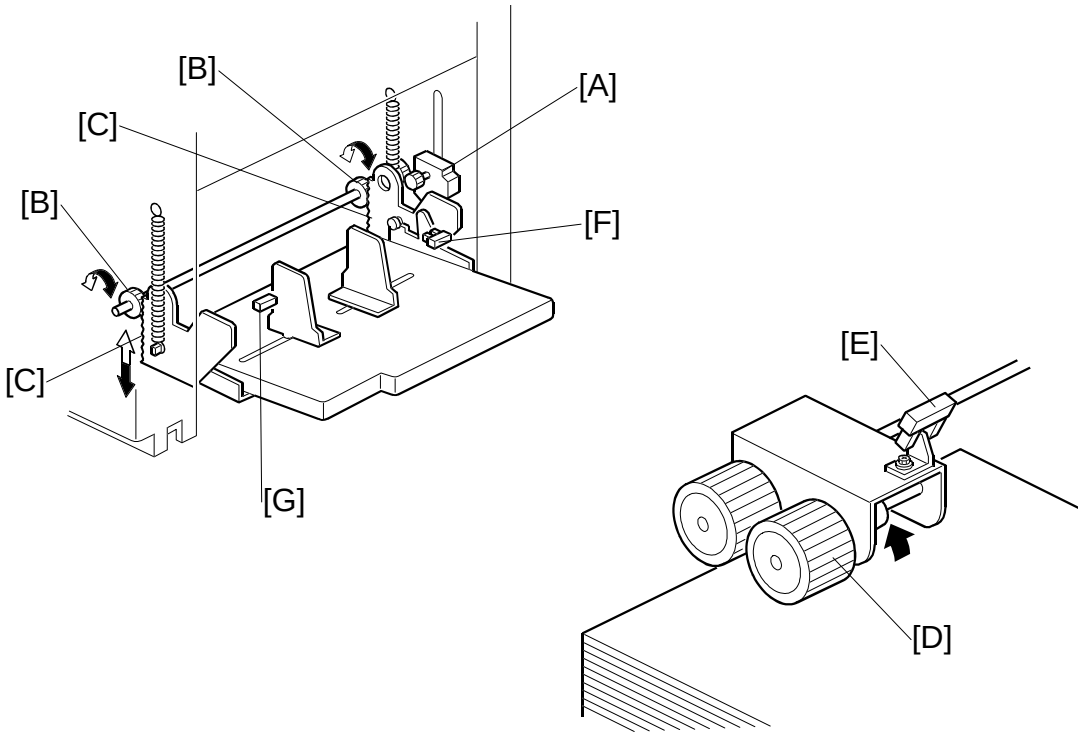


Table Up and Down Mechanism

An independent dc motor, the paper table motor [A], drives the paper table. When the motor turns, the pinions [B] turn on the racks [C], lifting or lowering the paper table.

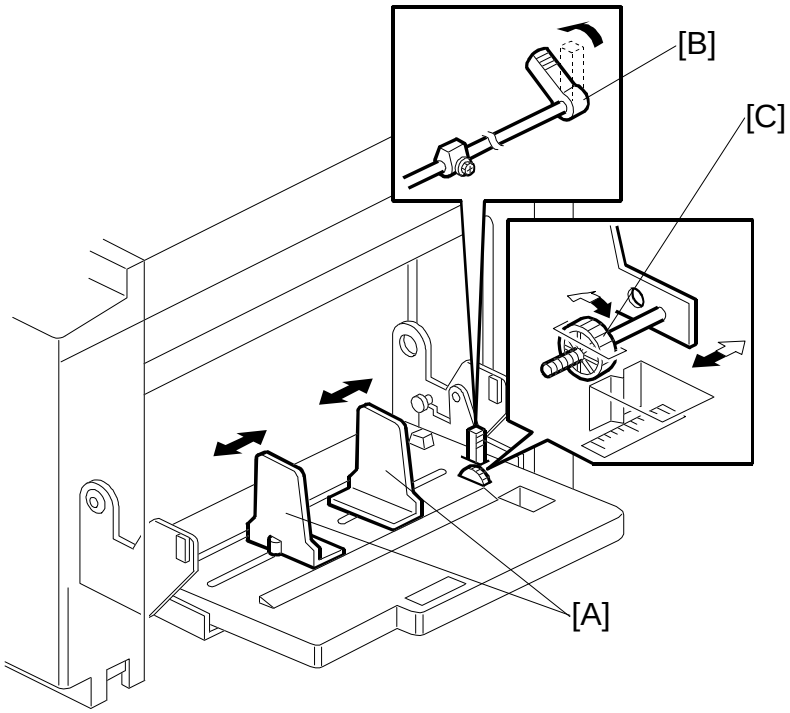
When the paper table moves up, the top of the paper stack contacts the pick-up roller [D], lifting it up. When the paper height sensor [E] is actuated, the paper table stops.

During a printing run, the sheets of the stack are fed, lowering the pick-up roller position. When the paper height sensor is de-actuated, the paper table motor starts turning and raises the paper table until the sensor is actuated again. In this way, the top of the paper stack is kept in position during printing.

When the tray lowers, the lower limit position is detected by the lower limit sensor [F], which is located beside the paper table motor.

Paper End Detection Mechanism

The paper end sensor [G] located under the paper table is used to detect when the paper stack on the table has run out.



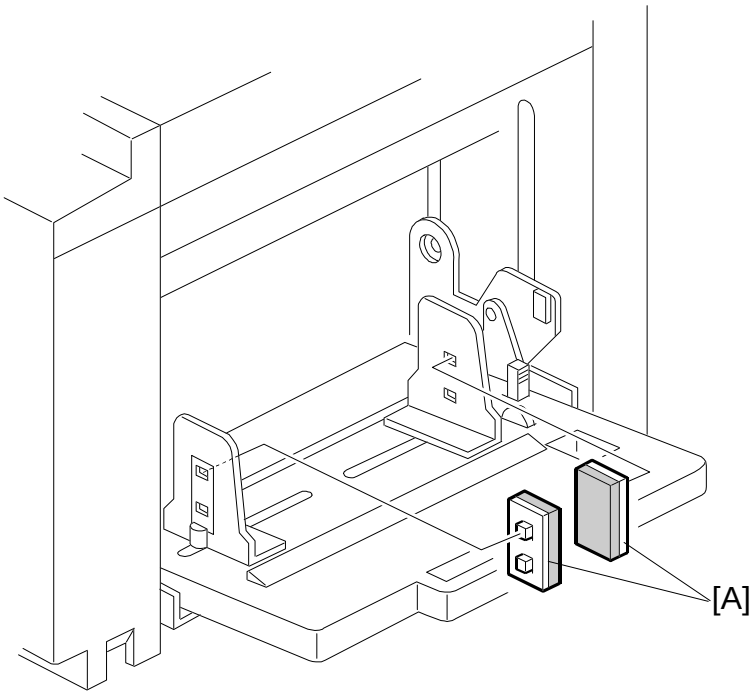
Paper Table Side Fence Mechanism

The left and right side fences [A] move together due to a rack and pinion mechanism. There is a lock lever [B] to hold the side fences in position.

NOTE: The lock lever may be useful if there is no dedicated operator and some of the operators cannot set the side fences properly, causing paper feed problems. Advise the operator to use the lock lever once the paper fences are properly adjusted.

Paper Table Side-to-Side Shift Mechanism

The paper table shifting dial [C] shifts the image on the paper. When the dial is turned, the whole paper table moves towards the front or the rear of the machine.



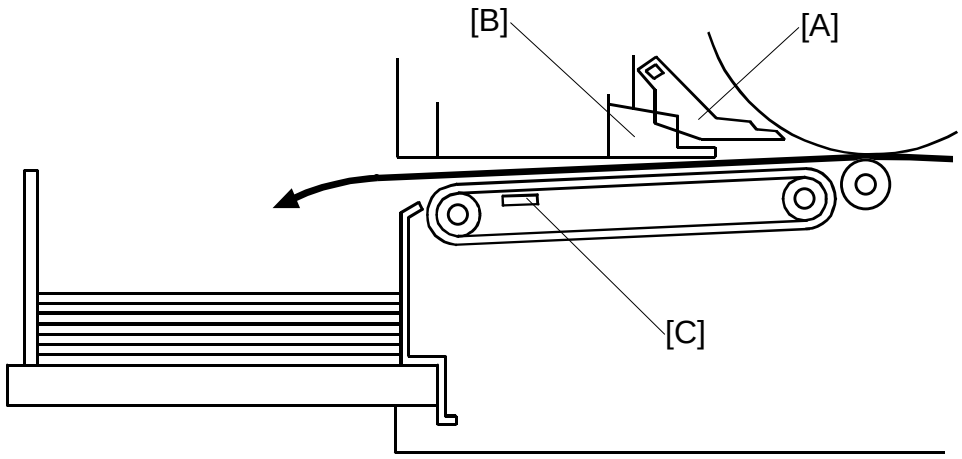
Side Fence Friction Pads

The two side fence friction pads are included as accessories. These are not normally used, but if paper multi-feed frequently occurs, the friction pads [A] can be installed to apply additional stopping pressure to the paper. These are especially useful when thin paper is used.

The user can install the friction pads if they are using thin paper.

2.7 PAPER DELIVERY

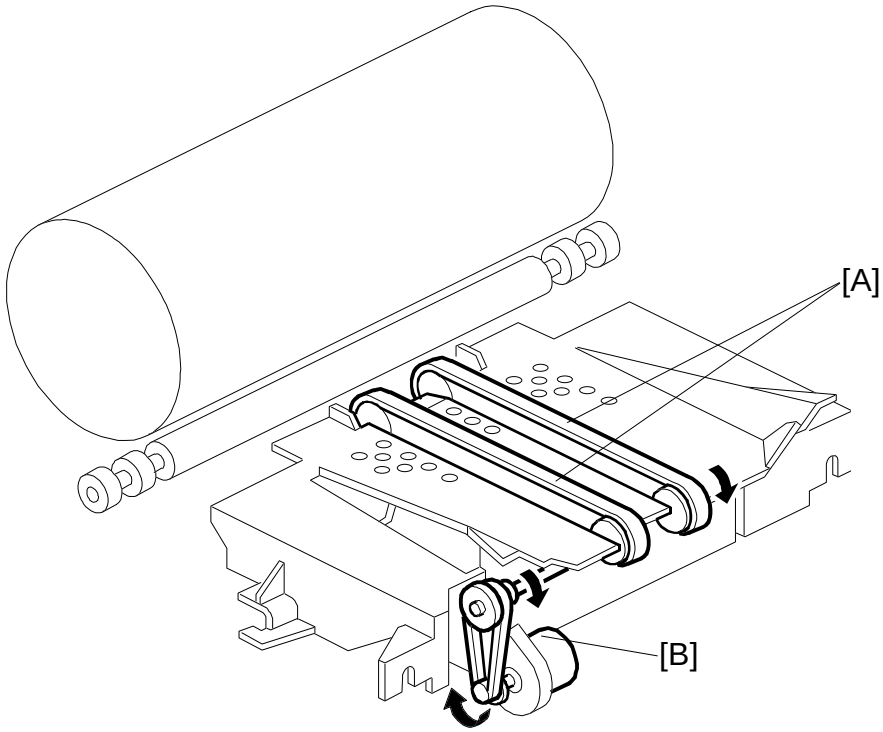
2.7.1 OVERALL



The exit pawl [A] and the air knife [B] separate the paper from the drum. The paper is transported to the delivery table by the delivery unit, which includes rubber belts and a vacuum fan motor.

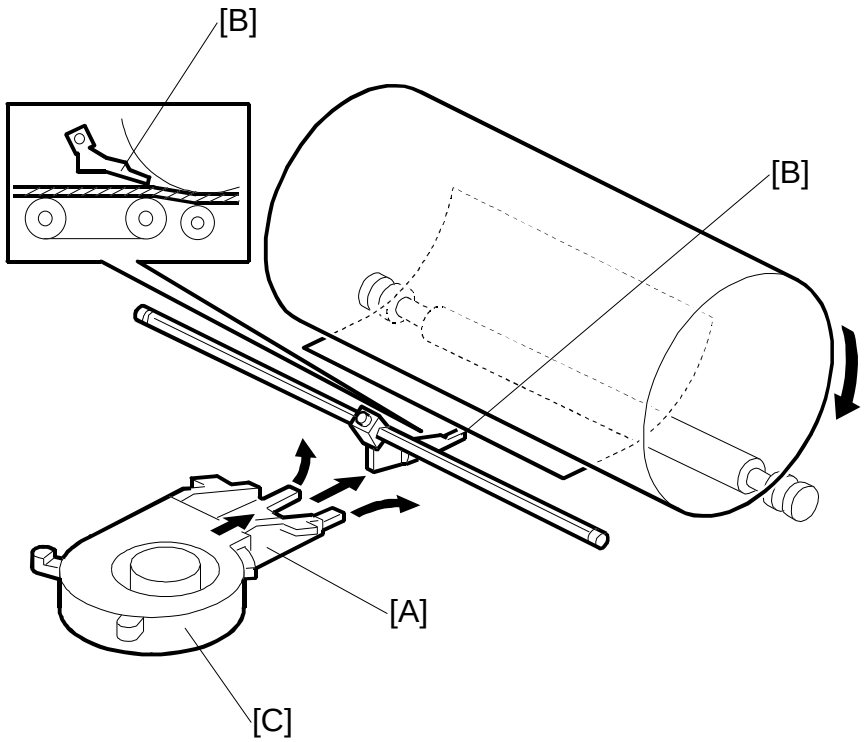
The paper exit sensor [C] (a reflective photosensor) is used to detect paper delivery jams.

2.7.2 PAPER DELIVERY UNIT DRIVE MECHANISM



The vacuum fan inside the unit holds the paper against the transport belts [A] to deliver the paper onto the delivery table. The transport belts are driven by an independent dc motor (the paper delivery motor [B]).

2.7.3 PAPER SEPARATION FROM DRUM

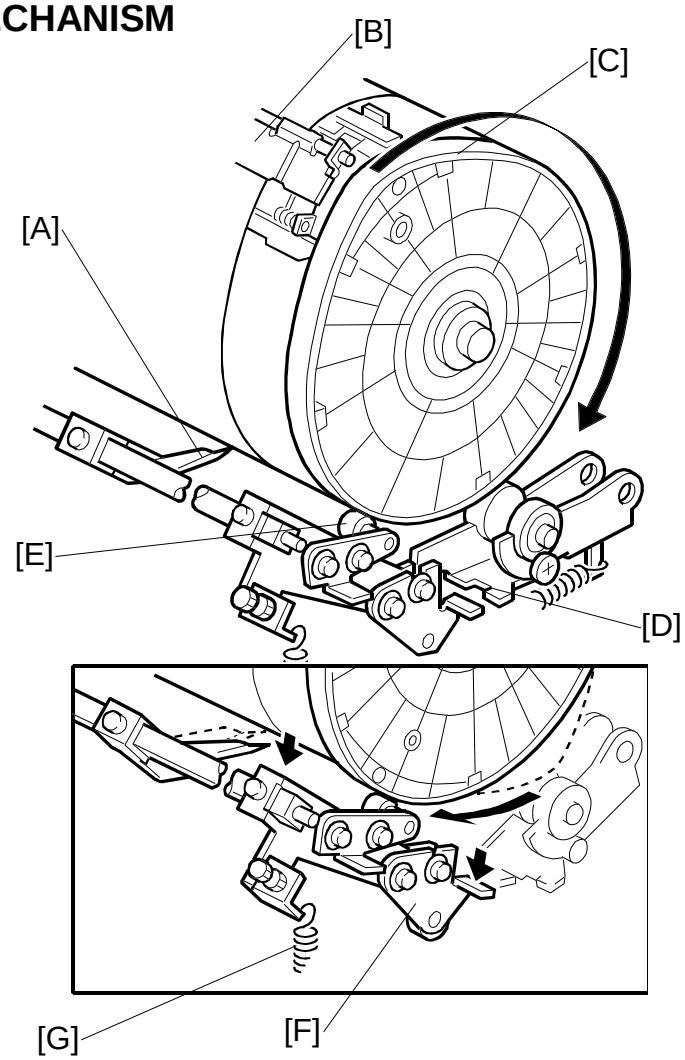


The air from the air knife nozzle [A] separates the paper from the drum.

The exit pawl [B] prevents the paper from being transported upwards and being wrapped around the drum, if the air does not separate the paper properly.

The air knife fan motor [C] starts blowing air when either the print start key is pressed or the master cutting cycle is finished. The paper passes under the exit pawl and is delivered onto the delivery table. The motor air knife stops after the last sheet of paper is fed out.

2.7.4 EXIT PAWL DRIVE MECHANISM

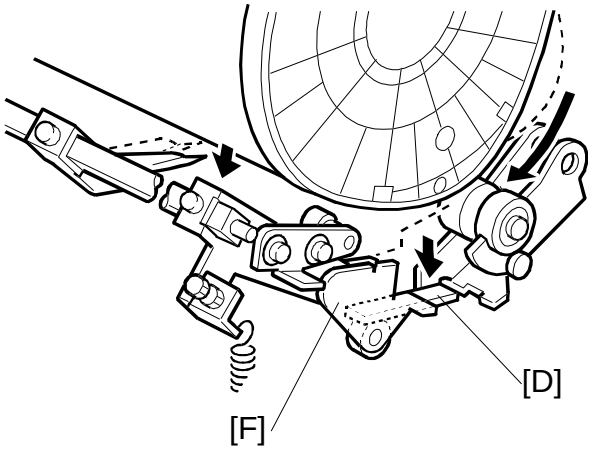


During printing, the distance between the exit pawl [A] and the drum is very small to prevent paper wrap jams. However, when the master clamper [B] approaches the exit pawl (as the drum turns), the pawl has to be moved away from the drum to prevent it from being damaged by the master clamper. This is controlled by the front drum flange [C], which is cam-shaped, and the cam follower [E] on the exit pawl shaft.

When the cam follower is not pushed away by the drum flange, the exit pawl is positioned close to the drum surface, by the tension of spring [G].

As the master clamper approaches the exit pawl, the high point of the drum flange cam [C] moves into contact with the cam follower [E] pushing it down. This moves the cam follower arm [F] downwards. The pawl shaft turns clockwise to move the pawl away from the drum.

When printing finishes and the printing pressure is released, the cam follower arm [F] is engaged by the printing pressure release arm [D] and held in the lower position. Therefore, after printing finishes, the cam follower is out of contact with the cam, and the exit pawl moves away from the drum to its normal position.



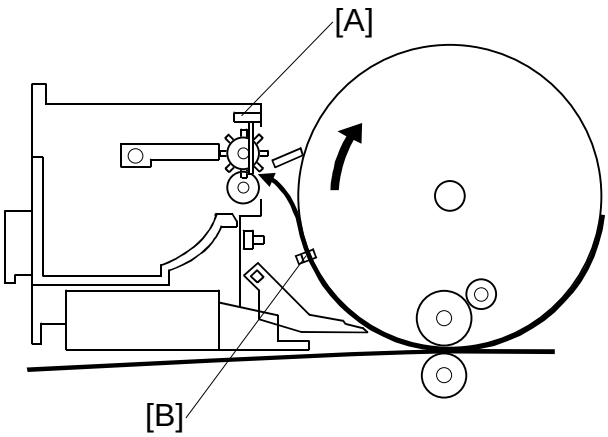
2.8 ERROR DETECTION

2.8.1 ORIGINAL JAM DETECTION

The jam indicator lights if any one of the following conditions occur.

Jam Condition	Description
Non-feed	The scan line sensor does not switch on within 5 seconds after the ADF motor starts.
Misfeed 1	The scan line sensor does not turn off after turning on even when the trial print is made (when the printing pressure sensor is actuated).
Misfeed 2	When the final page of the document has been fed out of the scanner, or when a jammed document has been removed, the ADF motor reverses. The message is displayed if the document sensor stays on at this time.

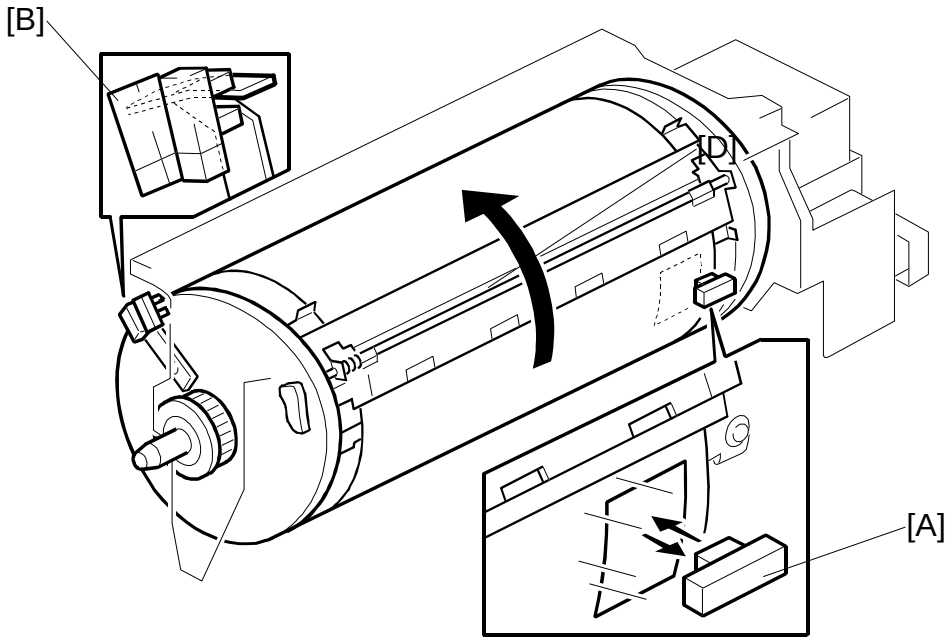
2.8.2 MASTER EJECT JAM DETECTION



The master eject jams are detected by the master eject sensor [A]. The jam indicator will light if any of the following conditions occurs:

1) If the master eject sensor is actuated when the main switch is turned on.
2) If the master eject sensor is not actuated within 0.3 seconds after the drum started turning to feed the master into the master eject box.
3) If the master eject sensor is not actuated when the drum makes a half turn and passes the 2nd feed timing sensor [B]. This happens when the leading edge of the picked up master is pulled back to the drum and the master remains on the drum. (The jam indicator lights after the drum returns to the home position.)
4) If the master eject sensor is actuated when the pressure plate is returned to the home position. This happens when the trailing edge of the master sticks on the pressure plate and is pulled back to the master eject rollers.

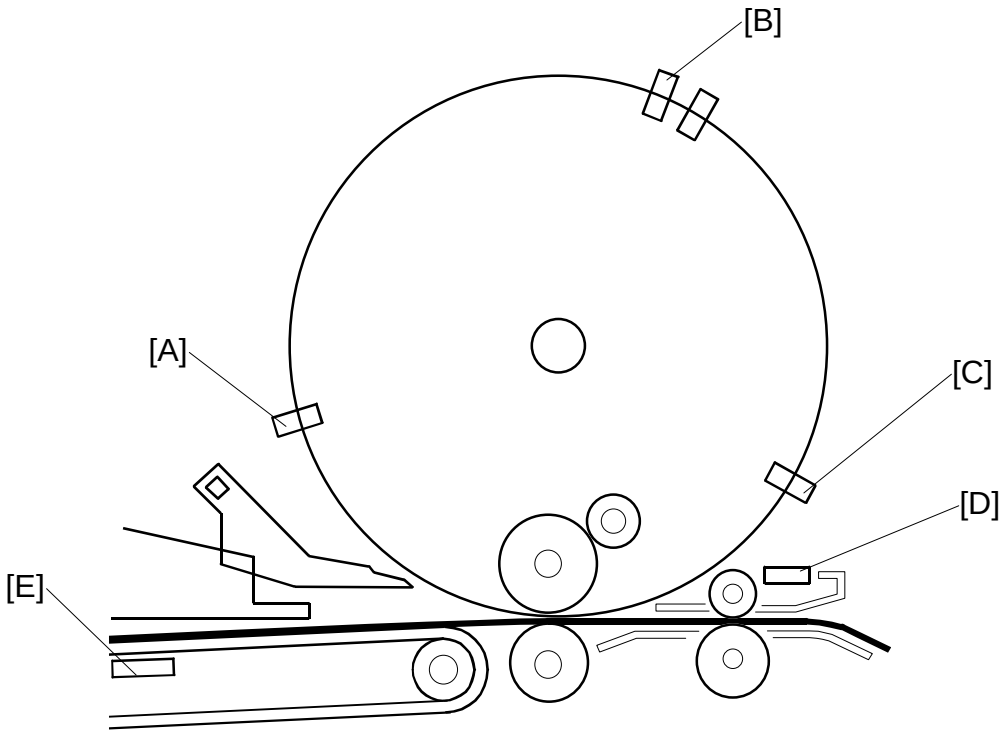
2.8.3 MASTER FEED JAM DETECTION



There is no jam sensor in the master feed path. Master feed jams are detected by the drum master sensor [A], which detects the presence of the master on the drum.

When the drum returns to the home position (i.e. the master eject position) after master making, if the drum master sensor [A] does not detect a master on the drum, the jam indicator on the operation panel will light. (The master eject position sensor [B] is used to identify when the drum is at the home position.)

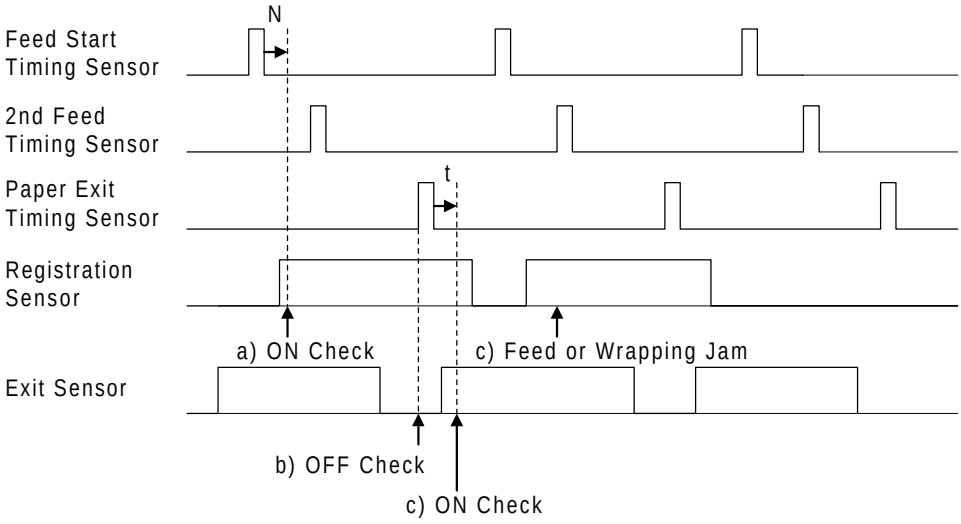
2.8.4 PAPER FEED JAM DETECTION



Paper jams are detected by the registration sensor [D] and the exit sensor [E]. Jam detection timing is determined by the drum position sensors and the main motor encoder (not shown). The 2nd feed timing sensor [A] and the paper exit timing sensor [B] are used as the drum position sensors.

The timing chart on the next page shows the jam detection timing.

ERROR DETECTION



a) When the CPU counts a certain number of main motor encoder pulses (N) after the feed start timing sensor is actuated, if the registration sensor does not detect the paper, the jam indicator lights.

b) When the paper exit timing sensor is actuated, if the exit sensor remains activated, the jam indicator lights.

c) When a certain time (t) (this time depends on the drum speed) has passed after the paper exit timing sensor is actuated, if the exit sensor is not activated, the machine detects a paper jam. If this jam condition is detected, the CPU will stop the next paper from being fed. When the 2nd feed timing sensor is actuated:

1. If the registration sensor is activated, a registration failure is detected.
2. If the registration sensor is not activated, a paper wrap jam is detected.

INSTALLATION

CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

3. INSTALLATION

3.1 INSTALLATION REQUIREMENTS

Carefully select the installation location because environmental conditions greatly affect machine performance.

3.1.1 OPTIMUM ENVIRONMENTAL CONDITION

1. Temperature —10 to 30°C (50 to 86°F)
2. Humidity —20 to 90 % RH 20 to70 % RH (ADF)
3. Install the machine on a strong and level base. The machine must be level within 5 mm (0.2”) both front to rear and left to right.

3.1.2 ENVIRONMENTS TO AVOID

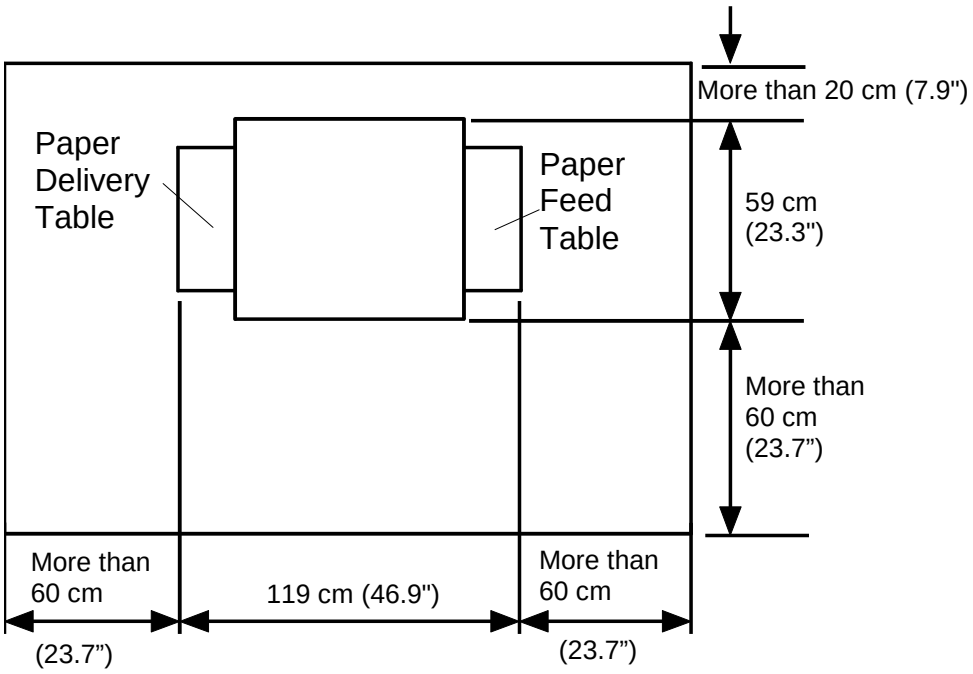
1. Locations exposed to direct sunlight or strong light (more than 1,500 lux).
2. Dusty areas.
3. Areas containing corrosive gases.
4. Locations directly exposed to cool air from an air conditioner or reflected heat from a space heater. (Sudden temperature changes from low to high or vice versa may cause condensation within the machine.)

3.1.3 POWER CONNECTION

1. Securely connect the power cord to a power source.
2. Make sure that the wall outlet is near the machine and easily accessible.
3. Make sure the plug is firmly inserted in the outlet.
4. Voltage must not fluctuate more than 10%.
5. Avoid multi-wiring.
6. Do not pinch the power cord.

3.1.4 ACCESS TO MACHINE:

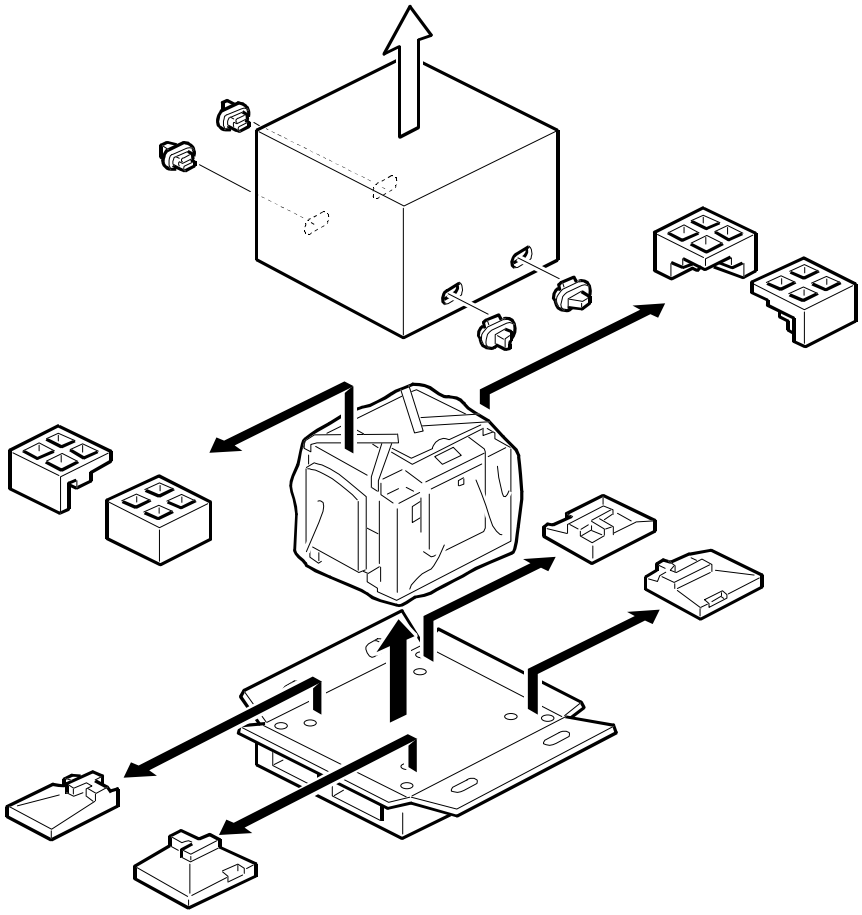
Place the machine near a power source, providing clearance as shown below.



3.2 INSTALLATION PROCEDURE

3.2.1 MAIN BODY

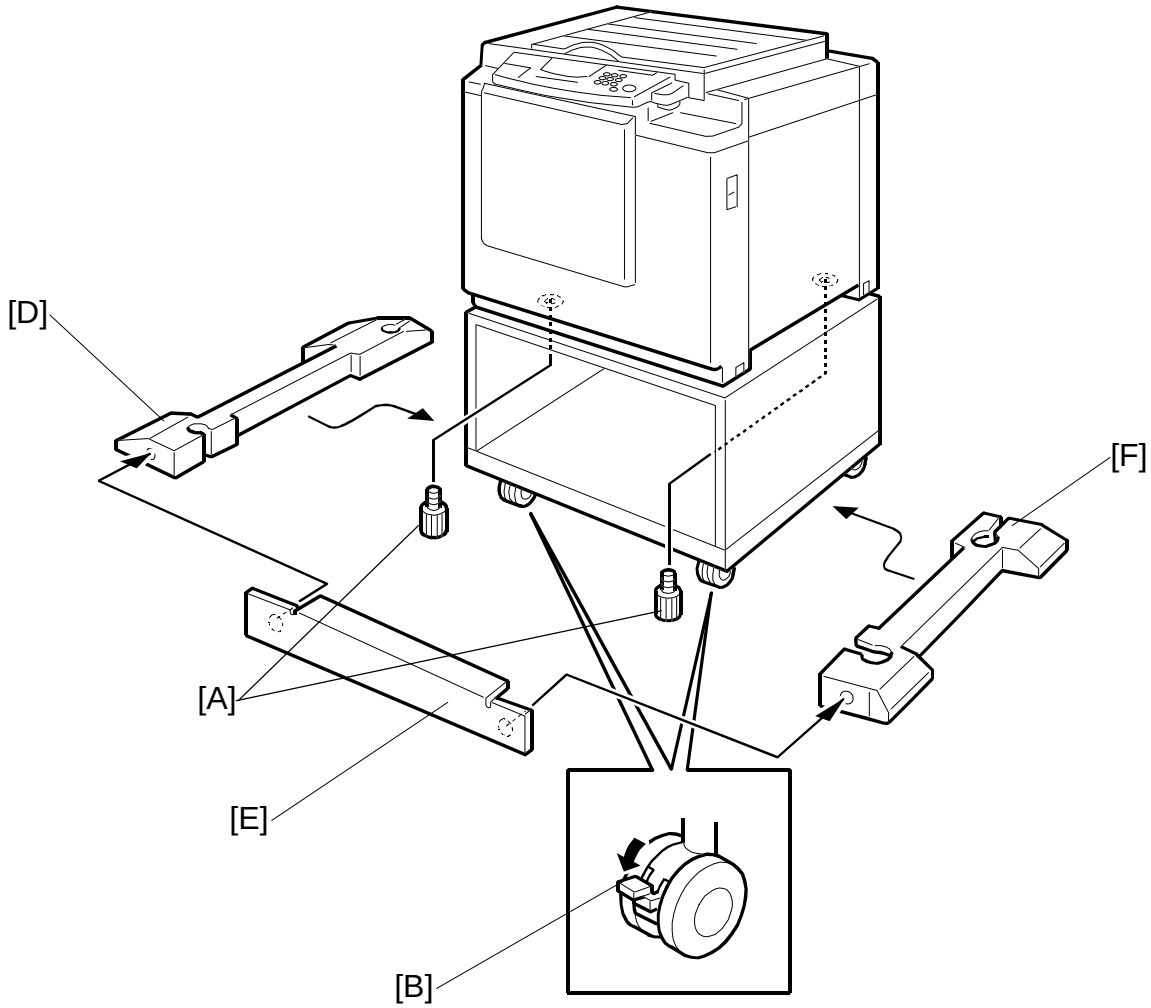
Accessory Check



Make sure that you have all the accessories listed below:

Master Spool..... 2
Paper Feed Side Pad..... 2
Operating Instructions (except the Ricoh European version).. 1
NECR (Ricoh version only) 1
Stabilizer brackets (3 brackets)..... 1 set
Model Name Plates (OEM version only) ..... 1 set

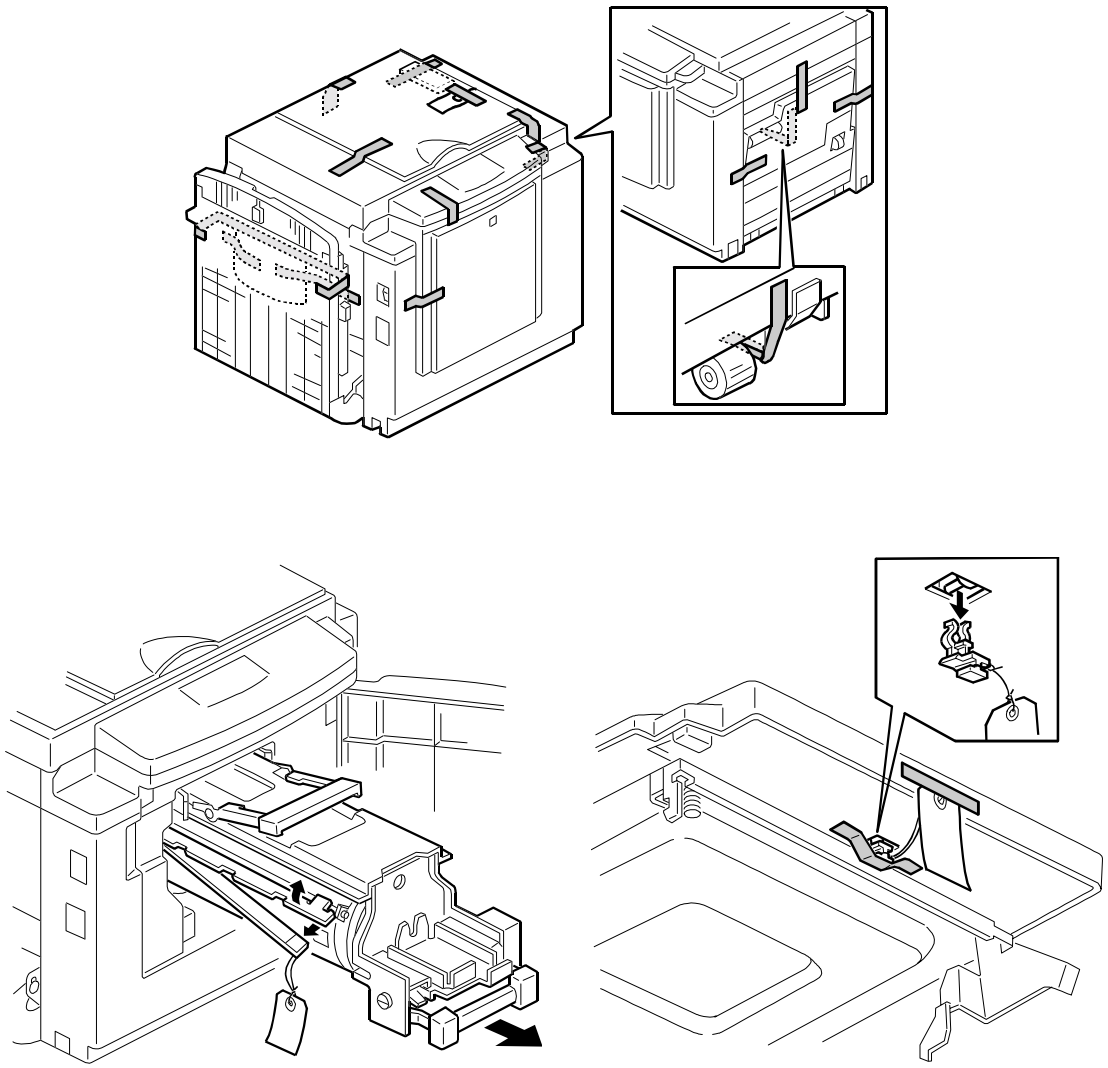
Installation Procedure



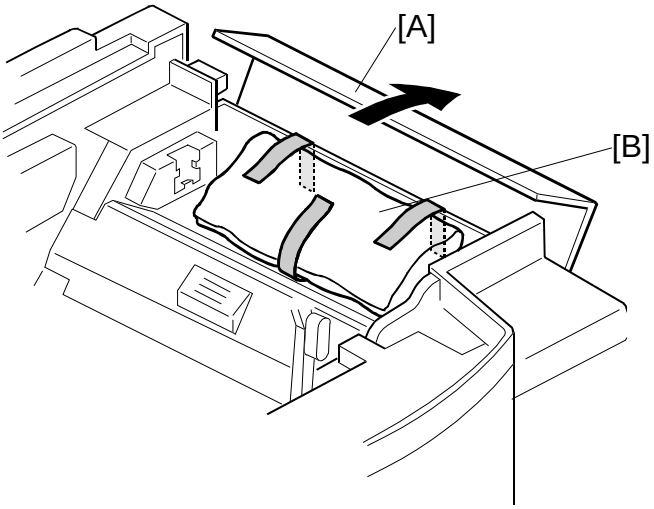
1. Unpack the box. When installing the optional table, mount the machine, as shown (There are 2 screws packed with the table).

⚠CAUTION

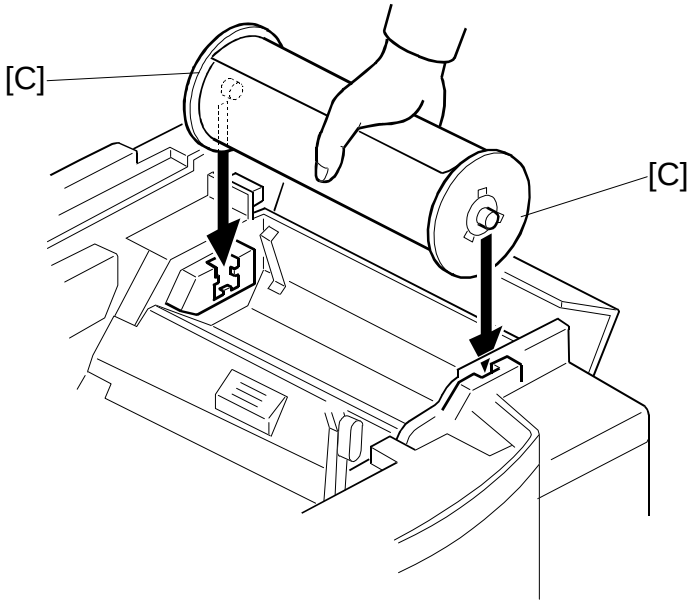
1) Unplug the power cord before starting the following procedure.
2) Only handle the carrying handles on the bottom corners of the machine.
3) Secure the machine on the table with the 2 screws [A] provided. This procedure prevents the machine from falling from the table when the scanner unit is open.
4) Lock the casters of the table as shown [B], to prevent the machine from moving (e.g. when the drum is set).
5) Set the stabilizer brackets [D], and [F] under the optional table and connect 2 stabilizer brackets [D] and [F] by the stabilizer bracket [E].



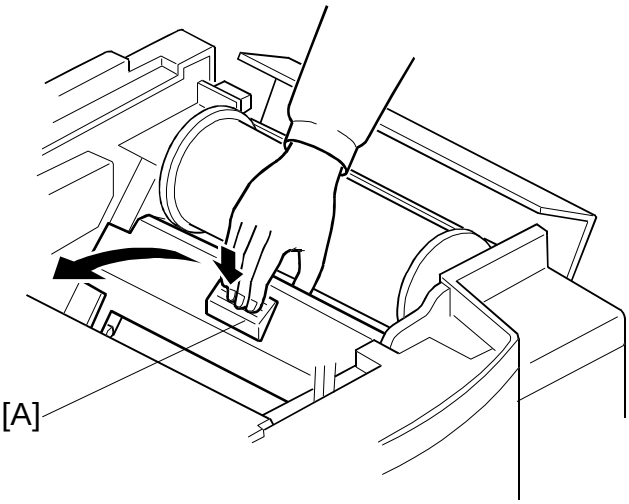
2. Remove the tape and string securing the covers and units as shown above.
3. Open the paper delivery table.



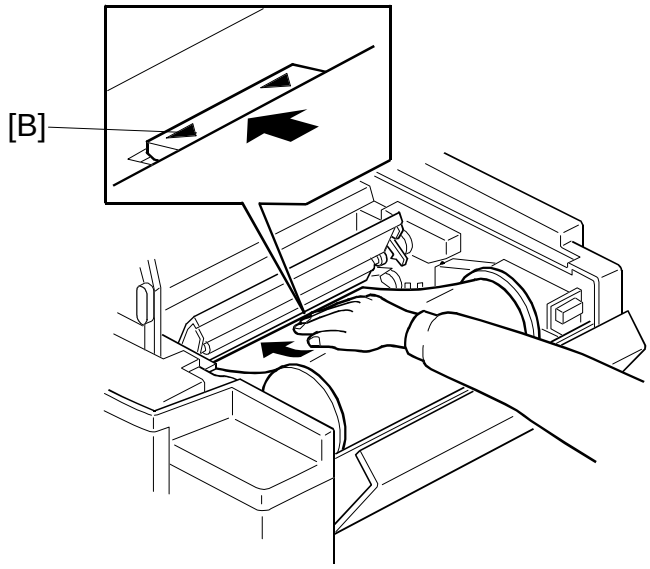
4. Open the scanner unit, then the upper cover [A], and take out the accessory bag [B].



5. Insert both spools [C] into the new master roll.
6. Set the master roll as shown.

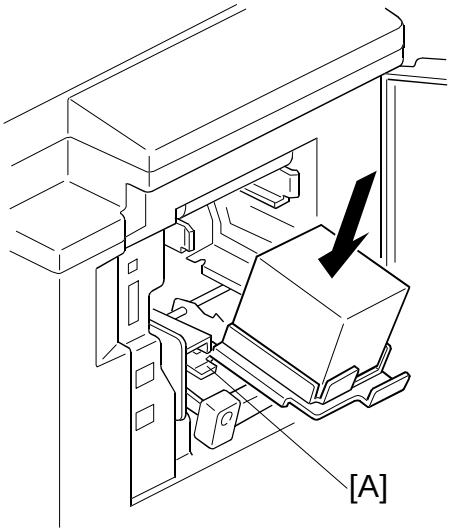


7. Open the platen roller unit by pushing the button [A].



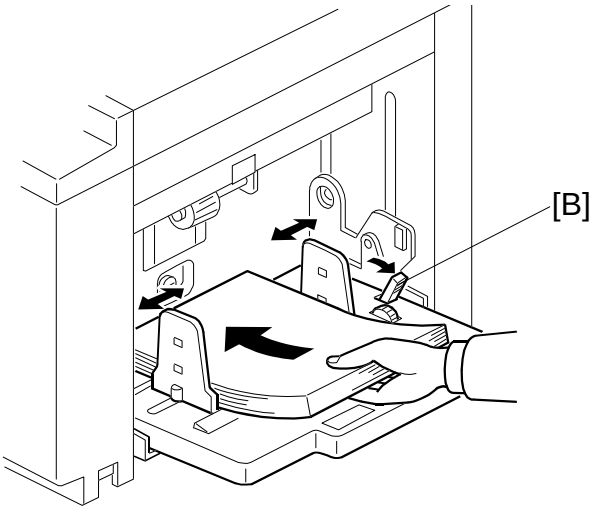
8. Insert the leading edge of the master roll under the platen roller. The arrows [B] indicate the correct position of the master leading edge.
9. Close the platen roller unit.
10. Close the upper cover and scanner unit.

11. Push the ink cartridge release button [A] to slide out the ink cartridge holder.
12. Install the new ink cartridge.



13. Release the side fence lock lever [B], then install the paper.
14. Adjust the side fence positions so that they touch the paper firmly. Engage the side fence lock lever [B].
15. Firmly insert the plug in the wall outlet.

    CAUTION: Make sure that the wall outlet is near the machine and easily accessible.



16. Turn on the main switch.
17. Press the “Economy Mode” key while holding down the “0” key, to supply ink in the drum.
18. Make test copies.

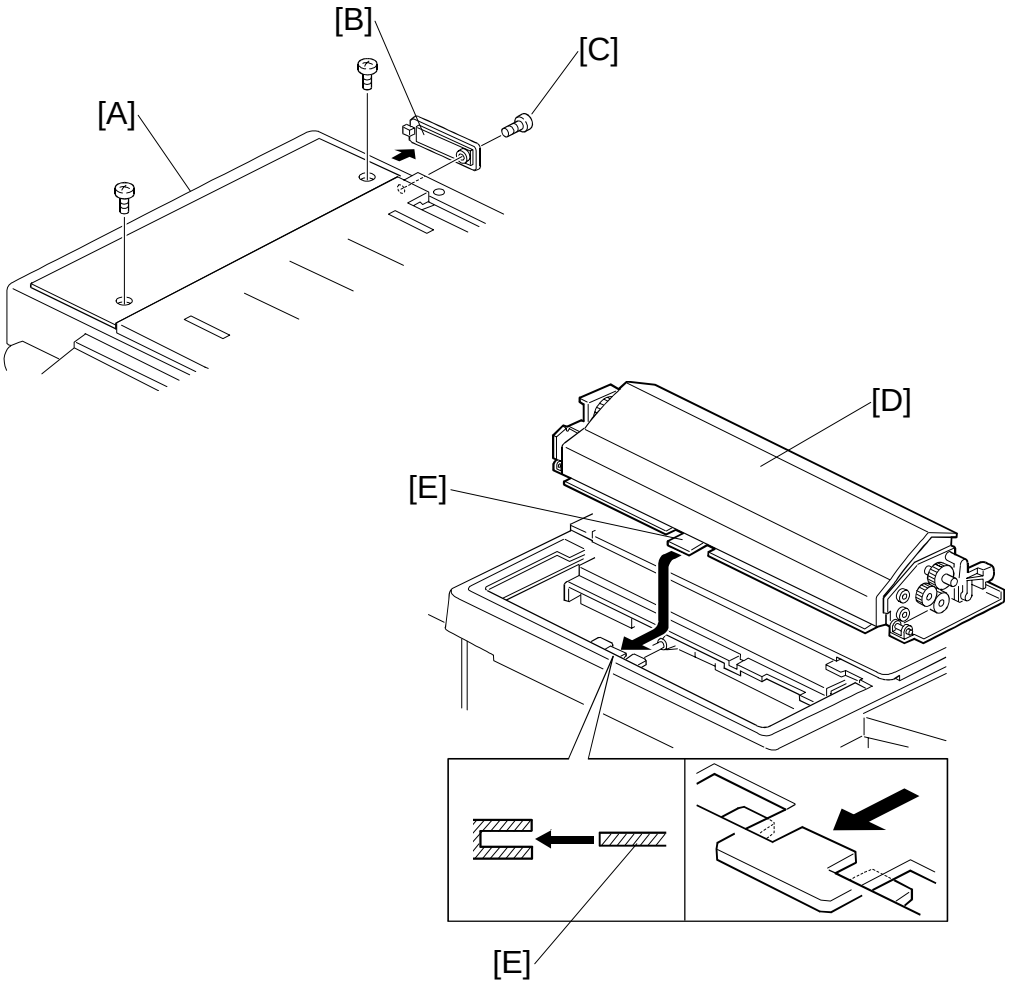
3.2.2 AUTO DOCUMENT FEEDER (OPTION)

Accessory Check

Make sure that you have all the accessories listed below:

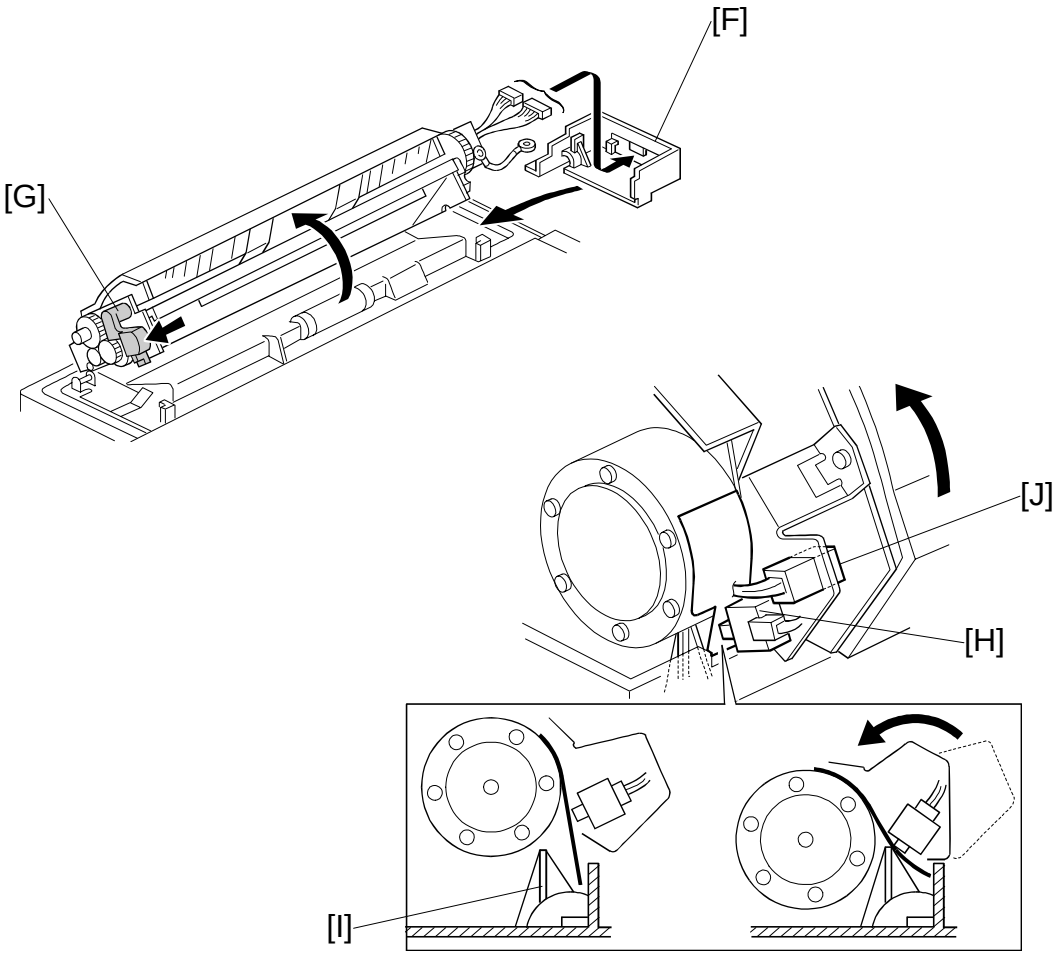
ADF Unit	1
Upper Front Cover	1
Upper Rear Cover	1
Lower Front Cover	1
Lower Rear Cover	1
Connector Cover	1
ADF Roller Assembly	1
Original Table	1
Platen Cover Stopper	1
M3 x 8 Screws (to install the lower front/rear covers)	4
M3 x 6 Sunken Screws (to install the upper front/rear covers)	2

Installation Procedure



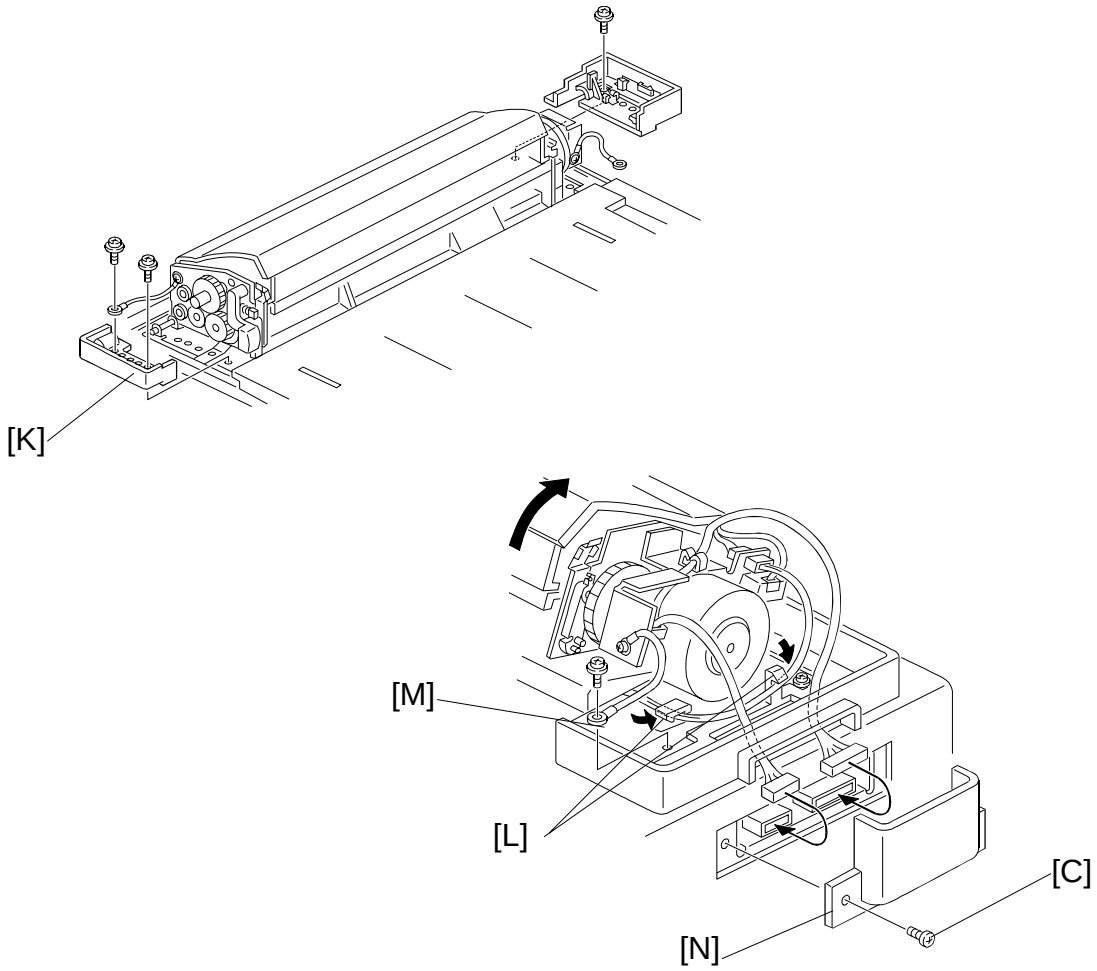
1. Remove the cover [A] (2 screws).
2. Remove the small cover [B] (1 screw). Retain the screw [C] for step 9.
3. Mount the ADF unit [D].

NOTE: When you mount the ADF unit [D] onto the scanner unit, make sure to insert the tab [E] as shown above.

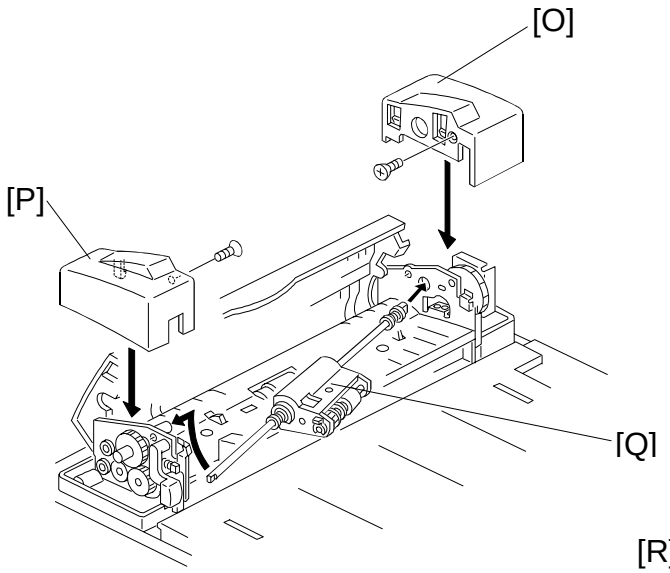


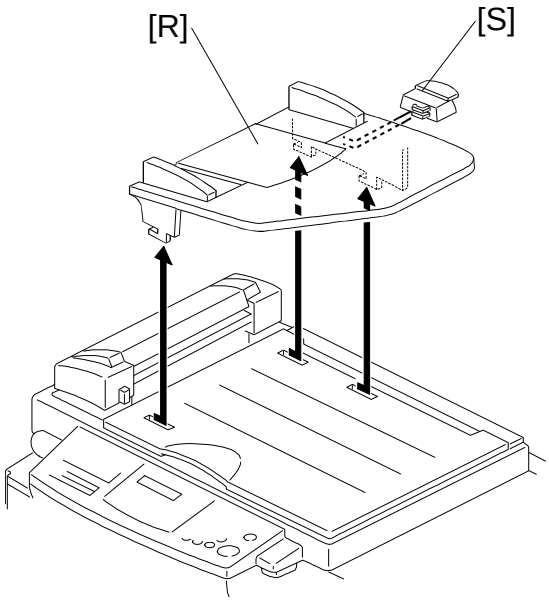
4. Secure the non-operation side of the ADF unit with the ADF lower rear cover [F] (1 screw).

NOTE: 1) When you install the ADF lower rear cover [F], at first you must open the ADF unit (flip it up) by pressing the release lever [G] as shown above.
2) There is a switch [H] to detect whether the ADF unit is closed. Make sure that the switch is properly activated when the ADF unit is closed after installing the ADF lower rear cover [F]. Use care installing the ADF lower rear cover because the rib [I] in the cover may interfere with the movement of the switch.
3) The connector [J] is not used and remains open.



5. Secure the operation side of the ADF unit with the ADF lower front cover [K] (2 screws). Secure the grounding wire as shown.
6. At the non-operation side of the ADF unit, secure the harness with the two clamps [L].
7. Secure the grounding wire [M] (1 screw).
8. Pass the two harnesses through the cutout in the ADF lower rear cover, and then connect the harnesses to the main body.
9. Attach the connector cover [N] with the screw [C] removed in step 2.





10. Attach the ADF upper rear cover [O] (1 sunken screw and 1 hook).
11. Attach the ADF upper front cover [P] (1 sunken screw and 2 hooks).
12. Install the ADF roller assembly [Q].
13. Attach the original table [R], then the platen cover stopper [S].

NOTE: To enable the use of the ADF, access the SP mode and set SP No. 2 to "1". Refer to section 4.4.2.

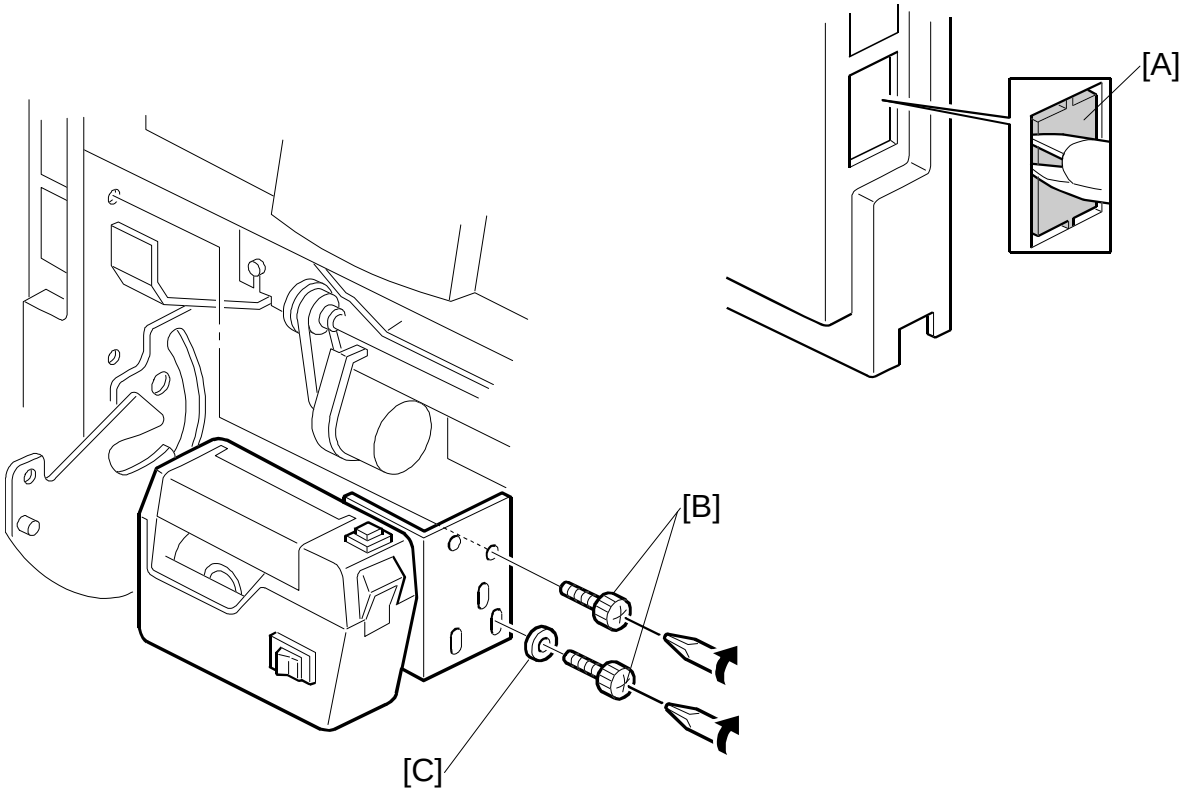
3.2.3 TAPE MARKER (OPTION)

Accessory Check

Check the quantity and condition of the accessories in the box against the following list:

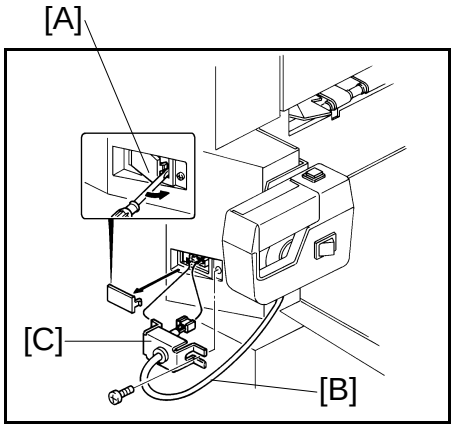
1. Knob Screw (For models #C210, C217, C218, C219, C222, C223, C225, C228 and **C231** only) 2
2. Screw M4 x 25 (For models # C211, C212, C213, C214, C216, C224, and C226 only)..... 2
3. Hexagon Nut M4 (For models # C211, C212, C213, C214, C216, C224, and C226 only)..... 2
4. Auxiliary Bracket (For model # C226 only)..... 1
5. Screw M4 x 8 (For model # C226 only)..... 2
6. Lock Washer (For model # C226 only)..... 1
7. Lock Washer 1
8. Tape 1

Installation Procedure
- For C231 -



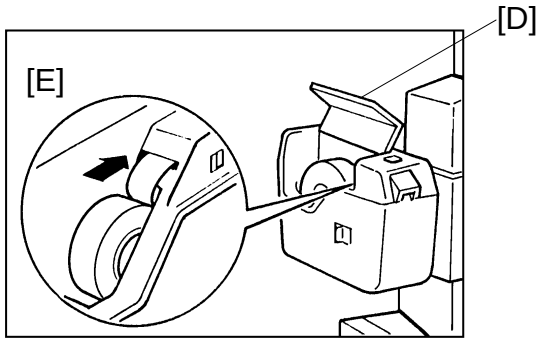
1. Turn off the main switch and unplug the power cord.
2. Remove the paper delivery table (2 screws).
3. Remove the paper delivery plate (4 screws).
4. Cut the cap [A] off the rear cover with pliers.
5. Remove the small cap in the rear cover of the main body. Then, connect the tape marker harness to the main body, and install the connector cover using one of the rear cover securing screws.
6. Install the tape marker on the main body with two knob screws [B] (accessories) in the two outside holes of the tape marker bracket. Install the lock washer [C] (accessory) with the lower of the two knob screws.
7. Reinstall the paper delivery plate and paper delivery table.

8. Remove the small cap in the rear cover of the main body [A]. Then, connect the tape marker harness [B] to the main body, and install the connector cover [C] using one of the rear cover securing screws.

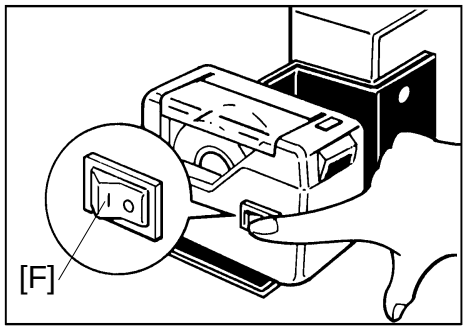


9. Open the tape marker cover [D]. Then, insert the leading edge of the tape into the tape entrance until it stops as shown in the illustration [E].

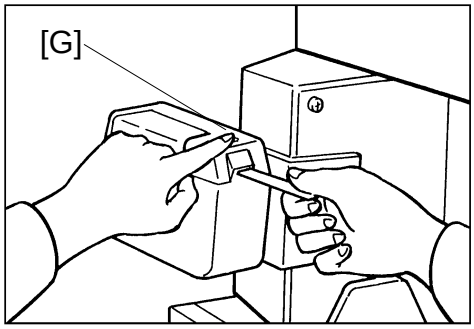
   NOTE: Be sure that the tape is installed in the proper direction. If it is not, the tape marker will not work correctly.



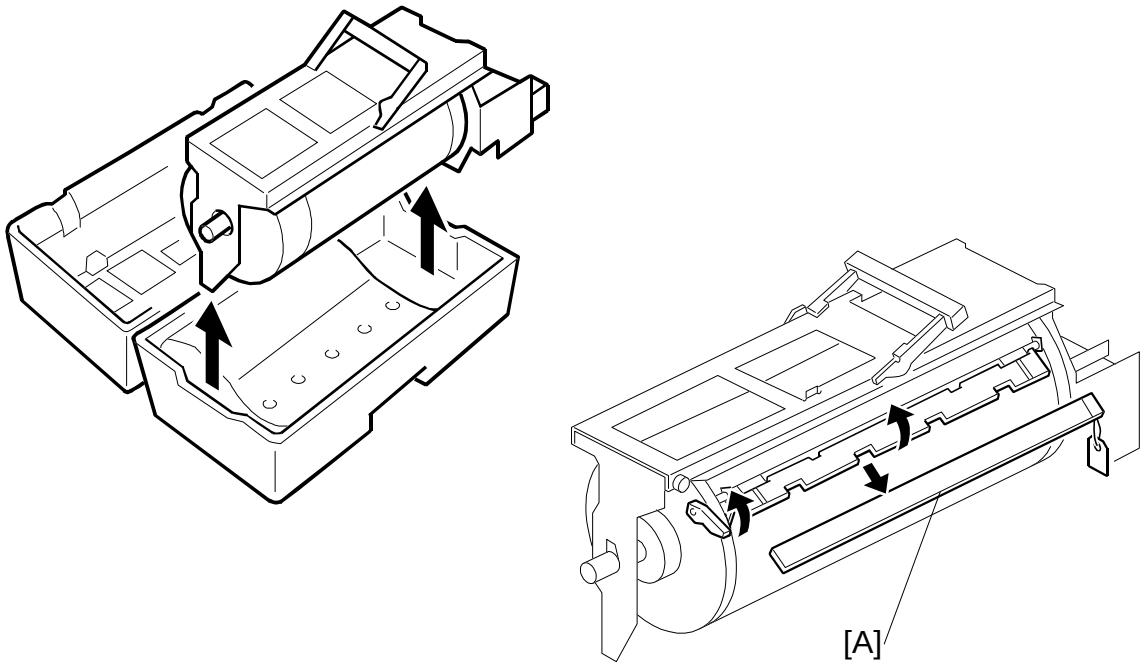
10. Turn on the main switch of the main body, access the SP mode and set SP No.5 to ”1” to activate the tape marker. (Refer to the section 4.4.2.)
11. Turn on the tape marker switch [F].



12. Press the tape cut button [G] to cut off the leading edge of the tape.
13. Check the tape marker operation using the Memory/Class modes of the main body.



3.2.4 COLOR DRUM (OPTION)



There are three types of color drum units:

- B4 Size: For the C231 B4 model
- Legal Size: For the C231 Legal model
- A4 Size: For the C231 A4 model

1. Remove the protective sheet [A] from the drum unit.
2. Remove the tape securing the ink holder.
3. Attach a color indicator decal to the drum case. The decal must be the same color as the ink in use.
4. Remove the drum unit.
   a) Leave the master wrapped around the removed drum to protect the drum from dust and drying.
   b) Keep the removed drum unit in the drum case.
5. Install the color drum unit.

   The color drum indicator on the operation panel stays lit when a color drum is mounted in the machine.
6. Install the colored ink.
   a) Remove the ink cartridge cap.
   b) Insert the ink cartridge into the ink holder.
7. Cycle ink into the drum by pressing the “Economy Mode “ key while holding down the “0” key. The drum will turn 40 rotations to supply ink to the drum. Repeat step 7 if nesessary.

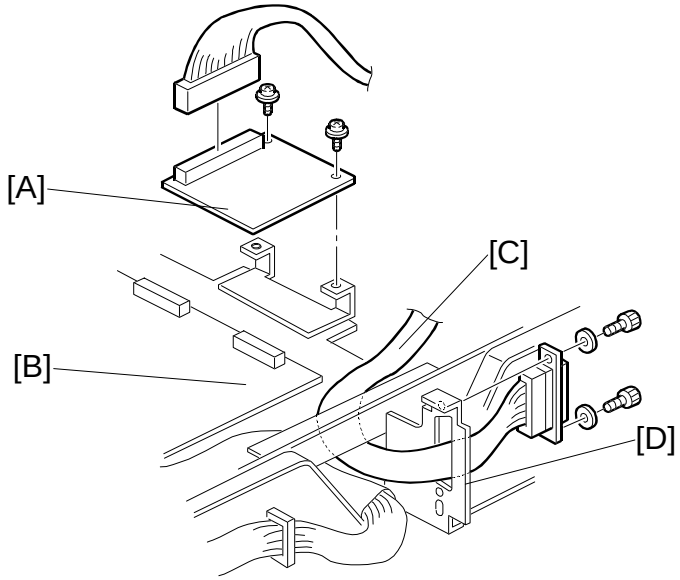
3.2.5 INTERFACE BOARD (OPTION)

Accessory Check

Check the quantity and condition of the accessories in the box against the following list:

1. Interface Board 1
2. Interface Harness..... 1
3. Screw M3 x 6 2
4. Lock Screws..... 2
5. Washer..... 2

Installation Procedure



1. Turn off the main switch and unplug the power cord.
2. Remove the upper rear cover.
3. Remove the MPU cover.
4. Connect CN102 of the interface board [A] to CN110 [B] of the MPU board and secure it using two screws.
5. Connect the harness [C] to CN101 of the interface board, and secure it to the connector bracket [D] using two lock screws and washers.
6. Remove the communications port cover plate from the upper rear cover.
7. Reinstall the MPU cover.
8. Reinstall the upper rear cover.

SERVICE TABLES

CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

4. SERVICE TABLES

4.1 SERVICE REMARKS

4.1.1 MASTER FEED SECTION

1. Thermal Head Installation

When installing the thermal head, there are important remarks. See “6.5.2 Thermal Head Removal.” Also, see "Remarks for Handling the Thermal Head" in "2.2.7 Thermal Head.".

2. Thermal Head Voltage Adjustment

When replacing the thermal head, be sure to adjust the voltage supplied to the thermal head (See “6.5.3 Thermal Head Voltage Adjustment”).

4.1.2 PAPER FEED SECTION

1. Friction Pad

When removing and reinstalling the friction pad base, be sure to install it in the correct orientation and position. (See "6.7.1 Paper Feed Roller, Pick-up Roller, and Friction Pad")

2. Paper Feed Roller and Pick-up Roller

Be careful to install the rollers the correct way around. Do not touch the surface of the roller with bare hands.

3. Paper Guide Plate Position for Registration Roller

Be sure to adjust the paper guide plate position once it is removed. (See "6.7.4 Registration Roller Clearance Adjustment.")

4.1.3 DRUM AND DRUM DRIVE SECTION

1. Main Motor

When the motor pulley has been removed from the motor and then reinstalled, be careful of the position of the pulley on the motor shaft. (See "6.9.8 Main Motor Pulley Position Adjustment")

2. Doctor Roller

Normally the doctor roller gap is not adjusted or changed. It tends to be difficult to adjust in the field. If the gap becomes narrower, an uneven image may appear on the prints. If it becomes wider, too much ink will be applied to the drum screens, resulting in ink leakage from the drum.

3. Drum Master Clamper

1) When installing the drum master clamper, be sure to position the two springs in the drum master clamper correctly.
2) Do not allow the inside of the clamping plate to become dirty with ink.
3) Do not use alcohol or other solvents to clean the inside of the clamping plate. Use a cloth dampened with water.

4. Ink Roller Unit

Do not disassemble the ink roller unit. Each part between the front and rear side plates of this unit has been precisely adjusted on the production line to keep the doctor and ink rollers parallel against the drum shaft.

5. Ink Pump

When the ink pump has been removed and reinstalled, be sure to adjust the plunger position. (See "6.9.6 Ink Pump Removal and Plunger Position Adjustment") When removing the ink pump, do not lose the small metal valve. When reinstalling the pump, first set the valve on the joint side as shown, then install the ink pump on the two joints. (See "6.9.6 Ink Pump Removal and Plunger Position Adjustment")

4.1.4 PAPER DELIVERY SECTION

1. Exit Pawl

The exit pawl clearance adjustment must be done prior to the drive timing adjustment. Once this has been done then the drive timing adjustment must be performed (See “6.10.4 Exit Pawl Clearance Adjustment” and “6.10.5 Exit Pawl Drive Timing Adjustment”).

4.1.5 ELECTRICAL COMPONENTS

1. Main Processing Unit (MPU) 1

After replacing the MPU, be sure to perform the following:

1) Vertical magnification adjustment (SP30, 36)
2) Side-to-side registration (SP31, 37)
3) Leading edge margin adjustment (SP33)
4) Leading edge registration adjustment (SP26, 38)
5) Correct drum type select (SP15)

If you use the backup RAM on the old MPU for new one, all data, including data in the SP mode, will be restored. You do not have to perform the above procedures.

See "6.3 MPU Replacement."

2. Main Processing Unit (MPU) 2

After replacing the MPU, also perform the following:

1) Ink detection adjustment
2) Master end sensor adjustment

See "6.3 MPU Replacement."

3. Power Supply Unit

When replacing the power supply unit, be sure to adjust the voltage supplied to the thermal head (See “6.5.3 Thermal Head Voltage Adjustment”).

4. Sensor Adjustments

Adjustment is needed for the master end sensor. For details, see 6.5.4 Master End Sensor Adjustment.

4.2 DIP SW, LED, VR, TP, AND FUSE TABLES

4.2.1 TEST POINTS

MPU

No	Usage
TP101	CIS Sample Clock
TP102	Video Signal
TP103	GND-a
TP104	Scan Line Synchronizing Signal
TP105	Ink Detection Pulse (Standard Pulse)
TP106	Ink Detection Pulse
TP107	Not used
TP108	Master End Sensor Output Voltage
TP109	GND-a
TP110	-12V

4.2.2 POTENTIOMETERS

MPU

No	Usage
VR101	Ink Detection Adjustment
VR103	Master End Sensor Adjustment

Power Supply Unit

No	Usage
VR2	Thermal Head Voltage Adjustment

4.2.3 LED'S

MPU

LED #	OFF	ON
101	Low Ink Condition	Sufficient Ink Condition

4.2.4 FUSES

MPU

FUSE #	Rated Current	Voltage	Related Devices
101	1 A	24VDC	Paper Transport Motor
102	1 A	24VDC	Ink Pump Motor, Master Eject Motor

PSU

FUSE #	Rated Current	Voltage	Related Devices
501	10 A	120/230VAC	AC Line
502	5 A	24VDC	Paper Transport Motor, Paper Feed Clutch, Air Knife Fan Motor, Front/Rear Pressure Release Solenoid, Vacuum Fan Motor
503	5 A	24VDC	Ink Pump Motor, Master Eject Motor, Optional Key Counter, Master Counter, Paper Counter, Contact Image Sensor
504	6.3 A	24VDC	Main Motor Control Board
505	5 A	24VDC	Optional Tape Dispenser

4.3 SERVICE CALL CODES

No.	Description/Definition	Points to Check
E-00	*Clamper Motor Failure* The MPU cannot detect the master clamper position sensor signal (open or closed) within 1.2 seconds after the clamper motor turns on.	* Mechanical interference with the clamper drive * Master clamper sensors * Clamper motor * Clamper drive mechanism
E-01	*Cutter Failure* • The cutter HP sensor does not turn on within 3 seconds after the cutter motor turns on. • If the master is not cut at the end of the master making. The drum master detection sensor is used to check if the black cover at the trailing part of the drum cloth screen is covered by the master just before the drum returns the home position. In this case, the SC is cleared once the power is off.	* Master cut error occurred * Cutter switch * Cutter motor * Cutter drive mechanism
E-02	*Paper Table Drive Failure* The paper height sensor or the table lower limit sensor does not turn on within 7 seconds after the table drive motor turns on.	* Paper table drive motor * Paper height sensor or table lower limit sensor * Mechanical interference with the paper table drive
E-04	*Thermal Head Overheat* Temperature of the thermal head is greater than 54°C when the Start key is pressed.	* Thermal head * Thermistor of the thermal head (short circuit) * Wait for the thermal head to cool down
E-06	*Main Motor Lock* The CPU cannot detect the feed start timing sensor signal within 2 seconds after the main motor turns on, or the sensor remains on for more than 0.5 seconds.	* Main motor * Power to the main motor * Feed start timing sensor * Mechanical interference with the drum drive
E-09	*Thermal Head Thermistor Open* The thermistor output voltage (CN109-A1) is over 4.9 volts.	* Thermal head thermistor * Thermal head connector
E-10	*Thermal Head Drive Failure* The CPU detects an abnormal condition in the thermal head drive circuit.	* Thermal head * MPU * Thermal head connector and harness
E-12	*Pressure Plate Motor Failure* The pressure plate home position sensor signal is not detected within 4 seconds after the pressure plate motor turns on.	* Mechanical interference with the pressure plate drive * Pressure plate motor * Pressure plate HP sensor

No.	Description/Definition	Points to Check
E-13	*Scanner Malfunction* • The scanner HP sensor does not turn on after the scanner motor moves for more than 7 seconds back to the home position after scanning. • The scanner cannot leave the home position within 4 seconds of power on. • When the scanner cannot return to the home position within 2 seconds of leaving.	* Mechanical interference with the scanner * Defective scanner HP sensor
E-14	*IPU error* Signal transmission error (from the IPU) occurred in the MPU.	* MPU

4.4 SERVICE PROGRAM MODE

The service program (SP) mode is used to check electrical data, change modes, or change adjustment values.

4.4.1 ACCESS PROCEDURE

Service Program Mode Access Procedure (For Engineers)

All service program modes can be accessed with the following procedures.

1. Press the following keys on the operation panel in the following order:

   - Method 1 -

   Clear Modes ⇒ **1** ⇒ **0** ⇒ **7** ⇒ **Clear/Stop**

   *: Hold down the Clear/Stop key for more than 3 seconds.

   - Method 2 -

   Clear Modes ⇒ **Clear/Stop** ⇒ **Economy** ⇒ **Enter (#)**

   *: For the China machine, use the Combine 2 Original key, instead of the Economy key.

   - Method 3 -

   Turn on the main switch while holding the **Start, Clear/Stop, and Enter (#)** keys simultaneously.

   NOTE: Method 3 is a special way to enter SP mode that differs from the other two methods. For example, when a service call indicator (E-xx) is displayed at power on, SP mode can only be accessed by Method 3.

   After you enter SP mode with Method 3, you can leave it by turning the main switch off then on again.

2. The following is displayed on the LCD when the SP mode is accessed.

   ```
   SP-MODE
   PROGRAM No. 0
   ```

3. Using the **number keys**, enter the desired SP mode number (listed in the service program table), then press the **Enter (#) key**.

   NOTE: The SP mode number can be shifted up or down by pressing the **Select Size And Direction ("∧" or "∨") keys.**

4. Follow the "Change Adjustment Values or Modes" procedure on page 4-10.

   NOTE: To cancel SP mode, press the **Clear Modes key**. To shift to another SP mode number, press the Enter (#) key again to return to the display in step 2. Enter the desired SP mode number.

   After you enter SP mode with Method 3, you can leave it by turning the main switch off then on again.

Service Program Mode Access Procedure (For Users)

This procedure allows users to access only the service program modes that are marked with an asterisk in the service program table.

1. Press the following keys on the operation panel in the following order:

   - Method 1 -

   Clear Modes ⇒ Clear/Stop

   *: Hold down the Clear/Stop key for more than 3 seconds.

   - Method 2 -

   Clear Modes ⇒ Clear/Stop ⇒ Enter (#)

2. The following is displayed on the LCD.

SP-MODE PROGRAM No. 0

3. Using the **number keys**, enter the desired SP mode number (listed in the service program table), then press the **Enter (#) key**.
4. Do the following procedure (‘Change Adjustment Values or Modes’). To cancel the SP mode, press the **Clear Modes key**.

Change Adjustment Values or Modes

1. After entering the desired SP mode number and pressing the **Enter (#)key**, the current value or mode will be displayed on the LCD (at the end of the second line).
2. Enter the desired value or mode using the **number keys** (listed in the service program table).

   NOTE: Use the **Memory/ Class key** to toggle between + and -.
3. Press the **Enter (#) key** to store the desired value or mode.
4. To cancel the SP mode, press the **Clear Modes key**.

4.4.2 SERVICE PROGRAM TABLE

*: Accessible by a customer

No.	Display	Function	Settings	Factory Setting	Comments
1	This SP number was used to enable the On-line key for some other models. On this model, the On-line key is enabled automatically when the optional PC controller is connected, SP number 1 is not used.				
2	ADF Unit	Enables ADF operation.	0: No 1: Yes	0	
3	Key Counter	Enables key counter operation.	0: No 1: Yes	0	
4	Key Card	Used only in Japan.	0: No 1: Yes	0	
*5	Tape Marker Off	Disables tape marker operation.	0: No (Use the tape marker) 1: Yes	0	
*10.	Min. Print	Limits the minimum print quantity that can be entered.	0 to 9999	0	
*11	Max. Print	Limits the maximum print quantity that can be entered.	0 to 9999	9999	
*12	Set Display Mode	Selects the language used on the display. 0: Japanese 1: English 2: German 3: French 4: Italian 5: Spanish 6: Chinese 7: Dutch 8: Brazilian	0 to 8	1	
*13	Set Size Mode	Selects the metric size (mm) or inch size on the display.	0: mm 1: Inch	-	
14	Set Operation Panel	Selects the expression type on display that matches the machine.	0:JPN/CHN 1:OTHER	-	Never change the setting.
15	Set Drum Size	Selects the drum size that matches the machine. NOTE: This function is for production line use only.	0:B4 1:A4 2:LG	-	Never change the setting.
16	LCD Contrast Adjust	Changes the LCD contrast.	17 to 24	21	

No.	Display	Function	Settings	Factory Setting	Comments
17	Set Combine Key	Enables the Combine 2 Original mode. The blank key at the upper left corner under the top left cover on the operation panel is used as the mode key.	0: No 1: Yes	0	• Except for the China version model. • SP14 must be set at 0.
*20	Buzzer On	Turns the beeper on.	0: No 1: Yes	0	
*21	Prints/Master Cost	Adjusts the cost ratio of masters to prints for accounting purposes. (When SP4 is set at 1, This function cannot be used.)	0 to 50	0	The set number (0 to 50) is automatically added to the key counter each time a master is used.
22	Home Position Adjust	The drum home position (the master eject position) changes.	0 to 9	5	Never change the setting.
23	Plot Position Adjust	The drum stop position for the master making changes.	0 to 9	5	Never change the setting.
*25	Clear 2 In 1	Selects whether to reset the Combine 2 Original mode automatically after master making.	0: No 1: Yes	0	
26	Feed Timing Adjust	Adjusts the registration motor on timing for better paper registration.	0 to 7	3	
27	ADF Current Down	Lowers the current to the ADF motor.	0: No 1: Yes	0	If the ADF motor vibrates due to a part variation causing noise, reduce the motor current with this mode.
28	Paste Shadow Erase	Adjusts the Paste Shadow Erase level that can be set with the key on the operation panel. The shadows of pasted-up edges on originals lighten.	0: Standard 1: Light 2: Lighter	0	
*29	Pht Background Correct	Determines whether the original background correction is done in Photo mode.	0: Correction is not done. 1: Correction is done.	0	

No.	Display	Function	Settings	Factory Setting	Comments
30	Sub Scan Mag. Adjust	Adjusts the sub-scan magnification.	-1.9 to +1.9%		• For the platen mode • 0.1% steps • Use the Memory/ Class key for "+" or "-"
31	SCN Center Adjust	Adjusts the center position of copies in the platen mode.	-1.9 to +1.9 mm	0	• For the platen mode • 0.1 mm steps • Use the Memory/ Class key for "+" or "-" • See Remark 1
32	SCN Line Adjust	Adjusts the position of the scanner (CIS) in the ADF mode. If images cannot be scanned in the ADF mode, adjust the position. If the value is changed, also perform SP38.	-1.9 to +1.9%		• This is for the production use only. • 0.1% steps • Use the Memory/ Class key for "+" or "-"
33	Lead Edge Adjust	Adjusts the lead edge margin.	4 to 10 mm	5	
34	Head Energy Adjust (Normal)	Adjusts the thermal head energy for the normal mode.	0 to -99%		
35	Economy Head Energy Adjust	Adjusts the thermal head energy for the Economy mode.	0 to -99%	(-10)	
36	ADF Mag. Adjust	Adjusts the ADF sub-scan magnification.	-1.9 to +1.9%	(0)	• For the ADF mode • 0.1% steps • Use the Memory/ Class key for "+" or "-"
37	ADF Center Adjust	Adjusts the center position of copies in the ADF mode.	-1.9 to +1.9 mm	0	• For the ADF mode • 0.1 mm steps • Use the Memory/ Class key for "+" or "-" • See Remark 1

SERVICE PROGRAM TABLE

No.	Display	Function	Settings	Factory Setting	Comments
38	ADF Scan Line Adjust	Adjusts the ADF scanning start position.	-4.9 to 4.9 mm	(0)	• 0.1 mm steps. • Use the Memory/ Class key for "+" or "-". • See Remark 2
39	Trail Edge Adjust	Adjusts the blank margin at the trailing edge of prints.	0 to 3 mm	0	1 mm steps.
*40	Original	Specifies the image mode at power-up.	0: Letter 1: Lt/Photo 2: Photo	0	
*41	Image Density	Specifies the image density at power-up.	0: Light 1: Standard 2: Dark 3: Darker	1	
*42	Print Speed	Specifies the printing speed at power-up.	1: 80 rpm 2: 100 rpm 3: 120 rpm	2	
*43	Auto Cycle Mode	Specifies whether Auto Cycle mode is selected at power-up.	0: No 1: Yes	1	
*45	Std. Image Position	Specifies the image position at power-up.	40: +10mm | 20: 0 mm | 0: -10 mm	20	
52	Compress With Start Key	Compressing the ejected masters is done every time the Start key is pressed for the master making.	0: No 1: Yes	0	See Remark 3
60	Clear All Memory	Returns all SP modes to the default settings.	0: No 1: Yes	0	The memory is cleared after pressing the Enter (#) key.
61	Clear Memory/ Except Adj.	Returns all SP modes to the default settings except for Adjustments.	0: No 1: Yes	0	The memory is cleared after pressing the Enter (#) key.
70	Original Feed Jam (A)	Displays the total number of original jams.		0	
71	Paper Feed Jam (B)	Displays the total number of paper feed jams.		0	
72	Paper Wrap Jam (E/BE)	Displays the total number of times that paper has accidentally wrapped around the drum.		0	

No.	Display	Function	Settings	Factory Setting	Comments
73	Paper Delivery Jam (G)	Displays the total number of paper delivery jams.		0	
74	Master Feed Jam (C)	Displays the total number of master feed jams.		0	
75	Master Delivery Jam (F)	Displays the total number of master delivery jams.		0	
76	Clear Jam Counters	Clears all jam counters.	0: No 1: Yes	0	The memory is cleared after pressing the Enter (#) key.
*81	Quality Start No.	Specifies how many prints are made with the lowest drum rotation speed (30 rpm) to stabilize image density for the beginning prints after a new master is made.	0 to 3 sheets	0	This mode is to ensure that the first print has sufficient ink density even if the machine was not used for a long.
*82	Skip Feed No.	Specifies how many prints are skipped between prints in the skip feed mode.	1 to 9	2	"1" means no skip.
*84	Auto Multi Copy	Specifies the initial mode for the Combine 2 Originals mode.	0: No 1: Yes (Two identical images are made if the Master Making key is pressed once.)	0	
85	Initial Compression	Specifies whether full master box detection is made at power-up. Compressing the ejected masters is done.	0: No 1: Yes	0	See Remark 3
*87	Memory Print	Specifies the printing operation when in Memory mode.	0: Memory 1: Stack	0	See Remark 4
*88	Auto Memory/ Class	Specifies whether the Memory/Class mode is used.	0: No 1: Yes	0	See Remark 5
90	Thermal Head Test	Select "1" to carry out the thermal head test.	0: Off 1: On	0	See the Test Pattern Image Mode, section 4.5

SERVICE PROGRAM TABLE

No.	Display	Function	Settings	Factory Setting	Comments
95	Scanner Free Run	Carries out a scanner free run test.	Start with the Print Start key. Stop with the Stop key.	0	
96	ADF Original Feed	Carries out an ADF original feed test.	Start with the Print Start key. Stop with the Stop key.		
98	Economy Count	Displays the total number of masters made in Economy mode.		0	
103	Margin Erase Count	Displays the total number of masters made with the Margin Erase key.		0	
104	On line Count	Displays the total number of masters made in On Line mode.		0	
105	Overlay Count	Displays the total number of masters made in Overlay mode.		0	
106	Enlarge Count	Displays the total number of masters made in Fixed Enlargement mode.		0	
107	Reduction Count	Displays the total number of masters made in Fixed Reduction mode.		0	
111	Total Count	Displays the total number of masters and prints.		0	M: Master count P: Print count
*113	Resetable Count	Used by the customer to display the total number of masters and prints.		0	M: Master count P: Print count
*114	CLR Reset-able Count	Clears the resetable total master/print counters.	0: No 1: Yes	0	
115	ADF Mode Count	Displays the total number of sheets fed in the ADF mode.		0	
116	Scanner Mode Count	Displays the total number of originals set in platen mode.		0	
117	Color Drum Count	Displays the total number of prints made using the color drum.		0	
119	CLR All Total Count	Clears the following counters: SP Nos. 111, 115, 116, and 117.	0: No 1: Yes		

No.	Display	Function	Settings	Factory Setting	Comments
*120 -1	User Code Mode	Selects user code mode.	0: No 1: Yes		See the user code mode section.
-2	Auto Reset Time	Selects the auto reset time.	0: Unlimited 1: 1 min. 2: 2 min. 3: 3 min. 4: 4 min. 5: 5 min.	0	Displays only when "Yes" is selected in SP120-1.
*121	UC Count	Displays the total number of masters and prints made with each user code.		0	Press the # key to shift to another user code.
*122	Clear UC Count	Clears the selected user code counter.	0: No 1: Yes	0	Same as above.
*123	Total UC Count	Displays the total number of masters and prints for up to 20 user codes.		0	
*124	Clear Total UC Count	Clears the total user code counter.	0: No 1: Yes	0	
130	Input Check Mode	Displays the inputs from sensors and switches.			See the input check table.
131	Output Check Mode	Turns on the electrical components.			See the output check table.
132	All Indicators ON	Turns on all the indicators on the operation panel.			Press the # key to light all the indicators.
135	SN: Master End	Displays the master end sensor voltage.			Unit: Volts
140	Ink Detection	Specifies whether ink detection is done.	0: No 1: Yes	1	
141	Paper Detection	Specifies whether paper end detection is done.	0: No 1: Yes	1	
142	Master End Detection	Specifies whether master end detection is done.	0: No 1: Yes	1	
146	ADF Cover Detection	This mode disables the ADF cover switch.	0: No 1: Yes	1	This function is valid only when SP2 is set at "1".
147	ADF Set Detection	This mode disables the platen cover sensor detection.	0: No 1: Yes	1	If "0" is selected, "Set the original" is displayed each time at master making.
150	Control ROM No.	Displays the ROM part number and the ROM manufacturing date.		P/No.	YYYY/MM/DD

SERVICE PROGRAM TABLE

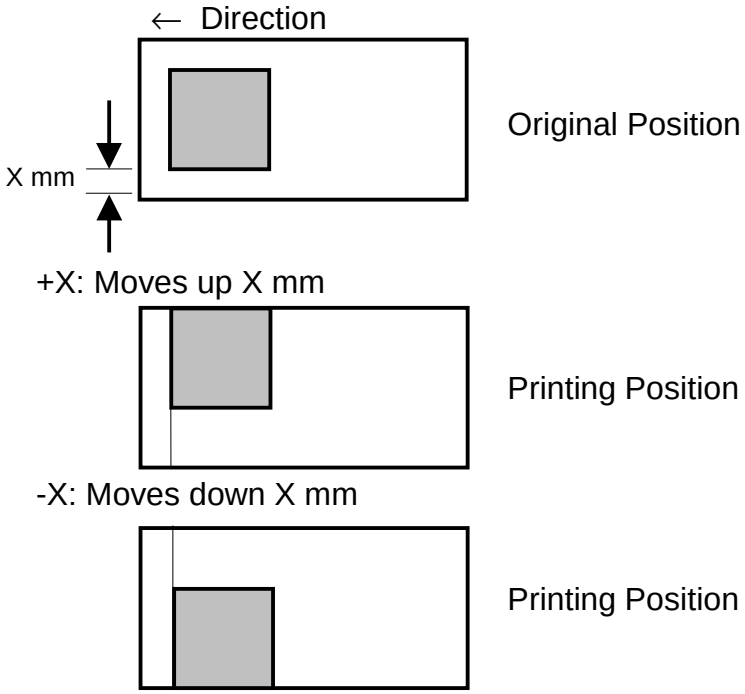
No.	Display	Function	Settings	Factory Setting	Comments
151	Machine No.	Displays the machine serial number and the installation date.		0	Input the serial number and the installation date.
152	Service Tel. No.	Input the service representative's telephone number, which is displayed with the service call code.		0	• Use the number keys to input the telephone number at installation. • Press the Memory/ Class key if you wish to add a hyphen between the digits.
153	Last Service Code	Displays the last service call.		0	
*160	Side Ers.	Adjusts the default side edge margin width in the Margin Erase mode.	2 to 20 mm or 0.1 to 0.8 inch	5 mm or 0.2”	
*161	Center Ers.	Adjusts the default center margin width in the Margin Erase mode.	4 to 60 mm or 0.2 to 2.3 inch	10 mm or 0.4”	
*162	Horizontal Ers.	Adjusts the default horizontal edge (top and bottom) margin in the Margin Erase mode.	2 to 20 mm or 0.1 to 0.8 inch	5 mm or 0.2”	
*170	ERS. **1	Enter the original size (in "mm") that you want to use with the Margin Erase mode.	(100 to 258) x (100 to 364) mm or (4.0 to 10.0) x (4.0 to 14.3) inch	0 x 0	The original size entered is displayed by pressing the Select Size And Direction ("∧" or "∨") keys when in the Margin Erase mode.
*171	ERS. **2	Enter the original size (in "mm") that you want to use with the Margin Erase mode.	(100 to 258) x (100 to 364) mm or (4.0 to 10.0) x (4.0 to 14.3) inch	0 x 0	Same as above

No.	Display	Function	Settings	Factory Setting	Comments
*172	ERS. **3	Enter the original size (in "mm") that you want to use with the Margin Erase mode.	(100 to 258) x (100 to 364) mm or (4.0 to 10.0) x (4.0 to 14.3) inch	0 x 0	Same as above

Remarks

1. SP Mode No. 31 and 37 - SCN/ADF Center Adjust

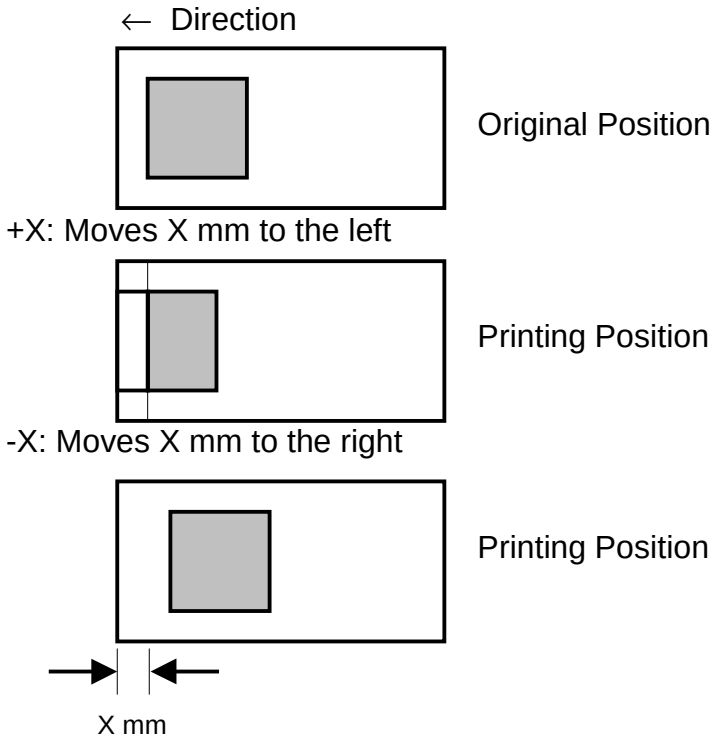
The printing position moves as shown below.



NOTE: When adjusting the scanner image position, input "0" first:
Example) X = 0.9 mm → "0", "9", then press the # key.

2. SP Mode No. 38 - ADF Scan Line Adjust

The printing position moves as shown below.



3. SP Mode No. 52 - Compress With Start Key, SP Mode No. 85 - Initial Compression

These modes eliminate the possible causes of master eject jams. If the operator continues to make masters even after the master eject box becomes full, the ejected masters will interfere with the movement of the pressure plate, causing another master eject jam.

When these modes are selected, the full master box detection, with the master compressing operation, is carried out each time the machine is switched on (SP85) or the Start key is pressed to make a new master (SP52). Selecting SP52 affects the master processing time, so this is not enabled as the default. SP85 is enabled as the default.

4. SP Mode No. 87 - Memory Print

Normally, in Platen mode (when no originals are placed in the ADF) in combination with Memory mode, the machine stops when the 1st print job is finished even if the tape marker is installed, so that the next original can be placed on the exposure glass. The next printing job (with the number of prints that has been set with Memory mode for the next original) starts when the Start key is pressed.

If "1" (Stack) is selected in this SP mode, after the 1st print job is finished, the next print job starts immediately afterwards. (The tape marker feeds a strip of tape to separate the jobs if it is used.)

In Platen mode in combination with Memory mode, the machine can print continuously depending on the numbers set with Memory mode for each print set, without replacing the original.

5. SP Mode No. 88 - Auto Memory/Class

In Memory/Class mode, the machine normally stops when the first print job is finished if the tape marker is not installed.
If "1" is selected in this mode, the machine stops for a while (this interval is the same as when the tape marker is operating). Then it continues with the next print (or master making) job.

4.4.3 INPUT/OUTPUT CHECK MODE

This program checks the electrical components.

Input/Output Check Mode Access Procedure

1. Access the SP mode. (See the SP mode access procedure.)
2. Enter 130 (for the Input Check mode) or 131 (for the Output Check mode) with the **number keys**.
3. Press the Enter (#) key.
4. Enter the desired number. (See the Input or Output Check Table.)

   NOTE: The number can be shifted up or down by pressing the **Select Size And Direction ("∧" or "∨") keys**.
5. Press the **Enter (#) key**.

   NOTE: In the input check mode, all printing speed LEDs turn on when the sensor or switch that is being tested is actuated. A beep will also be heard.
6. For the Output Check mode, press the **Start key** to turn on the component.
7. Press the **Enter (#) key** to return the display to the initial input or output check menu.
8. Press the **Clear Modes key** to leave the SP mode.

Input Check Table

Code	LCD Display	Component Checked
1.	SN: ADF Cover In- 1	ADF Cover Switch
2.	SN: 1st Original (ADF) In- 2	Document Sensor
3.	SN: 2nd Original (ADF) In- 3	Scan Line Sensor
18.	SN: Paper End In-18	Paper End Sensor
20.	SN: Paper Table Low Limit In-20	Table Lower Limit Sensor
21.	SN: Paper Height In-21	Paper Height Sensor
22.	KEY: Table Down In-22	Paper Table Lowering Switch
26.	SN: Master End In-26	Master End Sensor
27.	SIG: Ink In-27	When the Ink Detecting Pin detects ink
31.	SN: Pressure Plate Home Position In-31	Pressure Plate Home Position Sensor
32.	SN: Pressure Plate Limit Position In-32	Pressure Plate Limit Sensor
33.	SW: Master Eject Box In-33	Eject Box Set Sensor
39	SIG: Key Counter In-39	When a key counter is installed
42	SN: Paper Exit In-42	Paper Exit Sensor
43	SN: Master Eject In-43	Master Eject Sensor
44	SN: Drum Master In-44	Drum Master Sensor
45	SN: Scanner Home Position In-45	Scanner Home Position Sensor
47	SN: Platen Set In-47	Platen Cover Sensor
51	SW: Plotter Cover In-51	Master Making Unit Cover Safety Switch
52	SW: Cover Open In-52	Door Safety Switch Scanner Unit Safety Switch

Code	LCD Display	Component Checked
53	SN: Cutter Home Position In-53	Cutter Home Position Sensor
54	SN: Master Set Cover In-54	Master Set Cover Sensor
56	SN: Feed Start Timing In-56	Feed Start Timing Sensor
57	SN: 2nd Feed Timing In-57	2nd Feed Timing Sensor
58	SN: Paper Exit Timing In-58	Paper Exit Timing Sensor
59	SN: Master Eject Position In-59	Master Eject Position Sensor
62	SN: Drum Set In-62	When the drum connector is connected
65	SN: Clamper Close In-65	Clamper Close Sensor
66	SN: Clamper Open In-66	Clamper Open Sensor
68	SN: Registration In-68	Paper Registration Sensor

Output Check Table

Code	LCD Display	Description
3	MOTOR: Master Eject Out- 3	Turns on the master eject motor.
6	MOTOR: Vacuum Out- 6	Turns on the vacuum fan motor.
7	MOTOR: Air Knife Out- 7	Turns on the air knife fan motor.
8	SIG: Key Counter Out- 8	Increments the key counter.
9	COUNTER: Master Out- 9	Increments the master counter.
10	COUNTER: Paper Out-10	Increments the paper counter.
12	MOTOR: Ink Supply Out-12	Turns on the ink pump motor.
14	SOL: Print Pressure Out-14	Turns on the pressure release solenoids. At the same time, it turns on the paper transport motor.
18	MOTOR: Paper Table Down Out-18	Turns on the paper table motor (down).
19	MOTOR: Paper Table Up Out-19	Turns on the paper table motor (up).
21	SIG: Fluorescent Lamp Out-21	Turns on the xenon lamp.
22	MOTOR: Cutter + Direction Out-22	Turns on the cutter motor.
23	MOTOR: Cutter Home Out-23	Turns on the cutter motor and moves the cutter to the home position.
27	MOTOR: Drum Home Stop Out-27	Turns on the main motor and moves the drum to the home position.
28	MOTOR: Drum Plot Stop Out-28	Turns on the main motor and moves the drum to the master making position.
33	MOTOR: Original Feed Out-33	Turns on the ADF motor.
34	MOTOR: Master Feed High Speed Out-34	Turns on the master feed motor at high speed.
35	MOTOR: Master Feed Low Speed Out-35	Turns on the master feed motor at low speed.

Code	LCD Display	Description
36	MOTOR: Master Feed Normal Speed Out-36	Turns on the master feed motor at normal speed.
37	MOTOR: Scanner Out-37	Turns on the scanner motor. The scanner moves to the original scanning position for ADF mode when the Start key is pressed. It returns to home position when the Start key is pressed again.
41	SIG: VHD on Out-41	Applies thermal head voltage. Power is applied by pressing the Start key. It is stopped by pressing the Clear/Stop key.
42	MC: Paper Feed Out-42	Turns on the paper feed clutch.
43	MOTOR: Paper Delivery Out-43	Turns on the paper transport motor while the Start key is pressed.
44	MOTOR: Clamper Close Out-44	Turns on the clamper motor and moves to the clamper close position.
45	MOTOR: Clamper Open Out-45	Turns on the clamper motor and moves to the clamper open position.
46	MOTOR: Pressure Plate ON Out-46	Turns on the pressure plate motor and moves the plate to the lower limit position.
47	MOTOR: Pressure Plate OFF Out-47	Turns on the pressure plate motor and moves the plate to the home position.

4.5 TEST PATTERN IMAGE MODE

This function is used to determine which printer component is causing an image quality problem on the master.

In this mode, the background pattern that is printed covers the entire sheet of paper.

- Procedure -

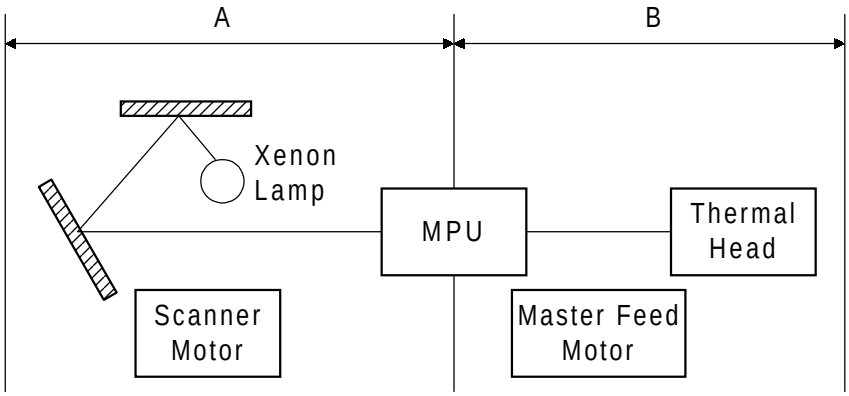
1. Place paper on the paper table.
   NOTE: To reduce thermal head load, use the smallest paper size possible, i.e. the smallest paper width on which the part with the image problem can be printed.
2. Access SP mode.
3. Input **SP number 90** and enter "1". Then, press the **Enter (#) key**.
4. Press the **Clear Modes key** to leave the SP mode.
5. Carry out the master making process (an original is not necessary).
6. Make some prints and check the image.

NOTE: The SP mode number 90 setting returns to the default (0) after the above procedure.

- Assessment -

If the printout is normal, a Part A component is defective.

If the printout is abnormal, a Part B component is defective.



4.6 USER CODE MODE

With the user code function (SP mode number 120), operators must input an authorized code before the machine will operate. The machine keeps track of the number of prints made under each code.

There are 20 user codes as follows:

No.	User Code No.
1	382
2	191
3	182
4	173
5	164
6	155
7	146
8	137
9	128
10	119
11	482
12	291
13	282
14	273
15	264
16	255
17	246
18	237
19	228
20	219

- How to use a user code -

1. Enter the user code (3 digits) with the **number keys**.
2. Press the **Enter (#) key**.
3. Press the **Start key** to start printing.

NOTE: The user code is reset if the **Clear Modes key** and the **Clear/Stop key** are pressed together. The user then has to input a user code to use the machine.

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⇒4.7 ROM HISTORY

4.7.1 C231 FIRMWARE MODIFICATION HISTORY

C231 FIRMWARE MODIFICATION HISTORY		
DESCRIPTION OF MODIFICATION	**REV. LEVEL**	**SERIAL NUMBER**
• SP45 'Standard Image Position at Power-on' has been changed from a customer accessible item to a non-accessible item.	**ROM:** C2315105 **E** **MPU:** C2315100 **F**	From the start of Mass Production
• SP18 'Master Selection' has been added. This item is only for the Japanese version. SP18 must be set at '0' for the other versions. '0' is the default. • SP19 has been added. By switching this item to '1,' the edge erase mode for B5 size originals is always selected when the combine 2 originals mode is used. This erases the shadows along the edge of the original for prints in the combine 2 originals mode.	**ROM :** C2315105 **K** **MPU:** C2315100 **L**	November '98 Production
- Connectivity with the controller - • When a communication error occurs between the C231 and controller (the EZ-1 or CB-1), the controller sends an error signal to the main body. The C231 sometimes does not send a response signal to the controller and the controller stays in the busy condition. The LED on the controller stays blinking until it is switched off. • This problem does not occur when the controller is properly communicating with the main body. However, once any communication errors occur, there is possibility that this problem could occur. With the new firmware The C231 can send the response signal properly even if a communication error occurs. ***- Error in the User Code mode -*** • Even when the User Code mode was enabled by SP120, the machine could not be reset (to enter the user code entry display) by pressing the keys as explained in the manual. • The only way to reset it was to wait for the automatic reset (the Auto-reset mode) or switch the machine off and on. This problem has been solved in this version.	**ROM:** C2315105 **M** **MPU:** C2315100 **N**	December '98 Production

Service Tables

C231 FIRMWARE MODIFICATION HISTORY		
DESCRIPTION OF MODIFICATION	**REV. LEVEL**	**SERIAL NUMBER**
• SP46 'Set Fine Mode Default' has been added. By switching this item to '1', the fine mode is selected at power-up. '0' is the default. • SP47 'Swap Start Key' has been added. By switching this item to '1', the master making key function and the print start key functions swap. '0' is the default.	**Main ROM:** C2315165 **A** **MPU:** C2315100 **V**	May 1999 Production
• To ensure paper feed, about 6 mm is always added to the paper feed length. **NOTE:** *The main ROM remained the same.*	**Feed ROM:** C2315107 **C** **MPU:** C2315100 **W**	June 1999 Production
• To ensure feeding of the trial, about 10 mm is always added to the paper feed length when feeding a trial print. **NOTE**: *The main ROM remained the same.*	**Feed ROM:** C2315107 **D** **MPU:** C2315100 **Y**	January 2000 Production
• Service Calls 'E21', 'E22', 'E23' and 'E24' have been added.	**Main ROM:** C2315165 **C** **MPU:** C2315190	June 2000 Production

PREVENTIVE MAINTENANCE

CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

5. PREVENTIVE MAINTENANCE

5.1 MAINTENANCE TABLE

The following items should be maintained periodically. There are two sets of intervals - one based on time and the other based on print count. For maintenance items with entries in both of them, use whichever comes first.

C: Clean, R: Replace, L: Lubricate, A: Adjust

Interval / Item	Time				Print Counter					EM	NOTE
	6M	1Y	2Y	3Y	300K	600K	1M	1.2M	2M		
Scanner/Optics											
Exposure Lamp	C	C	C	C							Dry Cloth
Mirror/Reflector	C	C	C	C							Soft Cloth
Platen Cover / White Plate	C	C	C	C							Damp Cloth
Exposure Glass	C	C	C	C							Dry Cloth
Master Feed											
Thermal Head										C	Alcohol
Platen Roller Expected life: 6K masters	C	C	C	R							Damp cloth and water
Master Eject Rollers	C	C	C	C							Alcohol
Drum Master Sensor										C	Dry Cloth
Paper Feed											
Paper Pick-up Roller	C	R	R	R		R		R			Damp Cloth
Paper Feed Roller	C	R	R	R		R		R			Damp Cloth
Friction Pad	C	R	R	R		R		R			Damp Cloth
Press Roller	C	C	R	C				R			Alcohol
Paper Feed Clutch									R		
Feed Roller and Transport Belt Roller Bushings		L	L	L							Motor Oil (SAE #20)
Feed Drive Gears		L	L	L							Grease (Alvania #2)
Paper Delivery Transport Belts			R					R			
Paper End Sensor	C	C	C	C							Dry Cloth
Registration/Exit Sensors	C	C	C	C							Dry Cloth
Registration Roller	C	C	C	C							Dry Cloth

MAINTENANCE TABLE

Interval / Item	Time				Print Counter					EM	NOTE
	6M	1Y	2Y	3Y	300K	600K	1M	1.2M	2M		
Drum and Ink Supply											
Cloth Screen			R					R			
Drum Drive Gears and Cam		L	L	L							Grease (Alvania #2)
Drum Flange Bushing		L	L	L							Motor Oil (SAE #20)
In/Outside of Drum	C	C	C	C							Alcohol
Ink Nozzle	C	C	C	C							Alcohol
Others											
Main Drive Timing Belt Tension			A								
Press Roller Release Lever Position			A								
ADF (Option)											
DF Pick-up, Reverse, Feed Rollers	C	C	C	C							Dry Cloth
DF R1, R2, R3 Rollers	C	C	C	C							Dry Cloth

REPLACEMENT AND ADJUSTMENT

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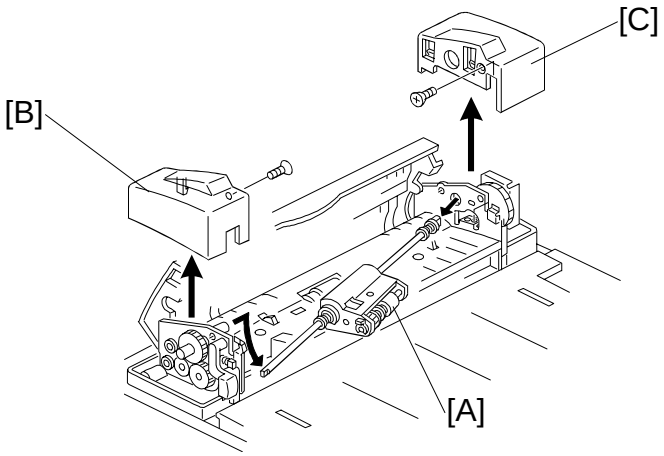
6. REPLACEMENT AND ADJUSTMENT

6.1 EXTERIOR COVER REMOVAL

6.1.1 ADF

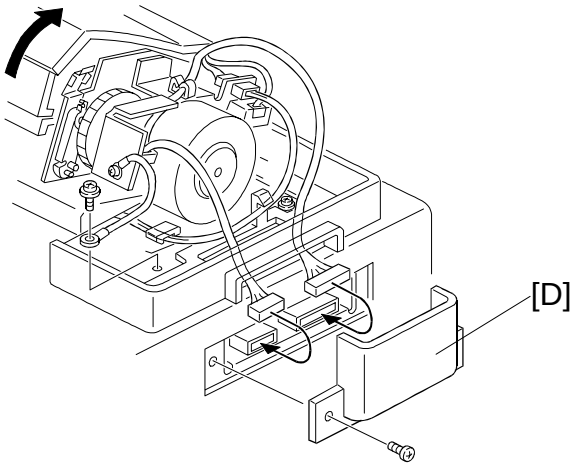


First, remove the ADF roller assembly [A].

A: ADF Roller Assembly

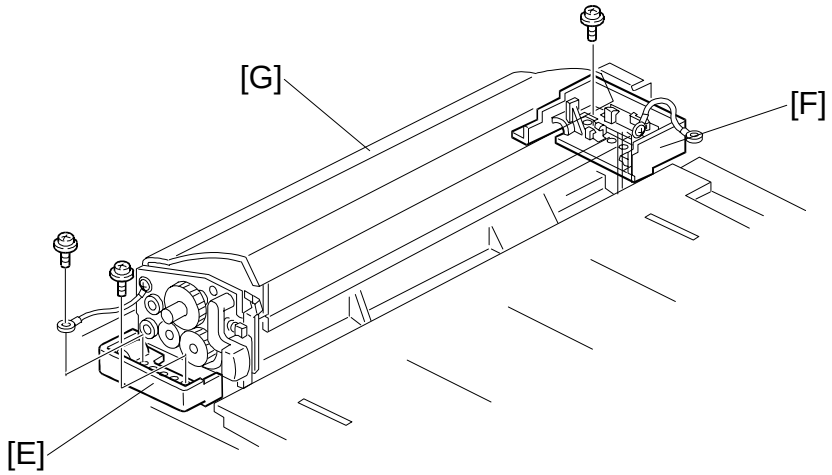
B: ADF Upper Front Cover (1 screw, 1 hook)

C: ADF Upper Rear Cover (1 screw, 2 hooks)



Remove the connector cover, then remove the harness and ground wire.

D: Connector Cover (1 screw)

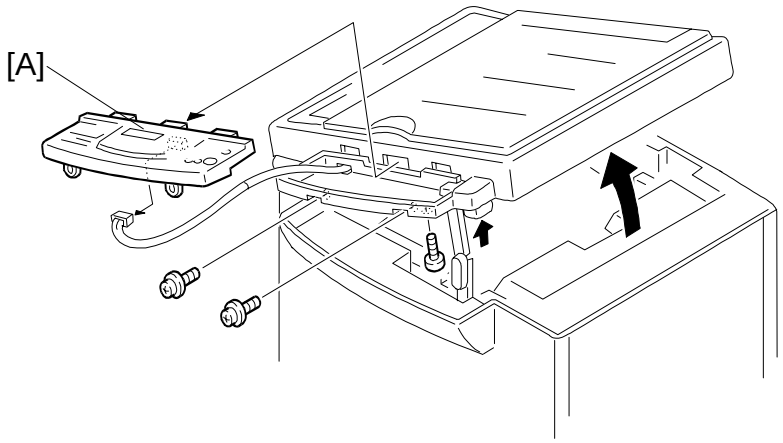


E: ADF Lower Front Cover (2 screws, 1 grounding wire)

F: ADF Lower Rear Cover (2 screws, 1 grounding wire)

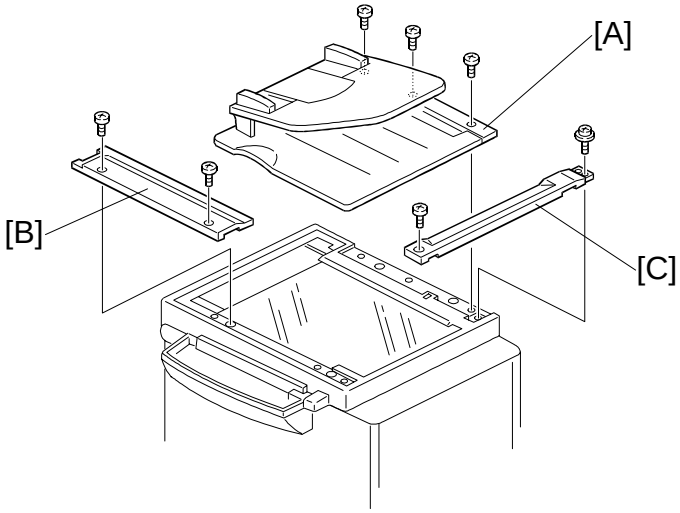
G: ADF Unit (2 connectors)

6.1.2 OPERATION PANEL



A: Operation Panel Assembly (3 tapping screws, 1 connector)

6.1.3 PLATEN COVER AND UPPER COVERS

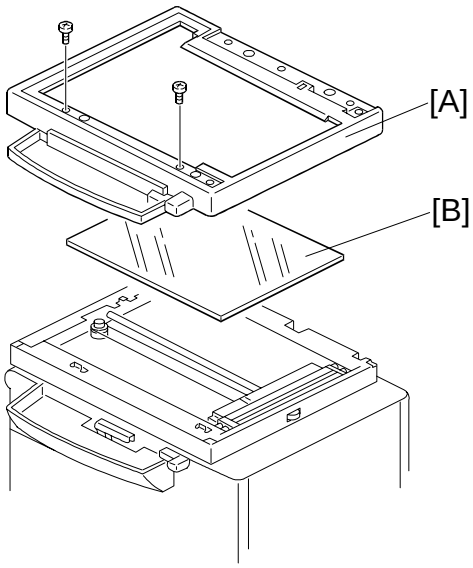


A: Platen Cover (3 tapping screws)

B: Horizontal Upper Cover (2 silver screws)

C: Vertical Upper Cover (1 silver screw, 1 screw)

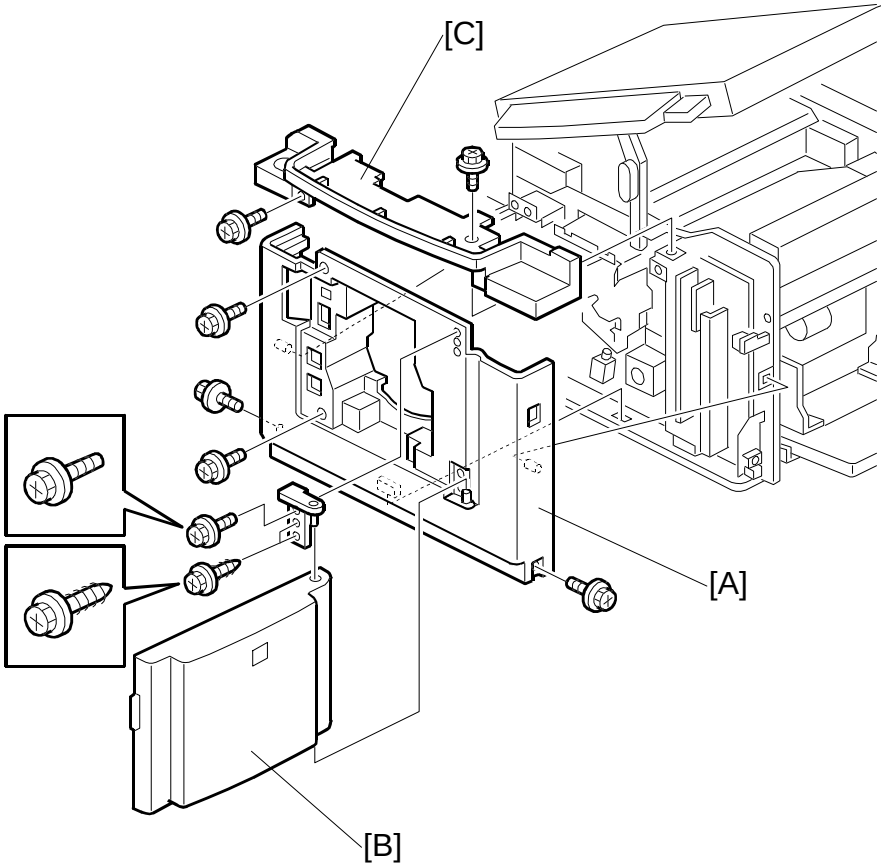
6.1.4 TOP COVER AND EXPOSURE GLASS



A: Top Cover (2 screws)

B: Exposure Glass

6.1.5 OTHER COVERS

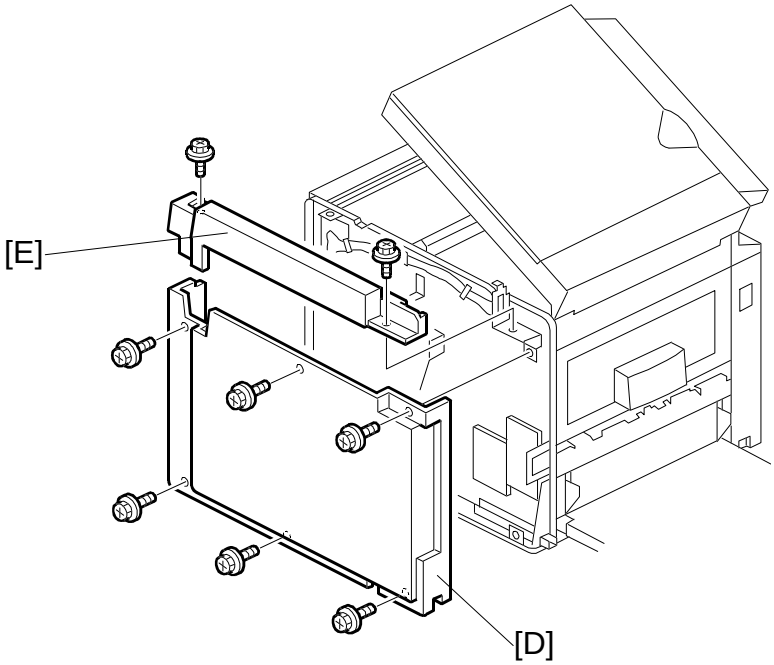


A: Front cover (5 screws).

B: Front door (2 screws).

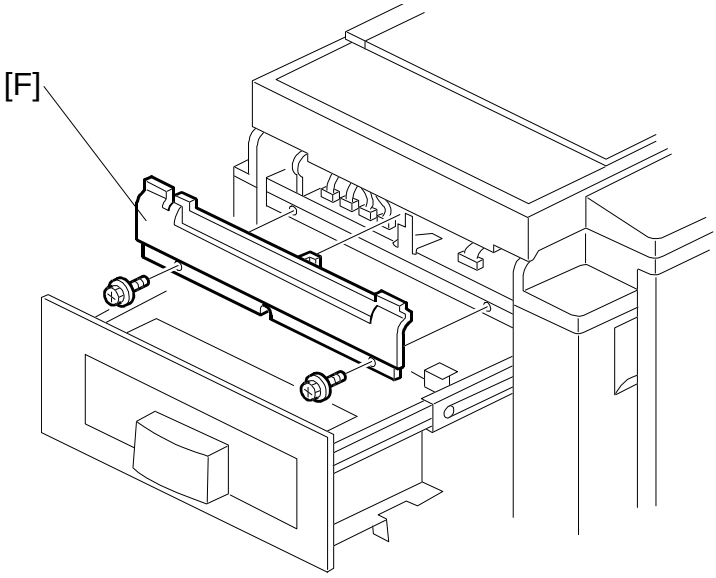
NOTE: The two screws are different in shape, as shown.

C: Operation panel under cover (2 screws).



D: Rear cover (6 screws).

E: Rear upper cover (2 screws).



F: Left upper cover (2 screws).

6.2 COPY IMAGE ADJUSTMENT

6.2.1 LEADING EDGE REGISTRATION ADJUSTMENT

PURPOSE: To adjust the leading edge registration on prints in platen mode and ADF mode.

ADJUSTMENT STANDARD:

Within 0 ± 2.0 mm (in platen mode)

Within 0 ± 2.5 mm (in ADF mode)

CAUTION: This adjustment is required every time the MPU has been replaced.

1. Turn on the main switch, and make a copy in platen mode.

   NOTE: The image position on the trial print that is automatically made after making a master tends to be inconstant. Do not use the trial print to check the copy image.
2. Measure the difference between the leading edge registration of the original and the print. If the registration does not meet specifications, go to the next step.
3. Access SP26 (Feed Timing Adjustment).
4. Adjust the gap.
5. Exit the SP mode and make a copy.
6. Re-measure the leading edge registration to ensure it is within specifications. If the registration meets specifications, go to the next step.
7. Make a copy in ADF mode and repeat the same steps using SP38 (ADF Scan Line Adjustment). The specification in ADF mode is 0 ± 2.5 mm.

   NOTE: SP38 changes the scanning start timing in the ADF mode, changing the leading edge registration in the ADF mode.

6.2.2 SIDE-TO-SIDE REGISTRAION ADJUSTMENT

PURPOSE: To adjust the side-to-side image position on prints by changing the main-scan positions in platen and ADF modes.

ADJUSTMENT STANDARD:

Within 0 ± 2.0 mm (in platen mode)

Within 0 ± 2.5 mm (in ADF mode)

CAUTION: This adjustment is required every time the MPU has been replaced.

1. Turn on the main switch, and make a copy in platen mode.

   NOTE: The image position on the trial print that is automatically made after making a master tends to be inconstant. Do not use the trial print to check the copy image.
2. Measure the difference between the side-to-side edge registration of the original and the print. If the registration does not meet specifications, go to the next step.
3. Access SP31 (Scan Center Adjustment - Platen Mode).
4. Adjust the gap.
5. Exit the SP mode and make a copy.
6. Re-measure the side-to-side registration to ensure it is within specifications. If the registration meets specifications, go to the next step.
7. Make a copy in ADF mode and repeat the same steps using SP37 (ADF Center Adjustment - ADF Mode). The specification in ADF mode is 0 ± 2.5 mm.

6.2.3 VERTICAL MAGNIFICATION ADJUSTMENT

PURPOSE: To adjust the vertical magnification to within the adjustment standard by changing the scanning speeds in platen and ADF modes.

ADJUSTMENT STANDARD:

Within 100 ± 1.0%

CAUTION: This adjustment is required every time the MPU has been replaced.

1. Turn on the main switch, and make a copy in platen mode.

   NOTE: The image position on the trial print that is automatically made after making a master tends to be inconstant. Do not use the trial print to check the copy image.
2. Measure the difference between the magnification of the original and the print. If the vertical magnification does not meet specifications, go to the next step.
3. Access SP30 (Sub-Scan Magnification Adjustment).
4. Adjust the value.
5. Exit the SP mode and make a copy.
6. Check the vertical magnification again to ensure it is within specifications. If the vertical magnification meets specifications, go to the next step.
7. Make a copy in ADF mode and repeat the same steps using SP 36 (ADF Magnification Adjustment).

6.2.4 LEADING EDGE BLANK MARGIN ADJUSTMENT

PURPOSE: To adjust the leading edge blank margin.

ADJUSTMENT STANDARD:

Within 5 mm

CAUTION: This adjustment is required every time the MPU has been replaced.

1. Turn on the main switch, and make a copy in platen mode.

   NOTE: The image position on the trial print that is automatically made after making a master tends to be inconstant. Do not use the trial print to check the copy image.

2. Measure the leading blank margin on the print. If the blank margin does not meet specifications, go to the next step.
3. Access SP33 (Lead edge Adjustment).
4. Adjust the value.
5. Exit the SP mode and make a copy.
6. Check the leading edge blank margin again to ensure it is within specifications.

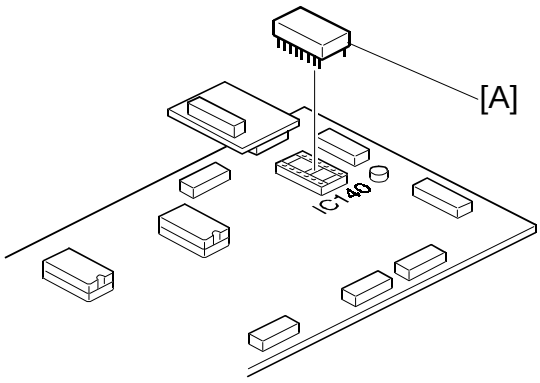
6.3 MPU REPLACEMENT

SP mode data and other adjustment data are stored in the backup RAM on the MPU.

Therefore, after replacing the MPU, be sure to do the following:

1) Vertical magnification adjustment (SP30, 36)
2) Side-to-side registration adjustment (SP31, 37)
3) Leading edge margin adjustment (SP33)
4) Leading edge registration adjustment (SP26, 38)
5) Correct drum type select (SP15)

NOTE: If you use the backup RAM [A] (IC140) from the old MPU for the new MPU, all data, including data in the SP mode, will be restored. You do not have to do the above procedures. (The battery inside the RAM can hold data when the RAM is removed from the MPU.)

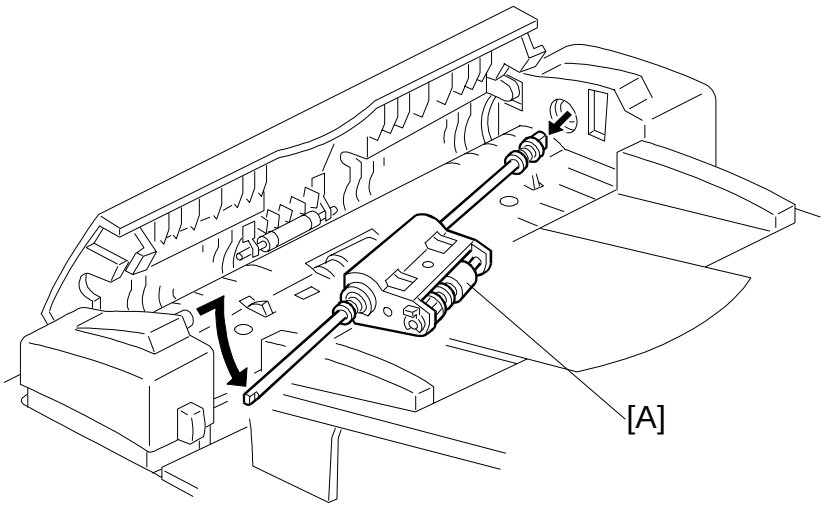


The following adjustments are needed even when you use the backup RAM from the old MPU on the new one:

1) Ink detection adjustment (Refer to section 6.9.5)
2) Master end sensor adjustment (Refer to section 6.5.4)

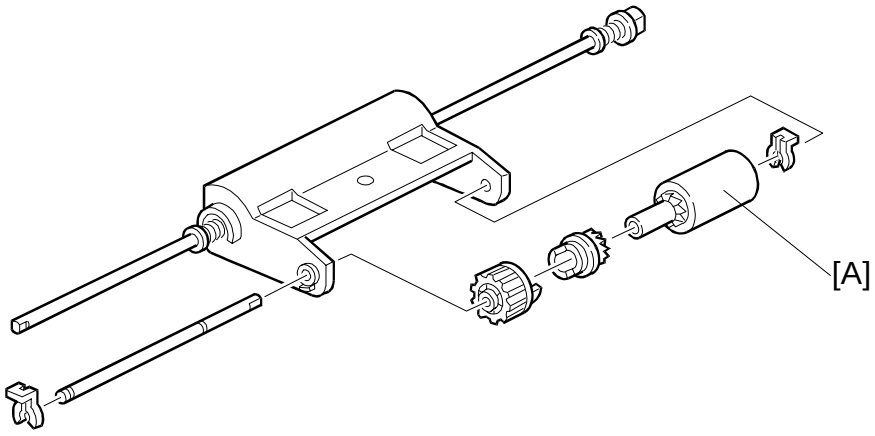
6.4 ORIGINAL FEED SECTION

6.4.1 ADF ROLLER ASSSEMBLY



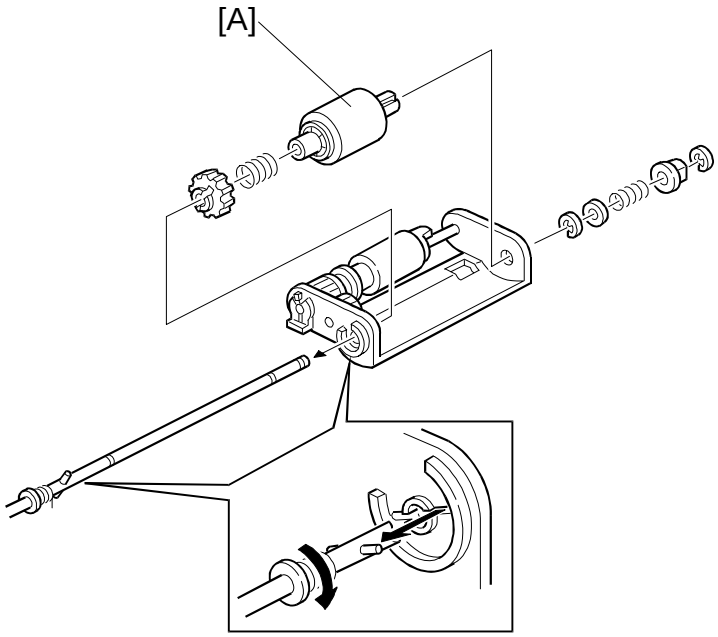
A: ADF Roller Assembly

6.4.2 PICK-UP ROLLER



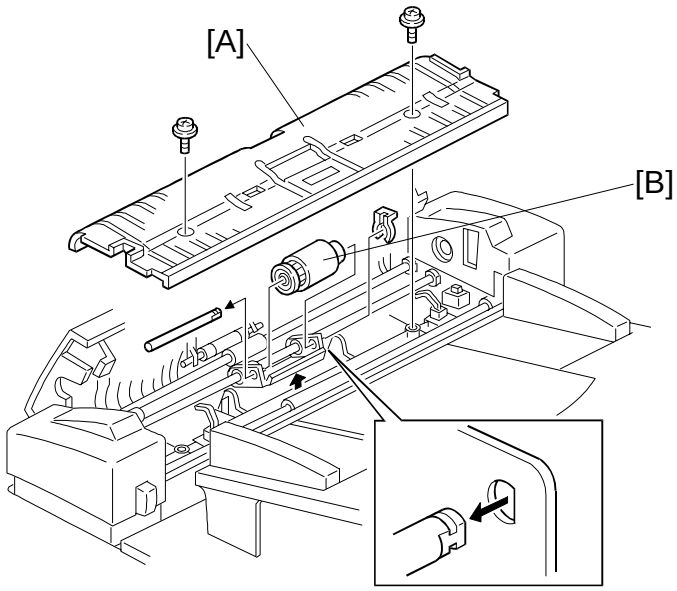
A: Pick-up Roller (2 clips, 2 gears)

6.4.3 FEED ROLLER



A: Feed Roller (1 clip, 1 gear, 2 springs, 2 E-rings, 1 washer)

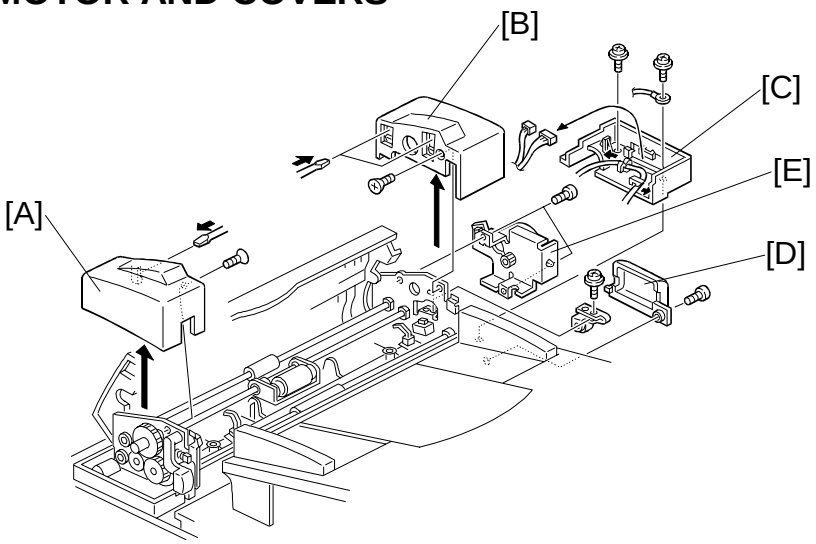
6.4.4 SEPARATION ROLLER



A: Upper Guide Plate (2 tapping screws)

B: Separation Roller (1 clip)

6.4.5 ADF MOTOR AND COVERS



A: ADF Upper Front Cover (1 screw, 1 hook)

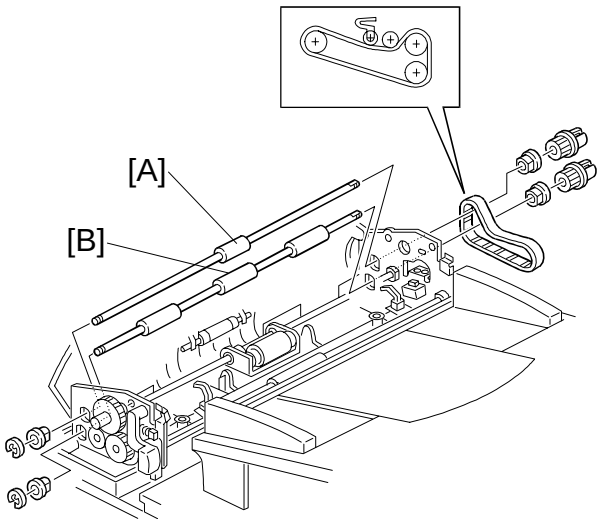
B: ADF Upper Rear Cover (1 screw, 2 hooks)

C: ADF Lower Rear Cover (2 screws)

D: Connector Cover (1 screw)

E: ADF Motor (2 screws)

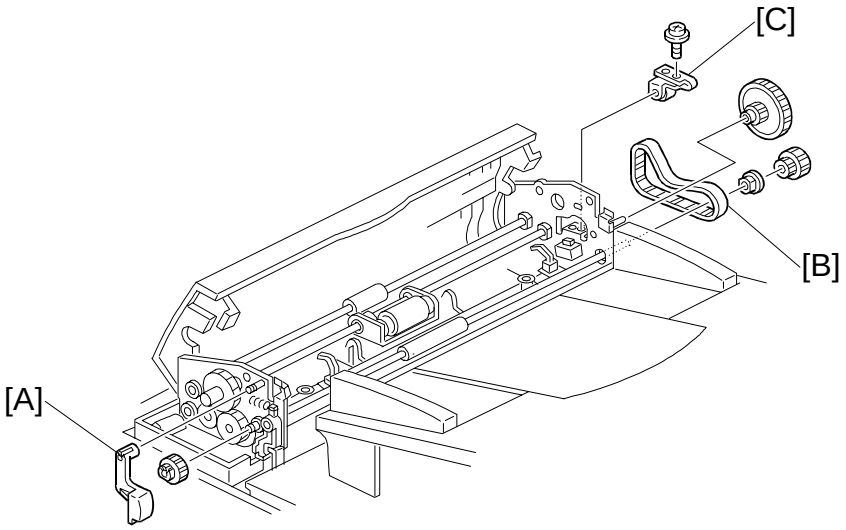
6.4.6 R0 AND R1 ROLLERS



A: R0 Roller (1 E-ring, 1 gear, 2 bushings)

B: R1 Roller (1 E-ring, 1 gear, 2 bushings)

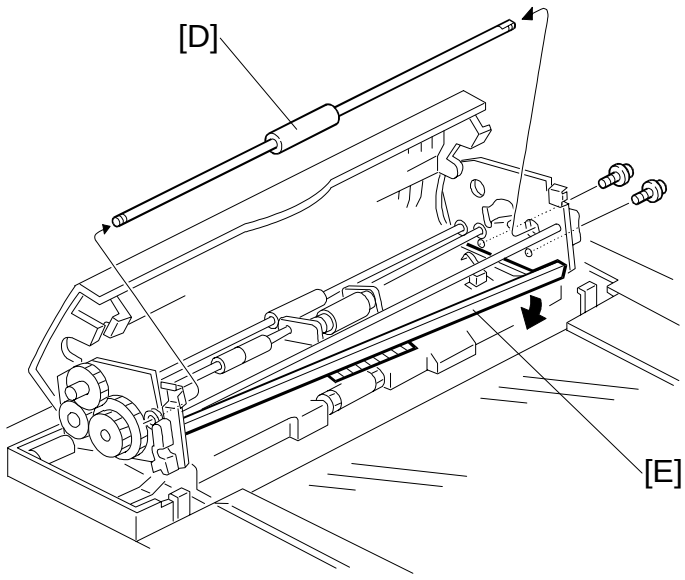
6.4.7 R2 ROLLER



A: ADF Release Lever

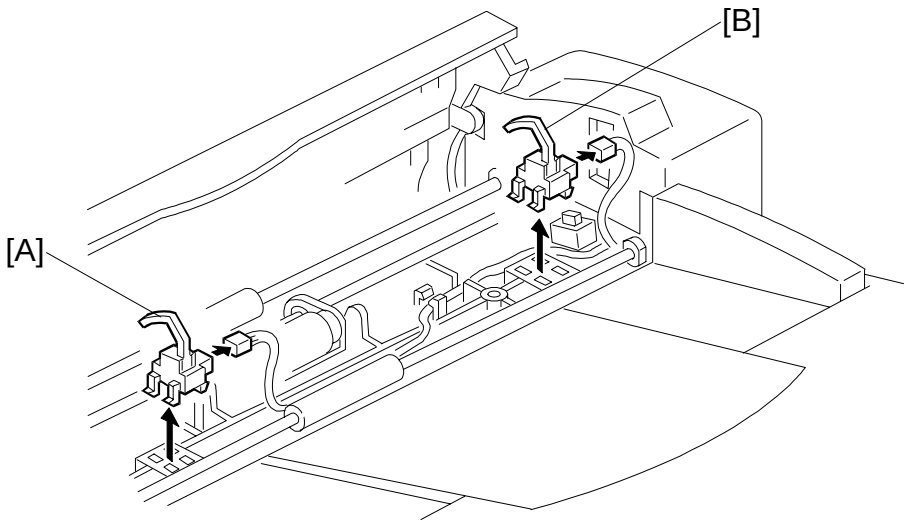
B: Timing Belt

C: Tensioning Roller Ass'y (1 screw)



Remove the R2 roller [D] while lowering the guide plate [E].

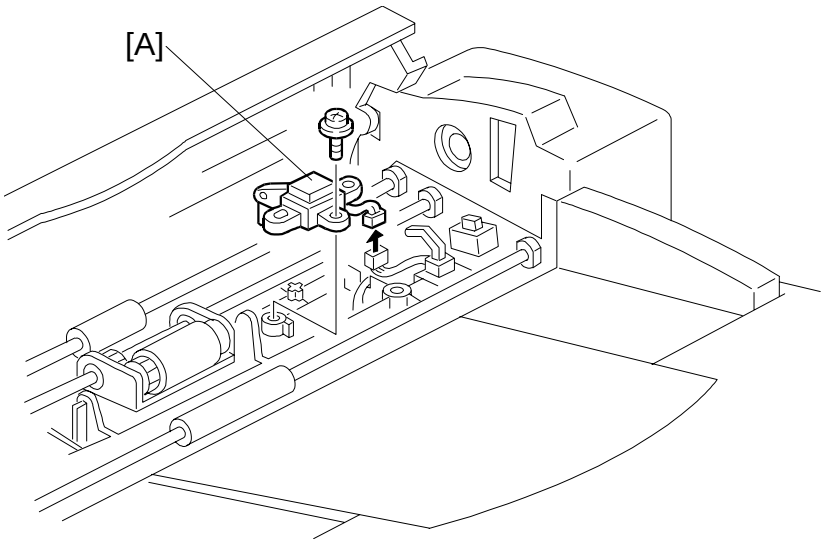
6.4.8 DOCUMENT SENSOR



A: Document Sensor

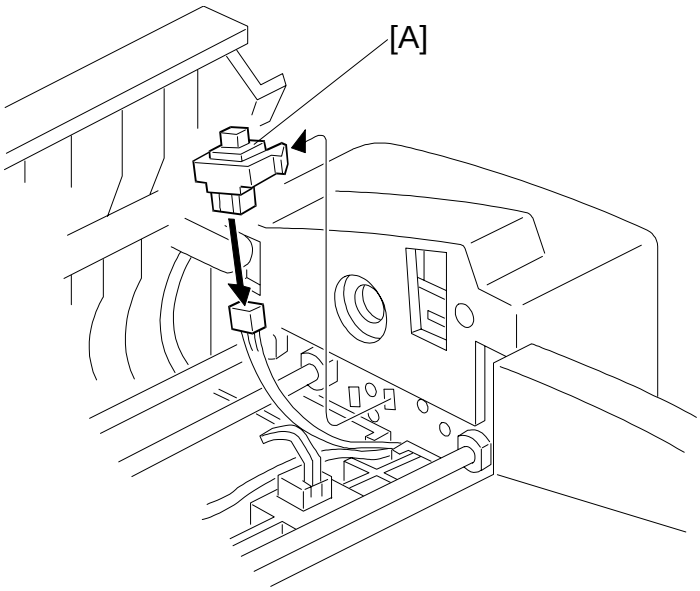
B: This sensor has no function

6.4.9 SCAN LINE SENSOR

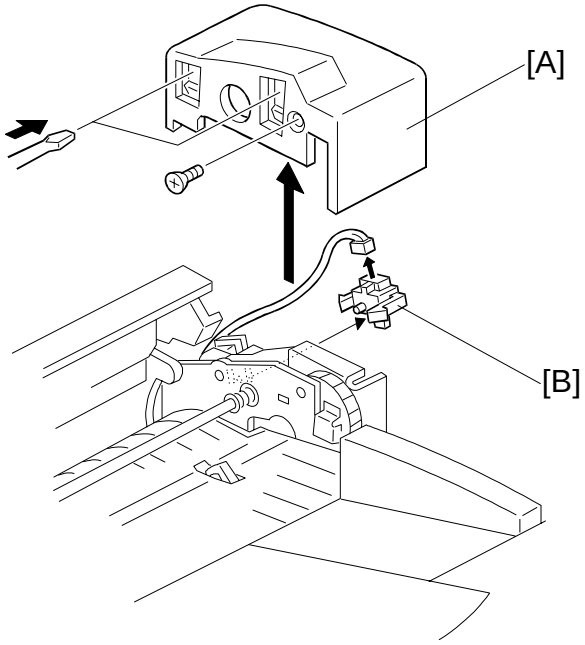


A: Scan Line Sensor (1 screw)

6.4.10 COVER SENSORS



A: ADF Cover Switch

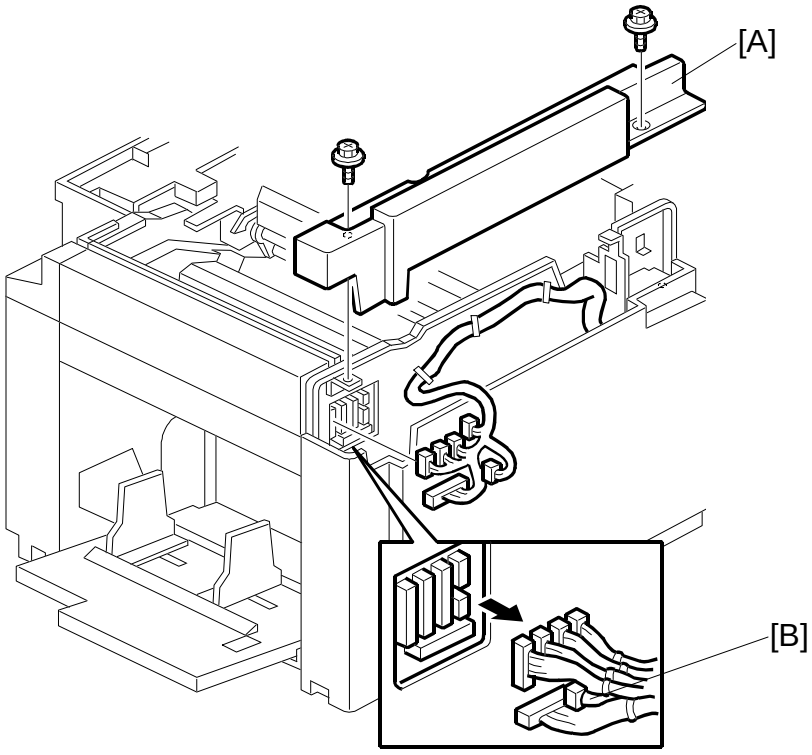


A: Upper Rear Cover (1 screw, 2 hooks)

B: ADF Switch

6.5 MASTER FEED SECTION

6.5.1 MASTER MAKING UNIT REMOVAL

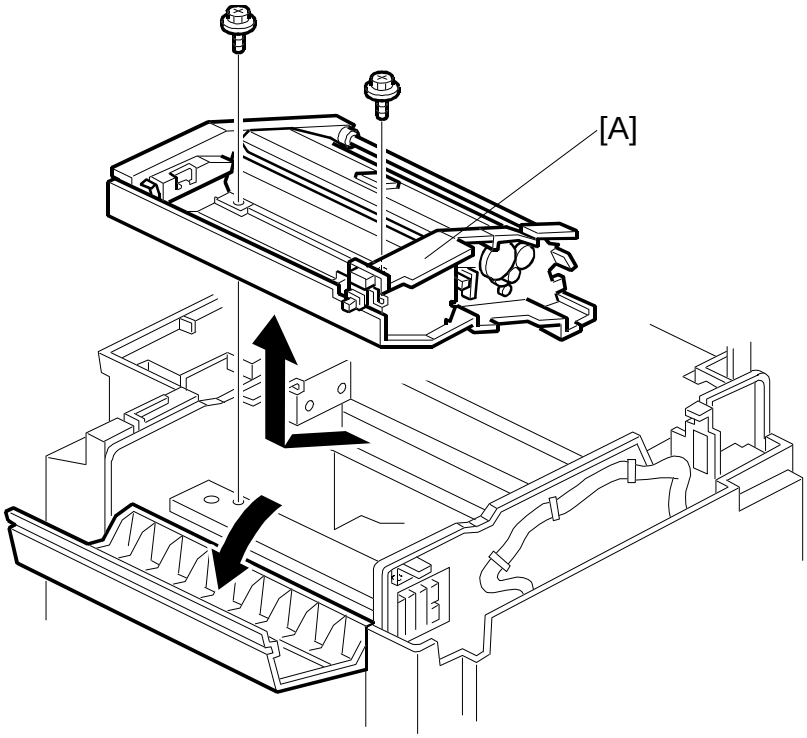


First, turn off the main switch and disconnect the power plug.

Then open the scanner unit.

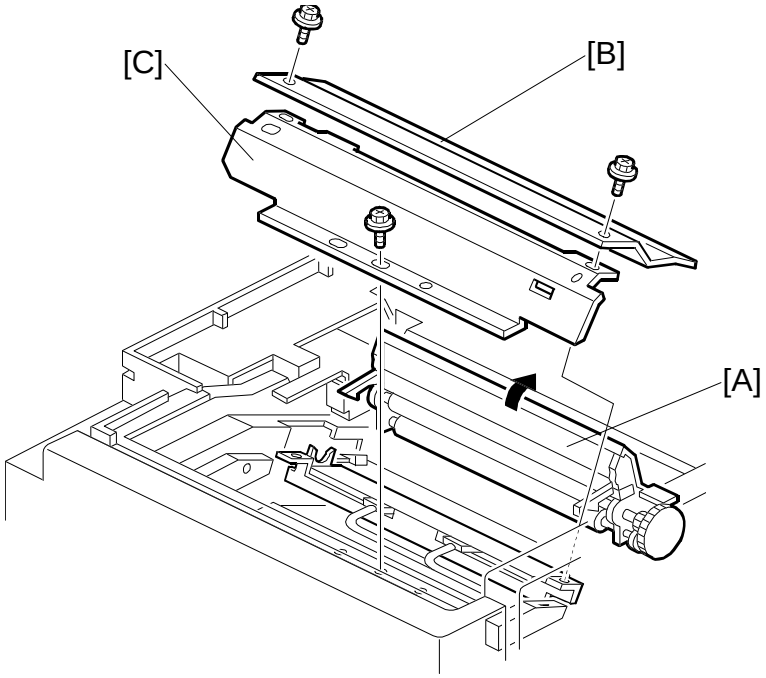
A: Rear upper cover (2 screws)

B: Disconnect 6 connectors



A: Master making unit (2 screws)

6.5.2 THERMAL HEAD REMOVAL

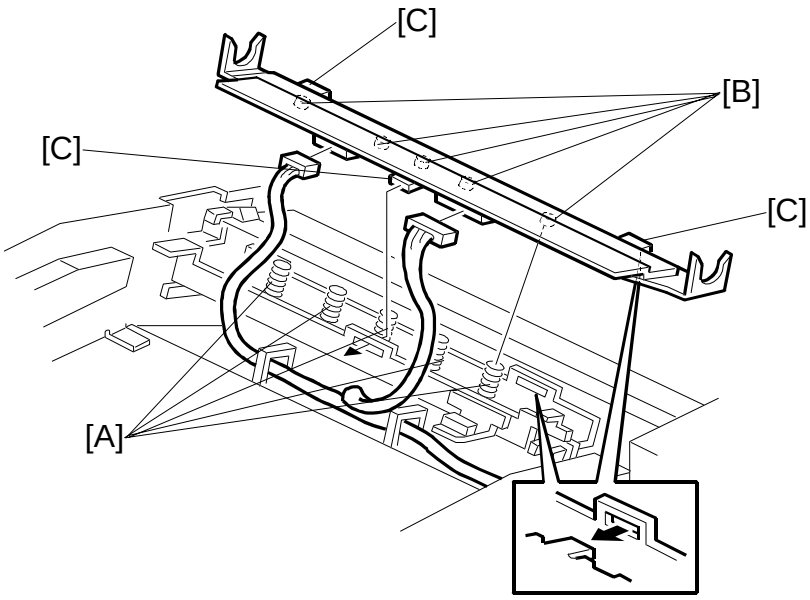


⚠CAUTION

If the thermal head has been replaced, the input voltage must be adjusted. Refer to "Thermal Head Voltage Adjustment". Refer to section 6.5.3.

1. Turn off the main switch and disconnect the power plug.
2. Remove the master making unit. (See Master Making Unit Removal.)
3. Open the platen roller unit [A].
4. Remove the thermal head upper cover [B] (2 screws).
5. Remove the thermal head side cover [C] (1 screw).
6. Remove the thermal head connector (2 connectors).(See the illustration on the following page.)
7. Unhook the lock pawls of the thermal head (3 lock pawls). Make sure to unhook the two rear sides (the drum side) first.
8. Remove the thermal head.

Remarks for thermal head installation



If the following remarks are not followed, the thermal head will be installed incorrectly.

1) Fit the base's springs [A] over the protrusions [B] on the underside of the thermal head (5 points).

2) While fitting the tops of the springs [A] over the protrusions on the underside of the thermal head, hook the lock pawls [C] of the thermal head onto the base (3 lock pawls). Make sure to set the front side (the paper table side) first.

3) The spring in the middle is longer than the other ones. Therefore, set the central protrusion first, then fit the other protrusions into the springs. Make sure that all protrusions are properly fit into the springs. With the master making unit removed from the machine, you can look from the tension roller side to check if the springs are fitted properly.

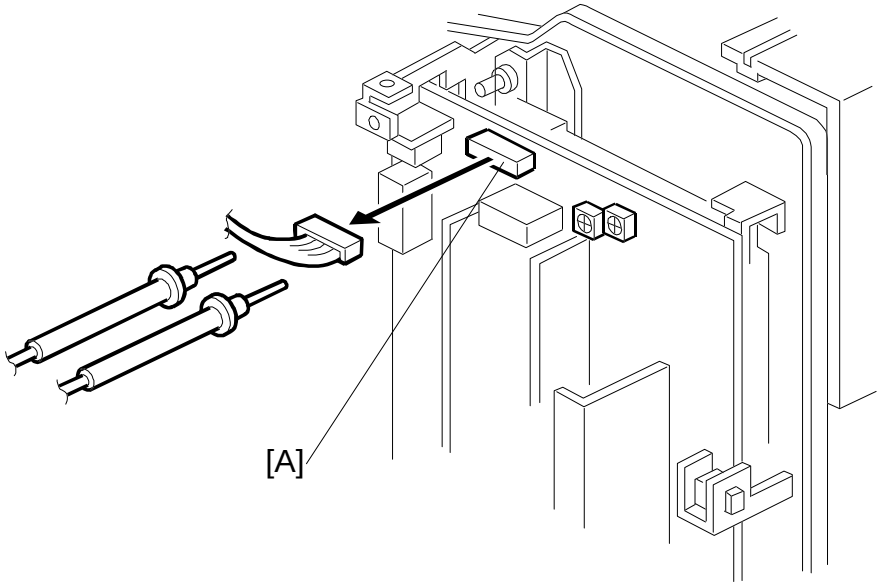
6.5.3 THERMAL HEAD VOLTAGE ADJUSTMENT

PURPOSE: To maintain master making quality and extend the lifetime of the thermal head.

ADJUSTMENT STANDARD:

Refer to the voltage value (X) printed on the thermal head. The value varies from one thermal head to another.

The adjustment voltage should be between X and X - 0.1 V.

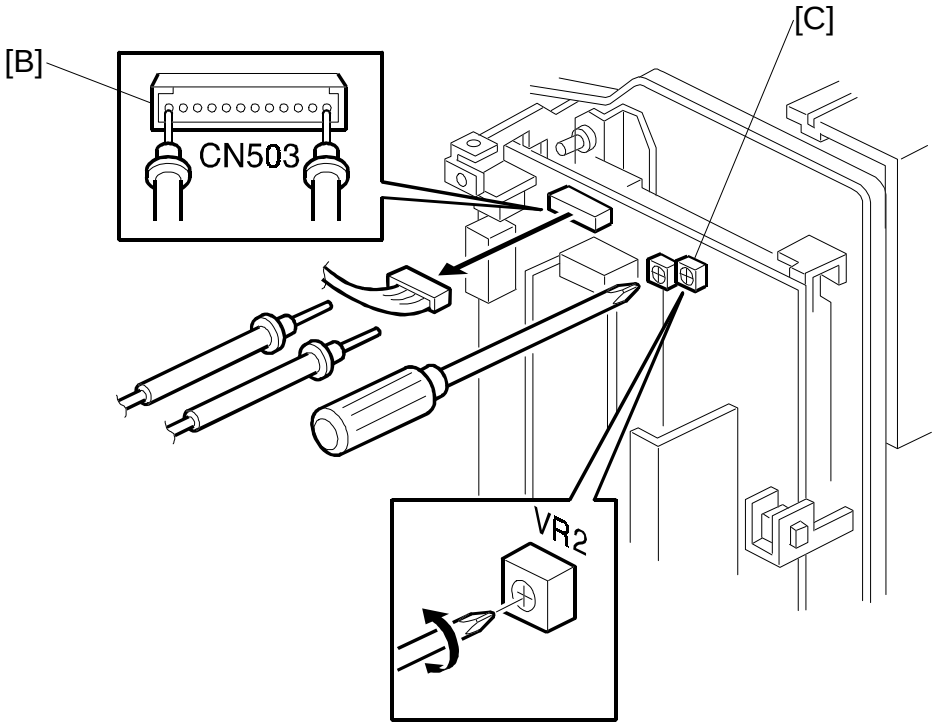


⚠CAUTION

This adjustment is always required when the thermal head or power supply unit has been replaced.

1. Turn off the main switch and disconnect the power plug.
2. Remove the front cover and panel cover (6 screws).
3. Disconnect CN503 [A] on the power supply unit.
4. Read the voltage value on the decal on the thermal head.(not shown)
5. Connect the power plug, and turn on the main switch to access SP mode, #131, output check mode.
6. Select the thermal head power supply output check mode 41.

MASTER FEED SECTION



7. Press the Start key. The power to the thermal head is continually applied. Press the Stop key if you cannot finish the adjustment quickly.

   NOTE: A beeper sounds while the power is supplied.

8. Measure the voltage between an output terminal Pin 14(VHD) and a grounding terminal Pin 1(VHD GND) of CN503.

⚠CAUTION
Use the outside terminals of the connector as shown [B] to measure the voltage. If the output and ground terminals touch each other, the board will be damaged.

9. Turn VR2 [C] so that the value becomes between "+0" and "-0.1" volts of the voltage value that is printed on the thermal head decal.

⚠CAUTION
Never turn VR2 [C] clockwise rapidly while the connector is connected. The thermal head will be damaged if too much voltage is supplied suddenly.

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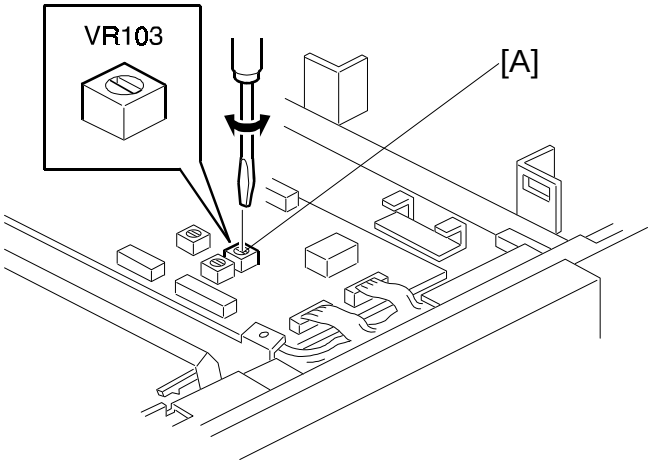
6.5.4 MASTER END SENSOR ADJUSTMENT

PURPOSE: To ensure that the sensor detects the end mark (a solid black area) on the master roll.

ADJUSTMENT STANDARD:

Within 1.5 ± 0.1 volts (when detecting the solid black area)

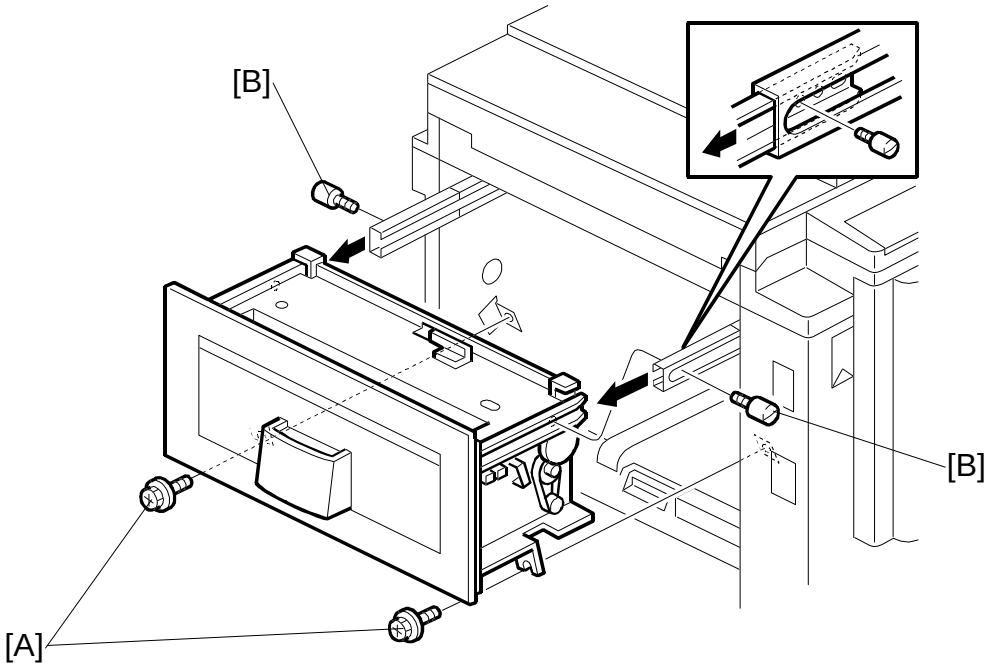
Within 3.7 ± 0.1 volts (when detecting a new master roll)



1. Make a print that includes a solid fill black area.
2. Open the scanner unit, and remove the master roll.
3. Put the print so that the solid black image faces the master end sensor.
4. Turn on the main switch and access SP mode.
5. Select the master end sensor voltage mode (SP 135), then press the Enter key.
6. The sensor input voltage is displayed on the operation panel. (If the displayed voltage is 1.5 ± 0.1 volts, the following steps are not necessary.)
7. Open the scanner unit, and remove the MPU cover (2 screws).
8. Turn VR103 [A] so that the sensor input voltage becomes 1.5 ± 0.1 volts.
9. Remove the solid black pattern from the master end sensor.
10. Install a new master roll.
11. The sensor input voltage is displayed on the operation panel. Check that it is 3.7 ± 0.1 volts.

6.6 MASTER EJECT SECTION

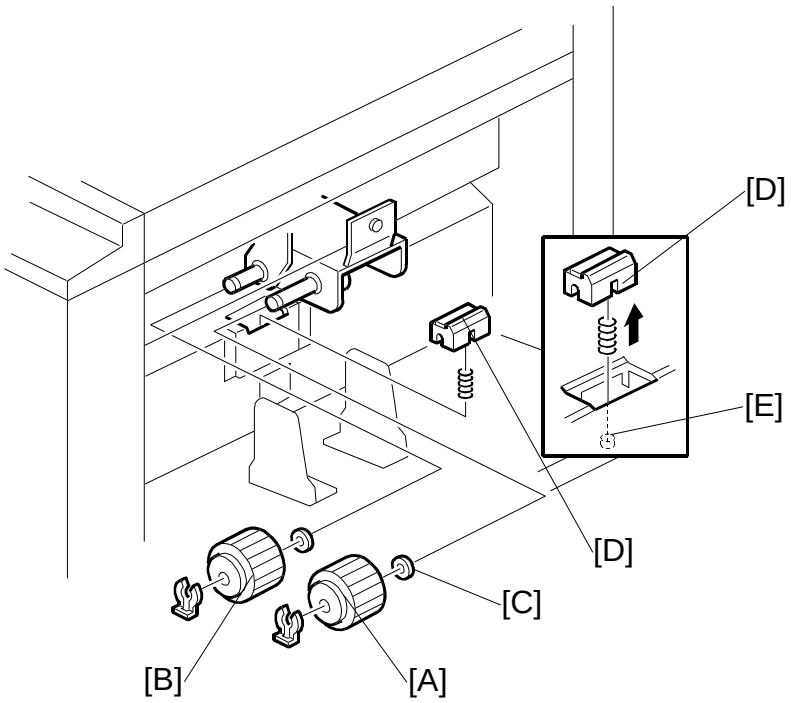
6.6.1 MASTER EJECT UNIT REMOVAL



1. Turn off the main switch and disconnect the power plug.
2. Remove the 2 screws [A].
3. Pull out the master eject unit.
4. Remove the 2 screws [B].

6.7 PAPER FEED SECTION

6.7.1 PAPER FEED ROLLER, PICK-UP ROLLER, AND FRICTION PAD



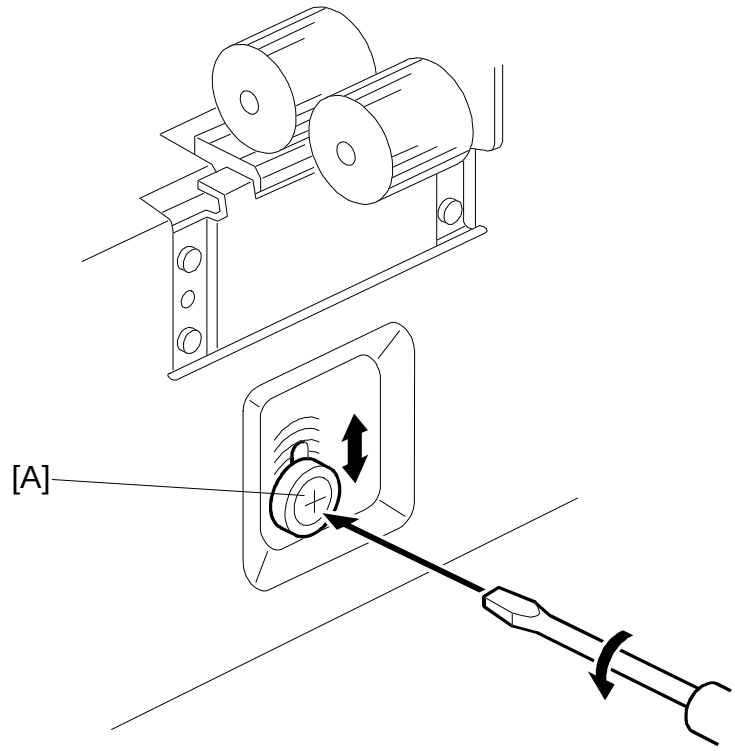
1. Turn off the main switch and disconnect the power plug.
2. Lower the paper table, and remove the pick-up roller [A] (1 snap ring).
3. Remove the paper feed roller [B] (1 snap ring).

   NOTE: 1) Do not lose the small spacers [C] inside the rollers.
   2) Install the paper feed roller in the proper way round, due to the one-way built-in clutch. The clutch faces inside.
4. Remove the friction pad base [D].

NOTE: Install the friction pad base in the proper direction, as shown. Also, be sure that the friction pressure spring is properly set into the hole in the friction pad base [D] and over the projection [E] in the bottom hold. Otherwise, paper misfeed will occur.

6.7.2 PAPER SEPARATION PRESSURE ADJUSTMENT

PURPOSE: To ensure that the friction pad exerts sufficient pressure for smooth printing paper separation.



Adjust the paper separation pressure by loosening and moving up or down the adjusting screw [A].

- Moving the screw up ⇒ Increases the paper separation pressure
- Moving the screw down ⇒ Decreases the paper separation pressure

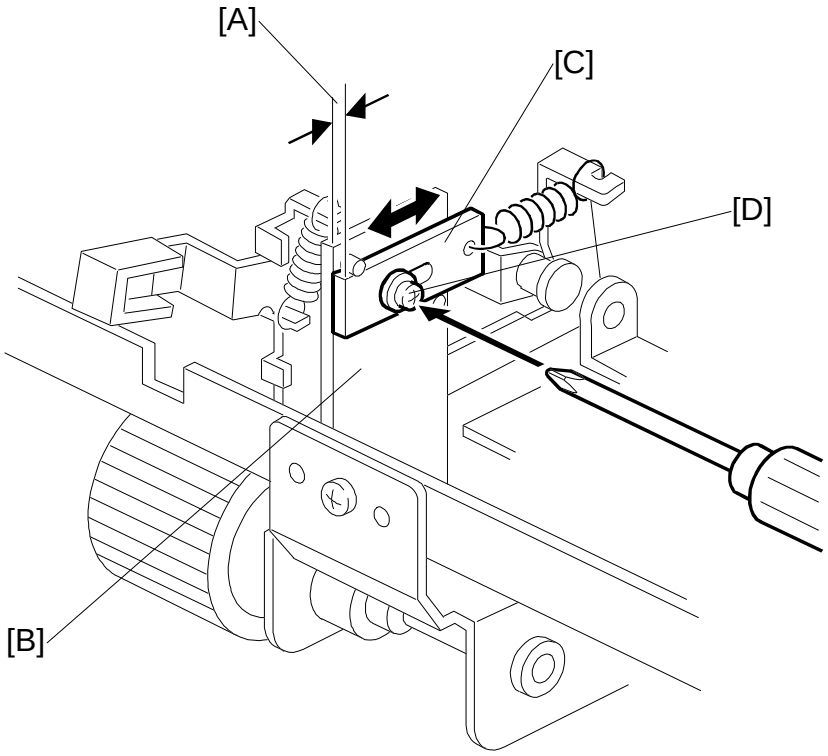
Tighten the screw after the adjustment.

NOTE: As the default, the screw is set at the lowest position.

6.7.3 PAPER FEED PRESSURE ADJUSTMENT

PURPOSE: To ensure that the paper feed roller exerts sufficient pressure for smooth printing paper feed.

ADJUSTMENT STANDARD:
0.0 to 0.3 mm



NOTE: Users can adjust the paper feed pressure using the paper feed pressure lever. The adjustment method in this section is an additional adjustment for service technicians only.

1. Remove the paper table upper cover (7 screws), and check the gap [A] between the bracket [B] and spring anchor [C].

   NOTE: As the default, the gap [A] is less than 0.3 mm.

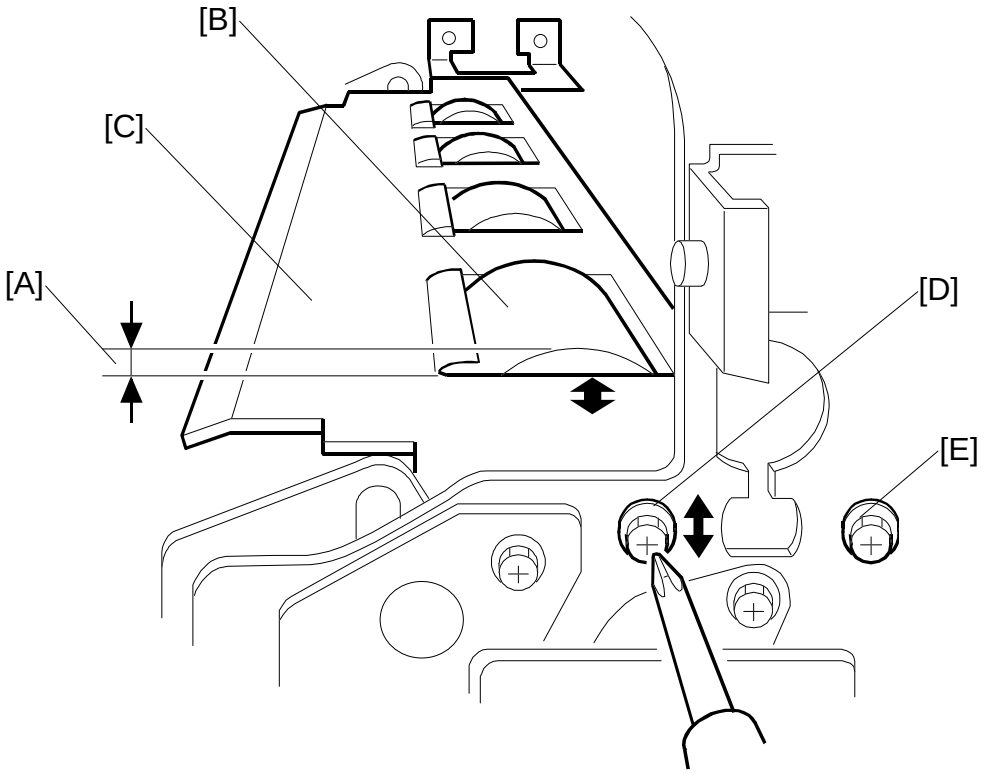
2. Adjust the paper feed pressure by moving the spring anchor [C] (loose the screw [A]).
   - Moving it towards the front ⇒ Increases the feed pressure
   - Moving it towards the rear ⇒ Decreases the feed pressure

6.7.4 REGISTRATION ROLLER CLEARANCE ADJUSTMENT

PURPOSE: To ensure smooth paper feed with no paper jams, folds, or wrinkles.

ADJUSTMENT STANDARD:

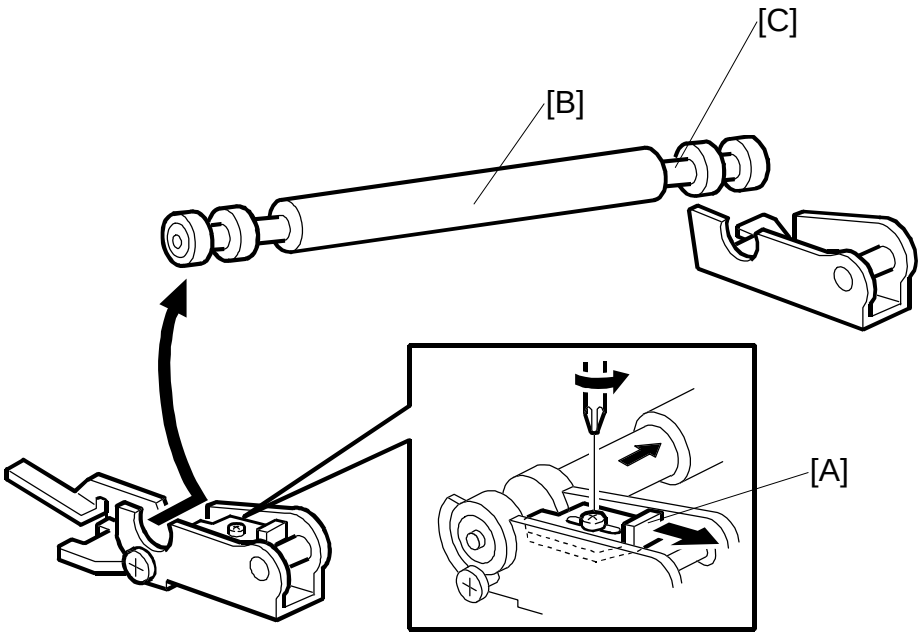
0.2 to 0.4 mm



1. Turn off the main switch and disconnect the power plug.
2. Remove the front cover. (See 6.1.5 Other Covers.)
3. Measure the clearance [A] between the lower registration roller [B] and the guide plate [C]. It should be 0.2 to 0.4 mm.
4. If it is not correct, adjust the position with the screw [D] after loosening the screw [D] and [E].
5. Repeat steps 3 and 4 for the rear side of the machine.

6.8 PRINTING SECTION

6.8.1 PRESS ROLLER REMOVAL



⚠CAUTION

Take care to avoid possible injury. If the printing pressure release arms disengage, the press roller will be pulled upwards suddenly.

1. Turn off the main switch and disconnect the power plug.
2. Remove the drum unit.
3. Remove the front cover (4 screws). (See 6.1.5 Other Covers.)
4. Loosen the screw and slide the bracket [A].
5. Remove the press roller [B].

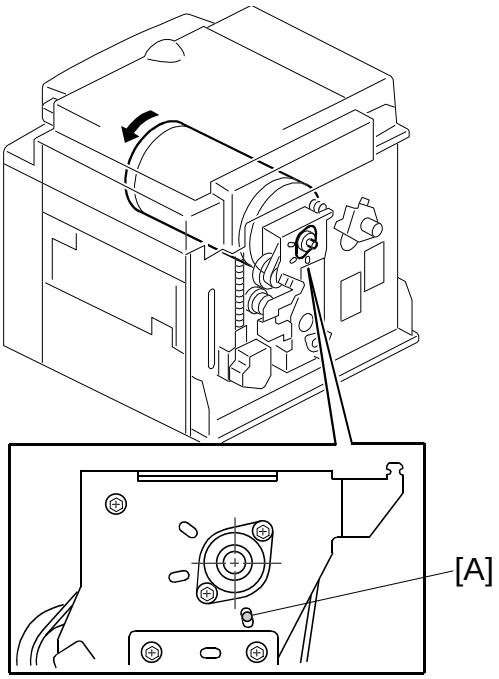
CAUTION: The length of the exposed shaft on the rear and front differs. During installation, ensure that the longer exposed shaft [C] is positioned towards the rear of the machine.

6.8.2 PRESS ROLLER LOCK LEVER ADJUSTMENT

PURPOSE: To maintain the correct clearance between the press roller arms and press roller lock levers. This ensures that the press roller is correctly released and pressed against the drum when the press roller release solenoid is energized.

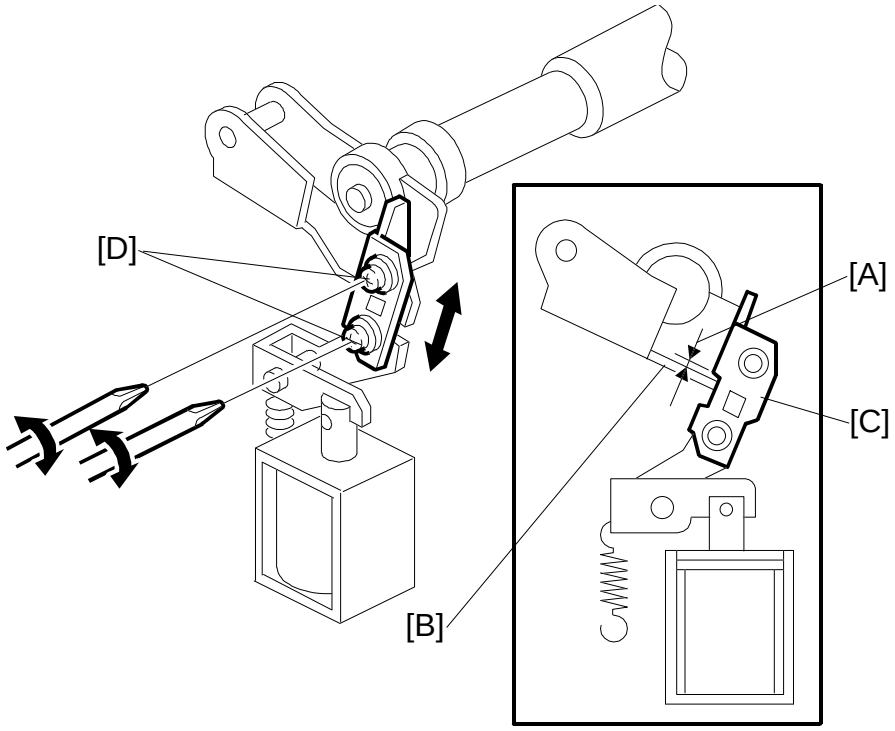
ADJUSTMENT STANDARD:

0.7 to 1.2 mm



1. Turn off the main switch and disconnect the power plug.
2. Remove the drum unit and remove the front cover (4 screws).
   NOTE: The front cover must be removed prior to the adjustment.
3. Reinstall the drum.
4. Remove the rear cover (6 screws). (See 6.1.5 Other Covers.)
5. Turn the drum manually until the drum master clamper on the drum moves into the lowest position. (The high points of the cams on the drum flanges meet with the cam followers on both ends of the press roller.)

   NOTE: To identify the correct position of the drum for the adjustment, look at the rear end of the drum shaft. The recess on the drum drive gear meets the long hole [A] in the bracket when the drum is in the correct position.



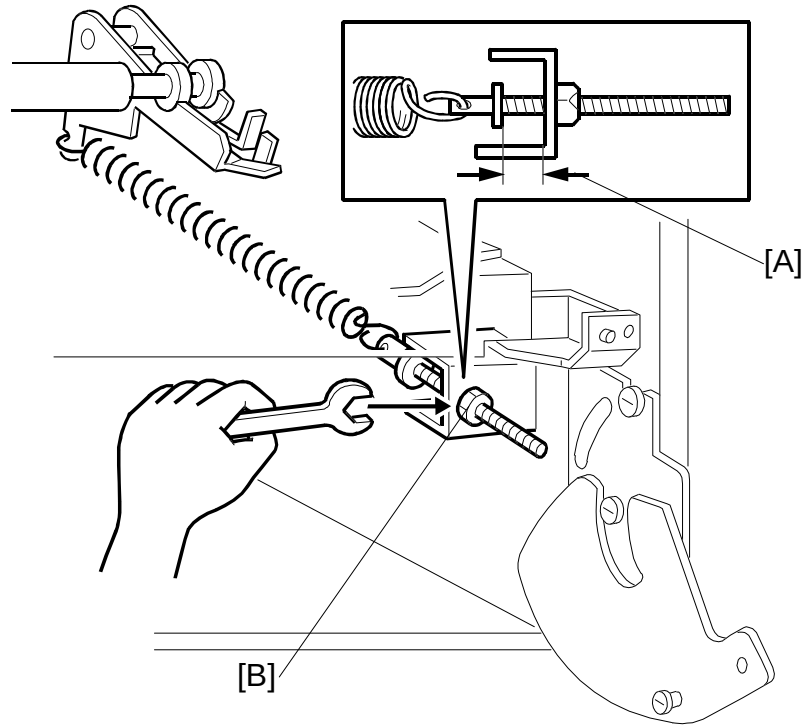
6. Using a thickness gauge, measure the clearance [A] between the press roller arm [B] and press roller lock lever [C] (rear side). It should be between 0.7 and 1.2 mm.
7. If it is not correct, adjust the position of the press roller lock lever after loosening the two screws [D].
8. Repeat steps 6 and 7 for the press roller lock lever located on the operation side of the machine.

6.8.3 PRINTING PRESSURE ADJUSTMENT

PURPOSE: To make better print results without decreasing the run length.

ADJUSTMENT STANDARD:

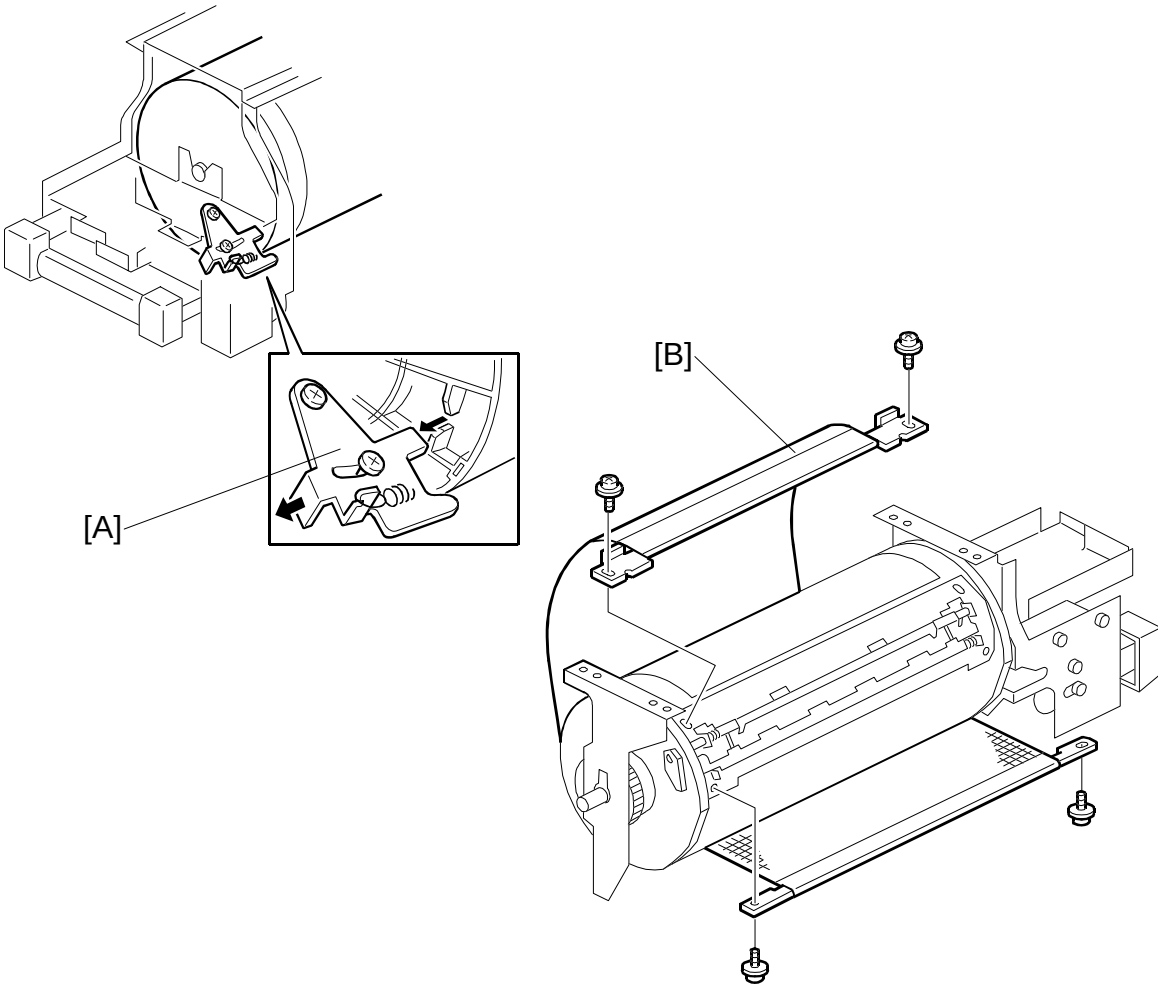
Within 10 ± 0.5 mm



1. Turn off the main switch and disconnect the power plug.
2. Remove the paper delivery cover. (See 6.10.1 Vacuum Unit Removal.)
3. Adjust the distance [A] to 10 ± 0.5 mm by turning the adjusting bolt [B].
4. Repeat the same procedure for the printing pressure spring at the non-operation side of the machine.

6.9 DRUM AND DRIVE SECTION

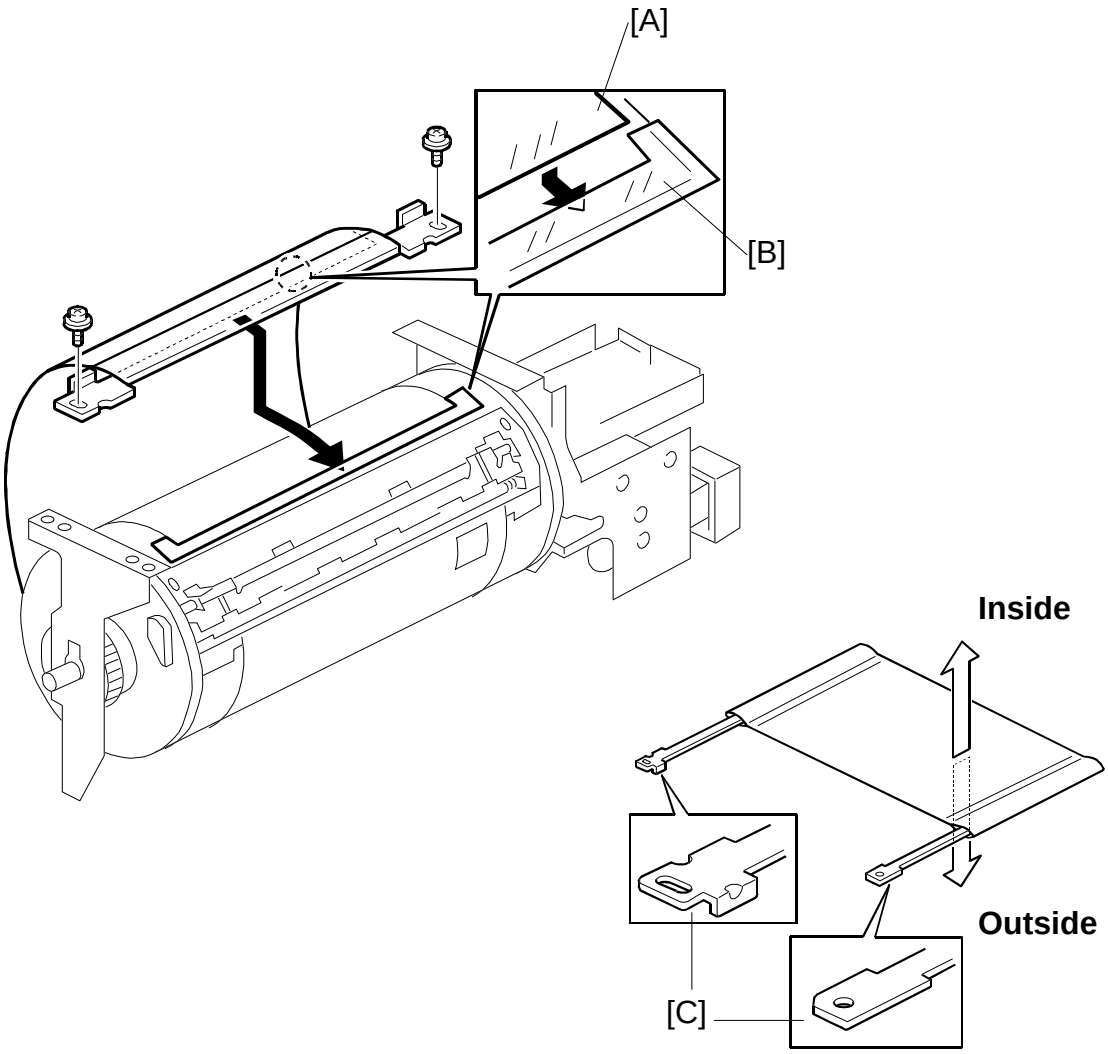
6.9.1 DRUM CLOTH SCREEN REMOVAL



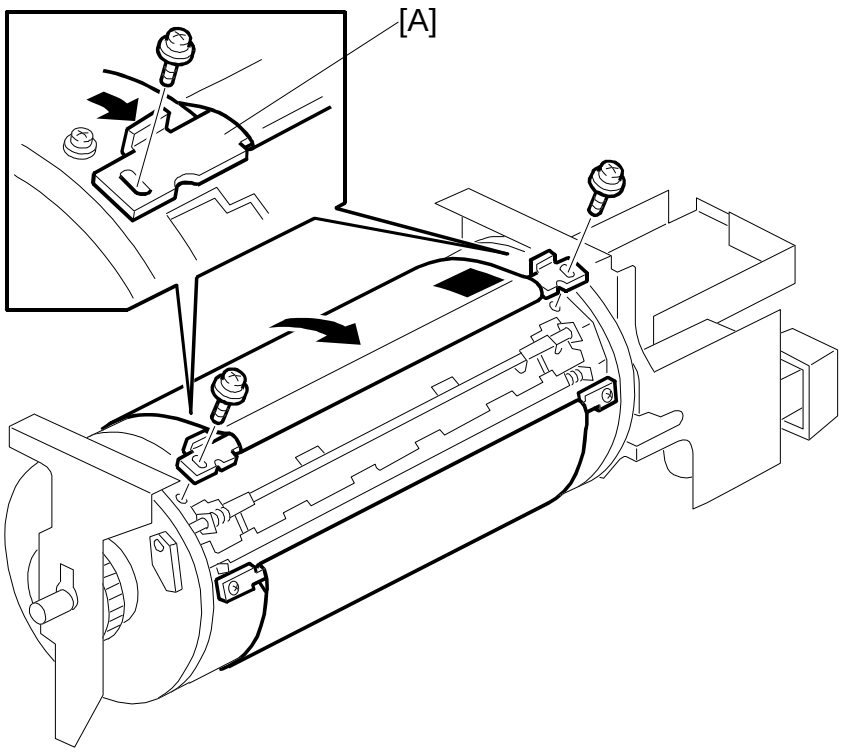
NOTE: Do not settle the drum unit upside down. However, if the drum unit was settled upside down, wipe off the ink around the ink roller beforehand (to do this, remove the ink cartridge, use SP 140, select OFF in ink detection mode, and feed paper until the ink supply ends).

1. Turn off the main switch and disconnect the power plug.
2. Remove the drum unit.
3. Remove the drum upper bracket (4 screws).(not shown)
4. Release the stopper [A], then rotate the drum until the master clamper faces upward.
5. Remove the cloth screen [B] (4 screws).

Remarks for the cloth screen installation

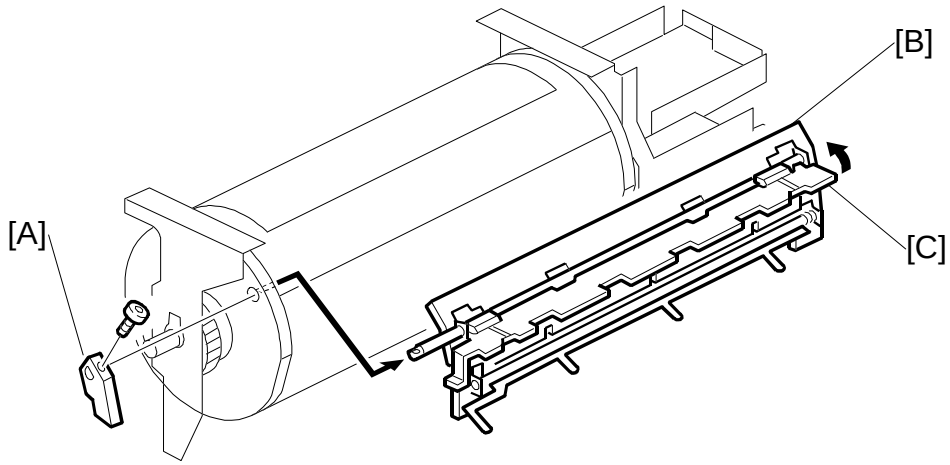


- Do not scratch the cloth screen or metal screen.
- Properly insert the edge of the mylar [A] on the cloth screen under the mylar [B] on the metal screen, as shown above.
  Otherwise, ink will leak from the trailing edge of the master onto the drum during a long printing run.
- Make sure that the correct side of the screen is facing up. In addition, make sure that the stays for [C] securing the cloth screen are positioned correctly. (Refer to the lower right illustration.)



- When replacing the cloth screen, spread the screen around the metal screen while strongly pulling the stay [A]. Adjust the stay so that it is parallel to the master clamper, then tighten the screws.
- Make sure that the cloth screen is not wrinkled while spreading it around the drum.

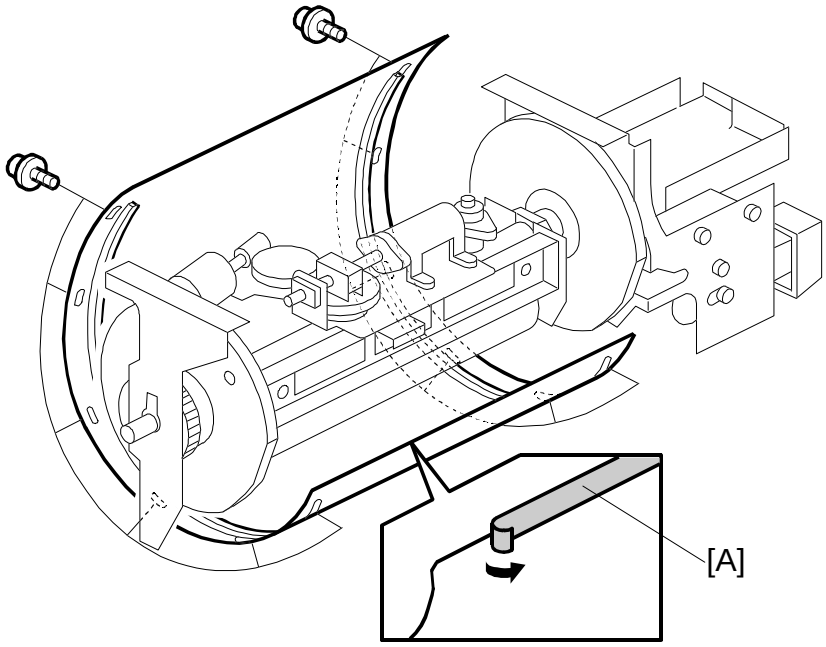
6.9.2 DRUM MASTER CLAMPER AND METAL SCREEN REMOVAL



NOTE: Do not settle the drum unit upside down. However, if the drum unit was settled upside down, wipe off the ink around the ink roller beforehand (to do this, remove the ink cartridge, use SP 140, select OFF in ink detection mode, and feed paper until the ink supply ends).

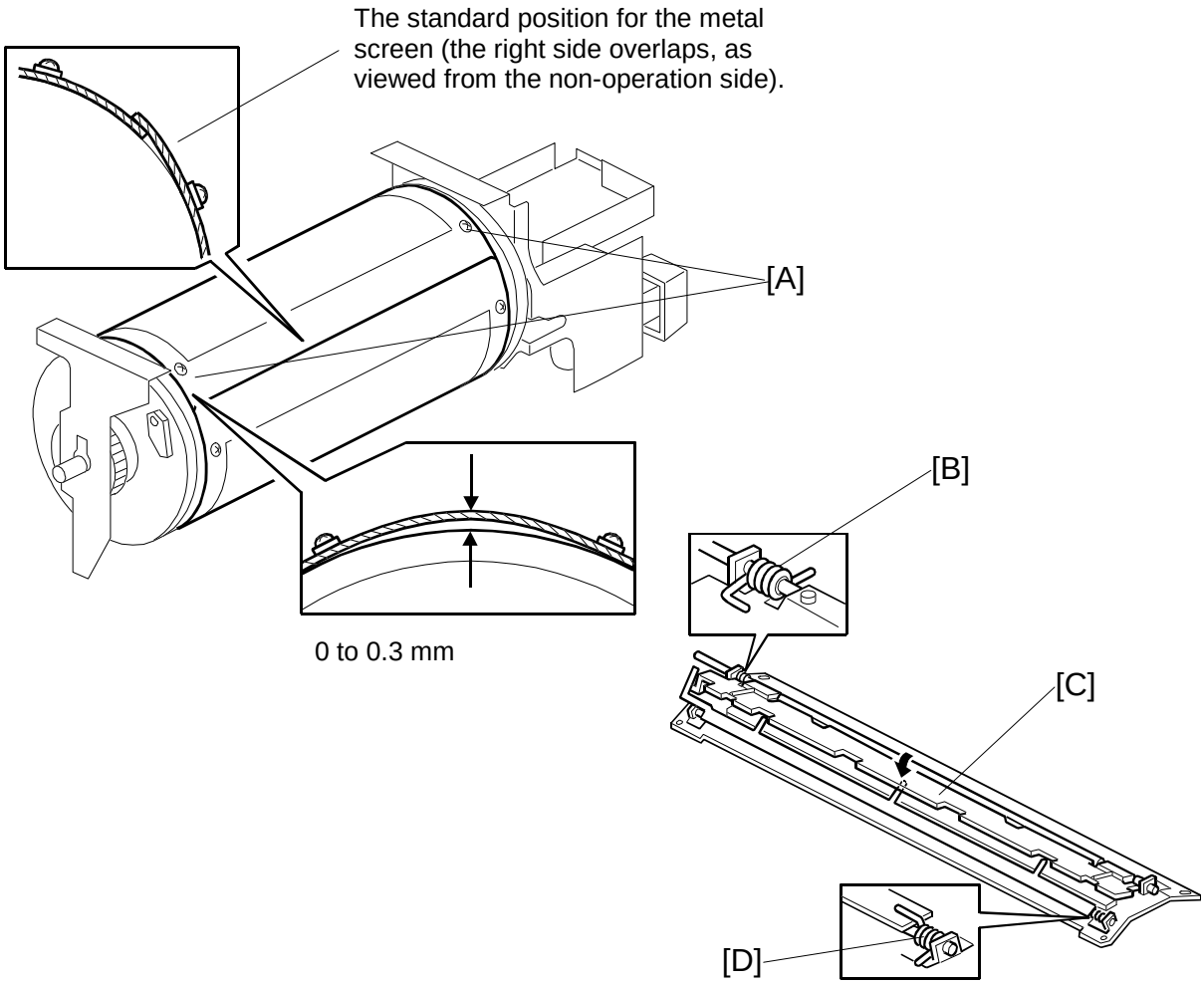
1. Turn off the main switch and disconnect the power plug.
2. Remove the drum.
3. Remove the drum screen. (See 6.9.1 Drum Cloth Screen Removal.)
4. Remove the clamper open lever [A] (1 hexagon screw).
5. Remove the drum master clamper [B] while opening the clamping plate [C].

NOTE: 1) Do not allow the inside of the clamping plate [C] to become dirty with ink. If it is dirty with ink, the master may slip and the image position on the prints will move toward the trailing edge of the print during a printing run.
2) Use a cloth dampened with water to clean the inside of the clamping plate [C]. Never use alcohol or other solvents. The clamping force of the magnet will be weakened.



6. Peel off the tape [A].
7. Remove the metal screen (12 screws).

Remarks for drum screen installation



- Make sure that the correct end of the metal screen is overlapping. (Refer to the upper left illustration.)

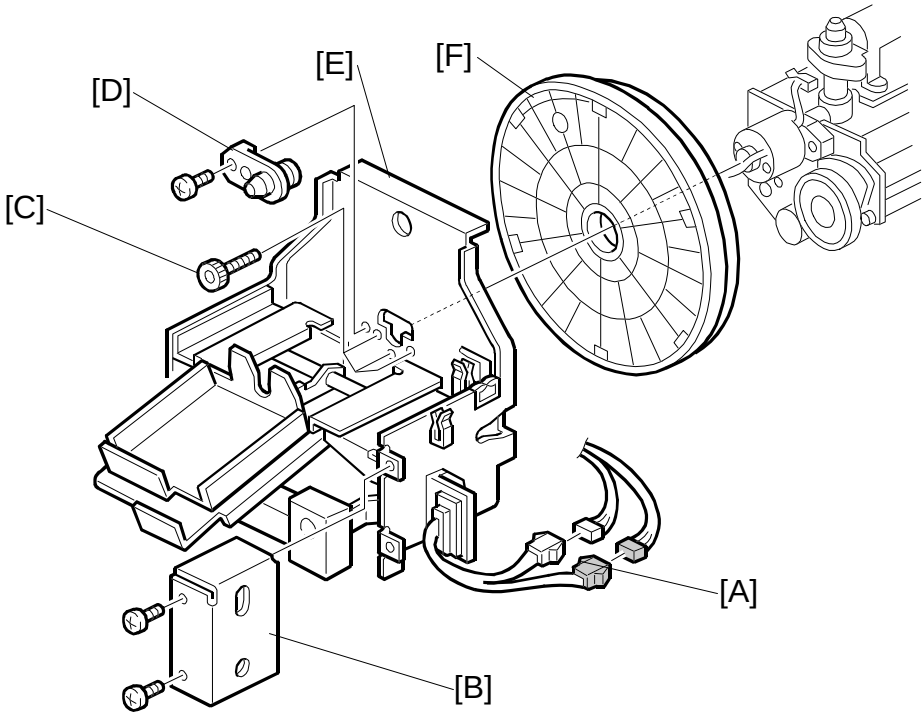
- The 4 screws holding the drum master clamper are longer than the 12 screws holding the metal screen, although they are similar in appearance. Be careful not to mix them up or use the wrong screws.

- When installing the metal screen, secure the trailing edge first with the 2 screws. (The two holes [A] on the trailing side of the screen are round holes and the other holes are oblong holes to allow for the removal of the slack.)Then, tighten the other screws while removing the slack from the screen. Make sure that the gap between the drum flanges and the screen is 0.3 mm or less, as shown in the upper illustration.
- Position the springs [B] and [D] (one each at the front and rear) as shown when reinstalling the drum master clamper [C].

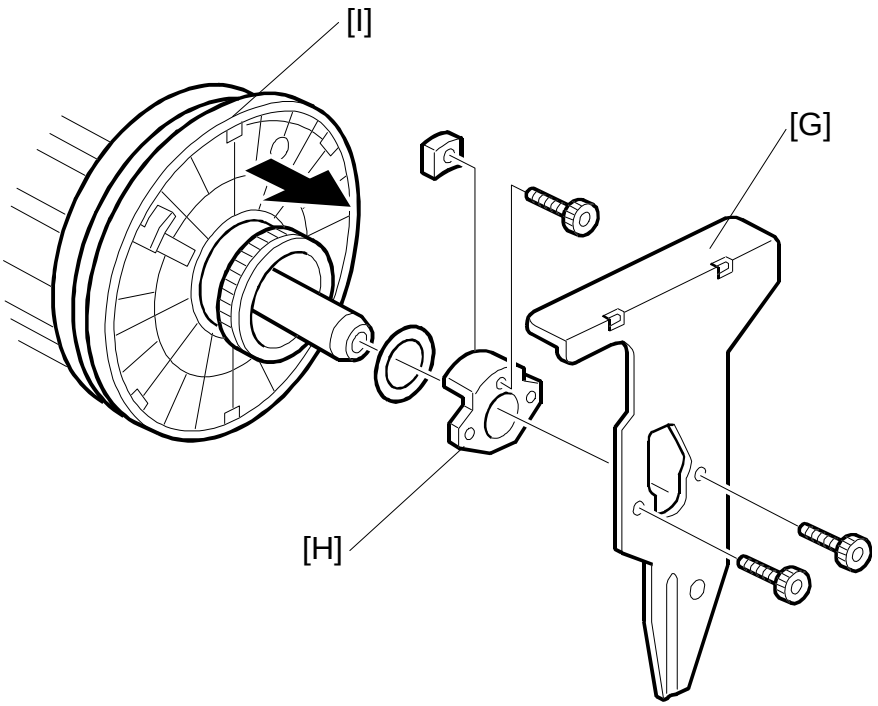
- Do not scratch the cloth screen or metal screen.

6.9.3 INK ROLLER UNIT REMOVAL

CAUTION: Never disassemble the ink roller unit. Each part between the front and rear side plates of this unit has been precisely adjusted on the production line to keep the doctor and ink rollers parallel against the drum shaft.



1. Wipe off the ink around the ink roller beforehand (to do this, remove the ink cartridge, use SP 140, enter 0, and feed paper until the ink supply ends).
2. Turn off the main switch and disconnect the power plug.
3. Remove the drum cloth and the metal screens. (See 6.9.1 Drum Cloth Screen Removal and 6.9.2 Drum Master Clamper and Metal Screen Removal.)
4. Disconnect the connectors [A] after removing the connector cover [B] (2 screws, 2 connectors).
5. Remove the ink socket [D] and the hexagon screws [C] (1 screw, 3 hexagon screws).
6. Remove the front drum bracket [E] and the front drum flange [F].



7. Remove the drum rear plate [G] (2 hexagon screws).
8. Remove the drum rear stopper [H] (1 hexagon screw).
9. Remove the drum rear flange [I].

NOTE: If the ink detection off mode has been selected with SP 140, do not forget to return it to the default (detection on).

6.9.4 DOCTOR ROLLER GAP ADJUSTMENT

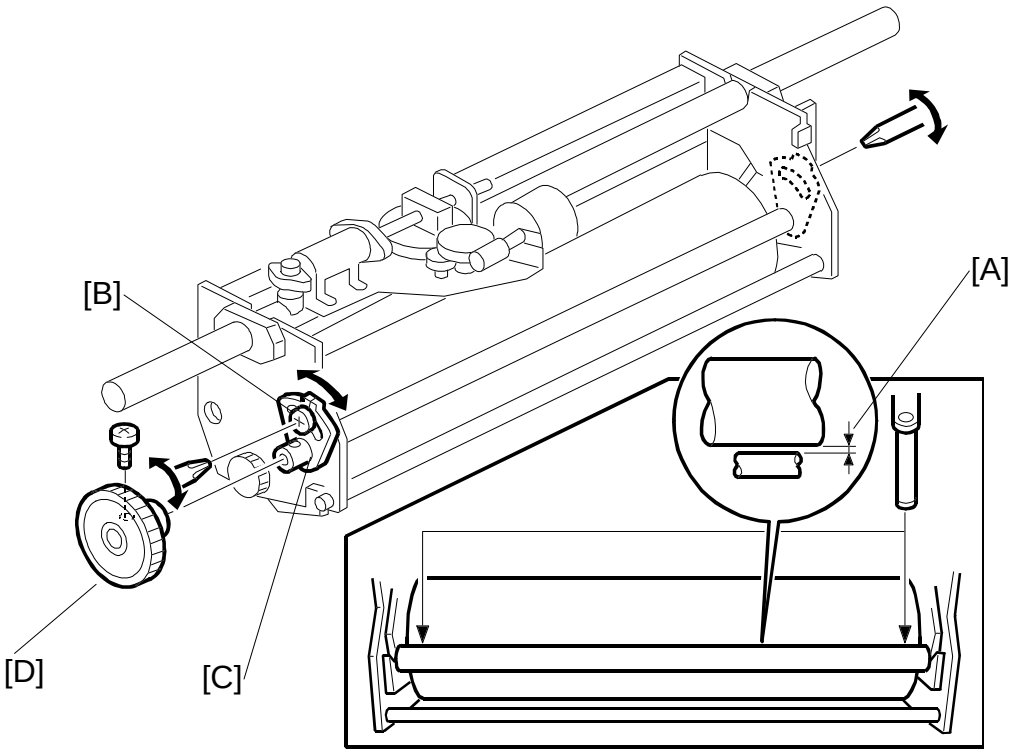
PURPOSE: To control the ink thickness around the ink roller.

ADJUSTMENT STANDARD:

0.07 mm gauge: Passes
0.09 mm gauge: Does not pass

CAUTION: Normally the doctor roller gap is not adjusted or changed. It tends to be difficult to change in the field. If the gap is too narrow, an uneven image may appear on the prints. If it is too wide, too much ink will be applied to the drum screens, resulting in ink leakage from the drum.

1. Wipe off the ink around the ink roller beforehand.
   NOTE: To make this procedure easier, remove the ink cartridge, use SP 140, select OFF in ink detection mode, and feed paper until the ink supply ends.
2. Turn off the main switch and disconnect the power plug.
3. Remove the drum unit, then remove the ink roller unit. (See 6.9.3 Ink Roller Unit Removal.)
4. Wipe off the ink around the ink roller and doctor roller.



5. Make sure that a 0.07 mm gap gauge goes through the gap [A] between the ink and doctor rollers, and that a 0.09 mm gap gauge does not.

   NOTE: 1) The gap should be checked at both ends of the doctor roller. Insert a gap gauge at each end of the roller. The gap tends to be larger for the center.
   2) While the gap gauge is inserted, hold the doctor and ink rollers with your fingers in order to stop the rollers from rotating.
   3) While the gap gauge is inserted, hold the end of the gap gauge.

6. If the gap is out of the standard, after removing gear [D], loosen the screw [B] and adjust the gap by turning the cam bushing [C] for the front and for the rear.
   NOTE: Make sure to repeat the adjustment for both ends of the rollers.

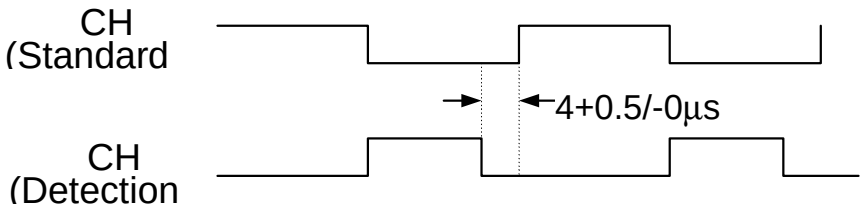
NOTE: If the ink detection off mode has been selected with SP 140, do not forget to return it to the default (detection on).

6.9.5 INK DETECTION ADJUSTMENT

PURPOSE: To ensure that the CPU detects a no ink condition.

ADJUSTMENT STANDARD:

See the following illustration.



CAUTION: This adjustment is required every time the MPU has been replaced.

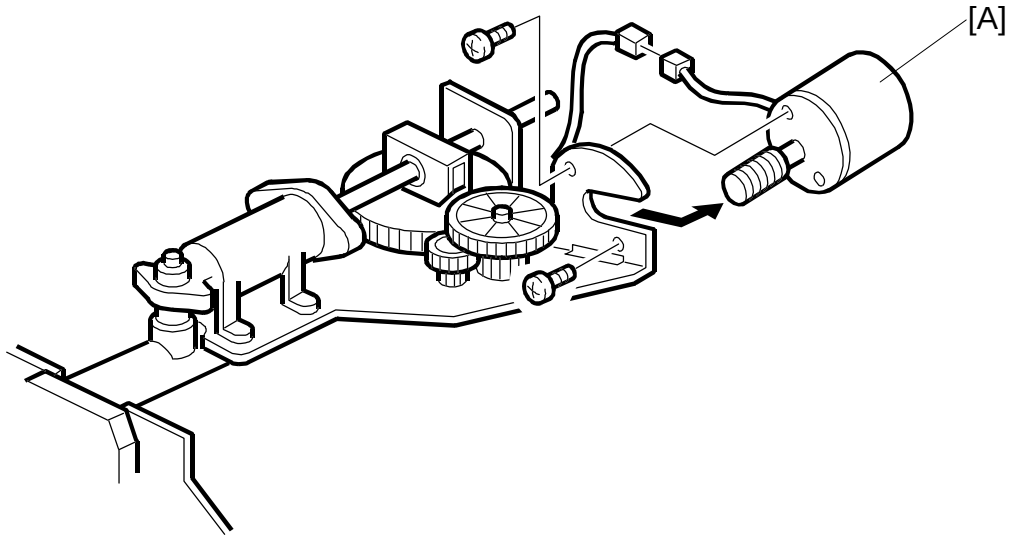
1. Wipe off the ink around the ink roller beforehand (remove the ink cartridge ,use SP 140, enter 0, and feed paper until the ink supply ends).
2. Turn off the main switch and disconnect the power plug.
3. Open the scanner.
4. Remove the MPU cover (2 screws).
5. Connect the CH1 probe of an oscilloscope to TP106, the CH2 probe to TP105, and the grounding leads of both probes to TP110 (-12 volts). Select the 5-microsecond range on the oscilloscope.
6. Connect the power plug and turn on the main switch.
7. Make sure that the waveform is as shown in the illustration while the ink end indicator is lit.
8. If it is not correct, adjust the ON timing of the detection signal by turning VR101 beside the test pins.

   NOTE: If the standard signal is delayed with respect to the detection signal, the machine cannot detect the no ink condition. In such a case, LED101 on the MPU will light to warn of this condition.

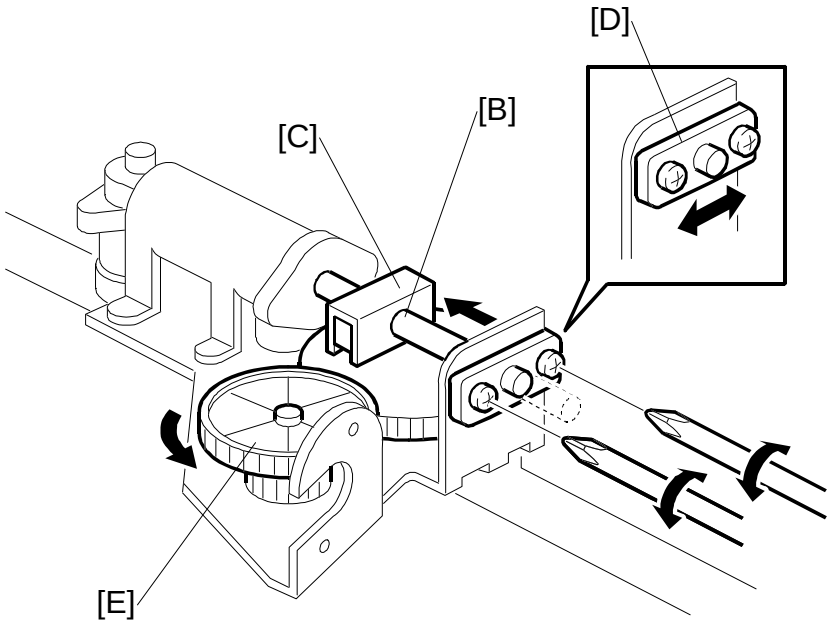
NOTE: If the ink detection off mode has been selected with SP 140, do not forget to return it to the default (detection on).

6.9.6 INK PUMP REMOVAL AND PLUNGER POSITION ADJUSTMENT

PURPOSE: To ensure the smooth operation of the ink pump plunger by properly positioning its holder.



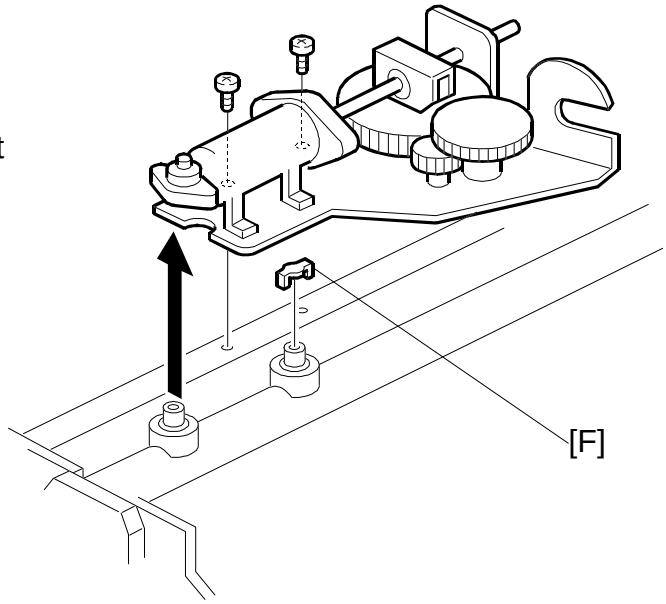
1. Turn off the main switch and disconnect the power plug.
2. Remove the drum unit.
3. Remove the drum screen. (See 6.9.2 Drum Master Clamper and Metal Screen Removal.)
4. Remove the ink supply motor [A] (2 screws, 1 connector).



5. Remove the E-ring [B] to free the plunger from the pump drive slider [C].
6. Loosen the two screws securing the plunger holder [D]. (Do not remove the holder.)
7. By turning the gear [E] manually, move the plunger until it reaches the bottom.
8. While holding the plunger holder [D], re-tighten the two screws.
9. Reinstall the E-ring [B].

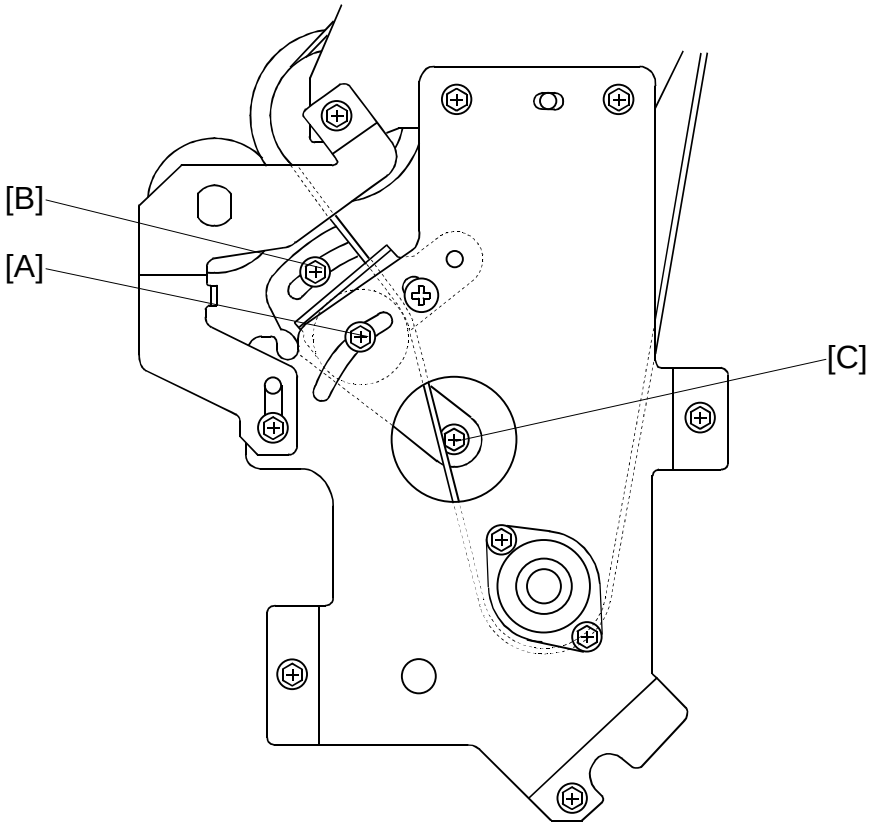
- Remark for the ink pump removal -

When removing the ink pump, do not lose the small metal valve [F]. When reinstalling the pump, first set the valve on the joint side as shown, then install the ink pump on the two joints.

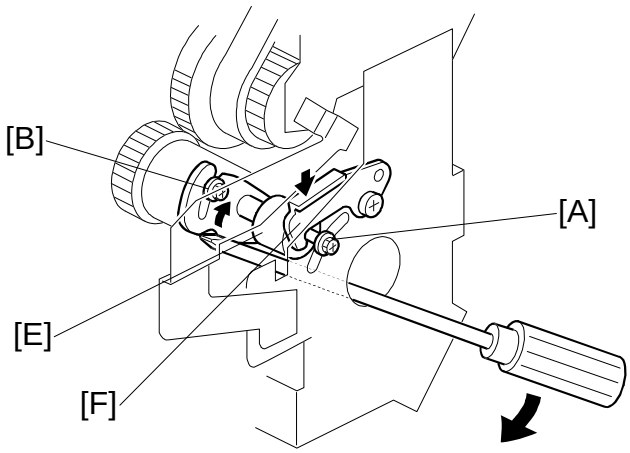


6.9.7 MAIN DRIVE TIMING BELT TENSION ADJUSTMENT

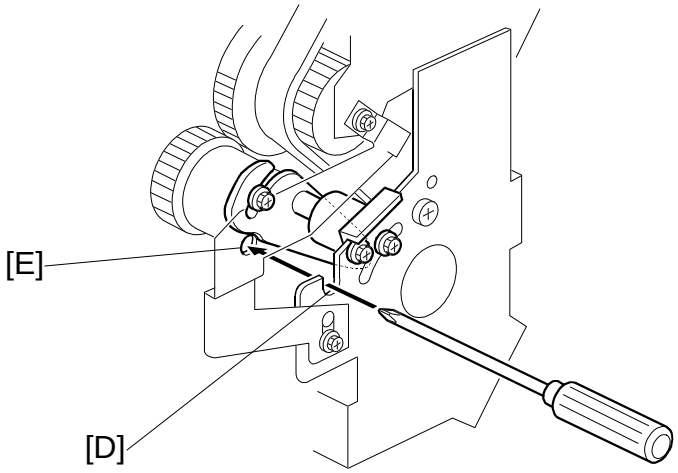
PURPOSE: After the timing belt is replaced, correct belt tension must be applied using the procedure below.



1. Turn off the main switch and disconnect the power plug.
2. Remove the rear cover (5 screws). (See 6.1.5 Other Covers.)
3. Loosen the screws [A], [B], and [C].



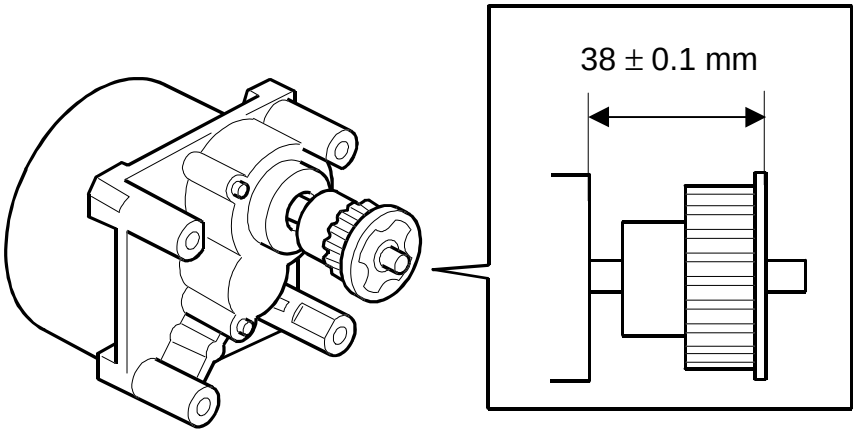
4. Lift up the tension roller [E] with a screwdriver as shown.
5. Hook the stopper [F] onto the shaft [A].
6. Remove the screwdriver.



7. Insert a screwdriver through spaces [D] and [E].

   NOTE: This is to set the shaft [A] in line.
8. Tighten the screws [A], [B], and [C],shown on page 6-46 in the sequence listed.
9. Remove the screwdriver.

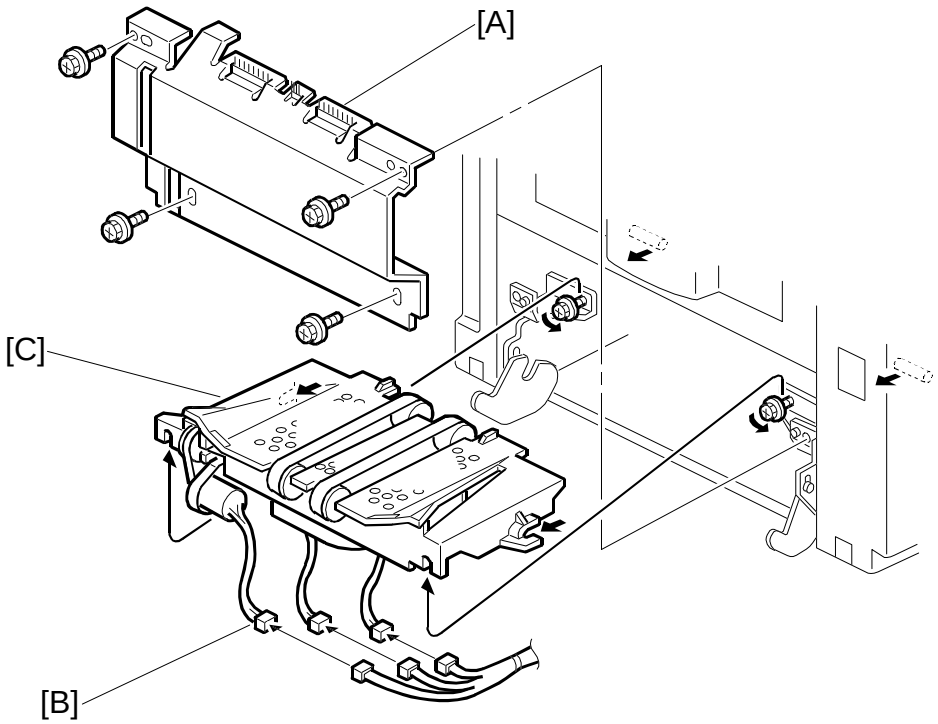
6.9.8 MAIN MOTOR PULLEY POSITION ADJUSTMENT



After installing the pulley onto the main motor shaft, refer to the above illustration for the correct position of the pulley.

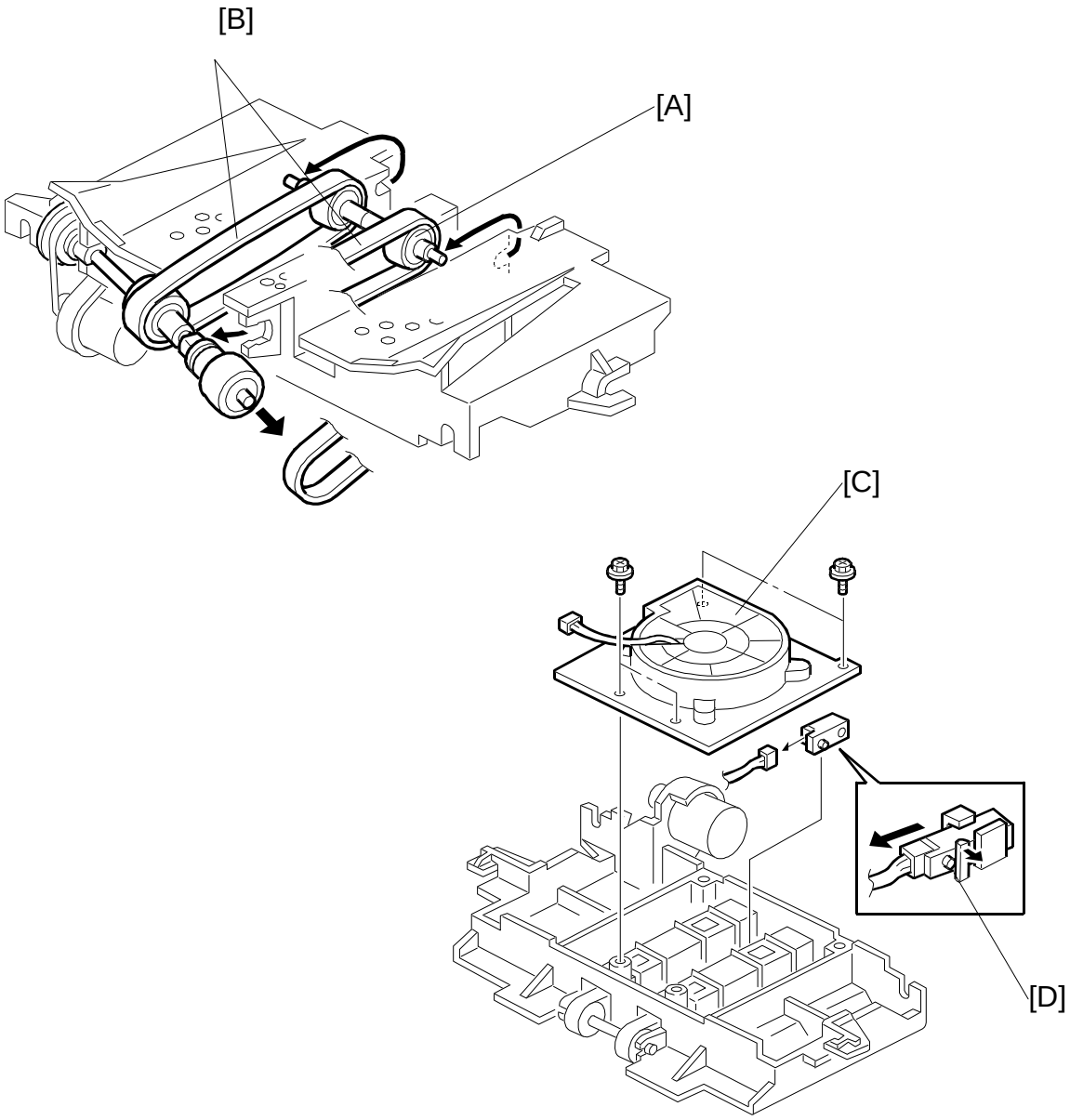
6.10 PAPER DELIVERY SECTION

6.10.1 VACUUM UNIT REMOVAL



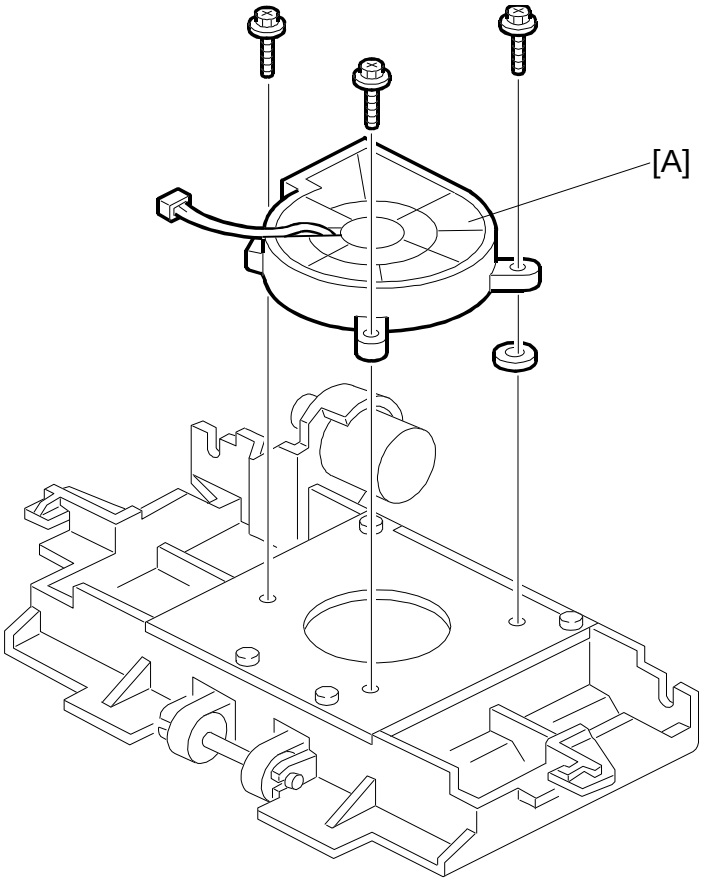
1. Turn off the main switch and disconnect the power plug.
2. Remove the paper exit table (2 screws).(not shown)
3. Remove the paper delivery cover [A] (4 screws).
4. Disconnect the 3 connectors [B].
5. Remove the vacuum unit [C] (2 screws).

6.10.2 DELIVERY BELT/PAPER EXIT SENSOR REMOVAL



1. Turn off the main switch and disconnect the power plug.
2. Remove the vacuum unit. (See 6.10.1 Vacuum Unit Removal.)
3. Remove the belt tension roller [A].
4. Remove the delivery belts [B].
5. Remove the vacuum motor assembly [C] (4 screws, 1 connector).
6. Remove the paper exit sensor [D] (1 connector).

6.10.3 VACUUM MOTOR REMOVAL



1. Turn off the main switch and disconnect the power plug.
2. Remove the vacuum unit. (See 6.10.1 Vacuum Unit Removal.)
3. Remove the vacuum motor [A] (3 screws, 1 connector).

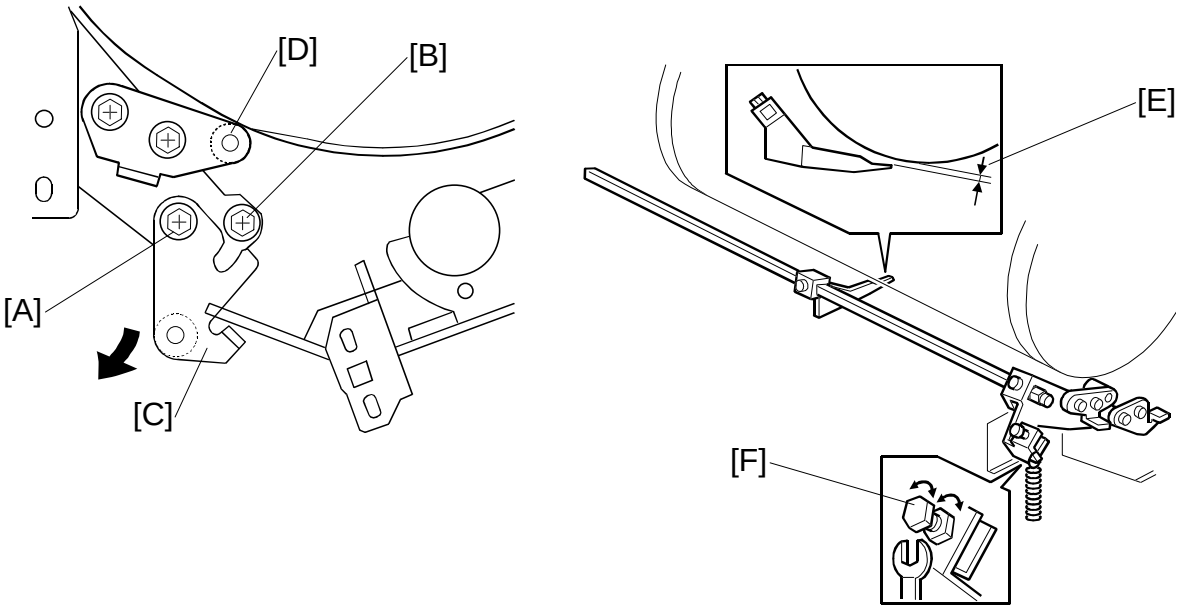
6.10.4 EXIT PAWL CLEARANCE ADJUSTMENT

PURPOSE: If the clearance is too narrow, the exit pawls may hit the drum screen and damage it. If it is too wide, paper may wrap around the drum.

ADJUSTMENT STANDARD:

1.15 (± 0.15) mm

⚠CAUTION
When this adjustment has been performed, check the exit pawl drive timing.



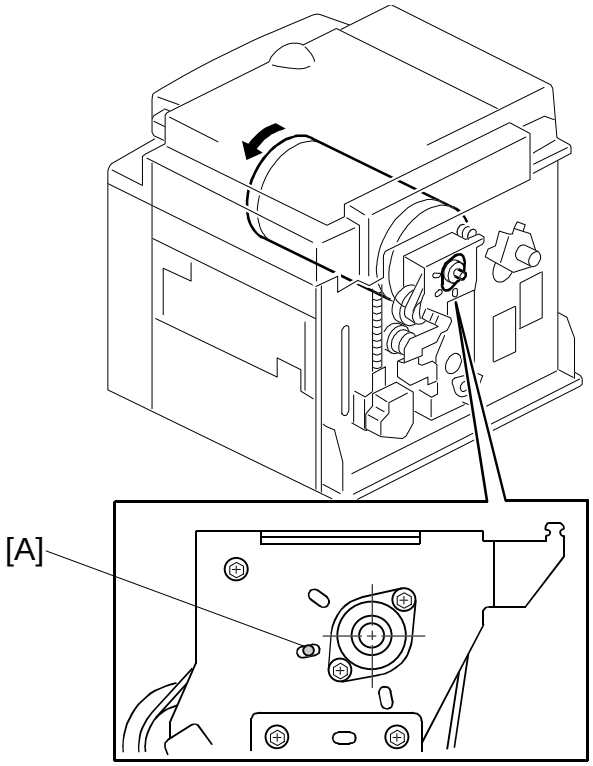
1. Turn off the main switch and disconnect the power plug.
2. Remove the drum, then remove the front cover (4 screws).
3. Reinstall the drum.
4. Loosen screw [A] then screw [B] in this order (do not remove them). Make sure that the bracket [C] becomes free from engagement and the cam follower [D] contacts the drum flange.
5. Using a gap gauge, measure the clearance [E] between the drum surface and the exit pawls. It should be between 1.0 and 1.3 mm.
6. If the clearance is not correct, loosen the lock nut. Then adjust the clearance by turning the bolt [F].
7. Reposition the bracket [C] and tighten the screws [A] and [B].

6.10.5 EXIT PAWL DRIVE TIMING ADJUSTMENT

PURPOSE: To ensure that the exit pawls can move out of the way of the drum master clamper while the drum is rotating.

ADJUSTMENT STANDARD:

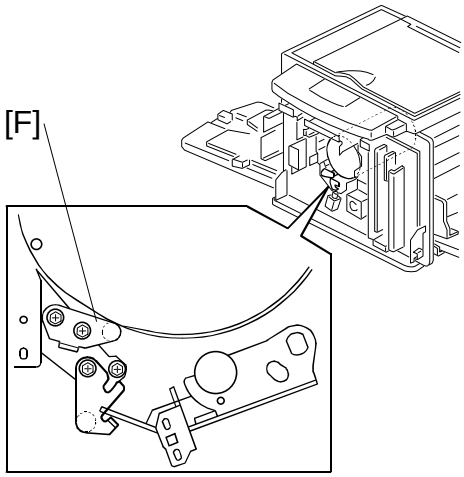
0 to 0.5 mm

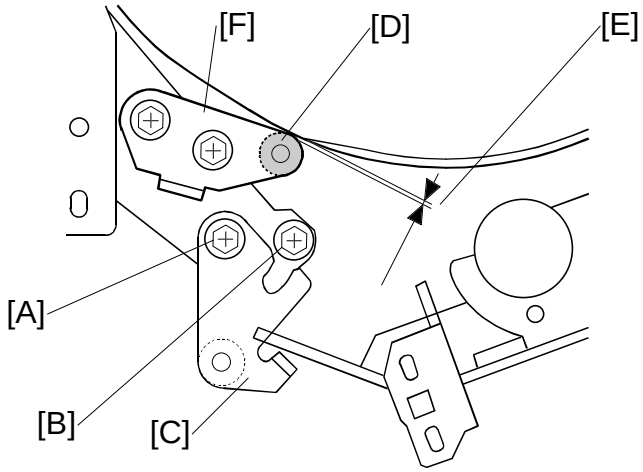


⚠CAUTION

Before this adjustment, the exit pawl clearance from the drum must be checked.

1. Turn off the main switch and disconnect the power plug.
2. Remove the front cover (4 screws) and the rear cover (6 screws).
3. Turn the drum manually until the recess in the drum drive gear meets the long positioning hole [A] in the bracket, as shown.





4. Loosen screw [A] then screw [B] in this order (do not remove them). Make sure that the bracket [C] becomes free from engagement and the cam follower [D] contacts the drum flange.
5. Measure the gap [E] between the cam follower and cam face (front drum flange). It should be 0 to 0.5 mm.
6. If the gap is not correct, loosen the two screws securing the cam follower bracket [F].
7. Retighten the two screws while pushing the cam follower against the cam face. Make sure that the gap [E] is 0 or less than 0.5 mm.
   NOTE: Do not push the cam followers too strongly against the cam.
8. Reposition the bracket [C] and tighten the screws [A] and [B].

TAPE MARKER

C532

CÓPIA NÃO CONTROLADA

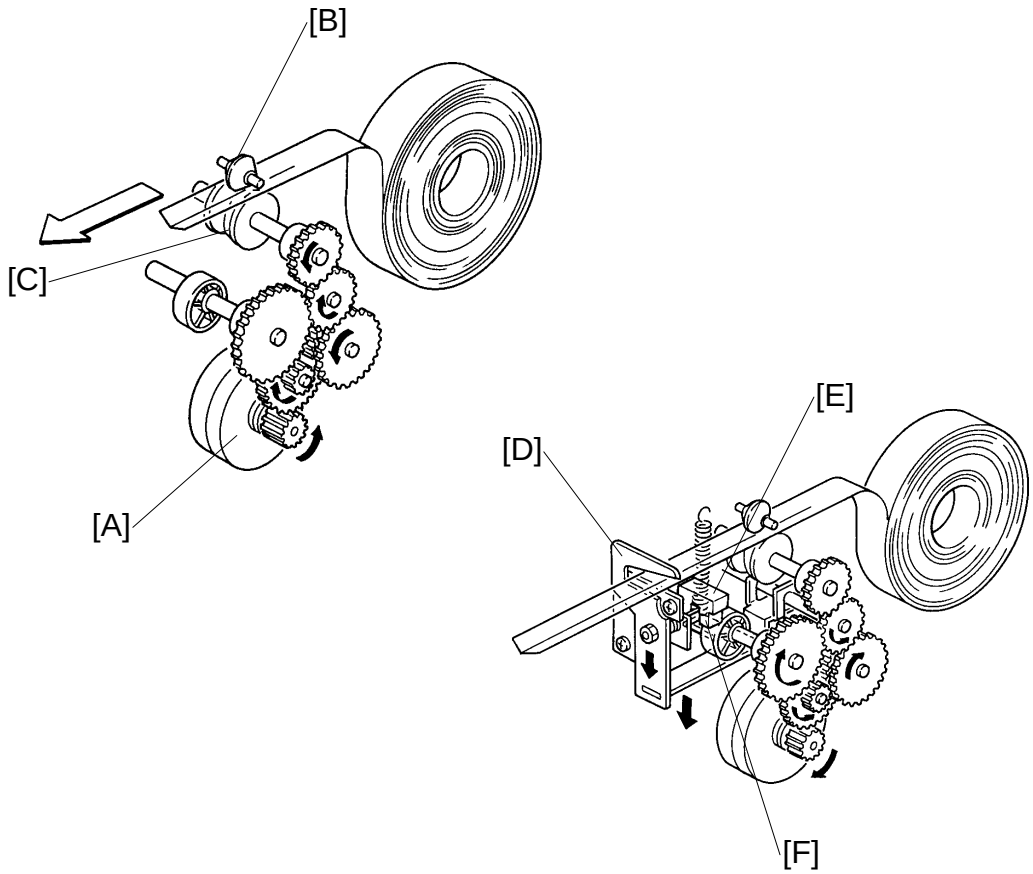
CÓPIA NÃO CONTROLADA

1. SPECIFICATIONS

Tape Feed Length:	250 mm (9.8")
Tape Feed Speed:	100 mm/s (3.9"/s)
Tape Size:	Outside Diameter 80 mm (3.1") or smaller Inside Diameter 20 mm (0.8") or larger Width 17 mm to 18 mm (0.67" to 0.71")
Dimensions:	155 mm (W) x 105 mm (D) x 60 mm (H) (6.1" x 4.1" x 2.4")
Weight:	700 g (1.5 lb)
Power Source:	+24 VDC and +5 VDC from main body
Power Consumption:	15 W

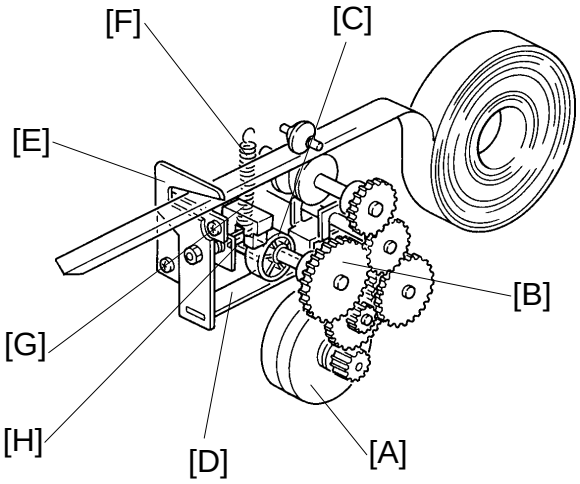
2. BASIC OPERATION

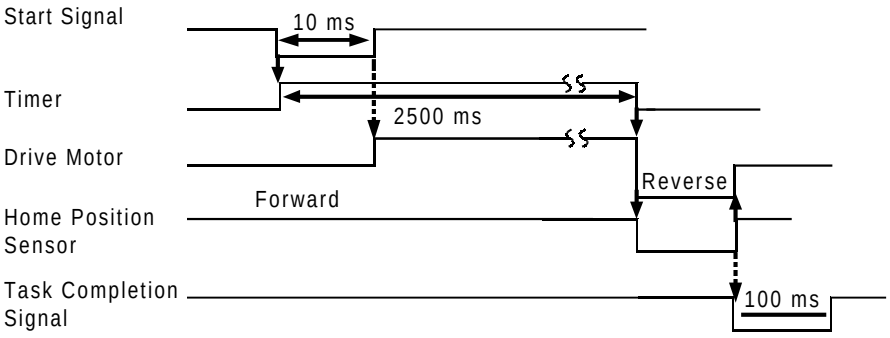
2.1 OVERVIEW



After the tape dispenser receives the start signal from the main body, the drive motor [A] rotates counterclockwise to feed out the tape. The pinch roller [B] presses the center of the tape against the feed roller [C] flexing the tape into a V shape. This keeps the tape stiff as it is fed out. After the tape has fed out the proper length, the drive motor rotates in the opposite direction (clockwise) and the cutter [D] moves down to cut the tape. After the cutter home position sensor [E] detects the cutter actuator [F], the drive motor stops and sends the task completion signal to the main body. The main body starts the next job after receiving this signal.

2.2 DRIVE AND CUTTING MECHANISM



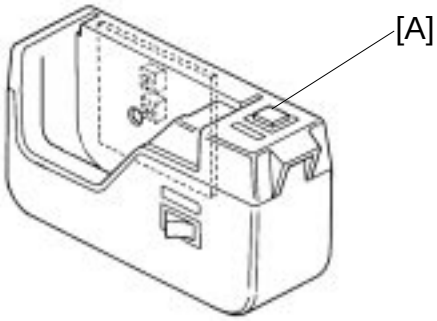


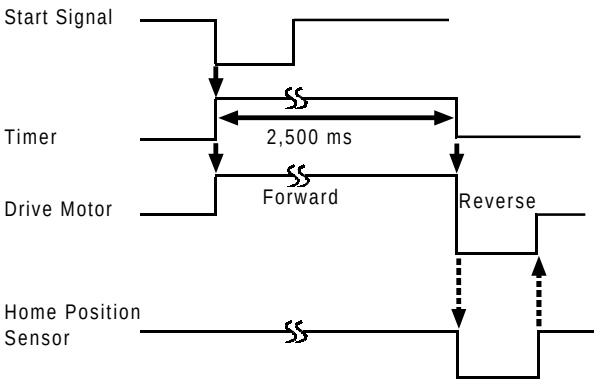
The tape dispenser uses a stepping motor, which is driven at 460 pulses per second, as a drive motor.

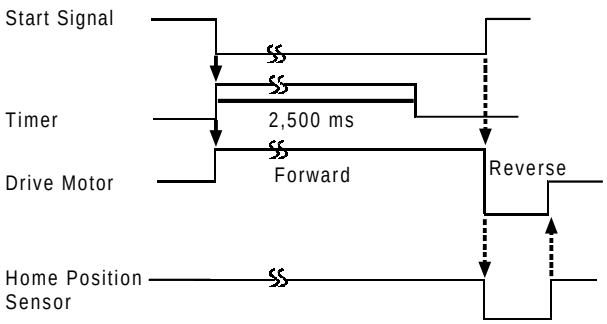
When the print counter of the main body becomes 0, the start signal from the main body changes from high (+5 VDC) to low (0 VDC) to start the timer on the tape dispenser board. When the start signal changes to high 10 milliseconds later, the drive motor [A] starts to rotate counterclockwise to feed tape. However, since a one-way bearing is mounted in the cam drive gear [B], the cutter cam [C] does not rotate.

The drive motor starts rotating in the opposite direction 2,500 milliseconds after the timer starts. At this time, the tape has been fed out 250 mm (9.8") from the tape dispenser. The drive motor rotates the cam drive gear clockwise and the eccentric shaped cutter cam presses down the cutter arm [D]. The cutter [E] then goes down to cut the tape. The cutter spring [F] returns the cutter to its original position. After the cutter home position sensor [G] detects the cutter actuator [H], the drive motor stops and the tape dispenser board sends the task completion signal to the main body.

2.3 MANUAL CUT





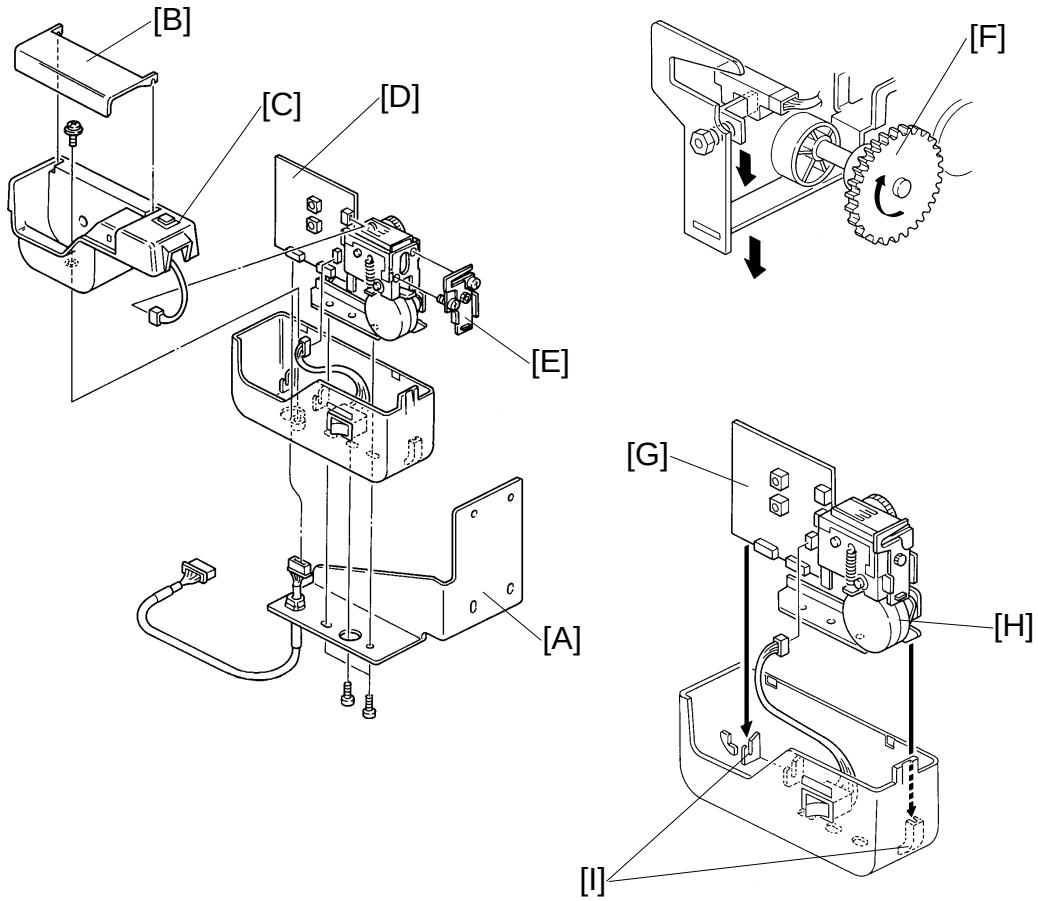


When the manual cut switch [A] is pressed, the timer starts counting and the drive motor starts feeding tape. 2,500 milliseconds later, the drive motor reverses to cut the tape.

If the manual switch is pressed longer than 2,500 milliseconds, the tape continues to be fed out until the manual switch is released. Afterward, the motor reverses to cut the tape.

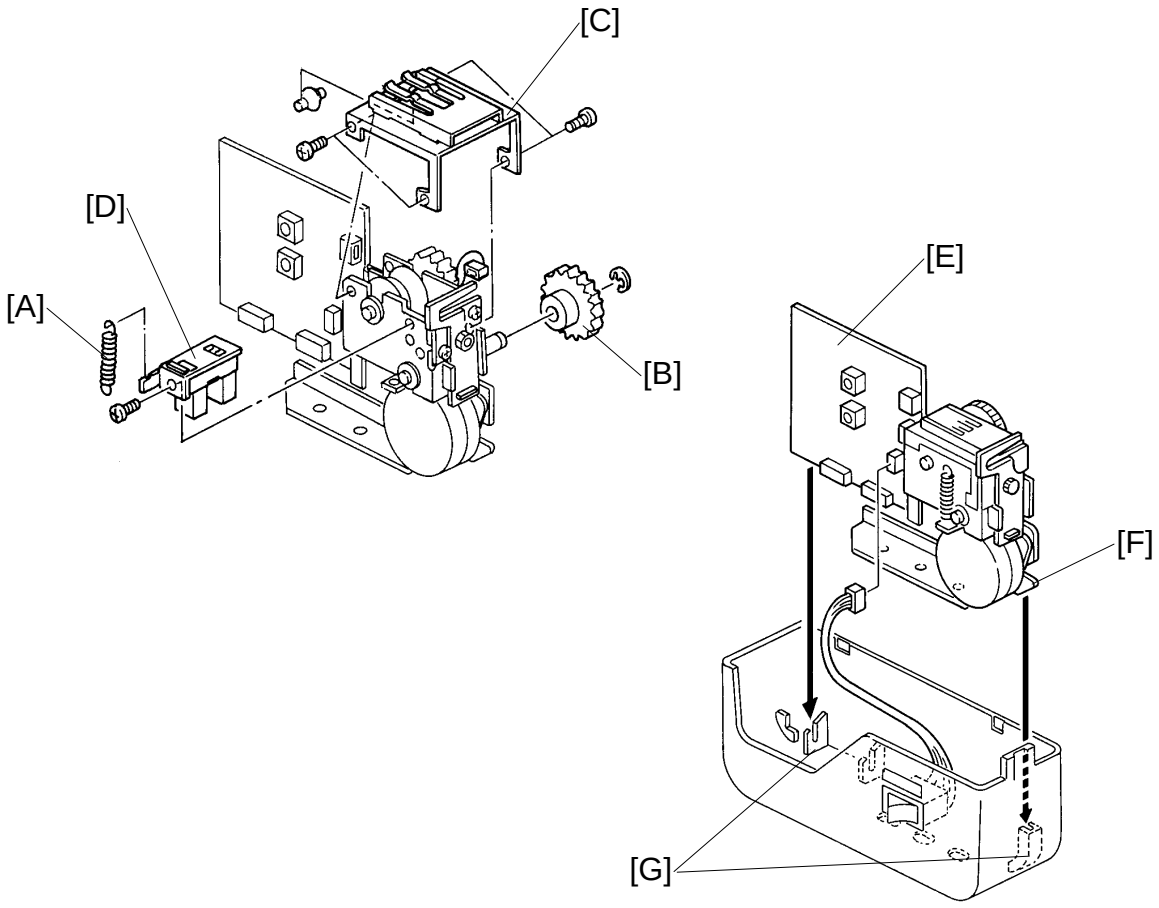
3. REPLACEMENT AND ADJUSTMENT

3.1 CUTTER REPLACEMENT



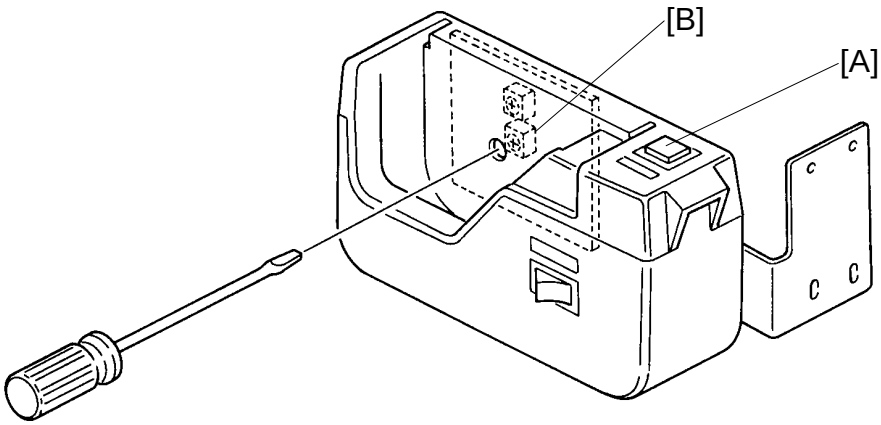
1. Remove the tape dispenser from the main body. (1 connector, 2 screws)
2. Remove the support bracket [A]. (3 screws)
3. Remove the tape dispenser cover [B] and the upper housing [C] (1 screw, 1 connector)
4. Remove the tape dispensing assembly [D]. (2 connectors)
5. Replace the cutter assembly [E]. (2 screws)
   NOTE: Make sure that the cutter moves smoothly by rotating the cam drive gear [F] clockwise manually after the replacement.
6. Reassemble the tape dispenser.
   NOTE: Make sure that the tape dispenser board [G] and the tape dispensing bracket [H] are positioned in lower housing slots [I].

3.2 CUTTER HOME POSITION SENSOR REPLACEMENT



1. Remove the tape dispensing assembly. (See steps 1 to 4 on of " 3.1 CUTTER REPLACEMENT".)
2. Unhook the cutter spring [A].
3. Remove the cam drive gear [B]. (1 E-ring)
4. Remove the pinch roller support bracket [C]. (4 screws)
5. Remove the cutter home position sensor assembly [D] and replace the sensor. (1 screw, 1 connector)
6. Reassemble the tape dispenser.
   NOTE: Make sure that the tape dispenser board [E] and the tape dispensing bracket [F] are positioned in lower housing slots [G].

3.3 TAPE CUT LENGTH ADJUSTMENT



Adjustment standard : 250 mm ± 15 mm

1. Turn on the main body and the tape dispenser main switches.
2. Press the manual cut switch [A].
   NOTE: Do not press the switch longer than 2.5 seconds.
3. Measure the tape length.
   If the tape is longer than 250 mm, turn VR2 [B] counterclockwise.
   If the tape is shorter than 250 mm, turn VR2 clockwise.

⚠CAUTION
Do not turn VR1. It is for factory adjustment only.

CÓPIA NÃO CONTROLADA

PCRIP-EZ1
GDI/QuickDraw

Priport Controller

User's Guide

CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

TABLE OF CONTENTS

This User's Guide was printed using a Priport Controller connected to a Priport Digital Duplicator.

CÓPIA NÃO CONTROLADA

REGULATORY NOTICES

FCC REGULATIONS

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

VDE

Hiermit wird besheinigt, daß Priport Controller PCRIP-EZ1 DIN-VDE-Norm bzw. EN-Norm bzw. BMPT-Amtsbl. Vfg 243/1991 funkentstört ist.

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CÓPIA NÃO CONTROLADA

INTRODUCTION

The Priport Controller is an external raster image processor designed to add a computer interface to Priport Digital Duplicators. Since it is separate from the Priport, the designers were able to use high-speed techniques making it one of the fastest add-on processors available.

The Controller uses a high-speed 25-megahertz Intel 960-CA RISC microprocessor chip to achieve its high speed processing. In addition, the PCRIP-EZ1 Controller contains 4 Megabytes (MB) of RAM that can be upgraded to 8 MB or 16 MB.

This program features Computer:applications, Inc. DigiPrint™ software for both PC and Macintosh platforms. The DigiPrint drivers for Windows 3.1 and Windows 95 on the PC support the Graphic Device Interface (GDI) and all True Type Fonts. The DigiPrint Driver for the Macintosh supports system fonts and True Type fonts. Utility and Monitor programs for the Macintosh are also provided.

The PCRIP-EZ1 Controller is a GDI controller, that is, it does not recognize PCL or PostScript.

The Controller supports several models of Priport Digital Duplicators with print resolutions from 300 dots per inch (dpi) to 400 dpi. The U.S. page sizes supported by the Priport Controller are US Letter, US Legal and US 11 x 17. Supported international page sizes are A3, A4, B4 and B5.

We reserve the right to make amendments to the technical specifications and/or the external appearance of the equipment without prior notice.

SYSTEM REQUIREMENTS

Supported Priports:

- Models VT1730, VT1800, VT2105, VT2200, VT2250, VT2400, VT2600, VT3500, VT3600, VT3800 and JP1030

Compatible computers:

- IBM 486, Pentium and compatible PC's
- Apple Macintosh Peforma 630 or higher

Memory requirements:

- This Priport Controller requires 8Mb of the RAM in the PC or Macintosh.

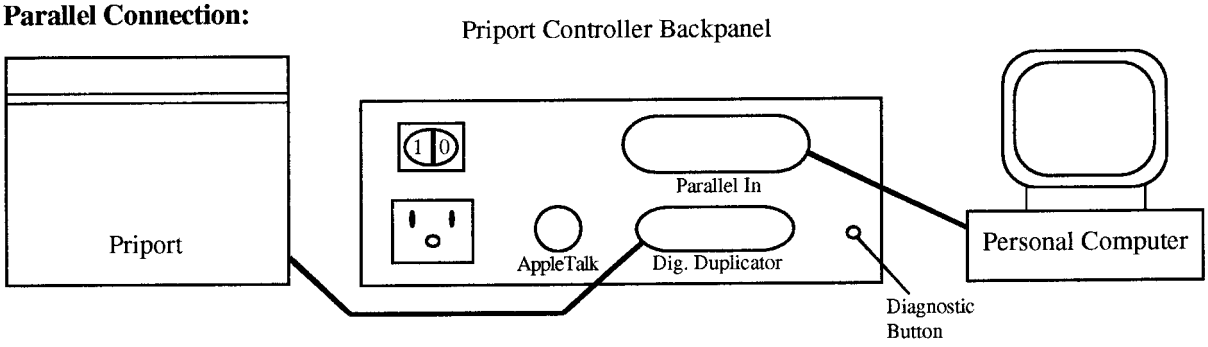
HARDWARE INSTALLATION

1. The Controller connects the Priport to the computer using cables. (The computer and Priport are not directly connected to each other.) The inputs to the Priport Controller replicate those of a standard printer, including Parallel and AppleTalk® inputs. For the PC, the required cable is a standard IBM-PC parallel printer cable that is not included with the Controller. The Macintosh is connected to the AppleTalk port using a standard AppleTalk/LocalTalk or AppleTalk/PhoneTalk cable that is **not** included with the Controller.

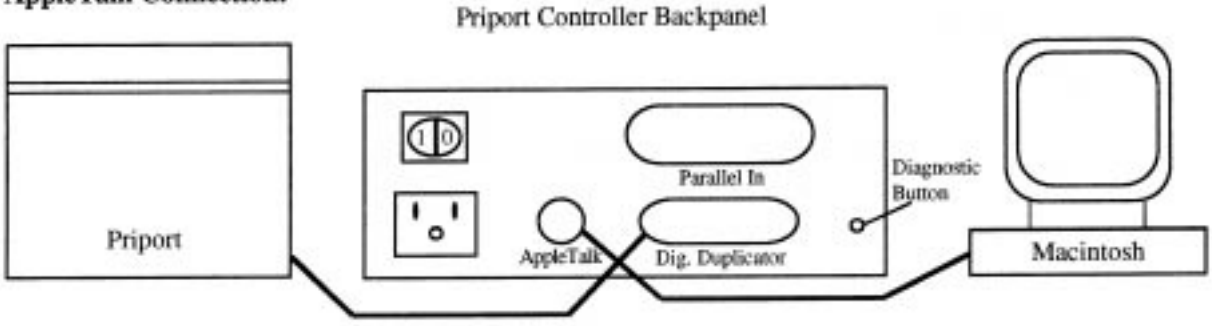
2. The Controller is connected from the Priport port on its backpanel to the input port on the back of the Priport. The required cable is a special DB-25M to DB-25F cable that is included with the Controller.

3. Cabling Diagrams:

Parallel Connection:



AppleTalk Connection:



PRIPORT CONTROLLER CONFIGURATION

1. Factory Settings:

   The Controller comes preset with the following factory defaults:

   - Input Buffers: Parallel Inputs - 256 KB
     AppleTalk - Not applicable

   - Page Size: US Letter (8-1/2" x 11") in US and Canada
     A4 (210mm X 297mm) for International

   - Mode: Windows Graphical Device Interface (GDI) and
     Macintosh QuickDraw (QD)

2. Controller Configuration Programs:

   Two utility diskettes have been provided with the Controller: One 3 1/2" for IBM and compatible computers and one 3 1/2" for Apple Macintosh computers. Each of these configuration programs allows you to change the factory settings of the Controller (including the ones listed above) until the next power down of the Controller or permanently if desired.

   NOTE: See Step 9 on page 5 on how to save configuration changes you have made using the PC Configuration Program. See Step 5-6 on page 6 on how to save configuration changes you have made using the DigiPrint Utility for the Macintosh.

CONFIGURATION OF IBM PC AND COMPATIBLES

The vast majority of users will never need to use the configuration program to change the factory default settings listed above.

The most likely uses for the configuration program will be to change input buffer size (if connected to a PC), print the diagnostic status page or a test file, enable/disable AppleTalk (if connected to PC only), save configuration changes or change the default table. If there is a need to change the configuration, the menu-driven program has been designed to be very simple to use. When the initial configuration is completed and saved, you should rarely need to use this program disk again.

Due to changes in the firmware and driver for the PCRIP-EZ1, it is no longer necessary to change the paper size settings with the configuration program design as it was with the PCRIP-10 Controller. The driver will automatically transmit the page size selected in the document to the controller. The inter-job timeout value needs to be changed only if both a PC and a Macintosh are connected to one Controller.

WINDOWS 3.1 AND WINDOWS 95 CONFIGURATION

Step 1. Insert the Utility Disk in drive A.

Step 2. In Windows 3.1 Program Manager, under **File**, select **Run**. In Window 95, go to **Setting, Control Panel** and double click on the **Add/Remove Programs** icon. Type or confirm "**a:\setup**" when prompted for the Program name and click **OK**. Follow the instructions in the Setup program. A new Program group named Controller Configuration will be created with one program icon that represents the PCRIP-EZ1 Configuration.

Step 3. Double click on the PCRIP-EZ1 Configuration icon. The program will ask for you to hit any key to continue. The following Menu Bar will appear across the top of the screen:

File Page Install PC Port InputBufrs Special Help Quit

The "**Help**" Menu item explains the general function of each item in the menu bar. The first item on each of the pull-down menus is context-sensitive help. This item describes the functions of all the other items available on whatever pull-down menu you have open.

Step 4. Using the right arrow key, highlight "**PC Port**" and <ENTER>. Menu items are: **Printer Port LPT1, Printer Port LPT2, Printer Port to LOG file, and Printer Port to NULL.**

Step 5. Use the up or down arrow keys to highlight the correct PC output port and <ENTER>. A cable connects the Controller to a physical port on the back of the computer. The port selection should match the name of this physical port. Any selection from any menu will move you back up to the main menu bar.

Step 6. Using the left arrow key, highlight the "**Install**" pull-down menu and <ENTER>. Menu items are: **Enable AppleTalk, Disable AppleTalk, Reset to Factory Config, Print Test File, Print Diagnostic Status Page, Save Configuration Changes.** You may use items from this menu to turn AppleTalk on or off, reset the Controller back to the original factory settings, print a test page, print the diagnostic status page, or permanently save the configuration settings you have made during this session. Use the up or down arrow keys to highlight your choice and <ENTER>.

Step 7. Using the left arrow key, highlight the "**Page**" pull-down menu and <ENTER>. Menu items are: **Page Size A4, Page Size A4 (Short Drum), Page Size A3, Page Size B4, Page Size B5, US Letter, US Letter (Short Drum), US Legal, US 11 X 17.** Normally you will not need to make any changes here since the PCRIP-EZ1 Controller printer drivers automatically select page size.

Step 8. Using the right arrow key, highlight the "**InputBufrs**" pull-down menu and <ENTER>. Menu items are:

Parallel Input Buffer Size = 0K, Parallel Input Buffer Size = 128K,
Parallel Input Buffer Size = 192K, Parallel Input Buffer Size = 256K,
Parallel Input Buffer Size = 512K.

You may also want to change the input buffers if you are connected to a PC. The larger the input buffer, the faster your print job will be processed; however, there is a limited amount of memory to be allocated to input buffers. If you have problems printing a A3/11x17 document with a PCRIP-EZ1, try changing the input buffer size to 512K or upgrading the memory size.

Step 9. Using the right or left arrow, highlight the "**Install**" pull-down menu and <ENTER>. Use the down arrow key to select "**Save Configuration Changes**" and <ENTER>. When all the configuration changes are completed, you must decide if you want to make them permanent. If you do not complete this step, any changes you have made during this session will be lost the next time the Controller is turned off. If you do complete this step, the Controller will remember any changes you have made through all power cycles. **You can change and save the configuration settings of the Controller as often as you wish.**

The two remaining Main Menu items, "**File**" and "**Special**", provide functions that may be useful during setup or reconfiguration of the Controller.

- The "**File**" menu has the following items: **`Print a File, Eject a Page, Info About this Program and Quit (Exit) this Program.`** Use the "**Print a File**" command before saving or exiting the program to test the configuration. Use the "**Eject Page**" command to clear the Input Buffer of the Controller or to create a master for a blank page. Choose "**Info About this Program**" to check the revision number of the EZ1 program currently installed.

- The "**Special**" menu has the following items: **`Set Inter-Job Timeout Value and Set Default Table.`** The factory default setting for Inter-Job Timeout Value is 20 seconds. **The inter-job Timeout value applies only if more than one computer is connected to the Controller.** In this case, if the current print job has paused longer than the Inter-Job Timeout Value and another computer's print job is waiting, the Controller assumes that current print job is stalled and will terminate it, giving control to the new print job. Since graphics-intensive print jobs often may pause longer than 20 seconds while transferring data to the Controller, you may want to use the"**Set Inter-Job Timeout Value**" menu item to increase the timeout value. We recommend increasing the value to 120 seconds or greater. The optimal time for your computer's setting will depend on its speed and how graphics-intensive your print jobs are. "**Set Default Table**" applies a set of factory default configurations.

CONFIGURATION FOR MACINTOSH COMPUTERS

The “DigiPrint Utility” and several small configuration files are found in a folder named “DigiPrint Utility” on the PCRIP-EZ1 Controller Macintosh Disk. These small files contain the commands for changing the output page size, printing the diagnostic status page, saving configuration changes permanently and naming your Controller. (Naming your Controllers is necessary to distinguish between multiple Controllers connected to the same AppleTalk network.) Copy the entire DigiPrint Utility folder onto your hard disk for ease of access.

- The most frequently used page size may be selected and saved for a small print-speed improvement. The choices are "A4 page size", "A3 page size", "B4 page size", "B5 page size", "A4 (wide feed edge)", "US Letter page size", "US Legal page size", "US 11 x 17 page size", and "US Letter (wide feed edge)". If you have changed the output page size and wish to retain that change as the Controller's power-on default, you will also need to use "Save Configuration Changes."

- If you wish to verify that the page size selection within the Controller is correct, you can select "Print Diag Status Pg". This file will generate a one-page printout of the current Controller settings. See Appendix A for an example of this Diagnostic Status Page output.

- If you have more than one EZ1 Controller installed on an AppleTalk network, you will need to rename each Controller so that AppleTalk can distinguish between the Priports. If you only have one EZ1 Controller and Priport installed on the AppleTalk network, you will not need to use these files unless you wish to personalize the name.

Step 1. Insert the PCRIP-EZ1 Macintosh Disk in the drive and double click on the floppy icon to open it.

Step 2. Open the DigiPrint Utility folder by double clicking on it. Then double click on the DigiPrint Utility icon. When the program comes up, make sure the large button labeled **Printers** in the center of the window says **DigiPrint**. If it says **PostScript**, then click the down arrow and select DigiPrint.

Step 3. The DigiPrint Utility will display all devices in the current AppleTalk zone (similar to the display in the Chooser). Click on the desired Priport model. If there is only one Controller, there should be only one Priport entry displayed.

NOTE: The PCRIP-EZ1 Controller is a different device type than a LaserWriter printer. Only DigiPrint type devices will be displayed when **DigiPrint** is selected. To see any connected LaserWriter type devices (including PCRIP-10), you must either select **PostScript** on the utility menu or select the LaserWriter driver in the Chooser. If you select **PostScript** within the DigiPrint Utility, you will need to re-select **DigiPrint** to see any PCRIP-EZ1 Controllers.

Step 4. If you wish to personalize the name of a Controller, point and click to select the desired printer and then click on the **Rename Printer** button. The program will prompt for the new name. Type the new name and click **OK**. This new name will now appear in the right hand window as well as the DigiPrint driver and status monitor.

Step 5. To make other configuration changes, click on the **Download File** button. Then point and click to select the file that will make the desired configuration.

Step 6. Click **OK**. If you wish to make any other changes, start again at Step 5. If you are finished making or saving the configuration changes, click on the button in the upper left corner of the DigiPrint Utility window to close.

APPLICATION SOFTWARE SET-UP

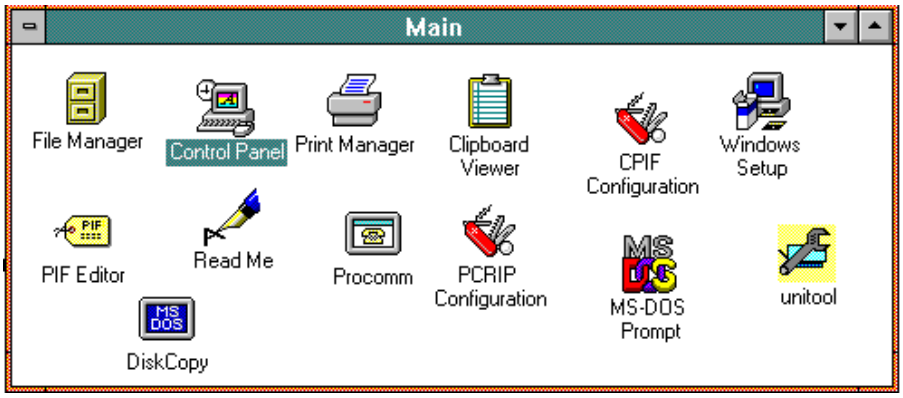
Each desktop publishing or word processing application needs to use the custom printer drivers for Graphic Device Interface (GDI) and QuickDraw (QD) printing provided on the utility disks with the Controller. These DigiPrint drivers are installed into the Windows 3.1, Windows 95 or Macintosh system folder using the following procedures:

1. GDI Printing under Windows 3.1

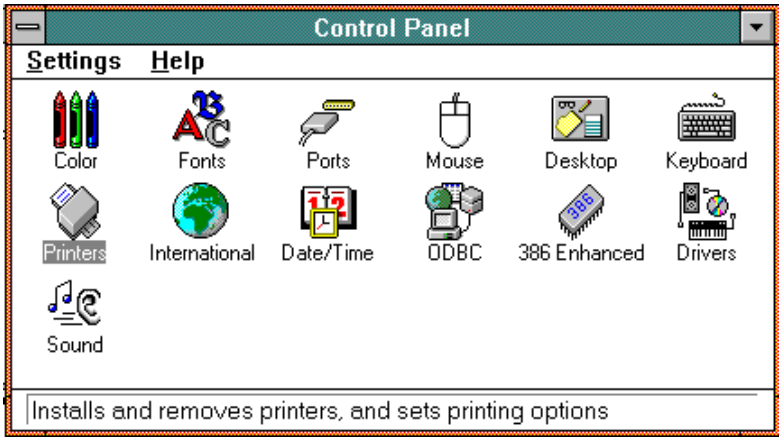
Customized Driver Installation for Windows 3.1:

A. Open Program Manager. Double click on **Main**.

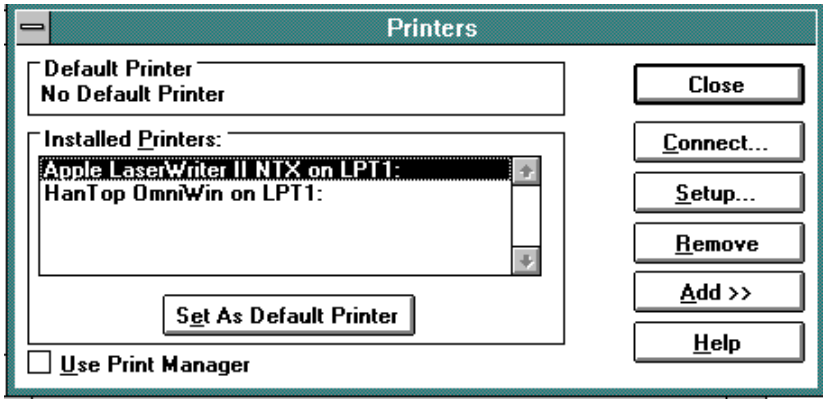
B. Double-click on **Control Panel**.



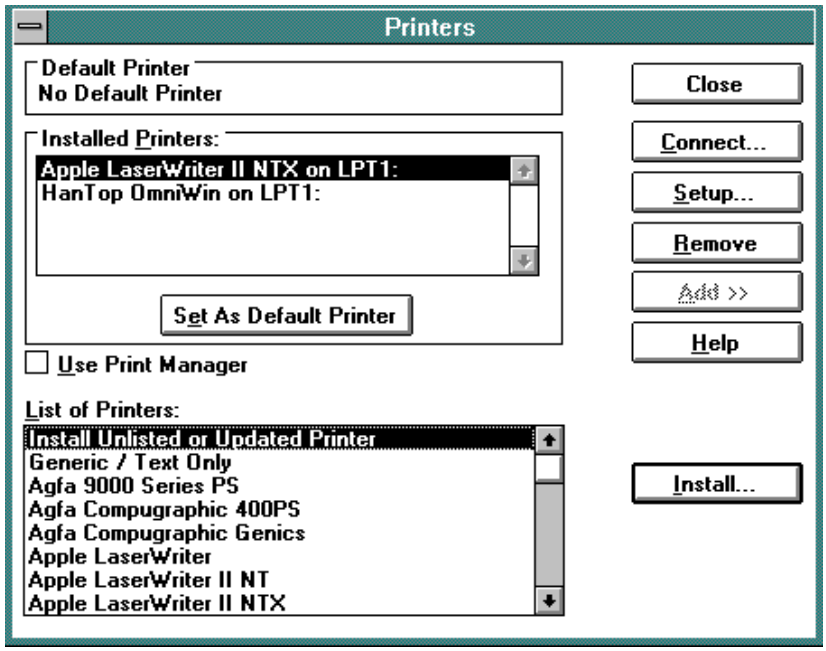
C. Double click on **Printers**.



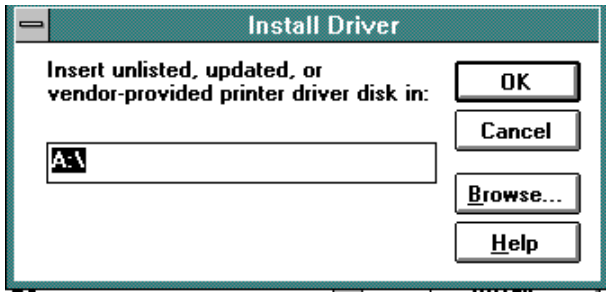
D. Click on **Add**.



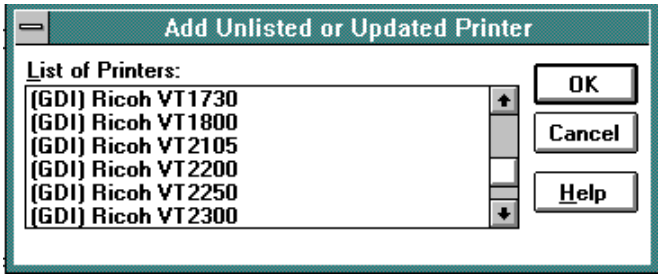
E. In the "**List of Printers**" dialog box, which will appear on the lower half of the screen, highlight: **Install Unlisted or Updated Printer**. Click on **Install**.



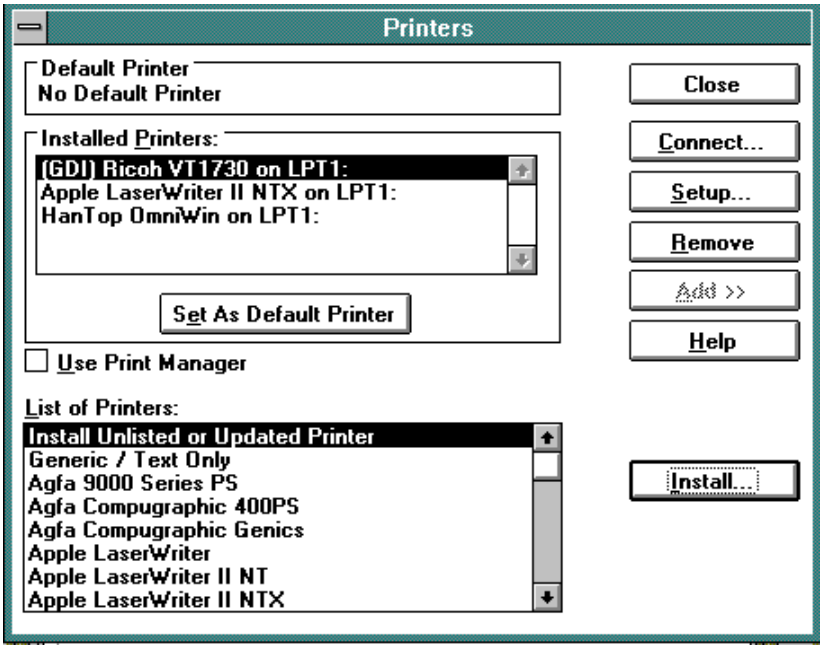
F. Insert the floppy disk labeled Windows 3.1 Drivers in the floppy drive. The "Install Driver" window will provide a prompt for drive **A:**. If that is correct, click **OK**. If not, type the correct floppy drive designation and click **OK**.



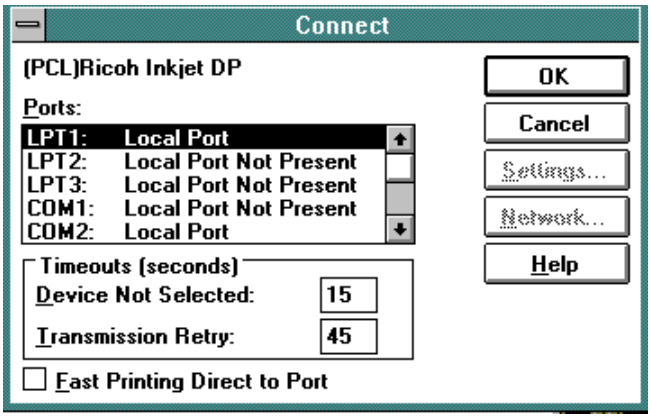
G. The "Add Unlisted or Updated Printer" window will display a list of printer driver files that are on the floppy. Highlight the driver name which contains the Priport Model Number which will be connected to the EZ1 Controller and click **OK**.



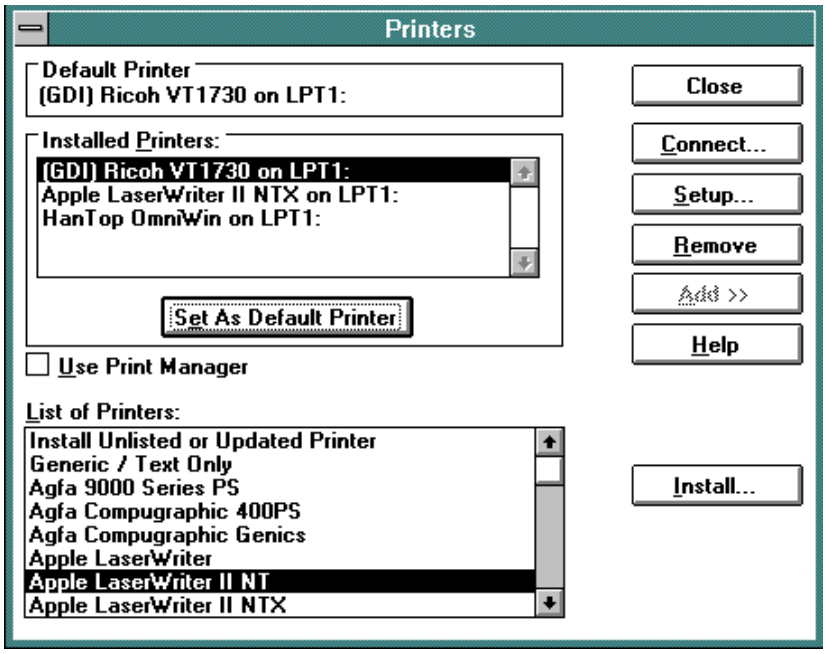
H. When the install process is completed, the printer name will appear in the "Installed Printers" dialog box on the upper half of the screen. Check to see that the new printer(s) just installed is hooked to the correct output port. If not, click on **Connect** to select the correct output port from the computer.



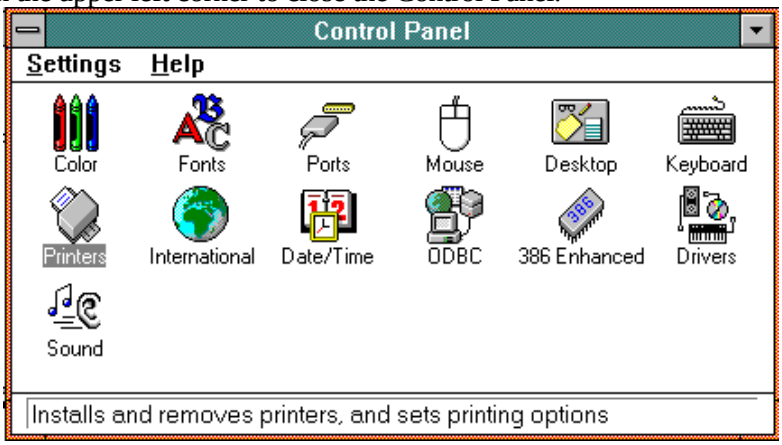
I. You should verify that "Fast Printing Direct to Port" is turned off on this window. To change computer output ports, highlight the correct port and then click on **OK**.



J. The “Printers” screen reappears. You may also choose the Priport as your default printer here. Click on **Close** to exit to the Control Panel.



K. Double click in the upper left corner to close the Control Panel.



To print:

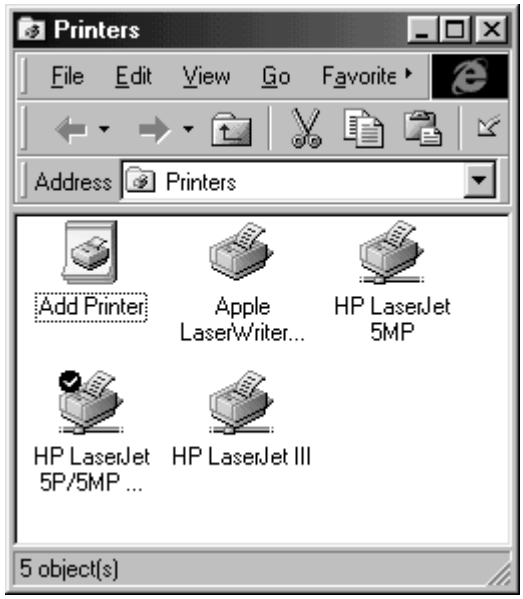
Follow the standard printing sequences within the Windows 3.1 program being used. Make certain to select the printer driver that matches the Priport Model connected to the PCRIP-EZ1 Controller. GDI printing as described by the computer industry is "WYSIWYG"--"what you see is what you get". In other words, however the document is displayed on the screen is how the document will print. For example, if you compose a document using the Ricoh VT1800 driver (300 dpi), for example, and then change to the Ricoh VT3800 driver (400 dpi), the page displayed on the screen WILL be reformatted due to a variation in font metrics at the different resolutions. The document will print as currently displayed on the screen. If you change the print driver back to the Ricoh VT1800, the display will change again and subsequent printed output will match the screen.

Special note for Model VT3600 and VT3800 who use the Short Drum: Choose the standard Letter or A4 page size instead of Ltr (SD) or A4 (SD) page size in the page setup of your application software. If the paper is loaded correctly for the Short Drum (wide edge feed), the Priport's page size sensing will tell the Controller to rotate the image correctly to match the paper.

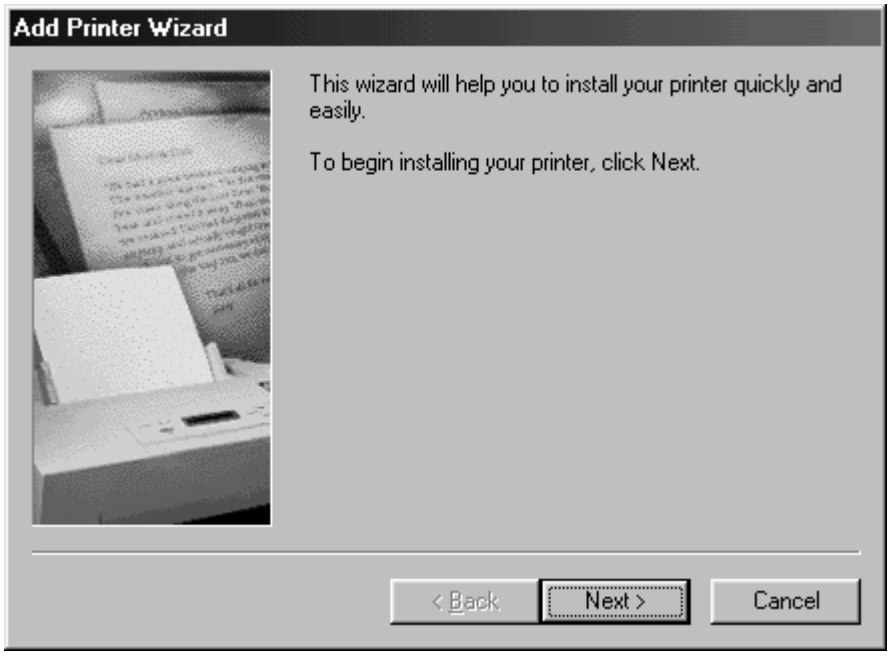
Special note for Model VT3500 who use the Short Drum: You must first use the Configuration program to select the Letter - Short Drum or A4 - Short Drum page size in the PCRIP-EZ1. **Then choose the standard Letter or A4 page size** instead of Ltr (SD) or A4 (SD) in the page setup of your application software. Make certain that the paper is loaded correctly for the Short Drum (wide edge feed) and the Controller will rotate the image correctly to match the paper.

2. GDI Printing under Windows 95
Customized Driver Installation for Windows 95:

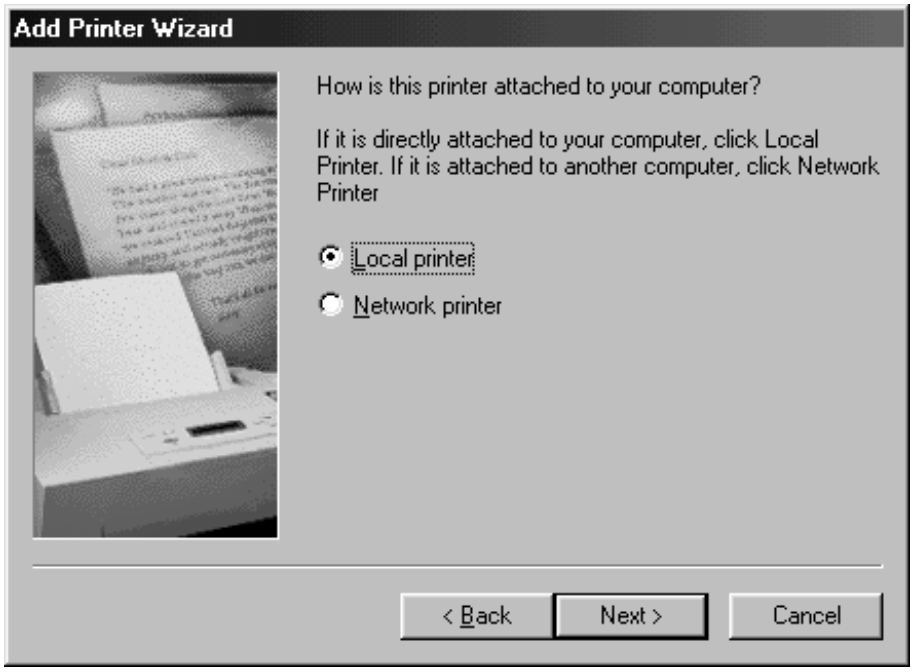
A. Hold down the left mouse button on **Start**, select **Settings** and then **Printers**. Double click on **Add Printer**.



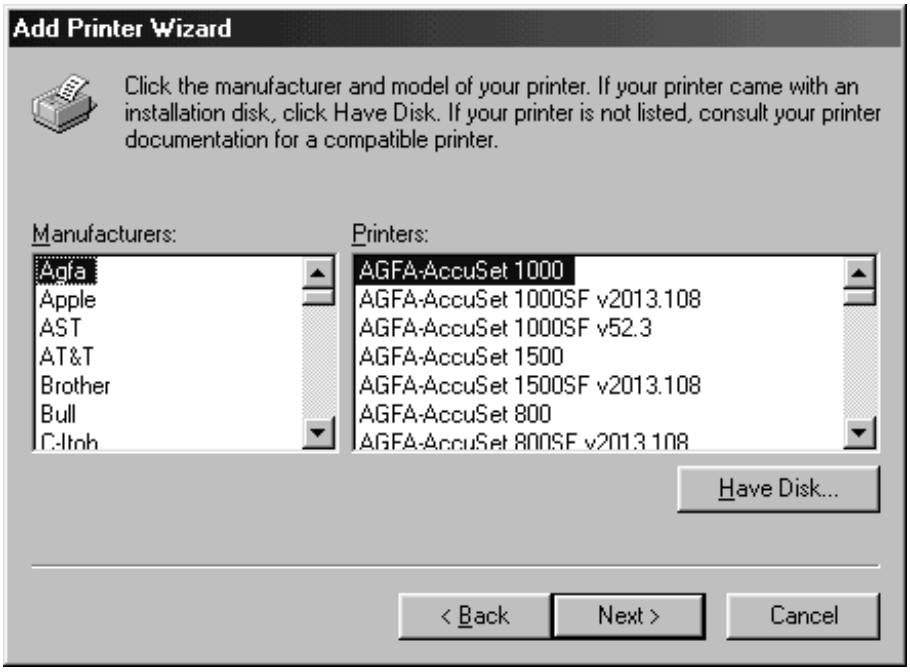
B. When the **Add a Printer Wizard** screen appears, click on the **Next** button.



C. Choose **Local Printer** and click **Next**.

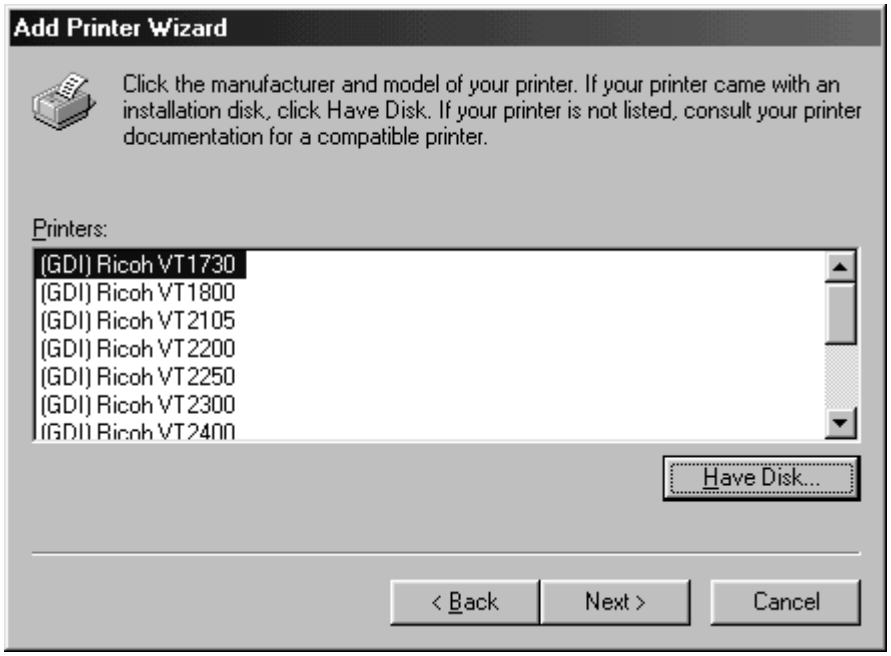


D. A listing of printers will be displayed on the left side of the screen. **The printer driver you need to install will not be displayed here.** Instead, insert the Windows 95 Drivers disk provided in the floppy drive and click on the **Have Disk** button.

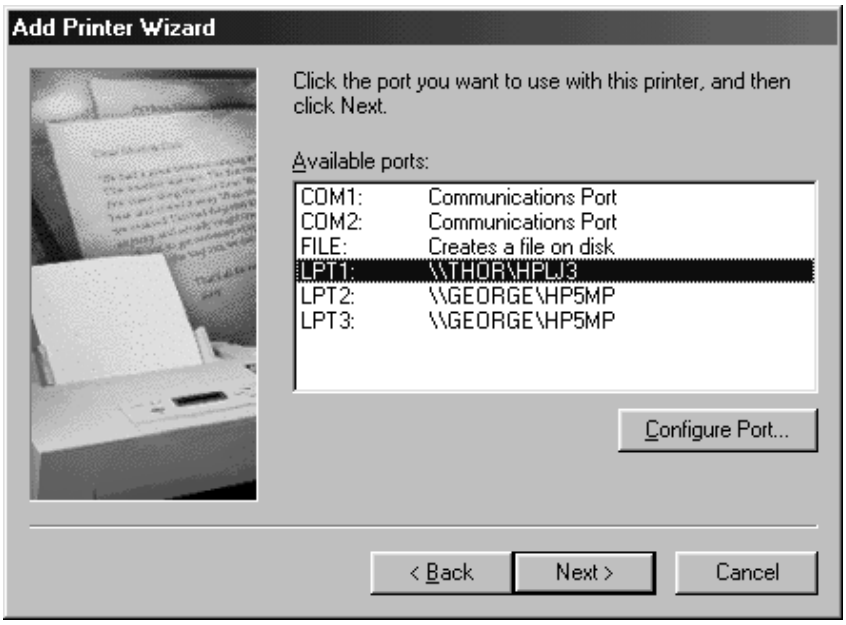


E. Insert the disk labeled Windows 95 Drivers into the drive. Click **OK**.

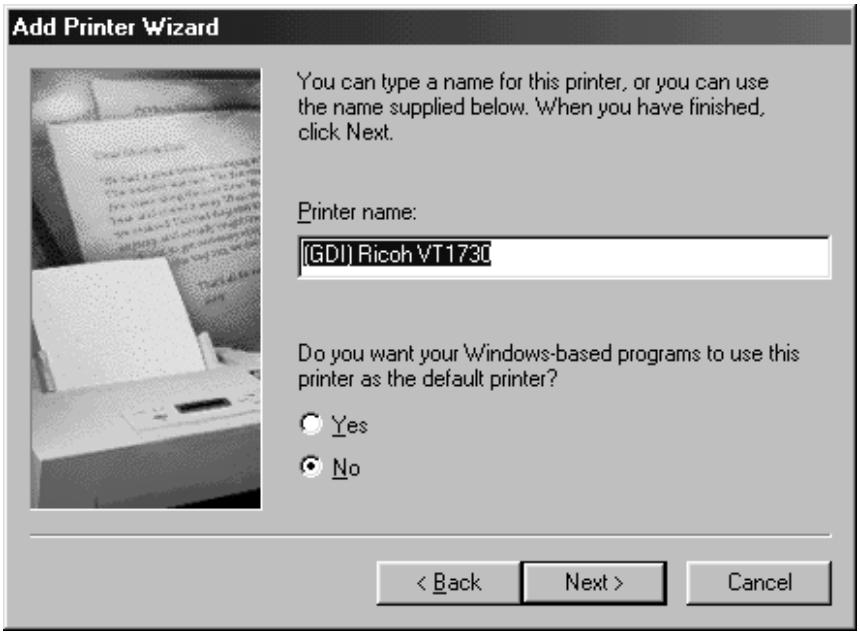
F. Select the Priport model number you are connecting to the EZ1 Controller and click **Next**.



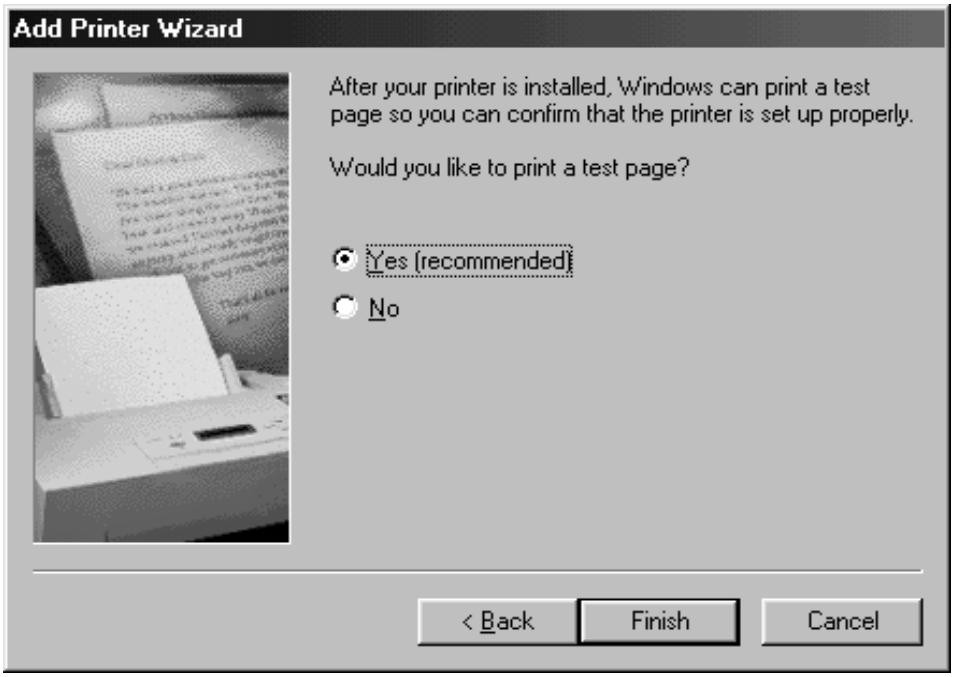
G. On this screen, verify that the correct computer output port is selected. To change computer output ports, highlight the correct port and then click **Next**.



H. On this screen, you have the option to change the name displayed for the printer or you can use the name provided by the driver. You may also choose the Priport as your default printer here. Click **Next** to proceed.



I. On the final screen, you can print a Win95 test page to verify printer connection. Click on **Finish** to complete the driver installation.



To print:
Follow the standard print sequence within the Windows 95 program being used. Make certain to select the printer driver that matches the Priport Model connected to the PCRIP-EZ1 Controller. GDI printing as described by the computer industry is "WYSIWYG"--"what you see is what you get". In other words, however the document is displayed on the screen is how the document will print. For example, if you compose a document using the Ricoh VT1800 driver (300 dpi), for example, and then change to the Ricoh VT3800 driver (400 dpi), the page displayed on the screen WILL be reformatted due to a variation in font metrics at the different resolutions. The document will print as currently displayed on the screen. If you change the print driver back to the Ricoh VT1800, the display will change again and subsequent printed output will match the screen.

Special note for Model VT3600 and VT3800 who use the Short Drum: Choose the standard Letter or A4 page size instead of Ltr (SD) or A4 (SD) page size in the page setup of your application software. If the paper is loaded correctly for the Short Drum (wide edge feed), the Priport's page size sensing will tell the Controller to rotate the image correctly to match the paper.

Special note for Model VT3500 who use the Short Drum: You must first use the Configuration Program to select the Letter - Short Drum or A4 - Short Drum page size in the PCRIP-EZ1. **Then choose the standard Letter or A4 page size** instead of Ltr (SD) or A4 (SD) in the page setup of your application software. Make certain that the paper is loaded correctly for the Short Drum (wide paper edge feed) and the Controller will rotate the image correctly to match the paper.

3. QuickDraw Printing on the Macintosh

NOTE: The DigiPrint Utility program and associated files should have already been copied from this utility disk to a location on the hard disk that can be easily accessed.

Customized Driver Installation for the Macintosh:

A. Insert the Macintosh Utility disk in the floppy drive.

B. Double-click on the floppy disk icon to it.

C. Drag the **DigiPrint** file icon and drop in the Extensions Folder inside the System Folder on your hard disk.

D. Drag the **DigiPrint Prefs** folder and drop it in the Preferences Folder inside the System Folder.

E. Drag the **DigiPrint Monitor** icon and drop it in a location that is easily accessible. (We recommend creating a folder on the hard disk named "DigiPrint Monitor" to contain this program so it can be found quickly.)

To print:

A. Using the pull-down menu from the Apple icon, point and click on Chooser.

B. Within the Chooser left-hand dialog box, point and click on the **DigiPrint** icon.

C. The Macintosh will poll the AppleTalk printer network and return the **Priport** name (or the personalized name if you renamed the printer as described earlier).

D. Click on **Setup** to bring up the Model Selection screen.

E. Click and hold the mouse button on the down arrow to the right of the "Model file" dialog box to see a menu of Priport model selections. Highlight the appropriate Priport model and release the mouse button to select it.

F. The Priport model file you just selected should be displayed in the dialog box. If the Priport model is not correct, repeat the step above.

G. Click **OK** to close the Model Selection screen.

When you close the Chooser, the Macintosh is ready to send print files to the Controller from any Macintosh software program. The DigiPrint driver together with the model file selected in the Chooser will support all possible output page sizes at the correct resolution for that Priport model.

PRIPORT CONTROLLER OPERATION

1. Power-On/Power-Off Sequence:

   Please follow the steps listed below to turn on and off your system:

   A. Power-On:
      1. Priport
      2. Controller
      3. Computer

   B. Power-Off:
      1. Computer
      2. Controller
      3. Priport

2. Controller - Front Panel Indicator Lights:

   A. Power-On Light (left hand light): When light is on, power is on.

   B. Ready Light (right hand light)

3. Ready Light:

   A. The Controller is ready for operation after the following sequence occurs:

      - At power on, the ready light remains off for a short time.
      - When ready light turns on, the Controller is ready for use.

   B. Ready Light--Slow Flash:

      - When a slow flash occurs, the Controller is processing the document.

   C. Ready Light--Quick Flash:

      - When a quick flash occurs, the Controller has encountered an error condition in processing the document. (See the Troubleshooting section for possible error conditions and solutions.)

   D. Ready Light--One Long + Two Short Flashes:

      - When one long and two short flashes occur, either the Priport is off-line or the Priport is still waiting to print copies off a new master, which is currently on the drum.

4. Copy Setting, Page Size Selection and Image Overlay Functions:

   How to Implement and Use **Copy Setting**: Models VT1800, VT2200, VT2250, VT2400, VT2600, VT3600, and VT3800

   A. Verify that the dip switches at DPS101 on the Video Interface board inside the Priport have been set to OFF.

   B. The Controller will automatically turn Auto-Cycle on. If Auto-Cycle is on, the requested number of copies entered from the computer will be displayed on the Priport control panel and will print without any further intervention. However, if the copy count is set to 1, the Controller will change the copy count to 3 when the print job is sent to the Priport. This feature was designed to prevent interlocked masters.

   C. When the Priport is On Line, all of the Priport manual control buttons are disabled EXCEPT Auto Cycle, Speed, Image Position and Stop. To regain access to all other control buttons, you must take the Priport off line.

   D. If you use a Windows program which has a **collate copies** check box as an option on the Print Window, you should turn that feature OFF. When this feature is turned on, the program will send the print job to the Controller again and again to produce the desired number of copies rather than allowing the Priport to execute the desired number of copies.

E. Most Windows 3.1 and all Win95 programs can support copy setting as described above if you are using the customized DigiPrint driver provided. (Priport Models VT1800, VT2200, VT2250 and VT2400 can not provide the page size mismatch feature described below.)

F. All Macintosh software applications can also pass the requested copy count to the Priport.

How to Implement and Use **Page Size Selection**: Models VT2600, VT3600 and VT3800

A. When the Priport is put On Line, it will check to see what paper size is loaded in the paper-input tray. If the page size selected in the Controller does not match the paper size loaded in the Priport's input tray, the Controller will change its page size setting to match the paper loaded. Any time you remove (or use) all the paper from the paper input tray the Priport will go off line. **When you load new paper and put the Priport back On Line**, it will again check the paper size loaded in the input tray against the page size selected in the Controller.

B. With the DigiPrint driver installed in Windows 3.1 or Win95, you will be able to prevent large quantities of "misprints". First of all, remember that if the Priport is On Line, the Controller has reset its page size to match the paper loaded in the Priport's input tray.

- If the document image sent is larger than the paper loaded, the Priport will truncate the image on the master to match the paper and reduce the requested copy count to 2. In this case, you need to change the paper in the input tray to match the document and resend the print job.

- If the document image sent is smaller than the paper loaded, the Priport will create the complete image on the master but when it prints, the image will be placed on the paper incorrectly and the requested
copy count will be reduced to 2. In this case, you might be able to print correct copies off this master.
To see if this is possible, load the correct size paper, and push the Proof button. If the image is placed correctly on the paper in the Proof copy, you can then enter the desired number of copies manual copy setting keys on the Priport control panel and push Print Start.

How to Use **Image Overlay** Function: Models VT2600, VT3600 and VT3800

A. Take the Priport off-line.

B. Place the original document on the glass or in the ADF that you wish combined with the computer generated document and push the OverLay button.

C. Put the Priport back On-Line and send the document from the computer.

D. The Priport combines the image sent from the computer and the image from the original scanned document into a single master to create the printed output.

5. DigiPrint Monitor Function : **Macintosh only**

When the DigiPrint Monitor is enabled, error conditions at the Priport that will prevent successful completion of a print job are reported back to the user's screen. This feature is especially useful when the Priport and/or Controller are distant from the Macintosh computer that generated the print job.

The Video Interface board installed inside the Priport, which receives output data from the Controller, also receives status reports from the Priport itself. The DigiPrint Monitor polls the Video Interface board for status and receives back a status code. Each different status code reports a different condition of the Priport. **Ready** means that the Priport is ready to accept a print job. **Master Making** means that the Priport is currently making a master. **Printing** means that the Priport is currently printing from the master on the drum.

All of the potential error codes are also reported to the DigiPrint Monitor. Some of the common error codes are: **Master Out, Paper Out, Ink out, Paper Jam - feed in, Paper Jam - feed out, Cover open, Master Jam,** and **Used Master Box Full**. All error conditions are prioritized by the DigiPrint Monitor program. When all error conditions are cleared and the print job resumes, the Monitor will report the current status.

Appendix B lists all the possible status codes that the DigiPrint Monitor will report.

COMMONLY ASKED QUESTIONS

1. How far can I have the Controller from the computer?

- The official specification for **parallel** cables recommends a length not greater than 10 feet (approximately 3 meters), however you can probably use a cable up to 25 feet (approximately 8 meters) without encountering any line communication problems.
- The **AppleTalk** specification recommends a cable length of not greater than 1000 feet (approximately 300 meters) which should not be exceeded.

2. How far can I have the Controller from the Priport?

- The official specification allows for a 10-foot (approximately 3-meter) cable. A 6-foot (approximately 2-meter) cable was supplied with the Controller, but you can probably use a cable up to 20 feet (approximately 6 meters) if necessary. The farther the Priport is from the computer, the greater the potential for line communication problems.

3. How many computers can you run from the Controller?

- **Two.** One IBM or compatible connected to the parallel port AND one Apple Macintosh or Macintosh network connected to the AppleTalk port.

4. Will the Controller work with a laptop or notebook computer?

- Yes, all computers connect to the Controller as if it were a standard computer printer. The GDI or QuickDraw driver will need to be installed in each computer.

5. Is any special wiring required for the Controller?

- No, it will work on 110 or 220-volt systems by using the appropriate power cord.

6. How much RAM memory does the Controller have?

- It comes standard with 4 megabytes of RAM.

7. What if my file size is over 4 megabytes? Will the Controller be able to process the file?

- Under most circumstances, the answer is yes, due to a process built into the Controller called image compression. However, some images can not be compressed successfully.

8. Can you add additional memory?

- Yes, the Controller can be upgraded to 8 or 16 megabytes of RAM. Please contact your local Sales Representative for more details on this upgrade.

9. Must you configure all software when you install the Controller?

- No. Once the driver is installed in Windows 3.1 or Windows 95 on the PC or in the Chooser on the Macintosh, all software application programs can use it.

10. Will the Controller work with Windows 3.1? Windows 95? Macintosh?

- Yes! But different configuration programs and printer drivers must be installed for each operating system.

11. Will the Controller work with all application software programs?

- All Windows 3.1, Windows 95 and Macintosh programs can send documents to the Controller.

12. Will the PCRIP-EZ1 Controller work on a network?

- Yes, but only with simple Macintosh "printer networks" via AppleTalk/LocalTalk or AppleTalk/PhoneTalk are supported.

13. What fonts are built into the Controller?

- None! Windows 3.1 and Windows 95 can use any True Type font. Macintosh can use all system fonts and True Type fonts. If Adobe Type Manager is also installed in the Macintosh, you can also print PostScript Type 1 printer fonts.

14. Can you use other downloaded soft fonts with the Controller?

- No! Soft fonts can not be downloaded to the Controller, but any True Type font installed on the PC or Macintosh and displayed on the monitor can be printed.

15. Will the Controller allow the Priport to create an A3/11" X 17" image?

- Yes, as long as the Priport Model has the image size output capability and the Controller contains enough memory.

16. Can you combine two A4/US Letter pages side by side into a single A3/11" X 17" image?

- If your software application supports A3/11" X 17" landscape printing, you should also be able to place the two pages side by side. The specific method used to accomplish this page placement, however, will vary by software application.

17. Can you reverse scan with the Controller and the Priport?

- No, but you could buy a scanner and hook it directly to your computer. While this process is simpler in the Macintosh environment, it is still a very complex project in either the PC or Macintosh environment and
should be undertaken only by an expert computer user. When scanned images are saved as graphic files, they can be included in documents you create in various software applications.

18. What type of scanned images can be input into my documents?

- Only images that have been saved as graphics files(ie, those with extensions like .tiff, .gif, .bmp, .pcx., etc.)

19. Can you set the number of copies to print from the computer?

- Yes, all of the newer Priport models allow you to set the copy count from your computer: VT1800, VT2200, VT2250, VT2400, VT2600, VT3600 and VT3800. For all other Priport models the number of copies to be printed must be set from the Priport control panel.

20. How important is the "Auto Cycle" key in the printing of a job?

- It is important that the Priport print a minimum of one copy in addition to the proof copy for each new master. Until at least one copy has been printed, the Priport will not allow a new master to be created. Therefore, we recommend that when using the Controller that you also use the "Auto Cycle" mode to enable the system to clear itself and be ready for the next print job.

21. What does the Diagnostic Page Button do?

- When the Diagnostic Button on the back panel of the Controller is pushed in, the Priport will output a Diagnostic Status page that includes configuration information for the Controller. (See Appendix A.)

22. If I have a software or hardware question, whom do I call?

- Your local sales/service organization should be contacted.

TROUBLESHOOTING

The following are symptoms you might encounter and the appropriate solution for each:

1. There is a quick flash of the ready light.

- An error condition has been detected in the Priport. First, check for a loose or missing cable between the Controller and the Priport.
- Next, check the control panel of the Priport for a flashing indicator. Clear the error condition (master jam, out of ink, out of paper, etc.) and push reset. If possible, print one proof copy from the newly created master. If the image on the proof copy is complete, you can print more copies. If the image is not complete, you will need to resend the document to the Priport and create a new master.
- If you are unable to print a proof copy, you will need to power the Priport off and on again to clear the error and then resend the document to create a new master.

2. There is no master making at all.

The Customer Engineer who installed the Controller should have tested both the connection between the Controller and the Priport, the connection between your computer and the Controller and the system as a whole.

- If you are using a Macintosh, the Monitor program will tell you exactly what is wrong at the Priport. When you correct the error, the Monitor will tell you the Priport is ready.
- If the Controller ready light is producing a quick flash, follow the steps listed above to clear the error in the Priport.
- If the Controller ready light is producing one long and two short flashes, check to see if the Priport may beoff-line. Put the Priport back on-line and verify that the PCRIP-EZ1 ready light has stopped flashing.
- If the Priport is not off-line, then the Priport is waiting to print from a new master. You may either print
- copy from the master currently on the drum, or push the Priport's on-line button off and then on again to clear this condition.

3. A new master is made, but only blank pages print out.

- Verify that the selected page size, the Controller configuration and the Priport all match.
- Check that the document being sent to the Controller is not blank.
- If you have followed all of the steps listed above and still get blank pages as output, contact your local service organization.

4. Part of the document image I can see on my monitor is missing when it prints.

- Verify that the page size **and** the page orientation (portrait or landscape) selected in the application software, the Controller configuration and the Priport all match.
- If you have a VT3500, check to see if you have the Short Drum installed. If so, you need to select the correct page size which references the short drum through the Controller Configuration Program.

5. The document image is rotated AND partly missing when it prints.

- If you have a VT3500 Priport, check to see if you have the A3 drum installed. If so, you need to select the correct page size which does NOT reference the short drum through the Controller Configuration Program.

6. I keep getting a Macintosh error message saying "Priport is not available on AppleTalk".

- Make sure that the Controller is powered on and the Priport is on-line.
- If only one Macintosh is connected to the Controller, contact your local sales/service organization for additional help.

7. The Controller's ready light starts blinking slowly as if it is processing a print BEFORE I have even sent a print job down.

- If you have a Macintosh connected to the AppleTalk port and AppleTalk has been disabled through the PC Configuration program, the Macintosh will still try to communicate with the Controller. This attempt at communication from the Macintosh looks like the start of a print job to the Controller and the ready light will start blinking.
- First, unplug the AppleTalk cable from the Controller. This will stop input from the Macintosh and the ready light will go to steady.
- Then if you have a PC also connected to the Controller, you can use the PC EZ1 Configuration program to re-enable AppleTalk and save that configuration change.
- If you do not have a PC connected to the Controller, you can still re-enable AppleTalk using the following steps:
  1. Turn off the Controller.
  2. Hold in the Diagnostic Button while you turn the Controller back on. This procedure temporarily re-enables AppleTalk mode. These configuration changes will only last until the next power down if you do not take the following step to save this revised configuration in the Controller.
  3. Using the DigiPrint Utility, select "Download File" and then "Save Configuration Changes".

8. The Controller's ready light starts blinking slowly as if it is processing a print job AFTER my print job has been completed.

- If only one computer is connected to the Controller, the inter-job timeout value has been unnecessarily increased from the factory default setting of 20 seconds. If that value is changed back to 20 seconds through the EZ1 Configuration Program and that configuration change is saved, the ready light will not continue blinking after the print jobs is completed.
- If more then one computer is connected to the Controller, it may be processing a print job from the other computer.

9. What if the DigiPrint icon doesn't appear in the Chooser on my Macintosh for QuickDraw printing?

- If the DigiPrint icon does not appear in the Chooser, then the DigiPrint driver did not get installed correctly in the Extensions folder. Refer to item 3, “QuickDraw Printing on the Macintosh” in the Application Software Set-up section, and repeat steps A, B and C under “Customized Driver Installation for the Macintosh”.

10. What if the Model Selection screen under Setup in the Chooser on my Macintosh says "None found"?

- You will see this message if the "DigiPrint Prefs" folder from the Macintosh disk is not installed correctly in the Preferences folder. Refer to item 3, “QuickDraw Printing on the Macintosh” in the Application Software Set-up section, and repeat steps A, B and D under “Customized Driver Installation for the Macintosh”.

11. Why does the Controller continue blinking for several minutes after I have cancelled the print job on my Macintosh?

- The Controller will continue to process whatever data it received before the cancel command cancel print job If the print job you cancelled is large or complex, you might want to power off and on the Controller rather than waiting for reset.

APPENDIX A
DIAGNOSTIC STATUS PAGE

```
                    Priport Controller Status Page

Controller Firmware Rev:  09XXXXX       0 XXXX 5 XXXX    a XXXX
Selected Page Size:  US Letter          1 XXXX 6 XXXX    b XXXX
Controller RAM Size:  X Megabytes       2 XXXX 7 XXXX    c XXXX
Mode:  GDI/QuickDraw                    3 XXXX 8 XXXX    d XXXX
                                        4 XXXX 9 XXXX    e XXXX
```

APPENDIX B
DIGIPRINT MONITOR STATUS CODES

Ready
Offline
Paper Out
Master Out
Paper Jam
Master Jam
Ink Out
Cover Open
Paper Size Mismatch
Scanner Cover Open
Front Door Open
ADF Cover Open
Drum Not Installed
Master Eject Error
No Master On Drum
Paper Jam - Feed In
Paper Jam - Feed Drum
Paper Jam - Feed Out
Used Master Box Removed
Out of Paper Tape
Master Clamp Miss
Thermal Head Overheat
PSU Overtemp
Drum Movement Error
Cutter Error
Paper Tray Error
Vertical Adjust Error
Tape Inserter Error
Incorrect Drum Installed
Call Service
Scanner Error
Used Master Box Full
Caution
Busy
Printing
Waiting To Print
Master Making
Error
ADF Feed Jam
No Key Counter
No Copies Printed From Current Master
AutoOnLine
Printing Complete

INDEX

CÓPIA NÃO CONTROLADA

C237
SERVICE MANUAL

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CÓPIA NÃO CONTROLADA

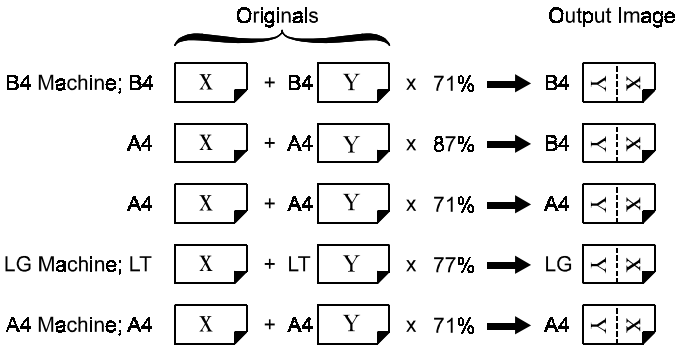
OVERALL MACHINE INFORMATION

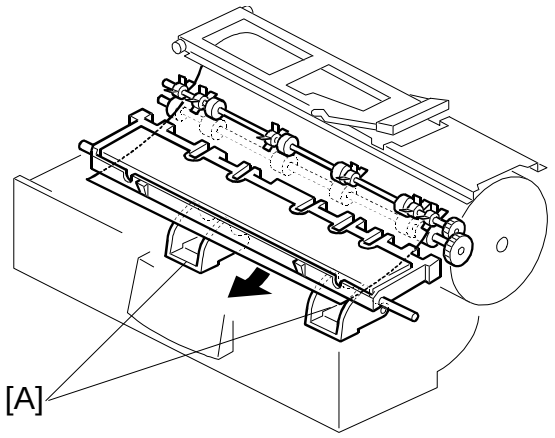
CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

1. OVERALL INFORMATION

1.1 ESSENTIAL DIFFERENCES BETWEEN THE C237 AND C231 MODELS

No.	Item	Remarks
1	Fast Printing Speed	The maximum printing speed is increased from the current 120 cpm to 130 cpm. C231 model: 80, 100, 120 sheets/minute C237 model: 80, 100, 130 sheets/minute
2	Print Paper Weight	By changing the type of rubber on the separation pad, the print paper weight specification is changed. C231 model: 47.1 g/m^2 to 157.0 g/m^2 C237 model: 47.1 g/m^2 to 209.3 g/m^2
3	Energy Saver Mode	Energy saver mode lowers the energy consumption level below 10 W. When the machine enters Energy saver mode, only the LED for the clear mode key stays on. All other keys and the LCD remain on stand-by until the clear mode key is touched.
4	Combine Two Originals	The model is equipped with an image rotation feature memory where the scanned image is rotated 90 degrees using an image processing technology.  The above combinations are pre-programmed and can be selected easily by pressing the “Combine Copies” key on the operation panel.
5	Exit Pawl Air Pump	To ensure paper separation from the drum, the exit pawl air pump system is added. By adding the exit pawl air pump unit, thin paper separation from the drum has been improved. The unit is only added on the Chinese model.
6	MPU, PSU, Operation Panel Boards	Some related parts are different. Refer to the new electrical components section for details.

No.	Item	Remarks
7	Paper Separation Pressure Adjustment	The paper feed roller pressure position and paper separation pressure position are changed. For details, refer to the paper separation pressure adjustment in the replacement and adjustment section.
8	Supply Incompatibilities	**Ink:** The C237 and C231 model black inks are not interchangeable. In addition, the C237 model black inks are designed differently for each vendor brand. The C237 and C231 color inks are interchangeable. **Master:** The C237 and C231 master rolls are not interchangeable.
9	Master Eject Unit	The C237 model has increased the ejected master capacity. There are additional parts [A] inside the master eject unit for better master compression. 

No.	Item	Remarks
10	New SC and SP numbers	Several SC codes, SP numbers, and input check codes were changed. **SC code:** E-21 Paper exit timing sensor remains off E-22 2nd feed timing sensor remains off E-23 Master eject position sensor remains off E-24 Feed start timing sensor remains off **SP number:** No. 14 Not used for the C237 model No. 17 Not used for the C237 model No. 18 Master Type No. 19 Not used for the C237 model No. 125 Auto Energy Saving **Input check:** Code 51 Not used for the C237 model Refer to the service tables section for details.

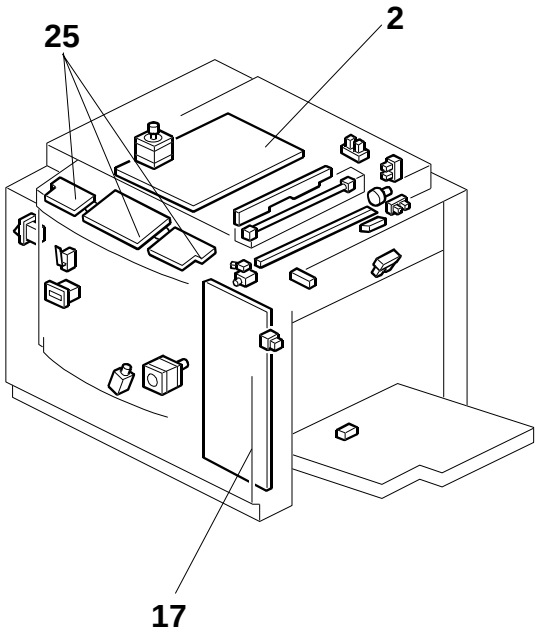
1.2 SPECIFICATIONS

The specifications are identical to the C231 models, except for the following.

Printing Speed:	80, 100, 130 sheets/minute (3 steps)
Print Paper Weight	47.1 g/m^2 to 209.3 g/m^2 [12.5 lb to 55.6 lb]
Master Process Time:	Platen mode: Less than 29 seconds (A4 paper) ADF mode: Less than 34 seconds (A4 paper)
Master Eject Box Capacity	Normal conditions: 60 masters (Master for B4 drum) 70 masters (Master for LG drum) 80 masters (Master for A4 drum)
Maximum Power Consumption:	Max: 250 W (Same as the C231 model) Energy saver mode: Below 10 W
Dimensions:	Trays closed: 607 mm x 651 mm x 567 mm 607 mm x 601 mm x 567 mm (Chinese model) 607 mm x 651 mm x 617 mm (With ADF) 607 mm x 601 mm x 617 mm (With ADF) (Chinese model) Trays open: 1187 mm x 651 mm x 567mm 1187 mm x 601 mm x 567mm (Chinese model) 1187 mm x 651 mm x 617mm (With ADF) 1187 mm x 601 mm x 617mm (With ADF) (Chinese model)
Noise Emission: (At the operation position)	At 80 rpm printing speed: 68 dB At 100 rpm printing speed: 70 dB At 130 rpm printing speed: 73 dB

1.3 NEW ELECTRICAL COMPONENTS

1.3.1 MAIN BODY



1.3.2 TABLES OF ELECTRICAL COMPONENTS

Boards

Index No.	Name	Function
2	Main Processing Unit (MPU)	Controls all machine functions both directly and through other boards. (The backup RAM number on the MPU is changed from IC140 to IC145.)
25	Operation Panel Boards	These boards control the operation panel.
17	Power Supply Unit (PSU)	Provides DC power to the system. [VR2 on the PSU (used for adjusting thermal head voltage) has been moved to a new position, but there are no changes in its function.]

Switches

Index No.	Name	Remarks
-	Test Switch	Not used for the C237 model
-	Master Making Unit Cover Safety Switch	Not used for the C237 model

CÓPIA NÃO CONTROLADA

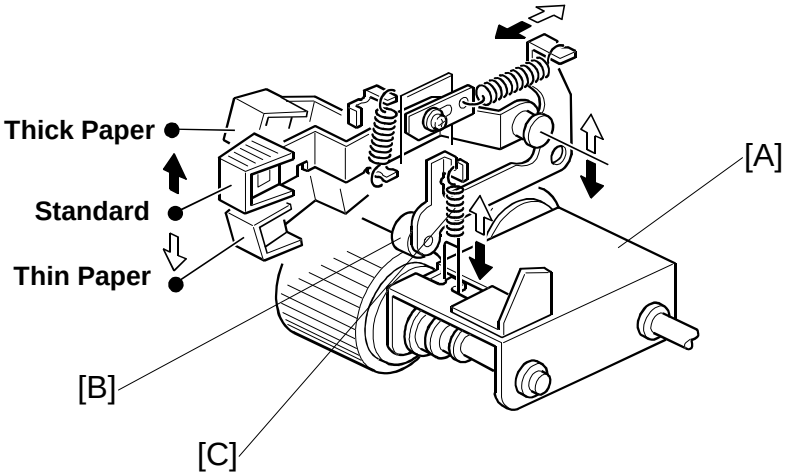
DETAILED SECTION DESCRIPTIONS

CÓPIA NÃO CONTROLADA

2. DETAILED SECTION DESCRIPTIONS

2.1 PAPER FEED

2.1.1 PAPER FEED/SEPARATION PRESSURE ADJUSTMENT MECHANISM



The C237 model has an additional adjustment level for paper feed pressure. The paper feed pressure adjustment now has 3 levels.

C231 model	C237 model
Standard, Thick Paper	Standard, Thick Paper, Thin Paper

Standard: Paper feed pressure via the weight of the paper feed roller unit [A].

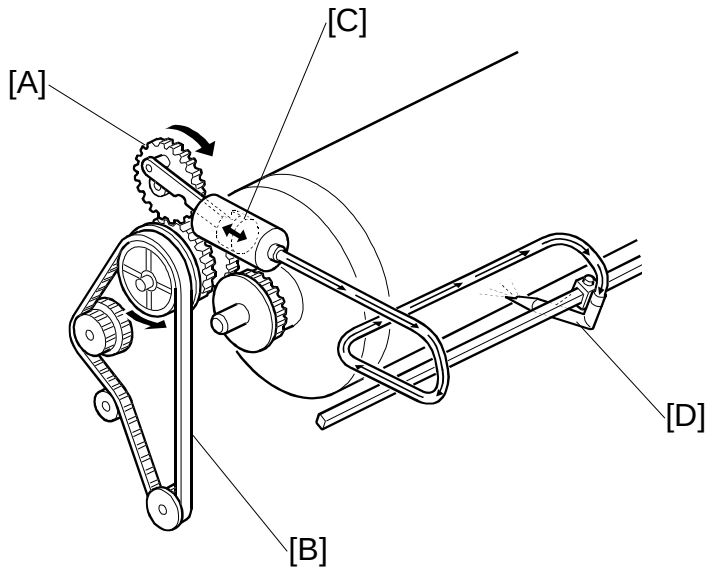
Thick Paper: Gives a higher pressure, using pressure from the roller [B] in addition to the weight of the paper feed roller unit [A].

Thin Paper: Gives a lower pressure by lifting up the feed roller unit with a spring [C].

NOTE: The paper feed pressures for standard and thick paper are the same as for the C231 model.

2.2 PAPER DELIVERY

2.2.1 EXIT PAWL AIR PUMP MECHANISM (CHINESE MODEL ONLY)



Drive from the main motor is transmitted to the pump gear [A] through gears and a timing belt [B]. When the gear [A] rotates, it drives the piston [C] back and forth.

The piston moves forward and pushes a jet of air out through the nozzle [D]. This jet of air helps to separate the paper from the drum.

INSTALLATION

CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

3. INSTALLATION

There are no differences from the C231 model in this section.

CÓPIA NÃO CONTROLADA

SERVICE TABLES

CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

4. SERVICE TABLES

4.1 SERVICE CALL CODES

*: Status code unique to the C237 model

No.	Description/Definition	Points to Check
E-00	*Clamper Motor Failure* The MPU cannot detect the master clamper position sensor signal (open or closed) within 1.2 seconds after the clamper motor turns on.	Mechanical interference with the clamper drive Master clamper sensors Clamper motor Clamper drive mechanism
E-01	*Cutter Failure* The cutter HP sensor does not turn on within 3 seconds after the cutter motor turns on. If the master is not cut at the end of the master making. The drum master detection sensor is used to check if the black cover at the trailing part of the drum cloth screen is covered by the master just before the drum returns the home position. In this case, the SC is cleared once the power is off.	Master cut error occurred Cutter switch Cutter motor Cutter drive mechanism
E-02	*Paper Table Drive Failure* The paper height sensor or the table lower limit sensor does not turn on within 7 seconds after the table drive motor turns on.	Paper table drive motor Paper height sensor or table lower limit sensor Mechanical interference with the paper table drive
E-04	*Thermal Head Overheat* Temperature of the thermal head is greater than 54°C when the Start key is pressed.	Thermal head Thermistor of the thermal head (short circuit) Wait for the thermal head to cool down
E-06	*Main Motor Lock* The CPU cannot detect the feed start timing sensor signal within 2 seconds after the main motor turns on, or the sensor remains on for more than 0.5 seconds.	Main motor Power to the main motor Feed start timing sensor Mechanical interference with the drum drive
E-09	*Thermal Head Thermistor Open* The thermistor output voltage (CN109-A1) is greater than 4.9 volts.	Thermal head thermistor Thermal head connector
E-10	*Thermal Head Drive Failure* The CPU detects an abnormal condition in the thermal head drive circuit.	Thermal head MPU Thermal head connector and harness

No.	Description/Definition	Points to Check
E-12	*Pressure Plate Motor Failure* The pressure plate home position sensor signal is not detected within 4 seconds after the pressure plate motor turns on.	Mechanical interference with the pressure plate drive Pressure plate motor Pressure plate HP sensor
E-13	*Scanner Malfunction* The scanner HP sensor does not turn on after the scanner motor moves for more than 7 seconds back to the home position after scanning. The scanner cannot leave the home position within 4 seconds of power on. When the scanner cannot return to the home position within 2 seconds of leaving.	Mechanical interference with the scanner Defective scanner HP sensor
E-14	*IPU error* Signal transmission error (from the IPU) occurred in the MPU.	MPU
***E-21**	*Paper exit timing sensor remains off* The paper exit timing sensor does not activate before the master eject position sensor activates.	Paper exit timing sensor
***E-22**	*2nd feed timing sensor remains off* The 2nd feed timing sensor does not activate before the paper exit timing sensor activates.	2nd feed timing sensor
***E-23**	*Master eject position sensor remains off* The master eject position sensor does not activate before the feed start timing sensor activates.	Master eject position sensor
***E-24**	*Feed start timing sensor remains off* The feed start timing sensor does not activate before the 2nd feed timing sensor activates.	Feed start timing sensor

4.2 SERVICE PROGRAM TABLE

*: Accessible by a customer

**: SP mode unique to the C237 model

***: Not used for the C237 model

No.	Display	Function	Settings	Factory Setting	Comments
2	ADF Unit	Enables ADF operation.	0: No 1: Yes	0	
3	Key Counter	Enables key counter operation.	0: No 1: Yes	0	
4	Key Card	Used only in Japan.	0: No 1: Yes	0	
***5**	Tape Marker Off	Disables tape marker operation.	0: No (Use the tape marker) 1: Yes	0	
***10.**	Min. Print	Limits the minimum print quantity that can be entered.	0 to 9999	0	
***11**	Max. Print	Limits the maximum print quantity that can be entered.	0 to 9999	9999	
***12**	Set Display Mode	Selects the language used on the display. 0: Japanese 1: English 2: German 3: French 4: Italian 5: Spanish 6: Chinese 7: Dutch 8: Portuguese(Brazil)	0 to 8	1	
***13**	Set Size Mode	Selects the metric size (mm) or inch size on the display.	0: mm 1: Inch	-	
****14**	Not used for the C237 model				
15 -1	Set Drum Size	Selects the drum size that matches the machine. NOTE: This function is for production line use only.	0:B4 1:A4 2:LG	-	Never change the setting.
-2		Select the area name.	0:JPN 1:Asia 2:EU	-	Displays only when “0:B4” is selected in SP15-1. Never change the setting.

No.	Display	Function	Settings	Factory Setting	Comments
16	LCD Contrast Adjust	Changes the LCD contrast.	17 to 24	21	
***17**	Not used for the C237 model				
18	Master Type	Selects the master production district.	0:Overseas 1:Japan	0	Never change the setting.
***19**	Not used for the C237 model				
*20	Buzzer On	Turns the beeper on.	0: No 1: Yes	0	
*21	Prints/Master Cost	Adjusts the cost ratio of masters to prints for accounting purposes. (When SP4 is set at 1, This function cannot be used.)	0 to 50	0	The set number (0 to 50) is automatically added to the key counter each time a master is used.
22	Home Position Adjust	The drum home position (the master eject position) changes.	0 to 9	5	Never change the setting.
23	Plot Position Adjust	The drum stop position for the master making changes.	0 to 9	3	Never change the setting.
*25	Clear 2 In 1	Selects whether to reset the Combine 2 Original mode automatically after master making.	0: No 1: Yes	0	
26	Feed Timing Adjust	Adjusts the registration motor on timing for better paper registration.	0 to 7	3	
27	ADF Current Down	Lowers the current to the ADF motor.	0: No 1: Yes	0	If the ADF motor vibrates due to a part variation causing noise, reduce the motor current with this mode.
28	Paste Shadow Erase	Adjusts the Paste Shadow Erase level that can be set with the key on the operation panel. The shadows of pasted-up edges on originals lighten.	0: Standard 1: Light 2: Lighter	0	

No.	Display	Function	Settings	Factory Setting	Comments
***29**	Pht Background Correct	Determines whether the original background correction is done in Photo mode.	0: Correction is not done. 1: Correction is done.	0	
30	Sub Scan Mag. Adjust	Adjusts the sub-scan magnification.	-1.9 to +1.9%	(0)	• For the platen mode • 0.1% steps • Use the Memory/ Class key for "+" or "-"
31	SCN Center Adjust	Adjusts the center position of copies in the platen mode.	-1.9 to +1.9 mm	0	• For the platen mode • 0.1 mm steps • Use the Memory/ Class key for "+" or "-" • See Remark 1
32	SCN Line Adjust	Adjusts the position of the scanner (CIS) in the ADF mode. If images cannot be scanned in the ADF mode, adjust the position. If the value is changed, also perform SP38.	-1.9 to +1.9%	(0)	• This is for production use only. • 0.1% steps • Use the Memory/ Class key for "+" or "-"
33	Lead Edge Adjust	Adjusts the lead edge margin.	4 to 10 mm	5	
34	Head Energy Adjust (Normal)	Adjusts the thermal head energy for the normal mode.	0 to -99%	(0)	
35	Economy Head Energy Adjust	Adjusts the thermal head energy for the Economy mode.	0 to -99%	(-8)	
36	ADF Mag. Adjust	Adjusts the ADF sub-scan magnification.	-1.9 to +1.9%	(0)	• For the ADF mode • 0.1% steps • Use the Memory/ Class key for "+" or "-"

No.	Display	Function	Settings	Factory Setting	Comments
37	ADF Center Adjust	Adjusts the center position of copies in the ADF mode.	-1.9 to +1.9 mm	0	• For the ADF mode • 0.1 mm steps • Use the Memory/ Class key for "+" or "-" • See Remark 1
38	ADF Scan Line Adjust	Adjusts the ADF scanning start position.	-4.9 to 4.9 mm	(0)	• 0.1 mm steps. • Use the Memory/ Class key for "+" or "-". • See Remark 2
39	Trail Edge Adjust	Adjusts the blank margin at the trailing edge of prints.	0 to 3 mm	1	1 mm steps.
***40**	Original	Specifies the image mode at power-up.	0: Letter 1: Lt/Photo 2: Photo	0	
***41**	Image Density	Specifies the image density at power-up.	0: Light 1: Standard 2: Dark 3: Darker	1	
***42**	Print Speed	Specifies the printing speed at power-up.	1: 80 rpm 2: 100 rpm 3: 120 rpm	2	
***43**	Auto Cycle Mode	Specifies whether Auto Cycle mode is selected at power-up.	0: No 1: Yes	0	
***45**	Std. Image Position	Specifies the image position at power-up.	40: +10mm | 20: 0 mm | 0: -10 mm	20	
46	Set Finemode Default	Specifies whether the fine mode is selected at power-up.	0:No 1:Yes	0	
47	Swap Start Key	Enables swapping the start (master making) key function and the print key function depending on the end user's preference.	0:No 1:Yes	0	

No.	Display	Function	Settings	Factory Setting	Comments
52	Compress W Start Key	Compressing the ejected masters is done every time when the Start key is pressed for the master making.	0: No 1: Yes	0	See remark 3
60	Clear All Memory	Returns all SP modes to the default settings.	0: No 1: Yes	0	The memory is cleared after pressing the Enter (#) key.
61	Clear Memory/ Except Adj.	Returns all SP modes to the default settings except for Adjustments.	0: No 1: Yes	0	The memory is cleared after pressing the Enter (#) key.
70	Original Feed Jam	Displays the total number of original jams. (A)		0	
71	Paper Feed Jam	Displays the total number of paper feed jams. (B)		0	
72	Paper Wrap Jam	Displays the total number of times that paper has accidentally wrapped around the drum. (E)/(BE)		0	
73	Paper Delivery Jam	Displays the total number of paper delivery jams. (G)		0	
74	Master Feed Jam	Displays the total number of master feed jams. (C)		0	
75	Master Delivery Jam	Displays the total number of master delivery jams. (F)		0	
76	Clear Jam Counters	Clears all jam counters.	0: No 1: Yes	0	The memory is cleared after pressing the Enter (#) key.
***81**	Quality Start No.	Specifies how many prints are made with the lowest drum rotation speed (30 rpm) to stabilize image density for the beginning prints after a new master is made.	0 to 3 sheets	0	This mode is to ensure that the first print has sufficient ink density even if the machine was not used for a long.
***82**	Skip Feed No.	Specifies how many prints are skipped between prints in the skip feed mode.	1 to 9	2	"1" means no skip.

No.	Display	Function	Settings	Factory Setting	Comments
***84**	Auto Multi Copy	Specifies the initial mode for the Combine 2 Originals mode.	0: No 1: Yes (Two identical images are made if the Master Making key is pressed once.)	0	
*****85**	Not used for C237 model				
***87**	Memory Print	Specifies the printing operation when in Memory mode.	0: Memory 1: Stack	0	See remark 4
***88**	Auto Memory/ Class	Specifies whether the Memory/Class mode is used.	0: No 1: Yes	0	See remark 5
90	Thermal Head Test	Select "1" to carry out the thermal head test.	0: Off 1: On	0	
91	CIS Test	Select "1" to carry out the CIS test. Select the photo mode and make a new master. If the CIS is damaged, white or black lines corresponding to damaged pixel elements will appear on prints.	0: Off 1: On	0	The mode is cancelled once a master is made or the power is turned off.
95	Scanner Free Run	Carries out a scanner free run test.	Start with the Print Start key. Stop with the Stop key.	0	
96	ADF Original Feed	Carries out an ADF original feed test.	Start with the Print Start key. Stop with the Stop key.		
98	Economy Count	Displays the total number of masters made in Economy mode.		0	
103	Margin Erase Count	Displays the total number of masters made with the Margin Erase key.		0	

No.	Display	Function	Settings	Factory Setting	Comments
104	On line Count	Displays the total number of masters made in On Line mode.		0	
105	Overlay Count	Displays the total number of masters made in Overlay mode.		0	
106	Enlarge Count	Displays the total number of masters made in Fixed Enlargement mode.		0	
107	Reduction Count	Displays the total number of masters made in Fixed Reduction mode.		0	
111	Total Count	Displays the total number of masters and prints.		0	M: Master count P: Print count
***113**	Resettable Count	Used by the customer to display the total number of masters and prints.		0	M: Master count P: Print count
***114**	CLR Reset-table Count	Clears the resettable total master/print counters.	0: No 1: Yes	0	
115	ADF Mode Count	Displays the total number of sheets fed in the ADF mode.		0	
116	Scanner Mode Count	Displays the total number of originals set in platen mode.		0	
117	Color Drum Count	Displays the total number of prints made using the color drum.		0	
119	CLR All Total Count	Clears the following counters: SP Nos. 111, 115, 116, and 117.	0: No 1: Yes		
***120 -1**	User Code Mode	Selects user code mode.	0: No 1: Yes		
-2	Auto Reset Time	Selects the auto reset time.	0: Unlimited 1: 1 min. 2: 2 min. 3: 3 min. 4: 4 min. 5: 5 min.	0	Displays only when "Yes" is selected in SP120-1.
***121**	UC Count	Displays the total number of masters and prints made with each user code.		0	Press the # key to shift to another user code.
***122**	Clear UC Count	Clears the selected user code counter.	0: No 1: Yes	0	Same as above.
***123**	Total UC Count	Displays the total number of masters and prints for up to 20 user codes.		0	

No.	Display	Function	Settings	Factory Setting	Comments
***124**	Clear Total UC Count	Clears the total user code counter.	0: No 1: Yes	0	
***/** 125**	Auto Energy Saving	Selects an energy saver mode time from 0 to 120 minutes	0 to 120 min	3	0: Not selected
130	Input Check Mode	Displays the inputs from sensors and switches.			
131	Output Check Mode	Turns on the electrical components.			
132	All Indicators ON	Turns on all the indicators on the operation panel.			Press the # key to light all the indicators.
135	SN: Master End	Displays the master end sensor voltage.			Unit: Volts
140	Ink Detection	Specifies whether ink detection is done.	0: No 1: Yes	1	
141	Paper Detection	Specifies whether paper end detection is done.	0: No 1: Yes	1	
142	Master End Detection	Specifies whether master end detection is done.	0: No 1: Yes	1	
146	ADF Cover Detection	This mode disables the ADF cover switch.	0: No 1: Yes	1	This function is valid only when SP2 is set at "1".
147	ADF Set Detection	This mode disables the platen cover sensor detection.	0: No 1: Yes	1	If "0" is selected, "Set the original" is displayed each time at master making.
150	Control ROM No.	Displays the ROM part number and the ROM manufacturing date.		P/No.	YYYY/MM/DD
151	Machine No.	Displays the machine serial number and the installation date.		0	Input the serial number and the installation date.

No.	Display	Function	Settings	Factory Setting	Comments
152	Service Tel. No.	Input the service representative's telephone number, which is displayed with the service call code.		0	• Use the number keys to input the telephone number at installation. • Press the Memory/ Class key if you wish to add a hyphen between the digits.
153	Last Service Code	Displays the last service call.		0	
***160**	Side Ers.	Adjusts the default side edge margin width in the Margin Erase mode.	2 to 20 mm or 0.1 to 0.8 inch	5 mm or 0.2”	
***161**	Center Ers.	Adjusts the default center margin width in the Margin Erase mode.	4 to 60 mm or 0.2 to 2.3 inch	10 mm or 0.4”	
***162**	Horizontal Ers.	Adjusts the default horizontal edge (top and bottom) margin in the Margin Erase mode.	2 to 20 mm or 0.1 to 0.8 inch	5 mm or 0.2”	
***170**	ERS. **1	Enter the original size that you want to use with the Margin Erase mode.	(100 to 258) x (100 to 364) mm or (4.0 to 10.0) x (4.0 to 14.3) inch	0 x 0	The original size entered is displayed by pressing the Select Size And Direction ("∧" or "∨") keys when in the Margin Erase mode.
***171**	ERS. **2	Enter the original size that you want to use with the Margin Erase mode.	(100 to 258) x (100 to 364) mm or (4.0 to 10.0) x (4.0 to 14.3) inch	0 x 0	Same as above

No.	Display	Function	Settings	Factory Setting	Comments
***172**	ERS. **3	Enter the original size that you want to use with the Margin Erase mode.	(100 to 258) x (100 to 364) mm or (4.0 to 10.0) x (4.0 to 14.3) inch	0 x 0	Same as above

4.3 INPUT/OUTPUT CHECK MODE

Input Check Table

*: Not used for the C237 model

Code	LCD Display	Component Checked
1	SN: ADF Cover In- 1	ADF Cover Switch
2	SN: 1st Original (ADF) In- 2	Document Sensor
3	SN: 2nd Original (ADF) In- 3	Scan Line Sensor
18	SN: Paper End In-18	Paper End Sensor
20	SN: Paper Table Low Limit In-20	Table Lower Limit Sensor
21	SN: Paper Height In-21	Paper Height Sensor
22	KEY: Table Down In-22	Paper Table Lowering Switch
26	SN: Master End In-26	Master End Sensor
27	SIG: Ink In-27	When the Ink Detecting Pin detects ink
31	SN: Pressure Plate Home Position In-31	Pressure Plate Home Position Sensor
32	SN: Pressure Plate Limit Position In-32	Pressure Plate Limit Sensor
33	SW: Master Eject Box In-33	Eject Box Set Sensor
39	SIG: Key Counter In-39	When a key counter is installed

Code	LCD Display	Component Checked
42	SN: Paper Exit In-42	Paper Exit Sensor
43	SN: Master Eject In-43	Master Eject Sensor
44	SN: Drum Master In-44	Drum Master Sensor
45	SN: Scanner Home Position In-45	Scanner Home Position Sensor
47	SN: Platen Set In-47	Platen Cover Sensor
***51**	Not used for the C237 model	
52	SW: Cover Open In-52	Door Safety Switch Scanner Unit Safety Switch
53	SN: Cutter Home Position In-53	Cutter Home Position Sensor
54	SN: Master Set Cover In-54	Master Set Cover Sensor
56	SN: Feed Start Timing In-56	Feed Start Timing Sensor
57	SN: 2nd Feed Timing In-57	2nd Feed Timing Sensor
58	SN: Paper Exit Timing In-58	Paper Exit Timing Sensor
59	SN: Master Eject Position In-59	Master Eject Position Sensor
62	SN: Drum Set In-62	When the drum connector is connected
65	SN: Clamper Close In-65	Clamper Close Sensor
66	SN: Clamper Open In-66	Clamper Open Sensor
68	SN: Registration In-68	Paper Registration Sensor

Output Check Table

There are no differences from the C231 model in this section.

Code	LCD Display	Description
3	MOTOR: Master Eject Out- 3	Turns on the master eject motor.
6	MOTOR: Vacuum Out- 6	Turns on the vacuum fan motor.
7	MOTOR: Air Knife Out- 7	Turns on the air knife fan motor.
8	SIG: Key Counter Out- 8	Increments the key counter.
9	COUNTER: Master Out- 9	Increments the master counter.
10	COUNTER: Paper Out-10	Increments the paper counter.
12	MOTOR: Ink Supply Out-12	Turns on the ink pump motor.
14	SOL: Print Pressure Out-14	Turns on the pressure release solenoids. At the same time, it turns on the paper transport motor.
18	MOTOR: Paper Table Down Out-18	Turns on the paper table motor (down).
19	MOTOR: Paper Table Up Out-19	Turns on the paper table motor (up).
21	SIG: Fluorescent Lamp Out-21	Turns on the xenon lamp.
22	MOTOR: Cutter + Direction Out-22	Turns on the cutter motor.
23	MOTOR: Cutter Home Out-23	Turns on the cutter motor and moves the cutter to the home position.
27	MOTOR: Drum Home Stop Out-27	Turns on the main motor and moves the drum to the home position.
28	MOTOR: Drum Plot Stop Out-28	Turns on the main motor and moves the drum to the master making position.
33	MOTOR: Original Feed Out-33	Turns on the ADF motor.
34	MOTOR: Master Feed High Speed Out-34	Turns on the master feed motor at high speed.

Code	LCD Display	Description
35	MOTOR: Master Feed Low Speed Out-35	Turns on the master feed motor at low speed.
36	MOTOR: Master Feed Normal Speed Out-36	Turns on the master feed motor at normal speed.
37	MOTOR: Scanner	Turns on the scanner motor. The scanner moves to the original scanning position for ADF mode when the Start key is pressed. It returns to home position when the Start key is pressed again.
41	SIG: VHD on Out-41	Applies thermal head voltage. Power is applied by pressing the Start key. It is stopped by pressing the Clear/Stop key.
42	MC: Paper Feed Out-42	Turns on the paper feed clutch.
43	MOTOR: Paper Delivery Out-43	Turns on the paper transport motor while the Start key is pressed.
44	MOTOR: Clamper Close Out-44	Turns on the clamper motor and moves the clamper to the close position.
45	MOTOR: Clamper Open Out-45	Turns on the clamper motor and moves the clamper to the open position.
46	MOTOR: Pressure Plate ON Out-46	Turns on the pressure plate motor and moves the plate to the lower limit position.
47	MOTOR: Pressure Plate OFF Out-47	Turns on the pressure plate motor and moves the plate to the home position.

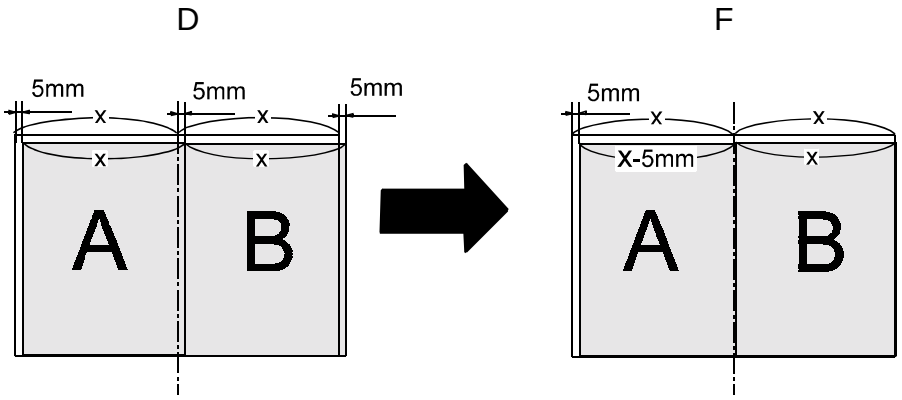
⇒4.4 ROM HISTORY

4.4.1 C237 FIRMWARE MODIFICATION HISTORY

C237 FIRMWARE MODIFICATION HISTORY		
DESCRIPTION OF MODIFICATION	**REV. LEVEL**	**SERIAL NUMBER**
This is the first mass production.	**Main ROM:** C237 5105-**B** **Feed ROM:** C237 5107-**A** **MPU:** C237 5100-**B**	Initial Production
• Improved the paper registration when the machine feeds paper at 130 rpm.	**Main ROM:** C237 5105-**B** **Feed ROM:** C237 5107-**B** **MPU:** C237 5100-**C**	July 2000 Production
• Corrected the image position failure when the 'combine 2 original mode' is used. (Main ROM) • To ensure paper registration at 130 rpm, paper feed timing was changed. (Feed ROM)	**Main ROM:** C237 5105-**C** **Feed ROM:** C237 5107-**C** **MPU:** C237 5100-**D**	August 2000 Production
• Modified because the counter on the operation panel returns to the previous value when the machine stopped because of a problem (e.g. jam during a copy job).	**Main ROM:** C237 5105-**D** **Feed ROM:** C237 5107-**C** **MPU:** C237 5100-**F**	September 2000 Production
This version causes problems and should not be used. Refer to version H history for the problem. • The specification of the 'Combine 2 original mode' for U.S. version models was changed from 'LT x LT = LG 77%' to 'LT x LT = LT 65%'. • The specification of the 'Combine 2 original mode' was changed to fit between the paper centerline and the image centerline, and 5 mm at the leading edge image was cut (see Remark 1 on the next page). • The motion time of the pressure plate motor has been changed from 2.8 ms to 1.8 ms, to prevent the motor on master eject section has a load a long term. **NOTE**: *This issue is related to the U.S. version models only.*	**Main ROM:** C237 5105-**F** **Feed ROM:** C237 5107-**C** **MPU:** C237 5100-**J**	October 2000 Production

C237 FIRMWARE MODIFICATION HISTORY		
DESCRIPTION OF MODIFICATION	**REV. LEVEL**	**SERIAL NUMBER**
• The image position was fixed because 2.3 mm was cut from the image when the North America machine used 'combine 2 original mode'. **NOTE**: *This issue is related to the U.S. version models only.*	**Main ROM:** C237 5105-**H** **Feed ROM:** C237 5107-**C** **MPU:** C237 5100-**L**	November 2000 Production
• Added a stop command for the registration motor. Intermittently the registration motor will not stop after the paper is properly captured between the drum and the pressure roller. This symptom was due to a firmware bug, and it has been solved.	**Main ROM:** C237 5105-**H** **Feed ROM:** C237 5107-**D** **MPU:** C237 5100-**N**	November 2000 Production

Remark 1:



Service Tables

CÓPIA NÃO CONTROLADA

PREVENTIVE MAINTENANCE

CÓPIA NÃO CONTROLADA

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5. PREVENTIVE MAINTENANCE

There are no differences from the C231 model in this section.

CÓPIA NÃO CONTROLADA

REPLACEMENT AND ADJUSTMENT

CÓPIA NÃO CONTROLADA

6. REPLACEMENT AND ADJUSTMENT

6.1 MASTER FEED SECTION

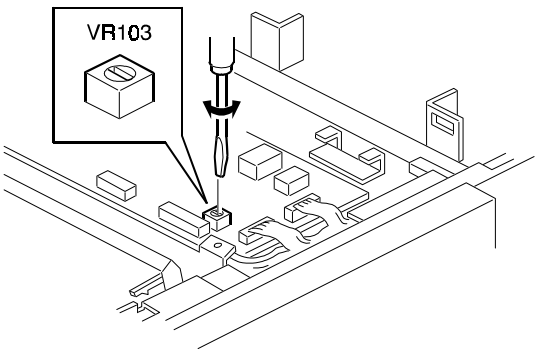
6.1.1 MASTER END SENSOR ADJUSTMENT

Purpose:
To ensure that the sensor detects the end mark (a solid black area) on the master roll.

NOTE: In the C237 model, the master end sensor input voltage, when detecting the solid black area, was changed from 1.5 ± 0.1 volts to 2.0 ± 0.1 volts.

Adjustment standard:
Within 2.0 ± 0.1 volts (when detecting the solid black area)
Within 3.7 ± 0.1 volts (when detecting a new master roll)

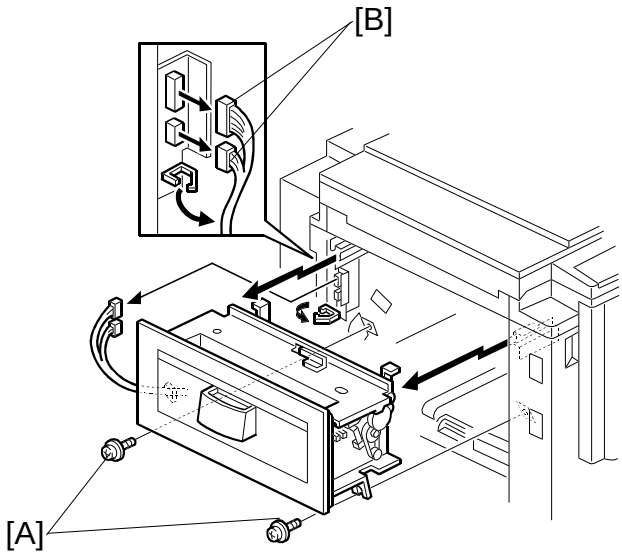
1. Make a print that includes a solid-fill black area.
2. Open the scanner unit, and remove the master roll.
3. Position the print so that the solid black area faces the master end sensor.
4. Turn on the main switch and access the SP mode.
5. Select the master end sensor voltage mode (SP135), then press the Enter key.
6. The sensor input voltage is displayed on the operation panel. (If it is 2.0 ± 0.1 volts, the following steps are not necessary.)
7. Open the scanner unit, and remove the MPU cover.
8. Adjust VR103 until the sensor input voltage becomes 2.0 ± 0.1 volts.
9. Remove the solid black pattern from the master end sensor.
10. Install a new master roll.
11. The sensor input voltage is displayed on the operation panel. Check that it is 3.7 ± 0.1 volts.



6.2 MASTER EJECT SECTION

6.2.1 MASTER EJECT UNIT REMOVAL

1. Turn off the main switch and disconnect the power plug.
2. Remove the 2 screws [A].
3. Pull out the master eject unit.
4. Disconnect the 2 connectors [B].



6.3 PAPER FEED SECTION

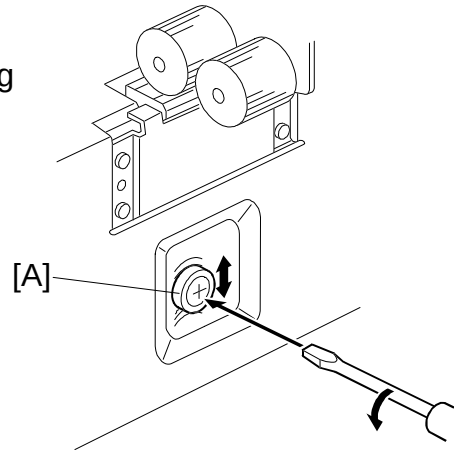
6.3.1 PAPER SEPARATION PRESSURE ADJUSTMENT

Purpose:
To ensure that the friction pad exerts sufficient pressure for smooth printing paper separation.

NOTE: As the default, the adjusting screw [A] is set at the 2nd position from the top. The amount of separation pressure is the same as for the C231 model. This change allows the separation pressure to be lowered more, which makes it more effective for thin paper feed and separation.

Adjust the paper separation pressure by loosening and moving the adjusting screw [A] up or down.

- Moving up the screw⇒
  Increases the paper separation pressure
- Moving down the screw ⇒
  Decreases the paper separation pressure



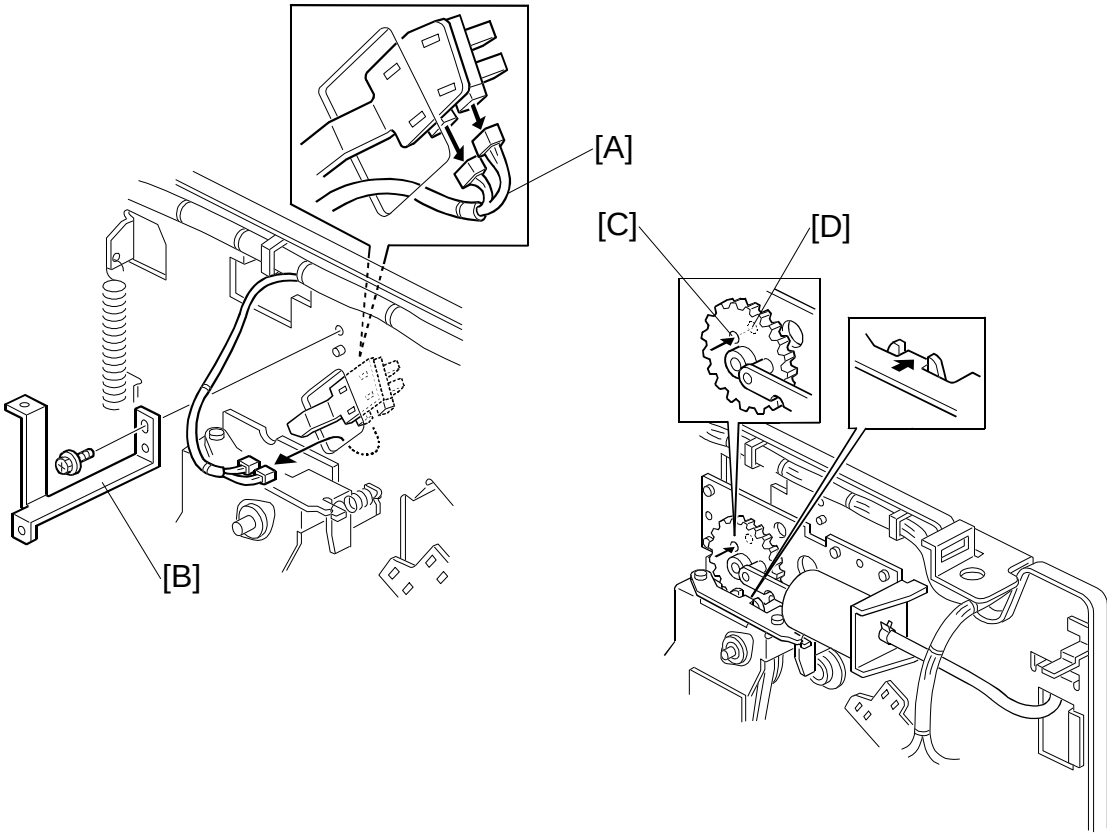
Using this adjustment to cure non-feed and multi-feed is not simple and depends on many factors. Adjust using trial and error to get the best results.

Tighten the screw after the adjustment.

6.4 PAPER DELIVERY SECTION

6.4.1 AIR PUMP ADJUSTMENT (CHINESE MODEL ONLY)

Purpose:
To ensure that the paper exit pawl air pump produces a jet of air at the proper time.



1. Turn off the main switch and disconnect the power plug.
2. Remove the rear cover.
3. Remove the drum.
4. Disconnect the 2 connectors [A] and remove the stay [B].
5. Check whether the hole [C] in the pump drive gear is aligned with the hole [D] in the air pump unit bracket.
6. If the alignment is incorrect, remove the air pump unit and reposition the gear.

CÓPIA NÃO CONTROLADA

C238
SERVICE MANUAL

CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

INSTALLATION

CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

1. INSTALLATION

1.1 INSTALLATION REQUIREMENTS

Carefully select the installation location because environmental conditions greatly affect machine performance.

1.1.1 OPTIMUM ENVIRONMENTAL CONDITION

1. Temperature —10 to 30 °C (50 to 86 °F)
2. Humidity —20 to 90 % RH
3. Install the machine on a strong and level base. The machine must be level within 5 mm (0.2") both front to rear and left to right.

1.1.2 ENVIRONMENTS TO AVOID

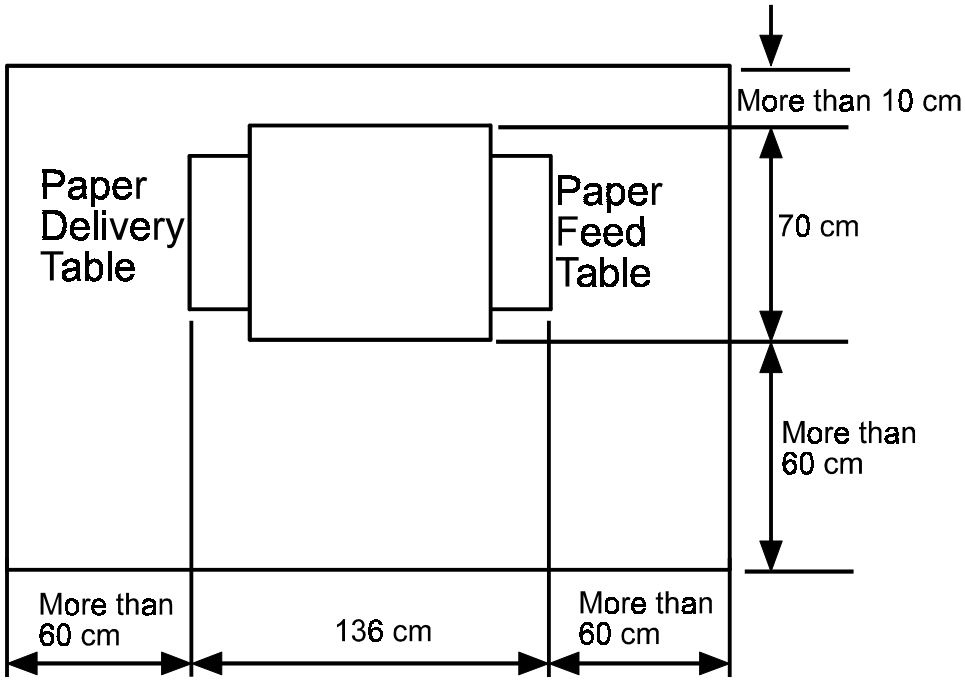
1. Locations exposed to direct sunlight or strong light (more than 1,500 lux).
2. Dusty areas.
3. Areas containing corrosive gases.
4. Locations directly exposed to cool air from an air conditioner or reflected heat from a space heater. (Sudden temperature changes from low to high or vice versa may cause condensation within the machine.)

1.1.3 POWER CONNECTION

1. Securely connect the power cord to a power source.
2. Make sure that the wall outlet is near the machine and easily accessible.
3. Make sure the plug is firmly inserted in the outlet.
4. Avoid multi-wiring.
5. Do not pinch the power cord.

1.1.4 ACCESS TO THE MACHINE

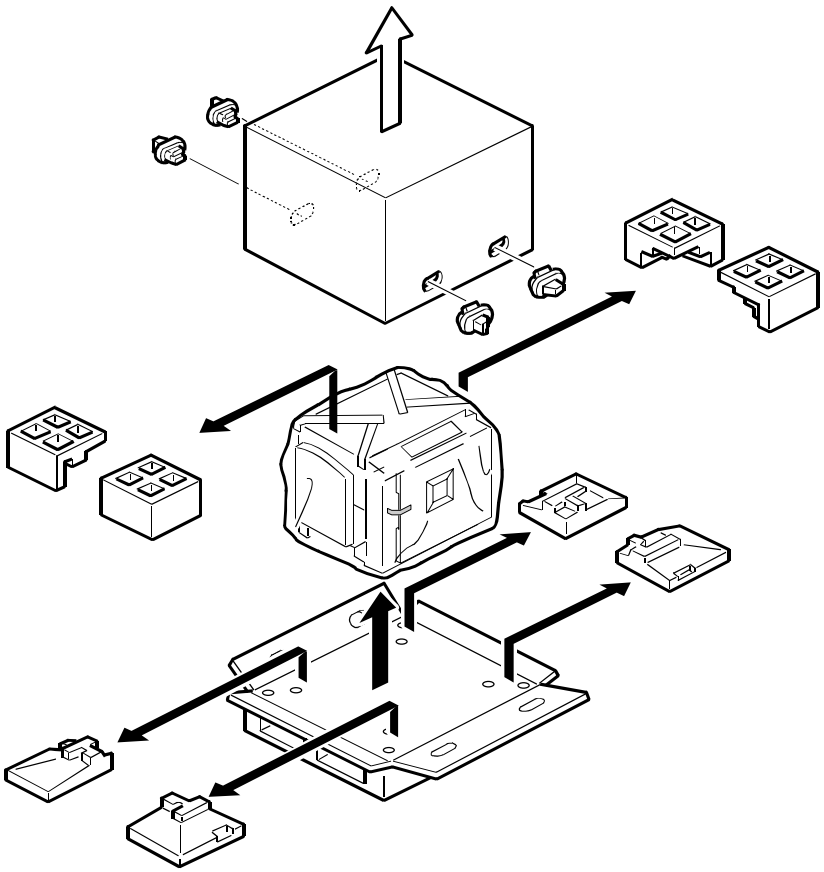
Place the machine near a power source, providing clearance as shown below.



1.2 INSTALLATION PROCEDURE

1.2.1 MAIN BODY

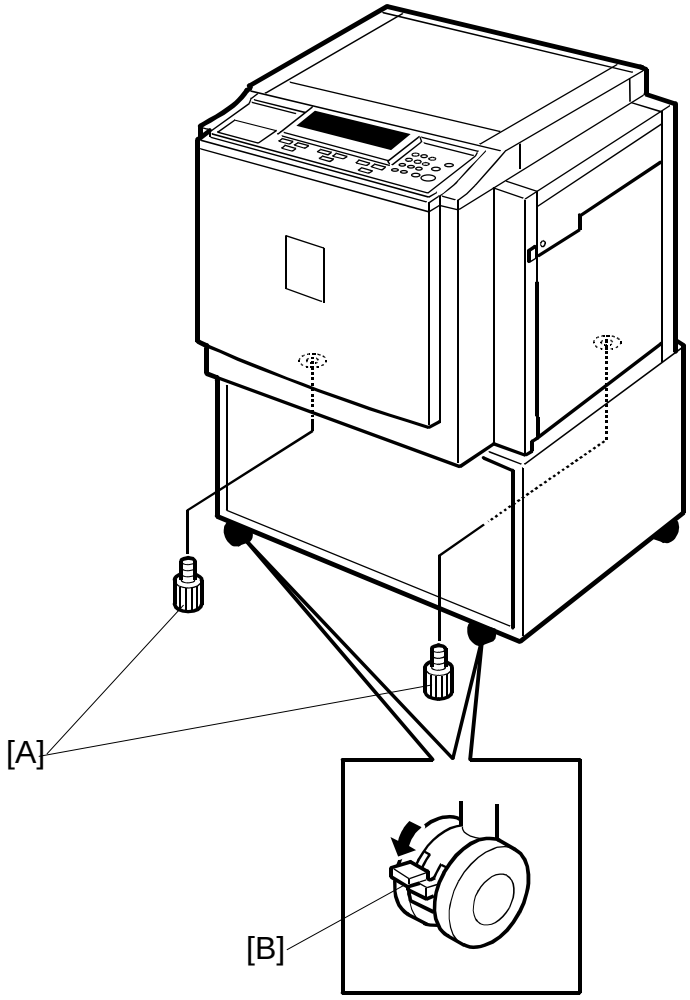
Accessory Check



Make sure that you have all the accessories listed below:

	Description	Quantity
1.	Master Spool	2
2.	Paper Feed Side Pad	2
3.	Operating Instructions	1
4.	NECR (Ricoh version only)	1
5.	Model Name Plates (C238-22, -52 and -54 only)	1 set

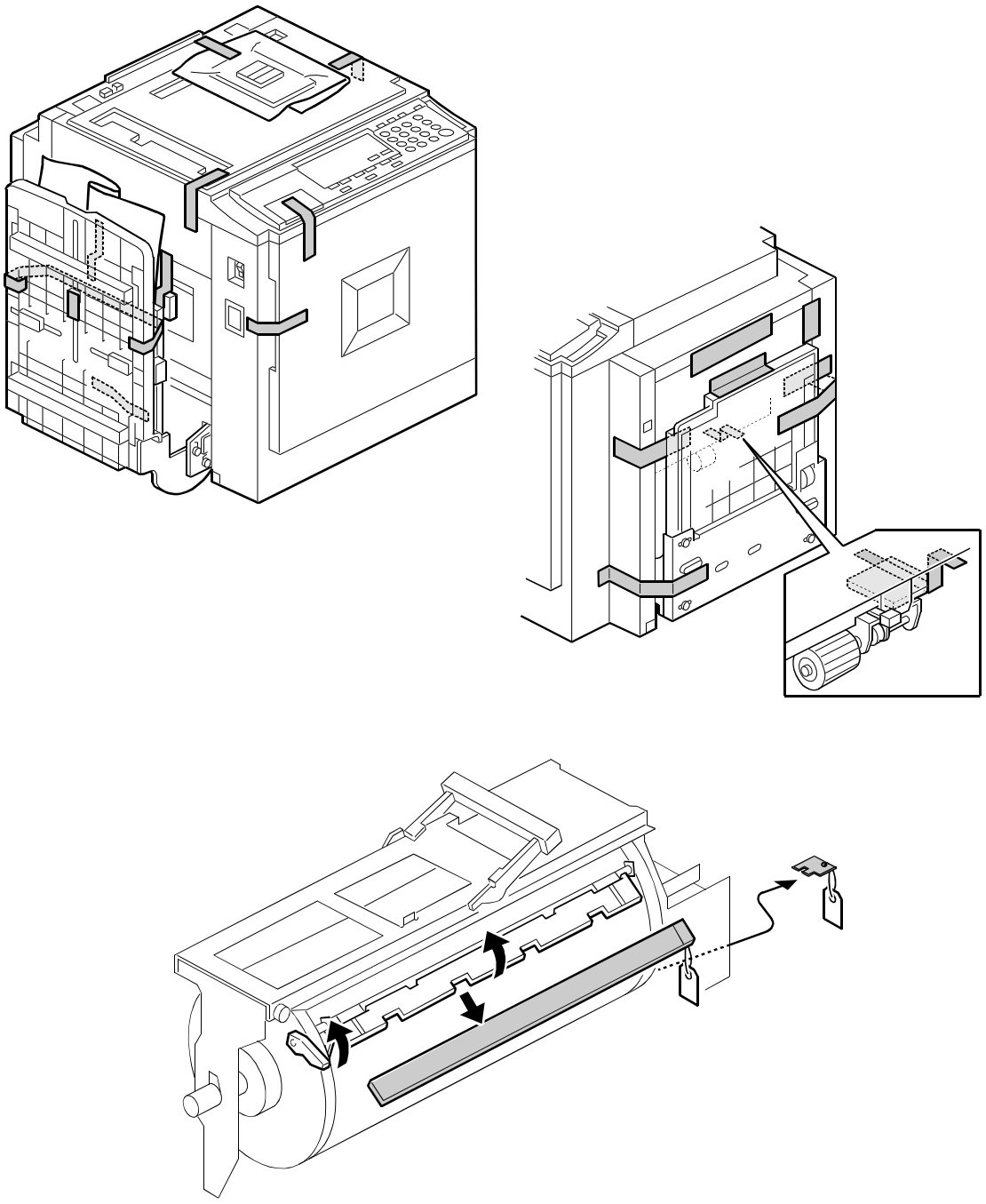
Installation Procedure



1. Unpack the box. When installing the optional table, mount the machine as shown (there are 2 screws [A] packed with the table).

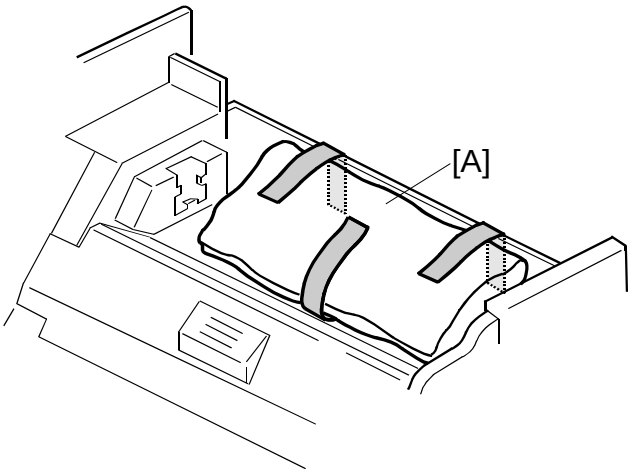
⚠CAUTION

Only lift with the carrying handles on the bottom corners of the machine.
Secure the machine on the table with the 2 screws [A] provided. This prevents the machine from falling from the table when the platen cover is open.
Lock the casters of the table as shown [B], to prevent the machine from moving (e.g. when the drum is set).

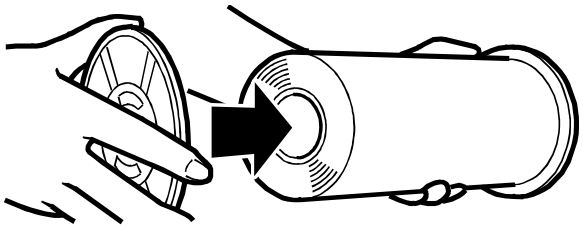


2. Remove the filament tape and string securing the covers and units as shown above.

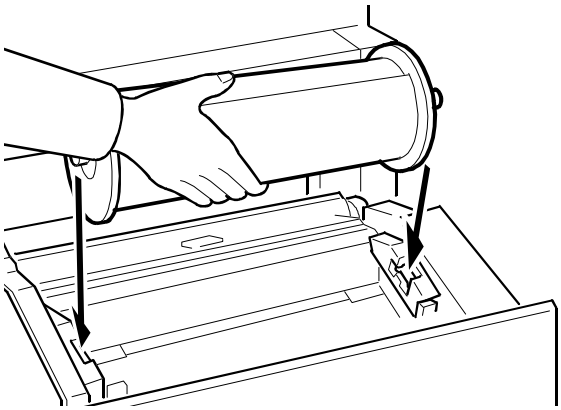
3. Pull out the master making unit, and take out the accessory bag [A].



4. Insert both spools into a new master roll.



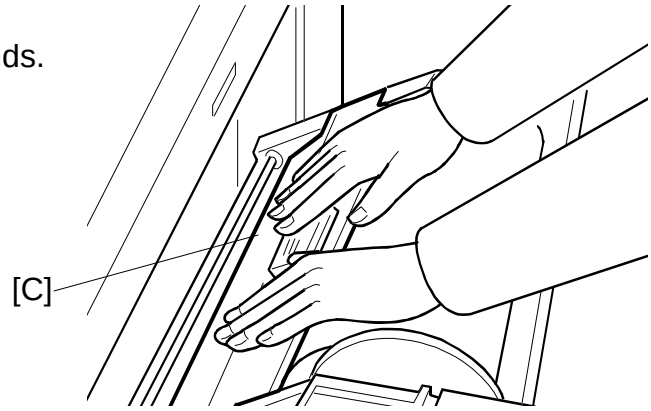
5. Install the master roll as shown to the right.



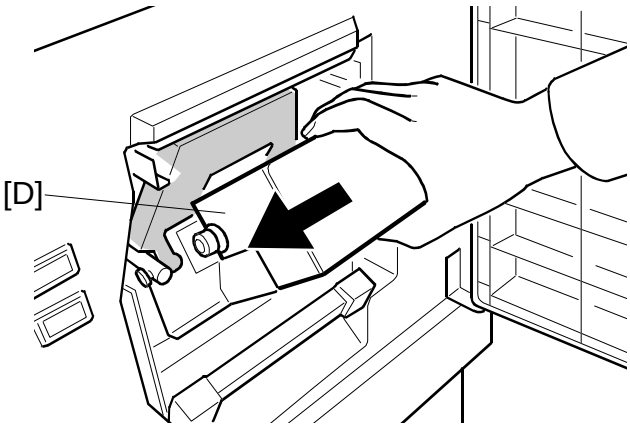
6. Insert the leading edge of the master roll under the platen roller. The arrows [B] indicate the correct position of the master leading edge.

CÓPIA NÃO CONTROLADA

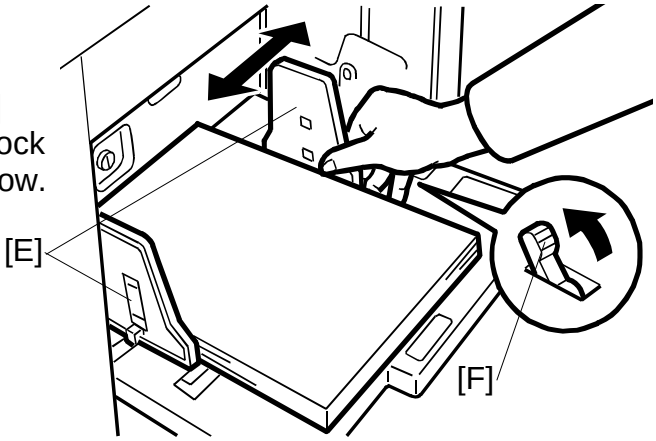
7. Close the cover [C] using both hands.
8. Set the master making unit.



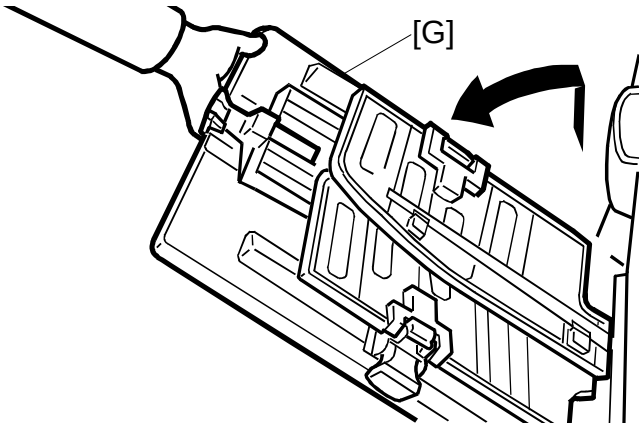
9. Open the door, and insert a new ink cartridge [D].



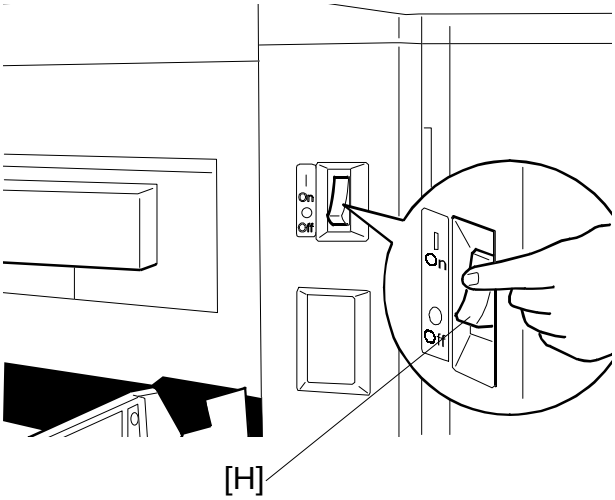
10. Open the paper table, and load a stack of paper .
11. Make sure that the side plates [E] touch the paper gently. Shift the lock lever [F] in the direction of the arrow.



12. Raise the paper delivery table [G] slightly, then gently lower it.
13. Lift the side plates and the end plate, and adjust them to the paper size.



14. Firmly insert the power plug in the outlet.
15. Make sure that the wall outlet is near the machine and easily accessible.
16. Turn on the main switch [H].
17. Press the “Economy mode” key while holding down the “0” key, to supply ink inside the drum.
18. Make some test copies.



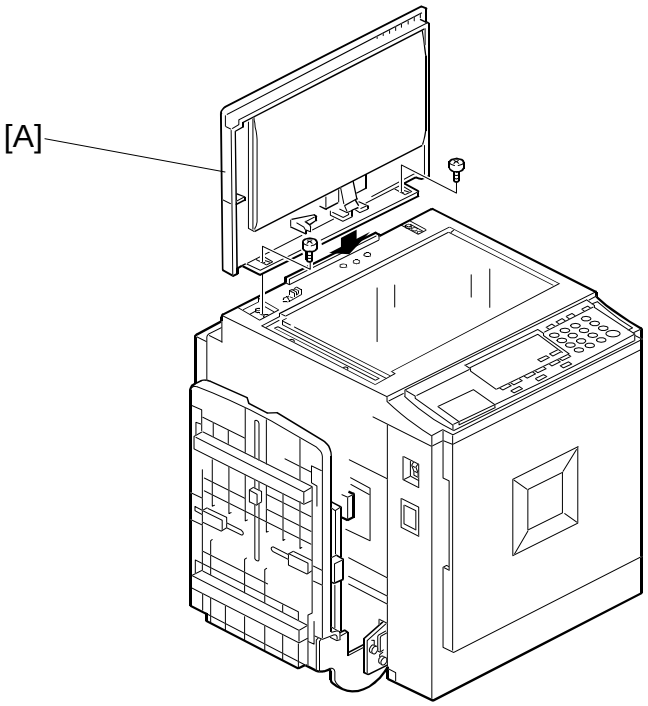
1.2.2 PLATEN COVER INSTALLATION (OPTION)

Accessory Check

Check the quantity and condition of the accessories in the box against the following list:

Description	Quantity
1. Stepped Screw	2

Installation Procedure



1. Install the platen cover [A] (2 screws).

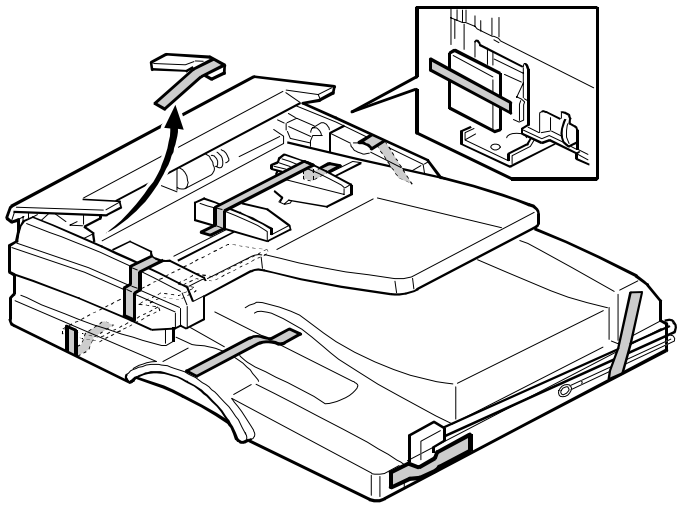
1.2.3 ADF INSTALLATION (OPTION)

Accessory Check

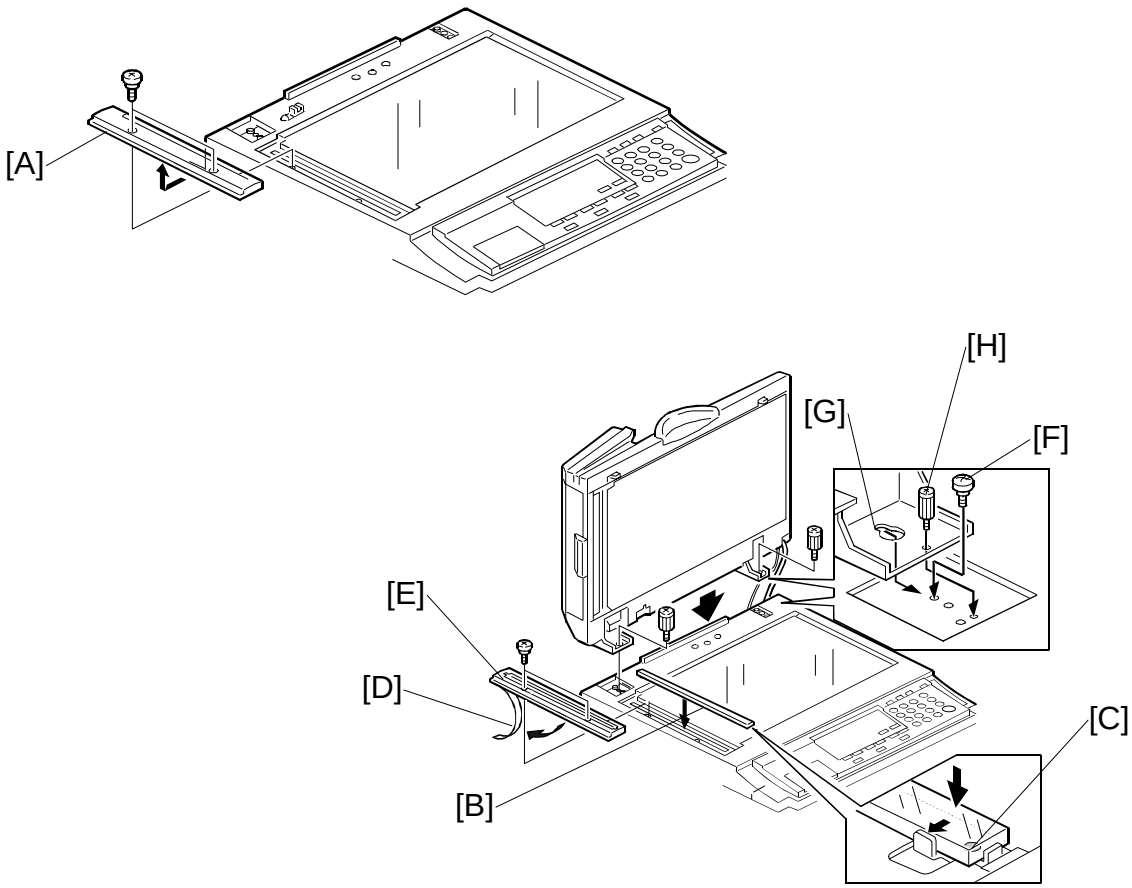
Check the quantity and condition of the accessories in the box against the following list:

Description	Quantity
1. Stepped Screw	2
2. Screws	3
3. Screwdriver	1
4. DF Exposure Glass	1
5. Decal - Exposure Glass	1
6. Decal - Scale - mm	1
7. Decal - Scale - inch	1
8. Scale Guide	1
9. Stabilizer Bracket	2
10. Thumbscrew	4
11. Caution Label	1

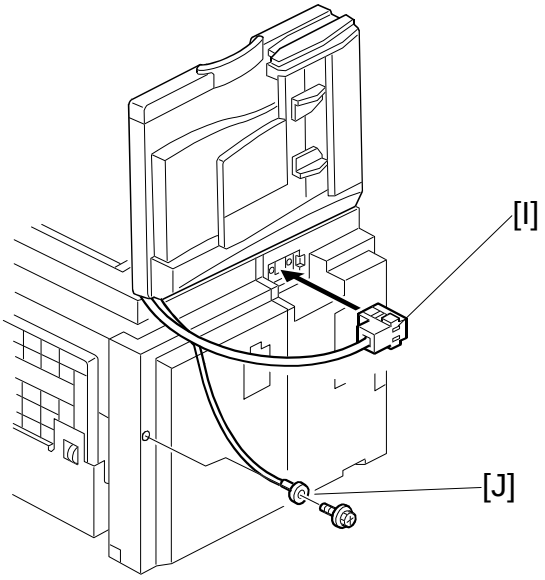
Installation Procedure



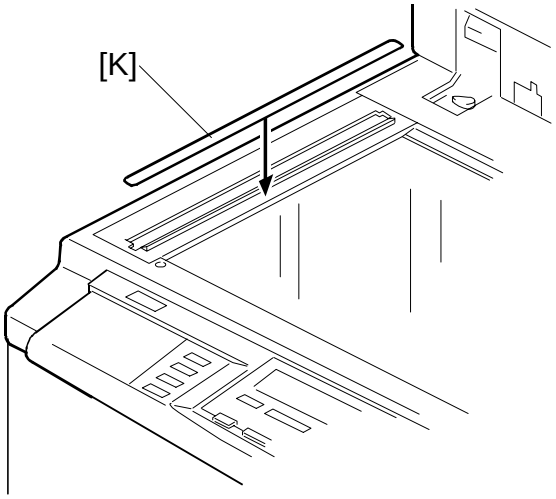
1. Remove the strips of tape.



2. Remove the left scale [A] (2 screws).
3. Place the DF exposure glass [B] on the glass holder.
   NOTE: When installing the DF exposure glass, make sure that the white point [C] is positioned at the lower front side, as shown.
4. Peel off the backing [D] of the double-sided tape attached to the rear side of the scale guide [E], then install the scale guide (2 screws removed in step 2).
5. Install the two stud screws [F].
6. Mount the DF by aligning the holes [G] in the DF with the stud screws, then slide the DF to the front as shown.
7. Secure the DF unit with two screws [H].

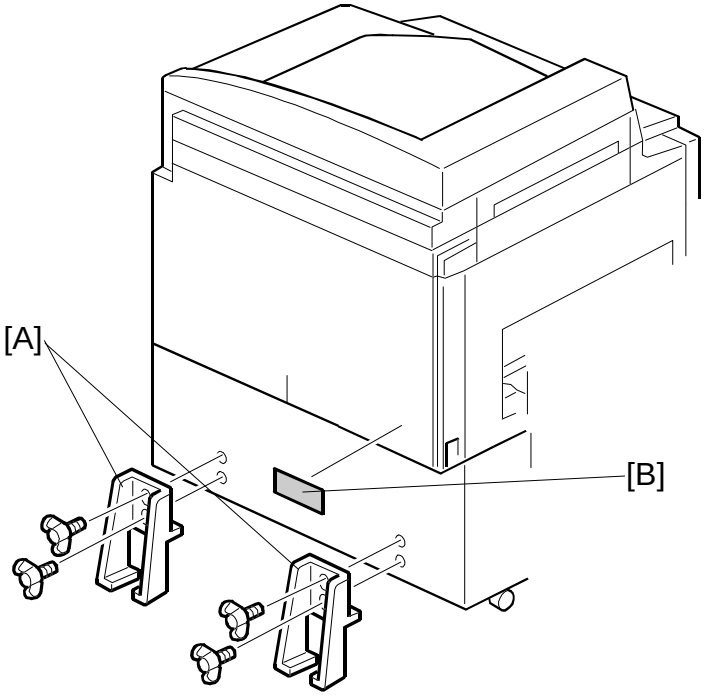


8. Connect the cables [I] and [J] to the main body.



9. Attach the scale decal [K] as shown.
10. Plug in the power cord, then turn the main switch on.
11. Make a full size copy using the ADF. Then check to make sure the side-to-side and leading edge registrations are correct. If they are not, adjust their values (do the adjustment procedures in section 5.7.3).

ADF stabilizer installation



1. Attach the two stabilizer brackets [A] to the back of the table using the thumbscrews (4 screws).
2. Attach the caution label [B], as shown.

⚠CAUTION
This procedure must be done to prevent the machine from falling backwards when the ADF is open.

1.2.4 TAPE MARKER (OPTION)

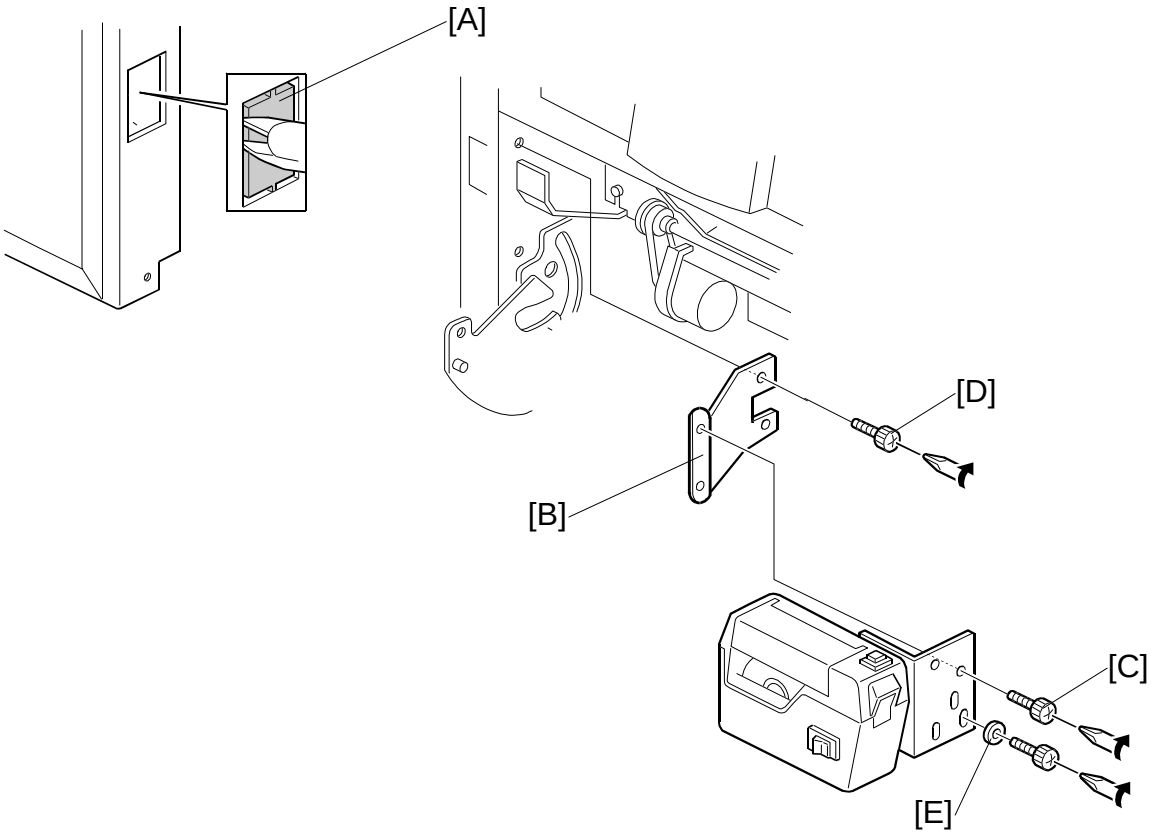
Accessory Check

Check the quantity and condition of the accessories in the box against the following list:

Description	Quantity
1. Knob Screw (C210, C217, C218, C219, C222, C223, C225, C228, C238, C237, and C238 only)	2
2. Screw M4 x 25 (C211, C212, C213, C214, C216, C224, and C226 only)	2
3. Hexagon Nut M4 (C211, C212, C213, C214, C216, C224, and C226 only)	2
4. Auxiliary Bracket (C226 only)	1
5. Auxiliary Bracket (C238 only)	1
6. Screw M4 x 8 (C226 and C238 only)	2
7. Lock Washer (C226 only)	1
8. Lock Washer	1
9. Tape	1

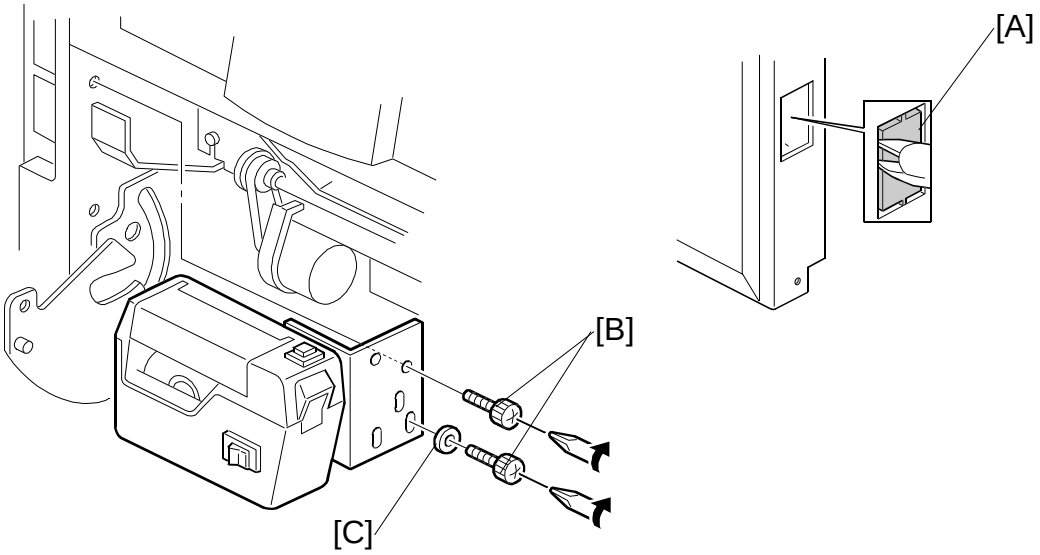
Installation Procedure

- For C238 -



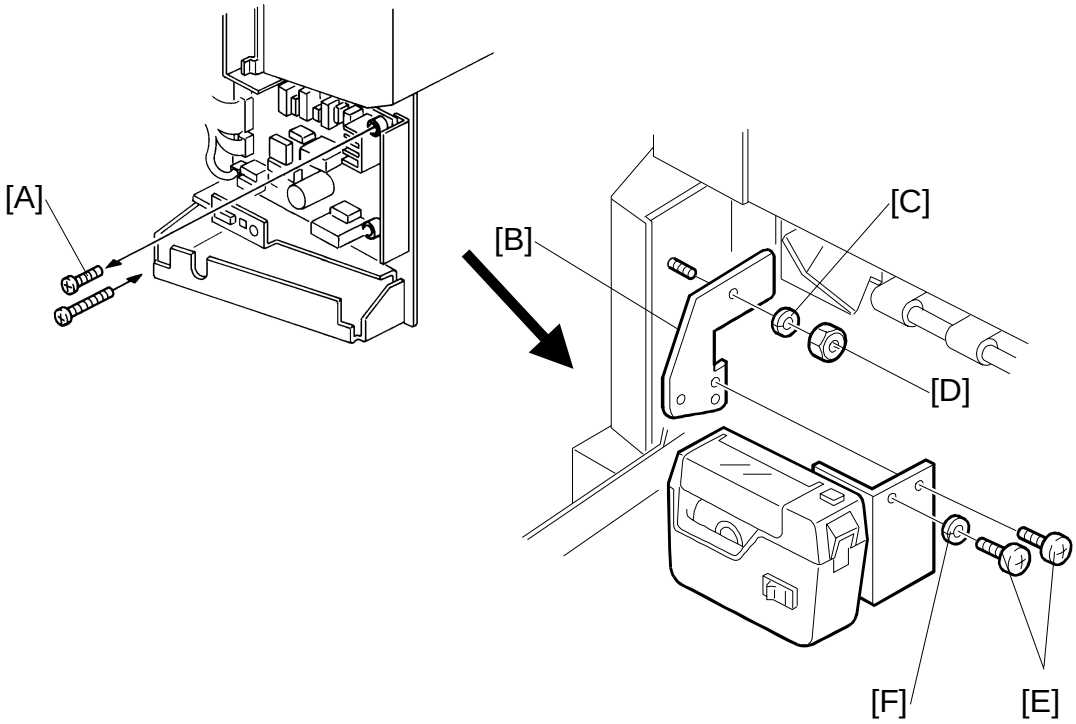
1. Turn off the main switch and unplug the power cord.
2. Remove the paper delivery plate (4 screws).
3. Cut the cap [A] off the rear cover of the main body with pliers, then connect the tape marker cable to the main body.
4. Install the auxiliary bracket [B] on the tape marker with M4 x 8 screws (accessories) [C].
5. Install the tape marker on the main body with two knob screws [D] (accessories) in the two outer holes in the tape marker bracket.
   NOTE: 1) Tighten the knob screws with a screwdriver to prevent them from coming loose.
   2) Install the lock washer [E] (accessories) with the lower of the two knob screws.
6. Reinstall the paper delivery plate.
7. Refer to "Common Steps".

- For C231 and C237-



1. Turn off the main switch and unplug the power cord.
2. Remove the paper delivery table (2 screws).
3. Remove the paper delivery plate (4 screws).
4. Cut the cap [A] off the rear cover with pliers, then connect the tape marker cable to the main body.
5. Install the tape marker on the main body with two knob screws [B] (accessories) in the two outer holes in the tape marker bracket.
   NOTE: 1) Tighten the knob screws with a screwdriver to prevent them from coming loose.
   2) Install the lock washer [C] (accessories) with the lower of the two knob screws.
6. Reinstall the paper delivery plate and paper delivery table.
7. Refer to "Common Steps".

- For C226 -



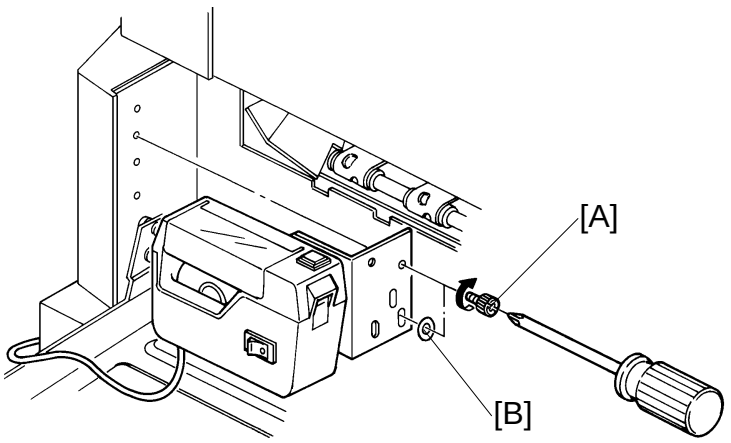
Main Body:

1. Turn off the main switch and unplug the power cord.
2. Remove the rear cover (6 screws).
3. Replace the screw [A], to secure the AC drive board with M4 x 25 screws (accessories).
4. Reinstall the rear cover.
5. Install the auxiliary bracket [B] on the main body with the hexagon nut [D] (accessories) as shown.
   NOTE: Install the lock washer [C] (accessories) with the nut.

Tape Marker:

6. Install the tape marker on the auxiliary bracket with two M4 x 8 screws [E] (accessories).
7. Install the lock washer [F] (accessories) with one of the two screws.
8. Refer to "Common Steps".

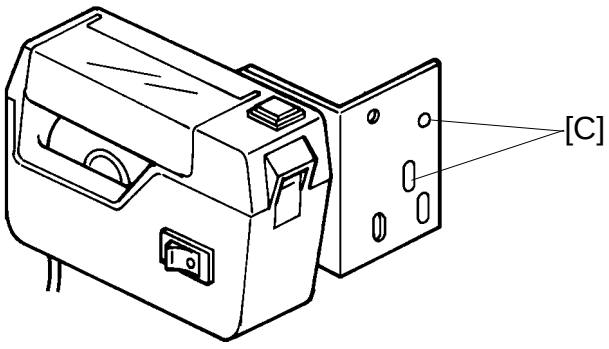
- For C210, C218, C219, C222, and C223 -



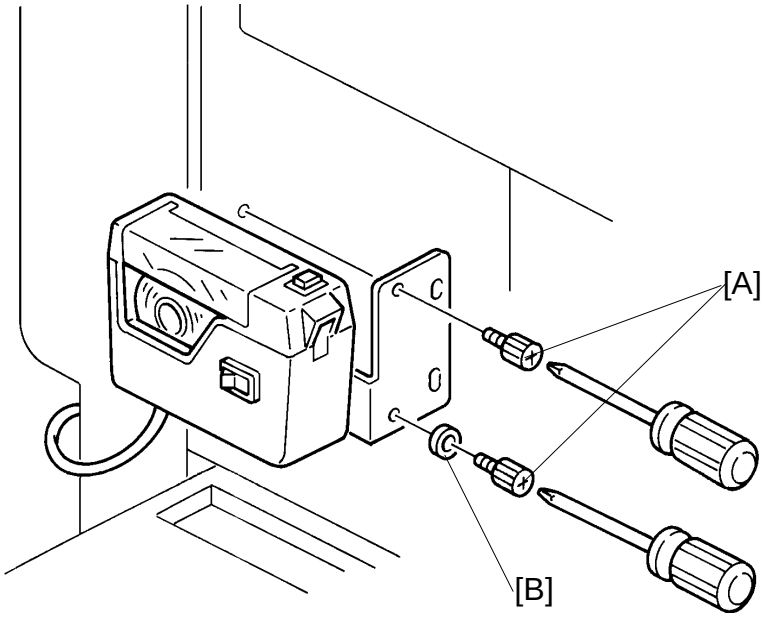
1. Turn off the main switch and unplug the power cord.
2. Install the tape marker on the main body with two knob screws [A] (accessories) in the two outer holes in the tape marker bracket.
   NOTE: 1) Tighten the knob screws with a screwdriver to prevent them from coming loose.
   2) Install the lock washer [B] (accessories) with the lower of the two knob screws.
3. Refer to "Common Steps".

— For Model C228 and the models on which the New Paper Delivery Table is installed —

Use the two holes in the tape marker bracket [C] as shown below.



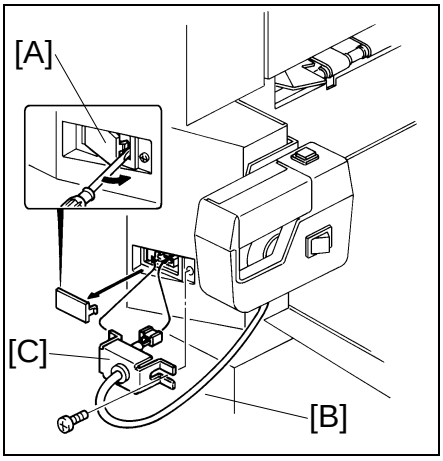
- For C217 and C225 -



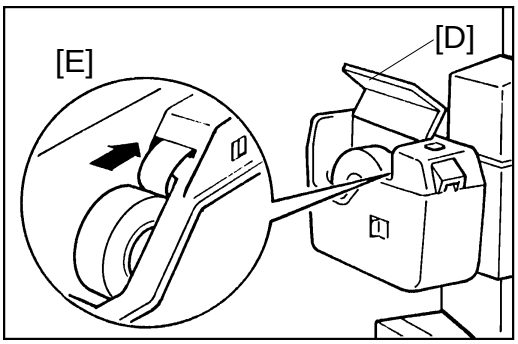
1. Turn off the main switch and unplug the power cord.
2. Install the tape marker on the main body with two knob screws [A] (accessories) in the two inner holes of the tape marker bracket.
   NOTE: 1) Tighten the knob screws with a screwdriver to prevent them from coming loose.
   2) Install the lock washer [B] (accessory) with the lower of the two knob screws.
3. Refer to “Common Steps”.

- Common Steps -

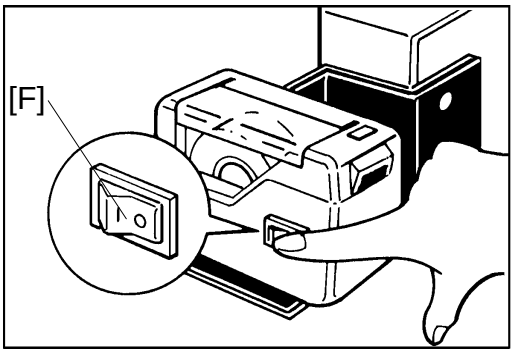
1. Remove the small cap in the rear cover of the main body [A]. Then, connect the tape marker cable [B] to the main body, and install the connector cover [C] using one of the rear cover securing screws. (For C238 and C238, this has already been done.)



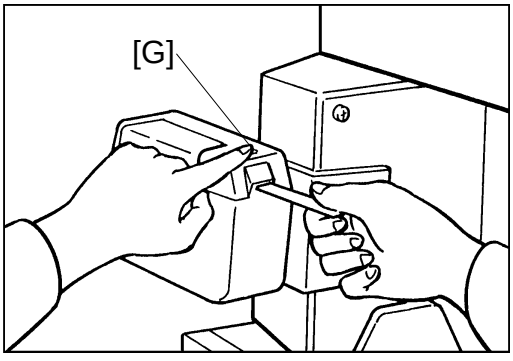
2. Open the tape marker cover [D]. Then, insert the leading edge of the tape into the tape entrance until it stops as shown in the illustration [E].
   NOTE: Be sure that the tape is installed in the proper direction. If it is not, the tape marker will not work correctly.



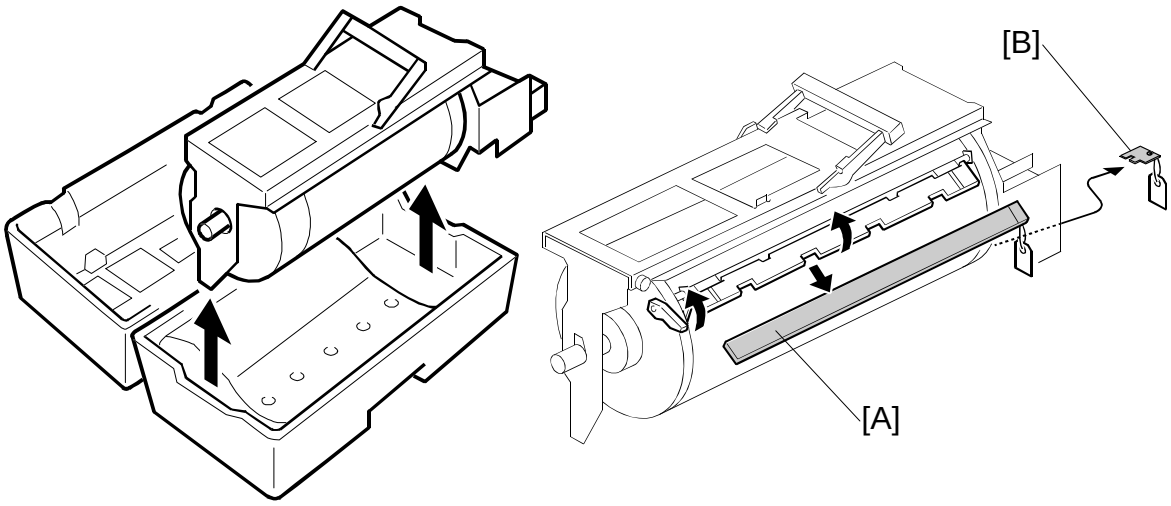
3. Turn on the main switch of the main body and set the SP mode to activate the tape marker. (Refer to the service program table.)
4. Turn on the tape marker switch [F].



5. Press the tape cut button [G] to cut off the leading edge of the tape.
6. Check the tape marker operation using the Memory/Class modes of the main body.



1.2.5 ADDITIONAL DRUMS (OPTION)



There are two types of drum units:

A3 Size: Color drum

A4 Size: Black drum (Black ink only)

1. Remove the protective sheet [A] and the lock [B] from the drum unit.
2. Remove the tape securing the ink holder.
3. Attach a color indicator decal to the drum case. The decal must be the same color as the ink in use.
4. Remove the drum unit.
5. Leave the master wrapped around the removed drum to protect the drum from dust and from drying.
6. Keep the removed drum unit in the drum case.
7. Install the drum unit.
   NOTE: The color drum indicator (or A4 drum indicator) on the operation panel stays lit when a drum is mounted in the machine.
8. Remove the ink cartridge cap.
9. Insert the ink cartridge in the ink holder.

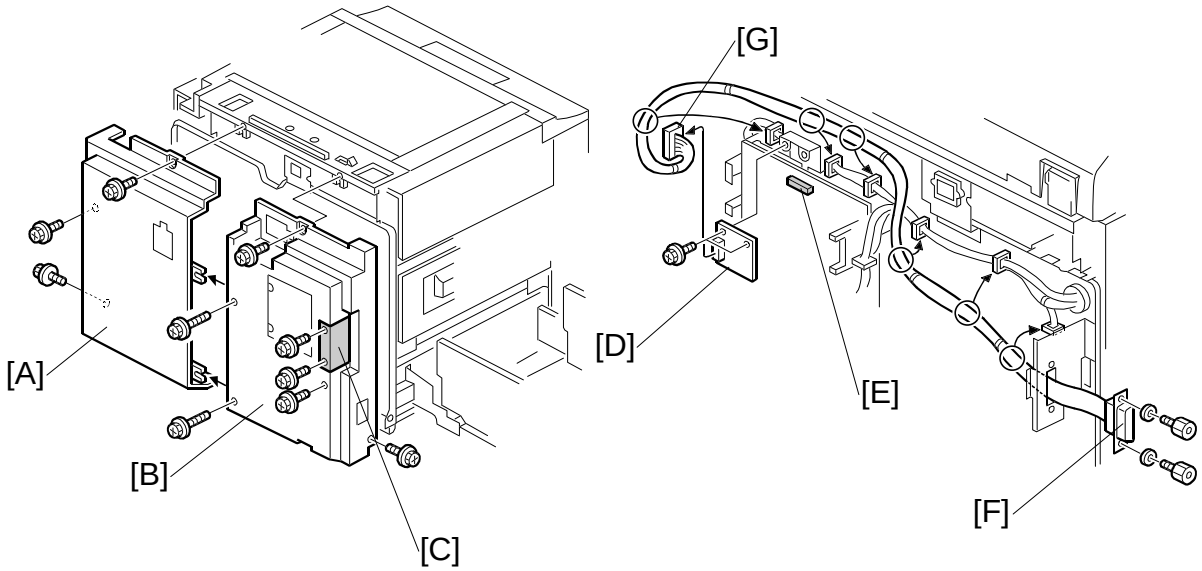
1.2.6 INTERFACE BOARD (OPTION)

Accessory Check

Check the quantity and condition of the accessories in the box against the following list:

Description	Quantity
1. Interface Board	1
2. Interface Cable	1
3. Screw M3 x 6	2
4. Lock Screw	2
5. Washer	2

Installation Procedure



1. Remove the rear covers [A] [B] (8 screws).
2. Remove the I/F connector cover [C] (2 screws).
3. Install the I/F board [D] (accessories) in CN117 [E] on the MPU (2 screws).
4. Attach the cable [F] (accessories) to the connector bracket (2 screws) and clamp the cable (6 clamps).
5. Connect the connector [G] at the opposite end to the I/F board.
6. Re-install the rear covers.

CÓPIA NÃO CONTROLADA

PREVENTIVE MAINTENANCE

CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

2. PREVENTIVE MAINTENANCE

2.1 MAINTENANCE TABLE

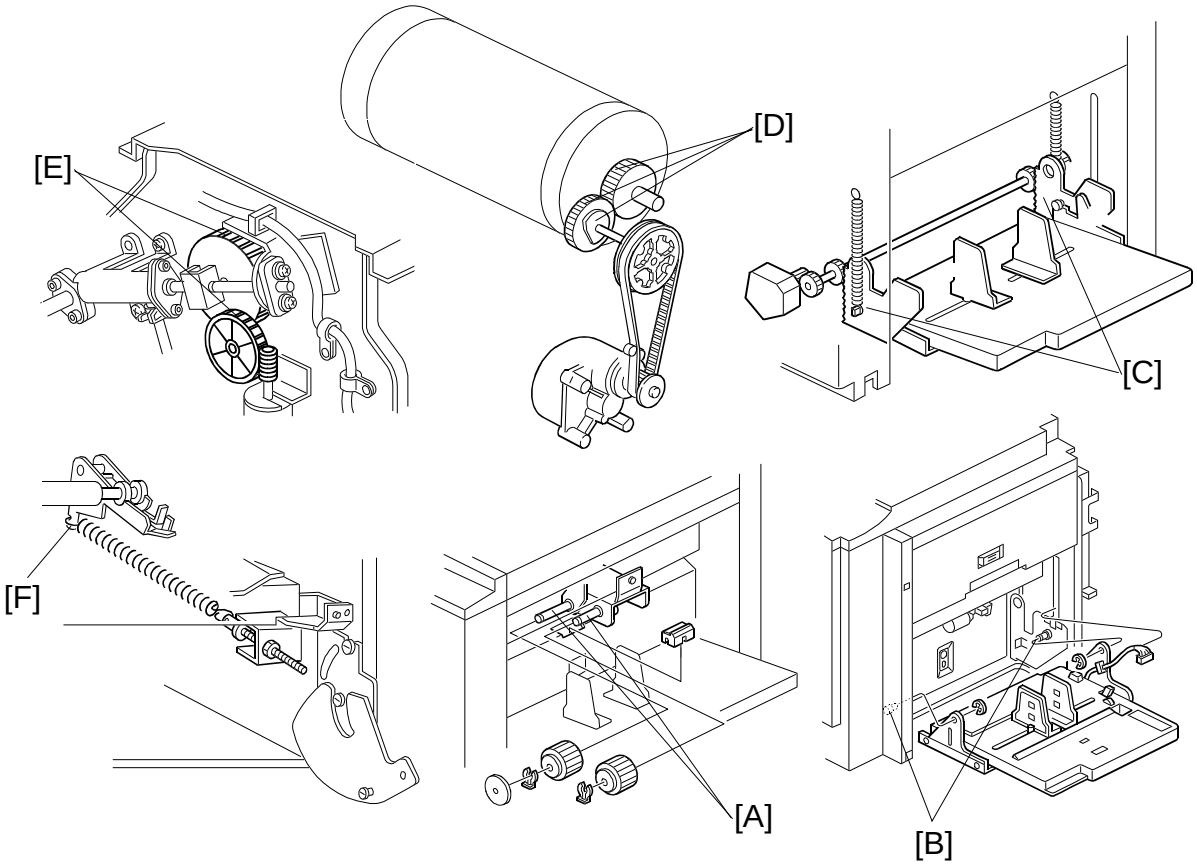
The following items should be maintained periodically. There are two sets of intervals - one based on time and the other based on print count. For maintenance items with entries in both of them, use whichever comes first.

C: Clean, R: Replace, L: Lubricate, A: Adjust

Interval / Item	Time				Print Counter					EM	NOTE
	6M	1Y	2Y	3Y	1M	1.2M	2M	2.4M	3M		
Scanner/Optics											
Exposure Lamp	C	C	C	C							Dry Cloth
Mirror/Reflector	C	C	C	C							Soft Cloth
Scanner Guide Rail	C	C	C	C							Dry Cloth
Platen Cover / White Plate	C	C	C	C							Damp Cloth
Exposure Glass	C	C	C	C							Dry Cloth
Master Feed											
Thermal Head										C	Alcohol
Platen Roller	C	C	C	C							Damp cloth and water
Master Eject Rollers	C	C	C	C							Alcohol
Drum Master Sensor										C	Dry Cloth
Paper Feed											
Paper Pick-up Roller	C	C	R	C		R		R			Damp Cloth
Paper Feed Roller	C	C	R	C		R		R			Damp Cloth
Pick-up Roller/Feed Roller Shafts [A]		L	L	L							Motor Oil (SAE #20)
Friction Pad	C	C	R	C		R		R			Damp Cloth
Press Roller	C	C	R	C		R		R			Alcohol
Table Fulcrum Shafts [B]		L	L	L							Motor Oil (SAE #20)
Table Racks [C]		L	L	L							Grease (Alvania #2)
Paper Delivery Transport Belts			R			R		R			
Paper End Sensor	C	C	C	C							Dry Cloth
Registration/Exit Sensors	C	C	C	C							Dry Cloth
Registration Roller	C	C	C	C							Dry Cloth

MAINTENANCE TABLE

Interval / Item	Time				Print Counter					EM	NOTE
	6M	1Y	2Y	3Y	1M	1.2M	2M	2.4M	3M		
Drum and Ink Supply											
Cloth Screen			R			R		R			
Ink Roller One-way Clutch									R		☛ 3.8.5
Drum Drive Gears and Cam [D]		L	L	L							Grease (Alvania #2)
Ink Pump Gears [E]		L	L	L							Motor Oil (SAE #20)
In/Outside of Drum	C	C	C	C							Alcohol
Ink Nozzle	C	C	C	C							Alcohol
Others											
Main Drive Timing Belt Tension			A								☛ 3.8.9
Printing Pressure Spring Hooks [F]		L	L	L							Grease (Alvania #2)
Press Roller Release Lever Position			A								
ADF (Option)											
DF Feed Rollers	C	C	C	C							Dry Cloth



REPLACEMENT AND ADJUSTMENT

CÓPIA NÃO CONTROLADA

3. REPLACEMENT AND ADJUSTMENT

3.1 GENERAL CAUTION

⚠CAUTION

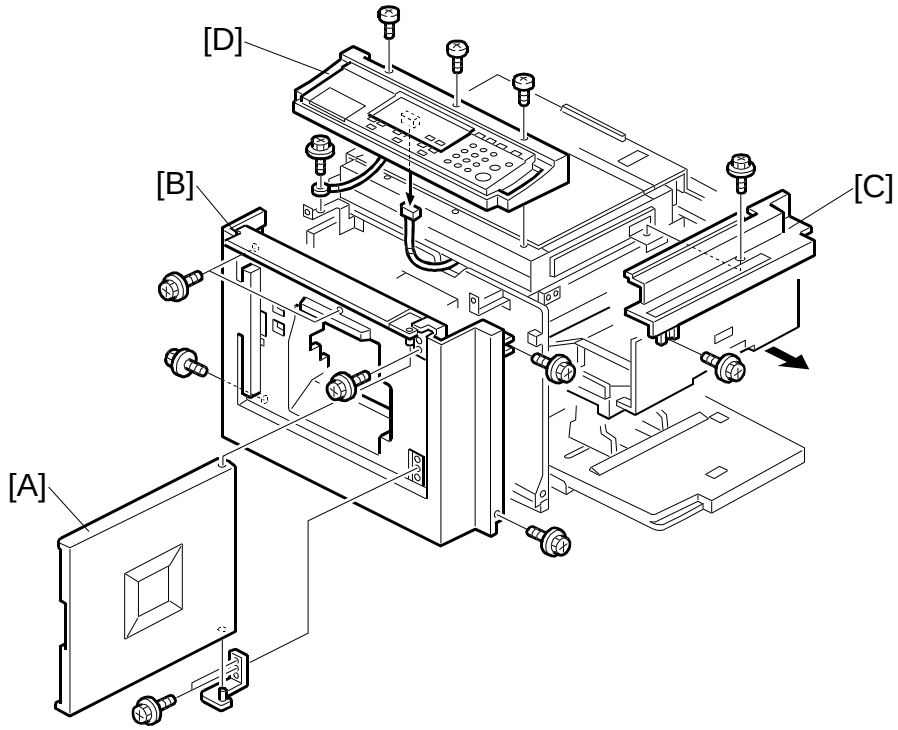
Turn off the main power switch and unplug the machine before attempting any of the procedures in this section.

NOTE: This manual uses several symbols. The meaning of those symbols are as follows:

☛ : See or Refer to : screw : connector : E-ring : Clip

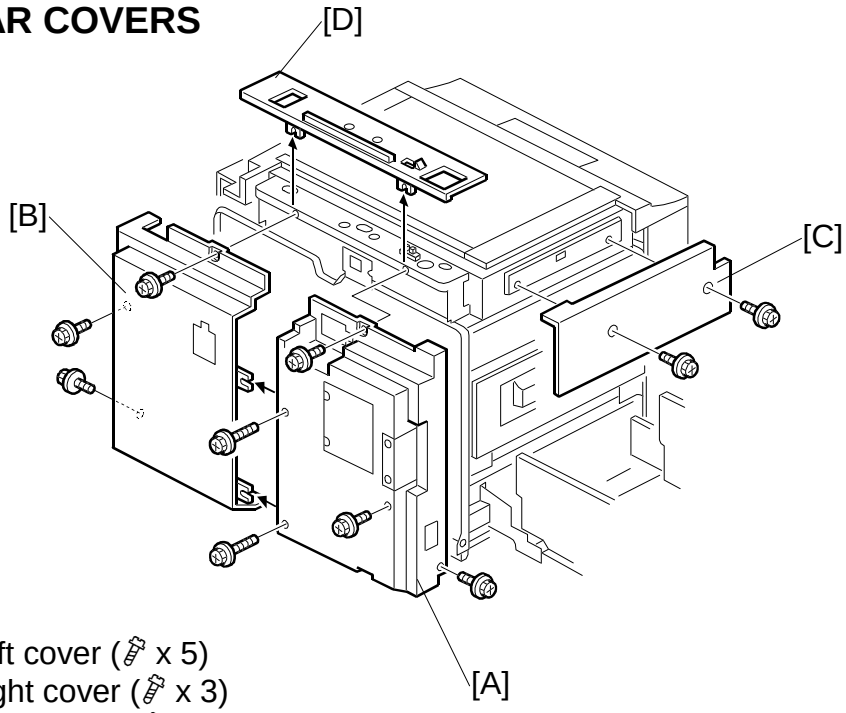
3.2 COVERS / BOARDS

3.2.1 FRONT COVER / PANEL



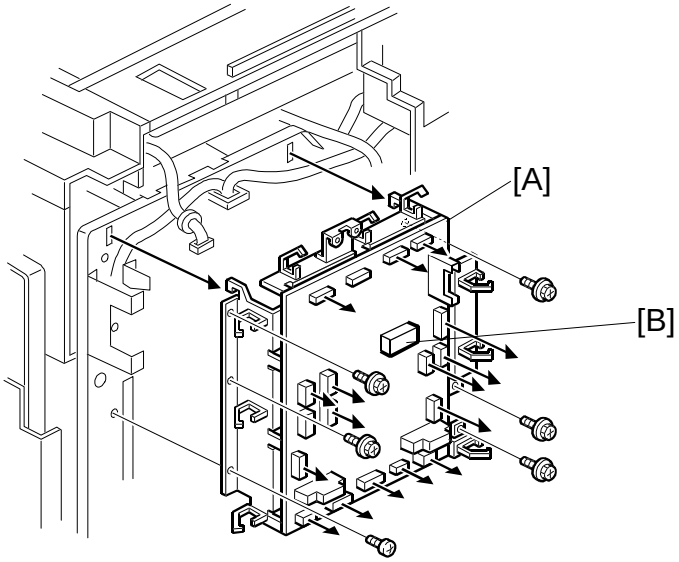
[A]: Front door (x 4)
[B]: Front cover (x 6)
[C]: Upper right cover (x 2)
[D]: Operation panel (x 4, x 1)

3.2.2 REAR COVERS



[A]: Rear left cover (x 5)
[B]: Rear right cover (x 3)
[C]: Upper left cover (x 2)
[D]: Rear upper cover

3.2.3 MPU

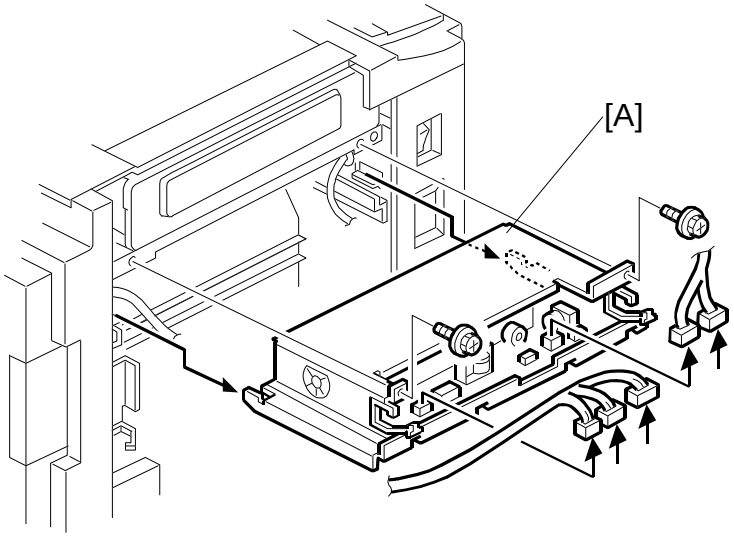


- Rear left cover, Rear right cover (☛ 3.2.2)

[A]: MPU (x 17, x 6, 9 clamps)

CAUTION: Move the RAM [B] from the old board to the new one, so that the SP mode settings will be transferred to the new board. Adjust the master end sensor (☛ 3.5.4) after installing the new MPU.

3.2.4 PSU



- Upper left cover (☛ 3.2.2)
- Master eject unit (☛ 3.4.1)

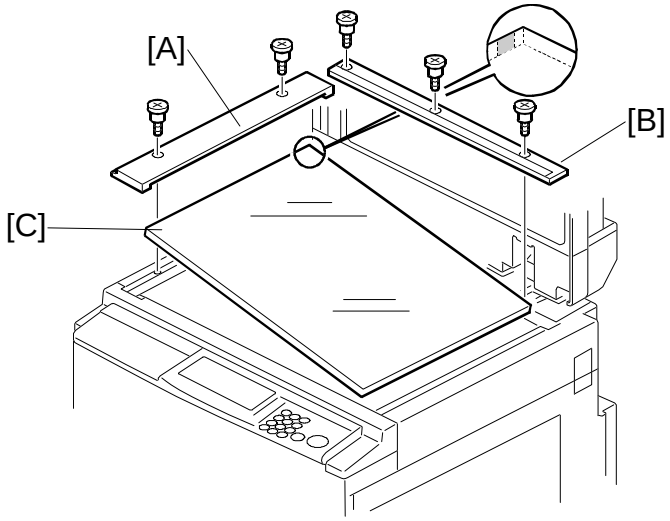
[A]: PSU (✋ x 5, 🔩 x 2, 2 clamps)

CAUTION: When the PSU is replaced, the thermal head voltage returns to the default. Adjust the thermal head voltage (☛ 3.5.3) after installing the new board.

3.3 SCANNER

3.3.1 EXPOSURE GLASS / SCALES

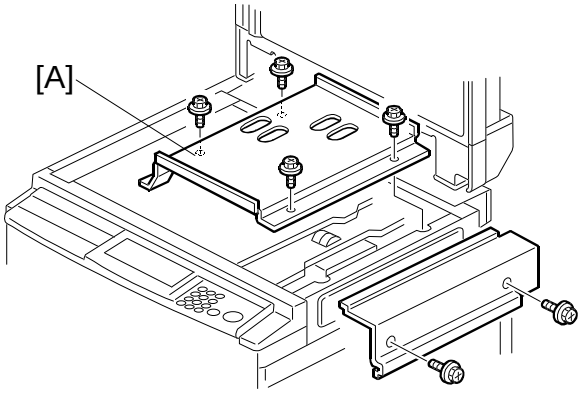
[A]: Left scale (x 2)
[B]: Upper scale (x 3)
[C]: Exposure glass



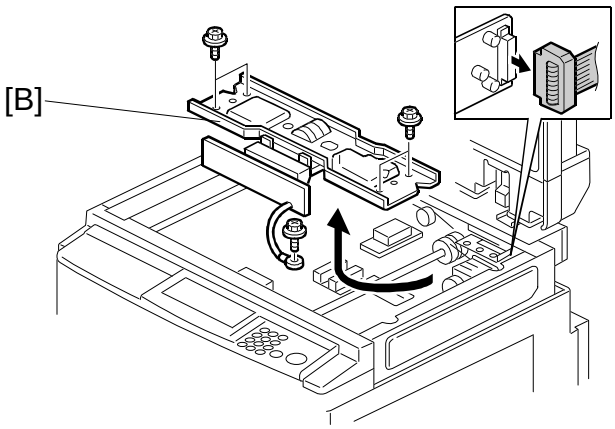
3.3.2 SBU AND LAMP STABILIZER / SCANNER MOTOR

- Left scale, Upper scale, Exposure glass (☛ 3.3.1)
- Upper right cover (☛ 3.2.1)

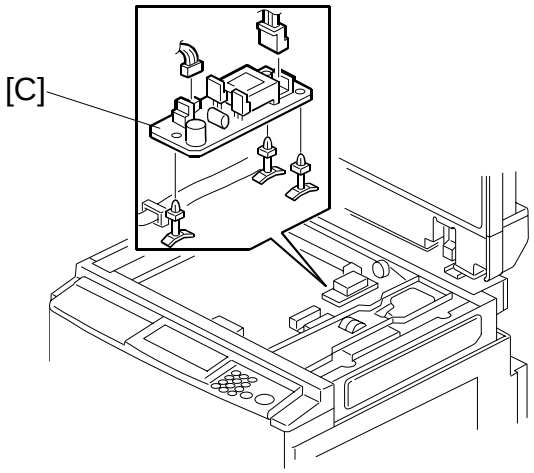
[A]: SBU cover (x 4)



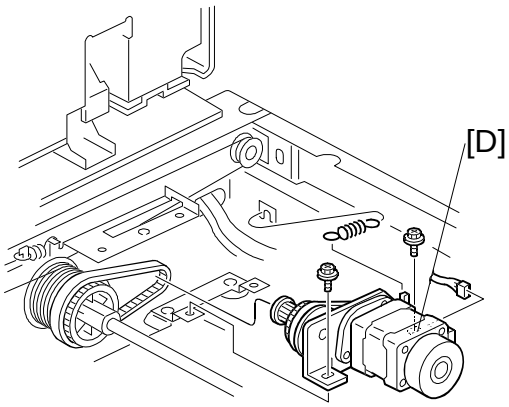
[B]: SBU (x 1, x 5)



[C]: Lamp stabilizer (☞ x 2, 3 standoffs)



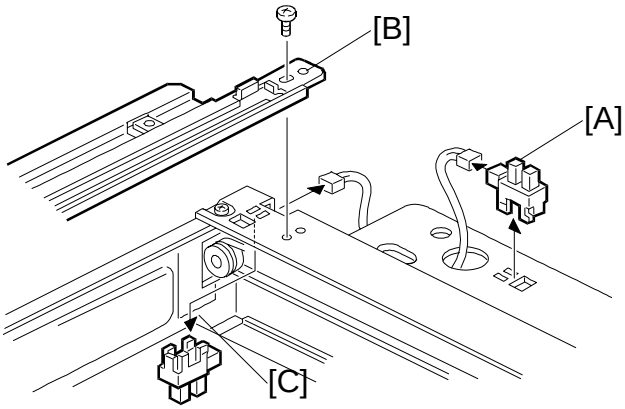
[D]: Scanner motor (☞ x 2, ☞ x 1, 1 spring)



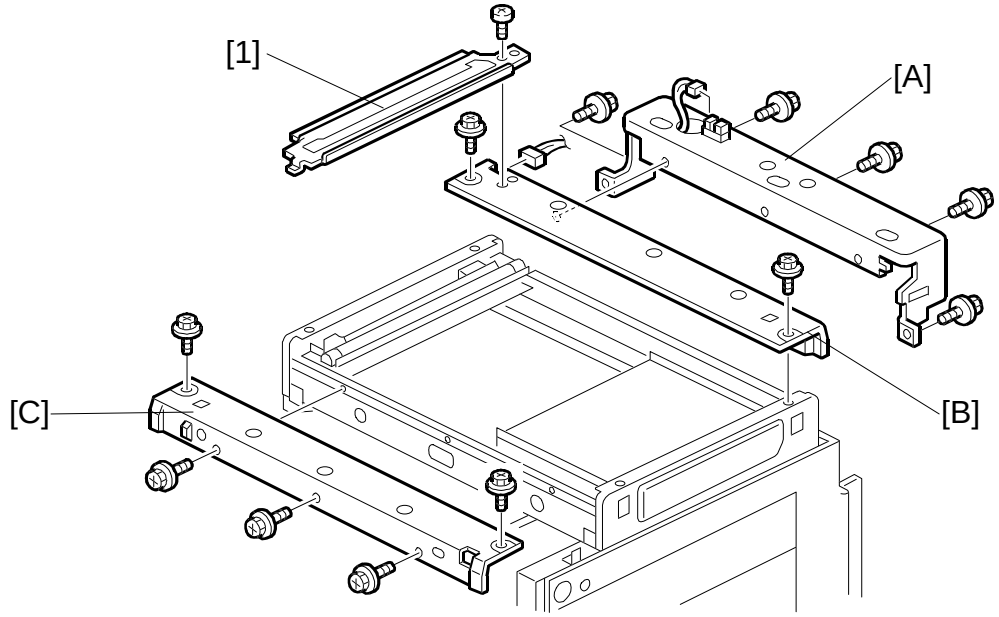
3.3.3 SCANNER H.P. SENSOR / PLATEN COVER SENSOR

- Left scale, Upper scale, Exposure glass (☛ 3.3.1)
- Operation panel (☛ 3.2.1)
- Rear upper cover (☛ 3.2.2)

[A]: Platen cover sensor (☞ x 1)
[B]: Left stay (☞ x 1)
[C]: Scanner H.P. sensor (☞ x 1)

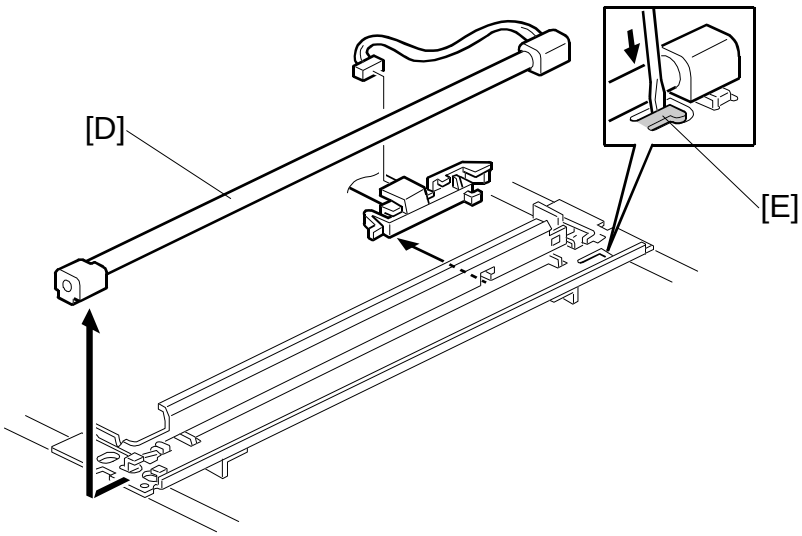


3.3.4 EXPOSURE LAMP (XENON LAMP)



- Move the first scanner next to the opening in the frame.
- Exposure glass (☛ 3.3.1)
- [1]: Left stay (☛ 3.3.3)

[A]: Platen base (🖐 x 1, 🔩 x 5)
[B]: Rear frame (🖐 x 1, 🔩 x 2)
[C]: Front frame (🔩 x 5)

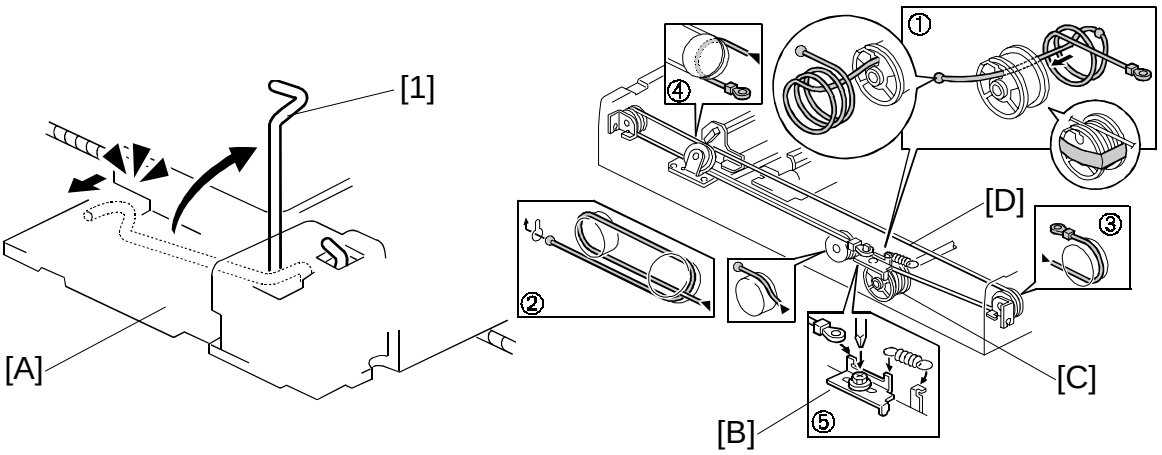


[D]: Exposure lamp (🖐 x 1)

NOTE: After installing the lamp, press the lamp holder [E] up to the original position so that it can hold the lamp properly.

3.3.5 SCANNER WIRES

- Move the first scanner next to the opening in the frame.
- Exposure glass (☛ 3.3.1)
- SBU cover (☛ 3.3.2)
- Left stay (☛ 3.3.3)
- Rear and front frames (☛ 3.3.4)

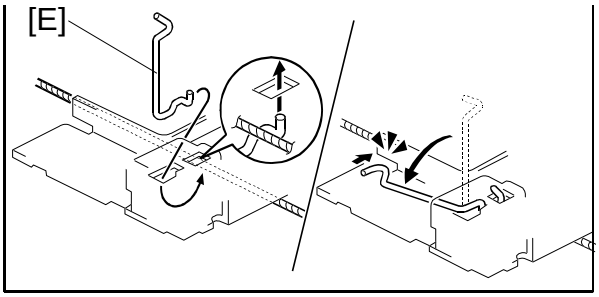


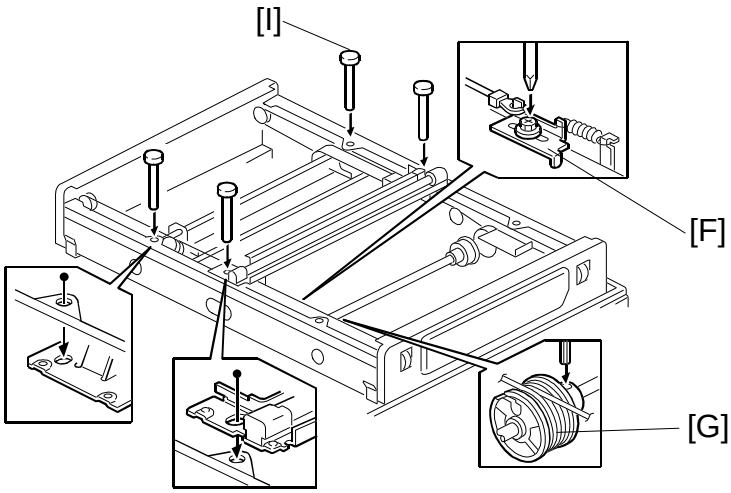
1. First scanner ([1]: 2 pins)
   NOTE: The drawings show only the front side. Repeat to remove components on the other side.

[A]: Wire tension brackets (2 springs, 🔩 x 2)
[B]: Scanner drive pulleys (2 Allen screws)
[C]: Scanner wires

Installation

1. Wrap the new scanner wire around the pulley as shown ①, then temporarily secure the pulley with tape.
2. Re-install the first scanner. Then secure the first and second scanner with the scanner positioning pins (P/N A0069104), as shown in the illustration on the next page.
3. Wind the new scanner wire around the scanner drive pulley in the correct way, as shown.
4. Wind the end of the new wire with the ball as shown (②).
5. Wind the end of the new wire with the ring as shown (③,④, and ⑤).
6. Connect the tension spring to the wire tension bracket (⑤).
7. Wind the new scanner wire for the other side as well.





8. Secure the first scanner with the pins [E].
9. Tighten the screw securing the tension bracket [F].
10. Secure the scanner drive pulley [G] (1 Allen screw).
11. Remove the scanner positioning pins [I] (P/N: #A0069104).
12. Slide the scanner to the left and right several times, then set the scanner positioning pins to check the clamp position and wire tension bracket position again.

3.3.6 IMAGE ADJUSTMENT

Purpose: To adjust the image position on prints by changing the SP settings.

Adjust the following in the order given below.

SP6-10: Master writing speed (☛ 5.7.3)

↓

SP6-21: Paper registration position (☛ 5.7.3)

↓

SP6-05: Scanning speed - platen (☛ 5.7.3)

SP6-06: Scanning speed - ADF

↓

SP6-03: Scanning start position - platen (☛ 5.7.3)

SP6-04: Scanning start position - ADF

↓

SP6-01: Main scan position - platen (☛ 5.7.3)

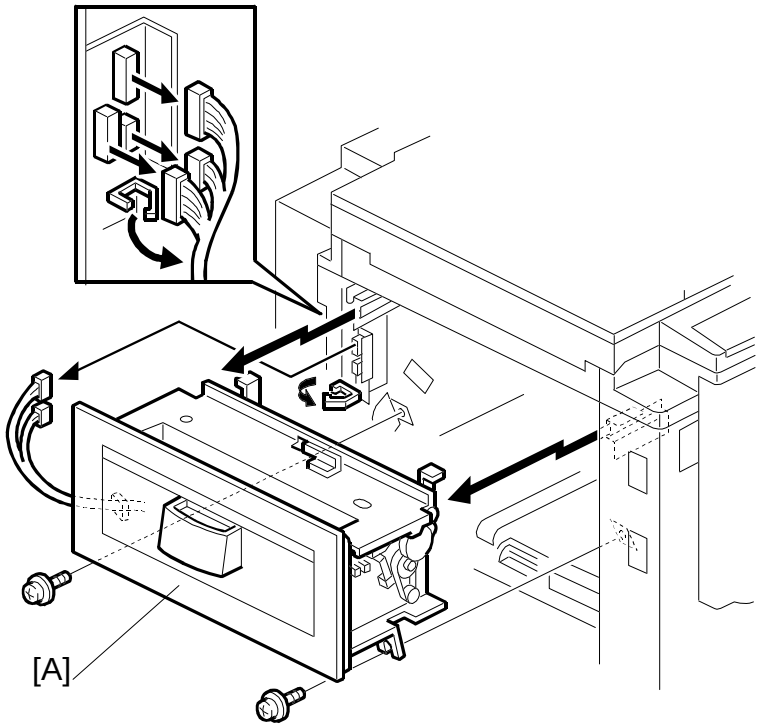
SP6-02: Main scan position - ADF

↓

SP6-31: SBU calibration (☛ 5.7.4)

3.4 MASTER EJECT

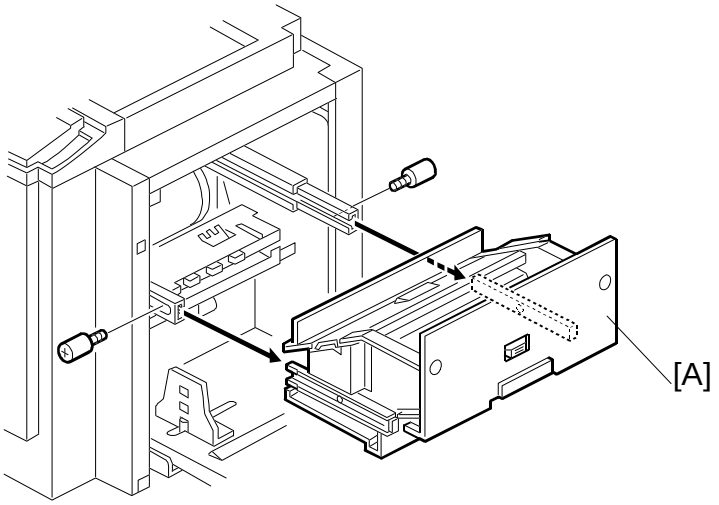
3.4.1 MASTER EJECT UNIT



[A]: Master eject unit (x 3, x 2, 1 clamp)

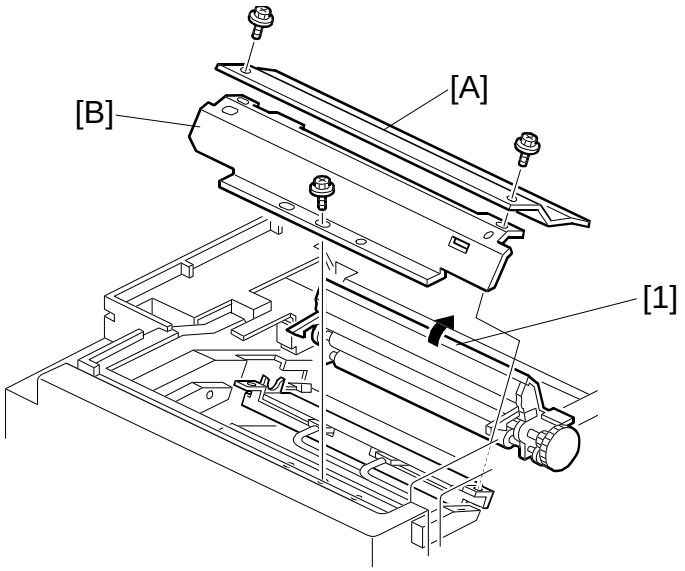
3.5 MASTER FEED

3.5.1 MASTER MAKING UNIT



[A]: Master making unit (☞ x 2)

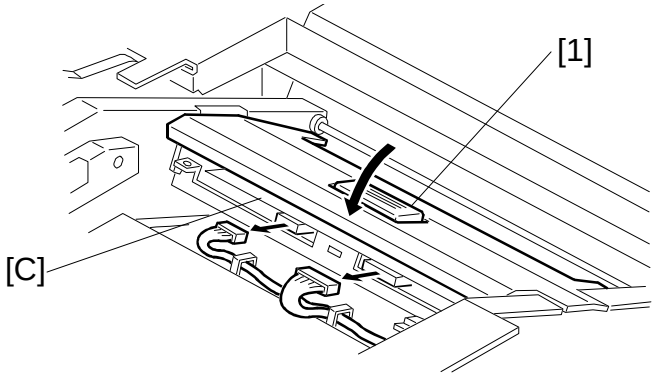
3.5.2 THERMAL HEAD



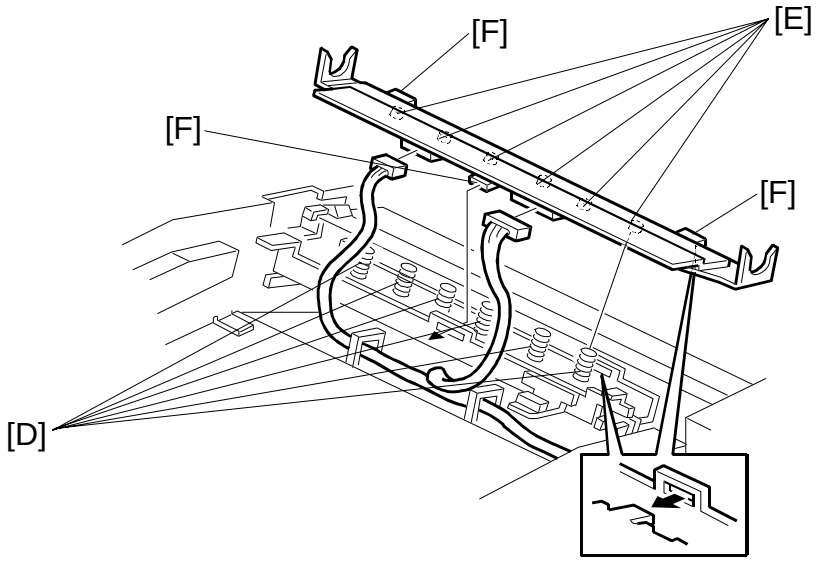
- Master making unit (☛ 3.5.1)
- Open the platen roller unit [1].

[A]: T/H upper cover (☞ x 2)
[B]: T/H side cover (☞ x 1)

• Close the platen roller unit [1].
[C]: Thermal head (☞ x 2)



Installation



If the following remarks are not followed, the thermal head will be installed incorrectly.

1) Fit the base's springs [D] over the protrusions [E] on the underside of the thermal head (6 points).
2) While fitting the tops of the springs [D] over the protrusions on the underside of the thermal head, hook the lock pawls [F] of the thermal head onto the base (3 lock pawls). Make sure to set the front side (the paper table side) first.
3) Make sure that all protrusions are properly fitted into the springs.

CAUTION: Adjust the thermal head voltage (☛ 3.5.3) after installing the new thermal head.

3.5.3 THERMAL HEAD VOLTAGE ADJUSTMENT

⚠CAUTION

This adjustment is always required when the thermal head or PSU has been replaced.

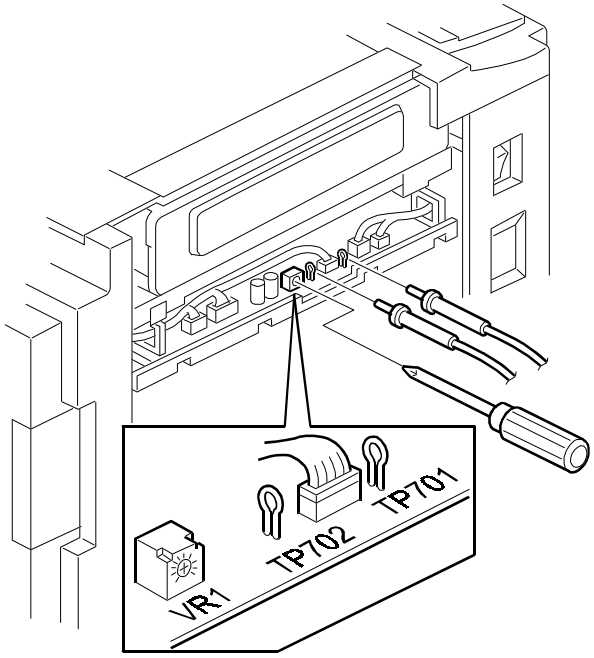
Purpose: To maintain master making quality and extend the lifetime of the thermal head.

Standard: Refer to the voltage value (X) printed on the thermal head. The value varies from one thermal head to another.

The adjustment voltage should be between X and X - 0.1 V.

Tools: Circuit tester

- Upper left cover (☛ 3.2.2)
- Read the voltage value on the decal on the thermal head.



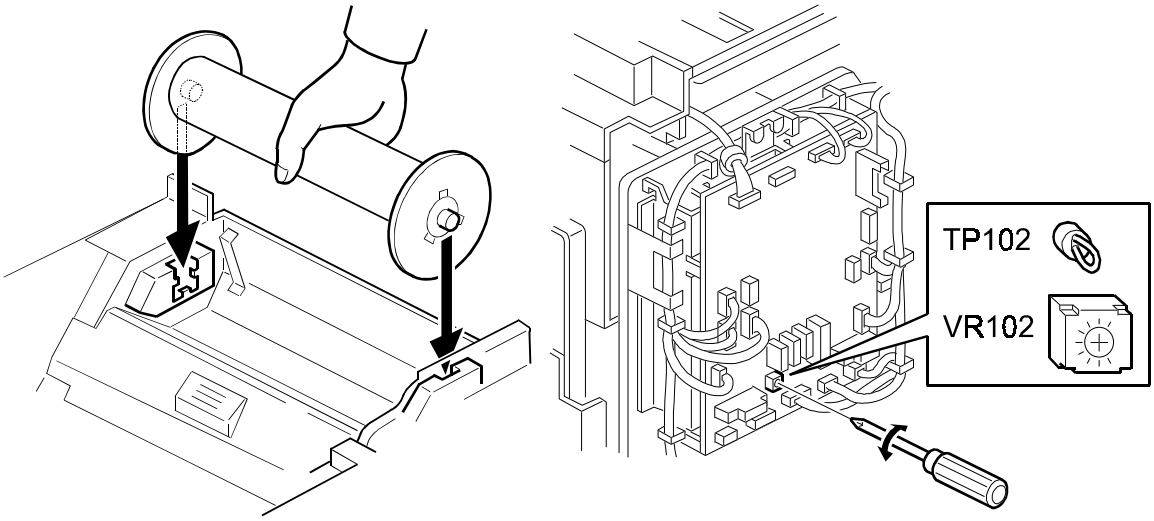
1. Slide out the master making unit.
   CAUTION: Never turn VR1 clockwise rapidly while the master making unit is connected. The T/H will be damaged if too much voltage is supplied suddenly.
2. Connect the positive terminal of a circuit tester to TP701 and the negative terminal to TP702 .
   CAUTION: If the output and ground terminals touch each other, the board will be damaged.
3. Connect the power plug, and turn on the main switch to access SP mode.
4. Select SP5-12 (Thermal head signal output).
5. Press the Start key. Power is continuously supplied to the thermal head, so press the Stop key if you cannot finish the adjustment quickly.
   A beeper sounds while the power is being supplied.
6. Measure the voltage, and turn VR1 so that the value becomes between “+0” and “-0.1” volts from the value on the thermal head decal.

3.5.4 MASTER END SENSOR ADJUSTMENT

Purpose: To ensure that the sensor detects the end mark (a solid black area) on the master roll.

Standard: 1.6 volts (within “+0.1” and “-0” volts)

Tools: Circuit tester, the core of a used master roll (the core has no master)

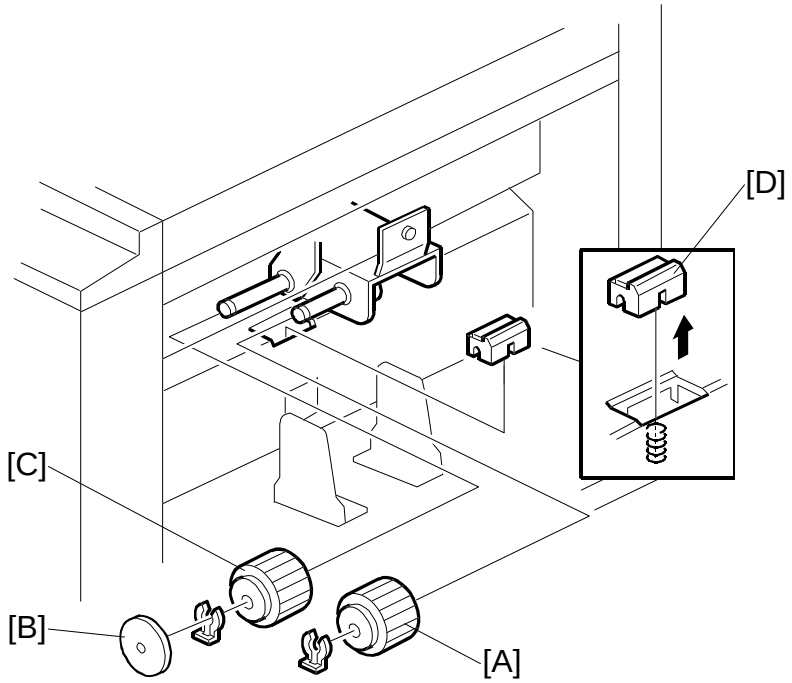


- Rear covers (☛ 3.2.2)

1. Connect the terminals of a circuit tester to TP102 and to a grounded place (e.g. iron base).
2. Place the core of the used master roll inside the master making unit, and close the master making unit.
3. Connect the power plug, and turn on the main switch.
4. Measure the voltage, and turn VR102 so that the value becomes between “-0” and “+0.1” volts from the standard value (1.6 volts).

3.6 PAPER FEED

3.6.1 PICK-UP ROLLER / PAPER FEED ROLLER / FRICTION PAD



- Lower the paper table.

[A]: Pick-up roller (x 1)
[B]: Paper guide
[C]: Feed roller (x 1)
[D]: Friction pad

3.6.2 PAPER SEPARATION PRESSURE ADJUSTMENT

Purpose: To ensure that the friction pad exerts sufficient pressure for smooth printing paper separation.

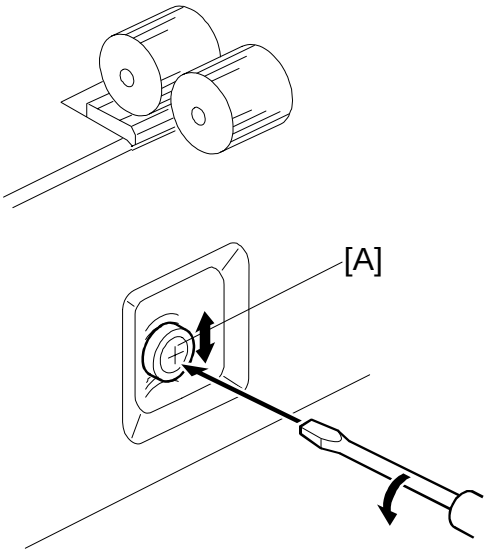
Default: The next position to the top.

Adjust the paper separation pressure by loosening and moving the adjusting screw [A] up or down.

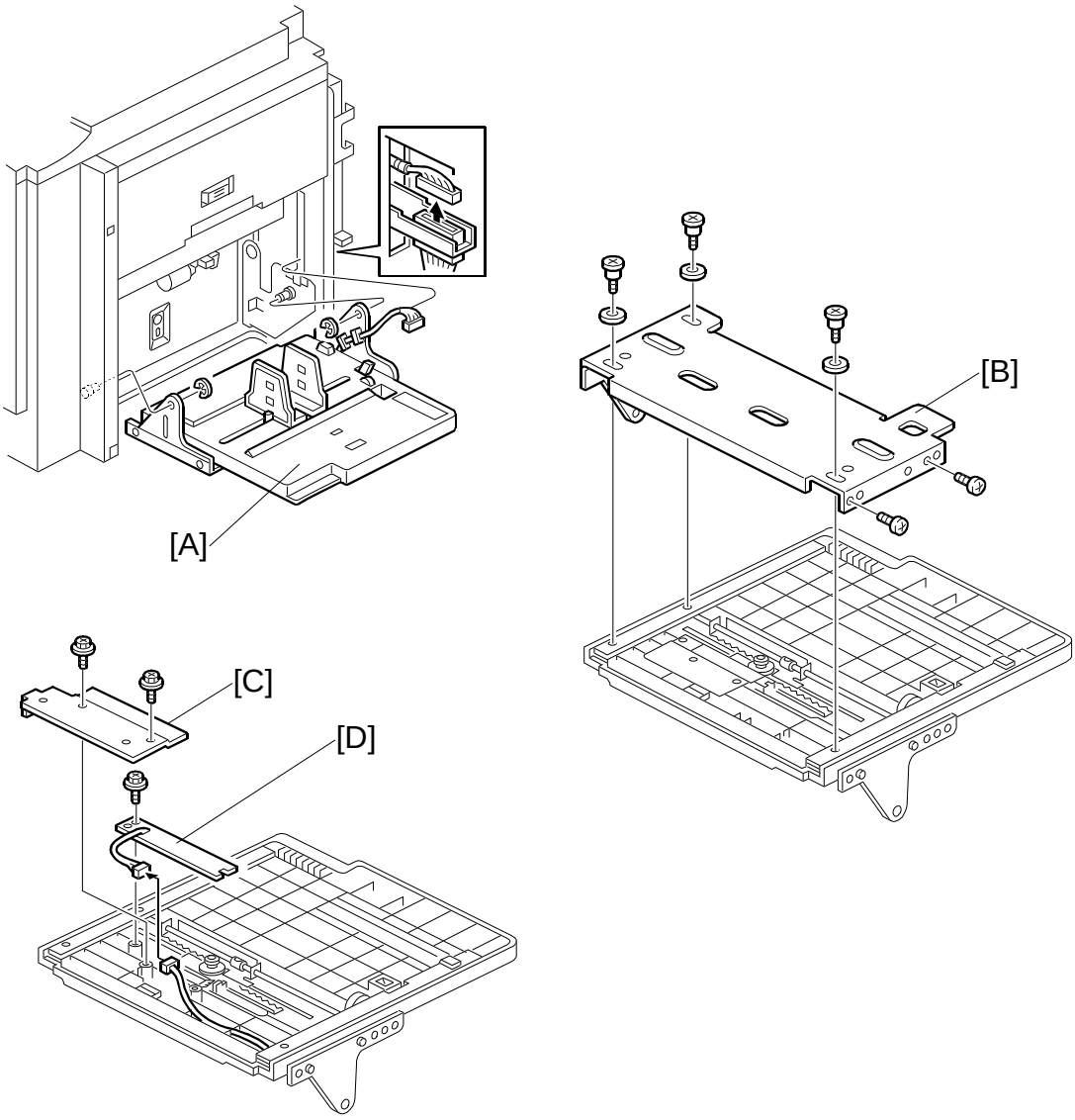
Moving up the screw ⇒ Increases the paper separation pressure

Moving down the screw ⇒ Decreases the paper separation pressure

Tighten the screw after the adjustment.



3.6.3 PAPER WIDTH DETECTION BOARD

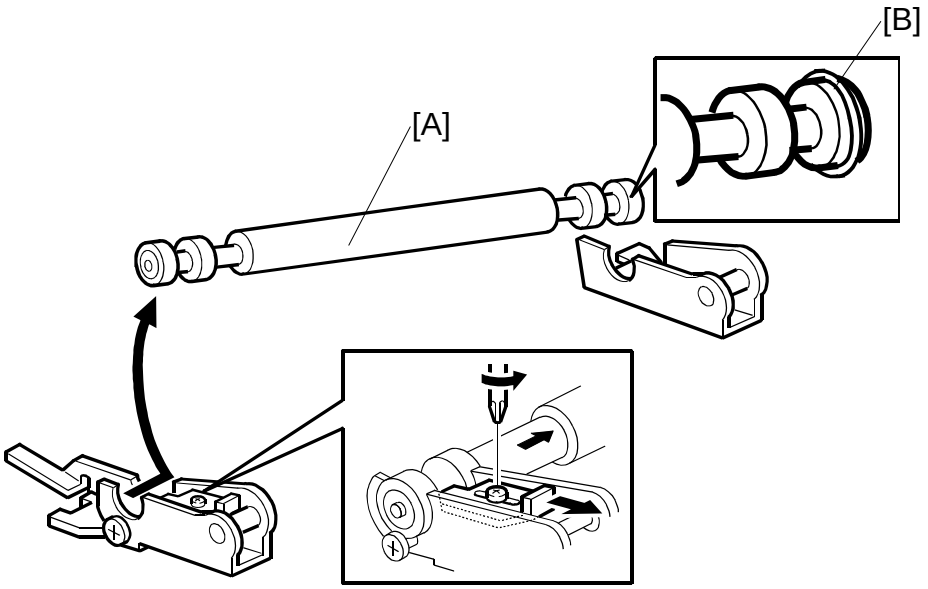


- Lower the paper table.

[A]: Paper table (x 1, x 2)
[B]: Table cover (x 5, 3 washers)
[C]: Sensor cover (x 2)
[D]: Paper width detection board (x 1, x 1)

3.7 PRINTING

3.7.1 PRESS ROLLER



⚠CAUTION

Take care to avoid possible injury. If the printing pressure release arms disengage, the press roller will be pulled upwards suddenly.

- Remove the drum.

[A]: Press roller (🔩 x 1)

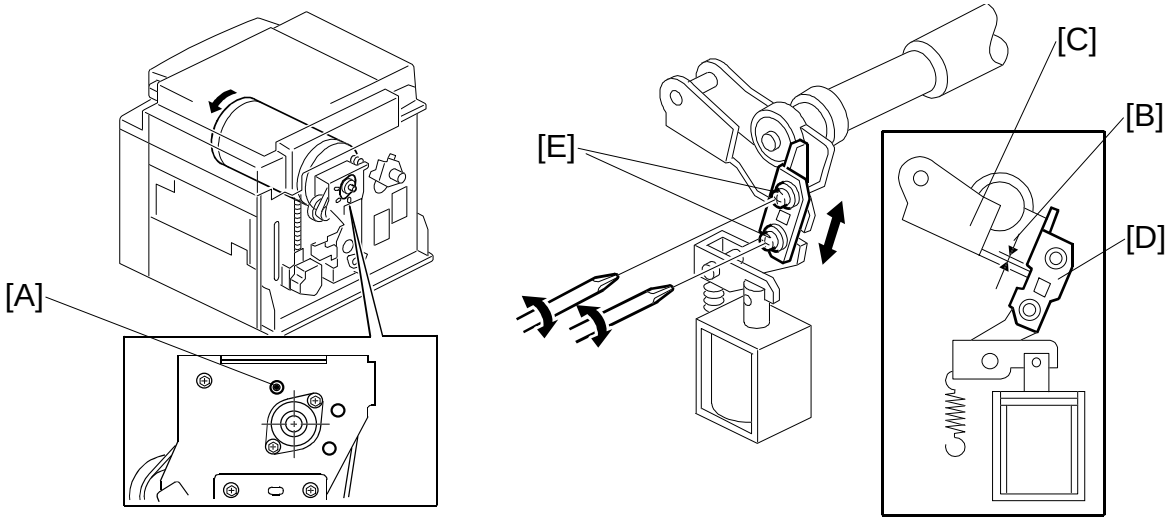
The bearings on the rear and front differ. During installation, ensure that the bearing with the stopper [B] is positioned towards the rear of the machine.

3.7.2 PRESS ROLLER RELEASE LEVER ADJUSTMENT

Purpose: To maintain the correct clearance between the press roller arms and press roller lock levers. This ensures that the press roller is correctly released and pressed against the drum when the press roller release solenoid is energized.

Standard: 0.7 to 1.2 mm

Tools: A thickness gauge



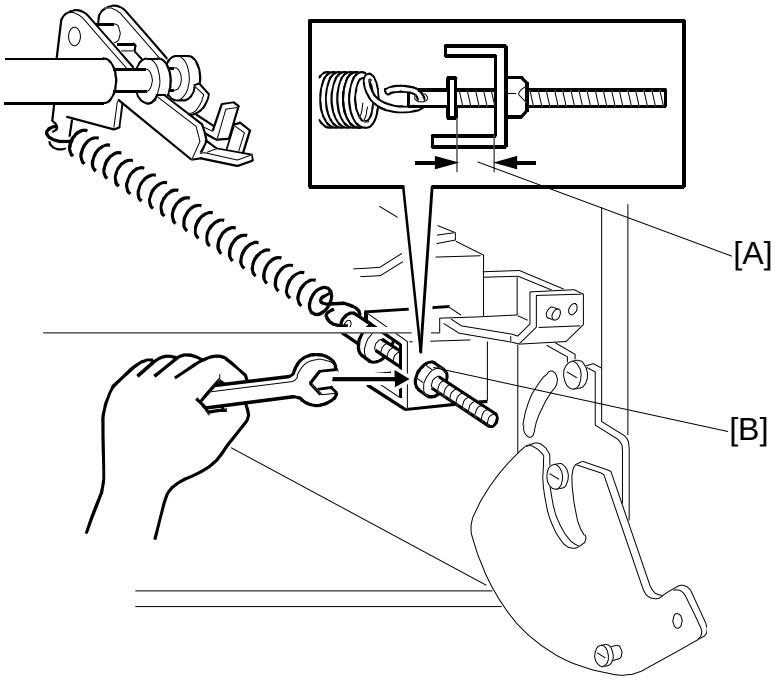
- Front cover (☛ 3.2.1)
- Rear covers (☛ 3.2.2)

1. Turn the drum manually until the drum master clamper on the drum moves into the lowest position. (This is when the high points of the cams on the drum flanges meet with the cam followers on both ends of the press roller.)
   - To find out the correct position of the drum for the adjustment, look at the rear end of the drum shaft. The recess on the drum drive gear meets the hole [A] in the bracket when the drum is in the correct position.
2. Using a thickness gauge, measure the clearance [B] between the press roller arm [C] and the press roller lock lever [D] (rear side). It should be between 0.7 and 1.2 mm.
3. If it is not correct, adjust the position of the press roller lock lever after loosening the two screws [E].
4. Repeat steps 2 and 3 for the front side.

3.7.3 PRINTING PRESSURE ADJUSTMENT

Purpose: To make better print results without decreasing the run length.

Standard: Within 10 ± 0.2 mm



- Paper delivery unit (☛ 3.9.1)

1. Adjust the distance [A] to 10 ± 0.2 mm by turning the adjusting bolt [B].
2. Repeat the same procedure for the printing pressure spring at the non-operation side.

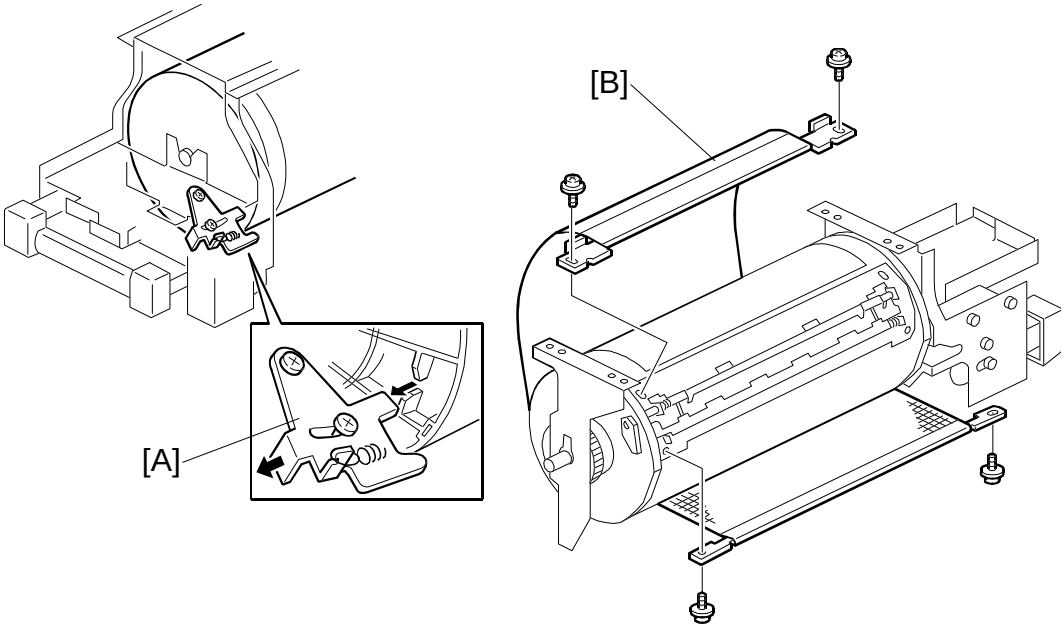
3.8 DRUM

3.8.1 PREPARATION

Before attempting any of the procedures in this section, wipe off the ink around the ink roller. To do this, set SP2-10 (ink detection) to OFF, and feed paper until ink ends.

After finishing the required procedures in this section, do not forget to return SP2-10 to the default (ink detection on).

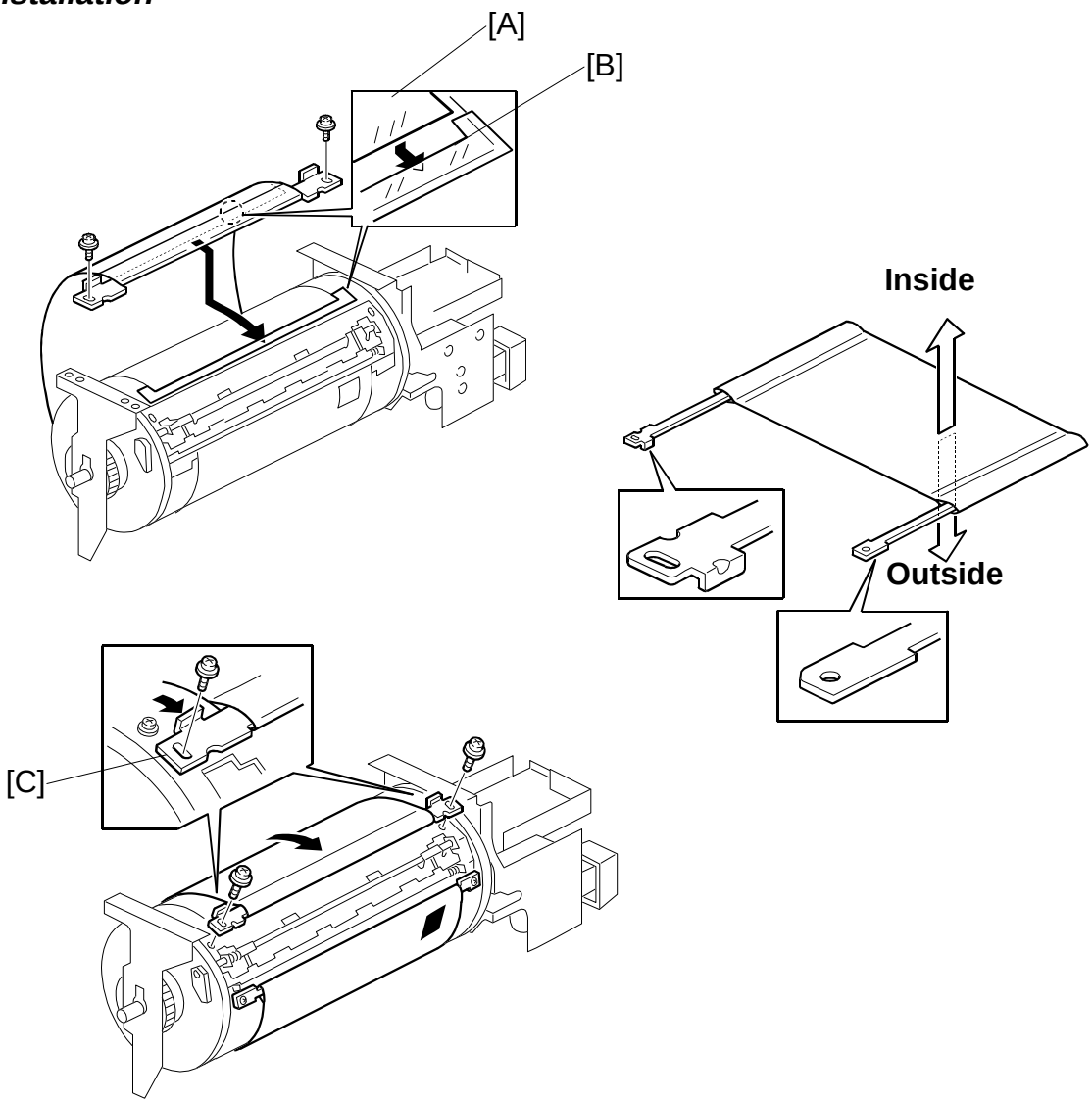
3.8.2 CLOTH SCREEN



- Remove the drum

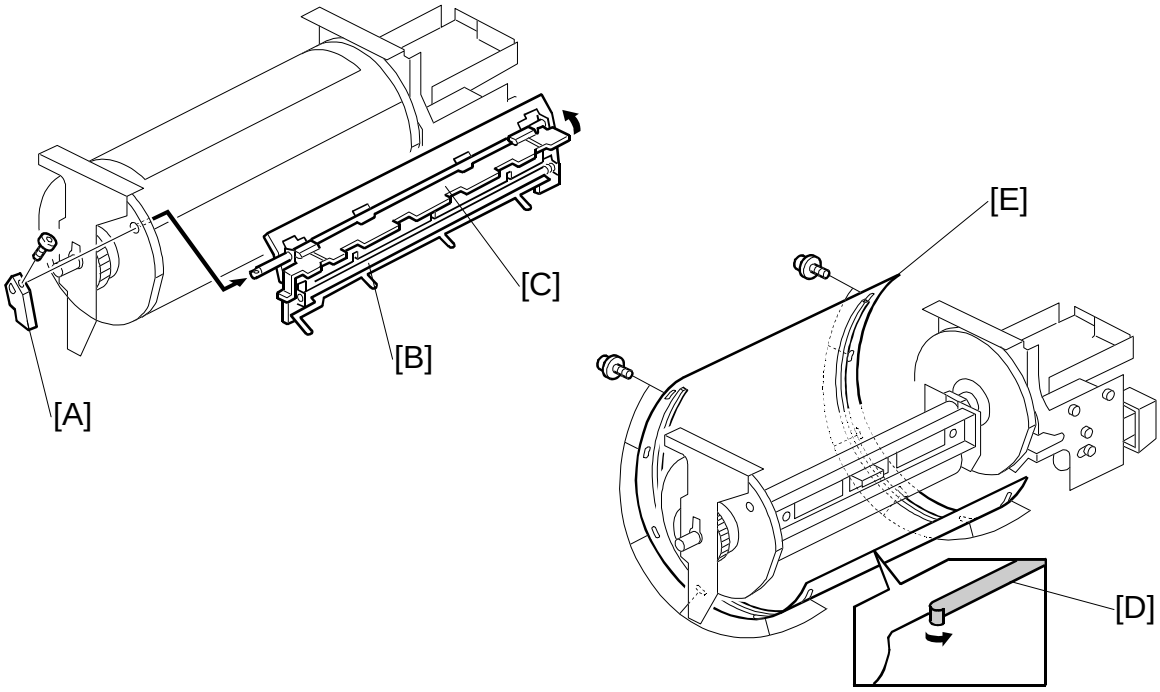
1. Remove the drum upper bracket (☞ x 4).
2. Release the stopper [A], then rotate the drum until the master clamper faces top.
3. Remove the cloth screen [B] (☞ x 4).

Installation



- Do not scratch the cloth screen or metal screen.
- Properly insert the edge of the mylar [A] on the cloth screen under the mylar [B] on the metal screen, as shown above.
  Otherwise, ink will leak from the trailing edge of the master on the drum during a long printing run.
- Make sure that the correct side of the screen is facing up. In addition, make sure that the stays for securing the cloth screen are positioned correctly. (Refer to the upper right illustration.)
- When replacing the cloth screen, spread the screen around the metal screen while strongly pulling the stay [C]. Adjust the stay so that it is parallel to the master clamper, then tighten the screws.
- Make sure that the cloth screen is not wrinkled while spreading it around the drum.

3.8.3 CLAMPER / METAL SCREEN



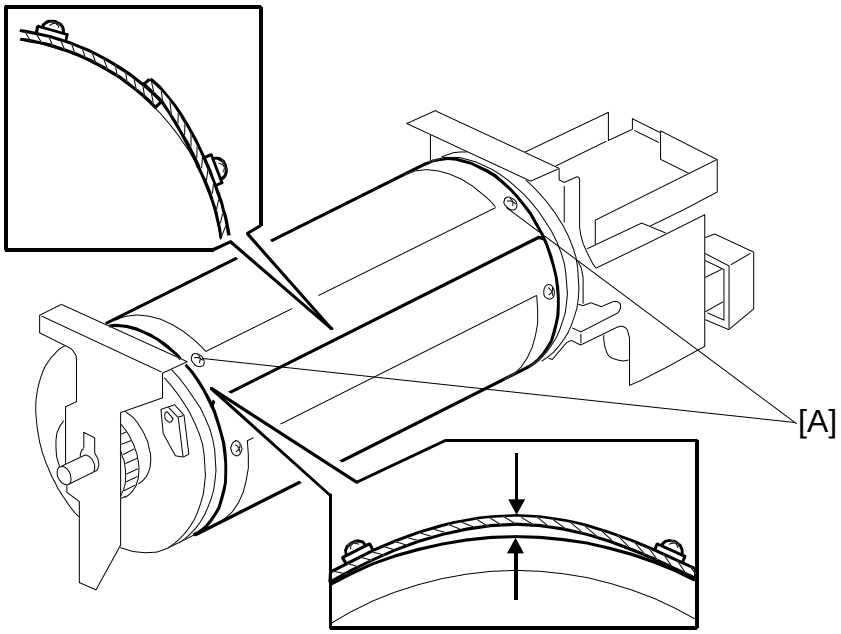
- Remove the drum
- Cloth screen (☛ 3.8.2)

[A]: Clamper lever (1 hexagon screw)
[B]: Clamper - open the clamping plate [C], then remove the clamper.

NOTE: 1) Do not allow ink to get on the inside of the clamping plate [C]. If it is dirty with ink, the master may slip off and the image position on the prints will move toward the trailing edge of the prints during a printing run.
2) Use a cloth dampened with water to clean the inside of the clamping plate [C]. Never use alcohol or other solvents. The clamping force of the magnet will be weakened.

[D]: Tape (do not lose it)
[E]: Metal screen (🔩 x 12)

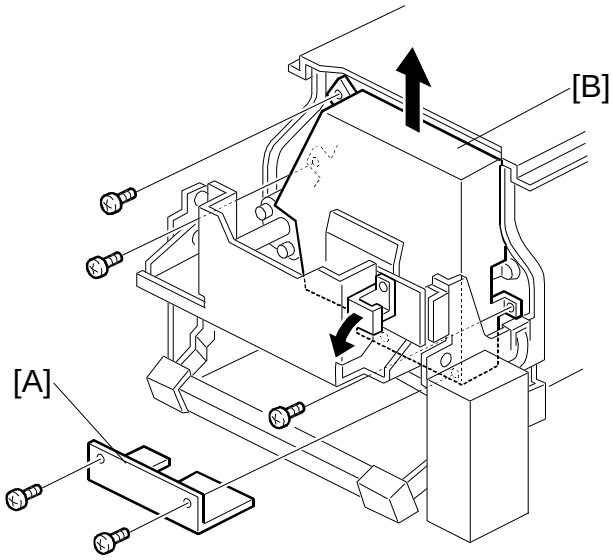
Installation



- Make sure that the correct end of the metal screen is overlapping. (The right side overlaps, as viewed from the non-operation side, as shown above.)
- The 4 screws holding the drum master clamper are longer than the 12 screws holding the metal screen, although they are similar in appearance. Be careful not to mix them up or use the wrong screws.
- When installing the metal screen, secure the trailing edge first with the 2 screws. Then, tighten the other screws while removing the slack from the screen. Make sure that the gap between the drum flanges and the screen is 0.3 mm or less, as shown above. (The two holes [A] on the trailing side are round holes and the other holes are long holes, to allow for the removal of the slack.)
- Do not scratch the cloth screen or metal screen.

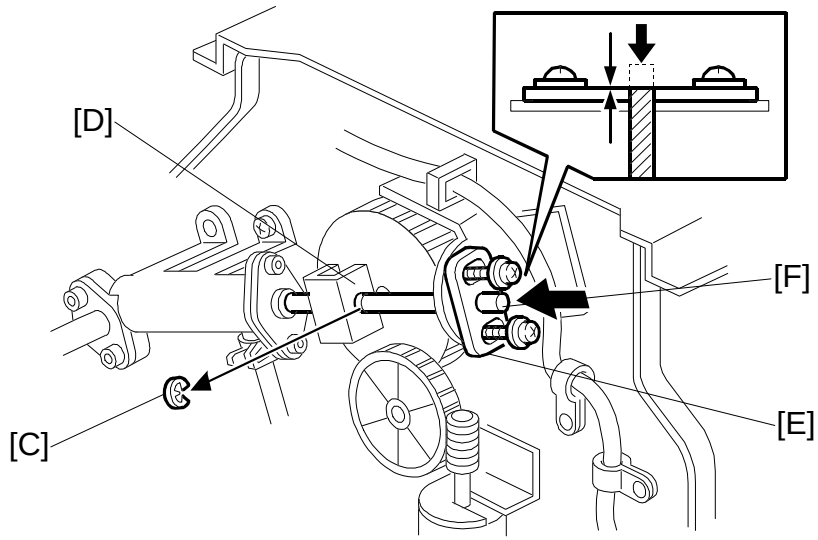
3.8.4 INK PUMP ADJUSTMENT

Purpose: To ensure the smooth operation of the ink pump plunger by properly positioning its holder.

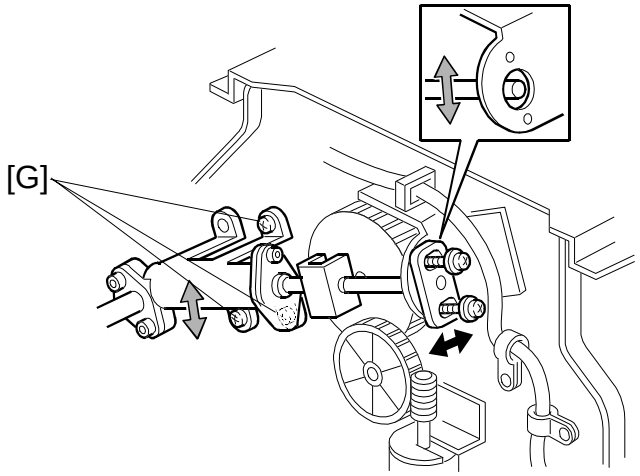


- Remove the drum

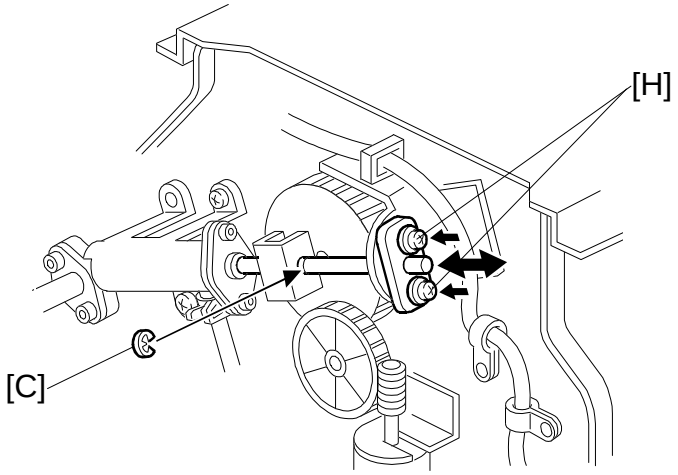
[A]: Lower pump cover (🖉 x 2)
[B]: Upper pump cover (🖉 x 3)



1. Remove the E-ring [C] to free the plunger from the pump drive slider [D].
2. Loosen the two screws securing the holder [E]. (Do not remove the holder.)
3. Push the plunger [F] until it reaches the bottom.
   NOTE: The end of the plunger [F] must not stick out from the holder [E].



4. Check that the piston motion is smooth.
5. If the motion is stiff, loosen the pump screws [G] and adjust the pump position.
6. After tightening, repeat step 4 and step 3.

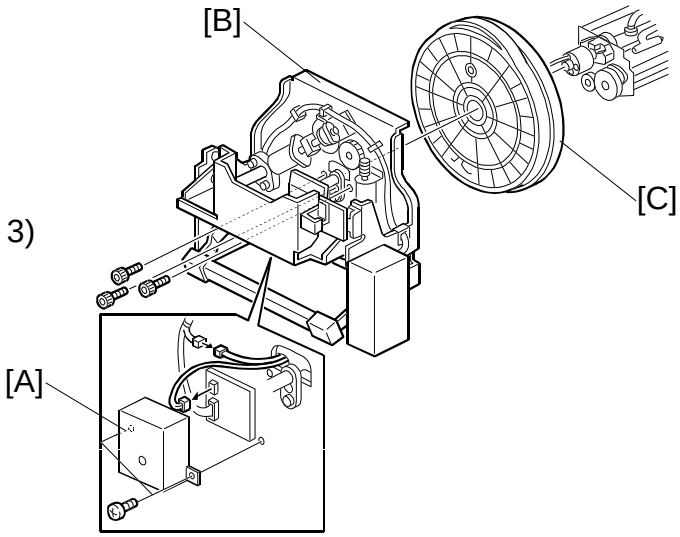


7. Re-tighten the two screws [H].
8. Check that the piston motion is smooth.
9. Reinstall the E-ring [C].

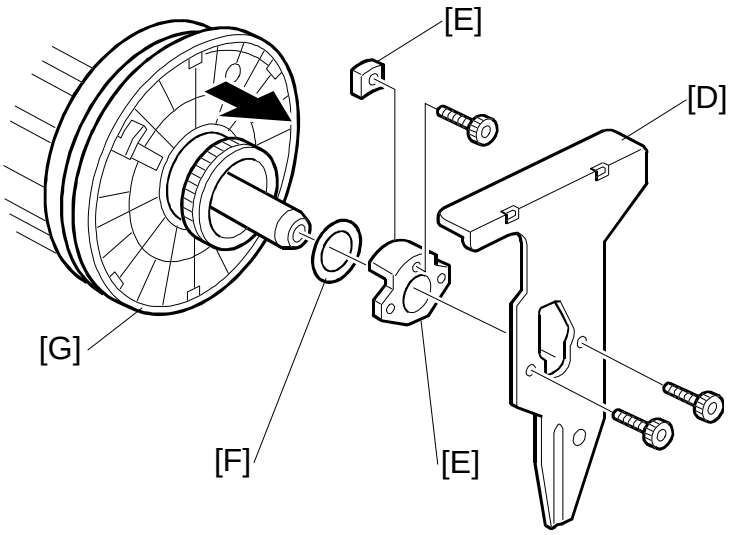
3.8.5 INK ROLLER UNIT / INK ROLLER ONE-WAY CLUTCH

- Metal screen (☛ 3.8.3)
- Pump covers (☛ 3.8.4)

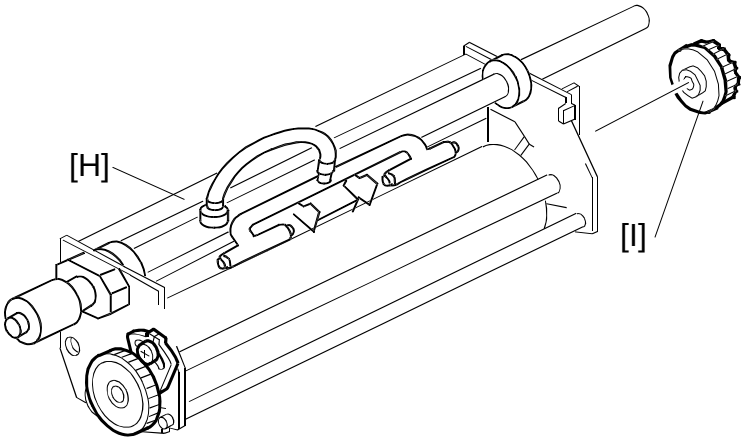
[A]: Board cover (x 2)
[B]: Front stay (x 2, x 3)
[C]: Front flange



[D]: Rear stay (x 2)
[E]: Rear stoppers (x 1)
[F]: Ring
[G]: Rear flange



[H]: Ink roller unit
[I]: Ink roller one-way clutch



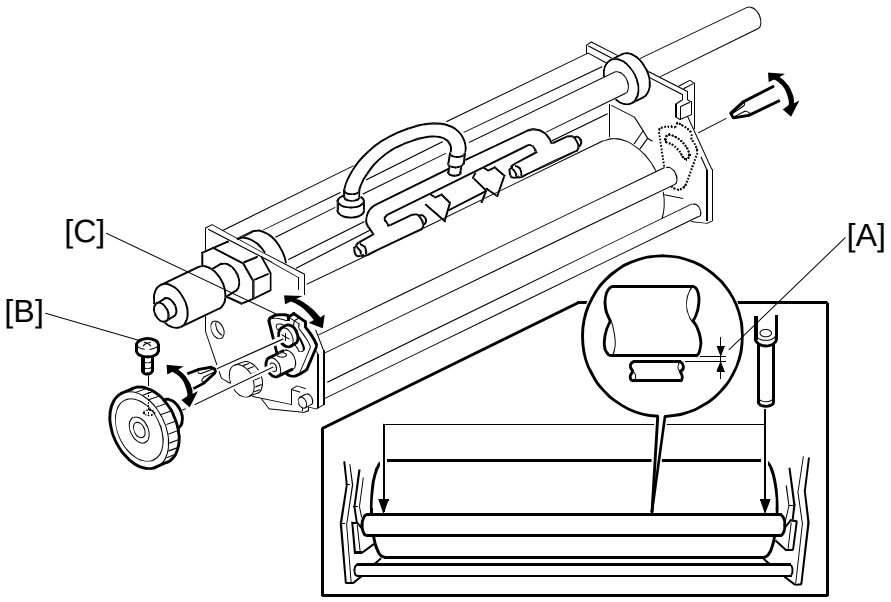
3.8.6 DOCTOR ROLLER GAP ADJUSTMENT

Purpose: To control the ink thickness around the ink roller.

Standard: 0.08 mm gauge passes, 0.10 mm gauge does not.

Tools: Thickness gauge

CAUTION: Normally the doctor roller gap is not adjusted or changed. It tends to be difficult to change in the field. If the gap is too narrow, an uneven image may appear on the prints. If it is too wide, too much ink will be applied to the drum screens, resulting in ink leakage from the drum.



- Ink roller unit (☛ 3.8.5)

1. Make sure that a 0.08 mm gap gauge goes through the gap [A] between the ink and doctor rollers, and that a 0.10 mm gap gauge does not.
   NOTE: 1) The gap should be checked at both ends of the doctor roller. Insert a gap gauge at each end of the roller. The gap tends to be larger for the center.
   2) While the gap gauge is inserted, hold the doctor and ink rollers with your fingers in order to stop the rollers from rotating.
   3) While the gap gauge is inserted, hold the end of the gap gauge.
2. If the gap is out of the standard, loosen the screw [B] and adjust the gap by turning the cam bushing [C] for the front and for the rear.
   NOTE: Make sure to repeat the adjustment for both ends of the rollers.

3.8.7 INK DETECTION ADJUSTMENT

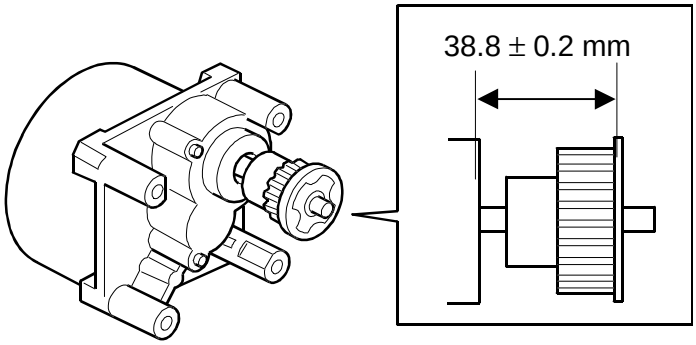
Purpose: To ensure that the CPU detects a no-ink condition.

CAUTION: Before attempting this procedure, wipe off the ink around the ink roller. To do this, set SP2-10 (ink detection) to OFF, and feed paper until ink ends.
After finishing this procedure, do not forget to return SP2-10 to the default (ink detection on).

- SP6-40 Ink detection adjustment (☛ 5.7.2)

3.8.8 MAIN MOTOR PULLEY POSITION

After putting the pulley back on the main motor shaft, refer to the above illustration for the correct position of the pulley.

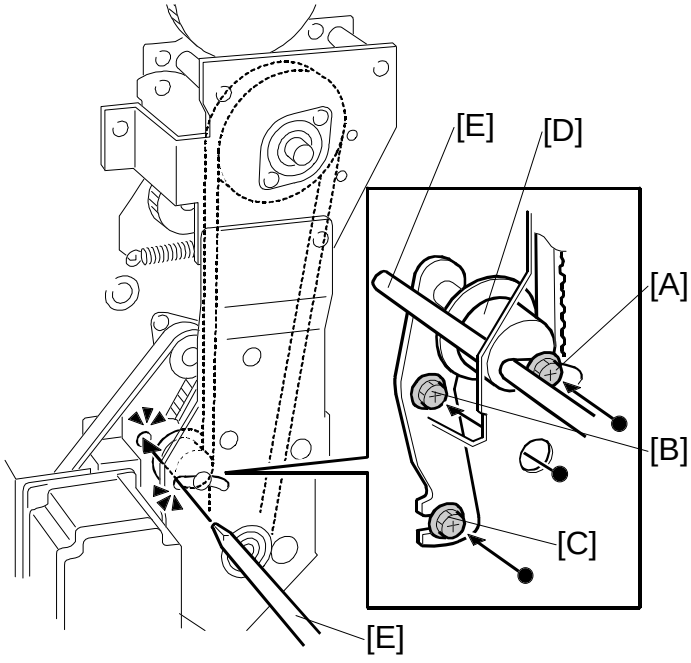


3.8.9 MAIN DRIVE TIMING BELT ADJUSTMENT

Purpose: After the timing belt is replaced, correct belt tension must be applied.

- Rear covers (☛ 3.2.2)
- MPU (☛ 3.2.3)

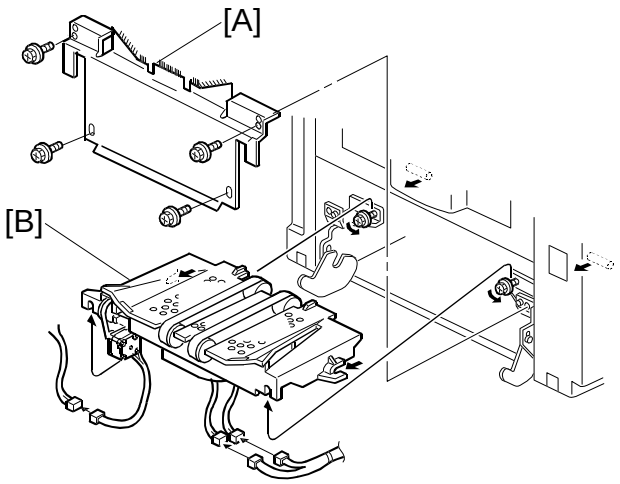
1. Loosen the screws [A], [B], and [C].
2. Move the tension roller [D] to the right with a screwdriver [E] as shown.
3. Tighten the screws [A], [B], and [C].
4. Remove the screwdriver.



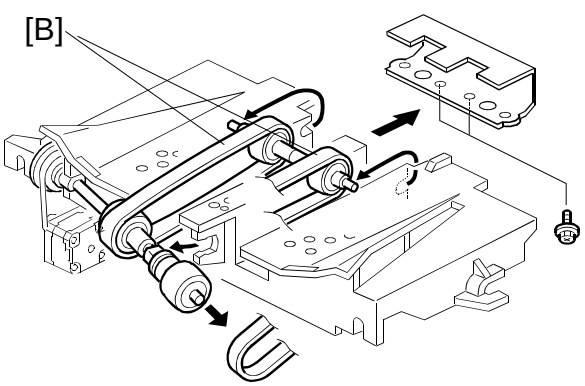
3.9 PAPER DELIVERY

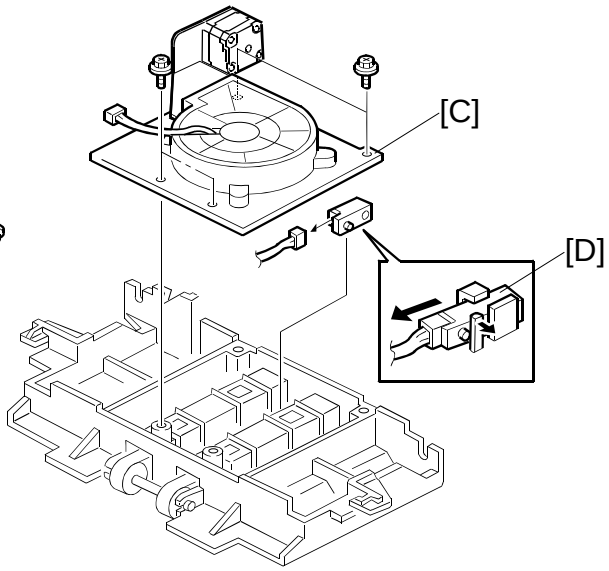
3.9.1 PAPER DELIVERY UNIT

[A]: Paper delivery cover (x 4)
[B]: Paper delivery unit (x 3, x 2)



3.9.2 DELIVERY BELT / PAPER EXIT SENSOR





- Paper delivery unit (☛ 3.9.1)

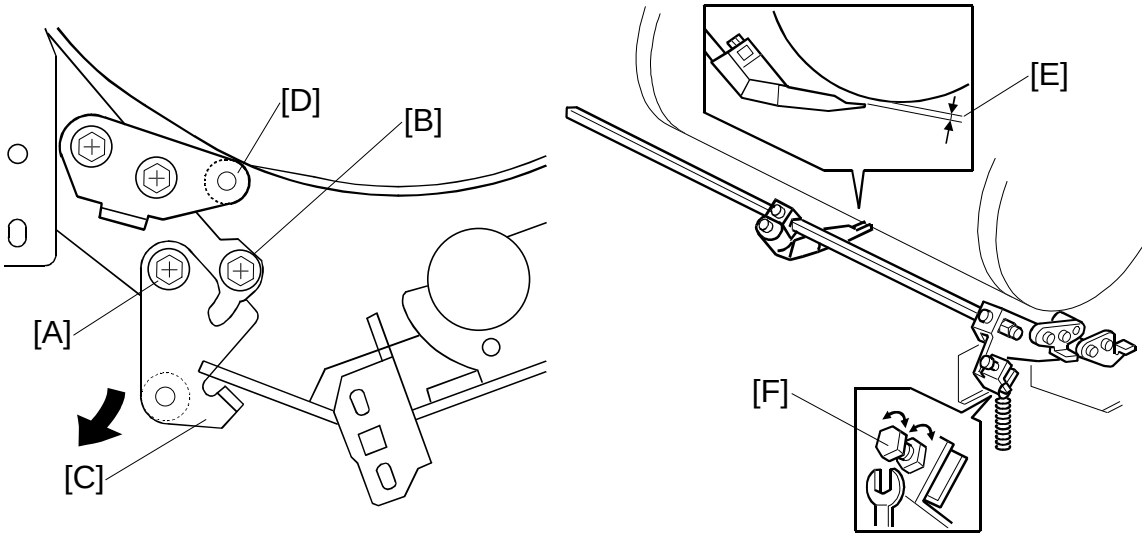
[A]: Paper guide (x 2)
[B]: Delivery belts
[C]: Vacuum fan motor (x 1, x 4)
[D]: Paper exit sensor (x 1)

3.9.3 EXIT PAWL ADJUSTMENT

Purpose: To ensure that the exit pawls can move out of the way of the drum master clamper while the drum is rotating.

Clearance adjustment

Standard: Within 1.15 ± 0.15 mm

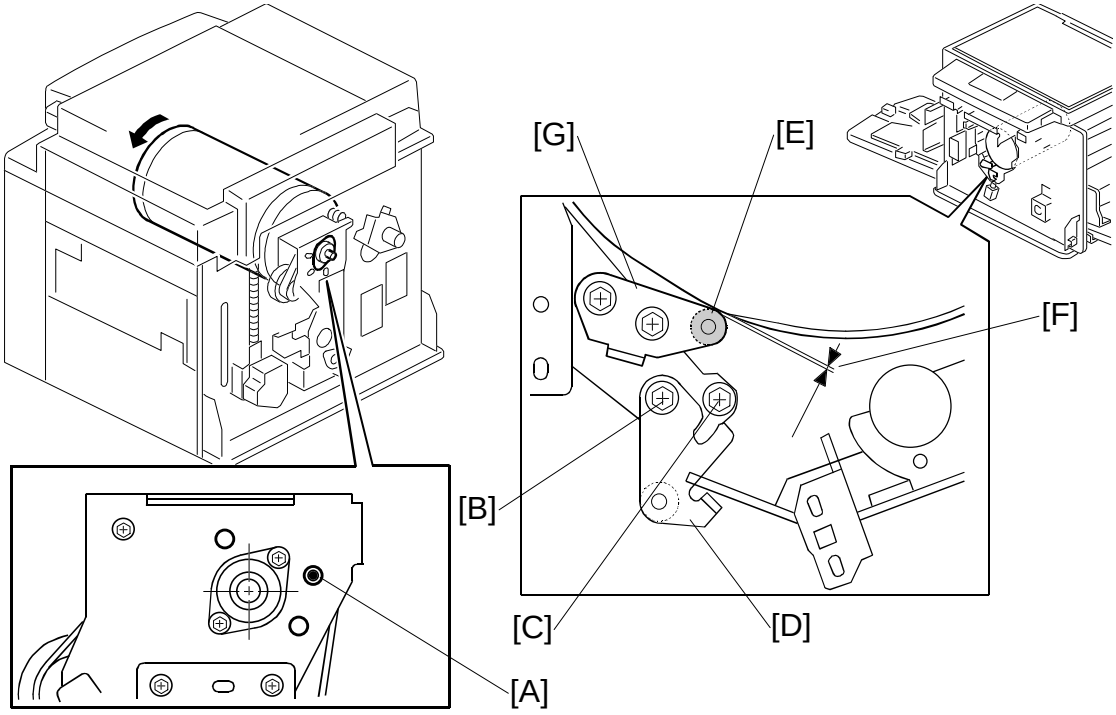


- Front cover (☛ 3.2.1)

1. Loosen screw [A] then screw [B] in this order (do not remove them). Make sure that the bracket [C] becomes free from engagement and the cam follower [D] contacts the drum flange.
2. Using a gap gauge, measure the clearance [E] between the drum surface and the exit pawls. It should be 1.15 ± 0.15 mm.
3. If the clearance is not correct, adjust the clearance by turning the bolt [F].
4. Reposition the bracket [C] and tighten the screws [A] and [B].
5. Do the timing adjustment (see the next page).

Timing adjustment

Standard: 0 or less than 0.5 mm



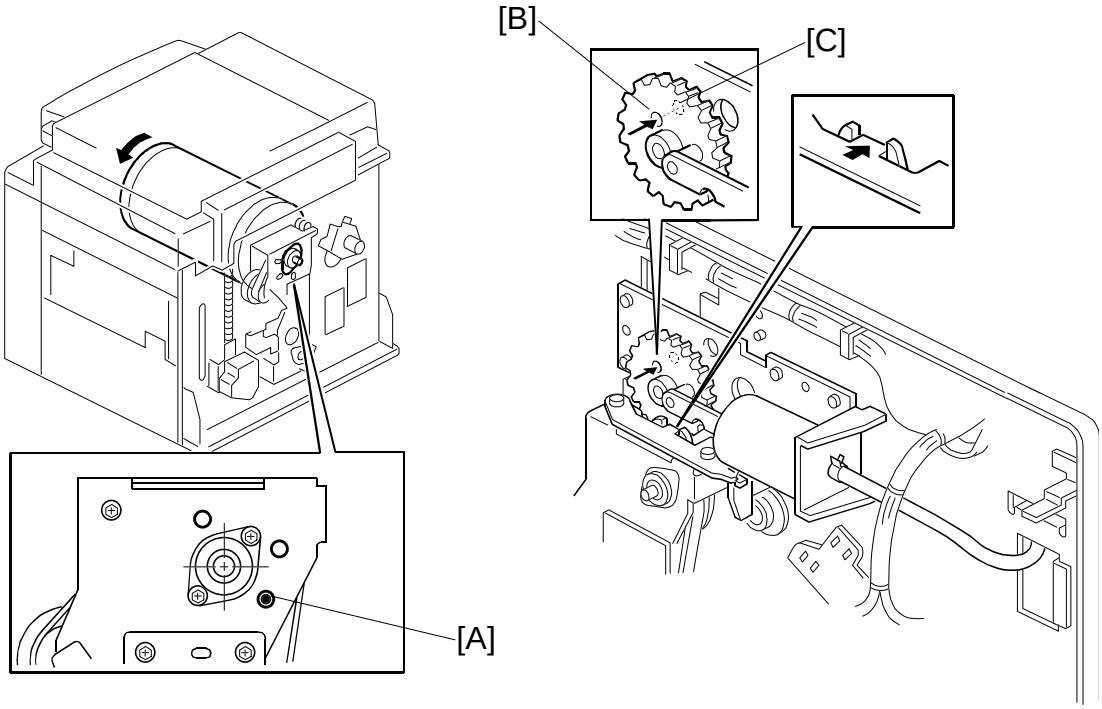
- Front cover (☛ 3.2.1)
- Rear covers (☛ 3.2.2)

- Do this after the clearance adjustment.

1. Turn the drum manually until the recess in the drum drive gear meets the positioning hole [A] in the bracket, as shown.
2. Loosen screw [B] then screw [C] in that order (do not remove them). Make sure that the bracket [D] becomes free from engagement and the cam follower [E] contacts the drum flange.
3. Measure the gap [F] between the cam follower and cam face (front drum flange). It should be 0 to 0.5 mm.
4. If the gap is not correct, loosen the two screws securing the cam follower bracket [G].
5. Re-tighten the two screws while pushing the cam follower against the cam face. Make sure that the gap [F] is 0 or less than 0.5 mm.
   NOTE: Do not push the cam followers too strongly against the cam.
6. Re-position the bracket [D] and tighten the screws [B] and [C].

3.9.4 AIR PUMP ADJUSTMENT

Purpose: To ensure that the exit pawl produces a jet of air at the proper time.



- Rear covers (☛ 3.2.2)

1. Check the recess in the drum drive gear meets the positioning hole [A] in the bracket, as shown.
2. Check whether the hole [B] in the pump drive gear is aligned with the hole [C] in the air pump unit bracket.
3. If the alignment is incorrect, remove the air pump unit and re-position the gear.

3.10 SPECIAL TOOLS

The following are the special tools used for service.

Description	Part number	Note
Scanner positioning pins (4 pins as a set)	A006 9104	☛ 3.3.5
Flash memory card	A230 9352	☛ 5.9.2 ☛ 5.9.3

CÓPIA NÃO CONTROLADA

TROUBLESHOOTING

CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

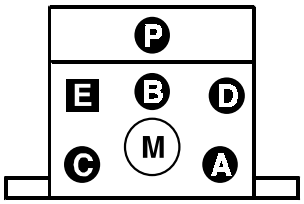
4. TROUBLESHOOTING

4.1 ERROR CODES

No.	Symptom	Possible cause
E-00	Clamper error The MPU cannot detect the clamper position sensor signal (open or closed) within 3.0 seconds after the clamper motor turns on.	Clamper drive Clamper sensors Clamper motor
E-01	Cutter error The cutter HP sensor does not turn on within 3.0 seconds after the cutter motor turns on.	Cutter drive Cutter switch Cutter motor
E-02	Paper Table Drive error The paper height sensor or the table lower limit sensor does not turn on within 7.5 seconds after the table motor turns on.	Table drive Table motor Table height sensor Table lower sensor
E-04	Thermal Head Overheat The temperature of the thermal head is greater than 54°C when the Start key is pressed.	Overheat (wait for the thermal head to cool down) Thermal head
E-06	Main Motor error The CPU cannot detect the master eject position sensor (drum HP) signal within 5.0 seconds after the main motor turns on.	Main motor drive Main motor Motor drive board Master eject position SN
E-09	Thermal Head Thermistor Open The thermistor output voltage is over 4.9 volts.	Thermal head thermistor Thermal head connector
E-12	Pressure Plate error The pressure plate home position sensor signal is not detected within 15.0 seconds after the pressure plate motor turns on.	Pressure plate drive Pressure plate motor Plate position sensors
E-13	Scanner error The scanner HP sensor does not turn on after the scanner motor has moved for more than 7.0 seconds back to home position after scanning. The scanner cannot leave the home position within 2.0 seconds of power on. Just after switching the power on, the scanner cannot return to the home position within 2.0 seconds of leaving.	Scanner drive Scanner HP sensor Scanner motor
E-15	Operation Panel error Signal transmission error (from the operation panel board) occurred in the MPU.	Operation panel MPU
E-16	Paper Feed Control error Signal transmission error (from the paper feed control section) occurred in the MPU.	MPU
E-17	Drum Thermistor Open The thermistor output voltage is over 4.9 volts.	Thermistor connector Thermistor
E-18	Drum Overheat The temperature of the drum is greater than 54°C when the Start key is pressed.	Drum overheat Thermistor

No.	Symptom	Possible cause
E-21	Paper Exit Timing Sensor error The paper exit timing sensor does not activate before the master eject position sensor activates.	Drum sensors Feeler
E-22	2nd Feed Timing Sensor error The 2nd feed timing sensor does not activate before the paper exit timing sensor activates.	Drum sensors Feeler
E-23	Master Eject Position Sensor (Drum HP) error The master eject position sensor does not activate before the feed start timing sensor activates.	Drum sensors Feeler
E-24	Feed Start Timing Sensor error The feed start timing sensor does not activate before the 2nd feed timing sensor activates.	Drum sensors Feeler

4.2 ELECTRICAL COMPONENT DEFECTS



4.2.1 SENSORS

Component	Condition	Symptom
Master Eject Position (HP) Sensor	Open	E-23 is displayed whenever the drum rotates.
	Shorted	
Paper Exit Timing Sensor	Open	E-21 is displayed whenever the drum rotates.
	Shorted	
Feed Start Timing Sensor	Open	E-24 is displayed whenever the drum rotates.
	Shorted	
2nd Feed Timing Sensor	Open	E-22 is displayed whenever the drum rotates.
	Shorted	
Pressure Plate Limit Sensor	Open	The “master eject” indicator is lit.
	Shorted	E-12 is displayed.
Pressure Plate HP Sensor	Open	The “master eject” indicator is lit.
	Shorted	E-12 is displayed.
Drum Master Sensor	Open	The “D” jam indicator is lit whenever a master is made.
	Shorted	
Paper Exit Sensor	Open	The “C” jam indicator is lit.
	Shorted	The “B” jam indicator is lit whenever a copy is made.
Master Eject Sensor	Open	The “E” jam indicator is lit.
	Shorted	The “E” jam indicator is lit whenever a used master is ejected.
Clamper Open Sensor	Open	E-00 is displayed.
	Shorted	E-00 is displayed whenever the clamper operates.
Clamper Close Sensor	Open	E-00 is displayed whenever the clamper operates.
	Shorted	E-00 is displayed.
Table Lower Sensor	Open	The paper table doesn’t go down.
	Shorted	The paper table goes down below the sensor, and E-02 is displayed.
Platen Cover Sensor	Open	The master is made normally, even if the platen cover is open.
	Shorted	The image is treated using center/edge erase mode.
Scanner HP Sensor	Open	E-13 is displayed.
	Shorted	

Component	Condition	Symptom
Master Set Cover Sensor	Open	The “D” jam indicator is lit or E-01 is displayed whenever the cover isn’t placed correctly.
	Shorted	The “the open cover” and “D” indicators are lit.
Master End Sensor	White	Master making can start even if there is no master roll, but the “D” jam indicator will be lit.
	Black	The “load new master roll” indicator is lit.
Paper Height Sensor	Open	The “A” jam indicator is lit whenever a copy is made.
	Shorted	The paper table goes up over the sensor, and E-02 is displayed
Registration Sensor	Open	The “A” jam indicator is lit.
	Shorted	The “A” jam indicator is lit whenever a copy is made.
Paper End Sensor	Open	Printing can begin even if there is no paper, but the “A” jam indicator will be lit.
	Shorted	The “load more paper” indicator is lit.
Cutter HP Sensor	Open	The cutter cuts the master only half way, and the “D” jam indicator is lit.
	Shorted	E-01 is displayed.
Paper Length Sensor	Open	The press roller becomes dirty whenever the paper is shorter than the image.
	Shorted	Long images will be cut because the machine does not detect the presence of long paper sizes on the table.

4.2.2 SWITCHES

Component	Condition	Symptom
Door Safety Switch	Open	The “the open cover” indicator is lit.
	Shorted	The “the open cover” indicator is not lit even if the door is opened.
Main Switch	Open	The machine does not turn on.
	Shorted	The machine does not turn off.
Master Making Unit Set Switch	Open	E-09 is displayed whenever the master making unit is not installed.
	Shorted	The “the open cover” and “E” indicators are lit.
Eject Box Set Switch	Open	The master is fed to the eject box, even if there is no eject box.
	Shorted	The “the open cover” and “E” indicators are lit.

4.2.3 LINES

Component	Condition	Symptom
+5v (CN102-4)	Wire (or PSU) broken	The machine does not turn on.
+5v (CN102-2, 3)		The machine does not turn on, but LED104 on the MPU blinks.
+12v (CN102-9)		The thermal head does not burn the master.
-12v (CN102-8)		The thermal head does not burn the master.
+24v (CN111-3, 4, 5)		E-13 is displayed, and the output mode in SP mode does not turn anything on except the main motor.
+24v (CN111-1)		E-13 is displayed, and SP5-14, 15 (pressure plate motor output mode) does not turn the motor on.

4.3 FUSE, LED, VR, DIP-SW, AND TP TABLES

4.3.1 BLOWN FUSE CONDITIONS

Main motor board

No.	Rate	Symptom
Fuse	10.0 A	The “close the covers” indicator is lit.

PSU

No.	Rate	Symptom
FU700	6.3 A	The machine does not turn on.
FU701, 702	5.0 A	E-13 is displayed, and the output mode in SP mode does not turn anything on except the main motor.
FU703, 704	5.0 A	The “close the covers” indicator is lit.

4.3.2 LED’S

MPU

No.	Function
LED101	Not used.
LED102	Monitors the master end sensor. When the sensor detects a master, this LED is lit. (☛3.5.4)
LED103	Monitors the paper feed circuit in the MPU. Usually, this LED is blinking at intervals of 2 seconds.
LED104	Monitors the CPU operation. Usually, this LED is blinking at intervals of 1 second.

4.3.3 VR’S

MPU

No.	Function
VR101	Not used.
VR102	Adjusts the master end sensor (☛3.5.4)

PSU

No.	Function
VR1	Adjusts the thermal head voltage. (☛3.5.3)
VR2	Not used.

Ink detection board

No.	Function
VR1	Adjusts the ink detection. (☛5.7.2)

4.3.4 DIP SWITCHES

Ink detection board

No.	Normal drum	Color drum	A4 black drum
SW1	OFF	OFF	ON
SW2	OFF	ON	OFF
SW3	OFF	OFF	OFF
SW4	OFF	OFF	OFF

4.3.5 TEST POINTS

MPU

No.	Function
TP102	Measures the master end sensor voltage. (☛3.5.4)

PSU

No.	Function
TP701	Measures the thermal head voltage. (☛3.5.3)
TP702	

CÓPIA NÃO CONTROLADA

SERVICE TABLES

CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

5. .SERVICE TABLES

5.1 USING SERVICE PROGRAM MODES

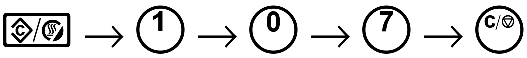
Use the service program modes (SP modes) to check electrical data, change operating modes, and adjust values.

5.1.1 ACCESSING SP MODES

Entering SP Mode

1. Key in the following sequence.

   Method 1:

   - Hold the key down for longer than 3 seconds.

   Method 2:

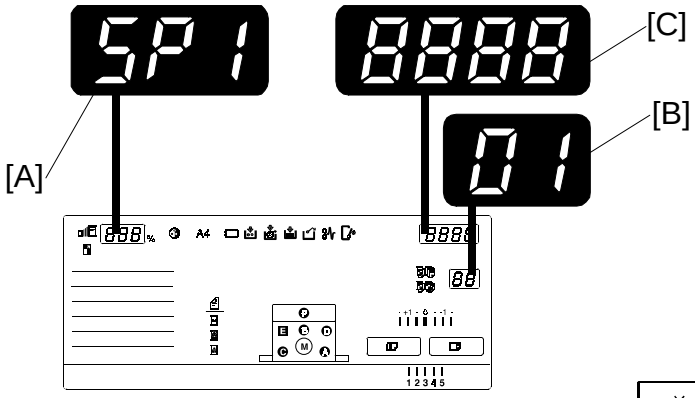
2. The zoom counter displays “SP1”.
3. Go to section 5.1.2.

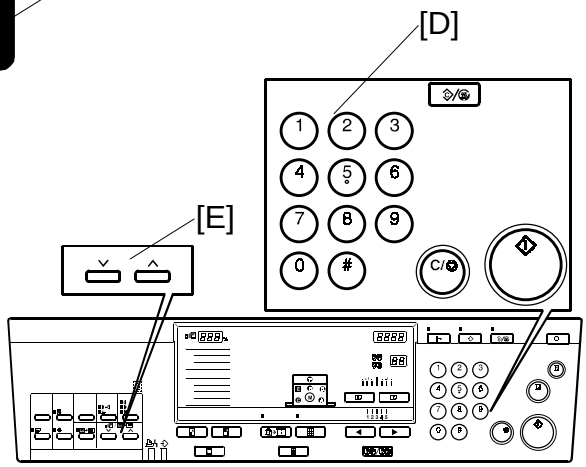
Leaving SP Mode

Press the key one or more times.

CÓPIA NÃO CONTROLADA

5.1.2 HOW TO SELECT A PROGRAM NUMBER

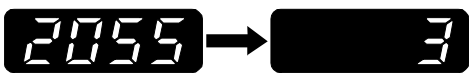


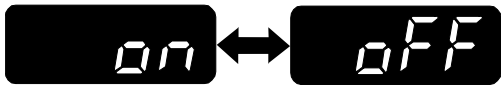


[A]: **Zoom counter: Main menu number**
[B]: **Class counter: Sub menu number**
[C]: **Paper counter: Setting**

1. Using the number keys [D] or the scroll keys [E], enter the desired main menu number (listed below), then press the Enter key. (The zoom counter [A] shows the main menu number.)
   Main menu number list:
   1. Copy data, 2. Basic settings, 3. System settings, 4. Input mode
   5. Output mode, 6. Adjustment, 7. Memory clear, 8. System test
2. Using the number keys or the scroll keys, enter the desired sub-menu number, then press the Enter key. (The class counter [B] shows the sub menu number.)
3. Enter the desired value or mode using the number keys (SP modes are listed in the service program tables). (The paper counter [C] shows the current setting.)
   NOTE: 1) Use the Memory/Class key to toggle between "+" and "-".
   2) To enter a decimal place, you do not have to enter a decimal point. For example, to enter "1.5" just press "1" and "5" keys.
4. Press the Enter key to store the displayed setting.

When the setting has more than four digits:





First, the last four digits of the number are displayed. Keep pressing the Enter key to display the rest of the number.

Example: When the value is 32055, the paper counter display changes as shown.

Change ON/OFF:

Use the "1" key and "0" key to switch an SP "ON" and "OFF".

1: ON 0: OFF

5.2 MAIN MENU NO.1: COPY DATA

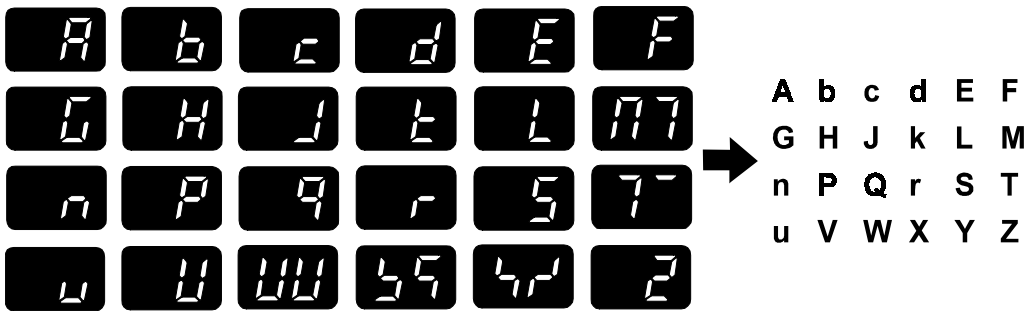
5.2.1 SP TABLE

No.	Menu Items	Function
1-1	Total master counter	
1-2	Master counter - ADF	
1-3	Master counter - Letter mode	
1-4	Master counter - Letter/Photo mode	
1-5	Master counter - Photo mode	
1-6	Master counter - Tint mode	
1-7	Master counter - Economy mode	
1-8	Master counter - Combine mode	
1-9	Master counter - Enlargement	
1-10	Master counter - Reduction	
1-11	Master counter - Zoom mode	
1-12	Master counter - Margin erase mode	
1-13	Master counter - Fine mode	
1-14	Master counter - Online mode	
1-15	Master counter - Online overlay	
1-16	Master counter - Color drum	
1-20	Total print counter	
1-21	Print counter - over A3/DLT	
1-22	Print counter - A3/DLT	
1-23	Print counter - B4/LG	
1-24	Print counter - A4-L/LT-L	"-L": Lengthwise feeds
1-25	Print counter - A4/LT	
1-26	Print counter - B5-L	
1-27	Print counter - B5	
1-28	Print counter - A6-L	
1-29	Print counter - under A6-L	
1-30	Print counter - other sizes	
1-40	Copies per original counters - 1,000 and under 1,000 prints	
1-41	Copies per original counters - over 1,000 prints	
1-50	D jam location counter (when clamping the master)	☛ 6.10.3
1-51	E jam location counter (picking up a used master from drum)	☛ 6.10.1
1-52	E jam location counter (compressing the used master)	☛ 6.10.1
1-53	A jam location counter (paper feed)	☛ 6.10.5
1-54	A jam location counter (after turning on the main switch)	☛ 6.10.5
1-55	B jam location counter (wrapping jam)	☛ 6.10.4
1-56	C jam location counter (paper delivery)	☛ 6.10.6
1-57	P jam location counter (original feed-in)	☛ 6.10.2
1-58	P jam location counter (original feed-out)	☛ 6.10.2
1-70	Main firmware suffix information	☛ 5.2.2
1-71	Feed ROM suffix information	☛ 5.2.2
1-72	Serial Number (Service)	☛ 5.2.4
1-75	Serial Number (Factory)	☛ 5.2.4
1-80	Error code information	☛ 5.2.3

Service Tables

5.2.2 SP1-70, 71: FIRMWARE/ROM SUFFIX INFORMATION

This model has no LCD, so the suffix is displayed as shown below instead of in English letters.



NOTE: The letters “i” and “o” are always skipped.

5.2.3 SP1-80: ERROR CODE INFORMATION

Purpose: To display the error codes and the date.

By pressing the Enter key, the display changes between the year, the month / date, and the time, as shown below.

Latest error code
↓#
The year
↓#
The month / the date
↓#
The time
↓#
Error code previous to that
↓#

Example: E-01, 2002/January/2nd/13:00

E-01
↓#
2002
↓#
0102
↓#
1300

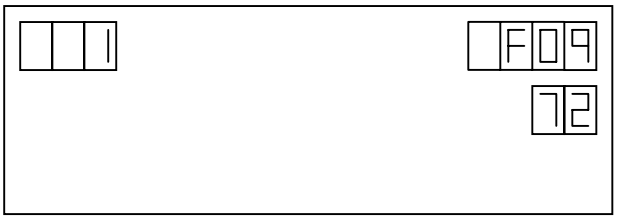
⇒ 5.2.4 SP1-72: SERIAL NUMBER (SERVICE) / SP1-75: SERIAL NUMBER (FACTORY)

Purpose: To display the serial number.

By pressing the Enter key, the display changes from the beginning of the number, to the middle, then to the end, as shown below.

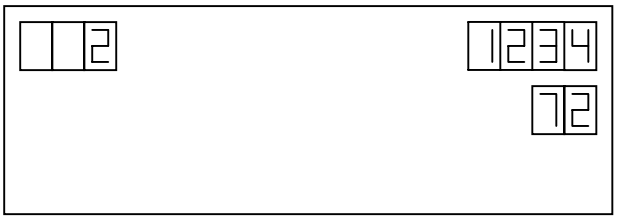
Example: Serial number F0912345678.

1. Enter SP1-72 (or SP1-75).
2. “F09” is displayed (first three digits).



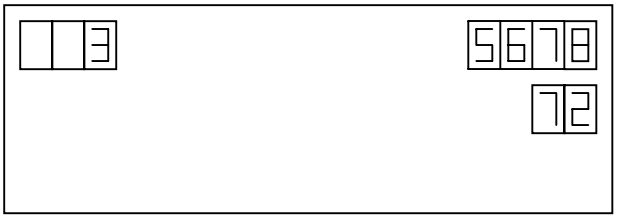
↓#

3. “1234” is displayed (middle four digits).

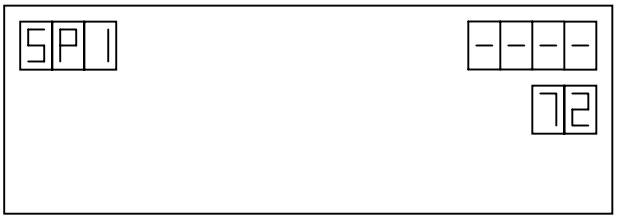


↓#

4. “5678” is displayed (last four digits).



5. If the machine has no serial number, the SP displays “ ---- ”.



Service Tables

5.3 MAIN MENU NO.2: BASIC SETTINGS

5.3.1 SP TABLE

No.	Menu Items	Default	Settings
2-1	Default print speed	3	1 to 5
2-2	Default image position	4	1 to 7 1: -15mm, 2: -10mm, 3: -5mm, **4: 0.0mm**, 5: +5mm, 6: +10mm, 7: +15mm
2-10	Ink detection board	On	Off/On (Off is used for tests, and for removing ink from the drum – section 3.8.)
2-11	Paper end sensor	On	Off/On (Off is used for tests.)
2-12	Drum master sensor	On	Off/On (Off is used for tests.)
2-13	Platen cover sensor	On	Off/On (Off is used for tests.)
2-14	ADF cover sensor	On	Off/On (Off is used for tests.)
2-20	Destination setting	-	0: Japan, 1: NA, 2: EU
2-21	Swap start key for print key	Off	Off/On
2-22	Double count-up for A3 masters	0	0: Not used, 1: Master counter only, 2: Master counter and print counter
2-24	Slow Starting Mode	1	**1**, 2, 3, 4 (☛ 5.3.3)
2-33	Re-Feeding	On	On/Off Factory = On (☛ 5.3.4)
2-40	T/H energy control by ink temperature	On	Off/On
2-41	Thermal head energy control	7	0 to 50%
2-42	Thermal head energy control - economy	10	0 to 43% (☛ 5.3.2)
⇒ 2-95	Paper Table Standby Position	Off	On/Off Factory = Off (☛ 5.3.5)

5.3.2 SP2-41, 2-42: THERMAL HEAD ENERGY CONTROL

2-41: The default is 7%. This means that during normal printing mode, the thermal head energy is 93% of the maximum possible (100 – 7).

2-42: The default is 10%. This means that in economy printing mode, the thermal head energy is reduced by another 10%. With the default settings, this means that the thermal head energy is 83% of maximum power (100-7-10).

5.3.3 SP2-24: SLOW STARTING MODE

Setting	Trial print	Skip feed	1st print	2nd print	3rd print	4th print	5th print
1	30 rpm	None	60 rpm	75 rpm	90 rpm	105 rpm	120 rpm
2	15 rpm	None	30 rpm	60 rpm	75 rpm	90 rpm	105 rpm
3	15 rpm	15 rpm(1time)	60 rpm	75 rpm	90 rpm	105 rpm	120 rpm
4	15 rpm	15 rpm(1time)	30 rpm	60 rpm	75 rpm	90 rpm	105 rpm

The figures above are drum rotation speeds. A setting of 2, 3, or 4 will increase the image density of trial prints.

5.3.4 SP2-33: RE-FEEDING

Purpose: When the machine performs re-feeding, the paper registration position can be up to 5 mm out of range. If this incorrect position is not acceptable to the customer, change this SP mode to “OFF”.

ON: Re-feeding is on (factory setting).

OFF: Re-feeding is off.

⇒5.3.5 SP2-95: PAPER TABLE STANBY POSITION

Sets whether the paper feed table will return to the lower standby position (standard) or the upper standby position. With this SP mode, the paper tray standby position can be changed to a higher position. As a result, the First Print time for the next job will be about 3 seconds faster.

ON: The paper feed table returns to the upper standby position after printing or master-making.

OFF (default): The paper feed table returns to the lower (standard) standby position after printing or master-making.

NOTE: In the following cases, the paper feed table returns to the lower (standard) standby position even if SP2-95 is ON. This is to make sure that the master making unit does not touch the paper feed table.

- When the Master End condition occurs
- When a B-jam (Master Eject Jam) or a D-jam (Master Feed Jam) occurs
- When the paper height sensor is activated at main power ON

5.4 MAIN MENU NO.3: SYSTEM SETTINGS

5.4.1 SP TABLE

No.	Menu Items	Default	Settings
3-1	Input the present time	-	☛ 5.4.2
⇒ 3-3	Input serial number on SP1-72	-	☛ 5.4.3
3-10	Optional key counter setting	Off	Off/On

5.4.2 SP3-1: INPUT THE PRESENT TIME

Input the year, the month / date, and the time in that order. Press the Enter key between each one.

Input the last two digits of the present year (two-digit number).

↓#

Input the present month and the date (four-digit number).

↓#

Input the present time (four-digit number).

↓#

Example: 2002/January/2nd/13:00

02

↓#

0102

↓#

1300

↓#

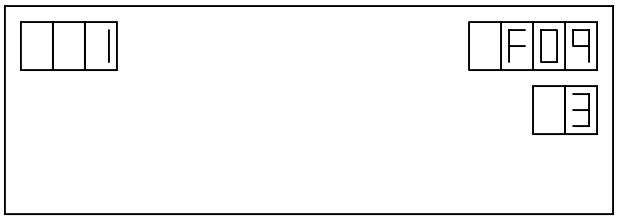
⟹ 5.4.3 SP3-3: INPUT SERIAL NUMBER ON SP1-72

Purpose: To input the serial number on SP1-72.

Example: Serial number F0912345678.

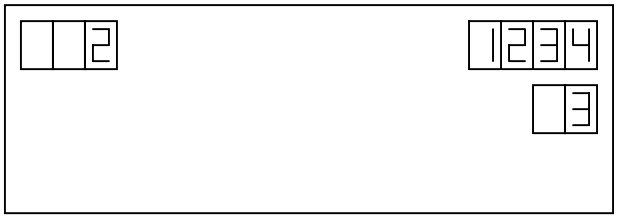
1. Enter SP3-3. (“F09” is displayed).

   ↓#



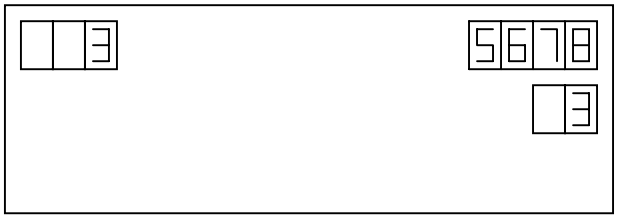
2. Input “1234” (middle four digits).

   ↓#



3. Input “5678” (last four digits).

   ↓#



NOTE: Can not input SP1-75 (Serial number: Factory).

5.5 MAIN MENU NO.4: INPUT MODE

5.5.1 SP TABLE

No.	Menu Items
4-1	Scanner HP sensor
4-2	Platen cover sensor
4-10	Master making unit set switch
4-11	Master set cover sensor
4-12	Cutter HP sensor
4-13	Master end sensor
4-14	Eject box set switch
4-15	Master eject sensor
4-16	Pressure plate HP sensor
4-17	Pressure plate limit sensor
4-18	Ink detection signal
4-19	Color drum signal
4-20	Drum size signal
4-21	Drum set signal
4-22	Clamper open sensor
4-23	Clamper closed sensor
4-24	Drum master sensor
4-25	Master eject position (drum HP) sensor
4-26	Paper exit timing sensor
4-30	Table lowering switch
4-31	Table lower sensor
4-32	Paper height sensor
4-33	Paper end sensor

No.	Menu Items
4-34	Paper length sensor
4-35	Paper width signal 0
4-36	Paper width signal 1
4-37	Paper width signal 2
4-38	Paper width signal 3
4-39	Paper width signal 4
4-40	Paper width signal 5
4-41	Registration sensor
4-42	Feed start timing sensor
4-43	2nd feed timing sensor
4-44	Paper exit sensor
4-45	Paper Size Display
4-50	Door safety switch
4-60	ADF connecting signal
4-61	ADF cover sensor
4-62	ADF registration sensor
4-63	ADF original trailing edge sensor
4-64	ADF original set sensor
4-65	ADF original length sensor 1
4-66	ADF original length sensor 2
4-67	ADF original width sensor 1
4-68	ADF original width sensor 2
4-69	ADF open sensor
4-70	Optional key counter signal

5.5.2 SP4-45: PAPER SIZE DISPLAY

The display for SP4-45 (Paper size display) is as shown below:

U.S. models: *SP2-20 (Destination setting) = "1".*

Form	HLT -L	Letter -L	Letter	Legal -L	Double letter -L
Width (mm)	134 to 154	211 to 231	274 to 295	211 to 231	274 to 295
Length (SP4-34)	OFF	OFF	OFF	ON	ON

"-L": Lengthwise feed SP4-34: Paper length sensor data

5.6 MAIN MENU NO.5: OUTPUT MODE

5.6.1 SP TABLE

No.	Menu Items
5-1	Exposure lamp (xenon lamp)
5-2	Scanner motor
5-10	Master feed motor
5-11	Cutter motor
5-12	VHD signal (☛ 3.5.3)
5-13	Master eject motor
5-14	Pressure plate motor: to limit
5-15	Pressure plate motor: to HP
5-16	Main motor: 15 rpm
5-17	Main motor: 30 rpm
5-18	Main motor: 60 rpm
5-19	Main motor: 75 rpm
5-20	Main motor: 90 rpm
5-21	Main motor: 105 rpm
5-22	Main motor: 120 rpm
5-23	Clamper motor: to open
5-24	Clamper motor: to close
5-25	Ink pump motor
5-26	Pressure release solenoids

No.	Menu Items
5-30	Table motor - up
5-31	Table motor - down
5-32	Paper feed motor: 15 rpm
5-33	Paper feed motor: 30 rpm
5-34	Paper feed motor: 60 rpm
5-35	Paper feed motor: 75 rpm
5-36	Paper feed motor: 90 rpm
5-37	Paper feed motor: 105 rpm
5-38	Paper feed motor: 120 rpm
5-39	Registration motor: 15 rpm
5-40	Registration motor: 30 rpm
5-41	Registration motor: 60 rpm
5-42	Registration motor: 75 rpm
5-43	Registration motor: 90 rpm
5-44	Registration motor: 105 rpm
5-45	Registration motor: 120 rpm
5-46	Air knife fan motor 1
5-47	Air knife fan motor 2
5-48	Vacuum fan motor
5-49	Paper delivery motor
5-50	Paper counter
5-51	Master counter
5-60	ADF motor
5-61	ADF feed clutch
5-62	ADF pick-up solenoid
5-63	Optional key counter signal

5.7 MAIN MENU NO.6: ADJUSTMENT

5.7.1 SP TABLE

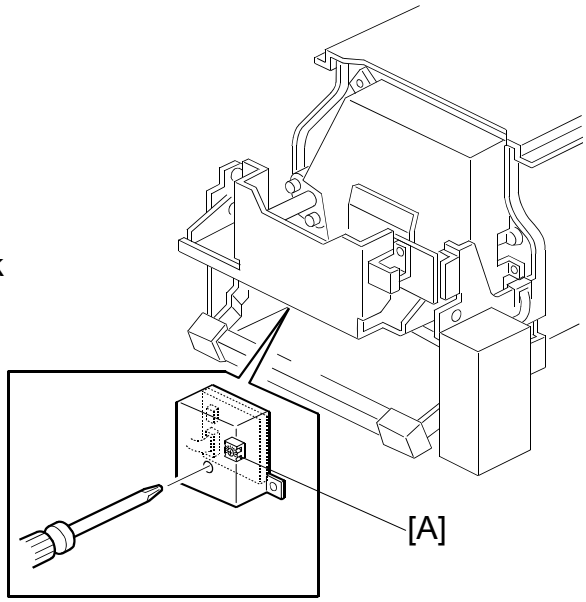
No.	Menu Items	Default	Settings
6-1	Main-scan position – platen mode	–	-5.0 to 5.0 mm (☛ 5.7.3)
6-2	Main-scan position - ADF mode	0	-5.0 to 5.0 mm (☛ 5.7.3)
6-3	Scanning start position - platen mode	–	-5.0 to 5.0 mm (☛ 5.7.3)
6-4	Scanning start position - ADF mode	0	-5.0 to 5.0 mm (☛ 5.7.3)
6-5	Scanning speed - platen mode	–	-5.0 to 5.0 % (☛ 5.7.3)
6-6	Scanning speed - ADF mode	0	-5.0 to 5.0 % (☛ 5.7.3)
6-10	Master writing speed	–	-5.0 to 5.0 % (☛ 5.7.3)
6-20	Registration buckle (Not used)	18	0 to100 pluses (☛ 5.7.5)
6-21	Paper registration position	–	-5.0 to 5.0 mm (☛ 5.7.3)
6-23	Paper registration – each speed	–	(☛ 5.7.6)
6-24	Paper reg – each speed (Skip Feed)	–	(☛ 5.7.6)
6-25	Paper reg – each speed (A4 Drum)	–	(☛ 5.7.6)
6-26	Paper reg – each speed(A4 : Skip)	–	(☛ 5.7.6)
6-27	Press Roller Buckle		(☛ 5.7.7)
6-30	Master making density	1	0: Pale, 1: Normal, 2: Dark
6-31	SBU calibration	Off	On/Off (☛ 5.7.4)
6-36	Master Length – A3 Drum	0	(☛ 5.7.8)
6-37	Master Length – A4 Drum	0	(☛ 5.7.8)
6-40	Ink detection adjustment	–	(☛ 5.7.2)

NOTE: For SP6-23 through 27 settings, see sections 5.7.6 and 5.7.7.

5.7.2 SP6-40: INK DETECTION ADJUSTMENT

Purpose: To ensure that the CPU detects a no ink condition.

CAUTION: Before attempting this procedure, wipe off the ink around the ink roller. To do this, set SP2-10 (ink detection) to OFF, and feed paper until ink ends. After finishing the procedure, do not forget to return SP2-10 to the default (ink detection on).



Access SP6-40, and open the door cover, then turn the VR1 [A] on the ink detection board until the display becomes “6.0 u” (6 μs).

NOTE: When the drum has ink inside, the machine displays “----“.

5.7.3 IMAGE ADJUSTMENT (SP6-10, -21, -5, -3, AND -1)

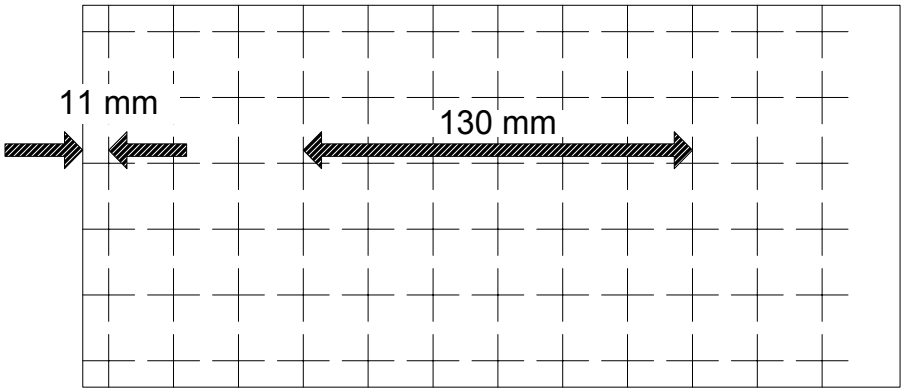
Purpose: To adjust the image position on prints by changing the SP settings.

Adjust the following in the given order.

When correcting errors made when printing with the controller, use only the first two procedures. When correcting errors made when printing with scanned originals, do all six adjustments in the given order.

This adjustment is required every time the RAM on the MPU has been replaced.

SP6-10: Master writing speed



1. Input SP8-10 (Test patterns) and enter “6”, then press the Start key.
2. Exit the SP mode, print 10 copies at 90 rpm (speed 3). Use the 10th print for the adjustment.
3. The length of the 6 squares in the feed direction should be 130 mm, as shown above.
4. If it is not, calculate the reproduction ratio using the following formula.
   {(130 - Value) / 130} x 100 = ± X.X % (Round off to one decimal place)
   Example: If the value is 133, {(130 - 133) / 130} x 100 = - 2.3 %
5. Access SP6-10, input the calculated ratio, and press the Enter key.
6. Repeat the procedure to make sure that the ratio is correct.

SP6-21: Paper registration position

1. Input SP8-10 (Test patterns) and enter “6”, then press the Start key.
2. Exit the SP mode, print 10 copies at 90 rpm (speed 3). Use the 10th print for the adjustment.
3. The space between the leading edge and the next line should be 11 mm, as shown above.
4. If it is not, access SP6-21, input the difference and press the Enter key.
   Example: If the value is 16 mm, 16 - 11 = +5.0
5. Repeat the procedure to make sure that the gap is correct.

SP6-05: Scanning speed - platen

SP6-06: Scanning speed - ADF

1. Make copies of the test pattern printed during the previous adjustments (☛ previous page), in platen mode at 90 rpm (speed 3). Use the 10th print for the adjustment.
2. The length of the 6 squares in the feed direction should be 130 mm.
3. If it is not, calculate the reproduction ratio using the following formula.
   {(130 - Value) / 130} x 100 = ± X.X % (Round off to one decimal place)
   Example: If the value is 133, {(130 - 133) / 130} x 100 = - 2.3 %
4. Access SP6-05, input the calculated ratio, and press the Enter key.
5. Check again to make sure that the ratio is correct.
6. Make copies of the test pattern in ADF mode and repeat the process using SP6-06.

SP6-03: Scanning start position - platen

SP6-04: Scanning start position - ADF

1. Make copies of the test pattern printed during the previous adjustments (☛ previous page), in platen mode at 90 rpm (speed 3). Use the 10th print for the adjustment.
2. The space between the leading edge and the next line should be 11 mm.
3. If it is not, access SP6-03, input the gap value and press the Enter key.
   Example: If the value is 16 mm, 16 - 11 = +5.0
4. Repeat the procedure to make sure that the gap is correct.
5. Make copies of the test pattern in ADF mode and repeat the process using SP6-04.

SP6-01: Main scan position - platen

SP6-02: Main scan position - ADF

1. Make a copy in platen mode at 90 rpm (speed 3).
2. Measure the difference between the center of the main-scan on the original and on the print.
3. Access SP6-01, input the gap value and press the Enter key. (If you input a positive value, the image moves towards the operation side.)
4. Repeat the procedure to make sure that there is no difference.
5. Make a copy in ADF mode and repeat the process using SP6-02.

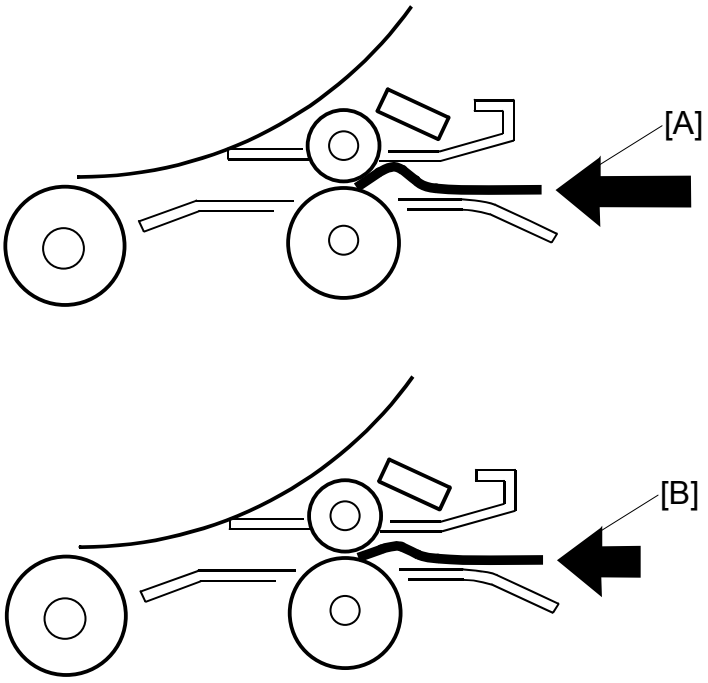
5.7.4 SP6-31: SBU CALIBRATION

Purpose: To adjust the SBU after the MPU or the white plate located behind the original scale is replaced.

1. Place a stack of 10 sheets of paper on the exposure glass.
2. Access SP6-31 and enter “1”, then press the Enter key to start the auto calibration.

5.7.5 SP6-20: REGISTRATION BUCKLE (NOT USED)

Purpose: To adjust the paper skew and the paper registration slippage.



[A]: **Increase the value**
The occurrence of paper skew will be reduced, but the paper is more likely to slip and the registration position may be incorrect.

[B]: **Decrease the value**
The paper registration position will be correct.

5.7.6 SP6-23: PAPER REGISTRATION – EACH SPEED

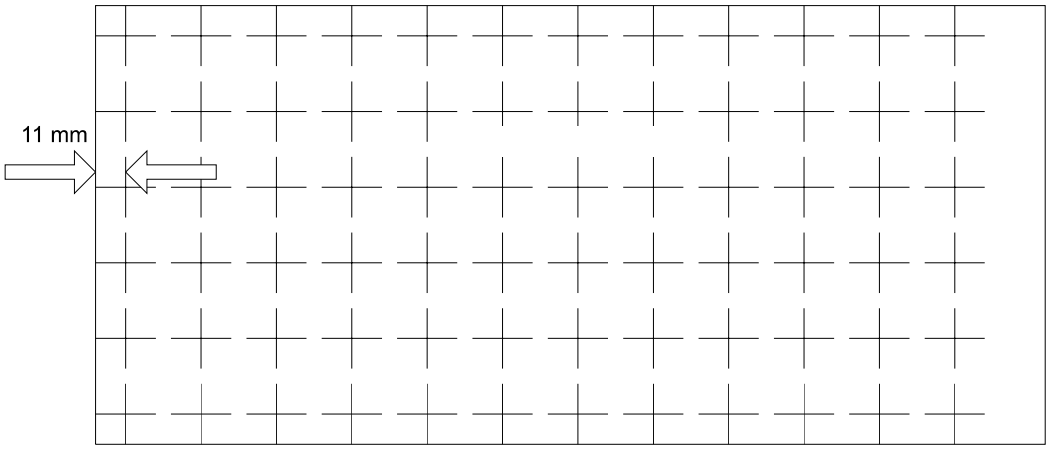
The following procedure allows the image position to be adjusted for each speed (15, 30, 60, 75, 90,105, and 120 rpm).

Note:

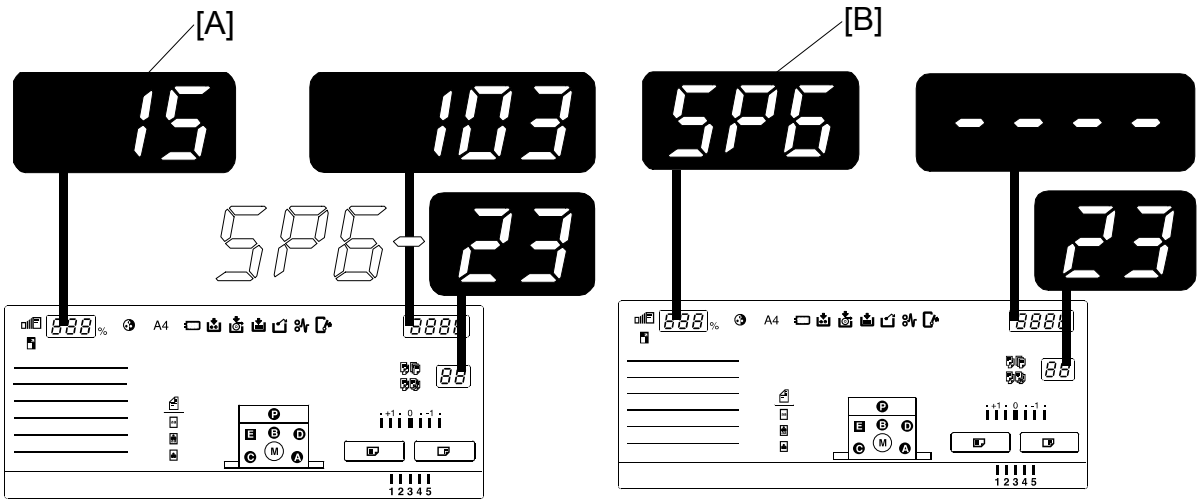
- If you want to adjust the image position for all speeds at the same time, use SP6-21 (Paper Registration position).
- The procedure below can also be used for SP6-24 to –26.

1. Set SP2-24 (Slow starting mode) to a value of “2” (print from 15 rpm).
2. Set SP8-10 (Test patterns) to a value of “6”, then press the Start key.
3. Make 6 copies at speed 5 (finishing with 120 rpm). Perform the adjustment below for all 6 copies:
   Trial print: 15 rpm
   1st print: 30 rpm
   2nd print: 60 rpm
   3rd print: 75 rpm
   4th print: 90 rpm
   5th print: 105 rpm
   6th print: 120 rpm

4. The distance between the leading edge and first line should be 11 mm, as shown below.



5. If this distance is not 11mm, access SP6-23. The zoom counter [A] displays the speed. If the I/O ROM is not C2385124-G or newer, the zoom counter [B] displays “SP6”, and cannot be adjusted.



6. Input a value to adjust the distance (range 0 to 255):

   The higher the value, the narrower the distance between the leading edge and 1st line becomes (and vice-versa). Also, each step corresponds to approximately 0.58mm. Input the value that will bring the distance to 11mm.

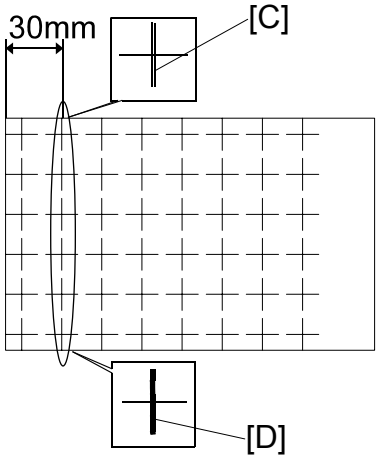
7. Press the Enter key twice, which will change the zoom counter [A] to the next printing speed. Then repeat Steps 4 thru 6 for each of the other five copy samples (i.e. 30, 60, 75, 90, 105, and 120rpm samples).

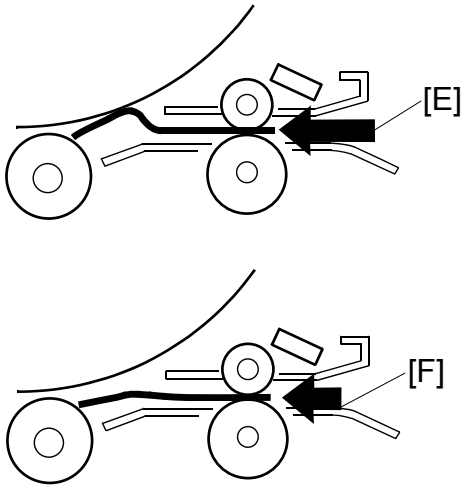
8. Perform the adjustment again for any of the samples that are still outside the 11mm standard.

9. Return SP2-24 (Slow starting mode) to the value it was at before the adjustment.

5.7.7 SP6-27: PRESS ROLLER BUCKLE

Purpose: To adjust doubled [C] or blurred [D] images (e.g. bold lines, text) for each printing speed (15, 30, 60, 75, 90,105, and 120 rpm), by changing SP settings.





1. Set SP2-24 (Slow starting mode) to a value of “2” (print from 15 rpm).
2. Set SP8-10 (Test patterns) to a value of “6”, then press the Start key.
3. Make 6 copies at speed 5 (finishing with 120 rpm). Perform the adjustment below for all 6 copies.
   Trial print: 15 rpm
   1st print: 30 rpm
   2nd print: 60 rpm
   3rd print: 75 rpm
   4th print: 90 rpm
   5th print: 105 rpm
   6th print: 120 rpm
4. Check the area from the leading edge to about 30mm down for any doubled or blurred images.
5. If any are present, access SP6-27. The zoom counter displays the printing speed. If the I/O ROM is not version C2385124-G or newer, the zoom counter displays “SP6”, and cannot be adjusted.
6. Input a value to adjust the blurred or doubled image (range: 0 to 100, step: 0.01).
   Higher values [E]: Blurred images improve; doubled images tend to be more noticeable.
   Lower values [F]: Doubled images improve; blurred images tend to be more noticeable.
7. Press the Enter key twice, which will change the zoom counter [A] to the next printing speed. Then repeat Steps 4 thru 6 for each of the other five copy samples (i.e. 30, 60, 75, 90, 105, and 120 rpm samples).
8. Perform the adjustment again where necessary.
9. Return SP2-24 (Slow starting mode) to the value it was at before adjusting.

SP6-23 through 6-27 Settings Summary

No.	Menu Items	Speed	Default	Settings
6-23	Paper registration – each speed	15 rpm	103	0 to 255
		30 rpm	107	
		60 rpm	93	
		75 rpm	82	
		90 rpm	70	
		105 rpm	59	
		120 rpm	45	
6-24	Paper registration – each speed (Skip feed)	15 rpm	103	0 to 255
		30 rpm	107	
		60 rpm	94	
		75 rpm	84	
		90 rpm	73	
		105 rpm	63	
		120 rpm	50	
6-25	Paper registration – each speed (A4 drum)	15 rpm	103	0 to 255
		30 rpm	107	
		60 rpm	96	
		75 rpm	85	
		90 rpm	75	
		105 rpm	62	
		120 rpm	46	
6-26	Paper registration – each speed (A4 drum: Skip)	15 rpm	103	0 to 255
		30 rpm	107	
		60 rpm	97	
		75 rpm	85	
		90 rpm	73	
		105 rpm	61	
		120 rpm	47	
6-27	Press roller buckle	15 rpm	1.00	0.00 to 1.00
		30 rpm	1.00	
		60 rpm	0.88	
		75 rpm	0.87	
		90 rpm	0.85	
		105 rpm	0.86	
		120 rpm	0.88	

Service Tables

⇒ 5.7.8 SP6-36 AND 37: MASTER LENGTH A3/A4

Purpose: To make sure smudges do not occur on the rear side of the copy paper.
Settings: -15 to 15 mm (Default: 0)

NOTE: - Lowering this setting decreases the length of the master.
- Lower settings will decrease smudges, but may cause an ink leak from the rear of the drum.

NOTE: SP6-36 and 37 require firmware version 1.34 or later.

5.8 MAIN MENU NO.7: MEMORY CLEAR

5.8.1 SP TABLE

No.	Menu Items	Default	Settings
7-1	Factory settings clear	No	No / Clr (☛ 5.8.3)
7-2	All settings clear	No	No / Clr
7-3	Total counter clear	No	No / Clr
7-4	Jam/Error data clear	No	No / Clr

5.8.2 SP7: HOW TO CLEAR

1. Using the number “1” key or the scroll keys, select “Clr”.
2. Press the Enter key.
3. When the clear is completed, the beeper will sound.

5.8.3 SP7-1: FACTORY SETTINGS CLEAR

This resets all SP settings except for the following SP numbers.

- SP2-20: Destination settings
- SP3-01: Present time
- SP6-All: Adjustments

5.9 MAIN MENU NO.8: SYSTEM TEST

5.9.1 SP TABLE

No.	Menu Items	Default	Settings
8-1	Download main firmware	No	No/Ld (☛ 5.9.2)
8-2	Upload main firmware	No	No/Ld (☛ 5.9.3)
8-10	Test patterns	6	1 to 9 (☛ 5.9.4)
8-20	Free run - scanner	Off	Off/On
8-21	Paper feed (15 rpm)	0	(☛ 5.9.5)
8-22	Free run - paper feed (15 rpm)	0	(☛ 5.9.6)
8-30	All indicators on the panel	-	Press # key

5.9.2 SP8-1: DOWNLOAD MAIN FIRMWARE

Purpose: This upgrades the main firmware using a flash memory card.

1. Before downloading new firmware, check the current version with SP1-70 (☛ 5.2.2).
2. Prepare a flash memory card with the latest firmware.
3. Turn off the main switch and disconnect the power cord.
4. Remove the rear card cover.
5. Plug the flash memory card into the connector on the MPU.
6. Connect the power cord, then turn on the main switch.
7. Access SP8-1. Using the “1” key, select “Ld”.
8. Press the Enter key. (It takes about 2.0 minutes to complete.)
9. Check that the “End” is displayed.
10. Turn off the main switch, and remove the flash memory card.

5.9.3 SP8-2: UPLOAD MAIN FIRMWARE

Purpose: This writes firmware to a flash memory card (P/N' #A2309352) from the machine.

1. Refer to steps 3 to 5 of section 5.9.2.
2. Connect the power cord, then turn on the main switch while holding the Clear modes key.
3. Access SP8-2. Using the "1" key, select "Ld".
4. Refer to steps 8 and 10 in section 5.9.2.

5.9.4 SP8-10: TEST PATTERNS

Purpose: To make prints without using the scanner.

Access SP8-10 and select the number "6", then press the Start key.

Other numbers are as shown below, but do not use them except the number "6".

1: Grid, 2: Vertical, 3: Horizontal gray, 4: Vertical gray, 5: 16 grays,
6: Cross, 7: Diagonal grid, 8: 256 grays, 9: 64 grays

5.9.5 SP8-21: PAPER FEED TEST (15 RPM)

Purpose: To feed paper at the lowest speed (15 rpm).

1. Set a stack of paper on the paper feed table.
2. Access SP8-21 and enter the number of sheets that you want to feed.
3. Press the Print key.
4. To exit this mode, press the Stop key.

5.9.6 SP8-22: FREE RUN PAPER FEED (15 RPM)

Purpose: To drive the paper feed mechanism at the lowest speed (15 rpm) without paper.

1. Access SP8-22 and enter the number of times that you want to repeat the paper feed cycle.
2. Press the Print key.
3. To exit this mode, press the Stop key.

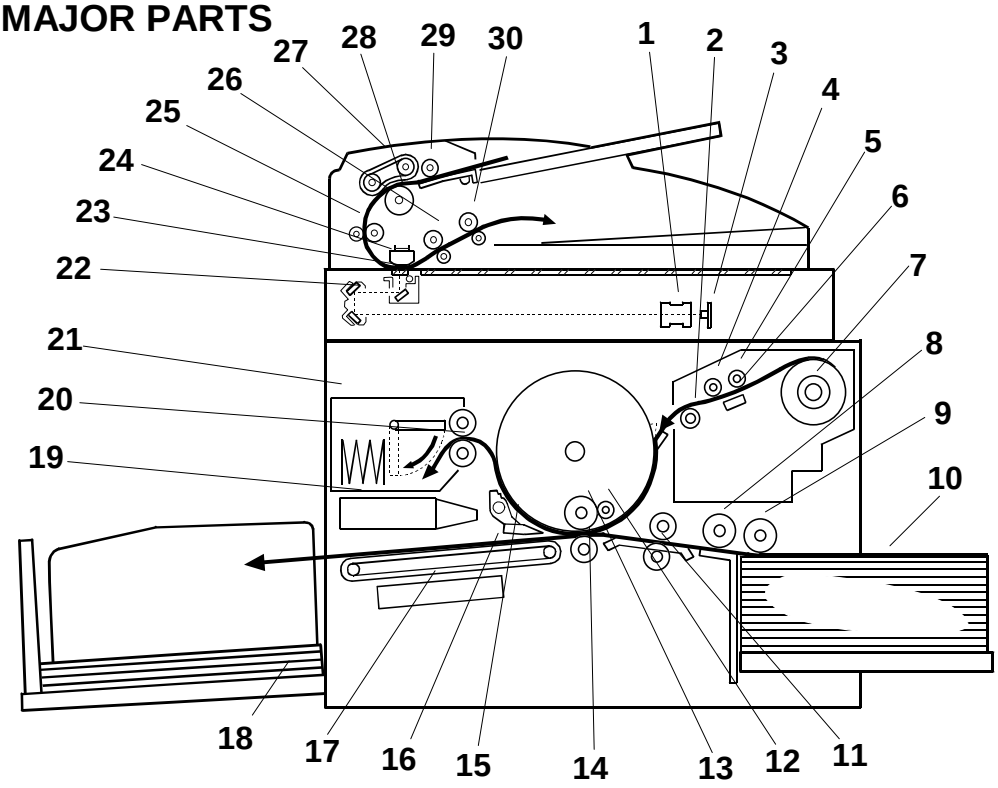
DETAILED SECTION DESCRIPTIONS

CÓPIA NÃO CONTROLADA

6. DETAILED SECTION DESCRIPTIONS

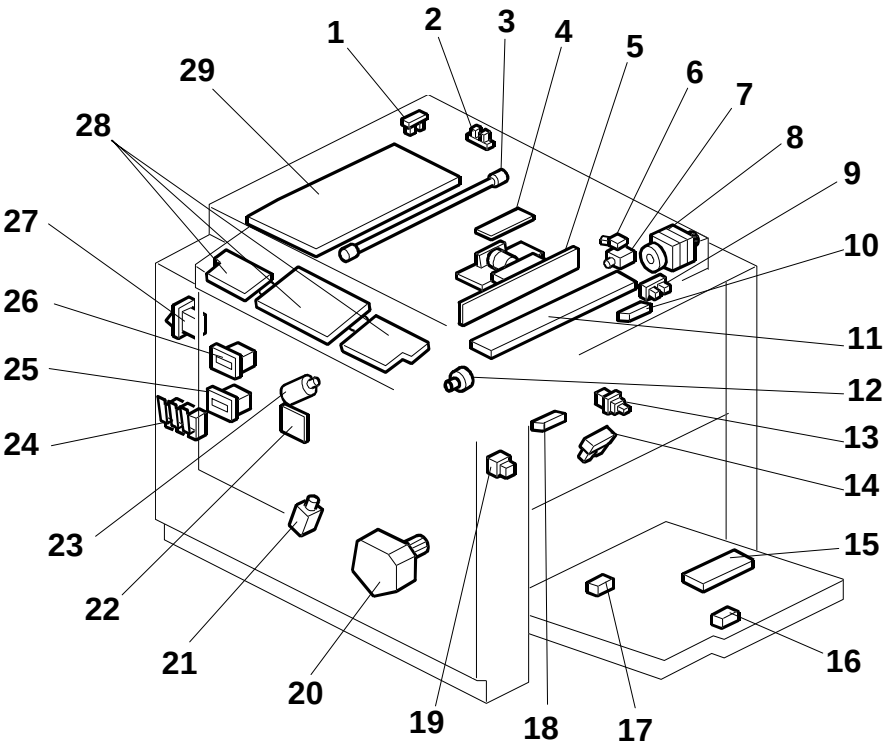
6.1 MECHANISM OVERVIEW

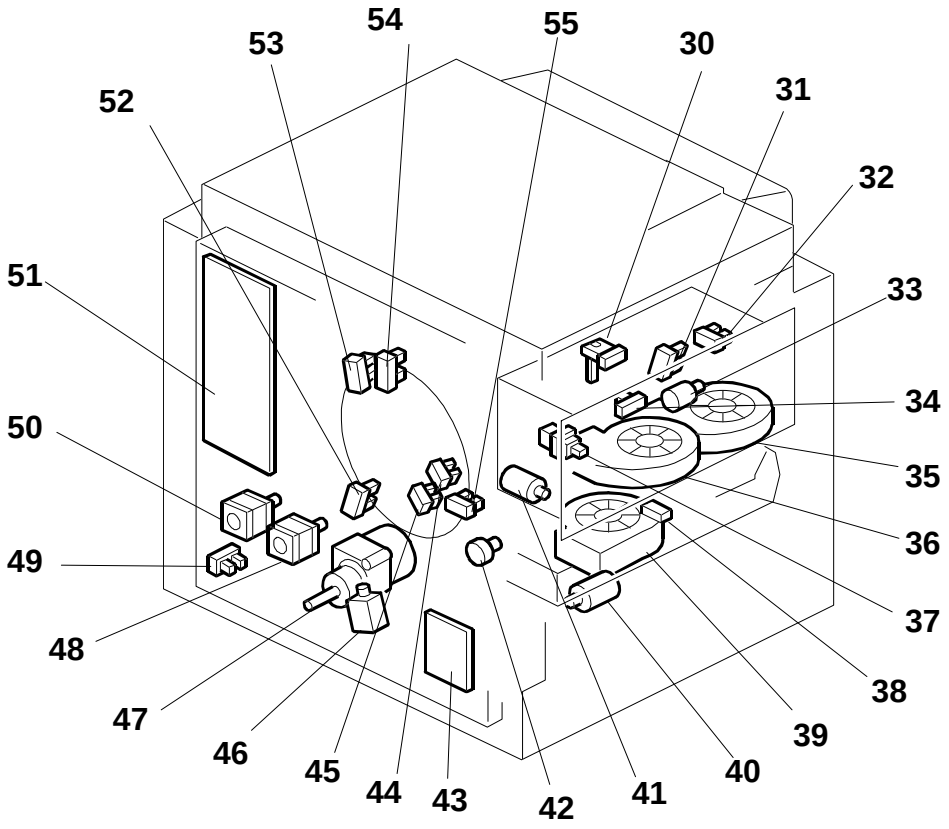
6.1.1 MAJOR PARTS



1. Lens
2. Tension roller
3. CCD and SBU
4. Master feed roller
5. Platen roller
6. Thermal head
7. Master roll
8. Paper feed roller
9. Paper pick-up roller
10. Paper table
11. Registration rollers
12. Doctor roller
13. Ink roller
14. Press roller
15. Exit pawl
16. Transport belts
17. Vacuum fan motor
18. Paper delivery table
19. Air knife fan motors
20. Master eject rollers
21. Master eject box
22. 2nd scanner
23. 1st scanner
24. DF exposure glass
25. 1st transport roller
26. 2nd transport roller
27. Original feed belt
28. Separation roller
29. Pick-up roller
30. Original exit roller

6.1.2 ELECTRICAL COMPONENT LAYOUT





Boards

No.	Component	Function
51	Main Processing Unit (MPU)	Controls all machine functions, both directly and through other boards.
4	Lamp Stabilizer	This supplies power to the exposure lamp.
29	Power Supply Unit (PSU)	Provides dc power to the machine.
28	Operation Panel Boards	These boards control the operation panel.
5	CCD and SBU	Outputs a video signal to the MPU.
43	Main Motor Board	Controls the main motor speed.
22	Ink Detection Board	Checks if there is ink in the drum.
15	Paper Width Detection Board	Sends data about the paper width on the paper table to the MPU.

Motors

No.	Component	Function
12	Master Feed Motor	Feeds the master to the drum.
7	Cutter Motor	Cuts the master.
48	Registration Motor	Feeds the paper to align it with the master on the drum.
50	Paper Feed Motor	Feeds the paper from the paper table.
8	Scanner Motor	Drives the scanner.
33	Master Eject Motor	Sends used masters into the master eject box.
35	Air Knife Fan Motor 1	Rotates the fan to provide air to separate the leading edge of the paper from the drum.
36	Air Knife Fan Motor 2	
41	Pressure Plate Motor	Raises and lowers the pressure plate.
39	Vacuum Fan Motor	Provides suction so that paper is held firmly on the transport belt.
40	Paper Delivery Motor	Feeds out the printed paper.
42	Clamper Motor	Opens or closes the master clamper on the drum.
47	Main Motor	Rotates the drum.
20	Table Motor	Raises and lowers the paper table.
23	Ink Pump Motor	Drives the ink pump.

Switches

No.	Component	Function
19	Table Lowering Switch	Lowers the paper table.
24	Door Safety Switch	Checks whether the front door is properly closed.
27	Main Switch	Turns the power on or off.
13	Master Making Unit Set Switch	Checks if the master making unit is installed.
37	Eject Box Set Switch	Checks if the master eject box is installed.

Sensors

No.	Component	Function
53	Master Eject Position (Drum HP) Sensor	Detects when the drum is at the master eject position.
54	Paper Exit Timing Sensor	Determines the paper exit misfeed check timing.
52	Feed Start Timing Sensor	Determines the paper feed start timing.
30	Master Eject Sensor	Detects used master misfeeds.
32	Pressure Plate Limit Sensor	Detects when the pressure plate is in the lowest position.
31	Pressure Plate HP Sensor	Detects when the pressure plate is at the home position.
34	Drum Master Sensor	Detects if there is a master on the drum.
38	Paper Exit Sensor	Detects paper misfeeds at the exit.
55	2nd Feed Timing Sensor	Determines the paper misfeed check timing at the paper registration area.
44	Clamper Open Sensor	Detects if the clamper is in the open position.
45	Clamper Closed Sensor	Detects if the clamper is in the closed position.
49	Table Lower Sensor	Detects when the paper table is at its lower limit position.
2	Platen Cover Sensor	Detects whether the platen cover is open or closed.
1	Scanner HP Sensor	Detects when the image sensor is at home position.
9	Master Set Cover Sensor	Checks if the master set cover is properly set.
10	Master End Sensor	Detects when the master making unit runs out of master roll.
14	Paper Height Sensor	Detects when the paper table reaches the paper feed position.
18	Registration Sensor	Detects paper approaching the registration roller.
17	Paper End Sensor	Detects when the paper table runs out of paper.
6	Cutter HP Sensor	Detects when the cutter is at the home position.
16	Paper Length Sensor	Detects when long paper is on the paper table.

Solenoids

No.	Component	Function
46	Rear Pressure Release Solenoid	Releases the press roller to apply printing pressure.
21	Front Pressure Release Solenoid	Releases the press roller to apply printing pressure.

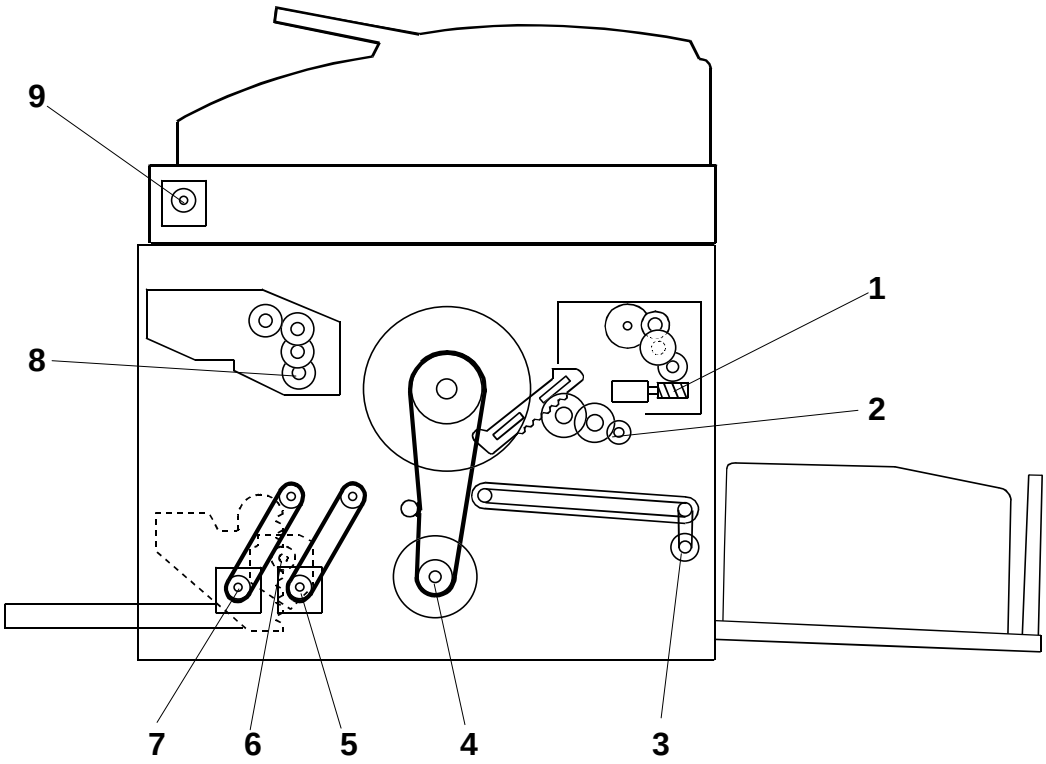
Counters

No.	Component	Function
25	Paper Counter	Keeps track of the total number of copies.
26	Master Counter	Keeps track of the total number of masters made.

Others

No.	Component	Function
11	Thermal Head	Burns the image onto the master.
3	Exposure Lamp (Xenon Lamp)	Applies light to the original for exposure.

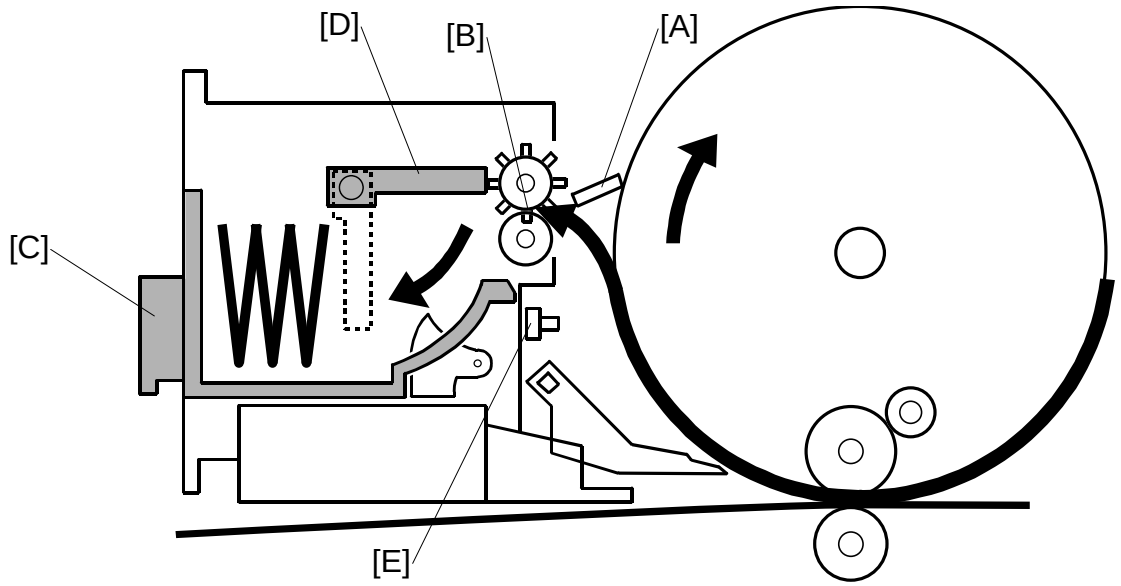
6.1.3 DRIVE LAYOUT



1. Pressure plate motor
2. Clamper motor
3. Paper delivery motor
4. Main motor
5. Registration motor
6. Table motor
7. Paper feed motor
8. Master feed motor
9. Scanner motor

6.2 MASTER EJECT UNIT

6.2.1 OVERVIEW



Overview

The master eject unit removes the used master from the drum. (☛ CT: Digital Duplicators – Duplicating Process – Master Ejecting)

Procedure

The drum turns to the master eject position. Then the clamper [A] opens.

↓

Master eject rollers [B] pick-up the master's leading edge and feed the master for 1.0 s into the master eject box [C].

↓

The clamper then closes.

↓

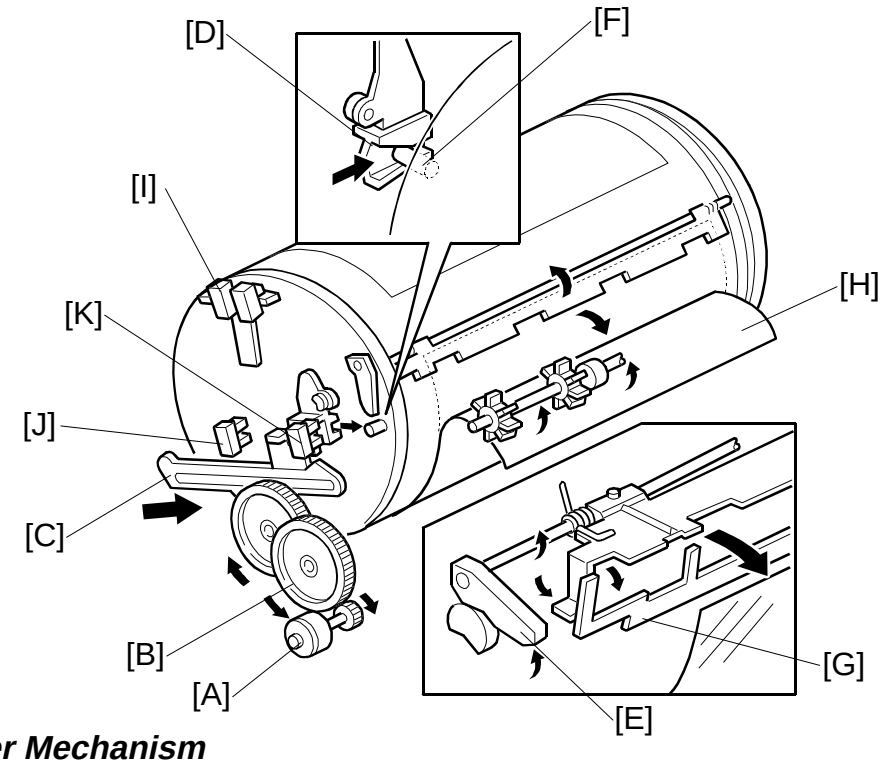
The drum then turns at 30 rpm while the master eject rollers continue to feed the used master into the eject box.

↓

The drum stops after making about 1.5 turns. The master eject motor also stops. The pressure plate [D] then compresses the used masters in the eject box.

- The capacity is 50 used masters (under normal conditions)
- The master eject process is skipped when the drum master sensor [E] detects no master on the drum.

6.2.2 MASTER CLAMPER OPENING MECHANISM



Clamper Mechanism

Clamper motor [A] - opens the clamper at the master eject position

↓

Gears [B]

↓

Link [C]

↓

Drum guide [D] - moves and engages the pin on the rear flange of the drum

↓

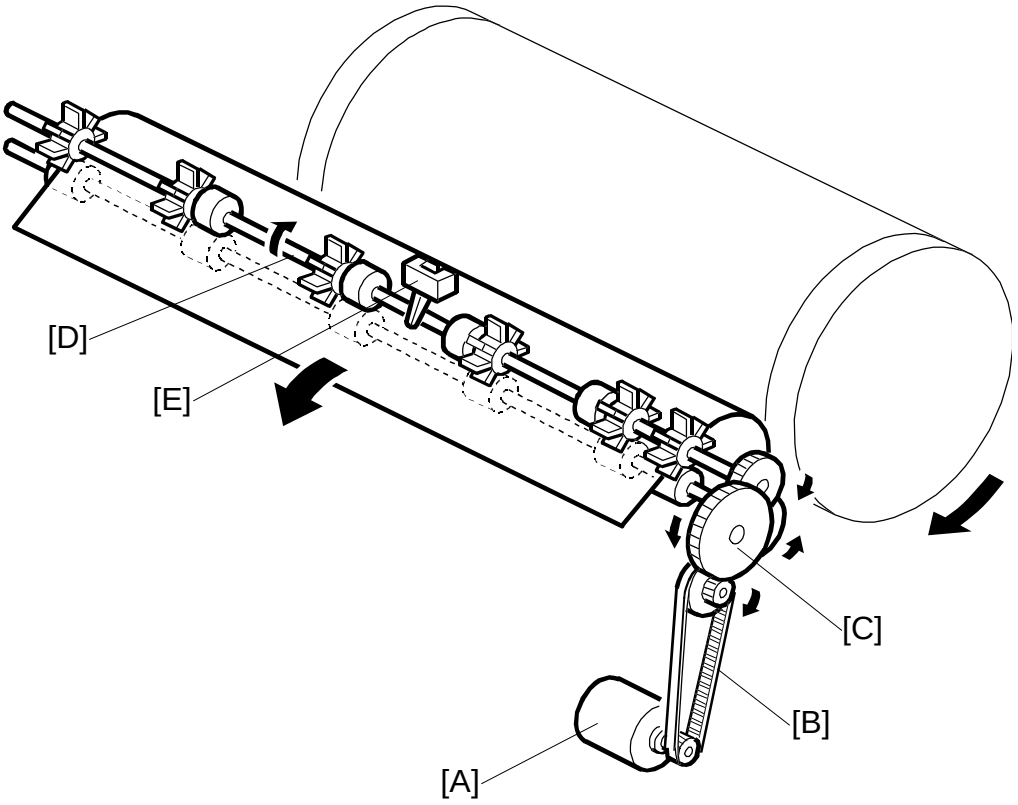
Lifts the clamper lever [E], and engages the drum pin [F]

↓

The lever [E] lifts the master eject arm [G] to release the master's leading edge [H] from the clamper.

NOTE: 1) After the Start key is pressed and before the clamper motor starts, the master eject position sensor [I] is checked (the drum must be at the master eject pos.).
2) The sensor actuators on the link [C], the clamper open sensor [J], and the clamper close sensor [K] determine the clamper open and close positions.
3) The master clamper uses a magnetic plate to clamp the master's leading edge.
4) The drum guide catches the drum at the master eject position while the master clamper is being opened. When the clamper motor turns on in reverse to close the clamper, the drum guide also disengages the pin and the drum can turn.

6.2.3 MASTER EJECT ROLLER MECHANISM



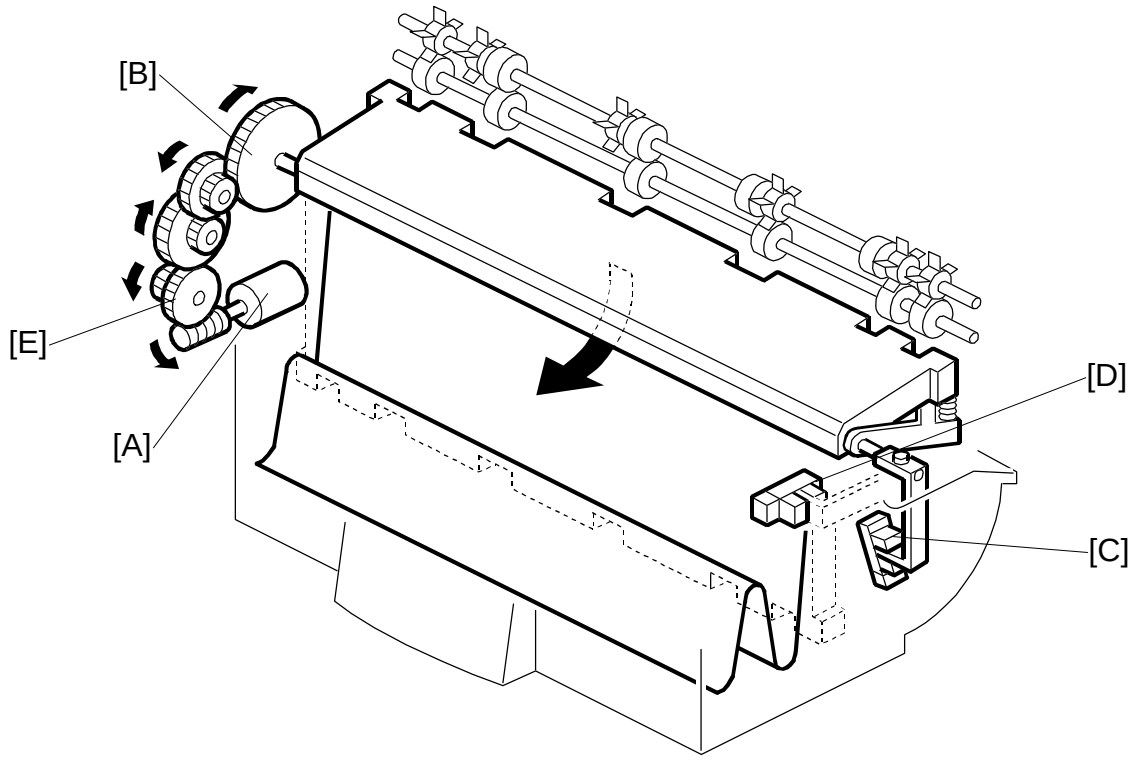
Mechanism

Master eject motor [A]
↓
Belt [B]
↓
Gears [C]
↓
Master eject rollers [D] – the upper roller has paddles
↓
Pick up the master and feed it into the master eject box

Procedure

1. When the clamper is open and the master's leading edge is released from the clamper, the master eject motor turns on for 1.0 s to pick up the leading edge.
2. Then, the clamper motor reverses to close the clamper
3. The drum then starts turning at the slower speed (30 rpm). At the same time, the master eject rollers turn again to feed the master into the master eject box.
4. When the drum reaches the master feed position, the master eject and drum motors stop. The master feed position is 121 encoder pulses (43 degrees) after the feed start timing sensor is actuated.
5. During this process, the master eject sensor [E] detects master eject jams. (☛ 6.10.1)

6.2.4 PRESSURE PLATE MECHANISM



Mechanism

Pressure plate motor [A]

↓

Gears [B]

↓

Pressure plate rotates

↓

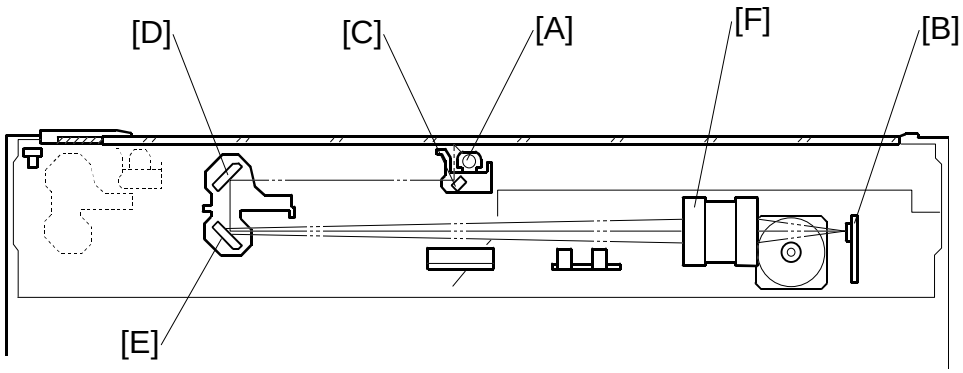
Compresses the masters

Procedure

1. After the master has been ejected and the drum is stopped at the master feed position, the pressure plate motor turns until the actuator on the pressure plate actuates the limit sensor [D].
2. After master making and cutting, the motor reverses until the pressure plate home position sensor [C] is actuated, then it stops.
3. If the pressure plate limit sensor is not actuated within 4.5 seconds after the pressure plate motor rotates, the Full Master Eject Box indicator lights.
4. The idle gear has a clutch [E] to prevent motor overload.

6.3 SCANNER UNIT

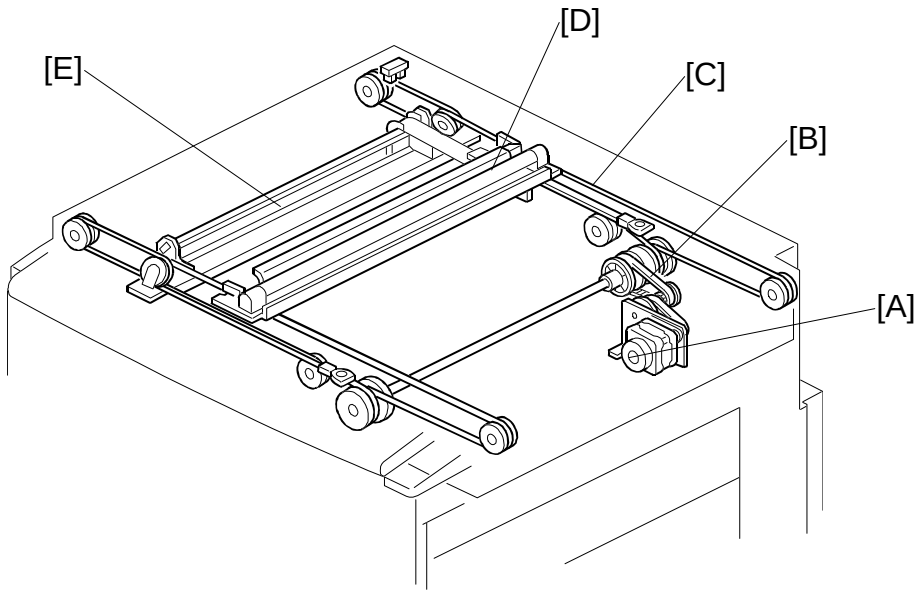
6.3.1 OVERVIEW



[A]: Exposure lamp
[B]: Charge coupled device (CCD)
[C]: First mirror
[D]: Second mirror
[E]: Third mirror
[F]: Lens

- The exposure lamp is a xenon lamp (DC 24V).
- Light reflected off the original is directed onto a CCD via the mirrors and the lens.
- The main-scan resolution is 600 dpi, because the CCD is 600 dpi. This model always reduces the amount of scanned data to 300 dpi. (☛ 6.4.5)
- The sub-scan resolution is 300 dpi.

6.3.2 SCANNER DRIVE



A: Scanner motor

↓

B: Timing belt

↓

C: Scanner wire

↓

D: First scanner, E: Second scanner

Full size mode

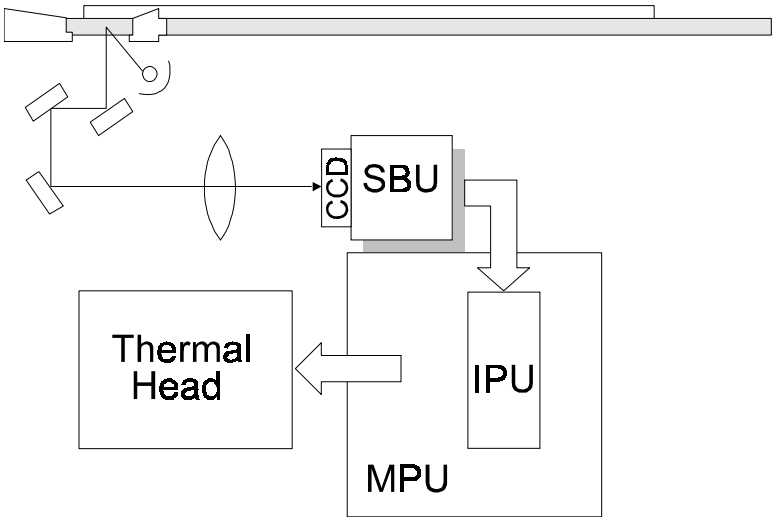
- During scanning, the first scanner speed is 20.32 mm/s.
- The second scanner's speed is half the first scanner's speed.
- Speed increases when the scanner returns.

Reduction/enlargement modes

- First scanner speed equals the drum rotation speed divided by the magnification ratio (0.5 to 2.0).
- Varying the scanner speed changes the sub-scan image size.
  Image processing on the MPU changes the main scan image size.
- The return speed is the same as in full size mode.

6.4 IMAGE PROCESSING

6.4.1 OVERVIEW

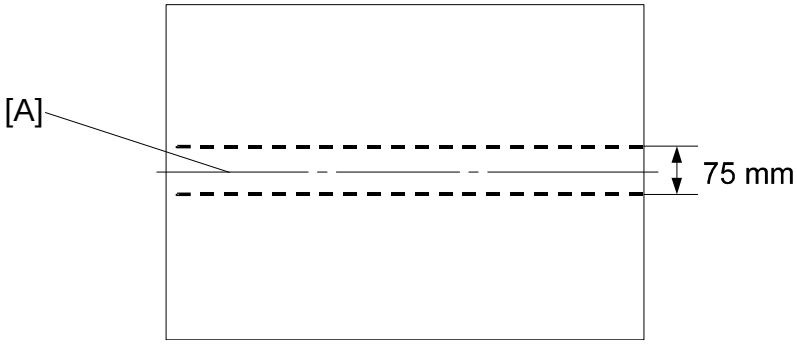


- The CCD line has 7,450 pixels and the resolution is 600 dpi (23.6 lines/mm).
- The A/D converter in the SBU transforms the analog signals into 8-bit digital signals.

The MPU carries out the following processes on the image data:

Auto shading
↓
Filtering (MTF)
↓
Magnification
↓
Binary processing

6.4.2 AUTO BACKGROUND CORRECTION



- Auto background correction prevents the background of an original from appearing on copies.
- The density of the area [A] (the central 75 mm of the main scan) is the peak white level density.
- This correction can be used in Photo/Letter, Photo, and Tint modes.

6.4.3 AUTO SHADING

- Auto shading corrects errors in the signal level for each pixel using the white plate.

6.4.4 MTF FILTER

- The MTF filter enhances the desired image qualities.
- The MTF filter is used in all modes (Letter, Letter/Photo, Photo, and Tint).
- This model has no SP mode adjustments.

6.4.5 MAIN SCAN ENLARGEMENT/REDUCTION

- Changing the scanner speed enables reduction and enlargement in the sub-scan direction.
- The processing for main-scan enlargement/reduction is the same as in the previous digital machines
- The thermal head is 300 dpi, but the CCD is 600 dpi. Therefore, this model always reduces the amount of scanned data by half before printing.

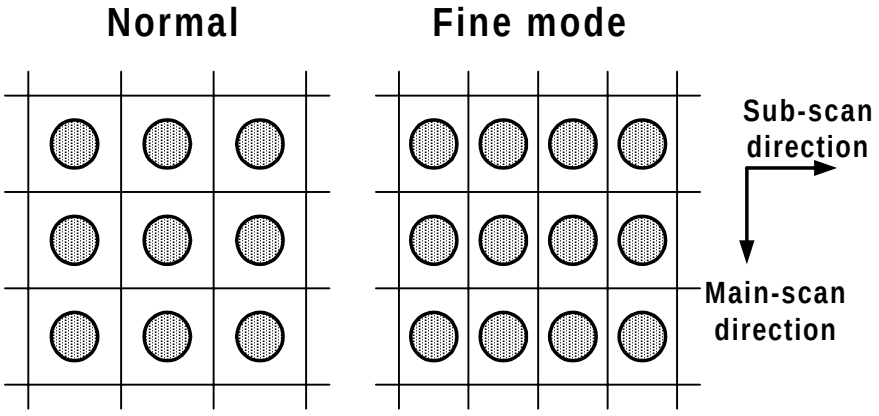
6.4.6 BINARY PROCESSING

This process converts the video signal from 8-bit to 1-bit (black and white) in accordance with a threshold value.

The threshold value depends on a compensation curve (gamma curve) which corresponds to selected image processing settings. For example, if a darker image is selected, a compensation curve that converts each pixel value to a higher number is selected. This ensures accurate generation of the 256 gray scales from black to white.

6.4.7 FINE MODE

Purpose: Use this function to make clear prints.



This machine's specification is 300 dpi.

With this function, the scanner scans at 400 dpi in the sub-scan direction by reducing the scanner motor speed, then the master making unit writes at 400 dpi in the master feed direction by reducing the master feed motor speed. Therefore, the resolution in the paper feed direction is 400 dpi.

6.4.8 THERMAL HEAD

Specifications

Length: 292.032 mm

Number of thermal head elements: 3456 dots

Density of thermal head elements: 300 dpi

Thermal head control

The thermal head contains heating elements at a density of 300 dpi. The thermal heating elements melt the over-coating and polyester film layers of the master, in accordance with the image signal for each pixel.

The PSU applies power (VHD) to the thermal heating elements. The power source varies from one head to another because the average resistance of each element varies. Therefore, when replacing the thermal head or power supply unit, it is necessary to readjust the applied voltage to the specific value for the thermal head.

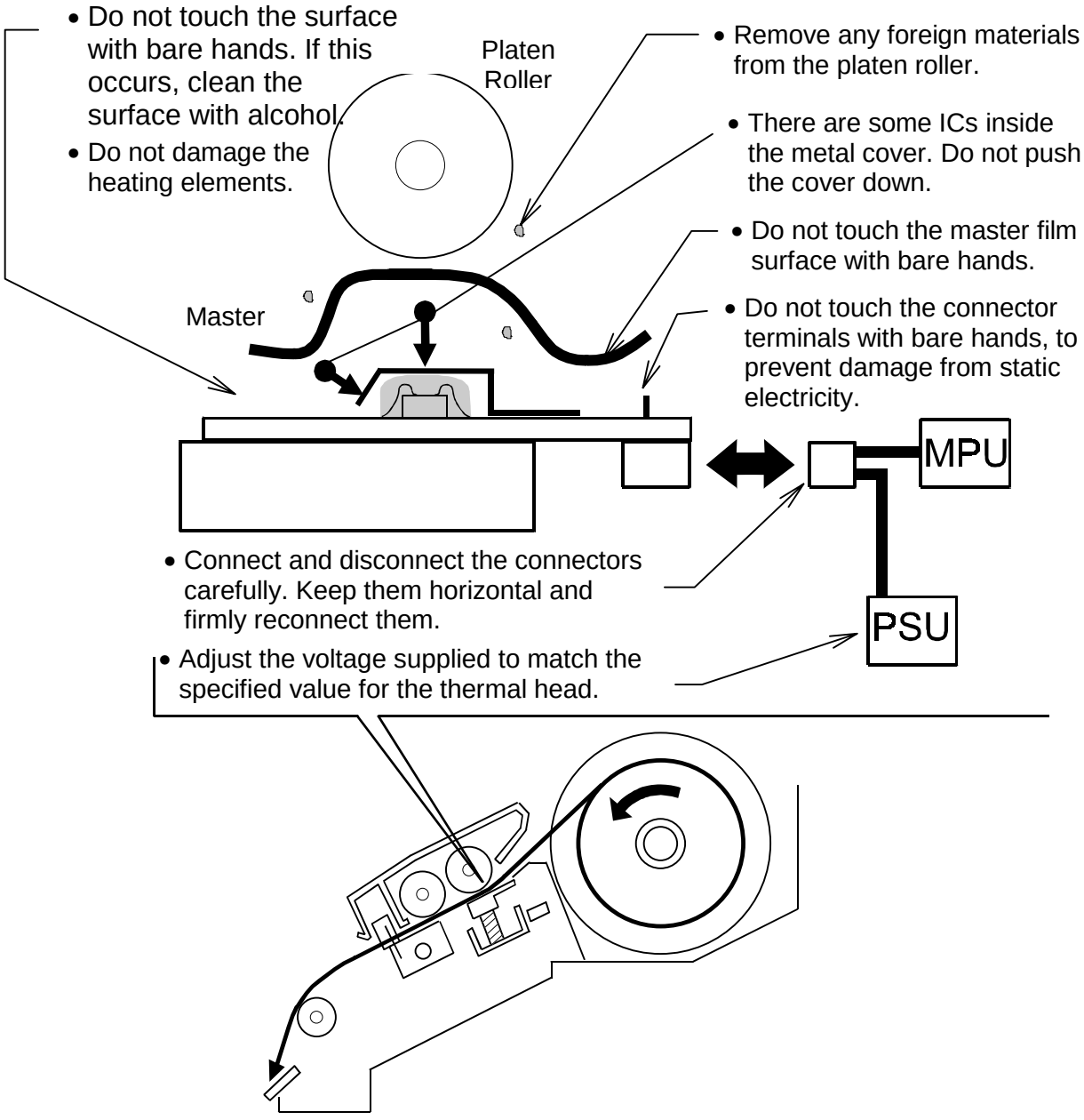
Thermal head protection

The thermistor on the thermal head provides thermal head protection, preventing the thermal head from overheating when processing a solid image. The CPU checks for any abnormal condition when the Start key is pressed; it displays an error code on the operation panel as follows:

No.	Symptom	Possible cause
E-04	Thermal Head Overheat The temperature of the thermal head is greater than 54°C when the Start key is pressed.	Overheat (wait for the thermal head to cool down) Thermal head
E-09	Thermal Head Thermistor Open The thermistor output voltage is over 4.9 volts.	Thermal head thermistor Thermal head connector

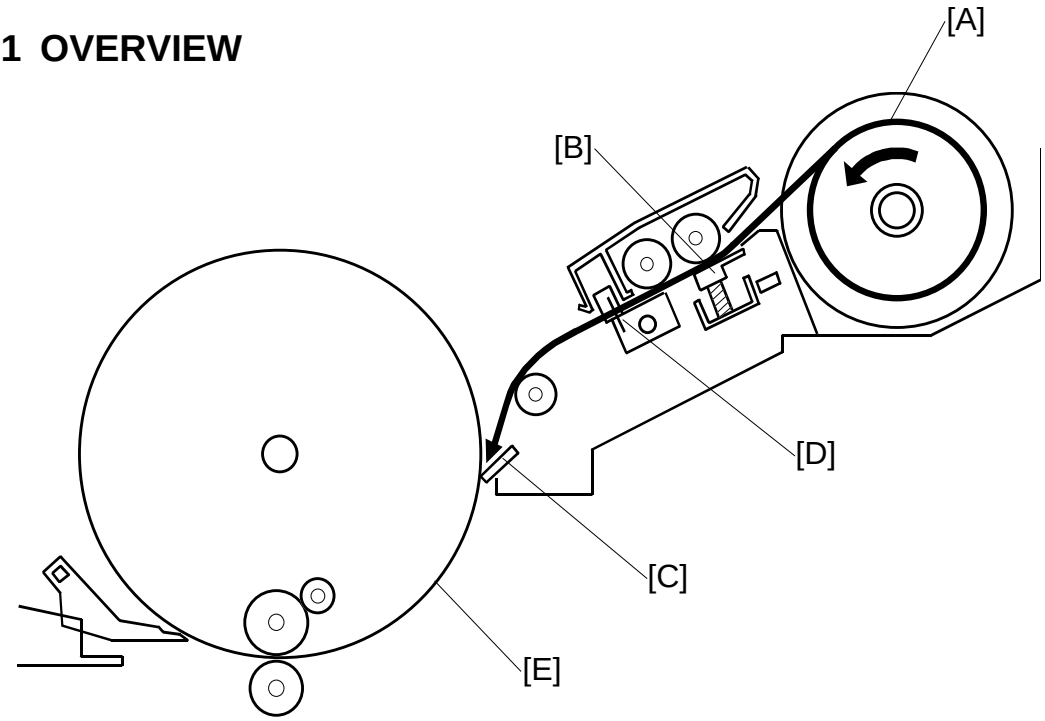
Remarks for Handling the Thermal Head

Pay careful attention to the following remarks when servicing:



6.5 MASTER FEED

6.5.1 OVERVIEW



The master feed unit makes an image on the master and feeds the master to the drum. (☛CT: Digital Duplicators – Duplicating Process – Master Feeding)

Procedure

The machine feeds the master from the master roll [A].

↓

The thermal head [B] makes an image on the master.

↓

Clamper [C] opens. (The drum is at the master feed position.)

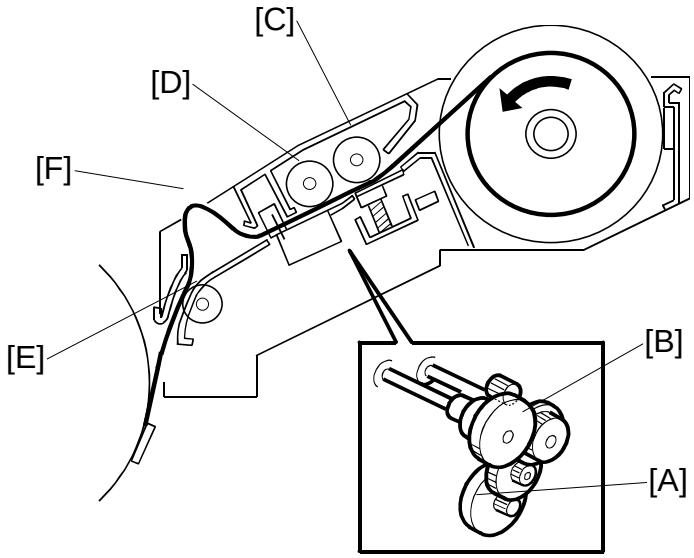
↓

The clamper clamps the master. At this time, the cutter [D] cuts the master.

↓

The master is wrapped around the drum [E].

6.5.2 MASTER FEED MECHANISM



Mechanism

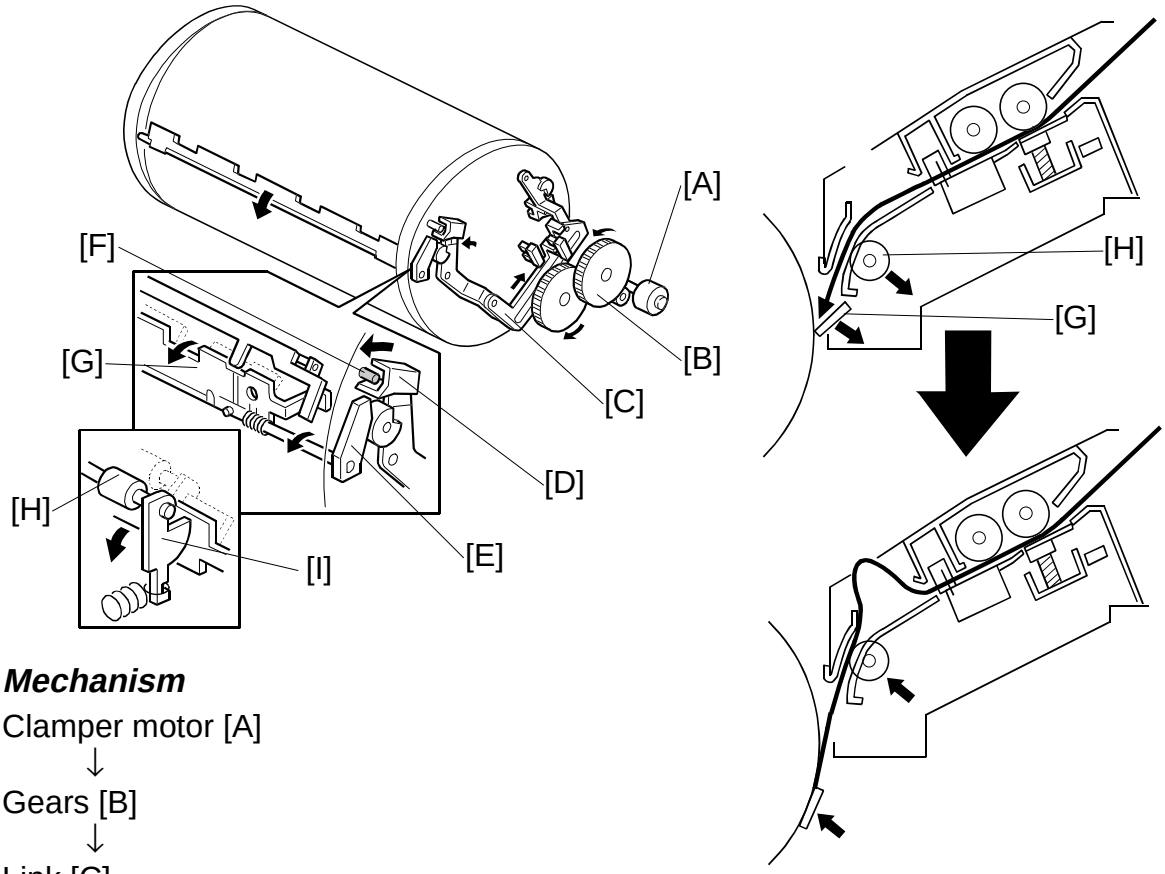
Master feed motor [A] (stepper motor)
↓
Gears [B]
↓
Platen roller [C], master feed roller [D]
↓
Feeds the master (The thermal head makes an image on the master.)

Procedure

1. After the old master has been ejected, the drum stops at the master feed position and the master clamper opens, ready to clamp the new master.
2. When the clamper is open, the tension roller releases and the master is fed to the clamper on the drum. For details of the tension roller, see the next section.
3. After the clamper closes, the master feed motor feeds the master while the drum rotates intermittently at 30 rpm. The intermittent rotation keeps a buckle [F] in the master above the master feed guide to absorb shocks from the wrapping operation.
4. The tension roller [E] keeps the master under tension. Without this roller, the master would crease when the drum turns continuously during wrapping around the drum, so it reduces the master making time.
5. The main motor turns off when the drum is at the master eject position. The master feed motor continues to feed the master until master making completed. Then the master feed motor turns off, and cutting is done.

NOTE: Springs press the thermal head against the platen roller. The pressure is applied when the master set cover, which includes the platen roller, is closed.

6.5.3 CLAMPER AND TENSION ROLLER MECHANISM



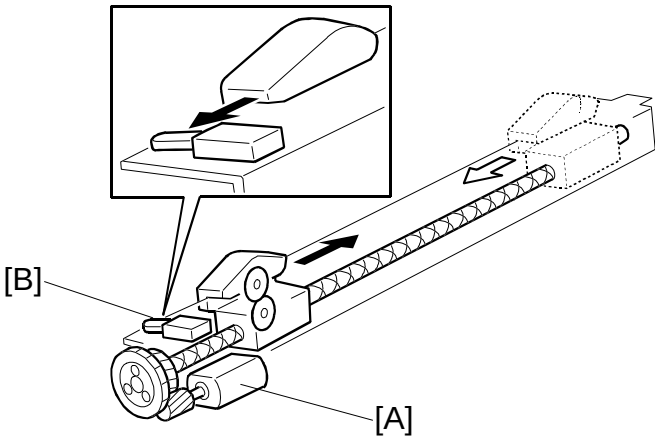
Mechanism

Clamper motor [A]
↓
Gears [B]
↓
Link [C]
↓
Drum guide [D]
↓
Lifts the lever [E], engages and locks the drum pin [F], and opens the clamper plate [G].
↓
Releases the tension roller [H].
↓
Feeds the master into the clamper.

Procedure

- When the old master has been ejected, the drum is stopped at the master feed position. The master clamper clamps the leading edge of the new master before the drum starts to turn again.
- The tension roller [H] normally presses against the master feed guide plate to apply tension to the master during master wrapping. When the clamper opens, it pushes the tension roller arms [I] and moves the tension roller away from the guide plate to allow the master to be fed into the master clamper.
- Clamper mechanism: See the Master Eject section

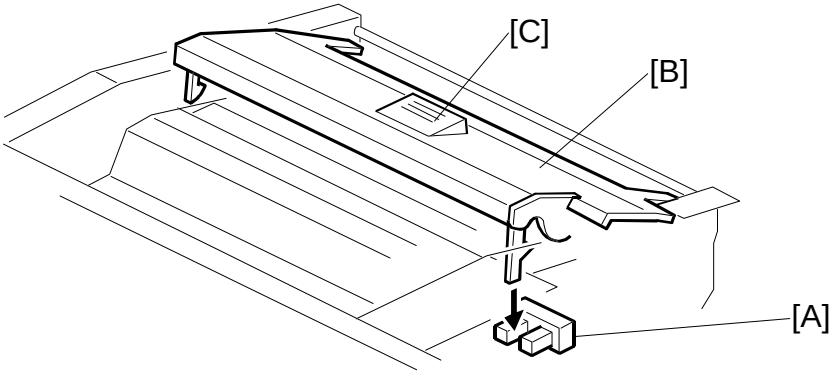
6.5.4 CUTTER MECHANISM



[A]: Cutter motor
[B]: Cutter HP sensor

- When the cutter starts, the drum is stopped at the master eject position (drum HP).
- The cutter moves backwards and forwards. While the cutter travels towards the rear (non-operation side), it cuts the master. The motor turns in one direction. The cutter returns to the home position when it reaches the rear because of the two different spiral threads on the screw shaft.
- The cutter usually cuts a master of about 550 mm in length. The cutter cuts a master of about 340 mm in length when an optional A4 black drum is used.
- After cutting, the drum starts turning again to wrap the remaining part of the master around the drum. The leading edge of the master that was cut remains at the cutting position, ready to make the next master.

6.5.5 MASTER SET COVER SENSOR

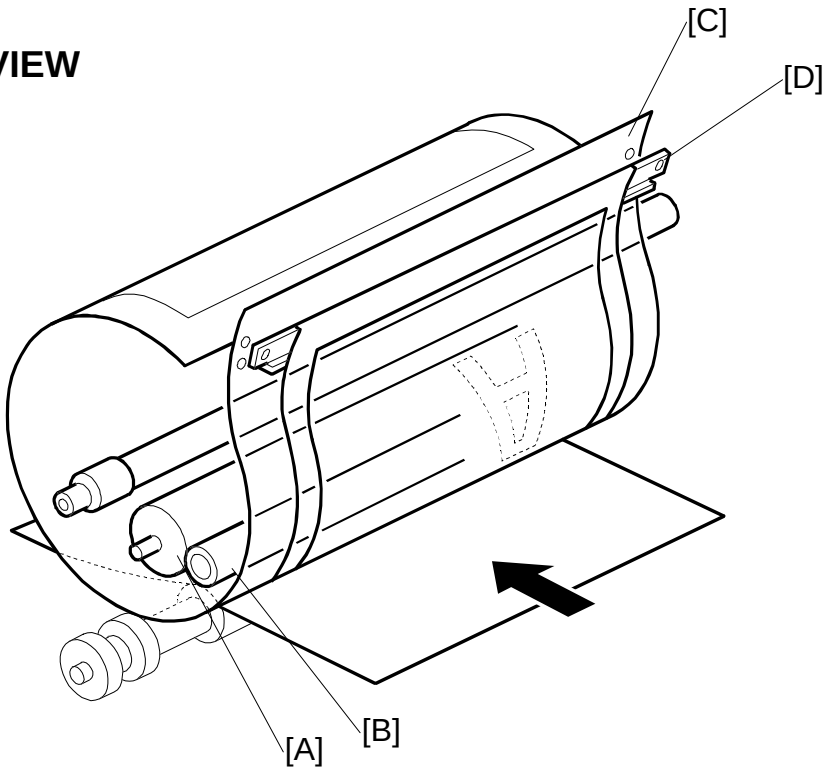


[A]: Master set cover sensor
[B]: Master set cover

- If the cover is closed properly, the release button [C] rises.

6.6 DRUM

6.6.1 OVERVIEW



Procedure

Ink is supplied inside the drum, through the drum shaft.

↓

The ink roller [A] and the doctor roller [B] spread the ink evenly on the screens.

↓

Ink passes through the metal screen [C].

↓

Ink passes through the cloth screen [D].

↓

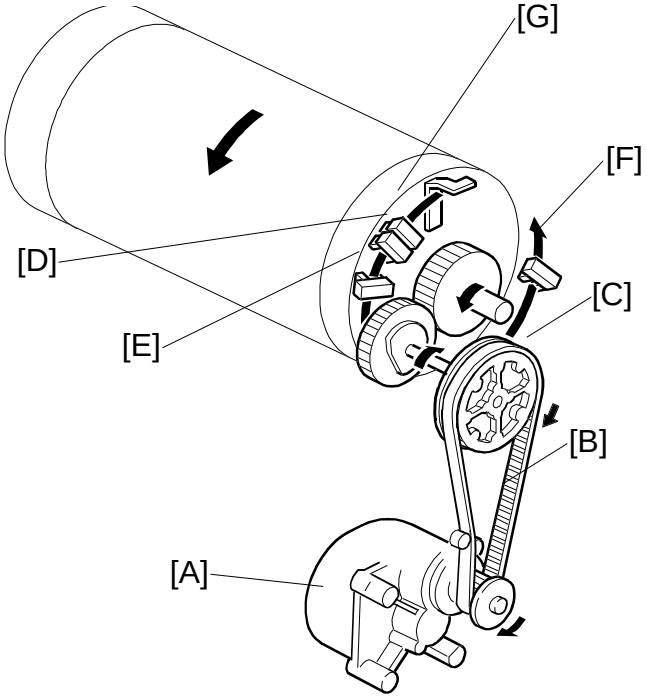
Ink passes through the holes in the master that were made by the thermal head.

↓

Ink reaches the paper.

NOTE: 1) The drum is driven by the main motor and turns only clockwise.
2) The main motor speed and the drum stop positions are controlled by monitoring the motor encoder.
3) The ink pump, which is outside the drum, supplies ink from the ink cartridge into the drum through the drum shaft.

6.6.2 DRUM DRIVE MECHANISM



Mechanism

Main motor [A] (dc motor)

↓

Belt [B]

↓

Gears [C]

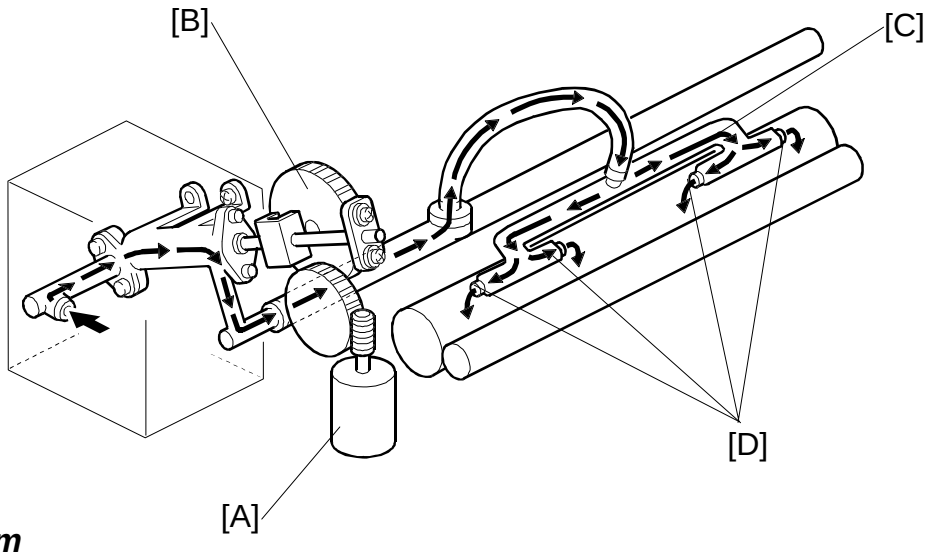
↓

The drum rotates.

NOTE: 1) The main motor encoder sends pulses to the main motor control board (1020 pulses = 360 degrees).
2) The CPU on the board monitors the pulses and controls the drum speed and stop positions.
3) The drum has four sensors.
- Master eject position sensor [D] (master eject position and HP)
- Feed start sensor [E] (feed start timing)
- Second feed timing sensor [F] (jam detection)
- Paper exit timing sensor [G] (jam detection)

4) The drum has two stop positions:
- Master eject (home) position
- Master feed position (feed start timing sensor + 121 pulses (43 degrees))

6.6.3 INK SUPPLY MECHANISM



Mechanism

Ink pump motor [A]

↓

Gears [B]

↓

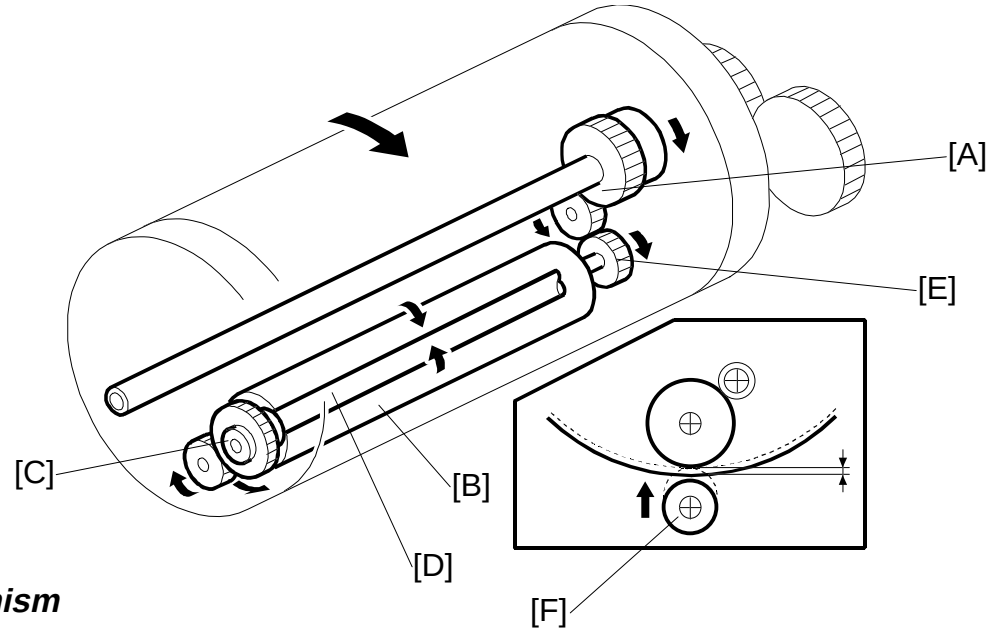
Gear rotation converted into piston motion.

↓

Supplies ink from the ink cartridge to the ink roller via the pump, the shaft, the tube, and the ink distributor pipes [C]. Ink drops through 4 openings [D] in the ink distributor onto the ink roller.

NOTE: The ink pump is outside the drum in this model.

6.6.4 INK ROLLER MECHANISM



Mechanism

Main motor

↓

Gears [A]

↓

Ink roller [B] rotates

↓

Gears [C]

↓

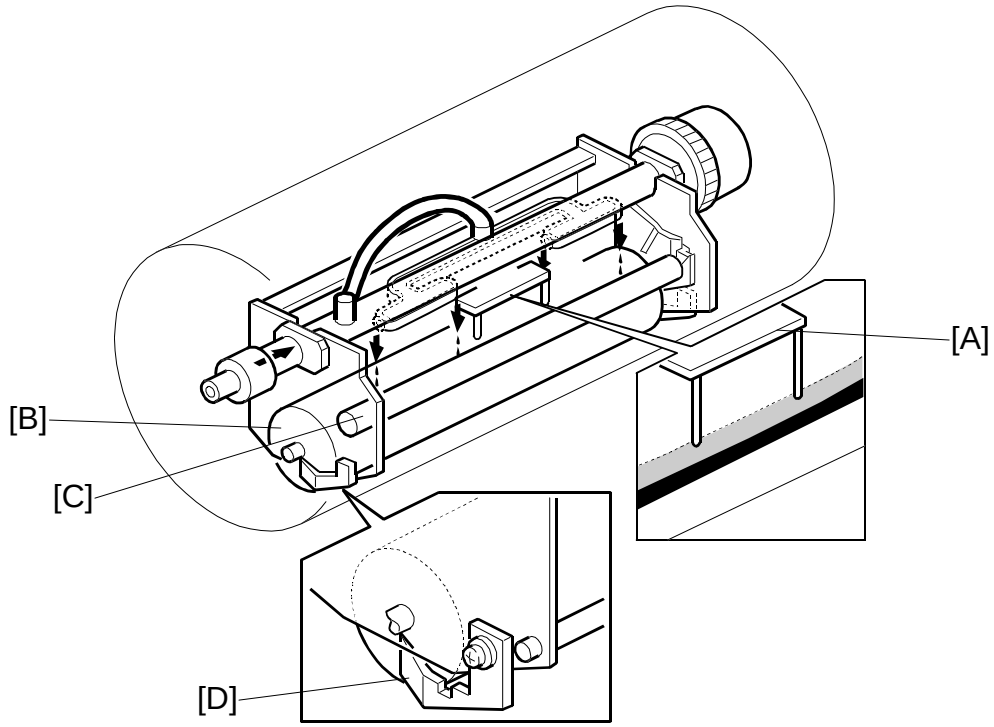
Doctor roller [D] rotates

↓

The doctor roller squeezes the ink on the ink roller to produce an even thickness of ink on the ink roller.

NOTE: 1) The ink roller drive gear [E] has a one-way clutch to prevent the ink roller from being turned in reverse if the drum is manually turned in reverse.
2) The ink roller does not touch the metal screen when the machine is not printing.
3) During printing, the ink on the ink roller is applied to the paper through the holes in the screens and the master. This happens when the press roller [F] under the drum moves up to press the drum screen and the master against the ink roller. (☛CT: Digital Duplicators – Ink Supply Control)

6.6.5 INK SUPPLY CONTROL



Mechanism

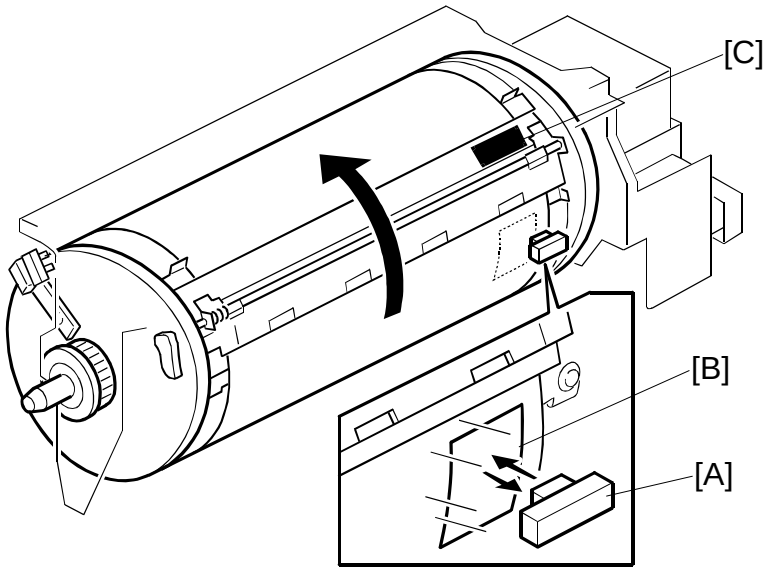
When the ink level is low, the pins [A] do not touch the ink.

↓

The ink pump motor (☛6.6.3) keeps the ink level normal by supplying ink when the level is low.

NOTE: 1) The ink detection pins [A] detect the capacitance between the ink roller [B] and doctor roller [C].
2) If the pins detect an insufficient amount of ink after activating the ink pump motor for 30 seconds, a "no ink condition" is detected. The add ink indicator on the operation panel will light.
3) There is an ink supply mode, which is useful when installing a new drum. When the “Economy Mode” key is pressed while holding down the “0” key, the drum turns for 60 seconds to supply ink inside the drum.
4) The ink roller blades [D] on both ends of the ink roller scrape off the built-up ink on the ends of the ink roller.

6.6.6 DETECTION OF MASTERS ON THE DRUM

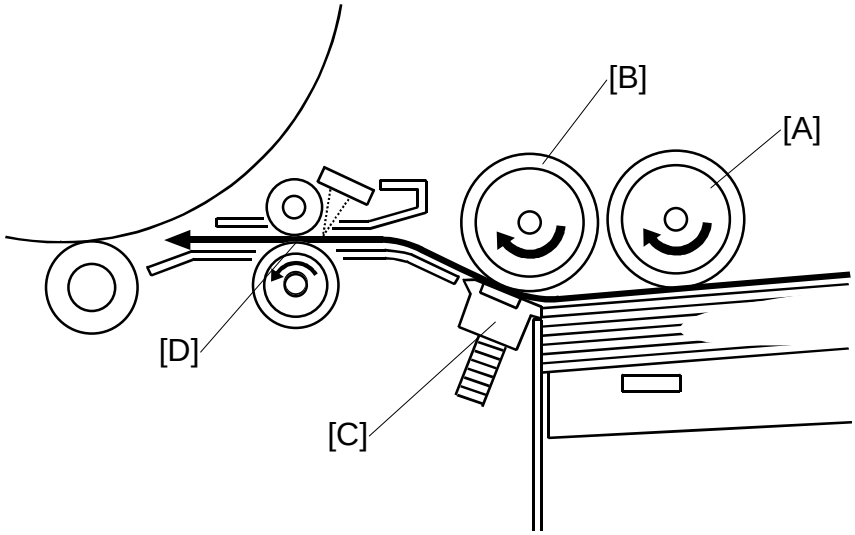


[A]: Drum master sensor
[B]: Black patch on the screen
[C]: Black patch on the clamper

- The drum master sensor [A] detects whether there is a master on the drum.
- When there is a master on the drum, the black patch [B] is covered and the sensor detects the light reflected from the master. When there is no master on the drum, the black patch [B] is exposed. The black patch does not reflect light back to the sensor. Because of this, the master eject process can be skipped when a new master is being made, if no master is detected on the drum.
- The drum master sensor uses the black patch [C] on the clamper for jam detection. (☛6.10.3)

6.7 PAPER FEED

6.7.1 OVERVIEW



This mechanism feeds blank copy paper into the printer. (☛CT: Handling Paper – Paper Feed – Paper Feed Methods – Friction Pad)

Mechanism

The paper table is lifted.

↓

The pick-up roller [A] picks up a sheet of paper.

↓

The feed roller [B] and the separation pad [C] only allow one sheet to pass.

↓

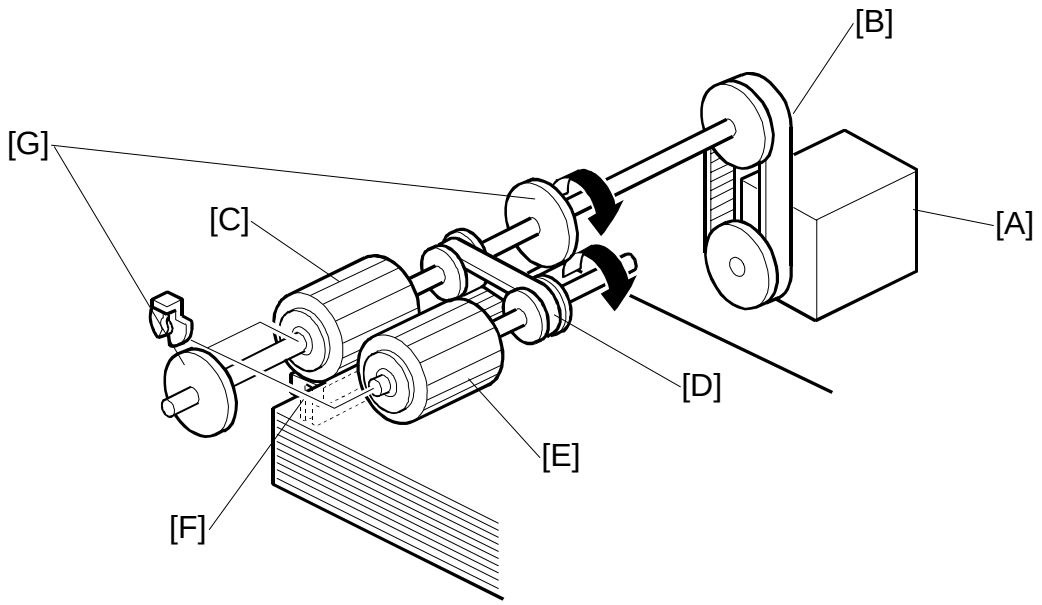
The registration rollers [D] feed the paper.

↓

The print is made.

NOTE: 1) A dedicated stepper motor (paper feed motor) controls the feed roller and the pick-up roller.
2) A dedicated stepper motor (registration motor) controls the registration roller.

6.7.2 PAPER FEED MECHANISM



Mechanism

Paper feed motor [A]

↓

Belt [B]

↓

Turns the feed roller [C]

↓

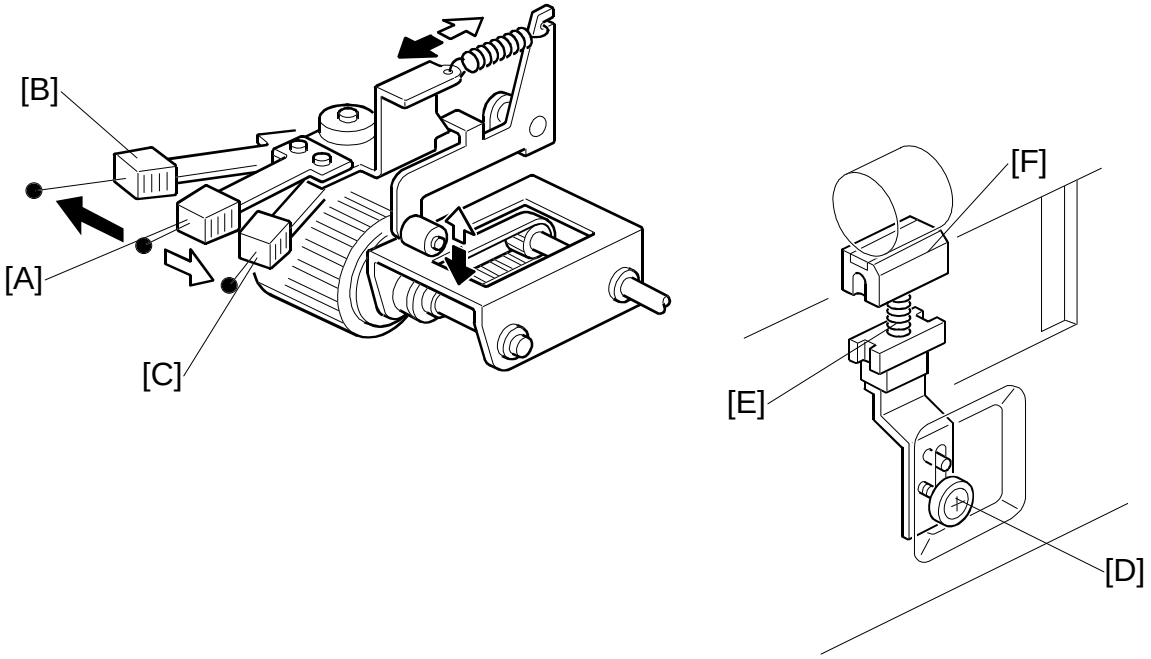
Belt [D]

↓

Turns the pick up roller [E]

NOTE: 1) The machine uses a friction pad [F] and feed roller system. (☛CT: Handling Paper – Paper Feed – Paper Feed Methods – Friction Pad)
2) When the rollers stop and paper is fed by the registration rollers, the one-way clutches in the pick-up and feed rollers ensure that these rollers do not resist paper feed.
3) The guides [G] help to feed paper that is not perfectly flat.
4) Paper feed start timing depends on the selected printing speed: see the Timing Charts.

6.7.3 PAPER FEED / SEPARATION PRESSURE MECHANISM



[A]: Normal position
[B]: Thick paper position
[C]: Thin paper position

- The user can change the pick-up roller pressure by changing the position of the pressure adjustment lever.
- If paper feed jams frequently occur, the lever should be moved to the left or the right to adjust the pressure.
- If non-feed or multi-sheet feed problems still occur, the paper separation pressure can also be adjusted. (This should be done by a technician; ☛3.6.2)
- By loosening then moving the screw [D] up or down, the spring [E], which applies pressure to the friction pad block [F], moves up or down.
- The default position of the screw [D] is at the next to highest position.

6.7.4 REGISTRATION ROLLER MECHANISM

Registration Roller Drive

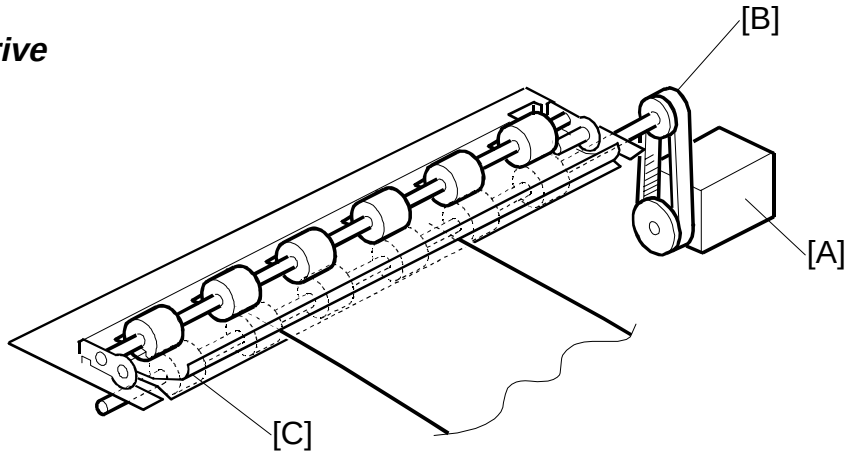
Registration motor [A]

↓

Belt [B]

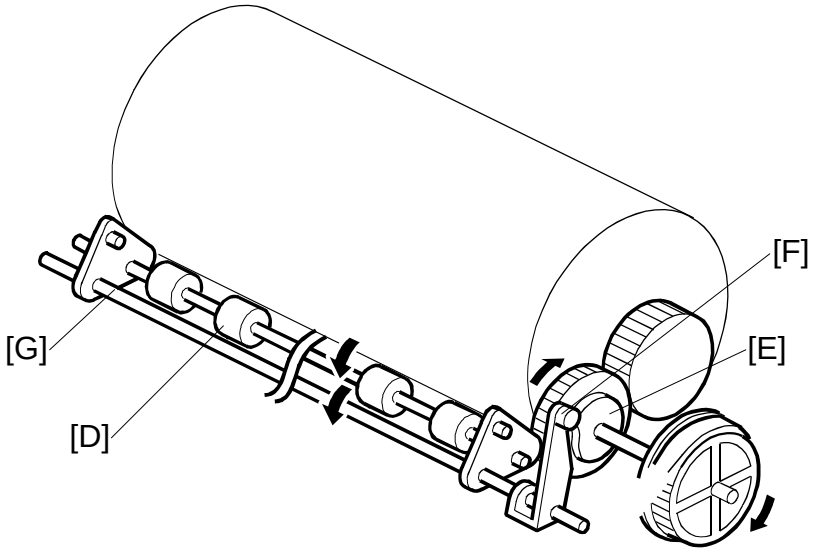
↓

Turns the lower registration roller [C]



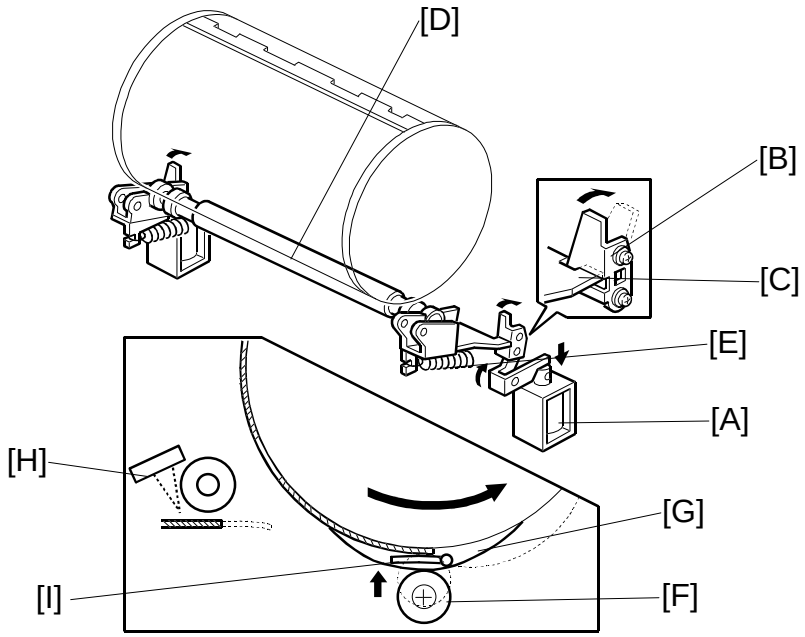
NOTE: 1) The CPU controls the registration roller start timing to synchronize the printer paper with the image on the master on the drum.
2) The motor speed depends on the selected printing speed.
3) By pressing the image position keys on the operation panel, the registration motor start timing is changed.

Registration Roller Up/Down Mechanism



- After the printing paper is caught between the drum and the press roller, the registration motor stops and the upper registration roller [D] is released from the lower registration roller. This is to prevent interference from the registration rollers while the drum and press roller transport the paper.
- When the high point of the cam [E] on the drum drive gear reaches the cam follower [F], the shaft [G] rotates clockwise (as seen from the operation side) to release the upper registration roller [D] from the lower registration roller.

6.7.5 PRINTING PRESSURE MECHANISM



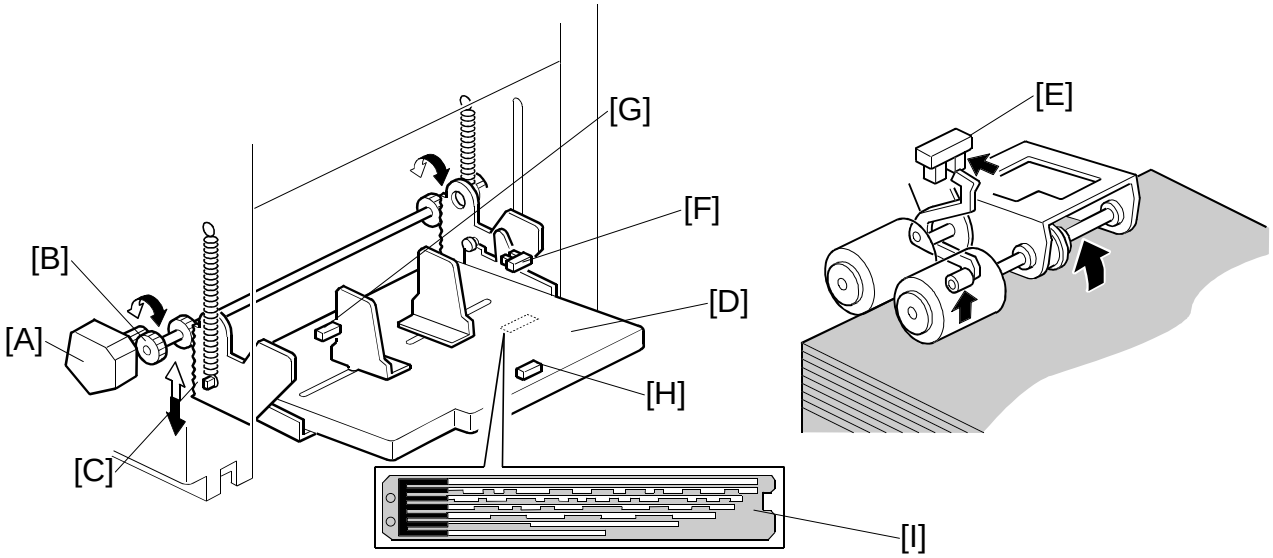
- When not in the printing cycle, the two solenoids [A] stay off and the stoppers [B] lock the brackets [C] to keep the press roller [D] away from the drum.
- When the 1st sheet of paper is fed, the solenoid is energized but the brackets are still locked by the stoppers due to strong tension from the springs [E]. When the high points of the cams [G] on the front and rear drum flanges reach the cam followers [F] on both sides of the press roller shaft, a small clearance is made between the stoppers and the brackets.
- The two solenoid plungers are pulled down at the same time, releasing the stoppers from the brackets. Printing pressure is applied by tension from the springs [E] when the cam followers [F] come off the high points of the cams [G].
- During the printing cycle, the solenoids stay on. However, if paper does not reach the registration sensor [H] at the proper time (when the cam follower is on the high point of the cam), the solenoids are de-energized to lock the brackets.
- The printing pressure is released when the cams push down the cam followers so that the press roller does not contact the master clamper [I].
- After printing is finished, the solenoids de-energize and the springs push the stoppers back. Before the drum returns to the home position, the stoppers lock the brackets again when the cams push down the cam followers.

6.7.6 RE-FEEDING MECHANISM

- If the registration sensor detects a non-feed, the machine tries again. However, if the machine detects a non-feed the second time, the jam indicator lights.

6.7.7 PAPER TABLE MECHANISM

Table lifting/lowering



Mechanism

Table motor [A] (dc motor)

↓

Gear [B]

↓

Racks [C]

↓

Lifting or lowering the paper table [D].

NOTE: 1) When the paper height sensor [E] is actuated, the top of the paper stack contacts the pick-up roller [D], lifting it up. Then, when the paper height sensor [E] is actuated, the table motor stops.
2) When the table lower sensor [F] is actuated, the tray has been lowered to its lower limit, and the motor stops.
3) During a printing run, sheets are fed from the stack, lowering the pick-up roller. When the paper height sensor [E] is de-actuated, the paper table motor raises the paper table until the sensor is actuated again.

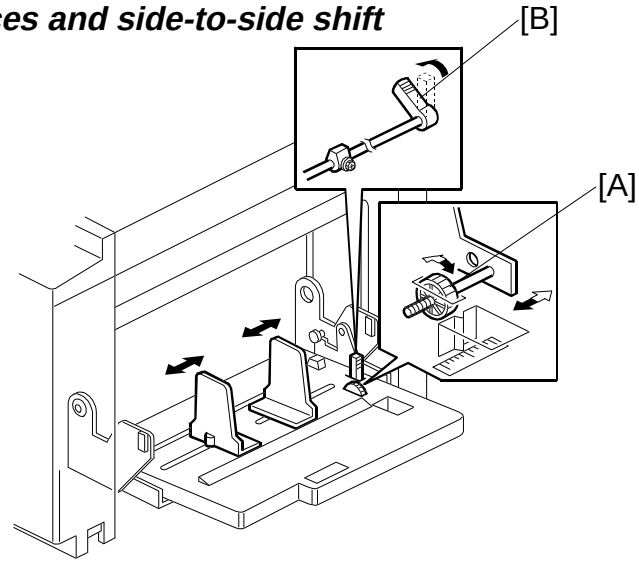
Paper end detection

- The paper end sensor [G] under the paper table detects when the paper on the table runs out.

Paper size detection

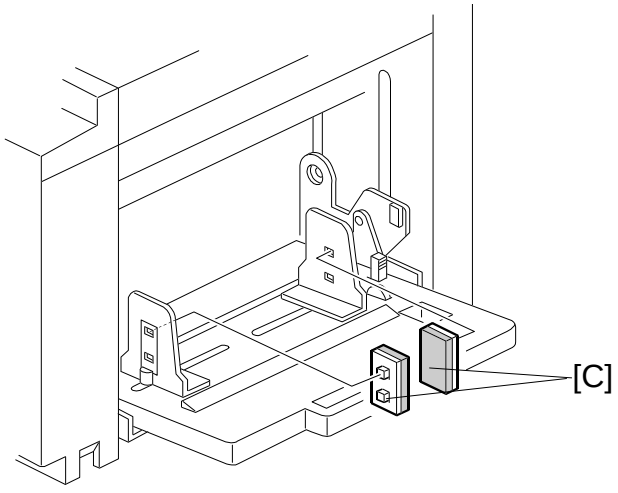
[H]: Paper length sensor
[I]: Paper width detection board

Table side fences and side-to-side shift



- The paper table shift dial [A] shifts the image across the page. If the dial is turned, the whole paper table moves towards one side or the other.
- The side fences move together due to a rack and pinion mechanism. There is a lock lever [B] to hold the side fences in position.

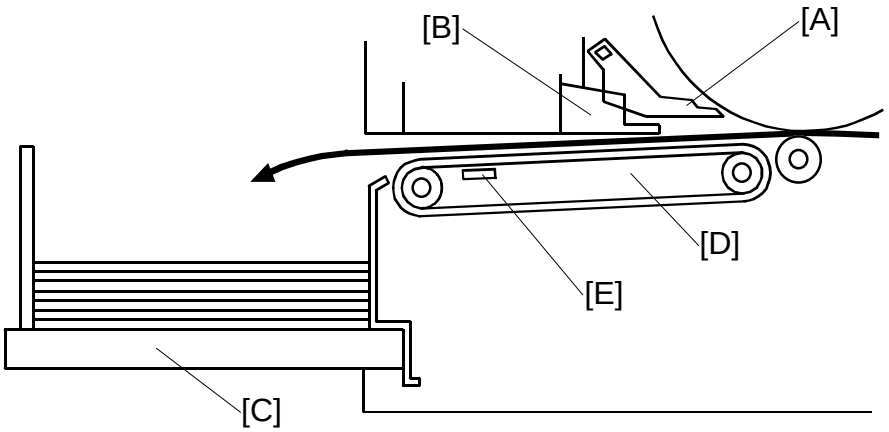
Side fence friction pads



- The two side fence friction pads [C] are included as accessories. These are not used normally, but if paper multi-feed frequently occurs, the friction pads can be installed to apply stopping pressure to the paper. These are especially useful when thin paper is used.
- The user can install the friction pads if they are using thin paper.

6.8 PAPER DELIVERY

6.8.1 OVERVIEW



Procedure

The exit pawl [A] and the air knife [B] separate the paper from the drum.

↓

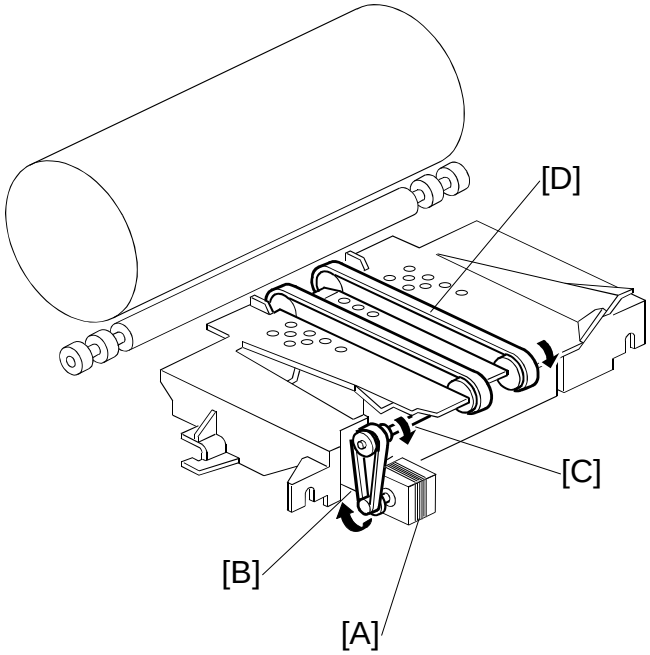
The paper is fed to the exit table [C] by the paper delivery unit [D].

The paper exit sensor [E] is used for jam detection. (☛ 6.10.6)

6.8.2 PAPER DELIVERY UNIT DRIVE MECHANISM

Mechanism

Paper delivery motor [A]
↓
Belt [B]
↓
Shaft [C]
↓
Rotates the transport belts [D].

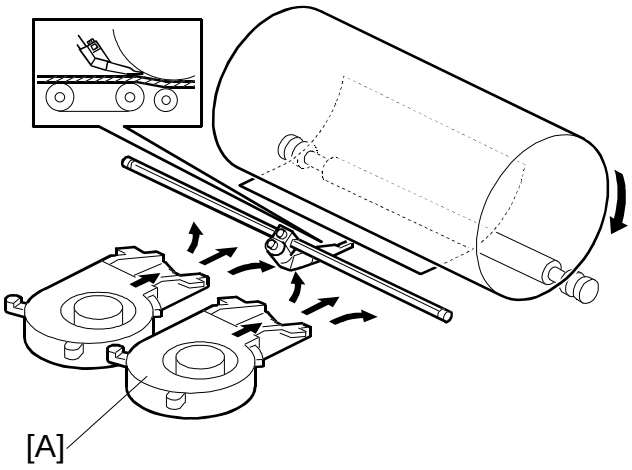


NOTE: 1) The vacuum fan motor inside the unit holds the paper against the belts [D] to deliver the paper to the exit table.
2) The motor rotation speed depends on the selected print speed.

6.8.3 PAPER SEPARATION FROM THE DRUM

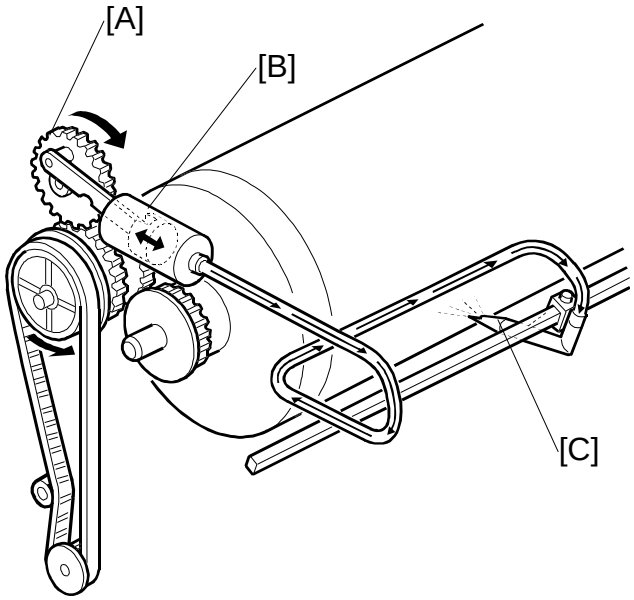
Air knife

- The air from the air knife fan motors [A] separates the paper from the drum.
- The air knife fan motors start blowing air when the print start key is pressed or when master cutting is finished. The paper passes under the exit pawl and is delivered to the delivery table.



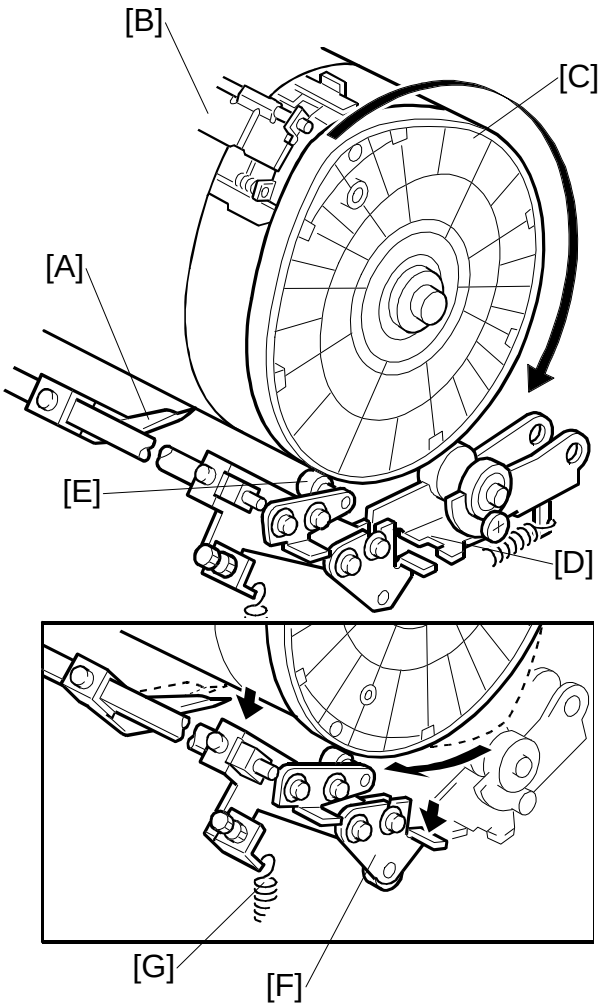
Exit pawl air pump

- Drive from the main motor is transmitted to the pump gear [A]. When the gear [A] rotates, it drives the piston [B] back and forth.
- The piston moves forward and pushes a jet of air out through the nozzle [C]. This jet of air helps to separate the paper from the drum.

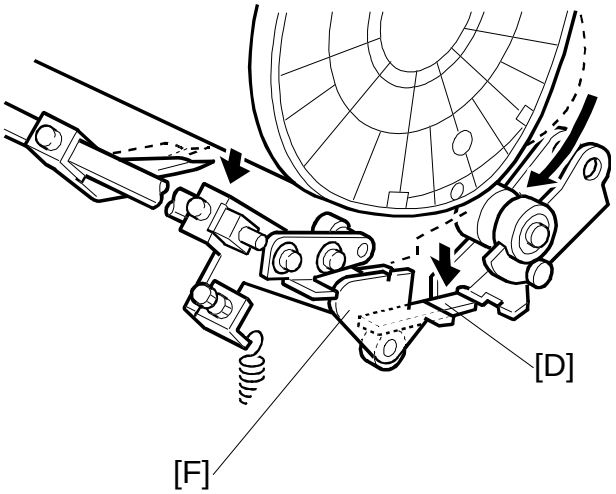


6.8.4 EXIT PAWL DRIVE MECHANISM

- During printing, the distance between the exit pawl [A] and the drum is very small, to prevent paper wrap jams. However, when the master clamper [B] approaches the exit pawl (as the drum turns), the pawl has to be moved away from the drum to prevent it from being damaged by the master clamper. This is controlled by the front drum flange [C], which is cam-shaped, and the cam follower [E] on the exit pawl shaft.
- When the cam follower is not pushed out by the drum flange, the exit pawl closely approaches the drum surface, due to the tension from a spring [G].
- As the master clamper approaches the exit pawl, the high point of the drum flange cam [C] moves into contact with the cam follower [E] pushing it down. This moves the cam follower arm [F] downwards. The pawl shaft turns clockwise to move the pawl away from the drum.

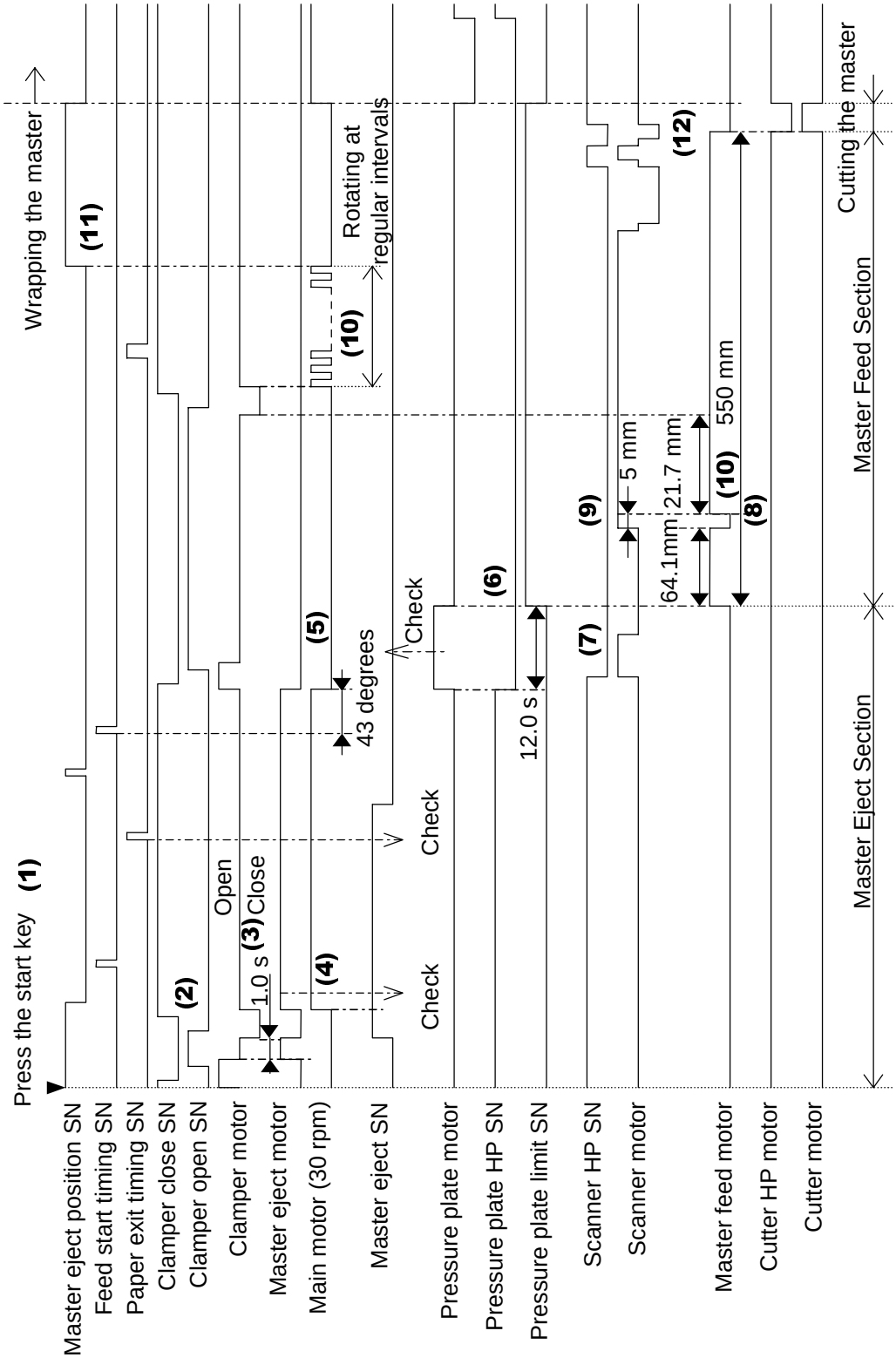


- When printing finishes and the printing pressure is released, the cam follower arm [F] is engaged by the printing pressure release arm [D] and held in the lower position. Therefore, after printing finishes, the cam follower is out of contact with the cam, and the exit pawl moves away from the drum to its normal position.



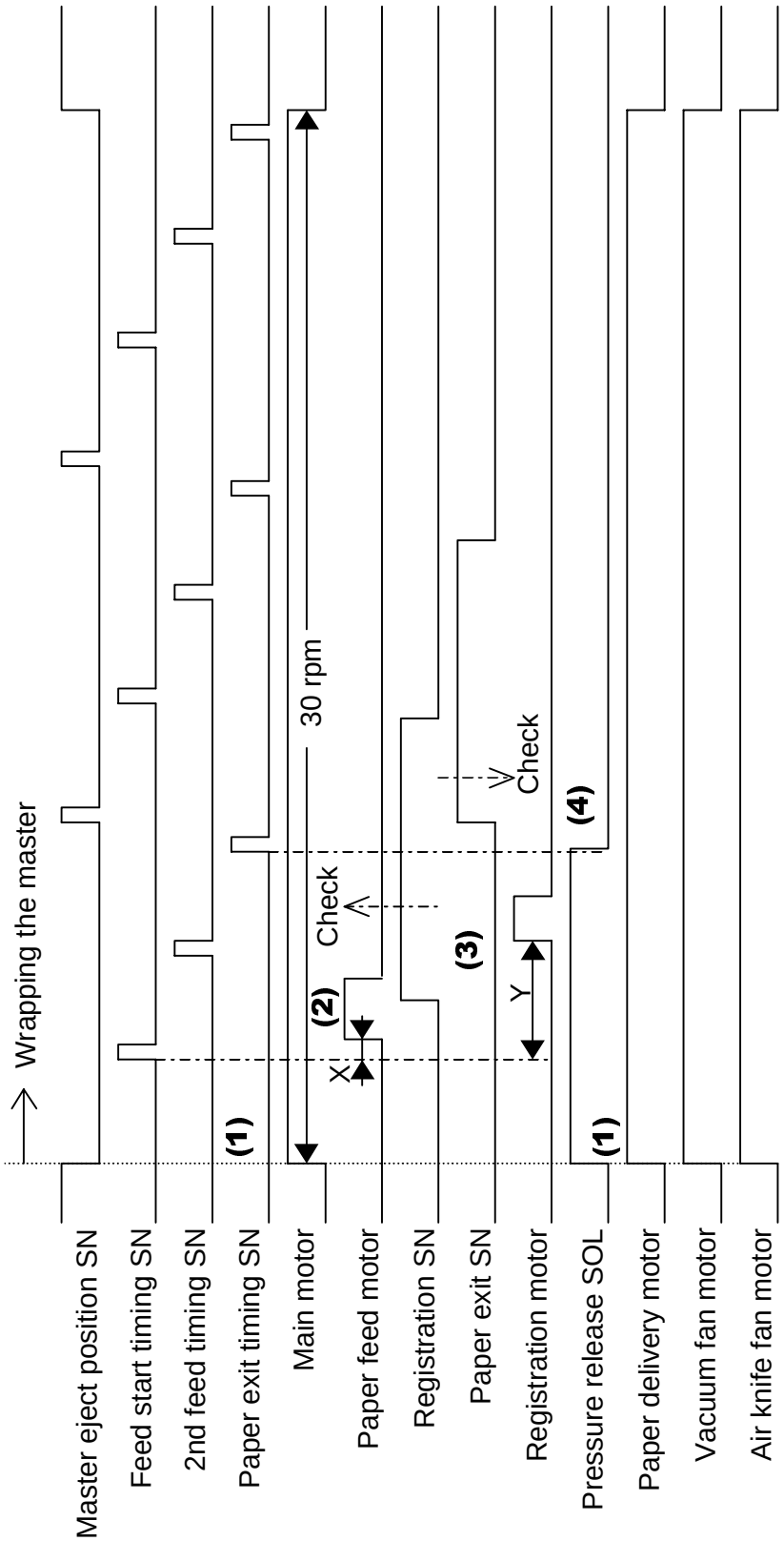
6.9 TIMING CHART

6.9.1 MASTER EJECT / MASTER FEED



(1) Press the Start key
(2) The clamper motor turns to open the clamper.
(3) When the clamper is open, the master eject motor turns on for 1.0 second, then the clamper closes.
(4) When the clamper is closed, the master eject motor and the main motor turn on.
(5) When the drum is at the feed start timing sensor position plus 43 degrees, the master eject motor and the main motor turn off, the pressure plate motor turns on to press the ejected master and the clamper motor turns on to open the clamper.
(6) After 12.0 seconds, the pressure plate motor turns off.
(7) The machine initializes the scanner.
(8) When the master feed motor has fed the master 64.1 mm, the motor stops and the scanner starts to scan.
(9) After scanning 5 mm, the master feed motor turns on.
(10) When the master feed motor has fed the master 21.7 mm, the clamper closes, and then the drum rotates at regular intervals.
(11) The drum stops at the master eject position sensor.
(12) When the master feed motor has fed the master 550 mm in all, the master feed motor stops, and the cutter cuts the master.

6.9.2 MASTER WRAPPING



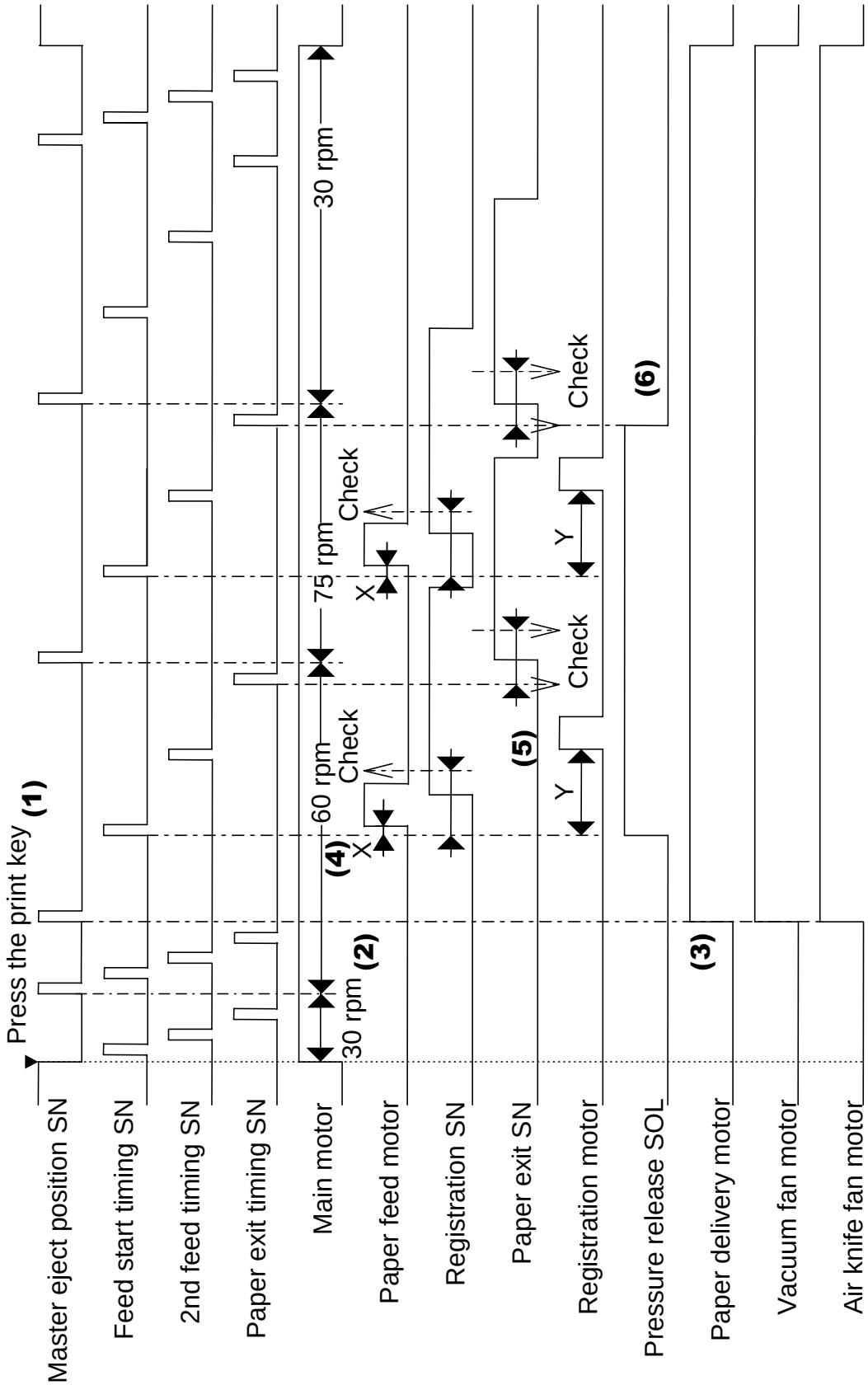
(1) When the cutter has cut the master, the pressure plate goes to the home position, the drum rotates, and the pressure release solenoid, paper delivery motor, vacuum fan motor and air knife fan motor all turn on.

(2) When the drum is at the feed start timing sensor plus a feed delay time (X), the paper feed motor turns on. X depends on the selected printing speed.

(3) After a certain time (Y), the registration motor turns on.

(4) When the drum is at the paper exit timing sensor, the solenoid turns off.

6.9.3 PRINTING

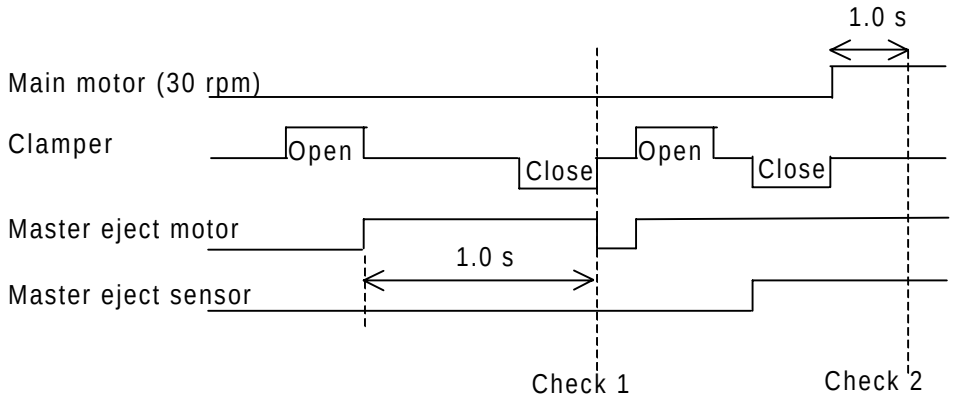


(1) Press the print key.
(2) The drum rotates at 30 rpm, then the speed goes to 60 rpm.
(3) When the drum is at the master eject position sensor, the paper delivery motor' vacuum fan motor, and air knife fan motor all turn on.
(4) When the drum is at the feed start timing sensor plus a feed delay time (X), the paper feed motor and the pressure release solenoid turn on. X depends on the selected printing speed.
(5) After a certain time (Y), the registration motor turns on.
(6) When the drum is at the paper exit timing sensor, the solenoid turns off.

6.10 JAM DETECTION

6.10.1 MASTER EJECT JAM (E JAM LOCATION INDICATOR)

Picking up the used master from the drum

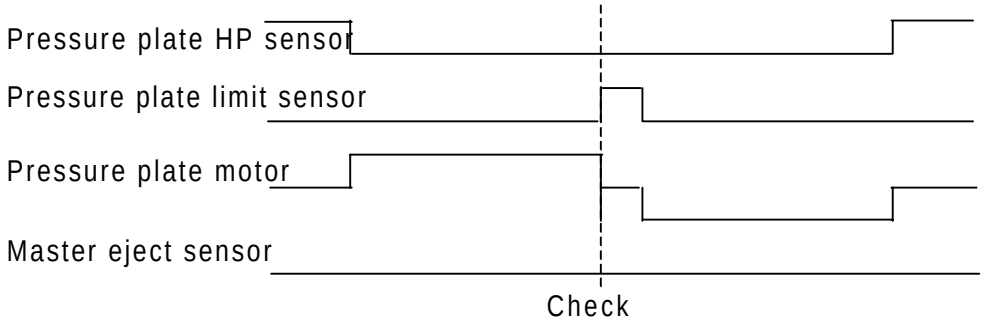


Jam check timing: When the clamper open sensor is on (clamper open).

Check 1: If the master eject motor is still on after 1.0 second, and the master eject sensor doesn't detect the master, the machine goes on to check 2.

Check 2: When the clamper opens and closes again, and the drum has rotated 1.0 s, if the master eject sensor doesn't detect the master, the E jam indicator will light.

Compressing the used master



Jam check timing: When moving the pressure plate.

Check: If the master eject sensor detects a master when the pressure plate limit sensor turns on (pressure plate at lower limit), the E jam indicator lights.

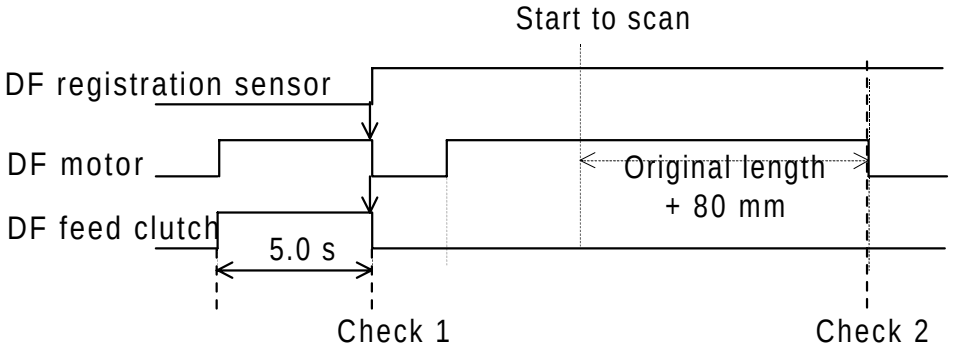
Just after turning on the main switch

Jam check timing: Just after the main switch has been turned on.

Check: If the master eject sensor is on (master detected), the E jam indicator lights.

6.10.2 DF JAM (P JAM LOCATION INDICATOR)

Feeding in the original



Jam check timing: When an original is placed in the DF.

Check 1: If the DF motor has operated for 5.0 seconds since the start key was pressed, and the DF registration sensor still doesn't detect the original, the P jam indicator lights.

Feeding out the original

Jam check timing: During original feed-out.

Check 2: When the DF has fed the original length plus 80 mm, the DF registration sensor still detects the original, the P jam indicator lights.

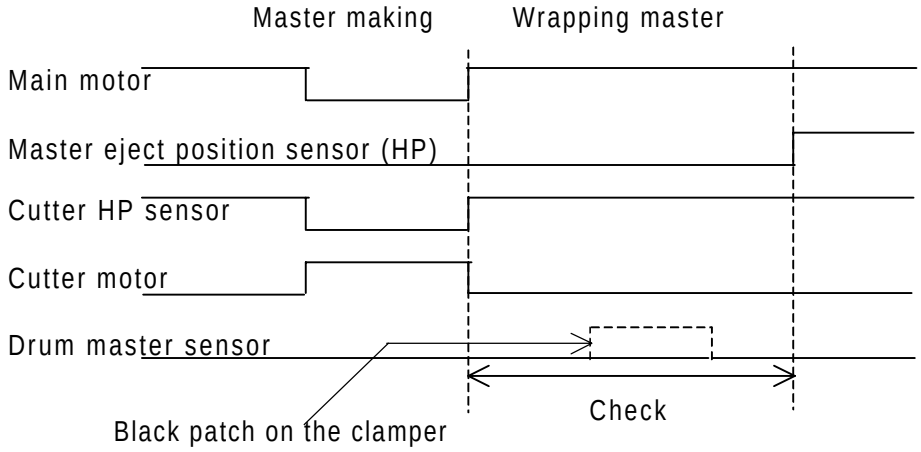
Turning on the main switch/closing the DF cover

Jam check timing: Just after turning the main switch on, and when the DF cover is closed.

Check: If the DF registration sensor detects an original, the P jam indicator lights.

6.10.3 MASTER FEED JAM (D JAM LOCATION INDICATOR)

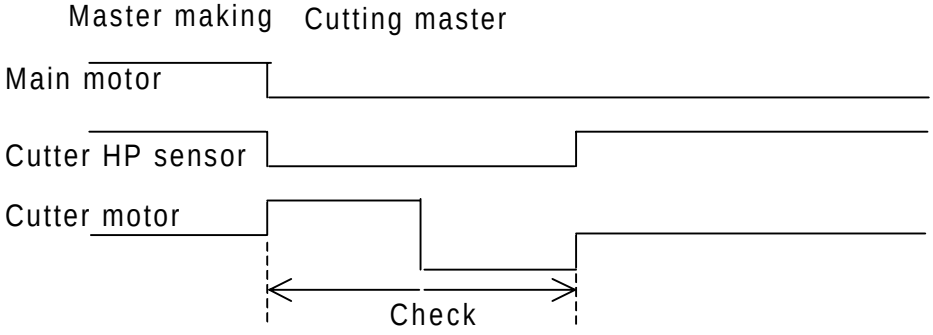
Cutting the master (master not cut)



Jam check timing: When the master is clamped in the clamper and cutting is taking place.

Check: While the drum is rotating from when the cutter home position sensor turns on (cutter at home position) until the master eject position sensor turns on (drum at master eject position), if the drum master sensor detects a master on the black patch on the clamper, then the D jam indicator lights.

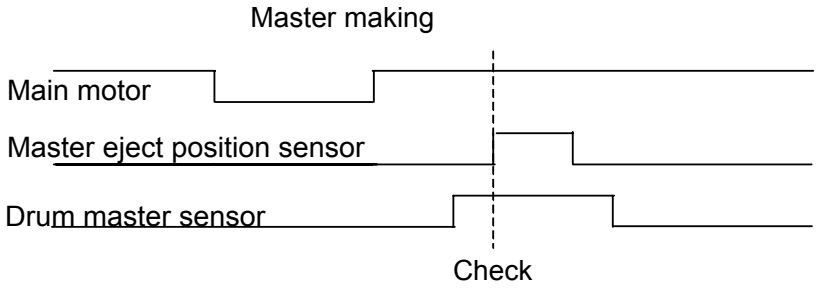
Cutting the master (cutter unit problem)



Jam check timing: When the master is clamped in the clamper and cutting is taking place.

Check: During master cutting, if the cutter HP sensor does not turn on (cutter does not reach home position) at the desired time, then the D jam indicator lights.

Clamping the master

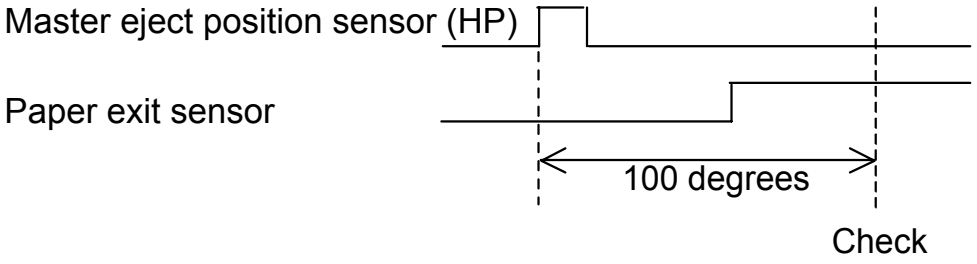


Jam check timing: When the master is wrapping around the drum.

Check: When the master eject position sensor turns on (drum at master eject position), if the drum master sensor doesn't detect a master, then the D jam indicator lights.

6.10.4 DRUM JAM (B JAM LOCATION INDICATOR)

Wrapping jam



Jam check timing: When printing.

Check: When the drum has turned 100 degrees since the master eject position sensor turned on (drum reached master eject position), and the paper exit sensor still doesn't detect the paper, then the B jam indicator lights.

⟹ ***Changed "B jam" indicator***

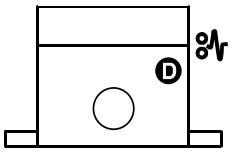
Since this model has no LCD for written display messages, the conditons for the "B-jam" and "M" LEDs have been changed as follows. This is to clarify when the wrapping master around the drum should be removed.

⇒ ***Details***

With the above change, the D-jam recovery flow has been changed as described below.

NOTE: The following “Old Recovery Flow“ was not included in the original C238 Service Manual.

Old Recovery Flow (for versions before C2385114-H):



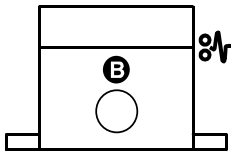
D-jam (master cut error) is indicated.

NOTE: This includes all D jams except for “Clamping the master”.

↓

Dispose of the jammed master in the plotter unit.

↓



When the plotter unit is pushed back in, the “B-jam” LED will light.

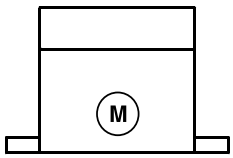
NOTE: This cannot be cleared by turning the main power off/on.

↓

Remove the wrapping master around the drum manually.

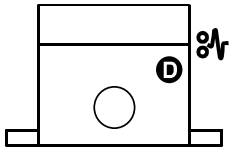
NOTE: When a master cut error occurs, the wrapping master length is not correct, therefore it is necessary to remove the wrapping master manually.

↓



Machine returns to normal, however when the Print key is pressed, the “M” LED lights, because the master has been removed. The machine is able to print after the Start key is pressed.

New Recovery Flow (for version C2385114-H or newer):



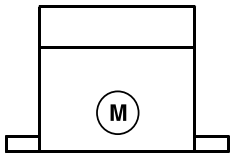
D-jam (master cut error) is indicated.

NOTE: This includes all D jams except for “Clamping the master”.

↓

Dispose of the jammed master in the plotter unit.

↓



When the plotter unit is pushed back in, no error is displayed. However when the Print key is pressed, the “M” LED light, and the machine cannot print.

NOTE: The wrapping master length is not correct, therefore the machine cannot print using the wrapping master.

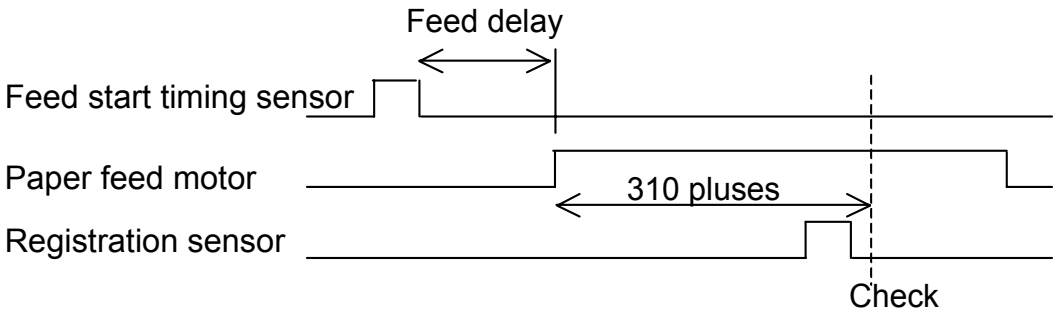
↓

Machine returns to normal and is able to print after the Start key is pressed, as the wrapping master is removed automatically. (It means “Master Eject”.)

NOTE: When SP2-12 (Drum master sensor) is off, the “B-jam” and “M” LEDs cannot be cleared. The factory setting for this SP is on.

6.10.5 PAPER FEED JAM (A JAM LOCATION INDICATOR)

Paper feed



Jam check timing: When the machine starts to feed. (When the feed delay time has passed since the feed start timing sensor turned on [drum at feed start position].)

Check: If after the paper feed motor has fed 310 pulses, the re-feeding function starts. The paper feed motor re-starts, and if the registration sensor doesn't detect paper again after 310 pulses, the A jam location indicator lights.

Detailed Descriptions

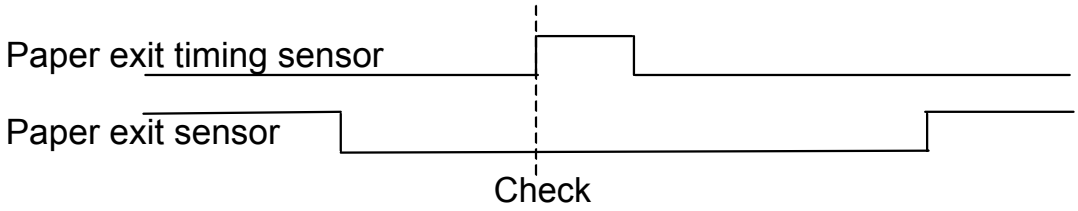
Turning on the main switch/end of paper feed

Jam check timing: Just after the main switch is turned on, or when paper feed has finished.

Check: If the registration sensor detects paper, the A jam location indicator lights.

6.10.6 PAPER DELIVERY JAM (C JAM LOCATION INDICATOR)

Paper delivery



Jam check timing: When printing.

Check: When the paper exit timing sensor turns on (drum at paper exit timing position), if the paper exit sensor detects paper, the C jam location indicator lights.

Drum: 360 degrees = 1020 pulses

CÓPIA NÃO CONTROLADA

SPECIFICATIONS

CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

SPECIFICATIONS

1. GENERAL SPECIFICATIONS

Configuration:	Floor standing
Master Process:	Digital with 300 dpi thermal head
Scanning (Pixel Density):	300 dpi (in Fine mode 400 dpi)
Originals:	Sheet/Book
Printing process:	Fully automatic one-drum stencil system
Original Size:	Maximum 304.8 x 432 mm / 12.0" x 17.0"
Copy Paper Size:	Maximum 297 x 432 mm / 11.6" x 17.0" Minimum 70 x 148 mm / 2.8" x 5.9"
Copy Paper Weight:	47.1 – 209.3 g/m^2, 12.5 – 55.6 lb.
Printing Area:	A3 drum 290 x 410 mm / 11.4" x 16.1" A4 black drum 200 x 290 mm / 7.8" x 11.4"
Printing Speed:	60, 75, 90, 105, 120 sheets/minute (5 steps)
Master Eject Box Capacity:	50 masters (Normal conditions)
Reproduction Ratios:	3 enlargement and 4 reduction

	A3 version	DLT version
Enlargement	141% 122% 115%	155% 129% 121%
Full Size	100%	100%
Reduction	93% 87% 82% 71%	93% 77% 74% 65%

Zoom:	50% to 200%, in 1% steps
Power Source:	America, Taiwan 110 / 120 V, 50/60 Hz 5.0 A Europe, Asia 220 – 240 V, 50/60 Hz 3.0 A

Specifications

SPECIFICATIONS

Power Consumption:

	Mainframe Only	
	120 V	**220 ~ 240 V**
Copying 60 rpm	Not above 170 W	Not above 170 W
Copying 90 rpm	Not above 190 W	Not above 190 W
Copying 120 rpm	Not above 220 W	Not above 215 W
Master making	Not above 160 W	Not above 160 W
Standby (Energy saver mode)	Not above 5 W	Not above 8 W

Noise Emission

	Sound Power Level	**Operating Position Sound Power Level**
Standby:	Not above 48 dB(A)	Not above 35 dB(A)
Copying 60 rpm:	Not above 74 dB(A)	Not above 60 dB(A)
Copying 90 rpm:	Not above 78 dB(A)	Not above 63 dB(A)
Copying 120 rpm:	Not above 81 dB(A)	Not above 66 dB(A)

NOTE: The above measurement made in accordance with ISO 7779 are actual value.

Dimensions (W x D x H)

Tables closed: 790 x 700 x 640 mm (31.1" x 27.6" x 25.2")

Tables opened: 1360 x 700 x 600 mm (53.6" x 27.6" x 25.2")

NOTE: Measurement Conditions

1) Without the ADF

2) Without the table

Weight

80 kg (176.6 lb)

(Excluding ADF, platen cover, ink, and master)

Master Process Time:	Not more than 23 seconds (A4 copying) Not more than 26 seconds (A3 copying) **NOTE:** Measurement Conditions 1) 100%size 2) Not using fine mode
Paper Table Capacity:	1,000 sheets (80 g/m^2, 20 lb)
Paper Delivery Table Capacity:	1,000 sheets (80 g/m^2, 20 lb)
Leading Edge Margin:	5 ± 3 mm
Trailing Edge Margin:	2 mm
Side Registration Adjustable Range:	± 10 mm
Vertical Registration Adjustable Range:	± 15 mm
Master Type:	Thermal master roll type: 320 mm width, 125 m/roll Yield: 220 masters/roll Maximum run length per master: 2,000 prints
Master Storage Conditions:	Temperature: 0 °C to 40 °C Humidity: 10% to 95% RH Recommended maximum storage period: One year after production date Note: Avoid locations exposed to direct sunlight.
Ink Type:	600 ml cartridge type Available colors: Black, Red, Blue, Green, Brown, Purple, Yellow, Navy, Maroon, Orange, Teal, and Gray
Ink Storage Conditions:	Temperature: -5 °C to 40 °C (Optimum conditions: 15 °C to 25 °C) Humidity: 10% to 95% RH (Optimum conditions: 20% to 70% RH)

Recommended maximum storage period:
18 months after production date

Note: Avoid locations exposed to direct sunlight.

Optional Equipment:

- Platen cover
- Auto document feeder
- Color drum
- A4 black drum
- Tape marker (dispenser)
- Interface board

DOCUMENT FEEDER C600

CÓPIA NÃO CONTROLADA

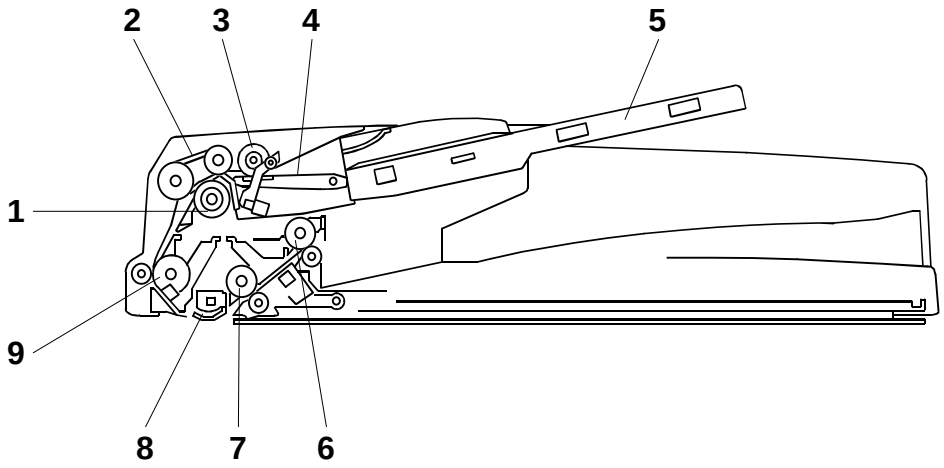
CÓPIA NÃO CONTROLADA

1. OVERALL INFORMATION

1.1 SPECIFICATIONS

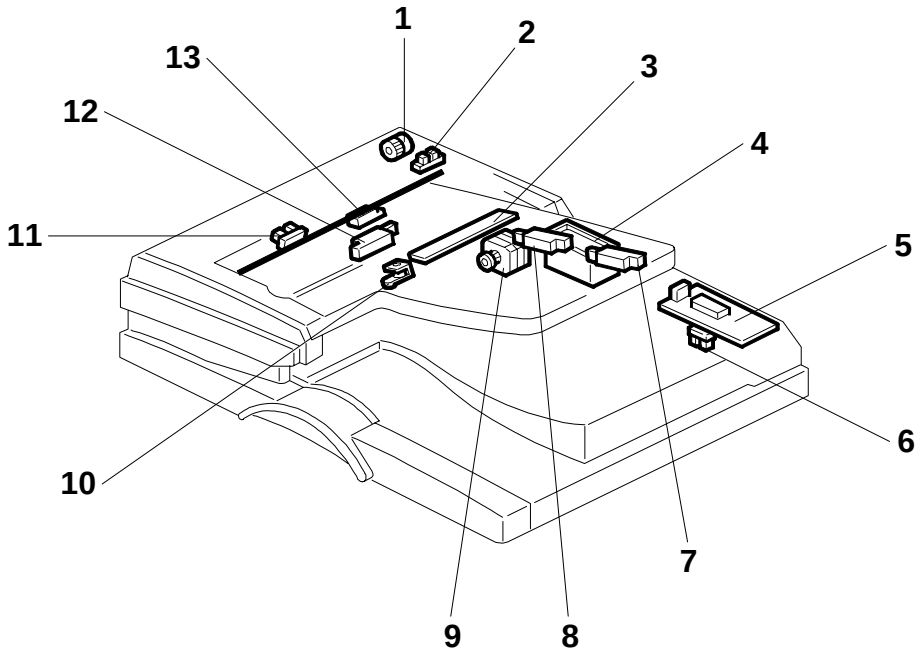
Original Size:	Standard Size (Single-sided Mode only): A3 to A5, DLT to HLT Non-standard Size (Single-sided Mode only): Max. width 297 mm Min. width 105 mm Max. length 1,260 mm Min. length 128 mm
Original Weight:	40 ~ 128 g/m^2 (10 ~ 34 lbs.)
Table Capacity:	50 sheets (80 g/m^2, 22 lbs.)
Original Standard Position:	Center
Separation:	FRR
Original Transport:	Roller transport
Original Feed Order:	From the top original
Reproduction Range:	50 ~ 200%
Power Source:	24 & 5 VDC from the copier
Power Consumption:	25 W
Dimensions (W x D x H):	550 mm x 470 mm x 130 mm
Weight:	9 kg or less

1.2 MECHANICAL COMPONENT LAYOUT



1. Separation roller
2. Original feed belt
3. Pick-up roller
4. Original entrance guide
5. Original table
6. Original exit roller
7. 2nd transport roller
8. Original exposure guide
9. 1st transport roller

1.3 ELECTRICAL COMPONENT LAYOUT

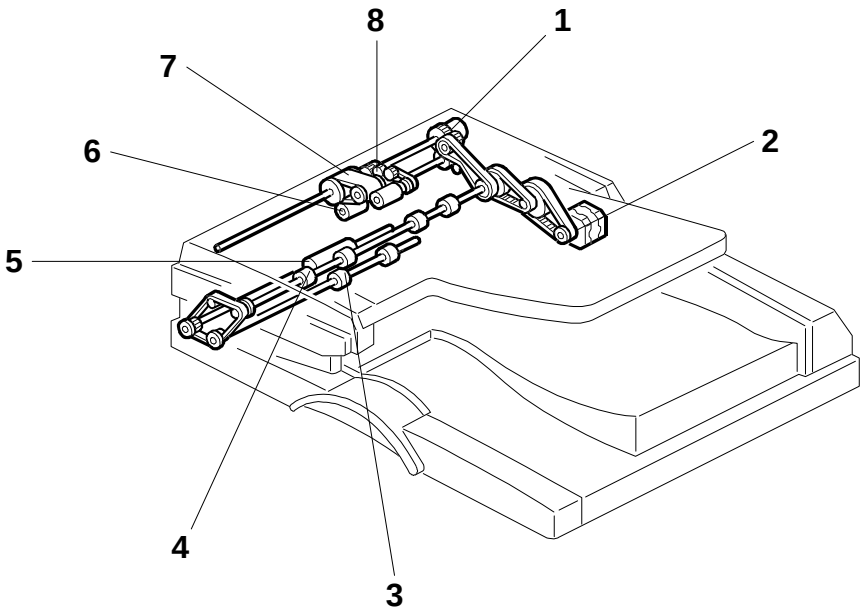


1. DF feed clutch
2. Feed cover open sensor
3. Original width sensor
4. DF pick-up solenoid
5. DF drive board
6. DF open sensor
7. Original length sensor 2
8. Original length sensor 1
9. DF transport motor
10. Stamp solenoid
11. Original set sensor
12. Original trailing edge sensor
13. Registration sensor

1.4 ELECTRICAL COMPONENT DESCRIPTION

Symbol	Name	Function	Index No.
Motors			
M1	DF Transport	Drives the transport and exit rollers	9
Sensors			
S1	DF Open	Informs the CPU of the DF when the DF is opened and closed (for platen mode).	6
S2	Registration	Detects the leading edge of the original to determine when to turn off the DF transport motor and expose the original, and checks for original misfeeds.	13
S3	Feed Cover Open Sensor	Detects whether the feed-in cover is open or not.	2
S4	Original Width	Detects the original width.	3
S5	Original Length 1	Detects the original length.	8
S6	Original Length 2	Detects the original length.	7
S7	Original Set	Detects the original is on the feed table.	11
S8	Original Trailing Edge	Detects the trailing edge of the last original to stop copy paper feed and to turn off the transport motor, and checks for original misfeeds.	12
Solenoids			
SOL1	DF Pick-up	Controls the up-down movement of the original table.	4
SOL2	Stamp	Energizes the stamp to mark the original.	10
Clutches			
MC1	DF Feed	Transfers transport motor drive to the pick-up roller and feed belt.	1
PCBs			
PCB1	DF Drive	Interfaces the sensor signals with the copier, and transfers the magnetic clutch, solenoid, and motor drive signals from the copier.	5

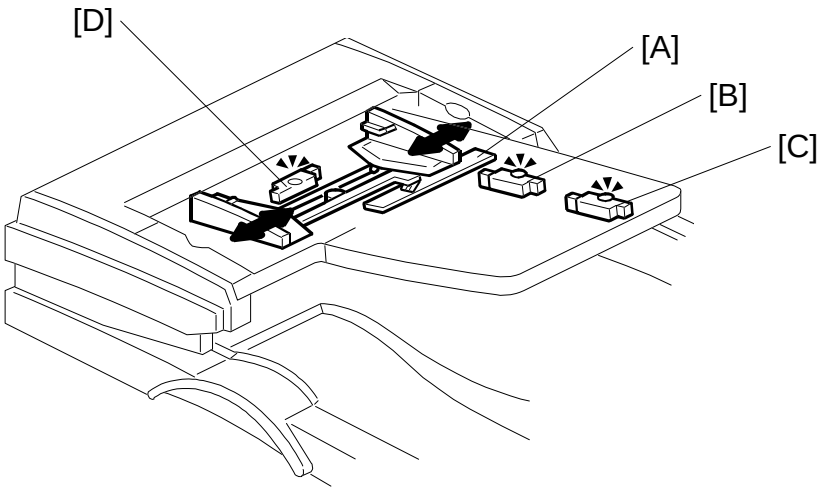
1.5 DRIVE LAYOUT



1. DF feed clutch
2. DF transport motor
3. 2nd transport roller
4. Exit roller
5. 1st transport roller
6. Separation roller
7. Original feed belt
8. Pick-up roller

2. DETAILED SECTION DESCRIPTIONS

2.1 ORIGINAL SIZE DETECTION



The DF has one width sensor [A] to detect the original width and two original length sensors (-1 [B] and -2 [C]) to detect the original length. The DF detects the original size through the combination of inputs from those sensors as shown in the table on the next page.

When using an original of a non-standard size, the user needs to input the original length at the operation panel.

The original width sensor [A] has four possible outputs (P1 to P4). The output depends on the position of the sliding electrode on the original rear fence.

During one-to-one copying, copy paper is fed to the registration roller in advance, to increase the copy speed. The original exit trailing edge sensor monitors the stack of originals in the feeder, and detects when the trailing edge of the last page has been fed in.

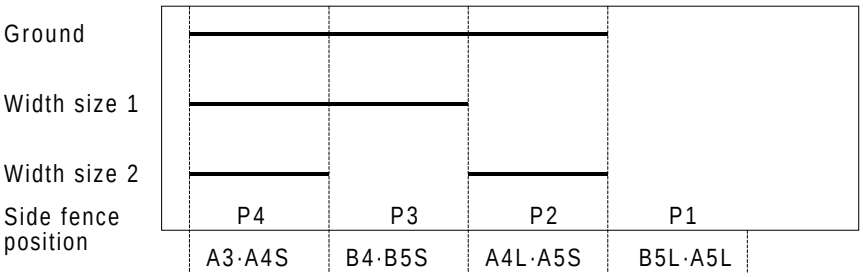
		NA	EU	Original Length 1	Original Length 2	P1	P2	P3	P4
1	A3 L (297 x 420)	✗	❍	ON	ON	—	—	—	ON
2	B4 L (257 x 364)	✗	❍	ON	ON	—	—	ON	—
3	A4 L (210 x 297)	✗	❍	ON	—	—	ON	—	—
4	A4 S (297 x 210)	✗	❍	—	—	—	—	—	ON
5	B5 L (182 x 257)	✗	❍	ON	—	ON	—	—	—
6	B5 S (257 x 182)	✗	❍	—	—	—	—	ON	—
7	A5 L (148 x 210)	✗	❍	—	—	ON	—	—	—
8	A5 S (210 x 148)	✗	❍	—	—	—	ON	—	—
11	11" x 17" L (DLT)	●1	✗	ON	ON	—	—	—	ON
12	11" x 15" L	❍1	✗	ON	ON	—	—	—	ON
13	10" x 14" L	❍	✗	ON	ON	—	—	ON	—
14	8 1/2" x 14" L (LG)	●2	✗	ON	ON	—	ON	—	—
15	8 1/2" x 13" L (F4)	✗	●4	ON	ON	—	ON	—	—
16	8" x 13" L (F)	❍2	❍4	ON	ON	—	ON	—	—
17	8 1/2" x 11" L (LT)	●3	✗	ON	—	—	ON	—	—
18	8 1/2" x 11" S (LT)	❍	✗	—	—	—	—	—	ON
19	10" x 8" L	❍3	✗	ON	—	—	ON	—	—
20	5 1/2" x 8 1/2" L (HLT)	❍	✗	—	—	ON	—	—	—
21	5 1/2" x 8 1/2" S (HLT)	❍	✗	—	—	—	ON	—	—

L: Lengthwise S: Sideways ✗: No ❍: Yes ON: Paper present

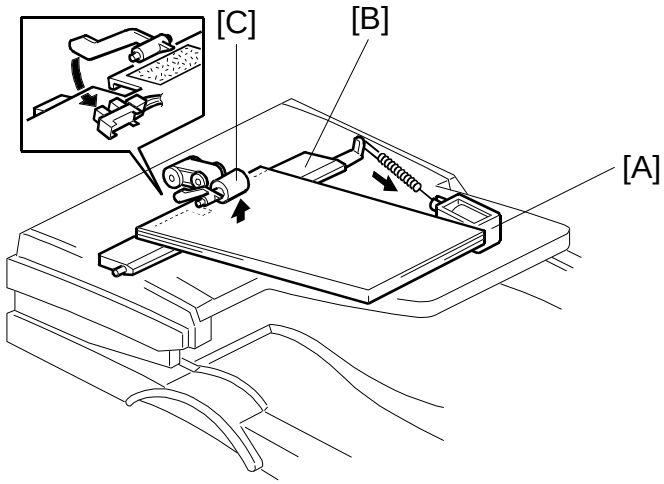
❍1, ●1: If the original is 11" x 15" L, it will always be detected as 11" x 17" L (DLT).
❍2, ●2: In North American models, if the original is 8" x 13" L (F size), it will always be detected as 8 1/2" x 14" L (LG).
❍3, ●3: If the original is 10" x 8" L, it will always be detected as 8 1/2" x 11" L (LT).
❍4, ●4: In Europe/Asia models, if the original is 8" x 13" L (F size), it will always be detected as 8 1/2" x 13" L (F4 size).

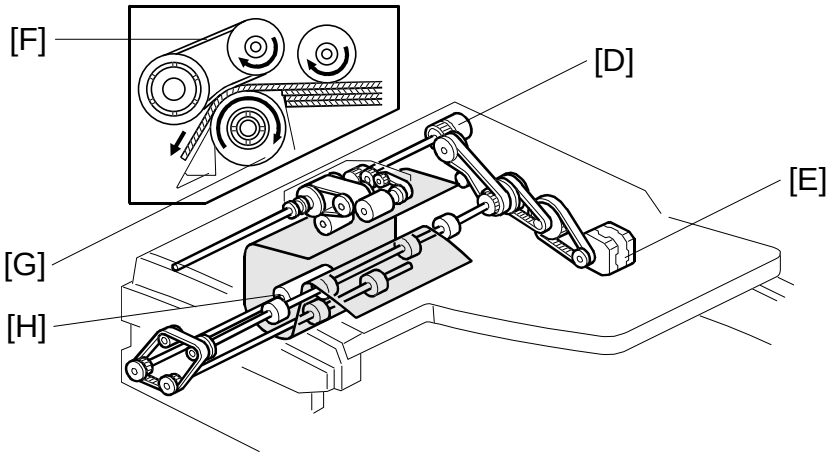
NA: North America, EU: Europe

- Original Width Sensor -



2.2 PICK-UP AND SEPARATION

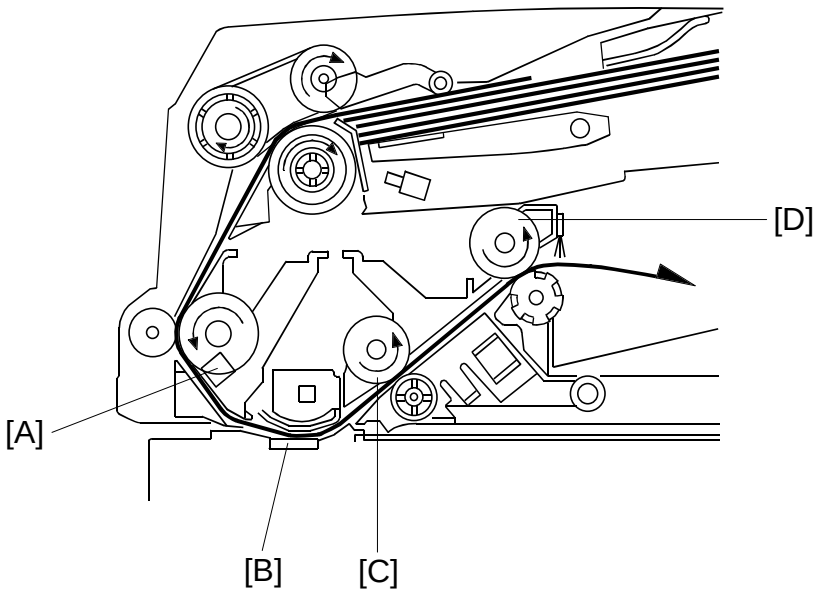




When the print key is pressed, the DF pick-up solenoid [A] turns on and the entrance guide [B] lifts up the originals to the pick-up roller [C]. At the same time, the DF feed clutch [D] turns on.

200 ms after this, the DF transport motor [E] turns on. The original is fed to the paper feed belt [F] from the top page. The pages are separated by the separation roller [G] and the top sheet of the original is fed to the 1st transport roller [H]. The original separation system uses an FRR system.

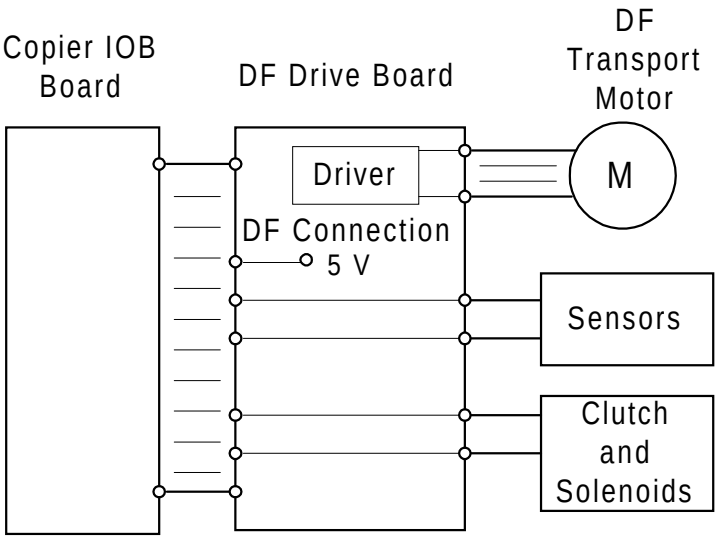
2.3 ORIGINAL TRANSPORT AND EXIT MECHANISM



When the leading edge of the original reaches the registration sensor [A], the DF transport motors turn off. After a short time the DF transport motors turn on again. The original is fed past the DF exposure glass [B], where it is scanned. The original is fed through to the 2nd transport roller [C] and fed out by the exit roller [D].

The DF transport motor speed, while feeding the original to the registration sensor, is constant. However, when the motor turns on again to feed the original to the exposure glass, the speed depends on the selected reproduction ratio. At 100%, it is 90 mm/s.

2.4 OVERALL ELECTRICAL CIRCUIT

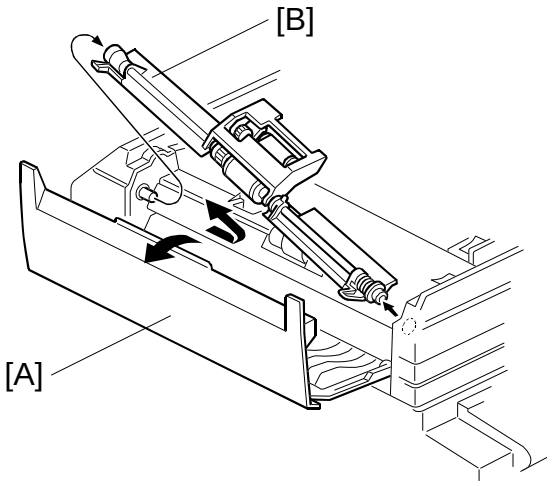


The copier directly controls the DF pick-up solenoid, stamp solenoid, and DF feed clutch through the DF drive board. The sensor signals are directly sent to the copier through the DF drive board. The DF drive board has a driver for the DF transport motor and the drive signals are sent from the copier.

When the DF connector is connected to the copier IOB board, the DF connection signal to the copier goes to 5 V. Then the copier detects that the DF is connected.

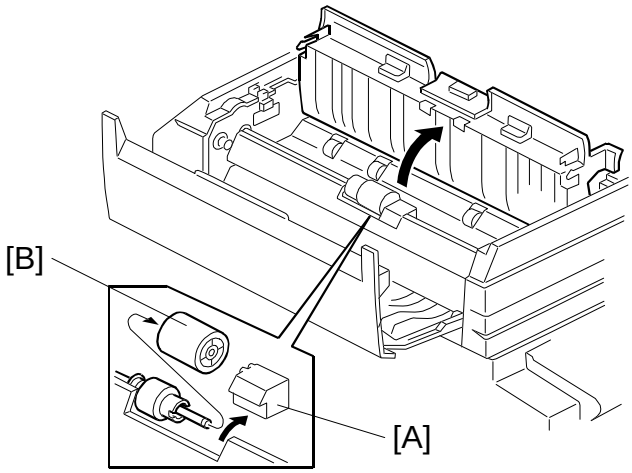
3. REPLACEMENT AND ADJUSTMENT

3.1 FEED UNIT REMOVAL



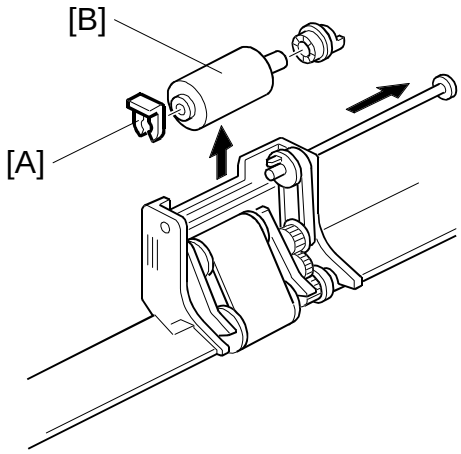
1. Open the DF feed cover [A].
2. Slide the feed unit [B] in the direction of the arrow, then remove it.

3.2 SEPARATION ROLLER REPLACEMENT



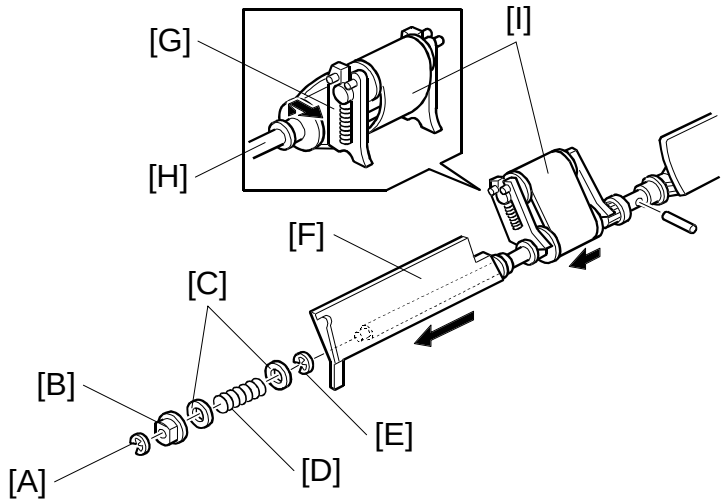
1. Remove the feed unit.
2. Remove the separation roller cover [A].
3. Replace the separation roller [B].

3.3 PICK-UP ROLLER REPLACEMENT



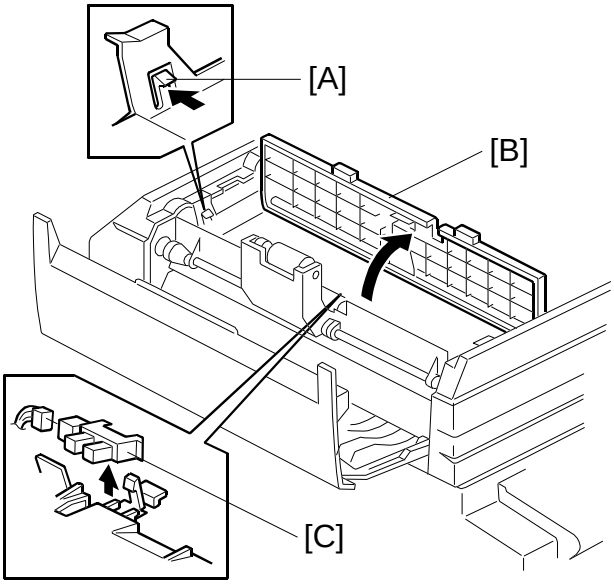
1. Remove the feed unit.
2. Remove the snap ring [A].
3. Replace the pick-up roller [B].

3.4 FEED BELT REPLACEMENT



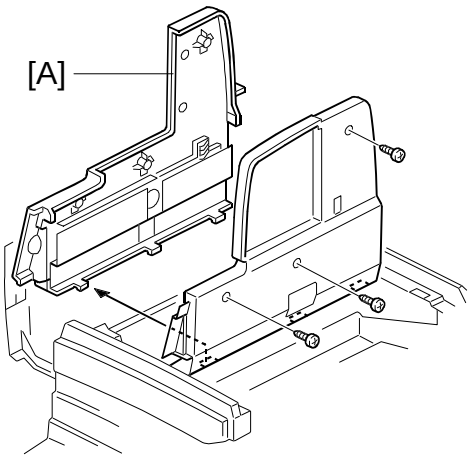
1. Remove the feed unit.
2. Remove the E-ring [A], bearing [B], washers [C], and spring [D].
3. Remove the E-ring [E], and remove the original guide [F].
4. Release the idle roller holder [G] from the drive roller shaft [H], then release the idle roller.
5. Replace the feed belt [I].

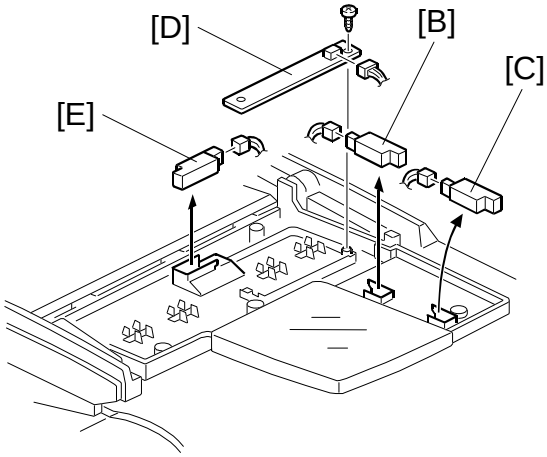
3.5 ORIGINAL SET SENSOR REPLACEMENT

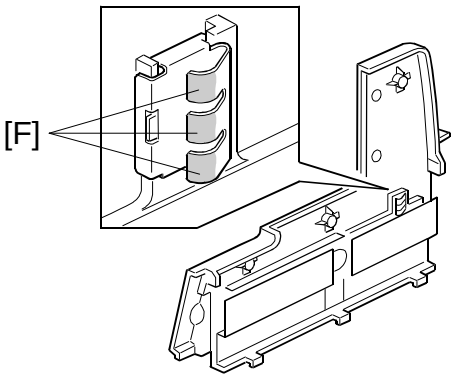


1. Remove the DF feed cover.
2. While releasing the front and rear stoppers [A], open the transport guide [B].
3. Replace the original set sensor [C].

3.6 ORIGINAL SIZE SENSORS REPLACEMENT



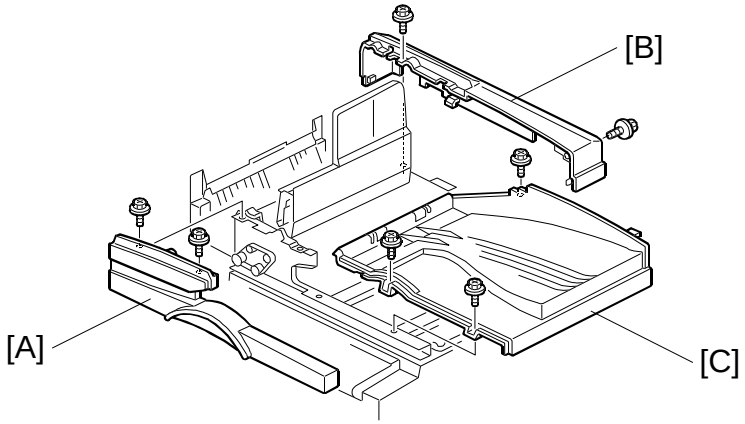




1. Open the original table.
2. Remove the original guide [A] (3 screws).
3. Replace the following sensors:
   - Original length sensor 1 [B]
   - Original length sensor 2 [C]
   - Original width sensor (1 screw) [D]
   - Original trailing edge sensor [E]

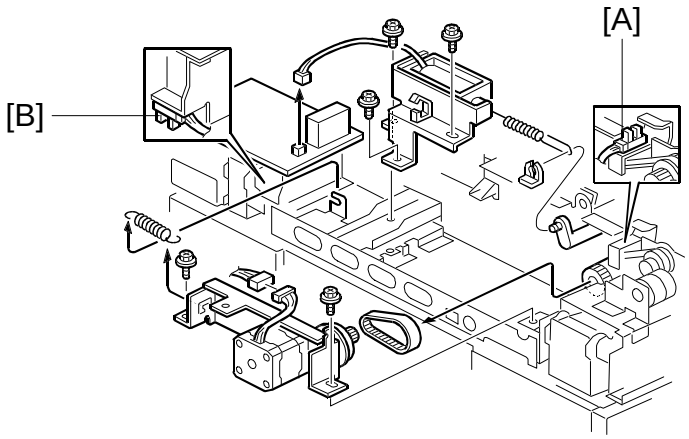
NOTE: To prevent incorrect size detection, clean the electrode [F] of the original width sensor using alcohol or a dry cloth. Then apply conductive grease KS-660 (G0049668).

3.7 ORIGINAL EXIT TRAY/FRONT COVER/REAR COVER REMOVAL



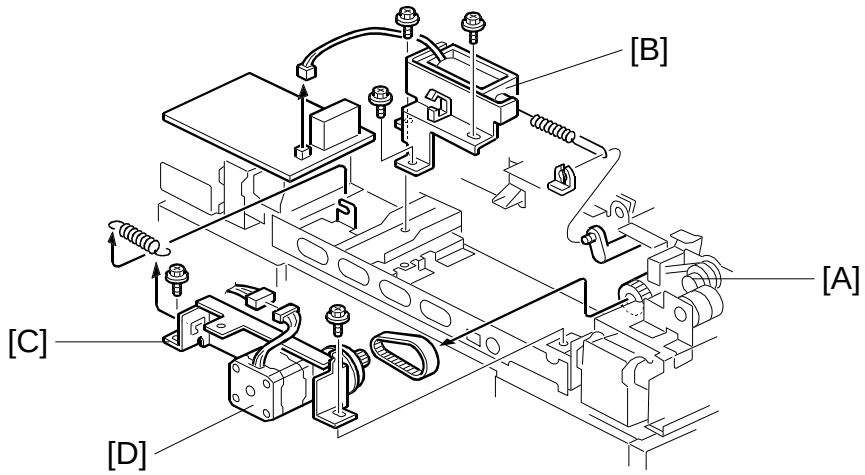
1. Open the DF feed cover.
2. Open the original table.
3. Remove the front cover [A] (2 screws).
4. Remove the rear cover [B] (2 screws).
5. Remove the original exit tray [C] (3 screws).

3.8 FEED COVER OPEN SENSOR/DF OPEN SENSOR REPLACEMENT



1. Remove the rear cover (2 screws).
2. Replace the following sensors:
   - Feed cover open sensor [A].
   - DF open sensor [B]

3.9 FEED CLUTCH/PICK-UP SOL/TRANSPORT MOTOR REPLACEMENT



1. Remove the rear cover (2 screws).

- Feed Clutch -

2. Replace the feed clutch [A] (1 E-ring and 1 connector).

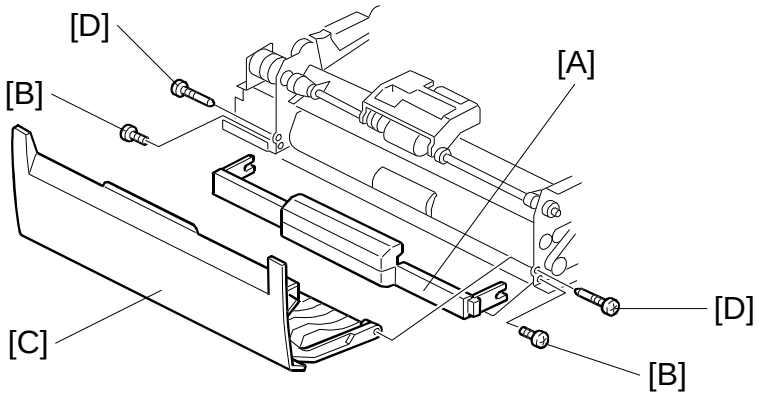
- Pick-up Solenoid -

3. Replace the pick-up solenoid [B] (3 screws and 1 connector).

- Transport Motor -

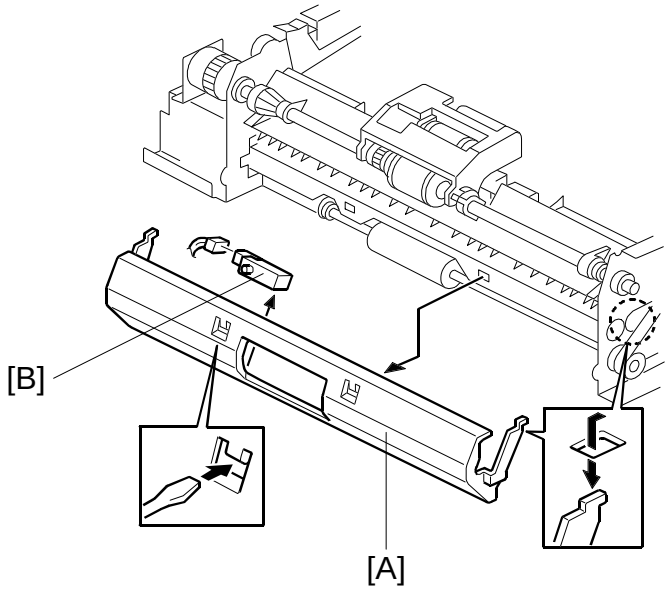
4. Remove the transport motor bracket [C] (2 screws).
5. Remove the transport motor [D] (2 screws, 1 connector).

3.10 DF FEED COVER REMOVAL



1. Remove the front cover (2 screws) and the rear cover (2 screws).
2. Remove the turn guide [A] (2 screws [B]).
3. Remove the DF feed cover [C] (2 screws [D]).

3.11 REGISTRATION SENSOR REPLACEMENT



1. Remove the front cover (2 screws) and the rear cover (2 screws).
2. Remove the transport guide [A].
3. Replace the registration sensor [B].

CÓPIA NÃO CONTROLADA

C248

SERVICE MANUAL

CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

1. ESSENTIAL DIFFERENCES BETWEEN THE C237 AND C248

The C248 is the successor to the current C237. The function and operation of the model C237 and the new C248 are identical. The only exception is the color change of the outer plastic covers.

⟹ Please refer to the C237 portion of the Service Manual for all your service requirements for the C248.

CÓPIA NÃO CONTROLADA

C267

CÓPIA NÃO CONTROLADA

CÓPIA NÃO CONTROLADA

1. INSTALLATION

1.1 INSTALLATION REQUIREMENTS

Carefully select the installation location because environmental conditions greatly affect machine performance.

1.1.1 OPTIMUM ENVIRONMENTAL CONDITION

1. Temperature: 10 to 30 C (50 to 86 F)
2. Humidity: 20 to 90 %RH
3. Install the machine on a strong and level base. The machine must be level within 5mm (0.2") both front to rear left to right.

1.1.2 ENVIRONMENTS TO AVOID

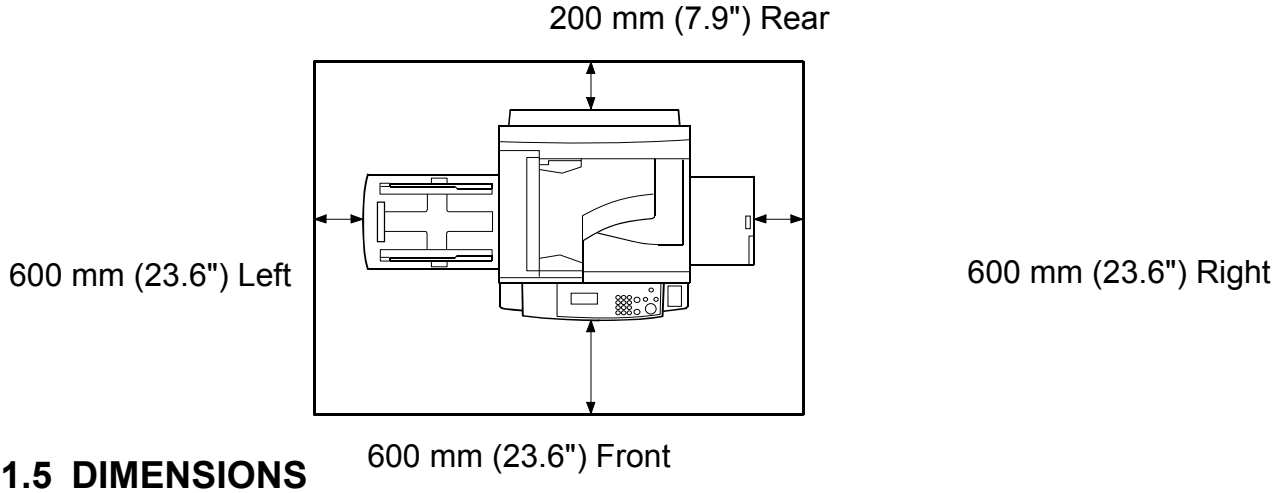
1. Locations exposed to direct sunlight or strong light (more than 1,500 lux).
2. Dusty areas
3. Areas containing corrosive gases.
4. Locations directly exposed to cool air from an air conditioner or reflected heat from a space heater. (Sudden temperature changes from low to high or vice versa may cause condensation within the machine.)

1.1.3 POWER CONNECTION

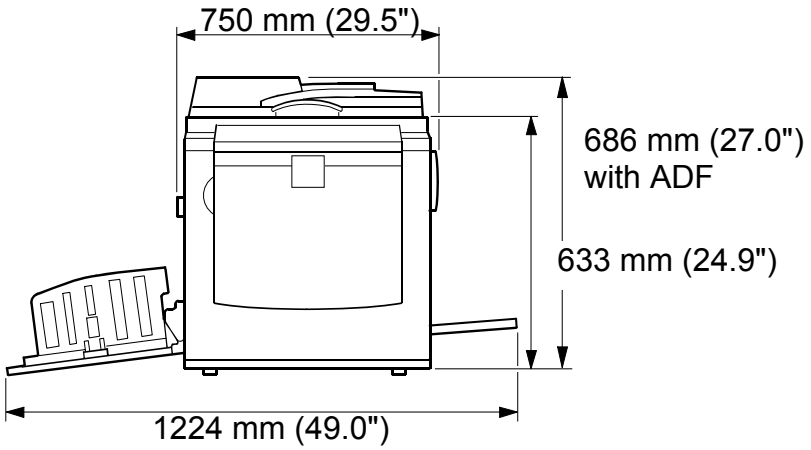
1. Securely connect the power cord to a power source.
2. Make sure that the wall outlet is near the machine and easily accessible.
3. Make sure the plug is firmly inserted in the outlet.
4. Avoid multi-wiring
5. Do not pinch the power cord.

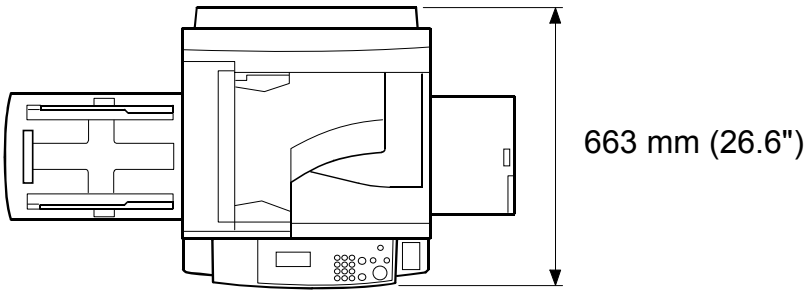
1.1.4 MINIMUM SPACE REQUIREMENTS

Place the machine near a power source, providing minimum clearance as shown below.



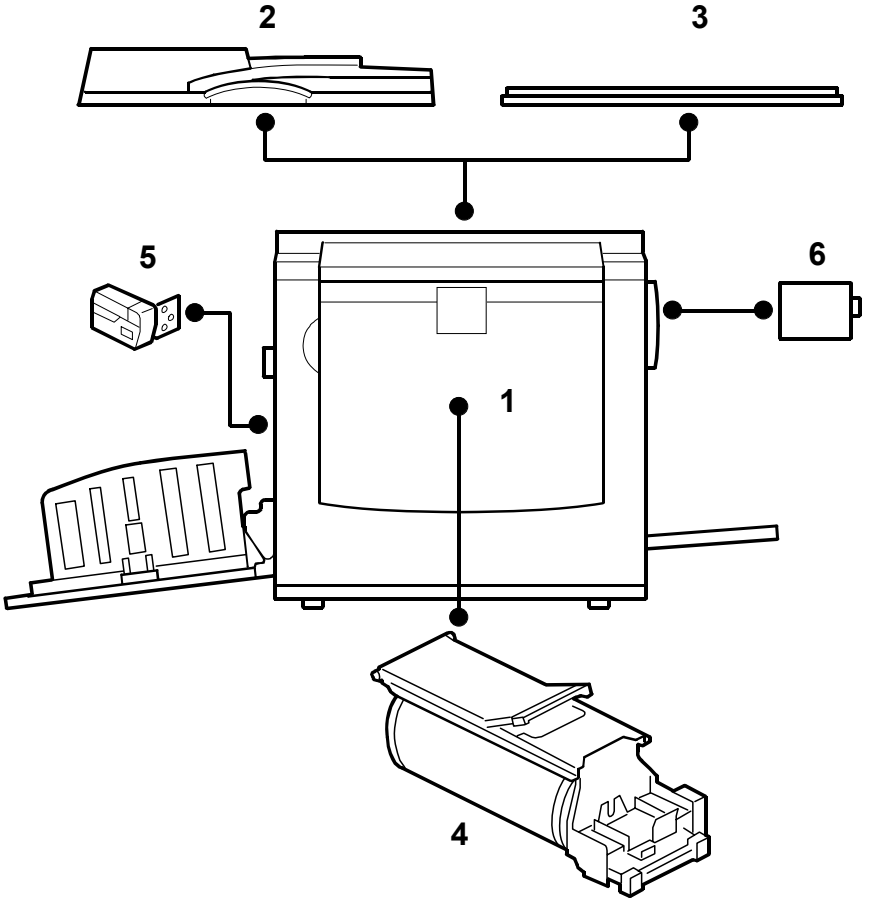
1.1.5 DIMENSIONS





1.1.6 MAIN BODY AND PERIPHERALS

This is a list of the peripheral devices that can be installed with the digital duplicator.



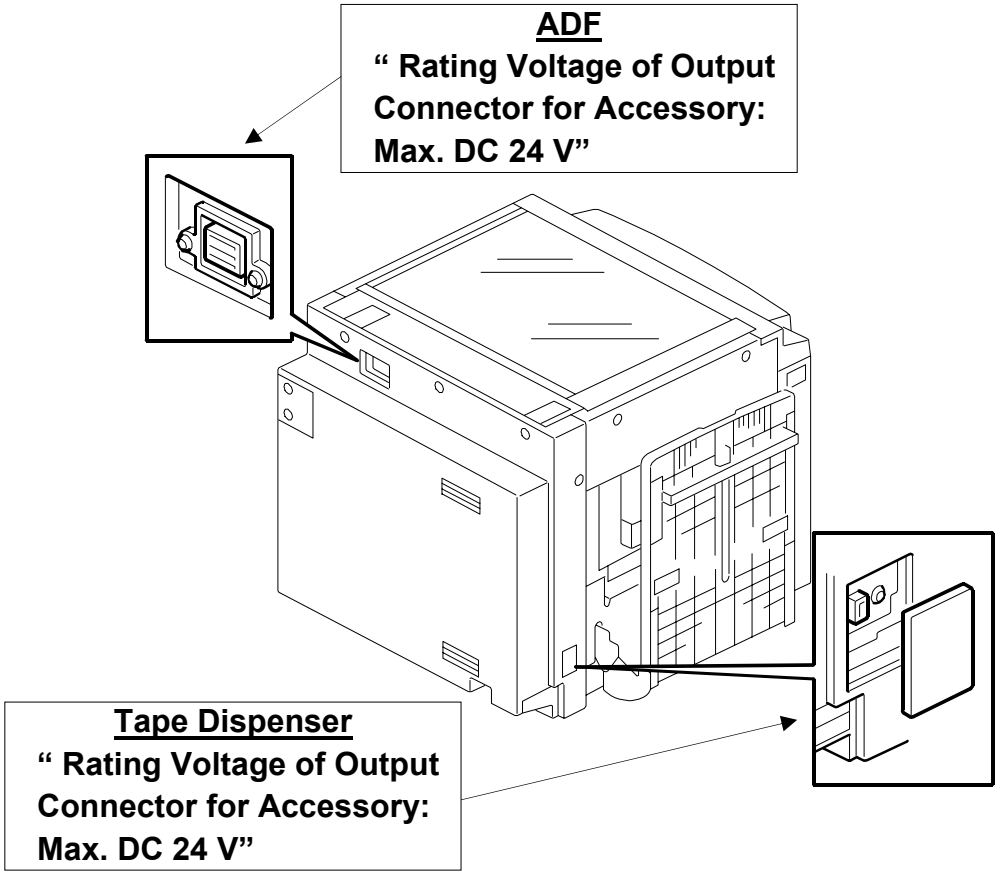
No.	Model	Name	Comments
1	C267	Digital duplicator	Main Machine
2	C642	ADF	Auto document feeder
3	B406	Platen cover	
4	C643/C647/C648	Color drum	Optional drum – A4/LG/B4
5	C651	Tape Dispenser	
6	C646	Printer unit VC-20	Printer controller unit

1.1.7 POWER SOCKETS FOR PERIPHERALS

⚠CAUTION

Rating Voltage for Peripherals

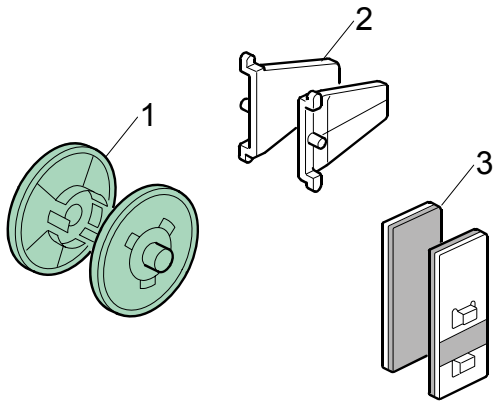
Make sure to plug the cables into the correct sockets.



1.2 INSTALLATION PROCEDURE

1.2.1 MAIN BODY

Accessory Check



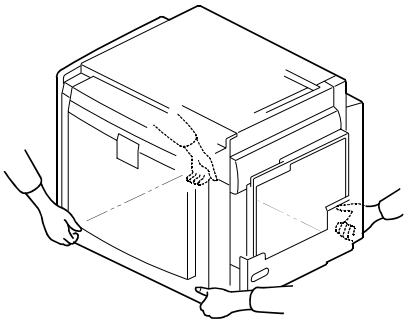
Make sure that you have all the accessories listed below.

Description	Quantity
1. Master Spool	2
2. Paper Delivery Table Side Plate Guide	2
3. Paper Feed Side Pad	2
4. Emblem Cover (C267-80, -83, -92, -93)	1
5. Emblem – Ricoh DX 3440 (C267-80)	1
6. Emblem – Gestetner DX 3440 (C267-80)	1
7. Warranty Letter on carton box (C267-76, -78)	1
8. Leaflet (C267-76, -78)	1
9. Operating Instructions (C267-61, -76, -78, -80, -92)	1
10. Easy Operation Guide (C267-61, -76, -78, -80, -92)	1
11. German Acoustic Statement – Ricoh (C267-83, -93)	1
12. German Acoustic Statement – Gestetner (C267-83, -93)	1
13. Bundled Items List (C267-76, -78)	1
14. NECR (C267-80, -92)	1

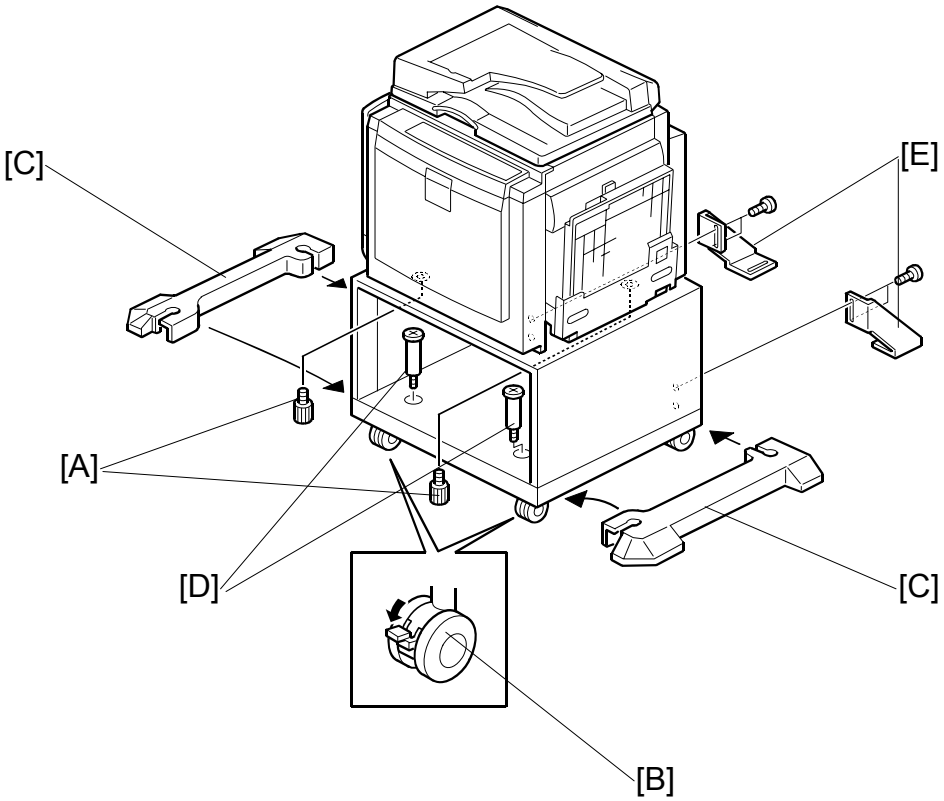
Installation Procedure

⚠CAUTION

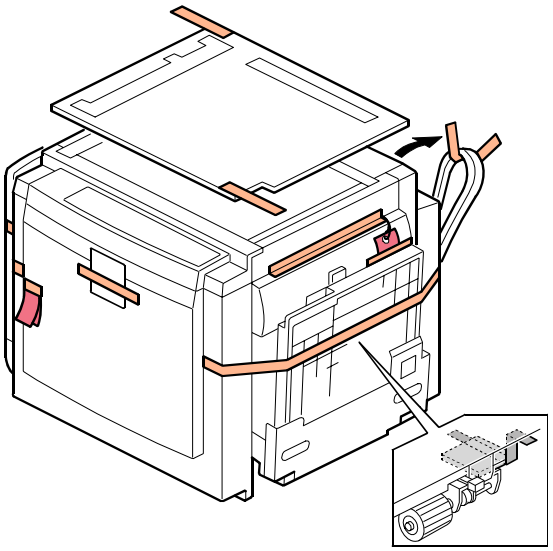
To avoid serious injury, do not connect the power plug to the machine until you are instructed to do so.

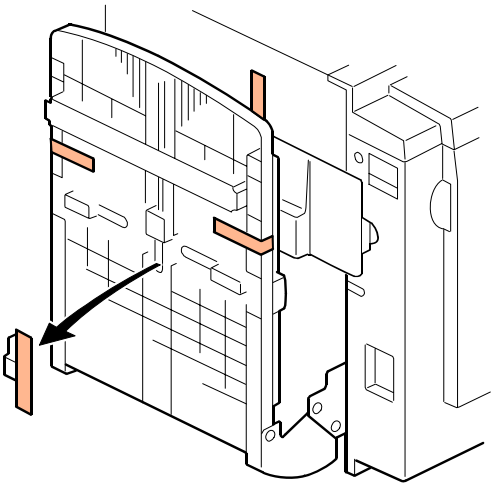


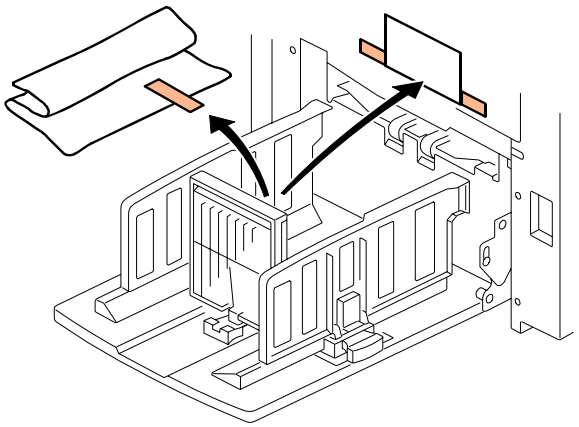
1. Unpack the machine and remove all the wrapping.



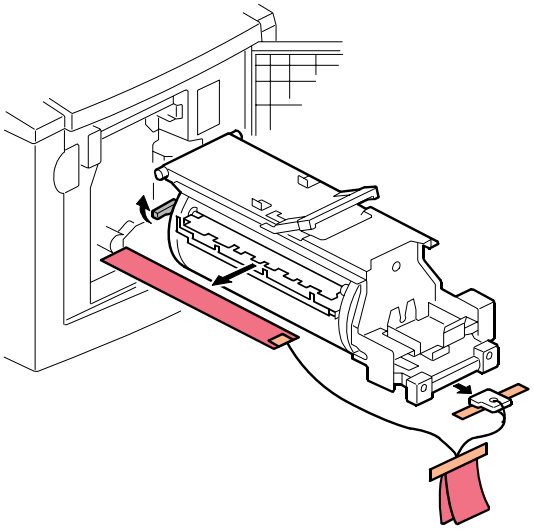
2. When you install the optional table:
   - Mount the machine on the table. There are two screws [A] packed with the table.
   - Lock the caster [B]
   - Fix the caster lock stays [C] and tighten the screws [D]
   - Attach the stabilizing brackets [E] (these help to prevent the machine from falling over).

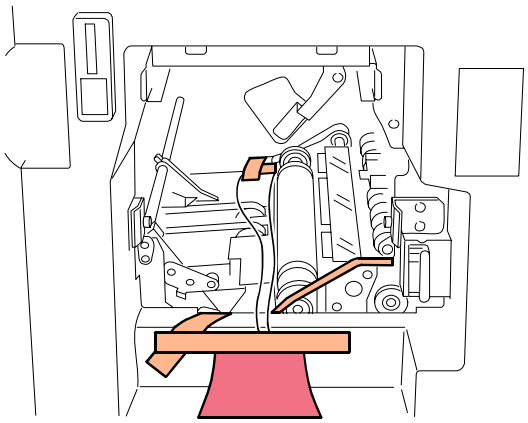




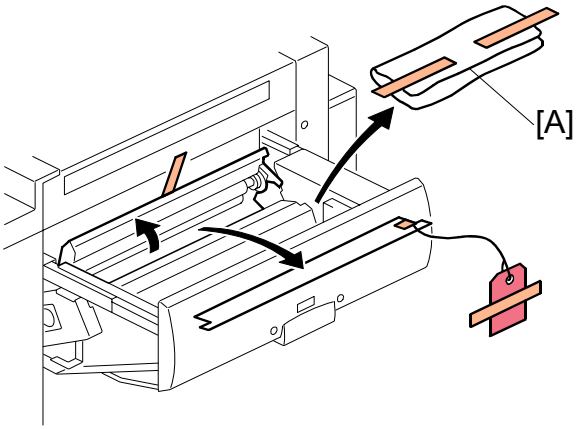


3. Remove the filament tape as shown above.

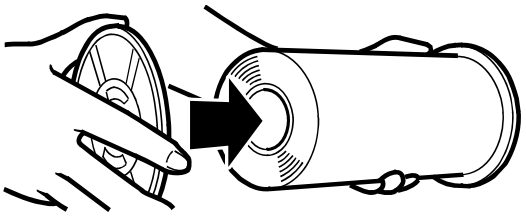




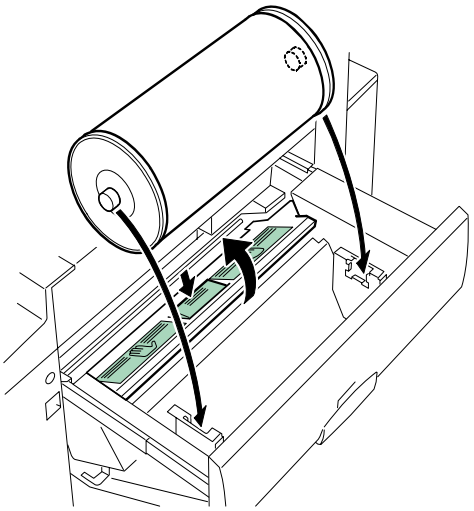
4. Remove the string securing the covers and units as shown above.



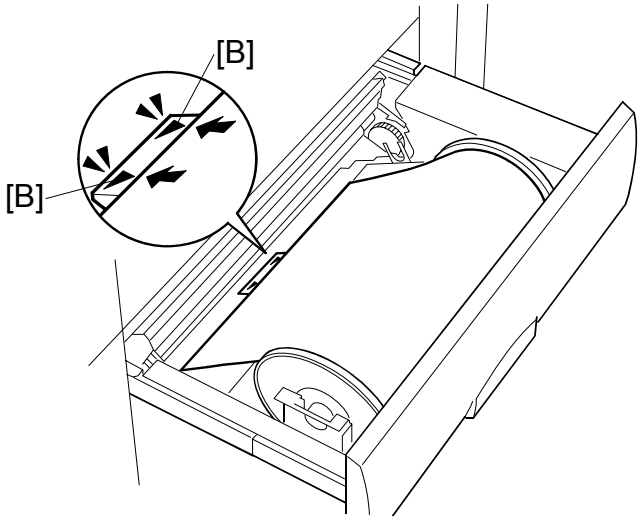
5. Open the paper table.
6. Pull out the master making unit, and take out the accessory bag [A].
7. Remove the filament tape and string securing the covers and units.



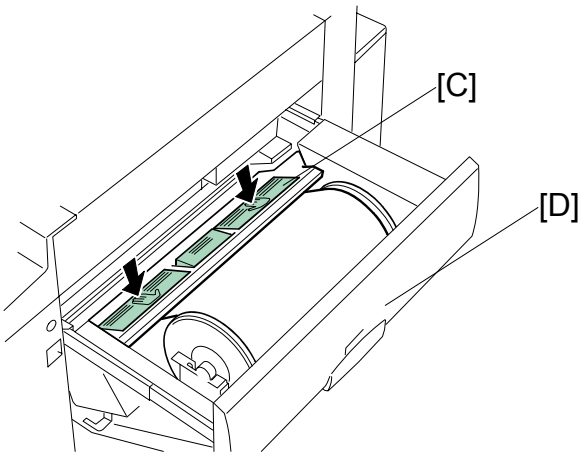
8. Insert both spools into a new master roll.



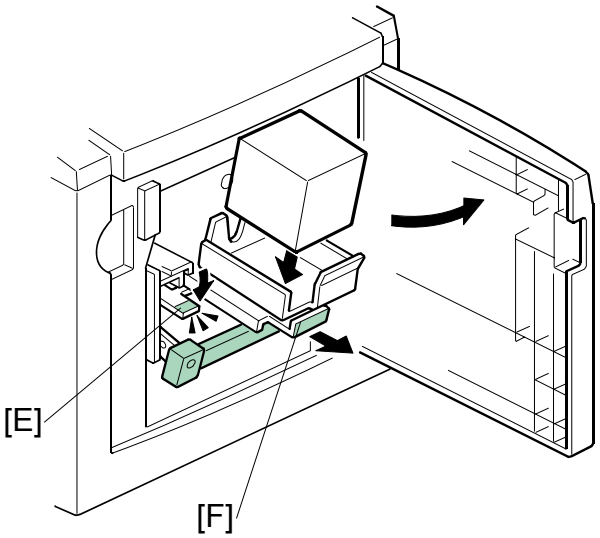
9. Install the master roll, and open the master making unit cover,



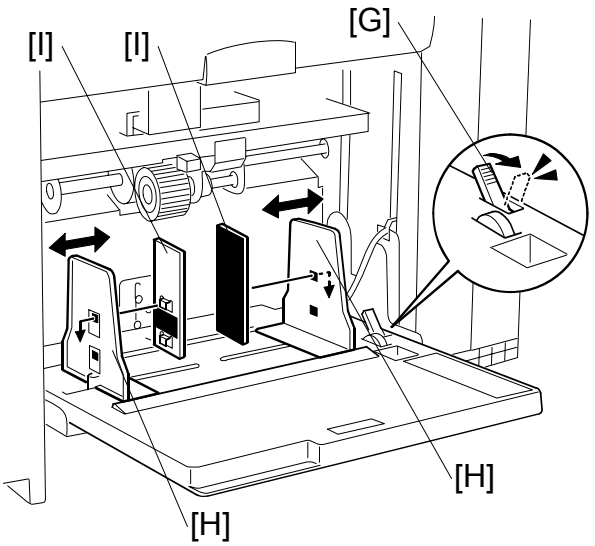
10. Insert the leading edge of the master roll under the platen roller. The arrows [B] indicate the correct position of the master leading edge.



11. Close the master making unit cover [C] using both hands until it clicks into place.
12. Close the master making unit [D].

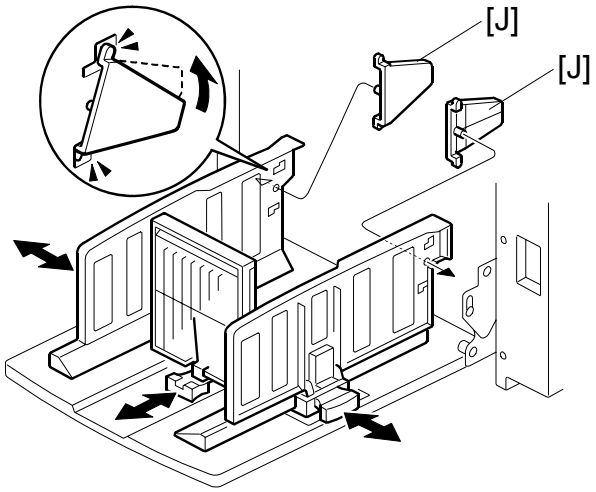


13. Open the front door.
14. Release the ink holder lock lever [E] and pull out the ink holder [F].
15. Remove the cap of the new ink cartridge, and insert a new ink cartridge into the ink holder.
16. Set the ink holder [F].



17. Load a stack of paper on the paper table.
18. Shift the lock lever [G] in the direction of the arrow. Make sure that the side plates [H] touch the paper gently.
19. Shift the lock lever [G] to its original position.

NOTE: Two side fence friction pads [I] are included as accessories. They are not used normally, but if paper multi-feed frequently occurs or thin paper is used, the side fence friction pads [I] can be installed to apply stopping pressure to the paper.



20. Raise the paper delivery table slightly, then gently lower it.
21. Lift the side plates and the end plate, and attach the side plate guides [J] for both side plates.

NOTE: When printing on A4 SEF, 81/2" SEF, B5 JIS LEF and SEF size paper and thin paper, you should attach the side plate guides to the side plates of the paper delivery tray. Users can also attach these guides.

22. Adjust the side and end fences of the paper delivery table to match the paper size.
23. Firmly insert the power plug in the outlet.
24. Turn on the main switch.
25. Make a master and make 30 prints with this master. Do this at least three times, until the image quality is acceptable.

NOTE: This is a new drum. Because of this, before the first print is made, ink is supplied automatically. This takes 2 minutes.

Changing the operation panel language

There are ten languages in the machine. If you need to change the language, use the User Tools menu to set the language.

- On the operation panel, press the User Tools key.
- Select “2. System”.
- Select “5. Language on LCD”.
- Select the language.

Date/Time Setting

Use the User Tools menu to set the current date and time.

- On the operation panel, press the User Tools key.
- Select “2. System”.
- Select “6. Date/Time”.
- Enter the date and the time.

SP Codes Setting

SP No.	Menu	Function
SP3-2	Input TEL number	Do this SP and input the contact numbers of the customer engineer. These numbers are shown when a service call is issued.

1.2.2 COLOR DRUM (OPTION)

Accessory Check

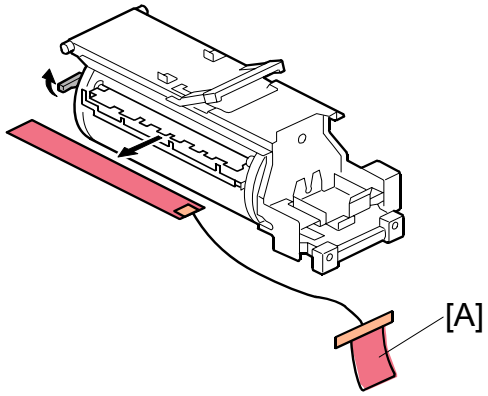
Check the quantity and condition of the accessories in the box against this list:

Description	Quantity
1. Color Indicator Decal	5

Installation Procedure

⚠CAUTION

To avoid serious injury, do not connect the power plug to the machine until you are instructed to do so.

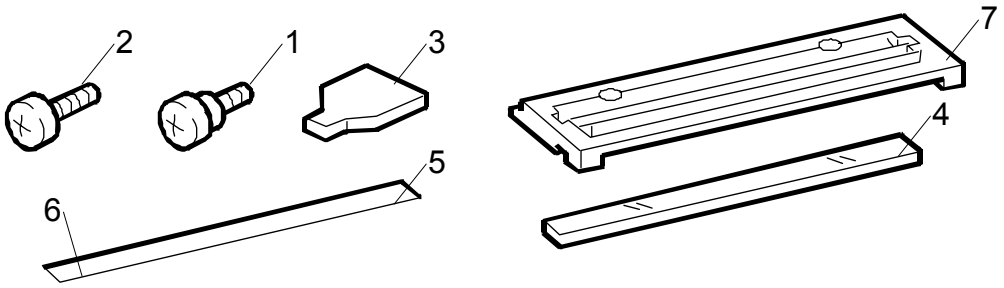


1. Remove the protective sheets [A] from the drum.
2. Attach a color indicator decal to the drum case. The decal must be the same color as the ink in use.
3. Remove the drum from the machine.
4. Leave the master wrapped around the removed drum to protect the drum from dust and from drying.
5. Keep the removed drum in the drum case.
6. Install the color drum in the machine.
   NOTE: The color drum indicator on the operation panel stays lit when a drum is mounted in the machine.
7. Remove the ink cartridge cap.
8. Insert the ink cartridge in the ink holder.
9. After main body installation, firmly insert the power plug in the outlet.
10. Turn on the main switch.
11. Make a master and make 30 prints with this master. Do this at least three times, until the image quality is acceptable.

NOTE: This is a new drum. Because of this, before the first print is made, ink is supplied automatically. This takes 2 minutes.

1.2.3 ADF (OPTION)

Accessory Check

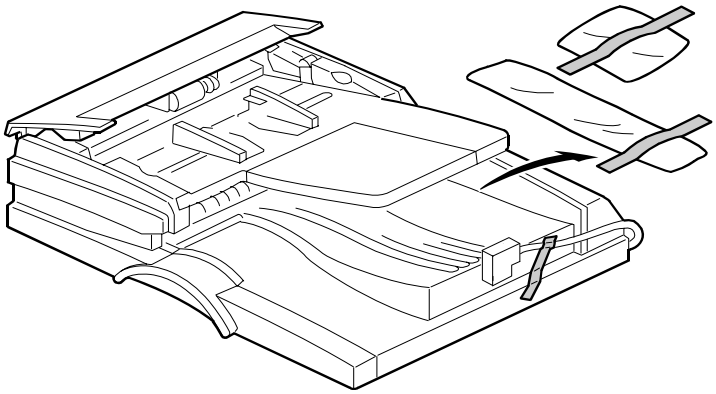


Check the quantity and condition of the accessories in the box against this list:

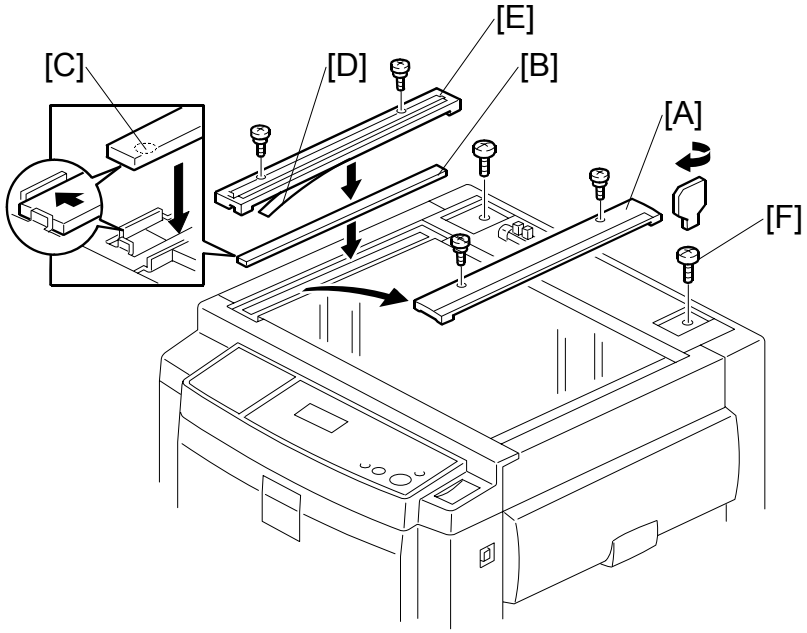
Description	Quantity
1. Stepped Screw	2
2. Screws	2
3. Screwdriver Tool	1
4. DF Exposure Glass	1
5. Decal - Scale – mm	1
6. Decal - Scale – inch	1
7. Scale Guide	1
8. Attention Label	1

Installation Procedure

⚠CAUTION
To avoid serious injury, do not connect the power plug to the machine until you are instructed to do so.



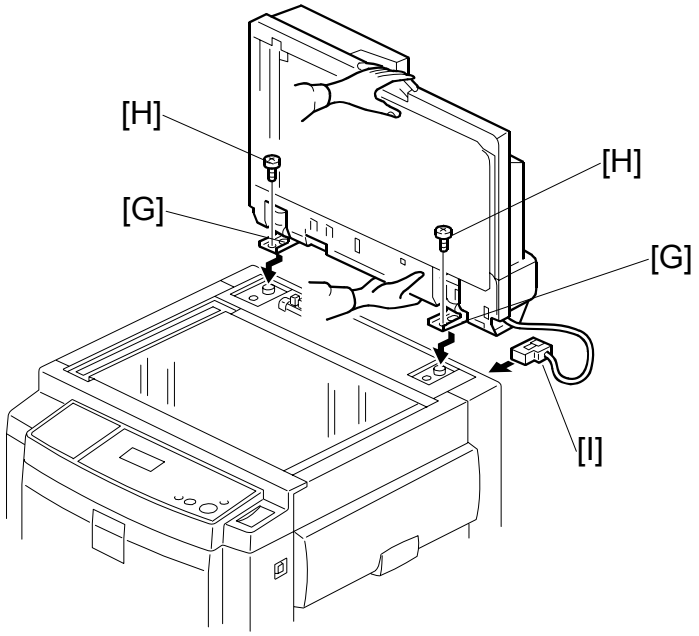
1. Remove the strips of tape.



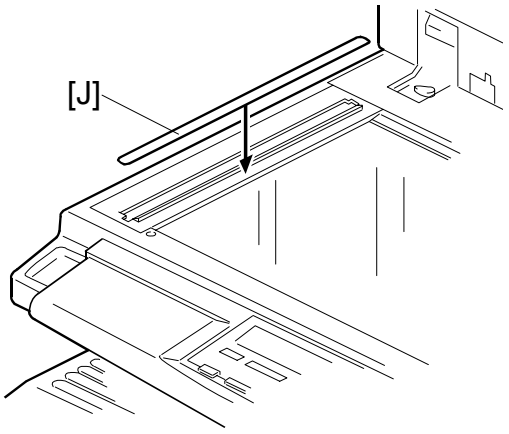
2. Remove the left scale [A] (🔩 x 2).
3. Place the DF exposure glass [B] on the glass holder.

NOTE: When installing the DF exposure glass, make sure that the white dot [C] is positioned at the front side, as shown.

4. Peel off the backing [D] of the double-sided tape attached to the rear side of the scale guide [E], then install the scale guide (2 screws removed in step 2).
5. Install the two stepped screws [F].



6. Mount the DF by aligning the holes [G] in the DF with the stepped screws, then slide the DF to the front as shown.
7. Secure the DF unit with two screws [H].
8. Connect the cables [I] to the main body.



9. Attach the scale decal [J] as shown.
10. Connect the power cord, then turn the main switch on.

1.2.4 PLATEN COVER (OPTION)

Accessory Check

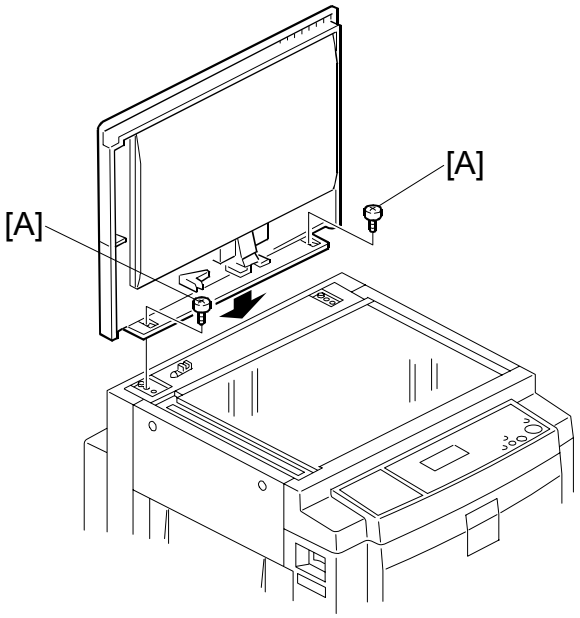
Check the quantity and condition of the accessories in the box against this list:

Description	Quantity
1. Stepped Screw	2

Installation Procedure

⚠CAUTION

To avoid serious injury, do not connect the power plug to the machine until you are instructed to do so.



1. Install the platen cover [A] (☞ x 2).

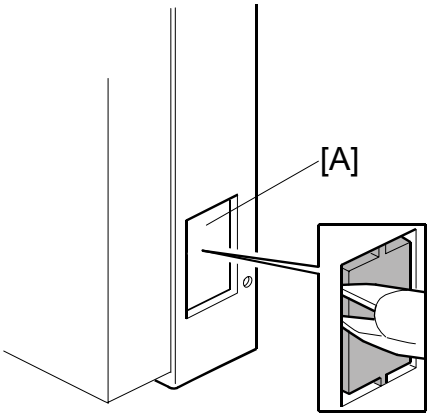
1.2.5 TAPE DISPENSER (OPTION)

Accessory Check

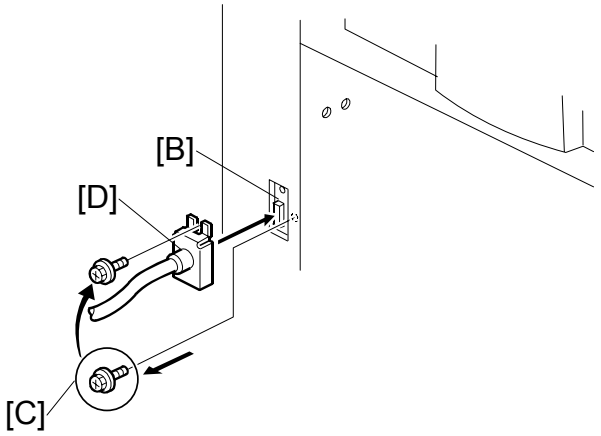
Check the quantity and condition of the accessories in the box against this list:

Description	Quantity
1. Knob Screw (For C210, C217, C218, C219, C222, C223, C225, C228, C238, C237, C238, C248, C249, C264 and C267)	2
2. Screw M4 x 25 (For C211, C212, C213, C214, C216, C224 and C226)	2
3. Hexagon Nut M4 (For C211, C212, C213, C214, C216, C224 and C226)	2
4. Auxiliary Bracket (For C226 and C267)	1
5. Auxiliary Bracket (For C238, C247 and C249)	1
6. Auxiliary Bracket (For C264)	1
7. Screw M4 x 8 (For C226, C238, C247, C249 and C267	4
8. Lock Washer (For C226 only)	1
9. Lock Washer (Without C267)	1
10. Tape	1

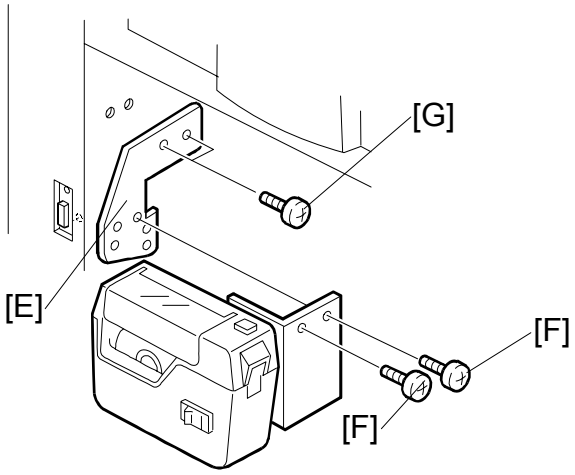
Installation Procedure



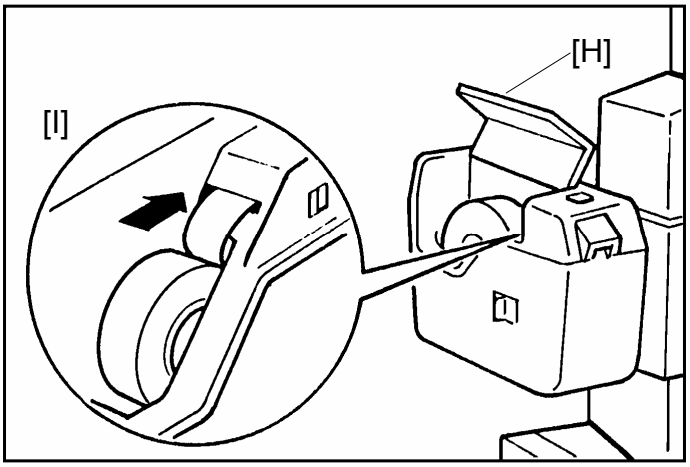
1. Turn off the main switch and unplug the power cord.
2. Remove the paper delivery cover (🔩 x 5).
3. Remove the cutout [A] from the rear cover, as shown.



4. Connect the harness from the tape dispenser to the connector [B].
5. Remove the screw [C] that is beside the connector [B]. Reuse the screw to secure the bracket [D], as shown.

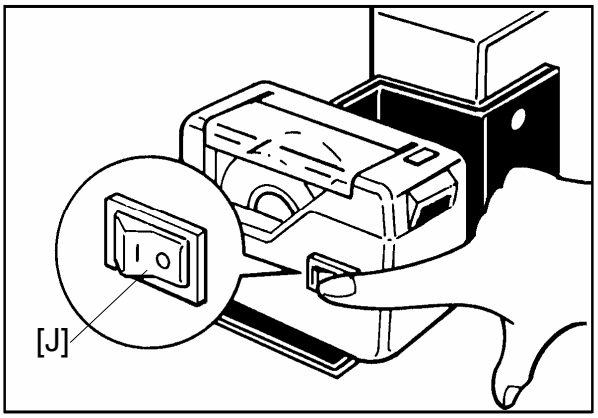


6. Open the master eject unit.
7. Install the auxiliary bracket [E] on the tape dispenser with M4x8 screws (accessories) [F].
8. Install the tape dispenser on the main body with two M4x8 screws [G] (accessories) in the two outer holes in the tape dispenser bracket.
9. Close the master eject unit. Reinstall the paper delivery cover.

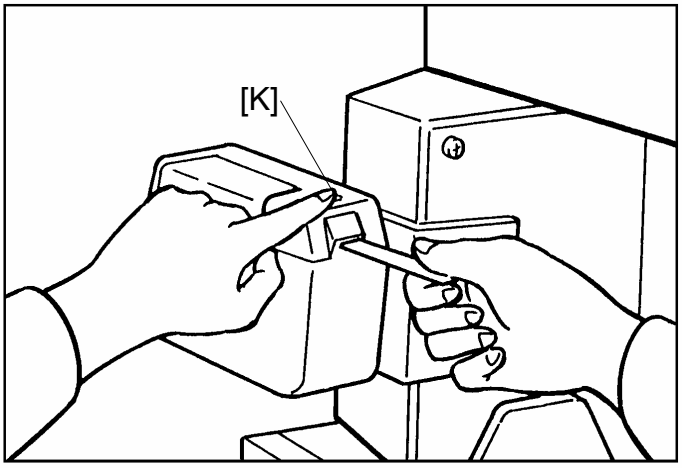


10. Open the tape dispenser cover [H]. Then, insert the leading edge of the tape into the tape entrance until it stops as shown in the illustration [I].

NOTE: Be sure that the tape is installed in the proper direction. If it is not, the tape dispenser will not work correctly.



11. Firmly insert the power plug in the outlet.
12. Turn on the main switch of the main body.
13. Turn on the tape dispenser switch [J].

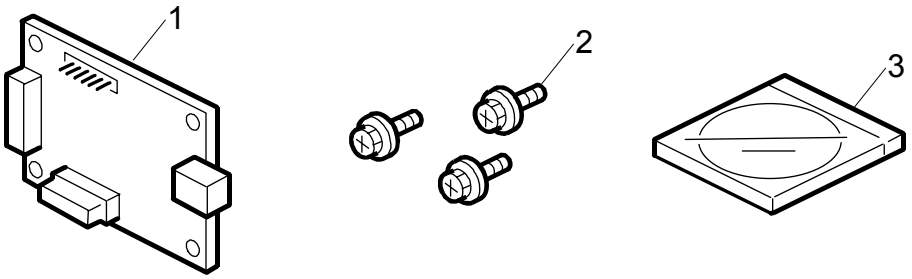


14. Press the tape cut button [K] to cut off the leading edge of the tape.
15. Check the tape dispenser operation using the Memory/Class modes of the main body.

1.2.6 PRINTER UNIT VC-20 (OPTION)

Accessory Check

Make sure that you have all the accessories listed below.

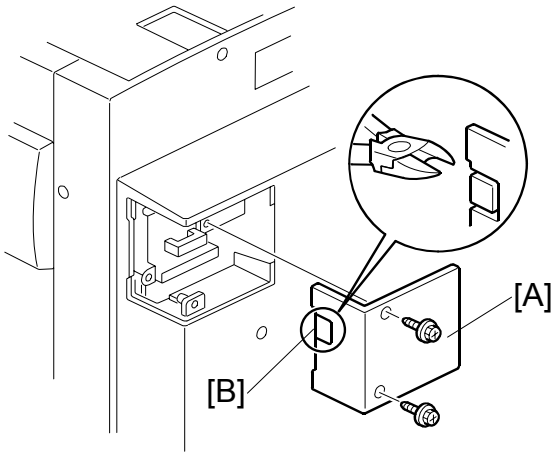


Description	Quantity
1. VC-20 Interface Board	1
2. Screws	3
3. Installation CD	1
4. Quick Install Guide	1
5. Safety Information	1

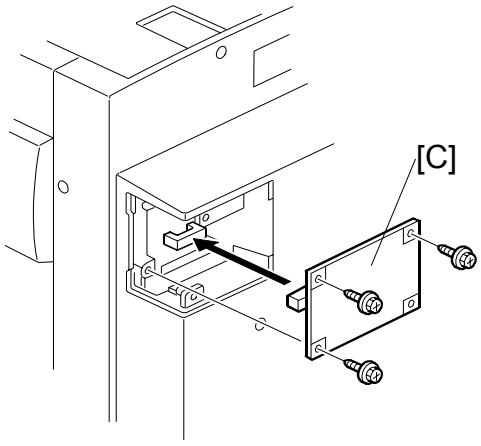
Installation Procedure

⚠CAUTION

To avoid serious injury, do not connect the power plug to the machine until you are instructed to do so.



1. Remove the small rear cover [A] in the rear cover. (🔩 x 2)
2. Cut out the USB port cover [B] in the small rear cover.



3. Connect the VC-20 interface board [C] to CN114 of the MPU board and secure it using three screws.
4. Reinstall the small rear cover.

2. PREVENTIVE MAINTENANCE

The following items should be maintained periodically. There are two sets of intervals - one based on time and the other based on print count or original count. For maintenance items with entries in both of them, use whichever comes first.

Symbol Key: **C**: Clean **R**: Replace **L**: Lubricate

⚠WARNING

Turn off the main power switch and unplug the machine before performing any procedure in this section.

Interval / Item	Time				Print Counter				EM	Note
	6M	1Y	2Y	5Y	600K	1.2M	2.4M	6M		
Optics										
Exposure glass	C	C	C	C					C	Clean with water.
Platen cover	C	C	C	C					C	Clean with water.
White plate	C	C	C	C					C	Clean with water.
Master Feed										
Thermal head	C	C	C	C					C	Clean with alcohol.
Platen roller							C			Clean with alcohol.
Drum and Ink Supply										
Ink nozzle							C			Damp cloth
Drum master sensor							C			Dry cloth
Black patches	C	C	C	C					C	Dry cloth
Cloth screen							R			
Ink roller one-way clutch								R		
Drum master sensor							C			Dry cloth
Master clapper	C	C	C	C					C	Clean with water.
Paper Feed										
Paper feed roller	C	C	C	C		R			C	Dry or damp cloth
Pick-up roller	C	C	C	C		R			C	Dry or damp cloth
Friction pad	C	C	C	C		R			C	Clean with alcohol.
Registration rollers						C				Clean with alcohol.
Feed start timing sensor						C				Dry cloth
Registration sensor	C	C	C	C		C			C	Dry cloth

Interval / Item	Time				Print Counter				EM	Note
	6M	1Y	2Y	5Y	600K	1.2M	2.4M	6M		
Exit sensor						C				Dry cloth
Press roller	C	C	C	C			R		C	Dry or damp cloth
Paper delivery unit bushings						C L		R		Motor oil (SAE #20)
Drum drive gears						L				Grease (Alvania #2)
Paper feed clutch								R		
Paper delivery belts							R			

ADF

Interval / Item	Time				Original Counter	EM	Note
	6M	1Y	2Y	5Y	80K		
Feed belt	C	C	C	C	R	C	Clean with water or alcohol.
Separation roller	C	C	C	C	R	C	Clean with water or alcohol.
Pick-up roller	C	C	C	C	R	C	Clean with water or alcohol.
White plate	C	C	C	C		C	Clean with water or alcohol.
DF exposure glass	C	C	C	C		C	Clean with water.
Platen cover	C	C	C	C		C	Clean with water or alcohol.

3. REPLACEMENT AND ADJUSTMENT

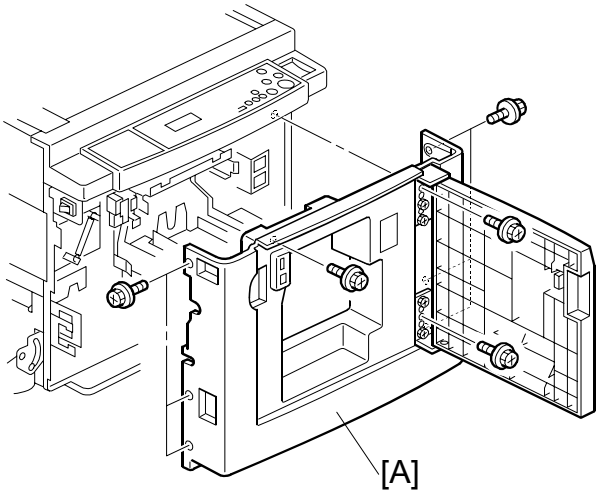
3.1 GENERAL CAUTION

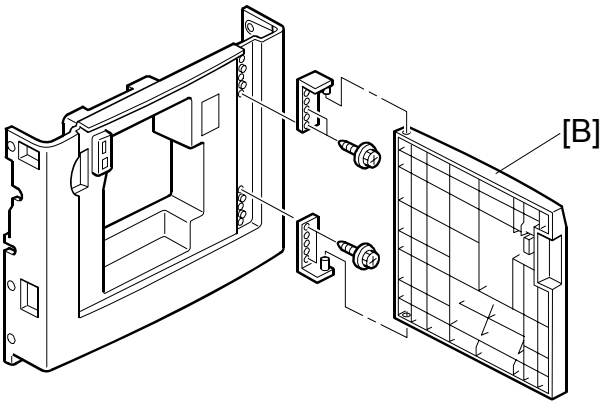
⚠CAUTION

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

3.2 COVERS

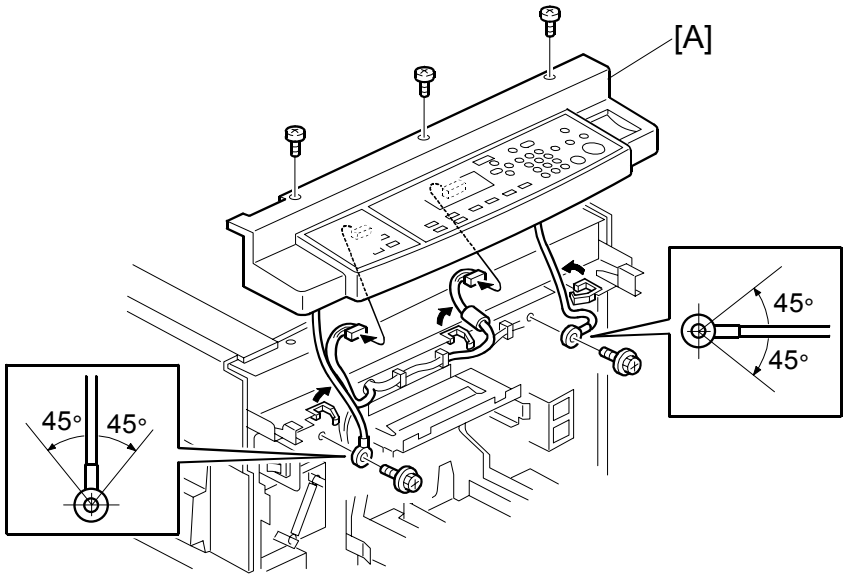
3.2.1 FRONT COVER / FRONT DOOR





[A]: Front cover (🔩 x 9)
[B]: Front door (🔩 x 4)

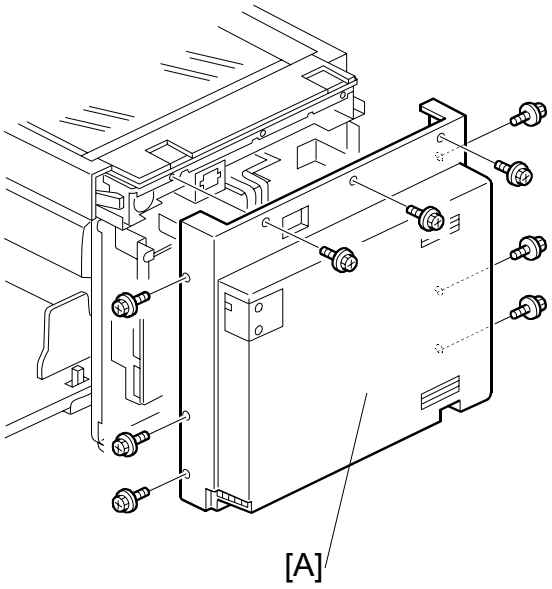
3.2.2 OPERATION PANEL



- Front cover (☛ 3.2.1)

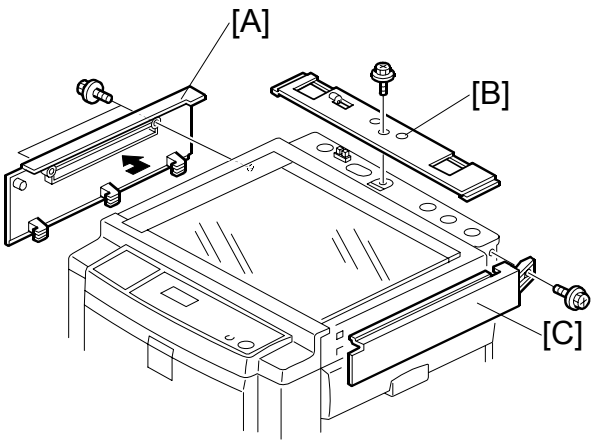
[A]: Operation panel (🔩 x 5, 🔌 x 2, 🔌 x 3)

3.2.3 REAR COVER



[A]: Rear cover (🔩 x 9)

3.2.4 UPPER COVERS



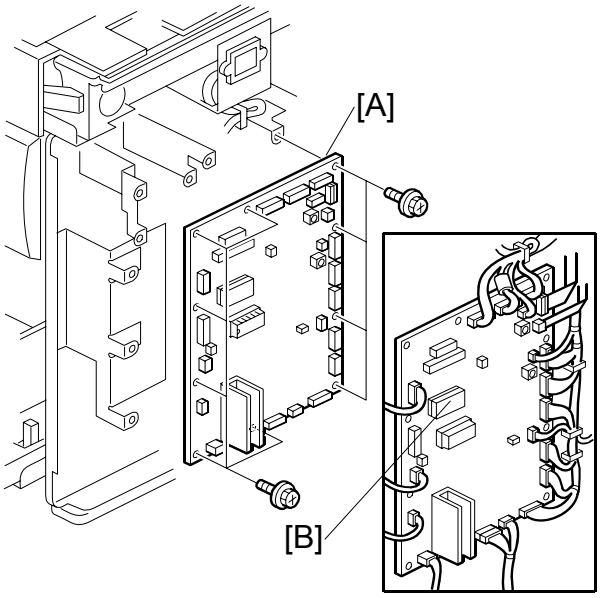
[A]: Left upper cover (☞ x 2)

[B]: Top rear cover (☞ x 1)

[C]: Right upper cover (☞ x 1)

3.3 BOARDS

3.3.1 MPU



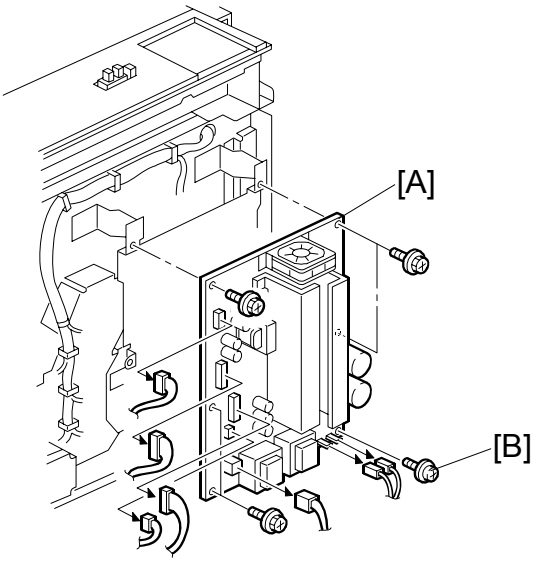
- Rear cover (☛ 3.2.3)

[A]: MPU (🔩 x 10, 🔌 x 18, 2 ribbon cables)

NOTE: 1) Take the NVRAM [B] from the old board and put it in the socket on the new board.
2) Adjust the master end sensor (☛ 3.5.4) after installing the new MPU.
3) Adjust the ink detection (☛ 3.9.6) after installing the new MPU.
4) If you must replace the MPU RAM, you must then do the image adjustments after you install the new RAM (see section 5.7.7. for the procedure).

3.3.2 PSU

NOTE: When the PSU is replaced, the thermal head voltage returns to the default. Adjust the thermal head voltage (☛ 3.5.7) after installing the new board.



PSU board

- Rear cover (☛ 3.2.3)

[A]: PSU (☞ x 6, 🖑 x 7)

NOTE: The split washer screw [B] is used for grounding. Do not use another type of screw here.

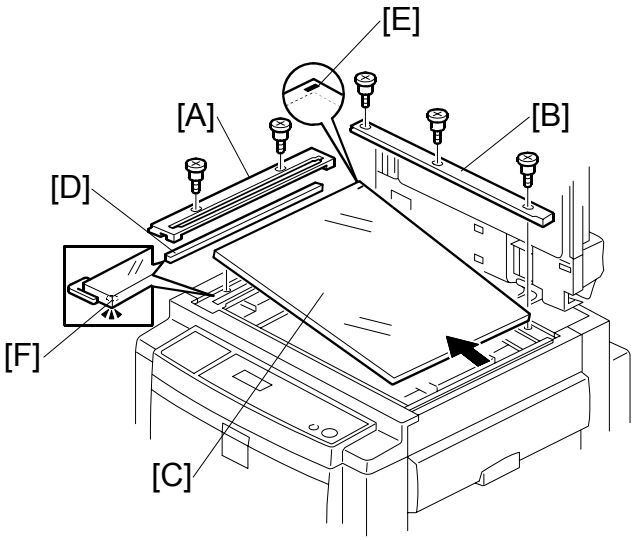
PSU board with bracket

- Rear cover (☛ 3.2.3)

[A]: PSU (☞ x 5, 🖑 x 7)

3.4 SCANNER

3.4.1 EXPOSURE GLASS/DF EXPOSURE GLASS, SCALES



Exposure Glass

[A]: Left scale (🔩 x 2)

[B]: Rear scale (🔩 x 3)

[C]: Exposure glass

NOTE: When reinstalling, make sure that the mark [E] is at the rear left corner, and that the left edge is aligned with the support on the frame.

DF Exposure Glass

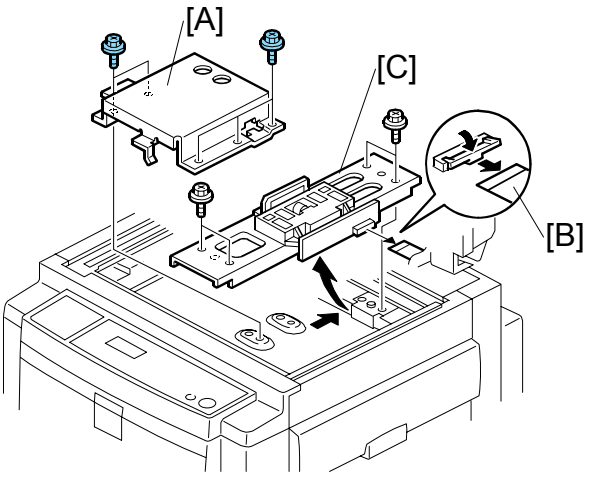
[A]: Left scale (🔩 x 2)

[D]: DF exposure glass

NOTE: When reinstalling, make sure that the mark [F] is on the bottom.

3.4.2 LENS BLOCK

CAUTION: 1) Do not touch the paint-locked screws on the lens block. The position of the lens assembly (black part) is adjusted before shipment.
2) Do not grasp the PCB or the lens assembly when handling the lens block. The lens assembly may slide out of position.



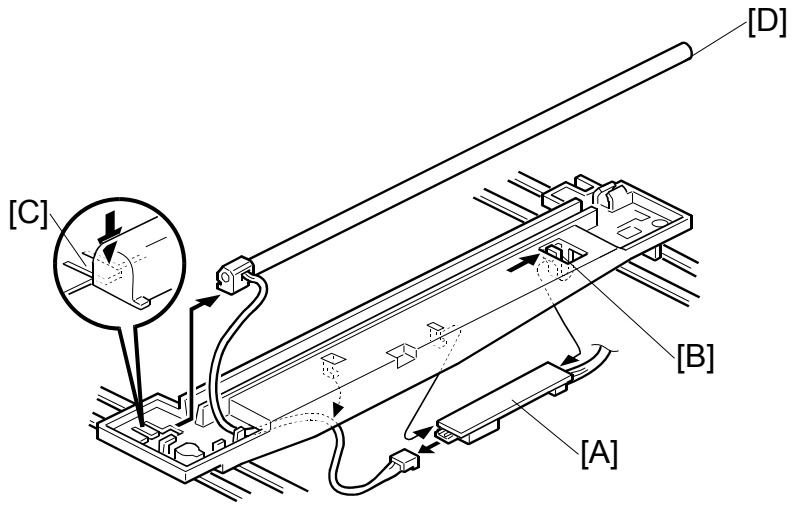
- Exposure glass (☛ 3.4.1)

[A]: Lens cover (🔩 x 5)

[B]: Ribbon cable

[C]: Lens block (🔩 x 4).

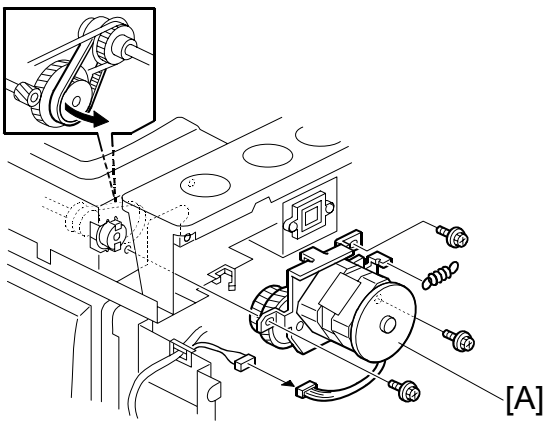
3.4.3 EXPOSURE LAMP, LAMP STABILIZER BOARD



- Exposure glass (☛ 3.4.1)

1. Slide the first scanner to a position where the front end of the lamp is visible.
2. Place one hand under the lamp stabilizer board [A] and release the hook [B].
3. Remove the lamp stabilizer board [A] (☞ x 2).
4. Press the plastic latch [C] and push the front end of the lamp toward the rear.
5. Remove the lamp [D] (with the cable).

3.4.4 SCANNER MOTOR

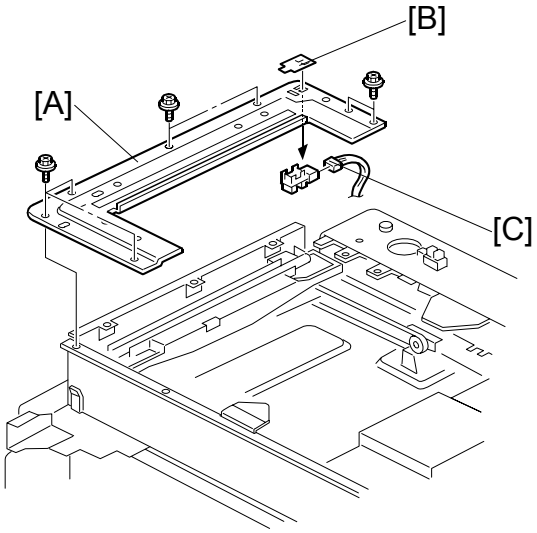


- Rear cover (☛ 3.2.3)
- Exposure glass (☛ 3.4.1)

[A]: Scanner motor (🔩 x 3, 🔌 x 1, x 1, 1 spring, 1 belt)

NOTE: When reassembling, install the belt first, and set the spring next. Fasten the leftmost screw (viewed from the rear), then fasten the other two screws.

3.4.5 SCANNER HOME POSITION SENSOR



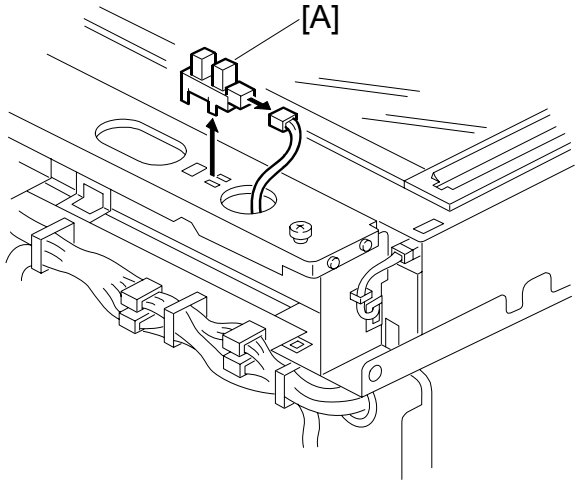
- Left upper cover (☛ 3.2.4)
- Top rear cover (☛ 3.2.4)
- Front cover (☛ 3.2.1)
- Operation panel (☛ 3.2.2)
- Exposure glass, DF exposure glass (if installed) (☛ 3.4.1)

[A]: Scanner left lid (🔩 x 7, 🔌 x 1).

[B]: Sensor tape

[C]: Scanner home position sensor

3.4.6 PLATEN COVER SENSOR



- Top rear cover (☛ 3.2.4)

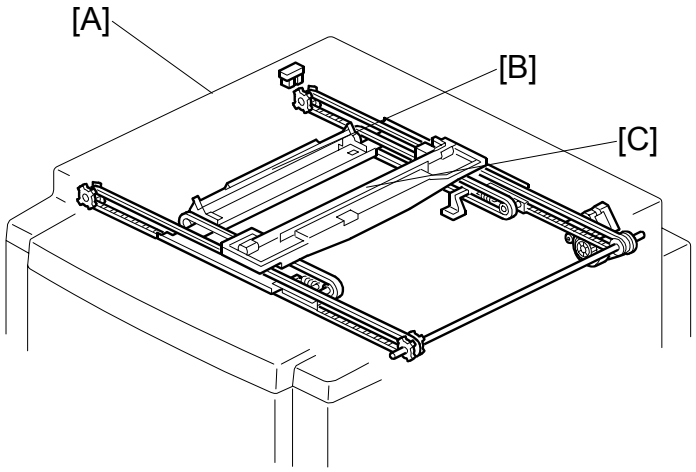
[A]: Platen cover sensor (🖑 x 1).

3.4.7 ADJUSTING THE SCANNER POSITION

⚠CAUTION

Grasp the front and rear ends (not the middle) of the first scanner when you manually move it. The first scanner may be damaged if you press, push, or pull the middle part of the scanner.

Overview

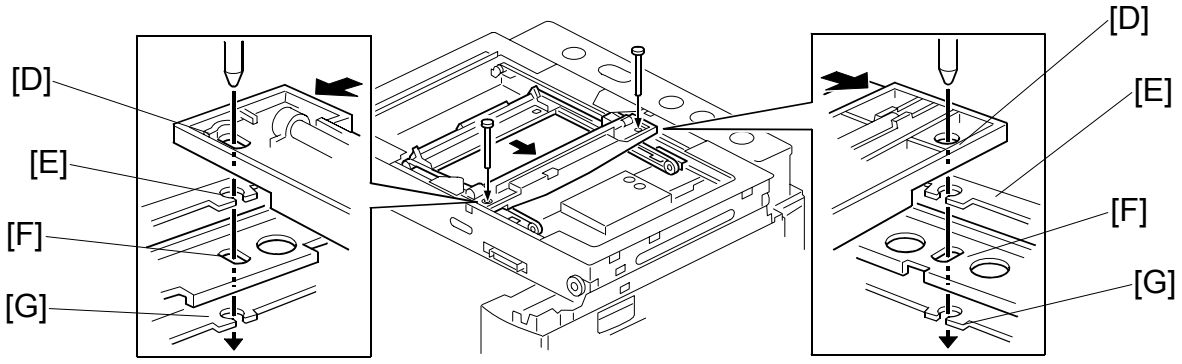


Adjust the scanner positions at these times:

- When the first scanner [C] and second scanner [B] are not parallel with the side frames [A]
- When you have replaced one or more of the scanner belts.

To adjust the scanner positions, do either of the following:

- To adjust the belt contact points on the first scanner (☛ Adjusting the Belt Contact Points for the First Scanner)
- To adjust the belt contact points on the scanner bracket (☛ Adjusting the Belt Contact Points for the Second Scanner)



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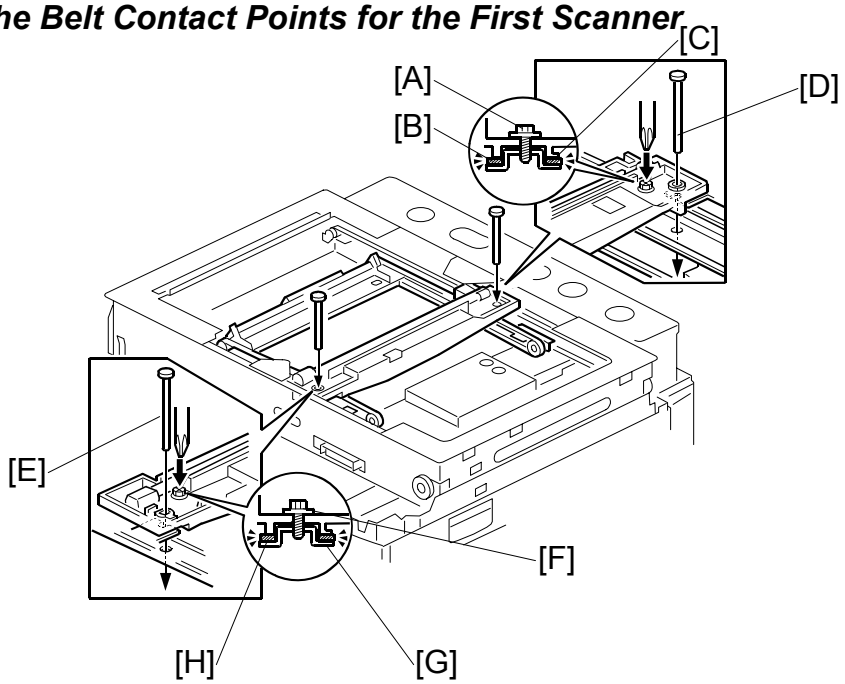
The two actions above have the same objectives: to align the following holes.

1st scanner [D], frame [E], arm of second scanner [F], and frame [G]

The scanner positions are correct when these holes are all aligned.

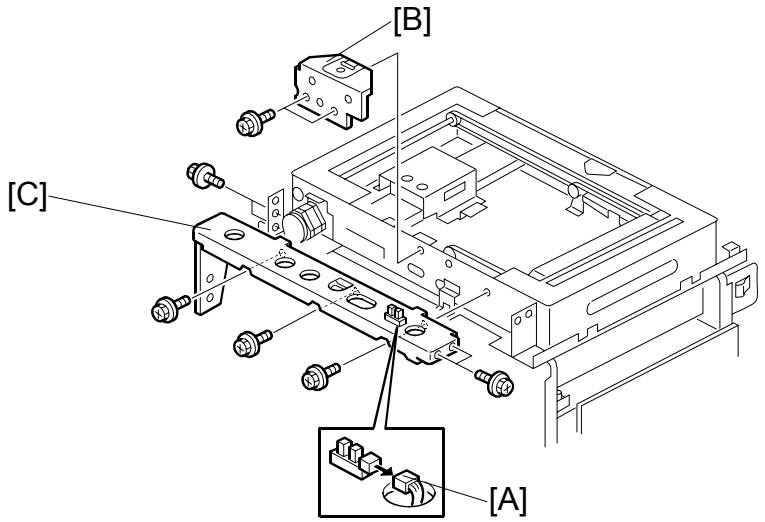
Adjusting the Belt Contact Points for the First Scanner



- ADF or platen cover
- Front cover (☛ 3.2.1)
- Operation panel (☛ 3.2.2)
- Rear cover (☛ 3.2.3)
- Top rear cover (☛ 3.2.4)
- Left upper cover (☛ 3.2.4)
- Exposure glass (☛ 3.4.1)

1. Loosen the 2 screws [A] [F].
2. Slide the 1st and 2nd scanners to align the following holes and marks (☛ Overview):
   - Align all four holes: 1st scanner, frame, arm of second scanner and frame
3. Insert the positioning tools [D] [E] through the holes.
4. Check that the scanner belts [B] [C] [G] [H] are properly set between the bracket and the 1st scanner.
5. Tighten the screws [A] [F].
6. Remove the positioning tools.
7. Reassemble the machine and check the operation.

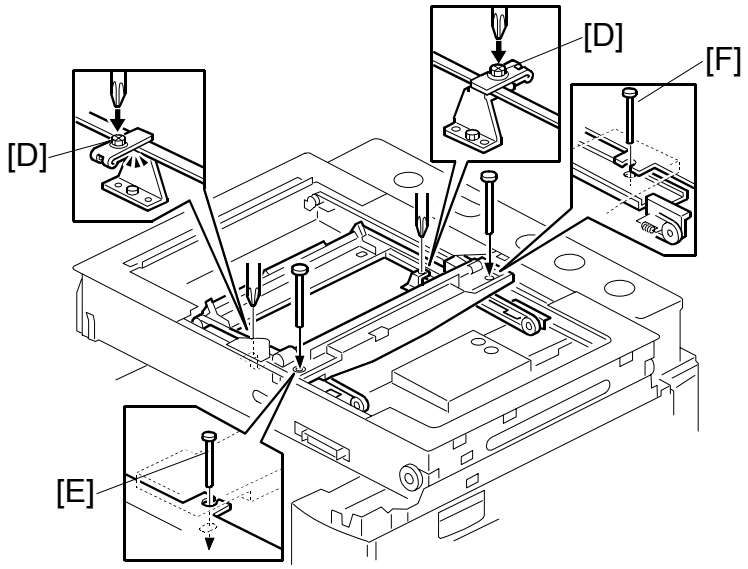
Adjusting the Belt Contact Points for the Second Scanner



- ADF or platen cover
- Front cover (☛ 3.2.1)
- Operation panel (☛ 3.2.2)
- Rear cover (☛ 3.2.3)
- Top rear cover (☛ 3.2.4)
- Left upper cover (☛ 3.2.4)
- Exposure glass (☛ 3.4.1)

1. Disconnect the platen cover sensor connector [A].
2. Scale bracket [B] (🔩 x 2)

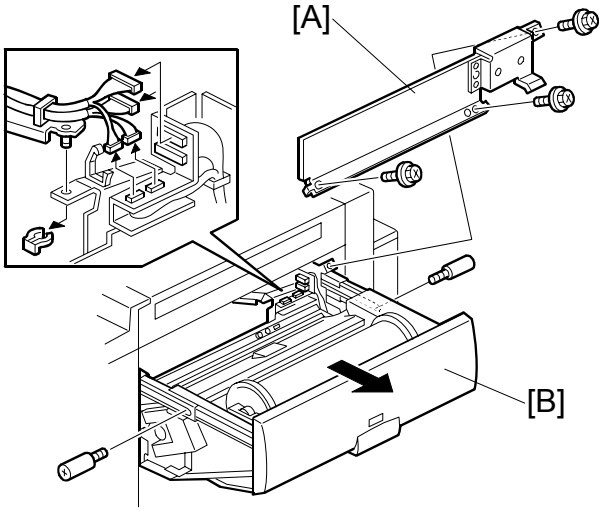
NOTE: 1) Take off the scale bracket, otherwise the screws [D] cannot be loosened.
2) Take off the bracket [C] in order to take off the scale bracket.



3. Loosen the 2 screws [D].
4. Slide the 2nd scanner to align the following holes and marks (☛ Overview):
   - Align all four holes: 1st scanner, frame, arm of second scanner and frame
5. Insert the positioning tools [E] [F] through the holes.
6. Check that the scanner belts are properly set in the brackets.
7. Remove the positioning tools.
8. Reassemble the machine and check the operation.

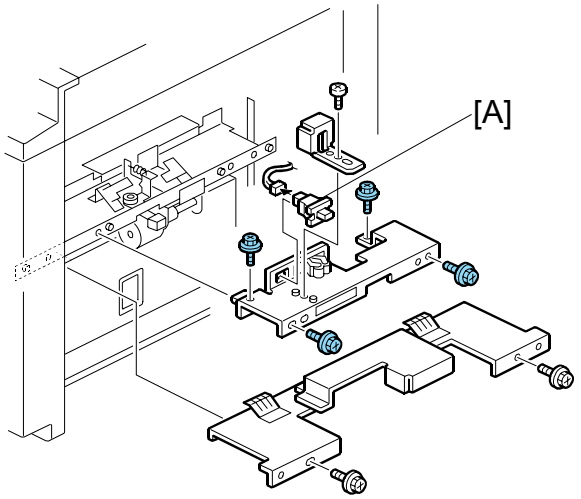
3.5 MASTER FEED

3.5.1 MASTER MAKING UNIT



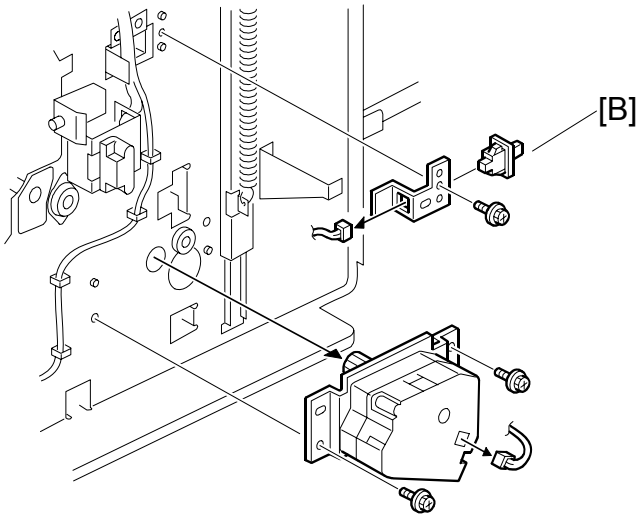
[A]: Master making unit cover (x 3)
[B]: Master making unit (x 2, x 4, x 1, x 1))

3.5.2 MASTER MAKING UNIT SET SWITCHES



- Master making unit (☛ 3.5.1)

[A]: Master making unit set switch (x 1, x 1)

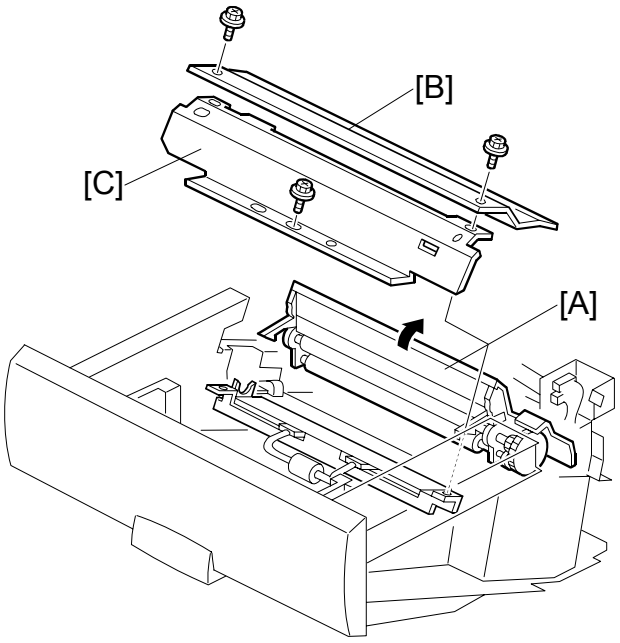


- Front cover (☛ 3.2.1)

[B]: Master making unit set switch (🔩 x 1, 🖐 x 1)

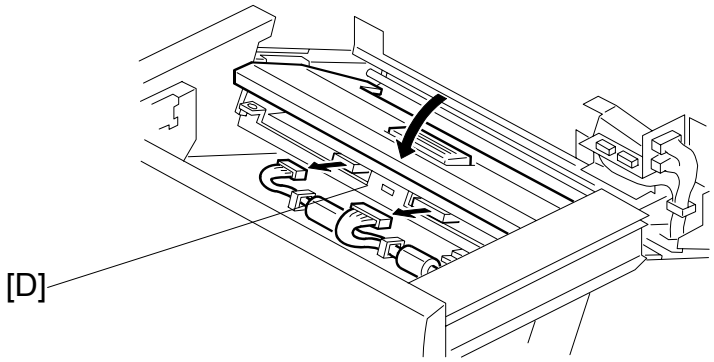
NOTE: There are two master making unit set switches for safety. Both sensors must be on or the machine will not start.

3.5.3 THERMAL HEAD



- Master making unit (☛ 3.5.1)

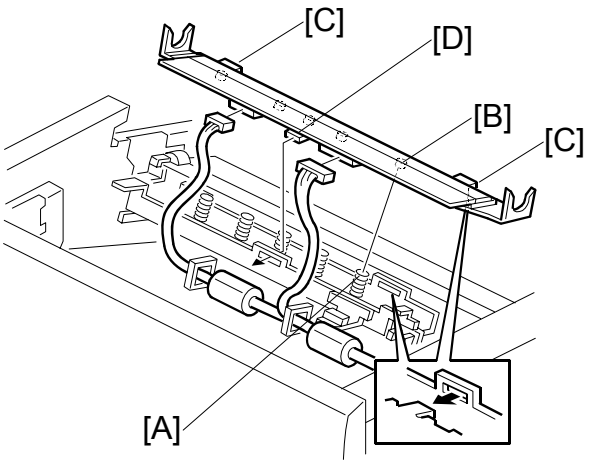
[A]: Open the platen roller unit.
[B]: Thermal head upper cover (☞ x 2)
[C]: Thermal head side cover (☞ x 1)



- Close the platen roller unit.

[D]: Thermal head (☜ x 2)

Installation

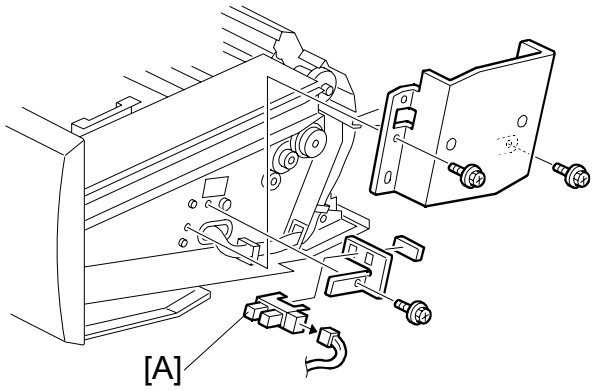


If the following remarks are not followed, the thermal head will be installed incorrectly.

1. Fit the base's springs [A] over the protrusions [B] on the underside of the thermal head (5 points).
2. While fitting the tops of the springs [A] over the protrusions on the underside of the thermal head, hook the lock pawls [C] of the thermal head onto the base (3 lock pawls). Make sure to set the front side [D] (the paper table side) first.
3. Make sure that all protrusions are properly fitted into the springs.

NOTE: 1) Adjust the thermal head voltage (☛3.5.7) after installing the new thermal head.
2) Don't touch the surface with bare hands. (If you touch it, clean the surface with alcohol.)
3) Don't touch the terminals of the connectors with bare hands.

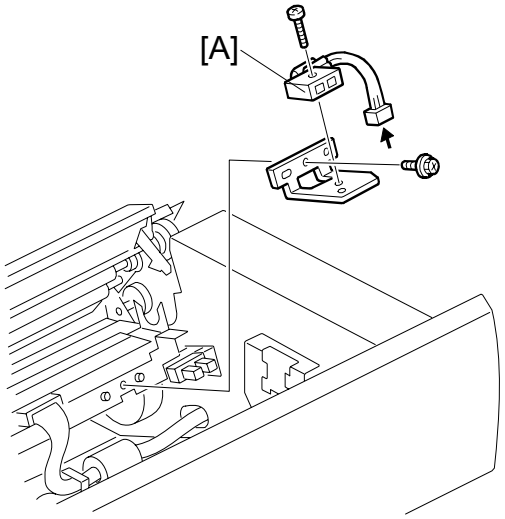
3.5.4 MASTER SET COVER SENSOR



- Master making unit (☛ 3.5.1)

[A]: Master set cover sensor (☞ x 3, 🖑 x 1)

3.5.5 MASTER END SENSOR

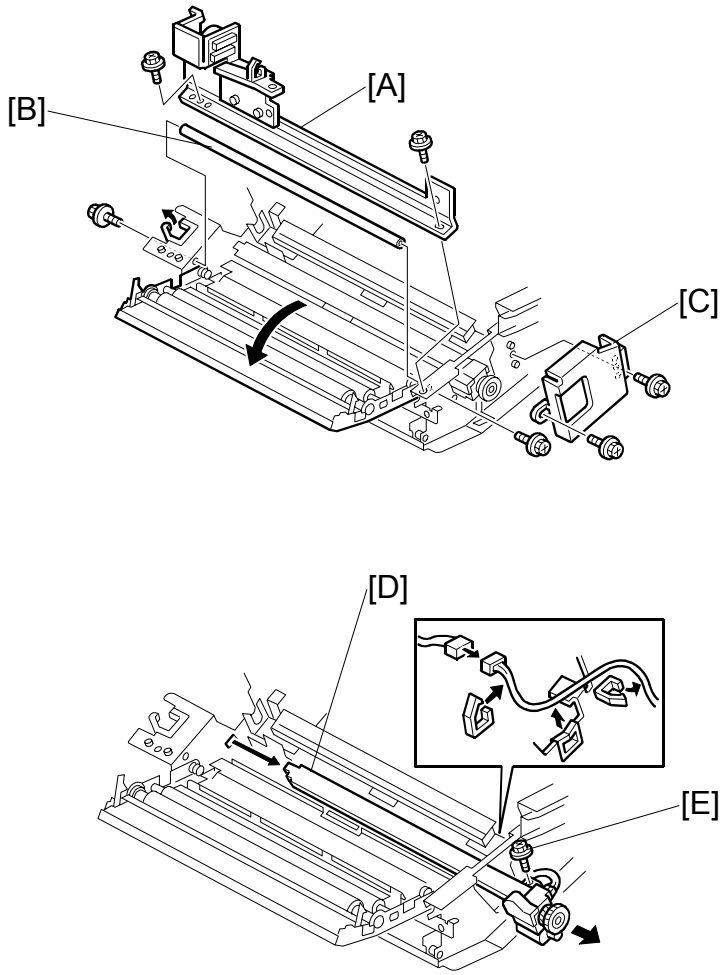


- Master making unit (☛ 3.5.1)
- Thermal head upper cover (☛ 3.5.3)
- Thermal head side cover (☛ 3.5.3)

[A]: Master end sensor (☞ x 2, 🖑 x 1)

NOTE: Adjust the master end sensor (☛ 3.5.8) after installing a new sensor.

3.5.6 CUTTER UNIT



- Master making unit (☛ 3.5.1)

[A]: Bracket (🔩 x 2)

[B]: Shaft (🔩 x 2)

[C]: Bracket (🔩 x 2)

[D]: Cutter unit (🖳 x 3, 🖑 x 1, 🔩 x 1)

NOTE: To remove the screw [E], you must slide the thermal head a small distance towards the paper feed table.

3.5.7 THERMAL HEAD VOLTAGE ADJUSTMENT

⚠CAUTION

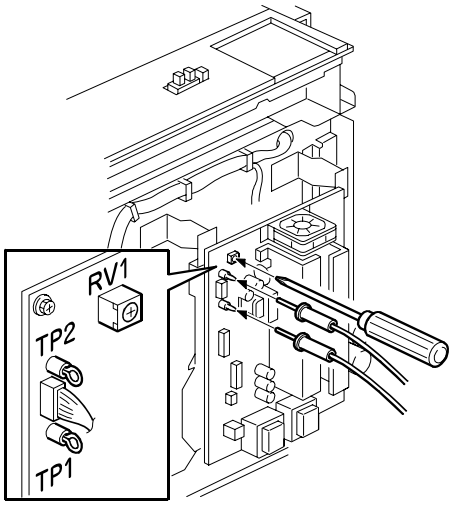
This adjustment is always required when the thermal head or PSU has been replaced.

Purpose: To maintain master making quality and extend the lifetime of the thermal head.

Standard: Refer to the voltage value (X) printed on the thermal head. The value varies from one thermal head to another.
The adjustment voltage should be between X and X - 0.1 V.

Tools: Circuit tester

- Rear cover (☛ 3.2.3)
- Read the voltage value on the decal on the thermal head.



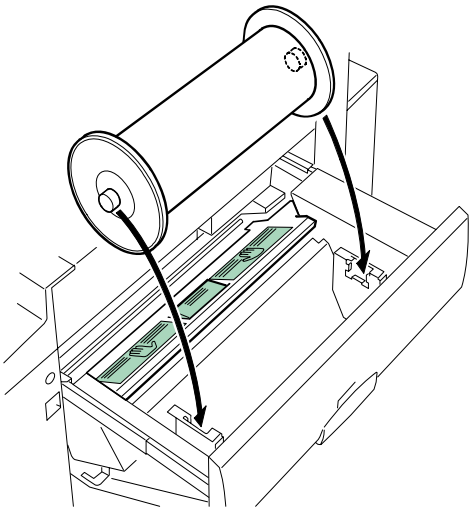
1. Connect the positive terminal of a circuit tester to TP1 and the negative terminal to TP2 on the PSU.
   CAUTION: If the output and ground terminals touch each other, the board will be damaged.
2. Connect the power plug, and turn on the main switch to access SP mode.
3. Select SP5-12 (Thermal head signal output).
4. Press the # key. Power is continuously supplied to the thermal head, which could damage the thermal head, so press the clear/stop key if you cannot finish the adjustment quickly.
   A beeper sounds while the power is being supplied.
5. Measure the voltage, and turn RV1 on the PSU until the value is between “+0” and “-0.1” volts from the value on the thermal head decal.

3.5.8 MASTER END SENSOR ADJUSTMENT

Purpose: To ensure that the sensor detects the end mark (a solid black area) on the master roll.

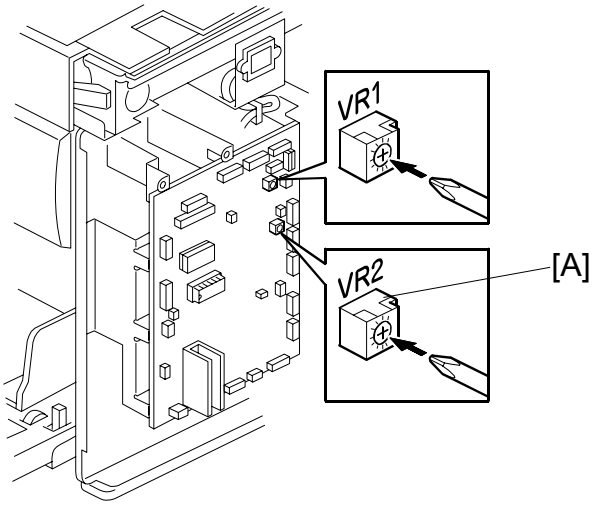
Standard: 2.0 ± 0.1 volts

Tools: The core of a used master roll (the core just before a master end display appears)



- Rear cover (☛ 3.2.3)

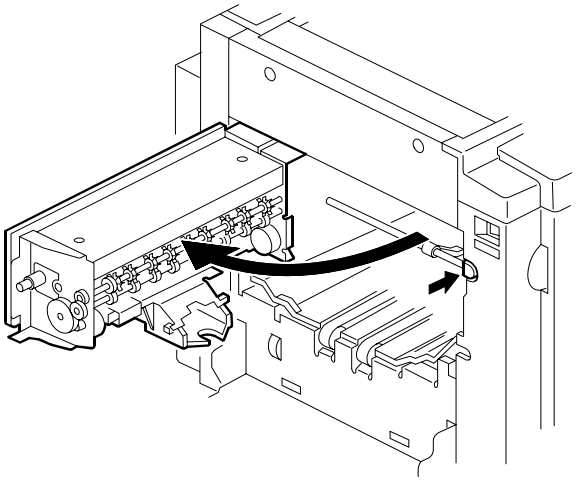
1. Place the core inside the master making unit, and close the master making unit.
2. Connect the power plug, and turn on the main switch.
3. Access SP6-50.



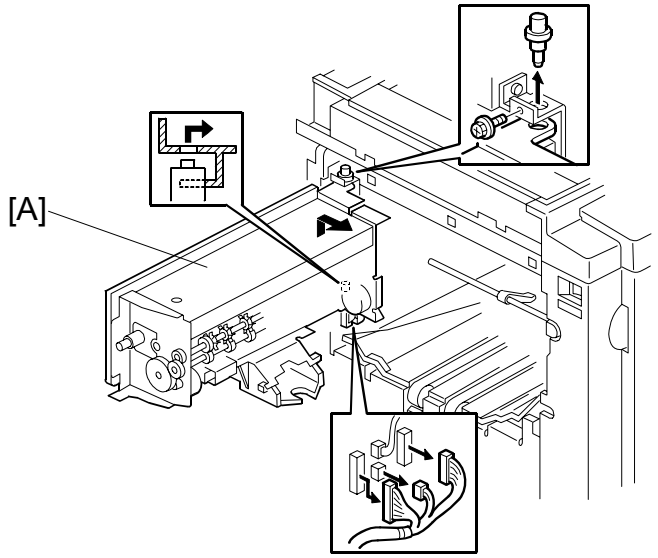
4. Turn VR2 [A] on the MPU board until the display is 2.0 ± 0.1 volts.

3.6 MASTER EJECT

3.6.1 MASTER EJECT UNIT

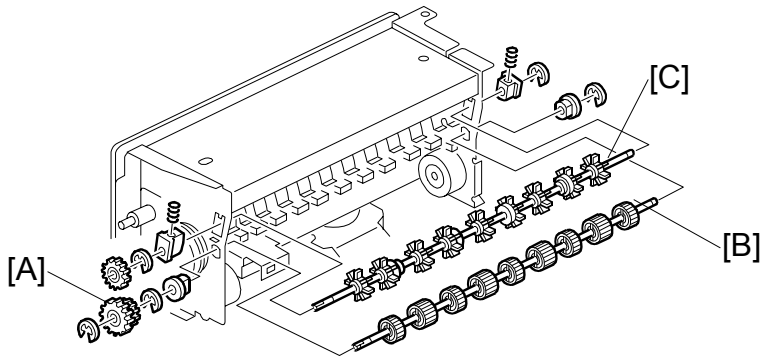


Open the master eject unit.



[A]: Master eject unit (x 3, x 1)

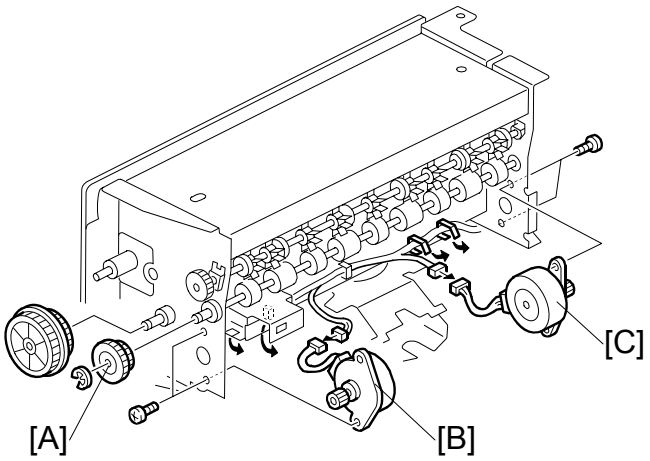
3.6.2 MASTER EJECT ROLLERS



- Master eject unit (☛ 3.6.1)

[A]: Gears (℃ x 1)
[B]: Lower master eject roller (℃ x 2)
[C]: Upper master eject roller (℃ x 2, 2 springs)

3.6.3 MASTER EJECT MOTOR / PRESSURE PLATE MOTOR



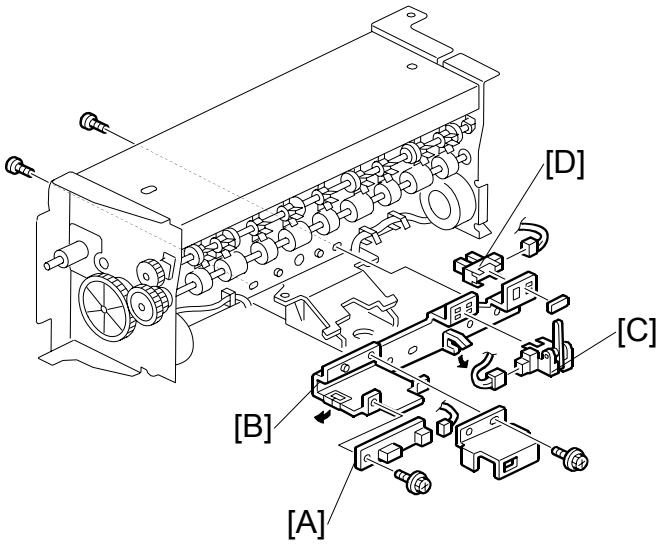
- Master eject unit (☛ 3.6.1)

[A]: Gears (℃ x 1)

[B]: Master eject motor (x 2, x 1, x 2)

[C]: Pressure plate motor (x 2, x 1, x 2)

3.6.4 DRUM MASTER SENSOR / MASTER EJECT SENSOR / EJECT BOX SET SENSOR



- Master eject unit (☛ 3.6.1)
- Master eject box

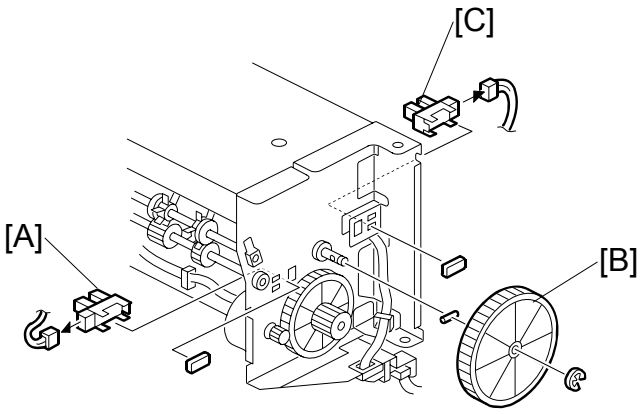
[A]: Drum master sensor (🔩 x 2, 🖐 x 1)

[B]: Bracket (🔩 x 2, 🔧 x 1)

[C]: Master eject sensor (🔧 x 1, 🖐 x 1)

[D]: Eject box set sensor (🖐 x 1)

3.6.5 PRESSURE PLATE HP SENSOR / PRESSURE PLATE LIMIT SENSOR



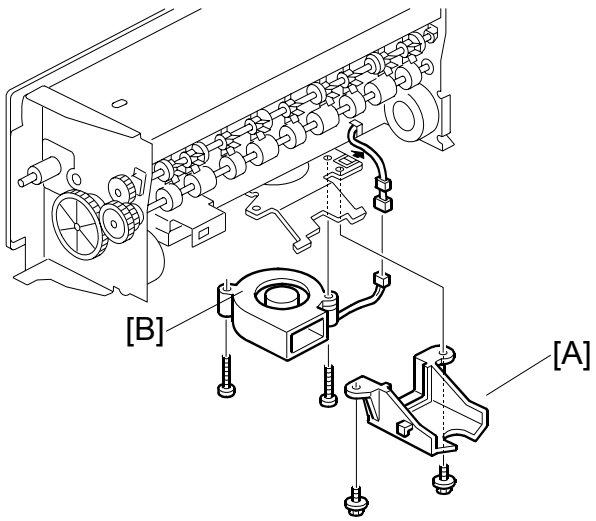
- Master eject unit (☛ 3.6.1)
- Master eject box

[A]: Pressure plate HP sensor (☞ x 1)

[B]: Gear (ℂ x 1, 1 pin)

[C]: Pressure plate limit sensor (☞ x 1)

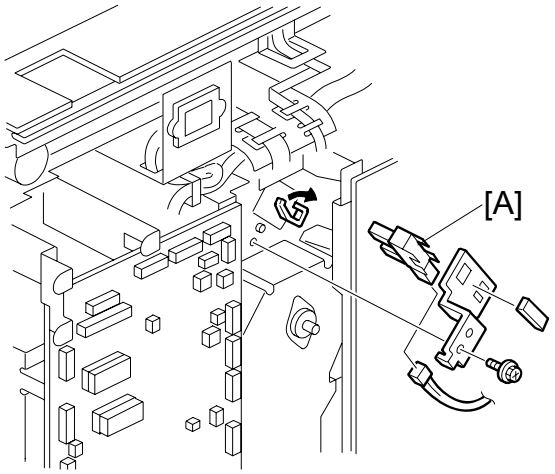
3.6.6 AIR KNIFE FAN MOTOR



[A]: Air knife fan duct (☞ x 2)

[B]: Air knife fan motor (☞ x 1, ☞ x 1, ☞ x 2)

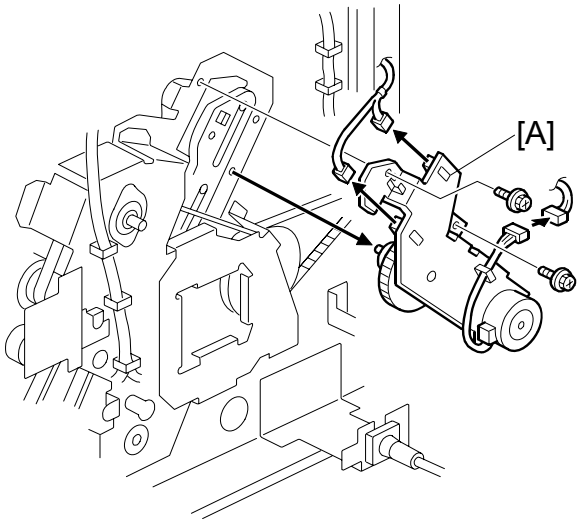
3.6.7 MASTER EJECT POSITION SENSOR



- Rear cover (☛ 3.2.3)

[A]: Master eject position sensor (x 1, x 1, x 1)

3.6.8 MASTER CLAMPER OPENING UNIT

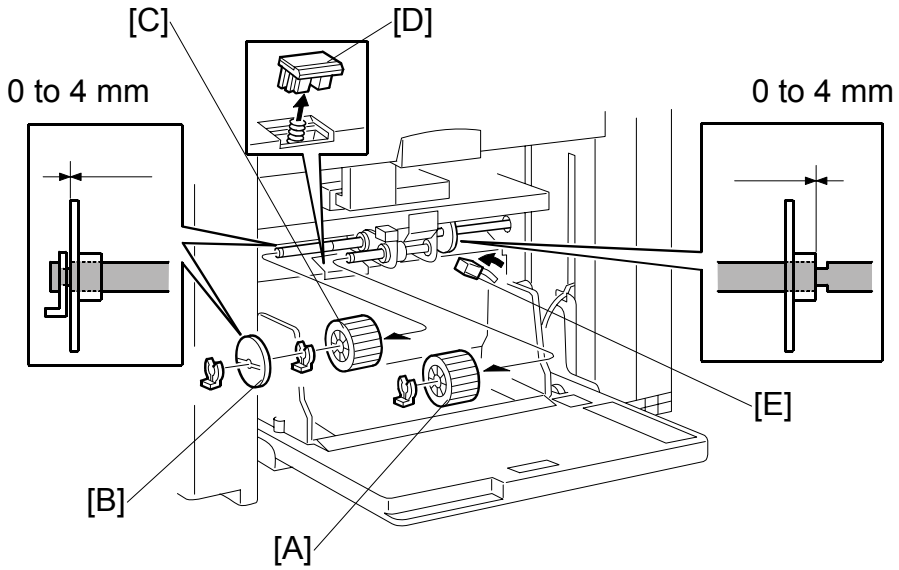


- Rear cover (☛ 3.2.3)

[A]: Master clamper opening unit (x 3, x 2)

3.7 PAPER FEED

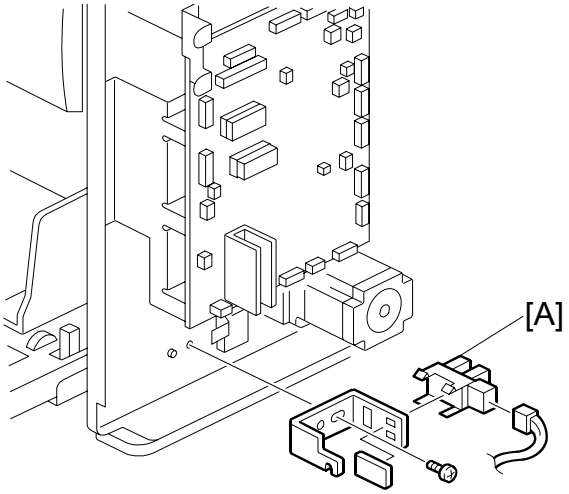
3.7.1 PICK-UP ROLLER / PAPER FEED ROLLER / FRICTION PAD



- Move the separation pressure slider [E] to position 1.

[A]: Pick-up roller (x 1)
[B]: Paper guide (x 1)
[C]: Paper feed roller (x 1)
[D]: Friction pad
NOTE: Do not change the position and direction of the paper guide [B].

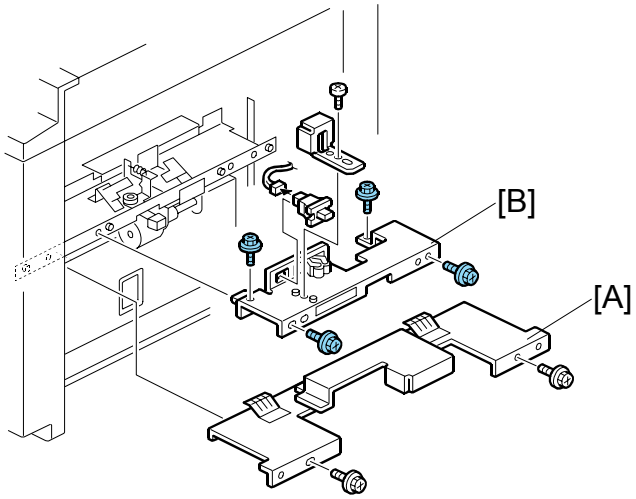
3.7.2 PAPER TABLE LOWER LIMIT SENSOR

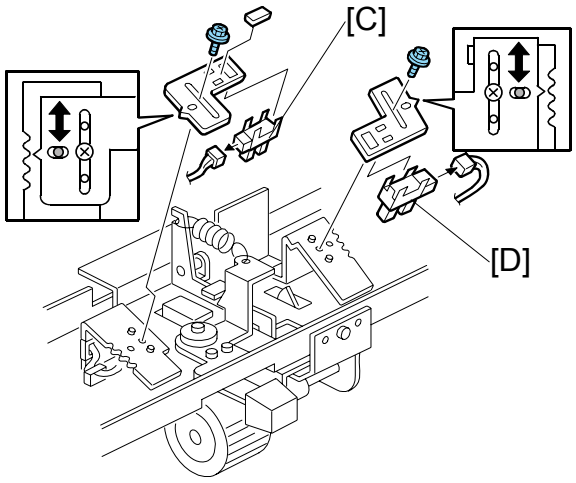


- Rear cover (☛ 3.2.3)

[A]: Paper table lower limit sensor (🔩 x 1, 🖐 x 1)

3.7.3 PAPER HEIGHT SENSOR 1 / 2





- Master making unit (☛ 3.5.1)

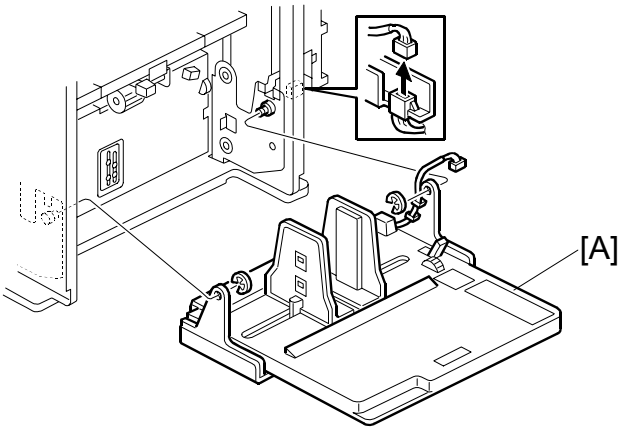
[A]: Paper feed unit cover (🔩 x 2)

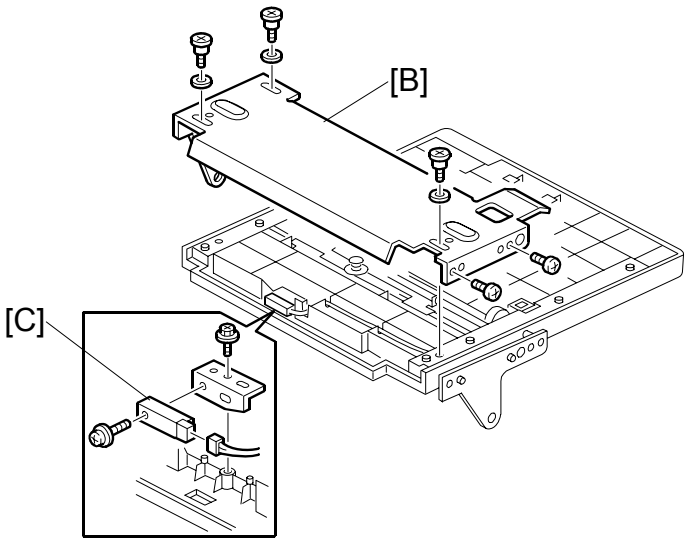
[B]: Paper feed unit cover – small (🔩 x 4, 🖑 x 1)

[C]: Paper height sensor 1 (🔩 x 1, 🖑 x 1)

[D]: Paper height sensor 2 (🔩 x 1, 🖑 x 1)

3.7.4 PAPER END SENSOR





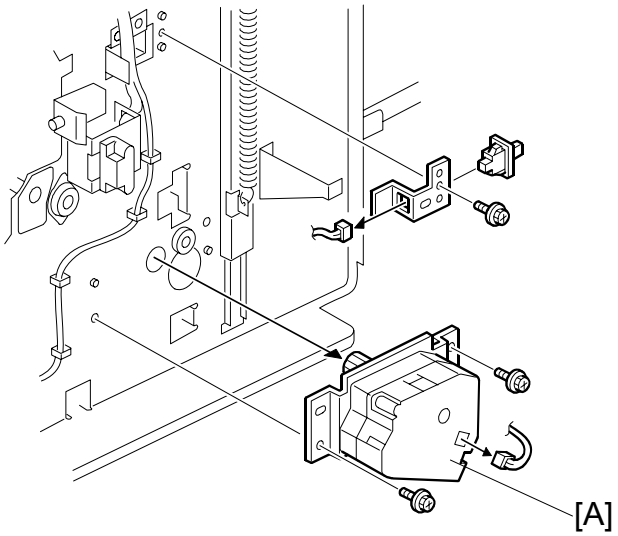
- Rear cover (☛ 3.2.3)

[A]: Paper table (✋ x 1, ℂ x 2)

[B]: Paper table bottom plate (🔩 x 5, 3 washers)

[C]: Paper end sensor (🔩 x 2, ✋ x 1)

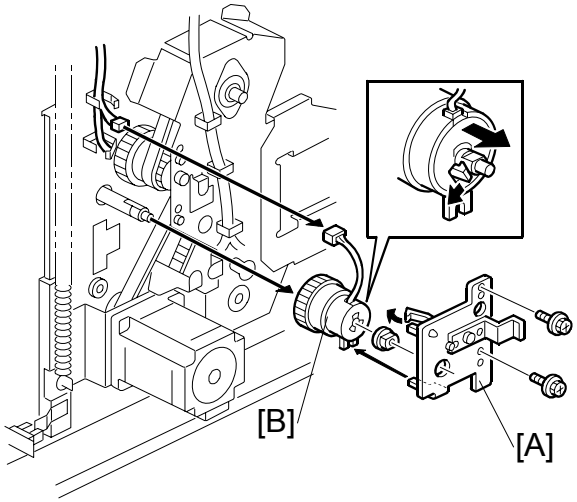
3.7.5 PAPER TABLE MOTOR



- Front cover (☛ 3.2.1)

[A]: Paper table motor (🔩 x 2, 🖑 x 1)

3.7.6 PAPER FEED CLUTCH



- Rear cover (☛ 3.2.3)
- MPU (☛ 3.3.1)

[A]: Paper feed clutch bracket (🔩 x 2)

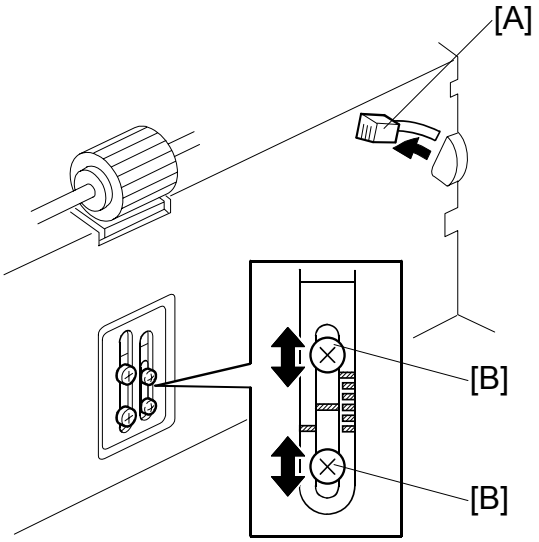
[B]: Paper feed clutch (🔧 x 1, 🖑 x 1)

3.7.7 PAPER SEPARATION PRESSURE ADJUSTMENT

The position of the screw can be changed in order to change the amount of pressure exerted by the friction pad.

This adjustment can be done:

- When feeding special paper, especially thick paper
- When the customer is experiencing feed problems.



- Move the separation pressure slider [A] to position 1.

Increase the paper separation pressure: Move up the screws [B]

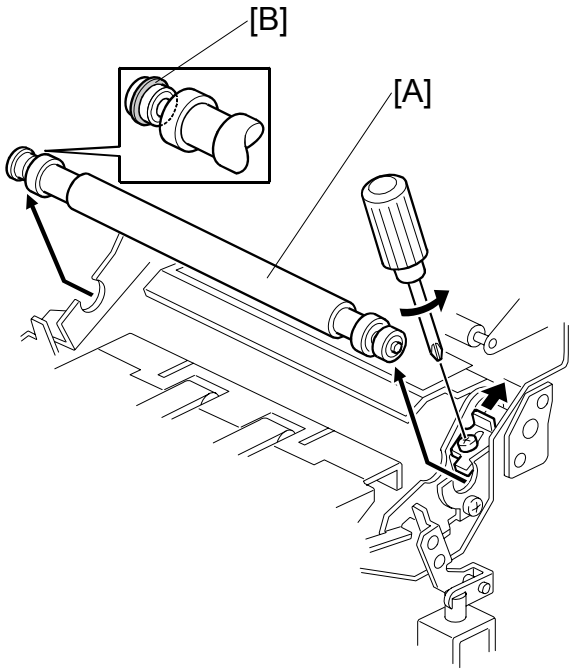
Decrease the paper separation pressure: Move down the screws [B]

Default position: lowest position

The adjustment is automatically applied to all settings of the separation pressure slider.

3.8 PRINTING

3.8.1 PRESS ROLLER



⚠CAUTION

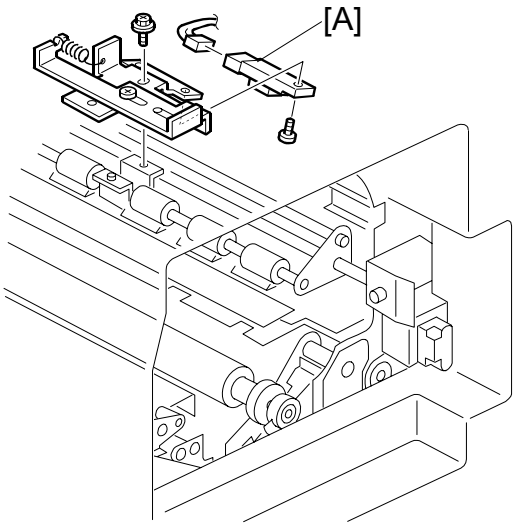
Take care to avoid possible injury. If the printing pressure release arms disengage, the press roller will be pulled upwards suddenly.

- Remove the drum

[A]: Press roller (🔩 x 1)

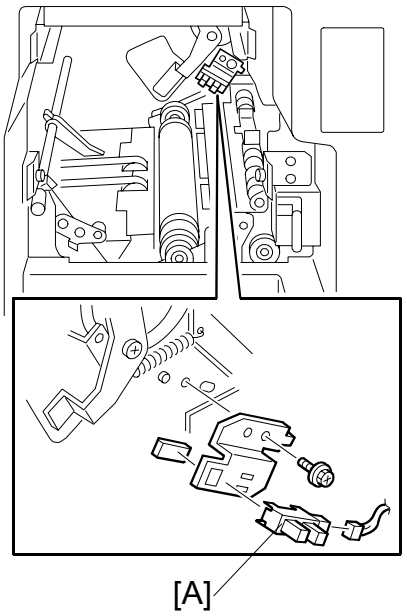
The bearings on the rear and front differ. During installation, ensure that the bearing with the stopper [B] is positioned towards the rear of the machine.

3.8.2 REGISTRATION SENSOR



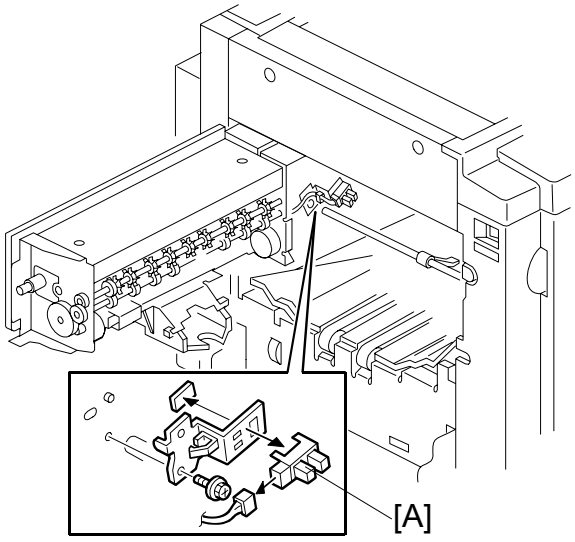
[A]: Registration sensor (🔩 x 2, 🖑 x 1)

3.8.3 FEED START TIMING SENSOR



[A]: Feed start timing sensor (🔩 x 1, 🖑 x 1)

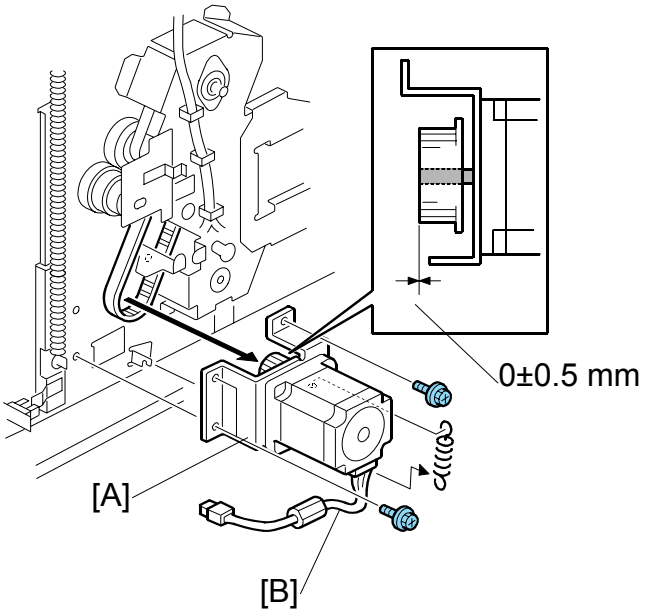
3.8.4 2ND FEED TIMING SENSOR



- Open the master eject unit

[A]: 2nd feed timing sensor (🔩 x 1, 🖐 x 1)

3.8.5 REGISTRATION MOTOR

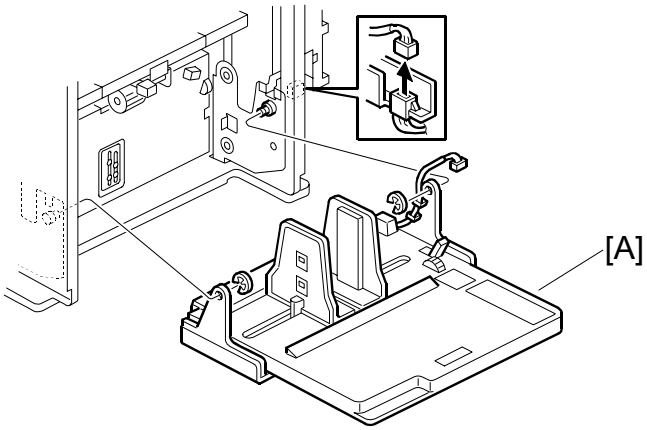


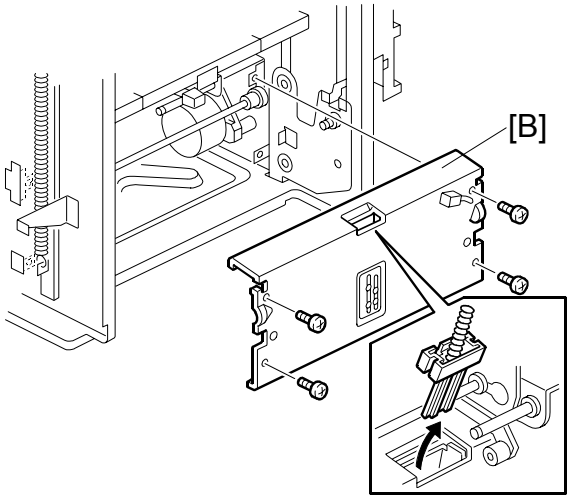
- Rear cover (☛ 3.2.3)
- MPU (☛ 3.3.1)

[A]: Registration motor (spring, 🔩 x3, belt, 🤚 x 1)

NOTE: 1) The side of the motor with the harness [B] should face downward, as shown in the diagram.
2) The flange of the gear should face towards the motor as shown in the diagram.

3.8.6 REGISTRATION ROLLER



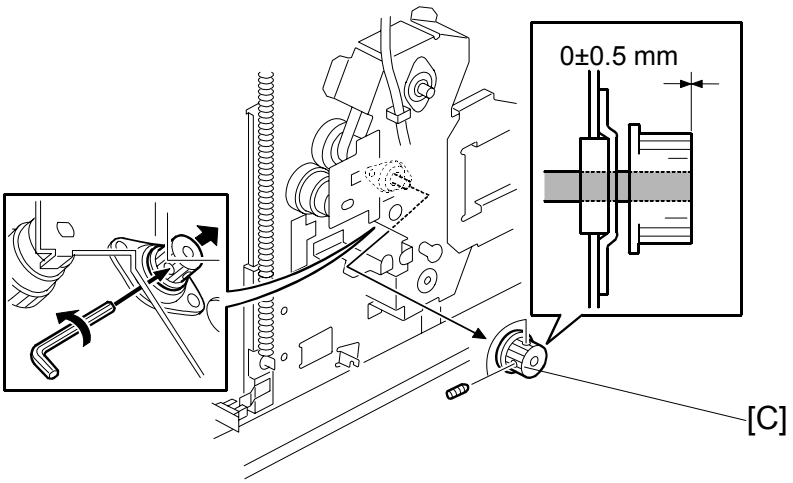


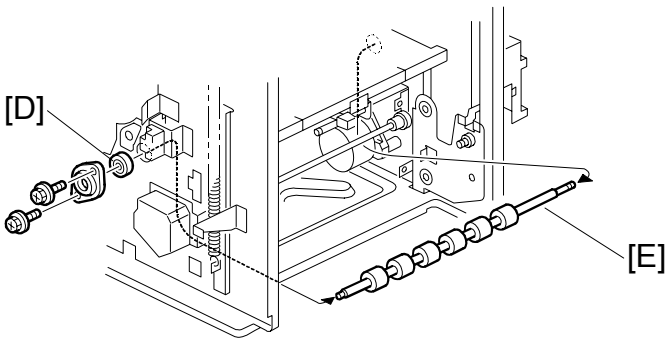
- Front cover (☛ 3.2.1)
- Rear cover (☛ 3.2.3)

[A]: Paper table (x 1, x 2)

[B]: Plate (x 4)

- MPU (☛ 3.3.1)
- PSU (☛ 3.3.2)
- Registration motor (☛ 3.8.5)

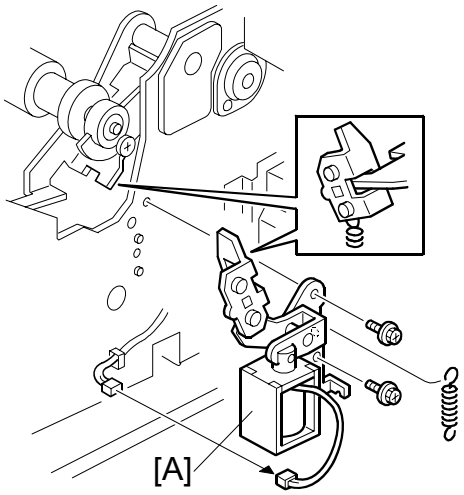


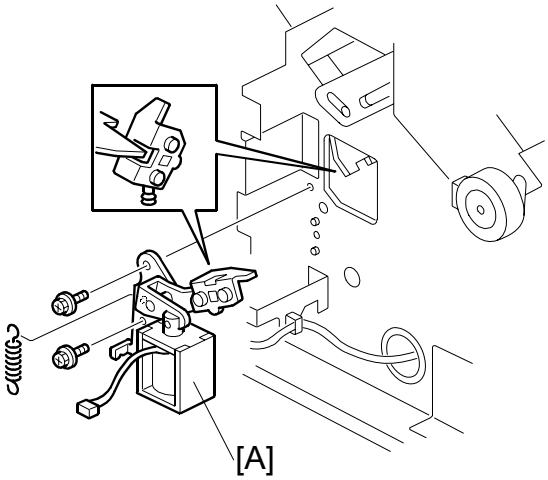


[C]: Gear
[D]: Bearing (x 2)
[E]: Registration roller

NOTE: The flange of gear [C] should face towards the machine, as shown in the diagram.

3.8.7 PRESS ROLLER RELEASE SOLENOIDS





- Front cover (☛ 3.2.1)
- Rear cover (☛ 3.2.3)

[A]: Press roller release solenoid (🔩 x 2, 🖐 x 1)

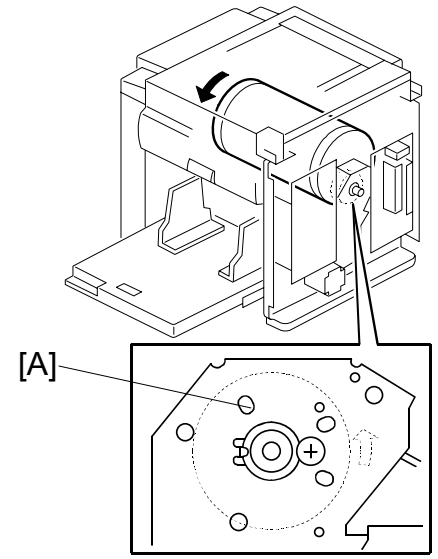
NOTE: Adjust the press roller release lever (☛ 3.8.8) after installing the new solenoid.

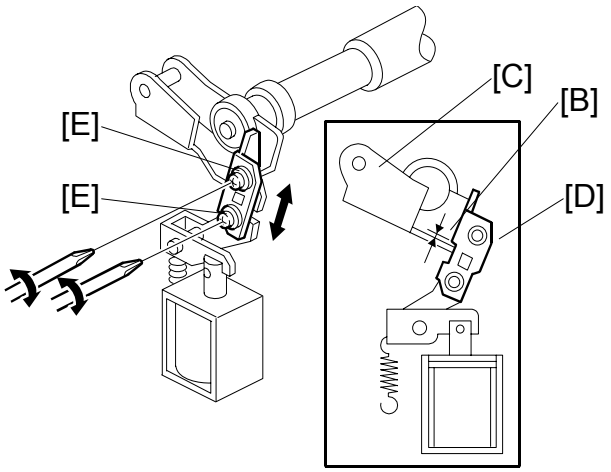
3.8.8 PRESS ROLLER RELEASE LEVER ADJUSTMENT

Purpose: To maintain the correct clearance between the press roller arms and press roller lock levers. This ensures that the press roller is correctly released and pressed against the drum when the press roller release solenoid is energized.

Standard: 0.7 to 1.2 mm

Tools: Thickness gauge





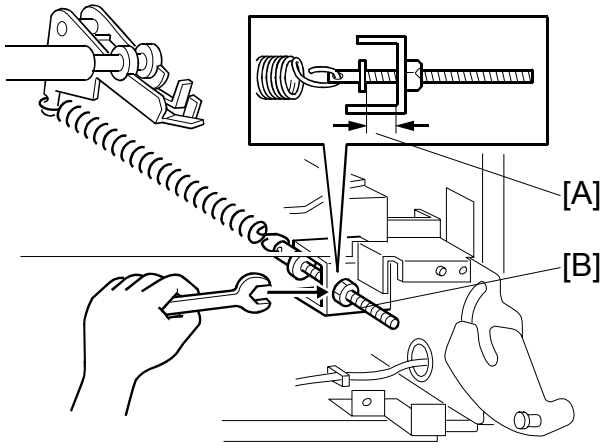
- Front cover (☛ 3.2.1)
- Rear cover (☛ 3.2.3)

1. Turn the drum manually until the drum master clamper on the drum moves into the lowest position. (This is when the high points of the cams on the drum flanges meet with the cam followers on both ends of the press roller.)
   - To find out the correct position of the drum for the adjustment, look at the rear end of the drum shaft. The recess on the drum drive gear meets the hole [A] in the bracket when the drum is in the correct position.
2. Using a thickness gauge, measure the clearance [B] between the press roller arm [C] and the press roller lock lever [D] (rear side). It should be between 0.7 and 1.2 mm.
3. If it is not correct, adjust the position of the press roller lock lever after loosening the two screws [E].
4. Repeat steps 2 and 3 for the front side.

3.8.9 PRINTING PRESSURE ADJUSTMENT

Purpose: To make better print results without decreasing the run length.

Standard: Within 10 ± 0.5 mm



- Paper delivery unit (☛ 3.10.1)

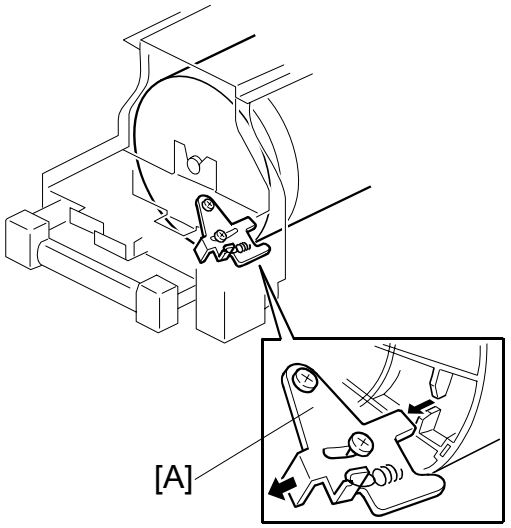
1. Adjust the distance [A] to 10 ± 0.5 mm by turning the adjusting bolt [B].
2. Repeat the same procedure for the printing pressure spring at the non-operation side.

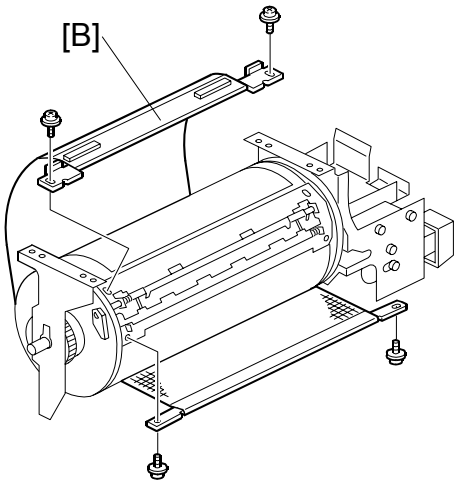
3.9 DRUM

3.9.1 PREPARATION

Before attempting any of the procedures in this section, wipe off the ink around the ink roller. To do this, set SP2-10 (ink detection) to off, and feed paper until ink ends.

3.9.2 CLOTH SCREEN

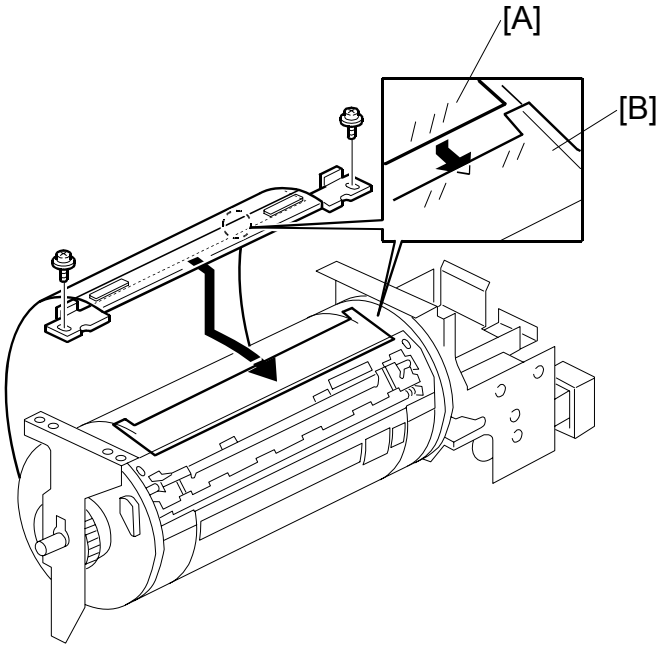


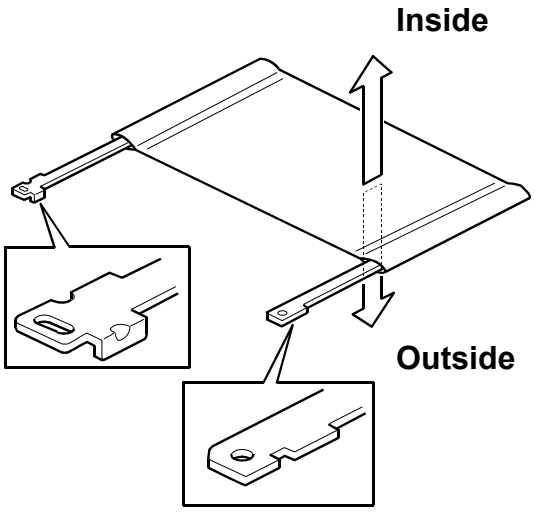


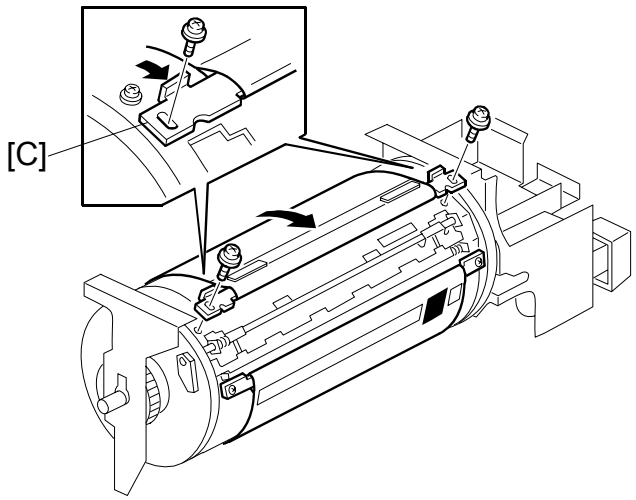
- Remove the drum

1. Remove the drum upper bracket (🔩 x 4).
2. Release the stopper [A], then rotate the drum until the master clamper faces top.
3. Remove the cloth screen [B] (🔩 x 4).

Installation

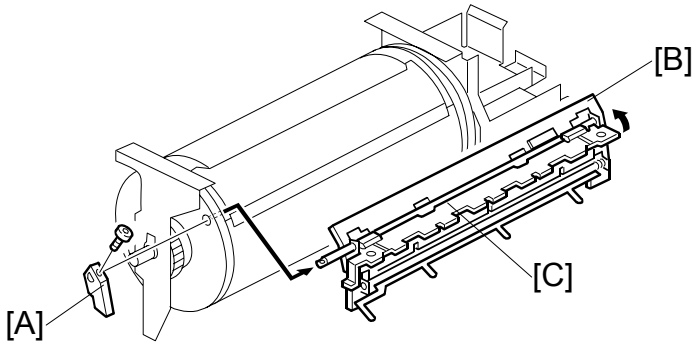


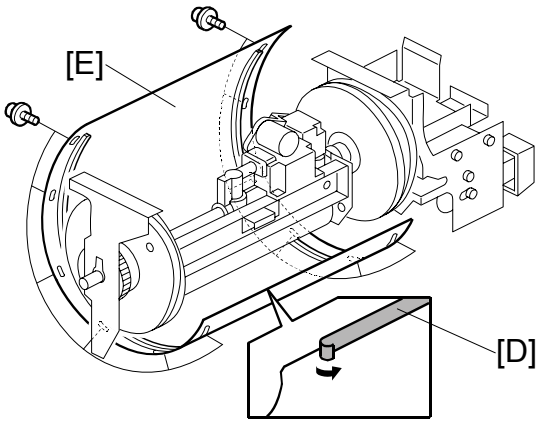




- Do not scratch the cloth screen or metal screen.
- Properly insert the edge of the cloth screen [A] on the cloth screen under the mylar [B] on the metal screen, as shown above.
  Otherwise, ink will leak from the trailing edge of the master on the drum during a long printing run.
- Make sure that the correct side of the screen is facing up. In addition, make sure that the stays for securing the cloth screen are positioned correctly.
- When replacing the cloth screen, spread the screen around the metal screen while pulling the stay [C]. Adjust the stay so that it is parallel to the master clamper, then tighten the screws.
- Make sure that the cloth screen is not wrinkled while spreading it around the drum.

3.9.3 CLAMPER / METAL SCREEN





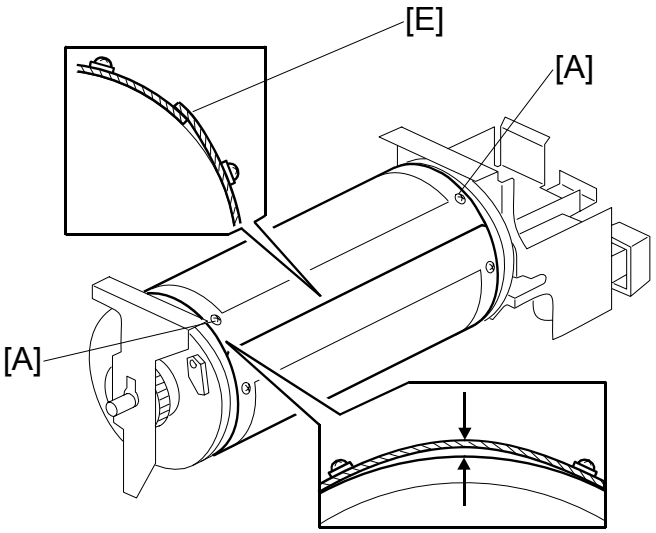
- Remove the drum
- Cloth screen (☛ 3.9.2)

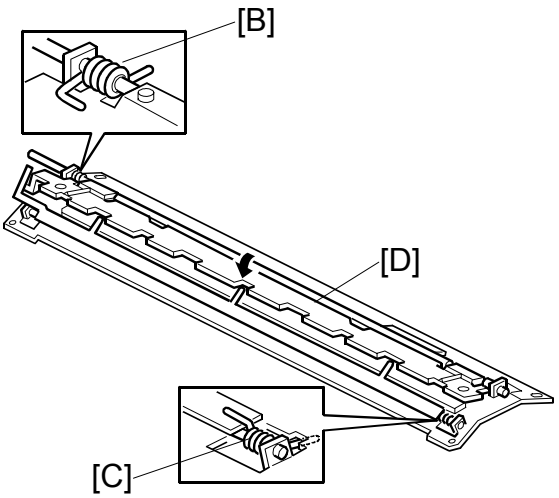
[A]: Clamper lever (1 hexagon screw)
[B]: Clamper - open the clamping plate [C], then remove the clamper.

NOTE: 1) Do not allow ink to get on the inside of the clamping plate [C]. Otherwise, the master may slip off and the image position on the prints will move toward the trailing edge of the prints during a printing run.
2) Use a cloth dampened with water to clean the inside of the clamping plate [C]. Never use alcohol or other solvents, or the clamping force of the magnet will be weakened.

[D]: Tape (do not lose it)
[E]: Metal screen (🔩 x 12)

Installation



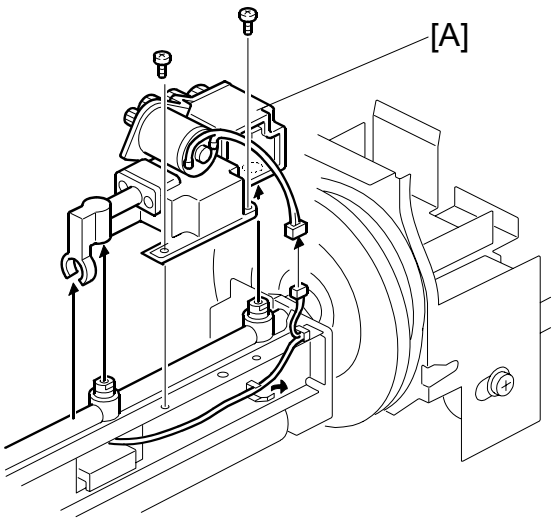


- Make sure that the correct end of the metal screen is overlapping. (The right side overlaps, as viewed from the non-operation side, as shown above.)
- The 4 screws holding the drum master clamper are longer than the 12 screws holding the metal screen, although they are similar in appearance. Be careful not to mix them up or use the wrong screws.
- When installing the metal screen, secure the trailing edge first with the 2 screws. Then, tighten the other screws while removing the slack from the screen. Make sure that the gap between the drum flanges and the screen is 0.3 mm or less, as shown above. (The two holes [A] on the trailing side are round holes and the other holes are long holes, to allow for the removal of the slack.)
- Position the springs [B] and [C] (one each at the front and rear) as shown when reinstalling the drum master clamper [D].
- Do not scratch the cloth screen or metal screen.

DRUM

NOTE: The side [E] with the part number printed on it must be on the top.

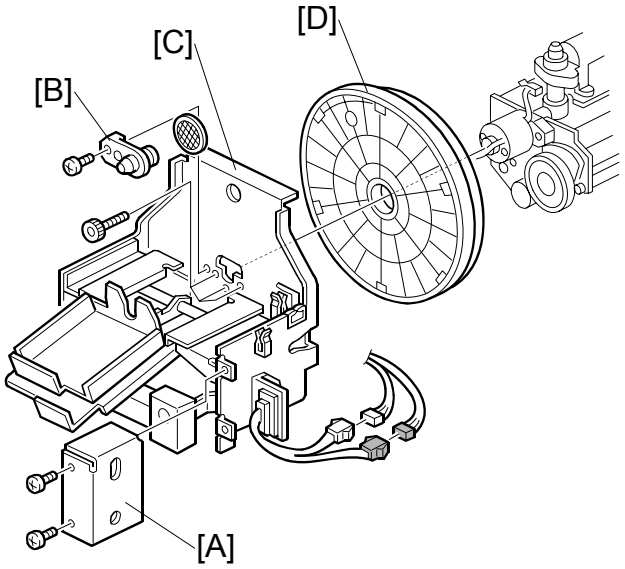
3.9.4 INK PUMP UNIT



- Remove the drum
- Cloth screen (☛ 3.9.2)
- Clamper / Metal screen (☛ 3.9.3)

[A]: Ink pump unit (✋ x 1, 🔩 x 2)

3.9.5 INK ROLLER UNIT / INK ROLLER ONE-WAY CLUTCH



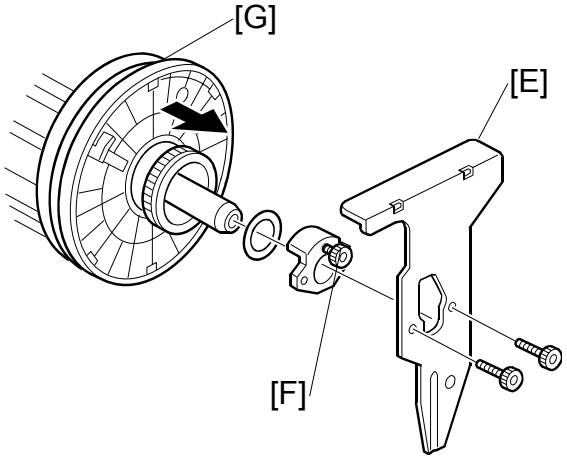
- Wipe off the ink around the ink roller beforehand (use SP2-10).
- Remove the drum
- Cloth screen (☛ 3.9.2)
- Clamper / Metal screen (☛ 3.9.3)

[A]: Connector cover (x 2, x 2)

[B]: Ink socket (x 1)

[C]: Front drum bracket (x 3)

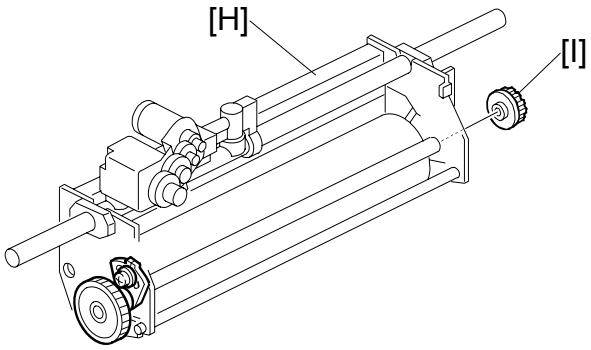
[D]: Front drum flange



[E]: Drum rear plate (x 2)

Untight the screw [F] to take off the drum rear stoppers (x 1)

[G]: Drum rear flange



[H]: Ink roller unit

[I]: Ink roller one-way clutch

3.9.6 DOCTOR ROLLER GAP ADJUSTMENT

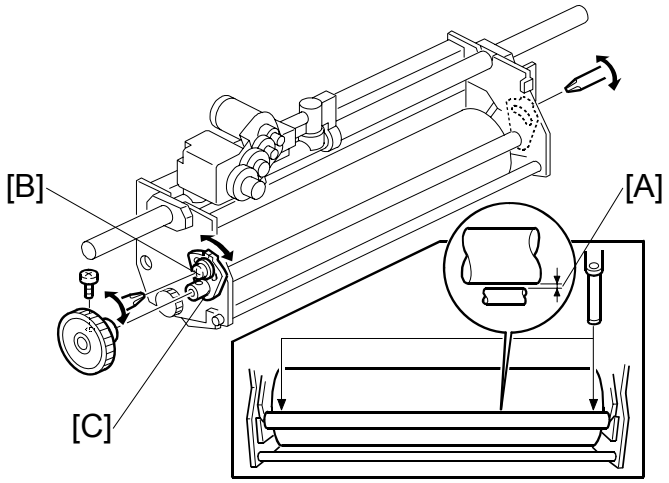
Purpose: To control the ink thickness around the ink roller.

Standard: A 0.07mm gauge passes, but a 0.09mm gauge does not.

Tools: Thickness gauge

⚠CAUTION

Normally the doctor roller gap is not adjusted or changed. It tends to be difficult to change in the field. If the gap is too narrow, an uneven image may appear on the prints. If it is too wide, too much ink will be applied to the drum screens, resulting in ink leakage from the drum.



- Wipe off the ink around the ink roller beforehand. (Use SP2-10)
- Remove the drum
- Remove the Ink roller unit

1. Make sure that a 0.07 mm gap gauge goes through the gap [A] between the ink and doctor rollers, and that a 0.09 mm gap gauge does not.
   NOTE: 1) The gap should be checked at both ends of the doctor roller. Insert a gap gauge at each end of the roller. The gap tends to be larger for the center.
   2) While the gap gauge is inserted, hold the doctor and ink rollers with your fingers in order to stop the rollers from rotating.
   3) While the gap gauge is inserted, hold the end of the gap gauge.
2. If the gap is out of the standard, loosen the screw [B] and adjust the gap by turning the cam bushing [C] for the front and for the rear.

NOTE: Make sure to repeat the adjustment for both ends of the rollers.

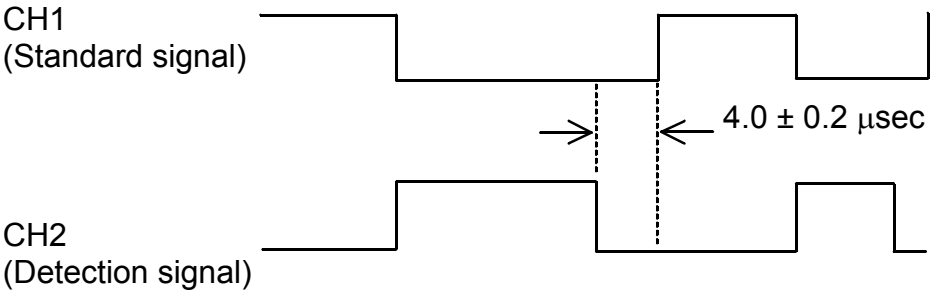
3.9.7 INK DETECTION ADJUSTMENT

Using an Oscilloscope

Purpose: To ensure that the CPU detects a no ink condition.

Standard: 4.0 ± 0.2 μsec

NOTE: 1) Before attempting this procedure, wipe off the ink around the ink roller. To do this, set SP2-10 (Ink Detection) to OFF, and feed paper until ink ends.
2) This adjustment is required every time the MPU has been replaced.
3) Normally, the simple method is sufficient. But, the oscilloscope method is more accurate. Use the oscilloscope method if you cannot adjust the sensor to the required value with the simple method, or if ink flooding problems occur after adjustment with the simple method.



1. Turn off the main switch and disconnect the power plug.
2. Remove the rear cover.
3. Connect the CH1 probe of an oscilloscope to TP25 (INK1), the CH2 probe to TP23 (INK2). Select the 2-microsecond range on the oscilloscope.
4. Connect the power plug and turn on the main switch.
5. Make sure that the waveform is as shown in the illustration while the ink end indicator lights.
6. If it is not correct, adjust the ON timing of the detection signal by turning VR1 beside the test pins.

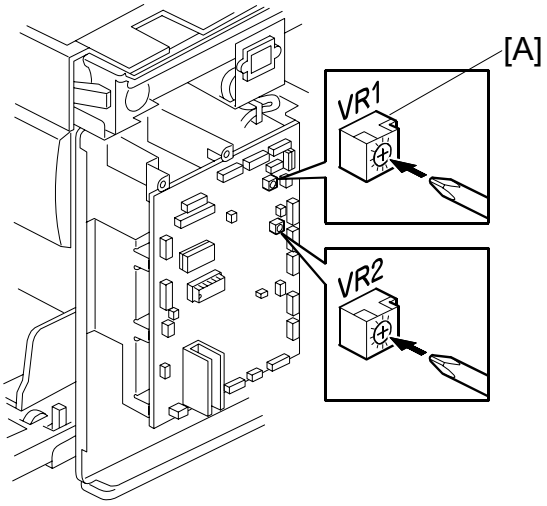
NOTE: 1) If the ink detection off mode has been selected with SP2-10, do not forget to return it to the default (detection on).

Simple Method

Purpose: To ensure that the CPU detects a no ink condition.

NOTE: 1) Before attempting this procedure, wipe off the ink around the ink roller. To do this, set SP2-10 (Ink Detection) to OFF, and feed paper until ink ends.
2) This adjustment is required every time the MPU has been replaced.
3) Normally, the simple method is sufficient. But, the oscilloscope method is more accurate. Use the oscilloscope method if you cannot adjust the sensor to the required value with the simple method, or if ink flooding problems occur after adjustment with the simple method.

Standard: 4.0 ± 0.2 μsec



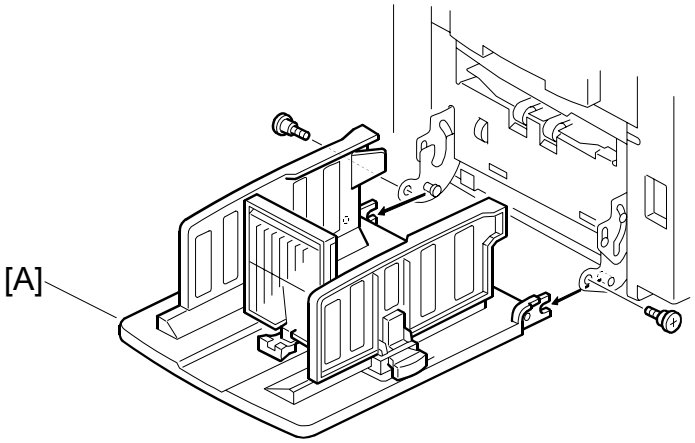
- Rear cover (☛ 3.2.3)

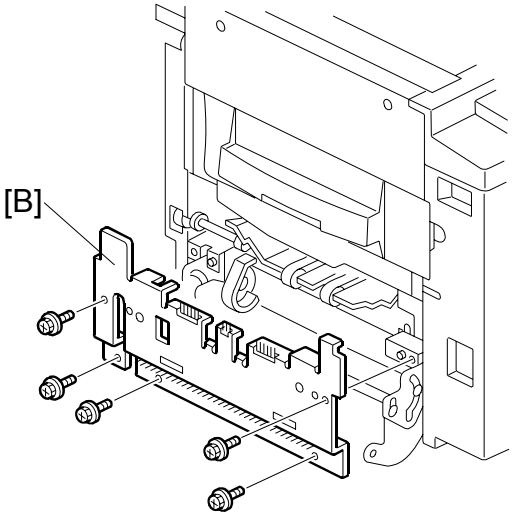
1. Access SP6-40.
2. Turn VR1 [A] on the MPU board until the display is "4.0 ± 0.2 μsec".
   NOTE: When the drum has ink inside, the machine displays "----". Do SP 2-10 again, then go back to step 1.

NOTE: If the simple method gives an inaccurate result (causing ink flooding, for example) , it is possible that too much ink will come out into the drum during printing. If this happens, repeat the adjustment, but use the oscilloscope method, because this is more accurate.

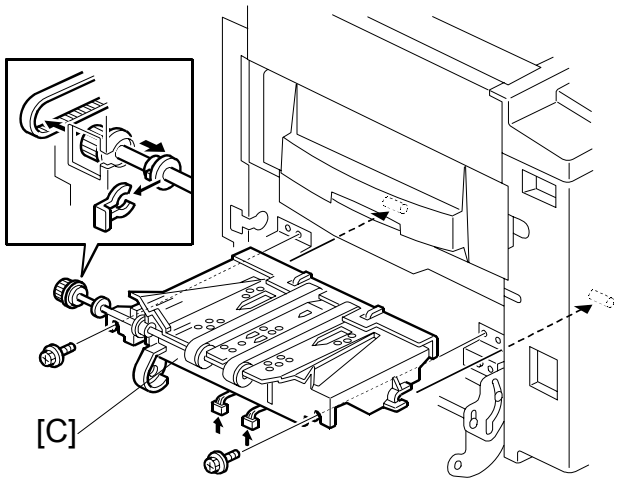
3.10 PAPER DELIVERY

3.10.1 PAPER DELIVERY UNIT





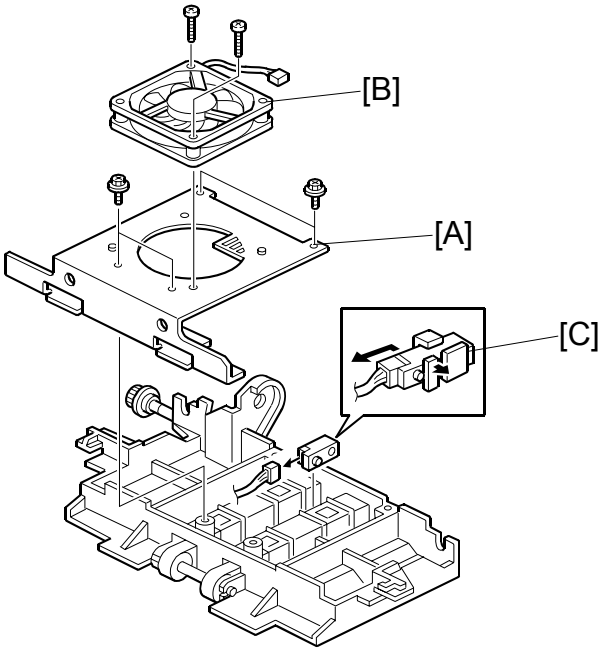
PAPER DELIVERY

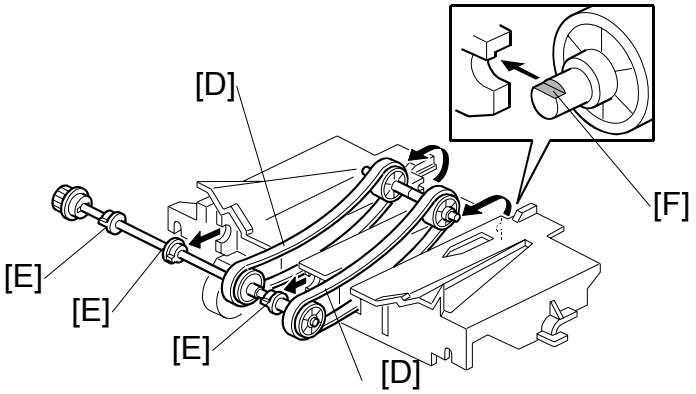


- Rear cover (☛ 3.2.3)

[A]: Paper table (🔩 x 2)
[B]: Paper delivery cover (🔩 x 5)
[C]: Paper delivery unit (🔩 x 2, 🔌 x 2, ⚙ x 1)

3.10.2 DELIVERY BELT / PAPER EXIT SENSOR / VACUUM FAN MOTOR / PAPER DELIVERY UNIT BUSHINGS





- Remove the paper delivery unit (☛ 3.10.1)

[A]: Vacuum fan motor bracket (🔩 x 4)
[B]: Vacuum fan motor (🔩 x 2)
[C]: Paper exit sensor (✋ x 1)
[D]: Delivery belts (ℂ x 1)
[E]: Paper delivery unit bushings

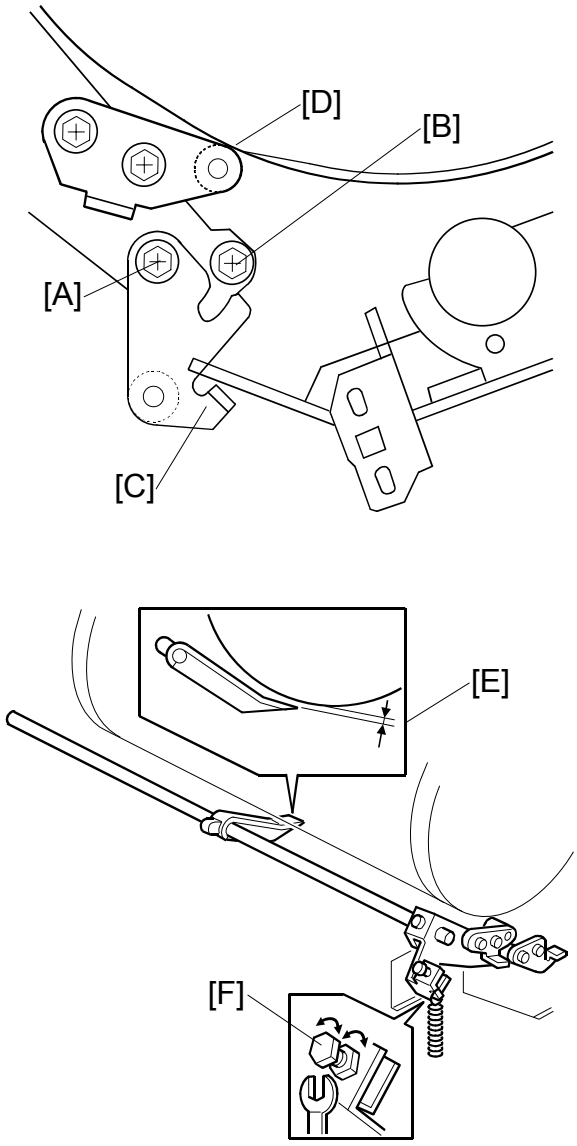
NOTE: 1) Make sure that you install the vacuum fan [B] the correct way around.
2) Install the delivery belt [D] the correct way around. The writing must be on the outside surface of the belt.
3) The flat part of the “D” shaped cutout in the shaft [F] must face upwards.

3.10.3 EXIT PAWL ADJUSTMENT

Purpose: To ensure that the exit pawls can move out of the way of the drum master clamper while the drum is rotating.

Clearance adjustment

Standard: Within 1.15 ± 0.15 mm



- Front cover (☛ 3.2.1)
- Rear cover (☛ 3.2.3)

1. Turn the drum to the drum home position.

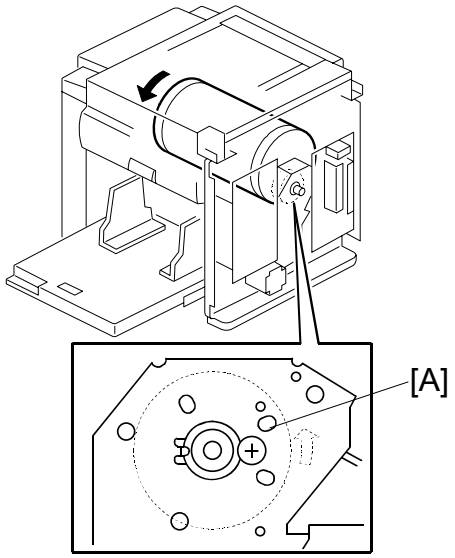
NOTE: The drum turns to home position automatically immediately after the power switch is turned on.

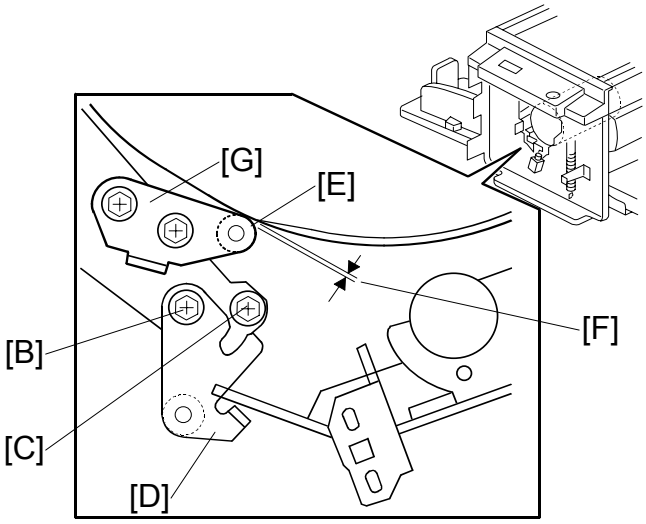
2. Loosen screw [A] then screw [B] in this order (do not remove them). Make sure that the bracket [C] becomes free from engagement and the cam follower [D] contacts the drum flange.
3. Using a gap gauge, measure the clearance [E] between the drum surface and the exit pawls. It should be 1.15 ± 0.15 mm.
4. If the clearance is not correct, adjust the clearance by turning the bolt [F].
5. Reposition the bracket [C] and tighten the screws [A] and [B].

Timing adjustment

Do this after the clearance adjustment.

Standard: 0 or less than 0.5 mm

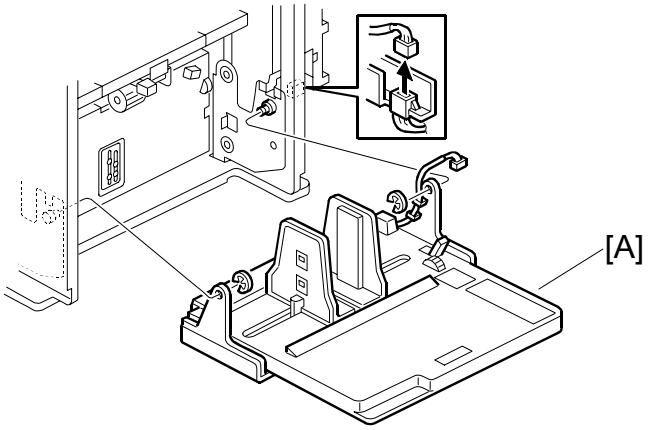


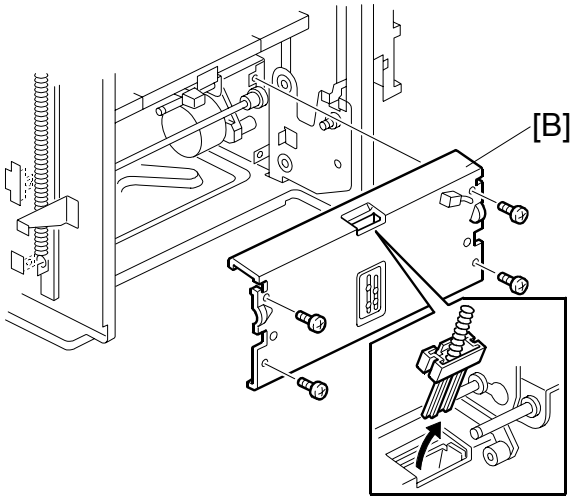


1. Turn the drum manually until the recess in the drum drive gear meets the positioning hole [A] in the bracket, as shown.
2. Loosen screw [B] then screw [C] in that order (do not remove them). Make sure that the bracket [D] becomes free from engagement and the cam follower [E] contacts the drum flange.
3. Measure the gap [F] between the cam follower and cam face (front drum flange). It should be 0 to 0.5 mm.
4. If the gap is not correct, loosen the two screws securing the cam follower bracket [G].
5. Re-tighten the two screws while pushing the cam follower against the cam face. Make sure that the gap [F] is 0 or less than 0.5 mm.
   NOTE: Do not push the cam followers too strongly against the cam.
6. Re-position the bracket [D] and tighten the screws [B] and [C].

3.11 MAIN DRIVE

3.11.1 MAIN MOTOR

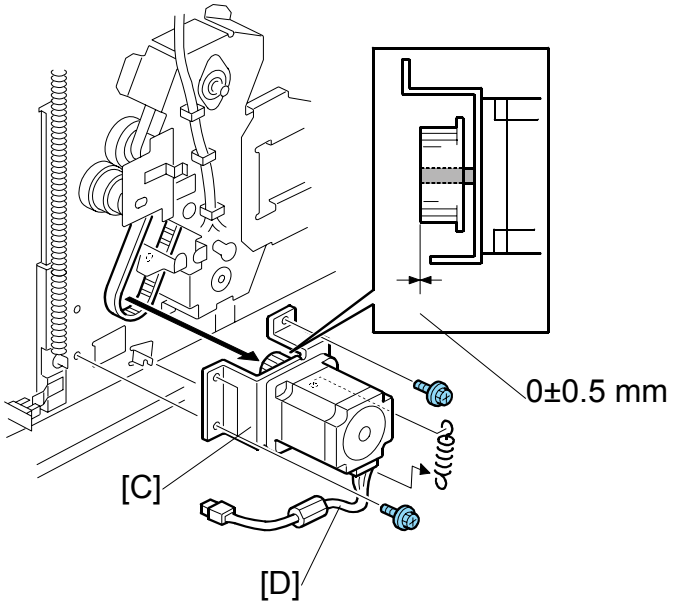




- Rear cover (☛3.2.3)
- MPU (☛3.3.1)
- PSU (☛3.3.2)

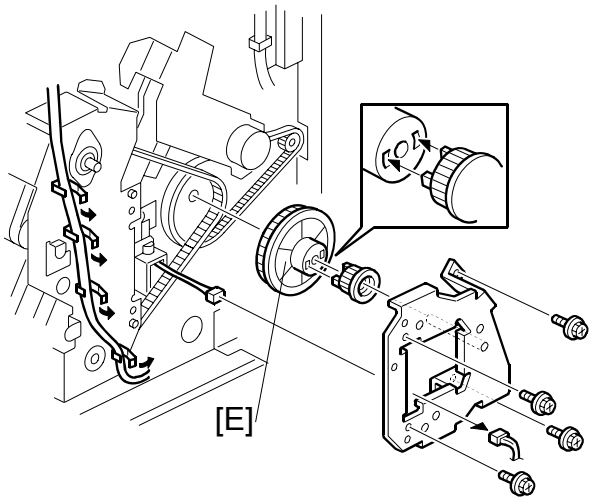
[A]: Paper table (✋ x 1, ℂ x 2)

[B]: Plate (🔧 x 4)

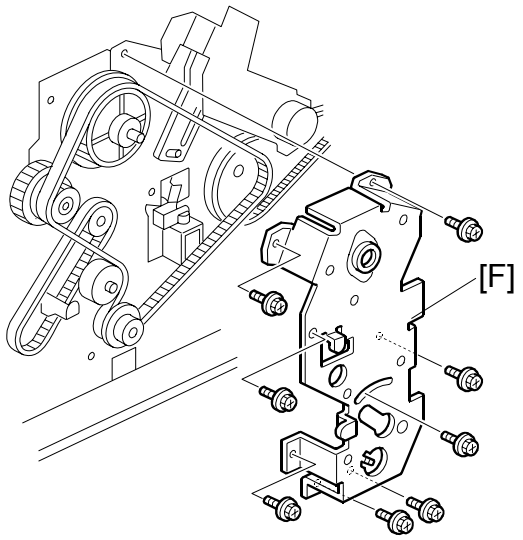


[C]: Registration motor (spring, x3, belt)

NOTE: 1) The side of the motor with the harness [D] should face downward, as shown in the diagram.
2) The flange of the gear should face towards the motor, as shown in the diagram.

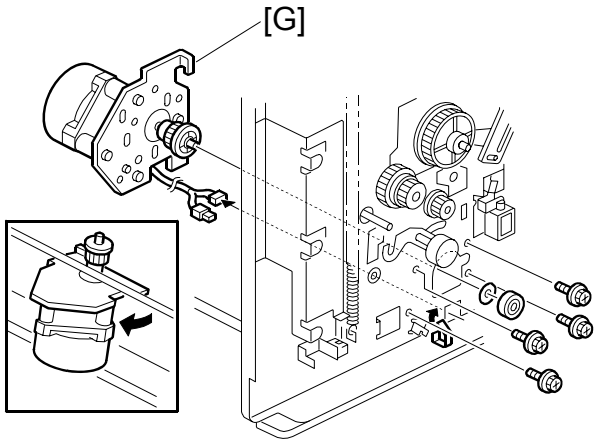


[E]: Gear (x 1, x 4, x 4)



- Paper feed clutch (☛3.7.2)

[F]: Drive bracket (🔩 x 8)

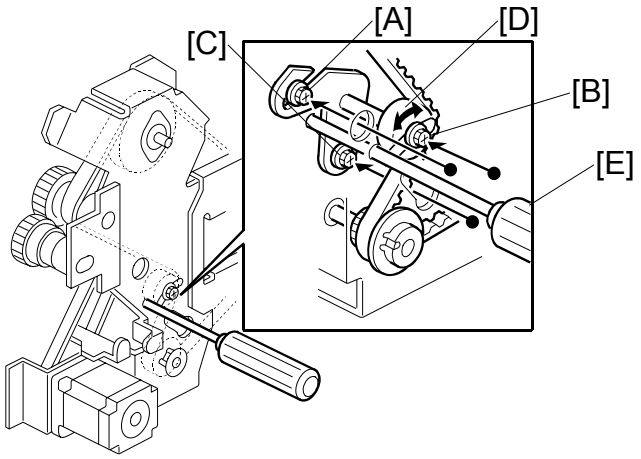


[G]: Main motor (🖃 x 1, 🔩 x 4)

NOTE: Adjust the main drive timing belt (☛ 3.11.2) after installing the new main motor.

3.11.2 MAIN DRIVE TIMING BELT ADJUSTMENT

After the timing belt is replaced, correct belt tension must be applied.



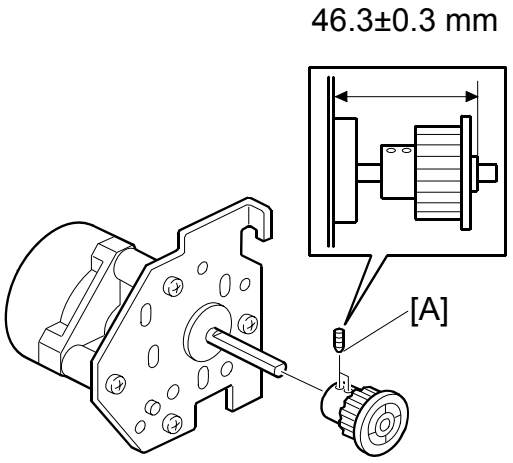
- Rear cover (☛ 3.2.3)
- MPU (☛ 3.3.1)

1. Loosen the screws [A], [B], and [C].
2. Move the tension roller [D] to the right with a screwdriver [E] as shown.
3. Tighten the screws [A], [B], and [C].
4. Remove the screwdriver.

3.11.3 MAIN MOTOR PULLEY POSITION

After putting the pulley back on the main motor shaft, refer to the above illustration for the correct position of the pulley.

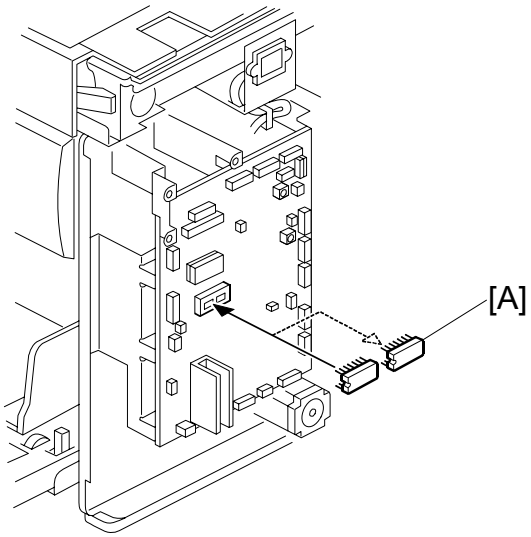
Standard: 46.3 ±0.3 mm



NOTE: Tight the screws alternately little by little. Do not tighten them completely one by one.

3.12 FIRMWARE UPDATE (I/O ROM)

The I/O control firmware in the EPROM on the MPU can be updated by replacing the EPROM.



1. Before upgrading the I/O ROM firmware, check the current ROM version with SP1-74.
2. Turn off the main switch and disconnect the power plug.
3. Remove the rear cover.
4. Replace the EPROM [A] on the MPU.
5. Connect the power plug and turn on the main switch.
6. Access SP1-74 and confirm that the ROM version was changed.

NOTE: If you upgrade the main firmware, refer to section 5.9.2.

3.13 SPECIAL TOOLS

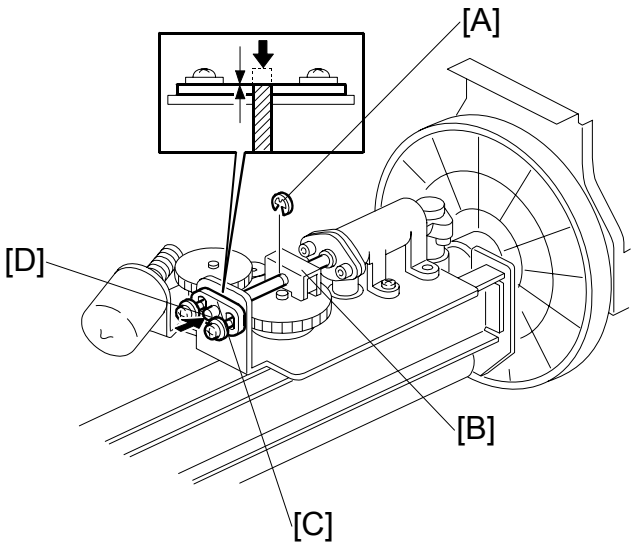
The following are the special tools used for service.

Description	Part number	Note
Scanner positioning pins (4 pins as a set)	A0069104	☛ 3.4.7
Flash memory card – 4MB	N8036701	☛ 5.9

3.14 COLOR DRUM

3.14.1 INK PUMP ADJUSTMENT

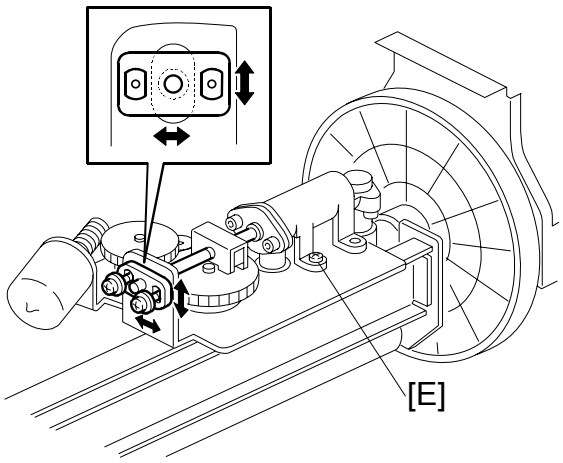
Purpose: To ensure the smooth operation of the ink pump plunger by properly positioning its holder.



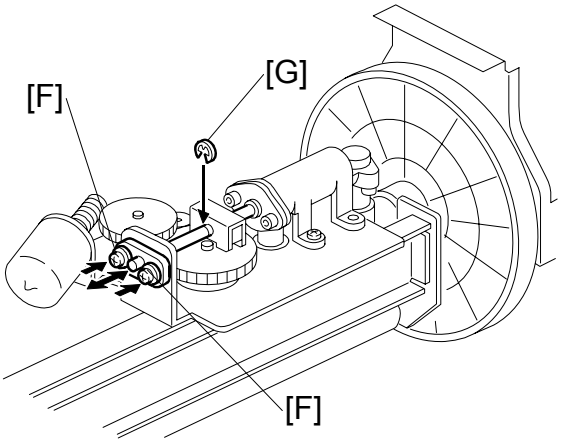
- Remove the drum
- Cloth screen (☛ 3.9.2)
- Clamper / Metal screen (☛ 3.9.3)

1. Remove the E-ring [A] to free the plunger from the pump drive slider [B].
2. Loose the two screws securing the holder [C]. (Do not remove the holder.)
3. Push the plunger [D] until it reaches the bottom.

NOTE: The end of the plunger [D] should not project outside from the holder [C].



4. Check that the piston motion is smooth.
5. If the motion is stiff, loosen the pump screws [E] and adjust the pump position.
6. After tightening, repeat step 4 and step 5.



7. Re-tighten the two screws [F].
8. Check that the piston motion is smooth.
9. Reinstall the E-ring [G].

4. TROUBLESHOOTING

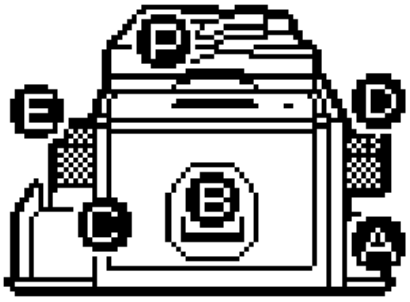
4.1 SERVICE CALL CODES

NOTE: 1) If the problem concerns electrical circuit boards, first disconnect then reconnect the connectors before replacing the PCBs.
2) If the problem concerns a motor lock, first check the mechanical load before replacing motors or sensors.

No.	Description/Definition	Points to Check
E-00	*Clamper Motor Failure* The MPU cannot detect the clamper position sensor signal (open or closed) within 3.0 seconds after the clamper motor turns on.	Clamper drive Clamper sensors Clamper motor MPU board Main motor encoder Master eject position sensor
E-01	Cutter error The cutter HP sensor does not turn on within 3.0 seconds after the cutter motor turns on.	Cutter drive Cutter switch Cutter motor
E-02	Paper Table Drive error The paper height sensor or the table lower limit sensor does not turn on within 7.5 seconds after the table motor turns on. Paper height sensor 1 or 2 does not turn on within 1 second after the paper height sensor 1 or 2 turn on.	Paper table drive Paper table motor Paper height sensor 1 or 2 Paper table lower limit sensor Gears Paper table spring
E-04	*Thermal Head Overheat* Temperature of the thermal head is greater than 65°C when the Start key is pressed.	Overheat (wait for the thermal head to cool down) Thermal head
E-06	*Main Motor Lock* The CPU cannot detect the master eject position sensor (drum HP) signal within 5.0 seconds after the main motor turns on.	Main motor drive Main motor Motor drive board Master eject position sensor
E-09	*Thermal Head Thermistor Open* The thermistor output voltage is over 4.432 volts.	Thermal head thermistor Thermal head connector
E-10	Thermal Head Energy Pulse error The CPU detects an abnormal ID signal from the thermal head energy control pulse.	Thermal head connector Thermal head MPU

No.	Description/Definition	Points to Check
E-12	Pressure Plate error The pressure plate home position sensor does not turn on within 6 seconds during initialization. Both the pressure plate home position and pressure plate limit sensors turn on when the main SW is turned on. The pressure plate home position sensor does not turn off when the pressure plate limit sensor does not turn on within 4.5 seconds when compressing the ejected master.	Pressure plate drive Pressure plate motor Plate position sensors Master eject error
E-13	Scanner error The scanner HP sensor does not turn on after the scanner motor has moved for more than 10 seconds back to home position after scanning. The scanner cannot leave the home position within 2.0 seconds of power on. Just after switching the power on, the scanner cannot return to the home position within 2.0 seconds of leaving.	Scanner drive Scanner HP sensor Scanner motor Scanner wire has come off
E-22	2nd Feed Start Timing Sensor error The 2nd feed start timing sensor does not activate before the master eject position sensor activates.	Drum sensors Feeler
E-23	Master Eject Position Sensor (Drum HP) error The master eject position sensor does not activate before the feed start timing sensor activates.	Drum sensors Feeler
E-24	Feed Start Timing Sensor error The feed start timing sensor does not activate before the 2nd feed timing sensor activates.	Drum sensors Feeler
E-40	Thermal Head ID error The CPU detects an abnormal ID signal from the thermal head.	Different thermal head MPU Thermal head connector disconnected
E-44	MSU error	Replace the MPU
E-50	NVRAM data version disagreement Data for the uploading NVRAM is not expected data for the machine.	Replace the MPU
E-51	Flash Rom error The data in the flash ROM is not complete.	Replace the MPU
E-61	Auto Off Switch error The main switch does not turn off for more than 6.0 seconds.	Auto off switch defective Auto off switch connector disconnected

4.2 ELECTRICAL COMPONENT DEFECTS



	Jam Type
Paper feed	A Jam
Drum	B Jam
Paper eject	C Jam
Master feed	D Jam
Master eject	E Jam
ADF	P Jam
Paper remaining	A or B Jam

4.2.1 DRUM

Name	State	Symptoms
2nd Feed start timing Sensor	Open	E-22 is displayed when the drum rotates.
	Shorted	
Master Eject Position (HP) Sensor	Open	E-23 is displayed when the drum rotates.
	Shorted	
Feed Start Timing Sensor	Open	E-24 is displayed when the drum rotates.
	Shorted	
Drum set	Set	Setting Drum: Normal Operation No Drum: E-06 is displayed when the main motor is rotates.
	OFF	Displays “no drum”
Drum ink sensor	ON	Image will be patchy because ink will not be supplied.
	OFF	Display “Ink end”

4.2.2 PAPER EJECT

Name	State	Symptoms
Paper Exit Sensor	Open	The “C” jam indicator is lit.
	Shorted	The “B” jam indicator is lit when a copy is made.

4.2.3 PAPER FEED

Name	State	Symptoms
Paper Registration Sensor	Open	The “AB” jam indicator is lit.
	Shorted	The “A” jam indicator is lit when a copy is made.
Paper Table Lower limit Sensor	Open	The paper table doesn’t go down.
	Shorted	The paper table goes down below the sensor, and E-02 is displayed.
Paper End Sensor	Open	Printing can begin even if there is no paper, and the “A” jam indicator will be lit.
	Shorted	The “load more paper” indicator is lit.
Paper height sensor 1	Open	E-02 is displayed after 1 second from moving up the paper feed table during printing.
	Shorted	The paper table goes up over the sensor, and E-02 is displayed
Paper height sensor 2	Open	E-02 is displayed after 1 second from moving up the paper feed table during printing.
	Shorted	The paper table goes up over the sensor, and E-02 is displayed

4.2.4 MAIN DRIVE

Name	State	Symptoms
Clamper Open Sensor	Open	E-00 is displayed.
	Shorted	E-00 is displayed when the clamper operates.
Clamper Close Sensor	Open	E-00 is displayed when the clamper operates.
	Shorted	E-00 is displayed.

4.2.5 SCANNER

Name	State	Symptoms
Platen Cover Sensor	Open	The master is made normally, even if the platen cover is open. (Have to push the start button twice)
	Shorted	The image is treated using center/edge erase mode.
Scanner HP Sensor	Open	E-13 is displayed.
	Shorted	

4.2.6 MASTER EJECT

Name	State	Symptoms
Drum Master Sensor	On	The “B” jam indicator is lit when print is started. (Print without master)
	Off	Master does not eject The “D” jam indicator is lit.
Pressure Plate Limit Sensor	Open	E-12 is displayed.
	Shorted	The “Full eject master” indicator is lit.
Pressure Plate HP Sensor	Open	E-12 is displayed.
	Shorted	E-12 is displayed.
Master Eject Box Sensor	On	The master is ejected, even if there is no master eject box
	Off	“No master eject box” is displayed. “Full eject master” indicator is lit.
Master Eject Sensor	Open	The “B” and “E” jam indicator is lit.
	Shorted	The “B” jam indicator is lit
Master eject unit safety switch	Open	“Unit open” is displayed.
	Shorted	

4.2.7 MASTER MAKING UNIT

Name	State	Symptoms
Master Set Cover Sensor	Open	The “D” jam indicator is lit.
	Shorted	The “open cover” indicators are lit.
Cutter HP Sensor	Open	E-01 is displayed.
	Shorted	E-01 is displayed.
Master making unit set switches	On	Either of sensors is work correctly, the machine move correctly.
	Off	“Not set making unit” is displayed
Master End Sensor	White	Master making can start even if there is no master roll, but the “D” jam indicator will be lit.
	Black	The “load new master roll” indicator is lit.
Thermal Head Temperature	Open	E-09 is displayed.
	Short	E-04 is displayed.

4.2.8 OTHER

Name	State	Symptoms
Auto shut off Switch	On	Cannot shut off the main switch. E-61 is displayed at auto shut off.
	Off	The main switch stays off

4.3 DIP SW, LED, VR, TP, AND FUSE TABLES

4.3.1 TEST POINTS

MPU

No	Usage
TP5	GND-a
TP10	+5V
TP11	+5VE
TP23	Ink Detection Pulse
TP25	Standard Pulse
TP28	GND-a

4.3.2 POTENTIOMETERS

MPU

No	Usage
VR1	Ink detection adjustment
VR2	Master End Sensor Adjustment

Power Supply Unit

No	Usage
RV1	Thermal Head Voltage Adjustment

4.3.3 LED'S

MPU

LED #	OFF	ON
LED 1	CPU2 (not use for service)	
LED 2	Low Ink Condition	Sufficient Ink Condition
LED 3	CPU1 (not use for service)	
LED 4	CPU1 (not use for service)	

FUSES

MPU

FUSE #	Rated Current	Voltage	Related Devices
FU 1	1 A	24 V DC	Ink Pump Motor
FU 2	2 A	5 V DC	UC2 PC Controller

PSU

FUSE #	Rated Current	Voltage	Related Devices
FU 700	6.3 A	120/230V AC	AC Line
FU 701	6.3 A	24VDC	Paper Transport Motor, Paper Feed Clutch, Paper Up-Down Motor, Air Knife Fan Motor, Front/Rear Pressure Release Solenoid, Vacuum Fan Motor, Ink Pump Motor, Master Eject Motor, Optional Key Counter, Master Counter, Paper Counter, Cutter Motor, Clamper Motor, Scanner Motor
FU 702	6.3 A	24V DC	Not used
FU 703	8 A	24V DC	Main Motor
FU 704	6.3 A	24V DC	Optional Tape Dispenser

5. SERVICE PROGRAM MODE

NOTE: The Service Program Mode is for use by service representatives only so that they can properly maintain product quality. If this mode is used by anyone other than service representatives for any reason, data might be deleted or settings might be changed. In such case, product quality cannot be guaranteed any more.

5.1 USING SERVICE PROGRAM MODES

Use the service program modes (SP modes) to check electrical data, change operating modes, and adjust values.

5.1.1 ACCESSING SP MODES

Entering SP Mode

1. Key in the following sequence.

 → 1 → 0 → 7 → 

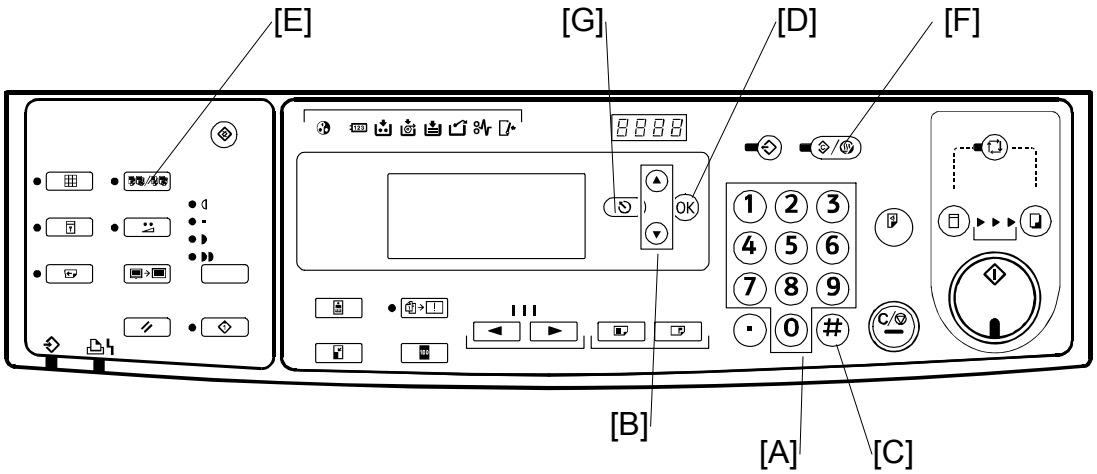
- Hold the  key down for longer than 3 seconds.

Leaving SP Mode

Press the  key one or more times.

CÓPIA NÃO CONTROLADA

5.1.2 HOW TO SELECT A PROGRAM NUMBER



1. Using the number keys [A] or the △▽ keys [B], enter the desired main menu number, then press the Enter key [C] or the OK key [D].
2. Using the number keys or the △▽ keys, enter the desired sub-menu number, then press the Enter key or the OK key.
3. Enter the desired value or mode using the number keys (SP modes are listed in the service program tables).
   NOTE: 1) Use the Memory/Class [E] key to toggle between "+" and "-".
   2) To enter a decimal place, you do not have to enter a decimal point. For example, to enter "1.5" just press "1" and "5" keys.
4. Press the Enter key or the OK key to store the displayed setting.
   NOTE: To cancel the SP mode, press the Clear Modes/Energy Saver key [F] or the Cancel key [G].

5.1.3 MAIN MENU NUMBER LIST

Number	Main Menu
1	Copy Data
2	Basic Settings
3	System Settings
4	Input Mode
5	Output Mode
6	Adjustment
7	Memory Clear
8	System Test

5.2 COPY DATA

5.2.1 SP TABLE (SP 1-XXX)

No.	Menu Items
1	Total master counter
20	Total print counter
50	D - master clamp jam
51	E - master eject jam
52	E - master compressing jam
53	A - paper non-feed jam
54	A - paper registration jam
55	B - paper wrapping jam
56	C - paper delivery jam
57	P - original feed - in jam
58	P - original feed - out jam
60	D - master cut jam
70	Main firmware part number
71	I/O ROM part number
72	Serial number
73	Main firmware version
74	ROM version
75	Serial number (Factory)
80	Error code history
81	Telephone number display
82	Jam history
83	PSU unusual voltage history
160	Japanese Display type (Japan only)
161	Key counter setting check
162	Key card setting check (Japan only)

5.2.2 SP1-70: MAIN FIRMWARE PARTS NUMBER

Displays the main firmware parts number and the suffix.

5.2.3 SP1-80: ERROR CODE HISTORY

Displays the latest 40 SC codes. Use the △▽ keys to view the codes.

5.2.4 SP1-83: PSU UNUSUAL VOLTAGE HISTORY

Display the unusual power supply into the machine history.

5.3 BASIC SETTINGS

5.3.1 SP TABLE (SP 2-XXX)

No.	Menu Items	Default	Settings
1	Default print speed	2	1 to 3
2	Default image position	0	-10.0mm to +10.0mm (0.5mm interval)
4	Destination code		
5	Not used (Ink)	0	0 / 2-
6	Image position display	1	0:Slow 1:Normal 2:Fast
10	Ink detection board	On	Off/On (Off is used for tests, and for removing ink from the drum)
11	Paper end sensor	On	Off/On (Off is used for tests)
12	Drum master sensor	On	Off/On (Off is used for tests)
13	Platen cover sensor	On	Off/On (Off is used for tests)
14	ADF cover sensor	On	Off/On (Off is used for tests)
20	Destination setting	Other	Other/Japan
21	Ink setting (not used)	0	0 to 1
33	Re - Feeding setting	On	Off/On
40	T/H energy control – B4/Black	7	0 to 50%
41	T/H energy control – B4/Color	7	0 to 50%
42	T/H energy control – A4/Black	7	0 to 50%
43	T/H energy control – A4/Color	7	0 to 50%
44	T/H energy control – LG/Black	7	0 to 50%
45	T/H energy control – LG Color	7	0 to 50%
50	T/H energy control - B4/Black eco	15	0 to 50%
51	T/H energy control - B4/Color eco	15	0 to 50%
52	T/H energy control - A4/Black eco	15	0 to 50%
53	T/H energy control - A4/Color eco	15	0 to 50%
54	T/H energy control – LG/Black eco	15	0 to 50%
55	T/H energy control – LG/Color eco	15	0 to 50%
60	Bold letter mode	Off	Off/On
61	T/H Swing Mode	Off	Off/On
62	T/H Swing Quantity	2	+-1mm to +-5mm
80	Auto off at unusual voltage	On	Off/On
95	Paper table standby position	Low	High / Low
100	Make master without print	Off	Off/On

5.3.2 SP2-6: IMAGE POSITION DISPLAY

When the user moves the image position on the operation panel, this SP controls the length of time that the adjustment value is shown on the display before the screen goes back to the previous display.

'Slow' means that the display is shown for the longest time possible.

5.3.3 SP2-33: RE-FEEDING SETTING

When the machine performs re-feeding, the paper registration position can be up to 5mm out of range. If this incorrect position is not acceptable to the customer, change this SP mode to "OFF".

ON: Re- feeding is on (factory setting).

OFF: Re- feeding is off.

5.3.4 SP2-40, 2-55: THERMAL HEAD ENERGY CONTROL

2-40~45: The default is 7%. This means that during normal printing mode, the thermal head energy is 93% of the maximum possible (100 – 7).

2-50~55: The default is 15%. This means that in economy printing mode, the thermal head energy is reduced by another 15%. With the default settings, this means that the thermal head energy is 85% of maximum power (100-15).

5.3.5 SP2-60: BOLD MODE: LETTER MODE ONLY

Makes a bold outline of a letter-mode image.

5.3.6 SP2-61: T/H SWING MODE

If this is set to 'ON', the thermal head writing position is moved a small amount between masters. The amount is set with SP2-61 (T/H Swing Amount) automatically. This changes the side-to-side margin on the master.

This prevents the same parts of the thermal head from being used all the time, because if masters that contain the same image (such as a logo) are made frequently, this can burn out the thermal head.

Default: OFF

5.3.7 SP2-62: T/H SWING AMOUNT

Settings: +-1 to +-5 mm

Default: 2 mm

5.3.8 SP2-80: AUTO OFF AT UNUSUAL VOLTAGE

There is an automatic detection system for unexpected voltage surges, featuring automatic shut-off and data logging features.

5.3.9 SP2-95: PAPER TABLE STANDBY POSITION.

High: The paper table after printing is moved to a higher position than the standard position. This will reduce the time for starting the first print when continuously making masters.

Low: The standard position

NOTE: If SP2-95 is “high”, the machine goes to the standard position in the following situations.

- When the master end indicator lights and a message is displayed
- When a master eject jam (B jam location indicator) is displayed
- When a master feed jam (D jam location indicator) is displayed
- When the paper height sensor is actuated immediately after the main switch is turned on.

5.3.10 SP2-100: MAKE MASTER WITHOUT PRINT

This function wraps a blank master around the drum. The ink on the drum may dry up at the following times:

- The machine is not used for a long time.
- The customer changes to a color drum that has not been used recently.

This might affect the print quality (Poor image: ghost image of the previous print).

Wrap a blank master around the drum after you print, to prevent ghost images of previous prints when the machine is not used for a long time.

Procedure:

1) Access SP2-100 (Make master without printing). Then press “OK”.
2) Press the “Start” key while holding down the “#” key.

5.4 SYSTEM SETTINGS

5.4.1 SP TABLE (SP 3-XXX)

No.	Menu Items	Default	Settings
1	Input the present time	(00/01/01 0:00)	99/12/31 23:59
2	Input TEL number	-	
3	Input serial number	-	
4	Input installation data	(00/01/01)	99/12/31
9	Key counter setting	No	No/Yes
10	Key card setting (Japan only)	No	No/Yes

5.4.2 SP3-1: INPUT THE PRESENT TIME

Input the year, the month / date, and the time in that order. Press the Enter key between each one.

Input the last two digits of the present year (two-digit number).
↓#
Input the present month (two-digit number).
↓#
Input the present date (two-digit number).
↓#
Input the present hour (two-digit number).
↓#
Input the present minute (two-digit number).
↓#
Input the present second (two-digit number).
↓#

Example: 2006/May/27th/13:00:00

06
↓#
05
↓#
27
↓#
13
↓#
00
↓#
00
↓OK

5.4.3 SP3-4: INPUT INSTALLATION DATE

Input installation date in that order. Press the Enter key between each one.

Input the last two digits of the present year (two-digit number).

↓#

Input the present month (two-digit number).

↓#

Input the present date (two-digit number).

↓#

Example: 2006/May/27th/13:00:00

06

↓#

05

↓#

27

↓OK

5.5 INPUT MODE

5.5.1 SP TABLE (SP 4-XXX)

No.	Menu Items
1	Scanner HP sensor
2	Platen cover sensor
7	Master eject unit open SN
9	Master making unit set SW 1
10	Master making unit set SW 2
11	Master set cover sensor
12	Cutter HP switch
13	Master end sensor
14	Eject box set switch
15	Master eject sensor
16	Pressure plate HP sensor
17	Pressure plate limit Sensor
18	Ink detection signal
19	Color drum signal
21	Drum set signal
22	Clamper open sensor
23	Clamper close sensor
24	Drum master sensor
25	Master eject position SN
27	Drum size1 signal
28	Drum size2 signal
30	Table lowering switch
31	Table lower sensor
33	Paper end sensor
35	Paper pick-up roller sensor
36	Paper height filler sensor
41	Registration sensor
42	Feed start timing sensor
43	2nd feed timing sensor
44	Paper exit sensor
50	Door safety switch

No.	Menu Items
60	ADF connecting signal
61	ADF cover sensor
62	ADF registration sensor
64	ADF original set sensor
69	ADF open sensor
70	Key counter signal
71	Key card signal (Japan only)

5.6 OUTPUT MODE

5.6.1 SP TABLE (SP 5-XXX)

No.	Menu Items
1	Exposure lamp (xenon lamp)
2	Scanner motor - scan
3	Scanner motor - return
4	Scanner to HP
8	Master feed motor – Forward
9	Cutter motor – to HP
10	Cutter motor – reverse
11	Cutter motor – forward
12	VHD signal
13	Master eject motor
14	Pressure plate motor - limit
15	Pressure plate motor -to HP
17	Main motor - 30 rpm
18	Main motor - 60 rpm
19	Main motor - 80 rpm
20	Main motor - 100 rpm
21	Main motor - 130 rpm
23	Clamper motor: to open
24	Clamper motor: to close
25	Ink pump motor
26	Pressure release solenoids
30	Table motor – down
31	Table motor – up
35	Paper feed clutch
40	Registration motor - 30 rpm
41	Registration motor - 60 rpm
42	Registration motor - 80 rpm
43	Registration motor - 100 rpm
44	Registration motor - 130 rpm
46	Air knife fan motors
47	Vacuum fan motor
48	PSU fan motor
50	Paper counter
51	Master counter

No.	Menu Items
60	ADF motor
61	ADF feed clutch
62	ADF pick-up solenoid
63	Key counter signal
64	Not used
65	Key card (Japan only)
90	Main motor – to HP
91	Main motor – to Master clamp
100	All indicators on the panel
111	Auto Off solenoid

5.7 ADJUSTMENT

5.7.1 SP TABLE (SP 6-XXX)

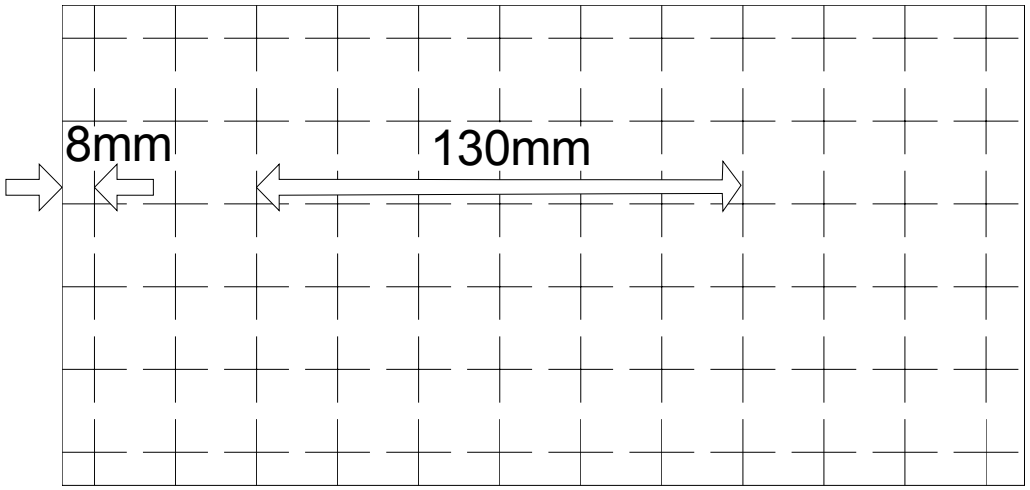
No.	Menu Items	Default	Settings
1	Main-scan position – platen	0	-5.0 to 5.0 mm
2	Main-scan position – ADF	0	-5.0 to 5.0 mm
3	Scan start position – platen	0	-2.0 to 5.0 mm
4	Scan start position - ADF	0	-5.0 to 5.0 mm
5	Scanning speed - platen	0	-5.0 to 5.0 %
6	Scanning speed - ADF mode	0	-5.0 to 5.0 %
10	Master writing speed	0	-5.0 to 5.0 %
11	Master writing length	0	-5.0 to 5.0 %
20	Registration buckle	0	0 to100 PLS
21	Paper regist position	0	-5.0 to 5.0 mm
27	Master making density - Tint	1	0: Pale, 1: Normal, 2: Dark
28	Master making density - Photo	1	0: Pale, 1: Normal, 2: Dark
29	Master making density - Letter/Photo	1	0: Pale, 1: Normal, 2: Dark
30	Master making density - Letter	1	0: Pale, 1: Normal, 2: Dark
32	MTF filter – Letter: Main	2	0 to 7
33	MTF filter – Letter: Sub	2	0 to 7
34	MTF filter – Letter/Photo: Main	2	0 to 7
35	MTF filter – Letter/Photo: Sub	2	0 to 7
36	MTF filter - Photo: Main	2	0 to 7
37	MTF filter – Photo: Sub	2	0 to 7
40	Ink detection adjustment	–	
50	Master end sensor voltage	2	0.5 to 3.5V
61	Master length – LG drum	4780	4200 to 6000 (0.1mm)
62	Master length – B4 drum	4780	4200 to 6000 (0.1mm)
63	Master length – A4 drum	4140	3000 to 6000 (0.1mm)
70	SBU VRT value	–	
71	SBU FBO value	–	
72	SBU FBE value	–	
100	Paper registration 30rpm	0	-40 to 40
101	Paper registration 60rpm	0	-40 to 40
102	Paper registration 80rpm	0	-40 to 40
103	Paper registration 100rpm	0	-40 to 40
104	Paper registration 130rpm	0	-40 to 40
108	Paper regist: skip: 30rpm	0	-40 to 40
109	Paper regist: skip: 60pm	0	-40 to 40

SP TABLE (SP 6-XXX)

No.	Menu Items	Default	Settings
110	Paper Regist: skip: 80rpm	0	-40 to 40
111	Paper Regist: skip: 100rpm	0	-40 to 40
112	Paper Regist: skip: 130rpm	0	-40 to 40
116	Paper middle bulge 30rpm (Do not Adjust)	0	-100 to 100
117	Paper middle bulge 60rpm (Do not Adjust)	0	-100 to 100
118	Paper middle bulge 80rpm (Do not Adjust)	0	-100 to 100
119	Paper middle bulge 100rpm (Do not Adjust)	0	-100 to 100
120	Paper middle bulge 130rpm (Do not Adjust)	0	-100 to 100
124	Paper front bulge 30rpm (Do not Adjust)	0	-90 to 8
125	Paper front bulge 60rpm (Do not Adjust)	0	-90 to 8
126	Paper front bulge 80rpm (Do not Adjust)	0	-90 to 8
127	Paper front bulge 100rpm (Do not Adjust)	0	-90 to 8
128	Paper front bulge 130rpm (Do not Adjust)	0	-90 to 8
132	Paper Regist: A4 drum 30 rpm	0	-40 to 40
133	Paper Regist: A4 drum 60 rpm	0	-40 to 40
134	Paper Regist: A4 drum 80 rpm	0	-40 to 40
135	Paper Regist: A4 drum 100 rpm	0	-40 to 40
136	Paper Regist: A4 drum 130 rpm	0	-40 to 40
140	Paper Regist: skip: A4: 30 rpm	0	-40 to 40
141	Paper Regist: skip: A4: 60 rpm	0	-40 to 40
142	Paper Regist: skip: A4: 80 rpm	0	-40 to 40
143	Paper Regist: skip: A4: 100 rpm	0	-40 to 40
144	Paper Regist: skip: A4: 130 rpm	0	-40 to 40
148	Paper middle bulge A4 30rpm(Do not Adjust)	0	-100 to 100
149	Paper middle bulge A4 60rpm(Do not Adjust)	0	-100 to 100
150	Paper middle bulge A4 80rpm(Do not Adjust)	0	-100 to 100
151	Paper middle bulge A4 100rpm(Do not Adjust)	0	-100 to 100
152	Paper middle bulge A4 130rpm(Do not Adjust)	0	-100 to 100
156	Paper front bulge A4 30rpm(Do not Adjust)	0	-90 to 8

No.	Menu Items	Default	Settings
157	Paper front bulge A4 60rpm(Do not Adjust)	0	-90 to 8
158	Paper front bulge A4 80rpm(Do not Adjust)	0	-90 to 8
159	Paper front bulge A4 100rpm(Do not Adjust)	0	-90 to 8
160	Paper front bulge A4 130rpm(Do not Adjust)	0	-90 to 8

5.7.2 SP6-10: MASTER WRITING SPEED



1. Input SP8-10 (Test patterns) and enter “6”, then press the Start key.
2. Exit the SP mode, print 10 copies at 100 rpm (speed 2). Use the 10th print for the adjustment.
3. The length of the 6 squares in the feed direction should be 130 mm, as shown above.
4. If it is not, calculate the reproduction ratio using the following formula.
   {(130 - Value) / 130} x 100 = ± X.X % (Round off to one decimal place)
   Example: If the value is 133, {(130 - 133) / 130} x 100 = - 2.3 %
5. Access SP6-10, input the calculated ratio, and press the Enter key.
6. Repeat the procedure to make sure that the ratio is correct.

5.7.3 SP6-21: PAPER REGIST POSITION

1. Input SP8-10 (Test patterns) and enter “6”, then press the Start key.
2. Exit the SP mode, print 10 copies at 100 rpm (speed 2). Use the 10th print for the adjustment.
3. The space between the leading edge and the next line should be 8 mm, as shown above.
4. If it is not, access SP6-21, input the difference and press the Enter key.
   Example: If the value is 7 mm, 7 - 8 = -1.0
5. Repeat the procedure to make sure that the gap is correct.

5.7.4 SP6-5: SCANNING SPEED – PLATEN AND SP6-6: SCANNING SPEED – ADF MODE

1. Make copies of the test pattern printed during the previous adjustments (☛ previous page), in platen mode at speed 2. Use the 10th print for the adjustment.
2. The length of the 6 squares in the feed direction should be 130 mm.
7. If it is not, calculate the reproduction ratio using the following formula.
   {(130 - Value) / 130} x 100 = ± X.X % (Round off to one decimal place)
   Example: If the value is 133, {(130 - 133) / 130} x 100 = - 2.3 %
3. Access SP6-05, input the calculated ratio, and press the Enter key.
4. Check again to make sure that the ratio is correct.
5. Make copies of the test pattern in ADF mode and repeat the process using SP6-06.

5.7.5 SP6-3: SCANNING START POSITION – PLATEN AND SP6-4: SCANNING START POSITION - ADF

1. Make copies of the test pattern printed during the previous adjustments (☛ previous page), in platen mode at speed 2. Use the 10th print for the adjustment.
2. The space between the leading edge and the next line should be 8 mm.
3. If it is not, access SP6-03, input the gap value and press the Enter key.
   Example: If the value is 7 mm, 7 - 8 = -1.0
4. Repeat the procedure to make sure that the gap is correct.
5. Make copies of the test pattern in ADF mode and repeat the process using SP6-04.

5.7.6 SP6-1: MAIN SCAN POSITION – PLATEN AND SP6-2: MAIN SCAN POSITION - ADF

1. Make a copy in platen mode at speed 2.
2. Measure the difference between the center of the main-scan on the original and on the print.
3. Access SP6-01, input the gap value and press the Enter key. (If you input a positive value, the image moves towards the operation side.)
4. Repeat the procedure to make sure that there is no difference.
5. Make a copy in ADF mode and repeat the process using SP6-02.

5.7.7 IMAGE ADJUSTMENT (SP6-10, -21, -5, -3, AND -1)

Adjusts the image position on prints by changing the SP settings.

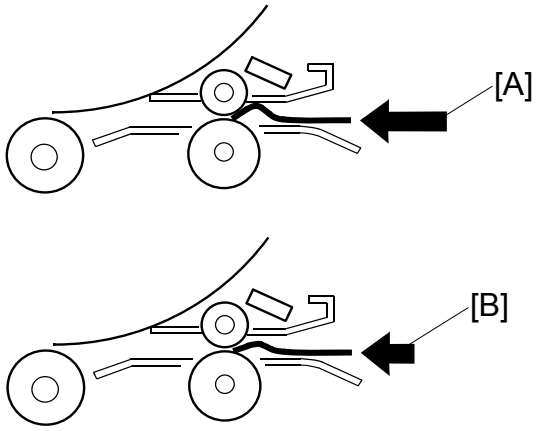
Adjust the settings in the order: SP6-10, -21, -5, -6, -3, -4, -1, -2.

When correcting errors made when printing with the controller, use only the first two procedures. When correcting errors made when printing with scanned originals, do all six adjustments in the given order.

This adjustment is required every time the RAM on the MPU has been replaced.

5.7.8 SP6-20: REGISTRATION BUCKLE

Adjusts the paper skew and the paper registration slippage.



[A]: **Increase the value**
The occurrence of paper skew will be reduced, but the paper is more likely to slip and the registration position may be incorrect.

[B]: **Decrease the value**
The paper registration position will be correct.

5.7.9 SP6-32 TO 37: MTF FILTER

Sharpens the image, but moiré can become more apparent.

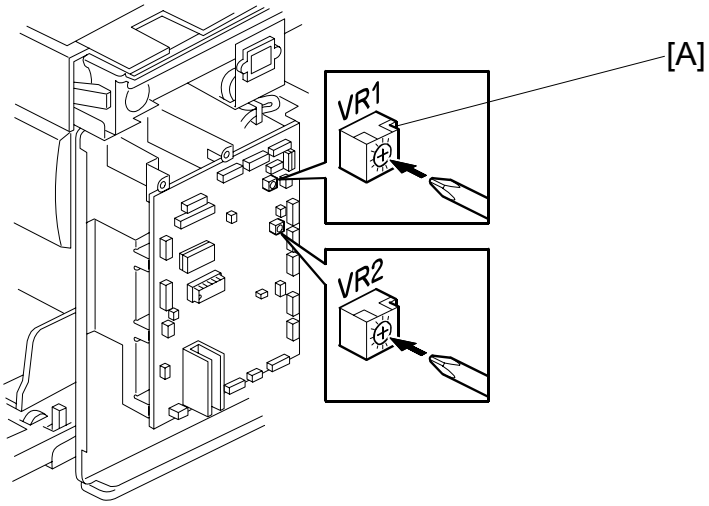
Refer to the following table for the relationship between this SP mode value and filter strength (the relationship is not linear).

Value	Strength of Filter
7	X 4
6	X 2
0	X 1
5	X 1/2
4	X 1/4
3	X 1/8
2	X 1/16
1	X 1/32

5.7.10 SP6-40: INK DETECTION ADJUSTMENT

Ensures that the CPU detects a no ink condition.

CAUTION: Before attempting this procedure, wipe off the ink around the ink roller. To do this, set SP2-10 (ink detection) to OFF, and feed paper until ink ends. After finishing the procedure, do not forget to return SP2-10 to the default (ink detection on).



Access SP6-40, and open the door cover. Then turn the VR1 [A] on the MPU board until the display becomes “4.0 +-0.2 u” (4 μs).

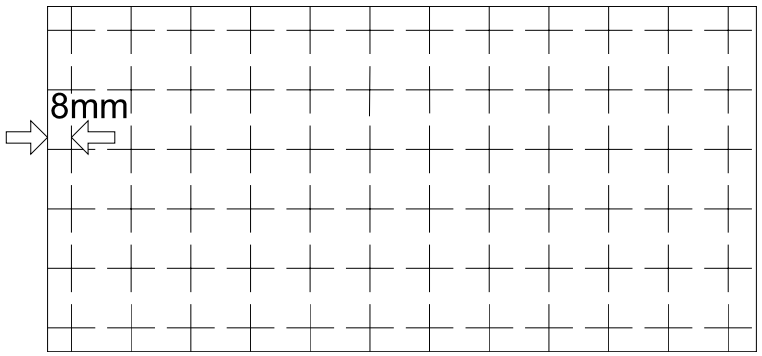
NOTE: When the drum has ink inside, the machine displays “----“.

5.7.11 SP6-100 TO 104: PAPER REGISTRATION - EACH SPEED

The following procedure allows the image position to be adjusted for each speed (30, 60, 80, 100 and 130 rpm)

NOTE: If you want to adjust the image position for all the speed at the same time, use SP6-21 (Paper registration position).

1. Set SP8-10 (Test patterns) to a value of “6”, then press the Start key.
2. Make 3 copies at speed 3 (finishing with 130 rpm). Perform the adjustment below for all 3 copies.
   Trial print: 30 rpm
   1st print: 60 rpm
   2nd print: 80 rpm
   3rd print: 100 rpm
   4th print: 130 rpm
3. The distance between the leading edge and first line should be 8mm, as shown below.



4. If this distance is not 8mm, access SP6-101 to 104 and then input a value to adjust the distance (range: -40 to 40, step: 1) for each of 3 copies samples (i.e. 30, 60, 80, 100 and 130 rpm samples).
   The higher the value, the narrower the distance between the leading edge and 1st line becomes (and vice-versa). Also, each step corresponds to approximately 0.5mm. Input the value that will bring the distance to 8mm.
5. Perform the adjustment again for any of the samples that are still outside the 8mm standard.

NOTE: Adjust SP6-108 to 112, 132 to 144 in the same way.

5.8 MEMORY CLEAR

5.8.1 SP TABLE (SP 7-XXX)

No.	Menu Items
1	Factory settings clear
3	Total counter clear
4	Jam/Error data clear

5.8.2 SP7-1: FACTORY SETTINGS CLEAR

This resets all SP and User tool settings except for the following SP and User tool numbers.

- User tool 1: Counter Display (Masters and Prints)
- User tool 2-4: mm/inch
- User tool 2-5: Language on LCD
- User tool 2-6: Date/Time
- SP2-4: Destination code
- SP2-20: Destination setting
- SP2-80: Auto off at unusual voltage
- SP3-3: Input serial number
- SP6-All: Adjustments

5.8.3 SP7-3: TOTAL COUNTER CLEAR

This resets the following SP numbers

- SP1-1 Total master counter
- SP1-20 Total print counter

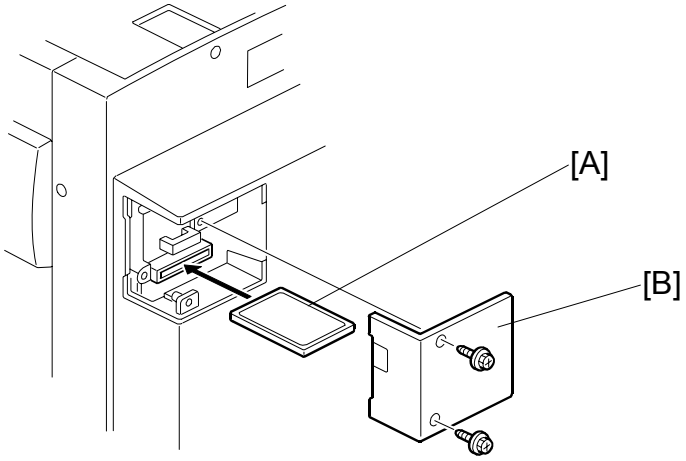
NOTE: The counters for “User tool 1: Counter Display” are unresetable counter

5.9 SYSTEM TEST

5.9.1 SP TABLE (SP 8-XXX)

No.	Menu Items	Default	Settings
1	Download main firmware	-	Start with # key
2	Upload main firmware	-	Start with # key
3	Data printout – Basic/SC/Jam	-	
4	Data printout – Adjustment	-	
5	Data printout – Input/Output	-	
9	Data printout – Power failure	-	
10	Test patterns	6	1 to 9 A4 start with #
19	Free run - ADF	100%	65%~155%
20	Free run - scanner	100%	65%~155%
21	Paper feed at 30rpm	Off	Off/On
22	Free run - Paper feed	Off	Off/On
30	All indicators on panel	-	Active when start press
31	LCD data download (Do not use)	Off	Off/On
100	Drum size/type check		

5.9.2 SP8-1. DOWNLOAD MAIN FIRMWARE



Updates the main firmware using a flash memory card [A].

NOTE: To update the I/O control firmware in the EPROM on the MPU, replace the EPROM (see section 3.12).

1. Before downloading new firmware, check the current version with SP1-70
2. Prepare a flash memory card with the latest firmware.
3. Turn off the main switch and disconnect the power cord.
4. Remove the rear card cover [B].
5. Plug the flash memory card into the connector on the MPU.
6. Connect the power cord, then turn on the main switch.
7. Access SP8-1 and press the OK key. Press the “Enter(#)” key.
8. Press the Enter key. (It takes about 2.0 minutes to complete.)
9. Check that the “Completed” is displayed.
10. Turn off the main switch, and remove the flash memory card.

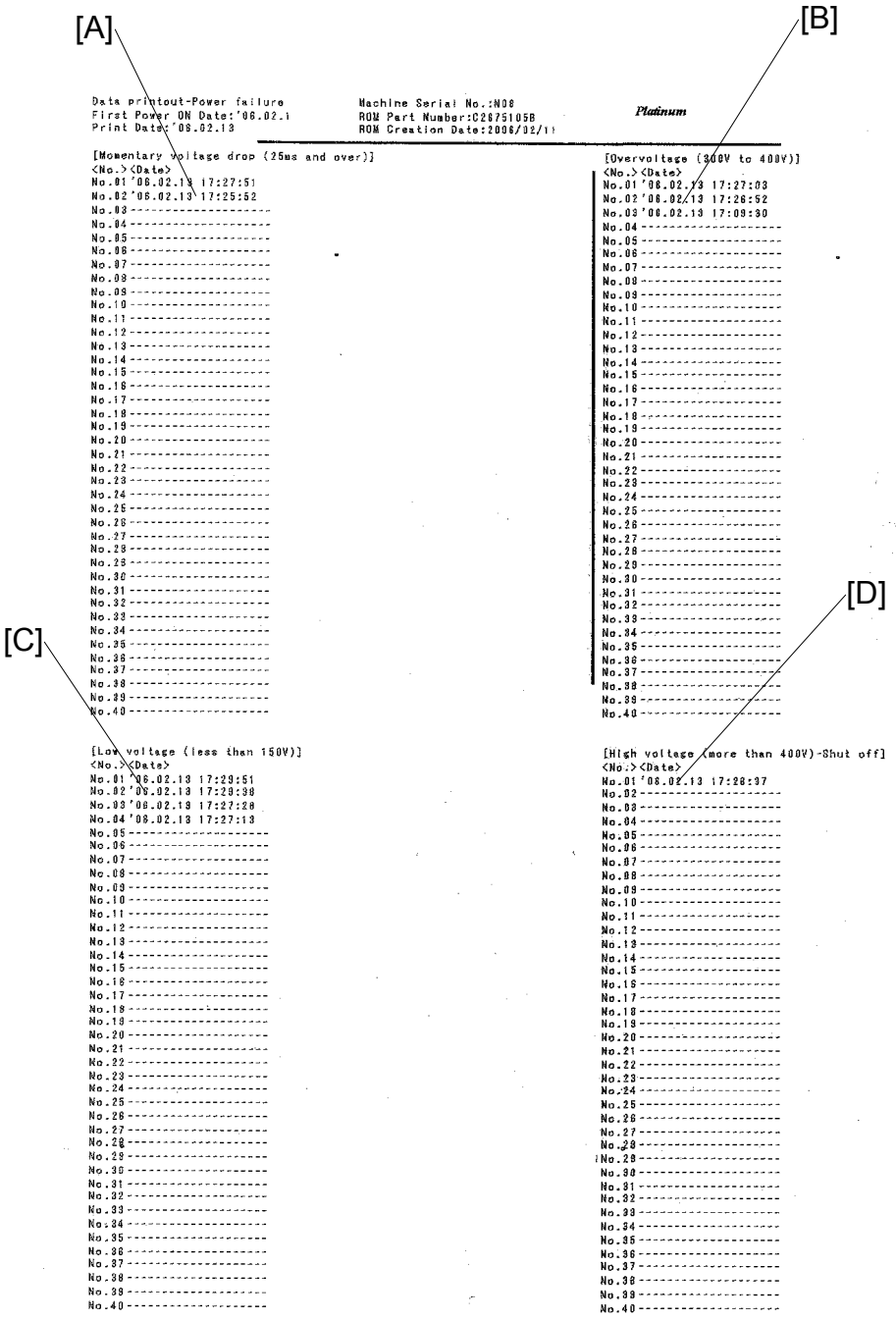
5.9.3 SP8-2: UPLOAD MAIN FIRMWARE

Writes firmware to a flash memory card (P/N’ #A2309352 or N8036701) from the machine.

1. Refer to steps 3 to 5 of section 5.9.2 (download main firmware).
2. Connect the power cord, then turn on the main switch while holding the Clear Modes key.
3. Access SP8-2 and press the OK key. Press the “Enter(#)” key.

Refer to steps 8 and 10 in section 5.9.2 (download main firmware).

5.9.4 SP8-9 DATA PRINTOUT – POWER FAILURE



[A]: Momentary Voltage Drop

[B]: Over voltage

[C]: Low voltage

[D]: High voltage

The machine collects information about unusual voltages from the power outlet and you can check this data with SP 8-9 Data printout – Power failure

See section 6.11 for more information about the four types of data ([A] to [D]).

5.9.5 SP8-10: TEST PATTERNS

Makes prints without using the scanner.

Access SP8-10 and select the number “6”, then press the “Enter(#)” key.

Other numbers are as shown below

1: Grid, 2: Vertical, 3: Horizontal gray, 4: Vertical gray, 5: 16 grays,
6: Cross, 7: Diagonal grid, 8: 256 grays, 9: 64 grays

5.9.6 SP8-21: PAPER FEED TEST (30 RPM)

Feeds paper at the lowest speed (30 rpm), and applies printing pressure.

1. Set a stack of paper on the paper feed table.
2. Access SP8-21 and press the OK key.
3. Exit the SP mode and enter the number of sheets that you want to feed.
4. Press the Print key.
5. To exit this mode, turn off the main switch.

5.9.7 SP8-22: FREE RUN PAPER FEED (30 RPM)

Drives the paper feed mechanism at the lowest speed (30 rpm) without paper.

1. Access SP8-22 and press the OK key.
2. Exit the SP mode and enter the number of times that you want to repeat the paper feed cycle.
3. Press the Print key.
4. To exit this mode, turn off the main switch.

5.10 USER TOOLS

5.10.1 MAIN MENU NUMBER LIST

Number	Main Menu
1	Counter
2	System Settings
3	Set Operation Mode
4	Initial Settings
5	Mode Settings
6	Administration Tools
7	Online Settings

5.10.2 USER TOOL LISTS

1. Counter

No.	Mode	Description
1	Counter Display	Shows the total number of masters and prints.

2. System

No.	Mode	Description
1	Auto Reset Timer	The machine automatically returns to its initial condition if it has not been operated for a certain period of time.
2	Disp. Resettable Counter	Shows the total number of masters and prints after resetting.
3	Reset Resettable Counter	You can select whether or not to clear the number of resettable counter
4	mm/inch	You can select the units of measurement used on the panel display.
5	Language on LCD	You can select the language for the panel display.
6	Date/Time	You can set the date and time for the machine's internal clock using the number keys.
7	Energy Saver Option	You can select the energy saver mode from Energy Saving or Auto Off.
8	Energy Saver Timer	You can specify the time taken for the machine to enter Energy Saver mode.
9	Auto Off Timer	You can select to use the auto off timer.
10	Data Print	You can print the log data and the counter list.

3. Set Operation Mode

No.	Mode	Description
1	Minimum Print Quantity	You can set a minimum print quantity between 0 and 9999. Any number below the minimum will not be printed.
2	Maximum Print Quantity	You can set a maximum print quantity between 0 and 9999.
3	Panel Beeper	You can turn the beeper on or off.
4	LCD Contrast	You can adjust the brightness of the panel display.
5	Class Display	Under the Memory/Class function, you can select to have “Select Class/Year” displayed as “Select Department” instead, when the machine is not limited to school or college use.

4. Initial Settings

No.	Mode	Description
1	Master Making Density	You can specify the image density that is selected by default when the power is turned on.
2	Original Type	You can specify the original type that is selected by default when the power is turned on.
3	Ratio	You can specify the reproduction ratio that is selected by default when the power is turned on.
4	Economy Mode	You can select to have Economy mode as either “On” or “Off” when the power is turned on, or after mode settings have been cleared.
5	Erase Border Width	You can specify the edge erase margin.
6	Program/ Change Class	You can store settings of the Class mode
7	Program/ Change Memory	You can store settings of the Memory mode”
8	Prog.Change: Class/Year	You can store settings of the Select Class/Year.

5. Mode Settings

No.	Mode	Description
1	Auto Cycle	You can select to have Auto Cycle mode as either “On” or “Off” when the power is turned on.
2	Background Correction	When you make prints in Photo, or Text/Photo mode, the background of the prints might appear dirty. In this case, you can select background correction to improve the clarity of your prints.
3	Longer Paper	If you are making prints on paper of custom sizes, you can set “Use”.
4	Combine/Repeat Priority	You can choose to have either Combine or Repeat selected by default when the power is turned on.
5	Cmb / Img Repeat Sep. Line	You can specify the type of separate line of combine and repeat.
6	Cancel Combine setting	You can specify whether Combine/Repeat mode will be automatically cleared after you have finished your print job.
7	Skip Feed	You can specify the number of times that the drum rotates when in Skip Feed mode.
8	Memory Mode Setting	You can choose to have either Memory mode or Stack Memory mode as the default.
9	Auto Class	Under the Class mode, the machine stops after it is finished a Class print job. When you select Auto Class, the machine stops for 2 seconds and then goes on to the next Class print job.

6. Administrator Tools

User Codes

If user codes are turned on, operators must enter their user codes before they can operate the machine. The machine keeps count of the number of masters and prints made under each user code.

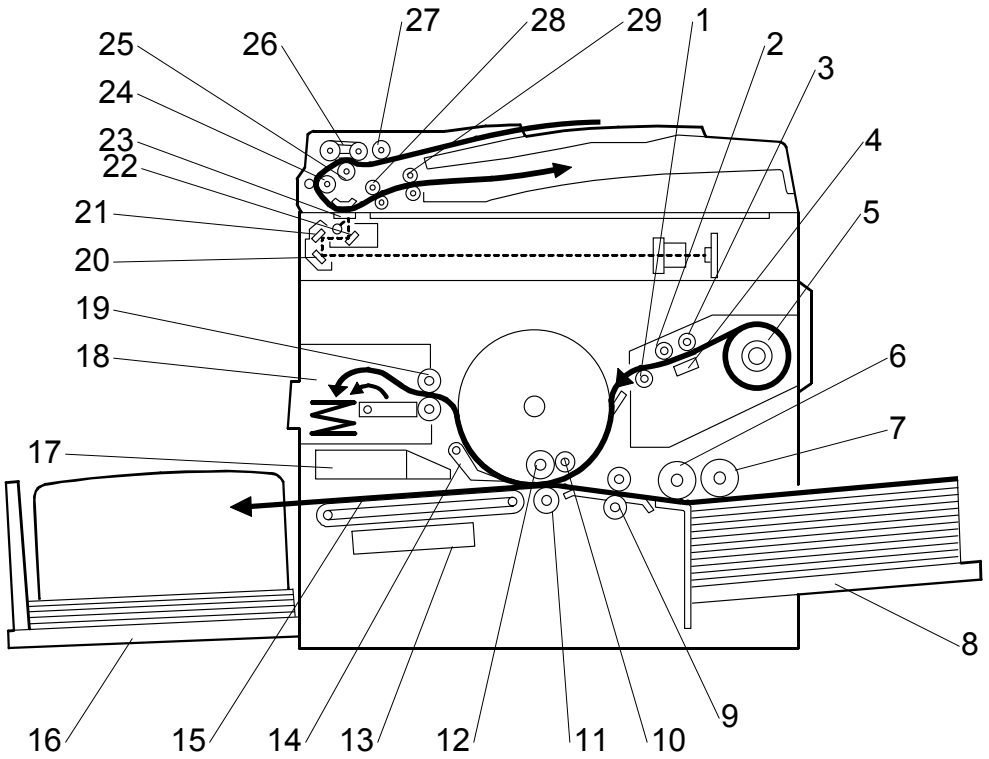
No.	Mode	Description
1	Display Counter(s)	You can check the number of masters and copies made under each user code.
2	Clear Counter(s)	You can clear each or all user code counters.
3	User Code Management	You can select whether or not to use User Code mode.
4	Key Counter Adjust	Normally, the optional key counter counts the number of prints regardless of the number of masters used. You can, however, add to the key counter a value between 0 and 50 to the key counter each time a new master is used.

7. Online Settings

No.	Mode	Description
1	Hold Data-in	You can select to have Hold Data-in mode either “On” or “Off” when the power is turned on, or after mode settings have been cleared.

6. DETAILED SECTION DESCRIPTIONS

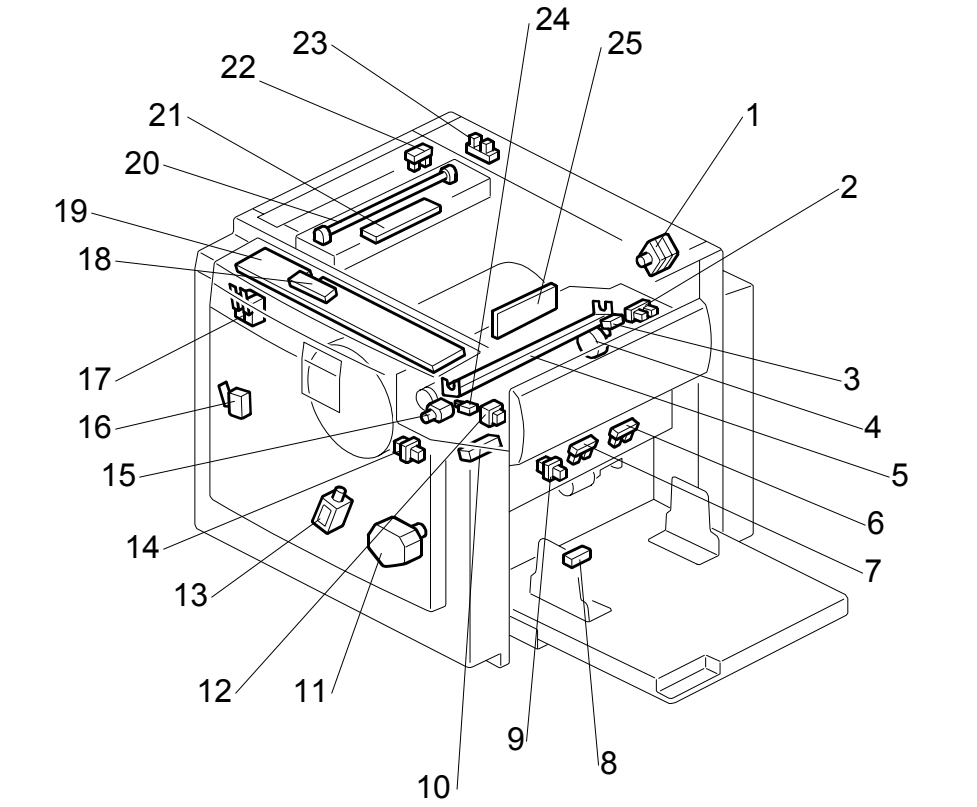
6.1 MECHANICAL COMPONENT LAYOUT

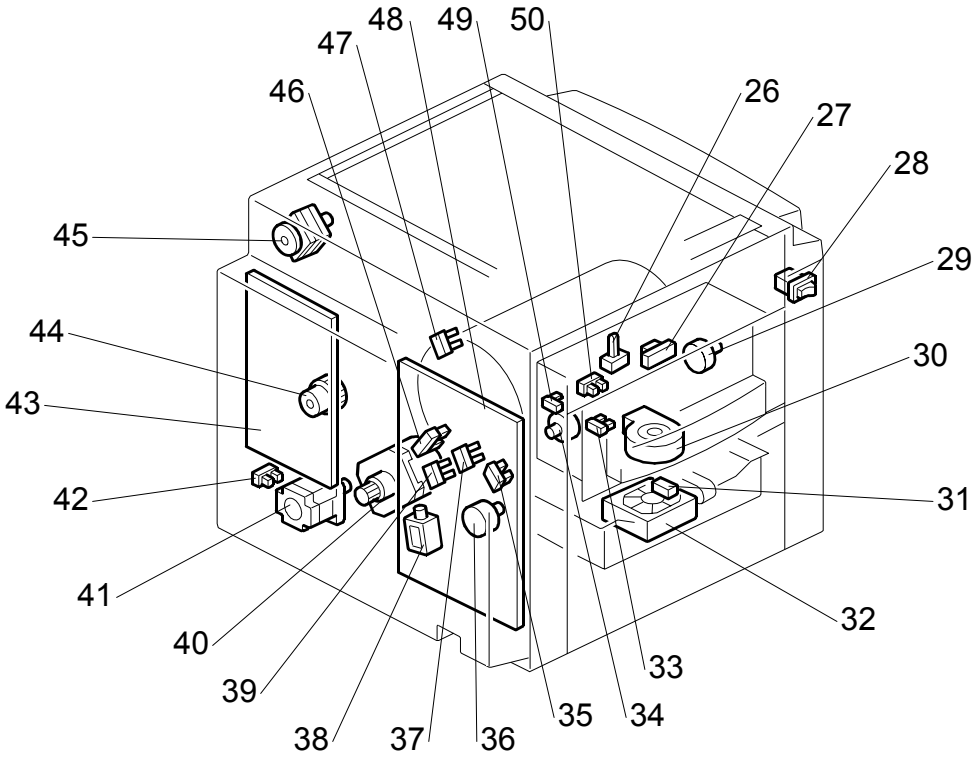


1. Tension Roller
2. Master Feed Roller
3. Platen Roller
4. Thermal Head
5. Master Roll
6. Paper Feed Roller
7. Paper Pick-up Roller
8. Paper Table
9. Registration Rollers
10. Doctor Roller
11. Press Roller
12. Ink Roller
13. Vacuum Fan Motor
14. Exit Pawl
15. Transport Belts
16. Paper Delivery Table
17. Air Knife Fan Motor
18. Master Eject Box
19. Master Eject Rollers
20. 3rd Mirror
21. 2nd Mirror
22. 1st Mirror
23. DF Exposure Glass
24. 1st Transport Roller
25. Separation Roller
26. Original Feed Belt
27. Pick-up Roller
28. 2nd Transport Roller
29. Original Exit Roller

6.2 ELECTRICAL COMPONENT LAYOUT

6.2.1 MAIN BODY





Boards

Index No.	Name	Function
18	LCD	Displays messages for the operator
19	Operation Panel Boards	These boards control the operation panel.
21	Lamp Stabilizer	This supplies power to the xenon lamp.
25	SBU	Makes a video signal from the scanned original.
43	Main Processing Unit (MPU)	Controls all machine functions both directly and through other boards.
48	Power Supply Unit	Provides dc power to the system.

Motors

Index No.	Name	Function
1	Scanner Motor	Stepper motor drives the book scanner.
4	Master Feed Motor	Feeds the master to the drum.
11	Paper Table Motor	Raises and lowers the paper table.
15	Cutter Motor	Cuts the master.
29	Master Eject Motor	Sends used masters into the master eject box.
30	Air Knife Fan Motor	Rotates the fan to provide air to separate the leading edge of the paper from the drum.
32	Vacuum Fan Motor	Provides suction so that paper is held firmly on the transport belt.
34	Pressure Plate Motor	Raises and lowers the pressure plate.
36	Clamper Motor	Opens or closes the drum master clamper.
40	Main Motor	Drives paper feed mechanisms, the drum, and the paper delivery unit.
41	Registration Motor	Feeds the paper to align it with the master on the drum.
45	Original Feed Motor	Stepper motor drives the book scanner.

Solenoids

Index No.	Name	Function
13	Front Pressure Release Solenoid	Releases the press roller to apply printing pressure.
38	Rear Pressure Release Solenoid	Releases the press roller to apply printing pressure.

Switches

Index No.	Name	Function
9, 14	Master making unit set switches	The machine does not work until the two set switches turn on.
12	Paper Table Lowering Switch	Lowers the paper table.
16	Master eject unit safety switch	Checks whether the master eject unit is properly closed.
17	Door Safety Switches	Checks whether the front door is properly closed.
24	Cutter HP Switch	Detects when the cutter is at the home position

Index No.	Name	Function
28	Main Switch	Turns the power on or off.

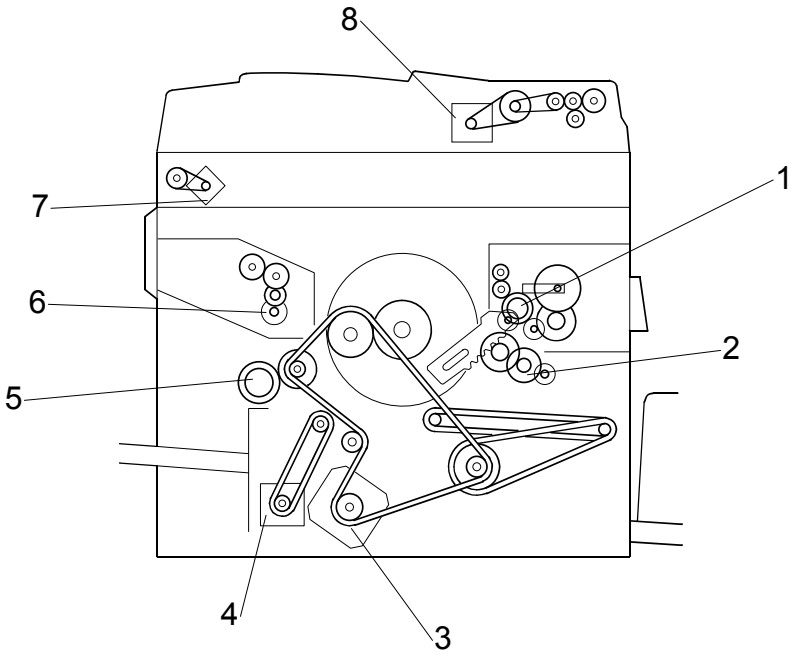
Sensors

Index No.	Name	Function
2	Master Set Cover Sensor	Checks if the master set cover is set.
3	Master End Sensor	Informs the CPU when the master making unit runs out of master roll.
6	Paper Height Sensor 1	Detects when the paper table reaches the paper feed position.
7	Paper Height Sensor 2	Detects when the paper table reaches the paper feed position.
8	Paper End Sensor	Informs the CPU when the paper table runs out of paper.
10	Paper Registration Sensor	Detects paper approaching the registration roller.
24	Scanner Home Position Sensor	Detects when the image sensor is at home position.
25	Platen Cover Sensor	Detects whether the platen cover is open or closed.
26	Master Eject Sensor	Detects used master misfeeds.
27	Drum Master Sensor	Detects if there is a master on the drum
31	Paper Exit Sensor	Detects paper misfeeds at the exit.
33	Pressure Plate Limit Sensor	Detects if the pressure plate is in the lowest position.
35	2nd Feed start Timing Sensor	Determines the paper misfeed check timing at the paper registration area.
37	Clamper Open Sensor	Detects if the clamper is in the open position.
39	Clamper Close Sensor	Detects if the clamper is in the closed position.
42	Paper Table Lower Limit Sensor	Detects when the paper table is at its lower limit position.
46	Feed Start Timing Sensor	Determines the paper feed start timing.
47	Master Eject Position Sensor	Detects when the drum is at the master eject position (this is the home position)
49	Pressure Plate Home Position Sensor	Detects if the pressure plate is at the home position.
50	Eject Box Set Sensor	Checks if the master eject box is set.

Others

Index No.	Name	Function
5	Thermal Head	Burns the image onto the master.
20	Xenon Lamp	Applies light to the original for exposure.
44	Paper Feed Clutch	Transmits main motor drive to the paper feed roller at the appropriate time.

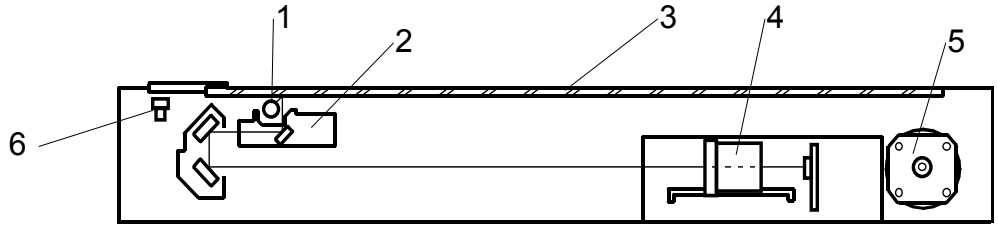
6.3 DRIVE LAYOUT



1. Pressure Plate Motor
2. Clamper Motor
3. Main Motor
4. Registration Motor
5. Paper Feed Clutch
6. Master Feed Motor
7. Scanner Motor
8. Original Feed Motor

6.4 SCANNER AND OPTICS

6.4.1 SCANNER OVERVIEW



1. Exposure Lamp
2. 1st Scanner
3. Exposure Glass
4. Lens Block
5. Scanner Motor
6. Scanner H.P. Sensor

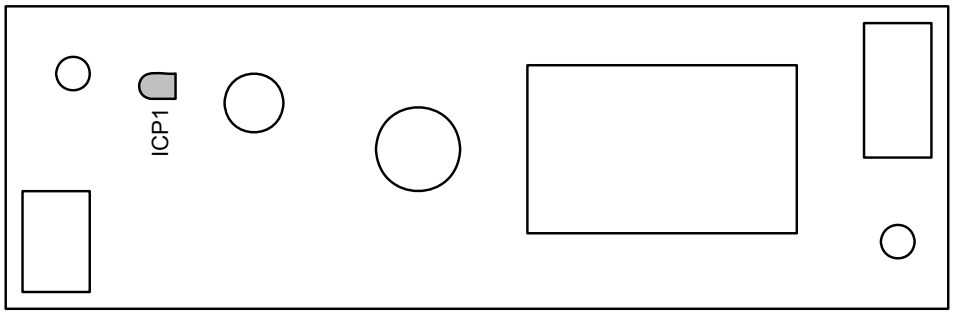
The original is illuminated by the exposure lamp (a xenon lamp). The image is reflected onto a CCD (charge coupled device) on the lens block via the 1st, 2nd, and 3rd mirrors, and through the lens on the lens block.

The 1st scanner consists of the exposure lamp, a reflector, and the 1st mirror.

A lamp stabilizer energizes the exposure lamp. The light reflected by the reflector is of almost equal intensity, to reduce shadows on pasted originals.

There is no original size detection. All masters are printed at full size.

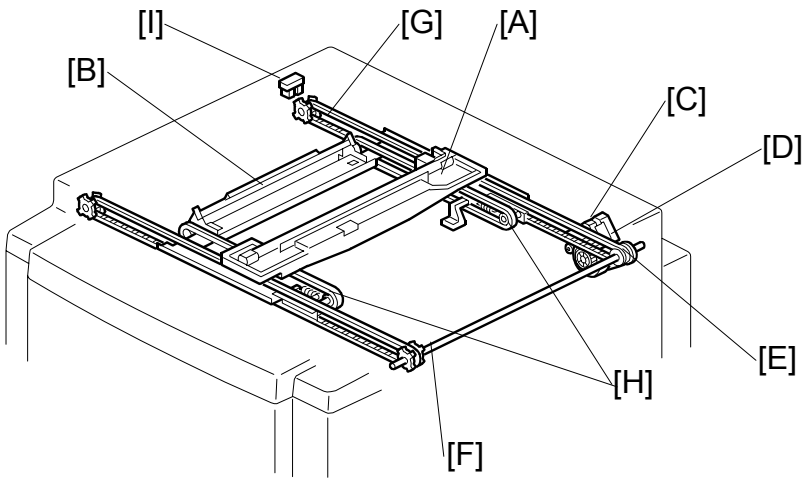
Lamp Stabilizer Fuse



	Rating	Manufacturer	Type No.
ICP1	DC50 V/1.5 A	ROHM CO.,LTD	ICP–N38

CÓPIA NÃO CONTROLADA

6.4.2 SCANNER DRIVE



A stepper motor drives the 1st and 2nd scanners [A, B]. The 1st scanner is driven by the scanner drive motor [C], timing belt [D], scanner drive pulley [E], scanner drive shaft [F], and two timing belts [G]. The 2nd scanner is driven through the 1st scanner and two timing belts [H].

- Book mode -

The MPU controls and operates the scanner drive motor. In full size mode, the 1st scanner speed is 200 mm/s during scanning. The 2nd scanner speed is half that of the 1st scanner.

In reduction or enlargement mode, the scanning speed depends on the magnification ratio. The returning speed is always the same, whether in full size or magnification mode. The image length change in the sub scan direction is done by changing the scanner drive motor speed, and in the main scan direction it is done by image processing on the MPU board.

Magnification in the sub-scan direction can be adjusted by changing the scanner drive motor speed using SP6-5. Magnification in the main scan direction can be adjusted using SP6-1.

- ADF mode -

The scanners are always kept at their home position (the scanner H.P. sensor [I] detects the 1st scanner) to scan the original. The ADF motor feeds the original through the ADF. In reduction/enlargement mode, the image length change in the sub-scan direction is done by changing the ADF motor speed. Magnification in the main scan direction is done in the MPU board, like for book mode.

Magnification in the sub-scan direction can be adjusted by changing the ADF motor speed using SP6-6. In the main scan direction, it can be adjusted with SP6-2, like for book mode.

6.5 IMAGE PROCESSING

6.5.1 IMAGE PROCESSING FLOW

Image processing is done by the IPU (Image Processing Unit) on the MPU board, following the steps shown below.

Shading Correction

↓

Reduce/Enlarge

↓

Filtering

↓

Gamma Correction

↓

Grayscale Processing

Shading Correction:

Corrects errors in the signal level for each pixel using the white plate.

Reduce / Enlarge:

Reduces or enlarges the image in the main-scan direction by data processing. (Image magnification in the sub-scan direction is controlled by changing the scanning speed.)

Filtering:

Improves the scanned image data, to make the image as close to the original as possible.

Gamma Correction:

Background erase

Grayscale Processing:

Compares each pixel with surrounding pixels to enhance the image.

- Text mode: Binary processing
- Photo mode: Error diffusion

CÓPIA NÃO CONTROLADA

6.5.2 THERMAL HEAD

Specifications

- Length 256 +- 0.2 mm
- Number of thermal head elements 3024 dots
- Density of thermal head elements 300 dpi
- Applied voltage Approximately 15 volts

Thermal Head Control

The thermal head has heating elements at a density of 300 dpi. The thermal heating elements melt the over-coating and polyester film layers of the master, according to the image signal for each pixel.

The power supply unit applies power to the thermal heating elements. The power source varies from one head to another since the average resistance of each element varies. Therefore, when the thermal head or power supply unit is replaced, it is necessary to readjust the applied voltage with particular values for each thermal head.

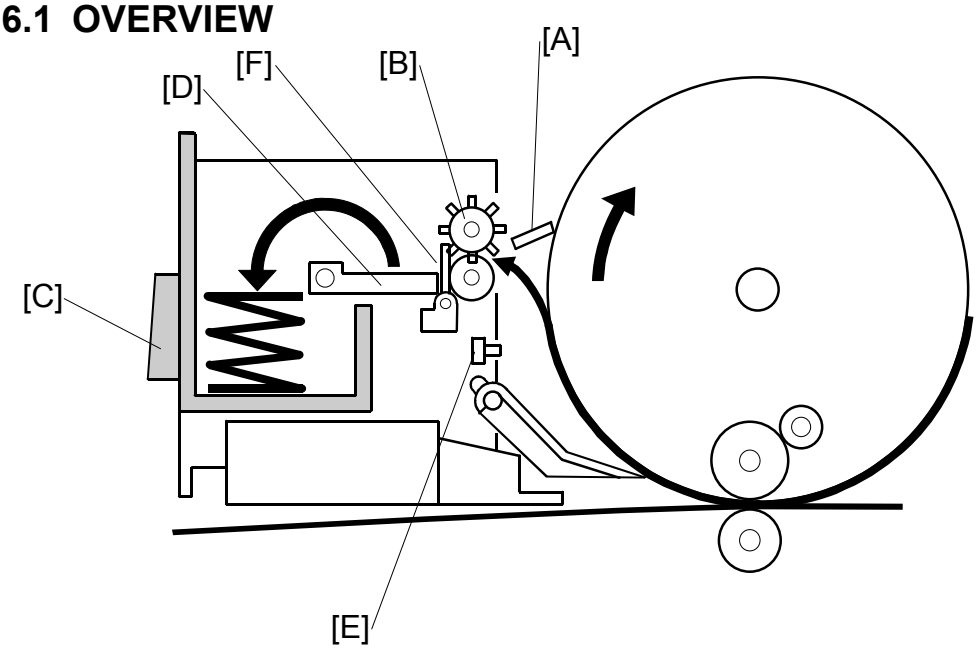
Thermal Head Protection

The thermistor on the thermal head provides thermal head protection, preventing the thermal head from overheating when processing a solid image. The CPU detects any abnormal condition when the Start key is pressed, and displays an SC code on the operation panel as follows:

SC Code	Conditions	Detecting Component
E - 04	Over 65°C	Thermistor
E - 09	More than 4.432V - (Normally, this indicates that the thermistor has become open, or a related connector is disconnected.)	Thermistor
E - 10	When the pulse width that controls the thermal head energy becomes abnormal, master making stops and this SC lights.	MPU
E-40	The CPU detects an abnormal ID signal from the thermal head.	MPU

6.6 MASTER EJECT UNIT

6.6.1 OVERVIEW



The master eject unit removes the used master from the drum. (☛CT: Digital Duplicators – Duplicating Process – Master Ejecting)

Procedure

The drum turns to the master eject position (same as drum home position). Then the clamper [A] opens.

↓

Master eject rollers [B] pick-up the master's leading edge and feed the master for 1 second into the master eject box [C].

↓

The clamper then closes.

↓

The drum then turns at 30 rpm while the master eject rollers continue to feed the used master into the eject box.

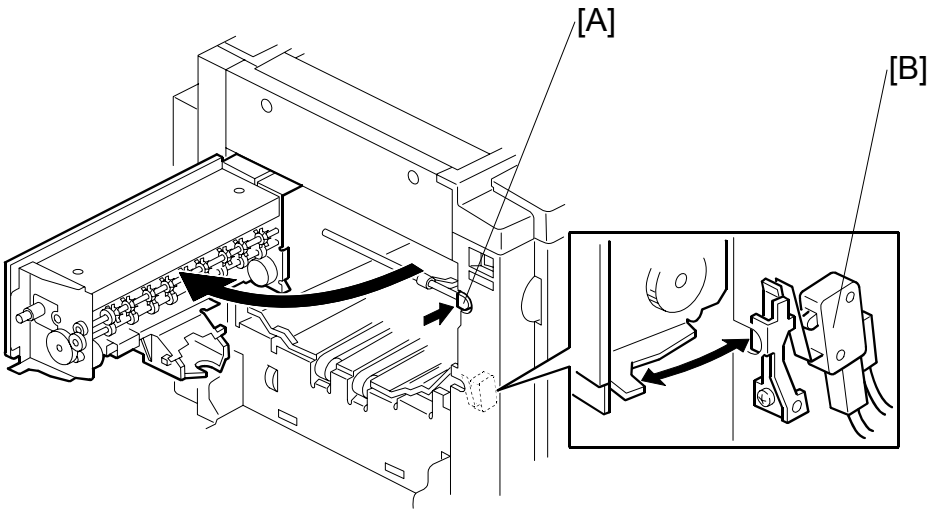
↓

After the drum makes 1.5 turns, it gets to the master feed position. Then, the master eject motor stops, and the pressure plate [D] then compresses the used masters in the eject box.

- The capacity is 30 used masters (under normal conditions)
- The master eject process is skipped when the drum master sensor [E] detects no master on the drum.
- During the master eject process, the master eject sensor [F] detects master eject jams.

CÓPIA NÃO CONTROLADA

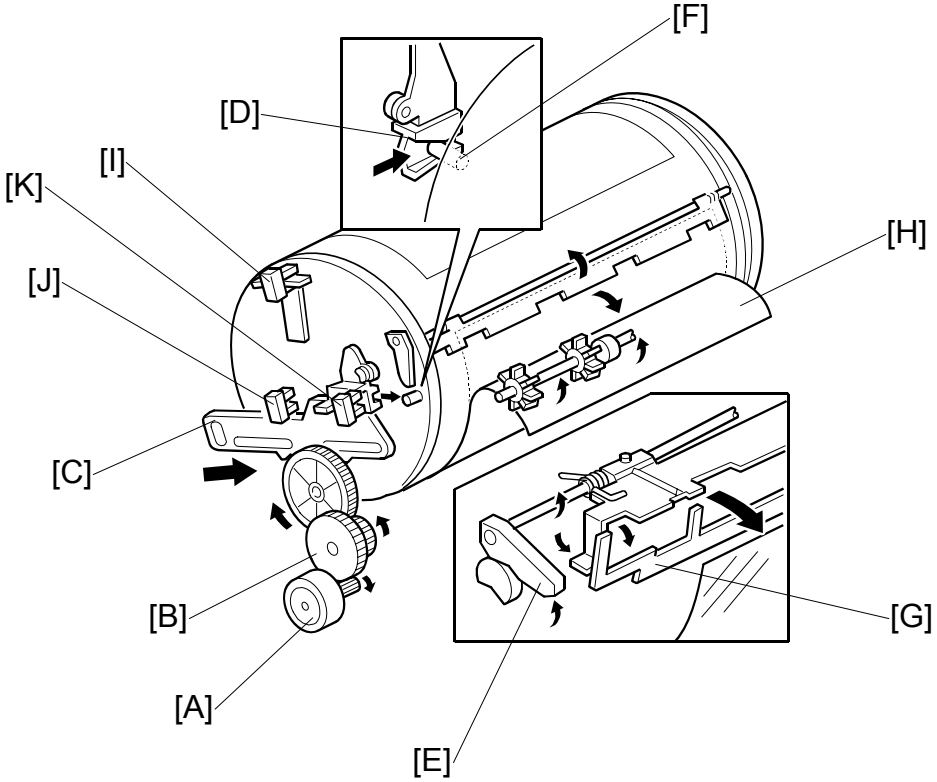
6.6.2 MASTER EJECT UNIT OPEN MECHANISM



To open the master eject unit, just push the button [A]. This makes it easy for maintenance and for removing master and paper jams.

If the button is pushed by accident while the machine is operating, the master eject unit safety switch [B] will stop the machine automatically for safety.

6.6.3 MASTER CLAMPER OPENING MECHANISM

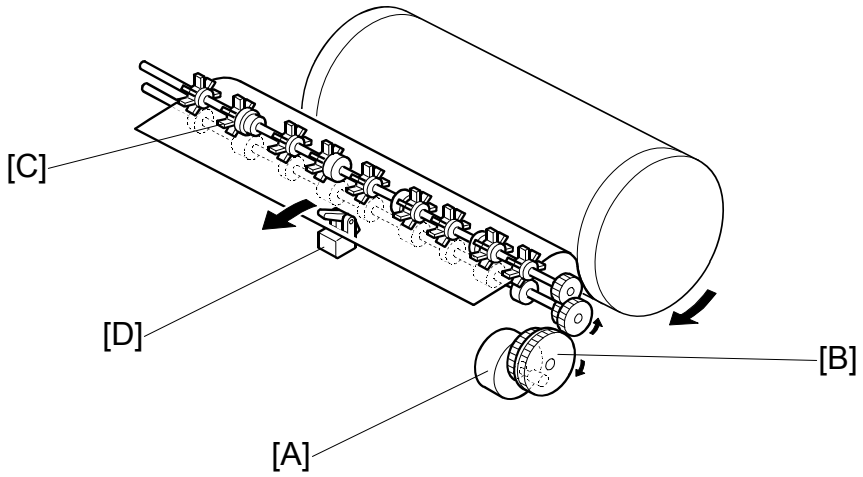


Clamper Mechanism

Clamper motor [A] - opens the clamper at the master eject position
↓
Gears [B]
↓
Link [C]
↓
Drum guide [D] - moves and engages the pin on the rear flange of the drum
↓
Lifts the clamper lever [E], and engages the drum pin [F]
↓
The lever [E] lifts the master eject arm [G] to release the master's leading edge [H] from the clamper.

NOTE: 1) After the master making key is pressed and before the clamper motor starts, the master eject position sensor [I] is checked (the drum must be at the master eject position).
2) The sensor actuators on the link [C], the clamper open sensor [J], and the clamper close sensor [K] determine the clamper open and close positions.
3) The master clamper uses a magnetic plate to clamp the master's leading edge.
4) The drum guide catches the drum at the master eject position while the master clamper is being opened. When the clamper motor turns on in reverse to close the clamper, the drum guide also disengages the pin and the drum can turn.

6.6.4 MASTER EJECT ROLLER MECHANISM

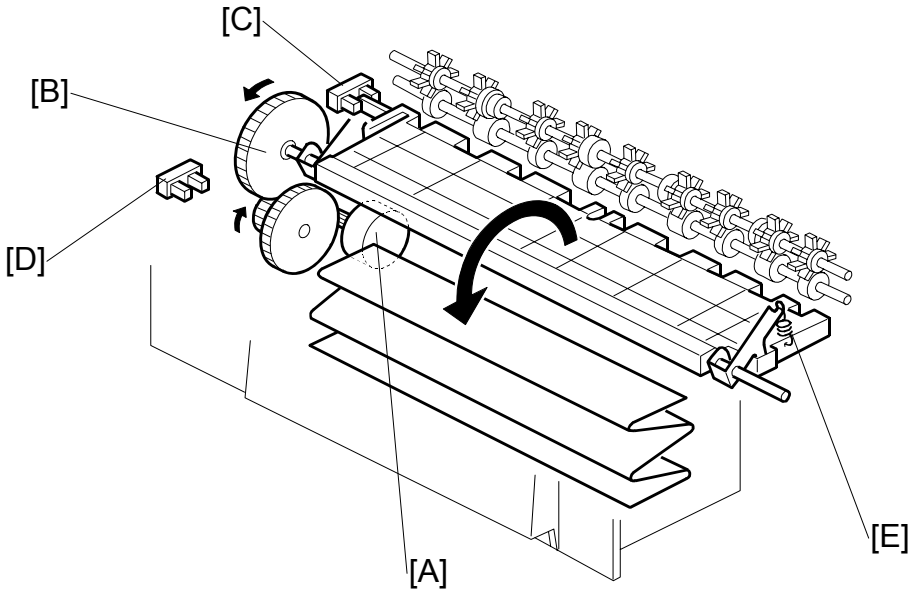


Mechanism

Master eject motor [A]
↓
Gears [B]
↓
Master eject rollers [C] – the upper roller has paddles
↓
Pick up the master and feed it into the master eject box

NOTE: During this process, the master eject sensor [D] detects master eject jams.

6.6.5 PRESSURE PLATE MECHANISM



Mechanism

Pressure plate motor [A]

↓

Gears [B]

↓

Pressure plate rotates

↓

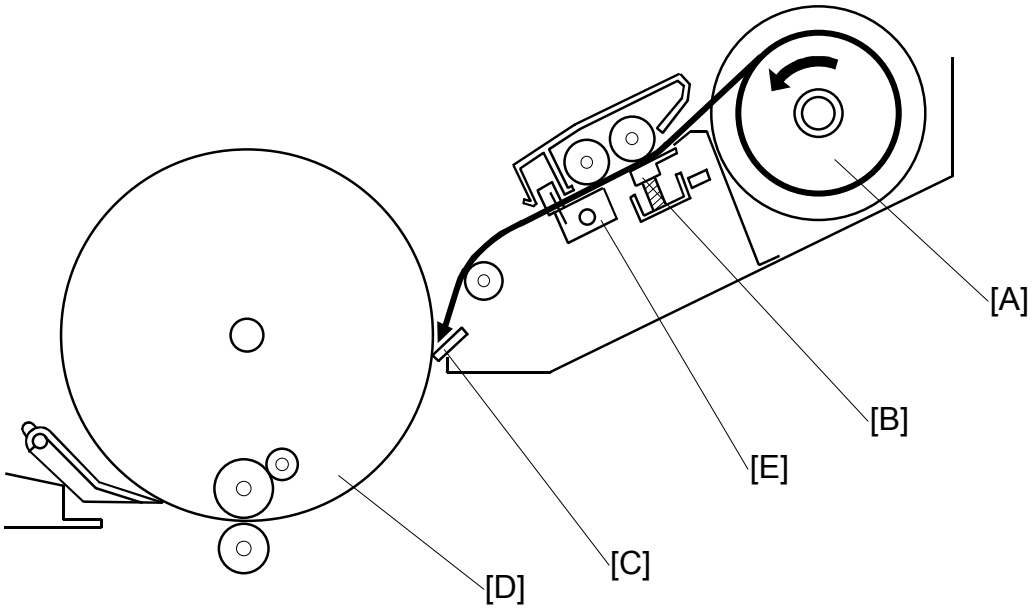
Compresses the masters

Procedure

1. After the master has been ejected and the drum is stopped at the master feed position, the pressure plate motor turns until the actuator on the pressure plate actuates the limit sensor [D].
2. After master making and cutting, the motor reverses until the pressure plate home position sensor [C] is actuated, then it stops.
3. If the pressure plate limit sensor is not actuated within 2.2 seconds after the pressure plate motor rotates, the Full Master Eject Box indicator lights.
4. The spring [E] prevents motor overload.

6.7 MASTER FEED

6.7.1 OVERVIEW



The master making unit makes an image on the master and feeds the master to the drum. (☛CT: Digital Duplicators – Duplicating Process – Master Feeding)

Procedure

The machine feeds the master from the master roll [A].

↓

The thermal head [B] makes an image on the master.

↓

Clamper [C] opens. (The drum is at the master feed position.)

↓

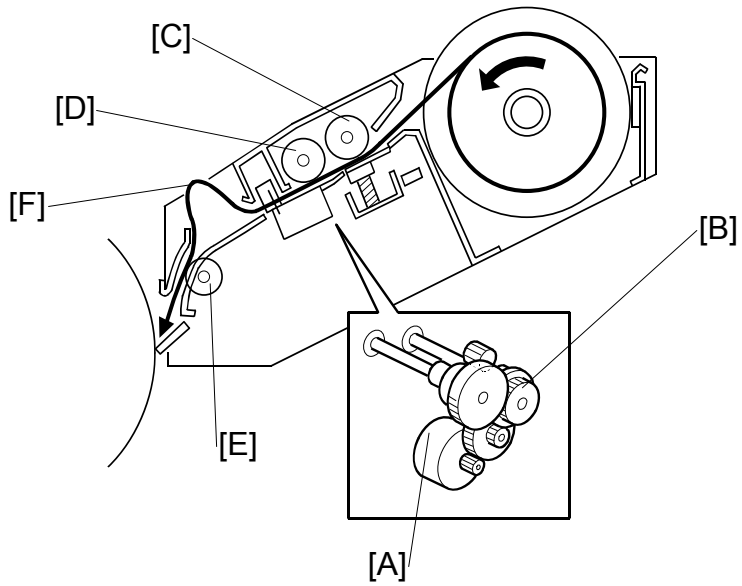
The clamper clamps the master.

↓

The master is wrapped around the drum [D]. Then, the cutter [E] cuts the master.

Then, after cutting, the drum turns a bit more to complete the wrapping.

6.7.2 MASTER FEED MECHANISM



Mechanism

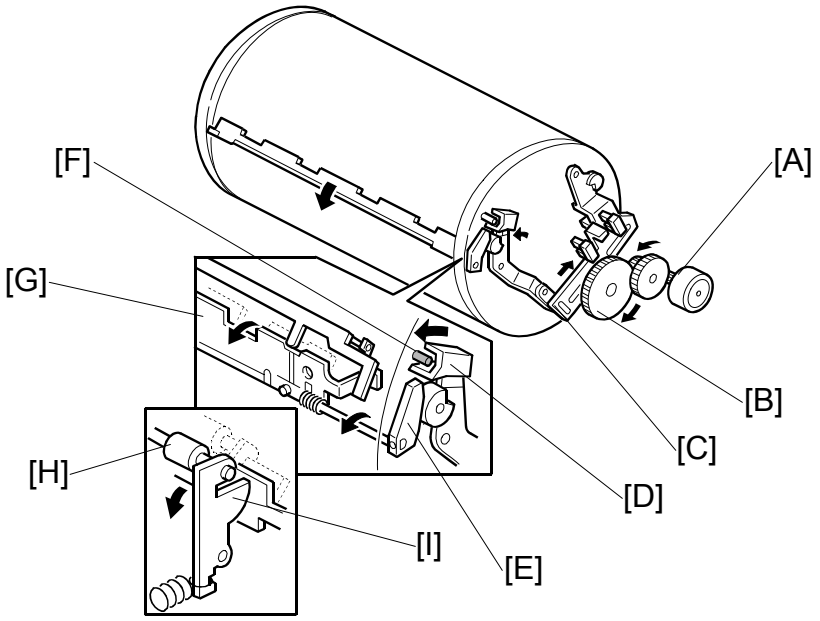
Master feed motor [A] (stepper motor)
↓
Gears [B]
↓
Platen roller [C], master feed roller [D]
↓
Feeds the master (The thermal head makes an image on the master.)

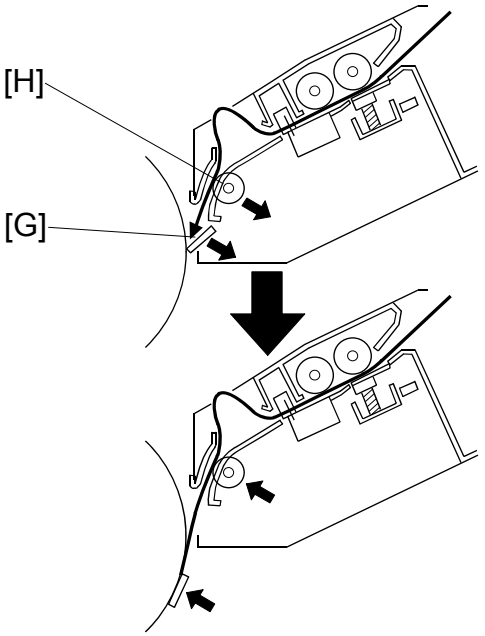
Procedure

1. After the old master has been ejected, the drum stops at the master feed position and the master clamper opens, ready to clamp the new master.
2. When the clamper is open, the tension roller releases and the master is fed to the clamper on the drum. For details of the tension roller, see section 6.7.3.
3. After the clamper closes, the master feed motor feeds the master while the drum rotates intermittently at 30 rpm. The intermittent rotation keeps a buckle [F] in the master above the master feed guide to absorb shocks from the wrapping operation.
4. The tension roller [E] keeps the master under tension. This roller reduces the master making time, because it allows the drum to turn continuously during wrapping. Without this roller, if the drum kept turning, the master would crease.
5. The main motor turns off when the drum is at the master eject position. The master feed motor continues to feed the master until master making completed. Then the master feed motor turns off, and cutting is done. Then the main motor turns on again to complete the wrapping.

NOTE: Springs press the thermal head against the platen roller. The pressure is applied when the master set cover, which includes the platen roller, is closed.

6.7.3 CLAMPER AND TENSION ROLLER MECHANISM





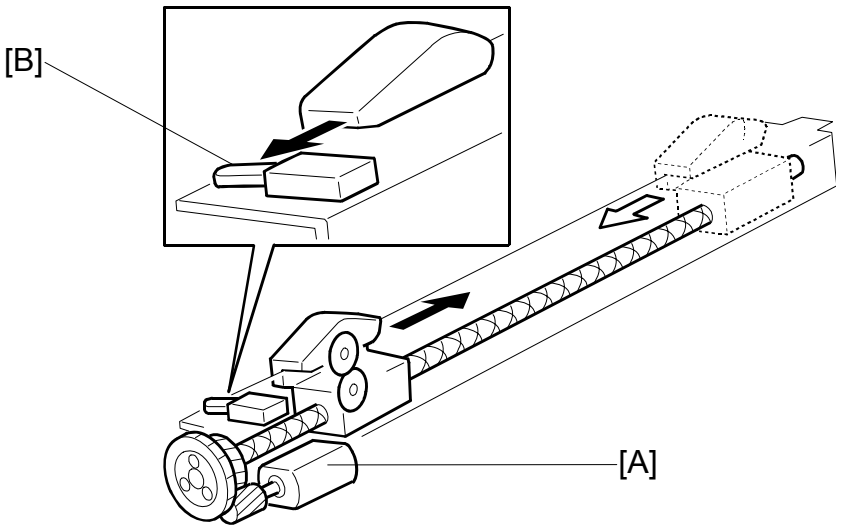
Mechanism

Clamper motor [A]
↓
Gears [B]
↓
Link [C]
↓
Drum guide [D]
↓
Lifts the lever [E], engages and locks the drum pin [F], opens the clamper plate [G].
↓
Releases the tension roller [H].
↓
Feeds the master into the clamper.

Procedure

- When the old master has been ejected, the drum is stopped at the master feed position. The master clamper clamps the leading edge of the new master before the drum starts to turn again.
- The tension roller [H] normally presses against the master feed guide plate to apply tension to the master during master wrapping. When the clamper opens, it pushes the tension roller arms [I] and moves the tension roller away from the guide plate to allow the master to be fed into the master clamper.
- Clamper mechanism: See the section 6.6.3 Master Clamper Opening Mechanism.

6.7.4 CUTTER MECHANISM

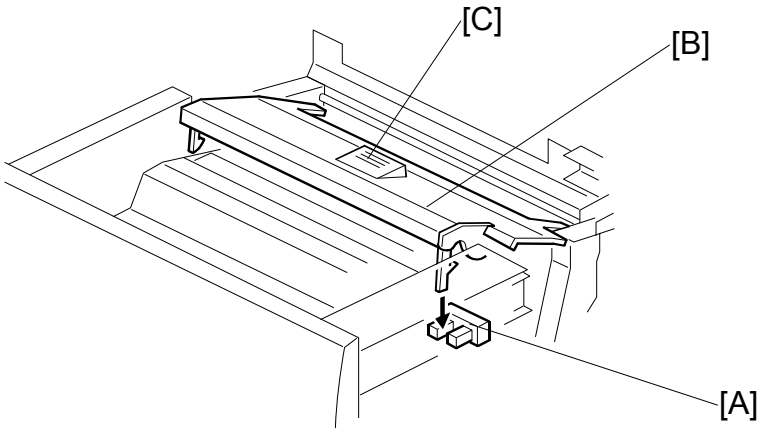


[A]: Cutter motor
[B]: Cutter HP sensor

- When the cutter starts, the drum is stopped at the master eject position (drum HP).
- The cutter moves backwards and forwards. While the cutter travels towards the rear (non-operation side), it cuts the master. The motor turns in one direction. The cutter returns to the home position when it reaches the rear because of the two different spiral threads on the screw shaft.
- The cutter usually cuts a master of about 474 mm in length.

After cutting, the drum starts turning again to wrap the remaining part of the master around the drum. The leading edge of the master that was cut remains at the cutting position, ready to make the next master.

6.7.5 MASTER SET COVER SENSOR

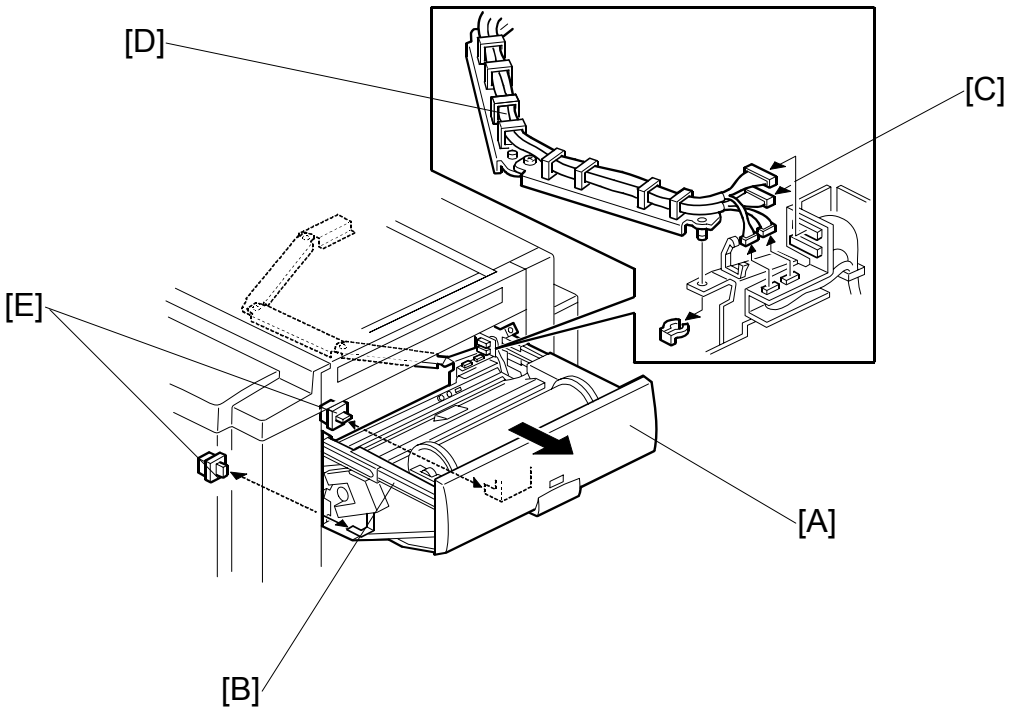


[A]: Master set cover sensor
[B]: Master set cover

NOTE: If the cover is closed properly, the release button [C] rises.

CÓPIA NÃO CONTROLADA

6.7.6 MASTER MAKING UNIT SLIDE-OUT MECHANISM

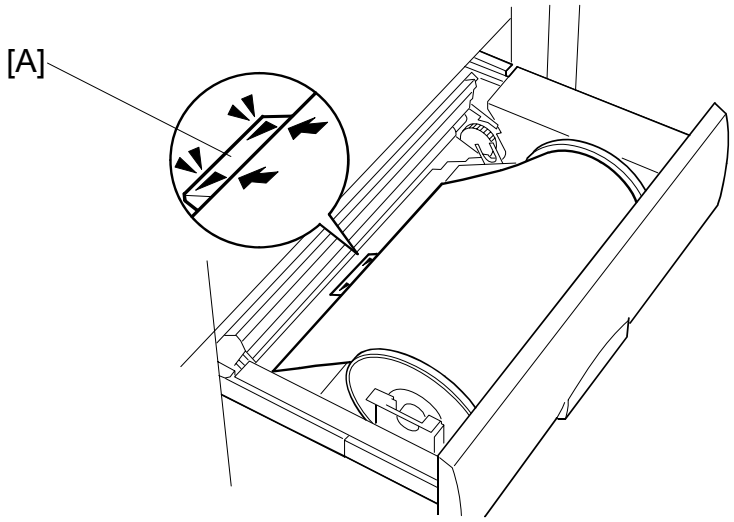


The master making unit [A] can be pulled out along the guide rails [B].

There are four cable connectors [C] behind the master making unit. The bundle of harnesses [D] is placed in the space between the scanner and the drum, and connected to the MPU.

There are two master making unit set switches [E] for safety, because this model does not have a unit locking mechanism. Both sensors must be on, or the machine will not start. When one of the sensors detects the unit is open, the operation panel displays a message.

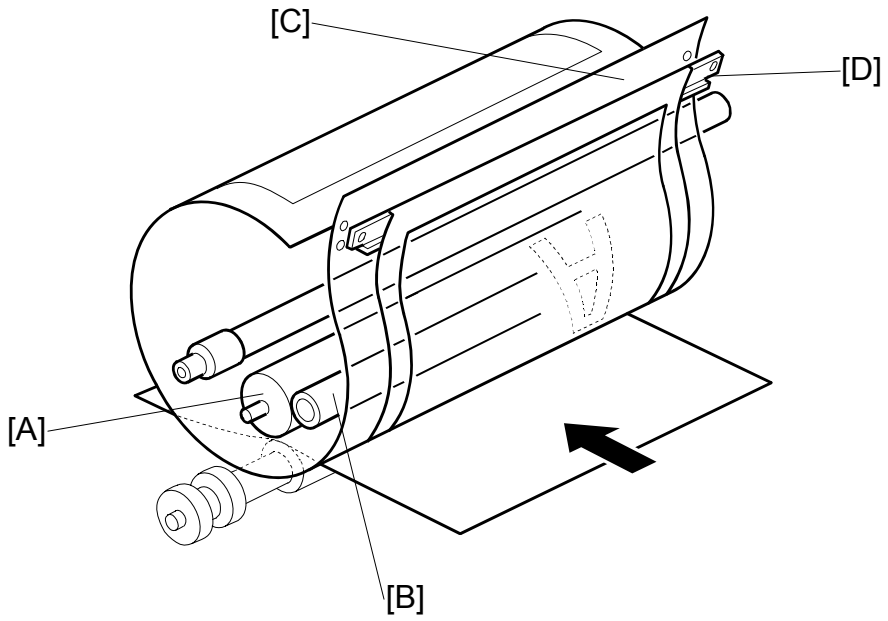
6.7.7 MASTER SET MECHANISM



The convex part [A] at the arrows helps the user when installing a new roll, so that the user does not push the leading edge too far into the interior of the master making unit.

6.8 DRUM

6.8.1 OVERVIEW



Procedure

Ink is supplied inside the drum, through the drum shaft.

↓

The ink roller [A] and the doctor roller [B] spread the ink evenly on the screens.

↓

Ink passes through the metal screen [C].

↓

Ink passes through the cloth screen [D].

↓

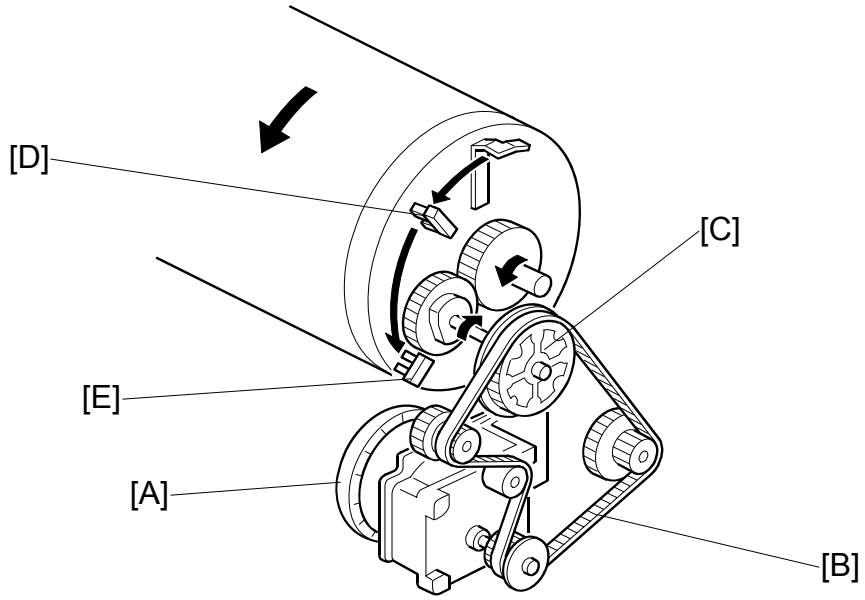
Ink passes through the holes in the master that were made by the thermal head.

↓

Ink reaches the paper.

NOTE: 1) The drum is driven by the main motor and turns only clockwise.
2) The main motor speed and the drum stop positions are controlled by monitoring the motor encoder.
3) The ink pump supplies ink from the ink cartridge into the drum through the drum shaft.

6.8.2 DRUM DRIVE MECHANISM



Mechanism

Main motor [A] (dc motor)

↓

Belt [B]

↓

Gears [C]

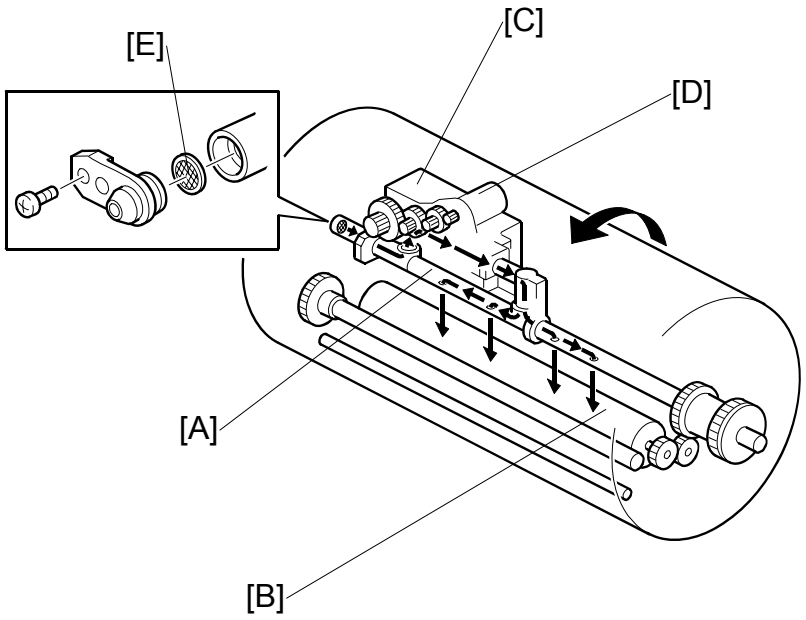
↓

The drum rotates.

NOTE: 1) The main motor encoder sends pulses to the main motor control board (1020 pulses = 360 degrees).
2) The CPU monitors the pulses and controls the drum speed and stop positions.
3) The drum has two sensors;
- Master eject sensor [D] (master eject position and drum home position)
- Feed start timing sensor [E]

4) The drum has two stop positions;
- Master eject (drum home) position
- Master feed position (feed start timing sensor + 102 pulses)

6.8.3 INK SUPPLY MECHANISM



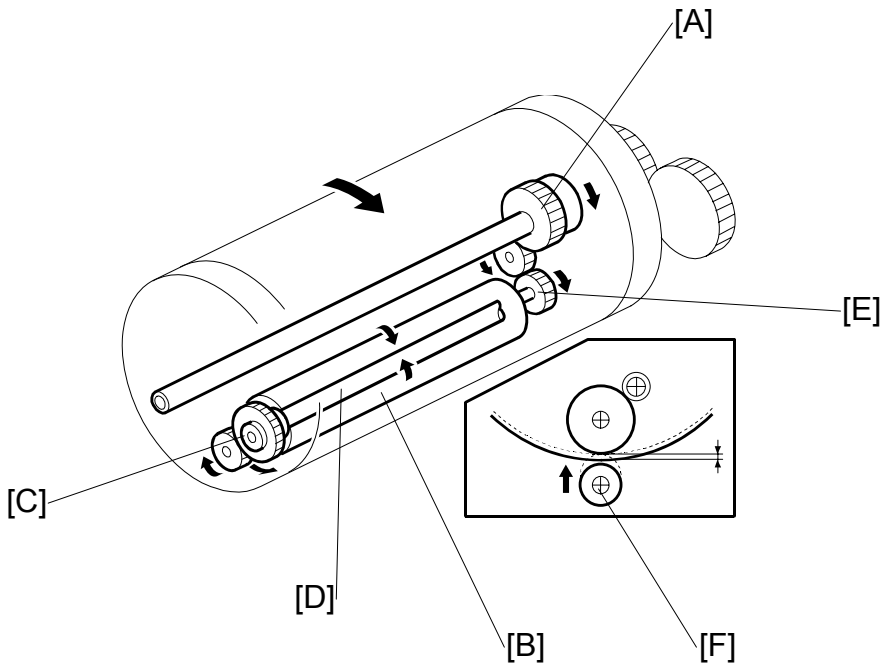
Ink is supplied from the ink cartridge to the ink roller [B] by a trochoid type pump [C]. The ink pump is driven by the ink supply motor (a dc motor) [D].

Ink drops through the holes in the drum shaft [A] onto the ink roller [B].

There is an ink filter [E] at the entrance of the ink nozzle. The ink filter prevents small objects from getting into the ink pump and causing damage.

NOTE: 1) There are 4 holes in the shaft for the B4 size drum models, and two holes for the Legal and A4 drum versions.
2) Optional drum units do not use the trochoid type pump, but use a piston pump.

6.8.4 INK ROLLER MECHANISM



Main motor

↓

Gears [A]

↓

Ink roller [B] rotates

↓

Gears [C]

↓

Doctor roller [D] rotates

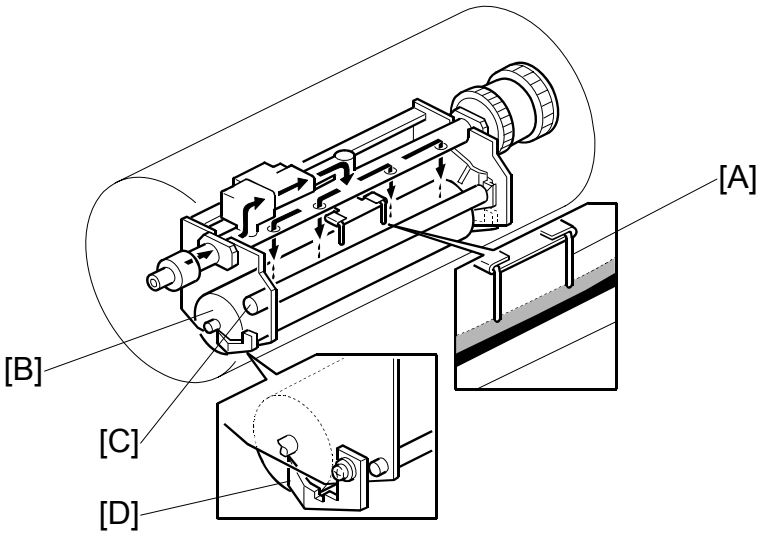
↓

The doctor roller squeezes the ink on the ink roller to produce an even thickness of ink on the ink roller.

NOTE: 1) The ink roller drive gear [E] has a one-way clutch to prevent the ink roller from being turned in reverse if the drum is manually turned in reverse.
2) The ink roller does not touch the metal screen when the machine is not printing.
3) During printing, the ink on the ink roller is applied to the paper through the holes in the screens and the master. This happens when the press roller [F] under the drum moves up to press the drum screen and the master against the ink roller. (☛CT: Digital Duplicators – Ink Supply Control)

CÓPIA NÃO CONTROLADA

6.8.5 INK SUPPLY CONTROL



Mechanism

When the ink level is low, the pins [A] do not touch the ink.

↓

The ink pump motor keeps the ink level normal by supplying ink when the level is low.

NOTE: 1) The ink detection pins [A] detect the capacitance of the ink between the ink roller [B] and doctor roller [C].
2) If the pins detect an insufficient amount of ink after activating the ink pump motor for 27 seconds, a "no ink condition" is detected. The add ink indicator on the operation panel will light.
3) The ink roller blades [D] on both ends of the ink roller scrape off the built-up ink on the ends of the ink roller.

Automatic Ink Supply for a New Drum

If the machine detects a new drum, ink is supplied automatically at the trial print for the first job with this drum.

The machine detects a new drum if:

- There is no master wrapped on the drum, and
- The ink detection pins detect no ink

Mechanism:

1. The machine detects a new drum

↓

2. Ink is supplied automatically.

↓

3. If the machine detects the ink before 26 seconds, go to step 5.

   If the machine does not detect the ink before 26 seconds, go to step 4.

↓

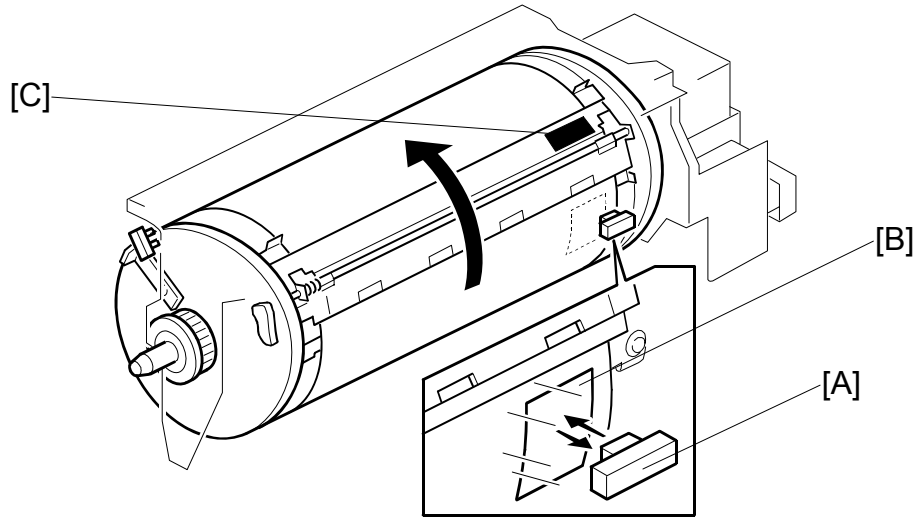
4. A blank master is wrapped around the drum, and the drum rotates, with pressure applied to the drum. Then the blank master is removed. Go to step 5.

↓

5. Master making is started for the original that you set.

NOTE: There is also a manual ink supply procedure, like for previous machines.
"0" + "Economy Mode"

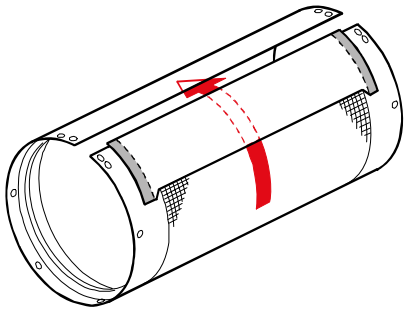
6.8.6 DETECTION OF MASTERS ON THE DRUM



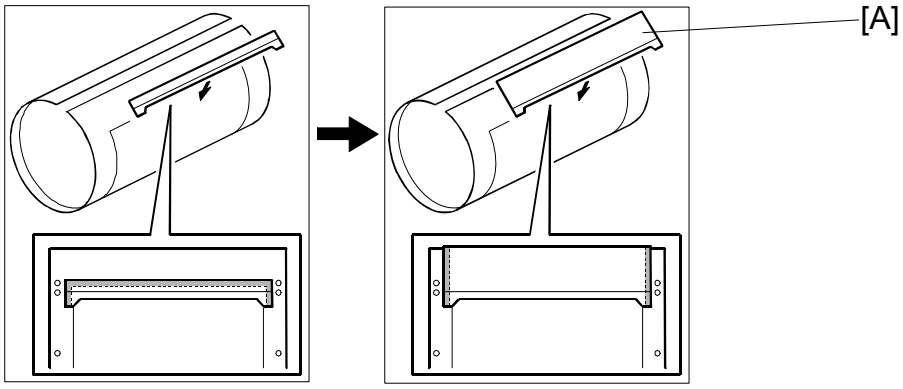
[A]: Drum master sensor
[B]: Black patch on the screen
[C]: Black patch on the clamper

- The drum master sensor [A] detects whether there is a master on the drum.
- When there is a master on the drum, the black patch [B] is covered and the sensor detects the light reflected from the master. When there is no master on the drum, the black patch [B] is exposed. The black patch does not reflect light back to the sensor. Because of this, the master eject process can be skipped when a new master is being made, if no master is detected on the drum.
- There is a black patch [C] on the clamper. If a master covers this black patch, there was an error during cutting, and because of this error the master is double-wrapped around the drum.

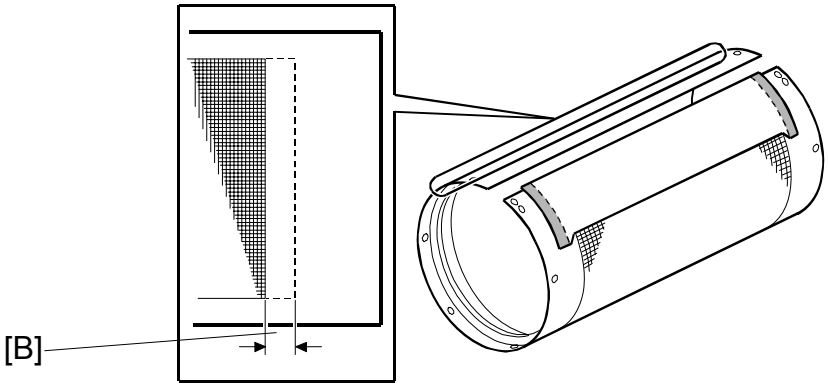
6.8.7 METAL SCREEN



The flow of ink is shown above. The excess ink goes back to the inside of the drum from the trailing edge of the metal screen.

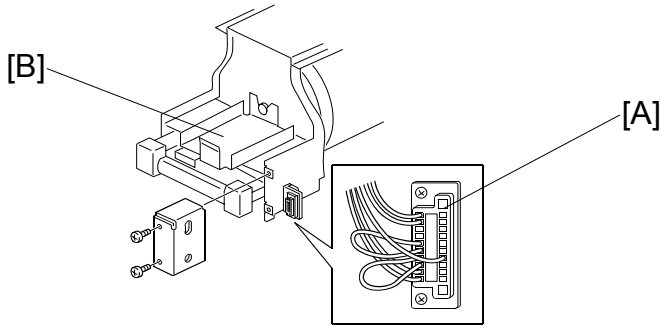


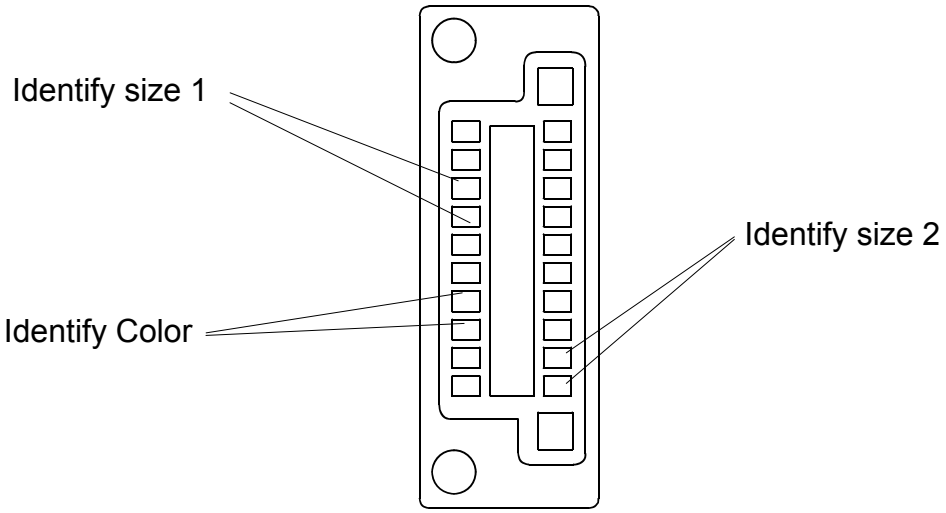
The adhesive parts [A] are only at the sides of the mylar seal for the metal screen. They are not attached to the trailing edge. This prevents ink leakage from the trailing edge.



The leading edge of the mesh on the metal screen is reduced by 2.5 mm [B] from previous models. This prevents small dots at the leading edge of the paper.

6.8.8 DRUM TYPE DETECTION





The type of drum is distinguished by inserting jumper wires in the drum connector [A] at three locations, as shown in the lower diagram.

Black drum

	Identify Color	Identify size 1	Identify size 2
B4 drum	No jumper	Jumper inserted	Jumper inserted
A4 drum	No jumper	Jumper inserted	No jumper
LG drum	No jumper	No jumper	Jumper inserted

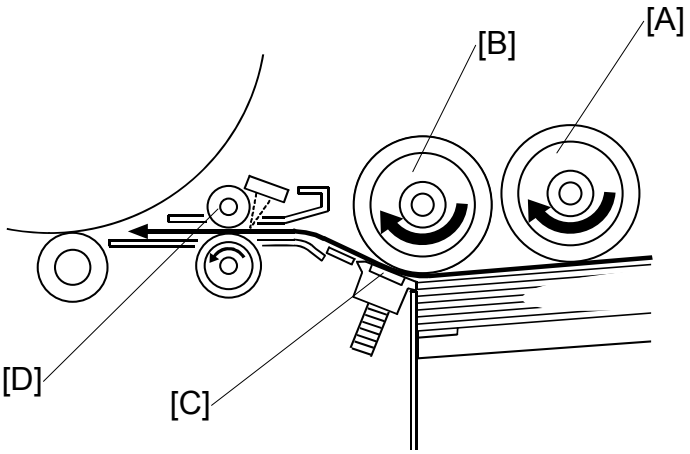
Color drum

	Identify Color	Identify size 1	Identify size 2
B4 drum	Jumper inserted	Jumper inserted	Jumper inserted
A4 drum	Jumper inserted	Jumper inserted	No jumper
LG drum	Jumper inserted	No jumper	Jumper inserted

NOTE: When you modify the color drum into a black drum, replace the ink holder [B] to the correct type for a black drum. Then take off the jumper at the 'identify color' location. Never remove or insert jumpers at 'identify size 1' or 'identify size 2', or the machine will detect the incorrect drum size.

6.9 PAPER FEED

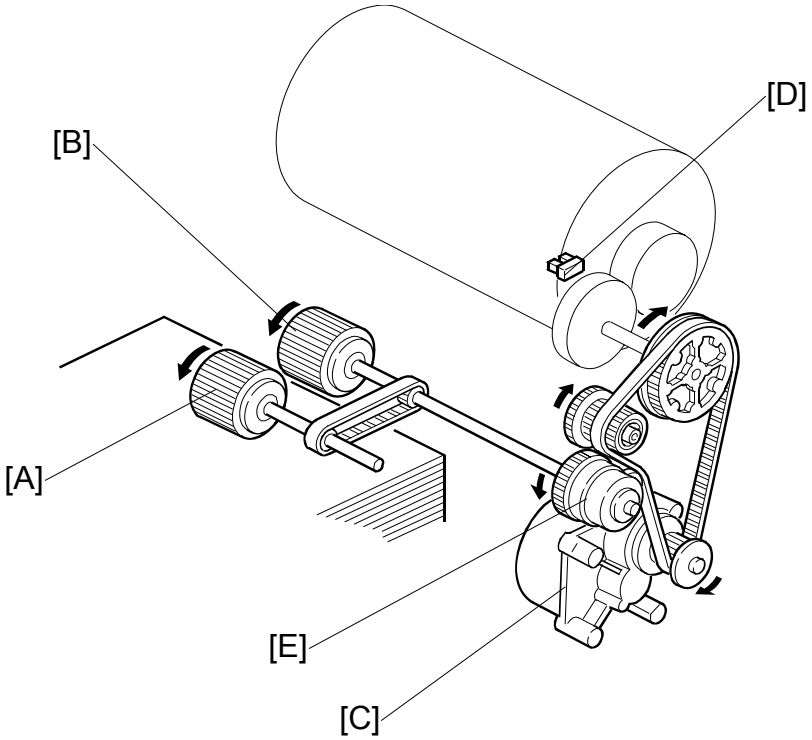
6.9.1 OVERALL



The top sheet of the paper on the paper table is first fed by the pick-up roller [A]. Then, it is separated by the paper feed roller [B] and the friction pad [C], and transported to the registration rollers [D]. The upper and lower registration rollers transport the sheet to the drum.

The paper feed roller is driven by the main motor, and an independent stepper motor is used to control the registration roller. The registration roller synchronizes the paper feed timing with the master on the drum. The registration roller starts rotating after the paper has come into contact with the rollers and has been aligned.

6.9.2 PAPER FEED MECHANISM

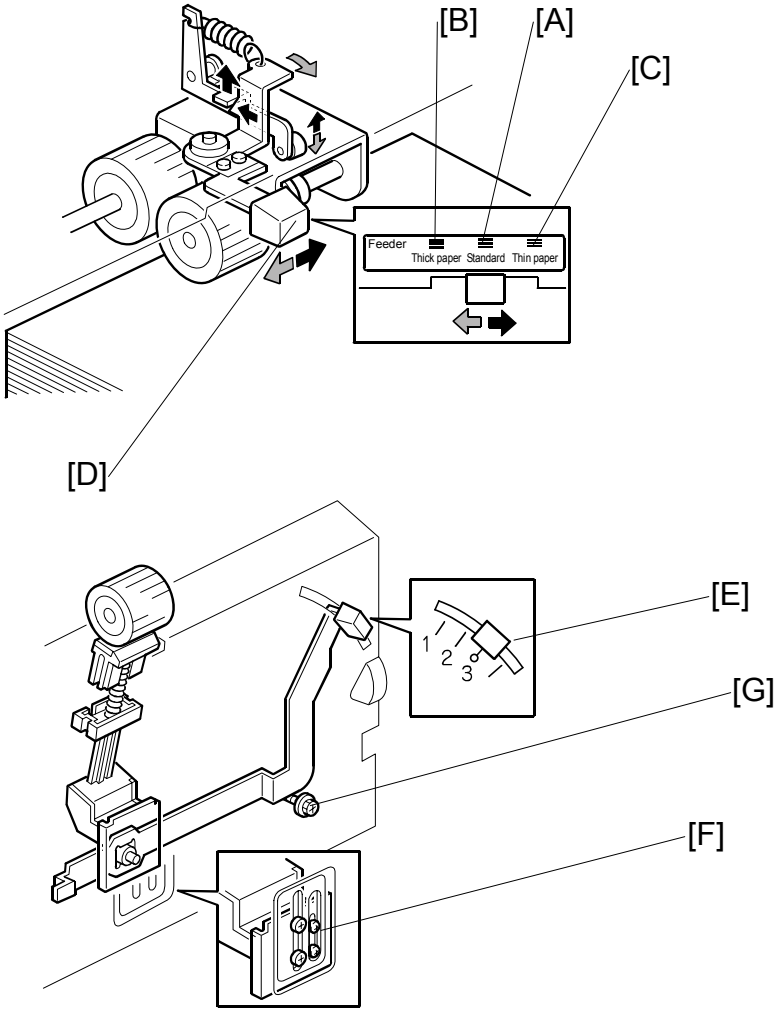


The pick-up roller [A] and paper feed roller [B] are driven by the main motor [C] through gears and a timing belt.

During the printing cycle, when the feed start timing sensor [D] is actuated by the actuator on the drum, the paper feed clutch [E] is energized to transmit the main motor rotation to the paper feed roller shaft. The top sheet of the paper is separated from the paper stack by the friction between the roller and the friction pad, and transported to the registration roller.

A one-way clutch is installed in the paper feed roller so that after the electromagnetic clutch is de-energized, it does not disturb the paper transportation.

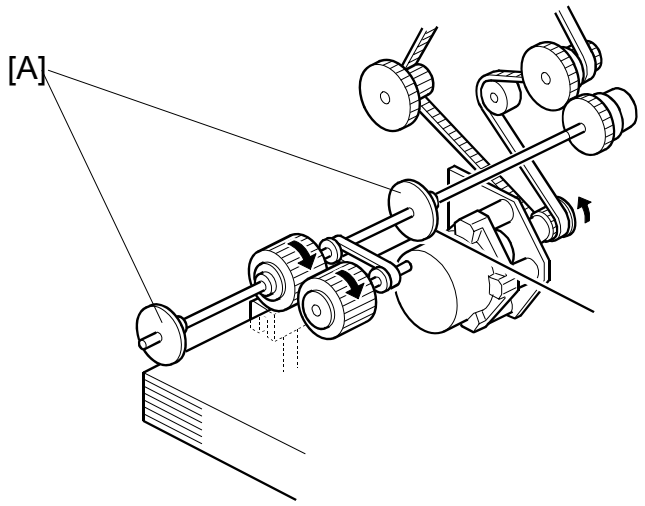
6.9.3 PAPER FEED/SEPARATION PRESSURE ADJUSTMENT MECHANISM



[A]: Normal position
[B]: Thick paper position
[C]: Thin paper position

- The user can change the pick-up roller pressure by changing the position of the pressure adjustment lever [D].
- If paper feed jams frequently occur, the lever [D] should be moved to the left or the right to adjust the pressure.
- If non-feed or multi-sheet feed problems still occur, the paper separation pressure can also be adjusted by the lever [E].
- If there is still a paper feed problem, the technician can adjust the paper separation pressure by loosening then moving the screw [F] up or down.
- For the Chinese model, the separation pressure adjustment lever [E] has 4 levels. For the other models, a screw [G] is attached so that the lever [E] cannot move down more than level 3.

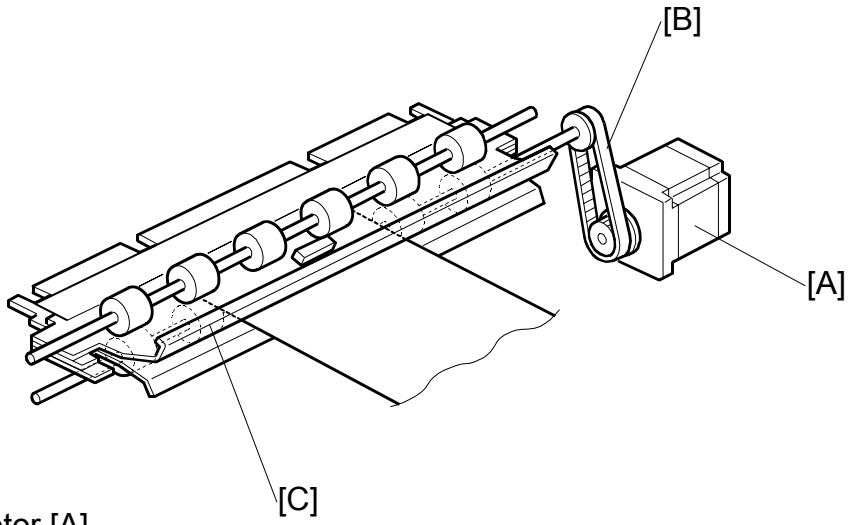
6.9.4 SIDE EDGE PAPER PRESS PLATE MECHANISM



For some paper types, the side edges of the paper might curl up because the centre of the paper is pressed down by the paper feed roller. This will cause paper jams to occur.

To prevent the curling up of the paper side edges, the paper guide plates [A] press the edges down.

6.9.5 REGISTRATION ROLLER MECHANISM



Registration motor [A]

↓

Belt [B]

↓

Turns the lower registration roller [C]

NOTE: 1) The MPU controls the registration roller start timing to synchronize the print paper with the image on the master on the drum.
2) The motor speed depends on the selected printing speed.
3) By pressing the image position keys on the operation panel, the registration motor start timing is changed.

6.9.6 PAPER FEED RETRY MECHANISM

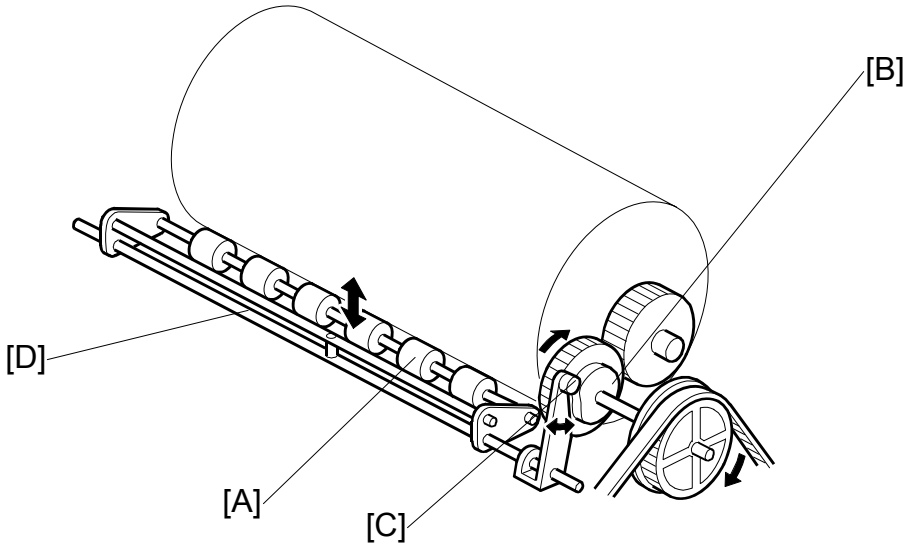
When paper is misfed at the paper feed tray, a paper feed jam is not displayed, and the machine tries to feed the paper again.

The paper registration sensor does not turn on after the paper feed motor turns, and the drum turns without paper. Then, when the feed start sensor is on again, the paper feed motor starts to feed again.

The paper feed retry mechanism only operates during printing, and not for the trial print.

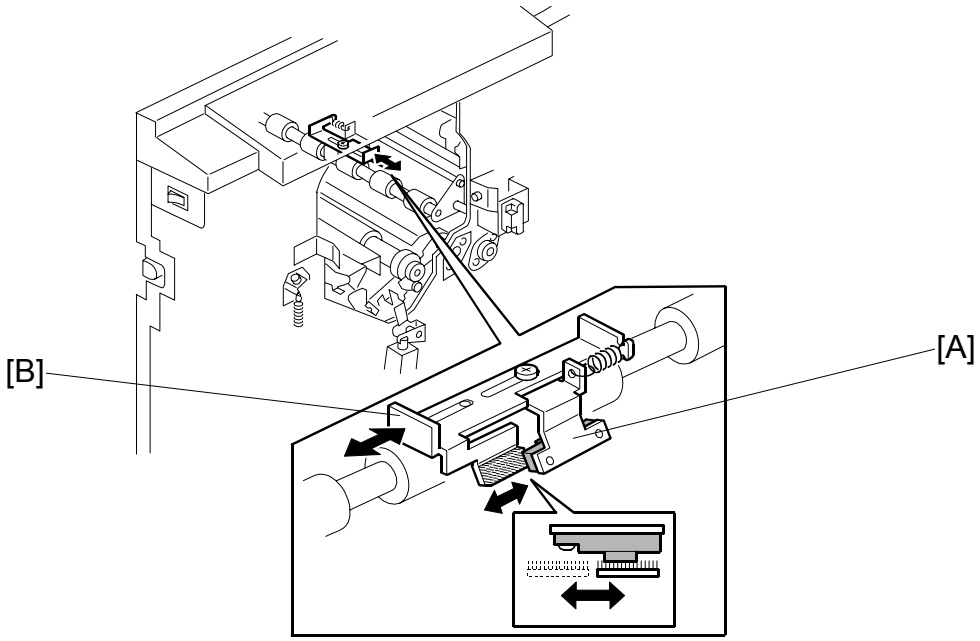
The retry is done only one time. If paper is not fed, then a misfeed occurs.

6.9.7 REGISTRATION ROLLER UP/DOWN MECHANISM



- After the printing paper is caught between the drum and the press roller, the registration motor stops and the upper registration roller [A] is released from the lower registration roller. This is to prevent interference from the registration rollers while the drum and press roller transport the paper.
- When the high point of the cam [B] on the drum drive gear reaches the cam follower [C], the shaft [D] rotates clockwise (as seen from the operation side) to release the upper registration roller [A] from the lower registration roller.

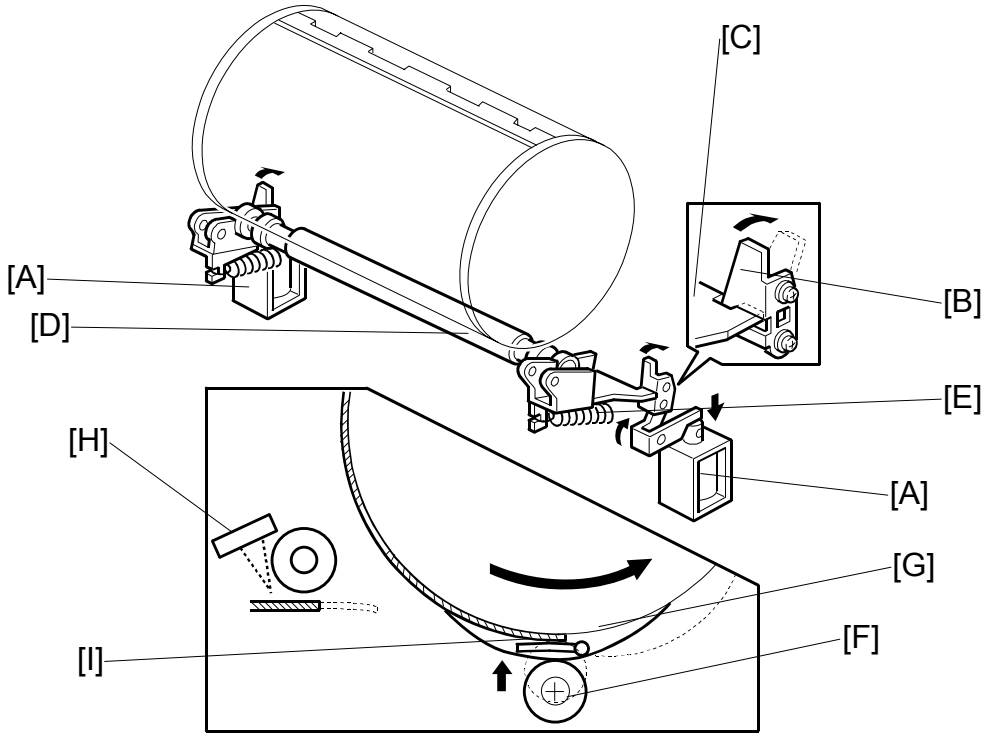
6.9.8 REGISTRATION SENSOR CLEANING



NOTE: This mechanism is attached only for the Chinese model.

Dust on the registration sensor [A] can be removed by operating a lever [B]. The technician should do this every visit.

6.9.9 PRINTING PRESSURE MECHANISM



- When not in the printing cycle, the two solenoids [A] stay off and the stoppers [B] lock the brackets [C] to keep the press roller [D] away from the drum.
- When the 1st sheet of paper is fed, the solenoid is energized but the brackets are still locked by the stoppers due to strong tension from the springs [E].
- When the high points of the cams [G] on the front and rear drum flanges reach the cam followers [F] on both sides of the press roller shaft, a small clearance is made between the stoppers and the brackets. The two solenoids plungers are pulled down at the same time, releasing the stoppers from the brackets.
- Printing pressure is applied by tension from the springs [E] when the cam followers [F] come off the high points of the cams [G].
- During the printing cycle, the solenoids stay on. However, if paper does not reach the registration sensor [H] at the proper time (when the cam follower is on the high point of the cam), the solenoids are de-energized to lock the brackets.
- The printing pressure is released when the cams push down the cam followers so that the press roller does not contact the master clamper [I].
- After printing is finished, the solenoids de-energize and the springs push the stoppers back. Before the drum returns to the home position, the stoppers lock the brackets again when the cams push down the cam followers.

6.9.10 PAPER TABLE MECHANISM

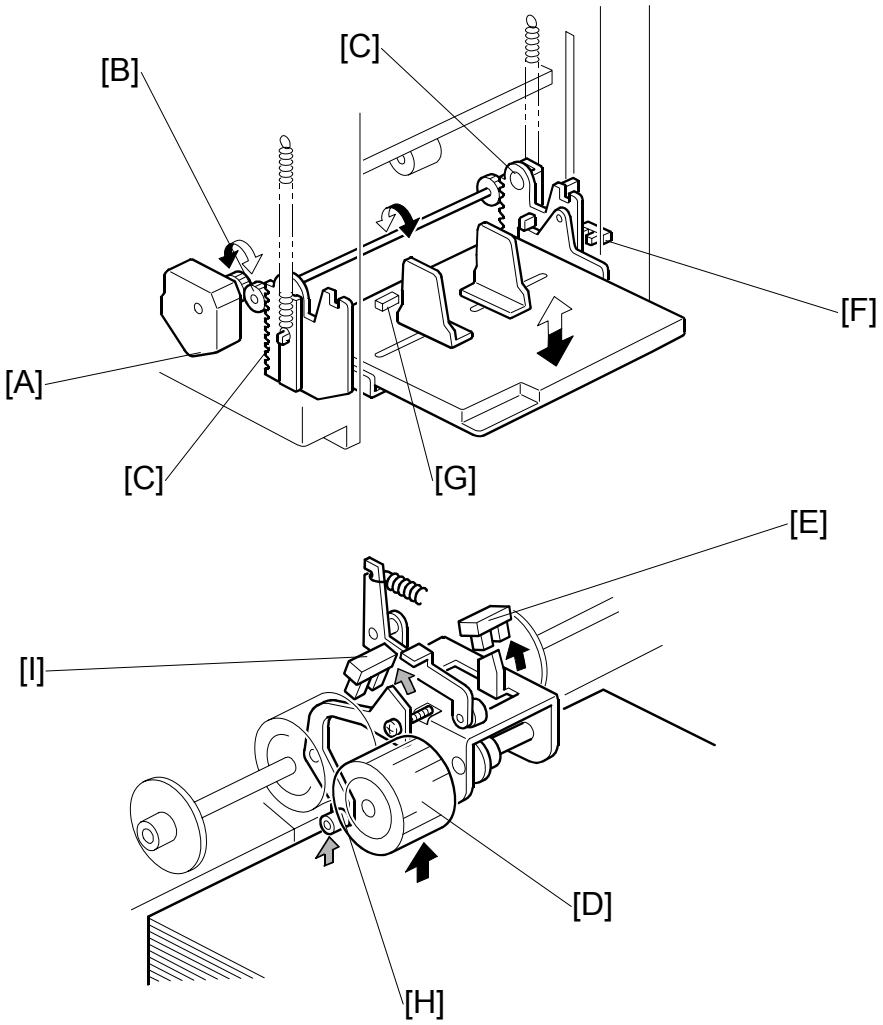


Table Up and Down Mechanism

An independent dc motor, the paper table motor [A], drives the paper table. When the motor turns, the pinions [B] turn on the racks [C], lifting up or lowering the paper table.

There are two paper height sensors.

- Sensor 1 [E] is actuated when the top of the stack pushes the pick-up roller [D] to a certain height.
- Sensor 2 [I] is actuated when the top of the stack pushes a feeler [H].

When the paper table moves up, the top of the paper stack contacts the pick-up roller [D] or feeler [H], lifting it up. Then, when paper height sensor 1 [E] or 2 [I] is actuated, the paper table stops.

During a printing run, sheets are fed from the stack, and the paper pick-up roller and feeler both drop. When the paper height sensor 1 or 2 is de-actuated, the paper table motor starts turning and lifts the paper table until the sensor is actuated

again. In this way, the top of the paper stack remains at the same position during printing.

When the tray lowers, the lower limit position is detected by the lower limit sensor [F], which is beside the paper table motor.

When paper runs out, the paper feed table lowers, until the paper table lower limit sensor (not shown) detects the lower limit position.

Why do we have two height sensors?

Note that the feeler [H] is at a different part of the stack from the pick-up roller [D].

Some types of paper have a different stack thickness at different parts of the stack. This is notably true for envelopes, which have a greater stack thickness at the leading edge. The pick-up roller contacts the stack a small distance away from the leading edge, so the stack is a bit thicker than detected by an actuator attached to the pick-up roller.

Then, if there is only one height sensor, it might detect that the table is at the correct height at the wrong time, or that the stack height is too low at the wrong time.

Then a misfeed will occur.

So, having two sensors prevents misfeeds.

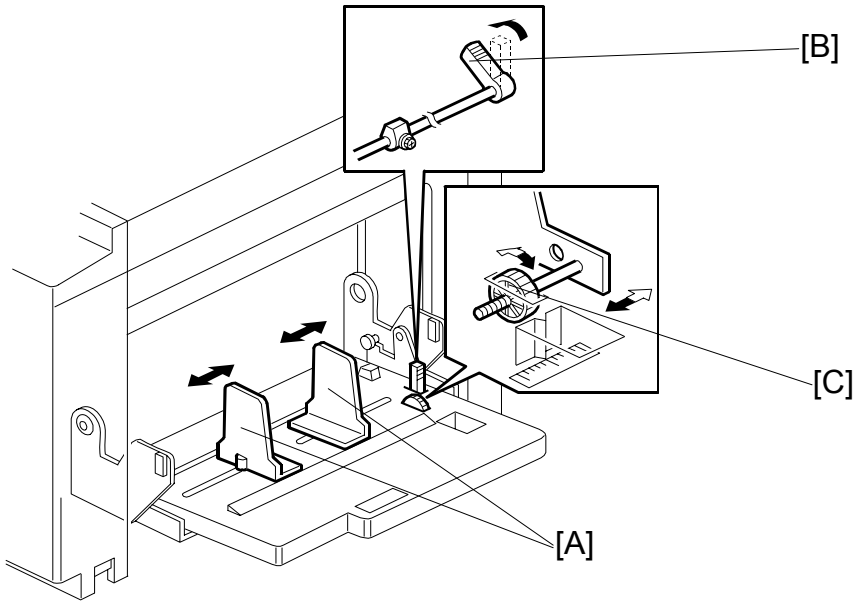
Paper End Detection Mechanism

The paper end sensor [G] is under the paper table to detect when the paper on the table runs out.

Paper Size Detection

NOTE: The paper size is not detected in this model, because there are no paper size sensors. As a result, the master is always made at full size. (Also, there is no size sensor for originals.)

6.9.11 PAPER TABLE SIDE FENCE MECHANISM



The left and right side fences [A] move together due to a rack and pinion mechanism. There is a lock lever [B] to hold the side fences in position.

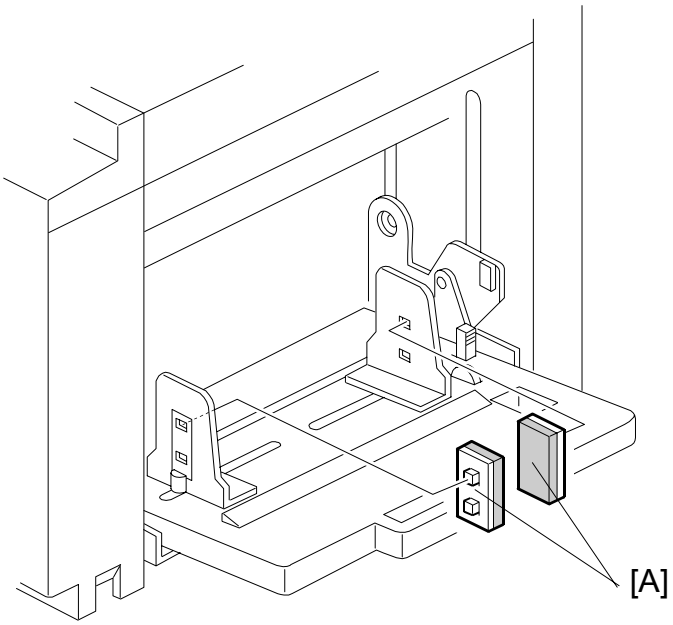
NOTE: The lock lever may be useful if there is no dedicated operator and some of the operators cannot set the side fences properly, causing paper feed problems. Advise the operator to use the lock lever once the paper fences are properly adjusted.

Paper Table Side-to-Side Shift Mechanism

The paper table shifting dial [C] shifts the image across the page. If the dial is turned, the whole paper table moves towards one side or the other.

CÓPIA NÃO CONTROLADA

Side Fence Friction Pads

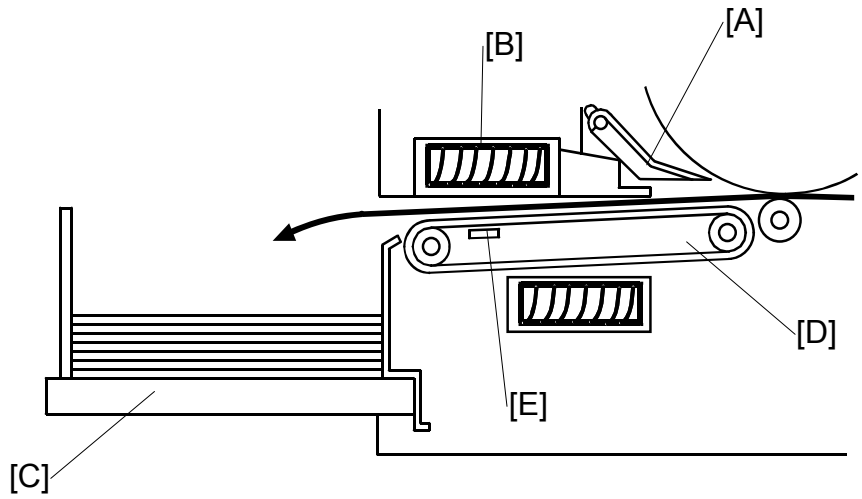


The two side fence friction pads are included as accessories. These are not used normally, but if paper multi-feed frequently occurs, the friction pads [A] can be installed to apply stopping pressure to the paper. These are especially useful when thin paper is used.

The user can install the friction pads if they are using thin paper.

6.10 PAPER DELIVERY

6.10.1 OVERALL



Procedure

The exit pawl [A] and the air knife [B] separate the paper from the drum.

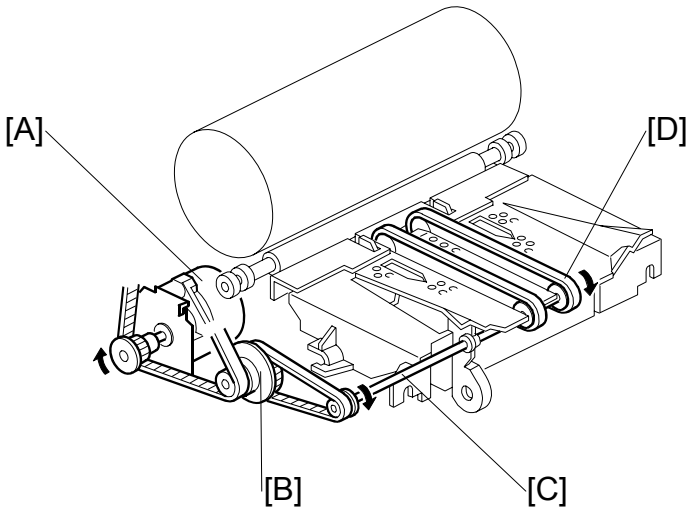
↓

The paper is fed to the paper delivery table [C] by the paper delivery unit [D].

↓

The paper exit sensor [E] is used for jam detection.

6.10.2 PAPER DELIVERY UNIT DRIVE MECHANISM

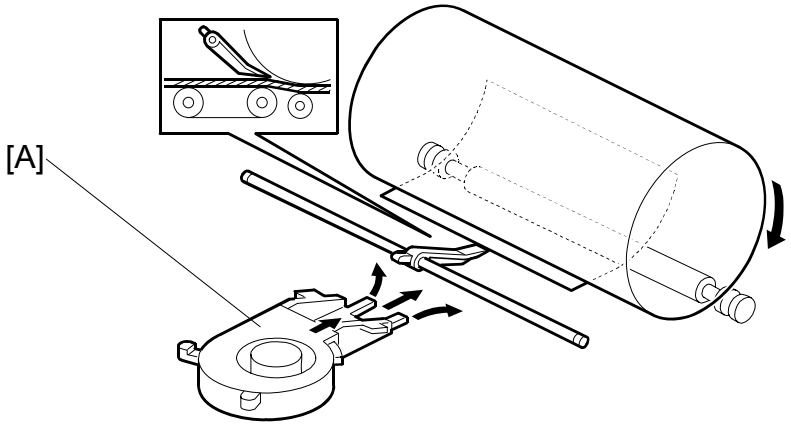


Mechanism

Main motor [A]
↓
Belt and gear [B]
↓
Shaft [C]
↓
Rotates the transport belts [D].

NOTE: 1) The vacuum fan motor inside the unit holds the paper against the belts [D] to deliver the paper to the delivery table.
2) Transport belt [D] become wider compare to the previous series machine.
3) The transport belt rotation speed depends on the selected print speed.

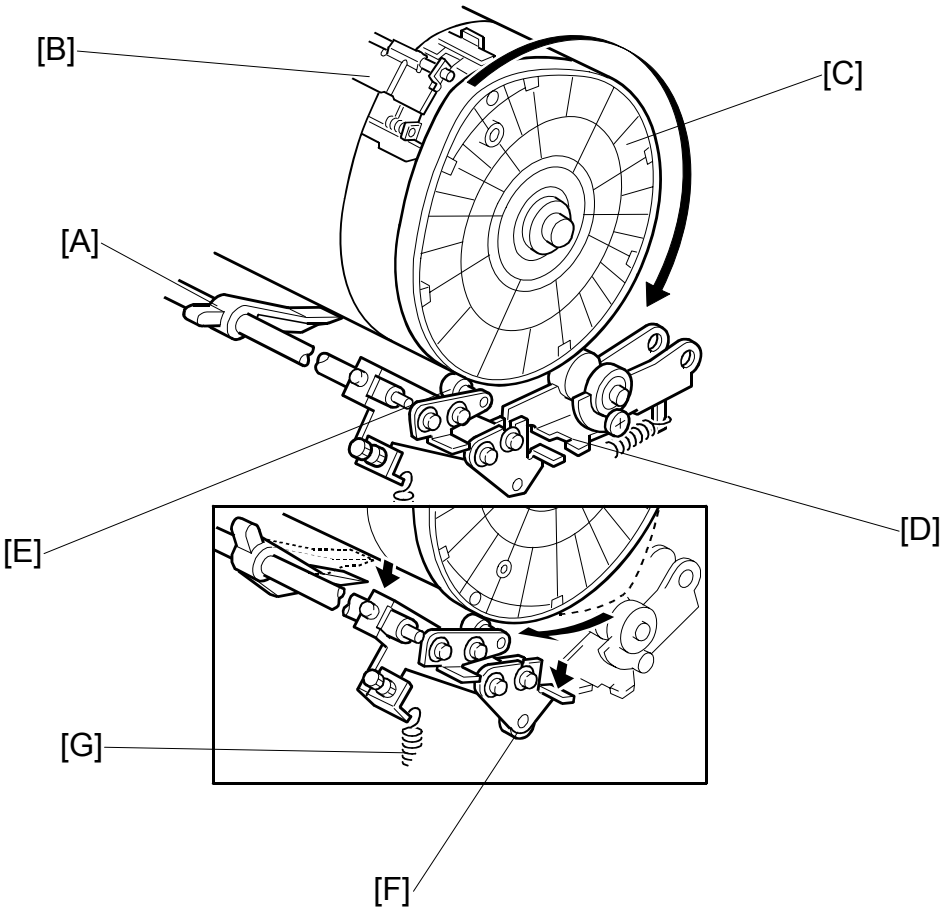
6.10.3 PAPER SEPARATION FROM DRUM



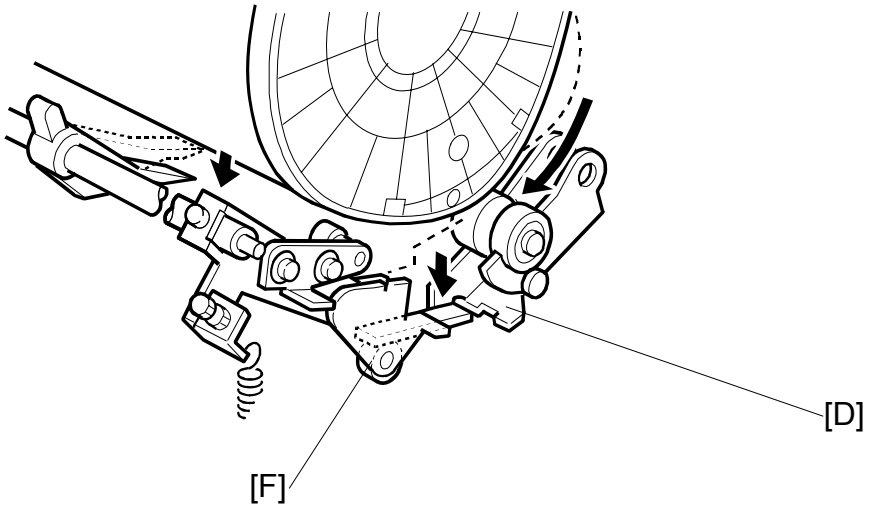
Air knife

- The air from the air knife fan motor [A] separates the paper from the drum.
- The air knife fan motor starts blowing air when the print start key is pressed or when master cutting is finished. The paper passes under the exit pawl and is delivered to the delivery table.

6.10.4 EXIT PAWL DRIVE MECHANISM

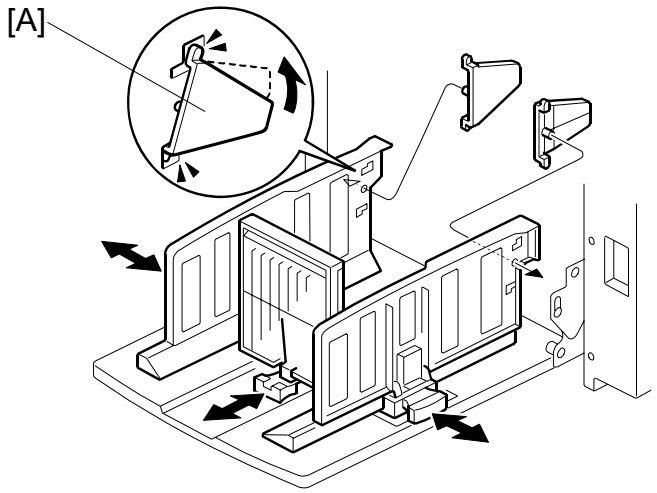


- During printing, the distance between the exit pawl [A] and the drum is very small, to prevent paper wrap jams. However, when the master clamper [B] approaches the exit pawl (as the drum turns), the pawl has to be moved away from the drum to prevent it from being damaged by the master clamper. This is controlled by the front drum flange [C], which is cam-shaped, and the cam follower [E] on the exit pawl shaft.
- When the cam follower is not pushed out by the drum flange, the exit pawl closely approaches the drum surface, due to the tension from a spring [G].
- As the master clamper approaches the exit pawl, the high point of the drum flange cam [C] moves into contact with the cam follower [E] pushing it down. This moves the cam follower arm [F] downwards. The pawl shaft turns clockwise to move the pawl away from the drum.



- When printing finishes and the printing pressure is released, the cam follower arm [F] is engaged by the printing pressure release arm [D] and held in the lower position. Therefore, after printing finishes, the cam follower is out of contact with the cam, and the exit pawl moves away from the drum to its normal position.

6.10.5 SIDE PLATE GUIDE

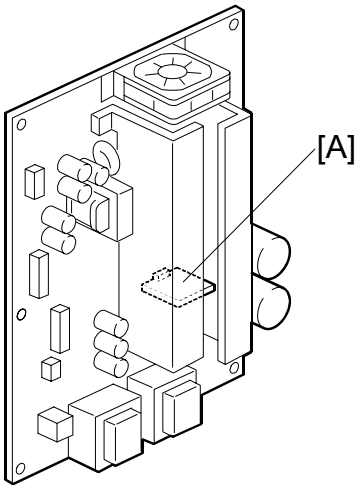


When printing on A4SEF, B5, and thin paper, side plate guides [A] should be attached to the side plate of the paper delivery table. Users can attach these guides.

Then, the side plate guides can correctly stack the printouts on the paper delivery table.

6.11 ABNORMAL VOLTAGE PROTECTION

This is for the AC220V ~240V machine only.



There is an automatic detection system [A] for unexpected voltage surges, featuring automatic shut-off and data logging features.

Momentary voltage drop

SP 1-83 records the number of momentary interruptions.

NOTE: The machine can record only interruptions of very short duration. If the machine does not get voltage continuously, the PSU will shut off.

Low voltage (less than 150V)

Records (SP1-83) the number of low voltage peaks.

High voltage

Records (SP1-83) the number of high voltage peaks.

AC300V to 400V

The machine records the occurrence, and if the PSU keeps getting the high voltage continuously, the main switch will shut off automatically to protect the machine.

Over voltage (More than AC400V)

The machine will shut off immediately after recording the high voltage occurrence.

NOTE: 1) The main switch contains a solenoid to shut off the main switch automatically.
2) The auto shut off mode can be set ON or OFF by SP2-80.
3) A message will be displayed when the machine is turned on the first time after an auto shut off.

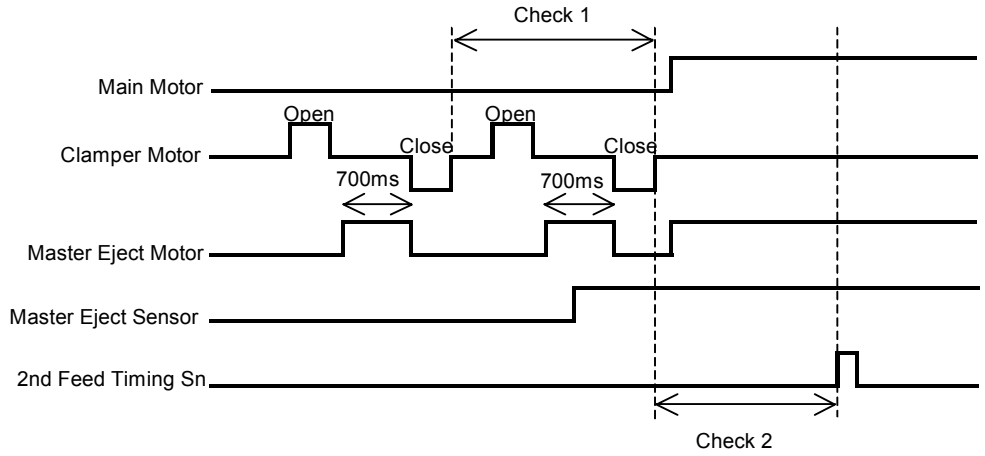
General Notes on this Feature

NOTE: 1) The durability of the PSU is improved compared to previous models.
2) The 100V machine does not have this mechanism, because voltages more than 220 V will not occur.
3) The machine keeps a record, and you can check the data with SP 8-9 Data printout – Power failure. Refer to section 5-9-3.
4) Collect the logging data with the PSU board when it is needed for investigation.
5) When the user turns the main power switch off, the machine detects this as a ‘momentary voltage drop’ and a ‘low voltage’, and adds this to the log for these two error types.

6.12 ERROR DETECTION

6.12.1 MASTER EJECT JAM (E JAM LOCATION INDICATOR)

Picking up the used master from the drum



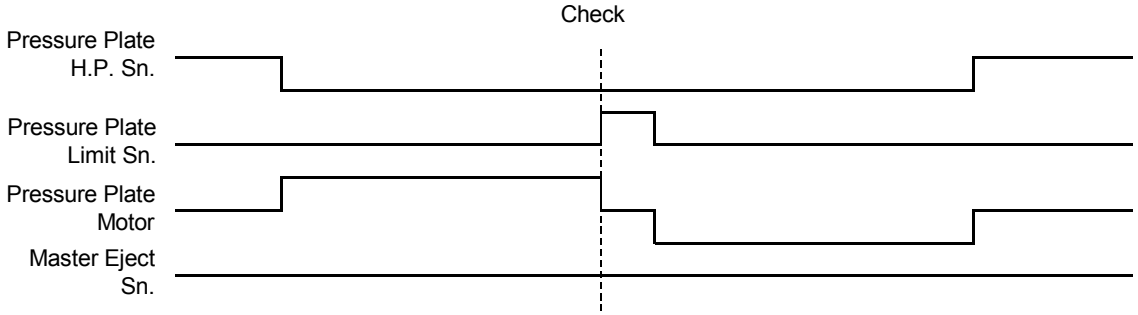
Check 1:

The retry mechanism will turn on when the master eject sensor does not turn on when the master eject motor is rotating.

Check 2:

The E jam indicator lights (master eject jam), when the master eject sensor does not turn on between closing the clamper and turning on the 2nd feed timing sensor.

Compressing the used master



Check:

If the master eject sensor detects a master when the pressure plate limit sensor turns on, the E jam indicator lights.

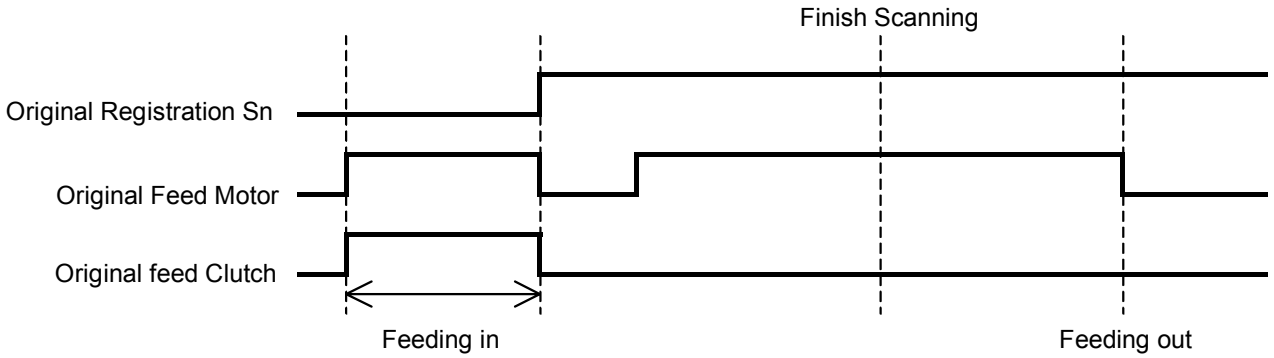
Just after turning on the main switch

Check:

If the master eject sensor is on (master detected), the E jam indicator lights.

6.12.2 ADF JAM (P JAM LOCATION INDICATOR)

Feeding in the original (ADF)



Feeding in

The P jam indicator lights if the original registration sensor does not turn on within 5 seconds after the original feed motor turns on

Feeding out

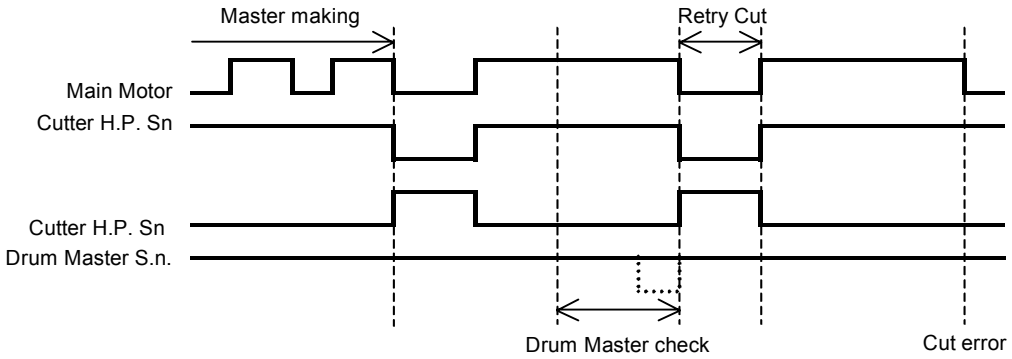
When the scanner has fed out the correct length and feeds 150mm more, but the original registration sensor still detects the original, the P jam indicator lights.

Just after turning on the main switch

If the original registration sensor detects an original, the P jam indicator lights.

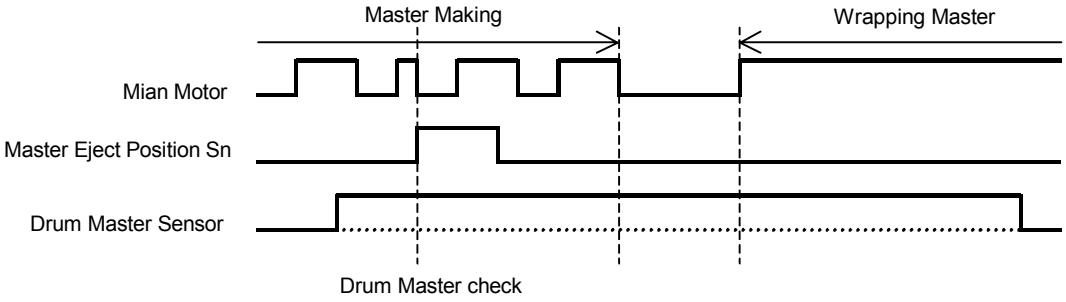
6.12.3 MASTER FEED JAM (D JAM LOCATION INDICATOR)

Cutting the master



The drum master sensor does not turn on between feed start timing sensor and drum black patch after the master cutting operation. In this case, the machine tries to cut the master again and if the machine does not cut the master correctly, the D jam indicator lights.

Clamping the master



A master clamp error occurs when the drum master sensor does not turn on at the home position (the drum stops at the home position for a short time; home position is when the master eject position sensor turns on).

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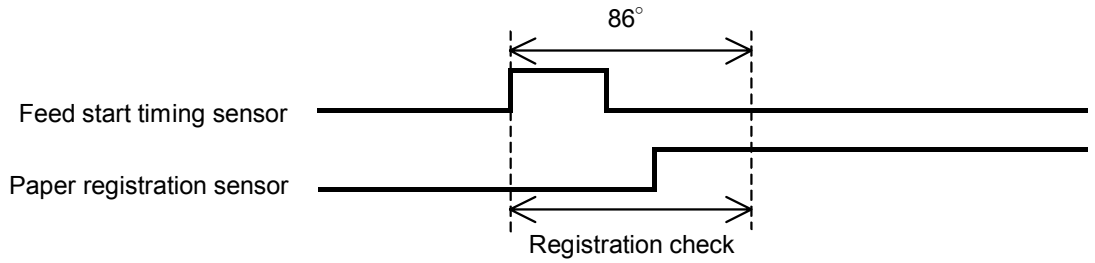
6.12.4 PAPER FEED JAM (A JAM LOCATION INDICATOR + +)

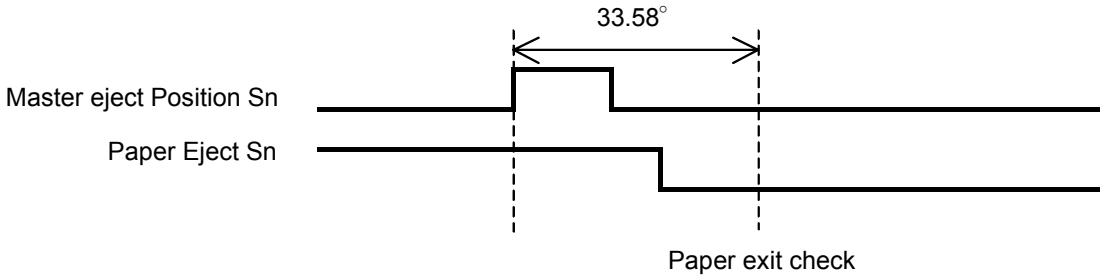
Paper feed



Paper feed will try again when the paper registration sensor does not turn on after 86 degrees from the paper start timing sensor. Then the drum will rotate one more time and if the paper registration sensor still does not turn on, the A jam indicator lights.

6.12.5 PAPER DELIVERY JAM (C JAM LOCATION INDICATOR)

Paper delivery

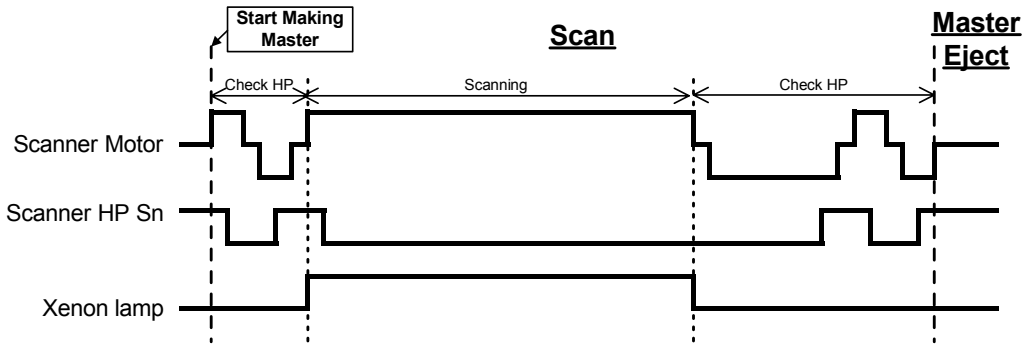


A paper exit error occurs when the paper exit sensor turns on immediately after turning on the power or after finishing printing.

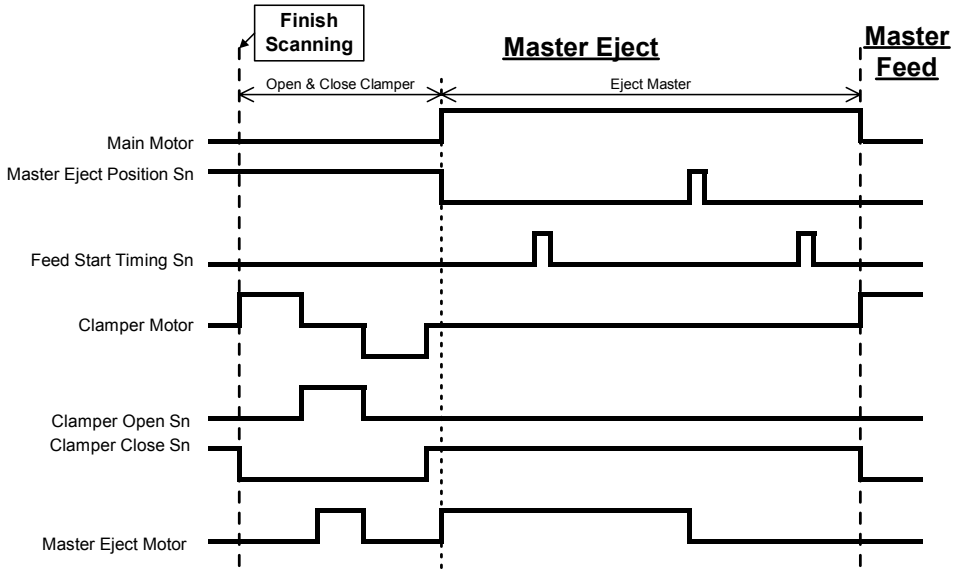
Also, a paper exit error occurs when the paper exit sensor turns on at 33.58 degrees from the paper ejection position during printing.

6.13 TIMING CHART

6.13.1 SCANNING



6.13.2 MASTER EJECT



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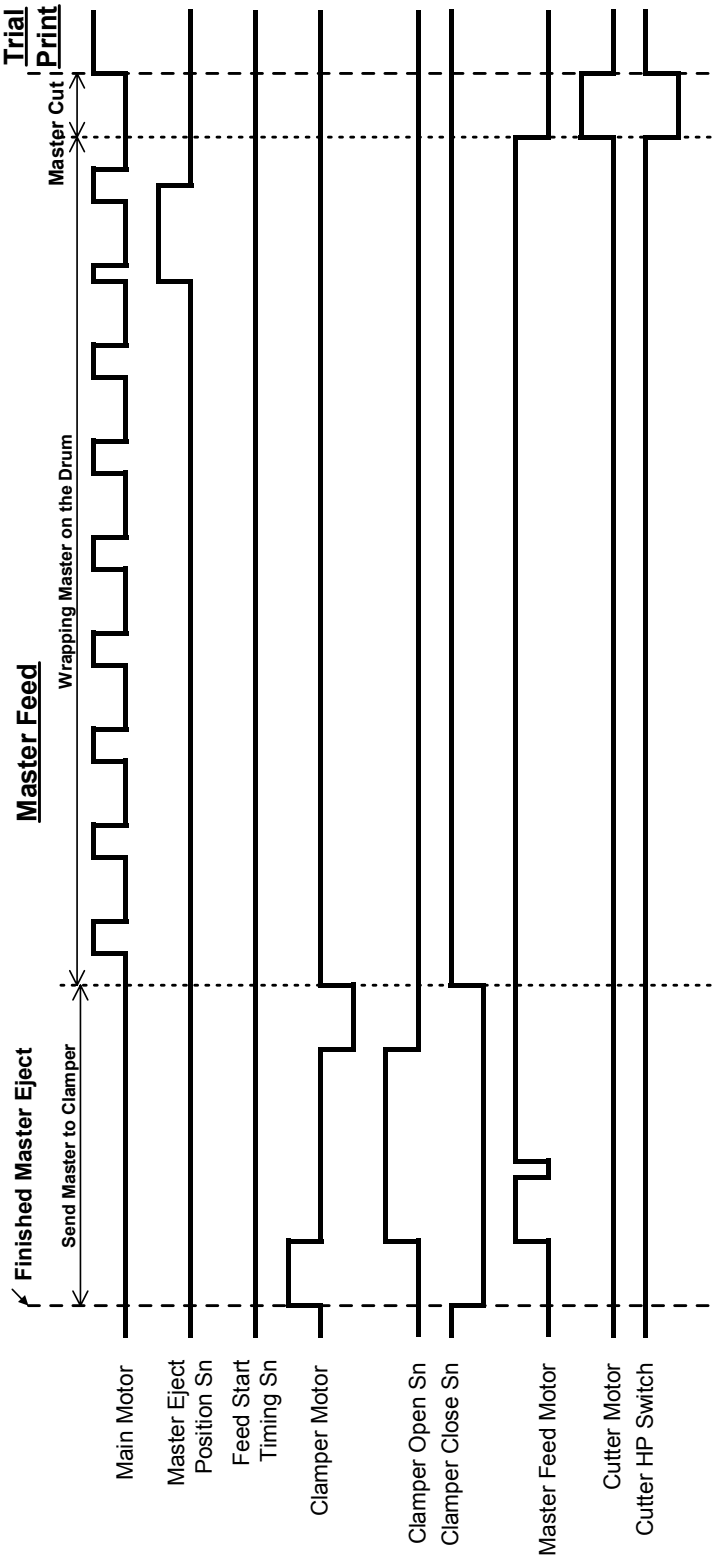
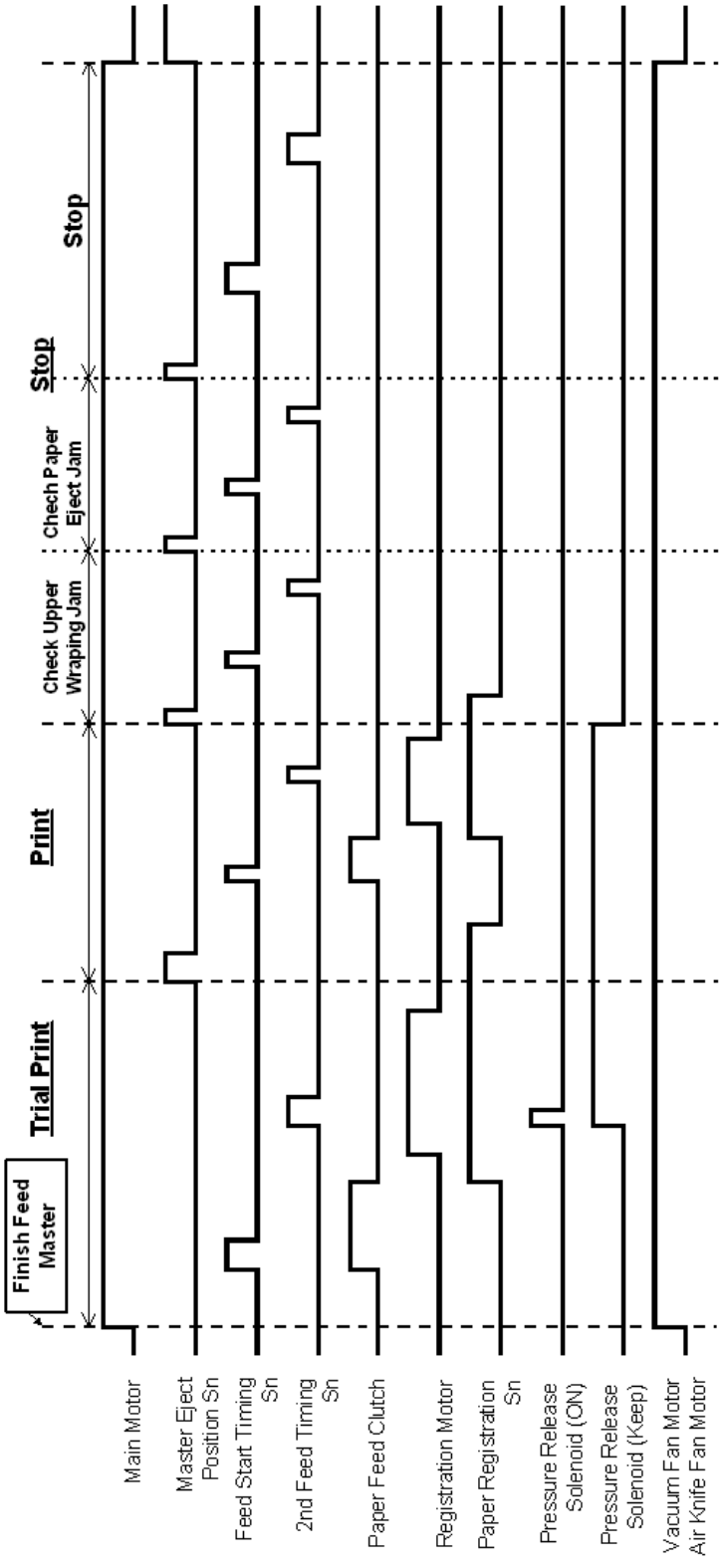
6.13.3 MASTER FEED



6.13.4 PRINT



CÓPIA NÃO CONTROLADA

7. SPECIFICATIONS

7.1 ESSENTIAL DIFFERENCES BETWEEN C248 AND C267 MODELS

No.	Item	Remarks
1	Scanner unit	A newly designed scanner unit is used. 600 dpi x 300 dpi CCD A3 / 11” x 17” size book scanner
2	Operation panel	A newly designed operation panel is used. Bigger size bright LCD Two start buttons (master making and print) combined into one.
3	Master eject unit	Added a master eject unit open mechanism
4	Master making unit	Added a master making unit slide-out mechanism
5	Drum unit	New ink pump unit (Trochoid type pump) Metal screen / Cloth screen Change the mylars to prevent ink leakage
6	Separation Pressure	The separation pressure can be changed with a lever. 3 levels (Other destinations) 4 levels (Chinese models)
7	Paper height sensor	Two paper height sensors
8	Paper delivery unit	Based on the TT model The main motor drives the paper delivery unit. Vacuum fan changed from sirocco fan motor to axial fan motor.
9	PSU	A newly designed PSU is used. Abnormal voltage protection mechanism. (220V machine only) • Durability is improved • Auto detection system for unexpected voltage surges, with automatic shut-off and data logging features.
10	MPU	A newly designed MPU is used. MPU controls: Machine, paper feed, image processing, main motor Upgrade the firmware using a flash memory card
11	Image processing	An LSI improves image processing
12	SP mode / User tools	
13	Auto off mode	Added the auto-off mode
14	ADF	A newly designed ADF is used.

7.2 ESSENTIAL DIFFERENCES BETWEEN C252 AND C267 MODELS

No.	Item	Remarks
1	Scanner unit	A newly designed scanner unit is used. 600 dpi x 300 dpi CCD A3 / 11” x 17” size book scanner
2	Operation panel	A newly designed operation panel is used. Bigger size bright LCD Two start buttons (master making and print) combined into one.
3	Master eject unit	Master eject unit open mechanism
4	Master making unit	Master making unit slide-out mechanism
5	Drum unit	Ink pump unit New ink pump unit Changed the motor to Trochoid type from piston pump type
6	Paper table	Based on the paper feed table
7	Paper height sensor	Two paper height sensors
8	Paper feed	Two types of roller (Paper pick-up roller and paper feed roller) The number of levels for paper feed pressure are changed from 2 levels to 3 levels.
9	Separation pressure	The separation pressure can be changed by the user with a lever. 3 levels (Other destinations) 4 levels (Chinese models)
10	PSU	A newly designed PSU is used. Abnormal voltage protection mechanism. (220V machine only) • Durability is improved • Auto detection system for unexpected voltage surges, with automatic shut-off and data logging features
11	MPU	A newly designed MPU is used. MPU controls: Machine, paper feed, image processing, main motor Upgrade the firmware using a flash memory card
12	Image processing	An LSI improves image processing
13	Printing speed	There are three printing speeds (not two).
13	SP mode / User tools	
14	Auto off mode	Added the auto-off mode
15	ADF	A newly designed ADF is used.

7.3 GENERAL SPECIFICATIONS

Configuration	Desktop
Pixel Density	300 dpi × 300 dpi In Fine mode, 400 dpi in sub-scanning resolution
Scanning	600 dpi × 300 dpi CCD This model always reduces the amount of scanned data in the main-scan direction by half before printing.
Master Process	Digital with 300 dpi thermal head
Original Type	Sheet / Book
Printing Process	Fully automatic one-drum system
Original Size	Platen Mode Maximum A3 / DL size ADF Mode Maximum 297 mm × 432 mm, 11.7” × 17.0” Minimum 105 mm × 128 mm, 4.1” × 5.0”
Original Thickness / Weight	Platen Mode Maximum 30 mm ADF Mode 52 to 105 g/m^2, 14 to 28 lb.
Original Stack Capacity (ADF)	40 sheets (A4/ 8 1/2” and below size, 80 g/m^2 [20 lb.]) 30 sheets (Over A4/ 8 1/2” x 11” size, 80 g/m^2 [20 lb.])
Copy Paper Size	Maximum 275 mm × 395 mm, 10.8” × 15.6” Minimum 90 mm × 140 mm, 3.5” × 4.7”
Copy Paper Weight	China model 35 to 127.9 g/m^2 Other models 47.1 to 209.3 g/m^2
Printing Speed	80, 100, 130 cpm (3 steps)
Original Type	Text, Text/Photo, Photo, Pale mode
Master Making Density	Lighter, Normal, Darker 1, Darker 2
Reproduction Ratios	Metric (%): 141, 122, 115, 93, 87, 82, 71 Inch (%): 155, 129, 121, 93, 77, 74, 65
Master Eject Box Capacity	30 masters
Copy Paper Capacity	1,000 sheets (64 g/m2, 171 lb.)
Paper Delivery Tray Capacity	1,000 sheets (64 g/m2, 171 lb.)
Power Source	120 V, 60 Hz, 2.0 A 220 V – 240 V, 50 – 60 Hz, 1.1 A
Power Consumption	Less than 180 W
Noise Emission	Sound Power Level Standby: 36 dB Copying 80 cpm: 78 dB Copying 100 cpm: 80 dB Copying 130 cpm: 84 dB Operating Position Sound Power Level Standby: 20 dB Copying 80 cpm: 63 dB Copying 100 cpm: 70 dB Copying 130 cpm: 72 dB

GENERAL SPECIFICATIONS

Dimensions (W × D × H)	Stored 750 × 676 × 633 mm, 29.5” × 26.6” × 24.9” Stored with ADF 750 × 676 × 686 mm, 29.5” × 26.6” × 27.0” Set up 1224 × 676 × 633 mm, 48.2” × 26.6” × 24.9” Set up with ADF 1224 × 676 × 686 mm, 48.2” × 26.6” × 27.0”
Weight	68.5 kg

Master Processing Time	32 seconds (A4 ▱) When setting an original on the exposure glass
First Print Time	33 seconds (A4 ▱) When setting an original on the exposure glass
Printing Area	B4 Drum 250 mm × 355 mm LG Drum 210 mm × 355 mm A4 Drum 210 mm × 288 mm
Leading Edge Margin	5 mm ± 3 mm
Side / Vertical Registration Adjustable Range	± 10 mm

Master	Master Type	280 mm width (B4) 240 mm width (LG / A4) 100 mm / roll (China) 125 mm / roll (other destinations)
	Yield	260 masters / roll (B4 / LG) 300 masters / roll (A4) 205 masters / roll (B4 China)
	Maximum run length per master	2000 prints / master
	Storage Condition	0 to 40 C, 10 to 95 %RH
	Storage Period	12 months after production date
Ink	Ink Type	500 ml / pack (Black, China) 600 ml / pack (Black, Other destinations) 600 ml / pack (Other colors)
	Available Colors	Black, Red, Blue, Green, Brown, Violet Yellow, Maroon, Navy, Orange, Hunter green
	Storage Condition	-5 to 40 C, 10 to 95 %RH
	Storage Period	-5 to 40 C (12 months after production date) 15 to 25 C (18 months after production date)

Avoid locations exposed to direct sunlight.