MODEL HP4-R2
(Machine Code: C264)
SERVICE MANUAL

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.

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.

Symbols

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

☛	See or Refer to
CT	Core tech manual
	Clip ring
	E-ring
	Screw
	Connector

OVERALL INFORMATION

The HP4-R2 will be released in 2006 as the successor to the Titanium. A new model code will be assigned to the HP4-R2 (C264), as there is full compliance with the RoHS and WEEE directives.

This service manual contains the following.

[PINKGOLD S/M]+ [HP4 S/M]+ [HP4-R2 S/M] *S/M: Service Manual

NOTE: 1) Parts that are common with the PG and HP4 S/M are in black.
2) Parts that are common with the HP4 S/M are in blue.
3) Corrections to the PINKGOLD and HP4 S/M and addition for the HP4-R2 S/M are in red.

The following table shows the main parts that were added and changed for HP4-R2 S/M.

Section	Item	Remarks
1	Installation	• Machine access • Power sockets for peripherals • Accessory check • Installation procedure • Tape dispenser type 20 (option) • Interface board type 45 (option)
2	Preventive maintenance	HP4-R2 is the same as HP4.
3	Replacement and adjustment	• Mylar seal • Chocks • Sound-proofing cushions
4	Troubleshooting	• Error code Some new comments have been added.
5	Service table	Some new SP modes have been added.
6	Detailed section descriptions	• Detection of masters on the drum • Drum home position detection • Paper delivery table mechanism • Adjustable buffer fins • Auto off mode • Sound-proofing cushions • Timing chart
7	Point to point diagram	Separated from the service manual.
Spec	Specifications	• Noise emission • Dimensions

TABLE OF CONTENTS

1. INSTALLATION

1.1 INSTALLATION REQUIREMENTS

Carefully select the installation location. 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.)

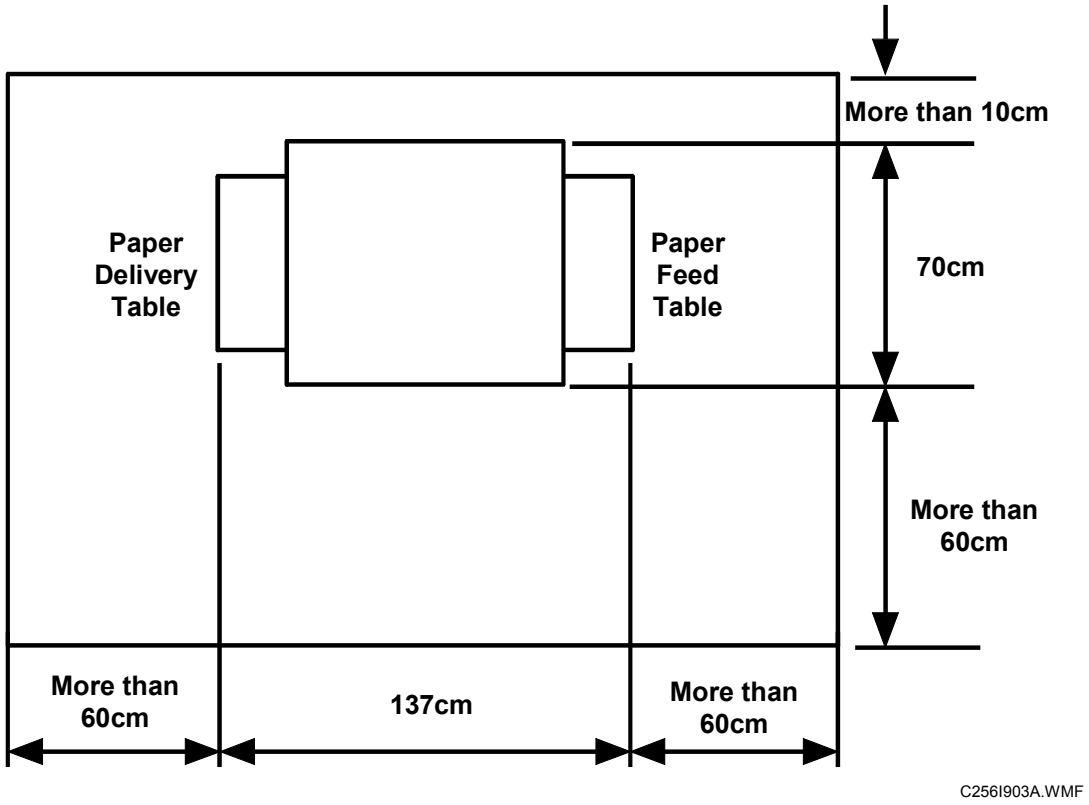
1.1.3 POWER CONNECTION

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 MACHINE ACCESS

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

This machine has a paper delivery table with buffer fins, so the width of the paper delivery table is changed from 136 cm (previous model) to 137 cm (this model).

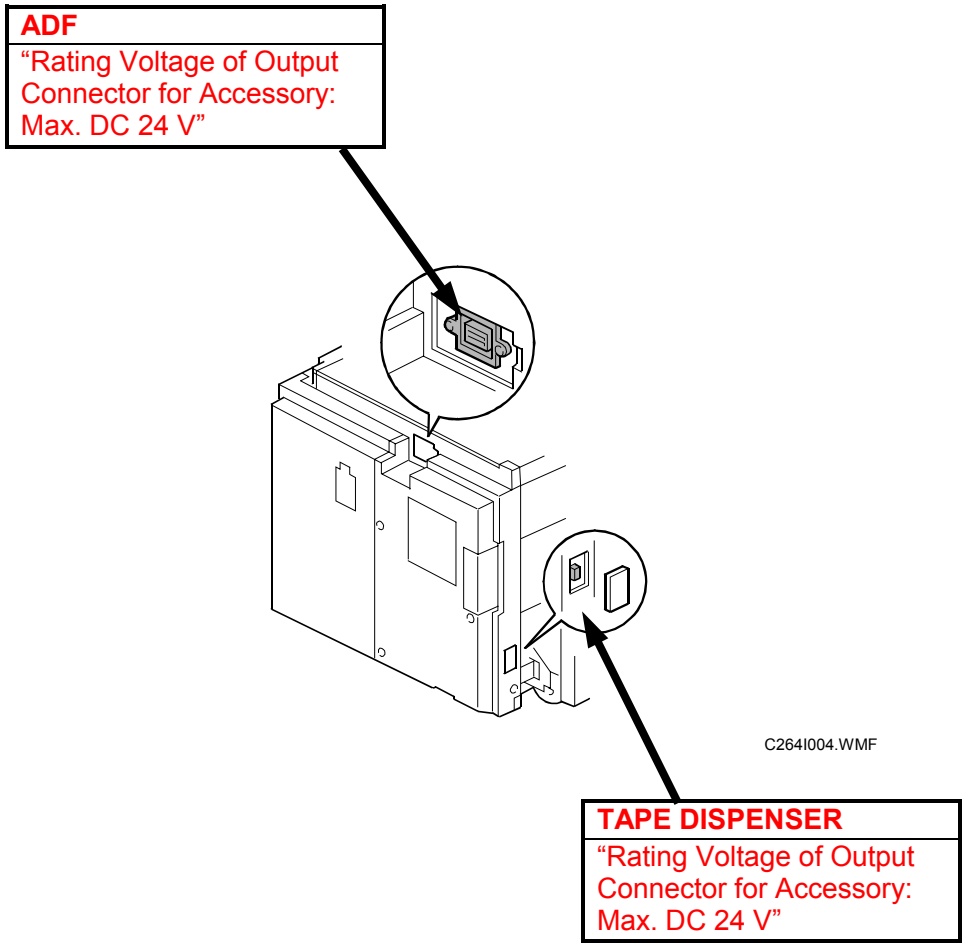


1.1.5 POWER SOCKETS FOR PERIPHERALS

⚠CAUTION

Rating Voltage for Peripherals

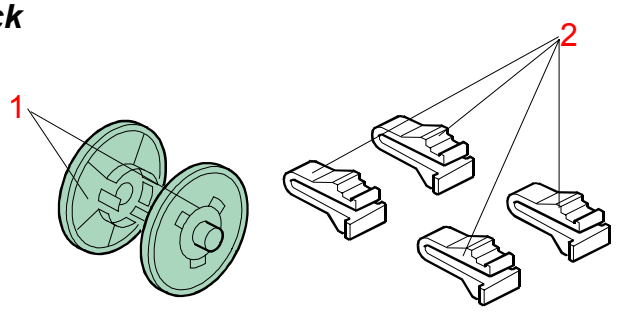
Make sure to plug the cables into the correct sockets.



1.2 INSTALLATION PROCEDURE

1.2.1 MAIN UNIT

Accessory Check

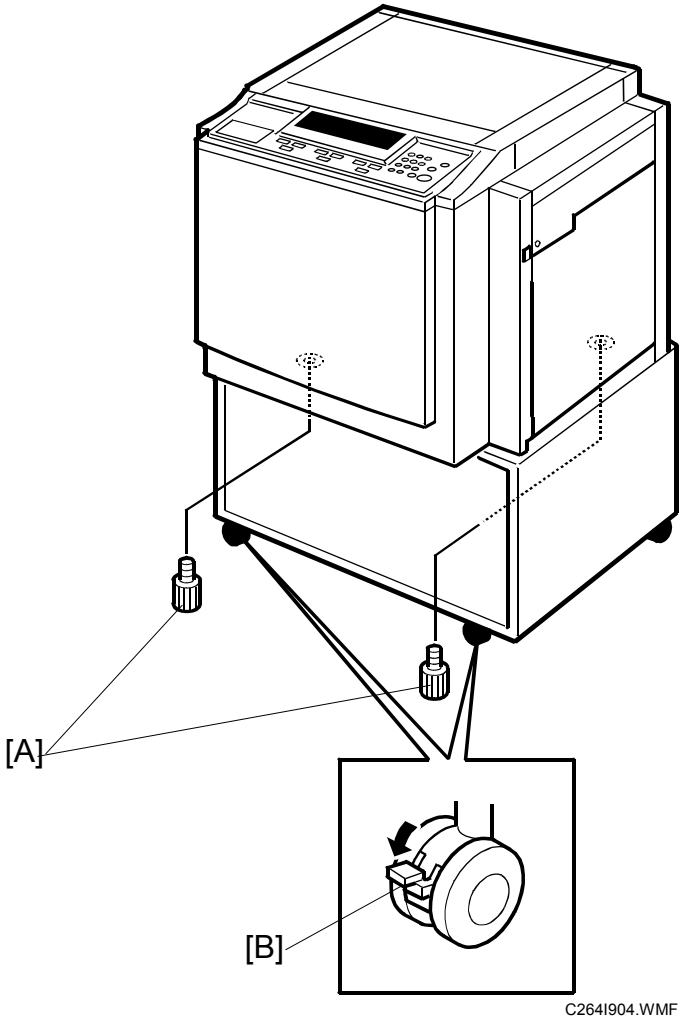


C264I907.WMF

Make sure that you have all the accessories listed below:

Description	Q'ty
1. Master Spool	2
2. Carrying Handle Stoppers	4
3. Operating Instructions (sheet) (Excluding C264-53)	1
4. Operating Instructions (CD-ROM) (C264-53 only)	1
5. NECR (C264-52 only)	1
6. Emblem Cover (C264-52, and -53 only)	1
7. Bundled Items List (C264-26, -28 only)	1

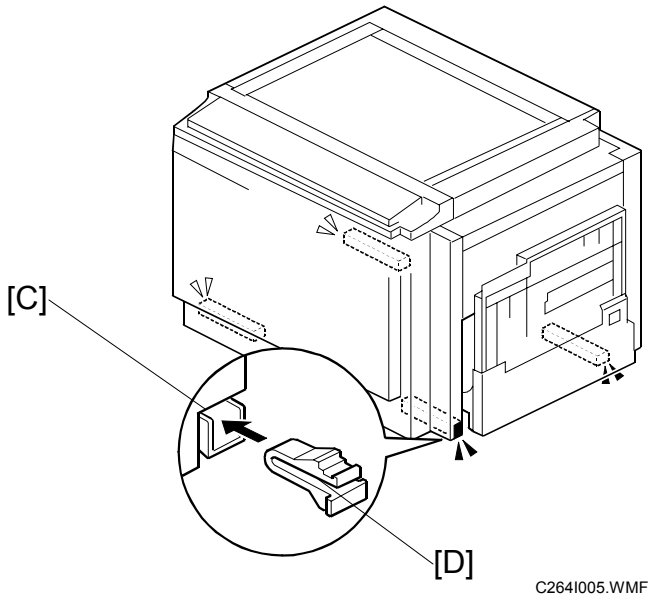
Installation Procedure



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).



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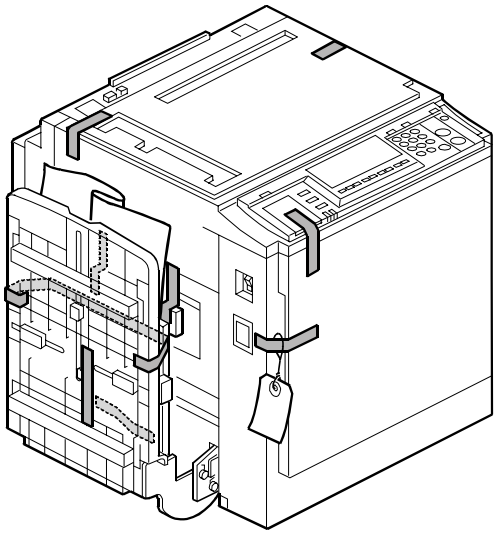
2. Push the carrying handles [C] into the machine, and attach the carrying handle stoppers [D].



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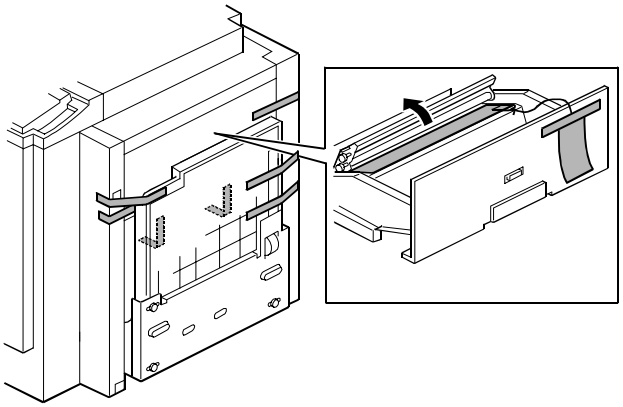
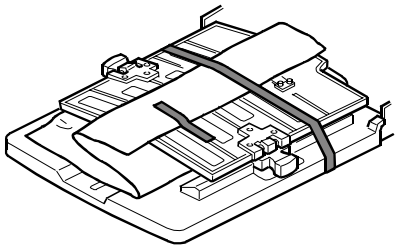


C264I006.WMF



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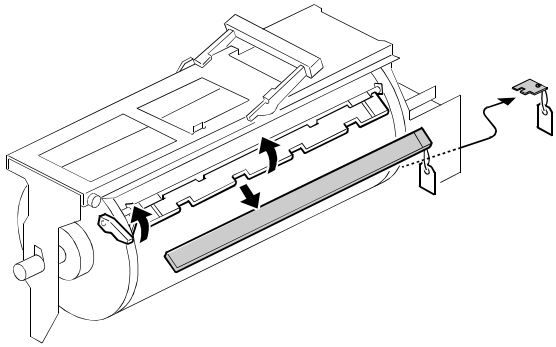
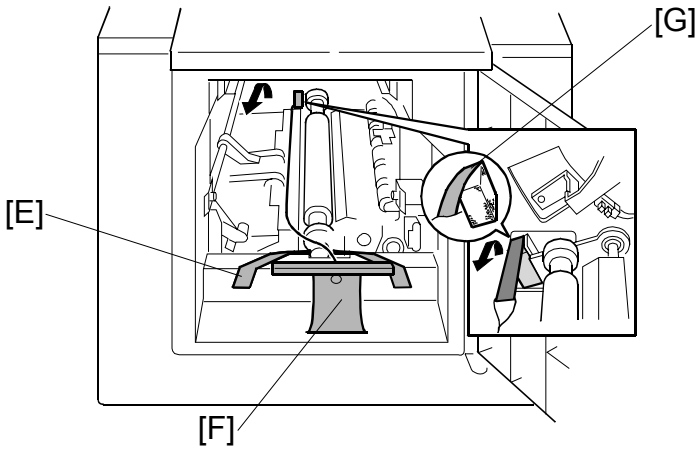


C249I020.WMF

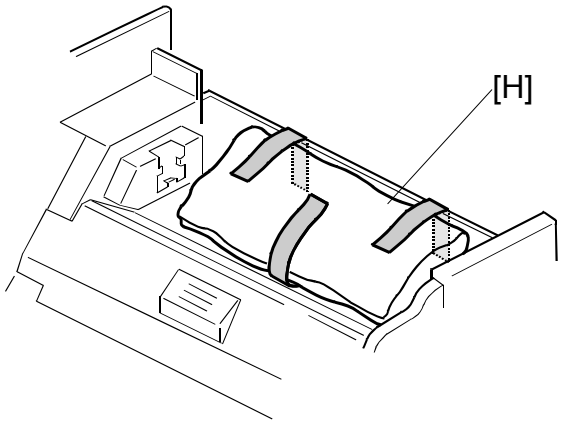
3. Remove the filament tape and string securing the covers and units as shown above.



C256I004.WMF

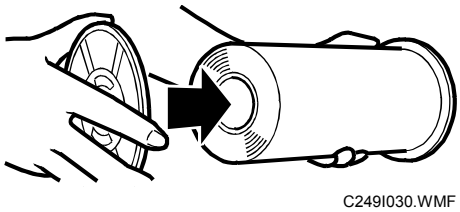
4. Remove the front tape [E], the tag [F], and the rear tape [G].

NOTE: To remove the rear tape, pull the portion shown in the diagram toward the front of the machine.



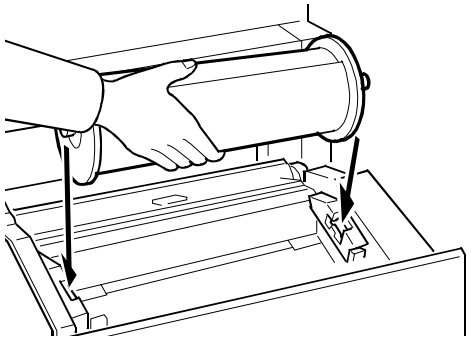
C249I038.WMF

5. Pull out the master making unit, and take out the accessory bag [H].

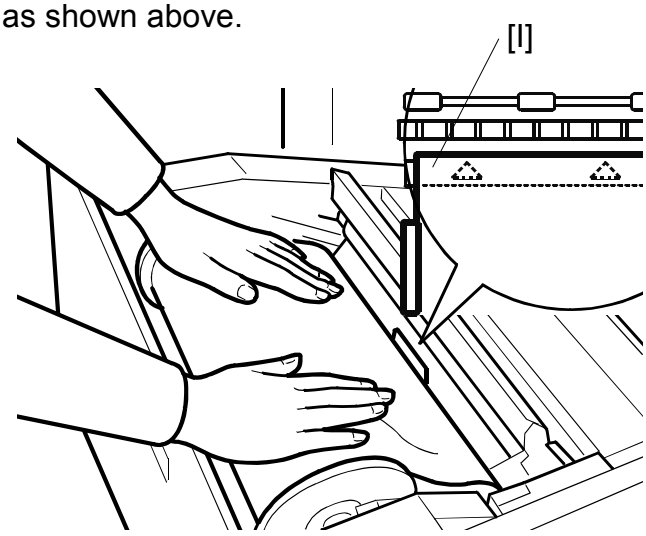


C249I030.WMF

6. Insert both spools into a new master roll.

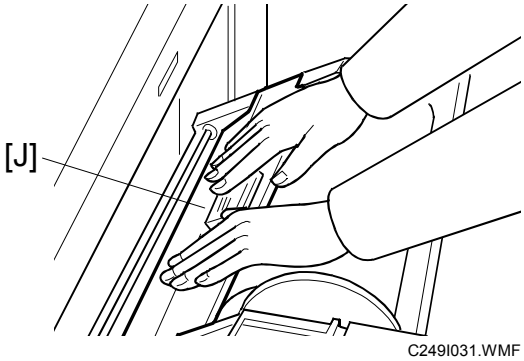

C249I032.WMF

7. Install the master roll as shown above.



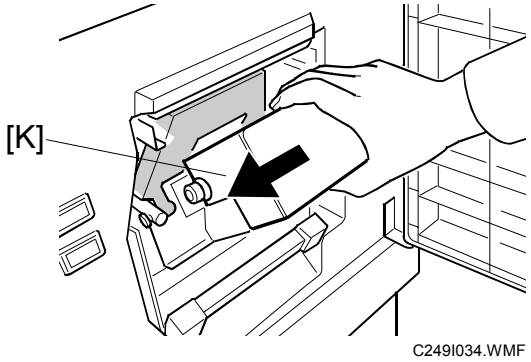
C249I910.WMF

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

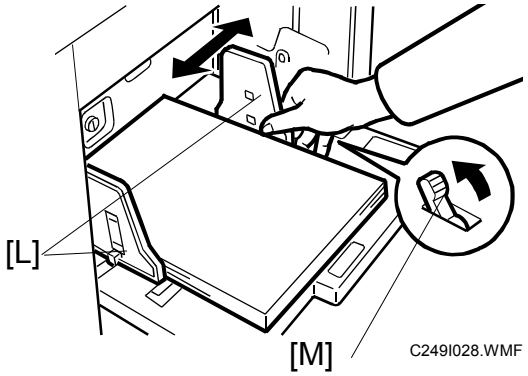


C249I031.WMF

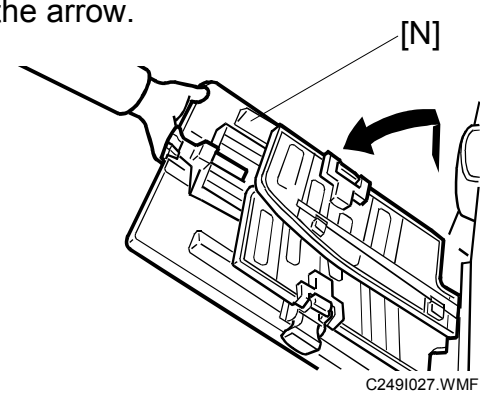
9. Close the cover [J] using both hands.
10. Set the master-making unit.



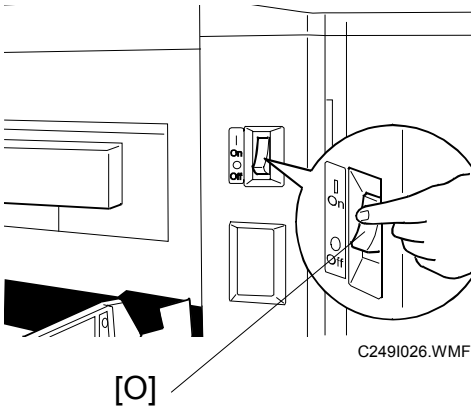
11. Open the door, and insert a new ink cartridge [K].



12. Open the paper table, and load a stack of paper.
13. Make sure that the side plates [L] touch the paper gently. Shift the lock lever [M] in the direction of the arrow.



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



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

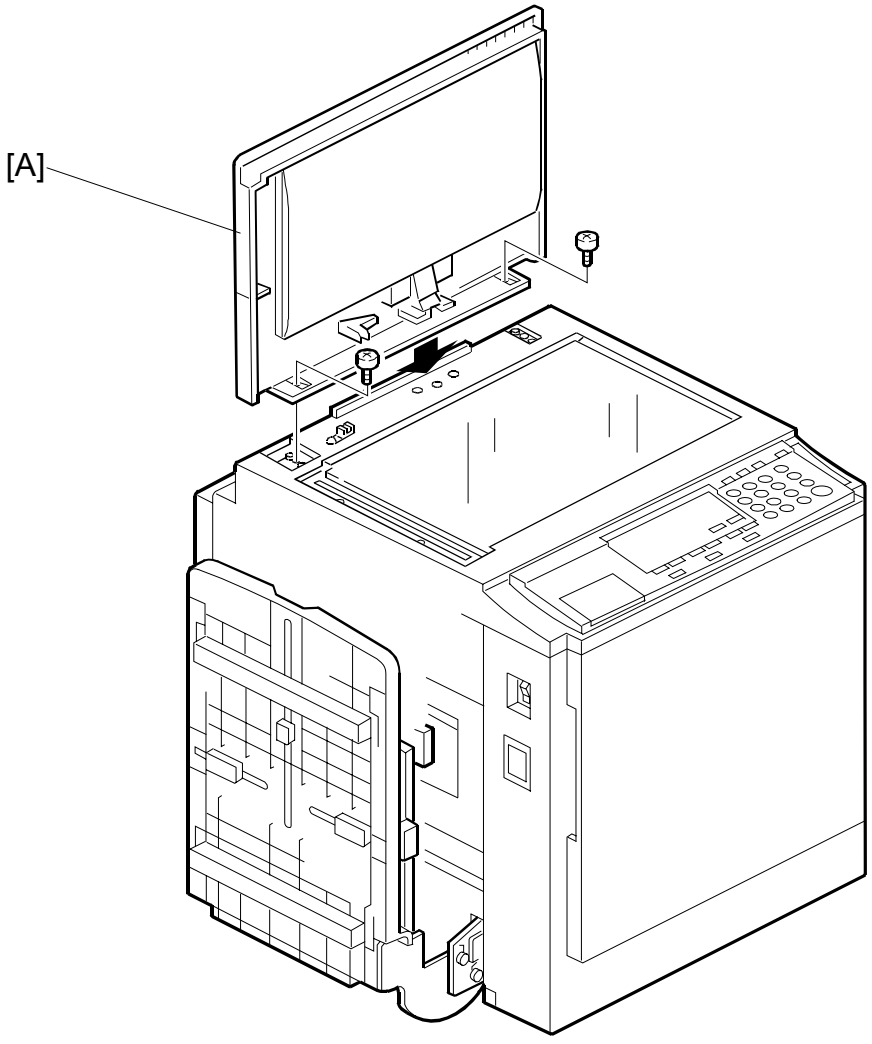
1.2.2 PLATEN COVER INSTALLATION (OPTION)

Accessory Check

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

Description	Q'ty
1. Stepped Screw	2

Installation Procedure

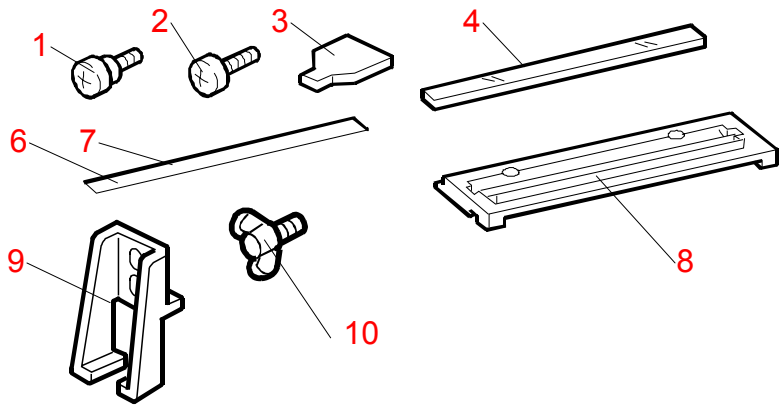


C264I906.WMF

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

1.2.3 ADF INSTALLATION (OPTION)

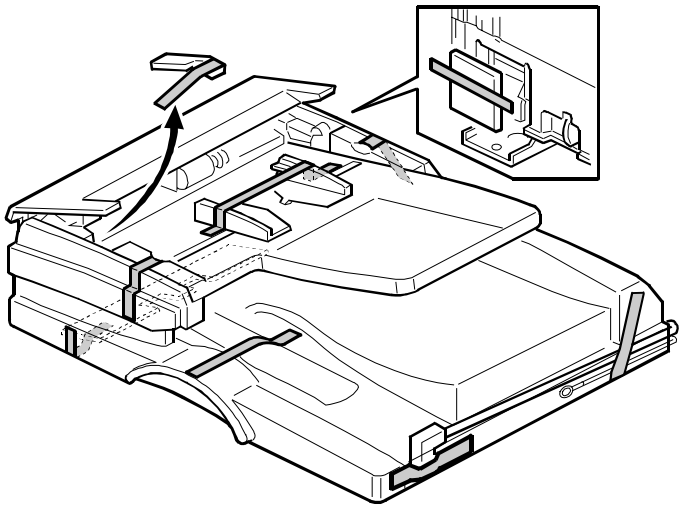
Accessory Check



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

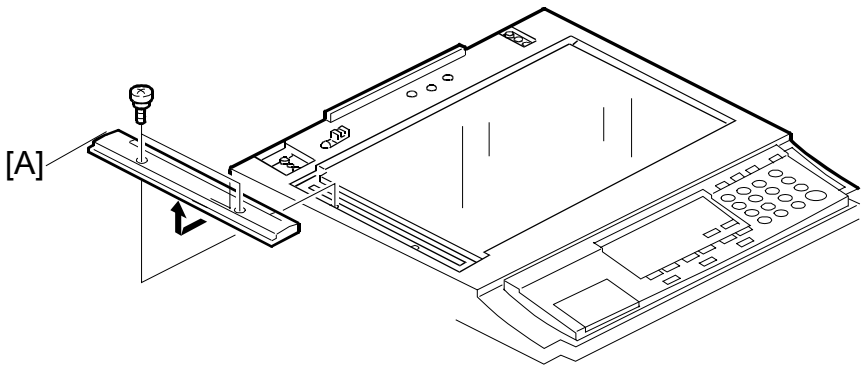
Description	Q'ty
1. Stepped Screw	2
2. Screws	3
3. Screwdriver	1
4. DF Exposure Glass	1
5. Decal - Exposure Glass	1
6. Decal - Scale - mm	1
7. Decal - Scale - inch	1
8. Scale Guide	1
9. Stabilizer Bracket	2
10. Thumbscrew	4
11. Caution Label	1

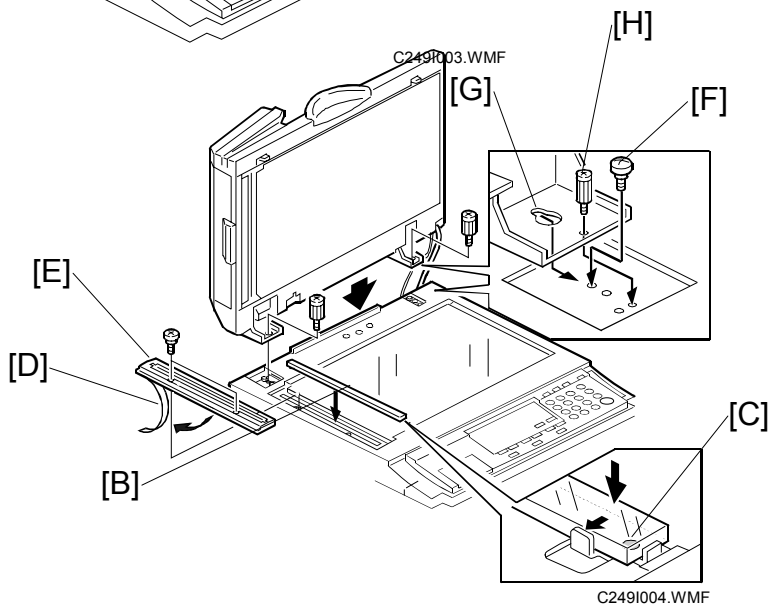
Installation Procedure



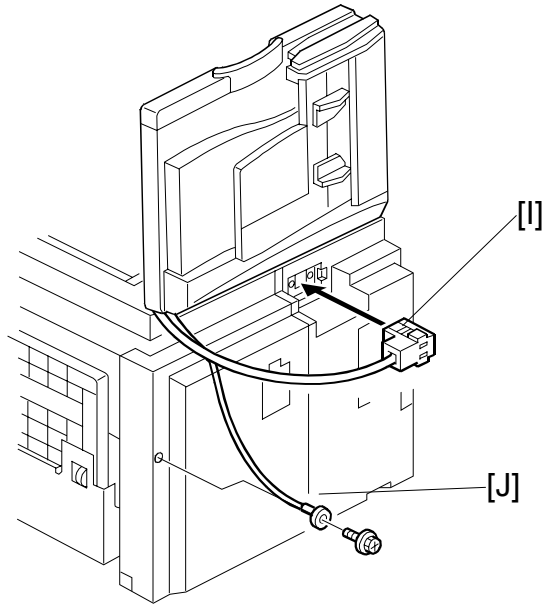
C249I002.WMF

1. Remove the strips of tape.

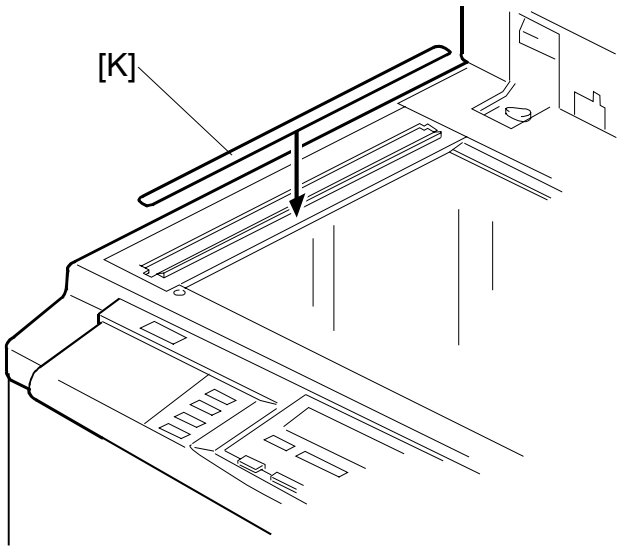




2. Remove the left scale [A] (2 screws).
3. Place the DF exposure glass [B] on the glass holder.
   NOTE: When installing the DF exposure glass, make sure that the white point [C] is positioned at the lower front side, as shown.
4. Peel off the backing [D] of the double-sided tape attached to the rear 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].



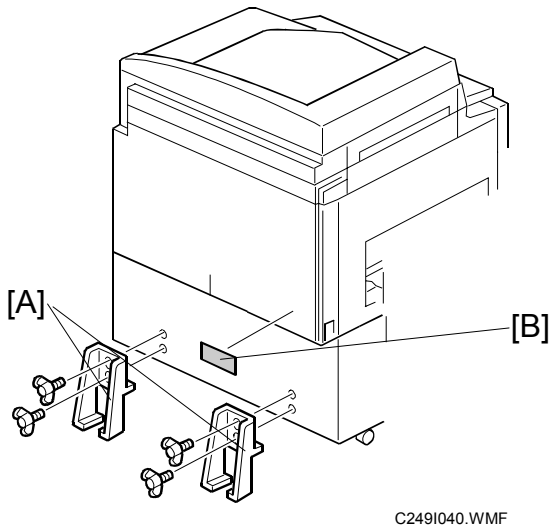
C249I018.WMF



C249I500.WMF

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 DISPENSER TYPE 20 (OPTION)

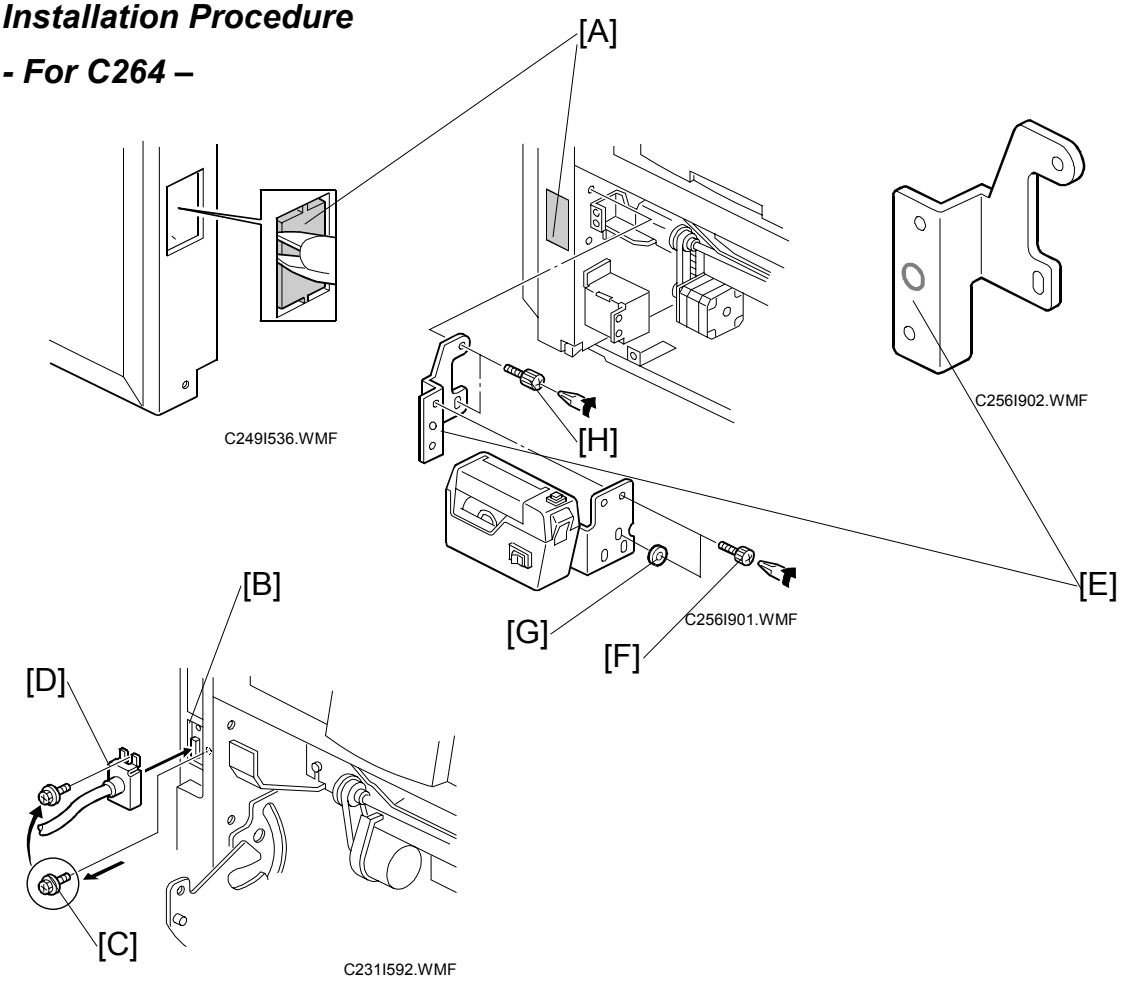
Accessory Check

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

Description	Q'ty
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 only)	1
7. Screw M4 x 8 (For C226, C238, C247, C249, C264 and C267)	4
8. Lock Washer (For C226 only)	1
9. Lock Washer (For all except C267)	1
10. Tape	1

Installation Procedure

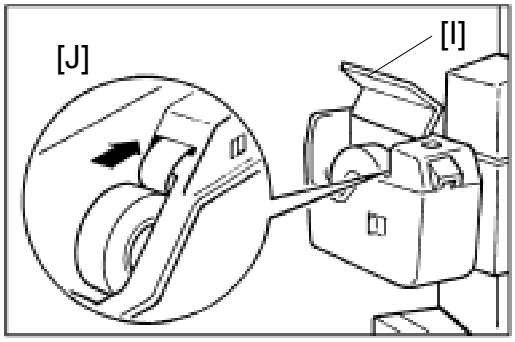
- For C264 –



1. Turn off the main switch and unplug the power cord.
2. Remove the paper delivery plate (4 screws).
3. Cut off the cover [A] in the rear cover, as shown.
4. Connect the harness of 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. Install the auxiliary bracket [E] on the tape dispenser with M4 x 8 screws (accessories) [F].
7. Install the tape dispenser on the main body with two knob screws [H] (accessories) in the two outer holes in the tape dispenser bracket.

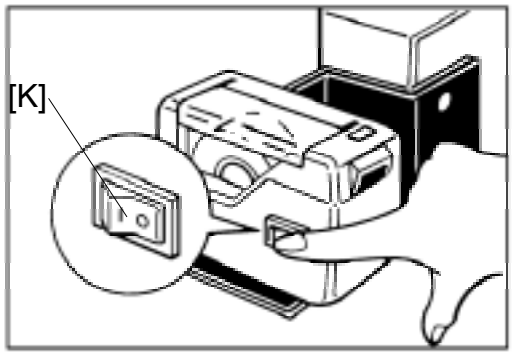
NOTE: Install the lock washer [G] (accessories) with the lower of the two knob screws.
Tighten the knob screws with a screwdriver to prevent them from coming loose.

8. Reinstall the paper delivery plate.



C238I519.WMF

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



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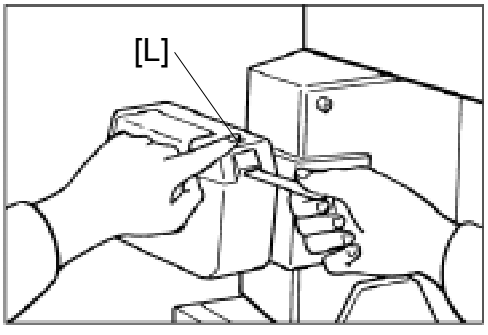
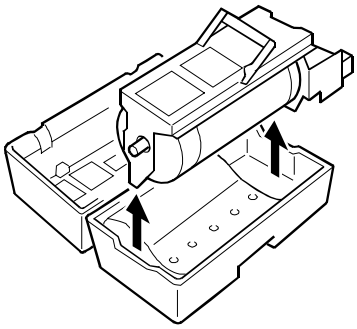
10. Turn on the main switch of the main body.
11. Turn on the tape dispenser switch [K].



C238I521.WMF

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

1.2.5 OPTIONAL DRUMS



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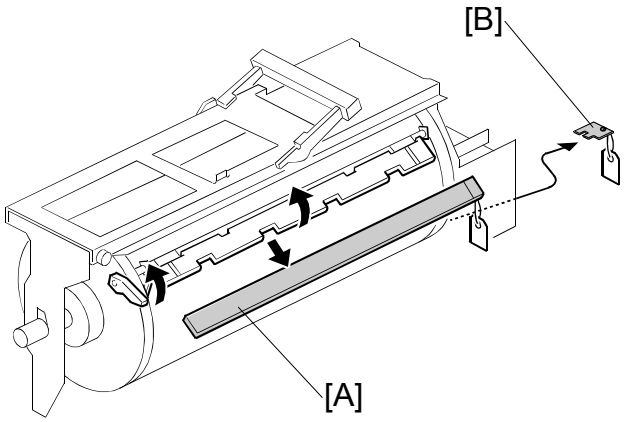


C249I020.WMF

There are two types of optional drum units:

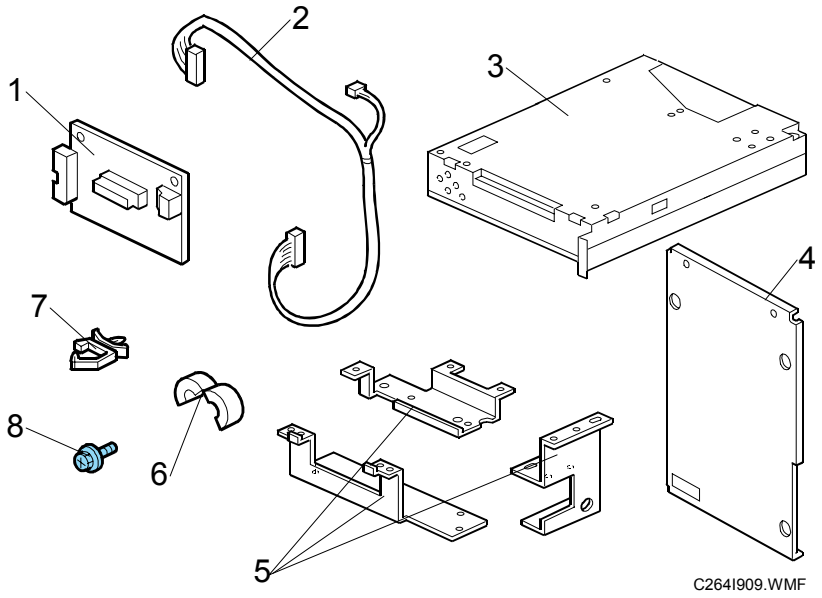
A3 Size: Color drum

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 TYPE 45 (OPTION)

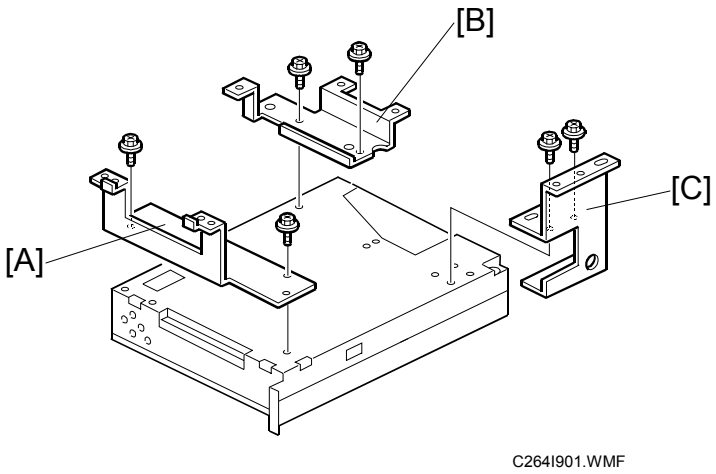
Accessory check



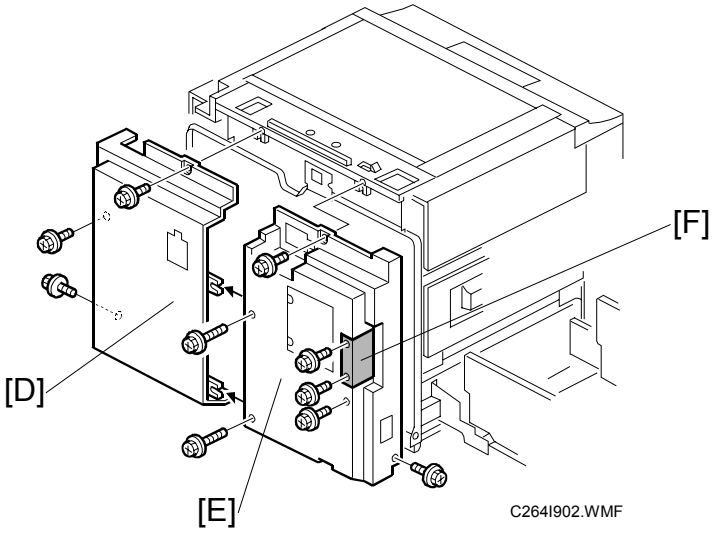
Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Interface Board	1
2. Interface Cable	1
3. Printer Controller Unit Case	1
4. Printer Controller Unit Cover	1
5. Bracket	3
6. Core	1
7. Cable Clamp	2
8. Screw M3 x 6	20

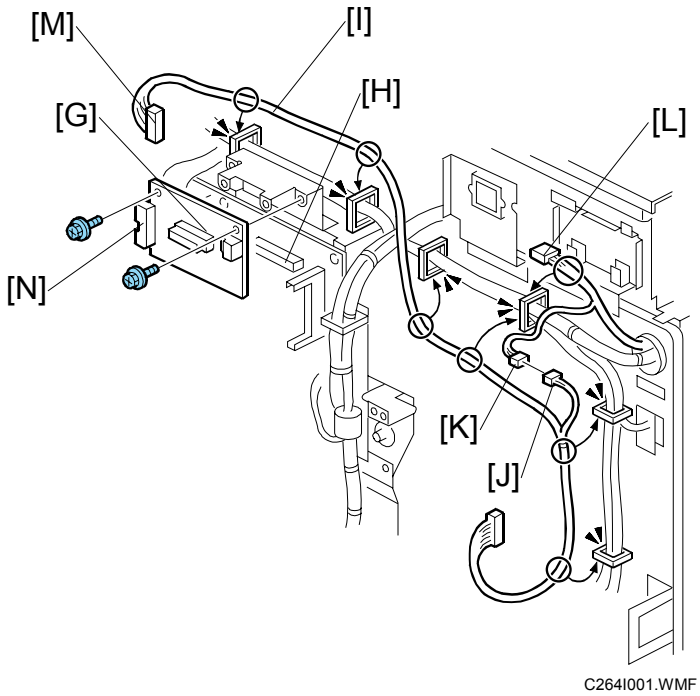
Installation procedure



1. Attach the three brackets [A], [B], [C] (☞ x 6)



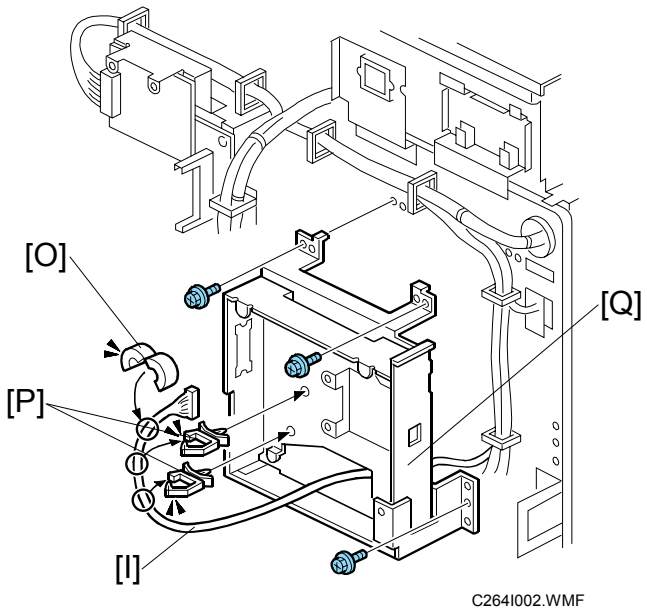
2. Remove the rear covers [D], [E] and I/F connector cover [F] (☞ x 10).



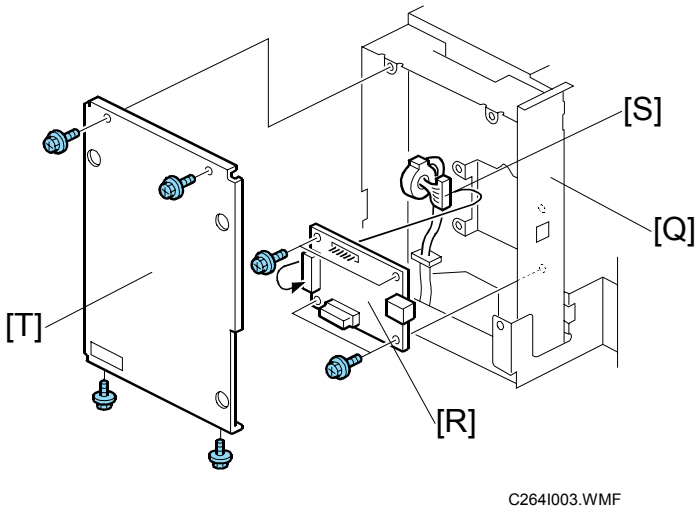
3. Connect CN101 [G] on the interface board to CN117 [H] on the MPU (🔩 x 2).
4. Clamp the interface cable [I] at the positions shown.
5. Connect the short end of the interface cable [J] (4-pin connector) to the main harness [K] (narrow 4-pin connector).
6. Clamp the main harness [L] (wide 4-pin connector) at the positions shown.

Note: This is because the wide 4-pin connector of the main harness is not used.

7. Connect the long end of the interface cable [M] (black connector) to CN102 [N] on the interface board.



8. Attach the core [O] to the interface cable [I].
9. Attach the cable clamp [P] to the printer controller unit case [Q] (x 2).
10. Attach the printer controller unit case [Q] to the machine (x 4).
11. Clamp the interface cable [I].



12. Attach the printer controller board [R] (included with the UC2 controller) to the printer controller unit case [Q] (x 4).
13. Connect the interface cable [S] (white connector) to the printer controller board [R] (included with the UC2 controller).
14. Attach the printer controller unit cover [T] (x 4).

2. PREVENTIVE MAINTENANCE

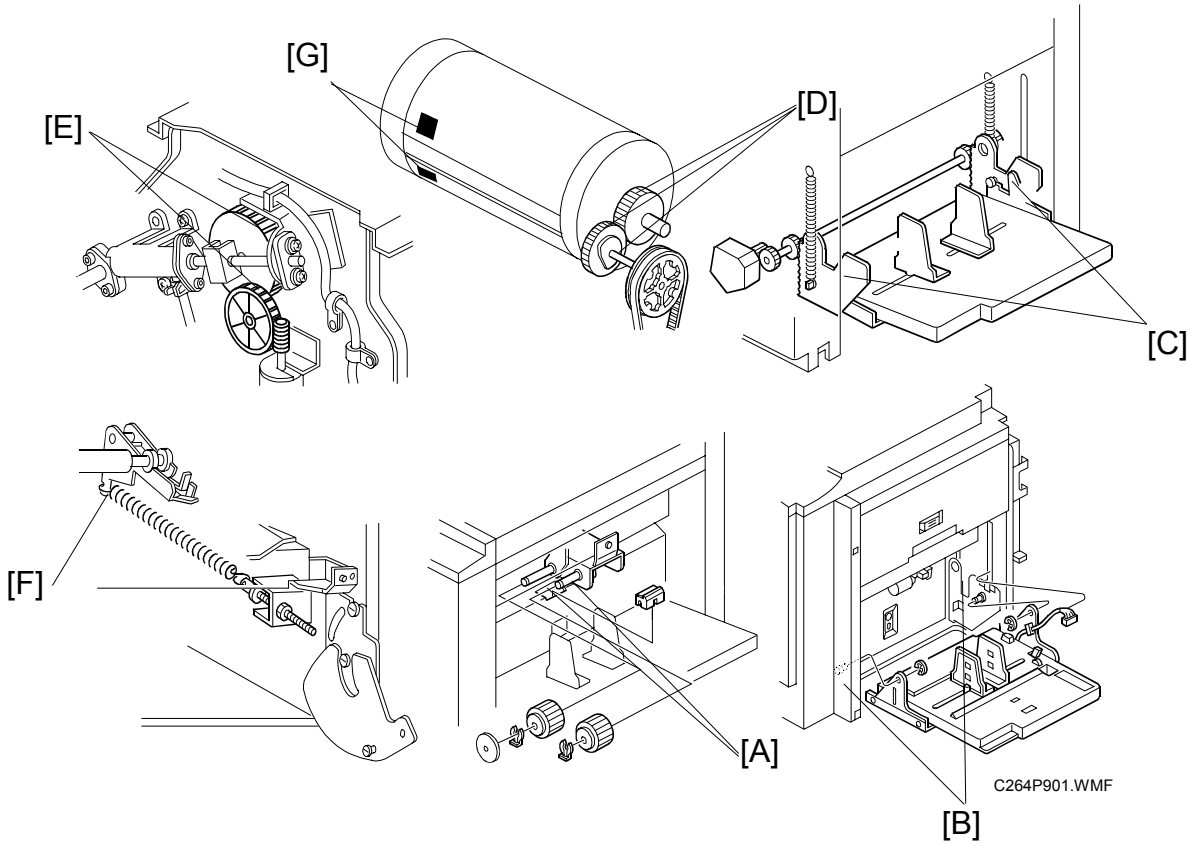
2.1 MAINTENANCE TABLE

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

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		☛ 3.8.6
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
Black Patch [G]	C	C	C	C							Dry Cloth
Others											
Main Drive Timing Belt Tension			A								☛ 3.8.11
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



3. REPLACEMENT AND ADJUSTMENT

3.1 GENERAL CAUTION

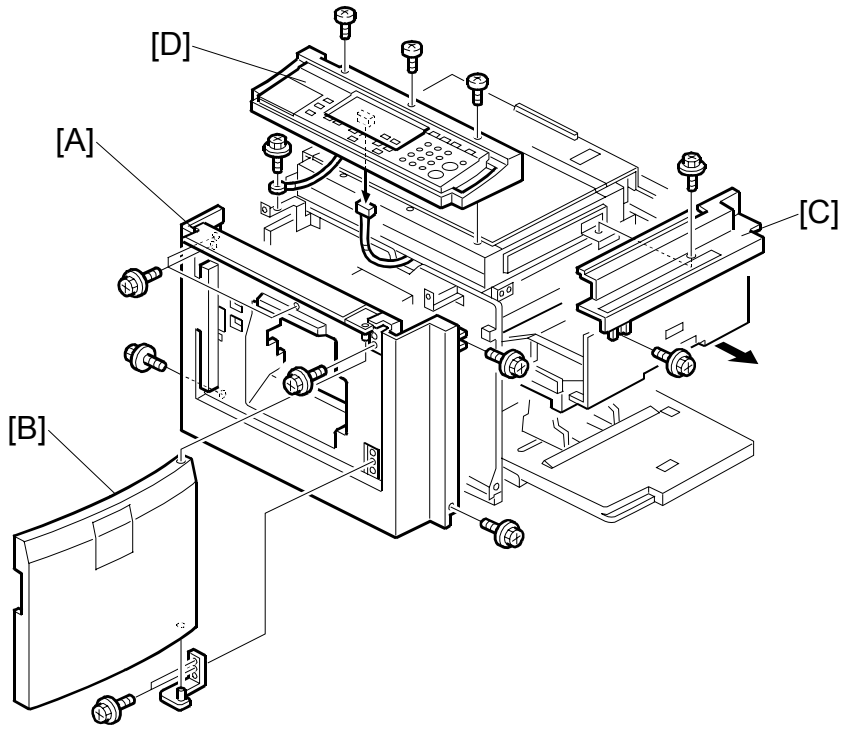
⚠CAUTION

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

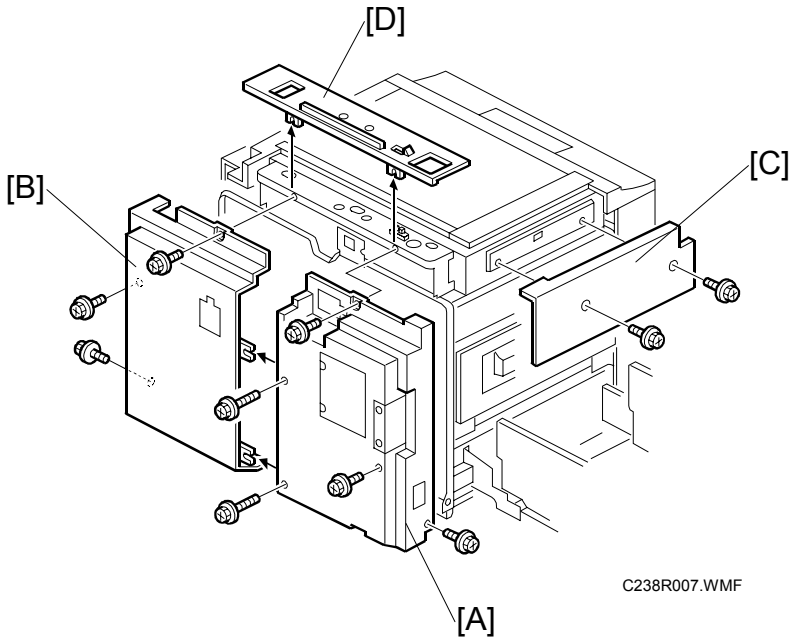
3.2.1 FRONT COVER / PANEL



C264R001.WMF

[A]: Front cover (🔩 x 7)
[B]: Front door (🔩 x 4)
[C]: Upper right cover (🔩 x 2)
[D]: Operation panel (🔩 x 4, 🔌 x 1)

3.2.2 REAR COVERS



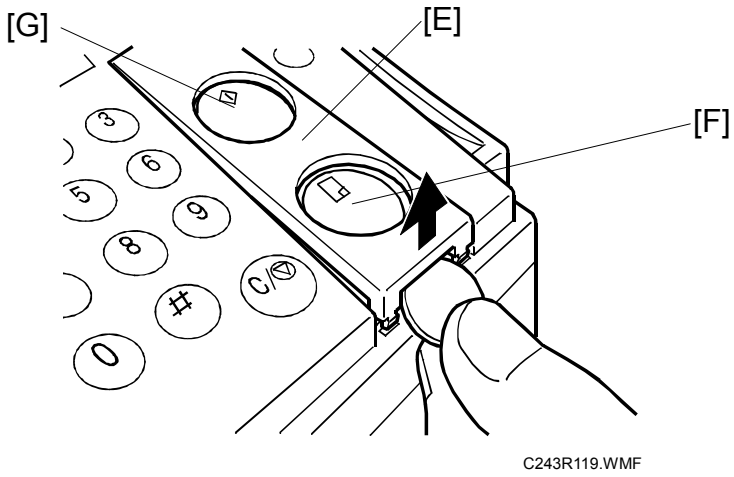
[A]: Rear left cover (🔩 x 5)

[B]: Rear right cover (🔩 x 3)

[C]: Upper left cover (🔩 x 2)

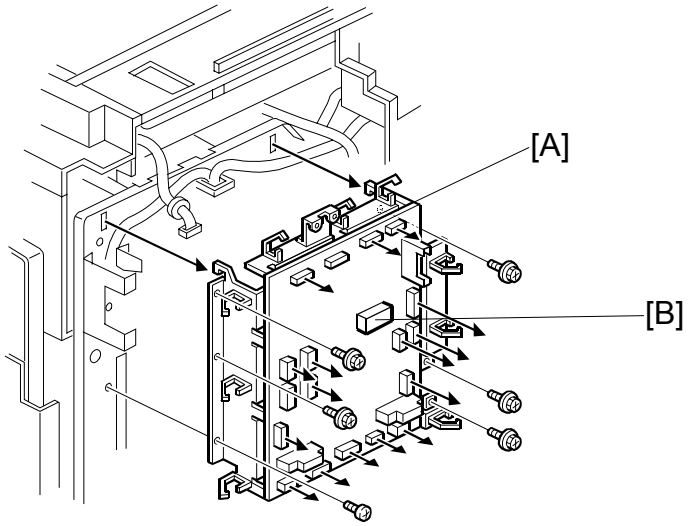
[D]: Rear upper cover

3.2.3 PRINT KEY / MASTER MAKING KEY



[E]: Key Cover
[F]: Print start key
[G]: Master making key

3.2.4 MPU



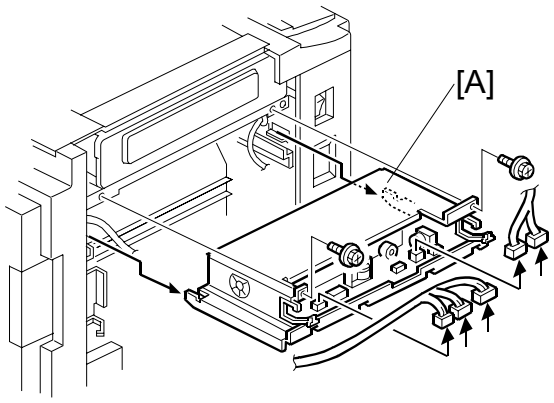
C238R008.WMF

- 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, duct jam sensor, master edge sensor, and 2nd drum master sensor (☛ 3.5.6 to 3.5.9) after installing the new MPU.
If you install a new RAM, you must do the image adjustments (☛ 3.3.6).

3.2.5 PSU



C238R009.WMF

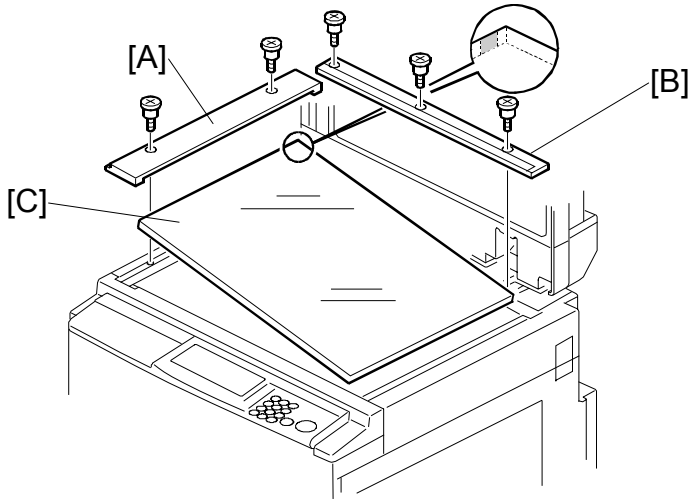
- Upper left cover (☛ 3.2.2)
- Master eject unit (☛ 3.4.1)

[A]: PSU (🖐 x 5, 🪛 x 2, 2 clamps)

When the PSU is replaced, the thermal head voltage returns to the default. Adjust the thermal head voltage (☛ 3.5.10) after installing the new board.

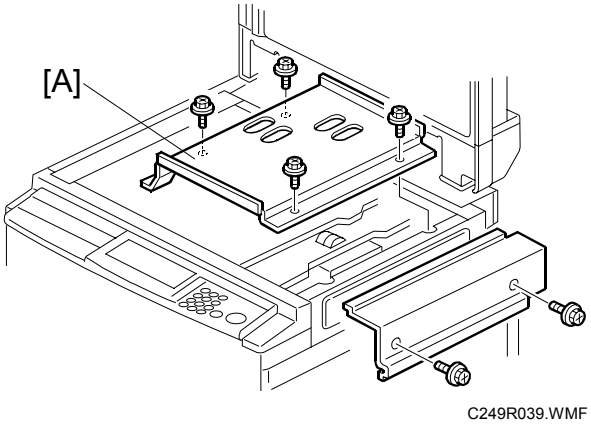
3.3 SCANNER

3.3.1 EXPOSURE GLASS / SCALES



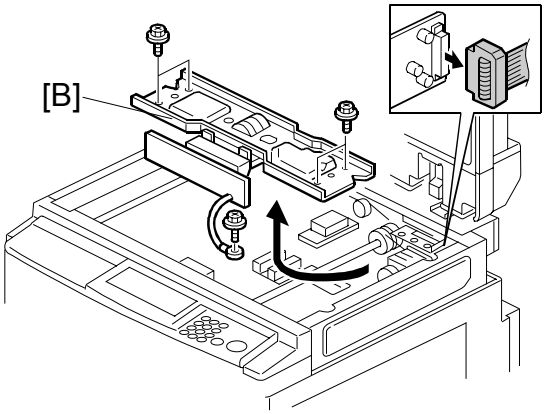
[A]: Left scale (☞ x 2)
[B]: Upper scale (☞ x 3)
[C]: Exposure glass

3.3.2 SBU AND LAMP STABILIZER / SCANNER MOTOR



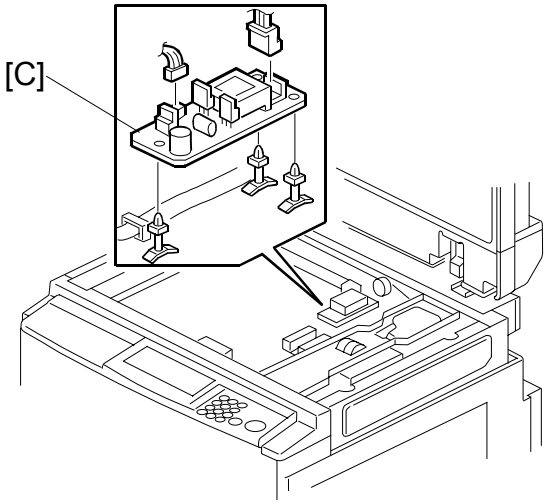
- Left scale, Upper scale, Exposure glass (☛ 3.3.1)
- Upper right cover (☛ 3.2.2)

[A]: SBU cover (☞ x 4)



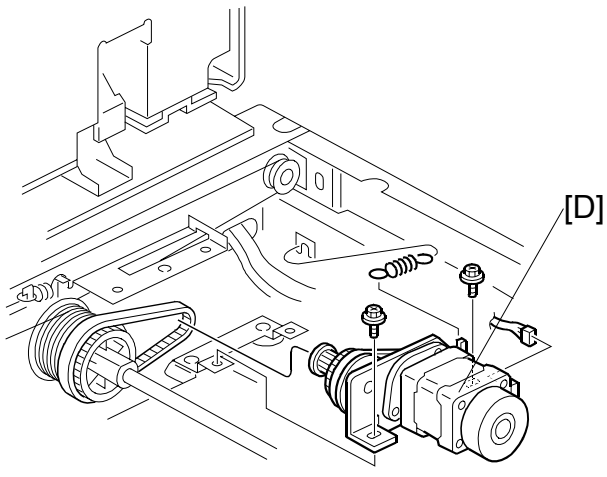
C238R040.WMF

[B]: SBU (✋ x 1, 🔩 x 5)



C238R041.WMF

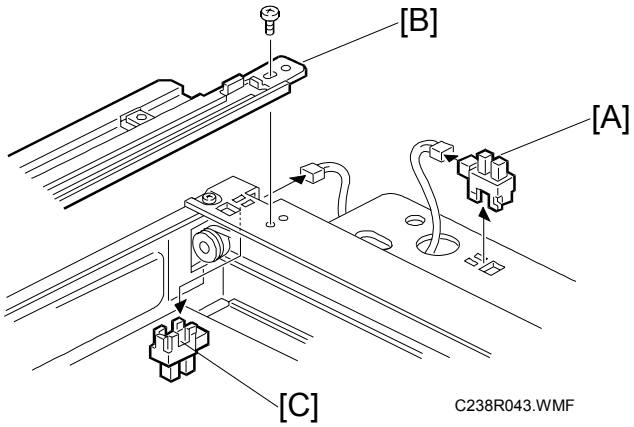
[C]: Lamp stabilizer (✋ x 2, 🔩 x 5)



C238R042.WMF

[D]: Scanner motor (🔩 x 2, 1 spring)

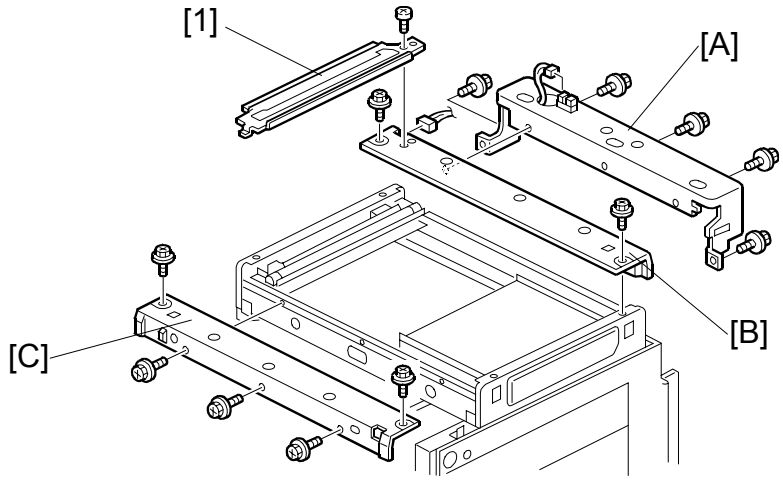
3.3.3 SCANNER H.P. SENSOR / PLATEN COVER SENSOR



- 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)

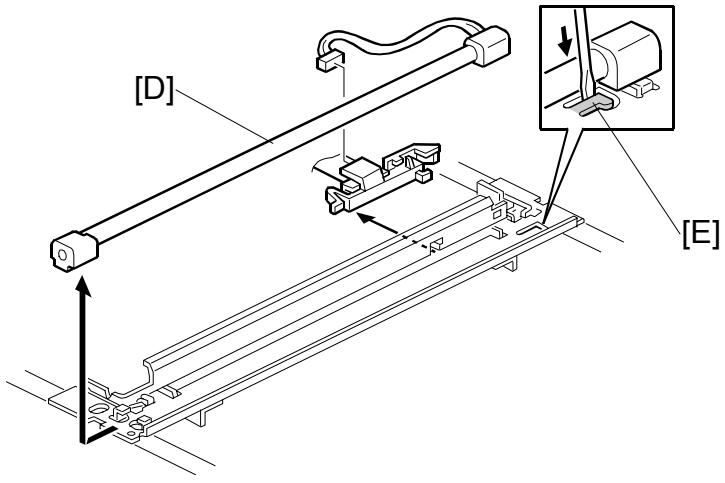
3.3.4 EXPOSURE LAMP (XENON LAMP)



C238R044.WMF

- 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)



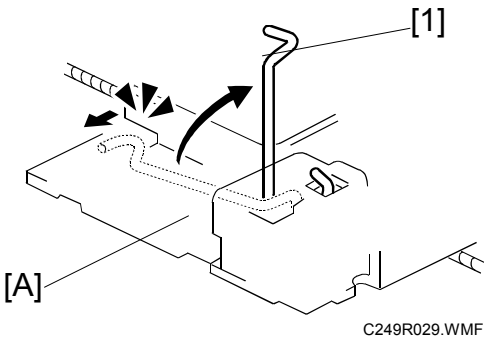
C238R045.WMF

[D]: Exposure lamp (x 1)

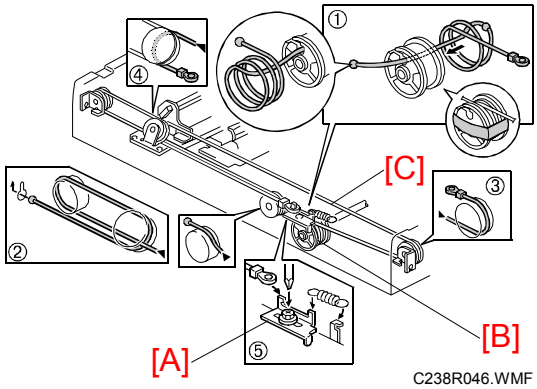
After installing the lamp, press the lamp holder [E] up to the original position so that it can hold the lamp properly.

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)



C249R029.WMF



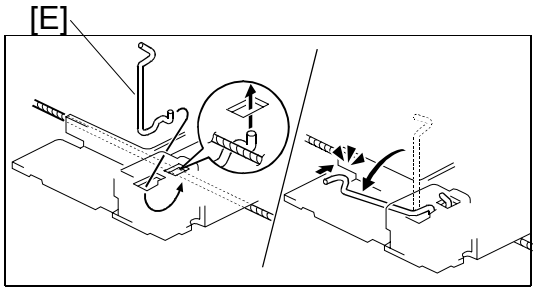
C238R046.WMF

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

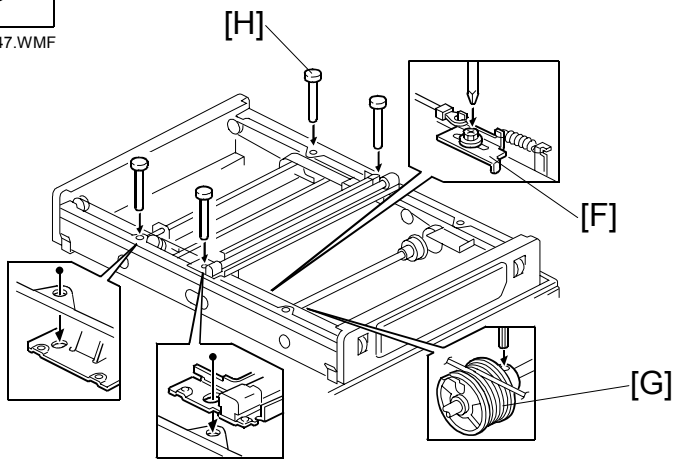
[A]: Wire tension brackets (2 springs, 🔩 x 2)
[B]: Scanner drive pulleys (2 Allen screws)
[C]: Scanner wires

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 below.
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 in the illustration above (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.



C249R047.WMF



C238R048.WMF

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 [H] (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

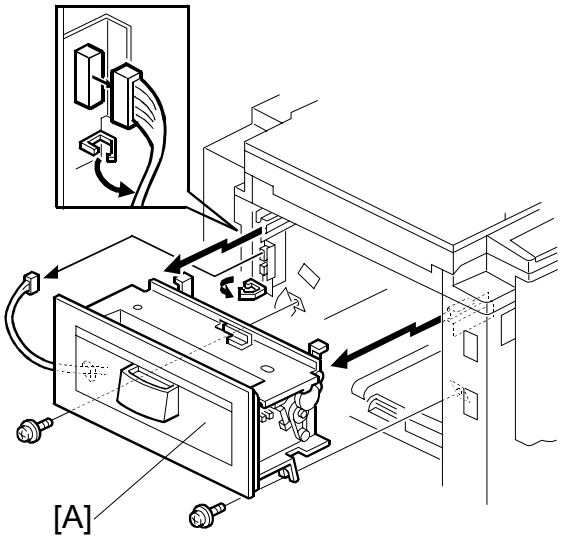
Purpose: To adjust the image position on prints by changing the SP settings.

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

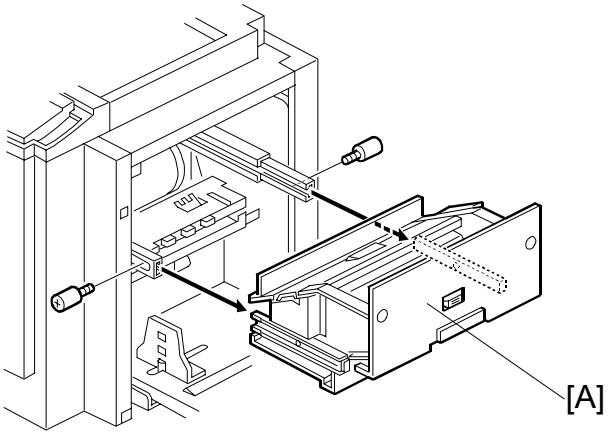


C249R001.WMF

[A]: Master eject unit (x 1, x 2, 1 clamp)

3.5 MASTER FEED

3.5.1 MASTER MAKING UNIT



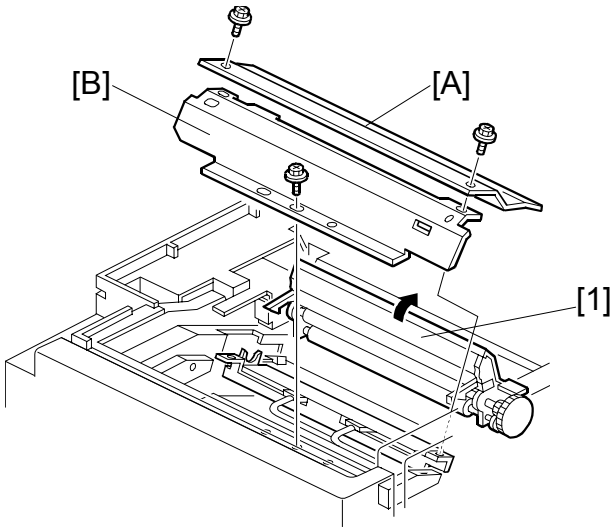
C249R121.WMF

[A]: Master making unit (☞ x 2)

3.5.2 THERMAL HEAD

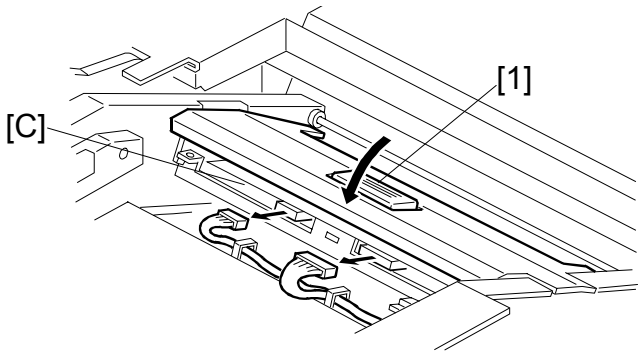
1. Connect the power plug. Then turn on the main switch to access SP mode.
2. Select SP5-74 (T/H driving motor - up), then press the enter (#) key and turn off the main switch.

NOTE: 1) The thermal head is released after about 2 seconds. (There is almost no sound of operation.)
2) The thermal head does not separate, unless it releases as mentioned above.



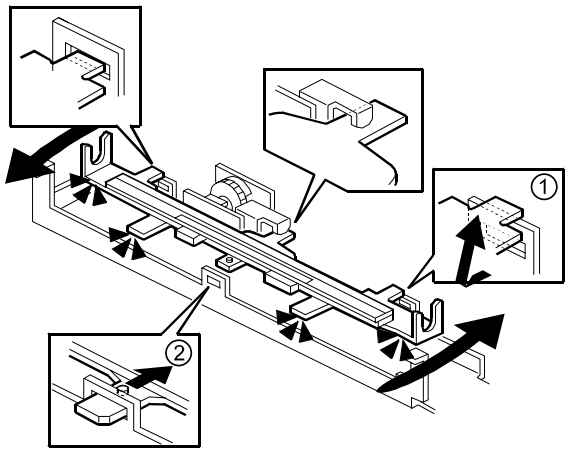
C249R049.WMF

3. Remove the master making unit (☛ 3.4.1)
4. Open the platen roller unit [1].
5. Remove the following:
[A]: T/H upper cover (☞ x 2)
[B]: T/H side cover (☞ x 1)



C249R122.WMF

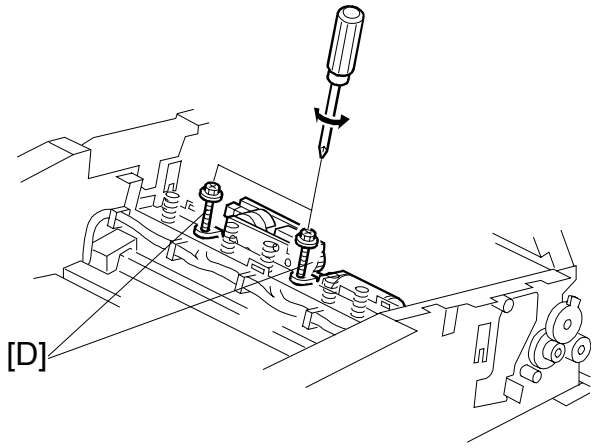
6. Close the platen roller unit [1].
7. Remove:
[C]: Thermal head (☞ x 2)



C249R116.WMF

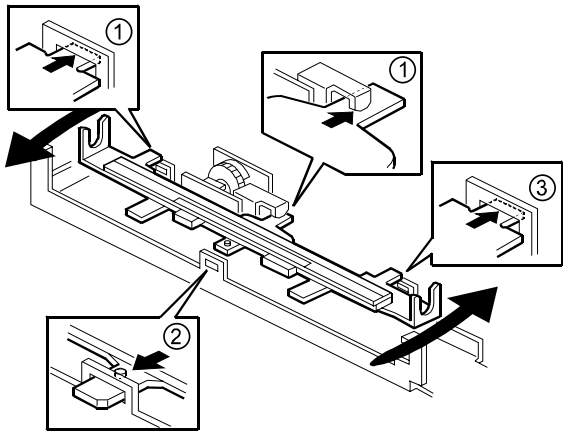
8. Turn the thermal head clockwise and remove a tab (①).
9. Turn the thermal head counterclockwise, and remove a tab (②).
10. Remove the thermal head slowly.

NOTE: If you cannot access SP modes, open the master making unit and loosen the 2 screws [D].

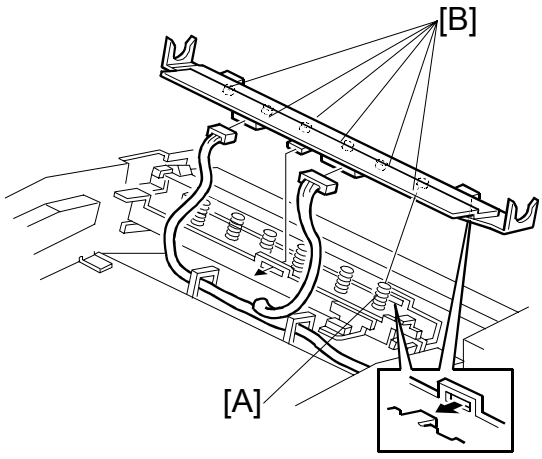


C249R110.WMF

Installation



C249R117.WMF



C249R030.WMF

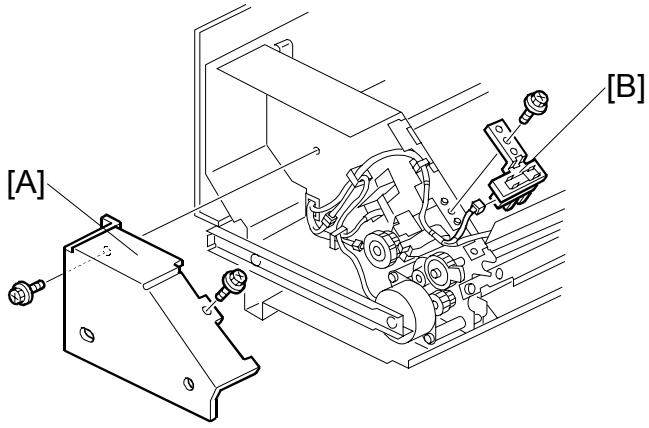
1. Insert the tabs (①) at the operation side and the middle.
2. Turn the thermal head counterclockwise and insert the tab (②) at the front.
3. Turn the thermal head clockwise and insert the tab (③) at the non-operation side.

Make sure to follow the above procedure or the thermal head will not be installed correctly.

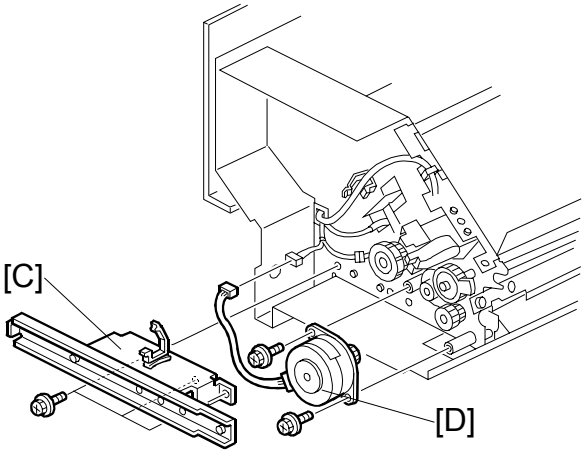
1) Fit the base's springs [A] over the protrusions [B] on the underside of the thermal head (6 points).
2) While fitting the tops of the springs [A] over the protrusions on the underside of the thermal head, make sure that all protrusions are properly fitted into the springs.

CAUTION: Adjust the thermal head voltage (☛ 3.5.10) after installing the new thermal head.

3.5.3 DUCT PLATE HP SENSOR / DUCT PLATE MOTOR



C249R101.WMF

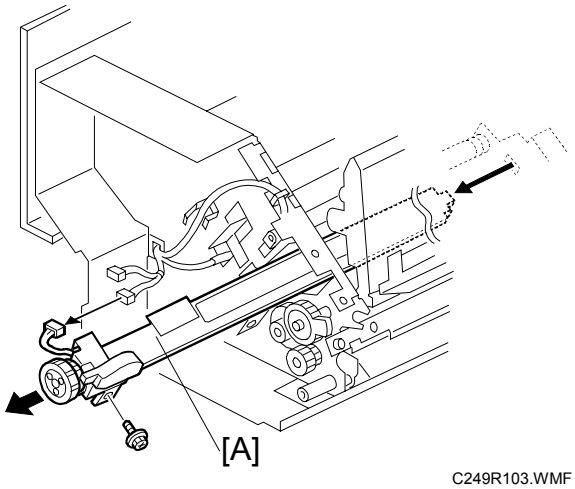


C249R102.WMF

- Master making unit (☛ 3.4.1)

[A]: Rear cover (🔩 x 2)
[B]: Duct plate HP sensor (🤚 x 1, 🔩 x 1)
[C]: Rear rail bracket (🔩 x 2)
[D]: Duct plate motor (🤚 x 1, 🔩 x 2)

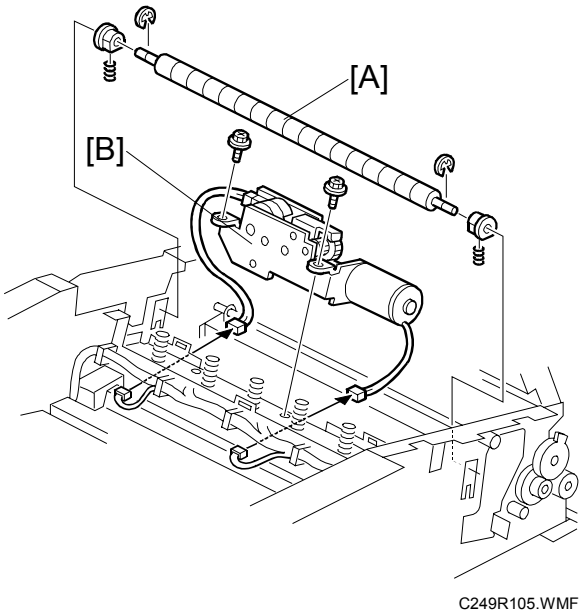
3.5.4 CUTTER UNIT



C249R103.WMF

[A]: Cutter unit (✋ x 1, 🔩 x 1)

3.5.5 THERMAL HEAD DRIVING UNIT



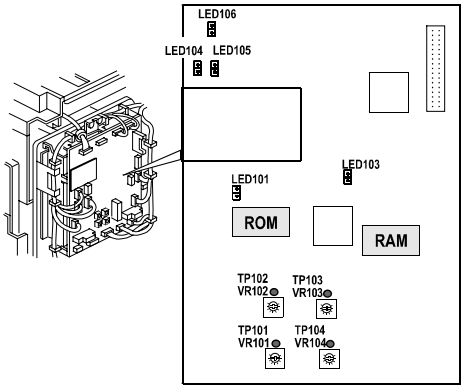
C249R105.WMF

- Thermal head (☛ 3.5.2)
- Rear cover (☛ 3.2.2)
- Cutter unit (☛ 3.5.4)

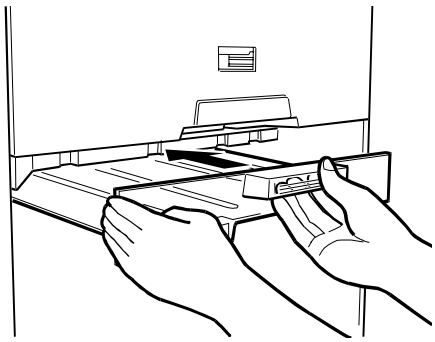
[A]: Anti-static roller (ℂ x 2)
[B]: Thermal head driving unit (✋ x 2, 🔩 x 2)

3.5.6 DUCT JAM SENSOR ADJUSTMENT

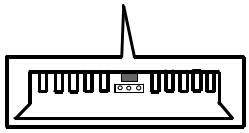
Ensures that the sensor detects when a master remains in the duct.



C249R124.WMF



C249R123.WMF



C249R113.WMF

Standard: 0.5 volts (within “+0.1” and “-0.1”volts)

Tools: Circuit tester

- Rear cover (☛ 3.2.2)

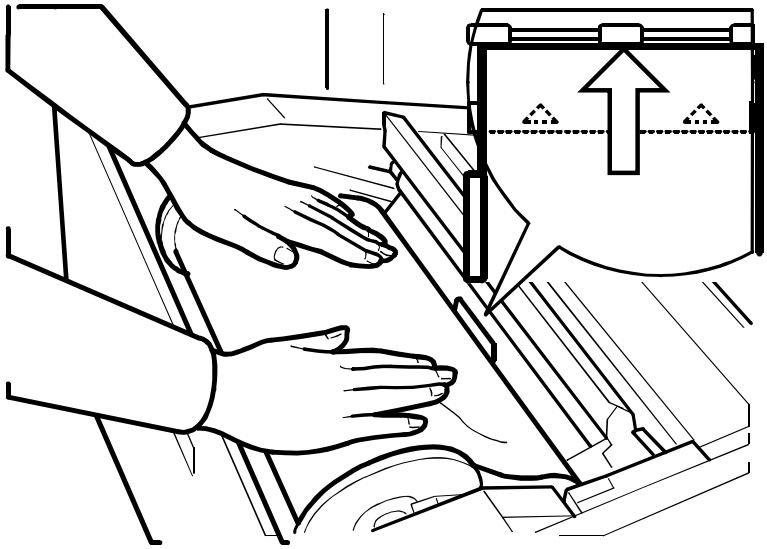
1. Check if a master remains in the duct. If a master remains in the duct, remove the master from the duct.
2. Connect the terminals of a circuit tester to TP102 and a grounded place (e.g. iron base)
3. Connect the power plug, and turn on the main switch to access SP mode.
4. Select SP6-52 (Duct jam sensor voltage).
5. Press the Print Start key.
6. Measure the voltage with the circuit tester, and turn VR102 until the value becomes between “-0.1” and “+0.1” volts from the standard value (0.5 volts)

NOTE: When the voltage cannot be adjusted to the standard value, adjust the threshold level of the duct jam sensor. (SP6-52: Duct jam sensor voltage)

Standard Value Master present	Threshold level (SP6-52)	Standard Value Master not present
Above 2.0V	2.0V	0.5 ±0.1V

3.5.7 MASTER EDGE SENSOR ADJUSTMENT

Ensures that the sensor detects the leading edge of the master.



C249R133.WMF

Standard: 2.0 volts (within “+0.1” and “-0.1”volts)

Tools: Circuit tester

- Rear cover (☛ 3.2.2)

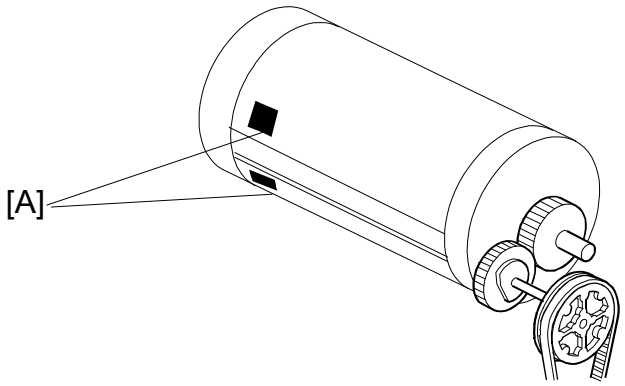
1. Connect the terminals of a circuit tester to TP103 and a grounded place (e.g. iron base)
2. Connect the power plug, and turn on the main switch to access SP mode.
3. Select SP6-51 (Master edge sensor voltage).
4. Remove the lower master tray.
5. Pull out the master-making unit from the machine and open the master set cover.
6. Insert the leading edge of the master under the master tension roller, then close the master set cover and reinstall the master-making unit in the machine.
7. Measure the voltage with the circuit tester, and turn VR103 until the value becomes between “-0.1” and “+0.1” volts from the standard value (2.0 volts).

NOTE: When the voltage cannot be adjusted to the standard value, adjust the threshold level of the master edge sensor. (SP6-51: Master edge sensor voltage)

Standard Value Master present	Threshold level (SP6-51)	Standard Value Master not present
2.0 ±0.1V	2.8V	Above 3.3V

3.5.8 2ND DRUM MASTER SENSOR ADJUSTMENT

Ensures that the sensor detects if there is a master on the drum.



C249R126.WMF

Standard: 2.0 volts (within "+0.1" and "-0.1"volts)

Tools: Circuit tester

- Rear cover (☛ 3.2.2)

1. Check that there is a master wrapped on the drum.
2. Connect the terminals of a circuit tester to TP104 and a grounded place (e.g. iron base)
3. Connect the power plug, and turn on the main switch to access SP mode.
4. Select SP6-53 (2nd drum master sensor voltage) and press the master-making key.
5. Measure the voltage with the circuit tester, and turn VR104 until the value becomes between "-0.1" and "+0.1" volts from the standard value (2.0 volts).
6. Turn off the main switch, then remove the master that is wrapped around the drum and install the drum in the main body.
7. Turn on the main switch to access SP mode.
8. Select SP6-53 (2nd drum master sensor voltage) and press the master-making key.
9. Check if the value of the voltage becomes below 0.8 volts.
10. If the voltage is not correct, clean the black patch [A] on the screen.

NOTE: When the voltage cannot be adjusted to the standard value, adjust the threshold level of the 2nd drum master sensor. (SP6-53: 2nd drum master sensor voltage)

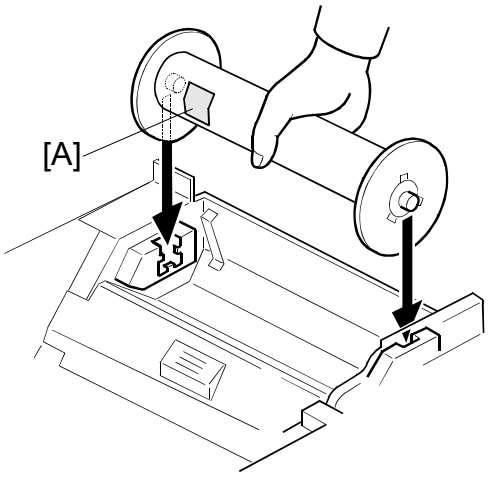
Standard Value Master present	Threshold level (SP6-53)	Standard Value Master not present
2.0 ±0.1V	1.0V	Below 0.8V

3.5.9 MASTER END SENSOR ADJUSTMENT

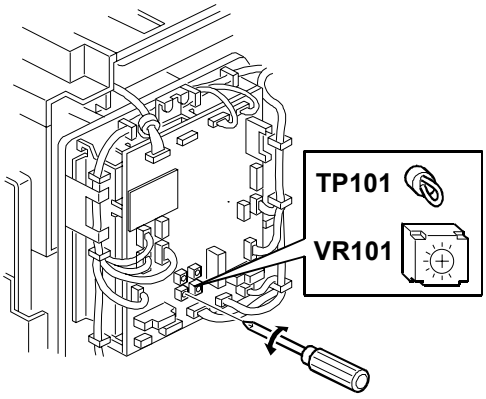
Ensures that the sensor detects the end mark (a solid black area) on the master roll.

Standard: 1.8 volts (within “+0.1” and “-0.1” volts)

Tools: Circuit tester, the core of a used master roll (the core has no master)



C249R114.WMF



C249R118.WMF

- Rear cover (☛ 3.2.2)

1. Connect the terminals of a circuit tester to TP101 and to a grounded place (e.g. iron base).
2. Put a piece of master [A] on the used master roll.
3. Place the core of the used master roll inside the master-making unit, and close the master-making unit.
   NOTE: Insert the core so that the piece of master [A] faces towards the master end sensor.
4. Connect the power plug, and turn on the main switch.
5. Measure the voltage with the circuit tester, and turn VR101 until the value becomes between “-0.1” and “+0.1” volts from the standard value (1.8 volts).

NOTE: Please refer to the following table for the standard voltages.
If the voltage cannot be adjusted to the standard value, do not change the threshold level using SP6-50.

When set a new roll (master present)	Standard value Master end (4 layers of master on the core)	End mark only
Above 3.0V	Below 2.0V	Below 0.8V

3.5.10 THERMAL HEAD VOLTAGE ADJUSTMENT

⚠CAUTION
This adjustment is always required when the thermal head or PSU has been replaced.

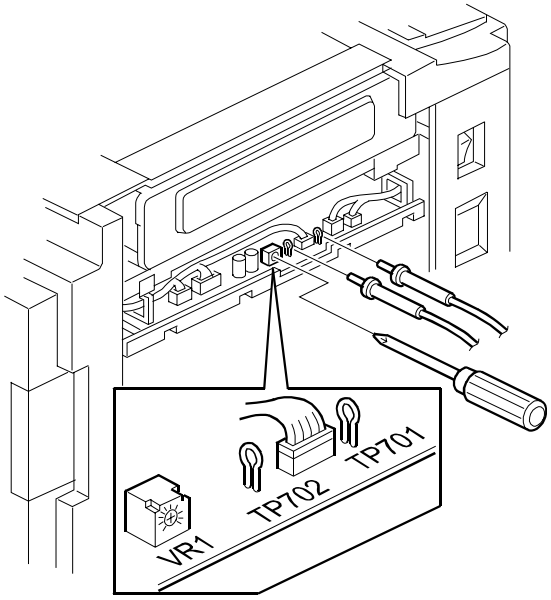
Purpose: To maintain master making quality and extend the lifetime of the thermal head.

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.

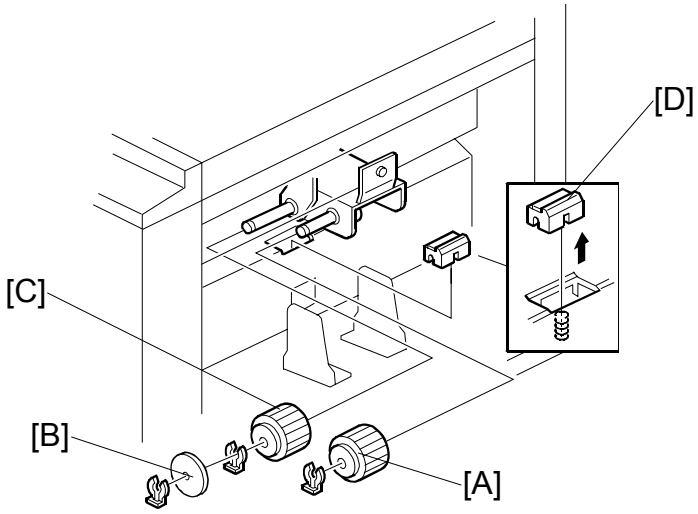


C238R012.WMF

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 (VHD: 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.

3.6 PAPER FEED

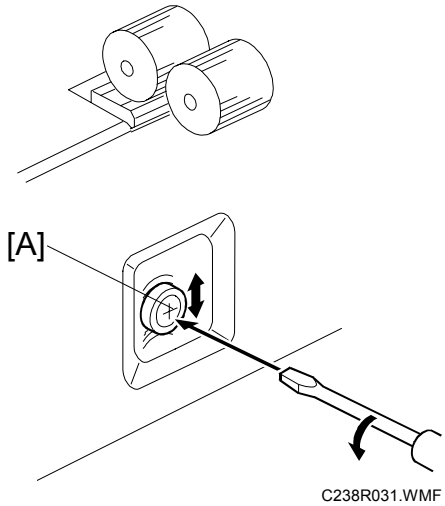
3.6.1 PICK-UP ROLLER / PAPER FEED ROLLER / FRICTION PAD



- Lower the paper table.

[A]: Pick-up roller (x 1)
[B]: Paper guide (x 1)
[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.

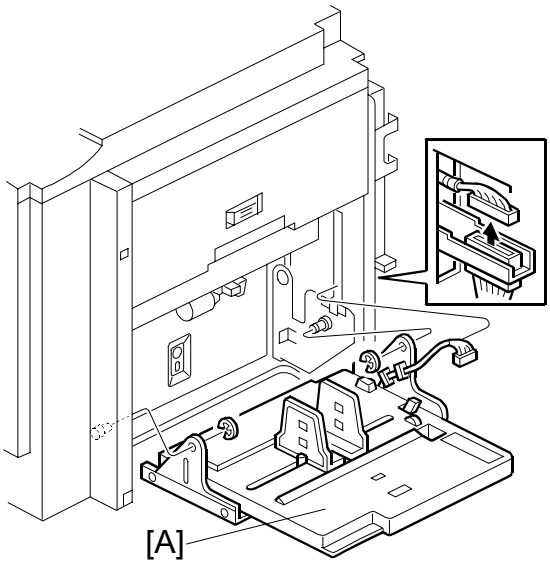
Default: The next position to the top.

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

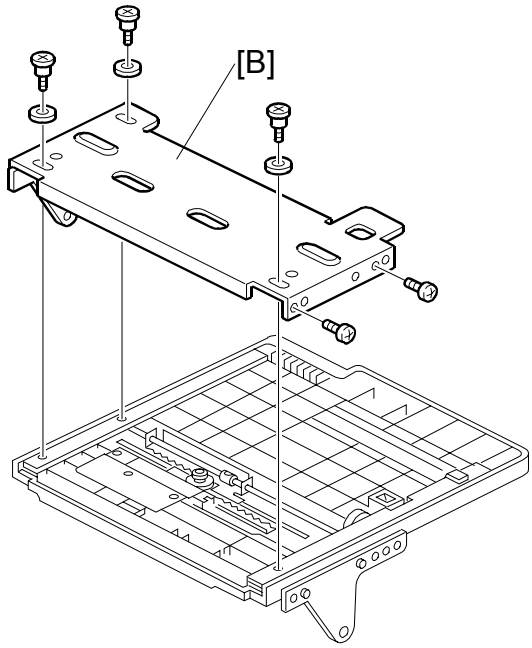
- Moving up the screw ⇒ Increases the paper separation pressure
- Moving down the screw ⇒ Decreases the paper separation pressure

Tighten the screw after the adjustment

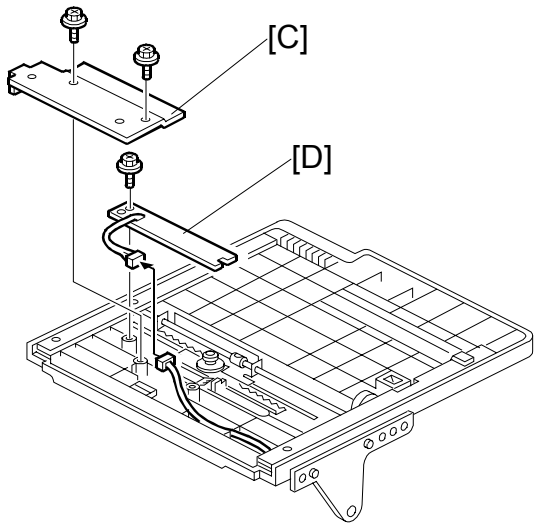
3.6.3 PAPER WIDTH DETECTION BOARD



C238R018.WMF



C249R019.WMF



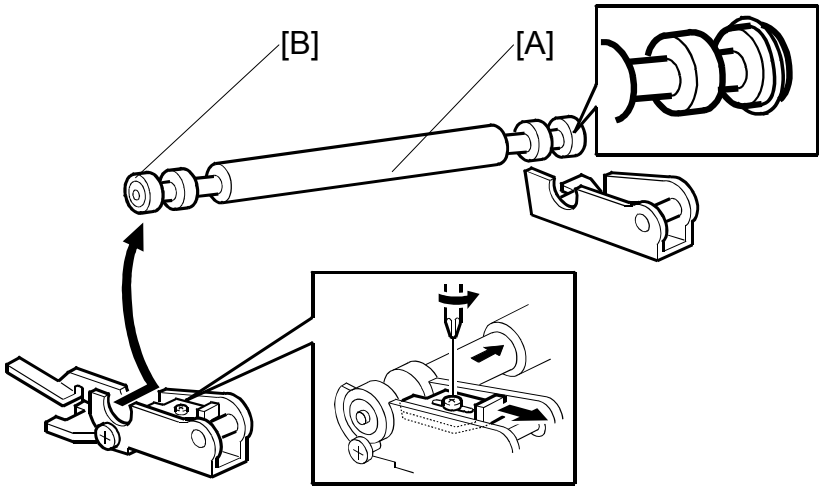
C238R020.WMF

- 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



C238R037.WMF

⚠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)

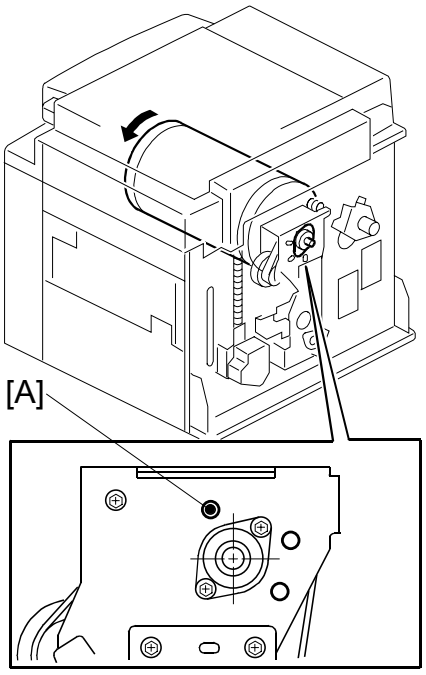
The bearings on the rear and front differ. During installation, ensure that the bearing with the stopper [B] is positioned towards the rear of the machine.

3.7.2 PRESS ROLLER RELEASE LEVER ADJUSTMENT

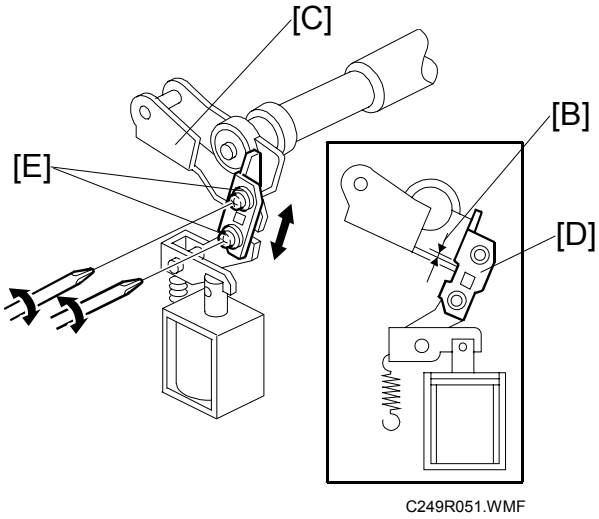
Purpose: To maintain the correct clearance between the press roller arms and press roller lock levers. This ensures that the press roller is correctly released and pressed against the drum when the press roller release solenoid is energized.

Standard: 0.7 to 1.2 mm

Tools: A thickness gauge



C238R001.WMF



C249R051.WMF

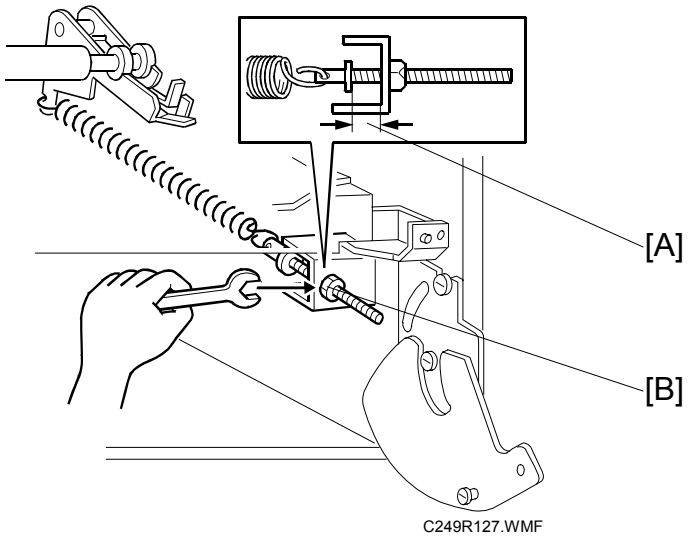
- Front cover (☛ 3.2.1)
- Rear covers (☛ 3.2.2)

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

Improves print results without decreasing the run length.

Standard: Within 17 ± 0.2 mm



- Paper delivery unit (☛ 3.9.1)

1. Adjust the distance [A] to 17 ± 0.2 mm by turning the adjusting bolt [B].
2. Repeat the same procedure for the printing pressure spring at the non-operation side.

NOTE: This is the adjustment for the standard printing pressure.
If print density is incorrect, you can also adjust printing pressure with SP 2-35 or SP 6-70 to 6-87 (☛ 5.3.7).

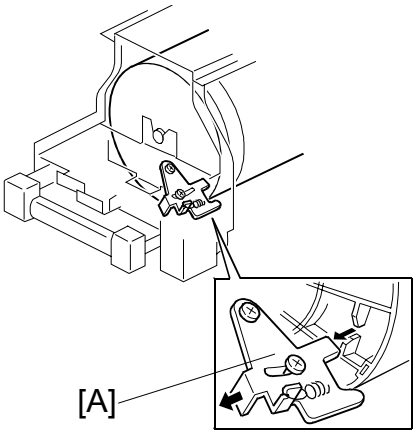
3.8 DRUM

3.8.1 PREPARATION

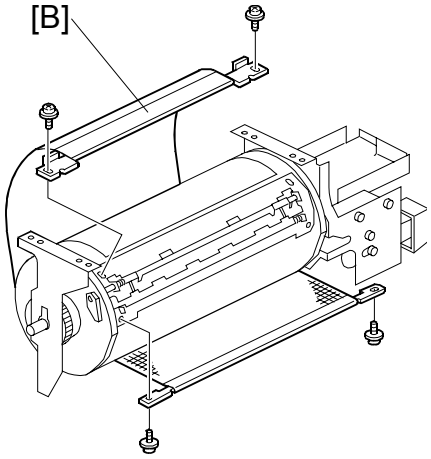
Before attempting any of the procedures in this section, wipe off the ink around the ink roller. To do this, set SP2-10 (ink detection) to OFF, and feed paper until ink ends.

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



C238R053.WMF

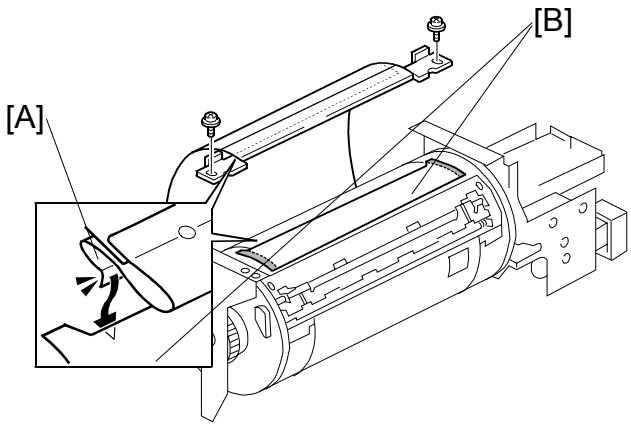


C238R054.WMF

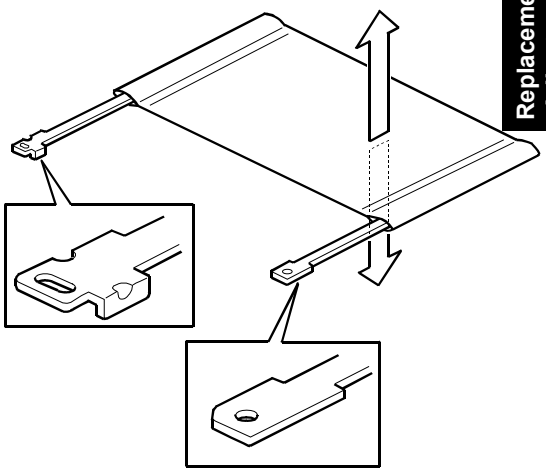
- Remove the drum

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).

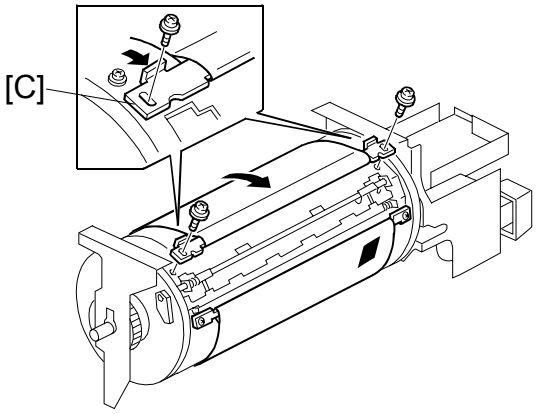
Installation



C264R904.WMF



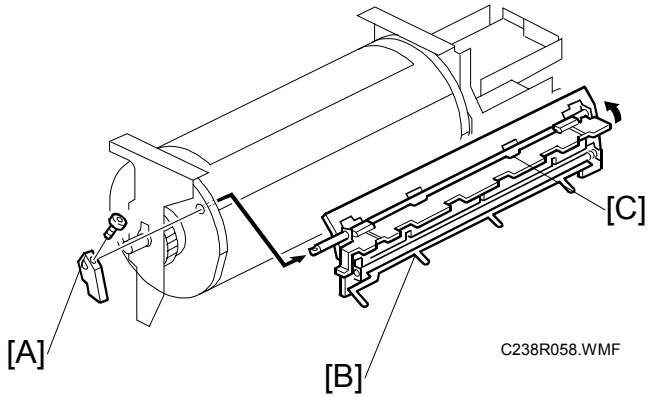
C238R055.WMF



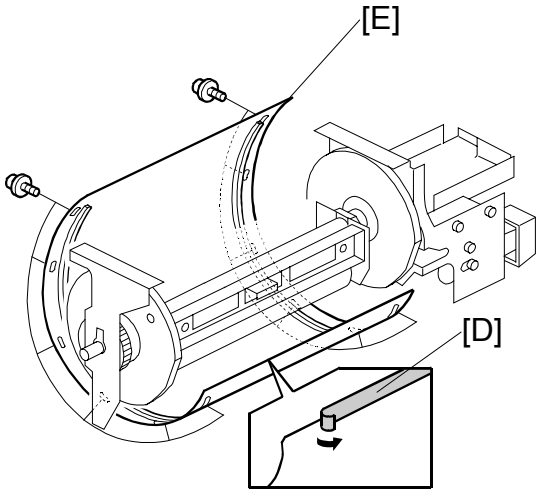
C238R057.WMF

- Do not scratch the cloth screen or metal screen.
- Properly insert the edge of the belt cloth [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



C238R058.WMF



C238R002.WMF

- Remove the drum

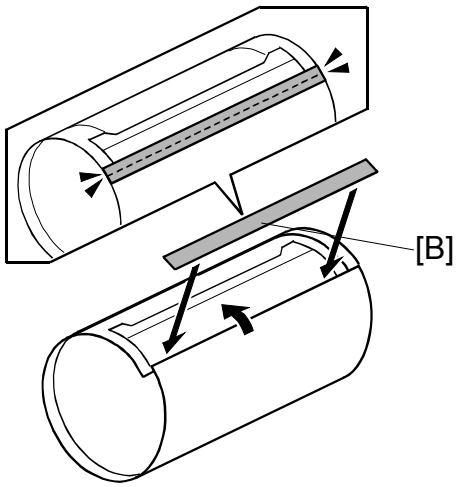
Cloth screen (☛ 3.8.2)

[A]: Clamper lever (1 hexagon screw)
[B]: Clamper - open the clamping plate [C], then remove the clamper.

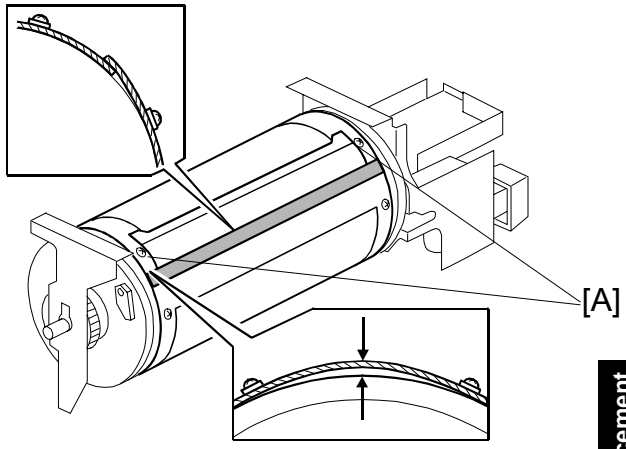
NOTE: 1) Do not allow ink to get on the inside of the clamping plate [C]. If it is dirty with ink, the master may slip off and the image position on the prints will move toward the trailing edge of the prints during a printing run.
2) Use a cloth dampened with water to clean the inside of the clamping 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



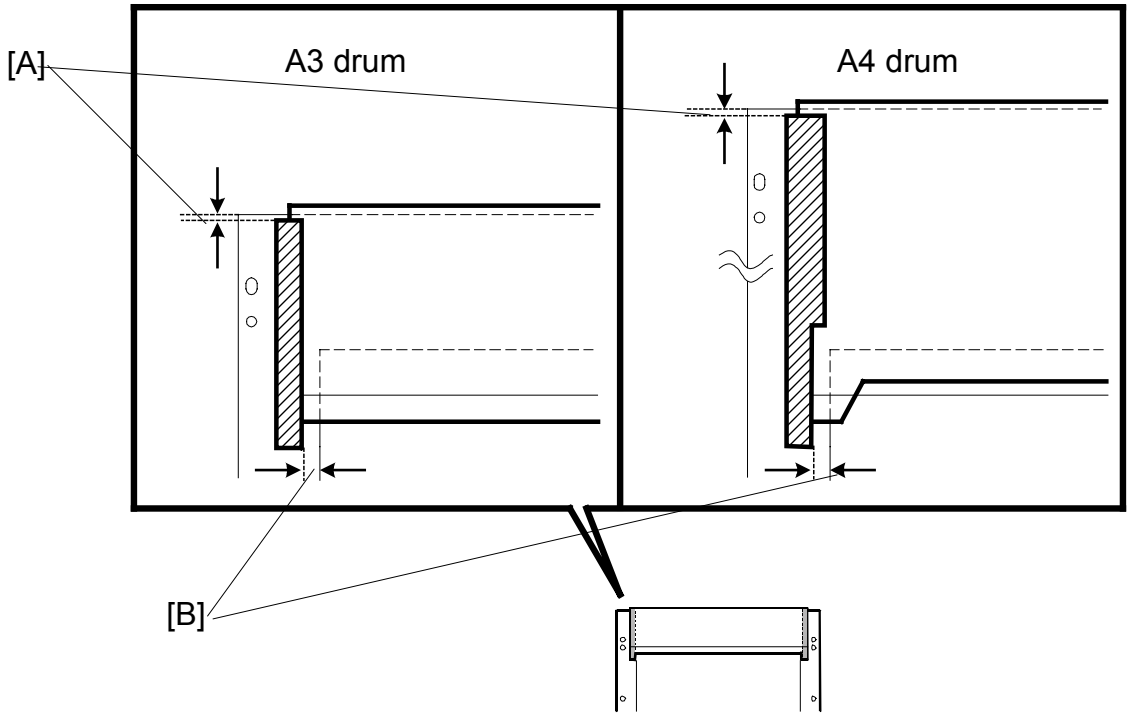
C264R006.WMF



C264R007.WMF

- 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.
- If there is no filament tape [B] where the metal screen is overlapping, replace the filament tape. (W: 19mm x L: 355mm)

3.8.4 MYLAR SEAL



C264R902.WMF

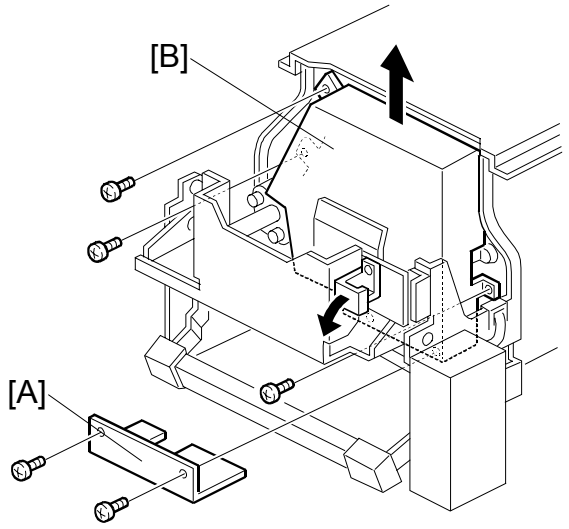
[A]: -0.5 to 0.5 mm
[B]: 5.6 to 7.2 mm

Attach the mylar seal at the attachment position on the metal screen as shown above.

NOTE: Clean the attachment position using isopropyl alcohol.

3.8.5 INK PUMP ADJUSTMENT

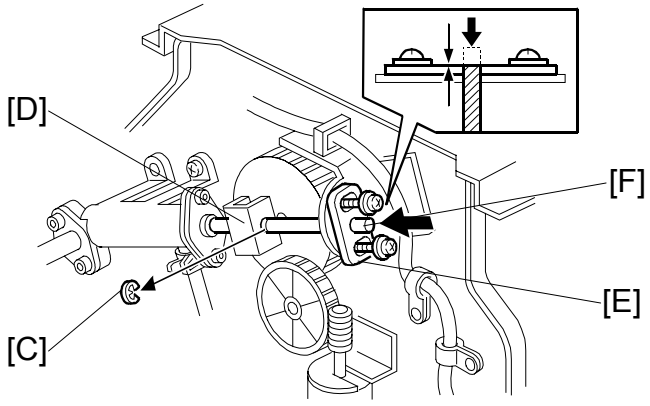
Purpose: To ensure the smooth operation of the ink pump plunger by properly positioning its holder.



C238R014.WMF

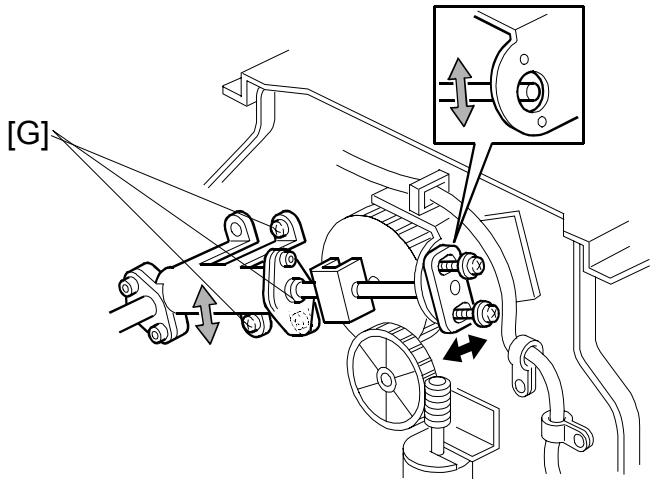
- Remove the drum

[A]: Lower pump cover (☞ x 2)
[B]: Upper pump cover (☞ x 3)



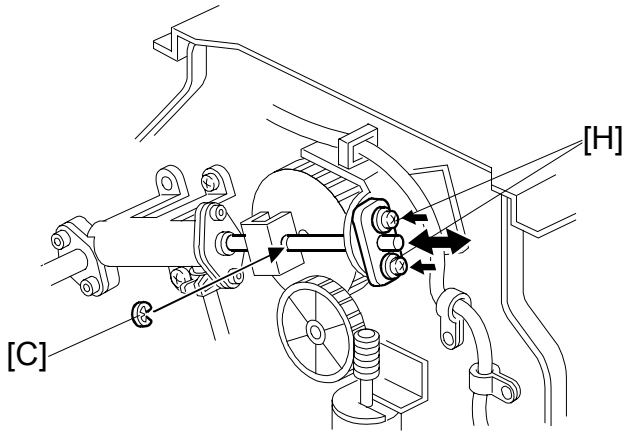
C238R015.WMF

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].



C238R016.WMF

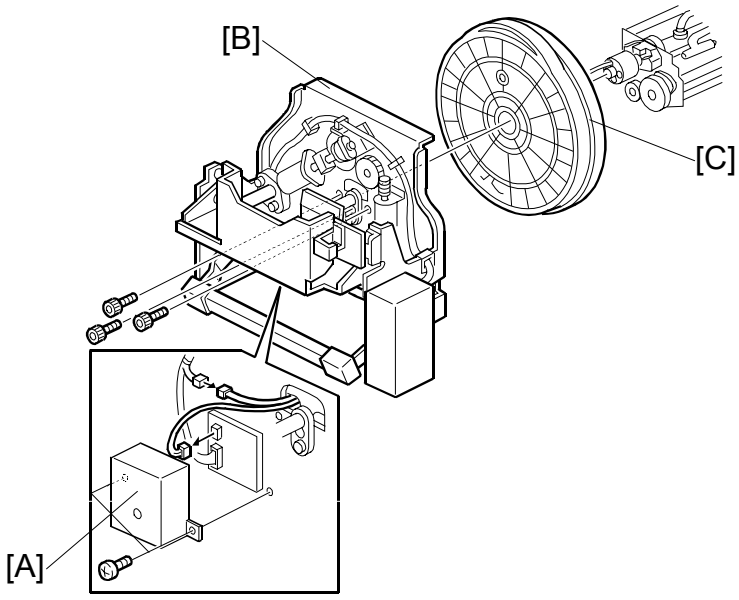
4. Check that the piston motion is smooth.
5. If the motion is stiff, loosen the pump screws [G] and adjust the pump position.
6. After tightening, repeat step 4 and step 3.



C238R017.WMF

7. Re-tighten the two screws [H].
8. Check that the piston motion is smooth.
9. Reinstall the E-ring [C].

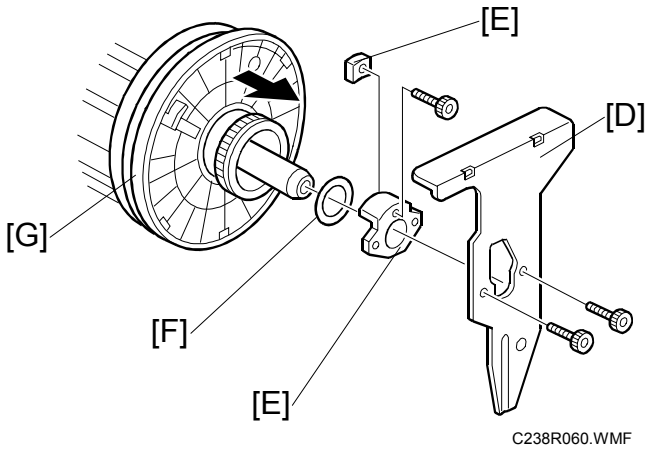
3.8.6 INK ROLLER UNIT / INK ROLLER ONE-WAY CLUTCH



C238R023.WMF

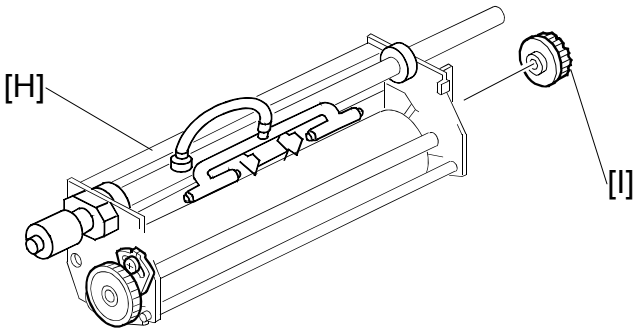
- Metal screen (☛ 3.8.3)
- Pump covers (☛ 3.8.5)

[A]: Board cover (☞ x 2)
[B]: Front stay (☜ x 2, ☞ x 3)
[C]: Front flange



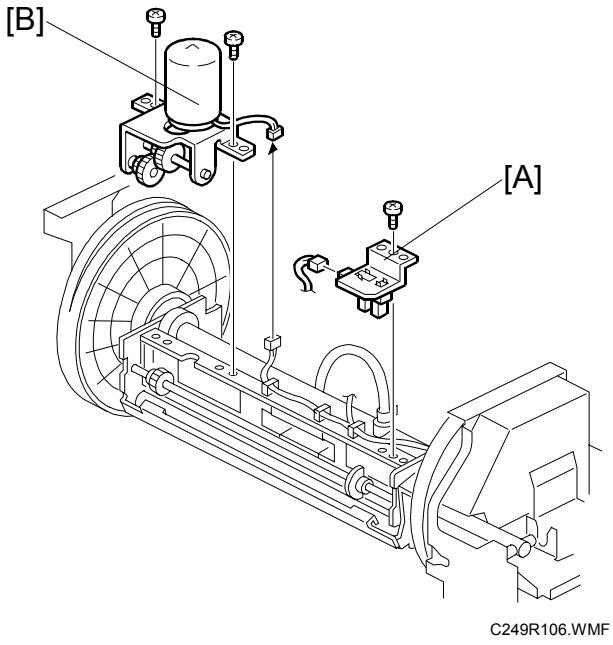
C238R060.WMF

[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

3.8.7 IDLING ROLLER MOTOR / IDLING ROLLER HP SENSOR



- Cloth Screen (☛ 3.8.2)
- Clamper / Metal Screen (☛ 3.8.3)

[A]: Idling roller HP sensor (🖑 x 1, 🔩 x 1)
[B]: Idling roller motor (🖑 x 1, 🔩 x 2)

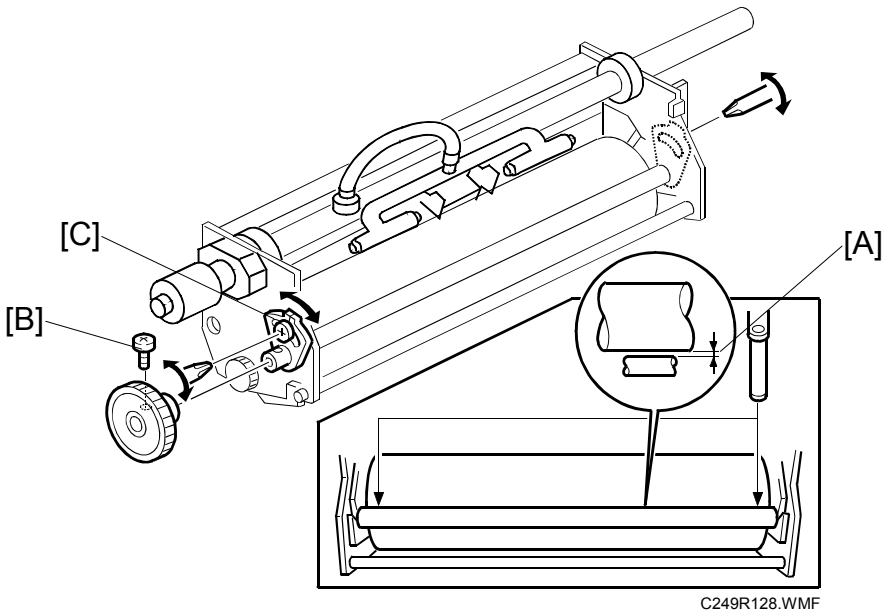
3.8.8 DOCTOR ROLLER GAP ADJUSTMENT

Controls ink thickness around the ink roller.

Standard: 0.07 mm gauge passes, 0.09 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 (☛ 3.8.6)

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.

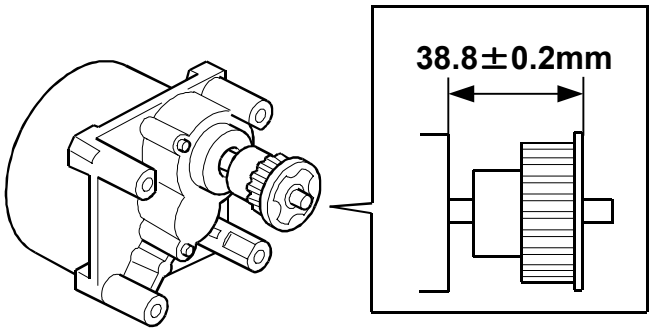
3.8.9 INK DETECTION ADJUSTMENT

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)

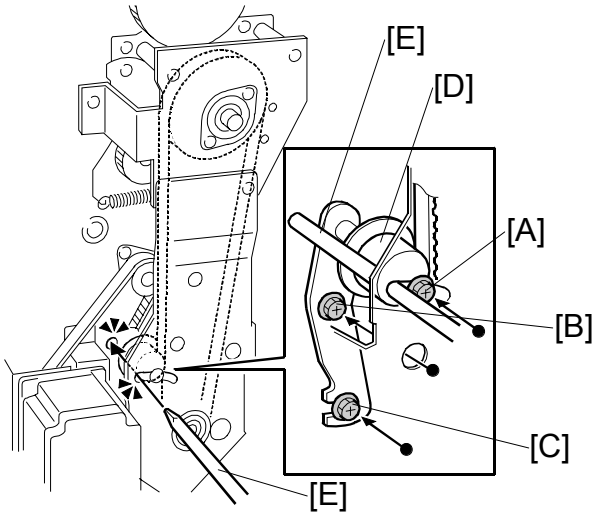
3.8.10 MAIN MOTOR PULLEY POSITION



C264R901.WMF

After putting the pulley back on the main motor shaft, refer to the above illustration for the correct position of the pulley.

3.8.11 MAIN DRIVE TIMING BELT ADJUSTMENT



C238R032.WMF

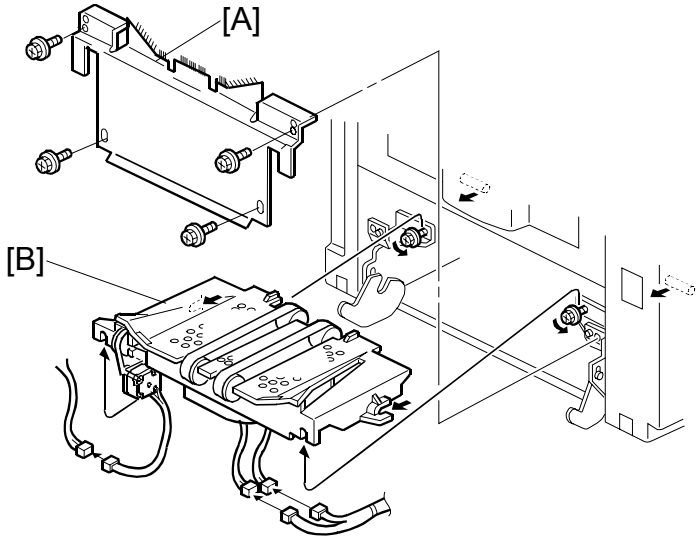
Purpose: After the timing belt is replaced, correct belt tension must be applied.

- Rear covers (☛ 3.2.2)
- MPU (☛ 3.2.4)

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

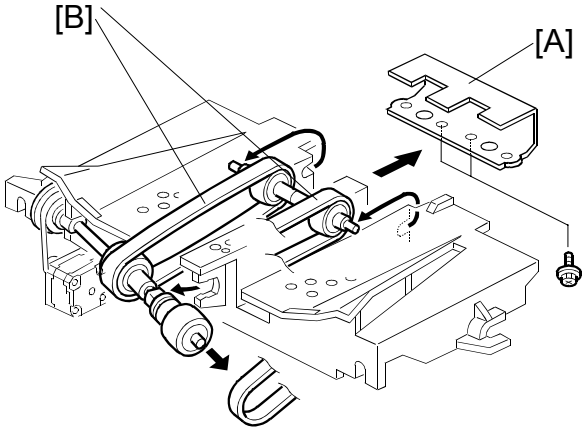
3.9.1 PAPER DELIVERY UNIT



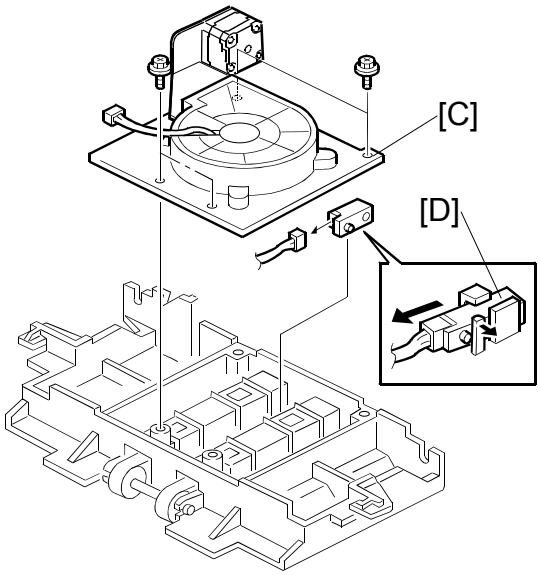
C238R027.WMF

[A]: Paper delivery cover (☞ x 4)
[B]: Paper delivery unit (☞ x 3, ☞ x 2)

3.9.2 FAN MOTOR, EXIT SENSOR



C238R035.WMF



C249R036.WMF

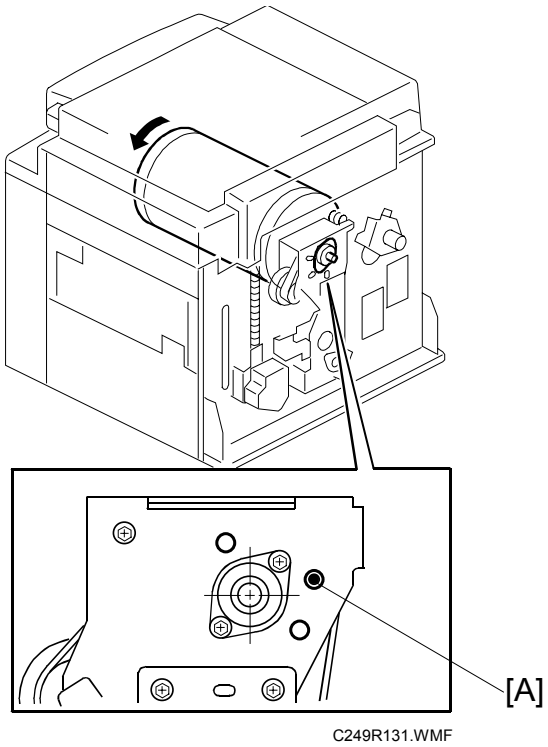
- Paper delivery unit (☛ 3.9.1)

[A]: Paper guide (☞ x 2)
[B]: Delivery belts
[C]: Vacuum fan motor (☞ x 1, ☞ x 4)
[D]: Paper exit sensor (☞ x 1)

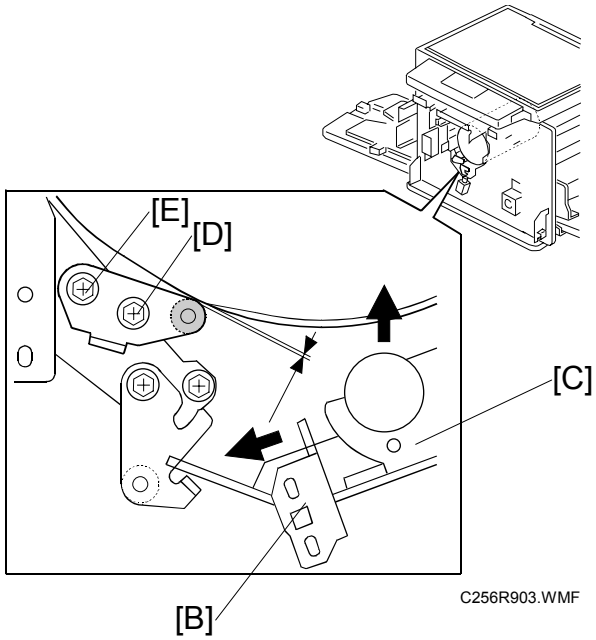
3.9.3 EXIT PAWL ADJUSTMENT

Ensures that the exit pawls can move out of the way of the drum master clamper while the drum is rotating.

Timing adjustment



C249R131.WMF



C256R903.WMF

- Front cover (☛3.2.1)
- Rear covers (☛ 3.2.2)

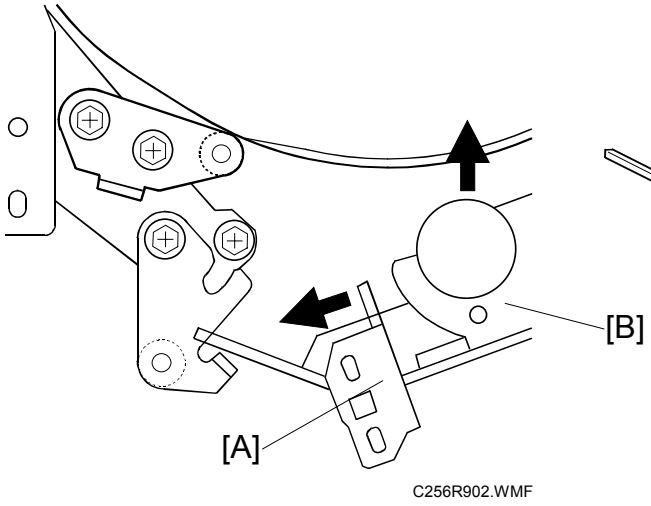
NOTE: When releasing the stoppers from the brackets, note that the press roller goes up quickly.

1. Turn the drum manually until the recess in the drum drive gear meets the positioning hole [A] in the bracket, as shown.
2. Release the stopper at the operation side [B] from the pressure arm [C].

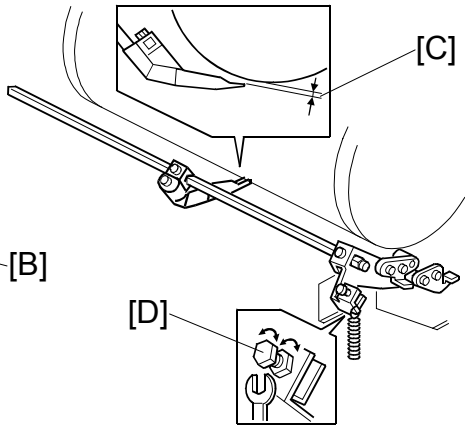
   NOTE: Slide the stopper [B] to the left, and then lift the pressure arm [C].
3. Loosen screws [D] and [E]. Then measure the gap between the cam follower and cam face (front drum flange). It should be 0 to 0.5 mm. Then re-tighten the two screws while pushing the cam follower against the cam face.
4. Lock the stopper on the operation side with the lock bracket to keep the press roller in its correct position.
5. Do the clearance adjustment (see the next page).

Clearance adjustment

- Do this after the timing adjustment.



C256R902.WMF



C249R130.WMF

Standard: Within 0.80 ± 0.15 mm

- Front cover (☛3.2.1)

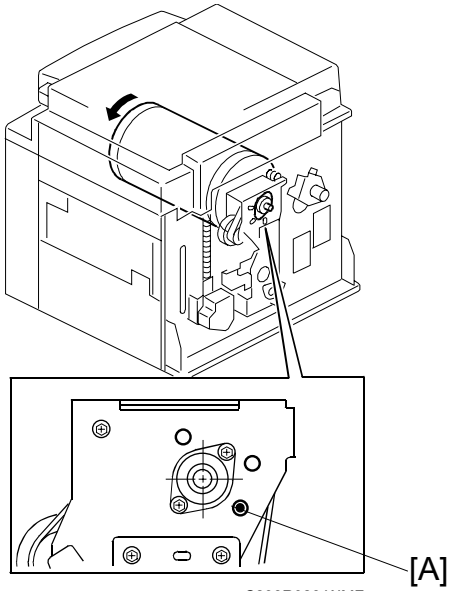
1. Release the stopper at the operation side [A] from the pressure arm [B].

   NOTE: Slide the stopper [A] to the left, and then lift the pressure arm [B].

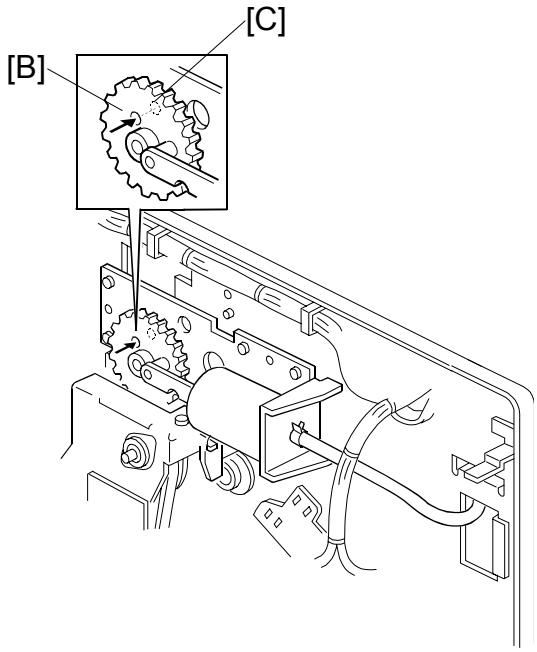
2. Using a gap gauge, measure the clearance [C] between the drum surface and the exit pawls. It should be 0.80 ± 0.15 mm.
3. If the clearance is not correct, adjust the clearance by turning the bolt [D].
4. Lock the stopper on the operation side with the lock bracket to keep the press roller in its correct position.

3.9.4 AIR PUMP ADJUSTMENT

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



C238R028.WMF

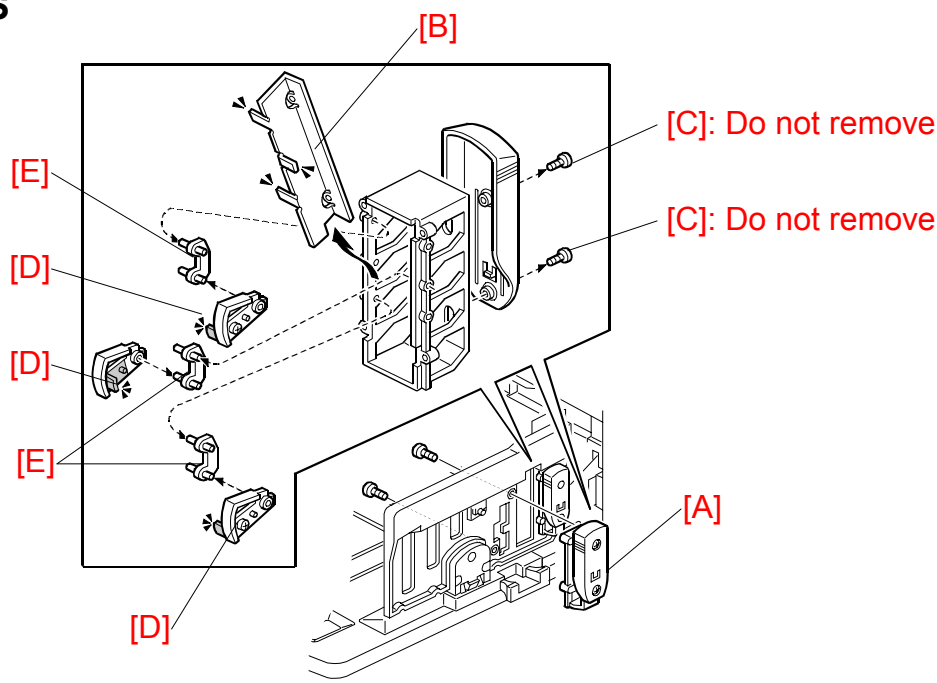


C249R026.WMF

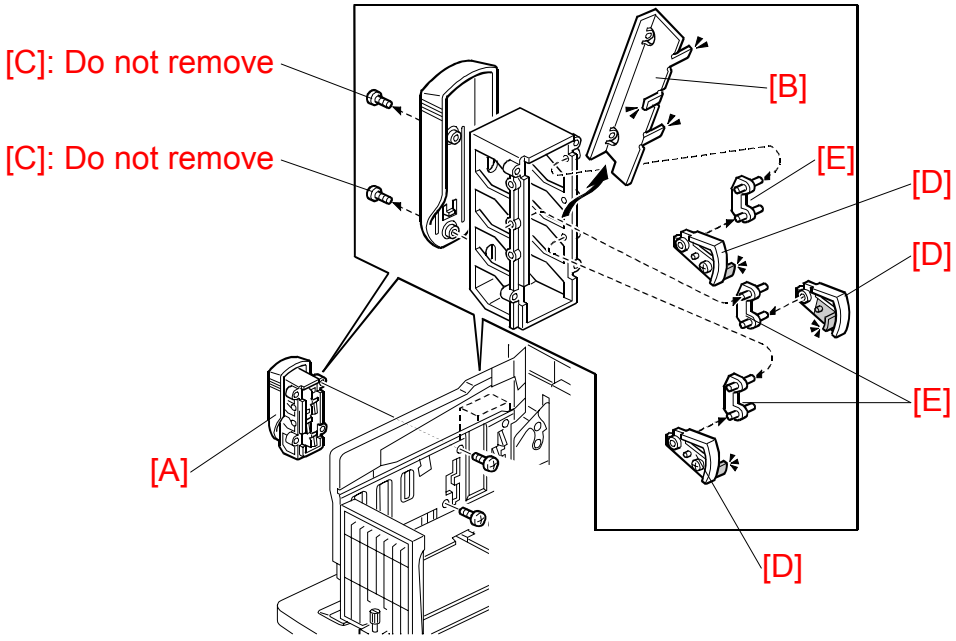
- Rear covers (☛ 3.2.2)

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.

3.9.5 CHOCKS



C256R005.WMF



C256R007.WMF

[A]: Chocks (x 2)
[B]: Buffer fin bracket (x 2 [C]) – Normally, do not disassemble parts [B] to [E] in the field.
[D]: Buffer fin
[E]: Buffer fin link

3.10 SPECIAL TOOLS

The following are the special tools used for service.

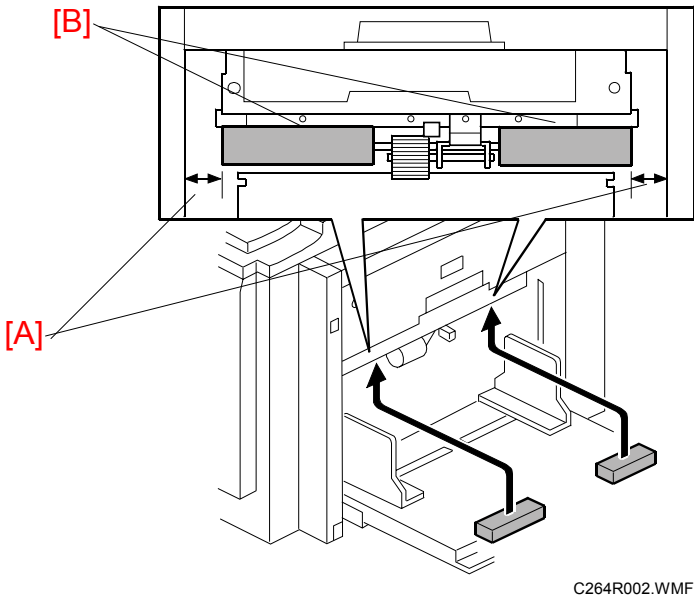
Description	Part number	Note
Scanner positioning pins (4 pins as a set)	A006 9104	☛ 3.3.5
Flash memory card	A230 9352	☛ 5.9.2 ☛ 5.9.3

3.11 OTHERS

3.11.1 SOUND-PROOFING CUSHIONS

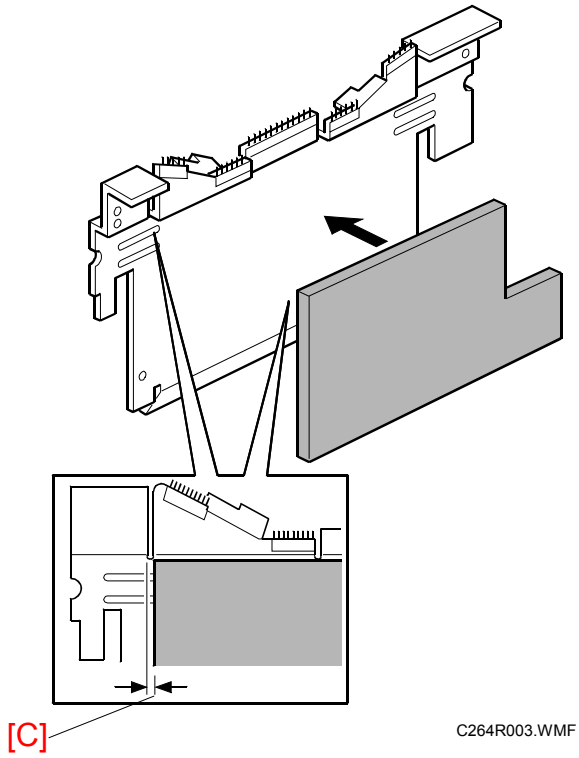
The following are the attachment positions of the soundproofing cushions.

Paper feed left, Paper feed right



[A]: 10.0 mm to 12.0 mm
[B]: 0.0 mm

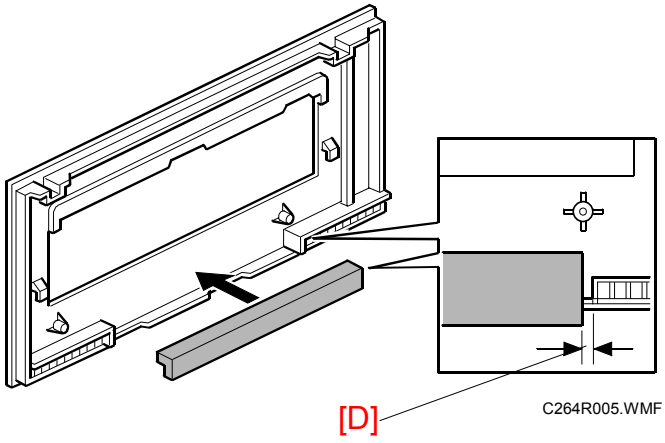
Paper exit



[C]: 0.0 mm

Master eject unit cover

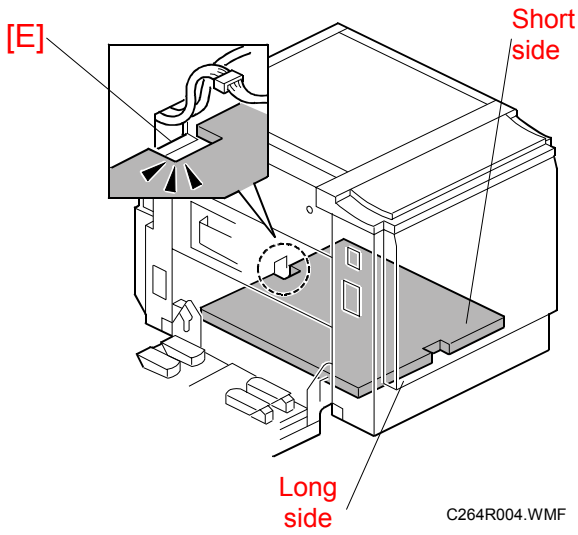
Master eject cover (🔩 x 4)



[D]: 0.0mm to 2.0mm

Base

Paper delivery cover (🔩 x 4) (☛: 3.9.1)



NOTE: Insert the soundproofing cushion from the paper delivery side, and push it towards the inside of the machine.
The cushion has a short side and a long side, as shown above. Insert the cushion from the short side, and secure the cushion inside the machine at [E].
The soundproofing for the base does not have double-sided tape.

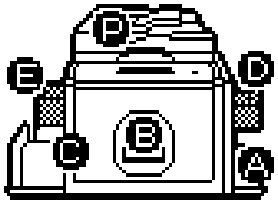
4. TROUBLESHOOTING

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 turn on.	Table Drive Table motor Table height sensor Table lower sensor
E-04	Thermal Head Overheat The temperature of the thermal head is grater than 54C 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 turn 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 4.9 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
E-12	Pressure Plate error The pressure plate home position sensor signal is not detected within 15.0 seconds after the pressure plate motor turn 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-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 54C when the Start key is pressed.	Drum overheat Thermistor
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

No.	Symptom	Possible cause
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
E-40	Thermal Head ID error The CPU detects an abnormal ID signal from the thermal head.	Thermal head MPU Thermal head connector disconnected
E-41	Idling roller HP sensor remains on or off The idling roller HP sensor does not change status within 4.0 seconds after the idling roller motor on signal is generated.	Idling roller HP sensor Ink idling motor
E-42	Duct plate error The duct plate HP sensor does not change status within 4.0 seconds after the duct plate motor on signal is generated.	Duct plate HP sensor Duct plate motor
E-43	Printing Pressure error The printing pressure HP sensor does not change status within 4.0 seconds after the printing pressure motor on signal is generated.	Printing pressure HP sensor Printing pressure motor
E-47	Thermal head driving error The thermal head HP sensor does not change status within 4.0 seconds after the thermal head driving motor on signal is generated.	Thermal head HP sensor Thermal head driving motor
E-61	Auto Off Switch error The main switch does not turn off for more than 6.0 seconds.	Auto off switch Auto off switch connector disconnected

4.2 ELECTRICAL COMPONENT DEFECTS



C249T001.BMP

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 “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.
Ink Idling Roller HP Sensor	Open	E-41 is displayed.
	Shorted	E-41 is displayed.
Printing Pressure HP Sensor	Open	E-43 is displayed.
	Shorted	E-43 is displayed.
Duct Jam Sensor	Open	The “D” jam indicator is lit.
	Shorted	There is a master in the lower master tray, but the duct jam sensor does not detect a master, the master vacuum fans do not pull the master, and E-01 is displayed.
Duct plate HP sensor	Open	E-42 is displayed.
	Shorted	E-42 is displayed.
Master Edge Sensor	Open	The “D” jam indicator is lit.
	Shorted	The “D” jam indicator is lit.

4.2.2 SWITCHES

Component	Condition	Symptom
Door Safety Switch	Open	The “open cover” indicator is lit.
	Shorted	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.
Lower Master Tray Set Switch	Open	Master making begins, but the lower master tray is open, the master vacuum fans do not pull the master, and E-01 is displayed.
	Shorted	The “Lower Master Tray is Open” indicator is lit.

4.2.3 POWER SUPPLIES

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 LED103 on the MPU blinks.
+12v (CN102-9)		The LCD/LED on the operation panel does not indicate and LED103 on the MPU blinks.
-12v (CN102-8)		The machine makes an image of many black stripes.
+24v (CN111-3, 4, 5, 6)		E-47 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 SP5-13, 14, 15 (master eject motor/ pressure plate motor output mode) do 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-47 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	Monitors the paper feed circuit in the MPU. Usually, this LED is blinking at intervals of 2 seconds.
LED102	Not used.
LED103	Monitors the CPU operation. Usually, this LED is blinking at intervals of 1 second.
LED104	Monitors the master end sensor. When the sensor detects a master, this LED is lit. (☛3.5.9)
LED105	Monitors the master edge sensor. When the sensor detects a master, this LED is lit. (☛3.5.7)
LED106	Monitors the duct jam sensor. When the sensor detects a master, this LED is lit. (☛3.5.6)

4.3.3 VR’S

MPU

No.	Function
VR101	Adjusts the master end sensor (☛3.5.9)
VR102	Adjusts the duct jam sensor (☛3.5.6)
VR103	Adjusts the master edge sensor (☛3.5.7)
VR104	Adjusts the 2nd drum master sensor (☛3.5.8)

PSU

No.	Function
VR1	Adjusts the thermal head voltage. (☛3.5.10)
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
TP101	Measures the master end sensor voltage. (☛3.5.9)
TP102	Measures the duct jam sensor voltage. (☛3.5.6)
TP103	Measures the master edge sensor voltage. (☛3.5.7)
TP104	Measures the 2nd drum master sensor voltage. (☛3.5.8)

PSU

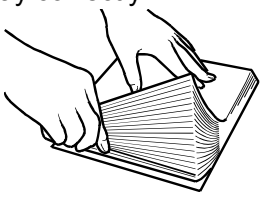
No.	Function
TP701	Measures the thermal head voltage. (☛3.5.10)
TP702	

4.4 OTHERS

Discussed in accordance with C238/C249/C264

O/I: Operation Instruction
S/M: Service Manual

4.4.1 PAPER FEED PROBLEMS

Model	Problem	Cause	Solution
C264 C249 C238	Paper feed jam (A Jam)	Dust build-up affects operation of the registration sensor. Sensor does not give correct detection.	Clean the registration sensor with a dry cloth. Replace the registration sensor. Clean the registration roller shaft.
C249 C238		The feed roller drops out of its bearing, causing the paper feed arm to deform.	Bend the paper feed roller back to its original position. (☛ RTB #RC238005) Replace the sleeve fixed shift. (☛ MB #MC238011)
C264 C249 C238	Multiple sheet feeding	Paper does not shuffle.	Fan the paper as shown below. Then set the paper in the paper feed tray correctly.  C264T903.WMF Feed pressure is set for thin paper. (☛ O/I Operation - Printing on thick or thin paper) Separation pressure is set for strong. (☛ S/M 6.7.3) Use the side fence friction pads C238: Side Fence Friction Pads are included. C249/C264: Use the Side Fence Friction Pads from C238.
C264 C249 C238	Paper feed problems for thin paper.	Feed and separation pressures are set too strong for thin paper.	Feed pressure is set for thin paper. (☛ O/I Operation - Printing on thick or thin) Separation pressure is set for weak. (☛ S/M 6.7.3) Replace to the 'special order' friction pad. (The friction coefficient is low.) ＊Use the side fence friction pads if multiple sheet feeding occurs after the friction pad has been changed.)

Model	Problem	Cause	Solution
C264 C249 C238	Non-feed jam	Feed pressure is weak.	Feed pressure is set for thick paper. (☛O/I Operation - Printing on thick or thin) Separation pressure is set for weak. (☛S/M 6.7.3)
C264 C249 C238	Thick paper peels at leading edge	Feed pressure is strong.	Separation pressure is set for weak. (☛S/M 6.7.3) Replace the friction pad. ＊Use the side fence friction pads if multiple sheet feeding occurs after the friction pad has been changed.
C249 C238	Paper skew	Amount of buckle for registration is not correct.	Adjust SP6-20 (the amount of buckle for registration). (☛ S/M 5.7.6) 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. Decrease the value: The paper registration position will be correct. **Caution**: Once this has been changed, the registration position will be out of order.
C264 C249 C238	Shift paper registration	The position of registration is not correct.	Adjust SP6-21 (the paper registration position). (☛ S/M 5.7.3) C249/C264: Adjust SP6-100 to 107 (paper registration - each speed) C238: Adjust SP6-23 (paper registration - each speed) (☛ RTB# RC238008a) C238: SP6-33 (paper registration - each speed, when image shifts forward) SP6-34 (paper registration - each speed, when image shifts backward) (☛ RTB# RC238011d)
C264 C249 C238		The retry mode for paper feed is ON. (Even though registration sensor does not turn on, it will not jam. The drum will rotate one more time, and paper will be fed.)	Turn off SP2-33 (Re feeding setting). (☛ RTB #RC238008) (☛S/M 5.3.5) **Caution**: A jam might occur after you turn the machine off.

Feed pressure/Separation pressure adjustment

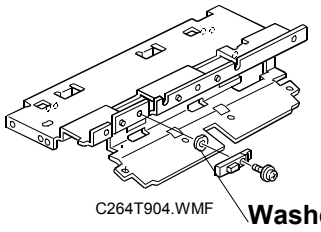
Paper	Thin Soft paper which is difficult feed by normal	Normal 47g/m^2 to 128g/m^2	Thick 157 g/m^2 to 203.3 g/m^2
Feed pressure (Lever)	Thin paper (Weak)	Normal paper (Normal)	Thick paper (Strong)
Separation Pressure (Scale)	Strong	Normal	Weak

NOTE: Adjust feed pressure at first. If it does not improve, then adjust the separation pressure.

4.4.2 PAPER EJECTION PROBLEMS

Model	Problem	Cause	Solution
C249 C238	Non-feed jam (Thin paper)	The suction of the vacuum fan is too strong at paper delivery unit.	Attach the air reduction sheet at the vacuum fan. (MB #MC238010) **Note**: Feed jam may occur for thick paper
C238	Non-feed jam	The transport belt of paper delivery unit may slip.	Clean paper dust in the delivery unit. Replace the transport belt. (☛ MB #MC238013)
C249 C238	Paper wrap jam	Adjustment of exit pawl is wrong.	Adjust the exit pawl. (☛3.9.3,)
C249 C238	Accordion jam (near the press roller)	The gap between the press roller and paper delivery unit is too big.	Attach a paper guide sheet at the vacuum fan. (☛ MB #MC238010)
C264 C249 C238	Paper stuck is bad.	The positions of paper delivery side plates and end plate are not right.	Adjust the position of paper delivery side plates and end plate to fit the paper size.
C249 C238	A paper delivery jam sometimes occurs when continuously printing many sheets.	The paper scratches the paper delivery unit wing tips, and this increases the static electricity buildup in the area. The static buildup eventually overcomes the force of paper delivery, triggering the jam.	C238/C249: 1. Install the metal wing set. (☛ RTB#RC238013) (☛ RTB#RC249015) 2. Install the improved air knife fan and delivery belt. (☛ MB# MC238031) (☛ MB# MC249016)

4.4.3 MASTER FEED PROBLEMS

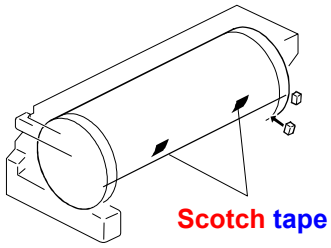
Model	Problem	Cause	Solution
C238	Master delivery incorrect	Master is wrapped around the platen roller and the tension roller.	Replace the thermal head guide with a stronger one. (☛ MB #MC238012)
C264 C249	Master feed jam (D jam)	Suction becomes weaker as pieces of master enter into the duct and the vacuum fan.	Pull out the master feed tray, and remove the broken pieces of master. (☛O/I Troubleshooting - Clearing Misfeeds)
C249 C238	Double masters on drum	The drum master sensor gives incorrect detection.	Clean the drum master sensor with a dry cloth or replace the drum master sensor. If the situation does not improve, insert the washer under the sensor. 

4.4.4 DRUM PROBLEMS

Model	Problem	Cause	Solution
C249 C238	Does not supply ink.	Ink detection board not working. Broken ink detecting pins.	Make sure SP2-10 (ink detection) is ON. Clean the ink detecting pins. Adjust the ink detection circuit. (☛S/M 5.7.2) Change the ink detection board. (☛ MB #MC238022)
C238		Ink sticks to the base of ink detecting pins.	Clean the ink detection pins. Then attach the ink pipe cover. (☛ MB #MC238006)
C264 C249 C238	Ink supply error	Air is mixing in the ink pack.	Flush out the air from the ink pack. Caution: Don't remove the ink pack.
C264 C249 C238		Defective ink pump	Adjust or replace the ink pump. (☛S/M 3.8.4)
C238	Leaks ink from end of drum.	Mylar comes off from metal and cloth screen.	Change the cloth screen. (☛ MB #MC238021)
C249 C238		The doctor gap in the drum is too wide.	Adjust the doctor gap. (☛S/M 3.8.7)
C249 C238	Drum cannot be set properly.	The bearing of drum drive part comes off.	Attach the spacer. (☛ RTB #RC238009, MB #MC238024)

4.4.5 POOR IMAGE

Model	Problem	Cause	Solution
C264 C249 C238	Blank image	Double masters on drum (Incorrect detection of a drum master sensor)	☛ "Problem : Double masters on drum"
C264 C249 C238		Incorrect operation of the printing pressure lever.	Adjust the gap of the press roller release lever. (☛S/M 3.7.2)
C264 C249 C238	Faint image	Ink detection errors.	☛ "Problem : Does not supply ink". Adjust the doctor gap. (☛S/M 3.8.7)
C264 C249 C238		A metal screen causes small chunks of ink to clog the drum if the machine has not been used for a long period of time.	Clean the metal screen with alcohol. **Caution**: Be careful around the mylar. Replace the metal screen.
C264 C249 C238	Faint image	Master separates from the clamp due to an incorrect setting of the doctor gap.	Adjust the doctor gap. (☛S/M 3.8.7)
C264 C249 C238	Shift paper registration	The position of registration is not right.	Adjust SP6-21 (paper registration position). (☛S/M 5.7.3) C249/C264: Adjust SP6-100 to 107 (paper registration - each speed) C238: Adjust SP6-23 (paper registration - each speed) (☛ RTB# RC238008a) C238: SP6-33 (paper registration - each speed, when image shifts forward) SP6-34 (paper registration - each speed, when image shifts backward) (☛ RTB# RC238011d)
C238	Side to side registration problem	Side pads.	Upgrade firmware and adjust the paper feed tray at the same time. (☛ MB #MC238001, RTB #RC238002)
C238	The area from the leading edge to about 30mm down has doubled or blurred images.	The amount of buckle is not enough at the press roller.	Change the guide plate sheet. (☛ MB #MC238009)

Model	Problem	Cause	Solution
C264 C249 C238	Ink is on the paper's leading edge.	The edge of the paper tears the master. * Envelopes, thick paper and others, which have sharp edges, tend to tear the master easily.	Scotch tape is stuck on the broken parts of the master.  C264T905.WMF When paper is set in the paper feed tray, place the paper upside down. This will prevent the edge of the paper from always hitting part of master.
C264 C249 C238	Immediately after making a master, first few prints have a striped pattern.	Low ink short supply. Masters were changed several times without making many prints and this caused the ink supply to decrease.	Turn off Auto cycle mode. Ink is added by pushing "0+Economy mode". (☛ 1.2.1)
C264 C249 C238	Part of image is not shown	Foreign materials may have stuck on the surface of the screen.	Remove foreign materials from the surface.
C238	Dirty paper feed roller (Double sided printing)	Stained with ink	Clean the paper feed roller Clean under the paper feed roller. Do not print on the rear side of paper until the ink on the front side has dried.

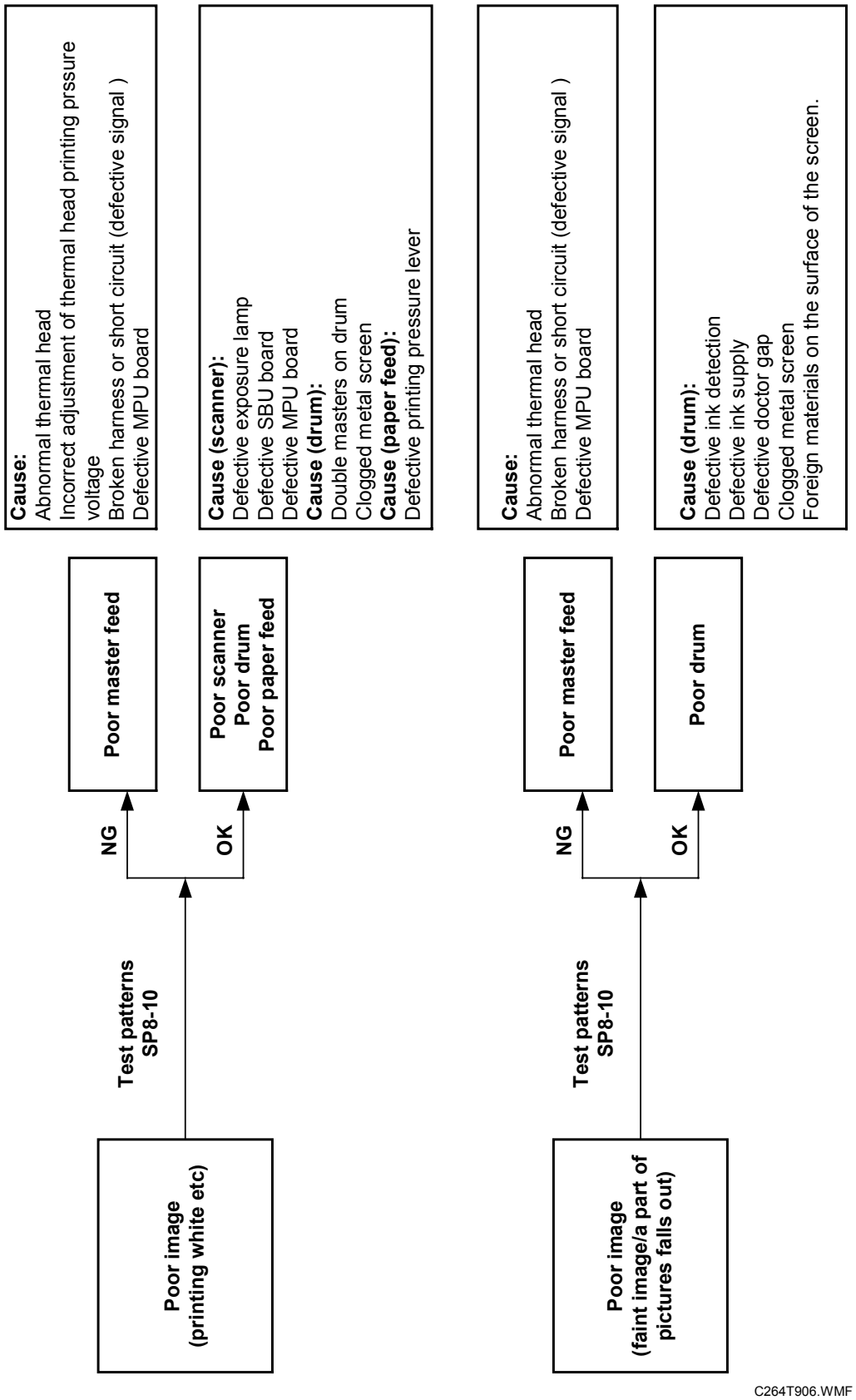
4.4.6 OTHERS

Model	Problem	Cause	Solution
C249 C238	Paper size misdetection	The paper tray harness is damaged.	C249: Replace the paper tray harness. (☛ MB# MC249012) (☛ RTB#RC249012) C238: Replace the paper feed tray harness, paper size sensor stay and pad plate harness. (☛ MB# MC238037, 038, 043) (☛ RTB#RC238017, 018, 020)
C264 C249	The cutter cannot trim the edge of the master	The edge has been unevenly cut, such as after a master misfeed jam (D-jam).	Press the Clear/Stop key, and then while holding this key down, push in the master making unit. (☛ RTB#RC249008)
C249 C238	Error code (E-21, E-22, E-23, E-24).	Jammed paper contancts one of the sensors during a print job, and the sensor comes loose from its bracket.	C238/C249 :Install the improved sensor bracket and drum positon plate. (☛MB# MC238042, MC249014) (☛RTB# RC238019, RC249013)
C264 C249 C238	Difficult to remove ink from exterior cover and so on.	Ink is present on the cover surface.	Clean the surface with a plastic eraser
C249 C238	When MPU is changed, the information that user input is lost.	The MPU was replaced, and the RAM was also new.	Remove the RAM from the previous MPU, and install this RAM on the new MPU. ∗ Be sure to do VR adjustments for the master set sensor, master edge sensor, duct jam sensor, and 2nd drum master sensor (☛ 3.5.6 to 3.5.9)
C264 C249 C238	Unusual operation	Due to static electricity.	Make sure the machine is secure. A fixed screw acts as a ground. The machine must be kept secure for the ground screw to operate.
C264 C249 C238		A harness snapped and caused a short circuit.	Check if there is a broken harness or short circuit. Unplug the machine. Then plug it back in again.
C264 C249 C238		Unknown	**Caution**: Record the settings before clearing memory. Clear the memory with SP7-1.

4.4.7 USER INSTRUCTIONS

Model	Problem	Cause	Solution
C264 C249 C238	B jam	Incorrect master installation (Inserted the master too far.)	Do not insert the master too far into the machine. The leading edge of the master must be fed until the ▲ mark.
C264 C249 C238	D jam	Exit pawl of clamper	When the master is taken off, the exit pawl clamper should not be on the master clamper.

4.4.8 FLOW CHARTS



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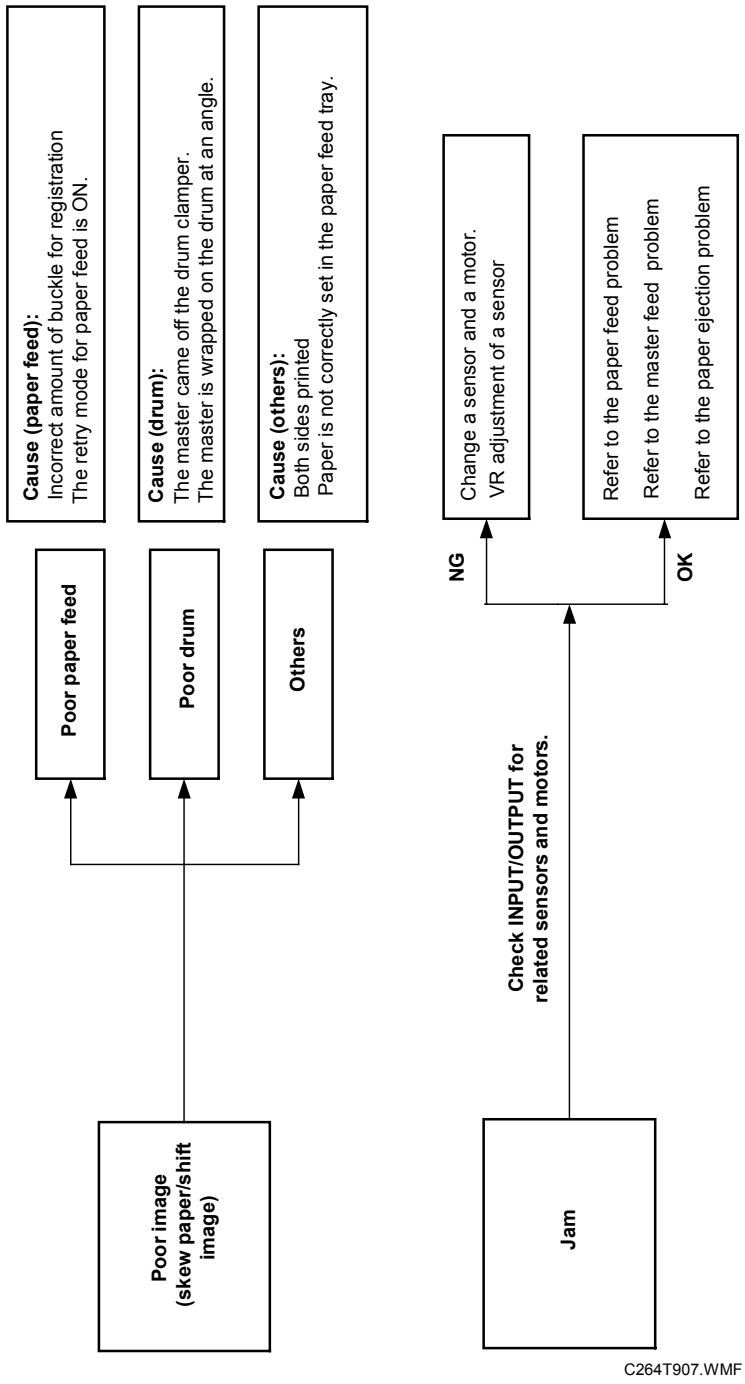

Cause (paper feed):
Incorrect amount of buckle for registration
The retry mode for paper feed is ON.
Cause (drum):
The master came off the drum clamper.
The master is wrapped on the drum at an angle.
Cause (others):
Both sides printed
Paper is not correctly set in the paper feed tray.
Poor paper feed
Poor drum
Others
Poor image (skew paper/shift image)
Jam
Check INPUT/OUTPUT for related sensors and motors.
NG
OK
Change a sensor and a motor.
VR adjustment of a sensor
Refer to the paper feed problem
Refer to the master feed problem
Refer to the paper ejection problem
C264T907.WMF

5. SERVICE TABLES

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. Press the following sequence of keys.

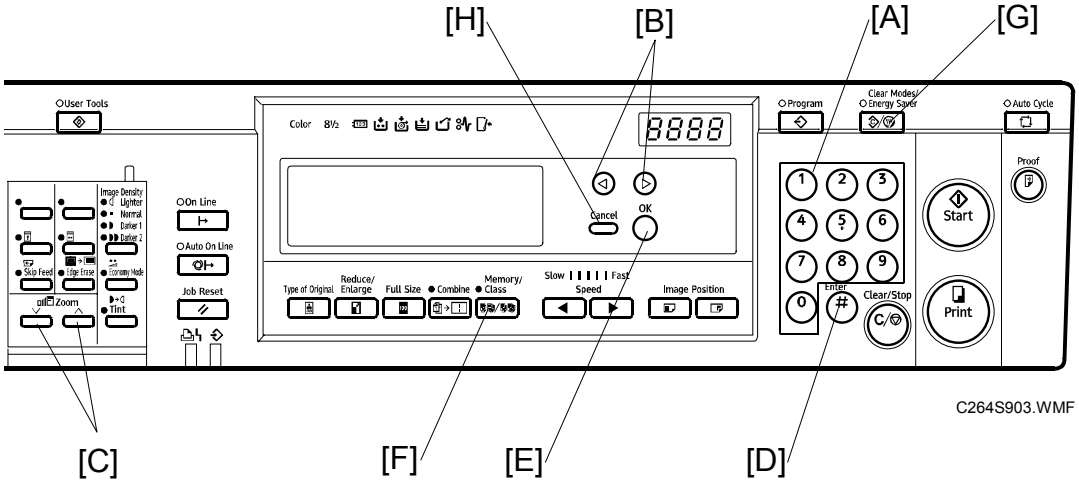
   User Tools → 1 → 0 → 7 → #

   - Hold the # key down for longer than 3 seconds.

Leaving SP Mode

Press the User Tools key one or more times.

5.1.2 HOW TO SELECT A PROGRAM NUMBER



1. Using the number keys [A] or the ◁▷keys [B] or the zoom keys [C], enter the desired main menu number (listed below), then press the Enter key [D] or the OK key [E].

   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 ◁▷ keys or the zoom 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 [F] 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.
5. Follow the "Change Adjustment Values or Modes" procedure below.
   NOTE: To cancel the SP mode, press the Clear Modes/Energy Saver key [G] or the Cancel key [H].

5.2 MAIN MENU NO.1: COPY DATA

5.2.1 SP TABLE

No.	Menu Items	Function
1-1	Total master counter	
1-20	Total print counter	
1-50	D - master clamp jam	☛ 6.12
1-51	E - master eject jam	☛ 6.12
1-52	E - master compressing jam	☛ 6.12
1-53	A - paper non-feed jam	☛ 6.12
1-54	A - paper registration jam	☛ 6.12
1-55	B - paper wrapping jam	☛ 6.12
1-56	C - paper delivery jam	☛ 6.12
1-57	P - original feed - in jam	☛ 6.12
1-58	P - original feed - out jam	☛ 6.12
1-59	D - master feed jam	☛ 6.12
1-60	D - master cut jam	☛ 6.12
1-61	D - mater duct jam	☛ 6.12
1-70	Main firmware part number	☛ 5.2.2
1-71	I/O ROM part number	
1-72	Serial number display	
1-73	Main firmware version	
1-75	Serial number display (Factory)	
1-80	Error code history	☛ 5.2.3
1-81	Service telephone number display	
1-160	Not used	
1-161	Key counter setting check	

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 records.

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	0.0	-15.0mm to +15.0mm
2-4	Destination code	264-XX	
2-5	Not used	0	0 to 2
2-6	Image position display	1	0:Slow 1:Normal 2:Fast (☛ 5.3.2)
2-7	Chinese display setting (China model only)	0	0 to 1 (☛ 5.3.3)
2-10	Ink detection board	On	Off/On (Off is used for tests, and for removing ink from the drum ☛ 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.)
2-15	Paper length sensor	On	Off/On
2-20	Destination setting	Other	Other/Japan
2-22	Double count-up (A3)	0	0: Not used, 1: Master counter only, 2: Master counter and print counter
2-28	Idling after less than 3 prints		(☛ 5.3.4)
2-29	Idling after how many prints		(☛ 5.3.4)
2-31	Ink Auxiliary Supply (Not used)	0	0:After 1:Before 2:No
2-32	Ink supply after trial	Off	Off/On (☛ 5.3.5)
2-33	Re - Feeding setting	On	Off/On (☛ 5.3.6)
2-34	Slow starting mode	45rpm	30rpm/45rpm (☛ 5.3.7)
2-35	Printing pressure adjust	0	-2 to 2 (☛ 5.3.8)
2-36	Ink idling roller setting	1	0 to 2 (☛ 5.3.9)
2-37	Paper delivery motor speed	0	-55 to 55%
2-38	Idling after print	On	Off/On (☛ 5.3.4)
2-39	T/H control by temp: color	On	Off/On
2-40	T/H control by temp: black	On	Off/On
2-41	T/H energy control	7	0 to 50% (☛ 5.3.10)
2-42	T/H energy control - eco	15	0 to 50% (☛5.3.10)
2-43	T/H control by temp: A4	On	Off/On
2-44	T/H energy control: A4 drum	12	0 to 50%
2-45	T/H energy control: A4 eco	15	0 to 50%
2-50	T/H swinging mode (Not used)	On	Off/On
2-51	T/H swinging quantity (Not used)	2	±1 to 5mm
2-60	Bold letter mode	Off	Off/On (☛ 5.3.11)
2-95	Paper table standby pos.	Low	High/Low
2-100	Master making without printing	OFF	Off/On (☛ 5.3.13)

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 SP2-7: CHINESE DISPLAY SETTING (CHINA MODEL ONLY)

To change the warning message after you have made a mistake to set different masters in the machine depends on the selling company.

0: Ricoh master type

1: Gestetner master type

5.3.4 SP2-28, 2-29, 2-38: IDLING AFTER PRINTING

Ensures that the first print has sufficient ink density if the machine was not used for a long time. Also, when the customer continuously prints small numbers (1 to 3 prints), ink leaks occur from the trailing edge of the drum.

When SP 2-38 is on, the idling roller motor turns to press the drum idling roller against the inner surface of the drum screen after printing. Then, the idling motor turns to remove the ink leaks. The idling motor action depends on the settings of SP 2-28 and 2-29.

- If SP 2-28 is set to 'YES', the idling motor turns if 3 or more prints were made.
- If SP 2-28 is set to 'NO', the idling motor turns if the number of prints made is the same as or more than the setting of SP 2-29.

SP2-38 (Idling after print)	SP2-28 (Idling after less than 3 prints)	SP2-29 (Idling after how many prints)
ON	YES	-
	NO →	1 to 5
OFF	-	-
	-	-

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5.3.5 SP2-32: INK SUPPLY AFTER TRIAL

Ink is detected and supplied after the trial print when this SP is on.

5.3.6 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 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.

5.3.7 SP2-34: SLOW STARTING MODE

Increase the image density of trial prints.

The figures below are drum-rotating speeds. A setting of “30rpm” will increase the image density of trial prints.

This mode was added because trial print images are lighter than with other models.

Setting	Trial Print	1st Print	2nd Print	3rd Print	4th Print	5th Print	6th Print
30rpm	30rpm	45rpm	60rpm	75rpm	90rpm	105rpm	120rpm
45rpm	45rpm	60rpm	75rpm	90rpm	105rpm	120rpm	120rpm

5.3.8 SP2-35: PRINTING PRESSURE ADJUSTMENT

Changes the printing pressure of all printing speeds (60 to 120 rpm).

NOTE: When you adjust printing pressure for each printing speed or temperature, use SP6-70 to 87.

5.3.9 SP2-36: INK IDLING ROLLER SETTING

Ensures that the first print has sufficient ink density if the machine was not used for a long time.

The idling roller motor turns to press the drum idling roller against the inner surface of the drum screen.

0: OFF

1: The machine enters the drum idling mode after the master is ejected.

2: The machine enters the drum idling mode after the master is made.

5.3.10 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).

5.3.11 SP2-60: BOLD MODE: LETTER MODE ONLY

Makes a bold outline of a letter-mode image.

5.3.12 SP2-95: PAPER TABLE STANDBY POS.

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.

5.3.13 SP2-100: MAKE MASTER WITHOUT PRINTING

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 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
3-2	Input Tel number	-	
3-3	Input serial number	-	
3-4	Input installation date	-	☛ 5.4.3
3-10	Key counter setting	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: 2003/January/27th/13:00:00

03
↓#
01
↓#
27
↓#
13
↓#
00
↓#
00
↓OK

5.4.3 SP3-4: INPUT INSTALLATION DATE

Input the installation date as shown below. 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: 2003/January/27th/13:00:00

03

↓#

01

↓#

27

↓OK

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
4-9	Thermal head HP sensor
4-10	Master making unit set switch
4-11	Master set cover sensor
4-12	Cutter HP switch
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 SN
4-18	Ink detection signal
4-19	Color drum signal
4-20	A4 drum signal
4-21	Drum set signal
4-22	Clamper open sensor
4-23	Clamper close sensor
4-24	Drum master sensor
4-25	Master eject position SN
4-26	Paper exit timing sensor
4-27	Printing pressure HP sensor
4-28	2nd drum master sensor
4-30	Table lowering switch
4-31	Table lower sensor
4-32	Paper height sensor
4-33	Paper end sensor
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

No.	Menu Items
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 SN
4-64	ADF original set sensor
4-65	ADF original length SN 1
4-66	ADF original length SN 2
4-67	ADF original width sensor 1
4-68	ADF original width sensor 2
4-69	ADF open sensor
4-70	Key counter signal
4-80	Master edge sensor
4-81	Duct plate HP sensor
4-82	Lower master tray switch
4-83	Duct jam sensor
4-90	Ink idling roller HP sensor
4-91	Ink temperature

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 - scan
5-3	Scanner motor - return
5-4	Scanner to HP
5-5	Duct plate motor - close
5-6	Duct plate motor - open
5-7	Duct plate motor: to HP
5-8	Duct fan motor
5-9	Master feed motor - Backward
5-10	Master feed motor – Forward
5-11	Cutter motor – forward
5-12	VHD signal (☛ 3.5.10)
5-13	Master eject motor
5-14	Pressure plate motor: 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
5-27	Ink idling motor
5-28	Ink idling roller: down
5-29	Ink idling roller: up
5-30	Table motor - down
5-31	Table motor - up
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

No.	Menu Items
5-43	Registration motor: 90 rpm
5-44	Registration motor: 105 rpm
5-45	Registration motor: 120 rpm
5-46	Air knife fan motors
5-47	Vacuum fan motor
5-48	Paper delivery motor - low
5-49	Paper delivery motor - high
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	Key counter signal
5-64	Not used
5-70	Master re-setting
5-71	Master push Mylar - push
5-72	Master push Mylar - free
5-73	Cutter motor - reverse
5-74	T/H driving motor - up
5-75	T/H driving motor - down
5-76	Blower fan motor
5-80	Printing pressure motor HP
5-81	Move to pressure 1
5-82	Move to pressure 2 (HP)
5-83	Move to pressure 3
5-84	Move to pressure 4
5-85	Move to pressure 5
5-90	Main motor to HP
5-91	Main motor to Master clamp
5-92	Main motor : 45rpm
5-93	Paper feed motor : 45rpm
5-94	Registration motor : 45rpm
5-100	All indicators on the panel
5-101	Drum Home Position LED
5-111	Auto Off solenoid

5.7 MAIN MENU NO.6: ADJUSTMENT

5.7.1 SP TABLE

No.	Menu Items	Default	Settings
6-1	Main-scan position - platen	0.0	-5.0 to 2.0 mm (☛ 5.7.3)
6-2	Main-scan position - ADF	0.0	-5.0 to 5.0 mm (☛ 5.7.3)
6-3	Scan start position - platen	0.0	-2.0 to 5.0 mm (☛ 5.7.3)
6-4	Scan start position - ADF	0.0	-5.0 to 5.0 mm (☛ 5.7.3)
6-5	Scanning speed - platen	0.0	-5.0 to 5.0 % (☛ 5.7.3)
6-6	Scanning speed - ADF mode	0.0	-5.0 to 5.0 % (☛ 5.7.3)
6-10	Master writing speed	0.0	-5.0 to 5.0 % (☛ 5.7.3)
6-11	Master writing length (Not used)	0.0	-5.0 to 5.0 %
6-20	Registration buckle	18	0 to100 pulses (☛ 5.7.6)
6-21	Paper registration position	0.0	-5.0 to 5.0 mm (☛ 5.7.3)
6-27	Master making density - Tint	1	0: Pale, 1: Normal, 2: Dark
6-28	Master making density - Photo	1	0: Pale, 1: Normal, 2: Dark
6-29	Master making density - LtrPht	1	0: Pale, 1: Normal, 2: Dark
6-30	Master making density - Letter	1	0: Pale, 1: Normal, 2: Dark
6-31	SBU calibration	–	Start with # key (☛ 5.7.4)
6-32	MTF filter - Letter : M	1	0 to 7 (☛ 5.7.5)
6-33	MTF filter - Letter : S	1	0 to 7 (☛ 5.7.5)
6-34	MTF filter – Letter/Photo : M	4	0 to 7 (☛ 5.7.5)
6-35	MTF filter – Letter/Photo : S	4	0 to 7 (☛ 5.7.5)
6-36	MTF filter - Photo : M	1	0 to 7 (☛ 5.7.5)
6-37	MTF filter - Photo : S	1	0 to 7 (☛ 5.7.5)
6-40	Ink detection adjustment	–	(☛ 5.7.2)
6-50	Master end sensor voltage	–	0.5 to 3.5V (☛ 3.5.9)
6-51	Master edge sensor voltage	–	1.5 to 3.5V (☛ 3.5.7)
6-52	Duct jam sensor voltage	–	0.5 to 3.5V (☛ 3.5.6)
6-53	2nd drum master sensor voltage	-	0.5 to 3.5V (☛ 3.5.8)
6-60	Master returning value	100	0 to 200〔0.1mm〕(☛ 5.7.7)
6-61	Master length - A3 drum (Not used)	5400	4200 to 6000〔0.1mm〕
6-63	Master length – A4 drum (Not used)	3400	3000 to 6000〔0.1mm〕
6-64	Master pushing value (Not used)	50	0 to 100〔pulses〕(☛ 5.7.8)
6-70	Trial pressure: low temp	2	1 to 5 (☛ 6.7.5)
6-71	60rpm pressure: low temp	1	1 to 5 (☛ 6.7.5)
6-72	75rpm pressure: low temp	3	1 to 5 (☛ 6.7.5)
6-73	90rpm pressure: low temp	4	1 to 5 (☛ 6.7.5)
6-74	105rpm pressure: low temp	5	1 to 5 (☛ 6.7.5)
6-75	120rpm pressure: low temp	5	1 to 5 (☛ 6.7.5)
6-76	Trial pressure: normal temp	2	1 to 5 (☛ 6.7.5)

No.	Menu Items	Default	Settings
6-77	60rpm pressure: normal temp	1	1 to 5 (☛ 6.7.5)
6-78	75rpm pressure: normal temp	2	1 to 5 (☛ 6.7.5)
6-79	90rpm pressure: normal temp	3	1 to 5 (☛ 6.7.5)
6-80	105rpm pressure: normal temp	4	1 to 5 (☛ 6.7.5)
6-81	120rpm pressure: normal temp	5	1 to 5 (☛ 6.7.5)
6-82	Trial pressure: high temp	2	1 to 5 (☛ 6.7.5)
6-83	60rpm pressure: high temp	1	1 to 5 (☛ 6.7.5)
6-84	75rpm pressure: high temp	1	1 to 5 (☛ 6.7.5)
6-85	90rpm pressure: high temp	2	1 to 5 (☛ 6.7.5)
6-86	105rpm pressure: high temp	3	1 to 5 (☛ 6.7.5)
6-87	120rpm pressure: high temp	5	1 to 5 (☛ 6.7.5)
6-100	Paper registration 15rpm	0	-40 to 40 (☛ 5.7.9)
6-101	Paper registration 30rpm	0	-40 to 40 (☛ 5.7.9)
6-102	Paper registration 45rpm	0	-40 to 40 (☛ 5.7.9)
6-103	Paper registration 60rpm	0	-40 to 40 (☛ 5.7.9)
6-104	Paper registration 75rpm	0	-40 to 40 (☛ 5.7.9)
6-105	Paper registration 90rpm	0	-40 to 40 (☛ 5.7.9)
6-106	Paper registration 105rpm	0	-40 to 40 (☛ 5.7.9)
6-107	Paper registration 120rpm	0	-40 to 40 (☛ 5.7.9)
6-108	Paper Regist: skip:15rpm	0	-40 to 40
6-109	Paper Regist: skip: 30pm	0	-40 to 40
6-110	Paper Regist: skip: 45rpm	0	-40 to 40
6-111	Paper Regist: skip: 60rpm	0	-40 to 40
6-112	Paper Regist: skip: 75rpm	0	-40 to 40
6-113	Paper Regist: skip: 90rpm	0	-40 to 40
6-114	Paper Regist: skip: 105rpm	0	-40 to 40
6-115	Paper Regist: skip: 120rpm	0	-40 to 40
6-116	Paper middle bulge: 15rpm (Not used)	0	-100 to 100 (☛ 5.7.10)
6-117	Paper middle bulge: 30rpm (Not used)	0	-100 to 100 (☛ 5.7.10)
6-118	Paper middle bulge: 45rpm (Not used)	0	-100 to 100 (☛ 5.7.10)
6-119	Paper middle bulge: 60rpm (Not used)	0	-100 to 100 (☛ 5.7.10)
6-120	Paper middle bulge: 75rpm (Not used)	0	-100 to 100 (☛ 5.7.10)
6-121	Paper middle bulge: 90rpm (Not used)	0	-100 to 100 (☛ 5.7.10)
6-122	Paper middle bulge: 105rpm (Not used)	0	-100 to 100 (☛ 5.7.10)
6-123	Paper middle bulge: 120rpm (Not used)	0	-100 to 100 (☛ 5.7.10)
6-124	Paper front bulge: 15rpm (Not used)	0	-90 to 8 (☛ 5.7.11)
6-125	Paper front bulge: 30rpm (Not used)	0	-90 to 8 (☛ 5.7.11)
6-126	Paper front bulge: 45rpm (Not used)	0	-90 to 8 (☛ 5.7.11)
6-127	Paper front bulge: 60rpm (Not used)	0	-90 to 8 (☛ 5.7.11)
6-128	Paper front bulge: 75rpm (Not used)	0	-90 to 8 (☛ 5.7.11)
6-129	Paper front bulge: 90rpm (Not used)	0	-90 to 8 (☛ 5.7.11)
6-130	Paper front bulge: 105rpm (Not used)	0	-90 to 8 (☛ 5.7.11)
6-131	Paper front bulge: 120rpm (Not used)	0	-90 to 8 (☛ 5.7.11)
6-132	Paper Regist: A4 drum 15 (Not used)	0	-40 to 40
6-133	Paper Regist: A4 drum 30 (Not used)	0	-40 to 40
6-134	Paper Regist: A4 drum 45 (Not used)	0	-40 to 40
6-135	Paper Regist: A4 drum 60 (Not used)	0	-40 to 40

No.	Menu Items	Default	Settings
6-136	Paper Regist: A4 drum 75 (Not used)	0	-40 to 40
6-137	Paper Regist: A4 drum 90 (Not used)	0	-40 to 40
6-138	Paper Regist: A4 drum 105 (Not used)	0	-40 to 40
6-139	Paper Regist: A4 drum 120 (Not used)	0	-40 to 40
6-140	Paper Regist: skip: A4: 15 (Not used)	0	-40 to 40
6-141	Paper Regist: skip: A4: 30 (Not used)	0	-40 to 40
6-142	Paper Regist: skip: A4: 45 (Not used)	0	-40 to 40
6-143	Paper Regist: skip: A4: 60 (Not used)	0	-40 to 40
6-144	Paper Regist: skip: A4: 75 (Not used)	0	-40 to 40
6-145	Paper Regist: skip: A4: 90 (Not used)	0	-40 to 40
6-146	Paper Regist: skip: A4: 105 (Not used)	0	-40 to 40
6-147	Paper Regist: skip: A4: 120 (Not used)	0	-40 to 40
6-148	Paper middle bulge: A4: 15 (Not used)	0	-100 to 100
6-149	Paper middle bulge: A4: 30 (Not used)	0	-100 to 100
6-150	Paper middle bulge: A4: 45 (Not used)	0	-100 to 100
6-151	Paper middle bulge: A4: 60 (Not used)	0	-100 to 100
6-152	Paper middle bulge: A4: 75 (Not used)	0	-100 to 100
6-153	Paper middle bulge: A4: 90 (Not used)	0	-100 to 100
6-154	Paper middle bulge: A4: 105 (Not used)	0	-100 to 100
6-155	Paper middle bulge: A4: 120 (Not used)	0	-100 to 100
6-156	Paper front bulge: A4: 15 (Not used)	0	-90 to 8
6-157	Paper front bulge: A4: 30 (Not used)	0	-90 to 8
6-158	Paper front bulge: A4: 45 (Not used)	0	-90 to 8
6-159	Paper front bulge: A4: 60 (Not used)	0	-90 to 8
6-160	Paper front bulge: A4: 75 (Not used)	0	-90 to 8
6-161	Paper front bulge: A4: 90 (Not used)	0	-90 to 8
6-162	Paper front bulge: A4: 105 (Not used)	0	-90 to 8
6-163	Paper front bulge: A4: 120 (Not used)	0	-90 to 8

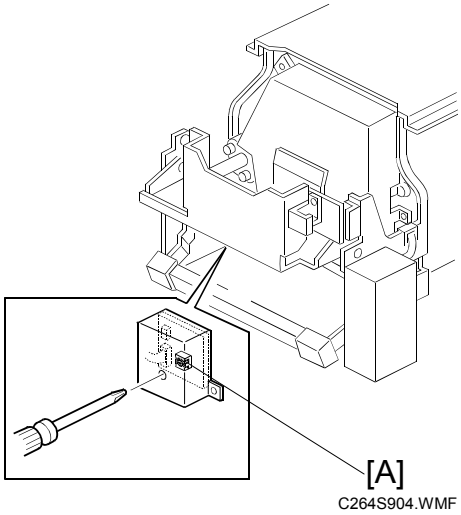
5.7.2 SP6-40: INK DETECTION ADJUSTMENT

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 VR1 [A] on the ink detection board until the display becomes “3.0 u” (3 μs).

NOTE: When the drum has ink inside, the machine displays “----“.



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5.7.3 IMAGE ADJUSTMENT (SP6-10, -21, -5, -3, AND -1)

Adjusts the image position on prints by changing the SP settings.

Adjust the following in the given order.

SP6-10: Master writing speed

↓

SP6-21: Paper registration position

↓

SP6-05: Scanning speed - platen

SP6-06: Scanning speed - ADF

↓

SP6-03: Scanning start position - platen

SP6-04: Scanning start position - ADF

↓

SP6-01: Main scan position - platen

SP6-02: Main scan position - ADF

↓

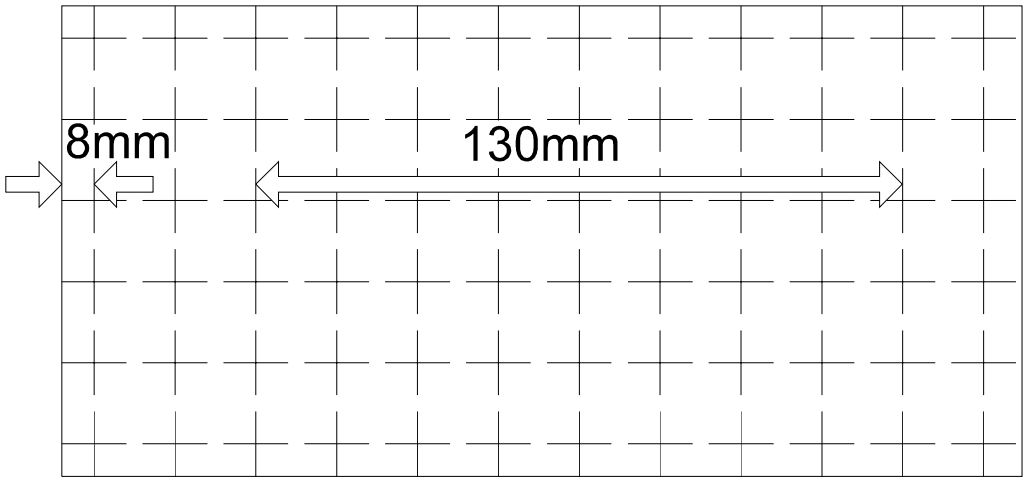
SP6-31: SBU calibration (☛ 5.7.4)

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



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1. Input SP8-10 (Test patterns) and enter “6”, then press the Start key.
2. Exit the SP mode, then print 10 copies at 90 rpm (speed 3). Use the 10th print for the adjustment.
3. The length of the 8 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, then 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 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.

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 8 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 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.

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

Do this after one of the following is replaced:

- RAM on the MPU
- White plate located behind the original scale .

Do it at the end of the image adjustment procedure (☛ 5.7.3)

1. Place a stack of 10 sheets of paper on the exposure glass.
2. Access SP6-31 and then press the Enter key to start the auto calibration.

5.7.5 SP6-32 TO 37: MTF FILTER

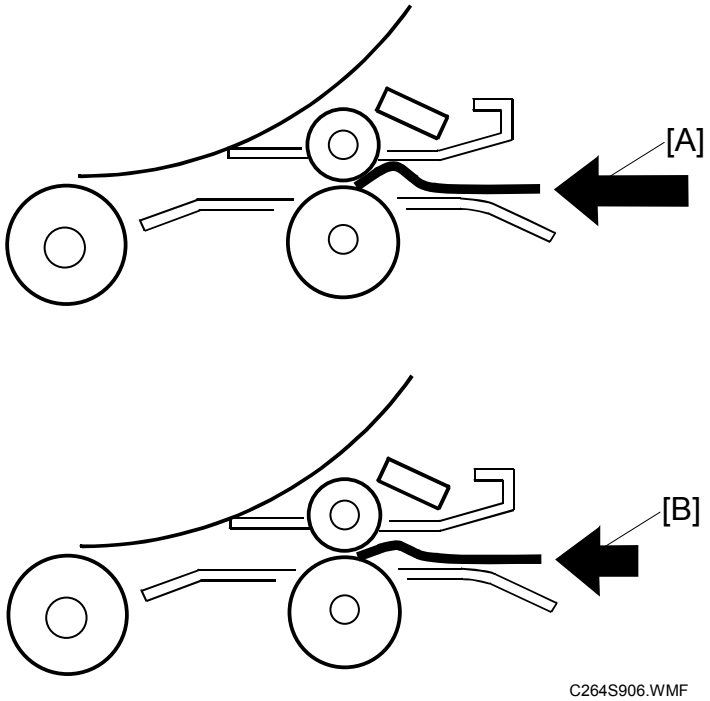
Sharpens the image, but moiré can become more apparent.

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

5.7.6 SP6-20: REGISTRATION BUCKLE (NOT USED)

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 is more likely to be correct.

5.7.7 SP6-60: MASTER RETURN VALUE

The auto adjustable master set mechanism automatically moves the leading edge of the master to the correct position after the user installs a master roll (☛ 6.5.2).

This position can be adjusted with SP 6-60. This SP adjusts the amount that the machine feeds the master after it detects the leading edge of the master.

Bigger number: increases feeding
Smaller number: decreases feeding

One unit: 0.1 mm

5.7.8 SP6-64: MASTER PUSHING VALUE (NOT USED)

This adjusts the pressure between the master push Mylar and the drum.
Bigger number: increases the pressure

Smaller number: decreases the pressure

5.7.9 SP6-100 TO 107: PAPER REGISTRATION - EACH SPEED

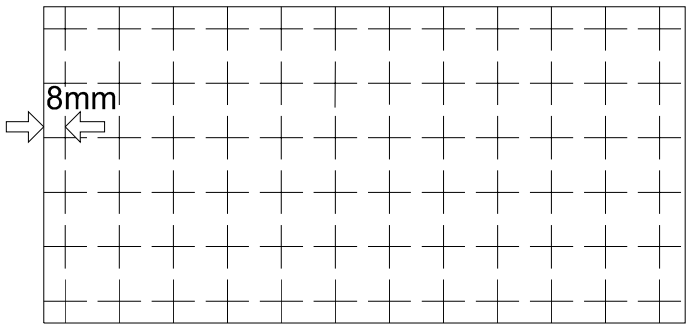
The following procedure allows the image position to be adjusted for each speed (15, 30, 60, 90 and 120 rpm)

NOTE: If you want to adjust the image position for all speeds at the same time, use SP6-21 (Paper registration position).

1. Set SP2-34 (Slow starting mode) to a value of “30 rpm” (print from 30 rpm).
2. Set SP8-10 (Test patterns) to a value of “6”, then press the Start key.
3. Access SP4-91 (Ink temperature), and check the ink temperature.
4. Make 6 copies at speed 5 (finishing with 120 rpm). Perform the adjustment below for all 6 copies.
   Trial print: 30 rpm
   1st print: 45 rpm
   2nd print: 60 rpm
   3rd print: 75 rpm
   4th print: 90 rpm
   5th print: 105 rpm
   6th print: 120 rpm

NOTE: When the ink temperature is low (below 15 degrees) or high (28 degrees or above), you can adjust the machine to make only 6 copies (change SP 8-23 to ‘On’). Then, the 2nd print will not be made, because it is the same speed as the first print.
Trial print: 30 rpm
1st print: 45 rpm
~~2nd print: 45 rpm~~
3rd print: 60 rpm
4th print: 75 rpm
5th print: 90 rpm
6th print: 105 rpm
7th print: 120 rpm

5. The distance between the leading edge and first line should be 8mm, as shown below.



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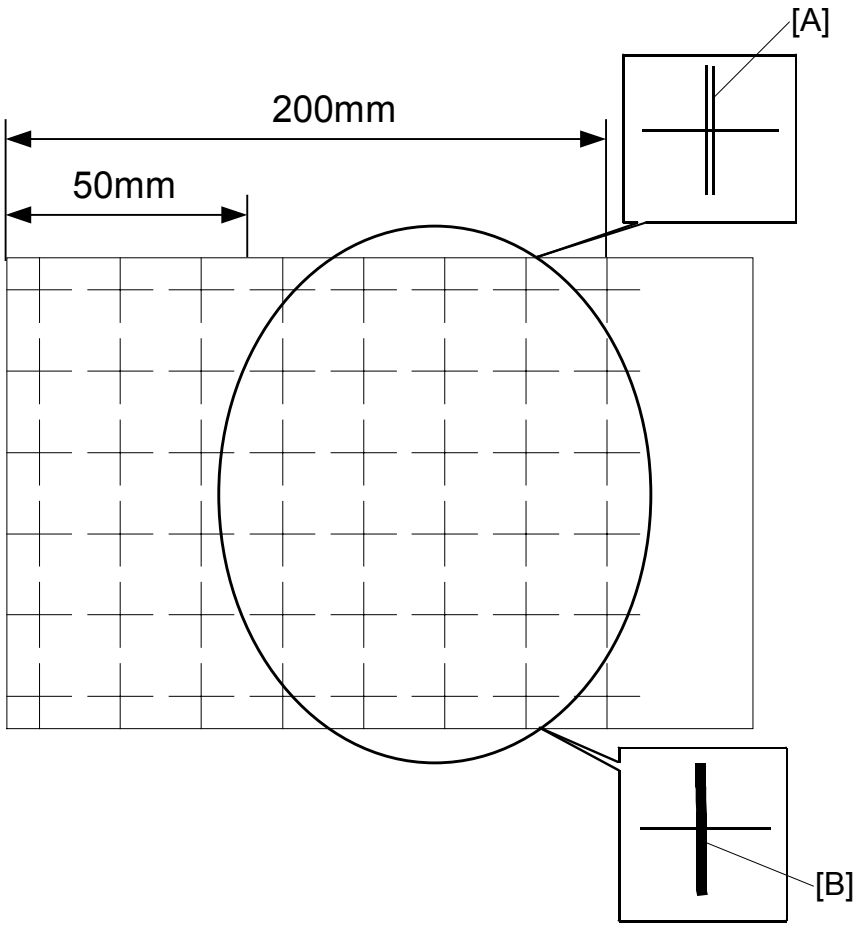
6. If this distance is not 8 mm, access SP6-101 to 107 and then input a value to adjust the distance (range: -40 to 40, step: 1) for each of 6 copy samples.
   To adjust the distance for 30 cpm, use SP 6-101.
   To adjust the distance for 45 cpm, use SP 6-102.
   To adjust the distance for 60 cpm, use SP 6-103.
   To adjust the distance for 75 cpm, use SP 6-104.
   To adjust the distance for 90 cpm, use SP 6-105.
   To adjust the distance for 105 cpm, use SP 6-106.
   To adjust the distance for 120 cpm, use SP 6-107.
   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 8mm.
7. Perform the adjustment again for any of the samples that are still outside the 8mm standard.
8. Return SP2-34 (Slow starting mode) to the value it was at before the adjustment.

5.7.10 SP6-116 TO 123: PAPER MIDDLE BUCKLE (NOT USED)

Adjusts doubled [A] or blurred [B] images (e.g. bold lines, text) for each printing speed (15, 30, 60, 75, 90, 105, 120 rpm), by changing SP settings.



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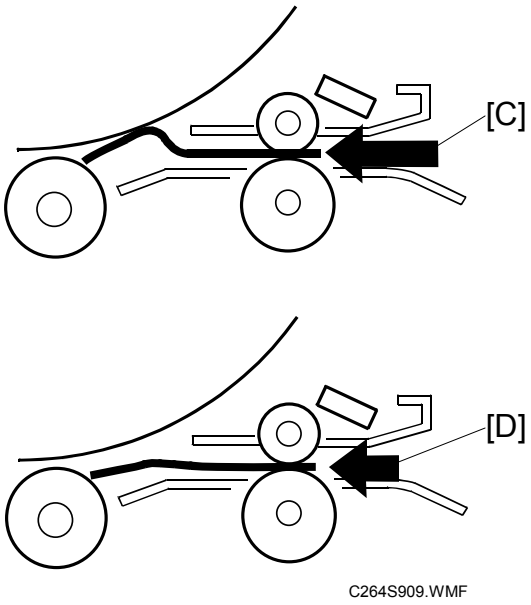

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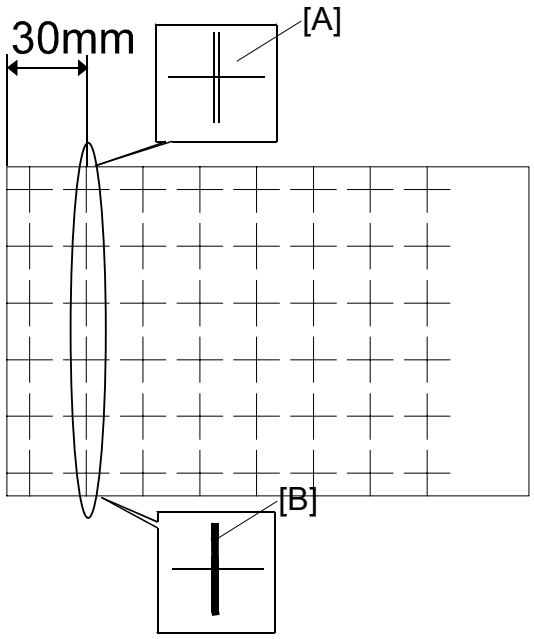
1. Set SP2-34 (Slow starting mode) to a value of “30 rpm” (print from 30rpm).
2. Set SP8-10 (Test patterns) to a value of “6”, then press the Start key.
3. Access SP4-91 (Ink temperature), then check the ink temperature.
4. Make 6 copies at speed 5 (finishing with 120 rpm). Perform the adjustment below for all 6 copies.
   Trial print: 30 rpm
   1st print: 45 rpm
   2nd print: 60 rpm
   3rd print: 75 rpm
   4th print: 90 rpm
   5th print: 105 rpm
   6th print: 120 rpm

NOTE: When the ink temperature is low (below 15 degrees) or high (28 degrees or above), you can adjust the machine to make only 6 copies (change SP 8-23 to ‘On’). Then, the 2nd print will not be made, because it is the same speed as the first print.
Trial print: 30 rpm
1st print: 45 rpm
~~2nd print: 45 rpm~~
3rd print: 60 rpm
4th print: 75 rpm
5th print: 90 rpm
6th print: 105 rpm
7th print: 120 rpm

5. Check the area from the leading edge to about 50 to 200mm down for any doubled or blurred images.
6. If any are present, access SP6-117 to 123 and then input a value to adjust the doubled or blurred images (range: -100 to 100, step: 1) for each of 6 copies samples
   To adjust the distance for 30 cpm, use SP 6-117.
   To adjust the distance for 45 cpm, use SP 6-118.
   To adjust the distance for 60 cpm, use SP 6-119.
   To adjust the distance for 75 cpm, use SP 6-120.
   To adjust the distance for 90 cpm, use SP 6-121.
   To adjust the distance for 105 cpm, use SP 6-122.
   To adjust the distance for 120 cpm, use SP 6-123.
   Higher values ([C]): Blurred images improve, doubled images tend to be more noticeable.
   Lower values ([D]): Doubled images improve, blurred images tend to be more noticeable.
7. Perform the adjustment again where necessary.
8. Return SP2-34 (Slow starting mode) to the value it was at before the adjustment.

5.7.11 SP6-124 TO 131: PAPER FRONT BUCKLE (NOT USED)

Adjusts doubled [A] or blurred [B] images (e.g. bold lines, text) for each printing speed (15, 30, 60, 75, 90, 105, 120 rpm), by changing SP settings.



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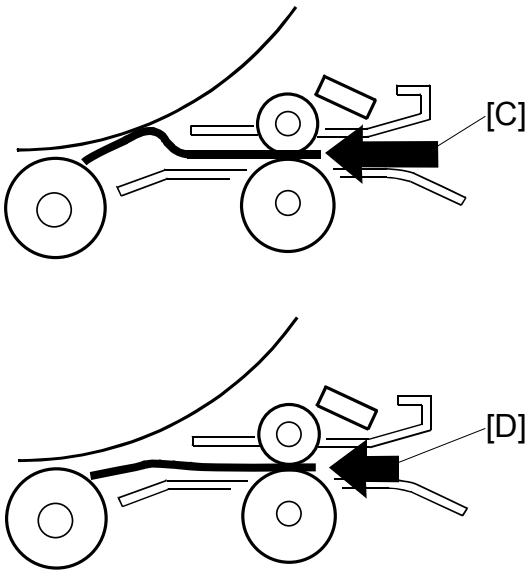

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1. Set SP2-34 (Slow starting mode) to a value of “30 rpm” (print from 30rpm).
2. Set SP8-10 (Test patterns) to a value of “6”, then press the Start key.

3. Access SP4-91 (Ink temperature), then check the ink temperature.
4. Make 6 copies at speed 5 (finishing with 120 rpm). Perform the adjustment below for all 6 copies.
   Trial print: 30 rpm
   1st print: 45 rpm
   2nd print: 60 rpm
   3rd print: 75 rpm
   4th print: 90 rpm
   5th print: 105 rpm
   6th print: 120 rpm

NOTE: When the ink temperature is low (below 15 degrees) or high (28 degrees or above), you can adjust the machine to make only 6 copies (change SP 8-23 to 'On'). Then, the 2nd print will not be made, because it is the same speed as the first print.
Trial print: 30 rpm
1st print: 45 rpm
~~2nd print: 45 rpm~~
3rd print: 60 rpm
4th print: 75 rpm
5th print: 90 rpm
6th print: 105 rpm
7th print: 120 rpm

5. Check the area from the leading edge to about 30mm down for any doubled or blurred images.
6. If any are present, access SP6-125 to 131 and then input a value to adjust the doubled or blurred images (range: -90 to 8, step: 1) for each of 6 copies samples
   To adjust the distance for 30 cpm, use SP 6-125.
   To adjust the distance for 45 cpm, use SP 6-126.
   To adjust the distance for 60 cpm, use SP 6-127.
   To adjust the distance for 75 cpm, use SP 6-128.
   To adjust the distance for 90 cpm, use SP 6-129.
   To adjust the distance for 105 cpm, use SP 6-130.
   To adjust the distance for 120 cpm, use SP 6-131.

   Higher values ([C]): Blurred images improve, doubled images tend to be more noticeable.
   Lower values ([D]): Doubled images improve, blurred images tend to be more noticeable.
7. Perform the adjustment again where necessary.
8. Return SP2-34 (Slow starting mode) to the value it was at before the adjustment.

5.8 MAIN MENU NO.7: MEMORY CLEAR

5.8.1 SP TABLE

No.	Menu Items	Default	Settings
7-1	Factory settings clear	-	Hold 0 & push # to clear (☛ 5.8.2)
7-3	Total counter clear	-	Hold 0& push # to clear
7-4	Jam/Error data clear	-	Hold 0 & push # to clear

5.8.2 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	-	Start with # key (☛ 5.9.2)
8-2	Upload main firmware	-	Start with # key (☛ 5.9.3)
8-10	Test patterns	6	Pattern 6 (1-9) A4 start with # (☛ 5.9.4)
8-18	Temporary security off	Off	Off/On
8-19	Free run - ADF	100%	50 to 200%
8-20	Free run - scanner	100%	50 to 200%
8-21	Paper feed at 15 rpm	Off	Off/On (☛ 5.9.6)
8-22	Free run - Paper feed (15 rpm)	Off	Off/On (☛ 5.9.7)
8-23	30->45->60 rpm print mode	Off	Off/On (☛ 5.9.8)
8-30	All indicators on the panel	-	Active when start press
8-31	Not used	Off	Off/On

5.9.2 SP8-1: DOWNLOAD MAIN FIRMWARE

Updates the main firmware using a flash memory card.

1. Before downloading new firmware, check the current part number and suffix with SP 1-70, or check the version with SP1-73 (☛ 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 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 “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) 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 and press the OK key. Press the "Enter(#)" key.
4. Press the Enter key. (It takes about 2.0 minutes to complete.)
5. Check that "Completed" is displayed.
6. Turn off the main switch, and remove the flash memory card.

5.9.4 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, but do not use them except for 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

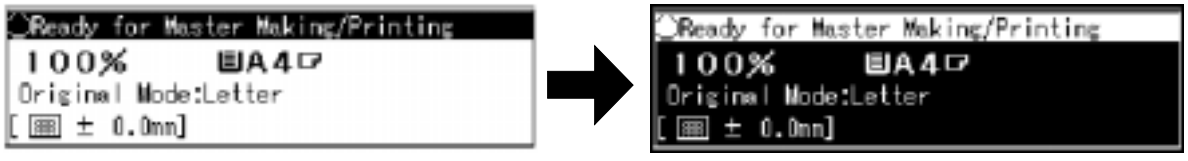
5.9.5 SP 8-18 - TEMPORARY SECURITY OFF

This function cancels "Security Mode" when the engineer repairs/inspects the machine.

The technician must cancel security mode in order to take out the drum.

It is not necessary to cancel security mode in order to make prints; put an original on the exposure glass and make a new master. But if the customer does not want you to waste a master, and is not concerned about security for the master on the drum, then you can cancel security mode and make prints with the master that is on the drum.

When this SP8-18 is "ON", security mode is cancelled and the drum rotates to the home position. You can pull the drum unit out of the machine. At this time, the display on the operation panel is reversed (see the illustration below).



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NOTE: Set SP8-18 to "OFF", after you repair/inspect the machine.

"Security Mode" is used to prevent others from accessing the master on the drum and making prints of confidential documents.

When you set "Security Mode":

- You cannot press the "Proof" key or the "Print" key while the previous master is on the drum
- You cannot pull out the drum unit when the machine is in standby mode.
- Printing will not start until you set a new original and press the "Start" key.
- You cannot clear "Security Mode" by turning off the main switch.

5.9.6 SP8-21: PAPER FEED TEST (15 RPM)

Feeds paper at the lowest speed (15 rpm).

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 (15 RPM)

Drives the paper feed mechanism at the lowest speed (15 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.

To exit this mode, turn off the main switch.

5.9.8 SP8-23: 30-45-60 RPM PRINT MODE

This SP affects the operation of SP 6-100-107, SP 6-116-123, and SP 6-124-131, if the temperature is low (below 15 degrees) or high (28 degrees or above).

NOTE: For details on these SPs, see sections 5.7.9, 5.7.10, and 5.7.11.

If SP 8-23 is set to 'Off', the machine makes 7 test copies at different speeds, including two at 45 rpm.

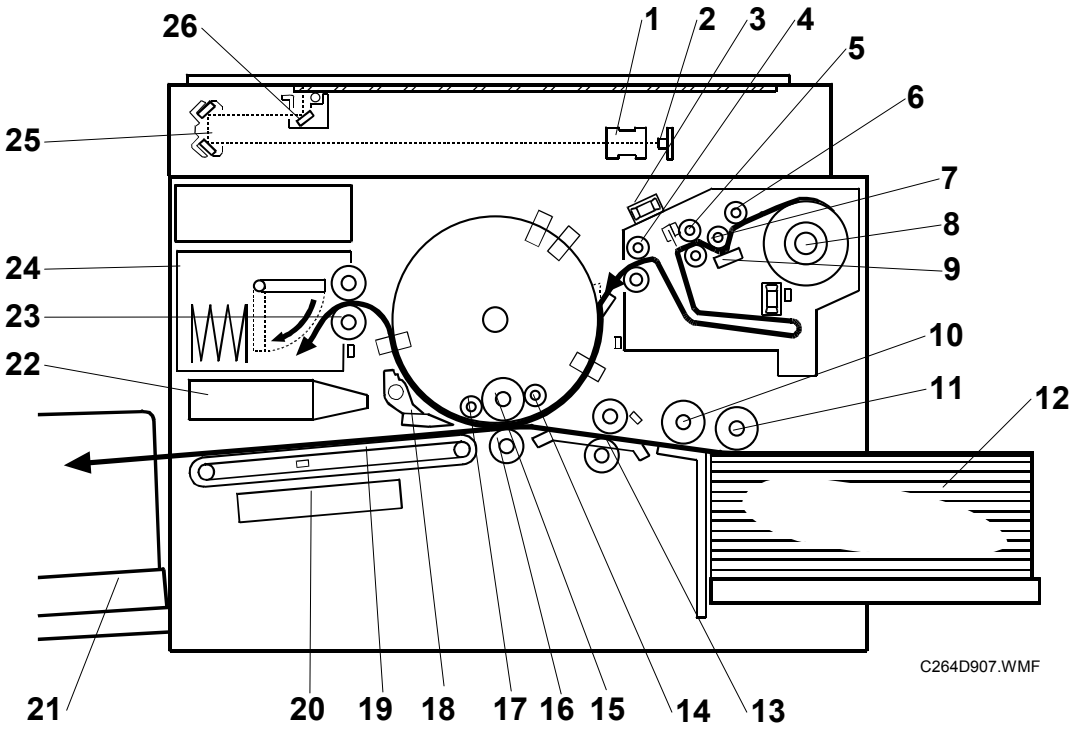
If SP 8-23 is set to 'On', the machine makes 6 test copies at different speeds, and omits one of the copies that are made at 45 rpm .

SP 8-23 automatically goes back to 'Off' after you turn the main switch off/on.

6. DETAILED SECTION DESCRIPTIONS

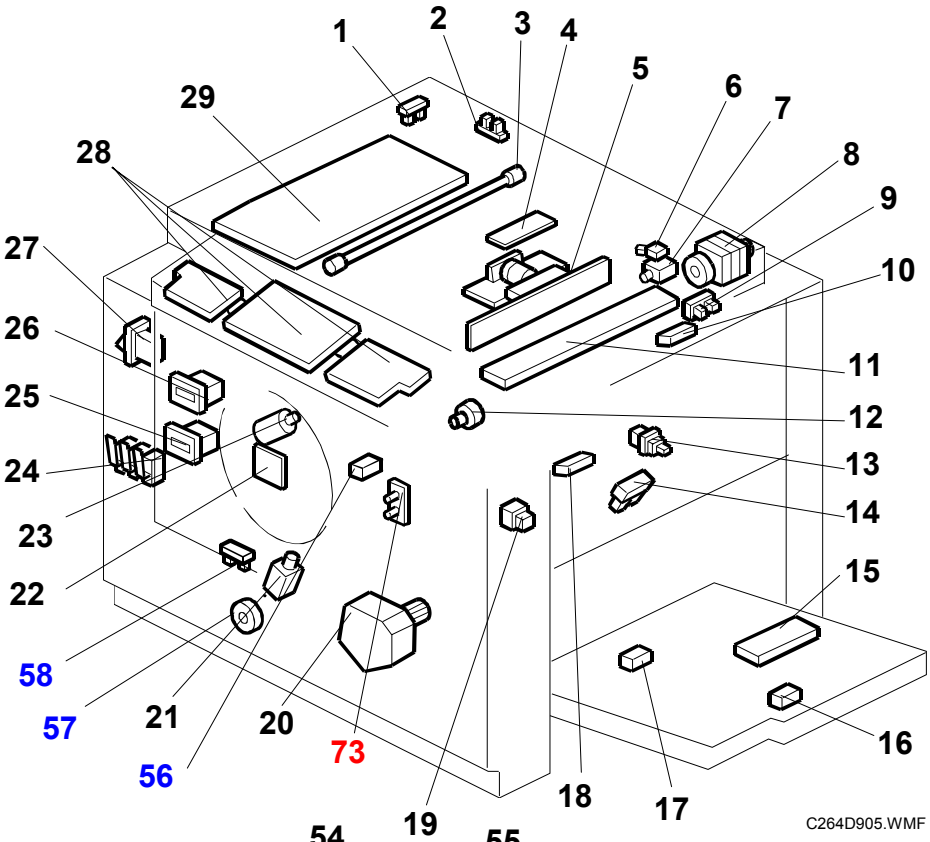
6.1 MECHANISM OVERVIEW

6.1.1 COMPONENT LAYOUT



1. Lens
2. CCD and SBU
3. Blower fan motor
4. Tension roller
5. Master feed roller
6. Master set roller
7. Platen roller
8. Master Roll
9. Thermal head
10. Paper separation roller
11. Paper feed roller
12. Paper table
13. Registration rollers
14. Doctor roller
15. Ink roller
16. Press roller
17. Idling roller
18. Exit pawl
19. Transport belts
20. Vacuum fan motor
21. Paper delivery table
22. Air knife fan motors
23. Master eject rollers
24. Master eject box
25. 2nd scanner
26. 1st scanner

6.1.2 ELECTRICAL COMPONENT LAYOUT



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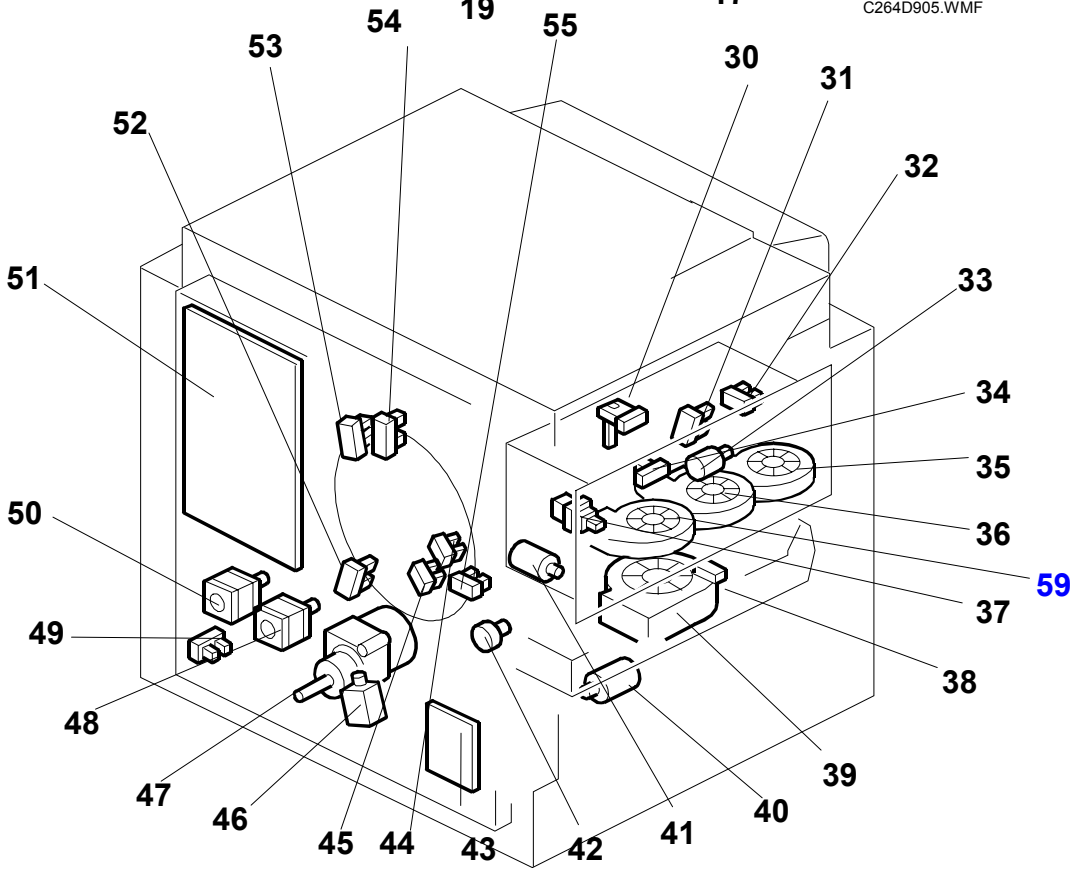
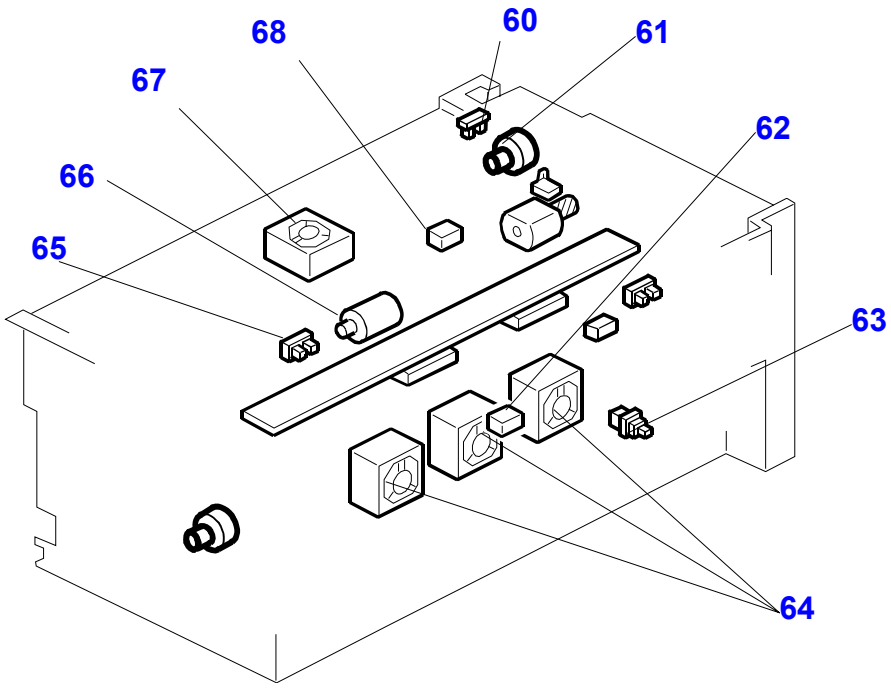
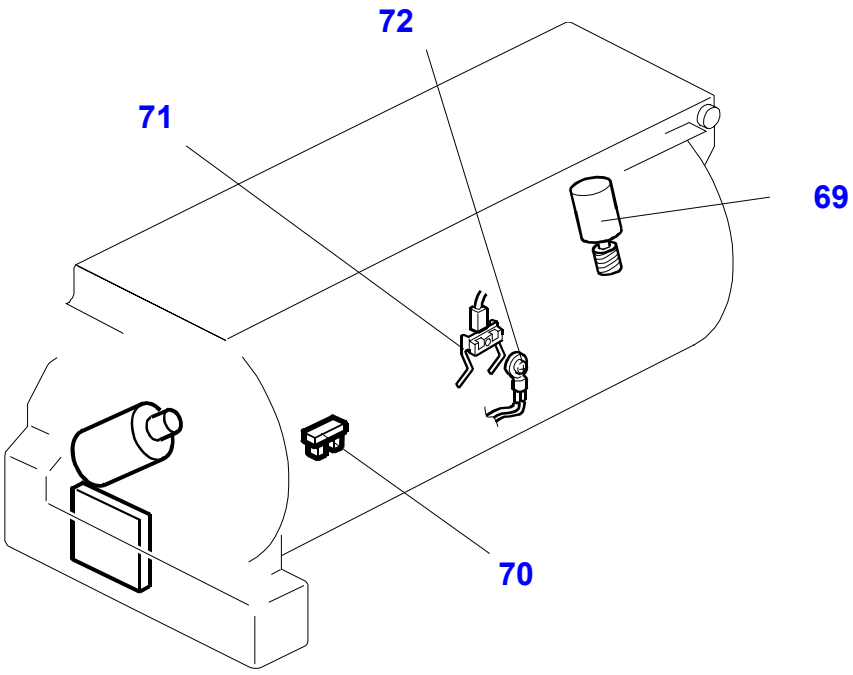


C264D908.WMF



C264D909.WMF



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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.
57	Printing pressure motor	Raises and lowers the pressure roller.
59	Air knife fan motor 3	Provides air to separate the leading edge of the paper from the drum.
61	Duct plate motor	Opens or closes the duct plate at entrance of the duct.
64	Duct fan motors	Provides suction to guide the master into the duct.
66	Thermal head driving motor	Raises and lowers the thermal head.
67	Blower fan motor	Provides air to separate the master.
69	Idling roller motor	Presses or releases the drum idling roller against the drum screen.

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.
56	2nd drum master sensor	Detects if there is a master on the drum.
58	Printing pressure HP sensor	Detects when the printing pressure is at the home position.
60	Duct plate HP sensor	Detects when the duct plate is at the home position.
62	Duct jam sensor	Detects when a master remains in the duct.
65	Thermal head HP sensor	Detects when the thermal head is at the home position.
68	Master edge sensor	Detects the leading edge of the master.
70	Ink idling roller HP sensor	Detects when the idling roller is at home position.

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.

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.
63	Lower master tray set switch	Checks if the lower master tray is installed.

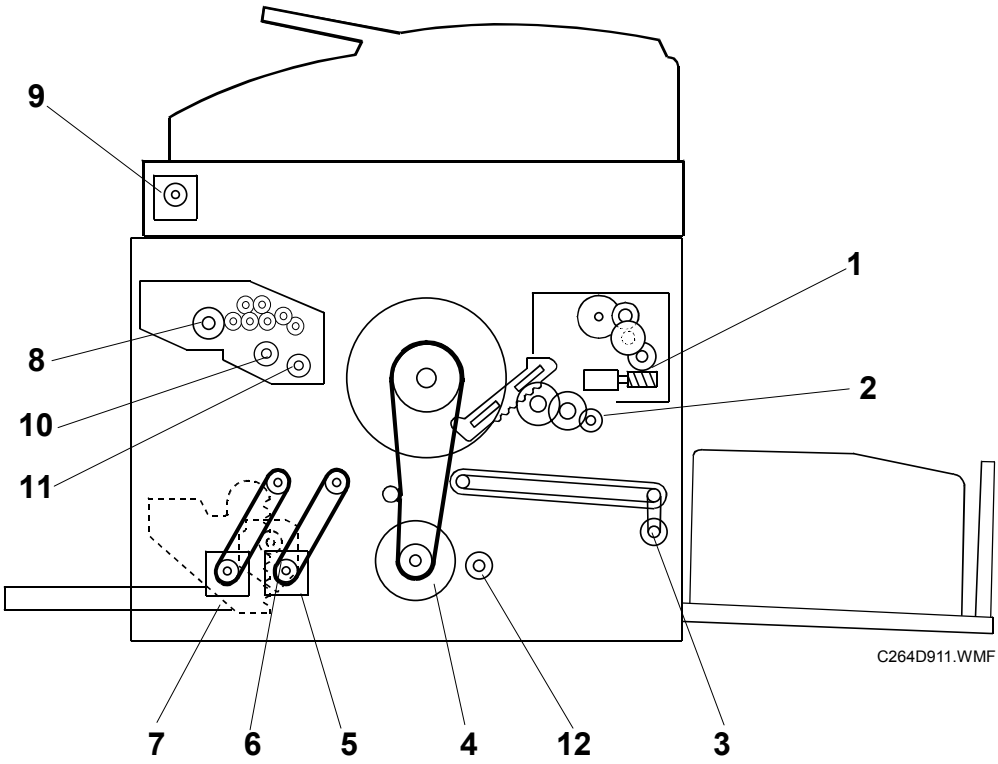
Counters

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.
71	Ink detection pins	Detect if ink is present in the drum
72	Drum thermistor	Detects the temperature inside the drum to adjust various processes.
73	Drum home position indicator (LEDs)	LEDs that indicates the drum position.

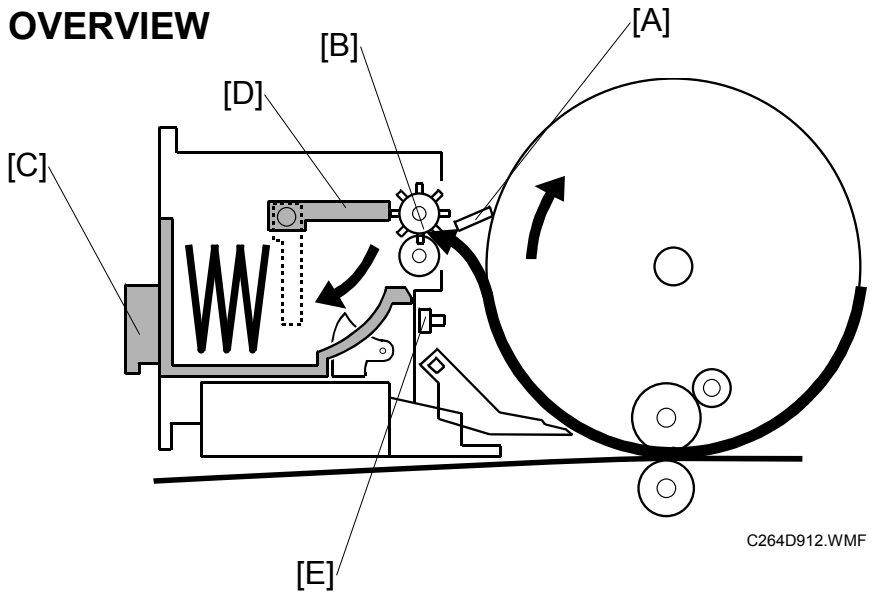
6.1.3 DRIVE LAYOUT



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
10. Thermal head driving motor
11. Duct plate motor
12. Printing pressure 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.

↓

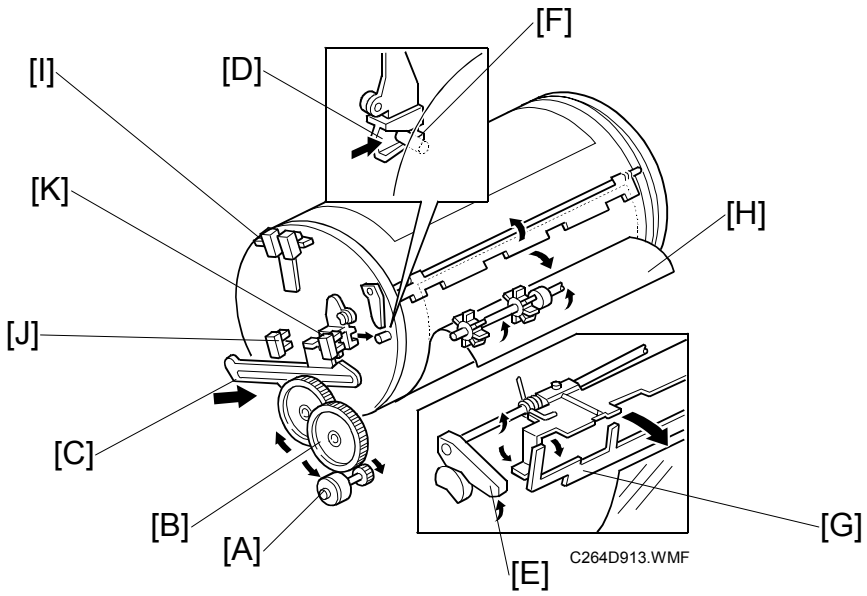
The drum then turns at 30 rpm while the master eject rollers continue to feed the used master into the eject box.

↓

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 MECHEANISM

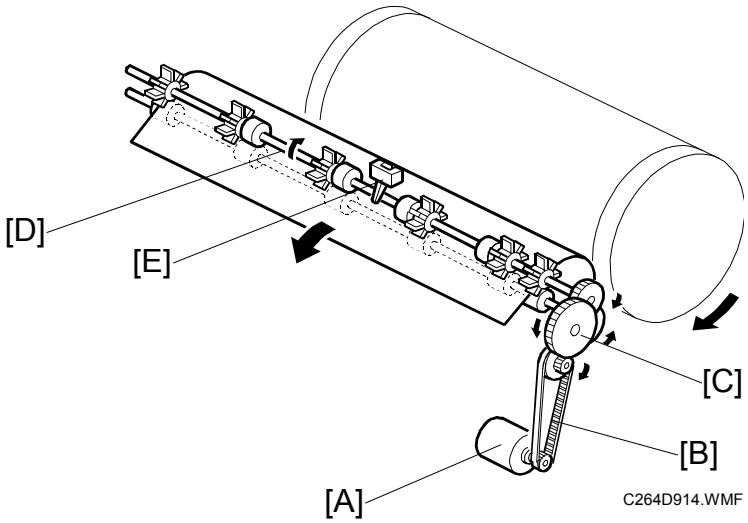


Clamper Mechanism

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



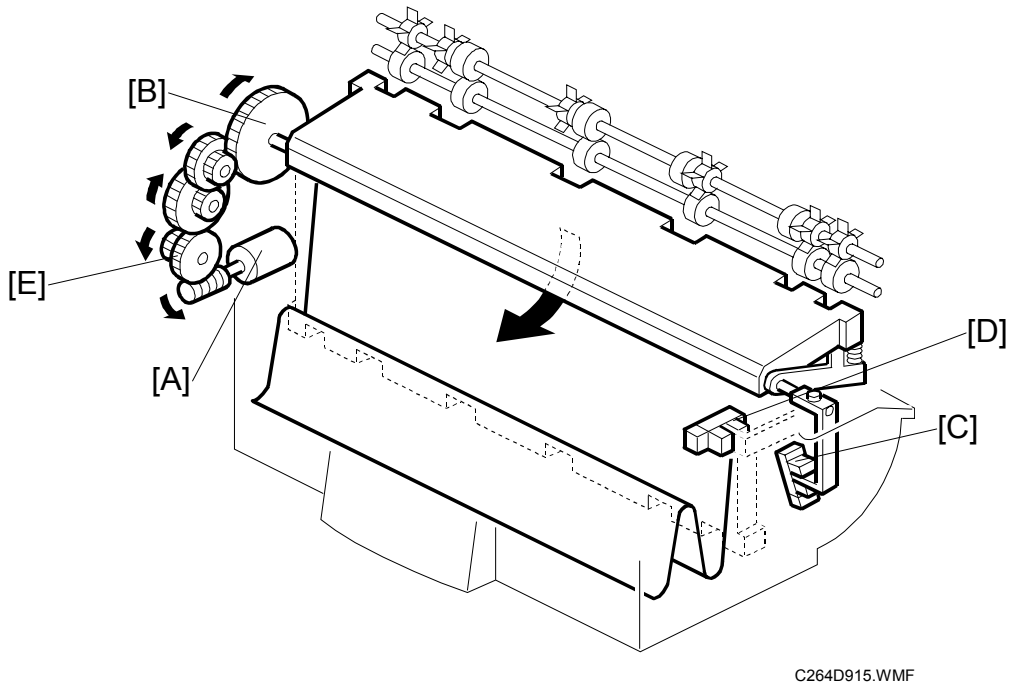
Mechanism

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. (☛ 6.12.1)

6.2.4 PRESSURE PLATE MECHANISM



Mechanism

Pressure plate motor [A]

↓

Gears [B]

↓

Pressure plate rotates

↓

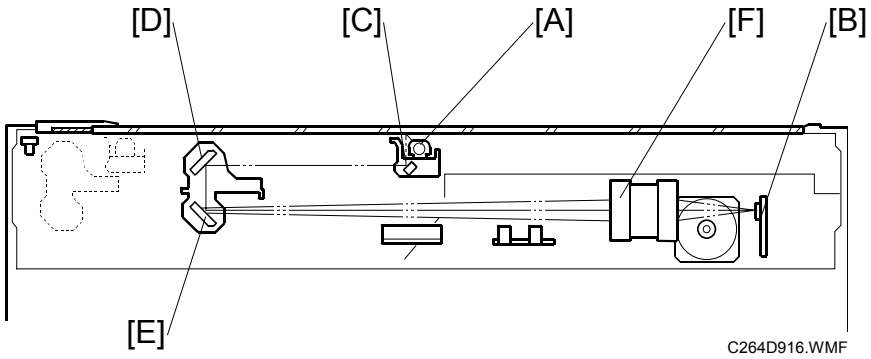
Compresses the masters

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

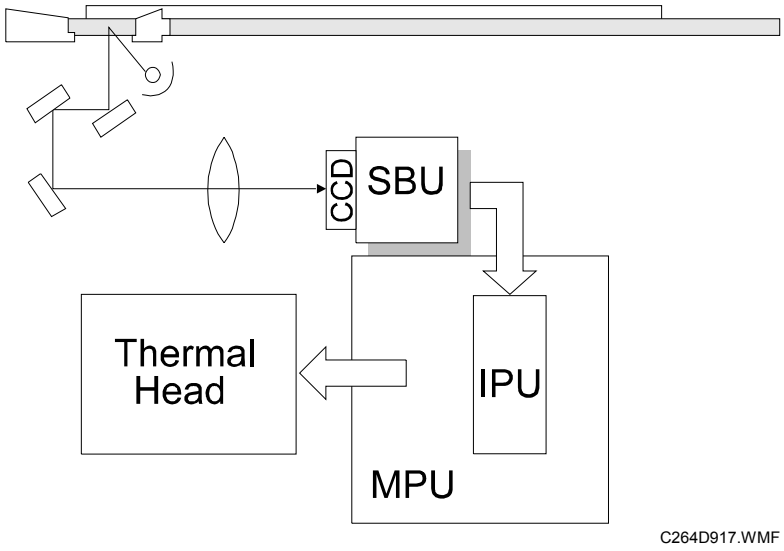


[A]: Exposure lamp
[B]: Charge coupled device (CCD)
[C]: First mirror
[D]: Second mirror
[E]: Third mirror
[F]: Lens

- 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 400 dpi. (☛ 6.4.4)
- The sub-scan resolution is 400 dpi.

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, Smoothing)

↓

Magnification

↓

Binary processing

6.4.2 MTF FILTER

- The MTF filter is used in all modes (Letter, Letter/Photo, Photo, and Tint).
- This model has SP mode adjustments (SP 6-32 to 6-37, see section 5.7.5).

6.4.3 SMOOTHING FILTER

- The Smoothing filter is used in Photo mode only.
- This model has no SP mode adjustments.

6.4.4 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 400 dpi, but the CCD is 600 dpi. Therefore, this model always reduces the amount of scanned data by half before printing.

6.4.5 THERMAL HEAD

Specifications

Length: 292.6 mm

Number of thermal head elements: 4068 dots

Density of thermal head elements: 400 dpi

Thermal head control

The thermal head contains heating elements at a density of 400 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.

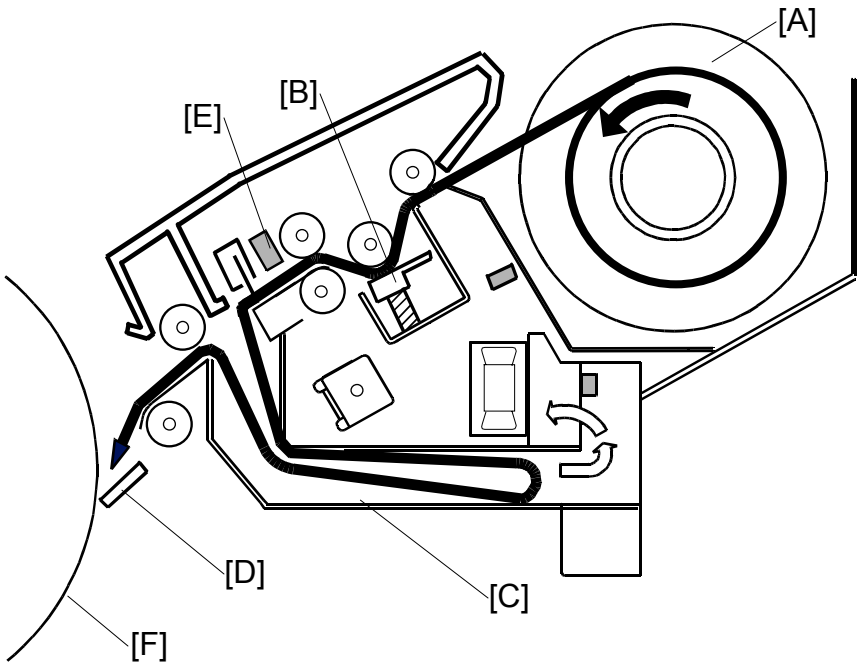
Thermal head protection

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
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
E-40	Thermal Head ID error The CPU detects an abnormal ID signal from the thermal head.	Thermal head MPU Thermal head connector disconnected

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.

Procedure

The machine feeds the master from the master roll [A].

↓

The thermal head [B] makes an image on the master. The master is fed into the master buffer duct [C].

↓

Clamper [D] opens. (The drum is at the master feed position.)

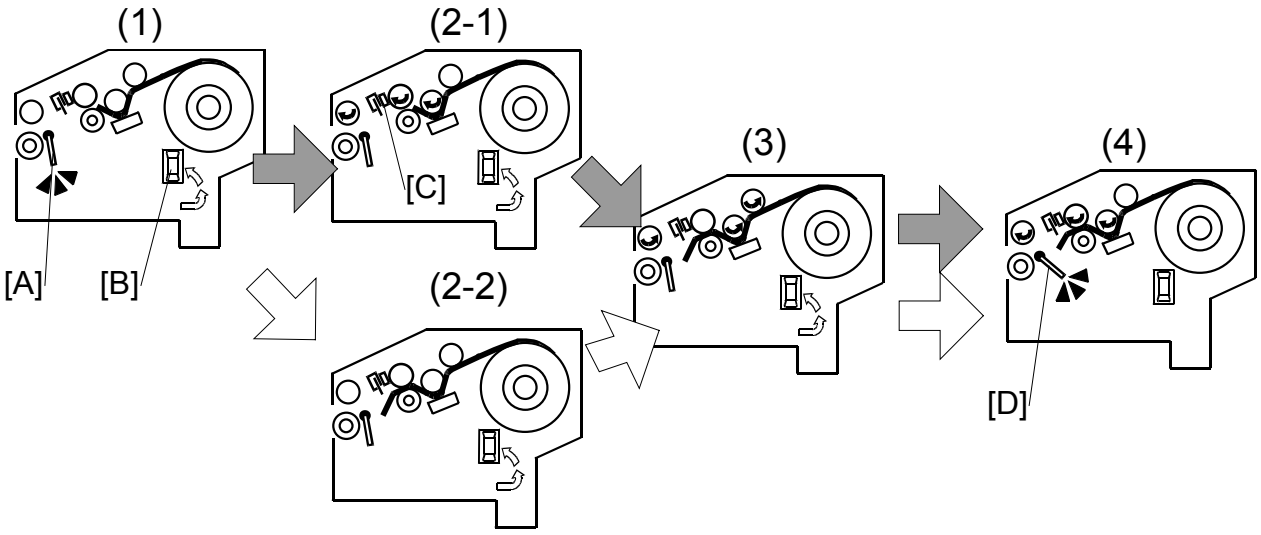
↓

The clamper clamps the master. At this time, the cutter [E] cuts the master.

↓

The master is wrapped around the drum [F].

6.5.2 AUTO ADJUSTABLE MASTER SET



C264D919.WMF

When the customer installs a master roll in the master making unit, the machine automatically adjusts the position of the leading edge of the master.

Procedure

The duct plate moves to the open position [A] from the middle position. (1)

↓

The master vacuum fans [B] turn on. (1)

↓

The master vacuum fans turn on after 2.0 seconds. The master feed motor feeds the master 40 mm when the master edge sensor [C] does not detect the master. (2-1)

If the master edge sensor detects the master, the master feed motor does not feed the master. (2-2)

↓

The master feed motor reverses the master until the master edge sensor does not detect the master. (3)

↓

The master feed motor feeds the master until the master edge sensor detects the master. (3)

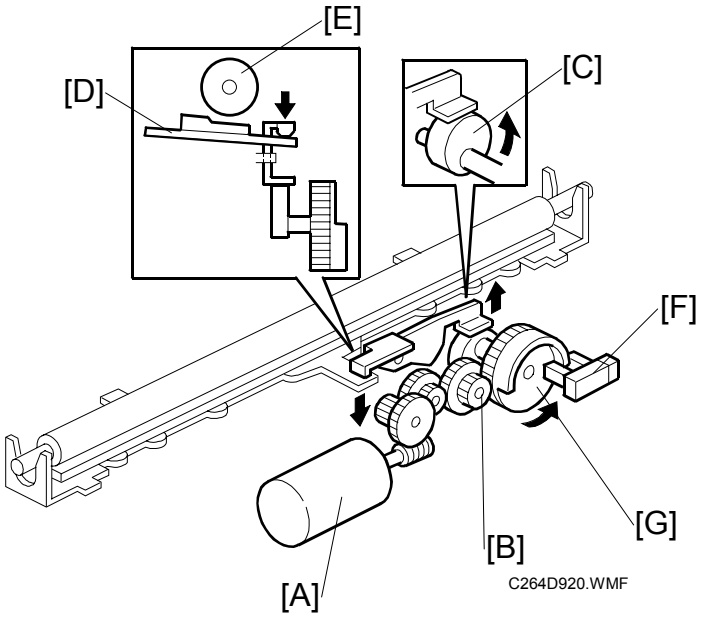
↓

The duct plate moves to the middle position [D] from the open position. (4)

↓

The master vacuum fans turn off. (4)

6.5.3 THERMAL HEAD DRIVING MECHANISM



Mechanism

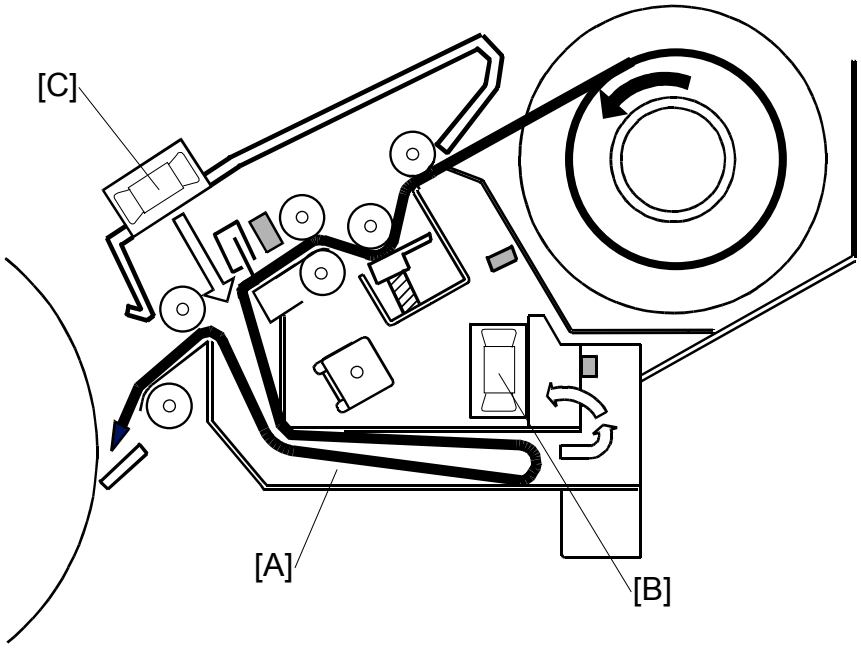
Thermal head driving motor [A]
↓
Gears [B]
↓
Thermal head release cam [C]
↓
Thermal head base [D] is released from the platen roller [E].

Thermal head HP sensor [F] has two stop positions:

- Platen roller applying position
- Platen roller release position

The actuator disk [G] interrupts the thermal head HP sensor [D] when the thermal head base [D] is released from the platen roller [E].

6.5.4 MASTER BUFFER MECHANISM



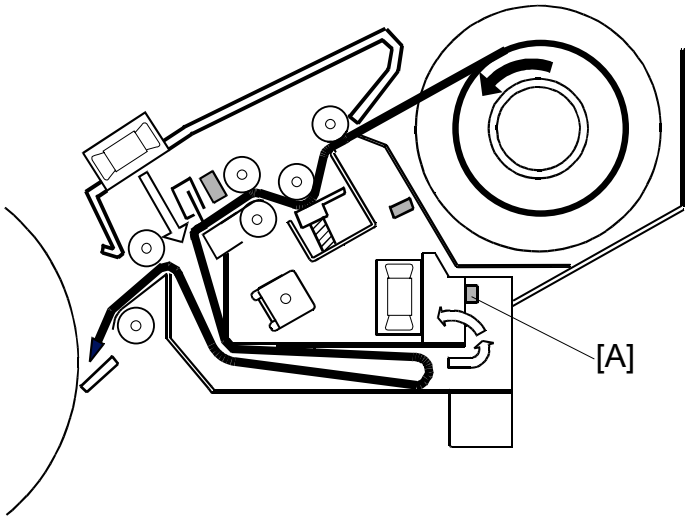
C264D921.WMF

The master is wrapped around the drum to not let air enter between the master and the drum when the master is wrapped around the drum.

The master is stored in the master buffer duct [A] by the three master vacuum fans [B] after the thermal head transfers the image to it. The stored master is fed out from the duct when the drum reaches the master making position after the master has ejected.

The blower fan motor [C] provides air to separate the master in the master buffer duct.

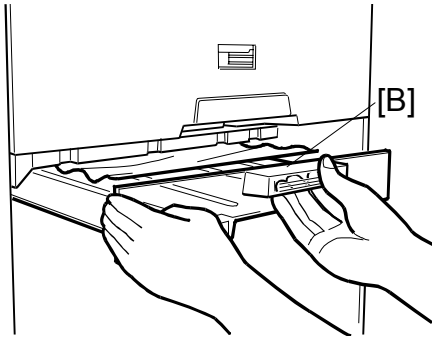
6.5.5 DETECTION OF A MASTER IN THE LOWER MASTER TRAY



C264D921.WMF

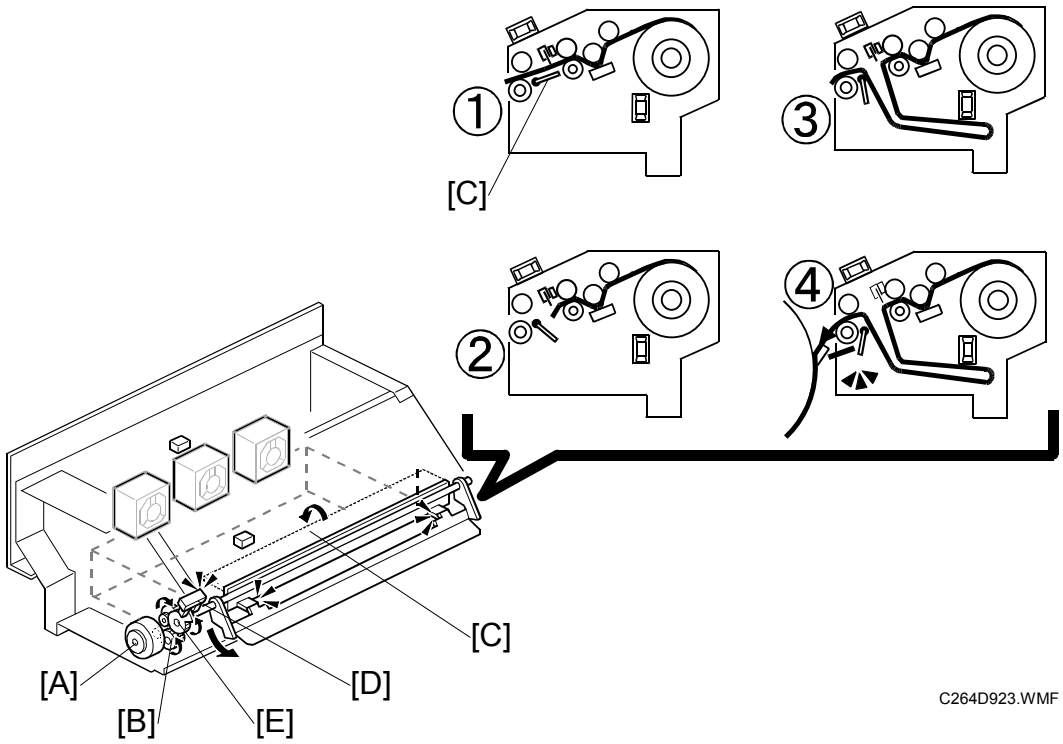
[A]: Duct jam sensor

- The duct jam sensor [A] detects whether there is a master in the lower master tray or not.
- When the duct jam sensor detects a master, the “D” jam indicator comes on. If this happens, open the lower master tray [B] and remove the misfed master.



C264D922.WMF

6.5.6 DUCT PLATE MECHANISM



Mechanism

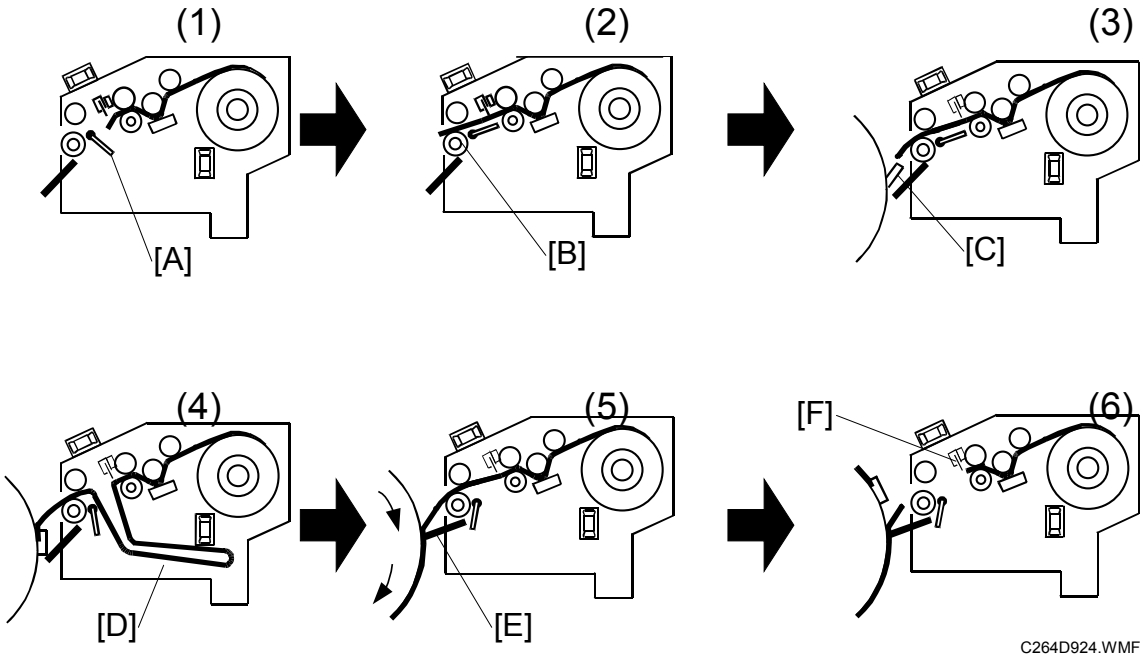
Duct plate motor [A]
↓
Gears [B]
↓
The duct plate [C] moves

The duct plate motor HP sensor [D] has four stop positions:

- The duct plate close position (①)
- The duct plate middle position (②)
- The duct plate open position (③)
- The master push mylar application position (④)

The actuator disk [E] interrupts the duct plate HP sensor [D] when the duct plate opens.

Procedure



The duct plate [A] is in the middle position before printing. (1)

↓

The duct plate moves to the close position when the master is fed until the master tension roller [B] catches the leading edge of the master. (2)

↓

Clamper [C] opens. (The drum is at the master feed position.) (3)

↓

The duct plate moves to the open position when the clamper clamps the master. At this time, the master is stored in the master buffer duct [D]. (4)

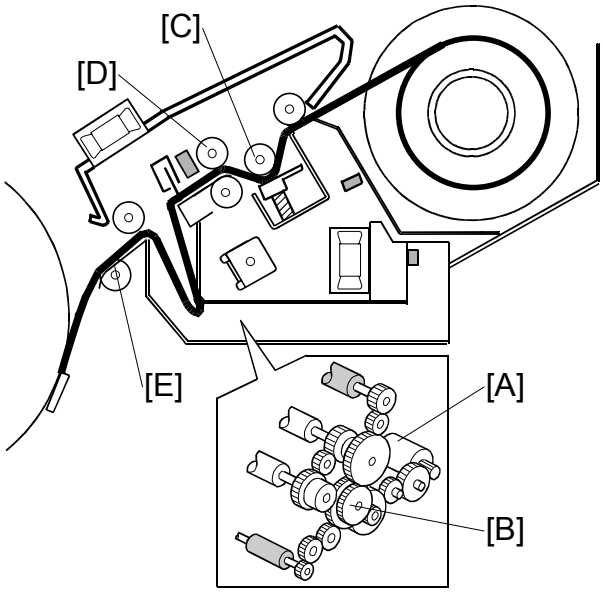
↓

The duct plate moves the master push mylar [E] after the clamper clamps the master. At this time, the master push mylar pushes the master against the drum (5).

↓

The cutter [F] cuts the master after the master is wrapped around the drum (6).

6.5.7 MASTER FEED MECHANISM



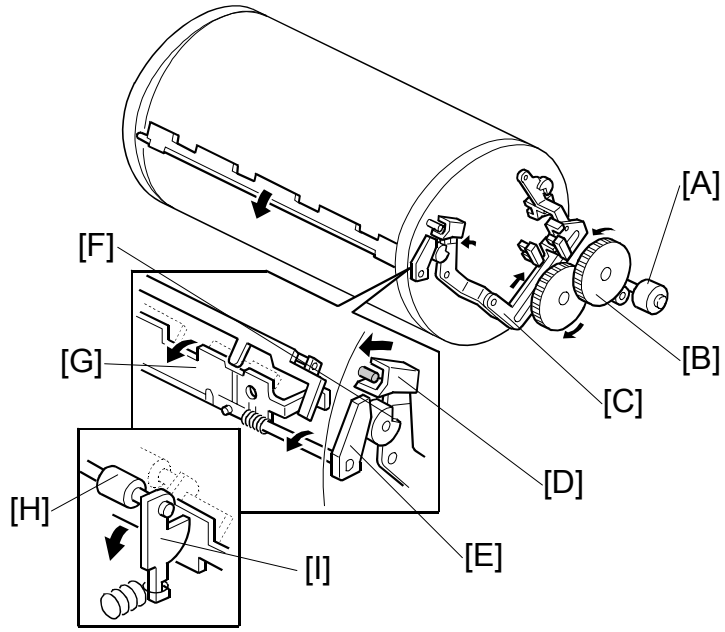
Mechanism

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.)

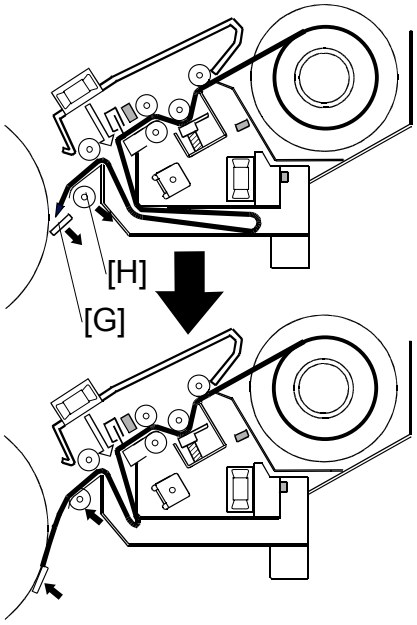
Procedure

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 15 rpm.
4. The tension roller [E] keeps the master under tension. Without this roller, the master would crease when the drum turns during wrapping around the drum. This reduces the master making time.
5. The main motor turns off when the drum is at the master eject position (this is the drum home position). Then the master feed motor turns off, and cutting is done.
6. Springs press the thermal head against the platen roller.

6.5.8 CLAMPER AND TENSION ROLLER MECHANISM



C264D926.WMF



C264D927.WMF

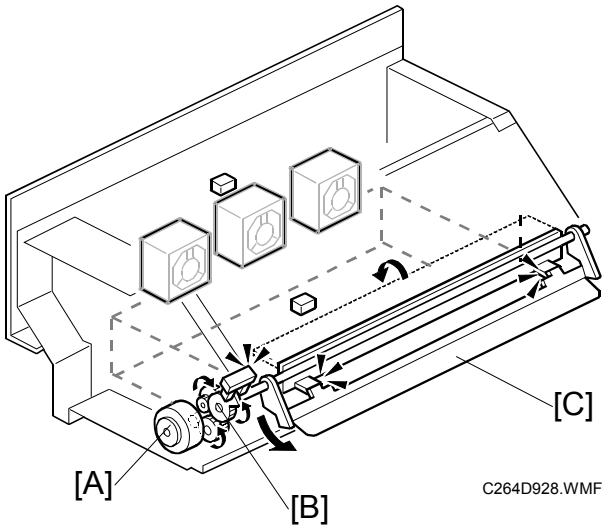
Mechanism

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

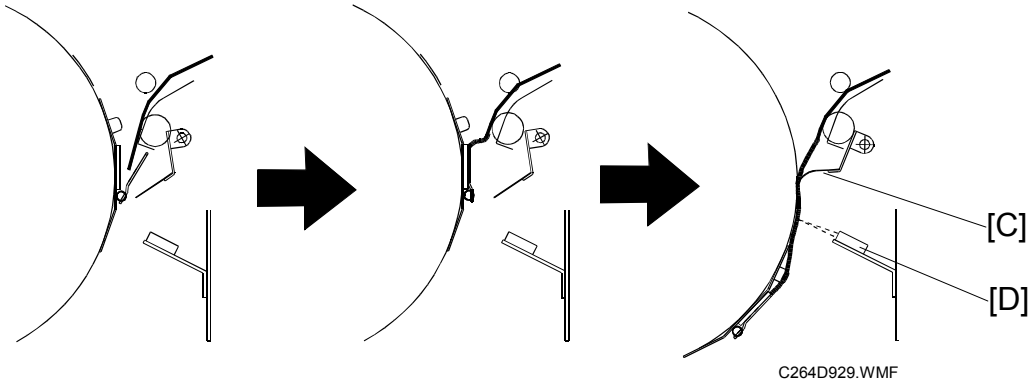
- When the old master has been ejected, the drum is stopped at the master feed position. The master clamper clamps the leading edge of the new master before the drum starts to turn again.
- The tension roller [H] normally presses against the master feed guide plate to apply tension to the master during 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.

6.5.9 MASTER PUSH MYLAR



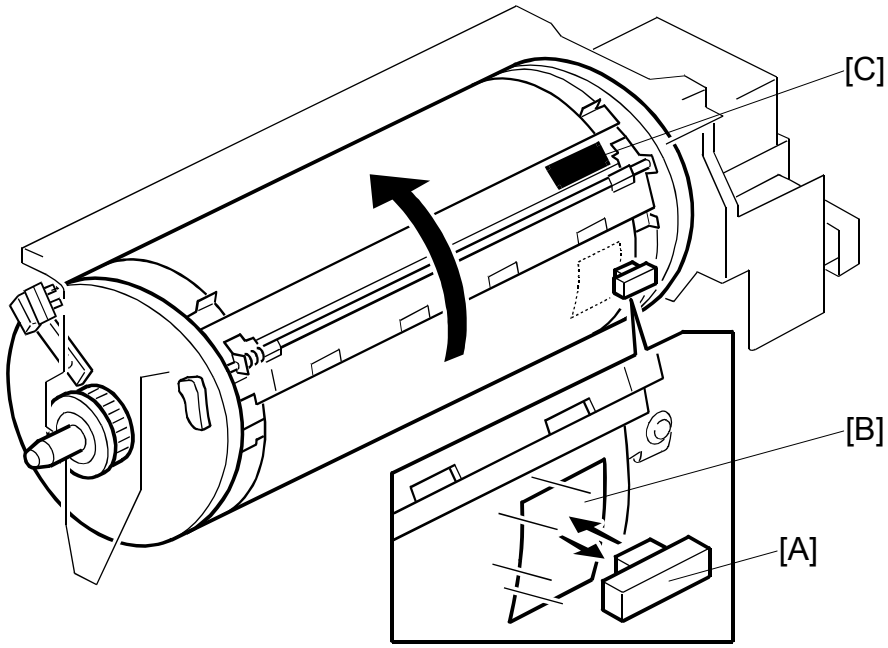
Mechanism

Duct plate motor [A]
↓
Gears [B]
↓
The master push mylar [C] pushes the master against the drum. This is done to distribute ink through the master.



- The 2nd drum master [D] sensor prevents contact between the master push mylar and the drum when there is no master on the drum.

6.5.10 DETECTION OF MASTERS ON THE DRUM

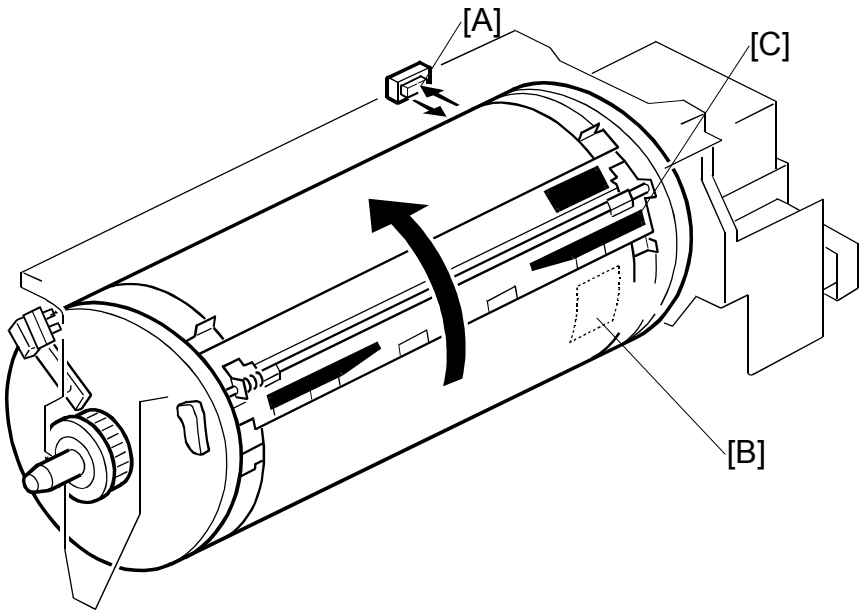


C264D930.WMF

[B]: Drum master sensor
[C]: Black patch on the screen
[D]: 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. (☛ 6.12.3)

6.5.11 2ND DRUM MASTER SENSOR



C264D931.WMF

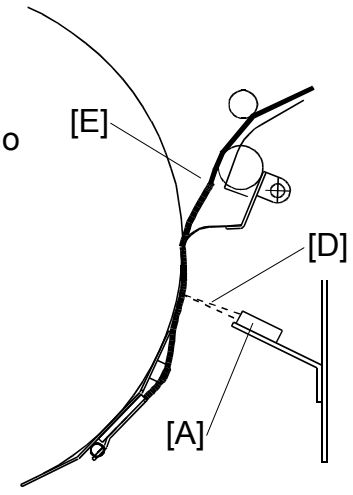
Mechanism

The 2nd drum master sensor [A] detects the black patch on the screen [B] when there is no master on the drum.

The 2nd drum master sensor detects the black patch on the clamper [C] when there is no master on the drum.

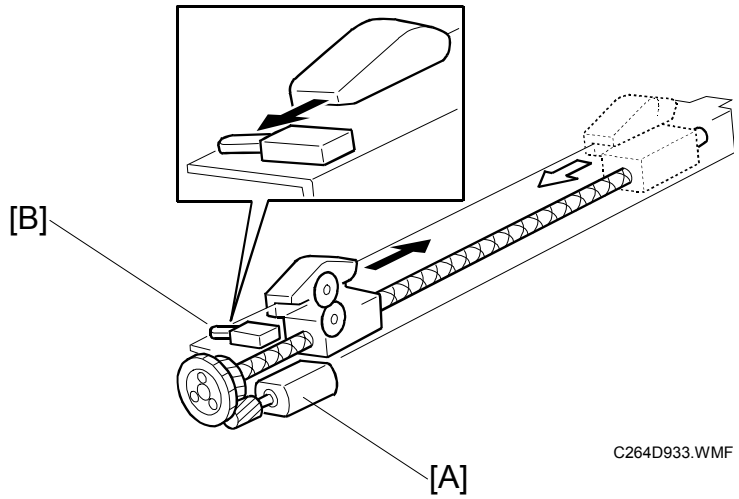
[A]: 2nd drum master sensor
[B]: Black patch on the screen
[C]: Black patch on the clamper

- The 2nd drum master sensor prevents contact between the master push mylar [D] and the drum when there is no master [E] on the drum.



C264D932.WMF

6.5.12 CUTTER MECHANISM



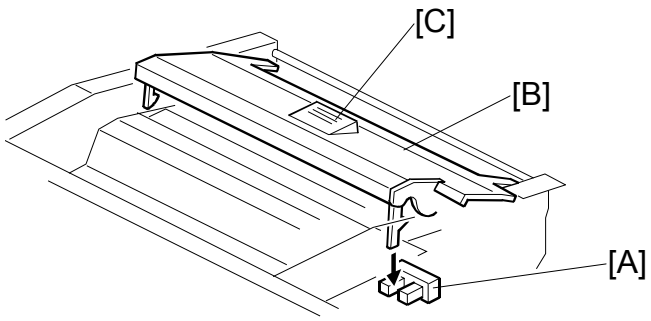
[A]: Cutter motor
[B]: Cutter HP sensor

- 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.

6.5.13 RE-CUTTING MECHANISM

- If the CPU cannot detect the master eject position sensor (drum HP) signal within 5.0 seconds after the main motor turns on at the start of master making, this could be because of an error in master cutting.
- So the cutter tries to cut the master again. If the CPU still cannot detect a signal from the master eject position sensor when the main motor starts again, E-06 (Main Motor error) occurs.

6.5.14 MASTER SET COVER



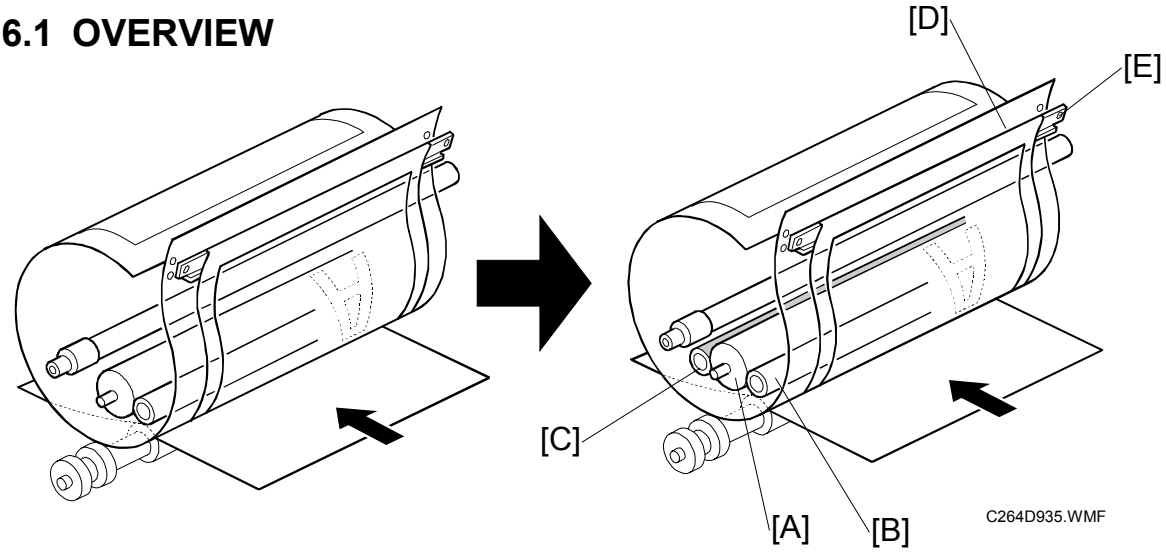
C264D934.WMF

[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



- The drum idling roller [C] ensures that the first print has sufficient ink density if the machine was not used for a long time.

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.

The drum idling roller [C] supplies ink to the screens and master before and after printing.

↓

Ink passes through the metal screen [D].

↓

Ink passes through the cloth screen [E].

↓

Ink passes through the holes in the master that were made by the thermal head.

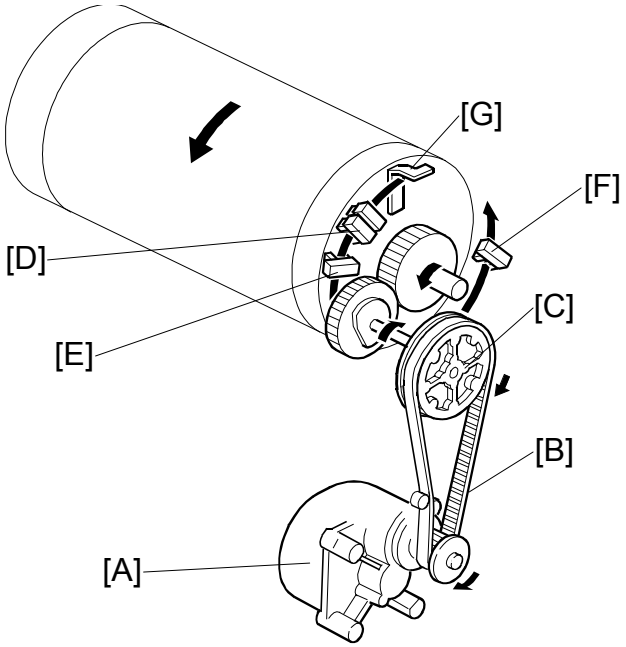
↓

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 to the drum through the drum shaft.

6.6.2 DRUM DRIVE MECHANISM

Mechanism



Main motor [A] (dc motor)

↓

Belt [B]

↓

Gears [C]

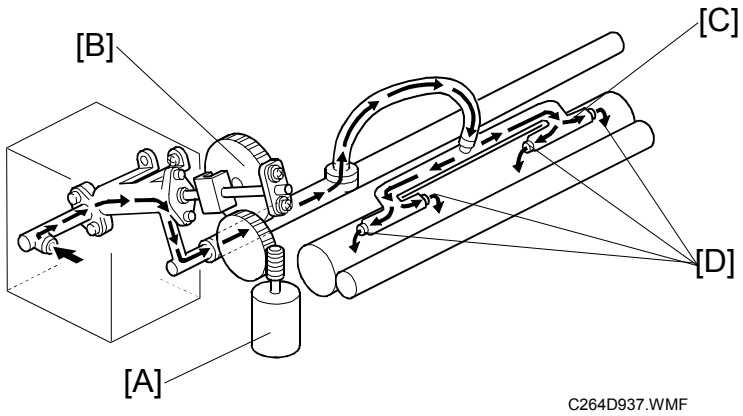
↓

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



Gears [C] Mechanism

Ink pump motor [A]

↓

Gears [B]

↓

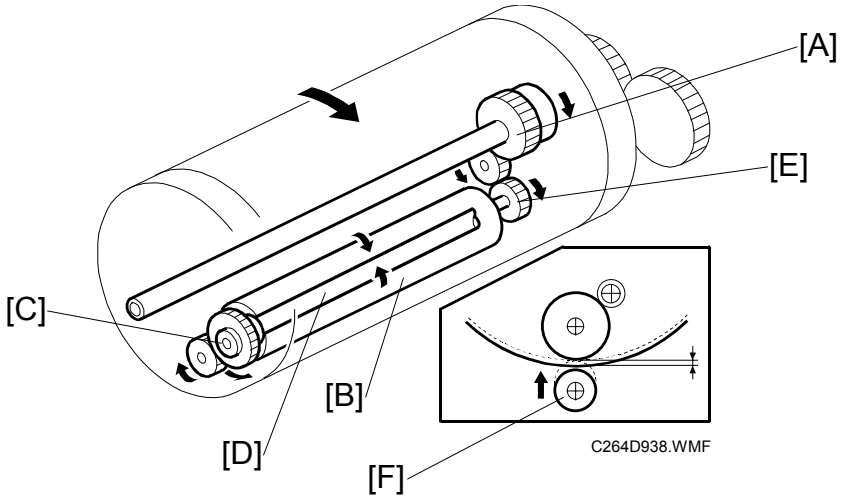
Gear rotation converted into piston motion.

↓

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]

↓

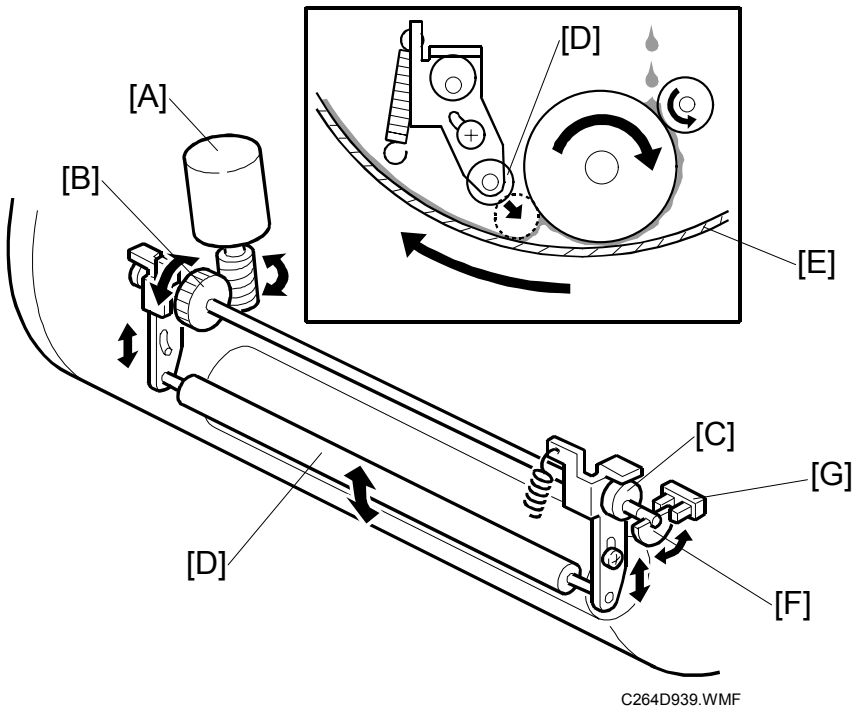
Doctor roller [D] rotates

↓

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 DRUM IDLING MECHANISM



Mechanism

Idling roller motor [A]

↓

Gears [B]

↓

Cam [C]

↓

Drum idling roller [D] rotates

↓

The drum idling roller puts the ink onto the screen and master before and after printing. This ensures that the first print has sufficient ink density even if the machine was not used for a long time.

The idling roller motor [A] turns to press the drum idling roller against the inner surface of the drum screen [E].

The actuator disk [F] interrupts the idling roller HP sensor [G] when the drum idling roller is in contact with the drum screen.

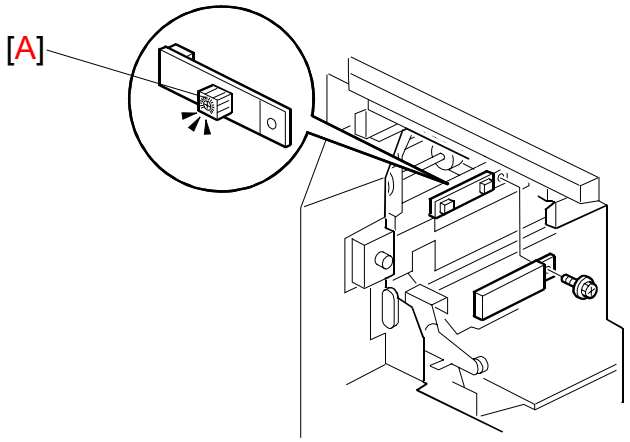
The number of drum idling rotations depends on temperature and period of machine inactivity, as shown in the following table.

NOTE: 1) User Tools 4-11 can change the number of rotations for each of these conditions.
2) The drum rotation speed during idling is fixed at 30 rpm.

Period/ Temperature	Less than 2 hours	2 to 4 hours	4 to 24 hours	Over 24 hours
High (28degree or above)	0	0	2	3
Normal (15 to 28 degree)	0	0	2	3
Low (below 15degree)	0	2	3	3

6.6.6 DETECTION OF MASTERS ON THE DRUM

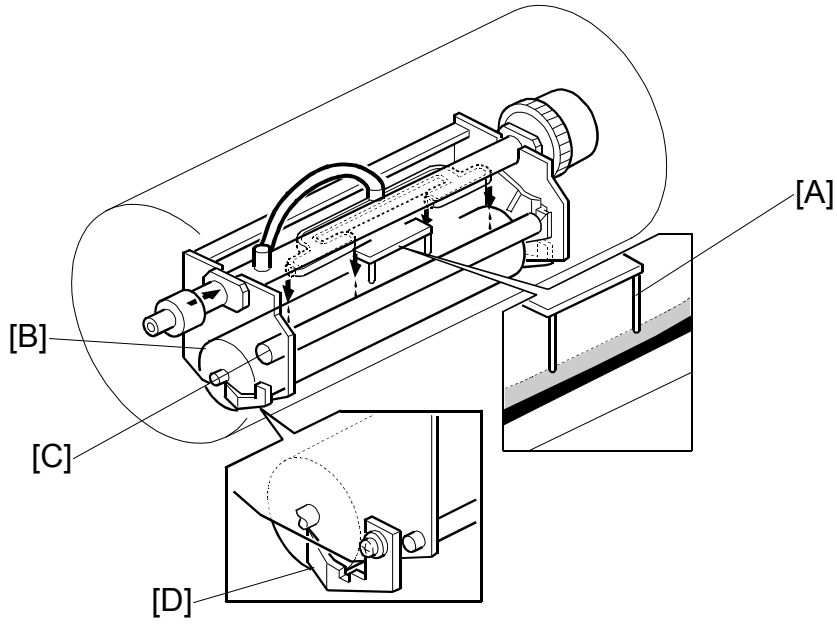
Drum master sensor



C264D001.WMF

A VR [A] was added for this sensor. This VR is for factory use only. Do not adjust it in the field.

6.6.7 INK SUPPLY CONTROL



C264D940.WMF

Mechanism

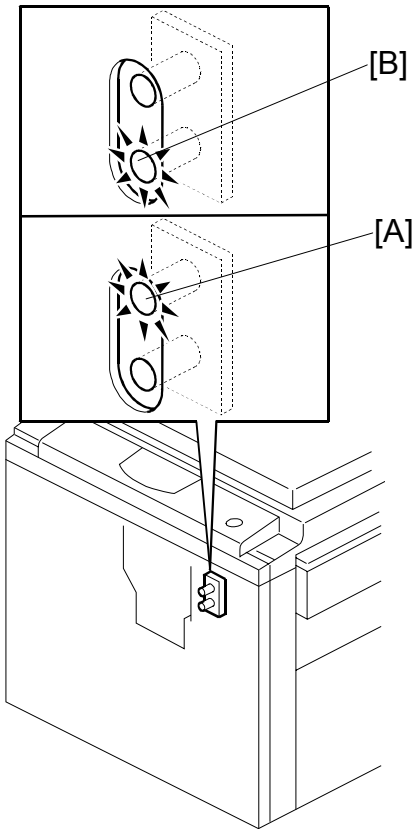
When the ink level is low, the pins [A] do not touch the ink.

↓

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.

6.6.8 DRUM HOME POSITION DETECTION



C264D904.WMF

LEDs are added to inform the operator when the drum is at the exact home position and can be pulled out. The drum home position sensor monitors the drum home position.

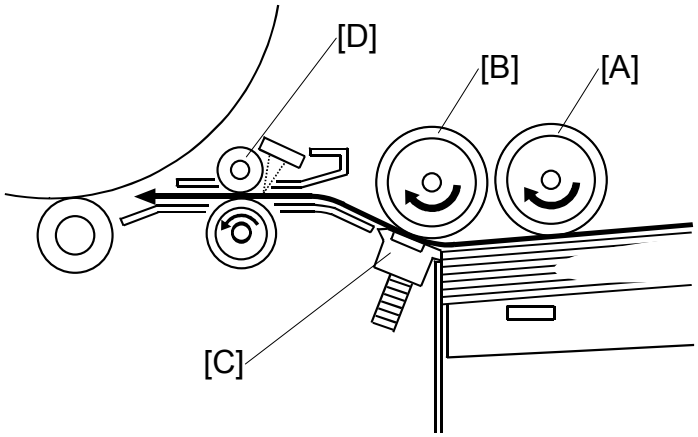
The green LED [A] turns on when the drum is at the home position.

The red LED [B] turns on when the drum is not at the home position.

NOTE: If the red LED lights when the machine is in standby mode, the drum is not at the home position, and the front door must be closed to reset the drum position.

6.7 PAPER FEED

6.7.1 OVERVIEW



C264D941.WMF

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.

↓

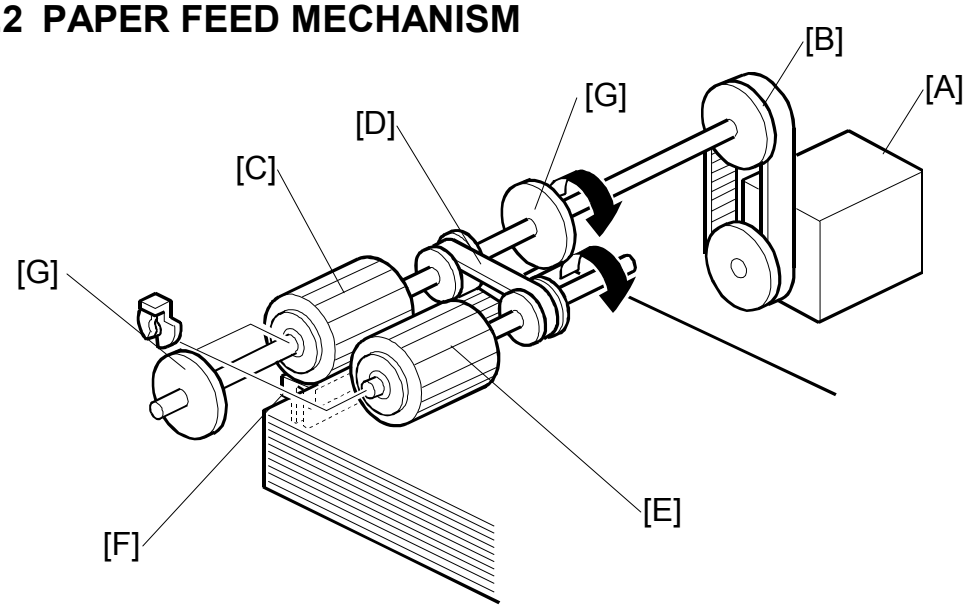
The registration rollers [D] feed the paper.

↓

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



C264D942.WMF

Mechanism

Paper feed motor [A]

↓

Belt [B]

↓

Turns the feed roller [C]

↓

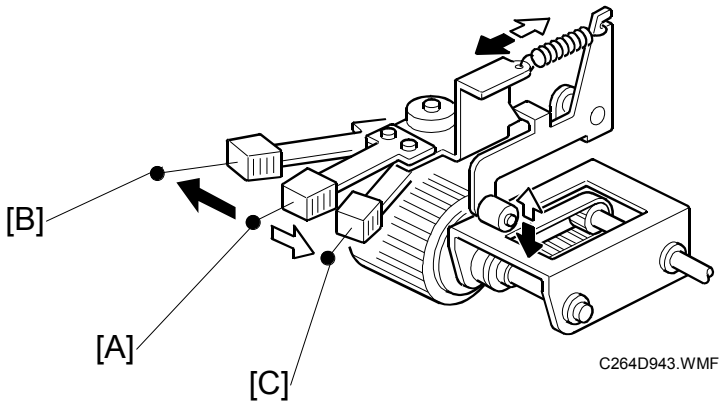
Belt [D]

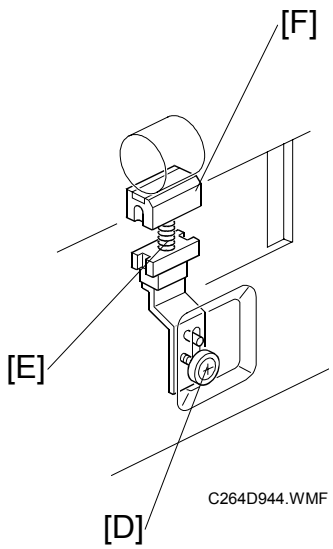
↓

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



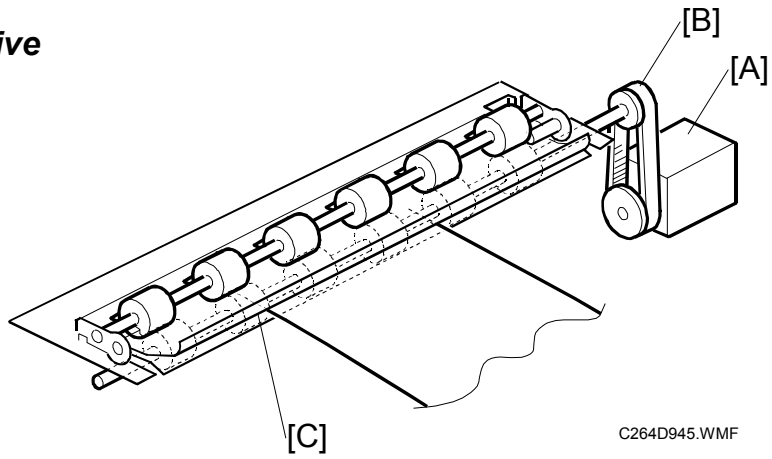


[A]: Normal position
[B]: Thick paper position
[C]: Thin paper position

- 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]

↓

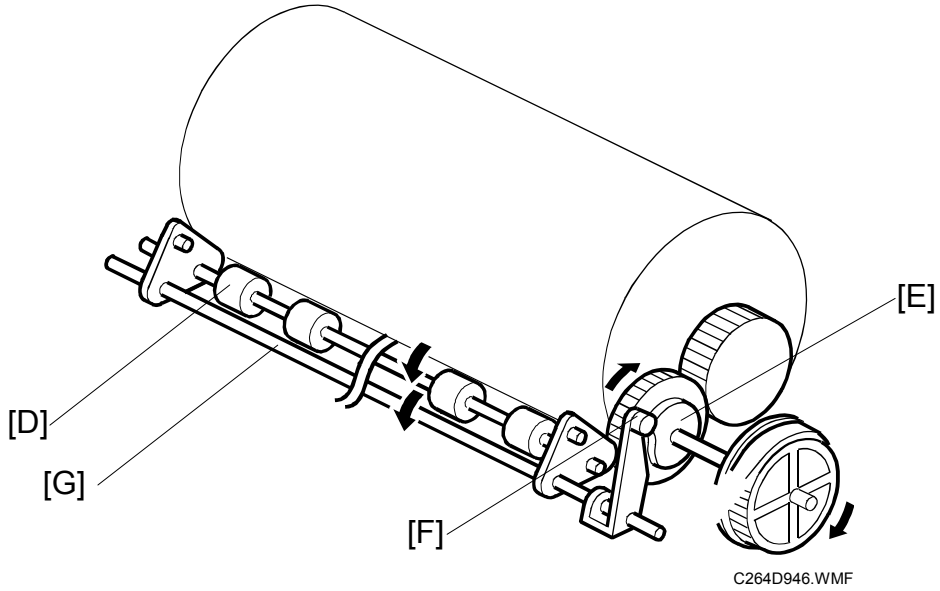
Belt [B]

↓

Turns the lower registration roller [C]

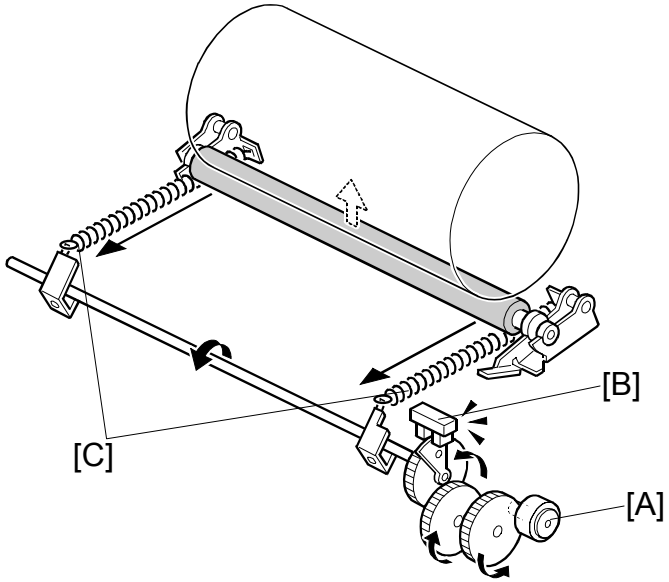
NOTE: 1) The CPU controls the registration roller start timing to synchronize the printer paper with the image on the master on the drum.
2) The motor speed depends on the selected printing speed.
3) By pressing the image position keys on the operation panel, the registration motor start timing is changed.

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 AUTO ADJUSTABLE PRINTING PRESSURE MECHANISM



C264D947.WMF

The printing pressure motor [A], the printing pressure sensor [B], and the printing pressure spring [C] were added to the press roller to control the image density for each printing speed or temperature. The printing pressure depends on temperature and printing speed, as shown in the following table.

NOTE: You can change the print pressure for each of these conditions with SP6-70 to 87. (☛ 5.7.1)

Temperature/ Print Speed	Low (Below 15 degrees)	Normal (15 to 28 degrees)	High (28 degrees and above)
Trial Print	Printing Pressure 2	Printing Pressure 2	Printing Pressure 2
1st Print (60 rpm)	Printing Pressure 1	Printing Pressure 1	Printing Pressure 1
2nd Print (75 rpm)	Printing Pressure 3	Printing Pressure 2	Printing Pressure 1
3rd Print (90 rpm)	Printing Pressure 4	Printing Pressure 3	Printing Pressure 2
4th Print (105 rpm)	Printing Pressure 5	Printing Pressure 4	Printing Pressure 3
5th Print (120 rpm)	Printing Pressure 5	Printing Pressure 5	Printing Pressure 5

Bigger number: increases the pressure

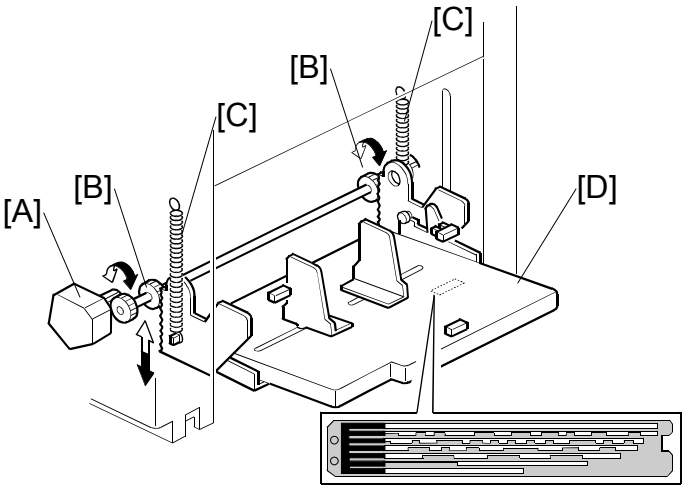
Smaller number: decreases the pressure

6.7.6 RE-FEEDING MECHANISM

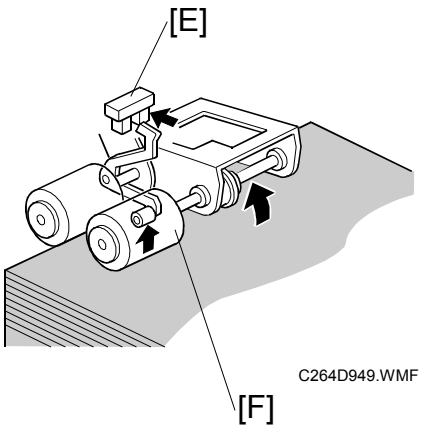
- If the registration sensor detects a non-feed, the machine tries again. However, if the machine detects a non-feed the second time, the jam indicator lights.

6.7.7 PAPER TABLE MECHANISM

Table lifting/lowering



C264D948.WMF



C264D949.WMF

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 [F], lifting it up. Then, when the paper height sensor [E] is actuated, the table motor stops.
2) When the table lower sensor [G] 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.

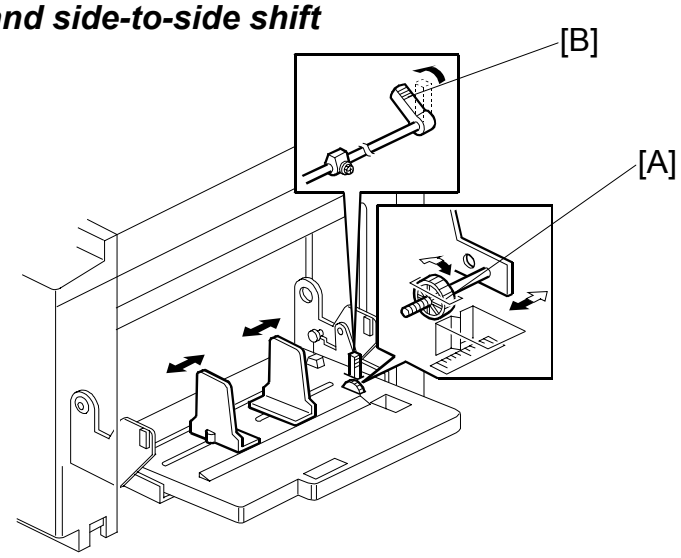
Paper end detection

- 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

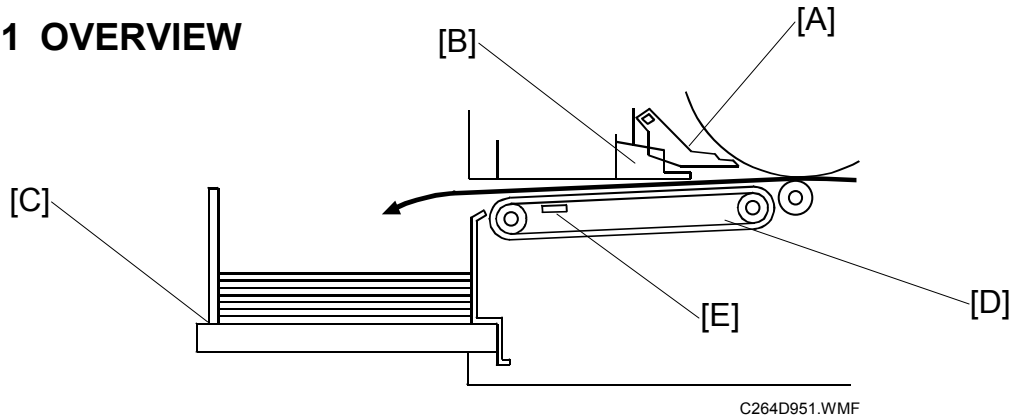


C264D950.WMF

- 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.

6.8 PAPER DELIVERY

6.8.1 OVERVIEW



Procedure

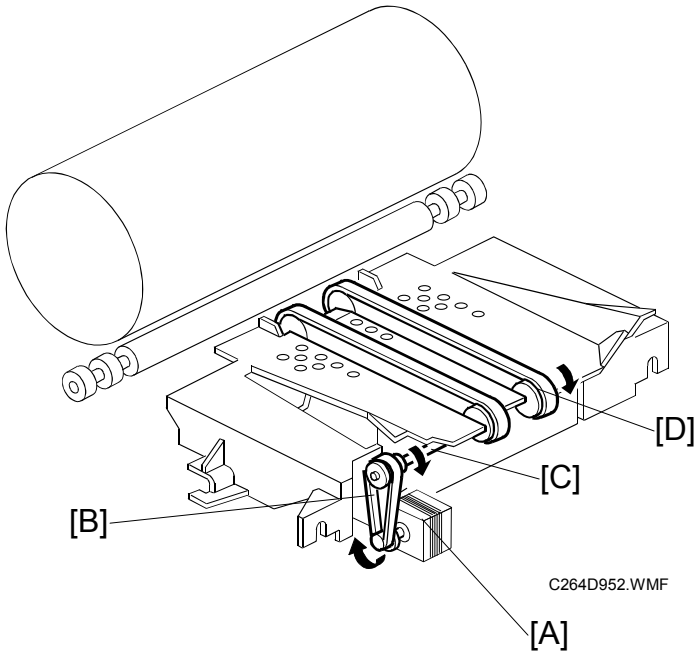
The exit pawl [A] and the air knife [B] separate the paper from the drum.

↓

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. (☛ 6.12.6)

6.8.2 PAPER DELIVERY UNIT DRIVE MECHANISM



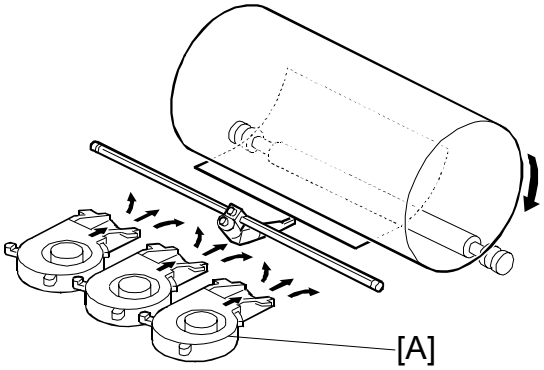
Mechanism

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.

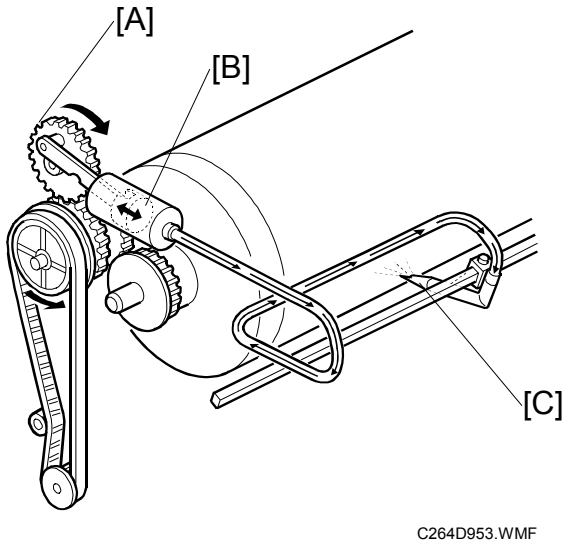
6.8.3 PAPER SEPARATION FROM THE DRUM

Air knife



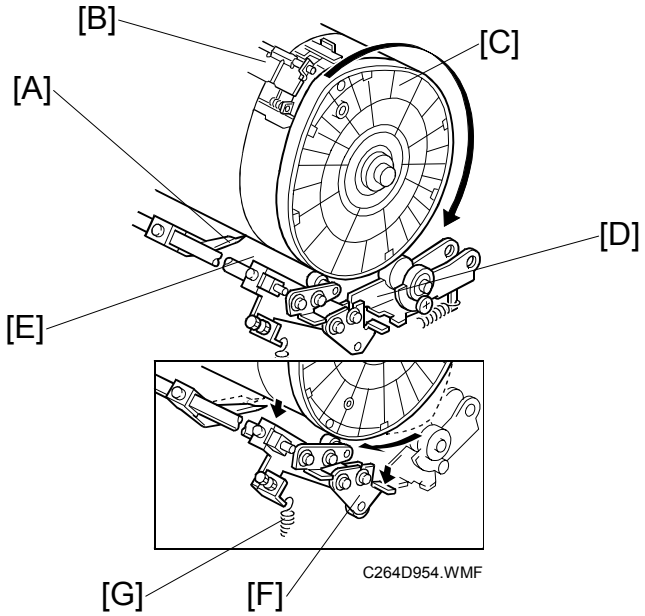
- The air from the air knife fan motors [A] separates the paper from the drum.
- The air knife fan motors start blowing air when the print start key is pressed or when master cutting is finished. The paper passes under the exit pawl and is delivered to the delivery table.

Exit pawl air pump



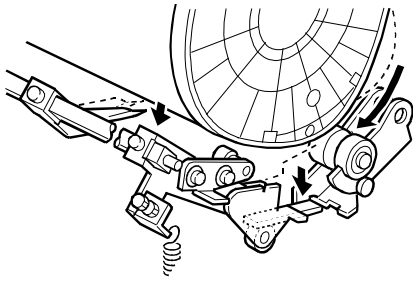
- Drive from the main motor is transmitted to the pump gear [A]. When the gear [A] rotates, it drives the piston [B] back and forth.
- The piston moves forward and pushes a jet of air out through the nozzle [C]. This jet of air helps to separate the paper from the drum.

6.8.4 EXIT PAWL DRIVE MECHANISM



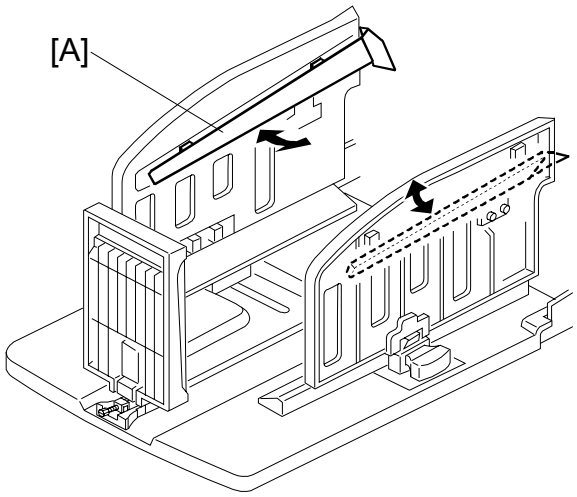
- During printing, the distance between the exit pawl [A] and the drum is very small, to prevent paper wrap jams. However, when the master clamper [B] approaches the exit pawl (as the drum turns), the pawl must be moved away from the drum to prevent it from being damaged by the master clamper. This is 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.

6.8.5 PAPER DELIVERY TABLE MECHANISM



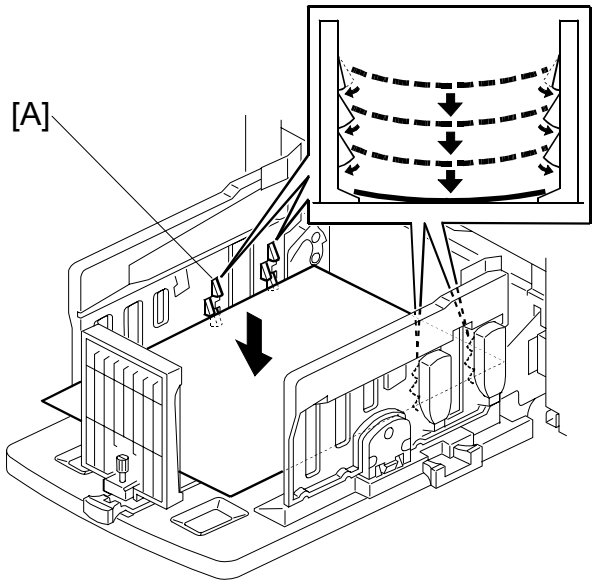
C264D956.WMF

The paper delivery table consists of the rear side fence, front side fence, and end fence. The angle of the small paper guide [A] on each side fence can be changed by pulling the small paper guide.

The small guides help to stack the paper more evenly on the table. Both edges of the paper are guided by the guides as the copy is fed out. Then, the paper is rapidly fed out against the end plate for stacking.

See the next page for how to set these guides for each paper type.

6.8.6 ADJUSTABLE BUFFER FINS



C264D957.WMF

The printed paper bends upwards easily. This causes uneven stacking and ink stains on the back of the paper on the delivery table. The buffer fins [A] on the paper delivery table lift the edges of the paper, to prevent this problem. When the paper is fed to the delivery table, these plates catch the edges of the paper, and the paper falls in an inverted “U” shape, as shown in the diagram, with a gap between each sheet. The plates catching the edges also make the paper fall more slowly, and the ink dries before the paper reaches the stack.

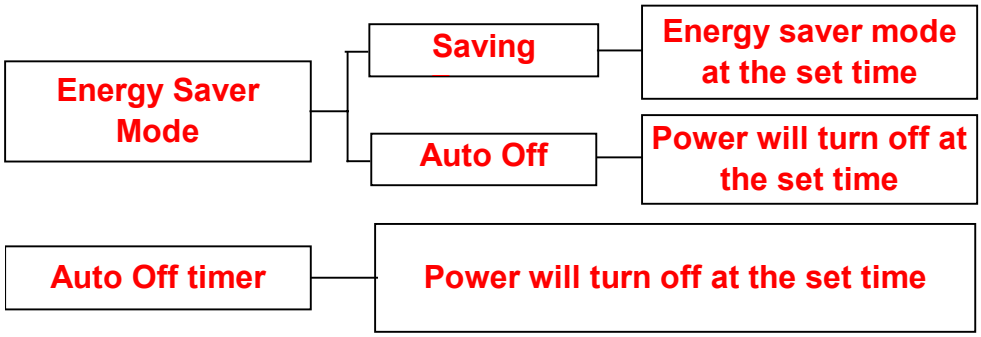
The following table shows the recommended positions for these plates (and for the paper guide wings) for each paper type.

Paper Weight	Paper Size	Paper Guide	Plate
128 g/m^2 or thicker	A3 SEF, 11” x 17” SEF, B4 JIS SEF	Lower the wings	Down
	A4 SEF LEF, B5 JIS SEF LEF	Lower the wings	Down
52.3 g/m^2-128 g/m^2	A3 SEF, 11” x 17” SEF, B4 JIS SEF	Raise the wings fully	Up
	A4 SEF LEF, B5 JIS SEF LEF	Raise the wings to about 45 degrees	Up
52.3 g/m^2 or thinner	A3 SEF, 11” x 17” SEF, B4 JIS SEF	Raise the wings to about 45 degrees	Down
	A4 SEF LEF, B5 JIS SEF LEF	Raise the wings to about 45 degrees	Down

6.9 AUTO OFF MODE

To meet environmental concerns, this machine has energy saving mode and auto off mode.

- Energy saver mode: The machine goes into a low-power mode.
- Auto off mode: The main switch will be turned off automatically by a solenoid.



The mode that is used is set with a user tool (System Settings – Mode Setting – Energy Saver Option).

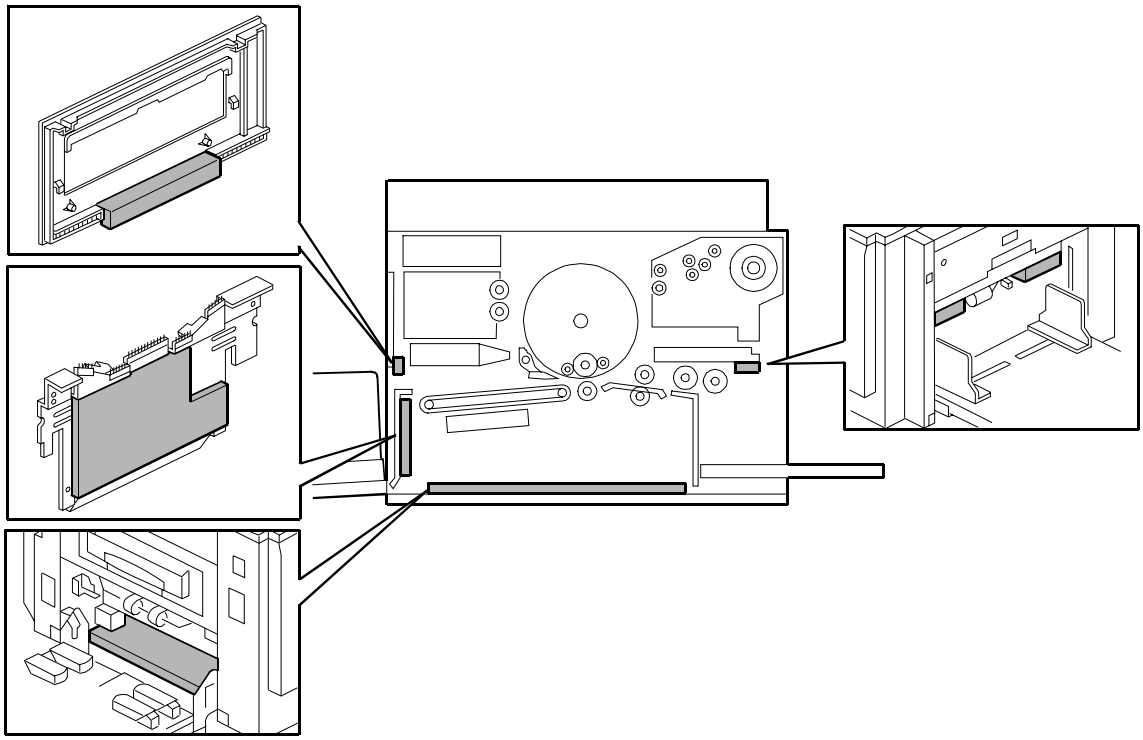
The machine goes into the selected mode at a set time after the end of a job, if the machine is not used. This time is set with a user tool (System Settings – Timer Settings – Energy Saver Timer).

There is also a 'timed auto-off mode'. In this mode, the machine will automatically go to auto off mode at a set time every day. The time is set with a user tool (System Settings – Timer Settings – Auto Off Timer). You use the same user tool to enable or disable this feature.

Specifications

- While the online LED lights or blinks, the auto off mode does not turn on. But, if the auto off timer is set, the main switch will turn off at the set time.
- The auto off timer does not turn the machine off if the machine power is turned on within 5 minutes before the auto off time.
- The auto off timer does not turn the machine off if the machine is being used when the auto off time comes. The timer will not turn the machine off until the auto off time on the next day.

6.10 SOUND-PROOFING CUSHIONS

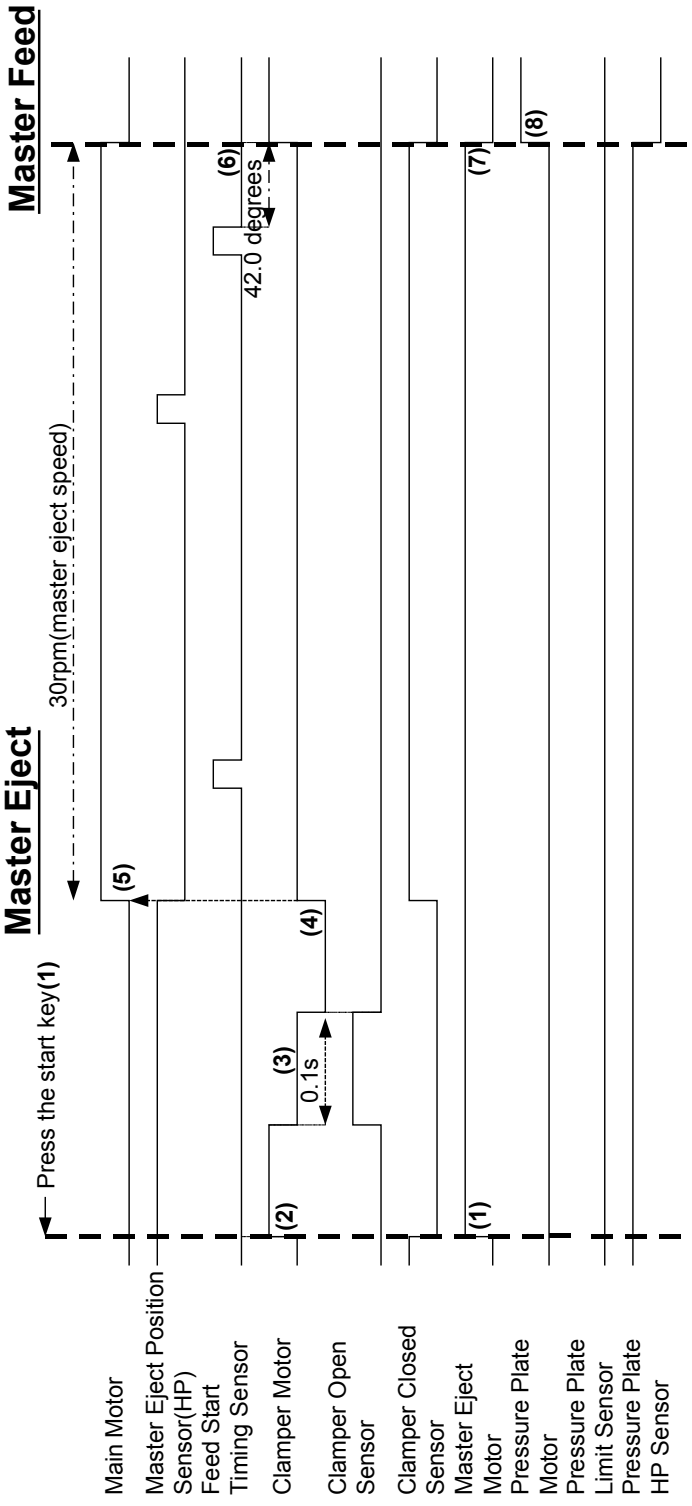


C264D002.WMF

Soundproofing cushions were added to further reduce the level of noise during printing.

6.11 TIMING CHART

6.11.1 MASTER EJECTION



C264D901.WMF

Master eject

(1) The master eject motor turns on when you press the Start Key,.

(2) When the master eject motor turns on, the clamper motor turns to open the clamper.

(3) After the clamper opens for 0.1 seconds, the clamper motor turns to close the clamper.

(4) The clamper closes.

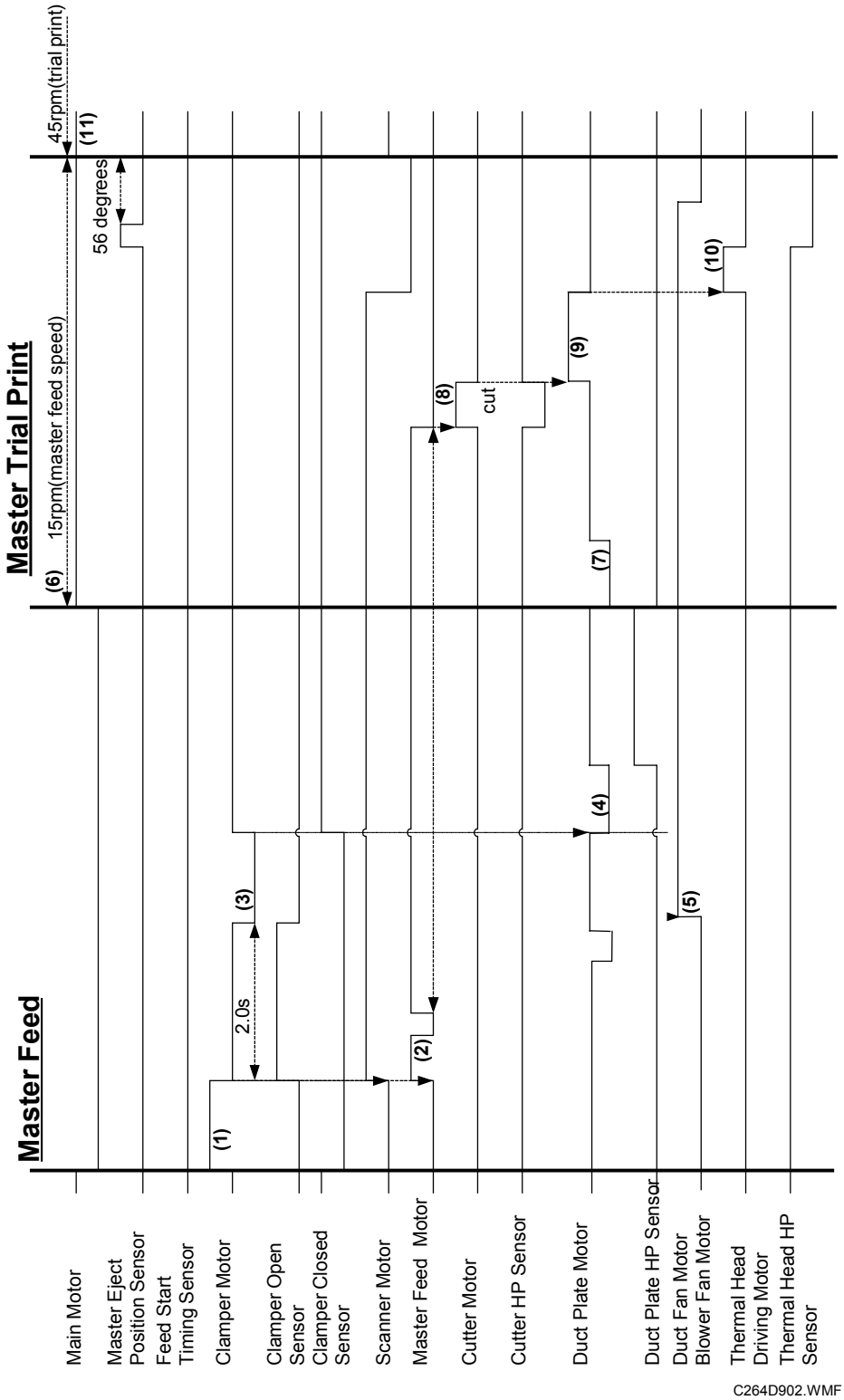
(5) When the clamper is closed, the main motor turns on.

(6) The drum is at the feed start timing sensor position plus 42 degrees.

(7) The master eject motor and main motor turn off.

(8) The pressure plate presses and turns the pressure plate motor.
(After 18.0 seconds, the pressure plate motor turns off.)

6.11.2 MASTER WRAPPING



Master feed

(1) The clamper motor turns to open the clamper.

(2) When the clamper is open, the master feed motor turns on. The master feed motor feeds the master at 45 mm.

(3) After 2.0 seconds, the clamper motor turns to close the clamper.

(4) When the clamper is closed, the duct plate motor turns to move the duct plate to the open position.

(5) The duct fan motors and the blower fan motor turn on.

(6) When the master feed motor has fed the master 430 mm (A4: 320mm), the main motor turns on.

(7) The duct plate motor turns to contact with the master push mylar to the master on the drum.

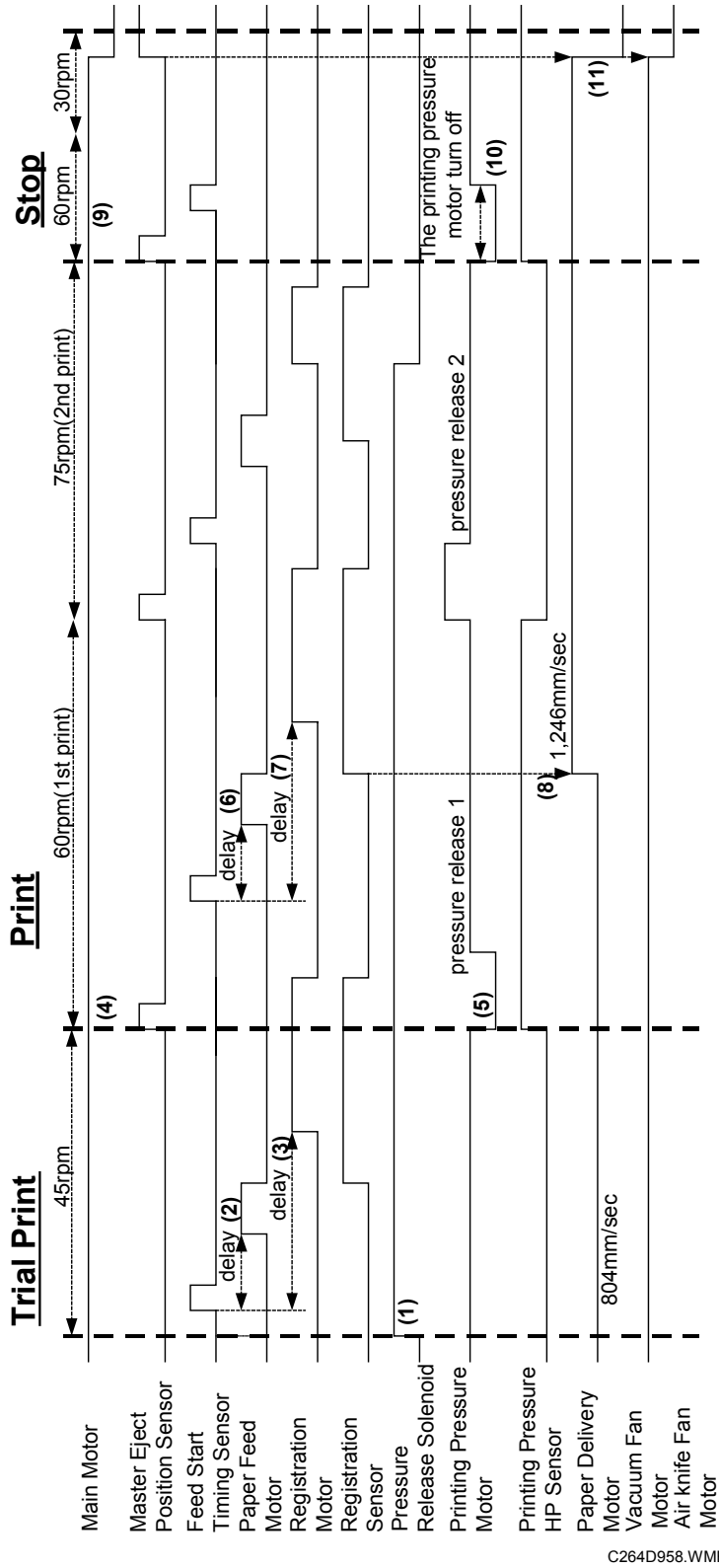
(8) When the master feed motor has fed the master 540 mm (A4: 340mm), the master feed motor stops, and the master is cut.

(9) When the cutter has cut the master, the duct plate motor turns to release the master push mylar. Them the duct plate moves to the middle position.

(10) When the drum is at the master eject position sensor, the thermal head driving motor turns on.

(11) When the drum is at the master eject position plus 56 degree, the speed goes to 45 rpm.

6.11.3 PRINTING



Trial print

(1) The pressure release solenoid turns on.

(2) After the drum is at the feed start timing sensor plus feed delay time, the paper feed motor turns on.

(3) When the drum is at the feed start timing sensor plus registration delay, the registration motor turns on.

(4) When the drum is at the master eject position sensor, the speed goes to 60 rpm.

Printing

(5) When the drum is at the master eject position sensor, the printing pressure motor turns on.

(6) After the drum is at the feed start timing sensor plus feed delay time, the paper feed motor turns on.

(7) After the feed start timing sensor plus registration delay, the registration motor turns on.

(8) When the registration sensor detects the paper, the speed of the paper delivery motor goes to 1264 mm/ sec.

Stop

(9) When the drum is at the master eject position sensor, the speed goes down to 60rpm.

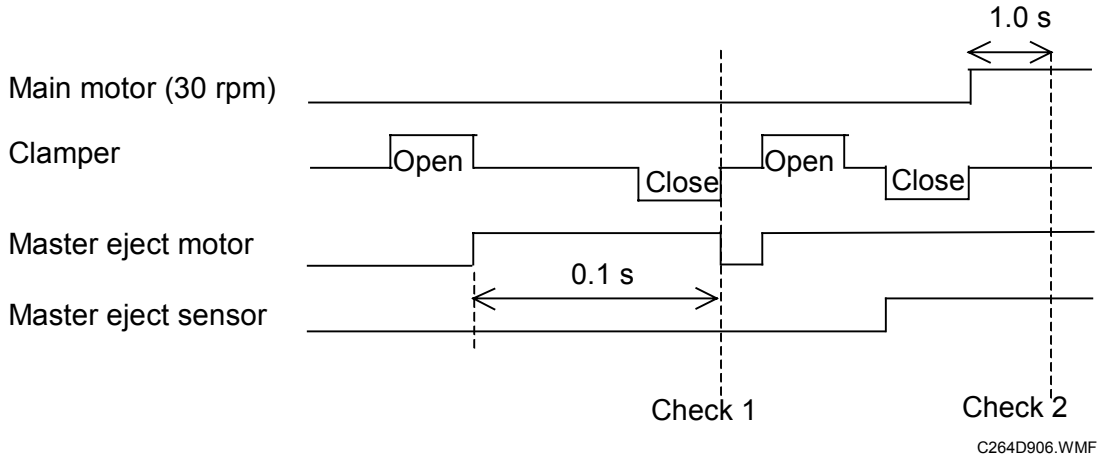
(10) The printing pressure motor turns off.

(11) When the main motor turns off, the paper delivery motor, the vacuum fan motor and the air knife fan motors turn off.

6.12 JAM DETECTION

6.12.1 MASTER EJECT JAM (B JAM LOCATION INDICATOR)

Picking up the used master from the drum



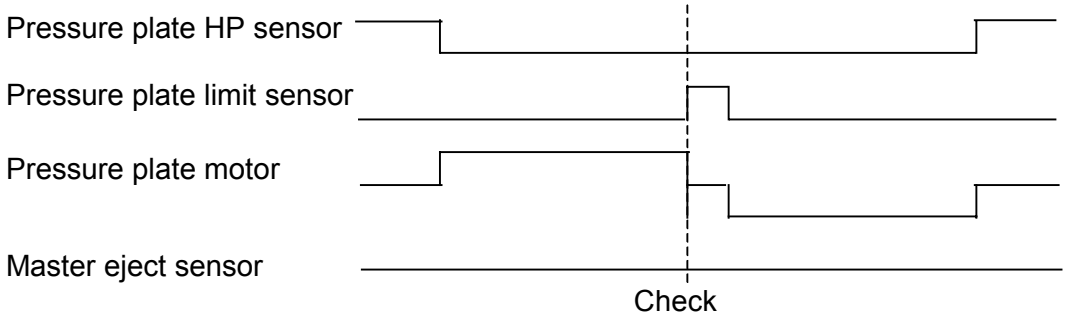
C264D906.WMF

Jam check timing: When the clamper open sensor is on (clamper open).

Check 1: If the master eject motor is still on after 0.1 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 B jam indicator will light.

Compressing the used master



C264D959.WMF

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 B, E jam indicator lights.

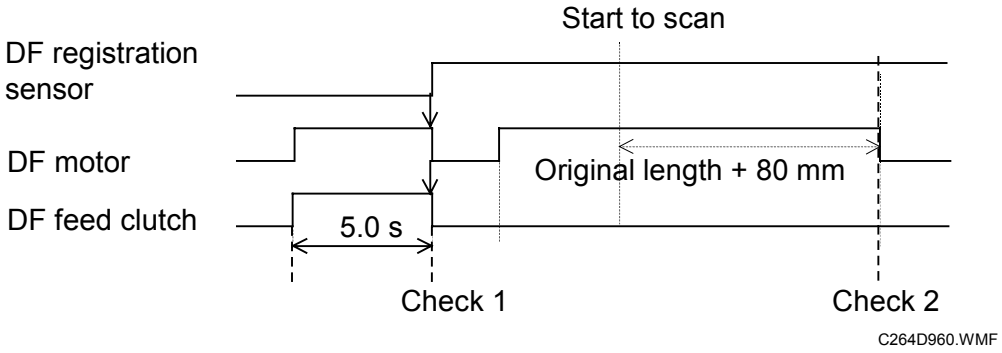
Just after turning on the main switch

Jam check timing: Just after the main switch has been turned on.

Check: If the master eject sensor is on (master detected), the B, E jam indicator lights.

6.12.2 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.

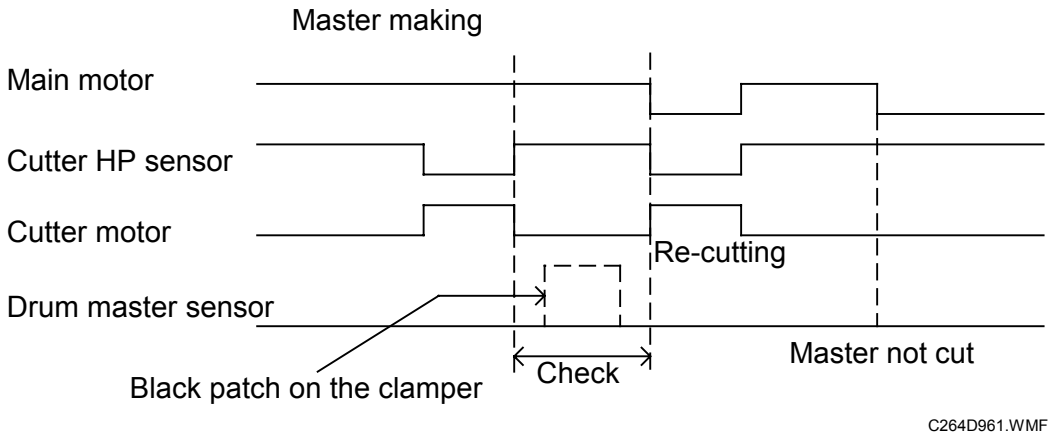
Turning on the main switch/closing the DF cover

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.

6.12.3 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.

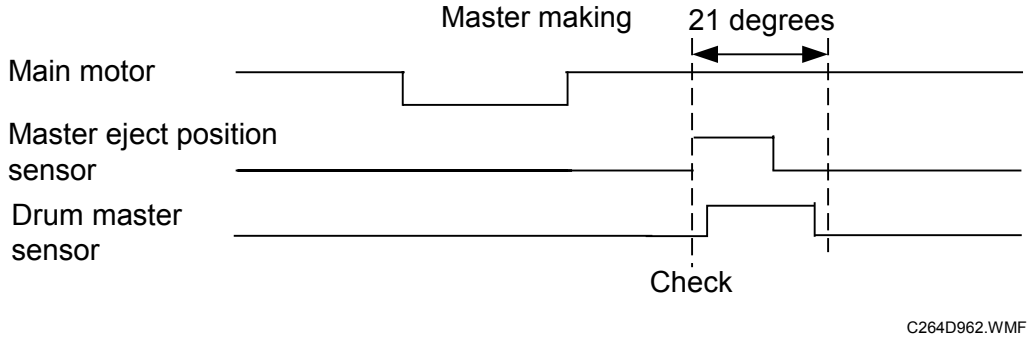
Check : If the CPU cannot detect the master eject position sensor (drum HP) signal within 5.0 seconds after the main motor turns on by master cut miss, the cutter tries to cut the master again. The cutter cuts the master the second time, and the jam indicator lights. If the cutter does not cut the maser the second time, the E-06 (Main Motor error) 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. When the cutter motor reverses to the cutter reach home position, the D jam indicator lights. When the cutter motor reverses, the cutter does not reach home position, the E-01 (Cutter error) indicator lights.

Clamping the master



Jam check timing: When the master is wrapping around the drum.

Check: When the drum has turned 21 degrees since 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.

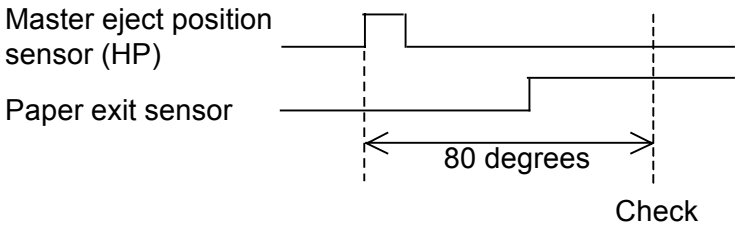
Remaining master in the lower master tray

Jam check timing: When the clamper open sensor is on (clamper open).

Check: When the duct jam sensor detects a master in the lower master tray, the D jam indicator lights.

6.12.4 DRUM JAM (B JAM LOCATION INDICATOR)

Wrapping jam



C264D963.WMF

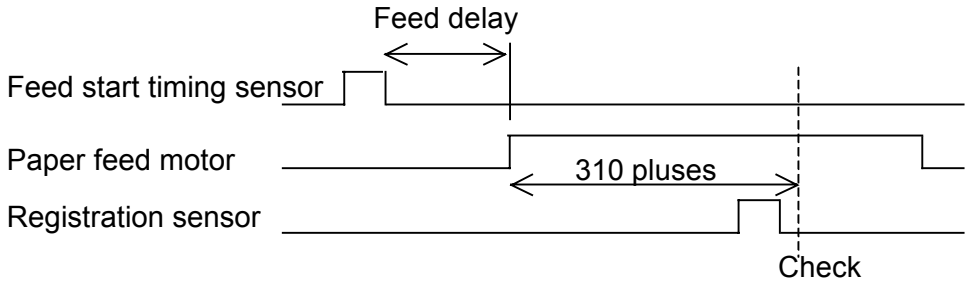
Jam check timing: When printing.

Check : When the drum has turned 80 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.

Check : When the drum has turned 80 degrees since the master eject position sensor turned on (drum reached master eject position), and the registration sensor detects the paper, then the A+B jam indicator lights.

6.12.5 PAPER FEED JAM (A JAM LOCATION INDICATOR)

Paper feed



C249D909.WMFF

C264D964.WMF

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.

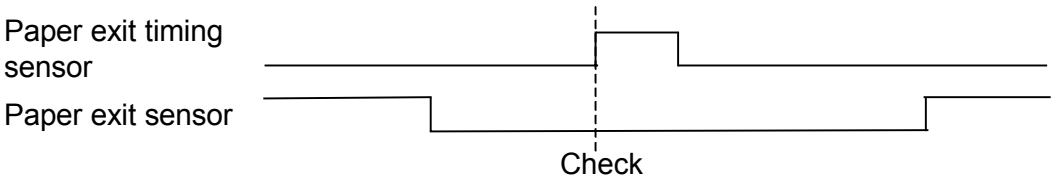
Turning on the main switch/end of paper feed

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+B jam indicator lights.

6.12.6 PAPER DELIVERY JAM (C JAM LOCATION INDICATOR)

Paper delivery



C264D965.WMF

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

Jam check timing: Just after the main switch is turned on, or when drum rotation has finished.

Check: When the paper exit sensor detects paper, the C jam location indicator lights.

SPECIFICATIONS

1. GENERAL SPECIFICATIONS

Configuration:	Stand-alone
Master Process:	Digital with 400 dpi thermal head
Scanning (Pixel Density):	400 dpi
Originals:	Sheet/Book
Printing process:	Fully automatic one-drum stencil system
Original Size:	Maximum 300.0 x 432 mm / 11.8" 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:	65 masters (Normal conditions)
Reproduction Ratios:	3 enlargements and 4 reductions

	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 120 V, 60 Hz Europe, Asia 220 – 240 V, 50/60 Hz

Spec.

Noise Emission

	Sound Power Level	Operating Position Sound Power Level
Standby:	Not more than 45 dB (A)	Not more than 31 dB (A)
Copying 60 rpm:	Not more than 73 dB (A)	Not more than 59 dB (A)
Copying 90 rpm:	Not more than 76 dB (A)	Not more than 62 dB (A)
Copying 120 rpm:	Not more than 79 dB (A)	Not more than 65 dB (A)

NOTE: The above measurements were made in accordance with ISO 7779 standard.

Dimensions (W x D x H)
Tables closed: 790 x 700 x 640 mm (31.1" x 27.6" x 25.2")
Tables opened: 1370 x 700 x 640 mm (53.9" x 27.6" x 25.2")

NOTE: Measurement Conditions
1) Without the ADF
2) Without the table

Weight: America, Europe, Asia (Except for Chinese Version)
85 kg (187.4 lb)
China
87 kg (191.8 lb)
(Excluding ADF, platen cover, ink, and master)

Master Process Time:	Less than 24 seconds (A4 copying) Less than 29 seconds (A3 copying) **NOTE:** Measurement Conditions 1) 100%size
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, 110 m/roll (A3 master roll) Yield: 200 masters/roll (A3 Drum) 315 masters/roll (A4 Drum) Maximum run length per master: 4,000 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
(Optimal conditions: 15 °C to 25 °C)

Humidity:
10% to 95% RH
(Optimal 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
- Automatic document feeder
- A3 color drum
- A4 black drum
- Tape dispenser
- Key Counter
- Interface kit (to connect the UC2)