

FR

SERIES

TECHNICAL MANUAL

VERSION 1.0
June, 1999

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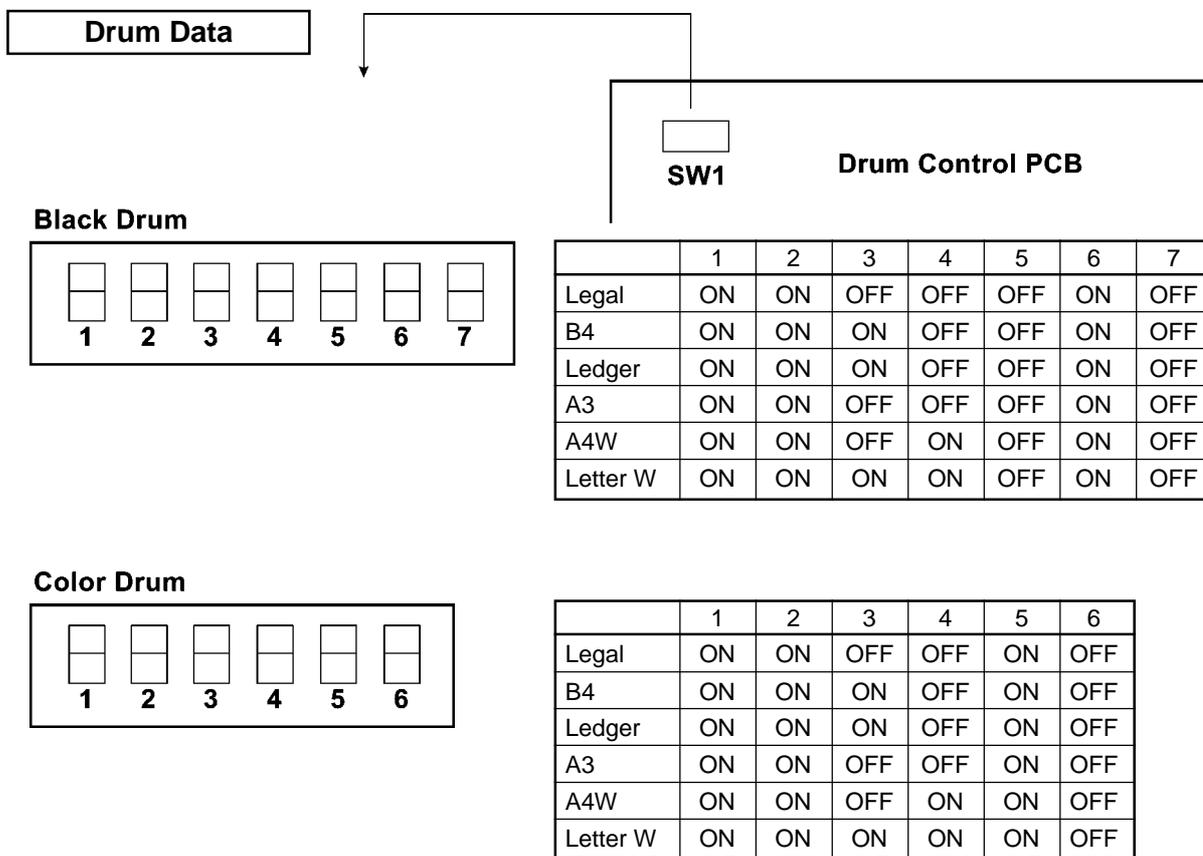
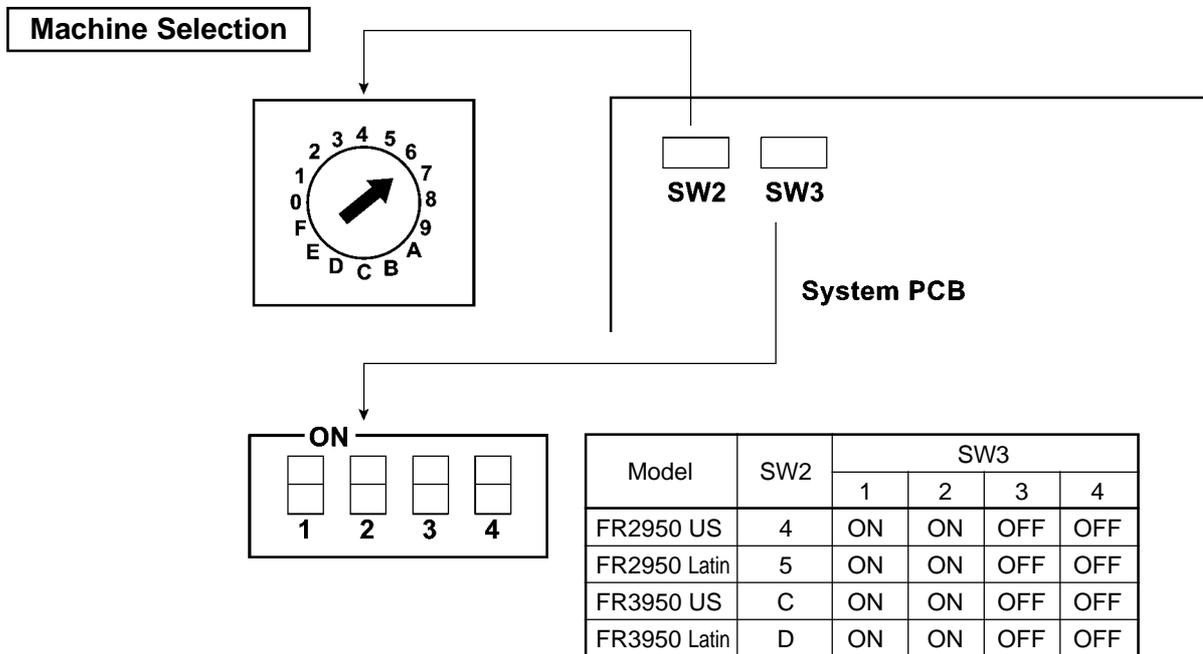
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1. Machine Model Setting :USA, Latin America



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1. Preface

This manual provides Technical Service Information for the RISOGRAPH **FR Series** duplicators.

This manual is published as a reference guide for use by RISO Group (RISO Kagaku Corp./RISO,INC./RISO EUROPE Ltd.) Certified Technical Representatives experienced in duplicator repair and service.

This manual also provides procedures for removing and installing major components. Following these procedures will minimize machine malfunctions. This information and format will also increase technical representatives' awareness and experience regarding repairs necessary to insure end-user satisfaction.

If assistance is required, please contact one of the following: _____

[RISO Kagaku Corp.]

Overseas Technical Section, Technical Support Department
2-5-1, Akanehama, Narashino-shi, Chiba 275, JAPAN
TEL: (0474)52-4111 FAX: (0474)52-3106 TELEX: 252-2298RISO J

[RISO EUROPE LTD.]

Solar House, 305 Ballards Lane, North Finchley, London N12 8NP, United Kingdom
TEL: (0181)446-1188 FAX: (0181)446-9547

[RISO, INC.]

NOTE : Before attempting to correct machine malfunctions, study the Technical Manual and make sure all questions and/or concerns have been satisfied. If necessary, please use the Technical Hotline:

TECHNICAL HOTLINE

800-578-7476
(Emergency Technical Assistance Only!!!)

REFERENCE	ADDRESSES	FOR
A	RISO, INC. Tech. Support Center 310 Andover Street Danvers, MA 01923	Technical Support Operations Correspondence and Technical Training
B	RISO, INC. REPAIR DEPT. 310 Andover Street Danvers, MA 01923	Repairs and Warranty Claims

CAUTION

[Handling of Lithium Battery]

- **Never fail to follow the following instructions when you discard the used lithium battery.**
- 1. Never let the battery short-circuited.**
If the (+) and (-) terminals contact each other or metal materials, the battery will be short-circuited. If the batteries are collected and stored in disorderly or one upon another, the above-mentioned case will occur.
- **DANGER -**
If the battery is short-circuited, it will heat up and may in some cases explode into fire.
- 2. Never heat up the battery.**
- **DANGER -**
If you heat the battery up to more than 100°C or put it into the fire, it may burn dangerously or explode.
- 3. Never disassemble the battery or press it into deformation.**
- **DANGER -**
If you disassemble the battery, the gas pouring out of the inside may hurt your throat or the negative lithium may heat up into fire.
If the battery is pressed into deformation, the liquid inside may leak out of the sealed part or the battery may be short-circuited inside an explode.
- 4. Never fail to keep the battery out of reach of children.**
If you put the battery within reach of children, they may swallow it down.
Should they swallow the battery, immediately consult the doctor.

[Replacement of the Lithium Battery]

- 1. The lithium battery must be replaced by a trained and authorized service technician.**
- 2. The battery must be replaced only with the same or equivalent type recommended by the manufacturer.**
- 3. Discard used batteries according to the manufacturer's instructions.**

!! WARNING !!

Important Safety Precautions

1. Always disconnect electrical supply before placing hands in the machine.

I. To avoid injuries:

Be sure to disconnect the electrical power before disassembling, assembling, or when making adjustments on the machine.

II. Protection of the machine:

Make sure to turn OFF the power to the machine before plugging or unplugging the electrical connectors, or when connecting a Meter.

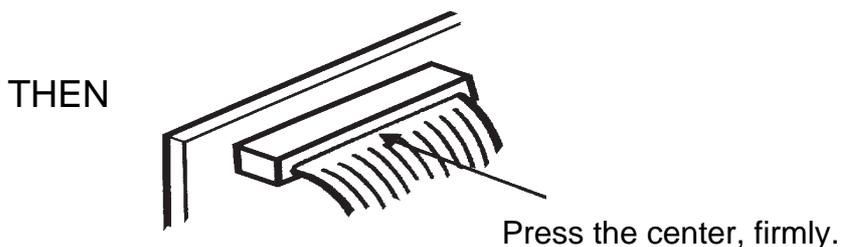
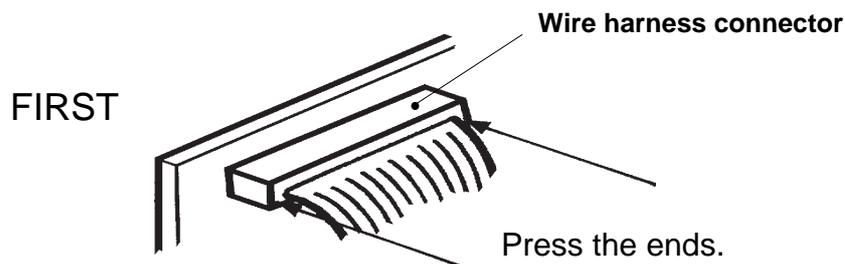
2. Always connect electrical connectors firmly.

I. To avoid electrical failure:

The connectors must be connected firmly together and onto the PCBs. Press on the ends of the connectors and then on the middle to ensure a firm fit.

II. Protection of the electrical components:

The electrical components may be damaged due to short circuits caused by a loose connector.



2. Work Precautions

Inspection

If you discover any defects or problems during an inspection, fix the problems or if necessary take steps such as replacing a part.

Removal

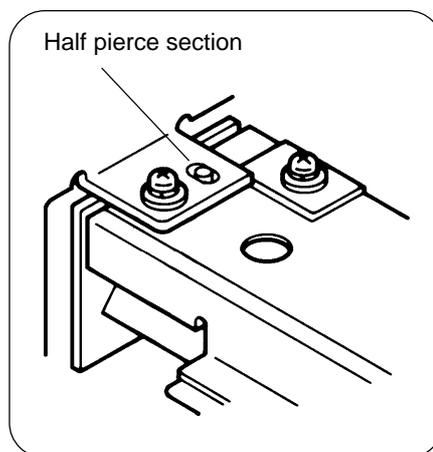
Check the problem area. At the same time, examine the cause of the problem and determine whether the part needs to be removed or disassembled. Next proceed according to the procedures presented in the Technical Manual. In cases where, for example, it is necessary to disassemble areas with large numbers of parts, parts which are similar to each other, or parts which are the same on the left and right, sort the parts so that you do not mix them up during reassembly.

- (1) Carefully sort the removed parts.
- (2) Distinguish between parts which are being replaced and those which will be reused.
- (3) When replacing screws, etc., be sure to use the specified sizes.

Assembly and Installation

Unless specified otherwise, perform the removal procedures in reverse during assembly and installation. In cases where protrusions or holes are provided to assist in positioning parts, use them for accurate positioning and securing.

(Protrusions and holes for positioning parts ⇨ Half pierce section)



Tools

Using tools other than those specified can lead to injury or damage screws and parts. Have all the tools necessary for the work available.

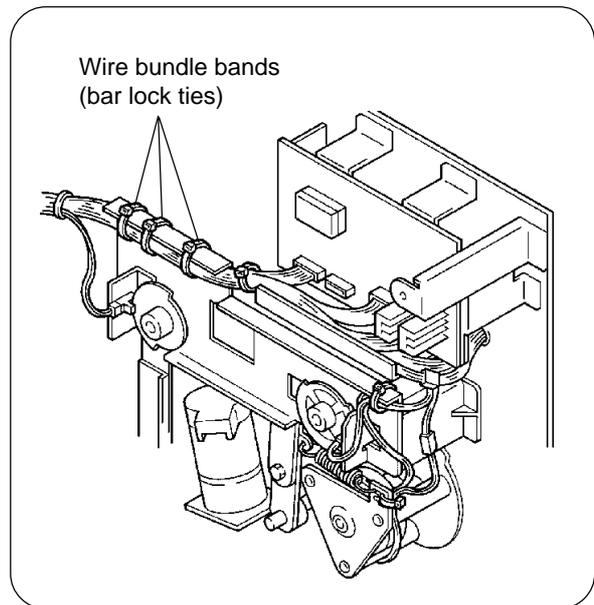
<Standard Tool list>

Type	Tip size	Shaft length, etc.	
Phillips screwdriver	No. 2	(250 mm)	
	No. 2	(100 mm-150 mm)	
	No. 2	(stubby type)	
	No. 1	(75 mm-100 mm)	
Standard screwdriver	6 mm	(100 mm-150 mm)	
	3 mm	(100 mm-150 mm)	
	1.8 mm	(precision type)	
Nut driver (box driver)	8 mm	(100 mm-150 mm)	
	7 mm	(100 mm-150 mm)	
High frequency driver	2.5 mm		
Spanners (may be double-ended)	5 mm	5.5 mm	7 mm
	8 mm	10 mm	13 mm
	Monkey		
Hex wrenches	5.0 mm		
	4.0 mm		
	3.0 mm		
	2.5 mm		
	2.0 mm		
	1.5 mm		

Type	Remarks
Steel scale	150 mm
Gap gauge	
Radial cutting pliers	
Pliers	
Nipper	
Small flashlight	
Multimeter	
Soldering iron	20 W-30 W
File	Flat, round

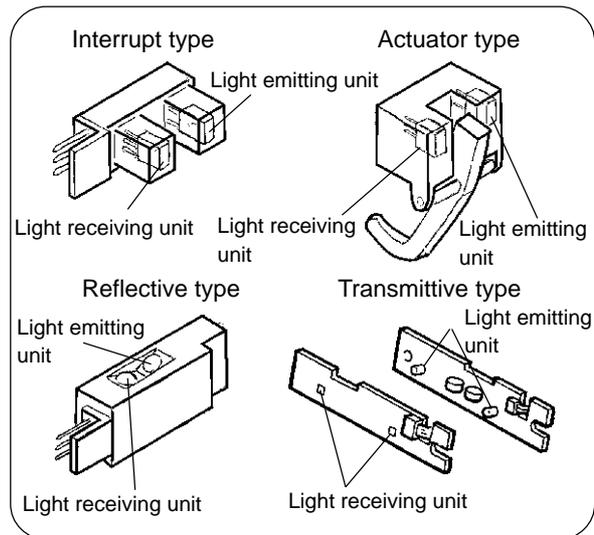
Electrical system work

- After removing wire bundles, fasten them with wire bundle bands (bar lock ties) so that they will not sag.
- When installing parts, be careful to avoid pinching or damaging the wire bundles.
- If a fuse blows, always replace it with one with the specified capacity. Using a fuse with a larger capacity can not only damage parts, but may cause fires.
- Be careful not to drop image scanners, thermal print heads, and other sensors as they can be easily damaged.



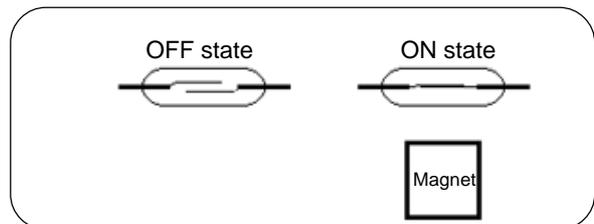
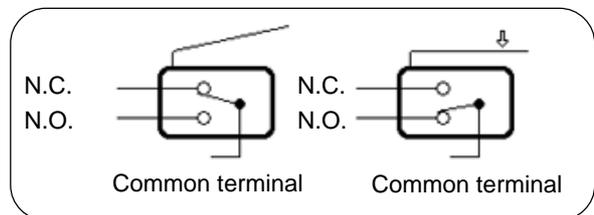
Sensor types

- Photo-electric sensors may be broadly divided into the following four types: interrupt types (U-shaped), actuator types, reflective types, and transmissive types.
- Magnetic sensors use Hall ICs, which react to the magnetic force in magnets.
- Always turn off the power before plugging or unplugging sensor connectors.



Switch types

- Microswitches may be divided between normally open (NO) types and normally closed (NC) types.
 - With an NO connection, an internal contact is connected when the switch actuator is pressed.
 - With an NC connection, an internal contact is disconnected when the switch actuator is pressed.
- Magnetic lead switches are switches in which an internal contact is connected in reaction to the magnetic force of a magnet.

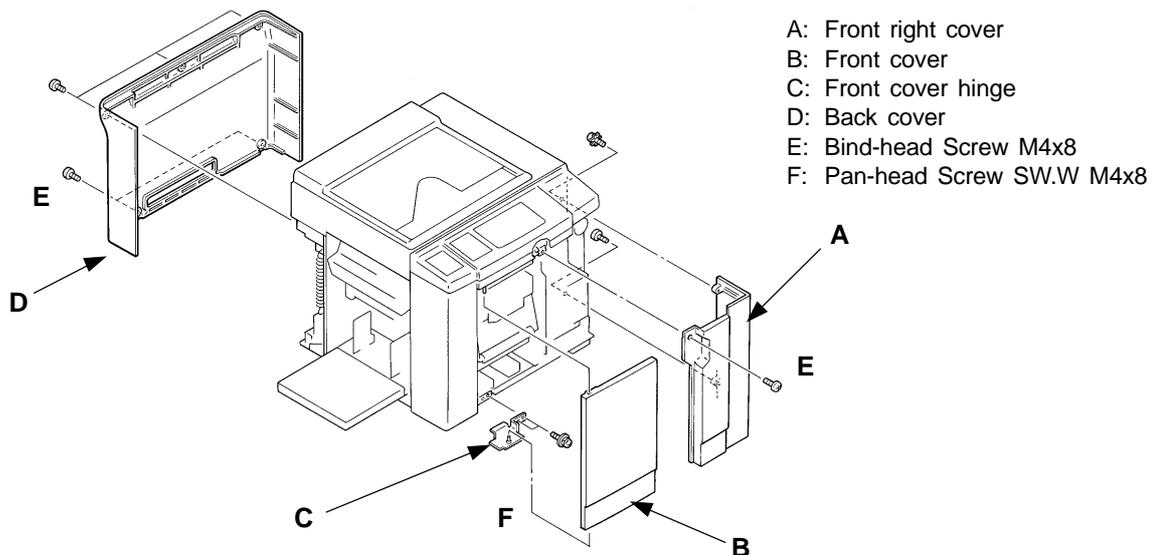


3. Exterior Cover Removal

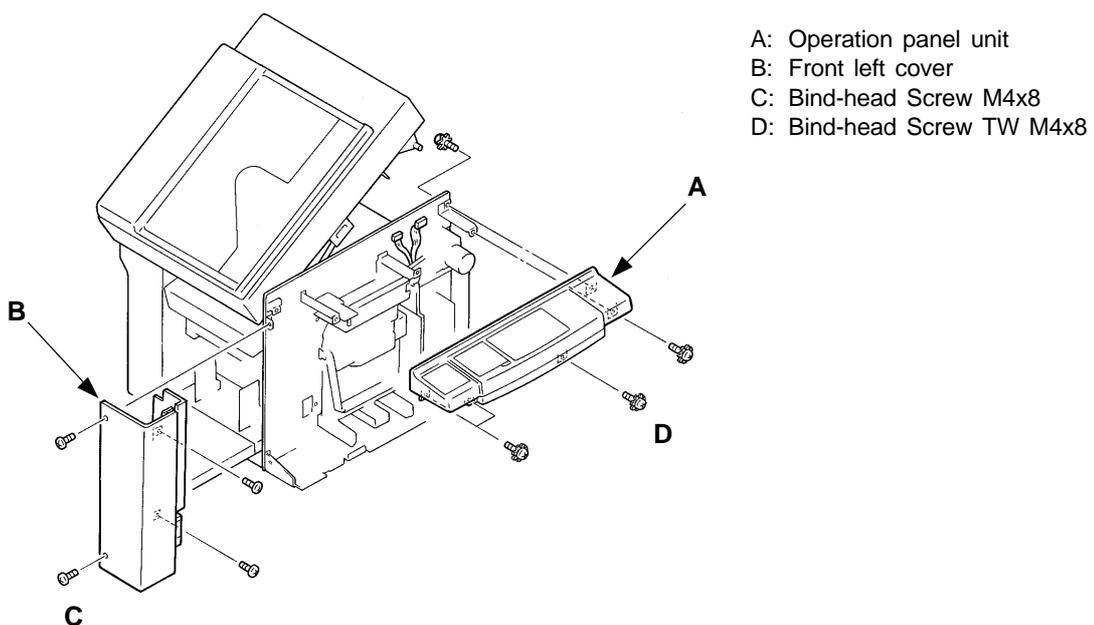
- Removal

*Disconnect a power cord and remove the covers.

- Back cover
- Front cover — Remove two mounting screws of the Front cover hinge.
- Front right cover



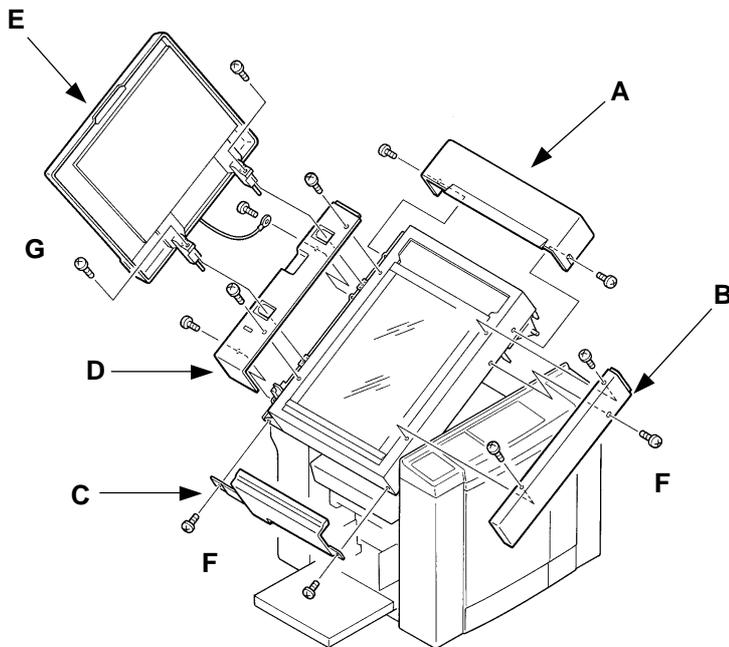
- Operation panel unit — Remove the Front right cover and disconnect two connectors to remove the Panel unit.
- Front left cover



CHAPTER 1. MAINTENANCE

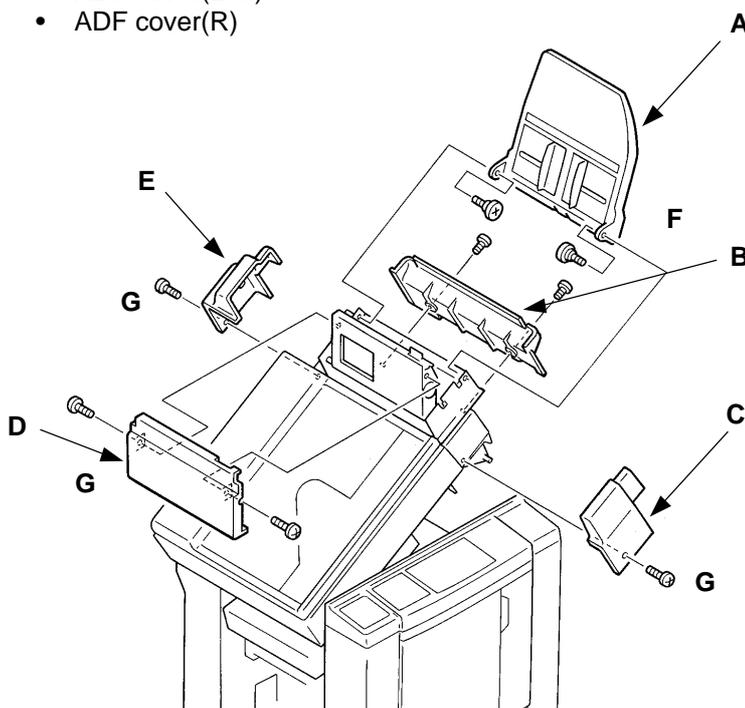
EXTERIOR COVER REMOVAL

- Stage cover ————— Remove a ground wire to remove the cover.
- Scanner cover(Right)
- Scanner cover(R) ————— Remove them after the Stage cover.
- Scanner cover (F)
- Scanner cover(Left) ————— Remove them after the Stage cover, Scanner cover(R), and Scanner cover(F) in that order.



- A: Scanner cover(Right)
- B: Scanner cover(F)
- C: Scanner cover(Left)
- D: Scanner cover(R)
- E: Stage cover
- F: Bind-head Screw M4x8
- G: Bind-head Screw M4x10

- Original tray
- ADF cover(Right)
- ADF cover(F)
- ADF cover(Left)
- ADF cover(R)



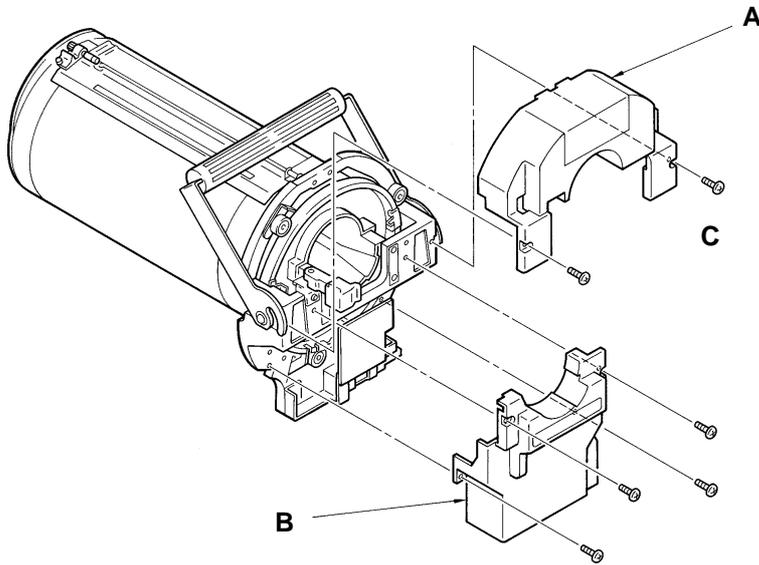
- A: Original tray
- B: ADF cover(Right)
- C: ADF cover(F)
- D: ADF cover(Left)
- E: ADF cover(R)
- F: Original tray shaft
- G: Bind-head Screw M4x8

CHAPTER 1. MAINTENANCE

EXTERIOR COVER REMOVAL

- Drum cover(Upper)
- Drum cover(Lower)

- A: Drum cover(Upper)
- B: Drum cover(Lower)
- C: Bind-head screw M3x6

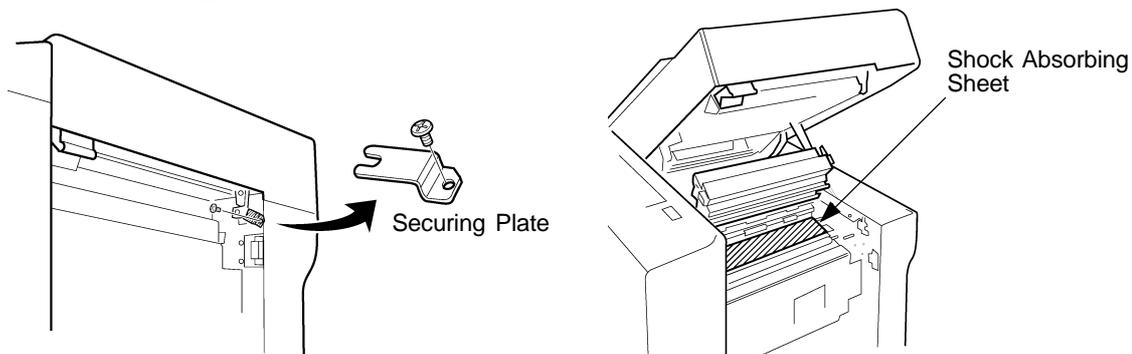


4. Installation

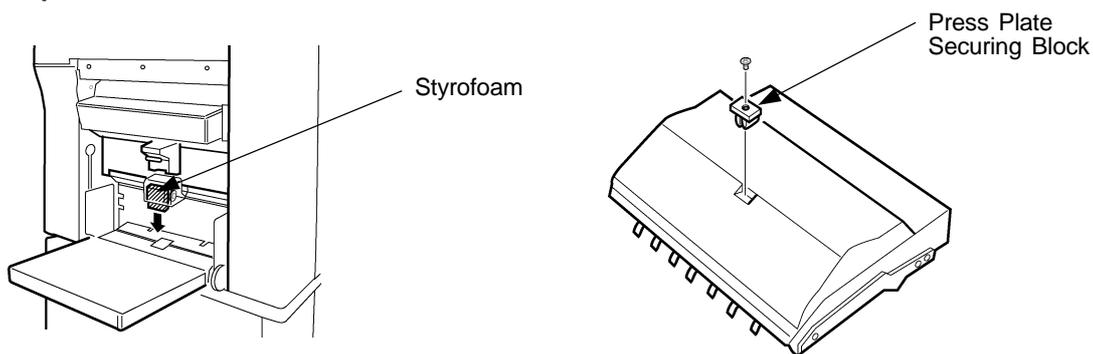
Be sure to follow the procedures below in installation.

(1) Removing Protectors

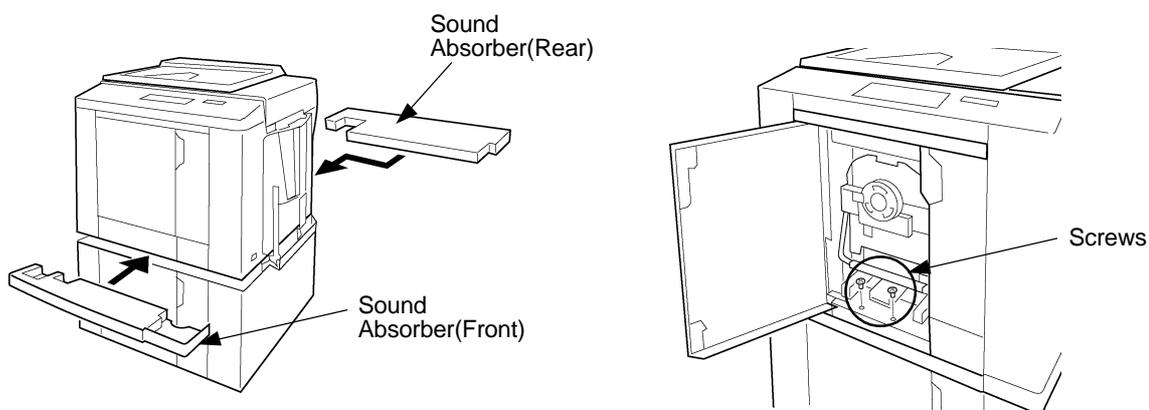
Paper Receiving Area



Paper Feed Area



(2) Attaching Sound Absorbers



Insert two Sound Absorbers(Rear and Front) between the RISOGRAF and the stand.

Open the Front Cover and secure the Sound Absorber(Front) with two screws.

Installation location

- Do not install the machine in any of the following locations.
 - (1) Those subject to direct sunlight or any bright location such as by a window (If you must install in such a location, put a curtain or the like over the window.)
 - (2) Those where the temperature changes drastically
 - (3) Those that are too hot, cold, humid, or dry
 - Temperature range: 15° centigrade - 30° centigrade
 - Humidity range: 40% - 70% No condensation allowed
 - (4) Those with radiant heat sources and any locations in the direct path of air from air conditioners, heaters
 - (5) Any poorly ventilated location
 - (6) Dusty atmosphere
 - (7) Any tilted location
(Installation height difference: 10 mm max. front - rear, 10 mm max. left - right)

Electrical connection

- Plug the plug securely into the socket so that there is no problem with the contact in the power supply plug section.
- Do not use any triplets or extension cords.
- Do not allow any other machine to stand on or crush the power cord.

Ground connection

- Always ground this machine to prevent electrical shock in the unlikely event of electrical leakage.

CHAPTER 2: MACHINE SUMMARY

Contents

1. Features of the RISOGRAPH FR	2-1
2. Specifications	2-2
3. Product Compatibility	2-6
4. Cross Sectional View	2-8
5. Machine Operations	2-9
6. Paper Feed and Receiving	2-10
7. Master Removal and Feed	2-11

1. Features of the RISOGRAFH FR

THREE FEATURES OF FR

SC Built-in (FR3950- α)

SC function built-in model will be lined up for FR series. It makes much easier to link a FR to the PC or Mac, just plug in a FR direct from the computer. This new model will give you persuasive selling point to today's computerized office as well as providing advanced image of Riso.

Quieter Operating Sound

Operating sound of the FR never disturb your work. We have succeeded in reducing the sound about 25 %, while maintaining durability of the GR series. This sound level will be accepted for the office equipment.

Improved Print Quality (New Ink and Master)

The print quality of the FR is noticeably improved with the refined TPH. The high performance new ink and high sensitive new master have been developed for best matching to produce high print quality. In addition, FR series does not required Image Enhancement mode, because it has high performance image processing program which is newly developed. Therefore, small characters and fine lines will be precisely reproduced.

Other New Functions

There are another powerful useful features which are newly added.

***2, 4, 8 and 16 up**

4 kinds multi up function has been installed.

***4 kinds screen dots**

4 kinds screen dots mode(Fine, small, medium and large) has been newly added for vireos picture processing.

***Electrical feeding tray adjustment(A3 Machine only)**

The side way print position can be adjusted ± 10 mm from the operation panel.

Auto Power Off

Environment-friendly RISOGRAFH requires no warming up. If it is left turned on, the auto shutoff function(OFF 5/10/30 minutes) can be set. Since the controller uses another power supply, the data can be received if the main body is turned off.

Preventive Maintenance Indication

Enter the "number of masters/print sheets" in the test mode. The overhaul and periodic maintenance timings are notified to you by displaying "MAINTENANCE <MASTER>/<PRINT> CALL SERVICE." on the liquid crystal display panel. In order to run RISOGRAFH in the better condition, keep close contact with an administrator at installation site.

2. Specifications

FR3950/FR3950 α

- **Processing** High-speed automatic digital scanning
Fully automatic, thermal screening duplicating system
- **Time to First Copy** Letter or A4 original / Approx. 17 seconds
Ledger or A3 original / Approx. 23 seconds
- **Print Speed** 5 selectable print speeds (60, 80, 100, 110, 120 sheets/min.)
- **Scanning Resolution** 400 dpi
- **Original Type** Bound documents or sheets
- **Original Size**
 - **For the Stage Glass:**
Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
Min./ Business card (50 x 90mm) or 2 x 3 1/2 inch
 - **In the optional ADF Unit:**
Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
Min./ B6 (128 x 182mm) or 5 x 7 inch
- **Paper Size** Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Original Weight**
 - **For the Stage Glass:**
10 kg (22 lbs.) or less
 - **In the optional ADF Unit:**
Max./ 110 g/m² or 28-lb bond
Min./ 50 g/m² or 15-lb bond
- **Paper Weight** Max./ 210 g/m² or 110-lb index
Min./ 46 g/m² or 13-lb bond
- **Image Area** A3 Drum / 290 x 412mm
Ledger Drum / 10.7 x 16.5 inch
- **Paper Capacity** 1000 sheets in feed and receiving tray
[Based on 64 g/m² (16-lb bond) paper]
- **Optional ADF Capacity** 50 originals
- **Machine Weight** FR3950 : Approx. 118 kg (260 lbs.)
FR3950 α : Approx. 120 kg (264 lbs.)
- **Dimensions**
[W x D x H]
In use / 1,320 x 675 x 825mm
52.0 x 26.6 x 32.5 inch
In storage / 745 x 675 x 705mm
29.3 x 26.6 x 27.8 inch
- **Power Source**
<Requirements>
Picture Model: 220 to 240 VAC, 50/60 Hz <3.0A>
USA Model: 120 VAC, 60 Hz <5.0A>
Metric Models: 110 VAC, 60 Hz <5.0A> - 110-V model
220 to 240 VAC, 50/60 Hz <3.0A> - 220-V model

CHAPTER 2. MACHINE SUMMARY

SPECIFICATIONS

- **Reduction Parameters** 4 selectable reductions (94%, 87%, 82% and 71%)
[94%, 77%, 75% and 66% in USA models]
- **Enlargement Parameters** 3 selectable enlargements (141%, 122% and 116%)
[141%, 127% and 121% in USA models]
- **Zooming Parameters** 50% to 200%
- **Features** Photo processing mode, Duo processing mode, Dot-screening (4 patterns), Multi-Up printing (2,4,8 and 16 up), Bound Book precessing, Automatic idle, Scanning Contrast Adjustment (auto/manual), Auto Print Density Control, Confidential mode, Auto Power-off, Memory Mode (Memory storage of frequently used settings), Programmed printing (Programmable print grouping), Auto Ejection Guide Control, Initial Setting Customization, Interface Capabilities, Preventive Maintenance Indication, Precision Stacking Tray
- **Optional Accessories** Color drum (Cylinder), Digitizer III, Sorter TM5000, Sorter TM2500, Sheet Feeder SF3000, Job Separator III, Key/Card Counter III, Computer Interface (SC3500/5500/7700)

CHAPTER 2. MACHINE SUMMARY

SPECIFICATIONS

FR2950

- **Processing** High-speed automatic digital scanning
Fully automatic, thermal screening duplicating system
- **Time to First Copy** Letter or A4 original / Approx. 17 seconds
Ledger or A3 original / Approx. 23 seconds
- **Print Speed** 5 selectable print speeds (60, 80, 100, 120, 130 sheets/min.)
- **Scanning Resolution** 400 dpi
- **Original Type** Bound documents or sheets
- **Original Size**
 - **For the Stage Glass:**
Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
Min./ Business card (50 x 90mm) or 2 x 3 1/2 inch
 - **In the optional ADF Unit:**
Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
Min./ B6 (128 x 182mm) or 5 x 7 inch
- **Paper Size** Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Original Weight**
 - **For the Stage Glass:**
10 kg (22 lbs.) or less
 - **In the optional ADF Unit:**
Max./ 110 g/m² or 28-lb bond
Min./ 50 g/m² or 15-lb bond
- **Paper Weight** Max./ 210 g/m²
Min./ 46 g/m²
- **Image Area** B4 Drum / 251 x 357mm
A4 Drum / 198 x 286mm
Legal Drum / 7.9 x 13.5 inch
- **Paper Capacity** 1000 sheets in feed and receiving tray
[Based on 64 g/m² (16-lb bond) paper]
- **Optional ADF Capacity** 50 originals
- **Machine Weight** Approx. 112kg (247 lbs.)
- **Dimensions**
[W x D x H]
 - In use / 1320 x 660 x 825mm
52.0 x 26.0 x 32.5 inch
 - In storage / 745x 660 x 705mm
29.3 x 26.0 x 27.8 inch
- **Power Source**
<Requirements>
 - Picture Model: 220 to 240 VAC, 50/60 Hz <3.0A>
 - USA Model: 120 VAC, 60 Hz <5.0A>
 - Metric Models: 110 VAC, 60 Hz <5.0A> - 110-V model
220 to 240 VAC, 50/60 Hz <3.0A> - 220-V model

CHAPTER 2. MACHINE SUMMARY

SPECIFICATIONS

- **Reduction Parameters** 4 selectable reductions (94%, 87%, 82% and 71%)
[94%, 77%, 75% and 66% in USA models]
- **Enlargement Parameters** 3 selectable enlargements (141%, 122% and 116%)
[141%, 127% and 121% in USA models]
- **Zooming Parameters** 50% to 200%
- **Features** Photo processing mode, Duo processing mode, Dot-screening (4 patterns), Multi-Up printing (2,4,8 and 16 up), Bound Book processing, Automatic idle, Scanning Contrast Adjustment (auto/manual), Auto Print Density Control, Confidential mode, Auto Power-off, Memory Mode (Memory storage of frequently used settings), Programmed printing (Programmable print grouping), Auto Ejection Guide Control, Initial Setting Customization, Interface Capabilities, Preventive Maintenance Indication, Precision Stacking Tray
- **Optional Accessories** Color drum (Cylinder), Digitizer III, Sorter TM5000, Sorter TM2500, Sheet Feeder SF3000, Job Separator III, Key/Card Counter III, Computer Interface (SC3500/5500/7700)

CHAPTER 2. MACHINE SUMMARY

PRODUCT COMPATIBILITY

3. Product Compatibility

Accessory Compatibility chart

PRODUCT	APPLICABLE MODEL			
	FR3950α	FR3950	FR2950	GR
FR Black Drum A3	●	●	X	X
FR Color Drum A3	●	●	X	●
FR Black Drum B4/A4/L	X	X	●	X
FR Color Drum B4/A4/L	X	X	●	●
FR Black A4 WIDE Drum	●	●	X	X
FR Color Drum A4 WIDE	●	●	X	●
ADF UNIT III	●	●	●	△
Sheet Feeder SF3000	●	●	●	●
TM5000 Sorter	●	●	●	●
TM2400 Sorter	X	X	X	△
TM2500 Sorter	●	●	●	●
DIGITIZER III (S)	●	●	●	□
Key/Card Counter III (S)	●	●	●	●
Job Separator III	●	●	●	●
Interface Board III (S)	●	●	●	●
SC 3500, 5500, 7500, 7700	X*1	●	●	●*2

● : Fully Compatible

X : Not Compatible

X*1 : Built-in SC Function

●*2 : Refer to SC Technical Manual

△ : Compatible (excludes GR3770)

□ : Compatible (GR3770, GR3750, GR2750)

CHAPTER 2. MACHINE SUMMARY

PRODUCT COMPATIBILITY

Consumables Compatibility Chart

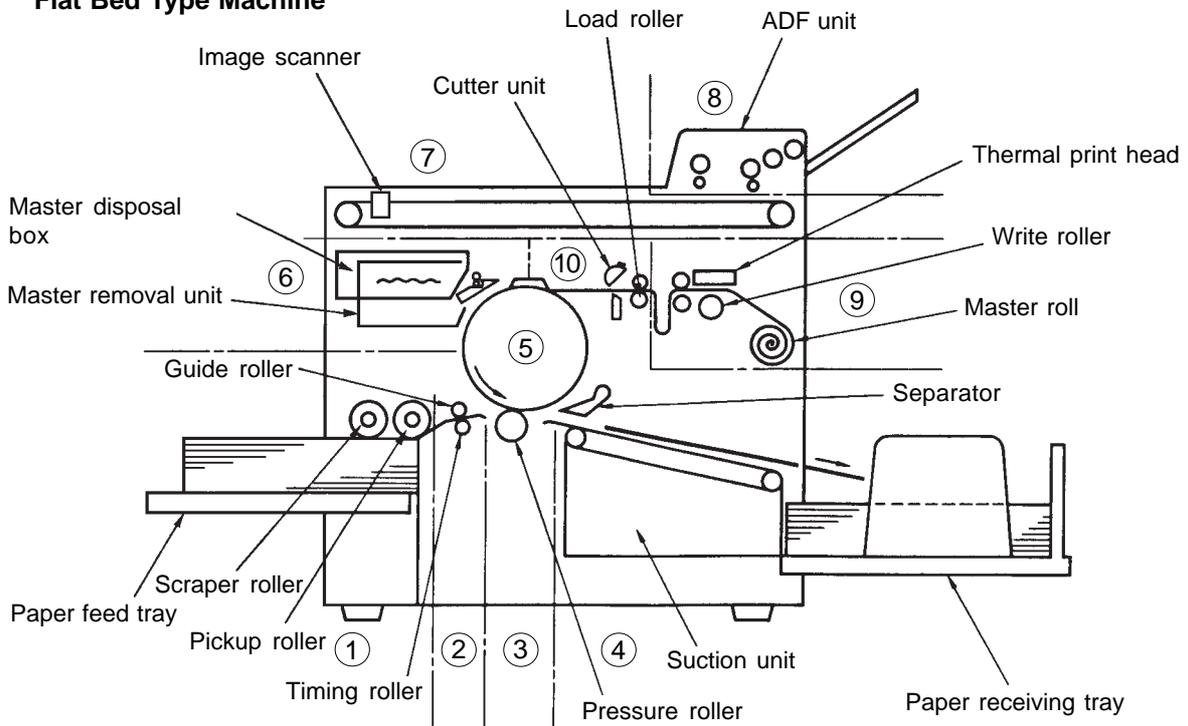
PRODUCT	APPLICABLE MODEL		
	FR3950/α	FR2950	GR
RISOGRAPH FR MASTER 96W	●	X	X
RISOGRAPH FR MASTER 95	X	●	X
RISOGRAPH FR INK (BLACK)	●	●	X
RISOGRAPH FR INK (RED)	●	●	●
RISOGRAPH FR INK (BLUE)	●	●	●
RISOGRAPH FR INK (BROWN)	●	●	●
RISOGRAPH FR INK (GREEN)	●	●	●
RISOGRAPH FR INK (YELLOW)	●	●	●
RISOGRAPH FR INK (GRAY)	●	●	●
RISOGRAPH FR INK (LIGHT GRAY)	●	●	●
RISOGRAPH FR INK (MARINE RED)	●	●	●
RISOGRAPH FR INK (BRIGHT RED)	●	●	●
RISOGRAPH FR INK (BURGUNDY RED)	●	●	●
RISOGRAPH FR INK (FEDERAL BLUE)	●	●	●
RISOGRAPH FR INK (MEDIUM BLUE)	●	●	●
RISOGRAPH FR INK (PURPLE)	●	●	●
RISOGRAPH FR INK (TEAL)	●	●	●
RISOGRAPH FR INK (FLAT GOLD)	●	●	●
RISOGRAPH FR INK (ORANGE)	●	●	●
RISOGRAPH FR INK (HUNTER GREEN)	●	●	●
* ORDER COLORS	●	●	●
RISOGRAPH GR INK (BLACK)	X	X	●*1
RISOGRAPH GR INK HD (BLACK)	X	X	●*2

●*1:Compatible (excludes GR3770)

●*2:Compatible (GR3770)

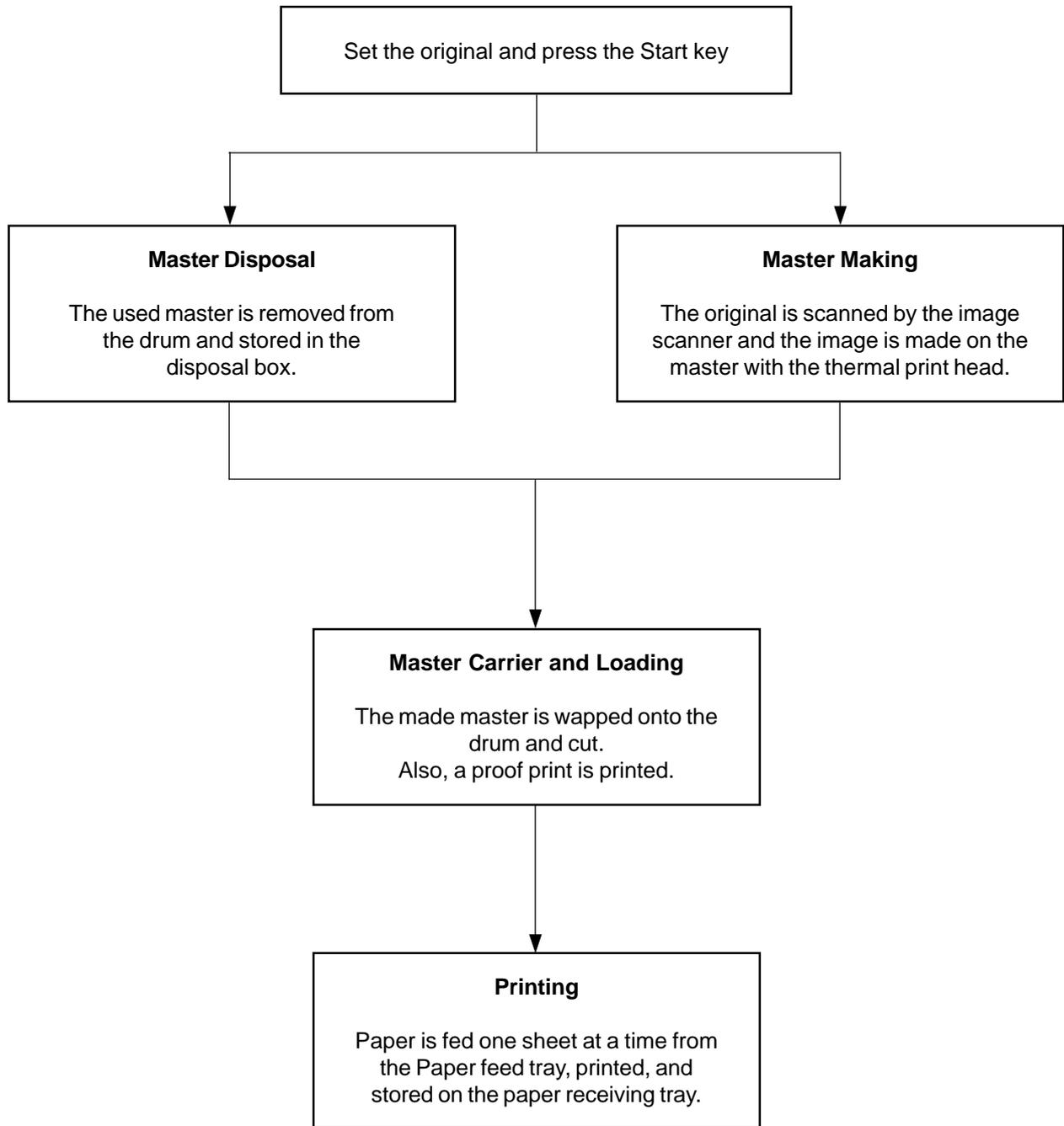
4. Cross Sectional View

Flat Bed Type Machine

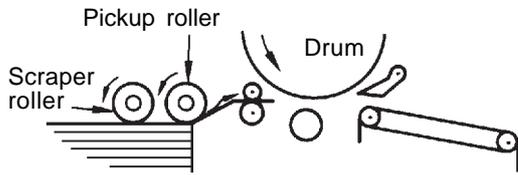


- ① **First Paper Feed Area:** Feeds single sheets of paper to the second paper feed area via the Scraper roller, Pickup rollers, and Stripper plate.
- ② **Second Paper Feed Area:** Controls the vertical print position and feeds paper to the print area via the Timing and Guide rollers.
- ③ **Print Area:** Uses the Pressure roller to press paper against the master on the Drum. The Drum rotates with the Pressure roller and prints an image on paper.
- ④ **Paper Ejection Area:** Separates a printed paper from the Drum, and transports it onto the Paper receiving tray.
- ⑤ **Drum Section:** Supplies the Drum surface with Ink from an Ink bottle.
- ⑥ **Master Disposal Area:** Separates a used master from the Drum and disposes it into the Master disposal box.
- ⑦ **FB Image Scanning Area:** Scans an original on the Stage glass by moving the Image scanner and converts the image information into digital data.
- ⑧ **ADF Image Scanning Area:** Carries an original and scans it with the Image scanner and converts the image information into digital data.
- ⑨ **Master Making Area:** Makes a master with the Thermal print head.
- ⑩ **Carrier and Clamp Area:** Feeds the prepared master material to the Drum, loads it on the Drum, and cuts it to an appropriate length.

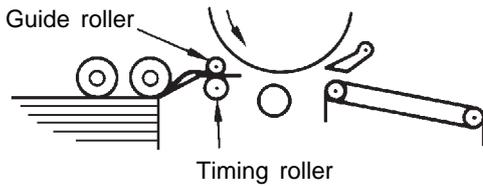
5. Machine Operations



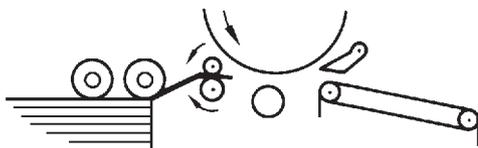
6. Paper Feed and Receiving



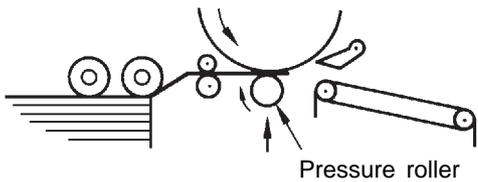
The Drum is rotated and a sheet of paper is fed from the first paper feed area to the second paper feed area by the Scraper and Pickup rollers.



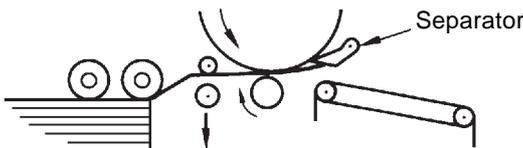
The paper feed to the second paper feed area is stopped by the Guide and Timing rollers to form a buckle. The paper then waits until the rotation of the Guide roller starts.



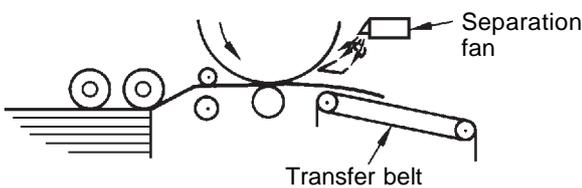
The Guide and Timing rollers in the second paper feed area are rotated and the paper is fed to the print area.



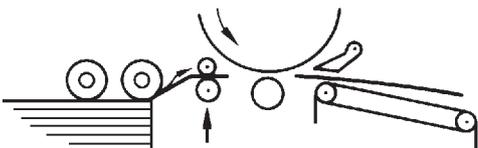
While the paper is being fed from the second paper feed area, the Pressure roller is raised and printing starts. (The Pressure roller contacts the Drum and starts rotating.)



After the Pressure roller contacts the Drum to start printing, the Separator approaches the Drum and the Timing roller goes down. (The paper is then transferred by the rotation of the Drum.)

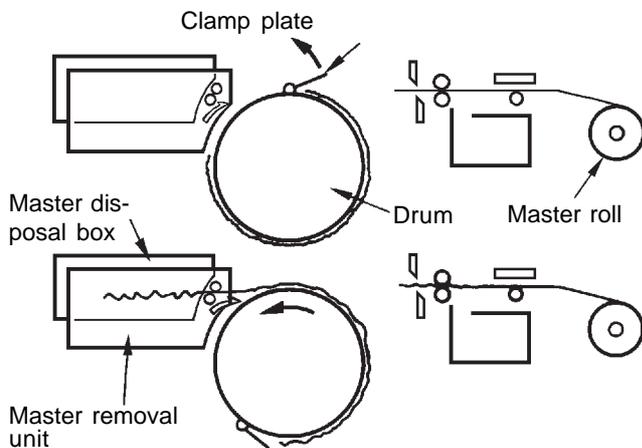


The printed paper is separated from the Drum by the Separator with a help of the air blow from the Separation fan and is transported onto the Paper receiving tray by the Transfer belts using the Suction fan.



The Timing roller contacts the Guide roller to feed the next sheet of paper.

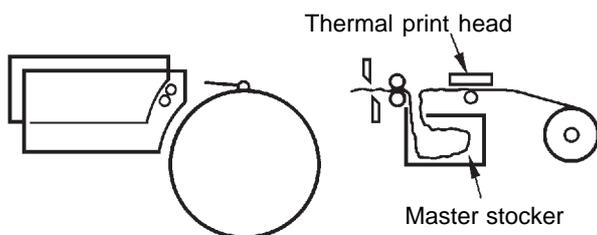
7. Master Removal and Feed



Master Removal

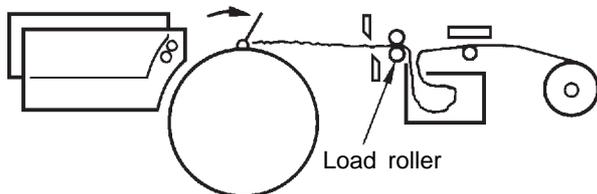
When the "START" button is pressed for master-making, the Drum is rotated to the home position and the Clamp plate is opened.

The Master removal hooks are activated, and the Drum is rotated a turn to remove a used master into the Master disposal box.



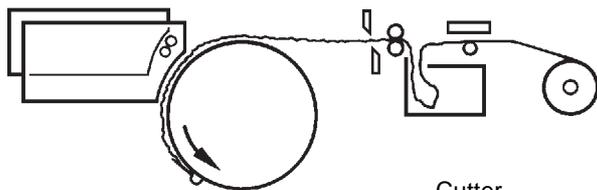
Master Making

At the same time the used master is removed from the Drum, the Image scanner scans an original and the Thermal print head makes a new master and stocks the new made master in the Master stocker.

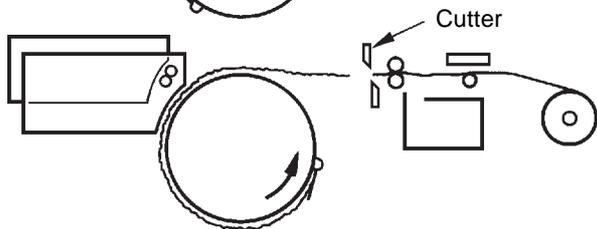


Master Loading

The lead edge of the master advances to the Drum, and the Clamp plate is closed to hold the master.



The Drum is rotated to load the master on itself.



Master loading continues until the prime surface of the Drum is covered, and then the Cutter cuts the master while the Drum still rotating.

CHAPTER 3: MAIN DRIVE SECTION

Contents

THEORY OF OPERATION

1. Main Drive	3T-1
2. Main Motor Safety Switch	3T-2
3. Other Mechanisms	3T-3

REMOVAL & ASSEMBLY

1. Main Shaft Ass'y	3R-1
2. Drive Unit	3R-2
3. Main Motor Unit	3R-3

THEORY OF OPERATION

1. Main Drive

- Rotation of Main Pulley

The Main motor provides the drive for the rotation of the Main pulley via the Cam pulley and Main belt.

- Rotation of Drum

The Main pulley is attached on the Main shaft, which is engaged with the Main shaft catch of the Drum.

While the Main motor is operating, therefore, the Drum is rotating, driven by the Main shaft.

- Control of Rotation Speed

The Main motor speed is controlled by the Encoder disc and sensor, which are attached on the top of the Main motor.

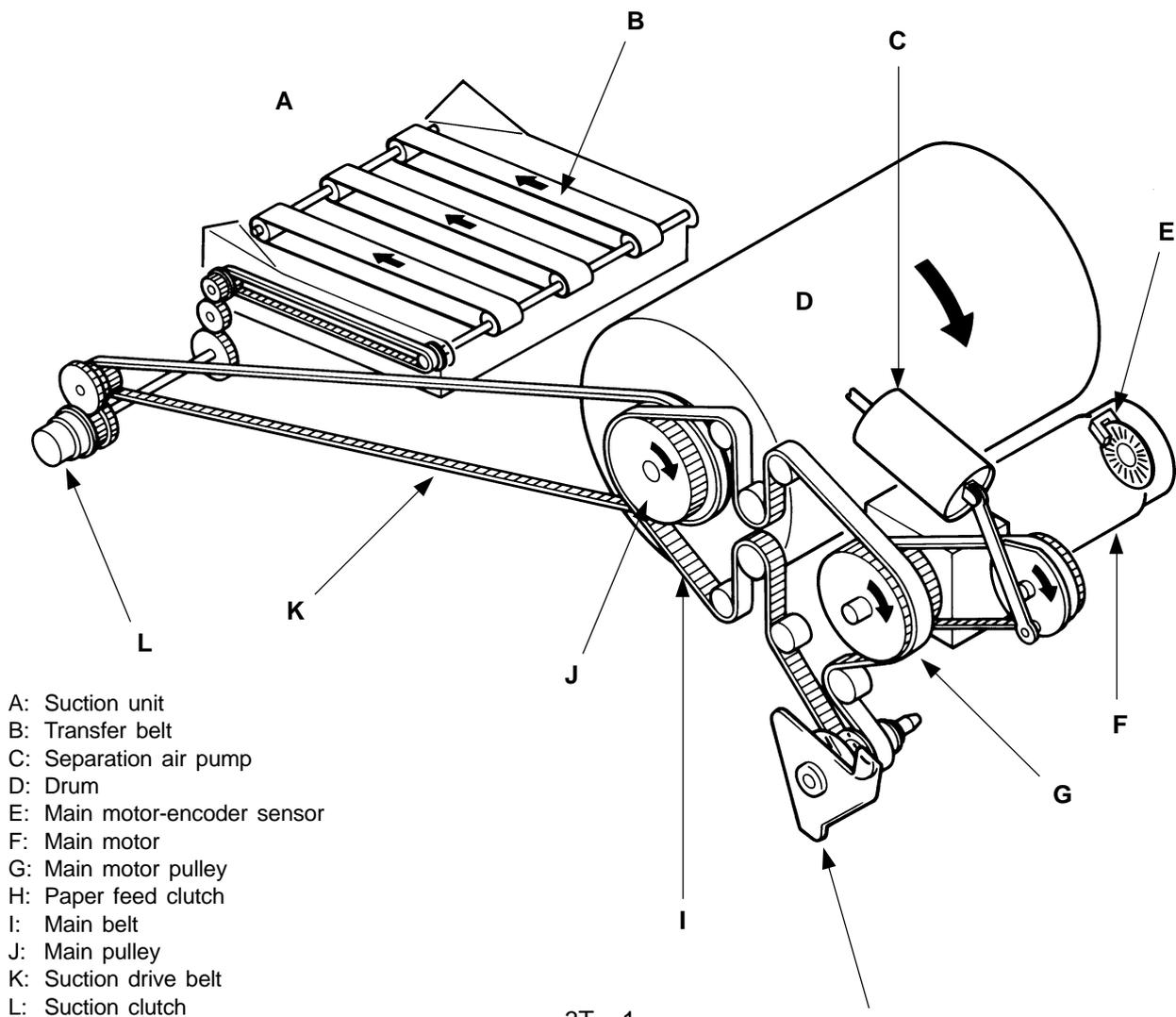
The Encoder sensor counts the number of slits of the Encoder disc which has passed the sensor in given period, and controls the actual drum rotation speed.

- First paper feed area drive

When the paper feed clutch is activated, the main drive is transferred to the First paper feed drive via clutch.

- Separation Air Pump

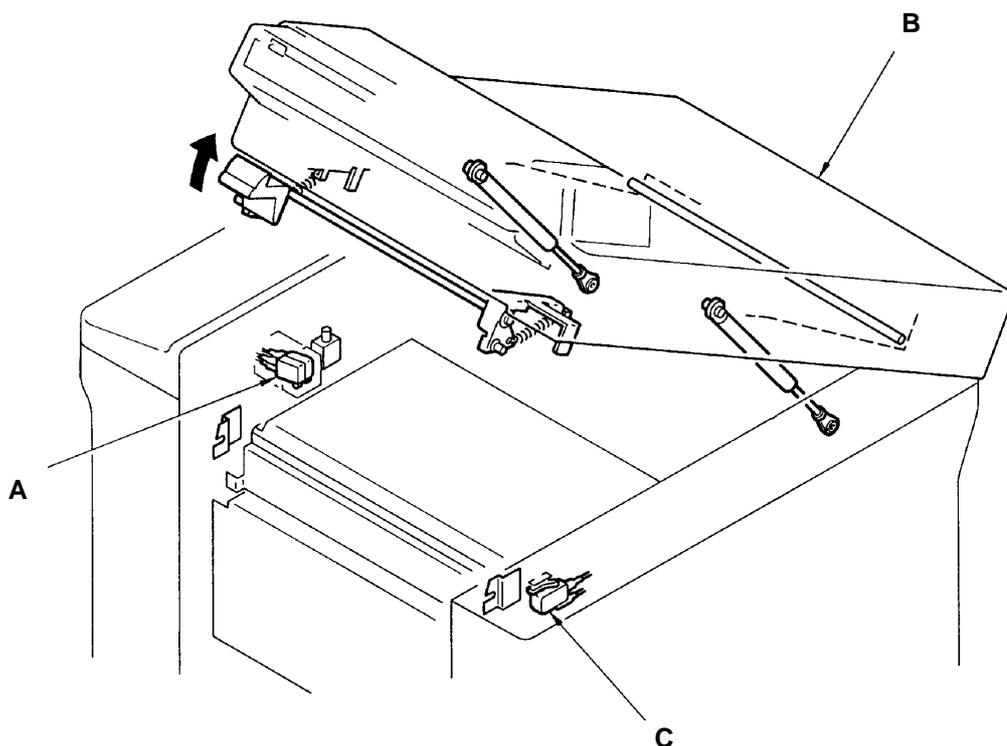
The Separation air pump is driven by the Main motor via a belt.



- A: Suction unit
- B: Transfer belt
- C: Separation air pump
- D: Drum
- E: Main motor-encoder sensor
- F: Main motor
- G: Main motor pulley
- H: Paper feed clutch
- I: Main belt
- J: Main pulley
- K: Suction drive belt
- L: Suction clutch

2. Main Motor Safety Switch

Scanner table Set SW detects if the scanner table has been set in position. When the scanner table is left open, the interlock switch neither for the thermal print head not for the main motor can be pushed, where power supply to the main motor and to the thermal head is cut off.

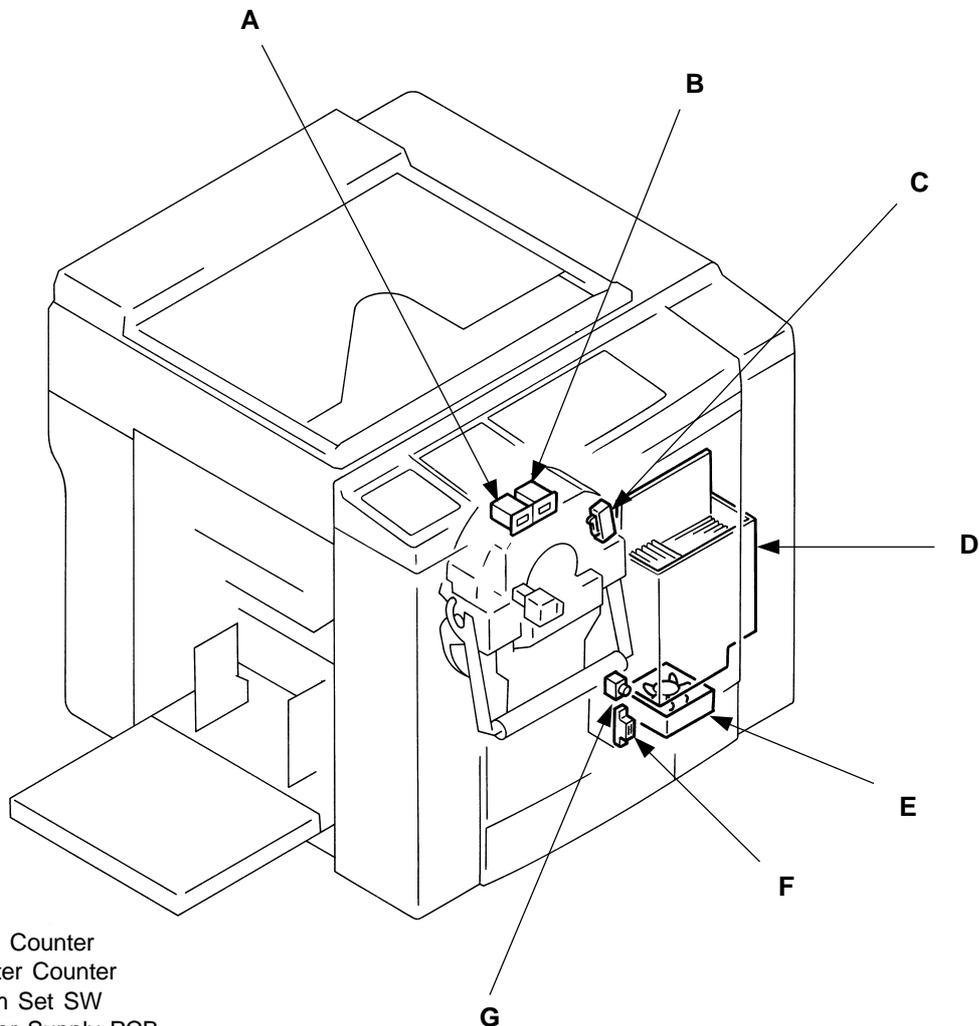


- A: Interlock SW
- B: Scanner table
- C: Scanner table set SW

If Scanner table Set Switch or Interlock Switch (for main motor) has not been pressed, "CLOSE SCANNER TABLE" message is displayed.

- Test Mode No. 16 Drum home position button
 - Short interval beeps when pressed
- No. 18 Drum set SW
 - Short interval beeps when pressed
- No. 30 Front cover set sensor
 - Short interval beeps when set

3. Other Mechanisms



- A: Total Counter
- B: Master Counter
- C: Drum Set SW
- D: Power Supply PCB
- E: Power Supply Cooling Fan
- F: Front Cover Set Sensor
- G: Drum Home Position Button

- Power Supply Cooling Fan

When the machine is in idling condition, the Power supply pcb cooling fan rotates at low speed, and at high speed when in master making or printing operation.

- Drum Home Position Button

Main motor rotates at 15 rpm while the Drum home position button is pressed with the Front cover set sensor in set condition (for servicing purpose).

- Total Counter

Total counter adds one count during printing after each paper ejection without paper jam.

- Master Counter

Master counter adds one count during master loading on drum after each master loading without master jams.

- Front Cover Set Sensor

If the Front cover set sensor is not detecting the Front cover, "CLOSE FRONT COVER" will be displayed.

MEMO

REMOVAL & ASSEMBLY

1. Main Shaft Ass'y

< Removal Procedure >

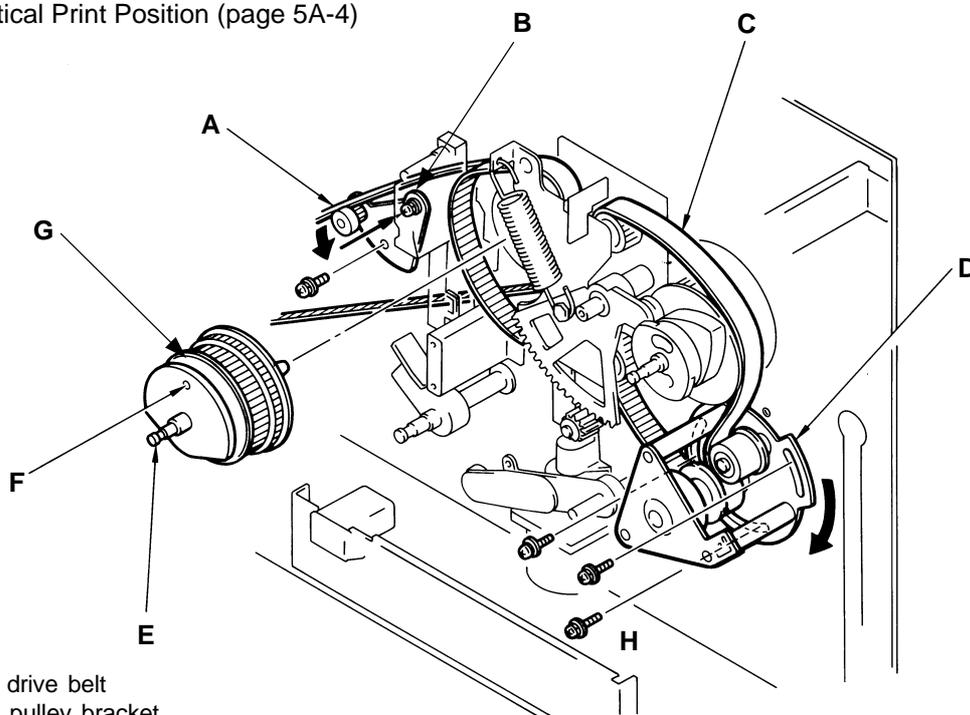
1. Lower the paper feed tray, remove the drum, disconnect the machine from the power supply and remove the following parts.
 - Scraper unit (page 4R-4)
 - Timing spring
 - P disc, Pressure sensor disc, Pressure shaft face plate, Main shaft face plate (page 6R-1)
 - Pressure Link ass'y (page 6R-2)
2. Remove three mounting screws on the Paper feed clutch base and let the Paper feed clutch unit hang free to loosen the tension of the Main belt further.
3. Loosen mounting screw on the Tension pulley bracket and loosen the tension of the Suction drive belt.
4. Remove the belts from the Main pulley and then remove the Main shaft ass'y.

- Precautions in Assembly -

- When you disassemble and reassemble the Main shaft assembly into the Pressure cam and Main shaft, align the alignment holes of the two parts with each other.
- Install the Main shaft ass'y so that the alignment hole on the Pressure cam can point up.

- Adjustments and checks after installation

- Resting Position of Pressure Lever (page 6A-3)
- Position of Pressure Sensor Disc (page 6A-7)
- Position of P Disc (page 4A-5)
- Vertical Print Position (page 5A-4)



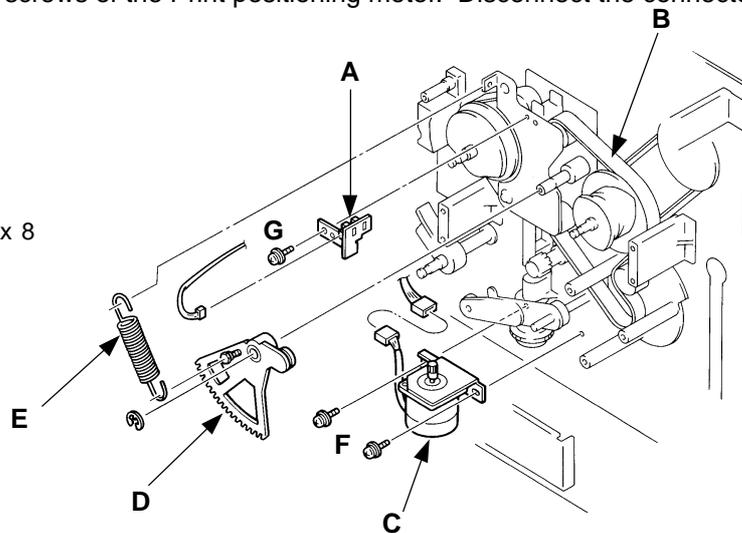
- A: Suction drive belt
- B: Tension pulley bracket
- C: Main belt
- D: Paper feed clutch base
- E: Main shaft ass'y
- F: Alignment hole of pressure cam
- G: Alignment hole of main shaft
- H: Pan-head Screw SW. W M4 x 8

2. Drive Unit

<Removal Procedure>

1. Set the Drum at the home position, lower the Paper feed tray, turn off the power, and remove the following parts.
 - Scraper Unit (page 4R-4)
 - Rear cover, timing spring (Loosen the tension of the main belt)
 - P disc, Pressure sensor disc, Pressure shaft face plate, Main shaft face plate (page 6R-1)
 - Pressure link ass'y (page 6R-2)
2. Remove the Sector gear spring, and the E-ring of the Sector gear, followed by the Sector gear.
3. Disconnect the connector of the Vertical centering sensor, remove a mounting screw of the Mounting plate, and then, remove the sensor together with the mounting plate.
4. Remove two mounting screws of the Print positioning motor. Disconnect the connector of the motor to remove.

- A: Vertical centering sensor
- B: Main belt
- C: Print positioning motor
- D: Sector gear
- E: Sector gear spring
- F: Pan-head Screw SW.W M4 x 8
- G: IT Screw M3 x 5



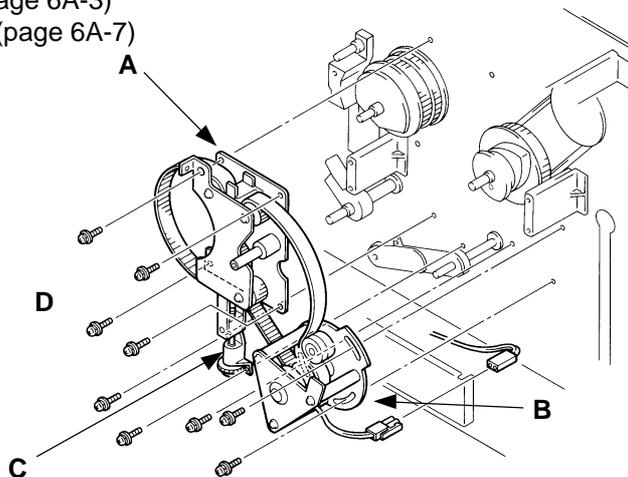
5. Remove three mounting screws on the Paper feed clutch base, four of them from the Drive unit, and two of them from the slide plate base block. Disconnect the connector of the Paper feed clutch to remove the Drive unit.

-Precautions in Assembly-

Adjustments and checks after installation

- Resting Position of Pressure Lever (page 6A-3)
- Position of the Pressure Sensor Disc (page 6A-7)
- Position of P-disc (page 4A-5)
- Vertical Print Position (page 5A-4)

- A: Drive unit
- B: Paper feed clutch base Ass'y
- C: Slide plate base block
- D: Pan-head Screw SW.W M4 x 8



3. Main Motor Unit

< Removal Procedure >

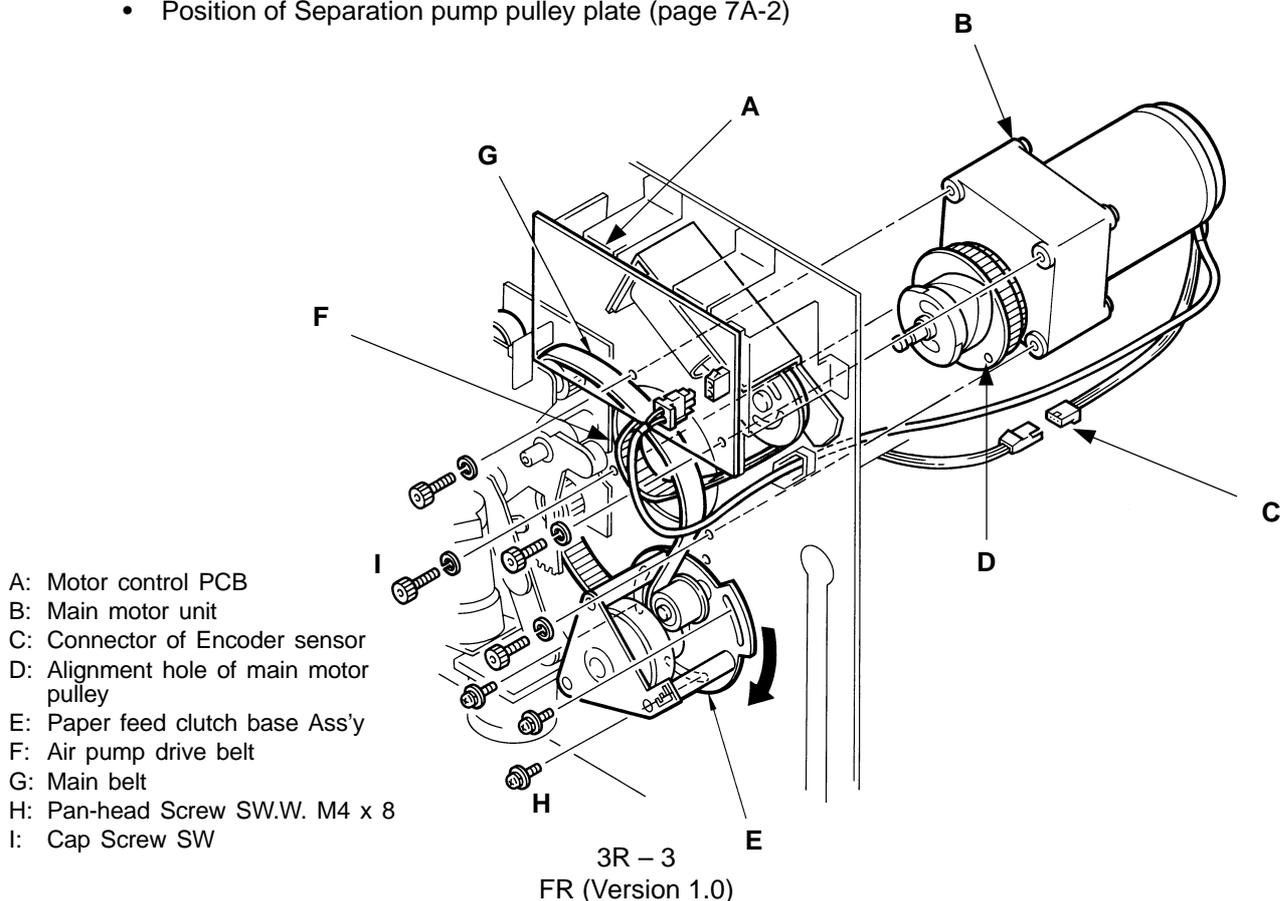
1. Lower the paper feed tray, disconnect the machine from the power supply and remove the following parts.
 - Back cover
 - Paper feed cover, Scraper unit (page 4R-4)
 - Master disposal box, Master removal unit (page 11R-1)
 - Timing spring
 - P disc, Pressure sensor disc, Pressure shaft face plate, Main shaft face plate (page 6R-1)
 - Sector gear spring
2. Remove three mounting screws on the Paper feed clutch base and let the Paper feed clutch unit hang free to loosen the tension of the Main belt further.
3. Disconnect the connector CN4 (for the Main motor) on the Motor control PCB.
4. Disconnect the connector of the Encoder sensor attached to the Main motor unit.
5. Remove four mounting screws of the Main motor unit.
6. Disengage the Main belt and Air pump drive belt from the pulleys attached to the Main motor unit and take out the unit from inside the body.

- Precautions in Assembly -

- As shown in the figure below, it is recommended to direct a hole in the pulley of the Main motor unit toward the lower right screw of the Main motor prior to setting the main belt.

- Adjustments and checks after installation

- Resting position of Pressure lever (page 6A-3)
- Position of Pressure sensor disc (page 6A-7)
- Position of P Disc (page 4A-5)
- Vertical print position (page 5A-4)
- Position of Separation pump pulley plate (page 7A-2)



MEMO

CHAPTER 4: FIRST PAPER FEED SECTION

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CHAPTER 4. FIRST PAPER FEED SECTION

THEORY OF OPERATION

LED PDTC Paper detection sensor

– Lights up when reflected light detected

Test Mode No. 55 Paper detection sensor

– Short interval beeps when reflected light detected

THEORY OF OPERATION

1. Paper Feed Tray Mechanism

- Basic

The Paper feed tray holds paper and the Paper detection sensor checks paper presence on the tray.

- Paper Side Guides Movement

The Paper side guides can be manually adjusted to the width of paper.

Sliding either of the two Paper side guides toward loaded paper centers the paper on the tray by moving the other side guide inward.

The Paper side guides have the Slide racks attached, which are linked by the Slide rack gear.

The movement of one side guide is transmitted to the other one by the racks and gear, enabling their synchronized movement.

- Paper Detection Sensor Function

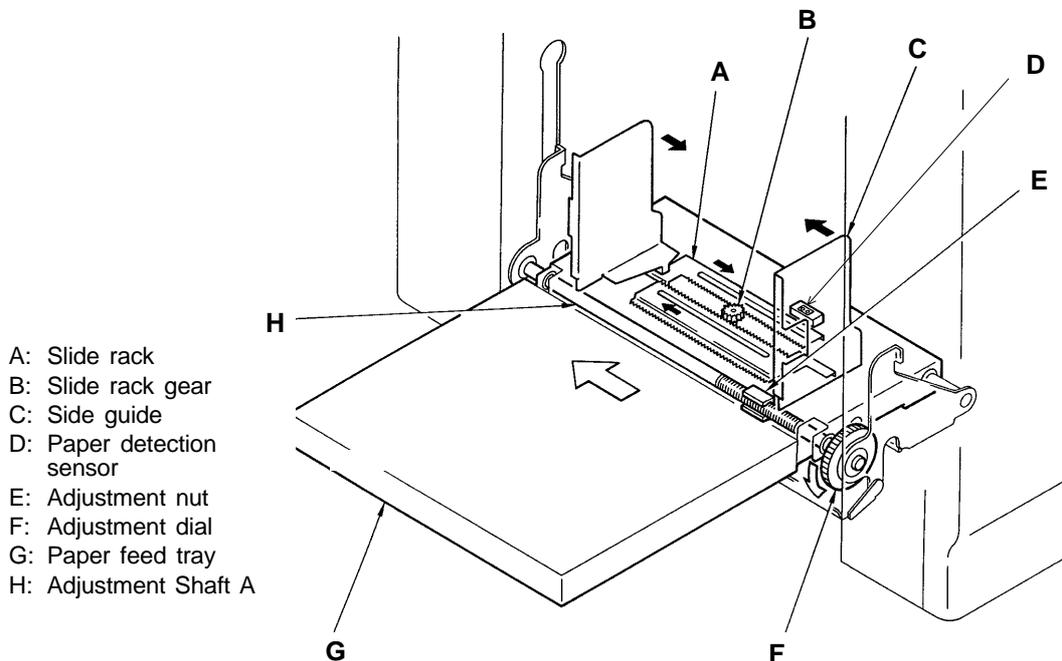
The Paper detection sensor checks the presence of paper on the Paper feed tray.

The machine goes into the printing mode only when paper is present on the Paper feed tray.

- Paper Positioning(B4)

The Paper feed tray can be shifted in both left and right directions by maximum 20mm (5mm for A3 or Ledger size paper), by manually turning the Adjustment dial.

The Adjustment dial is attached at the end of the Adjustment shaft A, which is rotated by the turn of the dial. By the rotation of the shaft, the Adjustment nut, which engages with the screw-face of the shaft, is moved to the left or right, causing the tray to move to the left or right.



2. Paper Feed Tray Sliding Mechanisms(A3)

- Paper Feed Tray Slide Mechanism; A3 Machine (Horizontal Printing Position)

When the Horizontal print position key is pressed, the Paper feed tray slide motor is activated to move the paper feed tray by 10 mm to the left/right. Every time the Print position key is pressed, the paper feed tray moves by 0.5 mm. The center position of the paper feed tray is checked by the Paper feed tray position sensor. A safety switch is used to check the safety to the left and right so that the paper feed tray will not exceed a moving range.

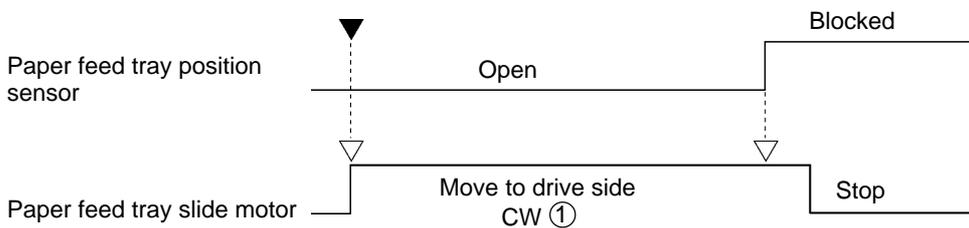
- Paper Feed Tray Initialization Mechanism

The print position is automatically returned to the center in the following cases:

- 1) when the power switch is turned ON, 2) when the “Centering” button is pressed, and 3) when the “RESET” button is pressed.

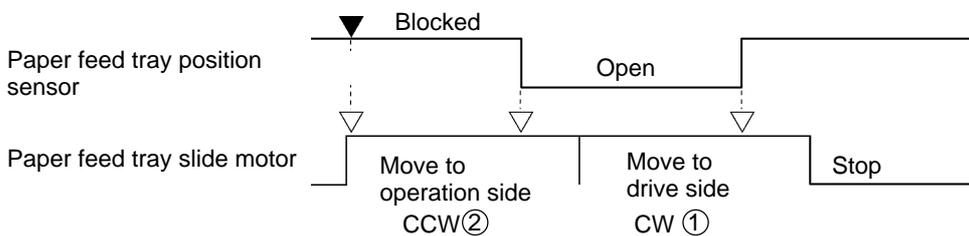
The Paper feed tray is towards the Operation side.

(The light path of the Paper feed tray position sensor is opened.)

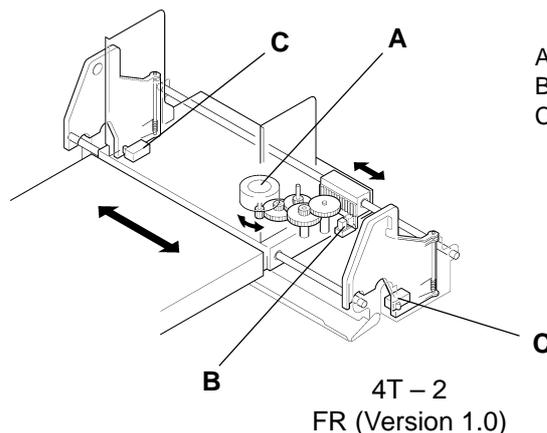


The Paper feed tray is in the center position or towards the drive side.

(The light path of the Paper feed tray position sensor is blocked.)



- ① If the Paper feed tray is located on the operation side (the Paper feed tray position sensor is opened) at centering start, the Paper feed tray slide motor will rotate in the clockwise until the light path of the Paper feed tray position sensor is blocked.
- ② If the Paper feed tray is located on the center or drive side (the Paper feed tray position sensor is blocked) at centering start, the Paper feed tray slide motor will rotate in the counter clockwise direction until the light path of the position sensor is opened, and then the motor is rotated in reverse until the light path is blocked again.
- ③ If the paper feed position sensor remains unchanged within 165 pulses (about 15mm) after the paper feed tray slide motor is turned on, “T30 CALL SERVICE” will be displayed.



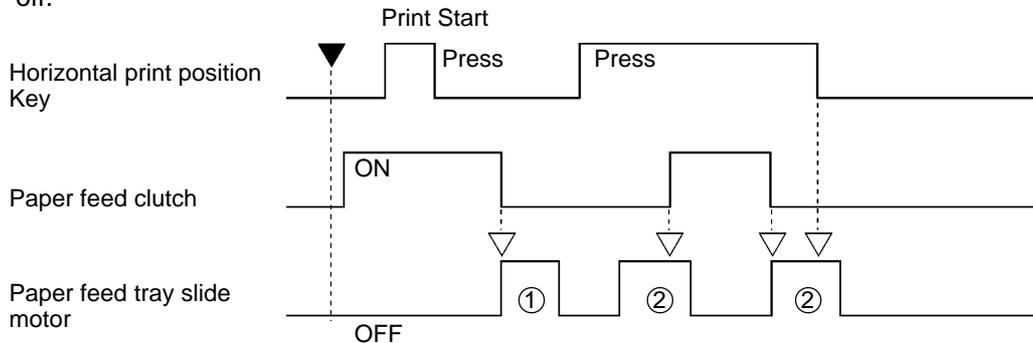
- A: Paper feed tray slide motor
- B: Paper feed tray position sensor
- C: Paper feed tray safety SW

CHAPTER 4. FIRST PAPER FEED SECTION

THEORY OF OPERATION

- Paper Feed Tray Slide Mechanism during printing

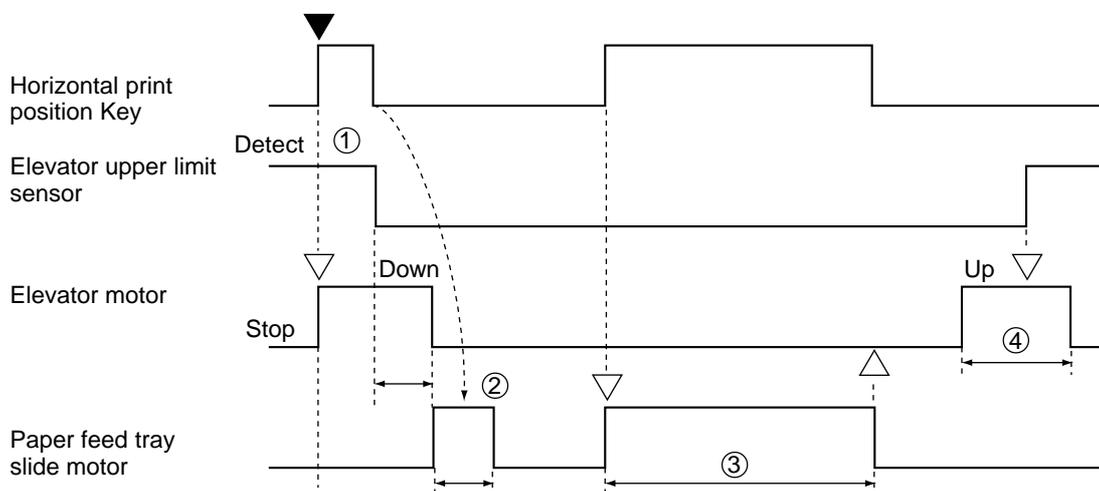
Only while the Paper feed clutch is turned off, the Paper feed tray slide motor runs to move the Paper feed tray to the left/right. If the Horizontal print position key is pressed while the Paper feed clutch is turned on, the paper feed tray will move to the left/right after the clutch is turned off.



- ① If the Horizontal print position key is pressed while the Paper feed clutch is turned on, the slide motor will run after the clutch is turned off.
- ② If the Horizontal print position key is held down, sliding operation will be performed when the Paper feed clutch is turned off. If the Paper feed clutch is turned on during continuous operation, the Paper feed tray will stop once and restart moving after the Paper feed clutch is turned off.

- Paper Feed Tray Slide Mechanism during idle condition

If the Horizontal print position key is pressed while the Elevator upper-limit sensor is detecting the paper feed tray at print suspension time, the slide motor will run after lowering the the paper feed tray. The paper feed tray will move to the left/right that much, and then, it will move up until the upper-limit sensor detects it again.



- ① If the Elevator upper-limit sensor detects the paper feed tray, the elevator will be lowered.
- ② After confirming that the elevator motor has stopped, the Paper feed tray starts moving to the left/right.
- ③ If the Elevator upper-limit sensor does not detect the paper feed tray, operation will start the moment the print position key is pressed.
- ④ After moving to the left/right, the elevator motor runs to move up the paper feed tray until the Elevator upper-limit sensor is turned on.

CHAPTER 4. FIRST PAPER FEED SECTION

THEORY OF OPERATION

LED PTL5 Paper size detection sensor

– Lights up when reflected light detected.

Test Mode No. 2 Paper size detection sensor

– Short interval beeps when reflected light detected.

3. Paper Width Detection System

- Basic

The Paper feed tray is equipped with the Paper size potentiometer and Paper size det. sensor, which check the size and set direction of paper loaded on the tray.

According to the detected paper size and direction, the Jump wings are automatically positioned in the Suction unit to secure better paper ejection and an image area is limited on a master not to go beyond printing paper size.

- Paper Width Detection

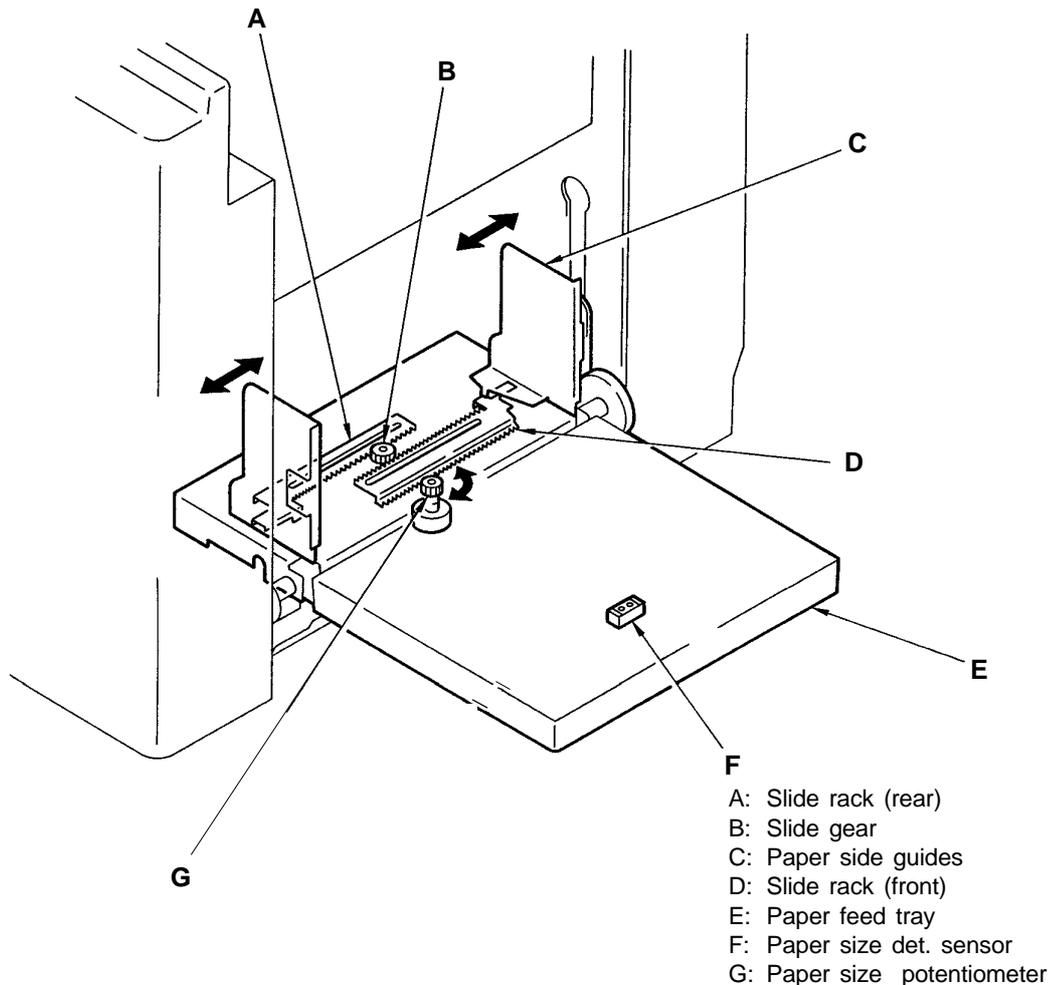
The movement of the Paper side guides are transmitted to the Paper size potentiometer via the Slide racks.

When the side guides are moved and set against the paper on the Paper feed tray, the potentiometer rotates and detects the paper width.

- Paper Direction Detection

The Paper size det. sensor checks whether paper is loaded on the paper feed tray, longways or sideways.

If the sensor detects paper (reflected light), it is assumed that paper is loaded longways.



Paper Size Definition**(1) Metric Models**

Paper width(mm)	Paper Size Det. Sensor Status	Defined Paper Size
307~292	ON OFF	A3(Portrait) A4(Landscape)
291~269	–	No definition
268~252.0	ON OFF	B4(Portrait) B5(Landscape)
251~227	–	No definition
226~206	ON OFF	Fools cap A4(Portrait)
205~193	–	No definition
192~178	ON OFF	No definition B5(Portrait)
177~68	–	No definition

(2) US Models

Paper width(mm)	Paper Size Det. Sensor Status	Defined Paper Size
307~292	ON	No definition
291~274	ON OFF	Ledger(Portrait) Letter(Landscape)
273~226	–	No definition
225~212	ON OFF	Legal(Portrait) Letter(Portrait)
210~151	–	No definition
150~136	ON OFF	No definition Statement(Portrait)
135~68	–	No definition

4. Paper Feed Tray Elevation System

- Basic

The Paper feed tray can move up and down depending upon the function selected.

- Paper Detection Sensor

The Paper detection sensor checks whether the paper is set on the Paper feed tray. The START button is only active when the paper detection sensor detects the paper on the Tray (the sensor's light is reflected back).

- Elevation of Feed Tray

When the START button is pressed, the elevator motor lifts the Paper feed tray until the Upper limit sensor of the Tray is pressed.

When the Upper limit sensor is pressed, the Elevator motor turns in the reverse direction to lower the Tray down just a little bit and then rotates in the original direction again to raise the Tray until the Upper limit sensor is pressed for the second time.

Printing is then started by the Main motor, turning the Drum.

- Elevation during printing

During the printing as the height of the paper decreases (Upper limit sensor is released), the Elevator motor rotates to raises the tray until the Upper limit sensor is pressed again.

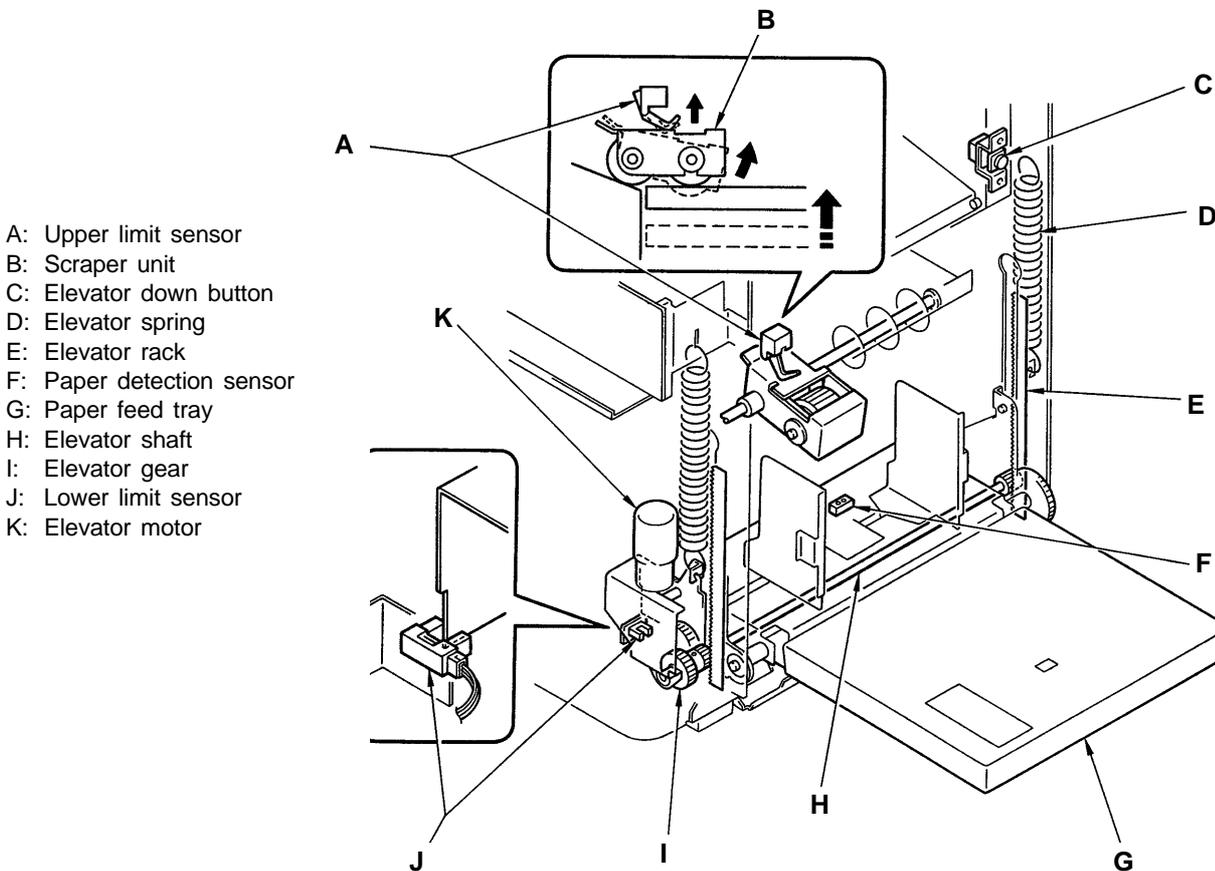
This operation is repeated to maintain the paper feed tray height, until the paper supply is depleted.

- Lowering of Feed Tray

The Paper detection sensor detects when the paper has run out, (the sensor's light does not reflect back).

The Elevator motor rotates to bring the Tray down, until the light path of the Lower limit sensor is cut.

If the Elevator down button is pressed while the machine is idle, the Elevator motor turns to lower the Tray until the button is released or the light path of the Lower limit sensor is cut.



- A: Upper limit sensor
- B: Scraper unit
- C: Elevator down button
- D: Elevator spring
- E: Elevator rack
- F: Paper detection sensor
- G: Paper feed tray
- H: Elevator shaft
- I: Elevator gear
- J: Lower limit sensor
- K: Elevator motor

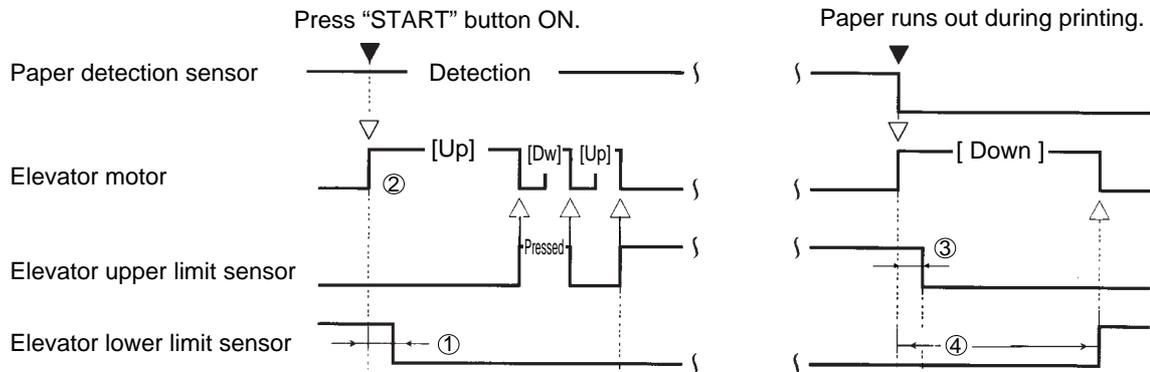
CHAPTER 4. FIRST PAPER FEED SECTION

THEORY OF OPERATION

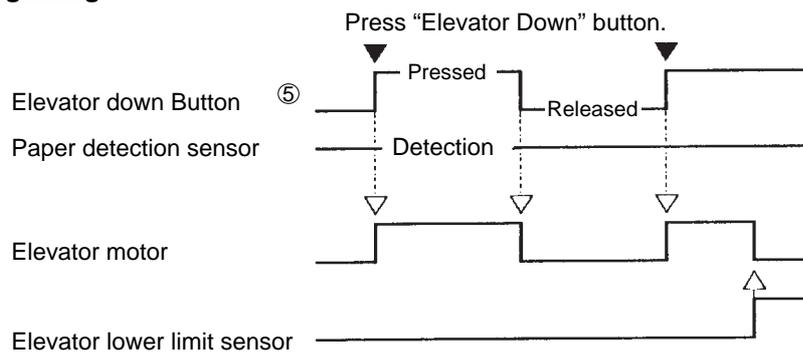
Test Mode No. 3 Elevator lower limit sensor
 – Short interval beeps when light path is blocked.
 No. 12 Elevator down button
 – Short interval beeps when pressed.
 No. 102 Elevator operation

- Timing Chart -

Paper Feed Tray Elevation System



During Idling



- ① If the light path of the Elevator lower limit sensor has not been opened **within 3 seconds** after the Elevator motor starts to raise the Paper feed tray, the machine assumes the Elevator motor has been locked and displays the error code **[T 02]**.
- ② If the actuator of the Elevator upper limit sensor has not been pressed (to open the light path of the sensor) **within 9 seconds** after the Elevator motor starts to raise the Paper feed tray, the machine assumes the Elevator motor has been locked and displays the error code **[T 02]**.
- ③ If the actuator of the Elevator upper limit sensor has not been released (to cut the light path of the sensor) **within 3 seconds** after the Elevator motor starts to lower the Paper feed tray, the machine assumes the Elevator motor has been locked and displays the error code **[T 02]**.
- ④ If the light path of the Elevator lower limit sensor has not been cut **within 9 seconds** after the Elevator motor starts to lower the Paper feed tray, the machine assumes the Elevator motor has been locked and displays the error code **[T 02]**.
- ⑤ The Elevator down button cannot be activated while the machine is printing.

T2 (Elevator Motor Lock)

- Elevator upper-limit sensor not turned on/off
- Elevator lower-limit sensor not turned on/off

5. Paper Feed Tray Safety System

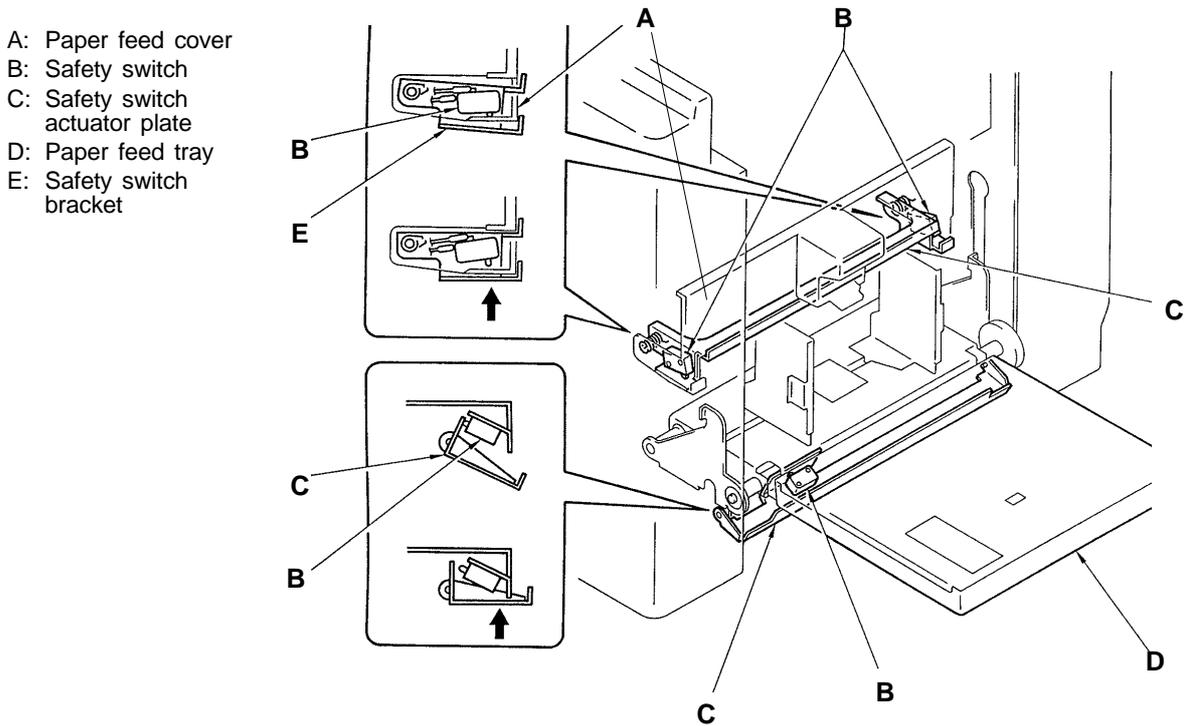
- Basic

The Paper feed tray is equipped with safety systems.

- Paper Feed Tray Safety System

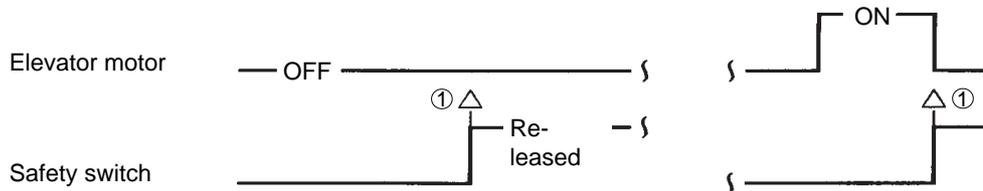
The safety systems are located at the bottom of the Paper feed cover and under the Paper feed tray.

If the actuator plate is pressed in either of these safety systems, safety switches are released in the safety system whose actuator plate is pressed, by which the machine assumes that an obstacle has been stuck on or under the Paper feed tray and displays an error message to interrupt the machine operation.



- Timing Chart -

Paper feed tray safety system



- ① When the Safety switch is released, the machine assumes that an obstacle has been stuck on or under the Paper feed tray and the Elevator motor makes an emergency stop, causing the error message “CHECK PAPER FEED AREA” displayed. In normal operating condition, the Safety switches are pressed.

6. Paper Feed Pressure Select System

- Basic

Paper feed pressure is changed by the Paper feed pressure adjustment lever.

- Paper Feed Pressure Adjustment Lever

The Paper feed pressure adjustment lever is located above the Scraper unit and positioned at two levels, high ("NORMAL") and low ("CARD"), securely with the help of the Lever spring attached to the left side of the lever.

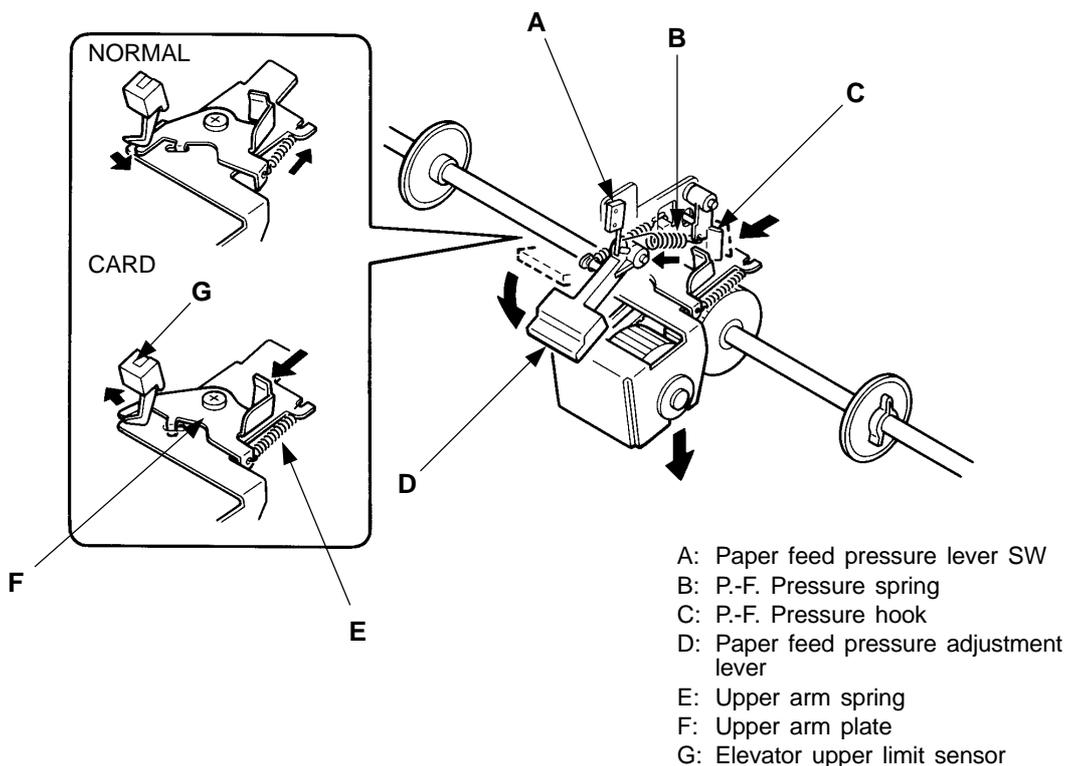
- Pressure Selection

The P.-F. Pressure spring is hooked to the Paper feed pressure adjustment lever at one end and to the P.-F. Pressure hook at the other end.

The lever, when set low for "CARD", pulls the hook via the spring. The pulled hook pushes down the Scraper ass'y against the loaded paper, giving more feeding pressure than by the assembly's weight. When the lever is set high for "NORMAL", the feeding pressure is less because no pressure is given other than the weight of the Scraper ass'y with the relaxed spring.

- Paper Feed Pressure Switch

Shifting the paper feed pressure adjustment lever to "CARD" presses the Paper Feed Pressure switch and causes the jump wing to change its operation. When "CARD" is selected, the upper-limit arm causes the paper feed tray upper-limit position to be slightly higher.



- LTD PDF2 Paper feed clutch sensor
 - Lights up when light path is blocked.
- LED P-IN Paper feed detection sensor
 - Lights up when light path is blocked.

**7. First Paper Feed Rollers Rotary System
(Activate by the paper feed clutch sensor)**

- Basic

The Scraper and Pickup rollers are driven by the Paper feed clutch.

- Paper Feed Clutch Sensor & P Disc

The Paper feed clutch is activated by the paper feed clutch sensor.

When the Main motor rotates, the P disc rotates clockwise through the Paper feed clutch sensor.

If the light path of the Paper feed clutch sensor is opened, the Paper feed clutch is engaged.

If the light path of the Paper feed clutch sensor is blocked, the Paper feed clutch is disengaged.

- Transmission of Rotation Power

The Paper feed clutch is driven by the Main belt.

When the Paper feed clutch is activated, clutch components are engaged by the electromagnet, transmitting the rotation of the Main belt to the Pickup roller via the Pickup roller shaft.

The Pickup and Scraper rollers drive paper to the second paper feed section.

- Prevention of Brake Effect by Pickup and Scraper Rollers

The Pickup and Scraper rollers have one-way bearings built-in.

The one-way bearings allow the paper to feed into the second paper feed section freely.

- Paper Feed Detection Sensor

To monitor the timing of paper transfer to the second paper feed section, a photo sensor, i.e. Paper feed detection sensor, is installed before the Guide roller.

When the paper feed detection sensor detects paper, the paper feed clutch is disengaged a preset period later and the first paper feed operation is completed.

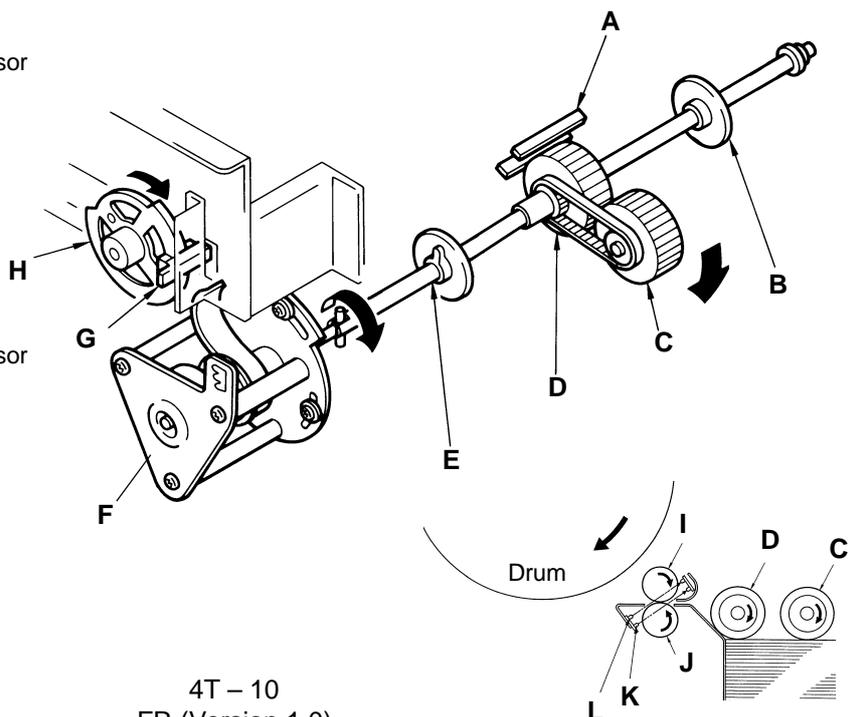
At this time, the leading edge of the paper comes into contact with the guide and timing rollers to sag. In order to cause the paper to sag at a constant rate before second paper feed starts, even if a printing speed changes, the OFF timing of the paper feed clutch is changed depending on the printing speed and the type of printing paper used.(Note 1)

If the light path of the Paper feed clutch sensor is blocked by the P disc before the Paper feed detection sensor detects paper, the paper feed clutch is disengaged at once to end the first paper feed operation even though the Paper feed detection sensor has not detected paper.

[Note 1]

The paper sag rate can be adjusted depending on setting of the paper in the user mode and the paper feed clutch OFF delay time of the Memory switch(Test mode).

- A: Paper feed detection sensor
- B: Paper guide roller
- C: Scraper roller
- D: Pickup roller
- E: Pickup roller shaft
- F: Paper feed clutch
- G: Paper feed clutch sensor
- H: P Disc
- I: Guide roller
- J: Timing roller
- K: Paper feed detection sensor
- L: Paper sensor



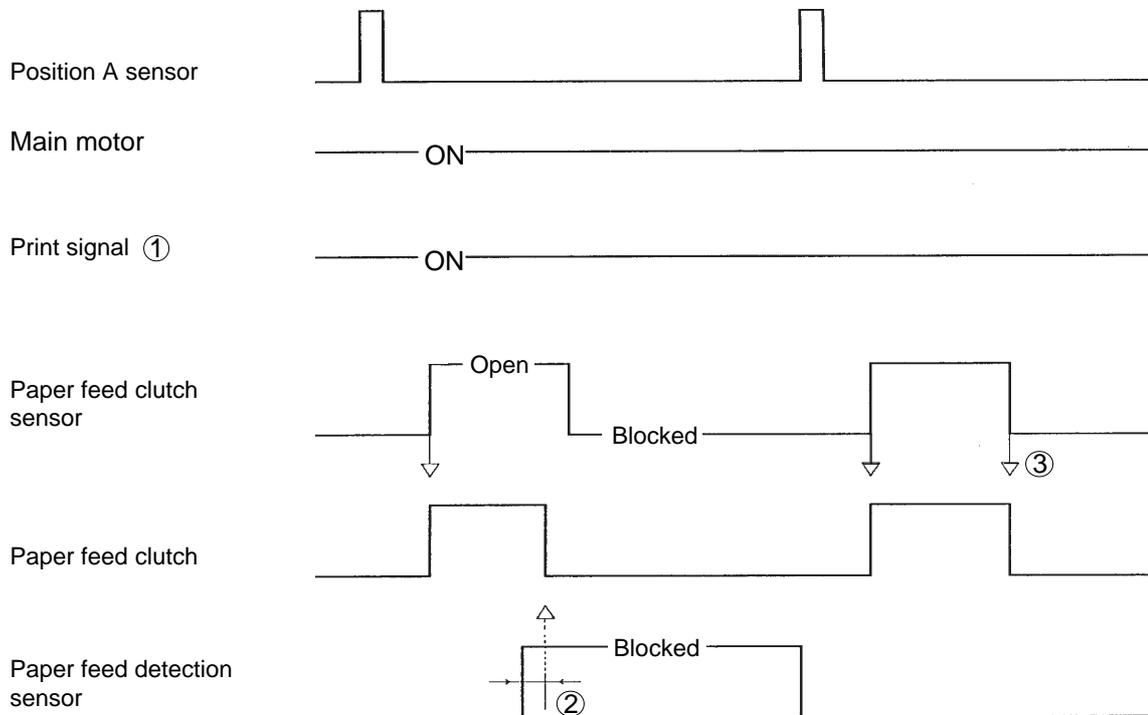
CHAPTER 4. FIRST PAPER FEED SECTION

THEORY OF OPERATION

Test Mode No. 24 Paper feed clutch sensor:
 – Short interval beeps when light path is blocked.
 No. 25 Paper feed detection sensor
 – Short interval beeps when light path is blocked.
 No. 67 Paper feed clutch(activated at
 Paper feed clutch sensor ON)

-Timing Chart -

First Paper Feed Rollers Rotary System (During Printing)



- ① The Print signal starts the paper feed operation. If the light path of the Paper feed clutch sensor is opened while the Print signal is ON , the Paper feed clutch is engaged.
- ② After the Paper feed detection sensor detects the leading edge of a sheet, the Paper feed clutch is disengaged.
 The OFF timing of the Paper feed clutch can be changed by setting of the paper type in the user mode and setting of the Test mode.
- ③ When the light path of the Paper feed clutch sensor is blocked, the Paper feed clutch is disengaged.

- The conditions for the Paper feed clutch's engagement

(All of the following three conditions are requisite.)

1. The Print signal is output (ON).
2. The light path of the Paper feed clutch sensor is opened.
3. The Stack paper feed sw is not actuated ON.

- The conditions for the Paper feed clutch's disengagement

(Any one of the following four conditions is enough.)

1. The Print signal is not output (OFF).
2. The Paper feed detection sensor detects the leading edge of a sheet.
3. The light path of the Paper feed clutch sensor is blocked.
4. The Stack paper feed sw is actuated ON.

**8. First Paper Feed Rollers Rotary System
 (Activate by Drum angle)**

- Basic

The Scraper and Pickup rollers are driven by the Paper feed clutch.

- Paper Feed Clutch

When the Main motor activates, the Drum rotates in the clockwise direction (looking from back of the machine).

The Paper feed clutch activates at a certain Drum angle from the Position-A.

This Drum angle is determined by the count signal from the motor encoder sensor.

The clutch is released as the Drum rotates for a certain set degrees after the Paper sensor detects incoming paper.

- Transmission of Rotation Power

The Paper feed clutch is driven by the Main belt.

When the Paper feed clutch is activated, clutch components are engaged by the electromagnet, transmitting the rotation of the Main belt to the Pickup roller via the Pickup roller shaft.

The Pickup and Scraper rollers drive paper to the second paper feed section.

- Prevention of Brake Effect by Pickup and Scraper Rollers

The Pickup and Scraper rollers have one-way bearings built-in.

The one-way bearings allow the paper to feed into the second paper feed section freely.

- Paper Feed Detection Sensor

To monitor the timing of paper transfer to the second paper feed section, a photo sensor, i.e. Paper feed detection sensor, is installed before the Guide roller.

When the Paper feed detection sensor detects paper, the paper feed clutch is disengaged a preset period later and the first paper feed operation is completed.

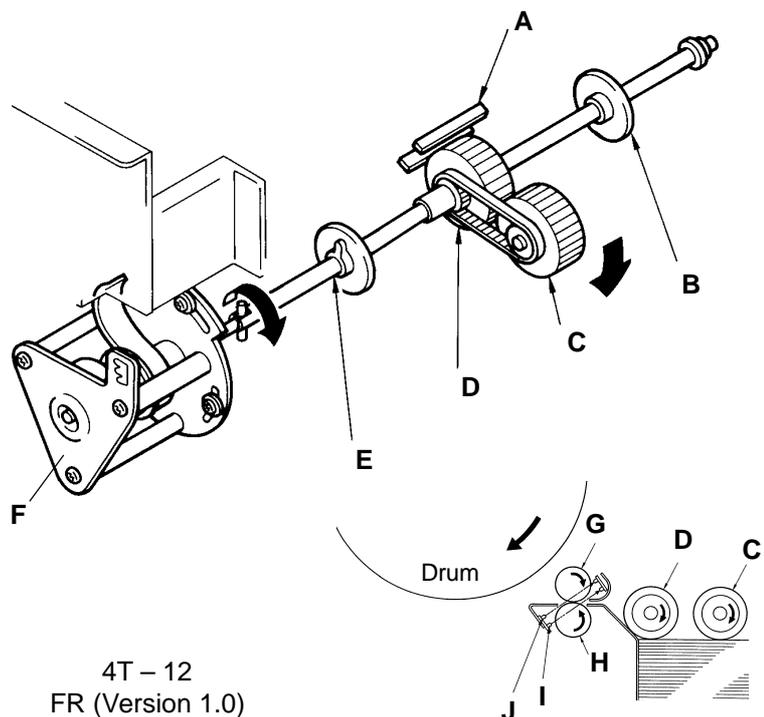
At this time, the leading edge of the paper comes into contact with the guide and timing rollers to sag. In order to cause the paper to sag at a constant rate before second paper feed starts, even if a printing speed changes, the OFF timing of the paper feed clutch is changed depending on the printing speed and the type of printing paper used.(Note 1)

If the Drum rotates 155° from 0° position before the Paper feed detection sensor detects paper, the paper feed clutch is disengaged at once to end the first paper feed operation even though the Paper feed detection sensor has not detected paper.

[Note 1]

The paper sag rate can be adjusted depending on setting of the paper in the user mode and the paper feed clutch OFF delay time of the Memory switch(Test mode).

- A: Paper sensor PCBs
- B: Paper guide roller
- C: Scraper roller
- D: Pickup roller
- E: Pickup roller shaft
- F: Paper feed clutch
- G: Guide roller
- H: Timing roller
- I: Paper feed detection sensor
- J: Paper sensor



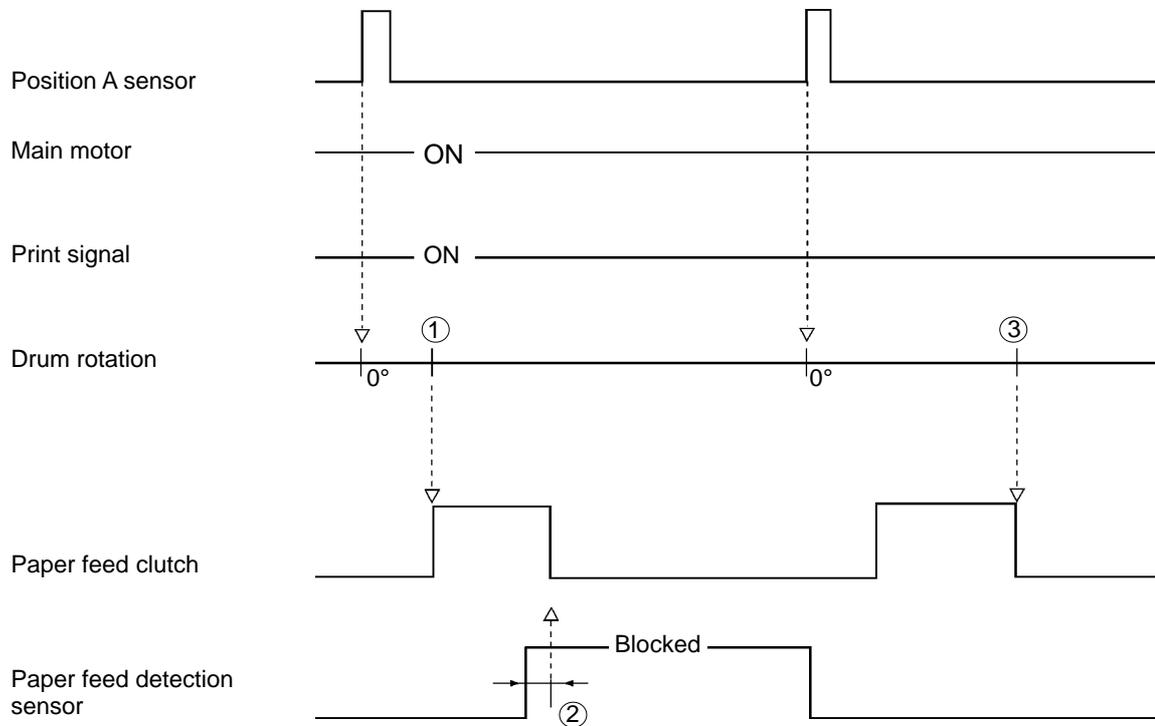
CHAPTER 4. FIRST PAPER FEED SECTION

THEORY OF OPERATION

Test Mode No. 25 Paper feed detection sensor
– Short interval beeps when light path is blocked.
No. 67 Paper feed clutch

-Timing Chart -

First Paper Feed Rollers Rotary System (During Printing)



- ① The Paper feed clutch activates each time the Drum rotates 32° from the 0° position.
- ② After the Paper feed detection sensor detects the leading edge of a sheet, the Paper feed clutch is disengaged.
Paper feed clutch OFF Timing can be adjusted by Memory Switch (Test Mode).
- ③ The Paper feed clutch is deactivated when the Drum rotates 155° from the 0° position.

- The conditions for the Paper feed clutch's engagement (All of the following three conditions are requisite.)

1. The Print signal is output (ON).
2. The Drum rotates 32° from the 0° position.
3. The Stack paper feed sw is not actuated ON.

- The conditions for the Paper feed clutch's disengagement (Any one of the following four conditions is enough.)

1. The Print signal is not output (OFF).
2. The Paper feed detection sensor detects the leading edge of a sheet.
3. The Drum rotates 155° from the 0° position.
4. The Stack paper feed sw is actuated ON.

9. Paper Pickup System

Feeding

- The papers on the Paper feed tray are fed by the Scraper roller, in several layers, in between the Pickup roller and Stripper plate.

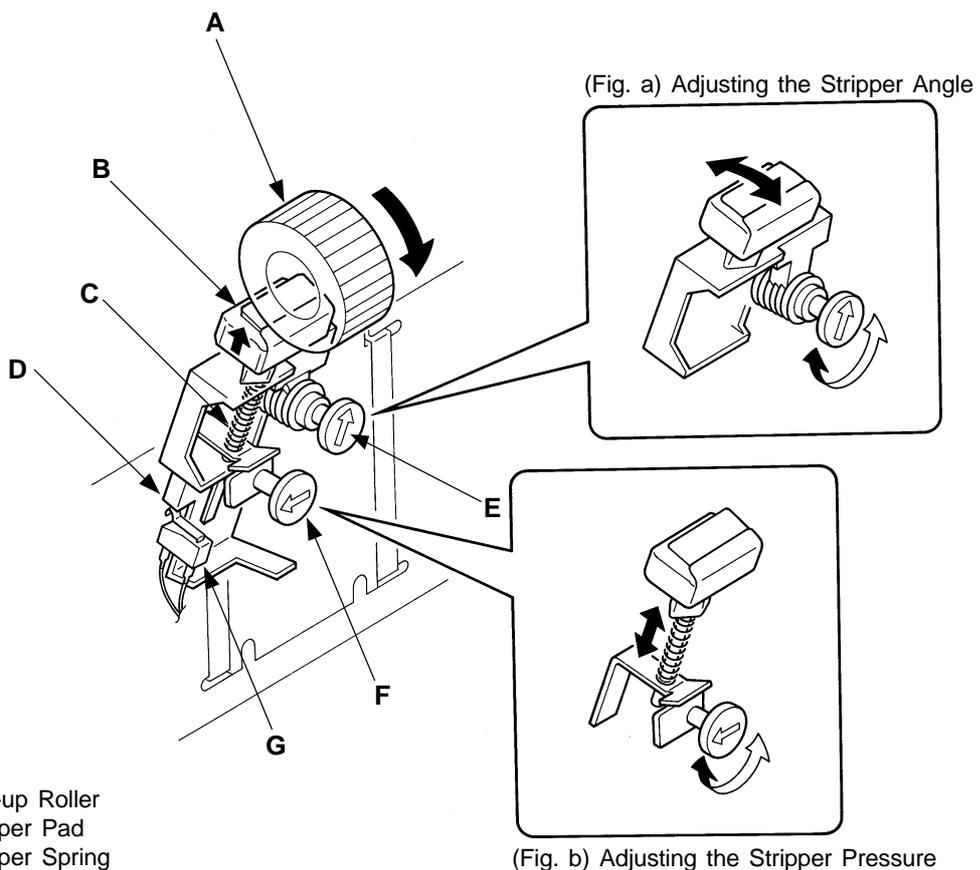
Pick-up

- The top sheet is separated from the rest by the Pickup roller and Stripper plate.
- The Stripper plates is pushed against the Pickup roller by the Stripper spring to provide resistance against paper feed, by which only a single sheet of paper is fed from the paper stack.
- The Stripper unit has Pressure adjust dial and Angle adjust dial which changes the stripper pressure against paper feed.

- Detection of Stack Paper Feed

If multiple sheets of paper are fed, the stripper plate is pushed down, causing the switch plate to contact the actuator of the Stack paper feed switch.

When the Stack paper feed switch is pressed, the Paper feed clutch is disengaged to stop feeding paper.



- A: Pick-up Roller
- B: Stripper Pad
- C: Stripper Spring
- D: Actuator Plate
- E: Stripper Angle Adjustment Dial
- F: Stripper Pressure Adjustment Dial
- G: Stacker Paper Feed Switch

Test Mode No. 102 Elevator operation
 No. 2 Paper size det. sensor
 – Short interval beeps when reflected light detected.
 No. 40 Paper feed safety switch
 – Short interval beeps when released.

REMOVAL & ASSEMBLY

1. Paper Feed Tray Unit

< Removal Procedure >

1. Select Test mode **No. 102**.

Press the Paper feed tray down button to raise the tray about a third way up.

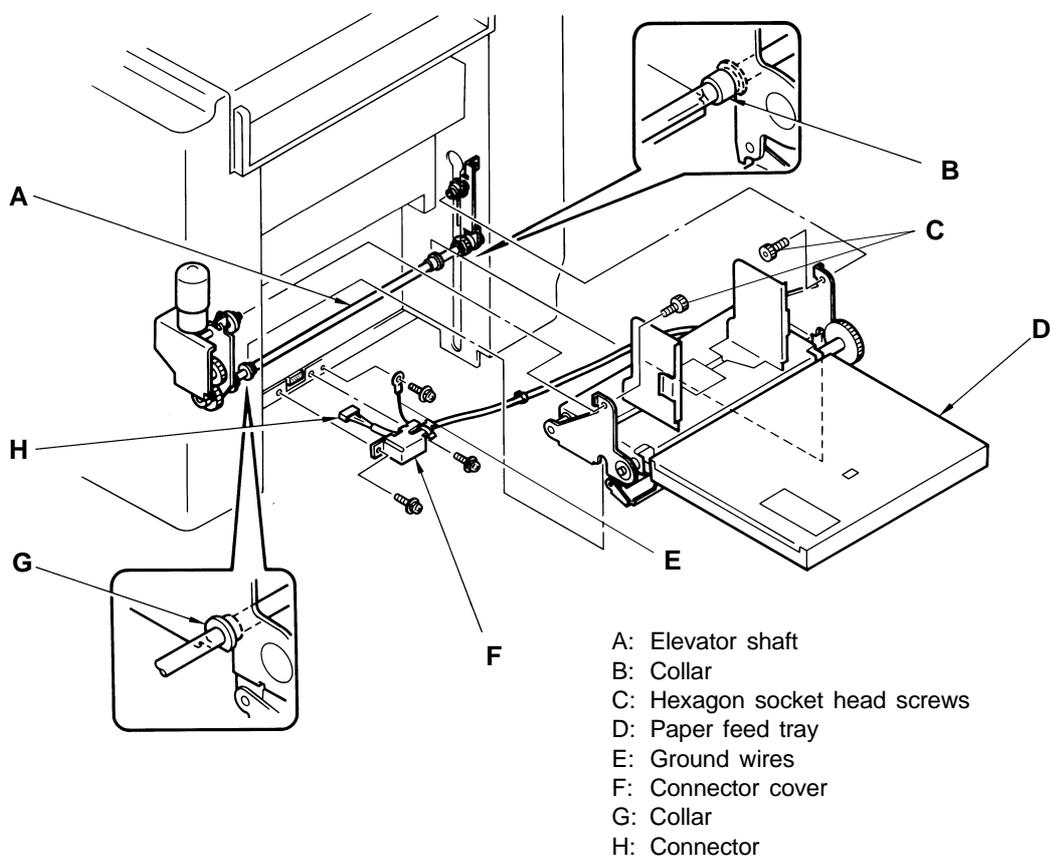
Turn OFF the power.

In order to remove the connector cover under the paper feed tray. Move the paper feed tray down to the lowest position when removing the paper guide plate

2. Remove the screw securing the ground wire on the frame under the Stripper unit.
3. Remove two screws holding the Connector cover located under the Stripper unit.
4. Pull out the wire harness until the connector comes out from under the Stripper unit. Disconnect the connector.
5. Remove two hexagon socket head screws and dismount the Paper feed tray unit.

- Precautions in Assembly -

- Make sure to mount the Paper feed tray firmly on collars on both sides.
- If the connector of the wire harness is disconnected, the machine assumes the Paper feed tray safety sw (bottom) is not actuated ON and prevents the Elevator motor from operating.



2. Paper Size Potentiometer

< Removal Procedure >

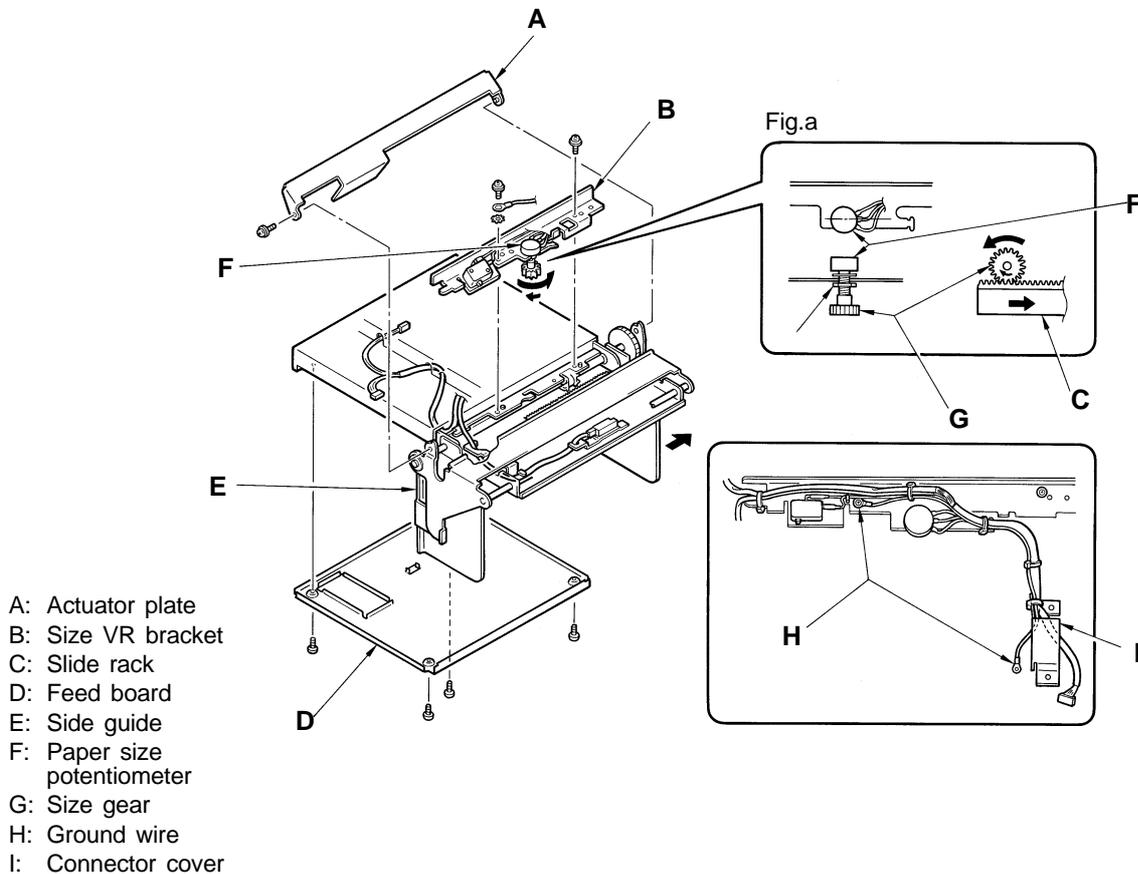
1. Remove the Paper feed tray unit.
2. Turn the tray upside down and remove the Actuator plate.
3. Remove two mounting screws on the Size VR bracket, and remove the bracket.
A Ground wire and a washer will be removed at the same time.
4. Loosen the nut on the Paper size potentiometer, and remove the potentiometer together with the Wire harness assembly attached.
The potentiometer is replaced together with the Wire harness assembly.
5. Remove four screws on the Feed board and remove the board.
Disconnect the wire harness connector of the Paper size sensor.

- Precautions in Assembly -

- 1) Attach the Paper size potentiometer to the size VR bracket. When this is done, catch it with a hexagonal nut and washer. The meter terminals should be set parallel to the size VR bracket.(See Fig. a)
- 2) Fit the size gear into the rotary shaft of the Paper size potentiometer(be careful not to lose a parallel pin).
- 3) When attaching the size VR bracket to the Paper feed tray body, open the Side guide fully, turn the size gear of the Paper size potentiometer fully in the opening direction, and return it by about 9 threads to engage it with the Slide rack.

- Adjustments and checks after installation

- Paper Width Data (page 4A-1).



3. Paper Feed Tray Slide Motor, Paper Feed Tray Safety SW, Paper Feed Tray Position Sensor (A3 model)

< Removal Procedure >

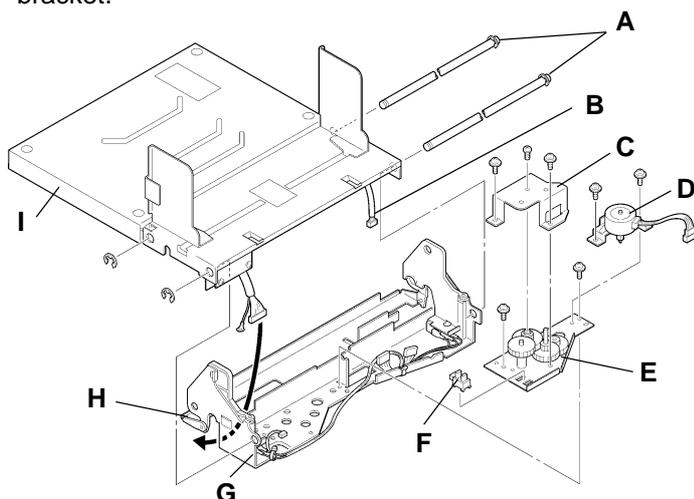
1. Remove the Paper feed tray from the main body (page 4R-1).
2. Remove a mounting screw of the actuator plate of the paper feed tray safety switch to remove the actuator plate.
3. Remove the E-ring each from one side of the Paper feed tray shafts, draw them out from the paper feed tray, and separate the paper feed tray (Upper) and paper feed tray (Lower), and unplug a connector.
4. Remove three mounting screws of the Gear cover and remove the cover.

Paper Feed Tray Slide Motor

5. Remove two mounting screws on the Paper feed tray slide motor and remove the motor.

Paper Feed Tray Position Sensor

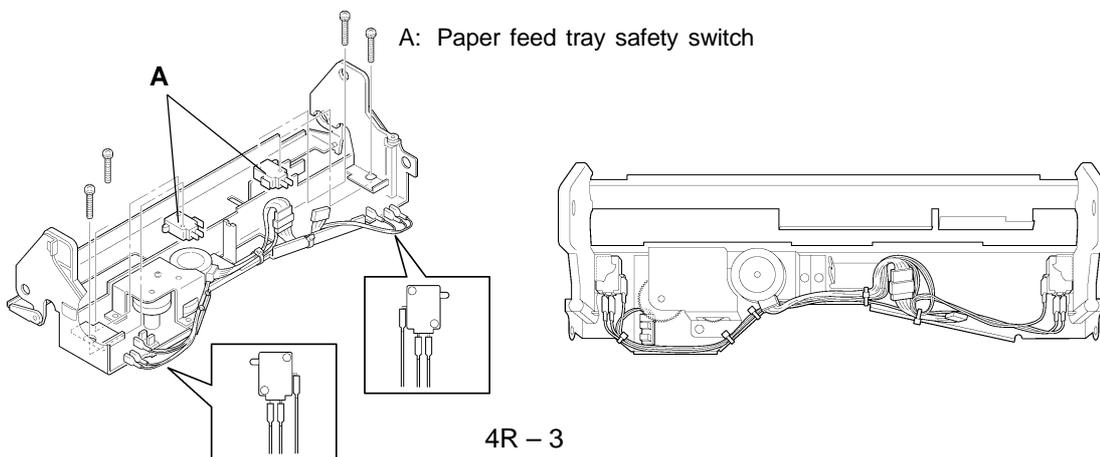
5. Remove two mounting screws on the Drive gear bracket and remove the bracket with the position sensor.
6. From the back of the Drive gear bracket, detach the fingers of the position sensor from the bracket.



- A: Paper feed tray shaft
- B: Connector
- C: Gear cover
- D: Paper feed tray slide motor
- E: Drive gear bracket
- F: Paper feed tray position sensor
- G: Paper feed tray (Lower)
- H: Actuator plate
- I: Paper feed tray (Upper)

Paper Feed Tray Safety Switch

4. Remove the two setscrews each of the safety switches attached to the left and right of the paper feed tray (Lower) to detach the switches.
5. See the figure below for the wiring of the safety switches.



4. Scraper Unit

< Removal Procedure >

1. Move the paper feed tray to the lowest position, turn off the power, and remove the scraper cover.
2. Lower the Paper feed pressure adjustment lever and remove two mounting screws on the Paper feed cover.
Disconnect a wire harness connector and remove the cover.
3. Remove the Lock ring from the right end of the Pickup roller shaft.
Slide the unit to the right and unhook the left end of the shaft from the Paper feed clutch shaft.

[IMPORTANT]

Be careful not to damage the actuator of the Elevator upper limit sensor.

4. Remove the unit from the machine by bringing out the left end of the shaft first.

[Note]

If the paper guide rollers hit against the Upper limit sensor bracket during the removal, slide the Paper guide rollers.

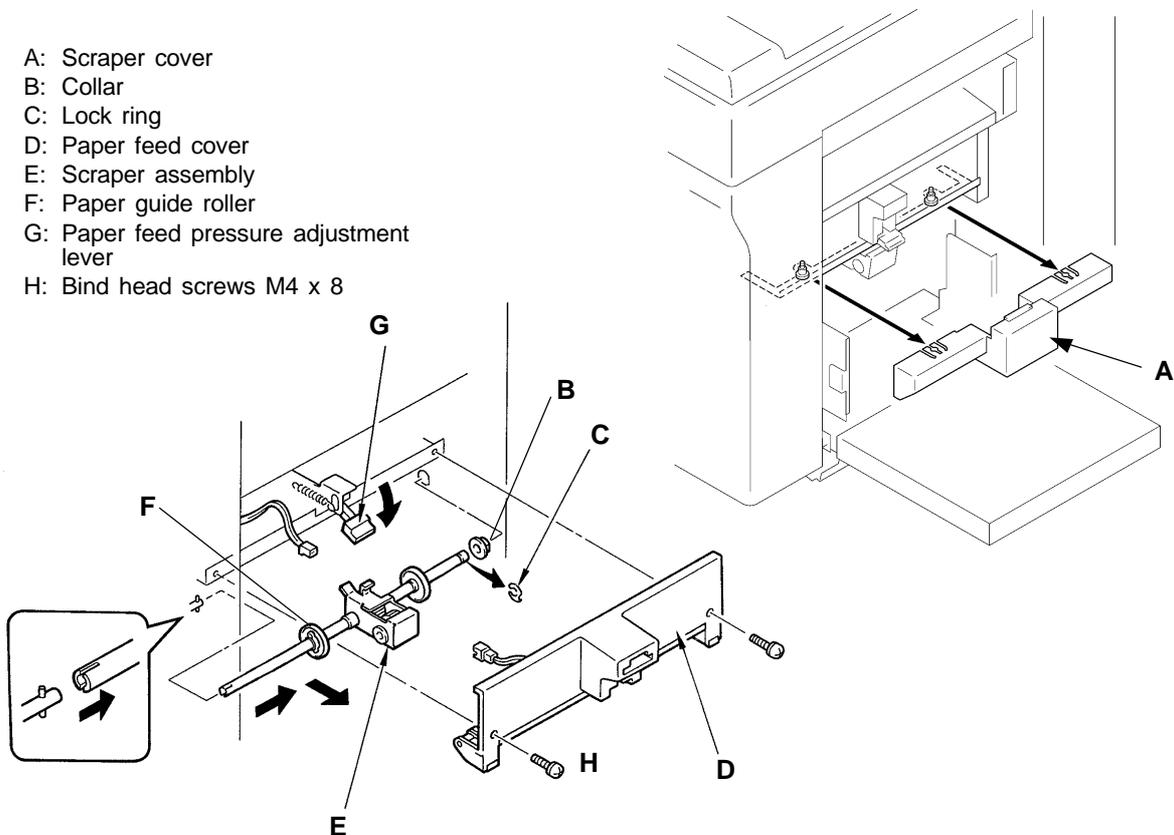
- Precaution in Removal -

- Be careful not to drop and lose the collar when removing the Scraper unit.

- Precautions in Assembly -

- Be careful not to damage the actuator of the Elevator upper limit sensor.
- Be careful not to break the Scraper cover.

- A: Scraper cover
- B: Collar
- C: Lock ring
- D: Paper feed cover
- E: Scraper assembly
- F: Paper guide roller
- G: Paper feed pressure adjustment lever
- H: Bind head screws M4 x 8



5. Scraper and Pickup Rollers

< Removal Procedure >

Scraper roller

1. Remove two Lock rings and collars from the ends of the Scraper roller shaft.
2. Remove the Scraper roller from the shaft.

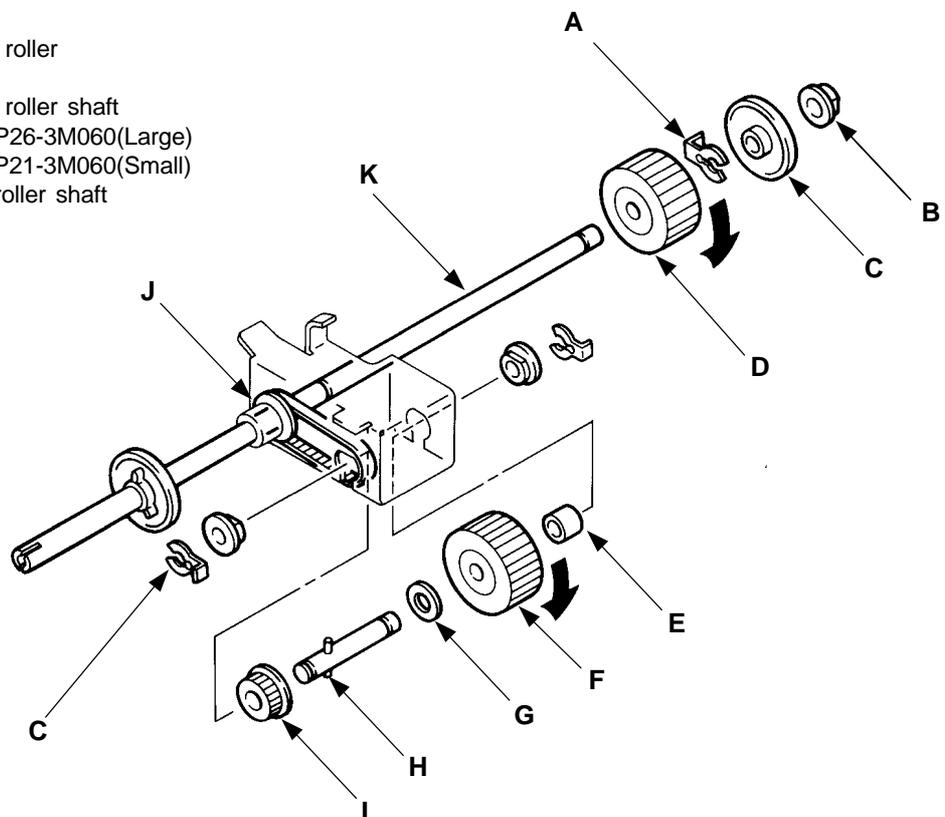
Pickup roller

1. Move the paper feed tray to the lowest position, turn off the power, and remove the scraper assembly(see the previous page).
2. Slide out the Paper guide roller on the right half of the Pickup roller shaft.
3. Remove the Lock ring on the right side of the Pickup roller and remove the roller from the shaft.

- Precautions in Assembly -

- As one-way bearings are built into the Scraper and Pickup rollers, be careful of the rotational direction upon installation.
If the rollers are installed on the shafts in the wrong way, the rollers will not rotate when the Pickup roller shaft is turned.
Check that the rollers rotate freely if turned towards the paper feed direction (the direction indicated by arrows in the figure below).

- A: Lock ring
- B: Collar(thick)
- C: Paper guide roller
- D: Pickup roller
- E: Collar
- F: Scraper roller
- G: Washer
- H: Scraper roller shaft
- I: Pulley; P26-3M060(Large)
- J: Pulley; P21-3M060(Small)
- K: Pickup roller shaft



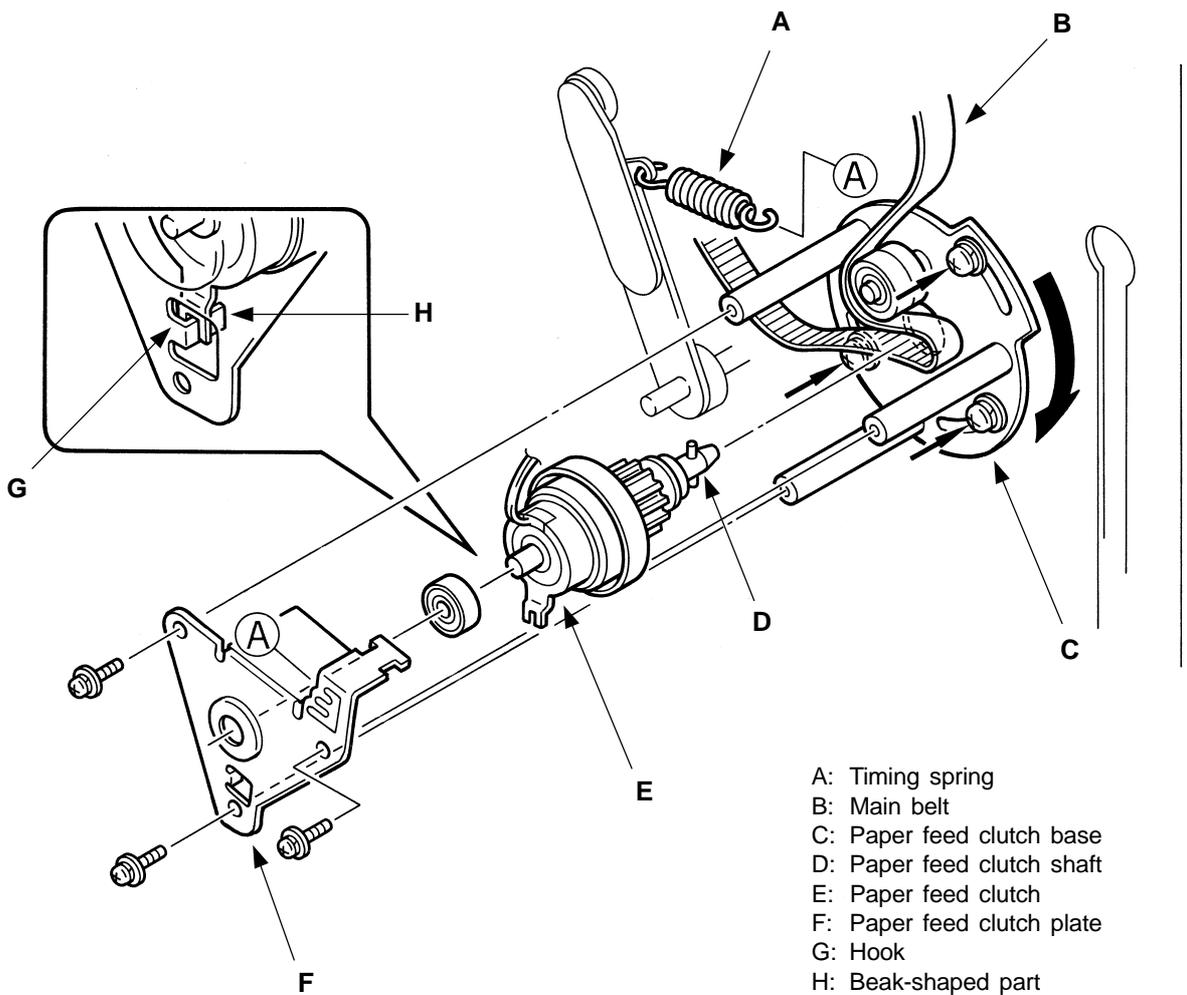
6. Paper Feed Clutch Ass'y

< Removal Procedure >

1. Turn OFF the power and remove the Back cover and scraper unit.
2. Remove the Timing spring.
3. Loosen three mounting screws on the Paper feed clutch base and turn the Paper feed clutch unit clockwise to release the tension of the Main belt.
4. Remove three mounting screws on the Paper feed clutch plate and remove the plate.
5. Pull the Paper feed clutch ass'y toward you and disengage the Paper feed clutch shaft from the Pickup roller shaft.
6. Disconnect the connector of the Paper feed clutch, disengage the Main belt from the Paper feed clutch pulley and remove the Paper feed clutch ass'y by pulling it further toward you.

- Precautions in Assembly -

- Make sure to engage the beak-shaped part of the Paper feed clutch with the hook of the Paper feed clutch plate.



- A: Timing spring
- B: Main belt
- C: Paper feed clutch base
- D: Paper feed clutch shaft
- E: Paper feed clutch
- F: Paper feed clutch plate
- G: Hook
- H: Beak-shaped part

7. Elevator Motor Unit

< Removal Procedure >

1. Raise the Paper feed tray a little (by approx. 5mm) if it is positioned at the bottom, using Test mode **No.102**.

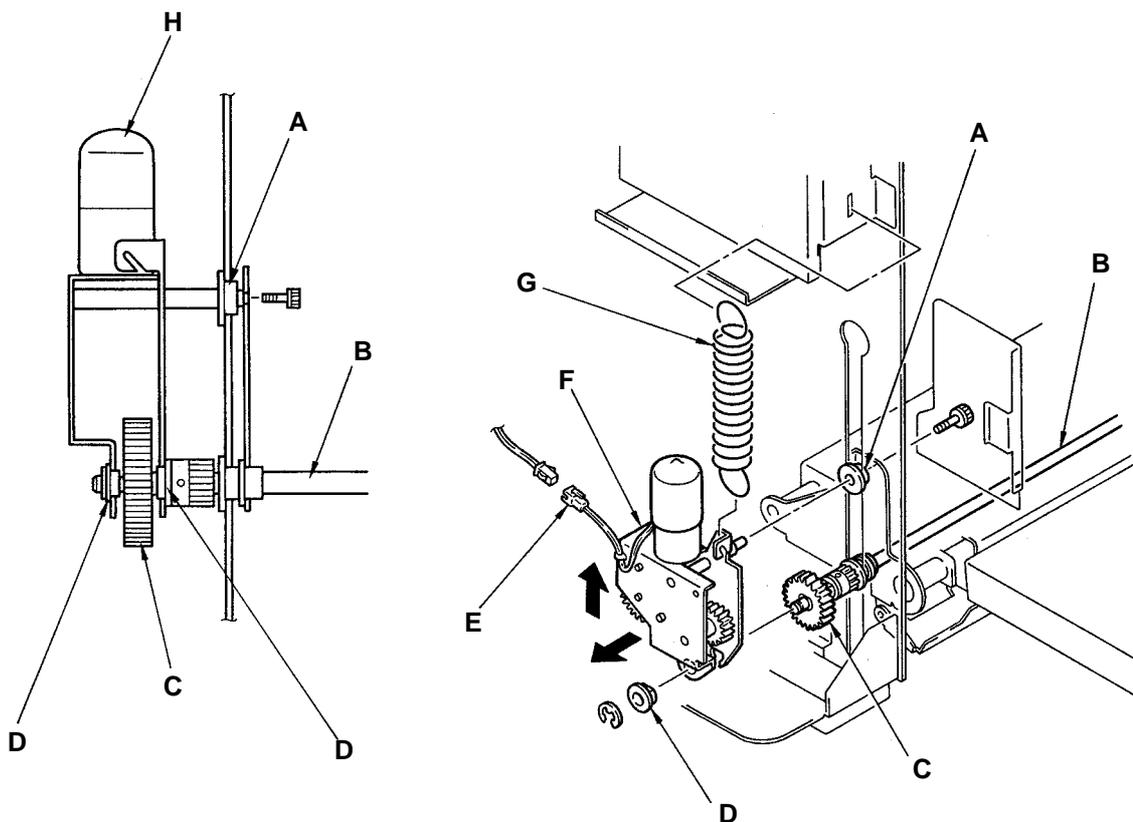
[Note]

In case the Elevator motor doesn't operate, raise the tray by manually rotating the worm gear of the Elevator motor.

2. Remove the Carrying grasp (a white plastic box) from the Bottom plate (left) by removing a tapping screw.
3. Remove the Elevator spring and the hexagon socket head screw securing the Paper feed tray unit on the Drive base side.
4. Disconnect the connector of the Elevator motor.
5. Remove the E-ring securing the collar at the end of the Elevator shaft and remove the collar.
6. Pull the Elevator motor unit toward you and lift it up off the Elevator shaft.

- Precautions in Assembly -

- Always put white grease on plastic gears in the Elevator motor unit and the Elevator gear after assembly.
- Position the Elevator shaft a little up before starting assembly.
- Put the Elevator collar on the upper shaft of the Elevator motor unit.



- A: Elevator collar
- B: Elevator shaft
- C: Elevator gear
- D: Collar
- E: Connector
- F: Elevator motor unit
- G: Elevator spring
- H: Elevator motor

8. Stripper Unit

Removal

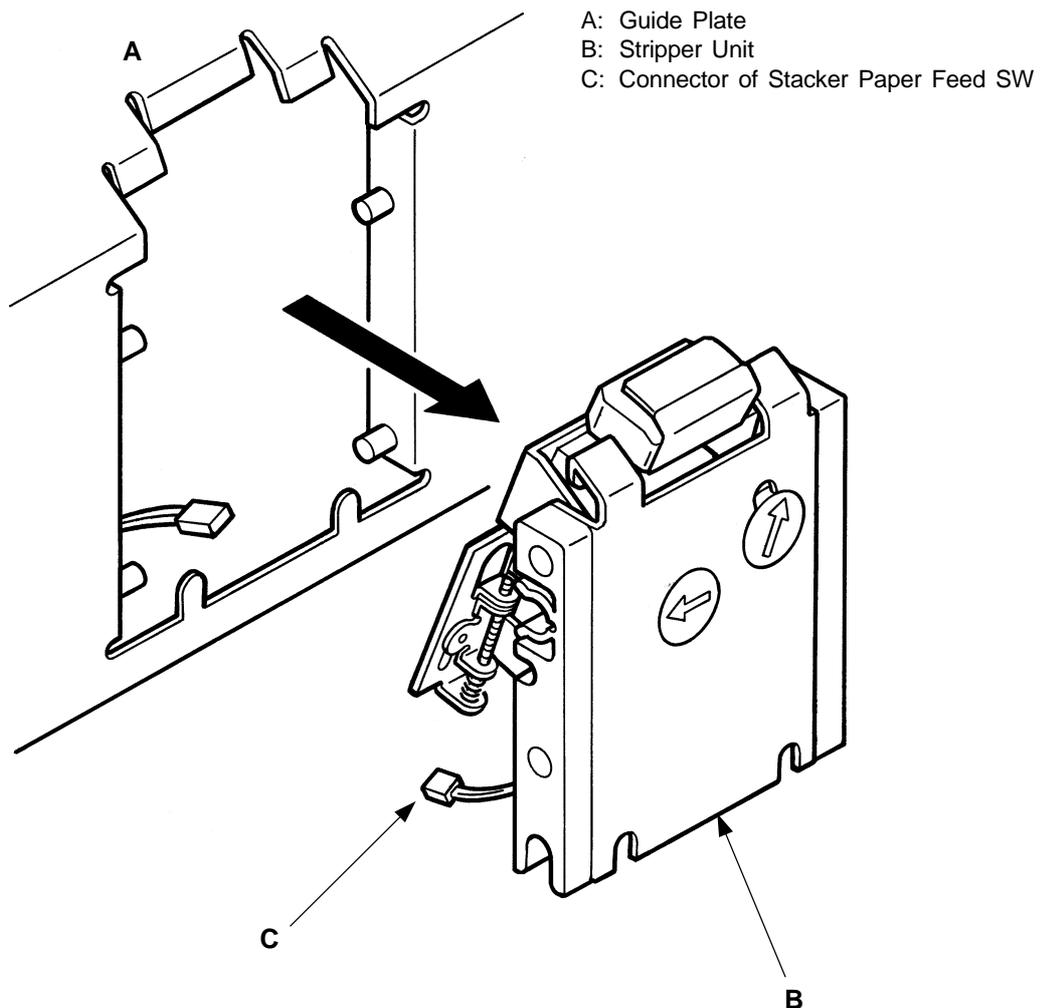
1. Move the paper feed tray down to the lowest position and turn off the power.
2. Set a finger on the upper part of the stripper unit and pull it out to the near side.
3. Disconnect the connector of the Stack paper feed switch hidden behind the guide plate and remove the stripper unit.

Precaution in Assembly

- With the stripper assembly pushed inside, set onto the guide plate.
- Remember to insert the connector of the Stack paper feed switch.

Adjustment after Assembly

- Stripper Pad Pressure. (page 4A-3)
- Position of the Stack Paper Feed switch (page 4A-4)



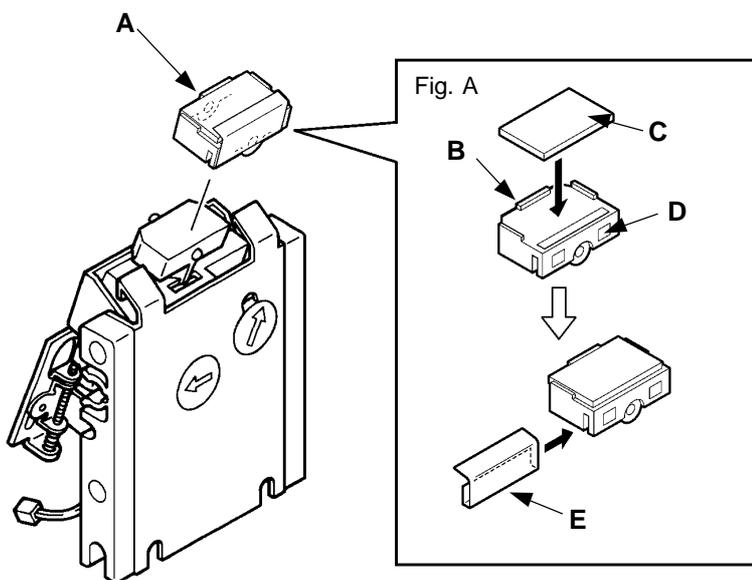
9. Stripper Pad

Removal

1. Move the paper feed tray down to the lowest position, turn off the power, and remove the stripper unit.
2. Raise the stripper pad manually and remove it.

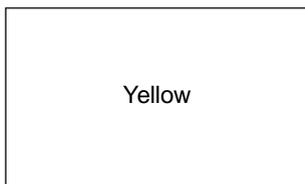
Precautions in Assembly

- There are two kinds of stripper pads. Choose a proper one according to the user's paper type.



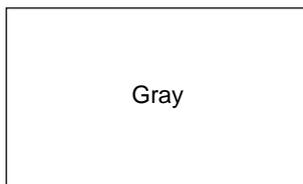
- A: Stripper Assembly
- B: Convex Part
- C: Stripper sheet
- D: Stripper pad
- E: Stripper cover

Normal Friction



Stripper pad; 70

High Friction



Stripper Pad; U

MEMO

ADJUSTMENT

1. Paper Width Data

1. Set the A4-size paper on the paper feed tray and adjust the Paper side guides properly to the paper size.
2. Start up the Test Mode No. 222(Memory switch) and make sure that the paper size potentiometer displays “210 mm.”
3. If not displaying “210 mm,” select the Test Mode No. 222(Memory switch) to make adjustment.
4. Cancel the Test Mode(Memory switch) to return to the normal screen.
5. Set the standard paper on the paper feed tray and make sure that a correct paper size is displayed.

Precautions for Adjustment

- If the paper size potentiometer does not display “210 mm” after adjustment in the Test Mode(Memory switch), its mounting position is dislocated. Attach it properly.
If the display is unstable or does not change by moving the Paper side guides, it is likely that the connector of the paper feed tray and that of the PCB may be disconnected.

Results of Misadjustment

If the reading width of the paper size potentiometer is incorrect, the proper paper size will not be displayed even if the standard paper is set.

Adjustment of Test Mode(Memory Switch) No. 222

Memory SW	9	A	B	C	D	E	F	0	1	2	3	4
Adjustment Amount(mm)	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4
	5	6	7	8								
	+5	+6	+7	+8								

Decrease ← Adjustment Amount → Increase

2. Position of Elevator Upper Limit Sensor

1. Remove paper from the Paper feed tray.
2. Switch the paper feed pressure adjustment lever to "NORMAL."
3. Enter Test mode **No.102**.
4. Press the Elevator down button until the Paper feed tray elevates and stops at the top position.
5. Confirm that the gap between the Pickup roller and the Paper feed tray is **1.5±0.5mm**.
6. If the measurement is off, loosen the screw holding the Upper limit sensor bracket and move the bracket up or down to adjust the top position of the Paper feed tray.

- Precautions in Adjustment -

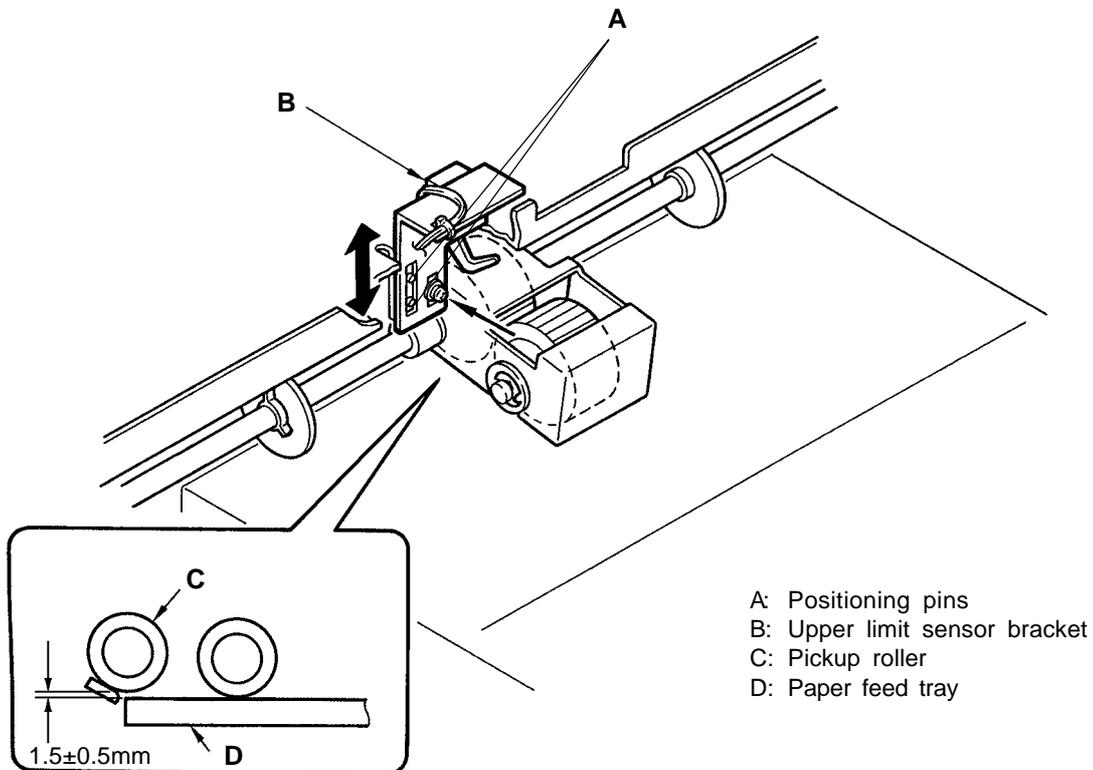
- Do not confuse the Pickup roller with the Scraper roller when measuring the space.
- The upper-limit stop position of the paper feed tray changes slightly by switching the paper feed pressure adjustment lever. (If the lever is switched to "CARD," the upper-limit stop position of the paper feed tray will be raised slightly)

- Checking after Adjustment -

- Check the actual paper feed state. If stacked paper or no paper is fed, make fine adjustment of the elevator upper-limit sensor's position as required, as well as adjustment of the stripper pressure and angle of the stripper pad.

- Results of Misadjustment -

- If the Upper limit sensor is set too high; the paper feed pressure becomes strong and multiple sheet feedings will occur.
- If the Upper limit sensor is set too low; the paper feed pressure becomes weak and paper will skip or misfeed.



3. Stripper Pad Pressure

1. Switch the paper feed pressure adjustment lever according to the type of paper and print.
2. When stacked paper or no paper is fed, adjust the stripper angle or pressure of the stripper pad.

(1) When stacked paper is fed

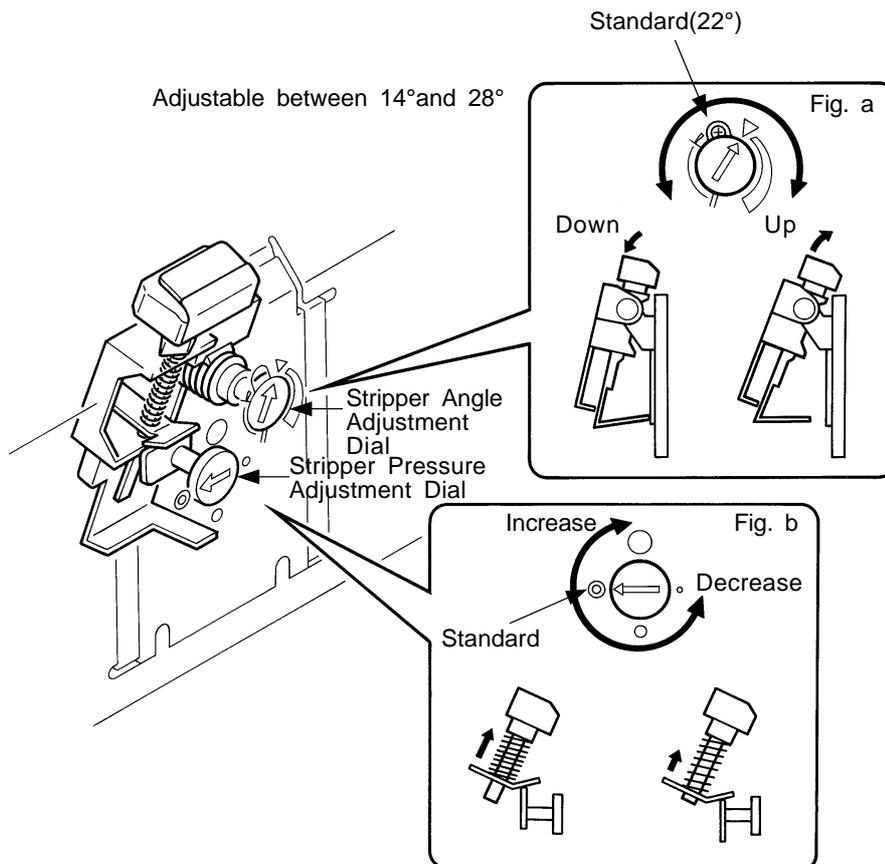
- Turn the stripper angle adjustment dial in the clockwise direction to increase the angle of the stripper pad.
- Turn the stripper pressure adjustment dial in the clockwise direction to increase the stripper pressure.

(2) When no paper is fed

- Turn the stripper angle adjustment dial in the counterclockwise direction to decrease the angle of the stripper pad.
- Turn the stripper pressure adjustment dial in the counterclockwise direction to decrease the stripper pressure.

Precautions for Adjustment

- If stacked paper or no paper feed cannot be corrected by adjusting the angle or pressure of the stripper pad, replace the stripper pad with another type.



4. Position of Stack Paper Feed Switch

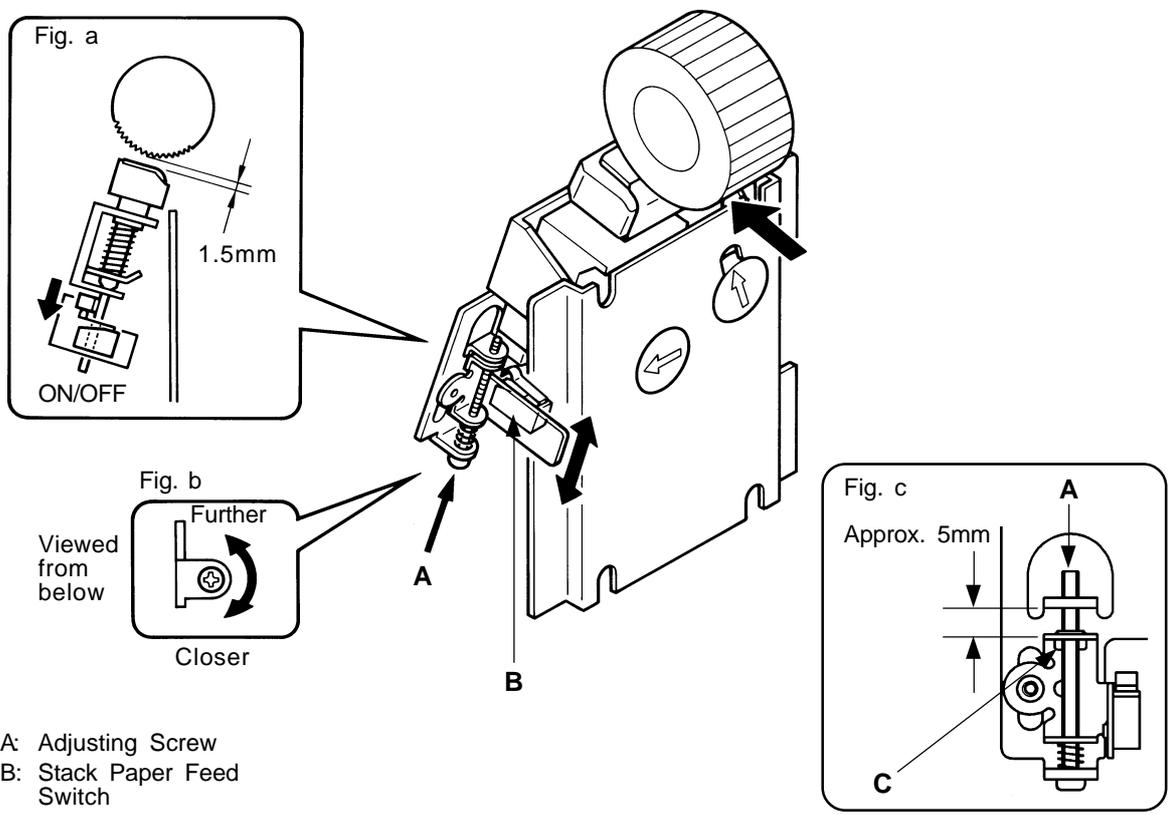
1. With the stripper unit attached to the main body, push down the Stripper pad slowly with a finger. After pushing them down about 1.5 mm, make sure that the Stack Paper Feed switch is pressed and clicks(Fig. a)
2. If other than the specified value, remove the stripper unit.
3. Turn the adjusting screw to make adjustment.
 - Viewing the adjusting screw from below, turning it counterclockwise causes the Stack Paper Feed switch to approach the actuator plate, and turning it clockwise causes it to go away.
 - One turn of the adjusting screw makes a change of about 0.5 mm.
 - The specified value is almost obtained by setting the distance marked with ★ to approx. 5 mm shown in Fig. C.
4. Finally, apply a screw locking agent to the adjusting screw(Fig. c) and attach to the main body.

- Precautions for Checking and Adjustment

- If the switch sound cannot be easily heard, turn on the Test Mode No. 67(paper feed clutch), press the SW1 of the System PCB to rotate the main motor at the slit section of the P-disc to check whether the paper feed clutch is activated or not.

- Results of Misadjustment -

- If the Stack Paper Feed switch is too close to the actuator plate, the switch will be pressed to turn off the paper feed clutch during printing, and if it has been pressed from the beginning, the paper feed clutch will not be turned on at all and “PAPER MISFEED CHECK PAPER FEED AREA AND PRESS ALL RESET KEY” will be displayed.
- If the switch is too far on the contrary, the paper feed clutch will not be turned off even if multiple sheets are fed at once, and the paper will jam in the secondary paper feed section, locking the drive unit or deforming the guide plate.



- A: Adjusting Screw
- B: Stack Paper Feed Switch
- C: Screw Locking Agent

5. Position of P Disc (Start-time of First Paper Feed)

1. Check that the vertical print position is at the center and the Drum at the home position.
2. Check if the alignment notch of the P disc is positioned on a level with the top corner of the Paper feed clutch sensor as shown in the figure below.
3. If not, first check if the hole on the Main shaft face plate is aligned with the counterpart on the Cam pulley.
If it is not aligned, adjust the arrangement of the Cam pulley.
4. If the alignment notch of the P disc is still not correctly positioned after confirming the hole alignment for the Cam pulley, loosen the allen screw securing the P disc and turn the P disc so that the alignment notch is positioned on a level with the top corner of the Paper feed clutch sensor.
5. Tighten the allen screw inside the P disc.

[IMPORTANT]

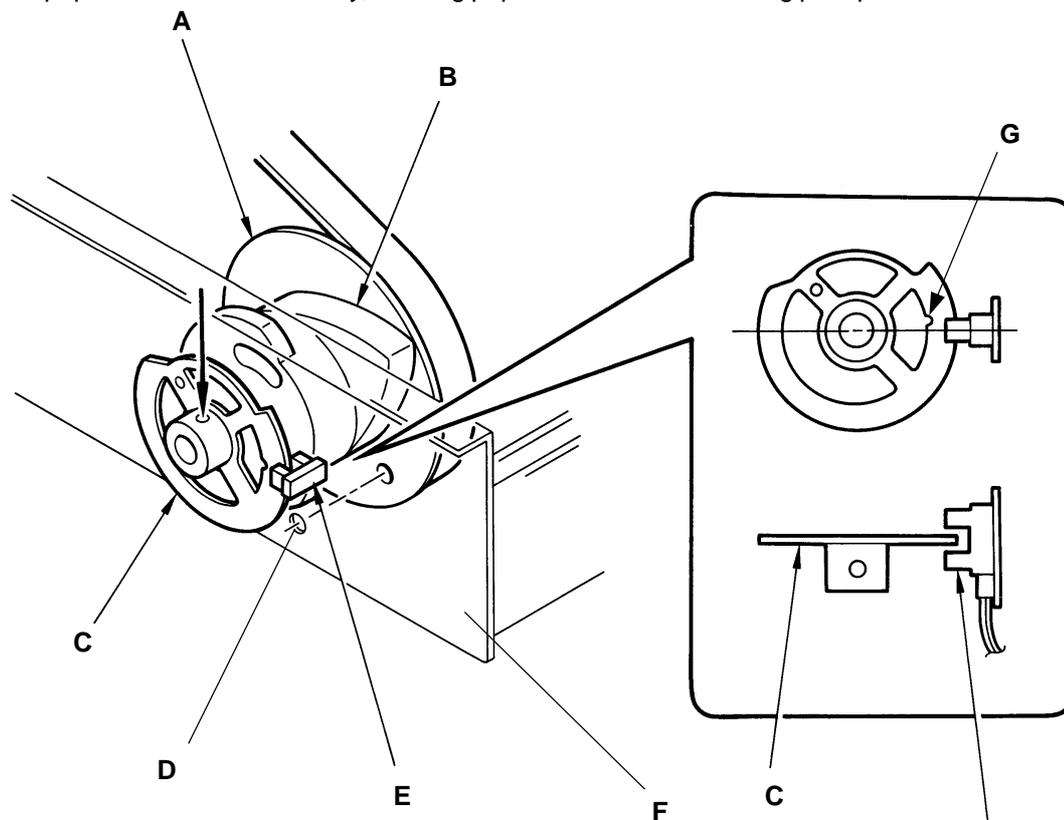
Secure the P disc so that it is positioned in the middle of the Paper feed clutch sensor as shown in the figure below.

- Precautions in Adjustment -

- Make sure that the P disc doesn't get contact with the inner surface of the Paper feed clutch sensor at any position by rotating the P disc with a press of SW1 on the System PCB.

- Results of Misadjustment -

- If the P disc is incorrectly positioned;
paper will not feed correctly, causing paper feed errors or making print position unstable.



- | | |
|---------------------|-----------------------------|
| A: Cam pulley | E: Paper feed clutch sensor |
| B: Guide roller cam | F: Main shaft face plate |
| C: P disc | G: Alignment notch |
| D: Alignment hole | |

6. Paper Feed Mode (Paper Feed Clutch OFF Timing)

1. In the User Mode No. 04, adjust setting to the paper used and print.
2. If the paper is not fed smoothly during printing, adjust the paper feed clutch OFF delay time with the Memory switch(Test Mode) so that the paper will sag adequately in first paper feed.

- Results of Misadjustment

- If the paper feed clutch delay time is too late, a first paper feed rate will increase, resulting in breakage of the paper, or the end of the paper will be returned to the first paper feed side at second paper feed and “jams” without implementing second paper feed.
- If the paper feed clutch delay time is too early on the contrary, the paper will not sag properly, likely to result in “print registration problem” or “paper jam.”

User Mode No. 04

User Mode
 04. PEPER FEED MODE
 STANDARD / CARD / THIN / CUSTOM
 Item /+ - Select / Start

Memory Switch(Test Mode) No. 232/234/236/238/240 Paper Feed Clutch OFF Delay Time Adjustment

Memory SW	9	A	B	C	D	E	F	0	1	2	3	4
Adjustment Amount(mm)	-7	-6	-5	-4	-3	-2	-1	0	+3	+6	+9	+12
	5	6	7	8								
	+15	+18	+21	+24								

Decrease ← ————— Adjustment Amount ————— → Increase

Test Mode

- No.232 Paper Feed Clutch OFF Delay Time Setting: (STANDARD)
- No.234 Paper Feed Clutch OFF Delay Time Setting: (CARD)
- No.236 Paper Feed Clutch OFF Delay Time Setting: (THIN)
- No.238 Paper Feed Clutch OFF Delay Time Setting: (CUSTOM)
- No.240 Paper Feed Clutch OFF Delay Time Setting with Special Paper Unit

CHAPTER 5: SECOND PAPER FEED SECTION

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ADJUSTMENT

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2. Gap between Timing Cam and Timing Lever	5A-2
3. Vertical Print Position	5A-4
4. Position of Timing Cam	5A-6

- LED PSEN Paper sensor
 - Lights up when light path is blocked.
- Test Mode No. 6 Paper sensor
 - Short interval beeps when light path is blocked.

THEORY OF OPERATION

1. Second Paper Feed System

- Rotation of Guide Roller

The Guide cam follower is shifted up and down on the Guide roller cam when the Main motor rotates.

When it follows the cam from the low point to the high one in the cam's rotation after a feeding sheet reach the Guide roller, the Sector gear is driven to rotate the Guide roller gear clockwise. The Guide roller gear incorporates a one-way spring clutch to rotate the Guide roller only when the Guide roller gear is driven clockwise and not to transmit rotation to the Guide roller when the Guide roller gear rotates counter-clockwise.

- Rotation of Timing Roller

When the Timing roller is raised, the Gear B on the Timing roller shaft is engaged with the Gear A on the Guide roller shaft.

When the Guide roller is rotated, the Timing roller is simultaneously rotated via the Gears A and B to feed a sheet to the print area.

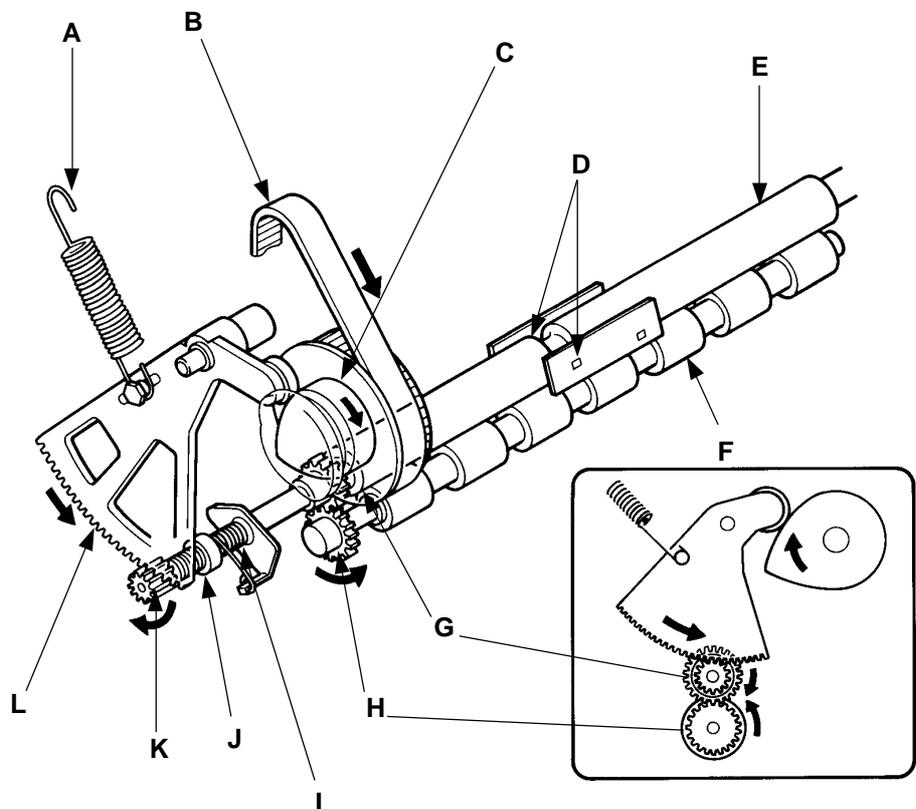
- Check of Paper Feed

The Paper sensor checks if a sheet is securely fed through the Guide and Timing rollers up to the print area.

- Function of Load Spring

The Load spring is put on the Guide roller shaft to prevent the roller from rotating when the rotation force is not transmitted to the roller by applying a load against rotation, which serves constant print position (registration).

- A: Sector gear spring
- B: Main belt
- C: Guide roller cam
- D: Paper sensor
- E: Guide roller
- F: Timing roller
- G: Gear A
- H: Gear B
- I: Load spring
- J: One-way spring
- K: Guide roller gear
- L: Sector gear



2. Timing Rollor Up Down System

- Shift-up of Timing Roller

The Timing cam attached to the Cam pulley rotates clockwise when the Main motor rotates. As the Timing cam rotates, the Timing cam follower on the Timing lever, pressed against the cam by the Timing spring, follows the cam and is shifted up and down on the cam.

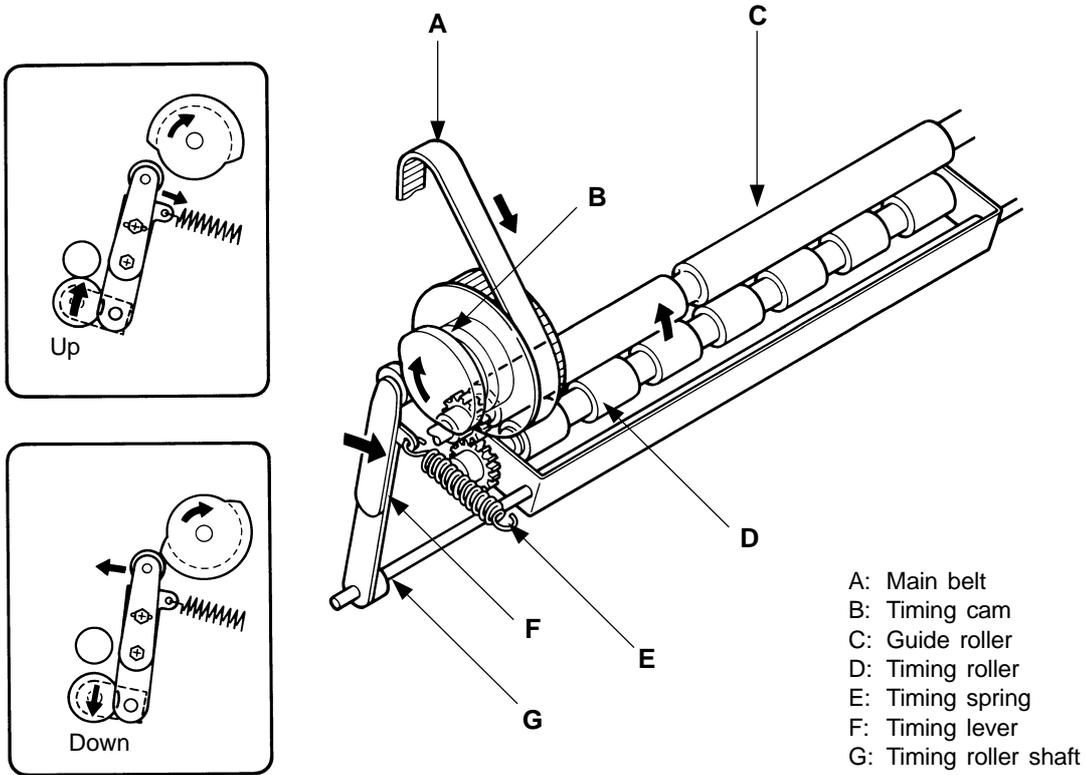
When it follows the cam from the high point to the low one in the cam's rotation while a sheet is picked up and fed in the first paper feed area, the Timing lever is driven to rotate the Timing roller shaft clockwise, raising the Timing roller mounted on the holder to the Guide roller.

The raised Timing roller is kept in contact with the Guide roller with sufficient pressure by the Timing lever spring.

- Shift-down of Timing Roller

When the Guide and Timing rollers finish rotating and the Timing cam follower follows the cam from the low point to the high one, the Timing lever is driven to rotate the Timing roller shaft counter-clockwise, lowering the Timing roller.

This mechanism prevents the back tension from being applied to the paper.



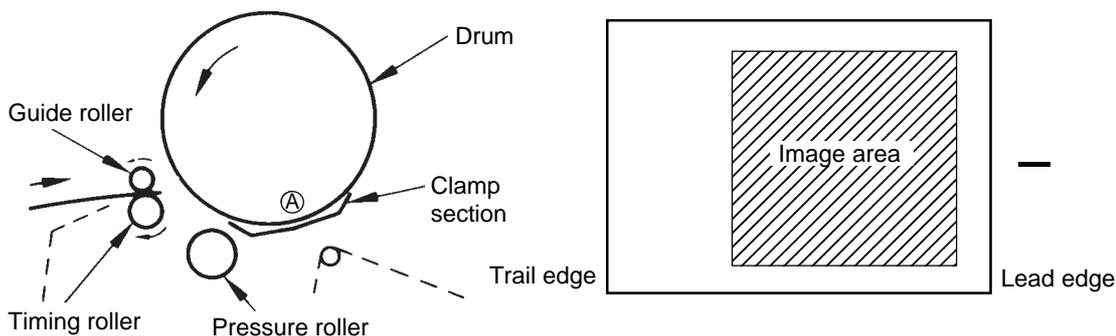
- A: Main belt
- B: Timing cam
- C: Guide roller
- D: Timing roller
- E: Timing spring
- F: Timing lever
- G: Timing roller shaft

3. Vertical Position Control System

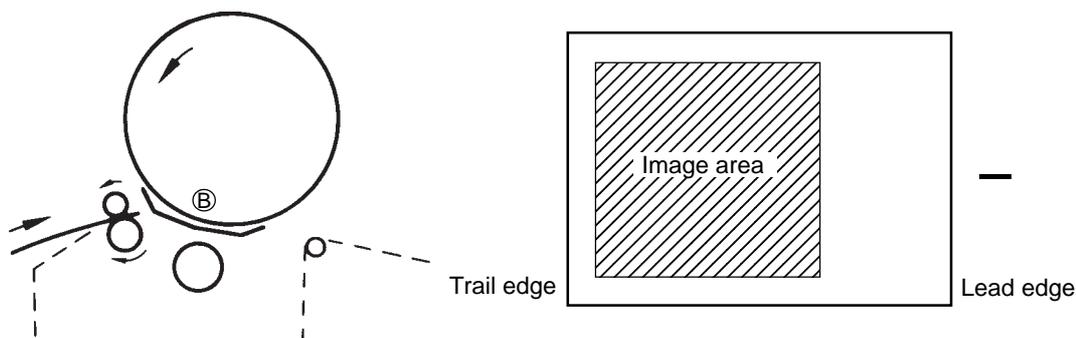
- Basic

When pressing the print position button on the operation panel, the Print positioning motor rotates and changes the vertical print position in steps on the printed copy to a maximum of $\pm 20\text{mm}$.(B4 models)

- <1> Suppose the Guide roller starts rotating and feeding a sheet to the print area when the Clamp section on the Drum is rotated to point A in the figure.
In this case, the image area on printed copies is as shown in the figure below.



- <2> Next suppose the Guide roller starts rotating and feeding a sheet to the print area when the Clamp section on the Drum is rotated to point B in the figure.
In this case, the sheet is fed earlier and the image area goes down to the bottom of printed copies as shown in the figure below.



The print position in the vertical direction is determined by the start time of the rotation of the Guide roller.

CHAPTER 5. SECOND PAPER FEED SECTION

THEORY OF OPERATION

LED TEN Vertical centering sensor

– Lights up when light path is blocked

Test Mode No. 22 Vertical centering sensor

– Short interval beeps when light path is blocked

- Rotation of Print Positioning Motor

When the Print position button "DOWN" on the operation panel is pressed to shift down the image area on printed copies, the Print positioning motor rotates clockwise, causing the Slide shaft to rotate counter-clockwise via the Slide gear.

- Elevation of Slide Plate

By the rotation of the Slide shaft, the Slide shaft bracket, which is fixed to the Slide plate, is elevated to shift up the Slide plate.

- Movement of Main Belt

When the Slide plate is shifted up, the two Slide idlers, which are fixed to the Slide plate to provide tension on the Main belt, are also elevated. This loosens the tension of the Main belt on the upper idler and tightens it on the lower idler, causing the Main belt to move counter-clockwise.

- Rotation of Main Pulley

When the Main belt moves counter-clockwise, the Main pulley is rotated counter-clockwise and the Drum is as well rotated out of the home position.

With the cams and pulleys arranged as above, the Sector gear is started to move earlier, causing the Guide roller as well to start rotating earlier to feed paper to the print area earlier.

As a result, the image area is shifted to the bottom on printed copies.

- Shift-up of Image Area

When the Print position button "UP" is pressed, the Print positioning motor rotates counter-clockwise, causing the Guide roller to start rotating later to shift the image area to the top on printed copies (by moving the belt and pulley in the direction opposite to the above case).

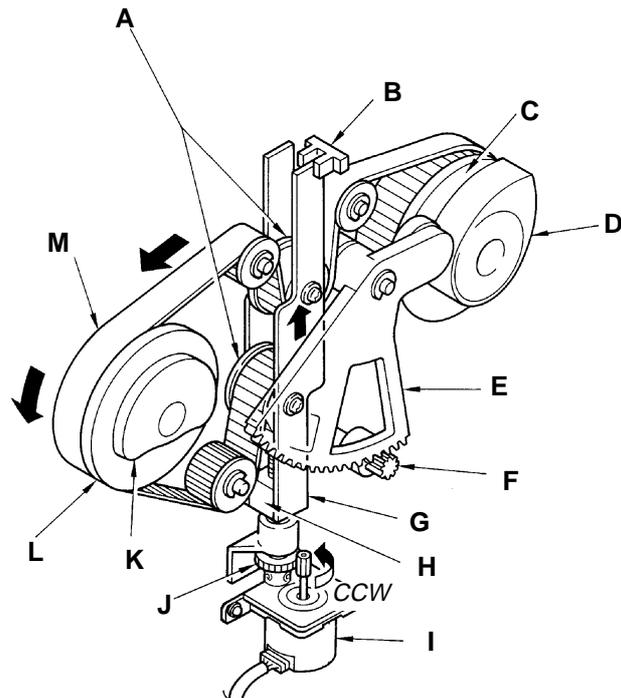
- Automatic Print Position Centering

The print position is automatically returned to the center (only vertically) by the Print positioning motor in the following cases: **1**) when the power switch is turned ON, **2**) when the "Centering" button is pressed, and **3**) when the "RESET" button is pressed.

<Mechanism>

1. If the light path of the Vertical centering sensor is blocked by the Slide plate, the Print positioning motor is rotated until the light path is opened.
2. If the light path of the Vertical centering sensor is open, the Print positioning motor is rotated until the light path is blocked by the Slide plate, and then the motor is rotated in reverse until the light path is opened again.

- A: Slide idler
- B: Vertical centering sensor
- C: Cam pulley
- D: Guide roller cam
- E: Sector gear
- F: Guide roller
- G: Slide plate
- H: Slide shaft bracket
- I: Print positioning motor
- J: Slide gear
- K: Pressure Cam
- L: Main pulley
- M: Main belt

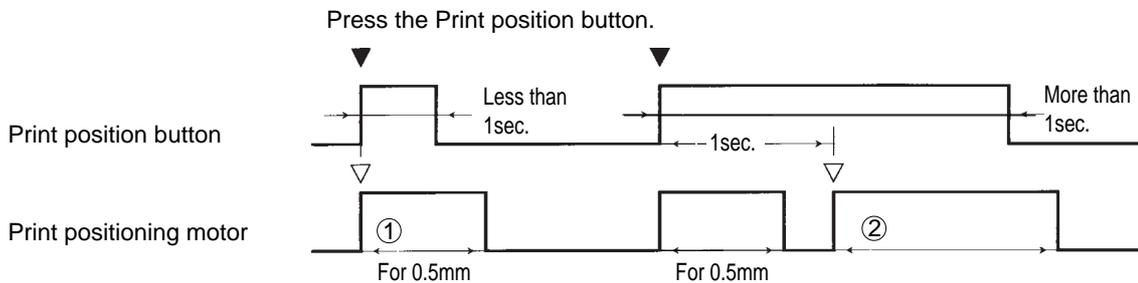


CHAPTER 5. SECOND PAPER FEED SECTION

THEORY OF OPERATION

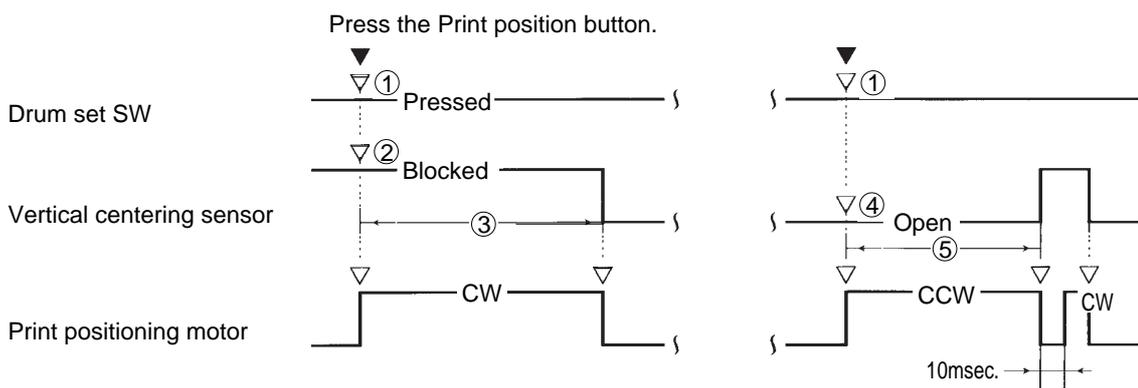
- Timing Chart -

Vertical Position Control System



- ① If the Print position button is pressed, the Print positioning motor is kept rotating until the print position is shifted by 0.5mm.
- ② If the Print position button has been pressed for more than 1 sec., the Print positioning motor restarts and keeps rotating (within the range of ± 20 mm from the center) while the button is kept pressing.

Automatic Print Position Centering Mechanism



- ① If the Drum set SW is not pressed ON, the Print positioning motor doesn't rotate for the automatic print position centering operation.
- ② If the light path of the Vertical centering sensor is blocked, the Print positioning motor rotates to lower the Slide plate.
- ③ If the light path of the Vertical centering sensor has not been opened within **12 seconds** after the Print positioning motor started operating, the machine assumes a Print positioning motor lock has occurred and displays the error code **[T 5]**.
- ④ If the light path of the Vertical centering sensor is open, the Print positioning motor rotates to raise the Slide plate.
- ⑤ If the light path of the Vertical centering sensor has not been blocked within **12 seconds** after the Print positioning motor started operating, the machine assumes a Print positioning motor lock has occurred and displays the error code **[T 5]**.

T5(Print Positioning Motor Lock)

- Vertical centering sensor not turned on/off

MEMO

REMOVAL & ASSEMBLY

1. Guide Roller Unit

< Removal Procedure >

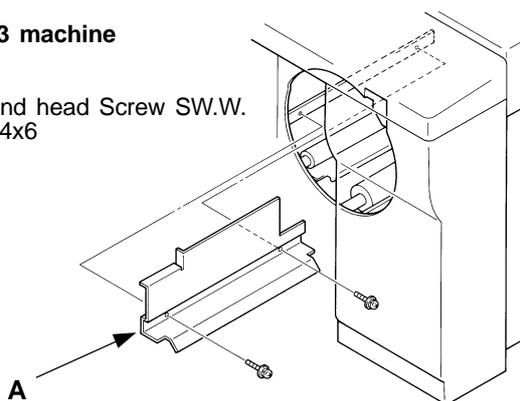
1. Take out the Drum from the machine, turn OFF the power and remove the Back cover.
2. Remove two mounting screws on the Master removal F cover, and remove the plate(A3 model only).
3. Loosen two mounting screws and remove the Pressure control motor.
4. Remove two mounting screws and washers on the Timing adjustment plate, and remove the plate.
5. Remove the Timing spring.
6. Remove two mounting screws on the Guide roller shaft catch and pull out the Guide roller unit toward the Drive base side.

[IMPORTANT]

Be careful not to drop the collar bearing which is inserted into the side frame at the other end of the Guide roller.

A3 machine

Bind head Screw SW.W.
M4x6



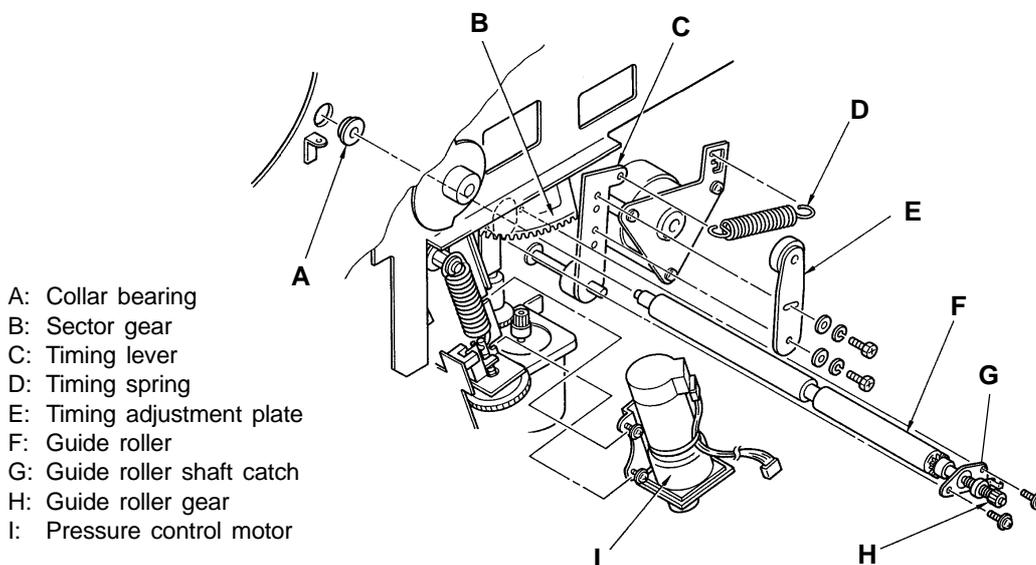
A: Master removal F cover

- Precautions in Assembly -

- Make sure that the Guide roller gear is well but not too tightly engaged with the Sector gear.
- Put grease well on the following parts: Load spring, One-way spring, Sector gear and Guide roller gear.
- Attach the Timing adjustment plate to the upper tapped hole in the Timing lever(see the figure).

- Adjustment after Assembly

- Parallelism of Timing Roller (Page 5A-1)
- Gap adjustment between the Timing lever and Timing cam (Page 5A-2)



- A: Collar bearing
- B: Sector gear
- C: Timing lever
- D: Timing spring
- E: Timing adjustment plate
- F: Guide roller
- G: Guide roller shaft catch
- H: Guide roller gear
- I: Pressure control motor

2. One-way Spring and Load Spring

< Removal Procedure >

- Removal of One-way Spring

1. Remove the drum, turn off the power, and remove the following parts.
 - Back cover
 - (Master removal F cover), Pressure control motor, Timing adjustment plate, Timing spring, Guide roller unit
2. Remove the E-ring at the end of the Guide roller shaft.
3. Remove the Guide roller gear, turning it counter-clockwise (in the direction indicated by the arrow).
4. Remove the One-way spring, turning it counter-clockwise (in the direction indicated by the arrow).

- Load Spring

5. Loosen the allen screws inside the Guide shaft and remove it.
6. Remove the Load spring along with the Guide roller shaft catch, turning them counter-clockwise.

- Reassembly of Guide Roll Unit

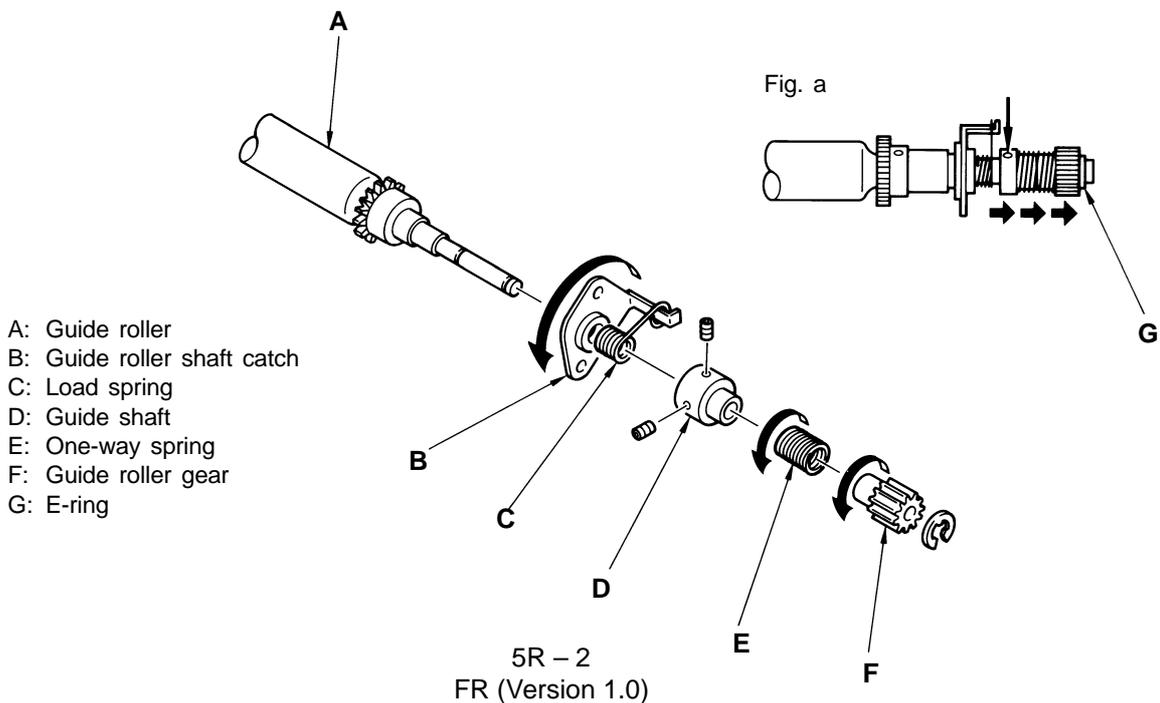
1. Hook the Load spring onto the Guide roller shaft catch and fit it into the Guide roller shaft, turning it counterclockwise.
2. Fit in the Guide shaft. Do not tighten screws yet.
3. Fit the One-way spring into the Guide shaft, turning it counterclockwise.
4. Fit the Guide roller gear into the One-way spring, turning it counterclockwise.
5. Fit in the E-ring.
6. Shift the Guide roller gear, one-way spring, and guide shaft lightly to the E-ring side and tighten the two setscrews of the Guide shaft(see Fig. a).

- Checking after Reassembly -

- Move the Guide roller gear manually in the shaft direction to make sure that there is too much movement. Turn the Guide roller gear manually counterclockwise to make sure that it idles.

- Others -

- Apply grease thinly to the section on the Guide roller shaft where the Load spring and One-way spring come into contact with.

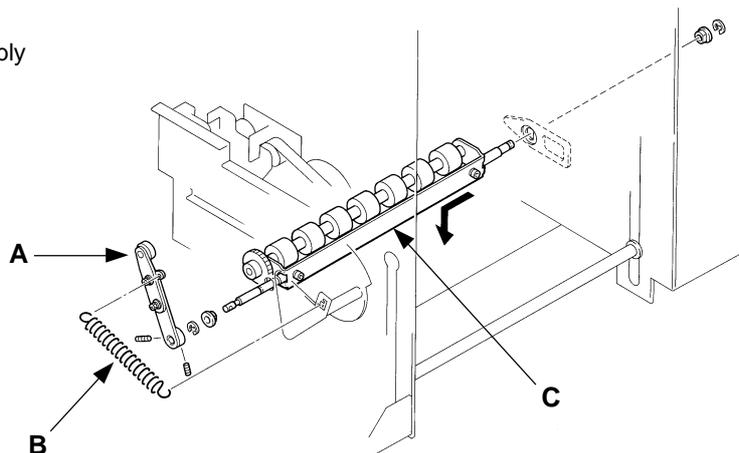


3. Timing Roller

< Removal Procedure >

1. Remove the Paper guide plate from the main body (page 5R-4).
2. Remove the Timing spring and Timing lever. Remove the E-rings and metals from both sides of the Timing shaft to detach the Timing roller assembly from the main body.

- A: Timing lever
- B: Timing spring
- C: Timing roller assembly



Disassembly

1. Remove the Timing roller from the main body. (see above)
2. Loosen the screws of the Gear B to remove the gear.
3. Remove the E-rings and metals from both ends of the Timing roller to detach from the Timing roller support plate.

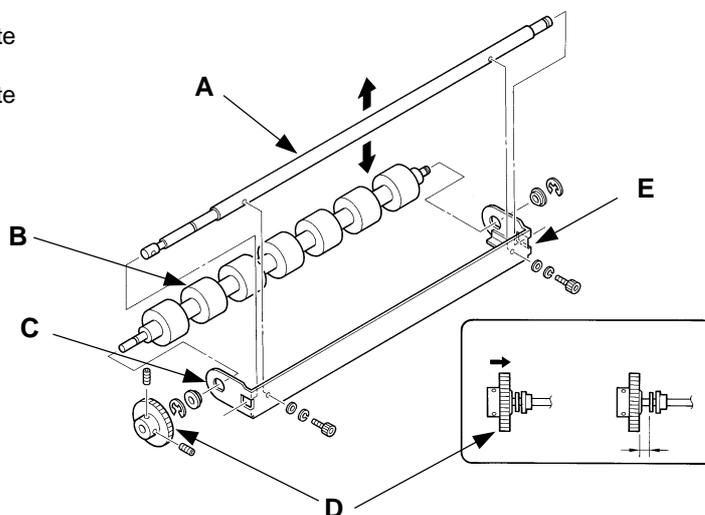
- Precautions in Assembly -

Set the Gear B onto the Timing roller shaft so that outer surface of the Gear B matches to the end of the shaft.

- Adjustment after Assembly -

- Parallelism of Timing Roller (page 5A-1)
- Gap between Timing Cam and Timing Lever (page 5A-2)

- A: Timing roller shaft
- B: Timing roller
- C: Timing roller support plate
- D: Gear B
- E: Timing roller support plate



CHAPTER 5. SECOND PAPER FEED SECOND

REMOVAL & ASSEMBLY

4. Paper Guide Plate

< Removal Procedure >

1. Move the Paper feed tray down to the lowest position, remove the Drum, turn off the power, and remove the following parts.
 - Back cover
 - Paper feed tray unit, paper feed cover, Scraper unit
 - Master removal unit
 - (Master removal F cover for A3 machine), Pressure control motor, Timing adjustment plate, Timing spring, Guide roller assembly
2. Disconnect the connector located on the Drive base side of the Paper guide plate.
3. Remove four mounting screws on the front of the Paper guide plate and two on the top, and take out the Paper guide plate from the machine.

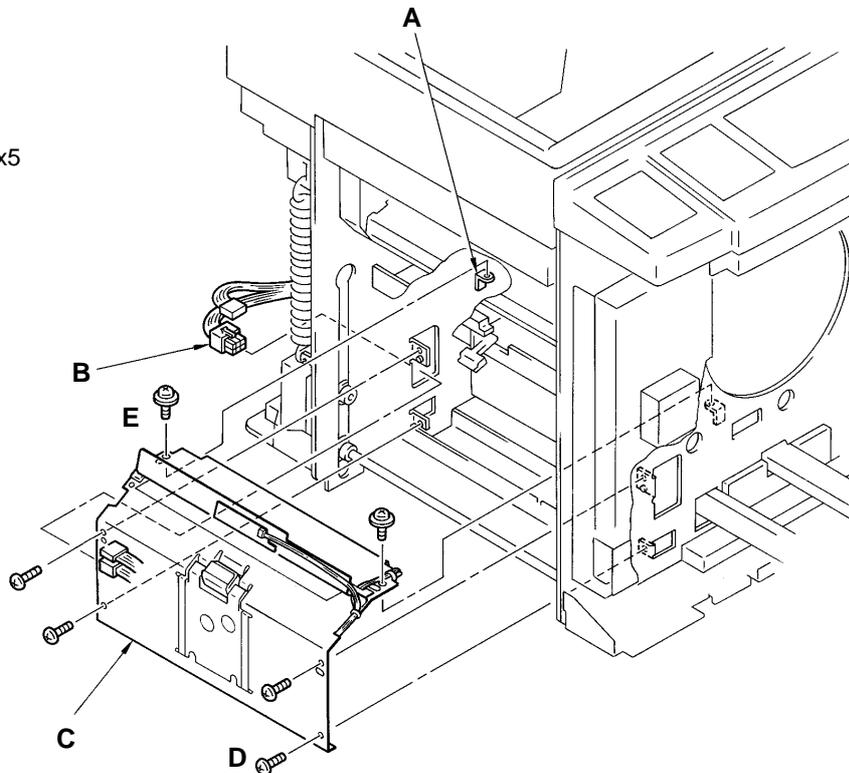
- Precautions in Assembly -

- Place the Paper guide plate on the bracket of the main body.
- If the bracket is moved by mistake, adjust the gap between the Guide plate and Guide roller.
- To adjust the height of the Paper guide plate, insert a 0.8 mm thick iron plate in between the Guide roller and Paper guide plate and fix the left and right brackets.
- Tighten the mounting screws after matching the bosses on the machine frame with the holes on the front side of the Paper guide plate.
- Be careful not to damage the Paper sensor with the Timing roller support plate.

- Adjustment after Assembly -

- Parallelism of Timing Roller (page 5A-1)
- Gap adjustment between the Timing lever and Timing cam (page 5A-2)

- A: Bracket(L plate)
B: Connector
C: Paper guide plate
D: Bind-head Screw M4x6
E: Pan-head IT Screw M3x5



- LED PDTTC Paper detection sensor
– Light up when reflected light detected.
PTLS Paper size detection sensor
– Light up when reflected light detected.
P-IN Paper feed detection sensor
– Light up when light path is blocked.
PSEN Paper sensor
– Light up when light path is blocked.
Test Mode No.40 Paper feed safety switch
– Short interval beeps when released.

CHAPTER 5. SECOND PAPER FEED SECOND

REMOVAL & ASSEMBLY

LED P-IN	Paper feed detection sensor
	- Light up when light path is blocked.
PSEN	Paper sensor
	- Light up when light path is blocked.
Test Mode	No.25 Paper feed detection sensor
	- Short interval beeps when light path is blocked.
	No.6 Paper sensor
	- Short interval beeps when light path is blocked.

5. Paper Sensor PCBs (Paper Sensor and Paper Feed Det. Sensor)

< Removal Procedure >

1. Remove the Paper guide plate, referring to the previous page.
2. Disconnect the connector of the Paper sensor PCBs and cut the wire clampers holding the wires of the Paper sensor PCBs.
3. Remove two mounting screws on the respective Paper sensor PCBs and remove the PCBs.

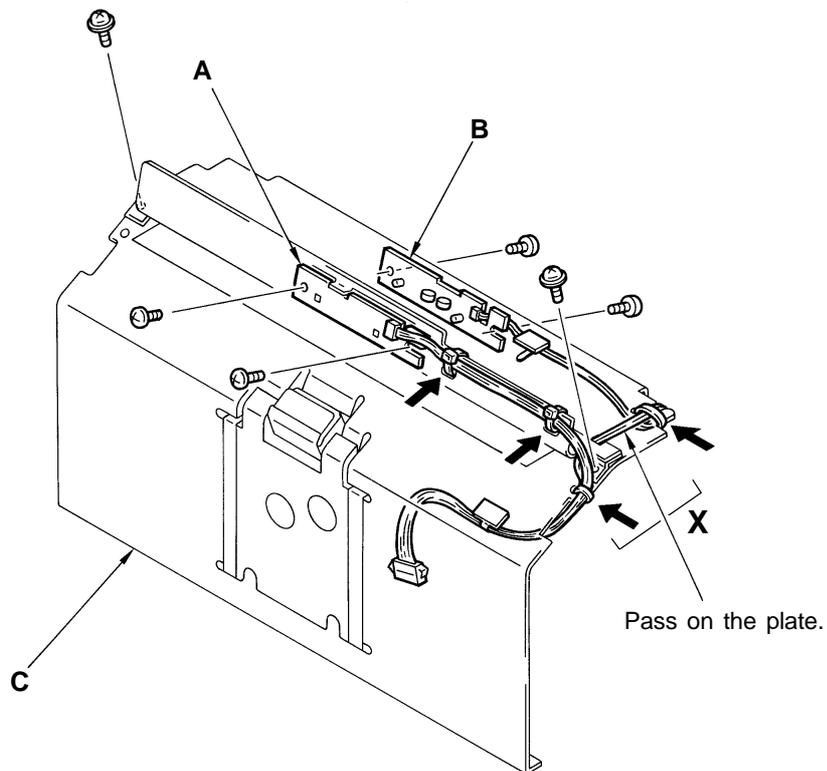
- Precautions in Assembly -

- Pass the wires of the Paper sensor PCB (send) on the Paper guide plate when leading them in the X-marked part in the figure below.

A: Paper sensor PCB
(Receive)

B: Paper sensor PCB (Send)

C: Paper guide plate



MEMO

ADJUSTMENT

1. Parallelism of Timing Roller

1. Take out the Drum from the machine and remove the Back cover.
2. Cut two strips of paper longways.
Insert the paper strips through the Paper guide plate and into between the Guide roller and the Timing roller at the two points (a and b) indicated in the figure below.
3. Rotate the drive mechanism until the Timing roller is raised and the paper strips start to feed, by pressing **SW1** on the **System PCB**.
4. By pulling the paper strips toward you, check if they are gripped with equal pressure .
5. If not, loosen the securing screws on the Parallel adjustment plate and collar and turn the adjustment collar to adjust the balance of the Timing roller.

[IMPORTANT]

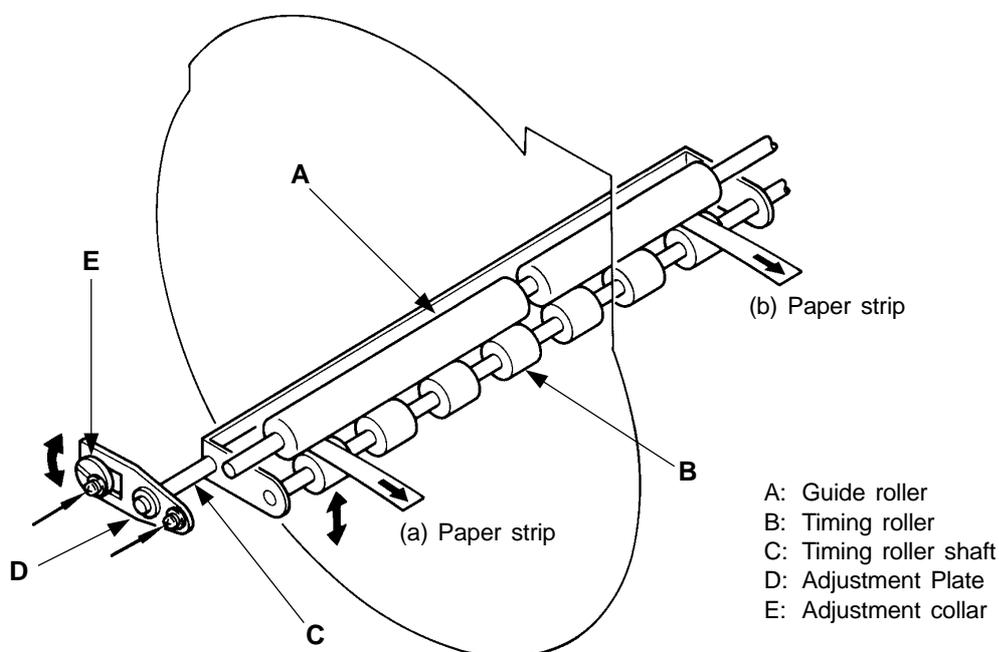
Check that the gap between the Timing cam and the cam follower on the Timing adjustment plate is correctly adjusted after adjusting the parallelism of the Timing roller.

- Precautions in Adjustment -

- Make sure that paper strips are securely gripped by the rubber rollers of the Timing roller when the Timing roller is raised.

- Results of Misadjustment -

- If the Timing roller is not parallel to the Guide roller;
paper may be pulled to one side in feeding through the second paper feed section.
As a result, paper will skew or be wrinkled.



2. Gap between Timing Cam and Timing Lever

2-1 Position of Timing Adjustment Plate

1. Rotate the drive mechanism so that the small round part of the Timing cam faces the cam follower on the Timing adjustment plate, by pressing **SW1** on the **System PCB**.
Turn OFF the power.
2. Check if the gap between the Timing cam and the cam follower on the Timing adjustment plate is approx. **2.5mm** (for example, by inserting a 2.5mm-thick hexagonal wrench between).
3. If not, loosen two securing screws on the Timing adjustment plate and adjust the position of the plate to get a 2.5mm-wide gap.
4. Tighten the securing screws on the Timing adjustment plate.

- Precautions in Adjustment -

- If a 2.5mm-wide gap can't be secured by adjusting the position of the Timing adjustment plate or if the Timing adjustment plate can't be positioned doglegged to secure a 2.5mm-wide gap, adjust the position of the Timing lever before adjusting the position of the Timing adjustment plate.

(Refer to the following page for the adjustment procedure of the Timing lever's position.)

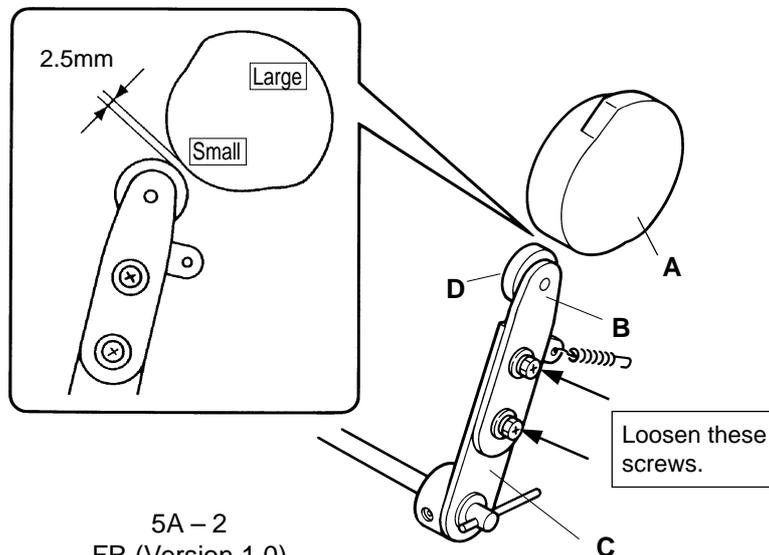
[IMPORTANT]

If the Timing adjustment plate is set doglegged, paper, especially cardboard, may not smoothly feed through the second paper feed section due to the change of the Timing spring's pressure.

- Results of Misadjustment -

- If the gap between the Timing cam and the cam follower on the Timing adjustment plate is narrower than 2.5mm;
the Timing roller is lowered too much and too early, which causes the Drive gear B to be disengaged from the Drive gear A when the Timing roller is set at the lowest position and shortens the paper feed range from the second paper feed section.
As a result, a loud scratching noise will sometimes be heard during printing and paper will not feed smoothly through the second paper feed section, especially for the first sample print.
- If the gap between the Timing cam and the cam follower on the Timing adjustment plate is wider than 2.5mm;
the Timing roller is raised too early and lowered too late.
As a result, the trailing part of a fed sheet will be caught by the Timing roller, which makes ghost images (double images).

- A: Timing cam
- B: Timing adjustment plate
- C: Timing lever
- D: Cam follower



2-2 Position of Timing Lever

1. Check that the Timing adjustment plate is attached to the Timing lever in a line.
2. Rotate the drive mechanism so that the small round part of the Timing cam faces the cam follower on the Timing adjustment plate, by pressing **SW1** on the **System PCB**.
Turn OFF the power.
3. Loosen two allen screws inside the root of the Timing lever on the Timing roller shaft.
4. Secure a **3mm**-wide gap between the Timing cam and the cam follower on the Timing adjustment plate (for example, by inserting a 3mm-thick hexagonal wrench between).
5. Insert a bar (like an allen key) into the hole at the end of the Timing roller shaft and turn the shaft clockwise to set the Timing roller in close contact with the Guide roller.

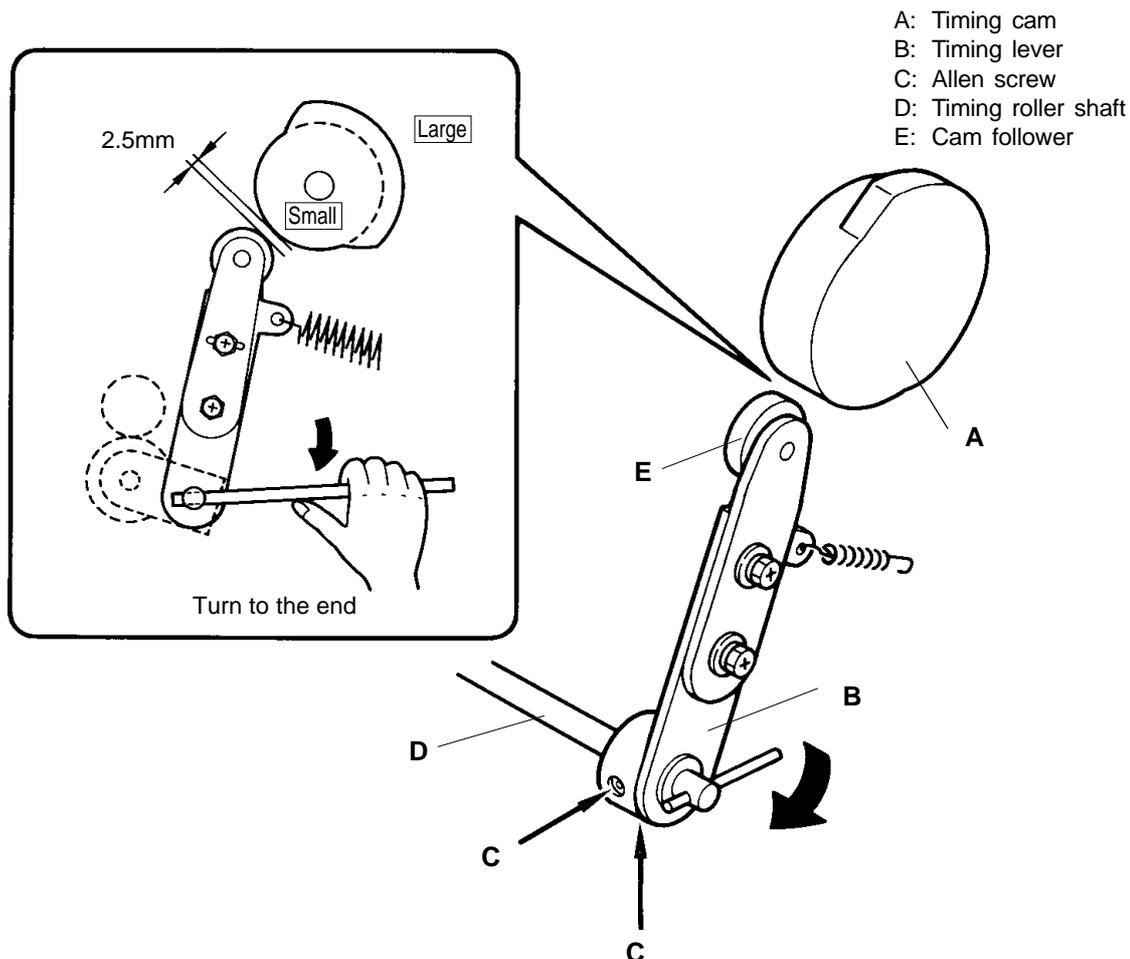
[IMPORTANT]

Confirm that the Drive gears on the roller shafts engage by moving the Sector gear by hand (to rotate the Guide roller).

6. Holding the shaft in this position, tighten the allen screws inside the root of the Timing lever.
7. Adjust the position of the Timing adjustment plate to change the gap between the Timing cam and the cam follower on the Timing adjustment plate to **2.5mm**, referring to the previous page.

- Precautions in Adjustment -

- Secure the Timing lever in the way it does not get in contact with the Main shaft face plate and Sector gear.



3. Vertical Print Position

There are two kinds of adjustment procedures for the vertical print position depending on the degree of difference in image position between an original and a printed copy as follow.

- If the difference is **less than 12mm**; → Adjust **(1) Position of Guide Roller Cam.**
- If the difference is **12mm or more**; → Adjust **(2) Arrangement of Main and Cam Pulleys.**

[IMPORTANT]

Remember that the following adjustment should be applied after confirming that the master-making and -loading positions are correct.

(1) Position of Guide Roller Cam

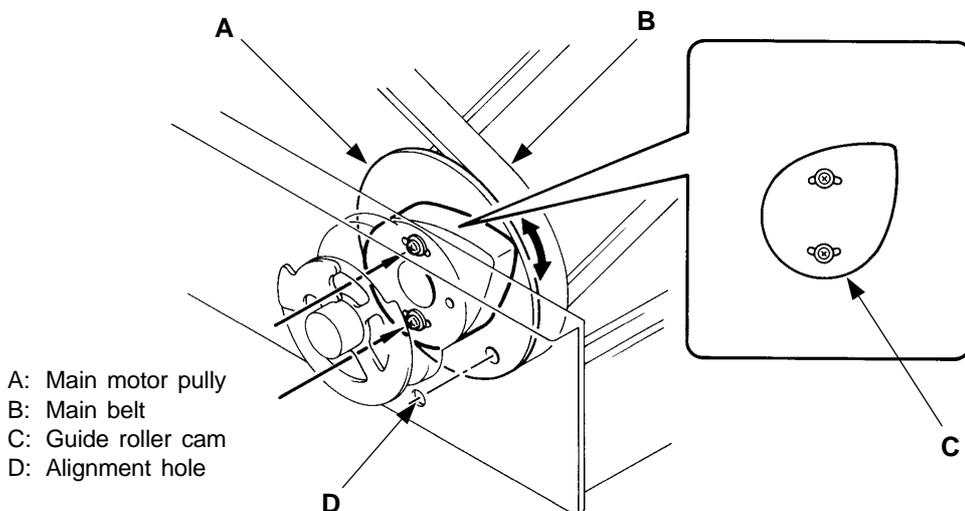
1. Check that images are transferred into the correct area on a master and the master is correctly loaded on the Drum.
If no error is found in the master-making and -loading operations, make a new master with Test chart as an original.
2. First move the print position toward the bottom by the Print position button and return it to the center by the "Centering" button. Then print **5 to 10** copies at **speed 3**.
3. Check if a degree of discrepancy of registration between on the original and on printed copies is within allowance. The allowance is **±5mm**.
4. If it is beyond the allowance but **within 12mm**, loosen two mounting screws on the Guide roller cam and adjust the installation position of the cam.

[Note]

- If the cam is moved clockwise, → the print position is shifted toward the bottom.
 - If the cam is moved counter-clockwise, → the print position is shifted toward the top.
5. Tighten the mounting screws on the Guide roller cam and check the print position by repeating the procedure in the step 2 above.

- Precautions in Adjustment -

- Don't loosen the mounting screws on the Timing cam. If they are loosened by mistake, secure them at the middle of the long hole.
- Move the Guide roller cam a little by a little because the vertical print position will be changed by more than 12mm only by adjusting the Guide roller cam's installation position.



(2) Arrangement of Main and Cam Pulleys

1. Return the print position to the center by the "Centering button and rotate the Drum to the home (A-plate detection) position.
2. Turn off the power and unhook the elevator spring from the drive side. Disconnect the connector of the Motor control PCB and ground wire. Remove three mounting screws to remove the unit.
3. Check if the holes on the Main shaft face plate are aligned with the counterparts on the Main pulley and Cam pulley.
4. If not, loosen three mounting screws on the Paper feed clutch base and turn the Paper feed clutch unit clockwise to release the tension of the Main belt.
5. Hold the main belt like pulling it. Turn the main pulley to align the alignment hole.
6. Turn the Paper feed clutch unit counter-clockwise to apply tension to the Main belt. Tighten the mounting screws on the Paper feed clutch base while applying tension.

[Note]

When applying tension to the Main belt, the Cam pulley alignment hole will move down a little or the Main pulley alignment hole will move up a little.

7. Attach the Motor control PCB and Elevator spring, and check a vertical print position.
8. Check the hole alignment once more to confirm the correct arrangement of the Main and Cam pulleys.

After confirming the correct arrangement of the pulleys, check the print registration following the adjustment procedure of the Guide roller cam's installation position.

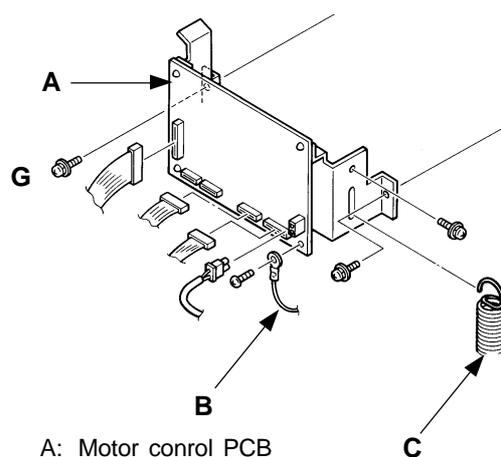
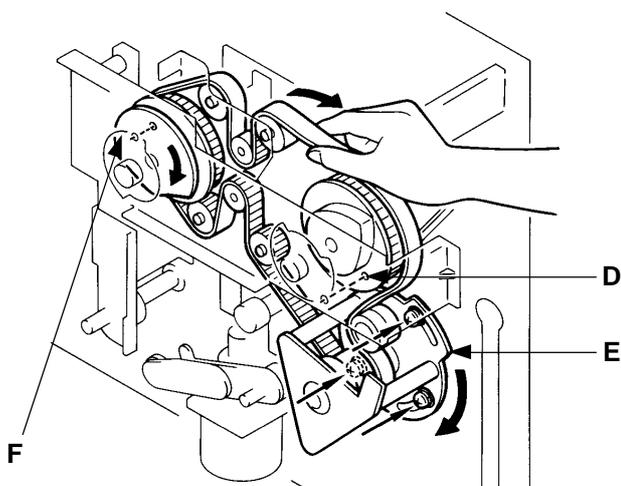
(Refer to the previous page.)

- Adjustment after Assembly

- Position of the P Disc (Page 4A-5)

- Results of Misadjustment -

- If the Guide roller cam is not positioned correctly or the Main and Cam pulleys are not correctly arranged ;
 - 1) the print registration will still be incorrect.
The print position is shifted about 12mm by one-gear-tooth discrepancy of the arrangement of the Cam pulley.
 - 2) paper will not feed properly and jam in the second paper feed section.
 - 3) printed paper will stick on the drum.



- A: Motor control PCB
- B: Ground wire
- C: Elevator spring
- D: Alignment hole(Main pulley)
- E: Paper feed clutch base
- F: Alignment hole(Main shaft and Pressure cam)
- G: Pan-head Screw SW. W M4x6

4. Position of Timing Cam

This adjustment is required only when the position of the timing cam was moved, mistaking it for the guide roller cam. It is subjected that the gap between the timing lever and timing cam has been properly adjusted.

- Adjustment and Checking

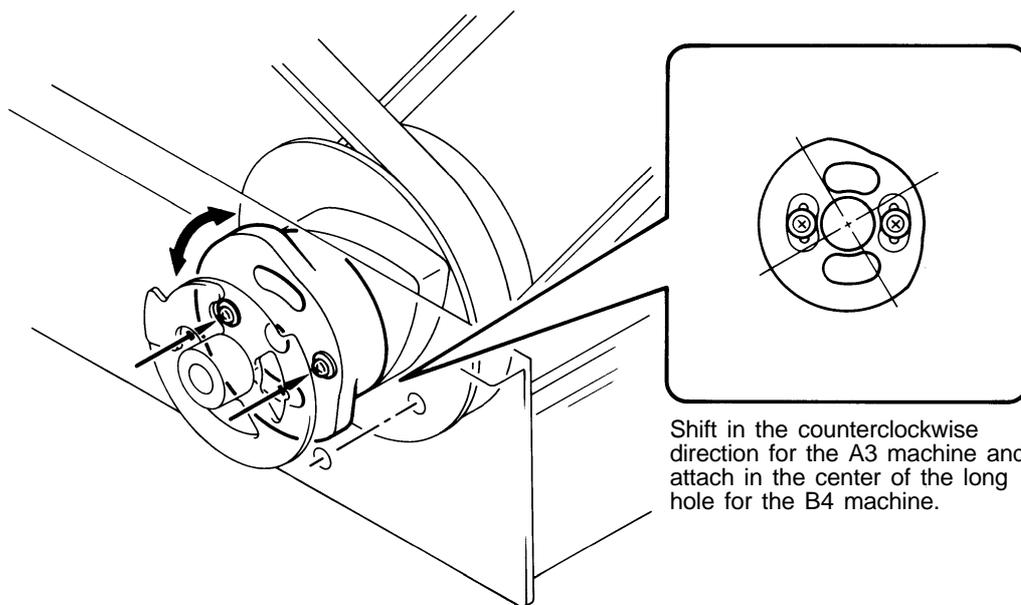
- 1) Attach the Timing cam to the following position.
For the A3 machine — Shift in the counterclockwise direction to attach.
For the B4 machine — Attach in the center of the mounting hole.
- 2) Make a master with A3-size original for the A3 machine and a B4-size original for the B4 machine, and print on the A3-size paper.
- 3) Make sure that there are no ghosts, even if the vertical print position is maximumly shifted either “upward” or “downward.”
- 4) If there is any ghost, loosen the setscrews of the Timing cam and move it in the following directions to make adjustment.
 - When the ghost appears at the beginning of the paper — Shift the Timing cam in the clockwise direction.
 - When the ghost appears at the end of the paper — Shift the Timing cam in the counter-clockwise direction.

- Result of Misadjustment -

If the Timing cam is dislocated in the clockwise direction, the paper may not reach the press roller due to earlier release timing of the Timing roller, displaying “PAPER JAM. CHECK PAPER FEED AREA.”

The contact timing of the Timing roller may become earlier, catches the rear end of the sheets of paper during printing, applies the back tension, thus causing the ghost.

On the contrary, if the Timing cam is dislocated in the counterclockwise direction, the release timing of the Timing roller may be delayed, and the back tension may be applied catching the paper despite that printing has begun with the press roller, thus causing the ghost.



CHAPTER 8: DRUM SECTION

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- LED DRMA Position A sensor
 - Light up when light path is blocked
- DRMC Position C sensor
 - Light up when light path is blocked
- Test Mode No.8 Position A sensor
 - Short interval beeps when light path is blocked
- No.11 Position C sensor
 - Short interval beeps when light path is blocked

THEORY OF OPERATION

1. Drum Rotation Check System

A drum rotating position is checked with the Position A sensor, Position C sensor, and Pressure detection sensor or Encoder sensor on the Main motor.

(1) Position A

This is the basic position(home position) in a cycle of the Drum, where the light path of the Position A sensor is blocked by the Plate A.

Example:

The Clamp solenoid is activated to open the clamp plate in master removal and close it in master loading.

(2) Position C-1

This is the position where the light path of the Position C sensor is blocked by Plate C-1 and the Drum is a little more than a quarter of a turn off the Position A.

Example:

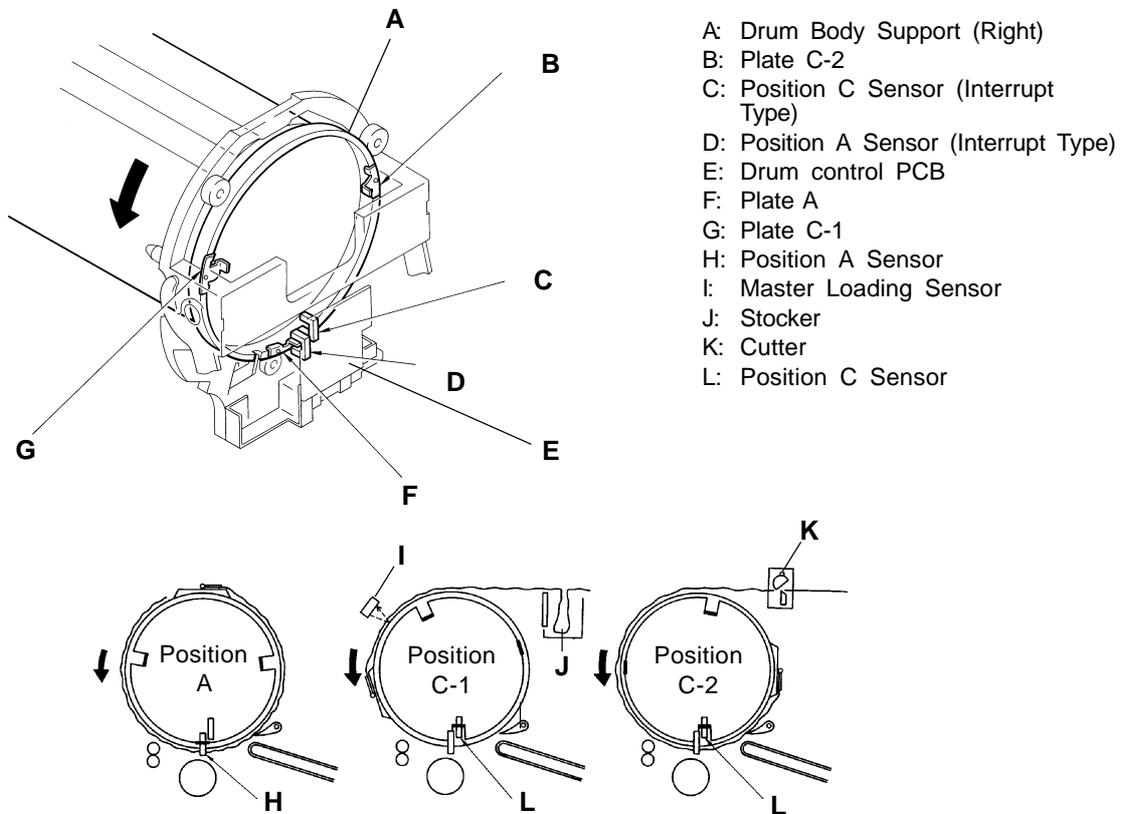
The Master loading sensor checks if a master is correctly loaded on the Drum in master loading.

(3) Position C-2

This is the position where the light path of the Position C sensor is blocked by Plate C-2 and the drum is about three-quarters of a turn off the Position A.

Example:

The Cutter motor is activated to cut a master after master loading.



T1 (Main Motor Lock)
<ul style="list-style-type: none"> • Position A sensor kept turned on • Position A sensor not turned on

T16 (Position C Sensor Malfunction)
<ul style="list-style-type: none"> • Position C sensor not turned on/off

CHAPTER 8. DRUM SECTION

THEORY OF OPERATION

(4) Encoder Sensor

The position of the Drum is determined by the count signal from the Encoder sensor.

4-1 Drum Angle 1

This position is when the Drum rotates 32° from the 0° position (Position A).

Example:

The Paper feed clutch is activated to feed a paper.

4-2 Drum Angle 2

This position is when the Drum rotates 160° from the 0° position (Position A).

Example:

The Pressure solenoid is deactivated in printing.

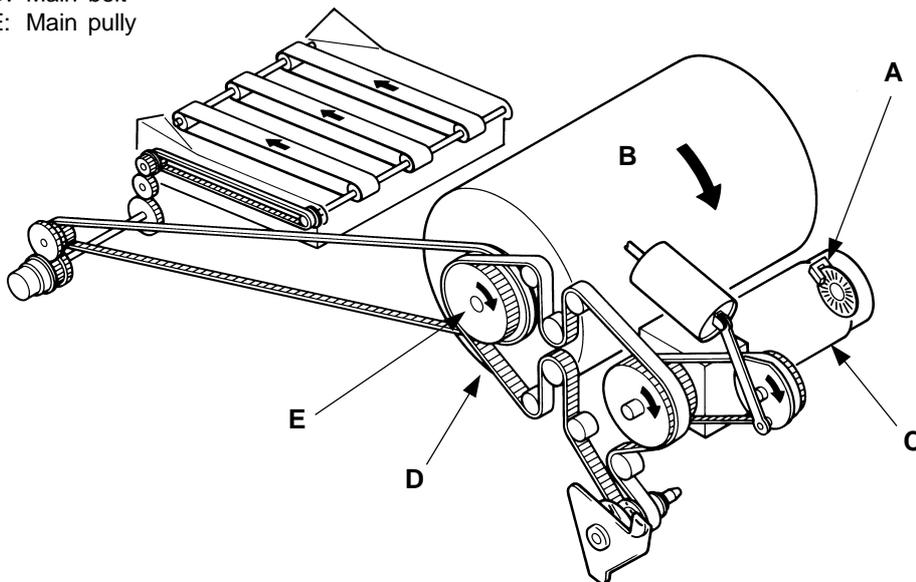
4-3 Drum Angle 3

This position is when the Drum rotates 255° from the 0° position (Position A).

Example:

The Paper receiving sensor 1 checks for detection of paper jams.

- A: Main motor encoder sensor
- B: Drum
- C: Main motor
- D: Main belt
- E: Main pulley



CHAPTER 8. DRUM SECTION

THEORY OF OPERATION

- LED PRSS Pressure det. sensor
– Light up when light path is blocked
- Test Mode No.7 Pressure det. sensor
– Short interval beeps when light path is blocked

(5) Pressure detection sensor

The position of the Drum is determined by the signal from the Pressure detection sensor.

5-1 Pressure detection sensor - 1 position

This is the position where the light path of the Pressure detection has just been opened and the Drum is a little less than a half of a turn off the Position A.

Example:

The Pressure solenoid is deactivated in printing.

5-2 Pressure detection sensor - 2 position

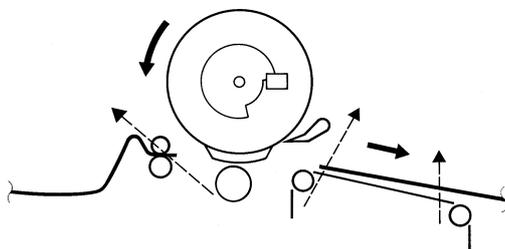
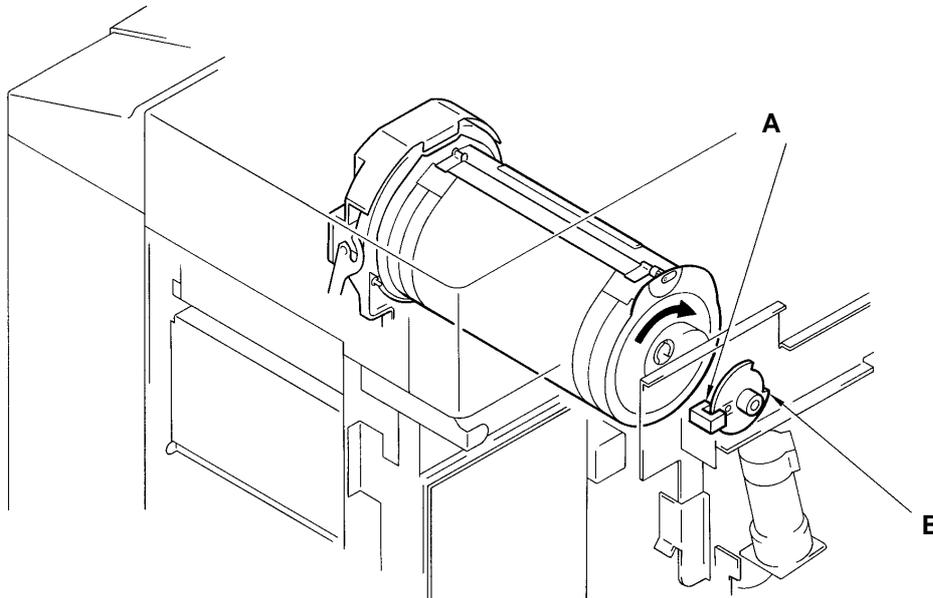
This is the position where the light path of the Pressure detection has just been blocked and the Drum is a little less three-quarters of turn off the Position A.

Example:

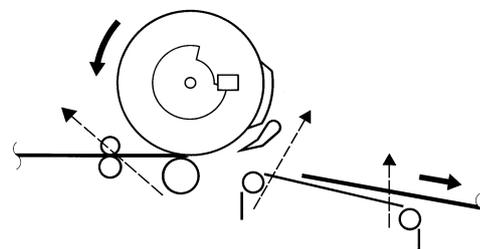
The paper receiving sensor 1 checks for the detection of paper jams.

A: Pressure detection sensor

B: Pressure sensor disc



Pressure Detection Sensor-1 Position
(Viewed from Panel Side)



Pressure Detection Sensor-2 Position
(Viewed from Panel Side)

T6 (Pressure Detection Sensor Malfunction)

- Pressure detection sensor not turned on/off

2. Drum Locking System

- Check of Drum Installation

When the Drum handle is let down after installing the Drum in the machine, the actuator of the Drum set switch is pressed by the handle, to indicate that the Drum is set in position.

- Lock of Drum in Machine

The Drum is supported by the Drum holder which is mounted on the Drum rails.

When the Drum is in the machine, the bent part of the Drum rail bracket, which is attached under the center Drum rail, is caught by the Drum lock hook to prevent the Drum from being released out of the machine while the Drum is rotating.

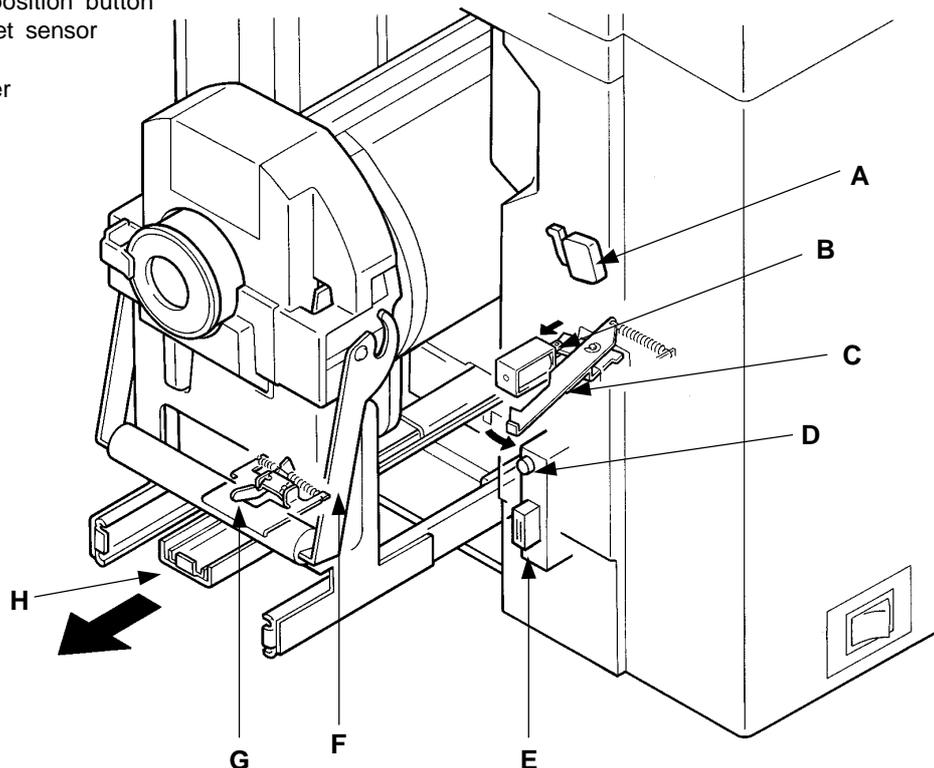
- Lock Release

When the Drum is at the home position, and the Front cover is opened, the Lock solenoid is activated ON to pull aside the Drum lock hook off the bent part of the Drum rail bracket, which allows the Drum to be released from the machine.

- Drum Set Lever

When the Drum is not existing, the Drum set lever prevents the Drum rail from entering the main body.

- A: Drum set SW
- B: Lock solenoid
- C: Drum lock hook
- D: Drum home position button
- E: Front cover set sensor
- F: Drum handle
- G: Drum set lever
- H: Drum rail



* If the Drum set switch is not pressed, "SET DRUM IN PLACE" will be displayed.

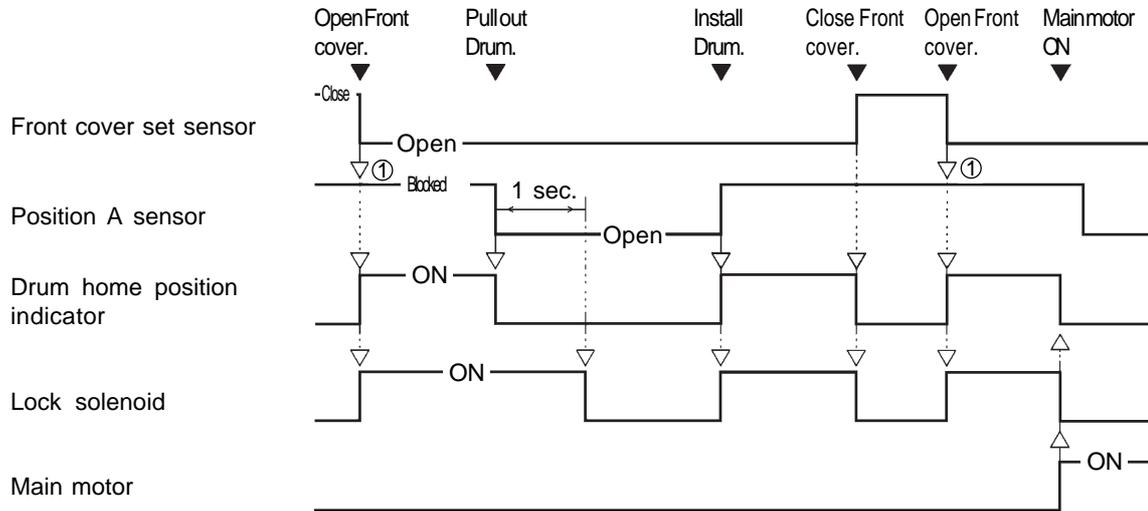
CHAPTER 8. DRUM SECTION

THEORY OF OPERATION

Test Mode No.30 Front cover set SW
 - Short interval beeps when cover is closed
 No.16 Drum home position button
 - Short interval beeps when pressed
 No.18 Drum set SW
 - Short interval beeps when pressed
 No.74 Lock solenoid

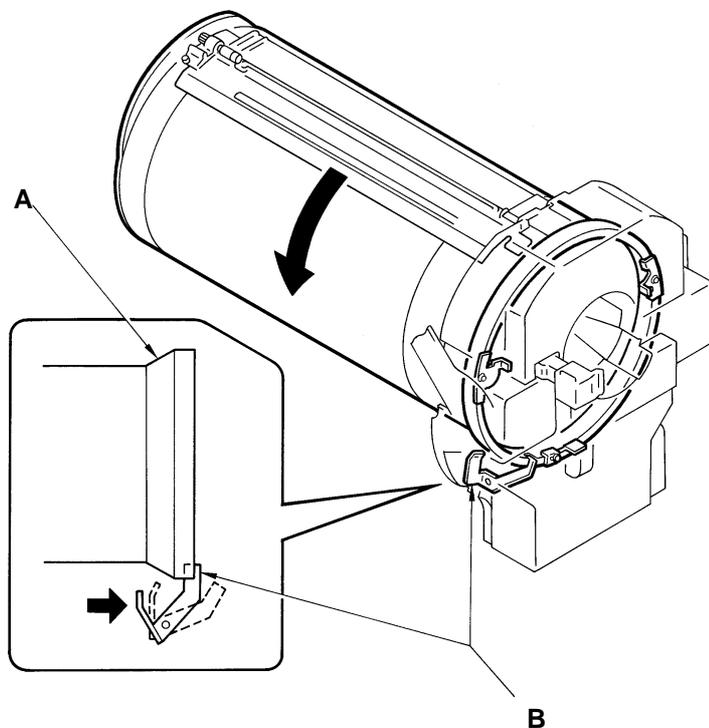
- Timing Chart -

Drum Locking System < In normal operation >



- ① The machine checks if the light path of the Position A sensor is blocked (if the Drum is at the home position).

When you want to manually rotate the Drum, push the Position A lock plate with hand to release the Lock plate from the Drum body support(right) and be sure to move it in the arrow-indicated direction.(If rotated in the reverse direction, the Ink blocking plate will be deformed)



A: Drum body support (right)
 B: Position A lock plate

CHAPTER 8. DRUM SECTION

THEORY OF OPERATION

LED DRMC	Position C sensor
	- Light up when light path is blocked
CSEN	Master loading sensor
	- Light up when reflected light detected
Test Mode	No.11 Position-C sensor
	- Short interval beeps when light path is blocked
	No.48 Master loading sensor
	- Short interval beeps when reflected light detected

3. Master Presence Check System

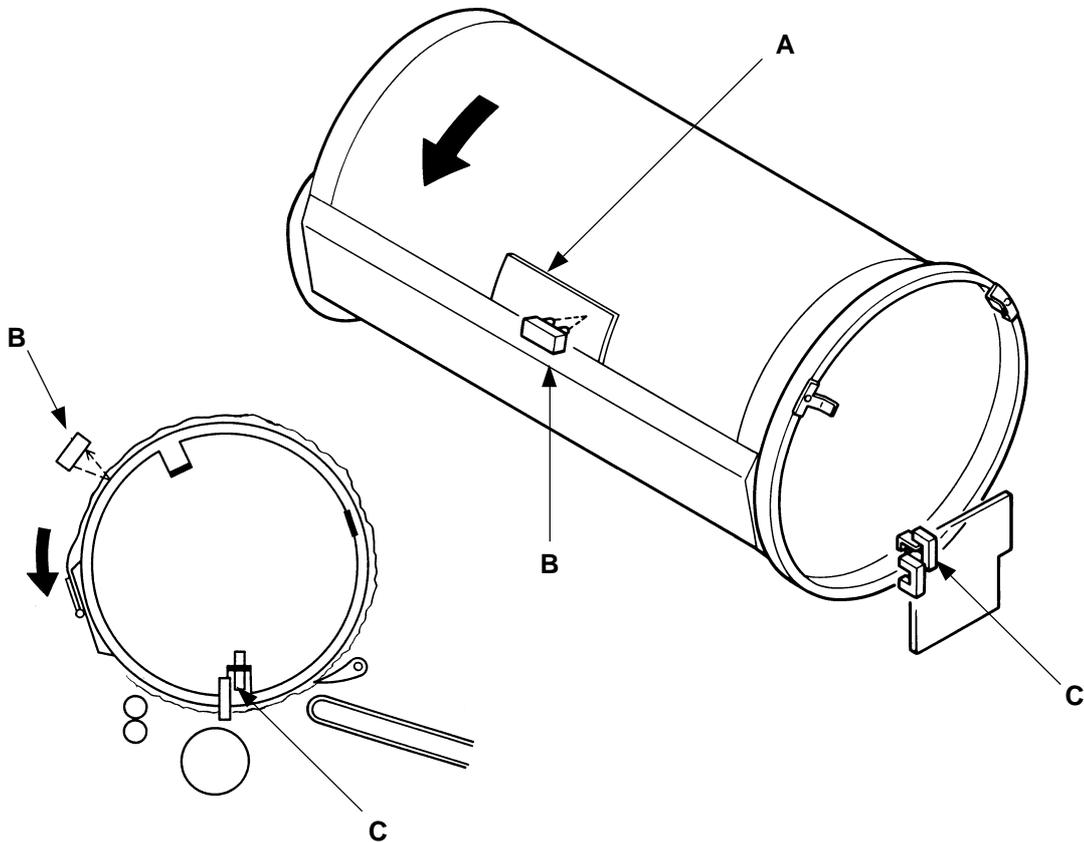
- Master loading sensor

Master loading sensor checks the presence of the master on the Drum at the Position C-1.

If the machine already knows the presence of the master on the Drum from the earlier machine operation, this master check movement is skipped.

The information (Master existence) checked with the Master loading sensor remains in the memory until the Drum is pulled out.

- A: Light absorber strip
- B: Master loading sensor (Reflection Type)
- C: Position C sensor (Interrupt Type)



* If the master is not on the drum upon starting printing, "NO MASTER ON DRUM. PRESS ALL RESET KEY AND MAKE A NEW MASTER" will be displayed.

4. Drum Type, Ink Bottle Detecting System

- Ink Bottle detecting

Ink bottle set SW checks the presence of the Ink bottle and type of Ink bottle.

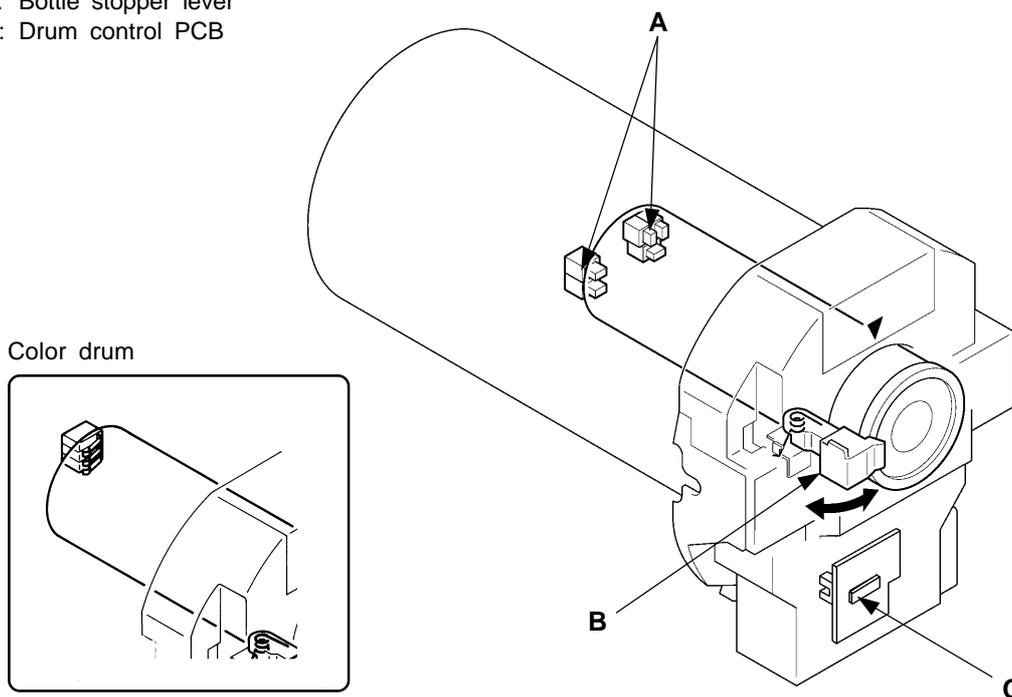
There are five switches on the PCB for the Black drum and three switches for the Color drum as shown on the below figure.

Ink bottle set SW checks whether the correct ink is set in the Drum or not.

- Drum Type detecting

The Drum type and size are recognized by the setting of the Dip SW on the Drum control PCB.

- A: Ink bottle set SW
- B: Bottle stopper lever
- C: Drum control PCB



- * If a wrong drum is set, "WRONG TYPE DRUM INSTALLED" will be displayed.
- * If a different size of drum is set, "WRONG SIZE DRUM INSTALLED" will be displayed.
- * If the Ink bottle set switch is not pressed, "INSTALL INK CARTRIDGE" will be displayed.
- * If a wrong combination of the Ink bottle set switch is pressed, "WRONG TYPE INK CARTRIDGE INSTALLED" will be displayed.

- LED INK Ink sensor
 - Light up when ink is not detected
- FLOW Overflow sensor
 - Light up when ink is not detected

5. Ink Supply System

- Rotation of Ink Driving Shaft and Squeegee Roller

When the Main shaft catch is rotated by the Main shaft, it rotates the Squeegee belt, which rotates the Ink driving shaft via the Ink driving shaft axis and the Squeegee roller via the Squeegee pulley.

[Note]

The Squeegee roller rotates clockwise while the Ink driving shaft rotates counter-clockwise.

- Ink Supply to the Inner Surface of Drum

When the Squeegee roller is rotated, ink is pressed through a narrow space above the roller and spread on it by the Doctor roller, which is attached close and in parallel to the Squeegee roller.

The ink on the Squeegee roller is then transferred to the inner surface of the Drum.

The ink which does not pass through the narrow space and remains there forms a long and even bead, rolled by the rotating Ink driving shaft.

- Ink Supply from Ink Bottle

When ink is used in printing, the ink bead becomes thinner and exposes the tip of the Ink sensor attached to the Drum PCB, which activates the Inking motor, driving the piston in the Inking pump.

This operation pumps ink out of an ink bottle through the nozzle of the Inking pump and supplies ink into the Squeegee section through the holes of the Ink distributor.

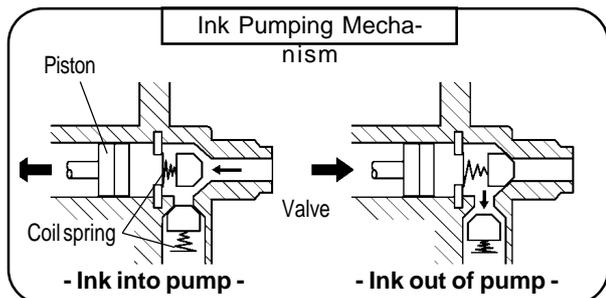
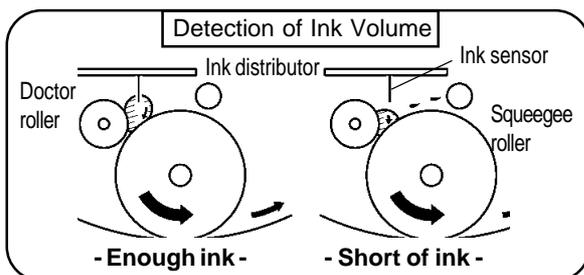
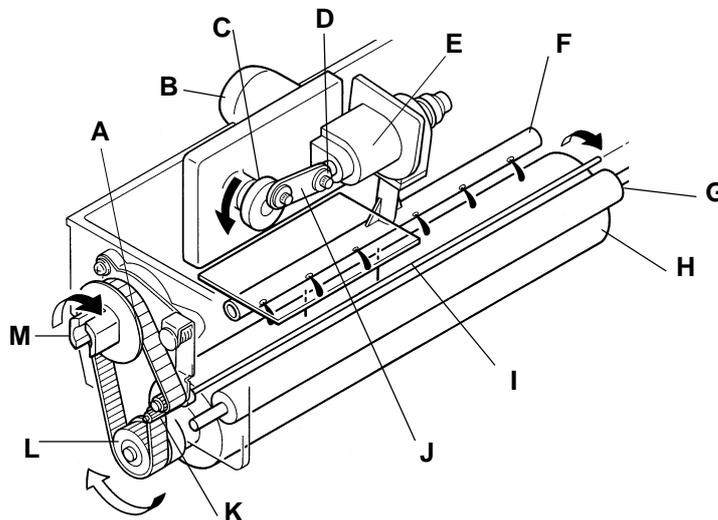
- Detection of Ink Volume

When the ink bead gets thicker due to ink supply, it gets contact with the Ink sensor, which deactivates the Inking motor to stop ink supply.

- Detection of Ink Overflow

If the ink bead gets so thick as to get contact with the Overflow sensor, which is a shorter pin than the Ink sensor and attached to the Drum PCB, the Inking motor is deactivated to prevent ink from overflowing the Squeegee section if it is operating and the error code [T4] is displayed on the operation panel.

- A: Squeegee belt
- B: Inking motor
- C: Linking disc
- D: Piston
- E: Ink pump unit
- F: Ink distributor
- G: Doctor roller
- H: Squeegee roller
- I: Ink driving shaft
- J: Linking plate
- K: Ink driving shaft axis
- L: Squeegee pulley
- M: Main shaft catch



CHAPTER 8. DRUM SECTION

THEORY OF OPERATION

Test Mode No.37 Ink sensor

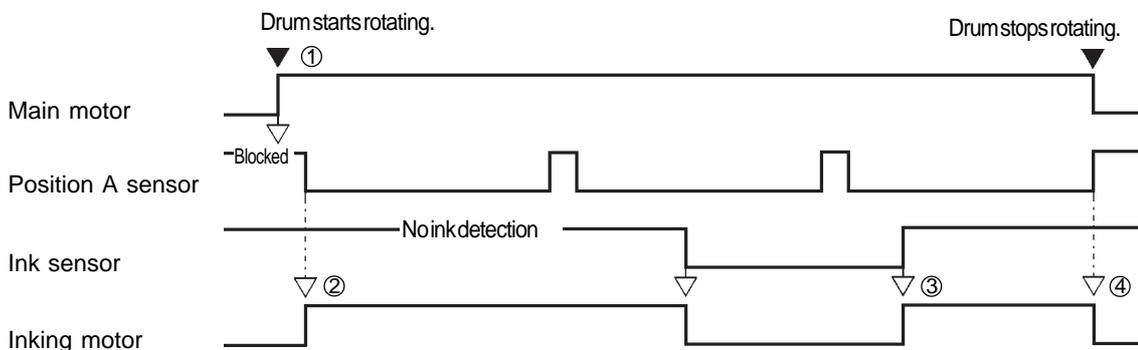
– Short interval beeps when ink is detected

No.38 Overflow sensor

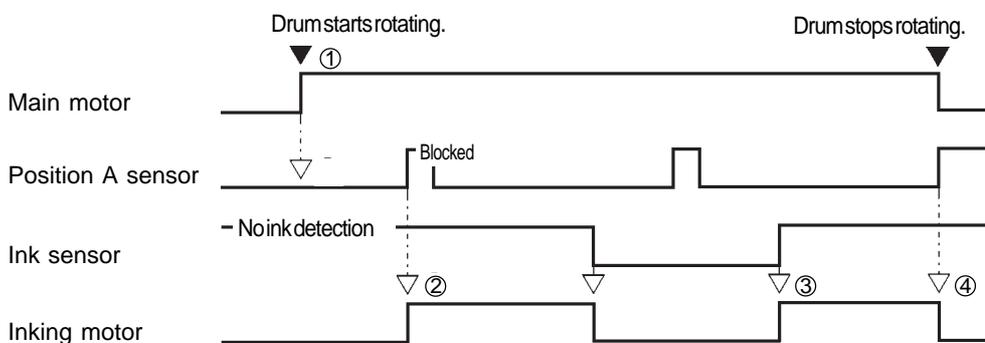
– Short interval beeps when ink is detected

- Timing Chart -

Ink Supply System < when the Drum starts rotating from the Position A >

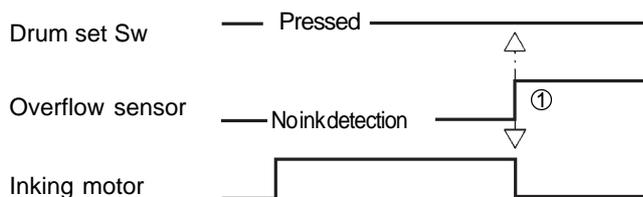


Ink Supply System < when the Drum starts rotating from any position but the Position A >



- ① If the Ink sensor is not in contact with ink when the Main motor starts operating, the Inking motor is not activated.
 - ② As soon as the light path of the Position A sensor is opened or blocked (it is confirmed that the Drum is rotating), the Inking motor is activated.
 - ③ If the Ink sensor gets out of contact with ink while the Main motor is operating, the Inking motor is activated.
 - ④ When the Main motor stops operating, the Inking motor is deactivated.
- * If the Ink sensor hasn't got contact with ink **within 30 seconds** after the Inking motor is activated, the machine assumes that no ink remains inside an ink bottle and the advice display **[REPLACE INK CARTRIDGE]** blinks on the operation panel.
When the Main motor stops operating before the built-in timer counts up 30 seconds to detect emptiness of an ink bottle, the timer is held.

Ink Overflow Detection Process



- ① If the Overflow sensor gets in contact with ink, the machine assumes that ink is about to overflow the Squeegee section and deactivates the Inking motor if it is in operation. In this case, the error code **[T4]** is displayed on the operation panel.

T4 (Overflow)
• Overflow Sensor ON

MEMO

REMOVAL & ASSEMBLY

1. Lock Solenoid

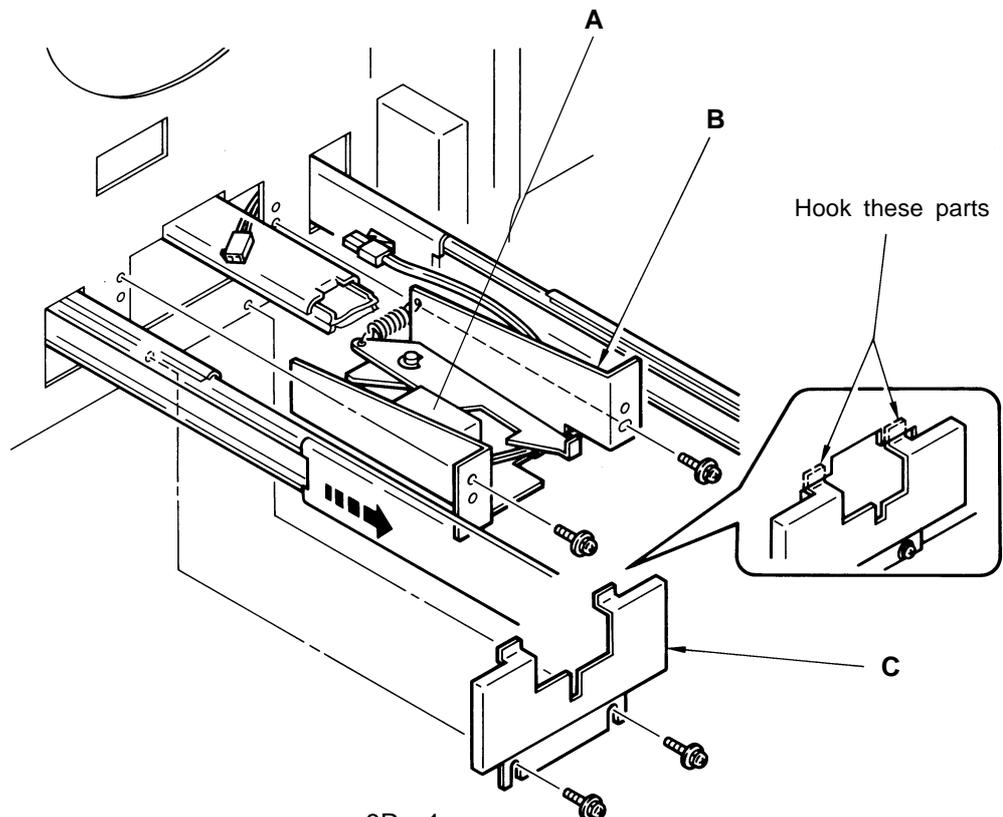
< Removal Procedure >

1. Take out the Drum from the machine and turn OFF the power.
2. Remove the Front right cover and Suction cover plate.
3. Cut the wire clammer holding the wires of the Lock solenoid below the Power supply PCB and disconnect the connector of the Lock solenoid.
4. Remove two mounting screws on the Drum lock cover, and remove the cover.
5. Remove two mounting screws on the Drum lock bracket and pull out the bracket, leading the wires and connector through the hole on the machine side frame.
6. Remove two mounting screws of the Lock solenoid, and remove the solenoid from the bracket.

- Precautions in Assembly -

- Make sure to match the positioning bosses on the Drum lock bracket with the holes of the machine frame.
- Make sure to secure the wires of the Lock solenoid to prevent the Drum rails from catching them.
- Make sure to insert the hooks of the Drum lock cover inside the machine frame as shown in the figure below.

A: Lock solenoid
B: Drum lock bracket
C: Drum lock cover



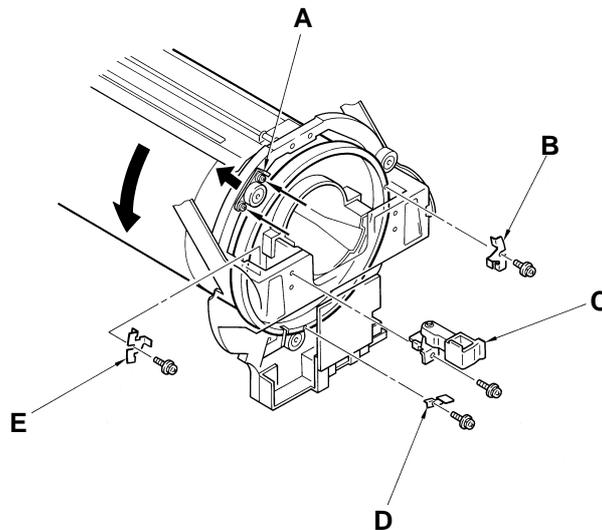
2. Squeegee Unit

< Removal Procedure >

1. Remove the Drum covers.
2. Make a marking on the Drum where the Plate C-2 is attached so that the plate can be reattached to the same position later, then remove the Plate C-2.
3. Remove the Plate C-1.
4. Remove the mounting screw on the Bottle stopper lever, and remove the lever.
5. Loosen two mounting screws on the Support roller adj. plate and slide the Support roller away from the Drum body support (right).

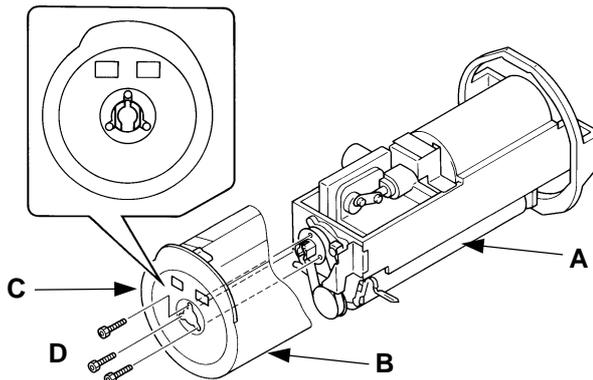
The Drum should be turned in the direction of the arrow after assembly.

- A: Support roller adj. plate
- B: Plate C-2
- C: Bottle stopper lever
- D: Plate A
- E: Plate C-1



6. Remove three Hexagon socket head screws securing the Squeegee unit to the Drum body support (left), and remove the Squeegee unit from the Drum.

- A: Squeegee unit
- B: Screen unit
- C: Drum body support (left)
- D: Hexagon socket head Screw



- Precautions in Assembly -

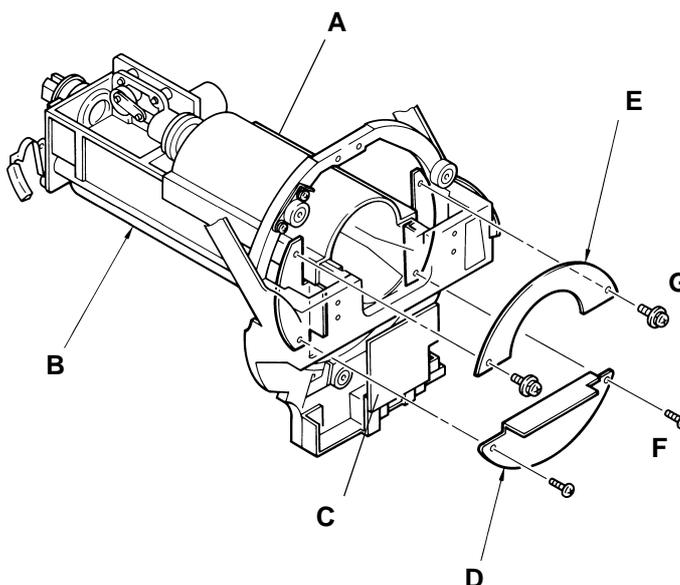
- The position of the Ink blocking plates on both ends of the Squeegee unit should be adjusted before assembling the Squeegee unit into the Drum unit.
- The narrower slit of the Shaft joint should point up when placing the Squeegee unit into the Drum unit.
- Confirm that the Support roller is in contact with the Drum body support (right) before tightening the mounting screws on the Support roller adj. plate.

3. Ink Pump Unit, Ink Bottle SW

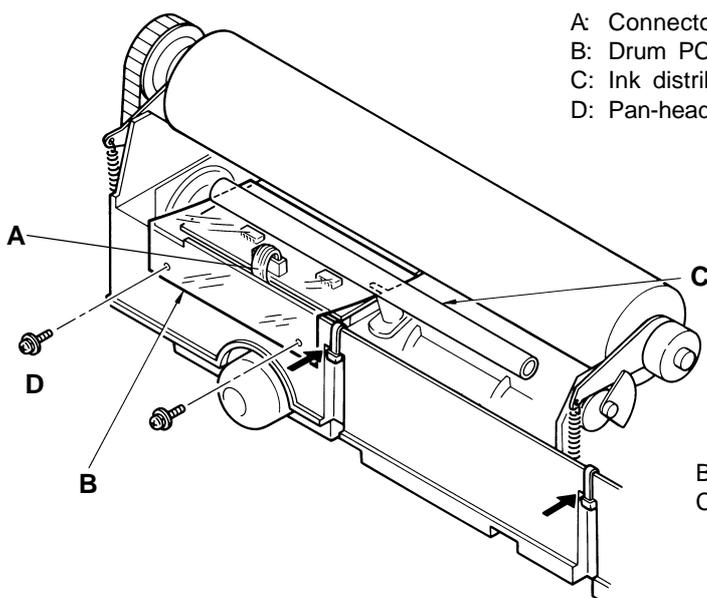
< Removal Procedure >

1. Take out the Drum from the machine, and remove the Squeegee unit from the Drum.
2. Remove two mounting screws on the Drum cover F (lower), and remove it.
3. Remove two mounting screws on the Drum cover F (upper), and remove it. (Only for A3 Drum).
4. Disconnect the connector for Inking motor (CN4) on the Drum control PCB.
5. Remove four mounting screws on the Bottle guide (Only for A3 Drum).

- A: Bottle guide
- B: Squeegee Unit
- C: Drum control PCB
- D: Drum cover F(lower)
- E: Drum cover F(upper)
- F: Bind-head Screw M3x6
- G: Pan-head Screw M3x8



6. Turn over the Squeegee unit and remove the Drum PCB cover by removing two mounting screws. Disconnect the connector on the Drum PCB.



- A: Connector
- B: Drum PCB cover
- C: Ink distributor
- D: Pan-head Screw SW.W M3x8

The Drum PCB cover should be placed between the Ink distributor and the Drum PCB.

B4 Drum:
Cut off the wire clamber binding the wires.

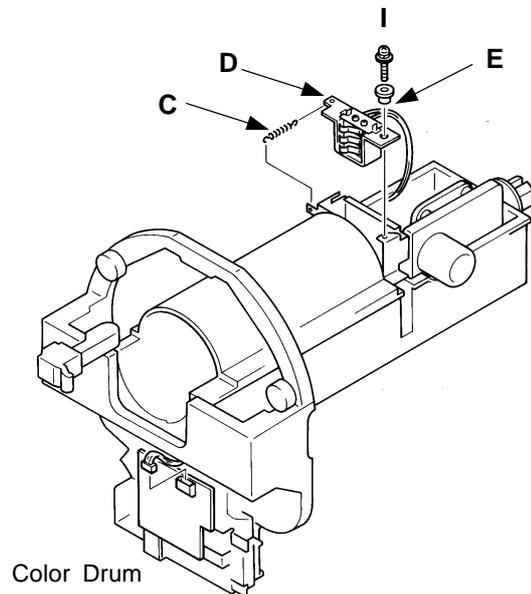
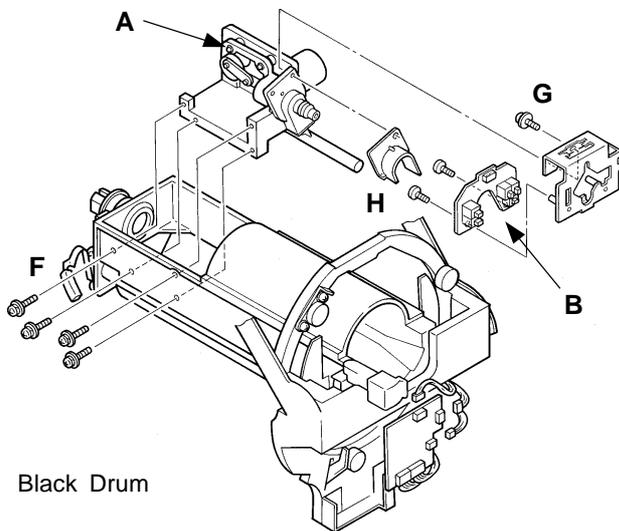
CHAPTER 8. DRUM SECOND

REMOVAL & ASSEMBLY

Black Drum

7. Disconnect the connector on the Ink bottle SW, and remove four mounting screws of the Inking pump unit and take the unit out.
8. Remove the mounting screw of Ink bottle SW bracket, and remove it from the Inking pump unit.
9. Remove two mounting screw on the Ink bottle SW, and remove the SW.

- A: Ink Pump Unit
- B: Ink bottle set SW
- C: Bottle SW spring
- D: Ink bottle SW
- E: Bottle SW boss
- F: Pan-head Screw SW.W M4x10
- G: Pan-head Screw SW.W M4x8
- H: Bind-head Screw M3x6
- I: Pan-head Screw SW.W M3x8

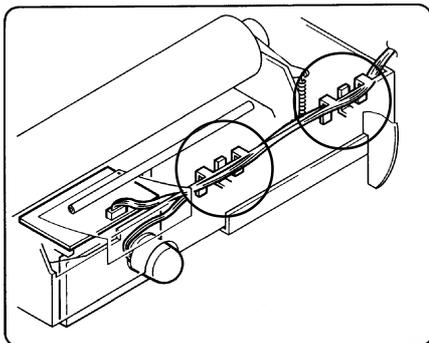


Color Drum

7. Remove four mounting screws of the Inking pump unit and take the unit out.
8. Disconnect the connector of the Ink bottle SW and remove the Bottle SW spring.
9. Remove the mounting screw on the Ink bottle SW, and remove the SW.

- Precaution in Assembly -

Lead the wire coming out of the Inking motor and Drum PCB through the hooks on the frame of the Squeegee unit as shown in the figure below. (A3 Drum)

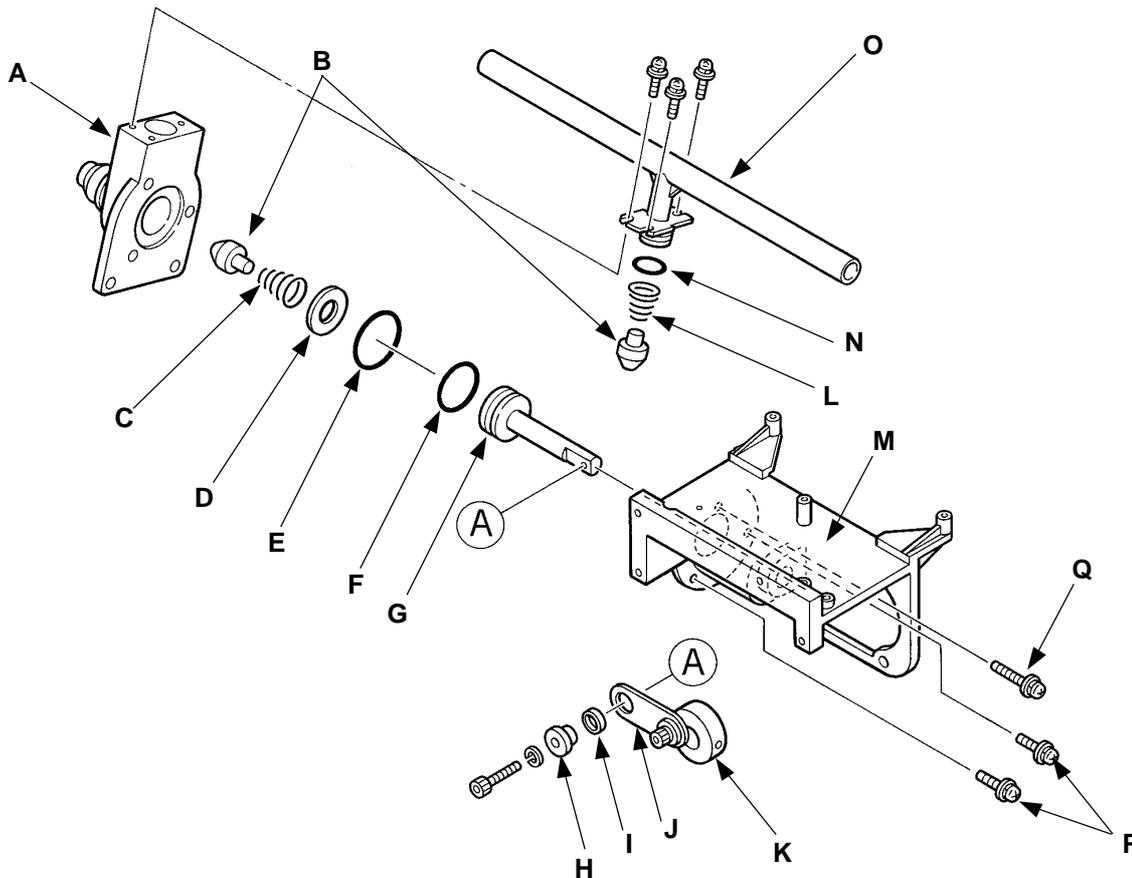


Disassembly of Ink pump Unit

- Removal and Disassembly -

1. Take out the Drum from the machine, and remove the Squeegee unit from the Drum.
2. Remove four mounting screws on the Ink pump unit, and remove the unit.
3. Disassemble the Ink pump unit as shown in the figure below.

- A: Ink pump body
- B: Valve
- C: Coil Spring (Silver, Weak)
- D: $\phi 10$ Plain Washer
- E: P22-2.4 O-ring
- F: P14-2.4 O-ring
- G: Piston
- H: Collar holder
- I: Collar
- J: Link Plate
- K: Linking disc
- L: RC Coil Spring (Golden, Strong)
- M: Inking motor bracket
- N: P10A-2.4 O-ring
- O: Ink distributor
- P: Pan-head Screw SW.W M4x12
- Q: Pan-head Screw SW.W M4x16



CHAPTER 8. DRUM SECOND

REMOVAL & ASSEMBLY

- LED INK Ink sensor
 - Light up when ink is not detected
- FLOW Overflow sensor
 - Light up when ink is not detected
- Test Mode No.37 Ink sensor
 - short interval beeps when ink is detected
- No.38 Overflow sensor
 - Short interval beeps when ink is detected
- No.101 Ink Supply

4. Inking Motor

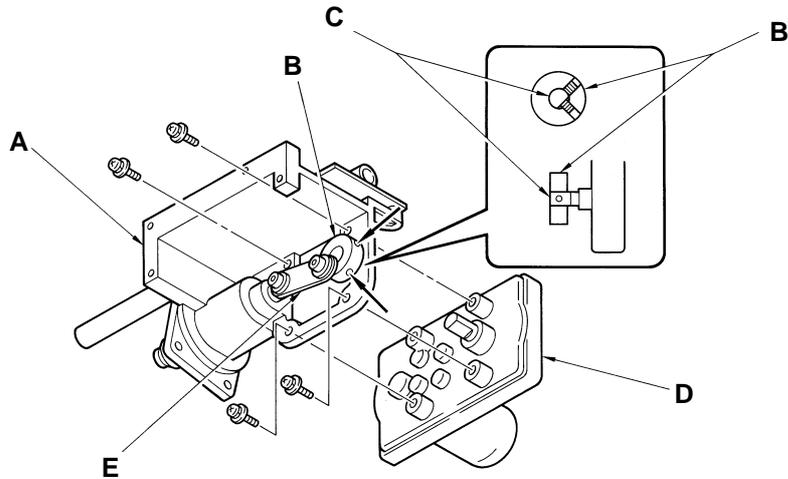
< Removal Procedure >

1. Remove the Inking Pump Unit from the Squeegee unit.
2. Loosen two allen screws securing the Linking disc on the shaft of the Inking motor.
3. Remove four mounting screws of the Inking motor and remove the motor.

- Precautions in Assembly -

- The Linking disc should be secured on a level with the end of the Inking motor shaft.
Either of two allen screws in the disc should be set against the flat cut face of the shaft.

- A: Inking motor bracket
- B: Linking disc
- C: Inking motor shaft
- D: Inking motor
- E: Linking plate



5. Drum PCB

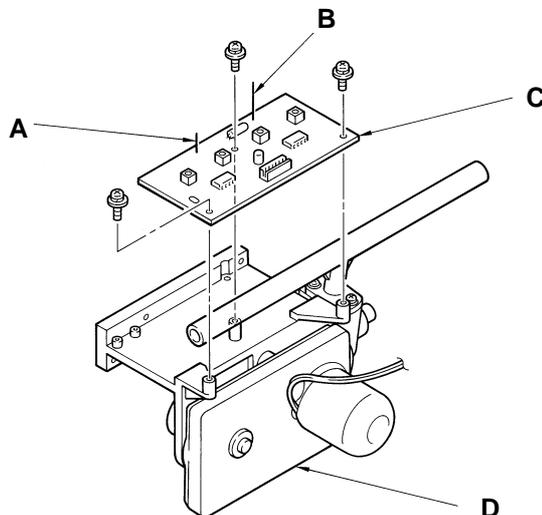
< Removal Procedure >

1. Remove the Inking Pump Unit from the Squeegee unit.
2. Remove three mounting screws on the Drum PCB, and remove the PCB.

- Precautions in Assembly -

- The Ink sensor and Overflow sensor should be set upright on the Drum PCB.

- A: Overflow sensor
- B: Ink sensor
- C: Drum PCB
- D: Inking pump unit



6. Squeegee Belt

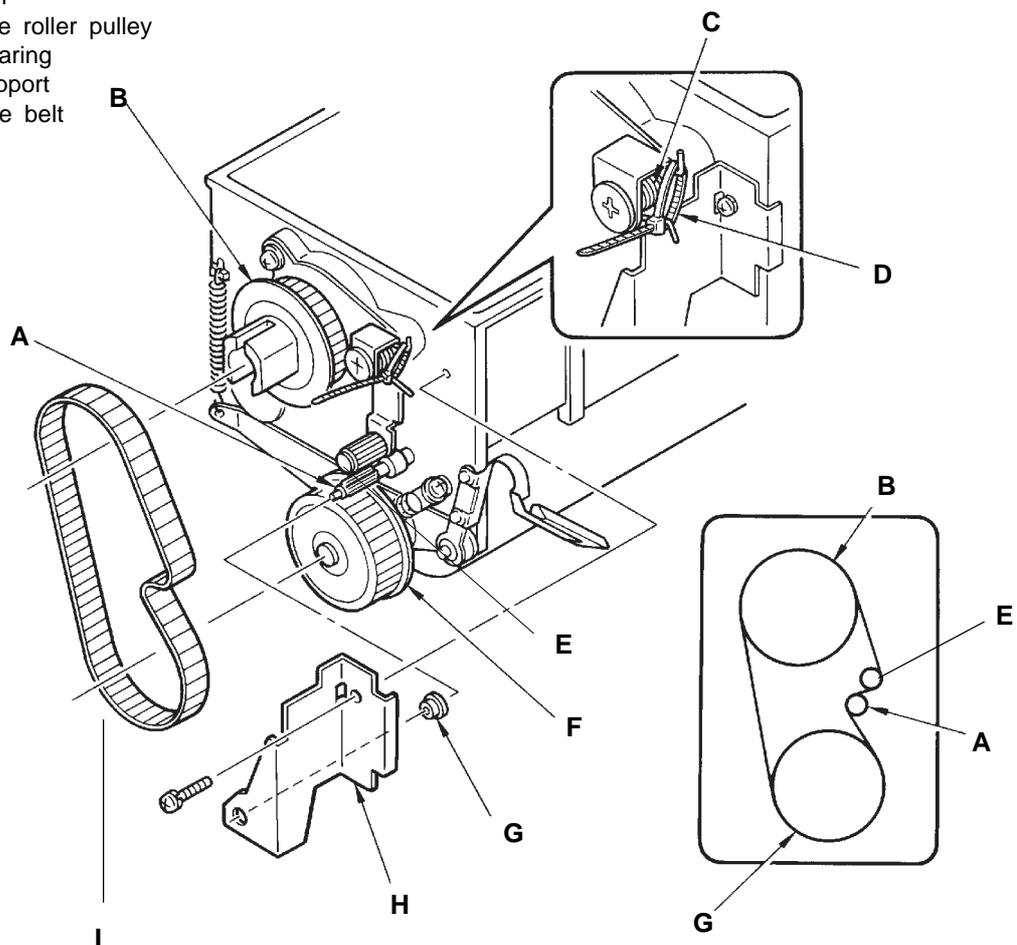
< Removal Procedure >

1. Remove the Squeegee unit from the Drum.
2. Wind a wire clammer on the Tensioner spring to prevent the Tensioner from giving tension on the Squeegee belt as shown in the figure below.
3. Remove the mounting screw on the Shaft support, and remove the Shaft support and a metal bearing at the end of the Ink driving shaft.
4. Remove the Squeegee belt from the pulleys.

-Precautions in Assembly -

- Confirm that the securing screw (allen screw) in the Main shaft pulley is not loose before putting the belt on it.
- Make sure to put a metal bearing on the end of the Ink driving shaft.
- Make sure to cut the wire clammer wound on the Tensioner spring after assembly.

- A: Ink driving shaft
- B: Main shaft pulley
- C: Tensioner spring
- D: Wire clammer
- E: Tensioner
- F: Squeegee roller pulley
- G: Metal bearing
- H: Shaft support
- I: Squeegee belt

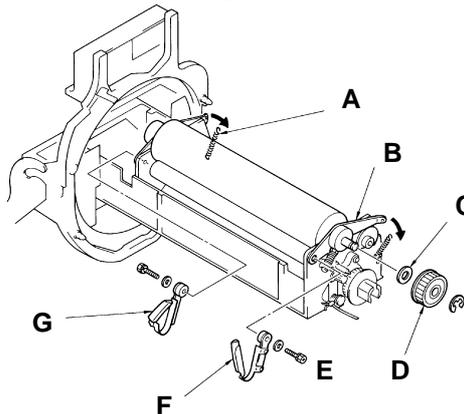


7. Squeegee Roller

< Removal Procedure >

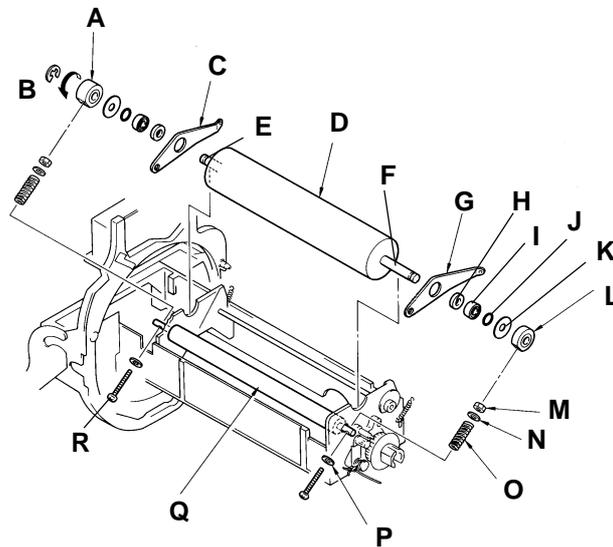
1. Remove the Squeegee unit from the Drum.
2. Remove the E ring at the one end of the Squeegee roller shaft, and remove the Squeegee roller pulley and a plain washer behind it.
3. Remove the securing screws on the Ink blocking plates (front and back), and remove the plates.
4. Unhook the Squeegee adj. Plate springs from the Squeegee adj. Plate.

- A: Squeegee adj. plate spring
- B: Squeegee adj. plate
- C: Plain washer
- D: Squeegee roller pulley
- E: Hexagonal Screw with spring washer, Plain washer
- F: Ink blocking plate (back)
- G: Ink blocking plate (front)



5. Loosen the Locking nuts on the adjustment screws securing the Reverse rotation stoppers (A and B) and remove the adjustment screws from the Reverse rotation stoppers.
6. Hold up the Squeegee roller and take it out of the Squeegee unit.

- A: Reverse rotation stopper A
- B: Arrow indicates idling direction
- C: Squeegee adj. plate (front)
- D: Squeegee Roller
- E: Short Shaft
- F: Long Shaft
- G: Squeegee adj. plate (back)
- H: Spacer (Only A3 Machine)
- I: Bearing
- J: O-ring
- K: Washer
- L: Reversal rotation stopper B
- M: Locking nut
- N: Washer (Small)
- O: Spring
- P: Plain Washer (Large)
- Q: Doctor Roller
- R: Adjustment screw



- Precautions in Assembly -

- Be careful not to attach the Squeegee adj. Plates and Reverse rotation stoppers to a wrong end of the Squeegee roller shaft because the length of the shaft is different at both ends.
 - The bent part of the Squeegee adj. Plate should face outward.
 - The Reverse rotation stopper A (thicker one) should be put on the shorter shaft.
- Confirm that the reverse rotation stopper A rotates on the shaft in the arrow-indicating direction as shown in the figure below before securing it with the adjustment screw because the Reverse rotation stopper A has an one-way clutch built-in.

- Adjustment after Assembly-

- Squeegee Gap (page 8A-1)

8. Screens <A3/Ledger>

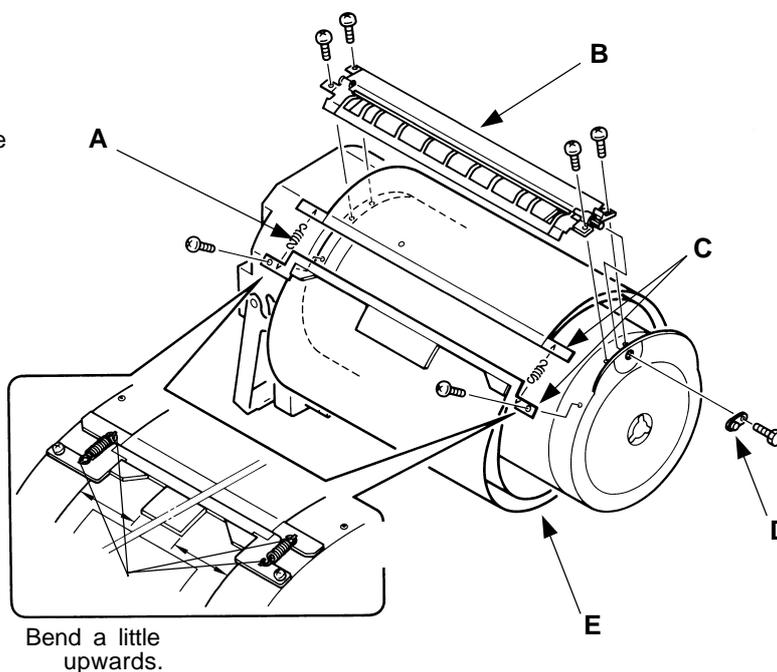
< Removal Procedure >

1. Put a blank master on the Drum by the confidential operation and pull out the Drum from the machine, keeping the Drum installed on the Drum holder.
2. Remove the mounting screw on the Angular magnet plate and remove the plate.
3. Remove four mounting screws on the Clamp plate base and remove it.
4. Remove the Screen springs from the hooks on both sides of the Screens.
5. Remove two securing screws on the Screens and peel the Screens off the Drum body, holding the attachment plates at both edges.

[IMPORTANT]

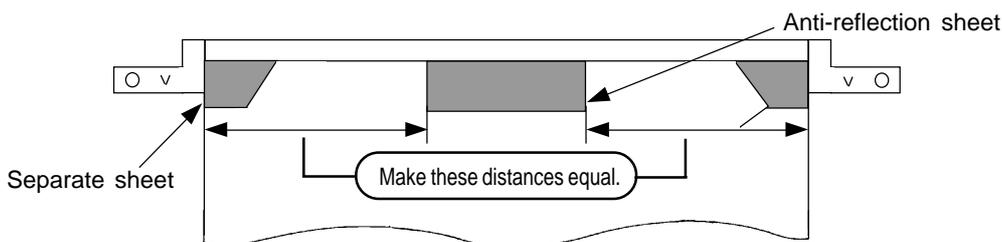
Be careful not to crease the Screens when peeling them off the Drum body.

- A: Screen spring
- B: Clamp plate base
- C: Attachment plate
- D: Angular magnet plate
- E: Screens



- Precautions in Assembly -

- Take care not to crease the Screens when handling them.
- Paste the following parts on the Screen as indicated in the figure below before assembly: Separate sheets and Anti-reflection sheet.
- After securing the Clamp plate base, always confirm that the Clamp plate can be smoothly opened and closed by hand.
- Attach the Angular magnet plate so that the magnet can be placed on the opposite side of the Clamp plate.

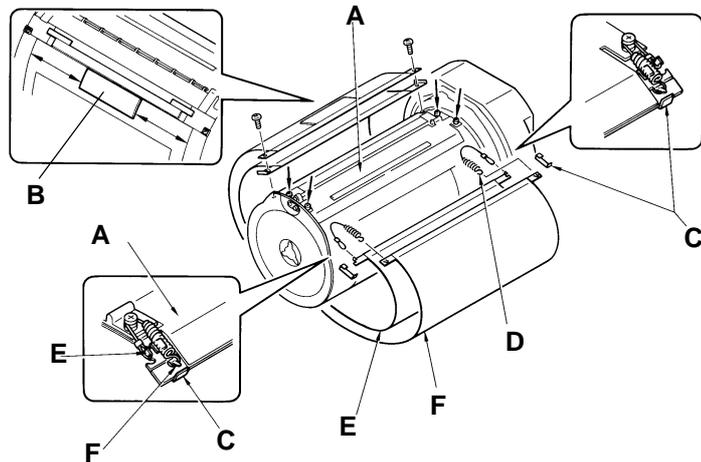


9. Screens <B4/A4/Legal>

< Removal Procedure >

1. Put a blank master on the Drum by the confidential operation and pull out the Drum from the machine, keeping the Drum installed on the Drum holder.
2. Remove the Screen springs from the hooks on both sides of the Screens.
3. Loosen four mounting screws on the Clamp plate base.
4. Remove two securing screws on the Screens and slide out the attachment plates (metal) at both edges of the Screens from under the Clamp plate base.
[IMPORTANT]
Be careful not to drop the Hanger plates when sliding out the attachment plate at the tail edge.
5. Peel the Screens off the Drum body, holding the attachment plates at both edges.
[IMPORTANT]
Be careful not to crease the Screens when peeling them off the Drum body.

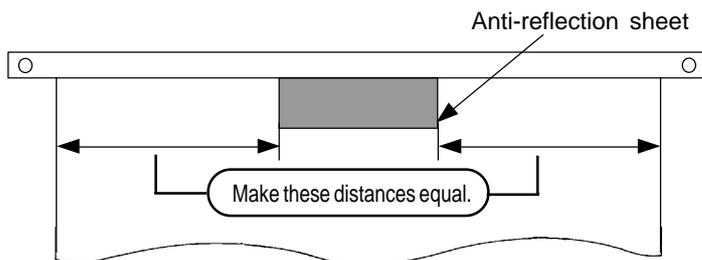
- A: Clamp plate base
- B: Anti-reflection sheet
- C: Hanger plate
- D: Screen spring
- E: Screen A
- F: Screen B



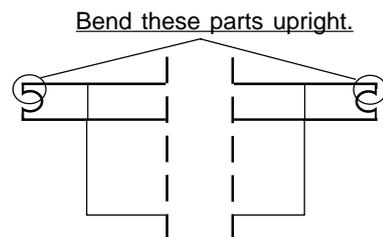
- Precautions in Assembly -

- Take care not to crease the Screens when handling them.
- Paste the Anti-reflection sheet on the Screen B as indicated in the figure below before assembly.
- Bend upright the parts at the tail edge of the Screen A which are indicated in the figure below before assembly.
- Make sure to hook the Hanger plates on the attachment plate of the Screen A from the bottom, and the Screen springs from outside to inside as indicated in the figure above.
- After securing the Clamp plate base, always confirm that the Clamp plate can be smoothly opened and closed by hand.

[Screen B]



[Screen A]



10. Drum Body

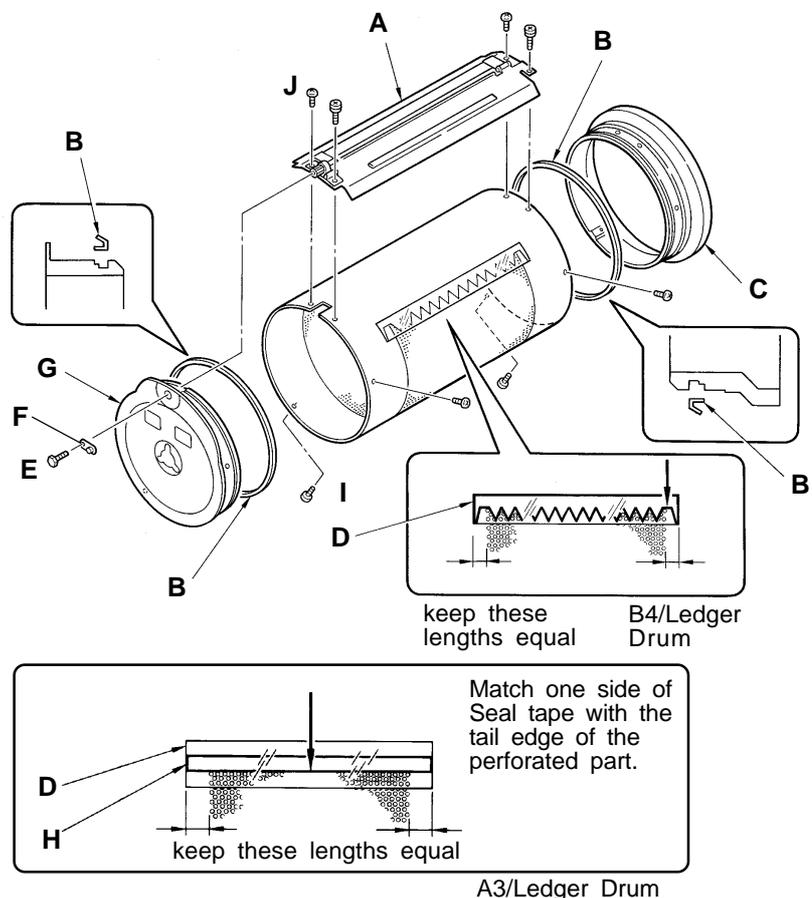
< Removal Procedure >

1. Remove the Screens from the Drum, referring to the previous page.
2. Unload the Drum from the Drum.
3. Remove the Squeegee unit from the Drum.
4. Remove the mounting screw on the Angular magnet plate, and remove the plate.
5. Remove four mounting screws on the Clamp plate base and remove it.
6. Remove the respective two securing screws of the Drum body supports (left and right), and remove the Drum body supports from the Drum body.

- Precautions in Assembly -

- The Drum seal should be put on the Drum body supports in the way described in the figures below.
Always put grease on the Drum seal before assembly to allow smooth insertion of the Drum body supports into the Drum body.
 - Make sure to secure the Drum body supports to the Drum body, pulling them outward.
 - Attach the Ink blocking sheet and Seal tape onto the Drum body as shown in the figure below.
 - Attach the Angular magnet plate so that the magnet can be placed on the opposite side of the Clamp plate.
- After assembly, confirm that the Angular magnet plate is placed on the same level in both cases when the Clamp plate is open and when it is closed.

- A: Clamp plate base
- B: Drum seal
- C: Drum body support (right)
- D: Ink blocking sheet
- E: Angular magnet screw
- F: Angular magnet plate
- G: Drum body Support (left)
- H: Seal tape
- I: Bind-head Screw M4x8
- J: Bind-head Screw M4x8

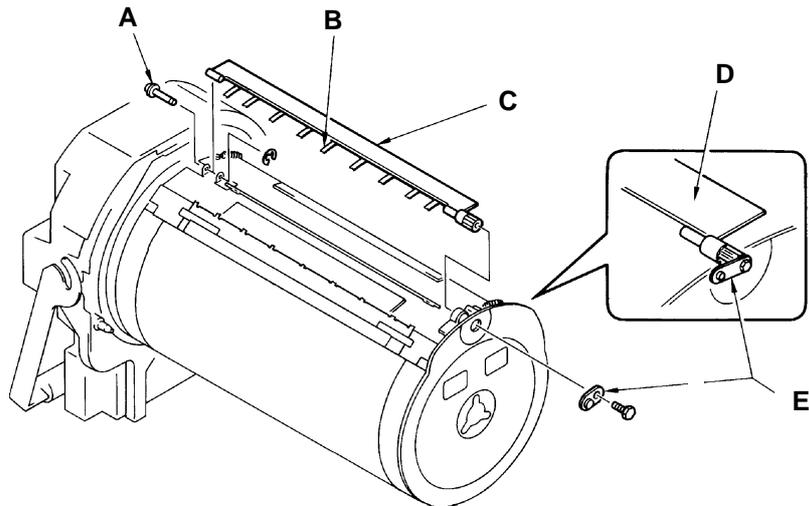


11. Clamp Plate Ass'y

< Removal Procedure >

1. Remove the Drum from the machine.
2. Remove the mounting screw on the Angular magnet plate, and remove the plate.
3. Remove an E ring at one end of the Clamp plate shaft, and pull out the shaft.
4. Cut the strips of the Clamp plate sheet.
5. Remove the Clamp plate ass'y, leading the Clamp plate gear through the Compensator.

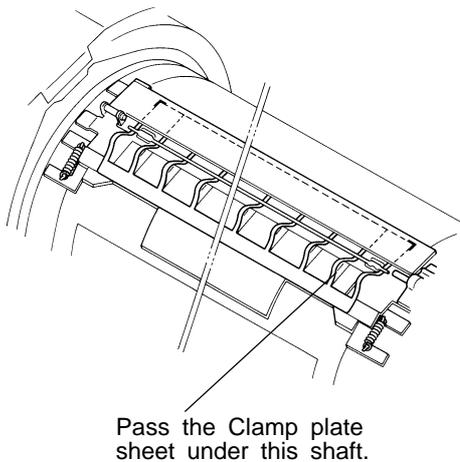
- A: Clamp plate shaft
- B: Clamp plate sheet
- C: Clamp plate ass'y
- D: Clamp plate
- E: Angular magnet plate



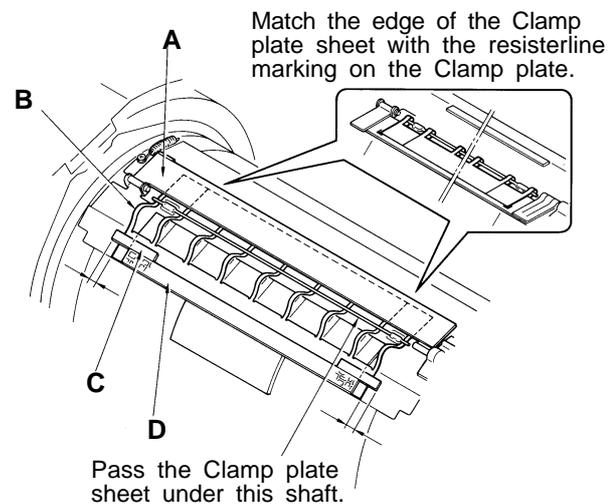
- Precautions in Assembly -

- Attach the following parts on the Drum and Clamp plate ass'y as indicated in the figure below: Clamp plate sheet, Drum sheets and Sticker sheet.
- Attach the Angular magnet plate so that the magnet can be placed on the opposite side of the Clamp plate. After assembly, confirm that the Angular magnet plate is placed on the same level in both cases when the Clamp plate is open and when it is closed.

A3/Ledger Drum



B4/A4/Legal Drum



- A: Clamp plate
- B: Clamp Plate sheet
- C: Drum sheet
- D: Sticker sheet

ADJUSTMENT

1. Squeegee Gap

1. Remove the Squeegee unit from the Drum.
2. Clean ink inside the Squeegee unit.
3. Check if the gap between the Doctor roller and the Squeegee roller is as indicated below at any point from end to end, by inserting a thickness gauge between the rollers.

A3 or Ledger Drum : 0.07 ± 0.02 mm	B4, A4 or Legal Drum : 0.10 ± 0.02 mm
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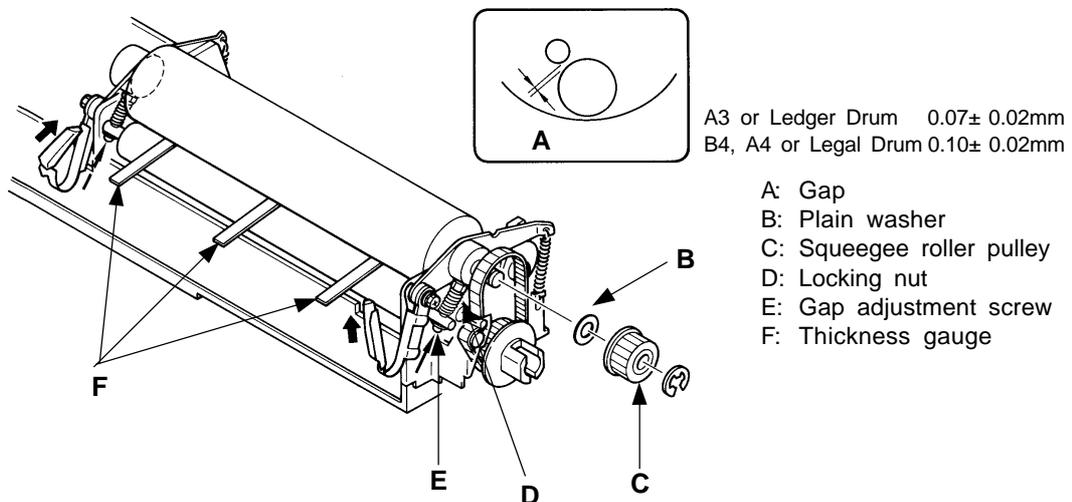
4. If not, adjust the gap following the procedures described below.
 - 1) Remove the Squeegee belt.
 - 2) Remove an E ring at one end of the Squeegee roller shaft, and remove the Squeegee roller pulley.
 - 3) Loosen the mounting screws on the Ink blocking plates (front and back) and turn them down to make space for adjustment.
 - 4) Loosen the locking nuts on the gap adjustment screws on both ends of the Squeegee roller.
 - 5) Insert a thickness gauge between the Doctor roller and Squeegee roller, and turn the gap adjustment screws to obtain the correct gap at any check point.
 - 6) Tighten the locking nuts, holding the gap adjustment screws in this condition with a screw driver, and then check the gap again.

- Precautions in Adjustment -

- Make sure that the gap is equal at both ends of the Squeegee roller.
- When the locking nuts are fastened, the gap will be slightly widened.
- One turn of the adjusting screw moves the gap by 0.5 mm.
- Always adjust the position of the Ink blocking plates after adjusting the Squeegee gap.
- The squeegee roller pulley has a one-way clutch. (The collar of the pulley should face inside.)

- Results of Misadjustment -

- If the gap is too wide;
too much ink will be transferred to the inner surface of the Drum body, causing ink leakage at the tail edge of the perforated part of the Drum body.
- If the gap is too narrow;
ink will not spread over the surface of the Squeegee roller well, causing uneven printing.

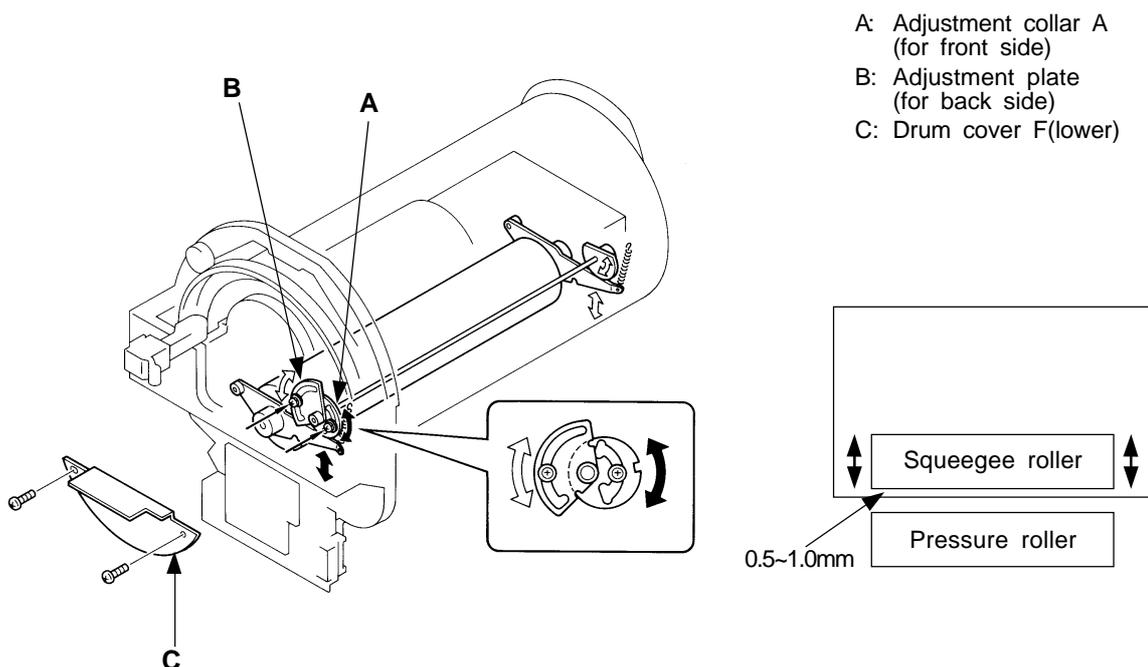


2. Squeegee Pressure Balance

1. Make a master with Test chart as an original.
2. Set the print density at **1** (lowest) and prints.
3. Check if the print density is even on both (right and left) sides of printed copies.
4. If not, adjust the Squeegee pressure balance following the procedures described below.
 - 1) Remove the Drum cover (lower).
 - 2) Remove the Drum cover F (lower) by which the **Adjustment plate** and **Adjustment collar A** become accessible.
 - 3) If the density is darker on the drive mechanism side of printed copies, loosen the securing screw on the **Adjustment plate** and turn the plate counter-clockwise.
If the density is darker on the operation panel side, loosen the securing screw on the **Adjustment collar A** and turn the collar counter-clockwise.
 - 4) If the density is too light on the whole, turn both the **Adjustment plate** and **Adjustment collar A** clockwise to adjust the entire density.
 - 5) After adjustment, check that the gap between the Squeegee roller and the Drum body is **0.5 to 1.0mm**, by pressing the Drum body just under the Squeegee roller from outside with a finger.
- 6) Perform the confidential operation to place a blank master on the Drum and feed **500 sheets of paper at the lowest speed**. Then check that no ink leaks at any point on the Drum body.
If ink leaks, re-adjust the Squeegee pressure balance by repeating the procedures in the steps 3 to 5 above.

- Results of Misadjustment -

- If the Squeegee pressure differs much between the front and back sides of the Drum; the print density will be uneven on both sides of printed copies.
- If the Squeegee pressure is too high; too much ink will be transferred to the inner surface of the Drum body, causing ink leakage at the tail edge of the perforated part of the Drum body.
- If the Squeegee pressure is too low; the print density will be weak or too much stress will be applied to the Drum body to shorten its life.



3. Position of Ink Blocking Plates

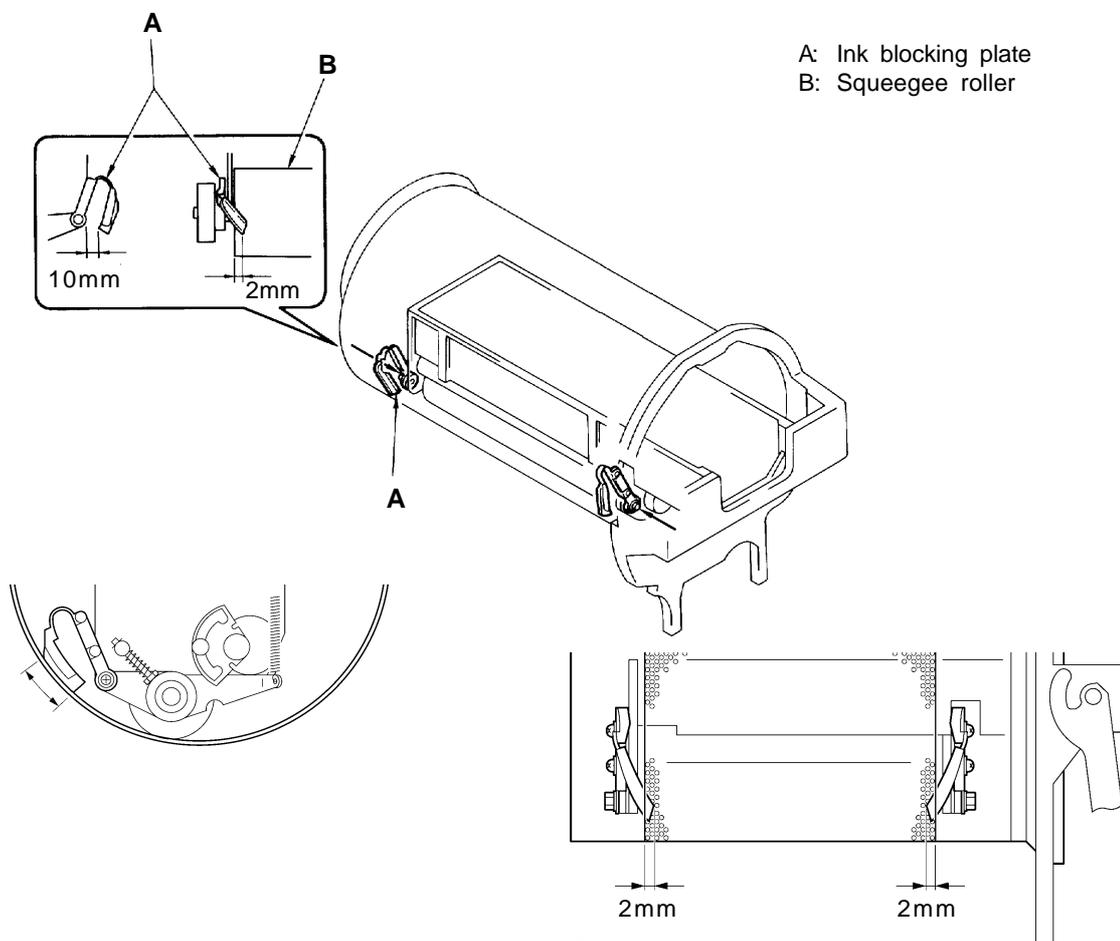
1. Remove the Squeegee unit from the Drum.
2. Remove the Drum cover F (lower).
3. Check if the tip of the Ink blocking plate is **10mm or more** away from the mounting screw on it and is **about 2mm** inside the end of the Squeegee roller at each end of the Squeegee roller, as shown in the figures below.
4. If not, reform the Ink blocking plate by hand to place the plate in the above-mentioned position.
5. Check if the Ink blocking plate is in close contact with the inner surface of the Drum body after installing the Squeegee unit into the Drum.
6. If not, loosen the mounting screw on the Ink blocking plate and adjust the position to put the plate into contact with the Drum body.

[Note]

The Ink blocking plates prevent ink from spreading sideways and keep ink within the print area.

- Results of Misadjustment -

- If the Ink blocking plates are set too inside; ink will be scraped off on sides within the print area, causing missing images on sides on printed copies.
- If the Ink blocking plates are set far from the Squeegee roller or it is not in close contact with the inner surface of the Drum body; excess ink will not be scraped off outside the print area, causing ink to leak from the sides of the Drum body.



4. Drum Position A (Drum Home Position)

1. Turn ON the power and open the Front cover.
2. Press the Drum home position button to bring the Drum to the Position A.
3. Open the Scanner table and press down the Compensator plate manually to confirm that the Compensator plate engages right with the Compensator on the Drum to secure gear engagement.
4. If the Compensator plate does not engage with the Compensator or if the Drum moves when they engage, pull out the Drum from the machine and remove the Drum cover (upper).

[Note]

It will be easier to make adjustment if the Drum is kept on the Drum holder.

5. Release the Drum from the rotation lock by manually pressing the Lock plate behind the Drum body support (right) and rotate the Drum manually until you can reach the Plate A.

[IMPORTANT]

Rotate the Drum only in the direction indicated by the arrow in the figure below because the reverse rotation will deform the Ink blocking plates.

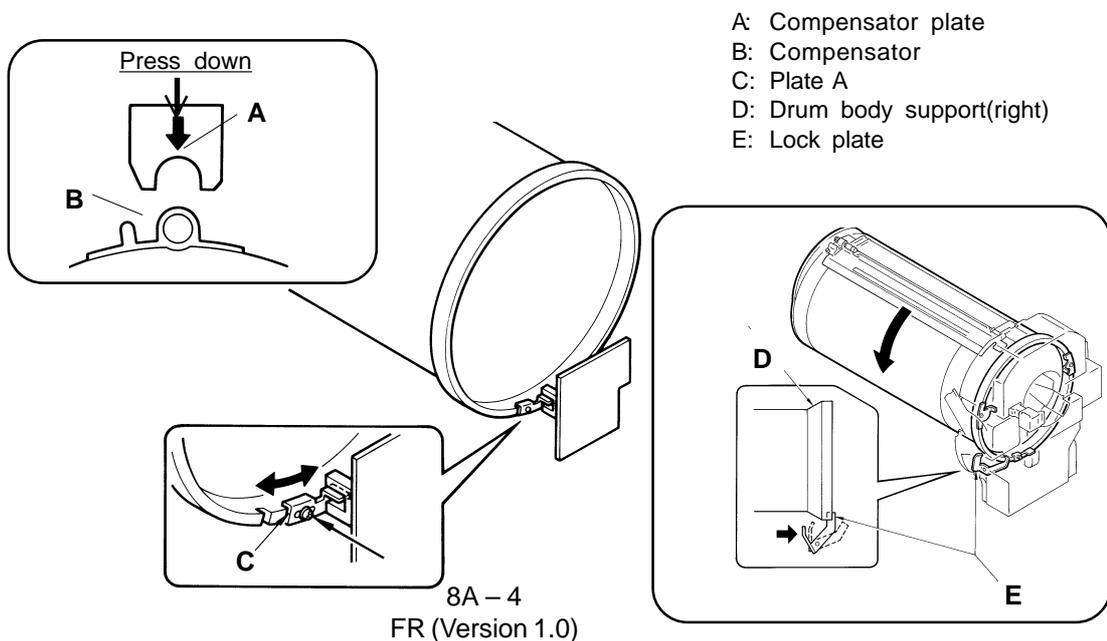
6. Loosen the mounting screw on the Plate A and adjust the position of the plate to ensure a right gear engagement.
7. Rotate back the Drum to the home position and install it in the machine. Then press the Drum home position button to set the Drum at the Position A for checking gear engagement.
8. Check gear engagement by repeating the procedure in the step 3 above.
When a right gear engagement is obtained, pull out the Drum and put back on the Drum cover (upper).

- Precautions in Adjustment -

- Close the Scanner table when pressing the Drum home position button because the Drum is prevented from rotating by a safety interlock sw when it is open.
- If the clamp unit is manually lowered, "T14" will be displayed, judging it a clamp error(2). Press the ALL RESET key to reset it.
- If the Drum cover (lower) is removed, the Drum set lever of the drum holder will not be pressed, disabling the drum from entering. It is recommended to fix the lever with tape, and so on.

- Results of Misadjustment -

- If a right gear engagement is not secured when the Drum is at the Position A; the Clamp motor will not smoothly open or close the Clamp plate in master removal and loading operations and, as a result, the error code **[T3]** will be displayed on the operation panel.



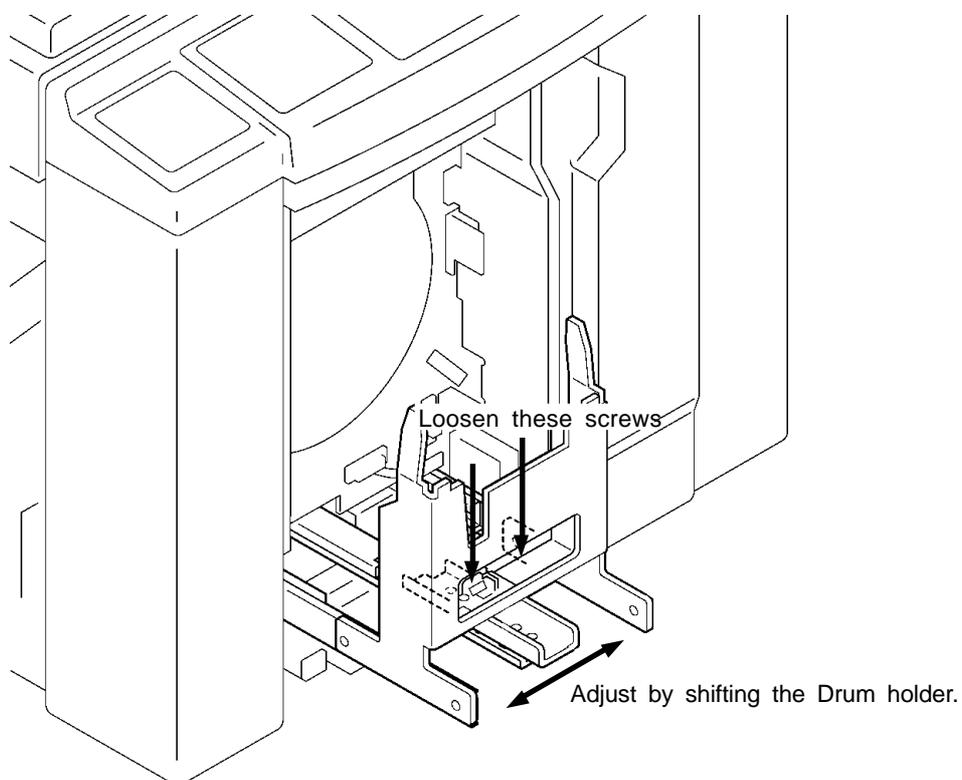
5. Position of Drum Holder

- Checking -

- When you press the Drum home position button to remove the drum from the main body, check whether it can be easily removed with one finger.
- When the Drum is engaged with the main shaft, check whether the drum body support(left) moves to the paper receiving side or paper feed side. Then, determine to which side adjustment should be made.

- Method-

- 1) Pull out the Drum from the main body and remove the Drum from the Drum holder.
- 2) Loosen two screws used to fix the Drum rail in the center and the Drum holder, and adjust the holder position to the left/right.
- 3) Put the Drum on the drum holder and check again how smoothly the Drum can be engaged and disengaged.



MEMO

CHAPTER 9: PAPER JAMS

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- LED PSEN Paper sensor
 - Light up when light path is blocked
- RCV1 Paper receiving sensor 1
 - Light up when light path is blocked
- RCV2 Paper receiving sensor 2
 - Light up when light path is blocked

1. Paper Jams

Three sensors, i.e. Paper sensor, Paper receiving sensors 1 and 2, watch for any paper jam in the machine during the printing operation.

The paper jams are divided into the following four cases.

1) Paper Jam in the First Paper Feed Area

The Paper sensor checks whether the paper is correctly supplied into the machine from the Paper feed tray during the printing operation.

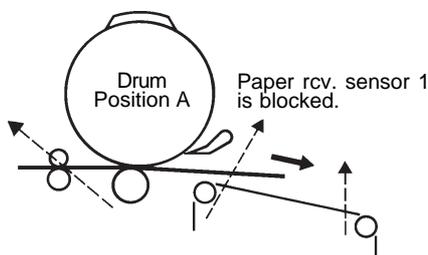
- In printing operation, if the Paper sensor does not detect any paper before the Drum comes to the Drum Position A for the third time, i.e. the Drum has turned three times without the light path of the Paper sensor blocked, the machine assumes that the paper has jammed in the first paper feed area and “PAPER MIS FEED CHECK PAPER FEED AREA AND PRESS ALL RESET KEY” is displayed.

2) Paper Jam in the Second Paper Feed Area / Paper Jam under the Drum

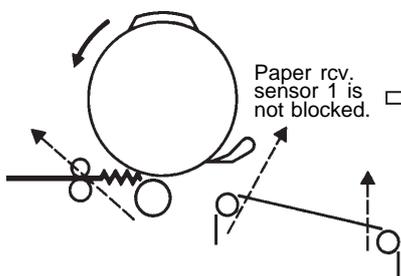
The Paper receiving sensor 1 checks whether the paper is correctly discharged out from the machine during the printing operation.

- If the light path of the Paper receiving sensor 1 is not blocked by a sheet of paper when the Drum comes to the Drum Position A, the machine assumes that the paper has jammed. The machine assumes that the paper has jammed in the second paper feed area if the paper sensor detects a sheet of paper at the next Drum Position A. “PAPER JAM CHECK PAPER FEED AREA” is displayed. The machine assumes that the paper has jammed under the Drum if the Paper sensor does not detect any paper at this second Drum Position A. “PAPER JAM ON DRUM REMOVE PAPER” is displayed.

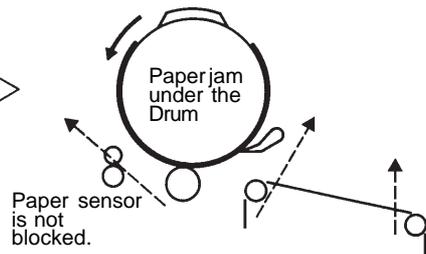
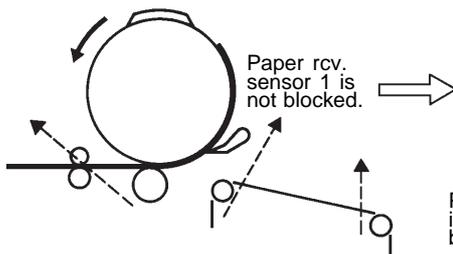
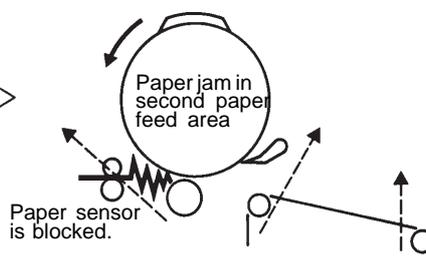
Normal paper feeding



First Drum Position A



Next Drum Position A



- Test Mode No.6 Paper sensor
 – Short interval beeps when light path is blocked
 No.19 Paper receiving sensor 1
 – Short interval beeps when light path is blocked
 No.20 Paper receiving sensor 2
 – Short interval beeps when light path is blocked

3) Paper Jam at Paper Receiving Sensor 1

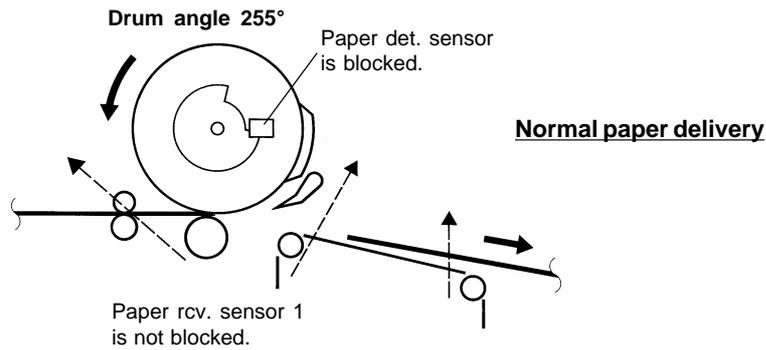
The Paper receiving sensor 1 checks whether the printed paper is correctly delivered from the printing area onto the Suction unit.

3-1 Timing of detection: Pressure detection sensor

- During the printing operation, if the Paper receiving sensor 1 does not detect any paper when the condition of the light path of the Pressure detect sensor changes from "open" to "blocked", the machine assumes the paper delivery on the Suction unit is normal. If the Paper receiving sensor 1 detects a sheet of paper at the above condition, the machine assumes the paper has jammed at the Paper receiving sensor 1 and "PAPER JAM UNDER DRUM PULL OUT DRUM" is displayed.

3-2 Timing of detection: Drum angle

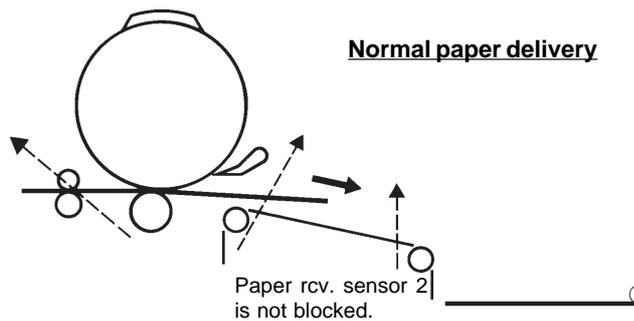
- During the printing operation, if the Paper receiving sensor 1 does not detect any paper when the Drum rotates 255° from the Position A, the machine assumes the paper delivery on the Suction unit is normal. If the Paper receiving sensor 1 detects a sheet of paper at the above condition, the machine assumes the paper has jammed at the Paper receiving sensor 1 and "PAPER JAM UNDER DRUM PULL OUT DRUM" is displayed.



4) Paper Jam at Paper Receiving Sensor 2

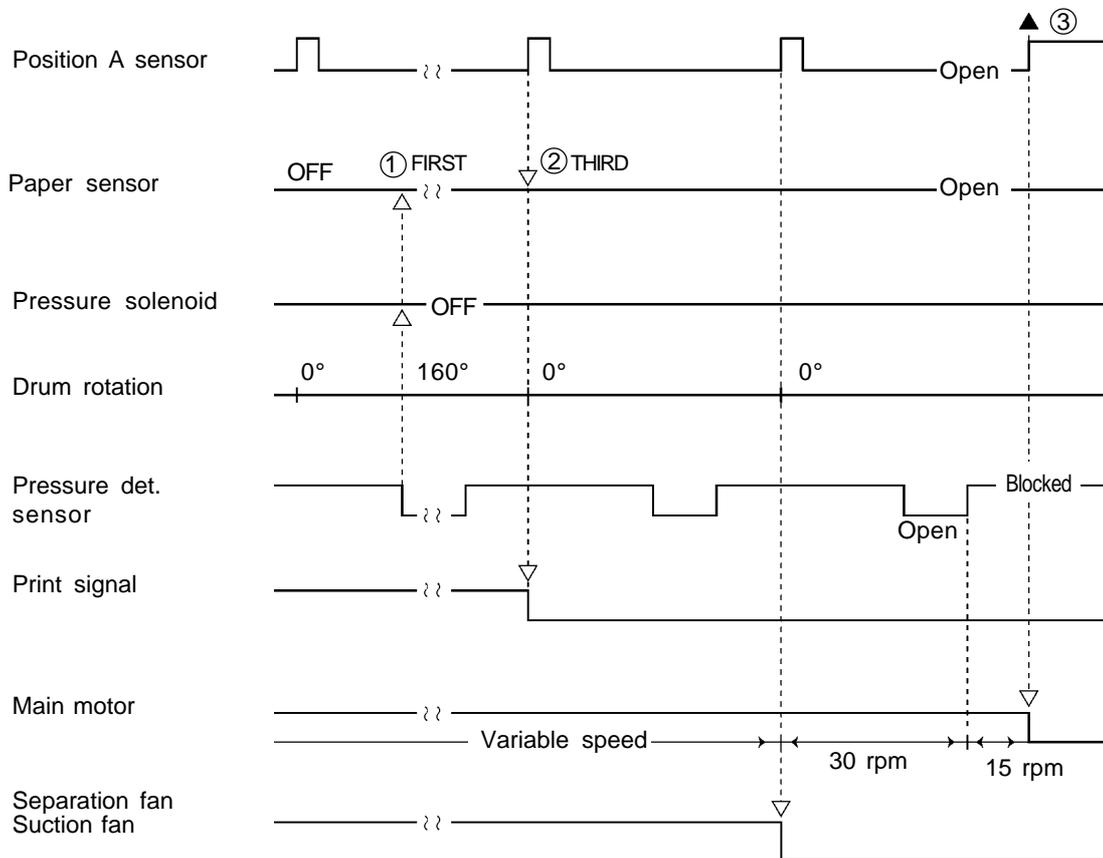
The Paper receiving sensor 2 checks whether the printed paper is correctly delivered on the Suction unit to the Paper receiving tray.

- During the printing operation, if the condition of Paper receiving sensor 2 changes from "paper detection" to "no paper detection" or vice versa, before the Drum Position A is checked twice, the machine assumes the paper delivery onto the Paper receiving tray is normal. If the Paper receiving sensor 2 keeps detecting a sheet of paper while the Drum Position A is checked twice, the machine assumes the paper has jammed at the Paper receiving sensor 2 and "PAPER JAM UNDER DRUM PULL OUT DRUM" is displayed.



- Timing Chart -

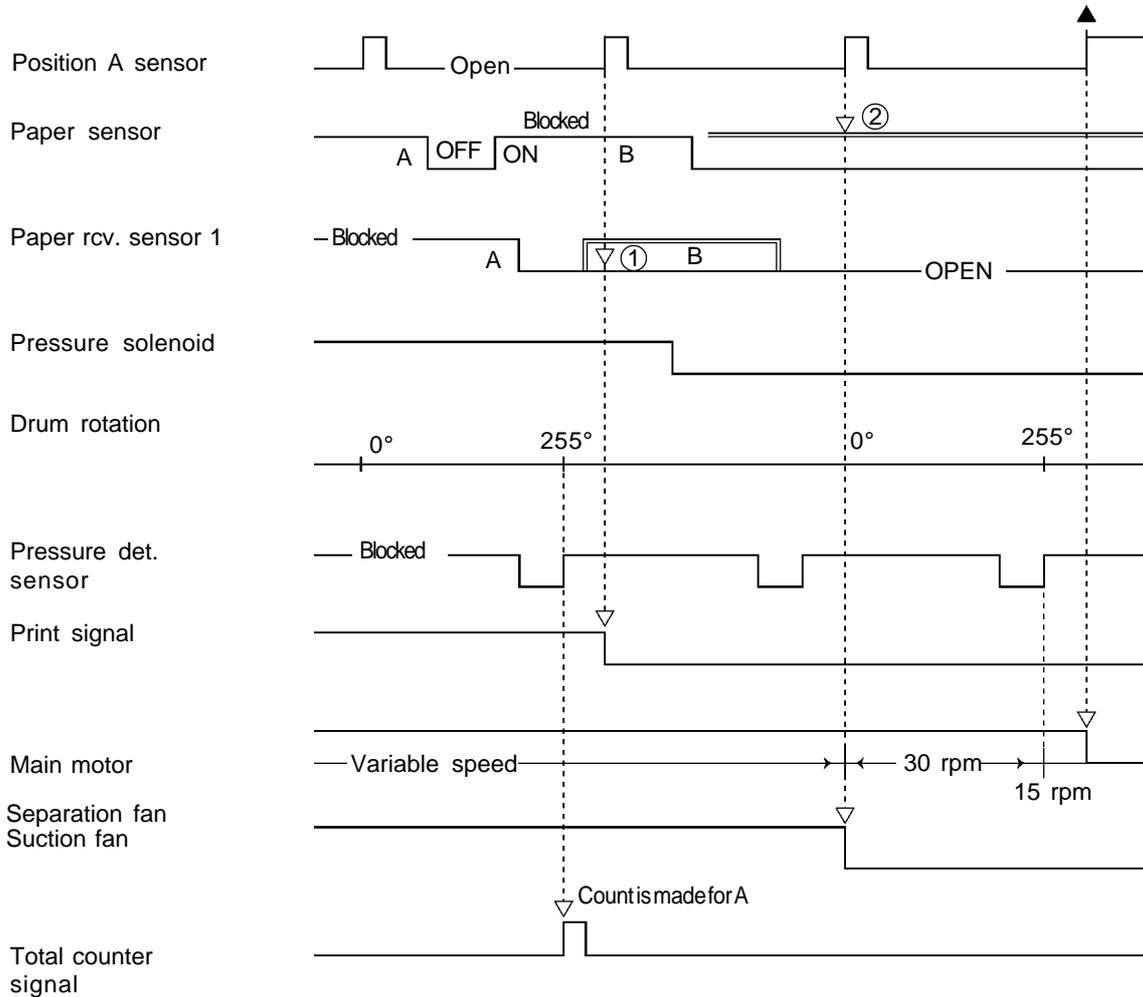
Paper Jam in the First Paper Feed Area



- ① If the light path of the Paper sensor is not blocked at Drum angle 160° (or the light path of the Pressure detection sensor is opened), the Pressure solenoid will not be turned ON.
- ② If the Paper sensor has detected no paper by the time the Drum makes its third turn, the machine assumes that the **paper has jammed at the First paper feed area**, and turns OFF the Print signal.
- ③ When the Drum stops, the error code "PAPER MISFEED CHECK PAPER FEED AREA AND PRESS ALL RESET KEY" is displayed.

- Timing Chart -

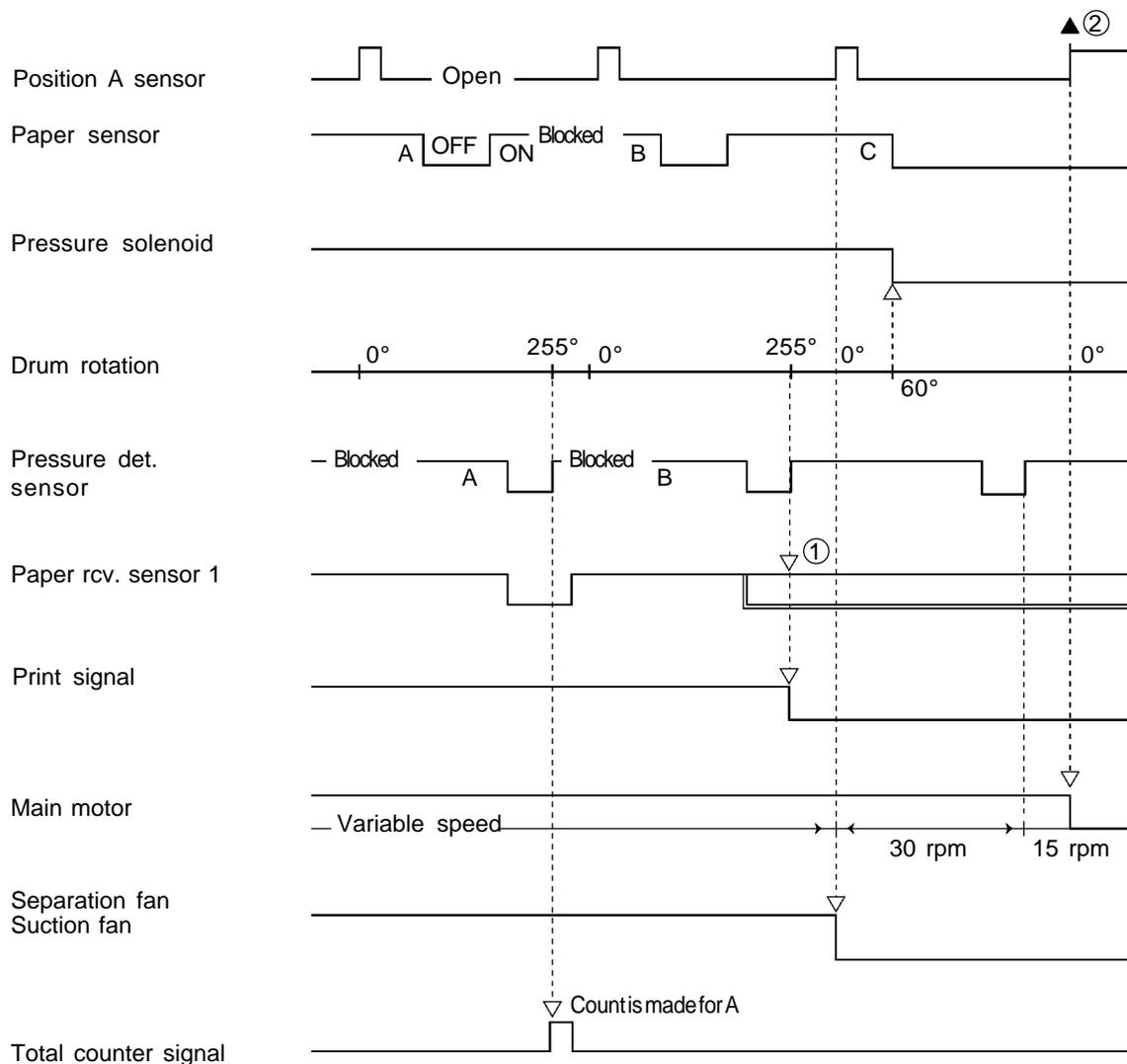
Paper Jam in the Second Paper Feed Area / Paper Jam under the Drum



- ① If the Paper receiving sensor 1 detects no paper, the machine assumes that the paper has jammed, and turns the Print signal OFF.
- ② At the next Drum Position A, the status of the Paper sensor is checked and if the Paper sensor detects a paper, the machine assumes that the **paper has jammed at the Second paper feed area**, and “PAPER JAM CHECK PAPER FEED AREA” is displayed. But if the Paper sensor detects no paper, the machine assumes the **paper has jammed under the Drum**, “PAPER JAM ON DRUM REMOVE PAPER” is displayed.

- Timing Chart -

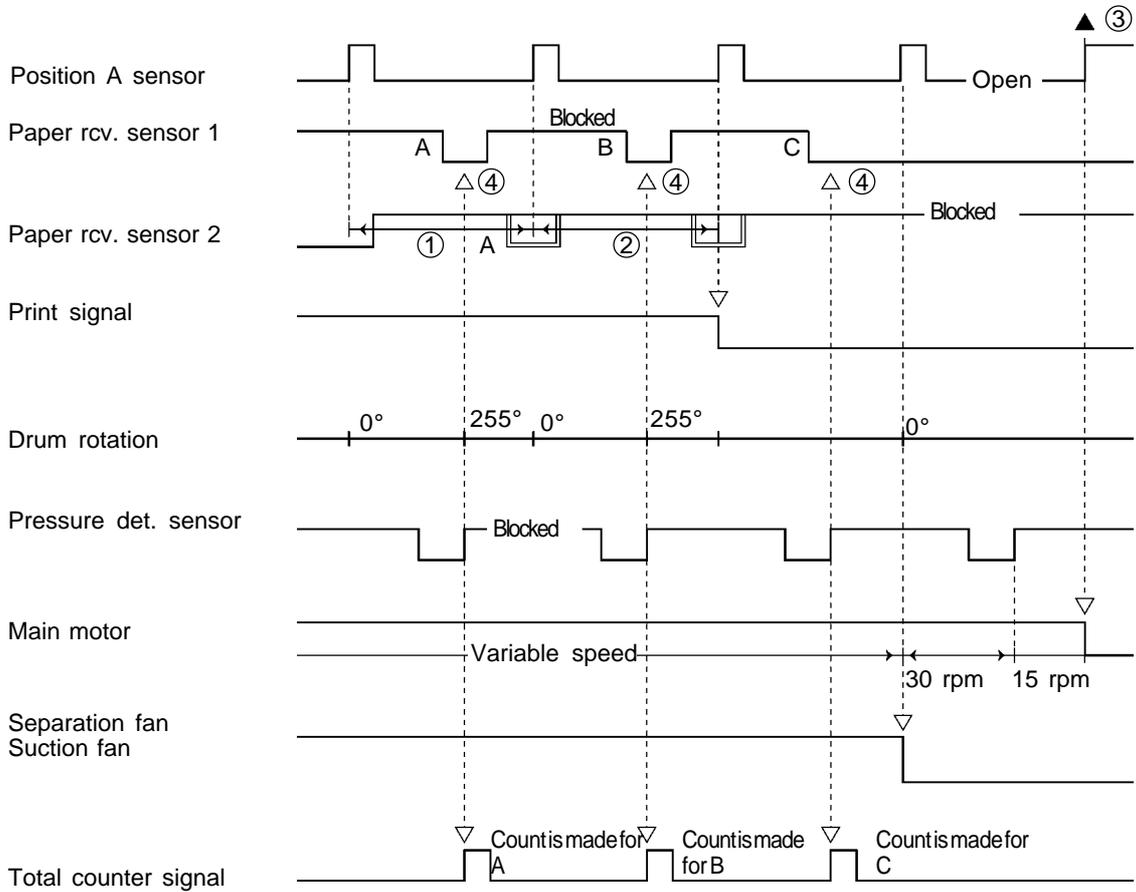
Paper Jam at Paper Receiving Sensor 1



- ① If the Paper receiving sensor 1 still detects a sheet of paper, the machine assumes the **paper has jammed at the Paper receiving sensor 1**, and turns the Print signal OFF.
- ② When the Drum stops, "PAPER JAM UNDER DRUM PULL OUT DRUM" is displayed.

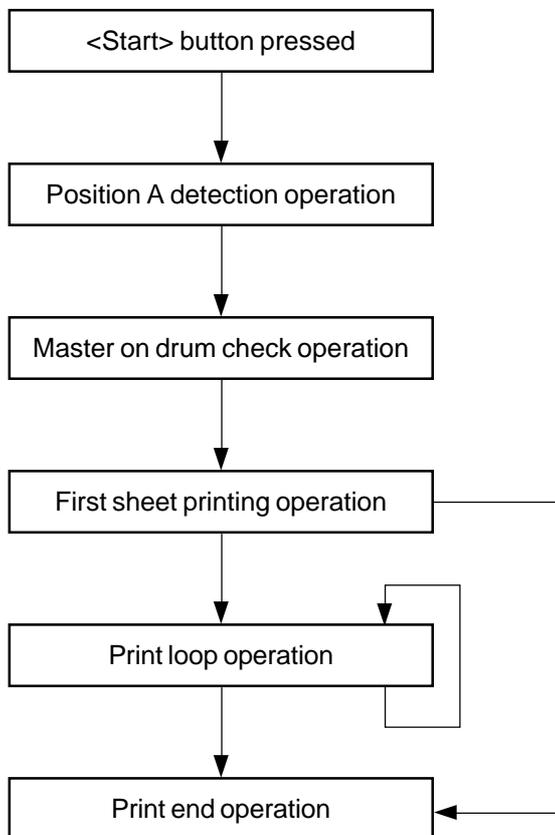
- Timing Chart -

Paper Jam at Paper Receiving Sensor 2



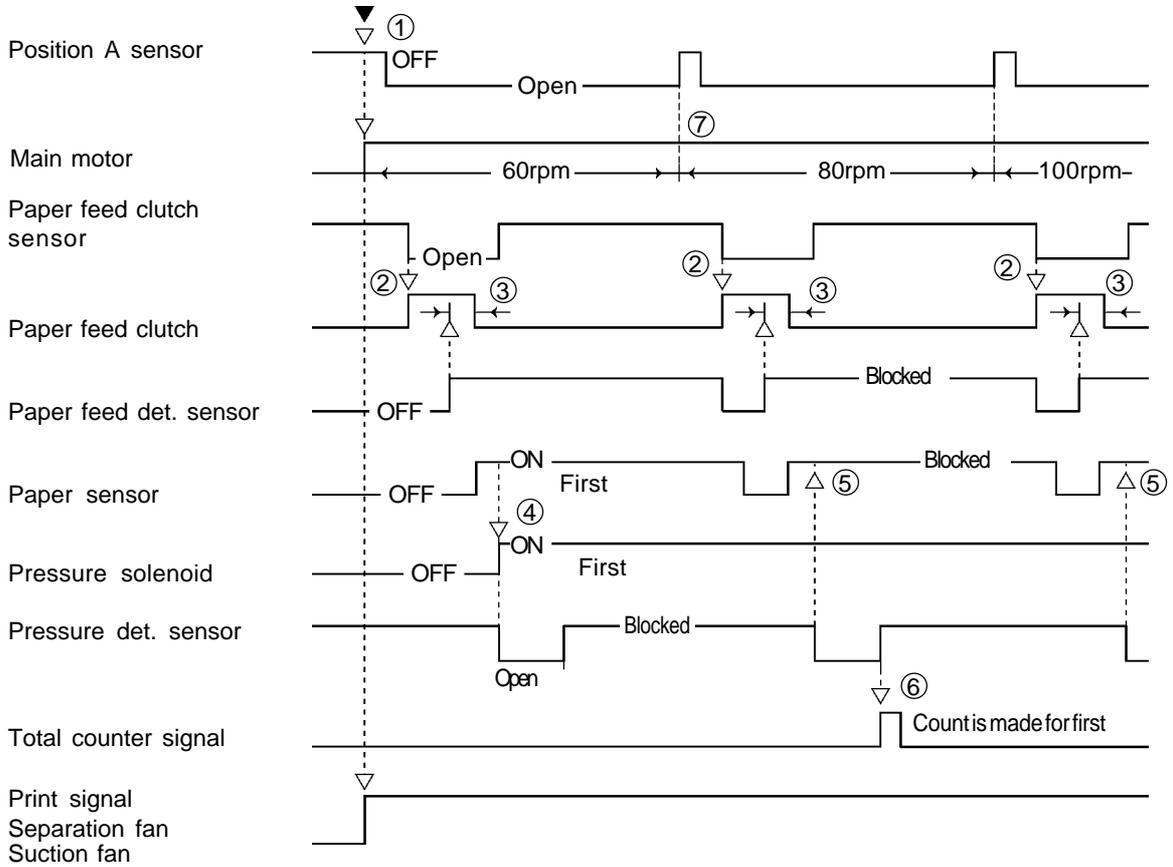
- ① Between the respective Drum Positions A, it is checked if the light path of the Paper receiving sensor 2 is opened.
- ② If the Paper receiving sensor 2 keeps detecting a sheet of paper while the Drum Position A is checked twice, the machine assumes the paper has jammed at the Paper receiving sensor 2, and turns the Print signal OFF.
- ③ When the Drum stops, "PAPER JAM UNDER DRUM PULL OUT DRUM" is displayed.
- ④ A sheet is assumed to be printed each time the status of the light path of the Paper receiving sensor 1 changes from "Blocked" to "Open" after it is confirmed that of the Paper sensor changed from "Blocked" to "Open".
Then as the light path of the Pressure detection sensor is blocked, the Total counter signal is turned ON to add one count on the Total counter.

2. Flow of Printing Operations



- Timing Chart -

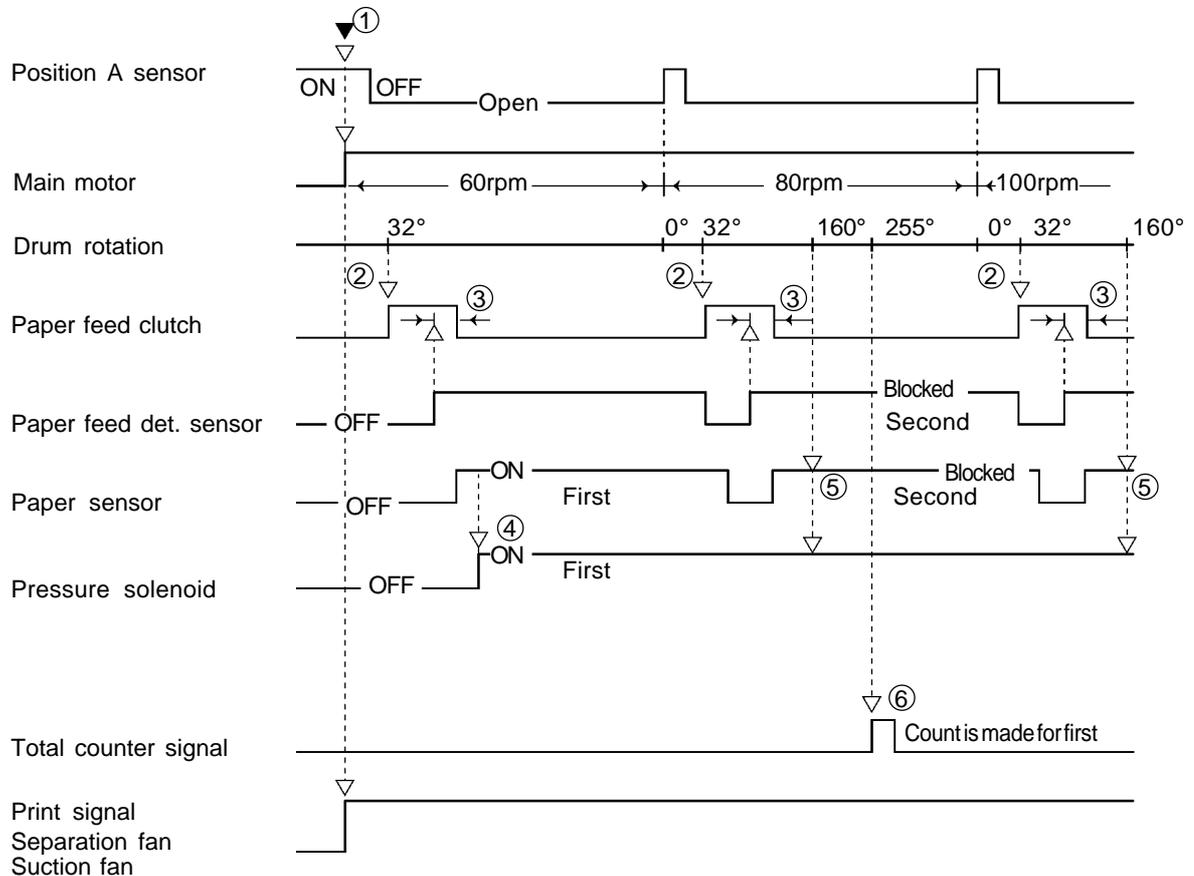
Printing Start Timing Chart (P disc, Pressure sensor disc)



- ① If the Position A sensor does not detect the Position A plate when the START button is pressed, the Drum rotates until the sensor detects the Position A plate.
If the presence of the master on the Drum is not checked when the START button is pressed, the Drum rotate and the Master loading sensor checks the presence at the Position C-1.
If the Upper limit sensor does not pressed when the START button is pressed, the Elevator motor lifts the Paper feed tray until the Upper limit sensor is pressed.
- ② If the light path of the Paper feed clutch sensor is opened while the Print signal is ON, the Paper feed clutch is engaged.
- ③ After the Paper feed detection sensor detects the leading edge of a sheet, the Paper feed clutch is disengaged.
- ④ The Pressure solenoid is activated ON when light path of the Paper sensor is blocked.
- ⑤ The moment the light path of the Pressure detection sensor senses the light, the Pressure solenoid is turned on consecutively when the light path of the Paper sensor is blocked.
- ⑥ The Total counter advances one count when the light path of Pressure detection sensor is blocked after the paper passed the Paper receiving sensor 1.
- ⑦ The Print speed is changed when the Position A sensor detect the Position A plate.

- Timing Chart -

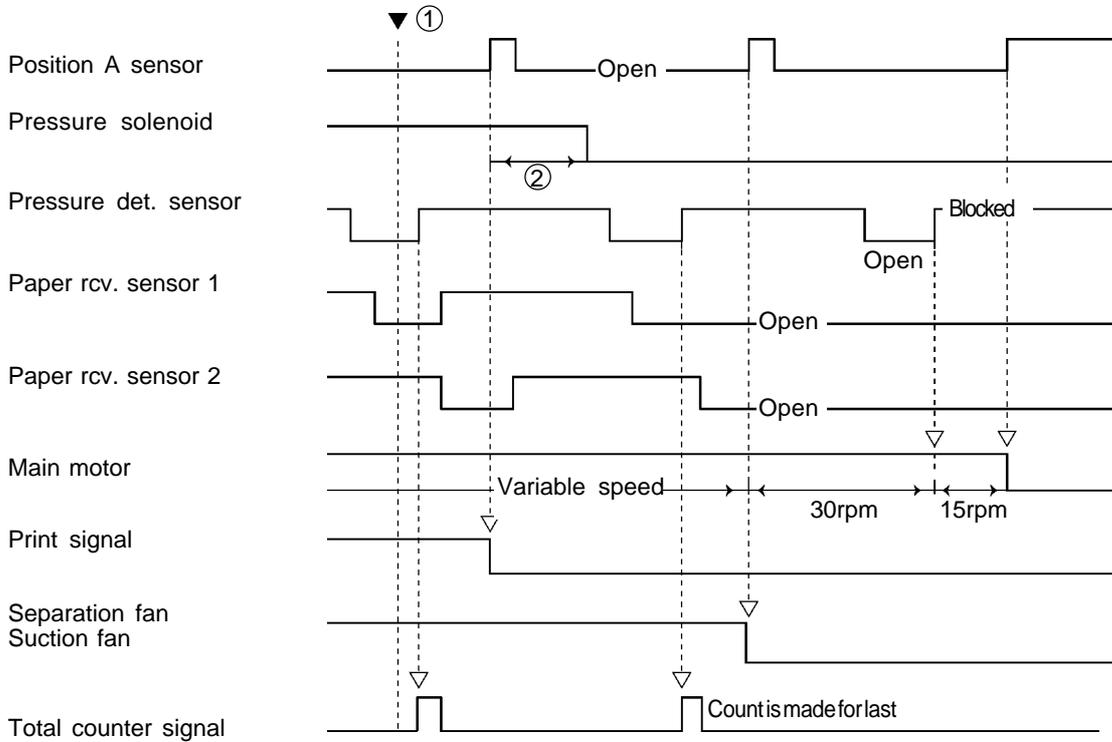
Printing Start Timing Chart (Drum angle)



- ① If the Position A sensor does not detect the Position A plate when the START button is pressed, the Drum rotates until the sensor detects the Position A plate.
If the presence of the master on the Drum is not checked when the START button is pressed, the Drum rotate and the Master loading sensor checks the presence at the Position C-1.
If the Upper limit sensor does not pressed when the START button is pressed, the Elevator motor lifts the Paper feed tray until the Upper limit sensor is pressed.
- ② The Paper feed clutch is engaged when the Drum rotates 32°.
- ③ After the Paper feed detection sensor detects the leading edge of a sheet, the Paper feed clutch is disengaged.
- ④ The Pressure solenoid is activated ON when light path of the Paper sensor is blocked.
- ⑤ The moment the Drum rotates 160°, the Pressure solenoid is turned on consecutively when the light path of the Paper sensor is blocked.
- ⑥ The Total counter advances one count when the Drum rotates 255° after the paper passed the Paper receiving sensor 1.
- ⑦ The Print speed is changed when the Position A sensor detect the Position A plate.

- Timing Chart -

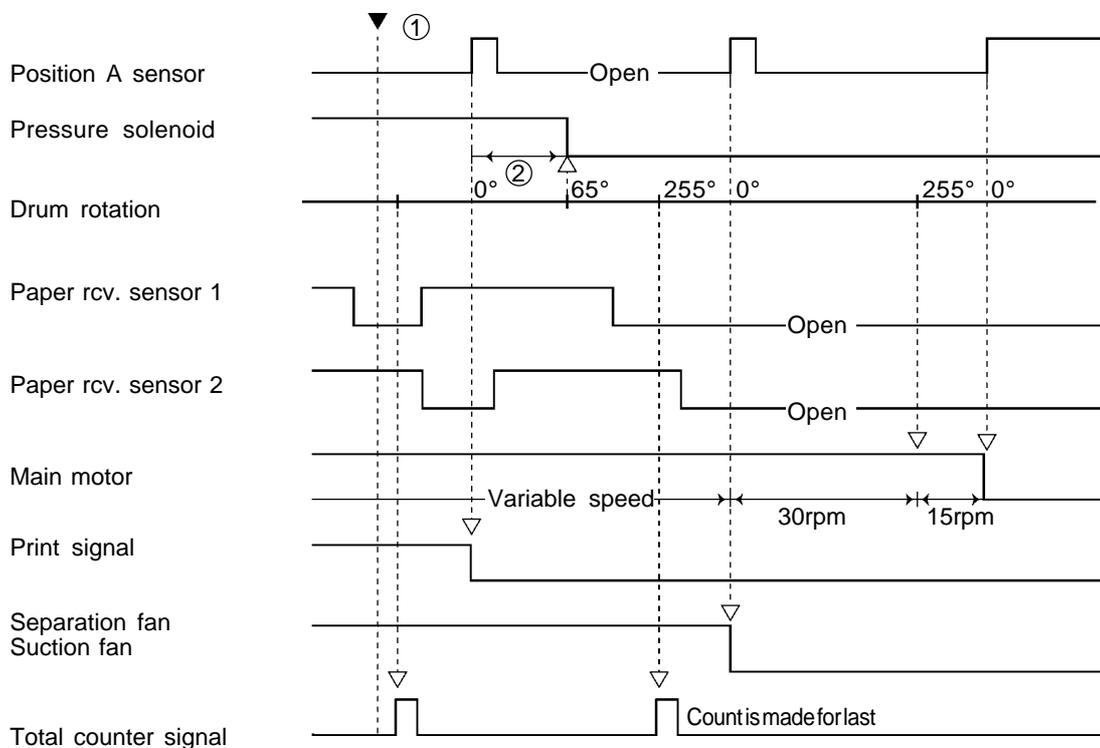
Printing Stop Timing Chart (P disc, Pressure sensor disc)



- ① If the STOP key is pressed before the Pressure detection sensor is blocked, the print stop movement starts.
If the STOP key is pressed just after the Pressure detection sensor is blocked, the Drum rotates one turn until the next Drum position A before the print stop movement starts.
- ② The Pressure solenoid is deactivated when the Drum rotates 65°.

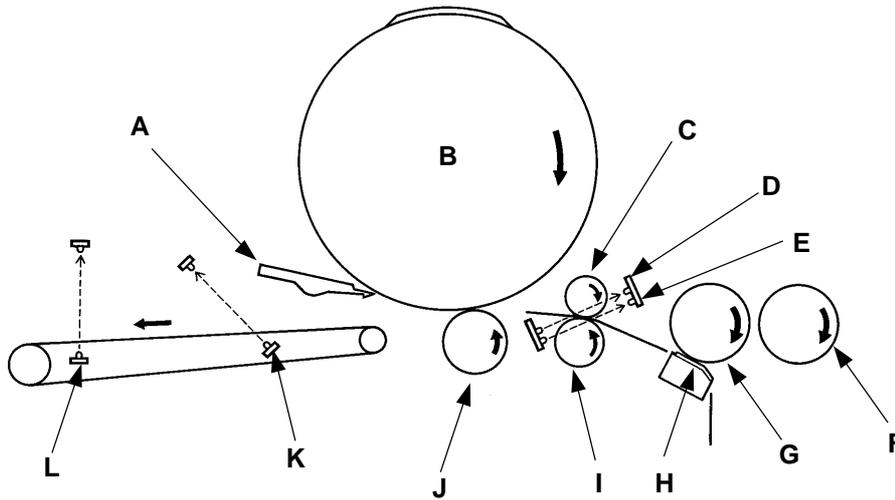
- Timing Chart -

Printing Stop Timing Chart (Drum angle)



- ① If the STOP key is pressed before the Drum rotates 255°, the print stop movement starts.
If the STOP key is pressed just after the Drum rotates 255°, the Drum rotates one turn until the next Drum position A before the print stop movement starts.
- ② The Pressure solenoid is deactivated when the Drum rotates 65°.

3. Cross Sectional Diagram of Paper Feed & Receive



- A: Separator
- B: Drum
- C: Guide roller
- D: Paper sensor
- E: Paper feed det. sensor
- F: Scraper roller
- G: Pickup roller
- H: Stripper pad
- I: Timing roller
- J: Pressure roller
- K: Paper receiving sensor 1
- L: Paper receiving sensee 2

CHAPTER 10: MASTER CLAMP SECTION

Contents

THEORY OF OPERATION

- 1. Clamp Plate Opening System 10T-1
- 2. Clamp Plate Closing System 10T-3

REMOVAL & ASSEMBLY

- 1. Clamp Unit 10R-1
- 2. Clamp Motor 10R-2
- 3. Clamp Solenoid 10R-2

THEORY OF OPERATION

1. Clamp Plate Opening System

- Opening of Clamp Plate

If the Position A sensor detects the Position A plate (if it is confirmed that the Drum is at the home position), at the same time, the Clamp solenoid is activated and the Clamp unit is pulled down, releasing the actuator of the Clamp safety switch (, which is pressed by the Clamp unit when the Clamp solenoid is not energized).

100 ms later, the Clamp motor starts rotating and opens the Clamp plate via gear engagement.

- Check of Opened Clamp Plate

When the 180° Angular sensor detects the Angular magnet on the Angular magnet plate, which is attached to one end of the Clamp plate shaft, the Clamp motor and Clamp solenoid are deactivated.

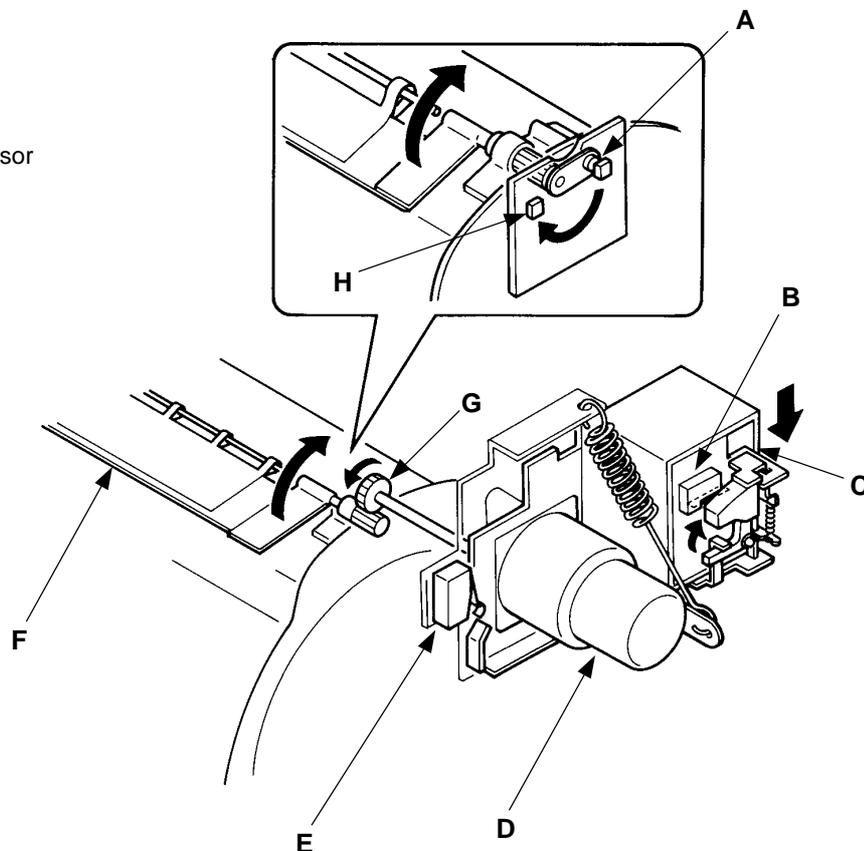
- Finish of Clamp Plate Operation

When the Clamp solenoid is deactivated, the Clamp unit is returned to the initial (retreat) position and presses the actuator of the Clamp safety switch, by which it is confirmed that the operation of opening the Clamp plate is finished.

- Protection of Clamp Solenoid

When the Clamp solenoid is energized, the Range setting switch is actuated ON to reduce the current flowing through the solenoid for protecting it against overheating.

- A: Angular magnet
- B: Range setting SW
- C: Clamp solenoid
- D: Clamp motor
- E: Clamp safety SW
- F: Clamp plate
- G: Gear
- H: 180° Angular sensor



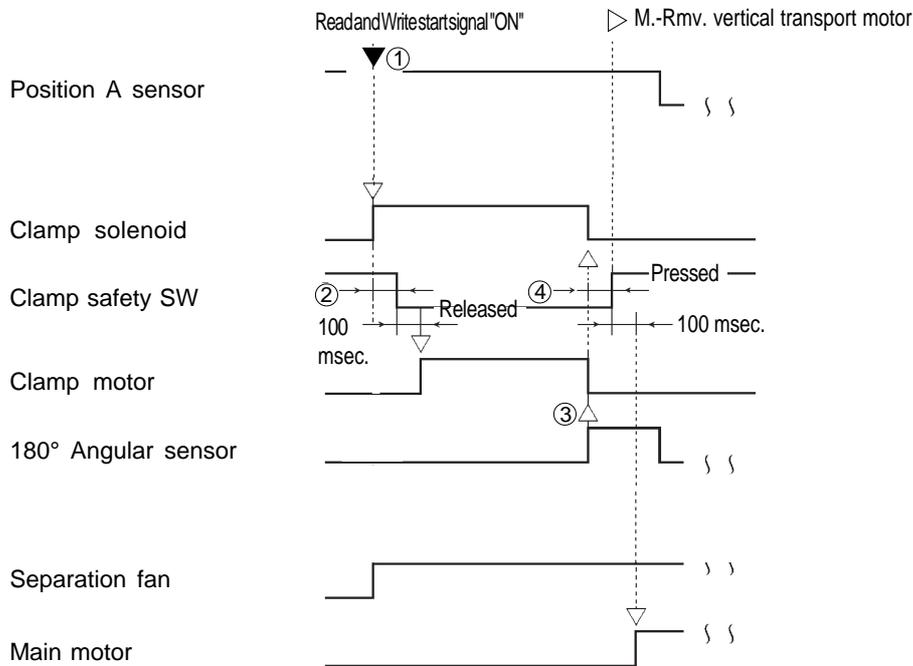
CHAPTER 10. MASTER CLAMP SECTION

THEORY OF OPERATION

Test Mode No.10 180° Angular sensor
 – Short interval beeps when magnetism is detected
 No.70 Master removal fan
 No.73 Clamp solenoid
 No.104 Clamp opening/closing

- Timing Chart -

Clamp Plate Opening System



- ① If the Position A sensor does not detect the Position A plate before the Clamp plate opening operation starts, the Drum rotates until the sensor detects the Position A plate.
- ② If the Clamp safety switch has not been released OFF **within 4 seconds** after the Clamp solenoid is energized, the Clamp solenoid is deenergized and the Drum rotates once for the Position A.
 Then the Clamp solenoid is energized once again.
 If the Clamp safety switch has not been released OFF **within 4 seconds** again, the machine assumes a Clamp error-1 has occurred and indicates the error message [T 3].
- ③ If 180° Angular sensor has not detected a magnet **within 8 seconds** after the Clamp motor is activated, the Clamp motor and Clamp solenoid are deactivated and the Drum rotates once for the Position A. Then the Clamp motor and Clamp solenoid is activated once again.
 If the magnet has not been detected by the 180° Angular sensor **within 8 seconds** again, the machine assumes a Clamp error-1 has occurred and indicates the error message [T 3].
- ④ If the Clamp safety sw has not been pressed **within 4 seconds** after the Clamp solenoid is deenergized, the machine assumes a Clamp error-1 has occurred and displays the error message [T 3].
 - If the Clamp Safety switch is not pressed at other than clamp solenoid operation time, "T14" will be displayed.

T3(Clamp Error (1))
<ul style="list-style-type: none"> • Clamp safety switch not turned on/off • 180° Angular sensor not turned on/off

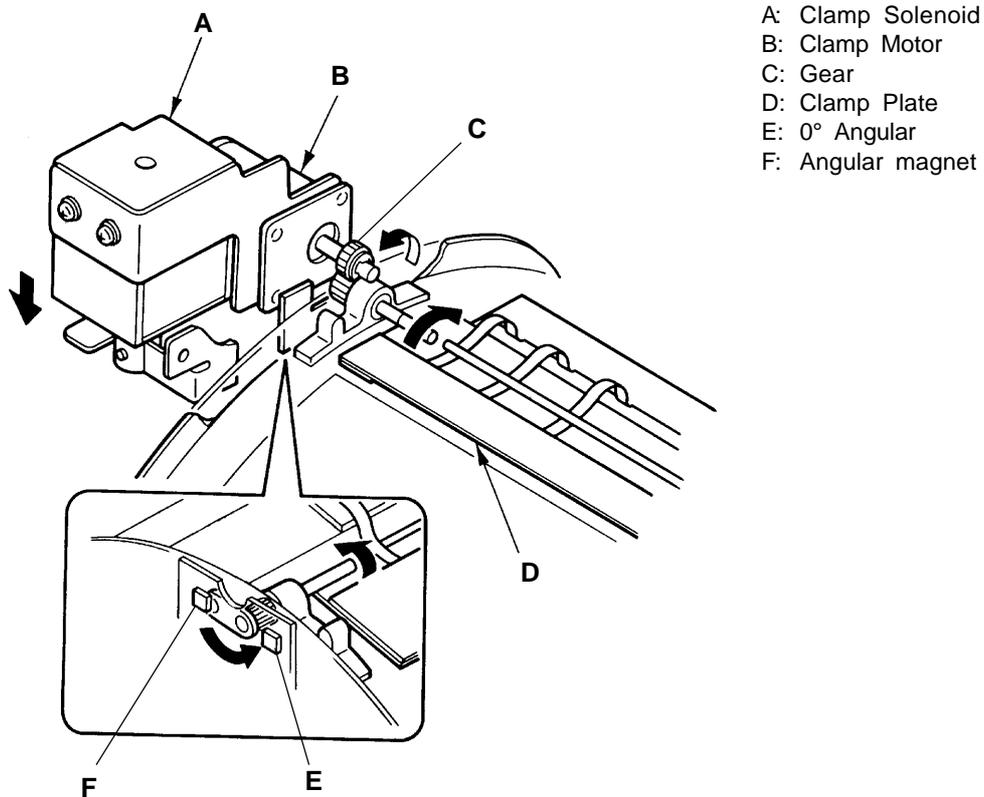
T14(Clamp Error (2))
<ul style="list-style-type: none"> • Clamp safety switch not pressed at normal time

2. Clamp Plate Closing System

If the Drum comes back to the Position A in master removal vertical transport operation, the Clamp solenoid will be turned on and the Clamp unit will go down.

If it is confirmed that the Clamp safety switch has been released and the unit has moved down, the Loading pulse motor will be turned on to feed out the master over the drum.

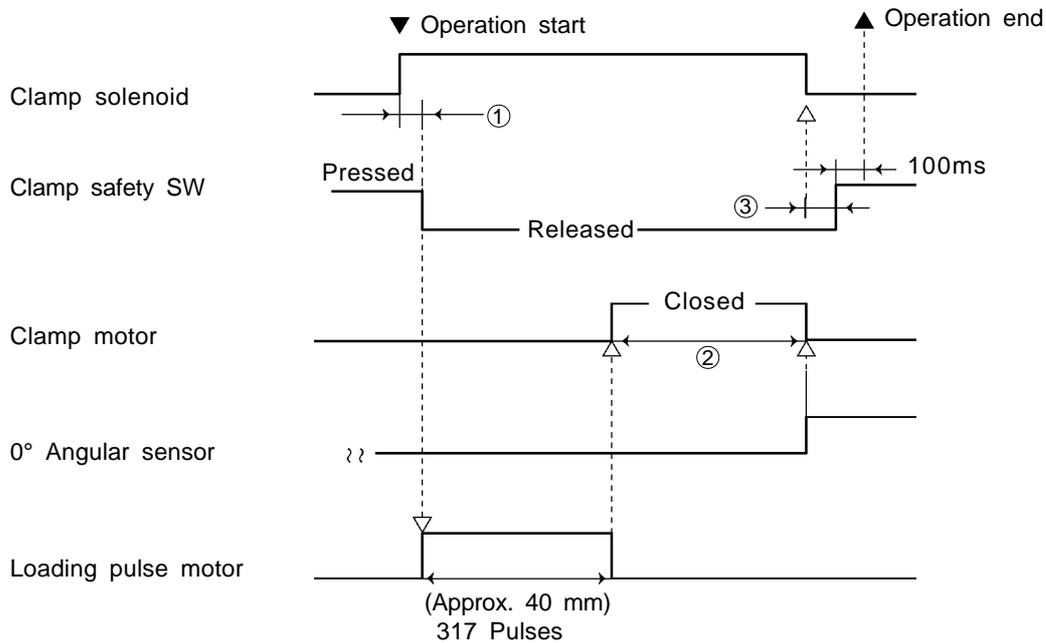
Then, the Clamp motor will be turned on and start closing the clamp plate. If the 0° Angular sensor detects a magnet, the Clamp motor and clamp solenoid will be turned off. Once it is confirmed that the Clamp safety switch has been pressed and the Clamp unit has moved back upward, clamp plate closing operation will be completed(the Clamp Safety switch is normally pressed).



CHAPTER 10. MASTER CLAMP SECTION

THEORY OF OPERATION

Test Mode No.9 0°Angular sensor
 – Short interval beeps when magnetism is detected
 No.13 Clamp safety SW
 – Short interval beeps when pressed
 No.73 Clamp solenoid
 No.104 Clamp opening/closing



- ① If the Clamp safety switch has not been released OFF within 4 seconds after the Clamp solenoid is energized, the Clamp solenoid is de-energized and Drum rotates once for the Position A.
Then the Clamp solenoid is energized once again.
If the Clamp safety switch has not been released OFF within 4 seconds again, the machine assumes a Clamp error-1 has occurred and indicates the error message **[T 3]**.
- ② If 0° Angular sensor has not detected a magnet within 8 seconds after the Clamp motor is activated, the machine assumes a Clamp error-1 has occurred and indicates the error message **[T 3]**.
- ③ If the Clamp safety SW has not been pressed within 4 second after the Clamp solenoid is de-energized, the machine assumes a Clamp error-1 has occurred and indicates the error message **[T 3]**.

* If the Clamp safety switch is not pressed at other than clamp solenoid operation time, "T14" will be displayed.

T3(Clamp Error (1))
<ul style="list-style-type: none"> • Clamp safety switch not turned on/off • 0° angular sensor not turned on/off
T14(Clamp Error (2))
<ul style="list-style-type: none"> • Clamp safety switch not pressed at normal time

REMOVAL & ASSEMBLY

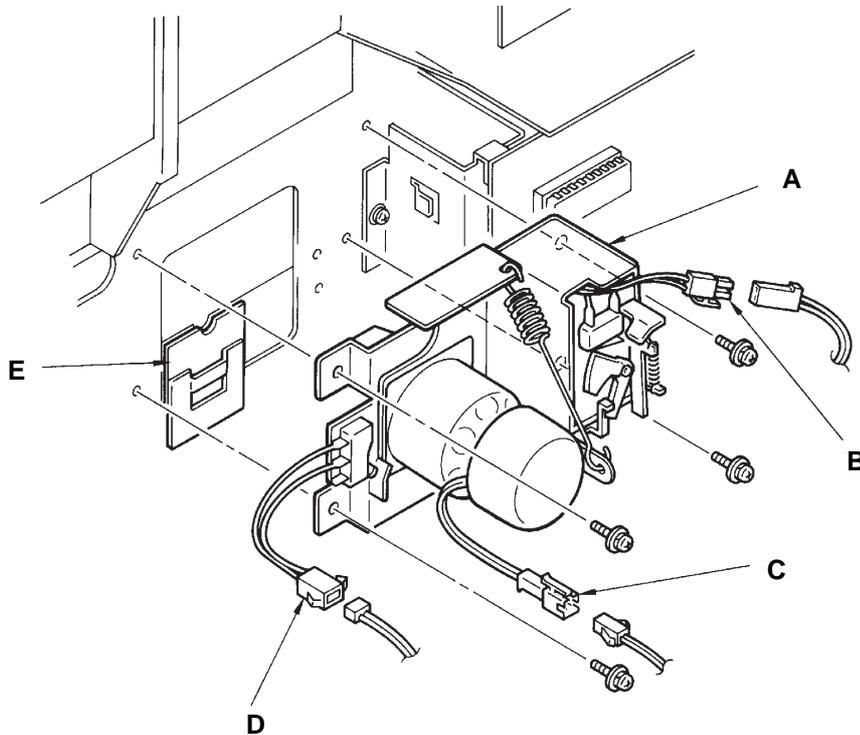
1. Clamp Unit

< Removal Procedure >

1. Turn OFF the power and remove the Back cover.
2. Disconnect the connectors of the wires coming out of the Clamp unit, i.e. Clamp solenoid, Clamp motor and Clamp safety switch.
3. Remove four mounting screws on the Clamp unit and remove the unit from the machine.

- Precautions in Assembly -

- M4x6 double-washer screws should be used in mounting the Clamp unit onto the machine. If longer screws are used, the screws will get contact with the Drum and interfere with the Drum rotation.



- A: Clamp solenoid bracket
- B: Clamp solenoid connector
- C: Clamp motor connector
- D: Clamp safety switch connector
- E: Angular sensors

2. Clamp Motor

< Removal Procedure >

1. Remove the Clamp unit, referring to the previous page.
2. Remove four mounting screws of the Clamp motor and remove the motor from the Clamp unit.

- Precautions in Assembly -

- Put grease lightly on the Drive gear of the Clamp motor.
- Put locking bond on the mounting screws of the Calmp motor after attaching the motor back on the Clamp unit.

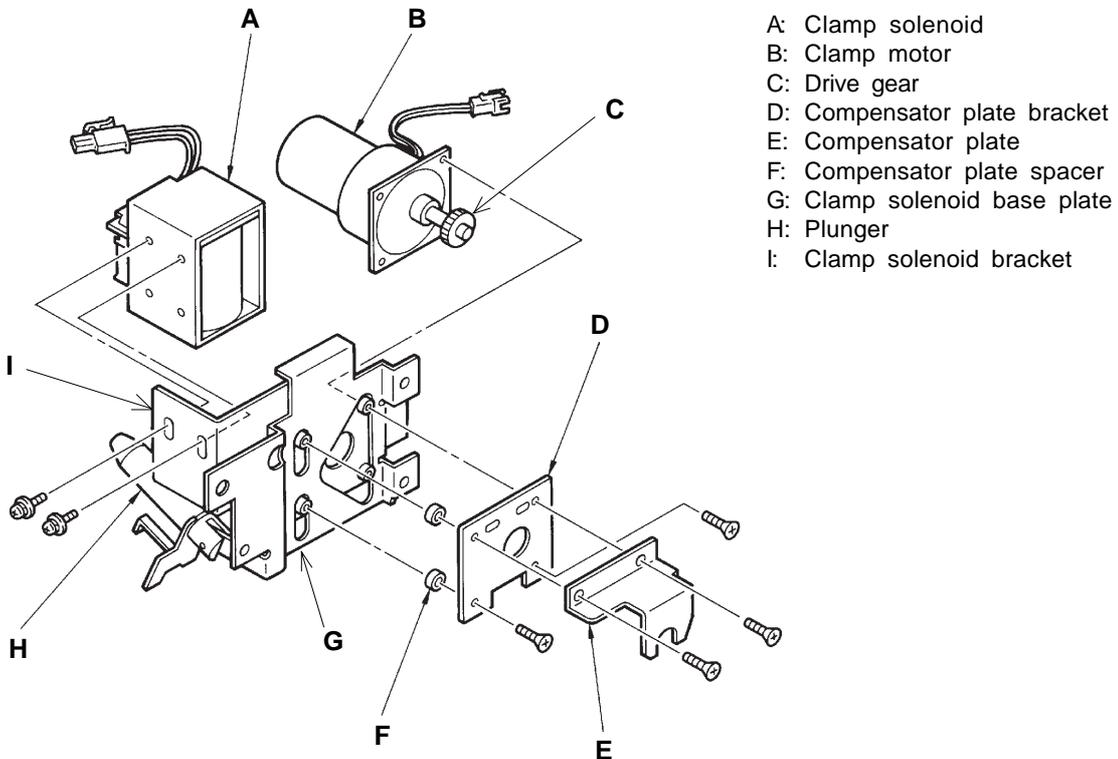
3. Clamp Solenoid

< Removal Procedure >

1. Remove the Clamp unit, referring to the previous page.
2. Remove two mounting screws of the Clamp solenoid and remove the solenoid from the Clamp unit, separating it from the Plunger.

- Precautions in Assembly -

- Put grease lightly on the sliding surface between the Clamp solenoid base plate and Clamp solenoid bracket.
- Attach the clamp solenoid to the bottom of the long holes.



CHAPTER 12: FLAT BED SCANNING SECTION

Contents

THEORY OF OPERATION

1. Scanner Table Setting System	12T-1
2. Flat Bed Original Detection System	12T-2
3. Image Scanner Initial Movement System	12T-4
4. Image Scanning System - in Auto Scanning Contrast Adjustment Mode	12T-6
5. Image Scanning System - Without Book Processing Feature & ADF	12T-8
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REMOVAL & ASSEMBLY

1. Stage Glass	12R-1
2. Image Scanner	12R-2
3. Image Scanner Carriage	12R-3
4. Flat Bed Read Pulse Motor	12R-4
5. FB-Scanner Belts	12R-5
6. Image Flexible Wire	12R-6
7. Flat Bed Original Detection Sensor	12R-6

ADJUSTMENT

1. Scanning Start Position	12A-1
2. Horizontal Scanning Position	12A-2
3. Image Elongation/Shrinkage Correction	12A-3

THEORY OF OPERATION

1. Scanner Table Setting System

- Basic

The Scanner table is pushed up by two Flat bed dampers when released from the hooks of the machine by holding the Open lever.

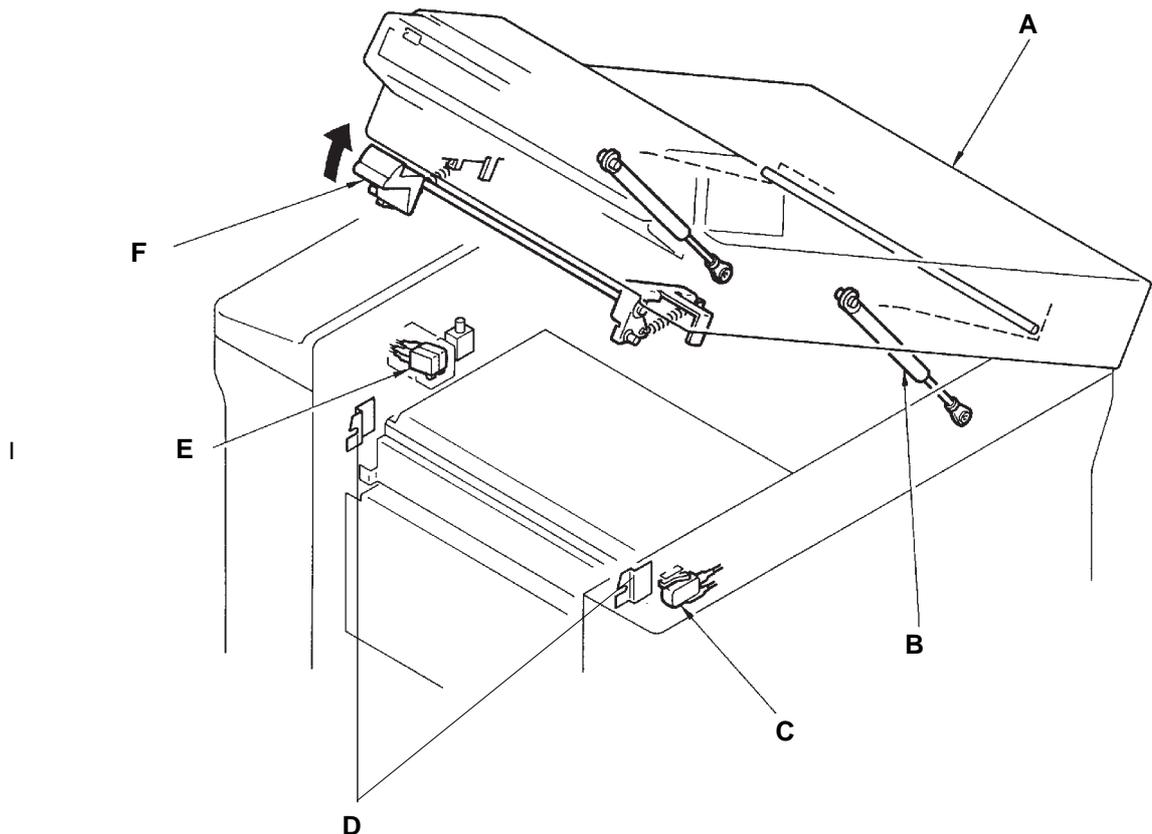
- Function of Flat Bed Set Switch

The Scanner table set switch detects whether the Scanner table is open or closed.

- Function of Interlock Switches

When the Scanner table is opened, the Interlock switches are released OFF, interrupting the power to the Main motor and Thermal print head.

- A: Scanner table
- B: Flat bed damper
- C: Scanner table set switch
- D: Hooks
- E: Interlock switches
(for Main motor & Thermal print head)
- F: Open lever



When the Scanner table set switch or Interlock switch is released OFF, the error message "CLOSE SCANNER TABLE" is displayed.

CHAPTER 12. FLAT BED IMAGE SCANNING SECTION

THEORY OF OPERATION

- Flat bed PCB LED 1 Flat bed original detection sensor
 - Light up when reflected light detected
- Test Mode No.51 Stage cover sensor
 - Short interval beeps when light path is blocked
- No.52 Flat bed original detection sensor
 - Short interval beeps when reflected light detected

2. Flat Bed Original Detection System

- Basic

When an original is placed on the Stage glass, the machine status is changed from "printing" to "master making".

- Function of Stage Cover Sensor

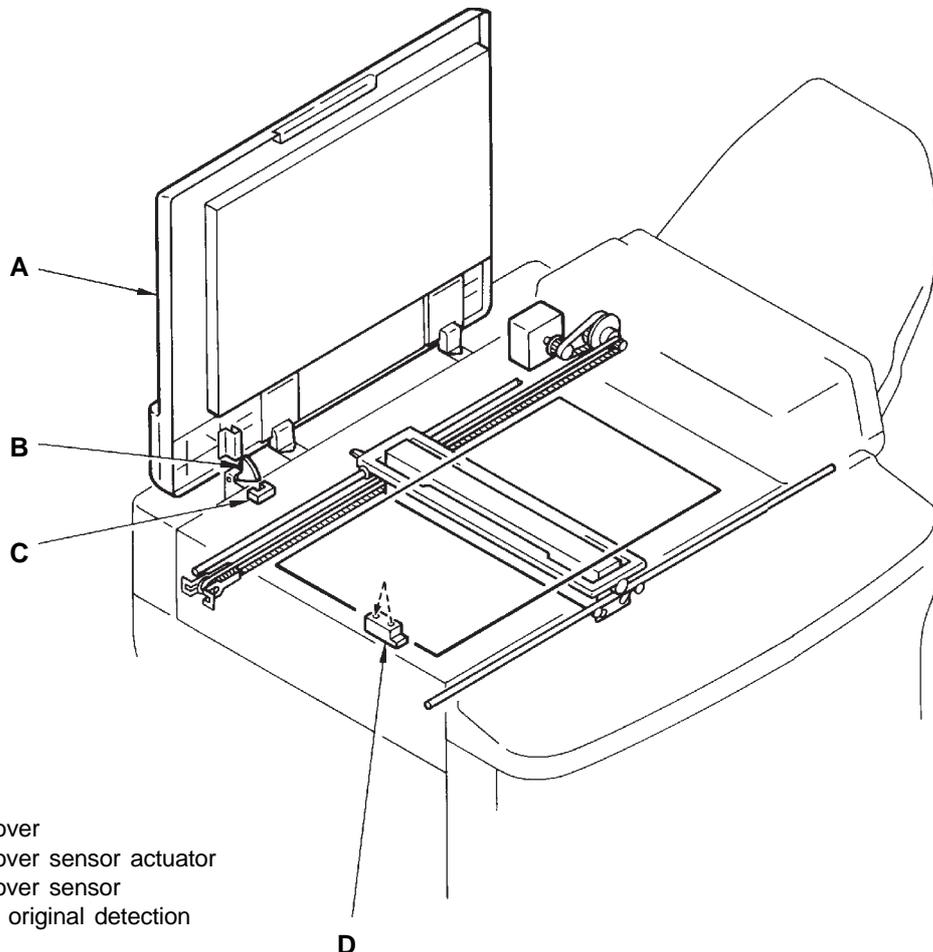
The Stage cover sensor checks whether the Stage cover is open or closed by checking its light path.

The light path of the sensor is blocked by the Stage cover sensor actuator when the Stage cover is closed more than halfway down.

- Function of Flat Bed Original Detection Sensor

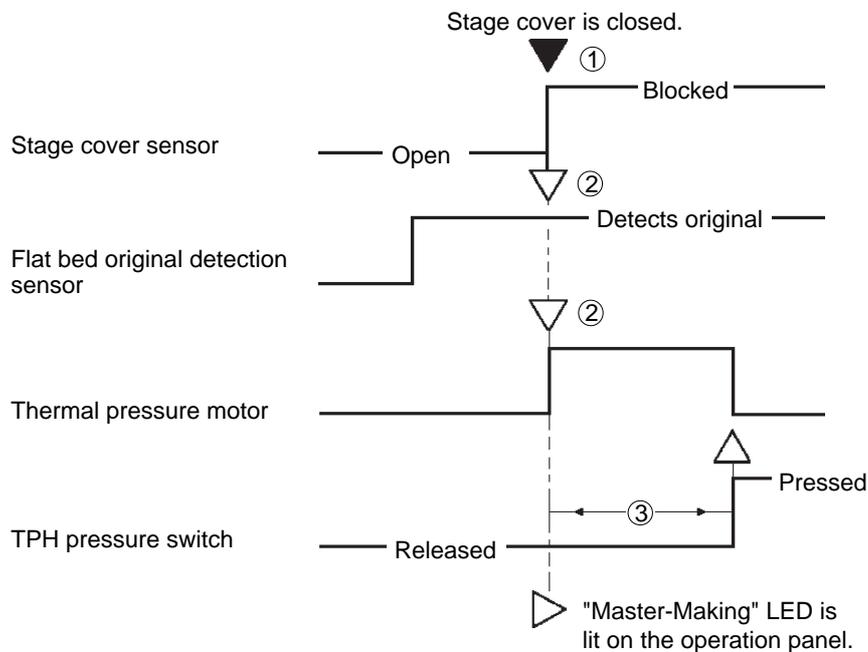
When the light path of the Stage cover sensor is blocked, the Flat bed original detection sensor checks for the presence of an original on the Stage glass.

When the sensor detects an original on the Stage glass, the "Master-Making/Print" LED on the operation panel is changed from "Print" to "Master-Making" and the Thermal pressure motor is activated to lower the Thermal print head until the TPH pressure switch is pressed.



- Timing Chart -

Flat Bed Original Detection System



- ① FB-ADF Original detection sensor is not pressed. Both the ADF switch and Flat bed set switch are pressed.
- ② When the Flat bed original detection sensor detects an original, the Thermal pressure motor is activated to lower the Thermal print head until the TPH pressure switch is pressed.
- ③ If the TPH pressure switch is not pressed **within 4 seconds** after the TPH pressure motor is activated, it is assumed that the Thermal pressure motor has been locked and the message **[T 19]** is displayed.

3. Image Scanner Initial Movement System

- Conditions for Image Scanner Initial Movements

The Image scanner makes either of the two initial movements mentioned below in the following cases:

Initial Movement 1

- 1) The power is turned ON or "ALL RESET button is pressed without originals on the ADF tray.
- 2) The Book processing feature is cancelled.

Initial Movement 2

- 1) The power is turned ON or "ALL RESET button is pressed with originals on the ADF tray.
- 2) The ADF original detection sensor is actuated ON by placing originals on the ADF tray.
- 3) The Book processing feature is selected.

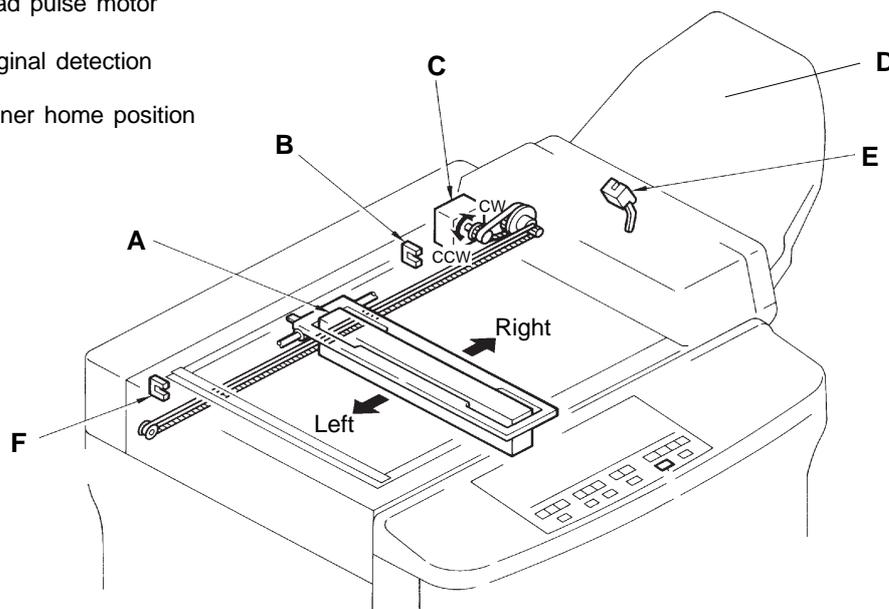
- Image Scanner Initial Movement 1

- (i) If the Image scanner home position sensor is not detecting the bracket of the Image scanner, the Flat bed read pulse motor is activated to transfer the Image scanner to the left until the sensor detects the bracket.
- (ii) If the sensor is detecting the bracket, the Image scanner stays still.

- Image Scanner Initial Movement 2

- (i) If the Image scanner ADF shading sensor and Image scanner home position sensor are not detecting the bracket of the Image scanner, the Flat bed read pulse motor is activated to transfer the Image scanner to the left.
 - If the Image scanner ADF shading sensor detects the bracket of the Image scanner **within 2204 pulses** after the Flat bed read pulse motor is activated, it is assumed that the Image scanner is located under the ADF unit and the Flat bed read pulse motor is stopped.
 - If not, it is assumed that the Image scanner is located outside the ADF unit and the Flat bed read pulse motor starts to reverse after **10msec.** rest, to move the Image scanner to the right until the Image scanner ADF shading sensor detects the bracket of the Image scanner.
- (ii) If the Image scanner home position sensor is detecting the bracket of the Image scanner, the Flat bed read pulse motor is activated to transfer the Image scanner to the right until the ADF shading sensor detects the bracket.
- (iii) If the ADF shading sensor is detecting the bracket, the Image scanner stays still.

- A: Image scanner
- B: Image scanner ADF shading sensor
- C: Flat bed read pulse motor
- D: ADF tray
- E: FB-ADF original detection sensor
- F: Image scanner home position sensor



CHAPTER 12. FLAT BED IMAGE SCANNING SECTION

THEORY OF OPERATION

Test Mode No.49 Scner home position sensor
 – Short interval beeps when light path is blocked
 No.50 Scanner ADF shading sensor
 – Short interval beeps when light path is blocked
 No.34 ADF original detection sensor
 – Short interval beeps when pressed
 No.108 FB/R Pulse motor continuous operation

- Timing Chart -

Image Scanner Initial Movement (1)

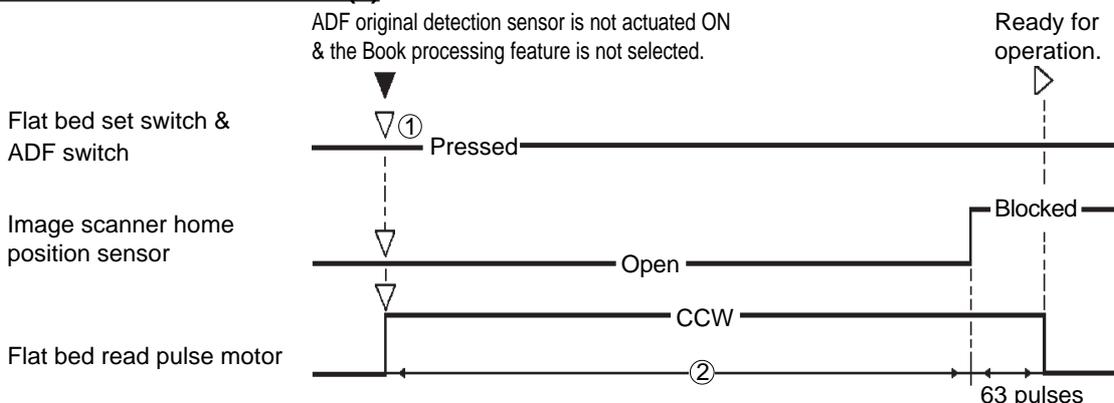
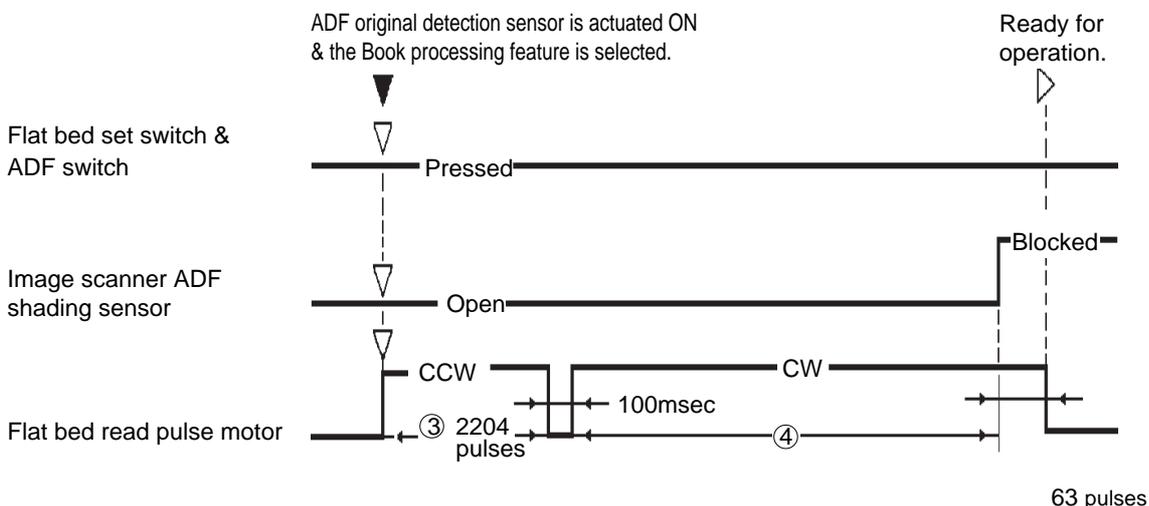


Image Scanner Initial Movement (2)



- ① If the Flat bed set switch is not pressed, the error message “CLOSE SCANNER TABLE” is displayed.
 If the ADF switch is not pressed, the error message “CLOSE ADF COVER” is displayed.
- ② If the Image scanner home position sensor does not detect the bracket of the Image scanner **within 18898 pulses** after the Flat bed read pulse motor is activated (CCW), it is assumed that the Flat bed read pulse motor has been locked and the error code [T 15] is displayed.
- ③ If the Image scanner ADF shading sensor has detected the bracket of the Image scanner **within 2204 pulses** after the Flat bed read pulse motor is activated (CCW), the Flat bed read pulse motor is stopped after making additional **63-pulses** turns(CCW).
 If the Image scanner home position sensor has detected the bracket of the Image scanner **within 2204 pulses** after the Flat bed read pulse motor is activated (CCW), the Flat bed read pulse motor rests for **100msec.**, and then reverses rotation (CW).
- ④ If the Image scanner ADF shading sensor has not detected the Image scanner **within 15748 pulses** after the Flat bed read pulse motor reverses rotation (CW), it is assumed that the Flat bed read pulse motor has been locked and the error code [T 15] is displayed.

* If the Flat bed read pulse motor is turned on for 800 pulses, the Image Scanner will move 1 inch(25.4 mm).(1 mm=31.5 pulses)

T15 (Flat Bed Read Pulse Motor Lock)
<ul style="list-style-type: none"> • Scanner home position not turned on • Scanner ADF shading sensor not turned on

4. Image Scanning System - in Auto Scanning Contrast Adjustment Mode

- Basic

The Image scanner is located at the Image scanner home position sensor, and the reading of the original background density starts after the shading compensation is made.

- Reading (Detection) of Original Background Density [AUTO BASE CONTROL]

By placing an original on the Stage glass and pressing the START button, the LEDs of the Image scanner are turned ON and the shading compensation is made.

200msec. later, the Flat bed read pulse motor is activated to move the Image scanner to the right.

598 pulses (19mm) after the Image scanner gets out of the Image scanner home position sensor, the Image scanner reads the original background density. This reading of the original background density is repeated twice, i.e. **81 pulses (2.57mm)** after the initial reading spot and **81 pulses (2.57mm)** after the second reading spot.

- Return Home of Image Scanner

10msec. after the third reading of the original background density is finished, the Flat bed read pulse motor starts to reverse rotation to return the Image scanner to the home position (at the Image scanner home position sensor).

- Start of Image Scanning

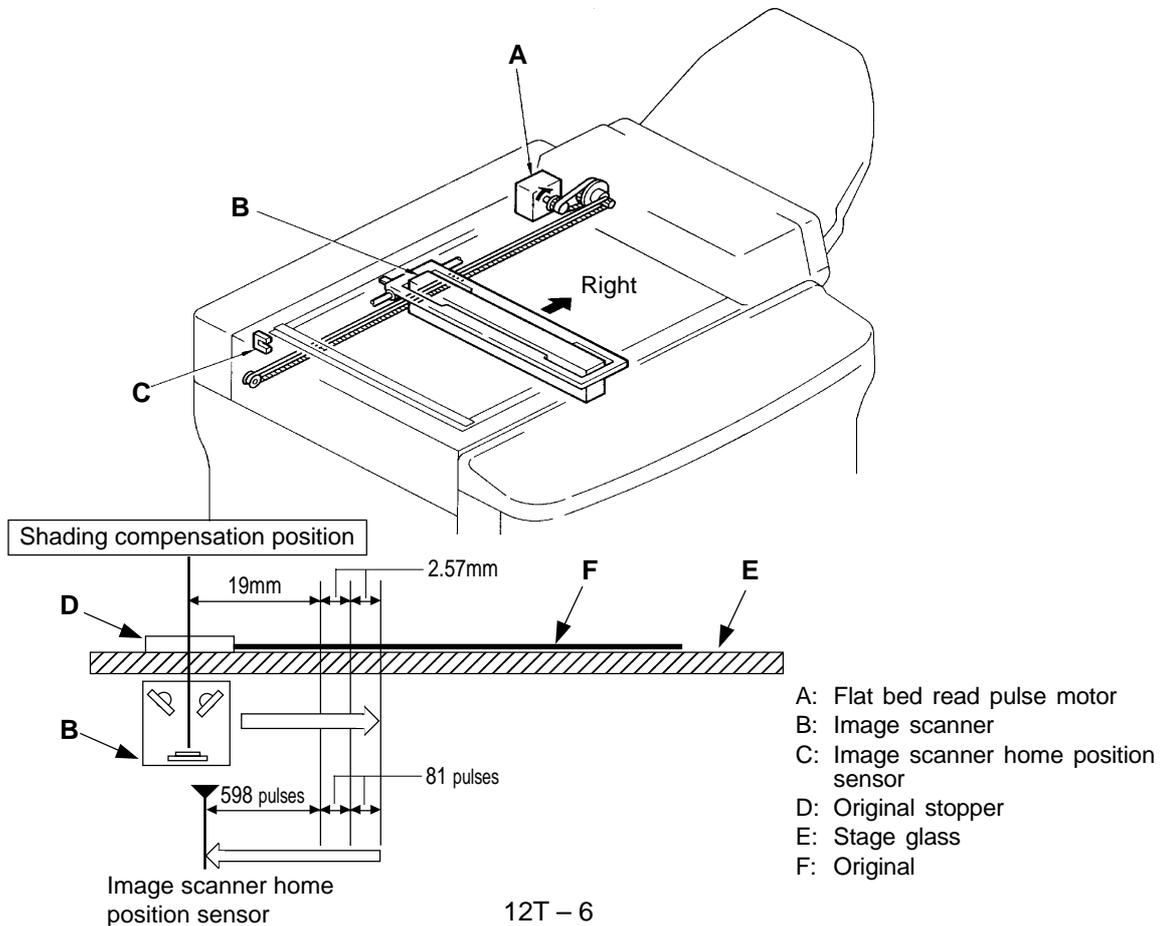
When the Image scanner returns to the home position, the Flat bed read pulse motor reverses the rotation, leading the Image scanner to start moving to the right again.

Subsequently, image is scanned in the same way as when scanning images without the Book processing feature.

- Availability of Auto Scanning Contrast Adjustment Mode

This functions only when the original read density is set to "AUTO."

The Auto scanning contrast adjustment mode is not available when any of the following features is selected; Photo mode, Duo mode, Dot photo mode or Book processing feature.



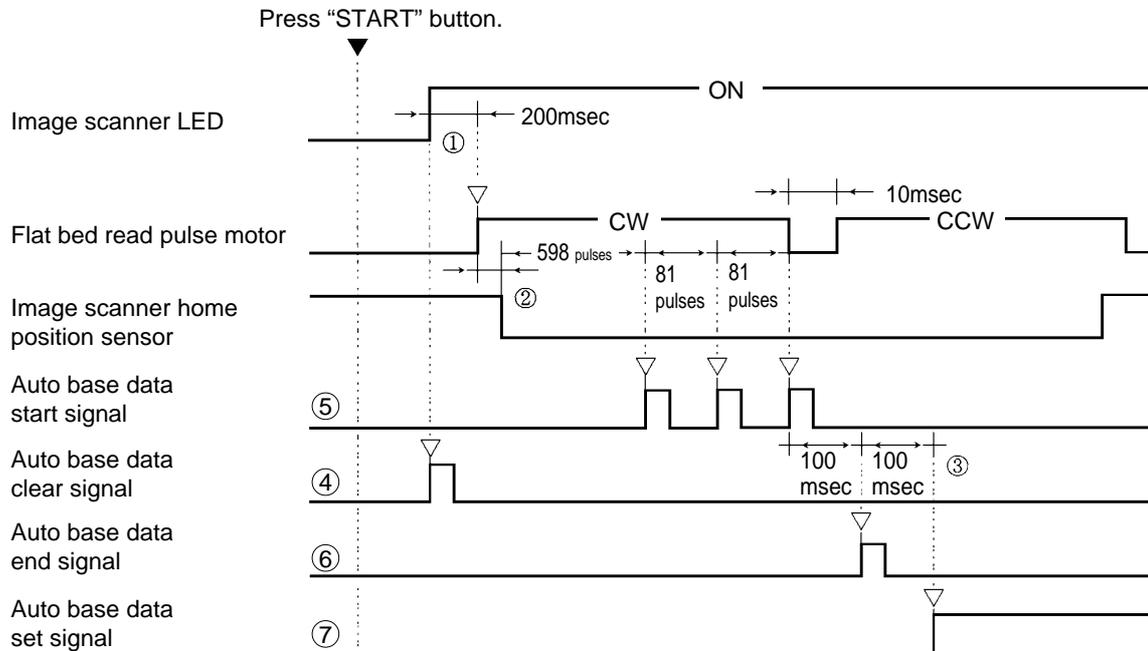
CHAPTER 12. FLAT BED IMAGE SCANNING SECTION

THEORY OF OPERATION

Test Mode No.49 Scnrer home position sensor
 – Short interval beeps when light path is blocked
 No.79 Image scanner LED lighting

- Timing Chart -

Image Scanning System - in Auto Scanning Contrast Adjustment Mode



- ① The shading compensation is made automatically when the LEDs of the Image scanner are turned ON.
- ② If the Image scanner has not gone out of the Image scanner home position sensor **within 314 pulses** after the Flat bed read pulse motor is activated, i.e. the light path of the sensor has not been opened, it is assumed that the Flat bed read pulse motor has been locked and the error message "**T15 CALL SERVICE**" is displayed on the operation panel.
- ③ If the Auto base data set signal has not been turned ON 100 msec after the Auto base data end signal is output, the operation is interrupted after the Image scanner returns to the home position and the error message "**T10 TURN MAIN POWER SW. OFF THEN ON**" is displayed on the operation panel.
- ④ If the Auto base data clear signal is turned on, the previous Auto base data will be cleared.
- ⑤ If the Auto base data start signal is turned on, the image data will be taken in by the image scanner.
- ⑥ The Auto base data end signal is to signal the end of taking in the image data.
- ⑦ The Auto base data set signal is turned on when the Auto base data is stored.

T15 (Flat Bed Read Pulse Motor Lock)
• Scanner home position sensor not turned off

T10 (Image Precessing PCB Failure)
• Auto base data set signal not turned on

5. Image Scanning System - Without Book Processing Feature & ADF

- Basic

The Image scanner is located at the Image scanner home position sensor, and the scanning starts after the shading compensation is made.

- Start of Image Scanning

By placing an original on the Stage glass and pressing the START button, the LEDs of the Image scanner are turned ON and the shading compensation is made.

200msec later, the Flat bed read pulse motor is activated to move the Image scanner to the right.

472 pulses after the Image scanner goes off the Image scanner home position sensor, the Read & Write start signal is turned ON and the image scanning starts.

At the same time, the Master making and Master removal processes take place.

- End of Image Scanning

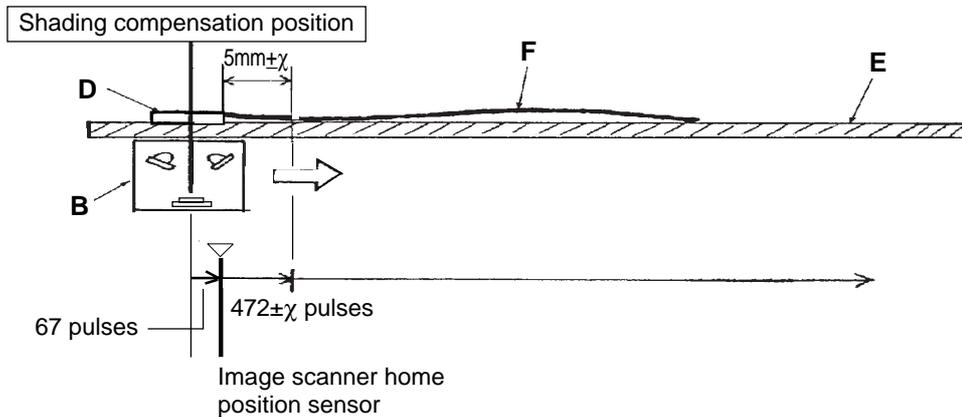
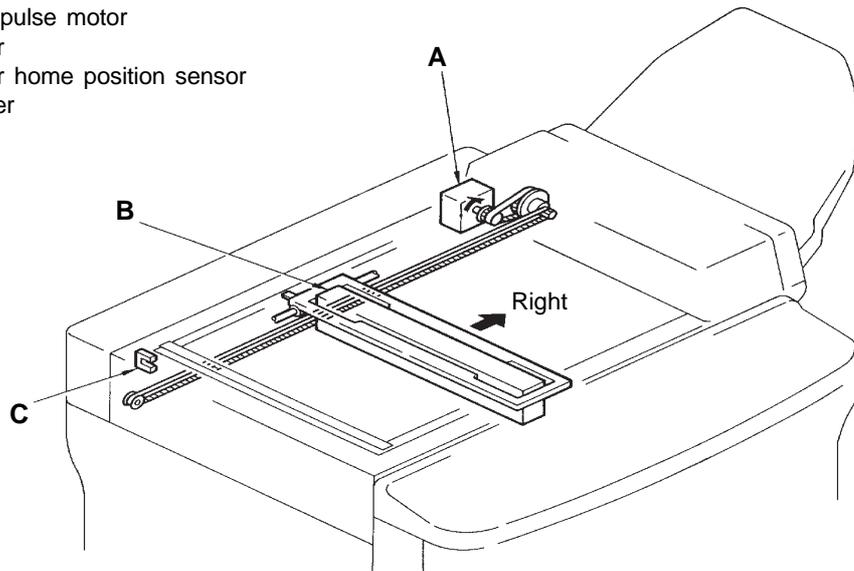
When a master is made for the size of the paper on the Paper feed tray, the Read & Write start signal and the Flat bed read pulse motor are turned OFF to end the image scanning process.

When the Read & Write start signal is turned OFF, the master making process is also finished and a new-made master starts to be loaded on the Drum after confirming that a used master has been removed completely.

- Return to Home of Image Scanner

200msec after the Read & Write start signal is turned OFF, the LEDs of the Image scanner are turned OFF and the Flat bed read pulse motor starts to reverse rotation to return the Image scanner to the home position (at the Image scanner home position sensor).

- A: Flat bed read pulse motor
- B: Image scanner
- C: Image scanner home position sensor
- D: Original stopper
- E: Stage glass
- F: Original



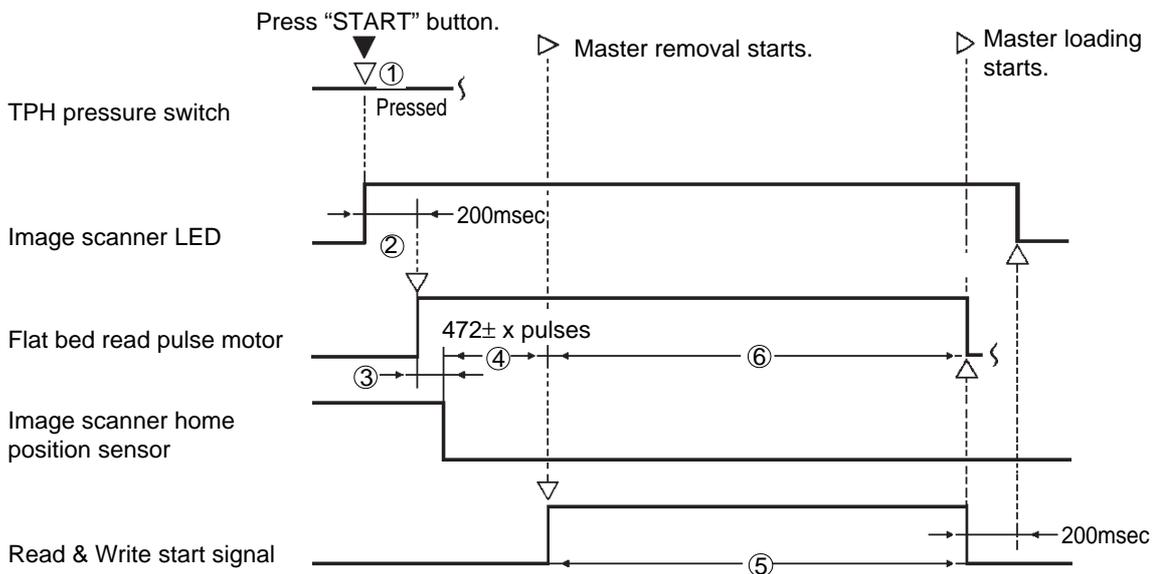
CHAPTER 12. FLAT BED IMAGE SCANNING SECTION

THEORY OF OPERATION

Test Mode No.49 Scnner home position sensor
 – Short interval beeps when light path is blocked
 No.79 Image scanner LED lighting

- Timing Chart -

Image Scanning System - Without Book Processing Feature & ADF



- ① If the TPH pressure switch is not pressed, the Thermal pressure motor is rotated until the switch is pressed.
The image scanning starts only after the TPH pressure switch is pressed.
- ② The shading compensation is made automatically when the LEDs of the Image scanner are turned ON.
- ③ If the Image scanner has not gone off the Image scanner home position sensor **within 314 pulses** after the Flat bed read pulse motor is activated, i.e. the light path of the sensor has not been opened, it is assumed that the Flat bed read pulse motor has been locked and the error code [T 15] is displayed on the operation panel.
- ④ The "x" pulse can be increased or decreased by Memory switch **No.213**.
- ⑤ The Read & Write start signal is turned OFF when a master is made for the size of the paper on the Paper feed tray.
- ⑥ If Read & Write start signal has not been turned OFF **within 13701 pulses** after it is turned ON, the signal and the LEDs of the Image scanner are turned OFF compulsively.

T15 (Flat Bed Read Pulse Motor Lock)
• Scanner home position sensor not turned off

6. Pre-Scanning System - With Book Processing Feature & Without ADF

- Basic

The Image scanner is located at the Image scanner ADF shading sensor, and the pre-scanning starts after the shading compensation is made.

- Start of Pre-Scanning (Check of Original Size)

By placing an original on the Stage glass and pressing the START button, the LEDs of the Image scanner are turned ON and the shading compensation is made.

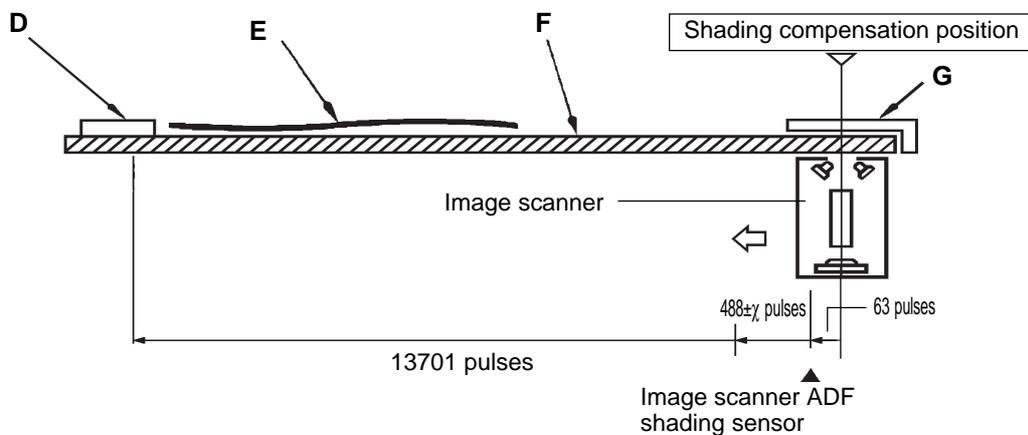
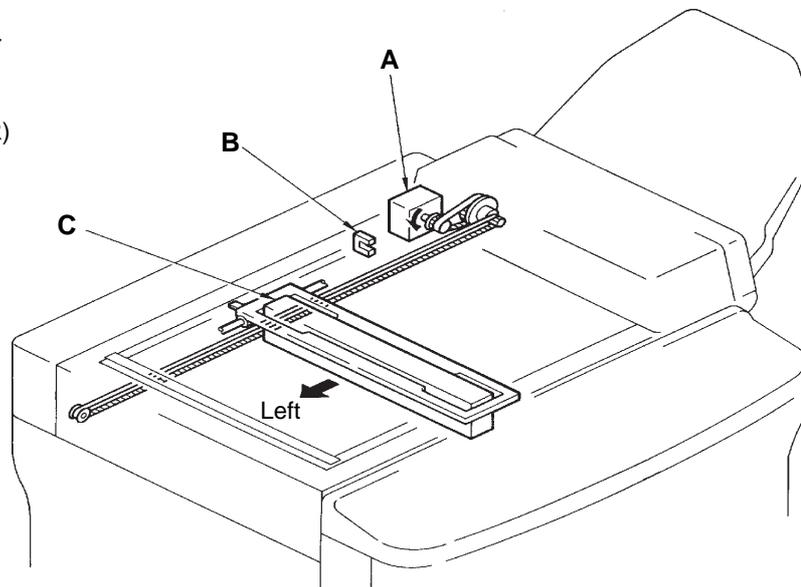
200ms later, the Flat bed read pulse motor is activated to move the Image scanner to the left.

488 pulses after the Image scanner goes off the Image scanner ADF shading sensor, the Image scanner starts to scan the original to find its size before scanning images.

- End of pre-Scanning

13701 pulses later, the Flat bed read pulse motor is deactivated to finish the pre-scanning operation and the image scanning process is started.

- A: Flat bed read pulse motor
- B: Image scanner ADF shading sensor
- C: Image scanner
- D: Original stopper
- E: Original
- F: Stage glass
- G: Glass holder (R)



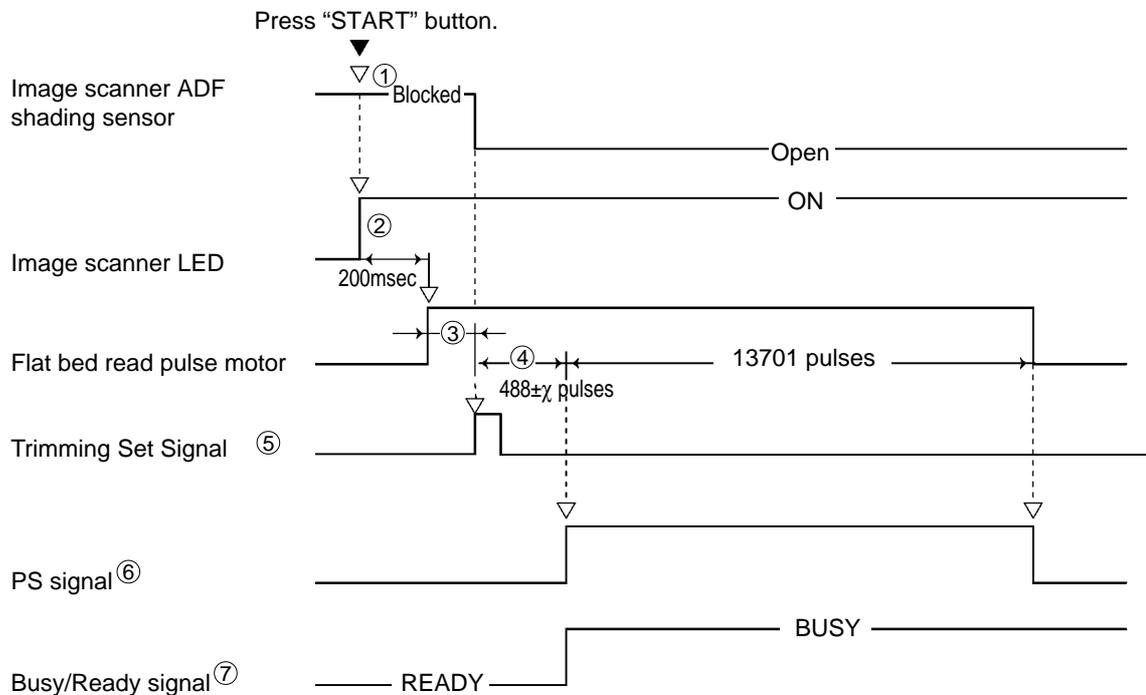
CHAPTER 12. FLAT BED IMAGE SCANNING SECTION

THEORY OF OPERATION

Test Mode No.50 Scanner ADF shading sensor
 – Short interval beeps when light path is blocked
 No. 79 Image scanner LED lighting

- Timing Chart -

Pre-Scanning System - With Book Processing Feature & Without ADF



- ① If the Image scanner ADF shading sensor is not detecting the bracket of the Image scanner, the Image scanner is moved to the ADF shading position to set the Image scanner ready for the pre-scanning process.
- ② The Shading compensation is made automatically when the LEDs of the Image scanner are turned ON.
- ③ If the Image scanner has not gone off the Image scanner ADF shading sensor **within 314 pulses** after the Flat bed read pulse motor is activated, it is assumed that the Flat bed read pulse motor has been locked and the error code **[T 15]** is displayed on the operation panel.
- ④ The "x" pulse can be increased or decreased by Memory switch **No.214**.
- ⑤ The trimming set signal is the signal to start of trimming. It is output from the Image Processing PCB to the Trimming PCB, clearing the previous trimming data.
- ⑥ The PS signal is the command to confirm the size of the original, which is output from the Image processing PCB to the Trimming PCB.
- ⑦ "Busy" signal is output from the Trimming PCB to the Image processing PCB while the Trimming PCB is calculating and confirming the original size.

T15 (Flat Bed Read Pulse Motor Lock)
• Scanner ADF shading sensor not turned off

7. Image Scanning System - With Book Processing Feature & Without ADF

- Basic

After the pre-scanning is finished, the Image scanner starts to scan images.

The Shading compensation is already made at the beginning of the pre-scanning process.

- Start of Image Scanning

When the pre-scanning is finished and the original size is calculated, the Flat bed read pulse motor is activated to move the Image scanner to the right.

When the Flat bed read pulse motor rotates by a given number of pulses, which is given as a result of the original size calculation, the Read & Write start signal is turned ON, leading the Image scanner to start scanning images.

At the same time, the Master making and Master removal processes take place.

- End of Image Scanning

When images are scanned for the calculated size of the original or if a master is made for the size of the paper on the Paper feed tray, the Read & Write start signal and the Flat bed read pulse motor are turned OFF to end the image scanning process.

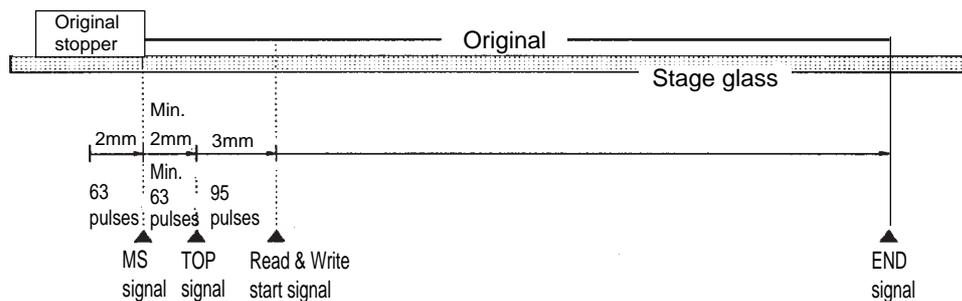
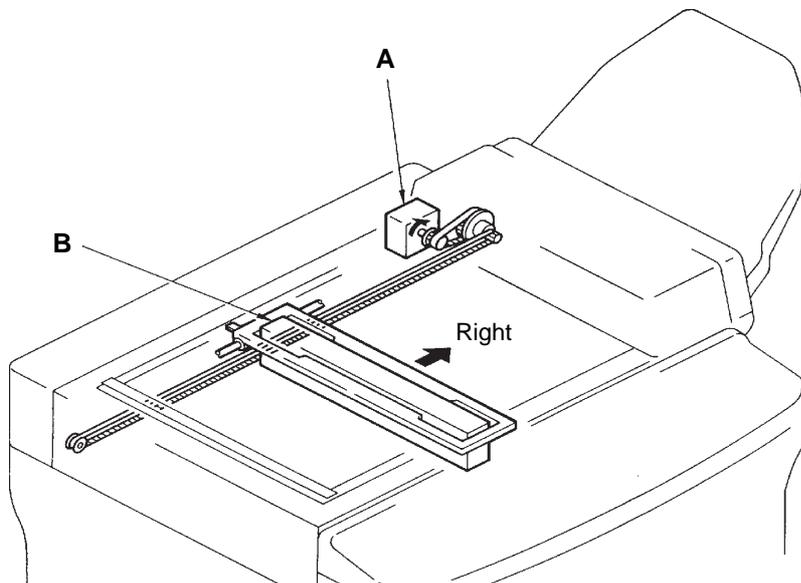
When the Read & Write start signal is turned OFF, the master making process is also finished and a new-made master starts to be loaded on the Drum after confirming that a used master has been removed completely.

- Return to Home of Image Scanner

200msec after the Read & Write start signal is turned OFF, the LEDs of the Image scanner are turned OFF and the Flat bed read pulse motor restarts rotating to return the Image scanner to the home position for the Book processing feature (at the Image scanner ADF shading sensor).

A: Flat bed read pulse motor

B: Image scanner

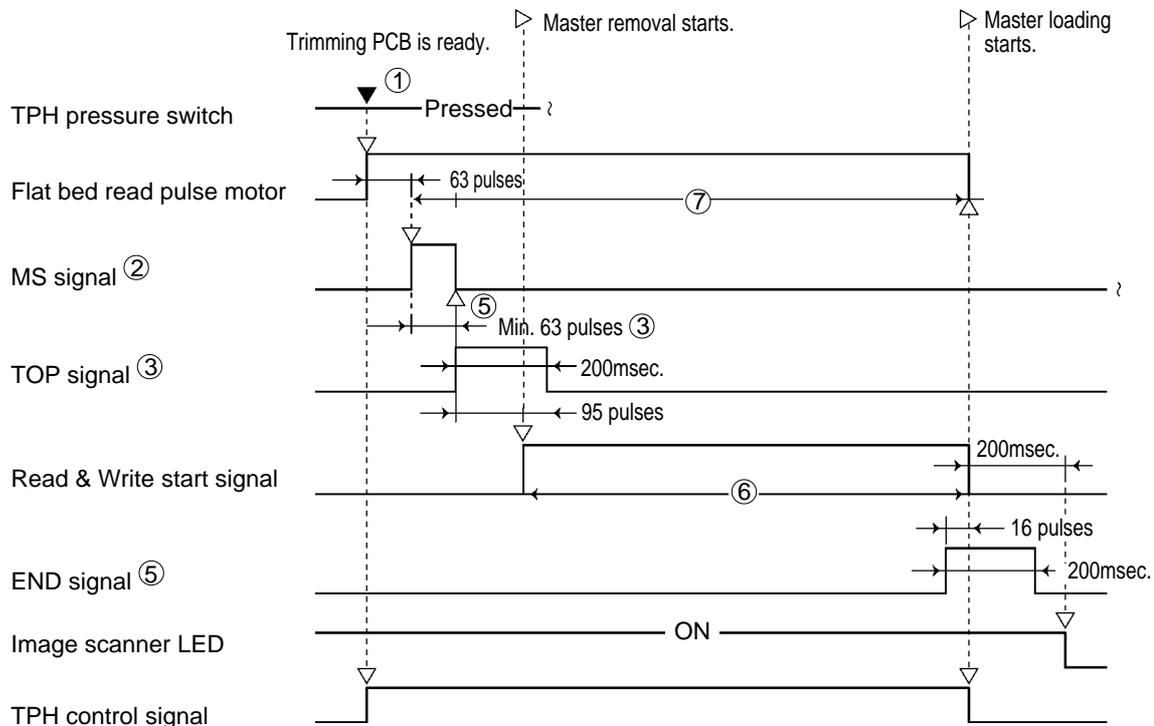


CHAPTER 12. FLAT BED IMAGE SCANNING SECTION

THEORY OF OPERATION

- Timing Chart -

Image Scanning System - With Book Processing Feature & Without ADF



- ① The image scanning starts only after the TPH pressure switch is pressed ON. If the TPH pressure switch is not pressed ON, the Thermal pressure motor is rotated until the switch is pressed.
- ② The MS signal is the signal to start image scanning, which is output from the Image processing PCB to the Trimming PCB.
- ③ The TOP signal is the signal to identify the top position of the original confirmed during the pre-scanning process, which is output from the Trimming PCB to the Image processing PCB. The TOP signal is output from the Trimming PCB **63 ~ 158 pulses** after the MS signal is received by the Trimming PCB. The start position of image writing (master making) is automatically compensated, even though an original is misplaced away from the Original stopper on the Stage glass, if the lead edge remains **within 3mm** from the Original stopper.
- ④ If the TOP signal has not been output **within 315 pulses** after the the MS signal is output, it is assumed that the Trimming PCB is faulty and the error code [T 10] is displayed on the panel.
- ⑤ The END signal is the signal indicating the tailing edge of the original which is confirmed during the pre-scanning process. It is output from the Trimming PCB to the Image processing PCB.
- ⑥ If the Write pulse motor has rotated for the size of the paper on the Paper feed tray, the Read & Write start signal and the LEDs of the Image scanner are turned OFF even before the END signal is output.
- ⑦ After the MS signal is output, if the END signal has not been output **within 13701 pulses** after the Flat bed read pulse motor is activated, the Read & Write start signal and the LEDs of the Image scanner are turned OFF, and a new-made master starts to be loaded on the Drum.

T10 (Image Processing PCB)
• TOP Signal not turned ON from Trimming PCB

MEMO

REMOVAL & ASSEMBLY

1. Stage Glass

< Removal Procedure >

1. Turn OFF the power and remove all Scanner covers (front, rear, right and left).

[Note]

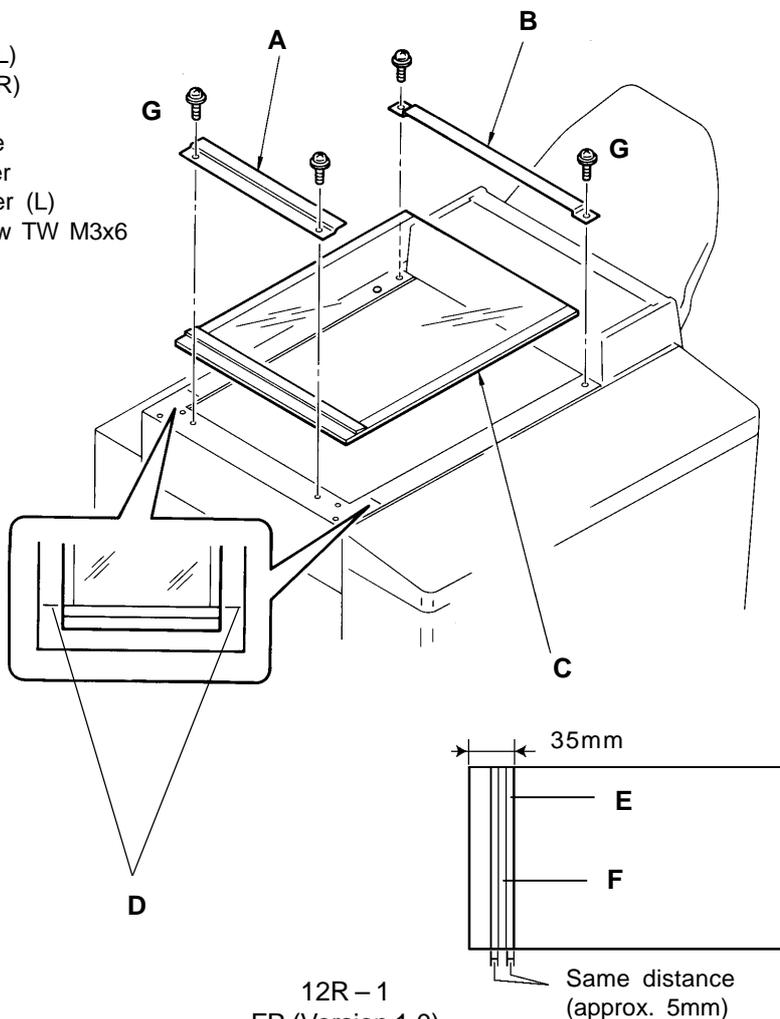
If the machine is equipped with the ADF unit, remove the FB-ADF covers (F) and (R).

2. Remove two screws each from the Glass holder (L) and Glass holder (R), and remove these two Glass holders.
3. Lift and remove the Stage glass.

-Precautions in Assembly -

- When placing the Stage glass back on the machine, touch the edges of the glass and their extended lines with the frames of the positioning lines on the Scanner table frame, as shown below.
- Do not scratch, stain or damage the Shading plate attached underneath the Glass holder (R).
- When replacing the Original stopper and Shading stopper (L) underneath on the Stage glass, attach them on the Stage glass as shown in the figure below.
- Check the scanning start position after assembly (Page12A-1)

- A: Glass holder (L)
- B: Glass holder (R)
- C: Stage glass
- D: Positioning line
- E: Original stopper
- F: Shading stopper (L)
- G: Pan-head Screw TW M3x6



2. Image Scanner

< Removal Procedure >

1. Turn OFF the power and remove the Stage glass, referring to the previous page.
2. Shift the Image scanner to reach mounting screws.
3. Remove the mounting screw on the Image scanner wire stand.
4. Disconnect the Image flexible wire from the Image scanner.
5. Remove four mounting screws on the Image scanner, and take out the scanner from the Image scanner carriage, lifting it upward gently.

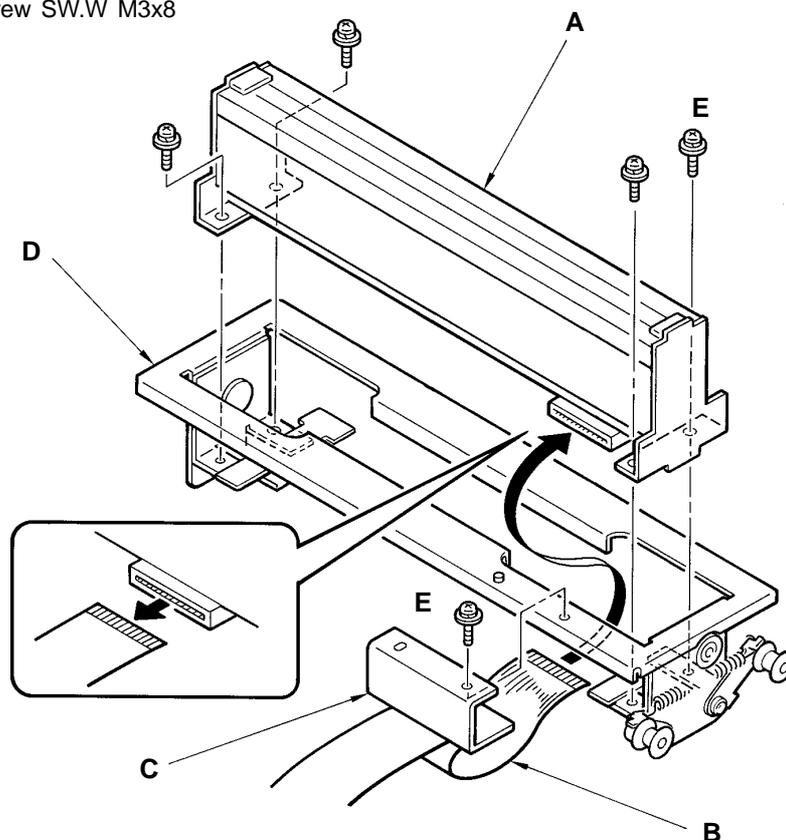
- Precautions in Assembly -

- Confirm that the Image scanner is installed in the Image scanner carriage, parallel to the Scanner table frame.

- Adjustments after Assembly -

- FB Scanning start position(Page 12A-1)
- ADF Scanning start position(Page 13A-2)

- A: Image scanner
- B: Image flexible wire
- C: Image scanner wire stand
- D: Image scanner carriage
- E: Pan-head Screw SW.W M3x8



3. Image Scanner Carriage

< Removal Procedure >

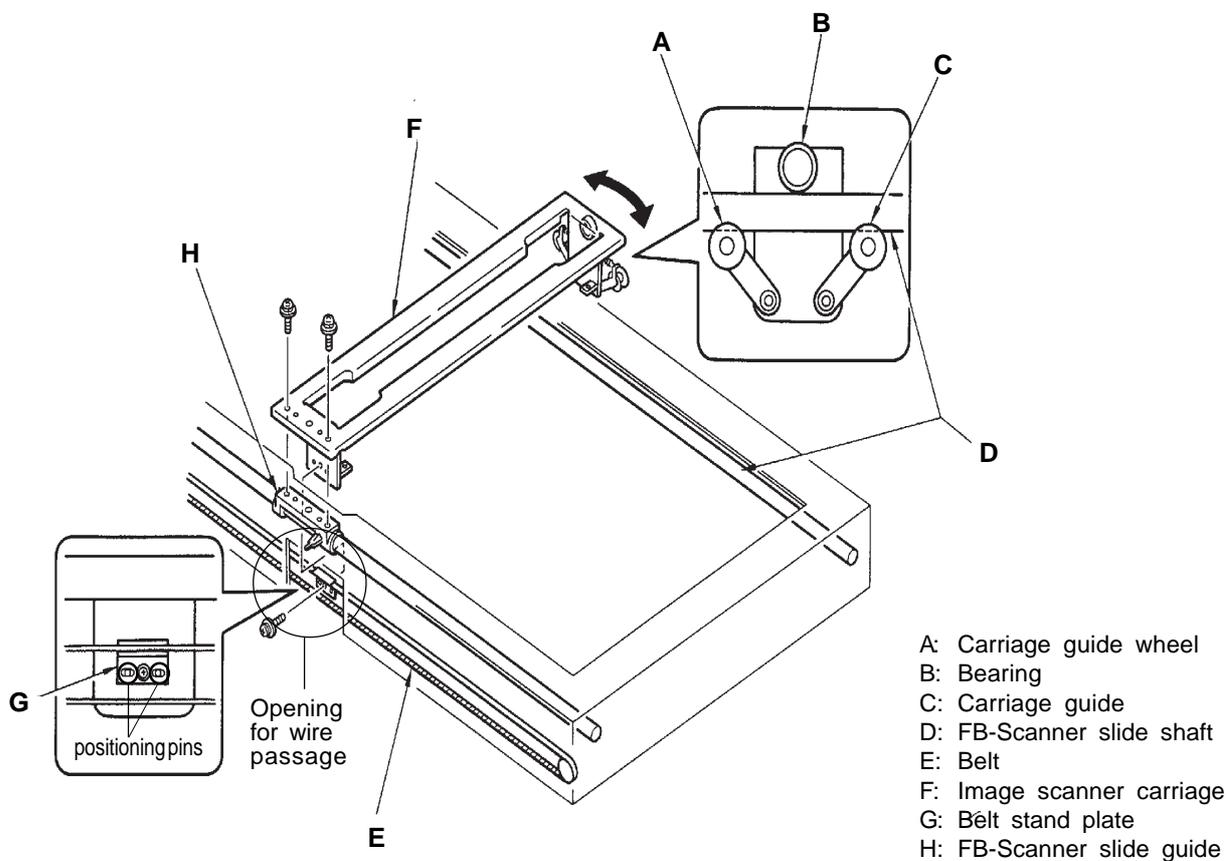
1. Turn OFF the power and remove the Image scanner, referring to the previous page.
2. Shift the Image scanner carriage to the position about at the middle of the Scanner table, where the Scanner table frame is cut to pass the Image flexible wire.
3. Remove the mounting screw on the FB-Scanner belt stand plate and free the plate from the Image scanner carriage.
4. Remove two mounting screws on the Image scanner carriage and separate the carriage from the FB-Scanner slide guide.
5. Gently rock the other end of the Image scanner carriage on the panel side horizontally and free two Carriage guide wheels from the FB-Scanner slide shaft to take out the carriage from the Scanner table.

- Precautions in Assembly -

- Match the positioning pins on the Image scanner carriage with positioning holes on the FB-Scanner belt stand plate when attaching the belt stand plate onto the carriage. The positioning pins can be located at any part of the holes.

- Adjustments after Assembly -

- FB Scanning start position (Page 12A-1)
- ADF Scanning start position (Page 13A-2)



- A: Carriage guide wheel
- B: Bearing
- C: Carriage guide
- D: FB-Scanner slide shaft
- E: Belt
- F: Image scanner carriage
- G: Belt stand plate
- H: FB-Scanner slide guide

4. Flat Bed Read Pulse Motor

< Removal Procedure >

1. Turn OFF the power, and remove the FB-Scanner cover (right) by removing two mounting screws.

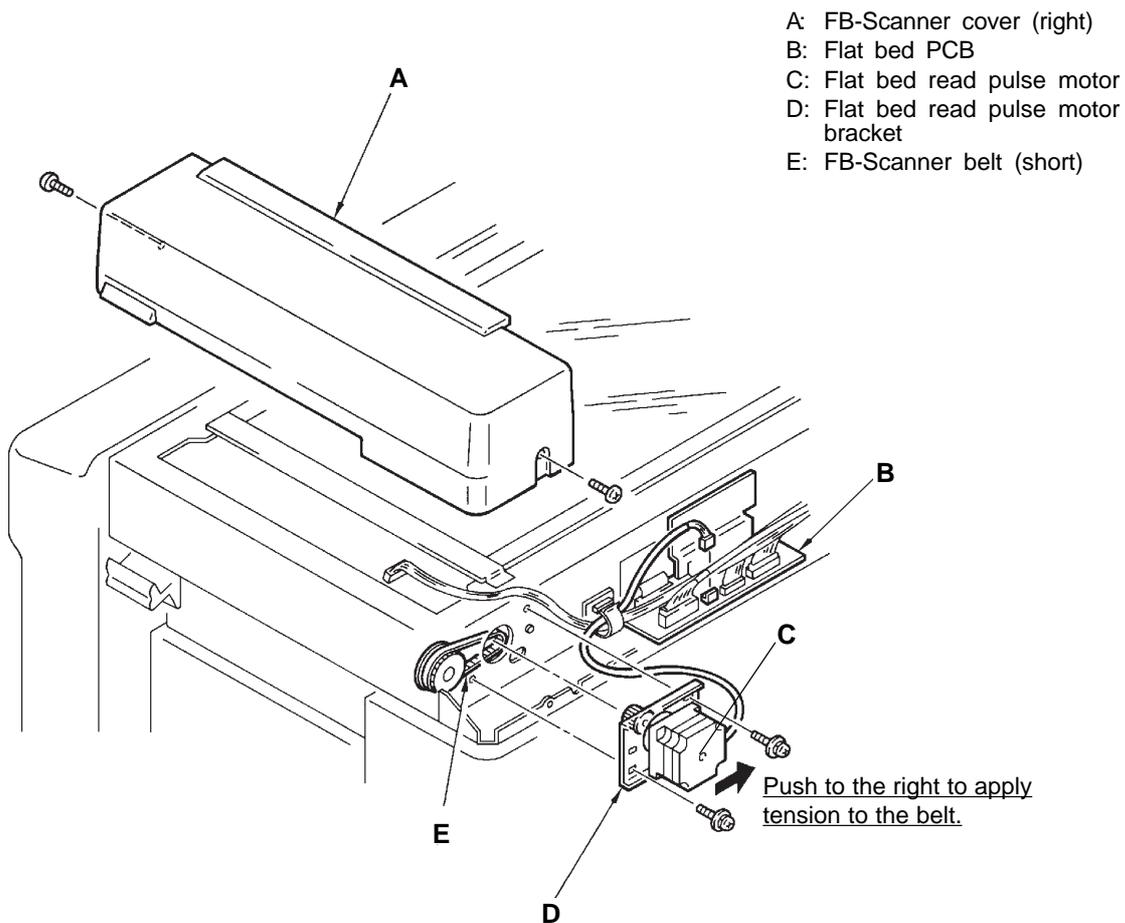
[Note]

If the machine is equipped with FB-ADF unit, remove the FB-ADF unit.

2. Remove two mounting screws of the Stage cover, and remove the Stage cover.
3. Unplug the connector of the Flat belt read pulse motor from **CN3** of the **Flat bed PCB**.
4. Remove two mounting screws on the Flat bed read pulse motor bracket, and remove the motor from the Scanner table frame together with the bracket.
5. Remove two mounting screws of the Flat bed read pulse motor and separate the bracket from the motor.

- Precautions in Assembly -

- When securing the motor, tighten the mounting screws, pushing the motor to the right to apply enough tension to the FB-Scanner belt (short).
- Make sure to match the positioning pins on the Scanner table frame into the positioning holes of the Flat bed read pulse motor bracket.



5. FB-Scanner Belts

< Removal Procedure >

1. Turn OFF the power, and remove the FB-Scanner cover (right) by removing two mounting screws.

[Note]

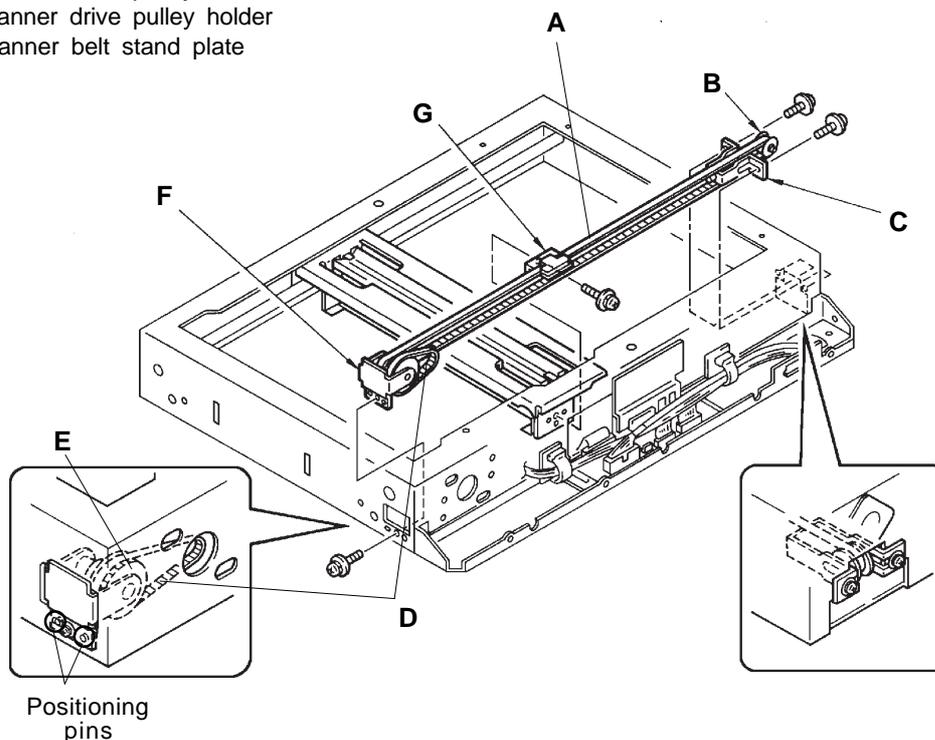
If the machine is equipped with the ADF unit, remove the ADF unit and FB-ADF cover (right).

2. Remove the Stage glass.
3. Remove the Flat bed read pulse motor.
4. Remove the mounting screw of the FB-Scanner drive pulley holder and separate the holder from the Scanner table frame.
5. Remove the mounting screw of the FB-Scanner belt stand plate to free the plate from the Image scanner carriage.
6. Remove two mounting screws on the FB-Scanner tension holder, and disengage the long FB-Scanner belt from the pulley of the tension holder.
7. Remove the securing screw on the FB-Scanner belt stand plate and separate the plate from the long FB-Scanner belt.

- Precautions in Assembly -

- Match the positioning pins on the Image scanner carriage with positioning holes on the FB-Scanner belt stand plate when attaching the belt stand plate onto the carriage. The positioning pins can be located at any part of the holes.
- Match the positioning pins on the FB-Scanner drive pulley holder with the positioning holes on the Scanner table frame.

- A: FB-Scanner belt (long)
- B: Pulley
- C: FB-Scanner tension holder
- D: FB-Scanner belt (short)
- E: FB-Scanner drive pulley
- F: FB-Scanner drive pulley holder
- G: FB-Scanner belt stand plate



CHAPTER 12. FLAT BED IMAGE SCANNING SECTION

REMOVAL & ASSEMBLY

Flat bed PCB LED 1 Flat bed original detection sensor
– Light up when reflected light detected
Test Mode No.51 Stage cover sensor
– Short interval beeps when light path is blocked
No.52 Flat bed original detection sensor
– Short interval beeps when reflected light detected
No.79 Image scanner LED lighting

6. Image Flexible Wire

< Removal Procedure >

1. Turn OFF the power and remove the Stage glass.
2. Remove the Image scanner wire stand from the Image scanner, disconnect the Image flexible wire from the Image scanner.
3. Remove five mounting screws each of the rails to remove both rails.
4. Remove five mounting screws on the Image flexible wire cover plate, and remove the plate.
5. Disconnect the Image flexible wire from the Flat bed PCB.

- Precautions in Assembly -

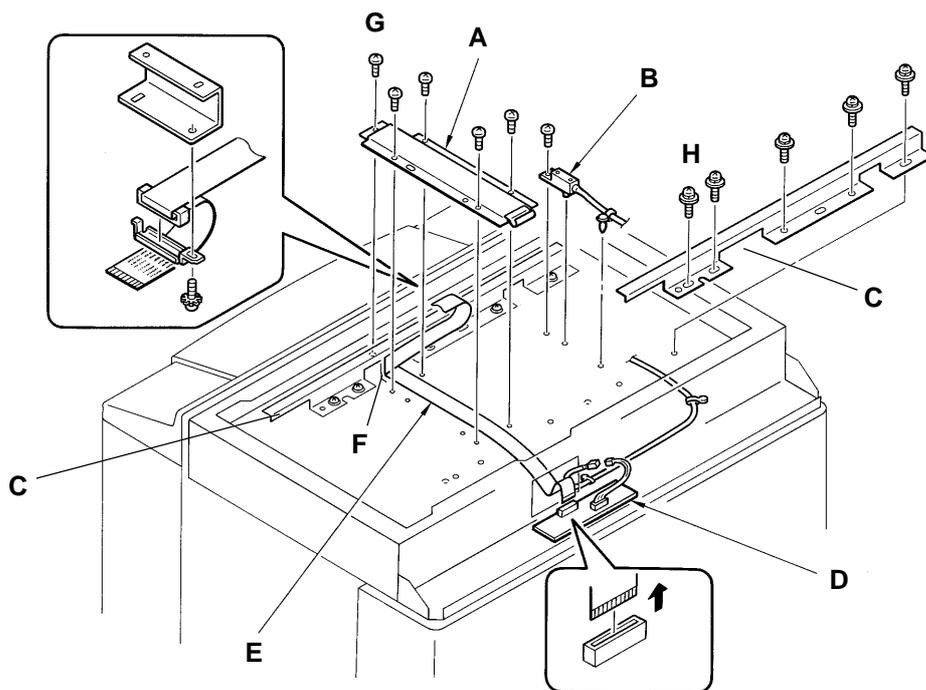
- Secure the bent portion of the Image flexible wire to the guideline-marked position on the bottom plate of the Scanner table, meeting the side edge of the wire with the guide line.

7. Flat Bed Original Detection Sensor

< Removal Procedure >

1. Turn OFF the power and remove the Stage glass.
2. Remove the mounting screw on the Flat bed original detection sensor.
3. Unplug the connector of the sensor just before the Flat bed PCB and take out the sensor.

- A: Wire cover
B: Flat bed original detection sensor
C: Rail
D: Flat bed PCB
E: Image flexible wire
F: Positioning line
G: Bind-head Screw M3x4
H: Bind-head Screw M3x6



ADJUSTMENT

1. Scanning Start Position

(1) When Scanning on the Stage Glass (Without the Book processing feature)

1. Place a ruler with scales engraved from the top edge on the Stage glass, against the Original stopper as shown on the sketch below, and close the Stage cover.
2. Select the PHOTO mode by LINE/PHOTO button and make a master and then print.
3. Check the print and confirm that the top **5±2mm** of the scale is erased on the print.
4. If more or less is erased, use Memory SW **No.213** to make the correction.
5. Press the PRINT POSITION button to select a Memory switch setting referring to the chart on next page.

For instance, if Memory switch setting number **4** needs to be selected, press the PRINT POSITION button to move the number up or down until the display shows **4 213**.

6. Press the **STOP** button and then the **ALL RESET** button to input the selected number. The panel display returns to an ordinary indication.

SW setting	9	A	B	C	D	E	F	O
Amount (mm)	-2.8	-2.4	-2.0	-1.6	-1.2	-0.8	-0.4	0
SW setting	1	2	3	4	5	6	7	8
Amount (mm)	+0.4	+0.8	+1.2	+1.6	+2.0	+2.4	+2.8	+3.2

← Skip Amount →
(Use the PRINT POSITION key to adjust)

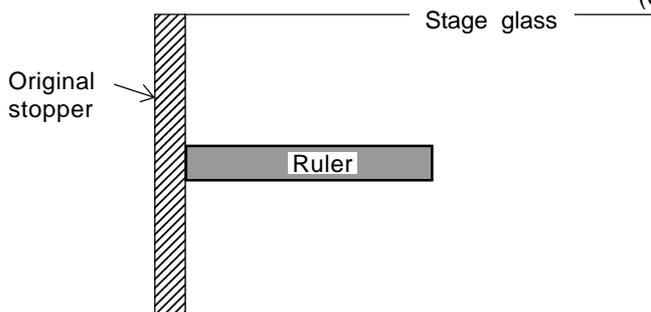
(2) When Scanning on the Stage Glass (With the Book processing feature)

1. Erase top **3mm** of the ruler with a white correction fluid and place it on the Stage glass, against the Original stopper, and close the Stage cover.
The **top 3mm must be erased white** to make "white margin" for this adjustment to work properly.
2. Select the PHOTO mode by LINE/PHOTO button and select BOUND BOOK CENTER mode (does not matter if it is Photo or Erase), and make a master and then print.
3. Check the print and confirm that the **5±2mm** of the ruler from its top is erased on the print.
4. If more or less is erased, use Memory SW **No.214** (Test mode No.82) to make the correction.

At Book Mode

SW setting	9	A	B	C	D	E	F	O
Amount (mm)	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0
SW setting	1	2	3	4	5	6	7	8
Amount (mm)	+0.2	+0.4	+0.6	+0.8	+1.0	+1.2	+1.4	+1.6

← Skip Amount →
(Use the PRINT POSITION key to adjust)



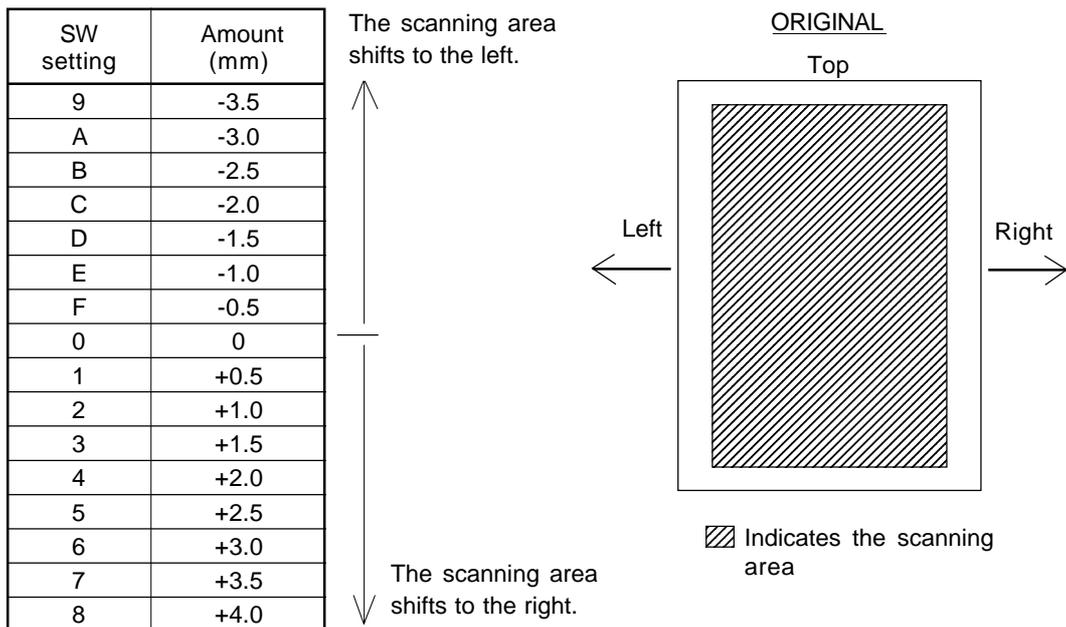
2. Horizontal Scanning Position

- When Scanning on the Stage Glass

1. Place **Test chart** on the Stage Glass, against the Original stopper.
2. Make a master at **[1:1]** size and make prints.
3. Check if all "e" marks on both sides of the test chart original appear on the master on the Drum.
4. If not, adjust the horizontal scanning position by Memory SW **No.212**, referring to the chart below.
5. Press the PRINT POSITION button to select a desired Memory switch setting referring to the chart below.
For instance, if Memory switch setting number **9** needs to be selected, press the PRINT POSITION button to move the number up or down until the display shows **9 212**.
6. Press the **STOP** button and then the **ALL RESET** button to input the selected number.
The panel display returns to an ordinary indication.

[IMPORTANT]

If "e" marks on both sides are missing in a large area, check the installation position of the **Paper size potentiometer** under the Paper feed tray, and the **Master making width adjustment**.



(Use the PRINT POSITION key to adjust)

MEMO

CHAPTER 13: ADF IMAGE SCANNING SECTION

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- 3. ADF Image Scanning System 13T-6

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- 1. ADF Glass, ADF Original IN Sensor (receive), ADF Switch, White Roller 13R-1
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- 1. Sensitivity of Original IN Sensor 13A-1
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THEORY OF OPERATION

1. ADF Original Loading System

- Basic

An original is loaded into the ADF unit via the Original pickup motor and waits until the "START" button is pressed to start the image scanning operation.

- Start of Original Loading

When originals are set in the ADF unit, they push the actuator out of the ADF original detection sensor.

2 seconds later, the Original pickup solenoid is energized and lowers the ADF pickup roller (upper).

200ms later, the Original pickup motor is energized to turn the ADF pickup roller (upper) and ADFstripper roller (via ADF gear and belt).

- Pickup of One Original

As the ADF stripper is pressed against the ADF stripper roller, one original is separated and fed into the ADF unit by rotation of the ADF stripper roller.

The original pushes the actuator out of the Original registration sensor, and **200ms** later, the Original pickup solenoid and Original pickup motor are turned OFF.

10ms later, the ADF read pulse motor is activated to turn the ADF transfer roller, White roller (Read roller) and ADF exit roller (upper) via pulleys and belts.

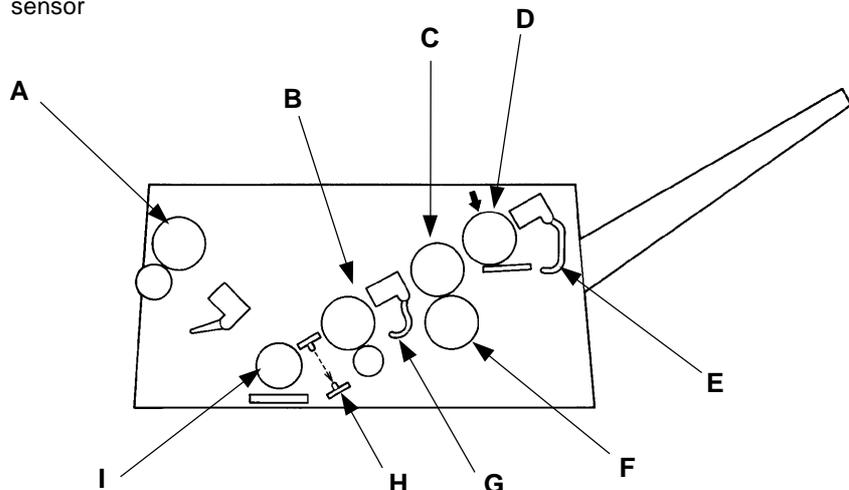
- Finish of Original Loading

The ADF read pulse motor is turned OFF **778 pulses** after the leading edge of the original blocks the light path of the Original IN sensor.

- Change of Panel Display & Preparation for Master Making

The "Master-Making/Print" display on the operation panel is changed from "PRINT" to "MASTER MAKING". At the same time, the Thermal pressure motor is activated to lower the Thermal print head until the TPH pressure switch is pressed.

- A: ADF exit roller
- B: ADF transfer roller
- C: ADF stripper roller(upper)
- D: ADF pickup roller(upper)
- E: ADF original detection sensor
- F: ADF stripper roller(lower)
- G: Original registration sensor
- H: Original IN sensor
- I: White roller

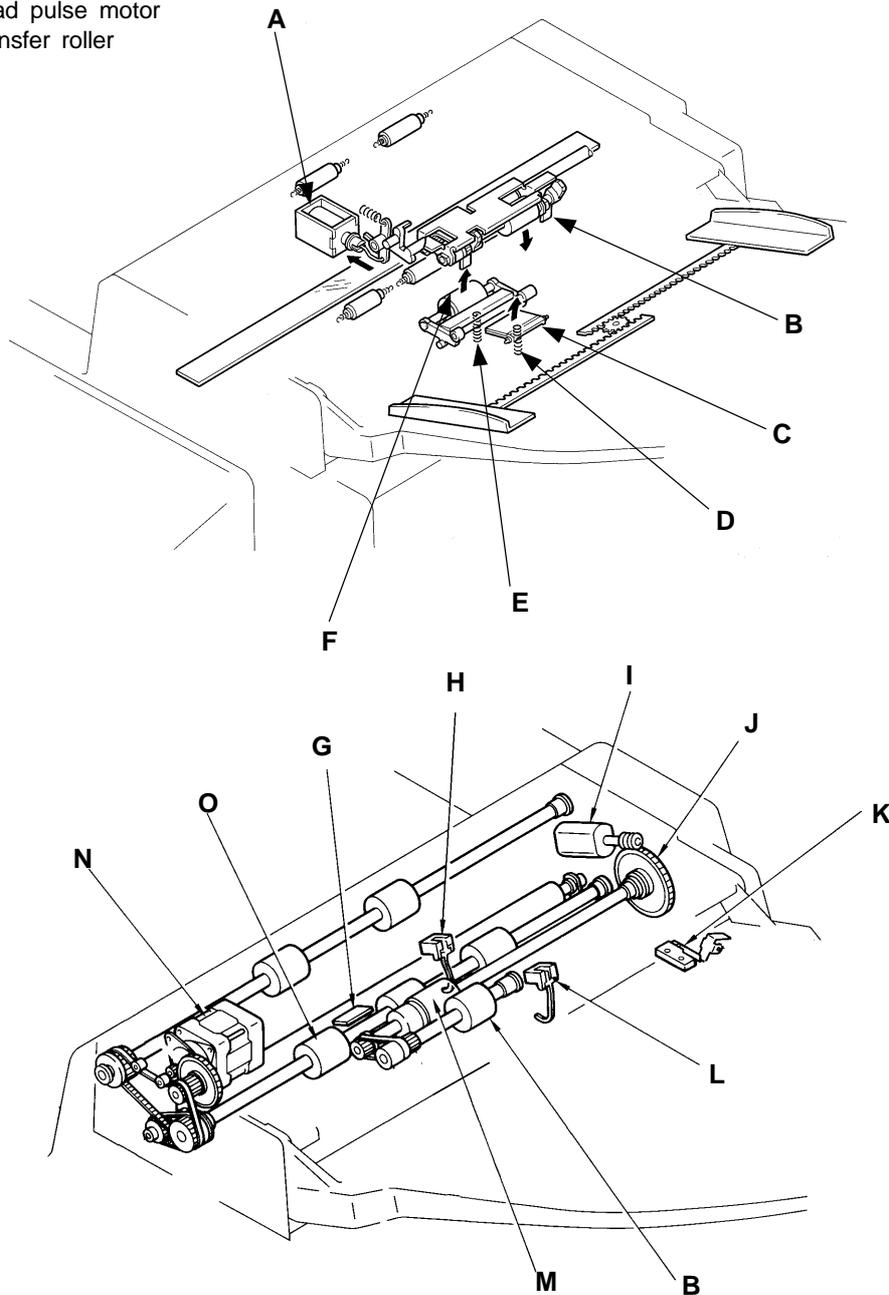


CHAPTER 13. ADF IMAGE SCANNING SECTION

THEORY OF OPERATION

- A: Original pickup solenoid
- B: ADF pickup roller(upper)
- C: Stripper pad
- D: Tray spring
- E: Stripper arm spring
- F: ADF stripper roller(lower)
- G: Original IN sensor
- H: Original registration sensor
- I: Original pickup motor
- J: ADF gear
- K: ADF switch
- L: ADF original detection sensor
- M: ADF stripper roller(upper)
- N: ADF read pulse motor
- O: ADF transfer roller

- Test Mode
- No.34 ADF original detection sensor
– Short interval beeps when pressed
 - No.35 Original registration sensor
– Short interval beeps when pressed
 - No.36 Original IN sensor
– Short interval beeps when light path is blocked
 - No.46 ADF SW
– Short interval beeps when pressed
 - No.76 Original pickup solenoid
 - No.78 Original pickup motor
 - No.113 ADF original feed operation

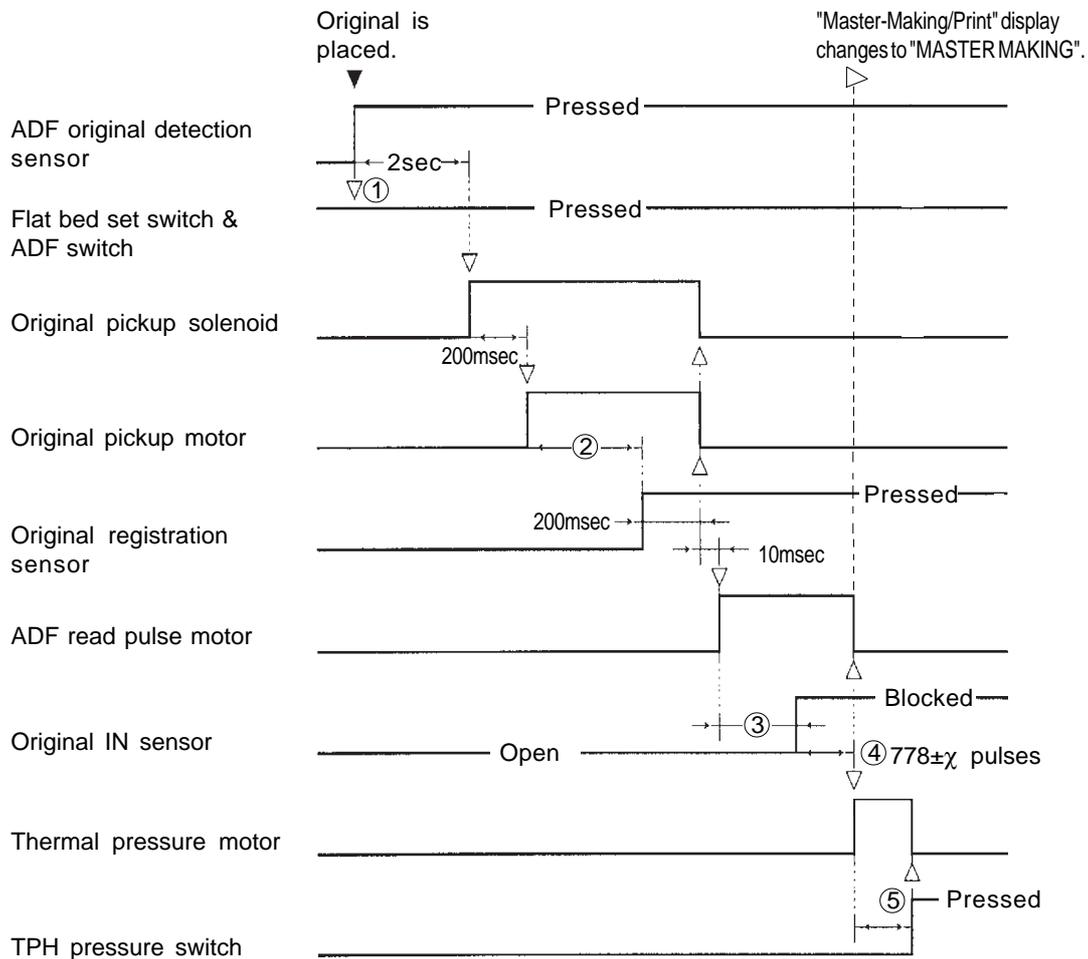


CHAPTER 13. ADF IMAGE SCANNING SECTION

THEORY OF OPERATION

- Timing Chart -

ADF Original Loading System



- ① The Flat bed set switch and ADF switch should be actuated ON to activate the ADF original detection sensor.
- ② If the Original registration sensor has not detected an original **within 1.35 seconds** after the original pickup motor is activated, the machine assumes the original has misfed and displays the error message "ORIGINAL MISFEED OPEN ADF COVER AND RESET ORIGINAL".
- ③ If the Original IN sensor has not detected an original **within 630 pulses** after the ADF read pulse motor is activated, the machine assumes the original has jammed at the ADF entrance and displays the error message "ORIGINAL JAM RESET ORIGINAL".
- ④ The adjustment of "x" pulses is possible by using the Memory switch **No.218**.
- ⑤ If the TPH pressure switch has not been actuated ON **within 4 seconds** after the Thermal pressure motor is activated, the machine assumes that the Thermal pressure motor has been locked and displays the error message "T19 CALL SERVICE".

2. ADF Image Scanning System - in Auto Scanning Contrast Adjustment Mode

- Shading Compensation

When the "START" button is pressed, after the original has been set in position, the LEDs of the Image Scanner are turned ON and the shading compensation is made.

200ms later, the Flat bed read pulse motor is activated, leading the Image scanner to the position for image scanning under the ADF unit.

- Reading (Detection) of Original Background Density [AUTO BASE CONTROL]

After the Image scanner slides out of the Image scanner ADF shading sensor, the Flat bed read pulse motor rotates **1811 pulses** more and then stops with the Image scanner positioned for image scanning.

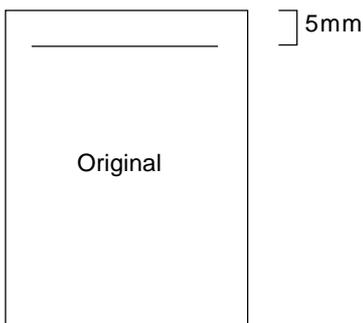
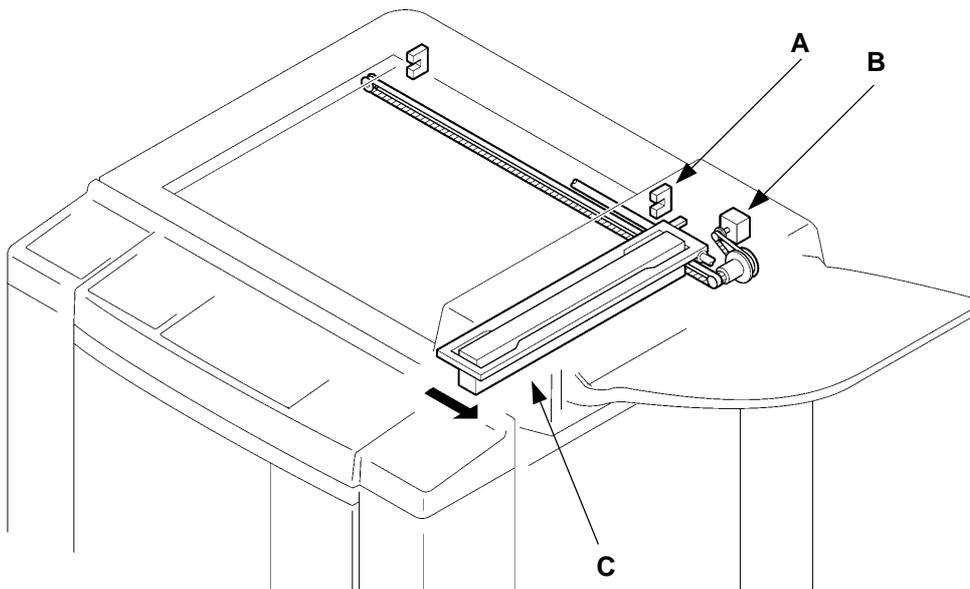
At the same time, the Auto base control data is cleared from the memory on the Image processing PCB and the Image scanner starts reading the original background density for the new Auto base control data.

- Start of Image Scanning

After the original background density data which has been read in are processed into the new Auto base control data, the FB-ADF read pulse motor is activated to feed the original and the Read & Write start signal is turned ON to start image scanning.

- Availability of Auto Scanning Contrast Adjustment Mode

The Auto scanning contrast adjustment mode is not available with the Photo mode, Duo mode or Dot photo mode.



A: Image scanner ADF shading sensor
B: Flat bed read pulse motor
C: Image scanner

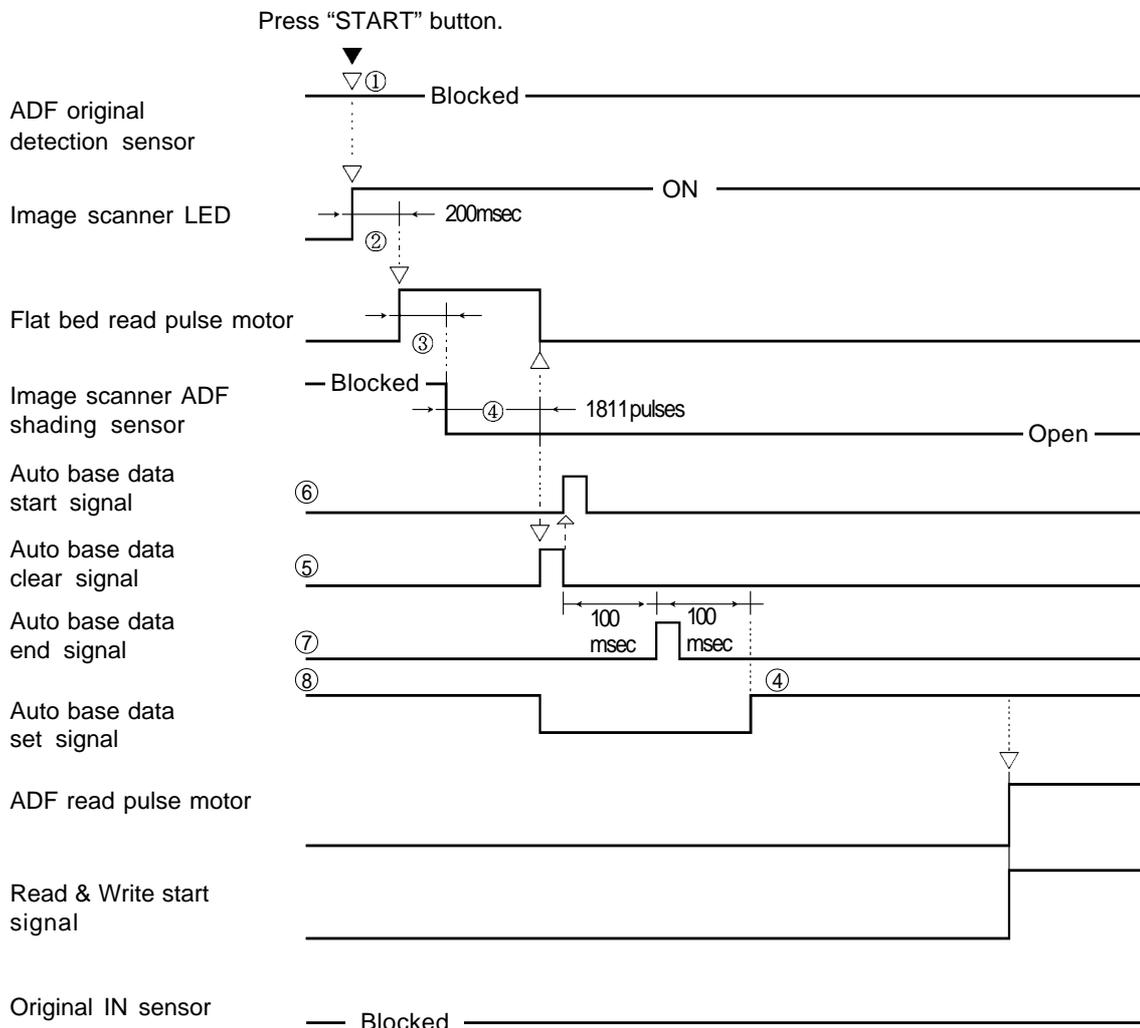
CHAPTER 13. ADF IMAGE SCANNING SECTION

THEORY OF OPERATION

Test Mode No.50 Image scanner ADF shading sensor
 - Light up when light path is blocked
 No.79 Image scanner LED lighting
 No.108 Flat bed pulse motor continuous operation
 No.113 ADF original feed operation

- Timing Chart -

ADF Image Scanning System - in Auto Scanning Contrast Adjustment Mode



- ① The "START" key cannot be activated until an original is completely loaded in the ADF.
- ② The shading compensation is made automatically when the LEDs of the Image scanner are turned ON.
- ③ If the Image scanner has not gone out of the Image scanner ADF shading sensor **within 314 pulses** after the Flat bed read pulse motor is activated, i.e. the light path of the sensor has not been opened, it is assumed that the Flat bed read pulse motor has been locked and the error message "**T15 CALL SERVICE**" is displayed on the operation panel.
- ④ If the Auto base data set signal has not been turned ON 100 msec after the Auto base data end signal is output, the error message "**T10 TURN MAIN POWER SW. OFF THEN ON**" is displayed on the operation panel.
- ⑤ If the Auto base data clear signal is turned on, the previous Auto base data will be cleared.
- ⑥ If the Auto base data start signal is turned on, the image data will be taken in by the image scanner.
- ⑦ The Auto base data end signal is to signal the end of taking in the image data.
- ⑧ The Auto base data set signal is turned on when the Auto base data is stored.

T10 (Image Processing PCB Failure)

- 2. Auto base data set signal not turned ON

13T-5

FR (Version 1.0)

3. ADF Image Scanning System

- Shading Compensation

When the "START" button is pressed, after the original has been set in position, the LEDs of the Image Scanner are turned ON and the shading compensation is made.

200ms later, the Flat bed read pulse motor is activated, leading the Image scanner to the position for image scanning under the ADF unit.

- Start of Scanning

After the Image scanner slides out of the Image scanner ADF shading sensor, the Flat bed read pulse motor rotates **1811 pulses** more and then stops with the Image scanner positioned for image scanning.

At the same time, the ADF read pulse motor is activated to feed the original by rotating the ADF transfer roller and ADF exit roller via pulleys and belt, and the Read & Write start signal is turned ON to start the scanning of the original.

- Finish of Scanning

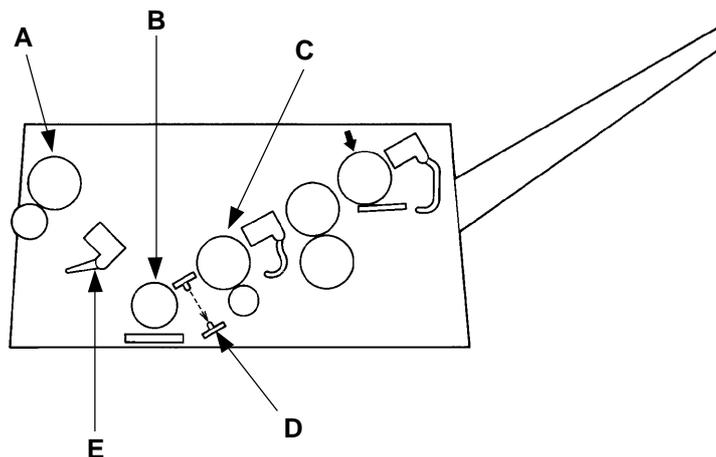
The original proceeding through the ADF unit opens the light path of the Original OUT sensor by pushing the actuator out of the sensor.

When the original advances further and its trailing edge passes through the Original IN sensor and opens its light path, **278 pulses** later, the Read & Write start signal is turned OFF to end the scanning of the original.

- Ejection of the Original

The ADF read pulse motor is rotated further for **3780 pulses** after the Read and Write start signal is turned OFF to finish the transportation of the original out of the ADF unit.

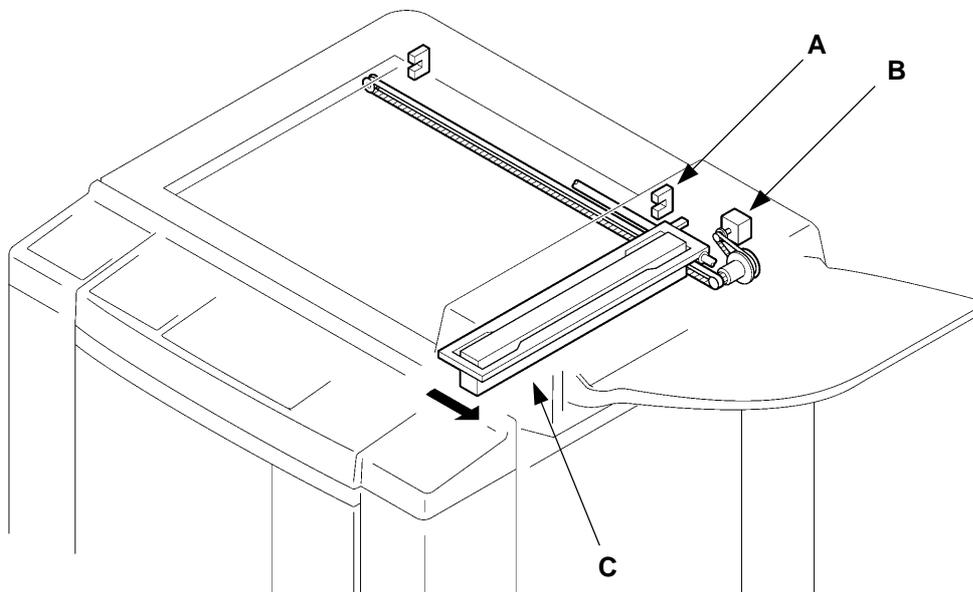
- A: ADF exit roller
- B: White roller
- C: ADF transfer roller
- D: Original IN sensor
- E: Original OUT sensor



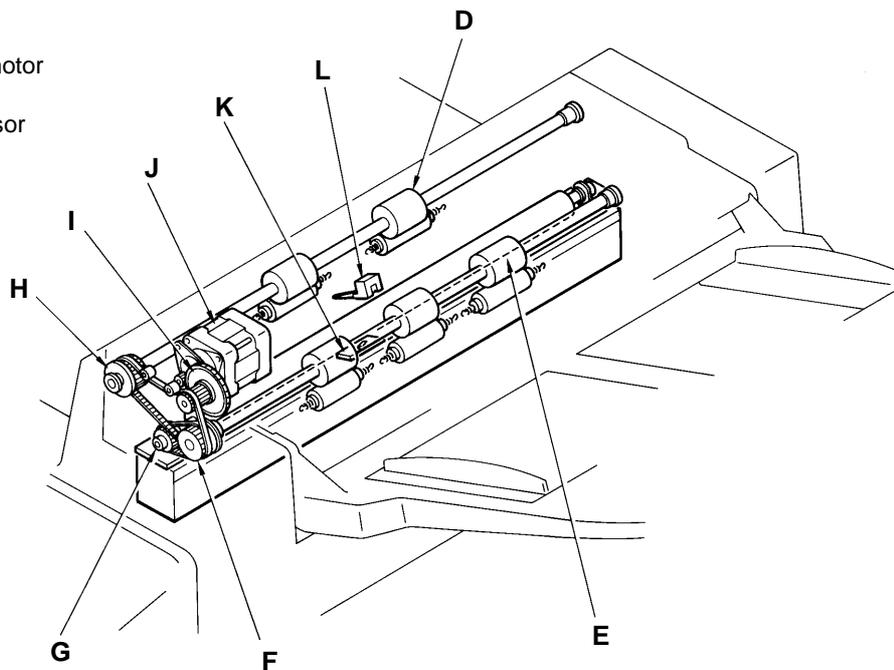
CHAPTER 13. ADF IMAGE SCANNING SECTION

THEORY OF OPERATION

- Test Mode
- No.36 Original IN sensor
 - Short interval beeps when light path is blocked
 - No.45 Original OUT sensor
 - Short interval beeps when pressed
 - No.50 Image scanner ADF shading sensor
 - Short interval beeps when light path is blocked
 - No.79 Image scanner LED lighting
 - No.113 ADF original feed operation



- A: Image scanner ADF shading sensor
- B: Flat bed read pulse motor
- C: Image scanner
- D: ADF exit roller
- E: ADF transfer roller
- F: Transfer roller pulley
- G: Read roller pulley
- H: ADF exit pulley
- I: ADF main gear
- J: ADF read pulse motor
- K: Original IN sensor
- L: Original OUT sensor

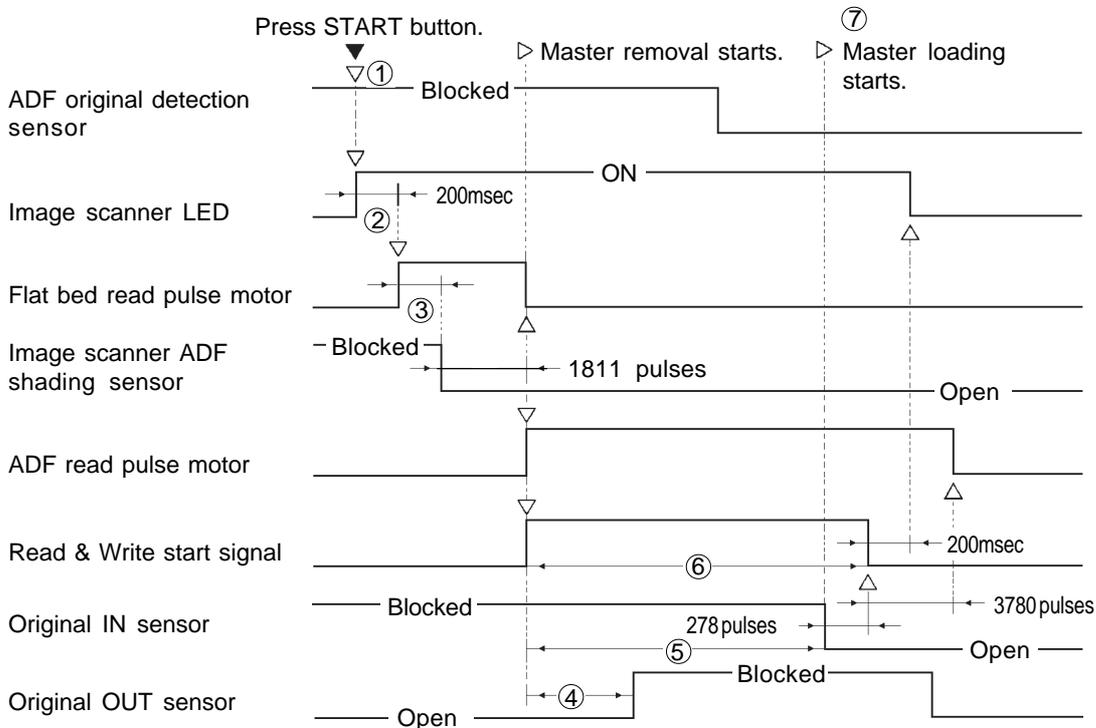


CHAPTER 13. ADF IMAGE SCANNING SECTION

THEORY OF OPERATION

- Timing Chart -

ADF Image Scanning System



- ① The "START" button cannot be activated until an original is completely loaded in the ADF.
- ② The shading compensation starts when the LED arrays of the Image scanner are turned ON.
- ③ If the Image scanner has not slid out of the Image scanner ADF shading sensor **within 314 pulses** after the Flat bed read pulse motor is activated, it is assumed that Flat bed read pulse motor has been locked and the error code [T 15] is displayed on the operation panel.
- ④ If the Original OUT sensor has not detected an original **within 1890 pulses** after the ADF read pulse motor is activated, it is assumed that the original has jammed at the exit of ADF and the error message "ORIGINAL JAM RESET ORIGINAL" is displayed on the operation panel.
- ⑤ If the Original IN sensor keeps detecting an original **for 14803 pulses** after the ADF read pulse motor was activated, the machine assumes the original has jammed or is oversized and indicates the error message "ORIGINAL JAM REMOVE ORIGINAL" on the operation panel.
- ⑥ The Read & Write start signal is turned OFF **278 pulses** after the trailing edge of the original clears out of the Original IN sensor, or when the Write pulse motor has rotated for the size of paper on the Paper feed tray.
- ⑦ When the trailing edge of the original clears out of the Original IN sensor, a new-made master starts to be loaded on the Drum after confirming that a used master is completely removed from the Drum.
If the Read & Write start signal is turned OFF before the original clears out of the Original IN sensor, the new-made master starts to be loaded on the Drum at that time.

- ADF PCB LED D6(IN) Original IN sensor
 - Light up when light path is blocked
- Test Mode No.36 Original IN sensor
 - Short interval beeps when light path is blocked
- No.46 ADF SW
 - Short interval beeps when pressed

REMOVAL & ASSEMBLY

1. ADF Glass, ADF Original IN Sensor (receive), ADF Switch, White Roller

< Removal Procedure >

ADF Glass

1. Turn OFF the power and remove the FB-ADF unit from the machine.
2. Remove the mounting screws on the Image scanner glass holders (L) and (R), and remove the holders.
3. Take out the ADF glass carefully.

ADF Original IN Sensor (receive)

2. Unplug the connector of the ADF original IN sensor (receive).
3. Remove the mounting screw of the ADF original IN sensor (receive), and remove the sensor from the ADF unit, peeling off the tape securing the wires of the sensor.

ADF Switch

2. Unplug the connector of the ADF switch and cut the wire clammer securing the wires of the switch.
3. Remove the mounting screw of the ADF switch bracket, and remove the bracket with the switch.

White Roller

2. Remove the two Read roller springs from both ends of the shaft.
3. Remove an E ring on end of the shaft and remove the Read roller housing.
4. Push the white roller to the left to disengage it from the ADF unit.

A: Original IN sensor (receive)

B: Glass holder (L)

C: ADF glass

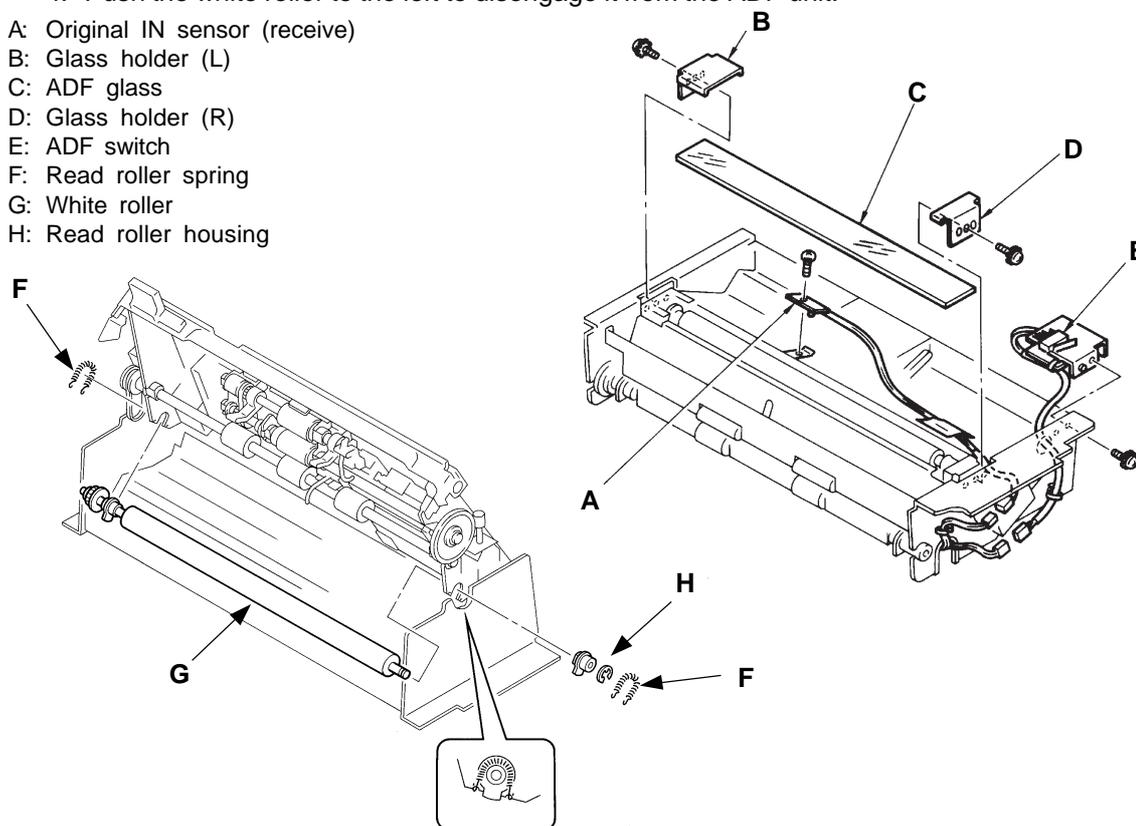
D: Glass holder (R)

E: ADF switch

F: Read roller spring

G: White roller

H: Read roller housing



CHAPTER 13. ADF IMAGE SCANNING SECOND

REMOVAL & ASSEMBLY

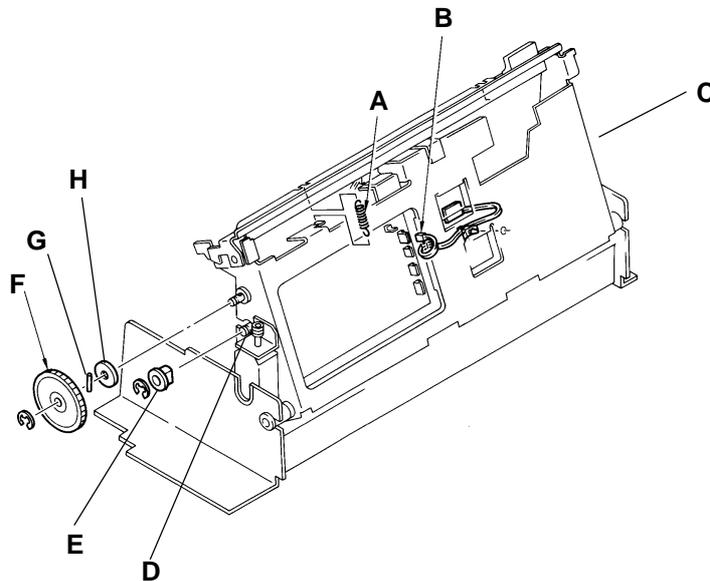
ADF PCB LED D6(IN) Original IN sensor
- Light up when light path is blocked
Test Mode No.36 Original IN sensor
- Short interval beeps when light path is blocked

2. Original IN Sensor (send), ADF Transfer Roller, Original Pickup solenoid

< Removal Procedure >

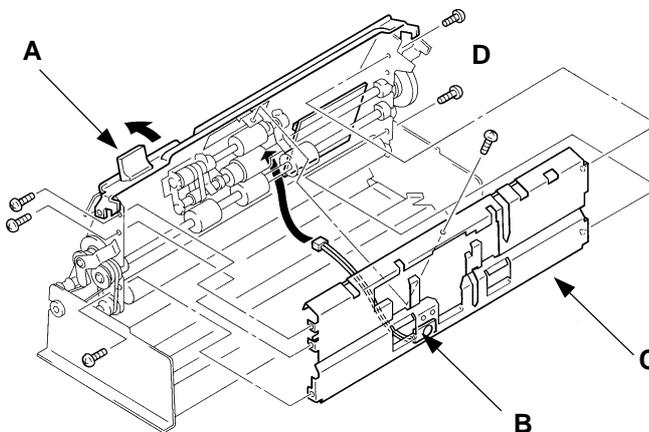
1. Turn OFF the power, and remove the ADF cover.
2. Remove the Open lever spring.
3. Unplug the connector of the Original IN sensor from CN8 of the ADF PCB and pinch the Wire harness band with a pair of pliers and push it off from the ADF upper frame.
4. Remove an E ring on the ADF gear and slide out the ADF gear, Parallel pin and Spacer.
[IMPORTANT]
Don't drop the parallel pin when removing the ADF gear because it will be freed.
5. Remove an E ring from the ADF transfer roller and slide out the Metal.

- A: Open lever spring
- B: Connector
- C: ADF upper frame
- D: ADF transfer roller
- E: Metal
- F: ADF gear
- G: Parallel pin
- H: Spacer



Original IN Sensor (send)

6. Remove six mounting screws on the ADF original guide (F) and remove the guide with the Original IN sensor attached.



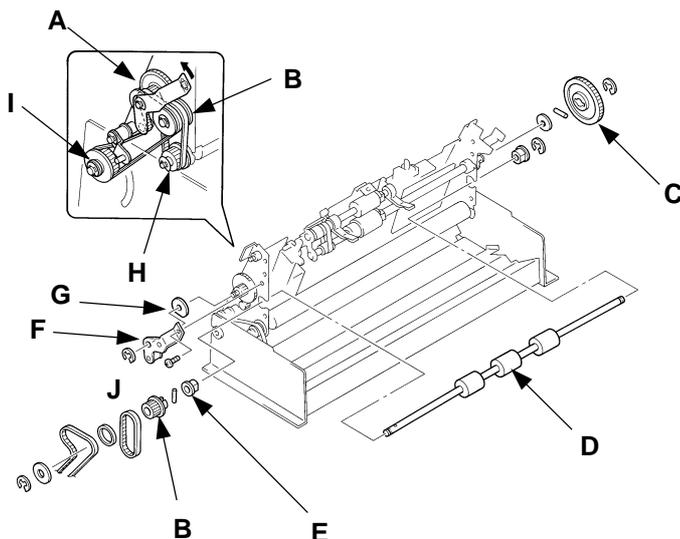
- A: ADF open lever
- B: Original IN sensor
- C: ADF original guide (F)
- D: Bind-head IB Lock Screw M3x6

ADF Transfer Roller

7. Remove the mounting screw and an E ring on the ADF tension plate, and remove the ADF tension plate and disengage the belt.
8. Remove an E ring on the ADF transfer roller and remove the Transfer roller pulley while disengaging the belt, and remove the Parallel pin and Plastic collar to free the ADF transfer roller from the ADF unit.

[IMPORTANT]

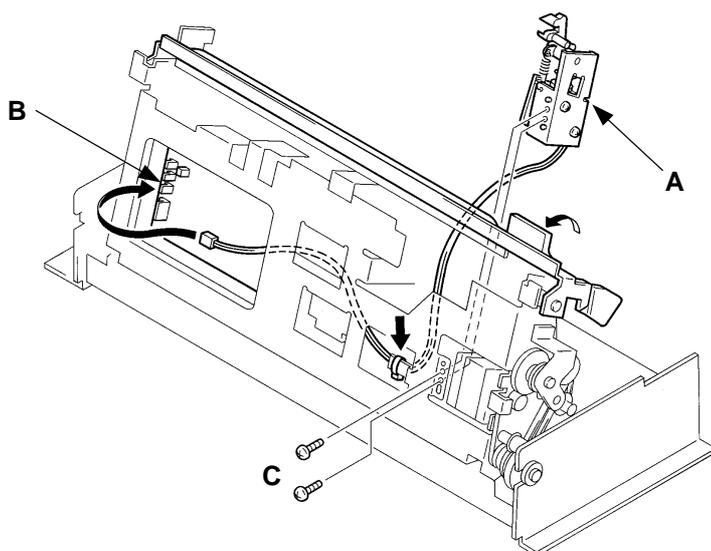
Don't drop the parallel pin when removing the ADF gear because it will be freed.



- A: Main gear
- B: Transfer roller pulley
- C: ADF gear
- D: ADF transfer roller
- E: Plastic collar
- F: ADF tension plate
- G: Main gear spacer
- H: Read roller pulley
- I: Exit pulley
- J: Pan-head Screw SW

Original Pickup Solenoid

9. Unplug the connector of the Original pickup solenoid from CN2 of the ADF PCB and remove two mounting screws on the solenoid.



- A: Original pickup solenoid
- B: CN2
- C: Bind-head IB Lock Screw M3x6

Test Mode No.34 ADF Original detection sensor
 – Short interval beeps when pressed
 No.35 Original registration sensor
 – Short interval beeps when pressed

3. ADF Original Detection Sensor, Original Registration Sensor

< Removal Procedure >

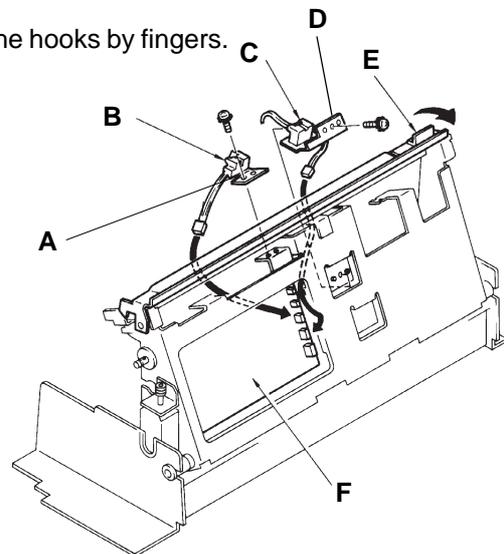
ADF Original Detection Sensor

1. Remove the FB-ADF original guide (F).
2. Unplug the Connector from CN9 of the ADF PCB.
3. Remove the mounting screw on the Original detection sensor bracket and lift the ADF open lever.
4. Remove the Original detection sensor bracket with the sensor from the ADF unit.

Original Registration Sensor

1. Unplug the Connector from CN10 of the ADF PCB.
2. Remove the mounting screw on the Original registration sensor bracket and remove the bracket with the sensor from the ADF unit.
3. Separate the sensor from the bracket by pinching the hooks by fingers.

- A: Original detection sensor bracket
- B: ADF original detection sensor
- C: Original registration sensor
- D: Registration sensor bracket
- E: ADF open lever
- F: ADF PCB

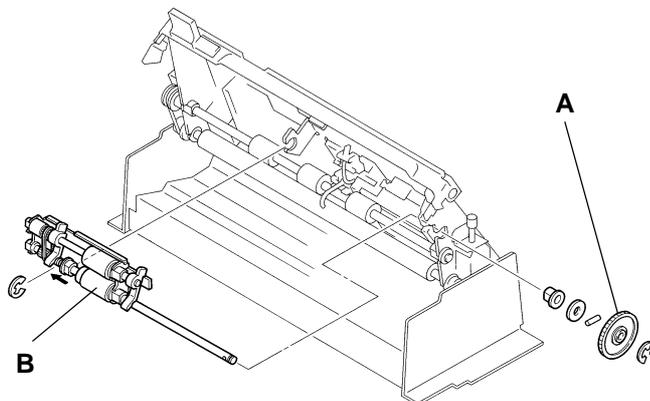


4. ADF Pickup (Upper) Ass'y, ADF Stripper Ass'y

<Removal Procedure>

ADF Pickup (Upper) Ass'y

1. Remove the ADF original guide (F).
2. Remove the ADF original detection sensor.
3. Remove an E ring on the right side of the ADF pickup (upper) ass'y.
4. Slide and remove the ADF pickup ass'y to the left.



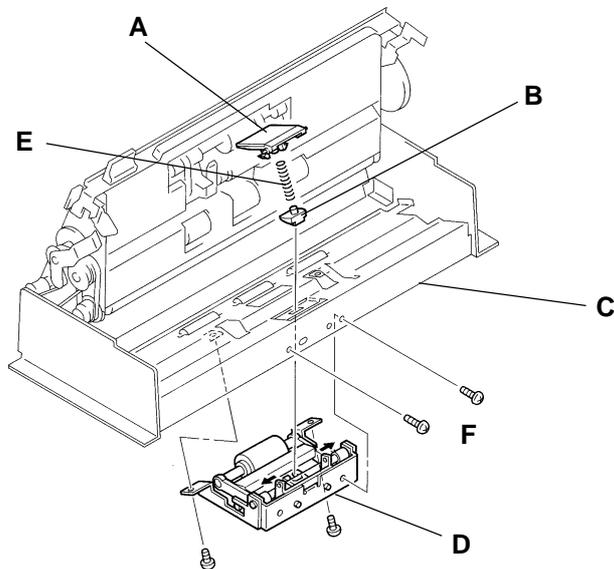
- A: ADF gear
- B: ADF pickup (upper) Ass'y

CHAPTER 13. ADF IMAGE SCANNING SECOND

REMOVAL & ASSEMBLY

ADF Stripper Ass'y

1. Remove four mounting screws on the ADF stripper ass'y and remove it from the ADF lower frame.



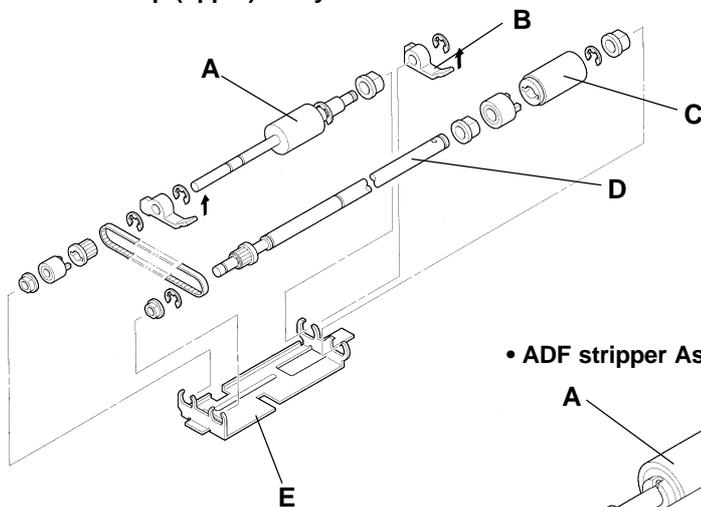
- A: Stripper pad
- B: Tray push
- C: ADF lower frame
- D: ADF stripper Ass'y
- E: Tray spring
- F: Bind-head IB Lock Screw M3x6

Disassembly of ADF Pickup (upper) Ass'y, ADF stripper Ass'y

< Disassembly >

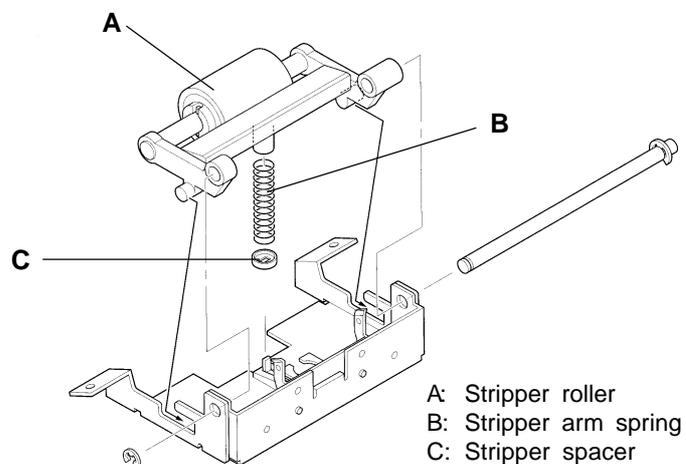
1. Disassembly and reassembly the these ass'y, showing the illustration below.

• ADF Pickup (upper) Ass'y



- A: ADF Pickup roller
- B: Lever shutter
- C: ADF stripper roller
- D: Stripper roller shaft
- E: Pickup roller frame

• ADF stripper Ass'y



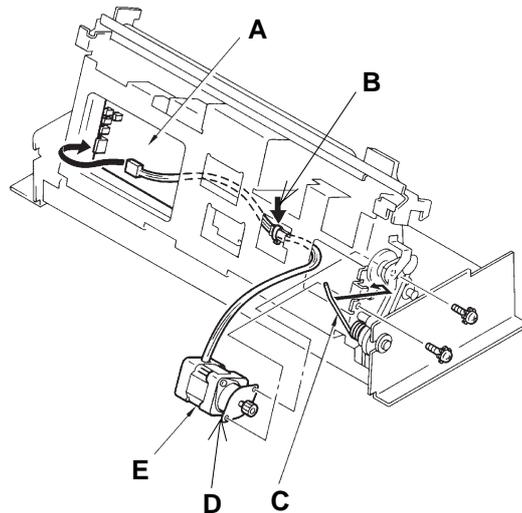
- A: Stripper roller
- B: Stripper arm spring
- C: Stripper spacer

5. ADF Read Pulse Motor

< Removal Procedure >

1. Turn OFF the power, and remove the ADF cover .
2. Unplug the connector of the ADF read pulse motor from CN1 of the ADF PCB and cut the Wire harness band to free the motor cord from the ADF unit.
3. Unhook the ADF spring (L) from the ADF upper frame.
4. Remove the two mounting screws on the ADF read pulse motor mount, and remove the motor with the mount from the ADF unit.

- A: ADF PCB
- B: Wire harness band
- C: ADF spring (L)
- D: Read pulse motor mount
- E: ADF read pulse motor



6. Original Pickup Motor, Original OUT Sensor

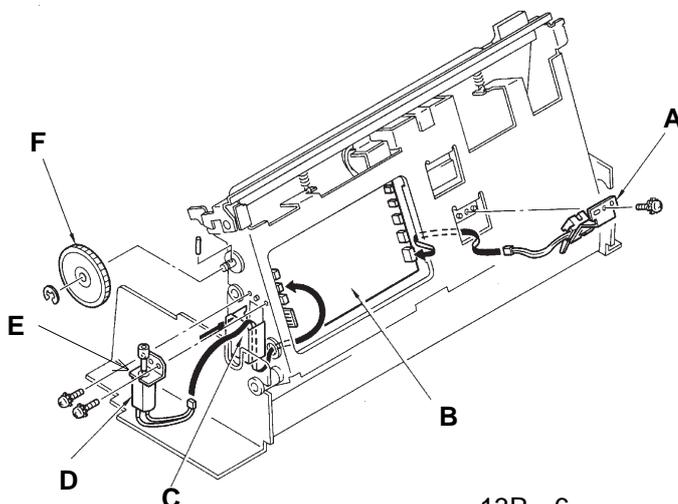
< Removal Procedure >

ADF Motor

1. Turn OFF the power, and remove the ADF cover .
2. Unhook the E ring and being careful not to misplace the parallel pin, remove the ADF gear.
3. Loosen the mounting screw of the Original pickup motor cover.
4. Remove the two mounting screws of the Motor bracket and unplug the Connector from CN3 of the ADF PCB.
5. Remove the Original pickup motor together with the bracket.

Original OUT Sensor

2. Remove the mounting screw of the Original OUT sensor bracket.
3. Unplug the Connector of the Original OUT sensor from CN11 of the ADF PCB and remove the sensor from the FB-ADF unit, together with the bracket.



- A: Original OUT sensor bracket
- B: ADF PCB
- C: Original pickup motor cover
- D: Original pickup motor
- E: Original pickup motor bracket
- F: ADF gear

ADF PCB LED D6(IN) Original IN sensor
 – Light up when light path is blocked
 Test Mode No.36 Original IN sensor
 – Short interval beeps when light path is blocked

ADJUSTMENT

1. Sensitivity of Original IN Sensor

1. Turn OFF the power and remove the ADF Cover.
2. Connect a voltage meter between **TP1 (IN)** and **TP(2) (GND)** on the ADF PCB.
3. Turn ON the power and place a white sheet of paper in the light path of the Original IN sensor.
 The voltage should read **1.0±0.2 volts** with a sheet of paper, and more than **3.0 volts** without (the light path of the Original IN Sensor not blocked).
4. If the above voltages are not obtained, adjust the sensitivity of the sensor by turning **VR1** on the ADF PCB.

[Note]

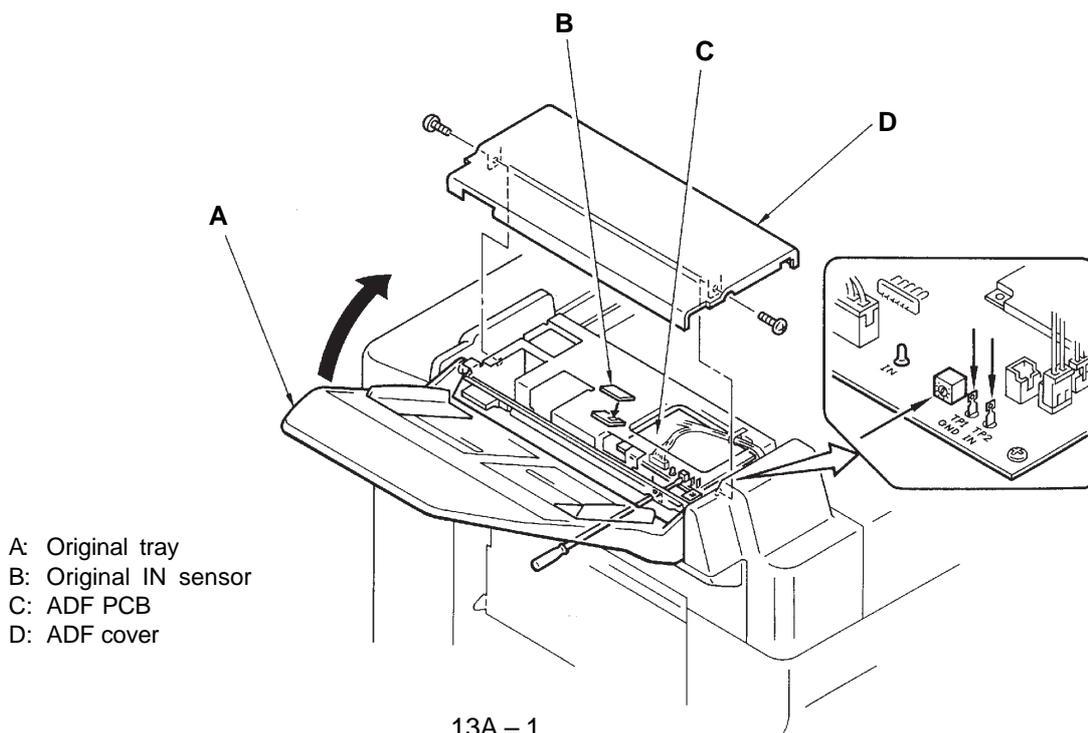
Turn the VR1 clockwise to increase the sensitivity of the sensor (the voltage increases).

- Check -

- Check the LED "IN" on the ADF PCB.
 Confirm that it illuminates when the light path of the Original IN sensor is blocked (a sheet of paper is inserted), and goes out when the sensor's light path is open (a sheet of paper is not inserted).

- Result of Misadjustment -

- If the sensitivity of the sensor is too high;
 The Original IN sensor cannot detect the original fed to the Image scanner even if the original is actually fed, and it is determined that the original has jammed before the Image scanner. As a result, the original jam error message "ORIGINAL JAM RESET ORIGINAL" will be displayed.
- If the sensitivity of the sensor is too low;
 It is determined that an original has already jammed before master making and the original jam error message "ORIGINAL JAM RESET ORIGINAL" will be displayed.



A: Original tray
 B: Original IN sensor
 C: ADF PCB
 D: ADF cover

2. Scanning Start Position

When using ADF Unit for the Scanning

1. Using an original with continuous image from the top (original without white margin on the top), make a master through the ADF Unit, and make a print.
2. Check the print and confirm that the top **5±2mm** of the measure is erased on the print.
3. If more or less is erased, use Memory SW **No.218** to make the correction.
4. Press the PRINT POSITION button to select a Memory switch setting referring to the chart below.

For instance, if Memory switch setting number **9** needs to be selected, press the PRINT POSITION button to move the number up or down until the display shows **9 218**.

5. Press the **STOP** button and then the **ALL RESET** button to input the selected number. The panel display returns to an ordinary indication.

- Precautions in Adjustment -

- The once-input Memory switch setting cannot be erased even if Test mode No.90 or 97 is activated or when System ROM is replaced.
- The Memory switch setting is erased when **System PCB** is replaced or when Test mode **No.98** is applied.

In this case all other Memory switch settings will also be erased.

SW Setting	9	A	B	C	D	E	F	O
Amount (mm)	-2.8	-2.4	-2.0	-1.6	-1.2	-0.8	-0.4	0
SW Setting	1	2	3	4	5	6	7	8
Amount (mm)	+0.4	+0.8	+1.2	+1.6	+2.0	+2.4	+2.8	+3.2

Decrease ← Skip Amount → Increase

3. Horizontal Scanning Position

- When using ADF Unit for Scanning

1. Make a master at [1:1] size using **Test chart** through the ADF Unit.
2. Check if all "e" marks on both sides of the test chart original appear on the master on the Drum.
3. If not, adjust the horizontal scanning position by Memory SW **No.217**, referring to the chart below.

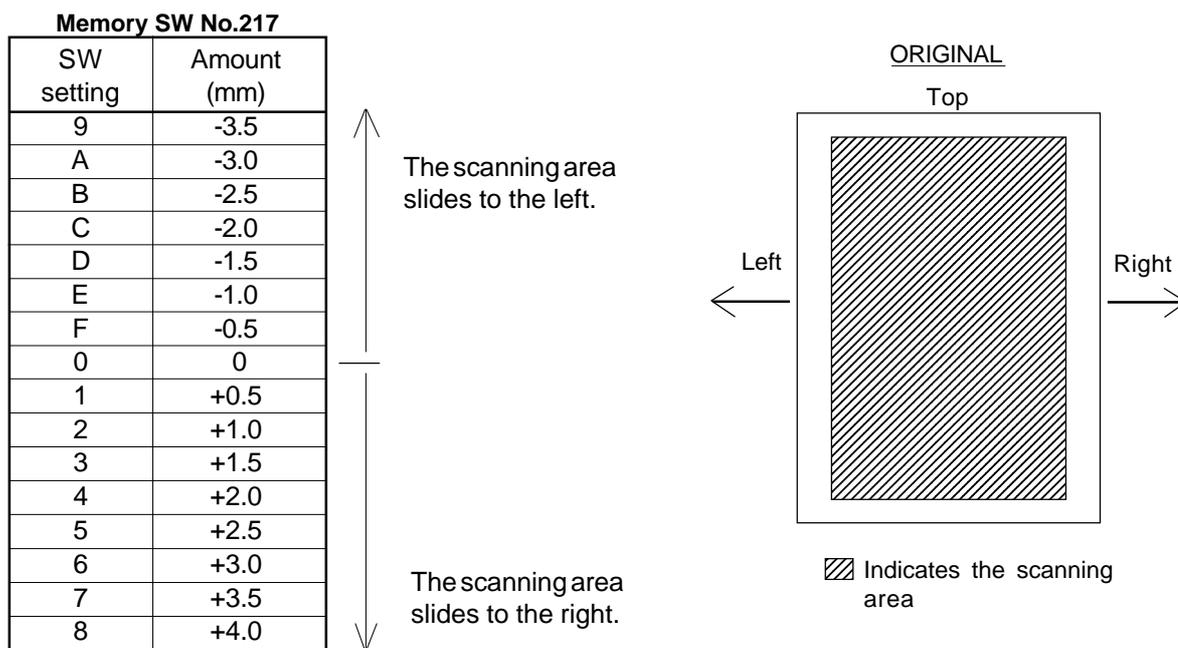
[IMPORTANT]

If "e" marks on both sides are missing in a large area, check the installation position of the Paper size potentiometer under the Paper feed tray, and the Master making width adjustment.

- Precautions in Adjustment -

- The once-input Memory switch setting cannot be erased even if Test mode No.90 or 97 is activated or when System ROM is replaced.
- The Memory switch setting is erased when **System PCB** is replaced or when Test mode **No.98** is applied.

In this case all other Memory switch settings which have been input will also be erased.



4. Image Elongation/Shrinkage Correction

- When using ADF unit for Scanning (ADF Read pulse motor speed adjustment).

1. Make a master at [1:1] size using **Test chart** through the ADF Unit and make prints.
2. Compare printouts with the test chart original.
Check that the difference in image size is **within 4mm** in the area between the top and bottom scaled lines, between the printouts and the test chart original.
3. If it is elongated or shrunk **by 4mm or more**, compared to the original size, select the Memory SW No. 216 and use the PRINT POSITION Key on the operation panel to select a desired Memory SW setting number, referring to the chart below.

[IMPORTANT]

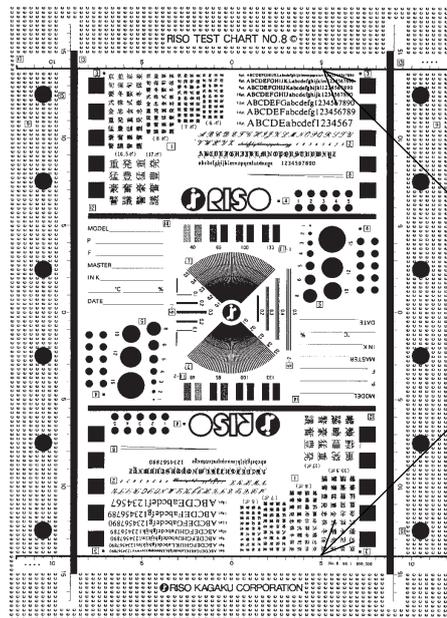
Be sure to turn OFF the machine each time the Hex SW is turned to update the memory.

SW Setting	9	A	B	C	D	E	F	O
Amount (mm)	-7	-6	-5	-4	-3	-2	-1	0
SW Setting	1	2	3	4	5	6	7	8
Amount (mm)	+1	+2	+3	+4	+5	+6	+7	+8

← Expansion Amount →

- Precautions in Adjustment -

- There may be more than one reason for elongation or shrinkage of printed image.
Mechanical causes, i.e. backward tension on the master roll, wear of the White roller, loose screw in the pulleys, etc. should also be checked.



Check the area between these scaled lines.

[Test Chart]

CHAPTER 14: CUTTER SECTION

Contents

THEORY OF OPERATION

1. Master Cutting System	14T-1
--------------------------------	-------

REMOVAL & ASSEMBLY

1. Cutter Unit	14R-1
2. Master Positioning Sensor	14R-2

THEORY OF OPERATION

1. Master Cutting System

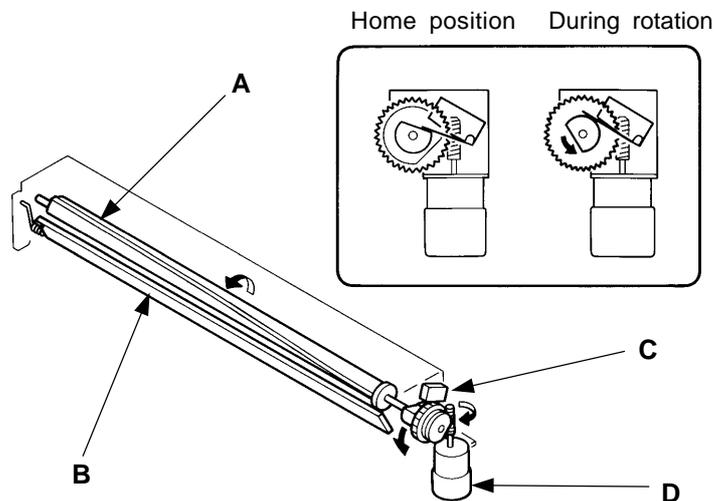
- Basic

The Cutter operates in the following cases.

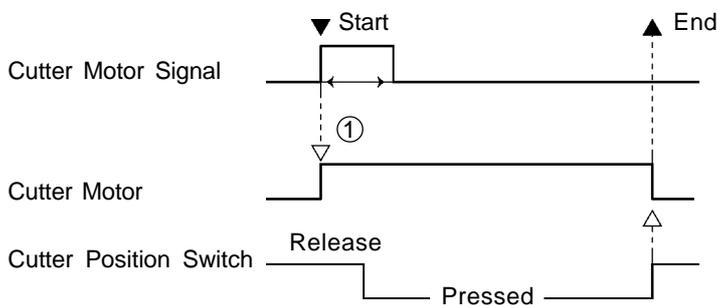
- When the Drum is rotated to the Position C-2 during loading master on the Drum.
- When the Master positioning sensor detects master material at the time the Master loading unit is opened and closed.
- When the Master loading button is pressed with master material already loaded.

The upper Cutter blade is rotated by the Cutter motor via the Cutter gear. The Cutter motor starts to rotate, the actuator of the Cutter position SW is pressed by the high part of the cam and the motor keeps rotating while the actuator of the switch is pressed.

- A: Upper blade
- B: Lower blade
- C: Cutter position switch
- D: Cutter motor



Cutter Timing Chart



- ① If the cutter motor signal is turned on, the cutter motor will be turned on.

MEMO

REMOVAL & ASSEMBLY

1. Cutter Unit

< Removal Procedure >

1. Pull out the Drum, turn OFF the power and remove the Back cover.
2. Open the Scanner table.
3. Remove two mounting screws on the Aero guide sheet and remove the sheet.
4. Remove two mounting screws on the Set sheet plate and remove the plate.
5. Disconnect the connector of the Master positioning sensor.
6. Disconnect the connectors of the Cutter motor and Cutter position switch.
7. Remove two mounting screws of the Cutter unit and take out the unit from the opening for the Drum replacement, holding it from underneath.

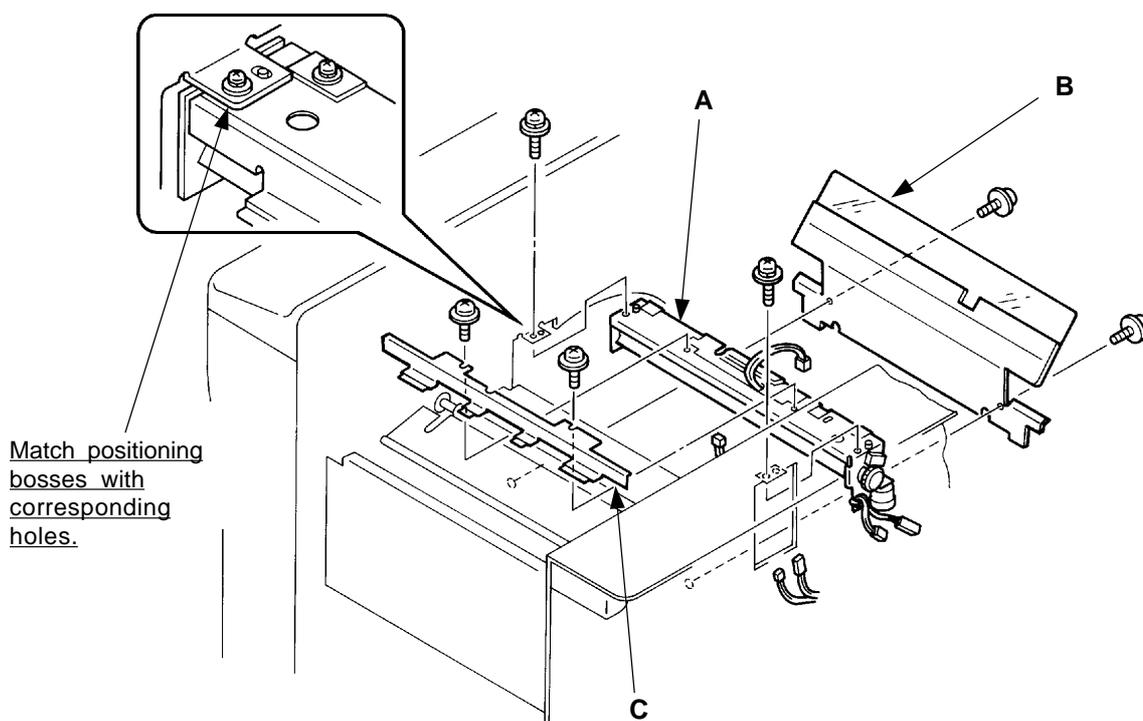
- Precautions in Assembly -

- Be sure to use M4x6 double-washer screws when securing the Cutter unit. If longer screws are used, they get contact with the upper Cutter blade and lock it.
- When mounting the Cutter unit back in the machine, make sure to match the respective positioning bosses on the Cutter unit with the corresponding holes of the mounting brackets. Otherwise, master wrinkles will occur in loading a master on the Drum.

- Checking after Assembly -

- After installing the Cutter unit, make sure that the upper Cutter blade moves smoothly with Test mode **No.112**, before setting master.

A: Cutter unit
B: Aero guide sheet
C: Set sheet plate



CHAPTER 14. CUTTER SECOND

REMOVAL & ASSEMBLY

- LED WAIT Master positioning sensor
– Light up when reflected light not detected
- Test Mode No.15 Master positioning sensor
– Short interval beeps when reflected light is detected

2. Master Positioning Sensor

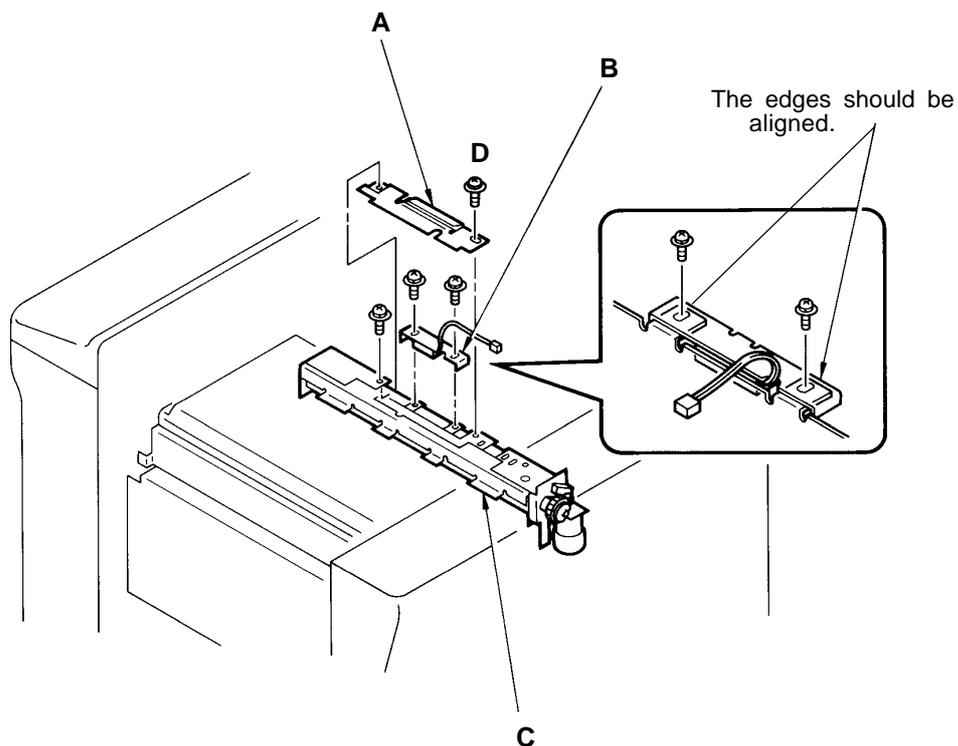
< Removal Procedure >

1. Turn OFF the power and open the Scanner table.
2. Disconnect the connector of the Master positioning sensor.
3. Remove two mounting screws on the Master guide stopper plate and remove the plate.
4. Remove two mounting screws on the Master positioning sensor and remove the sensor.

- Precautions in Assembly -

- Align the side edge of the Master positioning sensor with the front edges of the mounting plates on the Cutter unit.
If the mounting position of the Master positioning sensor is changed, the length of master which is to be caught by the Clamp plate will be changed accordingly.

- A: Master guide stopper plate
B: Master positioning sensor
C: Cutter unit
D: Pan-head Screw SW.W M3x6



CHAPTER 15: MASTER SETTING SECTION

Contents

THEORY OF OPERATION

- 1. Thermal Print Head Positioning System 15T-1
- 2. Master Setting System 15T-3
- 3. Master Free Feeding System 15T-7

REMOVAL & ASSEMBLY

- 1. Set Guide Plate 15R-1
- 2. Thermal Pressure Motor Unit 15R-2
- 3. Thermal Pressure Motor 15R-3

THEORY OF OPERATION

1. Thermal Print Head Positioning System

- Basic

The Thermal print head is lowered and raised by the rotation of the Thermal pressure motor.

- Lowering of Thermal Print Head

The Thermal pressure motor rotates until the TPH pressure switch has been actuated ON by the Sw cam, to lower the Thermal print head to the ready position.

- Pressing of Thermal Print Head on Write Roller

The lowered Thermal print head is pressed on the Write roller, with master material between, by the TPH pressure springs via the Pressure assist plates on both sides.

The Pressure assist plates are pushed down by the TPH bracket, which is pulled by the TPH pressure springs to make the Thermal print head pressed down.

- Retreat of Thermal Print Head

The Thermal pressure motor rotates in reverse until the TPH home position switch has been actuated ON by the Sw cam, to raise the Thermal print head to the home (retreat) position by the Thermal pressure motor cam.

In this condition, the Thermal print head is separated from the Write roller.

A: Master loading unit

B: Thermal pressure motor cam

C: TPH pressure sw

D: TPH home position sw

E: Sw cam

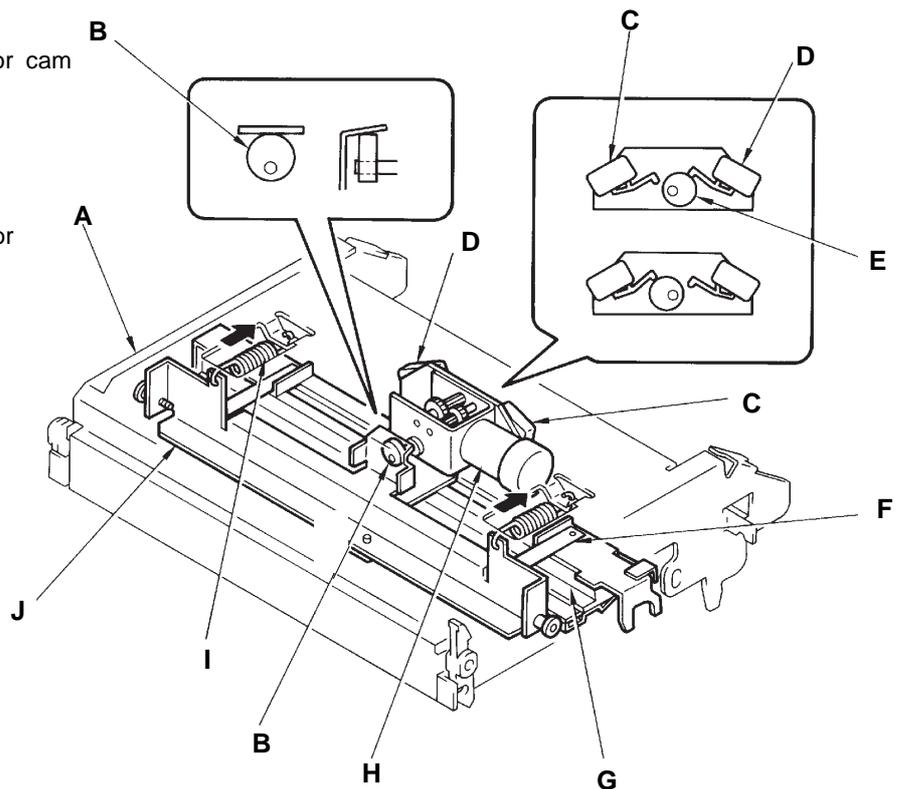
F: Pressure assist plate

G: Thermal print head

H: Thermal pressure motor

I: TPH pressure spring

J: TPH bracket



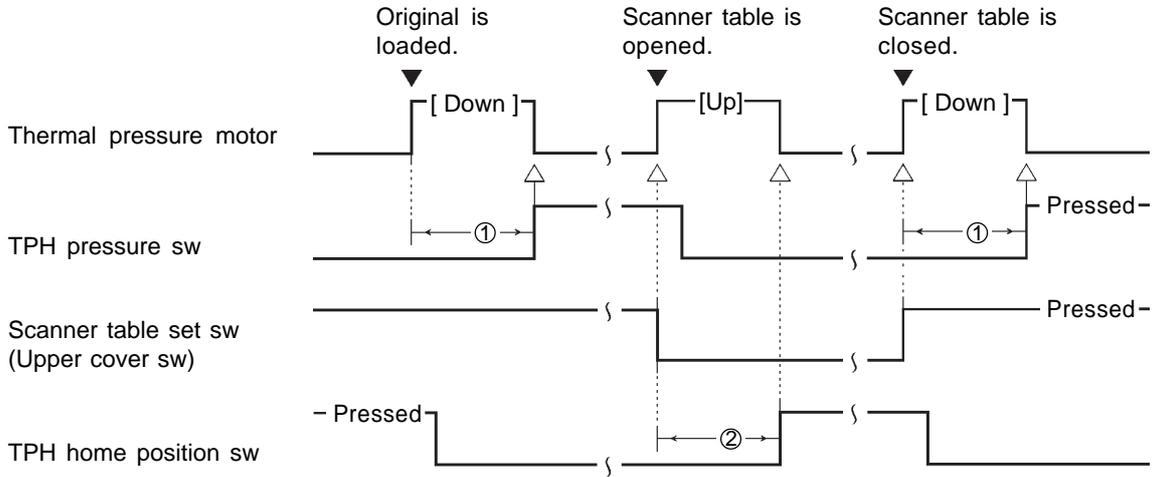
CHAPTER 15. MASTER SETTING SECTION

THEORY OF OPERATION

Test Mode No.31 TPH home position SW
 - Short interval beeps when pressed
 No.32 TPH pressure SW
 - Short interval beeps when pressed
 No.111 Thermal pressure motor operation

- Timing Chart -

Thermal Print Head Positioning System



- ① If the TPH pressure sw has not been pressed ON **within 4 seconds** after the Thermal pressure motor starts to rotate, the machine assumes that the Thermal pressure motor has been locked and displays the error code [T 19].
- ② If the TPH home position sw has not been pressed ON **within 4 seconds** after the Thermal pressure motor starts to rotate, the machine assumes that the TPH pressure motor has been locked and displays the error code [T 19].

T19 (Thermal Pressure Motor Lock)
<ul style="list-style-type: none"> • Thermal pressure SW not turned ON • Thermal home position SW not turned ON

- LED WAIT Master positioning sensor
 - Light up when reflected light not detected
- MDTC Master detection sensor
 - Light up when reflected light not detected
- MEND Master end sensor
 - Light up when reflected light detected

2. Master Setting System

- Basic

When master material is unrolled below the Master loading unit (under green films), the Master loading unit is closed on it and the Master loading unit switch is thus pressed, 1 second later, the status of the Master positioning sensor is checked to see whether the sensor detects master material.

If no master material is detected, the master setting movement **(1)** described below starts.

If master material is detected, the master setting movement **(2)** described below starts.

- Master setting movement (1)

1 second after the Master loading unit switch is pressed, the Thermal pressure motor is activated to lower the Thermal print head until the actuator of the TPH pressure switch is pressed.

As the TPH pressure switch is pressed, the Write pulse motor and Loading pulse motor are activated to transfer master material towards the Master positioning sensor.

The Write pulse motor and Loading pulse motor stop to end the master feeding movement **22 pulses** after the Master positioning sensor detects the leading edge of the master.

At the same time the motors stop, the Thermal pressure motor is activated to raise the Thermal print head until the actuator of the TPH home position switch is pressed and the master setting movement (1) is completed.

- Master setting movement (2)

1 second after the Master loading unit switch is pressed, the Thermal pressure motor is activated to lower the Thermal print head until the actuator of the TPH pressure switch is pressed.

As the TPH pressure switch is pressed, the Write pulse motor and Loading pulse motor are activated to feed master material.

556 pulses later, the motors stop and the Cutter motor is activated, cutting the master material. The machine panel indicates to remove a cut strip of master.

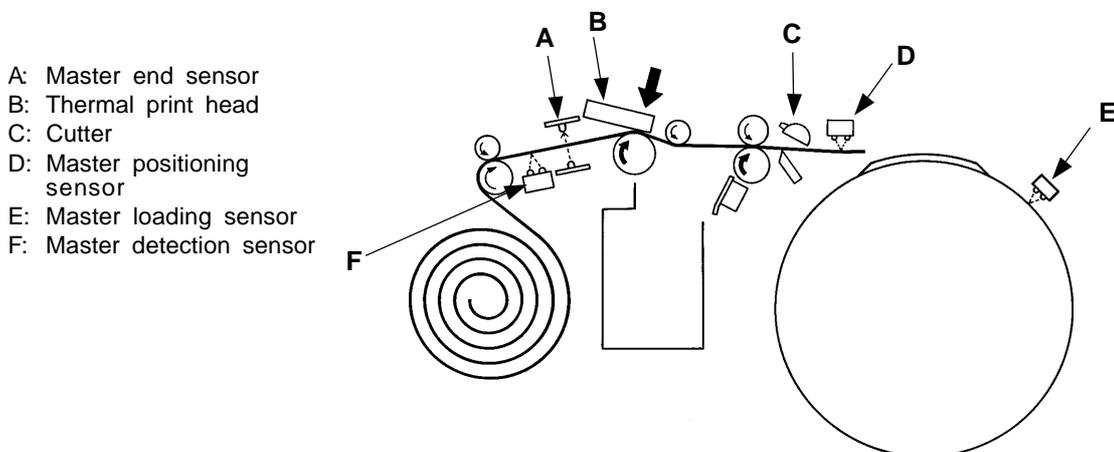
When the cut strip of master is removed as indicated on the panel and no master is thus detected by the Master positioning sensor, 1 second later, the Write pulse motor and Loading pulse motor restart to feed master material, towards the Master positioning sensor.

The Write pulse motor and Loading pulse motor stop to end the master feeding movement **22 pulses** after the Master positioning sensor detects the leading edge of the master.

At the same time the motors stop, the Thermal pressure motor is activated to raise the Thermal print head until the actuator of the TPH home position switch is pressed and the master setting movement (2) is completed.

- Status Check of Master Roll

The Master detection sensor checks whether or not master material is correctly set under the Master loading unit, and the Master end sensor detects the end of a roll of master, i.e. black tape.



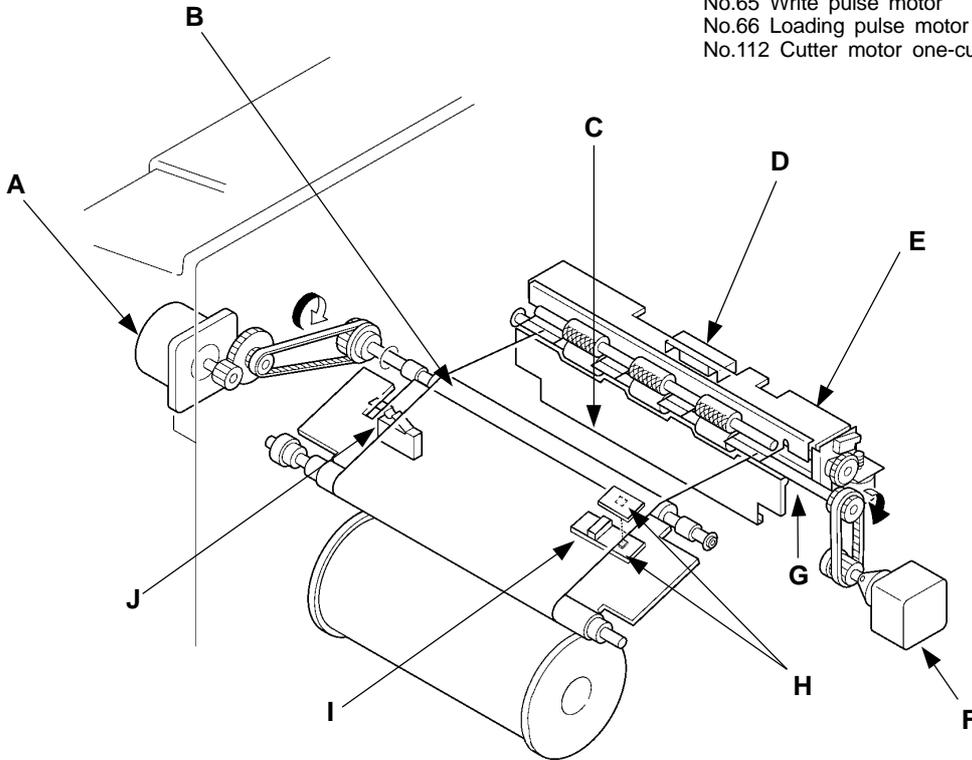
- A: Master end sensor
- B: Thermal print head
- C: Cutter
- D: Master positioning sensor
- E: Master loading sensor
- F: Master detection sensor

CHAPTER 15. MASTER SETTING SECTION

THEORY OF OPERATION

Test Mode No.15 Master positioning sensor
– Short interval beeps when reflected light detected
No.47 Master detection sensor
– Short interval beeps when reflected light detected
No.23 Master end sensor
– Short interval beeps when light path is blocked
No.29 Master loading unit switch
– Short interval beeps when pressed
No.65 Write pulse motor
No.66 Loading pulse motor
No.112 Cutter motor one-cut operation

B4 machine

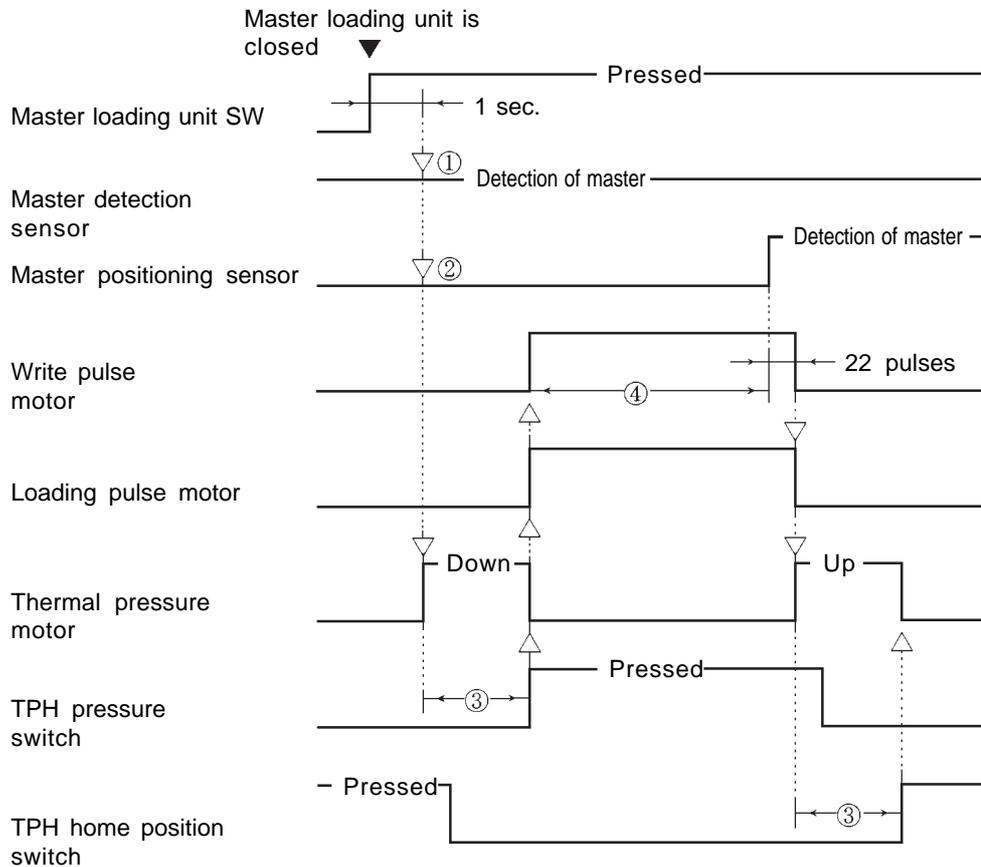


- A: Write pulse motor
- B: Write roller
- C: Master guide plate
- D: Master positioning sensor
- E: Cutter unit
- F: Loading pulse motor
- G: Load roller (lower)
- H: Master end sensor
- I: Master detection sensor
- J: Master loading unit switch

- * When the Master detection sensor detects no master material (no reflected light), the machine assumes that a roll of master is not correctly set in the machine and displays the error message **“SET LEAD EDGE OF MASTER UNDER GREEN FILM”**.
- * If the light path of the Master end sensor is blocked, i.e. the black tape is detected, the machine assumes a roll of master has been consumed and indicates the message **“REPLACE MASTER ROLL”** on the operation panel.
- * If the Master loading unit switch is not pressed, the machine assumes the Master loading unit is not closed and indicates the error message **“CLOSE MASTER LOADING UNIT”**.

- Timing Chart -

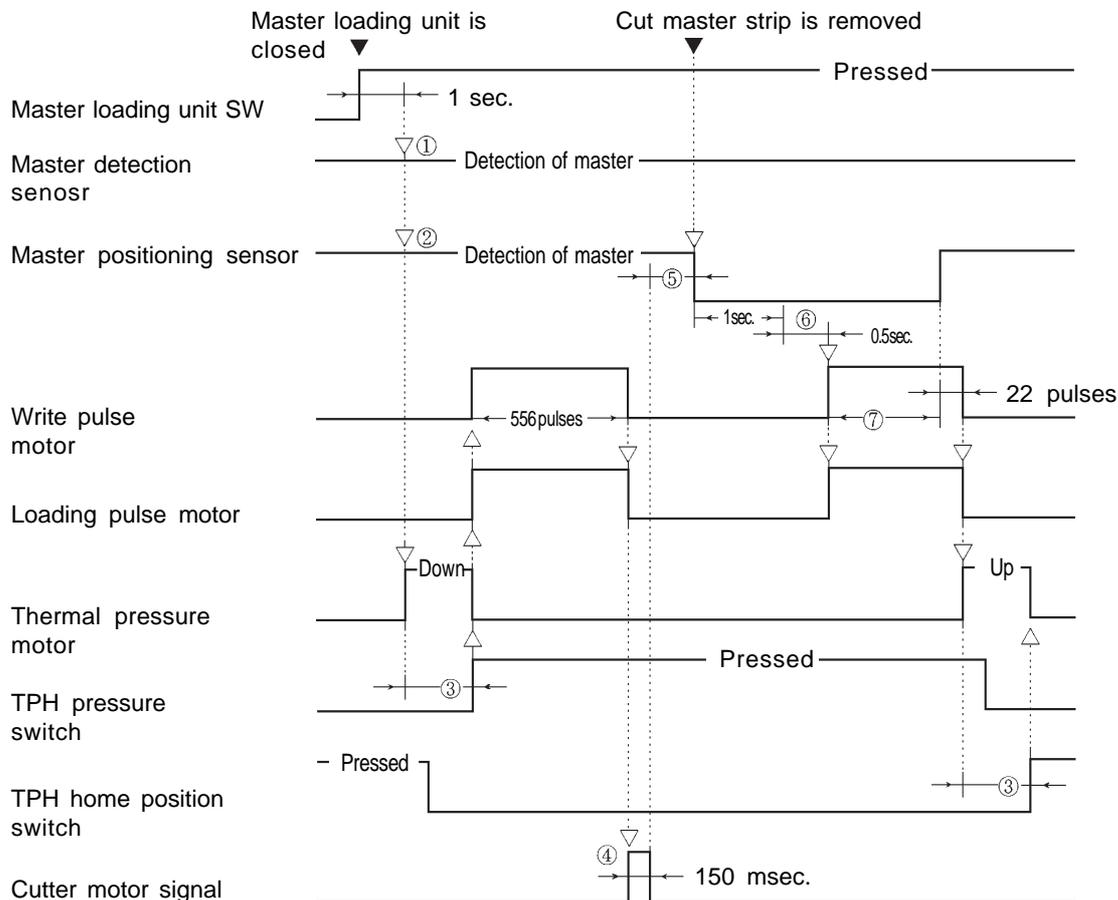
Master Setting Movement (1)



- ① The status of the Master detection sensor is checked to confirm the presence of master material.
- ② The status of the Master positioning sensor is checked to determine the next operation, i.e. Master setting movement (1) or (2), **1 second** after the Master loading unit is closed.
- ③ If the actuator of either the TPH pressure switch or TPH home position switch has not been pressed within **4 seconds** after the Thermal pressure motor is activated, the machine assumes that the Thermal pressure motor has locked and indicates the error code **[T 19]**.
- ④ If the Master positioning sensor has not detected master material **within 1260 pulses** after both the Write pulse motor and Loading pulse motor are activated, the machine assumes that master mis-feed has occurred and indicates the error message **“MASTER MIS-FEED REMOVE MASTER ROLL THEN RE-INSTALL”**.

- Timing Chart -

Master Setting Movement (2)



- ① The status of the Master detection sensor is checked to confirm the presence of master material.
- ② The status of the Master positioning sensor is checked to determine the next operation, i.e. the Master setting movement (2), **1 second** after the Master loading unit is closed.
- ③ If the actuator of either the TPH pressure switch or TPH home position switch has not been pressed **within 4 seconds** after the Thermal pressure motor is activated, the machine assumes that the Thermal pressure motor has locked and indicates the error code [T 19].
- ④ The Cutter motor is deactivated after the Cutter motor signal is kept output for **150 msec.** and the actuator of the Cutter position switch is released OFF.
- ⑤ If the Master positioning sensor detects master material after the Cutter motor is activated, the machine assumes a cut strip of master remains inside the machine and indicates the message "**REMOVE CUT MASTER STRIP**".
- ⑥ If the Master positioning sensor keeps unchanged in the status of "no detection of master" for **1 second**, the machine assumes that the cut master strip has been removed and, **0.5 second** later, the Write pulse motor and Loading pulse motor start to rotate.
- ⑦ If the Master positioning sensor has not detected master material **within 787 pulses** after both the Write pulse motor and Loading pulse motor are reactivated, the machine assumes that master mis-feed has occurred and indicates the error message "**MASTER MIS-FEED REMOVE MASTER ROLL THEN RE-INSTALL**".

3. Master Free Feeding System

- Basic

The Master loading button starts the following operations whenever the machine is idle: master feeding, cutting and post-cutting feeding.

- Master Feeding

When the Master loading button is pressed, the Thermal pressure motor is activated to lower the Thermal print head until the actuator of the TPH pressure switch is pressed, and then the Write pulse motor and Loading pulse motor are activated to feed master material.

If the Master positioning sensor detects master when the Master loading button is pressed, as in normal cases, the Write pulse motor and Loading pulse motor stop **566 pulses** later.

If not, however, they stop 566 pulses after the Master positioning sensor detects master.

- Master Cutting

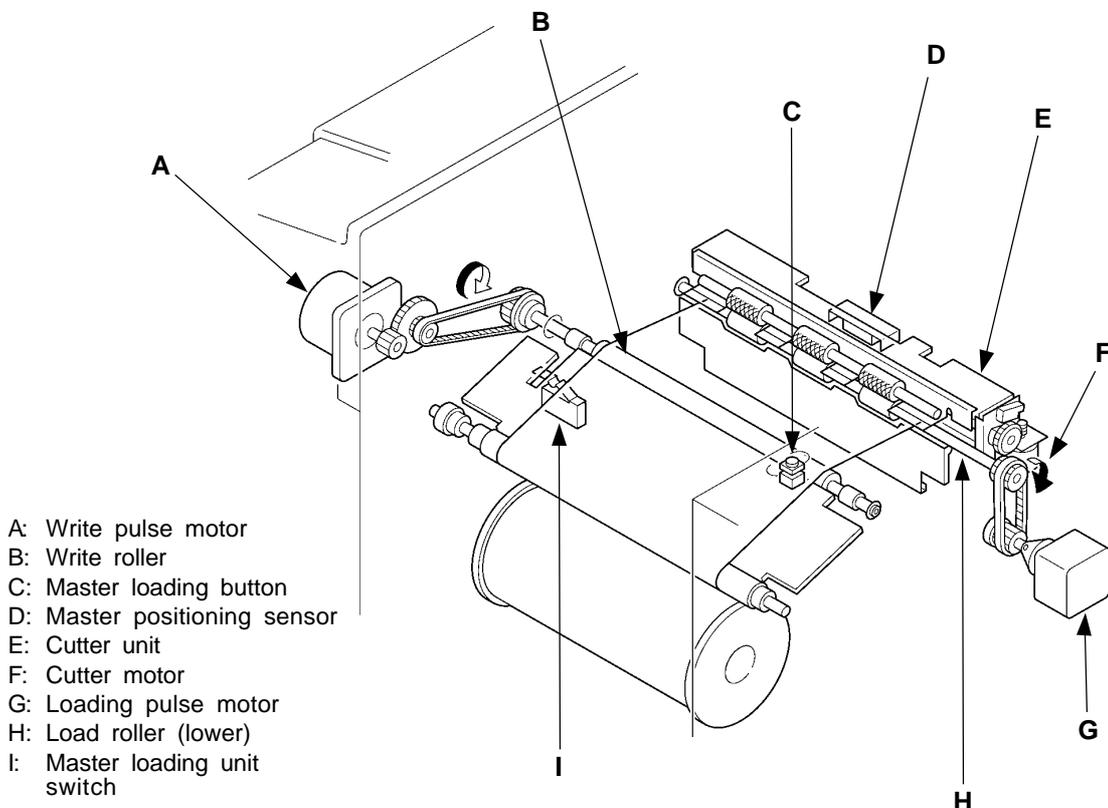
At the same time the motors stop, the Cutter motor is activated to cut the master material.

- Master Post-Cutting Feeding

When a cut strip of master is removed from the machine and the Master positioning sensor keeps unchanged in the status of "no detection of master" for 1 second, the machine assumes that the cut strip of master has been removed and, 0.5 second later, the Write pulse motor and Loading pulse motor is reactivated to feed the master material towards the Master positioning sensor.

As the Master positioning sensor detects the leading edge of the master material, the Write pulse motor counts **22 pulses** and then both the Write pulse motor and Loading pulse motor stop.

At the same time the motors stop, the Thermal pressure motor is activated to raise the Thermal print head until the TPH home position switch is pressed.



CHAPTER 15. MASTER SETTING SECTION

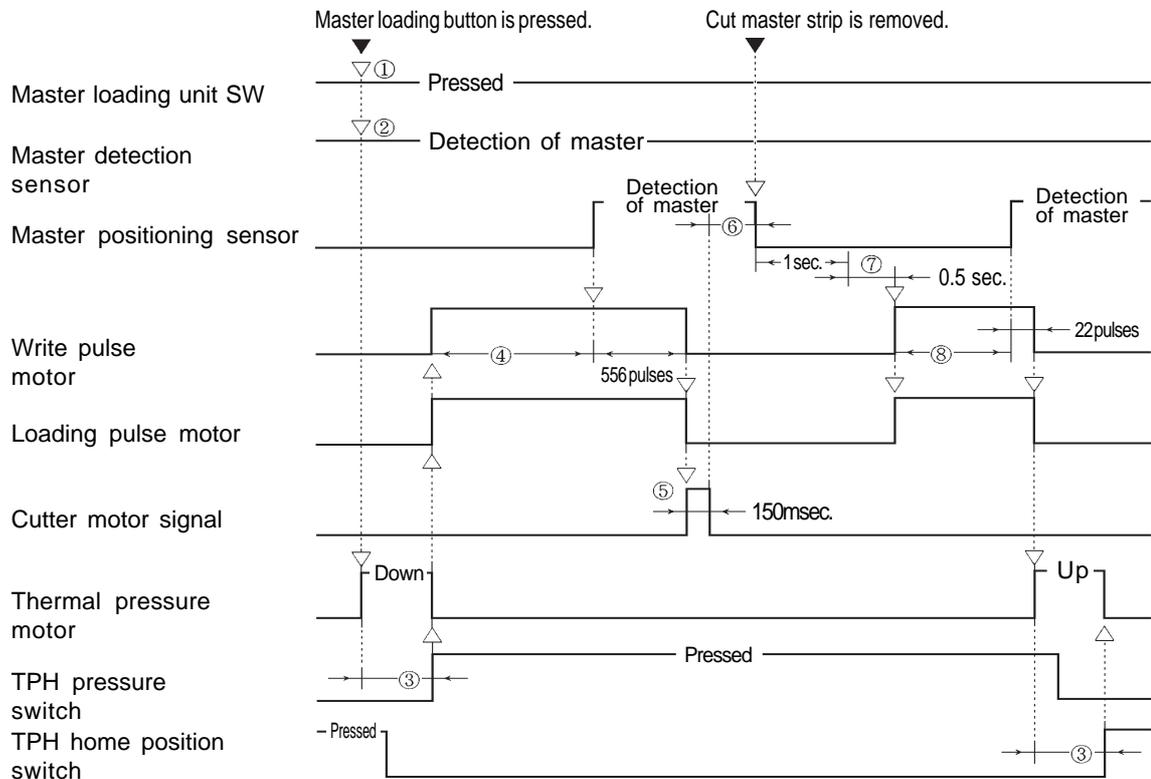
THEORY OF OPERATION

Test Mode

- No.15 Master positioning sensor
– Short interval beeps when reflected light detected
- No.05 Master loading button
– Short interval beeps when pressed
- No.65 Write pulse motor
- No.66 Loading pulse motor
- No.112 Cutter motor one-cut operation

- Timing Chart -

Master Free Feeding System



- ① The status of the Master loading unit switch is checked to confirm that Master loading unit is closed.
- ② The status of the Master detection sensor is checked to confirm that it detects master material.
- ③ If the actuator of either the TPH pressure switch or TPH home position switch has not been pressed **within 4 seconds** after the Thermal pressure motor is activated, the machine assumes that the Thermal pressure motor has locked and indicates the error code [T 19].
- ④ If the Master positioning sensor has not detected master material **within 1260 pulses** after both the Write pulse motor and Loading pulse motor are activated, the machine assumes that master mis-feed has occurred and indicates the error message "**MASTER MIS-FEED REMOVE MASTER ROLL THEN RE-INSTALL**".
- ⑤ The Cutter motor is deactivated after the Cutter motor signal is kept output for **150 msec.** and the actuator of the Cutter position switch is released OFF.
- ⑥ If the Master positioning sensor detects master material after the Cutter motor is activated, the machine assumes a cut strip of master remains inside the machine and indicates the error message "**REMOVE CUT MASTER STRIP**".
- ⑦ If the Master positioning sensor keeps unchanged in the status of "no detection of master" for **1 second**, the machine assumes that the cut master strip has been removed and, **0.5 second** later, the Write pulse motor and Loading pulse motor start to rotate.
- ⑧ If the Master positioning sensor has not detected master material **within 787 pulses** after both the Write pulse motor and Loading pulse motor are reactivated, the machine assumes that master mis-feed has occurred and indicates the error message "**MASTER MIS-FEED REMOVE MASTER ROLL THEN RE-INSTALL**".

- LED MDTC Master detection sensor
 - Light up when reflected light not detected
- MEND Master end sensor
 - Light up when reflected light detected
- Test Mode No.47 Master detection sensor
 - Short interval beeps when reflected light detected
- No.23 Master end sensor
 - Short interval beeps when light path is blocked

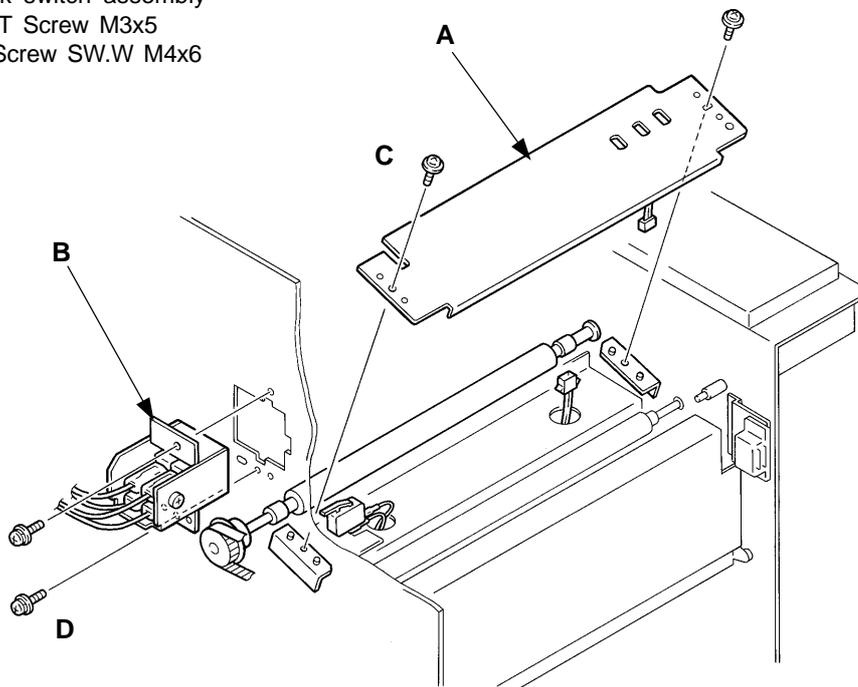
REMOVAL & ASSEMBLY

1. Set Guide Plate

Removal

1. Turn off the power and open the Scanner table and Master loading unit.
2. Remove the Front right cover.(A3 machine only)
3. Remove two mounting screws of the FB interlock switch assembly to make it loose.(A3 machine only)
4. Remove two mounting screws of the Set guide plate and disconnect the sensor's connector to remove the plate.

- A: Set guide plate
- B: FB interlock switch assembly
- C: Pan-head IT Screw M3x5
- D: Pan-head Screw SW.W M4x6

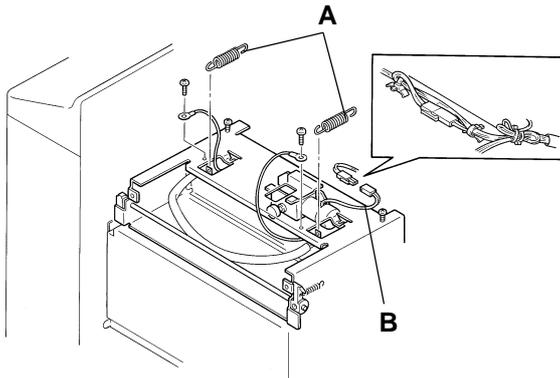


Test Mode No.31 TPH home position SW
 – Short interval beeps when pressed
 No.32 TPH pressure SW
 – Short interval beeps when pressed
 No.111 Thermal pressure motor operation

2. Thermal Pressure Motor Unit

Removal

1. Turn off the power and remove the following parts.
 - Master loading unit cover (top), Copy guide plate (lower), Thermal print head (see Chapter 16).
 - Set guide plate (see the previous page)
2. Remove two TPH pressure springs.
3. Disconnect the connector of the TPH pressure motor.



A: TPH pressure spring
 B: Connector of Thermal pressure motor

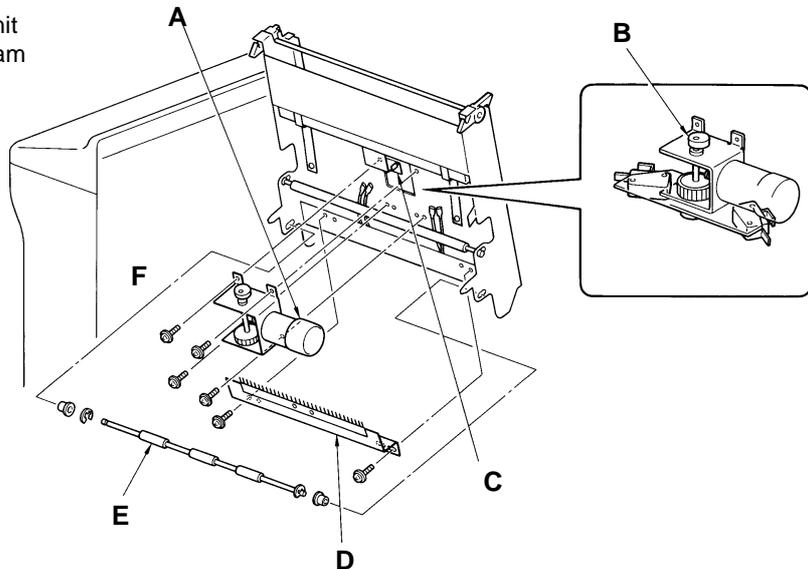
4. Place a sheet of paper below the Master loading unit to prevent E rings and screws from dropping inside the machine when they are removed.
5. Remove an E ring securing a metal bearing at one end of the Load roller shaft and slide the metal bearing on the shaft off the Master loading unit frame. Remove the Load roller from the Master loading unit, shifting it sideways.

[IMPORTANT]

Don't drop the metal bearing at the other end of the Load roller shaft when removing the roller.

6. Remove two mounting screws on the De-electricity brush bracket, and remove the bracket.
7. Remove four mounting screws on the Thermal pressure motor unit, and remove the unit from the Master loading unit frame.
8. Holding the Thermal pressure motor unit, disconnect wires from the terminals of the TPH pressure SW and TPH home position SW.

- A: Thermal pressure motor unit
- B: Thermal pressure motor cam
- C: TPH bracket
- D: De-electricity brush bracket
- E: Load roller
- F: Pan-head IT Screw M3x5



Test Mode No.31 TPH home position SW
 – Short interval beeps when pressed
 No.32 TPH pressure SW
 – Short interval beeps when pressed
 No.111 Thermal pressure motor operation

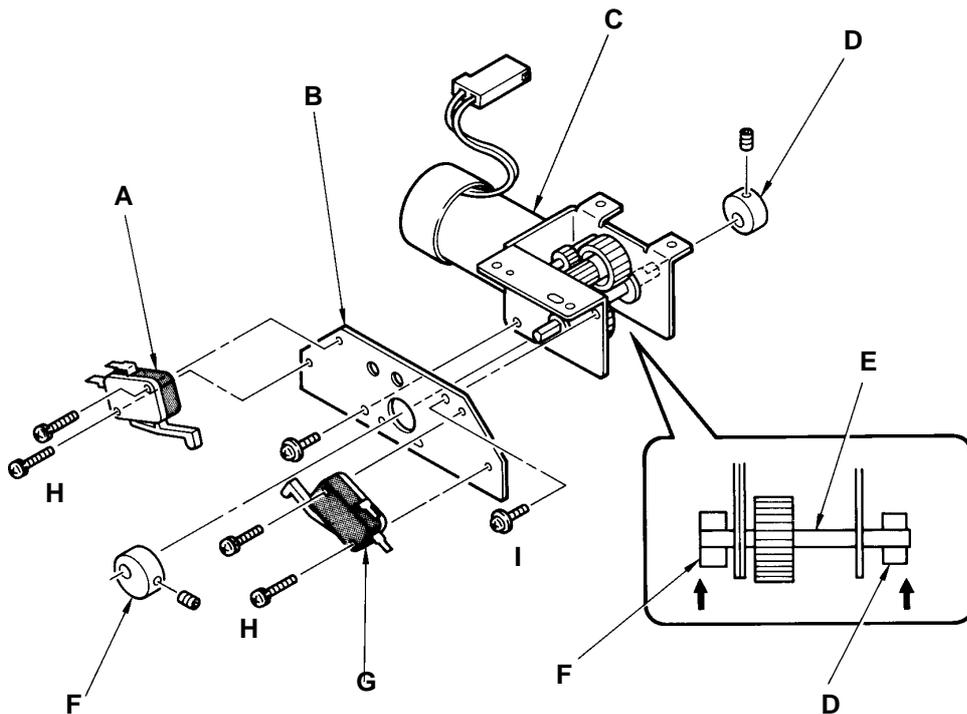
3. Thermal Pressure Motor

< Removal Procedure >

1. Remove the Thermal pressure motor unit.
2. Loosen the respective allen screws securing the Switch cam and Thermal pressure motor cam on the Thermal pressure motor shaft and remove these cams.
3. Remove two mounting screws on the Micro-sw bracket and separate the bracket from the Thermal pressure motor ass'y.

-Precautions in Assembly -

- Make sure to match the positioning holes of the Micro-sw bracket with the bosses on the Thermal pressure motor ass'y when attaching it.
- Remember that the Switch cam is larger than the Thermal pressure motor cam. Make sure to secure the Switch cam with its side face on a level with the end of the shaft, and the Thermal pressure motor cam with the end of the shaft protruding by 1 mm from the cam's side face, as shown in the figure below.
- Make sure to tighten the allen screw on the flat cut face of the shaft when securing the cams.
- Make sure to put grease on the Thermal pressure motor cam.



- A: TPH pressure SW
- B: Micro-sw bracket
- C: Thermal pressure motor
- D: Thermal pressure motor cam
- E: Thermal pressure motor shaft
- F: Switch cam (large)
- G: TPH home position SW
- H: Pan-head Screw SW M3x14
- I : Pan-head IT Screw M3x5

MEMO

CHAPTER 16: MASTER MAKING SECTION

Contents

THEORY OF OPERATION

- 1. Master Making System 16T-1

REMOVAL & ASSEMBLY

- 1. Write Roller 16R-1
- 2. Thermal Print Head 16R-3

ADJUSTMENT

- 1. Thermal Power of Thermal Print Head 16A-1
- 2. Image Elongation/Shrinkage Correction
(Write Pulse Motor Speed Adjustment) 16A-3

THEORY OF OPERATION

1. Master Making System

- Start of Master Making

When the Start button is pressed with an original loaded, the TPH control signal is turned ON to supply heating power to the Thermal print head.

A certain period later, the Read and Write start signal is turned ON, which activates the Write pulse motor to rotate the Write roller and starts image data transmission from the Image processing PCB to the Thermal print head for image perforation on a master.

- Master Feeding

When the Write pulse motor starts rotating, master material is fed pulse by pulse by the Write roller, which is rotated via the <Write pulse motor pulley-belt-Pulley G> route.

At that time, the master is caught by the Torque limiter mounted Tension roller and Nip roller; it is prevented from image shrinkage by applying a constant back tension regardless of the diameter of the master roll.

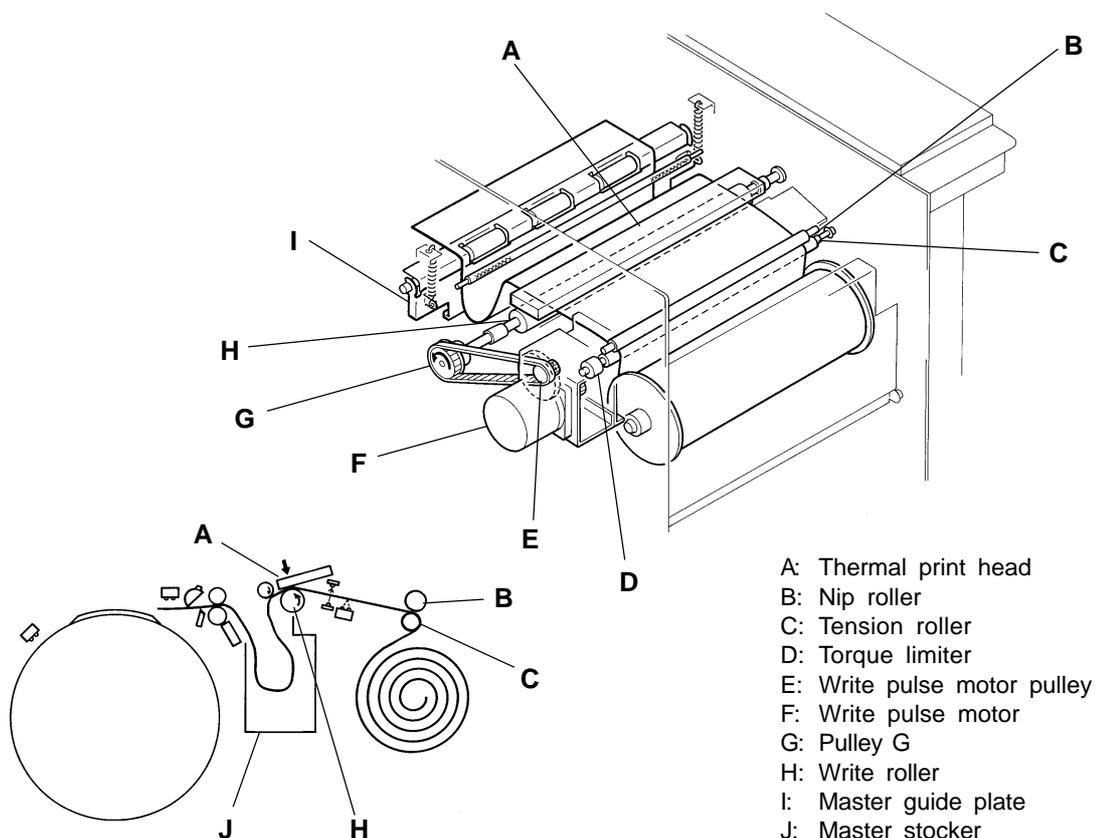
- Finish of Master Making

When a certain length of master has been made according to the size of an original or printing paper, the Read and Write start signal is turned OFF, which stops the rotation of the Write pulse motor and the image data transmission to finish image perforation on the master.

At the same time, the TPH control signal is turned OFF to terminate heating power supply to the Thermal print head, which is raised by the rotation of the Thermal pressure motor to release master material for master loading operation in the next step.

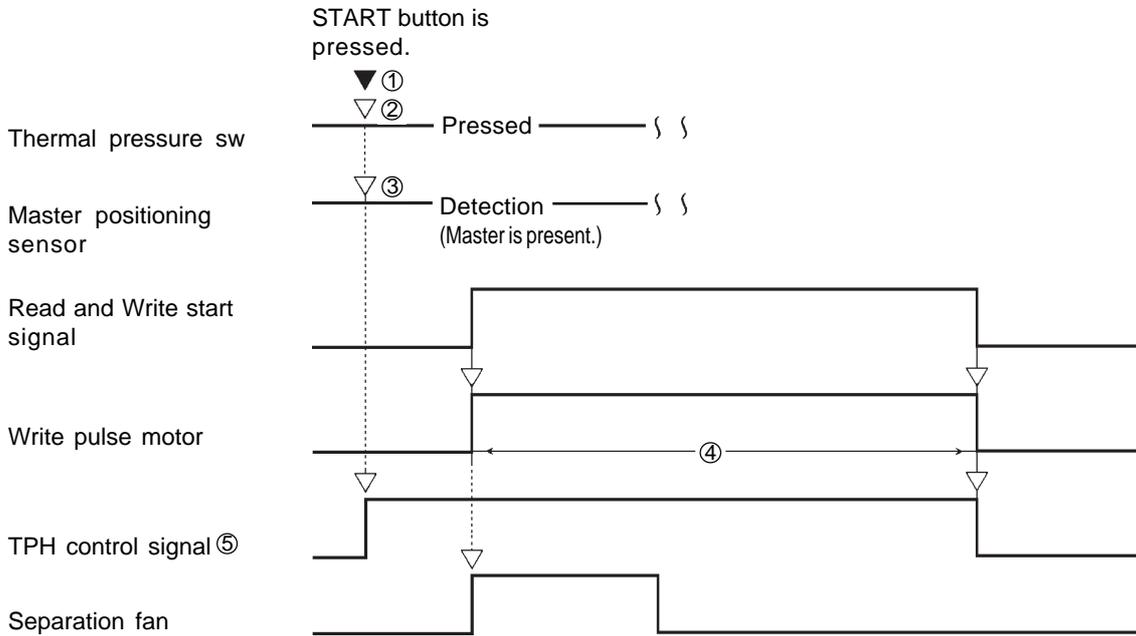
- Storage of a New-made Master

A new-made master is pulled into the Master stocker by air suction originating from the Separation fan operating at the beginning of master making (master removal) operation, and stored there to await loading on the Drum while an old master is removed from it.



- Timing Chart -

Master Making System



- ① The START button input is not accepted while an original is being loaded into the ADF unit.
- ② If the TPH pressure switch is not pressed ON, the master making operation starts after the Thermal pressure motor is rotated until the TPH pressure switch has been pressed ON.
- ③ If the Master positioning sensor detects no master (reflected light), the master making operation starts after a master is fed to the Master positioning sensor.

- ④ The Write pulse motor is deactivated at the same time the Read and Write start signal is turned OFF.

If the Write pulse motor has not been rotated by **4566 pulses** at this point yet, however, it is deactivated only after it has been rotated by **4566 pulses** because a new-made master can't be fed to the Drum without some master stored into the Master stocker.

- ⑤ When the TPH control signal is turned ON, power (voltage) is applied to the Thermal print head.

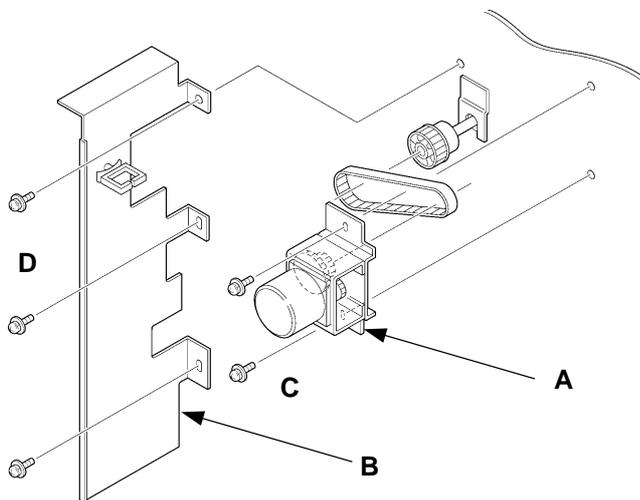
REMOVAL & ASSEMBLY

1. Write Roller

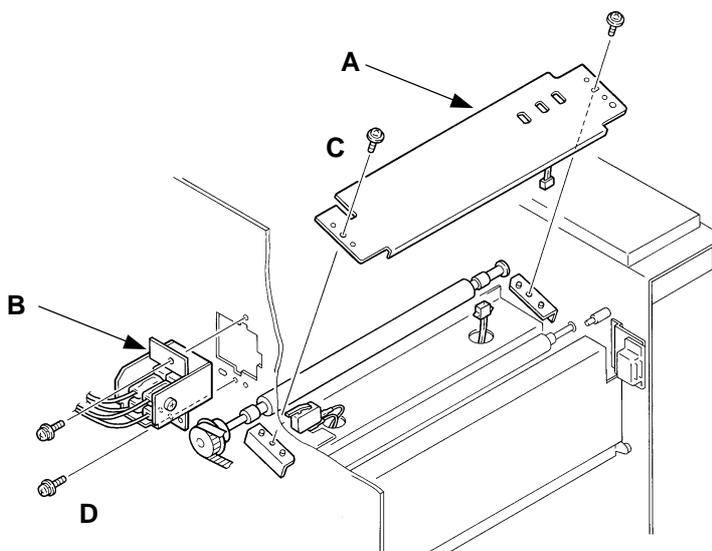
Removal

1. Disconnect the Power cord and remove the Front right cover.
2. Remove three mounting screws on the Power supply cover plate located on the left of the Power supply unit, and let the plate hang free.
3. Remove two mounting screws on the Write pulse motor, and remove the belt on the Pulley G.
4. Remove two mounting screws of the FB interlock switch assembly to make it loose. (A3 machine only)
5. Remove two mounting screws of the Set guide plate and disconnect the sensor's connector to remove the plate. (A3 machine only)

- A: Write pulse motor
- B: Power supply cover plate
- C: Pan-head Screw SW.W M4x8
- D: Pan-head Screw SW.W M4x6



- A: Set guide plate
- B: FB interlock switch assembly
- C: Pan-head IT Screw M3x5
- D: Pan-head Screw SW.W M4x6



CHAPTER 16. MASTER MAKING SECTION

REMOVAL & ASSEMBLY

6. Loosen the allen screw securing the Pulley G on the shaft and slide the pulley off the shaft.
7. Remove the securing screw on the Bearing fixing plate and remove the plate and bearing.
8. Pull the Write roller toward the operation panel side to slide out the other end from the rear side machine frame and take it out from below the Master loading unit.

[IMPORTANT]

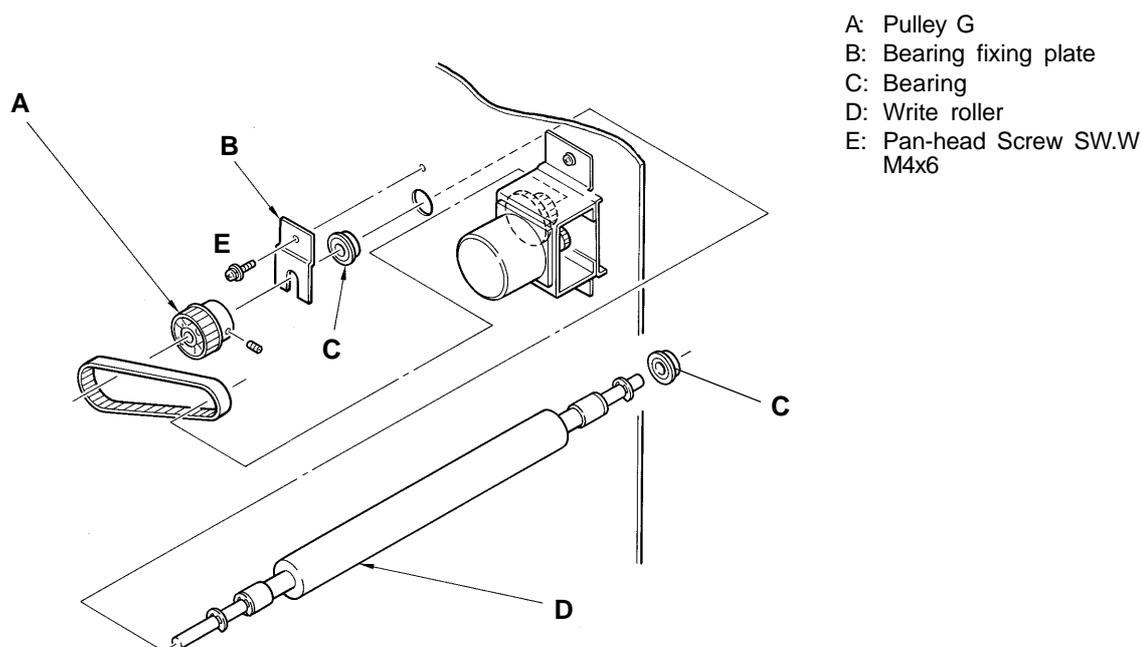
There is a bearing put on the other end of the Write roller. Do not drop it into the machine.

- Precautions in Assembly -

- Do not mount the Bearing fixing plate in reverse. The face with the part number imprinted should face you. Besides, make sure to match a small boss on the plate into a hole on the machine frame when securing it.
- Mount the Pulley G so that its outer face can be level with the end of the Write roller shaft. The allen screws should be tightened on the flat-cut face of the Write roller shaft.
- Confirm that the tension of the belt on the Write pulse motor is not too loose nor too tight after assembly.

- Phenomenon with a worn Write roller -

- If the Write roller is worn; images on prints may appear blurred on the edges, or wrinkles will be made during master making.



2. Thermal Print Head

< Removal Procedure >

1. Turn ON the power and open the Scanner table.
Then turn OFF the power.

[Note]

The above procedure is to raise the Thermal print head.

2. Loosen two mounting screws on the top of the Master loading unit cover (top) and remove other two mounting screws on the front of the cover. Then remove the cover.
3. Remove the ground wire by loosening the securing screw.
4. Disconnect the connector of the Master end sensor (receive).
5. Open the Master loading unit, and place a sheet of paper under the Thermal print head.

[Note]

This is to prevent screws from falling inside the machine when they are removed.

6. Loosen two mounting screws on the Copy guide plate (lower), and remove the plate.

[IMPORTANT]

Be careful not to damage the heating elements of the Thermal print head when removing the cover.

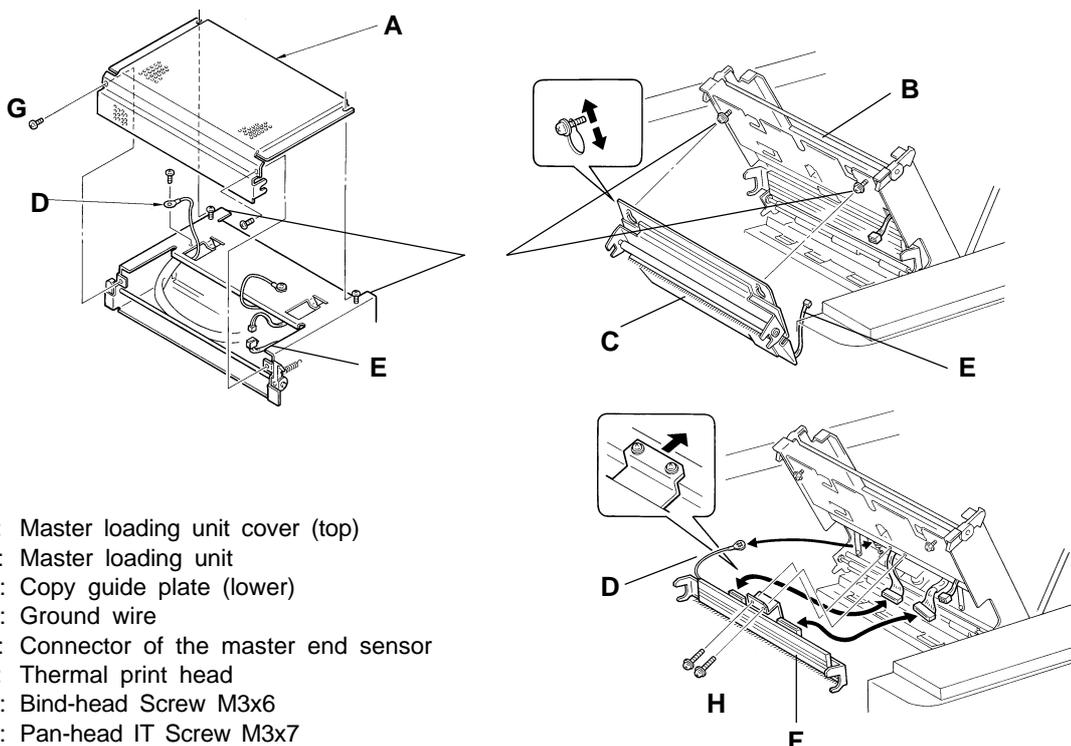
7. Remove two mounting screws on the bracket of the Thermal print head, disconnect two connectors from the Thermal print head and remove it from the Master loading unit.

- Precautions in Removal -

- Be careful not to damage the heating elements of the Thermal print head.
- Be careful not to touch the metal pins of the connectors.
Static electricity from your body (finger) may damage the Thermal print head.

- Precautions in Assembly -

- Be sure to adjust the thermal power each time the Thermal print head is replaced.



MEMO

ADJUSTMENT

1. Thermal Power of Thermal Print Head

PROCEDURE

- 1) Turn off the power, and remove the Front right cover.
- 2) Connect a voltmeter between pins TP1(+) and TP2(GND) on the power supply PCB.
- 3) Turning ON Test Mode No.77 (TPH/CTL signal), confirm that the voltage displayed on the voltmeter conforms to the setting table according to the thermal print head resistance value.
- 5) If not, adjust VR100/VR101 for Power Supply PCBH and VR401/VR402 for Power Supply PCBH (VR101/402: Fine adjustment, VR100/401: Rough adjustment).
- 6) On completion of adjustment, turn off the power and detach the voltmeter.
- 7) Carry out master-making and confirm results.

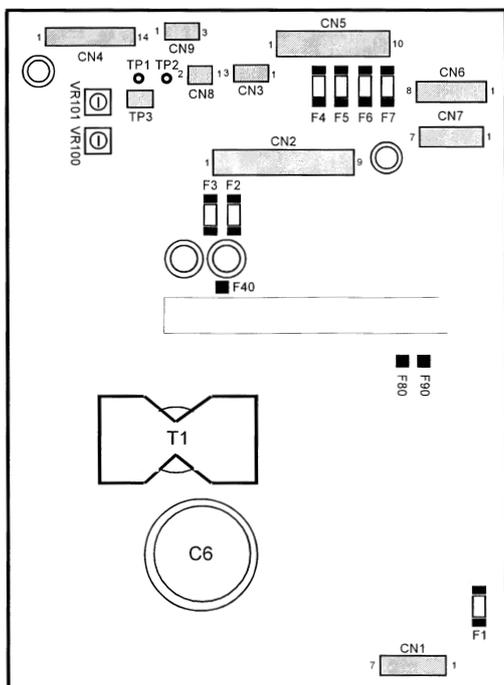
-Precautions in Adjustment -

- This adjustment has to be made every time the thermal print head is replaced.
- The Scanner table should be closed to apply power to the thermal print head. Otherwise, the interlock SW will interrupt the power.

-Results of misadjustment -

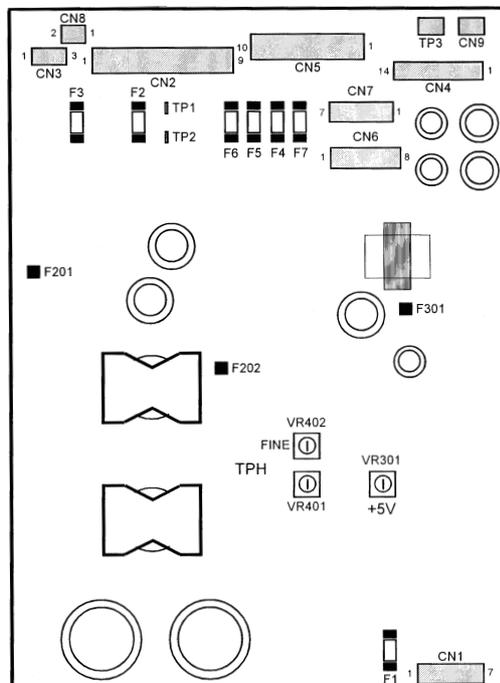
- If the voltage is too high ; solid print image will be deformed and the heating elements of the thermal print head will be liable to damages due to over heat.
- If the voltage is too low ; thin horizontal lines cannot to reproduced clearly.

Power Supply PCB H



019-5138-H (100V)

Power Supply PCB N



019-51038-N (100V)
019-51023-N (200V)

CHAPTER 16. MASTER MAKING SECTION

ADJUSTMENT

TPH Voltage Setting Table < 400 dpi models >

T-TPH

Resistance (ȳ)	Voltage (V)
1623~1645	14.0
1646~1669	14.1
1670~1692	14.2
1693~1716	14.3
1717~1740	14.4
1741~1764	14.5
1765~1789	14.6
1790~1813	14.7
1814~1838	14.8
1839~1863	14.9
1864~1888	15.0
1889~1913	15.1
1914~1938	15.2
1939~1964	15.3
1965~1989	15.4
1990~2015	15.5
2016~2041	15.6
2042~2067	15.7
2068~2094	15.8
2095~2120	15.9
2121~2147	16.0
2148~2174	16.1
2175~2201	16.2
2202~2228	16.3
2229~2255	16.4
2256~2283	16.5
2284~2310	16.6
2311~2350	16.7

K-TPH

Resistance (ȳ)	Voltage (V)
1989~2000	16.2
2001~2025	16.3
2026~2050	16.4
2051~2075	16.5
2076~2100	16.6
2101~2125	16.7
2126~2151	16.8
2152~2177	16.9
2178~2202	17.0
2203~2228	17.1
2229~2254	17.2
2255~2280	17.3
2281~2307	17.4
2308~2333	17.5
2334~2360	17.6
2361~2387	17.7
2388~2414	17.8
2415~2441	17.9
2442~2468	18.0
2469~2496	18.1
2497~2523	18.2
2524~2551	18.3
2552~2579	18.4
2580~2607	18.5
2608~2635	18.6
2636~2663	18.7
2664~2692	18.8

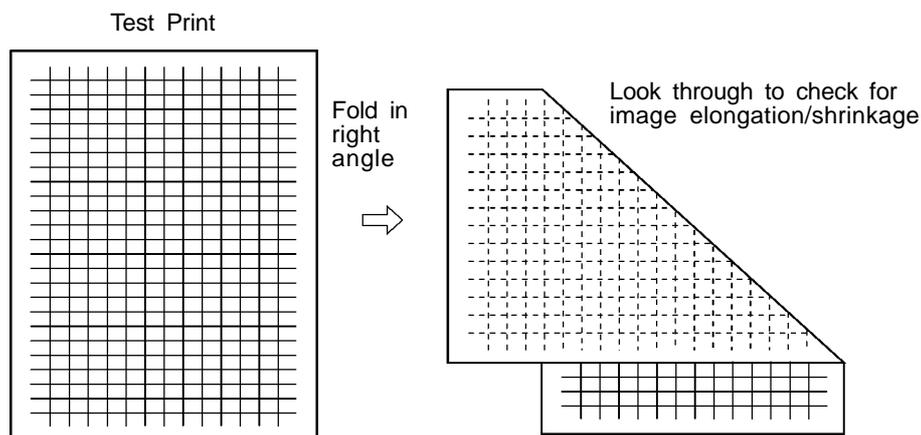
2. Image Elongation/Shrinkage Correction (Write Pulse Motor Speed Adjustment)

- Checking and Method

1. Put the same size of the paper as the effective printing area on the Paper feed tray and run test print(Test Mode No. 119).
2. Fold the output test print slantly at a right angle as shown below, and make sure that the main scan block and sub-scan block overlap properly.
3. If not overlapping, adjust a write pulse motor speed in Test Mode(Memory Switch) No. 221. Press the PRINT POSITION button to select a Memory switch setting referring to the chart below.
4. Adjust image elongation/shrinkage so that it will be finally within $\pm 1.4\%$.
 (25 cm x 1.4 % = 3.5 mm, 30 cm x 1.4 % = 4.2 mm)

No. 221 Write Pulse Motor Speed Control

SW setting	9	A	B	C	D	E	F	O
Amount (mm)	-7	-6	-5	-4	-3	-2	-1	0
SW setting	1	2	3	4	5	6	7	8
Amount (mm)	+1	+2	+3	+4	+5	+6	+7	+8



MEMO

CHAPTER 17: MASTER CLAMP & LOADING SECTION

Contents

THEORY OF OPERATION

1. Master Clamping System	17T-1
2. Master On-Drum Loading System	17T-3
3. Master Post-Cutting Feeding System	17T-6
4. Post-Master-Miscut Operation	17T-8

REMOVAL & ASSEMBLY

1. Loading Fan <B4/A4/Legal>	17R-1
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THEORY OF OPERATION

1. Master Clamping System

- Basic

When a used master is removed from the drum, a new-made master proceeds to the drum and its top part is caught by the Clamp plate.

- Preoperations for Master Clamping

The following steps are already completed before closing the Clamp plate.

1. The Main motor stops and the Drum is at the home position.
2. It is confirmed that the light path of the Master removal sensor is open (a removed master has entered the Master disposal box). **100 msec later**, the Clamp solenoid is activated, lowering the Clamp unit to the Drum, by which the gear on the Clamp motor is engaged with that of the Clamp plate.
3. The Clamp safety switch is released at the same time, causing the Loading pulse motor to start rotating, by which the Load rollers are rotated to feed a new-made master to the Drum.
4. **317 pulses later**, the Loading pulse motor stops to finish master feeding to the Drum.

- Closing of Clamp Plate

When the Loading pulse motor stops, the Clamp motor starts to rotate the Clamp motor gear, causing the Clamp plate to close on the top part of the fed master.

- Return of Clamp Unit

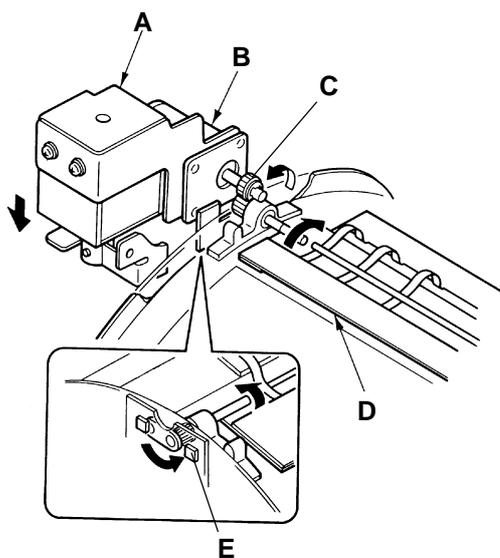
When the 0° Angular sensor detects magnetism of the Angular magnet on the Angular magnet plate attached to the end of the Clamp plate shaft, it is assumed that the Clamp plate has been closed and the Clamp motor and Clamp solenoid are simultaneously deactivated.

- Finish of Master Clamping

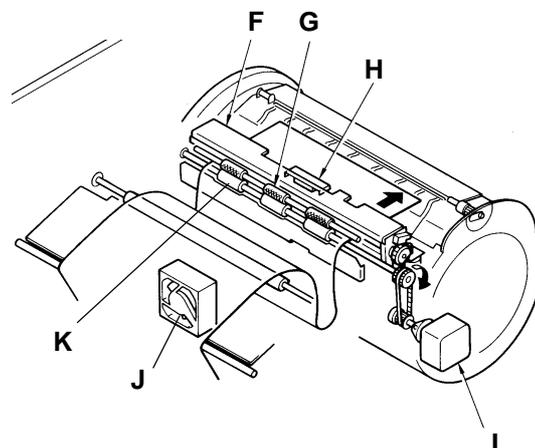
When the Clamp solenoid is deactivated, the Clamp unit is returned to the initial (retreat) position and presses the actuator of the Clamp safety switch, by which it is confirmed that the new-made master is now ready to be loaded on the Drum with its top part secured by the Clamp plate.

- Protection of Clamp Solenoid

When the Clamp solenoid is energized, the Range setting switch is actuated ON to reduce the current flowing through the solenoid for protecting it against overheat.



- | | |
|----------------------|------------------------------|
| A: Clamp solenoid | G: Load roller (upper) |
| B: Clamp motor | H: Master positioning sensor |
| C: Clamp motor gear | I: Loading pulse motor |
| D: Clamp plate | J: Loading fan |
| E: 0° Angular sensor | K: Load roller (lower) |
| F: Cutter unit | |



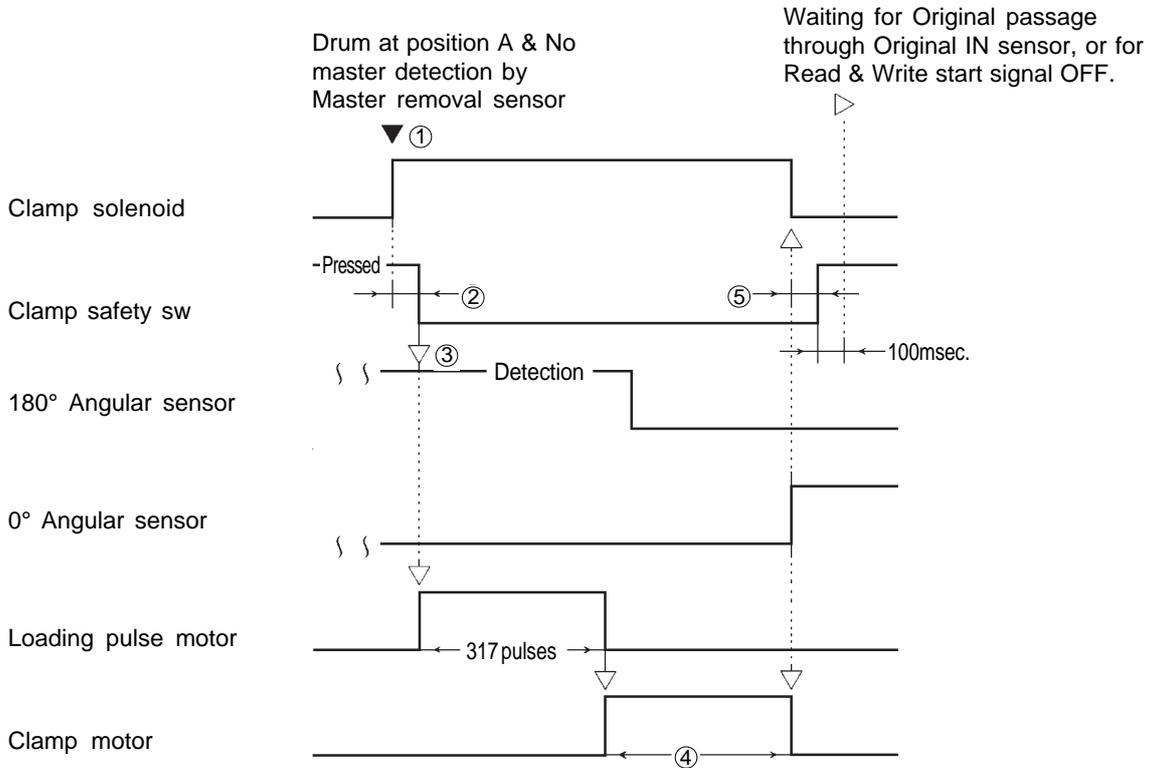
CHAPTER 17. MASTER CLAMP & LOADING SECTION

THEORY OF OPERATION

Test Mode No.09 0° Angular sensor
 – Short interval beeps when magnetism is detected
 No.13 Clamp safety SW
 – Short interval beeps when pressed
 No.73 Clamp solenoid
 No.66 Loading pulse motor

- Timing Chart -

Master Clamping System



- ① During Master removal operation, if a removed Master is still detected by the Master removal sensor when the Drum returns to Position A, the Clamp solenoid is not activated until the removed Master clears through the sensor completely.
- ② If the Clamp safety switch has not been released **within 4 seconds** after the Clamp solenoid is activated, the solenoid is deactivated and the Drum is rotated again and stops at Position A. The solenoid is reactivated after the Drum stops at Position A, and if the Clamp safety sw remains actuated **for 4 seconds**, the machine assumes a **Clamp error-1** has occurred and displays the error code [T 3].
- ③ If the 180° Angular sensor does not detect a magnet, the Clamp motor operates until the magnet is detected, after which the Loading pulse motor is activated.
- ④ If the 0° Angular sensor has not detected a magnet **within 8 seconds** after the Clamp motor is activated, the machine assumes a **Clamp error-1** has occurred and displays the error code [T 3].
- ⑤ If the Clamp safety switch has not been pressed **within 4 seconds** after the Clamp solenoid is deactivated, the machine assumes a **Clamp error-1** has occurred and displays the error code [T 3].

T3 (Clamp Error (1))
<ul style="list-style-type: none"> • Clamp safety switch not turned ON/OFF • 0° Angle sensor not turned ON

LED CSEN	Master loading sensor
	- Light up when reflected light detected
WAIT	Master positioning sensor
	- Light up when reflected light not detected
DRMC	Position C sensor
	- Light up when light path is blocked

2. Master On-Drum Loading System

- Basic

When the top part of a new-made master has been caught by the Clamp plate, the Drum starts rotating to load the master on the Drum.

- Start of Master On-Drum Loading

After the Clamp plate operation is completed, the Original IN sensor status is checked to ensure that the scanning of an original is close to the end.

When it is confirmed that the trail edge of an original has passed through the Original IN sensor (that the light path of the Original IN sensor is opened), or the Read and Write start signal is turned off (in case the Write pulse motor has been rotated for the preset pulses before an original passes through the Original IN sensor), the Main motor and Print signal are turned on, causing the Drum to rotate and paper to start feeding.

- Function of Loading Fan

At the same time the Main motor is turned on, the Loading fan starts to suck air and attracts the master waiting in the Master stocker to secure correct master loading on the Drum.

- Check of Master On-Drum Loading Error [Position C-1]

As the Drum rotates and the Plate C-1 is detected by the Position C sensor, the Master loading sensor is activated to check the master status on the Drum to determine if a master (on-drum) loading error has occurred.

- Master Cutting & Lowering of Thermal Print Head [Position C-2]

As the Drum rotates further and the Plate C-2 is detected by the Position C sensor, the Cutter motor is activated to cut the master with the Rotary cutter and simultaneously the Thermal pressure motor rotates until the TPH pressure switch is depressed to apply pressure on master material.

- Check of Master Cutting Error [Home Position A]

As the Drum rotates further and the Plate A is detected by the Position A sensor, the Master positioning sensor is activated to determine if a master cutting error has occurred.

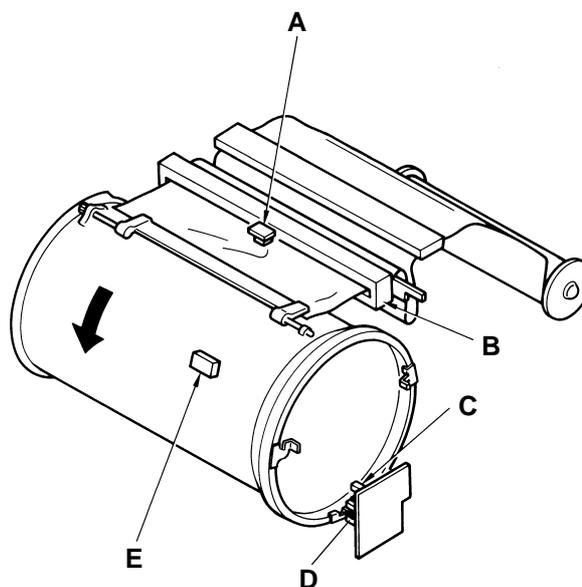
If master material is detected by the Master positioning sensor at this position, it is assumed that a master cutting error has occurred.

- Advance of Master for Next Master-Making

If it is determined that no master cutting error has occurred, the Write and Loading pulse motors rotate to advance master material into position for the next master-making operation.

The new-made master is closely loaded on the Drum, feeding a sheet of paper.
(No paper feeds in the confidential operation.)

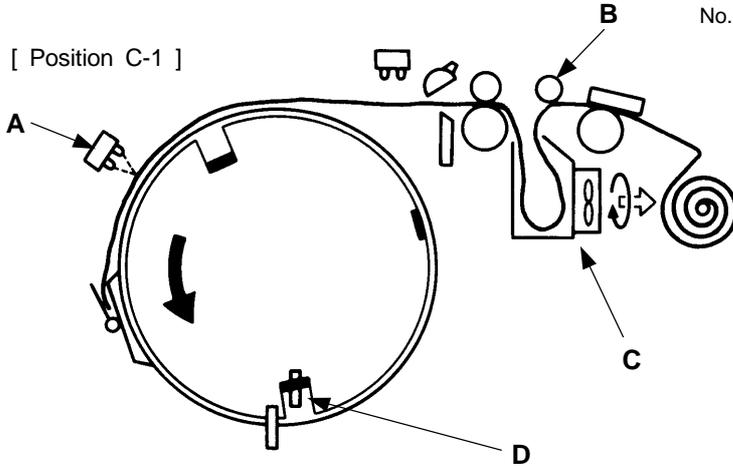
- A: Master positioning sensor
- B: Cutter unit
- C: Position C sensor
- D: Position A sensor
- E: Master loading sensor



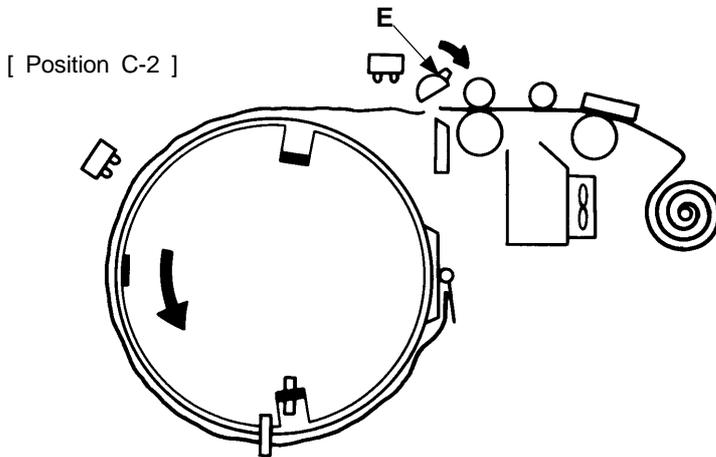
CHAPTER 17. MASTER CLAMP & LOADING SECTION

THEORY OF OPERATION

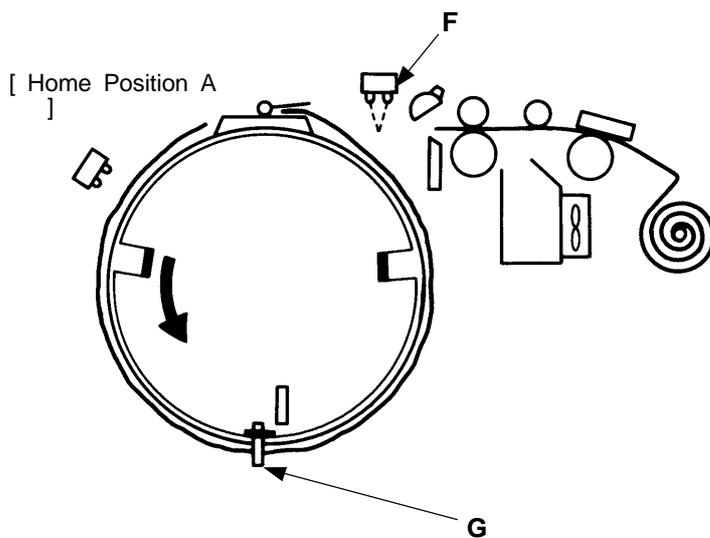
- Test Mode
- No.11 Position C sensor
 - Short interval beeps when light path is blocked
 - No.15 Master positioning sensor
 - Short interval beeps when reflected light detected
 - No.48 Master loading sensor
 - Short interval beeps when reflected light detected
 - No.72 Loading fan
 - No.112 Cutter motor one-cut operation
 - No.111 Thermal pressure motor operation



Check of Master On-Drum Loading Error



Master Cutting



Check of Master Cutting Error

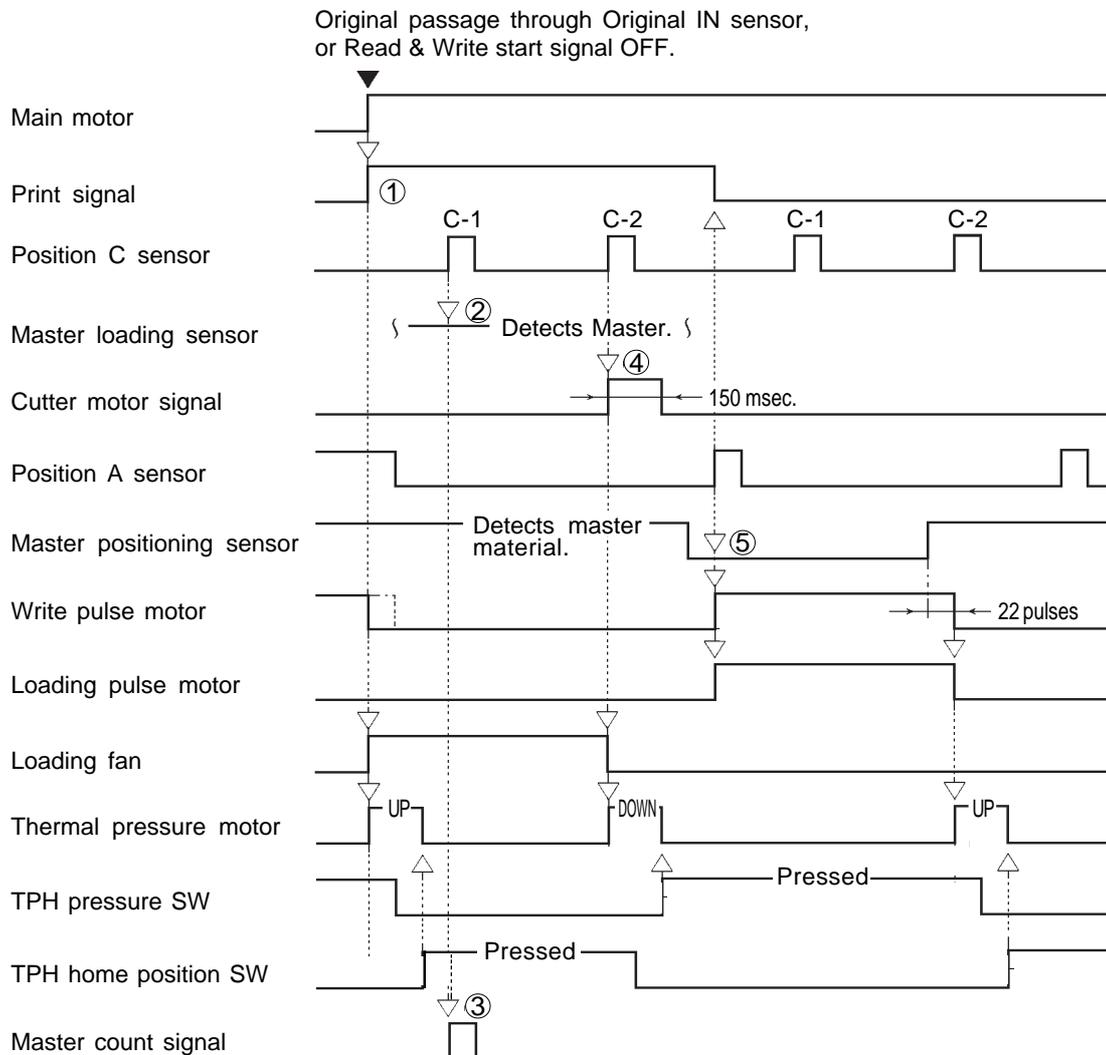
- A: Master loading sensor
- B: Catch roller
- C: Loading fan
- D: Position C sensor
- E: Cutter unit
- F: Master positioning sensor
- G: Position A sensor

CHAPTER 17. MASTER CLAMP & LOADING SECTION

THEORY OF OPERATION

-Timing Chart -

Master On-Drum Loading System



- ① The Print signal starts the paper feed operation.
- ② If the Master loading sensor does not detect master on the Drum, the machine assumes a **Master loading error** has occurred and displays the error message “**CLAMP ERROR REMOVE MASTER ROLL THEN RE-INSTALL**”.
- ③ If the Master loading sensor detects master on the Drum, the Master count signal is output to increase the Total master counter by 1.
- ④ When the Cutter motor signal is output, the Cutter motor is activated. The motor stops when the Cutter position switch is released.
- ⑤ If the Master positioning sensor detects master material, the machine assumes a **Master cutting error** has occurred and proceeds to a recovering action.

3. Master Post-Cutting Feeding System

- Basic

When the Drum rotates to the Home position A after master cutting in master loading operation and it is confirmed that the Master positioning sensor detects no master (no reflected light), that is, no master cut error has occurred, the Write pulse motor and Loading pulse motor are activated to feed master material until the Master positioning sensor detects the master material.

- Function of Write Pulse Motor

When the Write pulse motor is activated, the Write roller is rotated via pulleys and belts and start to feed master material.

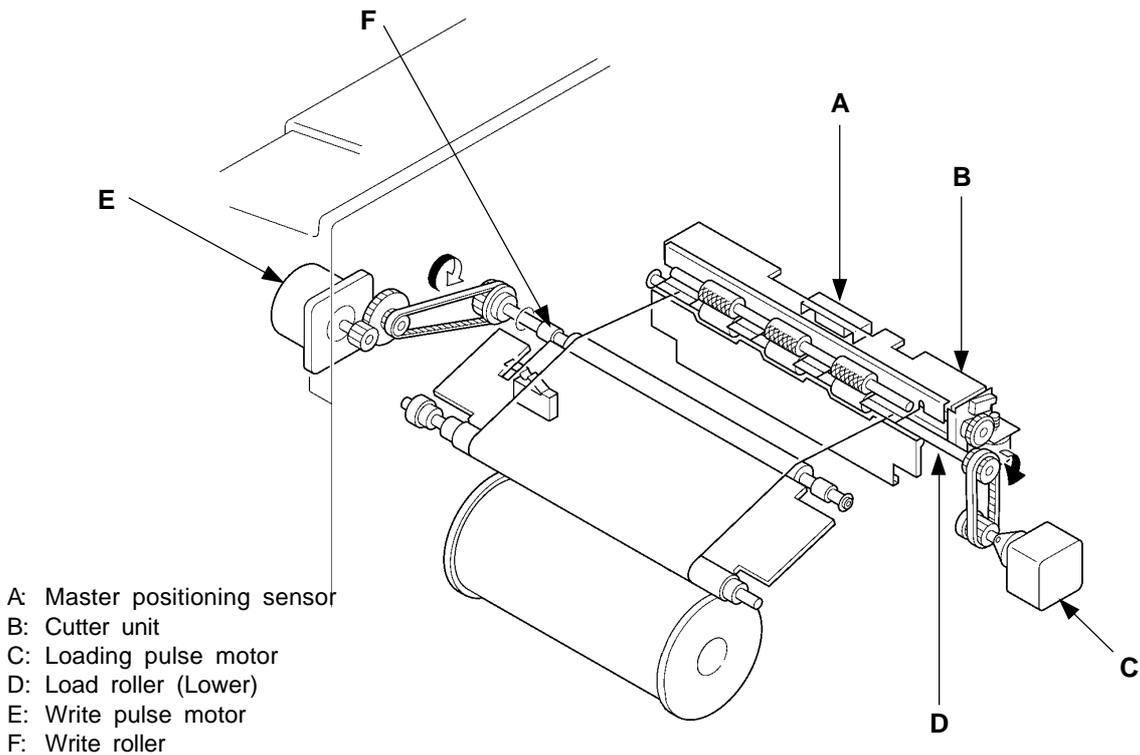
- Function of Loading Pulse Motor

The Loading pulse motor drives the Load roller (lower) via pulleys and a belt, and feed the oncoming master material further with the Load roller (upper), which is driven by the Load roller lower).

- Finish of Post-Cutting Feeding

As the leading edge of master material is detected by the Master positioning sensor, the Write pulse motor and Loading pulse motor are deactivated **22 pulses** later.

At the same time they are deactivated, the Thermal pressure motor is activated to raise the Thermal print head until the TPH home position switch is actuated ON.

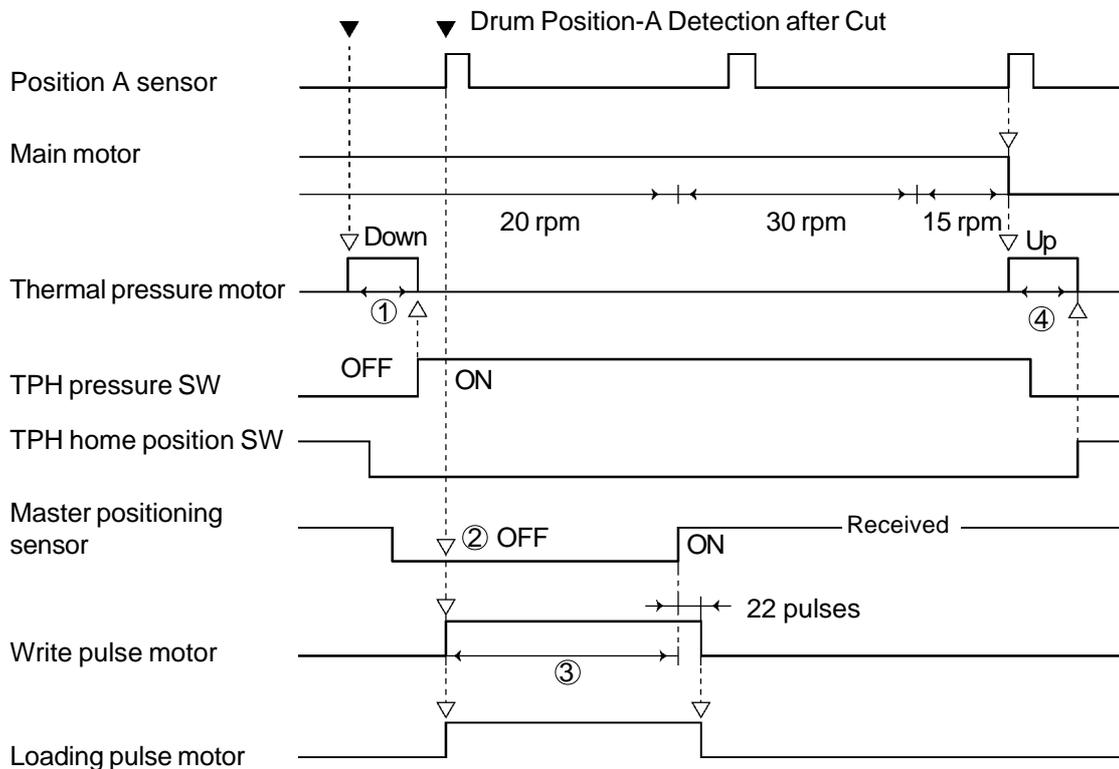


CHAPTER 17. MASTER CLAMP & LOADING SECTION

THEORY OF OPERATION

Test Mode No.15 Master positioning sensor
 – Light up when reflected light detected
 No.65 Write pulse motor
 No.66 Loading pulse motor

Master Post-Cutting Feed Timing Chart



- ① If the TPH pressure switch has not been pressed within 4 seconds after the Thermal pressure motor is activated, the machine assumes the Thermal pressure motor has locked and displays the error code **[T19]**.
- ② If the Master positioning sensor detects master material, the machine assumes a Master cutting error has occurred and proceeds to a recovering action.
- ③ If the Master positioning sensor has not detected the leading edge of master material within 1,574 pulses after the Write pulse motor and Loading pulse motor start, the machine assumes the master mis-feed has occurred and displays the error message **“MASTER MIS-FEED REMOVE MASTER ROLL THEN RE-INSTALL”**.
- ④ The Thermal print head is not raised if another original is set on the Original feed tray.

4. Post-Master-Miscut Operation

- Detection of Master Cut Error

If the Master positioning sensor detects master material at the Home position A after master cutting operation in loading a master on the Drum, the machine assumes a master cut error has occurred. (Refer to Fig. 1.)

- Retrial of Master Cutting Operation

When a master cut error occurs, the Thermal pressure motor is activated to raise the Thermal print head until the TPH home position switch is pressed, and the Drum continues to rotate.

When the Drum comes to the Position C-1, the Cutter motor is reactivated. (Refer to Fig.2.)

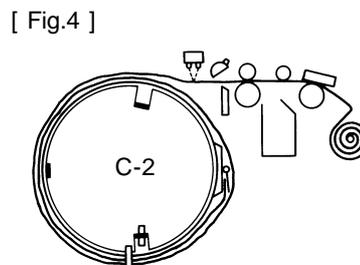
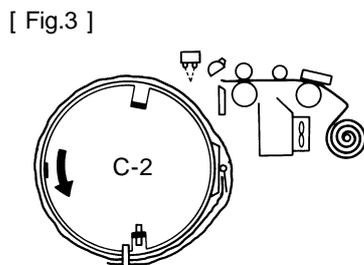
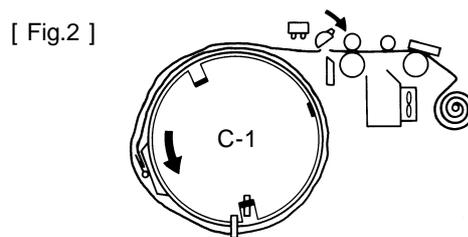
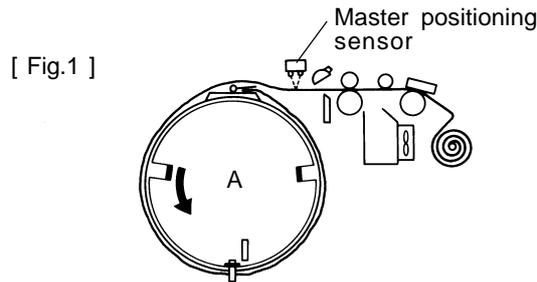
- Recheck of Master Cut Error

The Master positioning sensor checks the result of the master cutting operation again when the Drum comes to the Position C-2. (Refer to Fig.3 & 4.)

If the Master positioning sensor does not detect master material, the machine assumes that the master has been cut and activates the Thermal pressure motor to lower the Thermal print head until the TPH thermal pressure switch is pressed, in order to feed master material.

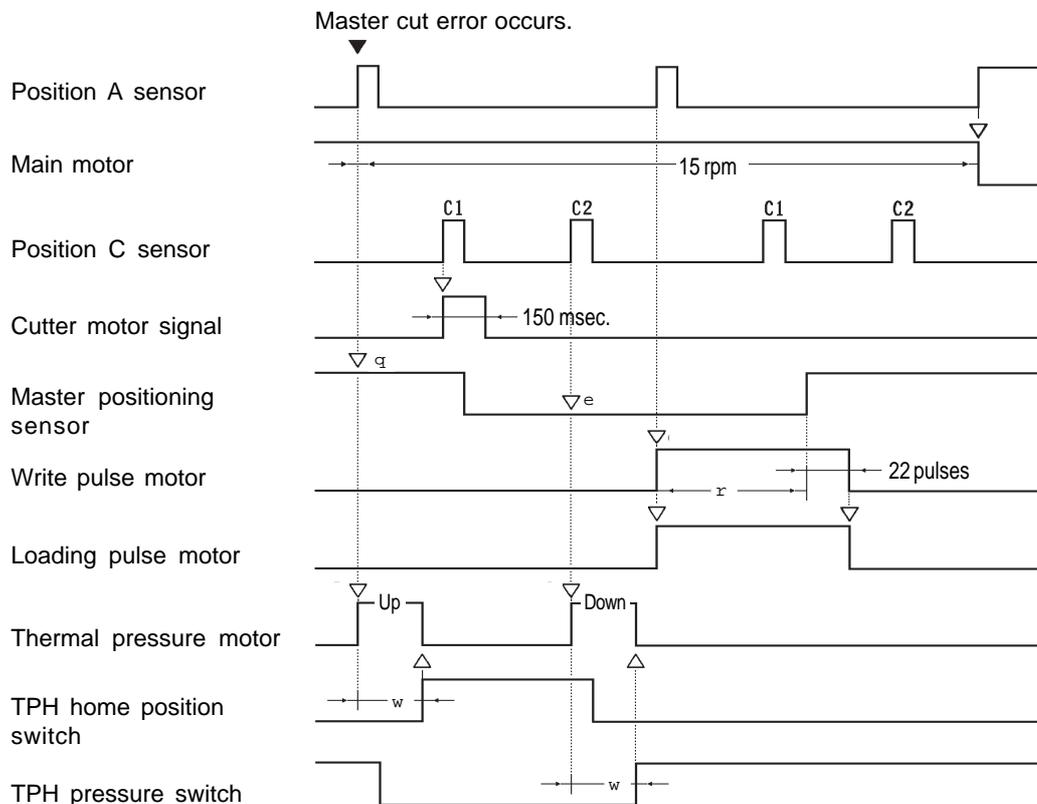
When the Drum returns to the Home position A, the Write pulse motor and Loading pulse motor are activated to feed the leading edge of the master material up to the Master positioning sensor.

If the Master positioning sensor detects master material, on the contrary, the machine assumes that the Cutter motor has locked and indicates the error code [T13] when the Drum returns to the Home position A.



- Timing Chart -

Post-Master-Miscut Operation



- ① As the Master positioning sensor detects master material, the machine assumes a master cut error has occurred.
- ② If the TPH home position switch or TPH pressure switch has not been pressed **within 4 seconds** after the Thermal pressure motor is activated, the machine assumes the Thermal pressure motor has locked and displays the error code **[T19]**.
- ③ When the Drum reaches the Position C-2, if the Master positioning sensor detects master material, the machine assumes that the Cutter motor has locked and displays the error code **[T13]**.
If the Master positioning sensor detects no master material, however, the machine assumes that the master has been cut at the second time and continues to feed master material until its leading edge passes under the Master positioning sensor. On the operation panel, on the other hand, the **"MASTER CUT ERROR REMOVE DRUM AND CHECK MASTER"** is displayed because there was a master cut error at the first time.
- ④ If the Master positioning sensor has not detected the leading edge of master material **within 787 pulses** after the Write pulse motor and Loading pulse motor start, the machine assumes the master mis-feed has occurred and **"MASTER MIS-FEED REMOVE MASTER ROLL THEN RE-INSTALL"** is displayed.

MEMO

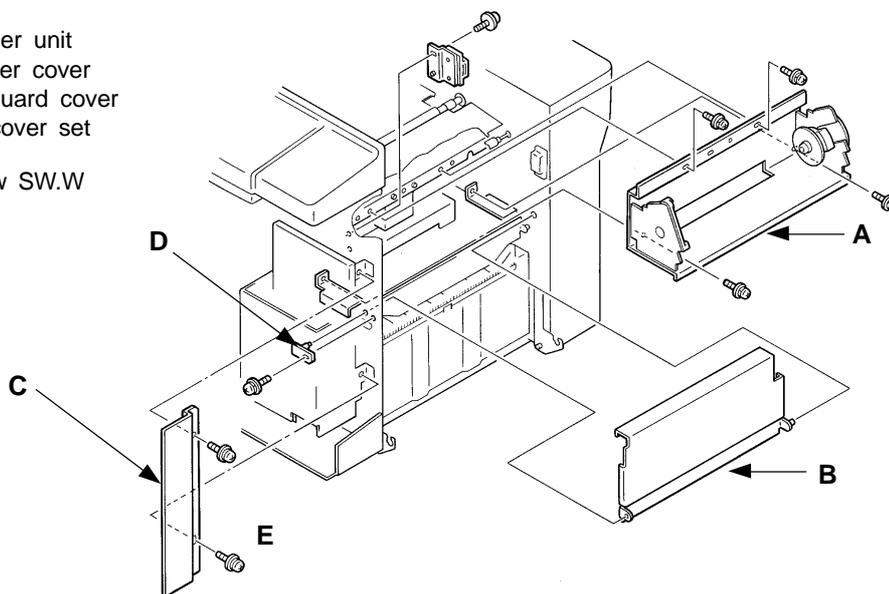
REMOVAL & ASSEMBLY

1. Loading Fan <B4/A4/Legal>

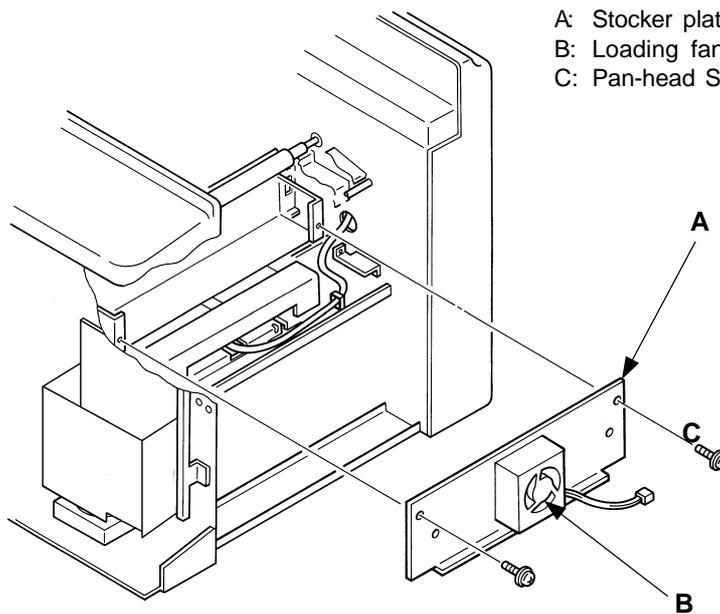
< Removal Procedure >

1. Turn OFF the power, and remove the Front right cover.
2. Remove two mounting screws on the Power supply guard cover, and remove the cover.
3. Remove the mounting screw on the Master holder cover set plate, and remove the plate.
4. Remove four mounting screws on the Master roll holder unit , and remove the unit.
5. Disconnect the connector of the Loading fan and remove two mounting screws of the stocker plate A.

- A: Master roll holder unit
- B: Master roll holder cover
- C: Power supply guard cover
- D: Master holder cover set plate
- E: Pan-head Screw SW.W M4x6



- A: Stocker plate A
- B: Loading fan
- C: Pan-head Screw SW.W M4x6



MEMO

CHAPTER 18: SC CONTROLLER SECTION

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1. SPECIFICATIONS

1-1. Specification

Item	
Host Compatibility	IBM compatible, Macintosh(*1) compatible
Operating Systems	Mac OS7.5, Mac OS7.6, Mac OS8.0, Mac OS8.1, Mac OS8.5, Windows3.1, Windows95/98, Windows NT4.0
Interface Ports	Parallel (IEEE1284B receptacle), Serial (RS-422)
Protocol	IEEE1284 Compatible, RS-422
Autoswitching	Printing port and protocol
Printer Languages	RisoRinc
Interface Unit Type	Built-In type (Inside of FR3950α)
RAM	8MB standard and one free slot (Max. 40MB with optional RAM)
Power Requirements	100 to 240VAC, 50/60Hz (Depending on the Risograph Model)
Power Consumption	20W
Operation Temperature	41F to 104F(5C to 40C)
Operation Humidity	40% to 70%(No dew condensation)
Resolution	Input: 400 dpi/ Output: 400dpi
Control Button	START, STOP and FUNCTION, UP and DOWN Buttons (5 buttons)
Indicator	Three LED's and a LCD for SC Controller
Margin Assignment	Top/bottom and left/right : 3mm(0.118 inch) or greater Check
Paper Size Range	Max. 297 x 432mm or 11.693 x 17.008 inch Min. 10 x 10mm or 0.394 x 0.394 inch

*1 - Can not connect with newer Mac Hardware such as iMac nor new G3 Macintosh which does not have RS-422 Serial Port.

1-2. Port Specification

A. Host (SERIAL) connector

- MAC (SERIAL)

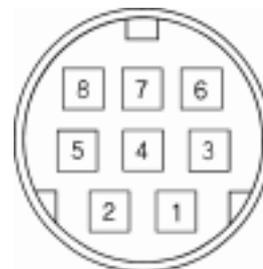
- Mac printer cable system : 57.6Kbps
- LocalTalk cable system : 230.4Kbps

- Input/Output Specifications

- Input : RS-422 receiver or equivalent
- Output : RS-422 driver or equivalent

- Pin Configuration

See on the right figure



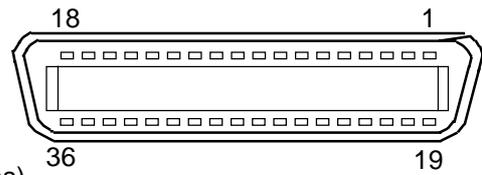
NOTE : Timing and other details are not published

CHAPTER 18. SC CONTROLLER SECTION

1.SPECIFICATIONS

1-2. Port Specification

B. Host (PARALLEL) connector
- Pin Configuration



- Interface signals (Centronics interface specifications)

Pin No.	Signal	Source	Function
1	DATASTROBE/	H	Data read synchronizing signal. When this signal is LOW, the FR3950 α SC Controller takes in data.
2	DATA1	Bi-Di	Represents data bit 1.
3	DATA2	Bi-Di	Represents data bit 2.
4	DATA3	Bi-Di	Represents data bit 3.
5	DATA4	Bi-Di	Represents data bit 4.
6	DATA5	Bi-Di	Represents data bit 5.
7	DATA6	Bi-Di	Represents data bit 6.
8	DATA7	Bi-Di	Represents data bit 7.
9	DATA8	Bi-Di	Represents data bit 8.
10	ACK/	P	Indicates that all data have been acknowledged when LOW.
11	BUSY	P	Indicates that the SC Controller is busy and cannot receive data when HIGH.
12	PE	P	Indicates the absence of paper in the printer when HIGH.
13	SELECT	P	Indicates whether the SC Controller is selected or not.
14	AF	H	Reserved for future expansion.
15	NC*		Underfined or reserved for future expansion.
16	GND		Signal ground
17	FG		Frame ground
18	5V	P	+5V power supplied from the SC Controller through a 4.2k ^{1/2} resistor.
19	GND		nStrobe signal ground
20	GND		Data 1 signal ground
21	GND		Data 2 signal ground
22	GND		Data 3 signal ground
23	GND		Data 4 signal ground
24	GND		Data 5 signal ground
25	GND		Data 6 signal ground
26	GND		Data 7 signal ground
27	GND		Data 8 signal ground
28	GND		nAck signal ground
29	GND		Busy signal ground
30	GND		pError signal ground
31	INPUT PRIME/	H	Restores the SC Controller into the initial status (compatibility mode) when HIGH.
32	FAULT/	P	Notifies the presence or absence of an error in the SC Controller to the external device(host).
33	NC*		Underfined or reserved for future expansion.
34	NC*		Underfined or reserved for future expansion.
35	NC*		Underfined or reserved for future expansion.
36	SELECT IN/	H	Used by the external device (host) to select the SC Controller. When this signal is LOW, the SC Controller is selected.

NC* stands for no connection

H stands for Host and P means the SC Controller

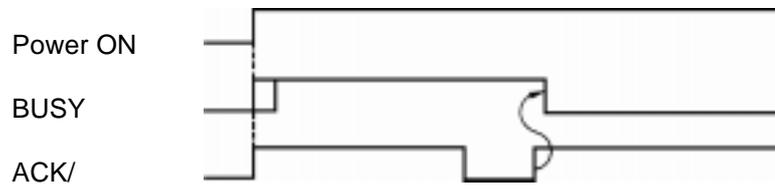
CHAPTER 18. SC CONTROLLER SECTION

1.SPECIFICATIONS

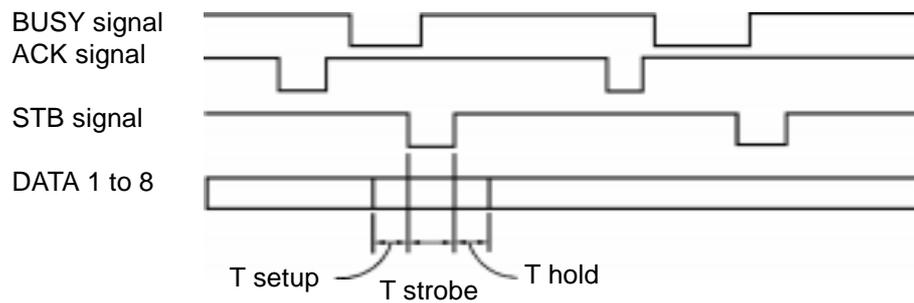
1-2. Port Specification

- Timing Charts

When the power is turned on;



When data is received;



- Electrical Characteristics

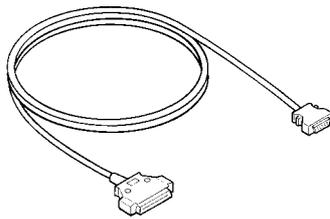
Signal	Circuit	Remarks
nAck Busy pError Select nFault		-Open collector LS06 or equivalent -IEEE 1284 level 1 or equivalent
Peripheral Logic Hight		Connected to the +5V source within the SC Controller through a 4.2k1/2 resistor
nStrobe Data 1 to 8 nInt nAutoFd nSelection		-Schmidt buffer LS14 or equivalent -IEEE 1284 level 1 or equivalent (input capacity varies)

2. INSTALLATION

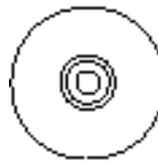
2-1. Checking Package Contents

Check that your FR3950 α package contains the items mentioned below.

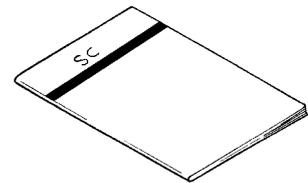
- SC II Cable (10m) 1pce
- Local Interface User`s Guide 1copy
- CD-ROM (Printer Drivers & Utilities) 1pce



SCII Cable



CD-ROM



*Local Interface User`s
Guide*

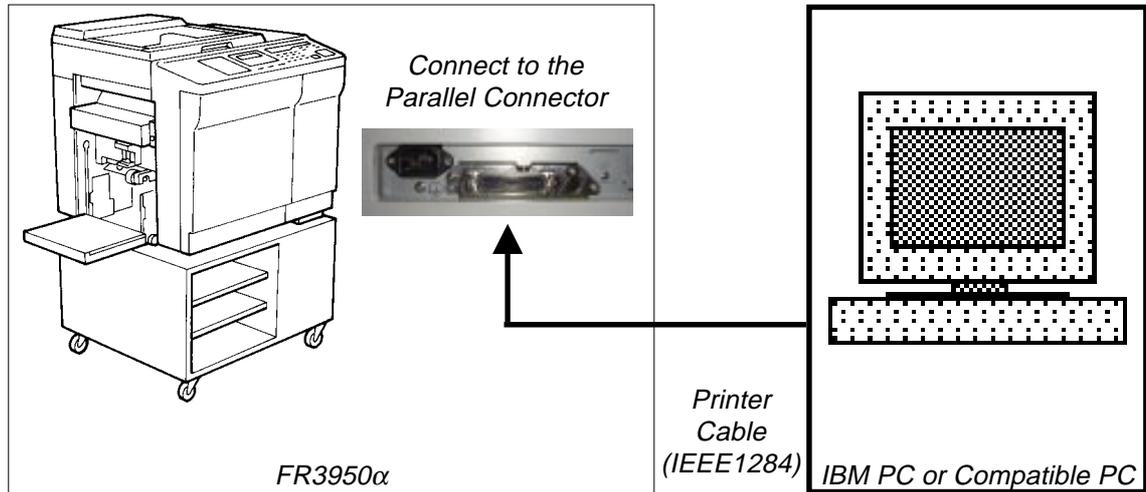
2-2. Computer Systems Requirements

- Windows Platform
 - IBM PC or compatible
 - > Centronics or IEEE 1284 parallel port
 - > CD-ROM Drive for the software installation
 - > Windows 3.1 or Windows 95/98 or Windows NT4.0 installed
- Macintosh Platform
 - Apple Macintosh
 - > CD-ROM Drive for the software installation
 - > Hard disk with minimum 256kB free space for the softwares
 - > Minimum 12MB installed memory (Main Memory)
 - > Minimum 60MB memory available with installed memory (Main Memory) and extended (Virtual) memory
 - > Mac OS above System 7.5X under System 8.5 installed
 - > QuickDraw installed and enabled
 - Apple Power Macintosh
 - > CD-ROM Drive for the software installation
 - > Hard disk with minimum 256kB free space for the softwares
 - > Minimum 16MB installed memory (Main Memory)
 - > Minimum 60MB memory available with installed memory (Main Memory) and extended (Virtual) memory
 - > Mac OS above System 7.5X under System 8.5 installed
 - > QuickDraw installed and enabled

2-3. Connecting the cables

Connect the cables of the FR3950α properly while referring to the figure shown below. Be sure to turn off the Personal Computer and FR3950α when connecting cables.

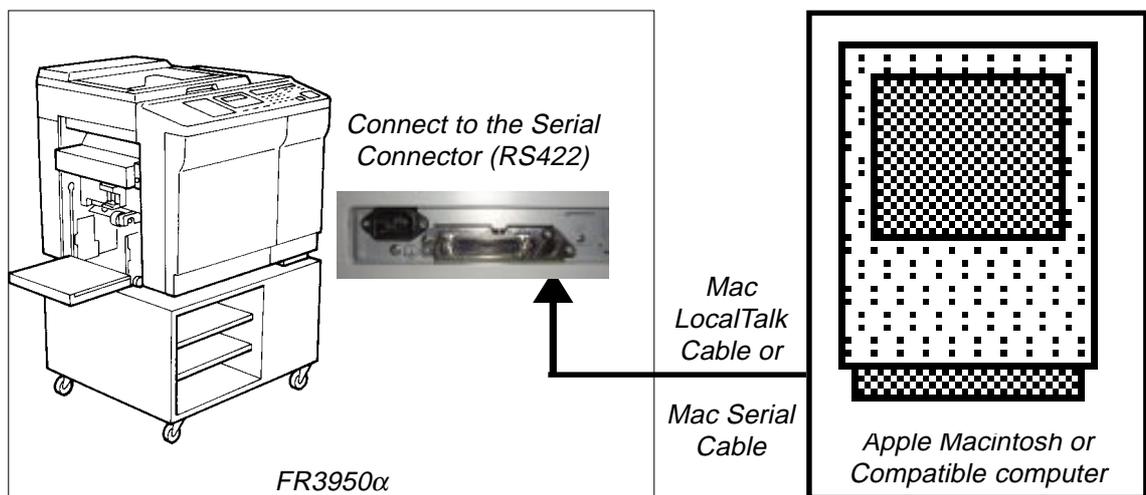
- With IBM PC or Compatible PC



[NOTE]

Purchase a commercially available printer cable for connecting between the FR3950α and the personal computer.

- With Apple Macintosh or Compatible computer



[NOTE]

Purchase a commercially available Mac serial cable or LocalTalk cable for connecting between the FR3950α and the personal computer.
If the printer port on the Macintosh is already occupied with the LocalTalk cable, use the LocalTalk network for cable connection or connect the Mac serial cable to the modem port.

2-4. Expanding Memory Volume

Purpose of Expanding Memory Volume

1. To increase the page data volume.
2. To achieve optional "Remote Mode" function. (Information will be available separately in the future by Technical Bulletin)

8MB RAM is installed as standard on the SC Main PCB in the FR3950 α .

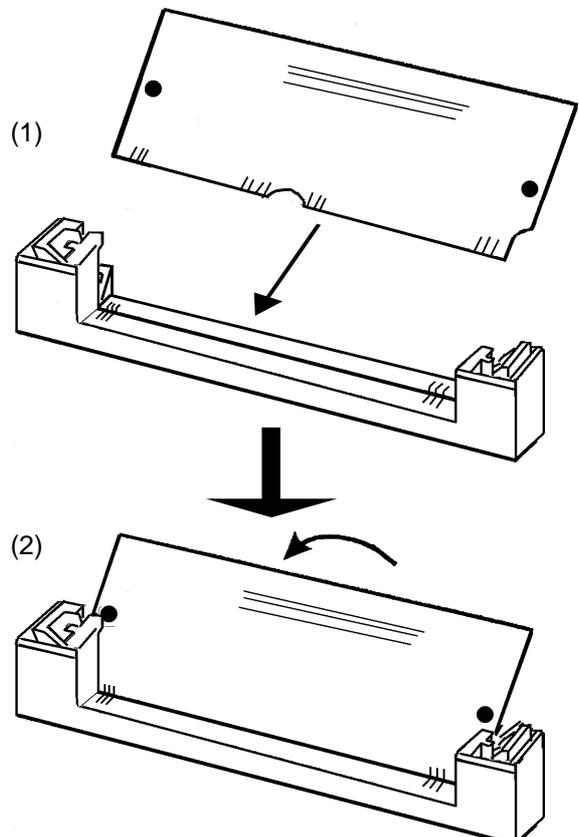
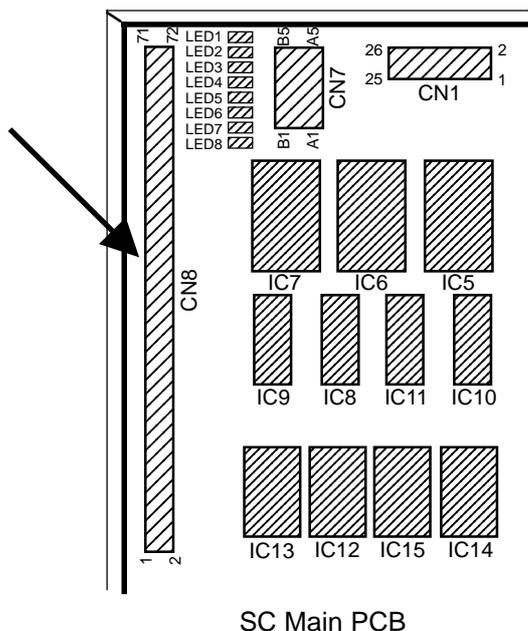
This memory space is used for developing the print data transmitted from the personal computer into page data.

This standard 8MB memory is enough memory to develop two A3-size documents in 400dpi resolution.

This memory volume can be expanded up to 40MB by installing an optional RAM (32MB) on the SC Main PCB in order to achieve the above purpose.

How to install the Optional RAM

1. Turn off the power on the FR3950 α and SC Controller, then unplug the power cord. If the FR3950 α is already connected to other equipment, remove all connected cables.
2. Ground yourself and remove the Front Left Cover from the FR3950 α to expose the SC Main PCB (Please refer "Disassemble and Re-Assembly 6-1" for the detail).
3. Install the Optional RAM (32MB) into CN8 socket on the SC Main PCB.
 - (1) Hold it at about 60 degree angle against its socket and press its edge connector firmly into the slot running through the center of the socket.
 - (2) Then pivot the RAM up. You will hear a click as the plastic tabs at each end of the socket snap into place around the RAM and then the small plastic projection snap into the holes at each of the RAM.



3. INSTALLATION (SOFTWARE-DRIVERS)

3-1. Macintosh (OS 8.1)

- (A) Turn on the Macintosh computer and start Mac OS.
- (B) Insert driver CD-ROM in the Macintosh.
"RISORINC" icon appears on the screen.
- (C) Double-click on "RISORINC" icon.



(MacOS8 inst1)

- (D) "RISORINC" appears on the display.
To install US English version, double click on "US_ENG" icon.



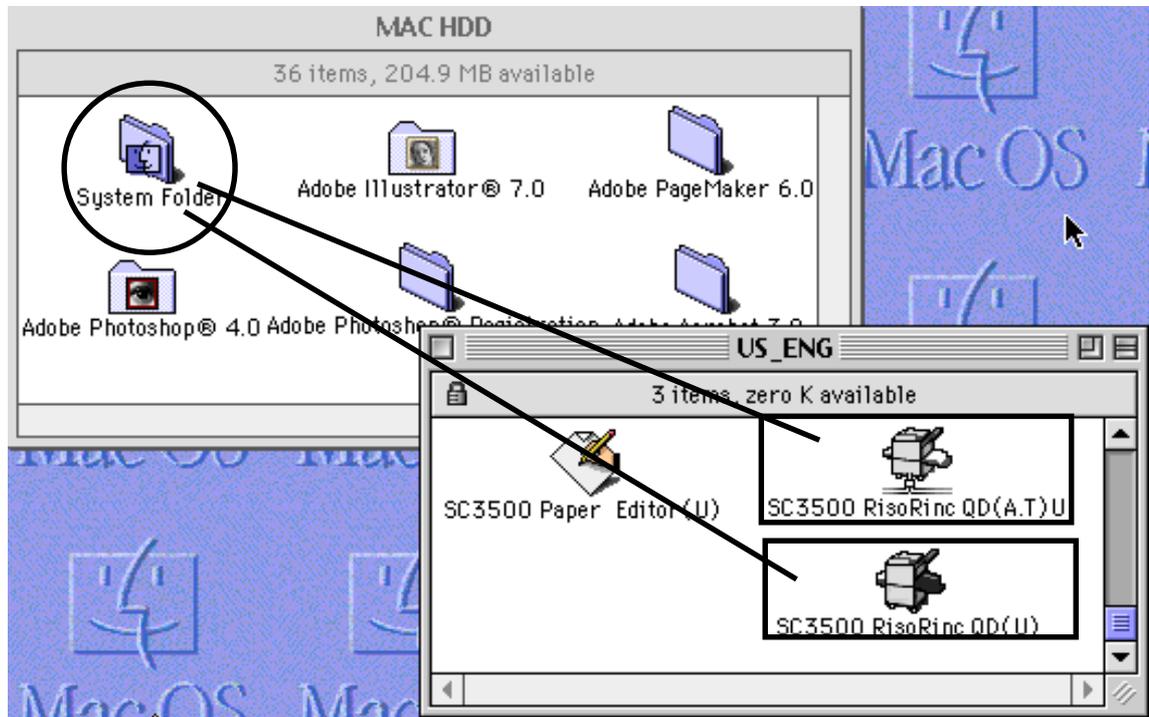
(MacOS8 inst2)

- (E) "US_ENG" appears on the display.



(MacOS8 inst3)

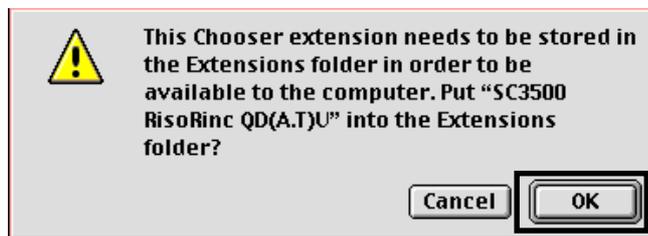
(F) Drag **[SC3500 RisoRinc QD(A.T)U]** icon or **[SC3500 RisoRinc QD(U)]** icon and drop this icon on **[System Folder]** icon in the MAC HDD.



(MacOS8 inst4)

Note : If you want to connect Macintosh with FR3950α by using,
Serial Cable - Copy **[SC3500 RisoRinc QD(U)]** icon to System Folder.
LocalTalk Cable - Copy **[SC3500 RisoRinc QD(A.T)U]** icon to System Folder.

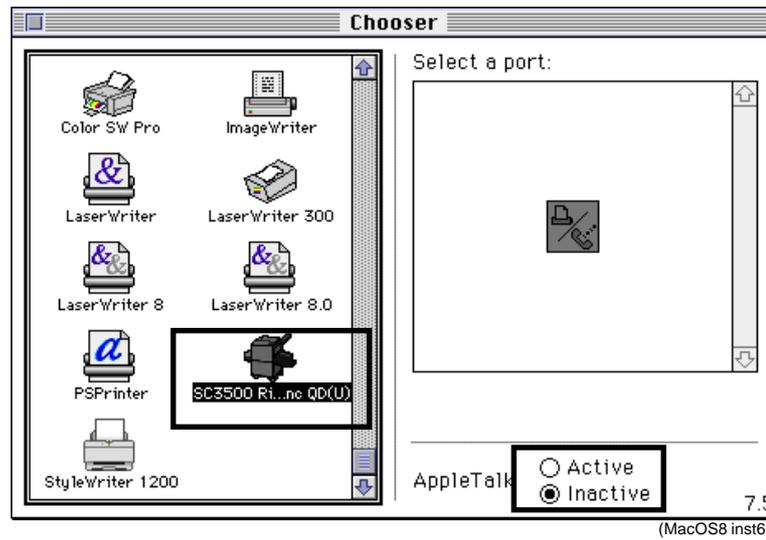
(G) Following dialog box appears on the display. Click on the **[OK]** button.



(MacOS8 inst5)

(H-1) - **Serial Cable connection -**

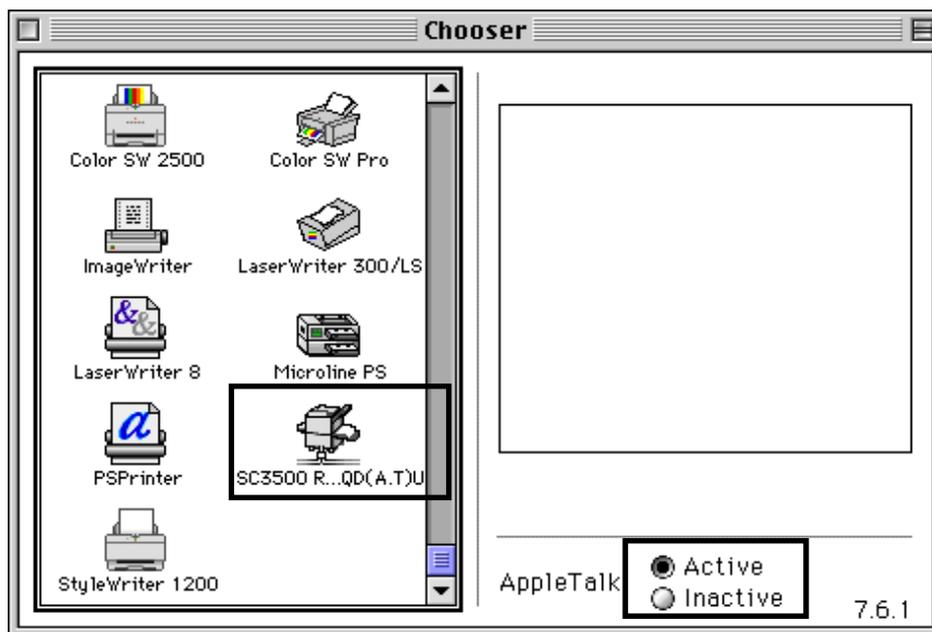
Select [**Chooser**] from the [**Apple**] menu. The [**Chooser**] dialog box then appears. Select AppleTalk section to "Inactive", then click on [**SC3500 Ri...nc QD(U)**] icon to finish installation.



(MacOS8 inst6)

(H-2) - **LocalTalk Cable connection -**

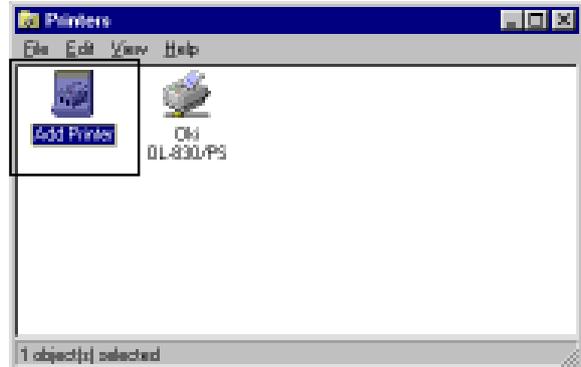
Select [**Chooser**] from the [**Apple**] menu. The [**Chooser**] dialog box then appears. Select AppleTalk section to "Active", then click on [**SC3500 R...QD(A.T)U**] icon to finish installation.



(MacOS8 inst7)

3-2. Windows95/98

- (A) Turn on the personal computer and start Windows 95/98.
Insert the software CD-ROM in the CD-ROM drive.
- (B) Open the **[My Computer]**.
- (C) Double-click on the **[Printers]** icon.
[Printers] dialog box appears on the display.
- (D) Double-click on the **[Add Printer]** icon.



(FRSC95 inst01)

- (E) **[Add Printer Wizard]** dialog box appears on the display.
Click on the **[Next >]** button.



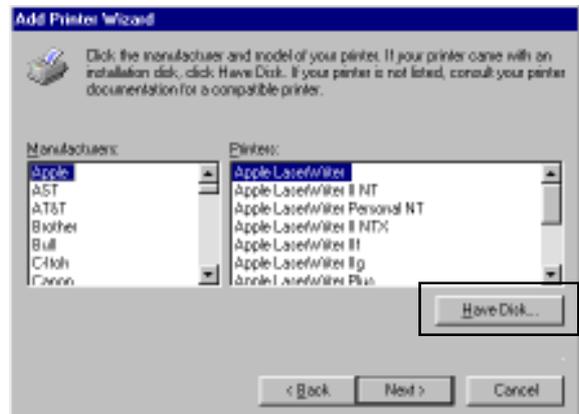
(FRSC95 inst02)

- (F) Click on the **[Next >]** button.
If you need to install the printer as Network printer, change mark in Network printer box.



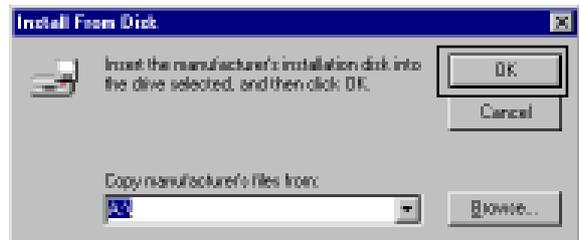
(FRSC95 inst03)

(G) Click on the **[Have Disk...]** button.



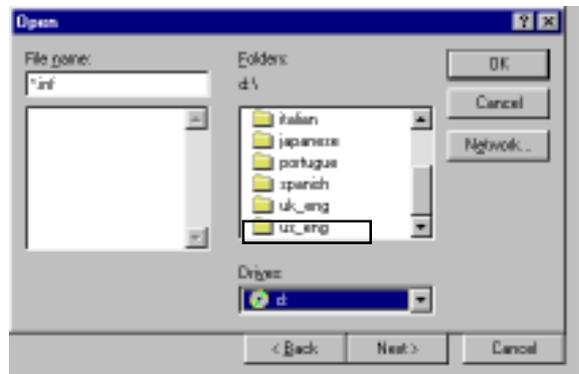
(FRSC95 inst04)

(H) Click on the **[OK]** button.



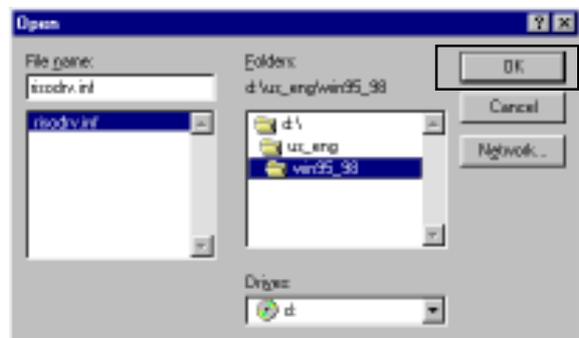
(FRSC95 inst05)

(I) **[Open]** dialog box appears on the display. Double click on the **[us_eng]** folder.



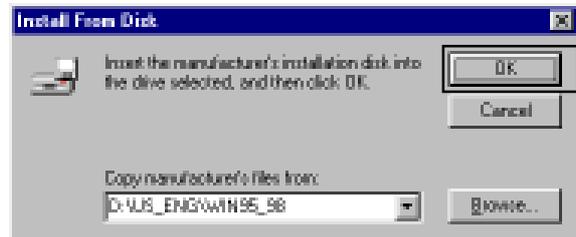
(FRSC95 inst06)

(J) Click on the **[OK]** button.



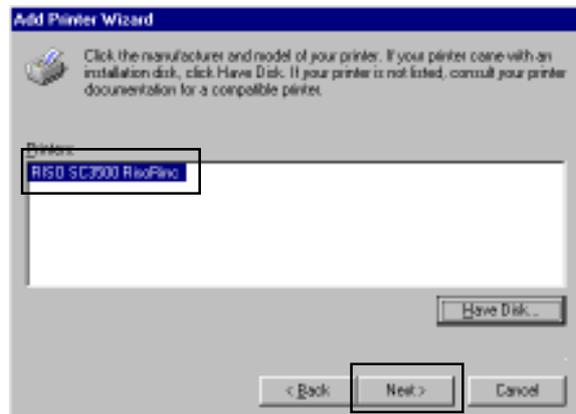
(FRSC95 inst07)

(K) Click on the **[OK]** button.



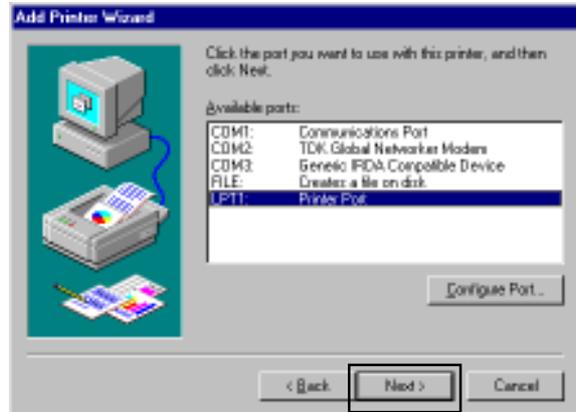
(FRSC95 inst08)

(L) **[RISO SC3500 RisoRinc]** appears in the Printers column.
Then click on the **[Next]** button.



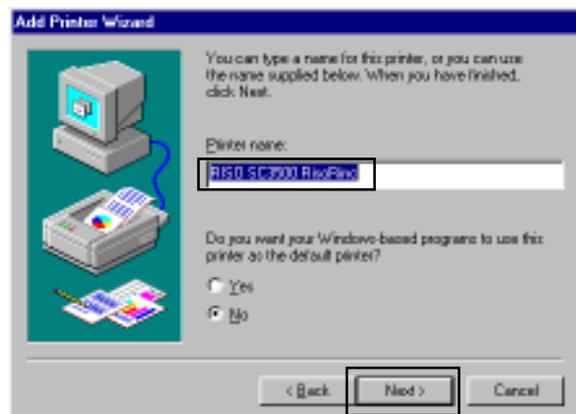
(FRSC95 inst09)

(M) Click on the **[Next]** button.



(FRSC95 inst10)

(N) **[RISO SC3500 RisoRinc]** appears in the Printers name box.
Then click on the **[Next]** button.



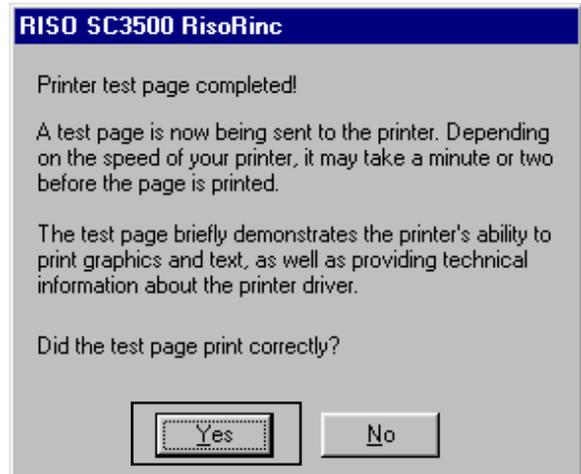
(FRSC95 inst11)

- (O) If you need to have a test print of Windows 95 printer settings, click on the **[Finish]** button.



(FRSC95 inst12)

- (P) If the test print of Windows 95 printer settings comes out correctly from the printer, click on the **[Yes]** button.



(FRSC95 inst13)

- (Q) **[RISO SC3500 RisoRinc]** appears in the **[Printers]** box, installation finished.



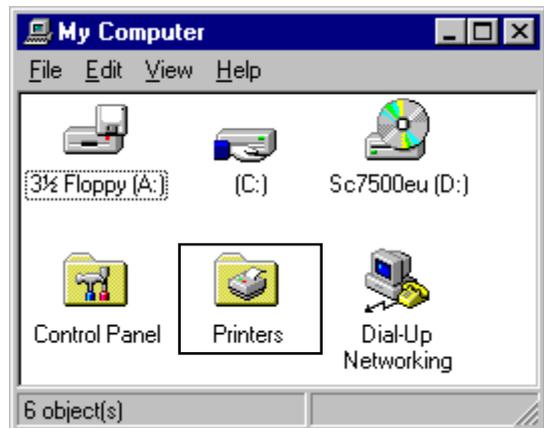
(FRSC95 inst14)

3-3. Windows NT4.0

(A) Turn on the personal computer and start Windows NT 4.0.
 Insert the software CD-ROM in the CD-ROM drive.

(B) Open the **[My Computer]**.

(C) Double-click on the **[Printers]** icon.



(FRSCNT inst01)

(D) Double-click on the **[Add Printer]** icon.



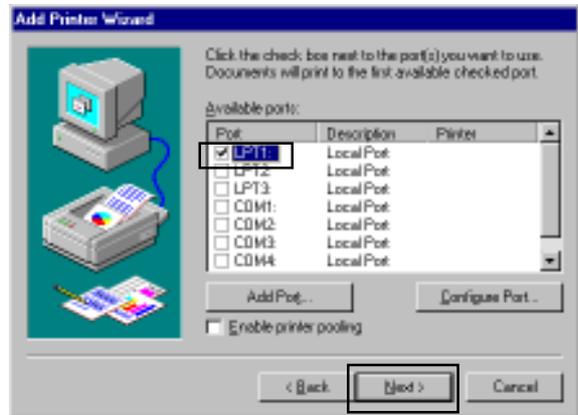
(FRSCNT inst02)

(E) If you install SC unit as local printer, click on the **[Next]** button.



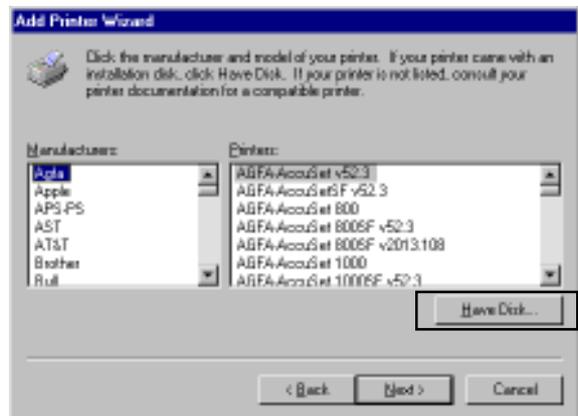
(FRSCNT inst03)

(F) Mark in the "LPT1" port (Suggest port) column, then click on the **[Next]** button.



(FRSCNT inst04)

(G) Click on the **[Have Disk...]** button.



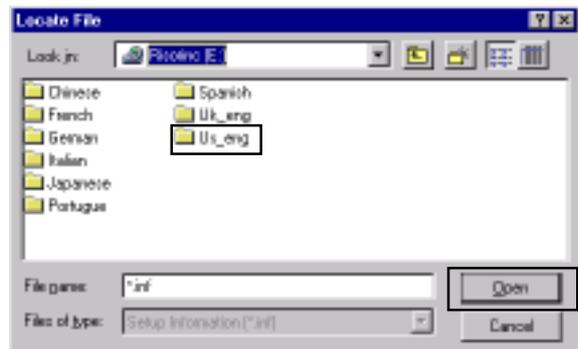
(FRSCNT inst05)

(H) **[Install From Disk]** dialog box appears. Click on the **[OK]** button.



(FRSCNT inst06)

(I) Select the **[Us_eng]** folder then click on the **[Open]** button.



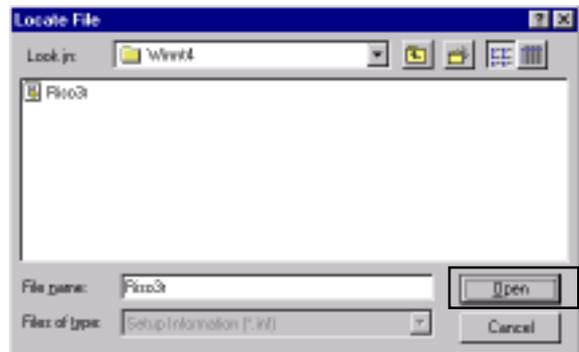
(FRSCNT inst07)

(J) Click on the **[Open]** button.



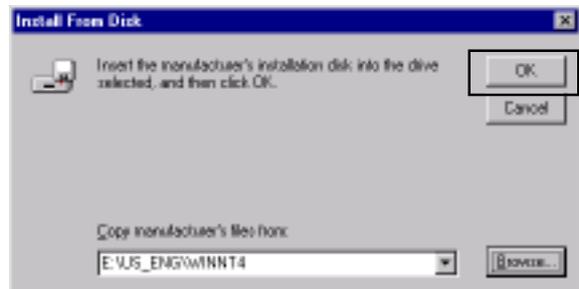
(FRSCNT inst08)

(K) Click on the **[Open]** button.



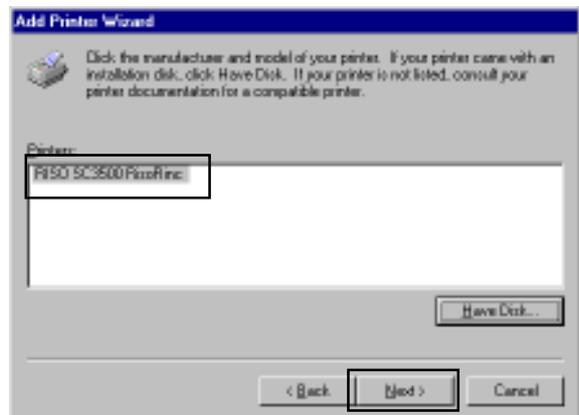
(FRSCNT inst09)

(L) Click on the **[OK]** button.



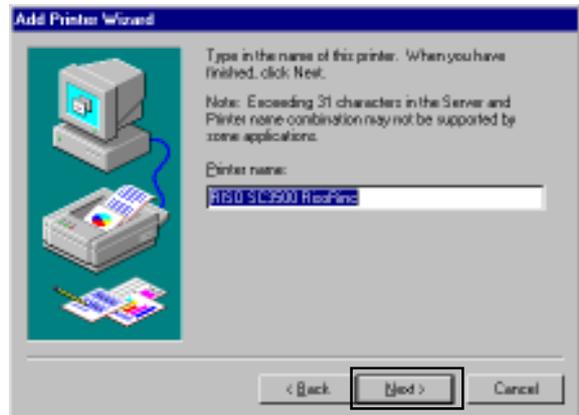
(FRSCNT inst10)

(M) **[RISO SC3500 RisoRinc]** appears in the Printers column. Then click on the **[Next]** button.



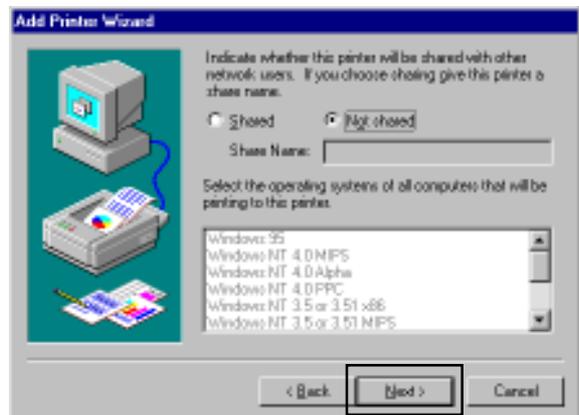
(FRSCNT inst11)

- (N) [RISO SC3500 RisoRinc] appears in the Printer name.
Then click on the [Next] button.



(FRSCNT inst12)

- (O) Click on the [Next] button.



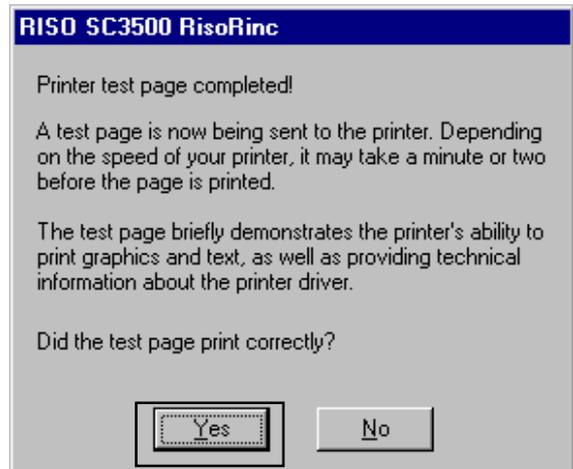
(FRSCNT inst13)

- (P) Click on the [Finish] button.



(FRSCNT inst14)

(Q) If the test print of Windows NT printer settings comes out correctly from the printer, click on the **[Yes]** button.



(FRSCNT inst15)

(R) **[RISO SC3500 RisoRinc]** appears in the **[Printers]** box, installation finished.



(FRSCNT inst16)

4. FIRMWARE PROGRAM

4-1. Firmware Program Version Check

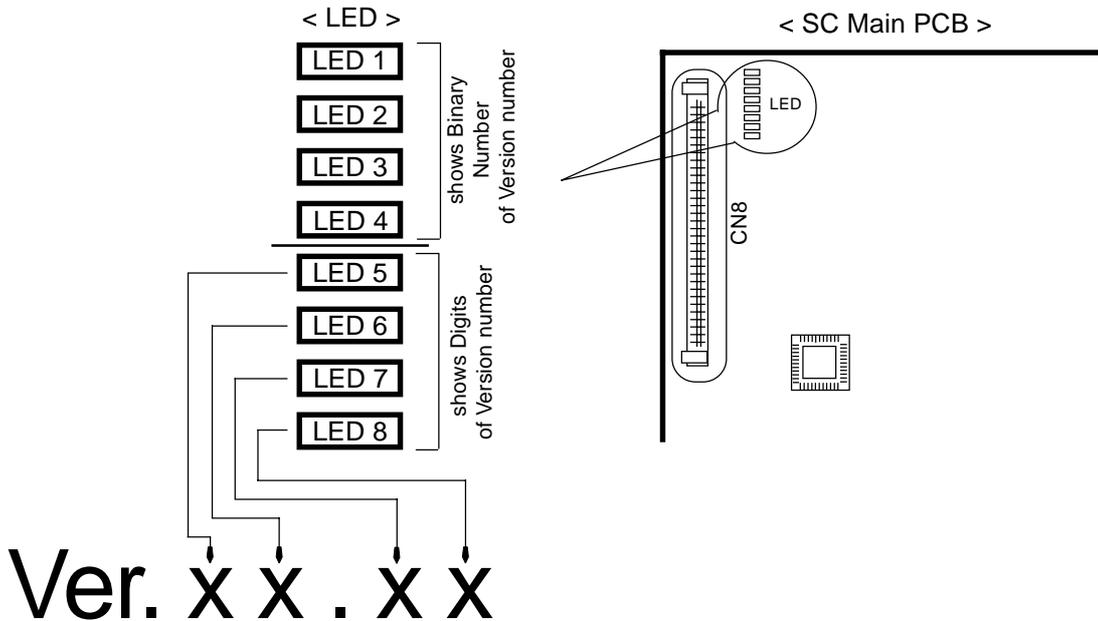
The version number of the firmware program can be checked in three different ways, according to the difference of the version number itself, as given below.

1) The firmware version number was shown on Test Print (Please refer "Trouble Shooting Tips 5-1") for the detail.

2) Check the version number by 8 LED's on the SC Main PCB

- When the version number is "3.11" ;

- 1) Turn off the Main power and remove the Front Left cover of FR3950α.
- 2) Check the illumination sequence of the green LEDs on the SC Main PCB when turning on the SC power.



LED 1 to LED 4

Indicate the numeric value of the version number by the 4-digit binary system.

LED 5 to LED 8

Indicate the digit place of the version number. For example, LED 8 as 2nd digit below the decimal point.

[Example. : LED illumination sequence when the version number is "3.11"]

Sequence	Version No.	LED1	LED2	LED3	LED4	LED5	LED6	LED7	LED8	Version Digit Place
1st	0	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	2nd place over decimal
2nd	3	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	1st place over decimal
3rd	1	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	1st place below decimal
4th	1	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	2nd place below decimal

3) Check the version number by 3 LED's on the SC Panel

- **When the version number is "3.11" ;**

- 1) Turn on the SC power, pressing down the FUNCTION button on the SC panel, and keep it pressed down until all 3 LED's on the SC panel start flashing.
- 2) Release the FUNCTION button. The indicators flashes three times and then indicate the version number through their illumination.
- 3) The first illumination combination of the indicators indicate the 1st over-zero digit of the version number.
- 4) Press the FUNCTION button again. Next, they indicate the 1st below-zero digit of the same version number.
- 5) When the FUNCTION button is pressed the third time, then, the 2nd below-zero digit of the number is indicated by them.
- 6) If the FUNCTION button is pressed once more at this stage, the version number can be checked again from the 1st over-zero digit, as described in the step 3 above.

< Indicator Illumination Table >

Number	ERROR	READY/DATA	PAGE STANDBY
0	OFF	OFF	OFF
1	OFF	OFF	ON
2	OFF	ON	OFF
3	OFF	ON	ON
4	ON	OFF	OFF
5	ON	OFF	ON
6	ON	ON	OFF
7	ON	ON	ON

4-2. Firmware Program Upgrading

The firmware program which controls the operation of the FR3950α SC Controller is stored in the Flash memory on the SC Main PCB inside. This program can be upgraded by downloading a new (upgraded) one, which will be supplied it when required, from the personal computer.

1) Upgrading on Windows 3.1

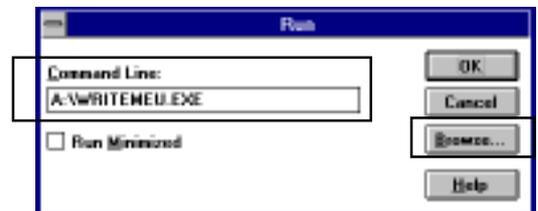
- (1) Confirm the FR3950α SC Controller is securely connected to the personal computer which is to be used for program upgrading procedure.
- (2) Turn on the FR3950α SC Controller, pressing down the STOP button and the FUNCTION button on the SC panel together, and keep them pressed down until all 3 indicators on the SC panel are illuminated and then the ERROR indicator (orange) goes off among them. Release the buttons.
- (3) Turn on the personal computer and start Windows 3.1.
- (4) Insert the floppy disk which contains an upgraded firmware program into the floppy disk drive on the personal computer.

NOTE : We must have the utility software which downloads file data in the floppy disk.

- (5) Click on [File] in the menu bar in the "Program Manager" window and then on [Run...] in the [File] menu. The [Run] dialog box then appears.
- (6) Enter "a: \ writemeu.exe" into the [Command Line] box. (If the "C" drive is assigned as floppy disk drive, enter "c: \ writemeu.exe" into this box.)
The above-mentioned file name can be selected from the file name reference list which can be opened by clicking on the [Browse...] button in the [Run] dialog box.
- (7) Confirm the entered file name is correct and click on the [OK] button.
The "downloader" program runs and then the [Program Downloader] dialog box appears.
- (8) Click on the [OK] button in this dialog box.
The [Open] dialog box then appears.
- (9) Select "rincsr.am.rin" from the file name list in this dialog box. In "rincsr.am.rin", the upgraded firmware program is contained.
(If this file name isn't displayed in the file name list, select "All Files (*.*)" from the [List Files of Type] box in this dialog box.)
- (10) Confirm "rincsr.am.rin" is displayed in the [File Name] box and click on the [OK] button in this dialog box.
The [Editor] dialog box then appears.



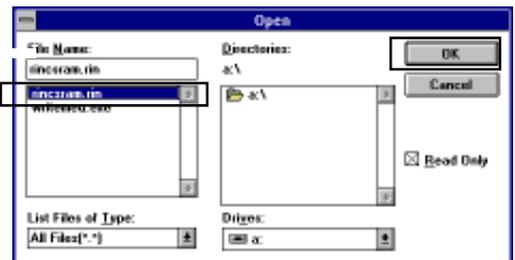
(Up31prom)



(Up31run)



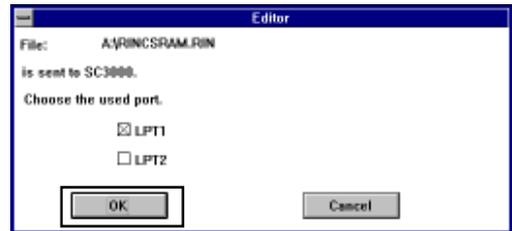
(Up31down)



(Up31open)

(11) Select the port to which the FR3950α SC Controller is connected, normally "LPT1", and click on the [OK] button in this dialog box.

The message box "Downloading" appears while the READY/DATA indicator (green) on the SC panel is flashing.



(Up31edit)

(12) When it is confirmed the firmware program has been downloaded successfully into the FR3950α SC Controller, the READY/DATA indicator stop flashing and the PAGE STANDBY indicator starts flashing, while the [Mini Editor] dialog box appears, informing the program has been successfully downloaded.



(Up31mied)

(13) Click on the [OK] button in this dialog box.

Turn off the FR3950α SC Controller and then remove the floppy disk from the floppy disk drive on the personal computer.

[NOTE]

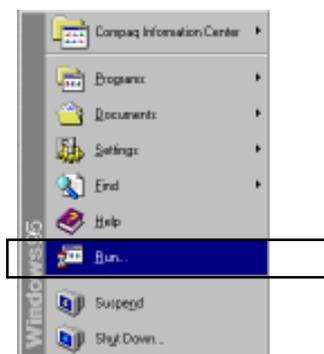
- It is recommended that the version number of the installed firmware program be checked when it is upgraded.
- If the ERROR indicator (orange) is illuminated during the firmware program upgrading procedure, repeat the procedure from the beginning.

2). Upgrading on Windows 95/98

- (1) Confirm the FR3950α SC Controller is securely connected to the personal computer which is to be used for program upgrading procedure.
- (2) Turn on the FR3950α SC Controller, pressing down the STOP button and the FUNCTION button on the SC panel together, and keep them pressed down until all 3 indicators on the SC panel are illuminated and then the ERROR indicator (orange) goes off among them. Release the buttons.
- (3) Turn on the personal computer and start Windows 95/98.
- (4) Insert the floppy disk which contains an upgraded firmware program into the floppy disk drive on the personal computer.

NOTE : We must have the utility software which downloads file data in the floppy disk.

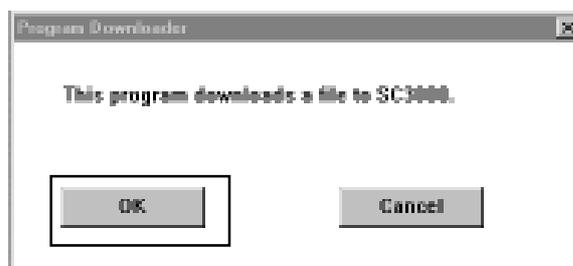
- (5) Click on [Start] button in the Desk Top window and then on [Run...] in the menu. The [Run] dialog box then appears.
- (6) Enter "A:\Writemeu.exe" into the box. (If the "C" drive is assigned as floppy disk drive, enter "C:\Writemeu.exe" into this box.)
The above-mentioned file name can be selected from the file name reference list which can be opened by clicking on the [Browse...] button in the [Run] dialog box.
- (7) Confirm the entered file name is correct and click on the [OK] button.
- (8) Click on the [OK] button in the [Program Downloader] dialog box.
The [Open] dialog box then appears.



(run)

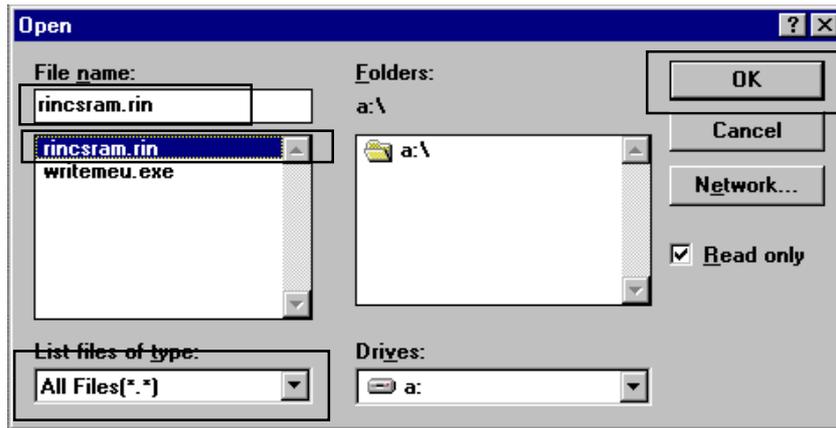


(rundial)



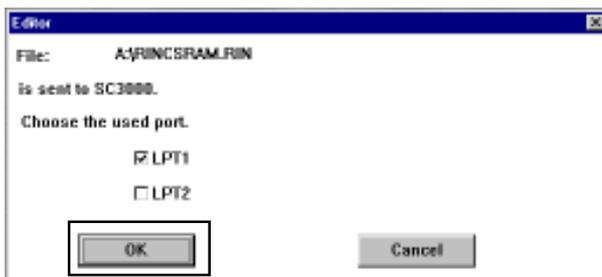
(Programdown)

- (9) Select "rincsrnm.rin" from the file name list in this dialog box. In "rincsrnm.rin", the upgraded firmware program is contained.
 (If this file name isn't displayed in the file name list, select "All Files(*.*)" from the [List files of type] box in this dialog box.)
- (10) Confirm "rincsrnm.rin" is displayed in the [File name] box and click on the [OK] button in this dialog box.
 The [Editor] dialog box then appears.



(open)

- (11) Select the port to which the **NOTE** : We must have the utility software which downloads file data in the floppy disk. is connected, normally "LPT1", and click on the [OK] button in this dialog box.
 The message box "Downloading" appears while the READY/DATA indicator (green) on the SC panel is flashing.



(FRSC95 fup05)



(FRSC95 fup06)

- (12) When it is confirmed the firmware program has been downloaded successfully into the FR3950α SC Controller, the READY/DATA indicator stop flashing and the PAGE STANDBY indicator starts flashing, while the [Mini Editor] dialog box appears, informing the program has been successfully downloaded.
- (13) Click on the [OK] button in this dialog box. Turn off the FR3950α SC Controller and then remove the floppy disk from the floppy disk drive on the personal computer.

[NOTE]

- It is recommended that the version number of the installed firmware program be checked when it is upgraded.
- If the ERROR indicator (orange) is illuminated during the firmware program upgrading procedure, repeat the procedure from the beginning.

3). Upgrading on MS-DOS

- (1) Confirm the FR3950α SC Controller is securely connected to the personal computer which is to be used for program upgrading procedure.
- (2) Turn on the FR3950α SC Controller, pressing down the STOP button and the FUNCTION button on the front panel together, and keep them pressed down until all 3 indicators on the front panel are illuminated and then the ERROR indicator (orange) goes off among them.

Release the buttons.

- (3) Turn on the personal computer.
- (4) Insert the floppy disk which contains an upgraded firmware program into the floppy disk drive on the personal computer.

NOTE : The utility software which downloads file data is also contained in this floppy disk.

- (5) Change the current directory to the root directory of the floppy disk drive.

Ex. If the root directory of the floppy disk drive is the "A" drive;

- 1. Enter "A:" and Press the Enter key.
- 2. Enter "CD \" and Press the Enter key.

- (6) Enter "SC3KU" and press the Enter key.

The following message is then displayed.

```

<<<<<< SC3000 / Program Transmission >>>>>> [ Ver. 1.00 ]
File Name = RINCSRAM. RIN
READY? ( [ 0 ] : START, 1 : JOB END ) =
```

In "RINCSRAM. RIN", the upgraded firmware program is contained.

- (7) Enter "0" and press the Enter key.

The upgraded firmware program then starts to be downloaded, while the displayed value of "Byte Count" keeps increasing and the READY/DATA indicator on the SC panel is flashing.

To interrupt this downloading operation, enter "1" and press Enter key.

- (8) When it is confirmed the firmware program has been downloaded successfully into the FR3950α SC Controller, the READY/DATA indicator stops flashing and the PAGE STANDBY indicator starts flashing, while the message "Completed hit RETURN/ ENTER key!" appears at the bottom of the screen.

Press the Enter key. The following message then appears again.

```

<<<<<< SC3000 / Program Transmission >>>>>> [ Ver. 1.00 ]
File Name = RINCSRAM. RIN
READY? ( [ 0 ] : START, 1 : JOB END ) =
```

- (9) Enter "1" and press the Enter key.

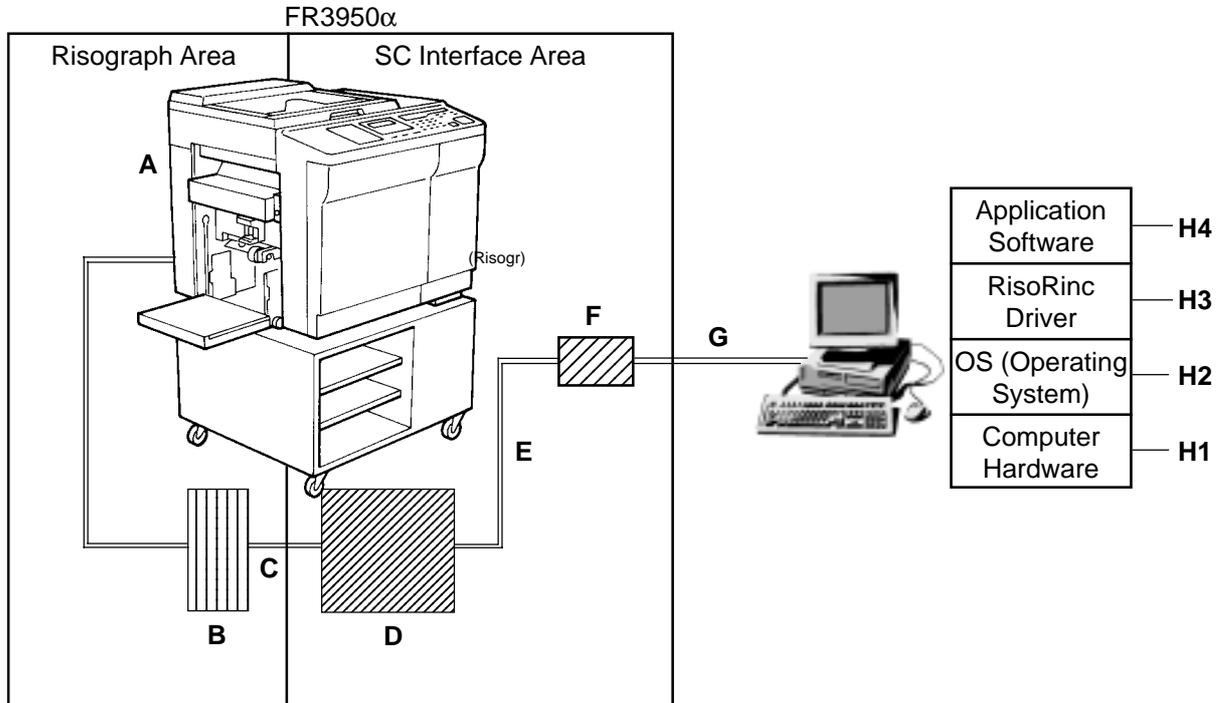
Turn off the FR3950α SC Controller and then remove the floppy disk from the floppy disk drive on the personal computer.

[NOTE]

- It is recommended that the version number of the installed firmware program be checked when it is upgraded.
- If the ERROR indicator (orange) is illuminated during the firmware program upgrading procedure, repeat the procedure from the beginning.

5. TROUBLE-SHOOTING TIPS

5-1. Isolating Fault Area



- A** Risograph Area
- B** Option PCB
- C** Inner Wire-Harness between Option PCB and SC Main PCB
- D** SC Interface Area (SC Main PCB, SC Power Supply PCB, etc.)
- E** Inner Wire-Harness between SC Main PCB and I/F-Port PCB
- F** I/F-Port PCB
- G** Printer Cable
- H** Computer System
 - H1** Computer hardware - printer port
 - H2** OS (Operating System)
 - H3** RisoRinc Printer Driver
 - H4** Application Software

Try to make tests which will eliminate areas as possible causes of any fault. The following is a guide to checking the system by area.

1) Area A (Risograph Area):**- No power, No (Wrong) Print -**

The Risograph may be tested on its own to determine if the Risograph is the cause of any print error.

Risograph Test Modes

The Risograph has several test modes for checking the stand-alone function of the print engine. Refer to the Risograph section of the Technical Manual.

If Area A is found to cause the fault repair the Risograph by referring to the Risograph section of the Technical Manual.

2) Area B (Option PCB):**- No (Wrong) Print -**

Check following points.

- > Connection of the connectors (CN1, CN2)
- > Make sure that SW1 set to OFF (400dpi) position-Set as factory default

3) Area C (Wire Harness between Option PCB and SC Main PCB):**- No (Wrong) Print -**

Check following points.

- > Breakage of the Wire-Harness
- > Make sure that correct Wire-Harness use (Must use Wire-Harness for Option PCB AIII)

4) Area D (SC Interface Area):**- No power, No display on SC Panel -**

Check following points.

- > SC Main Power SW2
- > Connection of the connectors
 - SC Main PCB (CN3, CN6)
 - Power Supply PCB; SC3K (CN1, CN2)
 - SC Panel PCB (CN2, CN3)
 - SC LCD Panel
- > Breakage of the Wire-Harness
 - SC Power SW - SC Power Supply PCB
 - SC Power Supply PCB - SC Main PCB
 - SC Main PCB - SC Panel PCB
 - SC Panel PCB - SC LCD Panel
- > Fuse (F11) on the SC Power Supply PCB
- > SC Power Supply PCB
- > SC Panel PCB
- > SC Main PCB

4) **Area D (SC Interface Area):** - continue from previous page -**- No CPU fan running -**

Check following points.

- > Connection of the connector
 - SC Main PCB (CN5)
- > Breakage of the Wire-Harness
 - SC Main PCB - CPU fan
- > CPU fan
- > SC Main PCB

- No (Wrong) Print -

Check following points.

- > Connection of the connectors
 - SC Main PCB (CN3, CN4)
- > SC Main PCB

5) **Area E (Wire Harness between SC Main PCB and I/F-Port PCB):****- No (Wrong) Print -**

Check following points.

- > Breakage of the Wire-Harness

6) **Area F (I/F-Port PCB):****- No (Wrong) Print -**

Check following points.

- > Connection of the connector
 - I/F Port PCB (CN3)
- > IF-Port PCB

- No (Wrong) Print through Parallel Port -

Check following points.

- > Connection of the connector
 - I/F Port PCB (CN1)
- > IF-Port PCB

- No (Wrong) Print through Mac Serial Port -

Check following points.

- > Connection of the connector
 - I/F Port PCB (CN2)
- > IF-Port PCB

Please make Self Test Print without connect the computer before goes to further area.

(Please refer 5-2. to make Self Test Print)

If you got correct Self Test Print without connect the computer, please move to Area G.

7) **Area G (Printer Cable):****- No (Wrong) Print through Parallel Port -**

Check following points.

- > Breakage of the parallel cable
- > Make sure correct parallel cable uses (Less than 2m long)
- > Connection of the connectors (Both sides)

- No (Wrong) Print through Mac Serial Port -

Check following points.

- > Breakage of the Mac serial cable
- > Breakage of the LocalTalk cable
- > Make sure correct LocalTalk cable uses (Use the Mac Genuine cable)
- > Connection of the connectors (Both sides)

8) **Area H1 (Computer Hardware):****- No (Wrong) Print -**

Check following points.

- > Print from other printer if available to ensure the computer itself is good working condition
- > Normal Printer Port must be selected (Not ECP, EPP nor other Enhanced port)
 - IBM PC or compatible
- > Minimum requirement hardware installed

9) **Area H2 (OS):****- No (Wrong) Print -**

Check following points.

IBM PC or Compatible

- > Make sure that correct kind or version of Operation System installed in PC
- > Normal Printer Port must be selected (Not ECP, EPP nor other Enhanced port)

Apple Macintosh

- > Make sure that correct version of Operation System installed in Macintosh
- > QuickDraw (Not QuickDraw GX) must be installed in Macintosh

10) **Area H3 (RisoRinc Printer Driver):****- No (Wrong) Print -**

Check following points.

IBM PC or Compatible

- > Make sure that the Printer Driver installed in the PC which compatible with the Operation System

11) **Area H4 (Application Software):**

- No (Wrong) Print -

Check following points.

- > Correct Printer selected for the print
- > Make sure "Collate Copies" column in the Print dialog box is **unmarked**.
PageMaker, MS-Word, etc.
- > Correct resolution (400 x 400dpi) must be selected in the SC3000 series Printer Setting Dialog box.

5-2. Test Print

The SC Controller in the FR3950α forwards the internally equipped image data to FR3950α directly, and does the Master-making and Printing.

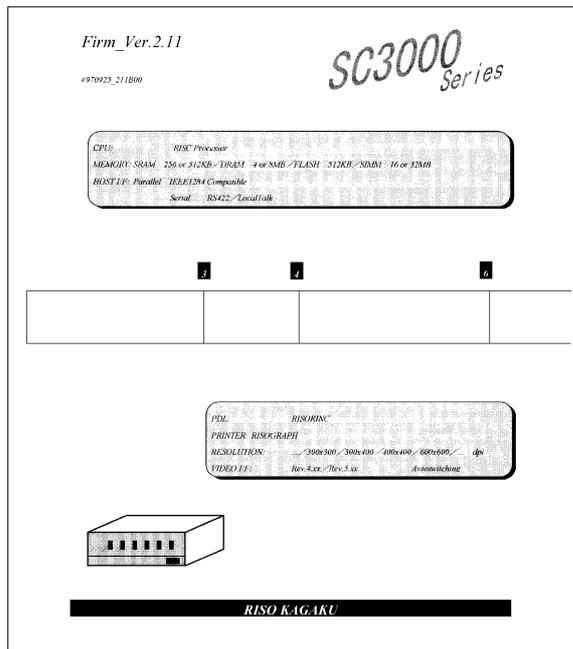
When an error occurs, we can judge from this Test Print whether or not the FR3950α Risograph area is in a normal condition.

If the test prints come out correctly, the FR3950α Risograph area is in a good condition.

The Test Print image is in A4 size.

Procedures for the Test Print

- 1) Pressing the "START" key of the SC Panel, turn ON the power of the FR3950α , and keep the "START" key pressed until the "ERROR" and "PAGE STANDBY" LEDs goes off.
- 2) The "READY" LED lights up while the Test Print image data within the SC Main PCB is being processed.
- 3) "TEST-DATA PROCESSING" will appears on LCD when the Test Print data processing is completed. The Risograph area starts the Master-making, followed by a proof print and the first print.



Important Notice:

- >A model name FR3950α not shown on the Test Print. It shows SC3000 series instead.
- >The Test Print image may change without notice.

5-3. Error Indicator on SC Panel**5-3-1. The READY/DATA indicator doesn't flash even after the print job finishes in the application software.****CAUSE**

The SC Controller cannot receive print data from a personal computer.

- 1) The printer cable is not securely connected between the SC Controller and the personal computer.
- 2) The personal computer's system is not set up for the SC Controller, e.g. the [RisoRinc SC3500] printer driver is not selected for the print job in question.
- 3) The page memory of the SC Controller is filled with the preceding print data and has no space for the print data in question.

Wait until the print data filling the page memory is output from the SC Controller to the Risograph.

5-3-2. The READY/DATA indicator keeps on flashing slowly without any printer's operation even after the print job finishes in the application software.**CAUSE**

The SC Controller cannot output the print data received from a personal computer to the Risograph while the latter is ready to receive it from the former.

- 1) The printer cable or LocalTalk cable was removed just after a print job started in the application software. [Printing] is displayed in the Print Manager or "Print queue" dialog box in this case.
Connect the printer cable or LocalTalk cable and cancel the current print job in the Print Manager or "Print queue" dialog box. Then turn off the SC Controller.
- 2) The print job was suspended by the personal computer's system. [Pause] or [Hold] is displayed as printer status in the Print Manager or "Print queue" dialog box. Select the file name in question and click on the [Restart] button in the Print Manager or the [Resume] button in the "Print queue" dialog box to resume the suspended print job.
- 3) The print job may have been canceled on the way in the application software on the personal computer.
Turn off the SC Controller.
- 4) The printer settings (paper size, print orientation, printer driver, etc.) in the application software don't match those in the SC printer driver, i.e. the [RISO SC3000 Setup] dialog box. < only on the Windows 3.1 platform >
Change the printer settings in the application software to make them identical with those in the printer driver or vice versa, and repeat the print job in question from the application software.

5-3-3. A print job has been suspended and the PAGE STANDBY indicator is flashing.

CAUSE

A "Pause" command was recognized in the SC Controller during the print job and the SC Controller is requesting an instruction on what to do next.

Press one of the following buttons to resume operation according to the suspended condition

: START button (or I/F key on the Risograph), STOP button or FUNCTION button.

5-3-4. Page image is not centered or is clipped at an edge.

CAUSE

The print condition settings are not correct.

- 1) The paper size setting in the application software or the [Page Setup] dialog box is not identical with the actual paper size on the Risograph.
- 2) The paper feed direction setting in the [Options] or [Page Setup] dialog box doesn't match the actual one on the Risograph.

6. DISASSEMBLY AND RE-ASSEMBLY

6-1. SC Main PCB

- 6-1-1. Turn OFF the power
- 6-1-2. Unplug the AC Power Cord
- 6-1-3. Open the Front Cover
- 6-1-4. Remove 2 Pan Head Screw (6x8) from the Front Cover Lower Hinge (Fig.1)
- 6-1-5. Remove Front Cover Lower Hinge
- 6-1-6. Remove Front Cover



Fig.1

- 6-1-7. Remove 2 Binding Head Screw (8x8) from the Front Left Cover (Fig.2)



Fig.2

- 6-1-8. Remove 2 Binding Head Screw (8x8) from the Front Left Cover (Fig.3)

- 6-1-9. Remove Front Left Cover



Fig.3

- 6-1-10. Remove 5 Binding Head Screw (6x5) from both sides of the Front Left Cover (Fig.4)
- 6-1-11. Disconnect CPU cooler connector from the SC Main PCB.
- 6-1-12. Remove SC Unit Cover



Fig.4

- 6-1-13. Disconnect connectors (CN1, CN3, CN4, CN6) from the SC Main PCB. (Fig.5)
- 6-1-14. Remove 7 Binding Head Screw (6x5) from the SC Main PCB. (Fig.5)
- 6-1-15. Remove the SC Main PCB

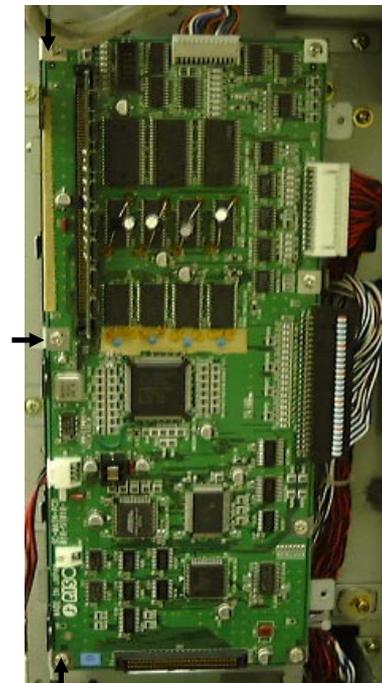


Fig.5

6-2. SC Power Supply PCB

- 6-2-1. Take same procedure has been showed on 6-1-1 through 6-1-9
- 6-2-2. Disconnect connectors (CN1, CN2) from the SC Power Supply PCB. (Fig.6)
- 6-2-3. Remove 2 Binding Head Screw (6x5) from the SC Power Supply PCB. (Fig.6)
- 6-2-4. Remove the SC Power Supply PCB



Fig.6

6-3. I/F-Port PCB

- 6-3-1. Turn OFF the power
- 6-3-2. Unplug the AC Power Cord
- 6-3-3. Remove 5 Binding Head Screw (8x8) from the Back Cover (Fig.7)



Fig.7

- 6-3-4. Remove 2 Pan Head Screw (6x8) from the Mount (Fig.8)
- 6-3-5. Remove the Mount
- 6-3-6. Remove 2 Binding Head Screw (6x5) from the Mount (Fig.8)
- 6-3-7. Disconnect the connector CN3 (Fig.9)
- 6-3-8. Remove the I/F-Port PCB



Fig.8

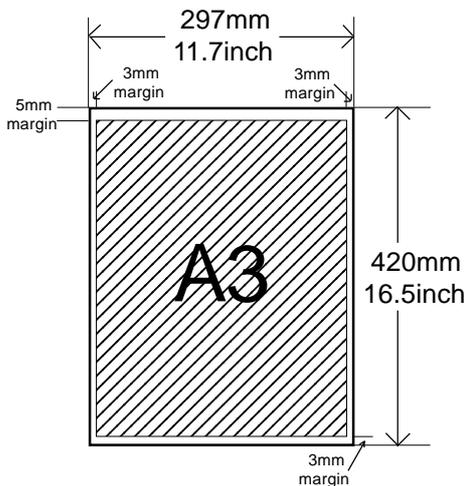


Fig.9

7. APPENDIX (SC SECTION)

7-1. Theory of Data Processing

The SC Contoroller is equiped standard with a 8MB RAM as a Page data memory, which can be expanded to maximum 40MB.
 8MB RAM will be able to process two A3 size page (400dpi).



A full A3 size 400dpi image equals to 29,808,000 dots(bit).

Which is equal to
 (11.5inch X 400dpi) X (16.2inch X 400dpi) = 29,808,000
 [No count for the area of margin]

Since
 8 bit = 1 byte,

$$29,808,000 \text{ bit} / 8 / 1,024 = 3,638\text{kbyte} / 1,024 = 3.55\text{MB}$$

If A4 (400dpi) is selected as the paper size, the A4 (400dpi) size area is half that of the A3 (400dpi) size, so four A4 (400dpi) pages can be processed in one operation.
 Which means, "Four allocated pages".
 If A5 (400dpi) is selected as the paper size, the allocate pages are nine.

The page memory data is processed within SC Controller when the data is first sent to SC Controller from the Print Manager of the Computer.
 (The paper size information is the first data on the data transmitted, the allocated page quantity is the first item to be processed.)

The Master-making on the Risograph starts when the data processing for one page is completed.

At the same time, the data processing of the second page will start if the allocated page quantity is two or more.

If the allocated page quantity is one, the data processing of the second page will not start until the Master-making is completed and the printing starts and the page memory is cleared.

Therefore, the smaller the paper size, or larger the memory(RAM) size, the faster the data transfer is from the computer to SC Controller, and will be an advantage if the page data file is in several pages.

Since SC Controller does not start processing the next file until the Master-making and printing of the present file is completed, even though a print command is given for two or more files and the first file is not using the full allocated page memory.

7-2. CD-ROM File Contents

7-2-1. Contents of RisoRinc CD-ROM Ver.1.0 (Macintosh)

FRENCH	...
GERMAN	...
ITALIAN	...
JAPANESE	...
SPANISH	...
UK_ENG	...
	-SC3500 paper Editor(U)
	-SC3500 RisoRinc QD(A.T)U
	-SC3500 RisoRinc QD(U)
US_ENG	...

7-2-2. Contents of RisoRinc CD-ROM Ver.1.0 (Windows)

Chinese	...
French	...
German	...
Italian	...
Japanese	...
Portugal	...
Spanish	...
Uk_eng	...
	-Win31
	Oemsetup.inf
	Riso3r.hlp
	-Win95_98
	Riso3r.hlp
	Risodrv.inf
	-Winnt4
	Riso3r.dl_
	Riso3r.inf
	Riso3rui.dl_
	Riso3rui.hl_
	Sc3rmon.dl_
Us_eng	...

7-3. Description of SC Panel LED

These three LEDs indicates the current status of FR3950α.

<p>ERROR</p> <p>READY/DATA</p> <p>PAGE STANDBY</p>	<p>This LED indicates error on the Risograph.</p> <p>This LED indicates the data receiving condition from the computer.</p> <p>This LED indicates the completion of 1 page data processing.</p> <p>Also this LED indicates that the unit is in stand by mode waiting for the next command.</p>
--	--

LED STATUS	ERROR (Orange)	READY/DATA (Green)	PAGE STANDBY (Yellow)
> Immediately after the Power turned ON	ON	ON	ON
> Ready for operation (Waiting for the data)	OFF	ON	OFF
> Data processing in progress (Receiving the data)	OFF	Flashing (Fast)	OFF
> Data processing in progress (No data receiving)	OFF	Flashing (Slow)	OFF
> Page data completed	—	—	ON
> No error on Risograph	OFF	—	—
> An error on Risograph (Jam error, Service call, etc.)	ON	—	—
> No power on the Risograph > Try to make interface ON during Risograph busy condition > Communication error between SC and Risograph areas	Flashing	—	—
> Waiting for next operation command	OFF	—	Flashing

— : Depends on each conditions

CHAPTER 18. SC CONTROLLER SECTION

7. APPENDIX (SC SECTION)

7-4. Description of SC Power Select Switch and SC Panel Button

7-4. Description of SC Power Select Switch and SC Panel Button

7-4-1. SC Power Select Switch

A function of SC Power Select Switch is changing status of the SC Power.



SC Power Select Switch Position	Status of the Power
SW1	Rely on Main Power SW Main Power ON - SC Power ON Main Power OFF - SC Power OFF
ⓘ	SC Power always ON Main Power OFF but SC Power stays ON

7-4-2. SC Panel Button (Normal Mode)

Function of five SC Panel Buttons are follows.

CONDITION BUTTON	Menu Mode	Ready Mode	Page Selection Mode
STOP Button	Abort the Menu Mode	Interrupt AUTO mode (Make-master or Print) Interrupt Printing job Skip Print on Manual Print Mode Interrupt Re-starting after Error Recovery	
START Button	Save set items or modified items data into SC Controller (push twice)	Start prints on Manual Print Mode Re-start after Error Recovery	Proceed Make-master and Prints on selected page
FUNCTION Button	Goes into Modification of set items	Goes into the Menu Mode Re-Make master on Manual Print Mode	
FUNCTION +STOP Buttons			Deletes all processed pages in the page memory
FUNCTION +START Buttons			Make-master and Print all processed pages in the page memory

CHAPTER 19: OTHER OPERATION & FUNCTION

Contents

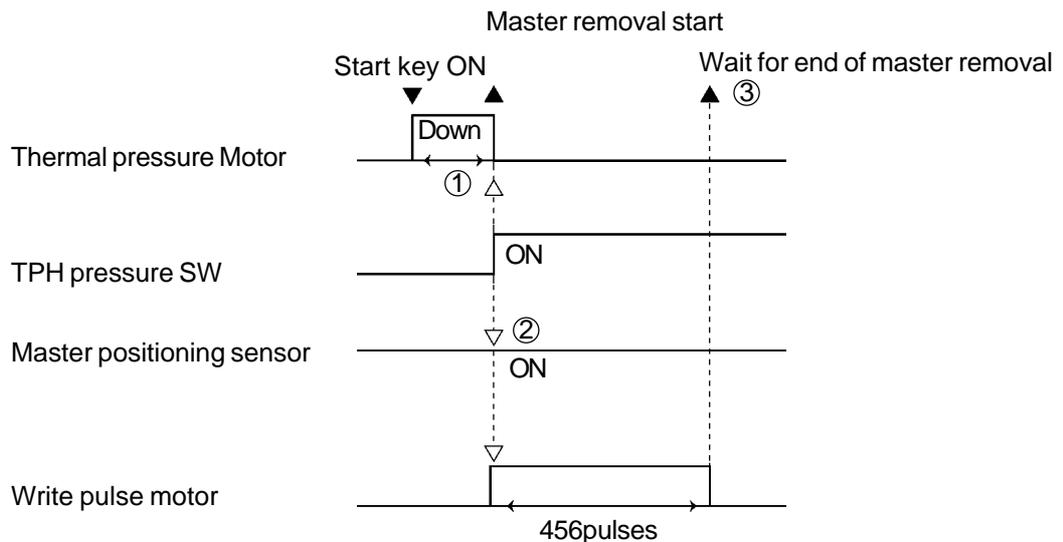
1. Confidential Mode	19-1
2. Automatic Idle	19-3
3. Multi Up Printing (2, 4, 8 and 16up)	19-4
4. TPH Test Pattern Print Out	19-5
5. Auto Power-Off	19-6
6. Preventive Maintenance Indication	19-7
7. Job Separator Activate Signal	19-8

1. Confidential Mode

The “CONFIDENTIAL” function is designed to discard the master after printing and wind the blank master around the drum to prevent duplication of the confidential document.

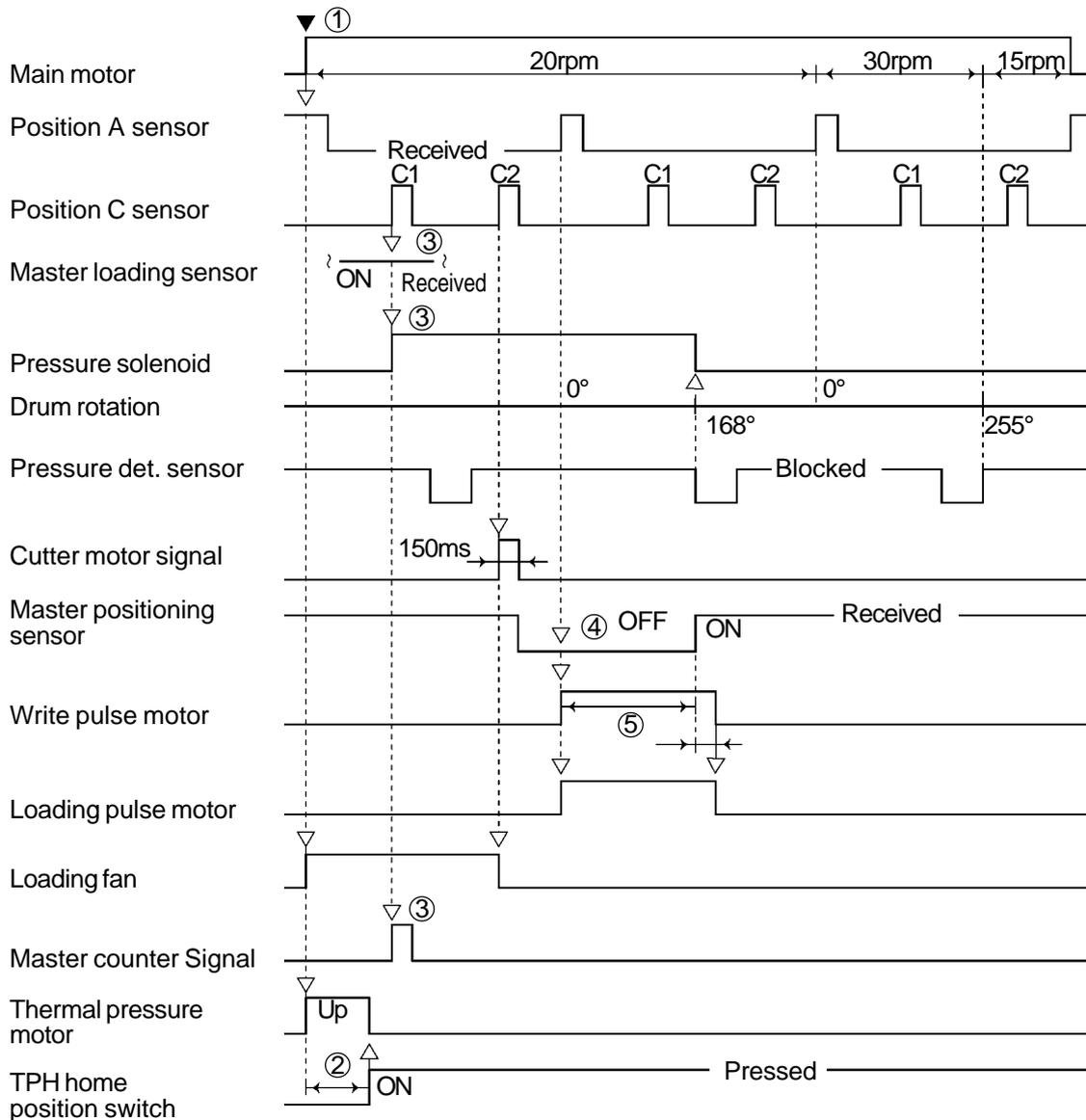
It saves some blank masters in the stocker simultaneously with master removal, and then, loads it. Although the Pressure roller moves up when the master is wound around the drum, the paper is not fed for the first print.

Confidential Mode Timing Chart (1)



- ① If the TPH pressure switch has not been pressed within 4 seconds after the Thermal pressure motor is activated, the machine assumes a Thermal pressure motor lock has occurred and displays the error code **[T19]**.
- ② If the Master positioning sensor has not detected master material, the Write pulse motor start to rotate after the Master positioning sensor detect master.
- ③ Once the Write pulse motor is turned off, wait for end of master removal operation and load the master on the drum.

Confidential Mode Timing Chart (2)



- ① The master removal and the clamp plate operation is completed. For removal of the master and closing of the Clamp plate, see their respective sections.
- ② If the TPH home position switch is not pressed 4 seconds after the Thermal pressure motor is turned on in the upward direction, **[T19]** will be displayed, judging that the Thermal pressure motor is locked.
- ③ If the Master loading sensor is sensing the light(with the master), the Pressure solenoid will be turned on and turn on the master count signal. If it is not sensing the light(without the master), **“CLAMP ERROR REMOVE MASTER ROLL THEN RE-INSTALL.”** is displayed.
- ④ If the Master positioning sensor is not sensing the light(without the master), the Write pulse motor and Load pulse motor will be turned on. If it is sensing the light(with the master), the machine will cope with a master cutting error, judging it a master cutting error.
- ⑤ If the Master positioning sensor has not detected the leading edge of master material within 1,574 pulses after the Write pulse motor and Loading pulse motor start, the machine assumes the master mis-feed has occurred and displays the error message **“MASTER MIS-FEED REMOVE MASTER ROLL THEN RE-INSTALL”**.

2. Automatic Idle

Automatic idle operation means to improve ink application to the drum surface by activating the confidential function and applying a pressure to the Drum prior to loading the new master after leaving RISOGRAPH unoperated for a long time.

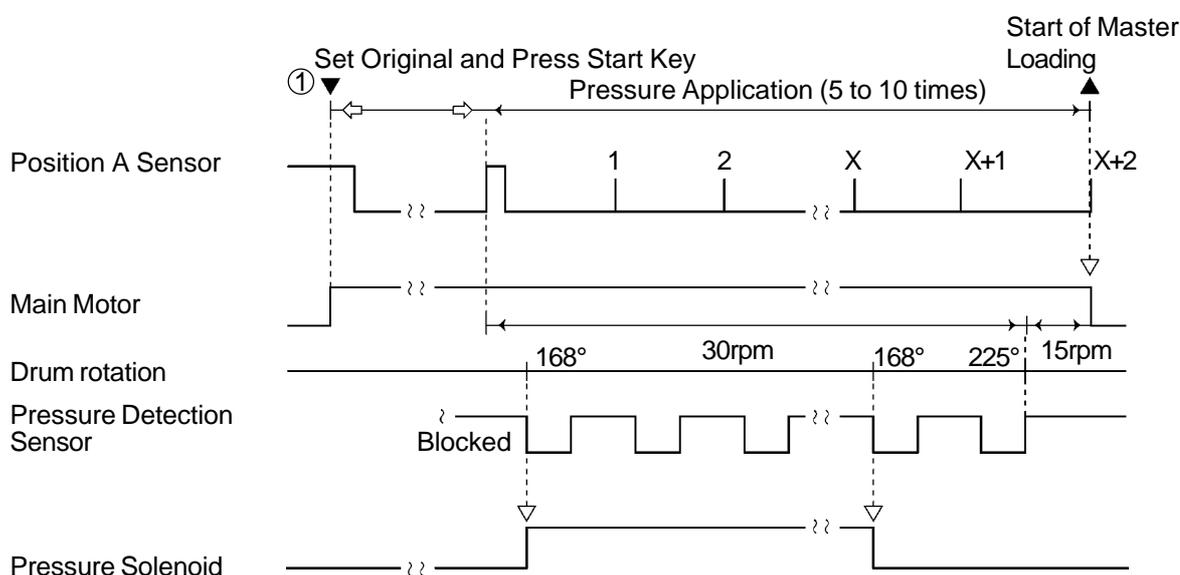
When the "AUTO IDLE" LED is illuminated on the panel, set the original and press the Start key. Automatic idle operation will be performed.

If the machine is left unoperated for 12 hours(or 6 hours) or more after printing is finished, or the Auto Idle key is pressed, the "AUTO IDLE" LED on the panel will be illuminated.

If you do not want Automatic idle operation, press the Auto Idle key to turn off the LED.

Automatic idle time can be set to "12 hours," "6 hours," or "none" by altering the setting of User Mode No. 06(Auto Idling Time).

Automatic Idle Timing Chart

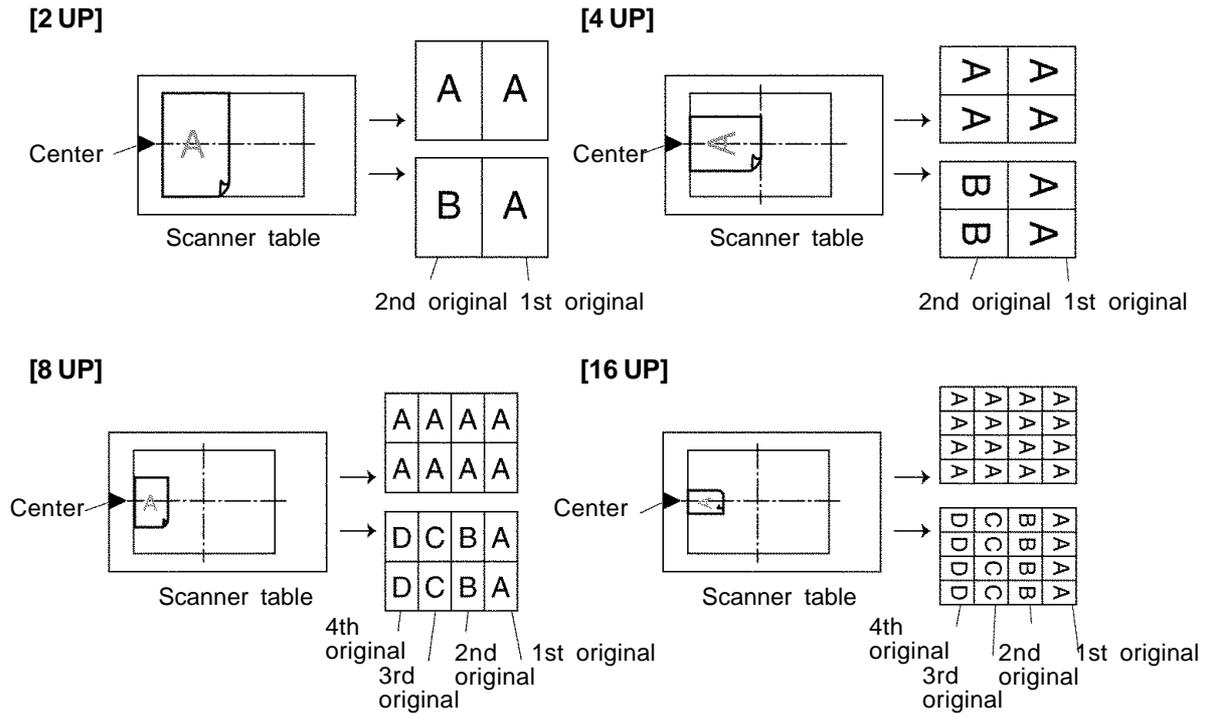


① Idling is performed only while the AUTO IDLE LED is illuminated. If it is unilluminated, master loading operation will start.

- The idling timer starts at the end of master loading, printing, and test printing.
- The number of press movement is changed 5 to 10 times depending on the thermistor data in the Drum and unoperated time.

3. Multi Up Printing (2, 4, 8 and 16up)

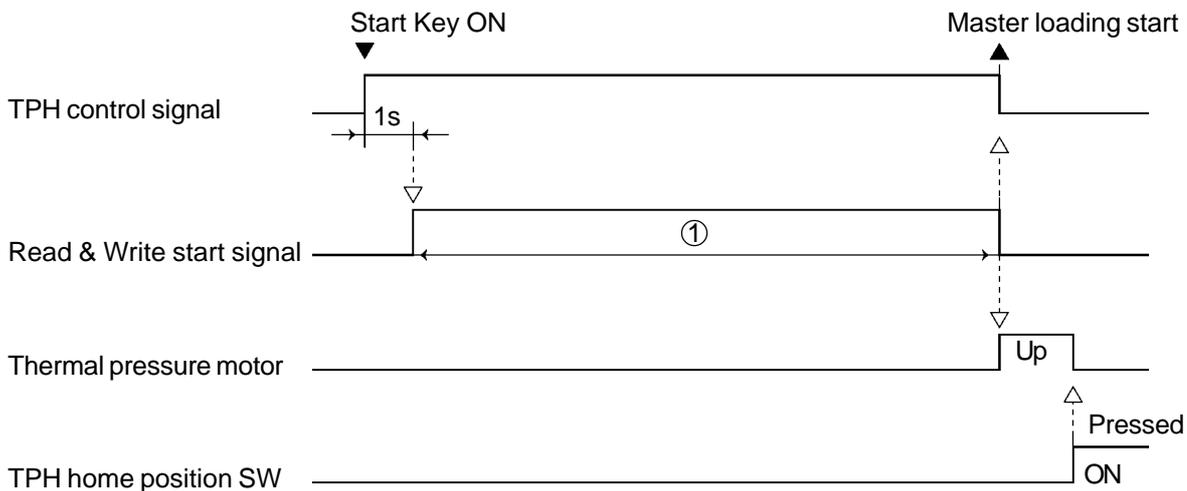
The Multi Up Printing function is designed to lay out and print one or more originals on a single sheet; it can lay out 2, 4, 8, and 16 frames on a single sheet. There are two kinds of multiframe consecutive printing; single original printing which layout multiple frames from one original and multioriginal printing which lay out multiple frames from multiple originals.



4. TPH Test Pattern Print Out

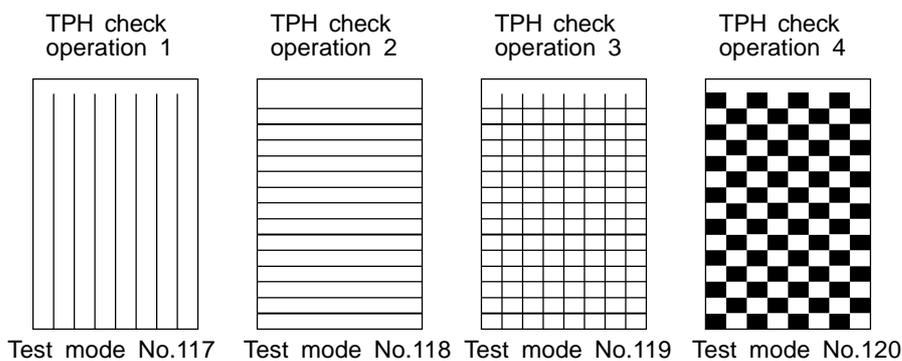
This function outputs the test pattern data in the Image processing PCB directly to the Thermal head. It allows you to check the condition ranging from the Image processing PCB to Thermal head, without interposing the Image scanner.

TPH Test Pattern Print Out



- ① Write the A3 size worth of data for the A3 drum and B4 size worth of data for the B4 drum, regardless of the printing paper size. The writing width in the main scanning direction depends on the printing paper size.

Test Pattern



5. Auto Power-Off

The Auto power-off function is designed to automatically turn off the printing machine when the printing machine is stopping condition.

- Auto power-off Start Time -

In the User mode, choose and set the stop time after which the Auto power-off function starts.

- OFF(default)
- 5 minutes
- 10 minutes
- 30 minutes

- Printing Machine Stopping Conditions -

When all of the following conditions are met, it can be recognized that the printing machine is stopping.

- No operation is being executed, such as master loading, printing, security function, idling.
- No operation panel key is being operated
- The printing machine has no error.
- The I/F mode is not being turned on.
- The sorter is not working.

The printing machine measures the time during which all of the above-mentioned conditions are met, and when the measuring time reaches the time set in the User mode, Auto power-off is activated.

The buzzer sounds to notify activation of the auto Auto power-off function just before it is activated.

6. Preventive Maintenance Indication

If the number of printed sheets or masters reach their respective set values, "MAINTENANCE CALL SERVICE" is indicated on the LCD panel at power-on after that or just after all reset. Maintenance call indication can be turned off by pressing the All Reset key. Unless a count value is cleared in the Test mode(No.93 or No.94), the maintenance call will be indicated again at next power-off or all reset.

- Setting Method -

- 1) Start the Test mode, enter "150" (MASTER COUNT) or "151" (COPY COUNT), and press the Start key.

TEST MODE MAINTENANCE COUNTER ENTRY MASTER COUNT ##### ENTRY ①~⑨	1 5 0
---	-------

TEST MODE MAINTENANCE COUNTER ENTRY COPY COUNT ##### ENTRY ①~⑨	1 5 1
---	-------

- 2) In this state, set a target value.

Test mode 150 Target Maintenance master count set

When this is done, a setting increment shall be 100 masters.

For example, pressing "1" sets "100 masters." That is, the minimum setting limit is 100 masters and maximum setting limit is 999,900 masters.

TEST MODE MAINTENANCE COUNTER ENTRY MASTER COUNT 100 ENTRY ①~⑨	1 5 0
---	-------

Test mode 151 Target Maintenance print count set

When this is done, a setting increment shall be 1000 sheet.

For example, pressing "1" sets "1000 sheets"

TEST MODE MAINTENANCE COUNTER ENTRY COPY COUNT 100 ENTRY ①~⑨	1 5 1
---	-------

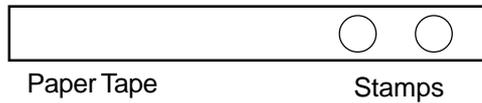
- 3) Pressing the Start key or Stop key settles the set value and exits the setting screen. If "0" is set, the Preventive maintenance function will not work.

7. Job Separator Activate Signal

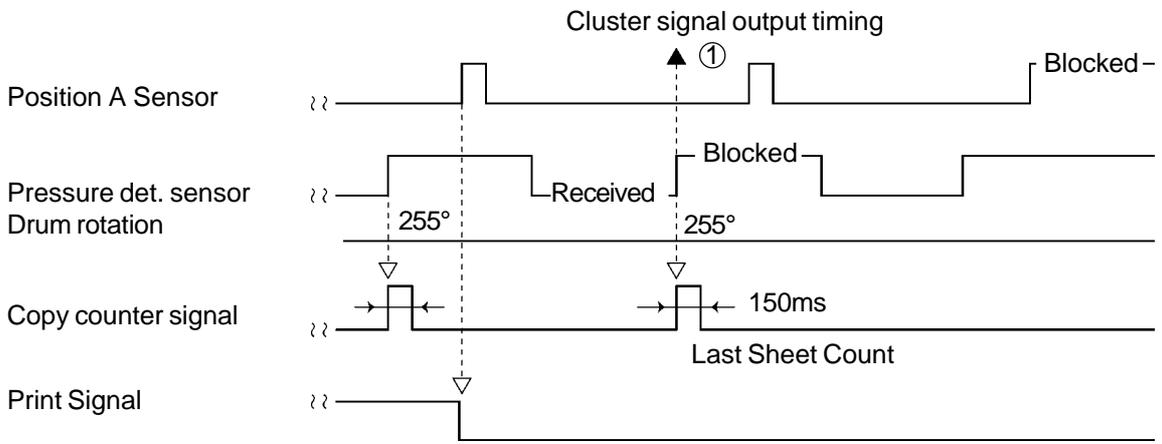
A cluster signal is to activate the job separator.

The Job Separator feeds the tape to sort the printed papers on the Paper receiving tray. Connection of the Job Separator needs to be set in the User mode.

Give one or two stamps to the tape to sort it by groups and originals.



-Cluster Signal Output Timing Chart



- ① The cluster signal is turned on at the output timing of the total counter signal, at which the set number of printed sheets is cleared to "0". It is not output when normal printing ends.

CHAPTER 20: IMAGE PROCESSING

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THEORY OF OPERATION

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5. Shading Compensation	20T- 5
6. Gamma Compensation	20T- 6
7. Book Processing Function	20T- 7
8. Fine Enhancement	20T- 9
9. Automatic Scanning Contrast Control	20T- 11

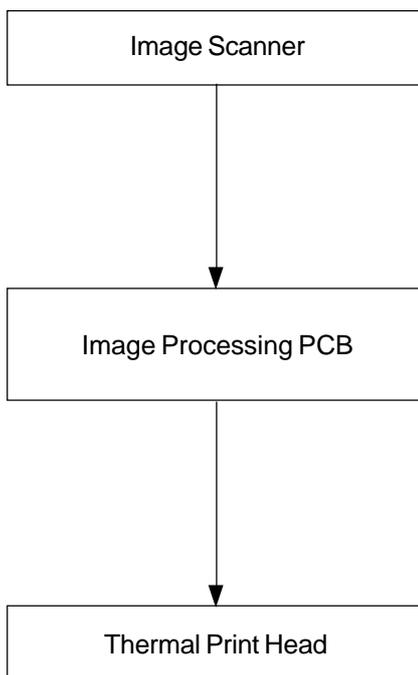
ADJUSTMENT

1. Gamma Compensation	20A- 1
2. Slice Level Adjustment	20A- 2
3. Fine Enhancement Adjustment	20A- 2

THEORY OF OPERATION

1. Image Processing Flow

The FR Series uses an image scanner to scan original images, which are then made into masters by a thermal print head. An overview of the flow of image processes from scanning to master making is presented below. (The individual image processes are described in detail in later sections of this chapter.)

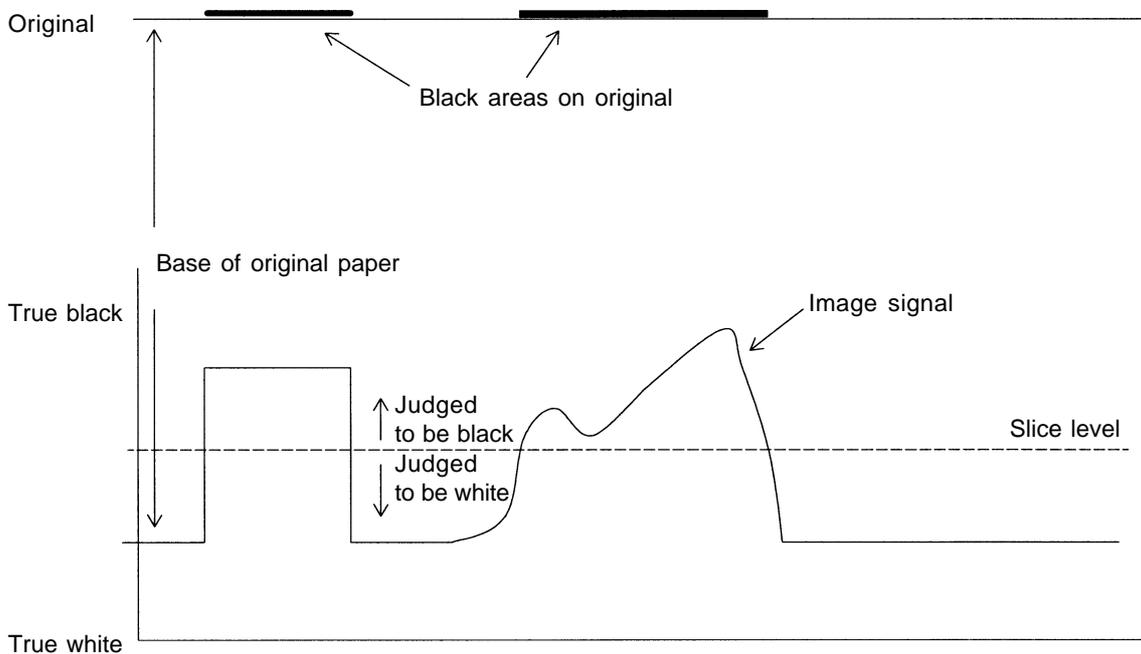


- An original image (analog signal) which had been scanned by the CCD is converted into an image signal (digital signal) with 256 gradations.
- Sensitivity mottling caused by the CCD or LED arrays is compensated for by shading compensation, after which the image signal is sent to the Image processing PCB. (page 20T-5.)
- The 256-gradation image signal is corrected into an image signal which is suitable for stencil duplicating by means of gamma compensation. (page 20T-6.)
(Compensation is not performed in line-copy mode.)
- The image signal is processed differently depending on which of the following modes is used:
 - Line-copy mode (page 20T-2)
 - Photo mode and dot-photo mode (page 20T-3)
 - Line/photo mixing mode (page 20T-4)
 - Book mode (page 20T-7)The signal is ultimately converted into bivalent data (black or white) and output to the thermal print head.

2. Line Mode Processing

Image Signal and Slice Levels

The image signal from the image scanner provides a value based on the darkness of the original. On the other hand, the data sent to the thermal print head must indicate whether or not to perform master making, i.e., they must be binary (indicating black or white). Thus in line-copy mode, a process is performed whereby the image signal is divided between black and white (binary conversion) very close to the midpoint between true black and true white. The value where this division takes place is called the slice level (threshold value).



When the slice level is shifted to the true black area, the area judged to be white is increased, resulting in a lower scanning darkness setting. Conversely, when the slice level is shifted to the true white area, the area judged to be black is increased, resulting in a higher scanning darkness setting.

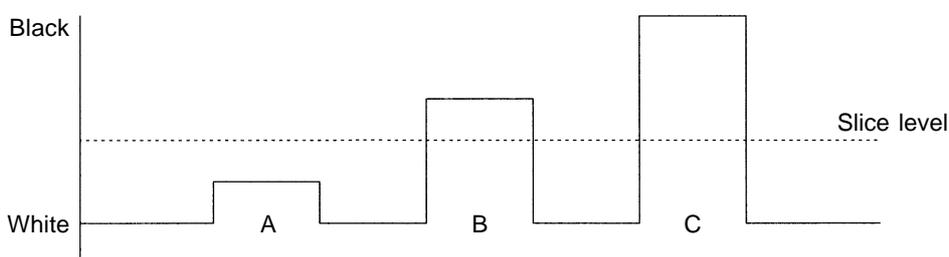
- The line-copy mode slice level can be varied by technicians by moving the slice level value by the Test Mode.
- The slice level can be varied by end users with the original scanning button (manual) on the operation panel.

3. Photo Processing

Line-Copy Processing and Photo Processing

On stencil duplicating process (On a Risograph), heat from the thermal print head forms holes in the master during the master making process. The image which is formed on the master consists of a collection of such holes formed by very small heating elements on the thermal print head. On line-copy processing, holes are formed in areas where the image signal is at or above a certain darkness level based on the slice level. On photo processing, however, darkness gradations must be expressed. Since it is not possible to alter the size of each individual hole, the distance among the holes are reduced or increased in order to express half tone.

Image signal of original



Master with line-copy processing



Master with photo processing



On line-copy processing, areas such as (A) in the diagram above, in which the image signal is below the slice level, will be true white on the master. Areas such as (B) and (C), which are above the slice level, will be true black on the master. Thus even though areas (B) and (C) have different darkness levels on the original, they will both be printed as true black.

On photo processing, half tone is expressed by varying the distance among the holes formed on the master based on the image signal. Thus if area (B) has a blackness level of 60%, then 60% of the corresponding pixels (in the sense of a pixel group) will be black, regardless of whether the individual pixels are black or white (i.e., whether or not holes are formed).

The FR uses two different image processing methods for photo processing. One of these methods, called the error diffusion method, is used for ordinary photos. The another method, called the ordered dither method, is used for mesh dot photos. Both of these methods can be used to express half tone, but they differ in terms of the finished print. The ordered dither method uses a pattern called a dither pattern. The type used with the FR tends to generate mesh dots.

If a pre-shaded photo is used as an original, the ordered dither method will tend to generate a distinctive strip pattern called a moiré.

4. Line/Photo Mixing Mode (“Duo” Mode)

Problems such as the following can occur with originals which contain a mixture of lines and photos.

- If line-copy mode is used for master making, it will not be possible to express the range of gradations in the photo areas on the originals. As a result, the finished printout will have high contrast.
- If photo mode is used for master making, simulated gradation processing will be used even in the line areas of the original. As a result, contrast quality will be worsened.

In order to print clean copies of an original which contains a mixture of lines and photos, the line areas and photo areas on the original should be clearly distinguished from each other, and line-copy processing (simple binary processing) or photo processing (simulated gradation processing) should be used as appropriate to each area. Unfortunately, actual originals contain ambiguous areas which may be lines or photos. Thus an ineffective zoning process could actually create more problems than it solves.

The FR processes mixtures of lines and photos through the method described below.

- Line/Photo Mixed Processing - Basic Concepts Behind Image Processing

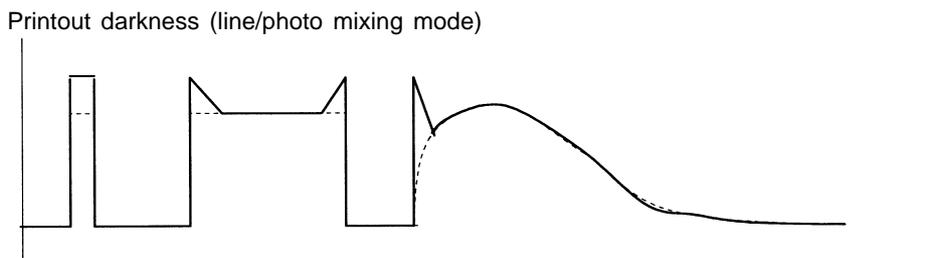
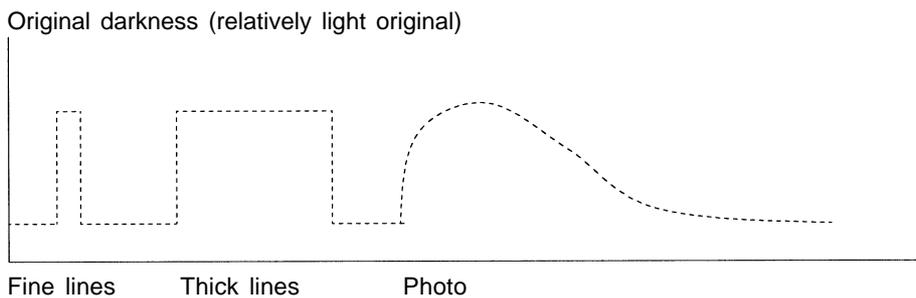
- 1) Edges are printed as true black.
 - 2) Photo processing gradually proceeds starting at the edge and moving toward a blackish area.
 - 3) Fine lines are sensed for line processing.
- * These processes provide relatively good results.

Lines

Even thick lines which are not very dark are printed as true black on the edges and undergo photo processing as the system progresses inward. This results in a decline in darkness. However, because of the sharp contrast between the edges and the base, the lines will appear black on the whole due to an optical illusion. Fine lines are sensed through a fine-line sensing process, making it possible to obtain results very close to those provided by line-copy processing.

Photos

Photos typically do not have edges, so they are almost always handled through photo processing. Even if a photo has edges, the feature described above in 2) ensures that gradations will be maintained and adverse effects on the overall image will be minimized.



5. Shading Compensation

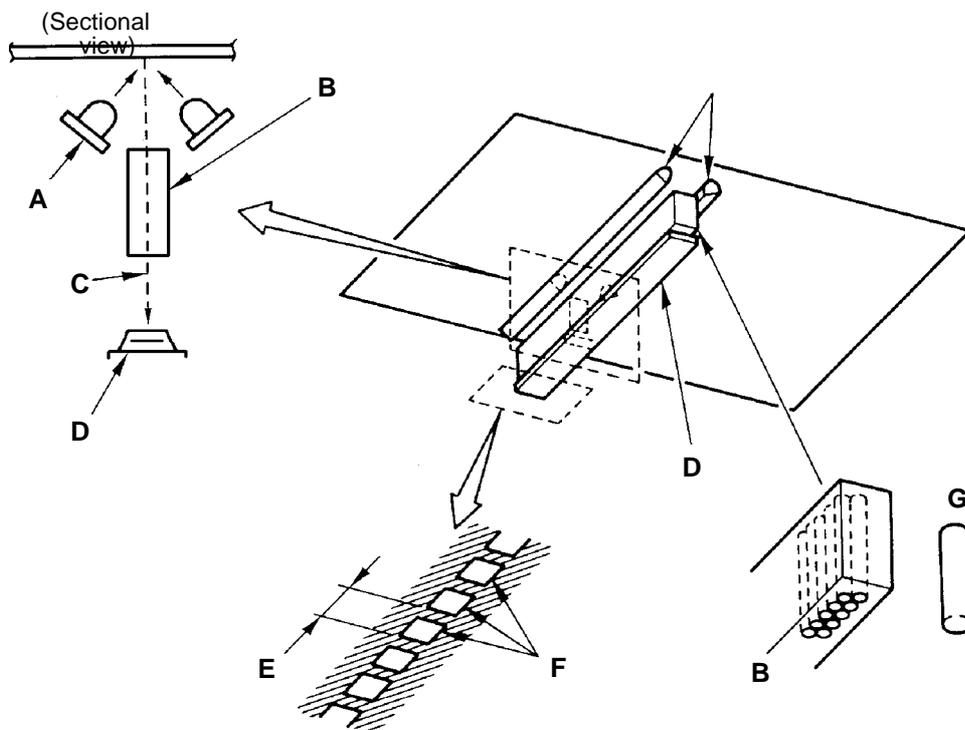
Approximately 4,600 light receiving elements are arranged inside the 400 dpi A3-width image scanner. Because of the sensitivity in the individual light receiving elements, luminosity mottling in the LED arrays which illuminate the original and other factors, the data which are output by the individual light receiving elements will vary, even when the image scanner scans an original of uniform darkness.

Therefore, in order to prevent master making darkness mottling, a type of sensitivity compensation known as shading compensation is performed. Shading compensation involves obtaining true white image data before the original is scanned. These data are used in sensitivity compensation during the process of actually scanning the original.

Image data for shading compensation can be obtained by scanning a true white shading sheet with the image scanner.

* dpi (dots per inch): This represents the number of elements per inch (approximately 25.4 mm).

Image scanner Structure

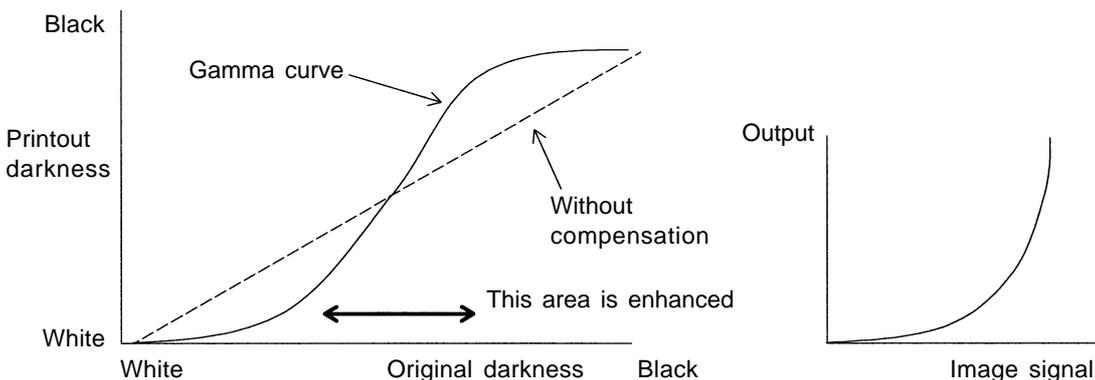


- A: LED array
- B: Focusing rod lens array
- C: Reflected ray
- D: Light sensing part
- E: 1/400 inch
- F: Light sensing elements
- G: Optical fiber

6. Gamma Compensation

Gamma Compensation

On printing in photo mode with the FR, if the scanned image signal is used directly for master making or printing, the contrast will be extremely low (especially in half tone). Therefore, in order to closely match the contrast of the printout with that of the original, it is necessary to perform a compensation process whereby the gradations on the white and black ends are dropped so as to enhance the gradations in the area indicated by the arrows in the diagram. This compensation process, called gamma compensation, is used on the image signal during the image processing stage.



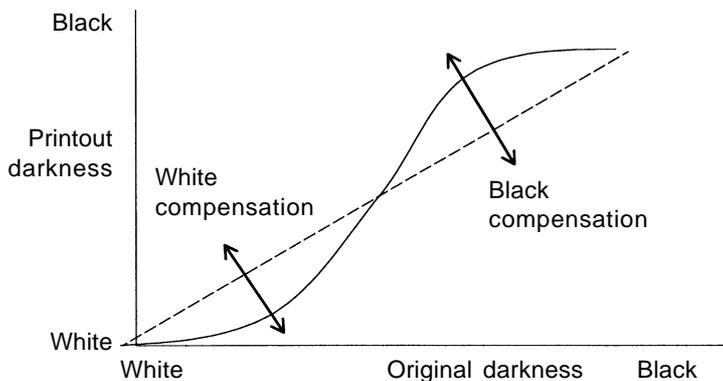
Gamma Curve

The gamma-compensated signal can be expressed as a curve or a straight line as shown in the diagram. This curve is called a gamma curve. The typical gamma curve with the FR is shaped as shown in the diagram. (The upper left diagram shows the correlation between the printout darkness and original darkness. The signal-level gamma compensation curve which is actually applied to the image signal is shaped as shown in the upper right diagram.)

Original Scanning Darkness and Gamma Compensation Settings

You can move the gamma curve in the diagram to the left or right, thereby varying the master making darkness. To do this, press the "Original Scanning Darkness Adjustment" key on the operation panel and move the original scanning darkness setting.

The quality of the photo printout finish depends on the user's preferences, so the amount of compensation to be applied can be adjusted by the user. To do this, move the Test Mode "Gamma Curve Black Level" value. This changes the gamma curve as shown in the diagram thereby changing just the black end (conversely, you can change just the white end using "Gamma Curve White Level").



7. Book Processing Function

If the Bound Original mode is selected, prescanning will be performed prior to scanning to check whether or not the original is floating from the scanner table's glass. Viewed from the image scanner, a blackish part is judged outside a range of the original or floating. This function allows to recognize a range of the original and erase outside the range.

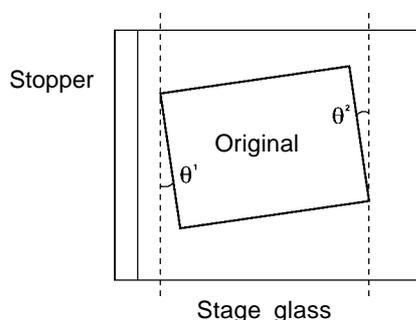
It also allows you to check the bound section of the book original for a float and photograph or erase that part. These processes are called trimming.

(1) Taking in the image data at prescanning

Both main scanning and sub-scanning take in the image data pixel by pixel at intervals of about 1 mm and takes two continuous points like white-white as a part of the original.

(2) Setting the frame of the original

After prescanning, the trimming PCB is used to calculate based on the read data. When this is done, the slope of two sides in the main scanning direction of the original is calculated to determine the frame of the original.



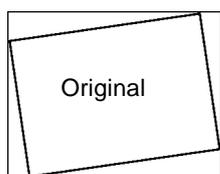
The frame of the original is the range of the original recognized by the machine.

θ_1 and θ_2 are compared, and the frame of the original is formed as follows, based on either θ with smaller slope.

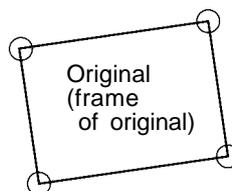
When θ is smaller than 2.8° : The frame of the original is formed parallel in both main and sub-scanning directions.

When θ is larger or equal to 2.8° : The four corner points of the original are searched for and the frame of the original is formed by connecting those four points.

Frame of original



$\theta < 2.8^\circ$

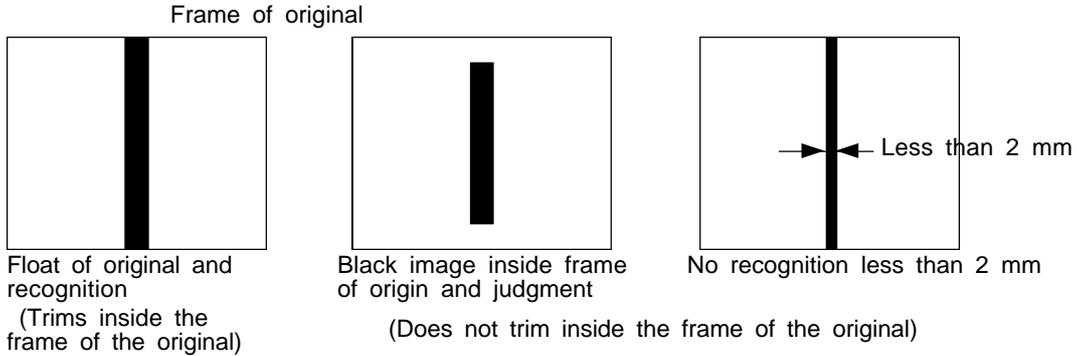


$\theta \geq 2.8^\circ$

If the original is shaped like other than a square, this theory may not apply. The outside of the frame of the original is trimmed and not make a image.

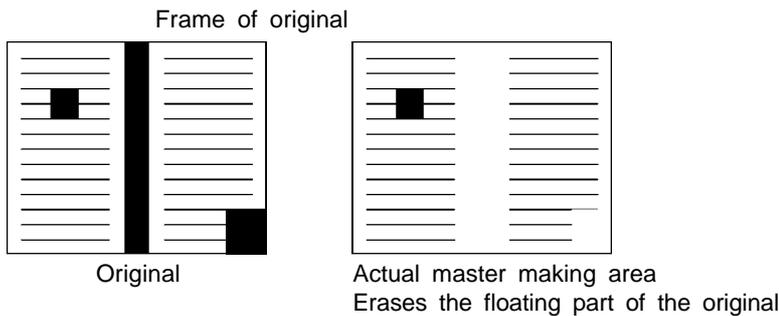
(3) Checking the original for a float(bound section)

Based on the image data at prescanning, this function takes a black continuous part extended from outside to inside the frame of the original as a float of the original. Since it takes two or more black-black continuous data points as a float of the original, the float of the original less than 2 mm cannot be dealt with. The float of the original is recognized, even if it is not in the center of the book original.



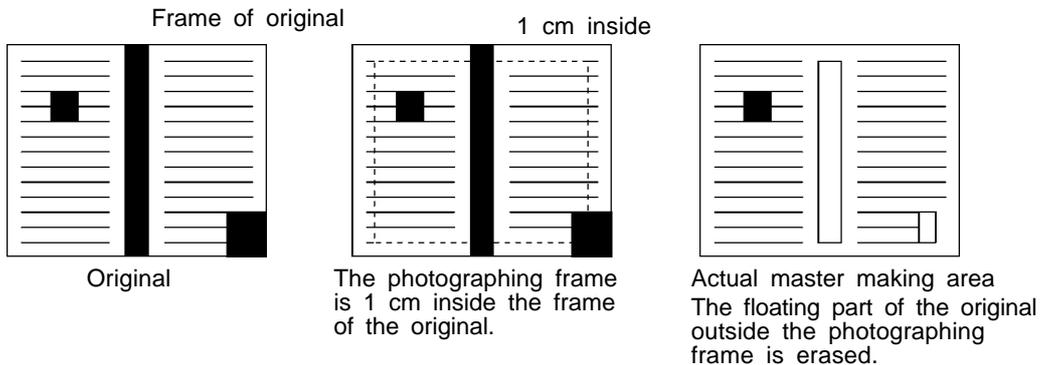
(4) Bound Original ERASE mode

Selecting the ERASE mode erases the floating part of the original.



(5) Bound Original PHOTO mode

Selecting the PHOTO mode photographs the floating part of the original. Since the frame of the original may be formed outside the actual original as described above, the area 1 cm inside the frame of the original is not photographed, but erased.

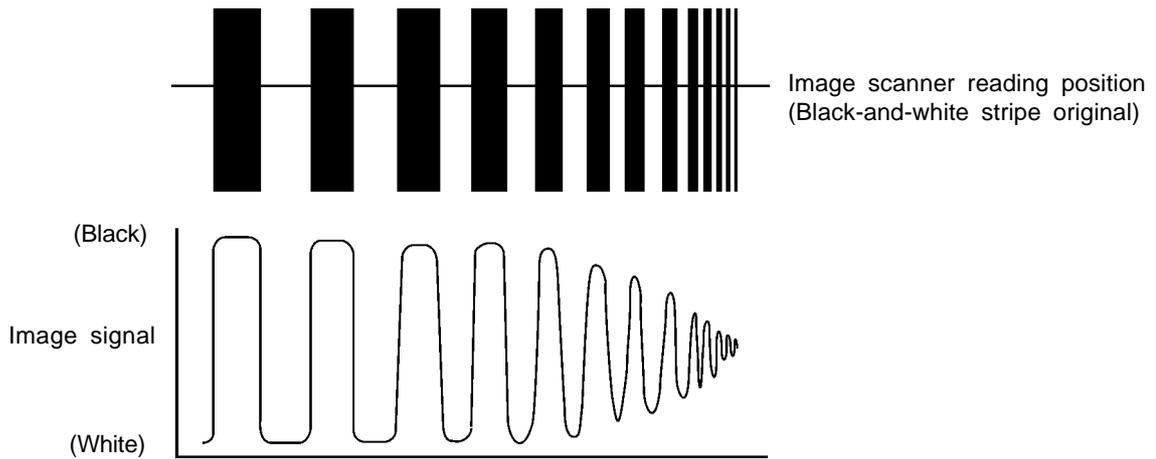


* If there is not a margin of 5 mm or more at the end of the original or there is not a margin of 2 mm or more around it, even the image will be erased. To avoid this, turn off the Bound Original mode.

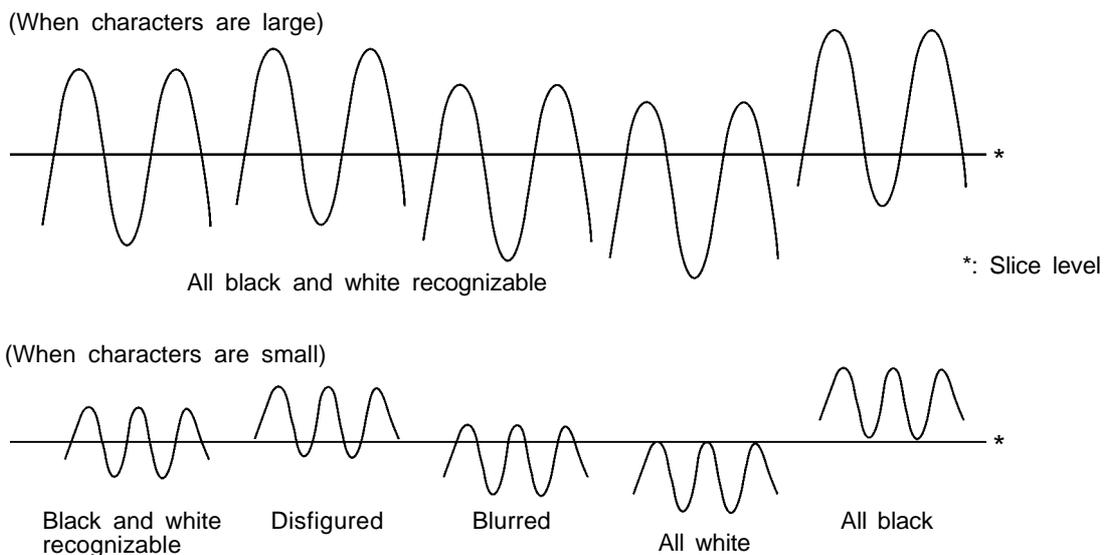
8. Fine Enhancement

(1) Reading of fine characters and image signal

Theoretically, a 400 dpi image scanner should be able to read the original with 400 black and white lines(200 pairs of lines) drawn per inch. Actually, however, even with the original not that much fine, as the characters become smaller or the lines become finer, the amplitude of the image signal is reduced, blurring black and white.



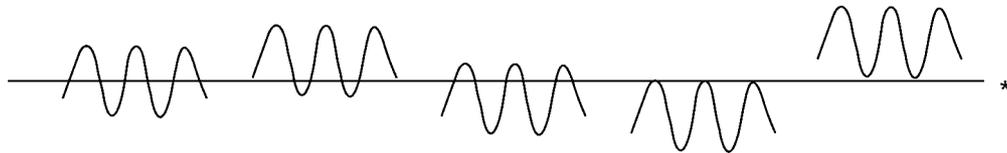
In the Line mode, the image signal is divided into black and white at the slice level, but its position changes up/down depending on the shade of the characters or that of the background. If the characters are large and the amplitude of the image signal is wide at this time, the signal can be clearly divided into black and white at the slice level, even if its position moves up/down. If the size of the characters is reduced, the amplitude will be narrowed, and consequently, the characters will be blurred or disfigured depending on the positional relations of the image signal and slice level.



(2) Fine enhancement

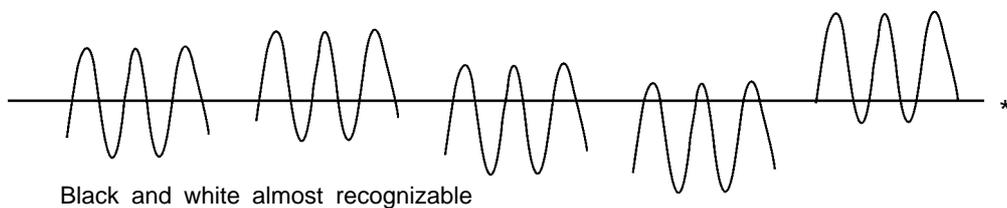
In order to properly reproduce small characters, the amplitude of the image signal is electrically amplified to correct the image signal so that the black and white can be recognized to some extent.

(Before Fine enhancement correction)



(After Fine enhancement correction)

*: Slice level



* The background of the original also has concentration to some extent and the image signal changes very finely. Higher edge enhancement amplifies the image signal for the background. If the background color of the original is dark, therefore, the amplified image signal may be extended over the slice level, printing the black points. In this case, either weaken fine-character enhancement or lower scanning contrast of the original.

- Fine enhancement can be set in 4 steps depending on the Test mode.

9. Automatic Scanning Contrast Control

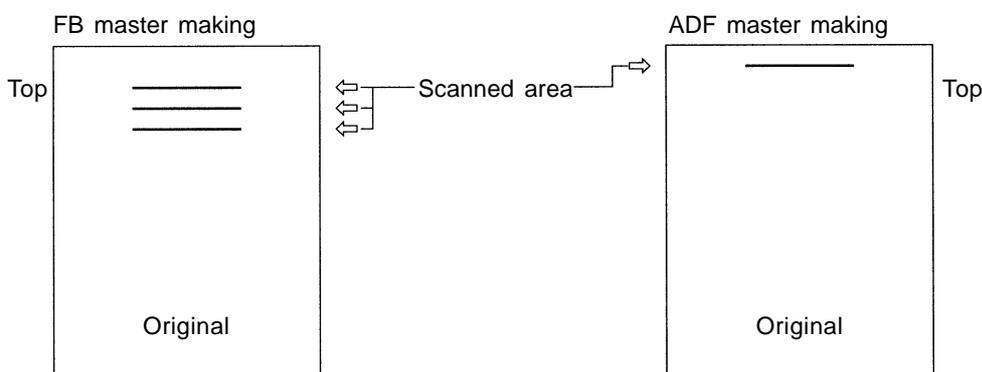
Automatic scanning contrast adjustment is a function which scans the darkness of the original base prior to master making and selects the slice level according to the darkness so that the base will not appear (so that dirt on the base will be removed) even on originals with dark bases.

Automatic scanning contrast adjustment only works with line-copy mode (when the "Auto" option is selected for original scanning darkness).

(1) Original base scanning

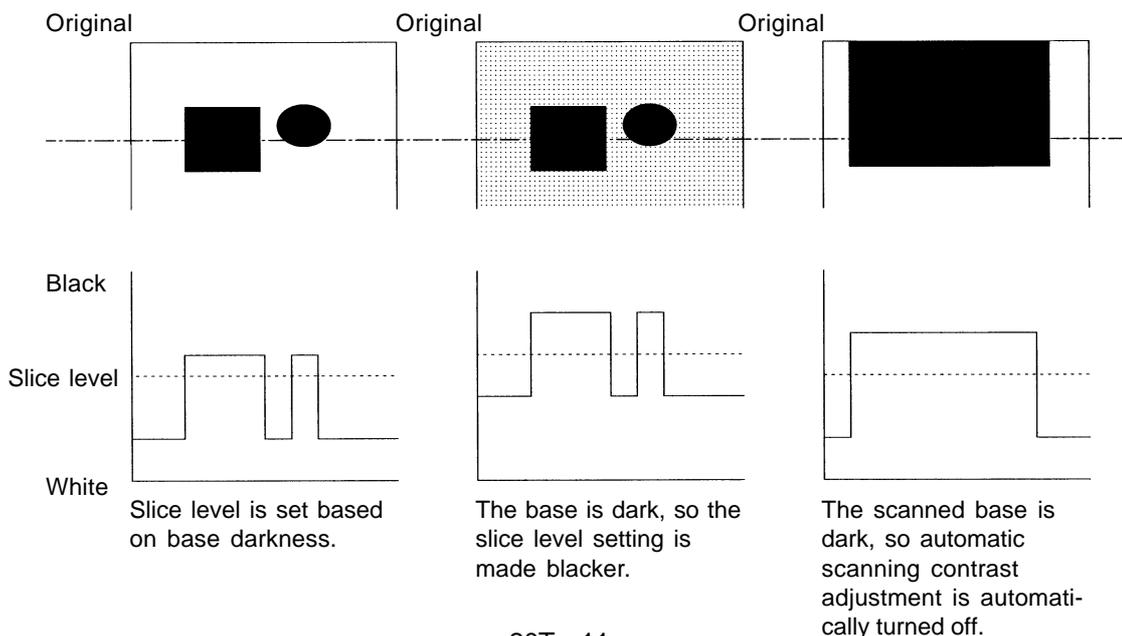
Press the master making <Start> key to read the darkness of the base at the leading edge of the original. During FB master making, three lines are scanned; during ADF master making, one line is scanned.

Note: Although the image scanner is A3-width, only the center of the original is scanned since the size of the original can not be recognized by the image scanner.



(2) Slice level setting

The slice level is set automatically based on the scanned base darkness. If the base is dark, the slice level setting will be made blacker accordingly. However, if the area recognized as the base is too dark, it may be an image line. In such cases, therefore, auto scanning contrast function is automatically turned off and the system switches to ordinary manual master making (scanning darkness center) (the display remains under the "Auto" setting).



MEMO

ADJUSTMENT

1. Gamma Compensation

- Setting Method -

- (1) Start Test Mode, input a atest mode No. and press <START> key.
- (2) To set the machine at the selected switch setting, press the <START> button.

- Principles Behind Adjustment -

Think of a printout as being divided between whitish area and blackish area.

To alter the master making darkness in the whitish area, change the “Gamma Curve White Level” value.

Conversely, to alter the master making darkness in the blackish area, change the “Gamma Black Level” value.

Test Mode No.

- 251 Gamma Curve White Level (Photo, Doto photo OFF)
- 252 Gamma Curve Black Level (Photo, Doto photo OFF)
- 253 Gamma Curve White Level (Photo, Doto photo ON)
- 254 Gamma Curve Black Level (Photo, Doto photo ON)
- 255 Gamma Curve White Level (Duo, Doto photo OFF)
- 256 Gamma Curve Black Level (Duo, Doto photo OFF)
- 257 Gamma Curve White Level (Duo, Doto photo ON)
- 258 Gamma Curve Black Level (Duo, Doto photo ON)

Memory SW	0	1	2	3
Print Image	Light	Standard	Little Dark	Dark

2. Slice Level Adjustment

- Setting Method -

- (1) Start Test Mode, input a Test mode No. and press <START> key.
- (2) To set machine at the selected switch setting, press the <START> key.

Test Mode No.

- 259 Slice Level Adjustment (Line-Copy Mode)
- 260 Slice Level Adjustutment (Automatic Scanning Contrast Control)

Memory SW	8	9	A	B	C	D	E	F	0	1	2	3	4	5	6	7
Slice Level	Low	← Standard →										High				
	Dark	← Printed Matter Density →										Light				

3. Fine Enhancement Adjustment

- Setting Method -

- (1) Start Test Mode, input a Test mode No. and press <START> key.
- (2) To set machine at the selected switch setting, press the <START> key.

Test Mode No.

- 261 Fine Enhancement Adjustment

Memory SW	0	1	2	3
Fine Enhancement	Low	Standard	Little High	High

* You can set either one of the Memory switches 0 through 3; the default is "1".

CHAPTER 21: ADVICE DISPLAYS

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ADVICE DISPLAYS

1. Trouble Messages (T Display)

Display	Details	How to Cancel
T1 CALL SERVICE ↓ TO RESUME OPERATION PRESS START KEY (while in master making.)	Main Motor Lock <ul style="list-style-type: none"> • In 3 seconds from turning ON of the Main motor, <u>the A detection sensor light path is still held blocked.</u> • In 8 seconds from turning ON of the Main motor, <u>the A detection sensor is not blocked.</u> 	Press <ALL RESET> key. ↓ Press <START> key.
T2 CALL SERVICE	Elevator Motor Lock <ul style="list-style-type: none"> • In 15 seconds from turning ON of the Elevator motor in upward direction, <u>the Elevator upper limit sensor is not pushed.</u> • In 15 seconds from turning ON of the Elevator motor in downward direction, <u>the light path of the Elevator lower limit sensor is not blocked.</u> • In 3 seconds from turning ON of the Elevator motor in upward direction, <u>the Elevator lower sensor is held blocked.</u> • In 3 seconds from turning ON of the Elevator motor in downward direction, <u>the Elevator upper limit sensor is held pressed down.</u> 	Press <ALL RESET> key.
T3 CALL SERVICE	Clamp Error (1) <ul style="list-style-type: none"> • In 4 seconds from turning ON of the Clamp solenoid in clamp retrieval, <u>the Clamp safety switch is held still pressed down.</u> • In 4 seconds from turning OFF of the Clamp solenoid, <u>the Clamp safety SW has not been pressed.</u> • In 8 seconds from turning ON of the Clamp motor in opening direction in clamp retrieval, <u>the 180° Angular sensor has not detected magnet.</u> • In 8 seconds from turning ON of the Clamp motor in closing direction in clamp retrieval, <u>the 0° Angular sensor has not detected magnet.</u> * In any of the above cases, master making is performed to the end.	Press <ALL RESET> key. ↓ Press <START> key.
T4 CALL SERVICE	Overflow <ul style="list-style-type: none"> • When ink is in contact with the Overflow sensor. The Drum set switch need be pushed. 	Overflow sensor OFF <CLEAN>

CHAPTER 21. ADVICE DISPLAYS

Display	Details	How to Cancel
T5 CALL SERVICE	Print Positioning Motor Lock • In 12 seconds from turning ON of the Print positioning motor, <u>the Vertical centering sensor is not turned ON/OFF.</u>	Press <ALL RESET> key.
T6 CALL SERVICE	Pressure Detection Sensor Malfunction • In 8 seconds from turning ON of the main motor, <u>the Pressure detection sensor is not turned ON/OFF.</u>	Press <ALL RESET> key.
T7 TURN MAIN POWER SW. OFF THEN ON	Communication error between FR and Digitizer • On occurrence of an error in communication between the System PCB and Digitizer III.	OFF -> ON
T8 TURN MAIN POWER SW. OFF THEN ON	Communication error between System PCB and Panel PCB • On occurrence of an error in communication between the System PCB and the Panel PCB.	OFF -> ON
T9 TURN MAIN POWER SW. OFF THEN ON	Communication error between FR and the Sorters • On occurrence of an error in communication between the System PCB and the Sorter (TM)	OFF -> ON
T10 TURN MAIN POWER SW. OFF THEN ON	Malfunction Image Processing PCB • When the scanning contrast adjustment signal is not output from the image processing PCB.	OFF -> ON
T11 CALL SERVICE	Pressure Control Motor Lock • In 100ms from turning ON of the Pressure control motor, <u>the Encoder sensor cannot detect a pulse.</u> • In 5 seconds from turning ON of the Pressure control motor, <u>the Pressure centering sensor is not turned ON/OFF.</u>	Press <ALL RESET> key.
T12 CALL SERVICE	• Malfunction of Trimming PCB • When the TOP signal is not output from the Trimming PCB 2	OFF -> ON
T13 CALL SERVICE	Cutter Motor Lock • After master cutting retrieval with the drum held in C-2 position, when the Master positioning sensor is in light-receiving state. (Master cutting has failed in the 2nd time.)	Drawer connector OFF (Pull out the drum.)
T14 CALL SERVICE	Clamp Error (2) • If the actuator of the Clamp safety switch is not depressed when the Clamp solenoid is not in operation.	Press <ALL RESET> key.

CHAPTER 21. ADVICE DISPLAYS

Display	Details	How to Cancel
T15 CALL SERVICE	Flat Bed Read Pulse Motor Lock <ul style="list-style-type: none"> • If the Image scanner home position sensor does not detect the Image scanner within 18898 pulses after the Flat bed read pulse motor is activated. • If the Image scanner ADF Shading sensor does not detect the Image scanner within 15748 pulses after the Flat bed read pulse motor is activated. • If the scanner home position sensor does not detect the Image scanner within 14,551 pulses(462 mm worth) after the Flat bed read pulse motor is activated during prescanning. • If the Image scanner is not release from the Image scanner home position sensor within 314 pulses after the Flat bed read pulse motor is activated. • If the Image scanner is not released from the Image scanner ADF Shading sensor within 314 pulses after the Flat bed read pulse motor is activated. 	Press <ALL RESET> key.
T16 CALL SERVICE	Position C Sensor Malfunction <ul style="list-style-type: none"> • If the Position C sensor status has not been changed from ON to OFF (or OFF to ON) within 8 seconds from the start of the Main Motor. 	Press <ALL RESET> key.
T17 CALL SERVICE REPLACE BATTERY	Replace Battery <ul style="list-style-type: none"> • When the battery voltage is less than 2.4 V at power-on, all reset, or end of operation. 	Power OFF -> ON

CHAPTER 21. ADVICE DISPLAYS

Display	Details	How to Cancel
T18 TURN MAIN POWER SW. OFF THEN ON	Sorter Error • If an error signal is received from the sorter.	Power OFF -> ON
T19 CALL SERVICE	Thermal Pressure Motor Lock • If the TPH Pressure switch has not been depressed within 4 seconds after the TPH Pressure motor was activated to lower the TPH. • If the TPH Pressure switch has not been released within 4 seconds after the TPH Pressure motor was activated to raise the TPH.	Press <ALL RESET> key.
T20 CALL SERVICE	Wing Motor Lock • If neither of the Jump wing sw1 or sw2 has been depressed within 5 seconds after the Wing motor was activated. • If neither of the Jump wing sw1 or sw2 has been released within 5 seconds after the Wing motor was activated.	Press <ALL RESET> key.
T30 CALL SERVICE	P. -F. Tray Slide Pulse Motor • When the Paper feed tray position sensor is not turned on/off within 165 pulses(approx. 3 second) after the P. -F. tray slide pulse motor is turned on.	Press <ALL RESET> key.
T50 CALL SERVICE	Connect "Copy/Master" Counter • When the copy counter or the master counter has not been connected.	Electromagnetic counter setting signal L (Connect an electromagnetic counter.)
T68 CALL SERVICE	SF3000 Power Supply Malfunction • When no power is supplied to the SF3000.	SF3000 OK signal H(SF3000 power-on)
T78 CALL SERVICE	Machine Model Selection Error • When there is no machine type which corresponds to the code having been set in System PCB.	Set the switch and turn OFF and ON the power
T79 CALL SERVICE	Destination Spec. Code Error • When the code set (DIP switch) does not match the model set with the Hex. switch.	Set the switch and turn off and on the power

2. Trouble Messages (Others)

Display	Details	How to Cancel
MAINTENANCE <MASTER> CALL SERVICE	<ul style="list-style-type: none"> When the number of masters has reached the set value in the Maintenance mode at power-on. 	Clear the master count value and press the ALL RESET key.
MAINTENANCE <PRINT> CALL SERVICE	<ul style="list-style-type: none"> When the number of printed sheets has reached the set value in the Maintenance mode at power-on. 	Clear the printed sheets count value and press the ALL RESET key.
CHECK PAPER FEED AREA	<ul style="list-style-type: none"> If the safety switch over or under the Paper feed tray is activated. When the P. -F. tray slide safety switches are pressed (Normally released) 	Press Safety SW. (Remove obstacles.) Release the safety switches.
PAPER MISFEED CHECK PAPER FEED AREA AND PRESS ALL RESET KEY	<p>Paper Jam in the First Paper Feed Area</p> <ul style="list-style-type: none"> If the Paper sensor has not detected paper while the Position A sensor detects the A position three times. 	Press <ALL RESET> key.
PAPER JAM CHECK PAPER FEED AREA	<p>Paper Jam in the Second Paper Feed Area</p> <ul style="list-style-type: none"> If at the Drum A position, the Paper receiving sensor 1 does not detect paper and at the next Drum A position, the Paper sensor detects the paper. 	Make either Paper Sensor OFF or Press <ALL RESET> key.
PAPER JAM ON DRUM (PRINT CYLINDER) REMOVE PAPER	<p>Paper Jam under the Drum</p> <ul style="list-style-type: none"> If the Paper receive sensor 1 does not detect paper at the Drum A position and the Paper sensor does not detect the paper at the next Drum A position. 	Drum set SW OFF → ON or press <ALL RESET> key.
PAPER JAM UNDER DRUM PULL OUT DRUM (PAPER JAM REMOVE PAPER UNDER PRINT CYLINDER)	<p>Paper Jam around Paper Receiving Sensor 1&2</p> <ul style="list-style-type: none"> If the Paper receiving sensor 1 detects paper when the Drum rotates at a certain Drum angle or the Pressure detection sensor detects the Pressure disc. When the light path of the Paper receiving sensor 2 is continuously shut off while the drum rotates once. 	Turn OFF Paper receiving Sensors 1&2 or Press <ALL RESET> key.
NO MASTER ON DRUM PRESS ALL RESET KEY AND MAKE A NEW MASTER	<p>No Master on Drum</p> <ul style="list-style-type: none"> If the Master loading sensor does not detect master on the drum at the Drum C-1 position when the printing starts. 	Press <ALL RESET> key.
ORIGINAL MISFEED OPEN ADF COVER AND RESET ORIGINAL	<p>Original Misfeed</p> <ul style="list-style-type: none"> If the actuator of the Registration sensor is not opened within 1.35 seconds after the Original pickup motor was turned on. 	ADF SW OFF → ON
ORIGINAL JAM RESET ORIGINAL / 1	<ul style="list-style-type: none"> If the Original IN sensor has not detected an original within 630 pulses after the Read pulse motor was turned on. In ADF original setting, <u>when the ADF original IN sensor has been blocked from the beginning.</u> 	ADF SW OFF → ON

CHAPTER 21. ADVICE DISPLAYS

Display	Details	How to Cancel
ORIGINAL JAM RESET ORIGINAL /3	Original Jam at the Exit Displayed after the master has been loaded onto the Drum: • If the Original OUT sensor has not detected an original within 1,890 pulses after the Read pulse motor was turned on.	ADF SW OFF → ON
ORIGINAL JAM REMOVE ORIGINAL. /2	Oversize Displayed after the master has been loaded onto the Drum: • If the light path of the Original IN sensor is blocked for 14,803 pulses after the Read pulse motor is turned on.	ADF SW OFF → ON
MASTER MIS-FEED REMOVE MASTER ROLL THEN RE- INSTALL	Master Mis-Feed Displayed after the master has been loaded onto the Drum in the master making or confidential process: • If the Master positioning sensor has not detected master material within 787 pulses (536 pulses in confidential process) after the Loading pulse motor started following the master cutting operation. Displayed to interrupt the machine operation when the Master loading button was pressed: • If the Master positioning sensor has not detected master material within 1260 pulses after the Loading pulse motor was turned on.	Master loading unit SW OFF → ON
CLAMP ERROR REMOVE MASTER ROLL THEN RE- INSTALL ↓ TO RETURN OPERA- TION PRESS <u>START KEY</u>	Master Loading Error (onto the Drum) • If the Master load sensor does not detect master at the Drum C-1 position during loading of the master on the Drum.	Master loading unit SW OFF → ON Press <START> key. ↓
MASTER CUT ERROR REMOVE DRUM (PRINT CYLINDER) AND CHECK MASTER	Master Cut Malfunction • When the drum is at the C-2 position and the Master positioning sensor is not sensing the light(without the master) at master cut retry(the master was cut in the 2nd time)	Drawer connector OFF (Pull out drum.)
REMOVE CUT MASTER STRIP	A Cut Piece of Master Remains inside the Machine Displayed: • If the Master positioning sensor detects master material (the reflected light) just after the master cut operation is completed.	Master positioning sensor OFF
DISPOSAL ERROR REMOVE DRUM (PRINT CYLINDER) AND DISCARD MASTER ↓ TO RETURN OPERA- TION PRESS <u>START KEY</u>	Master Removal Error Displayed after the Image scanning and Master making operations are completed or in the confidential operation: • If the Master removal sensor does not detect a removed master while the Drum rotates from C-1 to A position, during master removal operation. • If the light path of the Master removal sensor is still blocked by a removed master when the Vertical transport motor stops. * The above checking operation is performed when a master exists on the drum.	Drum set SW OFF → ON ↓ Press <START> key.

CHAPTER 21. ADVICE DISPLAYS

Display	Details	How to Cancel
REMOVE JAMMED MASTER IN DISPOSAL UNIT	Removed Master Jammed at the entrance of Master disposal box <ul style="list-style-type: none"> • If the light path of the Master removal sensor is blocked at the start of master-making operation. • If the light path of the Master removal hook sensor is not blocked at the start of master-making operation. 	Master removal sensor OFF, Master removal hook sensor ON
EMPTY DISPOSAL BOX	Empty Disposal Box Displayed after the machine operation is finished: <ul style="list-style-type: none"> • If the disposed master is detected 50 times (30 for A3 models) by the Master removal sensor after the Disposal box was emptied. 	Disposal box set SW OFF → ON, Disposal box master sensor OFF
CLOSE SHEET FEEDER COVER AND PRESS ALL RESET KEY	“SF3000” Bulk Sheet Feeder Error <ul style="list-style-type: none"> • When the Bulk sheet feed cover setting SW is not pressed 	Turn ON the Bulk sheet feed cover setting SW and, then, press <ALL RESET> key.
CHECK SORTER'S PANEL DISPLAY	CHECK SORTER PANEL <ul style="list-style-type: none"> • When the sorter has a error. 	Reset the error of the sorter.
PAPER JAM IN SORTER CHECK SORTER	Sorter Error - Paper jammed in Sorter <ul style="list-style-type: none"> • If paper has jammed in the sorter. 	Remove the jamming paper in the sorter.
CLOSE SORTER'S COVER	Sorter Error - Sorter door (or cover) is open <ul style="list-style-type: none"> • If the door (or cover) of the sorter is open. 	Cover SW ON Connection SW ON Door SW ON
PAPER REMAINING IN SORTER REMOVE PAPER	Sorter Error - Paper remains in Sorter <ul style="list-style-type: none"> • When the paper is remaining in the sorter bin when the sorter mode is turned on at the TM5000 • When the sorter mode is selected, which is different from the mode selected when the paper in the sorter bin is stored at the TM5000 • When the auto staple is set at the TM5000 when the sorter bin has the paper.(Not detected by the TM2500) 	Remove paper and, then, turn ON Cover SW (door SW).
SORTER BIN FULL REMOVE PAPER	Sorter Error - Sorter bins are full Displayed to interrupt the machine operation: <ul style="list-style-type: none"> • If the sort bins are full of sorted sheets. 	Remove paper and, then, turn ON Cover SW (door SW).
STAPLER ERROR CHECK STAPLER SORTER	STAPLER ERROR. CHECK STAPLER <ul style="list-style-type: none"> • When there is a no-needle error at the time of setting the Auto stapler at the TM5000 	Replenish the needles to the Stapler.
THIS SIZE OF PAPER IS NOT ACCEPTABLE FOR SORTER	PAPER SIZE UNAVAILABLE FOR SORTER Displayed to prevent the machine operation: <ul style="list-style-type: none"> • When the paper is set on the Paper feed tray, whose size is different from the paper stored in the TM5000. • When the paper is set at the sorter panel, whose size is different from the paper stored in the TM5000. 	Change the paper on the Paper feed tray. Alter the set paper size at the TM5000 panel.

3. Setting Confirmation Messages

Display	Details	How to Cancel
CLOSE FRONT COVER	Close Front Cover • If the metal plate is not attached to the Front cover set sensor.	Front cover set sensor ON
ADD PAPER	Add Paper • If the light path of the Paper detection sensor is open.	Paper detection sensor ON
SET DRUM IN PLACE (INSTALL PRINT CYLINDER)	Set Drum in Place • If the actuator of the Drum set switch is not depressed.	Drum set SW ON
WRONG-SIZE DRUM (PRINT CYLINDER) INSTALLED	Drum Size Error • If a wrong size drum is set in the machine.	Remove the drum.
WRONG-TYPE DRUM (PRINT CYLINDER) INSTALLED	Drum Brand Error • If a wrong brand drum is set in the machine.	Remove the drum.
INSTALL INK CARTRIDGE	Set Ink Cartridge in Place • If the actuator of the Ink bottle switch is not depressed.	Ink bottle SW ON
WRONG-TYPE INK CARTRIDGE INSTALLED	Ink Cartridge Brand Error • If a wrong type of ink cartridge is set in the machine.	Remove the ink bottle.
SET (INSTALL) MASTER DISPOSAL BOX IN PLACE	Set Master Disposal Box in Place • If the actuator of the Disposal box set switch is not depressed.	Disposal box set SW ON
CLOSE SCANNER TABLE	Close Scanner Table • If the safety switch is not pressed by the Scanner table.	Scanner table set SW ON Interlock SW ON
CLOSE ADF COVER	Close ADF Unit • If the actuator of the ADF unit set switch is not depressed.	ADF unit set SW ON
CLOSE MASTER LOADING UNIT	Close Master Loading Unit • If the actuator of the Master loading unit switch is not depressed.	Master loading unit SW
SET LEAD EDGE OF MASTER UNDER GREEN FILM	Set Leading Edge of Master Under Green Films • If the Master detection sensor does not detect master material (the reflected light).	Master detection sensor ON
INSERT CARD IN KEY/CARD COUNTER	Insert Card into Key/Card Counter • If an operator card is not set in the Key/Card counter.	Set a card.

4. Change-of-Consumables Messages

Display	Details	How to Cancel
REPLACE INK CARTRIDGE	<p>Replace Ink Cartridge</p> <ul style="list-style-type: none"> • If the Ink sensor does not detect ink in the Squeegee unit within 30 seconds after the Inking motor was started. 	Ink bottle set SW OFF → ON
REPLACE MASTER ROLL	<p>Replace Master Roll</p> <ul style="list-style-type: none"> • If the black tape attached at the end of the Master roll has been detected by the Master end sensor during master making or confidential operation. 	Master detection sensor OFF → ON (Master roll need to be replaced.)

MEMO

CHAPTER 22: TEST MODE

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TEST MODE

1. Operation Procedures

(1) Starting Up Test mode

Turn on the power, pressing down both <M/P> and <LINE/PHOTO> buttons on the main panel.

```
TEST MODE
Ver 1.23 SYSTEM
4.56 PANEL
```

```
0
```

← Ver.No. of the system ROM
 ← Ver.No. of the panel ROM

(2) HOW TO OPERATE

<1> Input a test mode No. by using panel-keys.

```
TEST MODE
Ver 1.23 SYSTEM
4.56 PANEL
```

```
64
```

(For example, when No.64 separation fan has been selected.)

<2> Press <START> key to start operation.

```
TEST MODE
- TESTING -
```

```
64
```

<3> Press <START> key one more time to stop operation.

```
TEST MODE
Ver 1.23 SYSTEM
4.56 PANEL
```

```
64
```

<4> To select another Test mode, clear the set Test No. by pressing the <C> or <STOP> button and select another Test No.

```
TEST MODE
Ver 1.23 SYSTEM
4.56 PANEL
```

```
0
```

(3) Exiting from the Test mode

To exit from a Test mode, clear the set Test No. by pressing the <C> or <STOP> button and then press the <ALL RESET> button.

(4) HOW TO OPERATE TEST MODE NO'S 211 TO 261 (MEMORY SW'S)

<1> Starting Test mode, input a Test mode No. and press <START> key.

```
TEST MODE
Ver 1.23 SYSTEM
4.56 PANEL
```

```
211
```

(For example, when Image Elongation/Shrinkage correction has been selected)

<2> To change the Memory switch setting, press the ◀ or ▶ key of the PRINT POSITION BUTTON to more the number up or down.

```
TEST MODE
MEMORY SW NO. → 0
TO SELECT, PRESS <> KEY
```

```
211
```

<3> To set the machine at the selected switch setting, press the <START> button and then <C> or <STOP> button and then <ALL RESET> button to exit from the Memory Switch adjustment.

(5) Adjusting the Paper Width Potentiometer (Test No. 222)

Input a test mode No. by using panel-keys. If executed (press the START key), the Potentiometer Adjustment screen will be displayed on the LCD.

```
TEST MODE
PAPER WIDTH DATA → 210 mm
MEMORY SW SETTING → A
TO SELECT, PRESS <>
```

```
222
```

Put the A4 paper on the paper feed tray vertically and adjust the Memory switch so that the DETECTION DATA value will be 210 mm.

To alter the MEMORY SW value, press the ◀ or ▶ key. To settle the MEMORY SW value, press the START key.

(6) Displaying the A/D Data (Test No. 114, 115, 116)

Input a test mode No. by using panel-keys. If executed (press the START key), the A/D Data Display screen will be displayed on the LCD.

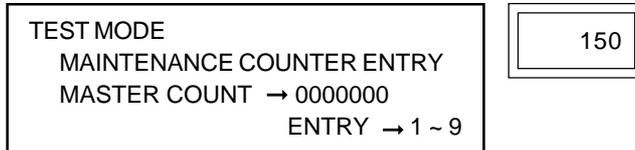
```
TEST MODE
BATTERY VOLTAGE → #. ## V
A/D DATA → ##
```

```
114
```

The A/D data is displayed in the HEX code. (00h to FFh)

(7) Setting the Target Maintenance Master/Print Count Value (Test No. 150, 151)

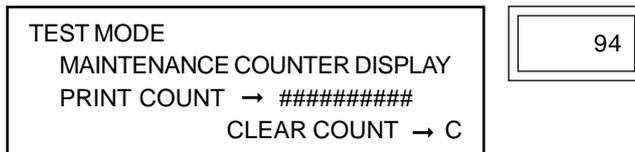
Input a test mode No. by using panel-keys. If executed (press the START key), the Target Count Setting screen will be displayed on the LCD.



- Use the panel-keys to set the master/print count. The lower two digits (master count) and lower three digits (print count) are fixed. Therefore, the maximum master count and print count are 999,900 and 9,999,000, respectively.
- The count can be cleared by pressing the <C> key.
- Pressing the <START> key or <STOP> key settles the displayed count and exits the Setting screen.

(8) Checking/Clearing the Maintenance Master/Print Count Value (Test No. 93, 94)

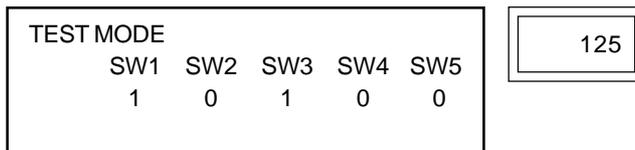
Input a test mode No. by using panel-keys. If executed (press the START key), the then-current count value will be displayed on the LCD.



- The count can be cleared by pressing the <C> key.
- If you press <C> key to clear the count and press the <START> key, you will exit the Setting screen, clearing the counter value.

(9) Displaying the Bottle Set Switch (Test No. 125)

Input a test mode No. by using panel-keys. If executed (press the START key), the status of the five Bottle Set switches will be displayed on the LCD.



- The status displayed for each Bottle Set switch is 0: OFF and 1: ON.
- The display is updated every time the status of the Bottle Set switch is altered.

2. Testing Sensor and Switch

The current states of sensors and switches are indicated with buzzer sound:

Detection : 0.1 second interval beep

No detection : 0.5 second interval beep

No.	Test Component	Detection Status	Remarks
1	Unused		
2	Paper size sensor	Reflected light is detected (for paper provided.)	
3	Elevator lower limit sensor	Light path is blocked (at lower limit)	
4	Paper feed pressure switch	The switch is released (for standard level.)	
5	Master loading button	This button is pressed.	
6	Paper sensor	Light path is blocked (for paper provided.)	
7	Pressure detection sensor	Light path is blocked (for disc provided.)	
8	Position A sensor	Light path is blocked.	
9	0° angular sensor	Magnetism is detected	
10	180° angular sensor	Magnetism is detected	
11	Position C sensor	Light path is blocked.	
12	Feed-tray down button	This button is pressed.	
13	Clamp safety switch	This switch is pressed (for standby position.)	
14	Master removal hook sensor	Light path is blocked.	
15	Master positioning sensor	Reflected light is detected.	
16	Drum home position button	This button is pressed.	
17	unused		
18	Drum set switch	This switch is pressed (for setting.)	
19	Paper receiving sensor 1	Light path is blocked (for paper provided.)	
20	Paper receiving sensor 2	Light path is blocked (for paper provided.)	
21	Scanner table set switch	This switch is pressed (for closure.)	
22	Vertical centering sensor	Light path is blocked.	
23	Master end sensor	Light path is blocked (for end tape provided.)	
24	Paper feed clutch sensor	Light path is blocked.	
25	Paper feed det sensor	Light path is blocked (for paper provided.)	
26	Jump wing switch 1	This switch is pressed.	
27	Jump wing switch 2	This switch is pressed.	
28	Master removal sensor	Light path is blocked (for master provided.)	
29	Master loading unit switch	This switch is pressed (for closure.)	
30	Front cover set sensor	Metal plate is detected (for closure.)	
31	TPH home position switch	This switch is pressed.	
32	TPH pressure switch	This switch is pressed.	
33	Disposal box set switch	This switch is pressed (for setting.)	
34	ADF original detection sensor	This sensor is operated (for original provided.)	Applicable only to ADF unit mounting type.
35	Original registration sensor	This sensor is operated (for original provided.)	Applicable only to ADF unit mounting type.
36	Original IN sensor	Light path is blocked (for original provided.)	Applicable only to ADF unit mounting type.
37	Ink sensor	Ink is detected.	
38	Overflow sensor	Ink is detected.	
39	Main motor interlock switch	This switch is pressed	
40	Paper feed safety switch	This switch is detached (for any abnormality occurrence.)	

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No.	Test Component	Detection Status	Remarks
41	Paper feed cassette sensor 1	Magnetism is detected.	Only to ADF unit mounting type. Only to ADF unit mounting type.
42	Paper feed cassette sensor 2	Magnetism is detected.	
43	Paper feed cassette sensor 3	Magnetism is detected.	
44	Paper feed cassette sensor 4	Magnetism is detected.	
45	Original OUT sensor	This sensor is operated (for original provided.)	
46	ADF switch	This switch is pressed.	
47	Master detection sensor	Reflected light detected (for master provided.)	
48	Master loading sensor	Reflected light detected (for master provided.)	
49	Scanner home position sensor	Light path is blocked.	
50	Scanner ADF shading sensor	Light path is blocked.	
51	Stage cover sensor	Light path is blocked (for closure.)	
52	FB original detection sensor	Reflected light detected (for original provided.)	
53	Pressure control sensor	Light path is blocked (for metal plate provided.)	
54	Disposal box master sensor (Master removal detection sensor)	Light path is blocked (for master provided.)	
55	Paper detection sensor	Reflected light is detected (for paper provided)	
56	P. -F. Tray Position Sensor	Light path is blocked	
57	Unused	.	
58	Unused	.	
59	Option PCB detection signal	Option PCB is provided.	

3. Testing Motor and Solenoid

Every pushing of <START> key turns the following ON/OFF:

No.	Test Item	Remarks
60	15rpm drum rotation	Main motor safety SW has to be held pressed. No.62 serves as <Print Speed Adj.> key to vary speed. Paper feed clutch sensor is held ON and Stack paper feed SW OFF.
61	30 rpm drum rotation	
62	Variable speed drum rotation	
63	Drum internal lamp ON	
64	Separation fan	
65	Write pulse motor	
66	Loading pulse motor	
67	Paper feed clutch	
68	Pressure solenoid	
69	Suction fan	
70	Master removal fan	
71	Master removal vertical transport motor	Only to ADF unit mounting type. Only to ADF unit mounting type.
71	Master removal solenoid	
72	Loading fan	
73	Clamp solenoid	
74	Lock solenoid	
75	Unused	
76	Original pickup solenoid	
77	Thermal power control	
78	Original pickup motor	
79	Image scanner LED lighting	
80	Wing motor	

4. Memory Clear and Counter Stop, etc.

No.	Details of Test Mode
90	<p>Partial Memory Clear</p> <p>Certain portion of RAM contents in the System PCB, such as Jam and Trouble messages, will be initialized. (The same operation as when turning the power ON while pressing All Reset button.)</p>
92	<p>Prevention of the following operations: master and copy counting, Key/card counter</p> <ul style="list-style-type: none"> • In normal operation, the Master count and Copy count signals will not be output, allowing a service technician to print without increasing the digit of the Master and Copy counters. • The machine will be released from this condition when the power is turned off. <p>[CAUTION] Do not use this mode when TM5000 is in connection.</p>
93	<p>Maintenance master counter clear</p> <p>Displays/clears the maintenance master counter value. The <C> key clears the count value and the <START > key settles it.</p>
94	<p>Maintenance print counter clear</p> <p>Displays/clears the maintenance master print counter value. The <C> key clears the count value and the <START> key settles it.</p>
97	<p>All Memory Clear</p> <p>All RAM contents in the System PCBs, excluding Memory switch setting by Test modes, will be initialized. Master disposal count is not cleared.</p> <p>NOTE: This test mode must be done each time System ROM, System PCB, or Battery is changed.</p>
98	<p>Memory Switch Clear</p> <p>Memory switch settings by Test modes will be initialized.</p> <p>This test mode must be done each time System PCB is changed.</p> <p>[CAUTION] Do not use this test mode in normal operation. All the programmed Memory switch settings in the machine will be initialized.</p>

5. Sequential Operation Test

No.	Details of Test Mode
101	<p>Ink supply operation</p> <p>Until the ink sensor gets ON, the main motor and the ink motor are held ON.</p> <p>Ink sensor ON → confidential op. → press application ` 30 times → Stopped on A detection position.</p> <p>(For FB type, further, the image scanner shuttles between the Image Scanner home position sensor and the ADF shading sensor at a speed of 50%.)</p>
102	<p>Elevator operation</p> <p>Operation starts when the feed tray DOWN button is pressed.</p> <p>UP → Elevator upper limit sensor ON → stop</p> <p>Upper limit position → DOWN → elevator lower limit sensor ON → stop</p> <p>Operation stops when the feed tray DOWN button is released.</p>
103	<p>P.-F. Tray Slide pulse motor operation (A3 only)</p> <p>Continuous sliding operation is performed after detecting P. -F. Tray Position Sensor.</p>
104	<p>Clamp open/close continuous operation</p> <p>Rotate Drum to Home position → clamp plate opened → one second halt → clamp plate closed</p> <p>→ Rotate Drum to Home position → clamp plate opened</p>
107	<p>Ink-free printing operation</p> <p>Continuous printing is performed without inking.</p>
108	<p>Flat bed read pulse motor (image scanner) continuous operation (speed at 100%)</p> <p>Image Scanner home position sensor position (2 seconds halt) → rightward shift → ADF shading sensor position (2 sec. halt)</p> <p>→ rightward shift → ADF read-in position (2 sec. halt) → leftward shift → Image Scanner home position sensor position (2 sec. halt)</p> <p>→ rightward shift →</p>
109	<p>Machine aging operation</p> <p>Drum rotation at 3000 times → Stop at A detection</p>
111	<p>Thermal pressure motor operation</p> <p>When TPH home position SW is ON:</p> <p>DOWN → TPH pressure SW ON → stop</p> <p>When TPH pressure SW is ON:</p> <p>UP → TPH home position SW ON → stop</p>
112	<p>Cutter motor one-cut operation</p>
113	<p>FB type ADF original feed operation (Image scanner does not operate.)</p> <p>ADF original det. sensor ON → ADF original setting → ADF read-in operation</p> <p>→ ADF original det. sensor ON → ADF original setting ...</p>

6. Other Test mode

No.	Details of Test Mode
114	Battery remaining capacity The battery remaining capacity is displayed on the LCD panel in terms of voltage and A/D values. Display range: 0 to 9.99 V, A/D value: 0 to FF
115	Drum internal thermistor display The drum internal thermistor value is displayed on the LCD panel in terms of A/D value. Display range: 0 to 999C°, A/D value: 0 to FF
116	TPH thermistor display The TPH thermistor value is displayed on the LCD panel in terms of C° and A/D value. Display range: 0 to 999C°, A/D value: 0 to FF
117	Thermal print head check operation 1 Makes a master of Test Pattern 1 memorized inside the Image processing PCB.
118	Thermal print head check operation 2 Makes a master of Test Pattern 2 memorized inside the Image processing PCB.
119	Thermal print head check operation 3 (checkered) Makes a master of Test Pattern 3 memorized inside the Image processing PCB.
120	Thermal print head check operation 4 (checkered) Makes a master of Test Pattern 4 memorized inside the Image processing PCB.
125	Ink Bottle Set switch status display Displays the status of the Ink Bottle Set switches 1 through 5 at the same time. Displays 0: OFF or 1: ON for each switch. The display on the LCD is updated every time the switch status changes.
126	Ink Bottle Set SW1 Set to detect.
127	Ink Bottle Set SW2 Set to detect.
128	Ink Bottle Set SW3 Set to detect.
129	Ink Bottle Set SW4 Set to detect.
130	Ink Bottle Set SW5 Set to detect.
131	Suction clutch operation Main motor rotates at 15rpm. Every pushing of <*> key turns ON/OFF the suction clutch.
150	Target Maintenance master count set Sets the target master count for displaying a maintenance call for the master making system. ("0" turns off the function; in increments of 100) Starts counting from the time of setting the number of masters.
151	Target Maintenance print count set Sets the target print count for displaying a maintenance call for the printing system. ("0" turns off the function; in increments of 1,000) Starts counting from the time of setting the number of sheets.

7. Memory Switch

Various kinds of setting concerning master making, etc. are stored in Memory switches. Use <Print Position Adjust> key to change setting.

No.	DETAILS OF MEMORY SW								
211	Image Elongation/Shrinkage Correction (Flat bed read pulse motor)								
	Memory SW	9	A	B	C	D	E	F	O
	Expansion (mm)	-7	-6	-5	-4	-3	-2	-1	0
		1	2	3	4	5	6	7	8
	+1	+2	+3	+4	+5	+6	+7	+8	
	Decrease		Expansion					Increase	
212	Horizontal Scanning Position Adjustment (FB)								
	Memory SW	9	A	B	C	D	E	F	O
	Amount (mm)	-3.5	-3.0	-2.5	-2.0	-1.5	-1.0	-0.5	0
		1	2	3	4	5	6	7	8
	+0.5	+1.0	+1.5	+2.0	+2.5	+3.0	+3.5	+4.0	
	Shift to Left		Read Position					Shift to Right	
213	Scanning Start Position Adjustment (FB)								
	Memory SW	9	A	B	C	D	E	F	O
	Amount (mm)	-2.8	-2.4	-2.0	-1.6	-1.2	-0.8	-0.4	0
		1	2	3	4	5	6	7	8
	+0.4	+0.8	+1.2	+1.6	+2.0	+2.4	+2.8	+3.2	
	Decrease		Skip Amount					Increase	
214	Scanning Start Position Adjustment (Book Processing)								
	Distance Control between Scanner ADF Shading Sensor Position and Original Read Start Position								
	Memory SW	9	A	B	C	D	E	F	O
	Amount (mm)	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0
	1	2	3	4	5	6	7	8	
	+0.2	+0.4	+0.6	+0.8	+1.0	+1.2	+1.4	+1.6	
	Decrease		Skip Amount					Increase	
216	Image Elongation/Shrinkage Correction (ADF read pulse motor)								
	Memory SW	9	A	B	C	D	E	F	O
	Expansion (mm)	-7	-6	-5	-4	-3	-2	-1	0
		1	2	3	4	5	6	7	8
	+1	+2	+3	+4	+5	+6	+7	+8	
	Decrease		Expansion					Increase	

No.	DETAILS OF MEMORY SW								
217	Horizontal Scanning Position Adjustment (ADF)								
	Memory SW	9	A	B	C	D	E	F	O
	Amount (mm)	-3.5	-3.0	-2.5	-2.0	-1.5	-1.0	-0.5	0
		1	2	3	4	5	6	7	8
	+0.5	+1.0	+1.5	+2.0	+2.5	+3.0	+3.5	+4.0	
	Shift to Left		← Read Position →					Shift to Right	
218	Scanning Start Position Adjustment (ADF)								
	Memory SW	9	A	B	C	D	E	F	O
	Amount (mm)	-2.8	-2.4	-2.0	-1.6	-1.2	-0.8	-0.4	0
		1	2	3	4	5	6	7	8
	+0.4	+0.8	+1.2	+1.6	+2.0	+2.4	+2.8	+3.2	
	Decrease		← Skip Amount →					Increase	
221	Image Elongation/Shrinkage Correction (Write pulse motor)								
	The set value is represented by an elongation/shrinkage amount of the image in the length of the B4 size.								
	Memory SW	9	A	B	C	D	E	F	O
	Amount (mm)	-7.0	-6.0	-5.0	-4.0	-3.0	-2.0	-1.0	0
	1	2	3	4	5	6	7	8	
	+1.0	+2.0	+3.0	+4.0	+5.0	+6.0	+7.0	+8.0	
	Decrease		← Expansion →					Increase	
222	Paper Width Potentiometer Adjustment								
	Set the A4 paper on the paper feed tray and adjust the paper side guide.								
	Check the data display and set the Memory switch so that the data will be 210 mm.								
	Memory SW	9	A	B	C	D	E	F	O
Adjustment Value (mm)	-7	-6	-5	-4	-3	-2	-1	0	
	1	2	3	4	5	6	7	8	
	+1	+2	+3	+4	+5	+6	+7	+8	
	Decrease		← Adjustment Value →					Increase	
223	Separation Fan Air Flow Rate Control								
	Memory SW	0	1	2	3				
	Power-on Time %	100%	70%	50%	30%				
* You can set either one of the Memory switches 0 through 3.									

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No.	DETAILS OF MEMORY SW									
224	Master Removal Full Capacity Setting									
	Memory SW	0	1	2	3					
	Full Capacity (B4 Machine) (A4 Machine) (Legal Machine)	50	40	30	20					
	Full Capacity (A3 Machine) (Ledger Machine)	30	20	10	30					
	Full Capacity (A4 W Drum)	42	28	14	42	* You can set either one of the Memory switches 0 through 3.				
232	Paper Feed Clutch OFF Delay Time Setting: (STANDARD)									
	Memory SW	9	A	B	C	D	E	F	O	
	Adjustment Value (mm)	-7	-6	-5	-4	-3	-2	-1	0	
		1	2	3	4	5	6	7	8	
	+3	+6	+9	+12	+15	+18	+21	+24		
		← Paper Feed Timing →							Delay	
234	Paper Feed Clutch OFF Delay Time Setting: (CARD)									
	Memory SW	9	A	B	C	D	E	F	O	
	Adjustment Value (mm)	-7	-6	-5	-4	-3	-2	-1	0	
		1	2	3	4	5	6	7	8	
	+3	+6	+9	+12	+15	+18	+21	+24		
		← Paper Feed Timing →							Delay	
236	Paper Feed Clutch OFF Delay Time Setting: (THIN)									
	Memory SW	9	A	B	C	D	E	F	O	
	Adjustment Value (mm)	-7	-6	-5	-4	-3	-2	-1	0	
		1	2	3	4	5	6	7	8	
	+3	+6	+9	+12	+15	+18	+21	+24		
		← Paper Feed Timing →							Delay	
238	Paper Feed Clutch OFF Delay Time Setting: (CUSTOM)									
	Memory SW	9	A	B	C	D	E	F	O	
	Adjustment Value (mm)	-7	-6	-5	-4	-3	-2	-1	0	
		1	2	3	4	5	6	7	8	
	+3	+6	+9	+12	+15	+18	+21	+24		
		← Paper Feed Timing →							Delay	
240	Paper Feed Clutch OFF Delay Time Setting with Special Paper Feed Unit Used:									
	Memory SW	9	A	B	C	D	E	F	O	
	Adjustment Value (mm)	-7	-6	-5	-4	-3	-2	-1	0	
		1	2	3	4	5	6	7	8	
	+3	+6	+9	+12	+15	+18	+21	+24		
		← Paper Feed Timing →							Delay	

8. Memory Switch (Image Adjustment)

No.	DETAILS OF MEMORY SW				
251	Gamma Curve White Level (Photo, Doto photo OFF)				
	Memory SW	0	1	2	3
	Print Image	Light	Standard	Little Dark	Dark
* You can set either one of the Memory switches 0 through 3; the default is "1".					
252	Gamma Curve Black Level (Photo, Doto photo OFF)				
	Memory SW	0	1	2	3
	Print Image	Light	Standard	Little Dark	Dark
* You can set either one of the Memory switches 0 through 3; the default is "1".					
253	Gamma Curve White Level (Photo, Doto photo ON)				
	Memory SW	0	1	2	3
	Print Image	Light	Standard	Little Dark	Dark
* You can set either one of the Memory switches 0 through 3; the default is "1".					
254	Gamma Curve Black Level (Photo, Doto photo ON)				
	Memory SW	0	1	2	3
	Print Image	Light	Standard	Little Dark	Dark
* You can set either one of the Memory switches 0 through 3; the default is "1".					
255	Gamma Curve White Level (Duo, Doto photo OFF)				
	Memory SW	0	1	2	3
	Print Image	Light	Standard	Little Dark	Dark
* You can set either one of the Memory switches 0 through 3; the default is "1".					
256	Gamma Curve Black Level (Duo, Doto Photo OFF)				
	Memory SW	0	1	2	3
	Print Image	Light	Standard	Little Dark	Dark
* You can set either one of the Memory switches 0 through 3; the default is "1".					
257	Gamma Curve White Level (Duo, Doto Photo ON)				
	Memory SW	0	1	2	3
	Print Image	Light	Standard	Little Dark	Dark
* You can set either one of the Memory switches 0 through 3; the default is "1".					
258	Gamma Curve Black Level (Duo, Doto photo ON)				
	Memory SW	0	1	2	3
	Print Image	Light	Standard	Little Dark	Dark
* You can set either one of the Memory switches 0 through 3; the default is "1".					

CHAPTER 22. TEST MODE

No.	DETAILS OF MEMORY SW																
259	Slice Level Adjustment (Line-copy Mode)																
	Memory SW	8	9	A	B	C	D	E	F	0	1	2	3	4	5	6	7
	Slice Level	Low		←—————				Standard				—————▶				High	
		Dark		←—————				Density				—————▶				Light	
260	Slice Level Adjustment (Automatic Scanning Contrast Control)																
	Memory SW	8	9	A	B	C	D	E	F	0	1	2	3	4	5	6	7
	Slice Level	Low		←—————				Standard				—————▶				High	
		Dark		←—————				Density				—————▶				Light	
261	Fine Enhancement Setting																
	Memory SW	0			1			2			3						
	Fine Enhancement	Low			Standard			Little High			High						
* You can set either one of the Memory switches 0 through 3; the default is "1".																	



MEMO

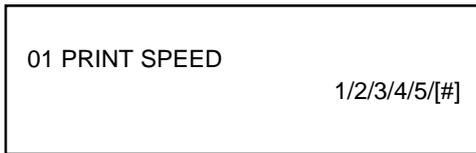
USER MODE

1. Operation Procedures

This mode allows the user to alter the initial settings of the machine.

[Starting Up Users Mode]

- 1) Press the [USER MODE] key on the sub-panel. The USER MODE setting screen will be displayed. When the [USER MODE] key is pressed, the "01 PRINT SPEED" setting screen is always displayed.



- 2) Using the [X] key or [+] key, change the item display to display the item you want to set. Now, pressing the [X] key decrements the item display(01 -> 19 -> 18 ->, ...) and pressing [+] key increments it(01 -> 02 -> 03 ->, ...).
- 3) In each setting screen, press the <START> key to select a choice. The selected item is displayed in reverse video. The reverse video is shifted from left to right by pressing the <START> key.
- 4) When setting multiple user modes at the same time, change the setting item, press the [X] key or [+] key to select the item you want to set, and make setting at the same time.
- 5) After altering all the user mode settings, press the <ALL RESET> key for one second. This will store all the items, exit the setting screen, and return to the normal screen display.

Note: The altered data remains valid until it is re-set again. If Test Mode No. 98 Memory Clear is executed, it will be initialized.

2. Initial Operation Settings

	Setting Item	Choice (-: Default)	Remarks
01	PRINT SPEED	1/ 2/ <u>3</u> / 4/ 5/ [#]	Sets the print speed at power-on or All reset.
02	Auto Print Feature	<u>OFF</u> / ON/ [#]	Sets the Auto print feature at power-on or All reset.
03	Scanning Contrast	<u>AUTO</u> / 3/ 4/ 5/ [#]	Sets the scanning density at power-on or All reset.
04	Paper Feed Mode	<u>STANDARD</u> / CARD/ THIN / CUSTOM switch).	Sets an adequate paper feed timing for the paper used(adjust with each Memory switch).
05	Auto Power-OFF Time	<u>NONE</u> / 5 MiN/ 10 MIN/ 30 MIN	Sets the time required to automatically turn off the power when the printer is not used.
06	Auto Idle Period	<u>12HRS</u> / 6HRS/ OFF	Sets the time required to turn on auto idling after last printing.
07	Auto Document Feed	<u>OFF</u> / ON	Makes the next master automatically if the ADF original tray has the original after printing. The print count complies with that for the 1st original.
08	Image Processing	<u>LINE</u> / DUO/ PHOTO/ [#]	Sets the Image processing mode at power-on or All reset.
09	Minimum Print Quantity	<u>0</u> / 10/ 20/ 30	Disables master-making unless the print counter's value is higher than the set value.
10	Displayed Print Quantity	<u>0000</u> / 0001	Sets the print count at power-on or All reset.
11	Auto Print-Q'ty Recovery	<u>ON</u> / OFF	Resets the print count when you stop continuous printing with the STOP key to change to the master-making mode.
13	Multi-up Stage Interval	<u>NONE</u> / 15 SEC.	Sets the waiting time required to start the next original after making the master for first original.
14	Auto Multi-Up Recovery	<u>ON</u> /OFF	Turns off the Multi-Up mode automatically after setting the Multi-Up mode to make the master.
15	Master-Making Area Limit	<u>VARIABLE</u> / A3/ B4/A4 size or to the fixed size.	Selects whether the master should be cut automatically according to the print paper size or to the fixed size.
16	Ejection Guide Arranging	<u>AUTO</u> / A3/ B5/ CARD	Selects whether the jump wing should be operated automatically according to the paper width or in a stationary manner.
18	Job Separator Connection	NO / YES	Selects this when the Job Separator is used.
19	Displayed Language	#1 #2 #3 #4 #5 #6 #7 #8 #9 (NOTE 2)	Sets the language displayed on the LCD. (The available language differs depending on the panel ROM)

Note 1: [#] means to start at the value set at power-off.

Note 2: The language assigned to each number differs depending on the type of the panel ROM.

CHAPTER 22. TEST MODE

AVAILABLE LANGUAGE BY DESTINATIONS

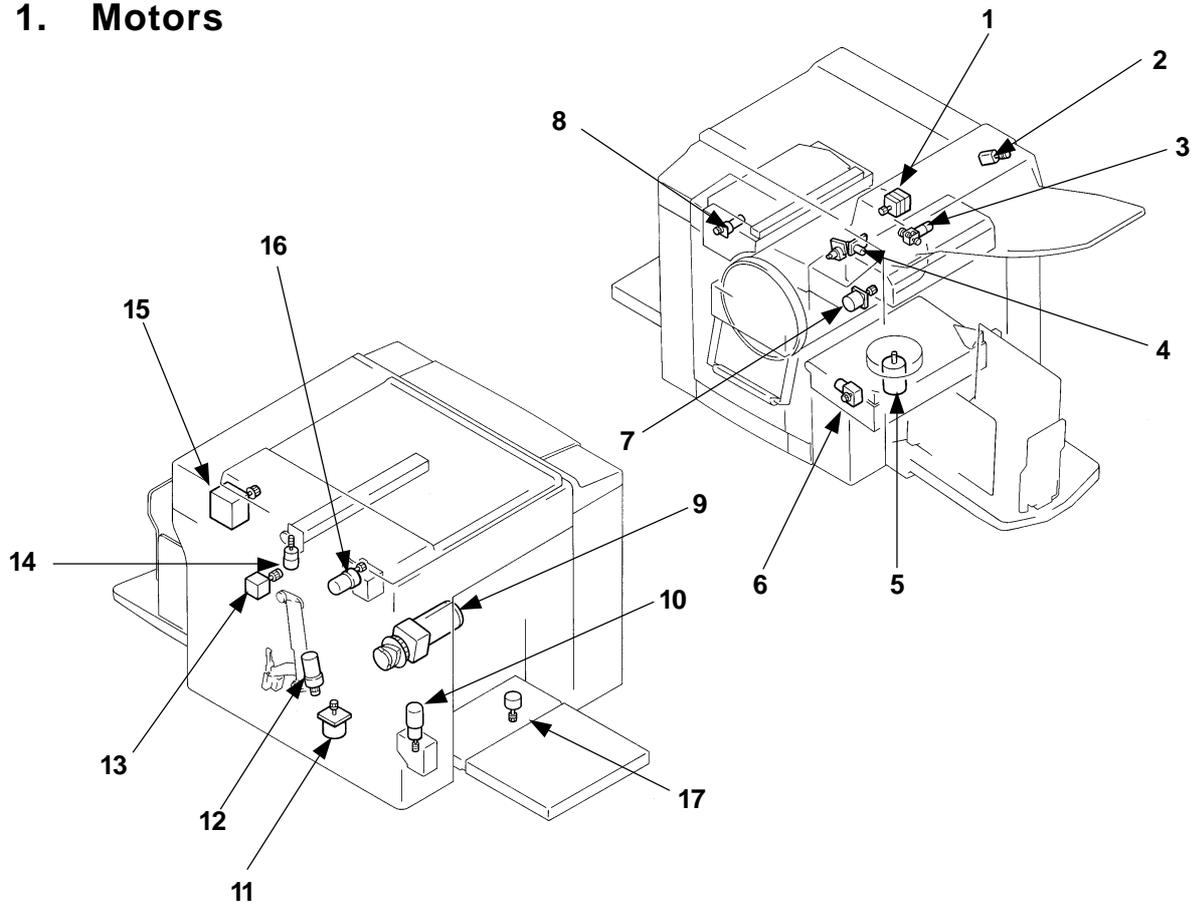
Destination	U.S.	Europe	Europe 2(Available for Service)	Asia
ROM	FRPU/ FRDU	FRPE/FRDE	FRPN/ FRDN	FRPA/ FRDA
#1	American English	British English	British English	British English
#2	French	American English	Swedish	Chinese (Standard)
#3	Korean	French	Norwegian	French
#4	German	German	German	Hindu
#5	Japanese	Japanese	Japanese	Japanese
#6	British English	Italian	Greek	Korean
#7	Spanish	Spanish	Danish	Taiwanese
#8	Portuguese	Portuguese	Finish	Indonesian
#9	Chinese (Standard)	Dutch	Polish	Thai

CHAPTER 23: ELECTRICAL COMPONENTS

Contents

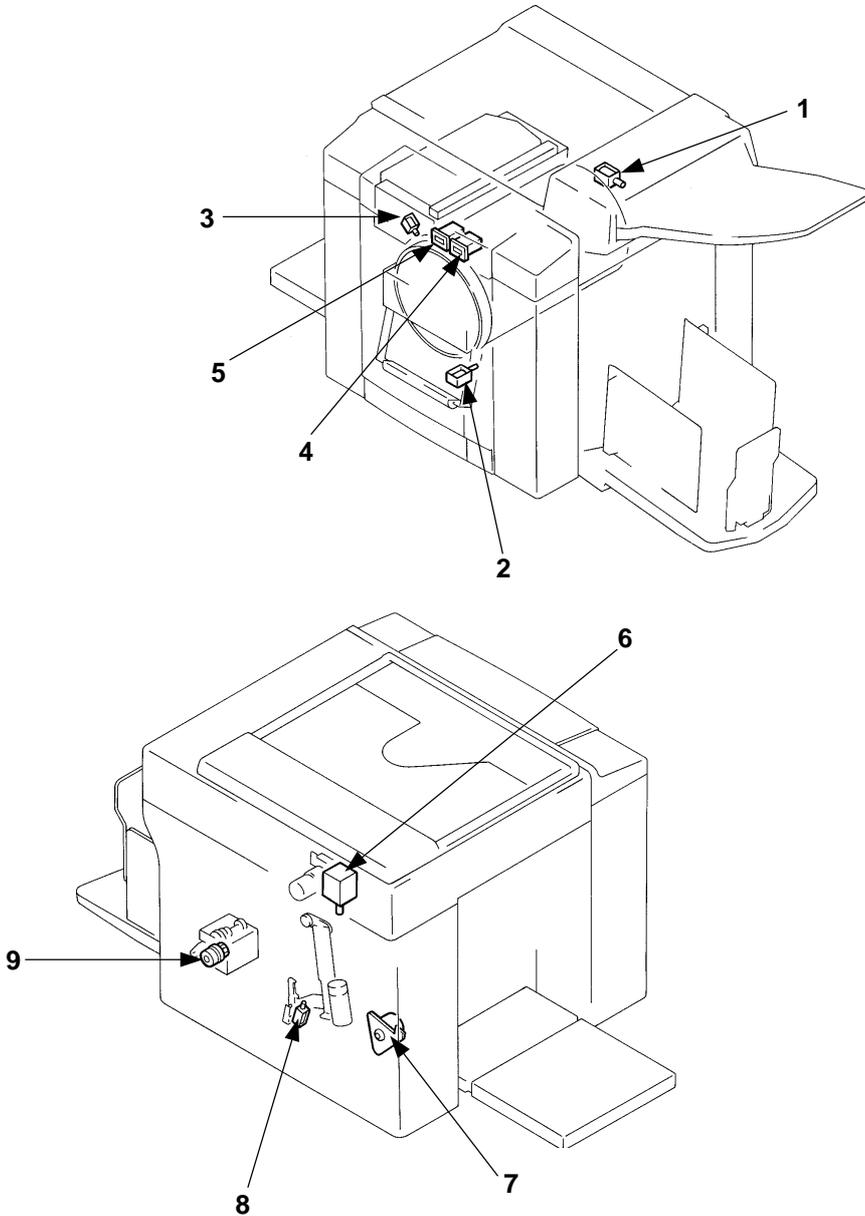
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3. Fan	23-3
4. Sensors	23-4
5. Switches	23-6
6. Other	23-8

1. Motors



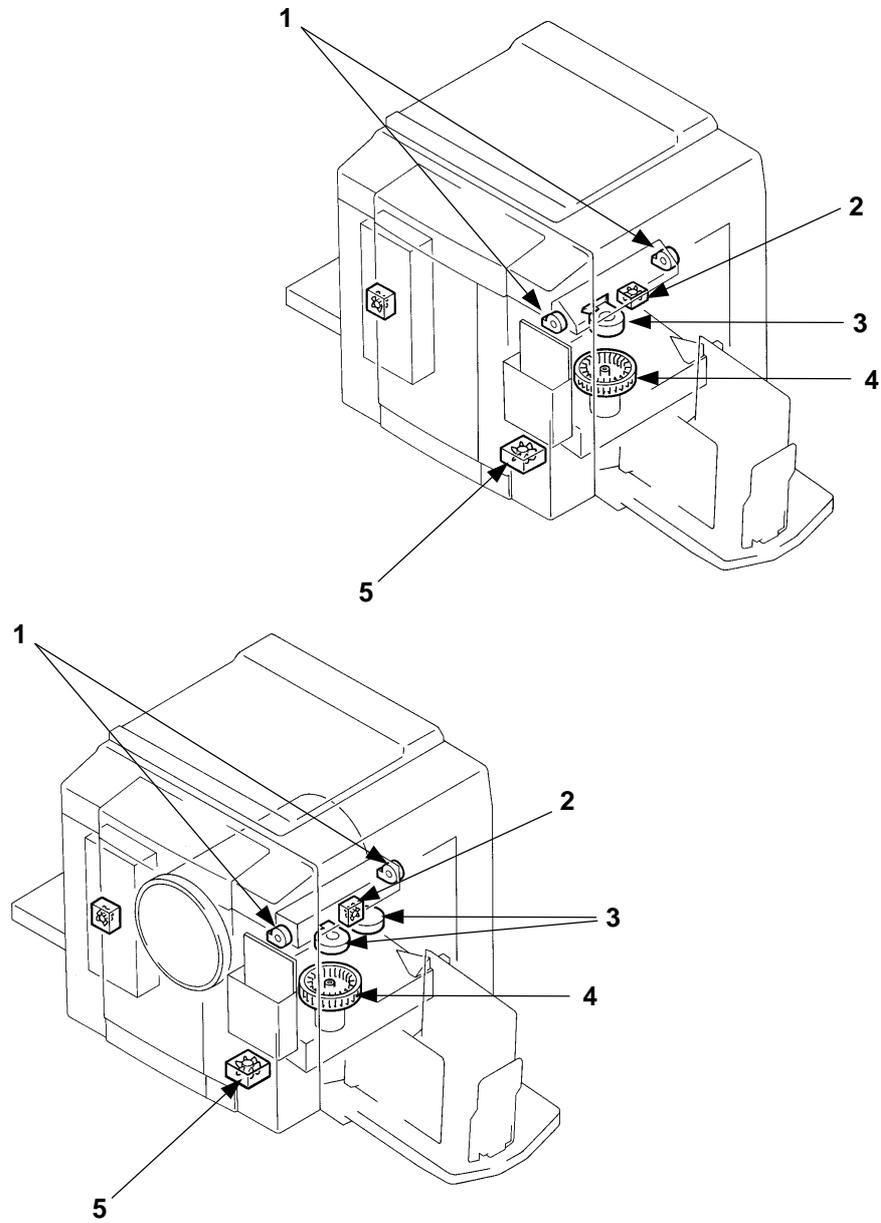
No.	Motors	Function	Test Mode No.
1	ADF read pulse motor	Runs the ADF transfer roller, white roller, and ADF exit roller. (Feeds the original)	113
2	Original pickup motor	Runs the ADF pickup roller and ADF stripper roller. (Feeds the original)	78, 113
3	Thermal pressure motor	Elevates the Thermal print head.	111
4	Inking motor	Activates the ink pump.(Supplies the ink)	101
5	Suction fan motor	Runs the suction fan.	69
6	Wing motor.	Elevates the jump wing, etc.	80
7	Write pulse motor	Runs the Write roller.(Feeds the master)	65
8	Master removal vertical transport motor	Runs the master removal vertical transport roller.	71
9	Main motor	Runs the drive unit.	60, 61 62
10	Elevator motor	Elevates the paper feed tray.	102
11	Print positioning motor	Elevates the slide plate.(Adjusts the vertical print position)	
12	Pressure control motor	Controls the pressure of Pressure roller.	
13	Loading pulse motor	Runs the load roller.(Feeds the master)	66
14	Cutter motor	Runs the cutter.(Cuts the master)	112
15	Flat bed read pulse motor	Moves the image scanner.	108
16	Clamp motor	Opens/closes the clamp plate.	104
17	Paper feed tray slide motor (A3 machine)	Moves the paper feed tray to left/right.	103

2. Solenoids & Clutches



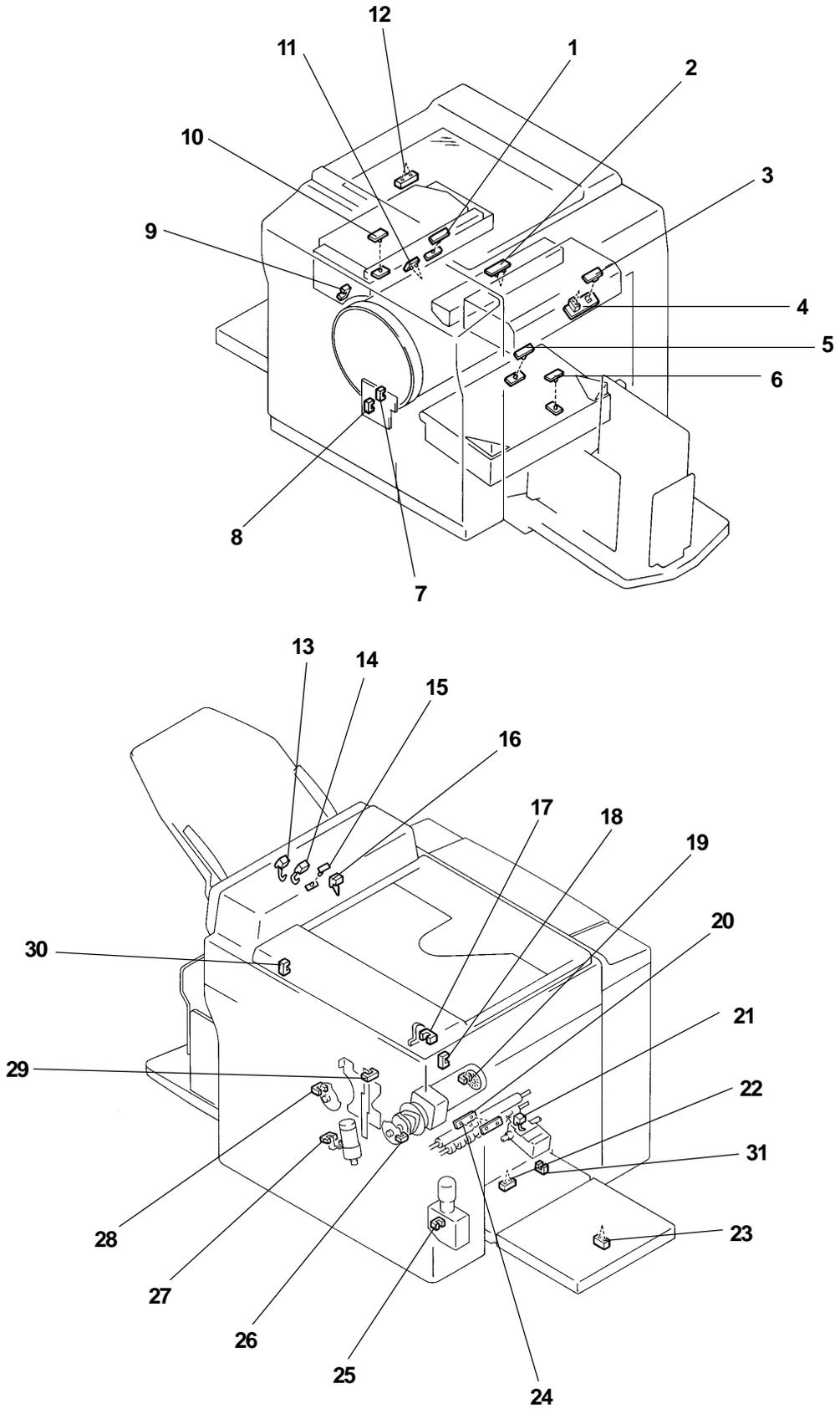
No.	Part Name	Function	Test Mode No.
1	Original pickup solenoid	Elevates the ADF pickup arm.	76
2	Lock solenoid	Locks/unlocks the drum rail.	74
3	Master removal solenoid	Puts in/out the master removal hook.	71
4	Master counter	Counts the masters.	
5	Copy counter	Counts the printed sheets.	
6	Clamp solenoid	Elevates the clamp unit.	73
7	Paper feed clutch	Runs the scraper and pickup roller.(Feeds the paper)	67
8	Pressure solenoid	Activates the hook.(Moves up the pressure roller).	68
9	Suction clutch	Changes the transfer belt's speed.	131

3. Fan



No.	Fan	Function	Test Mode No.
1	Master removal fan	Controls the end of the master.	70
2	Loading fan	Prevents creases when loading the master.	72
3	Separation fan	Separates the paper from the drum.	64
4	Suction fan	Adsorbes the paper to the transfer belt.	69
5	Power supply cooling fan	Cools the power supply unit.	

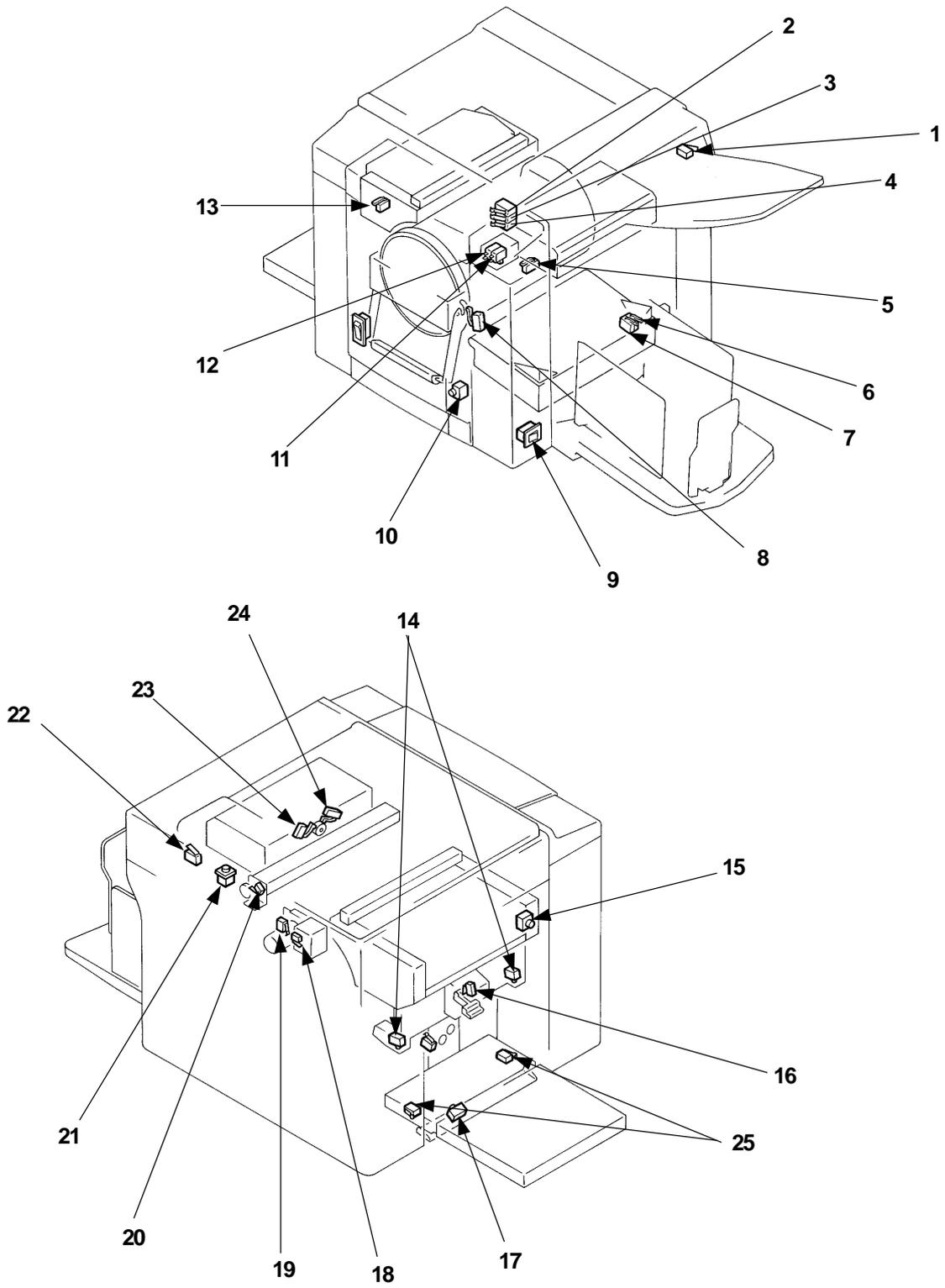
4. Sensors



CHAPTER 23. ELECTRICAL COMPONENTS

No.	Sensor	Type	Function	Test Mode No.
1	Master removal sensor	Transparent	Checks master removal jam.	28
2	Master positioning sensor	Reflection	Checks positioning of the master.	15
3	Master end sensor	Transparent	Checks the end of the master roller.	23
4	Master detection sensor	Reflection	Checks setting of the master roller.	47
5	Paper receiving sensor 1	Transparent	Checks paper jam.	19
6	Paper receiving sensor 2	Transparent	Checks paper jam.	20
7	Position C sensor	Interrupt	Checks the drum rotating position.	11
8	Position A sensor	Interrupt	Checks the drum rotating position.	8
9	Master removal hook sensor	Interrupt	Checks the master removal hook position.	14
10	Disposal box master sensor (Master removal sensor)	Transparent	Checks inside the master disposal box.	54
11	Master loading sensor	Reflection	Checks the master presence on the drum.	48
12	FB original detection sensor	Reflection	Checks the original on the stage glass.	52
13	ADF original detection sensor	Actuator	Checks setting of the ADF original.	34
14	Original registration sensor	Actuator	Checks feed of the original.	35
15	Original IN sensor	Transparent	Checks feed of the original.	36
16	Original OUT sensor	Actuator	Checks feed of the original.	45
17	Stage cover sensor	Interrupt	Check closing of the stage cover.	51
18	Scanner home position sensor	Interrupt	Check the position of the image scanner.	49
19	Main motor encoder sensor	Interrupt	Checks the main motor's rpm.	
20	Paper feed det sensor (Slack sensor)	Transparent	Checks first paper feed.	25
21	Elevator upper-limit sensor	Actuator	Checks the upper-limit position of the paper feed tray.	
22	Paper detection sensor	Reflection	Checks the paper on the paper feed tray.	55
23	Paper size sensor	Reflection	Checks the length of the print paper.	2
24	Paper sensor	Transparent	Checks second paper feed.	6
25	Elevator lower-limit sensor	Interrupt	Checks the lower-limit position of the paper feed tray.	3
26	Paper feed clutch sensor	Interrupt	Checks the paper feed clutch ON timing.	24
27	Pressure control sensor	Interrupt	Checks the pressure initial position.	53
28	Pressure detection sensor	Interrupt	Checks the drum rotating position.	7
29	Vertical centering sensor	Interrupt	Checks the vertical center position.	22
30	ADF shading sensor	Interrupt	Checks the image scanner position.	50
31	Paper feed tray position sensor (A3 machine)	Interrupt	Checks the center position of the paper feed tray.	56

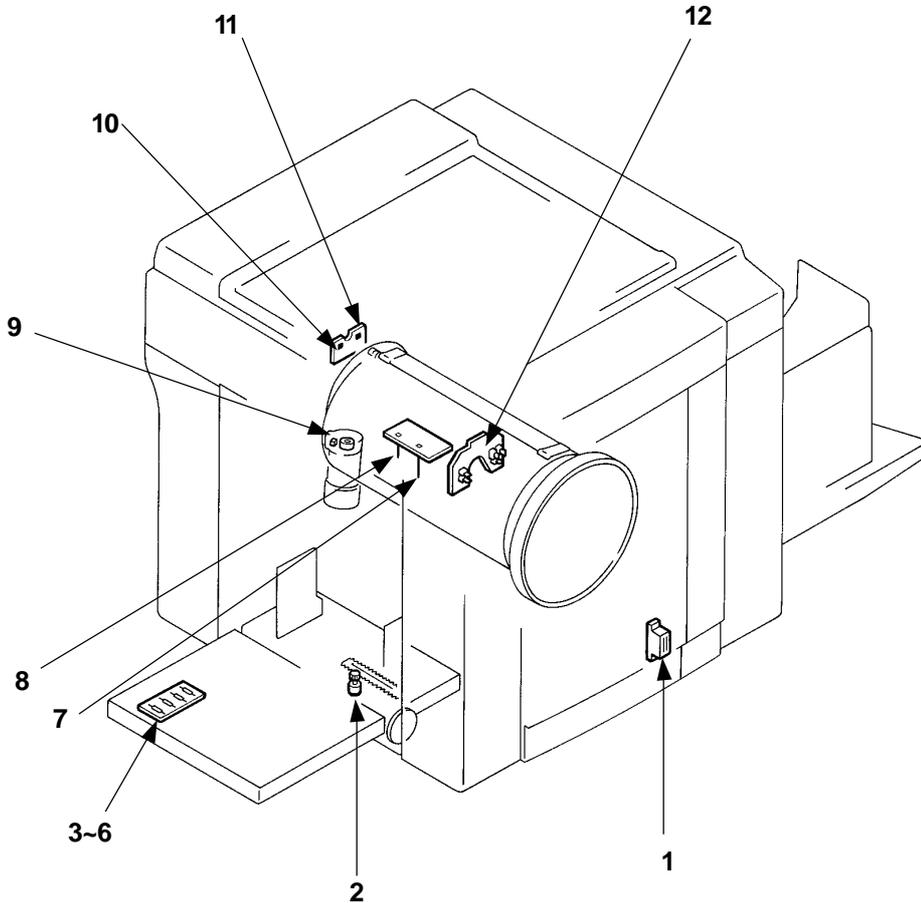
5. Switches



CHAPTER 23. ELECTRICAL COMPONENTS

No.	Switch	Function	Test Mode No.
1	ADF switch	Checks setting of the ADF cover.	46
2	Ink bottle set switch 3 (Color drum)	Checks setting of the ink bottle.	125
3	Ink bottle set switch 2 (Color drum)	Checks setting of the ink bottle.	125
4	Ink bottle set switch 1 (Color drum)	Checks setting of the ink bottle.	125
5	Master loading unit switch	Checks setting of the Master loading unit.	29
6	Jump wing switch 1	Checks the position of the jump wing, etc.	26
7	Jump wing switch 2	Checks the position of the jump wing, etc.	27
8	Drum set switch	Checks setting of the drum.	18
9	Power switch	Turns on/off the main power.	
10	Drum home position button	Sets the drum to the position A.	16
11	Main motor interlock switch	Forcibly turns off the main motor.	39
12	Thermal power interlock switch	Forcibly turns off the thermal power.	
13	Disposal box set switch	Check setting of the master disposal box.	33
14	Paper feed safety switch (Upper)	Checks safety of the paper feed tray. (Forcibly turns off the elevator motor)	40
15	Feed tray down button	Manually moves down the paper feed tray.	12
16	Paper feed pressure switch	Checks the position of the paper feed pressure adjustment lever.	4
17	Paper feed safety switch (Lower)	Checks safety of the paper feed tray. (Forcibly turns off the elevator motor)	40
18	Range set switch	Changes a clamp solenoid current value.	
19	Clamp safety switch	Checks the clamp unit position.	13
20	Cutter position switch	Checks the position of the cutter upper blade.	
21	Master loading button	Manually cuts the master.	5
22	Scanner table set switch	Checks setting of the scanner table.	21
23	TPH pressure switch	Check descent of the thermal print head.	32
24	TPH home position switch	Checks ascent of the thermal print head.	31
25	Paper feed tray safety switch (A3 machine)	Forcibly turns off the paper feed tray slide motor.	

6. Other



No.	Part Name	Type	Function	Test Mode No.
1	Front cover set switch	Magnetic lead	Checks setting of the front cover.	30
2	Paper size potentiometer (Paper size VR)	VR	Checks the print paper size.	222
3	Paper feed cassette sensor 1	Magnetic lead switch	Checks the paper feed cassette.	41
4	Paper feed cassette sensor 2	Magnetic lead switch	Checks the paper feed cassette.	42
5	Paper feed cassette sensor 3	Magnetic lead switch	Checks the paper feed cassette.	43
6	Paper feed cassette sensor 4	Magnetic lead switch	Checks the paper feed cassette.	44
7	Ink sensor	Electrostatic capacity	Checks the ink.	37
8	Overflow sensor	Electrostatic capacity	Checks the ink for overflow.	38
9	Pressure encoder sensor	Hall IC	Checks the pressure control motor for run.	
10	0° Angular sensor	Hall IC	Checks the clamp plate position.	9
11	180° Angular sensor	Hall IC	Checks the clamp plate position.	10
12	Bottle set switch (Black drum)		Checks setting of the ink bottle.	125

CHAPTER 24: DESCRIPTION OF PCBs

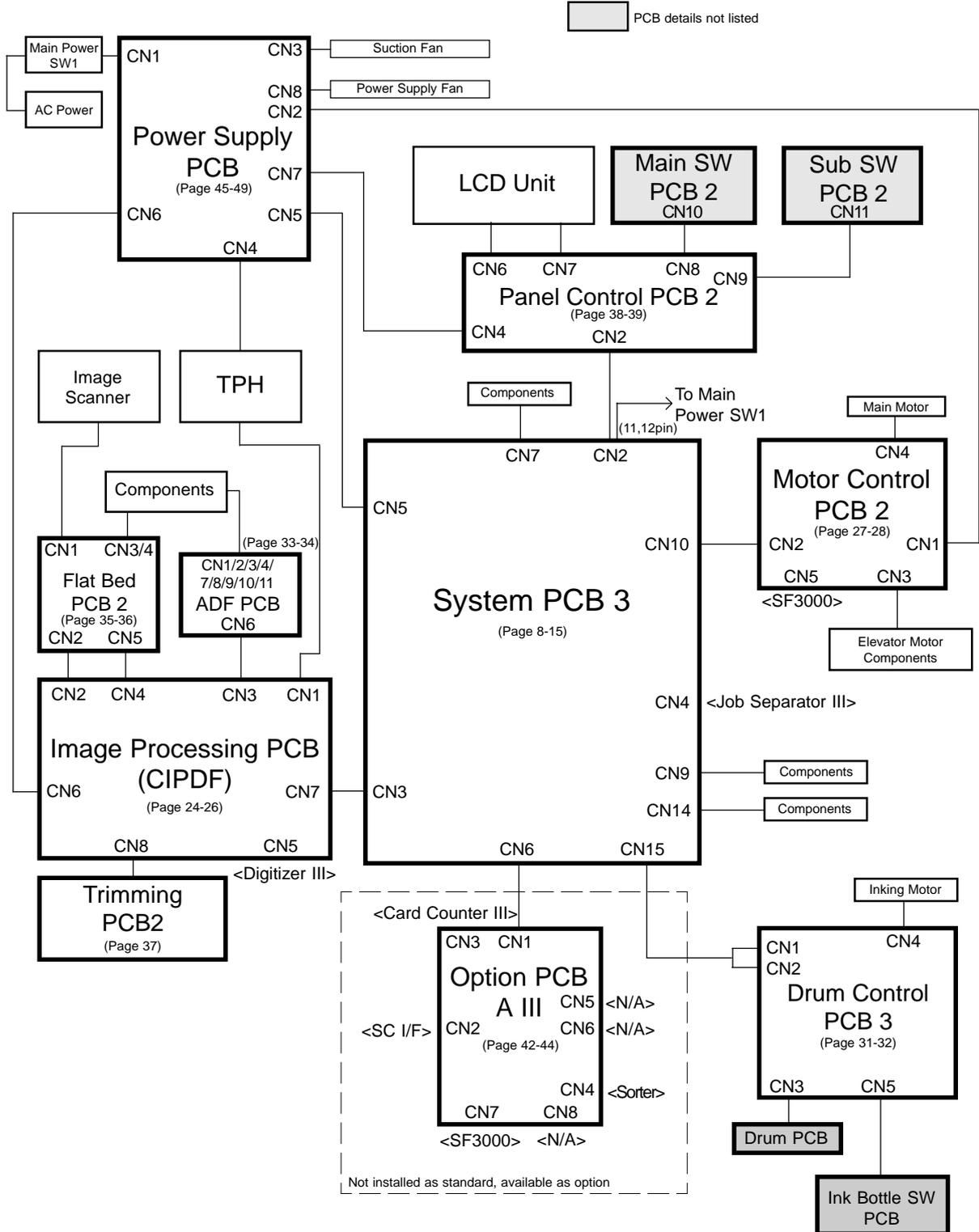
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1. BLOCK CHART(1/3)

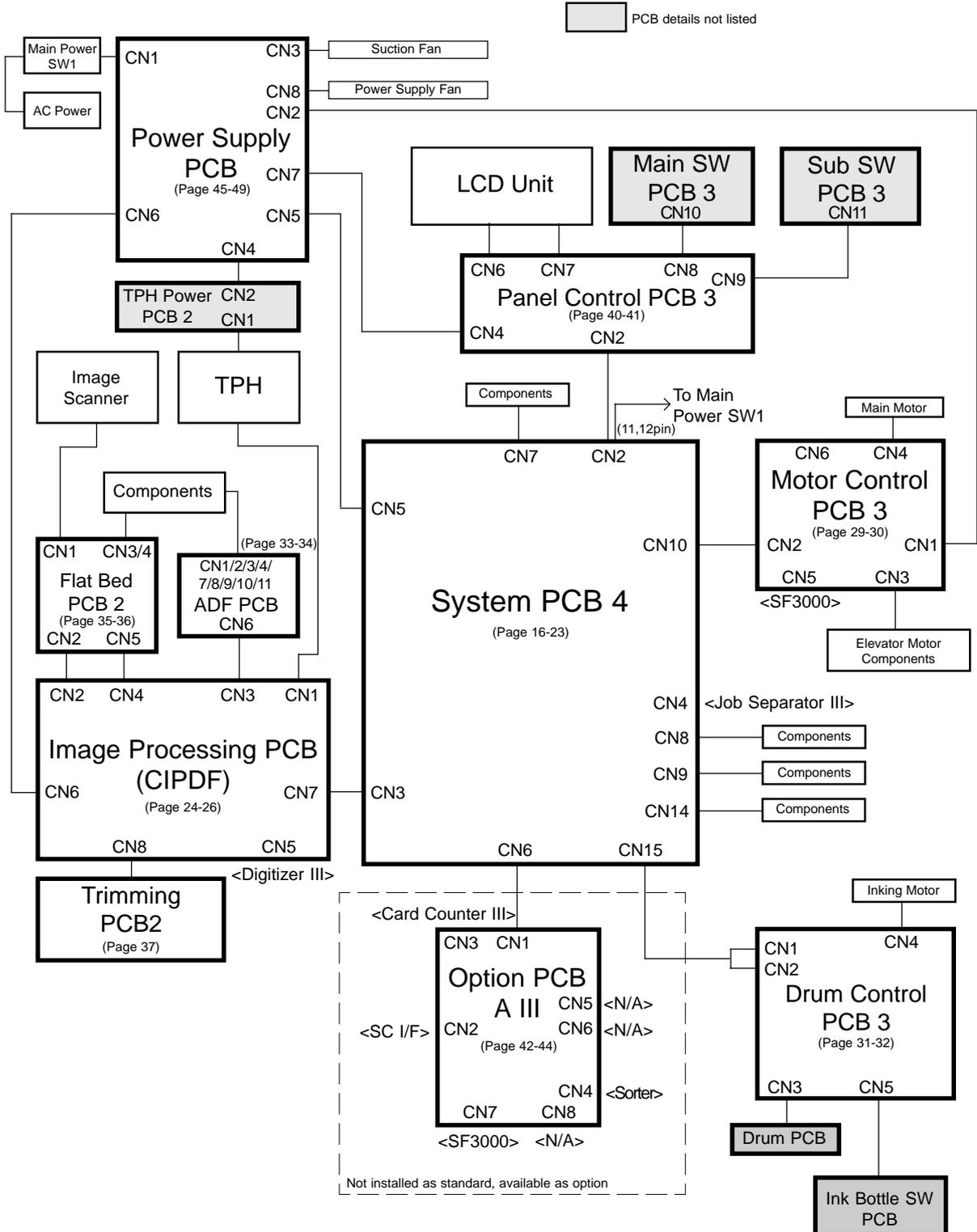
1. BLOCK CHART

1-1. FR2950



1. BLOCK CHART(2/3)

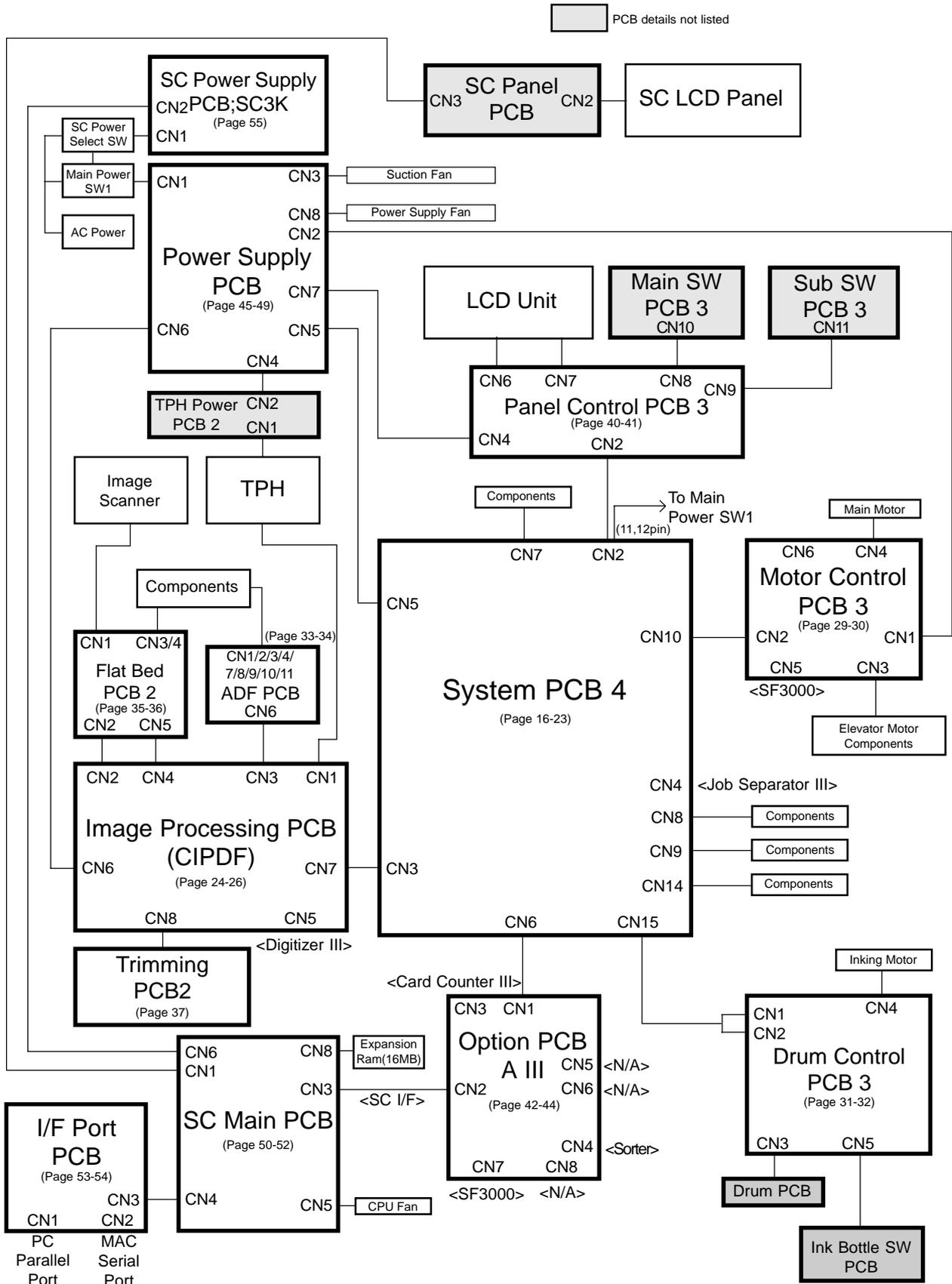
1-2. FR3950



CHAPTER 24. DESCRIPTION OF PCBs

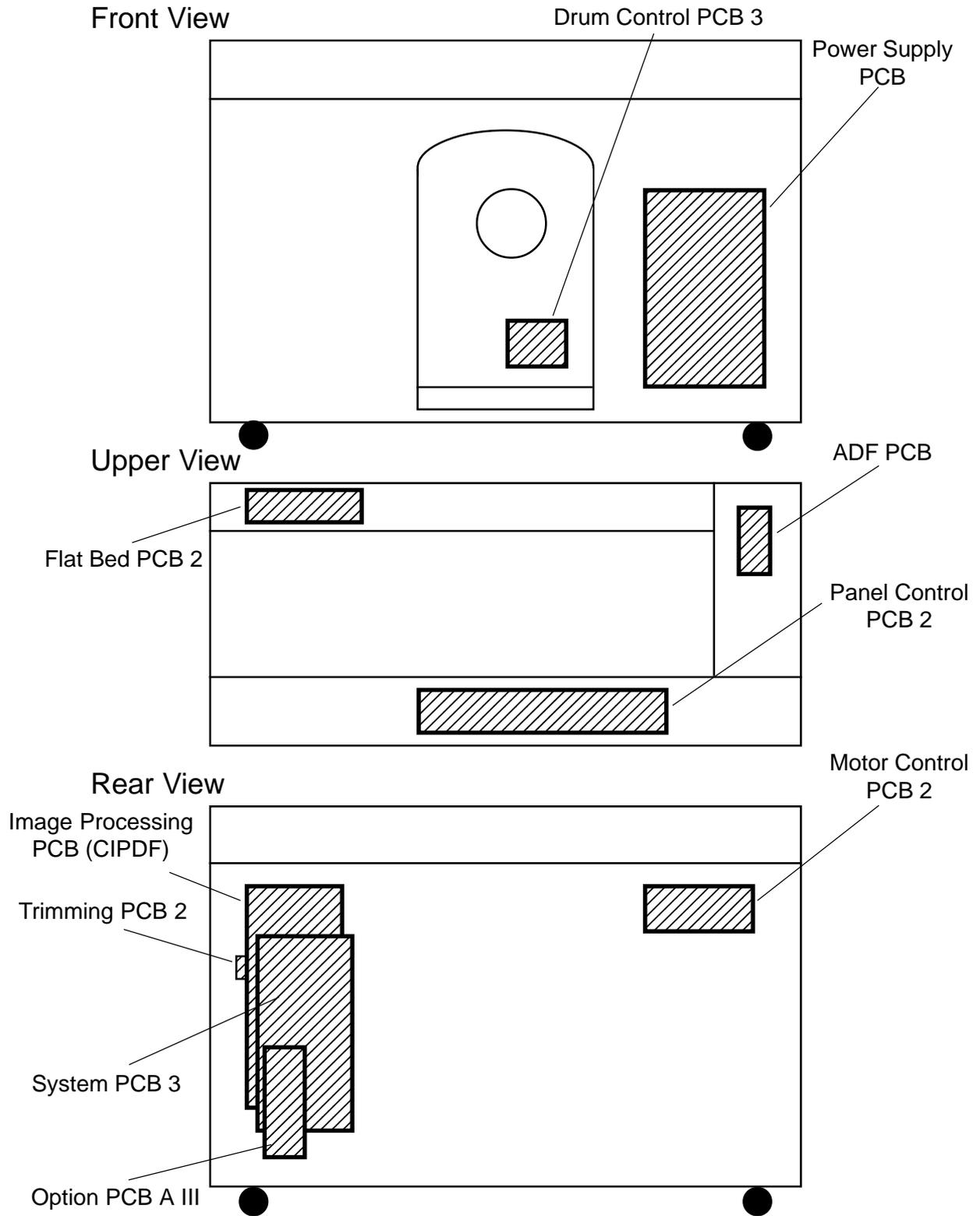
1. BLOCK CHART(3/3)

1-3. FR3950α



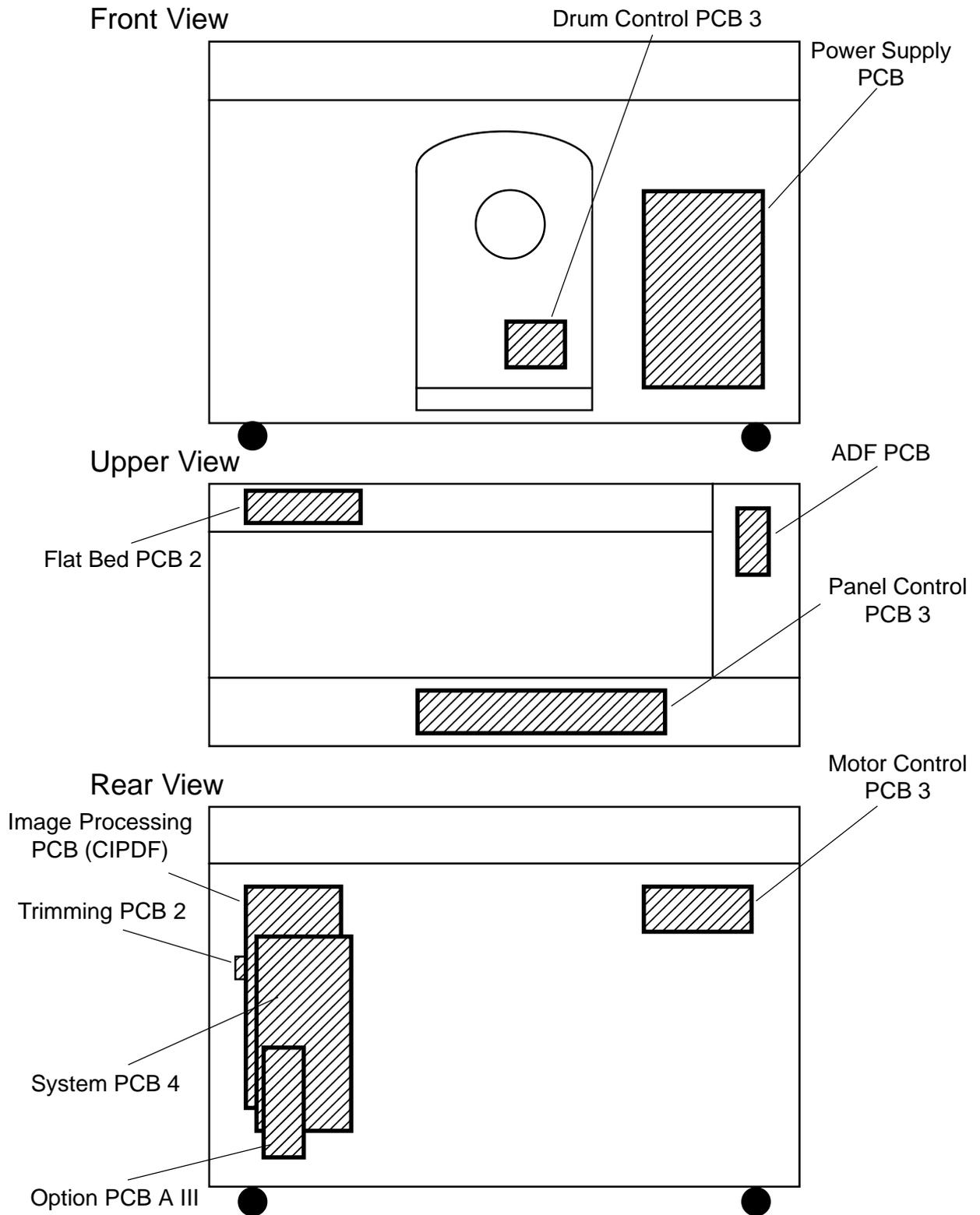
2. LOCATION OF PCBs

2-1. FR2950



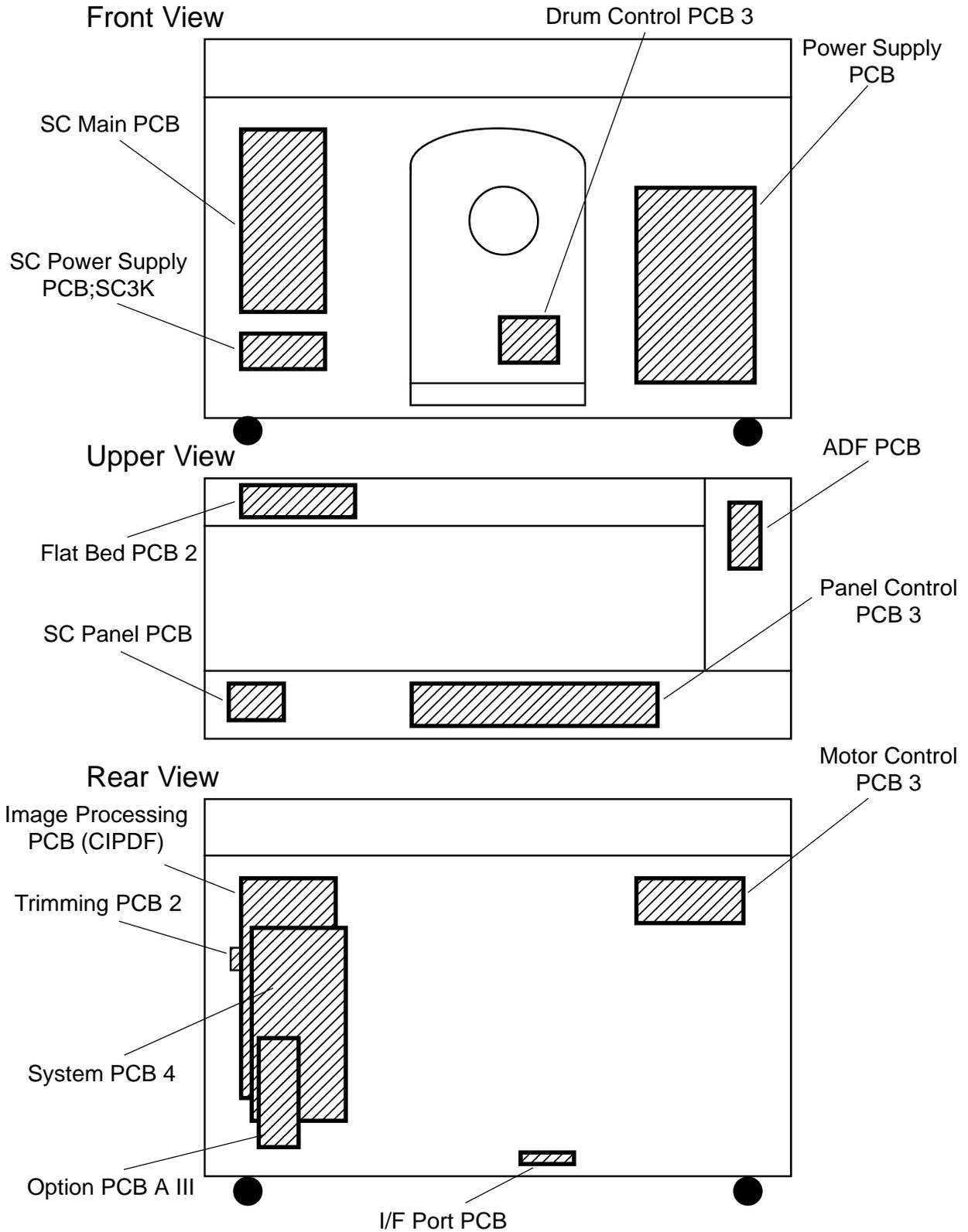
2. LOCATION OF PCBs(2/4)

2-2. FR3950



2. LOCATION OF PCBs(3/4)

2-3. FR3950α



CHAPTER 24. DESCRIPTION OF PCBs

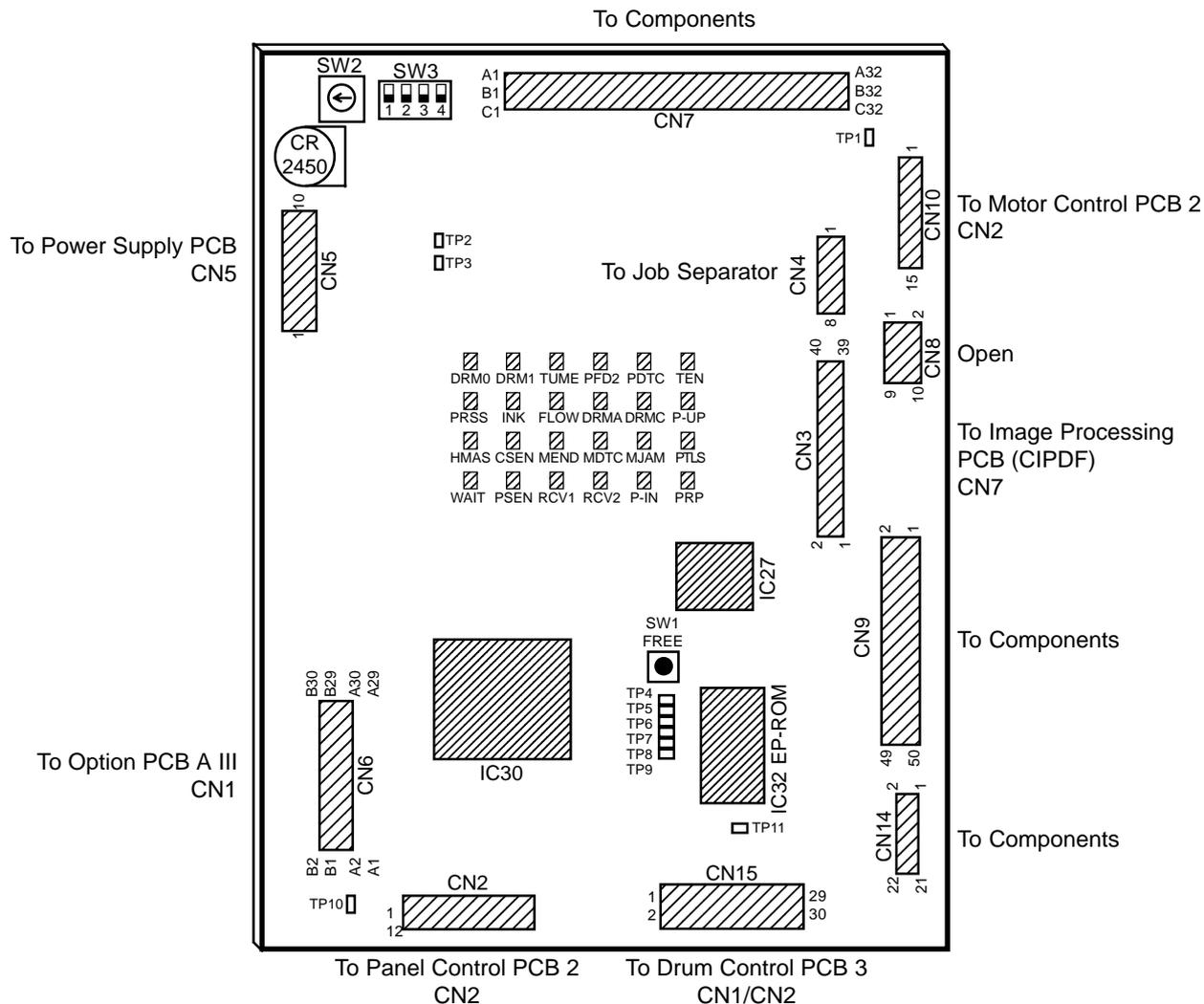
2. LOCATION OF PCBs(4/4)

2-4. PCB Function Detail

PCB Name	Function	Risograph Model
System PCB 3	Overall Control, Drive control of components	FR2950
System PCB 4	Overall Control, Drive control of components	FR3950/3950α
Image Processing PCB (CIPDF)	Processing Image data	FR2950/3950/3950α
Motor Control PCB 2	Control of Main Motor and Elevator Motor	FR2950
Motor Control PCB 3	Control of Main Motor and Elevator Motor	FR3950/3950α
Flat Bed PCB 2	Drive control of Read Pulse Motor, Junction of Sensors on Flat Bed PCB and ADF PCB	FR2950/3950/3950α
ADF PCB	Drive function of ADF unit	FR2950/3950/3950α
Panel Control PCB 2	Enter function key, Control display	FR2950
Panel Control PCB 3	Enter function key, Control display	FR3950/3950α
LCD Unit	Liquid Crystal Display (w/ Back Light)	FR2950/3950/3950α
Main SW PCB 2	Enter numeral key	FR2950
Main SW PCB 3	Enter numeral key	FR3950/3950α
Sub SW PCB 2	Enter Sub Panel function key	FR2950
Sub SW PCB 3	Enter Sub Panel function key	FR3950/3950α
Power Supply PCB (100 or 200)	Supply all voltages	FR2950/3950/3950α
TPH Power PCB 2	Supply voltage to TPH	FR3950/3950α
Drum Control PCB 3	Junction of sensors on Drum PCB, Drive Inking Motor	FR2950/3950/3950α
Trimming PCB2	Achieve image trimming function	FR2950/3950/3950α
Option PCB A III (Pre-installed on FR3950α, option for other models)	Control SC series Interface, Sorter, Card Counter,etc.	FR2950/3950/3950α
SC Main PCB	Control SC Computer Interface function	FR3950α
I/F Port PCB	Input port from PC or Mac (PC Parallel Port, MAC serial Port)	FR3950α
SC Power Supply PCB;SC3K	Supply voltage to SC Main PCB and CPU Fan	FR3950α
SC Panel PCB	Enter SC Panel function	FR3950α
SC LCD PCB	Display SC status	FR3950α

3. SYSTEM PCB

3-1. System PCB 3



SW

- SW1 :Drum (Main motor) 30 rpm
- SW2 :Machine Selection HEX SW
Please refer APPENDIX for the detail
- SW3 :Machine Selection Dip SW
Please refer APPENDIX for the detail

LED

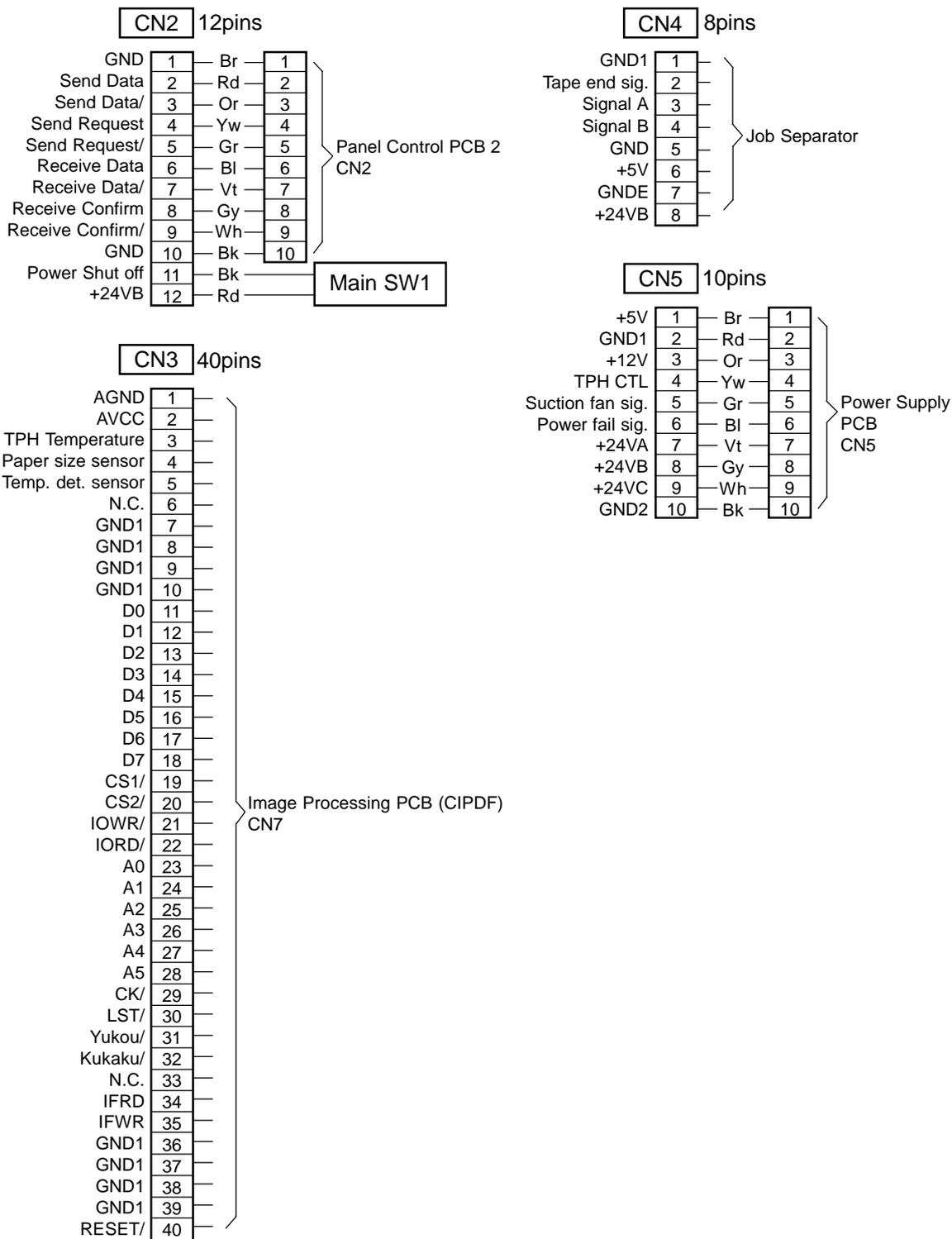
LED	Sensor Name	When LED is ON
DRM0	0 Angular Sensor	Magnetism is detected
DRM1	180 Angular Sensor	Magnetism is detected
PFD2	Paper Feed Clutch Sensor	Light path is blocked
PDTC	Paper Detection Sensor	Reflected light detected
TEN	Vertical Centering Sensor	Light path is blocked
PRSS	Pressure Detection Sensor	Light path is blocked
INK	Ink Sensor	Ink is not detected
FLOW	Overflow Sensor	Ink is not detected
DRMA	Position A Sensor	Light path is blocked
DRMC	Position C Sensor	Light path is blocked
P-UP	Elevator Upper Limit Sensor	Light path is opened (actuator pressed)
HMAS	Disposal Box Master Sensor	Light path is opened (Master not detected)
CSEN	Master Loading Sensor	Reflected light (Master) detected
MEND	Master END Sensor	Reflected light (Master) detected
MDTC	Master Detection Sensor	Reflected light (Master) not detected
MJAM	Master Removal Sensor	Light path is blocked (Master detected)
PTLS	Paper Size Detection Sensor	Reflected light (Paper) detected
WAIT	Master Positioning Sensor	Reflected light (Master) not detected
PSEN	Paper Sensor	Light path is blocked (Paper detected)
RCV1	Paper Receiving Sensor 1	Light path is blocked (Paper detected)
RCV2	Paper Receiving Sensor 2	Light path is blocked (Paper detected)
P-IN	Paper Feed Detection Sensor	Light path is blocked (Paper detected)
PRP	Pressure Control Sensor	Light path is opened
TUME	Master Removal Hook Sensor	Light path is opened

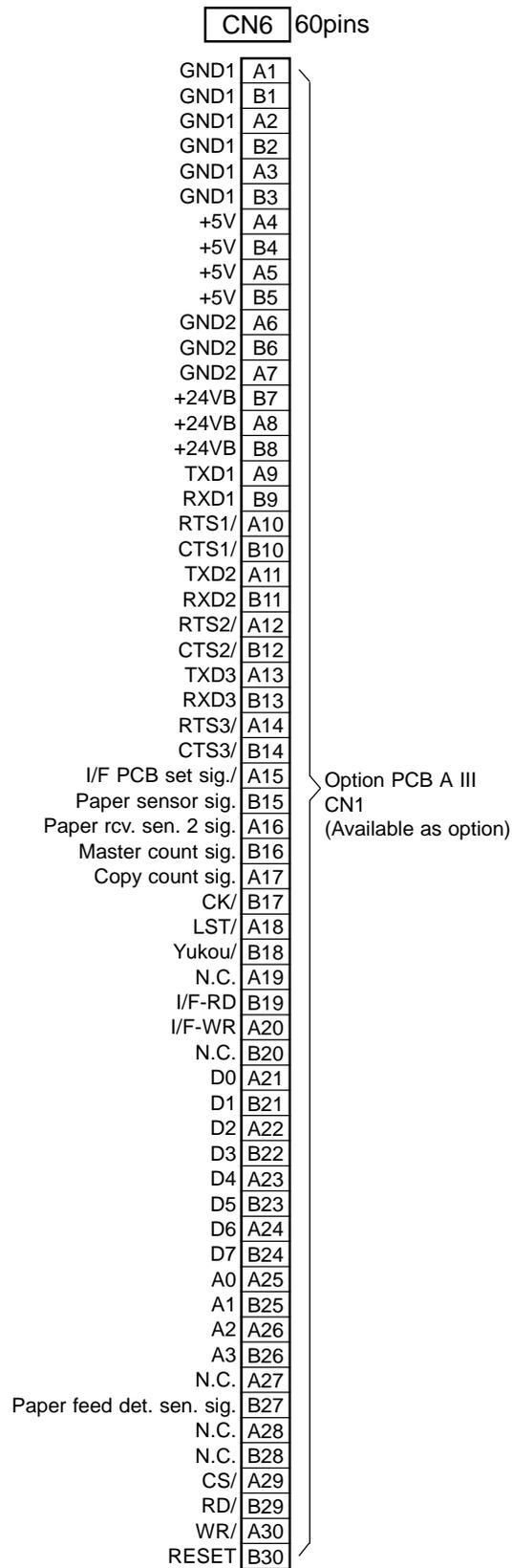
TP

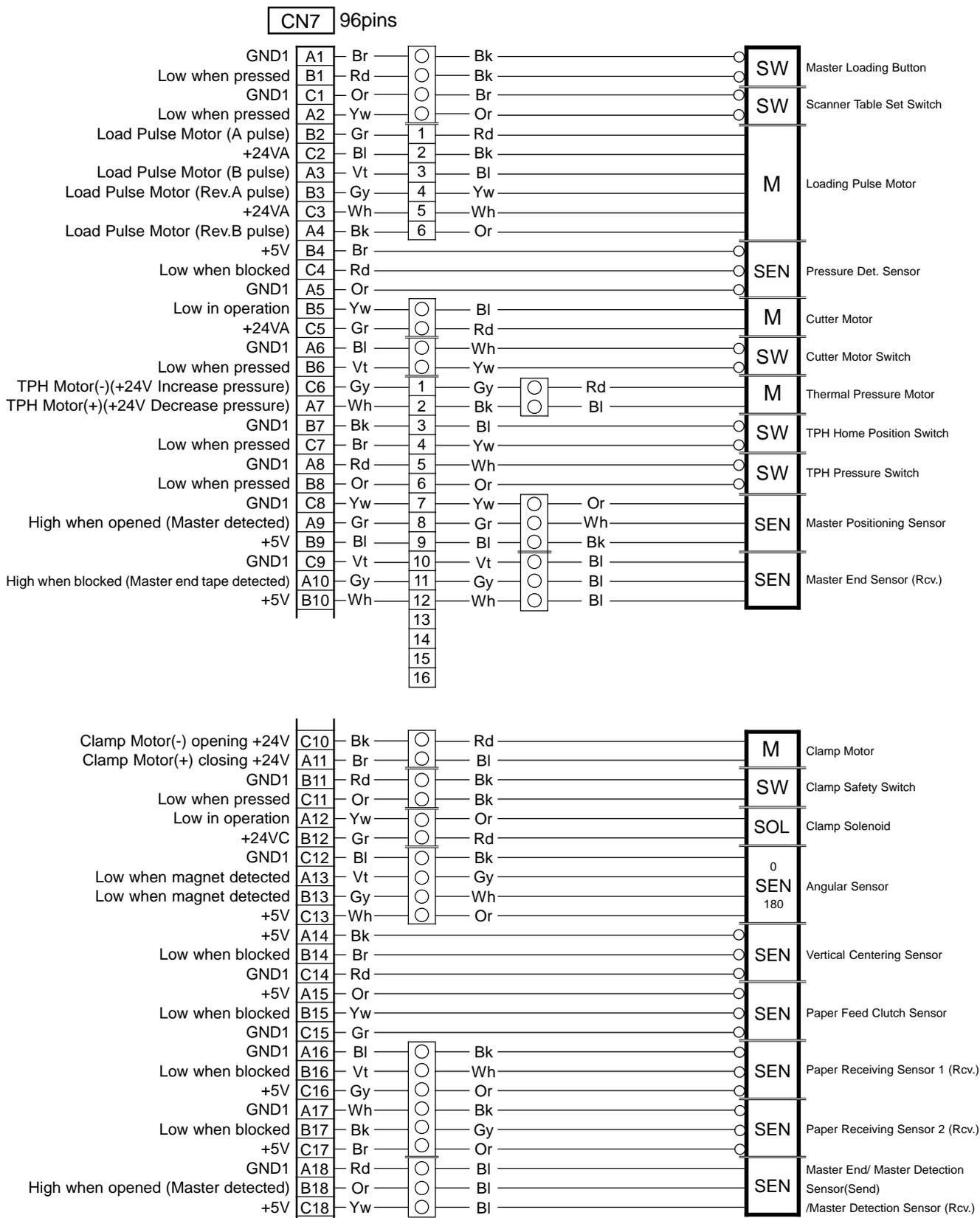
TP1 (GND)	Ground for +5V lines	TP7 (AKEN)	+5V
TP2 (GNDE)	Ground for +24V lines	TP8 (NMI)	+5V
TP3 (GND)	Ground for +5V lines	TP9 (RESET)	+5V
TP4 (PRESS)	+5V	TP10 (GND)	Ground for +5V lines
TP5 (PKEN)	+5V	TP11 (GND)	Ground for +5V lines
TP6 (CKEN)	+5V		

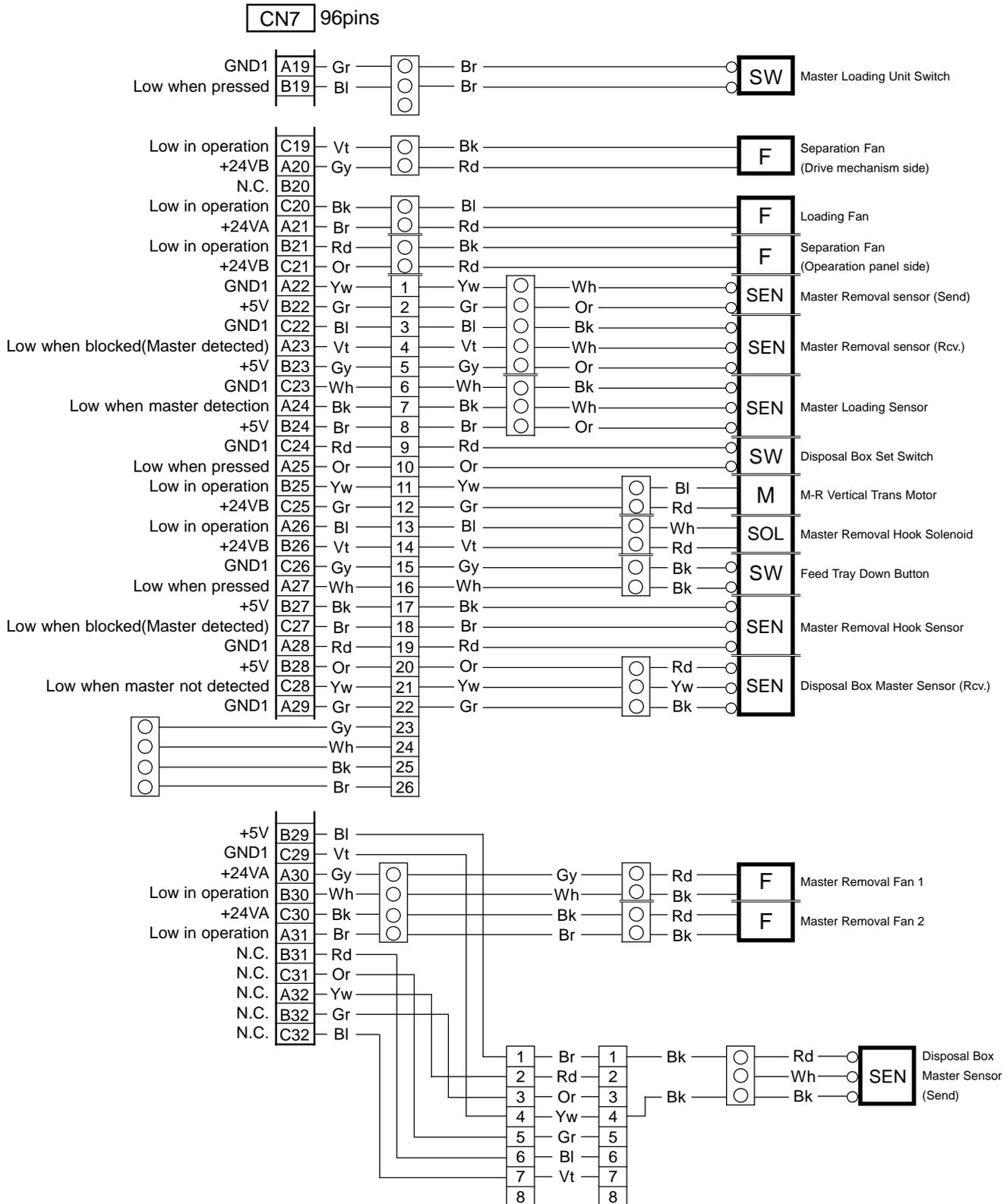
Battery

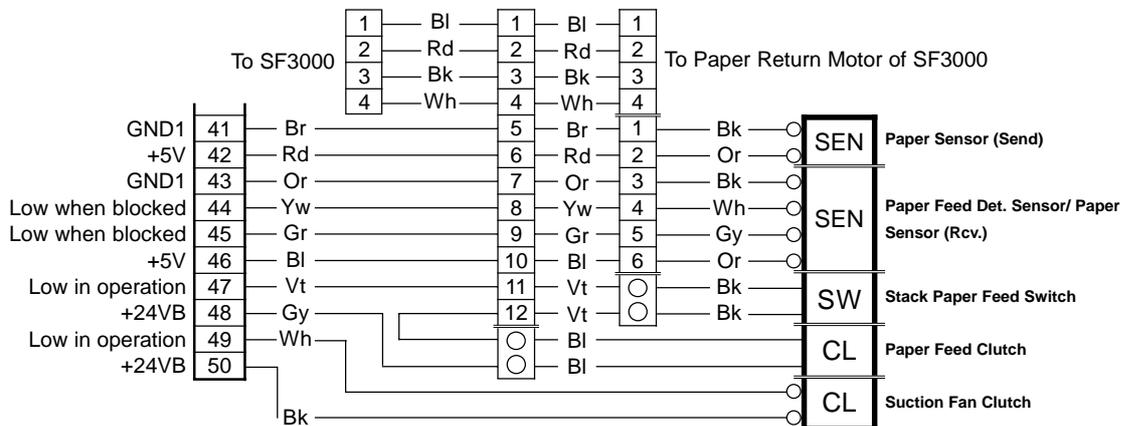
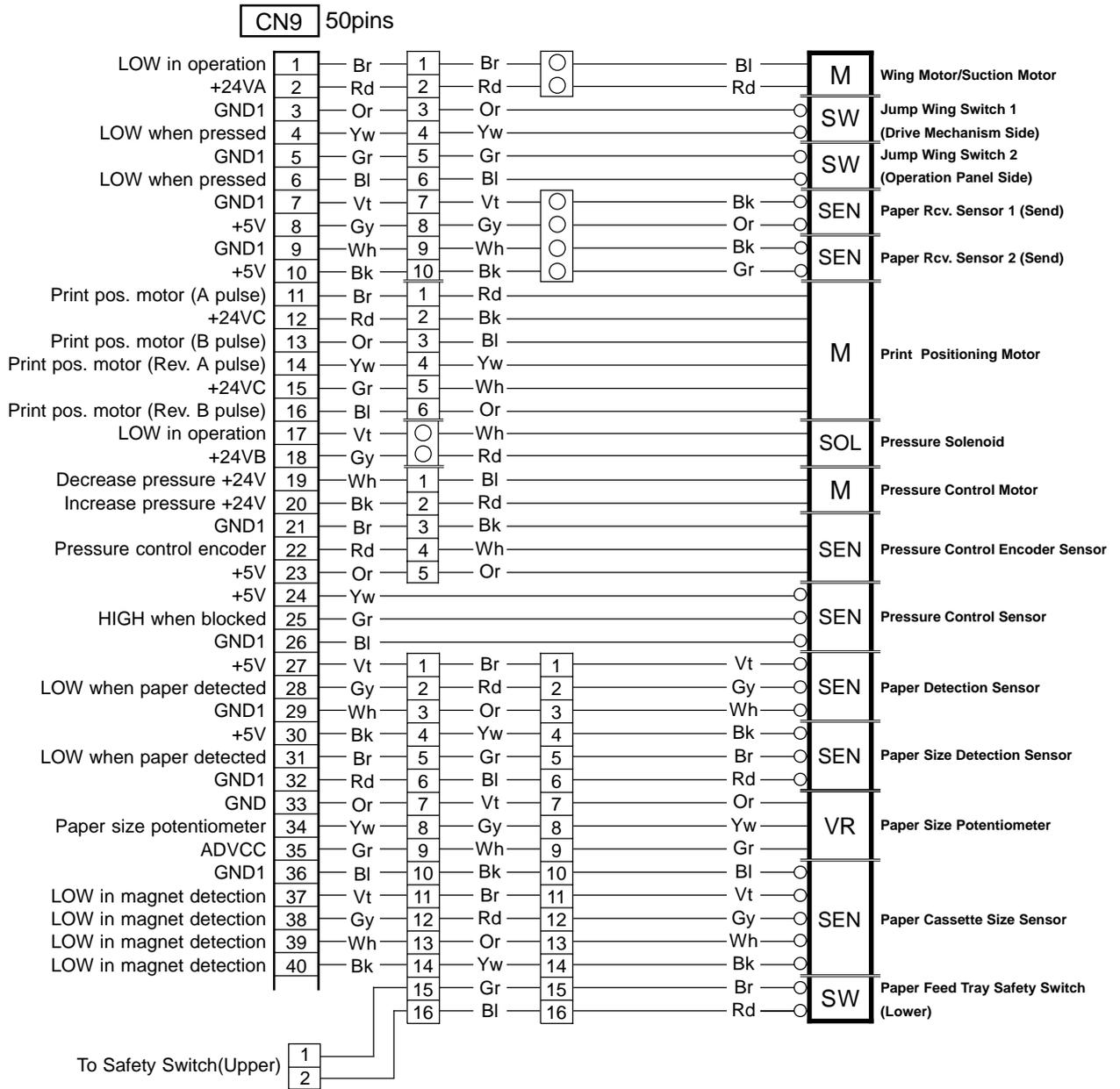
CR2450	1 piece
--------	---------

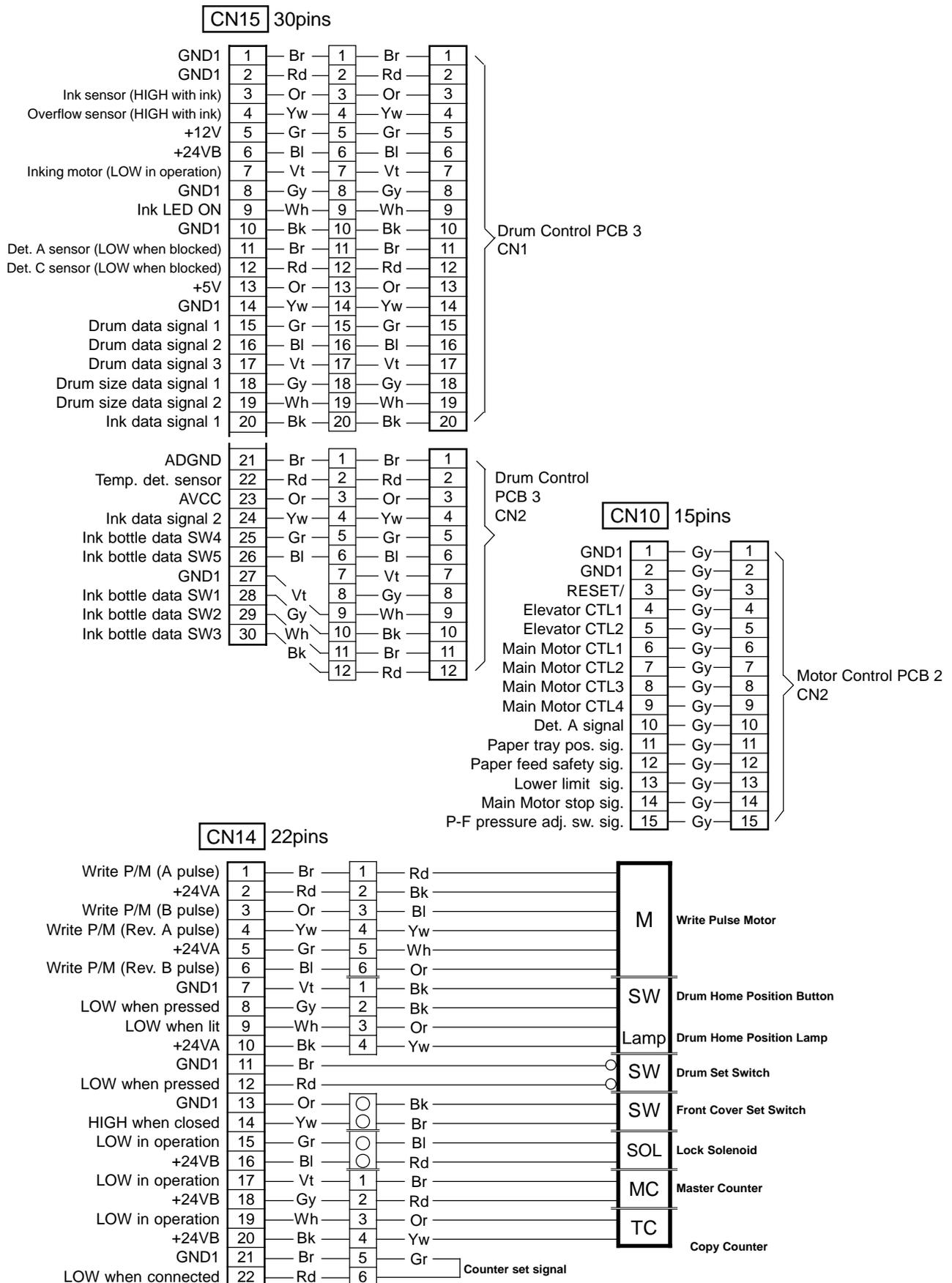




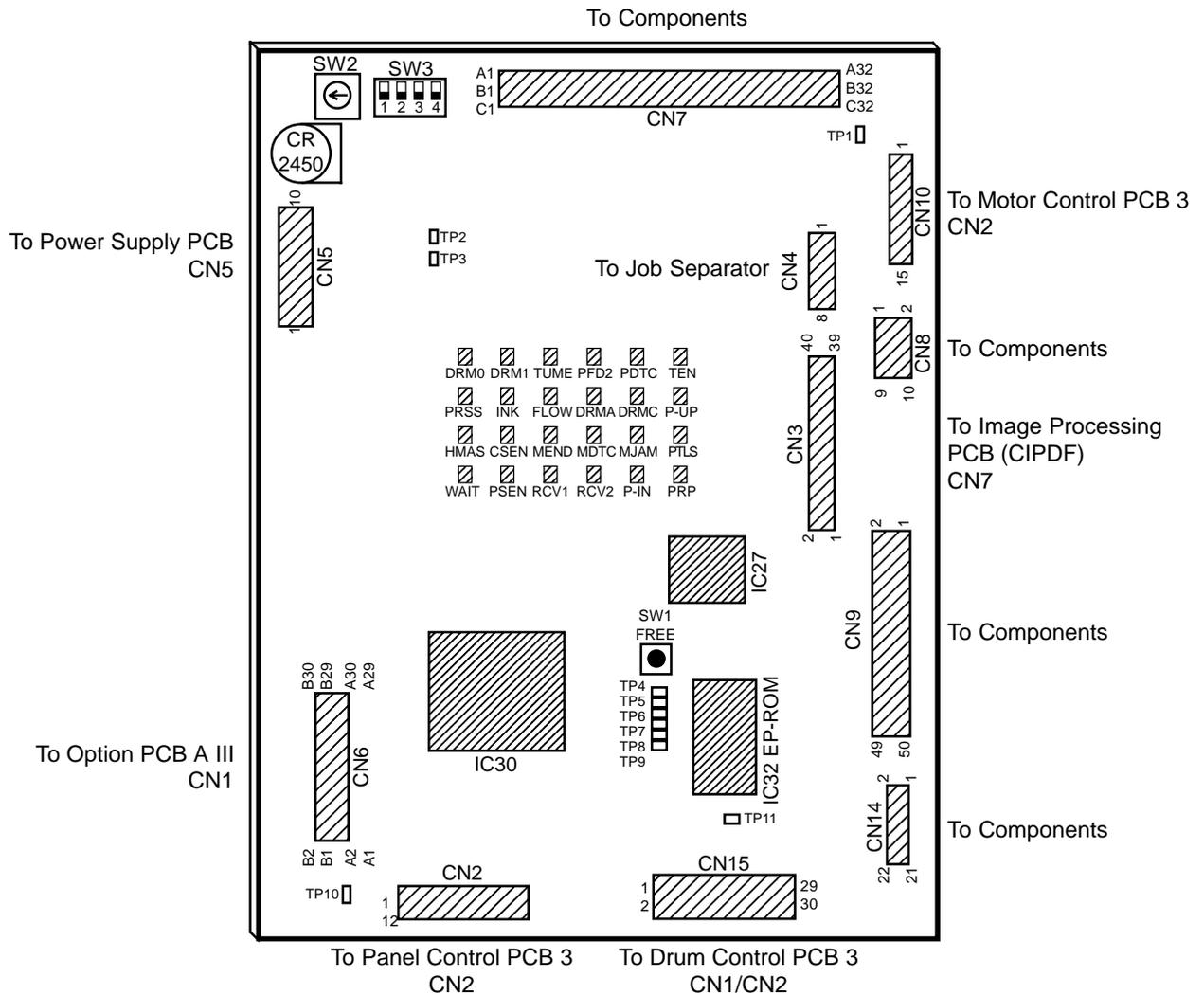








3-2. System PCB 4



SW

- SW1 :Drum (Main motor) 30 rpm
- SW2 :Machine Selection HEX SW
Please refer APPENDIX for the detail
- SW3 :Machine Selection Dip SW
Please refer APPENDIX for the detail

LED

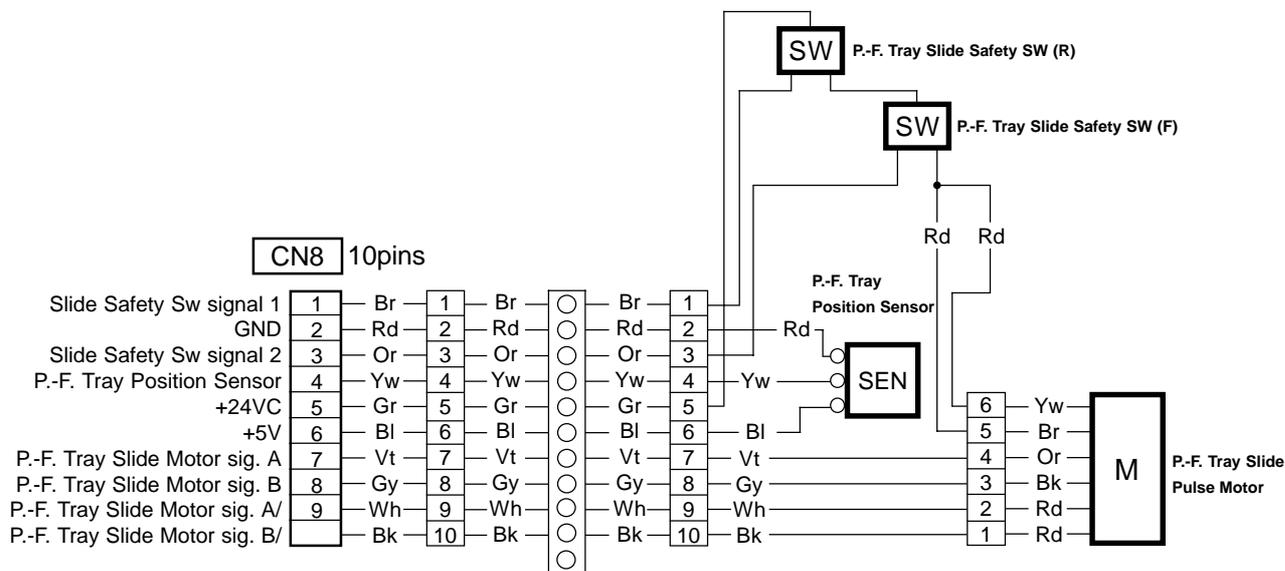
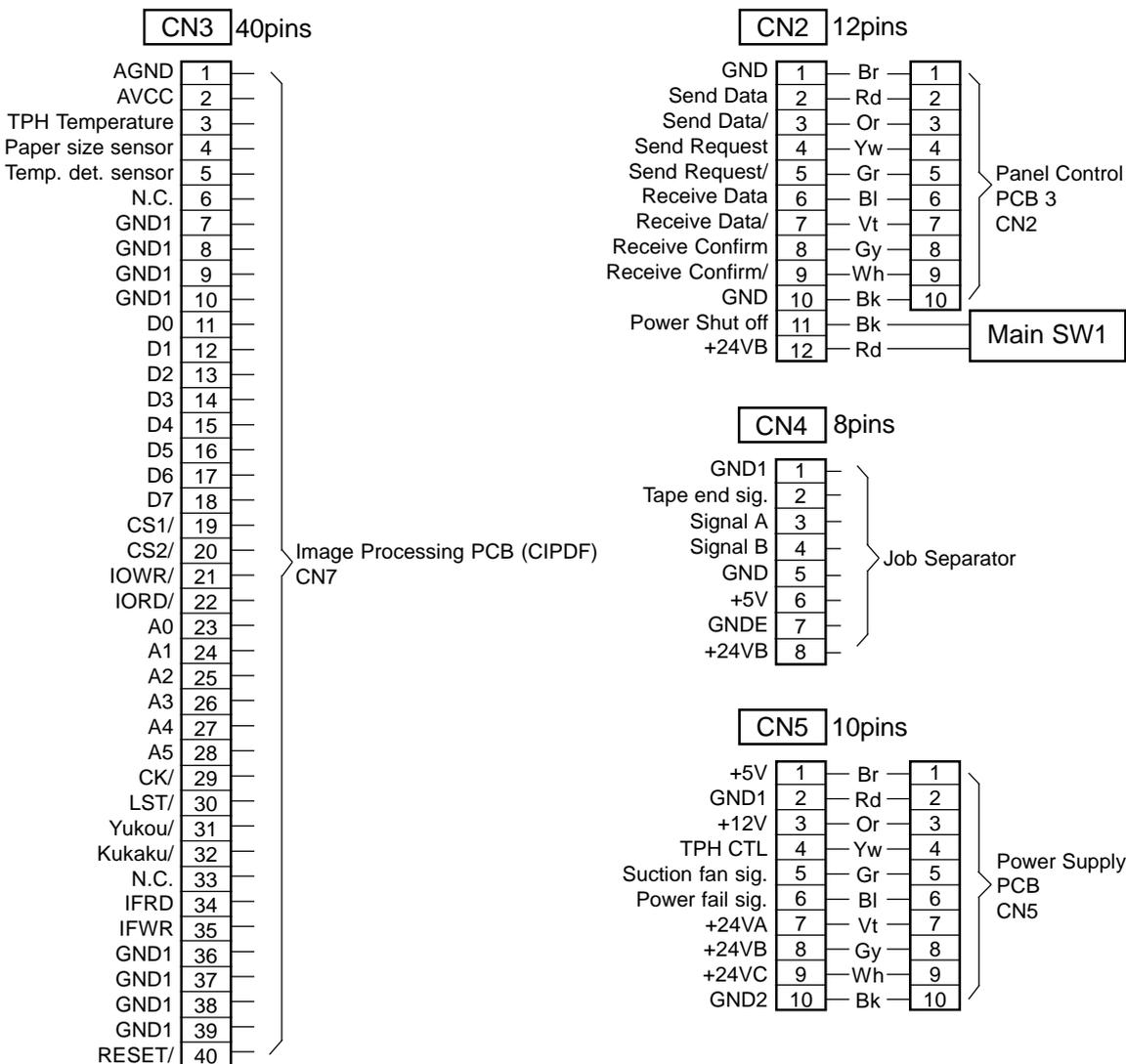
LED	Sensor Name	When LED is ON
DRM0	0 Angular Sensor	Magnetism is detected
DRM1	180 Angular Sensor	Magnetism is detected
PDTC	Paper Detection Sensor	Reflected light detected
TEN	Vertical Centering Sensor	Light path is blocked
INK	Ink Sensor	Ink is not detected
FLOW	Overflow Sensor	Ink is not detected
DRMA	Position A Sensor	Light path is blocked
DRMC	Position C Sensor	Light path is blocked
P-UP	Elevator Upper Limit Sensor	Light path is opened (actuator pressed)
HMAS	Disposal Box Master Sensor	Light path is opened (Master not detected)
CSEN	Master Loading Sensor	Reflected light (Master) detected
MEND	Master END Sensor	Reflected light (Master) detected
MDTC	Master Detection Sensor	Reflected light (Master) not detected
MJAM	Master Removal Sensor	Light path is blocked (Master detected)
PTLS	Paper Size Detection Sensor	Reflected light (Paper) detected
WAIT	Master Positioning Sensor	Reflected light (Master) not detected
PSEN	Paper Sensor	Light path is blocked (Paper detected)
RCV1	Paper Receiving Sensor 1	Light path is blocked (Paper detected)
RCV2	Paper Receiving Sensor 2	Light path is blocked (Paper detected)
P-IN	Paper Feed Detection Sensor	Light path is blocked (Paper detected)
PRP	Pressure Control Sensor	Light path is opened
TUME	Master Removal Hook Sensor	Light path is opened

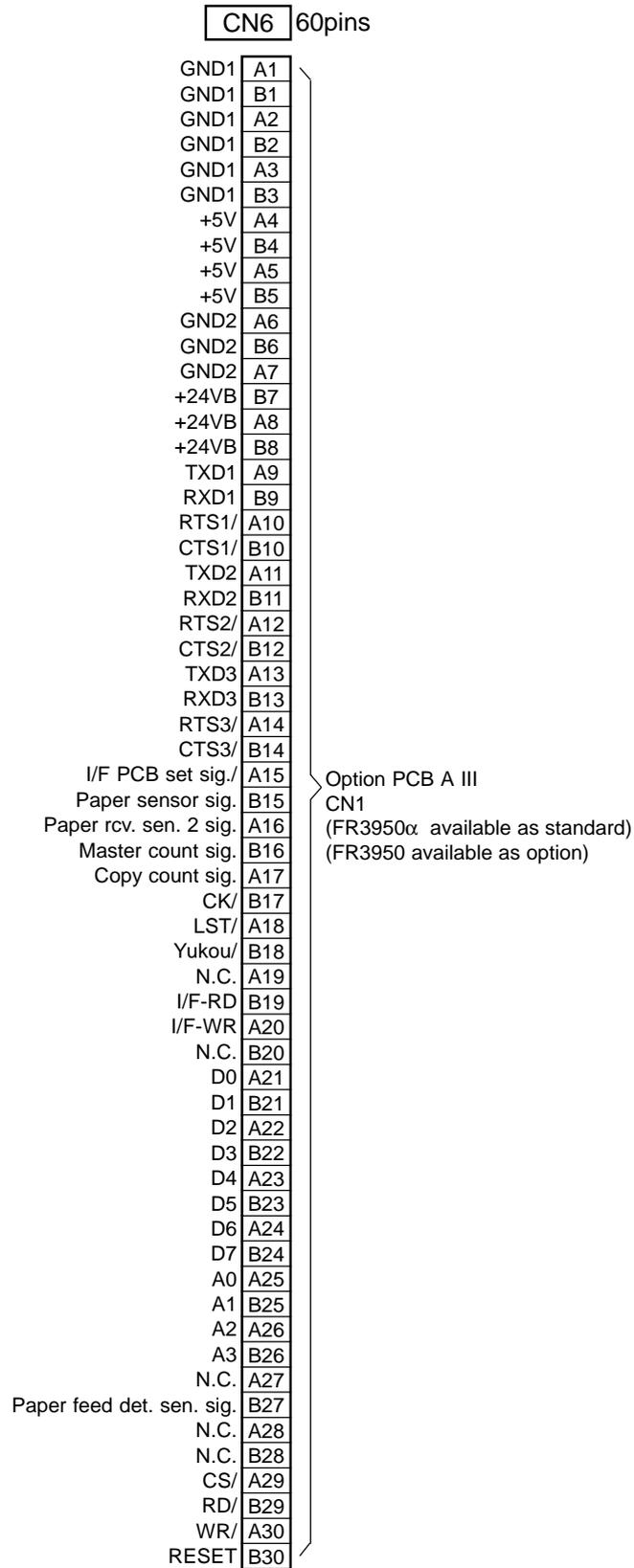
TP

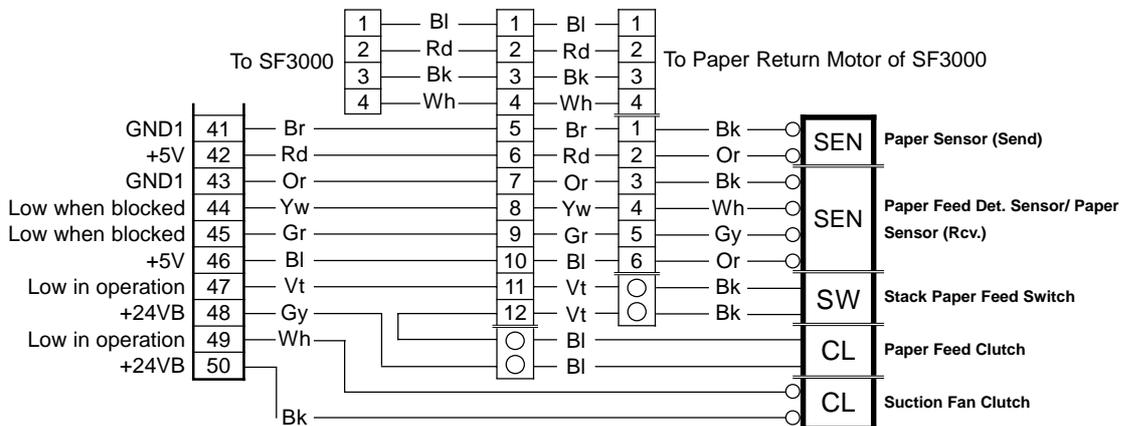
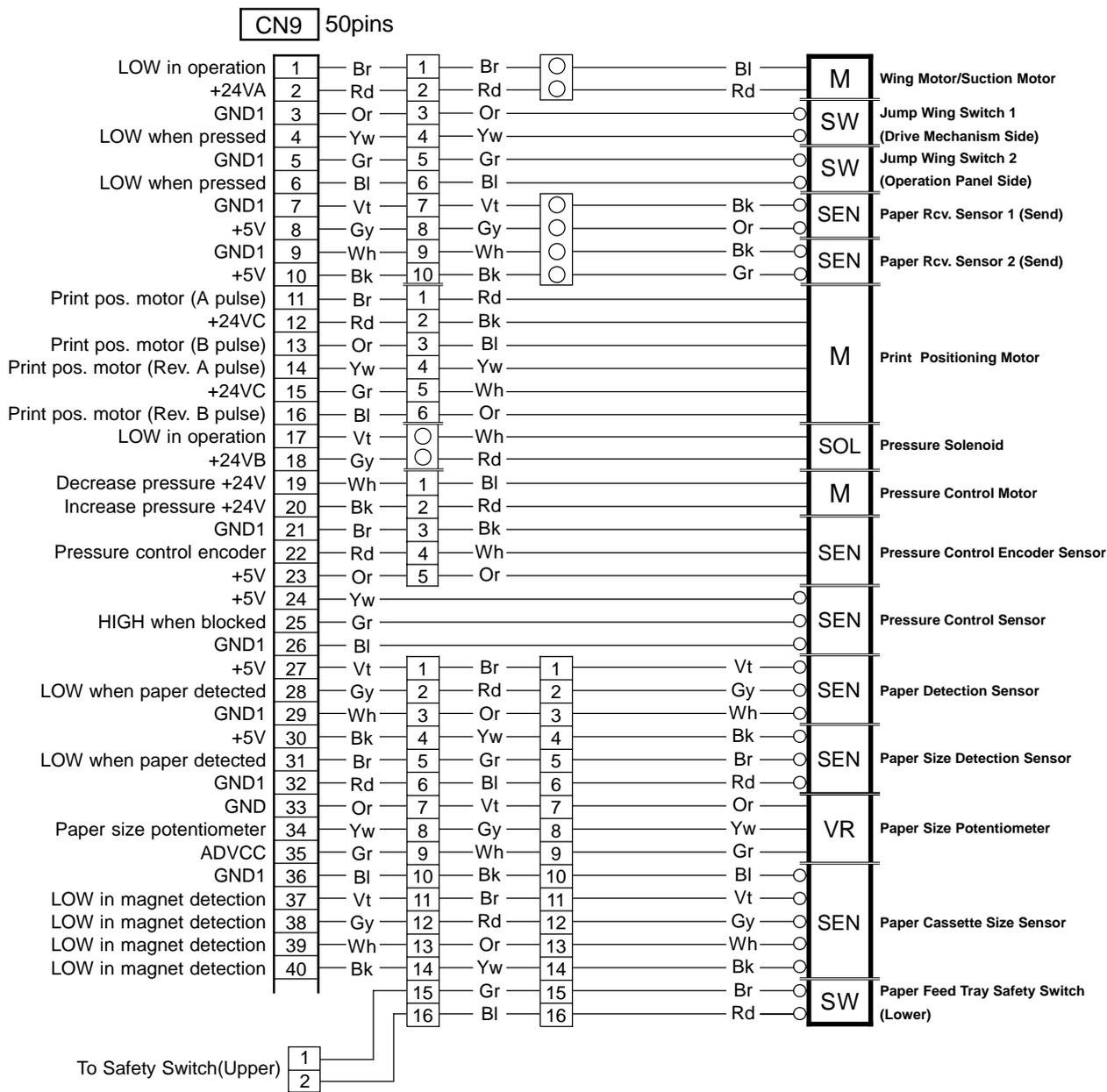
TP1 (GND)	Ground for +5V lines	TP7 (AKEN)	+5V
TP2 (GNDE)	Ground for +24V lines	TP8 (NMI)	+5V
TP3 (GND)	Ground for +5V lines	TP9 (RESET)	+5V
TP4 (PRESS)	+5V	TP10 (GND)	Ground for +5V lines
TP5 (PKEN)	+5V	TP11 (GND)	Ground for +5V lines
TP6 (CKEN)	+5V		

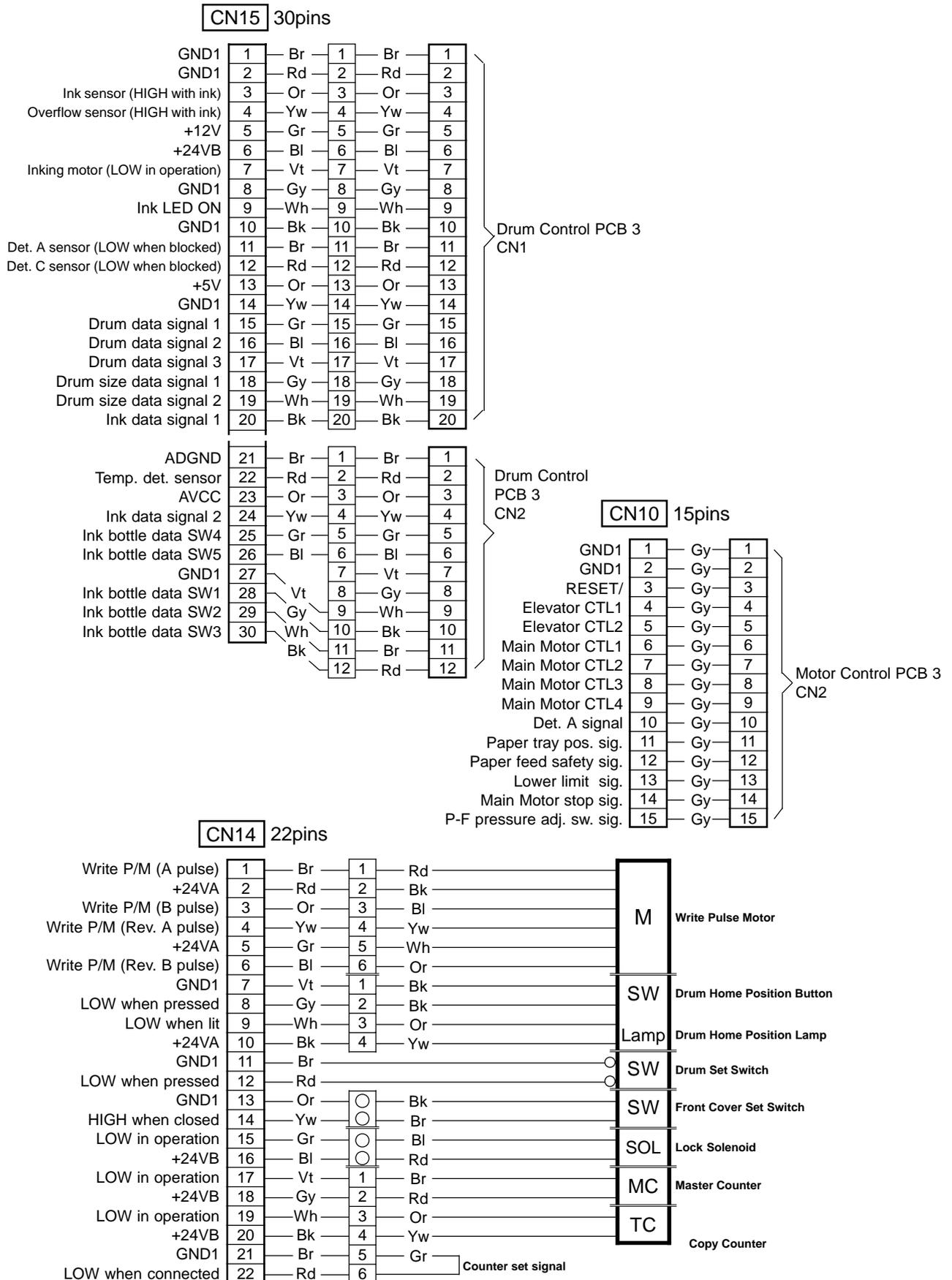
Battery

CR2450	1 piece
--------	---------



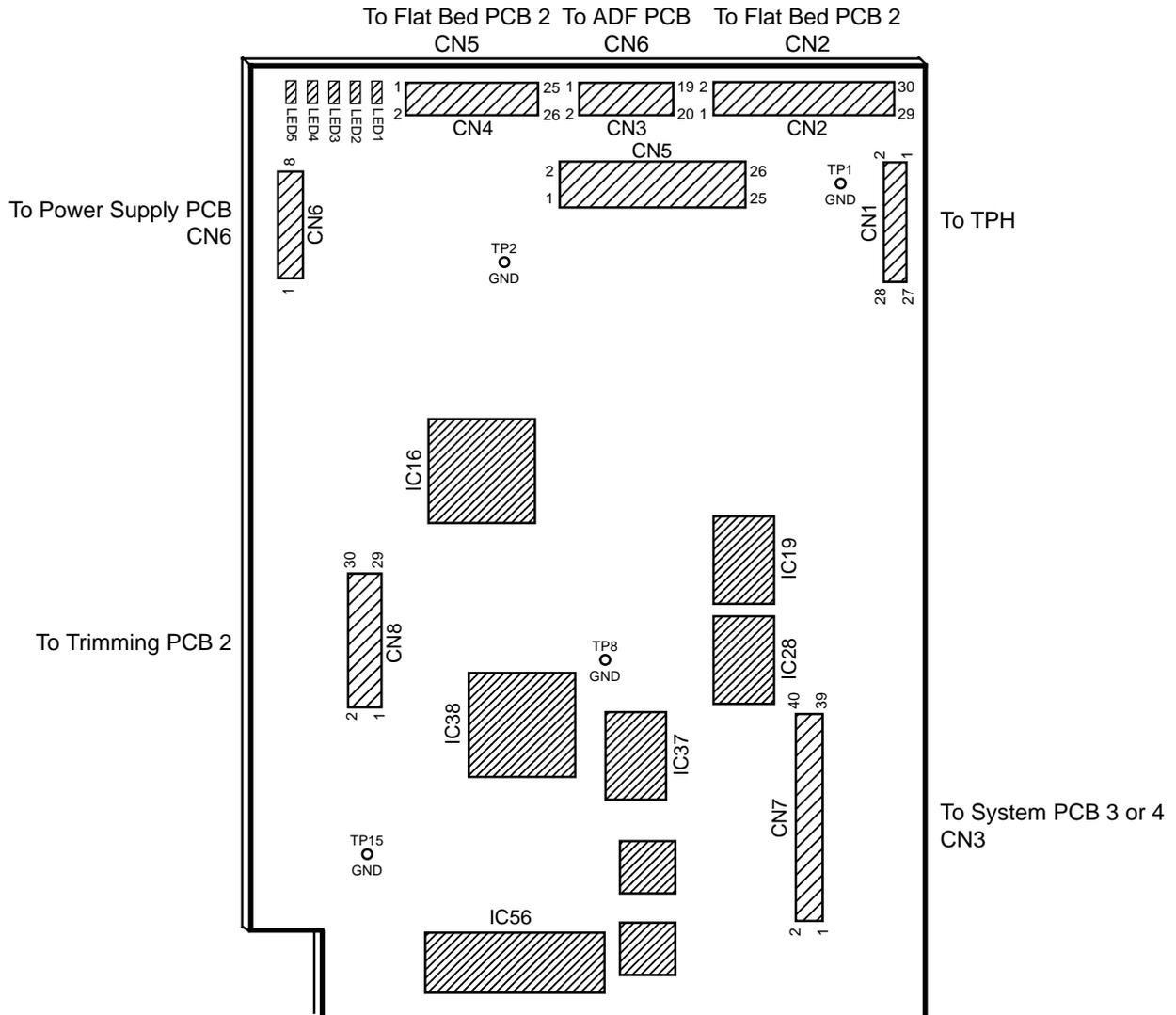






4. IMAGE PROCESSING PCB (CIPDF)(1/3)

4. IMAGE PROCESSING PCB (CIPDF)



LED

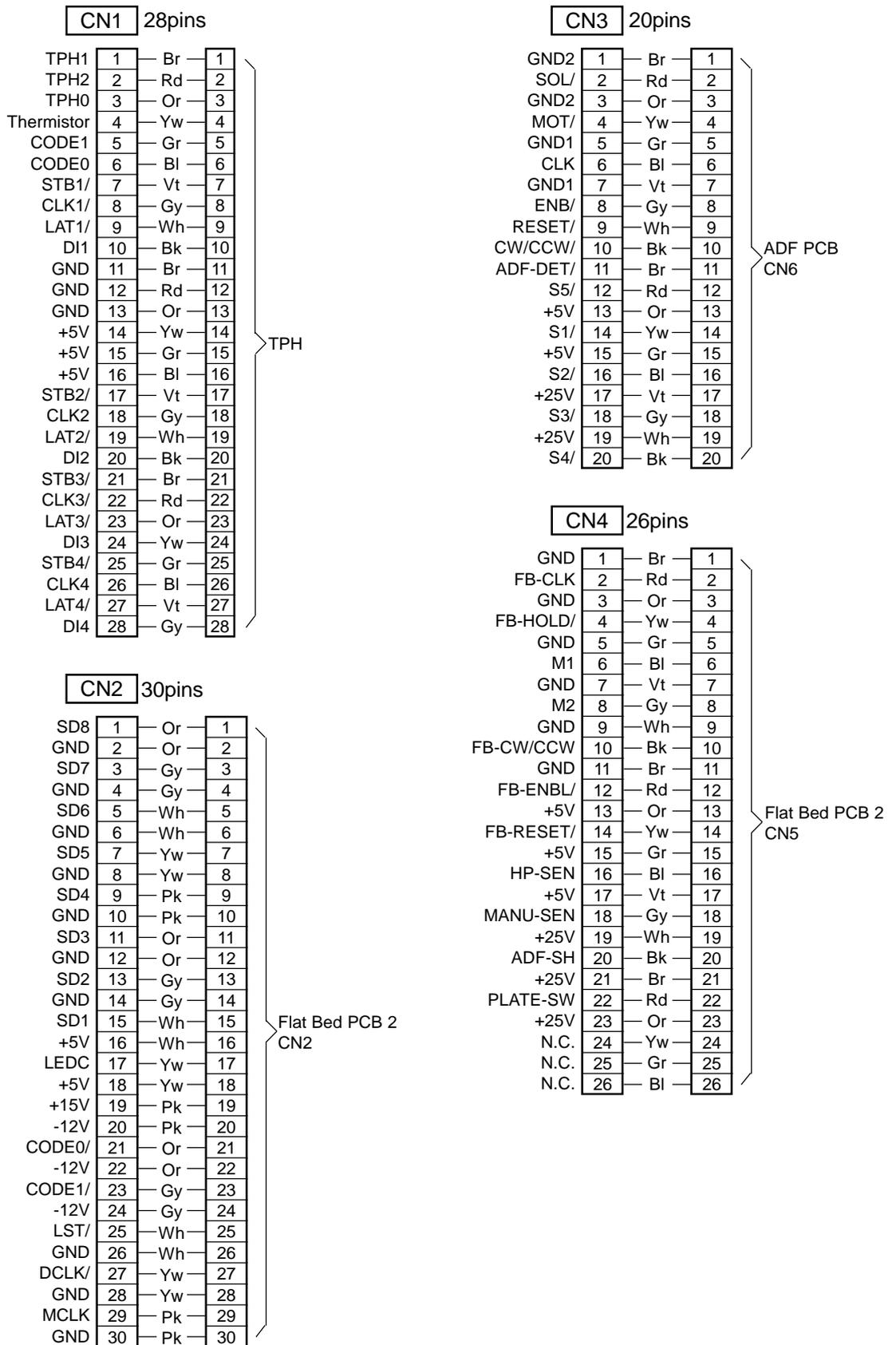
- LED1 :+5V
- LED2 :-12VA
- LED3 :+15VA
- LED4 :+12V
- LED5 :+24V

TPH

- TP1 :GND
- TP2 :GND
- TP8 :GND
- TP15 :GND

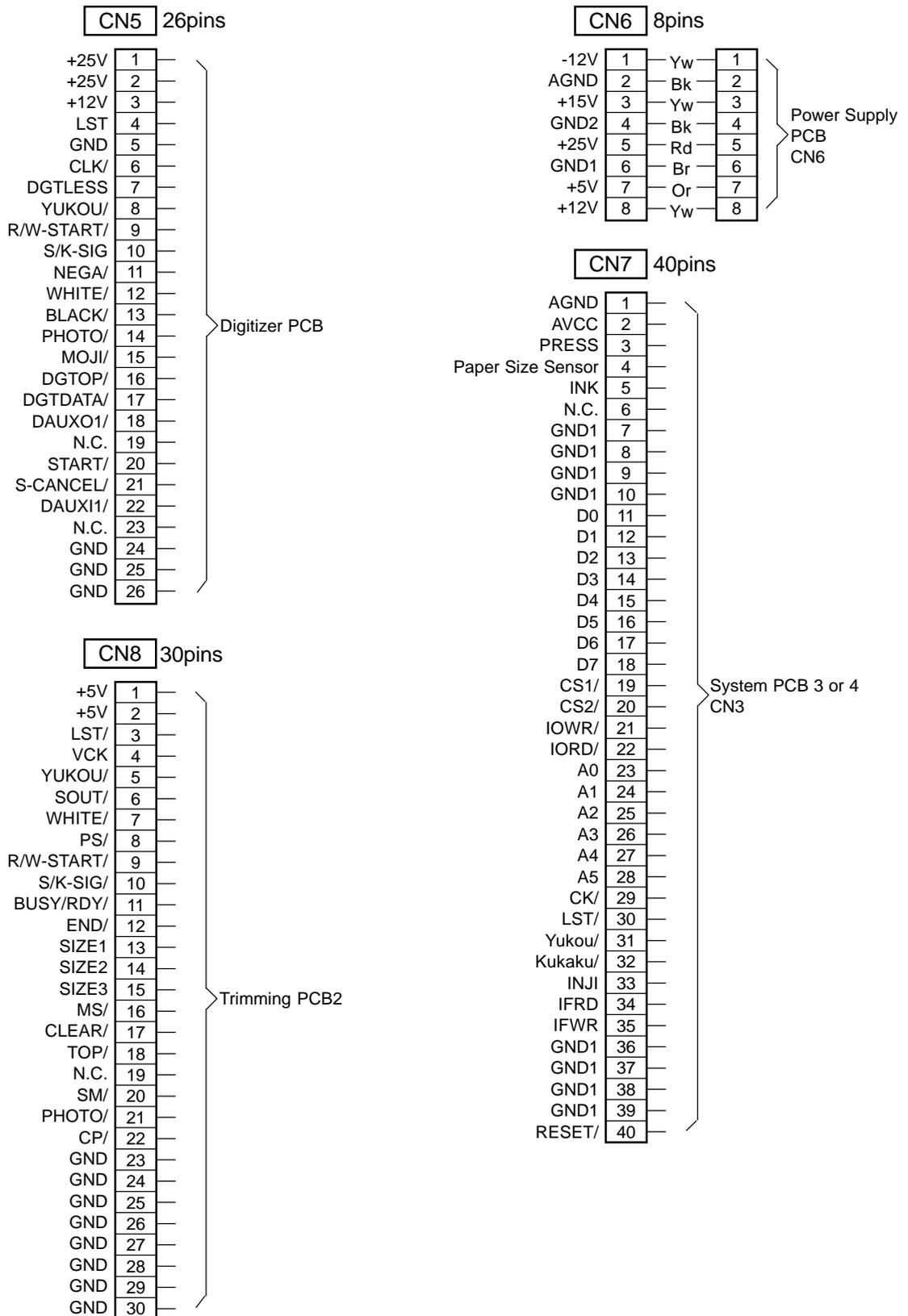
CHAPTER 24. DESCRIPTION OF PCBs

4. IMAGE PROCESSING PCB (CIPDF)(2/3)



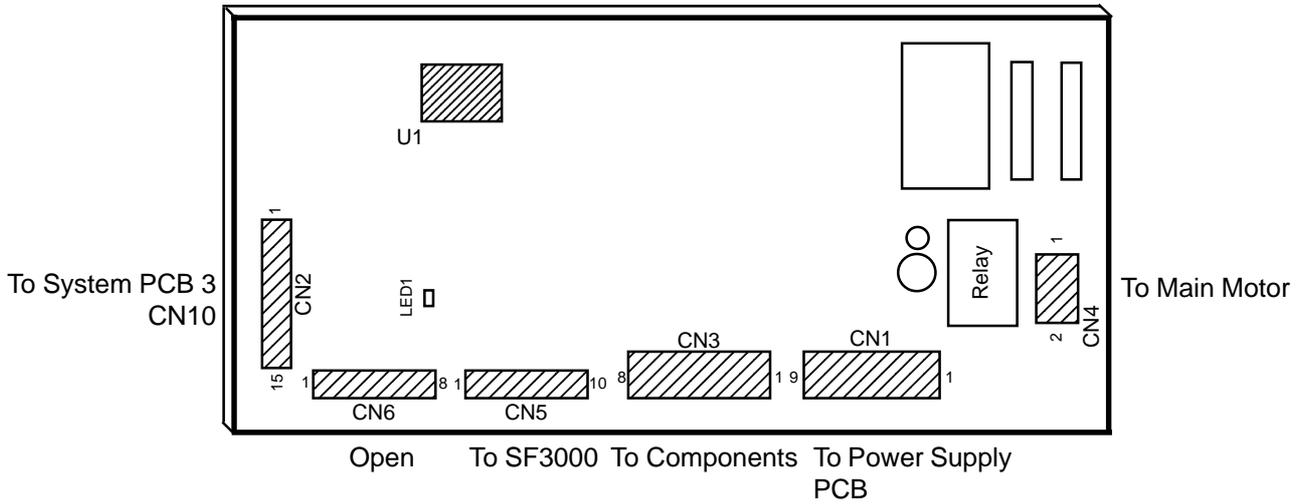
CHAPTER 24. DESCRIPTION OF PCBs

4. IMAGE PROCESSING PCB (CIPDF)(3/3)



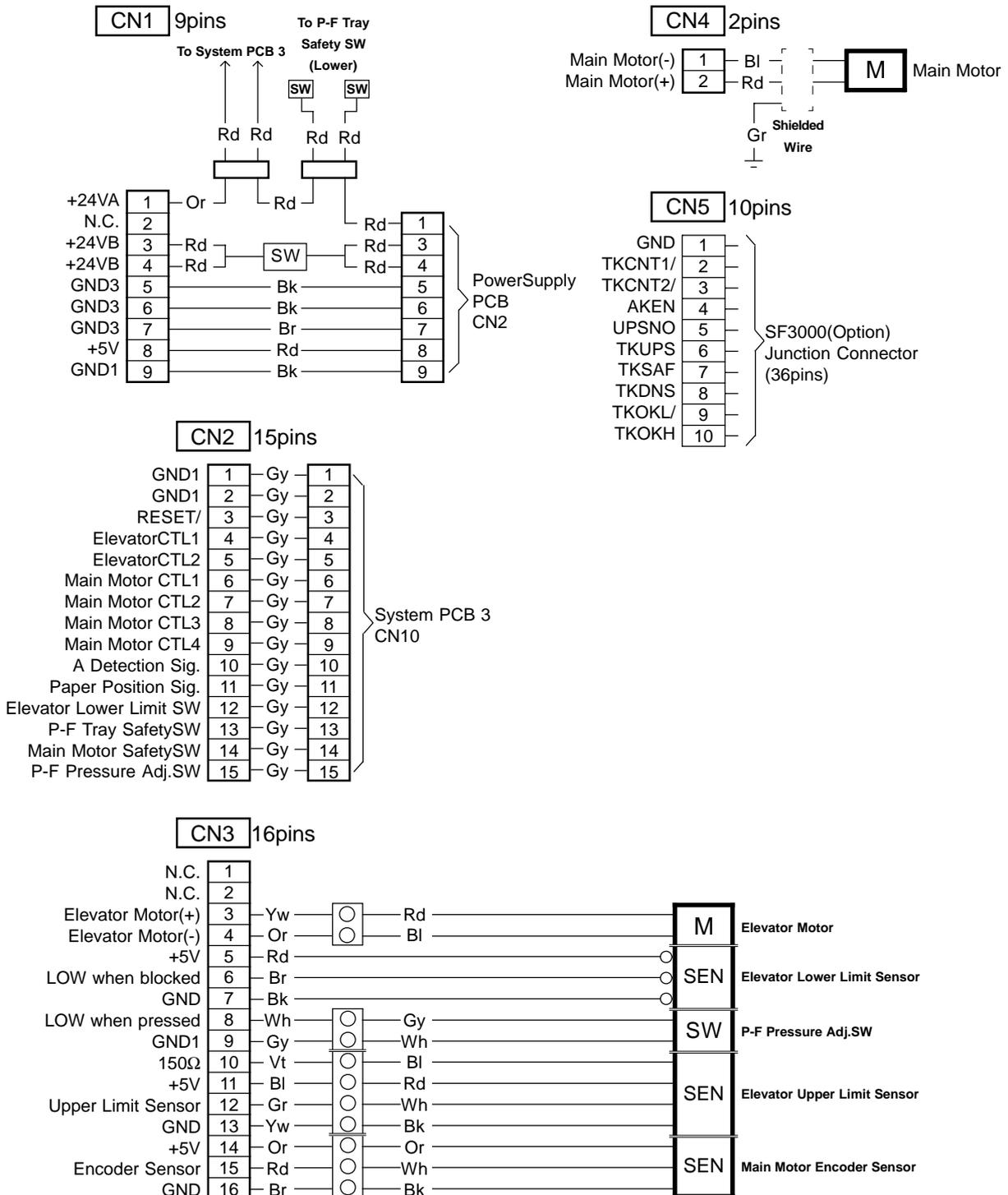
5. MOTOR CONTROL PCB

5-1. Motor Control PCB 2

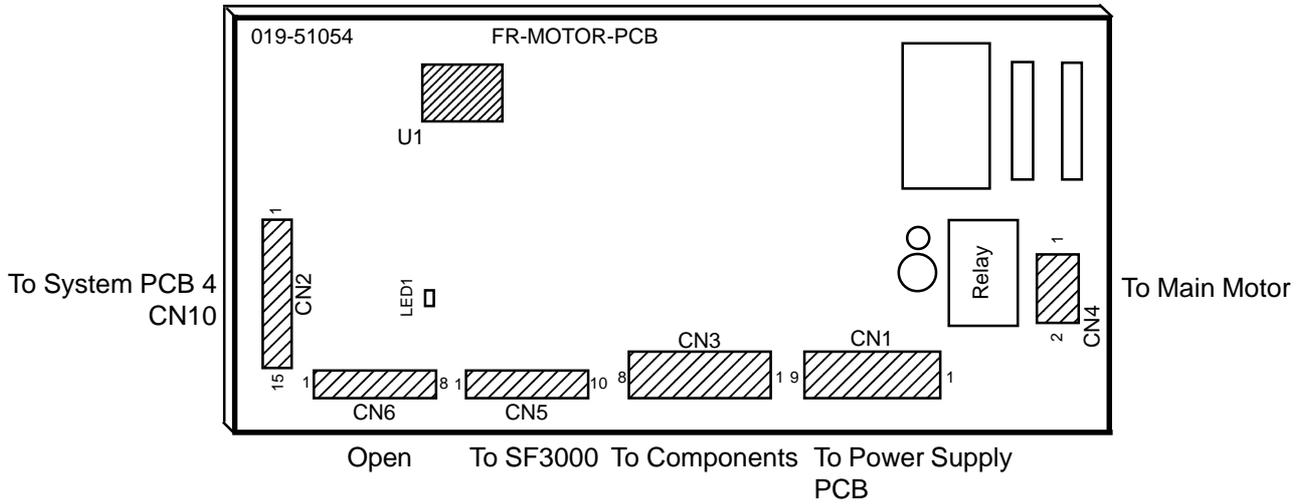


LED - When LED is ON -

LED1: The actuator of Elevator upper limit sensor is raised to open the light path.



5-2. Motor Control PCB 3



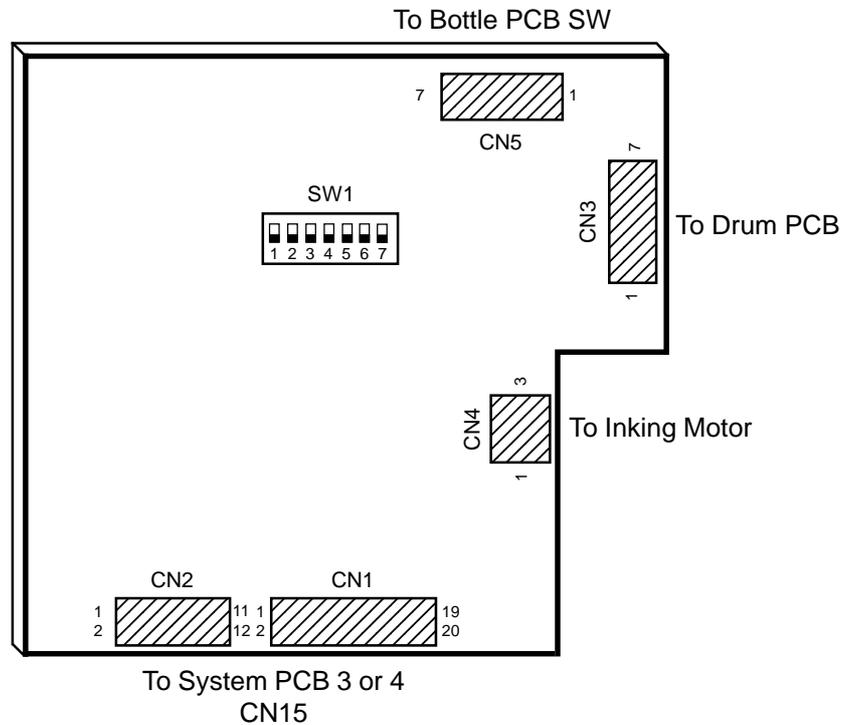
LED - When LED is ON -

LED1: The actuator of Elevator upper limit sensor is raised to open the light path.

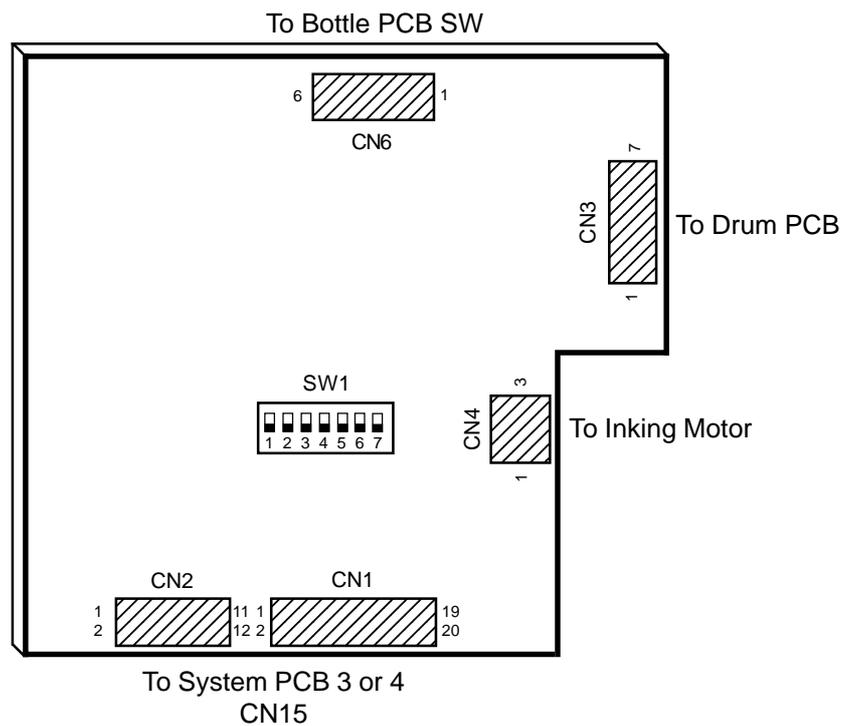
6. DRUM CONTROL PCB (1/2)

6. DRUM CONTROL PCB

6-1. DRUM CONTROL PCB3 (Black Drum)

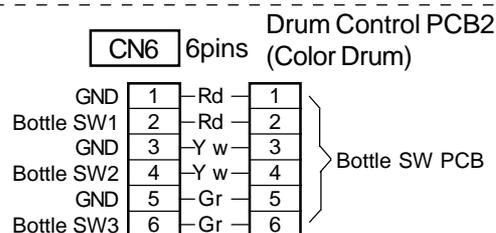
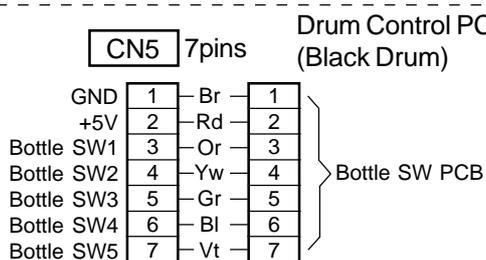
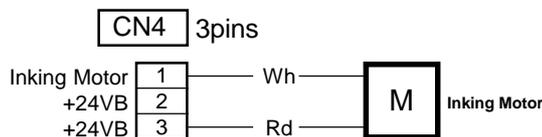
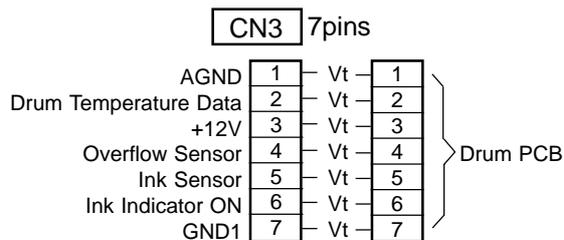
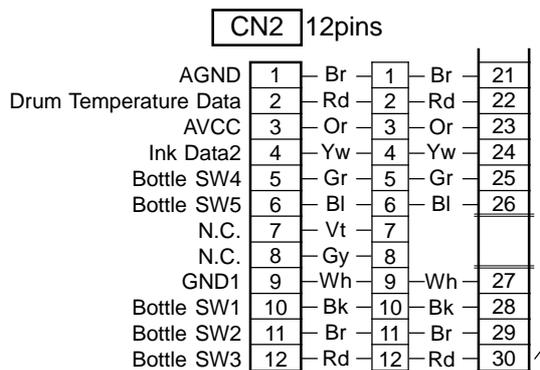
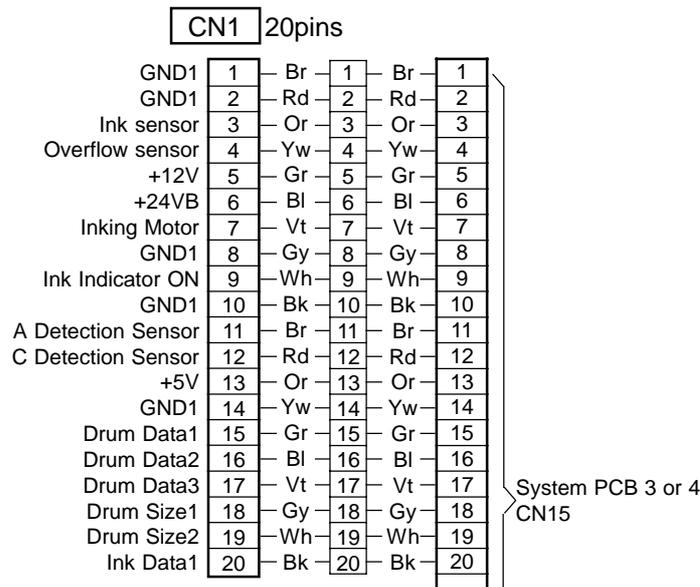


6-2. DRUM CONTROL PCB2 (Color Drum)



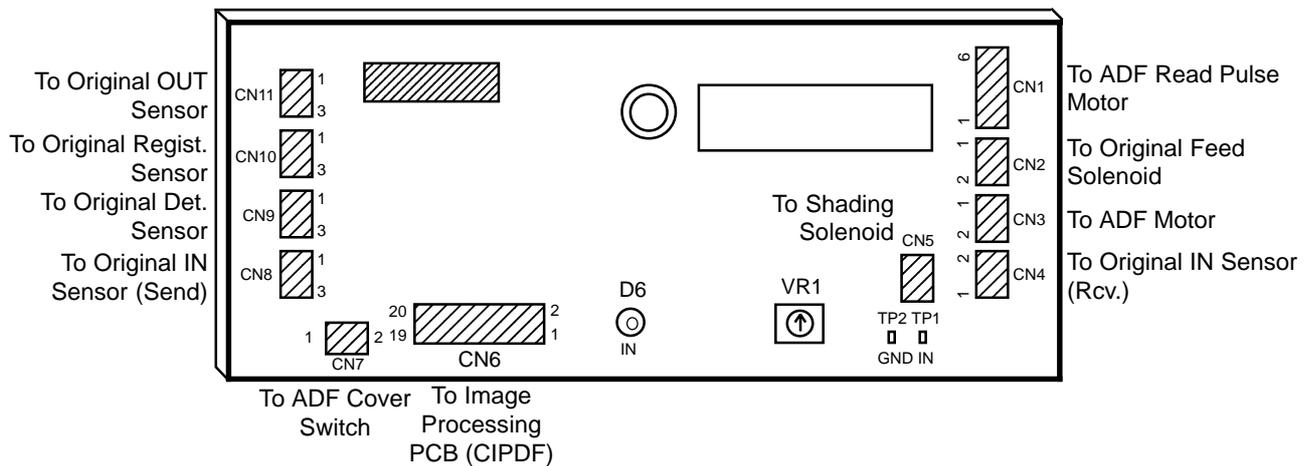
CHAPTER 24. DESCRIPTION OF PCBs

6. DRUM CONTROL PCB 3(2/2)



7. ADF PCB(1/2)

7. ADF PCB



VR

VR1 : For sensitivity adjustment of Original IN Sensor (Rcv.)

LED

- When LED is ON -

D6(IN) : The light path of the Original IN Sensor is blocked.

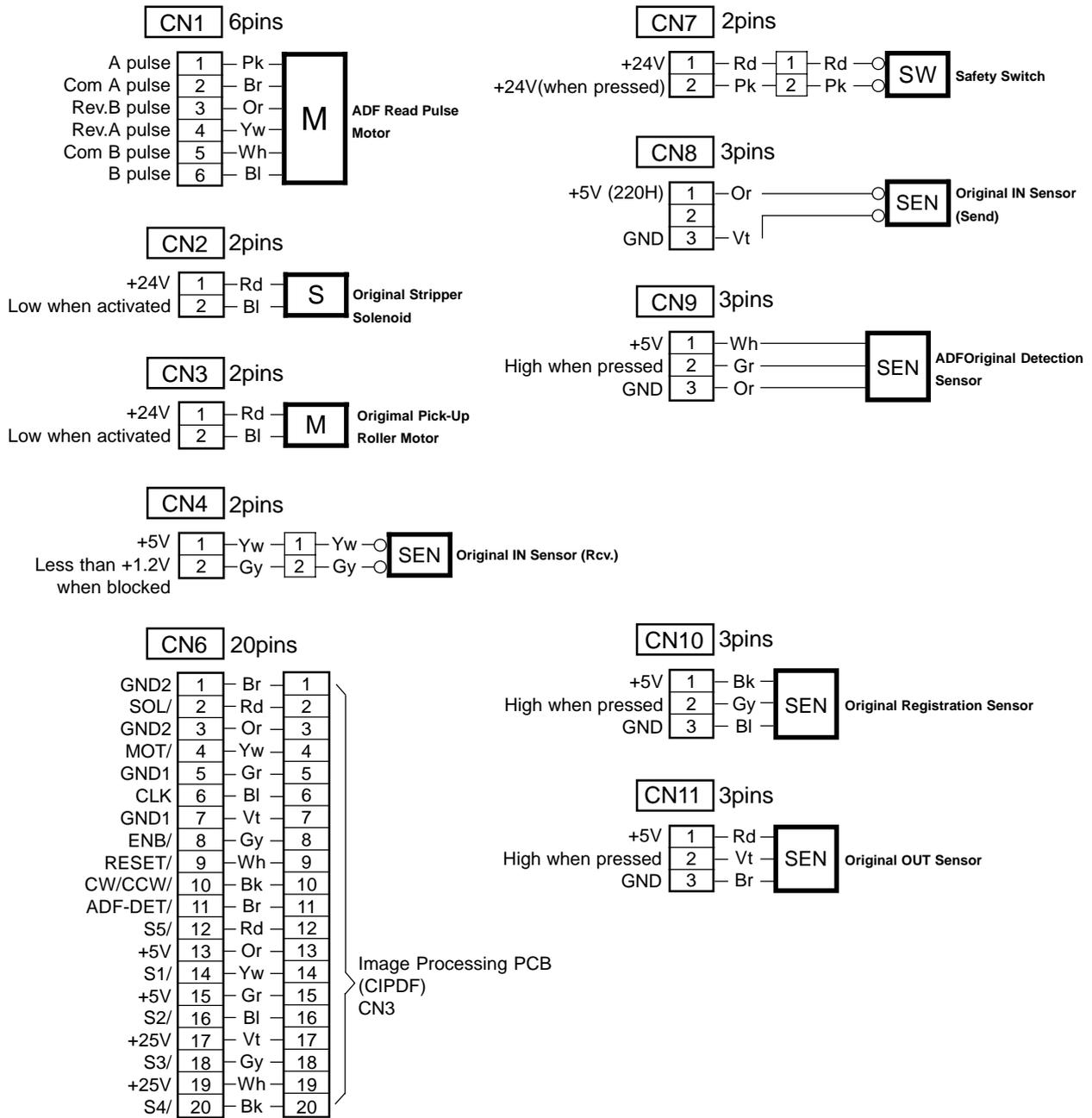
TP

TP1 (IN) : For sensitivity adjustment of Original IN Sensor

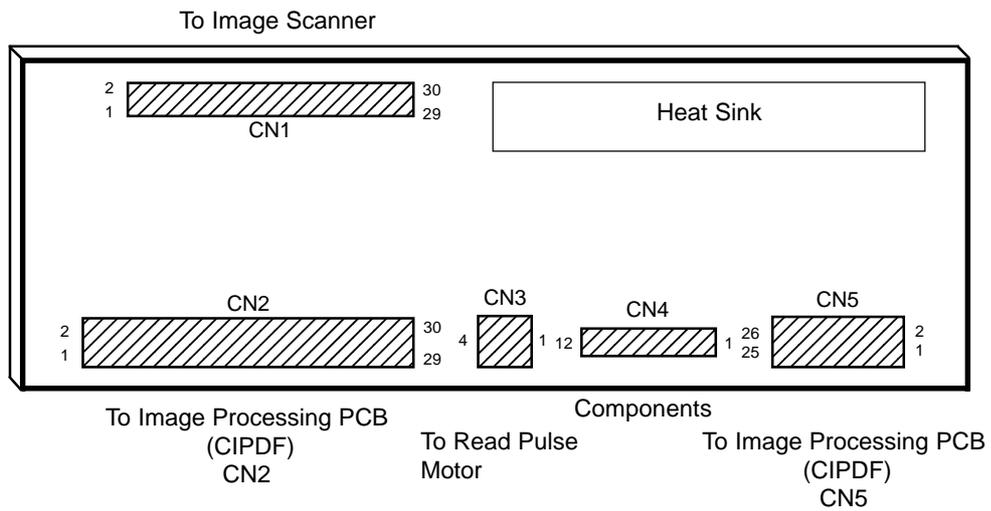
TP2 (GND): For sensitivity adjustment of Original IN Sensor (GND)

CHAPTER 24. DESCRIPTION OF PCBs

7. ADF PCB(2/2)

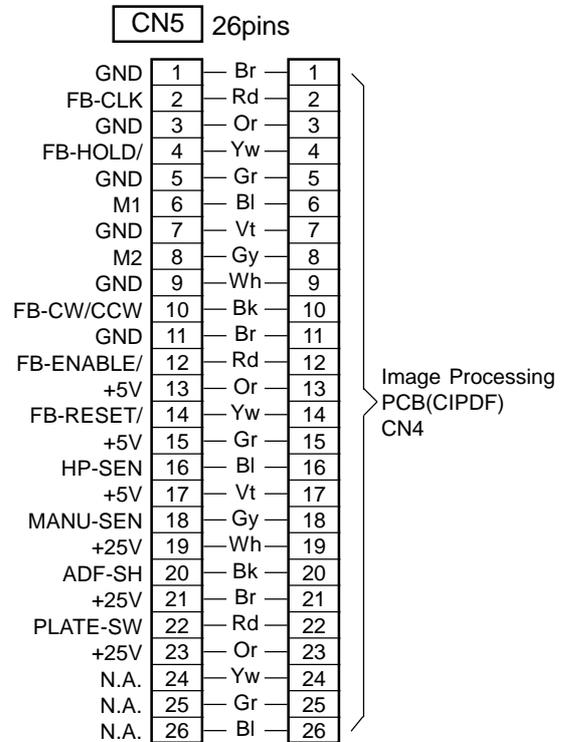
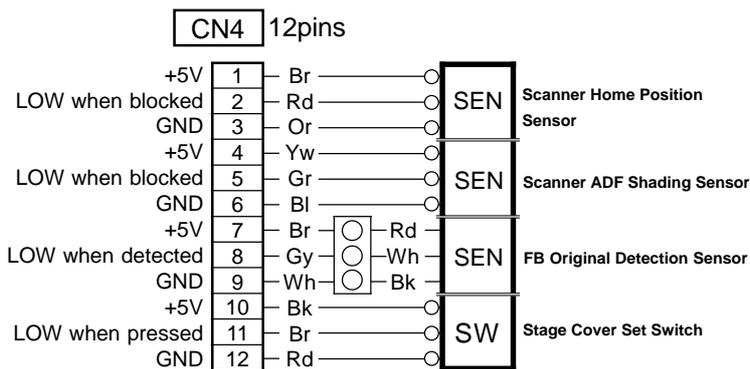
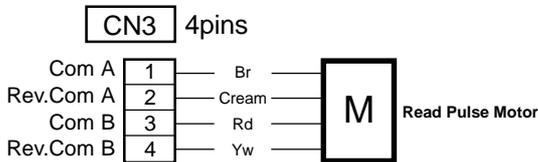
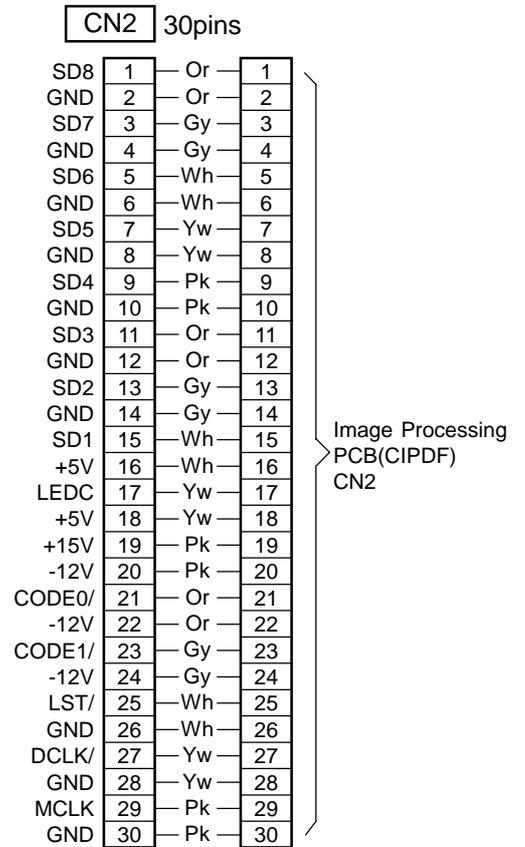
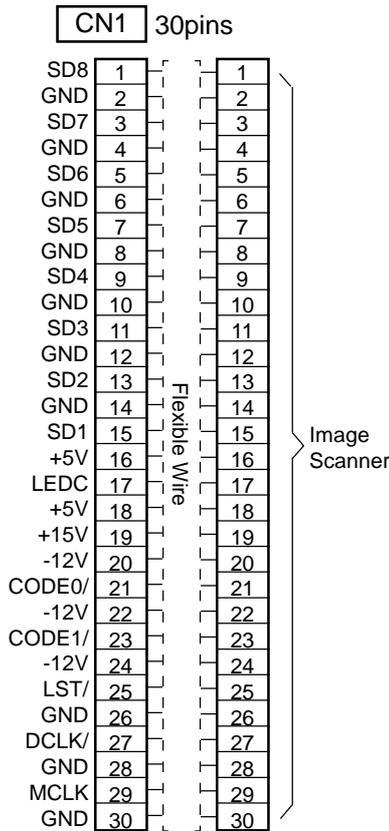


8. FLAT BED PCB 2

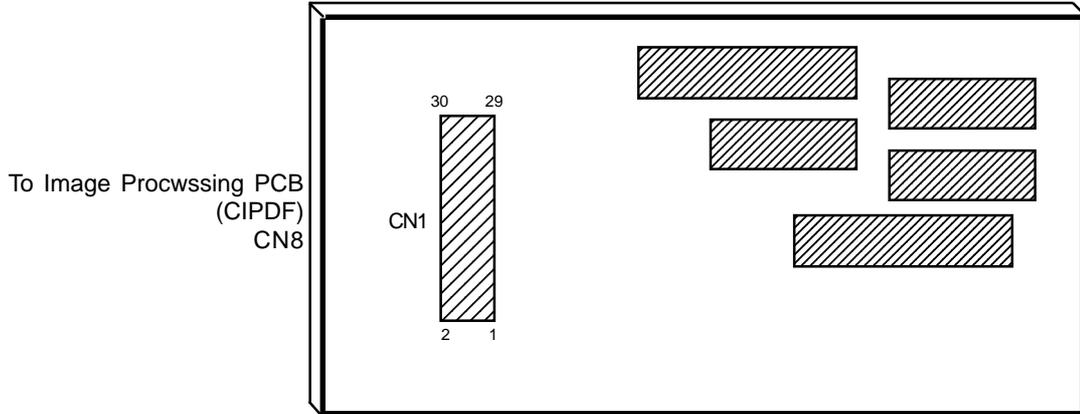


CHAPTER 24. DESCRIPTION OF PCBs

8. FLAT BED PCB 2(2/2)



9. TRIMMING PCB 2

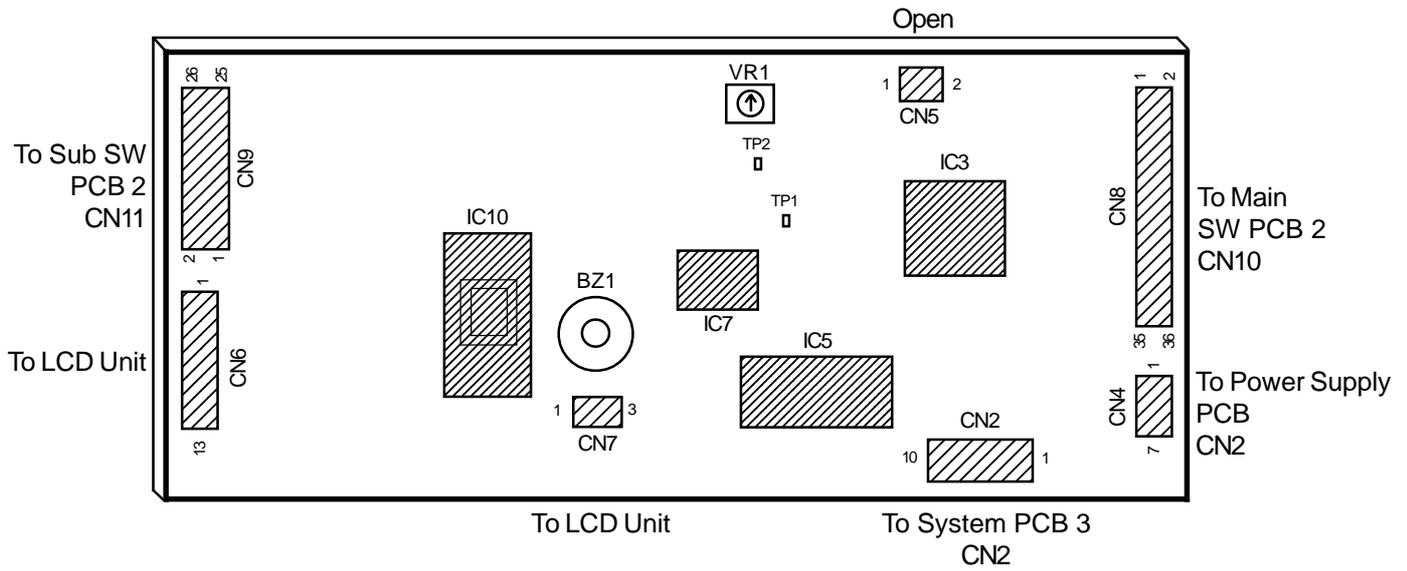


CN1 30pins	
+5V	1
+5V	2
LST/	3
VCK	4
ENABLE/	5
SOUT/	6
WHITE/	7
PS/	8
R-W-START/	9
S-K-SIG/	10
BUSY-READY/	11
END/	12
SIZE1	13
SIZE2	14
SIZE3	15
MS/	16
CLEAR/	17
TOP/	18
N.C.	19
SM/	20
PHOTO/	21
CP/	22
GND	23
GND	24
GND	25
GND	26
GND	27
GND	28
GND	29
GND	30

Image Processing PCB (CIPDF)
CN8

10. PANEL CONTROL PCB

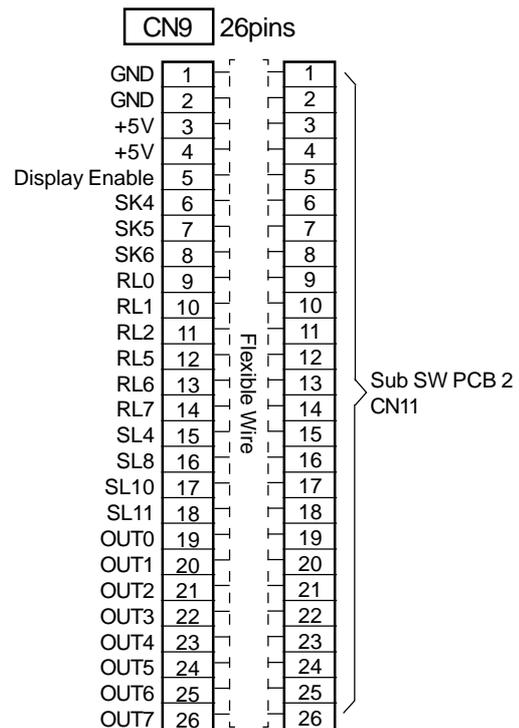
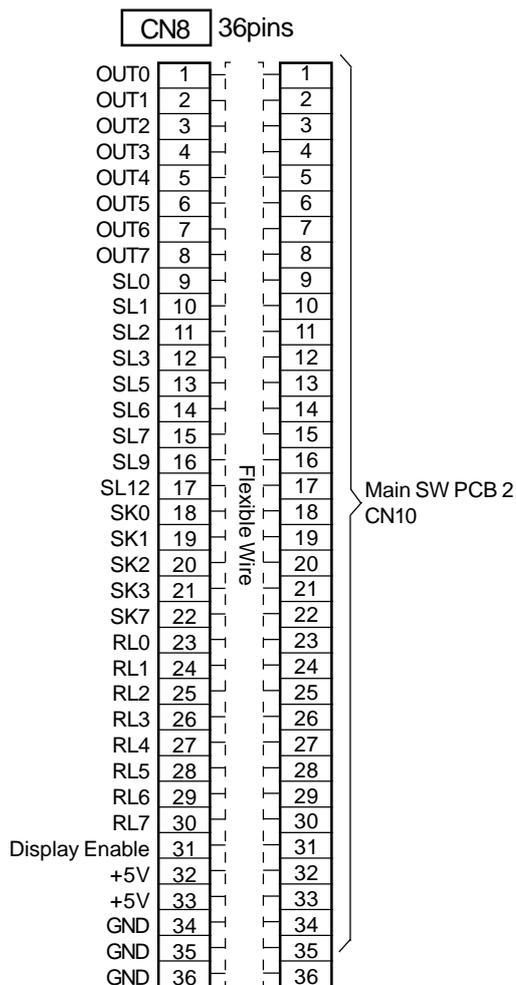
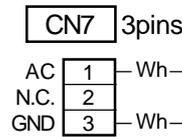
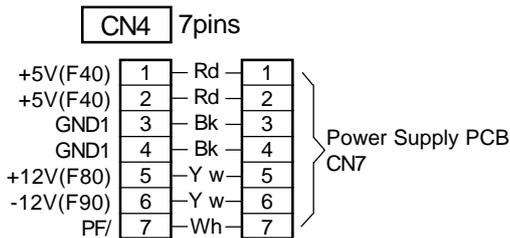
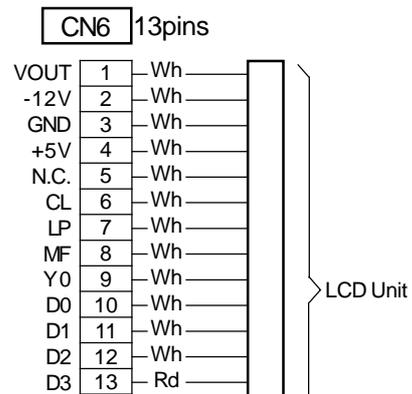
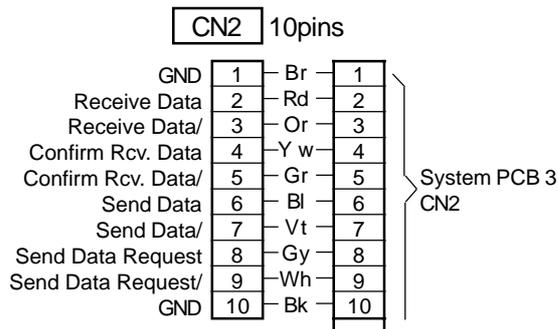
10-1. Panel Control PCB 2



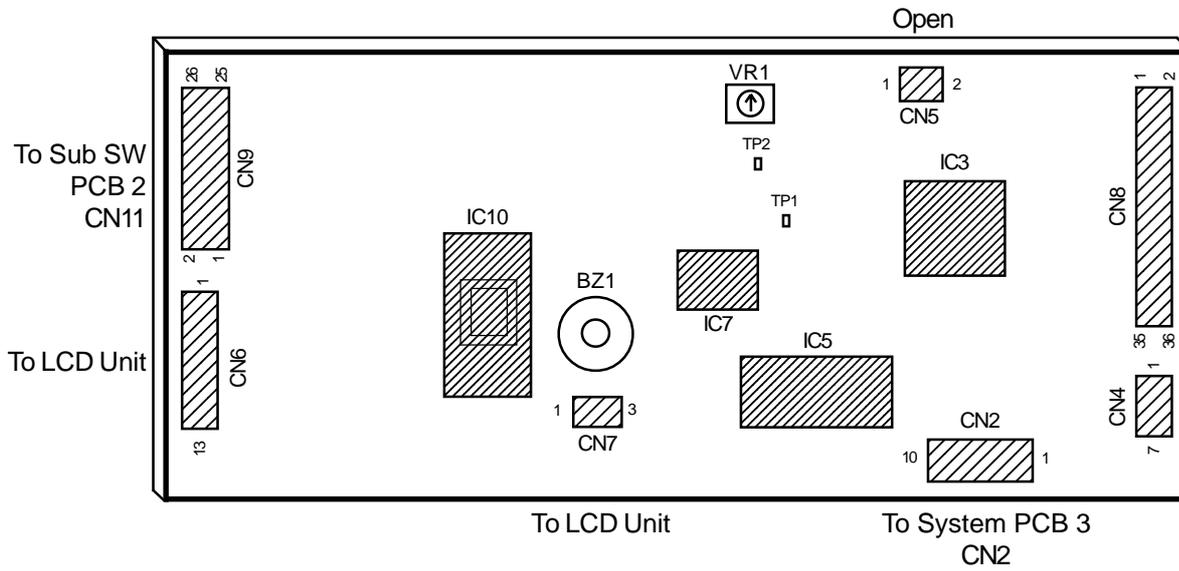
CHAPTER 24. DESCRIPTION OF PCBs

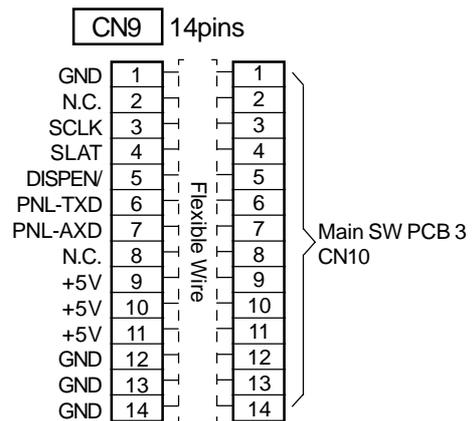
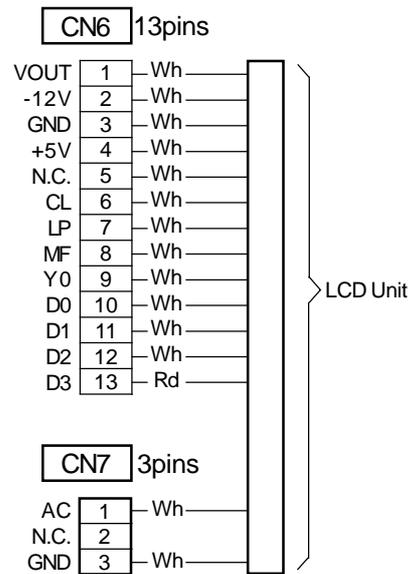
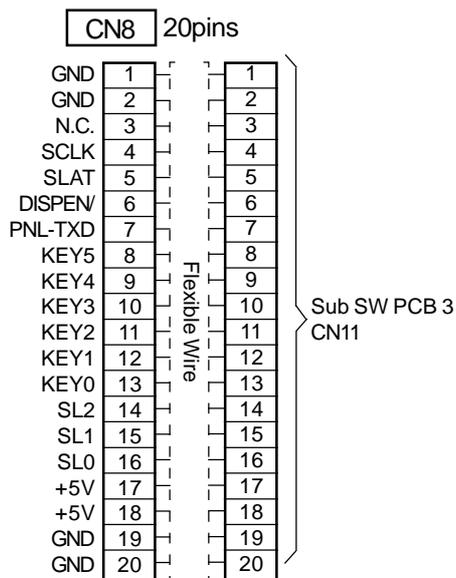
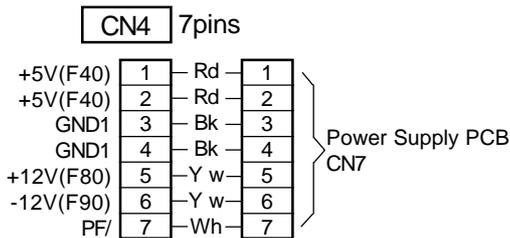
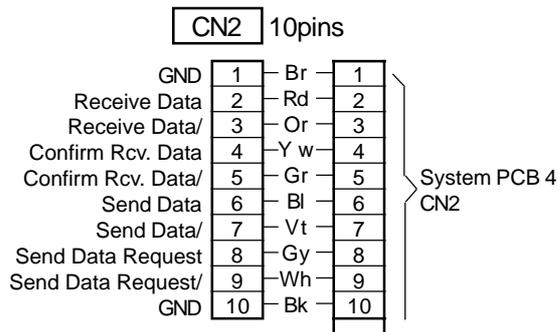
10. PANEL CONTROL PCB(2/4)

Panel Control PCB 2

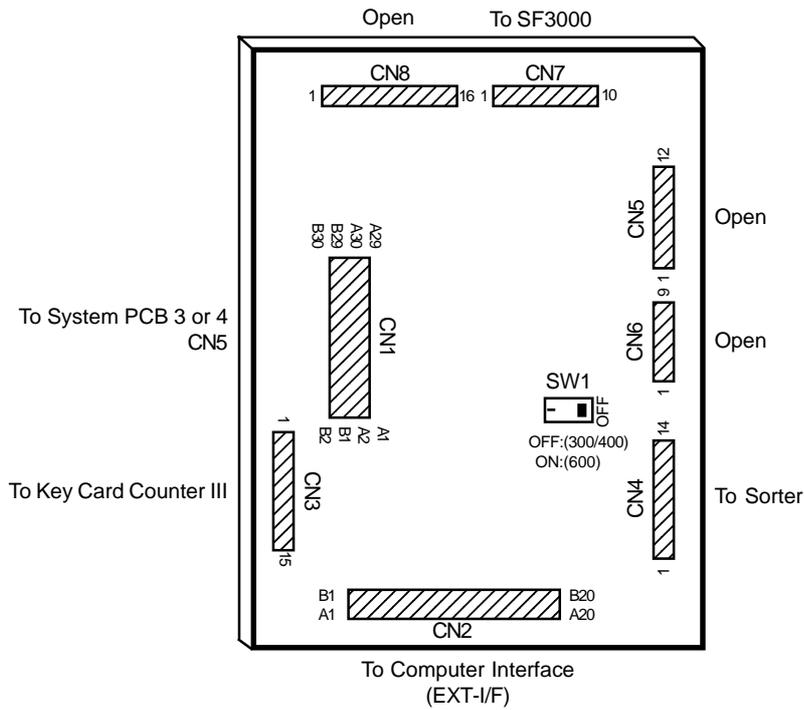


10-2. Panel Control PCB 3





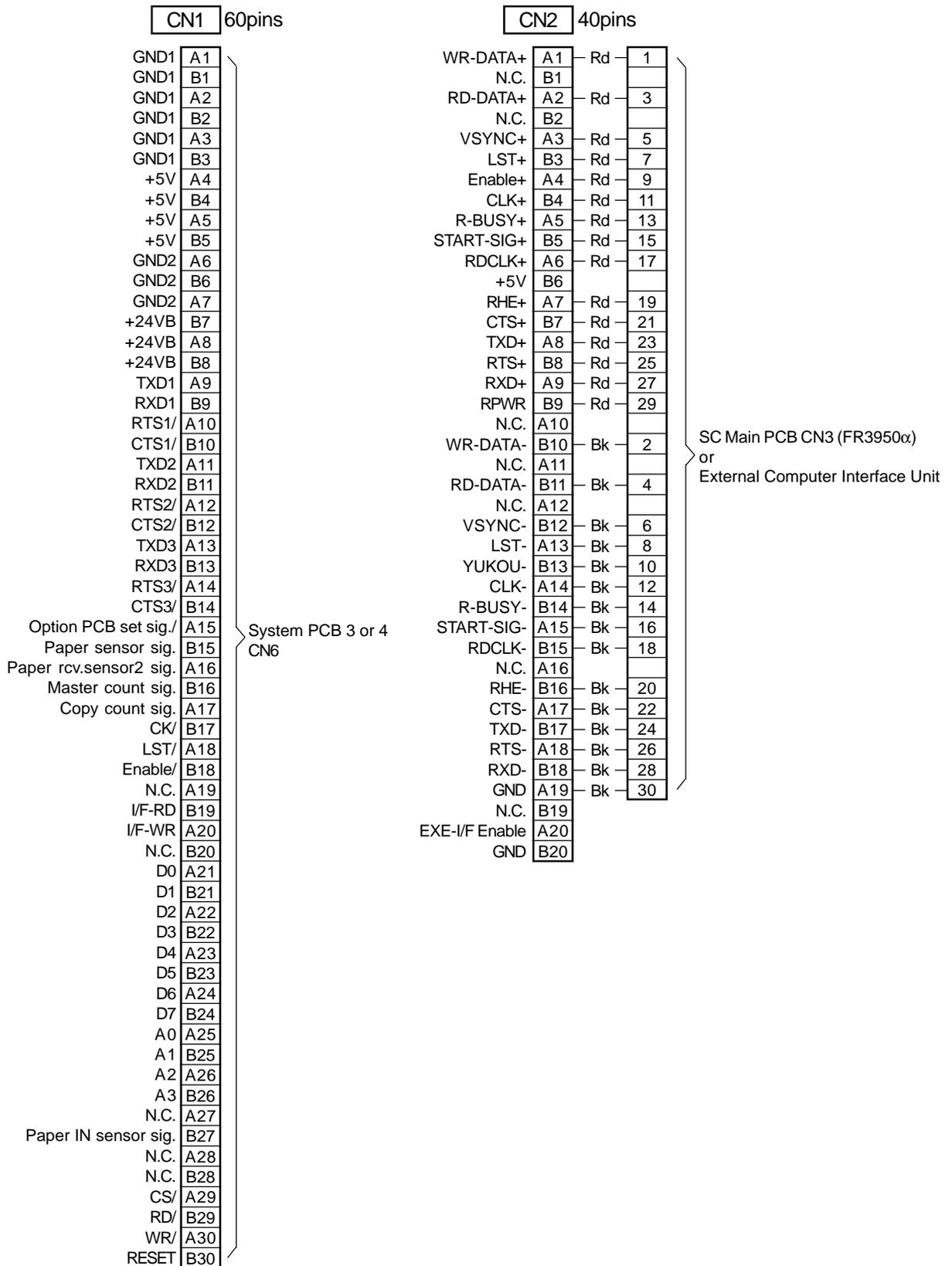
11. OPTION PCB A III



Note: FR3950α - Must set SW1 to OFF (300/400) position

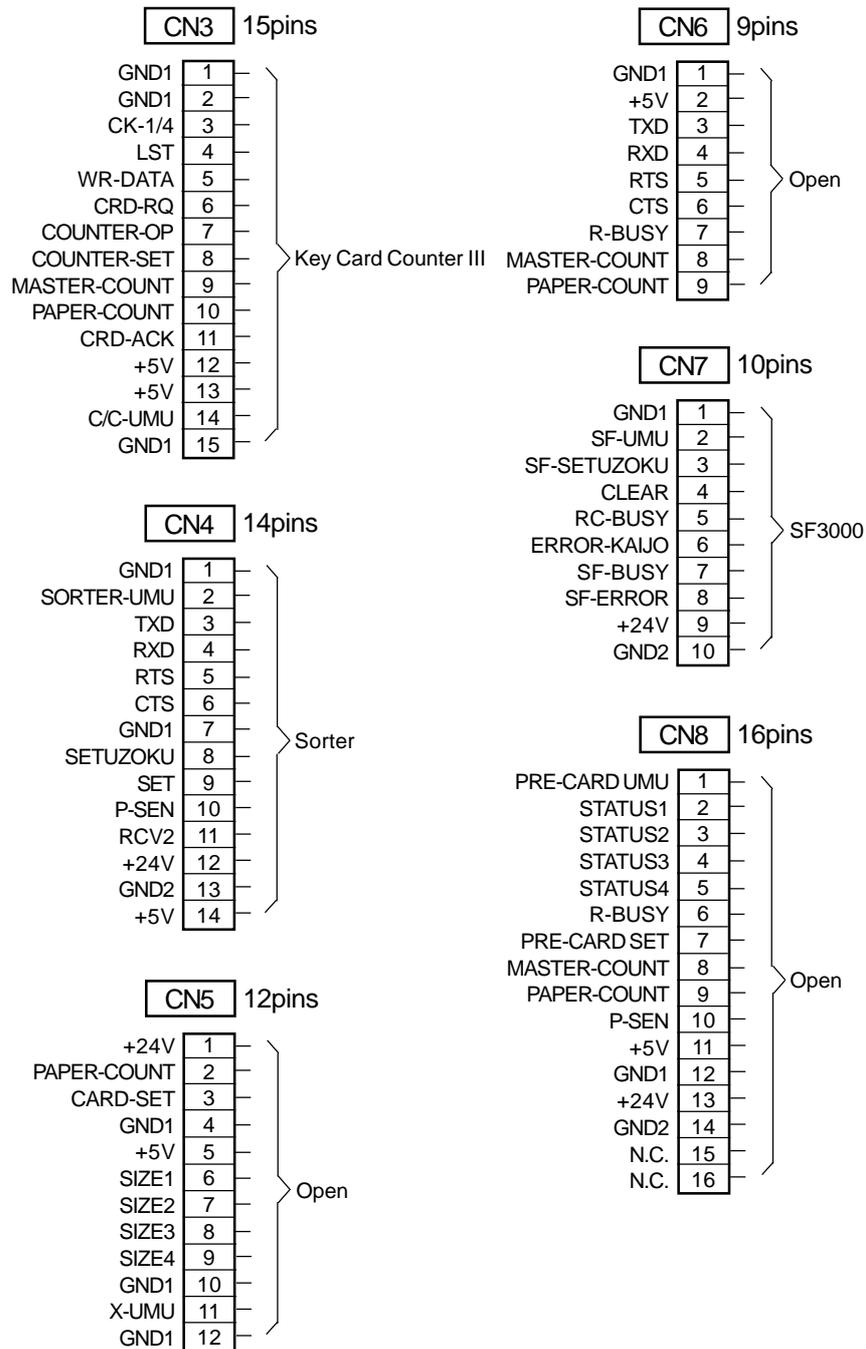
CHAPTER 24. DESCRIPTION OF PCBs

11. OPTION PCB A III(2/3)



CHAPTER 24. DESCRIPTION OF PCBs

11. OPTION PCB A III(3/3)



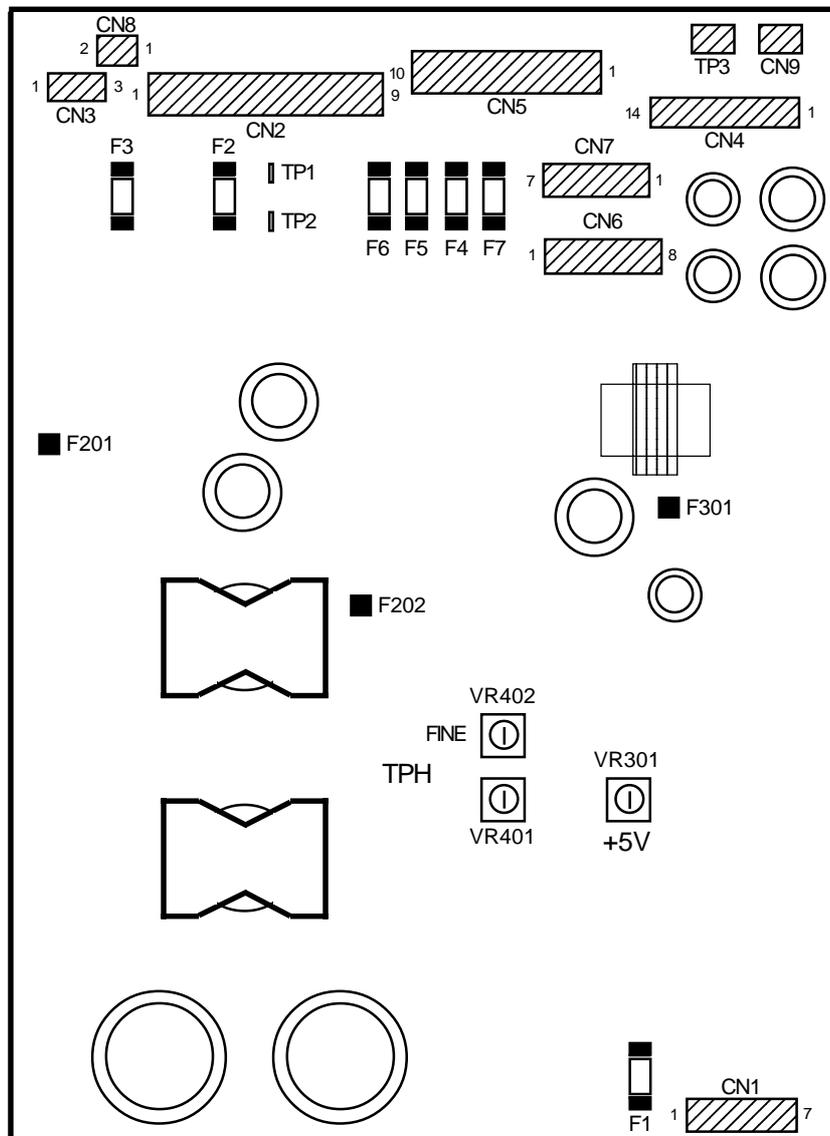
12. POWER SUPPLY PCB

FUSE REPLACEMENT

CAUTION: For continued protection against risk of fire,
replace only with same type and ratings of fuse(s).

Power Supply Model	120V Type		220-240V Type
	Nichicon 019-51038-N	Hitachi 019-51038-H	019-51023-A Nichicon
F1	10A/AC125V	10A/AC125V	T5A/AC250V
F2	8A/AC125V	8A/AC125V	T6.3A/AC250V
F3	3.15A/AC125V	3.15A/AC125V	T3.15A/AC250V
F4	3.15A/AC125V	3.15A/AC125V	T3.15A/AC250V
F5	3.15A/AC125V	3.15A/AC125V	T3.15A/AC250V
F6	3.15A/AC125V	3.15A/AC125V	T3.15A/AC250V
F7	3.15A/AC125V	3.15A/AC125V	T3.15A/AC250V
F40	N/A	3or3.15A/AC125V	N/A
F80	N/A	3or3.15A/AC125V	N/A
F90	N/A	3or3.15A/AC125V	N/A
F201	3.15A/AC125V	N/A	3.15A/AC125V
F202	3.15A/AC125V	N/A	3.15A/AC125V
F301	3.15A/AC125V	N/A	3.15A/AC125V

12-1. Power Supply PCB VII 100V (Nichicon) 019-51038-A



F1:
10A/AC125V

F2:
8A/AC125V

F3:
3.15A/AC125V

F4:
3.15A/AC125V

F5:
3.15A/AC125V

F6:
3.15A/AC125V

F7:
3.15A/AC125V

F201:
3.15A/AC125V

F202:
3.15A/AC125V

F301:
3.15A/AC125V

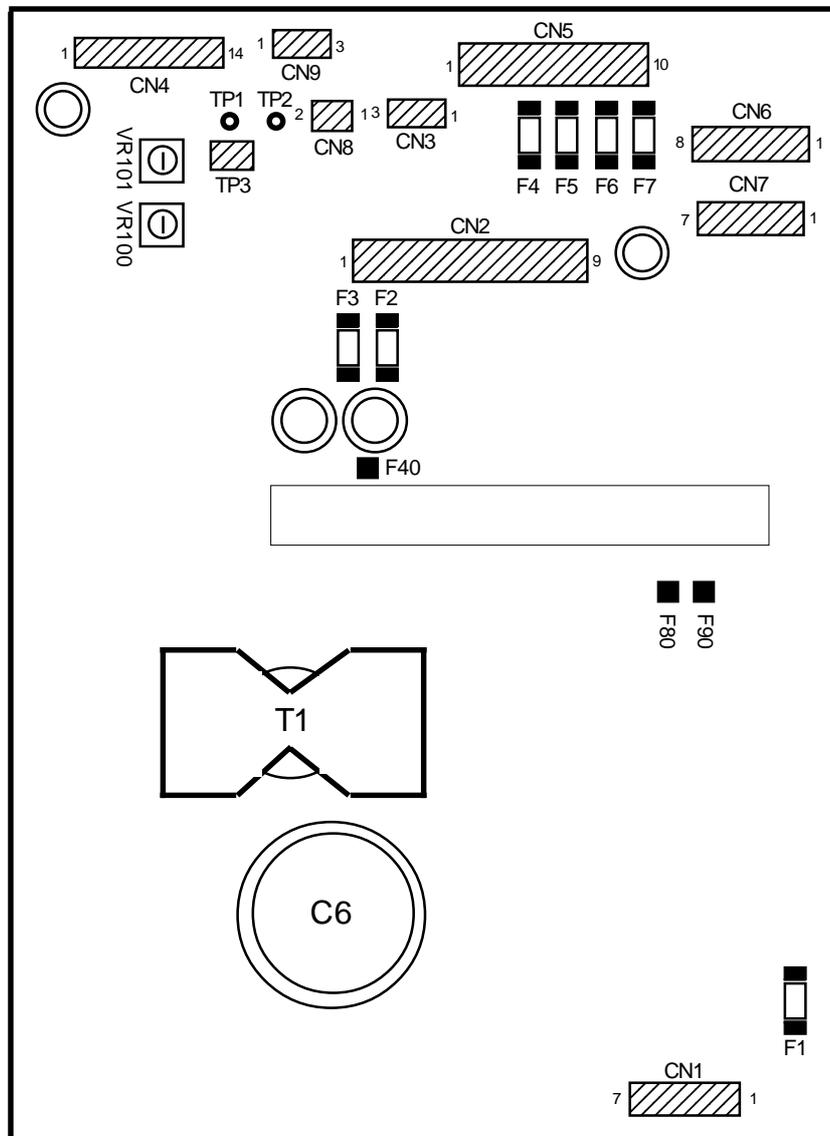
VR

- VR301 : For +5V adjustment (Factory adjustment only)
- VR401 : For TPH voltage adjustment (Rough)
- VR402 : For TPH voltage adjustment (Fine)

Connector

- | | |
|--------------------------------------|--------------------------------------|
| CN1 : AC Input | CN6 : To Image Processing PCB(CIPDF) |
| CN2 : To Motor Control PCB,Safety SW | CN7 : To Panel Control PCB |
| CN3 : To Suction Fan | CN8 : To Power Supply Fan |
| CN4 : To TPH | CN9 : N/A |
| CN5 : To System PCB | |

12-2. Power Supply PCB VII 100V (Hitachi) 019-51038-A



- F1:**
10A/AC125V
- F2:**
8A/AC125V
- F3:**
3.15A/AC125V
- F4:**
3.15A/AC125V
- F5:**
3.15A/AC125V
- F6:**
3.15A/AC125V
- F7:**
3.15A/AC125V
- F40:**
3A/AC125V
- F80:**
3A/AC125V
- F90:**
3A/AC125V

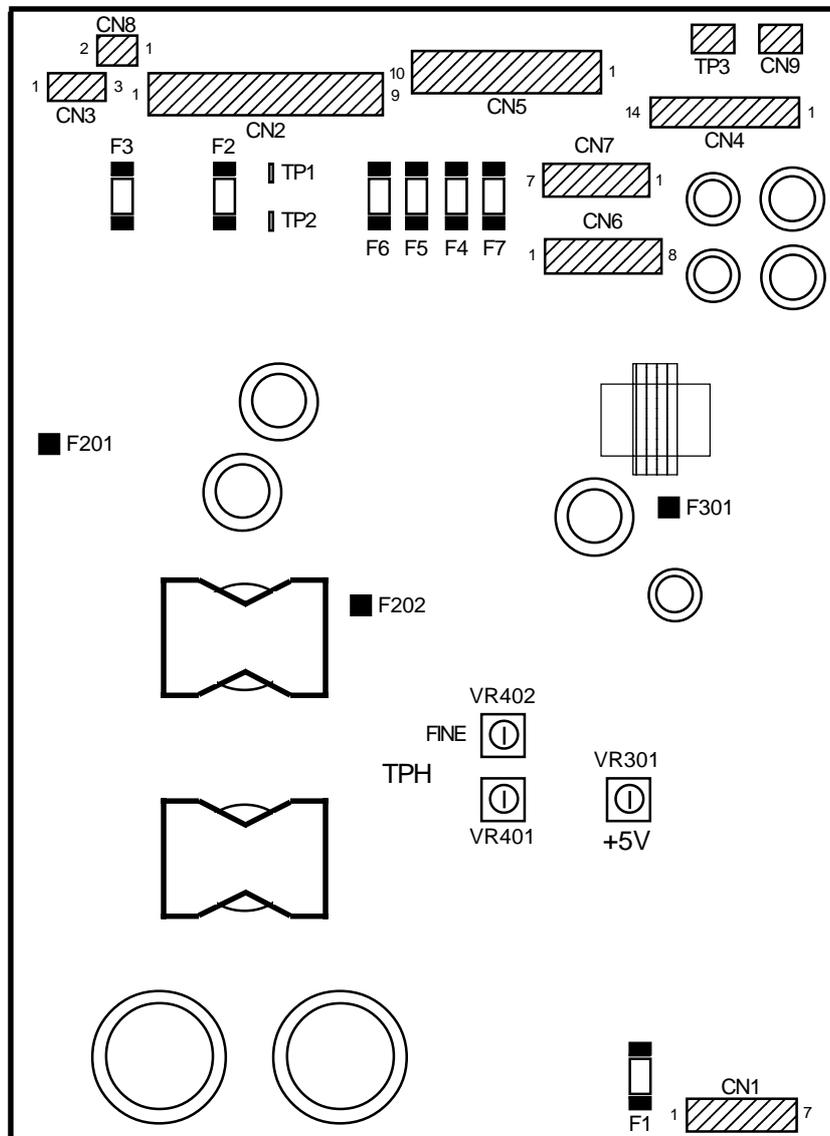
VR

VR100 : For TPH voltage adjustment (Rough)
 VR101 : For TPH voltage adjustment (Fine)

Connector

CN1 : AC Input	CN6 : To Image Processing PCB(CIPDF)
CN2 : To Motor Control PCB, Safety SW	CN7 : To Panel Control PCB
CN3 : To Suction Fan	CN8 : To Power Supply Fan
CN4 : To TPH	
CN5 : To System PCB	

12-3. Power Supply PCB N200V (Nichicon) 019-51023-A



- F1:**
5A/AC250V
- F2:**
6.3A/AC250V
- F3:**
3.15A/AC250V
- F4:**
3.15A/AC250V
- F5:**
3.15A/AC250V
- F6:**
3.15A/AC250V
- F7:**
3.15A/AC250V
- F201:**
3.15A/AC125V
- F202:**
3.15A/AC125V
- F301:**
3.15A/AC125V

VR

- VR301 : For +5V adjustment (Factory adjustment only)
- VR401 : For TPH voltage adjustment (Rough)
- VR402 : For TPH voltage adjustment (Fine)

Connector

- | | |
|--------------------------------------|--------------------------------------|
| CN1 : AC Input | CN6 : To Image Processing PCB(CIPDF) |
| CN2 : To Motor Control PCB,Safety SW | CN7 : To Panel Control PCB |
| CN3 : To Suction Fan | CN8 : To Power Supply Fan |
| CN4 : To TPH | CN9 : N/A |
| CN5 : To System PCB | |

