

Gestetner® **RICOH**® **savin**®



C218
SERVICE MANUAL

RICOH GROUP COMPANIES

PN: RCSM3600

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Ricoh Corporation

LEGEND

PRODUCT CODE	COMPANY		
	GESTETNER	RICOH	SAVIN
C218	5380	VT3600	

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Table of Contents

OVERALL MACHINE INFORMATION

1. SPECIFICATIONS	1-1
2. GUIDE TO COMPONENTS	1-4
3. OPERATION PANEL	1-6
4. PRINTING PROCESS	1-8
5. MECHANICAL COMPONENT LAYOUT	1-9
6. ELECTRICAL COMPONENT LAYOUT	1-10
7. ELECTRICAL COMPONENT DESCRIPTIONS	1-14
8. DRIVE LAYOUT	1-19

DETAILED SECTION DESCRIPTIONS

1. MASTER EJECT SECTION	2-1
1.1 OVERALL	2-1
1.2 MASTER EJECT ROLLER ROTATING MECHANISM	2-2
1.3 MASTER EJECT ROLLER DRIVE MECHANISM	2-3
1.4 MASTER EJECT CLAMPER MECHANISM	2-5
1.5 PRESSURE PLATE UP/DOWN MECHANISM	2-6
1.6 ELECTRICAL TIMING	2-8
1.7 CIRCUIT	2-11
2. SCANNER	2-12
2.1 OVERALL	2-12
2.2 SCANNER MECHANISM	2-16
2.3 PLATEN COVER POSITION DETECTION	2-17
2.4 ELECTRICAL TIMING	2-19
2.5 CIRCUIT	2-21

3. MASTER FEED SECTION.....	2-22
3.1 OVERALL.....	2-22
3.2 MASTER CLAMPER OPENING MECHANISM.....	2-23
3.3 MASTER FEEDING MECHANISM	2-24
3.3 MASTER WRAPPING MECHANISM.....	2-25
3.4 CUTTER MECHANISM	2-26
3.5 ELECTRICAL TIMING	2-27
3.6 CIRCUIT	2-30
4. PAPER FEED SECTION.....	2-31
4.1 OVERALL.....	2-31
4.2 PAPER FEED ROLLER/UPPER SEPARATION ROLLER MECHANISM	2-32
4.3 FEED ROLLER PRESSURE MECHANISM	2-33
4.4 PAPER SEPARATION MECHANISM	2-34
4.5 SEPARATION ROLLER PRESSURE RELEASE MECHANISM	2-37
4.6 SEPARATION PLATE PRESSURE RELEASE MECHANISM	2-38
4.7 PAPER RETURN MECHANISM	2-39
4.8 SECOND FEED ROLLER MECHANISM.....	2-40
4.9 PAPER TABLE SIDE ADJUSTMENT MECHANISM.....	2-43
4.10 PAPER TABLE UP/DOWN MECHANISM.....	2-44
4.11 PAPER SIZE DETECTION	2-46
4.12 ELECTRICAL TIMING	2-49
4.13 CIRCUIT.....	2-50
5. PRINTING SECTION.....	2-51
5.1 OVERALL.....	2-51
5.2 PAPER DETECTING AND PRINTING PRESSURE ON/OFF MECHANISM	2-52

5.3 PRINTING PRESSURE ON/OFF MECHANISM FOR A4/LT DRUM	2-53
5.4 PRINTING PRESSURE RELEASE MECHANISM.....	2-54
5.5 CIRCUIT	2-55
6. DRUM SECTION	2-56
6.1 OVERALL.....	2-56
6.2 DRUM ROTATION MECHANISM	2-57
6.3 DRUM LOCK MECHANISM 1	2-58
6.4 DRUM LOCK MECHANISM 2	2-59
6.5 DRUM LOCK MECHANISM 3	2-60
6.6 DRUM CONNECTION MECHANISM	2-61
6.7 INK SUPPLY MECHANISM.....	2-62
6.8 INK KNEADING MECHANISM.....	2-63
6.9 DRUM MASTER DETECTION.....	2-64
6.10 DRUM TYPE IDENTIFICATION	2-65
6.11 INK DETECTION	2-66
6.12 CIRCUIT.....	2-68
7. DELIVERY SECTION.....	2-70
7.1 OVERALL.....	2-70
7.2 EXIT PAWL DRIVE MECHANISM.....	2-71
7.3 VACUUM UNIT DRIVE MECHANISM.....	2-72
7.4 PAPER EXIT PAWL AIR PUMP MECHANISM.....	2-73
7.5 WING GUIDE MECHANISM	2-74
7.6 PAPER DELIVERY TABLE	2-75
7.6.1 Master Eject Unit Lock Mechanism	2-75
7.6.2 Paper Delivery Table Angle	2-76
7.7 ELECTRICAL TIMING	2-77
7.8 CIRCUIT.....	2-78

8. IMAGE POSITIONING SECTION	2-79
8.1 OVERALL	2-79
8.2 IMAGE POSITIONING MECHANISM	2-80
8.3 CIRCUIT	2-81
9. IMAGE PROCESSING	2-82
9.1 CCD (CHARGE COUPLED DEVICE)	2-82
9.2 A/D CONVERSION PCB	2-84
9.2.1 Overview	2-84
9.2.2 Inversion and Amplification	2-85
9.2.3 A/D Conversion	2-86
9.2.4 Reference Data Correction	2-89
9.3 IMAGE PROCESSING PCB	2-95
9.3.1 Overview	2-95
9.3.2 MTF Correction	2-97
9.3.3 Main Scan Magnification And Image Shift Processing	2-100
9.3.4 Binary Processing	2-102
9.3.5 Photo Data Compensation Processing	2-103
9.3.6 Half-tone Processing	2-105
9.3.7 Make-up Processing	2-110
9.4 PLOTTER	2-123
9.4.1 Overview	2-123
9.4.2 Thermal Head Description	2-124
9.4.3 Thermal Head Drive	2-126
9.4.4 Thermal Head Protection	2-129
10. OTHERS	2-131
10.1 INTERLOCK SWITCH	2-131
10.2 MONITOR INDICATION	2-132
10.2.1 Cover Open Indicator	2-132
10.2.2 Key Counter Indicator	2-132
10.2.3 Master Eject Box Indicator	2-133

10.2.4 Ink Supply Indicator	2-133
10.2.5 Master Supply Indicator	2-134
10.2.6 Paper Supply Indicator.	2-134
10.2.7 Master Eject Error Message.	2-135
10.2.8 Paper Misfeed Message	2-135
10.2.9 Paper Delivery Error Message.	2-135
10.2.10 Paper Wrap Message 1	2-136
10.2.11 Paper Wrap Message 2	2-136
10.2.12 Master Clamp Error Message	2-136
10.2.13 Original Misfeed Indication.	2-137
10.2.14 Other Guidance Displays	2-138
10.2.15 Other Monitor Indications.	2-139
10.3 MASTER PLOTTING AND PRINTING AREA	2-140
10.4 PAPER MISFEED DETECTION	2-144
10.5 PROTECTION FROM OVERCURRENT	2-145

INSTALLATION

1. INSTALLATION REQUIREMENTS.	3-1
1.1 ENVIRONMENT.	3-1
1.2 ACCESS TO THE MACHINE.	3-2
1.3 POWER SOURCE	3-2
1.4 ACCESSORY CHECK.	3-3
1.5 INSTALLATION PROCEDURE	3-4
1.5.1 MAIN BODY.	3-4
1.6 COLOR DRUM UNIT	3-10
1.6.1 Key Counter	3-12

SERVICE TABLES

1. SERVICE TABLES	4-1
1.1 MAINTENANCE TABLES	4-1
1.1.1 Lubrication Points.	4-1

1.1.2 User's Maintenance	4-4
1.1.3 Table of Periodic Inspection (every 6 months)	4-4
1.1.4 Table of Periodic Inspection (every 12 months)	4-4
1.2 TABLE OF SERVICE CALL CODES	4-6
1.3 TABLE OF DIP SW, LED, VR, TP (ON THE MAIN CONTROL PCB)	4-8
1.3.1 DIP SW	4-8
1.3.2 Photodiode	4-8
1.3.3 VR	4-9
1.3.4 TP	4-9
1.4 EXPECTED LIFE OF PARTS	4-10
1.5 SPECIAL TOOLS	4-10
2. SERVICE PROGRAM MODE	4-11
2.1 SERVICE PROGRAM MODE OPERATION	4-11
2.1.1 Service Program Mode Access Procedure (for engineers)	4-11
2.1.2 Service Program Mode Access Procedure (for users)	4-12
2.1.3 Change Adjustment Values or Modes	4-12
2.2 SERVICE PROGRAM TABLE	4-13
2.3 THERMAL HEAD TEST	4-28
2.4 COMMAND SHEET CHECK	4-29
2.5 INPUT/OUTPUT CHECK MODE	4-30
2.5.1 Input Check Mode Access Procedure	4-30
2.5.2 Output Check Mode Access Procedure	4-30
2.5.3 Input Check Table	4-31
2.5.4 Output Check Table	4-34
2.6 USER CODE MODE	4-36
2.6.1 User Codes	4-36
2.6.2 How To Use a User Code	4-36
3. DRUM/MASTER INTERCHANGEABILITY	4-37

REPLACEMENT AND ADJUSTMENT

1. EXTERIOR	5-1
--------------------------	------------

1.1 EXTERIOR COVERS	5-1
2. SCANNER SECTION	5-2
2.1 ADJUSTING THE SCANNER POSITION	5-2
2.2 FLUORESCENT LAMP	5-4
2.3 A/D CONVERSION PCB	5-5
2.4 SCANNER TIMING BELTS	5-6
3. OPTICS SECTION	5-7
3.1 OVERVIEW	5-7
3.2 PREPARATION FOR ADJUSTMENT	5-7
3.3 ADJUSTING THE REDUCTION RATIO (MOIRE ADJUSTMENT)	5-8
3.4 ADJUSTING THE FOCUS (MTF ADJUSTMENT)	5-8
3.5 ADJUSTING THE READING START POSITION IN THE MAIN SCAN DIRECTION	5-9
3.6 ADJUSTING THE SCAN LINE POSITION	5-9
3.7 ADJUSTING THE SHADING PLATE	5-10
3.8 ADJUSTING THE WHITE LEVEL AND BLACK LEVEL	5-10
4. MASTER FEED SECTION	5-11
4.1 ADJUSTING THE THERMAL HEAD POSITION	5-11
4.2 THERMAL HEAD	5-12
5. IMAGE ADJUSTMENT	5-13
5.1 SUB SCAN MAGNIFICATION ADJUSTMENT	5-13
5.2 IMAGE CENTER ADJUSTMENT (Side to Side)	5-13
5.3 SCANNER LEADING EDGE REGISTRATION ADJUSTMENT	5-14
6. MASTER FEED SECTION	5-15
6.1 ADJUSTING THE THERMAL HEAD VOLTAGE	5-15
6.2 ADJUSTING THE BELT TENSION	5-16
6.3 ADJUSTING THE RIGHT AND LEFT CUTTER SWITCHES ..	5-17

6.4 CUTTER	5-18
6.5 THERMAL HEAD	5-19
6.6 THERMAL HEAD DRIVE PCB.....	5-20
7. MASTER EJECT SECTION.....	5-21
7.1 ADJUSTING THE MASTER EJECT SENSOR	5-21
7.2 ADJUSTING THE MASTER EJECT SOLENOID.....	5-22
7.3 ADJUSTING THE AIR KNIFE MOTOR SAFETY SWITCH....	5-23
7.4 MASTER EJECT UNIT.....	5-24
7.5 MASTER EJECT SENSOR	5-25
7.6 MASTER EJECT BELT/ROLLER	5-26
8. PAPER FEED SECTION	5-27
8.1 ADJUSTING THE PAPER TABLE OPEN SWITCH	5-27
8.2 ADJUSTING THE PAPER TABLE HEIGHT	5-28
8.3 ADJUSTING THE SEPARATION PLATE RELEASE SOLENOID.....	5-29
8.4 ADJUSTING THE PAPER FEED ROLLER PRESSURE	5-31
8.5 ADJUSTING THE LOWER GUIDE PLATE	5-33
8.6 ADJUSTING THE UPPER SECOND FEED ROLLER.....	5-34
8.7 ADJUSTING THE SEPARATION PLATE PRESSURE	5-35
8.8 ADJUSTING THE FEED-LENGTH OF THE PAPER FEED ROLLER	5-36
8.9 ADJUSTING THE CLEARANCE OF THE PAPER FEED SECTOR GEAR STOPPER	5-37
8.10 ADJUSTING THE CLEARANCE OF THE SECOND FEED ROLLER SECTOR STOPPER	5-38
8.11ADJUSTING THE FEED-LENGTH OF THE SECOND FEED ROLLER	5-39
8.12 ADJUSTING THE FEED TIMING OF THE SECOND FEED ROLLER	5-40
8.13 PAPER FEED ROLLER.....	5-42

8.14 PAPER FEED ROLLER UNIT	5-43
8.15 UPPER SEPARATION ROLLER	5-44
8.16 SEPARATION PLATE RELEASE SOLENOID AND PAPER RETURN MOTOR	5-45
8.17 SEPARATION PLATE/LOWER SEPARATION ROLLER	5-46
9. PRINTING SECTION	5-47
9.1 ADJUSTING THE CLEARANCE OF THE PAPER DETECTING ARM	5-47
9.2 ADJUSTING THE PRESS ROLLER POSITION 1	5-48
9.3 ADJUSTING THE PRESS ROLLER POSITION 2 (FOR THE A4/LT DRUM)	5-49
9.4 ADJUSTING THE PRESSURE TIMING	5-50
9.5 ADJUSTING THE PRINTING PRESSURE	5-51
9.6 ADJUSTING THE CLEARANCE OF THE PRINTING PRESSURE SOLENOID	5-52
9. PRESS ROLLER	5-53
10. DRUM SECTION	5-54
10.1 ADJUSTING THE MAIN DRIVE BELT TENSION	5-54
10.2 ADJUSTING THE DRUM MASTER DETECTION SENSOR	5-55
10.3 ADJUSTING THE PRINTING SPEED	5-56
10.4 ADJUSTING THE DRUM STOPPER	5-57
10.5 ADJUSTING THE DRUM LOCK SOLENOID	5-58
10.6 ADJUSTING THE MASTER FEED CLAMPER CAM	5-59
10.7 ADJUSTING THE MASTER EJECT CLAMPER CAM	5-60
10.8 ADJUSTING THE POSITION OF THE INK DETECTING PIN	5-61
10.9 ADJUSTING THE CLEARANCE OF THE DOCTOR ROLLER	5-62
10.10 ADJUSTING THE INK ROLLER WITH THE DRUM UNIT	5-63

10.11 ADJUSTING THE POSITION OF THE INK SUPPLY SOLENOID.....	5-64
10.12 ADJUSTING INK DETECTION	5-65
10.13 SCREEN	5-66
10.14 DRUM DRIVE BELT.....	5-67
11. DELIVERY SECTION.....	5-71
11.1 ADJUSTING THE FIRST PAPER EXIT SENSOR	5-71
11.2 ADJUSTING THE SECOND PAPER EXIT SENSOR	5-72
11.3 ADJUSTING THE CLEARANCE OF THE EXIT PAWL.....	5-73
11.4 ADJUSTING THE EXIT PAWL TIMING.....	5-74
11.5 ADJUSTING THE PAPER EXIT PAWL AIR PUMP	5-75
11.6 TRANSPORT UNIT	5-76
11.7 DELIVERY BELT	5-77
11.8 TRANSPORT VACUUM FAN AND PAPER EXIT SENSORS.....	5-78
12. IMAGE POSITIONING SECTION	5-79
12.1 ADJUSTING THE IMAGE POSITION	5-79

TROUBLESHOOTING

1. ELECTRICAL COMPONENT TROUBLE	6-1
2. TROUBLESHOOTING.....	6-5
2.1 IMAGE TROUBLE	6-5
2.2 PAPER FEED TROUBLE.....	6-9

TAPE MARKER

1. SPECIFICATIONS	7-1
2. BASIC OPERATION	7-2
2.1 OVERVIEW	7-2
2.2 DRIVE AND CUTTING MECHANISM	7-3

2.3 MANUAL CUT	7-4
3. INSTALLATION	7-5
3.1 ACCESSORY CHECK	7-5
3.2 INSTALLATION PROCEDURE	7-6
4. REPLACEMENT AND ADJUSTMENT	7-8
4.1 CUTTER REPLACEMENT	7-8
4.2 CUTTER HOME POSITION SENSOR REPLACEMENT	7-9
4.3 TAPE CUT LENGTH ADJUSTMENT	7-10

DOCUMENT FEEDER

1. OVERALL MACHINE INFORMATION	8-1
1.1 SPECIFICATIONS	8-1
1.2 MECHANICAL COMPONENT LAYOUT	8-1
1.3 ELECTRICAL COMPONENT LAYOUT	8-2
2. SECTIONAL DESCRIPTION	8-3
2.1 DRIVE MECHANISM	8-3
2.2 PAPER FEED AND SEPARATION	8-4
2.3 ORIGINAL SIZE DETECTION	8-5
2.4 ADF OPEN/CLOSE DETECTION	8-5
2.5 ADF POSITION DETECTION	8-6
2.6 ELECTRICAL TIMING	8-7
2.6.1 ADF (Before Scanning)	8-7
2.6.2 ADF Scanning Process	8-8
2.6.3 Plotting	8-9
2.7 CIRCUIT	8-11
2.8 ORIGINAL MISFEED DETECTION	8-12
3. INSTALLATION PROCEDURE	8-13
3.1 ACCESSORY CHECK	8-13

4. REPLACEMENT 8-16

4.1 ADF COVER	8-16
4.2 ADF UNIT.....	8-17
4.3 SEPARATION ROLLER.....	8-18
4.4 PICK-UP ROLLER AND FEED ROLLER.....	8-19
4.5 TRANSPORT ROLLER	8-20
4.6 ORIGINAL REGISTRATION SENSOR	8-21
4.7 ADF POSITION SENSOR	8-22
4.8 ORIGINAL SET SENSOR	8-23
4.9 SCAN LINE SENSOR	8-24
4.10 ORIGINAL EXIT SENSOR.....	8-24
4.11 ADF MOTOR	8-25

5. ADJUSTMENT 8-26

5.1 PICK-UP TORQUE AND SHUTTER TORQUE ADJUSTMENT	8-26
5.2 SEPARATION ROLLER PRESSURE ADJUSTMENT	8-27
5.3 SEPARATION TORQUE ADJUSTMENT	8-28
5.4 ORIGINAL SKEW ADJUSTMENT	8-28
5.5 ADF HEIGHT ADJUSTMENT	8-29
5.6 IMAGE SCAN MAGNIFICATION ADJUSTMENT	8-30
5.7 IMAGE CENTER ADJUSTMENT (Side to side)	8-30
5.8 SCANNER LEADING EDGE REGISTRATION ADJUSTMENT	8-31

PRIORT CONTROLLER INSTALLATION GUIDE

1 INTRODUCTION 9-3

1.1 SYSTEM REQUIREMENT.....	9-3
1.2 INSTALLATION PROCEDURE	9-4
1.3 PARTS LISTING	9-7

9.5 CABLING BETWEEN PCRIIP-10 AND COMPUTER	9-8
A. IBM AND COMPATIBLES - PARALLEL	9-8
B. IBM AND COMPATIBLES - SERIAL	9-9
C. MACINTOSH COMPUTERS - APPLE TALK STANDARD	9-9
9.6 SYSTEM VERIFICATION AND DEFAULT CONFIGURATION	9-10
9.7 CABLE PIN-OUT DIAGRAMS	9-12
A. PARALLEL INTERFACE, PIN-OUT CONNECTIONS	9-12
B. PARALLEL INTERFACE CABLE, PIN ASSIGNMENTS	9-12
C. SERIAL INTERFACE CABLE, PIN-OUT CORRECTIONS	9-13
D. SERIAL INTERFACE CABLE, PIN ASSIGNMENTS	9-13
9.8 RAM UPGRADE PROCEDURE	9-14

PRIPORT CONTROLLER USER'S GUIDE

9.9 REGULATORY NOTICES	9-21
9.10 TRADEMARKS	9-21
9.11 HARDWARE INSTALLATION	9-23
9.12 PRIPORT CONTROLLER CONFIGURATION	9-24
9.13 CONFIGURATION OF IBM PC AND COMPATIBLES	9-24
9.14 CONFIGUTATION OF MACINTOSH COMPUTERS.	9-28
9.15 APPLICATION SOFTWARE SET-UP	9-29
9.16 PRIPORT CONTROLLER OPERATION	9-30
9.17 COMMONLY ASKED QUESTIONS.	9-31
9.18 TROUBLESHOOTING	9-34
9.19 APPENDIX A - DIAGNOSTIC STATUS PAGE	9-37
9.20 PARTS CATALOG	9-39

BULLETINS

IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

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

HEALTH SAFETY CONDITIONS

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

OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

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

SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

1. Dispose of replaced parts in accordance with local regulations.
2. Used ink and master should be disposed of in an environmentally safe manner and in accordance with local regulations.

– CAUTION –

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

OVERALL MACHINE INFORMATION	
	PRIPORT CONTROLLER INSTALLATION GUIDE
DETAILED SECTION DESCRIPTIONS	
	PRIPORT CONTROLLER USER'S GUIDE
INSTALLATION	
SERVICE TABLES	
REPLACEMENT AND ADJUSTMENT	
TROUBLESHOOTING	
TAPE MARKER C532	
DOCUMENT FEEDER C532	

TAB POSITION 1

TAB POSITION 2

TAB POSITION 3

TAB POSITION 4

TAB POSITION 5

TAB POSITION 6

TAB POSITION 7

TAB POSITION 8

OVERALL MACHINE INFORMATION

1. SPECIFICATIONS

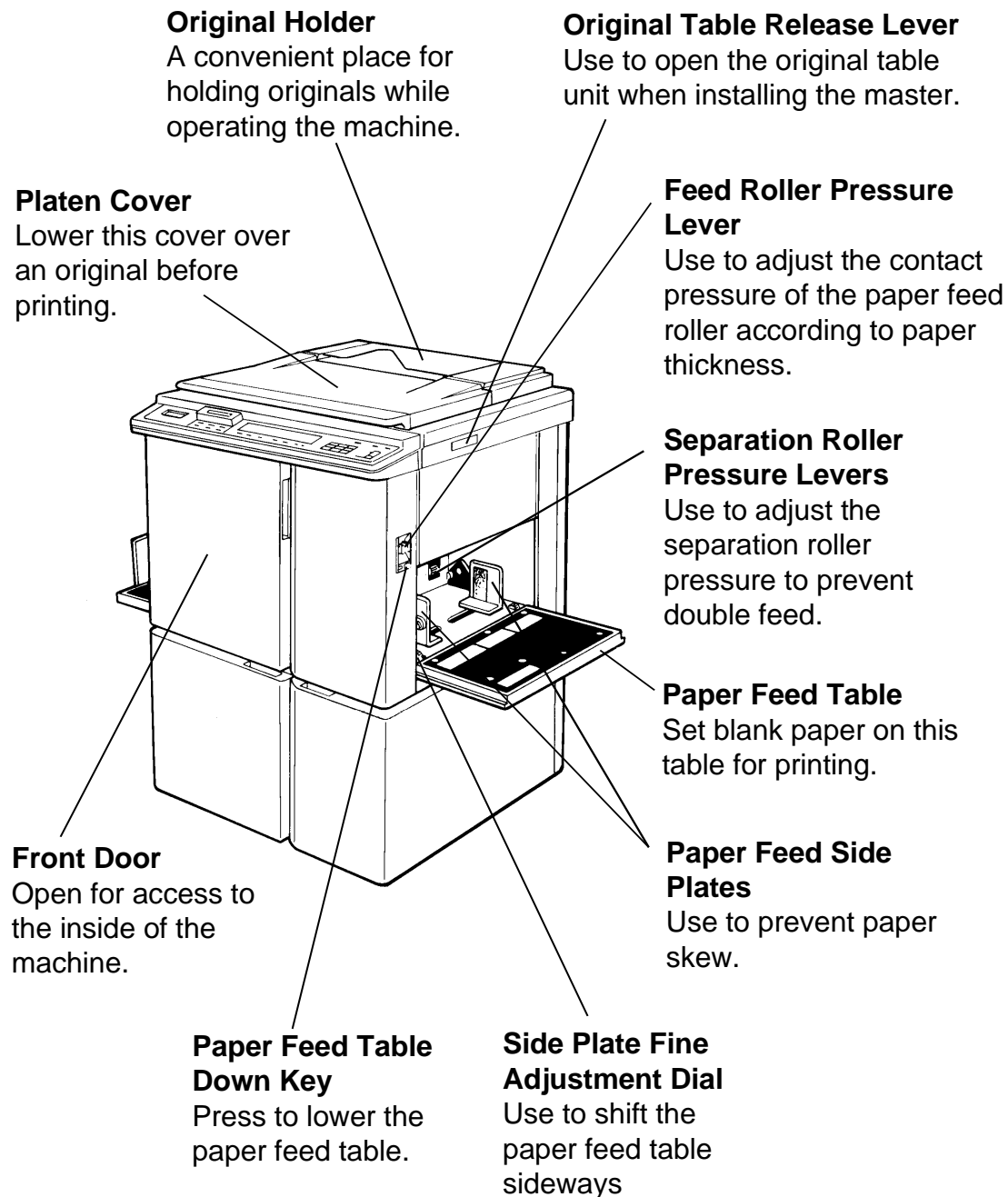
Configuration:	Desk top
Master Processing:	Digital
Printing Process:	Fully automatic one-drum stencil system
Original Type:	Sheet/Book
Original Scan Area Size:	Maximum: 307 mm x 432 mm (12.0" x 17.0")
Reduction Ratio:	LT version: 93%, 77%, 74%, 65% A4 version: 93%, 87%, 82%, 71%
Enlargement Ratio:	LT version: 155%, 129%, 121% A4 version: 141%, 122%, 115%
Image Mode:	Line/Photo/Sharpen
Zoom:	From 50% to 200% in 1% steps
Color Printing:	Drum unit replacement system (red, blue, green and brown)
Master Feed/Eject:	Roll master automatic feed/eject
Leading Edge Margin:	8 ± 3 mm (0.32" ± 0.12")
Print Paper Size:	Maximum: 325 mm x 447 mm (12.7" x 17.5") Minimum: 90 mm x 148 mm (3.6" x 5.8")
Printing Area:	Maximum: 290 mm x 412 mm (11.4" x 16.2") at 23°C/65% RH (A3/DLT drum) Maximum: 290 mm x 204 mm (11.4" x 8.0") at 23°C/65% RH (A4/LT drum)
Print Paper Weight:	47.1 g/m ² to 209.3 g/m ² (12.5 lb to 55.6 lb)
Printing Speed:	60, 75, 90, 105, 120 sheets/minute (5 steps)
First Print Time:	38 s/A3/DLT (with "L" drum) 35 s/A4/LT (lengthwise with "L" drum) 26 s/A4/LT (with "S" drum)
Paper Feed Table Capacity:	1000 sheets (75 g/m ² , 20 lb)
Paper Delivery Table Capacity:	1000 sheets (75 g/m ² , 20 lb)
Power Source:	120 V, 60 Hz, 4.1 A (for N.America) 220/240 V, 50 Hz, 2.1 A (for Europe, Asia)
Power Consumption:	120 V, 60 Hz, 374 W (for N.America) 220/240 V, 50 Hz, 380 W (for Europe, Asia)
Weight:	128 kg (282.2 lb) Cabinet: 23.5 kg (51.8 lb)

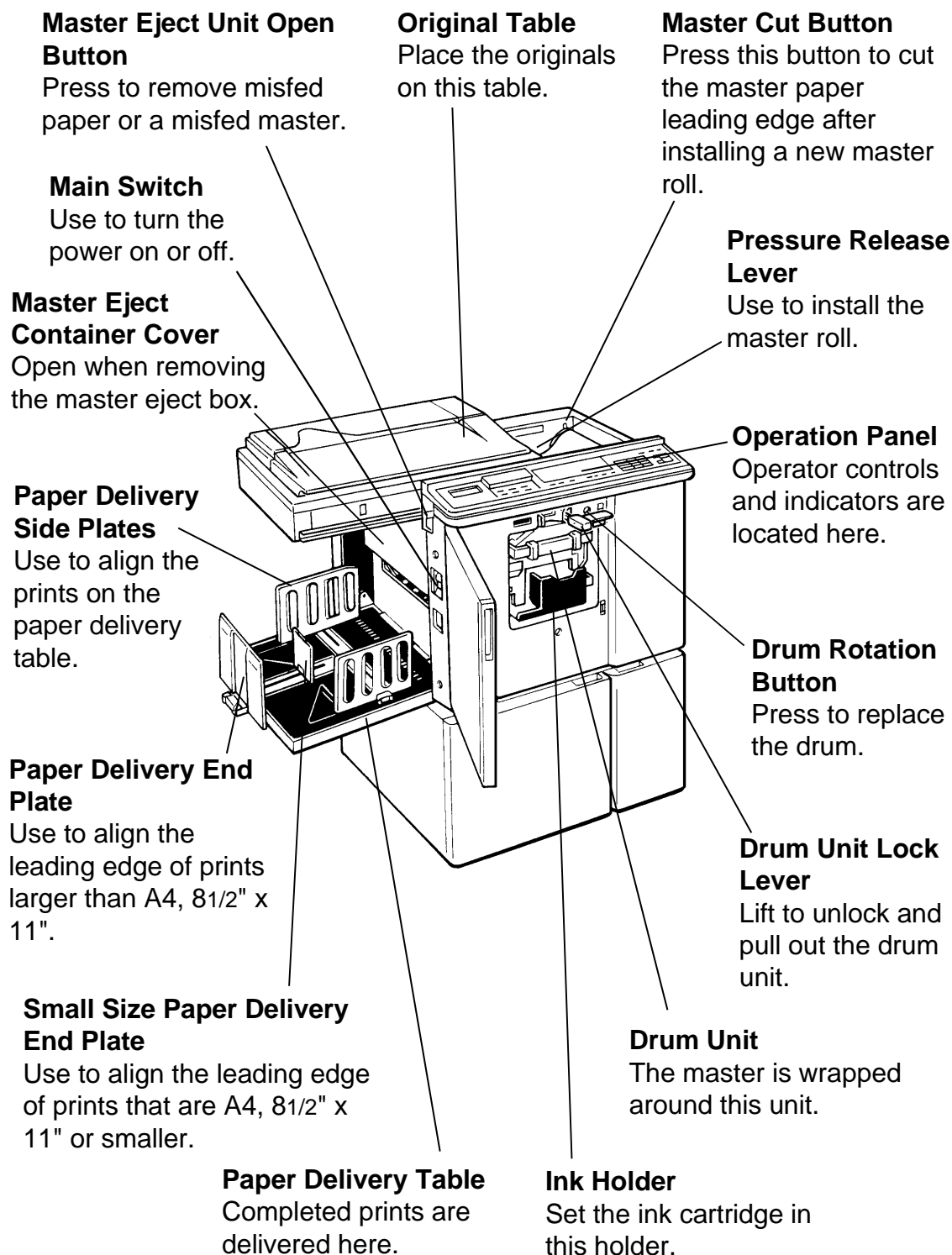
Dimensions (W x D x H):	Stored: 719 x 698 x 644 mm (28.3" x 27.5" x 25.4") Set up: 1331 x 698 x 644 mm (52.4" x 27.5" x 25.4") Cabinet: 1331 x 698 x 1070 mm (52.4" x 27.5" x 42.1")
Original Scanning Time:	3 ms/line
Pixel Density:	400 dpi
Master Eject Box Capacity:	50 masters with "L" drum 90 masters with "S" drum
Paper Separation:	Friction roller/center separation system
Feed Table Side Plate Movement Distance:	88 mm to 336 mm (3.46" to 13.2")
Paper Feed Roller Pressure:	Normal position 300 g Thick paper position 600 g
Separation Roller Pressure:	Normal position 125 g Weak position 50 g
Separation Plate Pressure:	Weak 10 g Normal 20 g Strong 1 40 g Strong 2 60 g
Side Registration:	±10 mm
Vertical Registration:	±20 mm
Paper Table Raising/Lowering Speed:	22 mm/s (50 Hz) 26 mm/s (60 Hz)
Ink Supply:	Automatic ink supply system
Press Roller Pressure:	12.5 ± 0.5 kg
Paper Delivery:	Air knife/vacuum delivery
Delivery Side Plate Movement Distance:	80 mm to 327 mm (31.5" to 12.9")
Print Counter:	7 digits
Noise Emission:	Less than 74 dB Printing (Average): 60 rpm less than 64 dB 90 rpm less than 67 dB 120 rpm less than 72 dB

Supplies:	<p>Master</p> <p>Thermal master 320 mm width 225 masters/roll</p> <p>Master length 540 mm/master Max run length 2000 prints</p> <p>Ink</p> <p>800 cc ink pack (black) 500 cc ink pack (red, blue, green, brown)</p>

**Overall
Machine
Information**

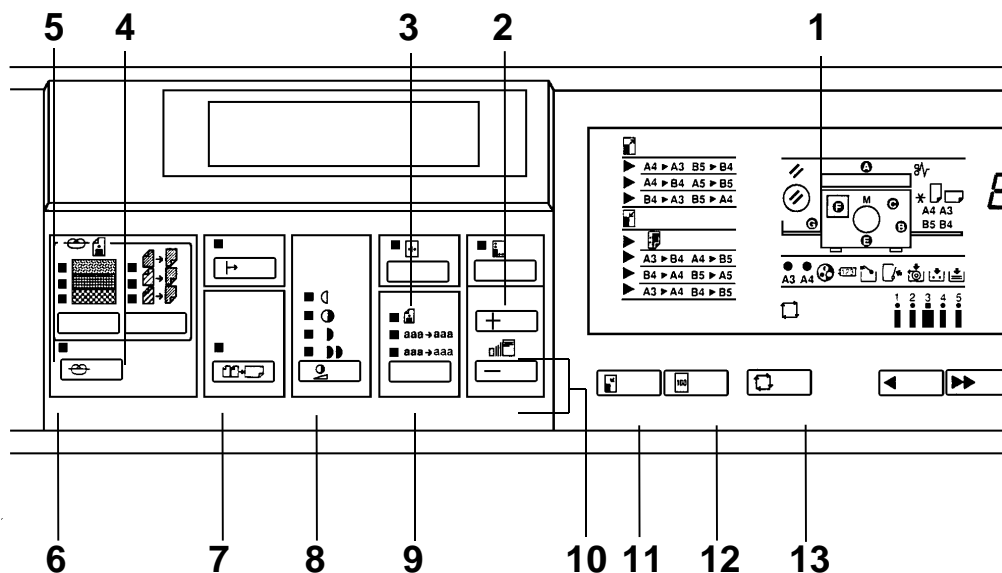
2. GUIDE TO COMPONENTS



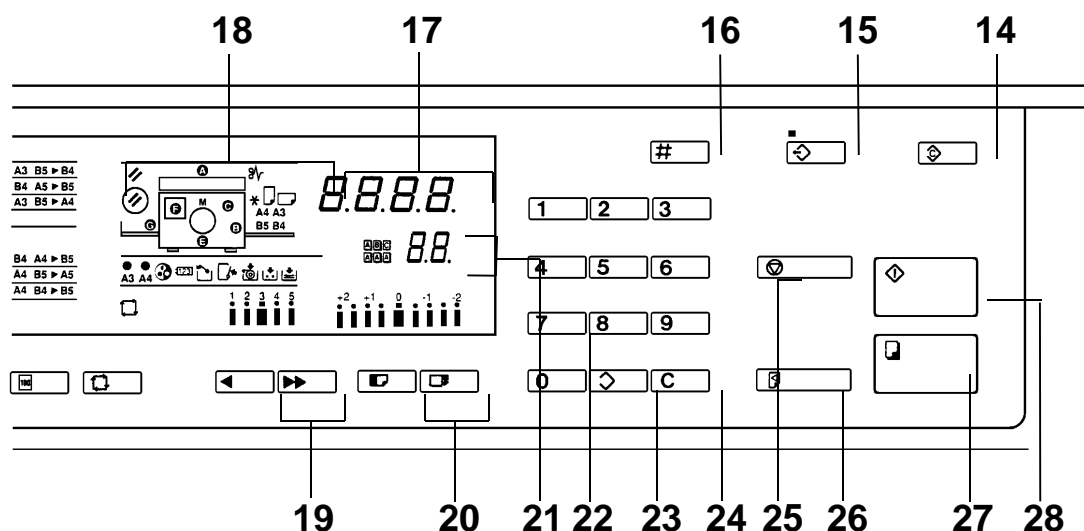


3. OPERATION PANEL

– Keys and Indicators –

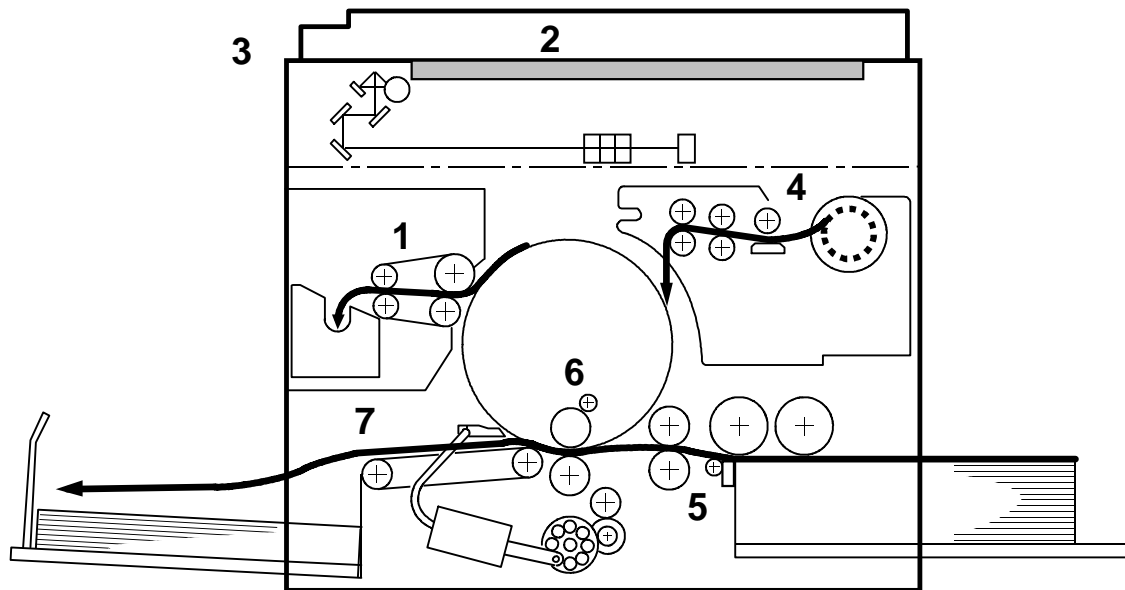


- | | |
|---|--|
| 1. Reset key | Press to reset error indicators. |
| 2. Directional Magnification key | Press to enter the horizontal or vertical magnification for copies, using the number keys. |
| 3. Image Shift key | Press to shift the image. |
| 4. Contrast key | Press to select the desired contrast according to the type and quality of the original. |
| 5. Screen key | Press to select the desired grade of screening to be applied to the image according to the type and quality of the original. |
| 6. Make Up key | Press to use the make-up function. |
| 7. Combine 2 Originals key | Press to combine two originals onto one print image. |
| 8. Image Density key | Press to make prints darker or lighter. |
| 9. Image Mode key | Press to select line mode, photo mode or sharpen image mode according to the type and quality of the original. |
| 10. Zoom keys | Press to alter the reproductions ratio in 1% increments from 50% to 200%. |
| 11. Reduce/Enlarge key | Press to reduce or enlarge the image. |
| 12. Full Size key | Press to make prints the same size as the original. |
| 13. Auto Cycle key | Use to automatically process masters and make prints. |



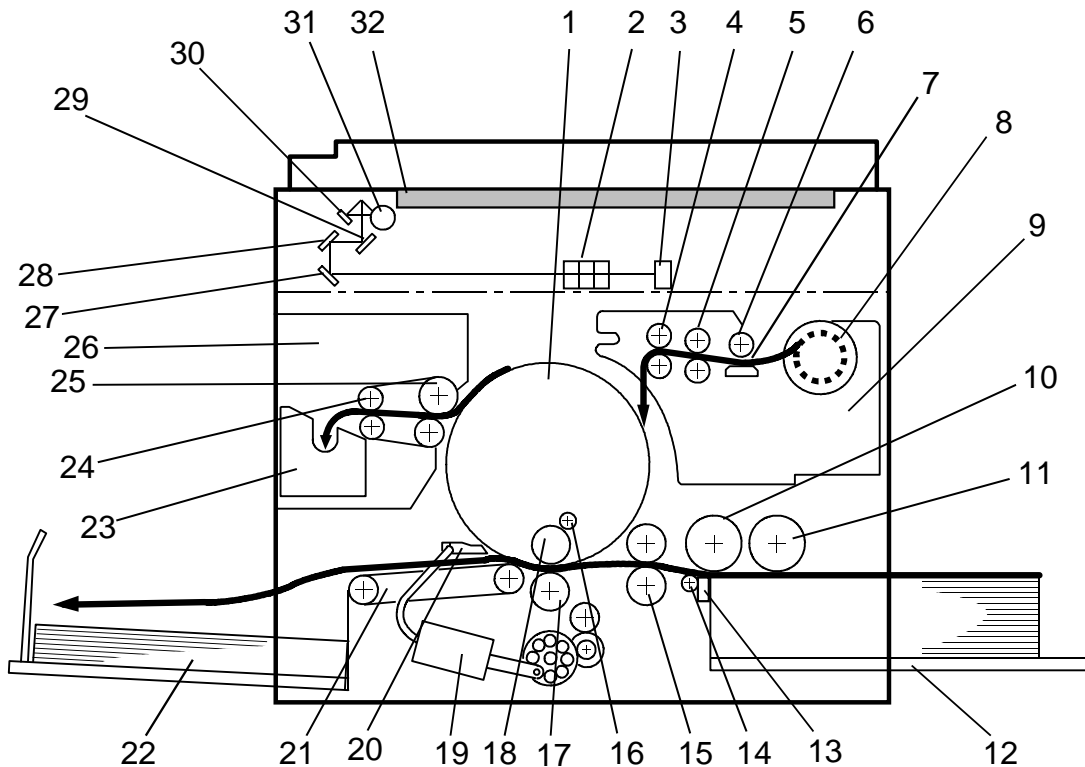
- | | |
|------------------------------------|--|
| 14. Clear Modes key | Press to cancel all previously entered settings and modes. |
| 15. Program key | Press to input or recall user programs. |
| 16. Enter key | Press to input information into memory. |
| 17. Counter | Displays the number of prints entered. While printing, it shows the number of copies left to print. |
| 18. Monitors | Light or blink when a non-standard condition occurs within the machine. |
| 19. Speed keys | Press to adjust the rotation speed of the drum according to the type of image and printing paper. |
| 20. Image Position key | Press to shift the image forwards or backwards on the print paper. |
| 21. Memory/Class Indicators | Shows the number entered in memory mode or class mode. |
| 22. Number keys | Press to enter the number of prints. |
| 23. Memory/Class key | Press to select group printing in memory mode or class mode. |
| 24. Clear key | Press to change the number set in the counter. Also use to change make-up mode. This key can be used only after the machine stops operation. |
| 25. Stop key | Press to stop the machine operation. The machine will continue operation when the Print Start key or Master Making key is pressed. |
| 26. Proof key | Press to make trial prints or extra prints. |
| 27. Print Start key | Press to start printing. |
| 28. Master Making key | Press to make a master. |

4. PRINTING PROCESS



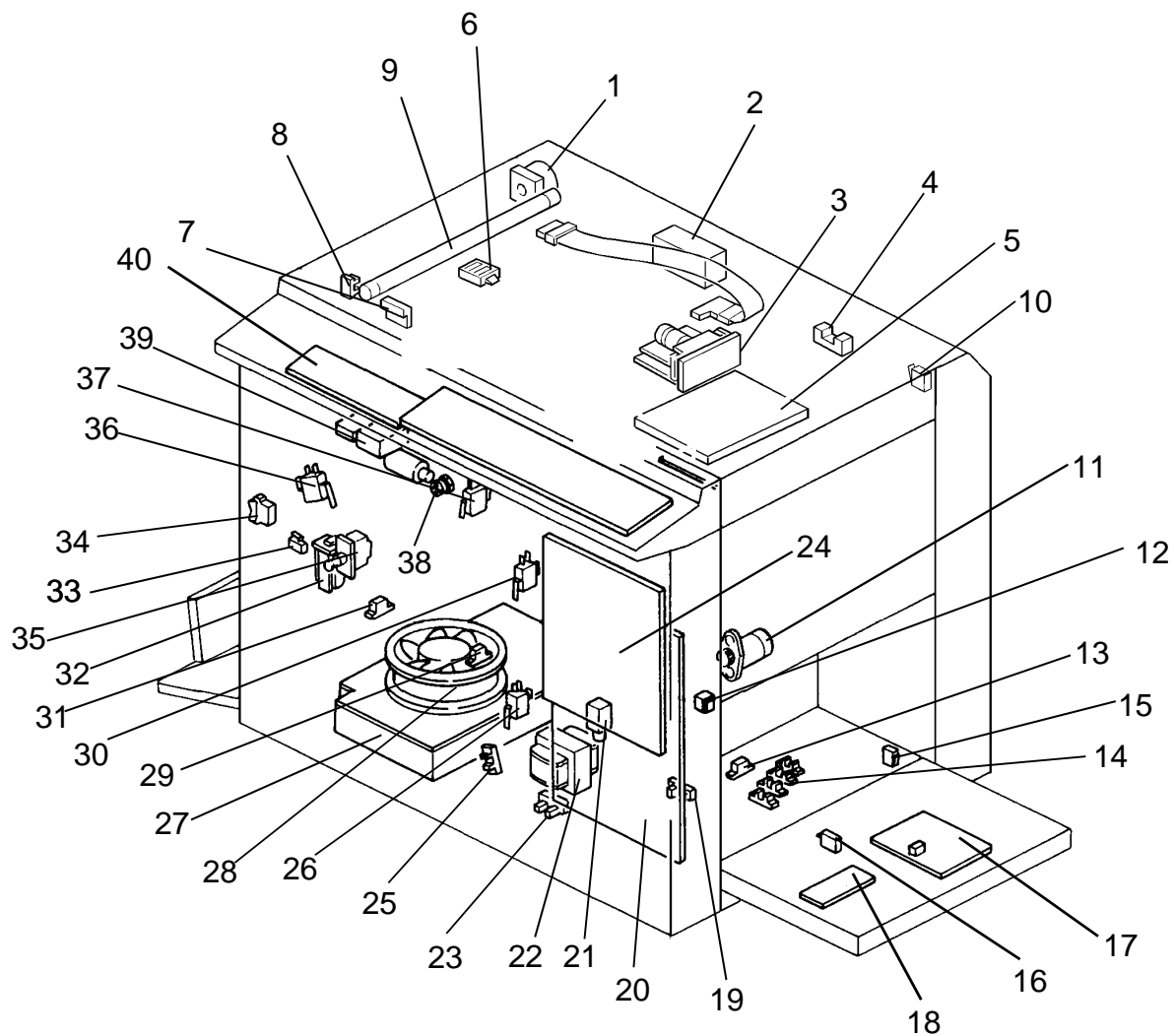
- | | |
|----------------------|--|
| 1. Master Ejecting: | Ejects the used master that was wrapped around the drum into the master eject box. |
| ↓ | |
| 2. Original: | The original is placed onto the exposure glass. |
| ↓ | |
| 3. Scanning: | Scans the original image with the CCD through the mirrors and the lens while moving the lamp across the original. |
| ↓ | |
| 4. Master Feeding: | Converts the image signal read by the CCD into digital signals and sends them to the thermal head to plot holes on the master. The new master is then wrapped around the drum. |
| ↓ | |
| 5. Paper Feeding: | Feeds the paper to the drum section. |
| ↓ | |
| 6. Printing: | Presses the paper fed from the paper feed section against the drum. This transfers the ink through the drum screen, the master and onto the paper. |
| ↓ | |
| 7. Paper Delivering: | Peels the printed paper off the drum with the exit pawl and air knife and ejects the paper onto the paper delivery table. |

5. MECHANICAL COMPONENT LAYOUT

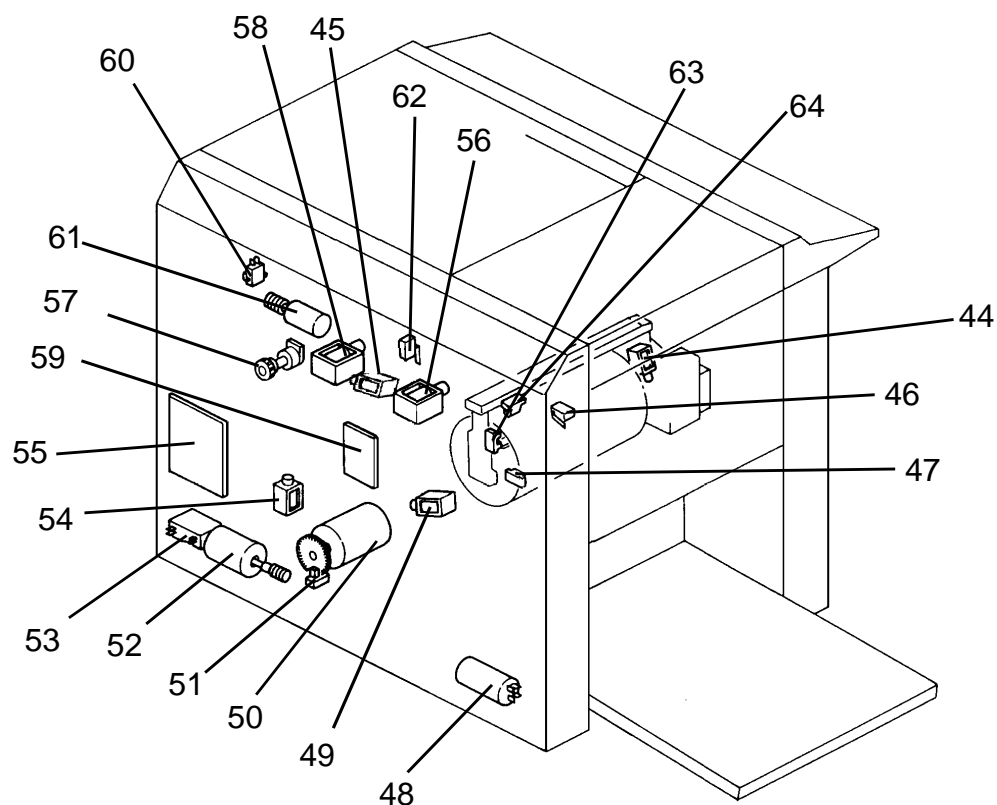


- | | |
|------------------------------|--------------------------|
| 1. Drum Unit | 20. Paper Exit Pawl |
| 2. Lens | 21. Transport Unit |
| 3. CCD | 22. Paper Delivery Table |
| 4. Reverse Roller | 23. Master Eject Box |
| 5. Master Feed Roller | 24. 2nd Eject Roller |
| 6. Platen Roller | 25. 1st Eject Roller |
| 7. Thermal Head | 26. Master Eject Unit |
| 8. Master Roll | 27. 3rd Mirror |
| 9. Plotter Unit | 28. 1st Mirror |
| 10. Upper Separation Roller | 29. 2nd Mirror |
| 11. Paper Feed Roller | 30. Reflector |
| 12. Paper Table | 31. Fluorescent Lamp |
| 13. Separation Plate | 32. Exposure Glass |
| 14. Lower Separation Roller | |
| 15. 2nd Feed Roller | |
| 16. Doctor Roller | |
| 17. Press Roller | |
| 18. Ink Roller | |
| 19. Paper Exit Pawl Air Pump | |

6. ELECTRICAL COMPONENT LAYOUT

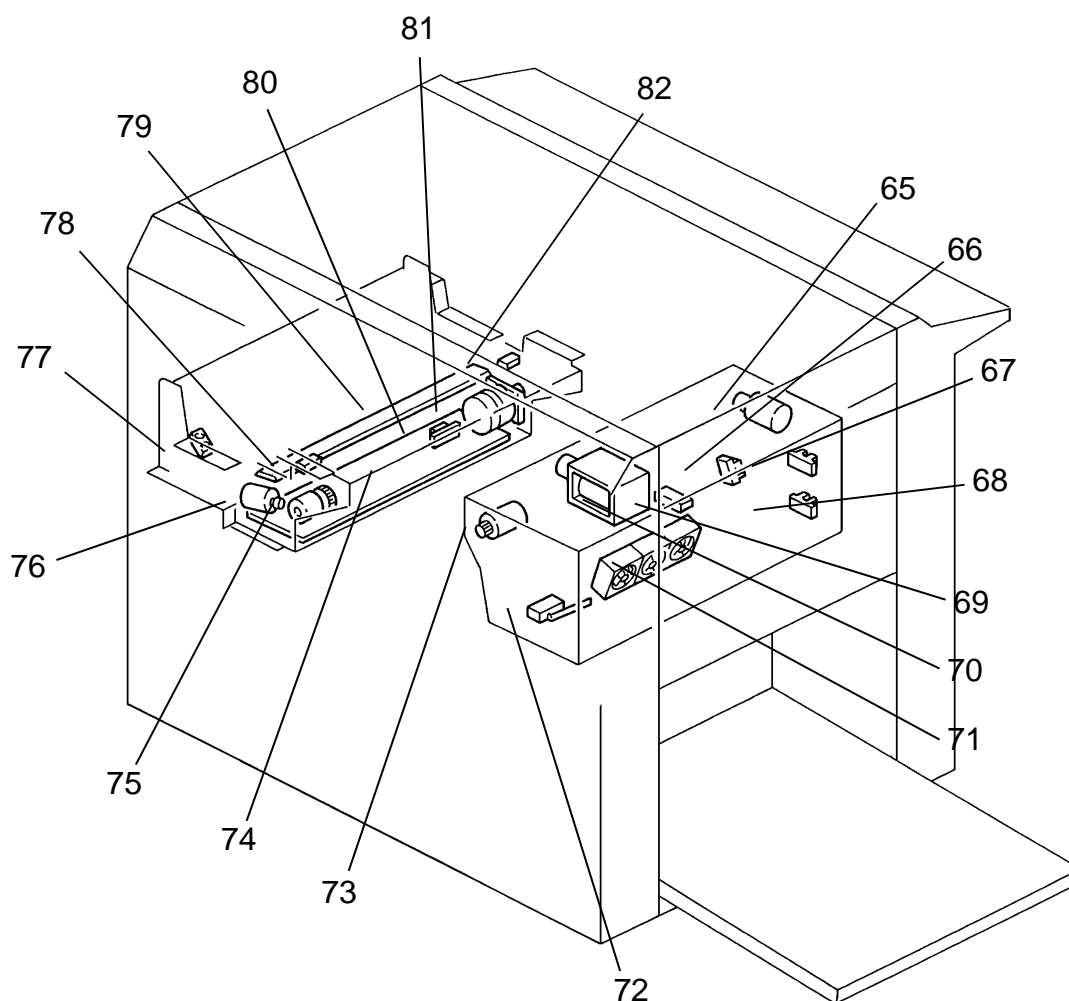


- | | |
|--|------------------------------------|
| 1. Scanner Motor | 22. Transformer |
| 2. Fluorescent Lamp Stabilizer | 23. Paper Table Lower Limit Sensor |
| 3. CCD PCB | 24. Main PCB |
| 4. Platen Cover Position Sensor | 25. Printing Pressure Sensor |
| 5. A/D Conversion PCB | 26. Front Door Safety Switch |
| 6. Original Sensor | 27. Power Supply Unit |
| 7. ADF Set Sensor | 28. Vacuum Fan Motor |
| 8. Scanner Home Position Sensor | 29. 1st Paper Exit Sensor |
| 9. Fluorescent Lamp | 30. Drum Detection Switch |
| 10. Scanner Unit Safety Switch | 31. 2nd Paper Exit Sensor |
| 11. Paper Return Motor | 32. Circuit Breaker |
| 12. Paper Table Down Button | 33. Delivery Table Open Switch |
| 13. Paper End Sensor | 34. Main Switch |
| 14. Paper Width Sensor | 35. Interlock Switch |
| 15. Paper Table Open Switch | 36. Air Knife Motor Safety Switch |
| 16. Paper Table Safety Switch | 37. Drum Rotation Switch |
| 17. Paper Detection PCB
(Paper Length Sensor) | 38. Drum Rotation LED |
| 18. Cassette Size Detection PCB | 39. Total Counter |
| 19. Paper Table Height Sensor | 40. Operation Panel |
| 20. Image Processing PCB | |
| 21. Separation Plate Release
Solenoid | |



- 44. Ink Supply Solenoid
- 45. Drum Lock Solenoid
- 46. Master Eject Unit Safety Switch
- 47. 2nd Drum Position Sensor
- 48. Noise Filter
- 49. Printing Pressure Solenoid
- 50. Main Motor
- 51. Drum Rotation Sensor
(Pulse Generator)
- 52. Paper Table Drive Motor
- 53. Paper Table Drive Motor
Capacitor
- 54. Paper Feed Solenoid

- 55. AC Drive PCB
- 56. Master Eject Clamper Solenoid
- 57. Image Position Sensor
- 58. Master Feed Clamper Solenoid
- 59. Ink Detection PCB
- 60. Master Cut Button
- 61. Image Positioning Motor
- 62. Drum Unit Safety Switch
- 63. 1st Drum Position Sensor
- 64. Drum Master Detection Sensor



65. Pressure Plate Motor

66. Lower Pressure Plate Sensor

67. Upper Pressure Plate Sensor

68. Full Master Detection Sensor

69. Master Eject Sensor

70. Master Eject Solenoid

71. Air Knife Motors

72. Master Eject Box Switch

73. Master Eject Motor

74. Thermal Head Drive PCB

76. Cutter Motor

77. Master End Sensor

78. Right Cutter Switch

79. Thermal Head

80. Master Buckle Sensor

81. Master Feed Motor

82. Left Cutter Switch

7. ELECTRICAL COMPONENT DESCRIPTIONS

Index No.	Name	Function
Motors		
* ADF option	Original Transport Motor	Transports the original to the scanner section.
11	Paper Return Motor	Returns paper to the paper table when the paper table is lowered.
28	Vacuum Fan Motor	Provides suction so paper is held firmly on the transport belt.
* ADF option	ADF Drive Motor	Feeds the original to the scanner section.
50	Main Motor	Drives paper feed, drum, printing and paper delivery unit components.
52	Paper Table Drive Motor	Raises and lowers the paper table.
61	Image Positioning Motor	Changes the timing between the paper feed roller and the drum to adjust the vertical image position.
65	Pressure Plate Motor	Raises and lowers the pressure plate.
71	Air Knife Motors	Rotates the fan to separate the paper leading edge from the drum.
73	Master Eject Motor	Sends used master into the master eject box.
76	Cutter Motor	Cuts the master.
81	Master Feed Motor	Feeds the master to the drum.
1	Scanner Motor	Transports the lamp across the original
Solenoids		
21	Separation Plate Release Solenoid	Releases the separation plate when the paper table is lowered.
44	Ink Supply Solenoid	Releases the spring clutch to turn on activate the ink supply pump.
45	Drum Lock Solenoid	Prevents the drum unit from being removed during the printing run.
49	Printing Pressure Solenoid	Engages the pressure ON/OFF lever when a paper misfeed occurs.
54	Paper Feed Solenoid	Releases the sector gears to feed the paper.
56	Master Eject Clamper Solenoid	Opens the master clamper to eject the master.

* ADF Option - Refer to Section 8.

Index No.	Name	Function
58	Master Feed Clamper Solenoid	Opens the master clamper to clamp the master.
70	Master Eject Solenoid	Presses the lower master eject roller against the drum surface.
Sensors		
*ADF option	Original Registration Sensor	Informs the CPU when the original activates the sensor. Also, detects the original misfeed.
*ADF option	Scan Line Sensor	Informs the CPU when the original activates the sensor. Also, detects original misfeeds.
*ADF option	Original Exit Sensor	Informs the CPU when the original exits the ADF.
*ADF option	Original Width Sensor	Informs the CPU of the original width.
13	Paper End Sensor	Informs the CPU if the paper is set on the paper table.
14	Paper Width Sensor	Informs the CPU of the paper width.
19	Paper Table Height Sensor	Informs the CPU if the paper table is at the paper feed position.
23	Paper Table Lower Limit Sensor	Informs the CPU if the paper table is at the lowest position.
25	Printing Pressure Sensor	Informs the CPU if printing pressure is applied. Also, detects paper misfeeds.
29	1st Paper Exit Sensor	Detects paper misfeeds.
31	2nd Paper Exit Sensor	Detects paper misfeeds.
47	2nd Drum Position Sensor	Checks the position of the drum.
51	Drum Rotation Sensor	Supplies timing pulses to the CPU based on the main motor speed.
57	Image Position Sensor	Informs the CPU of the image position.
63	1st Drum Position Sensor	Checks the position of the drum.
* ADF option	ADF Cover Sensor	Detects when the ADF cover is opened.

* ADF Option - Refer to Section 8.

Index No.	Name	Function
* ADF option	Original Set Sensor	Detects when an original is inserted into the ADF
4	Platen Cover Position Sensor	Detects when the platen cover is opened more than 25°
64	Drum Master Detection Sensor	Informs the CPU if the master is on the drum.
66	Lower Pressure Plate Sensor	Informs the CPU if the pressure plate is at the lower limit position.
67	Upper Pressure Plate Sensor	Informs the CPU if the pressure plate is at the upper limit position.
68	Full Master Detection Sensor	Informs the CPU when the master eject box is full of masters.
69	Master Eject Sensor	Detects used master misfeeds.
77	Master End Sensor	Informs the CPU if the plotter unit runs out of master roll.
80	Master Buckle Sensor	Informs the CPU if the master is buckling.
Switches		
9	Scanner Unit Safety Switch	Cuts off the power line of the main and paper table drive motors when the scanner unit is open.
12	Paper Table Down Button	Informs the CPU to turn on the paper table drive motor to lower the paper table.
15	Paper Table Open Switch	Checks whether the paper table is opened correctly or not.
16	Paper Table Safety Switch	Stops lowering the paper table to prevent catching fingers under it. Cuts the AC power line.
26	Front Door Safety Switch	Cuts off the power line of the paper table drive motor when the front door is open.
30	Drum Detection Switch	Checks whether the drum unit is set correctly or not.
33	Delivery Table Open Switch	Checks whether the delivery table is opened correctly or not.
34	Main Switch	Turns the power on or off.

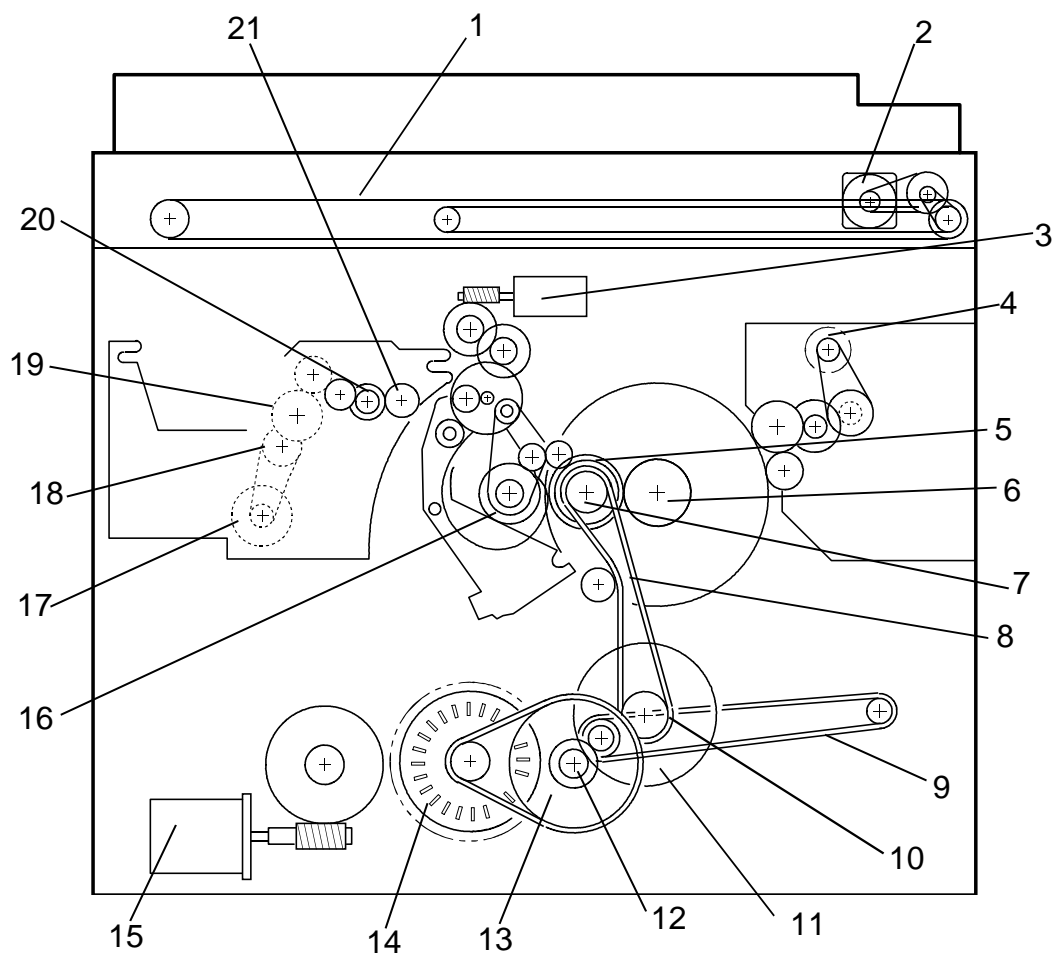
* ADF Option - Refer to Section 8.

Index No.	Name	Function
35	Interlock Switch	Disables the front door, paper table, master eject unit, and scanner unit safety switches.
36	Air Knife Motor Safety Switch	Cuts off the power line of the paper table drive motor when the master eject unit is open.
37	Drum Rotation Switch	Informs the CPU to rotate the drum at 10 rpm.
*ADF option	ADF Safety Switch	Cuts the power line of the paper table drive motor off when the ADF is open.
46	Master Eject Unit Safety Switch	Cuts off the power line of the paper table drive motor when the master eject unit is open. (Also, cuts off the power line of the main motor in the 220/240 V version machines.)
60	Master Cut Button	Informs the CPU to cut the master paper leading edge.
62	Drum Unit Safety Switch	Checks whether the drum unit is set correctly or not.
72	Master Eject Box Switch	Checks whether the master eject box is set correctly.
78	Right Cutter Switch	Detects when the cutter position is far right (non-operation side).
82	Left Cutter Switch	Detects when the cutter position is far left (operation side).
*ADF option	ADF Set Switch	Detects when the ADF unit is opened
Printed Circuit Board		
3	CCD PCB	Converts light intensity into an electrical signal.
5	A/D Conversion PCB	Converts the analog signal into a digital signal.
17	Paper Detection PCB	Detects the size of the paper set on the table.
18	Cassette Size Detection PCB	Detects the size of the cassette set on the table.
20	Image Processing PCB	Controls the image processing performance.
24	Main PCB	Controls all machine functions both directly and through other boards.
55	AC Drive PCB	Controls the AC component by relays.

* ADF Option - Refer to Section 8.

Index No.	Name	Function
59	Ink Detection PCB	Controls the ink supply.
74	Thermal Head Drive PCB	Supplies the power to the thermal head according to the signal from the scanner section.
Counters		
39	Total Counter	Keeps track of the total number of prints made.
Others		
2	Fluorescent Lamp Stabilizer	Stabilizes the power supplement to the fluorescent lamp.
22	Transformer	Steps down the wall voltage.
27	Power Supply Unit	Provides power for all DC components.
32	Circuit Breaker	Cuts the AC line off.
38	Drum Rotation LED	Turns to green from red when the drum stops to the home position.
9	Fluorescent Lamp	Applies light to the original for exposure.
48	Noise Filter	Filters electrical noise on the AC power input lines.
53	Paper Table Drive Motor Capacitor	Protects the AC drive PCB from induced current.
75	Reverse Roller Magnetic Clutch	Stops the reverse roller turning while the master buckle sensor is OFF.
79	Thermal Head	Plots the master using heat.

8. DRIVE LAYOUT



- | | |
|------------------------------|----------------------------------|
| 1. Scanner Belt | 12. Idle Gear |
| 2. Scanner Motor | 13. Idle Pulley |
| 3. Image Position Motor | 14. Main Motor |
| 4. Master Eject Motor | 15. Paper Table Drive Motor |
| 5. Drum Drive Gear | 16. Paper Feed Cam Gear |
| 6. Drum Unit Gear | 17. Master Feed Motor |
| 7. Drum Drive Pulley | 18. Timing Belt |
| 8. Main Drive Belt | 19. Platen Roller Gear |
| 9. Transport Belt | 20. Master Transport Roller Gear |
| 10. Printing Pressure Pulley | 21. Reverse Roller Gear |
| 11. Printing Pressure Gear | |

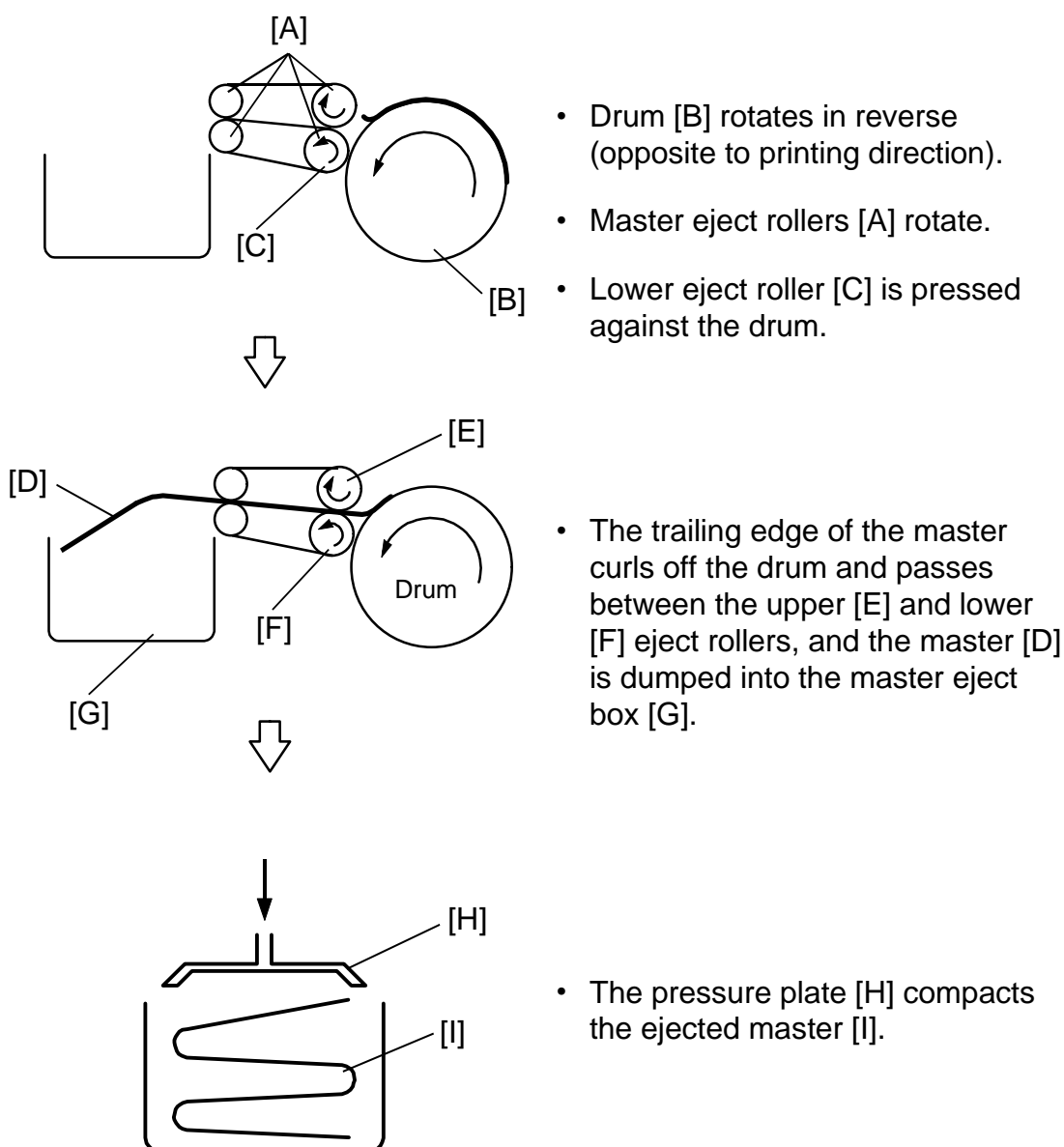
DETAILED SECTION DESCRIPTIONS

1. MASTER EJECT SECTION

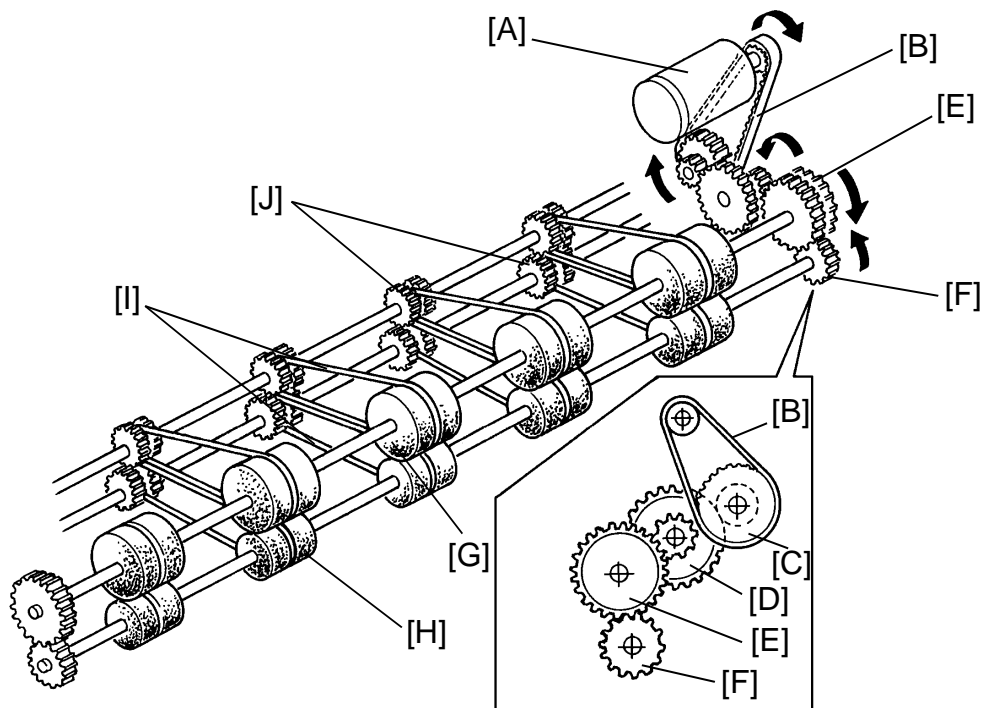
1.1 OVERALL

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

The master is pulled off the drum, by the eject rollers and is fed into the master eject box. A pressure plate compacts the used master.



1.2 MASTER EJECT ROLLER ROTATING MECHANISM



When the original is set and the Master Making key is pressed, the main motor starts turning at 30 rpm in the reverse direction. The drum will rotate in the reverse direction (ccw) (compared with the printing rotations).

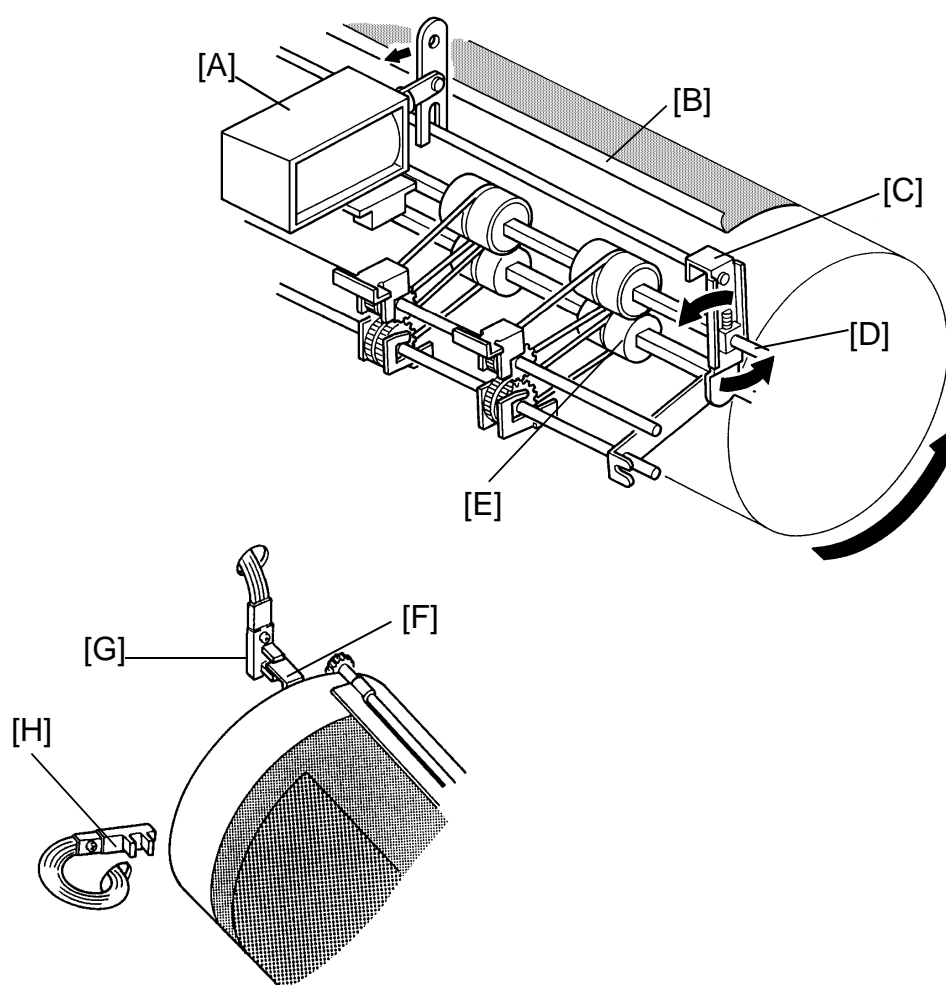
At this time, if the drum master detection sensor detects a master on the drum, the master eject motor [A] starts rotating. Drive is transmitted to gear [E] and to the upper first eject rollers [G] through the timing belt [B] and gears [C] and [D]. Gear [F] drives the lower first eject rollers [H]. The belts [I] transmit drive from the first eject rollers to the upper and lower second feed rollers [J].

(If the drum master detection sensor detects no master on the drum when the Master Making key is pressed, the machine skips the master eject process and goes directly to the master making process.)

After the master eject process is completed, the drum returns to its home position. The master eject rollers then stop rotating.

The model VT3600 has five rollers on each eject roller shaft. The roller shafts can feed up to A3/DLT sized masters.

1.3 MASTER EJECT ROLLER DRIVE MECHANISM

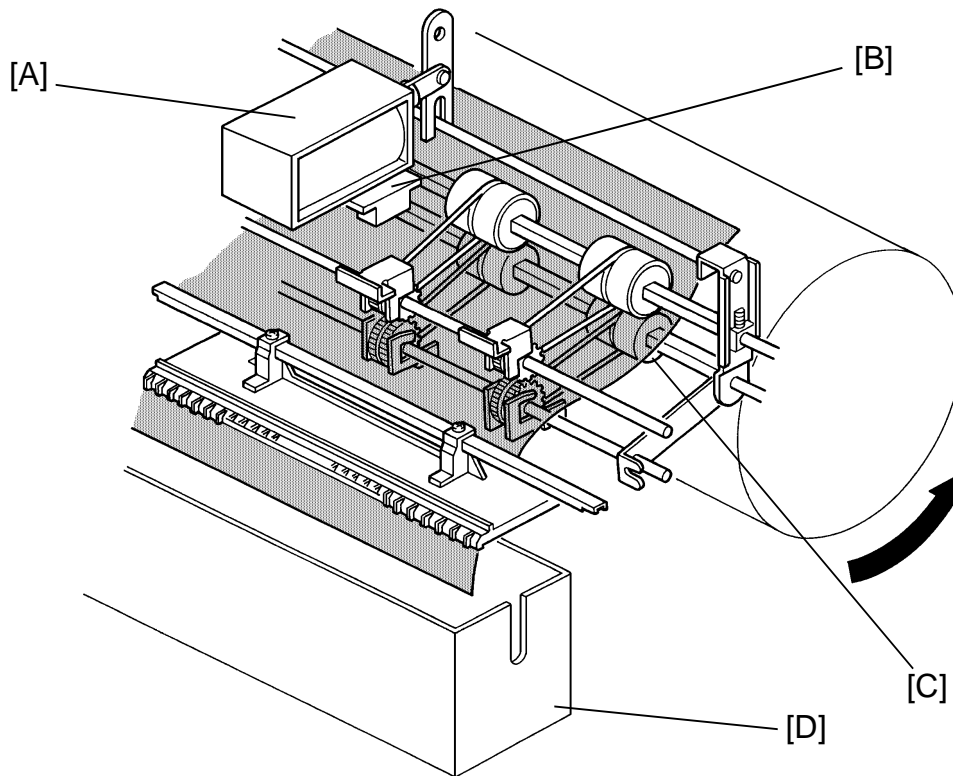


The drum position is detected by the first [G] and second [H] drum position sensors. When the drum reaches its home position, the first drum position sensor [G] is activated by the interrupter [F] at the rear side of the drum.

To eject the master, the drum turns in the reverse direction (CCW) (opposite to the printing direction). When the drum is 70° from the home position, the master eject solenoid [A] turns on and the supporter [C] rotates counterclockwise on the upper eject roller shaft [D]. This forces the lower first eject rollers [E] against the drum surface.

The drum will momentarily stop its reverse rotation for 150 milliseconds, when the trailing edge of the master is about 5 millimeters from the master rollers to ensure the completion of the master eject process.

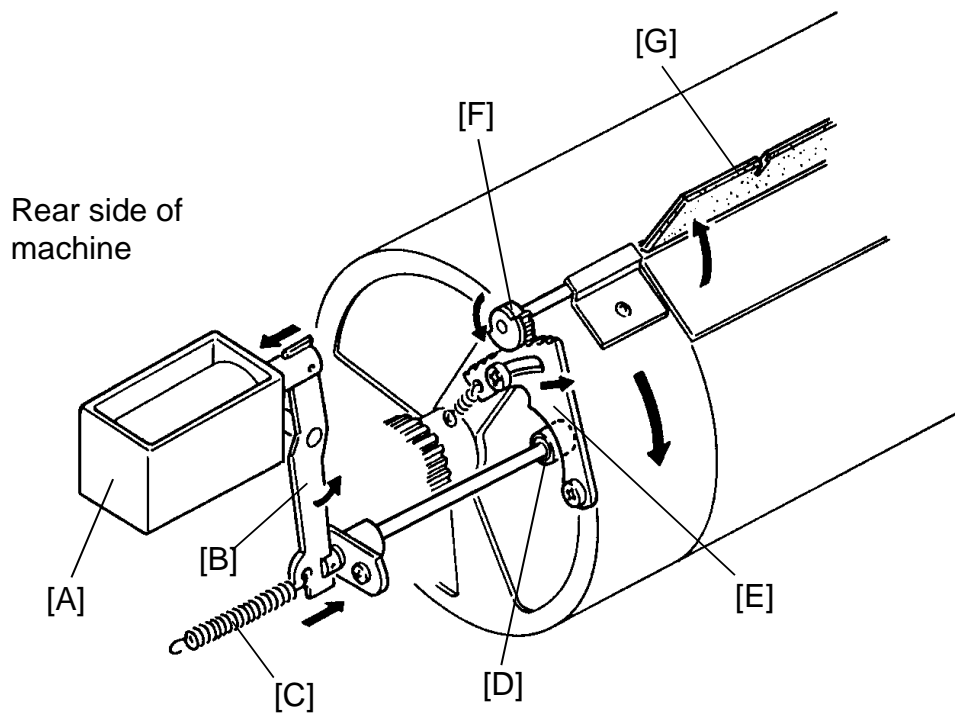
As the drum turns, the curled trailing edge of the master [B] passes between the upper and lower first eject rollers. The first eject rollers then peel the master from the drum.



When the drum is 109 degrees from the home position, the master eject solenoid [A] turns off, separating the lower first eject rollers [C] from the surface of the drum.

When the ejected master passes between the upper and lower first eject rollers, the master eject sensor [B] is actuated. The master is then dumped into the master eject box [D].

1.4 MASTER EJECT CLAMPER MECHANISM

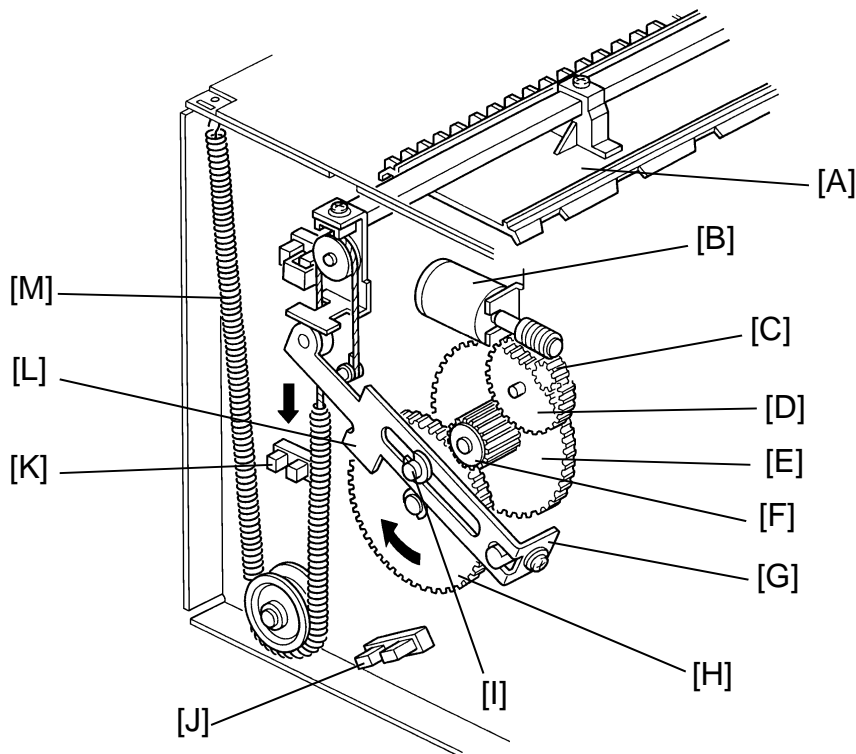


Detailed
Section
Descriptions

When the drum rotates 306 degrees (in the reverse direction) past the home position, the master eject clasper solenoid [A] turns on and lever [B] will rotate counterclockwise as shown. This moves the cam [D] inside the drum. The drum rotation will bring the clasper sector gear [E] against the cam [D]. Gear [F] will rotate counterclockwise as it engages the clasper sector gear, thus opening the master clasper [G]. The opened master clasper will release the master from the drum.

The drum will continue to turn until the interrupter at the rear side of the drum moves 13 degrees past the first drum position sensor. The main motor will then turn off. Half a second later, the master eject clasper solenoid [A] turns off and spring [C] pulls cam [D] back to its initial position. The drum then rotates forward to its home position.

1.5 PRESSURE PLATE UP/DOWN MECHANISM



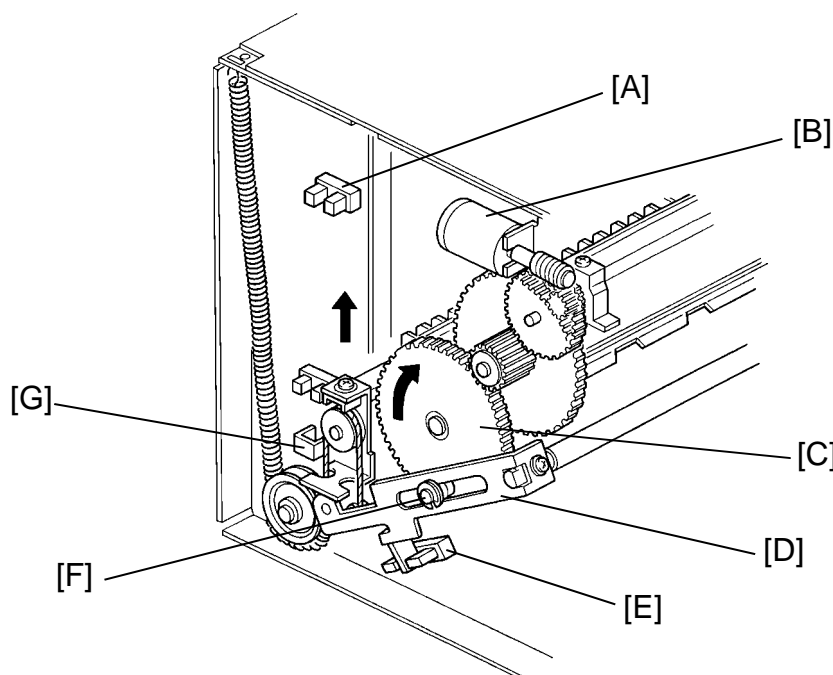
[Pressure Plate Down]

When the interrupter at the rear side of the drum interrupts the first drum position sensor (this means the end of the master eject process), the pressure plate motor [B] starts rotating. This drives gear [H] clockwise by means of gears [C], [D], [E], and [F].

Pin [I] on gear [H] moves the link [G] down until the link interrupter [L] interrupts the lower pressure plate sensor [J]. Spring [M] pulls down on the pressure plate and the ejected master in the master eject box is compressed by the pressure plate [A].

If the full master detection sensor [K] does not turn on when the pressure plate goes down, the master eject box is filled with ejected masters. In this case, the Master Full indicator will blink, and the machine will stop after a new master is wrapped around the drum.

Reset the Master Full indicator by turning the Master Eject Box switch OFF and ON (Remove and insert this box). This will prevent the master full indicator from being reset without removing the ejected masters from the box. When the Master Full indicator is blinking, the Master Making key will not work, but the Print Start key and Proof key function correctly.



[Pressure Plate Up]

When the master has been wrapped around the drum in the master making process and the master cutter leaves the home position to cut the master, the pressure plate motor [B] starts rotating to raise the pressure plate.

When the pressure plate motor [B] turns, the gear [C] is driven through the relay gears. The pin [F] on the gear in the link [D] rises and lifts the left end of the link, thus raising the pressure plate.

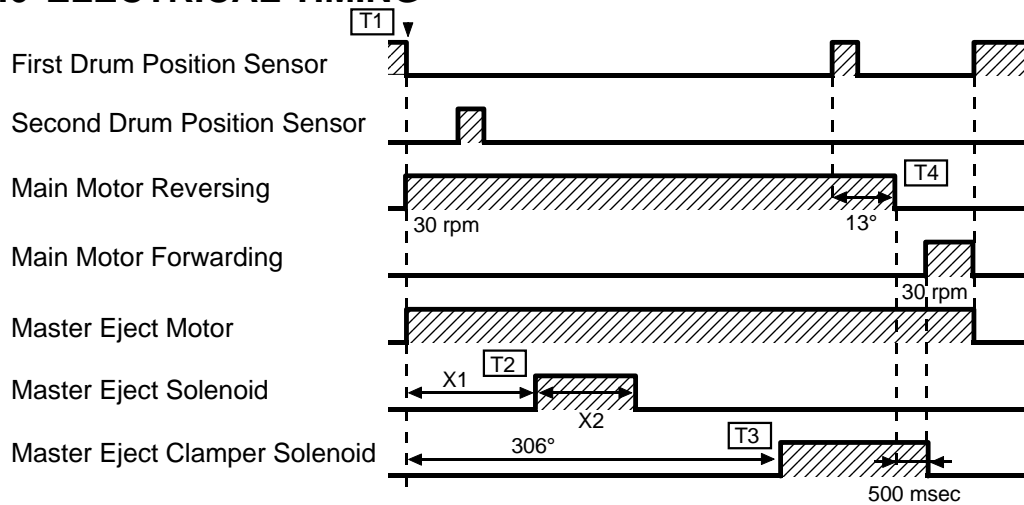
The gear [C] continues turning until the interrupter [G], which is installed onto the front end of the pressure plate, blocks the upper pressure plate sensor [A]. At this time, the master eject motor [B] will stop and the pressure plate will be held in the upper position.

[Pressure Plate Motor Lock Detection]

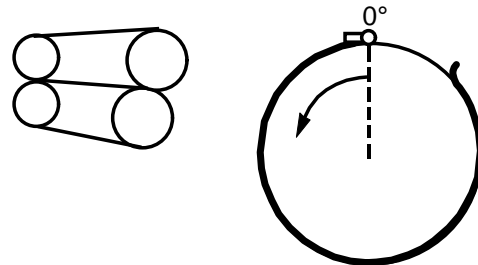
To prevent the pressure plate motor from locking the error indicator, "E-12" will light up on the operation display panel if any of the following conditions occur:

1. The upper [A] or lower [E] pressure plate sensor remains activated for more than 4 seconds after the pressure plate motor starts turning.
2. The lower pressure plate sensor [E] is not activated within 8 seconds of the pressure plate motor starts turning even though the upper pressure plate sensor [A] is de-activated.
3. The upper pressure plate sensor [A] is not activated within 8 seconds of the pressure plate motor starts turning even though the lower pressure plate sensor [E] is de-activated.

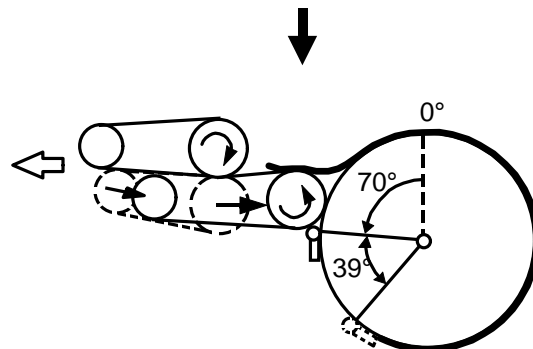
1.6 ELECTRICAL TIMING



T1: When the Master Making key is pressed, the main motor and master eject motor will start turning. At the same time, the paper table drive motor will start to lift the paper table to the paper feed position.



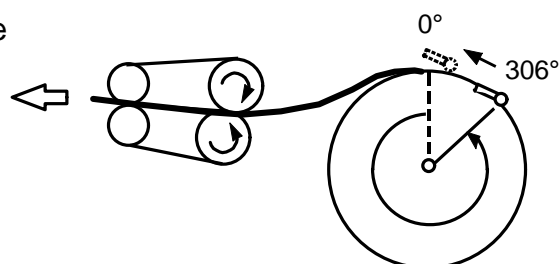
T2: When the drum rotates X1 degrees past the first drum position sensor actuation position (drum home position), the master eject solenoid is energized. This will press the lower eject rollers against the drum surface. The master eject solenoid is de-energized when the drum rotates X2 degrees more.



The drum rotation angles X1 and X2 depend on the drum type. This machine has two types of drums: one is the A3/DLT drum (standard), and the other is the A4/LT drum (optional). X1 and X2 for each drum are as follows:

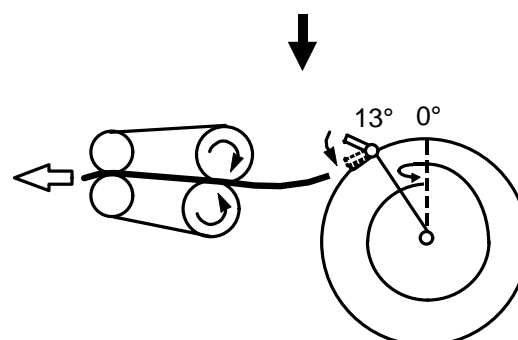
Drum Type	A3/DLT	A4/LT
X1 (degree)	70	174
X2 (degree)	39	55

T3: When the drum rotates 306 degrees past the home position, the master eject clamber solenoid is energized.

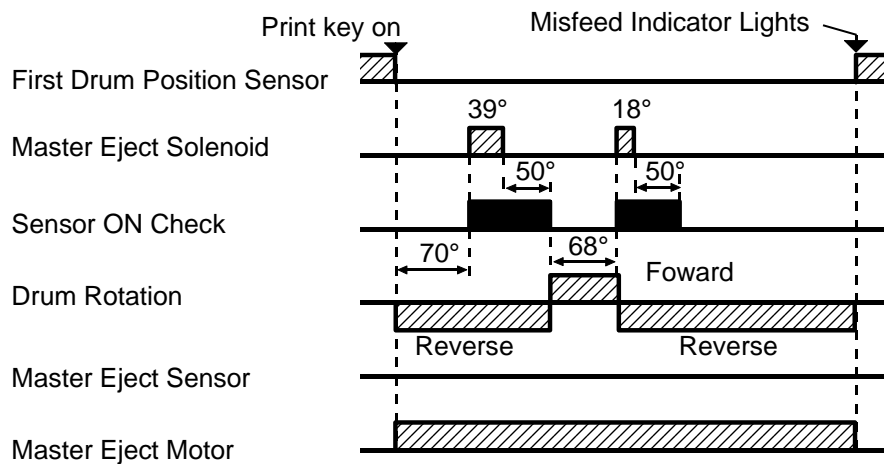


T4: When the drum rotates 13 degrees past the drum home position, the drum stops rotating.

500 milliseconds later (the drum completely stops during this period), the master eject clamber solenoid is de-energized and the drum starts rotating forward. The drum then returns to its home position. The master eject process is now over.



Soon after this, the machine will start feeding a new master and the drum will start rotating in reverse to begin the master making process.



[Master Eject Misfeed Detection]

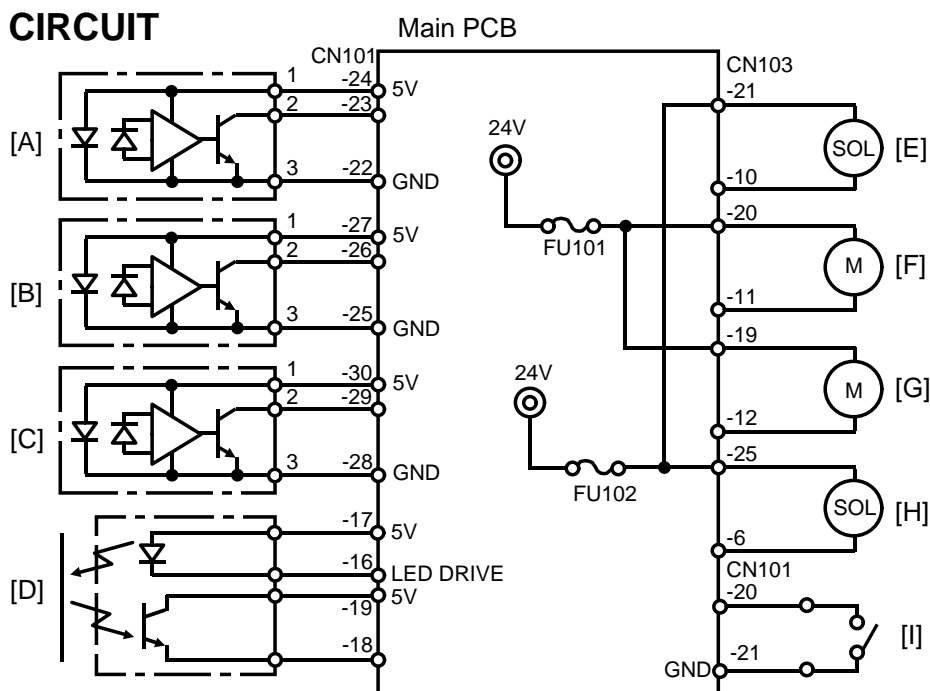
The misfeed indicator for the master eject section blinks in the following cases:

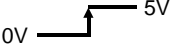
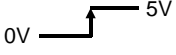
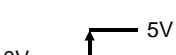
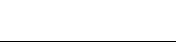
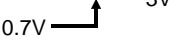
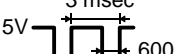
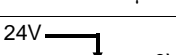
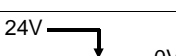
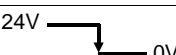
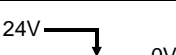
Case 1: The master eject sensor is not activated and the drum has turned 50 an additional degrees (still in reverse and after de-activation of the master eject solenoid). The machine will know that the eject rollers have failed to catch the master. The drum returns 68 degrees (by rotating in the forward direction, the printing direction) to repeat the master eject process one more time. The master eject solenoid is again energized while the drum turns another 18 degrees (in the reverse direction) to try to catch the curled edge of the master.

If the master eject sensor again fails to detect the master, the drum will return to its home position and the misfeed indicator will blink.

Case 2: The drum finishes its rotation for the master ejecting process and returns to the home position, but the master eject sensor does not turn off. This means that the master is still in between the master eject rollers, the misfeed indicator will blink.

1.7 CIRCUIT



Component Name	In/Out	Main PCB		Description
		CN No.	Signal Level	
Upper Pressure Plate Sensor [A]	In	101-23	0V 	Signal goes High when the pressure plate is at the highest position.
Lower Pressure Plate Sensor [B]	In	101-26	0V 	Signal goes High when the pressure plate is at the lowest position.
Full Master Detection Sensor [C]	In	101-29	0V 	Signal goes High when the interrupter of the pressure plate passes through the sensor. (Master full detection in the master eject box.)
Master Eject Sensor [D]	In	TP104 101-18	0.7V 	Signal goes High when the sensor detects the master. This is a pulse signal.
Sensor LED [D]	Out	101-16	5V 	Pulse signal goes to Low and the LED lights when the main switch is turned on.
Master Eject Solenoid [E]	Out	103-10	24V 	Signal goes Low when the solenoid turns on.
Master Eject Motor [F]	Out	103-11	24V 	Signal goes Low when the motor turns on.
Pressure Plate Motor [G]	Out	103-12	24V 	Signal goes Low when the motor turns on.
Master Eject Clamper Solenoid [H]	Out	103-6	24V 	Signal goes Low when the solenoid turns on.
Master Eject Box Switch [I]	In	101-20	5V 	Signal goes Low when the master eject box is installed.

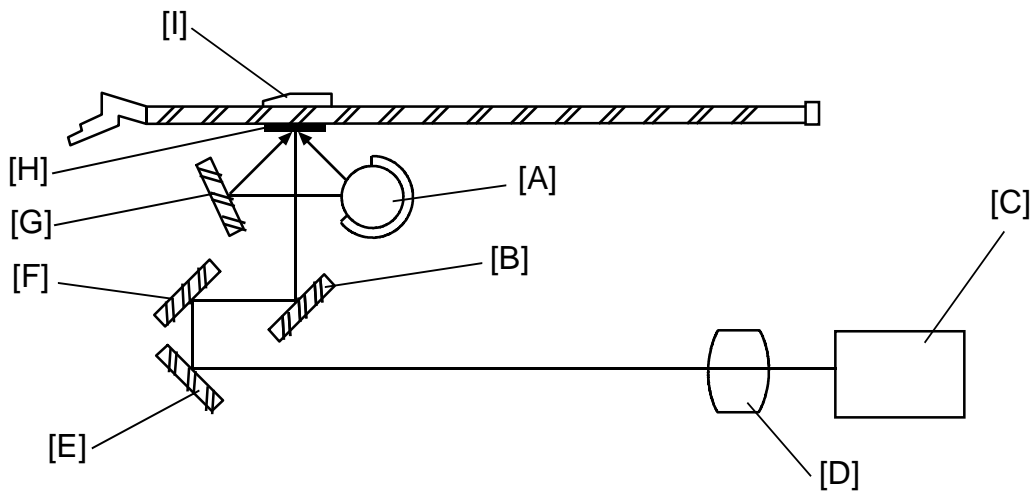
2. SCANNER

2.1 OVERALL

A book type scanner is used in the model VT3600. There are 2 modes for scanning originals.

Platen Cover Mode: The original is placed on the exposure glass, and the scanner motor drives the scanner to across the original.

Optional ADF Mode: When an optional Document Feeder is installed, the original is fed across the exposure glass. The scanner moves 24 mm away from the CCD and then remains still as it scans the original. The scanner will return to the home position when the scanning is finished.

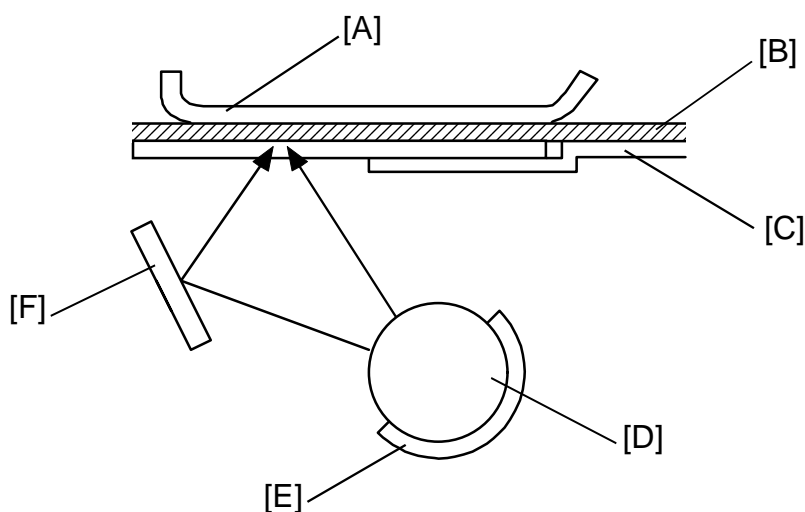


[G]: Reflector

The light from the fluorescent lamp [A] is reflected from the original, by the first [B], second [F], and third [E] mirrors and goes through the lens [D] into the CCD [C].

In the Platen Cover Mode, the CCD measures the reflector light off the white plate [H] on the back of the original scale [I] each time before scanning to obtain a standard white level before the original is scanned. The standard white level data is used to correct distortion. The scanner is in the home position when it measures the white level.

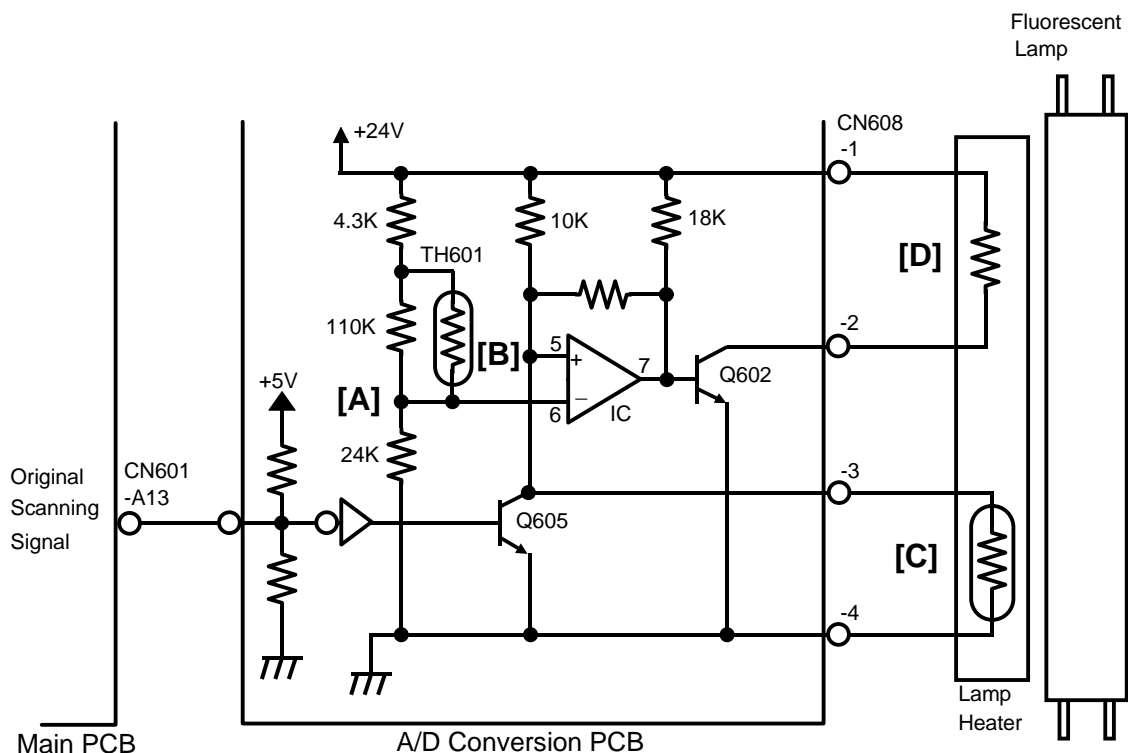
In the ADF mode, as the scanner moves 24 mm, the CCD will then measure the white plate installed on the ADF.

**[Light Source]**

A high frequency (15 kHz) fluorescent lamp [D] is used as a light source for high speed reading. The light is reflected off the original at two angles, direct and reflected. The reflector mirror [F] is used to prevent shadows from the edges of cut-and-paste originals from appearing as lines on the printed copies. The original guide plate [C] blocks part of the direct light from the fluorescent lamp to ensure that the light intensity of both the direct light and reflected light the same. A heater [E] is wrapped around the fluorescent lamp. The lamp will turn on for one minute when the main switch is turned on to quickly raise the lamp temperature. This will prevent a loss in light intensity that would occur if the lamp temperature were too low.

[Platen Cover]

The CCD reads the reflected light off the platen cover [A] to obtain a standard white level before the original is read. The standard white data are used to correct for distortion such as bright or dull spots in the light path (lamp, reflectors, exposure glass, mirrors, lens, and CCD).



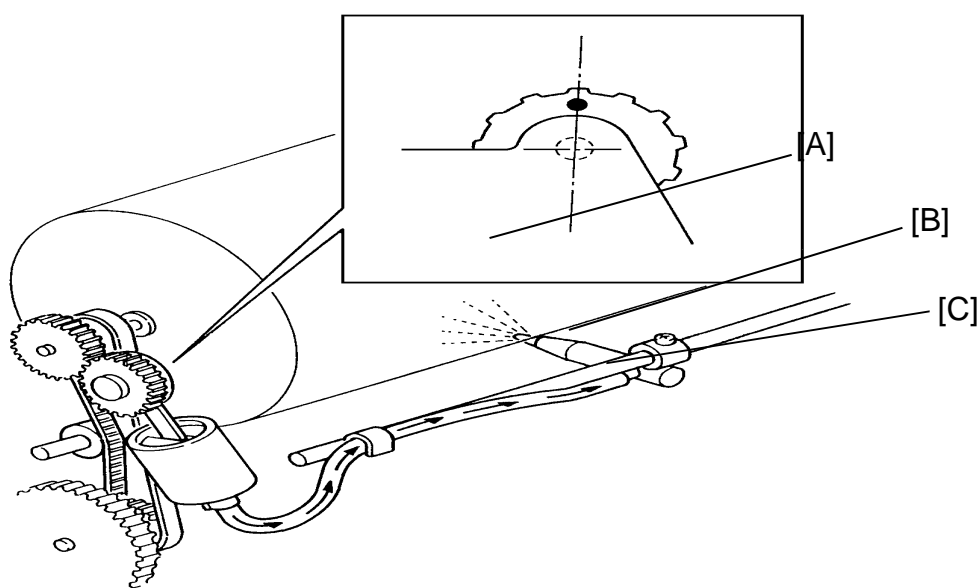
[Lamp Heater]

The thermistor [C] mounted in the lamp heater is used to maintain the lamp temperature at about 40°C.

If the lamp temperature drops too low, the voltage at [B] goes High. The resistance of thermistor [C] will increase, causing the voltage at IC-pin 7 (operational amplifier) to go High. Q602 will then turn on and the lamp heater [D] is energized. As the lamp temperature rises, the voltage at [B] will become less than that at IC-pin 6, causing IC-pin 7 to go Low, which will turn off the lamp heater.

Thermistor TH601, located on in the A/D conversion PCB, monitors the temperature inside the machine. If the temperature is low, the increased resistance of TH601 drops the voltage at [A] and the control temperature of the heater thermistor (heater ON/OFF temperature) is raised slightly. If the temperature is high, the control temperature is lowered slightly.

If Q605 turns on, the voltage at [B] becomes 0 volt and the lamp heater turns off. Q605 is turned on when the original scanning signal (active low) is sent from the main PCB. Consequently, the heater is always off during the original scanning process.



[Lens]

The lens assembly [B] consists of 6 lenses to transfer the image to the photoelectric elements of the CCD. It is possible to adjust the focus by moving the lens assembly.

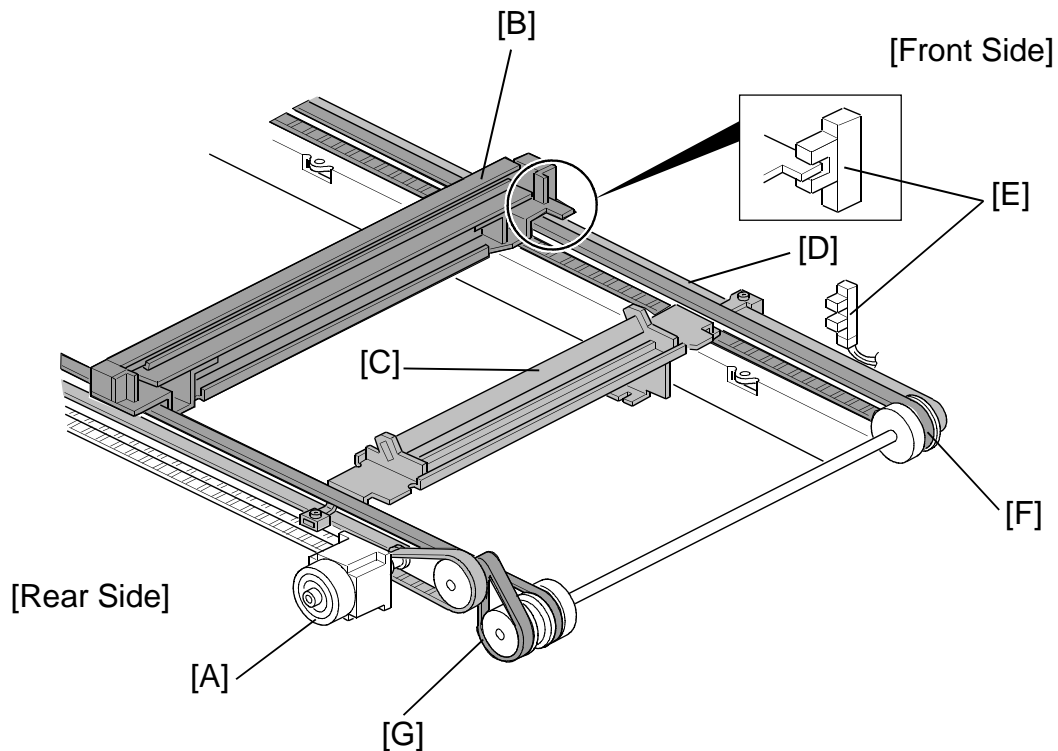
[Shading Plate]

Compared with the ends, the middle of the lamp is too bright. To correct this, a shading plate [A] is placed in front of the lens. The shading plate will block some of the light in the center to distribute it more uniformly, across the CCD.

[CCD (Charge Coupled Device)]

The CCD [C] is a solid-state device similar to a photodiode array, but unlike a photodiode array, a CCD can read one complete scan line at a time. The CCD produces an analog signal which is converted into a digital signal in the A/D conversion PCB.

2.2 SCANNER MECHANISM

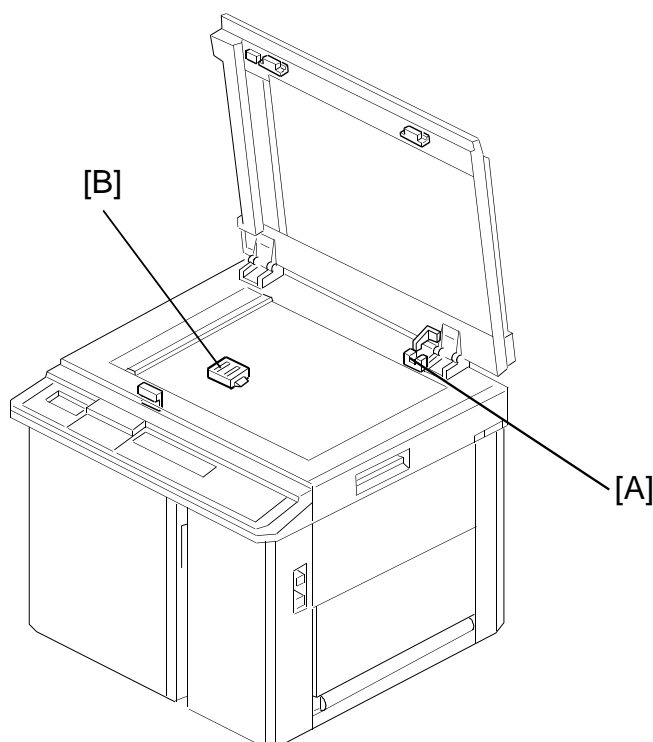


A stepper motor is used as the scanner motor [A] to drive both scanners. The first scanner [B], which consists of the exposure lamp and the first mirror, is driven by the first scanner belt [F]. The second scanner [C], which consists of the second and the third mirror, is driven by the second scanner belt [D]. Both scanners move along the guide rails.

The timing belt [G] moves the second scanner at half the speed of the first scanner. This is to maintain the focal distance between the original and the lens during scanning.

The scanner home position is detected by the home position sensor [E]. In the Platen Cover Mode, the scanner scans the original on the exposure glass for the full A3 length, then returns until the scanner home position sensor is activated. In the ADF Mode, the scanner moves 24 mm backwards (away from the CCD), to scan the original which is fed by the ADF. When the master making process is finished and the ADF motor stops, the scanner is returned to the home position.

2.3 PLATEN COVER POSITION DETECTION



When the platen cover is opened about 25 degrees, the Platen Cover Position Sensor [A] is deactivated. When this sensor is deactivated, the Original Sensor [B] is able to detect the original on the exposure glass.

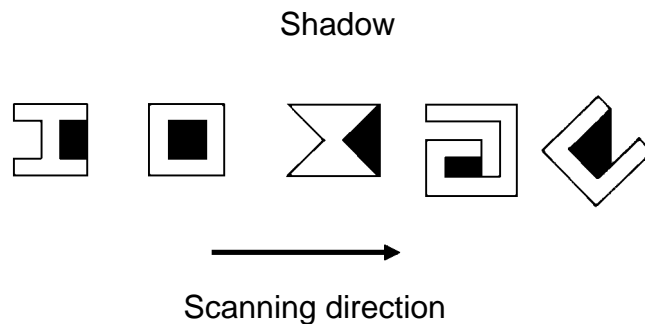
When the Platen Cover Position Sensor is deactivated and the Original Sensor detects no original on the exposure glass, the machine indicates "SET THE ORIGINALS" on the operation display. This is to prevent wasting of the master that would occur when the Master Making key is pressed with no original placed on the exposure glass.

The Margin Erase function will erase the shadows around the original. This function is useful when printing from thick books or similar originals. Margin erase function is also enabled when the Margin Erase key is pressed. When this key is pressed, the machine erases margin that is shown on the operation display disregarding of how much the platen cover is opened.

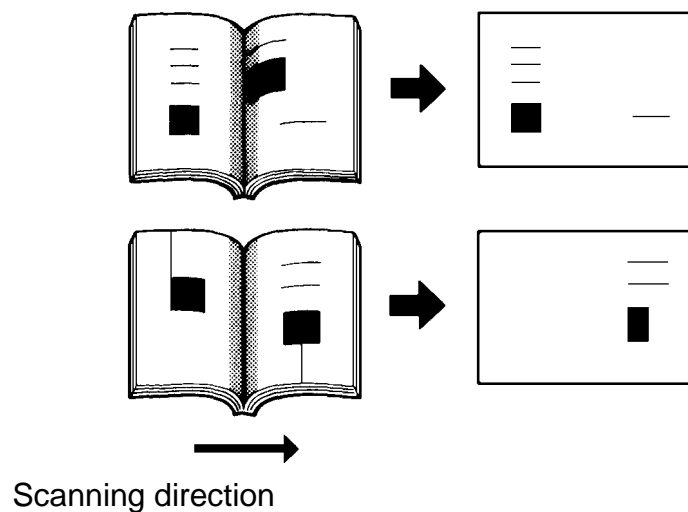
When the original is placed on the exposure glass and the Master Making key is pressed with the platen cover opened more than 25 degrees (as the Platen Cover Position Sensor is deactivated), the shadow erase function is enabled.

Notes regarding the shadow erase function:

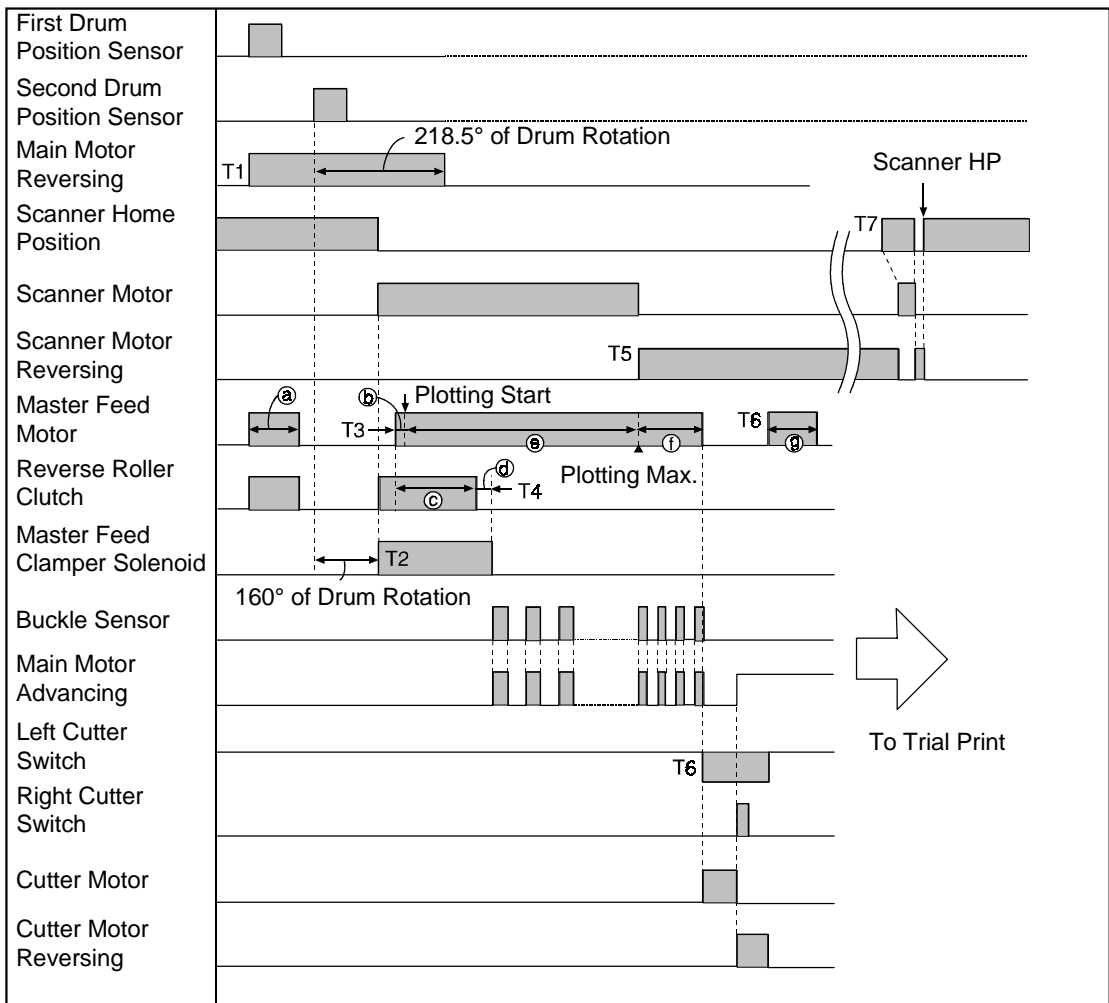
- Margins of 1 mm, 0.02" on all four sides of the original will be erased. The width of the margins will change depending on the reproduction ratios.
- Shadows near the book edge might not be erased completely.
- If the shape of the originals are as shown below, shadows might appear on the prints. In this case, make the master with the platen cover closed.



- If a line or solid image is on the margin at the center and at the edges being erased, the image might be erased as shown below.



2.4 ELECTRICAL TIMING



a: 21.5 mm b: 0.9 mm
e: 412 mm f: 60 mm
g: 40 mm c: 38 mm
d: 5 mm

T1: After the master eject process is completed, the main motor rotates in the reverse rotation at 30 rpm. At the same time, the master feed motor and the reverse roller magnetic clutch turn on to feed the master 21.5 millimeters.

T2: The master feed clamper solenoid is energized when the drum rotates 160 degrees past the second drum position sensor. At the same time, the reverse roller magnetic clutch is turned on and the scanner motor will start to rotate.

T3: When the scanner has moved 20 millimeters away from its home position, the master starts to be fed. When the master has been fed 0.9 millimeters, the thermal head will start to plot (burn) the data onto the master.

The leading edge is zero when the scanner is 12 millimeters from its home position. The leading edge margin can be adjusted within the range of 4 to 10 millimeters by SP mode No.33.

T4: When the master has been fed 38 millimeters, the reverse roller magnetic clutch will turn off. The master is then fed 5 additional millimeters and the master feed clasper solenoid is de-energized to close the master clasper. The original transport and the master feed motors speed up once the master plotting is completed. The master feeding lengths for plotting are:

412 millimeters: A3/DLT drum

204 millimeters: A4/LT drum

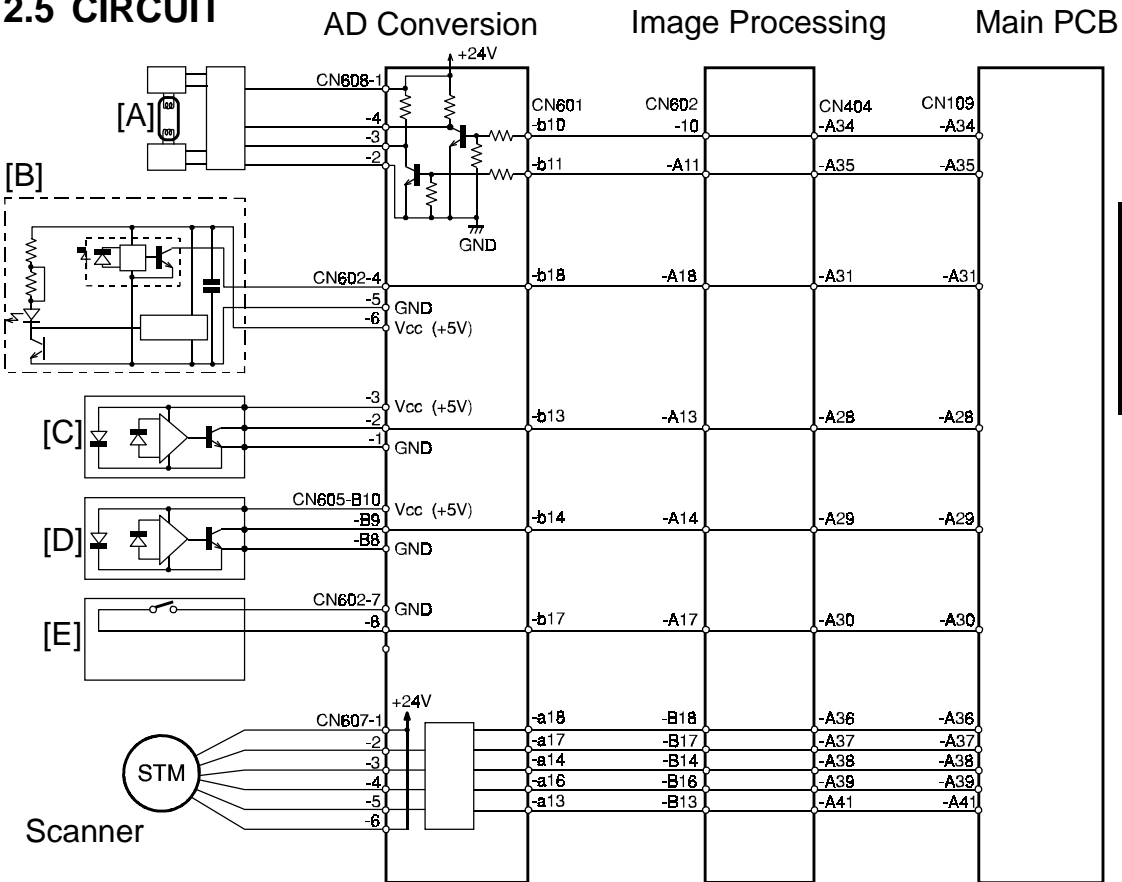
T5: When the scanner has scanned the full scanning length (the same length as the master feeding length), the scanner motor will start its reverse rotation to bring the scanner back to the home position.

T6: The master feed motor will stop when the master has been fed 534.4 millimeters. At the same time, the cutter motor will rotate to cut the master. The cutter motor will change its rotation direction when the cutter holder presses against the right cutter switch. The cutter motor stops when the cutter holder returns back to the home position to activate the left cutter switch.

When the right cutter switch is activated, the drum will start rotating to return back to its home position. When the left cutter switch is activated (when the cutter had returned to its home position), the master feed motor will turn on again to feed the master 40 millimeters.

T7: When the scanner motor stops its reverse rotation, the scanner motor will then rotate in the forward direction until the scanner home position sensor is activated.

2.5 CIRCUIT

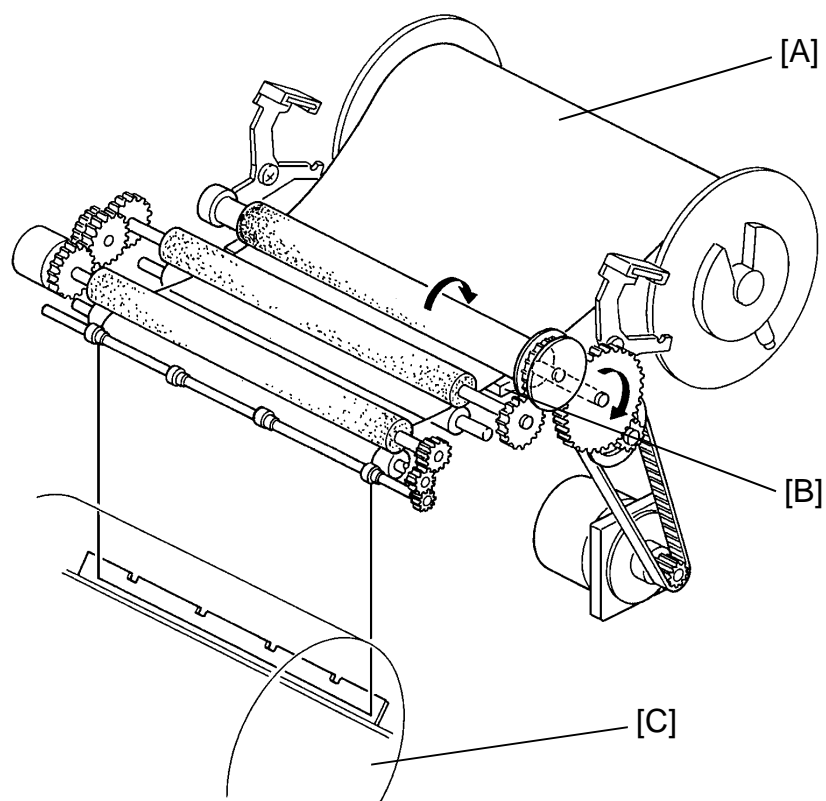


Detailed
Section
Descriptions

Component Name	I/O	MAIN PCB		Description
		CN No.	Signal Level	
Fluorescent Lamp [A]	Out	109-A34		Signal goes high when the lamp on signal turns on.
Fluorescent Lamp [A]	Out	109-A35		Signal goes low when the lamp on signal turns on.
Original Sensor [B]	In	109-A31		Signal goes low when the sensor detects an original.
Scanner HP Sensor [C]	In	109-A28		Signal goes high when the sensor detects an original.
Platen Cover Position Sensor [D]	In	109-A29		Signal goes high when the sensor detects an original.
ADF Set Sensor [E]	In	109-A30		Signal goes low when the lead switch is turned on.

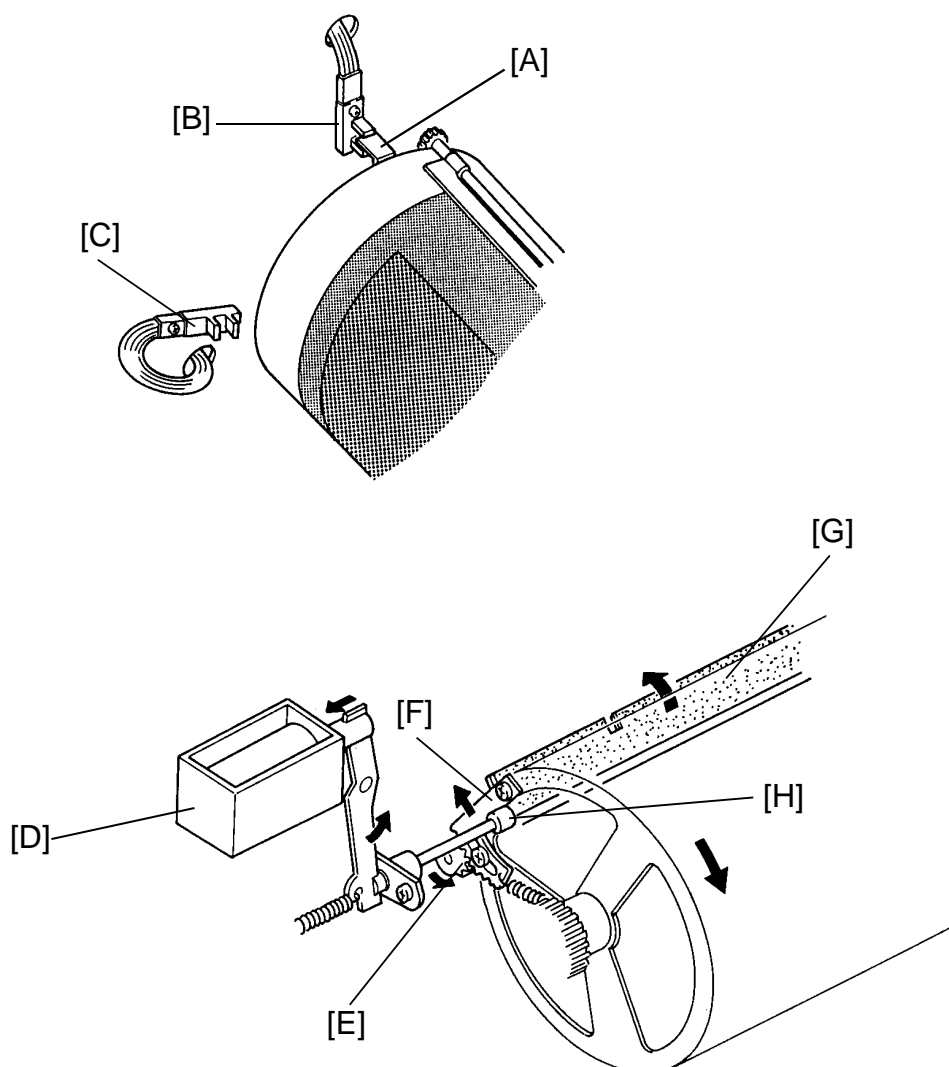
3. MASTER FEED SECTION

3.1 OVERALL



The thermal head [B] will burn the image (scanned by the CCD) onto the master [A] as it is being fed onto the drum [C]. The completed master is clamped to and wrapped around the drum.

3.2 MASTER CLAMPER OPENING MECHANISM

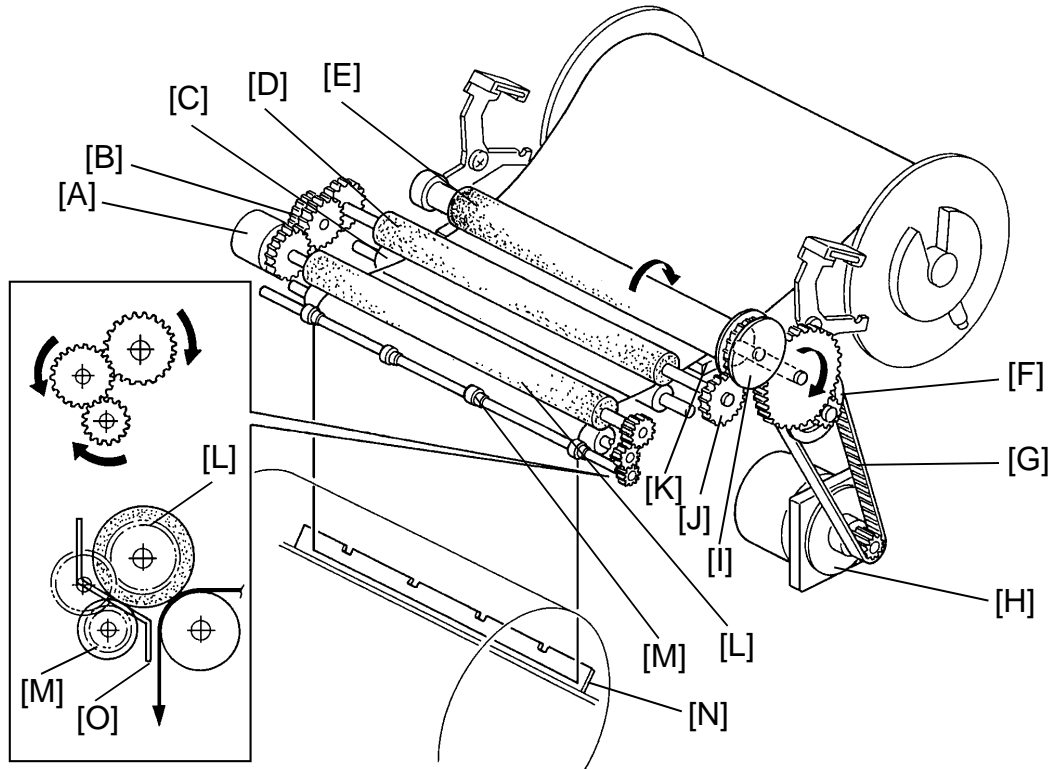


After the master eject process had completed and the interrupter [A] is positioned in the first drum position sensor [B] (drum home position), the main motor will turn on and the drum will start rotating (30 rpm) in the reverse direction (opposite to the printing direction).

When the drum rotates 160 degrees past the actuation position of the second drum position sensor [C], the master feed clamper solenoid [D] will energize and cam [H] will move towards the drum.

When the drum turns another 58.5 degrees, the sector gear [F] will rotate upwards as it contacts the cam [H]. This will engage the sector gear and gear [E], which will turn counterclockwise to open the clamper [G]. At the same time, the drum will stop and the clamper will remain open ready to clamp onto the leading edge of the master.

3.3 MASTER FEEDING MECHANISM

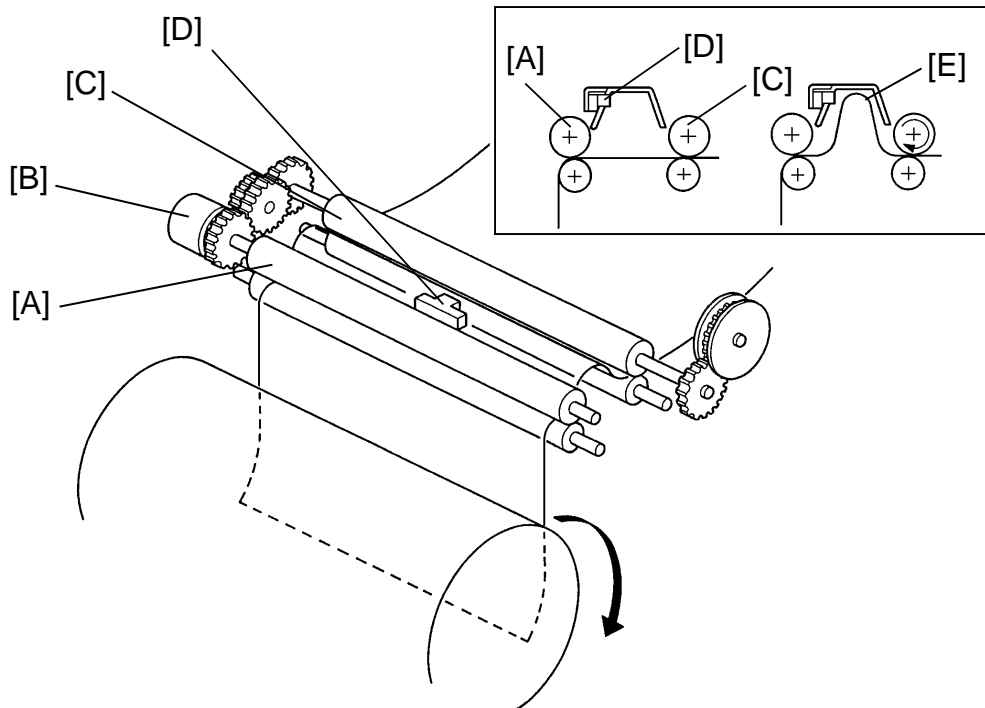


The drum will rotate 218.5 degrees past the second drum position sensor and then will stop. At this time, the magnetic clutch [A] located behind the reverse roller [L] and the master feed motor [H] will turn on. The rotation of the master feed motor [H] is transmitted to the platen roller [E] through the belt [G] and the gear/pulley [F]. The platen roller will then feed the master and press it against the thermal head [K]. Also, the rotation of the gear/pulley [F] is transmitted to a gear [J] through the relay gear [I] to drive the upper feed roller [D] and the lower feed roller [C] for feeding the new master.

When the magnetic clutch [A] turns on, the rotation of the upper feed roller [D] is transmitted to the reverse roller [L] through the relay gears [B], thus feeding the master. Also, the master is directed down to the clamber [N] of the drum by the reverse guide [O]. The counter rollers [M] are used to prevent the leading edge of the master from wrapping around the reverse roller [L].

After the master is fed 59.5 millimeters, the magnetic clutch [A] will turn off and the reverse roller [L] will stop. After the master is fed another 5 millimeters, the master feed clamber solenoid will turn off because the leading edge of the master has already reached the clamber [N].

3.4 MASTER WRAPPING MECHANISM

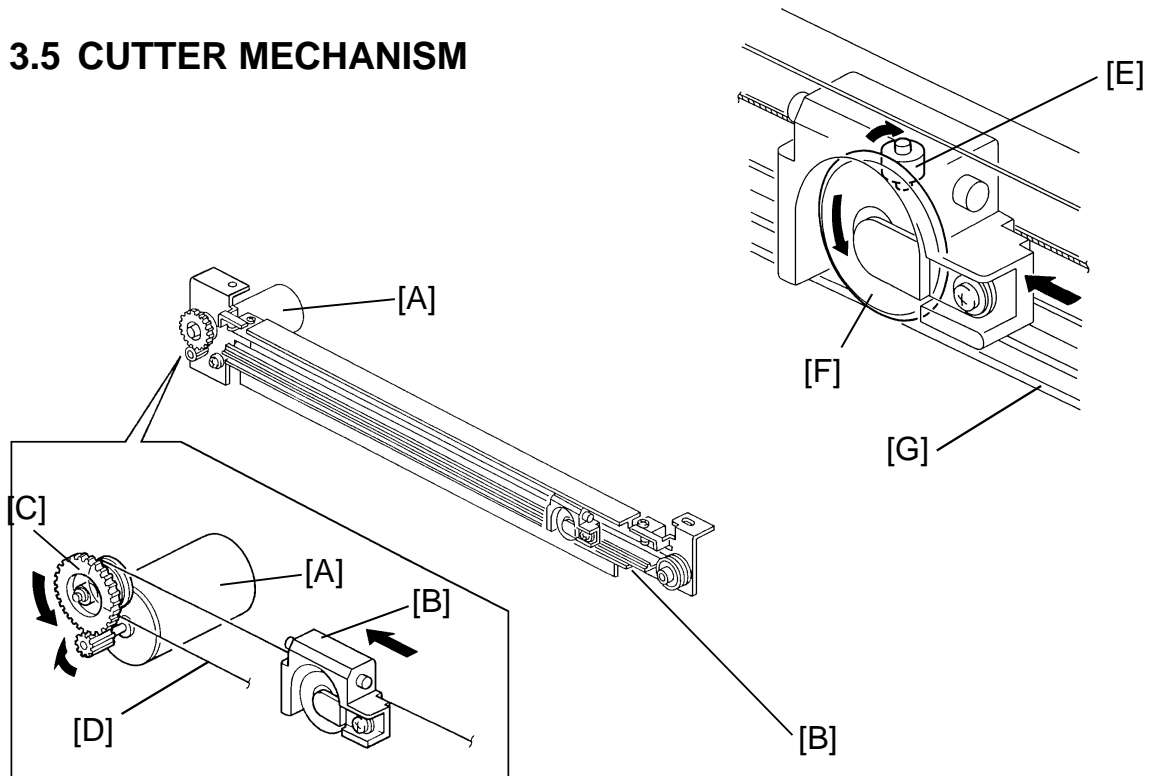


When the magnetic clutch [B] is turned off, the reverse roller [A] will stop.

However, since the feed rollers [C] turn continuously, the master continues to be fed, causing the master to buckle. This buckle [E] is detected by the master buckle sensor [D]. When the sensor turns on, the main motor will turn on at 10 rpm to rotate the drum. The main motor will turn off when the sensor turns off.

The master is fed by repeating the ON/OFF action of the master buckle sensor. This mechanism prevents the shockwave from having an effect on plotting (Burning the image onto the master) when the drum pulls the master (for instance by jiggling the master above the thermal head).

3.5 CUTTER MECHANISM



After the master making process (plotting process) is completed, the master feed motor will turn off and the cutter motor [A] will turn on.

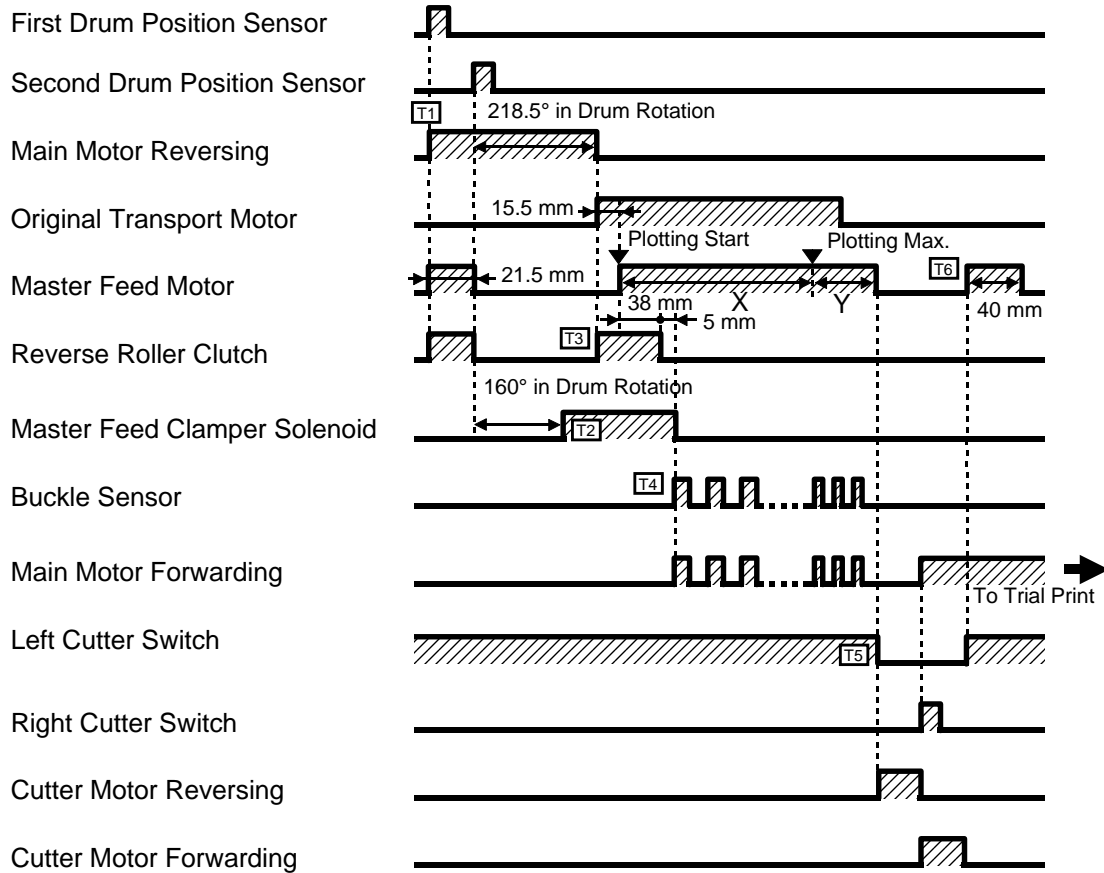
The cutter motor [A] starts turning in reverse (arrows) when the cutter holder [B] pushes against the left cutter switch located at the front (operation side) end of the cutter rail (cutter holder home position). This will drive the cutter holder [B] toward the rear on the machine (non-operation side) by means of the gear/pulley [C] and the wire [D] on which the cutter holder [B] is fixed.

When the cutter holder reaches the rear of the cutter rail and pushes against the right cutter switch, the cutter motor [A] will change the rotating direction, so the cutter holder [B] will start to move toward the front, cutting the master. The cutter motor [A] will stop turning when the cutter holder [B] returns to its home position and pushes against the left cutter switch. The master cutting process is now completed.

While the cutter holder [B] is traveling to the rear, the roller [E] installed in the cutter holder is turning clockwise because it touches the cutter rail. The roller [E] rotates the rotary cutter blade [F] as indicated by the arrow. The master is positioned between the rotary blade and blade plate [G] and as the cutter moves back to its home position, it will cut the master. The blade plate also serves as a lower guide plate for the master.

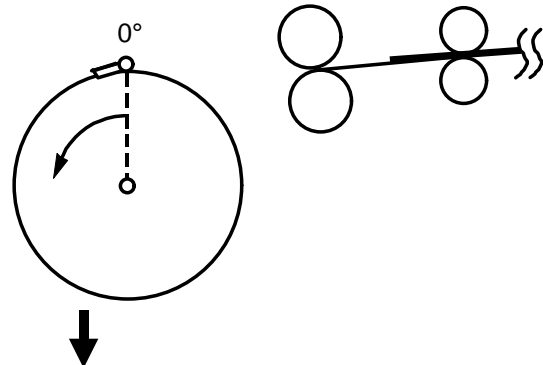
After the master cutting process is finished, the master is fed another 40 millimeters and the master feed process is finished.

3.6 ELECTRICAL TIMING

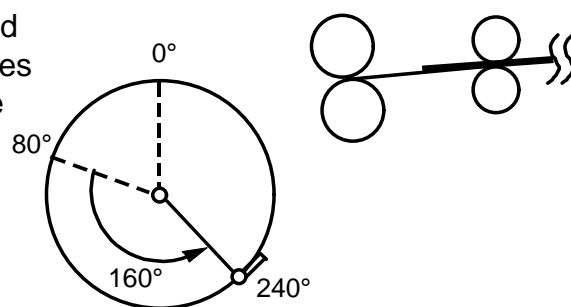


Detailed
Section
Descriptions

T1: After the master eject process is completed, the main motor starts rotating in reverse (opposite to printing direction) at 30 rpm. At the same time, the master feed motor and the reverse roller magnetic clutch are turned so on to feed the master 21.5 millimeters.



T2: The master feed clamper solenoid is energized when the drum rotates 160 degrees (in reverse) past the second drum position sensor actuation position.



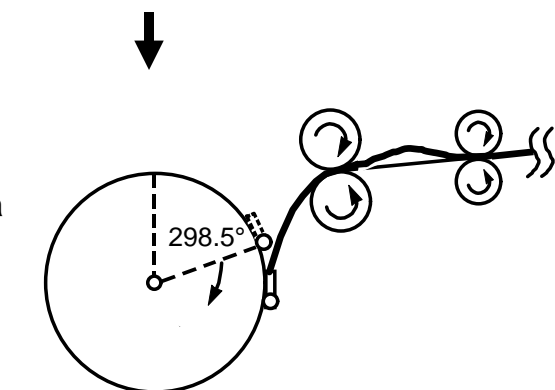
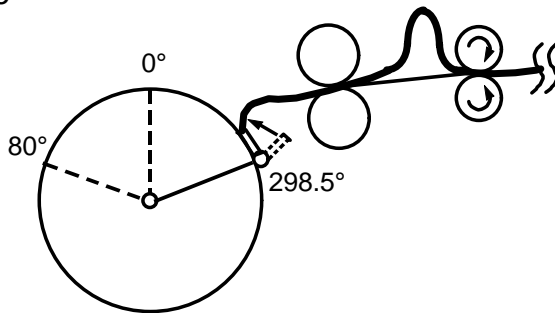
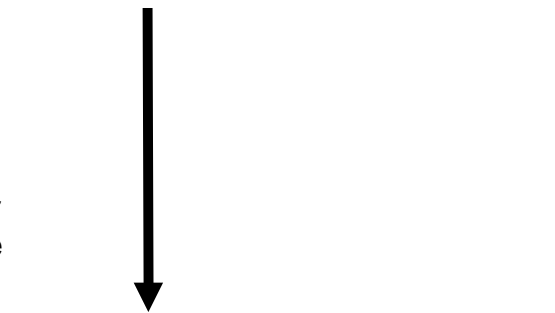
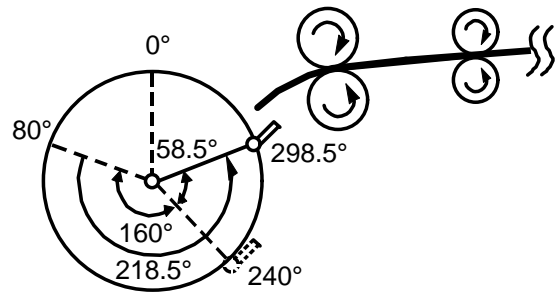
T3: When the drum rotates 58.5 degrees more, the drum master clamber is completely open, and the drum stops.

When the drum stops, the original will be fed. After the original has been fed 15.5 millimeters, the master will start being fed, and the thermal head will start plotting on the master.

At the same time, the reverse roller magnetic clutch will turn to feed the master 38 millimeters. The master will start to buckle when the reverse roller magnetic clutch turns off.

T4: After the reverse roller magnetic clutch is turned off, the master is fed 5 millimeters more. Then, the master feed clamber solenoid is de-energized and the master clamber is closed. (At this moment, the master plotting has already begun.)

Because the shockwave from clamping might affect plotting (for instance by jiggling the master above the thermal head). The extra 5 millimeters that the master is fed will buckle the master and the buckle will absorb the shockwave.



When the master feed clasper solenoid is de-energized, the drum will start rotating forward (the printing direction) at 10 rpm to wrap the master around the drum. The drum will pull the master and straighten out the buckle. The drum will stop when the buckle sensor is de-activated. The master again buckles since the master feed motor continues to feed the master. The master is wrapped around the drum by repeating these steps, controlled by the ON/OFF action of the buckle sensor.

The original transport and master feed motor will speed up once the master plotting is completed, so the blank section of the master is now being wrapped quickly. The master feeding length for the plotting area is fixed at 410 millimeters (maximum plotting length) in the standard A3/DLT drum (206 millimeters in the A4/LT drum).

The master feed motor will stop after the master is fed X1 and X2 millimeter. X1 and X2 depend on the drum type as follows:

Drum Type	A3/DLT	A4/LT
X1 (mm)	410	206
X2 (mm)	60	61

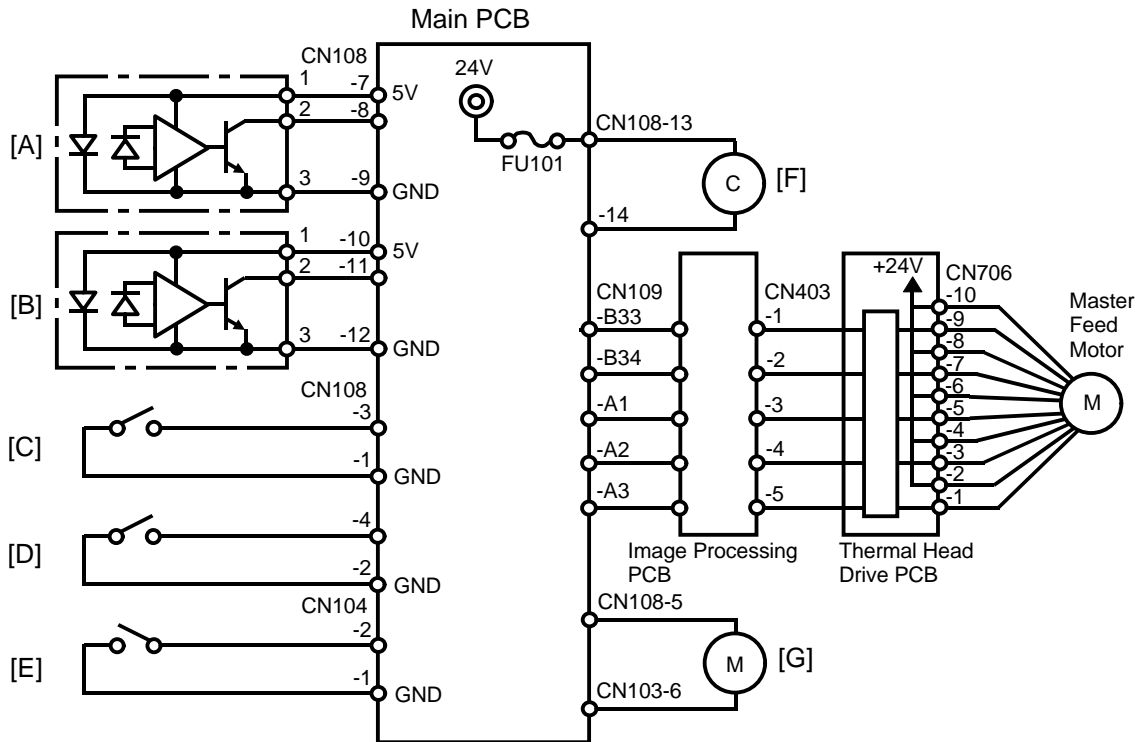
T5: The drum (main motor) will stop after the master has been fed 537 millimeters.

At the same time, the cutter motor starts rotating and the master is cut. The cutter motor will change the rotating direction when the cutter holder pushes against the right cutter switch. The cutter motor will stop when the cutter holder returns to the home position and the left cutter switch is again activated. (At the same time, the pressure plate motor will also start to turn to raise the pressure plate).

When the right cutter switch is activated, the drum will start rotating in the forward direction at 30 rpm to return to its home position. The drum will continue to rotate forward to make a trial print.

T6: When the left cutter switch is activated (the cutter home position) and the cutter motor will stop, the master feed motor again turns on to feed the master 40 millimeters an additional, then will turn off.

3.7 CIRCUIT

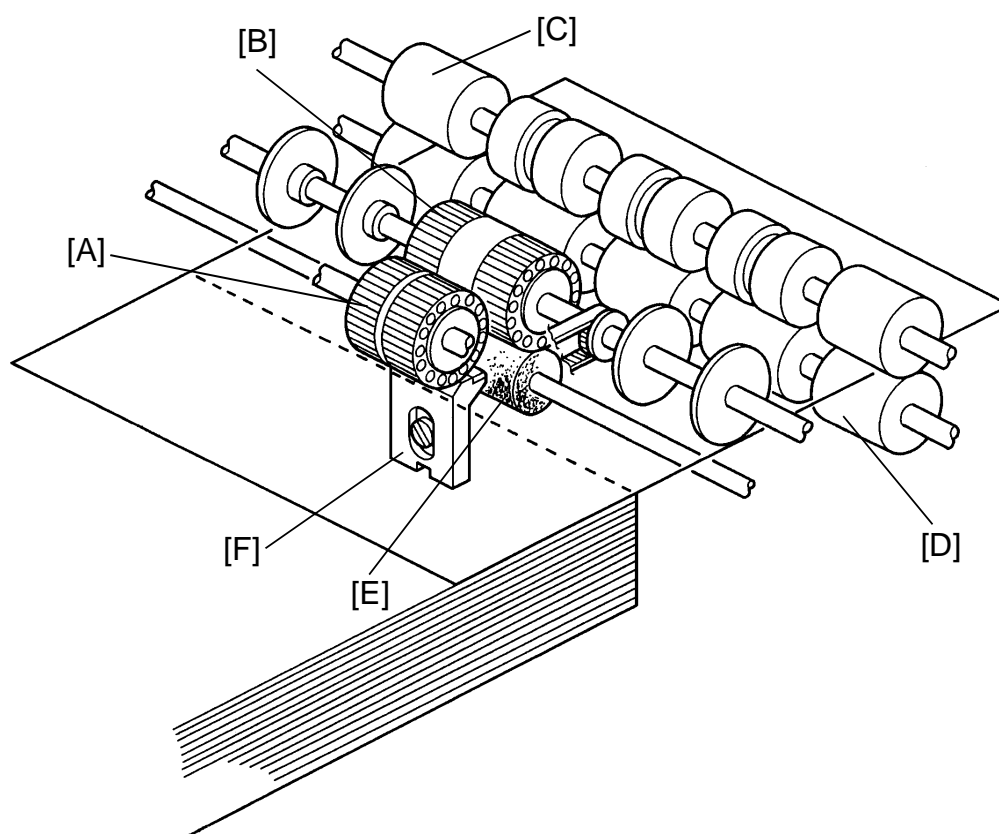


Component Name	In/Out	Main PCB		Description
		CN No.	Signal Level	
Master Buckle Sensor [A]	In	108-8	0V 5V	Signal goes High when the sensor detects the master buckle.
Master Roll Detection Sensor [B]	In	108-11	5V 0V	Signal goes Low when the sensor detects the master on the master roll.
Left Cutter Switch [C]	In	108-3	5V 0V	Signal goes Low when the cutter holder pushes the switch actuator (home position).
Right Cutter Switch [D]	In	108-4	5V 0V	Signal goes Low when the cutter holder pushes the switch actuator.
Master Cut Button [E] see note	In	104-2	7.5V 0V	Pulse signal goes to Low when the button is pressed.
Reverse Roller Magnetic Clutch [F]	Out	108-14	24V 0V	Signal goes Low when the clutch is energized.
Cutter Motor (Forward) [G]	Out	108-5	0V 24V	Signal goes High when the cutter holder is returning.
Cutter Motor (Reverse) [G]	Out	108-6	0V 24V	Signal goes High when the cutter holder is moving toward the rear.

NOTE: Measure 0.9V on DC meter

4. PAPER FEED SECTION

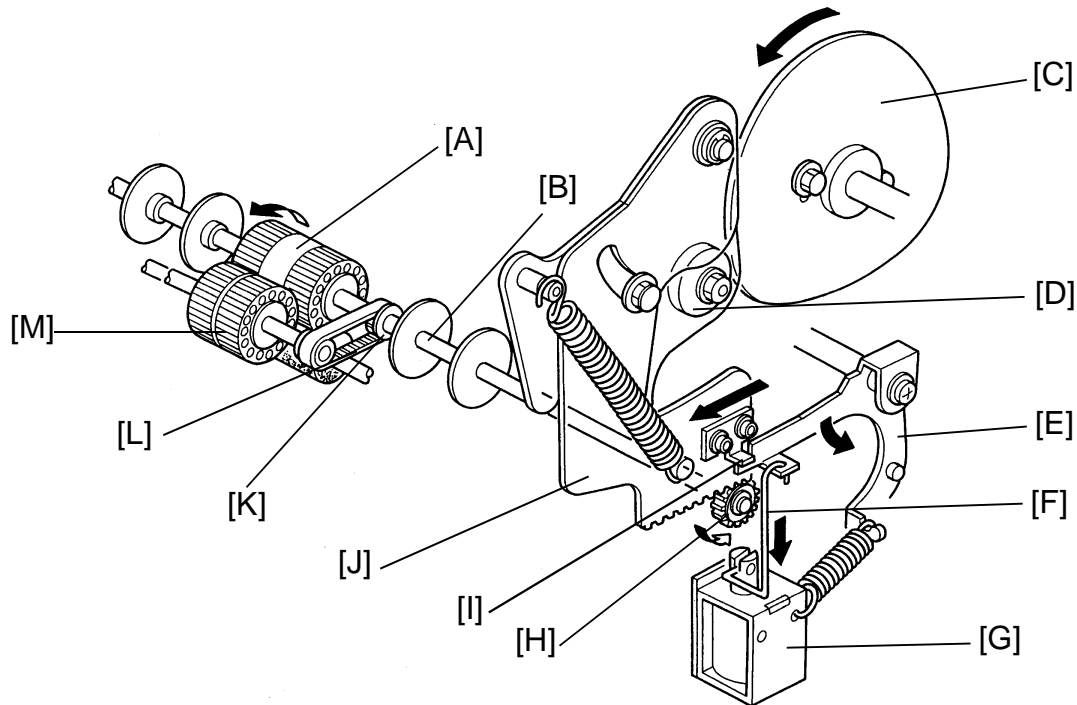
4.1 OVERALL



Detailed
Section
Descriptions

This mechanism uses a center separation system, which consists of the separation plate [F], upper separation roller [B], and the lower separation roller [E]. If a few sheets of paper are picked up from the paper stack (paper table) by the paper feed roller [A], only one sheet of paper is transported to the second upper feed roller [C] and second lower feed roller [D].

4.2 PAPER FEED ROLLER/UPPER SEPARATION ROLLER MECHANISM



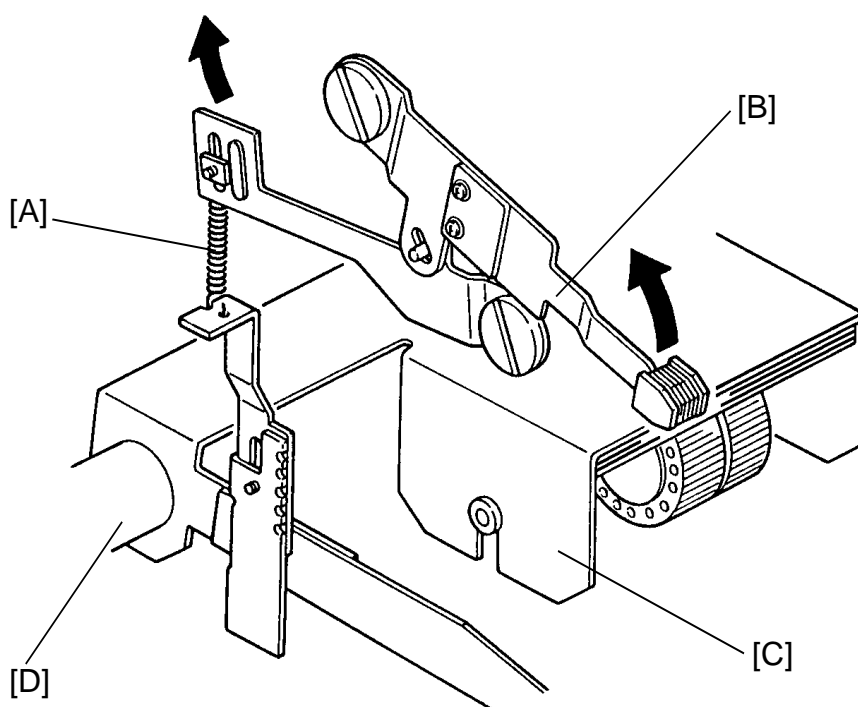
The sector gear [J], located on the non-operation side of the machine, rotates the paper feed roller [M] and the upper separation roller [A]. When the paper feed solenoid [G] is engaged, the link [F] is pulled downward. When the cam roller [D] is positioned on top of the paper feed roller cam [C], the sector stopper [E] will turn counterclockwise as a clearance is formed between the pin [I] and the stopper [E]. The cam roller [D] of the sector gear will move along the cam face of the paper feed roller cam [C].

When moving the cam roller [D] from the bottom to the top of the paper feed roller cam [C], the sector gear [J] turns clockwise and the gear [H] is turned counterclockwise. The rotation of the gear [H] is transmitted to the upper separation roller shaft [B] by a one-way clutch inside the gear [H], and the upper separation roller [A] will turn counterclockwise.

At the same time, the pulley [K] mounted on the upper separation roller shaft [B] will turn, and the belt [L] will rotate the paper feed roller [M] counterclockwise to feed the printing paper.

When the cam roller [D] moves from the top to the bottom of the paper feed roller cam [C], the sector gear [J] turns counterclockwise and the gear [H] is turned clockwise. However, due to the one-way clutch inside the gear [H], the upper separation roller [A] and the paper feed roller [M] do not turn.

4.3 FEED ROLLER PRESSURE MECHANISM

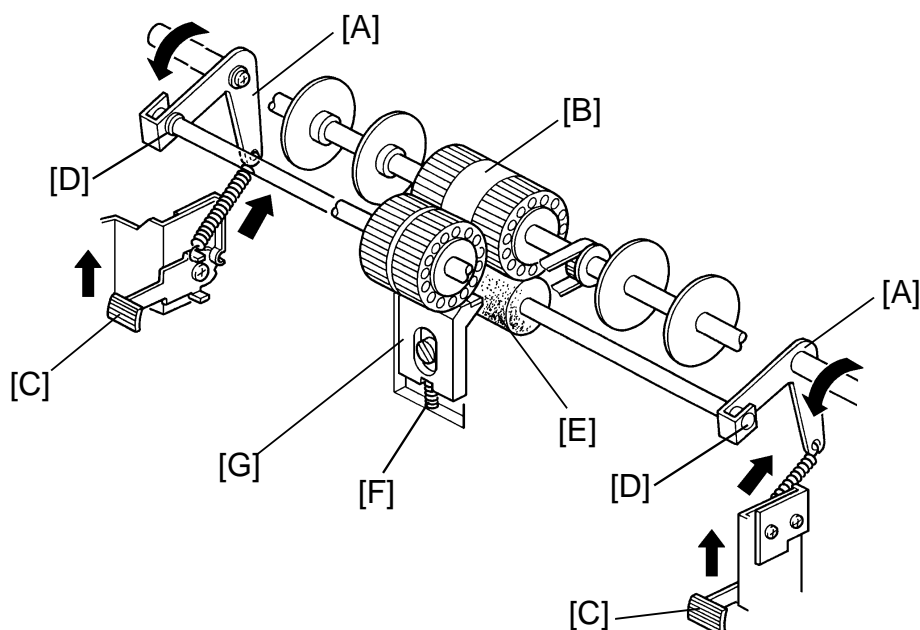


The weight of the feed roller assembly [C] will press the paper feed roller onto the paper that is stacked on the paper table. This is because the feed roller assembly rotates freely around its shaft [D].

The spring [A] applies tension to the feed roller assembly in the direction in which the paper feed roller is pulled up. When the feed roller pressure lever [B] is moved up, the spring [A] will also move upward. The tension of the spring is increased, weakening the feed roller pressure.

Originally, the feed roller pressure lever is in the up position (standard paper). When thick paper (132.5 to 215 g/m², or 35.2 to 57 lb.) is used and frequently paper is not fed, push down the feed-pressure lever. The feed roller pressure will increase.

4.4 PAPER SEPARATION MECHANISM



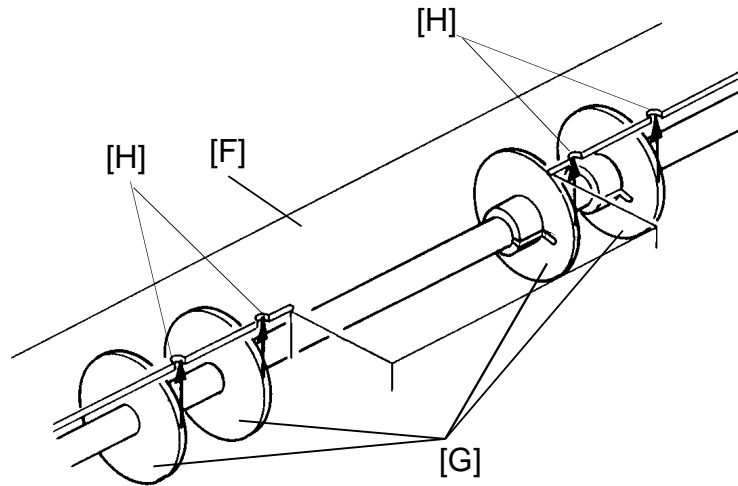
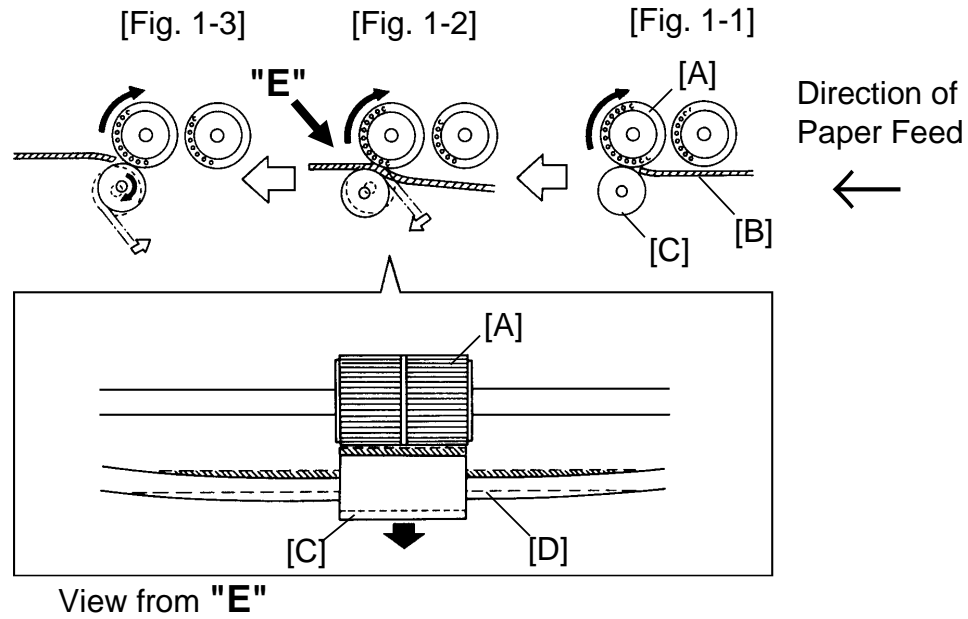
Spring tension [F] holds the separation plate [G] against the upper separation roller. A rubber pad located on top of the separation plate is used to separate a few sheets of paper before they reach the lower separation roller. If too many sheets of paper are fed to the lower separation roller at the same time, the lower separation roller will not separate the sheets, it can separate only two or three sheets of paper.

Springs pull lever [A] pushes the lower separation roller [E] upward. This roller presses the sheets to be fed against the upper separation roller [B]. The lower separation roller does not turn in the paper feeding direction. (It turns in the opposite direction because of the one-way clutch bearings [D] located on both right and left separation levers [A].) When 2 sheets of paper are fed, brake force is applied to the lower sheets of paper by the friction between the paper and the lower separation roller. Then, the sheets are separated and a single sheet of paper is fed to the second feed rollers.

The pressure between upper and lower separation rollers can be adjusted in two steps by changing the right and left separation pressure adjusting levers [C] as follows:

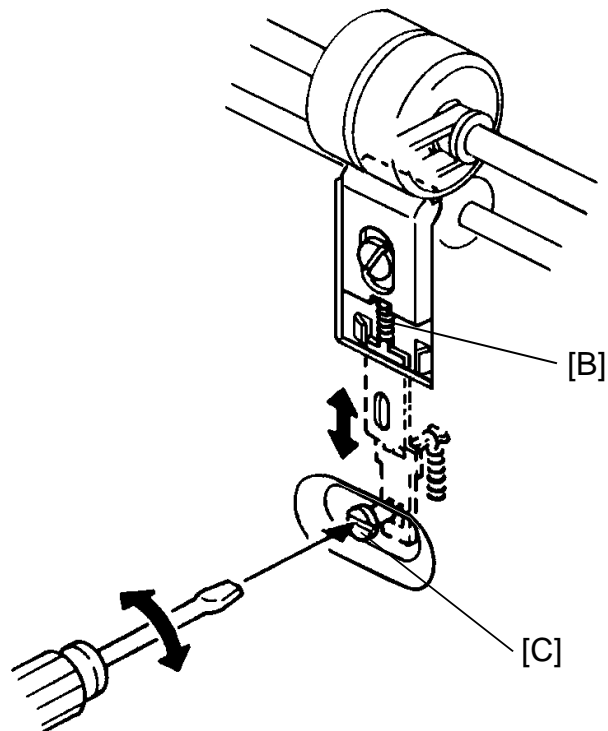
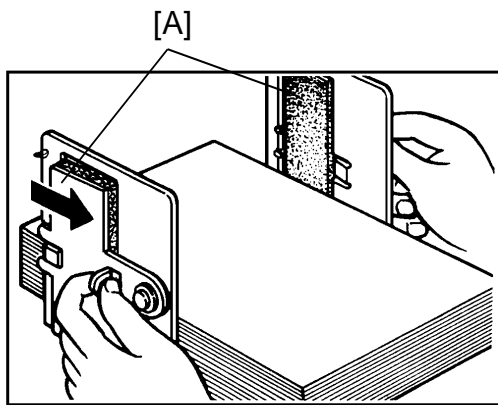
Levers Up:	Separation pressure decreases.
Levers Down:	Standard position.

When dog-eared or wrinkled prints are delivered, the separation pressure should be decreased.



The lower separation roller [C] will turn slightly (Fig. 1-1) due to the one-way clutch bearings when paper passes through the roller. The lower separation roller [C] and its shaft [D] are slightly pushed downward by the paper [B] when the upper separation roller [A] is feeding the paper. (View from "E") Just when the paper is being fed out from the rollers, the lower separation roller [C] and its shaft [D] will spring back against roller [A]. (Fig. 1-3) This rotates the lower separation roller and insures that it will wear out evenly.

There are four paper guide rollers [G] to reduce curl in the paper's leading edge, and to feed the paper smoothly into the guide plates. There are four slots [N] on the bracket [F] corresponding to the roller positions as shown in the lower figure.

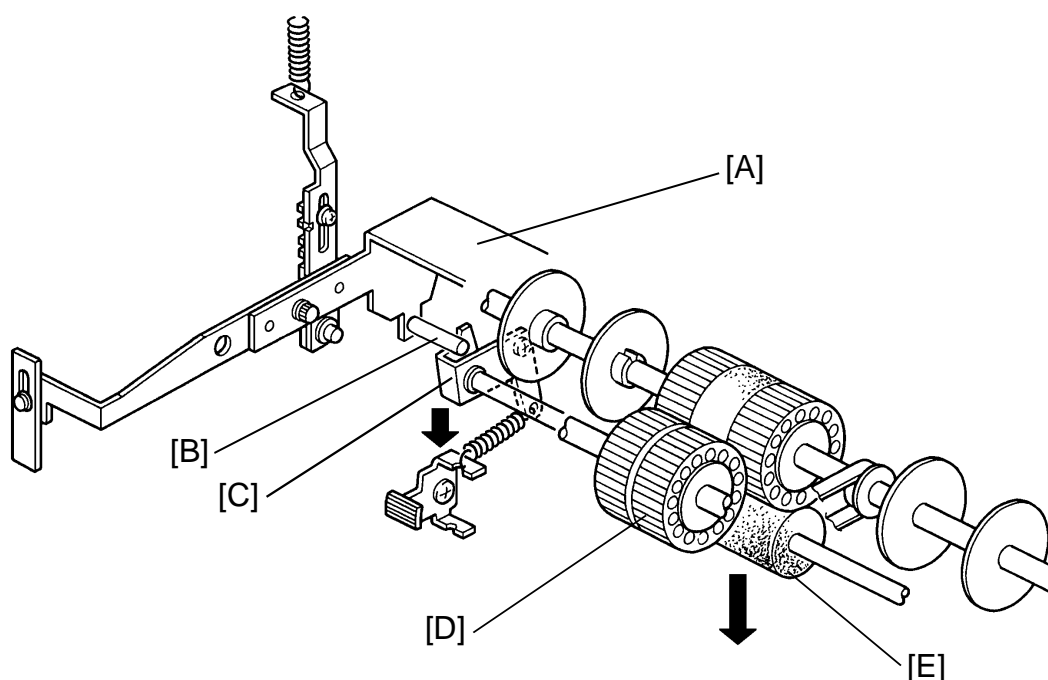


The side pads [A] are installed in the front and rear paper side guides to prevent multiple feed. These are especially useful when thin paper is used. After adjusting the paper side plates to the proper paper width (so that they touch the paper lightly), move the front and rear side pad levers to the right. Normally, the side pads pressure should be released by moving the levers to the left.

The separation plate pressure can be adjusted to match the type of paper being used. The plate which supports the pressure plate spring [B], can be moved up or down by turning the eccentric cam shaft [C].

If multiple paper feed frequently occurs, the plate should be moved upward. If paper misfeeds frequently, the plate should be moved downward.

4.5 SEPARATION ROLLER PRESSURE RELEASE MECHANISM

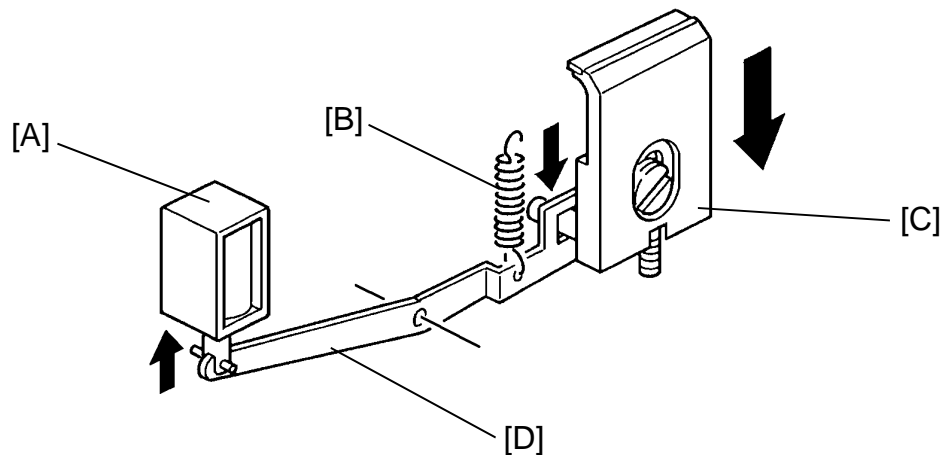


When printing is finished or a misfeed occurs, the paper table drive motor will rotate for 500 milliseconds to lower the paper table. The paper on the paper table will move down from the paper feed roller [D]. The paper feed bracket [A] is pulled downward by its own weight.

At this time, the shaft [B] will push the left separation lever [C] down. This will move the lower separation roller [E] slightly downward.

This mechanism will make it easier to remove paper that is caught between the upper and lower separation rollers.

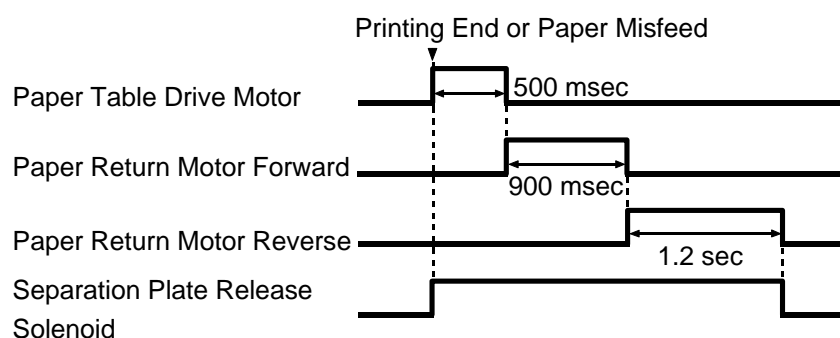
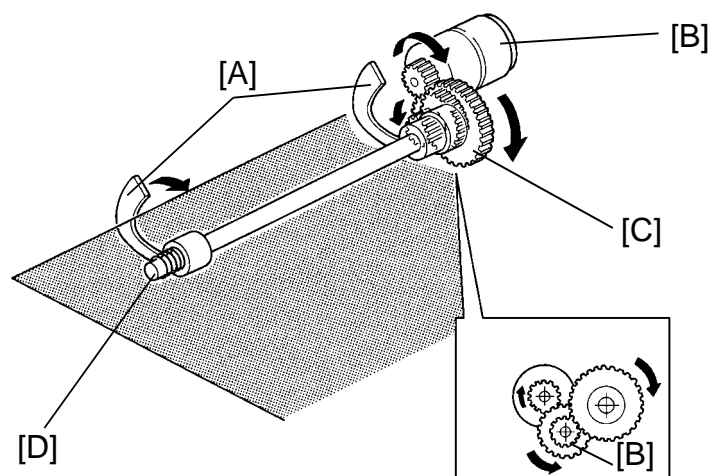
4.6 SEPARATION PLATE PRESSURE RELEASE MECHANISM



When the paper table starts to move down, the separation plate release solenoid [A] is energized. The pressure release arm [D] turns clockwise, and the separation plate [C] moves down from the upper separation roller. This mechanism will allow for the easy removal of any paper this is caught between the upper separation roller and the separation plate.

After the paper table is lowered, the separation plate release solenoid is de-energized. Spring [B] tension will move the separation plate back to the original position.

4.7 PAPER RETURN MECHANISM

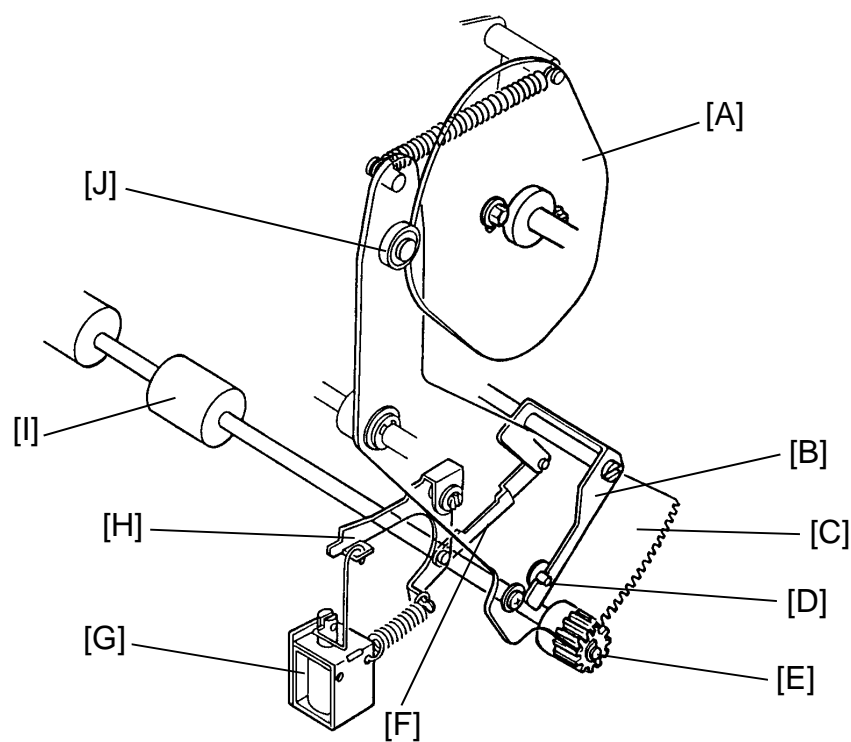


When the paper feed function stops, there may still be some sheets of paper between the upper and lower separation rollers. This mechanism will return sheets of paper that are between the rollers back onto the paper stack on the paper table.

When the paper table has been lowered, the paper return motor [B] (stepping motor) will start to rotate. The paper return levers [A] will turn toward the paper table, and push the sheets of paper between the upper and lower separation rollers back onto the paper stack on the paper table.

The paper return levers turn toward the paper table for 900 milliseconds. The paper return motor will then start rotating in the reverse direction. This will help the spring [D] to pull back the levers. (In reverse, the motor will not turn the levers directly through the gears because gear [C] has a one-way clutch.) The paper return motor will keep rotating for 1.2 seconds. During this period, the paper return levers hit the edge of a bracket and stop. When the paper return levers are stopped, the paper return motor is still turning. However, this rotation is not transmitted to the levers because of the one-way clutch in the gear [C].

4.8 SECOND FEED ROLLER MECHANISM



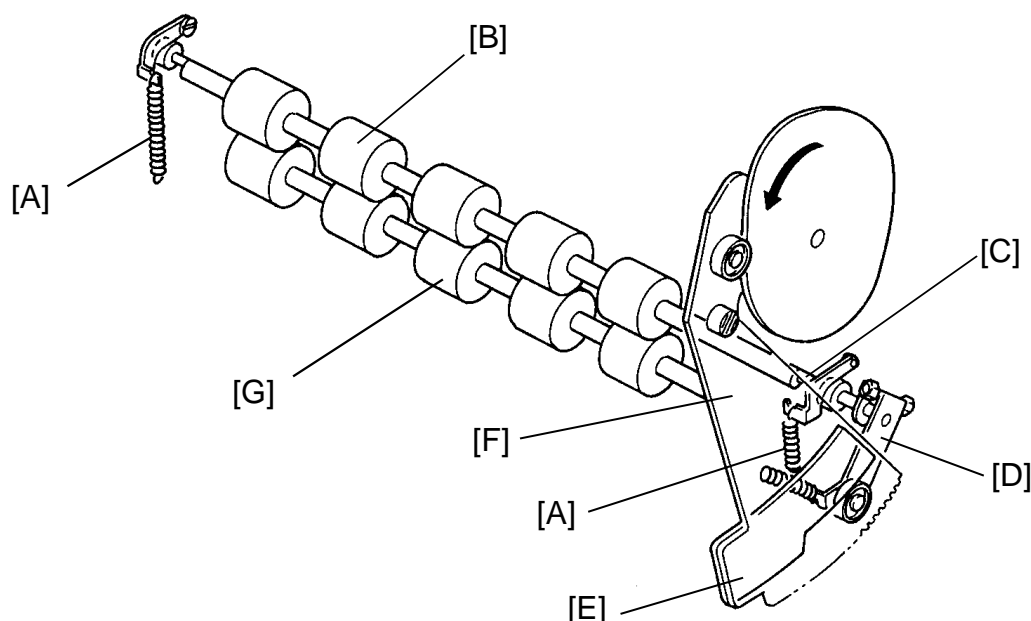
[Drive Mechanism]

The lower second feed roller [I] is driven by the sector gear [C] and the feed roller gear [E]. When the paper feed solenoid [G] turns on, the link [F] combined with the paper feed roller sector stopper [H] are pulled.

The bearing [J] of the sector gear moves along the edge of the second feed roller cam. When the bearing of the sector gear comes to the top of the lower second feed roller cam [A], the stopper [B] is released from the sector gear as a clearance is formed between the pin of the sector gear [D] and the stopper.

When the feed roller gear turns counterclockwise, its rotation is not transmitted to the lower second feed roller because of the one-way clutch bearing press-fit into the gear.

When the bearing of the sector gear moves up from the bottom of the second feed roller cam, the sector gear turns counterclockwise and the feed roller gear turns clockwise. As the rotation of the feed roller gear is transmitted to the lower second feed roller, the lower second feed roller will turn clockwise to feed the paper to the drum section.



[Release Mechanism]

The release mechanism does two things: it raises and lowers the upper second feed roller, and it activates the lower second feed roller. It also synchronizes these two steps.

The mechanism is made up of several parts. First, a cam which transmits motion to a sector gear [F]; then another cam [E] that is part of the sector gear. A lever [D] is rotated by this cam through the lever's bearing. There are two rollers called the second feed rollers: the upper second feed roller [B] and the lower second feed roller [G]. The lever [D] turns a shaft [C] and moves the upper second feed roller.

At the beginning of each paper feed cycle the two paper feed rollers are apart, they will come together halfway through the cycle and at the end of the cycle they will be moved apart.

Initially, the second feed rollers are apart, and the sector gear is ready to start moving clockwise. The lever's bearing is in contact with the sector gear's cam. As the gear turns clockwise, it will cause the cam to turn the lever in the same direction (clockwise).

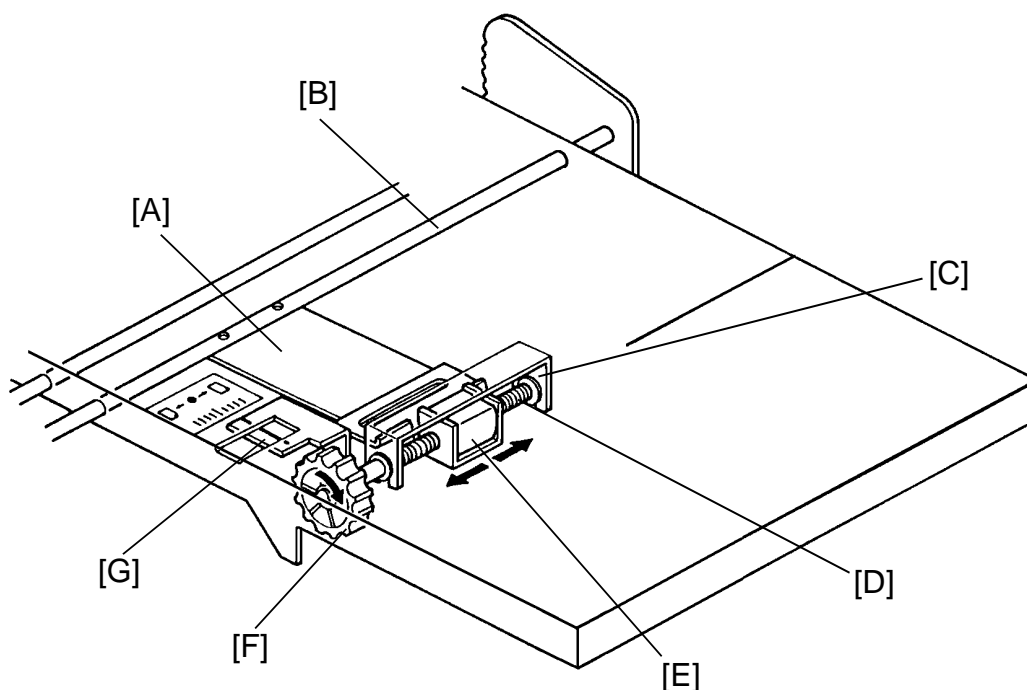
The lever will then lowers the upper second feed roller [B] by turning the roller's eccentric shaft [C]. Eccentric means that the shaft does not go through the center of the roller, actually it is a little off center. So that when the shaft turns the roller, the roller will move up or down.

When the cycle is halfway through, the sector gear has reached its maximum clockwise position. The upper roller will touch the lower roller and a pair of springs [A] will apply tension at each end of the upper roller. Until this member, the lower roller has not turned.

At this moment, the paper had arrived from the first paper feed rollers. The leading edge of the paper hit the two rollers and the paper will buckle slightly. This will insure that the paper will go into the rollers straight.

The lower roller begin to turn and will feed the paper to the drum section. The sector gear is turning counterclockwise, and will raise the upper roller. The gear will return to its original position and the paper feed cycle is now completed.

4.9 PAPER TABLE SIDE ADJUSTMENT MECHANISM



The shaft [D] of the fine adjusting dial [F] is threaded. The inside of the sleeve [E] is also threaded. The sleeve is fixed to the paper table stay [B] through a bracket [A].

The paper table bracket [C] is mounted under the table is fixed on both ends of the adjusting dial shaft. When the adjusting dial is turned clockwise, the feed table bracket [C] and the paper table will move to the right.

The indicator [G] is fixed to the bracket [A] and will show the movement value of the paper table.

4.10 PAPER TABLE UP/DOWN MECHANISM

The paper table is raised and lowered by the paper table drive motor.

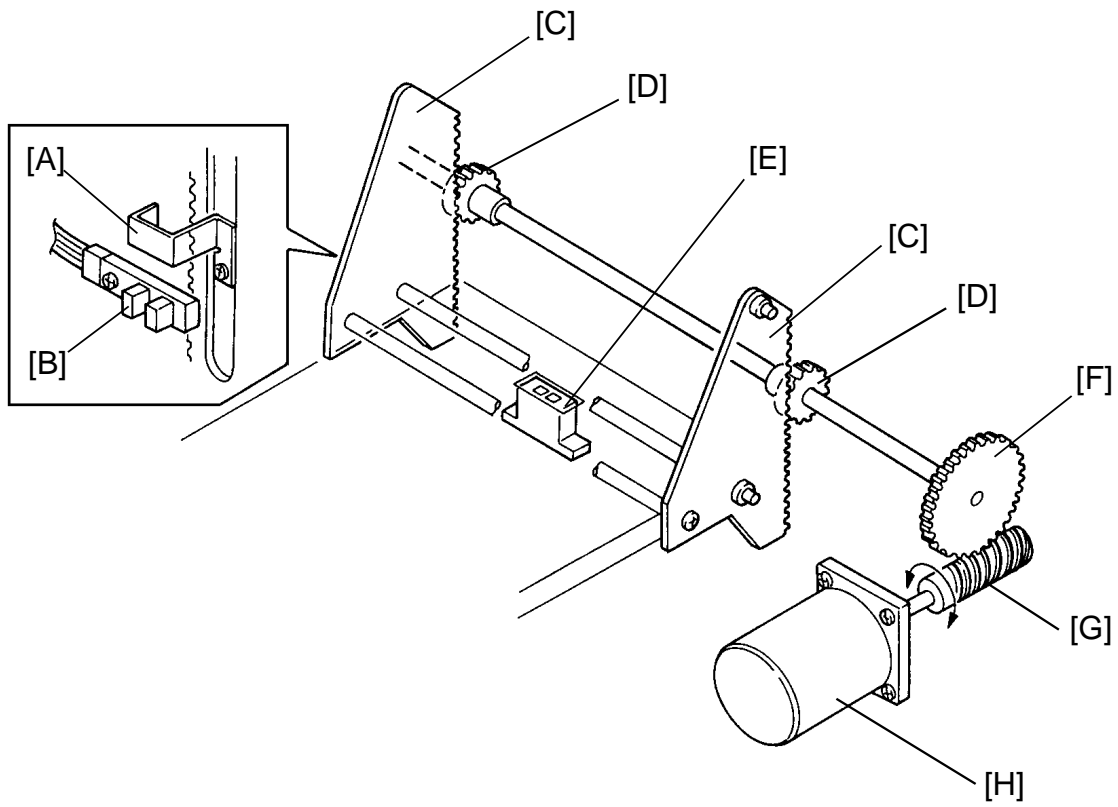
The paper end sensor [E] (a reflective photosensor) is actuated when the paper is set onto the paper table. When the Print Start key is pressed, the paper table drive motor [H] will rotate clockwise and the worm gear [G] will turn. The worm wheel [F] will rotate clockwise and both gears [D] will turn to raise the racks [C].

As the paper table rises, the paper will push against the paper feed roller [I]. This will raise the lever [J] which is mounted on the paper feed bracket. This will activate the paper table height sensor [K] (the phototransistor senses the light from the photocoupler, which up to now was cut off by the lever), when activated, the paper table height sensor will cause the paper table motor [H] to turn OFF and stop raising the paper table.

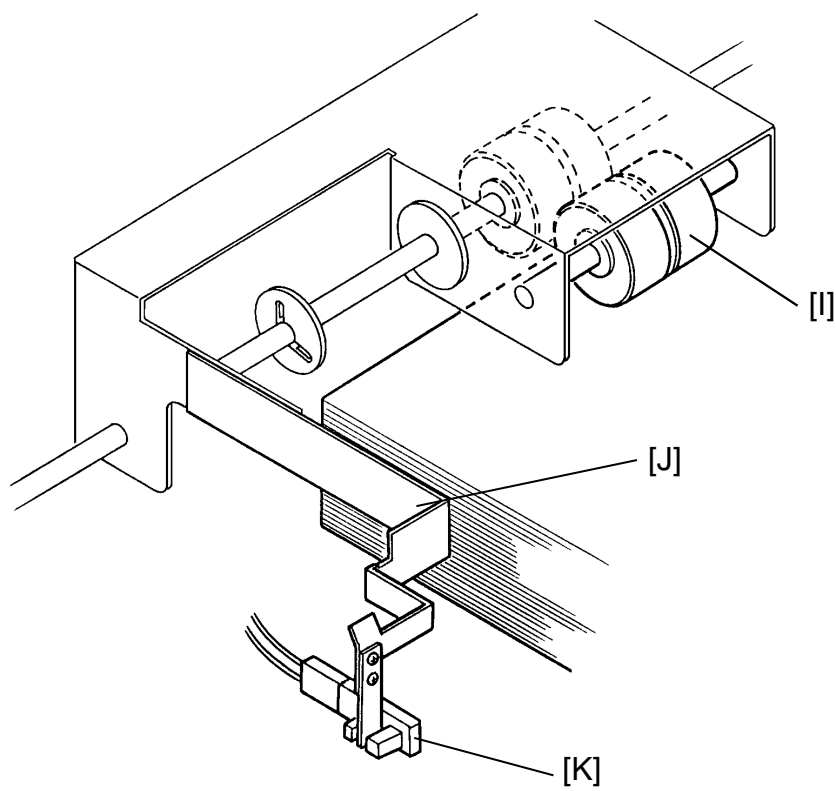
As printing proceeds and the level of paper on the table decreases, the lever [J] will cut off the light of the photocoupler and the motor [H] will turn clockwise raising the table until the phototransistor is reactivated. As a result, the top of the paper stack is constantly being kept at the correct height.

When no paper is present, the paper end sensor [E] is not activated and the motor [H] turns counterclockwise to lower the paper table. The paper table is lowered until the actuator [A] (fixed to the front rack) interrupts the lower limit sensor [B].

When a misfeed occurs or printing is finished, the paper table motor [H] will turn counterclockwise for 500 milliseconds, to lowering the paper table slightly.



Detailed
Section
Descriptions



4.11 PAPER SIZE DETECTION

This machine uses two methods to detect the paper size. One method is used for the paper on the paper table, and the other method is used for the optional cassette.

The machine will determine the master plotting area based on the detected paper size and the original size (which is detected during the original scanning process). If the original size is different from the paper size, the machine will compare the length of the original and paper. The master's length will be the shorter of the two. The machine will perform the same procedure for the width. (The determined plotting area is not changed if paper on the paper table is replaced with another size paper during the master making process.) The master plotting area for each detected paper size is as follows:

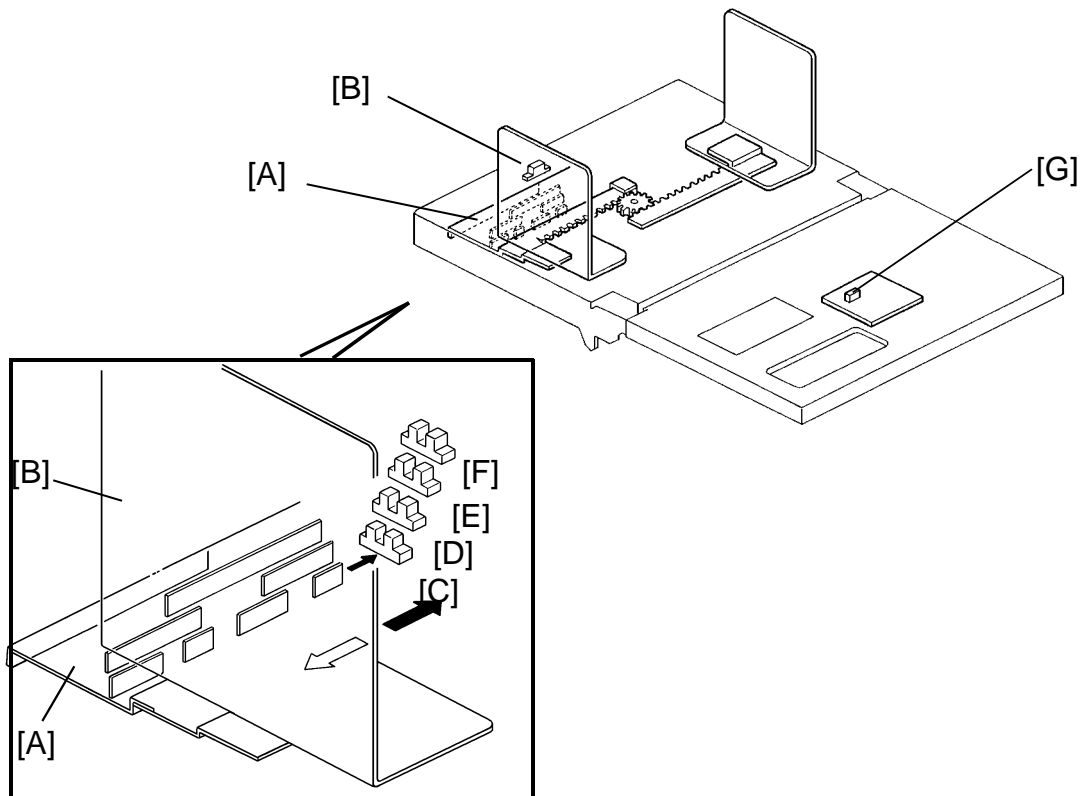
Paper Size	Master Plotting Area	
	Width (mm)	Length (mm)
A3	292	407
B4	256	351
A4	208	284
A4-S	292	197
B5	180	244
B5-S	256	169
A5	146	197
DLT	278	407
LG	214	343
LT	214	266
LT-S	278	203
HLT	138	203

-S: Sideways feed

The machine can only distinguish standard sizes. If a non-standard sized paper or original is used, the machine will judge the non-standard sized paper or original as a standard size. If the actual sized paper, the non-standard sized paper, or the original is larger than the judged paper size, the remaining area will not be plotted on the master.

In that case, in order to obtain the entire image of the original, the original width, paper size, and cassette size detections can be separately canceled, using SP mode. However, the press roller may become contaminated with ink when paper is smaller than the plotted image on the master. The ink will be transferred to the back side of the prints when the next printing is done with larger paper.

[Paper Size Detection for Paper Table]



Detailed
Section
Descriptions

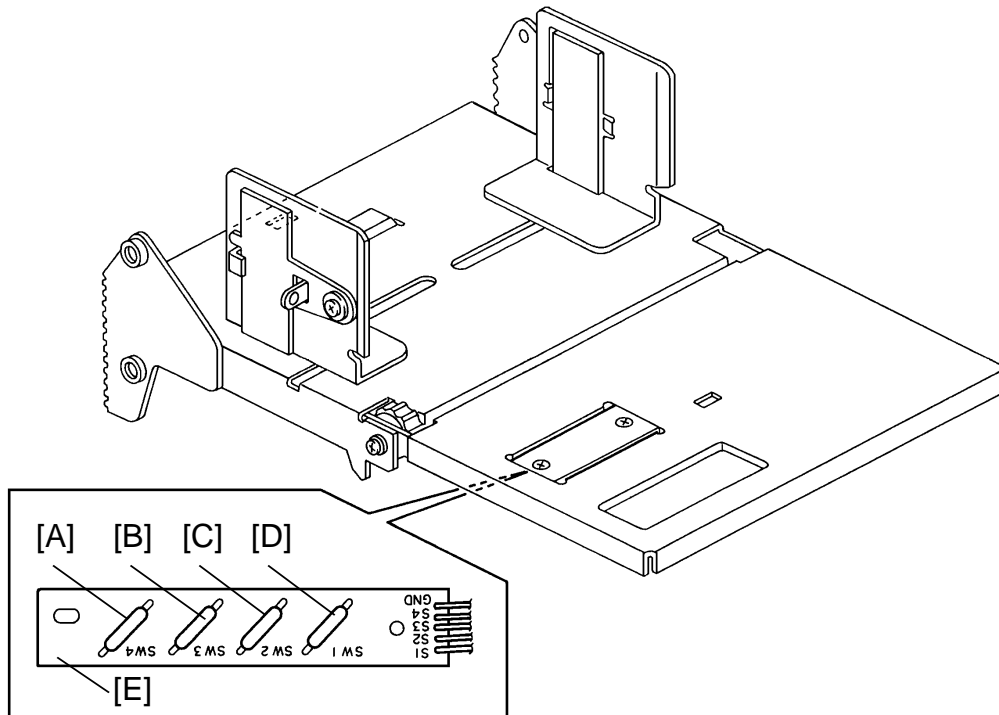
The paper width detection plate [A] installed behind the front paper side guide [B] has several interrupters, [C] to [F].

The front and rear paper side guides are adjusted to the paper width. Depending on which paper width sensors [C] [D] [E] [F] (4 photointerrupters) are interrupted and whether the paper length sensor [G] (a reflective sensor) on the paper detection PCB is activated, the machine will determine the paper size as shown in the below table.

Paper Size	A4-S	LT-S	B5-S	LT	A4		B5	A5	HLT		A3	DLT	B4	LG
Paper Width Sensor-0 [C]	O	X	O	X	X	X	O	X	X	O	O	X	O	X
Paper Width Sensor-1 [D]	X	O	O	X	X	X	O	O	O	O	X	O	O	X
Paper Width Sensor-2 [E]	X	X	O	O	O	O	O	X	X	X	X	X	O	O
Paper Width Sensor-3 [F]	X	X	X	X	X	O	O	O	O	O	X	X	X	X
Paper Length Sensor [G]	X	X	X	X	X	X	X	X	X	X	O	O	O	O

x: Non-blocked or Non-activated, o: Blocked or Activated
-S: Sideways feed

[Cassette Paper Size Detection]

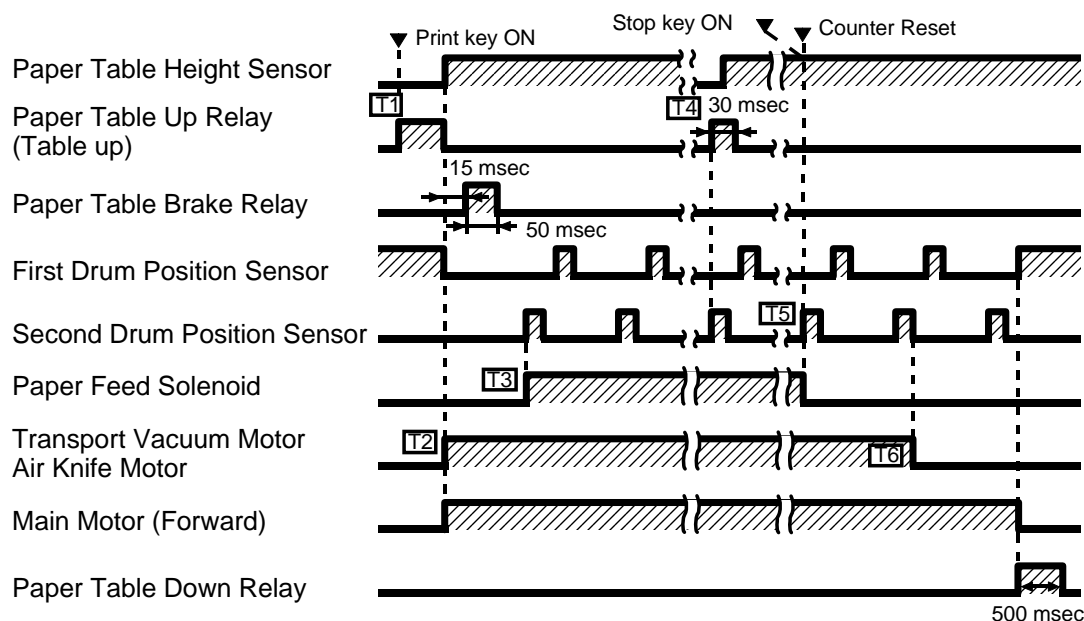


The machine determines the optional cassette size through the cassette size detection PCB [E]. The reed switches on this PCB are activated by magnets positioned on the bottom of the cassette. The magnets are positioned according to the paper size (the magnet position for each of size paper is described on the back of the cassette). Depending on which reed switches [A] [B] [C] [D] are activated, the machine will determine the cassette size as shown in the table below:

Paper Size	A3	B4	A4	A4-S	B5	B5-S	DLT	LG	LT	LT-S
Switch - 1 [D]	x	x	x	x	x	x	x	o	o	o
Switch - 2 [C]	x	x	x	o	o	o	o	x	x	x
Switch - 3 [B]	x	o	o	x	x	o	o	o	x	x
Switch - 4 [A]	o	x	o	x	o	x	o	x	x	o

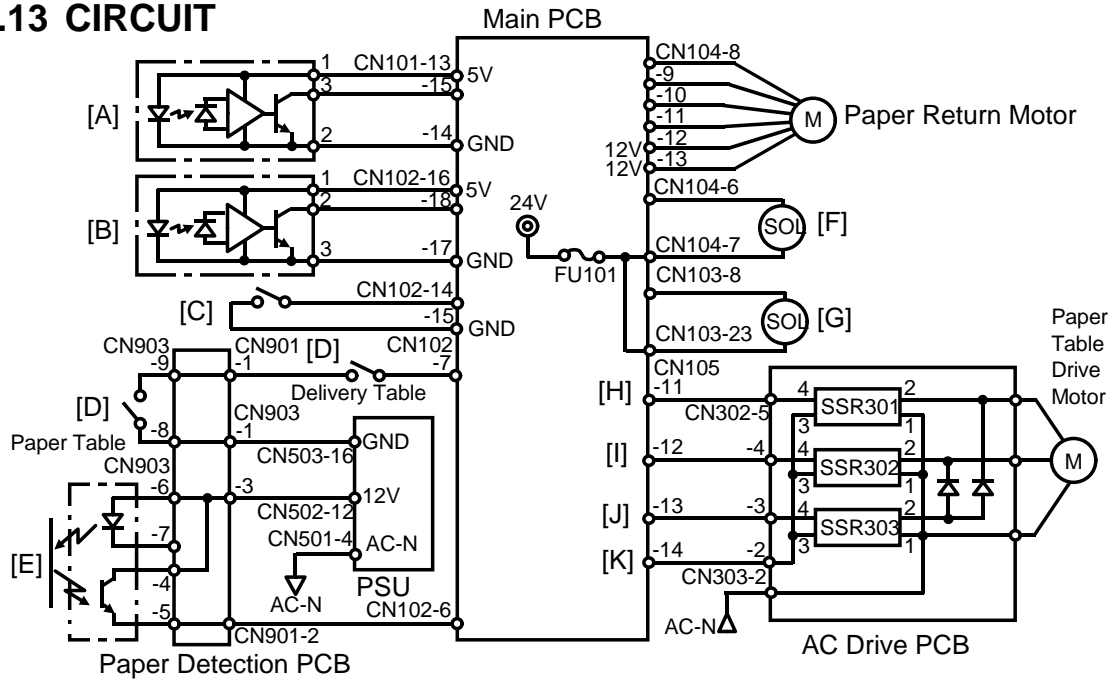
x: Not activated, o: Activated by magnet, S: Sideways feed

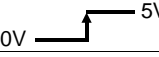
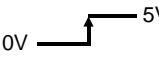
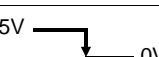
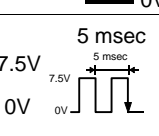
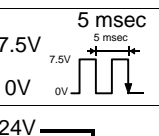
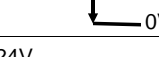
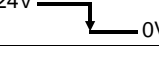
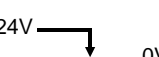
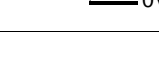
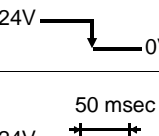
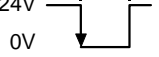
4.12 ELECTRICAL TIMING



- T1: When paper is set on the paper table and the Print key is pressed, the paper table will move upward until the paper table height sensor is activated. 15 milliseconds after the height sensor is activated, the paper table brake signal will turn on for 50 milliseconds and SSR303 in the AC drive PCB is energized. Brake force is then applied to the paper table drive motor to prevent the paper table from overrunning.
- T2: When the height sensor is activated, the transport vacuum motor and air knife motors will turn on. At the same time, the drum (main motor) will start turning forward (printing direction).
- T3: The paper feed solenoid is energized when the interrupter at the rear side of the drum activates the second drum position sensor.
- T4: After the paper is fed, the top of the paper stack is a little lower and the height sensor is de-activated. When the second drum position sensor is activated, the paper table drive motor will start rotating. This will lift the paper table until the height sensor is re-activated (approximately 30 millisecond after the motor starts). When the height sensor is re-activated, the motor will stop rotating.
- T5: After the Stop key is pressed, the paper feed solenoid is de-energized and the second drum position sensor is activated. This will reset the counter on the operation panel.
- T6: When the second drum position sensor is activated again after one more drum rotation, the transport vacuum motor and air knife motors will turn off. The drum will rotate once more and will stop at the first drum position actuation position (the drum home position).

4.13 CIRCUIT

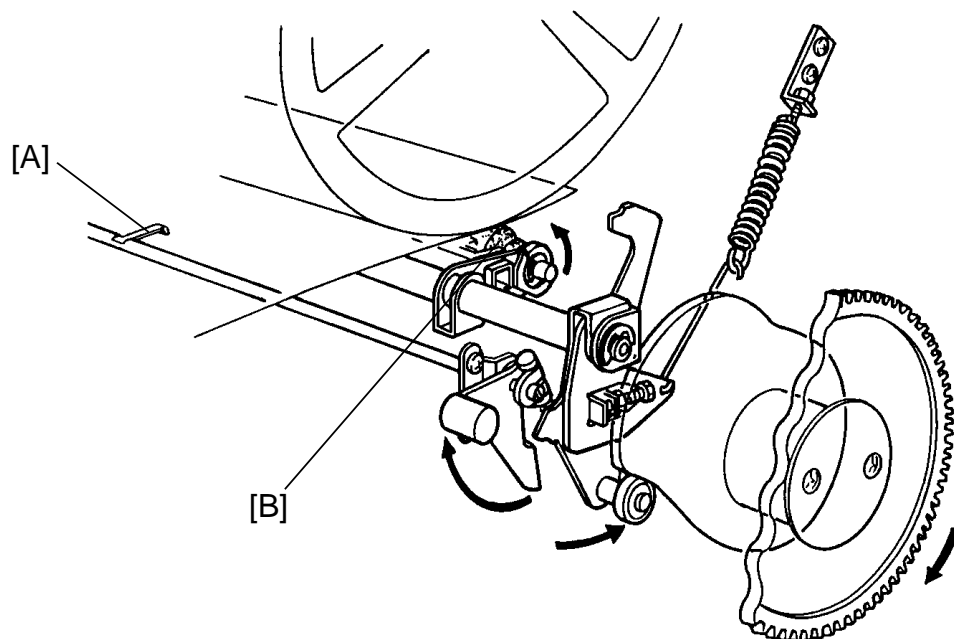


Component Name	In/Out	Main PCB		Description
		CN No.	Signal Level	
Paper Table Lower Limit Sensor [A]	In	101-15	0V 	Signal goes High when the sensor is interrupted.
Paper Table Height Sensor [B]	In	102-18	0V 	Signal goes High when the sensor is interrupted.
Paper Table Down Button [C]	In	102-14	5V 	Signal goes Low when the button is pressed.
Paper Table [D] see note	In	102-7	7.5V 	Pulse signal goes Low when the paper table and delivery table are open and the switches are turned on.
Paper End Sensor [E] see note	In	102-6	7.5V 	Pulse signal goes Low when the sensor detects paper.
Separation Plate Release Solenoid [F]	Out	104-6	24V 	The solenoid is energized when the signal goes Low.
Paper Feed Solenoid [G]	Out	103-8	24V 	The solenoid is energized when the signal goes Low.
Paper Table Up Relay [H]	Out	105-11	24V 	The paper table up relay is energized when the signal goes Low. (The table moves up.)
Paper Table Down Relay [I]	Out	105-12	24V 	The paper table down relay is energized when the signal goes Low. (The table moves down.)
Paper Table Brake Relay [J]	Out	105-13	24V 	Activated for 50 milliseconds when the paper table reaches the upper or lower limit. Brake force is applied to the paper table drive motor.
Common Relay Line [K]	Out	105-14	0V 	Activated when the main switch is turned on.

NOTE: Measure 0.9V on DC meter

5. PRINTING SECTION

5.1 OVERALL

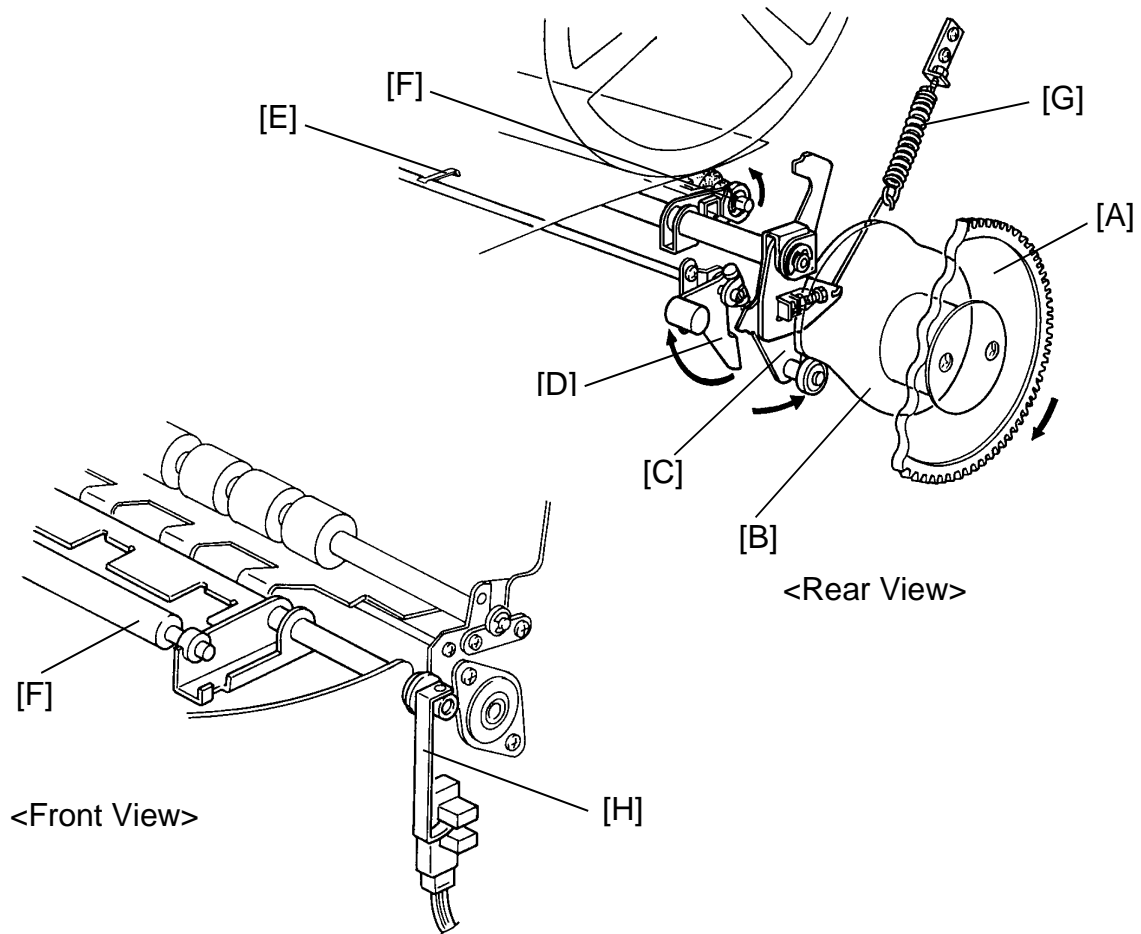


Detailed
Section
Descriptions

In this section, the paper detecting feeler [A] will detect if the paper was fed correctly to the second paper feed roller section or not.

Only when the paper is correctly fed, printing pressure is applied (the press roller [B] touches the drum) to transfer the ink through the master and onto paper.

5.2 PAPER DETECTING AND PRINTING PRESSURE ON/OFF MECHANISM

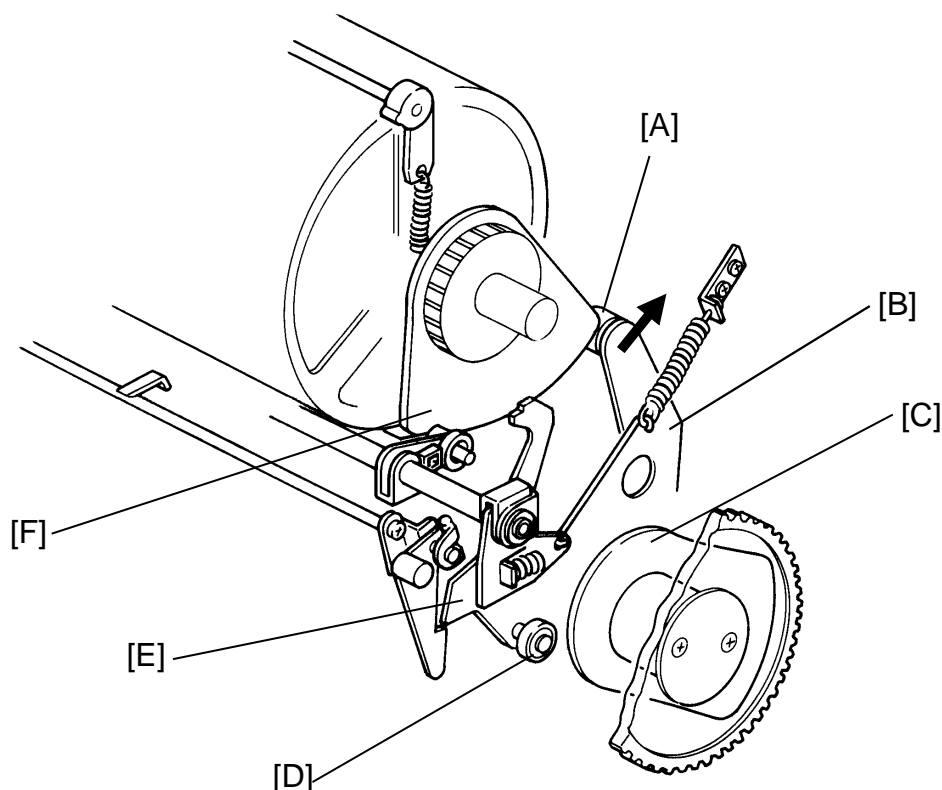


During the printing process, the main motor will turn the gear [A] and pressure cam [B] clockwise.

When the bearing of the pressure ON/OFF lever [C] reaches the top of the pressure cam [B], the paper detecting arm [D] separates from the pressure ON/OFF lever [C]. At this moment, if paper is being fed, the paper will press down the paper detecting feeler [E]. The paper detecting arm [D] will turn clockwise to release the pressure ON/OFF lever. As a result, the pressure ON/OFF bearing continues moving along the pressure cam and the press roller [F] will move against the drum to apply the printing pressure.

The printing pressure can be adjusted by the pressure spring [G]. The printing pressure sensor feeler [H] is away from the sensor while printing pressure is applied.

5.3 PRINTING PRESSURE ON/OFF MECHANISM FOR A4/LT DRUM



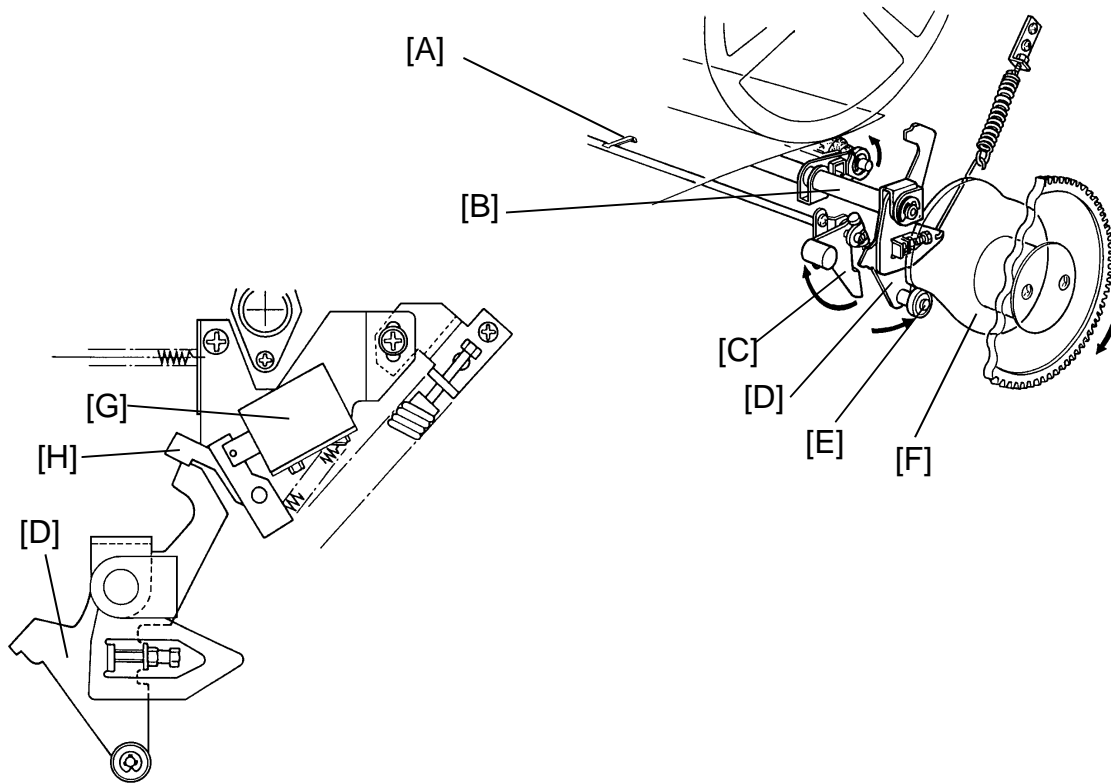
When the A3/DLT drum is used, the printing pressure is applied while the bearing [D] of the pressure ON/OFF lever [E] is located on the bottom of the pressure cam [C]. The printing pressure is released while the bearing is located on top of the cam.

When the A4/LT drum is used, the printing pressure should be released sooner because the master on the A4/LT drum is shorter than the master on the A3/DLT drum. This is to prevent the press roller from getting dirty.

Before the bearing [D] reaches to the top of the pressure cam, the bearing [A] of the arm [B] (fixed with the pressure ON/OFF lever) rides up the A4/LT cam [F] and the arm will move (arrow).

As a result, the pressure ON/OFF lever turns clockwise and the printing pressure is released.

5.4 PRINTING PRESSURE RELEASE MECHANISM



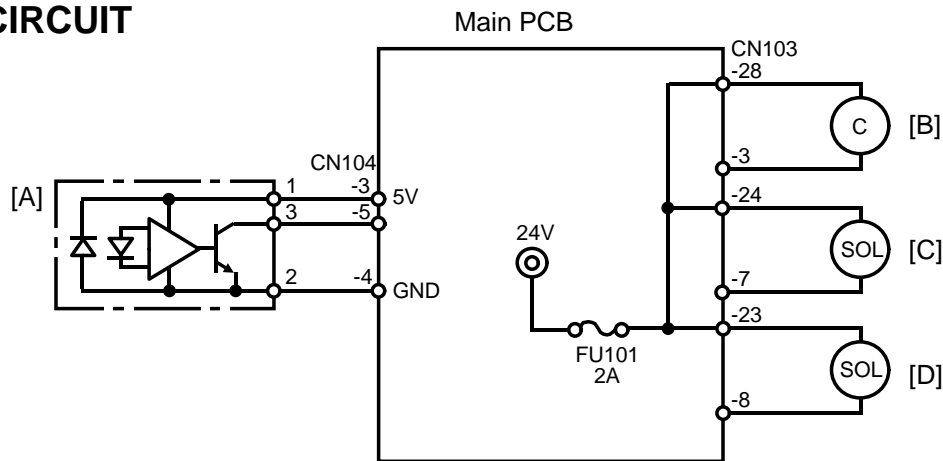
The pressure release solenoid [G] energizes to release the pressure ON/OFF lever [D] when the paper feed solenoid energizes during normal operation.

If a jammed sheet of paper in the printing section presses down on the paper detecting feeler [A], the pressure ON/OFF lever [D] remains disengaged from the paper detecting arm [C]. Printing pressure will keep continue to be applied to the drum.

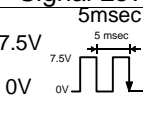
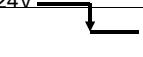
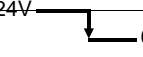

If printing pressure is still applied when an operator slides out the drum unit to remove the jammed sheet, the drum surface and the press roller may be damaged.

To prevent damage to the drum surface or drum rollers, the printing pressure is released from the drum when a paper misfeed is detected. When a misfeed is detected, the printing pressure solenoid [G] is de-energized. The drum will rotate to the home position. During the drum return cycle to the home position, the bearing [E] will ride on top of the pressure cam [F]. This will rotate the pressure ON/OFF lever [D] clockwise, then the stopper [H] engages the lever [D] (the stopper [H] is pressed down by spring tension). The printing pressure is released because the lever [D] is connected to the press roller [B].

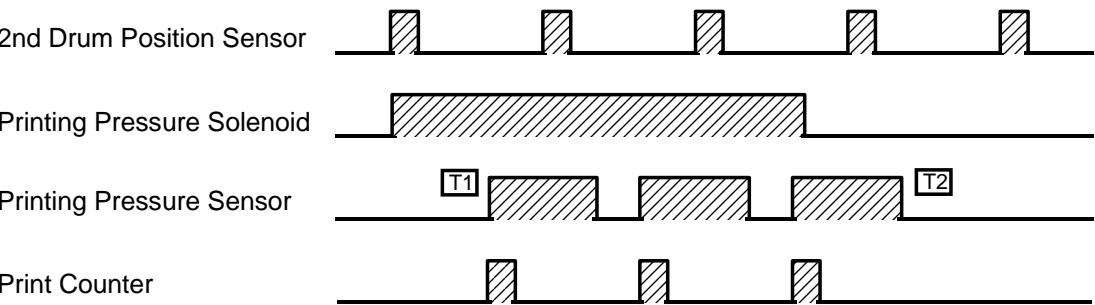
5.5 CIRCUIT



Detailed
Section
Descriptions

Component Name	In/Out	Main PCB		Description
		CN No.	Signal Level	
Printing Pressure Sensor [A] see note	In	104-5		Activated when the sensor is interrupted.
Print Counter [B]	Out	103-3		Activated when the counter is energized.
Printing Pressure SOL [C]	Out	103-7		Activated when the sensor is energized.
Paper Feed SOL [D]	Out	103-8		Activated when the sensor is energized.

NOTE: Measure 0.9V on DC meter

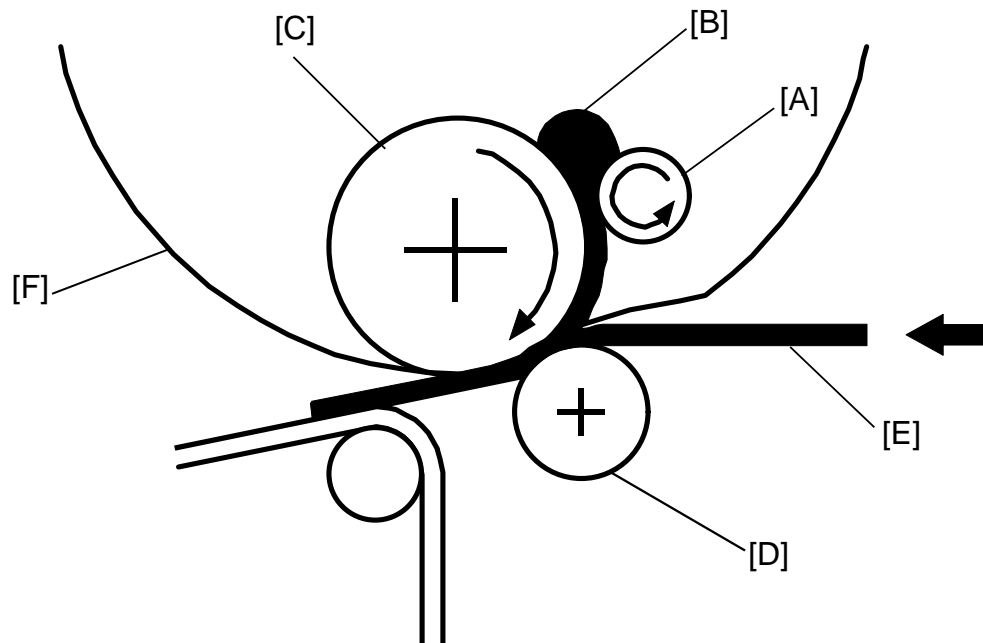


T1: When the printing pressure is applied and the printing pressure sensor is not interrupted, the print counter signal is applied for 100 milliseconds to increase the total counter and decrease the counter on the operation panel.

T2: When the printing pressure sensor is not interrupted and the copy counter on the operation panel indicates "0", the paper feed solenoid and the printing pressure solenoid will turn off to stop paper feeding and to release the printing pressure.

6. DRUM SECTION

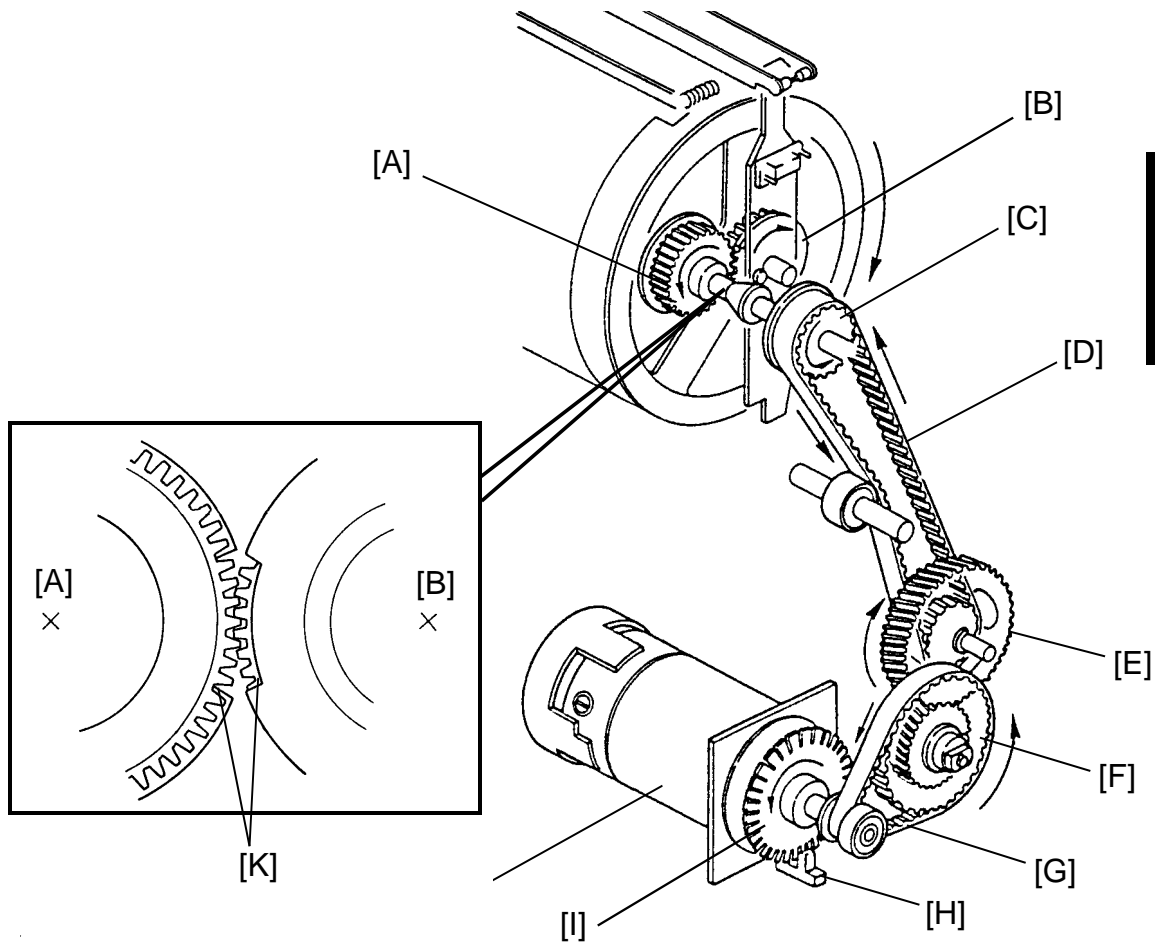
6.1 OVERALL



- [A]: Doctor Roller
- [B]: Ink
- [C]: Ink Roller
- [D]: Press Roller
- [E]: Paper
- [F]: Drum

In this section, ink is supplied from the ink cartridge and is applied to the ink roller uniformly. The ink is then transferred to the printing paper through the holes in the master.

6.2 DRUM ROTATION MECHANISM



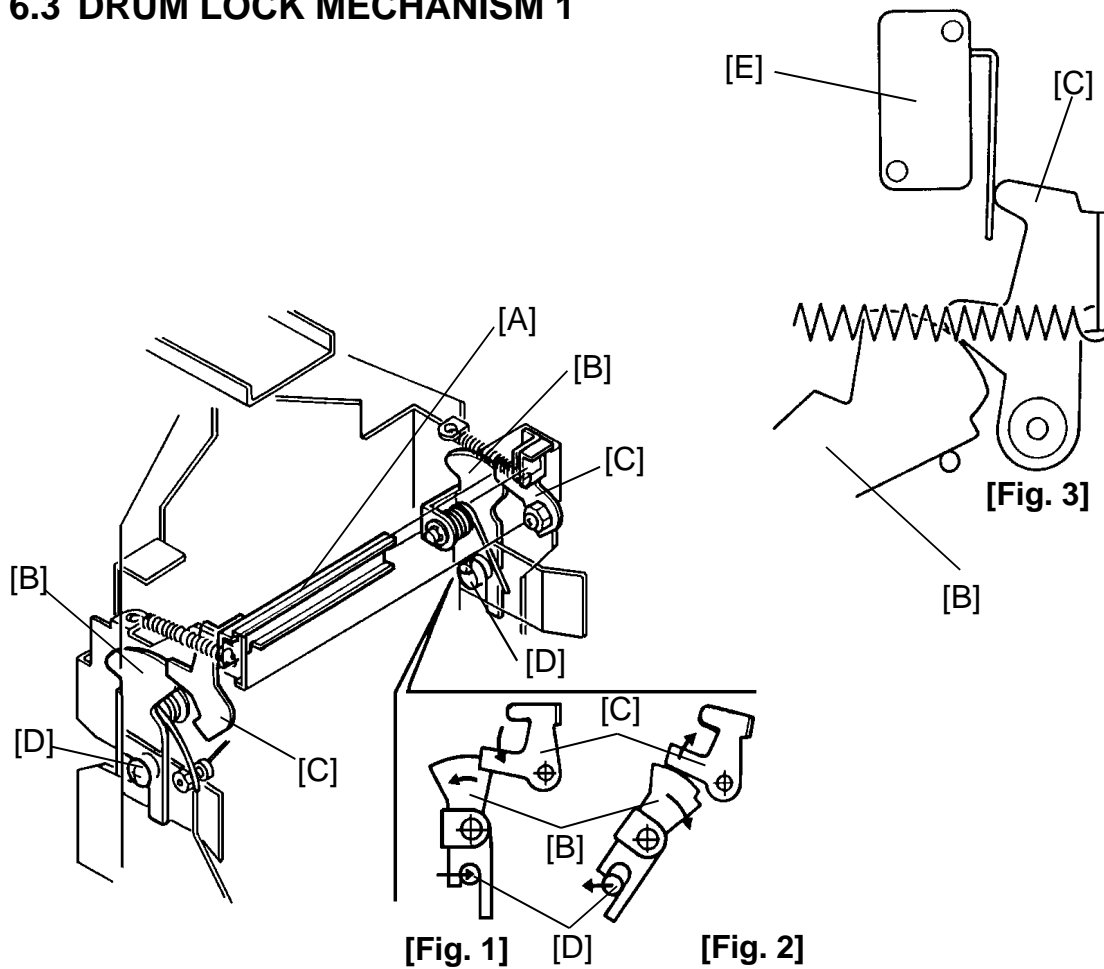
Detailed
Section
Descriptions

The main motor (DC motor) [J], located under the rear side plate, turns the drum either clockwise or counterclockwise through belt [G], then through gears [F] and [E], then belt [D], and pulley [C]. The drive mechanism uses helical gears because they turn more quietly.

Notice that gear [A], the last gear of the drive, and gear [B] at the rear end of the drum: they each have a part cut out of the flange [K]. When the drum is in the home position, the two cutout parts meet, and the drum unit can be pulled out of the machine.

Pulse disk [I] and sensor [H] on the main motor shaft are used to monitor the drum rotation speed.

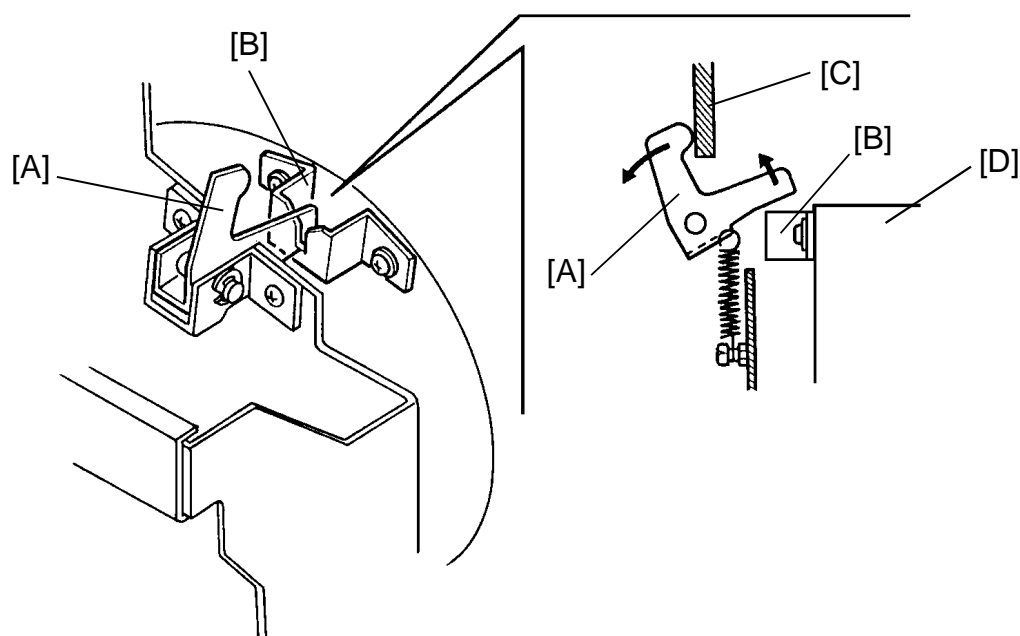
6.3 DRUM LOCK MECHANISM 1



When the drum unit is set in the machine, the arm [B] is pushed by the lock pin [D] until the top of the arm [B] is locked by the stopper [C]. The lock pin [D] is mounted on the front side plate of the main body. This completely locks the drum unit in the machine (Fig. 1). At the same time, the top of the right stopper [C] will close on the drum detection switch [E]. The switch [E] tells the machine that the drum unit is set (Fig. 3).

Pulling the lever [A] to remove the drum will turn the stopper [C] clockwise and disengages the arm [B]. Therefore, the lock pin [D] of the main body is also released from the arm [B] by the spring tension (Fig. 2).

6.4 DRUM LOCK MECHANISM 2

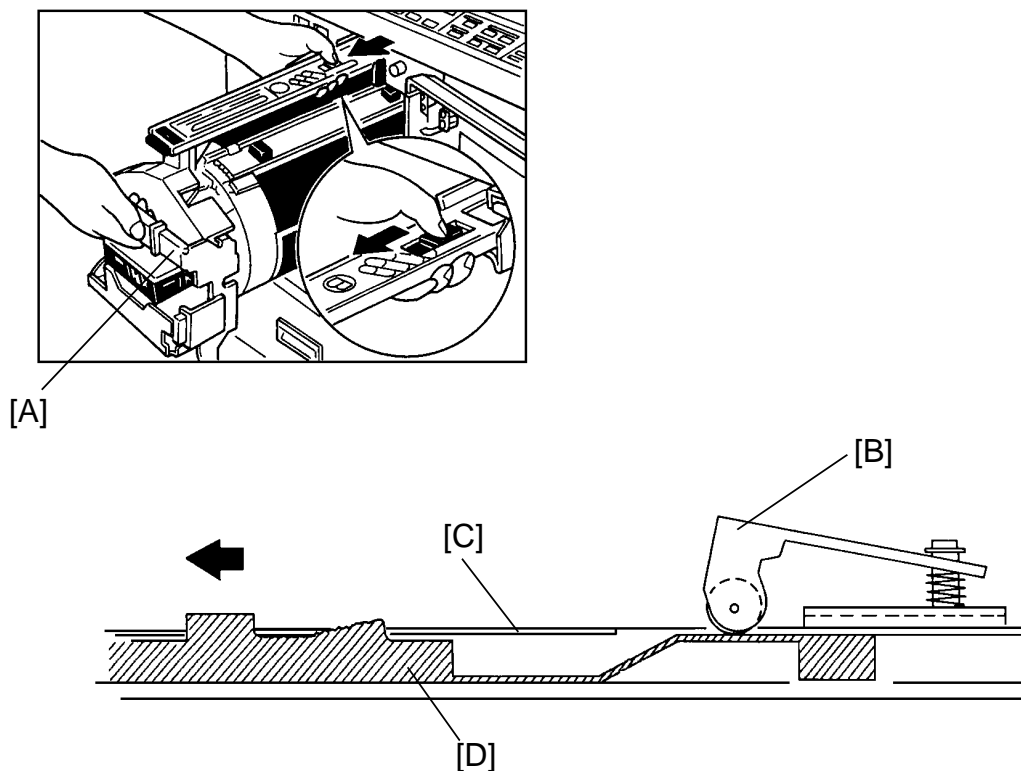


Detailed
Section
Descriptions

To prevent the drum from rotating when the drum unit is removed from the machine, the drum stopper [A] will drop into the drum lock [B].

When the drum unit is reinstalled in the machine, the front side plate of the main body [C] will move the drum stopper [A] out of the drum lock [B].

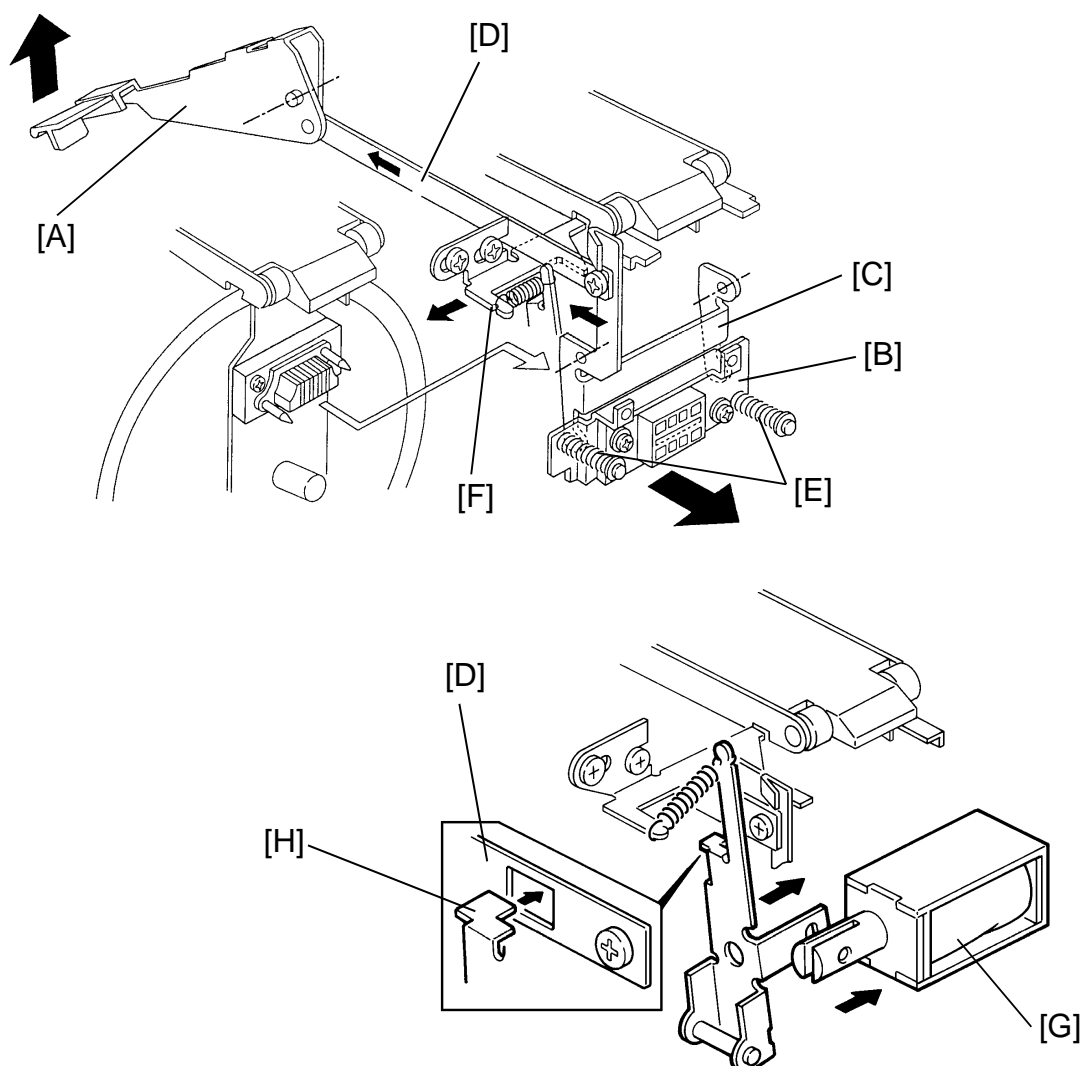
6.5 DRUM LOCK MECHANISM 3



When the drum is pulled out, the drum stopper [B] drops in the hole. This will stop the drum unit from being pulled out any further. If the operator continues to pull the handle [A], the drum unit will not fall out of the machine.

When the operator pulls the stopper release [D] in this direction (arrow), the drum stopper [B] will be pushed to the level of drum rail cover [C], allowing the drum to be removed.

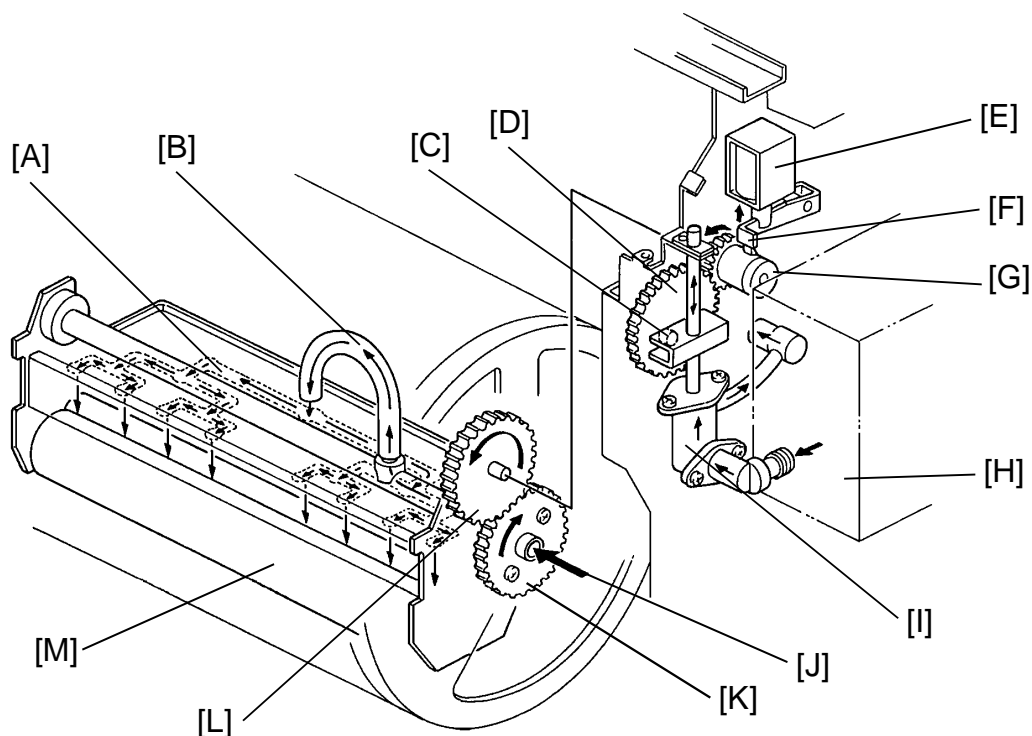
6.6 DRUM CONNECTION MECHANISM



The drum lock solenoid is activated when the drum is turning. If the print cycle is interrupted by opening the cover, the drum will stop. If the drum is not in the home position, the energized drum lock solenoid will prevent the drum from being removed from the machine.

When the drum release lever [A] in front of the machine is raised, the connector [B] is pushed away from the drum by the bracket [C] through the link [D]. The bracket [C] also pushes the drum lock lever [F] to release the drum lock allowing the drum to be removed. While the drum is away from its home position, the drum lock solenoid [G] is energized and the stopper [H] locks the link [D] to prevent the drum from being pulled out. The solenoid is de-energized when the drum is stopped at the home position (when the 1st drum position sensor is actuated).

6.7 INK SUPPLY MECHANISM



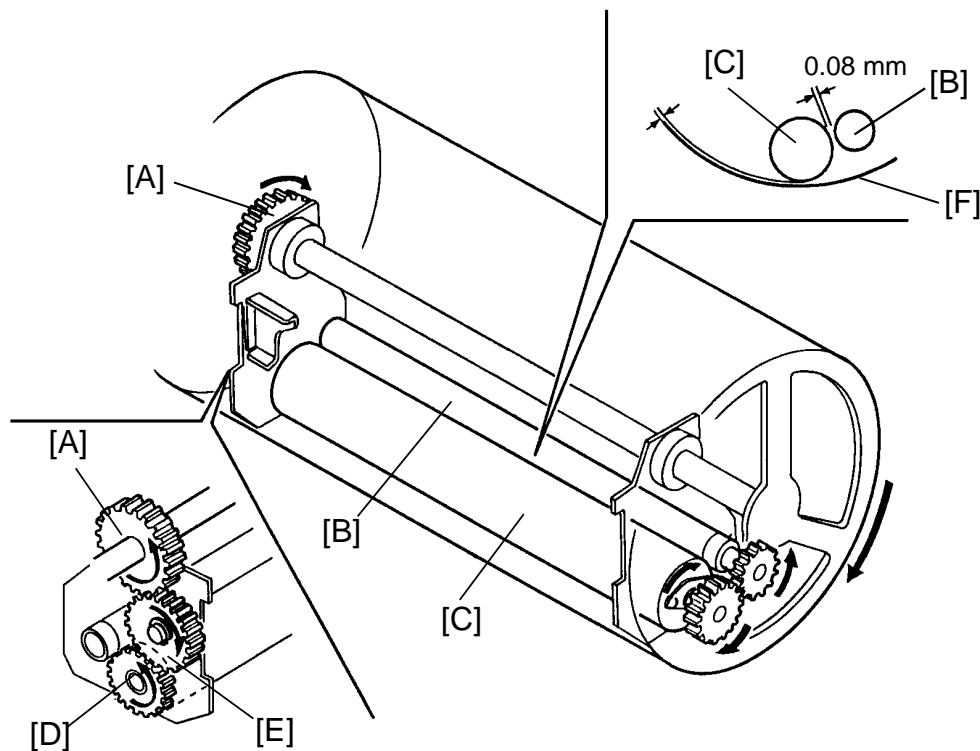
Ink is supplied from the ink cartridge [H] to the ink roller [M] by the ink pump [I] and then through 8 holes in the ink distributor [A].

Drum rotation is transmitted from gear [K] to gear [L], and to the gear of the spring clutch [G]. The rotation is not transmitted to gear [D] because of the spring clutch [G].

When the ink detector detects less ink on the ink roller [M], the ink supply solenoid [E] is energized, and the ink supply stopper [F] releases the clutch [G] allowing the gear [D] to turn.

The pin [C] will move the pump shaft up and down as the gear [D] rotates. (One stroke of the ink pump occurs for every 2 rotations of the drum.) The ink in the ink cartridge is sucked into the pump [I]. The pump will send the ink into the drum shaft [J]. The ink will go from the ink distributor [A] onto the ink roller [M] through the tube [B].

6.8 INK KNEADING MECHANISM



The ink kneading mechanism consists of the ink roller [C] and the doctor roller [B]. The ink roller [C] rotates with the drum and the doctor roller [B] to insure that the ink is distributed evenly across the ink roller.

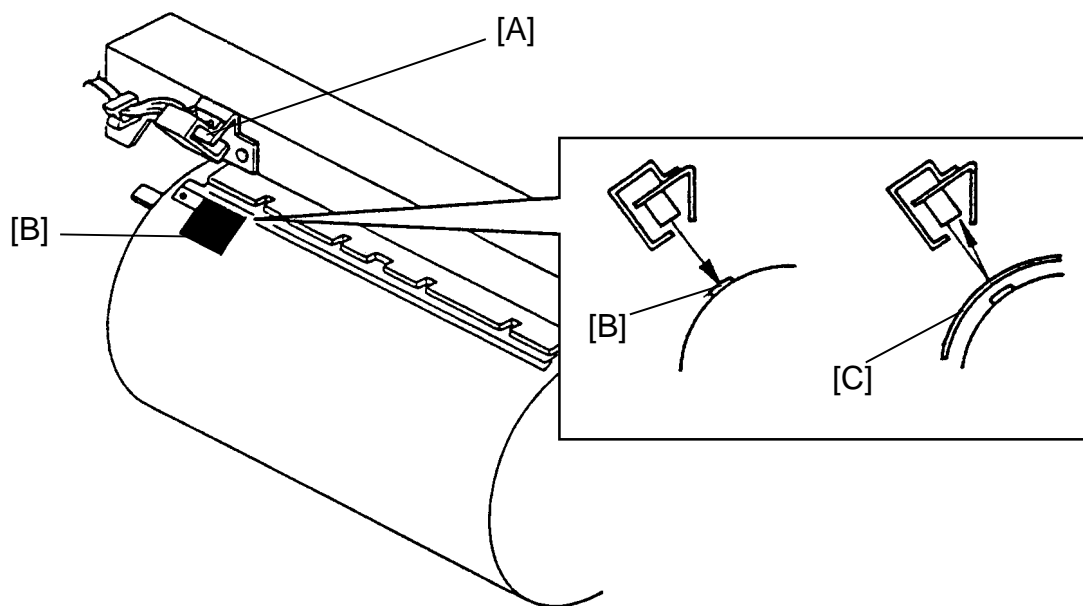
The ink roller [C] is rotated by the drum, the drum turning gear [A], which turns an idle gear [E], and idle gear [E] turns the roller gear [D]. The gear [D] is mounted on the ink roller.

The doctor roller is adjusted to a distance of 0.08 millimeters between itself and the ink roller, to create an even thickness of ink across the drum.

The ink roller does not touch the screen [F] when not printing. During the printing process, the ink on the ink roller goes on the paper through the holes in the screen and the master. The drum screen is held against the master by the pressure roller located under the drum.

During the master eject process, the drum rotates in the reverse direction and the ink roller will not rotate because the gear [D] has a one-way clutch.

6.9 DRUM MASTER DETECTION

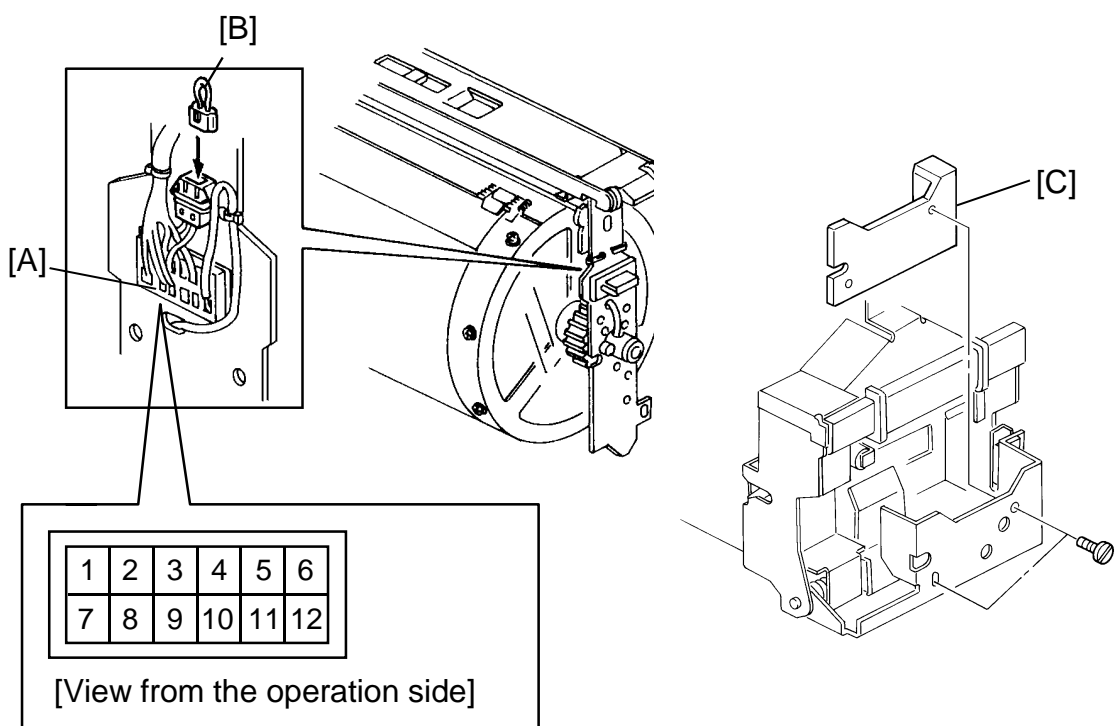


The drum master detection sensor [A] is mounted on the drum rail and it is used to detect whether there is a master on the drum.

When there is a master on the drum, the black seal [B] is covered and the sensor will detect the light reflected from the master [C]. Printing will start when the Print Start key is pressed.

When there is no master on the drum, the black seal is exposed. The black seal will not reflect light back to the sensor. The "M" indicator on the display panel will blink and printing will not start when the Print Start key or the Proof key is pressed. Even if there is no master on the drum, the Master Making key can be pressed after an original is set on the original table.

6.10 DRUM TYPE IDENTIFICATION



Terminal Numbers

The machine identifies the drum type electrically. Depending on which terminals of the drum unit connector [A] is connected to, the corresponding indicator will light on the operation panel as follows:

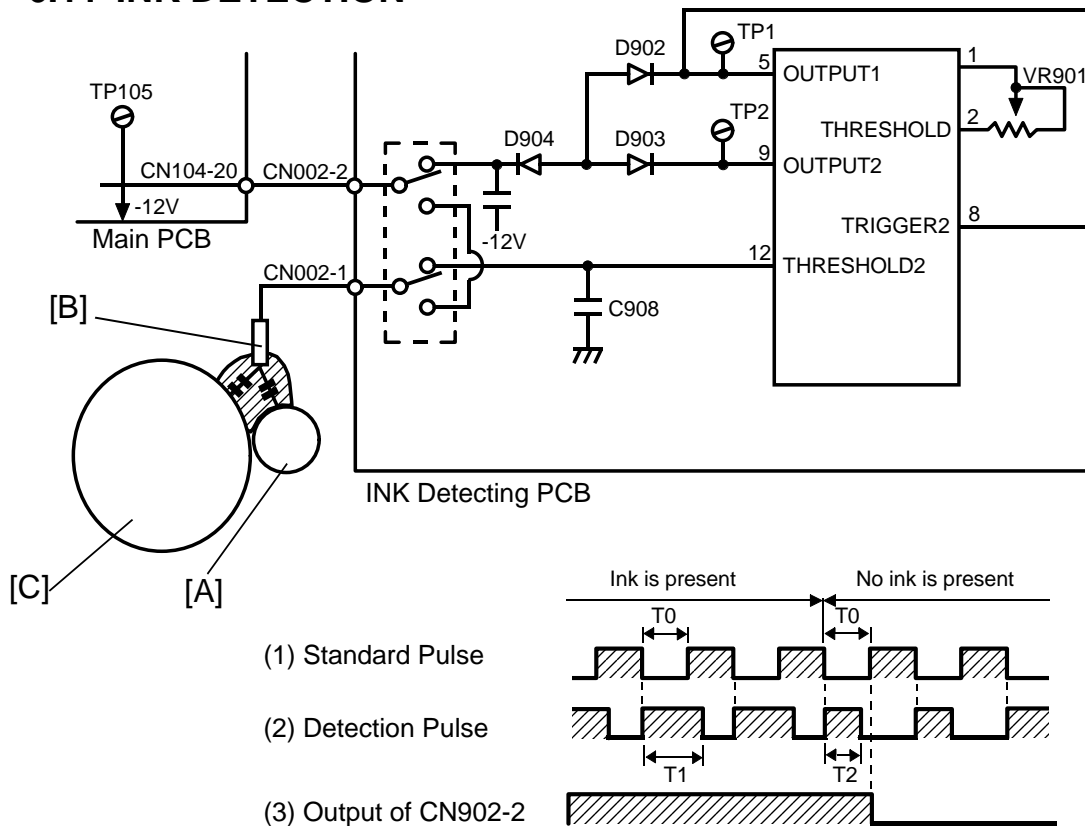
Drum Type	Indicator	Terminal Number			
		2	3	4	5
A3/DLT (Original)	17" Indicator	1	0	1	0
A3/DLT (Option)	17" and Color Indicators	1	1	1	0
A4/LT (Option)	8 1/2" Indicator	1	0	1	1

1: Connected, 0: Not connected

To use the A4/LT drum with color ink, terminals no. 2 and no. 3 should be linked using a short connector [B]. This will turn on the color indicator. The short connector is an accessory of the unit, and is included with it.

- NOTE:**
- * To use the A4/LT drum with black ink, it is not necessary to use short connector [B].
 - * To use 800 cc black ink cartridge with the drum, the ink holder spacer [C] must be removed. The ink holder spacer is originally installed in the optional A3/DLT and A4/LT drums and is necessary only for the 500 cc ink cartridges.

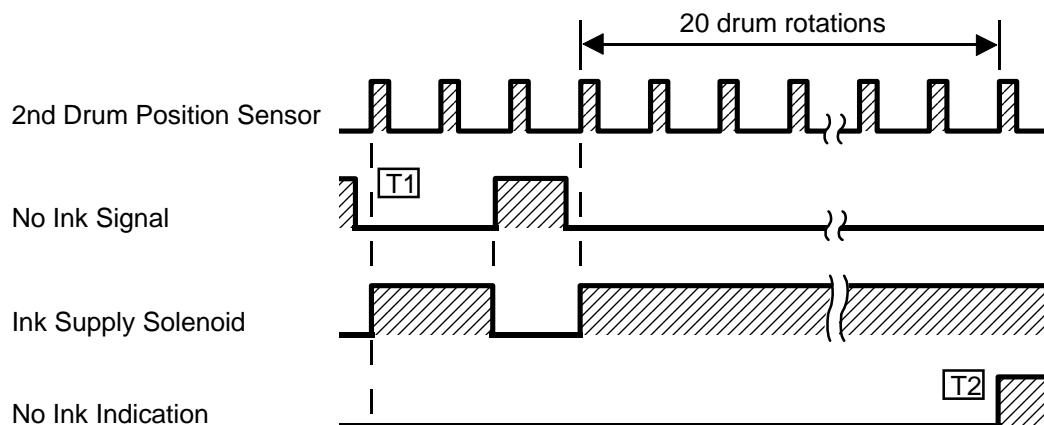
6.11 INK DETECTION



[Ink Detection Circuit]

The detecting pin [B] works like the electrode of a capacitor to detect electrostatic capacity. Through this detecting pin, the time constant of the pulse, which is generated in the ink detection PCB, is different when ink is present and when ink is not present. The detecting pulse is compared to a standard pulse to determine if there is ink in the drum or not.

- (1) The standard pulse is an output signal from OUTPUT 1. The pulse length (T₀) can be adjusted by adjusting VR901.
- (2) OUTPUT 2 is the detection pulse. The time constant is determined by C908 and the electrostatic capacity between the detecting pin and the ink roller [C] or the doctor roller [A] (ground). The detection pulse is triggered by the dropping edge of the standard pulse which is input from TRIGGER 2.
When ink is present, electrostatic capacity increases and the pulse length (T₁) becomes longer. When ink is not present, the pulse length (T₂) becomes shorter as electrostatic capacity decreases.
- (3) The pulse length (T₁ or T₂) is compared with the standard pulse (T₀).
When the time constant (T₂ = No ink) is shorter than the standard pulse (T₀), the output of CN902-2 goes low.



[Ink Detection Timing]

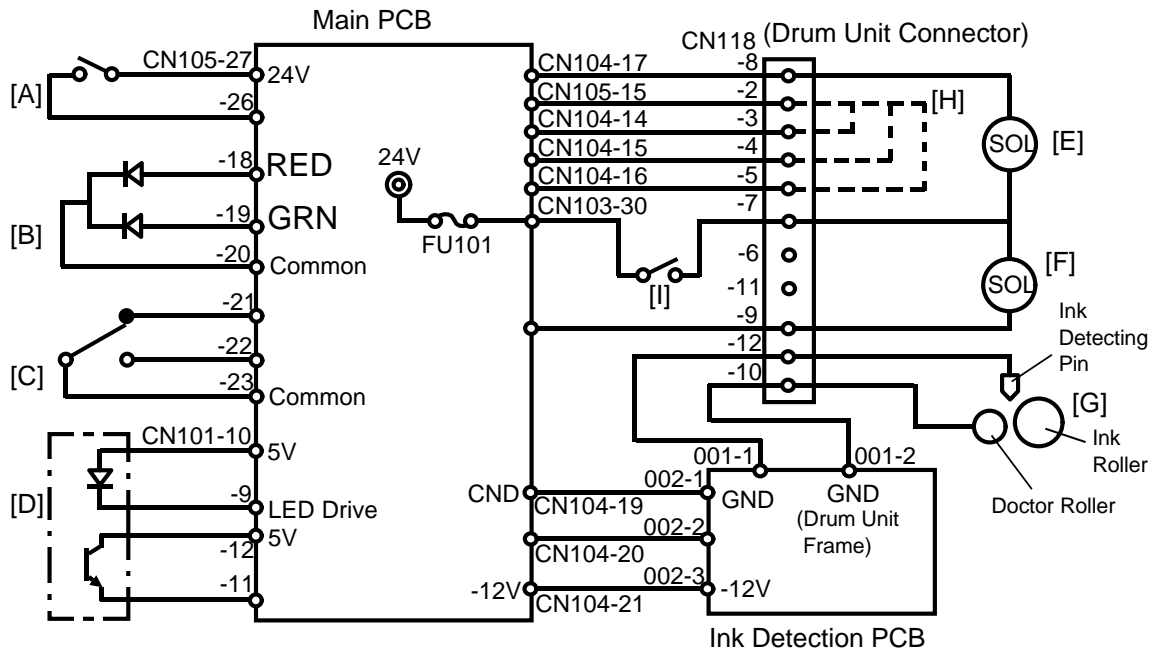
T1: When there is no ink left on the ink roller and the no ink signal (output of CN002-2) is LOW, the ink supply solenoid will turn on at the rising edge of the second drum position sensor signal. The ink supply solenoid will turn off when the no ink signal goes HIGH.








T2: If after the ink supply solenoid turns on the drum turns an additional 20 rotations and the no ink signal remains LOW, the No Ink indicator will blink.

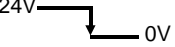
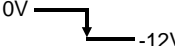
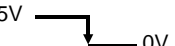
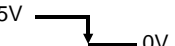
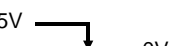
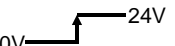
When this occurs and the "Reset" key is pressed, the drum will turn an additional 20 rotations to supply ink. (When the "0" key is pressed while pressing the "Reset" key, the drum will turn 20 rotations even when the No Ink indicator is not blinking.)

When the No Ink Signal goes HIGH during the 20 drum rotations, the indicator will go off and the ink supply solenoid is de-energized.

6.12 CIRCUIT

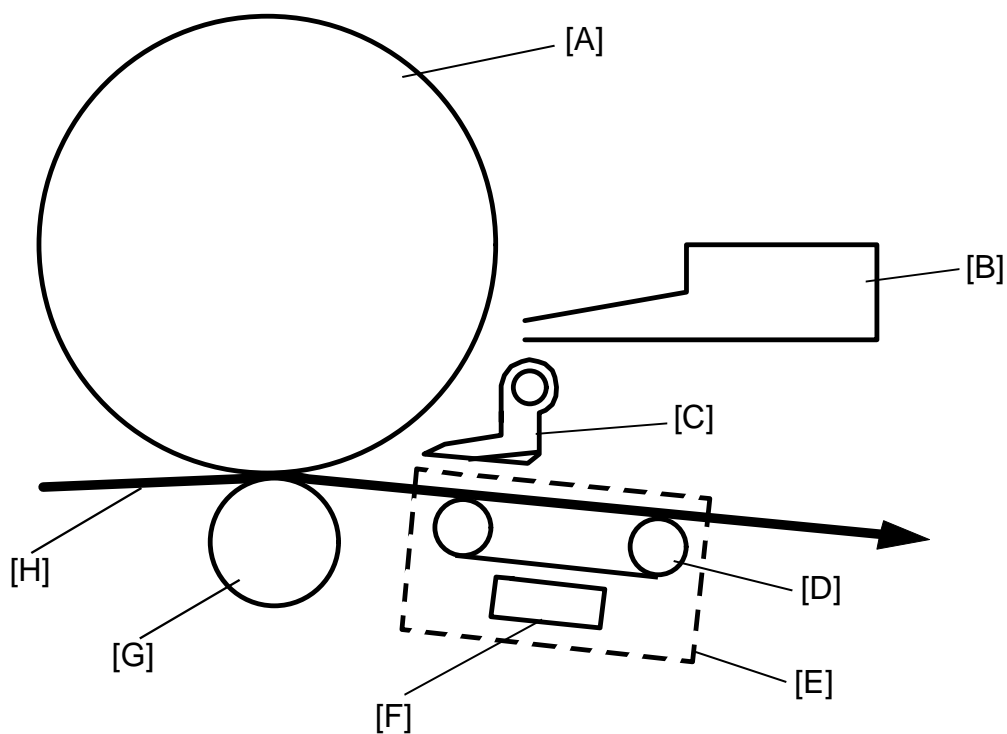


Component Name	In/Out	Main PCB		Description
		CN No.	Signal Level	
Drum Detection Switch [A]	In	105-26	24V 	Signal goes Low when the drum unit is slid out.
Drum Rotation LED (Red) [B]	Out	105-18	0V 	Signal goes High when the drum is not in the home position. (The LED lights red.)
Drum Rotation LED (Green) [B]	Out	105-19	0V 	Signal goes High when the drum is in the home position. (The LED lights green.)
Drum Rotation Button (N.C.) [C]	In	105-21	24V 	Signal goes Low when the button is pressed.
Drum Rotation Button (N.O.) [C]	In	105-22	0V 	Signal goes High when the main switch is turned on.
Drum Master Detection Sensor [D]	In	TP102	0V 	The voltage between TP102 and ground becomes more than 2 volts when a master is on the drum.
Ink Supply Solenoid [E]	Out	104-17	24V 	Signal goes Low when the solenoid is energized.

Component Name	In/Out	Main PCB		Description
		CN No.	Signal Level	
Drum Lock Solenoid [F]	Out	104-18	24V  0V	Signal goes Low when the solenoid is energized.
Ink Detection [G]	In	TP105	0V  -12V	Signal goes Low when there is no ink.
Color Drum Detection [H]	In	104-14	5V  0V	Signal goes Low when the color drum is installed. (CN118-2 and -3 are shortened.) The Color Drum indicator will light.
Drum Detection [H]	In	104-15	5V  0V	Signal goes Low when the drum is installed. (CN118-2 and -4 are shortened.) The A3 or DLT Drum indicator will light when CN118-2 and -5 are open.
A4/LT Drum Detection [H]	In	104-16	5V  0V	Signal goes Low when the A4/LT drum is installed. (CN118-2 and -5 are shortened.) The A4 or LT Drum indicator will light.
Drum Unit Safety Switch [I]	Out		0V  24V	CN118-7 of the drum unit connector becomes 24 volts when the drum unit is set.

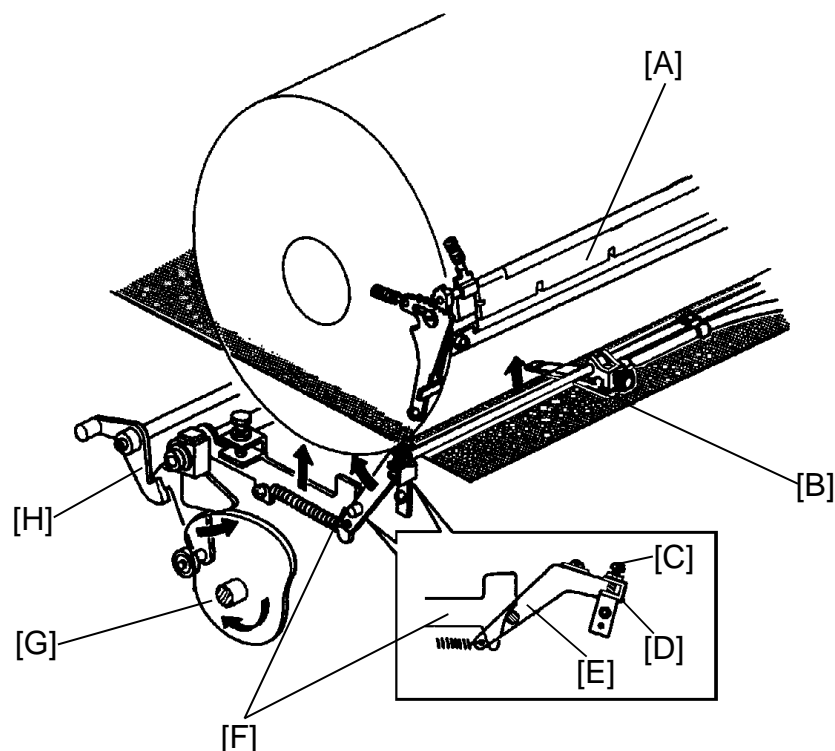
6. DELIVERY SECTION

6.1 OVERALL



[D]: Belt
[F]: Vacuum Fan
[G]: Press Roller
[H]: Paper

The exit pawl [C] and the air knife [B] separate the paper from the drum [A]. The vacuum fan [F] in the transport unit [E] pulls the paper against the belt [D] as the belt moves the paper to the delivery table.



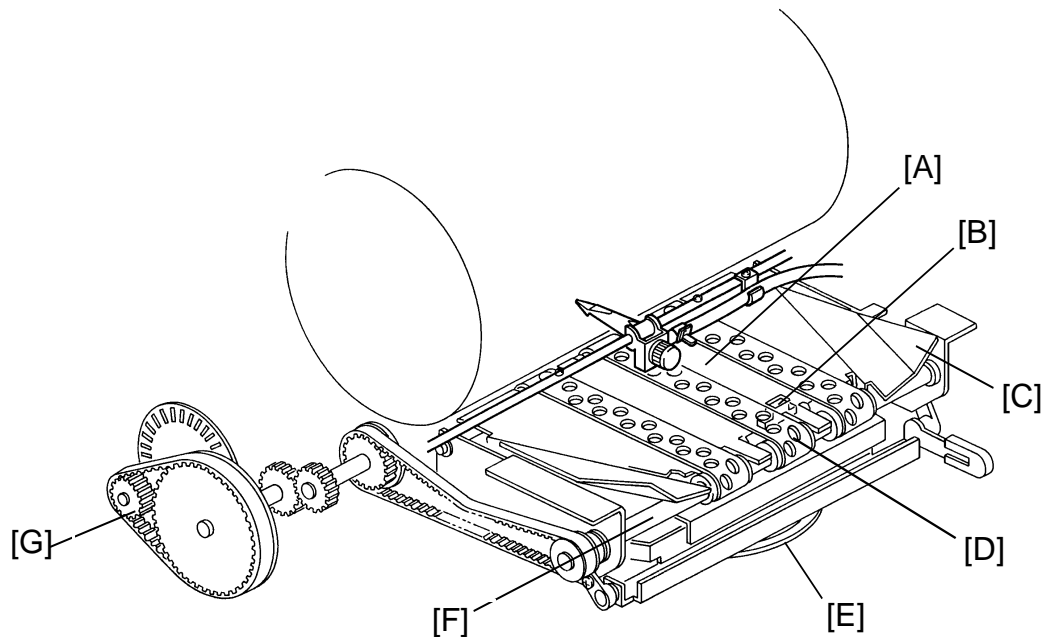
The exit pawl [B] located in the center of the drum, guides the center of the printing paper. As the master clammer [A] approaches the exit pawl, the exit pawl is moved away from the drum.

When the printing pressure is applied to the drum, the bearing of the pressure ON/OFF lever [H] comes to the bottom of the pressure cam [G] and the lever [H] will turn counterclockwise. The exit pawl drive cam [F] is connected to the pressure ON/OFF lever [H] and the cam [F] moves up. The exit pawl lever [E] will then turn clockwise along the surface of the exit pawl drive cam [F]. As the exit pawl comes in near contact with the drum, the stopper [D] will contact the adjusting screw [C]. This will provide a small clearance between the exit pawl and the drum surface to ensure that the printed paper will be fed to the vacuum unit.

As the press roller moves away from the drum (the bearing of the pressure ON/OFF lever [H] is at the top of the cam [G]), the exit pawl drive cam [F] will move down and the exit pawl lever [E] will turn counterclockwise. This will cause the exit pawl [B] to separate from the drum.

The exit pawl [B] is held away from the drum when the printing pressure is not being applied to the drum.

6.3 VACUUM UNIT DRIVE MECHANISM



The vacuum fan [E] will hold the paper against the transport belts [D]. The transport belts move the paper to the delivery table.

The wing guides [C] located at each end of the vacuum unit, help to keep the back side of the printed paper clean.

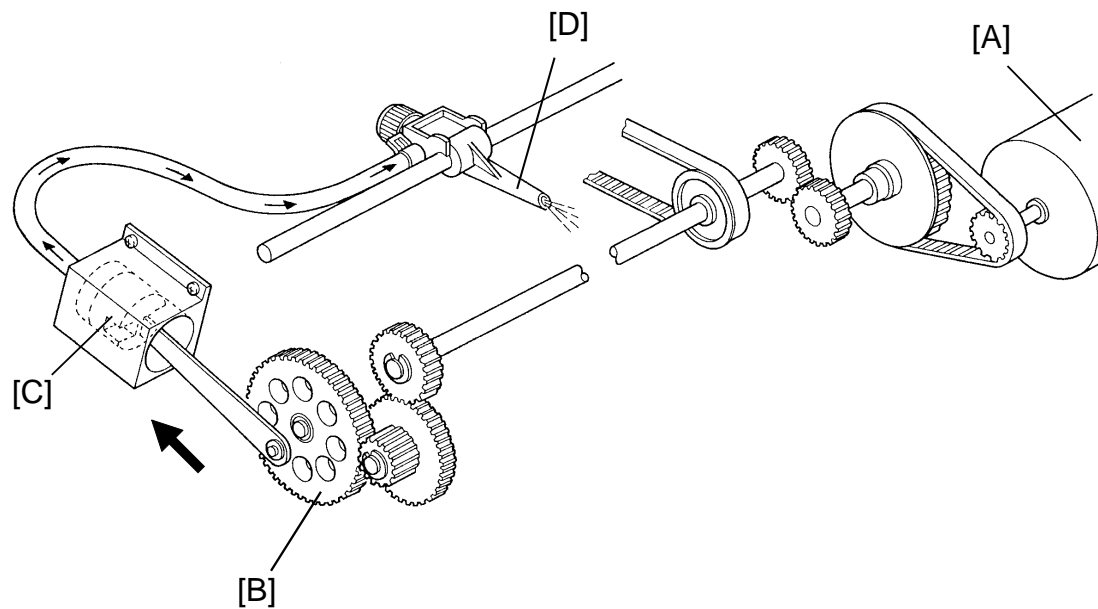
When the main motor turns on, the gear [G] mounted on the main motor shaft will drive the drive shaft [F] through gears and belts. The drive shaft will turn the transport belts.

The first and second paper exit sensors [A] and [B] will check for paper jams.

The paper exit jam check is done when the printing pressure is applied to the drum and the printing pressure sensor is interrupted.

Jam Condition	Sensor Status
Delivery Misfeed	2nd paper exit sensor is still on when the 2nd drum position sensor turns on.
Paper Wrap	1st paper exit sensor fails to turn on even though the drum has rotated 20° after activating the 2nd drum position sensor.
Paper Wrap	2nd paper exit sensor fails to turn on even though the drum has rotated 25° after activating the 1st drum position sensor.

6.4 PAPER EXIT PAWL AIR PUMP MECHANISM

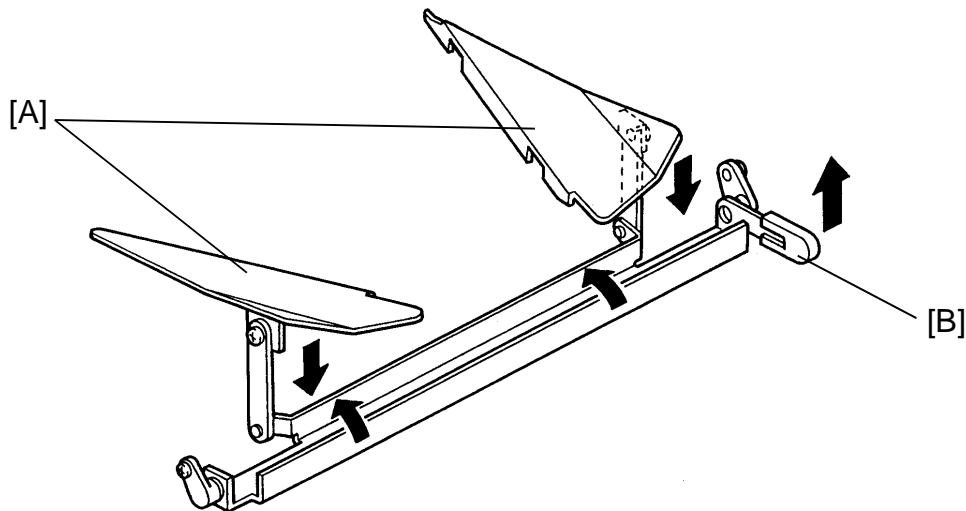


Detailed
Section
Descriptions

The main motor [A] turns a gear [B] through idle gears, a belt and a shaft. The gear [B] rotates and drives the piston in the air pump [C] back and forth.

The piston will move forward and will push a jet of air out through the nozzle [D]. This jet of air will help the paper downward and separate it from the drum.

6.5 WING GUIDE MECHANISM



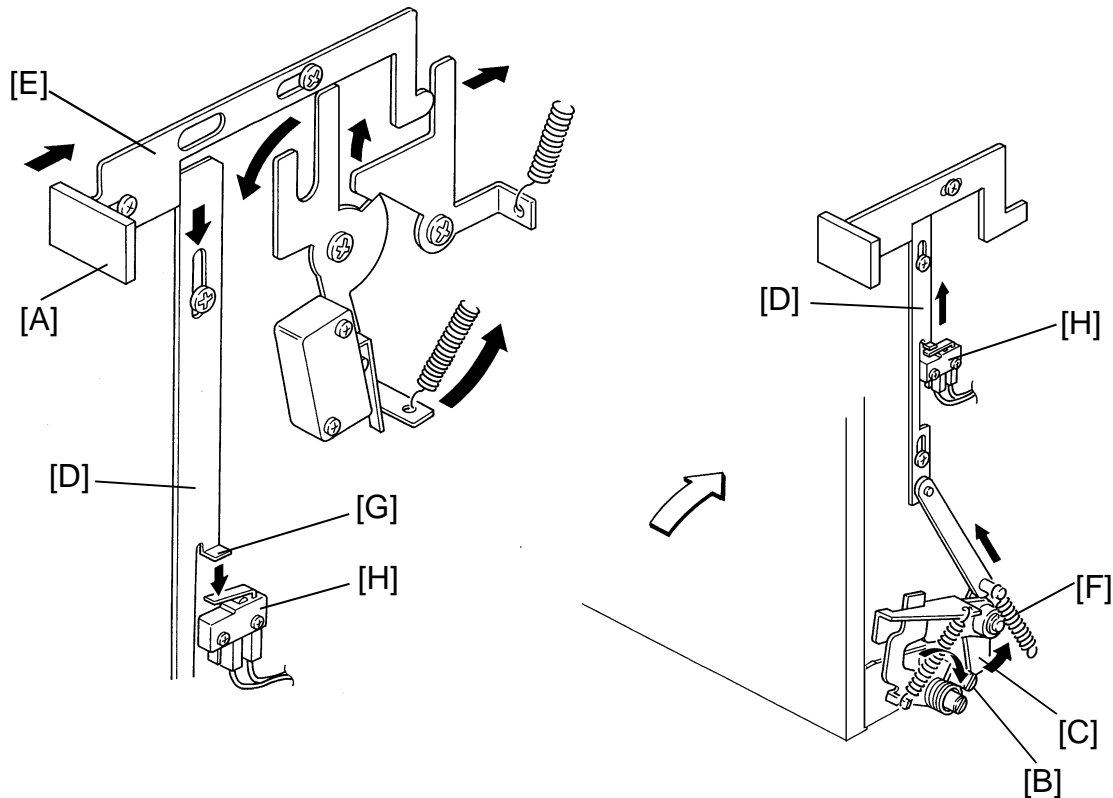
The wing guide[A] will lift up the sides of the paper as it exits the machine.

The wings will stiffen the paper so that the leading edge of thin paper will not sag and brush against the sheets of paper on the delivery table. This will prevent the ink on freshly printed sheets from being smeared.

The angle of the wing guide can be changed by moving the guide release lever [B]. Normally, the wing guide release lever are set at the lower position to raise the wings. If printed papers do not stack evenly or the paper passes over the end fence, raise the lever to the upper position to lower the wings.

6.6 PAPER DELIVERY TABLE

6.6.1 Master Eject Unit Lock Mechanism



Detailed
Section
Descriptions

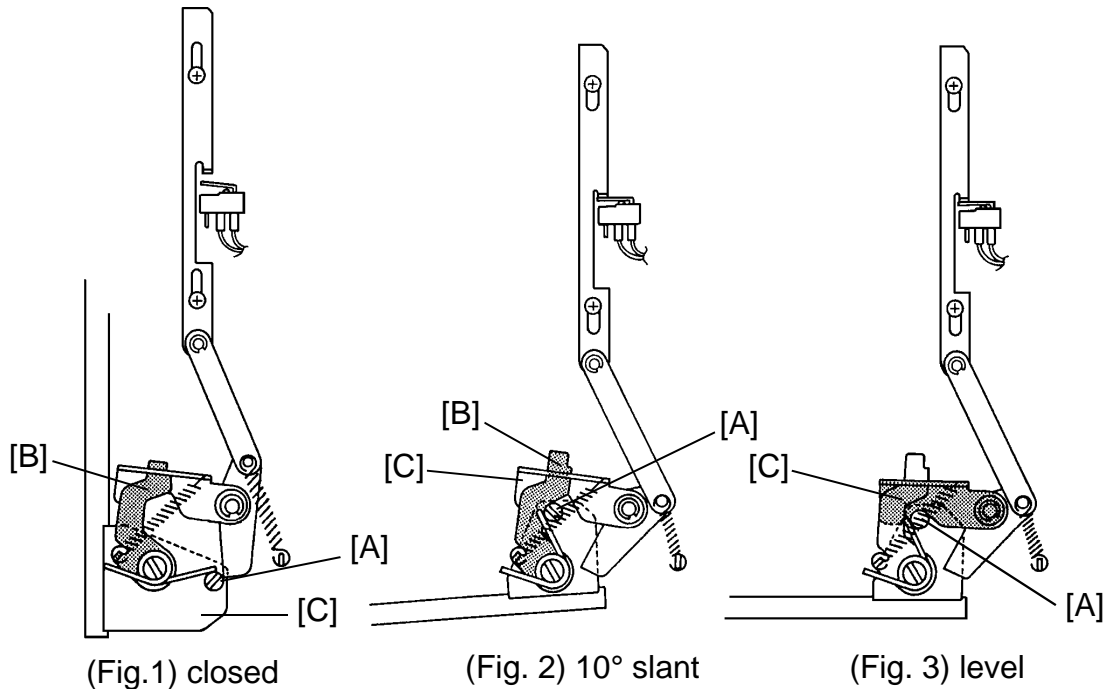
The master eject open button [A] is locked when the paper delivery table is closed. This lock mechanism functions as follows:

As the paper delivery table is closed, the pin [B] located on the front side of the paper delivery table, pushes down onto lever [C] which will raise arm [D]. When arm [D] is in the upper position, lever [E] cannot move forward.

When the delivery table is opened, arm [D] is pulled down by the tension spring [F] and lever [E] can move forward.

The projection [G] on arm [D] contacts the delivery table open switch [H], which sends a signal informing the main PCB the delivery table is open.

6.6.2 Paper Delivery Table Angle



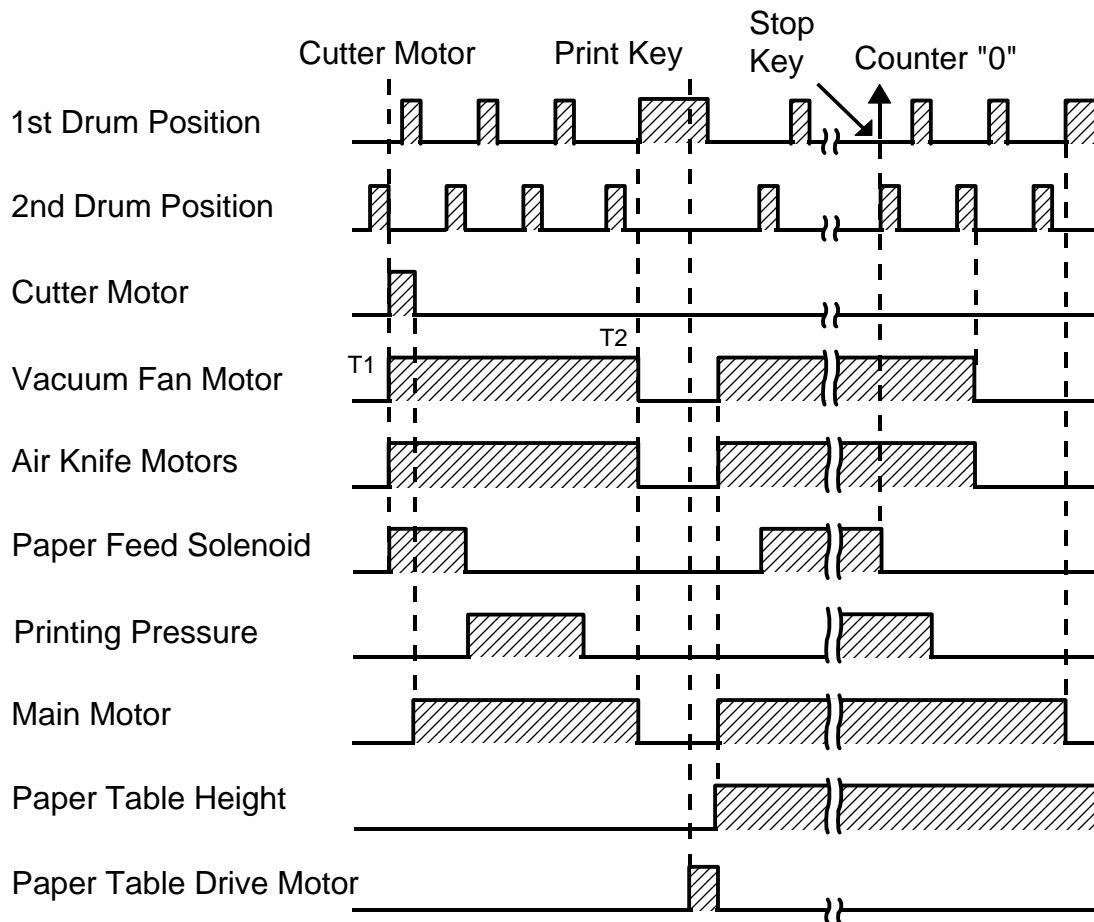
There are two paper delivery table open positions, level and 10° slant.

As the paper delivery table is lowered from the closed position (fig. 1), the pin [A] fixed to the table side frame moves forward and pushes the stopper [B] forward. This disengages (clicking noise) the lever [C] from the stopper (fig. 2) and the table stops at a 10° downward slant when the pin reaches the end of the slot cut in the side frame.

As the delivery table is slightly raised up from the 10° downward slant position, spring tension pulls the lever downward and the pin engages the lever. This will stop the table at the level position.

Normally, the table position should be at a 10° downward slant. This will prevent the leading edge of each sheet of paper when being fed out from rubbing against the other sheets on the table, and ensures that the ink on the leading edge is not smeared. However, small paper sheets may pass over the end fence if the table is at the 10° downward slant position. If this occurs, raise the table to the level position.

6.7 ELECTRICAL TIMING

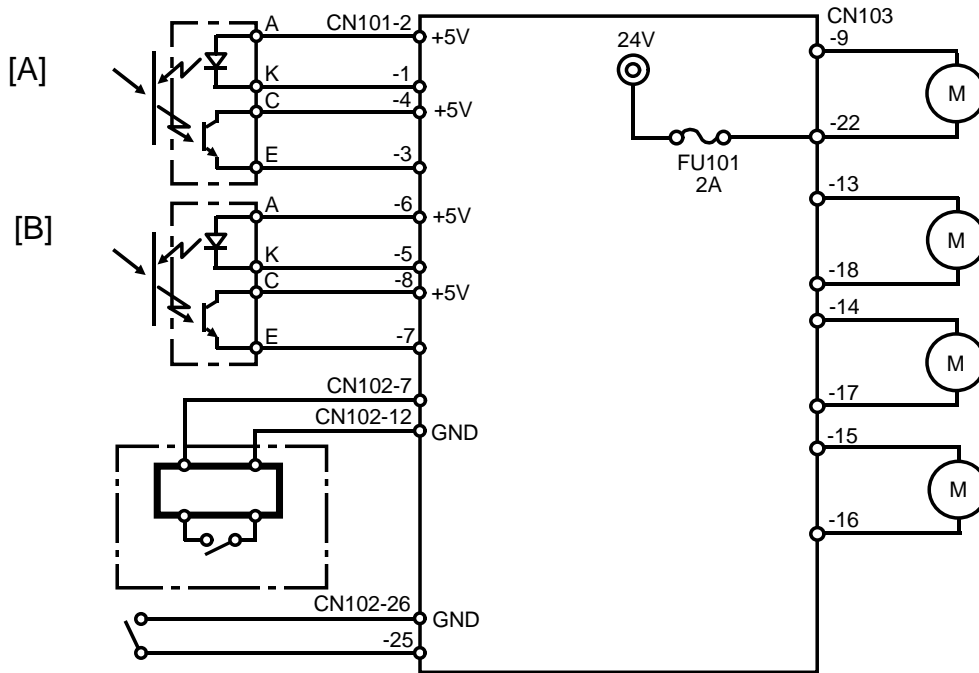


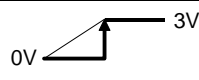
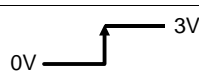

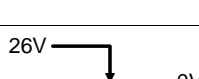
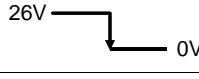
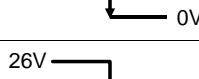
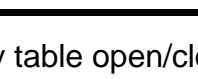
Detailed
Section
Descriptions

T1: The cutter motor, vacuum fan motor, and air knife motors turn on.
The main motor turns on when the cutter motor stops rotating.

T2: The vacuum fan motor and the air knife motors turn off when the printing pressure sensor is deactivated and the 1st drum position sensor is activated.

6.8 CIRCUIT

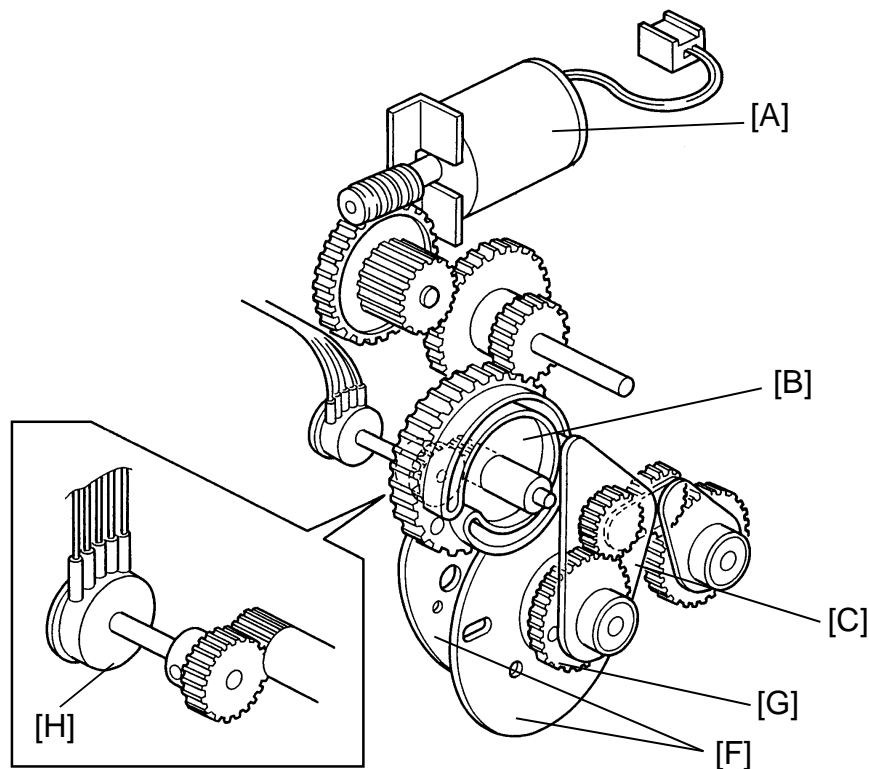


Component Name	I/O	Main PCB		Description
		CN No.	Signal Level	
1st Paper Exit Sensor [A]	In	TP101		Signal goes High when the paper is on the sensor.
2nd Paper Exit Sensor [B]	In	TP103		Signal goes High when the paper is on the sensor.
Delivery Table Open Switch [C]	In	102-25		Signal goes to Low when the delivery table is opened.
Vacuum Fan Motor [D]	Out	103-9		Signal goes Low when the motor is energized.
Air Knife Motor [E]	Out	103-13		Signal goes Low when the motor is energized.
Air Knife Motor [F]	Out	103-14		Signal goes Low when the motor is energized.
Air Knife Motor [G]	Out	103-15		Signal goes Low when the motor is energized.

The paper table and the delivery table open/close detection is done separately to enable paper table lowering regardless of whether the delivery table is open or closed.

7. IMAGE POSITIONING SECTION

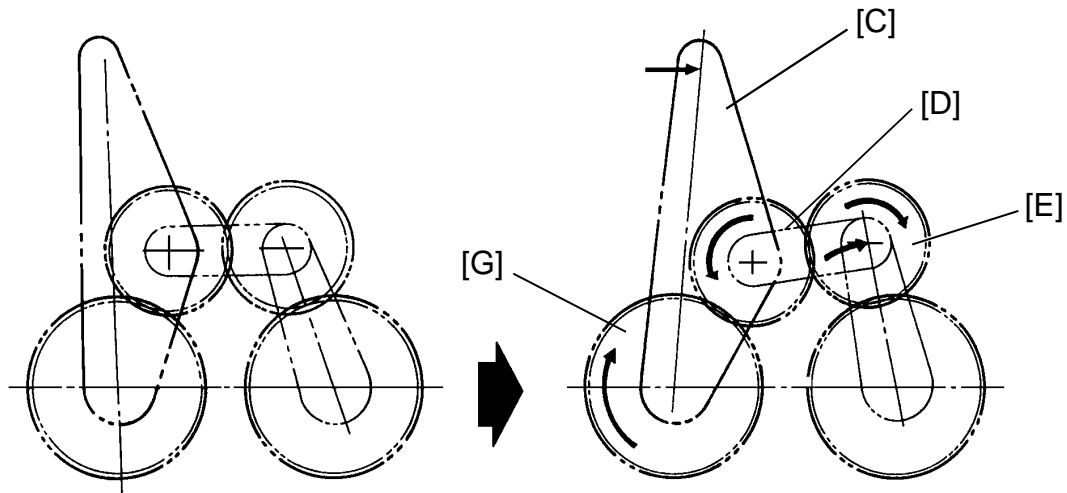
7.1 OVERALL



Detailed
Section
Descriptions

In the image positioning mode, the image can be shifted 20 mm (5 mm steps) up or down on the page by pressing the forward or backward Image Position key on the operation panel. This will rotate the first and second paper feed roller cam to change the paper feed timing in relation to the drum rotation timing.

7.2 IMAGE POSITIONING MECHANISM



When the forward Image Position key on the operation panel is pressed, the image positioning motor [A] will turn and drive cam gear [B] clockwise through gears.

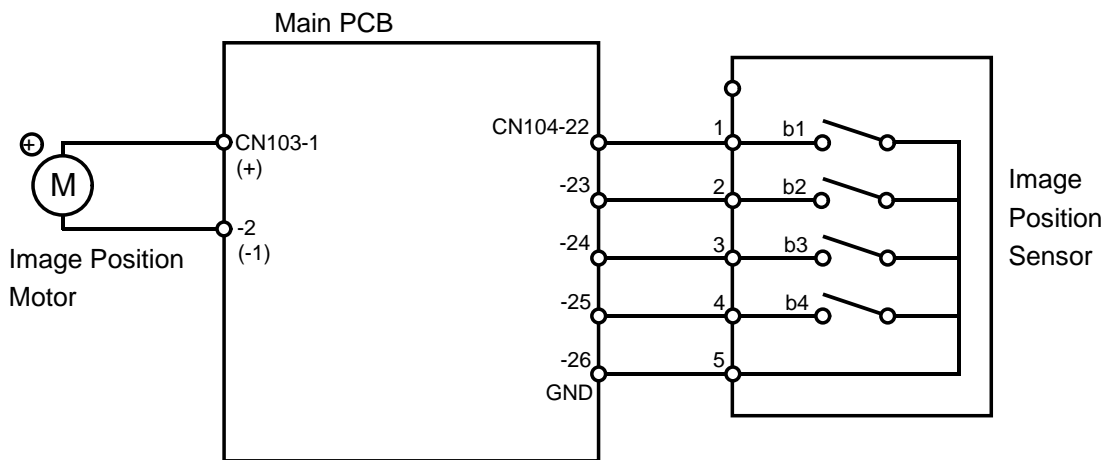
The cam gear has a spiral track along which the lever [C] moves. When the cam gear turns clockwise, the pin of the lever [C] moves towards the outside of the cam gear and the lever will turn clockwise.

The lever [C] drives gear [E] clockwise through gear [D] and the first paper feed roller and the second paper feed roller cams [F] mounted on the shaft on gear [G] will turn clockwise.

As a result, the paper feed start timing is delayed in relation to the drum rotation timing and the image position is moved in the forward direction.

The image position is detected by the image position sensor [H] which is located behind the cam gear [B].

7.3 CIRCUIT



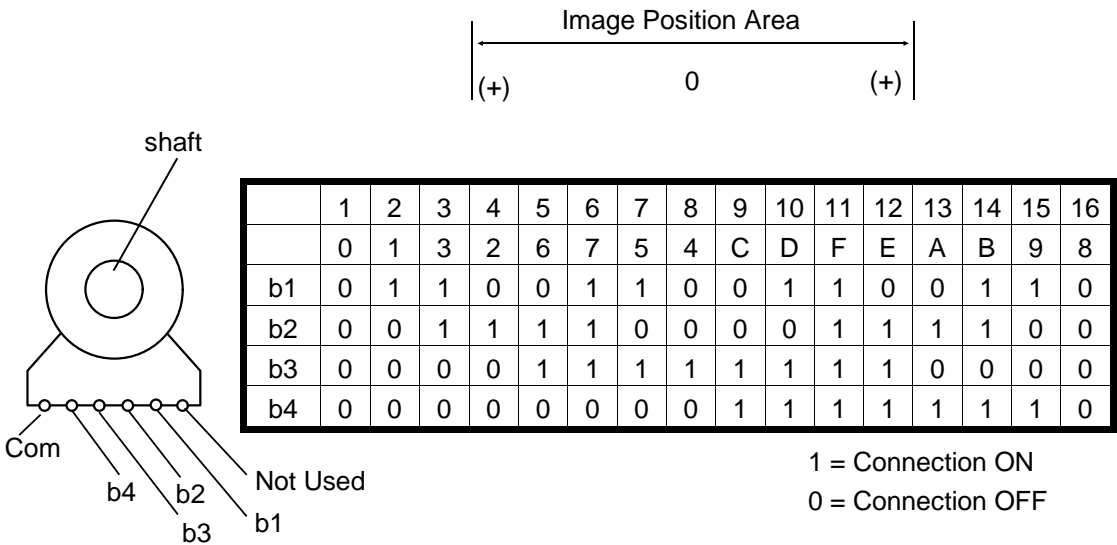
Detailed
Section
Descriptions

When the forward Image Position key is pressed, CN103-2 goes to 22 V and CN103-1 goes to 0 V, and the image positioning motor will turn to advance the paper feed timing.

When the backward Image Position key is pressed, CN103-1 goes to 22 V and CN103-2 goes to 0 V, and the image positioning motor will turn to move back the paper feed timing.

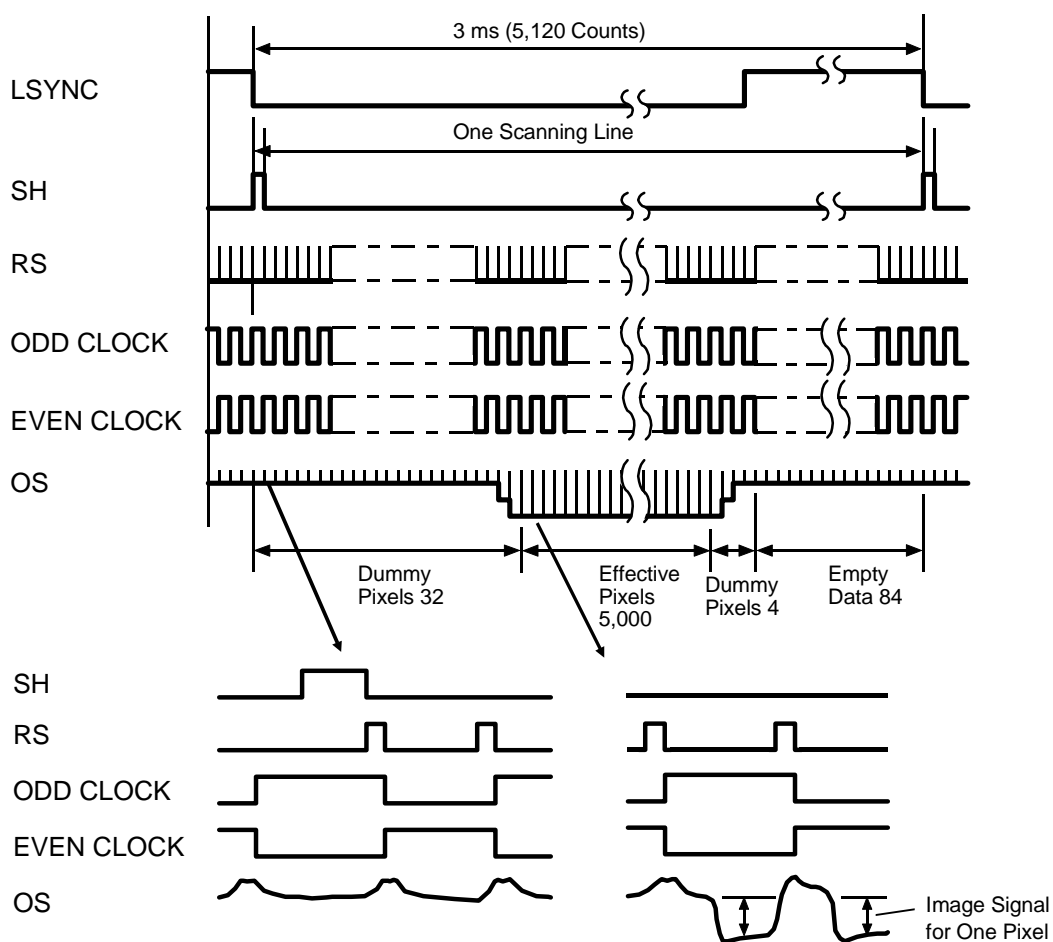
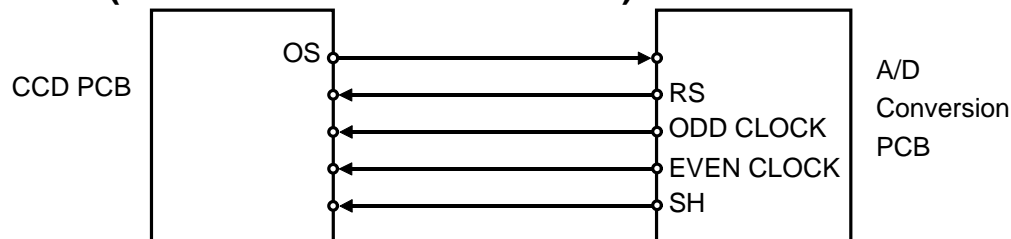
The main PCB detects the image position by means of a 4 bit signal received from the image position sensor. The image positioning motor will turn off when the image is at the selected position.

Nine different image position settings of the sixteen possible settings can be selected by pressing the Image Position key.



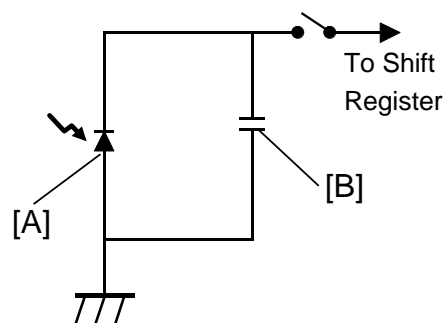
8. IMAGE PROCESSING

8.1 CCD (CHARGE COUPLED DEVICE)



The light reflected from the original exposes the CCD (Charge Coupled Device). The CCD is a solid-state device similar to a photodiode array, but unlike a photodiode array, a CCD can read one complete scanning line at a time.

The principle circuit of each pixel (picture element) in the CCD is shown on the right. The light reflected from the original is sensed by photodiode [A]. Capacitor [B] stores the electrical charge corresponding to the light intensity. The CCD used in this model has 5036 sets of such photodiodes and capacitors in series (5036 pixels). To increase scanning speed, the odd and even pixel data are handled separately.



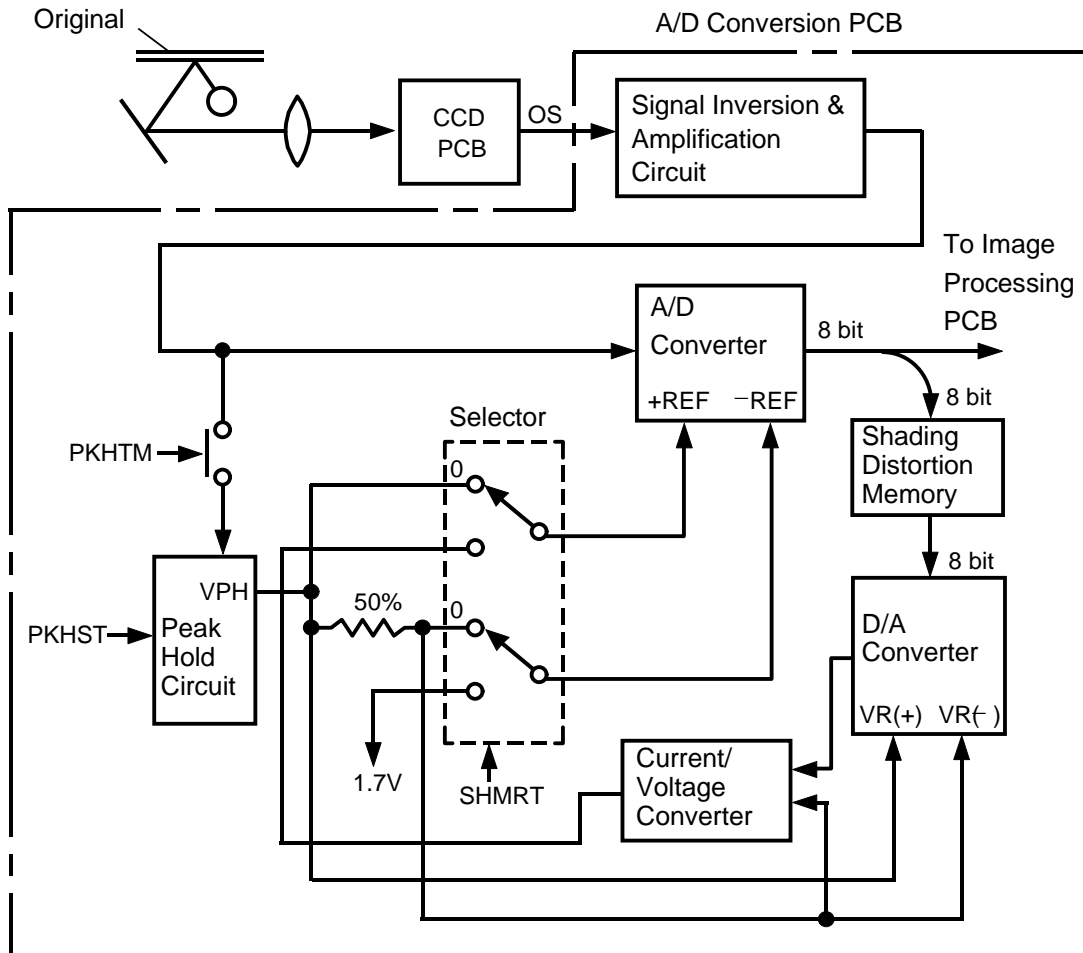
The line synchronizing signal (LSYNC) generated in the image processing PCB is turned off to do one line of main scanning. When main scanning for a line starts, the shift signal (SH) is sent from the A/D conversion PCB. The one line of image data are stored in the capacitors of each pixel. At the same time, the previous line of data stored in the capacitors are transmitted in parallel to two shift registers: one for odd numbered pixels and one for even numbered pixels. The odd and even pixel data are then outputted in a serial format. An output transistor source (OS) synchronizes the odd and even clock pulses. The odd and even clock pulses are activated or de-activated by the dropping edge of the reset signal (RS).

The CCD consists of 5,036 pixels. The first 32 pixels are dummy pixels. The 14 dummy pixels from the 16th to the 32nd are covered with aluminum film. These pixels are used for black limit level data. The following 5,000 pixels are effective pixels. All the data for one line of the original image are converted as electrical charges and stored in a capacitor of effective pixels individually. After the effective pixels, there are 4 additional dummy pixels.

Since one line scanning period (3 milliseconds) counts 5,120 clock pulses (a clock pulse corresponds to a pixel data output), there remains time for 84 additional clock pulses. The scanning position will move to the next line after this period (a sub-scan is completed), and main scanning for the next line starts.

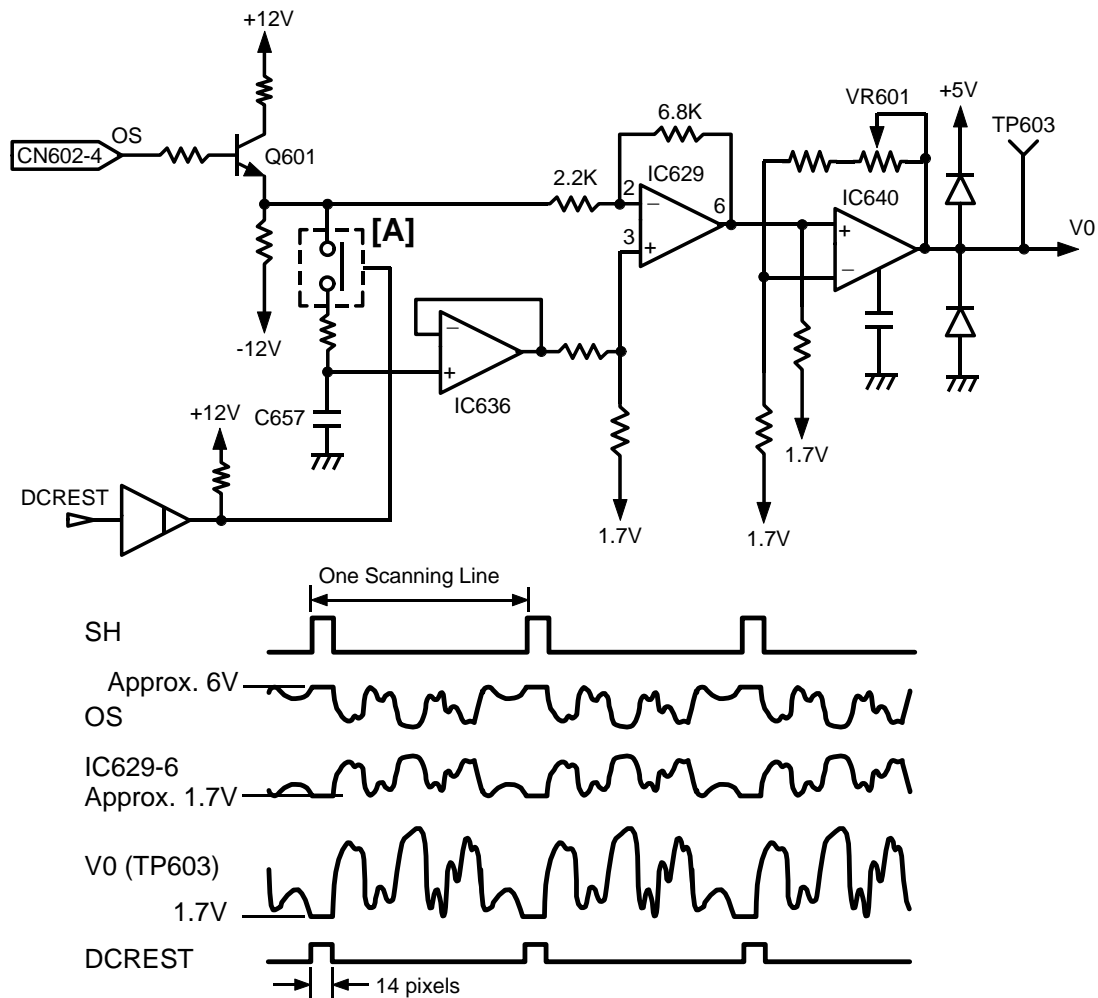
8.2 A/D CONVERSION PCB

8.2.1 Overview



The analog signal generated from the CCD is inverted and amplified in the A/D conversion PCB. The analog signal is then converted into an 8-bit digital signal and is sent to the image processing PCB. The original background and the distortion of the light path are monitored to obtain the exact image data.

8.2.2 Inversion and Amplification



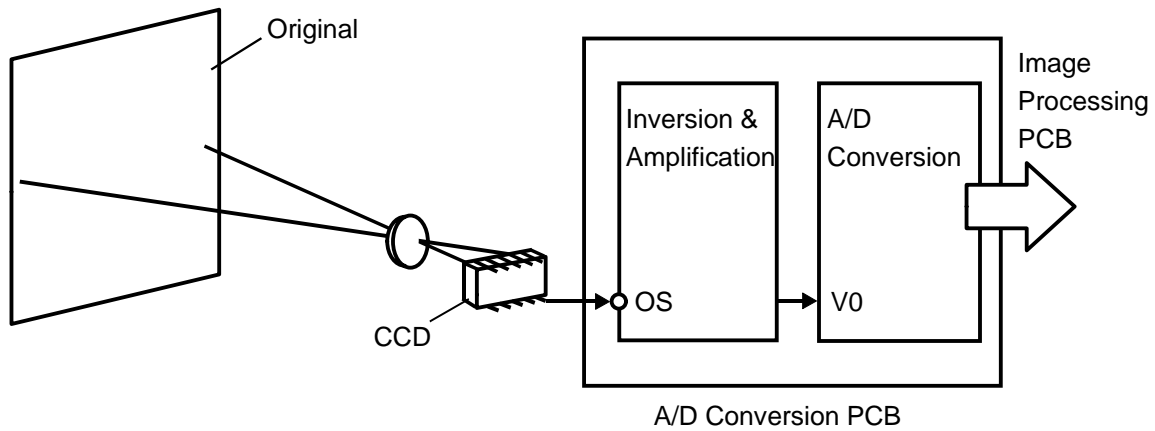
Detailed
Section
Descriptions

The analog signal (OS) from the CCD is output to the A/D conversion PCB. It is sent in the minus direction under the dc bias voltage (approximate 6 volts).

For every line scanned, 14 dummy pixels produce the black limit level data, while at the same time the DC reset signal (DCREST) is turned on. The DC reset signal turns on the switch [A]. Thus, the CCD output (black limit level) activates Q601, and C657 is charged with the Q601 output. When the switch [A] is turned off, the CCD output (the image data) is sent to IC629-pin 2 while the charged voltage in C657 is applied to IC629-pin 3. The difference in voltage levels between the image data and the black limit level is inverted and outputted from IC629-pin 6 above the base voltage of 1.7 volts.

The IC640 amplifies the output of IC629-pin 6 above the base voltage of 1.7 volts. The amplification ratio can be changed by VR601. This signal (V0) can be observed through TP603 in the A/D conversion PCB.

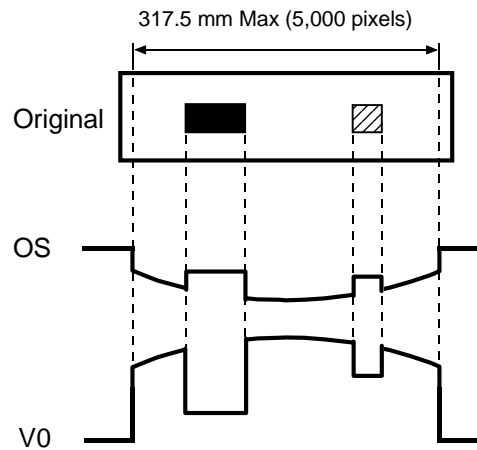
8.2.3 A/D Conversion

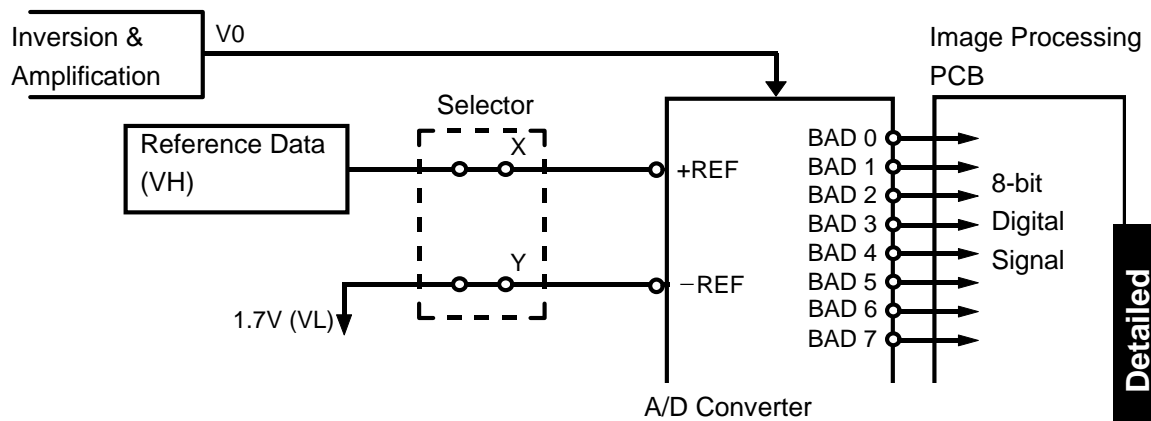


This system converts the analog image data into a digital form. It will then alter the data to correct for image intensity distortions caused by uneven light intensity.

The image data is inverted and amplified and then digitalized in an A/D converter. From there, the data go to the image processing PCB as 8-bit digital signals. The digital signal for each pixel is determined as follows:

1. The CCD converts the scanned image to an analog video signal, and sends it to the A/D conversion PCB as an OS signal. (See figure on the right, top.) The OS signal is then inverted and amplified, and is outputted as a V0 signal. (See figure on the right, bottom.)

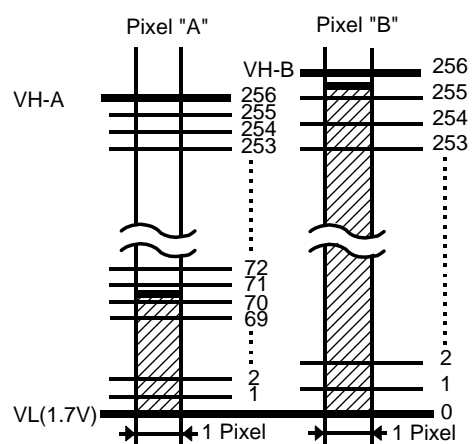
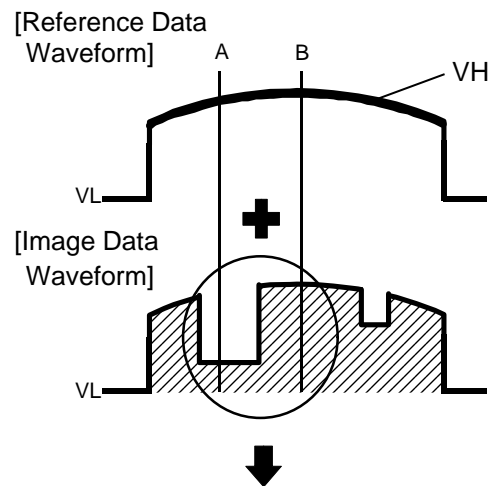




Detailed
Section
Descriptions

- Before scanning the original, the white platen cover is scanned and this data is stored in memory as reference data. The reference data show the white peak level (VH) for each pixel. VH varies for each pixel due to distortions of the light path. The black peak level (VL) is fixed at 1.7 volts for all pixels.

- While scanning the image, the image data (V0) is inputted to the A/D converter. The reference data is picked from memory and applied to the high reference voltage (+REF) of the A/D converter. The black peak level (VL = 1.7 volts) is applied to the low reference voltage terminal (-REF). The low reference voltage terminal stays constant at 1.7 volts. Only the high reference terminal voltage varies.



In the A/D converter, the difference in voltage between the "+REF" voltage and the "-REF" voltage is divided into 256 steps. The analog image data (V0) is digitized based on these steps.

For example, pixel data "A" and "B" are converted into digital signals as shown right. The pixel value of "A" is determined as "70" based on the value of VH-A and "B" is determined as "255" based on the value of VH-B.

4. The digitized pixel data is sent serially to the image processing PCB. For example, data "A" (70) and "B" (255) are expressed in 8-bit form and sent through the eight terminals (BAD 0 to BAD 7) shown in the table on the right.

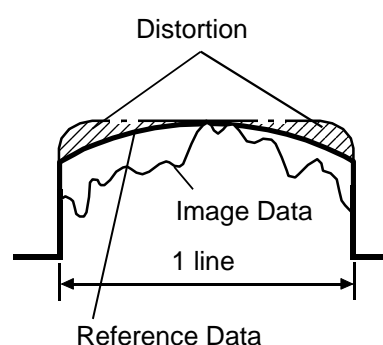
Data Pixel		A	B
Decimal		70	255
8-bit Output	BAD0	0	1
	BAD1	1	1
	BAD2	1	1
	BAD3	0	1
	BAD4	0	1
	BAD5	0	1
	BAD6	1	1
	BAD7	0	1

8.2.4 Reference Data Correction

[Overview]

The reference data, which are used to digitalize the image data, are compensated by the following corrections:

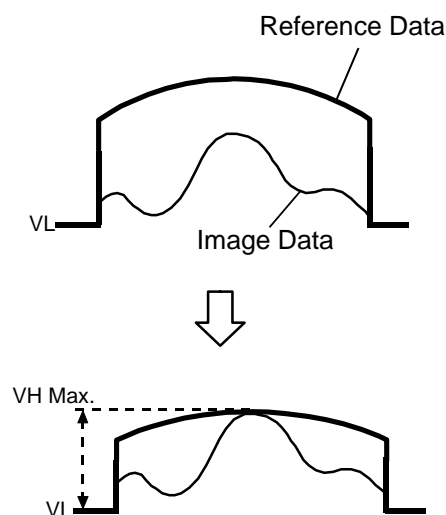
1. The image data sent from the CCD do not exactly represent the image for the following reasons:
 - Loss of brightness towards the ends of the fluorescent lamp and the edge of lens.
 - Variations in sensitivity among pixels of the CCD.
 - Distortions of the light path. (Stains and/or variations in reflectivity of reflectors, exposure glass, mirrors, etc.)

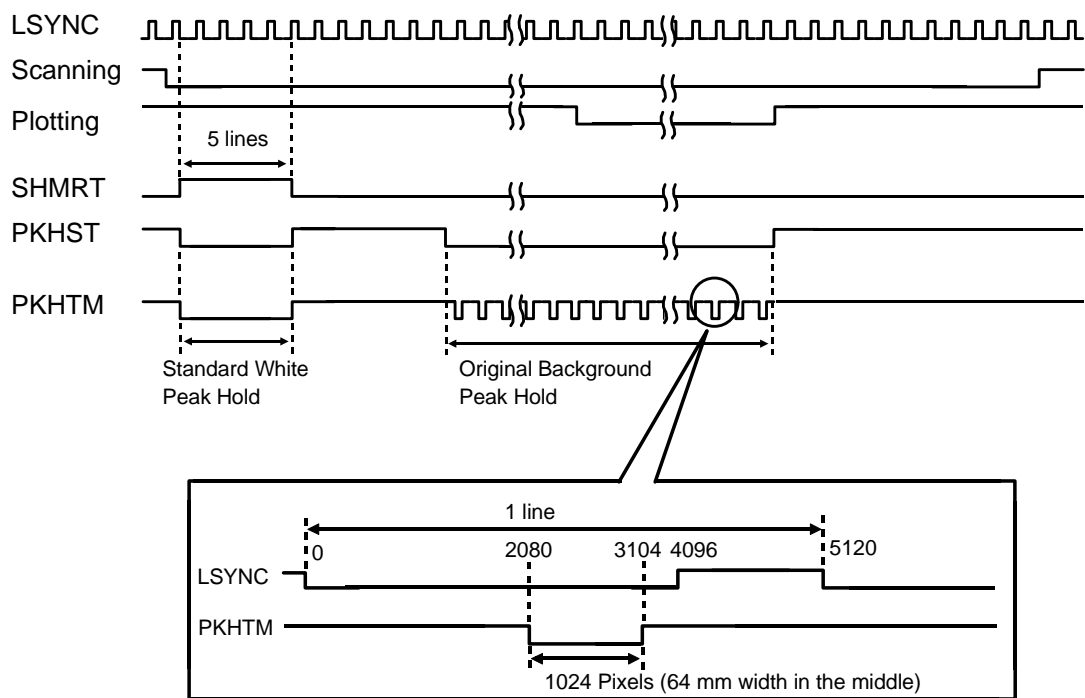
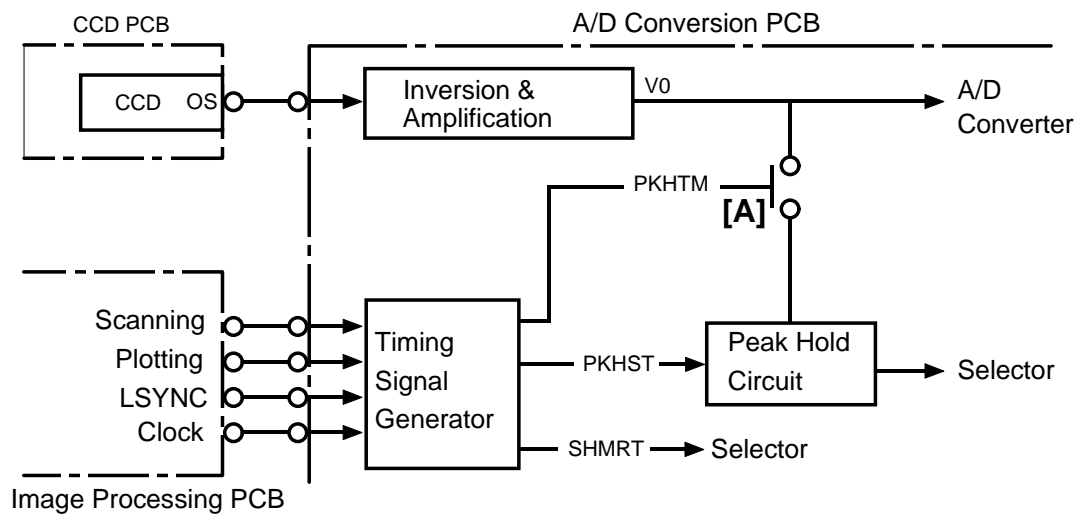


To eliminate such distortions from the image data, the distorted data is applied to the reference data. Thus, the image data is corrected when it is converted into digital data.

2. Original Background Correction

The white peak levels (VH) for each pixel are determined by the reference data. If a newspaper or blue print is scanned as an original, the whitest image datum is much lower than the white peak level of the white platen cover. The image datum is close to the black peak level (VL). As a result, a dirty background may appear on prints. To prevent this, the whitest image datum of the scanned image is used as the maximum white peak level (VH Max.) of the reference data.





[Peak Hold]

1. Standard White Peak Hold

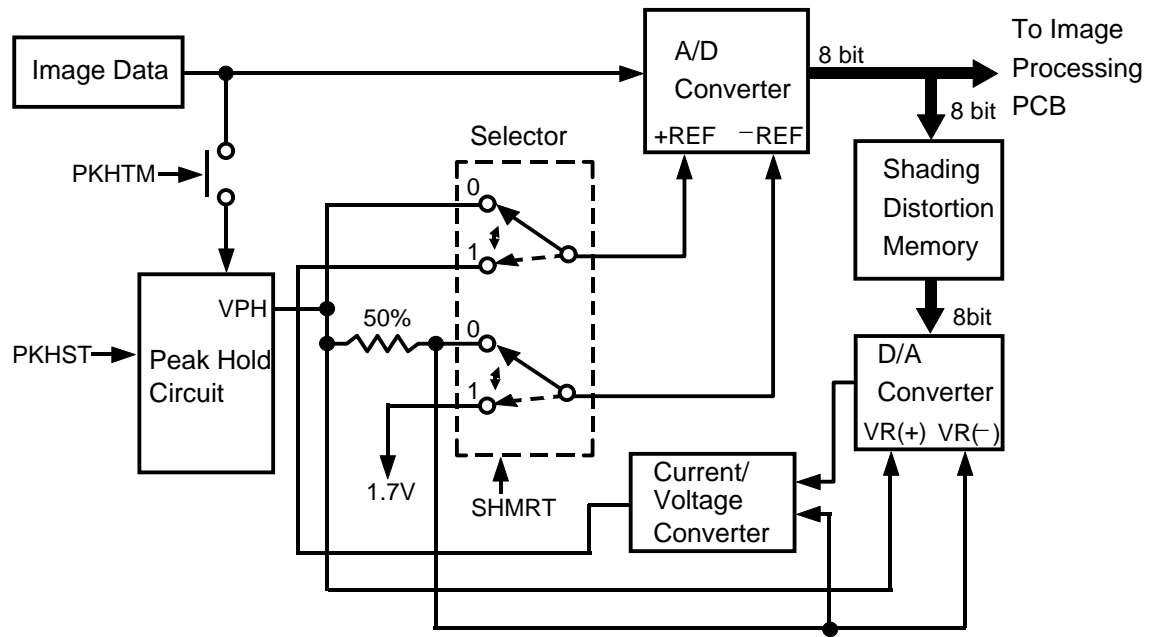
Before scanning the document image, the white platen cover is scanned. While the first five lines are scanned, the peak hold timing signal (PKHTM) is turned off and the switch [A] on the A/D conversion PCB turns on. This will allow the V0 signal to reach the peak hold circuit. Since the peak hold set signal (PKHST) is also turned off in this period, the whitest datum of each pixel is stored as a standard white peak voltage (VPH-SW). Since the shading distortion memory reset signal (SHMRT) is also turned on during this period, switches in the selector are switched to "0". Therefore, white peak voltage (VPH-SW) is sent to the A/D converter as a "+REF" voltage. The A/D converter will change the analog image data of the white platen cover to a digital signal and the digital signal is stored in memory as the shading distortion data.

2. Original Background Peak Hold

After the five lines of the platen cover have been scanned, the peak hold set signal (PKHST) will turn on to clear the standard white peak voltage (VPH-SW) in the peak hold circuit.

While the 64 millimeter width (1,024 pixels) in the middle of the original is scanned, the peak hold timing signal (PKHTM) is turned off to send the image data to the peak hold circuit. (This is done about 1 millimeter from the leading edge of original.) The peak hold will circuit hold the whitest (lightest) image voltage in 1024 pixels as an original background peak voltage (VPH-OB). This is because the peak hold set signal (PKHST) is turned off while the original image is being scanned.

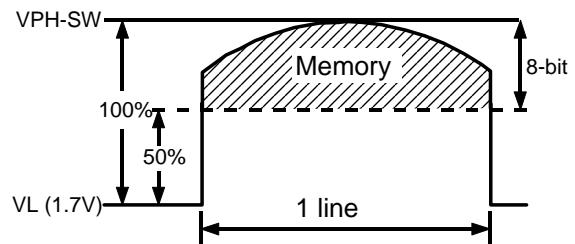
Since the scanning process starts before the light intensity of the fluorescent lamp stabilizes, the light intensity tends to increase for a little while. The image signal from the CCD increases until the light intensity stabilizes. As a result, lighter image densities may not appear on prints after the light stabilizes. To prevent this, the original background peak voltage (VPH-OB) is changed when a higher (lighter) image signal is applied to the peak hold circuit.



[Reference Data Correction]

1. Shading Distortion Memory

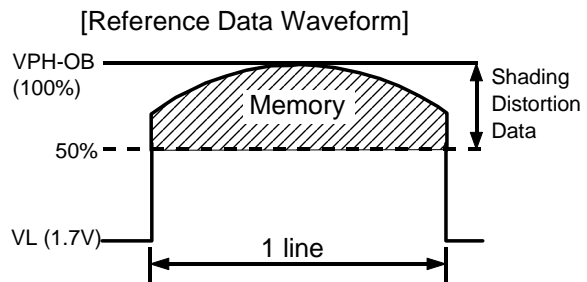
The platen cover is uniform in color and in reflection. However, the waveform of the white platen cover from the CCD shown on the right, is due to distortions of the light path.



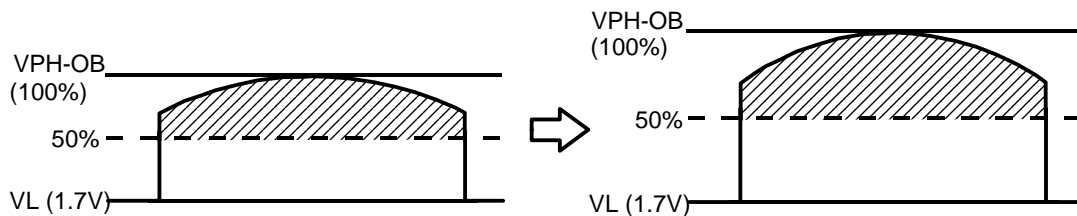
During the first five line scans, the selector flips the switches to the "0" position. The standard white peak voltage (VPH-SW) in the peak hold circuit is applied to the high reference voltage terminal (+REF) of the A/D converter. 50 percent of the difference in voltage between the peak voltage and the black peak level voltage (VL, 1.7 volts) are applied to the low reference voltage terminal (-REF). Also during this period, the platen cover white data is sent directly to the A/D converter. The upper 50 percent of the platen white cover data is digitalized into an 8-bit signal form. This will correct the data which is distorted by more than 50 percent of peak voltage. It is then stored in memory as the shading distortion data.

2. Shading Distortion Correction

While an original image is scanned, the shading distortion datum for each pixel is sent from memory to the D/A converter. The original background peak voltage (VPH-OB) is applied to the high reference voltage terminal (VR+) of the D/A converter. 50 percent of the difference in voltage between the original background peak voltage and the black peak voltage is applied to the low reference voltage terminal (VR-). The D/A converter converts the upper 50 percent of the shading distortion data to electrical current (analog signal).



3. Original Background Correction



50 percent of the difference in voltage between the original background peak voltage (VPH-OB) and the black peak voltage (VL = 1.7 volts) is also applied to the current/voltage converter. In the current/voltage converter, the analog shading distortion data are changed from an electrical current to a voltage and added to the 50 percent of the difference voltage.

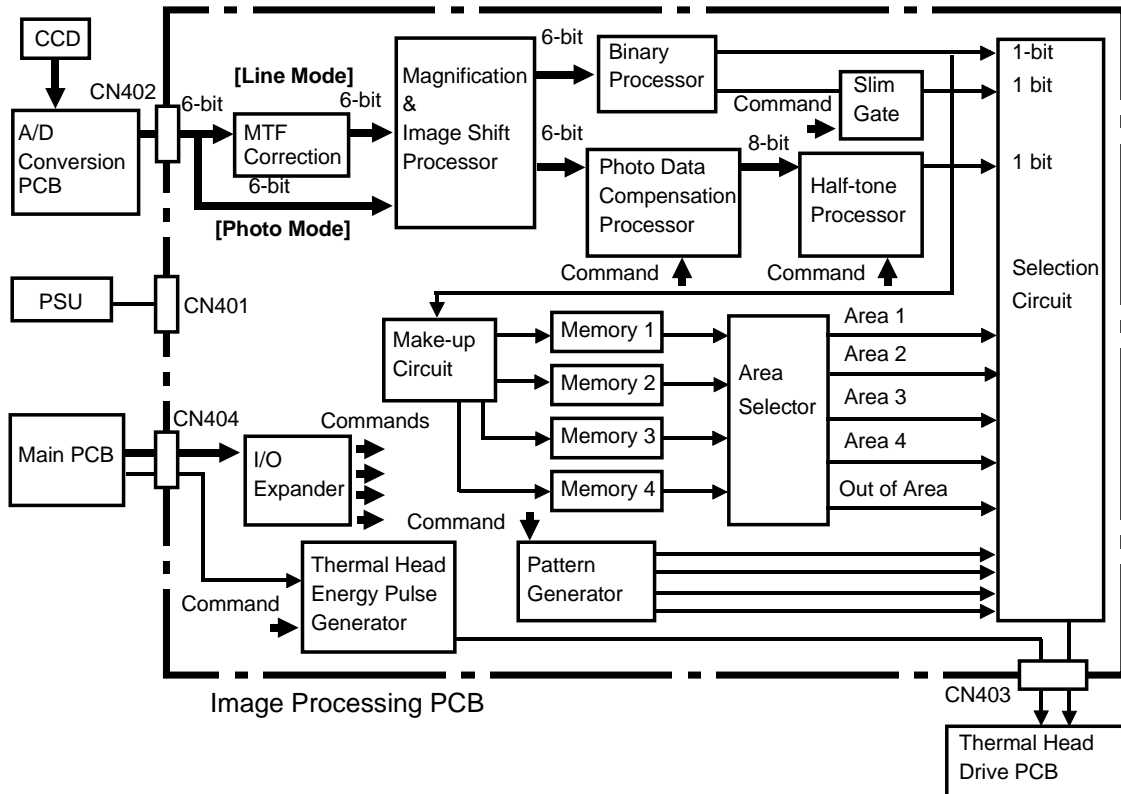
When the original image is being scanned, the selector flips the switches from "0" position to "1" position. The output voltage from the current/voltage converter is applied to the high reference voltage terminal (+REF) of the A/D converter. 1.7 volts is applied to the low reference voltage terminal (-REF). The image datum of each pixel is sent to the A/D converter directly, the image datum is then digitized to an 8-bit signal.

Since the peak hold set signal (PKHST) is low while the image is being scanned, the lightest background datum is always held in the peak hold circuit. This will convert the image analog signals to digital signals properly, even when the light intensity of the fluorescent lamp becomes high.

NOTE: If the platen cover is dirty, lower image data is stored as a white peak voltage due to the less reflection from the platen cover. This means that distorted data is lower than normal data (pure white data). As a result, white (lighter image) band will appear on prints.

8.3 IMAGE PROCESSING PCB

8.3.1 Overview



Detailed
Section
Descriptions

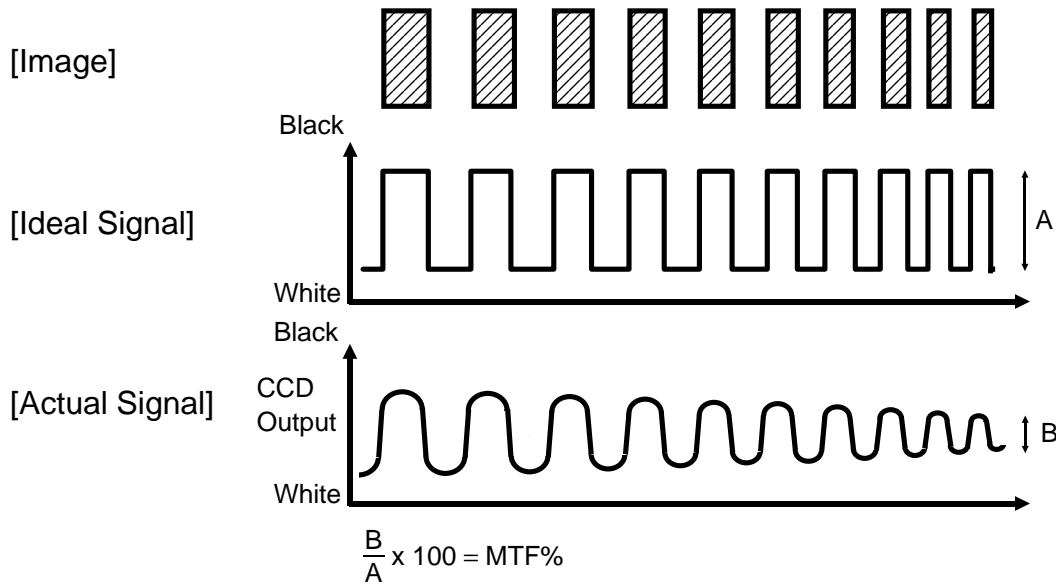
The upper 6 bits of the 8 bits from the A/D conversion PCB are used by this board. (The lower 2 bits are not needed and are discarded.) The digital data is inverted to match with the circuit of the image processing PCB. Therefore, the white peak level becomes 0, and the black peak level becomes 63.

In the line mode, the 6-bit image data are compensated by the MTF correction. Then if necessary, they are discarded or repositioned by the magnification and image shift processor. Next the 6-bit image data which gives 64 graduation steps (64 level grayscale) are converted to single-bit image data (white or black) by the binary processor. In this step, the image density is determined according to the level selected by the Image Density key (Lighter, Normal, Darker 1, or Darker 2). The single-bit image data is modified in the slim gate if the sharpen image mode is selected by the Image Mode key.

In the photo mode, the 6-bit image data will first go to the magnification and image shift processor. The 6-bit data is compensated and converted into 8-bit image data. This will give a 256 level grayscale used by the photo data compensation processor. This step will determine the image density and contrast (in the make-up mode only) which is selected by the Contrast key (Normal, Light Tone, or Dark Tone). Then, the 8-bit image data is converted to single-bit white or black data by the half-tone processor. There are three different types of the half-tone processing for the photo mode of the make-up mode, selected by the Screen key: Normal, Fine, or Coarse.

When the make-up mode is selected, the single-bit image data is combined in the selection circuit and is outputted to the thermal head drive PCB.

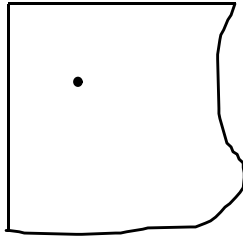
8.3.2 MTF Correction



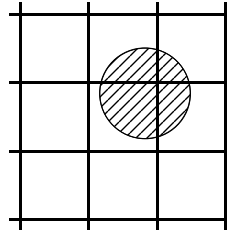
When the original image is converted into electrical signals by the CCD, the signal deteriorates and contrast is reduced. This is because neighboring black and white parts of the image influence each other. The lens' characteristics are the main cause for this. This phenomenon is typical when the width and spacing of the black and white areas are narrower. The ratio of the difference between the black and white levels of the electrical signal (an actual difference) and the difference between that of the original (an ideal difference) is called the Modulation Transfer Function (MTF).

If the MTF is too low, edges of the image tend to be lost. The MTF correction is used to emphasize the 6-bit image data in the line mode. This will help to better reproduce the characters.

A target pixel datum is compared with the surrounding pixel data and is compensated. If the surrounding pixels are very different (compared with the target pixel), the target value will be more influenced by them. This step is repeated for all pixels of the original.



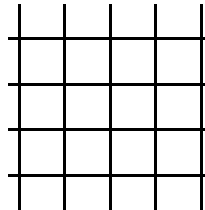
(a) Section of document



(b) Enlarged view of dot

0	0	0	0
0	12	4	0
0	30	12	0
0	0	0	0
0	0	0	0

(c) Image data after
A/D conversion



(d) Print without MTF correction
(threshold level: 32)

Consider a small black point on a original as shown in the illustration (a) and (b). The 6-bit image data (range 0 to 63) for this section of the original is shown in (c). If the threshold level is 32, all the pixels in this area will become single-bit white data and the image will not be reproduced (d).

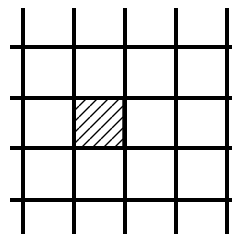
The MTF correction will prevent this image loss by:

		$-\frac{1}{2}$		
$-\frac{1}{8}$	$-\frac{3}{8}$	$3 \times$	$-\frac{3}{8}$	$-\frac{1}{8}$
		$-\frac{1}{2}$		

The value of the target pixel is multiplied by 3. Then, $\frac{3}{8}$ of the values of the pixels to the left and right, $\frac{1}{8}$ of the values of the pixels two steps to the left and right, and $\frac{1}{2}$ of the values of the pixels above and below are subtracted from the new value of the target pixel. (If the result is less than zero, then the pixel datum is set to zero.)

0	0	0	0
0	19.5	1.5	0
0	63	22.7	0
0	0	0	0
0	0	0	0

(e) Image data after
MTF correction



(f) Print after MTF correction

After the MTF correction is applied, the image data of the example is as shown in (e) and (f) above. The small black point is reproduced on the print.

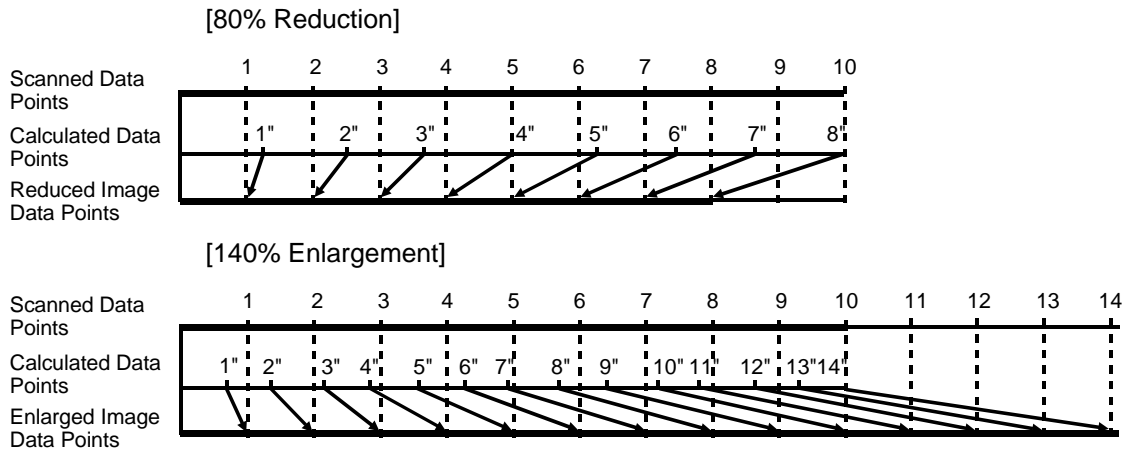
The correction value in the sub-scanning direction can be changed by using SP mode no. 31. The correction values for each setting of SP no. 31 are as follows:

SP31-0: Low	<table><tr><td></td><td></td><td>$-\frac{1}{4}$</td><td></td><td></td></tr><tr><td>$-\frac{1}{8}$</td><td>$-\frac{3}{8}$</td><td>$\frac{21}{2}$</td><td>$-\frac{3}{8}$</td><td>$-\frac{1}{8}$</td></tr><tr><td></td><td></td><td>$-\frac{1}{4}$</td><td></td><td></td></tr></table>			$-\frac{1}{4}$			$-\frac{1}{8}$	$-\frac{3}{8}$	$\frac{21}{2}$	$-\frac{3}{8}$	$-\frac{1}{8}$			$-\frac{1}{4}$		
		$-\frac{1}{4}$														
$-\frac{1}{8}$	$-\frac{3}{8}$	$\frac{21}{2}$	$-\frac{3}{8}$	$-\frac{1}{8}$												
		$-\frac{1}{4}$														
SP31-1: Standard	<table><tr><td></td><td></td><td>$-\frac{1}{2}$</td><td></td><td></td></tr><tr><td>$-\frac{1}{8}$</td><td>$-\frac{3}{8}$</td><td>3</td><td>$-\frac{3}{8}$</td><td>$-\frac{1}{8}$</td></tr><tr><td></td><td></td><td>$-\frac{1}{2}$</td><td></td><td></td></tr></table>			$-\frac{1}{2}$			$-\frac{1}{8}$	$-\frac{3}{8}$	3	$-\frac{3}{8}$	$-\frac{1}{8}$			$-\frac{1}{2}$		
		$-\frac{1}{2}$														
$-\frac{1}{8}$	$-\frac{3}{8}$	3	$-\frac{3}{8}$	$-\frac{1}{8}$												
		$-\frac{1}{2}$														
SP31-2: High	<table><tr><td></td><td></td><td>-1</td><td></td><td></td></tr><tr><td>$-\frac{1}{8}$</td><td>$-\frac{3}{8}$</td><td>4</td><td>$-\frac{3}{8}$</td><td>$-\frac{1}{8}$</td></tr><tr><td></td><td></td><td>-1</td><td></td><td></td></tr></table>			-1			$-\frac{1}{8}$	$-\frac{3}{8}$	4	$-\frac{3}{8}$	$-\frac{1}{8}$			-1		
		-1														
$-\frac{1}{8}$	$-\frac{3}{8}$	4	$-\frac{3}{8}$	$-\frac{1}{8}$												
		-1														
SP31-3: Maximum	<table><tr><td></td><td></td><td>-2</td><td></td><td></td></tr><tr><td>$-\frac{1}{8}$</td><td>$-\frac{3}{8}$</td><td>6</td><td>$-\frac{3}{8}$</td><td>$-\frac{1}{8}$</td></tr><tr><td></td><td></td><td>-2</td><td></td><td></td></tr></table>			-2			$-\frac{1}{8}$	$-\frac{3}{8}$	6	$-\frac{3}{8}$	$-\frac{1}{8}$			-2		
		-2														
$-\frac{1}{8}$	$-\frac{3}{8}$	6	$-\frac{3}{8}$	$-\frac{1}{8}$												
		-2														

The SP mode is normally set at 0 (factory setting). Setting it at 1, 2 or 3 will help to better reproduce low contrast originals.

NOTE: If SP31 is set to a higher level (2 or 3), stains, scratches etc. in the light path will appear on prints more easily.

8.3.3 Main Scan Magnification And Image Shift Processing



[Main Scan Magnification]

Reduction and enlargement in the sub-scanning direction is done by changing the original transport motor speed (see illustration above). Reduction and enlargement in the main scanning direction is handled by the magnification and image shift processing.

Scanning and plotting are done at fixed intervals (CCD and thermal head elements' interval). The image is scanned at the CCD elements' interval. If the master is plotted at the same interval (by the thermal head elements) then the master image will be the same size as the original.

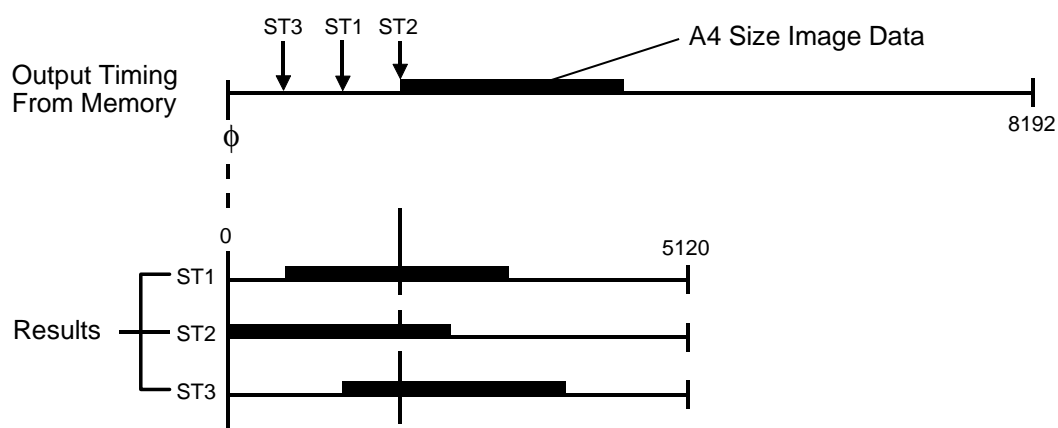
[80 % Reduction]

For example, data for 10 pixel elements in a main scanning line are scanned by the CCD. Those data are compressed into data for 8 pixel elements (data for imaginary points) by the magnification processor. As a result, the image is reduced to 80 %.

[140 % Enlargement]

Data for 10 pixel elements of a main scanning line are expanded into data for 14 pixel elements (data for imaginary points). As a result, the image is enlarged to a 140 % magnification ratio.

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

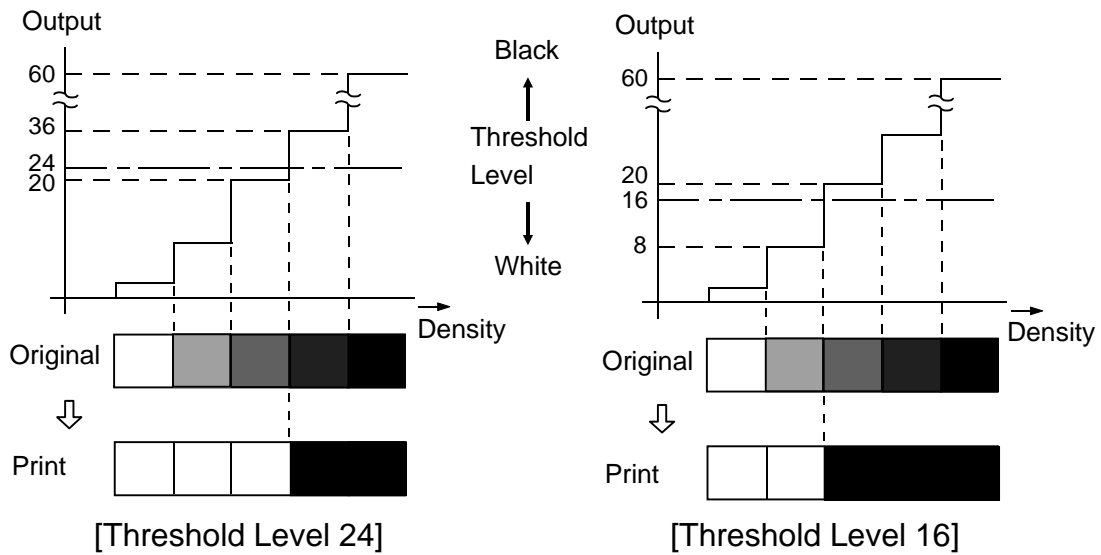


[Image Shift]

The model VT3600 can reposition the image of the original by using the image shifting mode. The image position change in the sub- scanning direction is done by changing the timing of the original scanning or of the master plotting. In the main scanning direction, it is done by the magnification and image shift processor, simultaneously with the magnification process.

Data for one main scanning line is stored in a line memory. This memory has enough room to hold one main scanning line, and has a little extra capacity. When the data is output from memory, the output timing can be adjusted by entering the desired value in the image shifting mode.

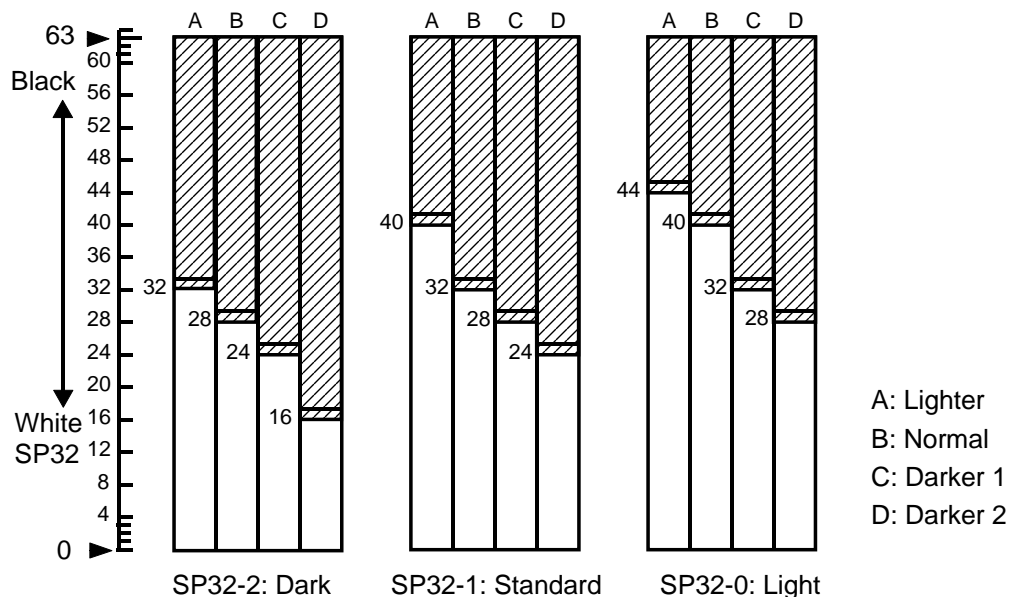
8.3.4 Binary Processing



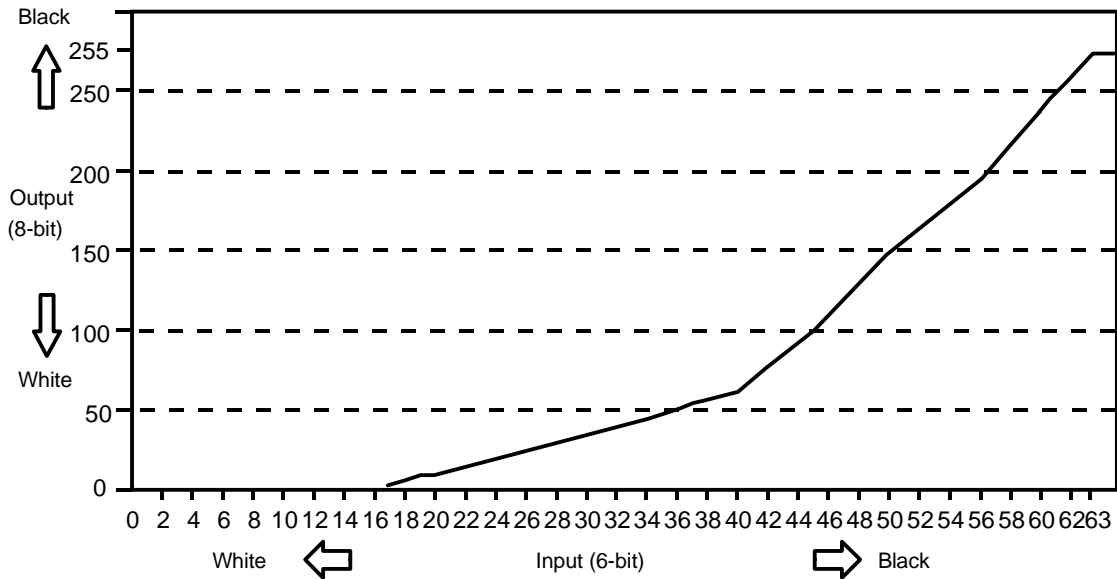
The binary processor converts the 6-bit image data into a single-bit white or black data to send to the thermal head. This processor is used only when in the line mode. (The binary processing for the photo mode is done by the half-tone processor.)

In this process, all pixel image data are compared with a single threshold level. A pixel datum is set to black if it is above the threshold level, or it is set to white if it is equal or below the threshold level. (See the above figure.)

The threshold level varies according to the image density level. The threshold level is selected by the Image Density key (Lighter, Normal, Darker 1, and Darker 2). The image can also be darkened or lightened by SP mode no. 32 as shown below:



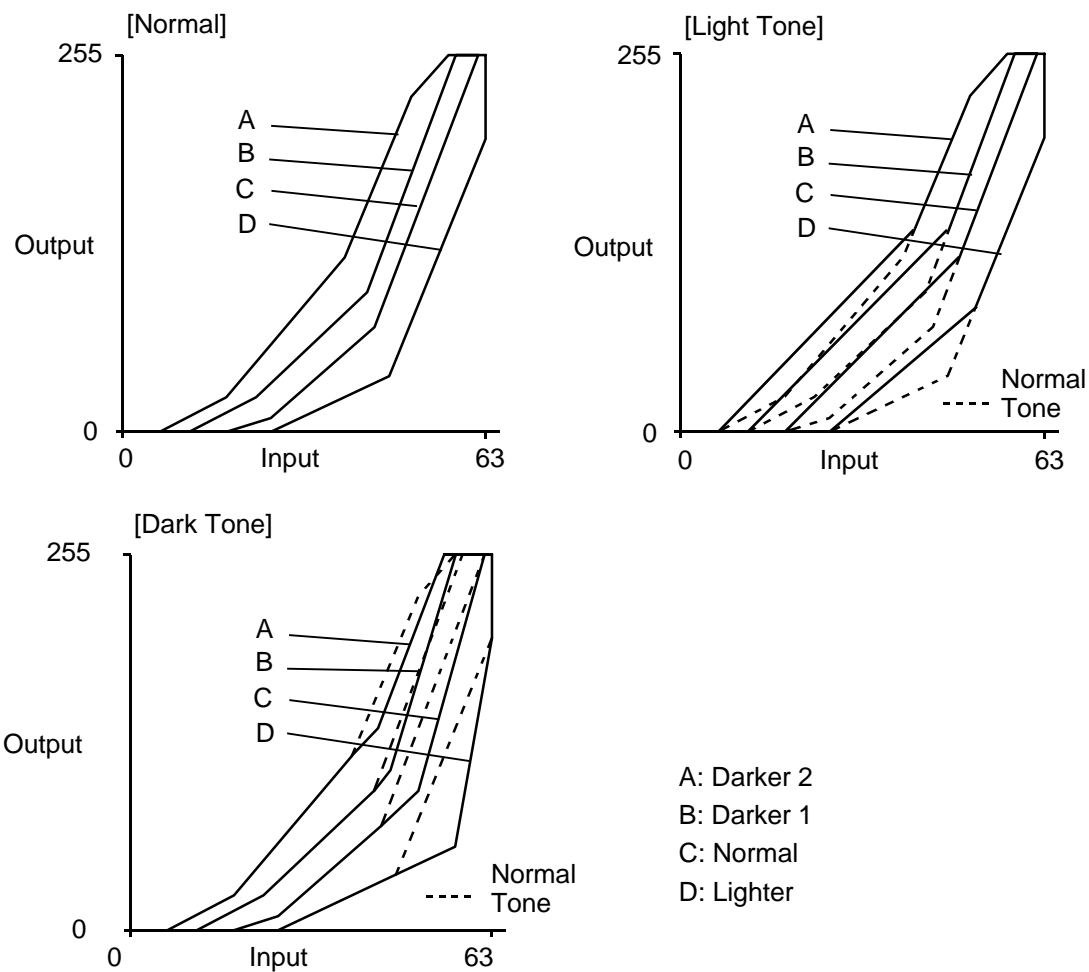
8.3.5 Photo Data Compensation Processing



Detailed
Section
Descriptions

The photo data compensation process is used only when the photo mode is selected.

In this process, 6-bit image data are compensated based on the selected image density. Select density with the Image Density key (Lighter, Normal, Darker 1, or Darker 2). When the photo mode is selected with the make-up mode, the contrast can also be changed by changing the compensation ratio (Normal, Light Tone, or Dark Tone). (The normal contrast setting is also applied for the photo mode without the make-up mode.) The compensated image data is output as an 8-bit signal to obtain more graduation steps. Therefore, this increases resolving power for half-tone images. The above graph shows one of the compensation ratios for input and output.



The compensation ratio varies according to which image density and contrast are selected. For example when Darker 1 key is selected the output value of the image data is increased slightly (i.e. it is slightly higher than the output obtained when Normal density is selected).

When Light Tone key is selected, the 8-bit output concentrates on the light tone part of the image (the low input value). This helps to reproduce the lighter parts of the image and the whole image will darken a bit. On the other hand, when Darker Tone key is selected, the 8-bit output concentrates on the dark tone parts of the image. This helps to reproduce the darker parts of the image and the whole image will lighten a bit.

The above graphs show the compensation ratios for each contrast and image density setting.

8.3.6 Half-tone Processing

In photo mode, the 8-bit image data from the photo data compensation processor are converted into single-bit white or black data in the half-tone processor. This helps to reproduce half-tone images (such as photographs). For half-tone images, this process works better than the binary process.

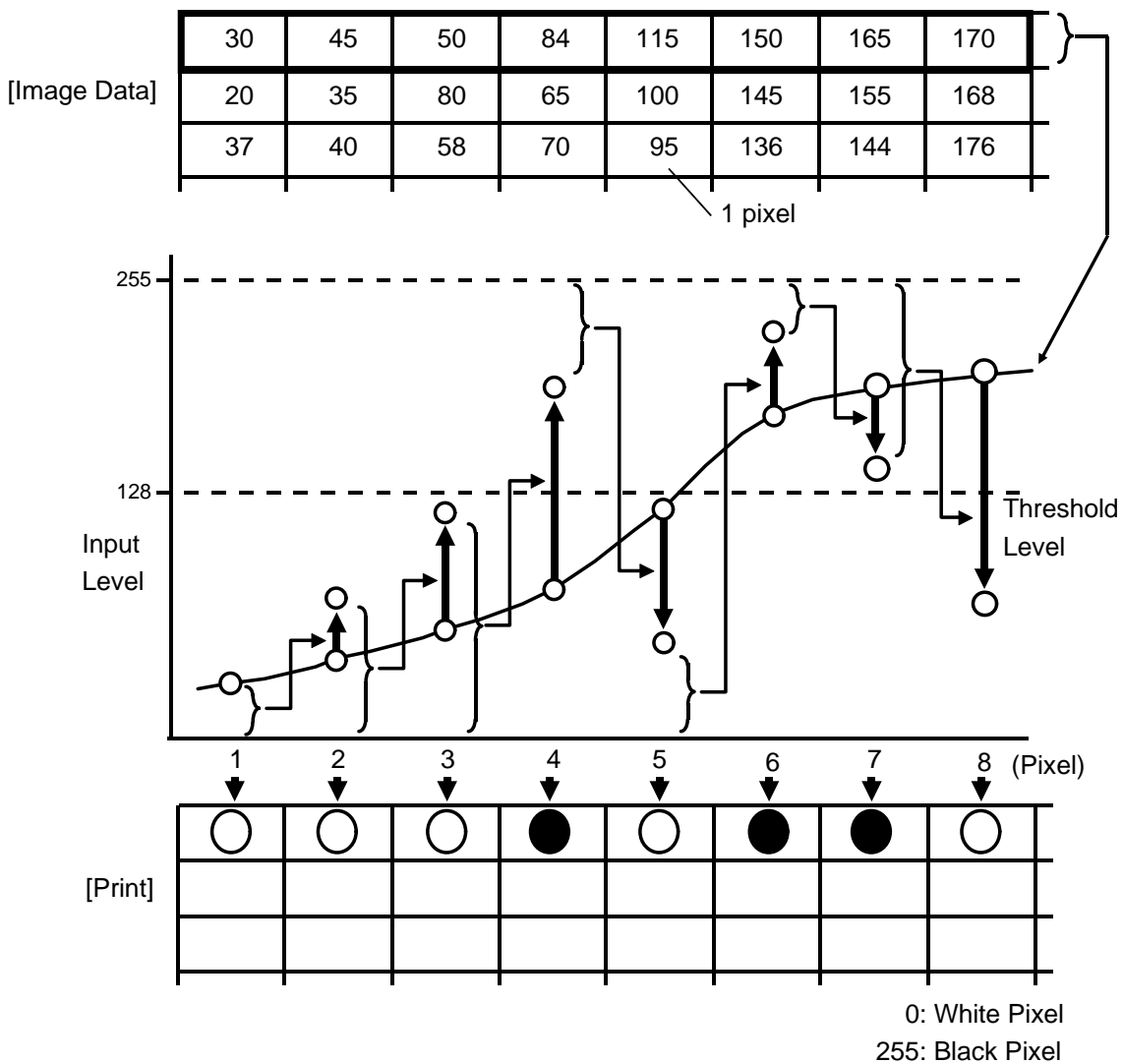
When the photo mode is selected in the make-up mode, three kinds of half-tone processing can be selected by the Screen key (Normal, Fine, and Coarse). The normal level (non-screen) is selected when the photo mode is on and the make-up mode is off.

[CAPIX]

CAPIX (Correlative-density-Assignment of adjacent pixels) is used when the screen mode is not selected (normal level).

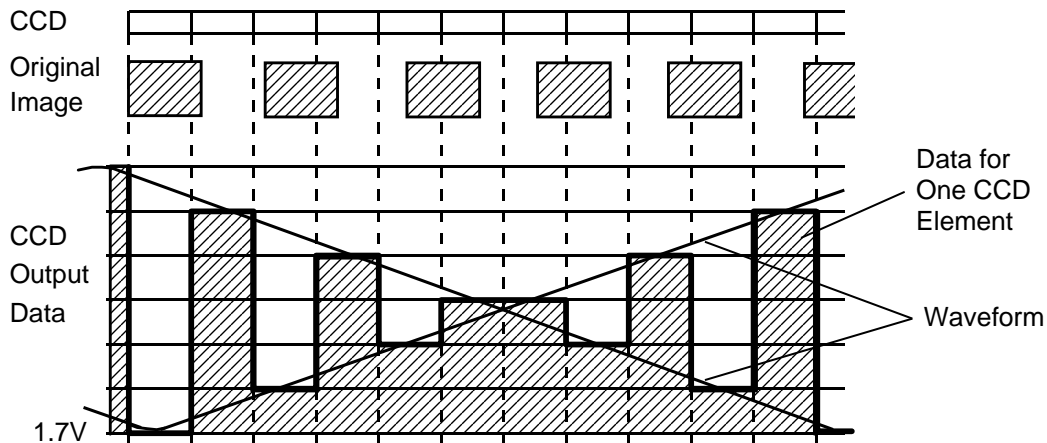
When an image signal is converted into a single-bit (white or black) signal based on a threshold level, a difference is yielded between the image signal value and the complete white value (255 in 8-bit signal) or black value (0). With CAPIX, the difference is distributed to surrounding pixel data and scattered. (The binary process simply erases these differences.)

For example, when considering a one dimensional CAPIX, the image data shown in the figure (next page) produces white and black data as outputs as shown on the next page.



In the VT3600, the errors are distributed in three dimensions. The error is preferentially distributed to darker pixels in higher ratio and to lighter pixels in lower ratio. CAPIX has the following advantages:

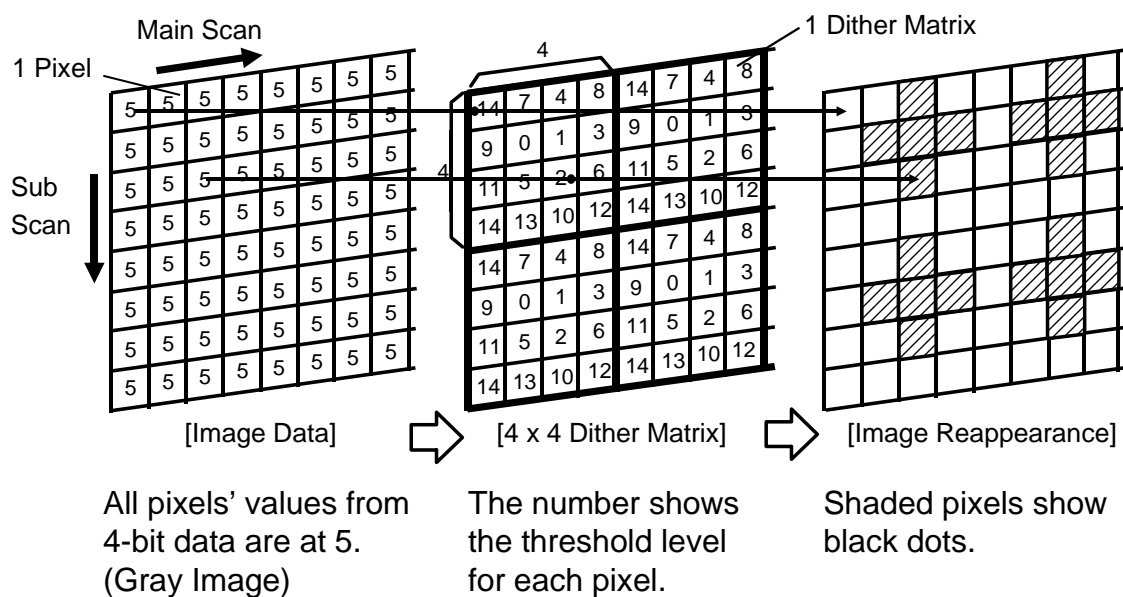
1. Moire patterns are not produced (as in the binary process of the line mode) since the differences of the binary process are scattered.
2. With CAPIX, both half-tone and solid images are well reproduced, but with dithering, solid images do not come out as well. This is because dithering uses more graduation steps than a solid image (such as a simple diagram or a character) will need.
3. Because of CAPIX's high resolving power, the texture pattern does not appear. (With dithering, it does appear.)



[Moiré]

When the CCD scans an image made up of regular lines such as a resolution chart, the output image may have another regular pattern over the regular lines. This is called "moiré".

The above illustration shows one of the moiré mechanism. In this case, the pixel density of the CCD is the same as the density of the regular lines of the original. However, the regular lines are slightly out of step with the CCD pixel elements due to some magnification error when they were scanned. As a result, each CCD pixel has a different value (as shown in the above figure). Since the length of a CCD pixel is very short, the waveform from the CCD output looks like the cross lines in the figure. The moiré pattern appears when prints are made from this signal. The moiré pattern typically appears when the CCD pixel density is a multiple of the regular lines density.



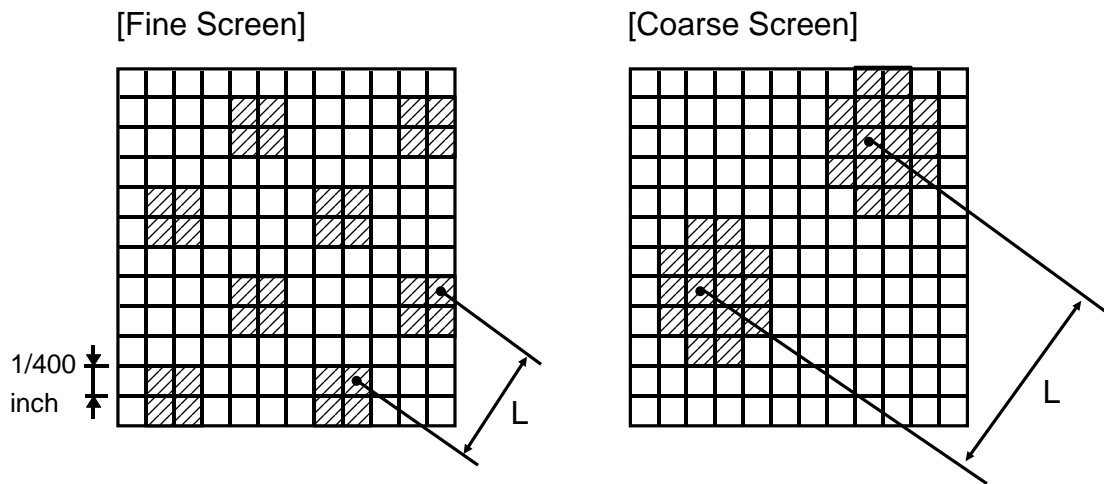
[Dithering]

Dithering is used when the screen mode is selected in make-up photo mode. Two kinds of dither matrices are used for the fine and coarse screen level.

Dithering converts the 8-bit image data into a single-bit white or black data.

A dither matrix contains various threshold levels (V_{thn}) for the locations which correspond to some pixels of an original image. Each pixel datum of the scanned image (E_n) is compared with the corresponding fixed threshold level (V_{thn}) in the dither matrix. Then, each pixel datum is converted to either black or white depending on whether the image data is greater or less than the threshold level. This procedure is repeated for the whole area of the original. The thresholds of the dither matrix are determined so that half-tone graduations are introduced on prints using only black and white pixels. This is done by changing the ratio of black pixels to white pixels.

The figures above show an example of a 4 x 4 (16 pixels) dither matrix and dithering for 4-bit data scanned from an imagined gray image. The result of dithering (image reappearance) shows the pattern of white and black dots, which appears gray to the human eye.



$$L = \frac{1}{400} \times 3 \times \sqrt{2} \text{ inches}$$

(100 Lines/inch)

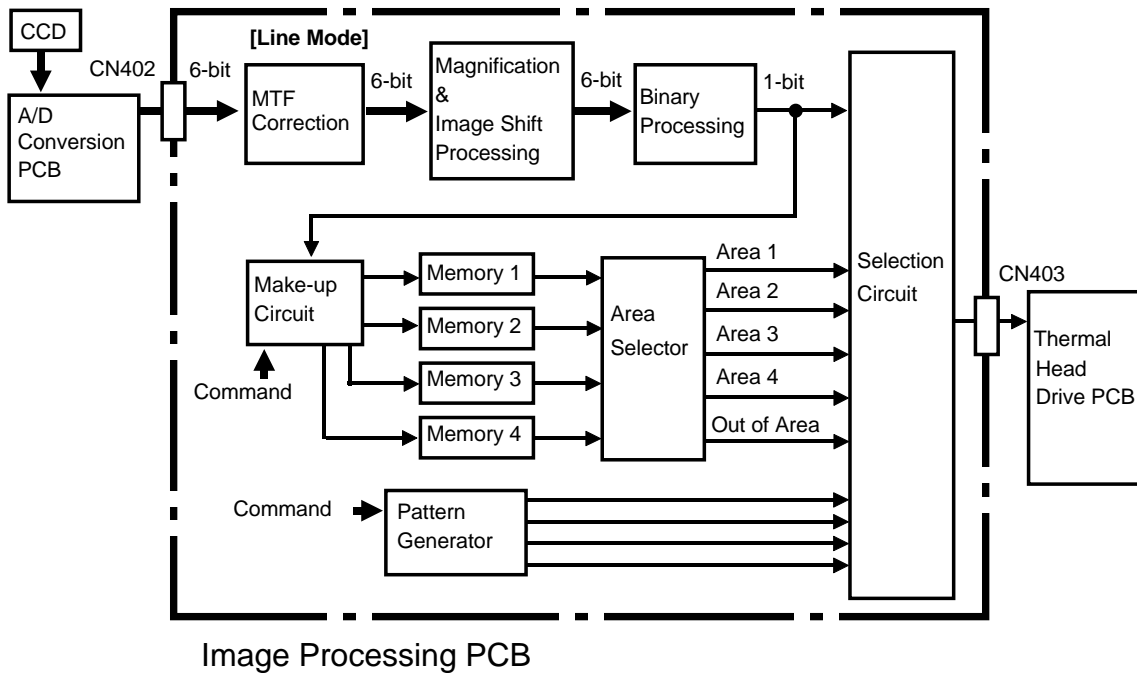
$$L = \frac{1}{400} \times 6 \times \sqrt{2} \text{ inches}$$

(50 Lines/inch)

In this model a 12 x 12 dither matrix is used to convert the 8-bit image data into a single-bit data. There are two kinds of dither matrices to allow for the fine and coarse screen modes.

A uniform gray area of an original is scanned, and the pixel datum is set at 55. It then goes through the dithering process and the results (both for coarse screen and fine screen) are shown above.

9.3.7 Make-up Processing

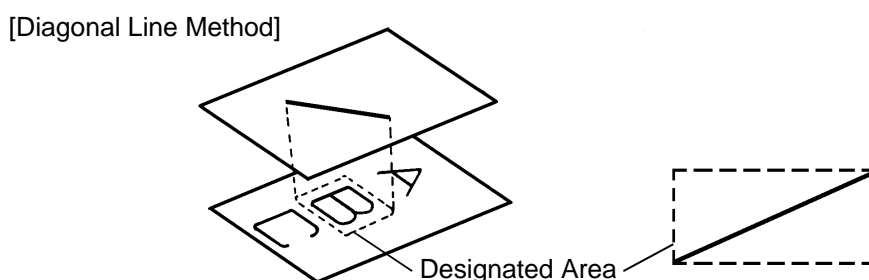
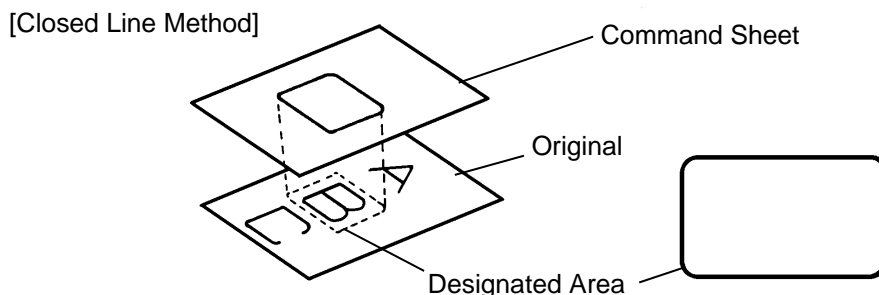


[Overall Operation]

The command sheet is scanned twice as fast as the original. The image data for the command sheet are digitized and converted to a single-bit white or black data. They also go through normal image processing in the line mode. The image data for a command sheet is reduced to 1/80 and stored in the corresponding area memory (Memory 1 to 4).

The command sheets data is picked out of memory through the area selector when image data of an original is sent to the selection circuit. When the areas designated by two or more command sheets overlap, the data from the last command sheet is picked out from the corresponding memory by the area selector.

The image data of the original and command sheet data are combined and edited in the selection circuit. When a pattern mode is selected, the pattern generator sends the selected background pattern(s) to the selection circuit. The image data of the original, the command sheet data, and the pattern data are combined and edited in the selection circuit as ordered.



[Make-up Mode]

A variety of editing functions can be selected in the make-up mode as follows:

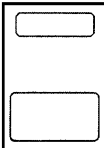








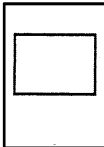


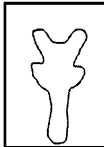


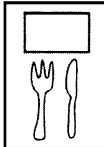

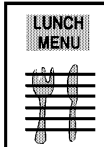
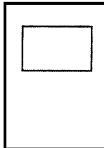


- Step 1** Make command sheet(s) to designate the areas to be edited. The diagonal line method or closed area method can be used for a command sheet to designate areas. Up to four command sheets can be used at a time to designate areas for an original. If designated areas on two or more command sheets overlap, the data from the last command sheet will apply for the overlapped portion.
- Step 2** Select the appropriate command number for the designated areas using the number keys. Only one command can be selected for each command sheet (up to four sheets) from seven modes. (See the following table of modes for designated area.) When two or more command sheets are used, select an appropriate mode for each command sheet.

When a pattern mode is selected, also select an appropriate background pattern using the Number keys. There are 40 patterns from no. 1 to 40. (See the following list of background patterns.) Patterns no. 51 to 90 are the same as patterns no. 1 to 40 but the pattern elements are twice as large. By adding 100 on the pattern numbers of no. 1 to 40 and no. 51 to 90, the patterns rotate 90°. Therefore, there are 180 patterns in all.

- Step 3 Select an appropriate command number for the outside of the designated areas using the number keys. Even if two or more command sheets are used at a time, only one command can be selected for all command sheets from four modes. (See the following table of modes for outside designated area.)
- Step 4 Set the command sheets and original on the scanner or the optional ADF so that the command sheets are scanned prior to the original.

[Modes for Designated Area(s)]

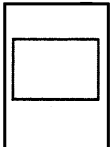


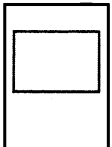


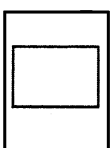


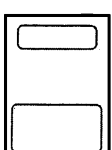
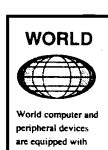
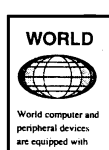
The following commands are for the designated area(s).

MODE		SAMPLE		COMMAND NO.	
Designated Area		Command sheet / Original (closed area method)	Print	Closed area method	Diagonal line method
1.	Line mode	 	→ 	Fn 1	Fn 11
2.	Outline mode	 	→ 	Fn 2	Fn 12
3.	Delete mode	 	→ 	Fn 3	Fn 13
4.	Photo mode	 	→ 	Fn 4	Fn 14
5.	Image pattern mode	 	→ 	Fn 5	Fn 15
6.	Area pattern mode	 	→ 	Fn 6	Fn 16
7.	Image outline & Area pattern mode	 	→ 	Fn 7	Fn 17

Detailed
Section
Descriptions

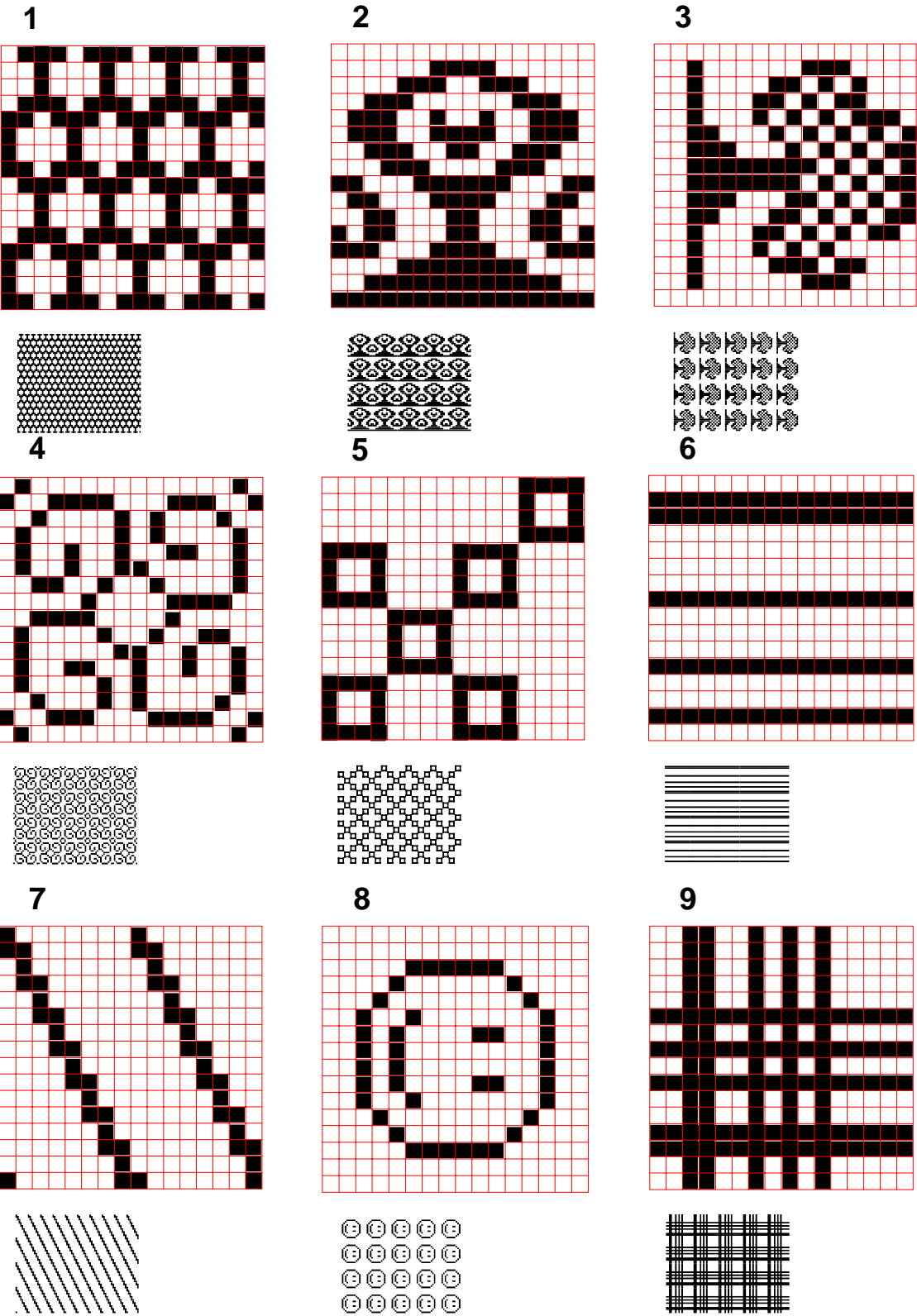
[Modes for Outside Designated Area(s)]

The following commands are for the area outside the designated area(s).

MODE		SAMPLE		COMMAND NO.
Undesignated Area		Command sheet / Original	Print	
1.	Line mode	 		Fn 1
2.	Outline mode	 		Fn 2
3.	Delete mode	 		Fn 3
4.	Photo mode	 		Fn 4

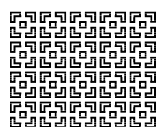
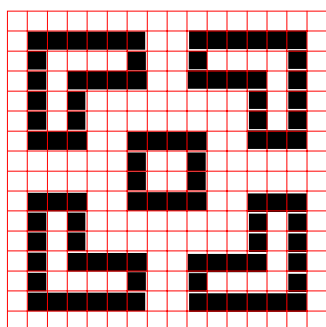
[Background Patterns]

The 40 background patterns shown below can be selected.

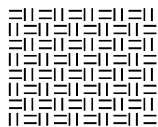
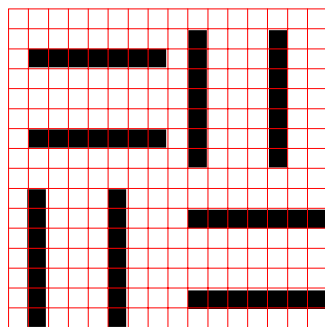


Detailed
Section
Descriptions

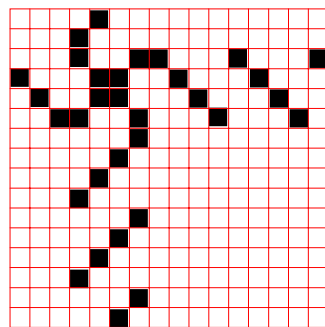
10



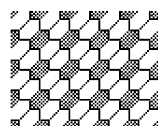
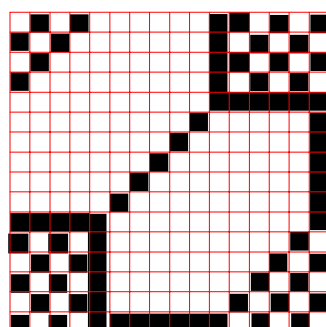
11



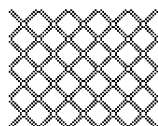
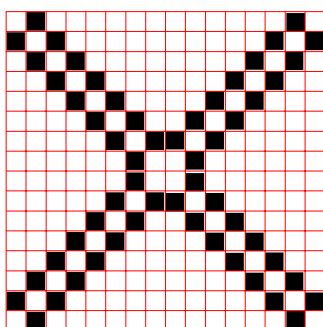
12



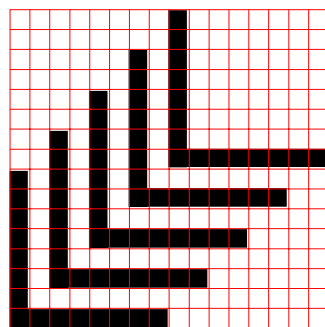
13



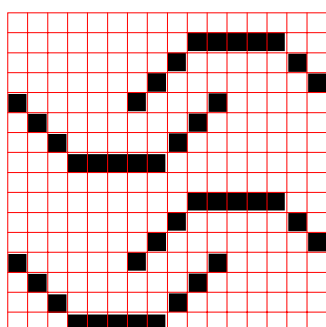
14



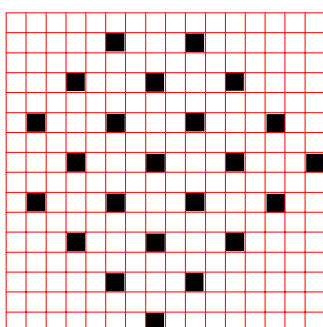
15



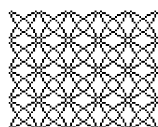
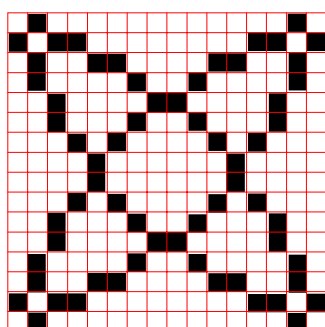
16



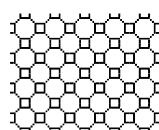
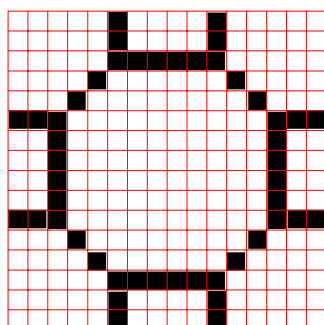
17



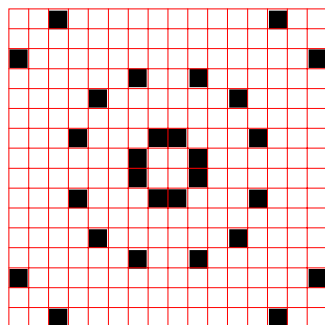
18



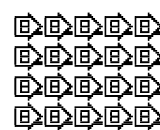
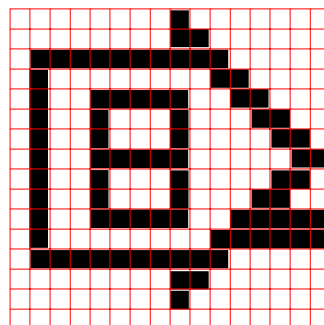
19



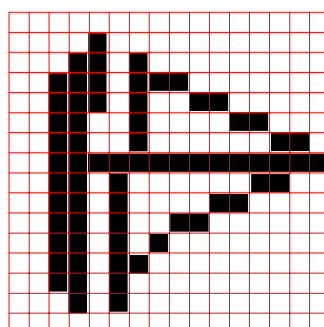
20



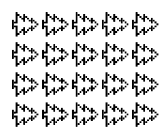
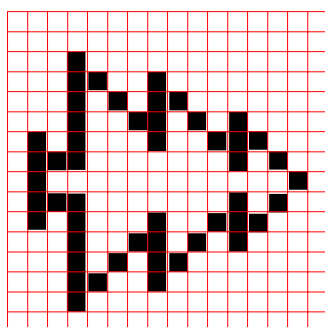
21



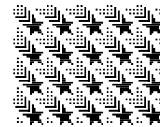
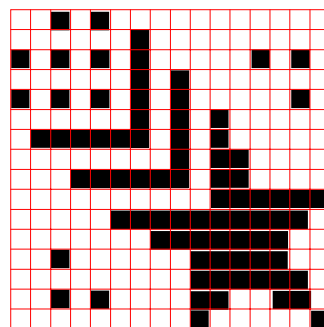
22



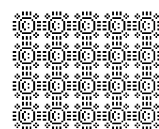
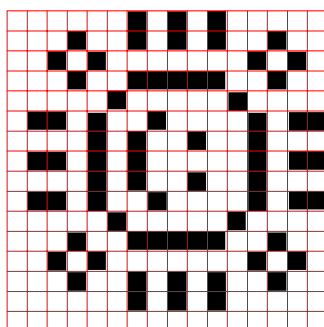
23



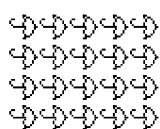
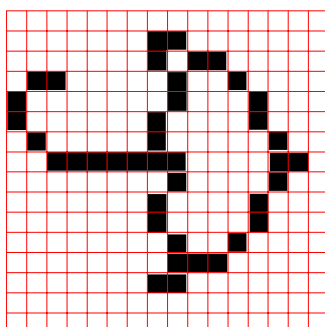
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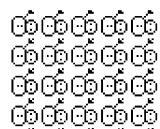
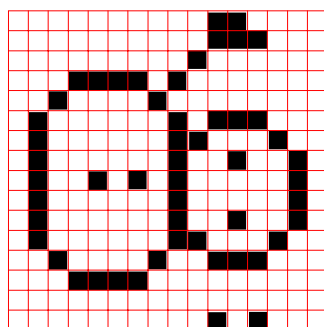
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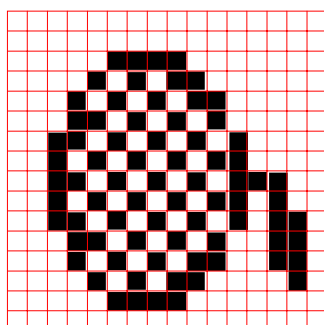
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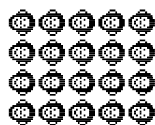
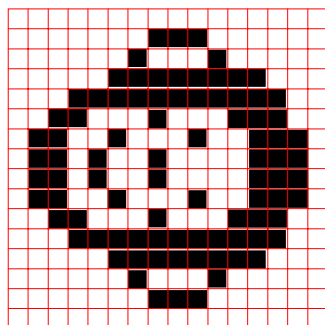
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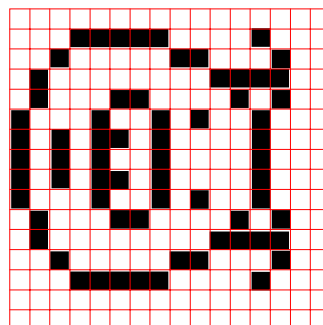
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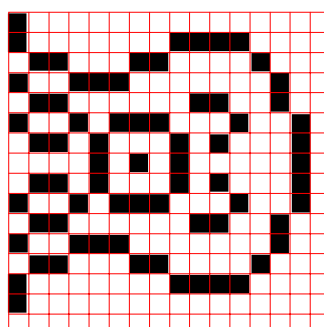
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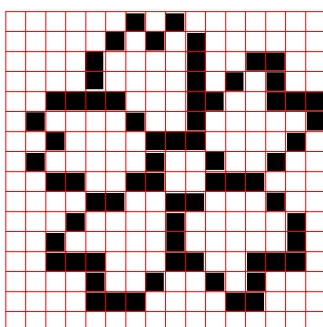
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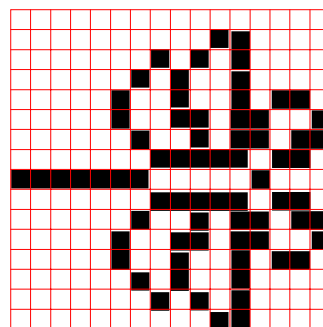
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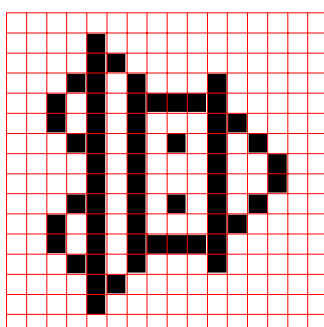
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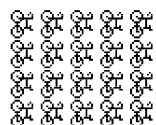
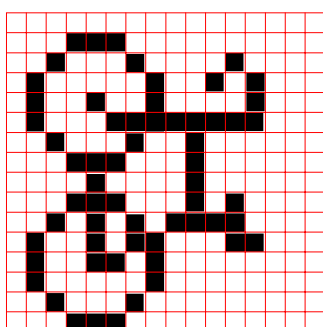
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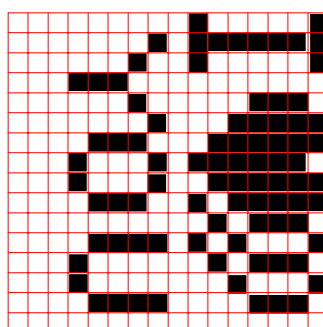
34



35

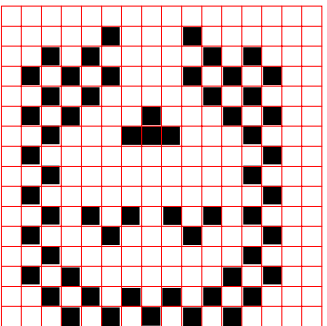


36

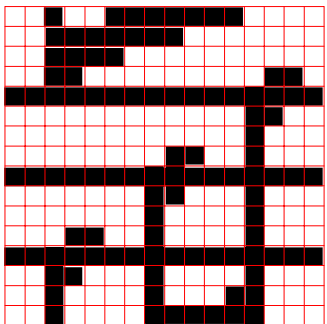


Detailed
Section
Descriptions

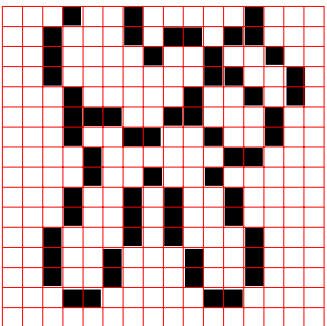
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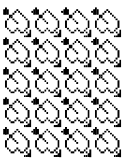
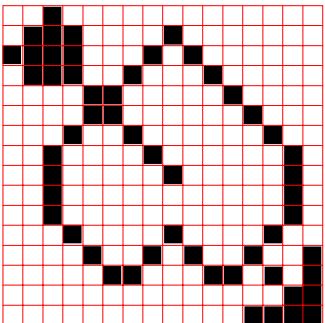
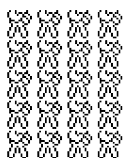
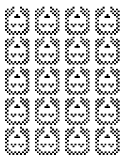
38



39

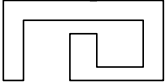
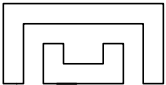

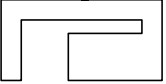


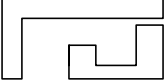
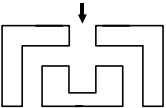
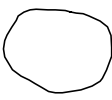
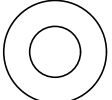
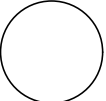

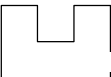
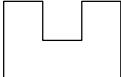


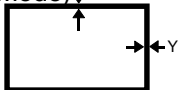
40

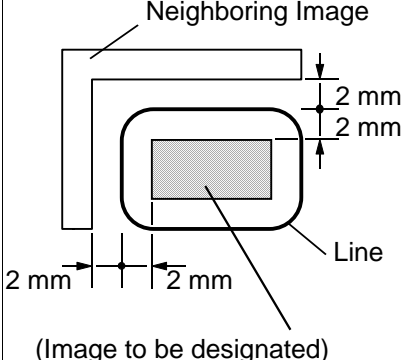


[Recognition of Designated Area]

How you enter the designated area will affect the final result, therefore refer to the following table when you make the command sheet.

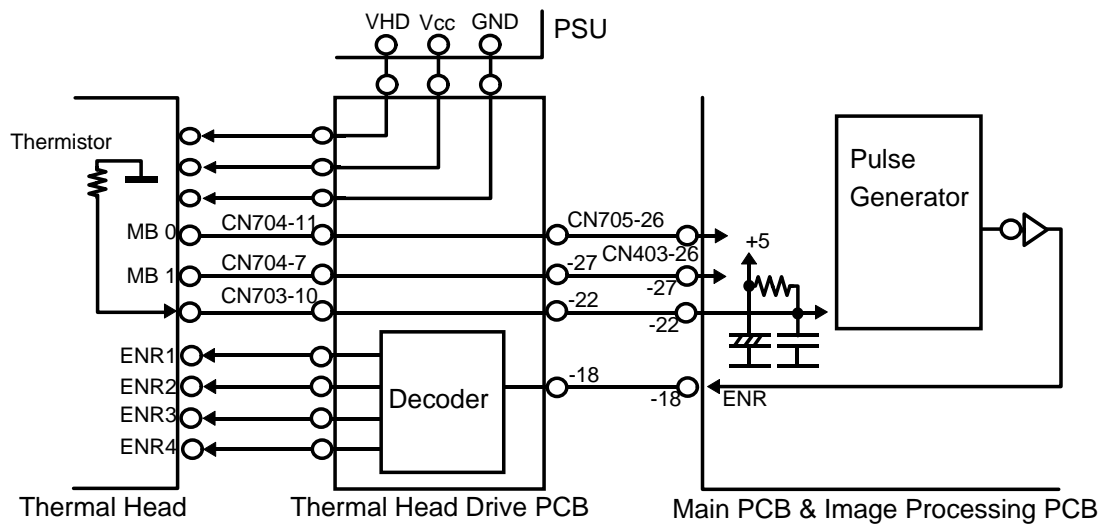
No.	Item	Typical Problems		Preferred designated area
		Designated area	Area recognized	
1	Form of the designated area	Serial pattern   	The designated area is recognized as follows:   	Separation the area to be designated as follows:  Make a space more than 2 mm.  Make a space more than 2 mm.  Designate area by a closed line.
		Double circle pattern. 	Only the outer circle will be recognized as follows: 	1) Make a gap in the pattern.  2) Use one command sheet for the one circle pattern. The smaller circle must be read as the designated area after the larger circle is read.
2	Non-closed line	The designated area is not a closed loop. 	The designated area is not recognized.	Designate the area by a closed loop. 

No.	Item	Typical Problems		Preferred designated area
		Designated area	Area recognized	
3	Thickness of the designating line.	<p>The thickness of the line as follows:</p> $X \leq 1 \text{ mm}$ $Y \leq 0.6 \text{ mm}$ <p>(In Full Size Mode)</p> 	As the line of the designated area is too thin, no designated area is recognized.	Mark with a line more than 1 mm in width. (More than 2 mm in 50% reduction mode.)
4	Density of the designated line.	When using a pencil or a color pen. (The line has low image density.)	As the designating line is too light, no designated area is recognized.	Mark using a black pen.
5	Type of command sheet.	<p>1) Rough paper is used as a command sheet.</p> <p>2) If the command sheet has a different friction coefficient from the original.</p>	<p>1) Any fibrous black spots will be read as a designated area.</p> <p>2) Due to different registration of the original and the command sheet, the designated areas will be different from the imagined positions.</p>	<p>1) Use white paper (65 g/m²).</p> <p>2) Use the same paper as the original.</p>

No.	Item	Typical Problems		Preferred designated area
		Designated area	Area recognized	
6	Gap between the designated area and neighboring image, or gap between two designated areas.	When the gap between the designated area and neighboring image is too small.	Depending on the original feed condition (registration and skewing) or handwriting ability the designated area, the neighboring image may or may not be recognized as a designated area.	 <p>(Image to be designated)</p> <p>1) There should be more than 2 mm clearance between the line and image.</p> <p>2) Mark the line away from the image in the designated area move than 2 mm to recognized the image completely.</p> <p>3) For consideration of the handwriting ability, approximately 5 mm is needed between the neighboring image and image to be designated as a clearance.</p>

9.4 PLOTTER

9.4.1 Overview

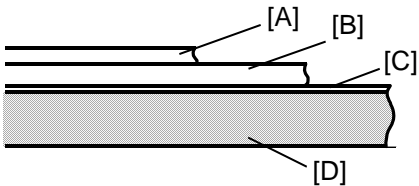


Detailed
Section
Descriptions

A thin-film type thermal heating element is used by the thermal head. The thermal heating elements will melt the over-coating and polyester film layers of the master according to the image signals for each pixel. The specifications are as follows:

Maximum Plotting Width:	292.6 mm
Number of Thermal Heating Elements:	4608 pieces
Density of Thermal Heating Elements:	400 dots/inch
Size of Thermal Heating Element:	45 x 60 μm
Average Resistance of Thermal Heating Elements:	1520 to 2300 Ω
Power Source:	15.1 to 18.6 V

[Section Plan for Master]



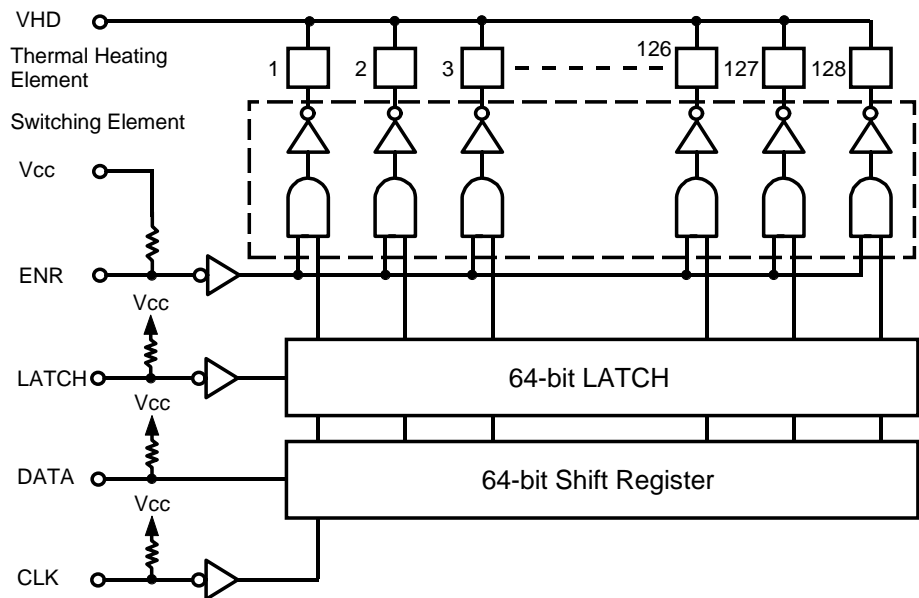
- [A]: Over-coating
- [B]: Polyester film
- [C]: Adhesive
- [D]: Base paper

The power source (VHD) is applied to the thermal heating elements through the thermal head drive PCB. The power source (VHD) varies from one head to another since the average resistance (AVR) of the elements varies. Therefore, when the thermal head or power supply unit is replaced, it is necessary to readjust the applied voltage with the particular value indicated on each thermal head.

NOTE: $VHD = (0.15 \times AVR)^{0.5}$

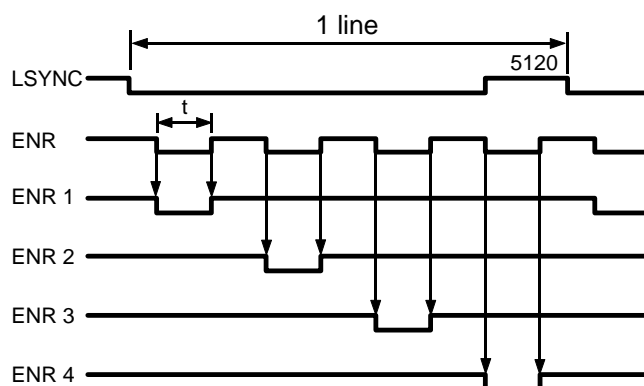
The thermal head will send the identification signal to the main PCB by using a combination of High and Low signals of MB 0 and MB 1.

9.4.2 Thermal Head Description



VHD:	Power source
Vcc:	Power source for ICs
ENR 1 to 4:	Signal for supplying VHD to each elements block
LATCH 1 to 4:	Signal to pick out data from the shift register for each elements block of the elements
DATA 1 to 4:	White/black pixel data for each elements block
CLK:	Clock pulse from the image processing PCB

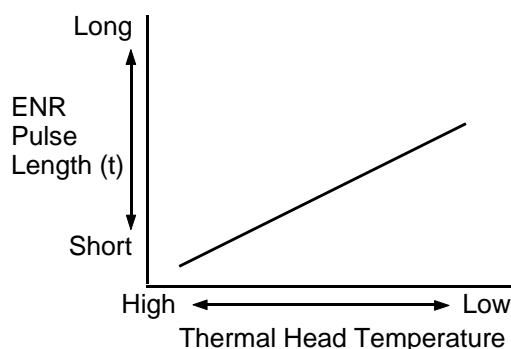
The thermal head consists of 72 sets of circuits as shown in the figure. The 72 sets are divided into four blocks which are separately driven. Each thermal heating element is directly activated by its corresponding switching element.



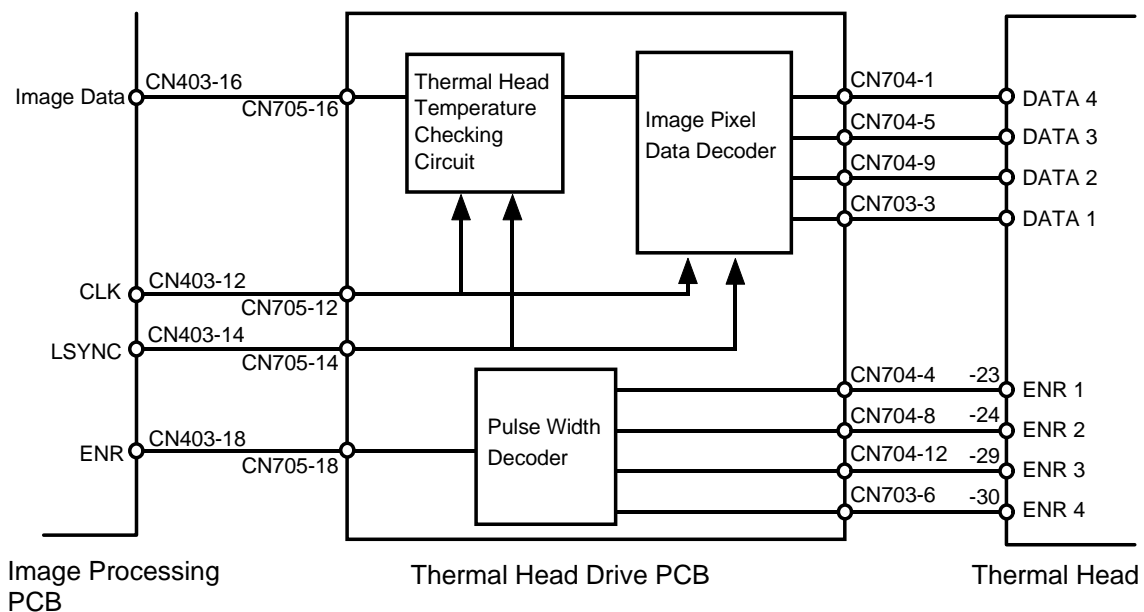
The power source (VHD) is supplied to the thermal head when the plotting signal turns on. When the plotting signal turns off, a relay (RA701) on the thermal head drive PCB will cut the power line.

The energy applied to the thermal heating elements is determined by the length of the time (t) that power is applied. This time, in turn is controlled by the pulse (ENR) length which is generated on the main PCB. The pulse signal (ENR) is sent to the thermal head drive PCB through the image processing PCB. The pulse signal is split into four pulse signals (ENR 1 to 4) in the thermal head drive PCB. Then, they are separately applied to the four blocks (1152 elements each) of the thermal head.

The thermistor on the thermal head detects the thermal head temperature. The detected temperature is sent to the pulse generator in the main PCB, and the pulse generator controls the length of the pulse (ENR) based on the temperature. (See graph.)



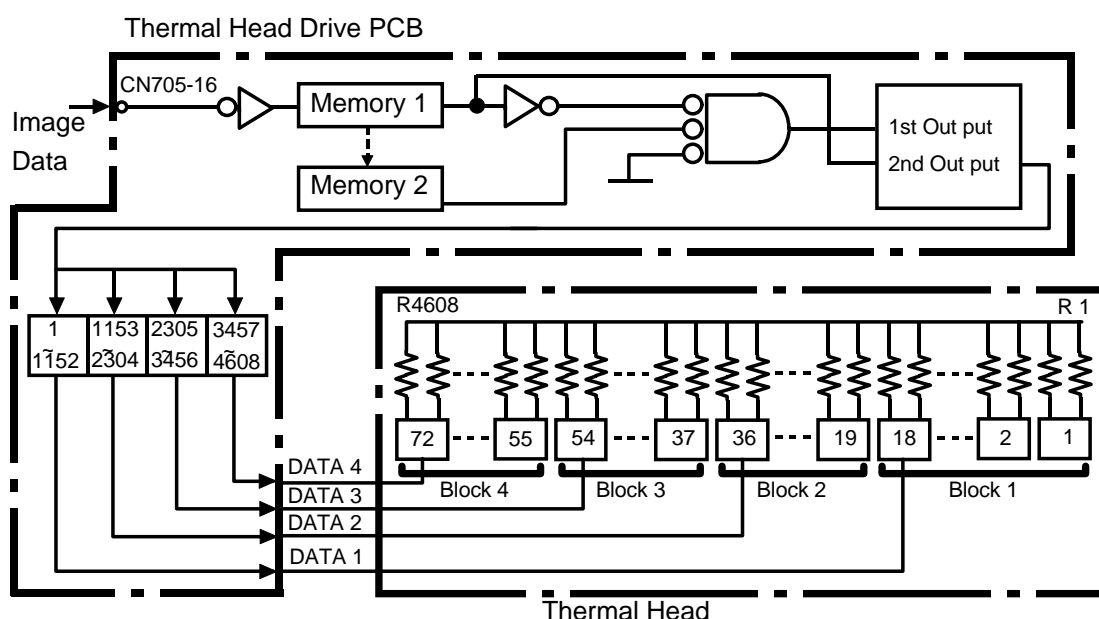
9.4.3 Thermal Head Drive



A thermal heating element may get too hot when there are consecutive black pixel data in the sub-scanning direction. Conversely, a thermal heating element may not get hot enough to plot on a master when there are consecutive white pixel data in the sub-scanning direction.

To remedy this, each thermal element receives data twice for one plotting:

1. Data for the line previous is monitored by the thermal head temperature checking circuit. Then, based on the datum obtained, the opposite datum is sent to the thermal heating element. This will either heat or cool the element (as required).
2. The actual plotting data is sent to the element to plot the pixel onto the master.



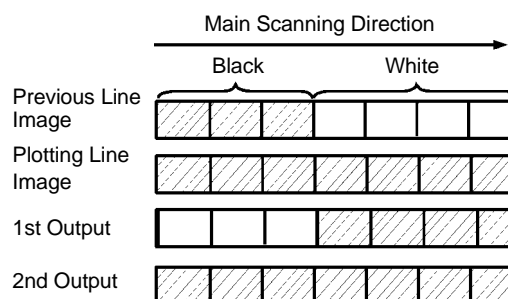
For example, if all of one line data are black, the first and second outputs are as follows:

[Previous Line's Pixel is White]

A black datum is sent to the corresponding thermal heating element as the first output. The applied energy to plot the pixel increases.

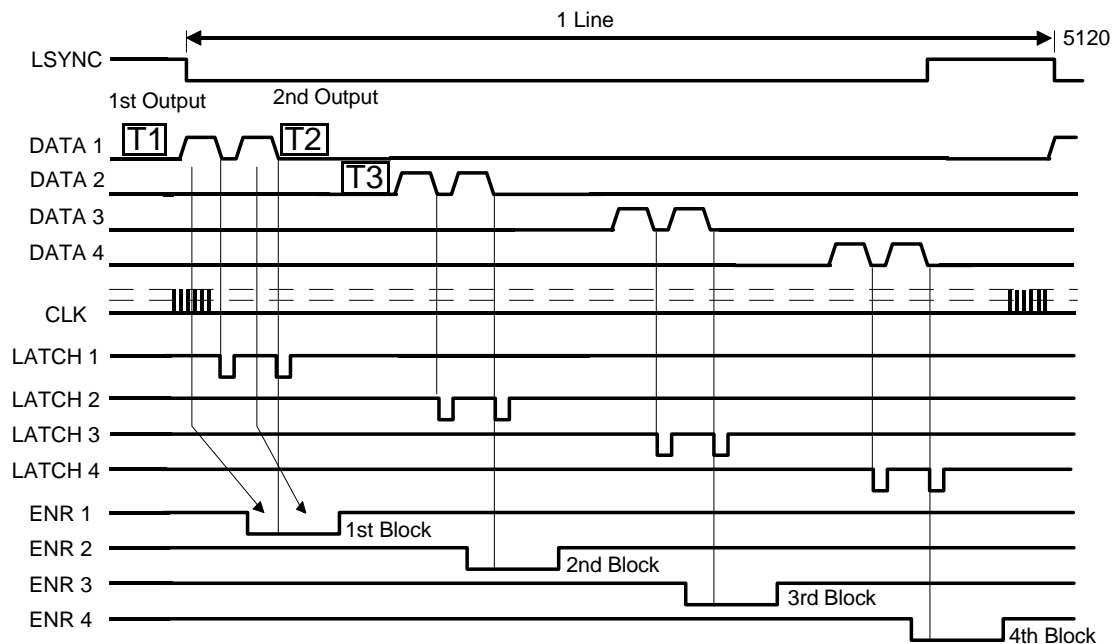
[Previous Line's Pixel is Black]

A white datum is sent as the first output. The applied energy to plot the pixel decreases.



The line data sent to the thermal head drive PCB is stored in a line memory (Memory 1). When the image data of the following scanning line is sent and stored in the line memory, the previous line data will move to another memory (Memory 2). The line data and previous line data are compared, and the pre-heat and/or cool data for each thermal heating element is serially sent to the thermal head as the first output. The line data to plot the master is picked out from the line memory (Memory 1) and is sent following the first output.

The outputs are divided into four (DATA 1 to 4) in the image pixel data decoder and are sent separately to the four blocks of the thermal head.



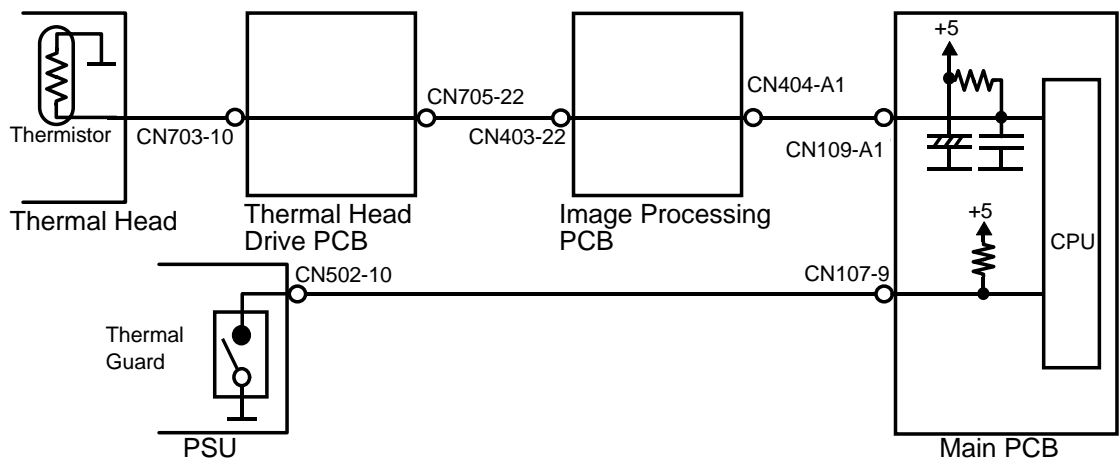
[Timing Chart]

T1: When the first output data (the first half of DATA 1) for the first one block (1152 pixels data) have been stored in the shift register, the latch signal (LATCH 1) is activated. Then, the switching elements for each thermal heating element are activated according to the first output data. If the datum for a pixel is black, the first part of the energy will be applied to the corresponding thermal heating element. The total energy (ENR 1, 2, 3, or 4) for one pixel plotting is fixed based on the thermal head temperature. The DATA, LATCH, and ENR signals are triggered by the rising edge of the clock pulse (CLK).

T2: When the second output data (the last half of DATA 1) for the first one block (1152 pixels data) have been stored in the shift register, the latch signal (LATCH 1) is again activated. If a pixel datum in the second output is black, the second part of the energy will be applied to the corresponding thermal heating element. One line for the first block is then completely plotted.

T3: The second, third, and fourth lines are plotted immediately after the first, with no interruption.

9.4.4 Thermal Head Protection



Detailed
Section
Descriptions

A thermistor on the thermal head and a thermal guard (a thermostat) on the power supply unit are used for thermal head protection. This will prevent the thermal head and power supply unit from overheating when continuously processing a solid image. The CPU will detect the abnormal condition and will light the SC code on the operation panel as follows:

Detecting Component	Detecting Temperature	Signal Level	SC Code
Thermistor	54°C	1.17 V CN109-A1	E-04
Thermistor	Under 54°C	Over 1.17 V	Recovery
Thermal Guard	85°C	0 V CN107-9	E-08
Thermal Guard	Under 85°C	5 V	Recovery

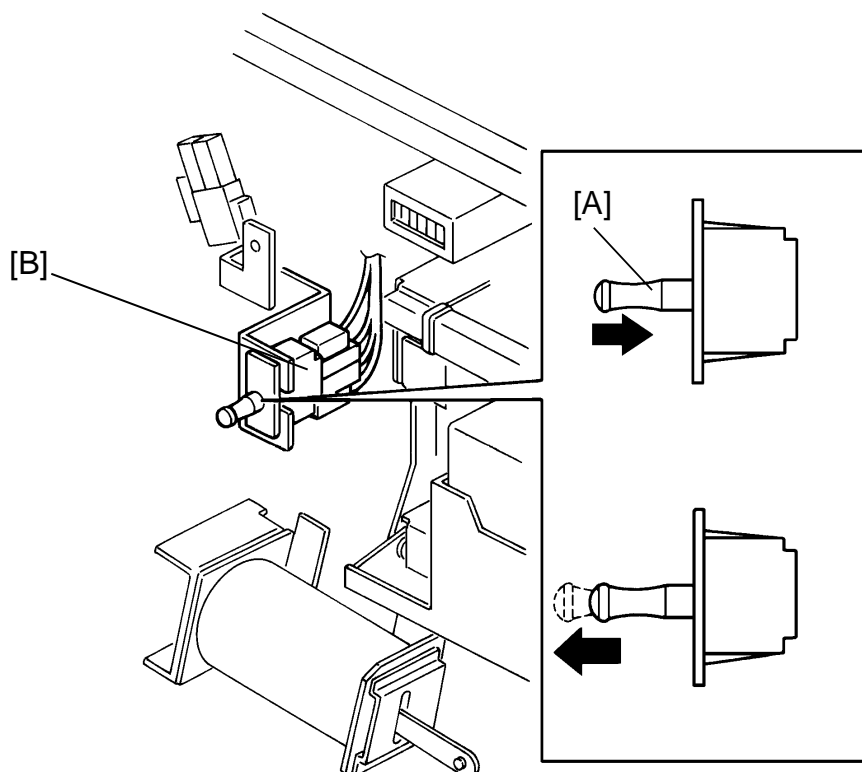
The CPU will also light the SC code in the following conditions:

Conditions	Possible Cause	SC Code
The signal level between CN109-A1 and GND is over 4.9 volts.	1) Thermistor open. 2) Related connectors are not connected. (See the above figure.)	E-09

Conditions	Possible Cause	SC Code
The CPU detects an abnormal condition in the pulse from the thermal head drive PCB (ENR 1 to 4). This pulse determines the energy applied to the thermal heating elements.	<ol style="list-style-type: none"> 1) Defective thermal head drive PCB or image processing PCB. 2) Disconnection of the related connector. (Main PCB CN109-A7, image processing PCB CN404-b7/CN403-20, or thermal head drive PCB CN705-20) 3) No power for ICs (Vcc) from power supply unit to image processing PCB. (Disconnection of image processing PCB CN701-7/14, or power supply unit CN503-12/13.) 	E-10

10. OTHERS

10.1 INTERLOCK SWITCH



Pull out the actuator [A] of the interlock switch [B] located inside of the inner cover to disable the front door, paper table, master eject unit, and scanner unit safety switches. The interlock switch remains activated as long as the actuator is pulled out.

- NOTE:**
1. The ADF safety switch can be disabled by using SP mode No. 146. Ensure to return the SP mode back to its original setting after disabling the safety switch.
 2. The cover open indicator can be canceled by turning on the DIP switch 101 on the main PCB. When this switch is turned on, the Print Start and Master Making keys will be accepted. However, this will light the SC code E-02 or E-06 if the interlock switch is not activated and a safety switch is turned off (e.g. the front door safety switch). This is because the power line of the paper table drive and main motors remain cut. The DIP switch is for factory use only.

10.2 MONITOR INDICATION

10.2.1 Cover Open Indicator

Condition	Guidance Display Message
The drum has not been inserted all the way into the machine.	SET THE DRUM COMPLETELY
Front door is open, master eject unit is open, or original table (scanner unit) is open.	CLOSE THE COVER
Paper table is closed, or paper delivery table is closed.	OPEN THE PAPER FEED/DELIVERY TABLE
ADF cover is open.	CLOSE THE ADF COVER

NOTE:

1. The above guidance messages are not displayed in the following modes:
 - Make-up mode
 - User program mode
 - Image shifting mode
 - Directional magnification mode
2. The cover open indicator turns off when a cover is closed, and the paper table and paper delivery table are opened.

10.2.2 Key Counter Indicator:

Condition	Guidance Display Message
Key counter is not set (SP mode data of address 3 is 1)	SET THE KEY COUNTER

NOTE:

1. If the key counter is taken out during master making, the key counter indicator does not turn on until master making is completed.
2. If the key counter is taken out while prints are being made, paper feeding will stop, the above message is displayed, and the key counter indicator will turn on.
3. The above message is not displayed in the following cases:
 - The machine is in make-up mode, user program mode, image shifting mode, or directional magnification mode.
 - Cover open indicator is on.
 - Machine is in operation.
4. Key counter indicator will turn off when the key counter is inserted.

10.2.3 Master Eject Box Indicator

Condition	Guidance Display Message
The master eject box is not set.	SET THE MASTER EJECT BOX
The master eject box is full. (When the pressure plate is lowered, the full master detection sensor does not turn on.)	EMPTY MASTER EJECT BOX

NOTE:

1. The Master Eject Box indicator does not turn on during machine operation.
2. When this indicator is turned on, masters cannot be made, but prints can be made.
3. The above message is not displayed in the following cases:
 - The machine is in make-up mode, user program mode, image shifting mode, or directional magnification mode.
 - Cover open indicator is on.
 - Machine is in operation.
4. The master eject box indicator will turn off when the master eject box is set or the Reset key is pressed after the master eject box is removed.

10.2.4 Ink Supply Indicator

Condition	Guidance Display Message
During the printing process, the ink detecting pin does not detect ink on the ink roller for 20 drum rotations.	LOAD NEW INK CARTRIDGE

NOTE:

1. In the following cases the above message is not displayed:
 - Cover open indicator ON
 - Key counter indicator ON
 - Master box indicator ON
 - Machine is in operation
2. When the Reset key is pressed after the ink supply indicator turns on, the drum will rotate 20 rotations. When ink is detected during drum rotation, the drum will stop rotating and the ink supply indicator is turned off.

10.2.5 Master Supply Indicator

Condition	Guidance Display Message
Master paper is running out, or the master roll is not set.	LOAD NEW MASTER ROLL

NOTE:

1. When this indicator is turned on, a new master cannot be made but prints can be made.
2. When the machine is in operation, the indicator does not turn on.
3. In the following cases, the above guidance message is not displayed:
 - The machine is in make-up mode, user program mode, image shifting mode or directional magnification mode.
 - Cover open indicator, master eject box indicator, key counter indicator or ink supply indicator turns on.
4. When the master roll is set, the indicator will turn off.

10.2.6 Paper Supply Indicator

Condition	Guidance Display Message
Paper is not on the paper table.	LOAD MORE PAPER

NOTE:

1. In the following cases, the above guidance is not displayed:
 - The machine is in make-up mode, user program mode, image shifting mode or directional magnification mode.
 - Cover open indicator, master eject box indicator, key counter indicator, ink supply indicator or master supply indicator is on.
 - Machine is in operation.
2. The paper supply indicator will turn off when paper is placed on the paper table.

10.2.7 Master Eject Error Message F +

Condition	Guidance Display Message
Master is not ejected.	MASTER EJECT JAM REMOVE JAMMED MASTER
The master eject sensor is ON when the main SW is turned on.	

NOTE:

When the Reset key is pressed, if the master eject sensor is OFF, the jam indicator will turn off.

10.2.8 Paper Misfeed Message B +

Condition	Guidance Display Message
Paper does not reach the paper detecting feeler. (The printing pressure sensor is not activated.)	PAPER FEED JAM REMOVE JAMMED PAPER

NOTE:

When the Reset key is pressed, if the 1st and 2nd paper exit sensors are OFF, jam indicator will turn off.

10.2.9 Paper Delivery Error Message G +

Condition	Guidance Display Message
Paper does not exit to the delivery table.	DELIVERY JAM REMOVE JAMMED PAPER
1st and/or 2nd paper exit sensor is ON when the main SW is turned on.	

NOTE:

When the Reset key is pressed, if the 1st and 2nd paper exit sensors are OFF, the jam indicator will turn off.

10.2.10 Paper Wrap Message 1 B + E +

Condition	Guidance Display Message
1st paper exit sensor does not turn ON after printing pressure sensor turns on.	PAPER WRAP JAM REMOVE JAMMED PAPER
Printing pressure sensor is on (printing pressure is applied) when the main SW is turned on.	

NOTE:

When the Reset key is pressed, if both the printing pressure sensor and the 1st Paper Exit sensors are OFF, the jam indicator will turn off.

10.2.11 Paper Wrap Message 2 E +

Condition	Guidance Display Message
2nd paper exit sensor does not turn on after the 1st paper exit sensor turns on.	PAPER WRAP JAM REMOVE JAMMED PAPER

NOTE:

When the Reset key is pressed, if both printing pressure sensor and 1st paper exit sensors are OFF, jam indicator will turn off.

10.2.12 Master Clamp Error Message C +

Condition	Guidance Display Message
When the main SW is turned on, master buckle sensor is ON.	MASTER FEED JAM REMOVE JAMMED MASTER
Master clasper fails to clamp the master.	
During master making process, cover is opened or Stop key is pressed before master is clamped.	

NOTE:

When the Reset key is pressed, if the master buckle sensor is OFF, the jam indicator will turn off.

10.2.13 Original Misfeed Indication **A +**

Condition	Guidance Display Message
When the main SW is turned on, the 2nd original sensor or original registration sensor is ON.	ORIGINAL JAM REMOVE ORIGINAL
The original is not fed.	
During the master making process, cover is opened or Stop key is pressed while original is being fed.	
The ADF cover is opened when the original is set in SADP mode. (The 2nd original sensor is ON.)	

Detailed
Section
Descriptions

NOTE:

When the Reset key is pressed, if the 1st or 2nd original sensor is OFF, the jam indicator will turn off.

10.2.14 Other Guidance Displays

Condition	Guidance Display Message
When more than one command sheet is used in make-up mode: after a command sheet is read, the following command sheet is not present on the original table.	SET THE COMMAND SHEET/S
In combine 2 originals mode, if the make-up mode is selected, the command sheet for the 2nd original is not placed on the original table after the 2nd original is read.	
In make-up mode, the original is not placed on the original table after the command sheet is read.	SET THE ORIGINAL
In combine 2 originals mode, the 2nd original is not placed on the original table after the 1st original is read.	
The original width exceeds the print paper width when multiplied by a magnification ratio.	CHECK THE PAPER SIZE PRESS MASTER KEY

NOTE:

- 1) When this message is displayed, input from the Make-up key, Image Positioning key, Fixed Magnification key and Program key are not accepted.
- 2) This message is displayed for 3 seconds after the master making key is pressed. "READY TO START" is then displayed.

If the operator does not change the paper size, the print paper size detected on the paper table is valid for master making.

In the following cases, the guidance message is not displayed when the Master Making key is pressed. Master Making starts as soon as the Master Making key is pressed.

- In zoom mode
- In directional magnification mode
- In image shift mode
- For reading the 2nd and following command sheets.
- For reading the 2nd original in the combine 2 original mode.

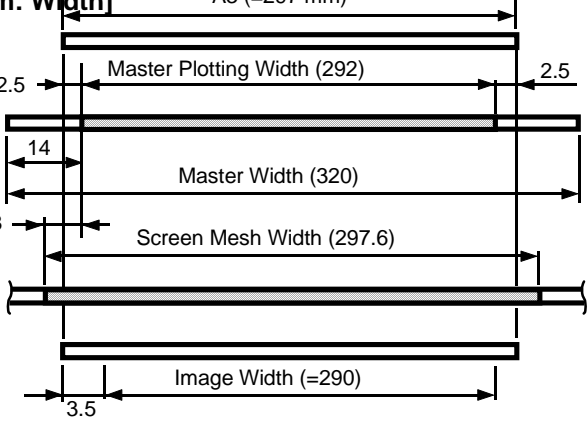
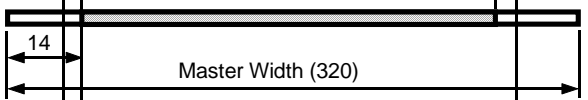
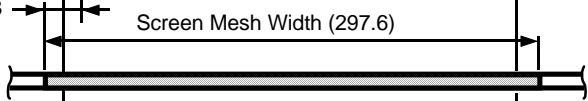
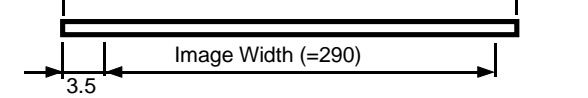
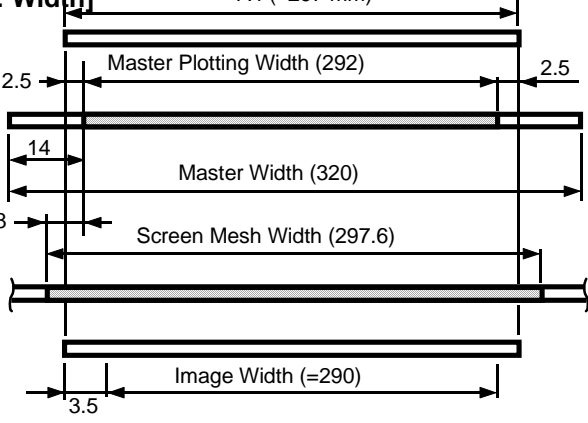
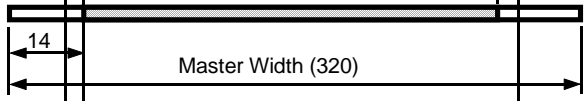
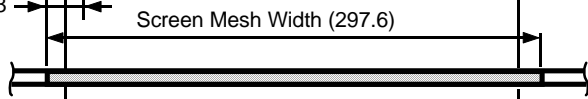
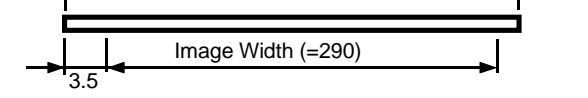
10.2.15 Other Monitor Indications

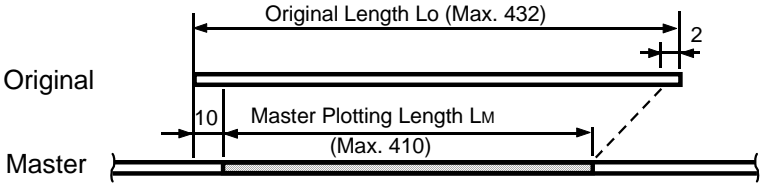
1. If the original is not set on the original table when the Master Making key is pressed, "A" on the misfeed location indicator will light and "SET THE ORIGINAL" is displayed for 2 seconds. The messages will then turn off and "READY TO START" is displayed.
2. If there is no master on the drum when the Print Start key is pressed, "M" indicates and "MASTER NOT WRAPPED" is displayed. The display message changes to "READY TO START" 2 seconds later, but "M" will remain lit until the cover is opened or the Master Making key is pressed.
3. When the drum is not set in the machine, both drum size indicators are turned off and "SET THE DRUM COMPLETELY" is displayed.

10.3 MASTER PLOTTING AND PRINTING AREA

Items	Standard	Note
<p>[A3/DLT Drum: Length]</p> <p>Original: A3 (≈420 mm)</p> <p>Master: 10, (407) Master Plotting Length, 94.3, Master Length (535), 3, Screen Mesh Length (436.2)</p> <p>Screen: Printing Pressure</p> <p>Paper (Image Position ±0): 1.6, 10, Image Area Length (≈405)</p>		<p>1) Master plotting area changes according to paper size.</p> <p>2) In enlarge or reduce mode, the 10 mm margin is not enlarged or reduced.</p> <p>3) If the machine knows the paper size, it allows for a 3 mm blank margin at the paper's trailing edge. If paper size detection is cancelled through the SP mode, the machine will not plot the last 2 mm of the original on the master.</p>
<p>When the combine 2 originals mode is selected.</p> <p>Master: 10, 94.3, Master Length (535)</p> <p>Paper: End of the 1st Original, 1st Original, 2nd Original, 2, 4, Image Area Length (≈405)</p>		<p>4) In combine 2 originals mode, the trailing edge of the 1st image has a 2 mm margin and the leading edge of the 2nd image has a 4 mm margin. (These margins vary according to the magnification ratio.)</p>
	<p>Maximum Image Length: 405 mm</p> <p>Maximum Master Plotting Length: 410 mm</p> <p>Screen Mesh Length: 436.2 mm</p> <p>Master Cut Length: 535 mm</p>	

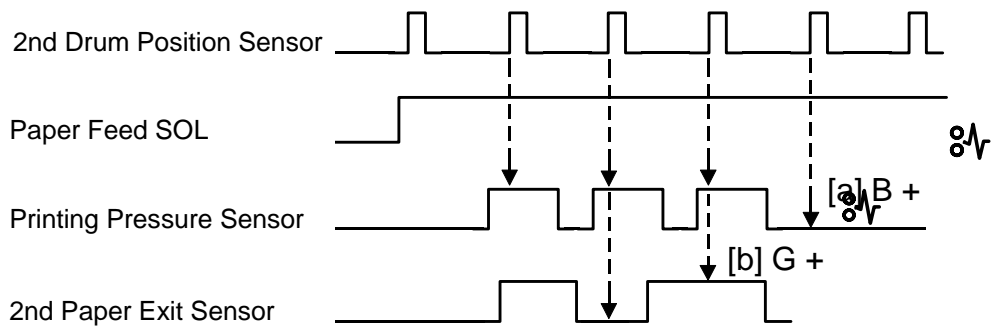
Items	Standard	Note								
<p>[A4/LT Drum: Length]</p> <p>Original</p> <p>Master</p> <p>Screen</p> <p>Paper (Image Position ±0)</p>		<p>1) Master plotting area changes according to paper size.</p> <p>2) In enlarge or reduce mode, the 10 mm margin is not enlarged or reduced.</p> <p>3) If the machine knows the paper size, it allows for a 3 mm blank margin at the paper's trailing edge. If paper size detection is cancelled through the SP mode, the machine will not plot the last 2 mm of the original on the master.</p>								
<p>When the combine 2 originals mode is selected.</p> <p>Master</p>		<p>4) In combine 2 originals mode, the trailing edge of the 1st image has a 2 mm margin and the leading edge of the 2nd image has a 4 mm margin. (These margins vary according to the magnification ratio.)</p>								
<table><tr><td>Maximum Image Length:</td><td>202 mm</td></tr><tr><td>Maximum Master Plotting Length:</td><td>206 mm</td></tr><tr><td>Screen Mesh Length:</td><td>233.2 mm</td></tr><tr><td>Master Cut Length:</td><td>332 mm</td></tr></table>		Maximum Image Length:	202 mm	Maximum Master Plotting Length:	206 mm	Screen Mesh Length:	233.2 mm	Master Cut Length:	332 mm	
Maximum Image Length:	202 mm									
Maximum Master Plotting Length:	206 mm									
Screen Mesh Length:	233.2 mm									
Master Cut Length:	332 mm									

Items	Standard	Note							
[A3/DLT Drum: Width]									
Original		In enlarge or reduce mode, the center of the image does not shift.							
Master									
Screen									
Paper									
	<table><tr><td>Maximum Image Width:</td><td>290 mm</td></tr><tr><td>Master Plotting Width:</td><td>292 mm</td></tr><tr><td>Screen Mesh Width:</td><td>297.6 mm</td></tr><tr><td>Master Width:</td><td>320 mm</td></tr></table>		Maximum Image Width:	290 mm	Master Plotting Width:	292 mm	Screen Mesh Width:	297.6 mm	Master Width:
Maximum Image Width:	290 mm								
Master Plotting Width:	292 mm								
Screen Mesh Width:	297.6 mm								
Master Width:	320 mm								
[A4/LT Drum: Width]									
Original		In enlarge or reduce mode, the center of the image does not shift.							
Master									
Screen									
Paper									
	<table><tr><td>Maximum Image Width:</td><td>290 mm</td></tr><tr><td>Master Plotting Width:</td><td>292 mm</td></tr><tr><td>Screen Mesh Width:</td><td>297.6 mm</td></tr><tr><td>Master Width:</td><td>320 mm</td></tr></table>		Maximum Image Width:	290 mm	Master Plotting Width:	292 mm	Screen Mesh Width:	297.6 mm	Master Width:
Maximum Image Width:	290 mm								
Master Plotting Width:	292 mm								
Screen Mesh Width:	297.6 mm								
Master Width:	320 mm								

Items	Standard	Note
<p>[Master Plotting Length in Relation to Paper Size]</p>  <p>Original Length L_o (Max. 432)</p> <p>Master Plotting Length L_M (Max. 410)</p> <p>Master Plotting Length</p> $L_M = (L_o - 10 - 2) \times \frac{\alpha}{100}$ <p> $\left[\begin{array}{ll} \text{A3/DLT} & L_M \leq 410 \\ \text{A4/LT} & L_M \leq 206 \end{array} \right.$ </p> <p>α: Magnification Ratio (%)</p>		<p>The machine will not plot the last 2 mm of the original on the master.</p>

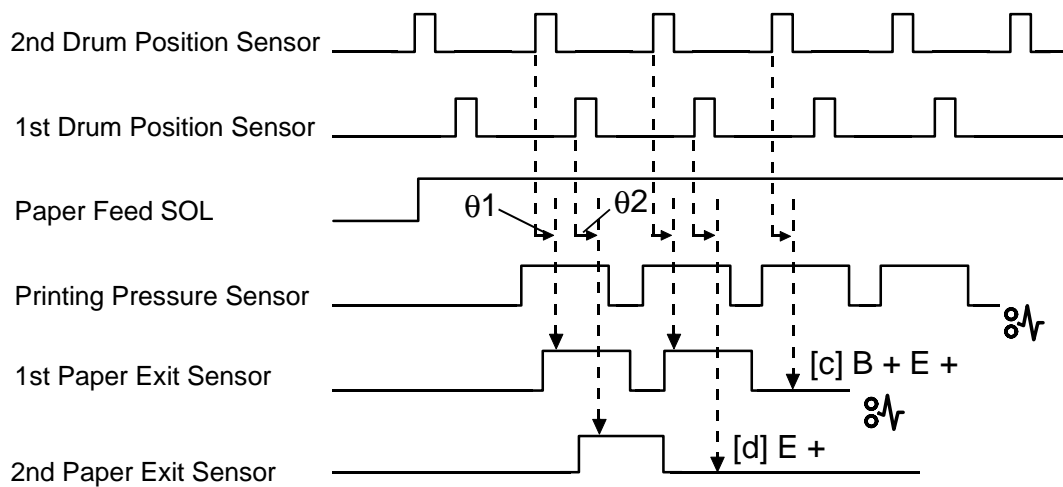
Detailed
Section
Descriptions

10.4 PAPER MISFEED DETECTION



[a] When the 2nd drum position sensor is turned on, if the printing pressure sensor is still OFF, the main PCB detects a paper misfeed.

[b] When the 2nd drum position sensor is turned on, if the 2nd paper exit sensor remains ON, the main PCB detects a paper misfeed.

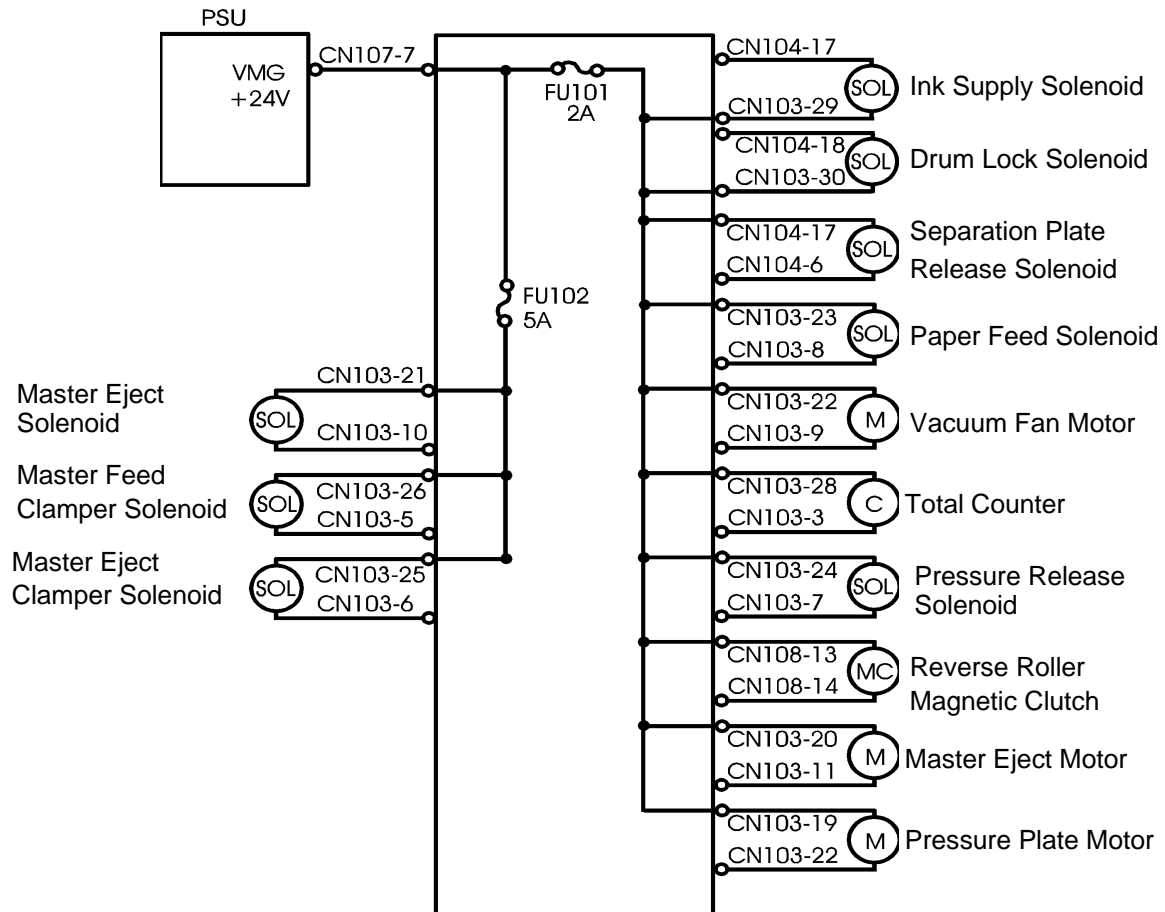


[c] When the drum has rotated 20° ($\theta 1$) after activating the 2nd drum position sensor, if the 1st paper exit sensor is still OFF, the main PCB detects a paper misfeed.

[d] When the drum has rotated 25° ($\theta 2$) after activating the 1st drum position sensor, if the 2nd paper exit sensor is still OFF, the main PCB detects a paper misfeed.

10.5 PROTECTION FROM OVERCURRENT

To protect solenoids and motors from overcurrent, there are two fuses are located in the 24 V line. The fuses are located on the main PCB.



Detailed
Section
Descriptions

INSTALLATION

1. INSTALLATION REQUIREMENTS

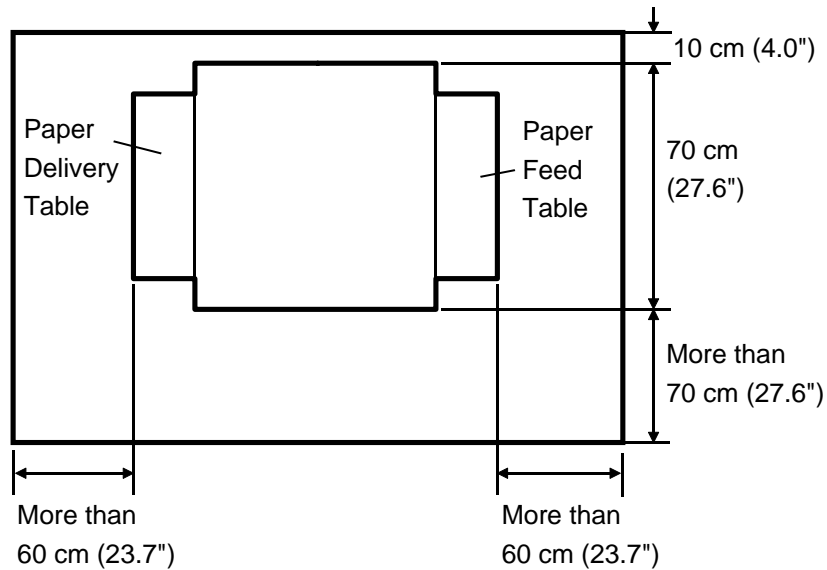
1.1 ENVIRONMENT

The installation location should be carefully chosen because environmental conditions greatly affect the performance of a machine. Ideal conditions are:

1. Temperature Range: 10°C to 30°C (50°F to 86°F)
2. Humidity Range: 20% to 90% RH
3. Ambient Illumination: Less than 1,500 lux. (Do not expose to direct sunlight.)
4. Ventilation: Room air should turn over at least 3 times an hour. (Avoid dusty areas.)
5. If the location is air-conditioned or heated, place the machine:
 - a) where it will not be subjected to sudden temperature changes from low to high, or vice versa.
 - b) where it will not be directly exposed to cool air from an air conditioner.
 - c) where it will not be directly exposed to reflected heat from a heater.
6. Avoid placing the machine in an area filled with corrosive gas.
7. Place the machine on a strong and level base. The machine must be level within 5 mm (13/64") both front to rear and left to right.

1.2 ACCESS TO THE MACHINE

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

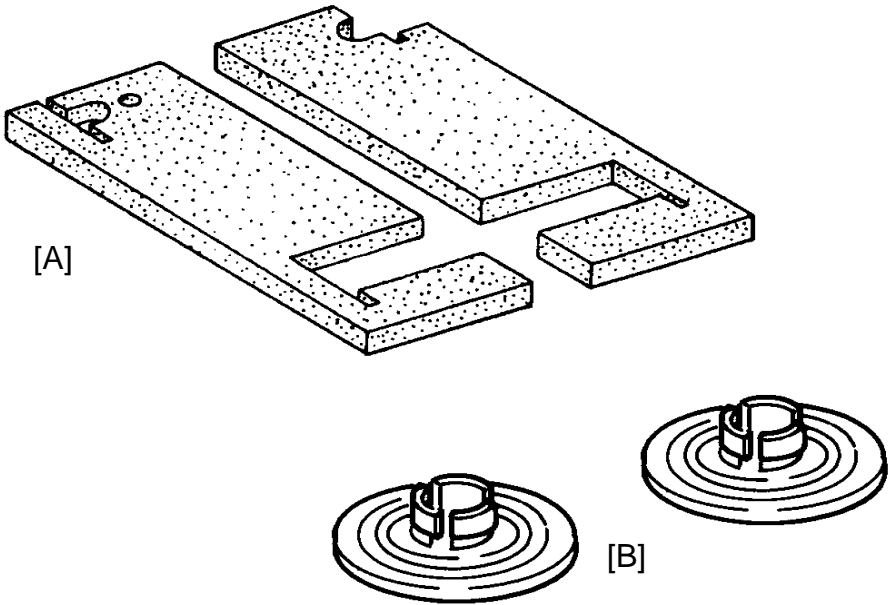


1.3 POWER SOURCE

1. Input Voltage Level
 - a) 115 V, 60 Hz: 5.5 A
 - b) 220 V 240 V, 50 Hz: 2.7 A
2. Voltage must not fluctuate more than 10%.
3. Make sure the plug is firmly inserted in the outlet.
4. Avoid multiwiring the outlet.
5. Do not pinch the power cord.

1.4 ACCESSORY CHECK

Make sure that you have all the accessories listed below.



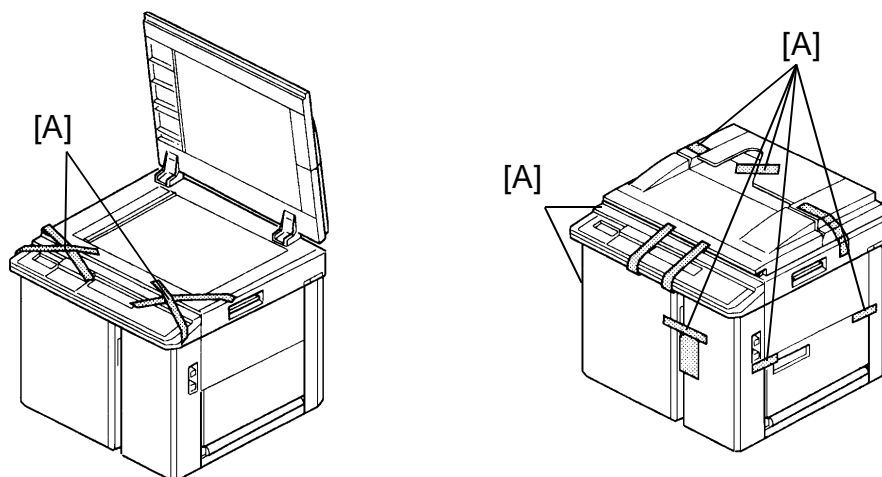
A. Base pad2

B. Master Spool2

Operating Instructions

1.5 INSTALLATION PROCEDURE

1.5.1 MAIN BODY

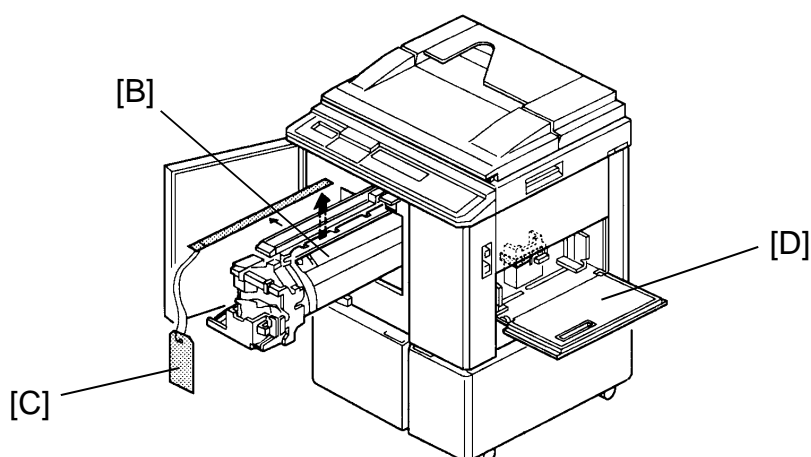


CAUTION: Do not hold the scanner unit when pushing the machine or the scanner unit safety switch may be damaged.

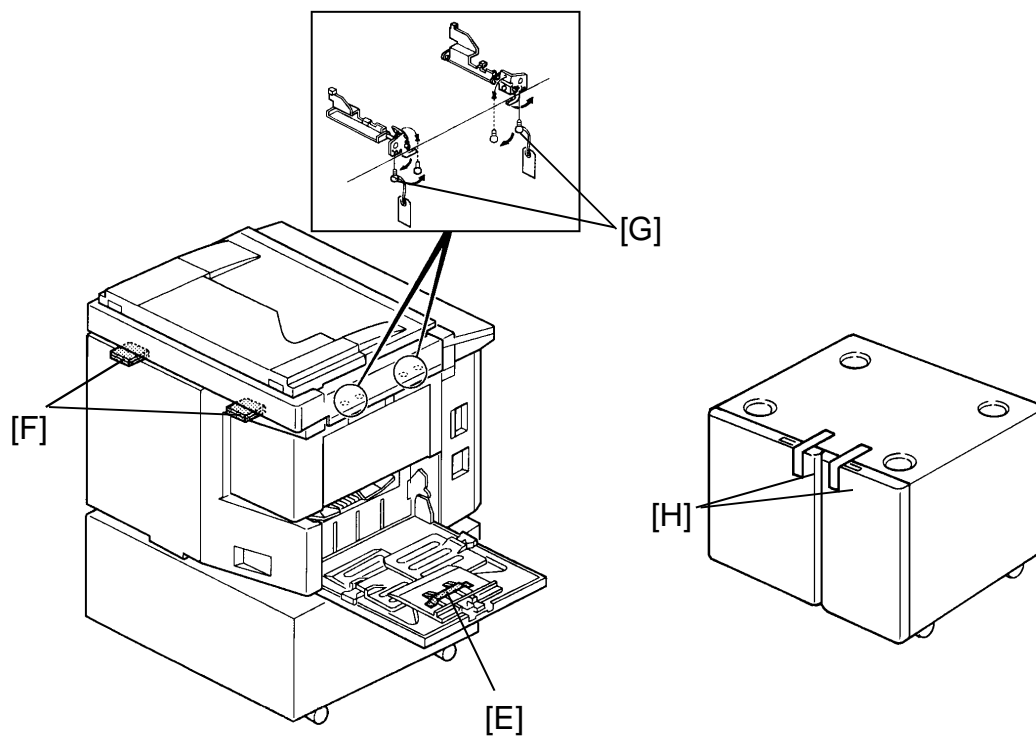
1. Place the machine on the table.

NOTE: The screw holes in the bottom plate of the machine must line up with the screw holes in the table.

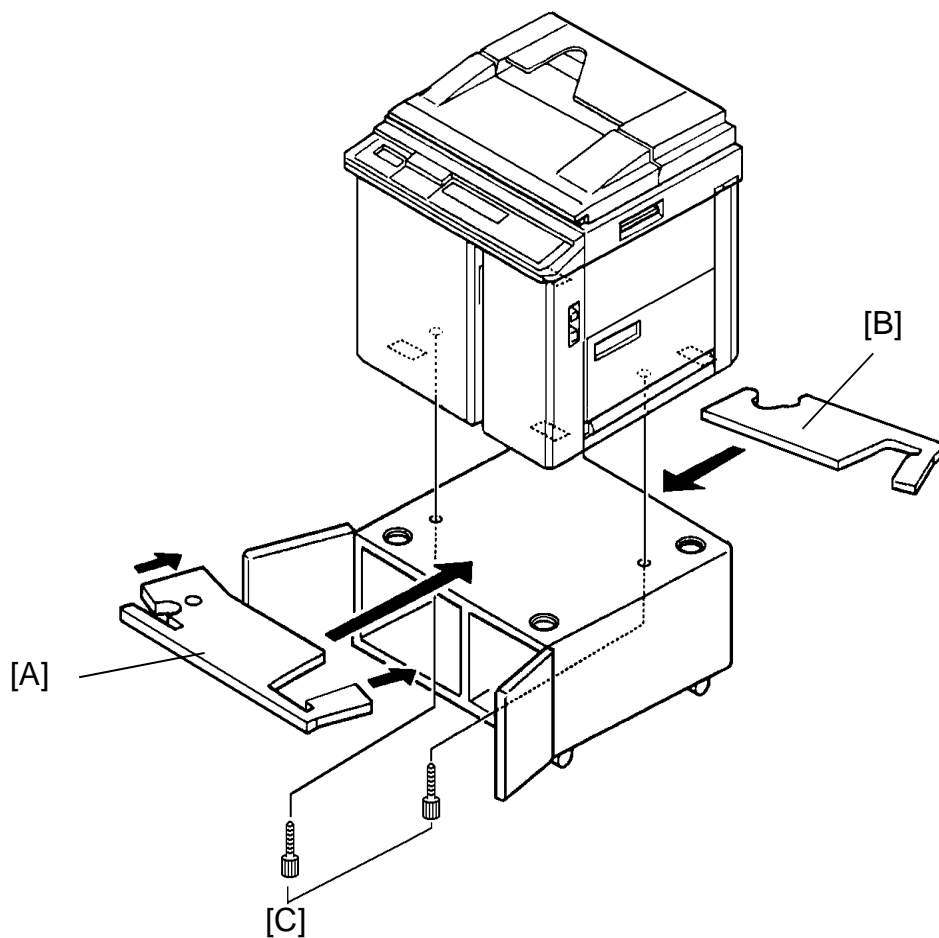
2. Remove the strips of tape [A] securing the covers and units shown above.



3. Open the front door and slide out the drum unit [B].
4. Open the master clamer and remove the clamp [C].
5. Open the paper feed table and remove the cardboard cover [D] protecting the paper feed roller.



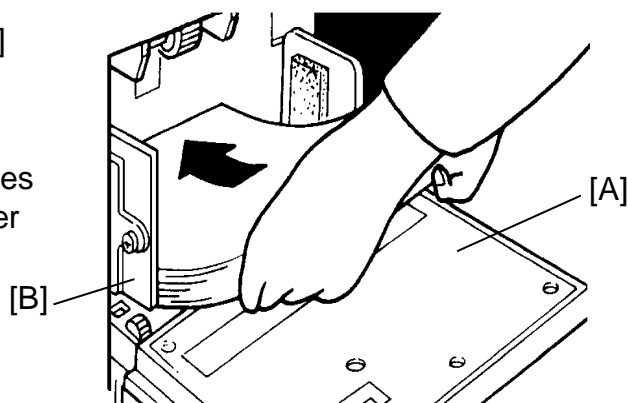
6. Open the paper delivery table and remove the strip of tape [E] protecting the end fence.
7. Remove the cardboard [F] under the scanner unit.
8. Open the scanner unit and change the position of screws [G] from transport position to operating position.
9. Open the doors (2 strips of tape [H]) of the optional table and take out the plastic bag containing 2 screws.



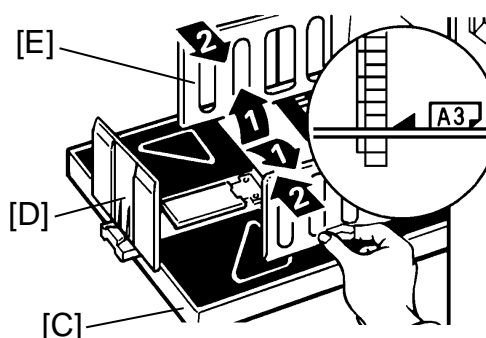
10. Raise the front side of the machine and position the base pad [A] under the machine. Then raise the rear side of the machine and position the other base pad [B] under the machine.
11. Secure the machine to the table with the two screws [C] packed with the table.

NOTE: Ensure the machine legs fit through the cutouts in the base pads.

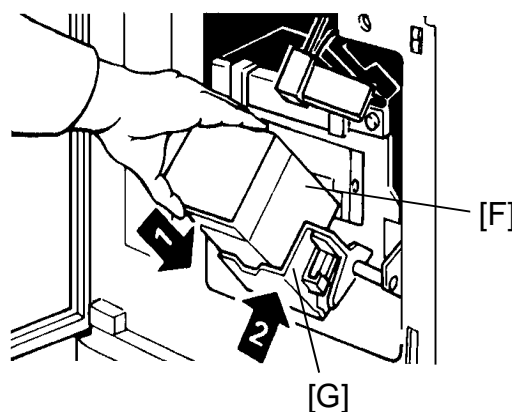
12. Open the paper feed table [A] and neatly stack the printing paper on the table.
13. Slide the paper feed side plates [B] gently up against the paper stack.



14. Open the paper delivery table [C] and adjust the position of the end plate [D] and the side plates [E] according to the printing paper size. Refer to the paper size scale on the table.

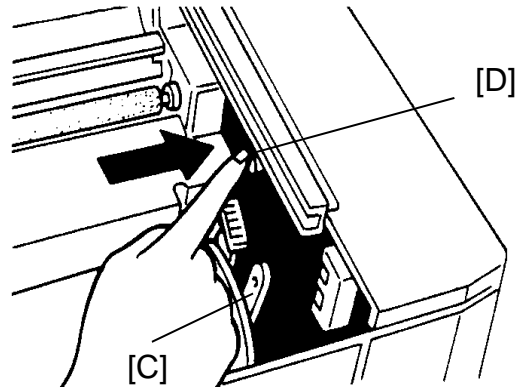
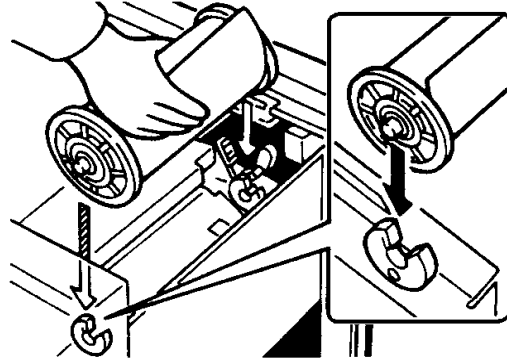
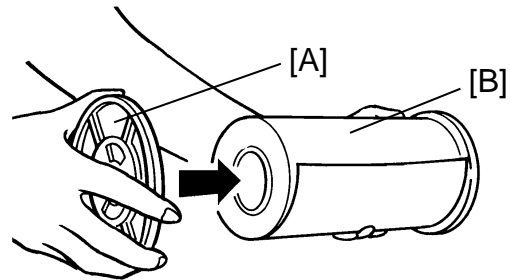


15. Install the ink cartridge [F].
 - a. Open the front door and lower the ink holder [G].
 - b. Remove the ink cartridge cap and inner seal.
 - c. Insert the ink cartridge in the ink holder and raise the ink holder to the original position.
 - d. Close the front door.



16. Install the master roll.

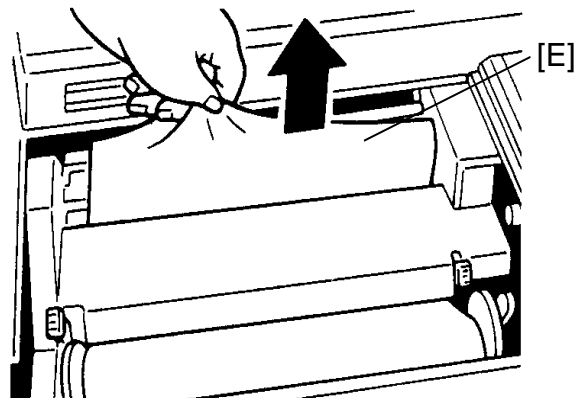
- a. Slide the scanner unit all the way to the left.
- b. Attach a spool [A] to each end of the master roll [B].
- c. Push the pressure release lever [C] to the left.
- d. Set the master roll in the machine as shown in the illustration.
- e. Insert the leading edge of the master roll under the platen roller.
- f. Return the pressure release lever to the original position.
- g. Plug in the power cord and turn on the main switch.
- h. Press the master cut button [D].

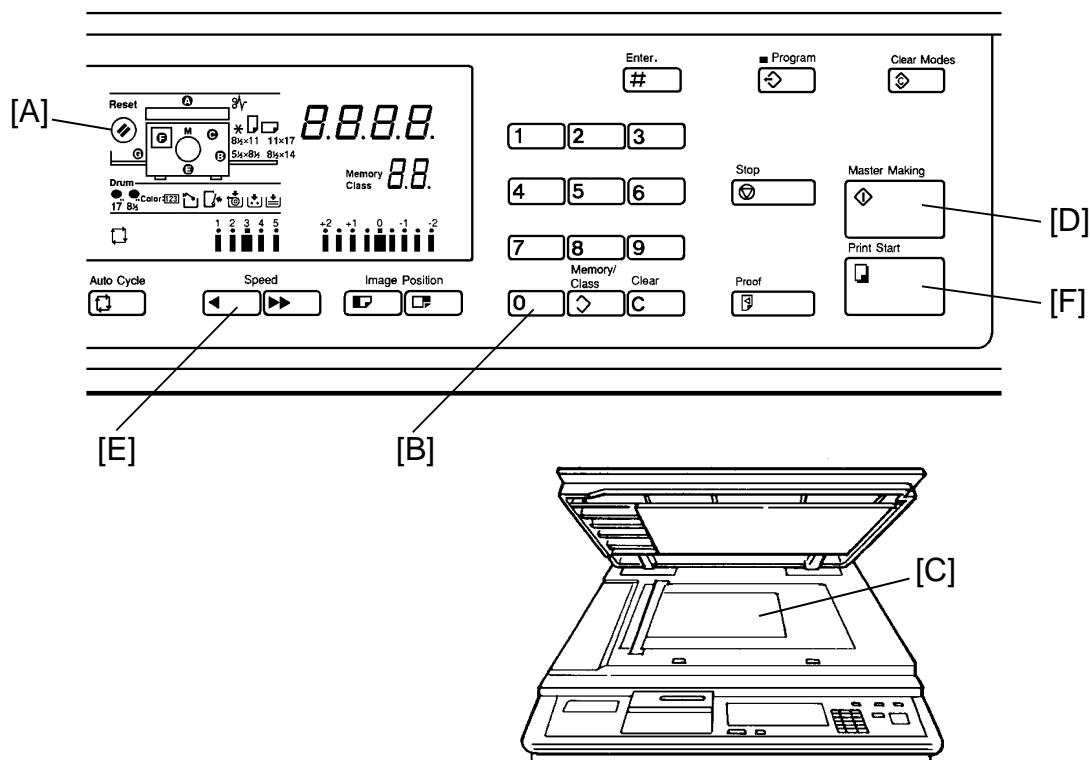


- i. Remove the cut strip [E] of master paper.


NOTE: Confirm that the paper on the master roll is not bent or creased.

- j. Close the scanner unit.





17. Idle the machine to distribute ink on the drum.

- Press the Reset key [A] while holding down the "0" key [B] on the operation panel.
- If  blinks on the operation panel when the machine stops, press the Reset key again.

17. Make some test prints to check the machine.

- Raise the platen cover and place the original face down on the exposure glass [C]. Make sure the original is flush with the left scale and aligned with the proper paper size marks.
- Press the Master Making key [D].
- Enter a quantity of 100 prints.
- Select the lowest print speed (1) with the Speed key [E] and press the Print Start key [F]. Make prints at this speed until the print image density stabilizes.

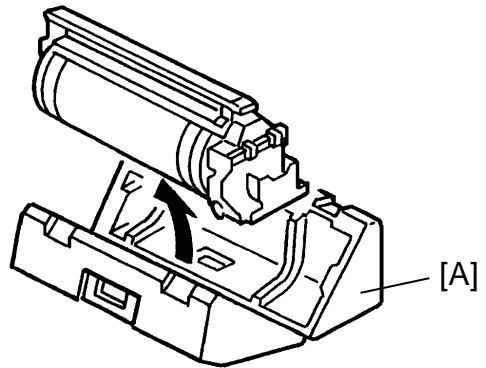
NOTE:

- Usually, about 100 prints are made before the image fully stabilizes.
- Check the image quality after the print image density is stabilized.

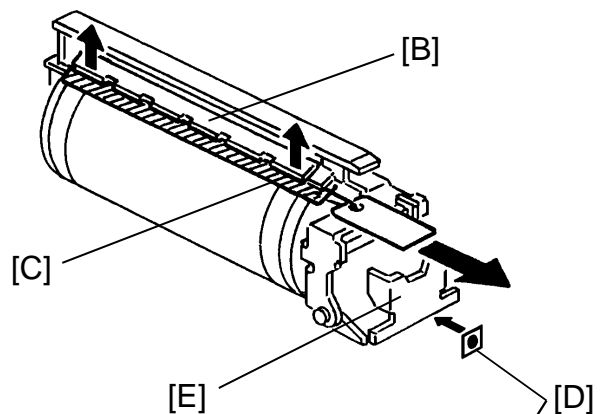
1.6 COLOR DRUM UNIT

Install the color drum unit according to the following procedure.

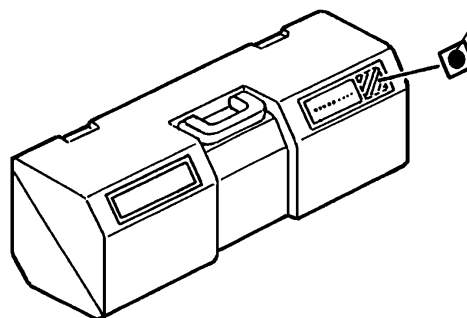
1. Open the drum case [A] and remove the red cushion.

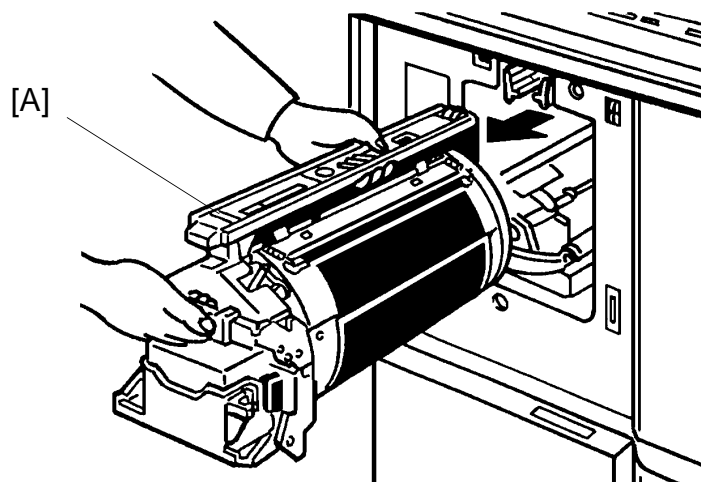


2. Open the master clasper [B] and remove the paper [C] protecting the drum surface.



3. Stick color seals [D] on the ink holder [E] and on the drum case.





4. Remove the drum unit [A] currently set in the machine.


5. Install the new color drum unit.

NOTE: 1. Keep the removed drum unit in the drum case.

2. The color indicator on the operation panel lights to indicate that the color drum unit is installed.

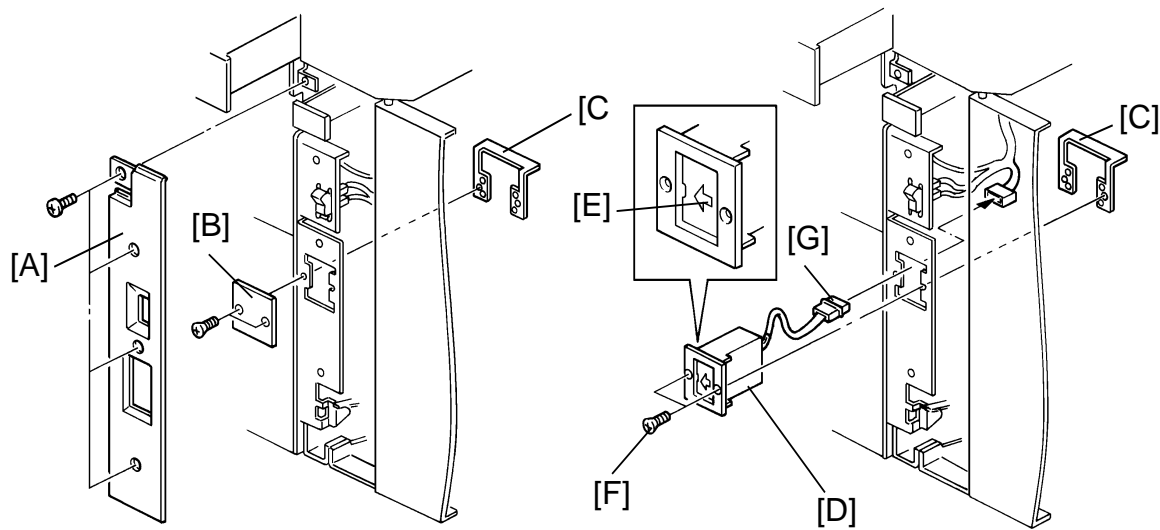
6. Set the color ink cartridge in the ink holder.

7. Press the Reset key once while holding down the "0" key to start the machine idle cycle.

NOTE: If  blinks on the operation panel when the machine stops, press the Reset key again.

8. Make a 100 prints, then check the quality of the print image.

1.6.1 Key Counter



1. Remove the main switch cover [A] (4 screws).
 2. Remove the key counter cover [B] and the fixing plate [C] (2 screws).
 3. Hold the fixing plate [C] in position inside the key counter bracket and insert the key counter holder [D].
- NOTE:** When installing the key counter holder, ensure that the arrow [E] points toward the rear side of the machine.
4. Align the holes in the fixing plate with the mounting holes of the key counter holder and secure them with 2 screws [F] packed with the key counter holder.
 5. Connect connector [G] and reinstall the main switch cover [A].
 6. Access the service program mode by pressing the operation panel keys in the following order:
Clear Modes key – Clear key – Combine 2 Originals key – Enter key
 7. Enter 3 with the number keys and then press the Enter key to access key counter mode.
 8. Change the data of key counter mode from 0 to 1 with the number keys.
 9. Press the Clear Modes key to leave SP mode.

SERVICE TABLES

1. SERVICE TABLES

1.1 MAINTENANCE TABLES

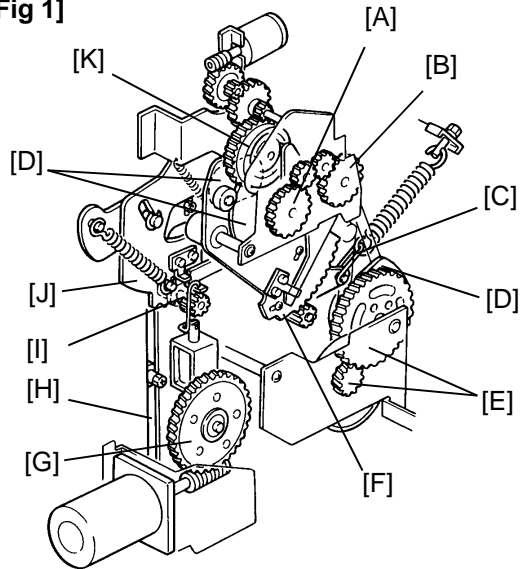
1.1.1 Lubrication Points

Lubricate after removing adhering ink and paper dust at yearly intervals.

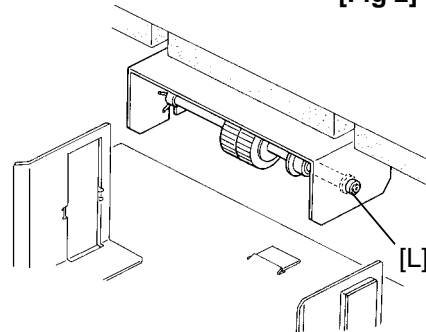
Section	Lubrication Point	Type	Location
Drive	Speed Reduction Gears of the Main Motor	Grease (Shell Albania No. 2)	(Fig.1- E)
	Gears of the Drum Drive Shaft		Inside and outside of the machine (Fig.1- B)
Image Positioning	Spiral Track of the Cam Gear		(Fig.1- K)
Paper Feed	Paper Feed Sector Gear		(Fig.1- J)
	Second Feed Sector Gear		(Fig.1- F)
	Gear of the Paper Feed Cam Shaft		(Fig.1- A)
	Paper Table Slide Groove		Both front side and rear side (Fig.1- H)
	Paper Table Drive Gear		(Fig.1- G)
	Bearings for the Upper Separation Roller Shaft	Motor oil (SAE No. 20)	(Fig.1- I)
	Bearings for the Paper Feed Roller Shaft		(Fig.2- L)
Drum	Drum Drive Gear	Grease (Shell Albania No. 2)	(Fig.3- N)
	Master Clamper Sector Gear		(Fig.3- O)
	Master Clamper Pinion Gear		(Fig.3- P)
	Ink Pump Drive Gear		(Fig.3- M)
Printing Pressure	Printing Pressure Arm and Printing Pressure Stay		Both front side and rear side (Fig.4- Q)
	Pressure Spring Link		(Fig.1- C)

Section	Lubrication Point	Type	Location
Master Eject	Master Pressure Plate Grooves	Grease (Shell Albania No. 2)	Both front side and rear side (Fig.5- S)
	Edges of the Master Pressure Plate Drive Arms		(Fig.5- R)
Paper Exit	Air Pump Drive Gears		(Fig.6- T)
	Inside of the Air Pump Piston	Grease (Mobil Ep-1)	(Fig.6- U)
ADF	Bearings for the Feed Roller Shaft	Motor oil (SAE No. 20)	Both front and rear side (Fig.7- V)
Others	Edge of Each Cam	Grease (Shell Albania No. 2)	(Fig.1- D)

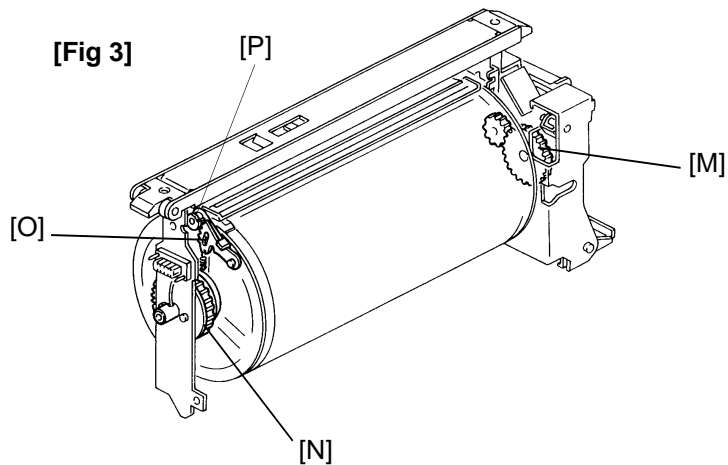
[Fig 1]



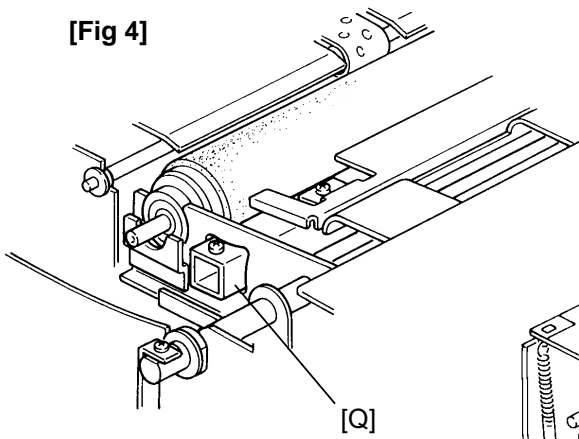
[Fig 2]



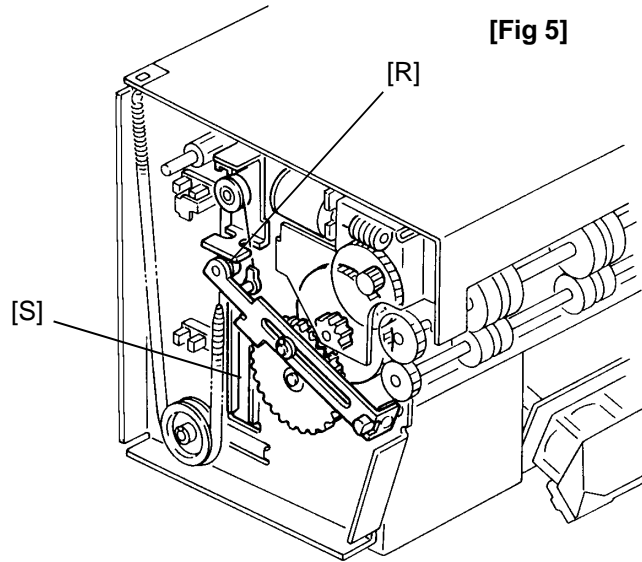
[Fig 3]



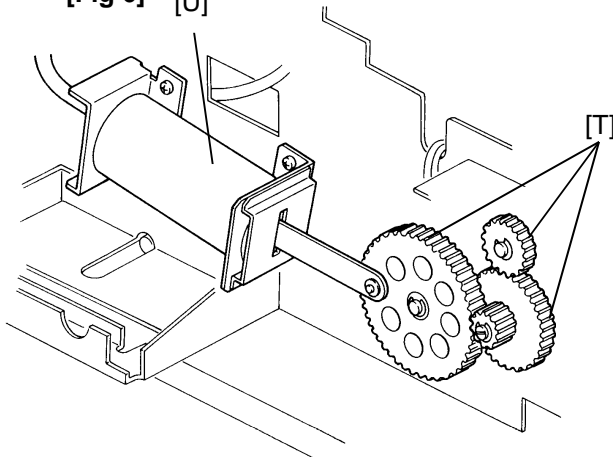
[Fig 4]



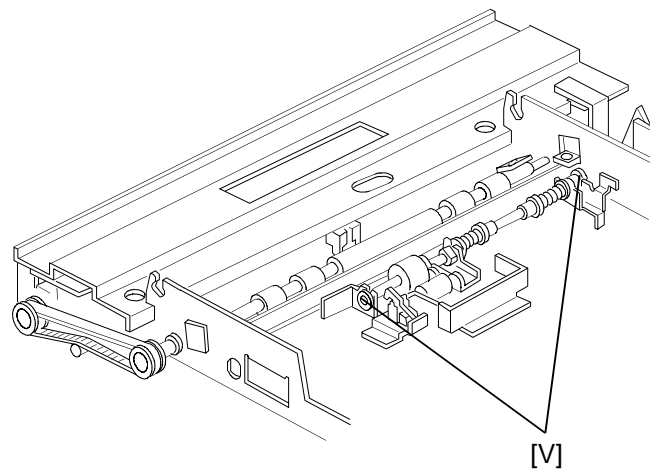
[Fig 5]



[Fig 6] [U]



[Fig 7]



1.1.2 User's Maintenance

Advise the customer to clean each item regularly. Clean the following items at every EM call if necessary.

Section	Cleaning Point	Cleaner	Interval
Optics	Original Platen Cover	Cloth and water	At every EM call
	Exposure Glass	Cloth and glass cleaner	
Paper Feed	Paper Feed Roller	Cloth and soap and water	
	Paper End Sensor	Dry cloth	
	Paper Length Sensor		
Printing	Press Roller	Cloth and soap and water	
ADF	Original Feed Rollers		
Plotter	Thermal Head	Thermal head cleaner	500 masters

1.1.3 Table of Periodic Inspection (every 6 months)

Section	Item	Standard Procedure
Optics	Original Platen Cover	Wipe off the stains using a soft cloth moistened with ethyl alcohol.
	Exposure Glass	Wipe with a dry cloth.
Paper Feed	Paper Feed Roller	Wipe off the ink and paper powder using a cloth moistened with ethyl alcohol.
	Upper and Lower Second Feed Rollers	
	Upper and Lower Separation Rollers	
Printing	Press Roller	Wipe off paper powder using a cloth moistened with water.
ADF	Pick-up Roller Feed Roller Separation Roller	

1.1.4 Table of Periodic Inspection (every 12 months)

Section	Item	Standard Procedure
Optics	Back side of the Exposure Glass	Wipe with a dry cloth.
	Back side of the Mirror and Sub Mirror	Use a blower brush.
	Back side of the Fluorescent Lamp	Wipe with a dry cloth.

Section	Item	Standard Procedure
Master Eject	Upper and Lower Master Eject Rollers	Wipe off the ink and paper powder using a cloth moistened with ethyl alcohol.
	Master Eject Box	Wipe off the ink using a cloth moistened with ethyl alcohol.
Drum	Inside and outside of Drum	Wipe off the built up ink and paper powder using a cloth moistened with ethyl alcohol.
	Ink Holder	
Plotter	Platen Roller	Wipe off the paper powder using a cloth moistened with water.
Others	First and Second Paper Exit Sensors Master Eject Sensor Drum Master Detection Sensor	Check the performance of all the sensors. Remove the stains from the sensors using a dry cloth.

1.2 TABLE OF SERVICE CALL CODES

Code	Problem	Possible Causes
E-01	Neither the right nor the left cutter switch turns off within 3 seconds of the cutter motor starting.	1) Drive wire cut 2) Drive section malfunction 3) Defective cutter switch
E-02	Malfunction in the paper table drive section. The lower limit sensor or paper table height sensor does not turn on within 7 seconds.	1) Drive worm gear broken 2) Mounting screw of the worm gear broken 3) No power supply
E-04	Temperature of the thermal head is greater than 54°C when the Master Making key is pressed.	1) Excessive thermal head temperature 2) Thermistor short
E-05	Malfunction in the image shifting section.	1) Image position sensor connector disconnected 2) Defective image position sensor
E-06	The drum rotation sensor detects an incorrect motor speed.	1) Drum lock 2) No power supply
E-07	Malfunction in the program. When the main switch is turned on, "E-07" lights up if the ROM is defective.	Defective ROM
E-08	Temperature of the power supply unit is greater than 85°C when the Master Making key is pressed.	Excessive power supply unit temperature
E-09	The signal level between CN109-A8 and GND is over 4.9 volts.	1) Thermistor open. 2) Related connectors are not connected (Main PCB CN109-A8, image processing PCB CN404-B8/ CN403-22, or thermal head drive PCB CN705-22/ CN703-10).

Code	Problem	Possible Causes
E-10	The CPU detects an abnormality in the pulse from the thermal head drive PCB (ENR 1 to 4). This pulse determines the energy applied to the thermal heating elements.	<ol style="list-style-type: none"> 1) Defective thermistor 2) Related connectors are not connected (Main PCB CN109-A7, image processing PCB CN404-B7/ CN403-20, or thermal head drive PCB CN705-20). 3) No power supply for ICs (Vcc) from power supply unit to image processing PCB (disconnection of image processing PCB CN701-7/14, or power supply unit CN503-12/13).
E-11	Encoder output does not change within 3 seconds of the main switch being turned on or the Clear Mode key being pressed.	<ol style="list-style-type: none"> 1) Defective image position motor 2) No power supply
E-12	<ol style="list-style-type: none"> 1. The upper or lower pressure plate sensor remains activated for more than 4 seconds after the pressure plate motor starts turning. 2. The lower pressure plate sensor is not activated within 8 seconds of the pressure plate motor starting to turn even though the upper pressure plate sensor is de-activated. 3. The upper pressure plate sensor is not activated for more than 8 seconds after the pressure plate motor starts to turn even though the lower pressure plate sensor is de-activated. 	Pressure plate drive mechanism malfunction.

Code	Problem	Possible Causes
E-13	<p>While the scanner is going back to the home position:</p> <ul style="list-style-type: none"> - The home position sensor remains activated for more than 4 seconds. - The home position sensor is not activated within 2 seconds. - The home position sensor is not activated within 7 seconds when the scanner returns after finishing making the master or scanning. 	<p>1) Defective Home Position Sensor</p> <p>2) Scanner Motor Lock</p>

1.3 TABLE OF DIP SW, LED, VR, TP (ON THE MAIN CONTROL PCB)

1.3.1 DIP SW

No. DIP SW	Function	Remarks
DIP SW101	—	Not used. Must be OFF.
DIP SW102	Sets the initial setting for the counter to increment by two counts per print when the A3 drum is used. (This setting can be changed by SP mode No.86)	Turn on to make the initial setting for the counter increment by two counts. Normal: OFF for Ricoh/ AB Dick ON for NRG

1.3.2 Photodiode

No. LED	Component	Remarks
LED101 (ROLL)	1st Paper Exit Sensor	When paper is detected, the LED lights.
LED102 (MST)	Drum Master Detection Sensor	When the master is on the drum, the LED lights.
LED103 (PDLV)	2nd Paper Exit Sensor	When paper is detected, the LED lights.
LED104 (MDRV)	Master Eject Sensor	When the master is under the master eject sensor, the LED lights.
LED105 (INK)	Ink Detection	When ink is present, the LED lights.

No. LED	Component	Remarks
LED106 (MAIN M)	Main Motor	When the main motor turns on, the LED lights.

1.3.3 VR

No. VR	Function
VR101	1st Paper Exit Sensor Adjustment
VR102	Drum Master Detection Sensor Adjustment
VR103	2nd Paper Exit Sensor Adjustment
VR104	Master Eject Sensor Adjustment
VR105	Printing Speed Adjustment

1.3.4 TP

No. TP	Function	Standard Voltage
TP101	1st Paper Exit Sensor Voltage	ON: More than 2 V OFF: 0.9 V
TP102	Drum Master Detection Sensor Voltage	ON: More than 2 V OFF: 0.9 V
TP103	2nd Paper Exit Sensor Voltage	ON: More than 2 V OFF: 0.9 V
TP104	Master Eject Sensor Voltage	ON: More than 2 V OFF: 0.9 V
TP105	Ink Detection Voltage	ON (ink is present): 0 V OFF: – 12 V
TP106	Drum Rotation Sensor Voltage	ON: 0 V OFF: 5 V
TP107	GND	

1.4 EXPECTED LIFE OF PARTS

Section	Part Description	Expected Life
Scanner	Fluorescent Lamp	15,000 originals
	1st and 2nd Lower Original Transport Rollers	1 year or 60,000 originals
Plotter/Master Feed	Thermal Head	30,000 masters
	Platen Roller	30,000 masters
	Upper Master Feed Roller	1 year or 30,000 masters
Drum	Drum Tetron Screen	2 years or 1,200,000 prints
Paper Feed	Paper Feed Rubber Side Plate	1,200,000 prints
	Paper Feed Roller	6 months or 300,000 prints
	Upper Separation Roller	1 year or 600,000 prints
	Lower Separation Roller	2,000,000 prints
	2nd Feed Roller Brake Belt	1,000,000 prints
	Separation Plate	1 year or 600,000 prints
Printing	Press Roller	2 years or 1,200,000 prints
Delivery	Transport Belt	2 years or 1,200,000 prints
ADF	Pick-up Roller	60,000 originals
	Original Feed Roller	30,000 originals
	Separation Roller	60,000 originals

1.5 SPECIAL TOOLS

Description	Part Number
Test Chart R-21	99992131
Resolution Chart	A0129110
Drum Gauge	C2009001
Image Shifting Gauge	C2009002

2. SERVICE PROGRAM MODE

2.1 SERVICE PROGRAM MODE OPERATION

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

2.1.1 Service Program Mode Access Procedure (for engineers)

All service program modes can be accessed with this procedure.

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

Case 1:

- a) Clear Modes key
- b) Clear key
- c) Combine 2 Originals key
- d) Enter key

Case 2:

- a) Turn off the power switch
- b) Press the Enter key, Stop key, and Clear key simultaneously
- c) Turn on the power

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

SP-MODE PROGRAM No. 0

3. Using the number keys, enter the desired SP mode number (listed in the service program table.)

NOTE: The SP mode number can be shifted up or down by pressing the Zoom key ("+" or "-").

4. To exit the SP mode, press the Clear Modes key.

2.1.2 Service Program Mode Access Procedure (for users)

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

1. Press the following keys on the operation panel in the following order:
 - a) Clear Modes key
 - b) Clear key
 - c) Enter key
2. The following is displayed on the LCD when the SP mode is accessed.

SP-MODE PROGRAM No. 0

3. Using the number keys, enter the desired SP mode number (listed in the service program table).
4. To cancel the SP mode, press the Clear Modes key.

2.1.3 Change Adjustment Values or Modes

1. After entering the desired SP mode number, press the Enter key. The value or mode set at the factory will be displayed on the LCD (at the end of the second line).
2. Enter the desired value or mode using the number keys (listed in the service program table).
3. Press the Enter key to store the desired value or mode.
4. To exit the SP mode, press the Clear Modes key.

2.2 SERVICE PROGRAM TABLE

*: Accessible by a customer ♥: A4 version ♦: LT version

No.	Display	Function	Data	Factory Setting	Comments
1.	On line	Enables On Line key operation.	0: No 1: Yes	0	
2.	FDC Type 10	Used only in Japan	0: No 1: Yes	0	Keep at 0.
3.	Key Counter	Enables key counter operation.	0: No 1: Yes	0	
4.	Key Card	Used only in Japan.	0: No 1: Yes	0	
5.	EMF Sorter	Selects the number of sorters.	0: No sorters 1, 2, 3, 4, or 5: Sorters present	0	Input 1 to 5 to indicate the number of sorters.
*10.	Min. Print	Limits the minimum print quantity that can be entered.	0 to 9999	0	
*11.	Max. Print	Limits the maximum print quantity that can be entered.	0 to 9999	9999	
*12.	♥: A4 → A3 Mag. Ratio ♦: HLT → LG Mag. Ratio	Adjusts the fixed magnification ratio. ♥: From A4 to A3 ♦: From 5 1/2" x 8 1/2" to 8 1/2" x 14"	50 to 200%	♥: 141% ♦: 155%	
*13.	♥: A4 → B4 Mag. Ratio ♦: LT → DLT Mag. Ratio	Adjusts the fixed magnification ratio. ♥: From A4 to B4 ♦: From 5 1/2" x 8 1/2" to 11" x 17"	50 to 200%	♥: 122% ♦: 129%	
*14.	♥: B4 → A3 Mag. Ratio ♦: LG → DLT Mag. Ratio	Adjusts the fixed magnification ratio. ♥: From B4 to A3 ♦: From 8 1/2" x 14" to 11" x 17"	50 to 200%	♥: 115% ♦: 121%	
*15.	Full Size	Adjusts the full size magnification ratio.	50 to 200%	100%	
*16.	Page Margin	Adjusts the create margin magnification ratio.	50 to 200%	93%	
*17.	♥: A3 → B4 Mag. Ratio ♦: LG → LT Mag. Ratio	Adjusts the fixed magnification ratio. ♥: From A3 to B4 ♦: From 8 1/2" x 14" to 8 1/2" x 11"	50 to 200%	♥: 87% ♦: 77%	

No.	Display	Function	Data	Factory Setting	Comments
*18.	♥: B4 → A4 Mag. Ratio ♦: ** → LT Mag. Ratio	Adjusts the fixed magnification ratio. ♥: From B4 to A4 ♦: From 11" x 15" to 8 1/2" x 11"	50 to 200%	♥: 82% ♦: 74%	
*19.	♥: A3 → A4 Mag. Ratio ♦: DLT → LT Mag. Ratio	Adjusts the fixed magnification ratio. ♥: From A3 to A4 ♦: From 11" x 17" to 8 1/2" x 11"	50 to 200%	♥: 71% ♦: 65%	
*20.	Buzzer On	Turns the beeper ON or OFF	0: No 1: Yes	0	
*21.	Prints/Master Cost	Adjusts the ratio of masters to prints. For accounting purposes.	0 to 50	0	The set number (0 to 50) is automatically added to the key counter each time a master is used.
22.	Read Image Area	Not used	—	0	Not used
30.	Sub Scan Mag. Adjust	Adjusts the sub-scan magnification.	-1.9 to +1.9%	(0)	The factory setting depends on the machine.
31.	MTF Level	Adjusts the MTF level.	0: Low 1: Standard 2: High 3: Maximum	1	
32.	Image Density Rank	In line mode, adjusts the image density level.	0: Light 1: Standard 2: Dark	1	
33.	Lead Edge Margin	Adjusts the lead edge margin.	4 to 10 mm	8 mm	
35.	Head Energy Adjust	Adjusts the thermal head energy.	0 to -99%	-7%	1% steps
36.	Sub Scan Mag. Adjust (ADF)	Adjusts the ADF sub-scan magnification.	-1.9 to 1.9%	0	0.1% steps
37.	Shadow Erase Level	Use to adjust the threshold levels for shadow erase in the various image modes.	0: Line 1: Photo 2: Clear		

No.	Display	Function	Data	Factory Setting	Comments
37-0	Line	Use to adjust the threshold value for shadow erase in Line mode. There are four numbers. Each represents the threshold value for an image density. Input the required value for the one that is blinking, then press Enter to move on to the next one. The lower the value, the darker the printout will be. The factory settings are 27 for Light, 23 for Standard, 21 for Dark, and 17 for Darker.			
37-1	Photo	Use to adjust the threshold values for each of the contrast settings for shadow erase in Line mode. There are three sub-menus to choose from. These are 0: Standard (Normal), 1: Light Tone, and 2: Dark Tone (see below).			
37-1 -0	Std (Normal)	Adjusts the shadow erase threshold level for the Normal contrast setting in Line mode	Defaults 31: Light 25: Standard 17: Dark 15: Darker		
37-1 -1	Lt (Light Tone)	Adjusts the shadow erase threshold level for the Light Tone contrast setting in Line mode	Defaults 31: Light 25: Standard 17: Dark 15: Darker		
37-1 -2	Dk (Dark Tone)	Adjusts the shadow erase threshold level for the Dark Tone contrast setting in Line mode	Defaults 17: Light 13: Standard 7: Dark 3: Darker		
37-2	Clear	Returns all the settings for SP mode 37 to the defaults.			
38.	ADF Scan Line Adjust	Adjusts the ADF scanning start position.	-4.9 to 4.9 mm	0	0.1 mm steps See remarks (1).
39	Image Center Adjustment	Adjusts the center position of copies in the ADF and platen modes.	0: Scanner 1: ADF	0	See remarks (2).
39-0	Image Center Adjustment: Scanner	Adjusts the center position of copies in platen mode.	-0.9 to 0.9 mm	0	0.1 mm steps
39-1	Image Center Adjustment: ADF	Adjusts the center position of copies in ADF mode.	-4.9 to 4.9 mm	0	0.1 mm steps
*40.	Original	Specifies the image mode at power-up.	0: Photo 1: Line 2: Sharpen	1	

No.	Display	Function	Data	Factory Setting	Comments
*41.	Image Density	Specifies the image density at power-up.	0: Light 1: Standard 2: Dark 3: Darker	1	
42.	Print Speed	Specifies the printing speed at power-up.	0: 60 rpm 1: 75 rpm 2: 90 rpm 3: 105 rpm 4: 120 rpm	2	
*43.	Auto Cycle Mode	Specifies whether Auto Cycle mode is selected at power-up.	0: No 1: Yes	0	
*44.	Memory/Class Mode	Specifies the initial job memory feature (Memory or Class mode) at power-up.	0: Class 1: Memory	1	
45.	Std. Image Position	Specifies the image position at power-up	0: -20 mm 1: -15 mm 2: -10 mm 3: -5 mm 4: 0 mm 5: +5 mm 6: +10 mm 7: +15 mm 8: +20 mm	4	
*46.	Make Up	Specifies the initial make-up background pattern when the Image Make-up mode is selected.	1 to 40 51 to 90 101 to 140 150 to 190	0	0: No background pattern is selected.
47.	Contrast	Specifies the initial contrast when the Photo mode is selected.	0: Standard 1: Light 2: Dark	0	
48.	Photo	Specifies the initial screen when the Photo mode is selected.	0: Standard 1: Fine 2: Coarse	0	
60.	Clear All Memory	Returns all SP modes to the factory settings.	0: No 1: Yes	0	
70.	Original Feed Jam (A)	Displays the total number of original jams.		0	
71.	Paper Feed Jam (B)	Displays the total number of paper feed jams.		0	

No.	Display	Function	Data	Factory Setting	Comments
72.	Paper Wrap Jam (E)/(B)(E)	Displays the total number of times that paper has wrapped around the drum.		0	
73.	Paper Delivery Jam (G)	Displays the total number of paper delivery jams.		0	
74.	Master Feed Jam (C)	Displays the total number of master feed jams.		0	
75.	Master Delivery Jam (F)	Displays the total number of master delivery jams.		0	
76.	Clear Jam Counters	Clears all jam counters.	0: No 1: Yes	0	
81.	Proof Print No.	Specifies how many trial prints are made after making the master.	0 to 2 sheets	1	
*82. -1	Skip Feed No.	Selects the feed interval.	1 to 5	1	1: Normal operation 2 to 5: One sheet fed every two to five drum rotations
-2	Long Sheet	Specifies whether a long sheet is used.	0: No 1: Yes	0	Displays only when no. 2, 3, 4, or 5 are selected in 82.
*83.	Auto Reset Time	Specifies the auto reset time.	0: No 1: 3 min. 2: 5 min.	0	
*84.	Auto Combine 2 Orig.	Specifies the initial mode for Combine 2 Originals.	0: Normal 1: Auto (Two identical images are made if the Master Making key is pressed once.)	0	
*85.	Initial Full Check	Specifies whether master full detection is made at power-up.	0: No 1: Yes	0	

No.	Display	Function	Data	Factory Setting	Comments
86.	A3 Drum 2 Count Up	Specifies whether the counter increments by two counts per print when the A3 drum is used.	0: No 1: Only the master counter 2: Both the master and the copy counter	0 Ricoh, AB Dick 2 NRG	See Remarks (3)
87.	Memory Print	Specifies the print mode when in Memory mode.	0: Normal (Memory Print Mode) 1: Stack Mode	0	See Remarks (4)
88	Auto Memory/ Class	Specifies the print mode.	0: Normal 1: Auto Class (Memory) Print	0	See Remarks (5)
90.	Thermal Head Test	Selects the background pattern for the copy made in the thermal head test; performs the test.	1 to 40 51 to 90 101 to 140 150 to 190	7	See the Thermal Head Test section 2-3.
91.	Command Sheet Check	Prints the command sheet image (designated area) together with the original image.	0: No 1: Yes	0	See the Command Sheet Check section 2-4.
92.	Thermal Paper Mode	Use this mode to test the thermal head.	0: No 1: Yes	0	See Remarks (6)
93.	Erase Area Check	Checks the erase area.	0: No 1: Yes	0	See Remarks (7)
95. -1	Scanner Free Run	Selects free running of the scanner.	0: With the lamp off 1: With the lamp on	0	See Remarks (8)
-2	Scanner Free Run	Carries out the scanner free run. (The speed can be changed: see remarks (8).)	Start with the Print Start key. Stop with the Stop key.		Displays by pressing #, after selecting 0 or 1 in 95.
96.	ADF Original Feed Check	Carries out the ADF original feed check. (The speed can be changed; see remarks (9).)	Start with the Print Start key. Stop with the Stop key.	100	See Remarks (9)

No.	Display	Function	Data	Factory Setting	Comments
100.	Combine 2 Originals Count	Displays the total number of masters made in Combine 2 Original mode.		0	
101.	Make Up Count	Displays the total number of masters made in Make-up mode.		0	
102.	Make Up Photo Count	Displays the total number of masters made in Make-up Photo mode.		0	
103.	Area Mask Count	Displays the total number of masters made with the Margin Erase key.		0	
104.	On line Count	Displays the total number of masters made in On Line mode.		0	
105.	Overlay Count	Used only in Japan.		0	
106.	Enlarge Count	Displays the total number of masters made in Fixed Enlargement mode.		0	
107.	Reduction Count	Displays the total number of masters made in Fixed Reduction mode.		0	
108.	Zoom Count	Displays the total number of masters made in Zoom mode.		0	
110.	Power On Time	Displays the total amount of time the machine has been turned on.		0	xxxxx Hour xx Min. xx Sec.
111.	Total Count	Displays the total number of masters and prints.		0	M: Master count P: Print count
*113.	Resettable Count	Used by the customer to display the total number of masters and prints.		0	M: Master count P: Print count
*114.	CLR Reset table Count	Clears the resettable total master/print counters.	0: No 1: Yes	0	

No.	Display	Function	Data	Factory Setting	Comments
115.	ADF Mode Count	Displays the total number of sheets fed in the ADF mode.		0	
116.	Platen Mode Count	Displays the total number of originals set in platen mode.		0	
117.	Color Drum Count	Displays the total number of prints when using the color drum.		0	
118.	Paper Size Count	Displays the total number of prints made in each paper size. See Remarks (10).		0	Display counters for each paper size by pressing the # key.
119.	CLR All Total Count	Clears the following counters: Nos. 111, 115, 116, 117, and 118.	0: No 1: Yes	0	
*120.	User Code Mode	Selects user code mode, and displays the total number of prints made in the User Code mode.	0: No 1: Yes	0	See the user code mode section.
	Auto Reset Time	Selects the auto reset time.	0: No 1: 3 min. 2: 5 min.	0	Displays only when "Yes" is selected in 120.
*121.	UC Count	Displays the total number of masters and prints made by each user code.		0	Press the # key to shift to another user code.
*122.	Clear UC Count	Clears every user code counter.	0: No 1: Yes	0	Same as above.
*123.	Total UC Count	Displays the total number of masters and prints for up to 20 user codes.		0	
*124.	Clear Total UC Count	Clears the total user code counter.	0: No 1: Yes	0	
130.	Input Check Mode	Displays the input from sensors and switches.			See the input check table.
131.	Output Check Mode	Turns on the electrical components.			See the output check table.
132.	All Indicators ON	Turns on all the indicators on the operation panel.			Press the # key to light all the indicators and to turn off.

No.	Display	Function	Data	Factory Setting	Comments
135.	SN: 1st Paper Exit	Displays the 1st paper exit sensor voltage.			Unit: Volts
136.	SN: 2nd Paper Exit	Displays the 2nd paper exit sensor voltage.			Unit: Volts
137.	SN: Master Eject	Displays the master eject sensor voltage.			Unit: Volts
138.	SN: Drum Master	Displays the drum master sensor voltage.			Unit: Volts
140.	Ink Detection	Specifies whether ink detection is done.	0: No 1: Yes	1	
141.	Paper Detection	Specifies whether paper end detection is done.	0: No 1: Yes	1	
*142.	Paper Size Detection	Selects paper size detection.	0: Yes 1: Width detection only 2: Length detection only 3: No detection	0	
	Size Indication Off	Specifies whether the paper size indication on the operation panel is erased.	0: No 1: Yes	0	Displays only when 1, 2, or 3 is selected in 142-1.
*143.	Orig. Size Detection	Specifies whether original size detection is done.	0: No 1: Yes	1	
145.	Drum Mast. Detection	Specifies whether drum master detection is done.	0: No 1: Yes	1	
146.	ADF Cover Detection	This mode disables the ADF Cover Sensor detection.	0: Disabled 1: Enabled	1	
147.	Platen Set Detection	This mode disables the ADF Set Sensor detection.	0: Disabled (the ADF is always set) 1: Enabled	1	
150.	Control ROM No.	Displays the ROM part number and the ROM manufacturing date.		P/No.	1994/10/07 = YYYY/MM/DD

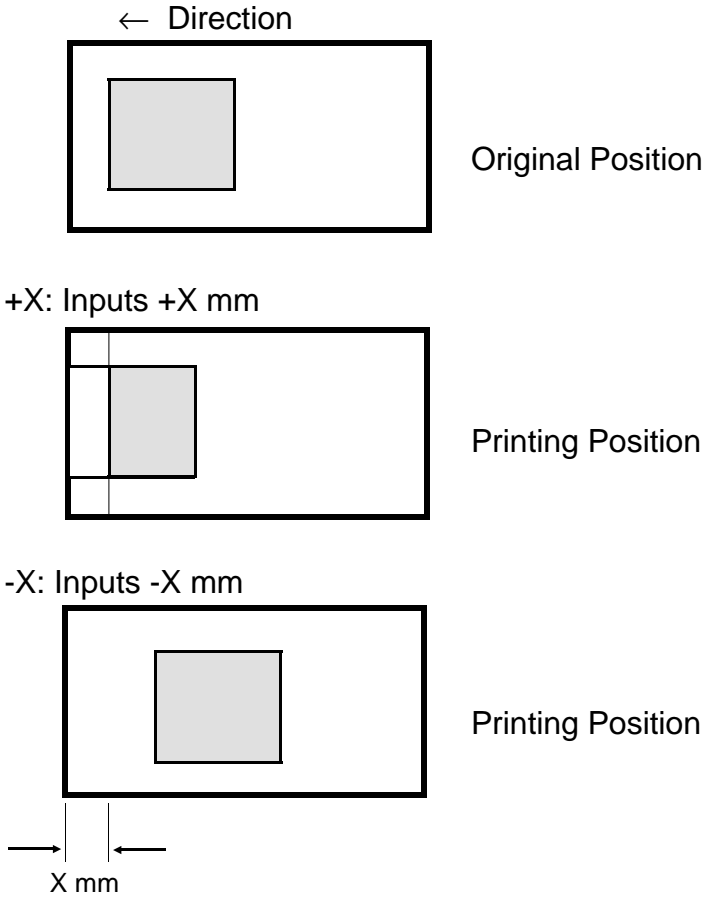
No.	Display	Function	Data	Factory Setting	Comments
151.	Machine No.	Displays the machine serial number and the installation date.		0	Input the serial number and the installation date.
152.	Service Tel. No.	Input the service representative's telephone number, which is displayed with the service call code.		0	Use the number keys to input the telephone number at installation. Press the Memory/Class key to add a space between the digits.
153.	Last Service Code	Displays the last service call.		0	
*160.	♥: Area Mask A3 <input type="checkbox"/> ♦: Area Mask 11x17 <input type="checkbox"/>	Adjust the margin erase area. ♥: A3 ♦: 11" x 17"	(50 to 307) x (50 to 432) mm	♥: 289 x416mm ♦: 271 x428mm	
*161.	♥: Area Mask B4 <input type="checkbox"/> ♦: Area Mask 8.5x14 <input type="checkbox"/>	Adjust the margin erase area. ♥: B4 ♦: 8 1/2" x 14"	(50 to 307) x (50 to 432) mm	♥: 249 x360mm ♦: 208 x352mm	
*162.	♥: Area Mask A4 <input type="checkbox"/> ♦: Area Mask 8.5x11 <input type="checkbox"/>	Adjust the margin erase area. ♥: A4 Landscape ♦: 8 1/2" x 11" Landscape	(50 to 307) x (50 to 432) mm	♥: 202 x293mm ♦: 208 x275mm	
*163.	♥: Area Mask A4 <input type="checkbox"/> ♦: Area Mask 8.5x11 <input type="checkbox"/>	Adjust the margin erase area. ♥: A4 Portrait ♦: 8 1/2" x 11" Portrait	(50 to 307) x (50 to 432) mm	♥: 289 x206mm ♦: 271 x212mm	
*164.	♥: Area Mask B5 <input type="checkbox"/> ♦: Area Mask 5.5x8.5 <input type="checkbox"/>	Adjust the margin erase area. ♥: B5 Landscape ♦: 5 1/2" x 8 1/2" Landscape	(50 to 307) x (50 to 432) mm	♥: 174 x253mm ♦: 132 x212mm	
*165.	♥: Area Mask B5 <input type="checkbox"/> ♦: Area Mask 5.5x8.5 <input type="checkbox"/>	Adjust the margin erase area. ♥: B5 Portrait ♦: 5 1/2" x 8 1/2" Portrait	(50 to 307) x (50 to 432) mm	♥: 249 x178mm ♦: 208 x136mm	

No.	Display	Function	Data	Factory Setting	Comments
*166.	♥: Area Mask A5 <input type="checkbox"/> ♦: Area Mask **1 <input type="checkbox"/>	Adjust the margin erase area. ♥: A5 Landscape ♦: 2" x 2"	(50 to 307) x (50 to 432) mm	♥: 140 x206mm ♦: 50x50mm	
*167.	♥: Area Mask A5 <input type="checkbox"/> ♦: Area Mask **2 <input type="checkbox"/>	Adjust the margin erase area. ♥: A5 Portrait ♦: 2" x 2"	(50 to 307) x (50 to 432) mm	♥: 202 x144mm ♦: 50x50mm	
*168.	♥: Area Mask A6 <input type="checkbox"/> ♦: Area Mask **3 <input type="checkbox"/>	Adjust the margin erase area. ♥: A6 Landscape ♦: 2" x 2"	(50 to 307) x (50 to 432) mm	♥: 97x144mm ♦: 50x50mm	
*169.	♥: Area Mask A6 <input type="checkbox"/> ♦: Area Mask **4 <input type="checkbox"/>	Adjust the margin erase area. ♥: A6 Portrait ♦: 2" x 2"	(50 to 307) x (50 to 432) mm	♥: 140 x101mm ♦: 50x50mm	
*170.	♥: Area Mask ** <input type="checkbox"/> ♦: Area Mask **5 <input type="checkbox"/>	Adjust the margin erase area. ♥: Others ♦: 2" x 2"	(50 to 307) x (50 to 432) mm	♥: 92x144mm ♦: 50x50mm	

Remarks

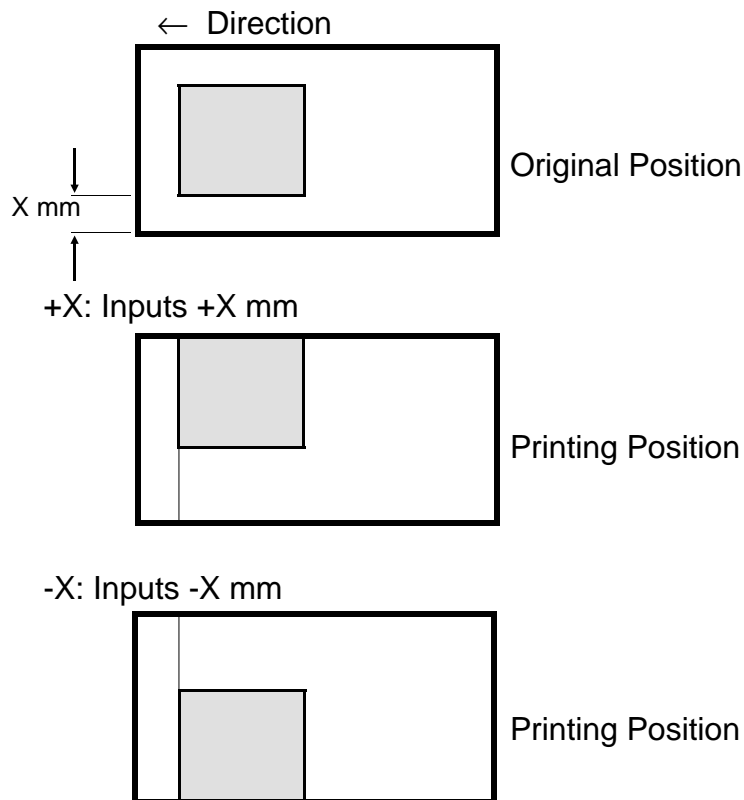
1) SP-Mode No. 38 – ADF Scan Line Position

The printing position moves as shown below.



2) SP-Mode No. 39 – Image Center Position

The printing position moves as shown below.



Note: In the case of image position adjustment of the scanner, input "0" first;

Example) $X = 0.9$ mm \rightarrow "0", "9", and then press the # key.

3) SP-Mode No. 86 – A3 Drum 2 Count Up

The counter increment goes up by 2 if an A3 drum is installed, regardless of the size of paper.

The default setting is changed with DIP switch 102. See page 4-8 for details.

4) SP-Mode No. 87 – Memory Print

Set this mode to Memory to print a different number of prints from each original. The machine will stop after printing each group. You must press the Print Start key each time to go on to print the next group. When all printing is completed, the input data is cleared.

Set this mode to Stack to print a different number of prints from only one original. The machine will print all printing groups continuously, without feeding the tape from the tape dispenser. When all printing is completed, the input data is stored in the machine.

5) SP-Mode No.88 – Auto Memory/Class

Set this mode to Yes to let the machine print all groups continuously without installing a tape dispenser.

6) SP Mode 92 – Thermal Paper Mode

You can use this mode to test the thermal head.

Place the thermal paper in the plotter face down and change this SP Mode to 1. Place an original on the exposure glass and press the Master Making key. The machine will start plotting on the thermal paper without doing the master clamp process.

You can also enable SP Mode 90 and press the Master Making key to do the same procedure without placing an original on the exposure glass.

7) SP Mode 93 – Erase Area Check

This checks the erased area for shadow erase (Center and Edge Margin Erasing). If you make a master and print an image with this mode, the machine will make a background pattern on the area to be erased.

8) SP-Mode No. 95 – Scanner Free Run

- It is possible to change the first scanner speed by changing the magnification ratio:
25 to 200 % (Maximum speed = 25 %)
- To start scanner free run, press the Print Start key after selecting "Lamp On/Off" using the # key.
Input a magnification ratio if you wish to change the first scanner speed, before you press the Start key. (Factory setting = 25 %)
- To stop the scanner free run, press the Stop key. The scanner returns to home position, then stops.
- The machine does not exit SP mode until the scanner will return to home position correctly.

9) SP-Mode No. 96 – ADF Original Feed Check

- It is possible to change the original feed speed, by changing the magnification ratio:
25 to 200 % (Maximum speed = 25 %)
- To start original feed, press the Print Start key after placing originals in the ADF.
Input a magnification ratio if you wish to change the original feed speed, before you press the Start key. The ADF starts feeding until all originals are fed.
- To stop feeding, press the Stop key. The original will stop at this moment.
- If the original feed fails, or if the Stop key is pressed, the "A + Jam" indicator will turn on.
If the failed originals are removed from the ADF, the jam indicator will turn off and the failure is reset.
- The machine will not exit SP mode during feeding.

10) SP-Mode No. 118 – Print Size Count

- The print size counter indicates the following paper sizes:

A4 version	LT version (standard)
• A3	• DLT
• B4	• LG
• A4 Landscape	• LT Landscape
• A4 Portrait	• LT Portrait
• B5 Landscape	• HLT
• B5 Portrait	• * (Others)
• * (Others)	

11) Others

- Use the Memory/Class key if you wish to change +/-.

2.3 THERMAL HEAD TEST

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

In this mode, the printed background pattern will cover the entire sheet of paper.

Procedure

1. Place paper on the paper table.

NOTE: To reduce thermal head load, use the smallest paper size possible, i.e. the smallest size on which the area with the image problem can be printed.

2. Access SP mode.

3. Input No. 90 and press the Enter key.

NOTE: The factory setting is pattern No. 7. If necessary, input another background pattern using the Number keys.

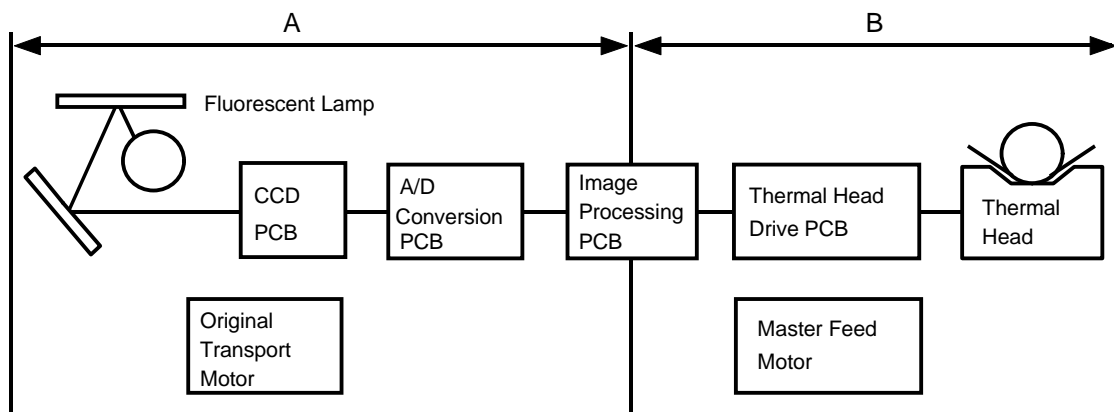
4. Press the Master Making key (an original is not necessary).

5. Make prints and check the image.

Assessment

If the pattern image is normal, a Part A component is defective.

If the pattern image is abnormal, a Part B component is defective.



- This mode can be used in combination with the SP mode No. 92, Thermal Paper Mode. See Page 4-18 for details.

2.4 COMMAND SHEET CHECK

Normally, Fn 9 or Fn 19 cannot be inputted in the Make-up mode.

By changing the data of SP mode #91 from 0 to 1, Fn 9 or Fn 19 can be input.

Command No.	Display	Function
Fn 9	OVERLAY	Prints both the original image and designated area of the command sheet on the paper.
Fn 19	OVERLAY	

This function is used to check the position of the designated area on the command sheet. It is checked in relation to the original image to ensure that the command sheet is being read correctly.

Procedure

1. Access SP mode.
 2. Input 91 and press the Enter key.
 3. Input 1 and press the Enter key.
 4. Press the Clear Modes key to exit the SP mode.
 5. Place the command sheet and the original in the ADF.
 6. Press the Make-up key and input Fn 9 or Fn 19 (these commands have the same function).
 7. Input 1 for the undesignated area.
 8. Press the Master Making key and then check the print to ensure that the area designated by the command sheet is in the correct position on the original image.
- NOTE:**
1. Only one command sheet can be stored in memory. If two or more command sheets are read, only the last command sheet is output.
 2. Ensure that the SP mode 91 is returned to its original setting after checking the designated area position.

2.5 INPUT/OUTPUT CHECK MODE

This program checks the electrical components. The procedure for accessing the program is as follows:

2.5.1 Input Check Mode Access Procedure

1. Access SP mode. (See the SP mode access procedure.)
2. Enter 130 (SP mode number) with the number keys.
3. Press the Enter key.
4. Enter the desired input number. (See the input check table.)

NOTE: The input number can be shifted up or down by pressing the Zoom keys ("+" or "-").

5. Press the Enter key.

NOTE: In the input check mode, all image position LEDs and printing speed LEDs turn on when a sensor or switch that is being tested is actuated. A beep will also be heard.

6. Press the Enter key to return the display to the initial input check menu.
7. Press the Clear Modes key to exit the SP mode.

2.5.2 Output Check Mode Access Procedure

1. Access SP mode. (See the SP mode access procedure.)
2. Enter 131 (SP mode number) with the number keys.
3. Press the Enter key.
4. Enter the desired output number. (See the output check table.)

NOTE: The output number can be shifted up or down by pressing the Zoom key ("+" or "-").

5. Press the Enter key.
6. Press the Print Start key to turn on the component.
7. Press the Enter key to return the display to the initial output check menu.
8. Press the Clear Modes key to exit the SP mode.

2.5.3 Input Check Table

Code	LCD Display	Component Checked
1.	SN: ADF Cover In- 1	ADF Cover Sensor
2.	SN: 1st Original (ADF) In- 2	Original Set Sensor
3.	SN: 2nd Original (ADF) In- 3	Original Registration Sensor
4.	SN: 3rd Original (ADF) In- 4	Scan Line Sensor
5.	SN: Original Size 0 In- 5	Original Width Sensor – 0
6.	SN: Original Size 1 In- 6	Original Width Sensor – 1
7.	SN: Original Size 2 In- 7	Original Width Sensor – 2
8.	SN: Original Size 3 In- 8	Original Width Sensor – 3
9.	SN: Cassette Size 0 In- 9	Cassette Size Switch – 4
10.	SN: Cassette Size 1 In-10	Cassette Size Switch – 3
11.	SN: Cassette Size 2 In-11	Cassette Size Switch – 2
12.	SN: Cassette Size 3 In-12	Cassette Size Switch – 1
13.	SN: Paper Size 0 In-13	Paper Width Sensor – 0
14.	SN: Paper Size 1 In-14	Paper Width Sensor – 1
15.	SN: Paper Size 2 In-15	Paper Width Sensor – 2
16.	SN: Paper Size 3 In-16	Paper Width Sensor – 3
17.	SN: Paper Size 4 In-17	Paper Length Sensor
18.	SN: Paper End In-18	Paper End Sensor
19.	SW: Paper Table Open In-19	Paper Table Open Switch
20.	SN: Paper Table Low Limit In-20	Paper Table Lower Limit Sensor
21.	SN: Paper Table Height In-21	Paper Table Height Sensor
22.	KEY: Lower Paper Feed Table In-22	Paper Table Down key
23.	SW: Right Cutter In-23	Right Cutter Switch

Code	LCD Display	Component Checked
24.	SW: Left Cutter In-24	Left Cutter Switch
25.	SN: Master Buckle In-25	Master Buckle Sensor
26.	SN: Master End In-26	Master End Sensor
27.	SIG: Ink In-27	When the Ink Detecting Pin detects ink
28.	SIG: Color Drum In-28	When a color drum is set
29.	SIG: Drum Size 0 In-29	When an A3/DLT or A4/LG drum is set
30.	SIG: Drum Set In-30	When an A4/LT drum is set
31.	SN: Pressure Plate High Position In-31	Upper Pressure Plate Sensor
32.	SN: Pressure Plate Low Position In-32	Lower Pressure Plate Sensor
33.	SW: Master Eject Box In-33	Master Eject Box Switch
34.	SN: Full Master In-34	Full Master Detection Sensor
35.	SN: Printing Pressure In-35	Printing Pressure Sensor
36.	SN: 1st Drum Position In-36	First Drum Position Sensor
37.	SN: 2nd Drum Position In-37	Second Drum Position Sensor
38.	SW: Manual Master Cut In-38	Master Cut Switch
39.	SIG: Key Counter In-39	When a key counter is set
40.	SIG: Power Supply Temp. Detect In-40	When the power supply unit temperature is over 85°C
41.	SN: 1st Paper Exit In-41	First Paper Exit Sensor
42.	SN: 2nd Paper Exit In-42	Second Paper Exit Sensor
43.	SN: Master Eject In-43	Master Eject Sensor
44.	SN: Drum Master In-44	Drum Master Detection Sensor
45.	SN: Scanner Home Position In-45	Scanner Home Position Sensor
46.	SN: Platen Angle (Scanner) In-46	Platen Cover Position Sensor
47.	SN: Platen Set (Scanner) In-47	ADF Set Sensor

Code	LCD Display	Component Checked
48.	SN: Platen Original (Scanner) In-48	Original Sensor
49.	SN: 4th Original (ADF) In-49	Original Exit Sensor
50.	SW: Delivery Table Open In-50	Delivery Table Open Switch

2.5.4 Output Check Table

Code	LCD Display	Description
2.	MOTOR: ADF Drive Out- 2	Turns on the ADF drive motor.
3.	MOTOR: Master Eject Out- 3	Turns on the master eject motor.
4.	MOTOR: Pressure Plate Up/Down Out- 4	Turns on the pressure plate up/down motor.
5.	MC: Master Reverse Roller Out- 5	Turns on the master reverse roller magnetic clutch.
6.	MOTOR: Vacuum Out- 6	Turns on the vacuum fan motor.
7.	MOTOR: Air Knife Out- 7	Turns on the air knife motor.
8.	SIG: Key Counter Out- 8	Increments the key counter.
9.	COUNTER: Master Out- 9	Increments the master counter.
10.	COUNTER: Paper Out-10	Increments the total counter.
11.	SOL: Paper Separation Release Out-11	Turns on the separation plate release solenoid.
12.	SOL: Ink Supply Out-12	Turns on the ink supply solenoid.
13.	SOL: Drum Lock Out-13	Turns on the drum lock solenoid.
14.	SOL: Paper Feed/Print Pressure Out-14	Turns on the paper feed solenoid and the printing pressure solenoid.
15.	SOL: Master Feed Clamper Out-15	Turns on the master feed clamper solenoid.
16.	SOL: Master Eject Clamper Out-16	Turns on the master eject clamper solenoid.
17.	SOL: Master Eject Out-17	Turns on the master eject solenoid.
18.	RELAY: Paper Table Down Out-18	Turns on the paper table drive motor (down).
19.	RELAY: Paper Table Up Out-19	Turns on the paper table drive motor (up).
20.	RELAY: Main Motor Reverse Out-20	Turns the drum in the direction opposite to the printing direction.
21.	SIG: Fluorescent Lamp Out-21	Turns on the fluorescent lamp if the Print key is pressed. Turns off the lamp if the Print key is pressed again.
22.	MOTOR: Cutter + Direction Out-22	Turns on the cutter motor (moves it to the front of the machine).
23.	MOTOR: Cutter – Direction Out-23	Turns on the cutter motor (moves it to the rear of the machine).
24.	MOTOR: Image Shift + Direction Out-24	Turns the image position motor in the "+" direction.

Code	LCD Display	Description
25.	MOTOR: Image Shift – Direction Out-25	Turns the image position motor in the "-" direction.
26.	MOTOR: Main (10 rpm) Out-26	Turns on the main motor (10 rpm).
27.	MOTOR: Main (30 rpm) Out-27	Turns on the main motor (30 rpm).
28.	MOTOR: Main (1st Speed) Out-28	Turns on the main motor (1st speed).
29.	MOTOR: Main (2nd Speed) Out-29	Turns on the main motor (2nd speed).
30.	MOTOR: Main (3rd Speed) Out-30	Turns on the main motor (3rd speed).
31.	MOTOR: Main (4th Speed) Out-31	Turns on the main motor (4th speed).
32.	MOTOR: Main (5th Speed) Out-32	Turns on the main motor (5th speed).
33.	MOTOR: Original Feed Out-33	Turns on the original transport motor.
34.	MOTOR: Master Feed Out-34	Turns on the master feed motor.
35.	MOTOR: Paper Reverse Out-35	Turns on the paper return motor.
36.	Turn on drum, feed/ pressure SOLs Out-36	Turns on the main motor (10 rpm), the paper feed solenoid, and the printing pressure solenoid.
37.	MOTOR: Scanner OUT-37	Turns on the scanner motor. Starts by the Print Start key. Stops by the Print Start key again. Then the scanner (carriage) returns to home position by pressing the Print Start key.
38.	EMF Sorter Mode 1 Out-38	Turns on test mode 1. (Available only when the EMF sorter is installed.) Starts with the Print Start key. Stops with the Stop key.
39.	EMF Sorter Mode 2 Out-39	Turns on test mode 2. (Available only when the EMF sorter is installed.) Starts with the Print Start key. Stops with the Stop key.
40.	EMF Sorter Mode 3 Out-40	Turns on test mode 3. (Available only when the EMF sorter is installed.) Starts with the Print Start key. Stops with the Stop key.
41.	EMF Sorter Mode 4 Out-41	Turns on test mode 4. (Available only when the EMF sorter is installed.) Starts with the Print Start key. Stops with the Stop key.

2.6 USER CODE MODE

2.6.1 User Codes

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

There are 20 user codes as follows:

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

2.6.2 How To Use a User Code

1. Enter the user code (3 digits) with the number keys.
2. Press the Enter key.
3. Press the Master Making key to start printing.

NOTE: The user code mode is reset if the Clear Modes key and the Stop key are pressed together.

3. DRUM/MASTER INTERCHANGEABILITY

O: Standard combination

X: Usable under certain conditions

Δ: Cannot be used

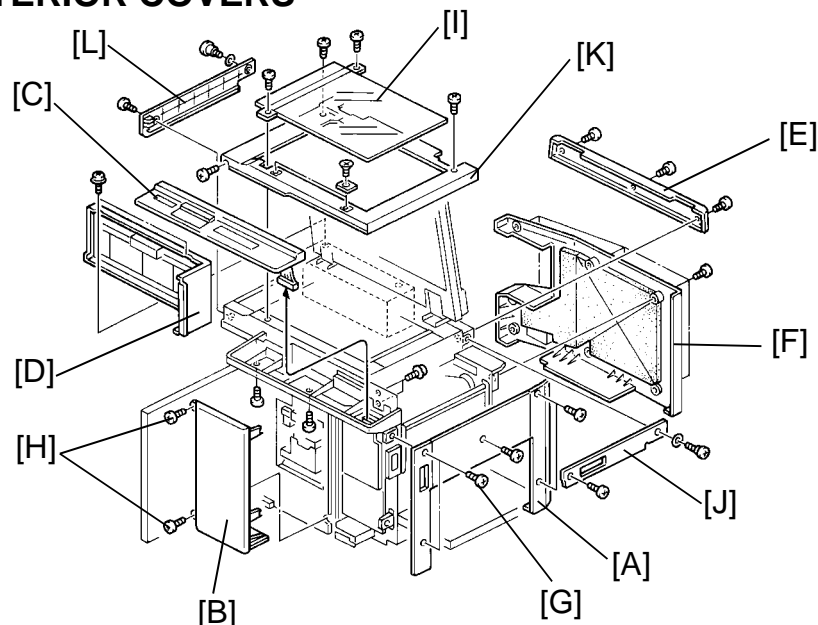
		VT3600
Masters	VT-M	X
	VT-L	X (NOTE 1)
	VT-M II	X
	VT-L II	O
Color Drums	VT2000-B4 (C533)	X
	VT2000-LG (C535)	X
	VT2000II-M (C558)	X
	VT2000II-LG (C557)	X
	VT3000-L (C526)	X (NOTE 2, 3, 4)
	VT3000-S (C528)	X (NOTE 2, 3)
	VT3000II-L (C556)	O
	VT3000II-S (C559)	O

- NOTES:**
1. The VT-L master can be installed. However, a weak image (sometimes a blank image) will appear. This is because the VT-M II master is more sensitive than the VT-M master.
 2. The modified clasper and the tetron screen must be installed.
 3. For the U.S. version of the machine, the modified Drum Unit Rail End must be installed (for safety standard reasons).
 4. The A3 size print area for the VT3600 is longer.

REPLACEMENT AND ADJUSTMENT

1. EXTERIOR

1.1 EXTERIOR COVERS



When adjusting or disassembling each section, refer to the following procedures on how to remove the exterior covers.

[A] Right Cover (5 screws)

[B] Right Front Cover: Open the front door, loosen the 2 screws [G], remove the 2 screws [H].

[C] Operation Panel: Open the front door, slide the scanner unit to the left and remove the 4 screws.

[D] Master Eject Cover: Open the master eject unit and remove the 2 screws.

[E] Upper Rear Cover: Remove the 3 screws.

[F] Rear Cover: Remove the 7 screws.

[K] Upper Cover

1: Remove the exposure glass [I] (2 screws).

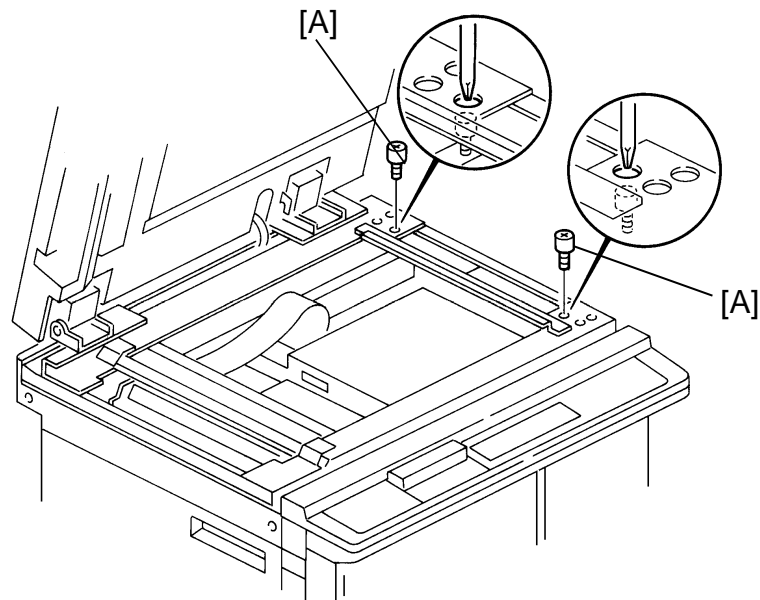
2: Remove the right upper cover [J] (Front: 1 screw /Rear: 1 stepped screw, 1 washer)

3: Remove the upper cover [K] (5 screws)

[L] Left Upper Cover (Front: 1 screw /Rear: 1 stepped screw, 1 washer).

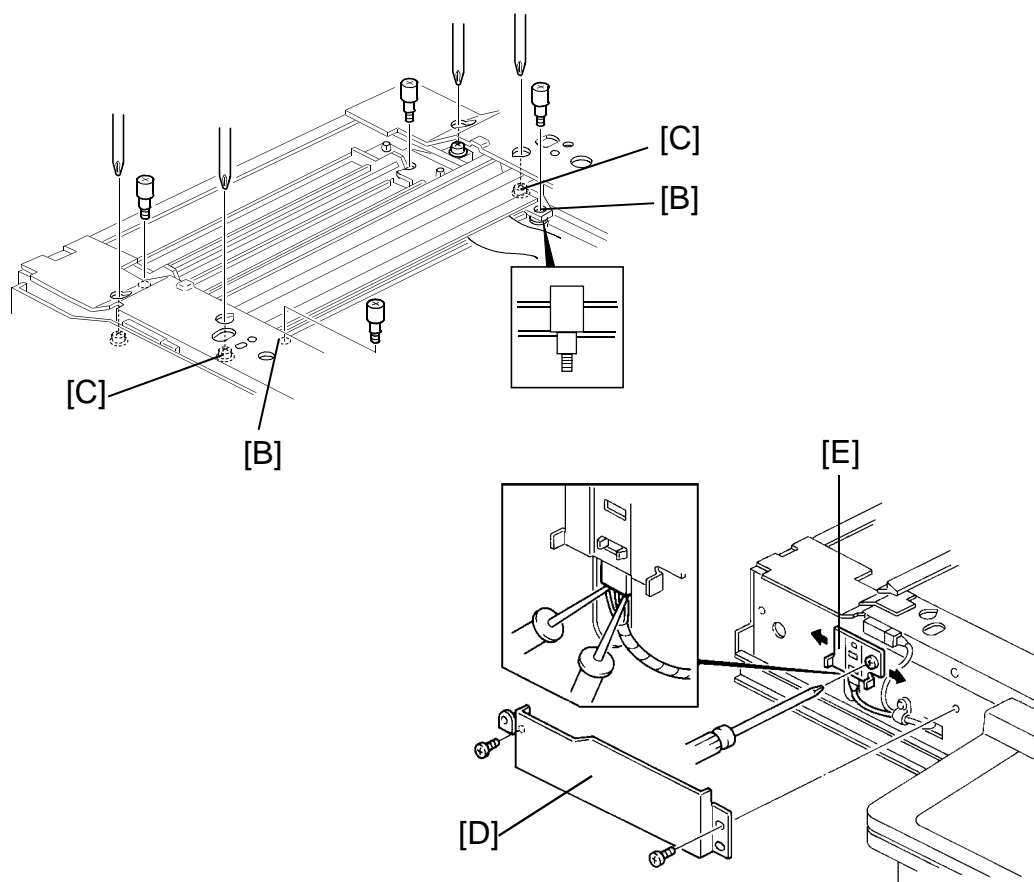
2. SCANNER SECTION

2.1 ADJUSTING THE SCANNER POSITION



Purpose: Ensure the position of the first and second scanners are parallel to the scan line position.

1. Restart the machine with the main switch, to allow the scanners to move to the home position. Then, enter the scanner home position check mode (SP no.130, Mode no. 45; see section 4-2).
2. Remove two positioning pins [A] that are located in the right side of the scanner.



3. Put the positioning pins in the front and rear holes [B] of the first scanner. Ensure that the positioning pins are set in the holes smoothly.
4. If the pins did not fit smoothly, adjust the position of the first scanner with the screws [C].
5. Check and adjust the position of the second scanner using the same procedure as in steps 3 and 4.
6. Slide the scanner unit and remove the sensor cover [D] (2 screws).
7. Connect the probes of the multimeter to the sensor's connector.
 CN1: +5V
 CN2: GND
 CN3: Scanner H.P (Signal)
8. Slide the sensor bracket [E] and tighten the bracket when the sensor output goes to low (5 V to 0 V).
9. Check the optics adjustments and adjust them if necessary

2.2 FLUORESCENT LAMP

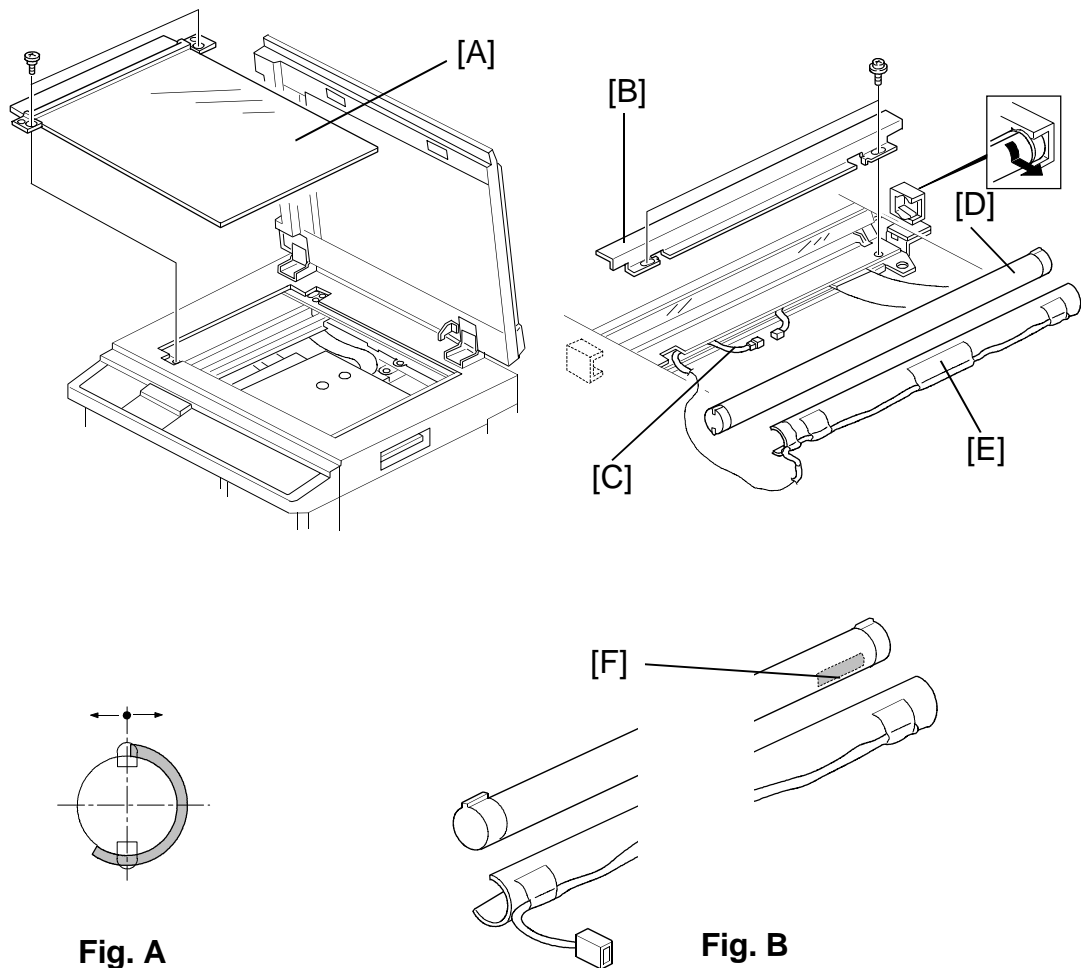


Fig. A

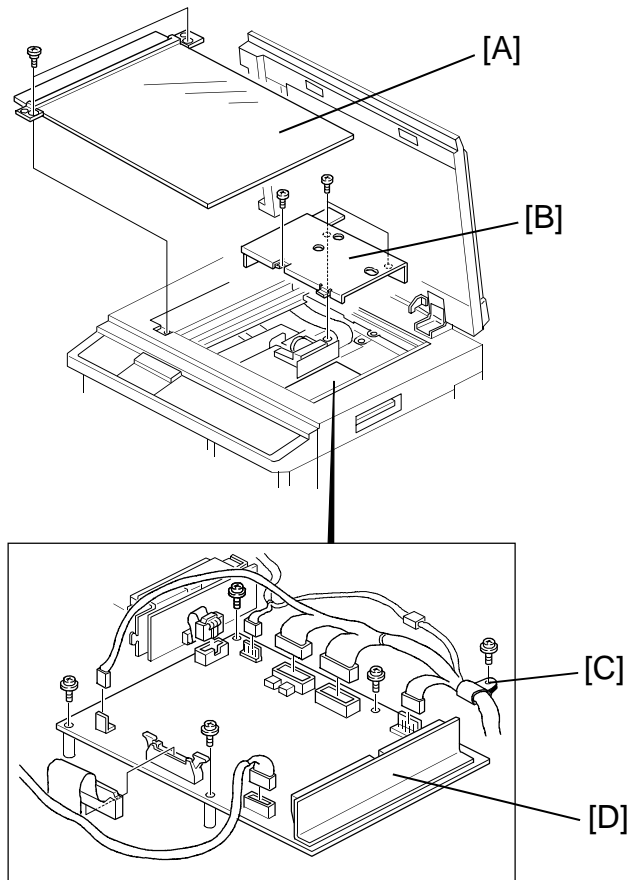
Fig. B

1. Remove the exposure glass [A] (2 screws).
2. Remove the lamp cover [B] (2 screws).
3. Disconnect the lamp heater harness [C].
4. Remove the fluorescent lamp [D].
5. Remove the lamp heater [E].

NOTE: When you reinstall the lamp heater, ensure of the following items.

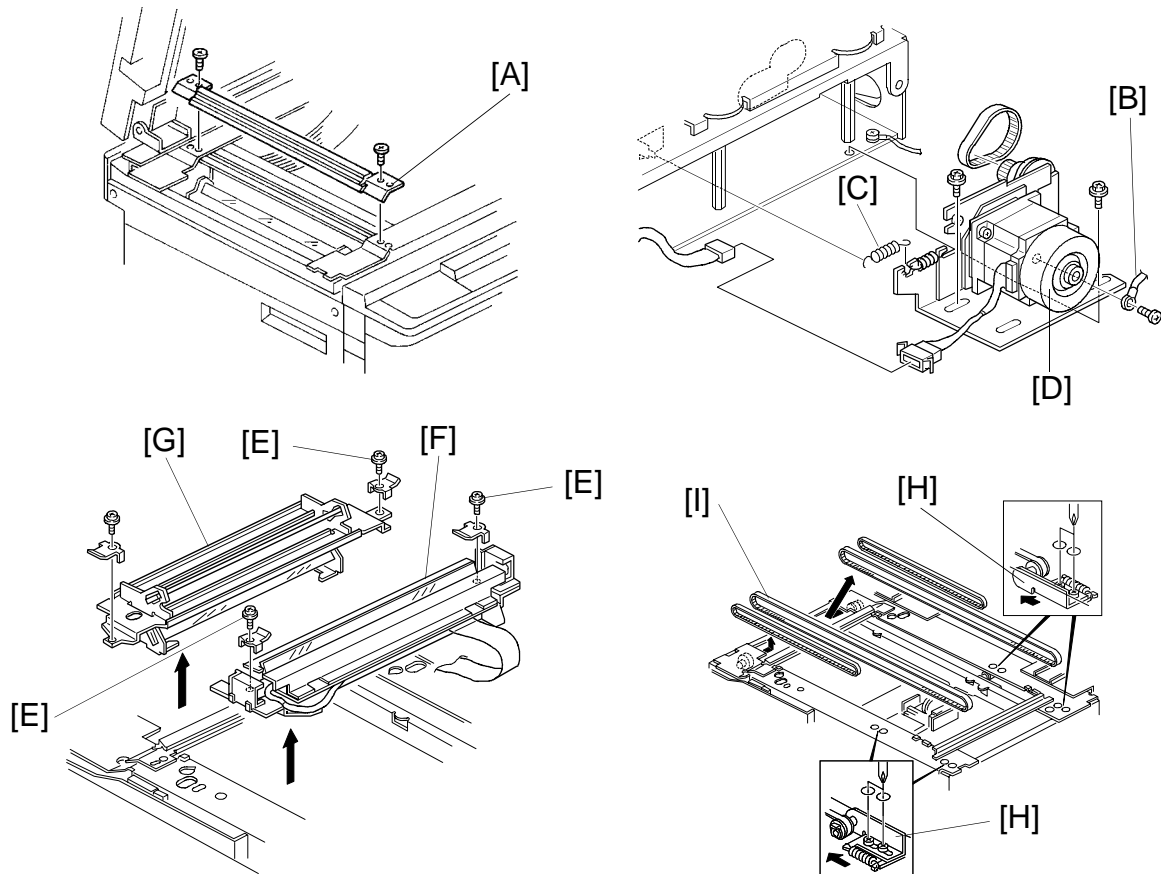
- * The edge of the heater should be in the same position as the lamp bias terminal as shown in figure A.
- * The maker name [F] of the lamp should be covered with the heater as shown in figure B.

2.3 A/D CONVERSION PCB



1. Remove the exposure glass [A] (2 screws).
2. Remove the lens block cover [B] (3 screws).
3. Remove the harness clamp [C] (1 screw).
4. Remove the A/D conversion PCB [D] (4 screws, 7 connectors).

2.4 SCANNER TIMING BELTS



1. Remove the exposure glass (see section 1-1).
2. Remove the upper cover (see section 1-1).
3. Remove the exit guide [A] (2 screws).
4. Remove the upper rear cover (see section 1-1).
5. Remove the grounding wire [B] (1 screw).
6. Remove the spring [C].
7. Remove the scanner motor assembly [D] (2 screws, 1 connector, 1 timing belt).
8. Loosen the screws [E] securing both the 1st scanner [F] and 2nd scanner [G]. Then, take out these scanners.
9. Loosen the screws securing the belt tension brackets [H].
10. Remove the timing belts [I].

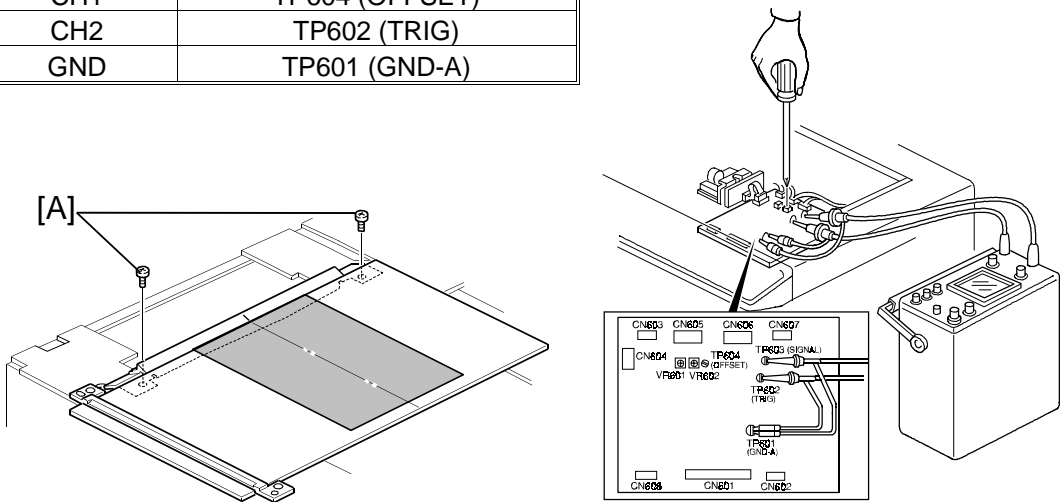
NOTE: After replacing the scanners, the scanner position adjustment must be performed (see section 2-1).

3. OPTICS SECTION

3.1 OVERVIEW

- 1) Facsimile Test Chart R-21
- (99992131)
- 2) Resolution Chart
- (A0129110)
- 3) Oscilloscope

Oscilloscope	Test Pin
CH1	TP603 (SIGNAL)
CH1	TP604 (OFFSET)
CH2	TP602 (TRIG)
GND	TP601 (GND-A)

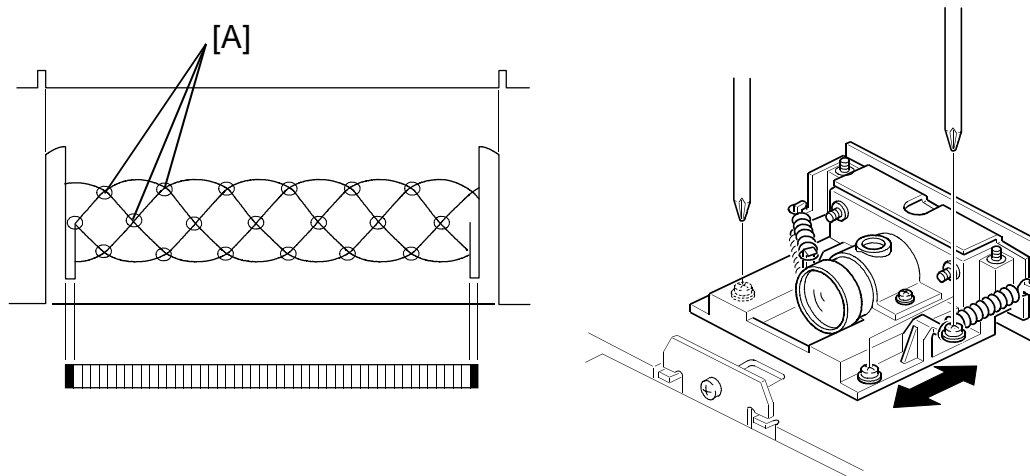


3.2 PREPARATION FOR ADJUSTMENT

1. Remove the upper cover (see section 1-1).
2. Remove the lens block cover.
3. Connect the terminals of the oscilloscope to the above mentioned test pins on the A/D conversion board. Refer to chart above.
4. Turn the main switch on and access the I/O Check Mode (SP-131).
5. Enter 21and press the Print Start key to turn on the fluorescent lamp.
- NOTE:

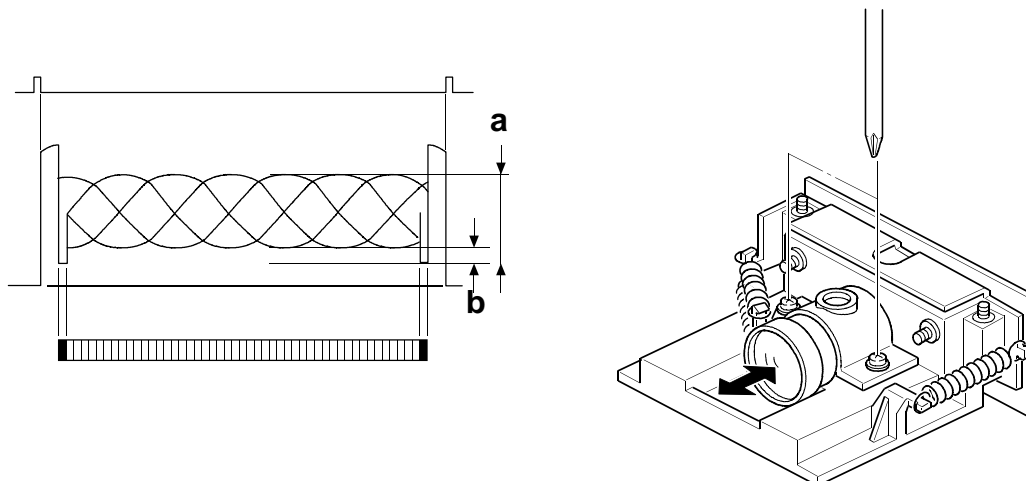
Before adjusting, leave the fluorescent lamp on for 5 minutes to stabilize the light intensity.
6. Remove the screws [A] then take off the exposure glass, rotate it 90 degrees, and position it as shown above.

3.3 ADJUSTING THE REDUCTION RATIO (MOIRE ADJUSTMENT)



Position the resolution chart so that the area concerning 200 dpi on the test chart can be read.
Adjust the lens block position so that there are fewer than 30 cross points [A].

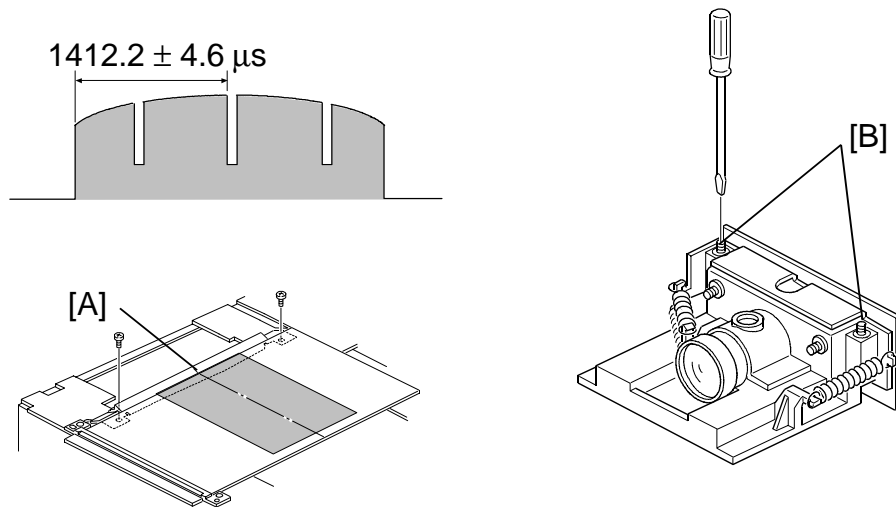
3.4 ADJUSTING THE FOCUS (MTF ADJUSTMENT)



$$\frac{a-b}{a+b} \times 100 \geq 60\%$$

Position the resolution chart so that the area concerning 200 dpi on the test chart can be read. Adjusting the lens position until the waveform's dimensions are as shown above.

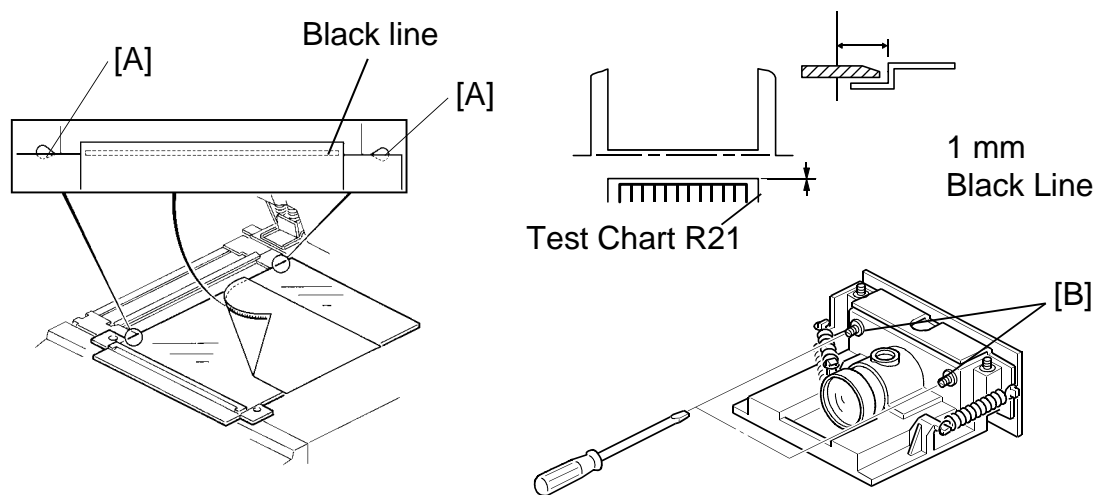
3.5 ADJUSTING THE READING START POSITION IN THE MAIN SCAN DIRECTION



Position the test chart so that the center line, located at the leading edge of the test chart, is positioned at the center mark [A] on the exit guide. Then, scan the test chart.

Adjust the CCD board position by turning the screws [B] until the waveform is as shown in the top diagram.

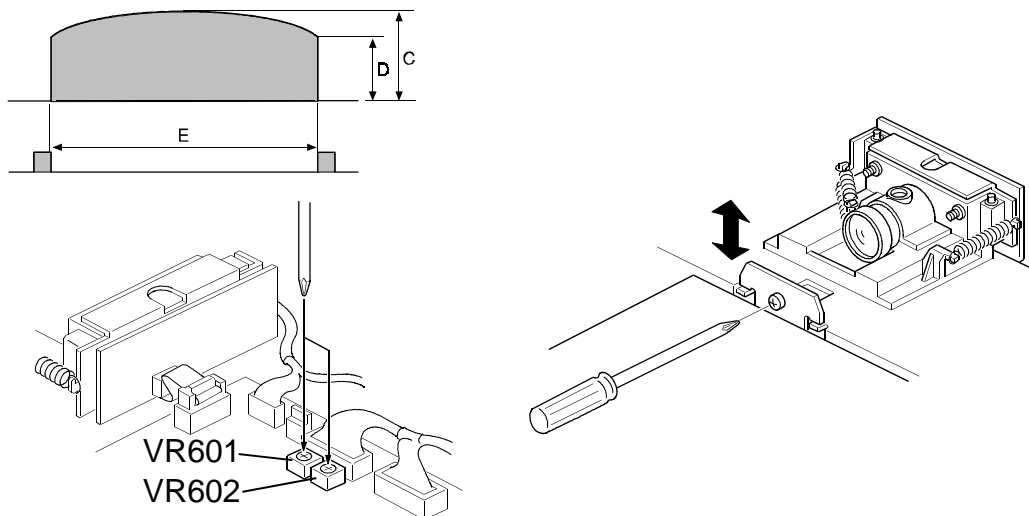
3.6 ADJUSTING THE SCAN LINE POSITION



Position the exposure glass so that the edge of the glass is placed across the center of the holes [A] and place the black line of the test chart just at the edge of the glass as shown in the above diagram.

Adjust the CCD board position by turning the screws [B] until the shape of the wave is similar to that shown in the above diagram.

3.7 ADJUSTING THE SHADING PLATE

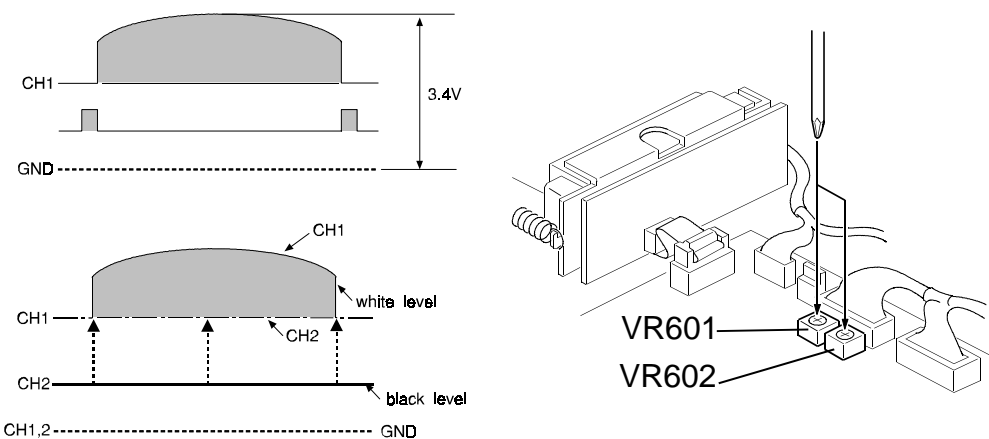


$D > 0.7C$ $C < 1.0V$ $E < 3 \text{ ms}$

* The middle of the waveform should be higher than the ends.

Position the resolution chart so that the white area can be read, then turn VR601 counterclockwise until it stops (maximum white level). Adjust the shading plate position until the wave is shaped as shown above.

3.8 ADJUSTING THE WHITE LEVEL AND BLACK LEVEL



Adjust VR601 on the A/D conversion board so that the maximum level is $3.4 \pm 0.1V$.

Check the standard black level at TP 604. It should be the same as that of the white level. If not, adjust the standard black level by turning VR602.

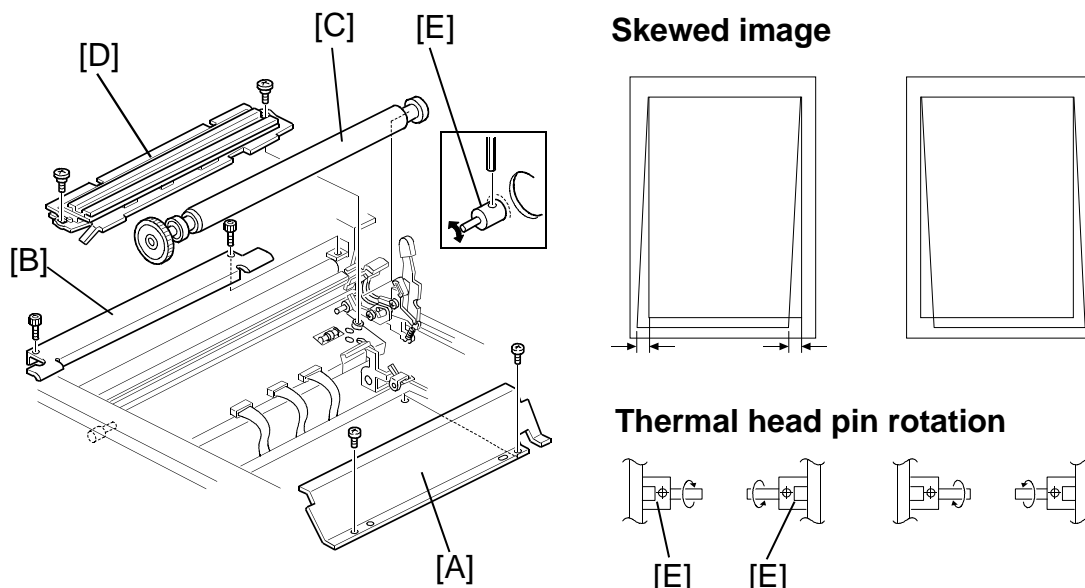
NOTE: When adjusting the standard black level, the GND level of CH1 and CH2 should be the same.

4. MASTER FEED SECTION

4.1 ADJUSTING THE THERMAL HEAD POSITION

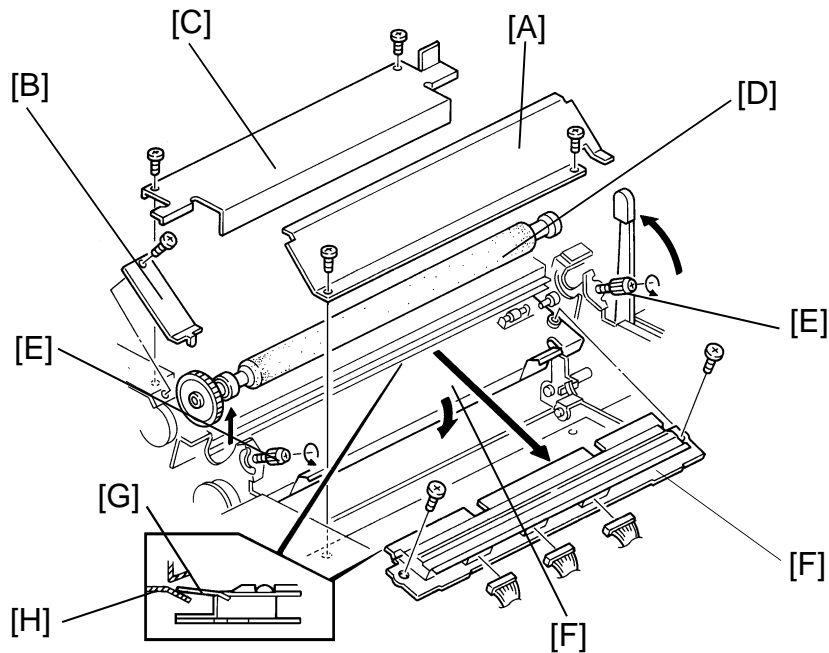
Purpose: To correct the skewed image on the master in the platen mode.

Adjustment standard: There is no skewed image appearing on the master.



1. Make a copy in the platen mode and check that the image is without any skew.
2. If the image is skewed, perform the following steps.
 - 2-1. Take out the master roll.
 - 2-2. Remove the cover [A] (2 screws).
 - 2-3. Remove thermal head cover [B] (2 screws).
 - 2-4. Remove the platen roller [C].
 - 2-5. Remove the thermal head [D] (2 screws, 3 connectors).
 - 2-6. Loosen the set screw in each thermal head pin [E].
 - 2-7. Turn the pins in the opposite direction to each other at the same time by the same amount (0.3 mm/unit on the scale).
 - 2-8. Tighten the set screws, then check the image.

4.2 THERMAL HEAD



1. Slide the scanner unit to the left.
2. Remove the master roll.
3. Remove the thermal head cover [A] (2 screws).
4. Remove the gear cover [B] (1 screw).
5. Remove the platen roller cover [C] (2 screws).
6. Remove the platen roller [D] (loosen 2 screws [E]).
7. Remove the thermal head [F] (2 screws, 3 connectors).

NOTE

- Make sure the thermal guide plate [G] is positioned above the lower cutter unit guide plate [H].
- After replacing the thermal head, perform the thermal head voltage adjustment. Refer to page 5-15.

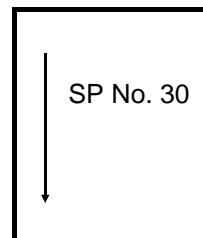
5. IMAGE ADJUSTMENT

5.1 SUB SCAN MAGNIFICATION ADJUSTMENT

Purpose: To correct the sub scan magnification.

Adjustment Standard: $100 \pm 0.5\%$ in the full size mode.

1. Using a test chart, make a print using the platen cover mode.
2. Check that the sub scan magnification is within the specification.
3. If it is out of specification, adjust the sub scan magnification using SP No.30.



5.2 IMAGE CENTER ADJUSTMENT (Side to Side)

Purpose: To correct the center position of the print image.

Adjustment Standard: Less than 1 mm

1. Using a test chart, make a print using the platen cover mode.
NOTE: The center line located at the leading edge of the test chart should be set at the center mark on the left scale.
2. Compare the original and the print image, then confirm that the difference between them is within 1mm.
3. If the difference is too great, adjust the image center using SP No. 39.

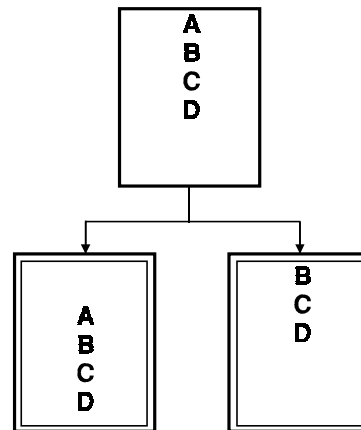
5.3 SCANNER LEADING EDGE REGISTRATION ADJUSTMENT

Purpose: To adjust the scanner start position according to the customer's request.

Standard Position: Scanning starts at 8 mm after the leading edge.

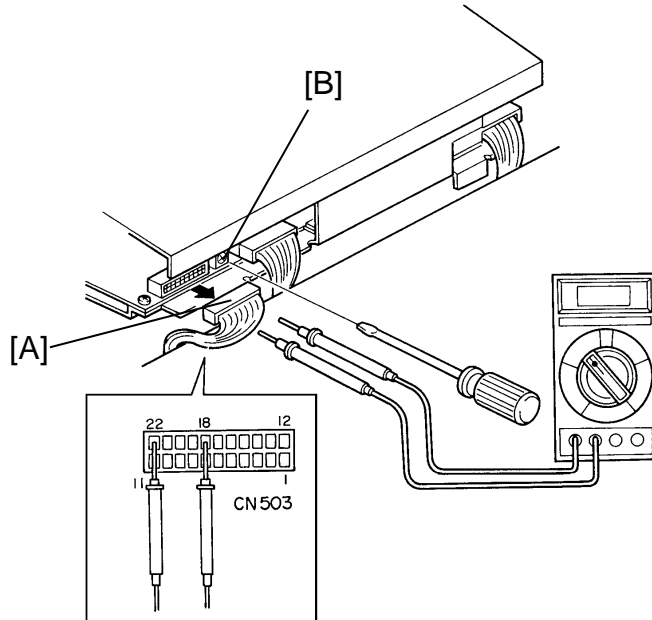
NOTE: When performing this adjustment, set the print speed and the image position to the standard positions.

1. Using a test chart, make a print using the platen mode.
2. Check the scanner start position and adjust the scanner leading edge registration using SP No. 33.



6. MASTER FEED SECTION

6.1 ADJUSTING THE THERMAL HEAD VOLTAGE



Purpose: To maintain quality when making masters and to extend the lifetime of the thermal head.

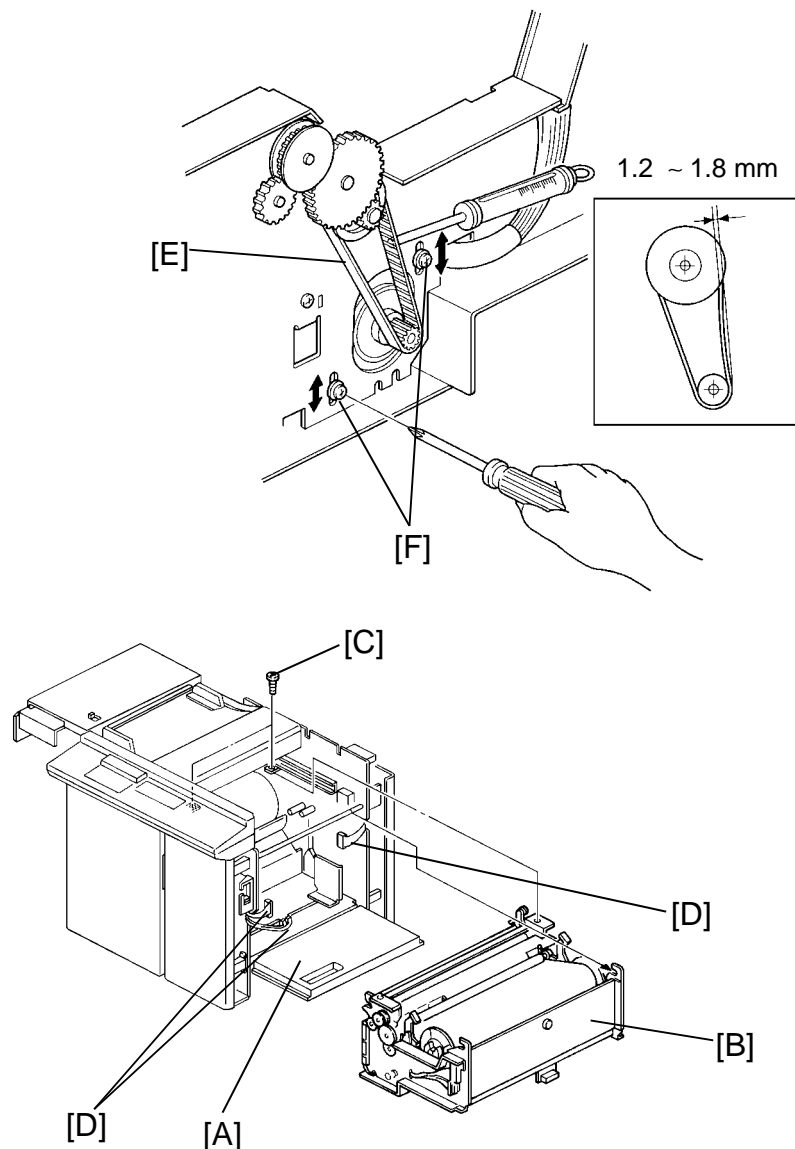
Adjustment Standard: Refer to the voltage value (X) on the thermal head decal of each machine. The adjustment voltage should be between "X – 0.1" and "X".

NOTE: This adjustment is always required whenever the thermal head or the power supply unit is replaced.

1. Turn off the main switch off and remove the paper exit cover plate (4 screws).
2. Check the voltage on the thermal head decal. (The voltage varies according to the individual thermal head.)
3. Turn on the main switch.
4. Confirm that the voltage between pin 22 and pin 18 of CN-503 [A] on the power supply unit is the correct voltage. Refer to the thermal head decal of each machine for the maximum voltage value. (0.1 volts less than the maximum voltage value is also acceptable.)
5. If not, adjust VR1 [B].

Replacement
and
Adjustment

6.2 ADJUSTING THE BELT TENSION

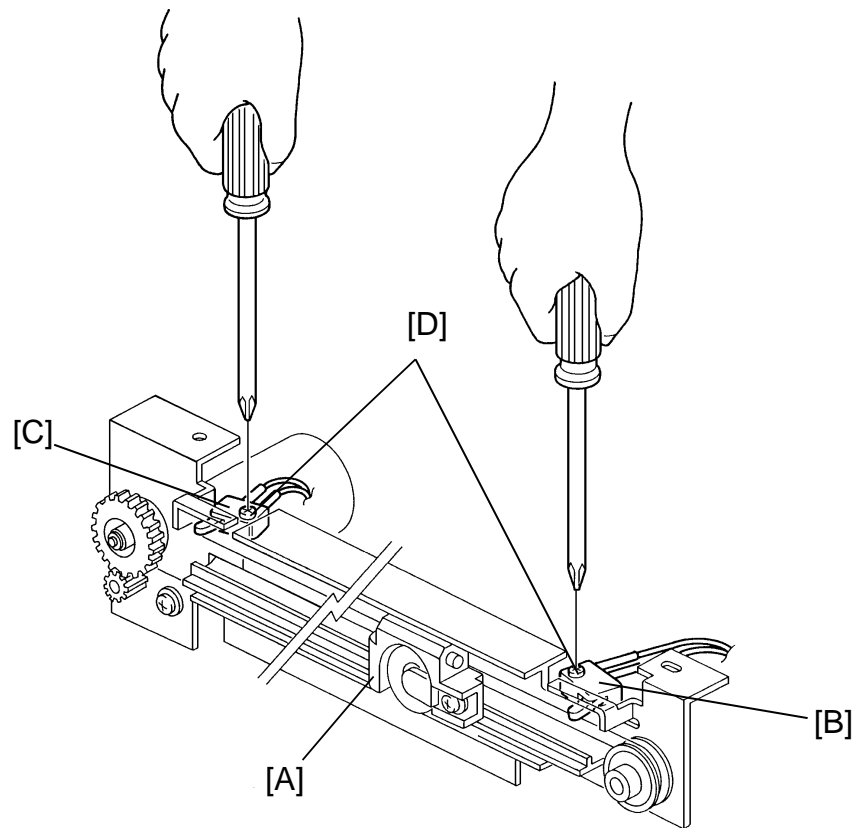


Purpose: To ensure that proper rotation for the master feed is transmitted to each roller.

Adjustment Standard: 1.2 to 1.8 mm

1. Lower the paper table [A].
2. Remove the plotter unit cover (5 screws).
3. Remove the plotter unit [B] (2 screws [C] and 4 connectors [D]).
4. Using a tension gauge, apply a 110-gram load to the center of the belt [E]. Ensure that the belt deflects 1.2 to 1.8 mm.
5. If not, adjust the master feed motor position (2 screws [F]).

6.3 ADJUSTING THE RIGHT AND LEFT CUTTER SWITCHES



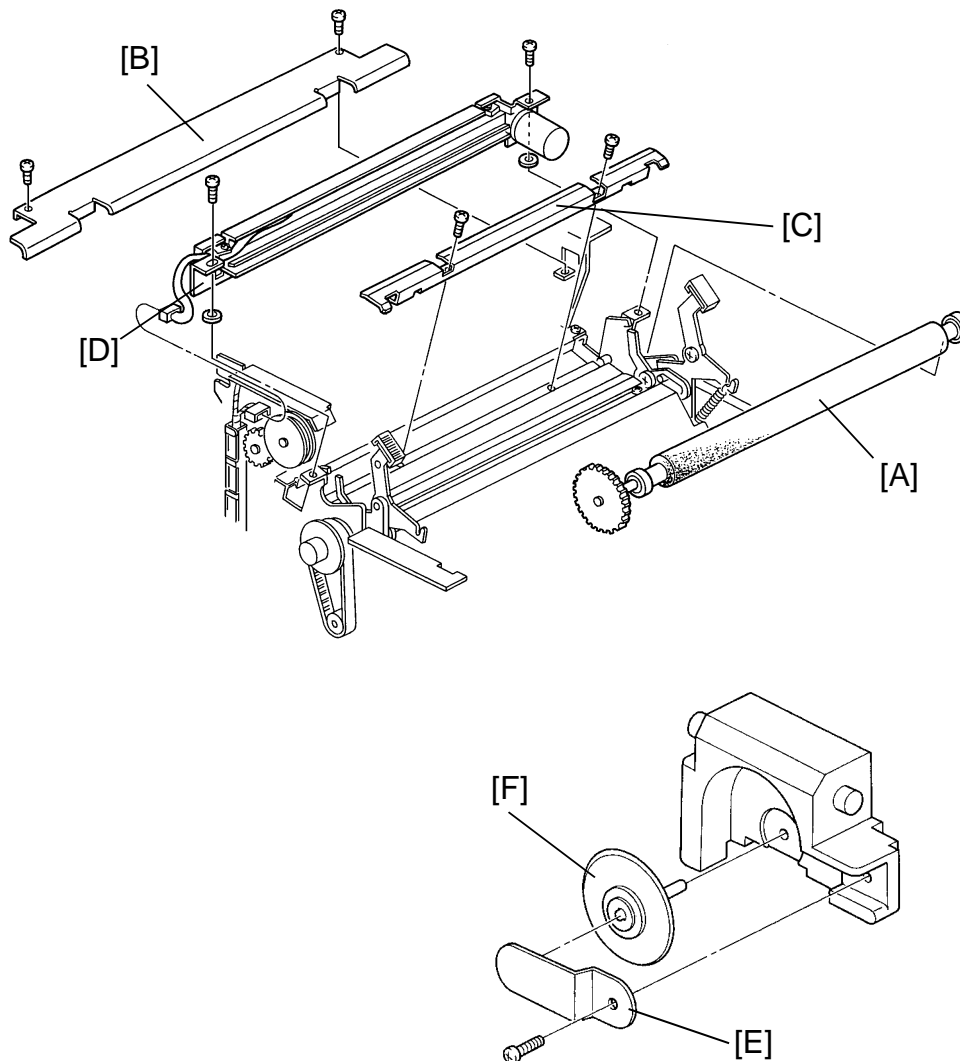
Purpose: To ensure that the cutter slider stops properly.

Adjustment Standard: Confirm that the cutter holder activates the switches.

1. Remove the cutter unit. (See Cutter section.)
2. Move the cutter holder [A] fully to the left, ensure that the left cutter switch [B] is turned on.
3. Move the cutter holder [A] fully to the right, ensure that the right cutter switch [C] is turned on.
4. If not, loosen the mounting screws [D] and adjust the switch positions.

Replacement
and
Adjustment

6.4 CUTTER

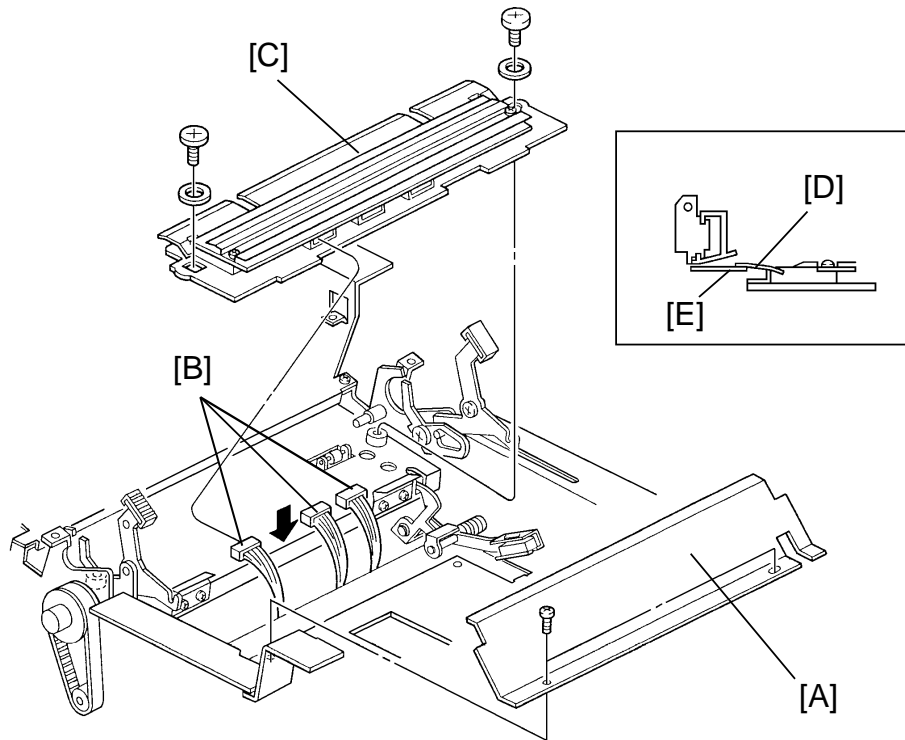


NOTE: Be careful not to damage the thermal head.

1. Lower the paper table.
2. Remove the plotter unit. (See Adjusting the Belt Tension section.)
3. Remove the platen roller [A].
4. Remove the cutter unit cover [B] (2 screws).
5. Remove the thermal head guide plate [C] (2 screws).
6. Remove the cutter unit [D] (2 screws).
7. Remove the holder plate [E] (1 screw) and remove the cutter [F].

WARNING: Do not touch the cutter with bare hands.

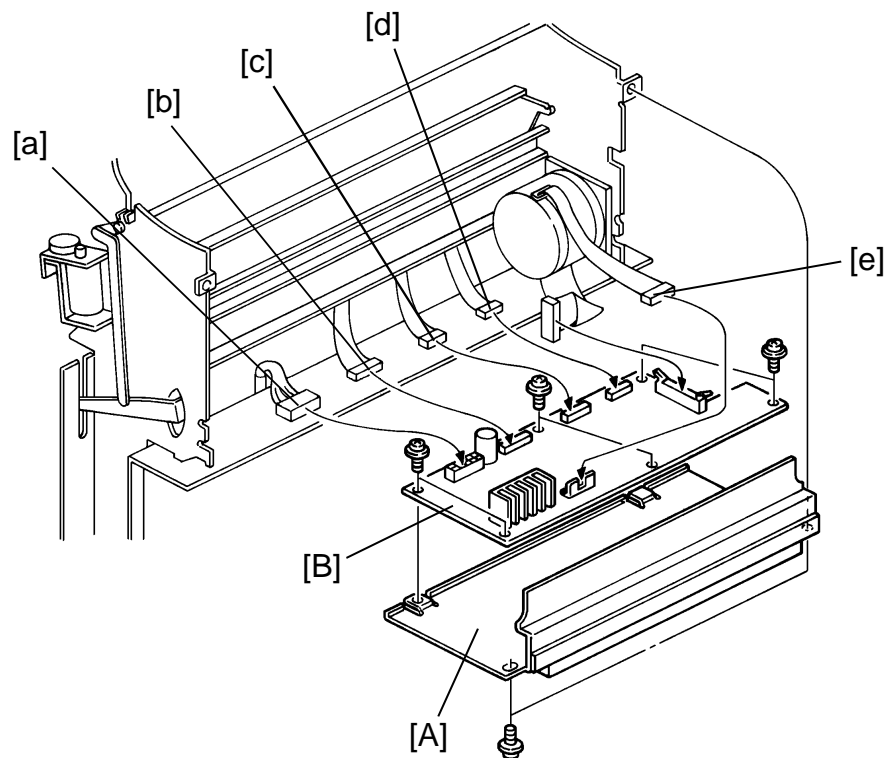
6.5 THERMAL HEAD



1. Slide the scanner unit to the left.
2. Remove the platen roller and remove the master roll.
3. Remove the thermal head cover [A] (2 screws).
4. Disconnect the three thermal head connectors [B].
5. Remove the thermal head [C] (2 screws).

NOTE: 1. Ensure that the thermal guide plate [D] is positioned above the lower cutter unit guide plate [E].
2. Ensure that the 3 connectors are properly secured.

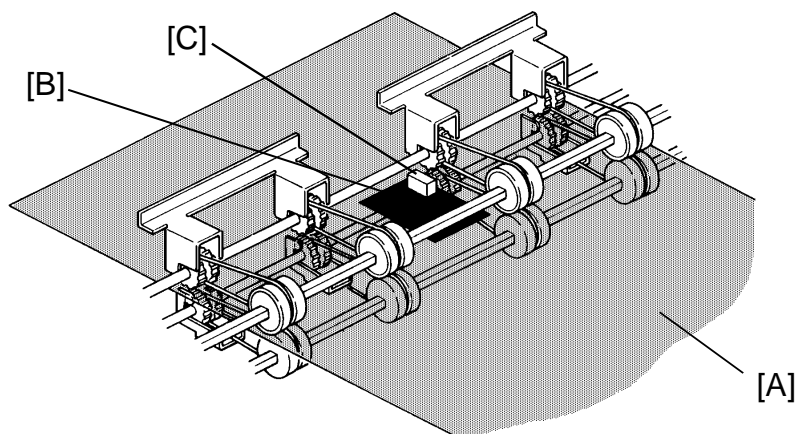
6.6 THERMAL HEAD DRIVE PCB



1. Remove the plotter unit.
2. Open the bottom plate [A] of the plotter unit (2 screws).
3. Disconnect the 5 connectors (a to e).
4. Remove the thermal head drive PCB [B] (6 screws).

7. MASTER EJECT SECTION

7.1 ADJUSTING THE MASTER EJECT SENSOR



Purpose: To ensure that the sensor detects the ejected master.

Adjustment Standard: 0.8 to 0.9 V when no master is detected.

1. Make a master that has a solid black area as follows. The solid black area should be about size A7 (74 x 105 mm/3" x 4"). Using a solid black test master ensures testing the sensor under worst case condition.
 - a. Set the original with the solid black area on the original table.
 - b. Make some prints.
 - c. Stop printing when the image density of the solid black area on the print stabilizes.
 - d. Remove the master from the drum.

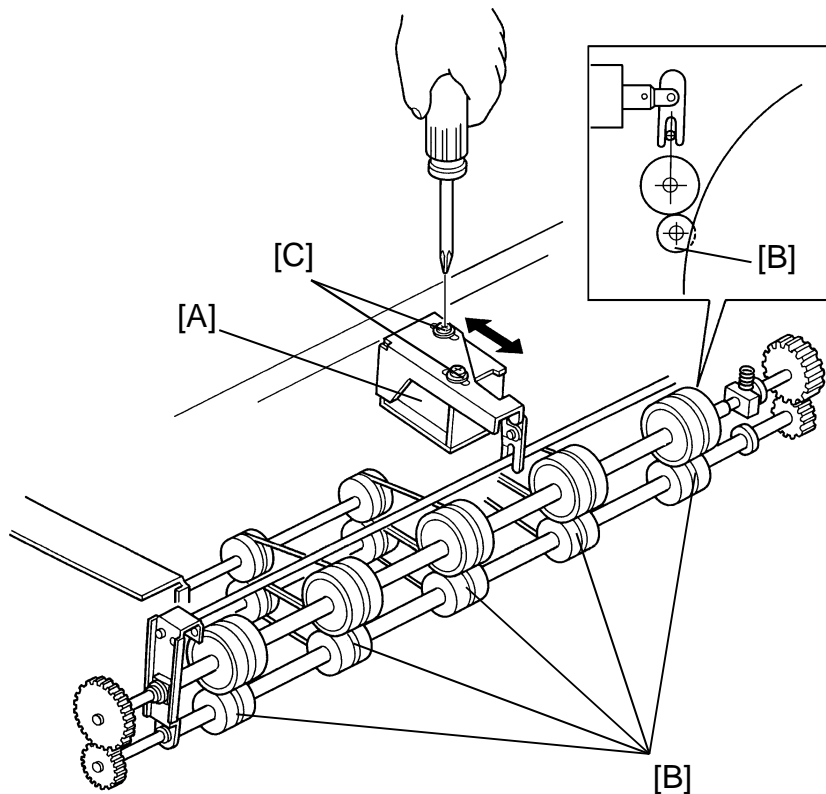
NOTE: To prevent the thermal head from overheating, do not use a large solid black original.

2. Set the drum unit and the master eject box.
3. Confirm that the voltage between TP104 and the GND line TP107 on the main PCB is 0.8 to 0.4 V when the master is not under the master eject sensor.

NOTE: The voltage level of the sensor can be checked by SP mode No. 137.

4. If not, adjust by turning VR104 on the main PCB.
5. After adjusting, insert the master [A] between the upper and the lower eject rollers with the master film side up and position the solid black area under the sensor. Then confirm that LED104 on the main PCB turns on.

7.2 ADJUSTING THE MASTER EJECT SOLENOID

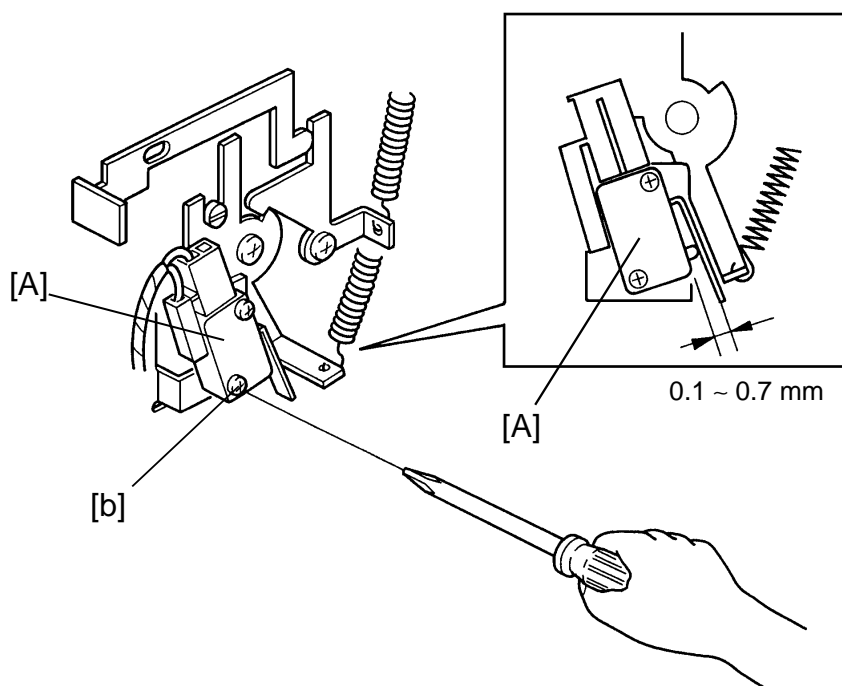


Purpose: To ensure that the master is ejected.

1. Open the master eject unit and remove its upper cover (4 screws).
2. Check if the lower rollers [B] touch the drum surface or not. If the solenoid [A] is on, the rollers should touch, and if the solenoid is off, the rollers should not touch. The solenoid can be energized by enabling output check mode number 17.
3. If the rollers are not adjusted properly, loosen the screws [C] and adjust the mounting position of the master eject solenoid [A].
4. After adjusting, retighten the screws [C].

NOTE: To easily check if the lower roller touches the drum surface: wrap the drum with blank paper. Then check the paper for roller marks.

7.3 ADJUSTING THE AIR KNIFE MOTOR SAFETY SWITCH



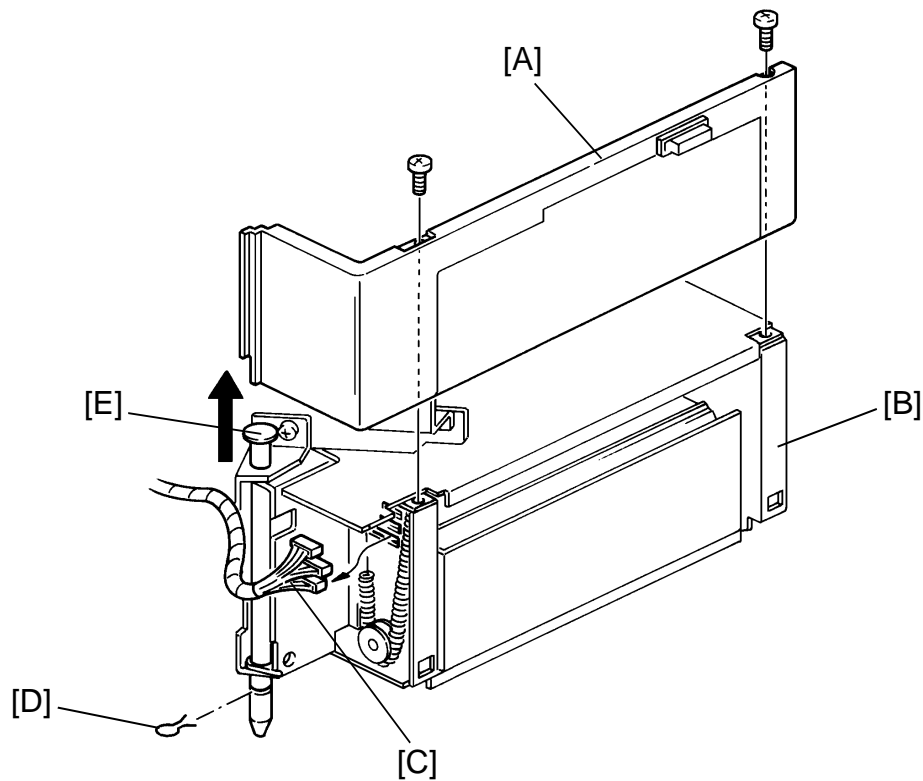
Purpose: To ensure that the safety switch turns on and stops the air knife motor when the master eject unit is opened.

Adjustment Standard: 0.1 to 0.7 mm

1. Open the front door, then remove the right front cover and inner cover.
2. Confirm that the safety switch [A] turns off when you open the master eject unit.
3. Confirm that the distance between the safety switch and the actuator is 0.1 ~ 0.7 mm when the master eject unit is closed.
4. If not, loosen the screw [B] and adjust the position of the switch [A].
5. After adjusting, tighten the screw [B] and check the function of the safety switch.

Replacement
and
Adjustment

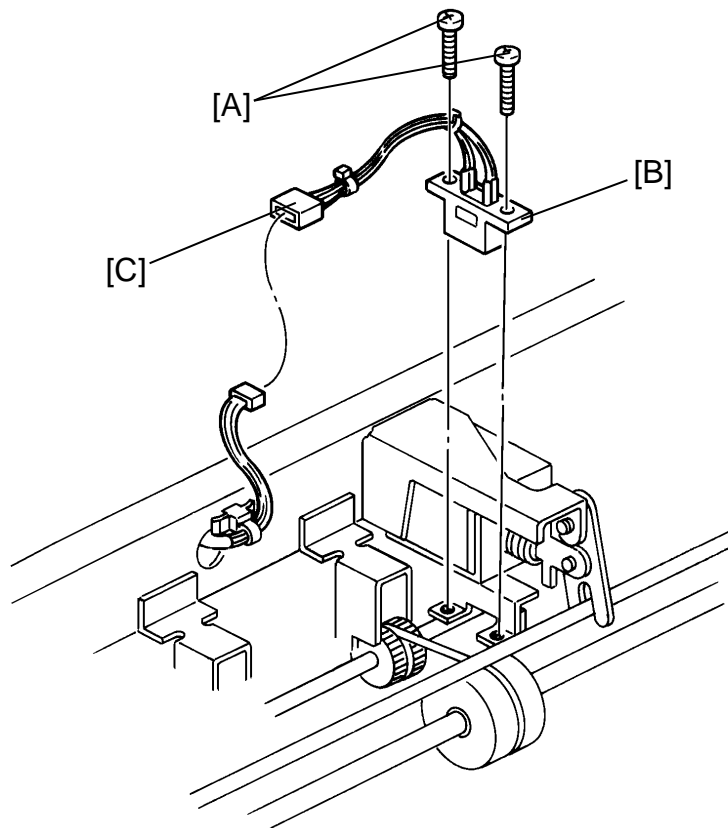
7.4 MASTER EJECT UNIT



1. Remove the upper rear cover (3 screws).
2. Remove the master eject unit cover [A] (2 screws).
3. Disconnect the 3 connectors [C].
4. Remove the clasper [D].
5. While supporting the master eject unit [B], slide out the shaft [E].

NOTE: Be careful not to drop the master eject unit.

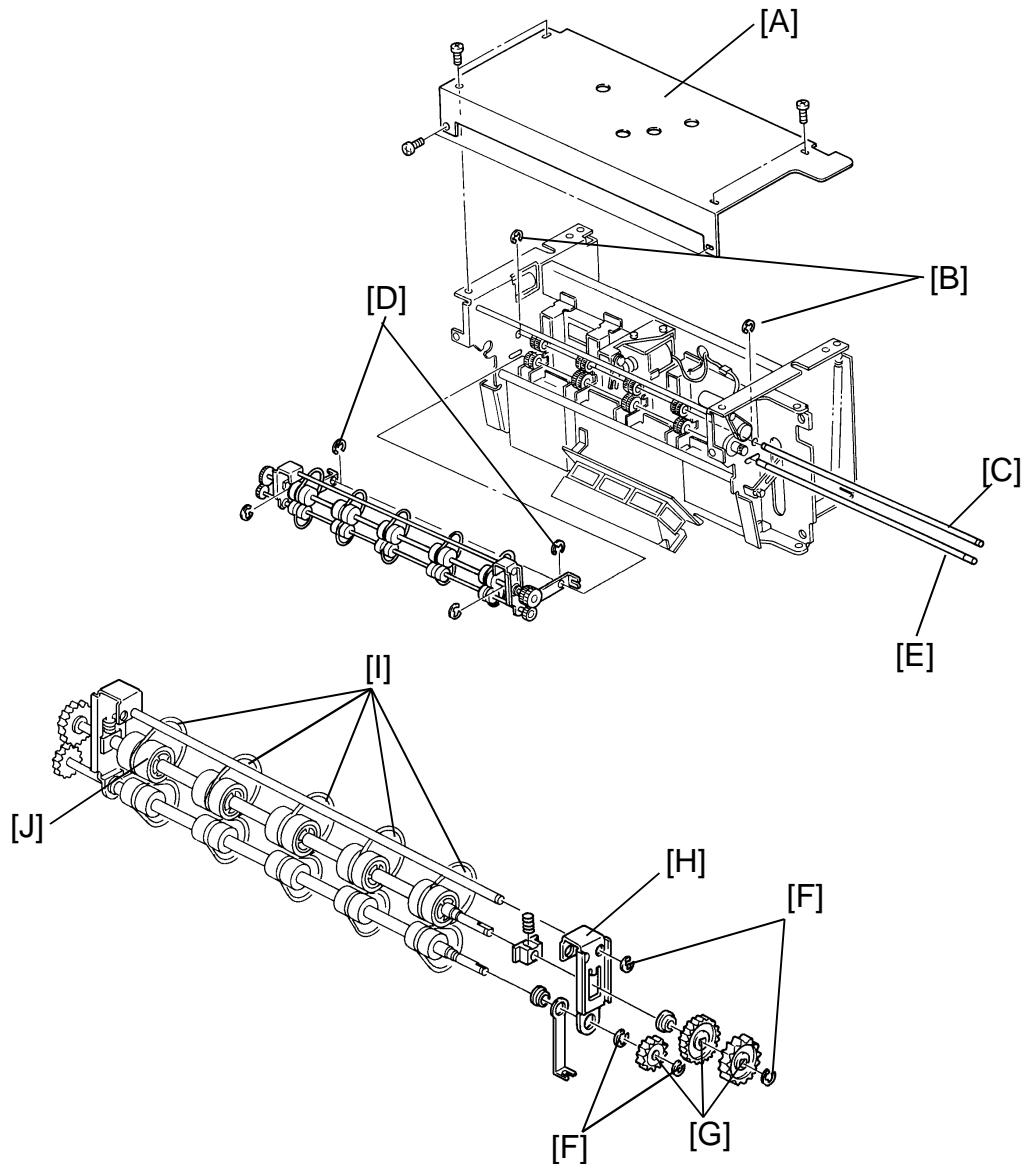
7.5 MASTER EJECT SENSOR



1. Remove the master eject unit.
2. Remove the upper master eject unit cover.
3. Remove the 2 screws [A].
4. Disconnect the connector [C] and remove the master eject sensor [B].

Replacement
and
Adjustment

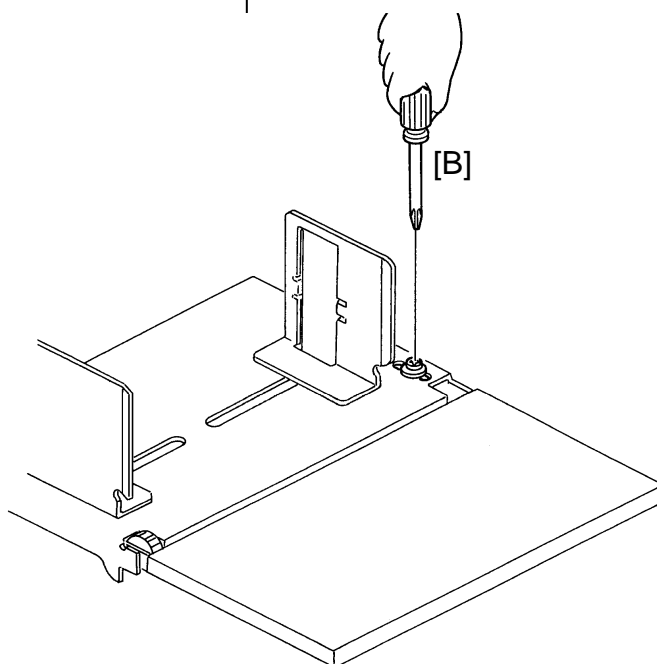
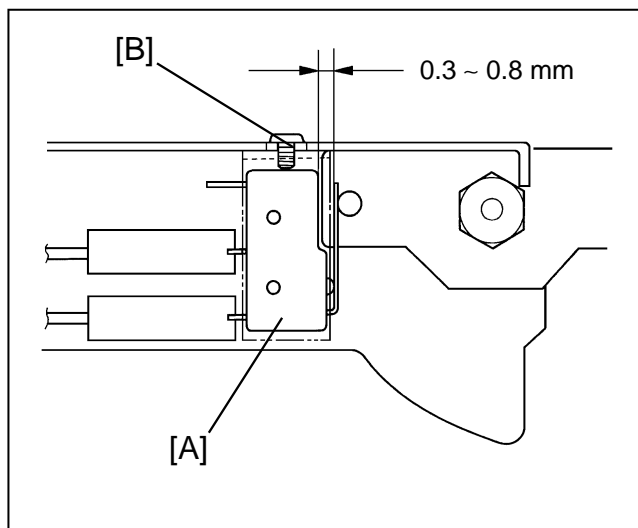
7.6 MASTER EJECT BELT/ROLLER



1. Remove the master eject unit.
2. Remove the unit cover [A] (6 screws).
3. Remove the 2 E-rings [B] and remove the upper pulley shaft [C].
4. Remove the 2 E-rings [D] and remove the lower shaft [E] to remove the roller unit from the master eject unit.
5. Remove the 4 E-rings [F] and 3 gears [G].
6. Remove the supporter [H].
7. Remove the 8 belts [I].
8. Remove the rubber rollers [J].

8. PAPER FEED SECTION

8.1 ADJUSTING THE PAPER TABLE OPEN SWITCH



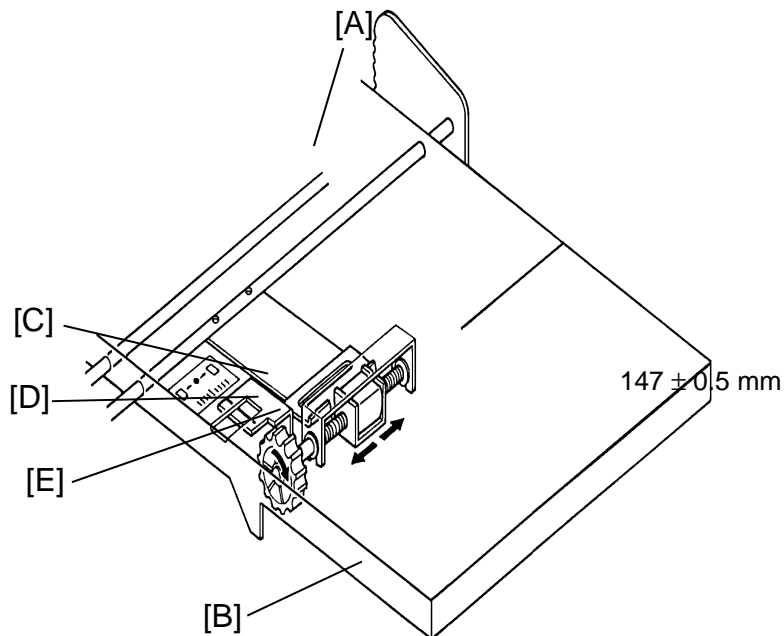
Replacement
and
Adjustment

Purpose: To ensure that the paper table open switch turns on to prevent the paper table from going up when the paper table is closed.

Adjustment Standard: 0.3 to 0.8 mm

1. Ensure that the switch [A] turns off when the paper table is opened and that the switch turns on when the paper table is closed.
2. If not, loosen the screw [B] and adjust the switch bracket position.
3. After adjustment, repeat step 1 again.

8.2 ADJUSTING THE PAPER TABLE HEIGHT



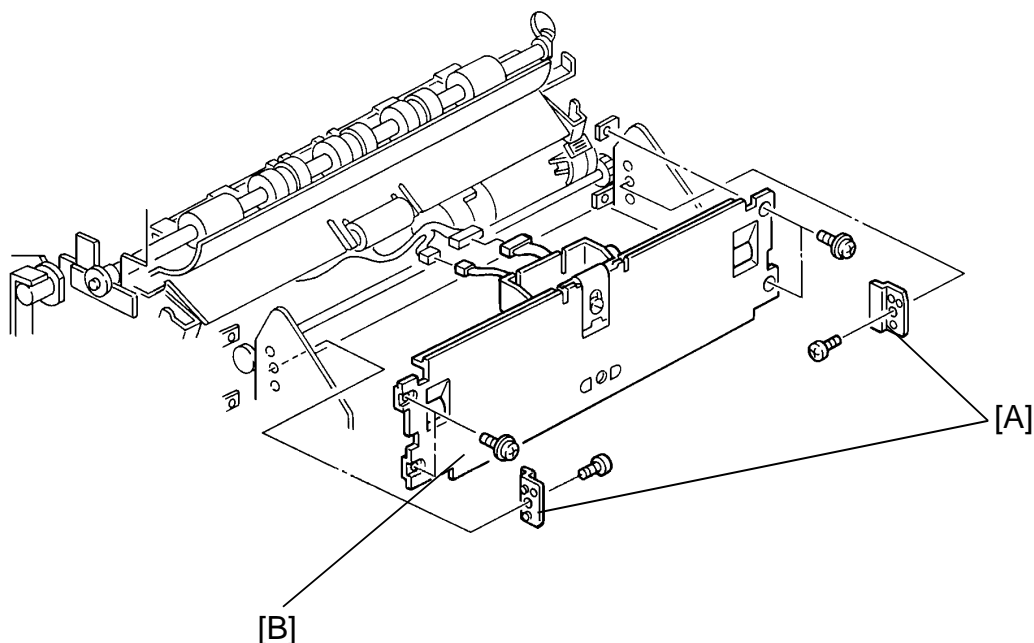
Purpose: To ensure smooth paper feed.

Adjustment Standard: 148.5 ± 0.5 mm

1. Set the paper feed pressure adjusting lever [A] to the upper position.
2. Remove the right front cover of the machine.
3. Turn the main switch on and access the service program mode.
4. Enter 131 to access the output check mode.
5. Enter 19 and then press the Print Start key to raise the paper table, or 18 to lower the paper table.
6. After the paper table stops, insert a scale into the slot at the end of the paper table. Ensure that the distance between the lower stay [B] and the upper face of the table is between 148 and 149 mm.
7. If not, loosen the screw [C] and adjust the position of the actuator [D].
8. After adjusting, repeat step 5 again by lowering and raising the paper table several times.

NOTE: When mounting the actuator, make sure that the actuator [D] does not touch the paper table height sensor [E].

8.3 ADJUSTING THE SEPARATION PLATE RELEASE SOLENOID

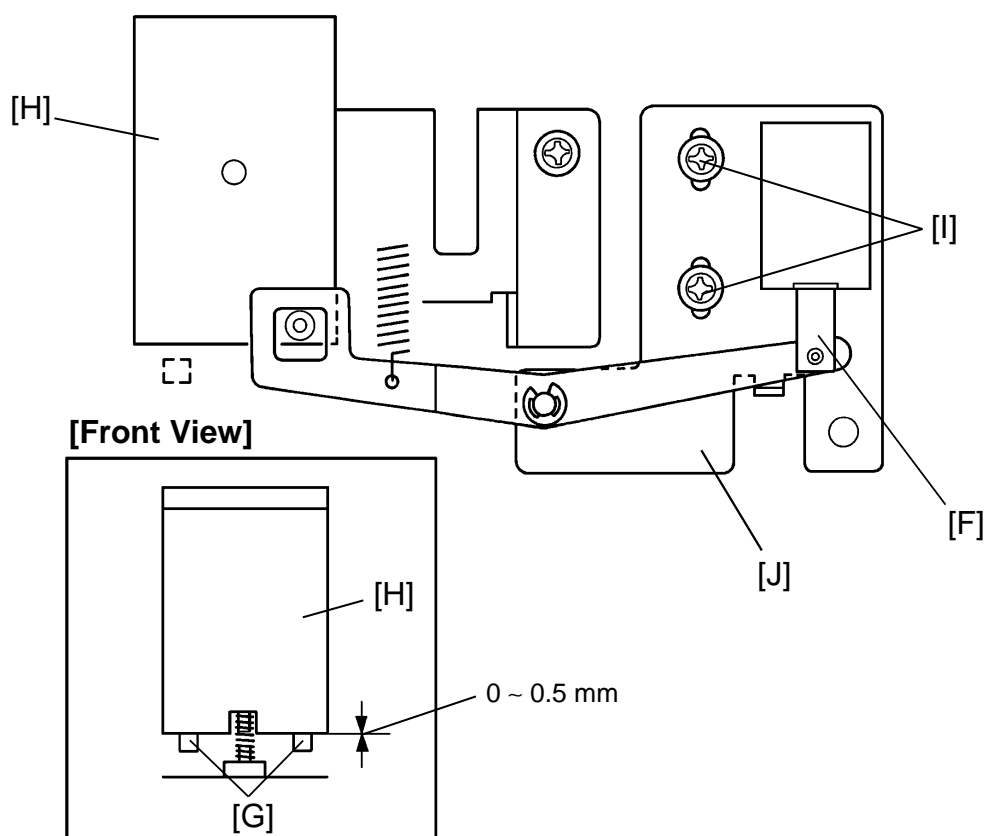


Purpose: To ensure that the separation plate is released from the upper separation roller when the paper table lowers.

Adjustment Standard: 0 to 0.5 mm

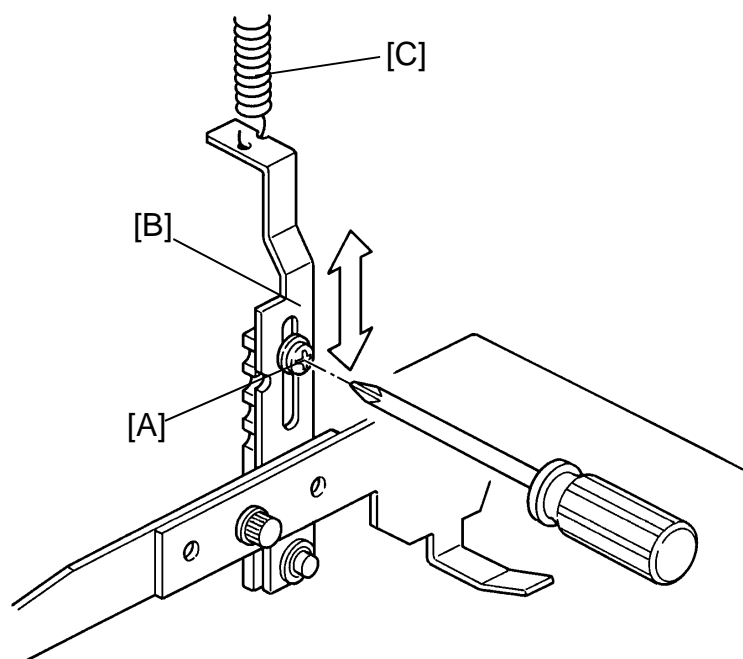
1. Lower the paper table.
2. Remove the plotter unit.
3. Remove the paper feed roller unit. (See Paper Feed Roller Unit section.)
4. Remove the two brackets [A].
5. Remove the front plate [B] from the machine (4 screws).

Replacement
and
Adjustment



6. Push up the plunger [F] by hand. Check the distance between the bottom of the separation plate [H] and stoppers [G]. The distance should be between 0 and 0.5 mm. The stoppers [G] are on the front side of the plate [E].
7. If the distance is more than 0.5 mm, then loosen the 2 screws [I] and adjust the position of the bracket [J].

8.4 ADJUSTING THE PAPER FEED ROLLER PRESSURE



Purpose: To ensure that the paper feed roller exerts sufficient pressure for a smooth paper feed (printing paper weight range of 50 g/m² to 215 g/m²).

- NOTE:**
1. If paper isn't feeding properly or isn't feeding at all, follow procedure 1. If procedure 1 fails to correctly adjust the feed roller pressure, follow procedure 2 (next page).
 2. After replacing the paper feed pressure spring [C], follow procedure 2 to adjust the roller pressure.

[Procedure 1]

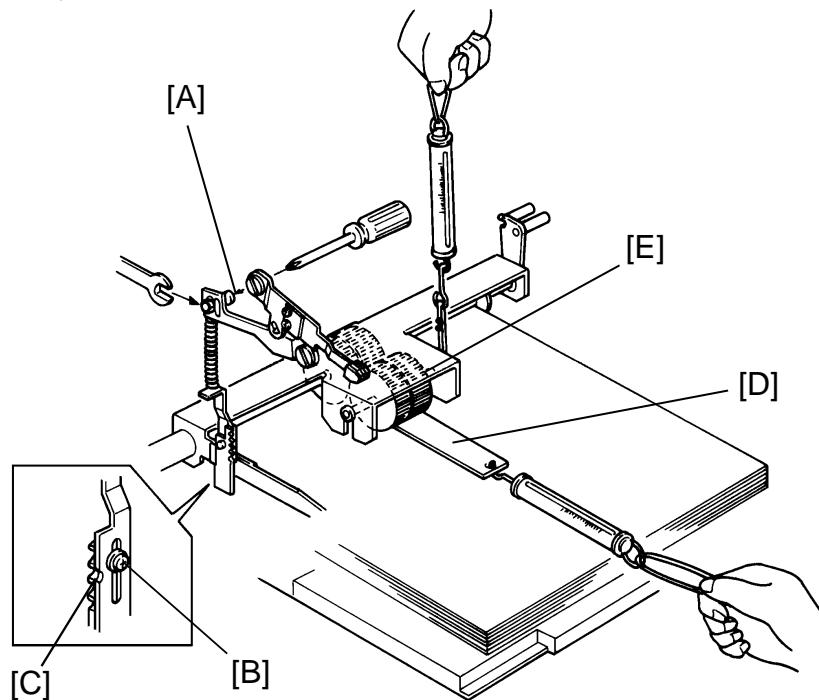
1. Loosen the screw [A] securing the lower adjusting plate [B].

NOTE: When loosening the screw [A], hold the lower adjusting plate [B] in the original position for a fine adjustment.

2. Adjust the paper feed roller pressure by moving the lower adjusting plate [B] up or down.

Up to increase the pressure
Down to reduce the pressure

Replacement
and
Adjustment

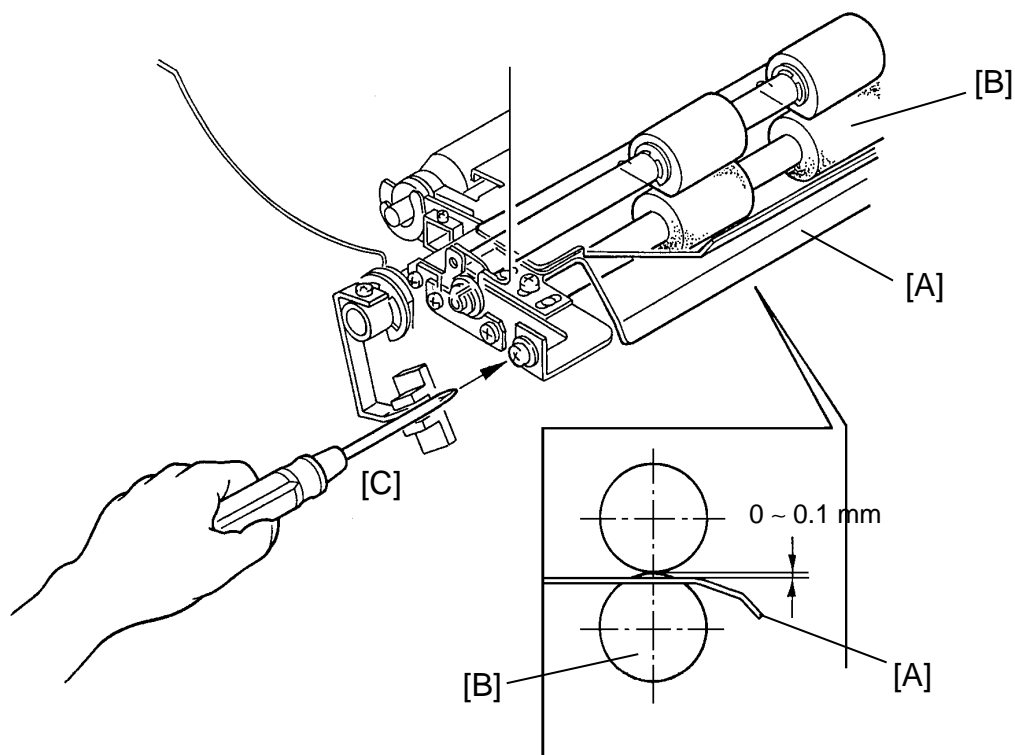


[Procedure 2]

This procedure should only be used when the proper pressure cannot be achieved with procedure 1.

1. Remove the plotter unit.
2. Set the lever for adjusting the paper feed roller pressure up.
3. Remove the right front cover, main PCB, and image processing PCB.
4. Manually rotate the paper table drive gear to raise the paper table to the paper feed position. (Paper table height sensor is interrupted.)
5. Align the lower adjusting plate notch with the center notch of the link [C] and tighten the screw [B].
6. Hook a tension gauge (500-gram range) to the paper feed roller shaft [E]. Insert a strip of paper [D] between the paper feed roller and the sheets of paper. Then hook a tension gauge (100-gram range) to the paper strip and apply a 100-gram load. Now gradually pull up the tension gauge hooked to the shaft and ensure that the paper strip can be pulled out when the tension gauge shows 250 ± 5 grams.
7. If not, adjust the pressure by moving the mounting position of the shaft [A].

8.5 ADJUSTING THE LOWER GUIDE PLATE



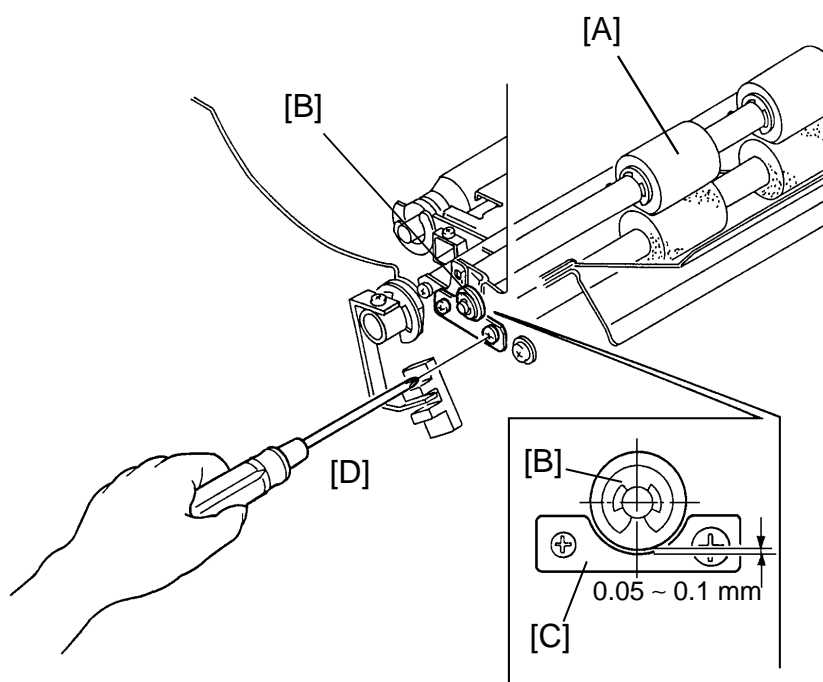
Purpose: To ensure a smooth paper feed, and to prevent paper jams, folds, or wrinkles.

Adjustment Standard: 0 to 0.1 mm

1. Make sure that the distance between the lower guide plate [A] and lower second feed roller [B] is between 0 and 0.1 mm as shown.
2. If not, remove both the front and rear covers and loosen the screw [C] (front and rear, one each). Then, adjust the position of the guide plate [A].
3. After adjustment, retighten the screw [C].

Replacement
and
Adjustment

8.6 ADJUSTING THE UPPER SECOND FEED ROLLER

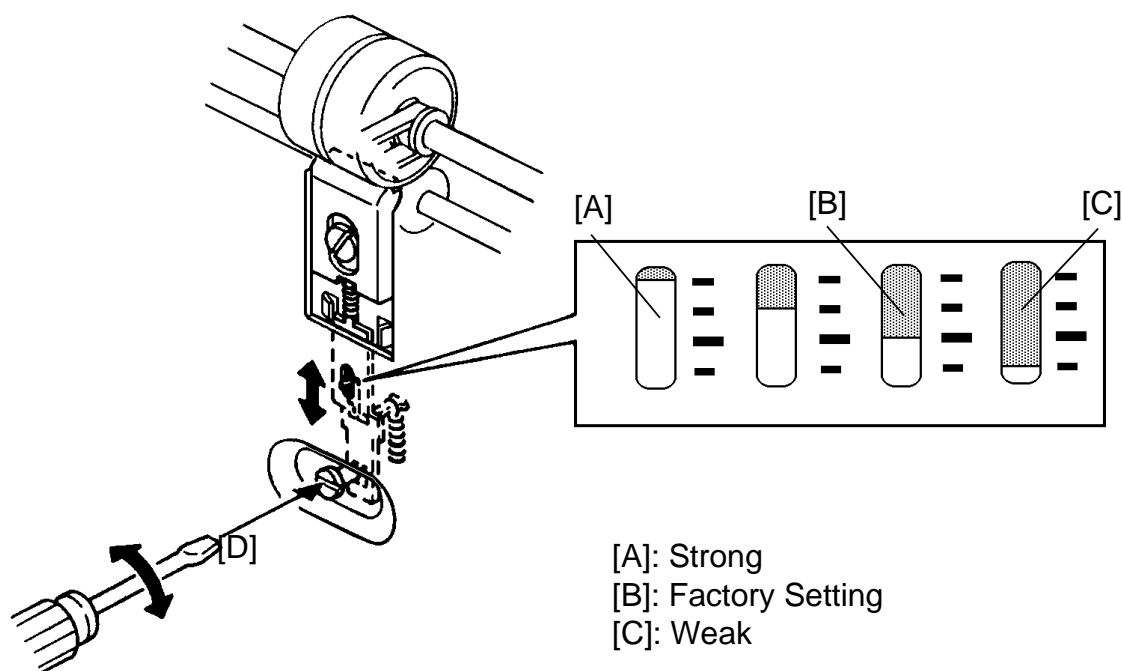


Purpose: To ensure that paper is fed straight between the drum and the press roller.

Adjustment Standard: 0.05 to 0.1 mm

1. Remove both front and rear covers.
2. Turn the second feed sector gear fully clockwise, so that the upper second feed roller [A] touches the lower second feed roller.
3. Ensure that the clearance between the bushing [B] and bushing supporter [C] is between 0.05 and 0.1 mm as shown. Also, manually rotate the left and right upper second feed rollers and confirm that they experience the same friction when rotated.
4. If not, loosen the screw [D] and adjust the clearance by moving the bushing supporter.
5. After adjusting, ensure that the feed length of the second feed roller is correct. (The feed length varies with the position of the bushing supporter.)



8.7 ADJUSTING THE SEPARATION PLATE PRESSURE



Purpose: To adjust the separation plate pressure for the type of paper being used by the customer.

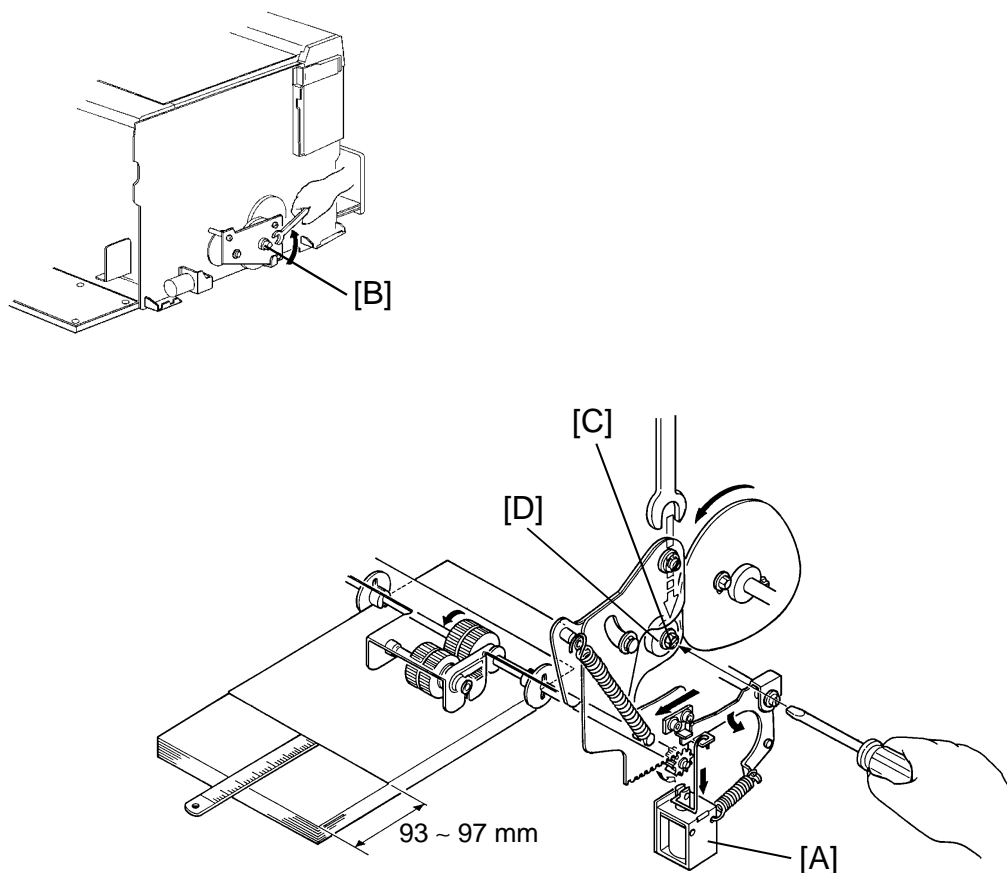
Adjustment Standard: See the above illustration.

1. Adjust the separation plate pressure by turning the adjusting screw [D].

NOTE: Position the minus groove on the screw head vertically  or horizontally . Otherwise, vibrations may cause the screw to loosen.

2. After adjusting, make several copies to ensure that the paper feeds smoothly without jamming, folding, or wrinkling. Confirm that all the types of paper that the customer uses, function correctly.

8.8 ADJUSTING THE FEED-LENGTH OF THE PAPER FEED ROLLER

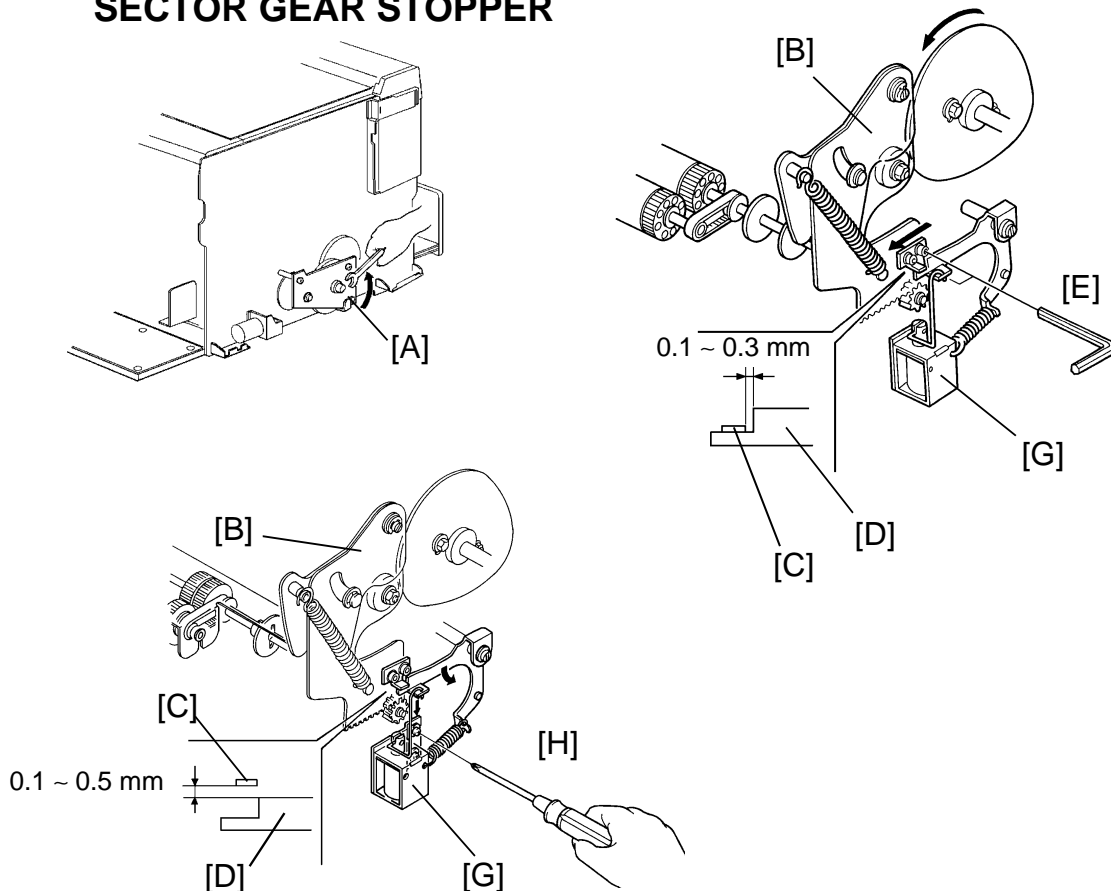


Purpose: To ensure paper feed to the second paper feed roller.

Adjustment Standard: 93 to 97 mm

1. Stack about 100 sheets of 65 g/m² paper on the paper table.
2. Set the lever for adjusting the paper feed roller pressure up.
3. Remove the rear cover.
4. Turn on the paper feed solenoid [A] manually. Then, turn the rollers counterclockwise by rotating the shaft [B] with a 10 mm spanner.
5. Measure the length of paper fed. Measure from the time the paper feed roller starts rotating until it stops rotating. This feed-length should be between 93 and 97 mm.
6. If not, adjust the feed-length by loosening the hexagon nut [C] mounted on the sector gear. Then shift the bearing [D] up or down.
7. After adjusting, repeat steps 5 and 6 again.

8.9 ADJUSTING THE CLEARANCE OF THE PAPER FEED SECTOR GEAR STOPPER

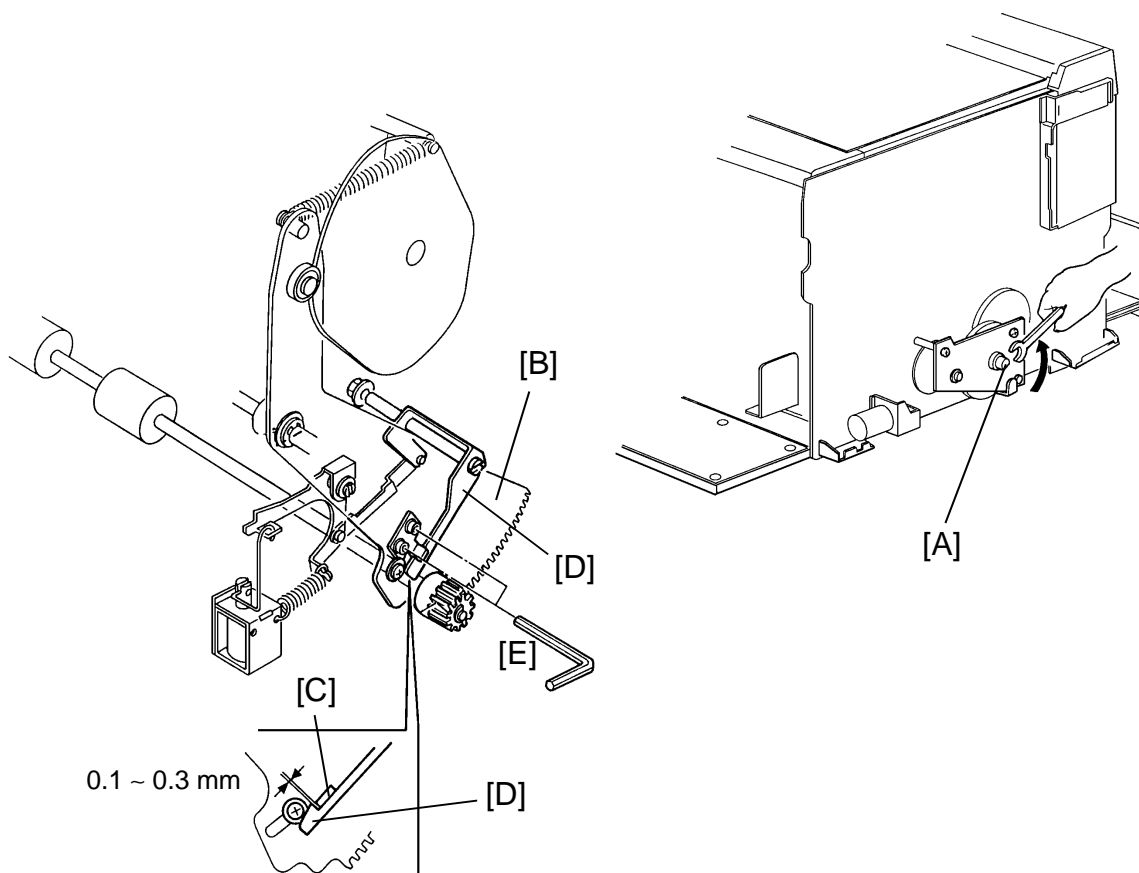


Purpose: To ensure that the paper feed roller rotate when the paper feed solenoid is energized and does not rotate when the paper feed solenoid is not energized.

Adjustment Standard: See the above illustrations.

1. Remove the rear cover.
2. With a 10 mm spanner, gradually turn the shaft [A] counterclockwise.
3. When the sector gear [B] fully turns clockwise, ensure that the clearance between the pin [C] and sector stopper [D] is between 0.1 and 0.3 mm.
4. If not, loosen the hexagon nut [E] and adjust the clearance by shifting the sector stopper [D].
5. Push the plunger of the paper feed solenoid [G] downward by hand. Ensure that the clearance between pin [C] and stepper [D] is between 0.1 and 0.5 mm.
6. If not, loosen the screw [H] and adjust it by shifting the bracket for the solenoid [G] up or down.

8.10 ADJUSTING THE CLEARANCE OF THE SECOND FEED ROLLER SECTOR STOPPER

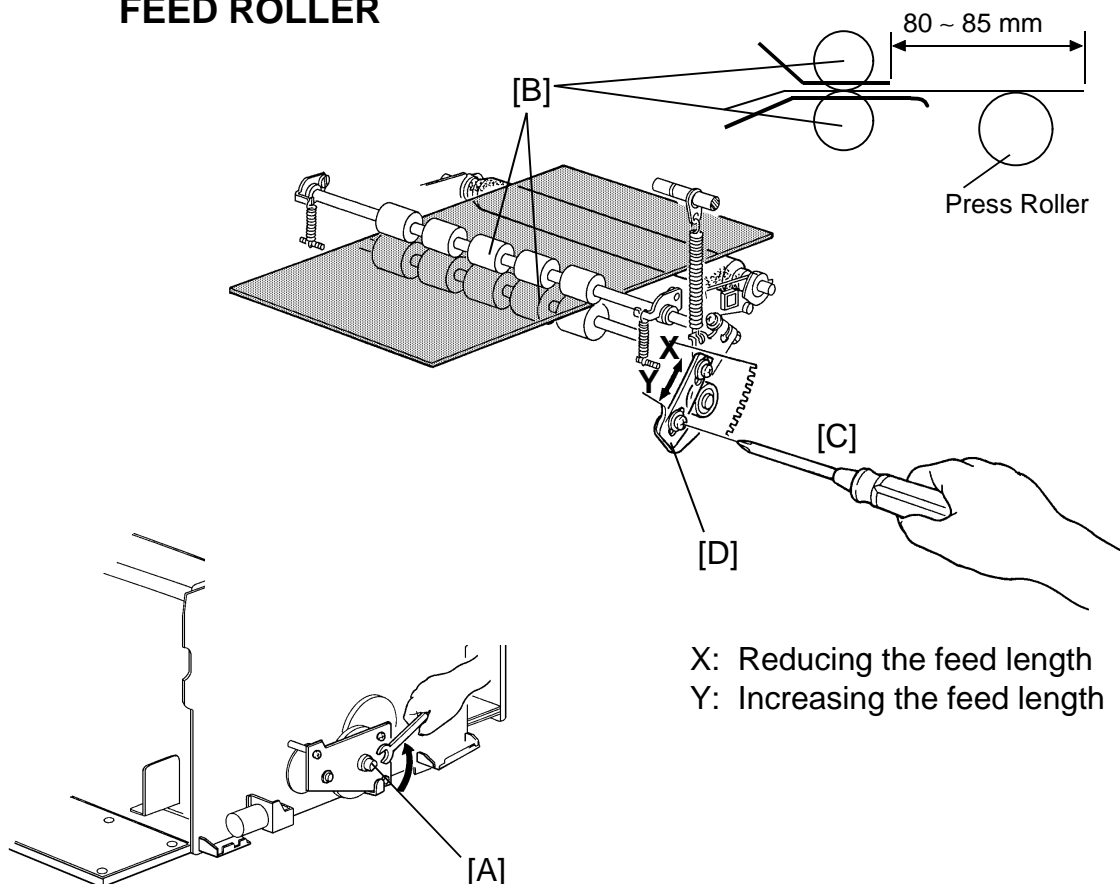


Purpose: To ensure that the second feed roller starts rotating when the paper feed solenoid is energized and does not rotate when the paper feed solenoid is energized.

Adjustment Standard: 0.1 to 0.3 mm

1. Remove the rear cover of the machine.
2. Gradually turn the drum rotating shaft [A] counterclockwise with a 10 mm spanner.
3. Turn the sector gear [B] counterclockwise until it stops. Ensure that the clearance between the pin [C] and the sector stopper [D] is between 0.1 and 0.3 mm.
4. If not, loosen the Allen screws [E] and adjust the clearance between the pin and the sector stopper.
5. Retighten the screws [E].

8.11 ADJUSTING THE FEED-LENGTH OF THE SECOND FEED ROLLER

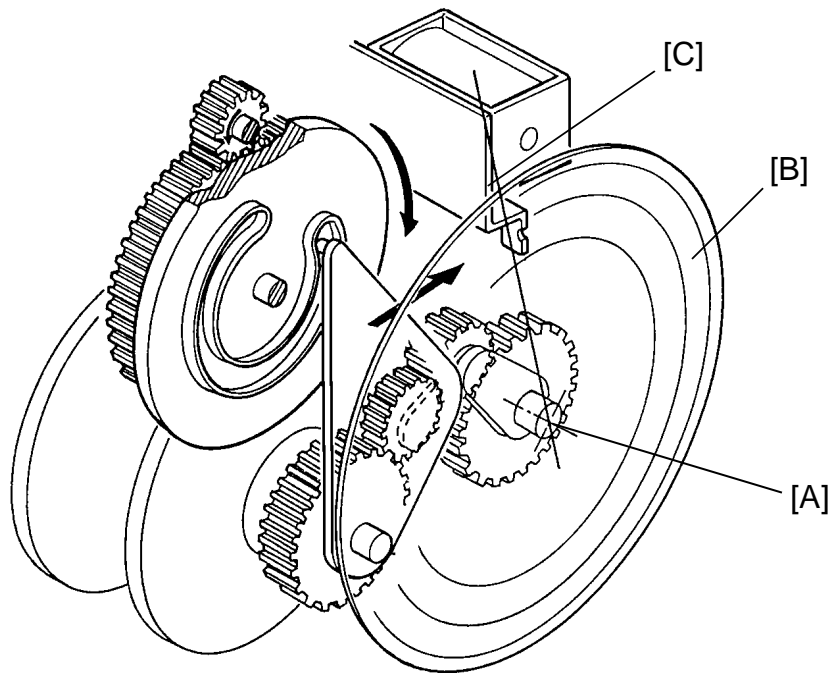


Purpose: To ensure the proper paper feed by the second feed rollers.

Adjustment Standard: 80 to 85 mm

1. Remove the drum unit and the rear cover from the machine.
2. Stack about 100 sheets of 65 g/m² paper on the paper table.
3. Set the paper table in the paper feed position. (Use Output Check mode number 19.)
4. Turn on the paper feed solenoid manually. Then, gradually turn the drum rotation shaft [A] with a 10 mm spanner.
5. Measure the paper feed length from the time the second feed roller [B] starts rotating until it stops rotating. This feed length should be between 80 and 85 mm.
6. If not, adjust the feed length by loosening the screw [C] and by shifting the cam [D] up or down.
7. Check the adjustment by repeating steps 4 and 5.

8.12 ADJUSTING THE FEED TIMING OF THE SECOND FEED ROLLER

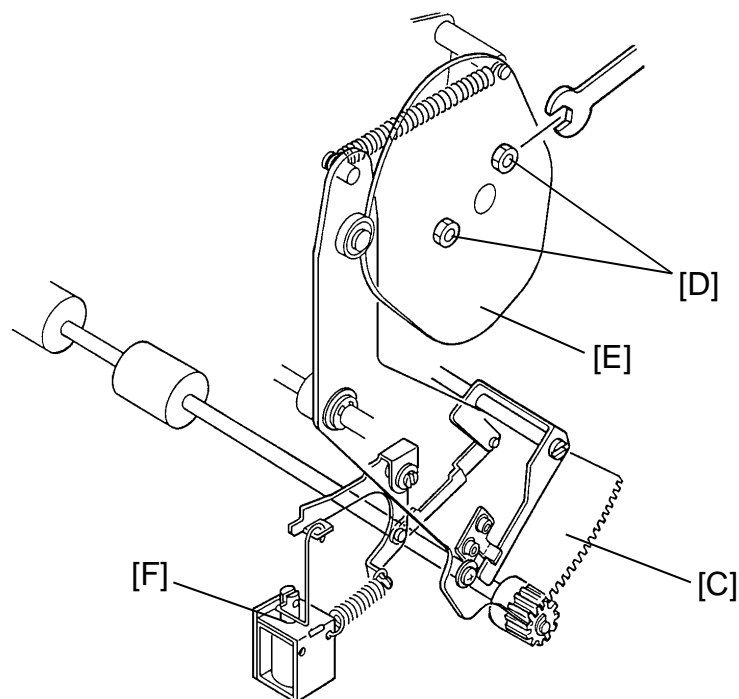


Purpose: To ensure paper feed by regulating the timing to start the second feed roller.

Adjustment Standard: 178°

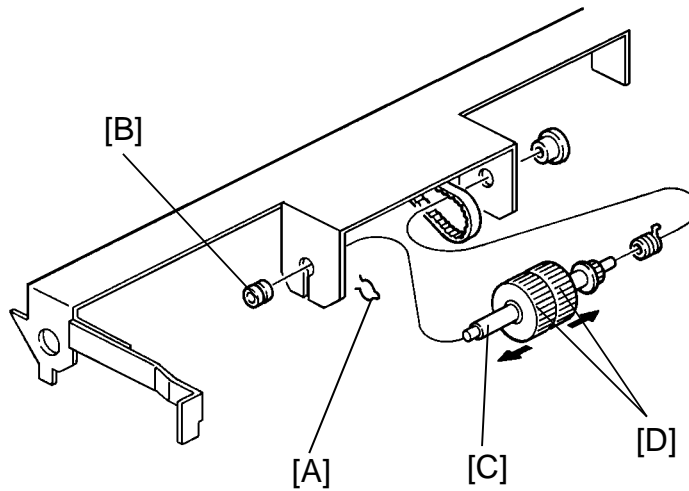
1. Set the Image Position indicator to the "0" position and return the drum to the home position by turning off and on the main switch.
2. Remove the rear cover of the machine.
3. Set a protractor [B] on the image shifting shaft [A].

NOTE: Align the origin of the protractor with the edge of the solenoid bracket [C].



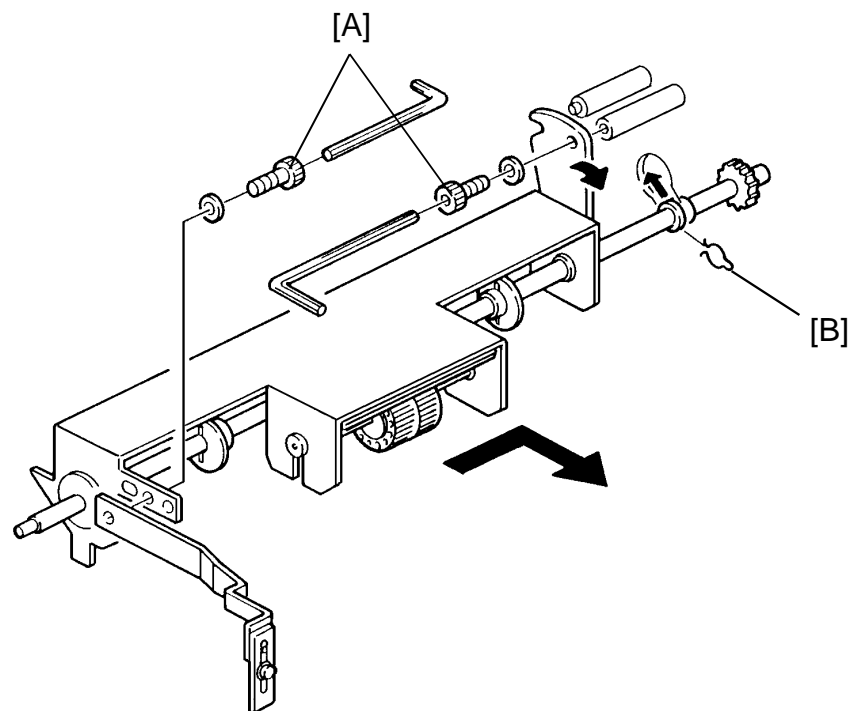
4. Turn on the paper feed solenoid [F] manually and, using a 10 mm spanner, gradually turn the drum rotation shaft.
5. Measure the degrees turned when the second feed roller sector gear [C] starts to move counterclockwise. (The second feed rollers start rotating.) This should be 178°.
6. If not, loosen the 2 bolts [D] and adjust the second feed rollers rotation timing by turning the cam [E].

8.13 PAPER FEED ROLLER



1. Remove the left clasper [A].
2. Remove the left bushing [B].
3. Remove the paper feed roller shaft [C].
4. Remove the 2 paper feed rollers [D].

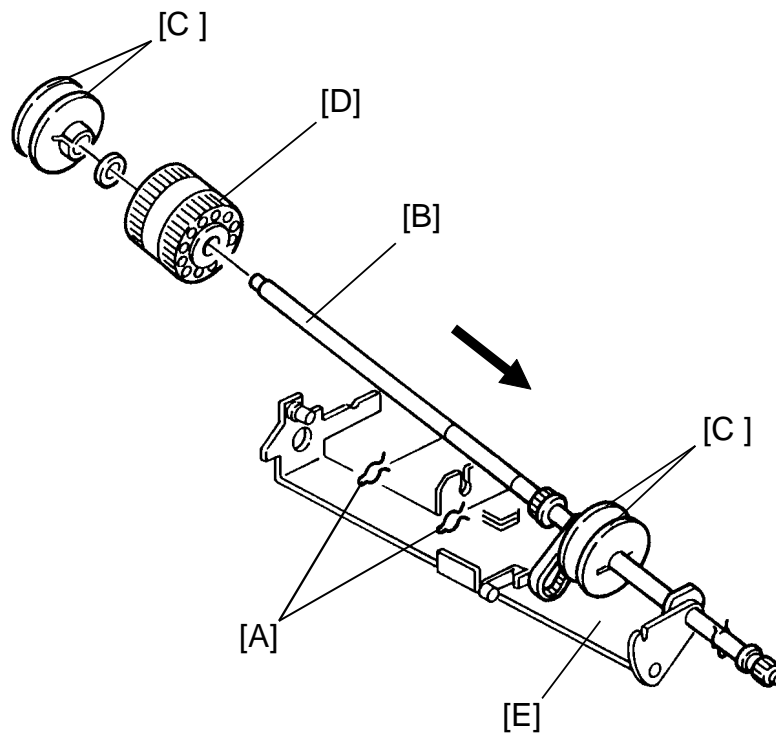
8.14 PAPER FEED ROLLER UNIT



1. Remove the plotter unit.
2. Remove 2 hexagon screws [A].
3. Remove the clamber [B].
4. Remove the paper feed roller unit from the machine by sliding the shaft to the rear.

Replacement
and
Adjustment

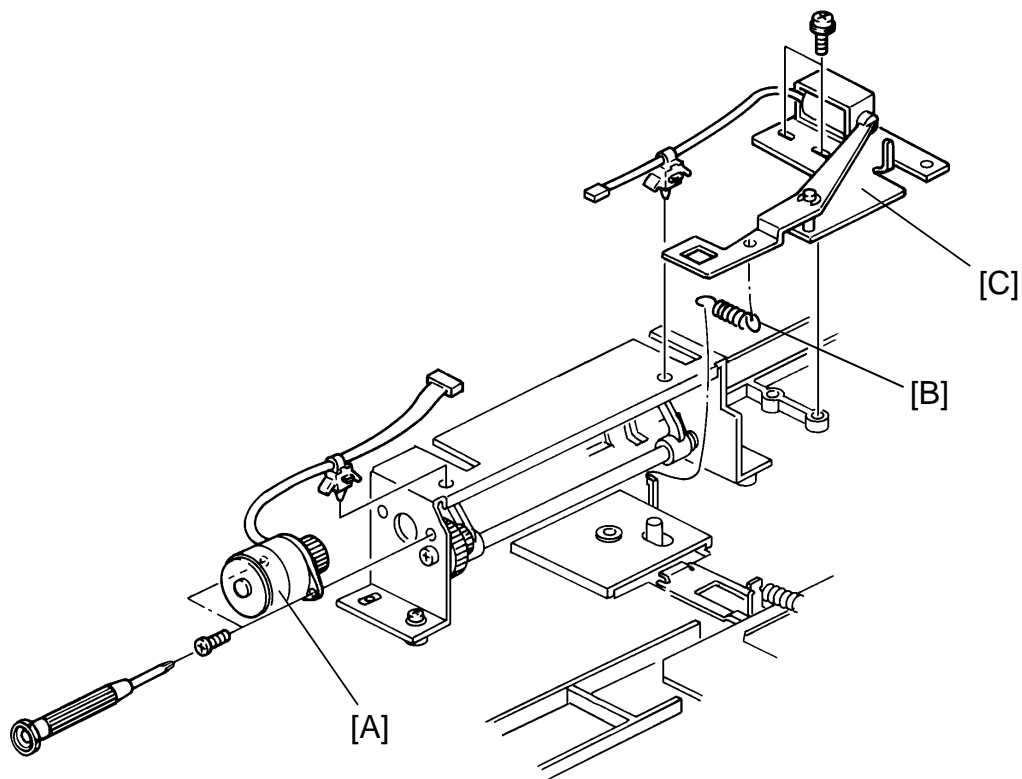
8.15 UPPER SEPARATION ROLLER



1. Remove the paper feed roller unit.
2. Remove the clamps [A] from both sides of the upper separation roller.
3. Slide the shaft [B] in the direction of the arrow.
4. Remove the guide disks [C] and remove the upper separation roller [D].

NOTE: When reassembling the paper feed roller unit, position the guide disks [C] under the cuts of the feed roller holder [E].

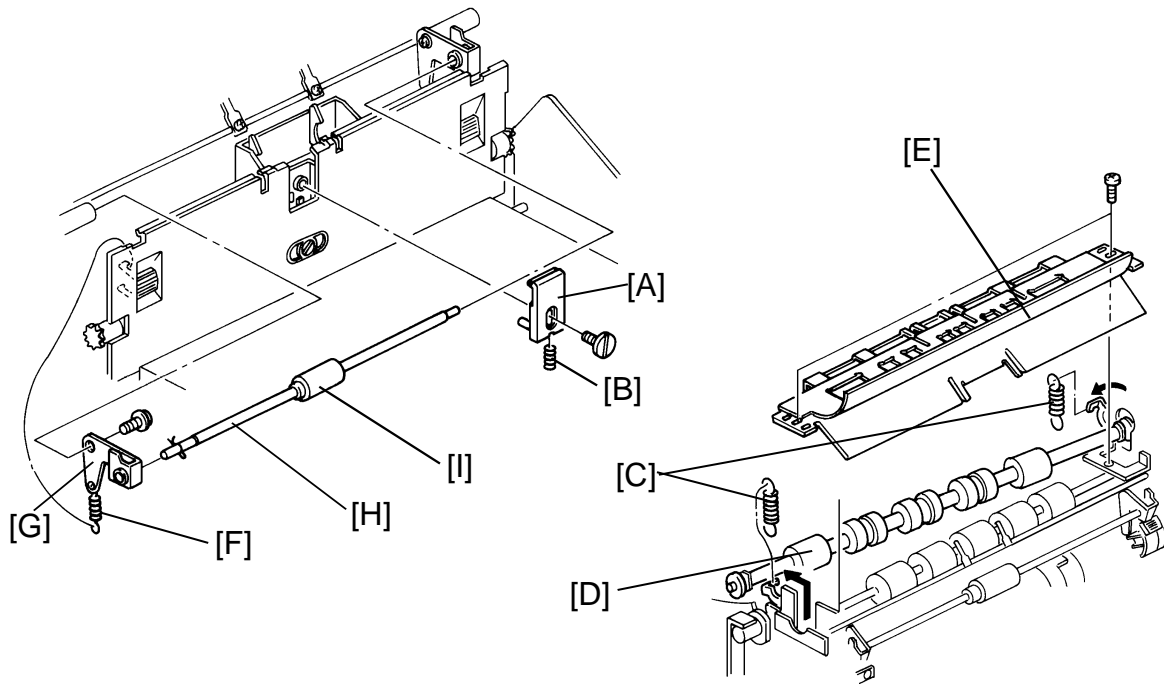
8.16 SEPARATION PLATE RELEASE SOLENOID AND PAPER RETURN MOTOR



1. Remove the front plate. (See Adjusting the Separation Plate Release Solenoid section.)
2. Remove the paper return motor [A] using a small plus screwdriver.
3. Remove the spring [B], then remove the separation plate release solenoid assembly [C] (2 screws).

Replacement
and
Adjustment

8.17 SEPARATION PLATE/LOWER SEPARATION ROLLER



[Separation Plate]

1. Remove the separation plate [A] with the spring [B] (1 screw).

[Lower Separation Roller]

1. Remove the plotter unit, paper feed roller unit and drum unit.
2. Remove the 2 springs [C] and slide the upper second feed roller [D] in the direction of the arrow.

NOTE: Use a spring hook. To prevent the spring from dropping into the machine.

3. Remove the upper and lower guide plates [E] (2 screws).

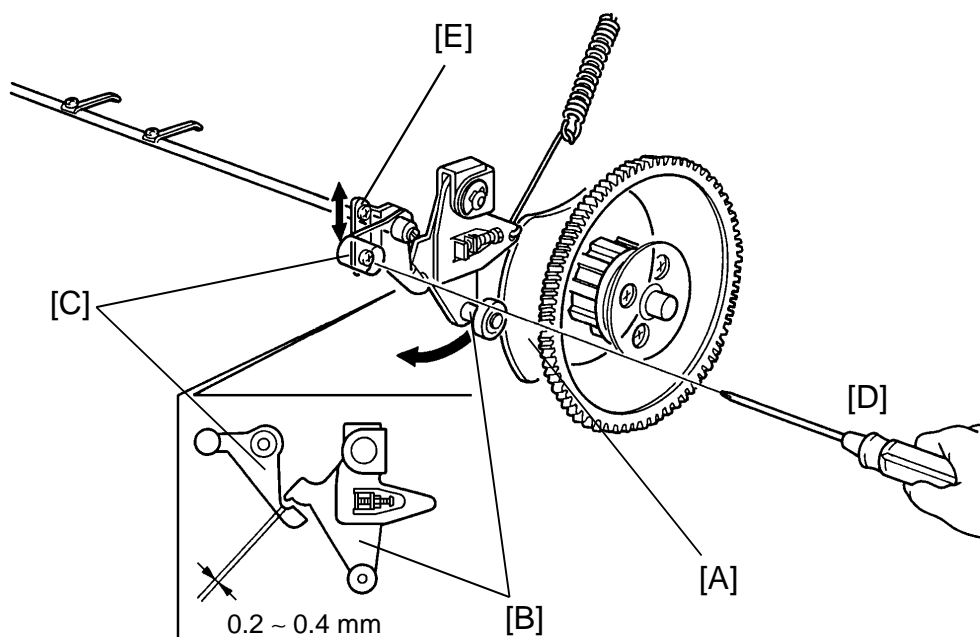
NOTE: When reassembling the guide plates, ensure that the guide plates do not touch the lower second feed roller.

4. Remove the spring [F] hooked on the front separation lever [G].
5. Remove the front separation lever [G] (1 screw).
6. Remove the lower separation roller shaft [H].
7. Remove the lower separation roller [I] from the shaft (one Allen screw).

NOTE: When reassembling the lower separation roller, confirm that the front and rear separation levers [G] move smoothly.

9. PRINTING SECTION

9.1 ADJUSTING THE CLEARANCE OF THE PAPER DETECTING ARM

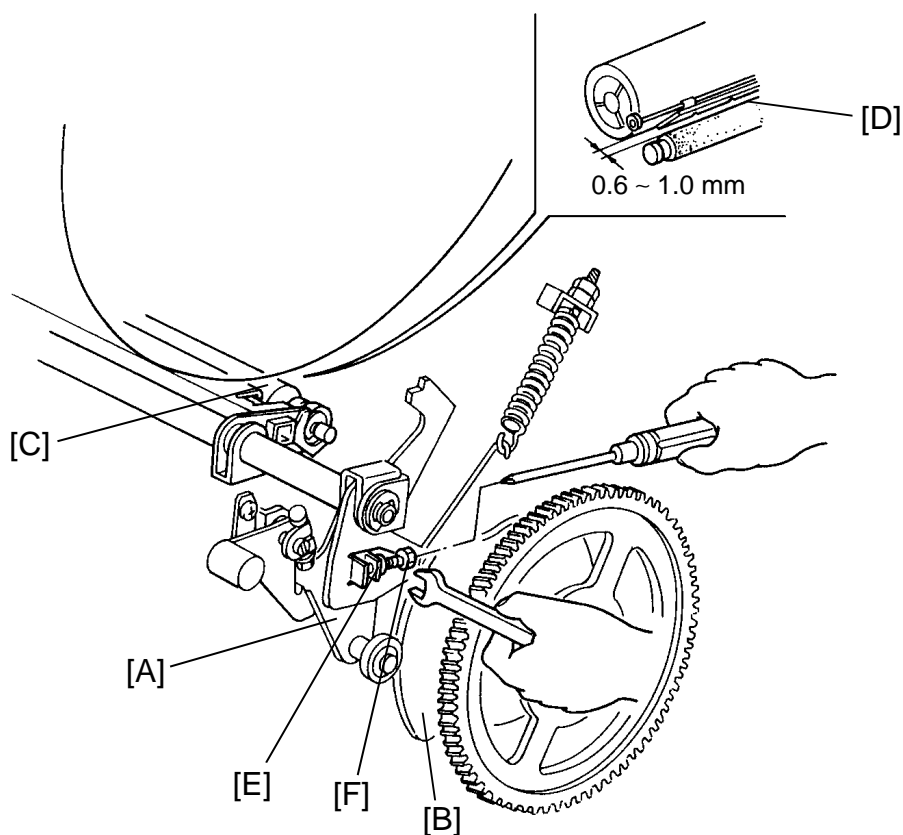


Purpose: To ensure that printing pressure is applied during paper feed, and is released correctly afterwards.

Adjustment Standard: 0.2 to 0.4 mm

1. Remove the rear cover of the machine.
2. Using a 10 mm spanner, gradually turn the drum rotation shaft counterclockwise to position the bearing of the pressure release arm [B] on the top of the pressure cam [A].
3. Make sure that the clearance between the paper detecting arm [C] and the pressure release arm [B] is 0.2 to 0.4 mm.
4. If it is not, loosen the screws [D] and adjust the clearance by shifting the paper detecting bracket [E] up or down.
5. After adjusting, confirm that the printing pressure ON/OFF mechanism is working properly. To do this, monitor a print run.

9.2 ADJUSTING THE PRESS ROLLER POSITION 1

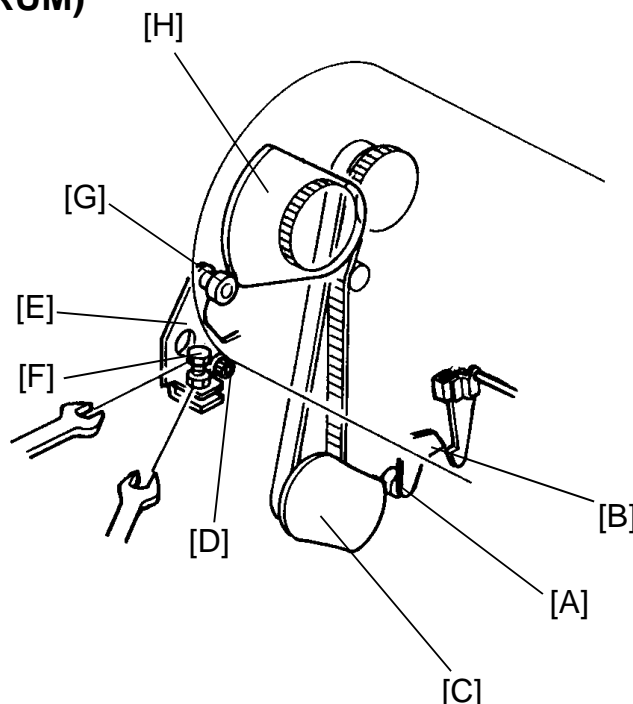


Purpose: To ensure that the press roller does not touch the clamber section of the drum.

Adjustment Standard: 0.6 to 1.0 mm

1. Remove the rear cover of the machine.
2. Using a 10 mm spanner, turn the drum rotation shaft counterclockwise and position the bearing of the pressure release arm [A] on top of the pressure cam [B].
3. When the arm is on top of the cam, ensure that the distance between the press roller [C] and the tip of the clamber [D] is 0.6 to 1.0 mm.
4. If not, loosen the hexagon nut [E] and adjust the clearance by turning the bolt [F].

9.3 ADJUSTING THE PRESS ROLLER POSITION 2 (FOR THE A4/LT DRUM)

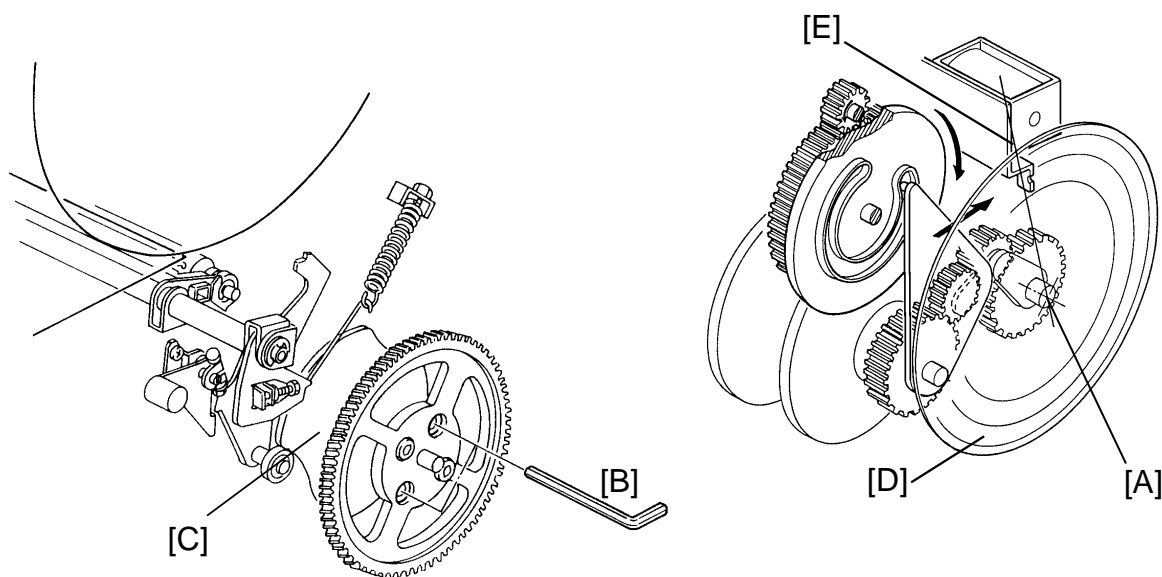


Purpose: To keep the distance between the press roller and the drum constant when the printing pressure is released.

NOTE: Perform this adjustment after adjusting the press roller position 1.

1. Remove the master eject unit.
2. Using a 10 mm spanner, turn the drum rotation shaft counterclockwise and position the bearing [A] of the pressure ON/OFF lever [B] on top of the pressure cam [C].
3. Loosen the bolt [D] fixing the arm [E].
4. Adjust the position of the bolt [F] using a 7 mm spanner so that the bearing [G] of the arm just touches the top of the A4 cam [H].
5. Rotate the bearing [G] manually. If there is no friction between the bearing and the cam, turn the bolt [F] clockwise.
6. Retighten the bolt [D].

9.4 ADJUSTING THE PRESSURE TIMING

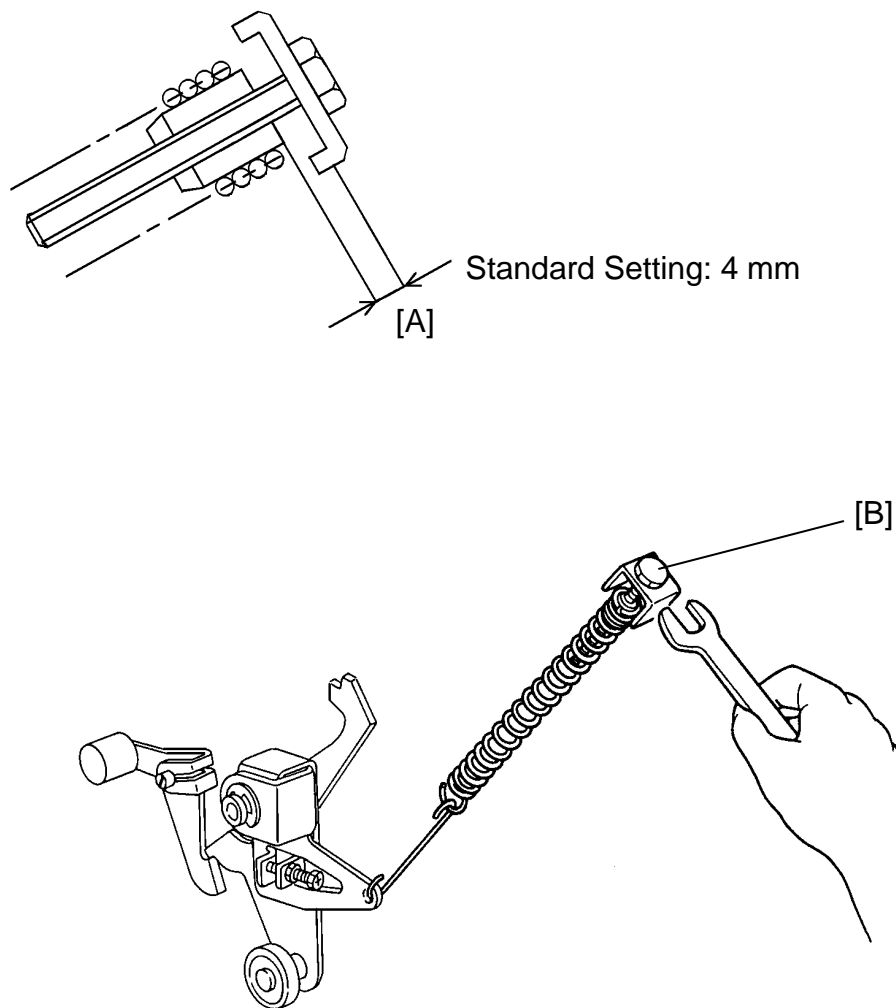


Purpose: To ensure that the maximum printing area is within specifications, and that the ink does not stain the trailing edge of the paper.

Adjustment Standard: $225^{\circ} \pm 1^{\circ}$

1. Stack about 100 sheets of 65 g/m² paper on the table.
2. Set the Image Shifting indicator to the "0" position and return the drum to the home position by turning off and on the main switch.
3. Set the paper table in the paper feed position. (Use Output Check mode number 19.)
4. Remove the rear cover of the machine.
5. Set a protractor [D] on the image shifting shaft [A]. Align the origin of the protractor with the edge of the solenoid bracket [E].
6. Using a 10 mm spanner, turn the drum rotation shaft counterclockwise while manually pressing in the plungers of the paper feed solenoid and the printing pressure solenoid by hand.
7. Turn the drum rotation shaft a little further, and stop when the press roller begins to touch the drum surface.
8. In the above condition, measure the degrees turned, this should be 224° to 226° .
9. If not, loosen the screw [B] of the pressure cam [C] and adjust the pressure timing by turning the cam [C].

9.5 ADJUSTING THE PRINTING PRESSURE

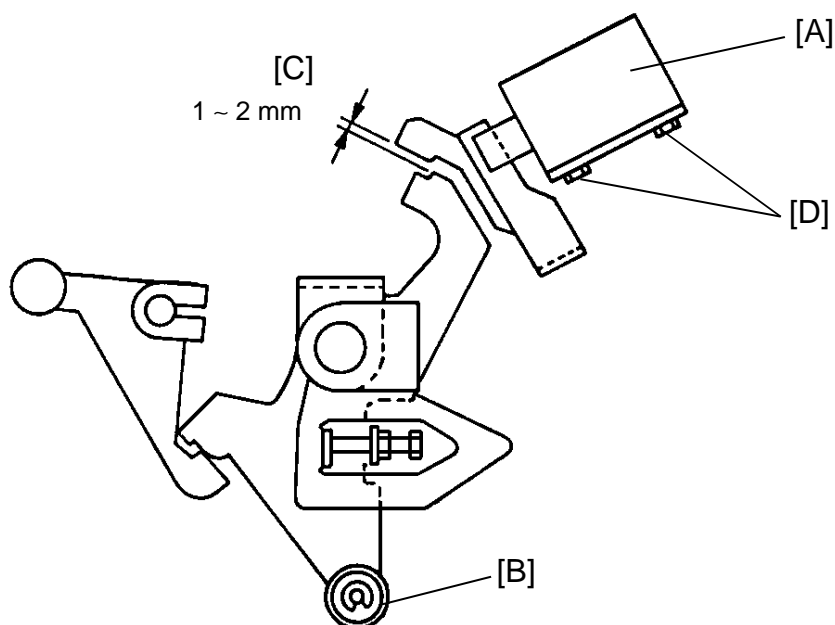


Purpose: To apply the proper printing pressure to the press roller.

Adjustment Standard: 4 mm

1. Remove the rear cover of the machine.
2. Adjust the clearance [A] to be 4 mm by turning the adjusting bolt [B].

9.6 ADJUSTING THE CLEARANCE OF THE PRINTING PRESSURE SOLENOID



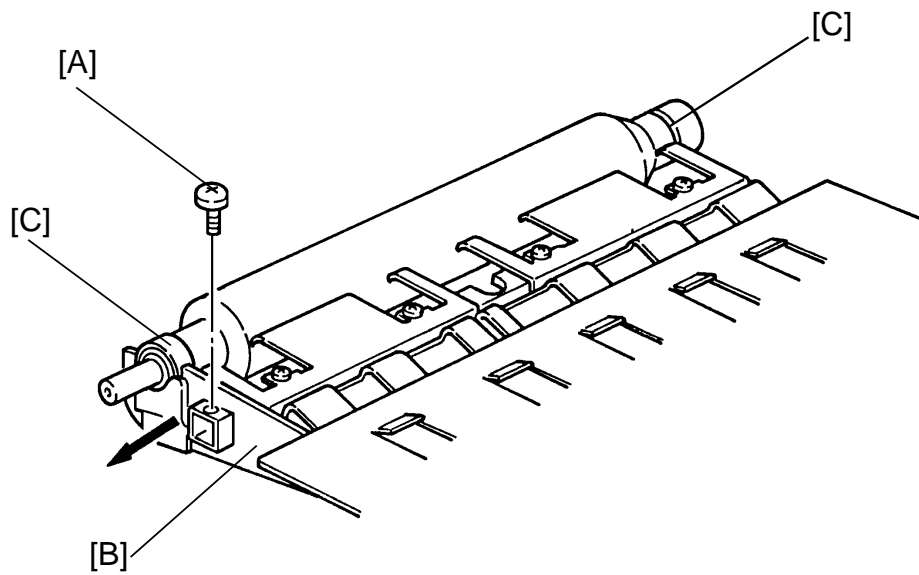
Purpose: To ensure that the printing pressure stopper is released when the paper feed starts, and that the stopper is locked within one drum rotation when a paper jam occurs.

Adjustment Standard: 1 to 2 mm

NOTE: Perform this adjustment after adjusting the clearance of the paper detecting arm.

1. Manually press in the plunger of the printing pressure solenoid [A]. At this time rotate the drum rotation shaft with a 10 mm spanner until the bearing [B] rides on top of the printing pressure cam.
2. Confirm that the clearance [C] is between 1 and 2 mm.
3. If not, loosen the hexagon head screws [D] and adjust the clearance by moving the printing pressure solenoid.

9.7 PRESS ROLLER

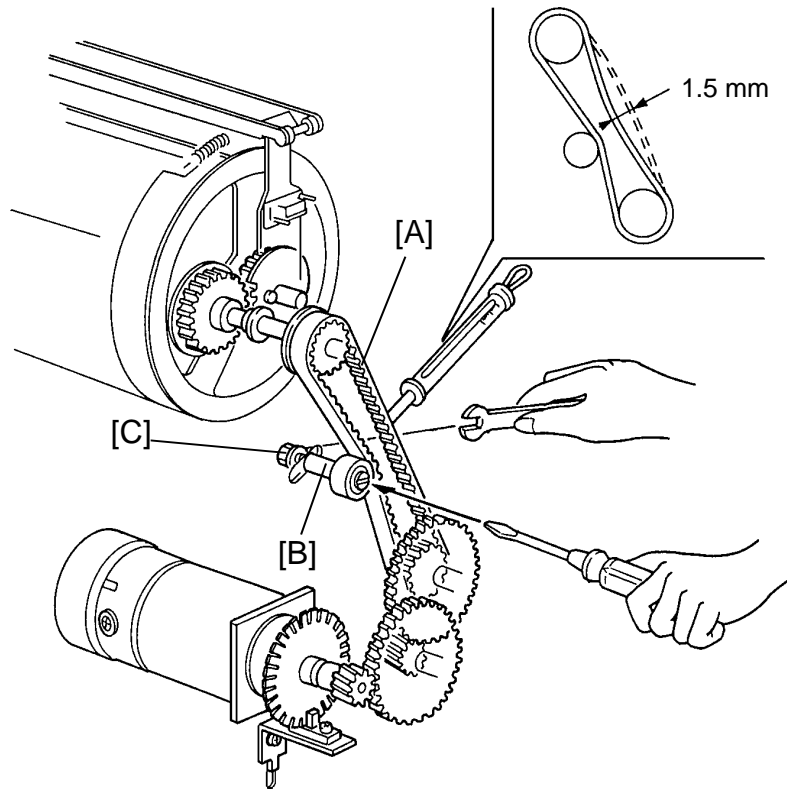


1. Remove the screw [A].
2. Slide the holding plate [B] to the front side of the machine.
3. Remove the press roller.
4. Remove both right and left bearings [C] (2 E-rings).

Replacement
and
Adjustment

10. DRUM SECTION

10.1 ADJUSTING THE MAIN DRIVE BELT TENSION

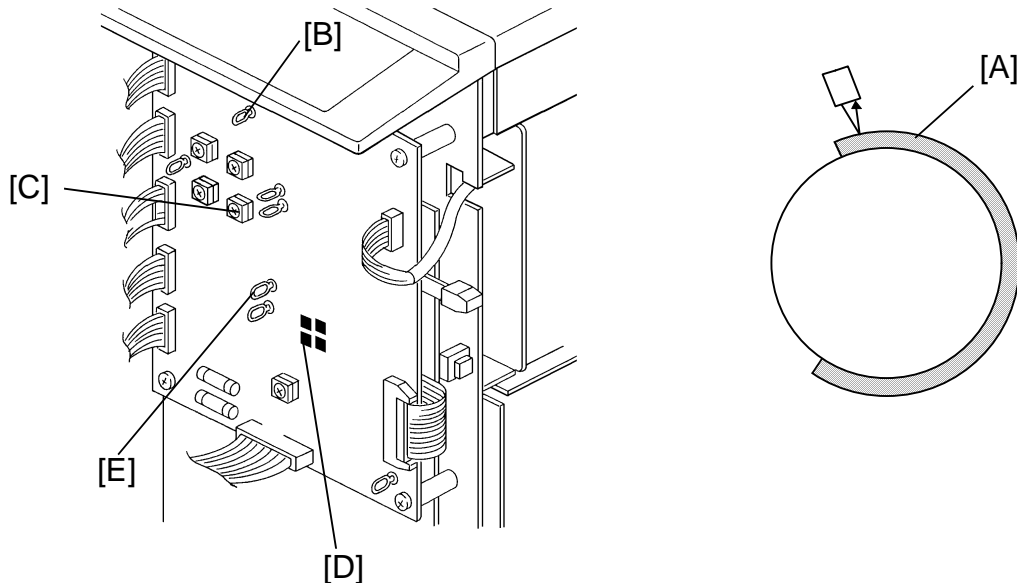


Purpose: To ensure that the main motor rotation is correctly transmitted to the drum.

Adjustment Standard: 1.5 mm

1. Remove the rear cover of the machine.
2. Apply a 1000-gram load (using a tension gauge) to the center of the main drive belt [A]. Ensure that the belt deflects 1.5 mm.
3. If not, remove the drum unit and adjust the belt tension by moving the tensioner shaft [B] after loosening the nut [C].
4. After adjusting, tighten the nut [C] very securely.

10.2 ADJUSTING THE DRUM MASTER DETECTION SENSOR



Purpose: To ensure that the drum master detection sensor correctly detects the master on the drum.

Adjustment Standard: 0.9 to 1.0 V when the sensor is activated, and 2.0 V or higher when it is not activated.

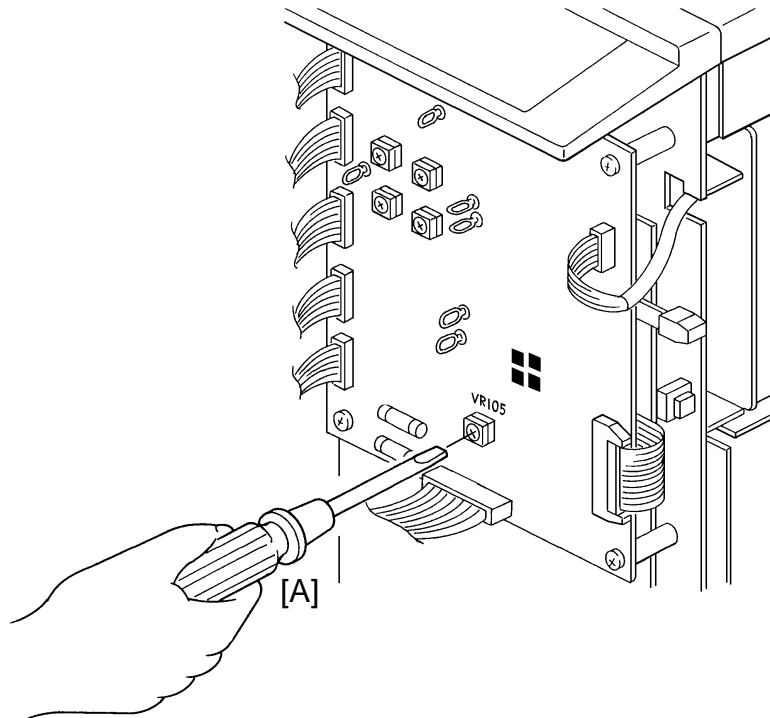
1. Slide out the drum unit and remove the master [A] from the drum.
2. Reinstall the drum unit. Press and hold down the Drum Rotation button until the drum reaches the home position.
3. Remove the right front cover. Then, confirm that the voltage between TP102 [E] and TP107 [B] on the main PCB is between 0.9 and 1.0 V.
4. If the voltage is outside the specified range, adjust VR102 [C] on the main PCB.
5. Make a master with a blank white original.

NOTE: Ensure the master leading edge is clamped to the drum clamber and that the master [A] is wrapped correctly on the drum.

6. Ensure that the voltage between TP102 [E] and TP107 [B] on the main PCB is 2.0 V or higher. At this time, LED102 [D] will light.

NOTE: The voltage of the sensor can be checked by SP mode no. 138.

10.3 ADJUSTING THE PRINTING SPEED

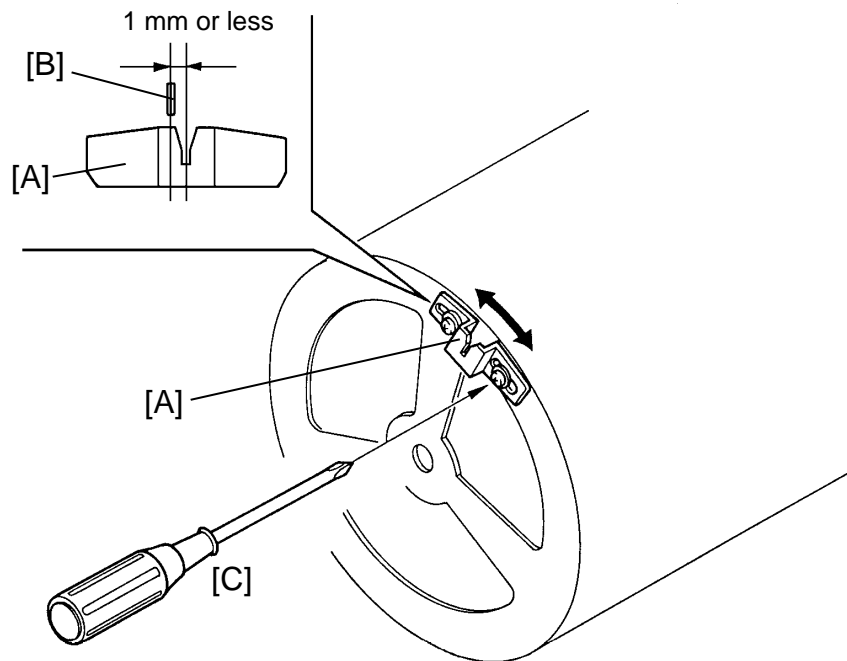


Purpose: To ensure the correct main motor speed.

Adjustment Standard: $120 \begin{smallmatrix} +10 \\ -1 \end{smallmatrix}$ rotations/minute at the maximum printing speed.

1. Press the Speed Change key to set the speed at the maximum level.
2. Make prints. After the first print, the machine should produce 120 prints every minute.
3. If not, adjust the speed of the main motor by turning VR105 [A].

10.4 ADJUSTING THE DRUM STOPPER

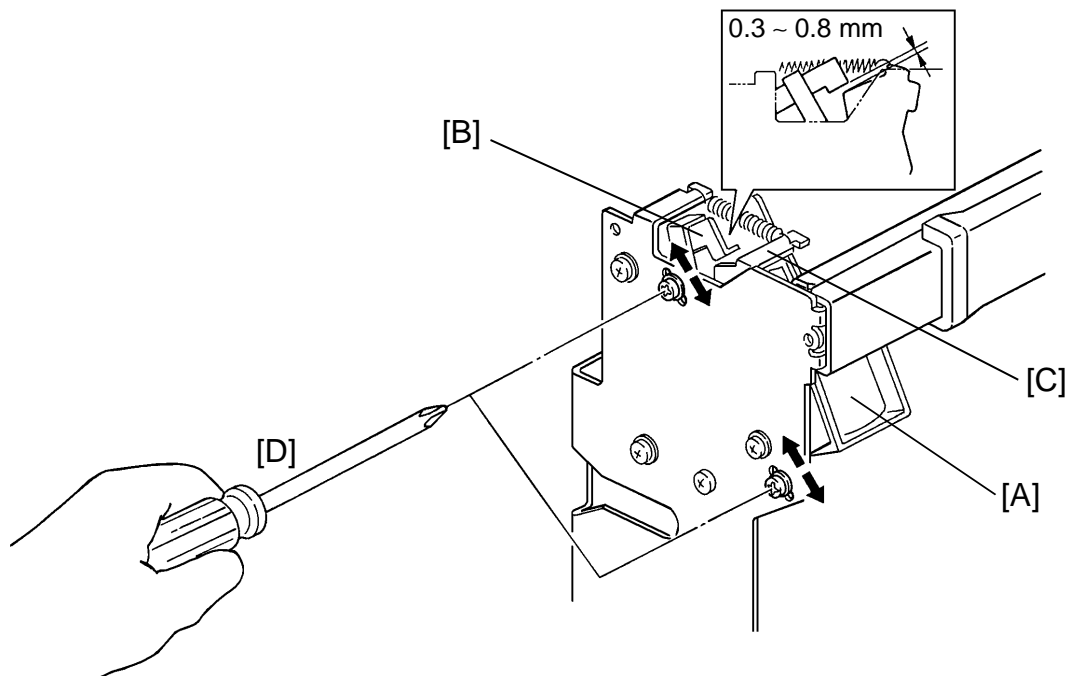


Purpose: To ensure that the drum is securely locked when the drum unit is pulled out.

Adjustment Standard: 1 mm or less

1. Remove the drum unit from the machine.
2. Ensure that the distance between the center of the drum lock [A] and the center of the drum stopper [B] is less than 1 mm.
3. If it is more than 1mm, loosen the screws [C] and adjust the distance by moving the drum lock [A].

10.5 ADJUSTING THE DRUM LOCK SOLENOID

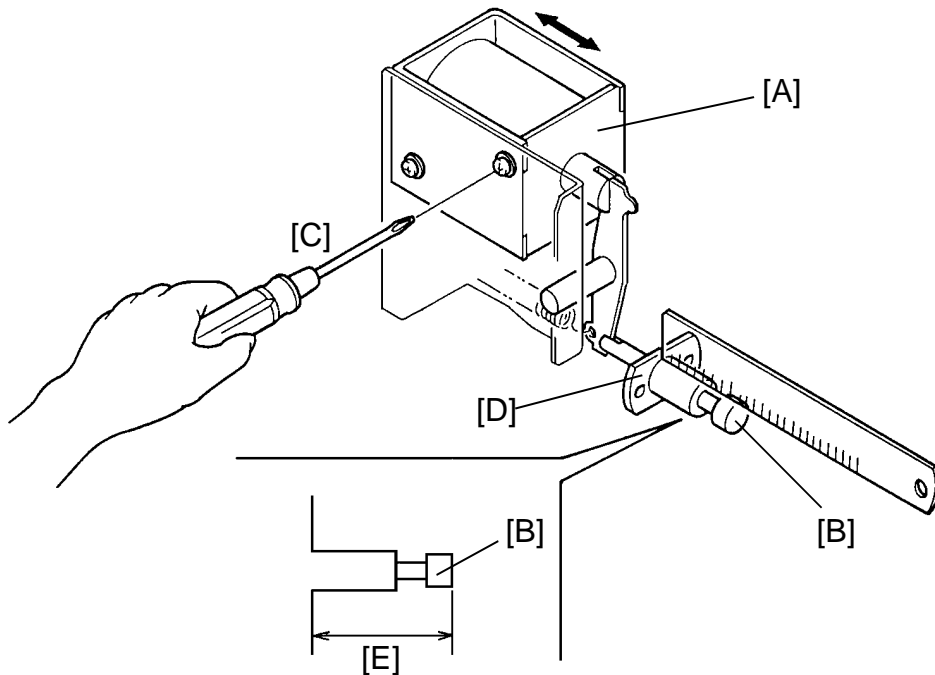


Purpose: To ensure that the drum can be removed only when it is in the home position.

Adjustment Standard: 0.3 to 0.8 mm

1. Remove the drum unit from the machine.
2. Remove the upper cover of the drum lock solenoid [A] (3 screws).
3. Ensure that the distance between the lock lever [B] and the stopper [C] is between 0.3 and 0.8 mm.
4. If the distance is not correct, loosen the two screws [D] and adjust the position of the solenoid bracket.
5. Set the drum back in the machine and press the drum rotation button. Ensure that the drum lock solenoid turns on and that the drum handle cannot be moved when the drum is not in the home position.

10.6 ADJUSTING THE MASTER FEED CLAMPER CAM



Purpose: To ensure that the master feed clasper is open during the master feed process and is closed during other processes.

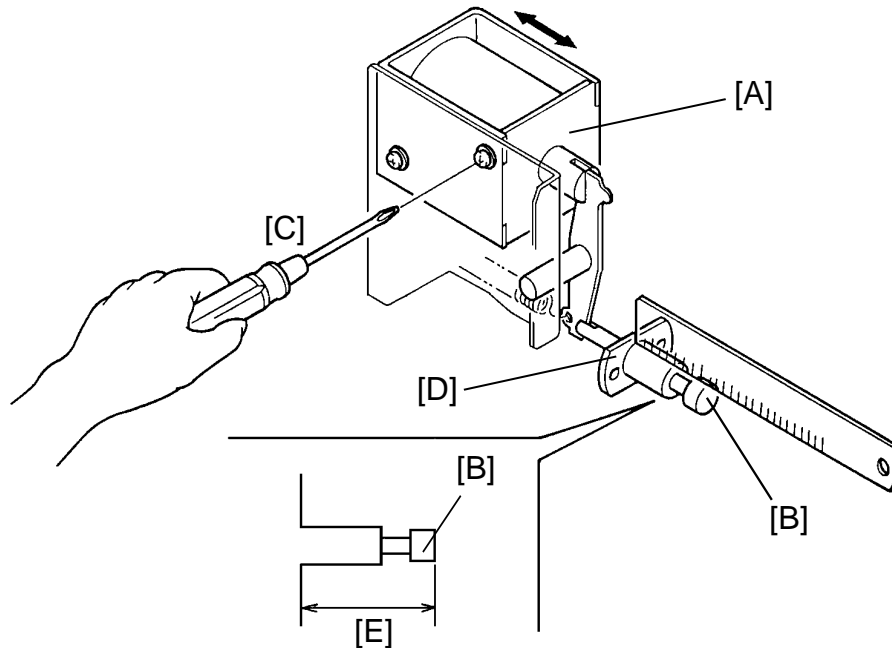
Adjustment Standard: 29 ± 0.5 mm when the solenoid is energized, and less than 25 mm when it is de-energized.

1. Remove the drum unit and open the master eject unit.
2. Turn on the master feed clasper solenoid [A]. (Use Output Check mode number 15.)
3. Confirm that the distance [E] between the bushing [D] and the edge of the opening cam [B] is 29 ± 0.5 mm when the solenoid is turned on.
4. If not, loosen the mounting screw [C] and adjust the solenoid position.

CAUTION: Do not leave the solenoid on longer than 10 seconds.

5. After adjusting, retighten the mounting screws [C].

10.7 ADJUSTING THE MASTER EJECT CLAMPER CAM



Purpose: To position the master eject clamber cam [B] so that the master clamber opens correctly during the master eject process and closes correctly during all other processes.

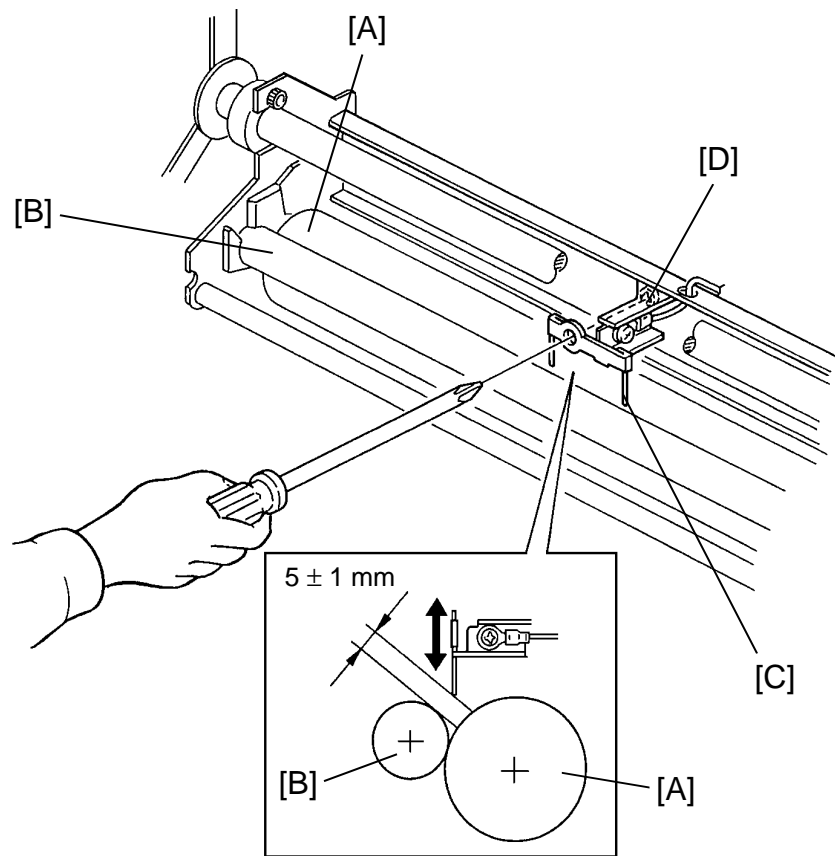
Adjustment Standard: 29 ± 0.5 mm when the solenoid is energized, and less than 25 mm when it is de-energized.

1. Remove the drum unit and open the master eject unit.
2. Turn on the master eject clamber solenoid [A]. (Use Output Check mode number 16.)
3. Confirm that the distance [E] between the bushing [D] and the edge of the opening cam [B] is 29 ± 0.5 mm when the solenoid is turned.
4. If not, loosen the mounting screws [C] and adjust the solenoid position.

CAUTION: Do not leave the solenoid on longer than 10 seconds.

5. After adjusting, retighten the mounting screws [C].

10.8 ADJUSTING THE POSITION OF THE INK DETECTING PIN

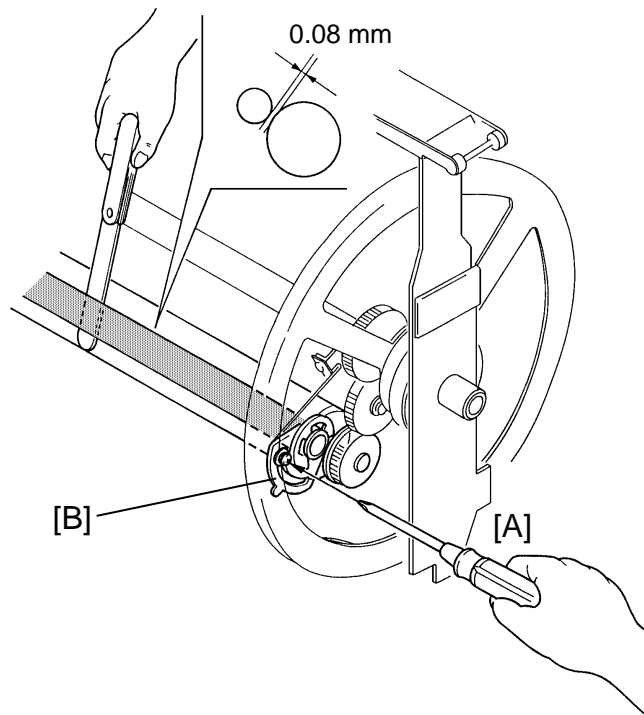


Purpose: To ensure detection of ink built-up between the ink roller and the doctor roller.

Adjustment Standard: 5 ± 1 mm

1. Remove the drum unit.
2. Remove the tetron screen and the metal screen from the drum unit.
3. Remove the ink distributor (2 screws).
4. Wipe off the ink around the ink roller [A] and the doctor roller [B].
5. Ensure that the distance between the end of the ink detecting pin [C] and the doctor roller [B] surface is 5 ± 1 mm.
6. If not, loosen the screw [D] and adjust the distance by moving the ink detecting pin [C].
7. After adjusting, retighten the screw [D].

10.9 ADJUSTING THE CLEARANCE OF THE DOCTOR ROLLER



Purpose: To equalize the ink thickness around the ink roller and prevent an uneven image.

Adjustment Standard: 0.08 mm

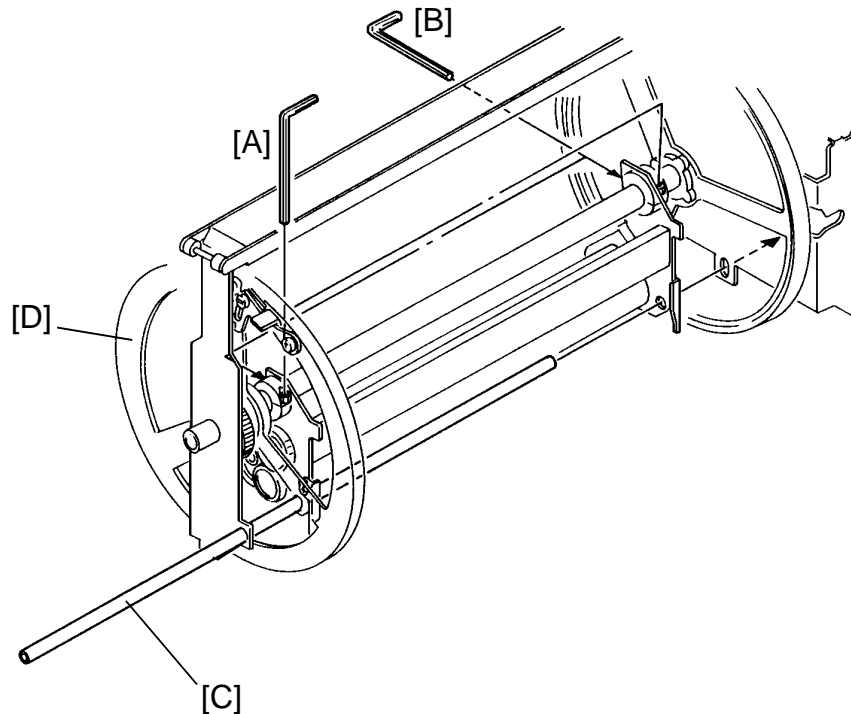
1. Remove the drum unit.
2. Remove the clamber.
3. Remove the tetron screen and the metal screen from the drum unit.
4. Remove the ink distributor.
5. Wipe off the ink around the ink roller and the doctor roller.
6. Insert a 0.08-mm gap gauge between the doctor roller and the ink roller. Then ensure that a 0.1-mm gauge can not penetrate the gap.

NOTE: Check the gap at the right, center, and left positions.

7. If the gap is not within specifications, loosen the screw [A] and adjust the gap by turning the eccentric bushing [B].

NOTE: Before adjusting, remove the drive gear located on the operation side of the doctor roller because the drive gear restricts the adjustment.

10.10 ADJUSTING THE INK ROLLER WITH THE DRUM UNIT

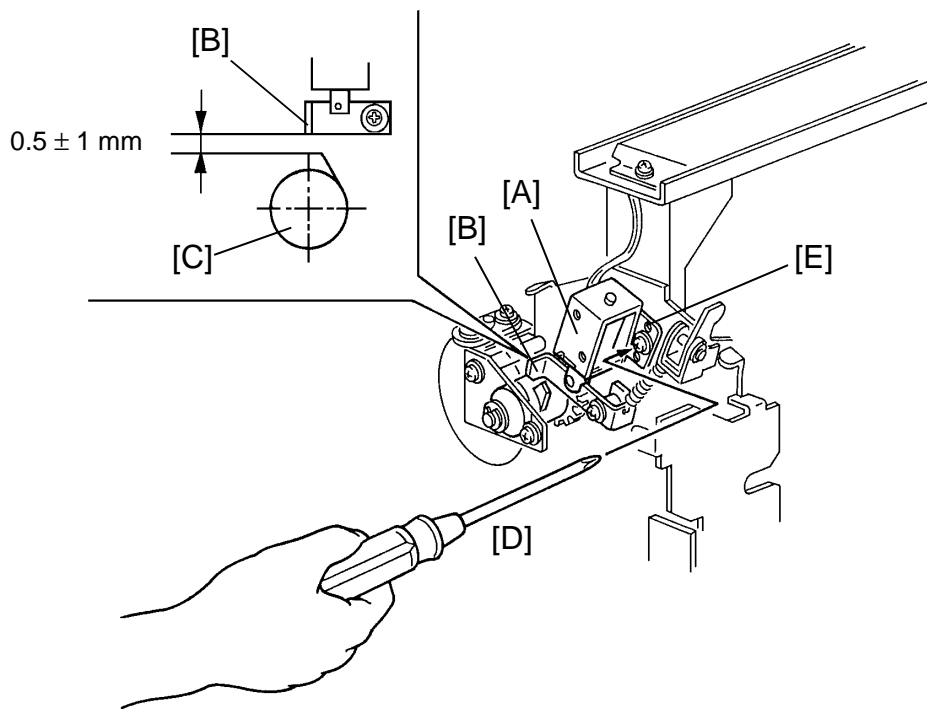


Purpose: To ensure that the pressure of the press roller is applied evenly to the ink roller.

Adjustment Standard: The drum gauge must be inserted.

1. Remove the drum unit from the machine.
2. Remove the tetron screen and the metal screen from the drum unit.
3. Loosen the bolts [A] and [B] that secure the ink roller unit to the drum shaft.
4. Insert the drum gauge [C] (P/N C2009001) through the holes in both side plates of the drum unit and in both side plates of the ink roller unit.
5. With the gauge in the holes, tighten the bolts [A] and [B] so that the thrust play of the flange [D] is between 0.05 and 0.2 mm.

10.11 ADJUSTING THE POSITION OF THE INK SUPPLY SOLENOID

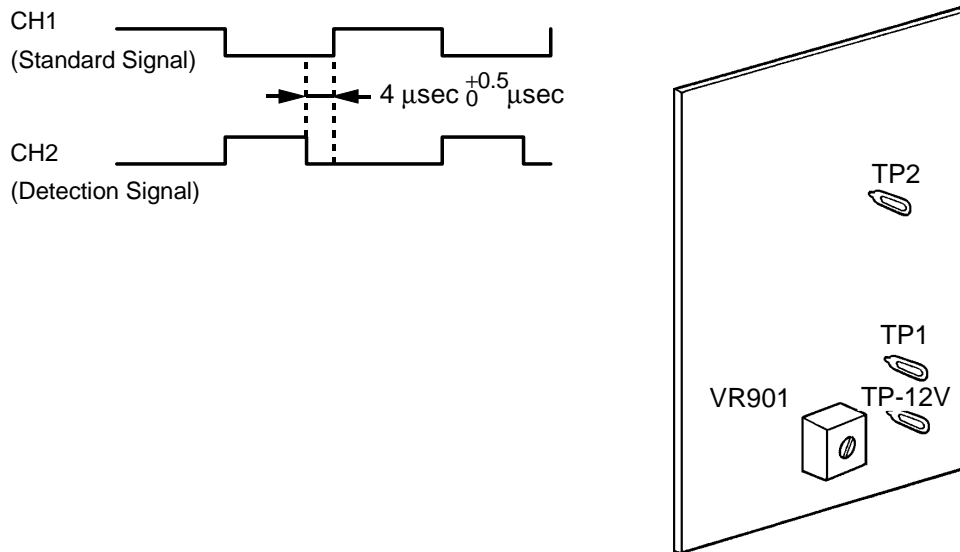


Purpose: To ensure total clutch-sleeve release by the stopper when the ink supply solenoid [A] turns on and complete clutch-sleeve locking by the stopper when the ink supply solenoid turns off.

Adjustment Standard: 0.5 ± 1 mm

1. Remove the drum unit from the machine.
2. Remove the upper ink supply solenoid cover and remove the front cover of the drum unit.
3. Press in the solenoid plunger by hand and ensure that the distance between the stopper [B] and the clutch sleeve [C] is between 0.5 mm and 1.0 mm as shown.
4. If not, loosen the screw [D] and adjust the distance by moving the solenoid bracket [E].
5. After adjusting, retighten the screw [D].

10.12 ADJUSTING INK DETECTION

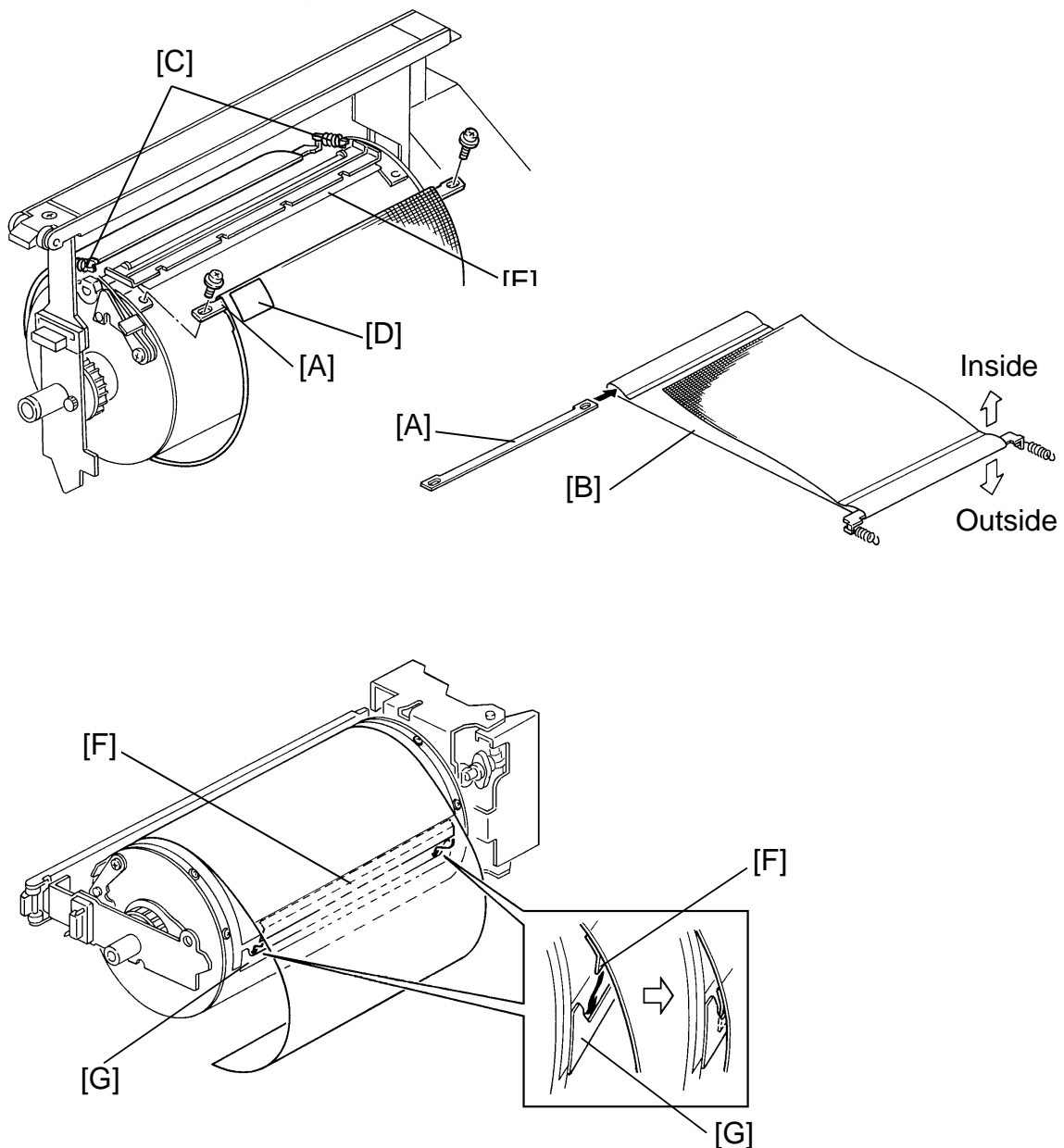


Purpose: To ensure that the ink detection PCB detects a no ink condition when the ink is running out.

Adjustment Standard: See the Above illustration.

1. Remove the rear cover of the machine.
2. Connect the CH1 probe of an oscilloscope to TP1, the CH2 probe to TP2 and the GND lead to TP-12 V. Select the 5 microsecond range.
3. Turn the main switch on and install a drum with no ink or remove the ink bottle and continue to make prints until the Add Ink indicator lights.
4. Ensure that the waveform is as shown.

- NOTE:**
1. This adjustment should be made under normal conditions ($20^{\circ}\text{C}/65\% \text{ RH}$).
 2. The period of the waveform varies inversely with temperature.
(High temp. \rightarrow reduced period, Low temp. \rightarrow increased period)
5. If not, adjust the ON timing of the detection signal using VR901 on the ink detection PCB.

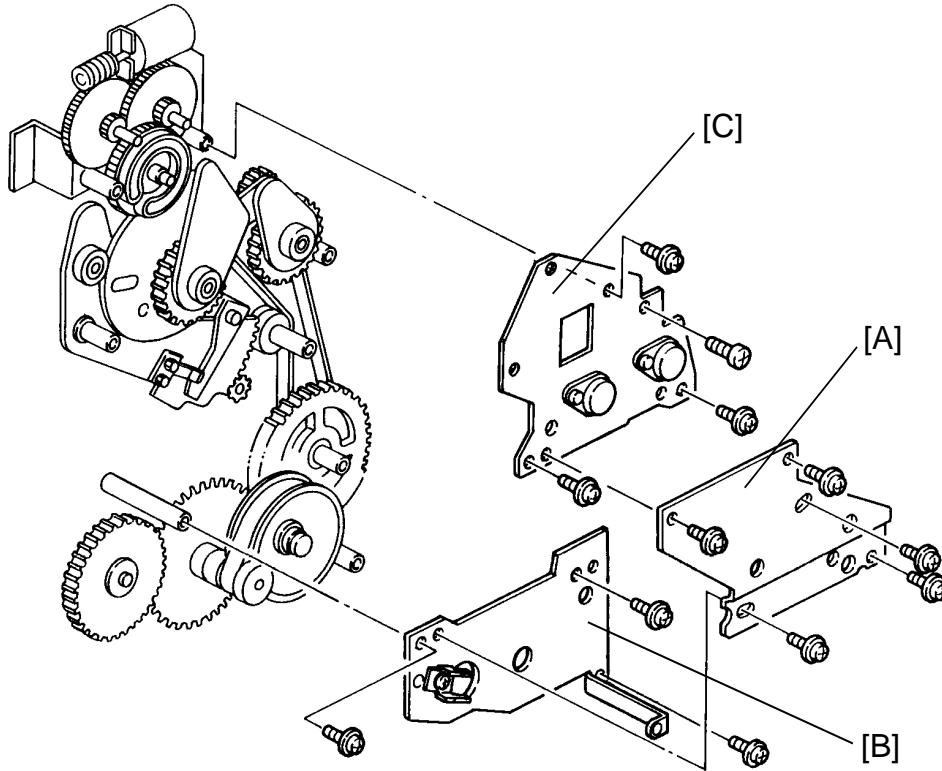


1. Remove the drum unit from the machine.
2. Remove the front stay [A] of the screen [B] (2 screws).
3. Remove the 2 springs [C].
4. Remove the screen [B].

NOTE:

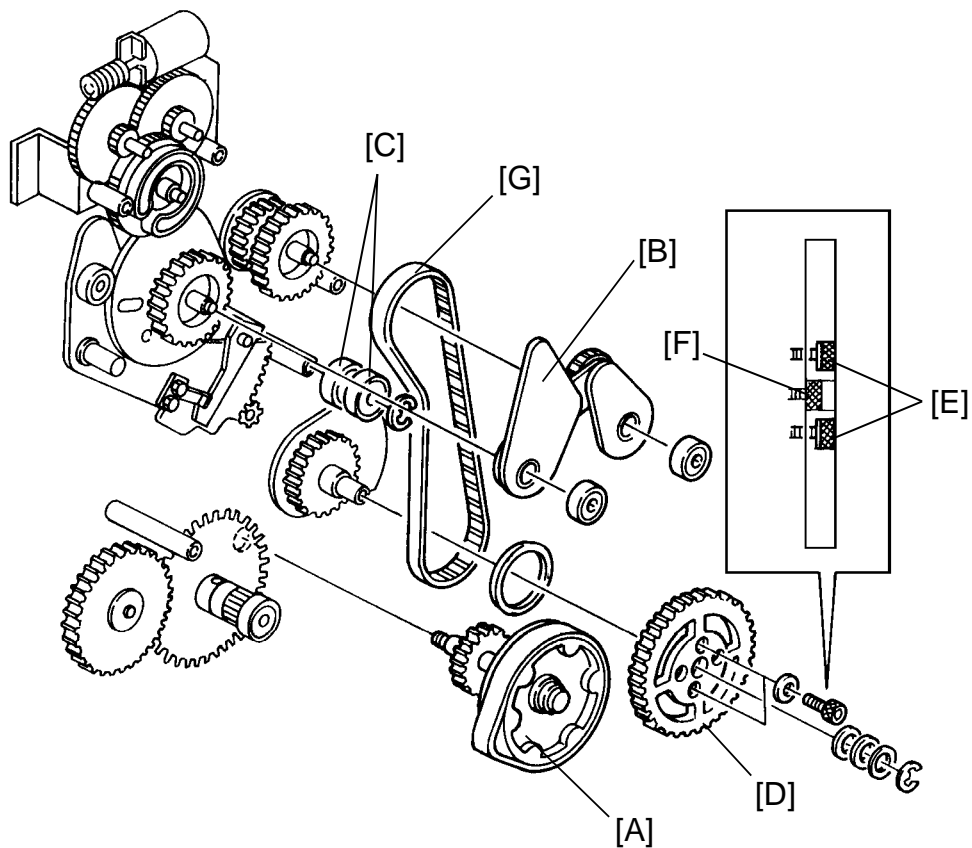
1. Ensure that the black seal [D] is on the front side (outside) of the screen when reinstalling it.
2. Ensure that the front stay [A] is located under the clamber plate [E] when reinstalling it.
3. Ensure that the mylar [F] of the screen is correctly inserted into the pocket [G] on the drum.

10.14 DRUM DRIVE BELT

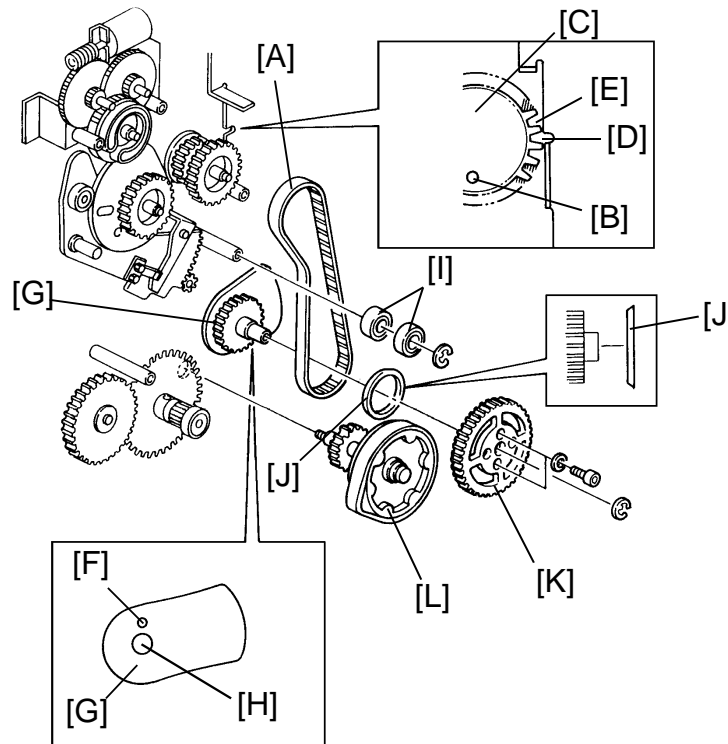


Removal:

1. Set the image position to "0" by turning the main switch off and on.
2. Turn the main switch off and unplug the power supply cord.
3. Remove the drum unit.
4. Remove the rear cover.
5. Remove the center support plate [A] (5 screws).
6. Remove the lower support plate [B] (3 screws).
7. Remove the upper support plate [C] (4 screws).



8. Remove the relay gear assembly [A].
 9. Remove the timing gear assembly [B].
 10. Remove two belt tension bearings [C].
 11. Remove the pressure cam drive gear [D] (2 hexagon bolts [E] and 1 E-ring).
- NOTE:** Four hexagon bolts secure the gear [D]. Do not loosen the two deeply recessed bolts [F].
12. Remove the drum drive belt [G].



Assembly:

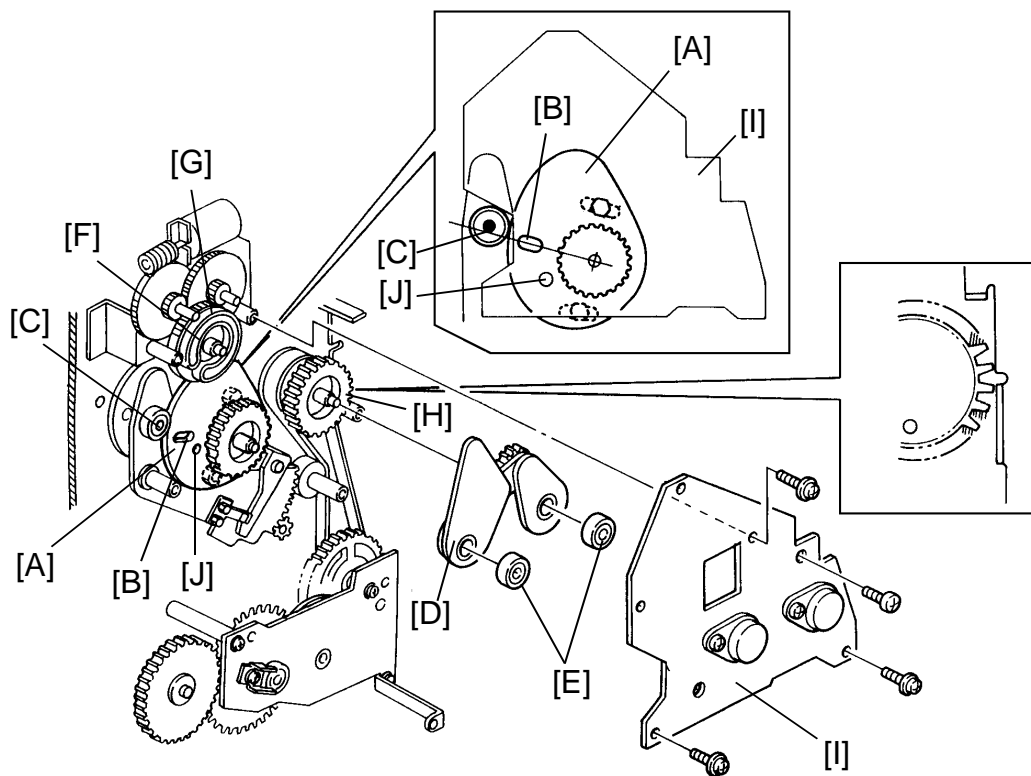
1. Install a new drum drive belt [A].
2. Adjust the drum drive belt position.
 - 1) The hole [B] in the drum drive gear [C] is aligned with the hole in the rear side plate. At this time, the notch cut [D] in the plate lines up with the center of the drum drive gear cutout [E].
 - 2) The hole [F] on the pressure cam [G] should be right over the pressure cam shaft [H].
3. Install two belt tension bearings [I] (1 E-ring).

NOTE: Ensure that the drum drive gear and the pressure cam are in proper position as explained above.
 If the relation between the printing pressure cam [G] position and the drum drive gear [C] position is wrong, printing pressure will be applied too late or too early. For each misaligned tooth between the cam and the gear, the print will appear either 23 mm too far up or too far down.

4. Install the white spacer [J] and the pressure cam drive gear [K] (2 hexagon bolts).

NOTE: Take care to install the white space [J] with the correct face towards the gear. (See figure.)

5. Install the relay gear assembly [L] and the relay belt.
6. Install the lower support plate (3 screws).



7. Adjust the position of the second feed cam [A] so that the center of the slot [B] in the second feed cam is aligned with the bearing shaft [C].

8. Install the timing gear assembly [D] with the two bearings [E].

NOTE: Ensure that the pin on the timing gear assembly is in the groove [F] of the cam gear [G].
Ensure that the drum drive gear [H] is at the home position.

9. Install the upper support plate [I] (4 screws).

10. Push down lightly on the second feed cam [A] to hold it firmly in place.
While still holding it, make sure that the hole [J] in the second feed cam is aligned with the upper support plate [I]. If not, repeat steps 7 to 10.

11. Make several prints to check the registration.

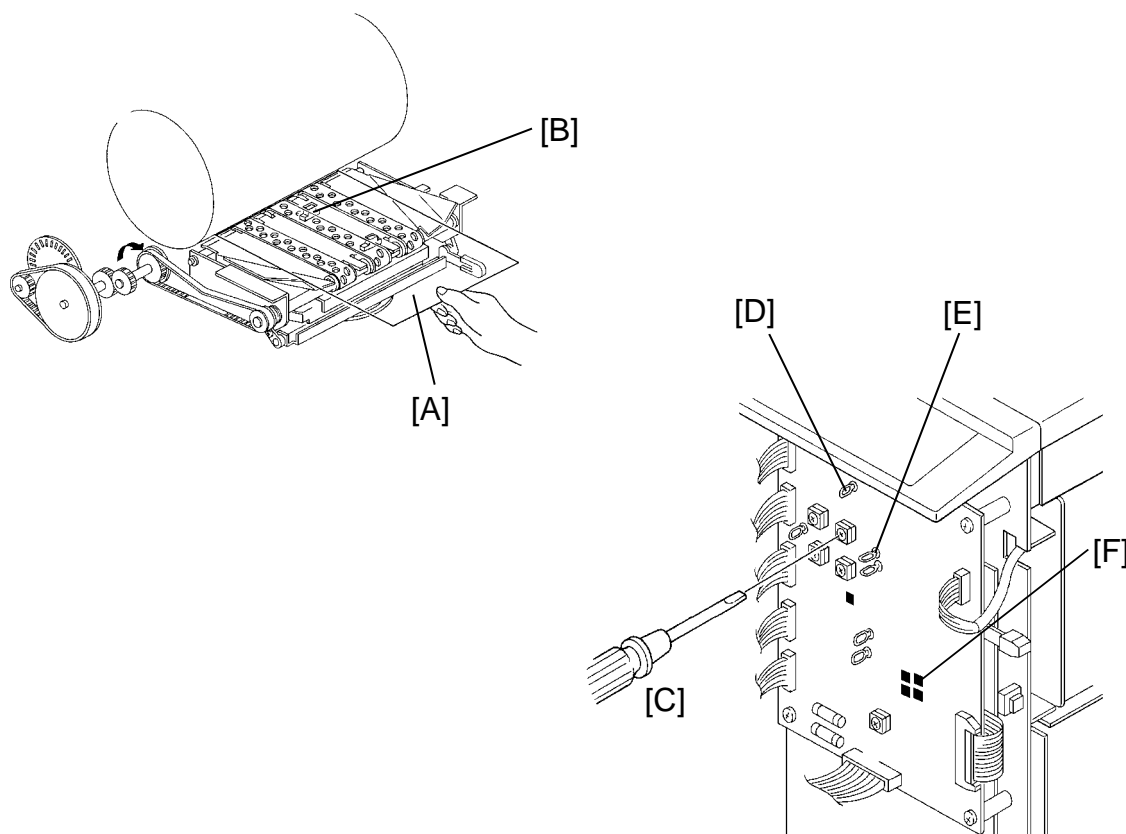
12. If the registration is off by more than 12 mm, repeat step 7 to 11. If the registration is less than 12 mm, adjust the relation between the feed rollers and the gear according to the "Adjusting the feed timing of the second feed roller" section.

NOTE: For each misaligned tooth of the feed cam gear, the registration is changed approximately 12 mm.

13. Install the center support side plate (5 screws).

11. DELIVERY SECTION

11.1 ADJUSTING THE FIRST PAPER EXIT SENSOR



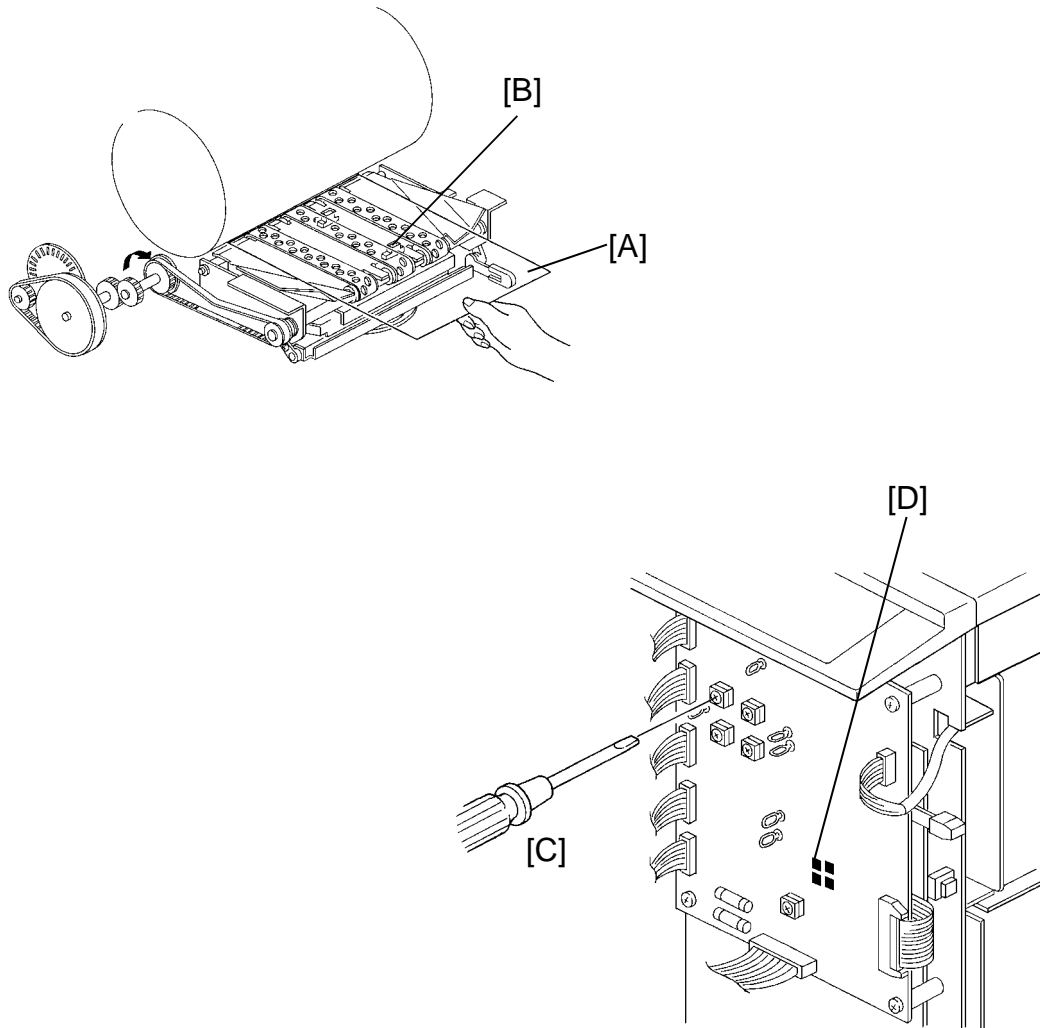
Replacement
and
Adjustment

Purpose: To ensure that the sensor detects correct paper delivery, and to ensure that the jam indicator blinks properly after an exit misfeed or a paper wrap occurs.

Ajustment Standard: 0.9 to 1.0 V

1. Remove the right front cover of the machine.
2. Wrap a sheet of 65 g/m² paper [A] around the drum.
3. Measure the voltage between TP101 [E] and TP107 (GND) [D]. It should be between 0.9 and 1.0 volts.
4. If it is not, adjust the sensor sensitivity by turning VR101 [C] on the main PCB.
5. To confirm that LED 101 [F] turns ON and OFF, activate the first paper exit sensor [B]. Use a sheet of paper to activate the sensor.

11.2 ADJUSTING THE SECOND PAPER EXIT SENSOR



Purpose: To ensure correct sensor detection of printing paper, and to ensure that the jam indicator blinks and the machine stops when a paper wrap or an exit misfeed occurs.

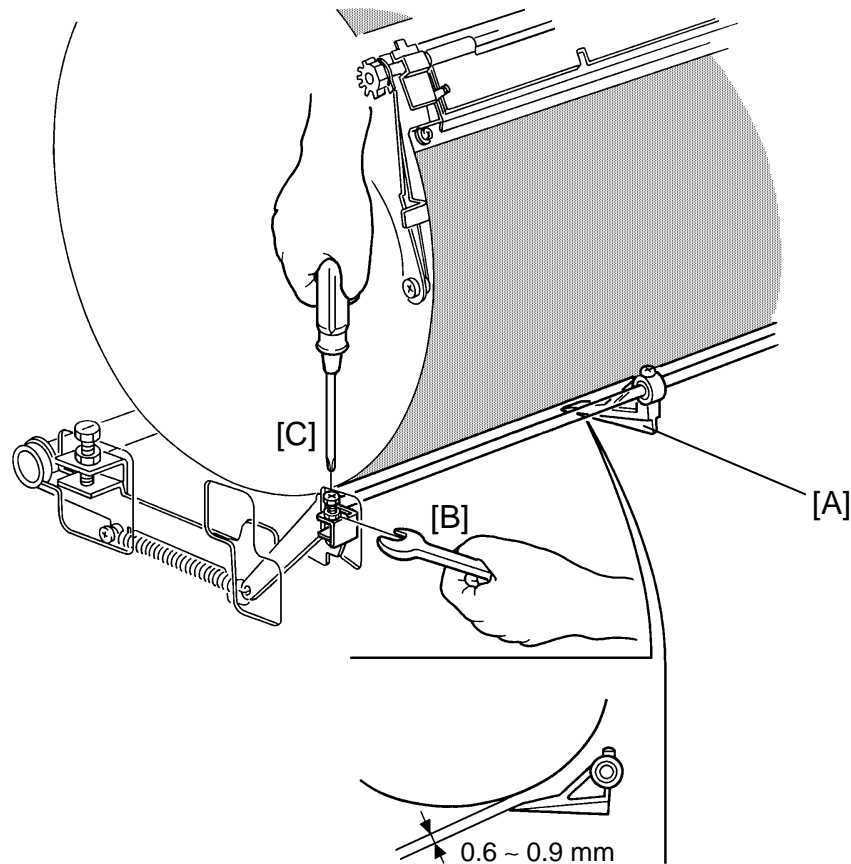
Adjustment Standard: VR103 is set at the ON/OFF threshold of LED103 [D].

1. Remove the right front cover of the machine.
2. Place a sheet of 65 g/m² paper [A] 15 mm away from the second paper exit sensor [B]. Make sure that VR103 [C] is set at the ON/OFF threshold of LED103 [D].

NOTE: The voltage of the sensor can be checked by SP mode No. 136.

3. If it is not, adjust the sensor sensitivity by turning VR103 [C] on the main PCB.

11.3 ADJUSTING THE CLEARANCE OF THE EXIT PAWL

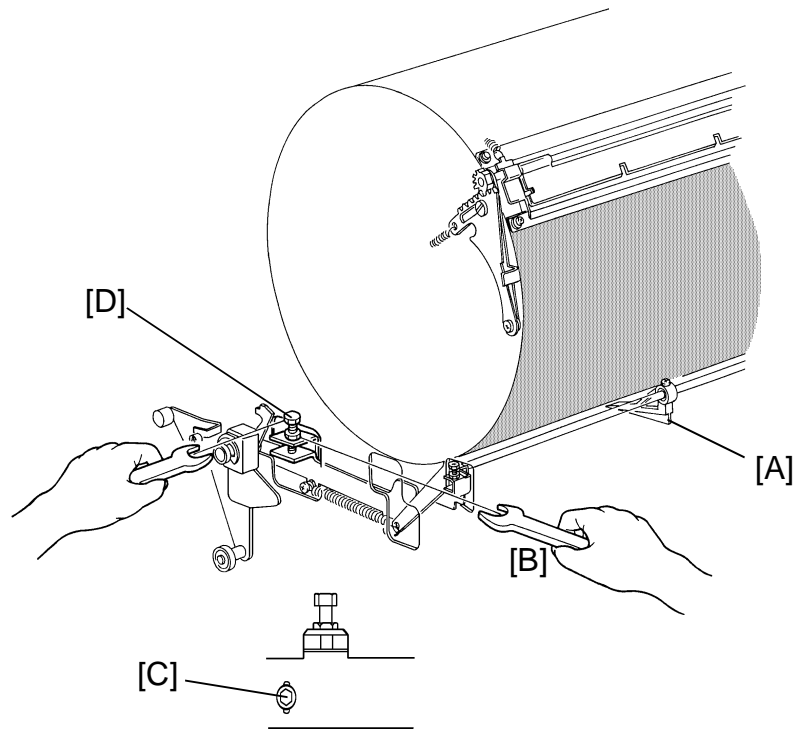


Purpose: To ensure that the printing paper is delivered without a paper wrap problem or damage to the screen.

Adjustment Standard: 0.6 to 0.9 mm

1. Remove the rear cover of the machine and open the master eject unit.
2. Set a few sheets of paper on the paper table. Then, set the paper table in the paper feed position. (Use Output Check mode number 19.)
3. To feed a sheet of paper, turn on the paper feed solenoid by hand, and using a 10 mm spanner, gradually rotate the drum rotation shaft and at the same time manually turn on the printing pressure solenoid to move the exit pawl [A] to the drum.
4. Make sure that the clearance between the drum and the exit pawl between 0.6 and 0.9 mm when the exit pawl is closest to the drum.
5. If it is not, loosen the hexagon nut [B] of the exit pawl drive arm, and adjust the clearance by turning the screw [C].
6. Check adjustment by repeating steps 3 and 4.

11.4 ADJUSTING THE EXIT PAWL TIMING

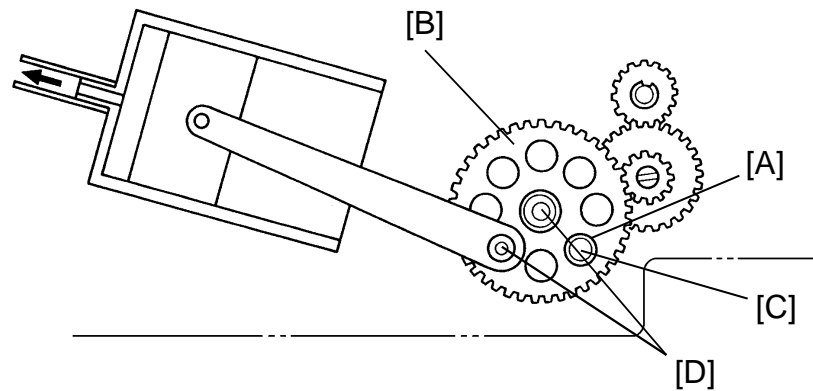


Purpose: To ensure that the exit pawl does not touch the master clamber.

Adjustment Standard: $232 \pm 3^\circ$

1. Remove the rear cover of the machine.
2. Press and hold down the Drum Rotation button until the drum reaches the home position.
3. Set the protractor on the image shifting shaft. Position the origin of the protractor at the bracket of the master feed clamber solenoid.
4. Manually press in the plunger of the printing pressure solenoid. Release the paper detecting arm manually by rotating the drum rotation shaft with a spanner (10 mm).
5. Measure the degrees turned when the exit pawl [A] comes closest to the drum. This must be $232 \pm 3^\circ$.
6. If not, loosen the hexagon nut [B] and screw [C], and adjust the exit pawl position by turning the hexagon bolt [D].
7. Check the adjustment by repeating step 4 to 6.

11.5 ADJUSTING THE PAPER EXIT PAWL AIR PUMP

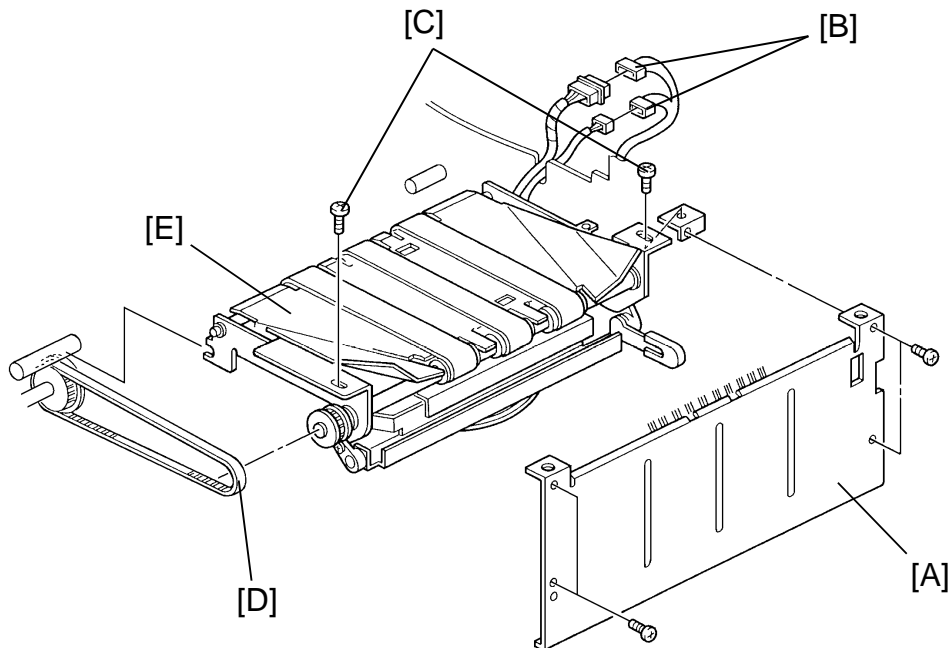


Purpose: To ensure that the paper exit pawl air pump produces a jet of air when the paper exit pawl is in the upper position (near the drum surface).

Adjustment Standard: When the drum has rotated $341^{\circ} \pm 3$ degrees, the pump piston position is at the upper dead point.

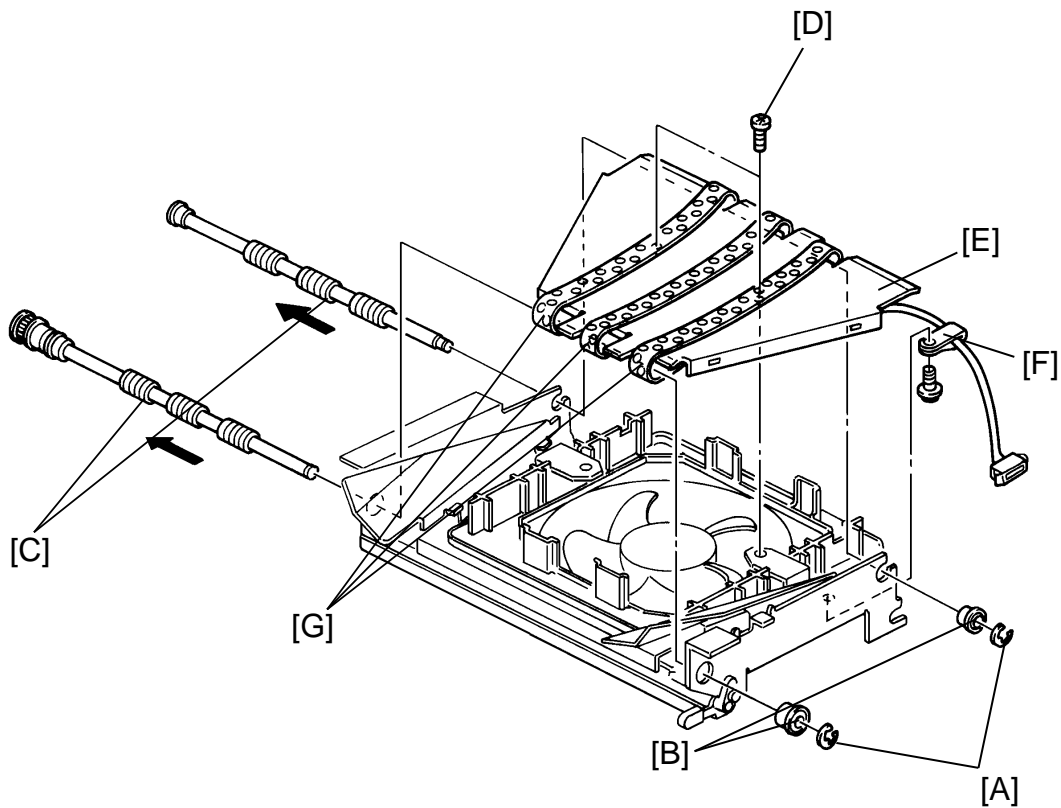
1. Open the front door and remove the inner cover.
2. Press and hold down the Drum Rotate button until the drum reaches the home position.
3. Confirm that the 13 mm diameter hole [A] in the gear [B] and the 8 mm diameter hole [C] in the side plate are lined up.
4. If the holes are not lined up, remove the E-rings [D] and reposition the gear.
5. Rotate the drum to the home position and confirm step 3 again.

11.6 TRANSPORT UNIT



1. Remove the right front cover and remove the inner cover.
2. Remove the exit side plate [A] (4 screws).
3. Remove the harness clamp and disconnect the two connectors [B].
4. Remove the two screws [C].
5. Take off the belt [D] from the pulley and remove the transport unit [E].

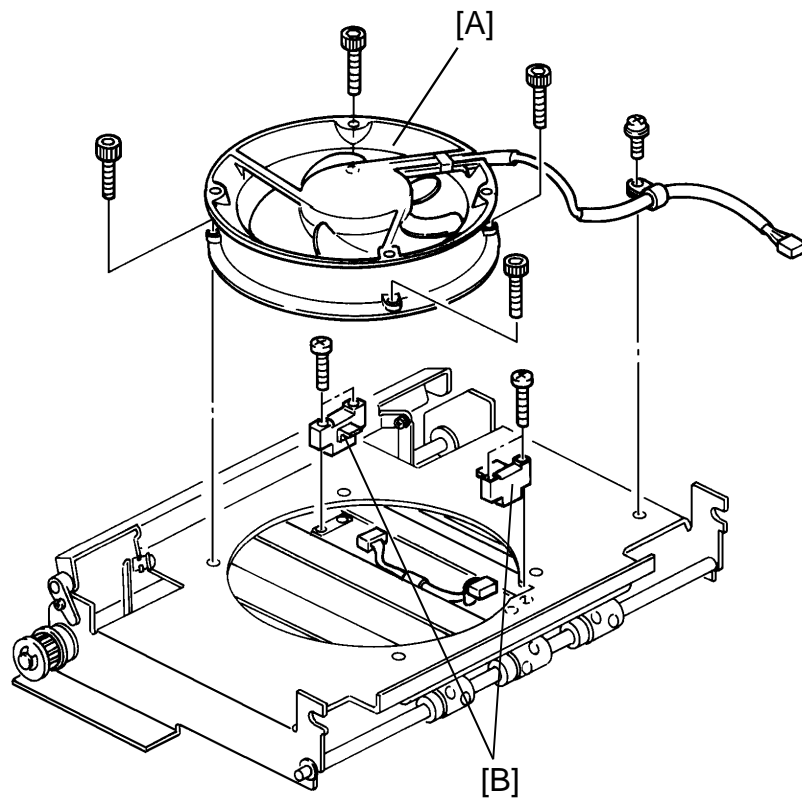
11.7 DELIVERY BELT



1. Remove the transport unit. (See Transport Unit section.)
2. Remove the E-rings [A] and bushings [B]. Then, slide out the rollers [C].
3. Remove the two screws [D] securing the transport guide plate [E].
4. Remove the screw securing the harness clamp [F] and then remove the transport guide plate [E].
5. Remove the transport belts [G].

Replacement
and
Adjustment

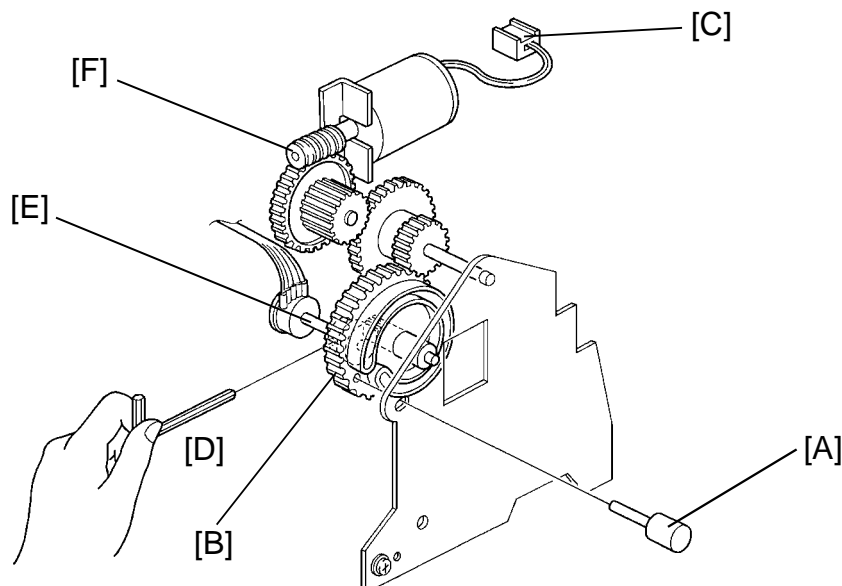
11.8 TRANSPORT VACUUM FAN AND PAPER EXIT SENSORS



1. Remove the transport unit. (See Transport Unit section.)
2. Turn the transport unit over.
3. Remove the transport vacuum fan motor [A].
4. Remove the first and second paper exit sensors [B].

12. IMAGE POSITIONING SECTION

12.1 ADJUSTING THE IMAGE POSITION



Purpose: To ensure that the image is well centered when the Image Position key is set to "0".

Adjustment Standard: The gauge [A] must be inserted.

1. Remove the rear cover.
2. Turn the main switch on. The image position will be returned to its initial position. (The image position indicator shows "0".)
3. Ensure that it is possible to insert the gauge [A] (P/N C2009002).
4. If the gauge [A] cannot be inserted into the hole of the gear [B], move the gear [B] to enable the gauge to be inserted into the hole as follows:
 - a) Disconnect the image positioning motor connector [C].
 - b) Loosen the Allen screw [D] so that the gear at the end of the image position sensor shaft [E] can rotate freely.
 - c) Turn the gear [B]. To do this, turn the worm gear [F] manually until the gauge [A] can be inserted into the hole of the gear [D].












NOTE: Do not turn the image position sensor shaft [E]. If the shaft is turned, the image position indicator will be affected. If the indicator is affected, turn the main switch off, then turn back on again. This will return the indicator to "0".













5. Make prints to check the image position.






CAUTION: Do not keep on pressing the Image Position key if the image position sensor is broken or removed. The plastic gears between the worm gear [F] and gear [D] may break if the pin which moves along the spiral track of the gear [D] hits the end of the track.




TROUBLESHOOTING

1. ELECTRICAL COMPONENT TROUBLE

Component	Condition	Phenomenon
FU1 (Power Supply Unit)	Open	Machine does not work. (No indicators on the operation panel turn on.)
FU2 (Power Supply Unit)	Open	When the main switch is turned on, "E-11" is displayed.
FU101 (Main PCB)	Open	When the Print Start key is pressed, paper is not fed and jam indicators "B" and  blink. When the Master Making key is pressed, master is not ejected and jam indicators "F" and  blink.
FU102 (Main PCB)	Open	If the master is wrapped around the drum, when the Master Making key is pressed, the master is not ejected and jam indicators "F" and  blink. If the master is not wrapped around the drum, when the Master Making key is pressed, master is not wrapped around the drum and jam indicators "C" and  blink.
FU301 (AC drive PCB)	Open	When the Print Start key or Master Making key is pressed, "E-02" is displayed and machine does not work.
First Original Sensor	ON condition (Not interrupted)	An original is not fed in ADF mode. When the Master Making key is pressed, indicator "A" blinks.
	OFF condition (Interrupted)	Jam indicators "A" and  blink after the last sheet of original has been fed.
Second Original Sensor	ON condition (Not interrupted)	An original is not fed.
	OFF condition (Interrupted)	When the main switch is turned on, jam indicators "A" and  blink.
Original Registration Sensor	ON condition (Not interrupted)	An original does not stop at the original registration sensor. It stops when the trailing edge has passed the 1st original sensor.
	OFF condition (Interrupted)	When the main switch is turned on, jam indicators "A" and  blink.
Master Eject Sensor	ON condition (Activated)	When the main switch is turned on, jam indicators "F" and  blink.
	OFF condition (Not activated)	When the master is being ejected, the jam indicators "F" and  blink.
Full Master Detecting Sensor	ON condition (Not interrupted)	When the master eject box is full, indicator  does not blink.
	OFF condition (Interrupted)	After master ejecting is finished, indicator  blink.
Paper Table Lower Limit Sensor	ON condition (Interrupted)	The paper table does not go down.
	OFF condition (Not interrupted)	When the paper feed table goes down and stops, the cover open indicator blinks.

Component	Condition	Phenomenon
Paper Table Safety Switch	ON condition (Feeler is actuated)	When the main switch is turned on, the cover open indicator blinks.
	OFF condition (Feeler is not actuated)	Paper feed safety bar does not work. If paper table lower limit sensor is faulty, the paper table moves all the way down and locks.
Paper Table Height Sensor	ON condition (Interrupted)	When the paper feed table goes up, it does not stop at the proper position and E-02 lights.
	OFF condition (Not interrupted)	The paper feed table does not go up. Jam indicators "B" and  blink when the Print key is pressed.
Paper End Sensor	ON condition (Activated)	When there is no paper on the paper feed table, the Print Start key can be activated, but jam indicators "B" and  blink.
	OFF condition (Not activated)	Though there is paper on the paper table, paper end indicator  blinks.
Printing Pressure Sensor	ON condition (Interrupted)	Drum rotates continuously (does not stop) after a trial printing.
	OFF condition (Not interrupted)	Jam indicators "B" and  blink after a trial printing and the paper stops on the transport unit.
First Paper Exit Sensor	ON condition (Activated)	When the main switch is turned on, jam indicators "G" and  blink.
	OFF condition (Not activated)	Jam indicators "B", "E", and  blink after one sheet of paper has been fed out.
Second Paper Exit Sensor	ON condition (Activated)	When the main switch is turned on, jam indicators "G" and  blink.
	OFF condition (Not activated)	Jam indicators "E" and  blink after one sheet of paper has been fed out.
Paper Feed Solenoid	OFF condition	When the Print Start key is pressed, paper is not fed and jam indicators "B" and  blink.
Drum Rotation Sensor	ON condition (Interrupted)	When the main switch is turned on, the drum rotates several times and stops. When the Master Making key is pressed, the drum continues to rotate in high speed.
	OFF condition (Not interrupted)	Same as above
Master End Sensor	ON condition (Activated)	Normal operation when master is present. Master end is not detected; Master End indicators "C" and  do not blink and jam indicators "C" and  blink.
	OFF condition (Not activated)	Even if the master is present, the Master End indicators "C" and  blink.

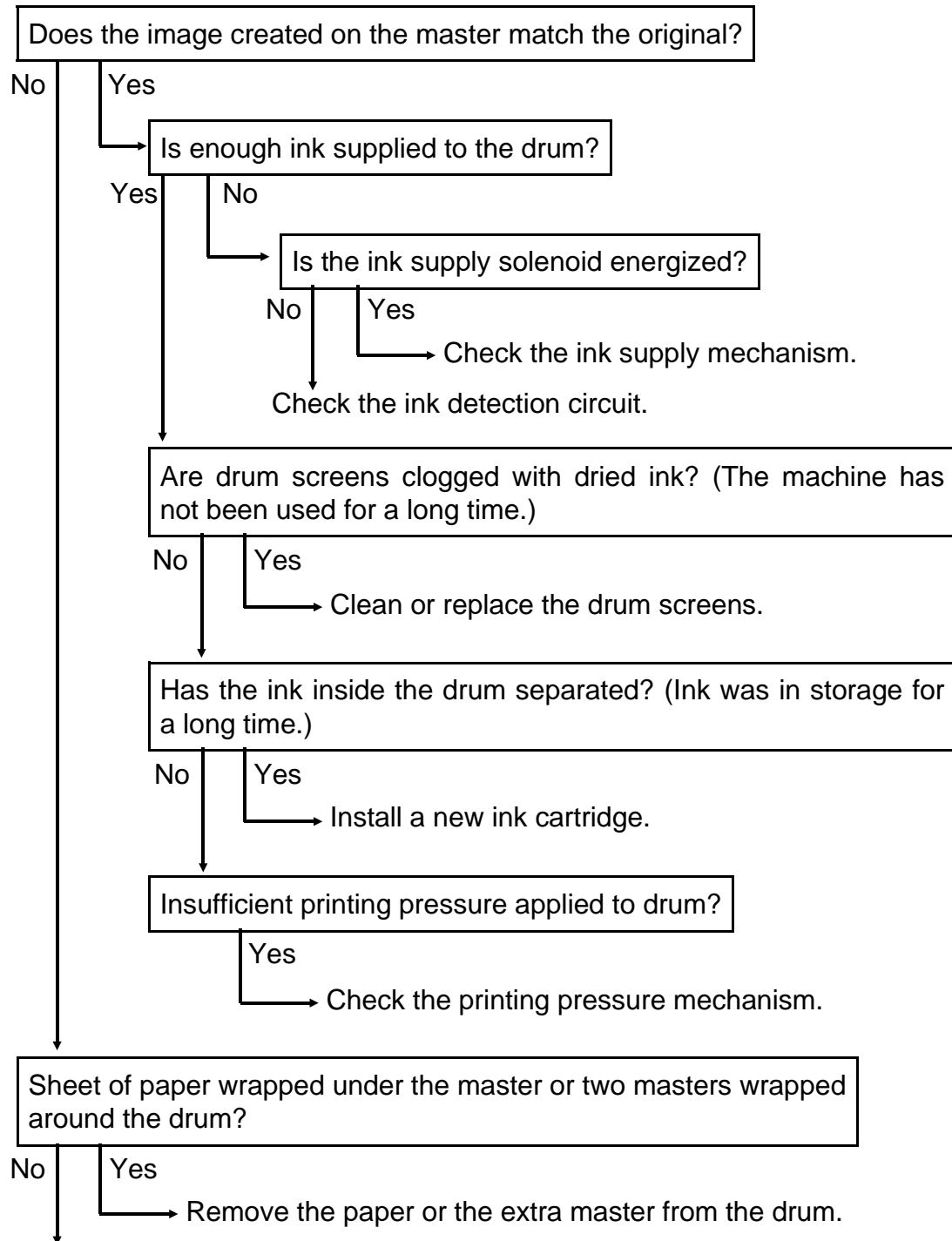
Component	Condition	Phenomenon
Right Cutter Switch (Rear)	ON condition (Feeler is actuated)	Master is not cut. (Cutter unit does not move at all.)
	OFF condition (Feeler is not actuated)	When the master is cut, indicator "E-01" lights. At that time the cutter does not return to the front.
Left Cutter Switch (Front)	ON condition (Feeler is actuated)	Master is not cut. (Cutter unit does not return from the rear.)
	OFF condition (Feeler is not actuated)	When the main switch is turned on, indicator "E-01" lights.
First Drum Position Sensor	OFF condition (Not interrupted)	When the main switch is turned on, the drum starts rotating and it cannot be stopped.
	ON condition (Interrupted)	1) Jam indicators "E" and  blink when the Print key is pressed. 2) The drum starts rotating and it cannot be stopped when the Master Making key is pressed.
Second Drum Position Sensor	OFF condition (Not interrupted)	1) When the Print key is pressed, the drum continues to rotate. However, paper is not fed from the paper feed table. 2) When the Master Making key is pressed, the drum continues to rotate after the wrapped master has been ejected. An original stops at the original sensor.
	ON condition (Interrupted)	When the Print key is pressed, paper feeding starts. When paper is out on the paper feed table, the paper feed table goes down. However, paper feeding still continues.
Master Buckle Sensor	ON condition (Activated)	When the main switch is turned on, jam indicators "C" and  blink and cannot be reset.
	OFF condition (Not activated)	When the Master Making key is pressed, an original stops halfway, and jam indicators "A", "C", and  blink.
Upper Pressure Plate Sensor	ON condition (Not interrupted)	When the main switch is turned on, pressure plate keeps moving up and down. Then "E-12" is displayed.
	OFF condition (Interrupted)	After master making process is finished and one sheet of paper is delivered,  indicates. Pressure plate stops at the lower position.
Lower Pressure Plate Sensor	ON condition (Interrupted)	After master making process is finished and one sheet of paper is delivered,  indicates.
	OFF condition (Not interrupted)	Pressure plate does not stop at the lower position.
Paper Width Sensor 0	ON (Activated)	"✕" Indicates even though standard paper is set on the paper table.
	OFF (Not activated)	
Paper Width Sensor 1	ON (Activated)	"✕" Indicates even though standard paper is set on the paper table.
	OFF (Not activated)	

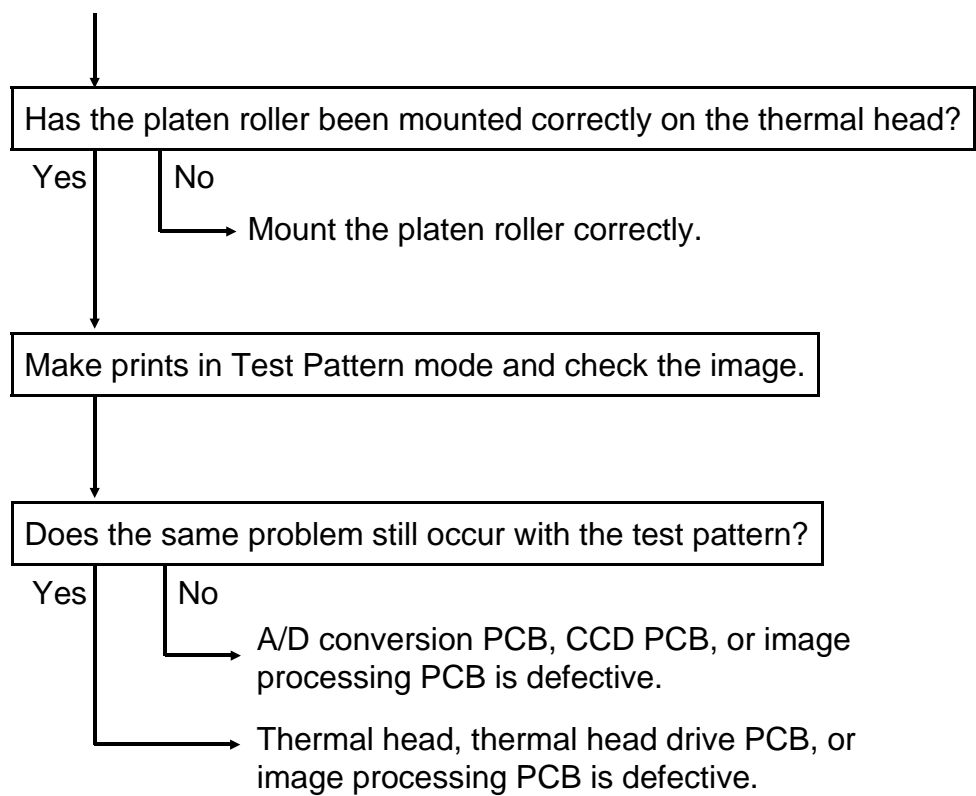
Component	Condition	Phenomenon
Paper Width Sensor 2	ON (Activated)	"✖" Indicates even though standard paper is set on the paper table.
	OFF (Not activated)	
Paper Width Sensor 3	ON (Activated)	A5 lengthwise paper is detected even though LT sideways paper is set on the paper table.
	OFF (Not activated)	LT lengthwise paper is detected even though A5 sideways paper is set on the paper table.
Paper Length Sensor [G]	ON (Activated)	A3 paper is detected even though A4 side ways paper is set on the paper table.
	OFF (Not activated)	A4 sideways paper is detected even though A3 paper is set on the paper table.
Drum Master Detection Sensor	Always ON (Sensor always detects white)	Master is on the drum: machine works correctly. Master is not on the drum: indicators "F" and  blink during the master eject process. Printing starts when the Print Start key is pressed, but  indicators "E", "B", and  soon turn on and the machine stops.
	OFF (Sensor always detects black)	Master is on the drum: two masters are wrapped on the drum. Master is not on the drum: master is wrapped correctly on the drum, but the "M" indicator blinks when the Print Start key is pressed.

2. TROUBLESHOOTING

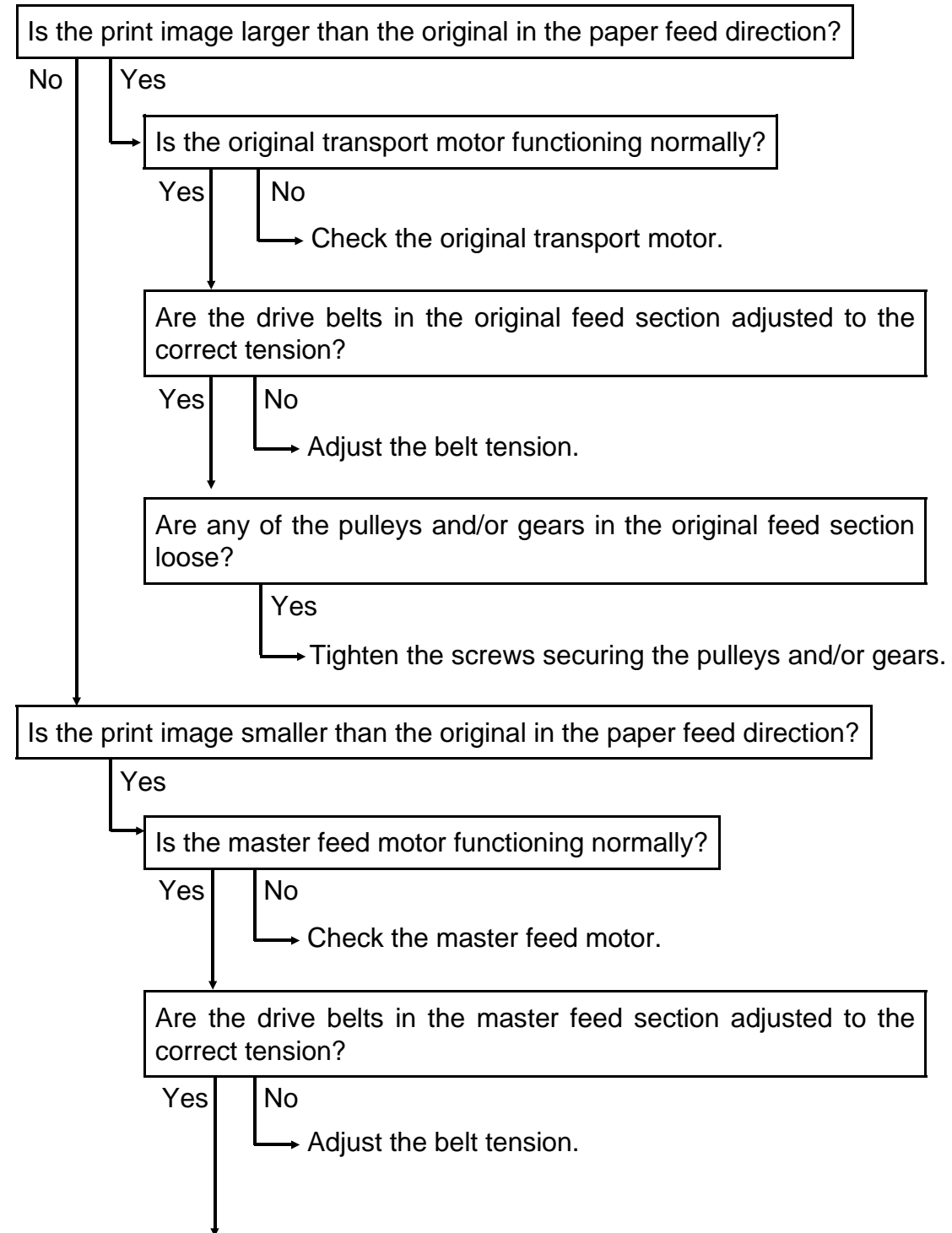
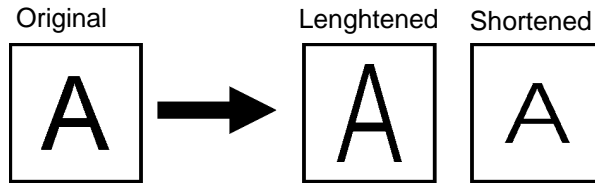
2.1 IMAGE TROUBLE

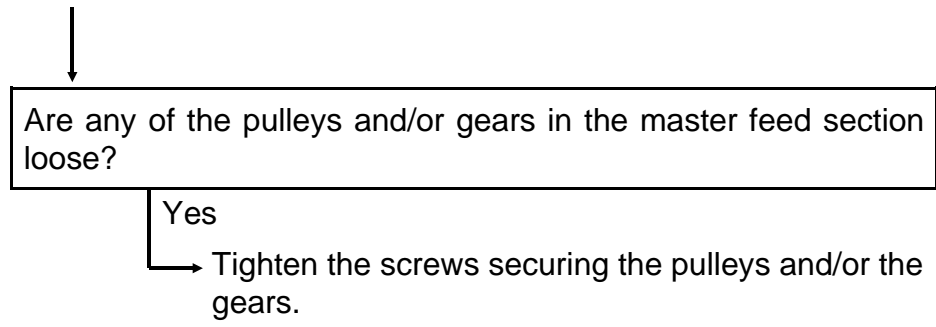
1. No image, white lines, uneven image on copy





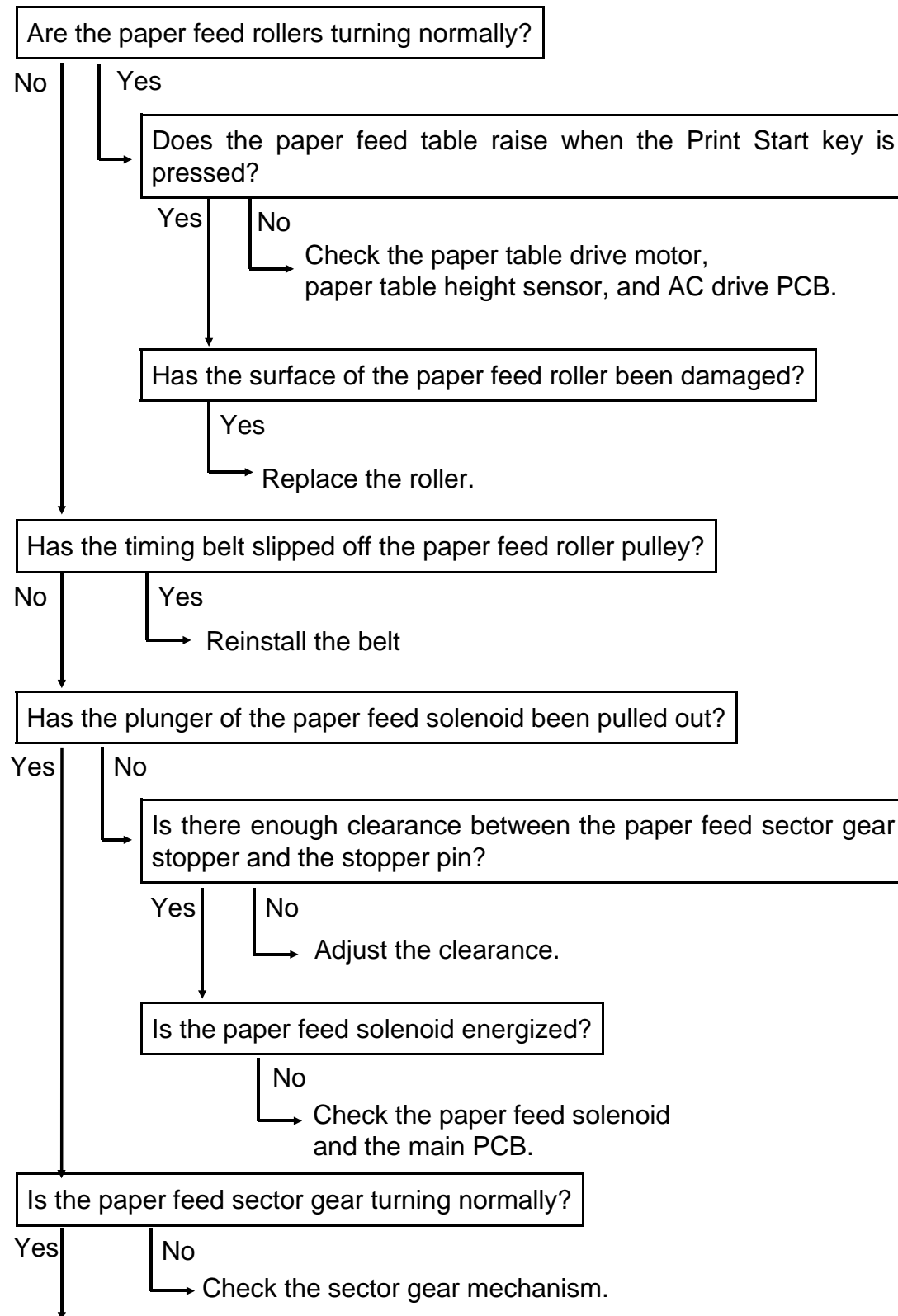
2. Print image is enlarged or reduced in the paper feed direction

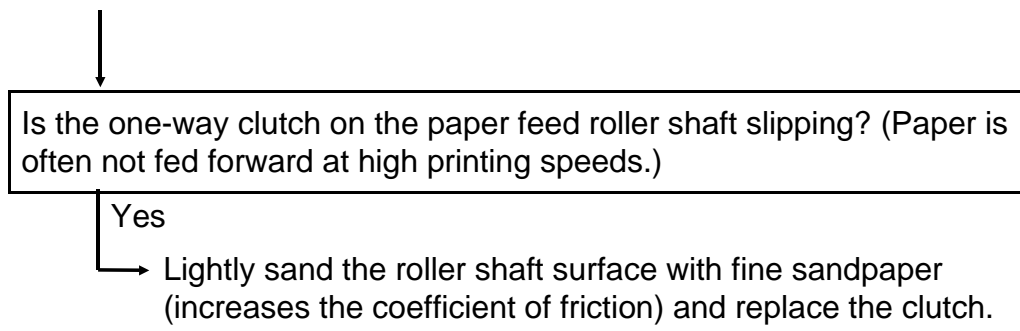




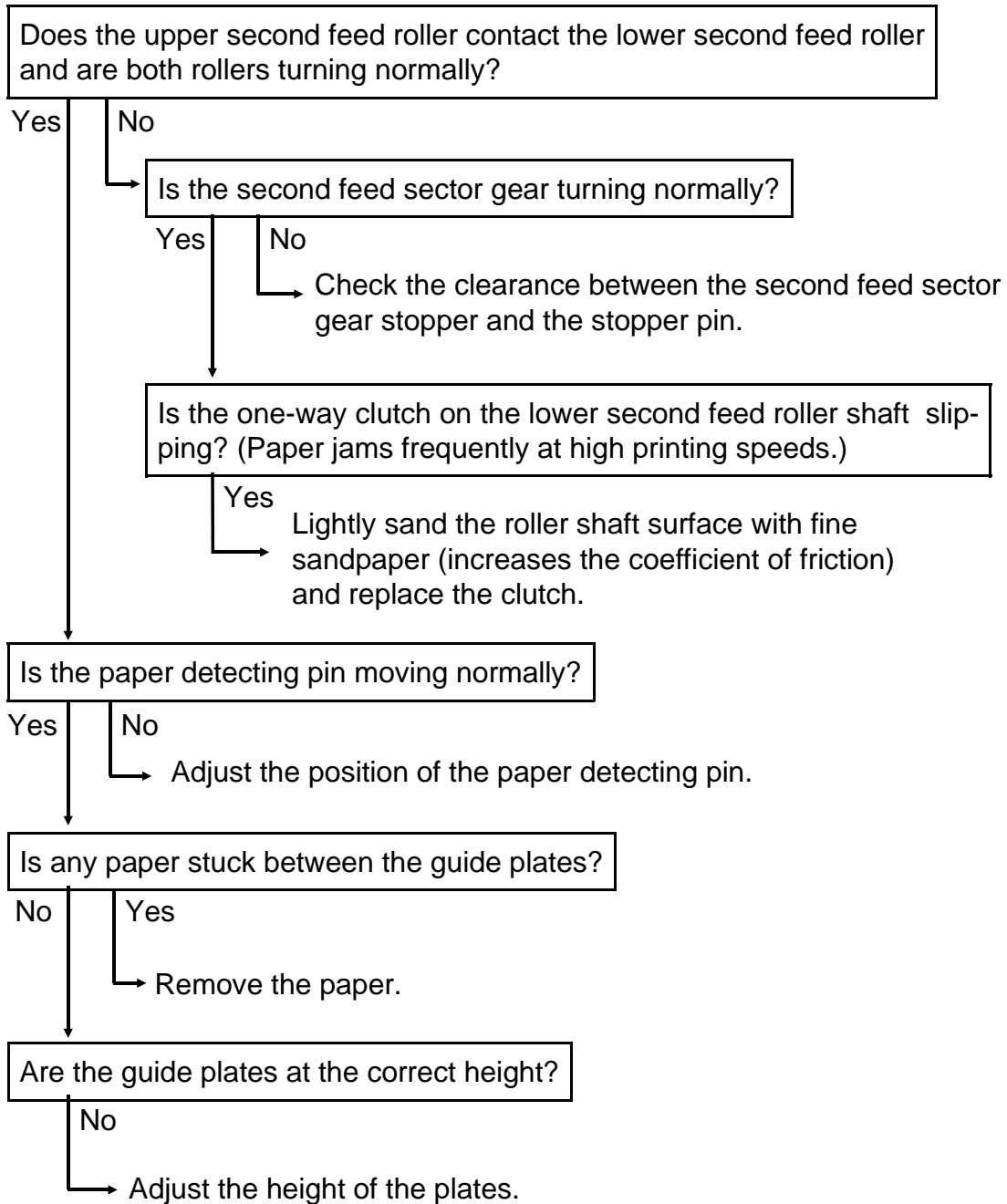
2.2 PAPER FEED TROUBLE

1. No paper is fed from the paper table.

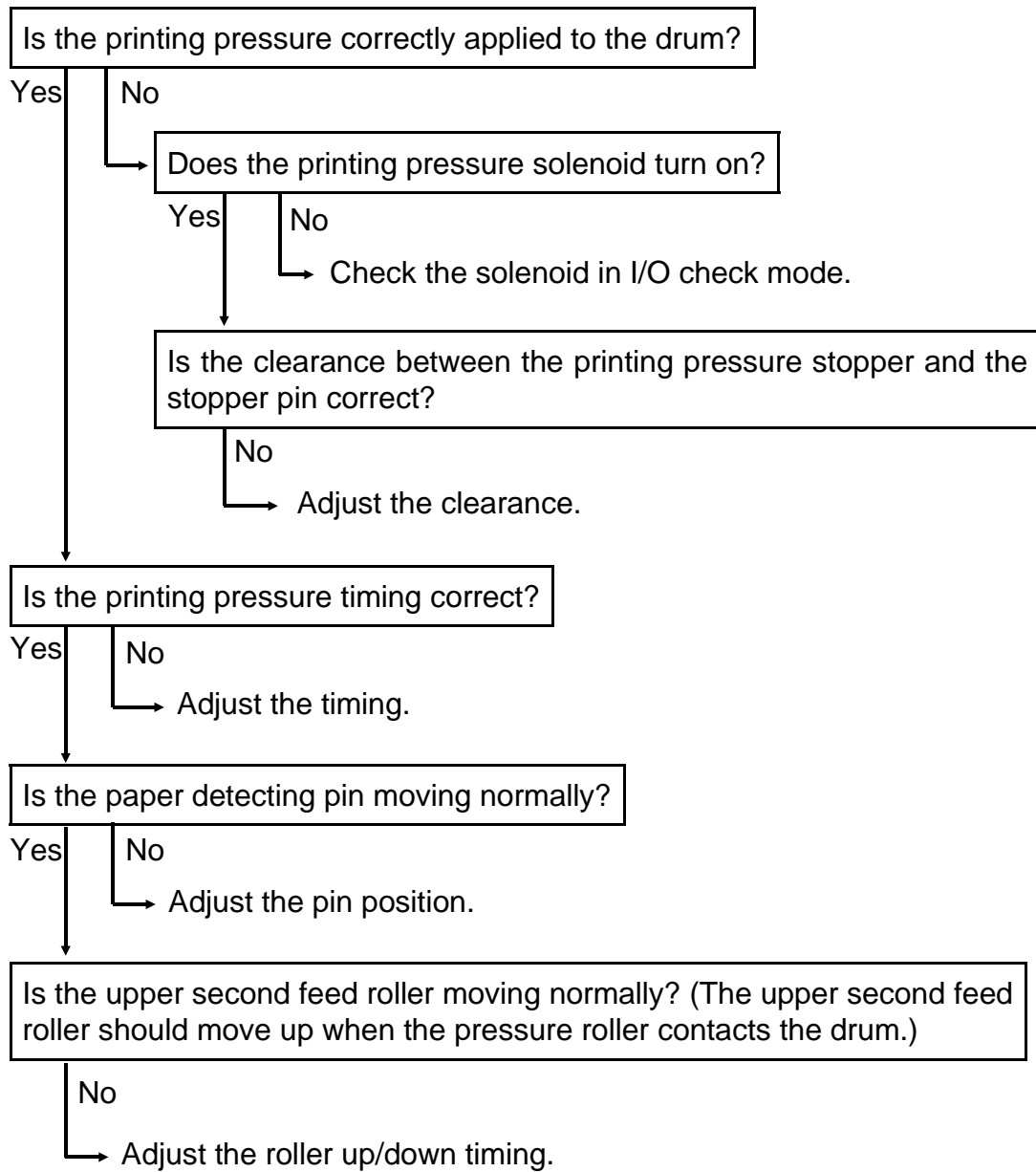




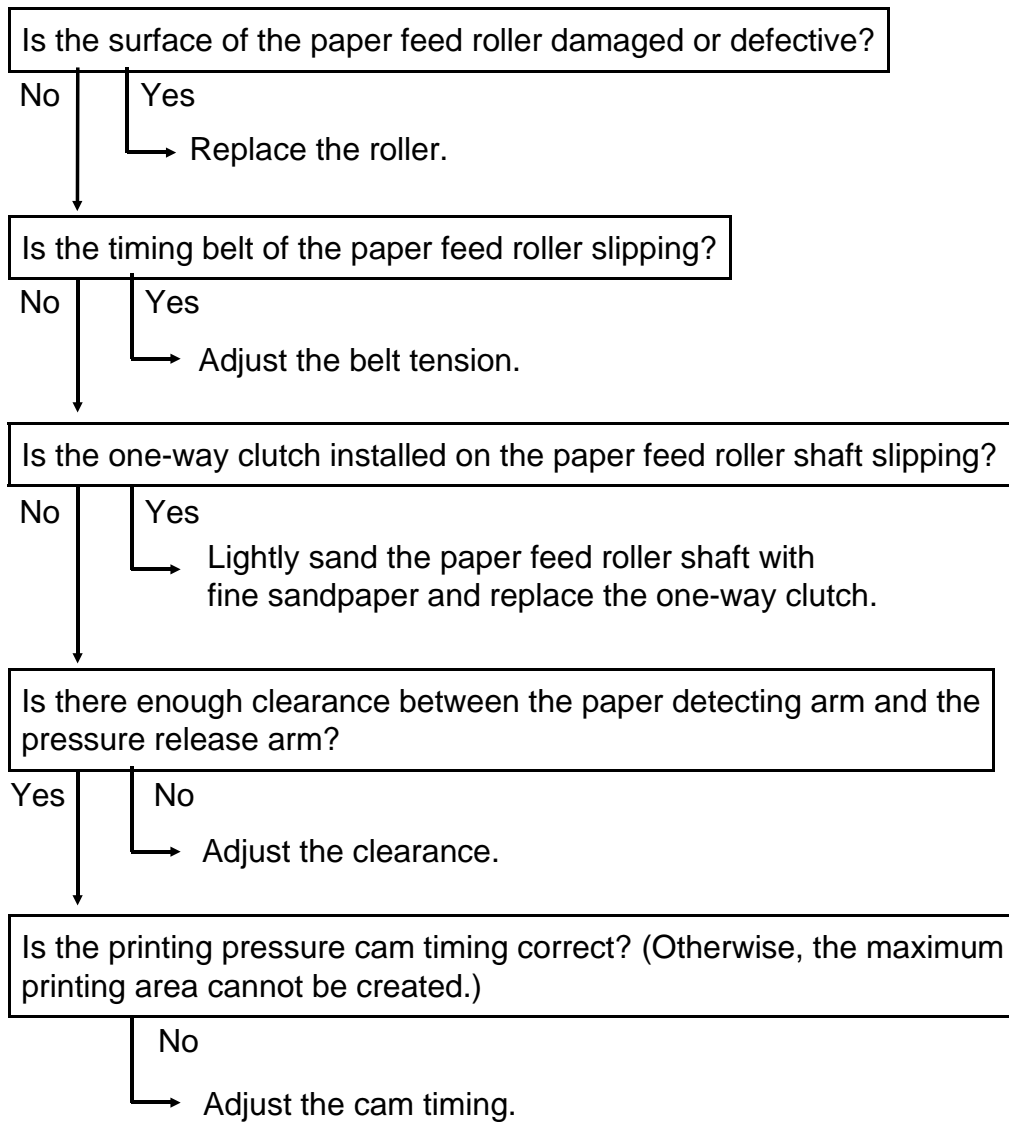
2. Paper leading edge jams under the second feed roller.



3. Paper leading edge jams under the drum.



**4. Paper frequently jams or is not fed during high speed printing.
(Does not occur at low printing speeds.)**



C532

TAPE MARKER

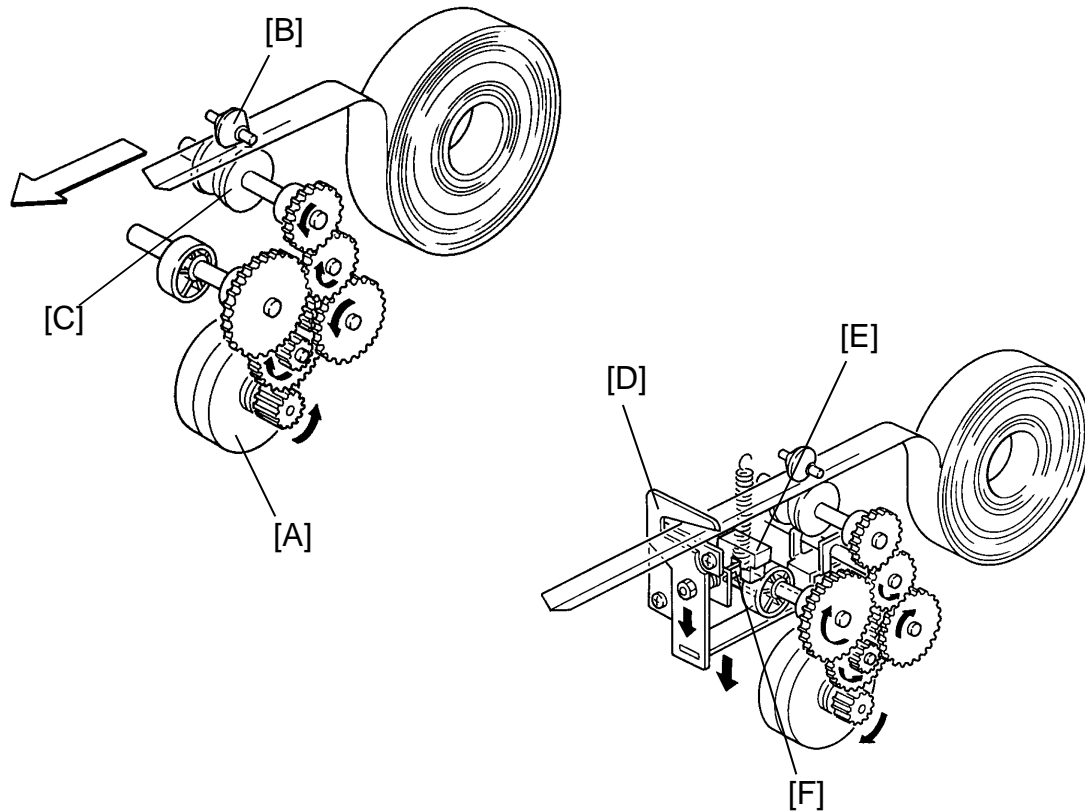
1. SPECIFICATIONS

Tape Feed Length:	250 mm (9.8") or 150 mm (5.9"), 200 mm (7.9")
Tape Feed Speed:	100 mm/s (3.9"/s)
Tape Size:	Outside Diameter 80 mm (3.1") or smaller Inside Diameter 20 mm (0.8") or larger Width 17 mm to 18 mm (0.67" to 0.71")
Dimensions (W x D x H):	155 mm x 105 mm x 60 mm (6.1" x 4.1" x 2.4")
Weight:	700 g (1.5 lb)
Power Source:	+24 VDC and +5 VDC from main body
Power Consumption:	15 W

TAPE
MARKER

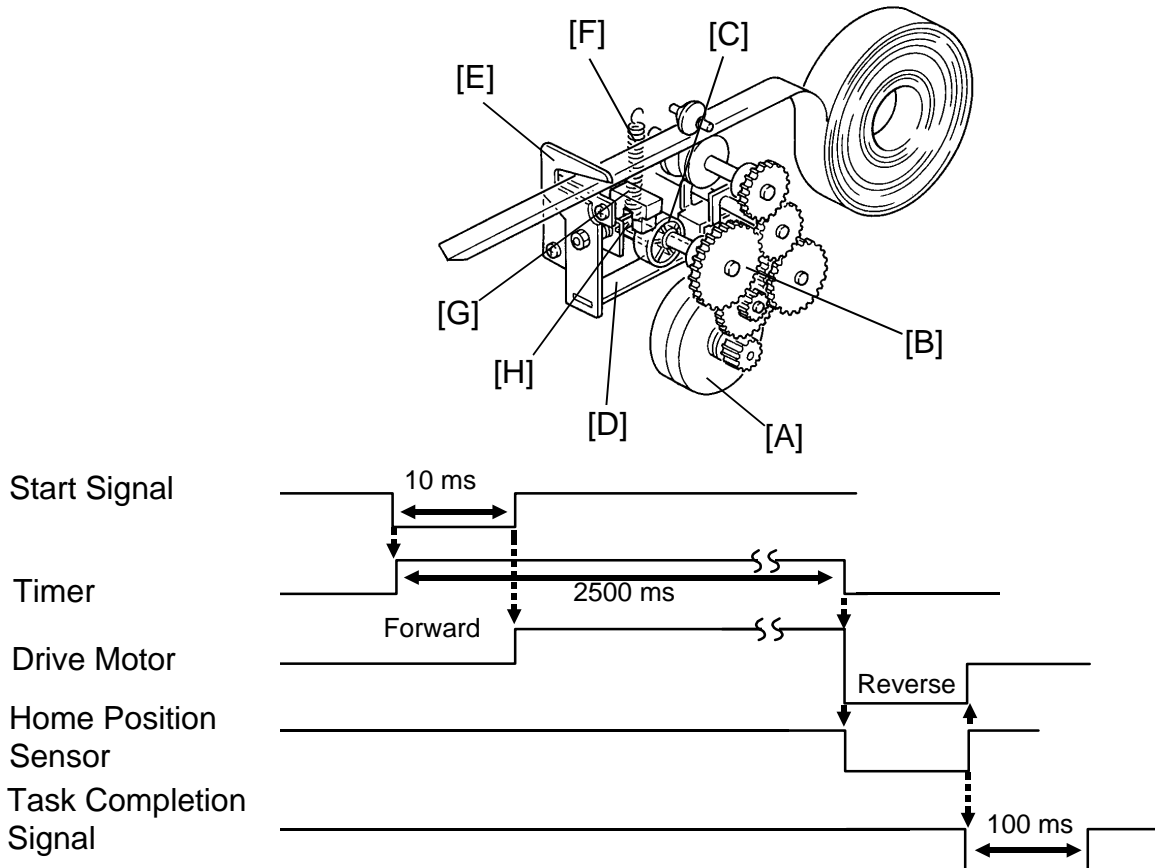
2. BASIC OPERATION

2.1 OVERVIEW



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

2.2 DRIVE AND CUTTING MECHANISM



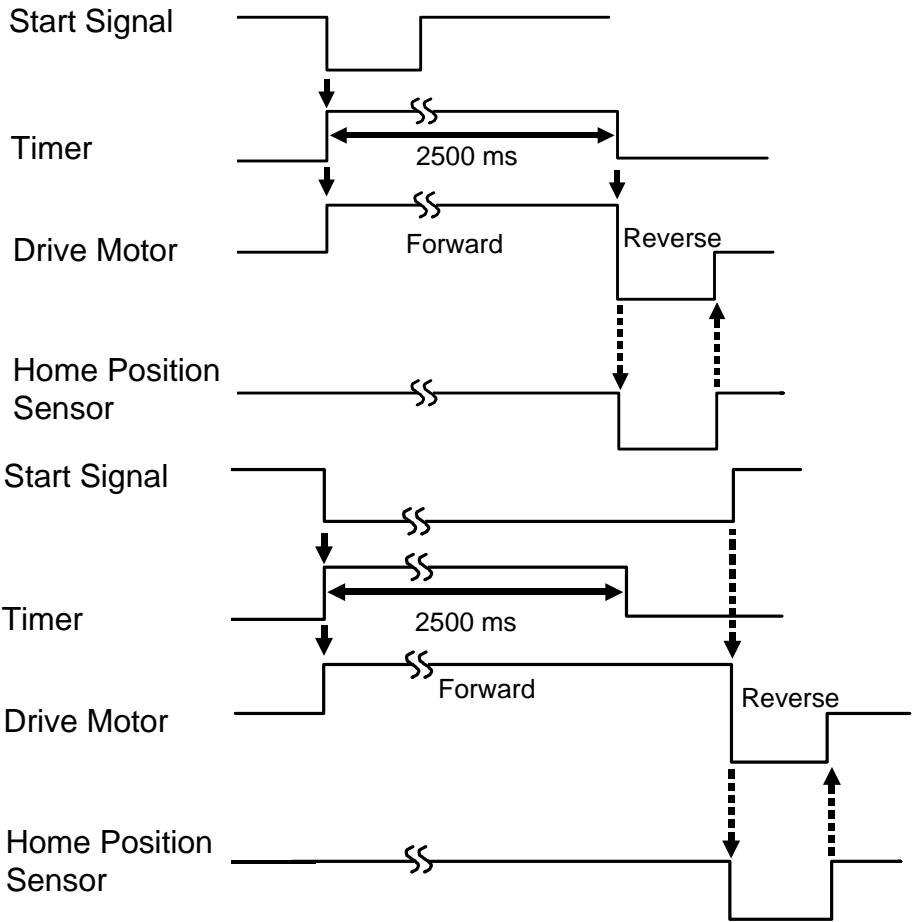
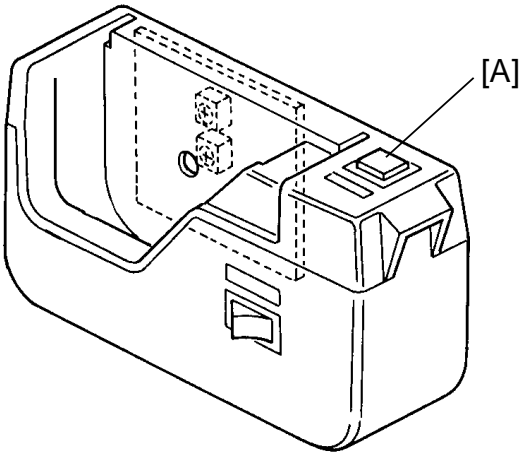
The tape dispenser uses a stepping motor, which is driven at 460 pulses per second, as the drive motor.

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

The drive motor will start to rotate in the opposite direction 2,500 milliseconds after the initial timer signal. To feed the tape out 250 mm (9.8") from the tape dispenser. The drive motor will rotate the cam drive gear clockwise and the eccentric shaped cutter cam will press the cutter arm down [D]. The cutter [E] will cut the tape. The cutter spring [F] returns the cutter to its original position. After the cutter home position sensor [G] detects the cutter actuator [H], the drive motor will stop and the tape dispenser PCB will send the task completion signal to the main body.

TAPE
MARKER

2.3 MANUAL CUT



When the manual cut switch [A] is pressed, the timer starts counting and the drive motor will feed the tape. 2,500 milliseconds later, the drive motor will reverse its direction to cut the tape.

If the manual switch is pressed longer than 2,500 milliseconds, the tape will continue to be fed out until the manual switch is released. Afterward, the motor will reverse direction to cut the tape.

3. INSTALLATION

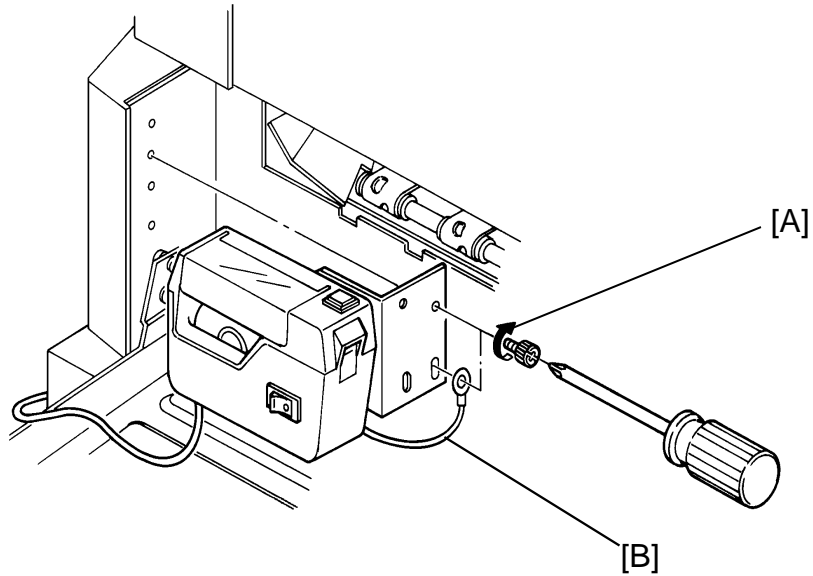
3.1 ACCESSORY CHECK

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

1. Knob Screw	2
2. Screw M4.....	2
3. Hexagon Nut M4	2
4. Tape	1



3.2 INSTALLATION PROCEDURE

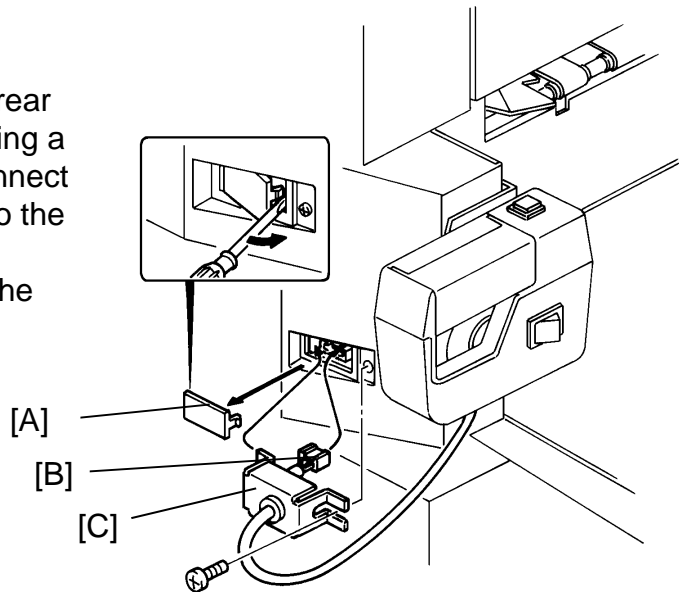


1. Install the tape marker on the main body with two knob screws [A] (accessory) using the outside two holes of the tape marker bracket.

NOTE: * Tighten the knob screws with a screwdriver to prevent them from coming loose.

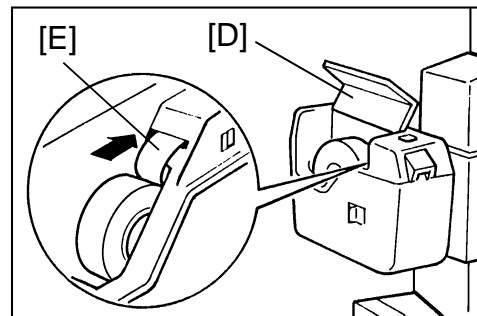
* Fix the grounding wire [B] with the lower of the two knob screws.

2. Remove the small cap in the rear cover of the main body [A] using a minus screw driver. Then, connect the tape marker harness [B] to the main body, and install the connector cover [C] using of the rear cover fixing screw.

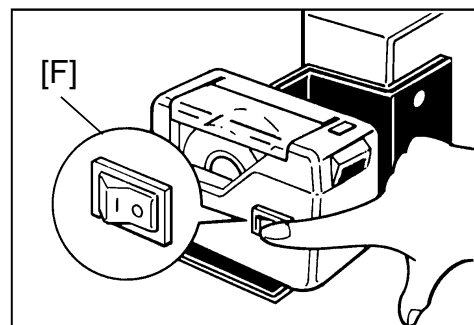


3. Open the tape marker cover [D]. Then, insert the leading edge of the tape into the tape entrance until it stops as shown in the illustration [E].

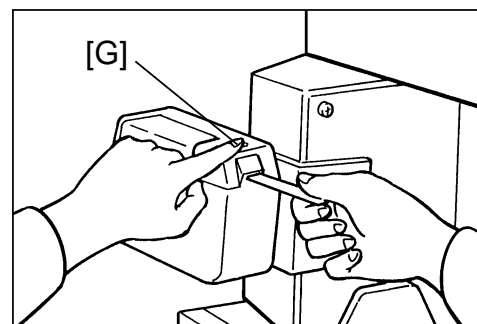
NOTE: Ensure that the tape is installed in the proper direction. If it is not correct, the tape marker will not work correctly.



4. Turn the main switch and the tape marker switch [F] on.



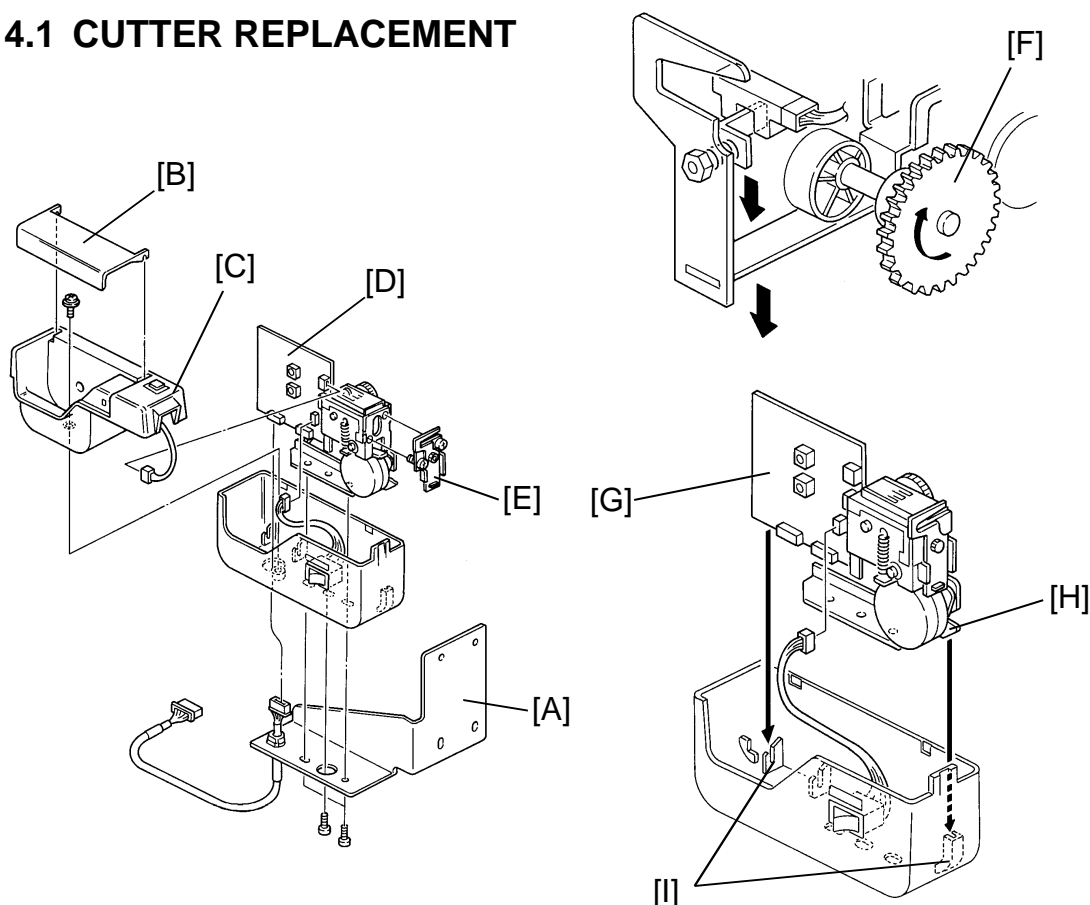
5. Press the tape cut button [G] to cut off the leading edge of the tape.
6. Check the tape marker operation using the memory/class modes of the main body.



TAPE
MARKER

4. REPLACEMENT AND ADJUSTMENT

4.1 CUTTER REPLACEMENT



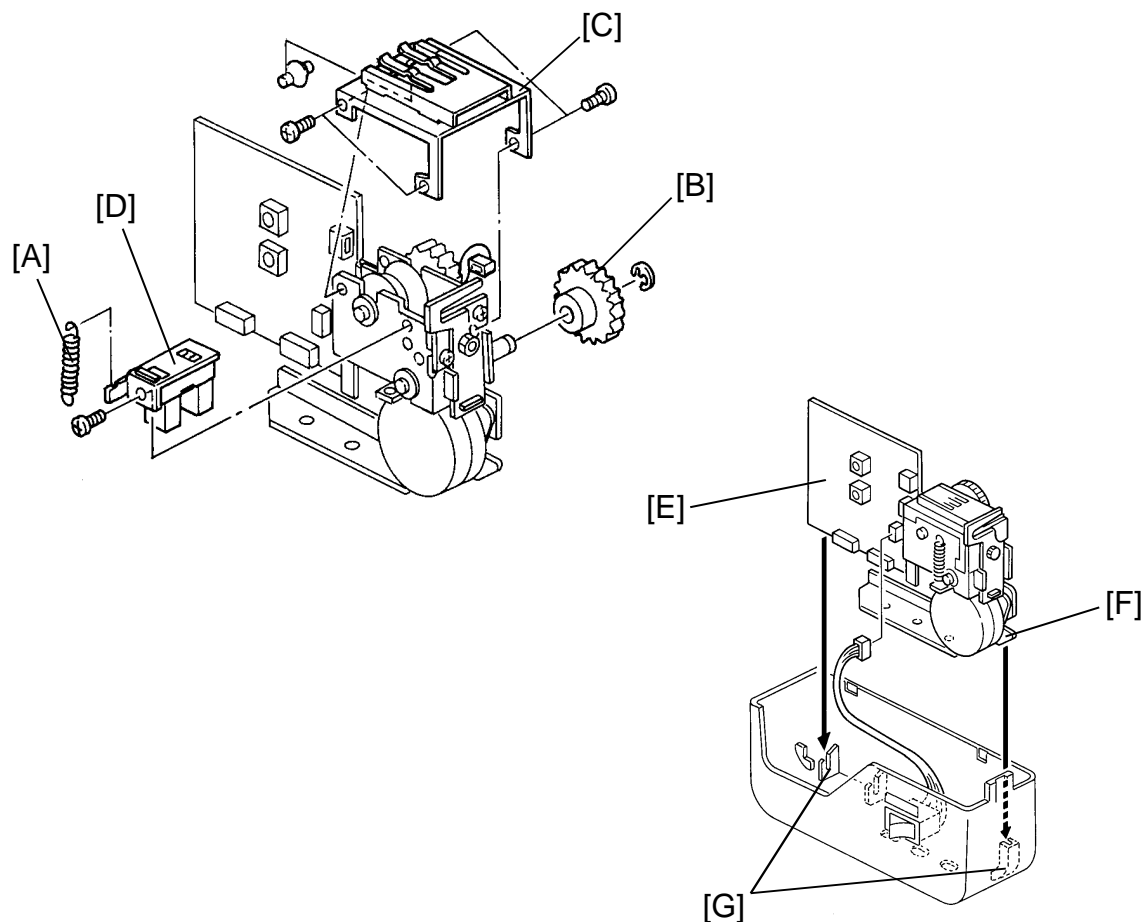
1. Remove the tape dispenser from the main body (1 connector, 2 nuts or screws).
2. Remove the support bracket [A] (3 screws).
3. Remove the tape dispenser cover [B] and the upper housing [C] (1 screw, 1 connector).
4. Remove the tape dispensing assembly [D] (2 connectors).
5. Replace the cutter assembly [E] (2 screws).

NOTE: Ensure that the cutter moves smoothly by manually rotating the cam drive gear [F] clockwise after the replacement cutter had been installed.

6. Reassemble the tape dispenser.

NOTE: Ensure that the tape dispenser PCB [G] and the tape dispensing bracket [H] are in lower housing slots [I].

4.2 CUTTER HOME POSITION SENSOR REPLACEMENT

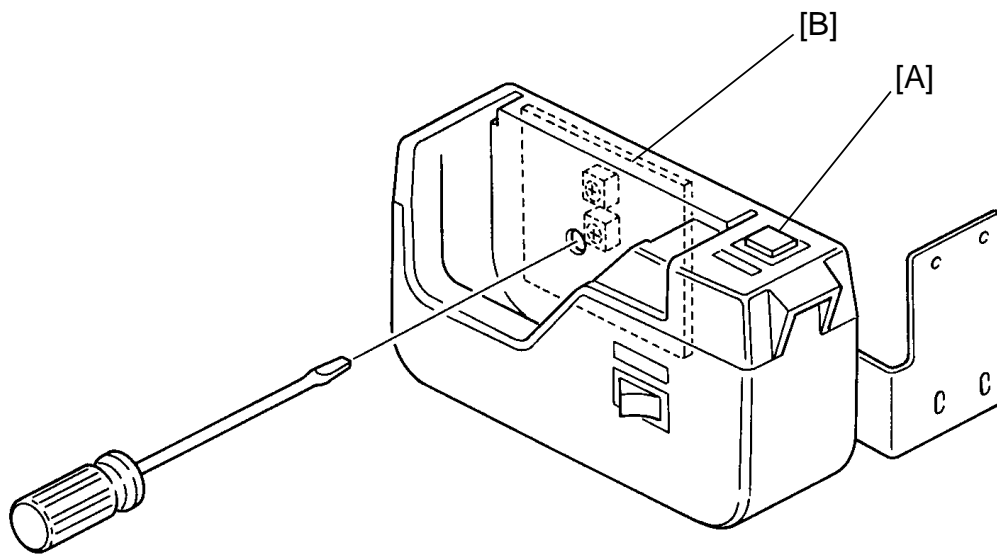


1. Remove the tape dispensing assembly. (See steps #1 to #4 of "4.1 CUTTER REPLACEMENT".)
2. Unhook the cutter spring [A].
3. Remove the cam drive gear [B] (1 E-ring).
4. Remove the pinch roller support bracket [C] (4 screws).
5. Remove the cutter home position sensor assembly [D] and replace the sensor (1 screw, 1 connector).
6. Reassemble the tape dispenser.

NOTE: Ensure that the tape dispenser PCB [E] and the tape dispensing bracket [F] are in the lower housing slots [G].

TAPE
MARKER

4.3 TAPE CUT LENGTH ADJUSTMENT



Adjustment standard: 250 mm \pm 15 mm

1. Press the manual cut switch [A].

NOTE: Do not press the switch longer than 2.5 seconds.

2. Measure the tape length.

If the tape is longer than 250 mm, turn VR2 [B] counterclockwise.

If the tape is shorter than 250 mm, turn VR2 clockwise.

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

C550

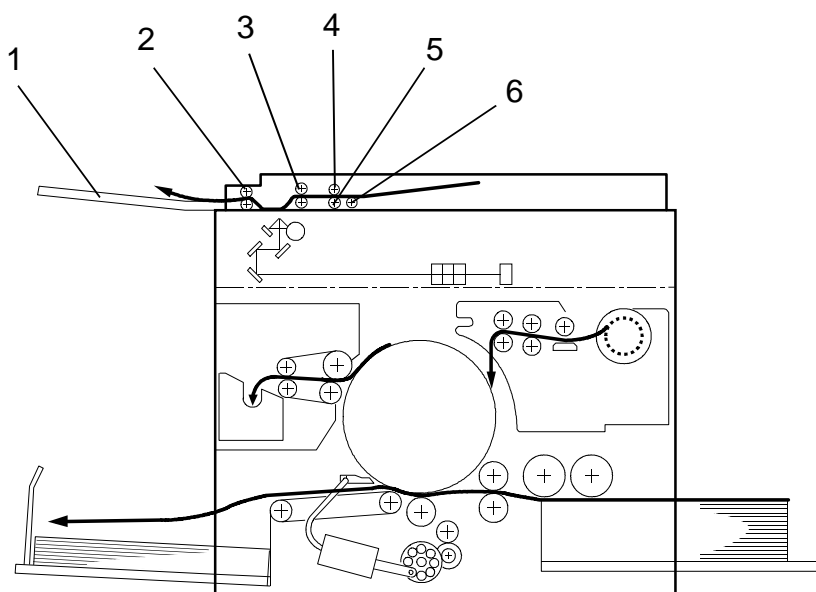
DOCUMENT FEEDER

1. OVERALL MACHINE INFORMATION

1.1 SPECIFICATIONS

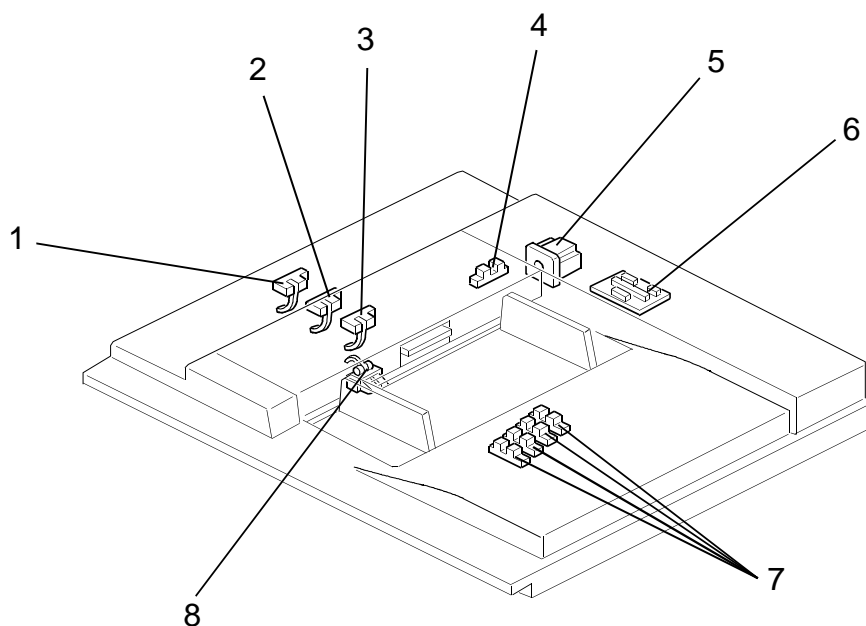
Original Type:	Sheet-feed
Original Paper Size:	Maximum 307 mm x 432 mm (12.0" x 17.0") Minimum 90 mm x 140 mm (3.6" x 5.5")
Original Weight:	40.7 g/m ² to 127.9 g/m ² , 10.8 lb to 34 lb
ADF Original Capacity:	20 sheets (66 g/m ² , 17.6 lb) or 1.8 mm height
Original Scanning Time:	3 ms/line
Original Feed Speed:	21.4 mm/s (while master processing) 85.6 mm/s (not master processing)

1.2 MECHANICAL COMPONENT LAYOUT



1. Original Exit Tray
2. 2nd Original Transport Roller
3. 1st Original Transport Roller
4. Separation Roller
5. Feed Roller
6. Pickup Roller

1.3 ELECTRICAL COMPONENT LAYOUT



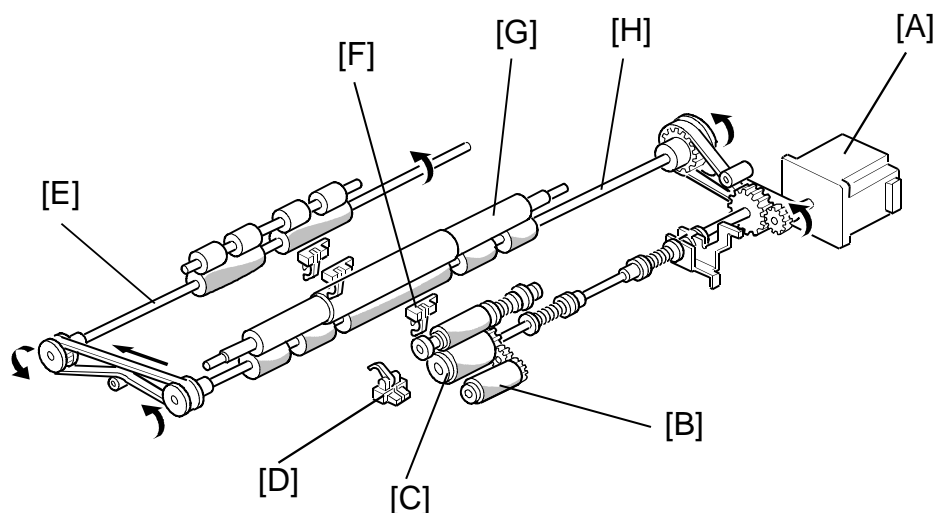
- | | |
|---------------------------------|--------------------------|
| 1. Original Exit Sensor | 5. ADF Motor |
| 2. Scan Line Sensor | 6. ADF Interface Board |
| 3. Original Registration Sensor | 7. Original Width Sensor |
| 4. ADF Cover Sensor | 8. Original Set Sensor |

COMPONENT DESCRIPTION

Index No.	Name	Function
1	Original Exit Sensor	Informs the CPU when the original activates the sensor. Also detects original misfeed.
2	Scan Line Sensor	Detects timing for scanning. Also detects original misfeed.
3	Original Registration Sensor	Detects timing for the ADF motor rotation. Also detects original misfeed.
4	ADF Cover Sensor	Informs the CPU when the ADF cover is opened.
7	Original Width Sensor	Informs the CPU of the original width.
8	Original Set Sensor	Informs the CPU when an original is set in the ADF mode.

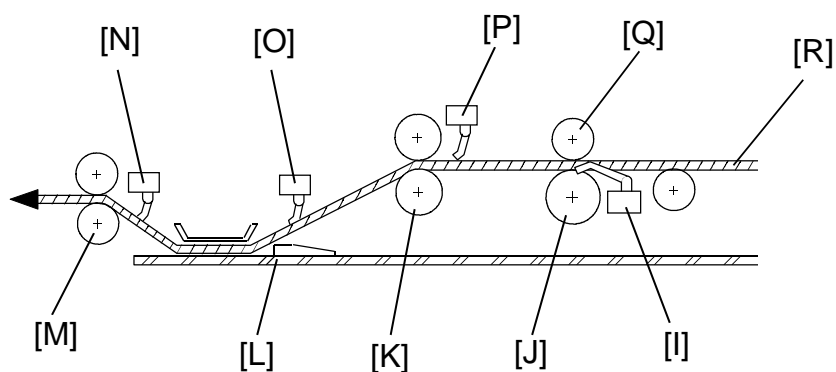
2. SECTIONAL DESCRIPTION

2.1 DRIVE MECHANISM



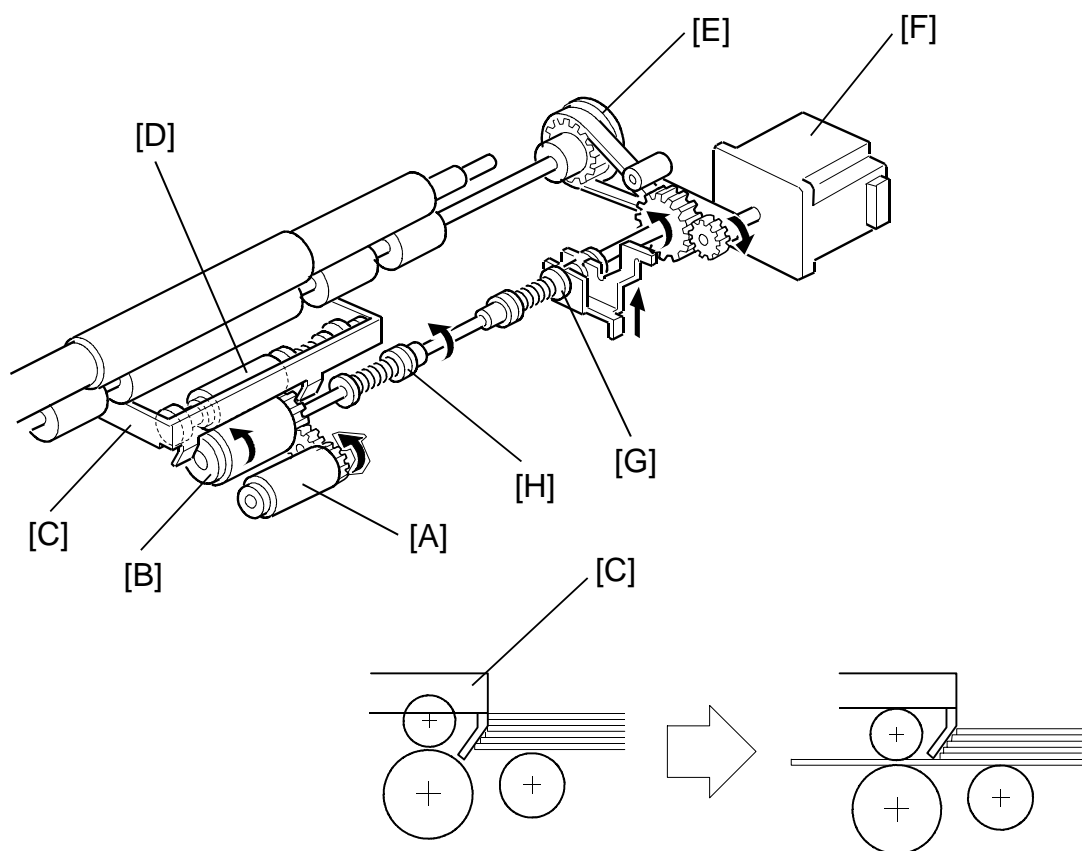
[D]: Original Set Sensor
[G]: 1st Original Transport Roller

A stepper motor is used for the ADF motor [A]. The ADF motor rotates clockwise and then counterclockwise to feed the original. When the Master Making key is pressed, the ADF motor will rotate clockwise to drive the pick up roller [B] and the feed roller [C] to turn counterclockwise to feed the bottom original. When the original has been fed 14.5 mm after the original registration sensor [F] was activated, the ADF motor will start to rotate counterclockwise. This will drive the lower 1st Original Transport roller [H] and the lower original exit roller [E] counterclockwise, feeding the original.



[I]: Original Set Sensor	[N]: Original Exit Sensor
[J]: Feed Roller	[O]: Scan Line Sensor
[K]: 1st Original Transport Roller	[P]: Original Registration Sensor
[L]: Exposure Glass	[Q]: Separation Roller
[M]: 2nd Original Transport Roller	[R]: Original Paper Path

2.2 PAPER FEED AND SEPARATION

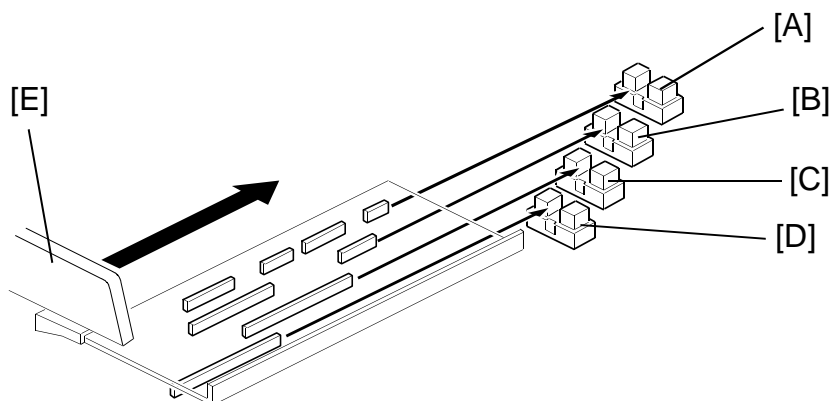


When the originals are placed on the ADF and the Master Making key is pressed, the pickup roller [A] will start to rotate as it is lifted by the spring clutch [H] to touch the bottom page of the document. The original shutter [C] is lifted by the spring clutch and the lever [G] when the ADF motor is turned on. The separation roller [D] and the feed roller [B] allow only one page into the scanner. The one-way clutch on the feed roller [E] prevents its backward rotation when the ADF motor [F] rotates counterclockwise.

The pick-up and the shutter torque are adjustable by the length of the spring. Refer to page 8-26.

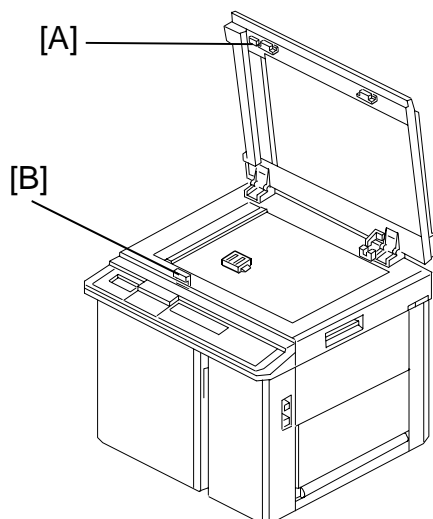
2.3 ORIGINAL SIZE DETECTION

There are 4 sensors (photointerrupters) installed behind the front original guide [A] to determine the original width.



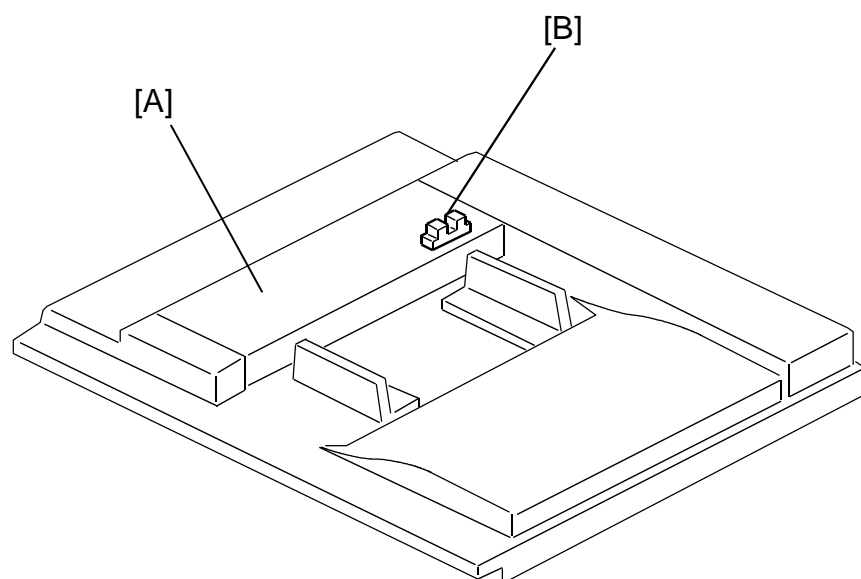
- [A]: Original Width Sensor-0
- [B]: Original Width Sensor-1
- [C]: Original Width Sensor-2
- [D]: Original Width Sensor-3
- [E]: Front Original Guide

2.4 ADF OPEN/CLOSE DETECTION



The ADF Set Sensor detects whether the ADF unit is opened or closed. This sensor is a reed switch. A magnet mounted on the ADF [A] activates the reed switch [B]. When an original is set in the ADF and the Master Making key is pressed with this sensor off, the machine indicates "CLOSE PLATEN COVER" on the operation display. The machine indicates this only when the optional ADF unit is installed.

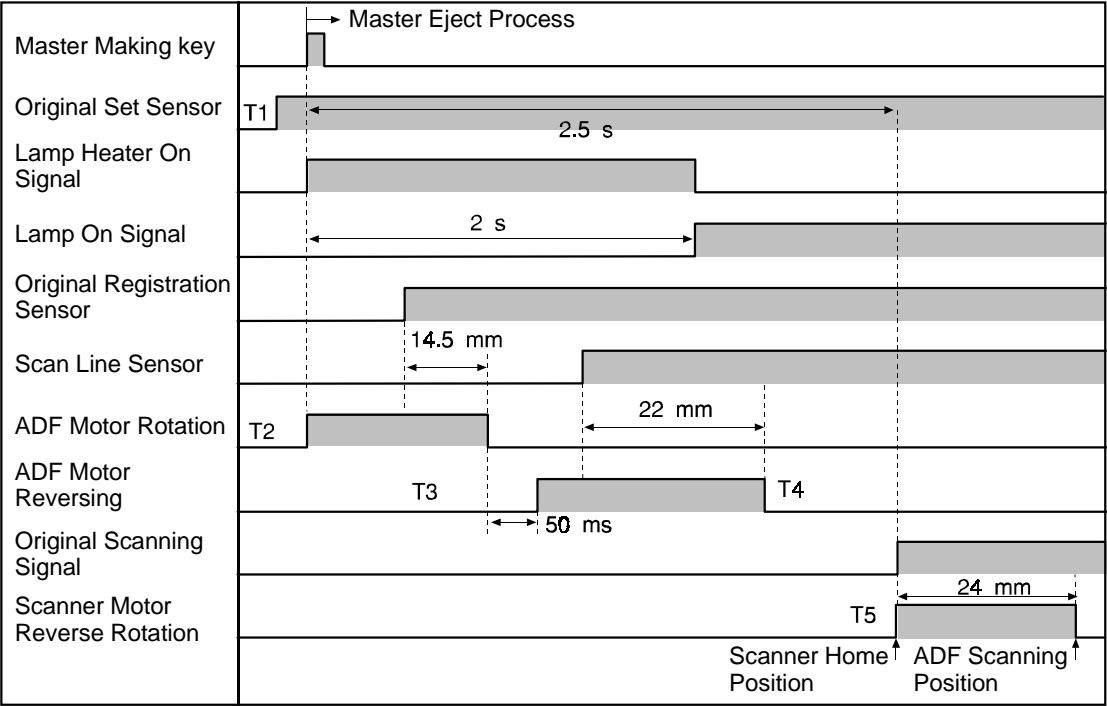
2.5 ADF POSITION DETECTION



When the ADF Cover [A] is opened, the ADF Position Sensor [B] is deactivated. When this sensor is deactivated, the machine will indicate "CLOSE ADF COVER" on the operation display.

2.6 ELECTRICAL TIMING

2.6.1 ADF (Before Scanning)

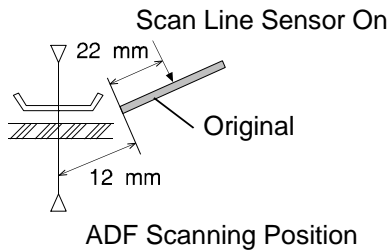


T1: When originals are inserted in the ADF unit, the original set sensor is activated.

T2: When the Master Making key is pressed, the ADF motor rotates the pickup roller and the feed roller to feed the bottom original into the ADF.

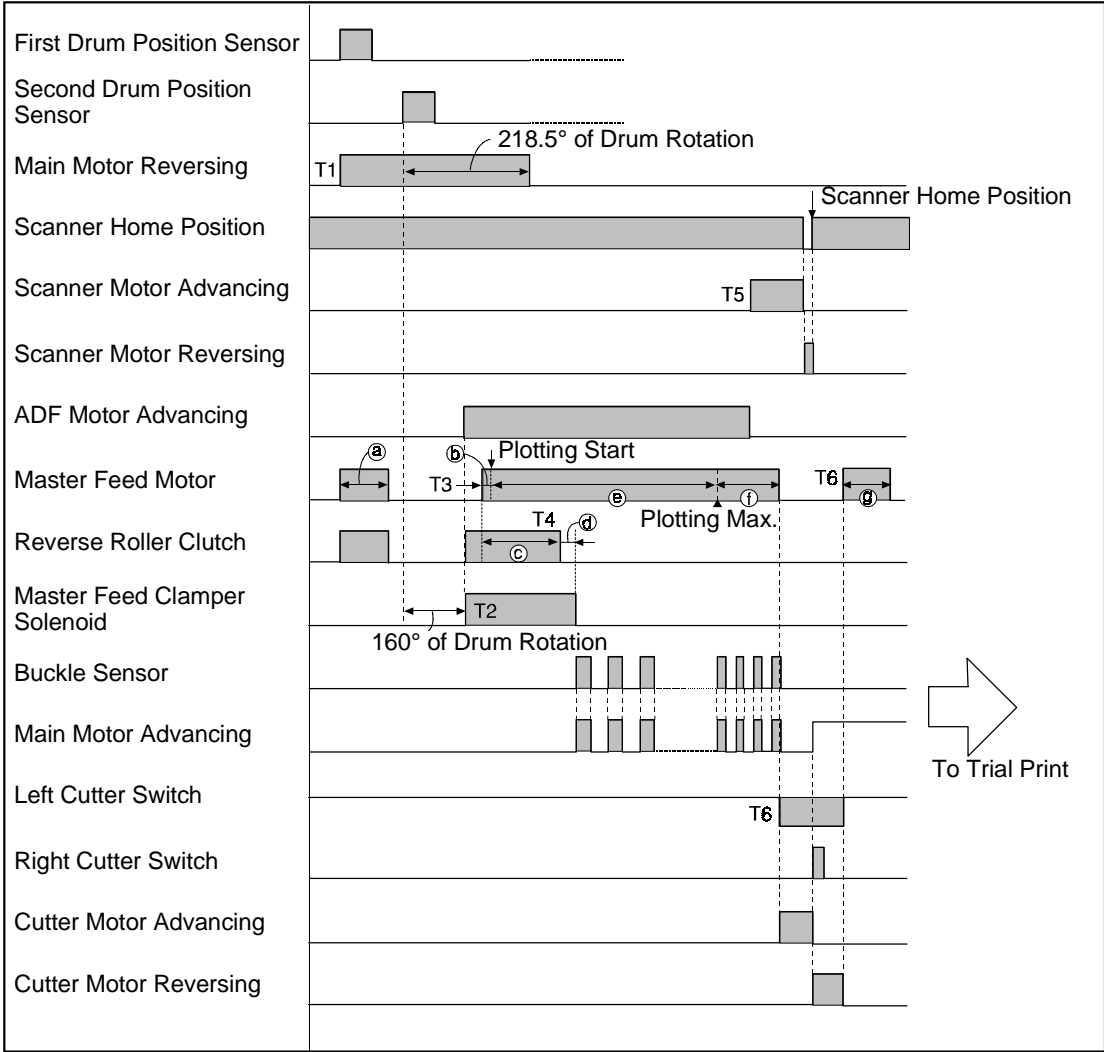
T3: The ADF motor will stop rotating clockwise when the original has been fed 14.5 millimeters after the original registration sensor was activated. After 50 milliseconds, the ADF motor will start to rotate counterclockwise to rotate the 1st original transport roller.

T4: The ADF motor will stop again when the original has been fed 22 millimeters after the scan line sensor was activated. The ADF motor will wait until the master eject process is finished.



T5: The scanner motor rotates counterclockwise for 2.5 seconds after the Master Making key is pressed, to bring the scanner into the ADF scanning position.

2.6.3 Plotting



- a: 21.5 mm b: 0.9 mm
- e: 412 mm f: 60 mm
- g: 40 mm c: 38 mm
- d: 5 mm

- T1: After the master eject process is completed, the main motor will rotate in the reverse direction at 30 rpm. At the same time, the master feed motor and the reverse roller magnetic clutch will turn on to feed the master for 21.5 millimeters.
- T2: The master feed clamper solenoid is energized when the drum has rotated 160 degrees past the second drum position sensor. At the same time the reverse roller magnetic clutch is turned on and the scanner motor will start to rotate.

T3: When the scanner has moved 20 millimeters from its home position, the master will start to be fed. When the master has been fed 0.9 millimeters the thermal head will start plotting (burn) on the master.

The leading edge is zero when the scanner is 12 millimeters from its home position. The leading edge margin can be changed to a value between 4 and 10 millimeters by SP mode No.33.

T4: When the master has been fed 38 millimeters, the reverse roller magnetic clutch turns off. Then the master is fed 5 millimeters more and the master feed clamper solenoid is de-energized to close the master clamper. The ADF motor and the master feed motor will speed up once the master plotting is completed. The master feeding length for plotting is:

412 millimeters: A3/DLT drum.

204 millimeters: A4/LT drum.

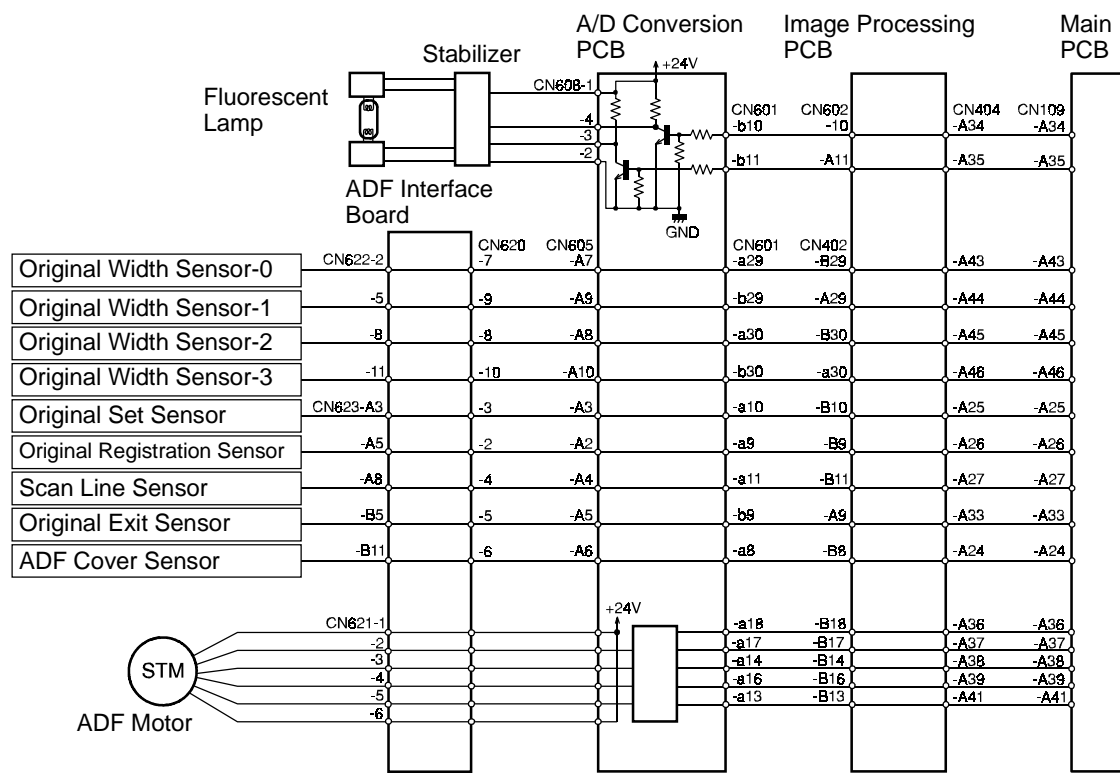
T5: When the ADF motor stops, the scanner motor will start to rotate clockwise to bring the scanner back to the home position.

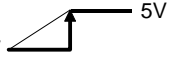
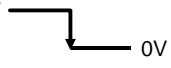
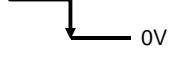
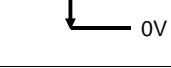
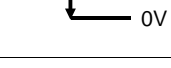

T6: The master feed motor will stop when the master has been fed 534.4 millimeters. At the same time, the cutter motor will start rotating to cut the master. The cutter motor changes the rotation direction when the cutter holder activates the right cutter switch. The cutter motor will stop when the cutter holder goes back to the home position to activate the left cutter switch.

When the right cutter switch is activated, the drum will start rotating to return to its home position.

When the left cutter switch is activated (when the cutter comes back to its home position), the master feed motor will turn on again to feed the master 40 millimeters.

2.7 CIRCUIT



Component Name	I/O	MAIN PCB		Description
		CN No.	Signal Level	
Original Width Sensor 0-3 see note	In	109-A43 -A44 -A45 -A46	0V  5V	Signal goes high when the sensors are interrupted by the detection plate.
Original Set Sensor	In	109-A25	5V  0V	Signal goes low when the sensors are interrupted by the detection plate.
Original Registration Sensor	In	109-A26	5V  0V	Signal goes low when the sensors are interrupted by the detection plate.
Scan Line Sensor	In	109-A27	5V  0V	Signal goes low when the sensors are interrupted by the detection plate.
Original Exit Sensor	In	109-A33	5V  0V	Signal goes low when the sensors are interrupted by the detection plate.
ADF Cover Sensor	In	109-A29	5V  0V	Signal goes low when the ADF Cover is opened.

NOTE: Measures 0.9V on DC Meter

Document Feeder

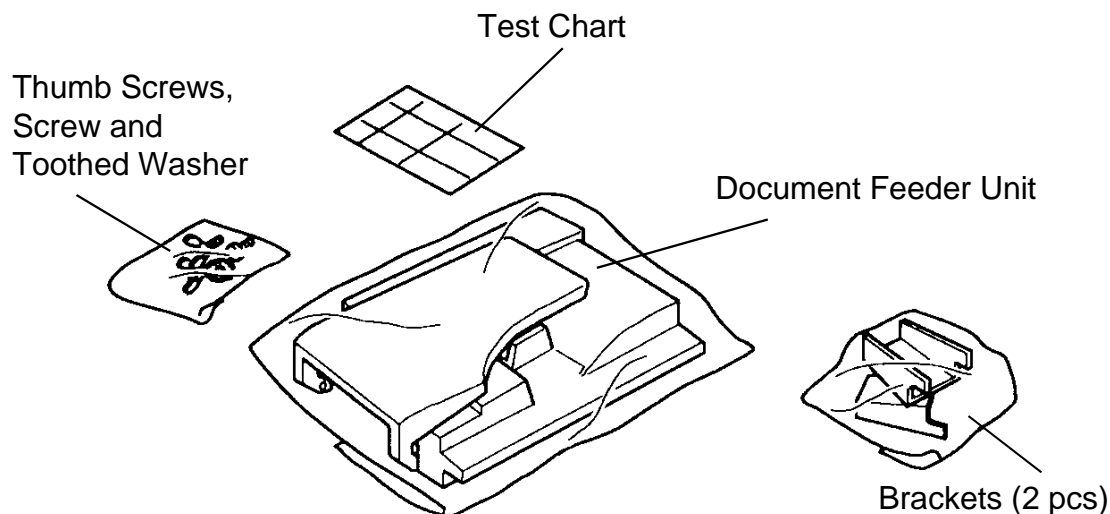
2.8 ORIGINAL MISFEED DETECTION

The machine will indicate an original misfeed in the following conditions.

- When the original registration sensor does not go on within 3 seconds after the ADF motor starts rotating (clockwise).
- When the scan line sensor does not go on within 2.5 seconds after the original registration sensor is turned on.
- When the original exit sensor does not go on after the scan line sensor is turned on and the original has been fed 60 millimeters.

3. INSTALLATION PROCEDURE

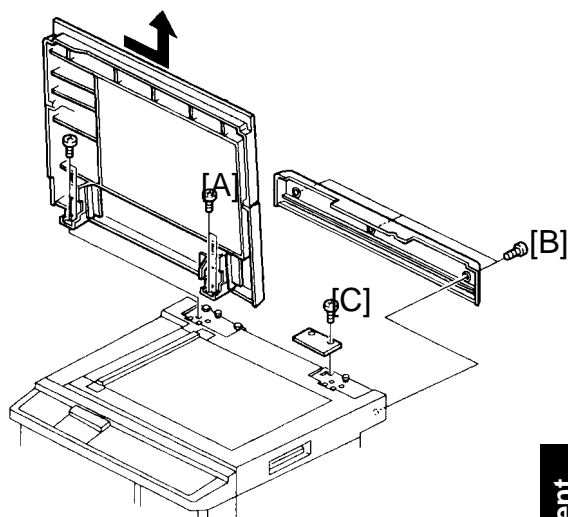
3.1 ACCESSORY CHECK



Make sure that you have all the accessories listed below.

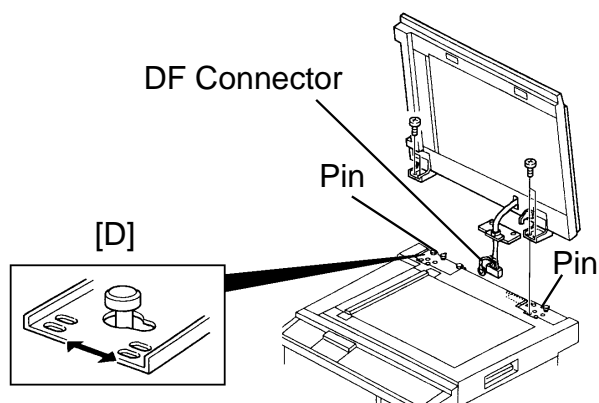
- (1) Document Feeder Unit
- (2) Bracket (2 pcs.)
- (3) Screw and a Toothed Washer
- (4) Thumb Screws (4 pcs.)
- (5) Test Chart
- (6) Installation Procedure

1. Turn off the main switch and unplug the power cord.
2. Open the Platen Cover, remove 4 screws [A] and remove the Platen Cover.
3. Remove 3 screws [B] and remove the Upper Rear Cover.
4. Remove 2 screws [C] and remove the cover plate.

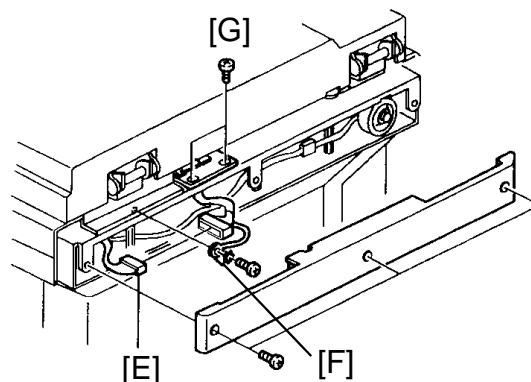


Document
Feeder

5. Feed the DF connector through the opening and mount the DF Unit as shown in the diagram [D].
6. Secure the DF Unit with the 4 screws that were removed in step 2.

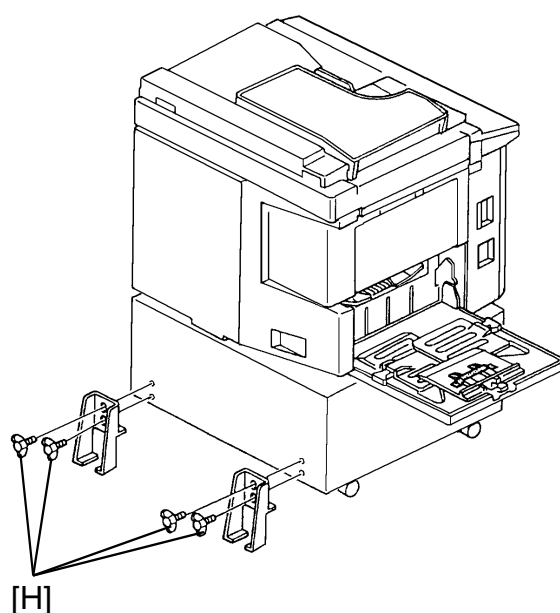


7. Close the DF and connect the connector to the scanner connector [E].
8. Secure the wire [F] with the screw and the washer in the accessories.
9. Secure the DF Harness Bracket with 2 screws [G].
10. Install the Upper Rear Cover (3 screws).



11. Secure the machine by attaching 2 brackets [H] to the back of the table using the 4 thumb screws in the accessories.

CAUTION: The brackets must be attached to the back of the table. This is to prevent the machine from falling over when the ADF is opened. Also, ensure that the machine is secured to the table. See page 3-6 for details.

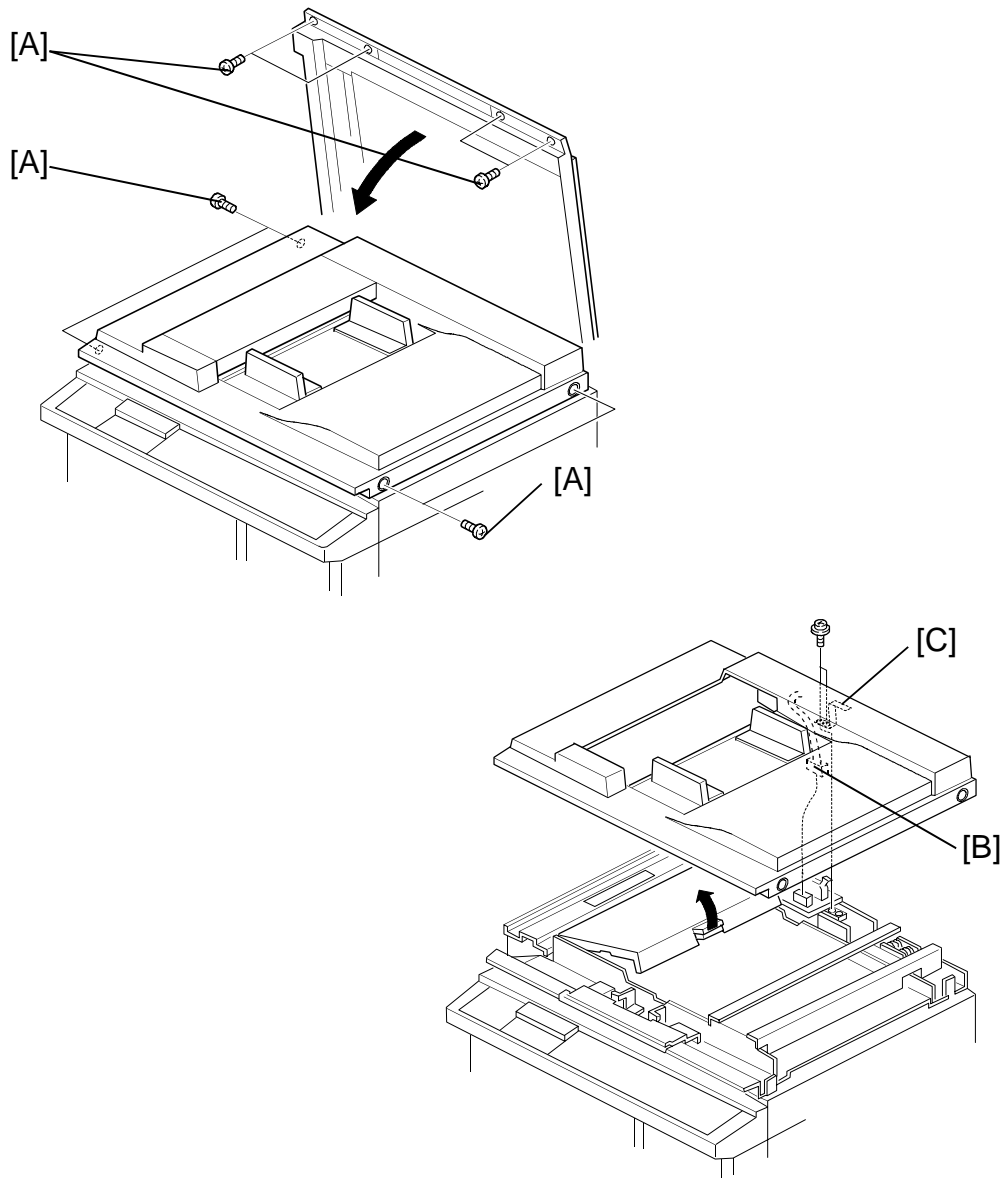


When you install the optional ADF, do the following adjustments.

- ADF height adjustment. (See page 8-29 for details.)
- Image center adjustment. (See page 8-30 for details.)
- Image scan magnification adjustment. (See page 8-30 for details.)

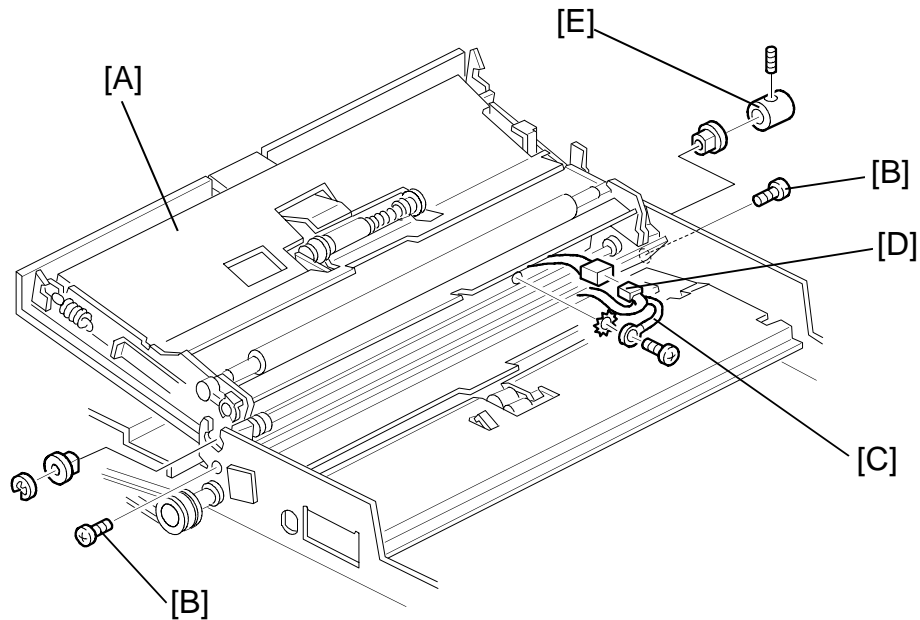
4. REPLACEMENT

4.1 ADF COVER



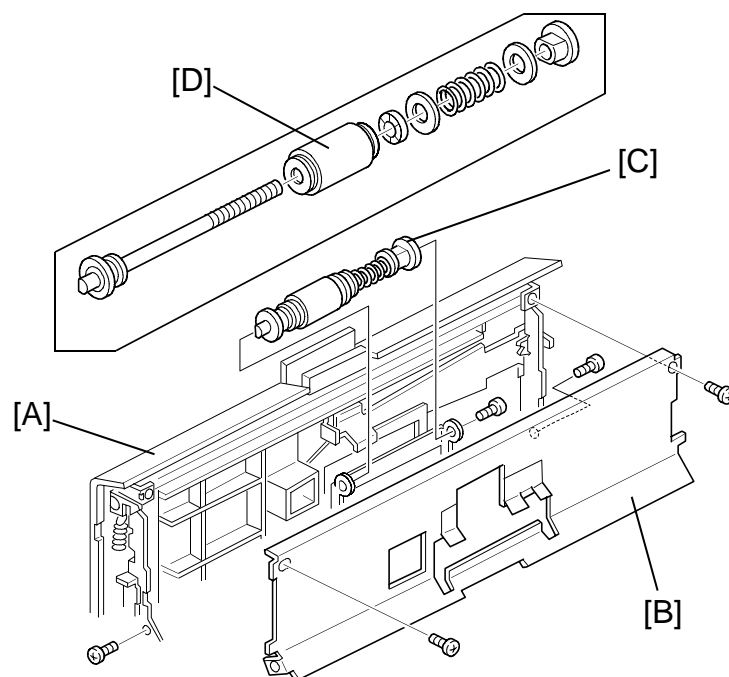
1. Remove the screws [A] securing the ADF cover (8 screws).
2. Disconnect the original size detector harness [B].
3. Remove the harness protector [C] (2 screws).

4.2 ADF UNIT



1. Remove the ADF cover (see section 4-1).
2. Open the ADF unit [A] and remove two stopper screws [B].
3. Remove the grounding wire [C] (1 screw, 1 toothed washer).
4. Disconnect the connector [D].
5. Remove the collar [E].
6. Remove the ADF unit [A] (2 bushings, 1 E-ring).

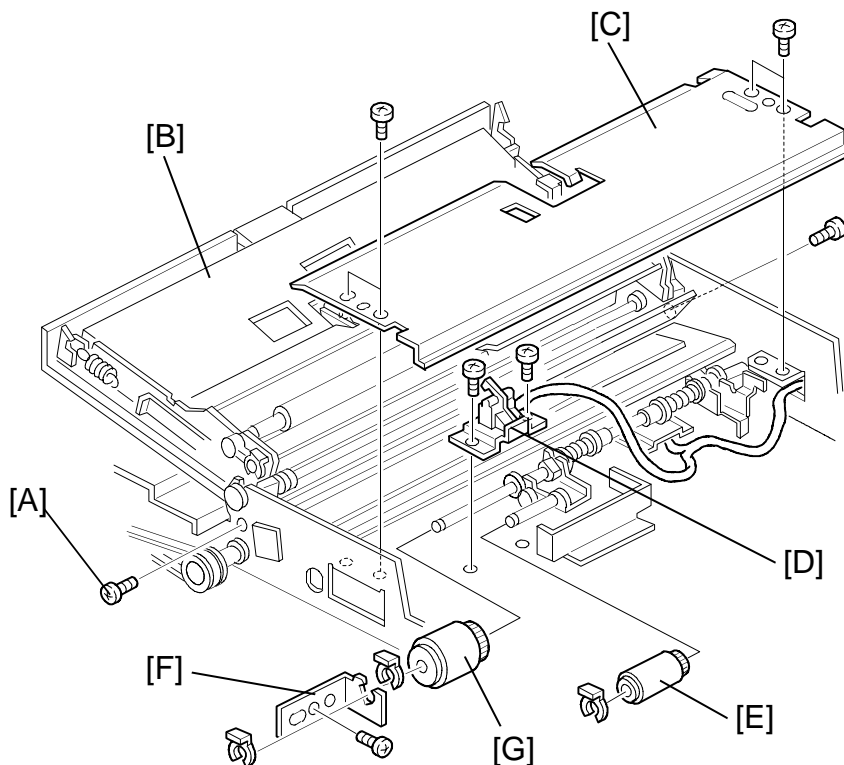
4.3 SEPARATION ROLLER



1. Open the ADF unit [A].
2. Remove the separation guide plate [B] (4 screws).
3. Remove the separation roller assembly [C] (1 screw).
4. Remove the separation roller [D].

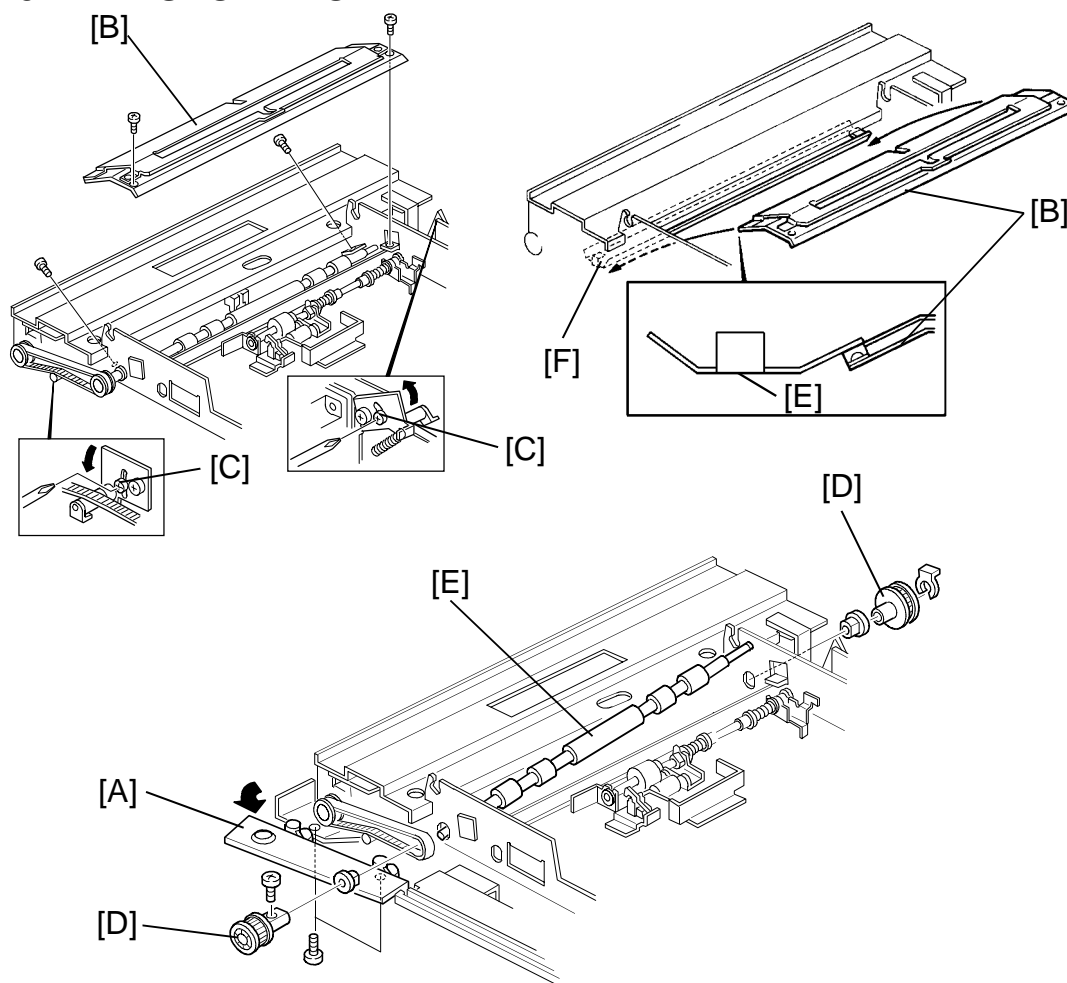
NOTE: After replacing the separation roller, perform the separation torque adjustment (see section 5-3).

4.4 PICK-UP ROLLER AND FEED ROLLER



1. Remove the ADF cover (see section 4-1).
2. Remove two stopper set screws [A] and open the ADF unit [B].
3. Remove the guide plate [C] (4 screws).
4. Remove the sensor bracket [D] (2 screws).
5. Remove the pick-up roller [E] (1 clip).
6. Remove the bracket [F] (1 screw, 1 clip).
7. Remove the feed roller [G] (1 clip).

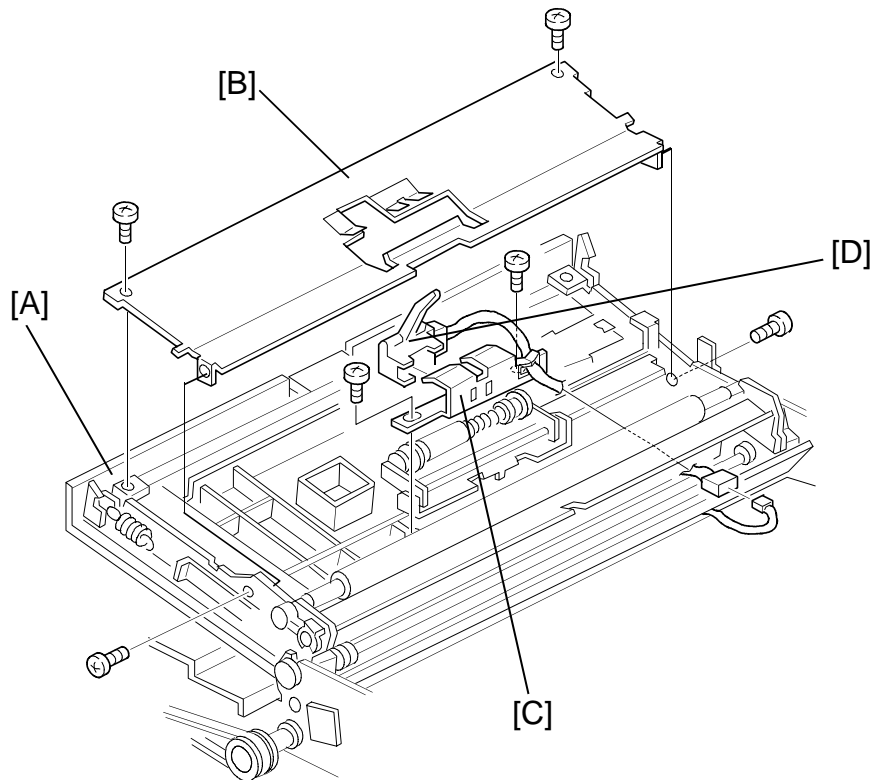
4.5 TRANSPORT ROLLER



1. Remove the ADF cover (see section 4-1).
2. Remove the grip cover [A] (2 screws).
3. Remove two stopper set screws and open the ADF unit.
4. Remove the guide plate.
5. Remove the transport guide plate [B] (4 screws).
6. Loosen the screws [C] securing the belt tension bracket.
7. Remove the pulleys [D] (1 screw, 1 clip each).
8. Remove the transport roller [E] (2 bushings).

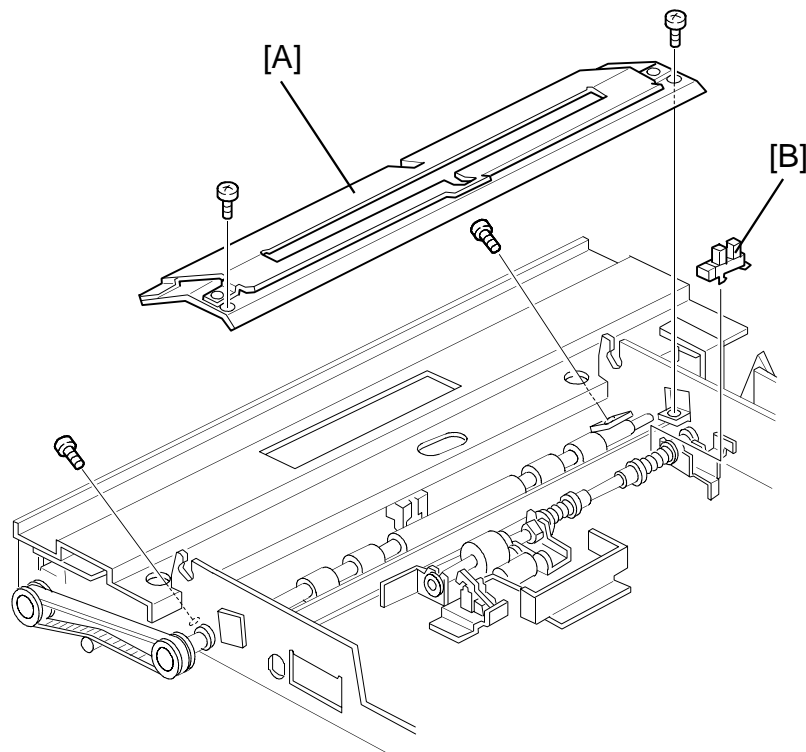
NOTE: When you reinstall the transport guide plate [B], make sure the guide plate is under the white plate [F].

4.6 ORIGINAL REGISTRATION SENSOR



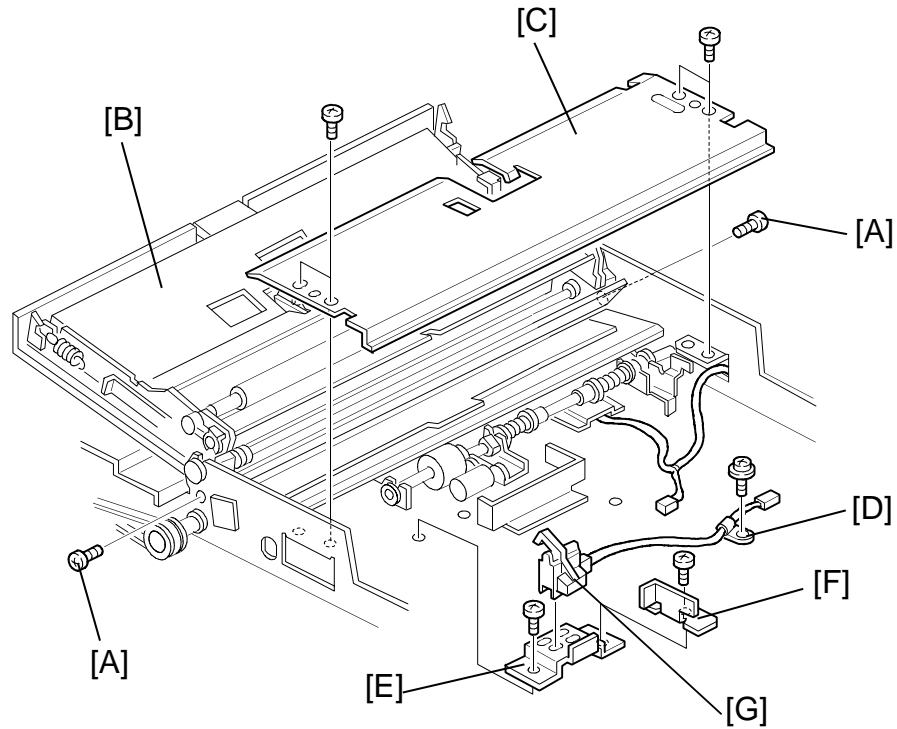
1. Remove the ADF cover (see section 4-1).
2. Remove two stopper set screws and open the ADF unit [A].
3. Remove the separation guide plate [B] (4 screws).
4. Remove the sensor bracket [C] (2 screws).
5. Remove the original registration sensor [D] (1 connector).

4.7 ADF POSITION SENSOR



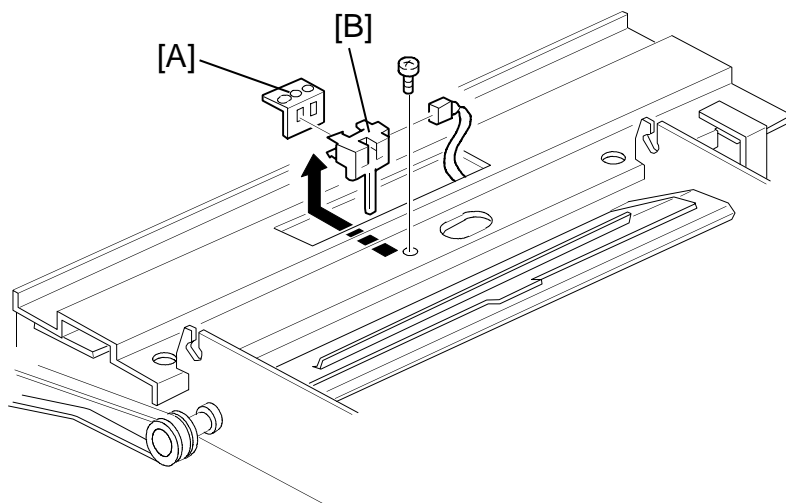
1. Remove the ADF cover (see section 4-1).
2. Remove two stopper set screws and open the ADF unit.
3. Remove the guide plate.
4. Remove the transport guide plate [A] (4 screws).
5. Remove the ADF position sensor [B] (1 connector).

4.8 ORIGINAL SET SENSOR



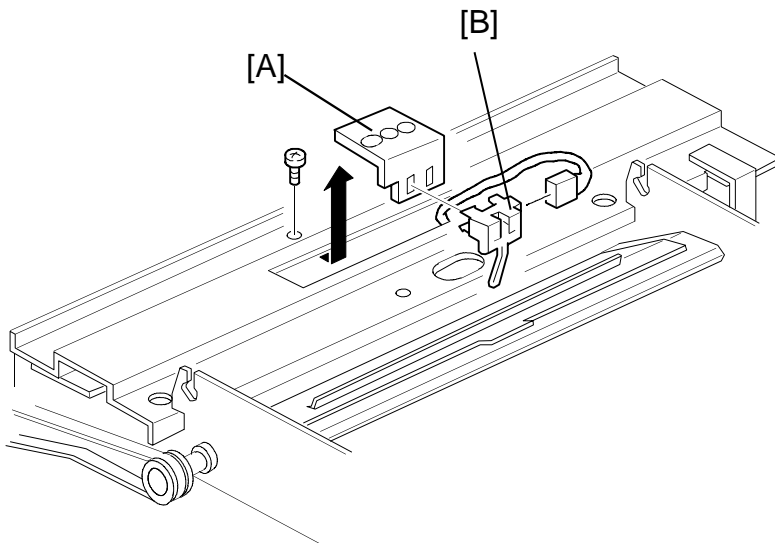
1. Remove the ADF cover (see section 4-1).
2. Remove two stopper set screws [A] then open the ADF unit [B].
3. Remove the guide plate [C] (4 screws).
4. Remove the harness clamp [D] (1 screw).
5. Remove the sensor bracket [E] and the bracket [F] (2 screws).
6. Remove the original set sensor [G] (1 connector).

4.9 SCAN LINE SENSOR



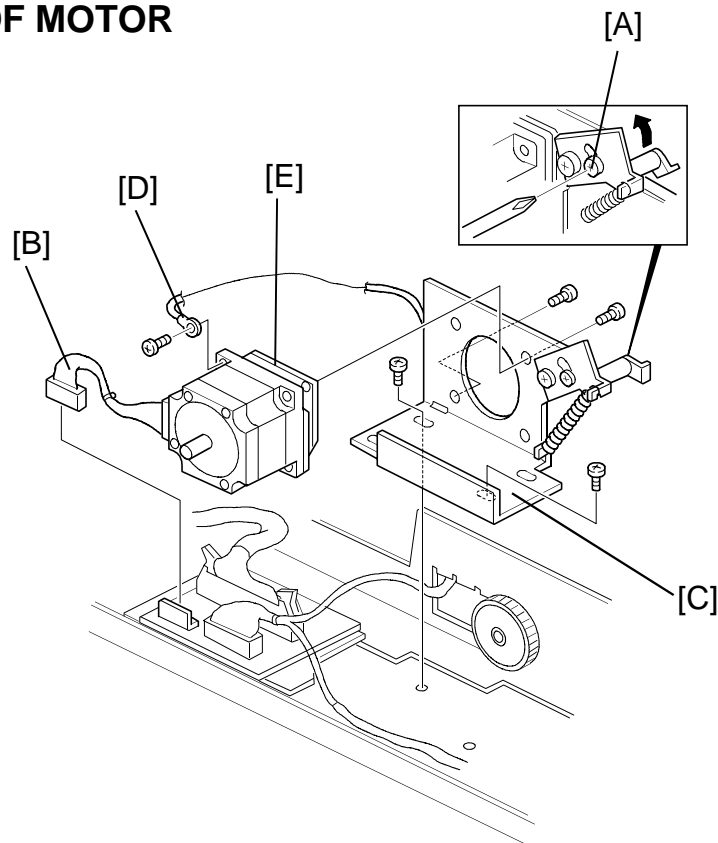
1. Remove the ADF unit (see section 4-2).
2. Remove the sensor bracket [A] (1 screw).
3. Remove the scan line sensor [B] (1 connector).

4.10 ORIGINAL EXIT SENSOR



1. Remove the ADF unit (see section 4-2).
2. Remove the sensor bracket [A] (1 screw).
3. Remove the original exit sensor (1 connector).

4.11 ADF MOTOR



1. Remove the ADF cover (see section 4-1).
2. Loosen the screw [A] securing the belt tension bracket.
3. Disconnect the motor harness [B].
4. Remove the motor bracket [C] (2 screws, 1 timing belt).
5. Remove the grounding harness [D] (1 screw).
6. Remove the ADF motor [E] (2 screws).

NOTE:

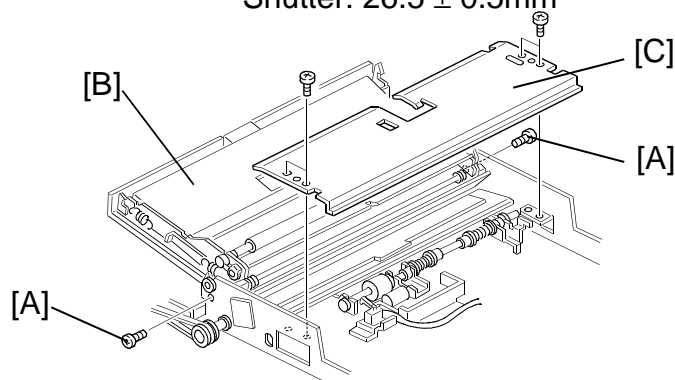
- When reinstalling the motor bracket, slide the bracket slightly to the right as viewed when standing at the back of the machine.
- After reinstalling the timing belt, ensure that you tighten the screw [A].

5. ADJUSTMENT

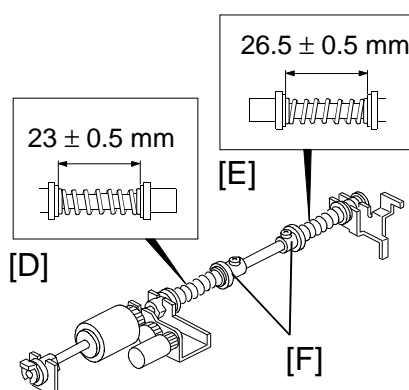
5.1 PICK-UP TORQUE AND SHUTTER TORQUE ADJUSTMENT

Purpose: To ensure that the originals are picked-up properly.

Adjustment Standard: The length of the spring for:
 Pick-up: 23 ± 0.5 mm
 Shutter: 26.5 ± 0.5 mm



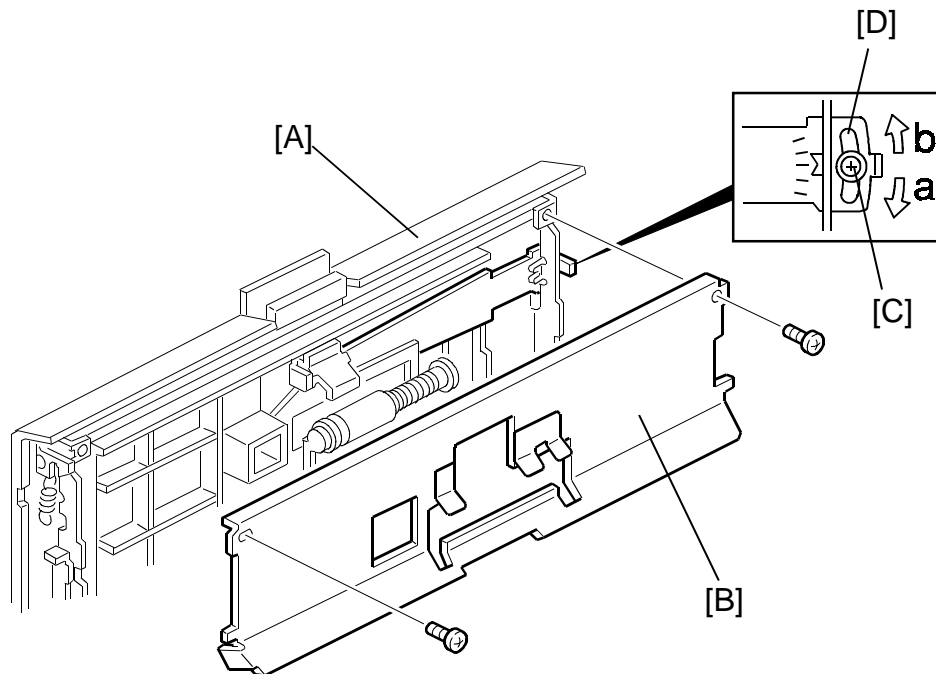
1. Remove the ADF cover (see section 4-1).
2. Remove two stopper screws [A] and open the ADF unit [B].
3. Remove the guide plate [C] (4 screws).



4. Check that the length of the pick-up and shutter torque springs are within the following specifications.
 Length of the pick-up spring [D]: 23 ± 0.5 mm
 Length of the shutter spring [E]: 26.5 ± 0.5 mm
5. If they are out of the specifications, adjust the spring lengths by sliding the collar [F].
 Original double feed: These springs should be shorter than the specifications.
 Original non-feed: These springs should be longer than the specifications.

5.2 SEPARATION ROLLER PRESSURE ADJUSTMENT

Purpose: To ensure that the originals are fed properly.

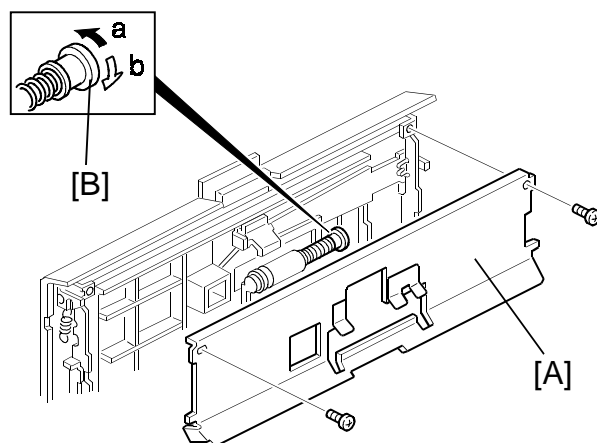


1. Open the ADF unit [A].
2. Remove the separation guide plate [B] (4 screws).
3. Loosen the screw [C] securing the pressure adjusting lever [D] then move the lever to change the pressure.
Original non-feed: Move the lever towards [a] (decrease the pressure).
Original double feed: Move the lever towards [b] (increase the pressure).
4. After adjusting the pressure, tighten the screw [C].

5.3 SEPARATION TORQUE ADJUSTMENT

Purpose: To ensure that the originals are fed properly.

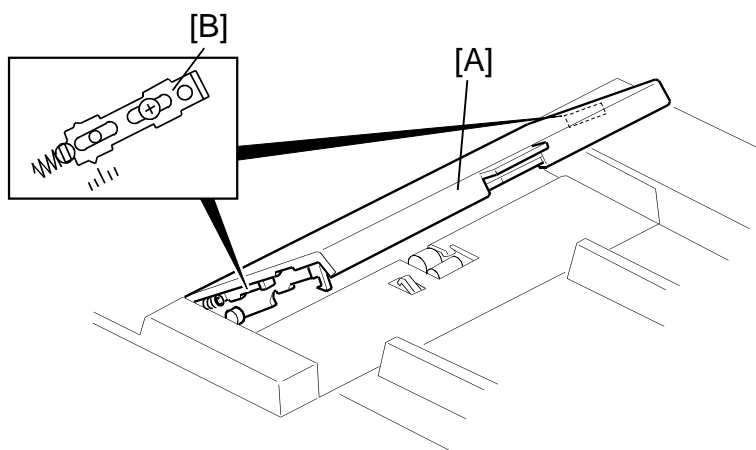
Adjustment Standard: 450 gf (torque gauge)



1. Open the ADF unit and remove the separation guide plate [A].
2. Adjust the separation torque by turning the bushing [B].
Original double feed: Turn the bushing in the [a] direction (increase the torque).
Original non-feed: Turn the bushing in the [b] direction (decrease the torque).

5.4 ORIGINAL SKEW ADJUSTMENT

Purpose: To correct the original skew.

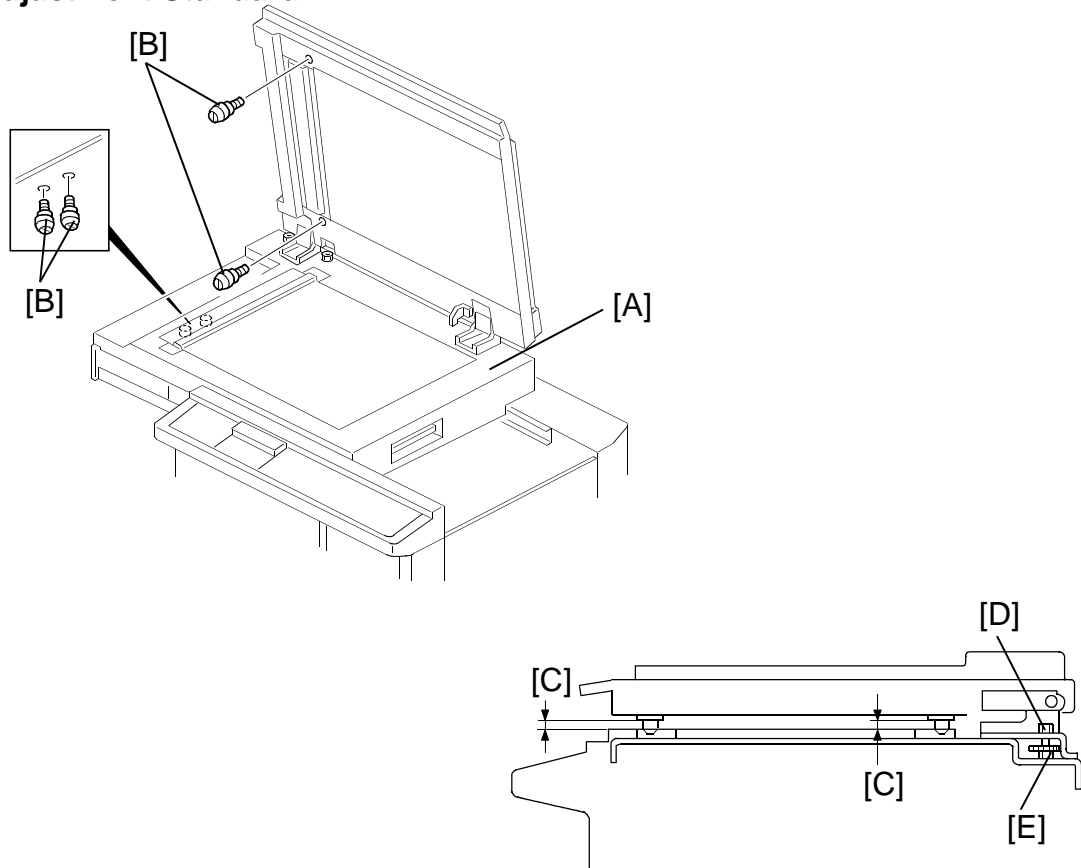


1. Open the ADF unit [A].
2. Move the adjusting plates [B] to correct the skew.
3. After adjusting the skew, tighten the plate properly.

5.5 ADF HEIGHT ADJUSTMENT

Purpose: To ensure that the image can be scanned properly.

Adjustment Standard: Less than 0.5 mm



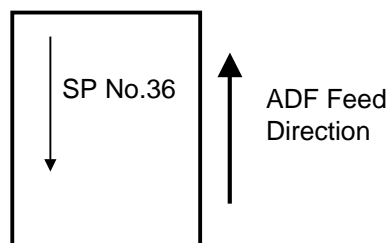
1. Slide the scanner unit to the left [A].
2. Remove two positioning pins (white) [B] located under the scanner unit. Then, attach them to the ADF as shown in the diagram.
3. Close the ADF and check that the gap [C] between the positioning pins and the scanner upper cover is less than 0.5 mm, using a thickness gauge.
4. If not, adjust the ADF height as follows.
 - 4-1. Remove the upper rear cover (see section 5-1 of the main frame's manual.).
 - 4-2. Loosen the nut [D] and adjust the height by turning the knob screw [E]. Then, tighten the nut.
5. After adjusting the ADF height position, return the positioning pins to their previous position (under the scanner unit).

5.6 IMAGE SCAN MAGNIFICATION ADJUSTMENT

Purpose: To correct the sub scan magnification.

Adjustment Standard: $100 \pm 0.5\%$ in the full size mode.

1. Using a test chart, make a print in the ADF mode.
2. Check that the sub scan magnification is within the specification.
3. If it is out of specification, adjust the sub scan magnification using SP No. 36.



5.7 IMAGE CENTER ADJUSTMENT (Side to side)

Purpose: To correct the center position of the print image.

Adjustment Standard: Less than 1 mm

NOTE: Before adjusting the image center position in the ADF mode, perform this in the platen mode.

1. Using a test chart, make a print using both ADF mode and the platen mode.
2. Compare both copies and confirm that the difference between the two copies is within 1 mm.
3. If the difference is too great, adjust the image center using SP No. 39.

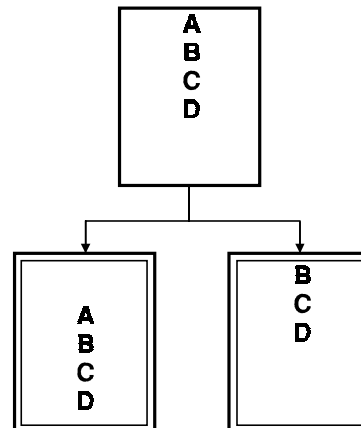
5.8 SCANNER LEADING EDGE REGISTRATION ADJUSTMENT

Purpose: To adjust the scanner start position according to the customer's request.

Standard Position: The scanning starts at 8 mm after the leading edge.

NOTE: When performing this adjustment, set the print speed and the image position to the standard positions.

1. Using a test chart, make a print using the ADF mode.
2. Check the scanner start position and adjust the scanner leading edge registration using SP No.38.



PCRIP-10

Priport Controller

Installation Guide

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1. INTRODUCTION

The Priport Controller is an external PostScript® and PCL-5® compatible processor designed to add a computer interface to Priport Digital Duplicators. Since it is separate from the Priport, the designers were able to use high-speed techniques making it one of the fastest add-on processors available.

The Controller uses a high-speed 25 megahertz Intel 960-CF RISC microprocessor chip to achieve its high speed processing. In addition the Controller contains 4 Megabytes (Mb) of RAM which can be upgraded to 16 Mb.

This product features Pipeline Associates' PowerPage™ interpreter, a widely recognized LaserWriter® compatible implementation of Adobe's® PostScript interpreter. The PowerPage interpreter offers users excellent quality and performance in handling the thirty-five industry standard Type 1 compatible fonts built into the Controller. Pipeline Associates' PCL-5 compatible interpreter is also built into the Controller providing the eight standard Intellifont™ PCL-5 fonts.

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

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

1.1 SYSTEM REQUIREMENTS

Supported Priports:

- Models VT1730, VT2105, and VT3600

Compatible computers:

- IBM 286, 386, 486 and compatible PC's
- Apple Macintosh

Memory requirements:

- The Priport Controller places no requirements on the RAM in the PC or Macintosh.

1.2 INSTALLATION PROCEDURE:

1. Ensure that the Priport is turned off and disconnected from the power source.
2. **Prior to installation**, set the dip switch DPS101 on the new Video Interface Board to the correct setting for the Model VT3600 Priport.

Number 1, 2, 3: ON (up)

Number 4: OFF (down)

3. Remove the Front Cover Panel from the Priport.
4. Mount the Interface Board Bracket onto the chassis at the right side of the Image Processing PCB using the Phillips M4x6 screw with flat washer. The bracket is used to support the upper right corner of the Video Interface PCB. Refer to figure 1.

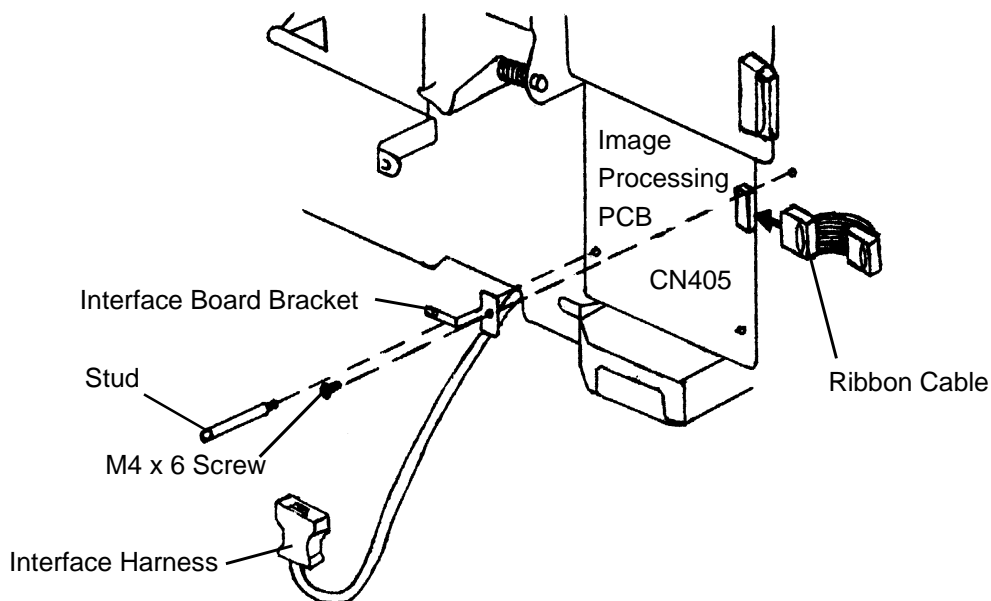


FIGURE 1 - Front View of frame with Mounting Hardware

5. Mount the Short Stud (Gray) onto the chassis at the lower left corner of the Image Processing PCB. The stud is used to support the lower left corner of the Video Interface PCB.
6. Attach one end of the short I/O Ribbon Cable to the connector labeled, CN405 on the Image Processing PCB.

7. Attach the upper right corner of the Video Interface PCB to the bracket installed in step 4, using a Phillips M3x6 screw with flat washer. Refer to figure 2.

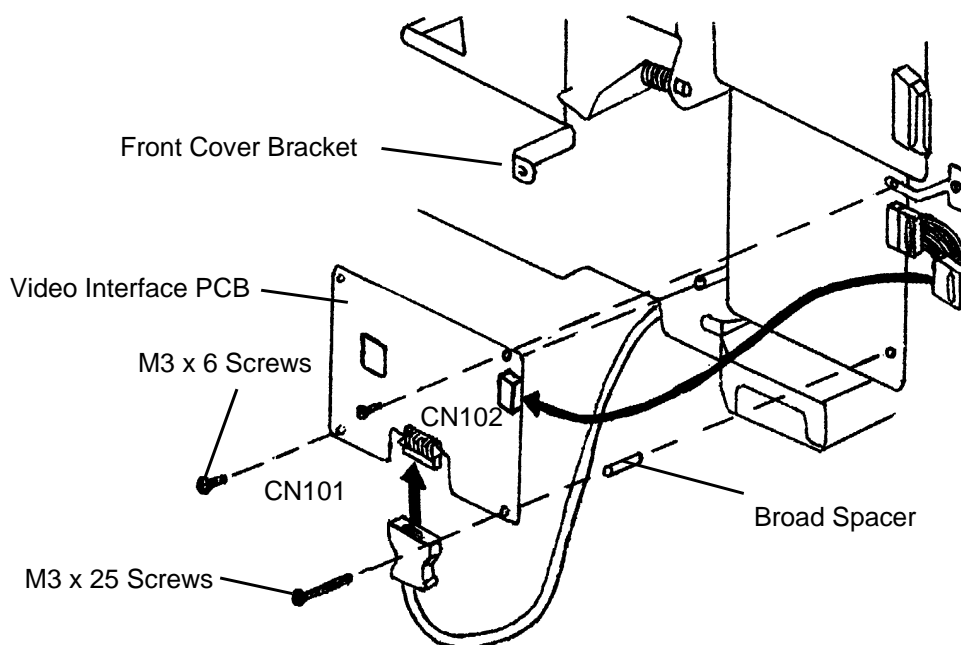


FIGURE 2 - Front View of frame with Video Interface PCB

8. Remove the lower right corner screw on the Image Processing PCB. Thread the Phillips M3x5 screw with flat washer through the mounting hole in the lower right corner of the Video Interface PCB, through the Board Spacer (White Nylon) and into the mounting hole in the lower right corner of the Image Processing PCB (where the screw was previously removed). Tighten the screw.
9. Attach the lower left corner of the Video Interface PCB to the stud installed in step 5, using a Phillips M3x6 screw with flat washer. Note that the upper left corner of the Video Interface PCB is not secured.
10. Attach the other end of the short I/O Ribbon cable to the connector along the right edge of the Video Interface PCB labeled, CN102.
11. Remove the screws securing the Main Power Cable Harness to the Cable Channel to allow the cable channel to drop downward.
12. Remove the Rear Cover Panel from the Priport.

13. Working from the rear of the machine, thread the small connector, labeled "AMP" of the Interface Harness with Bracket through the cable channel to the front of the machine.
14. Attach the connector labeled, "AMP" of the Interface Harness to the port labeled, CN101 on the Video Interface PCB.
15. Reposition the cable channel and reinstalled the screws removed in step 11.
16. On the rear side of the Priport, install the two (2) Long Studs (Black) into the chassis above the cable channel. Refer to figure 3.

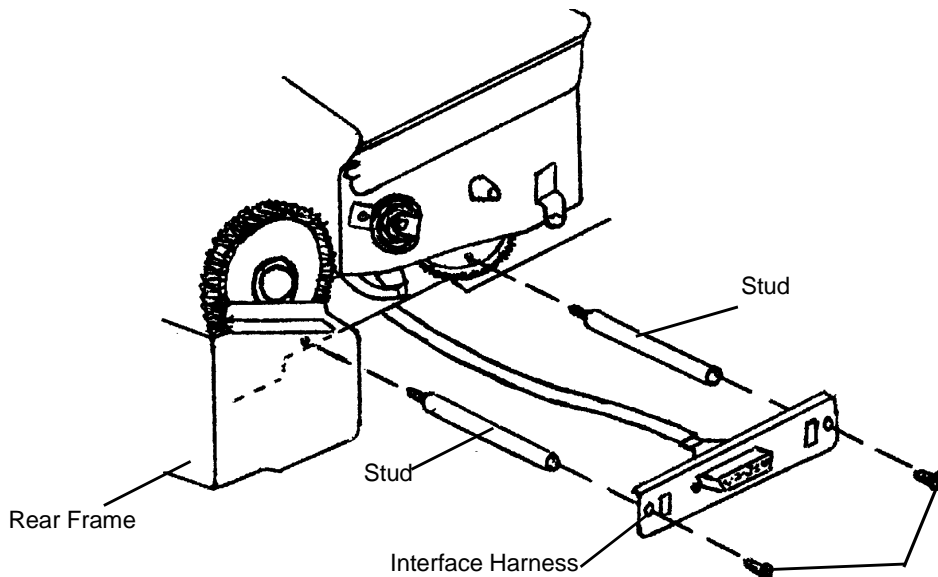


FIGURE 3 - Rear View of Frame

17. Attach the bracket end of the Interface Harness to the Long Studs installed in step 16 using two (2) Phillips M4x8 screws.
18. Remove the Communication Port Cover from the lower center of the Rear Cover Panel.
19. Reinstall the Front and Rear Cover Panels.
20. Refer to section 9.5 for the proper cabling configuration.
21. Refer to "Priport Controller User's Guide" (located after section 9.8) for the proper set-up and operation procedures.

1.3 PARTS LISTING:

INTERFACE UNIT - 10 TYPE 3 KIT

DESCRIPTION	QUANTITY
Interface Harness with Bracket	1
Video Interface PCB	1
Phillips screw with flat washer - M3x25	1
Phillips Screw with flat washer - M3x6	2
Phillips Screw with flat washer - M4x6	1
Phillips Screw - M4x8	2
Long Stud (Black) Interface Bracket	2
Short Stud (Gray)	1
Board Spacer (White Nylon)	1
Interface Board Bracket	1
I/O Ribbon Cable	1

1.4 CABLING BETWEEN PCRIP-10 AND COMPUTER

The cable to be installed now is one that the customer has purchased to match his specific computer and communication port choice. The correct cable for each computer and communication port is described generally below. (For more detailed technical information on cables, see page 9-12).

A. IBM and compatibles - Parallel

1. Make sure that the customer's computer is turned off.
2. Attach the DB-25 Male end of a standard PC parallel printer cable to the customer designated parallel output port on the rear of the computer. Record the choice of LPT1 or LPT2 because this port name will be required during the configuration process.
3. Attach the other end (36-pin Centronics Male) of a standard PC parallel printer cable to the input port on the rear of the PCRIP-10 labeled "Parallel In".

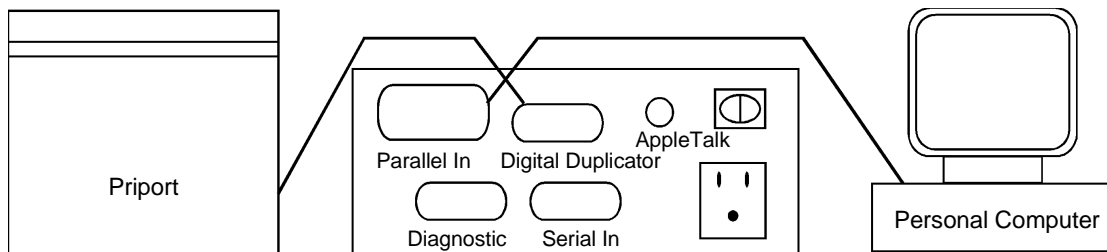


Figure A - Parallel Connection

B. IBM and compatibles - Serial

1. Make sure that the customer's computer is turned off.
2. Attach the DB-25 Female end of a standard PC serial printer cable to the customer designated serial output port on the rear of the computer. Record the choice of COM1 or COM2 because this port name will be required during the configuration process.
3. Attach the other end (DB-25 Male) of a standard PC serial printer cable to the input port on the rear of the PCRIP-10 labeled "Serial In".

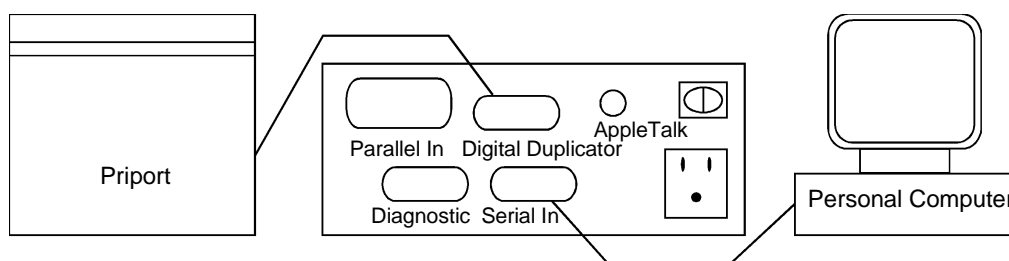


Figure B - Serial Connection

C. Macintosh computers - AppleTalk Standard

1. Make sure that the customer's computer is turned off.
2. Attach one 8-pin mini DIN Male end of a standard Macintosh printer cable to the printer output port on the rear of the computer.
3. Attach the other end (8-pin mini DIN Male) of a standard Macintosh printer cable to the input port on the rear of the PCRIP-10 labeled "AppleTalk".

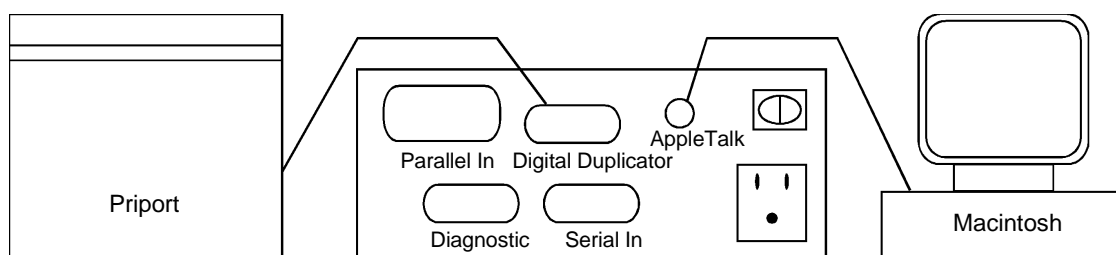


Figure C - AppleTalk Connection

1.5 SYSTEM VERIFICATION AND DEFAULT CONFIGURATION

Now that the physical installation is complete, you are ready to start the system verification.

1. Plug in all components of the system and turn them on in this order:
 1. Computer
 2. Priport
 3. PCRIP-10
2. Look at the two lights located in the lower left corner below the product label. The left hand light indicates "Power-on". It will stay on as long as the PCRIP-10 is receiving power.
3. The right hand light indicates "Ready". It will come on for a few seconds at Power-on and then go off for up to 60 seconds while the PCRIP-10 runs its internal diagnostics. If the Ready light comes back on and stays on, the PCRIP-10 has passed its startup diagnostics and verified communication with the Priport.
4. If the Ready light flashes quickly, the PCRIP-10 has not been able to verify communication with the Priport.
 - A. First, check to see if the Priport is plugged in and turned on.
 - B. Next, check to see that the cable from the PCRIP-10 to the Priport is securely seated in the ports at each end.
 - C. If the Ready light does not come on after these steps, turn off the PCRIP-10 and then the Priport.
- Check to see that the small "AMP" connector of the Interface Harness is securely fastened to the connector on the Video Interface PCB.
- Check to see that the I/O Ribbon Cable which connects the Video Interface PCB to the image processing board inside the Priport is securely fastened as well. Then, turn on the Priport and the PCRIP-10. Watch the Ready light again to see if it comes on briefly, goes off for approximately 30-60 seconds and then comes back on. If so, you are ready to proceed. If not, contact your local service organization for help.
5. If the Ready light fails to come on at all, the PCRIP-10 has been damaged, contact your local service organization for help.

6. Push the On Line button on the Priport Control Panel. The Priport must be On Line for the Priport to accept input from the computer through the PCRIP-10. (If the Priport is not On Line, the scanner in the Priport will be enabled instead.) If the green On Line light comes on, skip to Step 8.
7. If the On Line light does not come on, check to see that the new ROM was installed as described in Step 5 of the Installation Procedure and is seated firmly in its socket. Try the On Line key again. If the On Line light comes on, skip to Step 8. If not, contact your local service organization for help.
8. Turn the PCRIP-10 off. Install the Diagnostic Plug P/N DP000001 (optional test tool) in the port labeled Diagnostic on the rear of the PCRIP-10 and turn it back on again. The PCRIP-10 will send an internal PostScript file to the Priport which will output a Diagnostic Status page. This page includes PostScript font samples as well as configuration status from the PCRIP-10. (An example of this page can be found on page 9-37 of the Priport Controller User's Guide.)
9. The configuration status information found in the lower left corner of the page should match the following factory default settings:

Selected Page Size: US Letter (in US and Canada) or A4
(International)Controller RAM size: 4 Megabytes Mode: Postscript
Compatibility

(The number which follows "Controller Firmware Rev:" will vary according to when the PCRIP-10 was manufactured. This firmware revision number will be needed only if you must contact your local service organization about technical problems with this PCRIP-10 unit.)

Now that you have verified that the PCRIP-10 can successfully send files to the Priport, you are ready to proceed with configuring the PCRIP-10. Turn to page 9-23 of the User's Guide to continue.

1.6 CABLE PIN-OUT DIAGRAMS

A. PARALLEL INTERFACE CABLE (CENTRONICS) PIN-OUT CONNECTIONS:

<u>DB-25 Pin Male</u>	<u>Centronics</u>
1.....	1
2.....	2
3.....	3
4.....	4
5.....	5
6.....	6
7.....	7
8.....	8
9.....	9
10.....	10
11.....	11
12.....	12
13.....	13
15.....	32
18 - 25.....	19 - 30

B. PARALLEL INTERFACE CABLE (CENTRONICS) PIN ASSIGNMENTS:

<u>Signal</u>	<u>Pin</u>	<u>Signal</u>	<u>Pin</u>
-Strobe (Input)	1	GND.....	19
Data 1 (Input)	2	GND.....	20
Data 2 (Input)	3	GND.....	21
Data 3 (Input)	4	GND.....	22
Data 4 (Input)	5	GND.....	23
Data 5 (Input)	6	GND.....	24
Data 6 (Input)	7	GND.....	25
Data 7 (Input)	8	GND.....	26
Data 8 (Input)	9	GND.....	27
-Acknlg (Output)	10	GND.....	28
Busy (Output)	11	GND.....	29
Paper Error (Output).....	12	GND.....	30
Select (Output)	13	NC.....	31
NC	14	-Error.....	32
NC	15	+5 VDC (Output)	33
0 VDC.....	16	NC.....	34
GND	17	+5 VDC (Output)	35
+5 VDC (Output)	18	NC.....	36

The dash (-) before some signals indicates that the signal is negative true (active LOW). GND means the connection is a ground. NC indicates that the pin has no connection.

C. SERIAL INTERFACE CABLE PIN-OUT CONNECTIONS:

Controller	PC
<u>DB-25 Pin Male</u>	<u>DB-25 Pin Female</u>
1	1
2	3
3	2
5, 6	20
7	5
8	7
20	5, 6

ControllerPC

<u>DB-25 Pin Male</u>	<u>DB-9 Pin Female</u>
2	2
3	3
4	1
5, 6	4
7	5
8	7
20	6, 8

NOTE: The cable pin-outs shown above are recommended; however, any standard serial printer cable should work.

D. SERIAL INTERFACE CABLE PIN ASSIGNMENTS FOR CONTROLLER:

<u>Signal</u>	<u>Pin</u>
Protective ground shield	1
Transmitted data from the Controller (Output)	2
Received data by the Controller (Input)	3
Request to send (Output)	4
Clear to send (Input)	5
Data set ready (Input)	6
Signal ground	7
(Not Used)	8
Data terminal ready (Output)	20

1.7 RAM UPGRADE PROCEDURE

The RAM in the PCRIP-10 consists of four (4) - 1 Megabyte by 8 (or 9) Single-Inline-Memory-Modules (SIMMs) running at 70 nanoseconds. A SIMM consists of a very small (appr. 3/4" inch by 3 1/2" inches) printed circuit board (PCB) with 30 contact fingers which plug into sockets on the main board of the PCRIP-10. Dynamic RAM memory chips which are soldered on to this small PCB can communicate with each other through the wiring in the board and with the main board through the 30 contact fingers. The actual physical number of DRAM chips installed on the SIMM can be either 2 or 8 for 1 Mb x 8 (3 or 9 for 1 Mb x 9) depending on the density of the chips. (See Figure 1.)

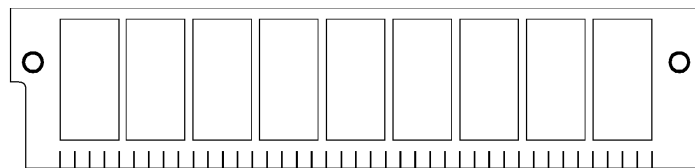


Figure 1 - SIMM

"1 Megabyte X 8" (or 9) describes a SIMM with 1 Megabyte usable storage which sends data out 8 bits (or 9 bits) at a time.

"70 nanoseconds" describes how fast the memory can respond in billionths of a second to commands from the Intel CF processor chip on the main board of the PCRIP-10.

HOW TO UPGRADE RAM TO 16 MEGABYTES

To upgrade the PCRIP-10 to 16 Megabytes of RAM from the factory standard, contact either a local computer dealer or an electronic component distributor about purchasing parts with the following description:

Four (4) - 4 Megabyte X 8 (or 9) SIMMs with 30 contact fingers running at 70 nanoseconds (ns) While SIMMs of this variety are available in both 70 and 80 ns speeds, **BE CERTAIN TO PURCHASE ONLY SIMMS WHICH RUN AT 70 NS!** Due to the high speed of the Intel CF processor chip, SIMMs running at 80 nanoseconds will not work in the PCRIP-10.

NOTE: Please take appropriate precautions for preventing static discharge throughout this procedure.

1. Turn off and disconnect all cables to the PCRIP-10.
2. Slide the metal chassis of the controller from its plastic housing.
3. Remove the 3 screws from each side and 2 screws from the backpanel which hold the chassis lid in place.
4. Remove the chassis lid and set it aside.

5. With the chassis oriented with the 2 LED's facing you, the 4 SIMMs to be replaced are located directly to your right. (See Figure 2.) Main PCB

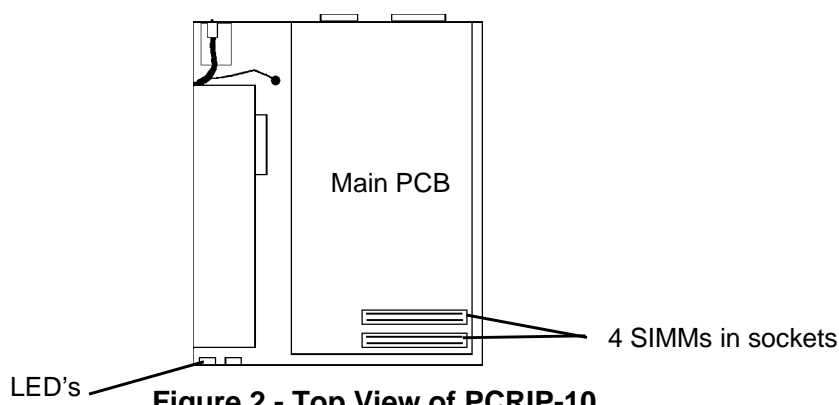


Figure 2 - Top View of PCRIP-10

NOTE: BE VERY CAREFUL NOT TO BREAK ANY PORTION OF THE SIMM SOCKET OR SOCKET CLIP WHEN REMOVING OR INSTALLING SIMMS. THIS IS AN ITEM WHICH CAN BE REPAIRED ONLY BY REPLACING THE MAIN BOARD AT THE FACTORY!

6. Starting with the SIMM in the socket closest to you, gently move the clip on one end of the socket to release the edge of the SIMM.
7. Gently move the clip on the other end of the socket to release the other edge. When both edges are released the SIMM will rotate forward (toward you) at a 45 degree angle.
8. Carefully remove the existing SIMM by pulling it towards you and set it aside.
9. Repeat Steps 6 through 8 for each of the remaining SIMMs, each time moving to the next socket away from yourself.
10. Starting with the SIMM socket farthest away from you, with the notched edge of the SIMM pc board on your right, insert one of the new 4 Megabyte X 8 (or 9) SIMMs in the socket at a 45 angle (toward you). The insertion angle for the new SIMMs is the same angle you used when removing the previous SIMMs.
11. Gently rotate the top of the SIMM away from you until you see the clips on each end of the socket engage. Check to see if the prongs of the clips are inserted in both of the small holes at each end of the SIMM. When correctly inserted, the SIMM should be firmly seated in the socket.
12. Repeat Steps 10 and 11 for each on the remaining SIMMs, each time moving to the next socket closer to you.

13. To verify that the SIMM installation was successful, reattach the chassis lid to the chassis and reconnect all cables including the power cable to the PCRIP-10.
14. Install the Diagnostic Plug in the Diagnostic Port on the backpanel of the PCRIP-10.
15. Power on the PCRIP-10. A Diagnostic Status Page should be output to the Priport which confirms the "Controller RAM size" as 16 Megabytes. If the Diagnostic Status Page is correct, you may skip to Step 18. If the Diagnostic Status Page does not reflect the upgrade to 16 Megabytes of RAM, go to Step 16. If the Diagnostic Status Page does not output at all and the PCRIP-10 Ready light is off, go to Step 17.
16. If the Diagnostic Status Page still shows only 4 Megabytes as the "Controller RAM size", you need to recheck that each of the 4 SIMMs you just installed match the specification of "4 Megabytes X 8" or "4 Megabytes X 9" as given above. The PCRIP-10 startup diagnostic routine has checked the RAM and only found 4 Megabytes. **BE SURE TO TURN OFF AND UNPLUG THE CONTROLLER BEFORE MAKING ANY FURTHER CHANGES TO THE SIMMS.** When the changes are completed, repeat Steps 13 through 15 to verify successful installation before continuing to Step 18 for reassembly.
17. If a Diagnostic Status Page was not output to the Priport at all, the PCRIP-10 startup diagnostics routine has checked the RAM in the PCRIP-10 and found an error that prevented any further operation. **BE SURE TO TURN OFF AND UNPLUG THE CONTROLLER BEFORE MAKING ANY FURTHER CHANGES TO THE SIMMS.** When the changes are completed, repeat Steps 13 through 15 to verify successful installation before continuing to Step 18.
 - First, check to see if all the SIMMs are properly seated in their sockets. There should be no movement from side to side and very little movement up and down if the SIMMs are properly seated.
 - Next, verify that the newly installed SIMMs are, in fact, 70 ns in speed. As mentioned in the purchase specification above, 80 ns SIMMs do not respond quickly enough to work with the Intel CF processor in the PCRIP-10 and can not be used!
 - Check that all the newly installed SIMMs are 4 Megabyte X 8 (or 9) and that you have not accidentally reinstalled one of the 1 Megabyte X 9 SIMMs you removed.

- If none of the steps above have solved the problem, it is possible, though highly unlikely, that one of the new SIMMs is defective. If the SIMMs were purchased from reputable dealer or distributor, these components should have been tested and should also be replaceable under warranty.
18. Make sure the PCRIP-10 is turned off and that the Diagnostic Plug and all cables are removed.
 19. Make sure that the chassis lid is reattached with 8 screws--3 on each side and 2 on the backpanel.
 20. Slide the metal chassis back into the plastic housing. Be careful to line up the two LED's on the front of the chassis with the holes cut in the front panel of the plastic housing for them.

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Priport Controller

User's Guide

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1.8 REGULATORY NOTICES

FCC REGULATIONS

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

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Shielded interconnect cables must be employed with this equipment to insure compliance with the pertinent RF emission limits governing this device.

Changes or modifications not expressly approved by Elesys, Inc. could void the user's authority to operate the equipment.

1.9 TRADEMARKS

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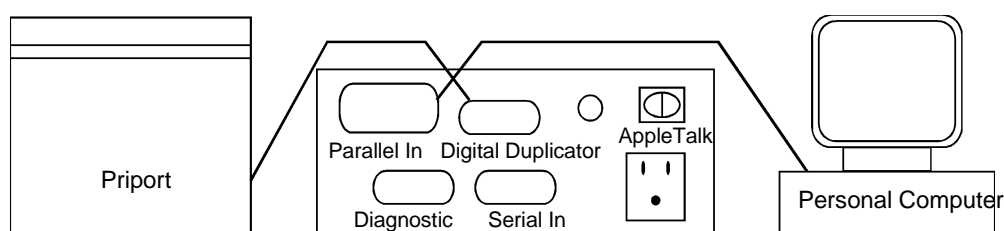
Governmental rights to this product are restricted. See license agreement.

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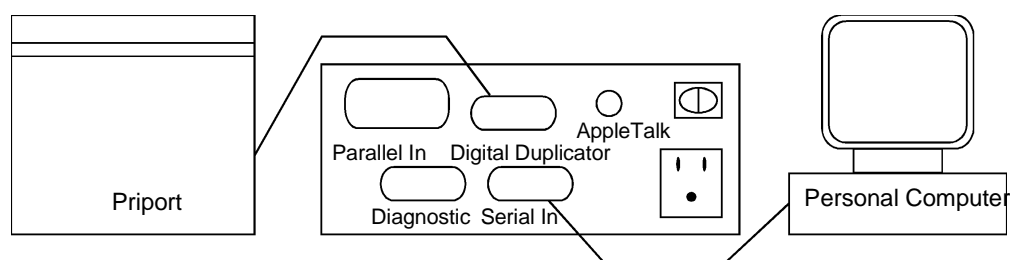
1.10 HARDWARE INSTALLATION

1. The Controller is connected by cables between both the computer and the Priport. (The computer and Priport are not directly connected to each other.) The inputs to the Priport Controller replicate those of a standard printer, including Parallel, RS-232 Serial and AppleTalk® inputs. Simply remove the cable from the printer and insert it into the appropriately labeled connector on the backpanel of the Controller. **DO NOT CONNECT A SERIAL CABLE TO THE DIAGNOSTIC PORT.**
2. The Controller is connected from the Priport port on its backpanel to the input port on the back of the Priport. The required cable is a standard IBM-PC parallel printer cable which is included with the Controller.
3. Cabling Diagrams:

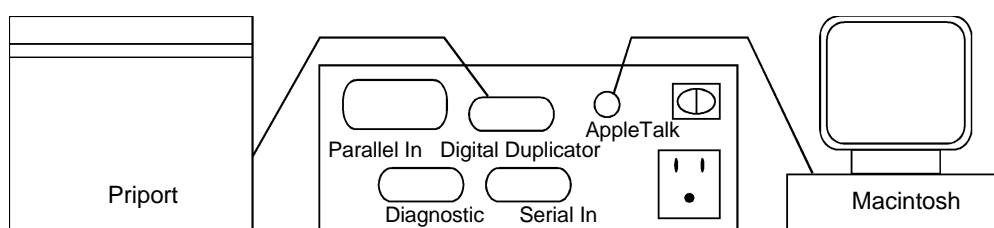
Parallel Connection



Serial Connection



AppleTalk Connection



1.11 PRIPORT CONTROLLER CONFIGURATION

1. Factory Settings:

The Controller comes preset with the following factory defaults:

- Input Buffers: Parallel Inputs - 256 Kb
 Serial Inputs - 4 Kb
 AppleTalk - Not applicable
- Page Size: US Letter (8-1/2" x 11") for U.S. and Canada
 A4 (210mm x 297mm) for International
- Mode: PostScript compatible

2. Controller Configuration Programs:

Three diskettes have been provided with the Controller: one 5 1/4" and one 3 1/2" for IBM and compatible computers and one 3 1/2" for Apple Macintosh computers. Each of these configuration programs allows you to change the factory settings of the Controller (including the ones listed above) until the next power down of the Controller or permanently if desired.

NOTE: See Step 9 on page 9-26 on how to save configuration changes you have made with an IBM and compatible computers. See Step 5 on page 9-29 on how to save configuration changes made with an Apple Macintosh.

1.12 CONFIGURATION OF IBM PC AND COMPATIBLES

The configuration program is menu-driven and has been designed to be very simple to use. (If you will be changing output page size regularly, you should copy these files to your hard disk.) When the initial configuration is completed and saved, you should rarely need to use this program disk.

- If you have the Controller connected to your IBM PC or compatible output port labeled **LPT1** and you wish to output in **PostScript mode** with the **default page size listed above**, you will not need to use this program to make any configuration changes from the factory settings.

- If you have the Controller connected to your IBM PC or compatible to an output port labeled **LPT2, COM1, or COM2**, or wish to change to **PCL-5** mode, or wish to change to any page size **other than the default page size listed above**, you will need to use this program.
- If you have **more than one computer (IBM compatibles and/or a Macintosh)** connected to the Controller, **you should be cautious about switching modes between PostScript and PCL-5** compatibility. To achieve the best output results, both IBM compatibles should output files in the same mode. Also, if the Controller is set in PCL-5 mode for the IBM's, the Macintosh will be locked out because it can only send PostScript compatible files.

Step 1. Insert the Utility Disk in drive A. (If you are copying these files to your hard disk, first create a subdirectory named PCRIP. At the DOS prompt type **md PCRIP <ENTER>** Next, type **cd PCRIP <ENTER>** At the **C:\PCRIP** prompt, type **COPY A:.* <ENTER>** and skip to Step 3.)

Step 2. Type **A: <ENTER>**

Step 3. Type **PCRIP <ENTER>** (The Main Menu Bar will appear across the top of the screen.)

File Page Install PC Port Input Bufrs Special Help Quit

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

Step 4. Use the right arrow key to move the highlight over the "**PC Port**" pull-down menu and **<ENTER>** The selections available are: **Printer Port LPT1, Printer Port LPT2, Printer Port COM1, Printer Port COM2, Printer Port to LOG file, and Printer Port to NULL.**

Step 5. Use the up or down arrow keys to highlight the correct PC output port and **<ENTER>**. This port selection should match the name of the physical port on the back of your computer that is connected by cable to the Controller. Any selection from any menu will move you back up to the main menu bar.

If you selected COM1 or COM2, you must select the "**PC Port**" pull-down menu again to specify a baud rate. The selections available are: **Com Port Baud Rate 1200, Com Port Baud Rate 2400, Com Port Baud Rate 4800, Com Port Baud Rate 9600 and Com Port Baud Rate 19.2K.** This selection will tell the Controller what speed to expect data from your computer. Most serial port users should select "**Com Port Baud Rate 19.2K**".

- Step 6.** Use the left arrow key to move the highlight back to the "Install" pull-down menu and <ENTER>. The selections available are: **Set PostScript compatible input, Set PCL-5 compatible input, Enable AppleTalk, Disable AppleTalk, Reset to Factory Config, Print Test File, Print Diagnostic Status Page, Save Configuration Changes.** You must use this menu to select PCL-5 mode or to re-select PostScript mode if you have previously selected PCL-5 mode. You may also use items from this menu to permanently save the configuration settings you have made during this session, turn AppleTalk on or off, print a test page, print the diagnostic status page or reset the Controller back to the original factory settings. Just use the up or down arrow keys to highlight your choice and <ENTER>.
- Step 7.** Use the left arrow key to move the highlight back to the "Page" pull-down menu and <ENTER>. The selections available are: **Page Size A4, Page Size B4, Page Size B5, US Letter, US Legal.** You must use this menu to select an output page size other than the factory default. Just use the up or down arrow to highlight your new output page size and <ENTER>.
- Step 8.** If your computer is connected to the Controller through COM1 or COM2, OR if it is the only computer connected, you may also want to change the input buffers. The larger the input buffer, the faster your print job will be processed, however there is a limited amount of memory to be allocated to input buffers. Use the right arrow key to move the highlight to "InputBufs" pull-down menu and <ENTER>. The selections available are: **Parallel Input Buffer Size = 0K, Parallel Input Buffer Size = 256K, Parallel Input Buffer Size = 256K, Serial Input Buffer Size = 0K and Serial Input Buffer Size = 64K.** If you are the only computer user hooked to the Controller, you should select the maximum available. For a single computer connected to COM1 or COM2, use the down arrow key to select "**Serial ... = 64K**". For a single computer connected to LPT1 or LPT2, use the down arrow to choose "**Parallel ... = 512K**", though the factory default of 256K should be adequate.
- Step 9.** When all the configuration changes are completed, you must decide if you want to make them permanent. If you do not complete this step, any changes you have made this session will be lost the next time the Controller is turned off. If you do complete this step, the Controller will remember any changes you have made through all power cycles. Use the right or left arrow to highlight the "Install" pull-down menu and <ENTER>. Use the down arrow key to select "**Save Configuration Changes**" and <ENTER>. You can change

and save the configuration settings of the Controller as often as you wish.

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

The following selections are available in the "**File**" menu: **Print a File, Eject Page, Info About this Program and Quit (Exit) this Program**. To print an output file from the hard disk or a diskette as a test of the configuration before saving or exiting the program, you would use the "**Print a File**" command. To clear the Input Buffer of the Controller or to create a master for a blank page, you would use the "**Eject Page**" command. To check the revision number of the PCRIP program which you are using, you would choose "**Info About this Program**". You may also exit the program from this menu.

The following selections are available in the "**Special**" menu: **Set Inter-Job Timeout Value, Disable Formfeed between Jobs, Enable Formfeed between Jobs and Enter Executive Mode**. The factory default setting for Inter-Job Timeout Value is 20 seconds. In other words, if the Controller does not receive any data from the computer for more than 20 seconds, the Controller will assume that the print job is complete and signal the start of master making in the Priport. Some software applications, specifically Windows-based programs which generate graphic-intensive output, may require a longer timeout value. If you use the "**Set Inter-Job Timeout Value**" to change this setting, we recommend that you increase the timeout value in 10 second increments until you achieve the desired output results. The factory default setting also has Formfeed Enabled. If the PCL-5 output file does not include a formfeed, the Controller will automatically generate one. You may turn this feature off with "**Disable Formfeed between Jobs**" and turn it back on with "**Enable Formfeed between Jobs**". This menu also provides an advanced PostScript feature called "Executive Mode" which allows direct entry of PostScript programming commands from the keyboard of the computer.

1.13 CONFIGURATION OF MACINTOSH COMPUTERS

The utility disk contains a program called "FontDownloader" and 13 small PostScript format files. These files contain the instructions for changing the output page size, printing the diagnostic status page, saving configuration changes permanently and numbering multiple Controllers if more than one Controller is connected to the same AppleTalk network. (If you will be changing the output page size regularly, you should copy the entire PCRIP Utility folder onto your desktop or hard disk.)

- The files which will be used most frequently are the output page size selection files. They are "A4", "B4", "B5", "US Letter" and "US Legal".
- If you wish to verify that the page size selection is correct, you can select "Diagnostic Status Page." This file will generate a one page print-out of PostScript font samples as well as a listing of the current Controller settings at the bottom of the page. See Appendix A for an example of this Diagnostic Status Page output.
- If you have more than one Controller installed on an AppleTalk network, you will need to add a number to its name so that Appletalk can distinguish between the Controller units. The file names are "Priport #1", "Priport #2", "Priport #3", etc. If you only have one Controller installed on the AppleTalk network, you will not need to use these files at all.
- If you have changed the output page size or the name/number of the Controller and wish to retain that change as the Controller's power on default, you will also need to use "Save Config Changes."

Step 1. Insert the Priport Controller Disk in the drive and double click on the floppy icon to open it.

Step 2. Double click on the Priport Controller folder to open it and then double click on "Downloader 5.0.1". (A new window will NOT appear on the screen but a new smaller menu bar with only three pull-down menus--**File Edit Special**--will appear.)

Step 3. Under the File Menu, the selections available are: **Download Font and Download PostScript File** and **Quit**. Double click on **Download PostScript File**. (A dialog box listing the 13 possible file choices will appear on the screen.)

Step 4. Point and click to select the file which will make the desired configuration change and click on Open. (While the file is being sent, AppleTalk will display a printer status report. When the file

has been successfully received by the Controller, the following message will be displayed "The download was successful".)

- Step 5.** Click OK. If you wish to make any other changes, start again at Step. 3. If you are finished making or saving the configuration changes, select **Quit** under the File menu.

1.14 APPLICATION SOFTWARE SET-UP

1. Printer Drivers:

Each desktop publishing or word processing application provides printer drivers for PostScript and PCL-5 compatible printers. Please follow the instructions supplied with your application software to select the appropriate printer for the page size you wish to send to the Priport. We have supplied examples for MS Windows 3.1 and WordPerfect.

2. Printer Selection:

A. PostScript-Compatible Printing - DOS:

- Windows 3.1 applications (Pagemaker, Corel Draw, MS Word for Windows, etc.) should select "**Postscript Printer**" for the following page sizes: Letter, Legal, A4 and B5.
- WordPerfect 5.1 users should select a "**TI Microlaser**" for the following page sizes: Letter, Legal and A4.
- WordPerfect 5.1 users needing B4 or B5 page sizes should install the WPPSE1.ALL file (supplied on the 3 1/2" Priport Configuration Disk for IBM and compatibles) and select "**Priport Controller**".

B. PostScript-Compatible Printing - Macintosh:

- Using the pull-down menu from the Apple icon, point and click on Chooser.
- Within the Chooser left-hand dialog box, point and click on LaserWriter. (The Macintosh will then poll the AppleTalk network and return the **Priport** name in the right-hand dialog box.)
- If it is not already selected, you should point and click on **Priport** now.

When you close the Chooser, the Macintosh is ready to send files to the Controller from any Macintosh software program. This driver supports the printing of all possible output page sizes through the Controller; however, you may be limited by the page size choices within the specific Macintosh application itself.

C. PCL-5 Compatible Printing - (only applicable for DOS applications):

All users should select an "**HP LaserJet III**" printer within their software application for letter, legal or A-4 page sizes. (Other page sizes are not available.)

1.15 PRIPORT CONTROLLER OPERATION

1. Power-On/Power-Off Sequence:

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

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

2. Controller - Front Panel Indicator Lights:

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

3. Ready Light:

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

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

B. Ready Light--Slow Flash:

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

C. Ready Light--Quick Flash:

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

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

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

1.16 COMMONLY ASKED QUESTIONS

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

- The official specification for **parallel** cables recommends a length not greater than 10 feet (appr. 3 meters), however you can probably use a cable up to 25 feet (appr. 8 meters) without encountering any line communication problems.
- The official specification for **serial** cables recommends a length not greater than 50 feet (appr. 16 meters), however you can probably use a cable up to 100 feet (appr. 30 meters).
- The **AppleTalk** specification recommends a cable length of not greater than 1000 feet (appr. 300 meters) which should not be exceeded.

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

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

3. Which is faster--the serial port or the parallel port?

- The parallel port connection on the back panel of the Controller will receive data from the computer as much as eight times faster than the serial connection. However, because of the higher data transmission rate, you are limited to a maximum parallel cable length of 25 feet (appr. 8 meters).

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

- Three. One IBM or compatible connected to the parallel port, one IBM or compatible connected to the serial port, and one Apple Macintosh or Macintosh network connected to the AppleTalk port.

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

- Yes, all computers connect to the Controller as if it were a standard computer printer.

6. Is any special wiring required for the Controller?

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

7. How much RAM memory does the Controller have?

- It comes standard with 4 megabytes of RAM.

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

- Under most circumstances, the answer is yes, due to a process built into the Controller called "power banding". If your files are very large, you might want to consider upgrading to 16 megabytes of RAM. Please contact your local Sales Representative for more information.

9. Can you add additional memory?

- Yes, the Controller can be upgraded from 4 megabytes to 16 megabytes of RAM. Please contact your local Sales Representative for more details on this upgrade.

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

- Yes and no. The Configuration Program supplied with the Controller must be installed on your computer in order for you to change any of the factory settings. For example, the Controller comes preset in PostScript mode with a US Letter (8 1/2" X 11") or A4 page size. If you wish to switch to PCL-5 mode or to a different page size, you must use the Configuration Program to make those changes. In order to output to the Priport through the Controller, you need to select the appropriate printer driver in your software application for the mode (PostScript or PCL-5) and page size you wish to print.

11. Will the Controller work with Windows 3.1?

- Yes, as long as you select the appropriate printer driver for the page size you need.

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

- As there are no international software standards which apply to the over 10,000 software applications worldwide, it is impossible to give a definitive answer for each and every program in the DOS, Windows and Macintosh environments. We have tested and know that the most popular software applications, MS Windows 3.1, WordPerfect, MS Word, etc. work extremely well. The Controller is designed to emulate (act as if it were in fact) a large variety of PostScript printers or a HP LaserJet III for PCL-5 output. Therefore, if your software application allows you to select either a PostScript printer or a HP LaserJet III, you should be able to send files to the Priport through the Controller to produce documents.

13. Will the Controller work on a network?

- Yes, if the Controller is connected to a host computer. The computer used as a host for the Controller can be the file server, a printer server or any one of the network nodes. Other than the AppleTalk port for Macintosh networks, there is no port on the Controller, at this time, which allows for a connection directly to the network.

14. What fonts are built into the Controller?

- The 35 standard PostScript fonts plus the 8 standard Intellifont PCL-5 fonts.

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

- Yes, you can use downloaded soft fonts in both PostScript and PCL-5 compatibility modes. You should be aware that the amount of RAM the soft fonts occupy may impact the processing speed.

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

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

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

- No, the number of copies to be printed must be set from the Priport control panel. This was done intentionally so that you can check that the correct paper and ink are in the Priport before printing.

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

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

19. What does the Diagnostic Port do?

- When the diagnostic plug used by the Customer Engineer is installed in the Diagnostic Port and the Controller is turned on, the Priport will output a Diagnostic Status page which includes Postscript font samples and configuration information for the Controller. (See Appendix A.)

20. If I have a software or hardware question, who do I call?

- Your local sales/service organization should be contacted first.

1.17 TROUBLESHOOTING

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

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

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

2. There is no master making at all.

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

- If the Controller ready light is producing a quick flash, follow the steps listed above to clear the error.
- If the Controller ready light is producing one long and two short flashes, check to see if the Priport may be off-line. Put the Priport back on-line and verify that the PCRIP-10 ready light has stopped flashing.
- If the Priport is not off-line, then the Priport is waiting to print from a new master. You may either print one copy from the master currently on the drum, or push the Priport's on-line button off and then on again to clear this condition.
- If you are sending PostScript files to the Controller, make sure that you have the correct PostScript compatible printer selected as the output printer within in your application software **and** the Controller has been configured for PostScript mode.
- If none of the steps above have produced any master making, it is possible that the PostScript file you are trying to print may be corrupted. You can test for actual Postscript output by printing the Diagnostic Status Page through the Configuration Program. If you can not successfully print this page (which is a special PostScript compatible file), you should contact your local service organization for help.

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

- Verify that the page size selected in the application software, the Controller configuration and the Priport all match.
- Make sure that you have the correct printer selected in the application software for either PostScript or PCL-5 mode.
- Check that the document being sent to the Controller is not blank.
- If you have followed all of the steps listed above and still get blank pages as output, contact your local service organization.

4. My document prints out as unrecognizable text.

- This symptom is usually the result of sending a PostScript file to a Controller that is still configured in PCL-5 compatibility mode. Check to make sure that you have the correct printer selected in the application as well as that the Controller is in PostScript compatibility mode.

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

- Verify that the page size **and** the page orientation (portrait or landscape) selected in the application software, the Controller configuration and the Priport all match.

6. My Macintosh gives an error message which says "Priport is not available on AppleTalk".

- Make sure that the Controller is powered on.
- If both an IBM or compatible and a Macintosh are connected to the Controller, check to see if the Controller has been switched to PCL-5 mode for the IBM PC. If so, the Macintosh will be locked out until the Controller is switched back to PostScript compatibility mode.
- If only one Macintosh is connected to the Controller, contact your local sales/service organization for additional help.

1.18 APPENDIX A - DIAGNOSTIC STATUS PAGE

Controller Status Page

1 Helvetica

2 Helvetica-Oblique

3 Helvetica-Bold

4 Helvetica-BoldOblique

5 Helvetica-Narrow

6 Helvetica-Narrow-Oblique

7 Helvetica-Narrow-Bold

8 Helvetica-Narrow-BoldOblique

9 AvantGarde-Book

10 AvantGarde-BookOblique

11 AvantGarde-Demi

12 AvantGarde-DemiOblique

13 NewCenturySchlbk-Roman

14 NewCenturySchlbk-Italic

15 NewCenturySchlbk-Bold

16 NewCenturySchlbk-BoldItalic

17 ZapfChancery-MediumItalic

18 ZapfDingbats

19 Symbol

20 Palatino-Roman

21 Palatino-Italic

22 Palatino-Bold

23 Palatino-BoldItalic

24 Times-Roman

25 Times-Italic

26 Times-Bold

27 Times-BoldItalic

28 Bookman-Light

29 Bookman-LightItalic

30 Bookman-Demi

31 Bookman-DemiItalic

32 Courier

33 Courier-Oblique

34 Courier-Bold

35 Courier-BoldOblique

Controller Firmware Rev: 123456

Selected Page Size: US Letter

Controller RAM size: 4 Megabytes

Mode: Postscript Compatibility

0 xxxx

1 xxxx

2 xxxx

3 xxxx

4 xxxx

5 xxxx

6 xxxx

7 xxxx

8 xxxx

9 xxxx

a xxxx

b xxxx

c xxxx

d xxxx

e xxxx

h xxxxxxxx

s xxxxxxxx

TECHNICAL SERVICE BULLETINS

BULLETIN NUMBER: VT3600 - 001

08/16/95

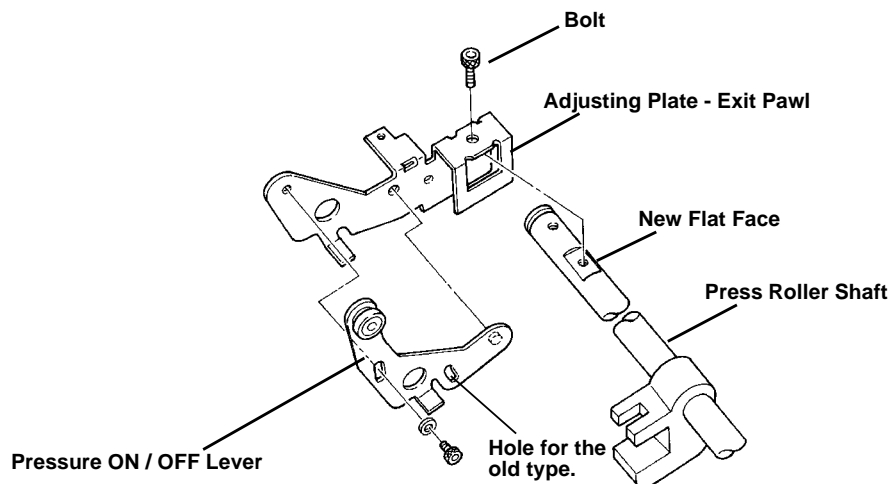
APPLICABLE MODEL: VT3600

SUBJECT: PARTS CATALOG UPDATE

GENERAL:

Due to parts standardization, the following parts have been changed:

1. **Press Roller Shaft** - A flat face has been added on the shaft as shown below.
2. **Adjusting Plate - Exit Pawl** - Due to the added flat face on the shaft, the Adjusting Plate is lowered by 2mm.
3. **Pressure ON / OFF Lever** - To prevent this part from moving out of position during operation, the distance between the two screw holes has been increased. The position of the screw holes on the Adjusting Plate side has also changed.



NOTE 1: The Pressure ON / OFF Lever is needed only when the optional A4 drum is used.

NOTE 2: The Pressure ON / OFF Lever can be installed with the old style Adjusting Plate (C2095570) because it has a screw hole for the old style Adjusting Plate.

NOTE 3: The Press Roller Shaft and Exit Pawl Adjusting Plate are fixed by a Bolt (05950140E) and are designed to prevent the Bolt from being broken due to excessive stress.

					REFERENCE	
OLD PART NO.	NEW PART NO.	DESCRIPTION	QTY	INT	PAGE	ITEM
C2095505	C2215505	Press Roller Shaft	1 → 1	3/S	37	13
C2095570	C2215570	Adjusting Plate - Exit Pawl	1 → 1	3/S	37	10
C2095573	C2215573	Pressure ON / OFF Lever	1 → 1	3/S	37	18

UNITS AFFECTED:

All VT3600 Priports manufactured after Serial Number C3265020001 will have the new style parts listed above installed during production.

Note: This copy intended as master of original for reproduction of additional bulletins.

COPY QUALITY
MECHANICAL
ELECTRICAL
PAPER PATH
F S M
PARTS
OTHER

BULLETIN NUMBER: VT3600 - 002

02/21/96

APPLICABLE MODEL: VT3600

SUBJECT: INK PUMP IMPROVEMENT

SYMPTOM:

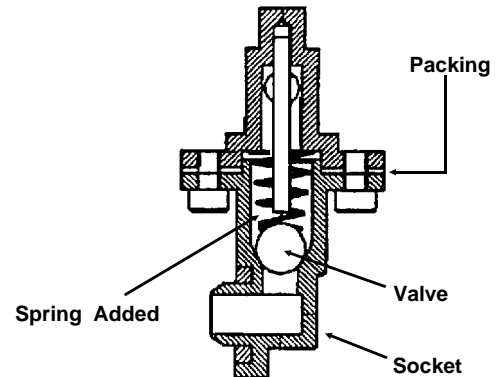
Not all of the ink is supplied from the ink cartridge.

CAUSE:

The small ball, which is used as a valve, is not pushed back properly.

PRODUCTION COUNTERMEASURE:

A spring has been added inside the ink pump to ensure the ball is pushed back as it should be.



PART NUMBER	DESCRIPTION	QTY	REFERENCE	
			PAGE	ITEM
C2244710	Pump Spring - 21mm	1	49	32*
C2244715	Packing	1	49	33*
C2004826	Pump Rubber	1	49	34*

* DENOTES NEW ITEM

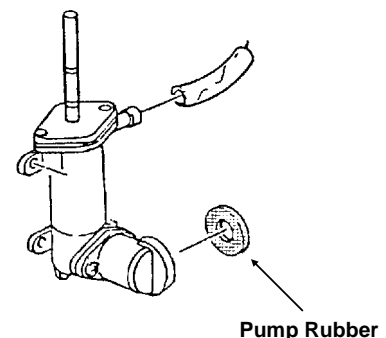
UNITS AFFECTED:

All VT1800 Priports manufactured from October '95 (C3265100001) will have the Pump Spring added during production.

FIELD COUNTERMEASURE:

Install the Pump Spring (C2244710) after removing the socket (2 screws).

- NOTE:**
1. When you remove the socket, ink will leak out. Make sure to place absorbent material under the work area prior to disassembling the ink pump.
 2. There is a packing (gasket) (C2004827) between the socket and the housing (see illustration above). If it is damaged, you may need to replace the packing, however, this normally is not necessary.
 3. The pump rubber (C2004826) is used to ensure that the nozzle of the ink cartridge tightly contacts the pump socket. Make sure that this part is not dislocated. The pump rubber used on the VT1730 and other later models is adhered by glue, however, it is not adhered on the older models.



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BULLETIN NUMBER: VT3600 - 002 REISSUE ★

06/28/96

APPLICABLE MODEL: VT3600

SUBJECT: INK PUMP IMPROVEMENT

SYMPTOM:

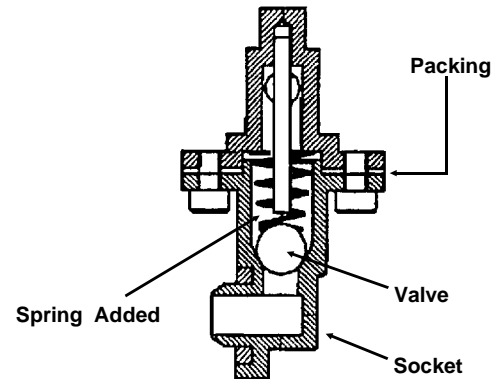
Not all of the ink is supplied from the ink cartridge.

CAUSE:

The small ball, which is used as a valve, is not pushed back properly.

PRODUCTION COUNTERMEASURE:

A spring has been added inside the ink pump to ensure the ball is pushed back as it should be.



			REFERENCE	
PART NUMBER	DESCRIPTION	QTY	PAGE	ITEM
C2224710	Pump Spring - 21mm	1	49	32*
C2004827	Packing	1	49	33*
C2004826	Pump Rubber	1	49	34*

* DENOTES NEW ITEM

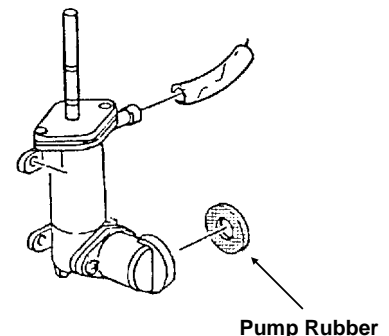
UNITS AFFECTED:

All VT1800 Priports manufactured from October '95 (C3265100001) will have the Pump Spring added during production.

FIELD COUNTERMEASURE:

Install the Pump Spring (C2224710) after removing the socket (2 screws).

- NOTE:**
1. When you remove the socket, ink will leak out. Make sure to place absorbent material under the work area prior to disassembling the ink pump.
 2. There is a packing (gasket) (C2004827) between the socket and the housing (see illustration above). If it is damaged, you may need to replace the packing, however, this normally is not necessary.
 3. The pump rubber (C2004826) is used to ensure that the nozzle of the ink cartridge tightly contacts the pump socket. Make sure that this part is not dislocated. The pump rubber used on the VT1730 and other later models is adhered by glue, however, it is not adhered on the older models.



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☐ PARTS

☐ OTHER

BULLETIN NUMBER: VT3600 - 003

06/28/96

APPLICABLE MODEL: VT3600

SUBJECT: MASTER EJECT BELT MODIFICATION

SYMPTOM:

Master eject jams occur frequently. In the worst case, the upper and lower master eject belts slip off the rollers.

CAUSE:

During the March, 1996 production, the vendor that produced the master eject belts was changed. The part numbers were not changed because there was no change in configuration. However, recently it was found that the new style master eject belts tend to stretch causing the above mentioned symptom.

SOLUTION:

The vendor has again been changed. The part numbers have been changed as follows:

					REFERENCE	
OLD PART NO.	NEW PART NO.	DESCRIPTION	QTY	INT	PAGE	ITEM
C2003545	C2193605	Upper Belt	5 → 5	1	73	28
C2003546	C2193606	Lower Belt	5 → 5	1	73	29

UNITS AFFECTED:

All VT3600 Priports manufactured after Serial Number C326604XXXX will have the new style Upper and Lower Belts installed during production.

INTERCHANGEABILITY CHART:

0	OLD and NEW parts can be used in both OLD and NEW machines.	2	NEW parts CAN NOT be used in OLD machines. OLD parts can be used in OLD and NEW machines.
1	NEW parts can be used in OLD and NEW machines. OLD parts CAN NOT be used in NEW machines.	3	OLD parts CAN NOT be used in NEW machines. NEW parts CAN NOT be used in OLD machines.
3/S	Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or previously modified, use the new part numbers individually.		

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BULLETIN NUMBER: VT3600 - 004

09/04/96

APPLICABLE MODEL: VT3600

SUBJECT: LOOSE SOCKET SCREW / BROKEN EXIT PAWL

SYMPTOM:

1. The drum unit cannot be removed.
2. The machine operates out of time which breaks the exit pawl.

CAUSE:

1. The Socket Screw (05940060E) which secures the Pressure ON/OFF Lever comes loose due to over-tightening or machine vibration.
2. If the machine is operated with the Socket Screw loose, the screw breaks causing the out of time condition.

SOLUTION:

Install a Lock Washer and Locktite adhesive to the Socket Screw (05940060E).

			REFERENCE	
PART NUMBER	DESCRIPTION	QTY	PAGE	ITEM
07030040G	Lock Washer	1 → 1	37	119*

* DENOTES NEW ITEM

UNITS AFFECTED:

All VT3600 Priports manufactured after Serial Number C318508XXXX will have the Lock Washer and Locktite applied during production.

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RICOH TECHNICAL SERVICE BULLETIN

CUSTOMER SERVICE GROUP

BULLETIN NUMBER: VT3600/3800 - 005

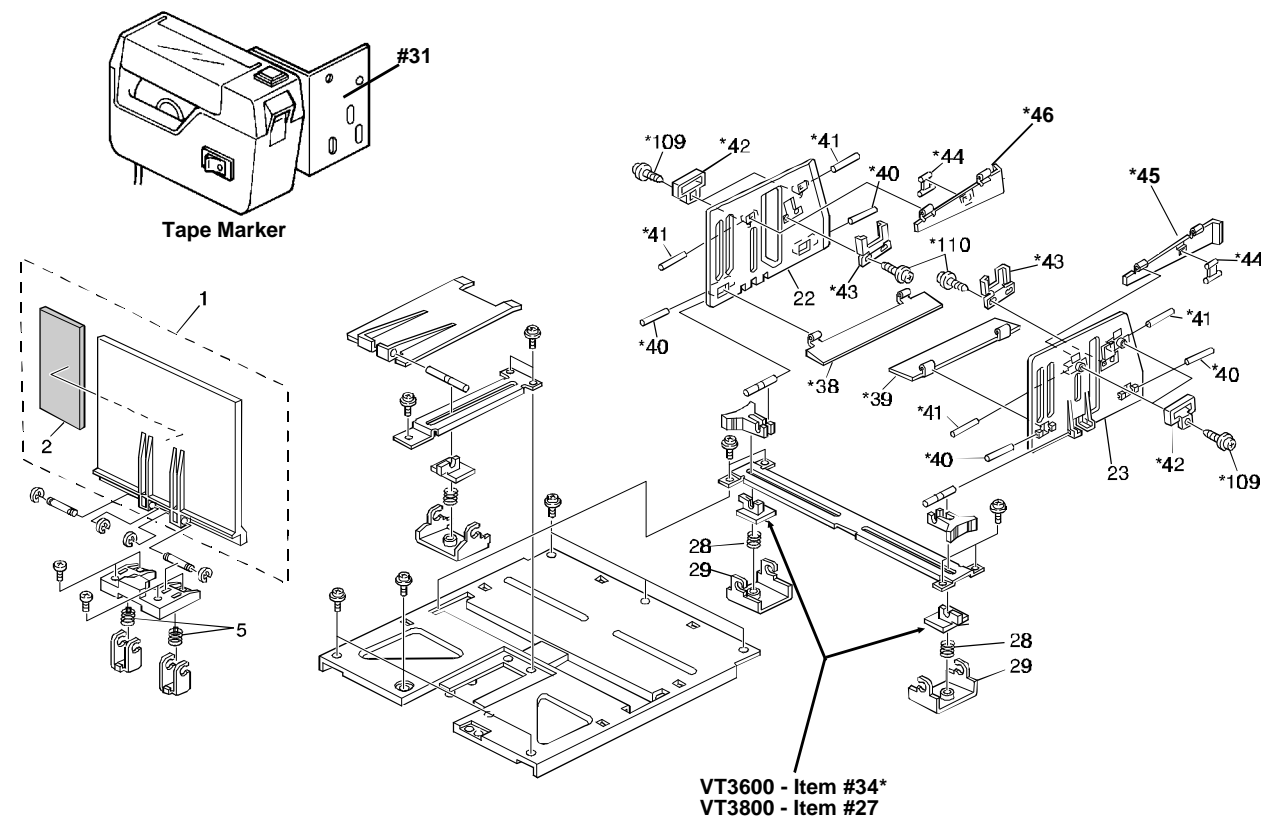
09/27/96

APPLICABLE MODEL: VT3600/3800

SUBJECT: PAPER DELIVERY TABLE

GENERAL:

To stack the copies more evenly on the Paper Delivery Table, some of the component parts have been changed. Due to these changes, the optional Tape Marker Bracket has also been changed. This information should be incorporated into all existing VT3600/3800 Parts Catalog documentation.



INTERCHANGEABILITY CHART:

0	OLD and NEW parts can be used in both OLD and NEW machines.	2	NEW parts CAN NOT be used in OLD machines. OLD parts can be used in OLD and NEW machines.
1	NEW parts can be used in OLD and NEW machines. OLD parts CAN NOT be used in NEW machines.	3	OLD parts CAN NOT be used in NEW machines. NEW parts CAN NOT be used in OLD machines.
3/S	Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or previously modified, use the new part numbers individually.		

Continued...

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☒ PARTS

☐ OTHER

OLD PART NO.	NEW PART NO.	DESCRIPTION	QTY	INT	REFERENCE		
					PAGE		ITEM
					VT3600	VT3800	
	C2196150	Delivery Table Unit (VT3600)	0 → 1		45	-	*
C2226101	C2226271	Delivery Table (VT3800)	1 → 1	1	-	45	*
C2096159	C2276159	End Fence Spring - Large	2 → 2	1	45	45	5
C2096181		Front Guide Plate	1 → 0		45	45	23
	C2276147	Front Guide Fence	0 → 1	2	45	45	23
C2096182		Rear Guide Plate	1 → 0		45	45	22
	C2276146	Rear Guide Fence	0 → 1	2	45	45	22
C2096142		Guide Fence Slider (VT3600) Guide Fence Slider (VT3800)	3 → 1 2 → 0		45	45	16 27
	C2276142	Guide Fence Slider (VT3600) Guide Fence Slider (VT3800)	0 → 2 2 → 2	1	45	45	34* 27
C2096149	C2276157	Guide Fence Spring	2 → 2	1	45	45	28
C2096145	C2276145	Guide Fence Bracket	2 → 2	1	45	45	29
C2096184	C2276184	End Fence	1 → 1	1	45	45	1
C2096156		Sponge Seal - 4.5 x 65 x 175	2 → 0		45	45	2
	C2276196	End Fence Cushion	0 → 1	2	45	45	2
	C2276166	Lower Guide - Rear Fence (A4)	0 → 1		45	45	38*
	C2226166	Lower Guide - Rear Fence (LT)	0 → 1		45	45	38*
	C2276167	Lower Guide - Front Fence (A4)	0 → 1		45	45	39*
	C2226167	Lower Guide - Front Fence (LT)	0 → 1		45	45	39*
	C2276155	Lower Guide Shaft	0 → 4		45	45	40*
	C2276156	Upper Guide Shaft	0 → 4		45	45	41*
	C2276158	Guide Stopper	0 → 4		45	45	42*
	C2276160	Upper Guide Spring Plate	0 → 2		45	45	43*
	C2276162	Upper Guide Link	0 → 2		45	45	44*
	C2276172	Upper Guide - Front Fence	0 → 1		45	45	45*
	C2276173	Upper Guide - Rear Fence	0 → 1		45	45	46*
	04504008W	Philips Tapping Screw - M4 x 8	0 → 4		45	45	109*
	04503008W	Philips Tapping Screw - M3 x 8	0 → 4		45	45	110*
C5322004	C5322111	Tape Marker Bracket	1 → 1	1	3	3	31

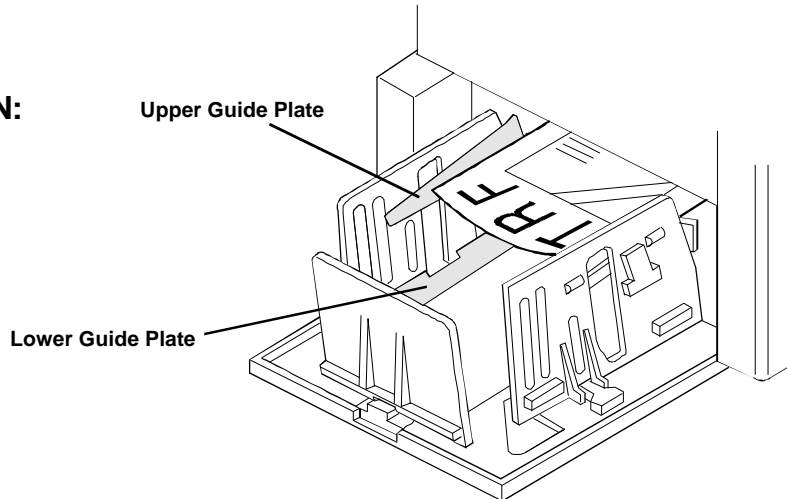
* DENOTES NEW ITEM

Continued...

UNITS AFFECTED:

All VT3600/3800 Priports manufactured from June 1996 will have the new style Paper Delivery Table installed during production.

ADDITIONAL INFORMATION:



1. The copies are more evenly stacked on the table due to the newly added small guide plates on the upper portion of both the front and rear side fences. Both edges of the copy are guided by the small guide plates as the copy is fed out. The copy is then correctly directed to the end plate for stacking.

The end plate is also new. The material and configuration of the cushion have been changed. The new end plate better receives the copies for stacking. The 2nd end plate, which is for the smaller sized paper, remains the same.

The other small guide plates, which are also provided on the bottom of each side fence, can hold the copies in the center of the table while the copies are stacked on the bottom of the table.

This feature is more beneficial when thinner paper is used.

2. To prevent the side fences and end fence of the paper delivery table from being pushed and spread outwards while the copies are stacked, the springs that hold those fences straight-up have been strengthened. This also helps the copies to stack evenly.

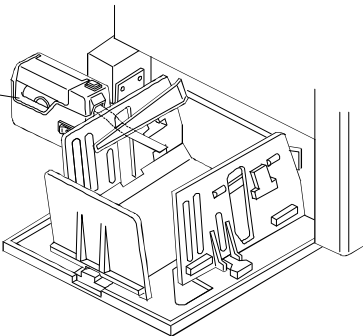
OPERATION TIPS FOR THE NEW PAPER DELIVERY TABLE

1. It is recommended to use the upper small guide plates when thin or normal paper (20 lbs or less) is used. For thicker paper, close the guide plates. If the paper is too thick, it tends to be caught by the upper guide plates. Thick paper can be stacked evenly without using the upper guide plates.
2. The paper stack capacity of the table is around 750 sheets when the upper small guide plates are used. This varies depending on paper types. Close the guide plates to achieve the maximum paper stack capacity.
3. When you store the paper delivery table, you must first close the upper small guide plates.

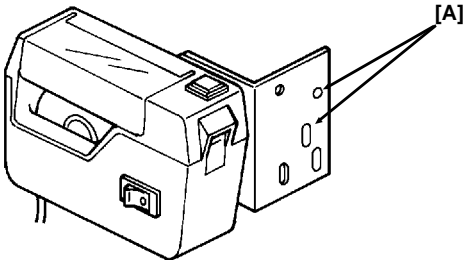
Continued...

4. The optional Tape Marker can be used for up to 500 sheets (this varies depending on paper types). When the old paper delivery table was used, the Tape Marker's capacity was around 750 sheets. This is because the position of the Tape Marker has been slightly lowered to prevent the dispensed tape from touching the added guide plate.

Tape Marker



5. As mentioned above, because of the new delivery table, the position of the Tape Marker has been slightly lowered. To use an older Tape Marker with the new Paper Delivery Table, a new bracket is necessary (see part chart on page 2). The new bracket has an additional hole. Install the Tape Marker using the holes [A] as shown below.



6. Since freshly printed sheets are stacked on the bottom of the delivery table, the ink on the top cop of the stack tends to be transferred to the reverse side of the next fed-out copy. This is referred to as "ink set-off". Especially with the new paper delivery table, this is likely to occur on the middle portion of the copy. This is because the small guide plates tend to buckle the paper downward in the center.

To correct this problem in the field, reduce the thermal head energy using SP35. Set it to -17%. On the production machines, the software has been modified. The default of SP35-1 (Head Energy Adjustment for Normal Mode) has been changed from -7% to -17%.

Applicable Models	Old P/N of the ROM	New P/N of the ROM	Notes
VT3800	C223 8045D	C223 8059 (Check Sum:423H)	The suffix has been advanced for the main control board (C2238042G→ H).
	C223 8047	C223 8061 (Check Sum:EFDH)	There are two ROM's on the main control board, and the old and new ones are interchangeable as a set only.

UNITS AFFECTED:

All VT3800 Priports manufactured from the June 1996 will have the new software installed during production.

BULLETIN NUMBER: VT3600/3800 - 006

10/15/96

APPLICABLE MODEL: VT3600/3800

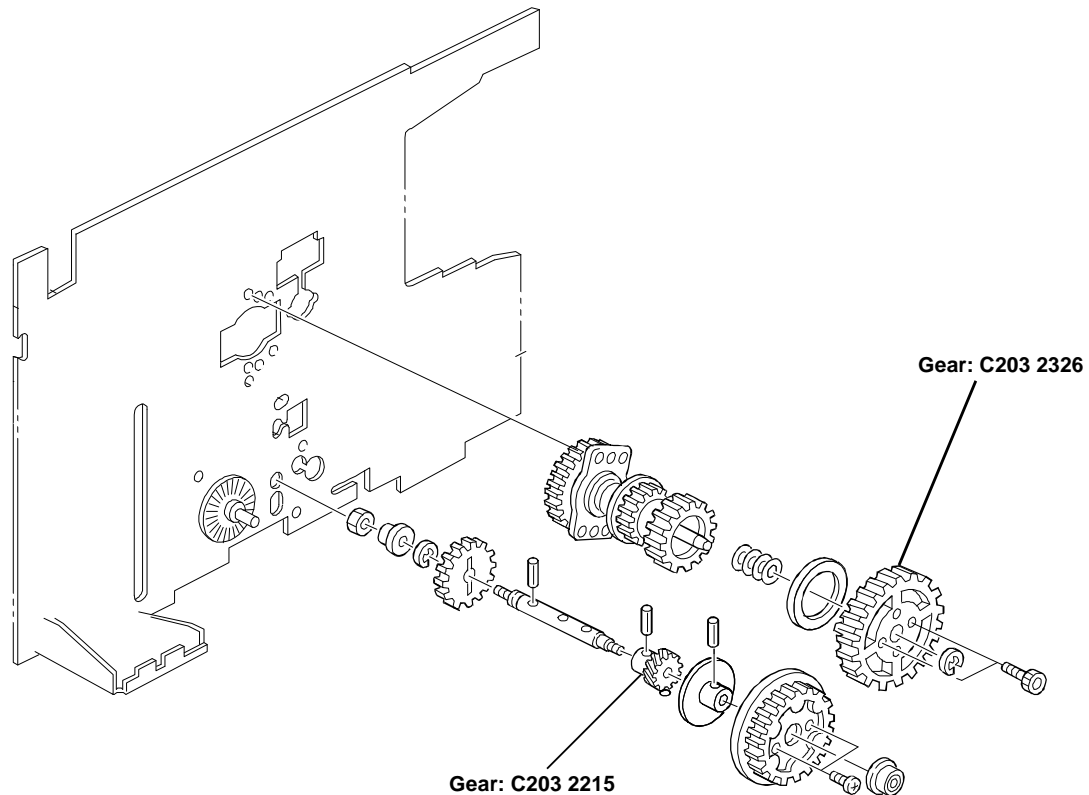
SUBJECT: MAIN DRIVE GEAR

SYMPTOM:

The gears shown below wear out prematurely. This is especially true of gear C2032215 which wears out after approximately 30,000 to 50,000 copies.

CAUSE:

It was found that these gears can rapidly wear out if they are not greased. It was also determined that a percentage of machines manufactured from the end of 1994 to April of 1995 had an insufficient amount of grease applied to these gears during production.



FIELD COUNTERMEASURE:

Inspect these gears and lubricate as necessary. Also, lubricate these gears whenever they are repaired and at yearly PM intervals as mentioned in the service manual.

PRODUCTION COUNTERMEASURE:

From May 1995, an inspection process was added to ensure these gears are properly lubricated during production.

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BULLETIN NUMBER: VT3600/3800 - 007

10/15/96

APPLICABLE MODEL: VT3800

SUBJECT: PAPER FEED JAMS**SYMPTOM:**

Paper does not reach the Second Feed Roller resulting in a jam. This is especially likely for the first feeding sheet or the trial print that is always made after making a new master.

CAUSE:

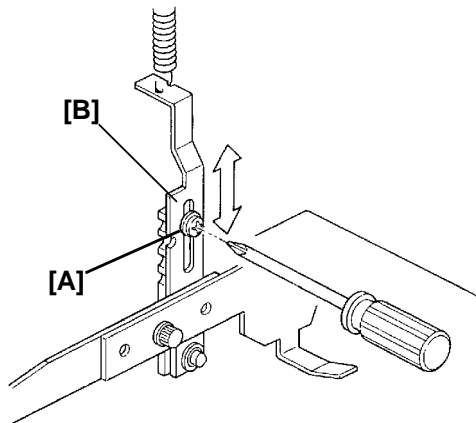
The Paper Feed Roller pressure is too low. It was found that on the production line the pressure adjustment was performed improperly for some units.

NOTE: *This problem applies to the VT3800 model only.*

SOLUTION:

From June 1996, the pressure adjustment has been corrected on the production line. If the above problem occurs in the field, re-adjust the paper feed roller pressure as follows:

1. Check the original position first, then loosen the screw [A] while holding the lower adjustment plate [B].
2. Shift the lower adjustment plate [B] up by one notch to increase the Paper Feed Roller pressure. Then, re-tighten the screw [A].



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BULLETIN NUMBER: VT3600/3800 - 008

10/15/96

APPLICABLE MODEL: VT3800

SUBJECT: PAPER TABLE DRIVE ERROR (E-02)**SYMPTOM:**

The Paper Feed Table is not driven. Service code E-02: (Paper Table Drive Error) is displayed.

CAUSE:

The DC motor that drives the table occasionally generates electrical noise when it starts rotating. This electrical noise is input into the AC Drive Board and damages IC301 on the board.

The electrical noise tends to be generated when the motor is still new. While the motor turns, the brushes inside are not yet worn in and this can cause electrical noise to occur.

Since a DC motor of this type is used on the VT3800 model only, this problem does not occur on the other PRIPORT models.

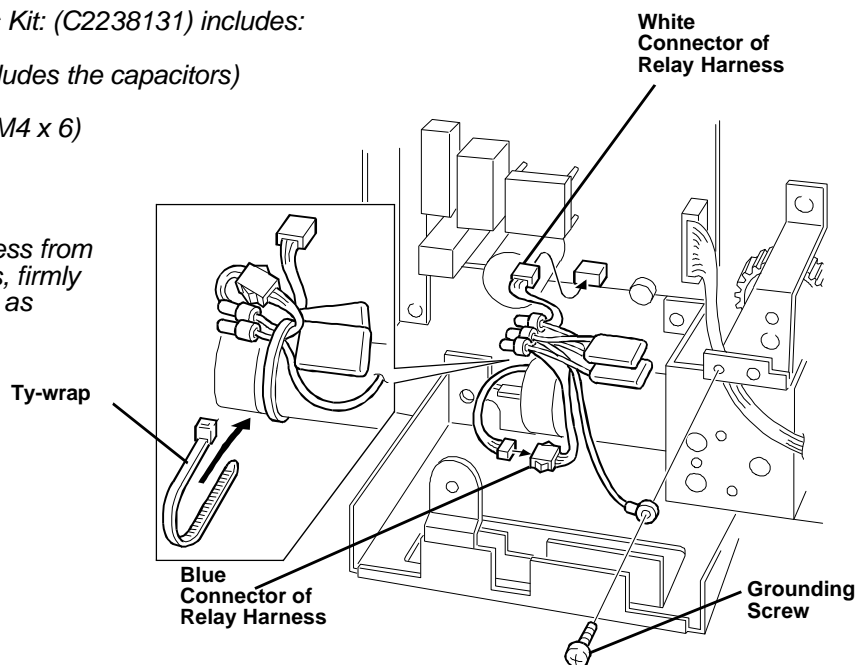
FIELD COUNTERMEASURE:

For the field units, the Motor Relay Harness Kit has been registered as a service part (C2238131). Install the kit as shown below.

NOTE: The Motor Relay Harness Kit: (C2238131) includes:

- One Relay Harness (includes the capacitors)
- One Ty-wrap
- One Grounding Screw (M4 x 6)

NOTE: To prevent the relay harness from being caught by the gears, firmly secure it with the Ty-wrap as shown in the illustration.

**PRODUCTION COUNTERMEASURE:**

To prevent the electrical noise from being generated, a harness which contains two capacitors will be installed between the AC Drive Board and DC motor from the August 1996 production.

BULLETIN NUMBER: VT3600/3800 - 009

10/15/96

APPLICABLE MODEL: VT3600/3800

SUBJECT: INK ON LEADING EDGE OF COPIES**SYMPTOM:**

During a long printing run, ink appears at the leading edge of copies. At first, it is very hard to see, but it becomes more visible as the printing continues.

CAUSE:

Due to rough paper edges, the master becomes damaged.

Just when the leading edge of the paper is positioned under the drum, it is pressed against the drum surface, so that the master is wrapped around by the press-roller. Due to this repeated action, the master's surface, where the paper leading edge contacts, is gradually torn.

Also, if the paper generates a lot of paper dust, it is accumulated on the press-roller surface and damages the master in the same manner.

Normally, even if the master is damaged, ink does not exist around the area beneath the master where the paper leading edge contacts (there are no holes in the metal screen). However, after a long printing run, ink leaks onto this area and is transferred to the paper through the damaged part of the master.

SOLUTION:

1. Change the paper type. Re-setting the paper on the paper feed table up side down so that the rough edge of the paper faces downward may also solve the problem.
2. Change the image position on the paper slightly using the IMAGE SHIFTING key before the leading edge of the paper becomes dirty with ink.
3. Cover the leading edge part of the cloth screen on the drum with tape, so that ink does not leak even when the master is damaged. See page two (2) for installation instructions for the tape.

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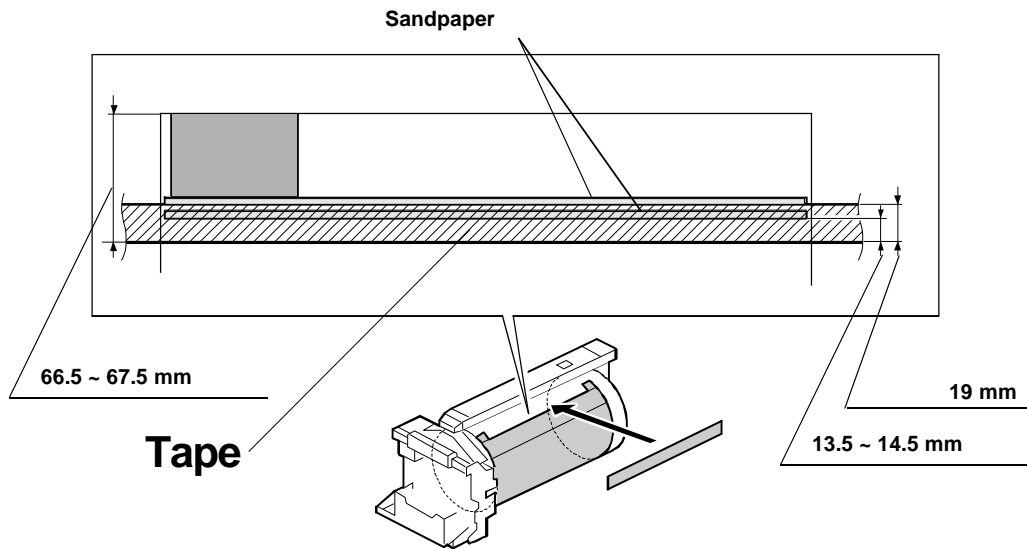
□ PARTS

□ OTHER

Continued...

Installation Instructions:

- It is recommended to use: **Teflon Tape - 19 mm: A0129112**
- The position of the tape has been determined to maintain the specified leading edge blank margin (8 mm for the VT3600 and 5 mm for the VT3800) for copies.
- Even after installing the tape, the same problem may occur if the leading edge registration of copies is not adjusted properly (if the paper feed timing is delayed). First check that the leading edge registration of copies is OK. If it is out of specification, follow the "SECOND FEED ROLLER START TIMING" adjustment procedure in the Service Manual.
- Strips of sandpaper are used on the leading edge portion of the cloth screen. This prevents the master wrapped around the drum from slipping out of the master clasper due to the repeating press-roller on/off action. Avoid covering all the sandpaper when you install the tape. However, to adhere the tape firmly, some area of the sand paper should be covered.
- Even if the sandpaper is not used on the cloth screen (the old type cloth screen), install the tape at the same position by measuring the distance from the edge of the cloth screen. Refer to the distance between the edge of the screen and the sand paper, which is described below.

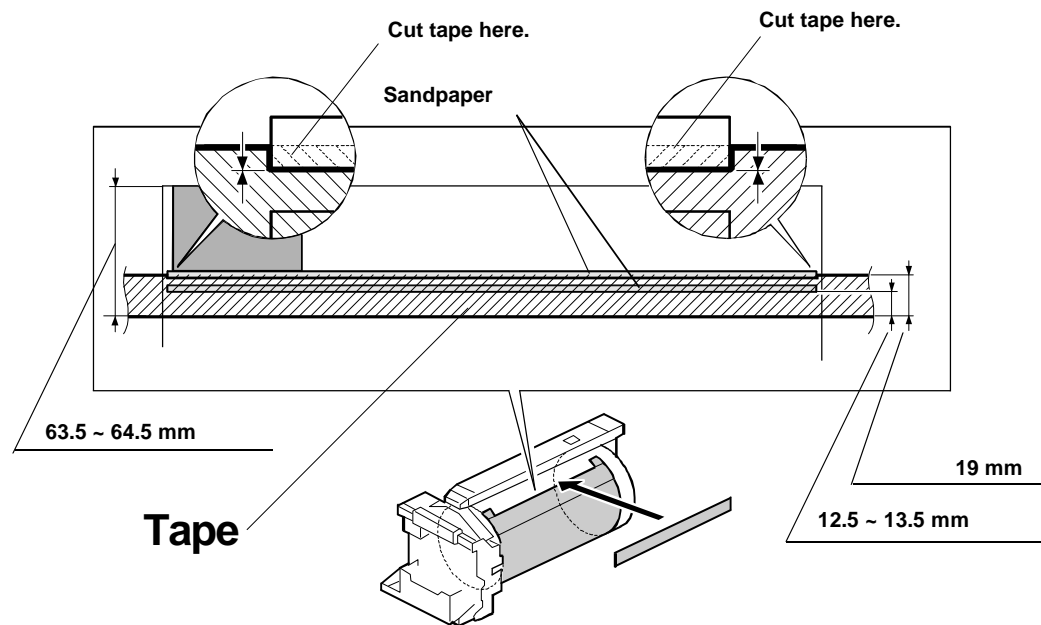


Remarks for the VT3600

- The position of the tape is slightly different for the VT3600 and VT3800 models since the specification of the leading edge blank margin is different. The position of the sandpaper is also different. The upper edge of the tape should meet between the two strips of sandpaper.
- Cut both edges of the tape at the edge of the metal screen. Do not let the tape ride over the drum flanges.
- Even if the sandpaper is not used on the cloth screen (the old type cloth screen), install the tape at the same position by measuring the distance from the edge of the cloth screen to the lower edge of the tape (between 66.5 and 67.5 mm).
- Since the specification of the leading edge blank margin for the VT3600 is 8 mm, it is permissible to install the tape 2 mm lower than the position indicated above (VT3600 only).

Continued...

Remarks for the VT3800



- Cut the tape where it covers the upper strip of sandpaper as shown. Be careful not to damage the **db** screen surface.
- Cut both edges of the tape at the edge of the metal screen. Do not let the tape ride over the drum flanges.

BULLETIN NUMBER: VT3600/3800 - 010

04/14/97

APPLICABLE MODEL: VT3800

SUBJECT: SERVICE MANUAL - INSERT

GENERAL:

The Service Manual page(s) listed below must be replaced with the page(s) supplied. Each bulletin package contains 1 set of replacement pages.

PAGES:

The revised areas have been highlighted by an arrow ⇒

- 5-29 Updated Information

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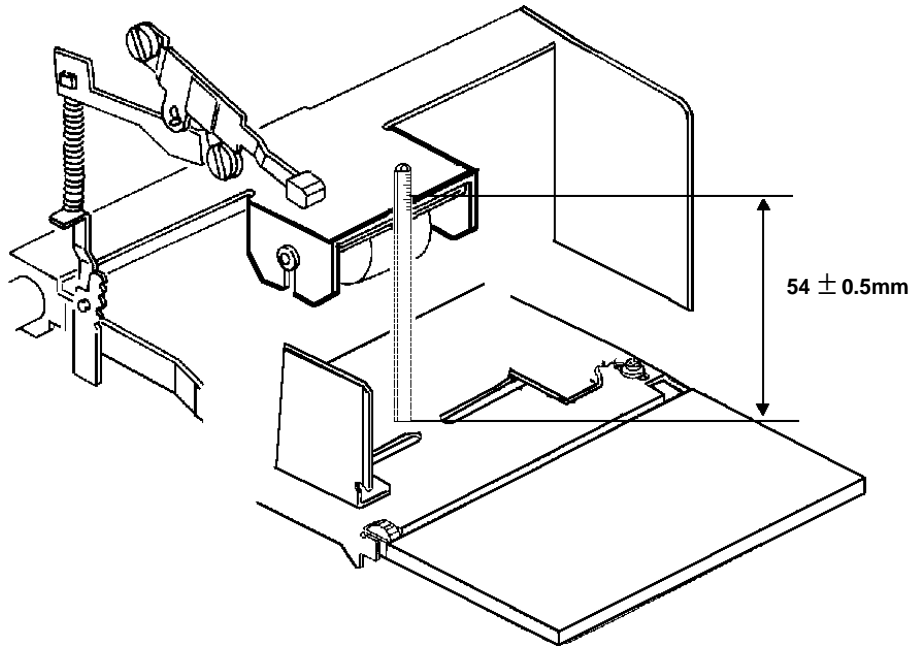
☐ ELECTRICAL

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Purpose: To ensure smooth paper feed.

Adjustment Standard: $54 \pm 0.5 \text{ mm}$

1. Set the paper feed pressure adjusting lever [A] to the upper position.
2. Remove the right cover of the machine (5 screws).
3. Turn on the main switch and access the service program mode.
4. Select output check mode (SP131) No. 19, and press the Print Start key to raise the table.
5. After the paper table stops, Ensure that the distance between Paper Table and the top of the Feed Roller Holder is $54 \pm 0.5 \text{ mm}$.
6. If it is not, loosen the screw [C] and adjust the position of the actuator [D].
7. After adjusting, repeat step 5 by lowering the paper table (use output No.18) and raising the paper table (use output No. 19) several times, checking the height each time.

NOTE: When mounting the actuator, ensure that the actuator [D] does not touch the paper table height sensor [E].

BULLETIN NUMBER: VT3600/3800 - 011

7/29/97

APPLICABLE MODEL: VT3600/3800

SUBJECT: FIELD SERVICE MANUAL - INSERT

GENERAL:

The Field Service Manual page(s) listed below must be replaced with the page(s) supplied. Each bulletin package contains 1 set of replacement pages.

PAGES:

The revised areas, listing the major differences between the VT3600 and the VT3800, have been highlighted by an arrow ⇒

- | | |
|---------------|------------------------|
| • 1-17 | Additional Information |
| • 2-2 | Additional Information |
| • 2-18 | Additional Information |
| • 2-21 ~ 2-22 | Additional Information |
| • 2-30 | Additional Information |
| • 2-65 | Additional Information |
| • 2-71 | Additional Information |
| • 3-6 ~ 3-7 | Additional Information |
| • 5-16 | Additional Information |
| • 5-19 | Additional Information |
| • 7-5 | Additional Information |
| • 8-5 | Additional Information |

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BULLETIN NUMBER: VT3600/3800 - 012

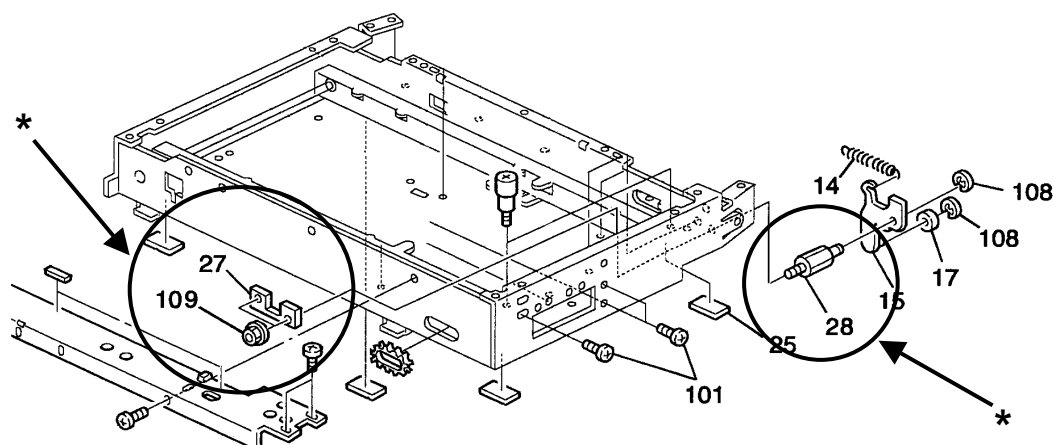
03/17/98

APPLICABLE MODEL: VT3600

SUBJECT: SUPPORT PLATE / SCANNER STOPPER SHAFT

GENERAL:

These parts were missing from Parts Catalog. Please add the following parts to your VT3600 Parts Catalog.



NEW PART NO.	DESCRIPTION	QTY	REFERENCE	
			PAGE	ITEM
C2183021	Support Plate	1	63	27 *
C2183022	Scanner Stopper Shaft	1	63	28 *
07130050B	Hexagon Nut - M5	2	63	109 *

*** DENOTES NEW PART**

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BULLETIN NUMBER: C218/C223/C228 - 001

06/25/98

APPLICABLE MODEL:
GESTETNER - 5390
RICOH - VT6000
SAVIN - 3400DNP

The chart listed below shows the Last Bulletin Number issued for the C218/C223/C228 series.

Bulletin Cross Reference	
Ricoh Group Companies	Last Bulletin No.
Gestetner	GCP #68
Ricoh	012
Savin	002

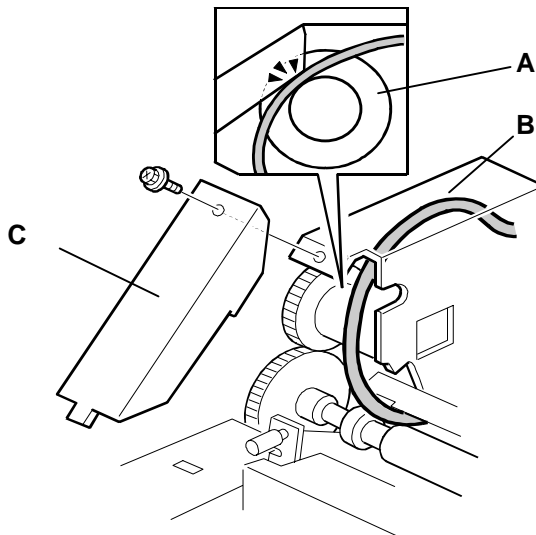
SUBJECT: MASTER FEED JAMMING

SYMPTOMS:

1. The master jams during feed at location C.
2. The length of the master that wraps around the Drum is shorter than normal. This causes a Master Eject Jam "F" when ejecting during the making of the next master. The jam occurs because the Master Eject Rollers cannot catch the trailing edge of the master on the drum.

CAUSE:

There is a Torque Limiter [A] which is built into the gear on the Upper Master Feed Roller. If the Wire Harness [B] from the Cutter Unit is routed improperly when the Gear Cover [C] is installed, the Gear Cover may catch and press the Wire Harness against the sleeve of the Torque Limiter. If this occurs, the rotation of the Upper Master Feed Roller is interfered with and the above symptoms may occur.



NOTE: The Torque Limiter is used on the C228 only, and this symptom does not occur on the C218 or C223.

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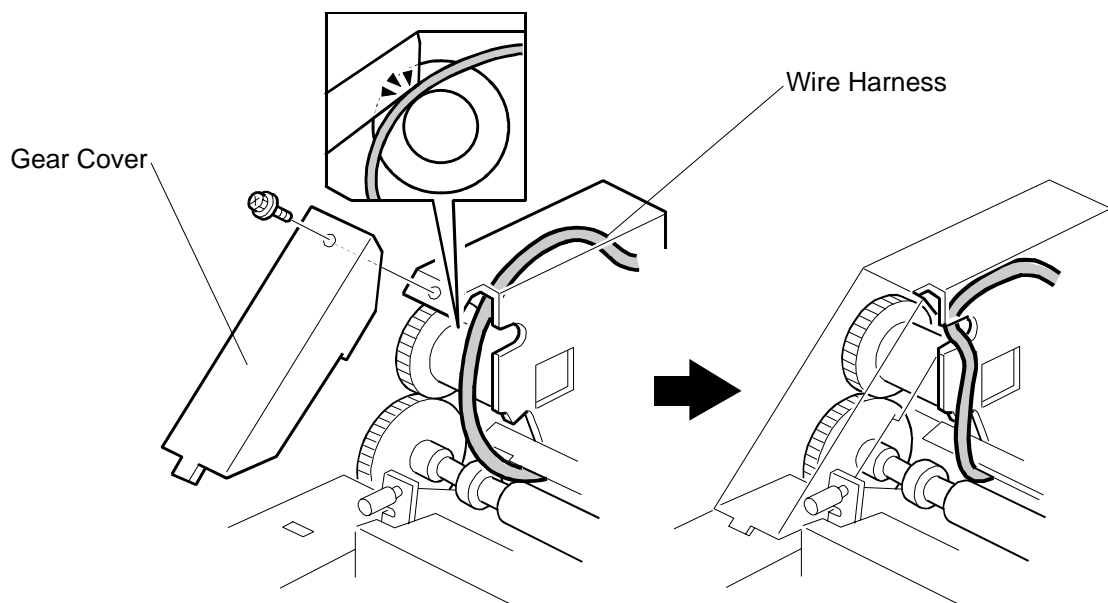
MECHANICAL

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SOLUTION:

When you reinstall the Gear Cover, be sure to install the Wire Harness from the Cutter Unit as shown below.

NOTE: The Gear Cover is removed when you remove the Thermal Head or Platen Roller.



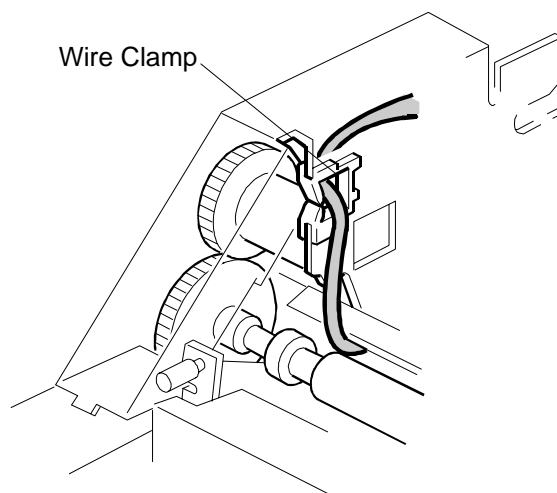
GENERAL:

This area has been inspected starting from the February 1998 production.

From the April 1998 production, a Wire Clamp has been installed on the Plotter Unit Frame to position the wire, as shown to the right. (The part number of the Frame remains the same although the cutout for the Clamp has been added.)

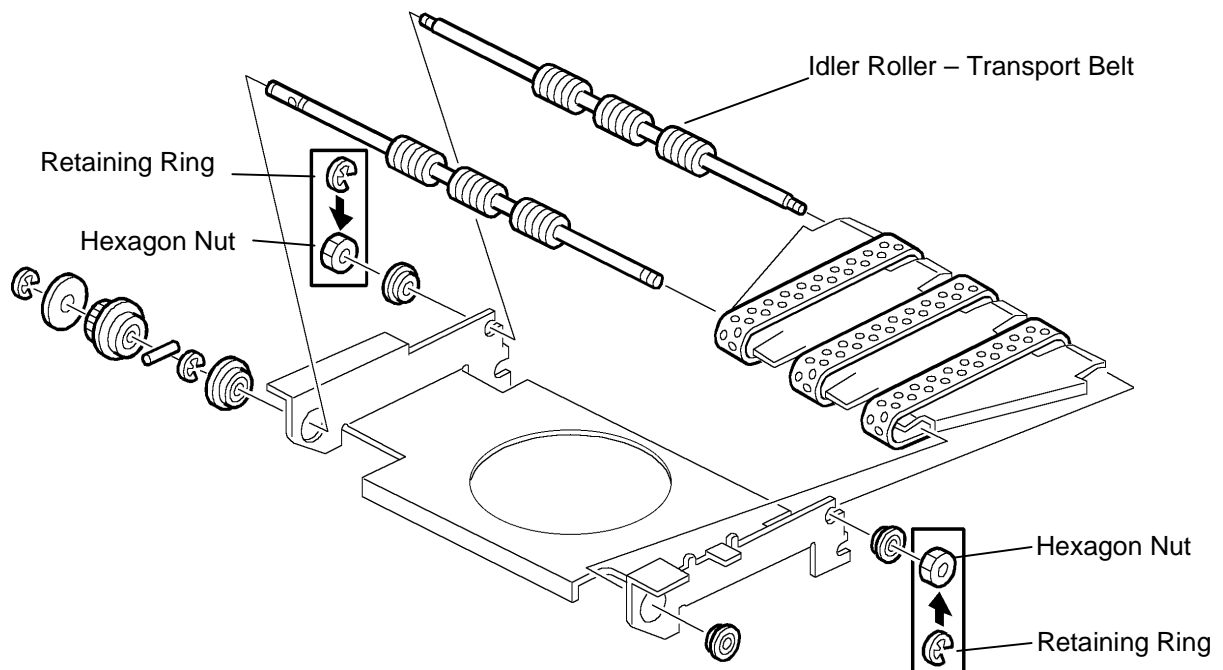
UNITS AFFECTED:

C228 Serial Number cut-in not available at time of publication.



BULLETIN NUMBER: C210/C218/C223/C228 - 002
07/01/98
APPLICABLE MODEL:
GESTETNER – 5375/5380/5385
RICOH – VT3500/3600/3800
SAVIN – 3300DNP
SUBJECT: PAPER DELIVERY ROLLER
GENERAL:

Due to parts standardization, the Idler Roller used in the Paper Delivery Vacuum Unit has been modified. Both ends of the Idler Roller shaft have been threaded to accept Hexagon Nuts – M6 instead of Retainer Rings – M4. The new style Idler Roller removes any thrust play between the Roller Shaft and the Bearings. The new style Idler Roller will also improve durability. The following parts updates are being issued for all C210, C218 and C223 Parts Catalogs.



					REFERENCE				
OLD PART NO.	NEW PART NO.	DESCRIPTION	QTY	INT	PAGE		ITEM		
					C210	C223/ C218	C210	C223	C218
C2096019	C2236019	Idler Roller - Transport Belt	1 → 1	3	37	39	1	1	1
07200040Z		Retaining Ring - M4	2 → 0		37	39	101	101	101
	07120060Z	Hexagon Nut - M6	0 → 2	3	37	39	*111	*112	*110

* Denotes new item.

Continued...

UNITS AFFECTED:

All units manufactured after the Serial Numbers listed below will have the new style Idler Rollers installed during production.

MODEL NAME	SERIAL NUMBER
Gestetner 5375	Service Parts Only
Gestetner 5380	Service Parts Only
Gestetner 5385	A147070001
Ricoh VT3500	Service Parts Only
Ricoh VT3600	Service Parts Only
Ricoh VT3800	C3437070001
Savin 3300DNP	S2238010001

INTERCHANGEABILITY CHART:

0	OLD and NEW parts can be used in both OLD and NEW machines.	2	NEW parts CAN NOT be used in OLD machines. OLD parts can be used in OLD and NEW machines.
1	NEW parts can be used in OLD and NEW machines. OLD parts CAN NOT be used in NEW machines.	3	OLD parts CAN NOT be used in NEW machines. NEW parts CAN NOT be used in OLD machines.
3/S	Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or previously modified, use the new part numbers individually.		

BULLETIN NUMBER: C210/C218/C223/C228 - 003**11/25/98****APPLICABLE MODEL:****GESTETNER - 5375/5380/5385/5390****RICOH - VT3500/3600/3800/6000****SAVIN - 3300DNP/3400DNP****SUBJECT: ENVELOPE FEEDING ENHANCEMENT****GENERAL:**

The C228 has an advantage over the C223 because of its ability to feed envelopes. This bulletin supplies information for the C223 improvement of envelope feeding using parts from the C228.

Feeding Envelopes On The Copy Printer/Digital Duplicator/Priport Product Line:

Significant differences in materials and manufacturing processes are used in the production of envelopes. Different sizes, paper weights, surface texture, glues and equipment are used in their construction. Packaging, shipping and storage conditions also combine to further increase the variables. In addition, the paper in an envelope is folded over itself 2 or 3 times, small variances in materials and construction are magnified. It is for these reasons envelopes from one manufacturer may differ greatly from another manufacturer, although they have the same published specifications. Differences may also exist between similar envelopes from the same manufacturer, or even in different lot numbers of the same envelope. Due to the large amount of variables, Ricoh/Savin/Gestetner has determined that the dependability of feeding envelopes can not be guaranteed.

As with other imaging applications, orientation and feed settings must be predetermined in order to provide optimal performance. We recommend no more than 100 envelopes be stacked in the feed tray at one time. Due to the stiffness of envelopes, we recommend checking the master for nicks after 100 impressions. An indication of a nicked master is ink marks on the lead edge of the envelope.

Enhancement and Limitations Details:

The C228 uses the registration sensor (photocoupler) to strictly control paper feed timing. Consequently, the C228 uses paper feed cams that are different from those of the C223 (The paper feed timing and speed are slightly different from each other).

This enhancement contains parts from the C228 paper feed system, however it does not contain the paper feed cams used in the C228. Therefore, the paper feed performance of the enhanced C223 does not exactly match the C228.

By following the procedure recommended in this bulletin, an enhanced C223 should have an advantage in performance when feeding envelopes, compared with the original paper feed system.

The enhanced paper feed system may have a little more fluctuation in the paper registration depending on the type of paper. However, this will not occur with most types of paper, and differs only slightly from the original system.

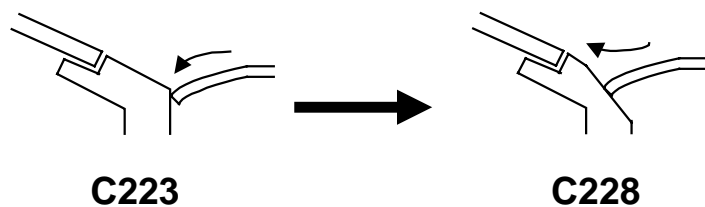
**■ PARTS****■ GENERAL
INFORMATION**

Note: This copy is intended as a master original
for reproduction of additional bulletins.

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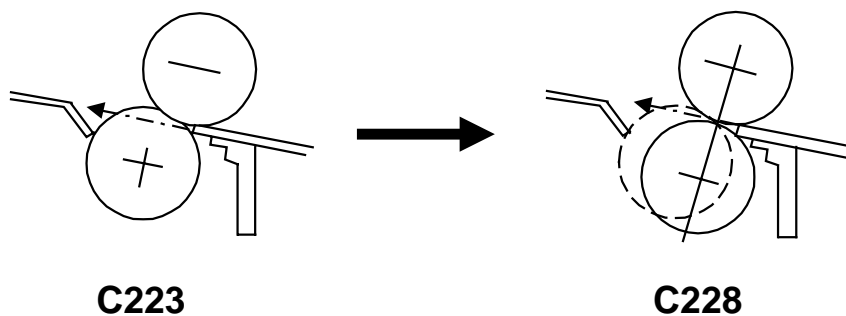
Details of Feed System Differences:

1. Separation Plate and Front Side Plate:



The shape of the Separation Plate and front side plate is different. The C228 type can prevent the leading edge of the paper (envelopes) from hitting against the corner of the plates and guides the paper more smoothly.

2. Right and Left Separation Arms:



The C228 (in combination of the right and left arms) moves The Lower Separation Roller to the paper table side. Thus, the paper (envelopes) can enter between the (upper) feed roller and Lower Separation Roller.

3. Lower Guide Plate:

Since the position of the lower separation roller changes, this part must be replaced.

4. Paper Feed Roller Core:

The C228 is longer, in order to enable the two rubber Feed Rollers on the shaft to be positioned at a distance. (For the C223, the rollers are closely positioned, side by side.)

5. Torque Limiter and Pick-up Roller Shaft:

Since the C228 paper feed roller core is heavier, the torque limiter (a coil spring) requires a stronger tension. The pick-up roller shaft must be modified to use the torque limiter.

6. Paper Feed Balancing Weight:

Since the C228 paper feed roller core is heavier, the paper feed pressure (the pressure from the pick-up roller against the paper stack) increases. This can cause multiple sheets feeding. To improve the paper feed pressure, remove one sheet of the balancing weight (C2015073) on the top of the bracket holding the Pick-Up Roller. (There are originally three sheets of the balancing weights are used in the C223.)

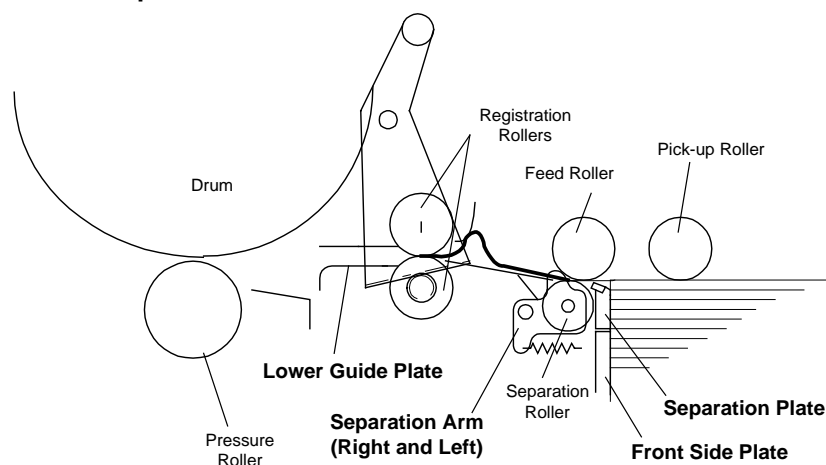
Continued...

Parts Required for the Enhancement Procedure:

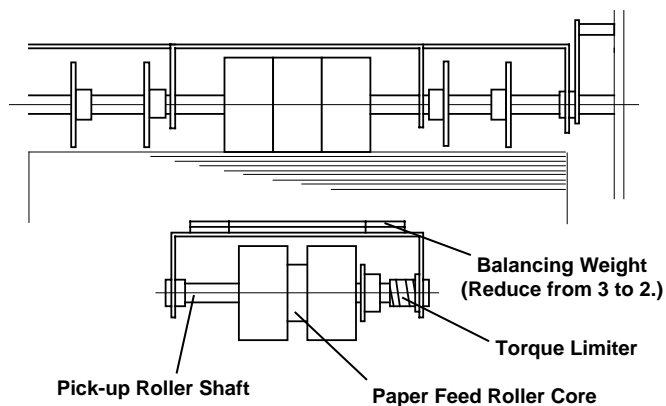
Description	Part Number
1. Front Side Plate	C228 5016
2. Separation Plate	C228 5018
3. Paper Feed Roller Core.....	C228 5033
4. Right Separation Arm	C228 5061
5. Left Separation Arm.....	C228 5062
6. Pick-up Roller Shaft.....	C203 5043
7. Torque Limiter - Paper Feed Roller	5507 6038
8. Lower Guide Plate	C228 5215
9. Balancing Weight (Remove one of three)	C201 5073

For the locations of each part, see diagrams below:

View From The Operator Side -

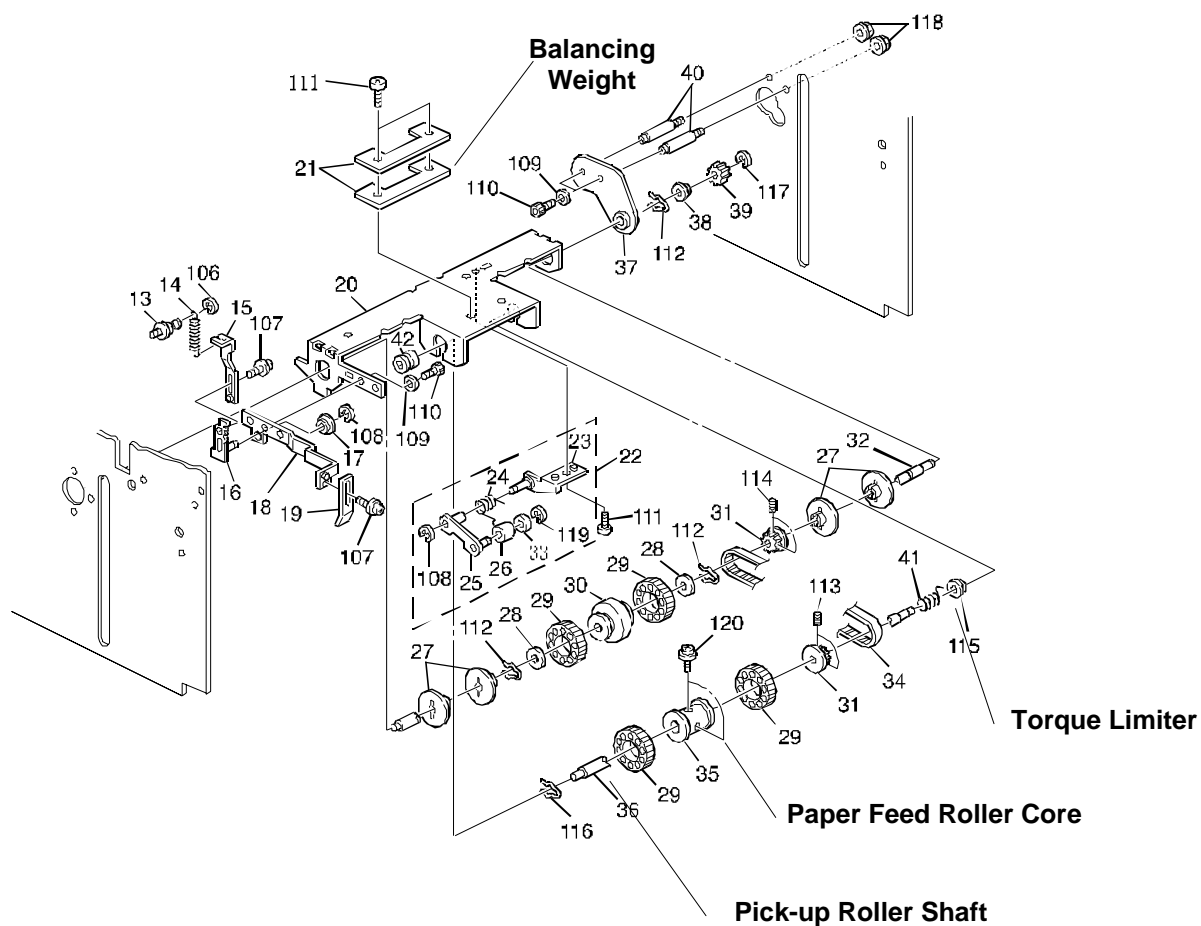


View From The Paper Feed Table Side



Continued...

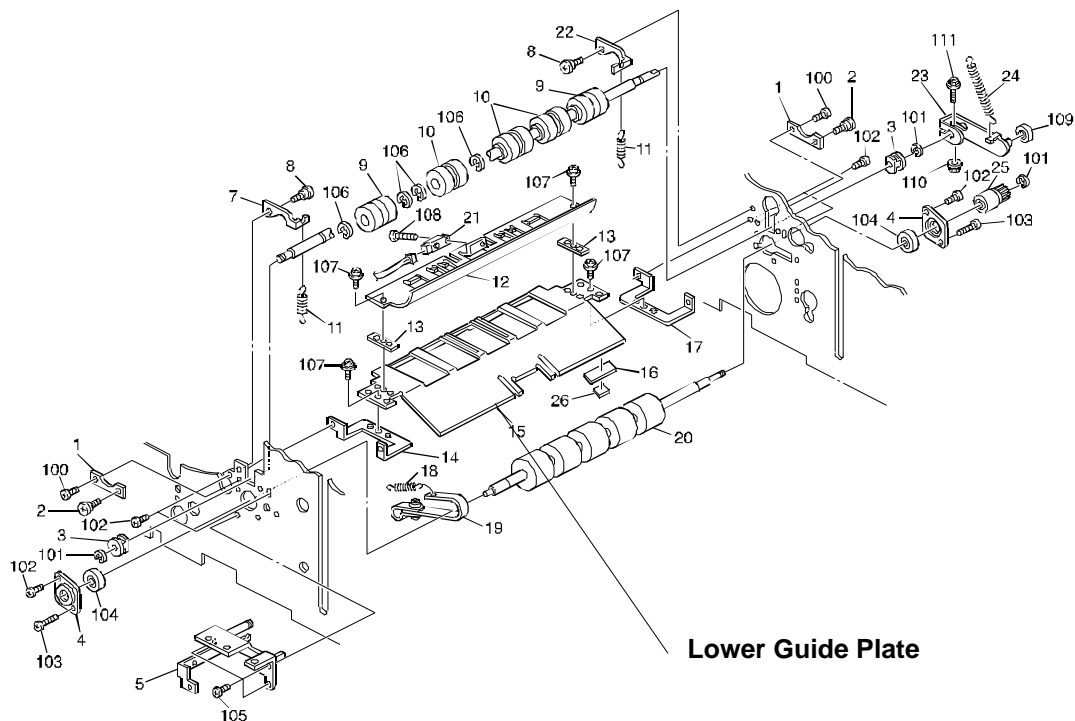
INSTALLATION PROCEDURE:



1. Remove one of the three Balancing Weights (C2015073). Only two Balancing Weights are needed.
2. Replace the Paper Feed Roller Core (C2285033). Reinstall the two rubber rollers on the new shaft.
3. Replace the Pick-Up Roller Shaft (C2035043) and Torque Limiter (55076038).

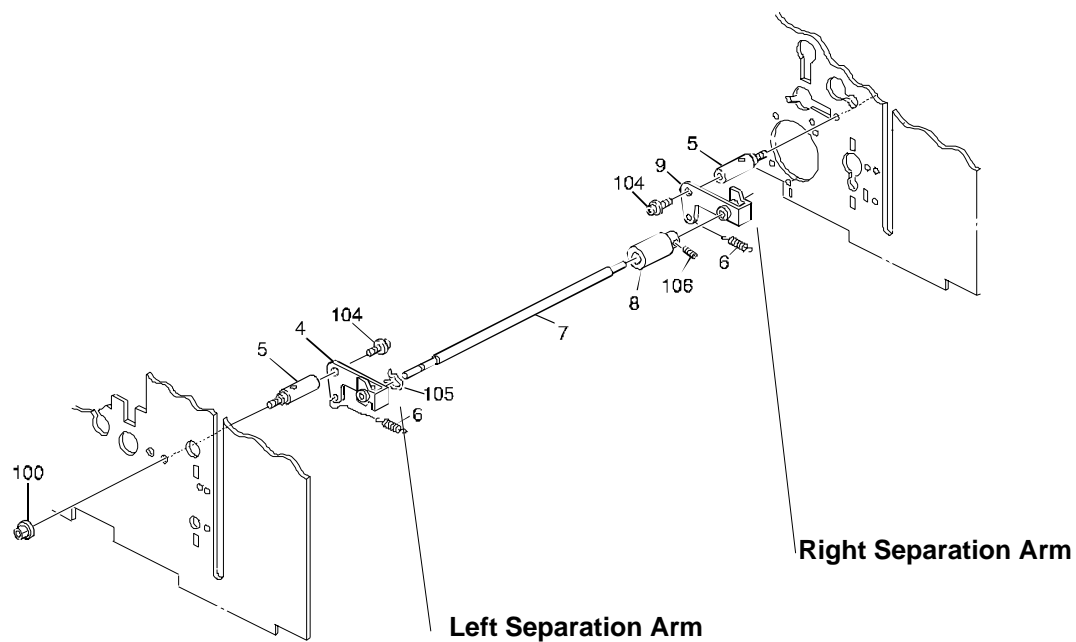
NOTE: Refer to 6.11 PAPER FEED ROLLER REMOVAL (page 5-40) in the C223 Service Manual.

Continued...



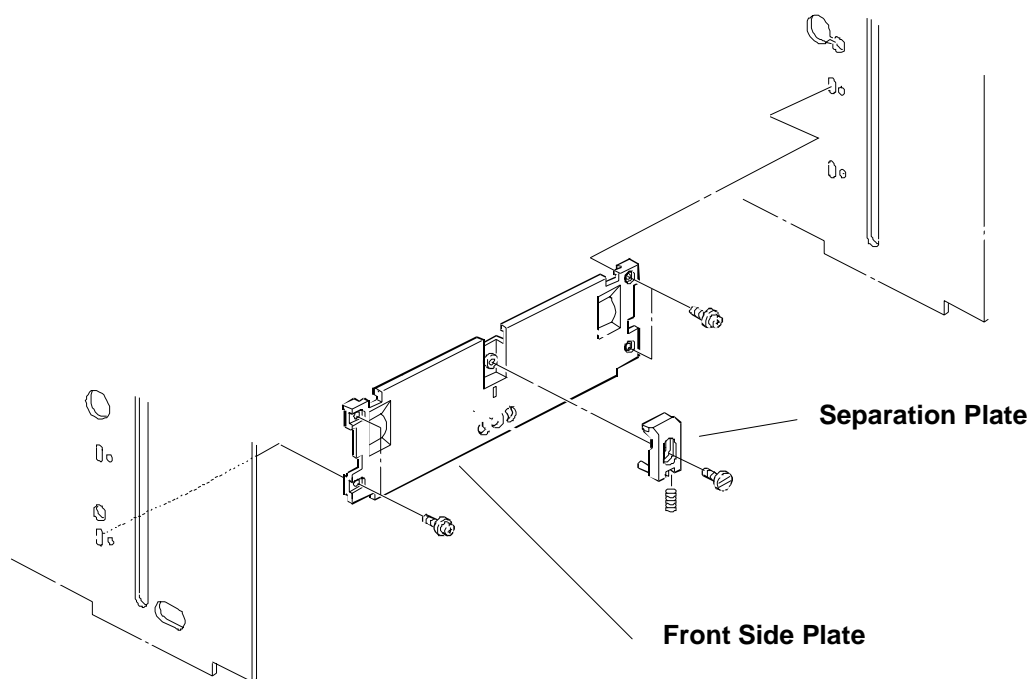
4. Replace the Lower Guide Plate (C2285215).

NOTE: Refer to 6.14 SEPARATION PLATE/LOWER SEPARATION ROLLER REMOVAL (page 5-43) in the C223 Service Manual.



5. Replace the right and left Separation Arm (C2285061 and C2285062).

Continued...



6. Replace the Front Side Plate (C2285016) and Separation Plate (C2285018).

BULLETIN NUMBER: C210/C218/C223/C228 – 003 REISSUE ★**02/24/99**

★ **APPLICABLE MODEL:**
GESTETNER – 5385
RICOH – VT3800
SAVIN – 3300DNP

SUBJECT: ENVELOPE FEEDING ENHANCEMENT**GENERAL:**

The C228 has an advantage over the C223 because of its ability to feed envelopes. This bulletin supplies information for the C223 improvement of envelope feeding using parts from the C228.

Feeding Envelopes On The Copy Printer/Digital Duplicator/Priport Product Line:

Significant differences in materials and manufacturing processes are used in the production of envelopes. Different sizes, paper weights, surface texture, glues and equipment are used in their construction. Packaging, shipping and storage conditions also combine to further increase the variables. In addition, the paper in an envelope is folded over itself 2 or 3 times, small variances in materials and construction are magnified. It is for these reasons envelopes from one manufacturer may differ greatly from another manufacturer, although they have the same published specifications. Differences may also exist between similar envelopes from the same manufacturer, or even in different lot numbers of the same envelope. Due to the large amount of variables, Ricoh/Savin/Gestetner has determined that the dependability of feeding envelopes can not be guaranteed.

As with other imaging applications, orientation and feed settings must be predetermined in order to provide optimal performance. We recommend no more than 100 envelopes be stacked in the feed tray at one time. Due to the stiffness of envelopes, we recommend checking the master for nicks after 100 impressions. An indication of a nicked master is ink marks on the lead edge of the envelope.

Enhancement and Limitations Details:

The C228 uses the registration sensor (photocoupler) to strictly control paper feed timing. Consequently, the C228 uses paper feed cams that are different from those of the C223 (The paper feed timing and speed are slightly different from each other).

This enhancement contains parts from the C228 paper feed system, however it does not contain the paper feed cams used in the C228. Therefore, the paper feed performance of the enhanced C223 does not exactly match the C228.

By following the procedure recommended in this bulletin, an enhanced C223 should have an advantage in performance when feeding envelopes, compared with the original paper feed system.

The enhanced paper feed system may have a little more fluctuation in the paper registration depending on the type of paper. However, this will not occur with most types of paper, and differs only slightly from the original system.

Note: This copy is intended as a master original
for reproduction of additional bulletins.

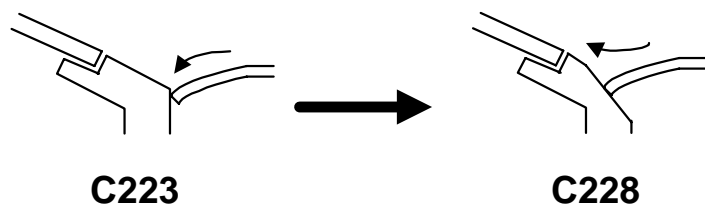


■ PARTS
■ GENERAL
INFORMATION

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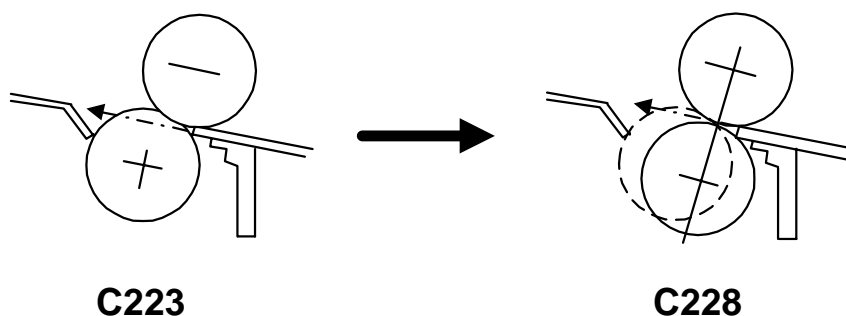
Details of Feed System Differences:

1. Separation Plate and Front Side Plate:



The shape of the Separation Plate and front side plate is different. The C228 type can prevent the leading edge of the paper (envelopes) from hitting against the corner of the plates and guides the paper more smoothly.

2. Right and Left Separation Arms:



The C228 (in combination of the right and left arms) moves The Lower Separation Roller to the paper table side. Thus, the paper (envelopes) can enter between the (upper) feed roller and Lower Separation Roller.

3. Lower Guide Plate:

Since the position of the lower separation roller changes, this part must be replaced.

4. Paper Feed Roller Core:

The C228 is longer, in order to enable the two rubber Feed Rollers on the shaft to be positioned at a distance. (For the C223, the rollers are closely positioned, side by side.)

5. Torque Limiter and Pick-up Roller Shaft:

Since the C228 paper feed roller core is heavier, the torque limiter (a coil spring) requires a stronger tension. The pick-up roller shaft must be modified to use the torque limiter.

6. Paper Feed Balancing Weight:

Since the C228 paper feed roller core is heavier, the paper feed pressure (the pressure from the pick-up roller against the paper stack) increases. This can cause multiple sheets feeding. To improve the paper feed pressure, remove one sheet of the balancing weight (C2015073) on the top of the bracket holding the Pick-Up Roller. (There are originally three sheets of the balancing weights are used in the C223.)

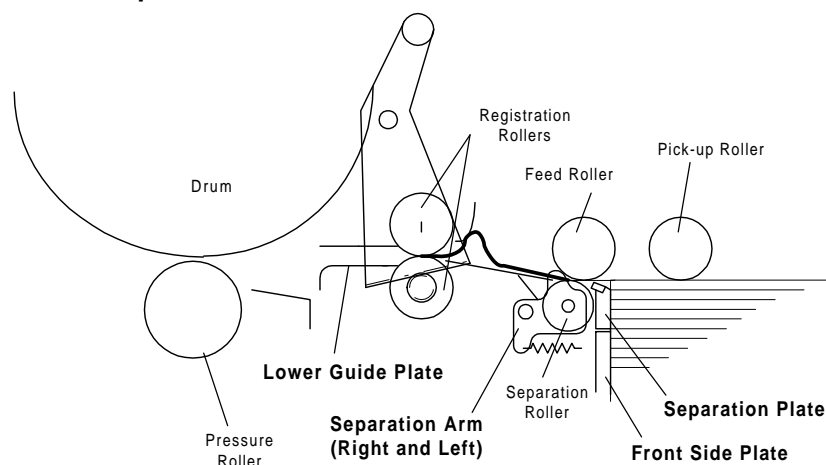
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Parts Required for the Enhancement Procedure:

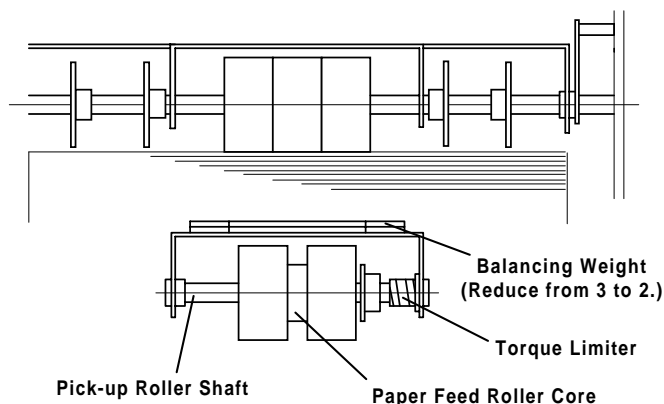
Description	Part Number
1. Front Side Plate.....	C228 5016
2. Separation Plate.....	C228 5018
3. Paper Feed Roller Core.....	C228 5033
4. Right Separation Arm.....	C228 5061
5. Left Separation Arm.....	C228 5062
6. Pick-up Roller Shaft.....	C203 5043
7. Torque Limiter - Paper Feed Roller.....	5507 6038
8. Lower Guide Plate.....	C228 5215
9. Balancing Weight (Remove one of three)	C201 5073

For the locations of each part, see diagrams below:

View From The Operator Side -

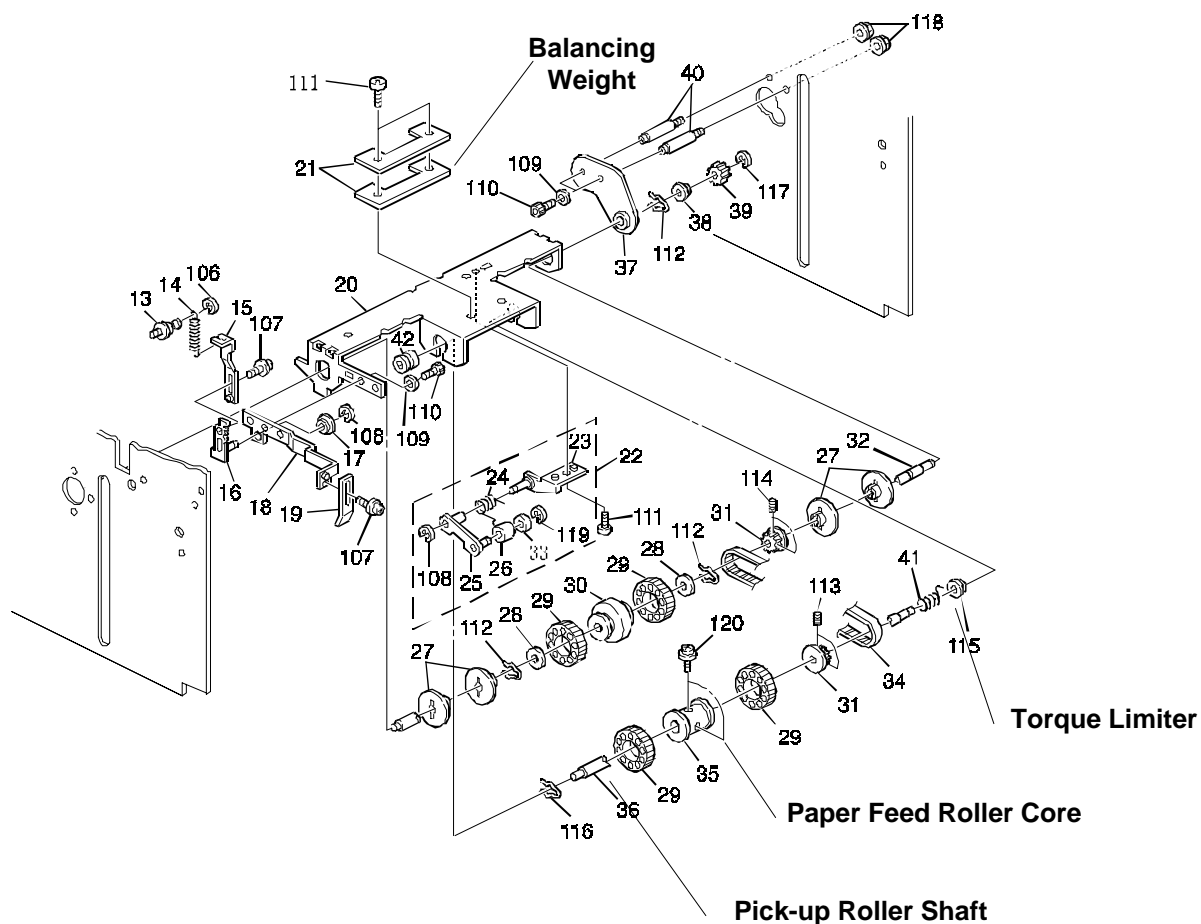


View From The Paper Feed Table Side



Continued...

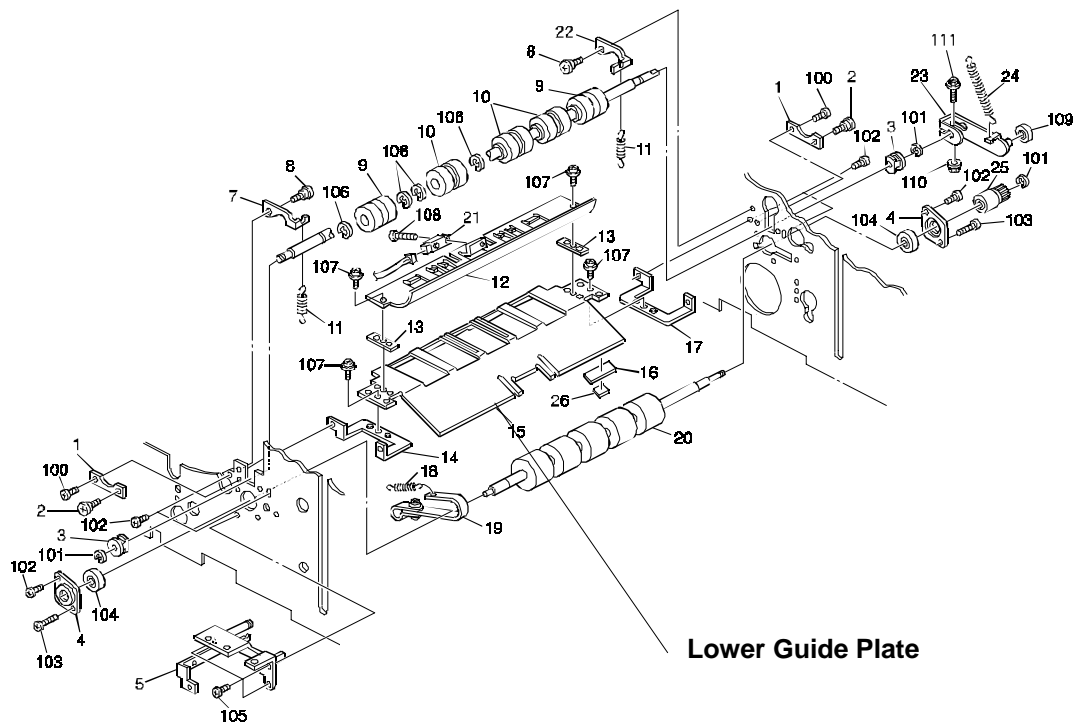
INSTALLATION PROCEDURE:



1. Remove one of the three Balancing Weights (C2015073). Only two Balancing Weights are needed.
2. Replace the Paper Feed Roller Core (C2285033). Reinstall the two rubber rollers on the new shaft.
3. Replace the Pick-Up Roller Shaft (C2035043) and Torque Limiter (55076038).

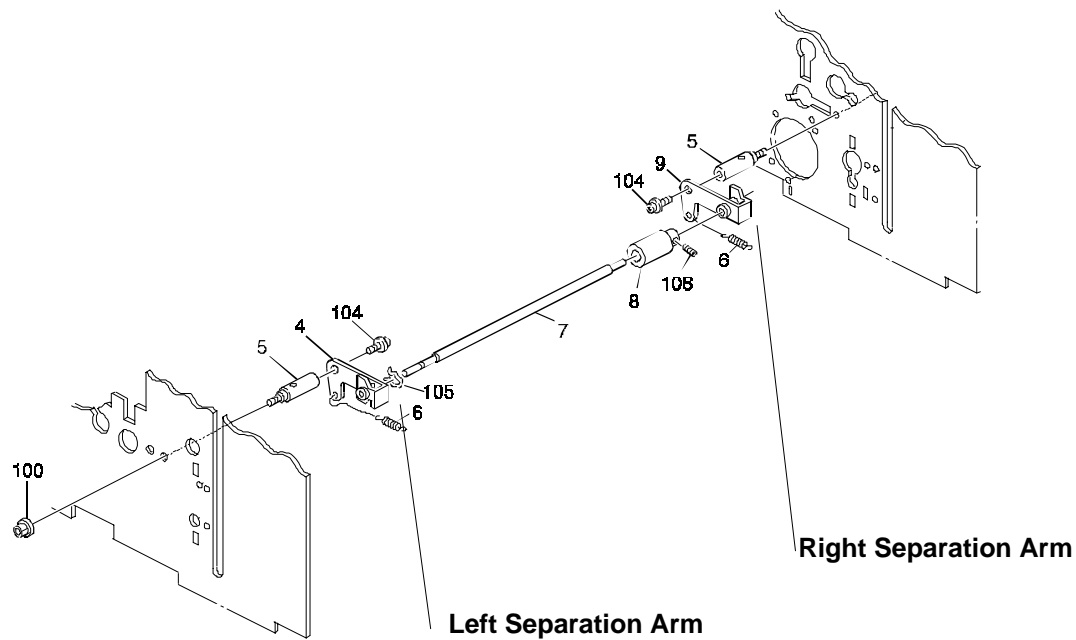
NOTE: Refer to 6.11 PAPER FEED ROLLER REMOVAL (page 5-40) in the C223 Service Manual.

Continued...



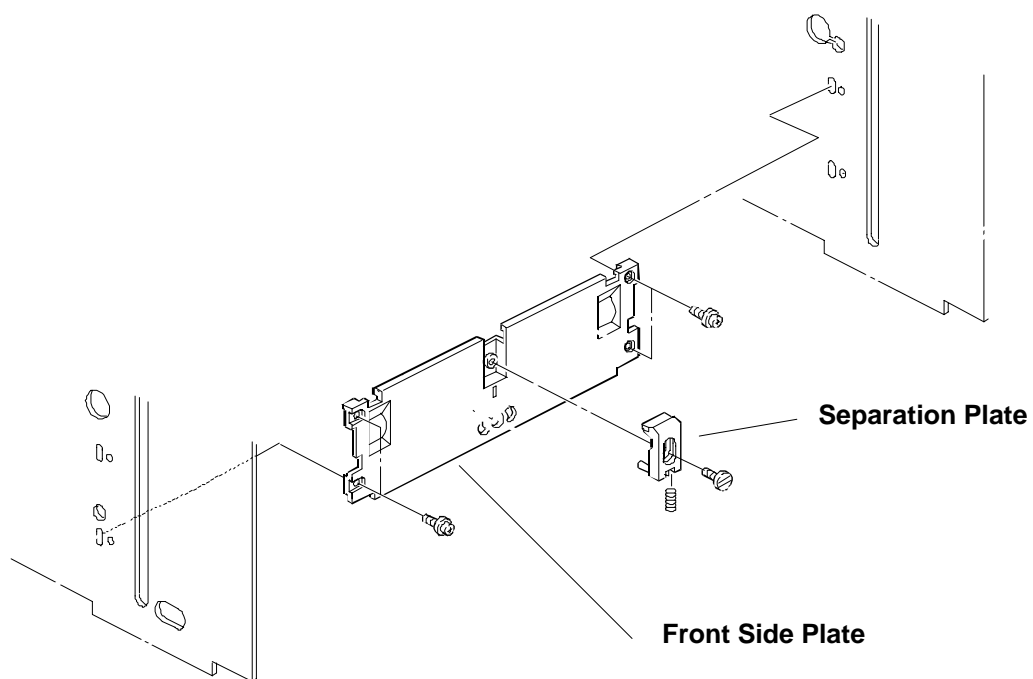
4. Replace the Lower Guide Plate (C2285215).

NOTE: Refer to 6.14 SEPARATION PLATE/LOWER SEPARATION ROLLER REMOVAL (page 5-43) in the C223 Service Manual.



5. Replace the right and left Separation Arm (C2285061 and C2285062).

Continued...



6. Replace the Front Side Plate (C2285016) and Separation Plate (C2285018).

BULLETIN NUMBER: C210/C218/C223/C228 – 003 REISSUE ★**05/28/99****APPLICABLE MODEL:****GESTETNER – 5385****RICOH – VT3800****SAVIN – 3300DNP****SUBJECT: ENVELOPE FEEDING ENHANCEMENT****GENERAL:**

The C228 has an advantage over the C223 because of its ability to feed envelopes. This bulletin supplies information for the C223 improvement of envelope feeding using parts from the C228.

Feeding Envelopes On The Copy Printer/Digital Duplicator/Priport Product Line:

Significant differences in materials and manufacturing processes are used in the production of envelopes. Different sizes, paper weights, surface texture, glues and equipment are used in their construction. Packaging, shipping and storage conditions also combine to further increase the variables. In addition, the paper in an envelope is folded over itself 2 or 3 times, small variances in materials and construction are magnified. It is for these reasons envelopes from one manufacturer may differ greatly from another manufacturer, although they have the same published specifications. Differences may also exist between similar envelopes from the same manufacturer, or even in different lot numbers of the same envelope. Due to the large amount of variables, Ricoh/Savin/Gestetner has determined that the dependability of feeding envelopes can not be guaranteed.

As with other imaging applications, orientation and feed settings must be predetermined in order to provide optimal performance. We recommend no more than 100 envelopes be stacked in the feed tray at one time. Due to the stiffness of envelopes, we recommend checking the master for nicks after 100 impressions. An indication of a nicked master is ink marks on the lead edge of the envelope.

Enhancement and Limitations Details:

The C228 uses the registration sensor (photocoupler) to strictly control paper feed timing. Consequently, the C228 uses paper feed cams that are different from those of the C223 (The paper feed timing and speed are slightly different from each other).

This enhancement contains parts from the C228 paper feed system, however it does not contain the paper feed cams used in the C228. Therefore, the paper feed performance of the enhanced C223 does not exactly match the C228.

By following the procedure recommended in this bulletin, an enhanced C223 should have an advantage in performance when feeding envelopes, compared with the original paper feed system.

The enhanced paper feed system may have a little more fluctuation in the paper registration depending on the type of paper. However, this will not occur with most types of paper, and differs only slightly from the original system.

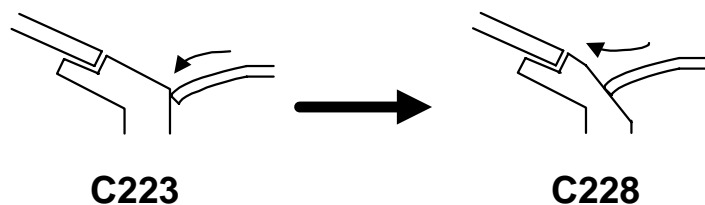
Note: This copy is intended as a master original
for reproduction of additional bulletins.

**■ PARTS****■ GENERAL
INFORMATION**

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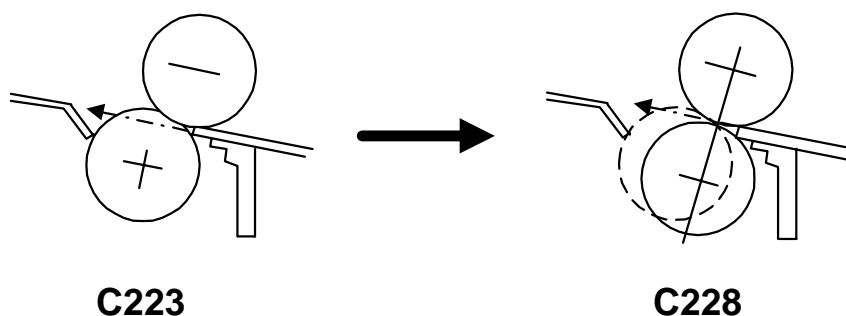
Details of Feed System Differences:

1. Separation Plate and Front Side Plate:



The shape of the Separation Plate and front side plate is different. The C228 type can prevent the leading edge of the paper (envelopes) from hitting against the corner of the plates and guides the paper more smoothly.

2. Right and Left Separation Arms:



The C228 (in combination of the right and left arms) moves The Lower Separation Roller to the paper table side. Thus, the paper (envelopes) can enter between the (upper) feed roller and Lower Separation Roller.

3. Lower Guide Plate:

Since the position of the lower separation roller changes, this part must be replaced.

4. Paper Feed Roller Core:

The C228 is longer, in order to enable the two rubber Feed Rollers on the shaft to be positioned at a distance. (For the C223, the rollers are closely positioned, side by side.)

5. Torque Limiter and Pick-up Roller Shaft:

Since the C228 paper feed roller core is heavier, the torque limiter (a coil spring) requires a stronger tension. The pick-up roller shaft must be modified to use the torque limiter.

6. Paper Feed Balancing Weight:

Since the C228 paper feed roller core is heavier, the paper feed pressure (the pressure from the pick-up roller against the paper stack) increases. This can cause multiple sheets feeding.

To improve the paper feed pressure, remove one sheet of the balancing weight (C2015073) on the top of the bracket holding the Pick-Up Roller. (There are originally three sheets of the balancing weights are used in the C223.)

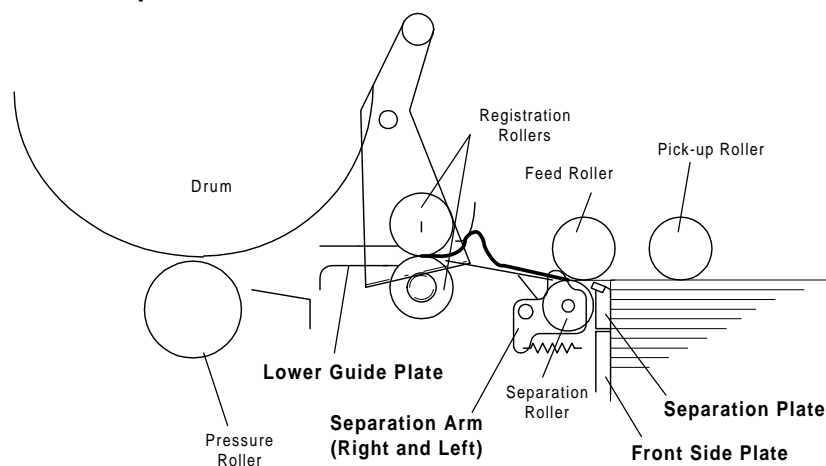
Continued...

Parts Required for the Enhancement Procedure:

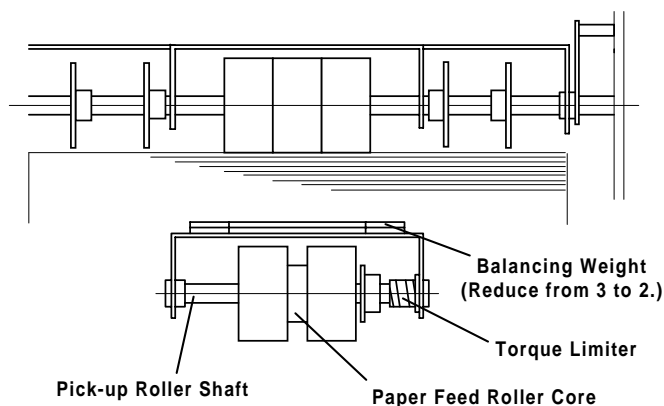
Description	Part Number
1. Front Side Plate	C228 5016
2. Separation Plate	C228 5018
3. Paper Feed Roller Core.....	C228 5033
4. Right Separation Arm	C228 5061
5. Left Separation Arm.....	C228 5062
6. Pick-up Roller Shaft.....	C203 5043
7. Torque Limiter - Paper Feed Roller.....	5507 6038
8. Lower Guide Plate	C228 5215
9. Balancing Weight (Remove one of three)	C201 5073
★ 10. Hexagon Headless Set Screws (2 required)	05740080E (Bag of 100)

For the locations of each part, see diagrams below:

View From The Operator Side -

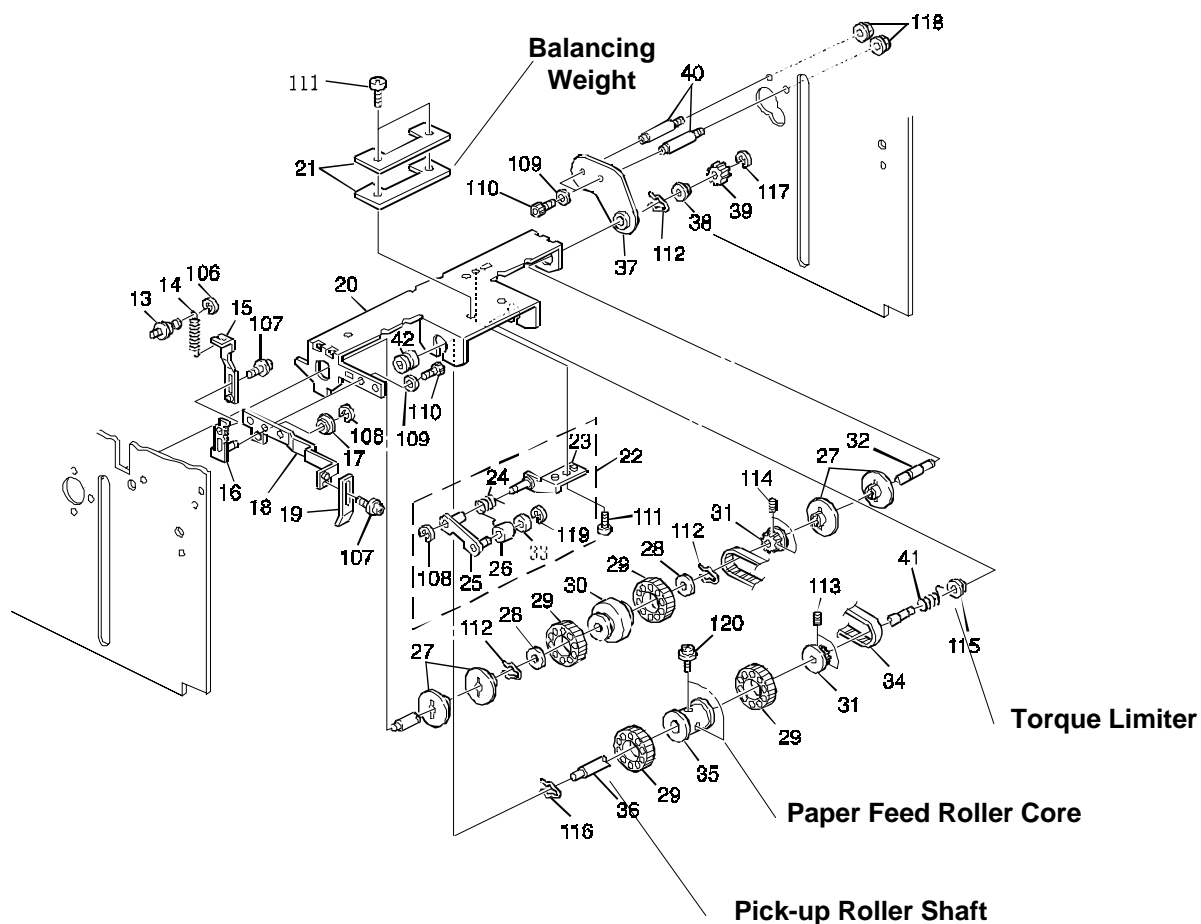


View From The Paper Feed Table Side



Continued...

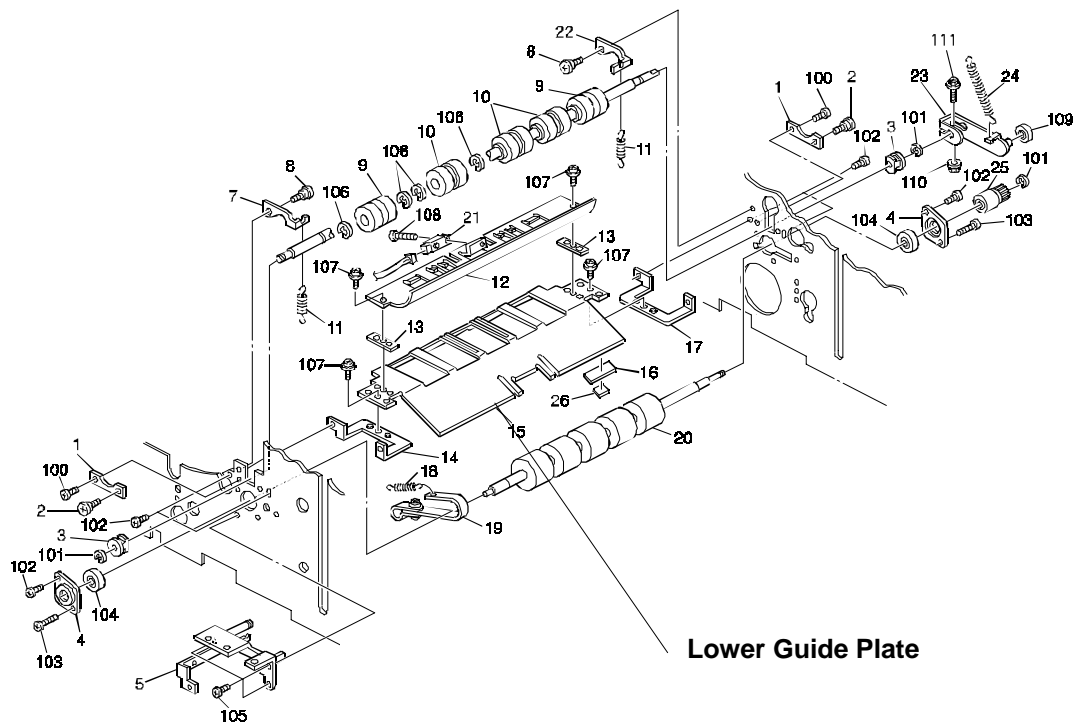
INSTALLATION PROCEDURE:



1. Remove one of the three Balancing Weights (C2015073). Only two Balancing Weights are needed.
2. Replace the Paper Feed Roller Core (C2285033). Reinstall the two rubber rollers on the new shaft.
3. Replace the Pick-Up Roller Shaft (C2035043) and Torque Limiter (55076038).

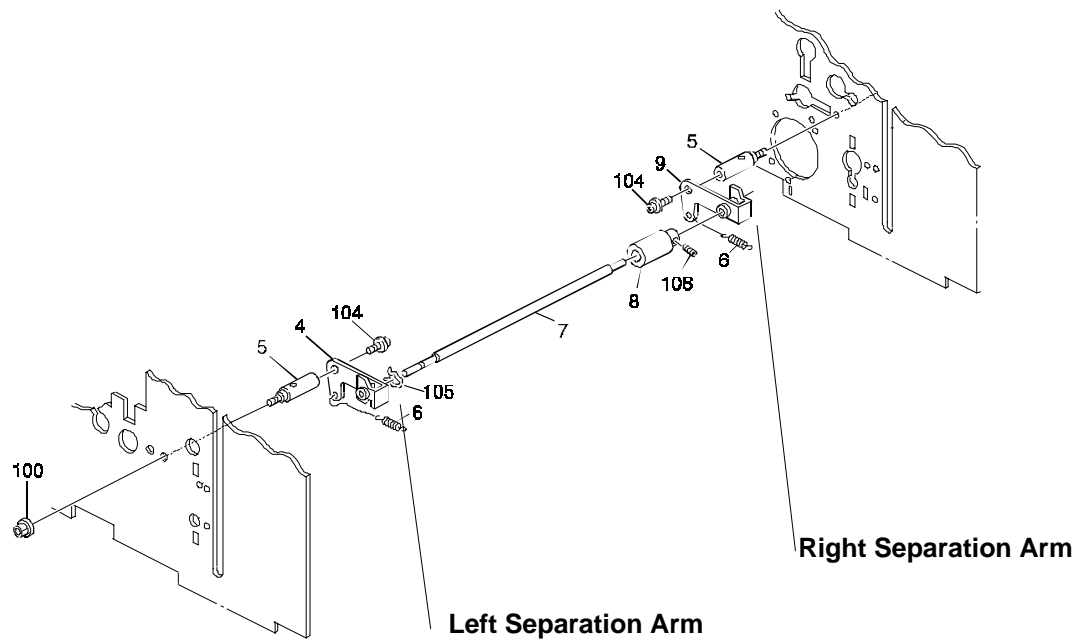
NOTE: Refer to 6.11 PAPER FEED ROLLER REMOVAL (page 5-40) in the C223 Service Manual.

Continued...



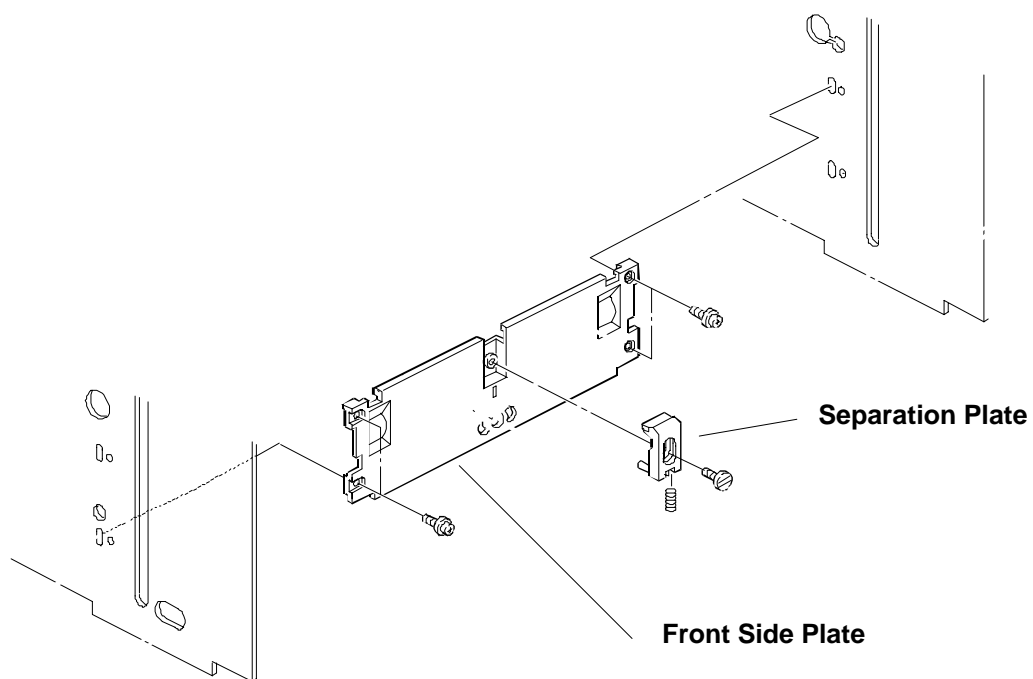
4. Replace the Lower Guide Plate (C2285215).

NOTE: Refer to 6.14 SEPARATION PLATE/LOWER SEPARATION ROLLER REMOVAL (page 5-43) in the C223 Service Manual.



5. Replace the right and left Separation Arm (C2285061 and C2285062).

Continued...



6. Replace the Front Side Plate (C2285016) and Separation Plate (C2285018).

BULLETIN NUMBER: C210/C218/C223/C228 - 004

10/05/99

APPLICABLE MODEL:

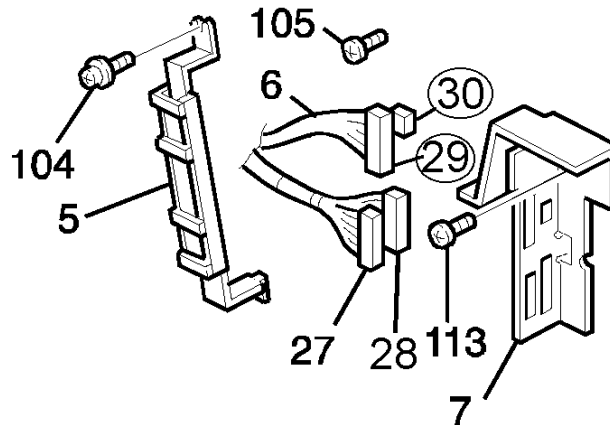
GESTETNER – 5380/5385/5390

RICOH – VT3600/3800/6000

SAVIN – 3300DNP/3400DNP

SUBJECT: PARTS CATALOG UPDATES

- **UPDATE 1:** C228 RELAY CONNECTORS - The following parts updates are being issued for all C228 Parts Catalogs. Please update your Parts Catalogs with the following information.



C228

			REFERENCE	
PART NUMBER	DESCRIPTION	QTY	PAGE	ITEM
11025828	Connector 15 P	1	73	29 *
11025193	Connector 10 P	1	73	30 *

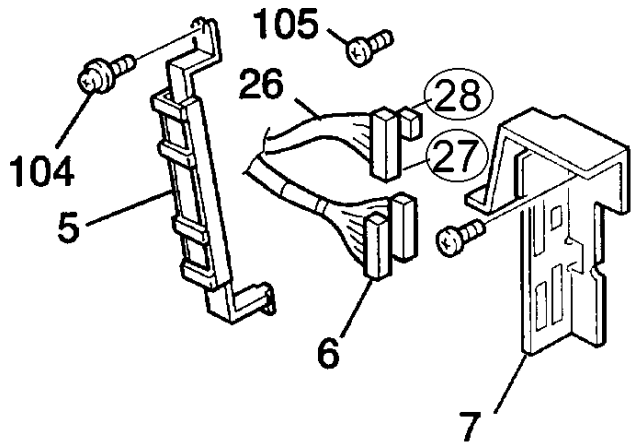
* Denotes new item.



■ PARTS

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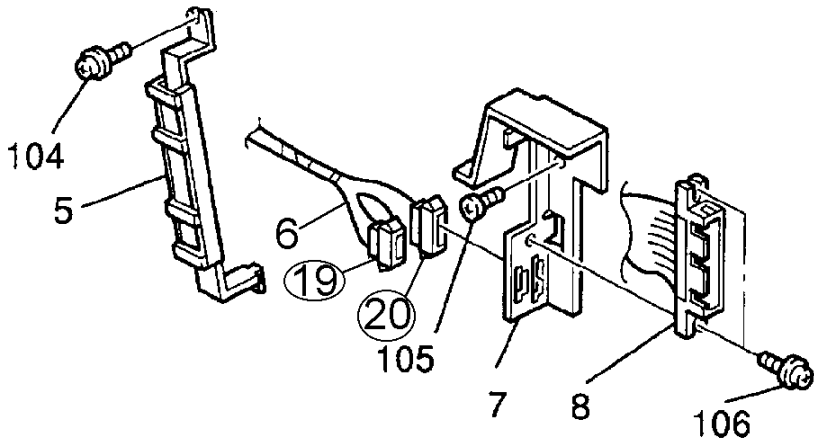
- **UPDATE 2:** C223 RELAY CONNECTORS - The following parts updates are being issued for all C223 Parts Catalogs. Please update your Parts Catalogs with the following information.



C223			REFERENCE	
PART NUMBER	DESCRIPTION	QTY	PAGE	ITEM
11026621	Connector 13 P	1	73	27 *
11024559	Connector 3 P	1	73	28 *

* Denotes new item.

- **UPDATE 3:** C218 RELAY CONNECTORS - The following parts updates are being issued for all C218 Parts Catalogs. Please update your Parts Catalogs with the following information.



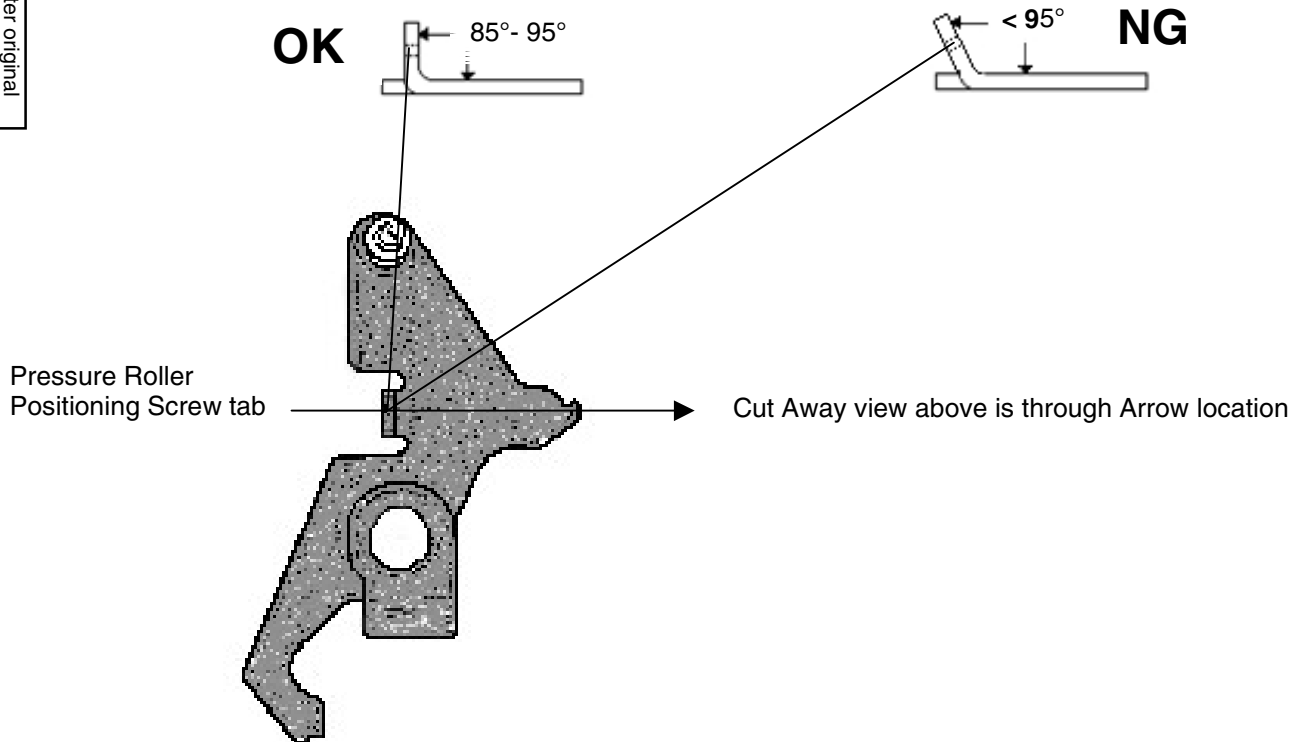
C218			REFERENCE	
PART NUMBER	DESCRIPTION	QTY	PAGE	ITEM
11024560	Connector 6 P	1	71	19 *
11024431	Connector 8 P	1	71	20 *

* Denotes new item.

BULLETIN NUMBER: C210/C218/C223/C228 - 005**1/07/2000****APPLICABLE MODEL:****GESTETNER - 5375/5380/5385/5390****RICOH - VT3500/3600/3800/6000****SAVIN - 3300DNP/3400DNP****SUBJECT: PRESSURE ON/OFF LEVER****GENERAL:**

When the Pressure On / Off Lever breaks, damage may occur to other parts of the machine. In an effort to reduce down time and possible additional damage, we recommend that on the next service call the Pressure On/Off Lever be inspected. If deformation of the tab that supports the Pressure Roller Positioning Screw (See diagram below) is found, replace the Pressure On/Off Lever using the accompanying procedure.

Note: This copy is intended as a master original
for reproduction of additional bulletins.



NOTE 1 Part number C2285566 has not changed.

NOTE 2 An improved Pressure On / Off Lever was installed in production October 1998.

NOTE 3 Any Pressure On / Off Lever currently ordered from our stock will be the new style part.

Continued...



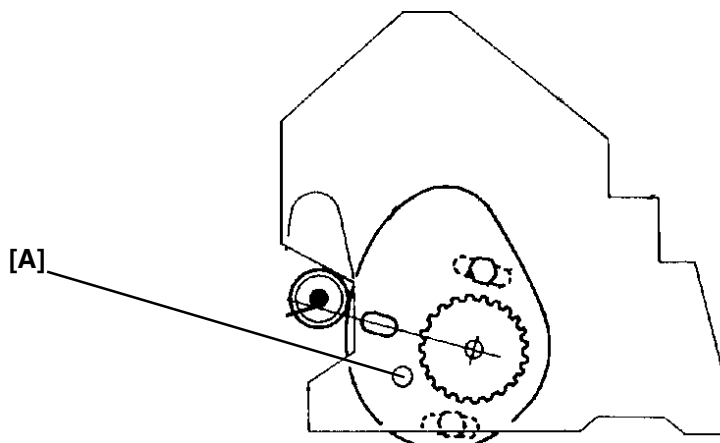
■ PARTS



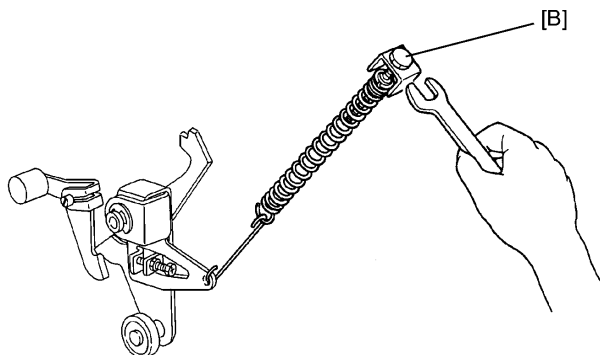
■ MECHANICAL

Pressure On / Off Lever Replacement Procedure:

1. Ensure Drum is in home position.
2. Lock Paper Feed Cam in home position by inserting screwdriver into hole [A].



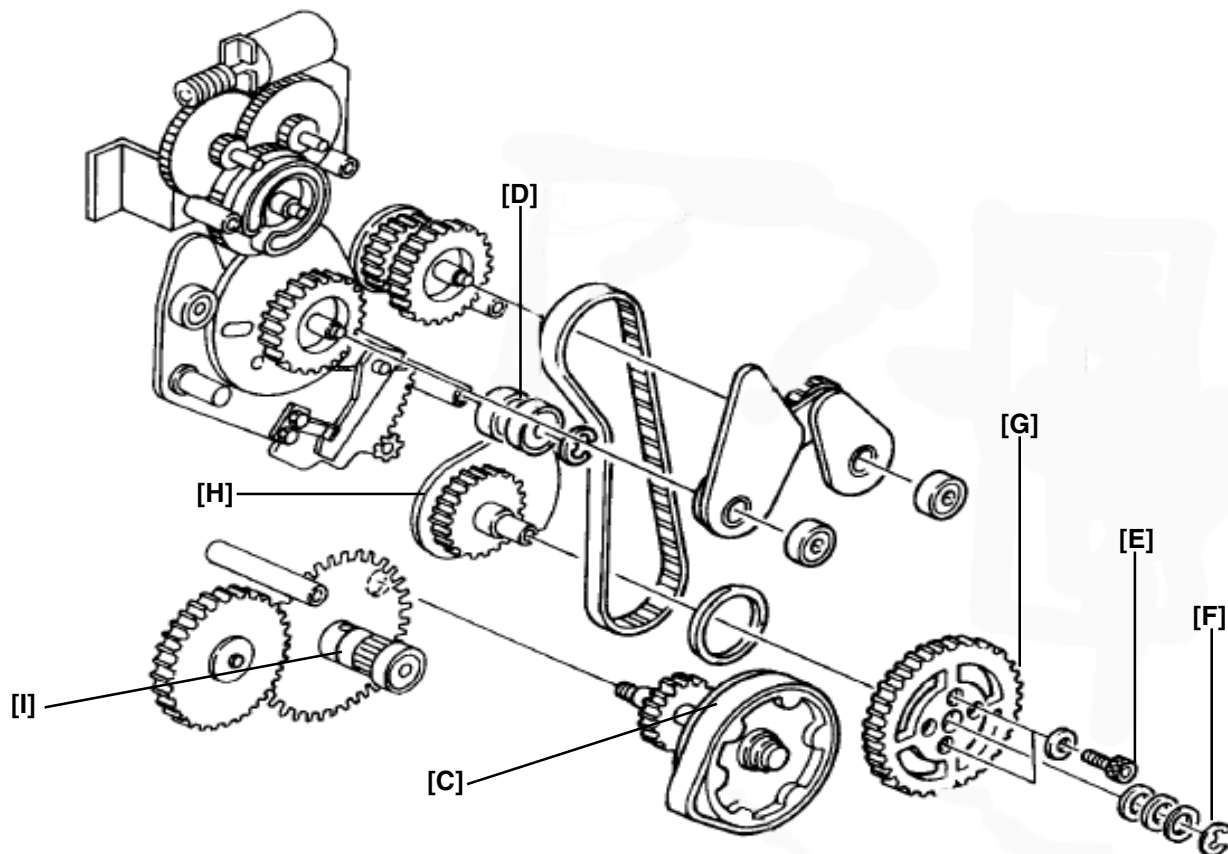
3. Remove Wiring Harness Bracket (1 Screw).
- Note:** *This will allow easier release of the spring tension in the following step.*
4. Release Pressure Roller pressure by turning screw [B] counterclockwise.



5. Remove Printing Pressure Spring.
6. Remove Main Motor Drive Belt Support Plate (3 screws).
7. Remove Drive Pulley Assembly [C].
8. Remove E-clip securing Drum Drive Belt Tension Bearings and remove Bearings [D].

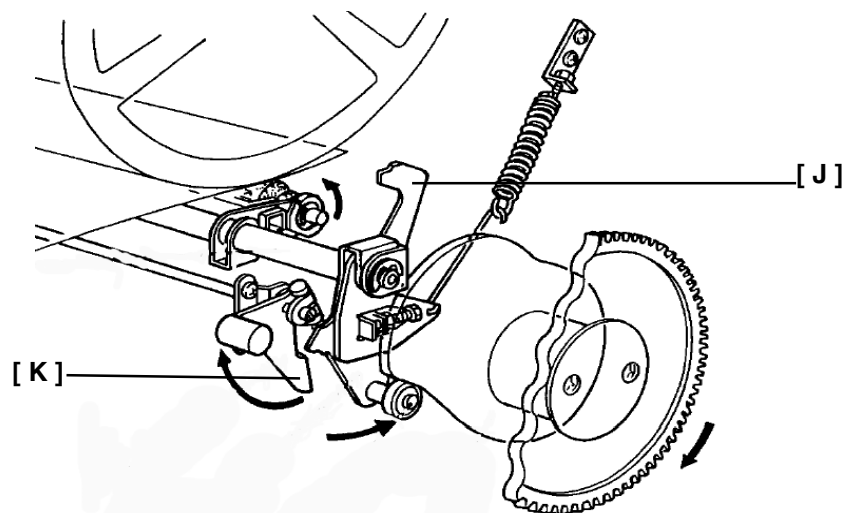
Continued...

9. Remove non-recessed Hex Nuts [E].
10. Remove E-clip [F].
11. Remove Drive Gear [G].
12. Tuck belt out of way.
13. Remove Pressure Timing Cam [H].
14. To avoid damage remove Pulse Generator Sensor [I] and Disk (two setscrews).



Continued...

15. Remove Pressure On/Off Lever [J] and Print Pressure Arm [K].



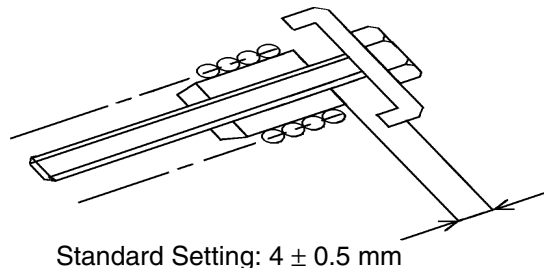
NOTE: To remove these two levers, the slot for the drive pin must be aligned with the cutouts in the lever. You may also need to manually release the Pressure Release Solenoid.

**DO NOT PRY THE LEVERS WITH A SCREWDRIVER FOR REMOVAL.
GRASP THE LEVERS FROM THE FRONT USING A PAIR OF PLIERS.**

16. Remove Bearing and Adjusting Screw (note position of screw for reassembly) from old Lever and install on new Lever.

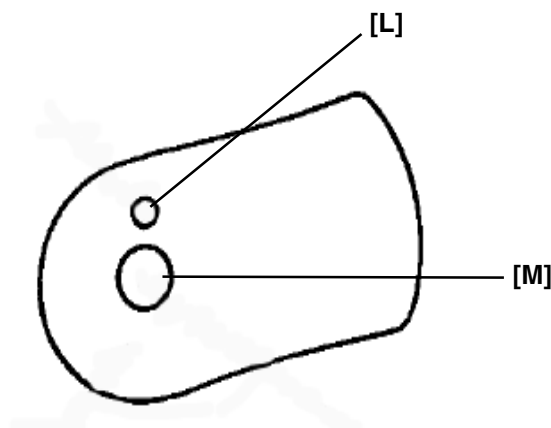
DO NOT TIGHTEN SCREW AT THIS TIME

17. Reinstall Lever assembly.
18. Adjust the position of screw the same amount as noted in step 16.
19. Reinstall E-clip on Lever Assembly.
20. Apply tension to Pressure Lever Adjustment listed on Page 5-49 (see below).



Continued...

- 21 Reinstall Pulse Generator Disk and Sensor.
- 22 Ensure that Pulse Generator Disk does not contact the Sensor (moves freely through sensor) and the teeth are not bent.
- 23 Reinstall Pressure Timing Cam (ensure that washers are installed).
- 24 Install Drive Belt.
- 25 Install Pressure Timing Cam Page 5-68 FSM. See diagram below. Hole [L] should be above shaft [M] when belt tension is applied.



- 26. Install Drum Drive Belt Tension Bearings and retaining E-clip.
- 27. Install Pressure Timing Drive Gear (2 cap screws) in center of adjustment range.
- 28. Install Main Motor Drive and Belt.
- 29. Install Main Motor Drive Belt Support Plate (3 screws).
- 30. **Caution!** Remove locking screwdriver installed in step 2.

END OF PROCEDURE

BULLETIN NUMBER: C210/C218/C223/C228 – 006

1/07/2000

APPLICABLE MODEL:

GESTETNER – 5390

RICOH – VT6000

SAVIN – 3400DNP

SUBJECT: RE-INSTALLATION OF PAPER TRAY FOLLOWING LCT REMOVAL
GENERAL:

If the LCT is being permanently removed from the machine the following parts are required to replace the Paper Tray after the LCT has been removed. Please refer to the Parts Table below and the following Illustrations for the required parts and their location.

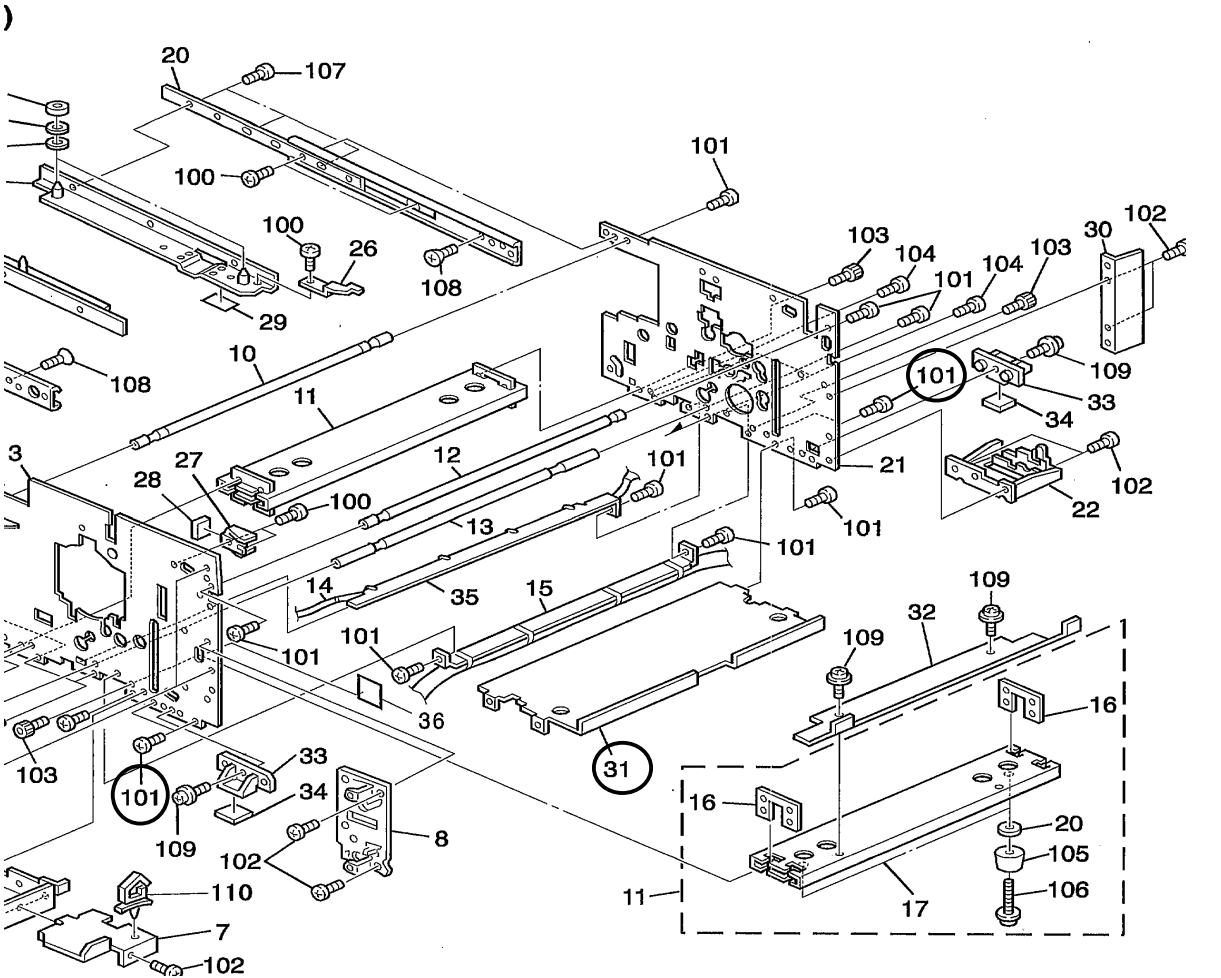
			REFERENCE	
PART NO.	DESCRIPTION	QTY	PAGE	ITEM
C2232085	Paper Table Lower Cover	1	14	31
03140080Z	Philips Screw-4x8	8	14	101
03140080Z	Philips Screw-4x8	1	16	107
C2192428	Switch Plate-Paper Feed Table	1	16	24
54032048	Bushing-4mm	1	16	25
C2198295	Safety Switch Relay Harness	1	16	26
C2198294	Safety Switch	1	16	27
AA063016	Pressure Spring	1	16	28
C2222429	Support Cover-Paper Feed Cover	1	16	29
C2102091	Harness Cover	1	16	41
03140060Z	Philips Pan Head Screw-4x6	2	16	108
03130120Z	Philips Screw-3x12	1	16	110
05940080E	Bolt-M4x8	1	16	112
* C2231059	Paper Feed Tray Assy (Assembled unit)	1		
C2235073	Paper Table Fixing Bracket	1	24	1
C2035142	Rack Shaft	1	24	12
56062310	Roller	2	24	13
C2095235	Paper Table Holder	1	24	35
C2195081	Sensor Bracket	1	24	36
AW020021	Photointerruptor-175487-3	1	24	37
C2223175	Scanner Slider	1	24	38
03140120Z	Philips Screw-4x12	1	24	100
05850161B	Hexagon Bolt-M5x16	1	24	104
09513008Z	Philips Screw With Flat Washer-M3x8	1	24	111

* = This indicates a whole assembly part number that is not currently in the Parts Catalog. This number can be used to order the whole Paper Feed Tray Assembly.

Continued...



Remove/replace the circled items.

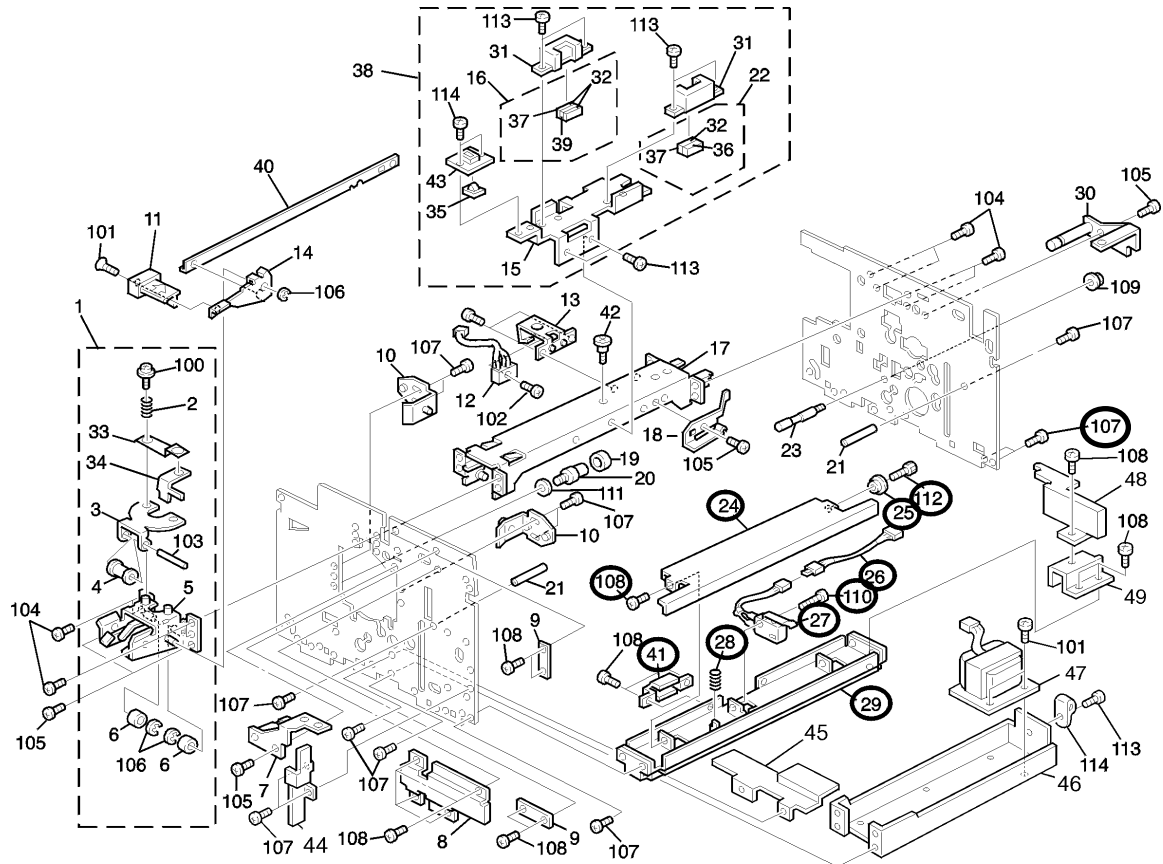


14

Parts Location and List

Continued...

Remove/replace the circled items.

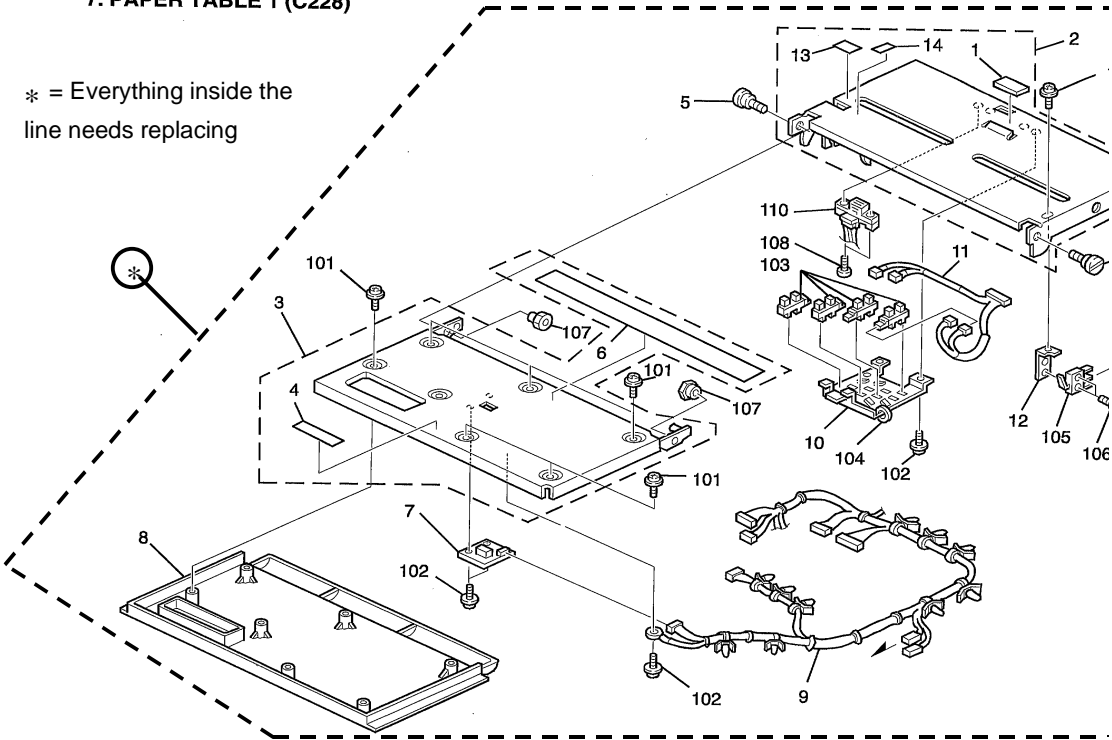


PAGE 16

Continued...

7. PAPER TABLE 1 (C228)

* = Everything inside the line needs replacing

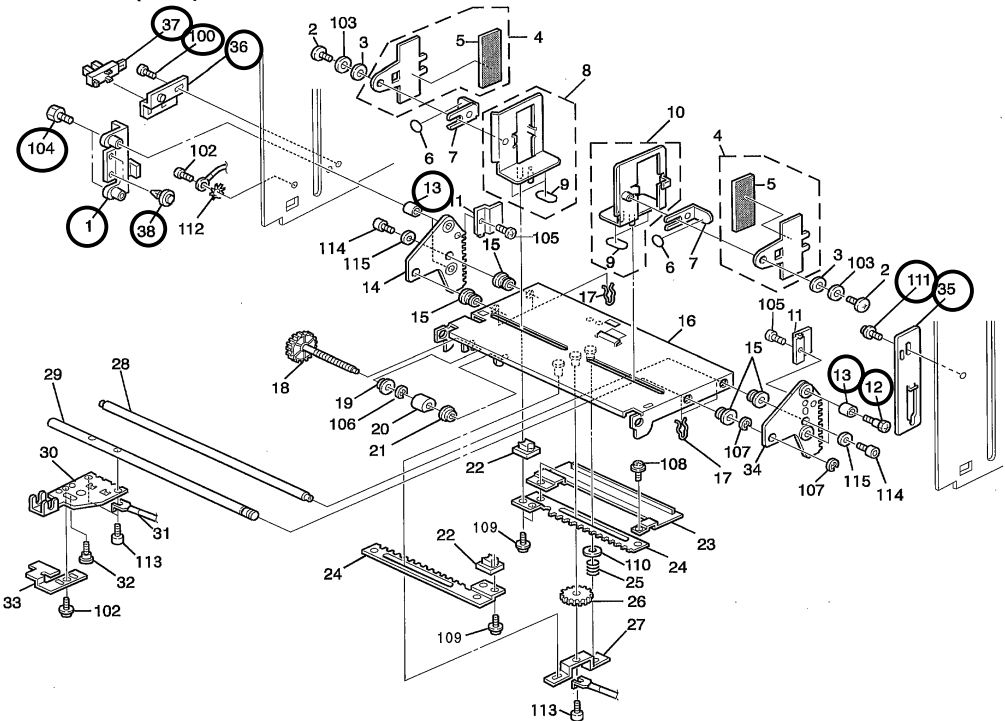


C228

22

Parts Location :

8. PAPER TABLE 2 (C228)



C228

24

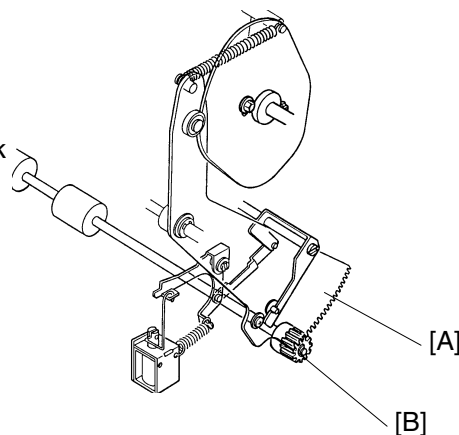
Parts Location and List

BULLETIN NUMBER: C210/C218/C223/C228 – 007**09/15/2000****APPLICABLE MODEL:****GESTETNER – 5375/5380/5385/5390****RICOH – VT3500/3600/3800/6000****SAVIN – NA/NA/3300DNP/3400DNP****SUBJECT: 2ND FEED ROLLER DAMAGE****SYMPTOM:**

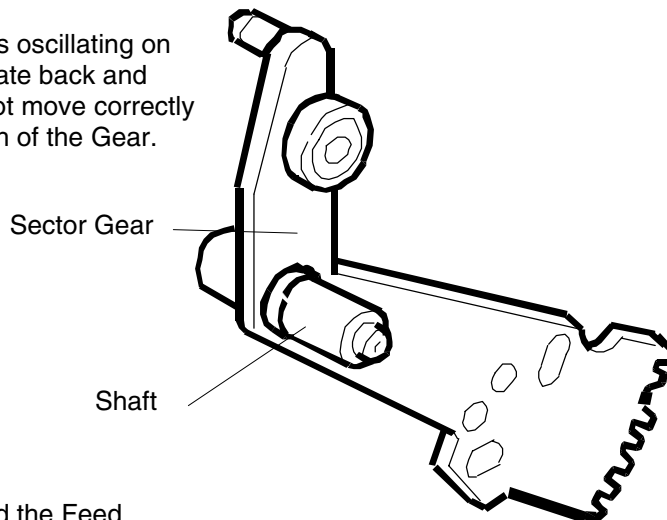
A worn 2nd Sector Gear and/or 2nd Feed Roller Gear causes paper feed jams. This also causes the 2nd Feed Roller lifting mechanism to not work properly. When this occurs, printed images will be distorted. These images are not transferred to paper properly because of the lifting mechanism failure.

CAUSE 1:

The Sector Gear [A] and the Feed Roller Gear [B] insufficiently lubricated. This causes the Sector Gear [A] to not oscillate back and forth correctly.

**CAUSE 2:**

There is too much thrust play and the Sector Gear is oscillating on the shaft. This causes the Sector Gear to not oscillate back and forth correctly. As a result, the Sector Gear does not move correctly on the 2nd Feed Roller Gear and damages the teeth of the Gear.

**SOLUTION 1:**

Make sure to lubricate between the Sector Gear and the Feed Roller Gear periodically.

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Continued...

SOLUTION 2:

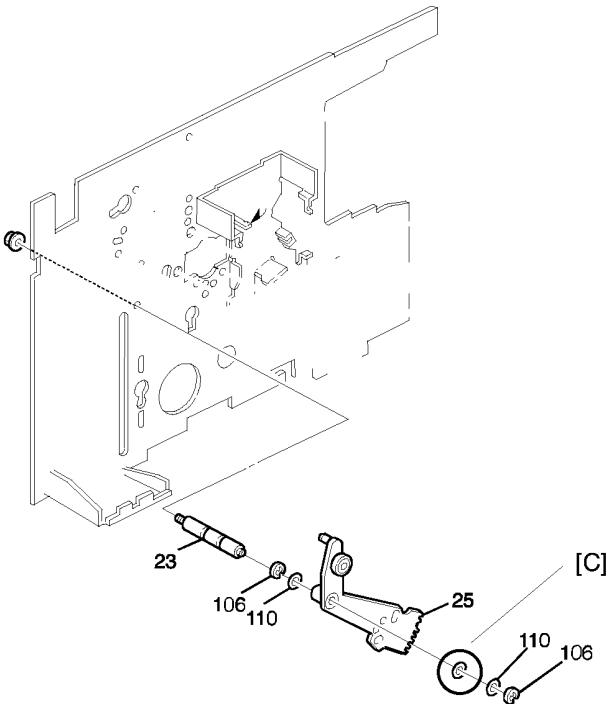
Add some Spacers to remove the play. The part numbers of the added Spacers are shown in the table below:

Production Name	Using Spacer #	Description
(C228) only	08077013	Spacer - 10.2X14X0.2 mm
Other models	08077018	Washer - M10

Add 1 or 2 additional Spacers [C] on the front side, as shown in the illustration to the right.

UNITS AFFECTED:

The above procedure was applied from the March 2000 production, so the thrust play was 0.2 mm or less.



BULLETIN NUMBER: C210/C218/C223/C228 – 008**12/11/2000****APPLICABLE MODEL:****GESTETNER – 5385/5390****RICOH – VT3800/6000****SAVIN – 3300DNP/3400DNP****SUBJECT: SERVICE MANUAL - INSERT****GENERAL:**

The Service Manual pages listed below must be replaced with the pages supplied. Each bulletin package contains 1 set of replacement pages.

PAGES:

The revised areas have been highlighted by an arrow ⇒.

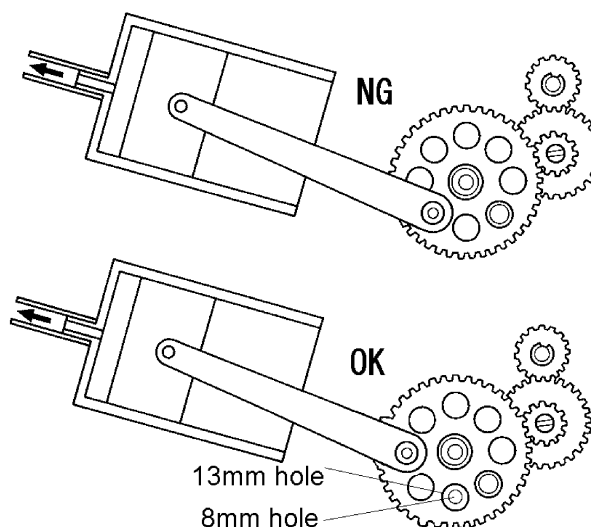
- | | |
|---------------|--|
| • xiv | Updated Information (Table of Contents) |
| • 5-74 (C223) | Updated Information (Paper Exit Pawl Air Pump Adjustment) |
| • 2-8 (C228) | Updated Information (Printing) |
| • 5-1 (C228) | Updated Information (Thermal Head Voltage Adjustment) |
| • 5-7 (C228) | New Information (Feed Length of the Second Feed Roller Adj.) |

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for reproduction of additional bulletins.



4.3.2 SERVICE PROGRAM TABLE	4-15
4.3.3 THERMAL HEAD TEST	4-32
4.3.4 COMMAND SHEET CHECK	4-33
4.3.5 INPUT/OUTPUT CHECK MODE	4-34
Input Check Mode Access Procedure	4-34
Output Check Mode Access Procedure	4-34
Input Check Table	4-35
4.3.6 USER CODE MODE	4-42
User Codes	4-42
How To Use a User Code	4-42
5. REPLACEMENT AND ADJUSTMENT	5-1
5.1 MASTER FEED	5-1
5.1.1 THERMAL HEAD VOLTAGE ADJUSTMENT	5-1
5.2 PAPER FEED	5-3
5.2.1 SECOND FEED ROLLER START TIMING	5-3
5.2.2 PAPER FEED ROLLER REMOVAL	5-5
5.3 DELIVERY	5-6
5.3.1 EXIT PAWL TIMING ADJUSTMENT	5-6
5.4 PAPER FEED	5-7
5.4.1 FEED LENGTH OF THE SECOND FEED ROLLER ADJUSTMENT	5-7
6. C228 POINT TO POINT DIAGRAM	6-1

9.5 PAPER EXIT PAWL AIR PUMP ADJUSTMENT



Purpose: To ensure that the paper exit pawl air pump produces a jet of air when the paper exit pawl is in the upper position (near the drum surface).

Adjustment Standard:

When the drum has rotated 341 degrees, the pump piston position is at the upper dead point.

1. Open the front door and remove the inner cover.
2. Press and hold down the Drum Rotate button until the drum reaches the home position.
- ⇒ 3. Confirm that the 13 mm diameter hole in the gear and the 8 mm diameter hole in the side plate are lined up at the 6:00 o'clock position.
4. If the holes are not lined up, remove the E-rings and reposition the gear.
5. Rotate the drum to the home position and do step 3 again.

2.4 PRINTING

2.4.1 OVERVIEW

Printing Pressure Cam

For better printing quality, the shape of the printing pressure cam (the cam profile) has been changed.

The new cam applies printing pressure to the drum faster than before. The press roller is pressed against the ink roller (the master and the drum screens are in between) before the leading edge of the paper reaches this section.

In the C223, the press roller is pressed against the ink roller just when the paper leading edge reaches this point. In this case, the paper leading edge is strongly pressed against the master surface on the drum. Since the new master is thinner and delicate, the paper leading edge tends to damage the master surface if the same printing pressure cam was used, especially during a long printing run. (If the master surface is damaged, ink will leak and transfer onto the paper.) The new printing pressure cam will avoid this situation.

- ⇒ **NOTE:** 1) Because of the new printing pressure cam, the adjustment values (angles) for printing pressure application timing and exit pawl operation timing are changed. Refer to 'Exit Pawl Timing Adjustment' in the 'Replacement and Adjustment' section.
- 2) The new printing pressure cam cannot be used in the older models. Because of the new cam profile, the shift range in the backward direction in image shifting mode has been changed from 15 mm to 10 mm. In the forward direction, it is 20 mm as before.

Paper Detection and Printing

In the C223, the paper detection feeler was used in order to prevent the press roller from contacting the drum (without paper) and getting ink on it when a paper misfeed occurred before the paper reached the press roller.

The paper detection feeler could be pressed downwards by paper since a gap between the paper detection arm and the pressure on/off lever was created when the widest part of the pressure cam reached the bearing on the pressure on/off lever. With the earlier second feed roller start timing, this gap cannot be created. Therefore, the same mechanism is not used. (The timing was changed to make paper registration more accurate; see the Paper Feed section for details.)

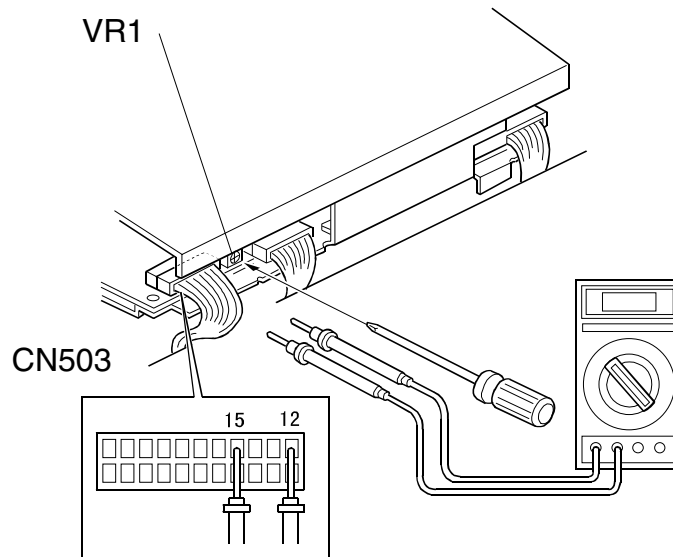
NOTE: For the details of the paper detection feeler operation, refer to the C223 Service Manual. (Section 5.2, 'Paper Detection And Printing Pressure On/Off Mechanism' in the 'Detailed Section Descriptions' section.)

Instead of the paper detection feeler, the registration sensor (a photocoupler) is used. When the sensor detects the paper, the printing pressure solenoid energizes to start applying the printing pressure. (In the C223, the printing pressure solenoid was energized as soon as paper feed started.) The sensor is also used as a paper jam detector.

5. REPLACEMENT AND ADJUSTMENT

5.1 MASTER FEED

5.1.1 THERMAL HEAD VOLTAGE ADJUSTMENT



Purpose: To maintain the quality of masters and to extend the life of the thermal head.

Adjustment Standard:

There are two steps.

- 1) The output voltage for the thermal head from the power supply unit must be 22.5 volts (± 0.5).
- 2) The output from the DC/DC converter board is different from one thermal head to another. Refer to the voltage value (X) on the thermal head decal. The output should be between "X-0.1" and "X" volts.

NOTE: This adjustment is always required when the thermal head or power supply unit is replaced.

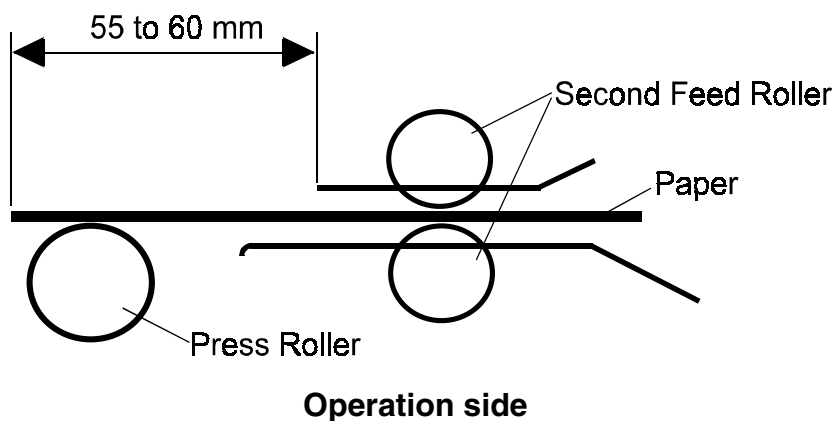
1. Turn off the main switch and remove the paper exit cover plate (4 screws).
- ⇒ 2. Turn on the main switch.
3. Access SP mode and select output check mode (SP131) No. 41.
4. Press the Print Start key to apply thermal head voltage continuously

CAUTION: Do not apply the Voltage for more than 60 seconds.

5. Check the voltage between CN503-15 and CN503-12. If the voltage is not 22.5 volts (± 0.5), turn VR1 on the power supply board to adjust the voltage.
6. Leave the SP mode and turn off the main switch. Then, connect CN503 of the power supply unit.

⇒ 5.4 PAPER FEED

5.4.1 FEED LENGTH OF THE SECOND FEED ROLLER ADJUSTMENT



Purpose: To ensure proper paper feed by the second feed rollers.

Adjustment Standard: 55 to 60 mm

1. Stack about 100 sheets of paper on the paper table.
2. Set the paper table in the paper feed position (Use output check mode SP131, No. 19). Then, turn the main switch off and unplug the machine.
3. Remove the rear cover and the drum unit from the machine.
4. Turn on the paper feed solenoid manually, then gradually turn the drum rotation shaft with a 10 mm spanner.
5. Measure the paper feed length from the time the second feed roller starts rotating until it stops rotating. This feed length should be between 55 and 60 mm.
6. If it is not, adjust the feed length by loosening the screw and shifting the cam up or down.
7. Check the adjustment by repeating steps 4 and 5.

BULLETIN NUMBER: C210/C218/C223/C228 – 009

07/26/2001

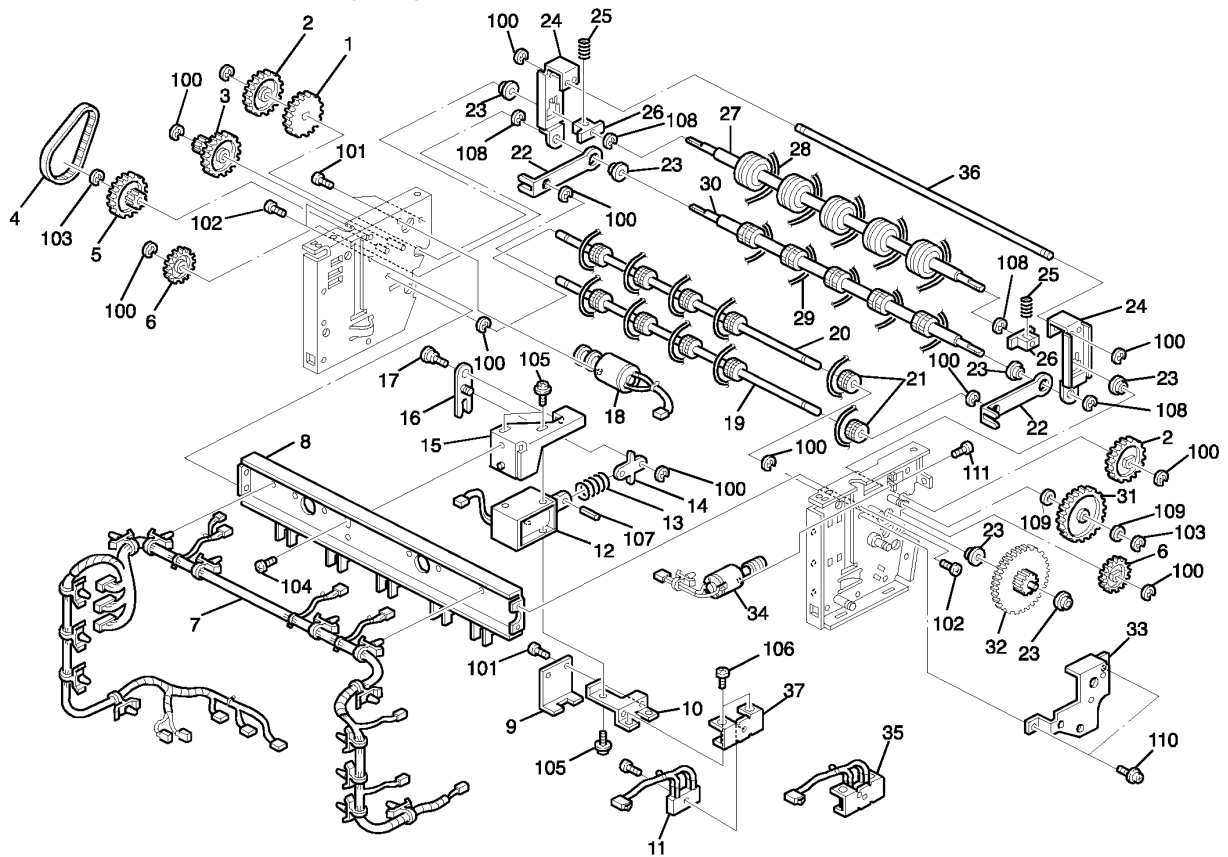
APPLICABLE MODEL:
GESTETNER – 5390
RICOH – VT6000
SAVIN – 3400DNP

SUBJECT: MASTER EJECT UNIT

GENERAL:

The following part update is being issued for all C228 Parts Catalogs.

33. MASTER EJECT SECTION 1 (C228)



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PARTS

					REFERENCE	
OLD PART NO.	NEW PART NO.	DESCRIPTION	QTY	INT	PAGE	ITEM
C2281011	C2281057	Master Eject Unit	1	-	75	*