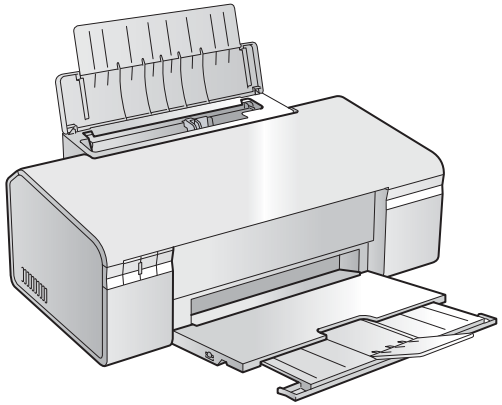
SERVICE MANUAL



Color Inkjet Printer

EPSON Stylus C110/C120/D120

EPSON
EXCEED YOUR VISION

SEIJ07-001

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PRECAUTIONS

Precautionary notations throughout the text are categorized relative to 1) Personal injury and 2) damage to equipment.

DANGER Signals a precaution which, if ignored, could result in serious or fatal personal injury. Great caution should be exercised in performing procedures preceded by DANGER Headings.

WARNING Signals a precaution which, if ignored, could result in damage to equipment.

The precautionary measures itemized below should always be observed when performing repair/maintenance procedures.

DANGER

1. ALWAYS DISCONNECT THE PRODUCT FROM THE POWER SOURCE AND PERIPHERAL DEVICES PERFORMING ANY MAINTENANCE OR REPAIR PROCEDURES.
2. NO WORK SHOULD BE PERFORMED ON THE UNIT BY PERSONS UNFAMILIAR WITH BASIC SAFETY MEASURES AS DICTATED FOR ALL ELECTRONICS TECHNICIANS IN THEIR LINE OF WORK.
3. WHEN PERFORMING TESTING AS DICTATED WITHIN THIS MANUAL, DO NOT CONNECT THE UNIT TO A POWER SOURCE UNTIL INSTRUCTED TO DO SO. WHEN THE POWER SUPPLY CABLE MUST BE CONNECTED, USE EXTREME CAUTION IN WORKING ON POWER SUPPLY AND OTHER ELECTRONIC COMPONENTS.
4. WHEN DISASSEMBLING OR ASSEMBLING A PRODUCT, MAKE SURE TO WEAR GLOVES TO AVOID INJURIER FROM METAL PARTS WITH SHARP EDGES.

WARNING

1. REPAIRS ON EPSON PRODUCT SHOULD BE PERFORMED ONLY BY AN EPSON CERTIFIED REPAIR TECHNICIAN.
2. MAKE CERTAIN THAT THE SOURCE VOLTAGES IS THE SAME AS THE RATED VOLTAGE, LISTED ON THE SERIAL NUMBER/RATING PLATE. IF THE EPSON PRODUCT HAS A PRIMARY AC RATING DIFFERENT FROM AVAILABLE POWER SOURCE, DO NOT CONNECT IT TO THE POWER SOURCE.
3. ALWAYS VERIFY THAT THE EPSON PRODUCT HAS BEEN DISCONNECTED FROM THE POWER SOURCE BEFORE REMOVING OR REPLACING PRINTED CIRCUIT BOARDS AND/OR INDIVIDUAL CHIPS.
4. IN ORDER TO PROTECT SENSITIVE MICROPROCESSORS AND CIRCUITRY, USE STATIC DISCHARGE EQUIPMENT, SUCH AS ANTI-STATIC WRIST STRAPS, WHEN ACCESSING INTERNAL COMPONENTS.
5. REPLACE MALFUNCTIONING COMPONENTS ONLY WITH THOSE COMPONENTS BY THE MANUFACTURE; INTRODUCTION OF SECOND-SOURCE ICs OR OTHER NON-APPROVED COMPONENTS MAY DAMAGE THE PRODUCT AND VOID ANY APPLICABLE EPSON WARRANTY.
6. WHEN USING COMPRESSED AIR PRODUCTS; SUCH AS AIR DUSTER, FOR CLEANING DURING REPAIR AND MAINTENANCE, THE USE OF SUCH PRODUCTS CONTAINING FLAMMABLE GAS IS PROHIBITED.

About This Manual

This manual describes basic functions, theory of electrical and mechanical operations, maintenance and repair procedures of the printer. The instructions and procedures included herein are intended for the experienced repair technicians, and attention should be given to the precautions on the preceding page.

Manual Configuration

This manual consists of six chapters and Appendix.

CHAPTER 1.PRODUCT DESCRIPTIONS
Provides a general overview and specifications of the product.

CHAPTER 2.OPERATING PRINCIPLES
Describes the theory of electrical and mechanical operations of the product.

CHAPTER 3.TROUBLESHOOTING
Describes the step-by-step procedures for the troubleshooting.

CHAPTER 4.DISASSEMBLY / ASSEMBLY
Describes the step-by-step procedures for disassembling and assembling the product.

CHAPTER 5.ADJUSTMENT
Provides Epson-approved methods for adjustment.

CHAPTER 6.MAINTENANCE
Provides preventive maintenance procedures and the lists of Epson-approved lubricants and adhesives required for servicing the product.

APPENDIX Provides the following additional information for reference:
- Exploded Diagram
- Parts List
- Circuit Diagrams

Symbols Used in this Manual

Various symbols are used throughout this manual either to provide additional information on a specific topic or to warn of possible danger present during a procedure or an action. Be aware of all symbols when they are used, and always read NOTE, CAUTION, or WARNING messages.

Indicates an operating or maintenance procedure, practice or condition that is necessary to keep the product's quality.

Indicates an operating or maintenance procedure, practice, or condition that, if not strictly observed, could result in damage to, or destruction of, equipment.

May indicate an operating or maintenance procedure, practice or condition that is necessary to accomplish a task efficiently. It may also provide additional information that is related to a specific subject, or comment on the results achieved through a previous action.

Indicates an operating or maintenance procedure, practice or condition that, if not strictly observed, could result in injury or loss of life.

Indicates that a particular task must be carried out according to a certain standard after disassembly and before re-assembly, otherwise the quality of the components in question may be adversely affected.

Revision Status

Revision	Date of Issue	Description
A	August 9, 2007	First Release
B	September 21, 2007	Chapter 1 • *1.2.1 Basic Specifications (p. 10)* : Note about a special nozzle of each color on the Printhead is added. • *1.2.3 Supported Paper (p. 12)* : Note about nominal weight is added. Chapter 2 • *2.1.2 Motors & Sensors (p. 22)* : Note about a special nozzle of each color on the Printhead is added. • *2.2.1 Printhead (p. 23)* : Note about a special nozzle of each color on the Printhead is added. Chapter 4 • *4.1.2 Tools (p. 70)* : The Upper Case Opener is added. • *4.3.4 Upper Housing/Cover Open Sensor (p. 74)* : CheckPoint of removing the Right Front Cover is added.

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Chapter 5 ADJUSTMENT

Chapter 6 MAINTENANCE

Chapter 7 APPENDIX

CHAPTER

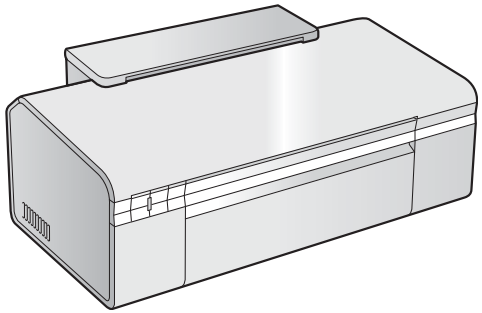
1

PRODUCT DESCRIPTION

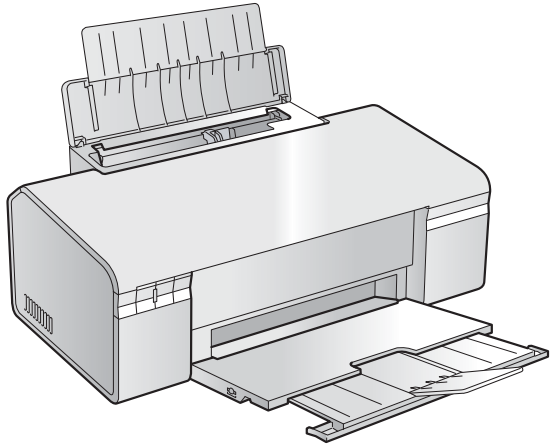
1.1 Features

EPSON Stylus C110/C120/D120 are single-function color ink-jet printers.
The main features are;

- High speed & High quality
  - Maximum print resolution: SMGA 5760 (H) x 1440 (V) dpi
  - Newly developed F3-3 Mach Turbo II Printhead achieves higher black&white print speed than ever.
  - Installs two black ink cartridges as standard.
  - Newly developed pigment ink is employed.
  - Borderless printing on specified EPSON brand paper is available.
- Control panel
  Simple design with three buttons and three indicators (LED).
- Dimensions
  - Dimensions: 435 mm (W) x 240 mm (D) x 161 mm (H)
    (Paper support and stacker are closed. Rubber feet are excluded)
  - Weight: 3.9 kg (without ink cartridges)



Paper Support & Stacker are Closed



Paper Support & Stacker are Opened

Figure 1-1. External View

1.2 Printing Specifications

1.2.1 Basic Specifications

Table 1-1. Printer Specifications

Item	Specifications
Print method	On-demand ink jet
Nozzle configuration	Black:180 nozzles x 2 Color: 60 nozzles x 3 (Cyan, Magenta, Yellow)*
Print direction	Bi-directional minimum distance printing (logic seeking)
Print resolution	Horizontal x Vertical (dpi) • 360 x 180 • 720 x 720 • 360 x 360 • 1440 x 720 • 360 x 720 • SMGA 5760 x 1440 (1440 x 1440)
Control code	• ESC/P Raster command • EPSON Remote command
Input buffer size	T.B.D. Kbytes
Paper feed method	Friction feed, using one ASF (Auto Sheet Feeder)
Paper path	Top feed, front out
Paper feed rates	T.B.D. mm/sec (at 25.4 mm feed)
PF interval	Programmable in 0.01764 mm (1/1440 inch) steps

Note *: The No.1 nozzle of each color is used only for executing flushing, and is not used for printing.Refer to "2.2.1 Printhead" *(p.23)*

1.2.2 Print Mode

Table 1-2. Print Mode (Color)

Media	Print Mode	Resolution (H x V) dpi	Dot Size (cps)	Bi-d	Micro Weave	Border-less
• Plain paper • Premium Bright White Paper (EAI) • Premium Ink Jet Plain papers (others)	Draft 1	360x180	Eco (400cps)	ON	OFF	N/A
	Draft 2	360x180	Eco (400cps)	ON	OFF	N/A
	Normal 2	360x360	VSD1 (320cps)	ON	OFF	N/A
	Normal 3	360x360	VSD1 (320cps)	ON	ON	N/A
	Fine	360x720	VSD2 (245cps)	ON	ON	N/A
	Photo 2	720x720	VSD3 (245cps)	ON	ON	N/A
• Ultra Premium Glossy Photo Paper (EAI) • Ultra Glossy Photo Paper (others)	Best Photo	1440x720	VSD3 (245cps)	ON	ON	OK
	Photo RPM	1440x1440	VSD3 (245cps)	ON	ON	OK
• Premium Photo Paper Glossy (EAI) • Premium Glossy Photo Paper (others)	Fine	360x720	VSD2 (245cps)	ON	ON	OK
	Photo 1	720x720	VSD2 (245cps)	ON	ON	OK
	Best Photo	1440x720	VSD3 (245cps)	ON	ON	OK
	Photo RPM	1440x1440	VSD3 (245cps)	ON	ON	OK
• Photo Paper Glossy (EAI) • Glossy Photo Paper (others)	Fine	360x720	VSD2 (245cps)	ON	ON	OK
	Photo 1	720x720	VSD2 (245cps)	ON	ON	OK
	Best Photo	1440x720	VSD3 (245cps)	ON	ON	OK

Table 1-2. Print Mode (Color)

Media	Print Mode	Resolution (H x V) dpi	Dot Size (cps)	Bi-d	Micro Weave	Border-less
• Premium Photo Paper Semi-Gloss (EAI) • Premium Semigloss Photo Paper (others)	Fine	360x720	VSD2 (245cps)	ON	ON	OK
	Photo 1	720x720	VSD2 (245cps)	ON	ON	OK
	Best Photo	1440x720	VSD3 (245cps)	ON	ON	OK
• Premium Presentation Paper Matte (EAI) • Matte Paper Heavy-weight (others)	Photo 1	720x720	VSD2 (245cps)	ON	ON	OK
	Best Photo	1440x720	VSD3 (245cps)	ON	ON	OK
• Photo Quality Inkjet Paper* (others)	Photo 1	720x720	VSD2 (245cps)	ON	ON	N/A
	Best Photo	1440x720	VSD3 (245cps)	ON	ON	N/A
• Envelope	Normal 2	360x360	VSD1 (320cps)	OFF	OFF	N/A
	Fine	360x720	VSD2 (245cps)	OFF	ON	N/A

Note * : Not supported in EAI.

Table 1-3. Print Mode (Monochrome)

Media	Print Mode	Resolution (H x V) dpi	Dot Size (cps)	Bi-d	Micro Weave	Border-less
• Plain paper • Premium Bright White Paper (EAI) • Premium Inkjet Plain Paper (others)	Draft 3	360x360	Eco (400cps)	ON	OFF	N/A
	Draft 4	360x360	Eco (400cps)	ON	OFF	N/A
	Normal 1	360x360	VSD1 (320cps)	ON	OFF	N/A
	Normal 3	360x360	VSD1 (320cps)	ON	ON	N/A
	Fine	360x720	VSD2 (245cps)	ON	ON	OK
	Photo 2	720x720	VSD3 (245cps)	ON	ON	N/A
• Premium Presentation Paper Matte (EAI) • Matte Paper Heavy-weight (others)	Photo 1	720x720	VSD2 (245cps)	ON	ON	OK
	Best Photo	1440x720	VSD3 (245cps)	ON	ON	OK
• Photo Quality Inkjet Paper* (others)	Photo 1	720x720	VSD2 (245cps)	ON	ON	N/A
	Best Photo	1440x720	VSD3 (245cps)	ON	ON	N/A
• Envelope	Normal 1	360x360	VSD1 (320cps)	OFF	OFF	N/A
	Fine	360x720	VSD2 (245cps)	OFF	ON	N/A

Note * : Not supported in EAI

1.2.3 Supported Paper

The table below lists the paper type and sizes supported by the printer. The Supported paper type and sizes vary depending on destinations (between EAI, EUR, and Asia).

Table 1-4. Supported Paper

Paper Name	Paper Size		Thickness (mm)	Weight	EAI		EUR		Asia	
					P*1	B*2	P*1	B*2	P*1	B*2
Plain paper	Legal	215.9 x 355.6 mm (8.5”x14”)	0.08-0.11	64-90 g/m^2 (17-24 lb.)	Y	-	Y	-	Y	-
	Letter	215.9 x 279.4 mm (8.5”x11”)			Y	-	Y	-	Y	-
	A4	210 x 297 mm (8.3”x11.7”)			Y	-	Y	-	Y	-
	B5	182 x 257 mm (7.2”x10.1”)			-	-	Y	-	Y	-
	A5	148 x 210 mm (5.8”x8.3”)			-	-	Y	-	Y	-
	Half Letter	139.7 x 215.9 mm (5.5"x8.5”)			Y	-	-	-	-	-
	A6	105 x 148 mm (4.2”x5.8”)			Y	-	Y	-	Y	-
	User Defined	89 x 127- 329 x 1117.6 mm (3.56”x 5.08” - 13.16”x44.7”)			Y	-	Y	-	Y	-
Premium Inkjet Plain Paper	A4	210 x 297 mm (8.3”x11.7”)	0.11	80 g/m^2 (21 lb.)	-	-	Y	-	Y	-
Premium Bright White Paper (EAI) Bright White Inkjet Paper (Euro, Asia)	Letter	215.9 x 279.4 mm (8.5”x11”)	0.11	90 g/m^2 (24 lb.)	Y	-	-	-	-	-
	A4	210 x 297 mm (8.3”x11.7”)	0.13	92.5 g/m^2 (25 lb.)	-	-	Y	-	Y	-
Ultra Premium Glossy Photo Paper (EAI)* Ultra Glossy Photo Paper (Euro, Asia)*	Letter	215.9 x 279.4 mm (8.5”x11”)	0.30	290 g/m^2 (77 lb.)	Y	Y	-	-	-	-
	A4	210 x 297 mm (8.3”x11.7”)			-	Y	Y	Y	Y	Y
	8” x 10”	203.2 x 254 mm			Y	Y	-	-	-	-
	5” x 7”	127 x 178 mm			Y	Y	Y	Y	-	-
	4” x 6”	101.6 x 152.4 mm			Y	Y	Y	Y	Y	Y

Table 1-4. Supported Paper

Paper Name	Paper Size		Thickness (mm)	Weight	EAI		EUR		Asia	
					P*1	B*2	P*1	B*2	P*1	B*2
Premium Photo Paper Glossy (EAI) Premium Glossy Photo Paper (Euro, Asia)	Letter	215.9 x 279.4 mm (8.5”x11”)	0.27	255 g/m^2 (68 lb.)	Y	Y	-	-	-	-
	A4	210 x 297 mm (8.3”x11.7”)			Y	Y	Y	Y	Y	Y
	8” x 10”	203.2 x 254 mm			Y	Y	-	-	-	-
	5” x 7”	127 x 178 mm			Y	Y	Y	Y	Y	Y
	4" x 6"	101.6 x 152.4 mm			Y	Y	Y	Y	Y	Y
	16:9 wide	101.6 x 180.6 mm			Y	Y	Y	Y	Y	Y
Photo Paper Glossy (EAI) Glossy Photo Paper (Euro, Asia)	Letter	215.9 x 279.4 mm (8.5”x11”)	0.25	258 g/m^2 (68 lb.)	Y	Y	-	-	-	-
	A4	210 x 297 mm (8.3”x11.7”)			Y	Y	Y	Y	Y	Y
	5” x 7”	127 x 178 mm			-	-	Y	Y	-	-
	4” x 6”	101.6 x 152.4 mm			Y	Y	Y	Y	Y	Y
Premium Photo Paper Semi-Gloss (EAI) Premium Semigloss Photo Paper (Euro, Asia)	Letter	215.9 x 279.4 mm (8.5”x11”)	0.27	250 g/m^2 (66 lb.)	Y	Y	-	-	-	-
	A4	210 x 297 mm (8.3”x11.7”)			-	-	Y	Y	Y	Y
	4” x 6”	101.6 x 152.4 mm			Y	Y	Y	Y	Y	Y
Premium Presentation Paper Matte (EAI) Matte Paper-Heavyweight (Euro, Asia)	Letter	215.9 x 279.4 mm (8.5”x11”)	0.23	167 g/m^2 (44 lb.)	Y	Y	-	-	-	-
	A4	210 x 297 mm (8.3”x11.7”)			Y	Y	Y	Y	Y	Y
	8” x 10”	203.2 x 254 mm			Y	Y	-	-	-	-
Photo Quality Inkjet Paper	A4	210 x 297 mm (8.3”x11.7”)	0.13	102 g/m^2 (27 lb.)	-	-	Y	-	Y	-
Envelopes	#10	104.8 x 241.3 mm (4.125”x9.5”)	-	75-100 g/m^2 (20-27 lb.)	Y	-	Y	-	Y	-
	#DL	110 x 220 mm			-	-	Y	-	Y	-
	#C6	114 x 162 mm			-	-	Y	-	Y	-

Note *1: “Y” in the “P” column stands for “the paper type/size is Supported”.

*2: “Y” in the “B” column stands for “Borderless printing is available”.

Note *: The nominal weight is 300 g/m^2

Note *:

CAUTION

- **Make sure the paper is not wrinkled, fluffed, torn, or folded.**
- **The curve of paper must be 5 mm or below.**
- **When printing on an envelope, be sure the flap is folded neatly.**
- **Do not use the adhesive envelopes.**
- **Do not use double envelopes and cellophane window envelopes.**

1.2.4 Printing Area

The printing area for this printer is shown below.

Table 1-5. Printing Area (Margins)

Print Mode	Paper Size	Margin			
		Left	Right	Top	Bottom
Standard print	Any size	3 mm	3 mm	3 mm	3 mm
	Envelope	5 mm	5 mm	3 mm	20 mm
Borderless print	A4/Letter to 5" x 7"	2.54 mm*	2.54 mm*	2.3 mm*	3.67 mm*
	4" x 6"			2.3 mm*	3.39 mm*

Note *: The margins for Borderless print are margins that bleed off the edges of paper.

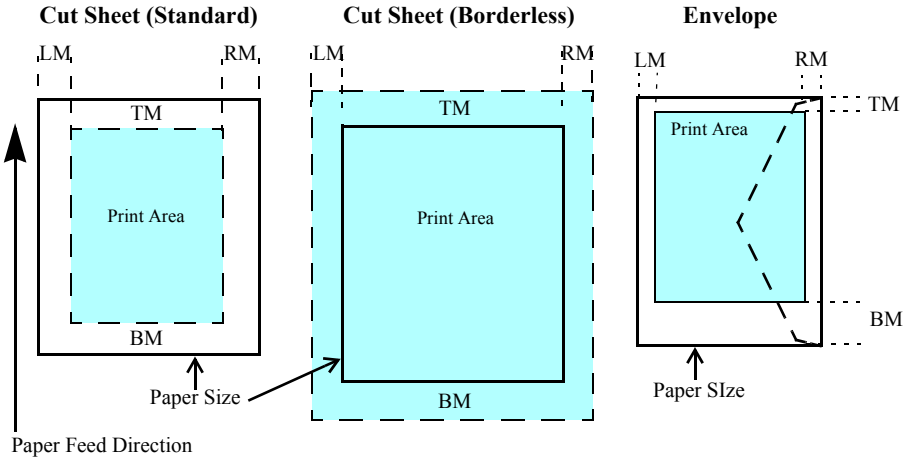


Figure 1-2. Printing Area

1.2.5 Ink Cartridge

The product numbers of the EPSON ink cartridges for this printer are shown below.

Table 1-6. Product No. of Ink Cartridges

Color	EAI	Latin	Euro	CISMEA	Asia
Black	T0681 (S)	T0731H (S)	T0711H (S) T0711 (2S)	T0731H (S) T0731 (2S)	T0731H (S)* T0731 (2S)
Cyan	T0692 (3S)	T0732 (3S)	T0712 (3S)	T0732 (3S)	T0732 (3S)
Magenta	T0693 (3S)	T0733 (3S)	T0713 (3S)	T0733 (3S)	T0733 (3S)
Yellow	T0694 (3S)	T0734 (3S)	T0714 (3S)	T0734 (3S)	T0734 (3S)

Note *: Not supported for EHK.

- ☐ Shelf life
  Two years from production date (if unopened), six months after opening package.
- ☐ Storage Temperature

Table 1-7. Storage Temperature

Situation	Storage Temperature	Limit
When stored in individual boxes	-20 °C to 40 °C (-4°F to 104°F)	1 month max. at 40 °C (104°F)
When installed in main unit	-20 °C to 40 °C (-4°F to 104°F)	

- ☐ Dimension
  12.7 mm (W) x 68 mm (D) x 47 mm (H)

CAUTION

- **The ink cartridge cannot be refilled.**
- **Do not use expired ink cartridges.**
- **The ink in the ink cartridge freezes at -16 °C (3.2 °F). It takes about three hours under 25 °C (77°F) until the ink thaws and becomes usable.**

1.3 Interface

The printer has a USB interface of the following specification.

- Standards
  - "Universal Serial Bus Specifications Revision 2.0"
  - "Universal Serial Bus Device Class Definition for Printing Devices Version 1.1"
- Transfer rate: 480 Mbps (High Speed Device)
- Data format: NRZI
- Compatible connector: USB Series B
- Recommended cable length: 2 [m] or less

Table 1-8. Device ID

Product Name	When IEEE 1284.4 is Enabled	When IEEE 1284.4 is Disabled
Stylus C120	MFG:EPSON; CMD:ESCPL2,BDC,D4,D4PX; MDL:Stylus[SP]C120; CLS:PRINTER; DES:EPSON[SP]Stylus[SP]C120;	MFG:EPSON; CMD:ESCPL2,BDC; MDL:Stylus[SP]C120; CLS:PRINTER; DES:EPSON[SP]Stylus[SP]C120;
Stylus D120	MFG:EPSON; CMD:ESCPL2,BDC,D4,D4PX; MDL:Stylus[SP]D120; CLS:PRINTER; DES:EPSON[SP]Stylus[SP]D120;	MFG:EPSON; CMD:ESCPL2,BDC; MDL:Stylus[SP]D120; CLS:PRINTER; DES:EPSON[SP]Stylus[SP]D120;
Stylus C110	MFG:EPSON; CMD:ESCPL2,BDC,D4,D4PX; MDL:Stylus[SP]C110; CLS:PRINTER; DES:EPSON[SP]Stylus[SP]C110;	MFG:EPSON; CMD:ESCPL2,BDC; MDL:Stylus[SP]C110; CLS:PRINTER; DES:EPSON[SP]Stylus[SP]C110;

1.4 General Specifications

1.4.1 Electrical Specifications

- Primary power input

Table 1-9. Primary Power Specifications

Item		100-120 V model	220-240 V model
Rated power supply voltage		100 to 120 VAC	220 to 240 VAC
Input voltage range		90 to 132 VAC	198 to 264 VAC
Rated current		0.6 A	0.3 A
Rated frequency		50 to 60 Hz	
Input frequency range		49.5 to 60.5 Hz	
Insulation resistance		3000 V (for one minute)	
Energy conservation		International Energy Star Program compliant	
Power consumption	Printing (ISO10561 Letter Pattern)	15 W	15 W
	Sleep mode	2.0 W	2.0 W
	Standby mode (power-off)	0.2 W	0.4 W

Note : If the printer is not operated for more than three minutes, the printer shifts into the standby mode and reduces the current to the motor to conserve power.

1.4.2 Environmental Conditions

Table 1-10. Environmental Conditions

Condition	Temperature*1	Humidity*1,2	Shock	Vibration
Operating	10 to 35°C (50 to 95°F)	20 to 80%	1G (1 msec or less)	0.15G, 10 to 55Hz
Storage (unpacked)	-20 to 40°C*3 (-4°F to 104°F)	5 to 85%	2G (2 msec or less)	0.50G, 10 to 55Hz

Note *1: The combined Temperature and Humidity conditions must be within the blue-shaded range in Fig.1-3.

*2: No condensation

*3: Must be less than 1 month at 40°C.

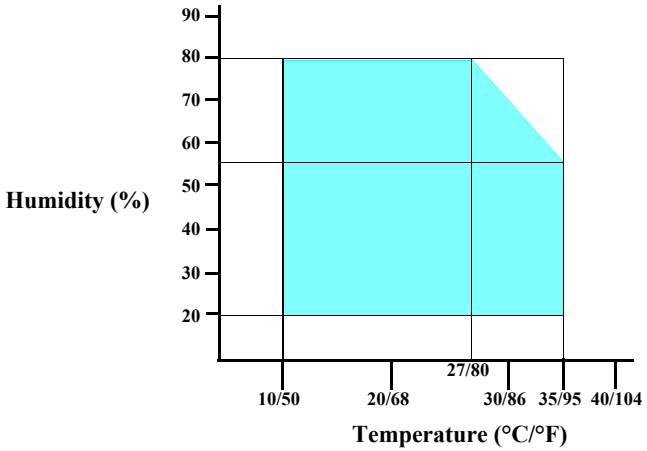


Figure 1-3. Temperature/Humidity Range

CAUTION

- **When returning the repaired printer to the customer, make sure the Printhead is covered with the cap and the ink cartridge is installed.**
- **If the Printhead is not covered with the cap when the printer is off, turn on the printer with the ink cartridge installed, make sure the Printhead is covered with the cap, and then turn the printer off.**

1.4.3 Durability

- ☐ Total print life: Black 20,000 pages (A4, 3.5% duty), Color 10,000 pages (A4, ISOFDC24712), or five years which ever comes first
- ☐ Printhead: Six billions shots (per nozzle) or five years which ever comes first

1.4.4 Acoustic Noise

Max. 55dB (when printing from PC, on A4, in default mode)

1.4.5 Safety Approvals (Safety standards/EMI)

USA	UL60950-1
	FCC Part15 Subpart B Class B
Canada	CSA No.60950-1
	CAN/CSA-CEI/IEC CISPR 22 Class B
Mexico	NOM-019-SCFI-1998
Taiwan	CNS13438 Class B
	CNS14336
EU	EN60950-1
	EN55022 Class B
	EN61000-3-2, EN61000-3-3
	EN55024
Germany	EN60950-1
Russia	GOST-R (IEC60950-1, CISPR 22)
Singapore	IEC60950-1
Korea	K60950-1
	KN22 Class B
	KN61000-4-2/-3/-4/-5/-6/-11
China	GB4943
	GB9254 Class B, GB17625.1
Argentina	IEC60950-1
Australia	AS/NZS CISPR22 Class B

1.5 Operation Buttons & Indicators (LEDs)

1.5.1 Operation Buttons

The printer has the following three operation buttons.

Table 1-11. Operation Buttons

Button	Function
Power	Turns the power ON/OFF.
Ink	Runs a sequence of ink cartridge replacement or cleaning.
Paper	Feeds or ejects paper.

1.5.2 Indicators (LEDs)

Three indicators (LEDs) are provided to indicate settings or printer status.

Table 1-12. Indicators (LEDs)

LED	Function
Power LED (green)	Lights at power-on. Flashes during some sequence is in progress. Flashes at high speed during power-OFF sequence.
Ink LED (orange)*1	Lights or flashes when an ink-related error occurs.*2
Paper LED (orange)*1	Lights or flashes when an paper-related error occurs.*2

Note *1: The Ink LED and Paper LED stay OFF when printing from PC.
*2: See Table 1-14 "Indicators (LEDs) Function" for the LED status at error occurrence.

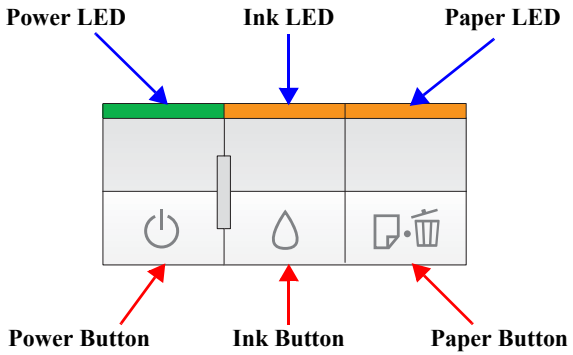


Figure 1-4. Buttons & LEDs

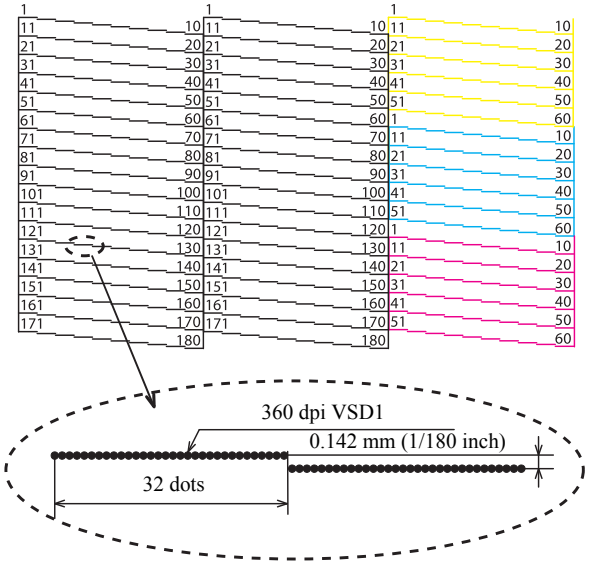
1.5.3 Operation Buttons & LEDs Functions

Detailed information on the buttons and LEDs functions are listed below.

Table 1-13. Operation Button Functions

Button	Function
Power	• Turns the power ON/OFF
Ink	• Runs a sequence of ink cartridge replacement. The carriage moves to set the ink cartridge to the position for replacement. • Moves the carriage to the ink check position when ink level low, ink out, or no ink cartridge error has occurred. • When an ink cartridge is at the ink check position, moves the carriage to set the cartridge to the position for replacement, or to the ink check position. • When an ink cartridge is at the ink replacement position, moves the carriage to the home position.
Paper	• Feeds or ejects paper. • Recovers from a multi-feed error and resumes the print job. • Feeds paper that is loaded on the tray when a no-paper error has occurred. • Ejects a jammed paper when a paper jam error has occurred. • Cancels the print job during printing.
Ink (when held for three seconds or longer)	• Runs a head cleaning. • Runs a sequence of ink cartridge replacement when ink level low, ink out, or no ink cartridge error has occurred.
Power + Paper *1 (combination)	• Prints a nozzle check pattern.*3
Power + Ink *2 (combination)	• Forcefully turns the power OFF.

Note 1: First press the Paper button and then Power button. The printer will turn On and print the nozzle check pattern.
2: First press the Power button and then Ink button. Hold them for seven seconds.
3: The nozzle check pattern printed by the printer is shown in **Figure 1-5**.



Note : The numbers shown in the figure are nozzle numbers. They are not printed on an actual nozzle check pattern.

Figure 1-5. Nozzle Check Pattern

Table 1-14. Indicators (LEDs) Function

Printer Status	Indicators (LEDs)			Priority*1
	Power	Ink	Paper	
Powering off	Flashes at high speed	OFF	OFF	1
Fatal error	OFF	Flashes at high speed	Flashes at high speed	2
Maintenance request	OFF	Flashes alternately 2	Flashes alternately 1	3
Paper jam	--	--	Flashes	5
Multi-feed error	--	--	ON	6
No paper error	--	--	ON	6
Cover open error	--	Flashes 2	Flashes 2	6
Ink cartridge replacement is in progress	Flashes	--	--	7
Ink sequence is in progress	Flashes	--	--	8
CSIC error	--	ON	--	9
No ink cartridge error or ink-out error	--	ON	--	9
During feeding or ejecting paper	Flashes	--	--	10
Data processing	Flashes	--	--	10
Ink level low error	--	Flashes	--	11
Power ON	ON	--	--	12
Reset request*2	ON	ON	ON	-

Note : --: No change
Flash: Repeats turning On and Off every 1.25 seconds.
Flash 2: Repeats On for 0.5 seconds, Off for 0.5 seconds, On for 0.5 seconds, and Off for 1.0 second.
Flash at high speed: Repeats turning On and Off every 0.5 seconds.
Flashes alternately 1: same as the "Flash"
Flashes alternately 2: Repeats turning Off and On every 1.25 seconds.

Note *1: When two or more errors occur at the same time, the one with higher priority will be indicated.

*2: All LEDs light for 0.2 seconds when a reset request is received.

1.5.4 Errors & Remedies

Error	Description	Remedies
Fatal error	A mechanical error has occurred.	Turn the power Off and back it On.
Maintenance request	Waste ink pads need to be replaced.	Replace the waste ink pads and reset the counter.
Paper jam	A paper jam has occurred.	Remove the jammed paper and press the Paper button.
No paper	Failed to feed paper.	Load paper correctly and press the Paper button.
Multi-feed	Multiple sheets of paper were fed at the same time.	Press the Paper button to eject the multiple sheets.
Ink-out	The cartridge has run out of ink.	Replace the ink cartridge.
No ink cartridge	Ink cartridge(s) was not detected.	Replace the ink cartridge.
Wrong ink cartridge	Incorrect ink cartridge(s) was detected.	Replace the ink cartridge.

Note : For more information on the remedies, see "3.2.2 Error Indications and Fault Occurrence Causes" *(p.45)*.

CHAPTER

2

OPERATING PRINCIPLE

2.1 Overview

This section describes the operating principles of the Printer Mechanism and Electrical Circuit Boards of Stylus C110/C120/D120.

Stylus C110/C120/D120 employs a newly developed printer mechanism. The following sections explain about the major components of the new printer mechanism.

2.1.1 Printer Mechanism

Stylus C110/C120/D120 printer mechanism consists of printhead, carriage mechanism, paper loading mechanism, paper feed mechanism, and ink system.

As the conventional models, Stylus C110/C120/D120 is equipped with two DC motors; one is used to drive the paper loading, paper feed mechanisms, and the pump mechanism that includes the carriage lock mechanism, and another one is used to drive the carriage mechanism. A paper is fed from the rear ASF unit by means of the LD roller and Retard roller and ejected to the front tray.

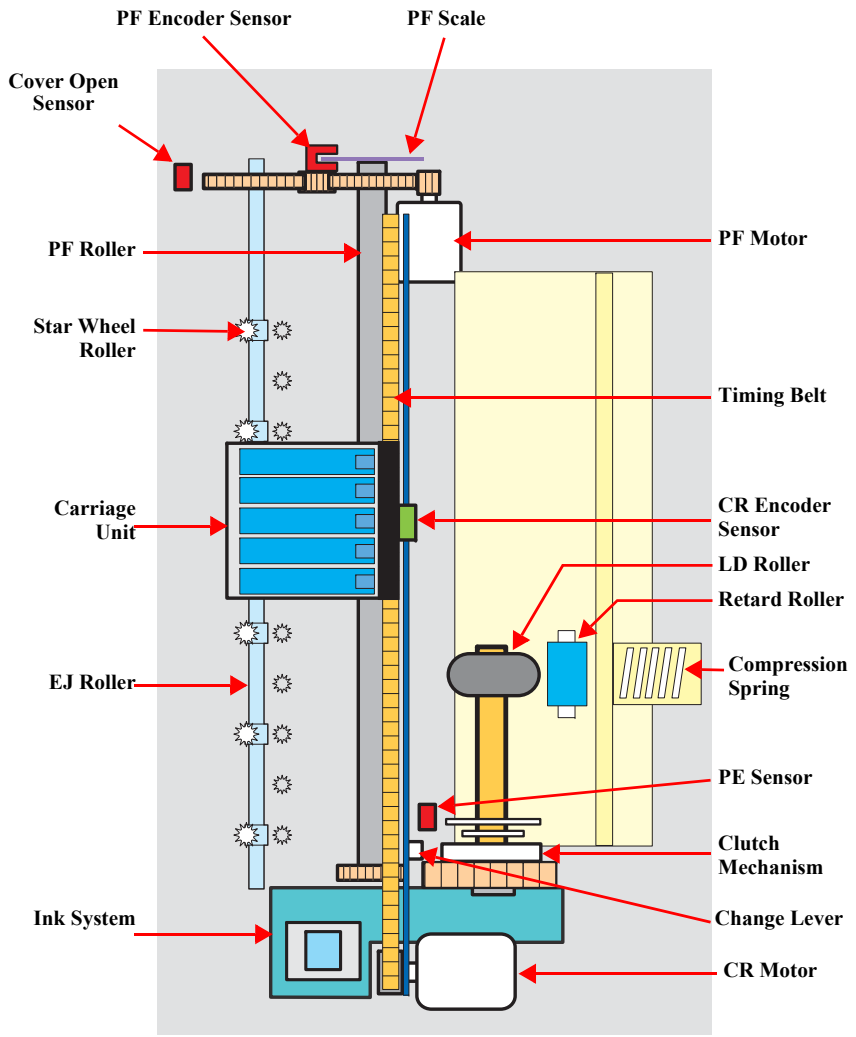


Figure 2-1. Printer Mechanism block diagram

2.1.2 Motors & Sensors

Stylus C110/C120/D120 printer mechanism is equipped with the following printhead, motors and sensors. Figure 2-3 shows their locations.

Table 2-1. List of Motors & Sensors

No.	Name	Specification
1	Printhead	F3-3 MACH Turbo2 head (Black: 180 nozzles x 2, Color: 180 nozzles (60 nozzles* x 3 colors) x 1
2	CR Motor	Type: DC motor Drive voltage: 42VDC +/- 5% (DRV IC voltage) Characteristics: Coil resistance: 22.7Ω +/- 10% Inductance: 15.9mH (1KHz) Drive method: PWM, constant-current chopping
3	PF Motor	Type: DC motor Drive voltage: 42VDC +/- 5% (DRV IC voltage) Characteristics: Coil resistance: 21.2Ω +/- 10% Inductance: 17.2 mH (1kHz) Drive method: PWM, constant-current chopping
4	PE Sensor	Purpose: Detection of paper top and bottom edge, for control to set paper at the print start position Type: Photo interrupter
5	CR contact module	CSIC board
6	CR Encoder Sensor	Type: Photo interrupter Resolution: 180 pulse/inch
7	PF Encoder Sensor	Type: Photo interrupter Resolution: 180 pulse/inch
8	Cover Open Sensor	Purpose: Detection of open/close status of the printer cover Type: Mechanical contact

Note "*": The No.1 nozzle of each color is used only for executing flushing, and is not used for printing.

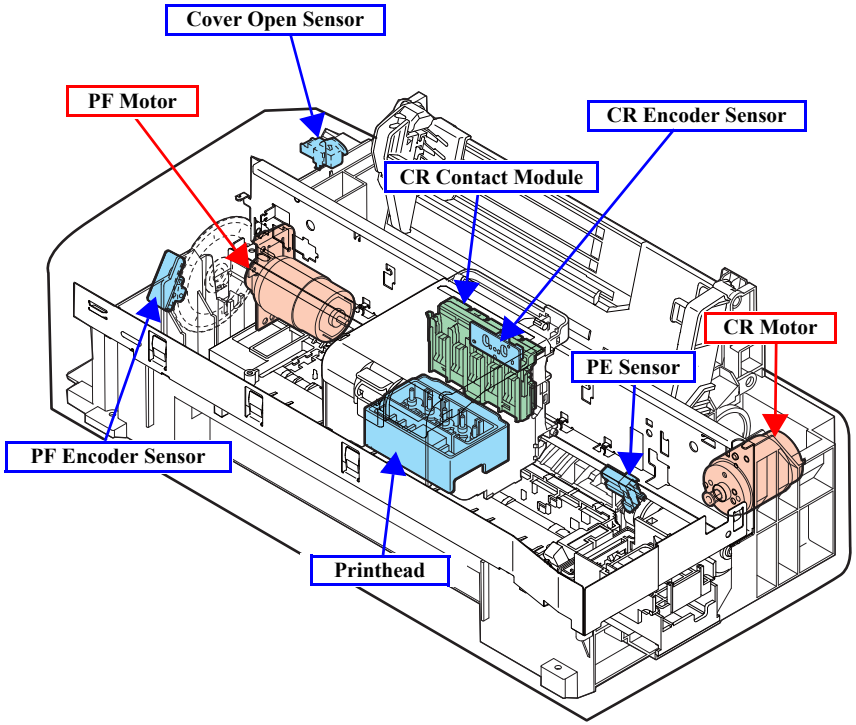


Figure 2-2. Motors & Sensors in Printer Mechanism

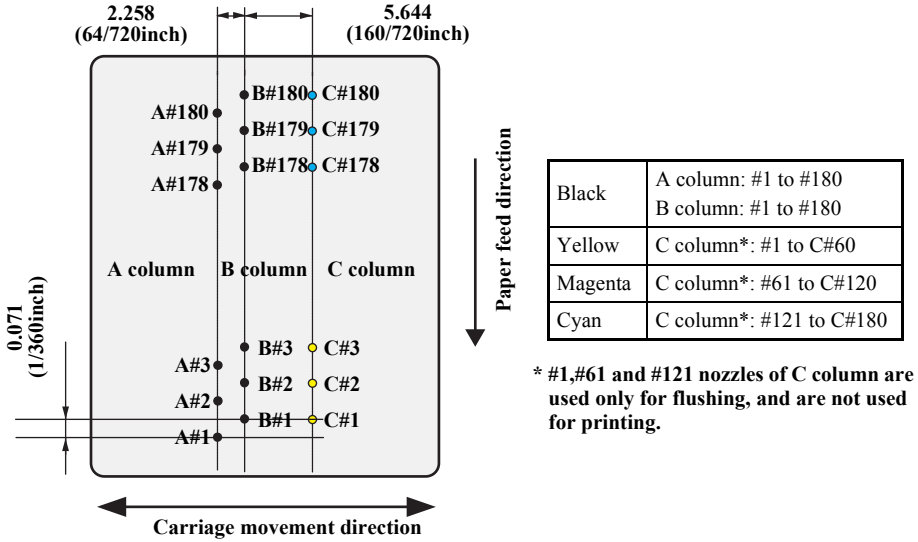
2.2 Printer Mechanism Operating Principles

2.2.1 Printhead

F3-3 Mach Turbo2 type printhead is employed, which produces variable sized dot and economy dot. The printhead configuration is as follows.

- Nozzle configuration
  - Black: 180 nozzles x 2
  - Color: 180 nozzles x 1 (cyan, magenta, yellow)

The nozzle layout as seen from behind the printhead is shown below.



Black	A column: #1 to #180 B column: #1 to #180
Yellow	C column*: #1 to C#60
Magenta	C column*: #61 to C#120
Cyan	C column*: #121 to C#180

*** #1,#61 and #121 nozzles of C column are used only for flushing, and are not used for printing.**

Figure 2-3. Nozzle Layout

The basic operating principles of the printhead, which plays a major role in printing, are the same as the previous printer; on-demand method which uses PZT (Piezo Electric Element). In order to reduce unit-to-unit variation in ink droplet size, the printhead has its own Head ID (10-digits code for Stylus C110/C120/D120) which corrects PZT drive voltage for the printhead.

Therefore, whenever the printhead, main board, or the printer mechanism must be replaced with a new one, the Head ID of the new printhead needs to be written into the EEPROM using the Adjustment Program. The printer generates appropriate PZT drive voltage based on the Head ID information.

Following explains the basic components of the printhead.

- PZT
  PZT is an abbreviation of Piezo Electric Element. Based on the drive waveform generated on the main board, the PZT selected by the nozzle selector IC on the printhead pushes the top of the ink cavity, which has ink stored, to eject the ink from each nozzle on the nozzle plate.
- Nozzle Plate
  The plate with nozzle holes on the printhead surface is called Nozzle Plate.
- Filter
  This filter is located beneath the ink supply needle which supply ink to the printhead from the ink cartridge. The filter is preventing dirt or dust from getting into the printhead. Any dirt or dust may interrupt normal ink flow or can cause nozzle clog adversely affecting the print quality.
- Ink Cavity
  The ink absorbed from the ink cartridge goes through the filter and then is stored temporarily in this tank called “ink cavity” until PZT is driven.

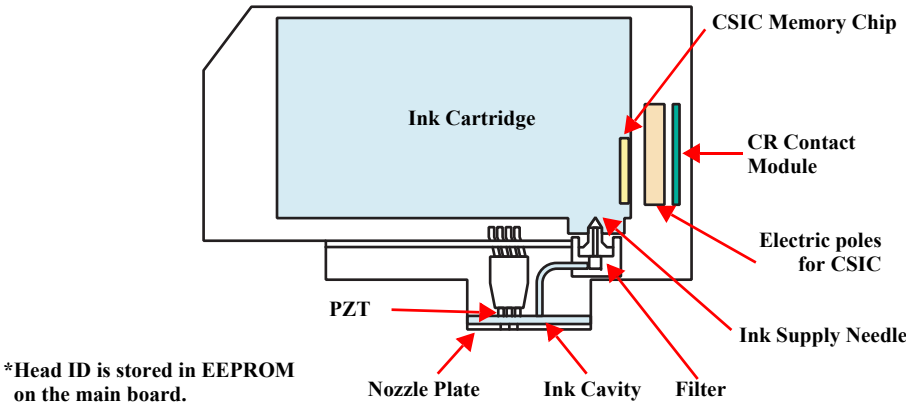


Figure 2-4. Printhead Mechanism

2.2.1.1 Printing Process

This section explains how the printhead of the on-demand inkjet printer fires ink drop from each of the nozzles.

1. When not firing ink drop
   When the printing signal is not output from the C687 main board, or the PZT drive voltage is not applied, the PZT does not change its shape. Therefore, the PZT does not push the ink cavity. The ink pressure inside the ink cavity is kept normal. (refer to Figure 2-5 *(p.24)* "When not firing ink drop")
2. When firing ink drop
   When the print signal is output from C687 main board, the nozzle selector IC provided on the printhead transmits the data in 1-byte unit. Based on the drive voltage generated on the main board, the PZT selected by the nozzle selector IC pushes the top of the ink cavity. By this operation, the ink stored in the ink cavity is ejected from nozzles. (refer to Figure 2-5 *(p.24)* "When firing ink drop")

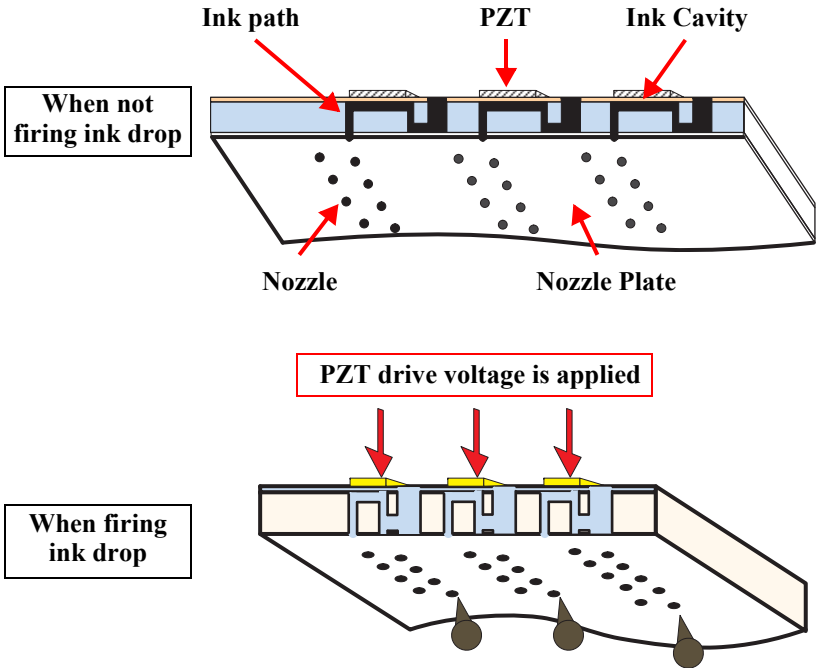


Figure 2-5. How to Fire Ink Drop

2.2.1.2 Printing Method

Stylus C110/C120/D120 offers printing with variable sized dot or printing with economy sized dot.

- ☐ Variable dot mode
  This mode is developed to improve the print quality on Epson designated paper. Three sizes of dot; micro, middle, and large are automatically selected and used for printing according to the print data, basically the same as conventional models. Superior quality can be achieved on the Epson paper.
- ☐ Economy dot mode
  Fixed larger dot is used for printing in economy mode, which enables fast printing with lower resolutions.

2.2.2 Carriage Mechanism

The carriage mechanism components include the carriage unit (including printhead, CR encoder sensor), CR motor, timing belt, and CR scale.
The operating principles of the carriage mechanism are described below.

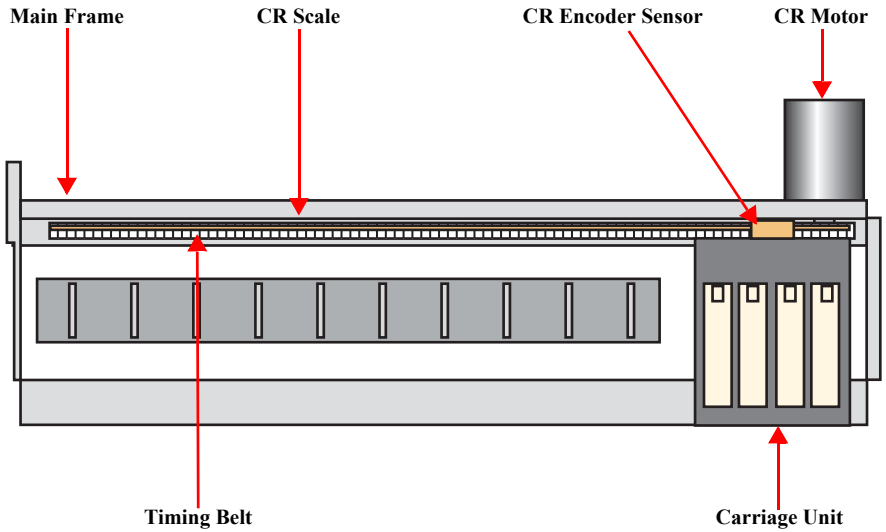


Figure 2-6. Carriage Mechanism

2.2.2.1 CR Motor Control

This printer employs closed-loop control, via the CR motor and an encoder, to control the carriage speed and position. Since the CR motor is DC motor, the printer controls the motor in the following methods in order to ensure stable print quality.

- Heat control
  The heat control over the CR motor is carried out based on the electrical characteristic of the motor such as torque constants, coil resistance and power supply voltages.
- CR motor drive dispersion measurement sequence
  Variations in torque constant, coil resistance and power supply voltage of the motor are measured in a CR motor drive dispersion measurement sequence when the CR mechanical load is in the initial state and saved into the EEPROM. According to the variations measured in the sequence, the voltage is corrected to make the drive current value constant reducing an individual difference.
- CR measurement sequence
  To set the appropriate drive voltage for the CR motor in accordance with variation of the CR motor mechanical load, the printer runs a CR measurement sequence and stores the measured data into the EEPROM at power-on or in an ink cartridge replacement sequence. A fatal error occurs if the printer detects that too much load is applied to the CR motor.

The above control and sequences enable to correct the drive voltage for the CR motor based on the mechanical load and the electrical characteristic of the motor. According to the corrected drive voltage, heating value of the motor is calculated. The printer automatically provides wait time per CR path during printing when the predetermined heating value is reached.

2.2.2.2 Carriage Home Position Detection

As the previous model, the carriage home position is detected by the CR motor drive electric current and carriage speed/position signals sent from the CR encoder. The detection sequence performed at power-on is described below.

1. Drives the CR motor to move the carriage until it contacts with the right frame, and then stops the CR motor. The carriage position is set as a position specified number of counts rightward from the home position.
2. Moves the carriage again to the carriage lock position to check the lock for proper operation.
3. The printer starts to monitor the carriage position through the CR encoder.

The printer causes a fatal error if too much load on the CR motor is detected due to obstruction on the carriage path or if no carriage position information is obtained due to CR encoder or CR scale failure.

2.2.3 Paper Loading/Paper Feed Mechanism

The paper loading/feed mechanism are driven and controlled by the PF motor (DC motor) and the PF encoder.
The PF motor drive force is transmitted to the LD roller and the PF roller via the gears in the mechanism. In the loading mechanism, paper is fed to the PF roller from the ASF unit, and the feed mechanism transports the paper during printing and ejects it.

The rotational direction of the PF motor switches between the loading and feed operations as shown in the table below.

Table 2-2. Rotational Direction of PF Motor & ASF Operations

Rotational Direction*	Operations
Clockwise	• Releases the change lever from the clutch mechanism.
Counterclockwise	• Feeds a paper into the printer and transports it. • Locks the clutch mechanism with the change lever.

Note "*": Rotational direction of the PF motor pinion gear as seen from the left side of the printer.

Figure 2-7 shows how the PF motor drive is transmitted to the LD roller and the PF roller. (The numbers in the figure indicate the sequence of the drive transmission.)

The PE sensor detects the paper top and bottom edges during the loading and feeding operations. When the sensor could not detect the top edge of paper during the loading operation, the printer causes a paper out error. And when the sensor could not detect the bottom edge of paper during feeding operation, the printer causes a paper jam error. For more details on the errors, see *Chapter 3 "TROUBLESHOOTING" (p42)*.

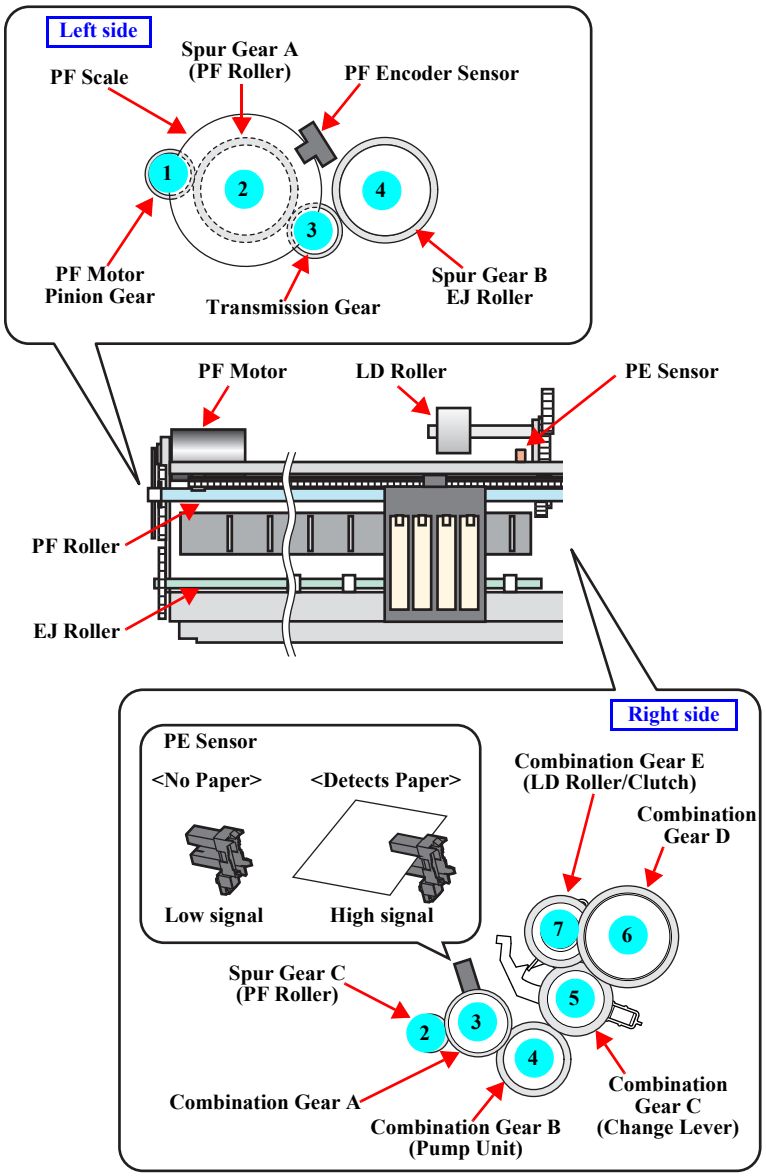


Figure 2-7. Paper Loading/Feed Mechanism

2.2.3.1 Paper Loading Mechanism (ASF Unit)

The paper loading mechanism loads paper from the ASF unit and feeds paper to the PF roller. The ASF unit includes the hopper, change lever, LD roller shaft, and clutch mechanism.
The change lever and the clutch mechanism play an important role in the paper loading operation as described below.

1. ASF home position detection function
   The change lever and the clutch mechanism are used to detect the ASF home position.
   The counterclockwise rotation of the PF motor brings the change lever to engage with the clutch mechanism. The ASF home position is detected by the engagement of the change lever at the beginning of the paper loading operation. At this time, paper is not fed to the PF roller because the PF motor drive force is not yet transmitted to the LD roller shaft.
2. Paper loading function
   When the change lever is disengaged from the clutch mechanism by the counterclockwise rotation of the PF motor pinion gear, the printer changes to the paper loading state from the ASF home position detection state. The PF motor drive force is transmitted to the LD roller, and paper is fed from the ASF unit.

The rotation of the two cams on the LD roller feeds paper into the printer.

- Larger cam: moves the hopper
- Smaller cam: moves the paper back lever

When the first sheet of paper has been fed, the second sheet is returned to the standby position by the hopper and the paper back lever, which are moved by the cams.

The following sections explain the paper loading sequence and operations of each components.

STEP1: ASF HOME POSITION

The counterclockwise rotation of the PF motor pinion gear (as seen from the left of the printer) causes the change lever to push down on the clutch lever, and the clutch lock tab is disengaged from the clutch gear as shown in Figure 2-8. This cuts the PF motor drive transmission to the LD roller shaft, and the shaft does not move at all. At the same time, the hopper is pushed down by the two cams on the LD roller shaft, and the paper back lever is set at the position to prevent paper from being fed. The "ASF home position" indicates all of the above statuses.

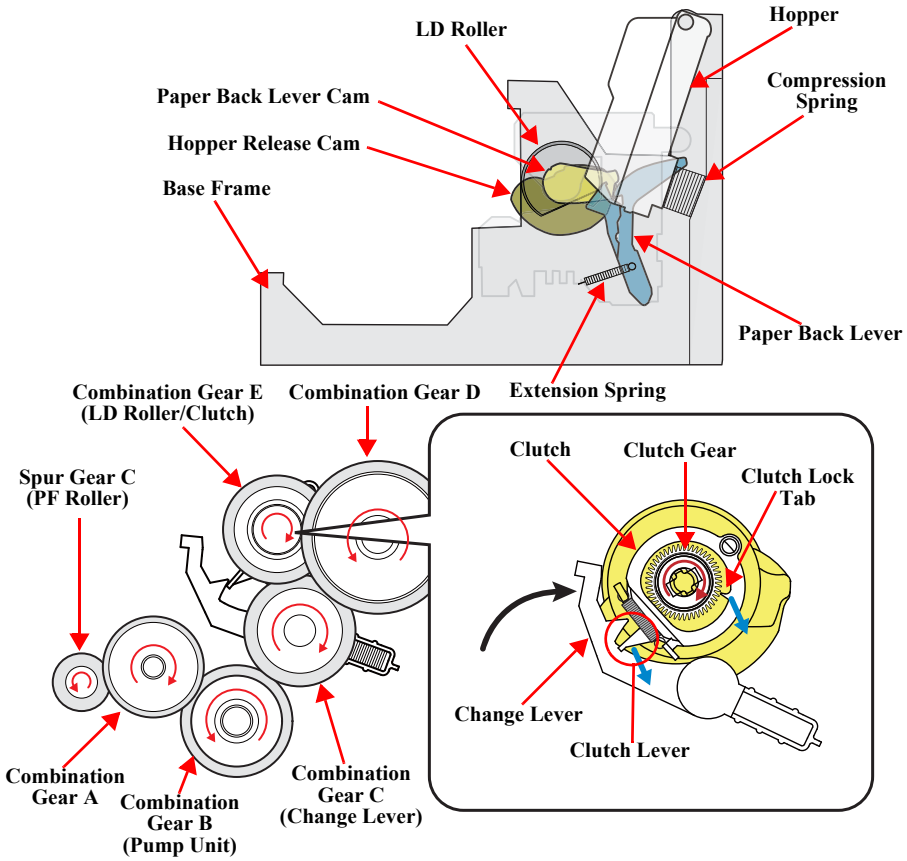


Figure 2-8. ASF Home Position

STEP2: RELEASING CLUTCH LEVER TO DRIVE LD ROLLER

When the PF motor pinion gear starts clockwise rotation (as seen from the left side), the change lever is moved toward the front of the printer to release the clutch lever. This causes the clutch to engage with the gear by being pulled by the extension spring. The clutch gear engages with the clutch lock tab and the PF motor drive force is now can be transmitted to the LD roller shaft.

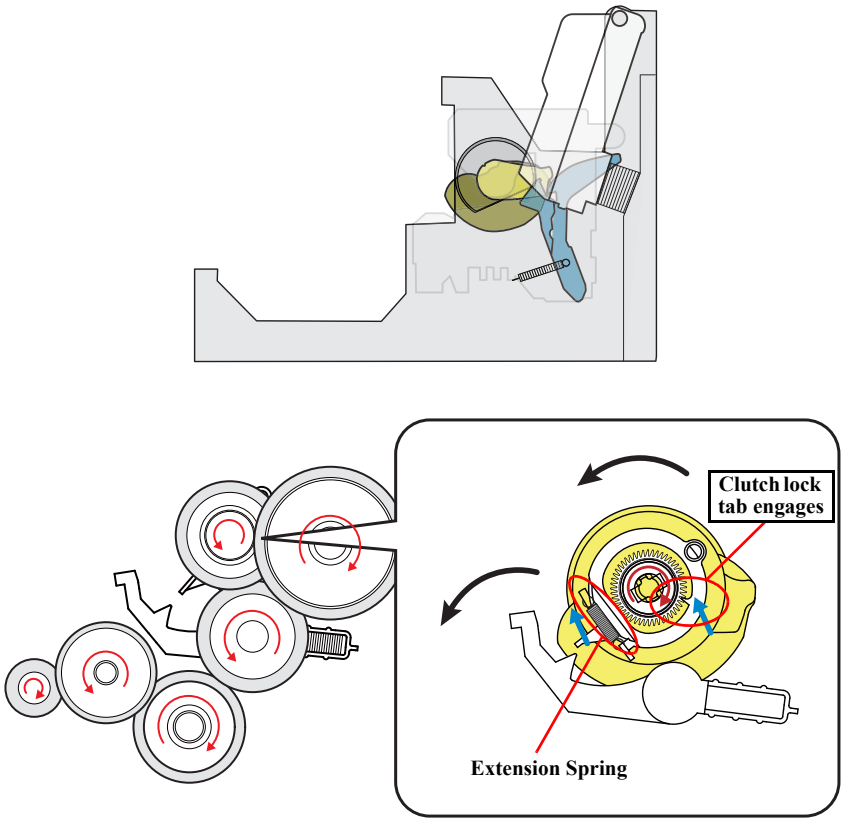


Figure 2-9. Releasing Clutch Lever

STEP3: FEEDING PAPER FROM ASF

After the engagement of the clutch, the PF motor pinion gear starts counterclockwise rotation (as seen from the left side) and the drive force is transmitted to the LD roller shaft via the clutch lock tab and the clutch gear. When the LD roller starts to rotate, the paper back lever is returned to its standby position, and the hopper is released from the cams by being pushed by the spring. This causes a sheet of paper to be caught between the hopper and the LD roller, and the further rotation of the LD roller feeds the paper into the printer.

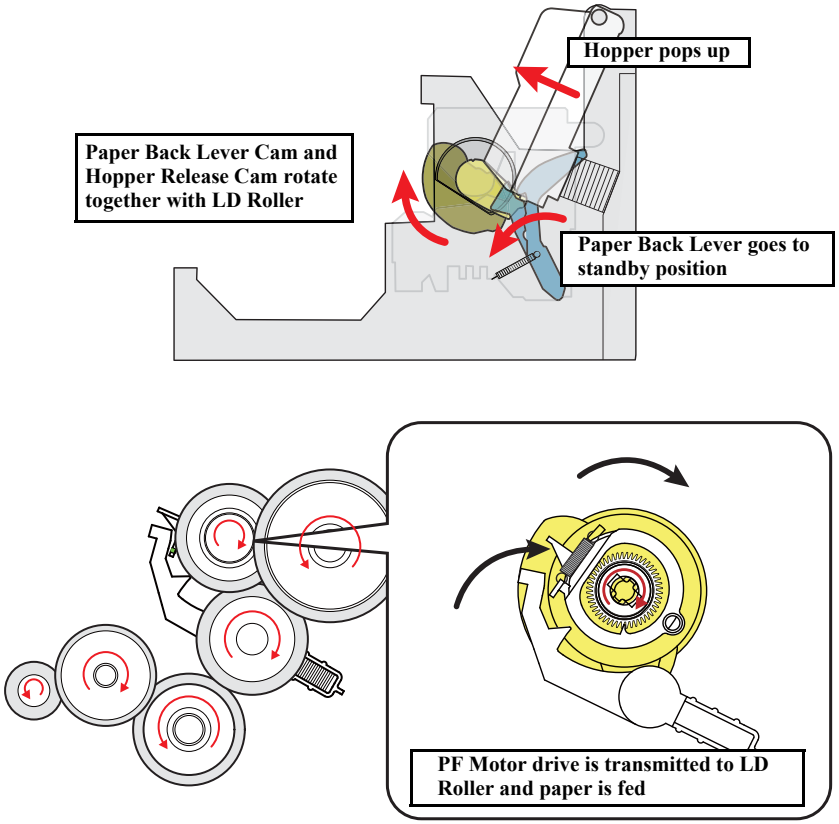


Figure 2-10. Feeding Paper from ASF

STEP4: ENDING PAPER LOADING OPERATION

Continuous counterclockwise rotation of the LD roller (as seen from the left side) feeds paper to the PF roller. The LD roller rotation causes the hopper release cam and the paper back lever cam to push down the hopper and the paper back lever respectively. The paper back lever returns paper to the standby position to prevent multiple sheets of paper from being fed at once.
When the LD roller and the clutch reach the ASF home position shown in “Step1” on the previous page, the clutch lever is locked again by the change lever. This causes the PF motor drive force not to be transmitted to the paper loading mechanism and to be transmitted only to the paper feeding mechanism.

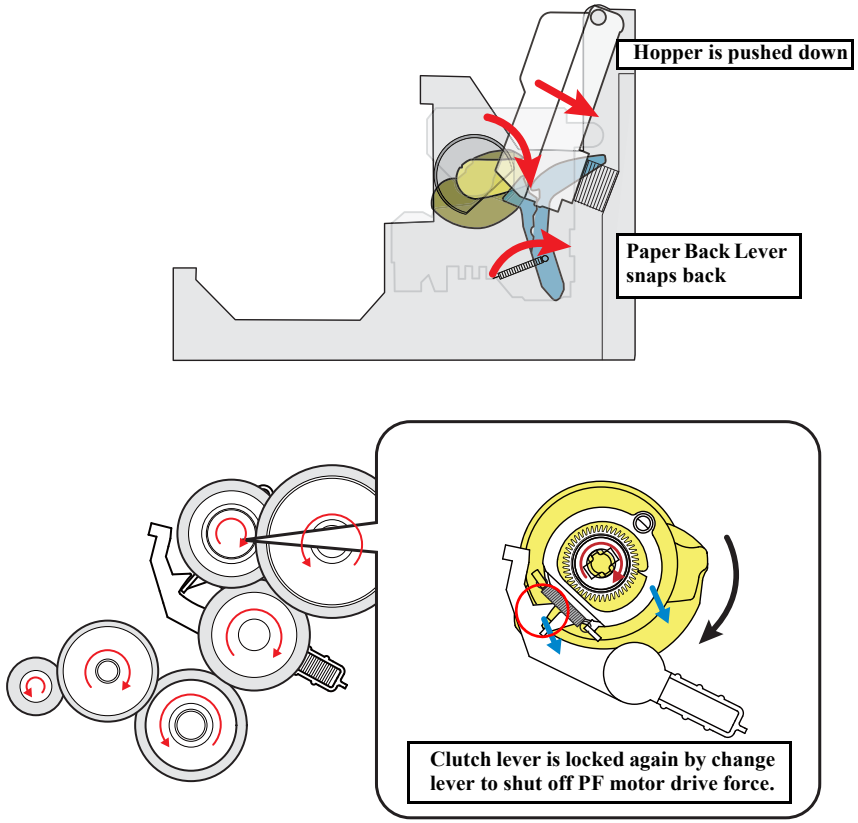


Figure 2-11. Ending Paper Loading Operation

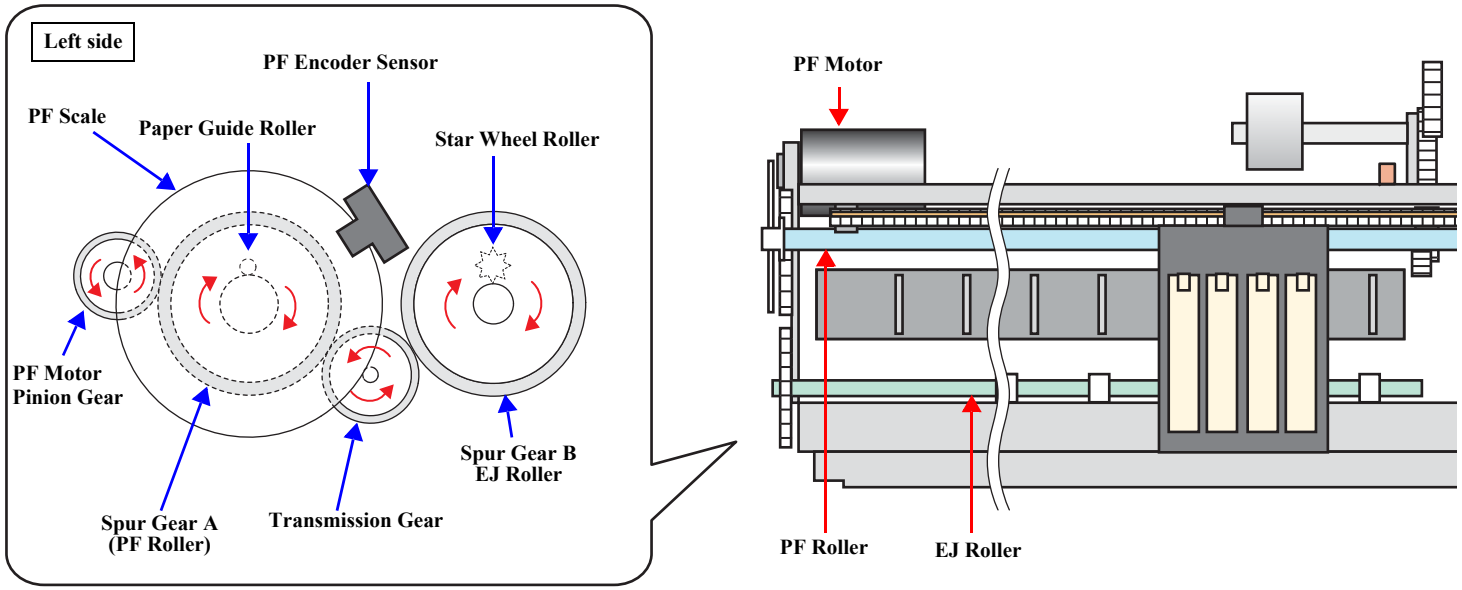
2.2.3.2 Paper Feed Mechanism

The major components of the paper feed mechanism are the PF motor, PF roller, EJ roller, PE sensor, PF encoder sensor, and PF scale. The sheet of paper fed from the ASF unit is nipped between two rollers to be transported during printing and to be ejected.

1. The first two rollers used for feeding the paper are the PF roller and the paper guide roller mounted on the upper paper guide unit. The PF motor drive force is transmitted to the paper guide roller via the PF roller.
2. The next two rollers are the EJ roller and the star wheel roller mounted on the Star Wheel Holder Assy. The PF motor drive force is transmitted to the star wheel roller via the EJ roller.

The figure below shows how the PF motor pinion gear drive force is transmitted to the PF roller, EJ roller, paper guide roller and the star wheel roller.

When the PF motor pinion gear starts counterclockwise rotation (as seen from the left side), the sheet of paper fed from the ASF unit to the PF roller is transported and ejected from the printer by the PF roller/paper guide roller combination and the EJ roller/star wheel roller combination.



PF Motor Drive Transmission Path (as seen from the left side of the printer)

• PF motor pinion gear (CCW) → Spur gear A (PF roller) (CW) → Transmission gear (CCW) → Spur gear B (EJ roller) (CW)

Figure 2-12. Paper Feed Mechanism

2.2.4 Ink System Mechanism

The ink system mechanism includes the capping mechanism and the pump mechanism. And the capping mechanism includes the carriage lock mechanism and the wiping mechanism. The table below describes the function of each mechanism.

Table 2-3. Function of Each Mechanism in Ink System

Mechanism	Function
Capping mechanism	Covers the printhead with the cap to prevent ink evaporation when the printer is in standby mode or when the printer is off.
Wiping mechanism	Wipes dust or ink stain off the printhead nozzle surface.
Pump mechanism	Drains ink from the ink cartridges, ink cavity, and the cap and sends it to the waste ink pad.
Carriage lock mechanism	Locks the carriage unit with the carriage lock lever while the unit is in the home position.

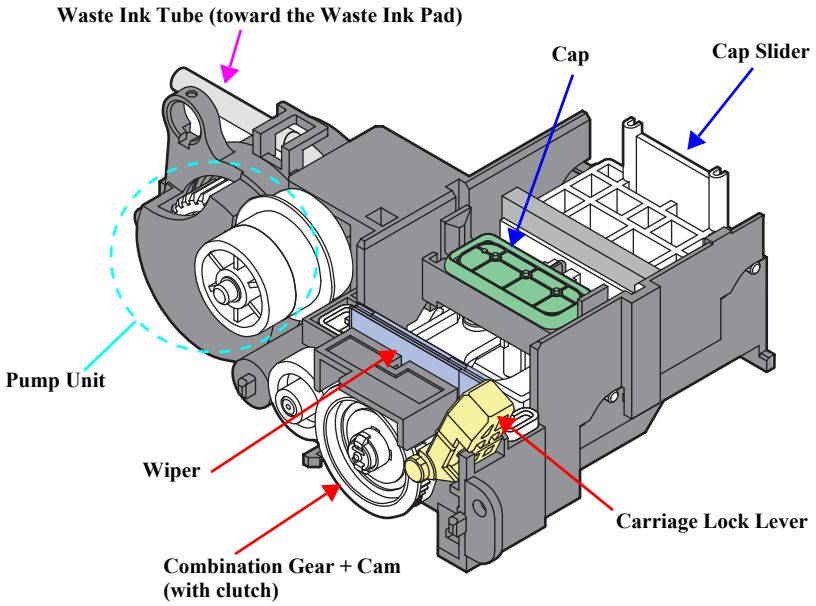


Figure 2-13. Ink System Mechanism

2.2.4.1 Capping Mechanism

The capping mechanism incorporates the wiping mechanism, however, the two mechanisms operate independently. Capping the printhead is performed by the carriage movement as the conventional models (such as Stylus CX4900/CX5000/CX6000) do.

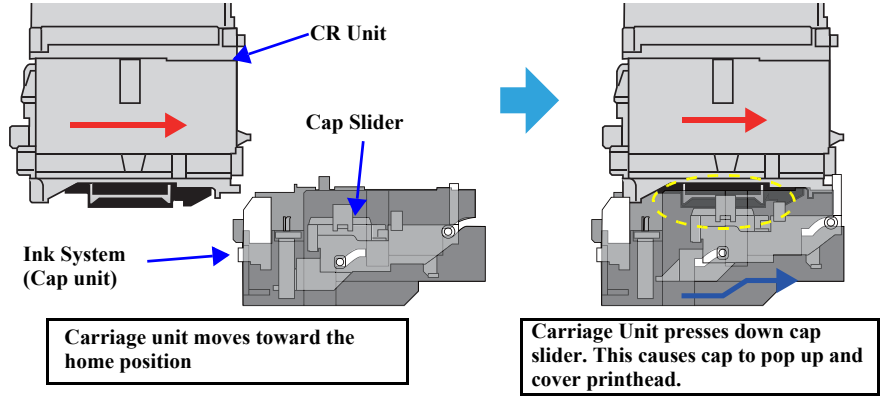


Figure 2-14. Capping Mechanism

2.2.4.2 Carriage Lock Mechanism

The carriage lock mechanism is activated by the capping operation. Locking or unlocking the carriage is performed by the PF motor drive force that is transmitted via the cam of the clutch-equipped combination gear. (See *"Wiping Mechanism (p32)"* for more explanation about the cap slider and the cam operations)

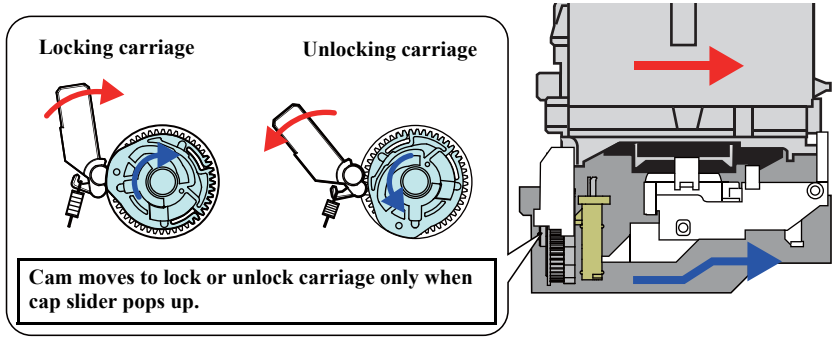


Figure 2-15. Carriage Lock Mechanism

2.2.4.3 Wiping Mechanism

The wiping mechanism is activated by the capping operation. The mechanism moves the wiper into- and out-of position for cleaning the head using the PF motor drive force that is transmitted via the cam of the clutch-equipped combination gear.

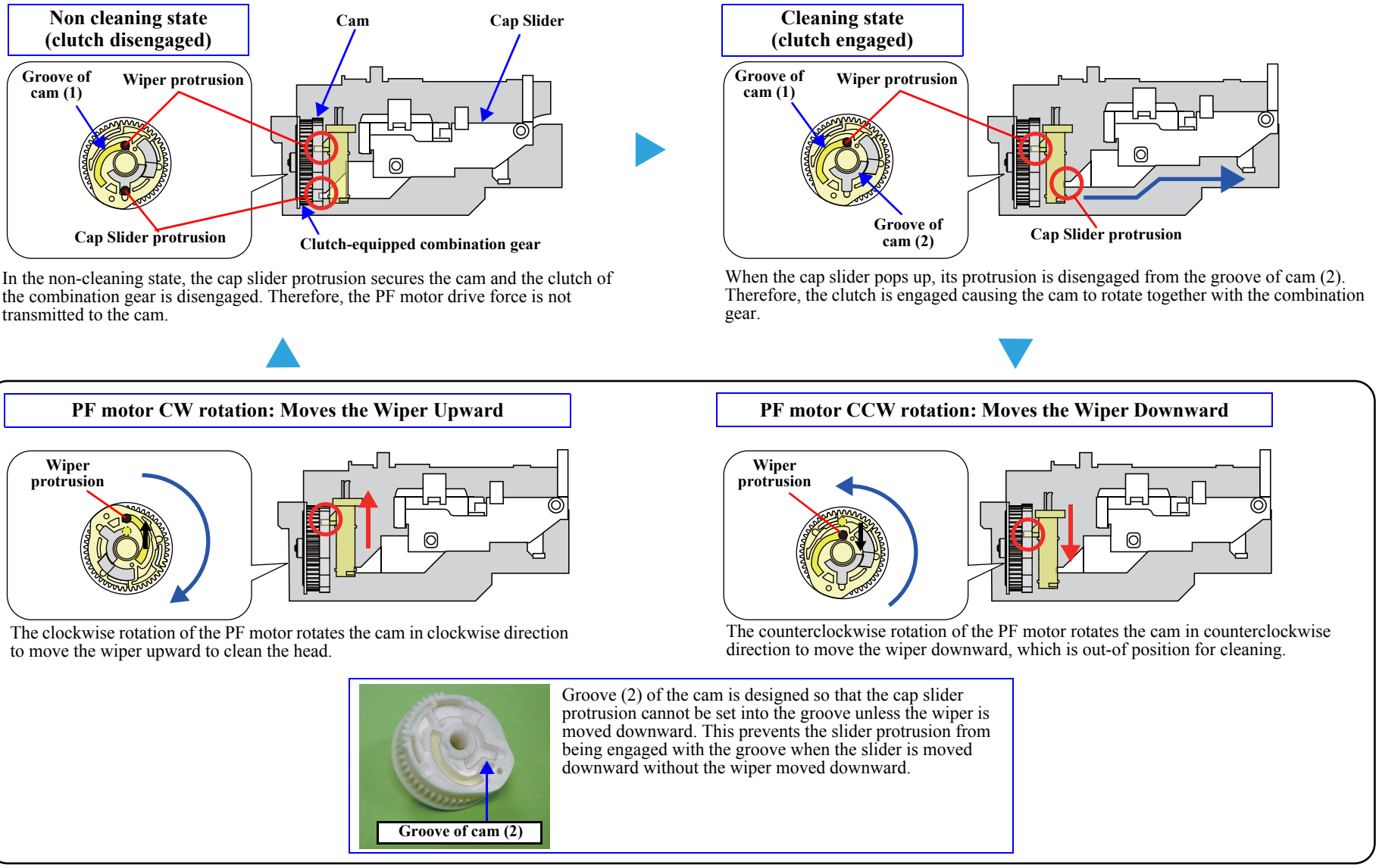


Figure 2-16. Wiping Mechanism

2.2.4.4 Pump Unit Mechanism

The PF motor drives the pump unit mechanism as well as the paper loading/feed mechanisms. The motor drive force is always transmitted to the pump unit. (It is also transmitted to the LD roller via the clutch mechanism and the change lever.)

The rotational direction of the PF motor changes the pump unit operations as shown in the following table.

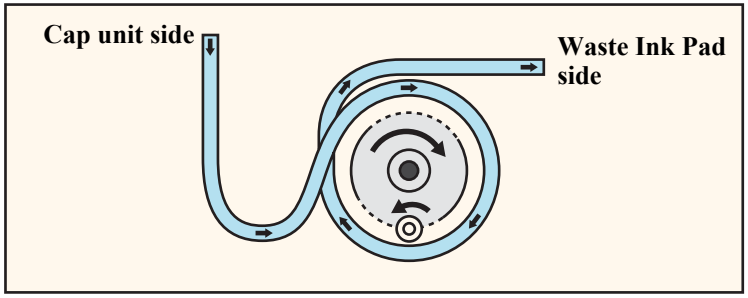
Table 2-4. PF Motor Rotational Direction & Pump Unit Operation

Rotational Direction*	Function
Clockwise	• Releases the pump
Counterclockwise	• Draws (suctions) ink

Note "*": The rotational direction as seen from the right side of the printer.

☐ Ink drawing operation
The pump unit draws ink out of the ink cartridges and ink cavity, and sends it to the waste ink pad by means of a pressure to the ink tube applied by the pump unit roller.

The following figure illustrates an overview of the pump unit mechanism operation.



Note : The PF motor rotational direction is as seen from the right side of the printer.

Figure 2-17. Pump Mechanism

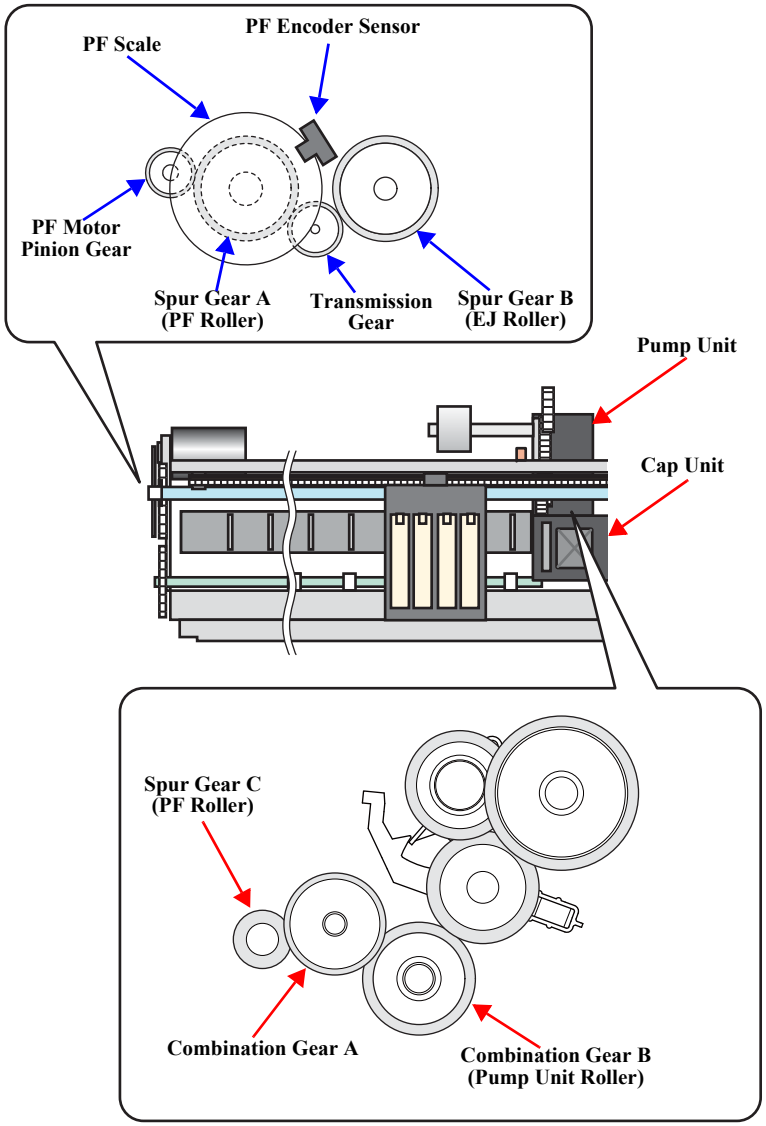


Figure 2-18. PF Motor Drive Transmission to Pump Unit

2.2.5 Ink Sequence

- Initial ink charge
  When the printer power is turned On first time after purchase, the initial ink charge is automatically carried out to fill the ink cavity in the printhead with ink. The initial ink charge flag in the EEPROM is cleared when the initial charge is completed successfully. Stylus C110/C120/D120 requires about 120 seconds at maximum for the initial ink charge. If the power is turned Off during the process, the printer automatically runs a CL3 at the next power-on.

- Manual Cleaning
  Stylus C110/C120/D120 offers three types of manual head cleaning (CL1, CL2, and CL3) that can be run from the control panel. They delete air bubbles in ink, clear nozzle clogging, or to eject foreign materials.

  CL1, CL2, and CL3 are performed in that order when the cumulative print time has not reached 9 minutes regardless of the number of print paths counted since the last CL. When 9 minutes has reached or exceeded, only CL1 is executed.
  In the case that any of the ink cartridges has almost run out or completely run out of ink, the LED flashes or light and the manual cleaning is disabled.

- Timer Cleaning
  Like the previous printers, this printer does not have lithium battery which is used for the backup power source for Timer IC. So, this printer manages the printer off period or cleaning cycle by using the following method.

  The printer driver sends the timer command (time data) to the printer before printing. The command is generated based on the PC's timer and it consists of year, month, date, hour, minute and second. As soon as the printer receives the timer command, the printer stores the command in the EEPROM and compares it with the latest CL time which has been stored in the EEPROM. When the time difference exceeds the predetermined time period, the printer automatically runs the timer cleaning and stores the date and time of the cleaning in the EEPROM.

- Flushing
  The following two types of flushing is carried out automatically.

  - Pre-printing flushing
    Reduces viscosity of ink inside the nozzles before starting printing.
  - Periodic flushing
    Reduces viscosity of ink inside the nozzles during printing.

2.3 Electrical Circuit Operating Principles

This section describes the operating principles of C687 main board and C687 PSB board.

The electric circuit of Stylus C110/C120/D120 consists of the following boards.

- ☐ Main Board
  - ■ C687 main board
- ☐ Power Supply Board
  - ■ C687 PSB/PSE board
- ☐ Panel Board
  - ■ C687 PNL board

NOTE: *CPU and ASIC is integrated as one chip (IC8) on the Main Board.*

2.3.1 Power Supply Board

The PSB/PSE board of Stylus C110/C120/D120 employs the simulated oscillating stimulation flyback converter circuit method, and it supplies +42VDC to the drive line. The application of the output voltage is described below.

Table 2-5. Application Of The DC Voltages

Voltage	Application
+42VDC	• Motors (CR Motor, PF Motor) • Printhead drive voltage • Printhead nozzle selector 42V drive voltage

AC voltage input from AC inlet first goes through filter circuit that removes high frequency components and is then converted to DC voltage via the rectifier circuit and the smoothing circuit. DC voltage is then lead to the switching circuit and FET QF1 preforms the switching operation. By the switching operation of the primary circuit, +42VDC is generated and stabilized at the secondary circuit.

2.3.2 C687 Main Board

The logic circuit of the C687 main board consists of the following components.

- Logic line
  (CPU-ASIC, SDRAM, FlashROM, etc.)
- Motor control/drive circuit (CR motor/PF motor)
- Head control/drive circuit
- USB Interface control circuit
- Sensor circuit
- Reset circuit, EEPROM circuit

The printer mechanism is controlled by the above circuits. Following describes the major characteristics of the main board.

- Streamlining with no complex circuit
  The main board includes the reset circuit and EEPROM circuit independently. This simple configuration is achieved because RTC is not required for the Stylus C110/C120/D120, which does not have stand-alone direct print function.
- Power save mode
  The main board reduces power consumption by carrying out the followings in the power save mode.
  - Partially stops the ASIC clock
  - Brings the motor driver/head DAC into sleep/standby mode
  - Stops energizing motors
  - Brings the SDRAM into the self-refresh mode

2.3.2.1 Major Components on Main Board

The table below lists the major components on the C687 main board.

Table 2-6. Major Components on Main Board

IC	Location	Function
Flash ROM	IC1	4Mbit • Stores the firmware
SDRAM	IC2	64Mbit • bus: 16bit
Reset IC	IC3	Monitors voltage on 42V line and 3.3V line.
CPU-ASIC	IC8	Drives at 96MHz (internal)/48MHz (external) of clock frequency and controls the printer mechanism, SDRAM and USB.
EEPROM	IC9	2kbit • Stores various mechanical settings
Motor driver	IC5	• CR/PF motor drive IC • Reduces 42V line to 3.3V/1.5V
Head driver	IC13	DAC that generates printhead drive waveform

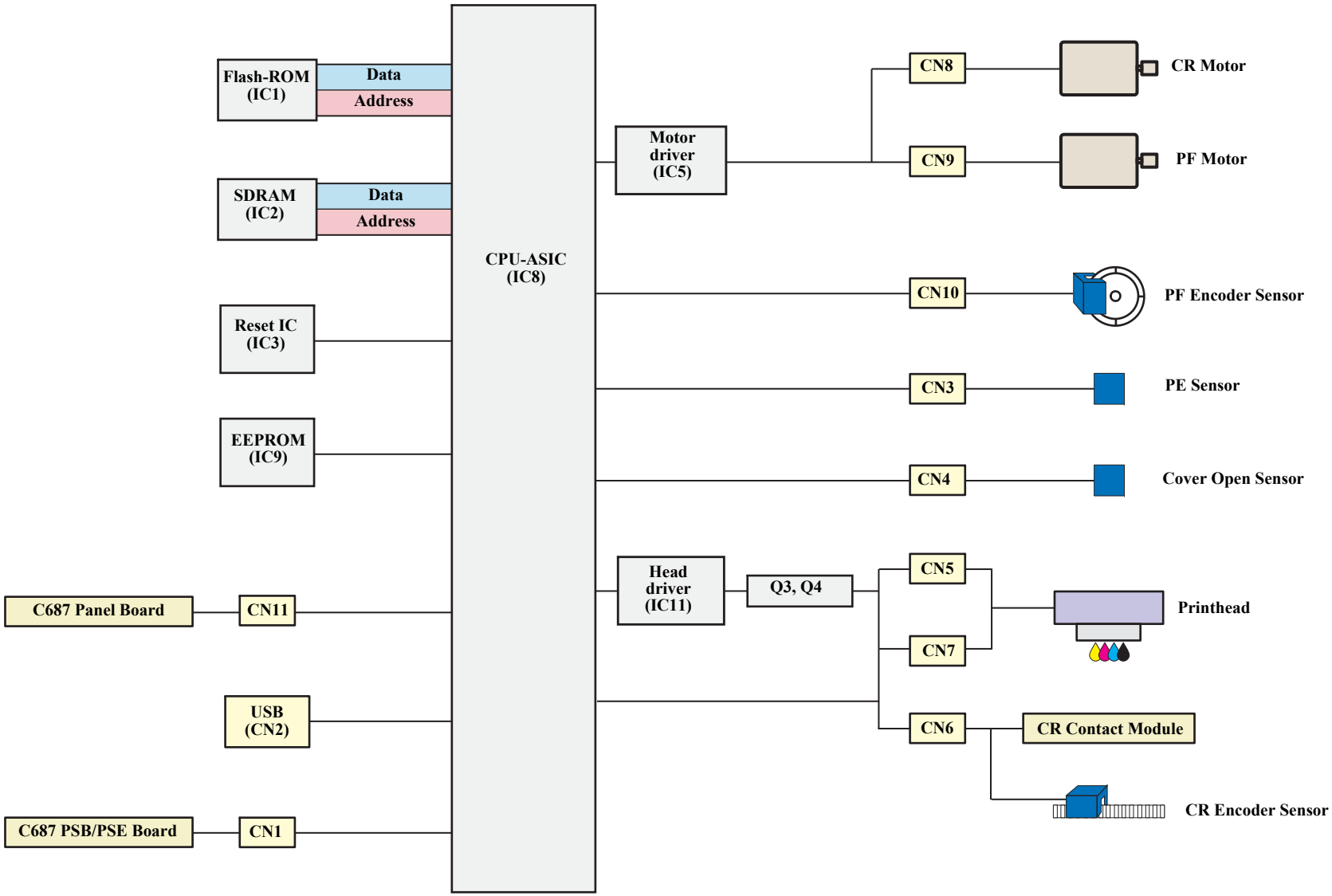


Figure 2-19. C687 Main Board Block Diagram

2.3.2.2 Printhead Driver Circuit

The printhead driver circuit consists of the following two components:

- Head common driver circuit (Head driver IC11 & Wave amplifier transistor Q3, Q4)
- Nozzle selector IC on the printhead driver

The common driver (IC11) generates a basic drive waveform according to the output signals from CPU (IC8). The basic drive waveform is amplified by the transistors Q3 and Q4 (the amplified one is called drive waveform.) and then transferred to the nozzle selector IC on the printhead driver board. Print data is converted to serial data by the CPU and then sent to the nozzle selector IC on the printhead driver board. Based on the serial data, the nozzle selector IC determines the nozzles to be actuated. The selected nozzles are driven by the drive waveforms amplified by the transistor Q3 and Q4. Refer to Figure 2-20 *(p.38)* for the printhead driver circuit block diagram.

☐ Head driver circuit
The basic drive waveform is generated in the head driver (IC7) based on the following 12 signal lines output from the CPU (IC8); DATA0-DATA9, LAT, and PSAVE. By the DATA signal output from the CPU, the original data for generating the head drive waveform is written in the memory in the head driver (IC7). The addresses for the written data are determined by DATA0-DATA9 signals. Then, the necessary data is selected from the address and appropriate basic drive waveform is generated. The generated head drive waveform is transmitted to the nozzle selector IC on the printhead driver board through the transistor Q3 and Q4 and applied to the nozzle PZT specified by nozzle selector IC.

☐ Nozzle selector circuit
A print data is converted into serial data by the CPU (IC8). The serial data is divided into three for allocating data to each of the three head columns, and transmitted to the nozzle selector via three signals (HS01 to HS03). The data transmission from the CPU (IC8) to the nozzle selector synchronizes with the LAT signal and SCK clock signal. Nozzles to be used are determined depending on the transmitted data and PZT for the selected nozzles are controlled by the waveform output from the head driver.

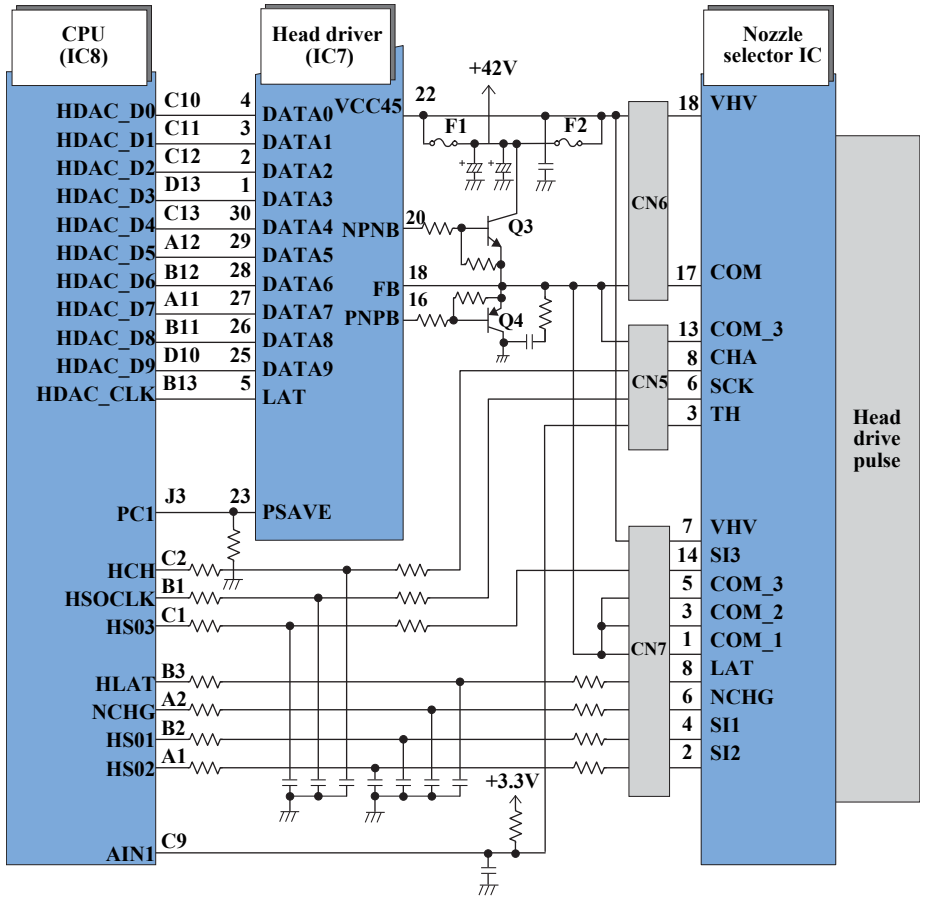


Figure 2-20. Printhead Driver Circuit Block Diagram

2.3.2.3 Motor Driver Circuit

CR/PF MOTOR DRIVE CIRCUIT

The motor driver IC (IC5) on the main board drives CR/PF motors. The both motors are DC motor and are controlled by constant current PWM drive method.

Based on the output pulse (signal) from the CR encoder or PF encoder, the CPU (IC8) sets the appropriate drive voltage for the current operation and outputs the value as a special control signal to the motor driver (IC5). Then, based on the signal output from the CPU, the motor driver applies the corresponding motor drive voltage to the CR/PF motor.

When no data has been received for 5 minutes, the CPU sets the motor driver voltage to 0, and turn the motor driver Off to save power.

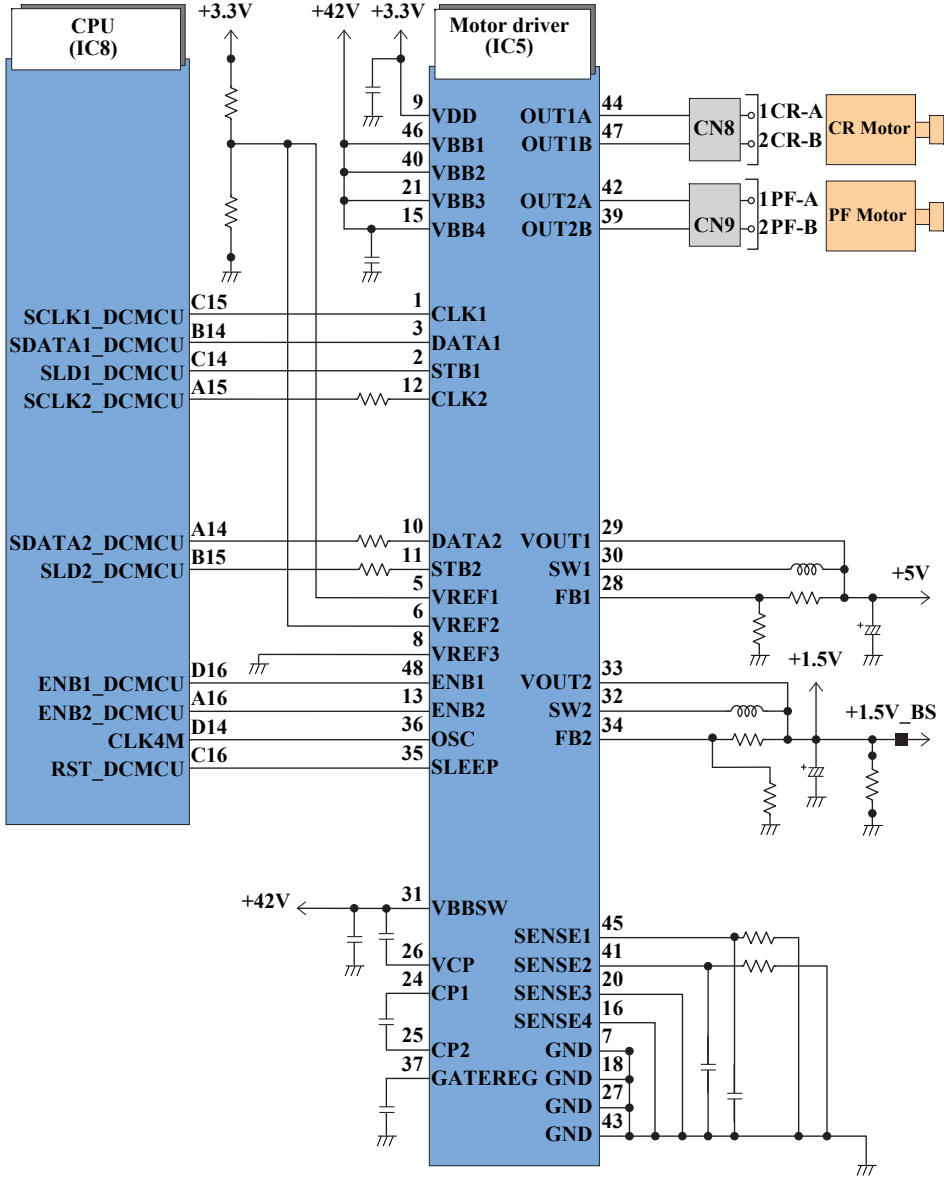


Figure 2-21. Motor Driver Circuit Block Diagram

2.3.2.4 Reset Circuit/EEPROM Circuit

RESET CIRCUIT

The reset IC (IC3) monitors +3.3V on the logic line and +42V on the drive line. It outputs a reset signal to the CPU (IC8) in the cases described below.

- ☐ +3.3V line reset circuit
  IC3 monitors 3.3V line through Vi2 port, and transmits a reset signal to the CPU through Vo2 port if it detects an abnormal voltage.
- ☐ +42V line reset circuit
  IC3 monitors 42V line through Vi1 port, and transmits a reset signal to the CPU through Vo1 port if it detects an abnormal voltage.

EEPROM CONTROL CIRCUIT

EEPROM is a nonvolatile memory that keeps data written to it even after the power-off. The CPU (IC8) reads data from the EEPROM (IC4) in the power-on sequence, and stores data into the EEPROM in the power-off sequence.

EEPROM stores the following information.

- Ink counter
  (Ink consumption in ink cartridges, Waste ink pad counter, etc.)
- Mechanical settings
  (Head ID, Bi-D adjusted settings, USB ID, etc.)

EEPROM is connected to the CPU with the four lines. Each of the lines are used for data transmission as shown below.

- CE : Chip selection signal
- CLK: Data synchronization clock pulse
- DI: Data to be written at power-off (serial data)
- DO : Data to be read at power-on (serial data)

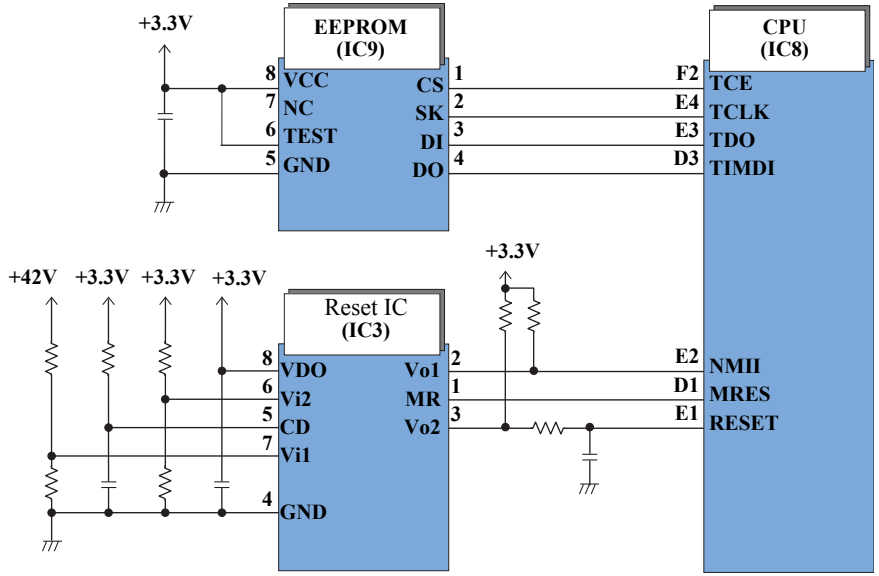


Figure 2-22. Reset/EEPROM Circuit Block Diagram

2.3.2.5 Sensor Circuit

CPU (IC8) on the main board monitors the status of the printer by several sensors. However, unlike the previous product, ASF unit on this printer does not have ASF Sensor. Instead of ASF Sensor, Change Lever and the Clutch mechanism is used to detect ASF home position. (As for the ASF home position detection, refer to "2.2.3 Paper Loading/Paper Feed Mechanism" *(p.26)*.

- PE Sensor
  This sensor is mounted at the right side center of the printer mechanism in order to detect the presence/absence of paper when the paper passes through the Upper Paper Guide.
  - Paper Absent: Light emitted from the light-emitting device of the sensor is received by the light-receiving side of the sensor without interrupted by paper. A LOW signal is output to the CPU.
  - Paper Present: Light emitted from the light-emitting device of the sensor is interrupted by paper. A HIGH signal is output to the CPU.
- CR Encoder Sensor
  The sensor consists of the two devices; a transmissive photosensor mounted on the back of the carriage and a linear scale attached along the carriage movement range. Fine black lines are printed on the linear scale in 1/180 inch of the minimum resolution. The photosensor outputs HIGH signal to the CPU each time it reads the black line, and outputs LOW signal each time it reads the non-printed area. The CPU controls the CR motor based on the signals. The carriage unit home position is also detected by the sensor.
- PF Encoder Sensor
  The sensor consists of the two devices; a transmissive photosensor mounted on the main board and a rotary scale attached at the left of the PF Roller Unit. Fine black lines are printed on the rotary scale in 1/180 inch of the minimum resolution. The photosensor outputs HIGH signal to the CPU each time it reads the black line, and outputs LOW signal each time it reads the non-printed area. The CPU controls the PF motor based on the signals.
- Thermistor (THM)
  The thermistor is directly mounted on the printhead drive board. It monitors the temperature around the printhead and determines a proper head drive voltage according to the detected temperature. This information is fed back to the CPU analog port. When the temperature rises, the head drive circuit lowers the drive voltage, and when the temperature lowers, the head drive circuit rises the drive voltage.
- Cover Open Sensor
  This sensor is mounted on the backside of the upper housing (far left) and detects whether the printer cover is opened or closed.
  - Cover is opened: a HIGH signal is output to the CPU.
  - Cover is closed: a LOW signal is output to the CPU.

The block diagram for the sensor circuit is shown below.

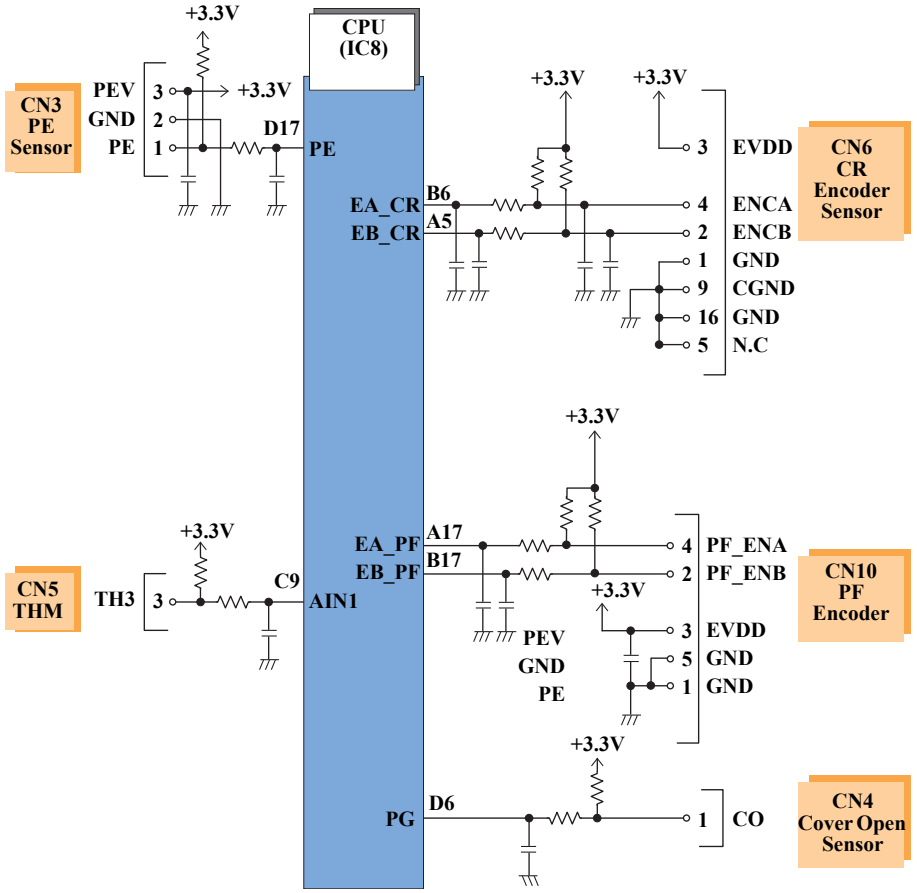


Figure 2-23. Sensor Circuit Block Diagram

CHAPTER

3

TROUBLESHOOTING

3.1 Overview

This chapter describes how to solve problems.

- **Be careful to avoid electric shocks when checking the electrical circuit boards (C687 MAIN and C687 PSE/PSB boards) while the power is turned on.**
- **Touching an FET, transistor or heat sink with one hand while touching a metal part of the mechanism with the other hand could result in an electric shock, so carefully avoid this.**
- **After initial filling of ink has been repeated several times, immediate moving or tilting of the printer could result in leaking of ink that has not been completely absorbed by the Waste Ink Pad. When initial filling of ink has been repeated several times, check the ink remaining in the tip of the Waste Ink Tube and the waste ink not absorbed by the Waste Ink Pad before moving the printer.**

- **Disassembly and reassembly of parts is often required when identifying the causes of problems. The parts should be disassembled and re-assembled correctly while referring to Chapter 4 "DISASSEMBLY/ASSEMBLY" *(p.69)* so that the operation and status of each check item can be correctly verified.**
- **Some individual part and units may require adjustment once they are removed or replaced. If removing or replacing parts which have specific instructions for adjustment included in Chapter 4 "DISASSEMBLY/ASSEMBLY" *(p.69)*, be sure to make these adjustments after repairing the problem location.**

3.1.1 Specified Tools

This printer does not require any specified tools for troubleshooting.

3.1.2 Preliminary Checks

Before starting troubleshooting, be sure to verify that the following conditions are all met:

- ☐ The power supply voltage must be within the specification limits. (Measure the voltage at the wall socket.)
- ☐ The power code must be free from damage, short circuit or breakage, or miswiring in the power code.
- ☐ The printer must be grounded properly.
- ☐ The printer should not be located in a place where it can be exposed to too high or low temperature, too high or low humidity, or abrupt temperature change.
- ☐ The printer should not be located near waterworks, near humidifiers, near heaters or near flames, in a dusty atmosphere or in a place where the printer can be exposed to blast from an air conditioner.
- ☐ The printer should not be located in a place where volatile or inflammable gases are produced.
- ☐ The printer should not be located in a place where it can be exposed to direct rays of the sun.
- ☐ The printer must be placed on a strong and steady level table (without an inclination larger than five degrees).
- ☐ Any vibrating equipment must not be placed on or under the printer.
- ☐ The paper used must conform to the specification.
- ☐ There is no error in handling of the printer.
- ☐ Check the inside of the printer, and remove foreign matters if any, such as paper clips, staples, bits of paper, paper dust or toner.
- ☐ Clean the inside of the printer and the rubber rolls.

3.2 Troubleshooting

3.2.1 Motor and Sensor Troubleshooting

☐ Motors

The resistance values for the CR motor and the PF motor are given below, however, the values cannot be used to check the motors status since they are DC motor and the resistance between the electric poles varies. Visually check the motors for abnormal operation and if it is hard to judge, replace the motor.

Table 3-1. Motor Specification

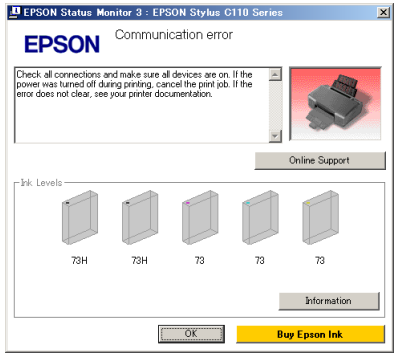
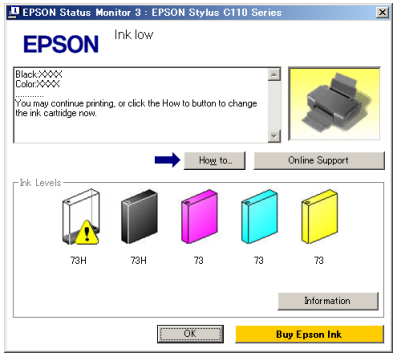
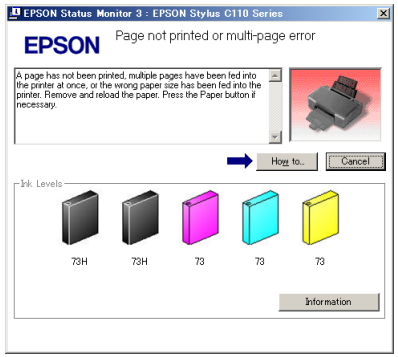
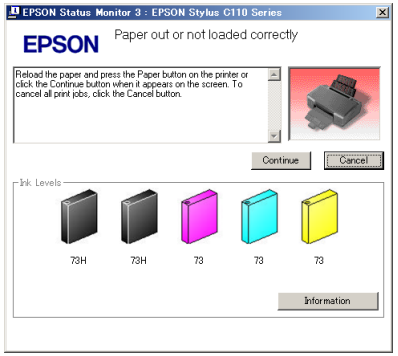
Motor	Motor Type	Drive Voltage	Resistance
CR motor	DC motor with brash	DC 42V±5%	22.7Ω ± 10%
PF motor			21.2Ω ± 10%

Table 3-2. Sensor check point

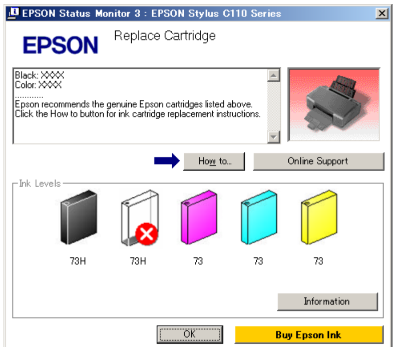
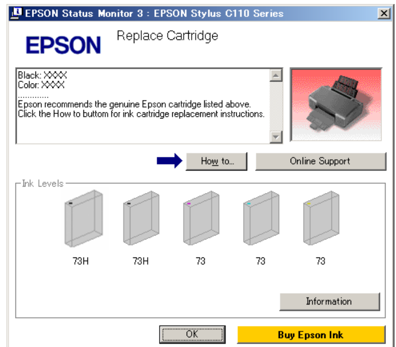
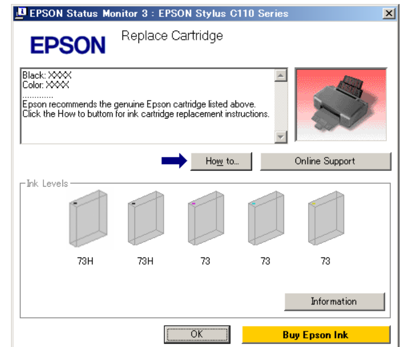
Sensor name	Check point	Signal level	Switch mode
Open Cover Sensor	CN4 / Pin 1 and 2	Less than 0.4V	Off: Case opened
		More than 2.4V	On: Case closed
PE Sensor	CN3 / Pin 1 and 2	Less than 0.4V	Off: No paper
		More than 2.4V	On: Detect the paper

3.2.2 Error Indications and Fault Occurrence Causes

This section describes the LED indications, STM3 messages and fault occurrence causes at occurrence of the following errors during any sequence/operation (e.g. power-on sequence, paper feeding/loading sequence, ink sucking sequence).

Printer Status		Communication Error	Ink Low	Double Feed	Paper Out
Indications	Power	—	—	—	—
	Ink	—	On	—	—
	Paper	—	—	On	On
Status monitor 3 message					
Fault Occurrence Cause		This error occurs when the printer cannot communicate with the PC correctly.	This error occurs when about 90 percent of ink consumed. Note : Even if this error is indicated on the STM3, you can continue printing until a "Replace Ink Cartridge" error appears. However, the Head Cleaning may not be performed during the ink low status.	This error occurs when multiple sheets of paper are fed simultaneously. The error condition is detected when paper length longer than its preset length is detected.	This error occurs when the PE sensor failed to detect the top edge of a paper during the paper feeding sequence.
Reference Page		*Table 3-11, "Check point for communication error according to each phenomenon," on page 61*	---	*Table 3-10, "Check point for double feed error according to each phenomenon," on page 60*	*Table 3-8, "Check point for paper out error according to each phenomenon," on page 57*

Note : "–" : No change

<table>
<tr><th colspan="2">Printer Status</th><th>Replace Ink Cartridge or No Ink Cartridge</th><th>CSIC Error</th><th>Incorrect I/C</th><th>Paper Jam</th></tr>
<tr><td rowspan="3">Indications</td><td>Power</td><td>—</td><td>—</td><td>—</td><td>—</td></tr>
<tr><td>Ink</td><td>On</td><td>On</td><td>On</td><td>—</td></tr>
<tr><td>Paper</td><td>—</td><td>—</td><td>—</td><td>Brink 1</td></tr>
<tr><td colspan="2">Status monitor 3 message</td>
<td> 
</td>
<td> 
</td>
<td> 
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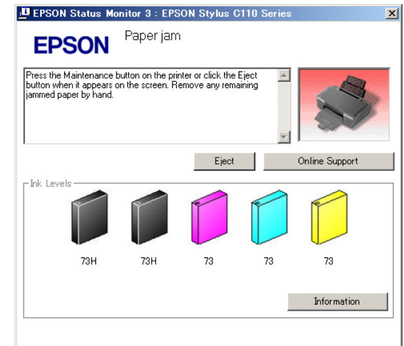
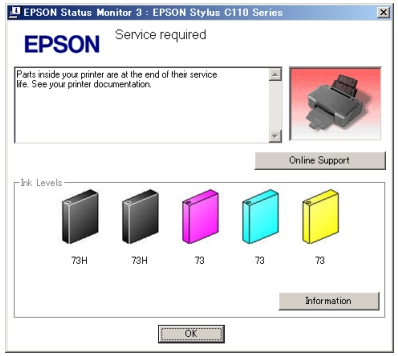
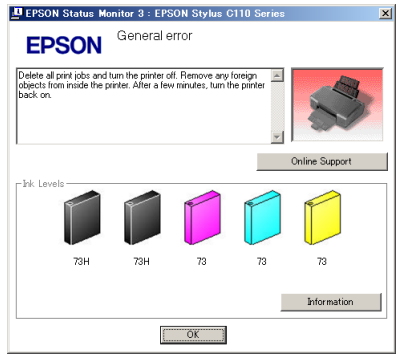
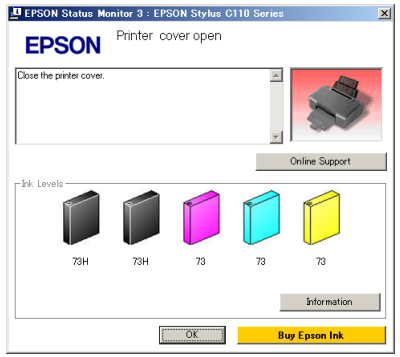
<td> 
</td></tr>
<tr><td colspan="2">Fault Occurrence Cause</td>
<td>This error occurs when any one of the followings is detected.
• 100 percent of ink has consumed.
• The ink cartridge is defective.
Note :
The ink cartridge still has a small amount of ink even after the error. This is to prevent the Printhead nozzles from being damaged by printing without ink.</td>
<td>This error occurs when data from CSIC cannot be read normally or when data cannot be written to CSIC.</td>
<td>This error occurs when any one of the followings is detected.
• An unsupported ink cartridge has been installed.
• An ink cartridge with a different destination has been installed.</td>
<td>This error occurs when the PE Sensor failed to detect the paper bottom edge during paper feeding sequence.</td></tr>
<tr><td colspan="2">Reference Page</td>
<td>Table 3-7, “Check point for no ink cartridge/CSIC error/incorrect ink cartridge according to each phenomenon,” on page 56</td>
<td>Table 3-7, “Check point for no ink cartridge/CSIC error/incorrect ink cartridge according to each phenomenon,” on page 56</td>
<td>Table 3-7, “Check point for no ink cartridge/CSIC error/incorrect ink cartridge according to each phenomenon,” on page 56</td>
<td>Table 3-6, “Check point for paper jam error according to each phenomenon,” on page 53</td></tr>
</table>

Note : "–": No Change
"Brink 1": 1.25 sec. on + 1.25 sec. off

Printer Status		Maintenance Request	Fatal Error	Cover Open Error
Indications	Power	Off	Off	—
	Ink	Brink 1	Brink 3	Brink 4
	Paper	Brink 2	Brink 3	Brink 4
Status monitor 3 message				
Fault Occurrence Cause		This error occurs when the Waste Ink Counter exceeds the preset counter value.	This error occurs when a mechanical error is detected. (CR error, PF error, etc.)	This error occurs when the Cover Open sensor detects the printer cover is opened.
Reference Page		*Table 3-5, "Check point for the Maintenance request according to each phenomenon," on page 52*	*Table 3-3, "Check point for fatal error according to each phenomenon," on page 48*	*Table 3-4, "Check point for cover open error according to each phenomenon," on page 52*

Note : "Brink 1": 1.25 sec. on + 1.25 sec. off
"Brink 2": 1.25 sec. off + 1.25 sec. on
"Brink 3": 0.5 sec. on + 0.5 sec. off
"Brink 4": 0.5 sec. on + 0.5 sec. off + 0.5 sec. on + 1.0 sec. off

Table 3-3. Check point for fatal error according to each phenomenon

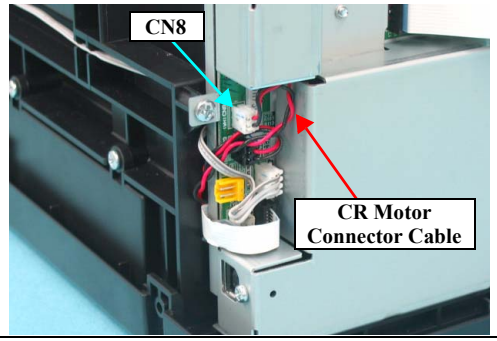
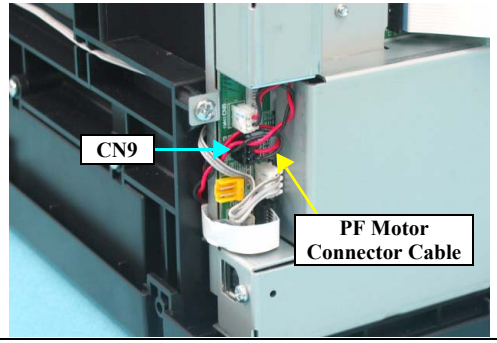
Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Power on • Anywhere	When turning on the power, the CR Motor does not operate at all.	CR Motor	1. Check if the CR Motor Connector Cable is connected to CN8 on the Main Board.  	1. Connect the CR Motor Connector Cable to CN8 on the Main Board.
			2. Check if the CR Motor Connector Cable is not damaged.	2. Replace the CR Motor with a new one.
			3. Check if the CR Motor operates.	3. Replace the CR Motor with a new one.
	When turning on the power, the PF Motor does not operate at all.	PF Motor	1. Check if the PF Motor Connector Cable is connected to CN9 on the Main Board.  	1. Connect the PF Motor Connector Cable to CN9 on the Main Board.
			2. Check if the PF Motor Connector Cable is not damaged.	2. Replace the PF Motor with a new one.
			3. Check if the PF Motor operates.	3. Replace the PF Motor with a new one.

Table 3-3. Check point for fatal error according to each phenomenon

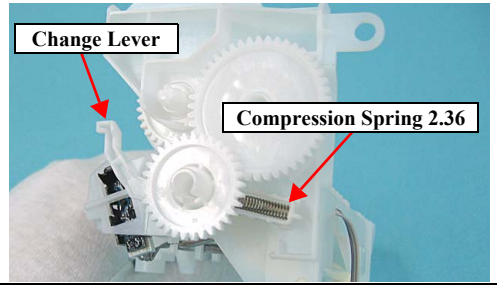
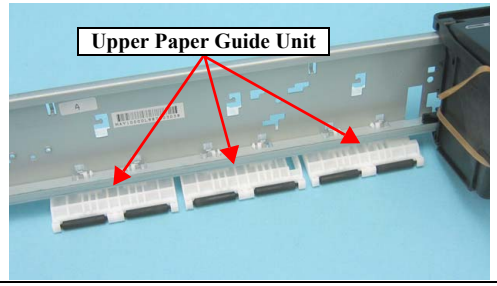
Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Power on • Anywhere	When turning on the power, the Carriage Unit collides to the Change Lever located to the front side of the printer.	PF Motor	1. Check if the PF Motor Connector Cable is connected to CN9 on the Main Board.	1. Connect the PF Motor Connector Cable to CN9 on the Main Board.
			2. Check if the PF Motor Connector Cable is not damaged.	2. Replace the PF Motor with a new one.
			3. Check if the PF Motor operates.	3. Replace the PF Motor with a new one.
		ASF Unit	1. Check if the Compression Spring 2.36 does not come off in the Change Lever.  	1. Replace the ASF Unit with a new one.
	The Carriage Unit collides with the Upper Paper Guide Unit when power is turned on.	Upper Paper Guide Unit	1. Check if the Paper Guide Upper Unit is correctly assembled.  	1. Reassemble the Upper Paper Guide Unit to the Main Frame correctly.

Table 3-3. Check point for fatal error according to each phenomenon

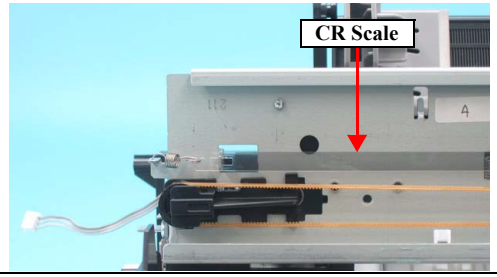
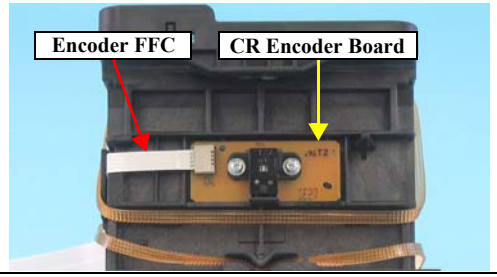
Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Power on • Anywhere	When turning on the power, the Carriage Unit collides to the right side of the Main Frame.	CR Scale	1. Check if the CR Scale does not come off or it properly passes through the slit of the CR Encoder Board.  	1. Reassemble the CR Scale correctly. * If the problem is not solved, replace the Main Board with a new one.
			2. Check if the CR Scale is not damaged or contaminated.  	2. Replace the CR Scale with a new one or clean it completely.
		CR Encoder Board	1. Check if the Encoder FFC is connected to the CR Encoder Board.  	1. Connect the Encoder FFC to the CR Encoder Board.
			2. Check if the Encoder FFC is not damaged.	2. Replace the Encoder FFC with a new one.
			3. Check if the CR Encoder Board is not damaged.	3. Replace the CR Encoder Board with a new one.

Table 3-3. Check point for fatal error according to each phenomenon

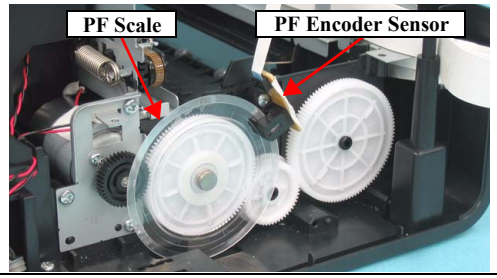
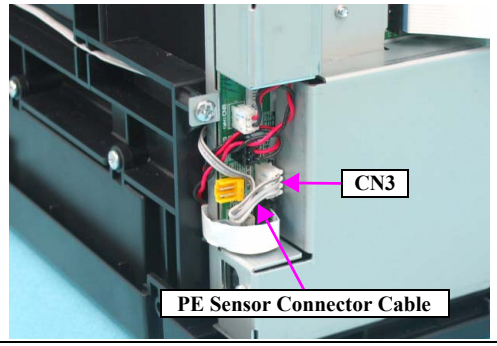
Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Power on • Anywhere	The eject rollers are rotating at high speed when power is turned on. (For about 1 cycle.)	PF Scale/PF Encoder Sensor	1. Check if the PF Scale is not damaged or contaminated.  	1. Replace the PF Scale with a new one.
			2. Check if the PF Encoder Sensor is not damaged.	2. Replace the PF Encoder Sensor with a new one.
• Operation • Anywhere	A paper feeding sequence failed to feed the paper, but a paper ejection sequence is performed.	ASF Unit	1. Check if the PE Sensor Connector Cable is connected to CN3 on the Main Board.  	1. Connect the PE Sensor Connector Cable to CN3 on the Main Board.
			2. Check if the PE Sensor Connector Cable is not damaged.	2. Replace the ASF Unit with a new one.
			3. Check if the PE Sensor is not damaged.	3. Replace the ASF Unit with a new one.

Table 3-4. Check point for cover open error according to each phenomenon

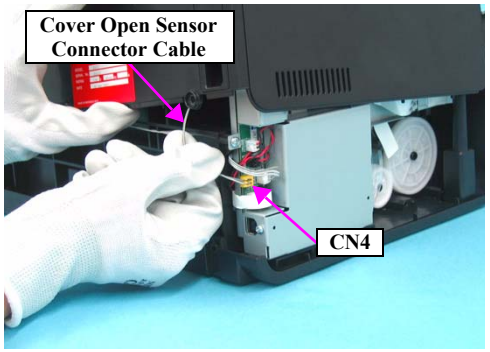
Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Operation • Anywhere	Cover open error is indicated even though the printer cover is closed.	Cover Open Sensor	1. Check if the Cover Open Sensor Connector Cable is connected to CN4 on the Main Board.  	1. Connect the Cover Open Sensor Connector Cable to CN4 on the Main Board.
			2. Check if the Cover Open Sensor Connector Cable is not damaged.	2. Replace the Upper Housing with a new one.
			3. Check if the Cover Open Sensor is not damaged.	3. Replace the Upper Housing with a new one.

Table 3-5. Check point for the Maintenance request according to each phenomenon

Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Operation • –	An error is indicated on the LED and STM.	Waste Ink Pads	---	1. Change the Waste Ink Pads and initialize the Waste Ink Pad Counter. (Refer to Chapter 5 "ADJUSTMENT" *(p.107)*.)

Table 3-6. Check point for paper jam error according to each phenomenon

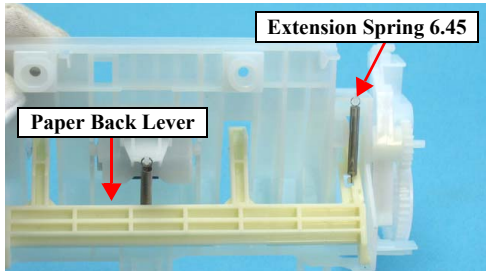
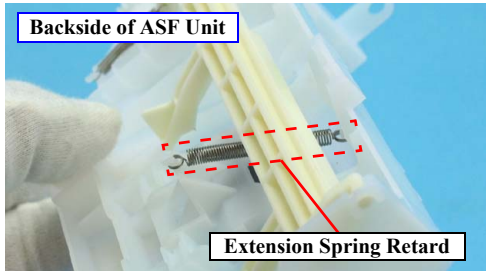
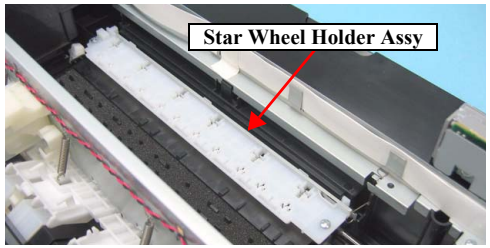
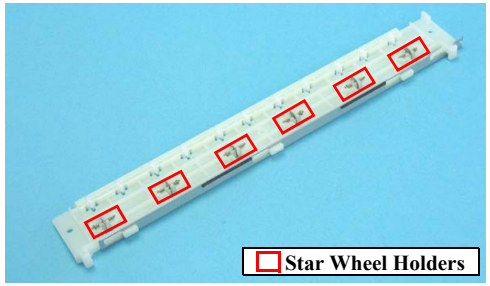
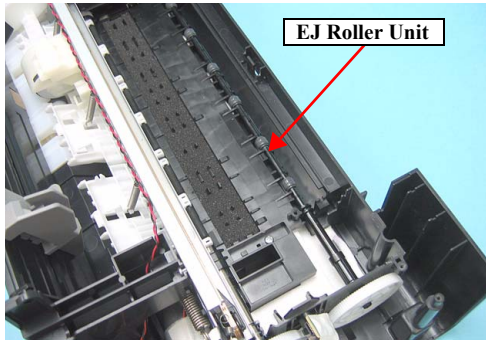
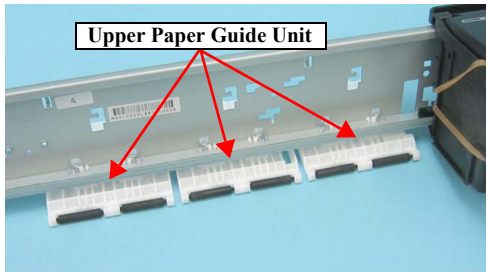
Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Operation • Outside HP	A paper feeding sequence failed to feed the paper, but a paper ejection sequence is performed.	ASF Unit	1. Check if the ASF Unit is properly installed.	1. Install the ASF Unit properly.
			2. Check if the Paper Back Lever operates correctly in the paper loading sequence.  	2. Set the Extension Spring 6.45 between the ASF Frame and the Paper Back Lever.
	Paper is being resent during paper feeding operation.	ASF Unit	1. Check if the Extension Spring Retard operates correctly in the paper loading sequence.  	1. Set the Extension Spring Retard between the Retard Roller Unit and the ASF Frame.

Table 3-6. Check point for paper jam error according to each phenomenon

Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Operation • –	The top edge of paper does not go through between the EJ Roller Unit and the Star Wheel.	Star Wheel Holder Assy*	1. Check if the Star Wheel Holder Assy is correctly assembled. 	1. Reassemble the Star Wheel Holder Assy correctly.
			2. Check if the Star Wheel Holders does not come off. 	2. Reassemble the Star Wheel Holders correctly.
		EJ Roller Unit*	1. Check if the EJ Roller Unit is correctly assembled. 	1. Reassemble the EJ Roller Unit correctly.
			2. Check if the Spur Gear 51.5 is not damaged.	2. Replace the EJ Roller Unit with a new one.

* In case that the paper jam error occurs in each operation, the jammed paper contacts the nozzle surface of the Printhead and the Printhead may be damaged.

Table 3-6. Check point for paper jam error according to each phenomenon

Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Operation • –	The top edge of paper is not loaded to the PF Roller Unit.	Upper Paper Guide Unit*	1. Check if the Upper Paper Guide Unit is correctly assembled.  	1. Reassemble the Upper Paper Guide Unit to the Main Frame correctly.

* In case that the paper jam error occurs in each operation, the jammed paper contacts the nozzle surface of the Printhead and the Printhead may be damaged.

Table 3-7. Check point for no ink cartridge/CSIC error/incorrect ink cartridge according to each phenomenon

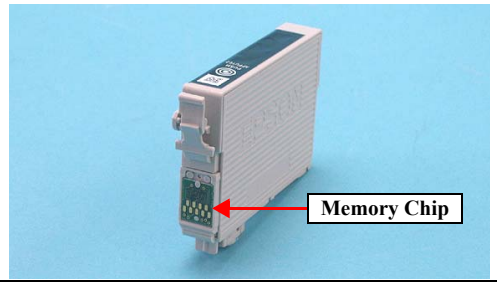
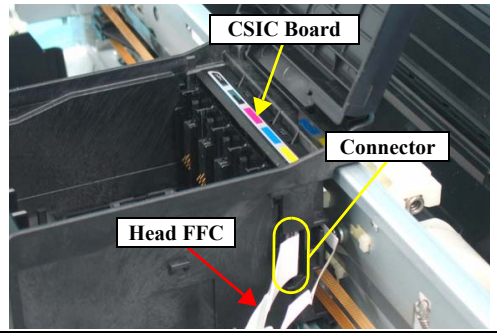
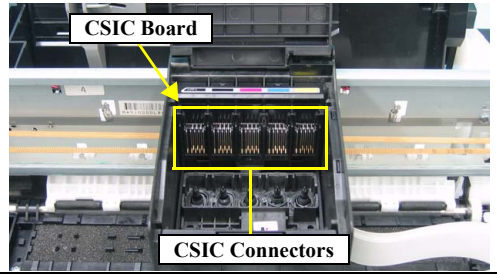
Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Power on • Inside HP	After the printer detects that the carriage is at the home position, an error is displayed.	Ink Cartridge	1. Check if Ink Cartridge is properly installed.	1. Install the Ink Cartridge properly.
			2. Check if the Memory Chip is not disconnected or not chipped.  	2. Replace the Ink Cartridge with a new one.
		CSIC Board	1. Check if the Head FFC is connected to connector on the CSIC Board.  	1. Connect the Head FFC to connector on the CSIC Board.
			2. Check if the CSIC Board is not damaged.	2. Replace the CSIC Board with a new one.
		CSIC Connector	1. Check if the CSIC Connector is not damaged.  	1. Replace the CSIC Board with a new one.

Table 3-8. Check point for paper out error according to each phenomenon

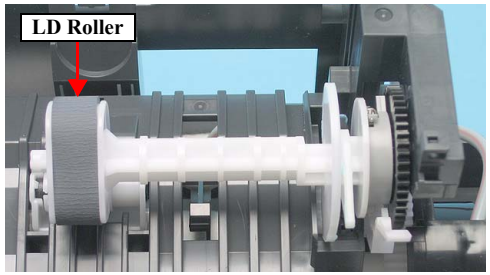
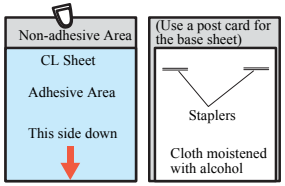
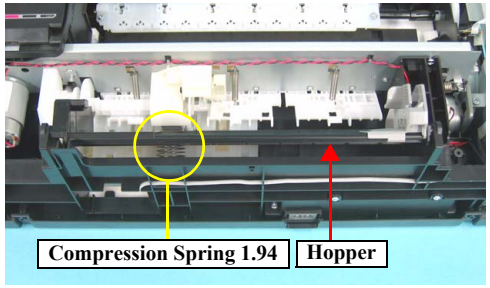
Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Operation • –	The LD Roller cannot pick up paper although the LD Roller attempt to rotate correctly.	ASF Unit	1. Check if any paper dust is not adhered to the surface of the LD Roller.  	1. Set a cleaning sheet in the ASF Unit up side down. Then holding the top edge, try to load the paper from the Printer driver. The micro pearl on the LD Roller surface is removed. To remove severe smear, staple a cloth moistened with alcohol to a post card and clean the roller in the same manner.  *If the problem is not solved, replace the ASF unit with new one.
	The Hopper does not operate during the paper loading sequence although the LD Roller rotates to load paper from the ASF Unit.	Hopper	1. Check if the Hopper operates correctly in the paper loading sequence.  	1. Reassemble the Compression Spring 1.94 between the Base Frame and the Hopper.

Table 3-8. Check point for paper out error according to each phenomenon

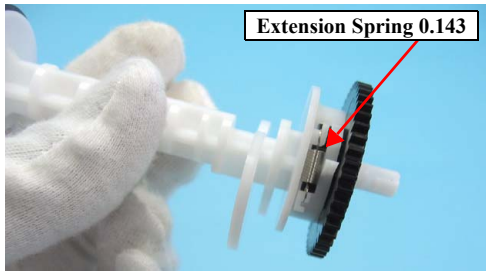
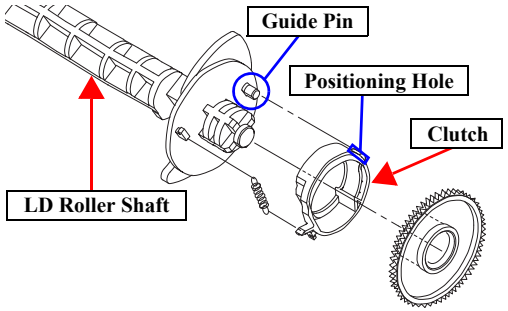
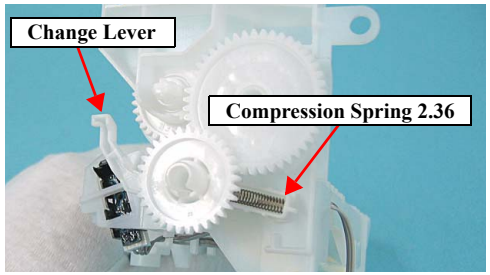
Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Operation • –	The drive of the PF Motor is not transmitted to the LD Roller Shaft.	ASF Unit	1. Check if the Extension Spring 0.143 does not come off in the Clutch mechanism.  	1. Reassemble the Extension Spring 0.143 in the Clutch mechanism.
			2. Check if the positioning hole of the Clutch does not come off from the guide pin of the LD Roller Shaft.  	2. Reassemble the positioning hole of the Clutch on the guide pin of the LD Roller Shaft.
			3. Check if the Clutch tooth is not damaged.	3. Replace the ASF Unit with a new one.
			4. Check if the Clutch is not damaged.	4. Replace the ASF Unit with a new one.
			5. Check if the Compression Spring 2.36 does not come off in the Change Lever.  	5. Replace the ASF Unit with a new one.

Table 3-8. Check point for paper out error according to each phenomenon

Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Operation • –	The LD Roller is not set to the ASF home position and paper is always loaded from the ASF Unit during the paper loading sequence.	ASF Unit	1. Check if the tip of the Change Lever is not damaged.	1. Replace the ASF Unit with a new one.

Table 3-9. Check point for the unable head cleaning according to each phenomenon

Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Operation • –	Head Cleaning is not carried out.	Ink Cartridge	1. Check if the ink is remaining in the Ink Cartridge.	1. Replace the Ink Cartridge with a new one.
			2. Check if the Ink Cartridge can be used by installing it to other printer.	2. Replace the Ink Cartridge with a new one

Table 3-10. Check point for double feed error according to each phenomenon

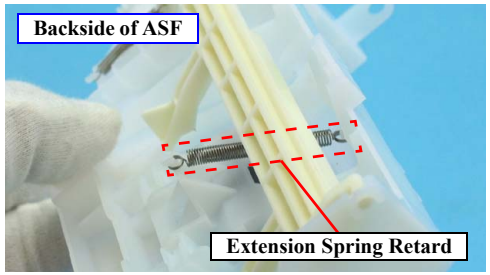
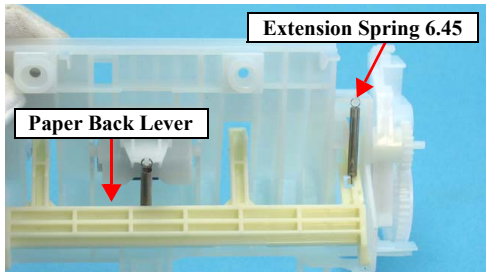
Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Operation • –	After both surfaces were printed, the paper was ejected but an error is displayed.	ASF Unit	1. Check if the Extension Spring Retard operates correctly in the paper loading sequence.  	1. Set the Extension Spring Retard between the Retard Roller Unit and the ASF Frame.
			2. Check if the Paper Back Lever operates correctly in the paper loading sequence.  	2. Set the Extension Spring 6.45 between the ASF Frame and the Paper Back Lever.

Table 3-11. Check point for communication error according to each phenomenon

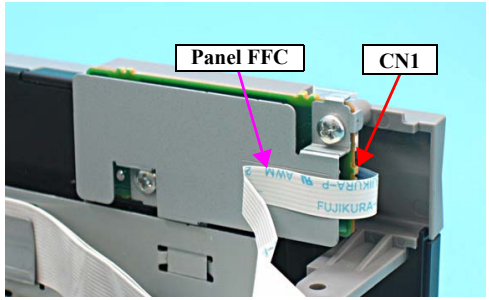
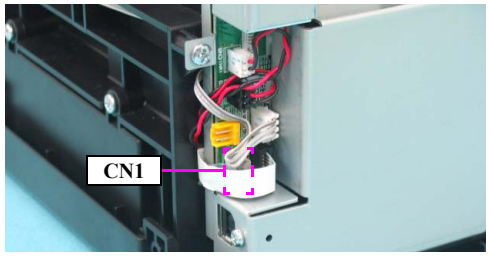
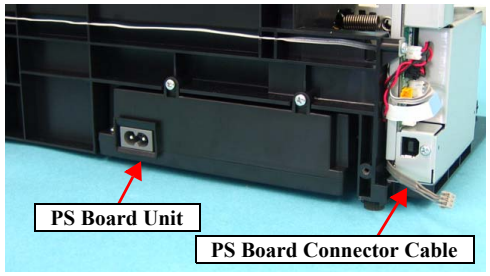
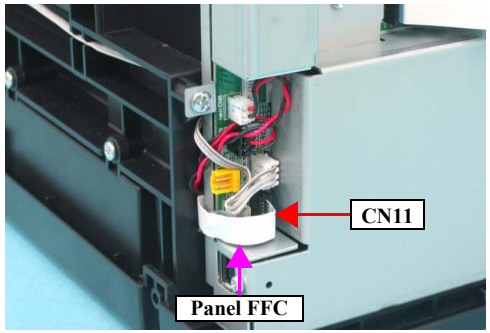
Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Power on • Anywhere	When turning on the power, the printer does not operate at all.	Panel Unit	1. Check if the Panel FFC is connected to CN1 on the Panel Board. 	1. Connect the Panel FFC to CN1 on the Panel Board.
			2. Check if the Panel FFC is not damaged.	2. Replace the Panel FFC with new one.
			3. Check if the Panel Board is not damaged.	3. Replace the Panel Board with new one.
• Power on • Anywhere	When turning on the power, the printer does not operate at all.	PS Board Unit	1. Check if the PS Board Connector Cable is connected to CN1 on the Main Board. 	1. Connect the PS Board Connector Cable to CN1 on the Main Board.
			2. Check if the PS Board Connector Cable/PS Board is not damaged. 	2. Replace the PS Board Unit with new one. * If the problem is not solved, replace the Main Board with new one.

Table 3-11. Check point for communication error according to each phenomenon

Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Operation • –	When turning on the power, the power on sequence is performed correctly. But, when any printer job is sent to the printer, a communication error is indicated with STM3.	USB Cable	1. Check if the USB Cable is connected between the printer and the PC.	1. Connect the USB Cable to the printer and the PC.
		Main Board Unit	1. Check if an correct model name is stored into the address of the EEPROM on the Main Board.	1. Use the Adjustment Program to write the correct value to the EEPROM address.
			2. Check if the Panel FFC is connected to CN11 on the Main Board.  	2. Connect the Panel FFC to CN11 on the Main Board.

3.2.3 Superficial Phenomenon-Based Troubleshooting

This section explains the fault locations of the error states (print quality and abnormal noise) other than the error states (LED and STM3) in the previous section.

Table 3-12. Check point for multiple sheets of paper are always loaded without LEDs and STM3

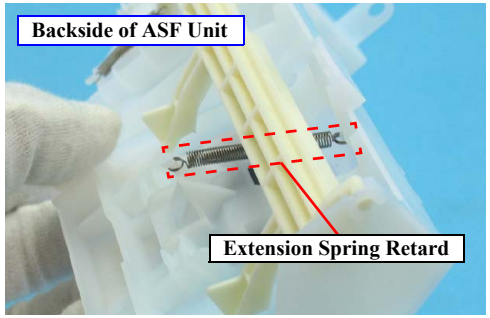
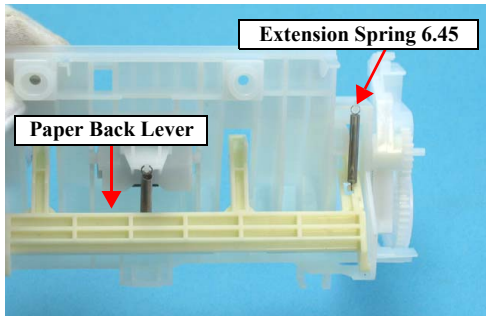
Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Operation • –	The LEDs and STM3 are not indicating error conditions. But, multiple sheets of paper are always loaded from the ASF Unit.	ASF Unit	1. Check if the Extension Spring Retard operates correctly in the paper loading sequence.  	1. Set the Extension Spring Retard between the Retard Roller Unit and the ASF Frame.
			2. Check if the Paper Back Lever operates correctly in the paper loading sequence.  	2. Set the Extension Spring 6.45 between the ASF Frame and the Paper Back Lever.

Table 3-13. Check point for the abnormal noise

Occurrence timing CR position	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Anytime • Anywhere	The abnormal noise occurs at the first power on timing and during each operation although the printing operation is performed.	Carriage Unit	1. Check if the grease on the Carriage Path is sufficient.	1. Wipe off the remaining grease on the Carriage path and lubricate it on its frame.
		ASF Unit	1. Check if the Change Lever moves smoothly.	1. Replace the ASF Unit with a new one.
	The Carriage Unit collides to the Upper-Paper Guide Unit during each operation.	Upper Paper Guide Unit	1. Check if the Upper Paper Guide Unit is attached securely. (check if it interferes with the Carriage Unit)	1. Reassemble the Upper Paper Guide to the Main Frame.

Table 3-14. Check point for the poor printing quality

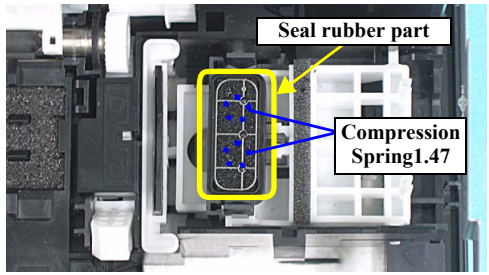
Print Quality State	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Dot missing and mixed colors	Ink is scarcely ejected to the Cap from the Printhead.	Ink System Unit (Cap Unit)	1. Check if there is not any foreign material/damage around the seal rubber part on the Cap Unit.  	1. Remove the foreign material around the seal rubber parts carefully.
			2. Check if the Compression Spring 1.47 is correctly mounted on the Cap Unit.	2. Replace the Ink System Unit with a new one.
	Ink is ejected to the Cap from the Printhead, but the printer does not recover from the error after cleaning or ink change.	Printhead	1. Check if it returns to normal by performing CL operation or replacing the Ink Cartridge.	1. Perform CL operation and the Ink Cartridge replacement specified times. If it doesn't work, change the Printhead with a new one.
			2. Check if the Printhead is not damaged.	2. Replace the Printhead with a new one.
		Cleaner Blade	1. Check if the Cleaner Blade does not have paper dust or bending.	1. Replace Ink System Unit with a new one.
		Main Board	1. Check if the Main Board is not damaged.	1. Replace the Main Board with a new one.

Table 3-14. Check point for the poor printing quality

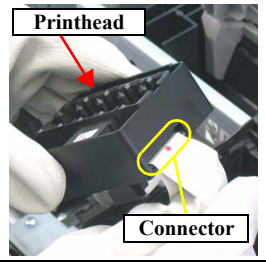
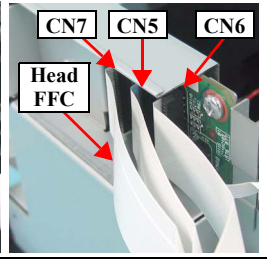
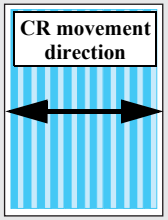
Print Quality State	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• White streak / abnormal discharge	Ink is ejected to the Cap from the Printhead, but printing is not done at all after cleaning or ink change, or abnormal discharge occurs.	Head FFC	1. Check if the Head FFC is securely connected to the Printhead Connectors and the Main Board Connectors (CN5, CN6, CN7).  	1. Connect the Head FFC to the Printhead and the Main Board Connectors.
			2. Check if the Head FFC is not damaged.	2. Replace the Head FFC with a new one.
		Printhead	1. Check if it returns to normal by performing CL operation or replacing the Ink Cartridge.	1. Perform CL operation and the Ink Cartridge replacement specified times. If it doesn't work, change the Printhead with a new one.
		Main Board Unit	1. Check if the Main Board is not damaged.	1. Replace the Main Board Unit with a new one.
• White streak/ color unevenness occurrence	Vertical banding appears against the CR movement direction. And, it looks like uneven printing.  [Note] If the problem is not solved, replace the CR Motor with a new one.	Adjustment	1. For printing in the Bi-D mode, check if Bi-D Adjustment has been performed properly.	1. Perform Bi-D Adjustment to correct print start position in bi-directional printing. (Refer to Chapter 5 "ADJUSTMENT" *(p.107)*.)
		Printhead	1. Check if the Nozzle Check Pattern is printed properly.	2. Perform Head Cleaning and check the Nozzle Check Pattern. (Refer to Chapter 5 "ADJUSTMENT" *(p.107)*.) If the problem is not solved, replace the Printhead with a new one.
		Main Frame	1. Check if there is any foreign material on the Carriage path.	1. Remove foreign material from surface of the Carriage path.
			2. Check if the Main Frame is not deformed.	2. Replace the Main Frame with a new one.
			3. Check if the grease is enough on the Carriage path of the Main Frame.	3. After wiping the grease G-71 on the Carriage path with a dry, soft cloth, coat it with grease. (Refer to Chapter 6 "MAINTENANCE" *(p.116)*.)

Table 3-14. Check point for the poor printing quality

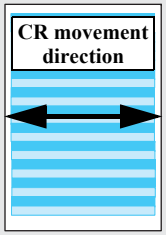
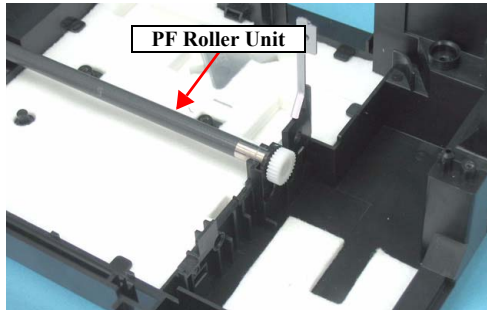
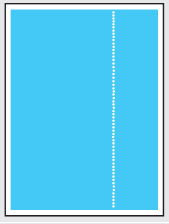
Print Quality State	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• White streak/ color unevenness occurrence	Micro banding appears horizontally against the CR movement direction and it appears with the same width.  [Note] If the problem is not solved, replace the PF Motor with a new one.	Printer driver & exclusive paper	1. Check if the suitable paper is used according to the printer driver setting.	1. Use the suitable paper according to the printer driver setting.
		Printhead	1. Check if the Nozzle Check Pattern is printed correctly.	1. Perform the Head Cleaning and check the Nozzle Check Pattern. (Refer to Chapter 5 "ADJUSTMENT" *(p.107)*.) If the problem is not solved, replace the Printhead with a new one.
		PF Roller Unit	1. Check if there is not any foreign material on the surface of the PF Roller Unit. 	1. Clean the surface of the PF Roller Unit carefully with the soft cloth.
			2. Check if the PF Roller Unit is not damaged.	2. Replace the PF Roller Unit with a new one.
	The Star wheel mark against the CR movement direction. 	Star Wheel Holder Assy	1. Check if the Star Wheel Holder does not come off.	1. Reassemble the Star Wheel Holder correctly.
			2. Check if the surface of the Star Wheel Holder Assy is flat.	2. Replace the Star Wheel Holder Assy with a new one.
	Printing is blurred.	Printer driver & exclusive paper	1. Check if the suitable paper is used according to the printer driver setting.	1. Use the suitable paper according to the printer driver setting.
		Printhead	1. Check if the correct Head ID is stored into the EEPROM by using the Adjustment Program.	1. Input 10 digits code of the Head ID into the EEPROM by using the Adjustment Program.

Table 3-14. Check point for the poor printing quality

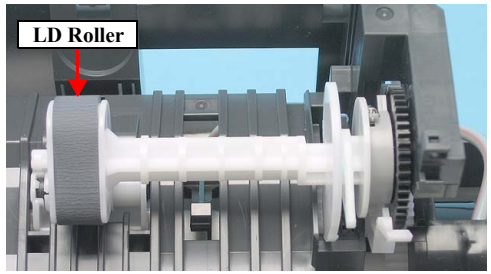
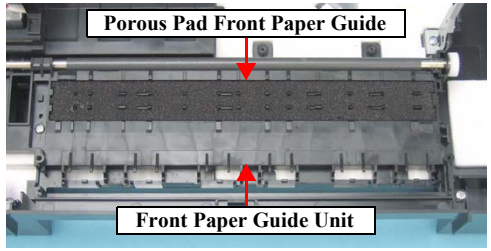
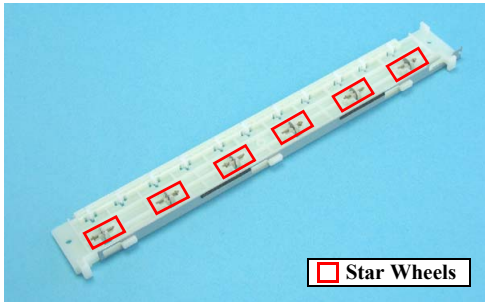
Print Quality State	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Print start position slip	The printing operation is correctly performed. But, the top margin is insufficient than usual one.	ASF Unit	1. Check if any paper dust is not adhered to the surface of the LD Roller. 	1. Set a cleaning sheet in the ASF up side down. Then holding the top edge, try to load the paper from the Printer driver. The micro pearl on the LD Roller surface is removed. To remove severe smear, staple a cloth moistened with alcohol to a post card and clean the roller in the same manner. As for the cleaning sheet, refer to page 57 "Remedy of the Paper out error". * If the problem is not solved, replace the ASF Unit with a new one.
• Ink stain of paper	Ink stain occurs at the back, top end or bottom end of the print paper.	Front Paper Guide	1. Check if the Front Paper Guide Unit is free from ink stain. 	1. Clean the Front Paper Guide Unit with a soft cloth.
			2. Check if heaps of ink are not formed on Porous Pad Front Paper Guide.	2. Replace the Front Paper Guide Assy with a new one.
		EJ Roller Unit	1. Check if the EJ Roller Unit is free from ink stain.	1. Clean the EJ Roller Unit with a soft cloth.
		PF Roller Unit	1. Check if the PF Roller Unit is free from ink stain.	1. Clean the PF Roller Unit with a soft cloth.

Table 3-14. Check point for the poor printing quality

Print Quality State	Detailed phenomenon	Defective unit/ part name	Check point	Remedy
• Ink stain of paper	Ink sticks to other than the print area of the paper, resulting in contamination	Printhead	1. Check if the Printhead Cover does not have the ink drop.	1. Clean the Printhead Cover carefully with a soft cloth.
		Upper Paper Guide Unit	1. Check if the Upper Paper Guide Unit is free from ink stain.	1. Clean the Upper Paper Guide Unit with a soft cloth.
		Star Wheel Holder Assy	1. Check if the Star Wheels is free from ink stain. 	1. Clean the Star Wheels with a soft cloth.

CHAPTER

4

DISASSEMBLY/ASSEMBLY

4.1 Overview

This section describes procedures for disassembling the main components of the product. Unless otherwise specified, disassembled units or components can be reassembled by reversing the disassembly procedure. Procedures which, if not strictly observed, could result in personal injury are described under the heading "WARNING". "CAUTION" signals a precaution which, if ignored, could result in damage to equipment. Important tips for procedures are described under the heading "CHECK POINT". If the assembly procedure is different from the reversed disassembly procedure, the correct procedure is described under the heading "REASSEMBLY". Any adjustments required after reassembly of components or parts are described under the heading "ADJUSTMENT REQUIRED". When you have to remove any components or parts that are not described in this chapter, refer to the exploded diagrams in the appendix.

Read the following precautions before disassembling and assembling.

4.1.1 Precautions

See the precautions given under the heading "WARNING" and "CAUTION" in the following columns when disassembling or assembling Stylus C110/C120/D120.

WARNING

- **Disconnect the power cable before disassembling or assembling the printer.**
- **If you need to work on the printer with power applied, strictly follow the instructions in this manual.**
- **Always wear gloves for disassembly and reassembly to protect your eyes from ink. If any ink gets in your eyes, wash your eyes with clean water and consult a doctor immediately.**
- **Always wear gloves for disassembly and reassembly to avoid injury from sharp metal edges.**
- **To protect sensitive microprocessors and circuitry, use static discharge equipment, such as anti-static wrist straps, when accessing internal components.**
- **Never touch the ink or wasted ink with bare hands. If ink comes into contact with your skin, wash it off with soap and water immediately. If you have a skin irritation, consult a doctor immediately.**

CAUTION

- **When transporting the printer after installing the ink cartridge, pack the printer for transportation without removing the ink cartridge and be sure to secure the Ink Cartridge to the printer cover with tape tightly to keep it from moving.**
- **Use only recommended tools for disassembling, assembling or adjusting the printer.**
- **Observe the specified torque when tightening screws.**
- **Apply lubricants as specified. See Chapter 6 (p116) for details.)**
- **Make the specified adjustments when you disassemble the printer. (See Chapter 5 (p107) for details.)**
- **when reassembling the Waste Ink Tube, make sure that the tip of waste ink tube is placed in the correct position, otherwise ink may leak.**
- **When using compressed air products; such as air duster, for cleaning during repair and maintenance, the use of such products containing flammable gas is prohibited.**

4.1.2 Tools

Use only specified tools to avoid damaging the printer.

Table 4-1. Tools

Name	EPSON Tool Code*
(+) Phillips screwdriver #1	1080530
(+) Phillips screwdriver #2	---
Flathead screwdriver	---
Flathead Precision screwdriver #1	---
Tweezers	---
Longnose pliers	---
Acetate tape	1003963
Nippers	---
Upper Case Opener	1108202

Note * : All of the tools listed above are commercially available.
EPSON provides the tools listed with EPSON tool code.

4.1.3 Work Completion Check

If any service is made to the printer, use the checklist shown below to confirm all works are completed properly and the printer is ready to be returned to the user.

Classification	Item	Check Point	Status
Printer Unit	Self-test	Is the operation normal?	☐OK / ☐NG
	ON-line Test	Is the printing successful?	☐OK / ☐NG
	Printhead (Nozzle check pattern print)	Is ink discharged normally from all the nozzles?	☐OK / ☐NG
	Carriage Mechanism	Does it move smoothly?	☐OK / ☐NG
		Is there any abnormal noise during its operation?	☐OK / ☐NG
		Is the CR Motor at the correct temperature? (Not too hot to touch?)	☐OK / ☐NG
Printer Unit	Paper Feeding Mechanism	Is paper advanced smoothly?	☐OK / ☐NG
		No paper jamming?	☐OK / ☐NG
		No paper skew?	☐OK / ☐NG
		No multiple feeding?	☐OK / ☐NG
		No abnormal noise?	☐OK / ☐NG
		Is the paper path free of any obstructions?	☐OK / ☐NG
		Is the PF Motor at correct temperature?	☐OK / ☐NG
ON-line Test	ON-line Test	Is the operation normal?	☐OK / ☐NG
Adjustment	Specified Adjustment	Are all the adjustments done correctly?	☐OK / ☐NG
Lubrication	Specified Lubrication	Are all the lubrication made at the specified points?	☐OK / ☐NG
		Is the amount of lubrication correct?	☐OK / ☐NG
Function	ROM Version	Version:	☐OK / ☐NG
Packing	Ink Cartridge	Are the ink cartridges installed correctly?	☐OK / ☐NG
	Waste Ink pad	Are the waste ink pads adequate to absorb?	☐OK / ☐NG
	Protective materials	Is the printer carriage placed at the capping position?	☐OK / ☐NG
Others	Attachments, Accessories	Have all the relevant items been included in the package?	☐OK / ☐NG

4.2 Disassembly Procedures

For disassembling each unit, refer to the pages in the following flowchart.

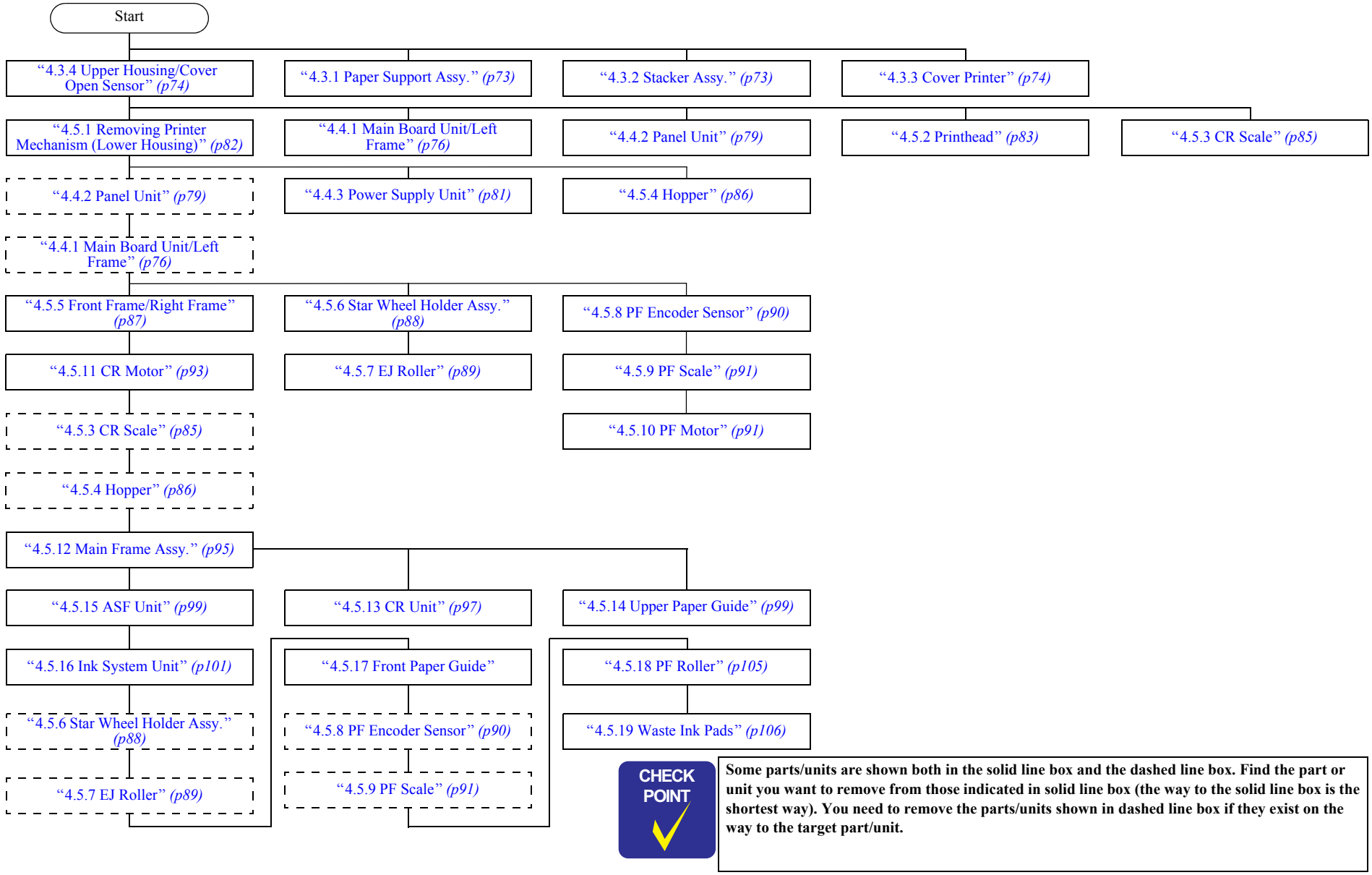


Figure 4-1. Disassembling Flowchart

4.3 Removing Housing

4.3.1 Paper Support Assy.

☐ **Part/Unit that should be removed before removing Paper Support Assy.**

None

☐ **Removal Procedure**

1. Release the guide pins (x2) that secure the Paper Support Assy. and remove it from the Upper Housing.

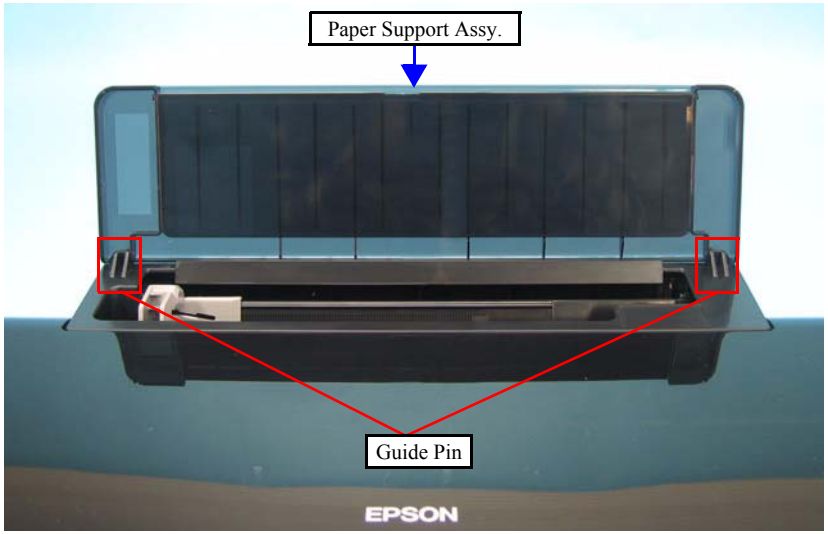


Figure 4-2. Removing Paper Support Assy.

4.3.2 Stacker Assy.

☐ **Part/Unit that should be removed before removing Stacker Assy.**

None

☐ **Removal Procedure**

1. Open the Stacker Assy.
2. Release the Stacker Assy. while pressing in the hook (x1) on the right with a flathead precision screwdriver or a similar tool, and then remove it.

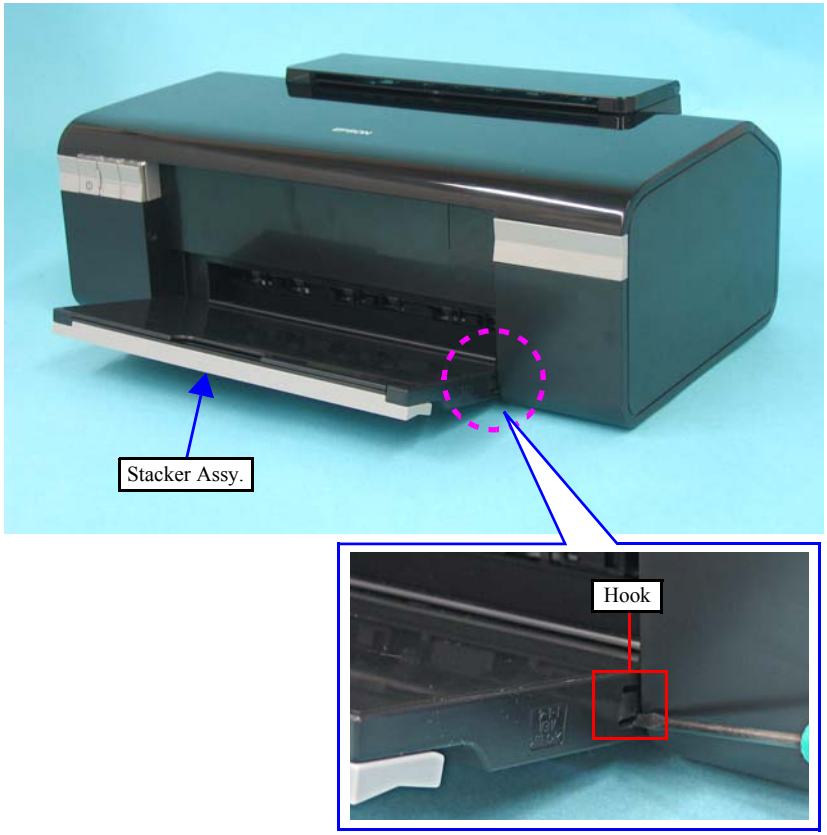


Figure 4-3. Removing Stacker Assy.

4.3.3 Cover Printer

☐ **Part/Unit that should be removed before removing Cover Printer**

None

☐ **Removal Procedure**

1. Release the guide pins (x2) that secure the Cover Printer and remove it from Upper Housing.

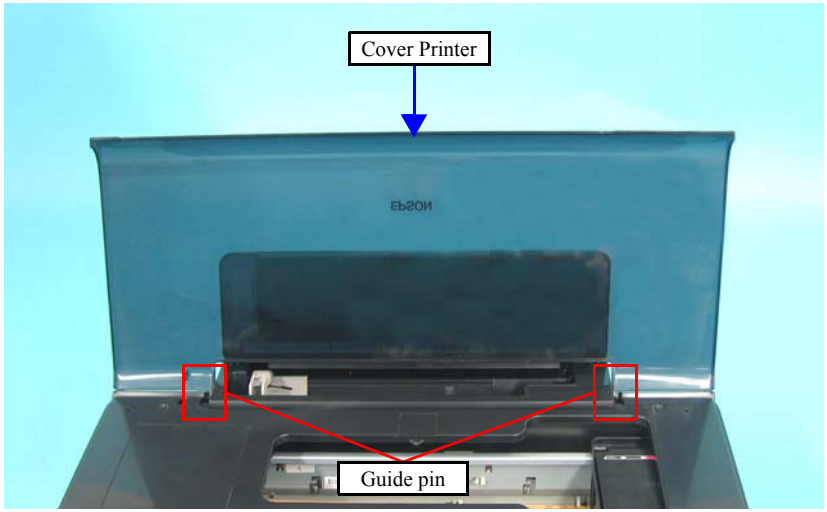


Figure 4-4. Removing Cover Printer

4.3.4 Upper Housing/Cover Open Sensor

☐ **Part/Unit that should be removed before removing Upper Housing/Cover Open Sensor**

None

☐ **Removal Procedure**

CHECK POINT

Stress whitening easily occurs in the hooks of the Right Front Cover. Be careful not to apply too much force on the hooks when removing the Right Front Cover. To remove the cover easily, use the Upper Case Opener (code:1108202).

1. Open the Paper Support Assy.
2. Open the Stacker Assy.
3. Remove the Right Front Cover.

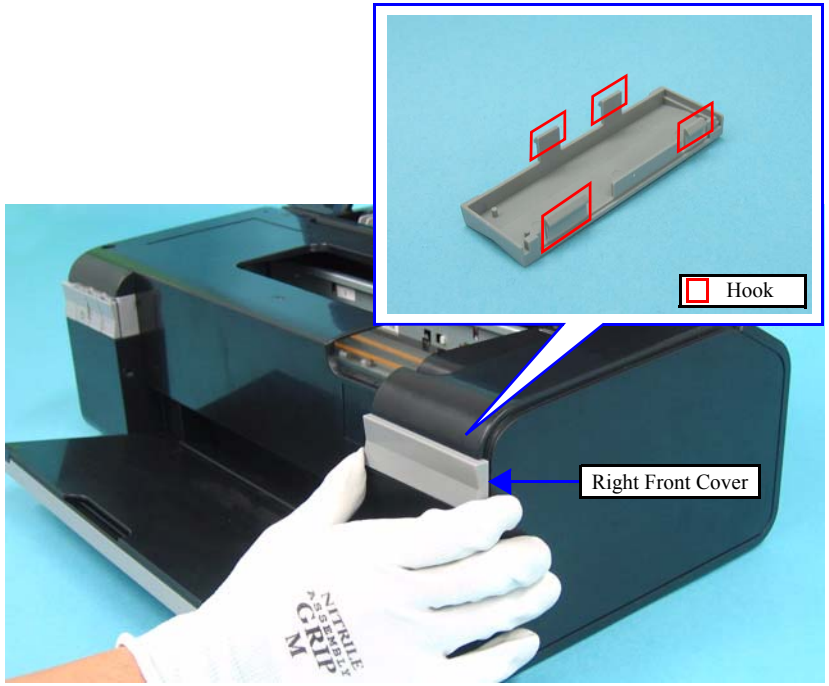


Figure 4-5. Removing Right Front Cover

4. Remove the screws (x4) that secure the Upper Housing.

Figure 4-6. Removing Upper Housing (1)

5. Lift the Upper Housing a little to disconnect the connector (CN4) of the Cover Open Sensor from the Main Board, then remove the Upper Housing.

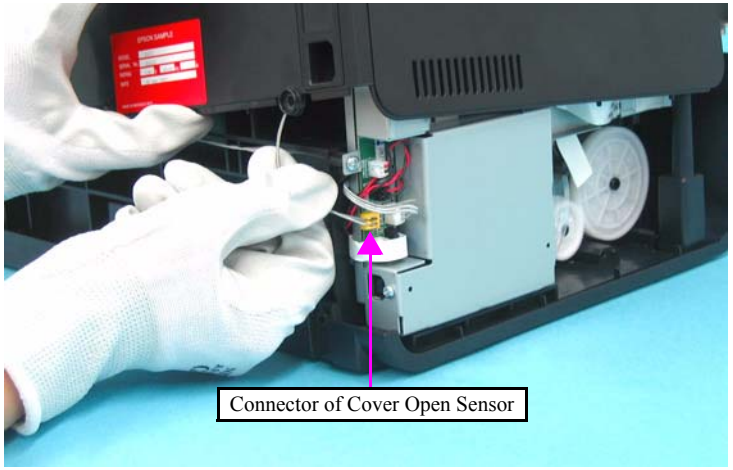


Figure 4-7. Removing Upper Housing (2)

REASSEMBLY

- **Tighten the screws in the order given in Figure 4-6.**
- **If the acetate tape that secures the cable of the Cover Open Sensor comes off, attach it correctly referring to the figure below.**

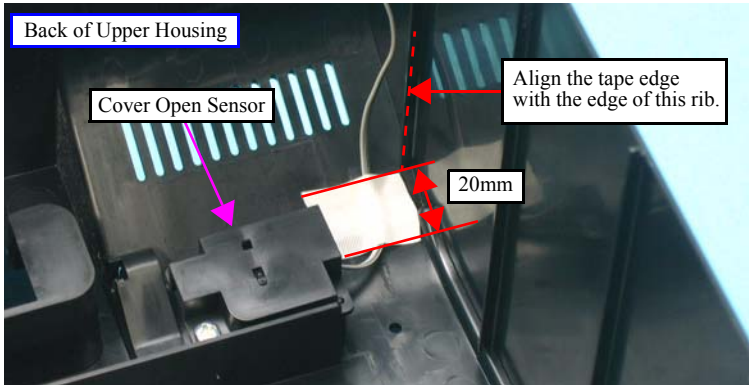


Figure 4-8. Acetate Tape Position

4.4 Removing Board

4.4.1 Main Board Unit/Left Frame

☐ **Part/Unit that should be removed before removing Main Board Unit/Left Frame**

Upper Housing

☐ **Removal Procedure**

CAUTION

Be careful not to bend or damage the Panel Unit FFC when removing it.

1. Disconnect the following connectors (x4) and FFCs (x5) from the Main Board.

CN No.	Cable	CN No.	Cable
CN1	Power Supply Unit cable	CN8	CR Motor cable
CN3	PE Sensor cable	CN9	PF Motor cable
CN5	Head FFC	CN10	PF Encoder FFC
CN6	Head FFC	CN11	Panel Unit FFC
CN7	Head FFC		

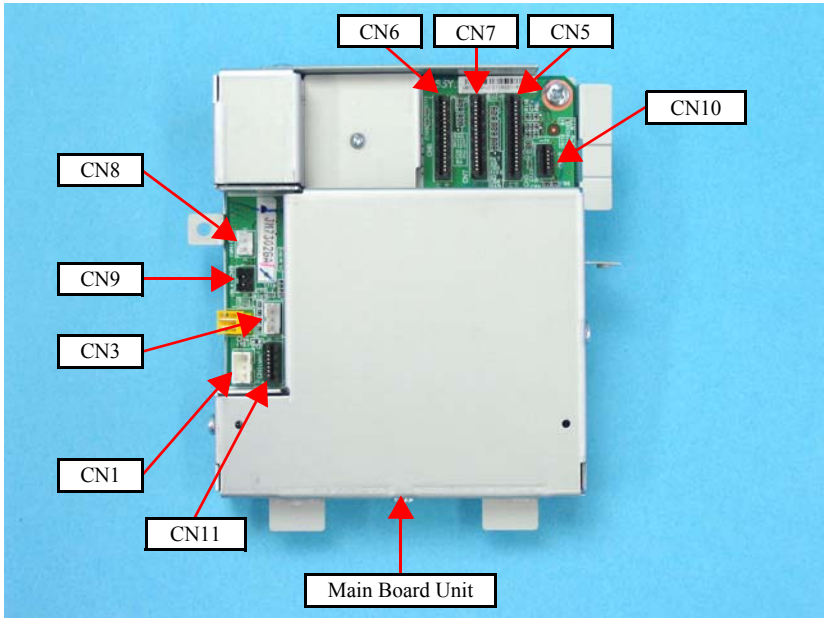


Figure 4-9. Connector Layout of Main Board

2. Peel off the acetate tape (x1) that secures the Head FFC and the Left Frame together, and release the Head FFC from the hook (x1) on the Left Frame.

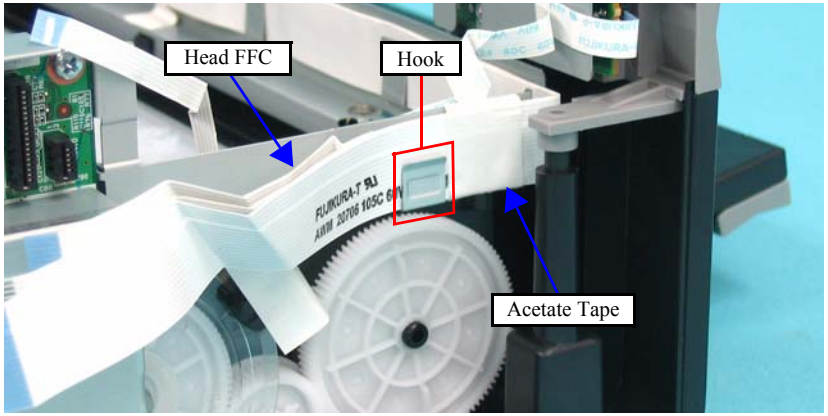


Figure 4-10. Removing Main Board Unit/Left Frame (1)

3. Remove the screws (x3) that secure the Main Board Unit and the Left frame.

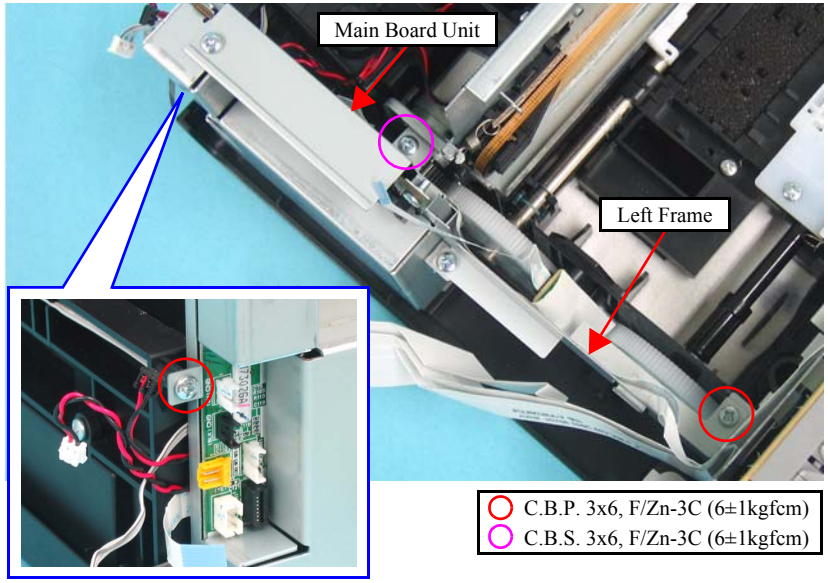


Figure 4-11. Removing Main Board Unit/Left Frame (2)

4. Peel off the Panel Unit FFC from both the Main Board Unit and the Left Frame, and remove them together.

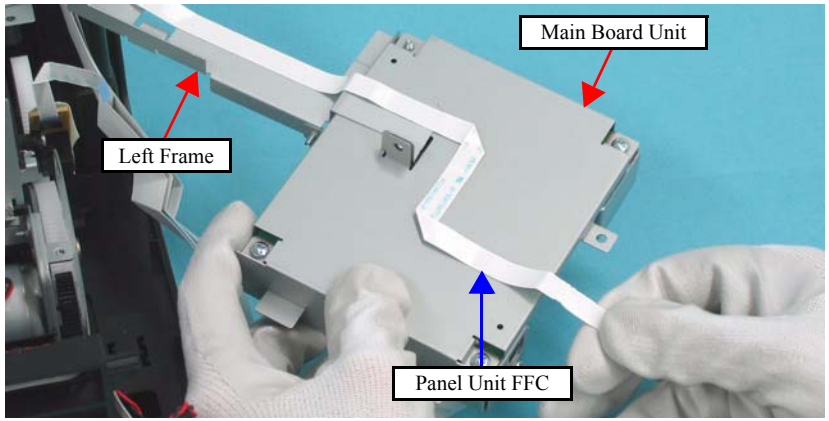


Figure 4-12. Removing Main Board Unit/Left Frame (3)

5. Remove the screw (x1) that secures the Left Frame, and remove the Main Board Unit.

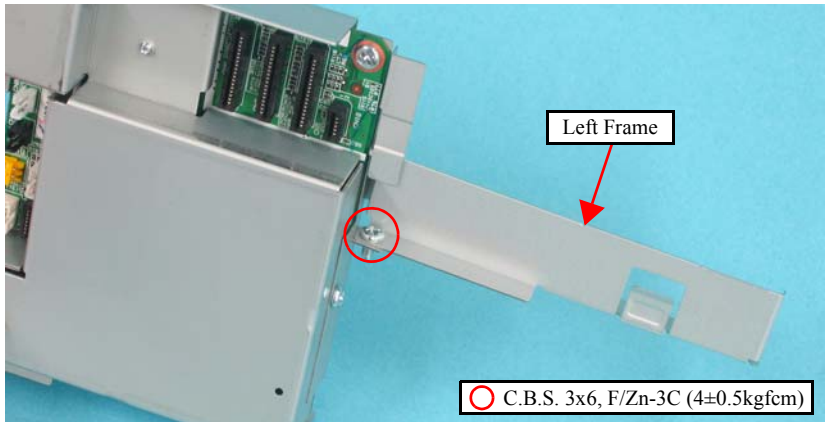


Figure 4-13. Removing Main Board Unit/Left Frame (4)

REASSEMBLY

- **Be careful not to damage the PF Scale and the Spur Gear of the EJ roller when installing the Main Board Unit and the Panel Unit.**
- **Route the Panel Unit FFC on the Main Board Unit and the Panel Unit referring to the figure below. Make sure to fold the FFC as shown.**

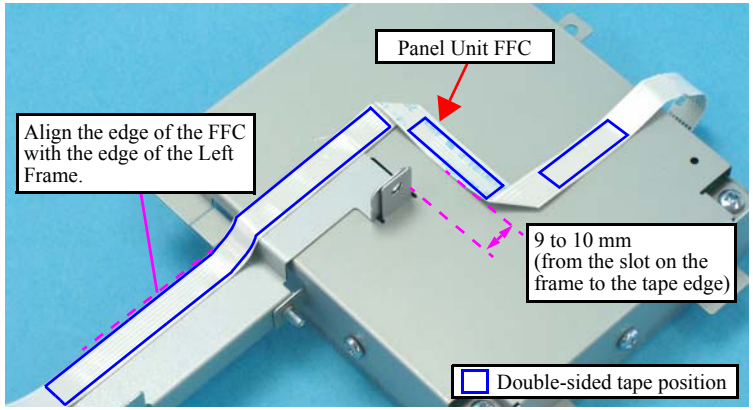


Figure 4-14. Routing Panel Unit FFC

- **When installing the Main Board Unit, be sure to insert the tabs (x2) of the Main Board Unit into the slots of the Base Frame (x2).**

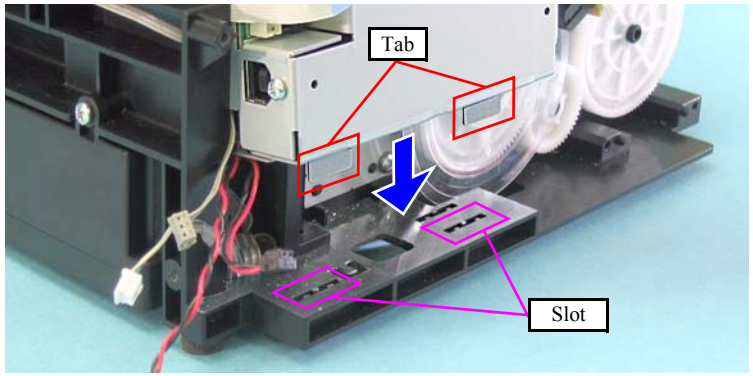


Figure 4-15. Installing Main Board Unit

REASSEMBLY

- **When routing the Head FFC on the Left Frame, secure the Head FFC with an acetate tape on the specified position as shown in the figure below.**

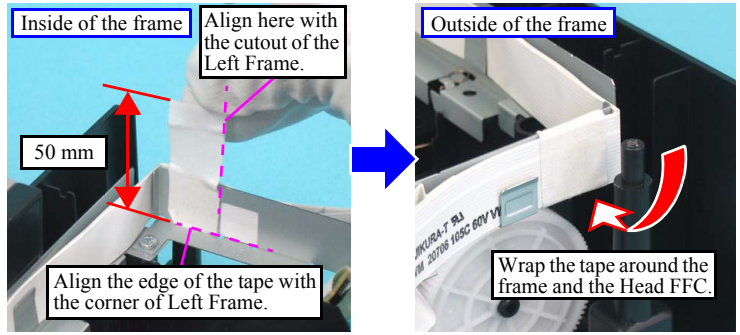


Figure 4-16. Acetate Tape Position

- **Be cautious of the following points when connecting the cables to the Main Board.**
  1. **Do not let the cables and FFCs over the USB interface.**
  2. **Route the CR Motor cable and the PF Motor cable through the gap between their connectors.**

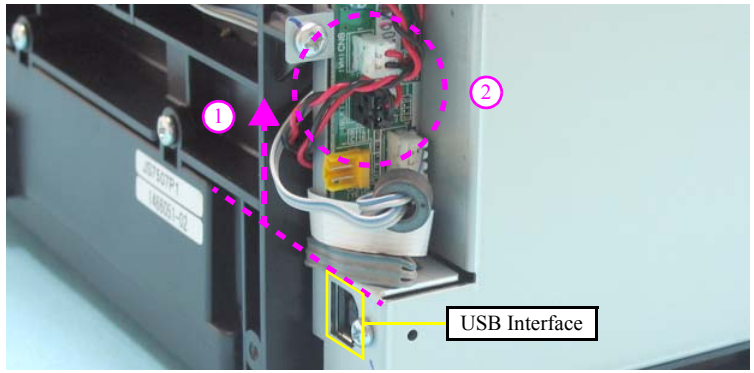


Figure 4-17. Routing cables on the Main Board

ADJUSTMENT REQUIRED

After replacing the Main Board Unit, be sure to perform specified adjustment. See Chapter 5 " ADJUSTMENT" (p.107)

4.4.2 Panel Unit

☐ **Part/Unit that should be removed before removing Panel Unit**

Upper Housing

☐ **Removal Procedure**

1. Peel off the Panel Unit FFC that is secured with the double-sided tape (x1) from the Panel Unit, and disconnect the FFC (x1) from the connector of the Panel Unit.
2. Release the rib (x1) of the Panel Unit from the cutout (x1) of the Front Frame, and remove the Panel Unit.

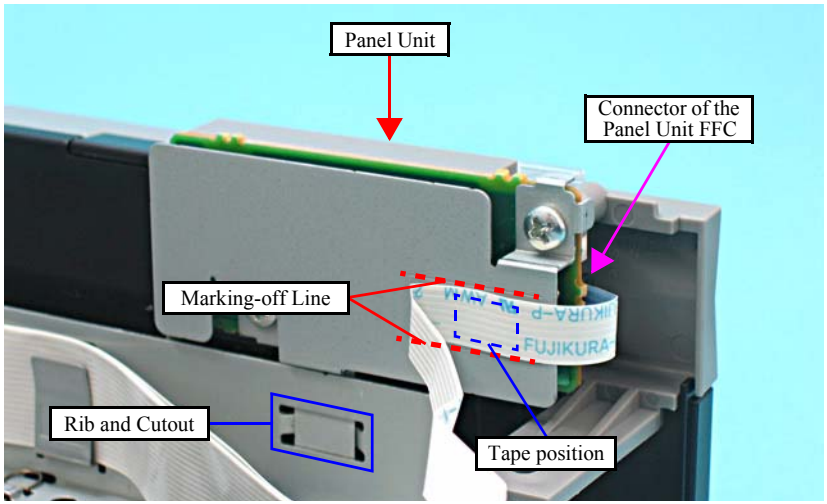


Figure 4-18. Removing Panel Unit

3. Remove the screws (x2) that secure the Panel Board and the Panel Shield Plate, and remove them together.

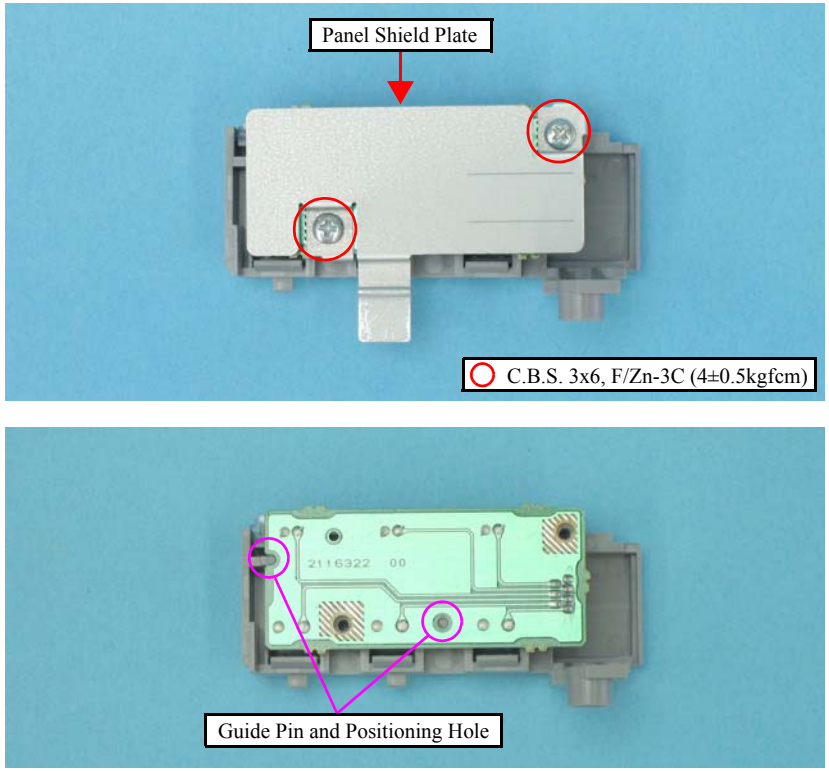


Figure 4-19. Removing Panel Board

4. Remove the Light Guide Tube from the Panel Housing.

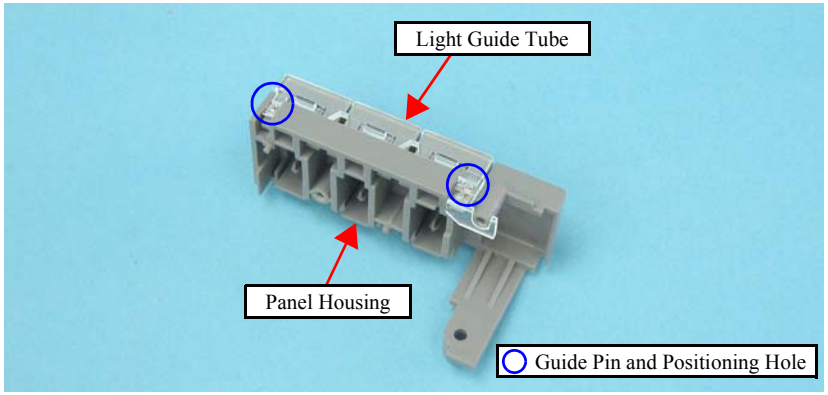


Figure 4-20. Removing Light Guide Tube

REASSEMBLY

- **Insert the guide pins (x2) of the Panel Housing into the positioning holes (x2) of the Light Guide Tube as shown in Figure 4-20.**
- **Insert the guide pins (x2) of the Panel Housing into the positioning holes (x2) of the Main Board as shown in Figure 4-19.**
- **When routing the Panel Unit FFC, tape the FFC to the Panel Unit with a double-sided tape. Both edge of the Panel Unit FFC must be aligned with the marking-off line as shown in Figure 4-18.**

4.4.3 Power Supply Unit

☐ **Part/Unit that should be removed before removing Power Supply Unit**

Upper Housing/Lower Housing

☐ **Removal Procedure**

1. Disconnect the connectors of the Panel Unit FFC (CN11) and the Power Supply Unit (CN1) from the Main Board. *(refer to Figure 4-9)*
2. Remove the screws (x2) that secure the Power Supply Unit.
3. Lift the Base Frame a little, and then remove the Power Supply Unit.

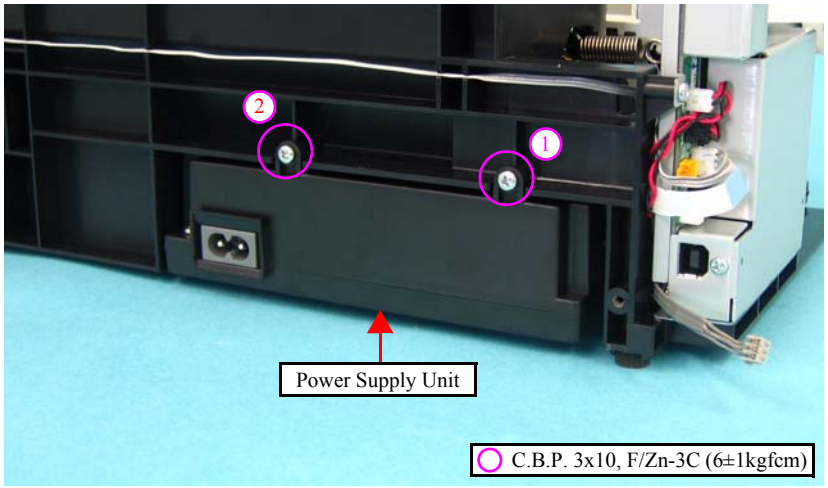


Figure 4-21. Removing Power Supply Unit

REASSEMBLY

When installing the Power Supply Unit, make sure to check the following points.

- **Insert the tabs (x2) of the Power Supply Unit into the holes on the Base Frame.**

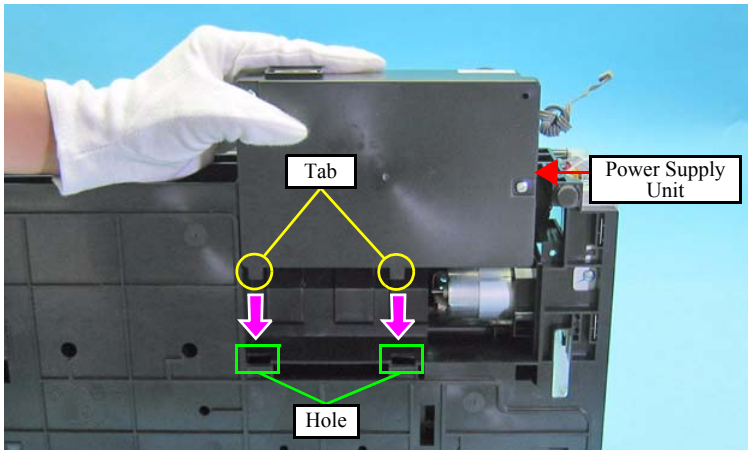


Figure 4-22. Installing the Power Supply Unit

- **Tighten the screws in the order given in Figure 4-21.**
- **Put the ferrite core attached to the Power Supply Unit cable into the cutout of the Base Frame.**

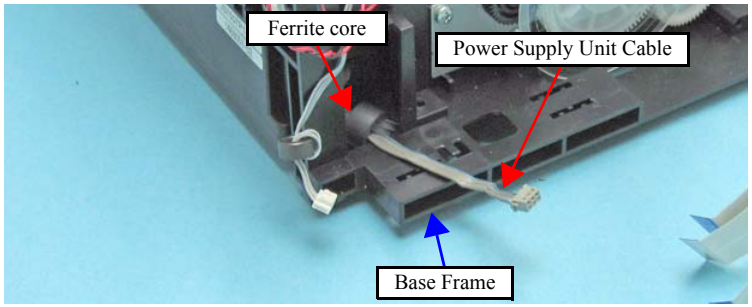


Figure 4-23. Routing the Power Supply Unit Cable

ADJUSTMENT REQUIRED

After replacing the Power Supply Unit, be sure to perform specified adjustment. See Chapter 5 " ADJUSTMENT" (p.107)

4.5 Disassembling Printer Mechanism

4.5.1 Removing Printer Mechanism (Lower Housing)

☐ **Part/Unit that should be removed before removing Printer Mechanism**

Upper Housing

☐ **Removal Procedure**

CAUTION

When lifting the Printer Mechanism, be sure to hold the positions specified in the figure below to prevent the Main Frame from becoming deformed.

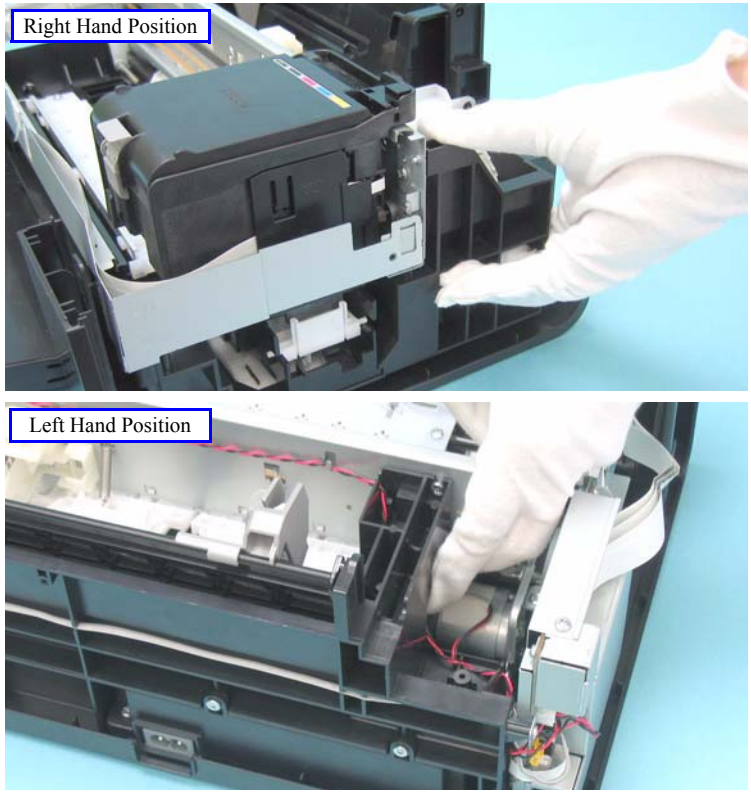


Figure 4-24. Printer Mechanism Handling Precaution

1. Remove the screws (x4) that secure the Printer Mechanism to the Lower Housing, and remove it.

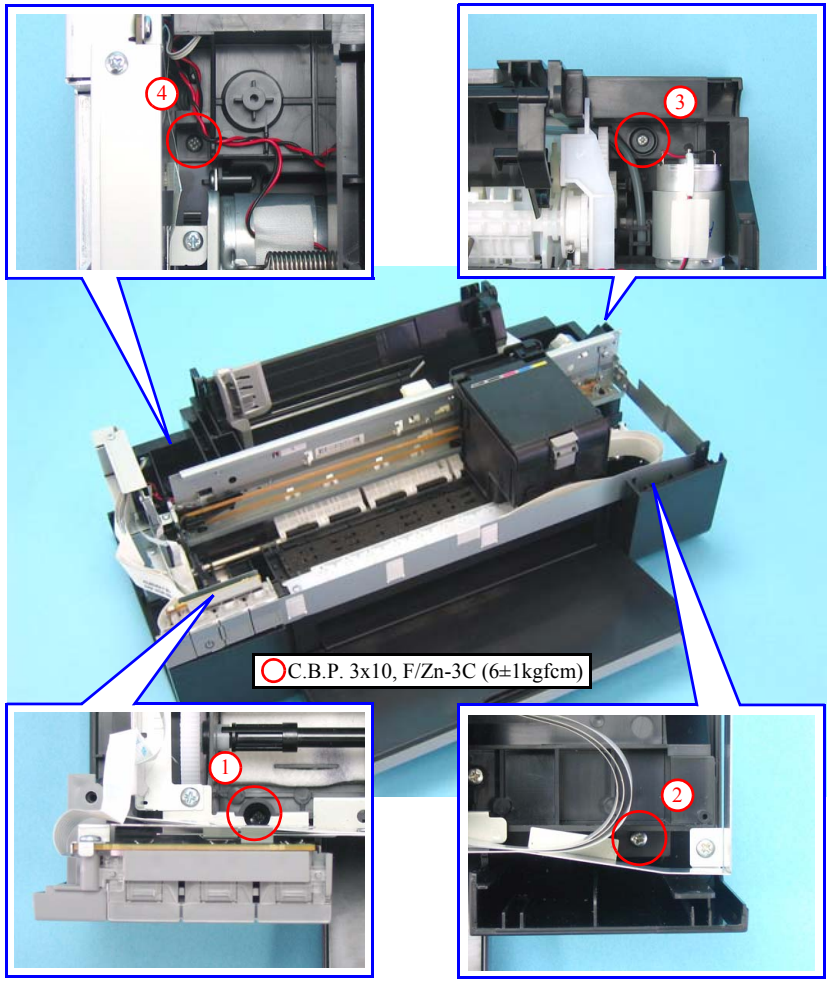


Figure 4-25. Removing Printer Mechanism

REASSEMBLY

Tighten the screws in the order given in Figure 4-25.

4.5.2 Printhead

☐ **Part/Unit that should be removed before removing Printer Mechanism**

Upper Housing

☐ **Removal Procedure**

1. Turn the Spur Gear 51.5 in the direction of the arrow to release the Carriage Lock, and then move the CR Unit to the center of the printer.

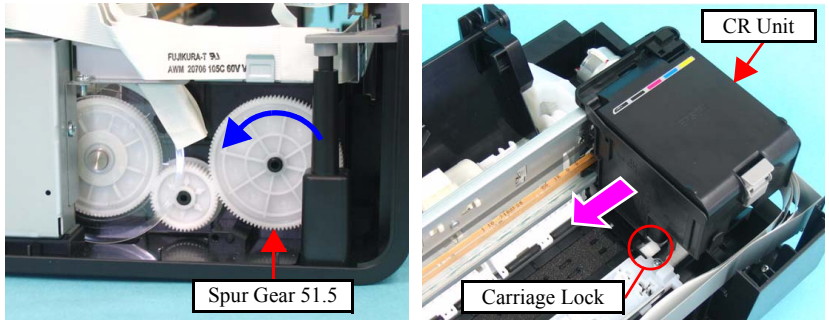


Figure 4-26. Unlocking and Moving CR Unit

2. Open the Cartridge Cover and remove all the ink cartridges from the CR Unit.
3. Release the hook (x1) of the Head Cable Cover with a flathead precision screwdriver, and remove the Head Cable Cover while sliding it downward (in the direction of the arrow).

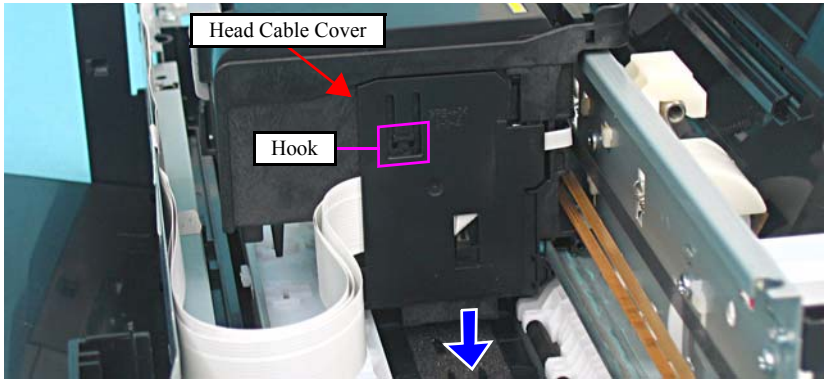


Figure 4-27. Removing Printhead (1)

4. Disconnect the Head FFC (x1) that is connected to the CSIC Board.
5. Release the tabs (x2) that secure the Holder Board Assy. using a needle or a similar tool, and remove the Holder Board Assy. upward (in the direction of the arrow).

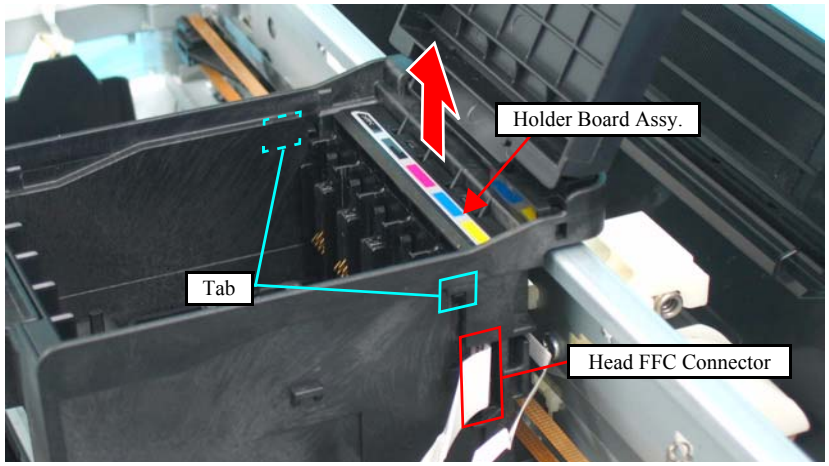


Figure 4-28. Removing Printhead (2)

CAUTION

Do not touch or damage the nozzles or the ink supply needles of the Printhead.

6. Remove the screws (x3) that secure the Printhead, and lift up the Printhead with a longnose pliers.

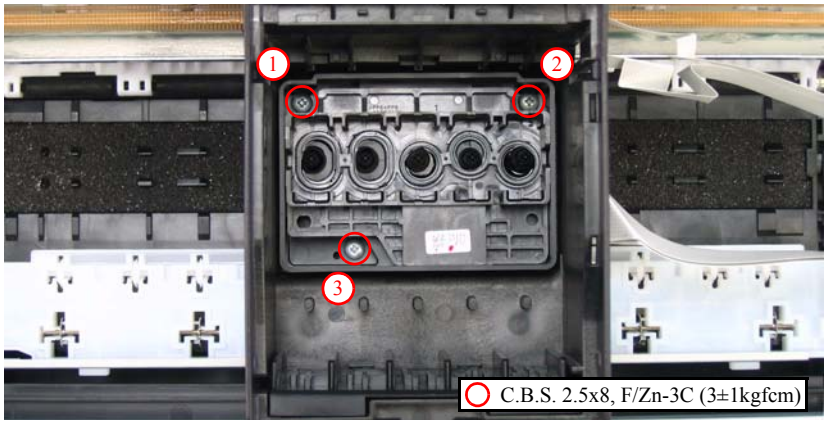


Figure 4-29. Removing Printhead (3)

7. Disconnect the Head FFC from the connectors (x2) of the Printhead, and remove the Printhead.

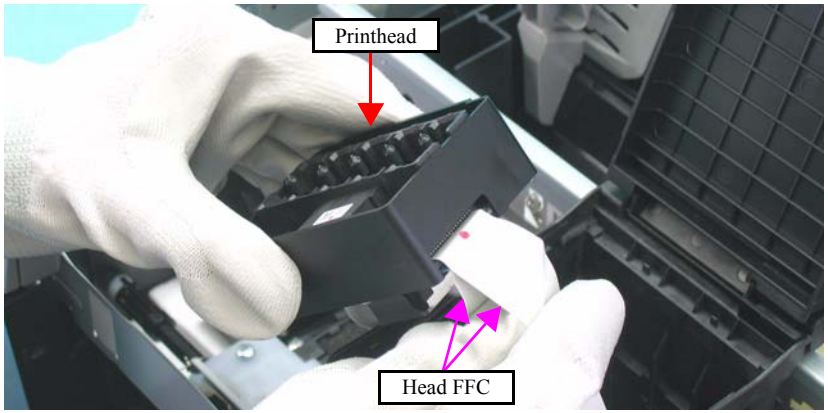


Figure 4-30. Removing Printhead (4)

REASSEMBLY

- **Tighten the screws in the order given in Figure 4-29.**
- **Insert the Holder Board Assy. vertically into the CR Unit so as not to put the assy. on the rib of the Printhead.**

ADJUSTMENT REQUIRED

After removing/replacing the Printhead, be sure to perform the specified adjustment. See Chapter 5 " ADJUSTMENT" (p.107)

4.5.3 CR Scale

☐ **Part/Unit that should be removed before removing CR Scale**

Upper Housing

☐ **Removal Procedure**

CAUTION

Pay attention to the following instructions:
- **Do not touch the CR Scale with bare hands.**
- **Do not damage the CR Scale.**
- **Do not stretch Extension Spring 3.289 too much.**

1. Release the right end of the CR Scale from the hook.
2. Release the CR Scale through the slit of the CR Encoder Sensor.

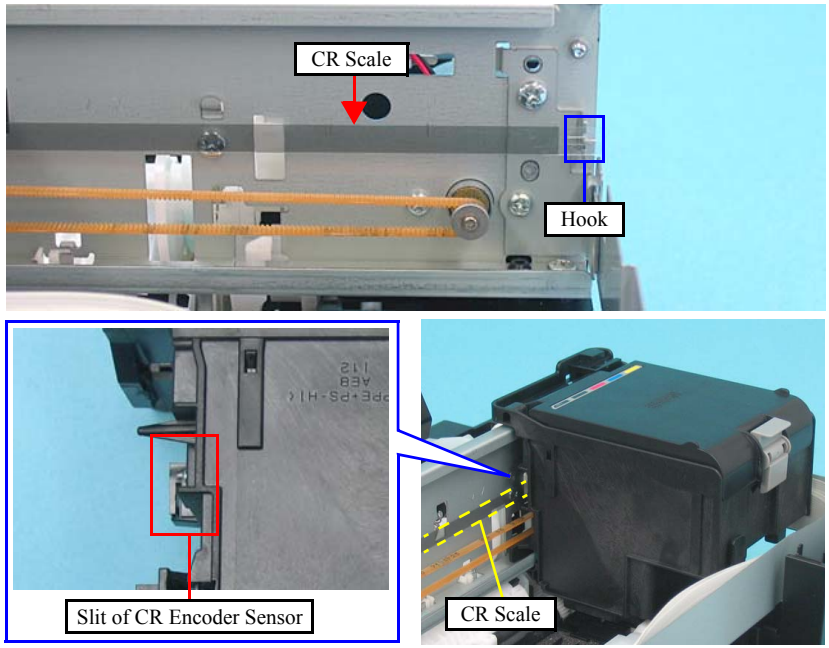


Figure 4-31. Removing CR Scale (1)

3. Release the Extension Spring 3.289 from the hook of the Main Frame.
4. Rotate the CR Scale 90 degrees as shown in the figure and remove the scale from the Main Frame.

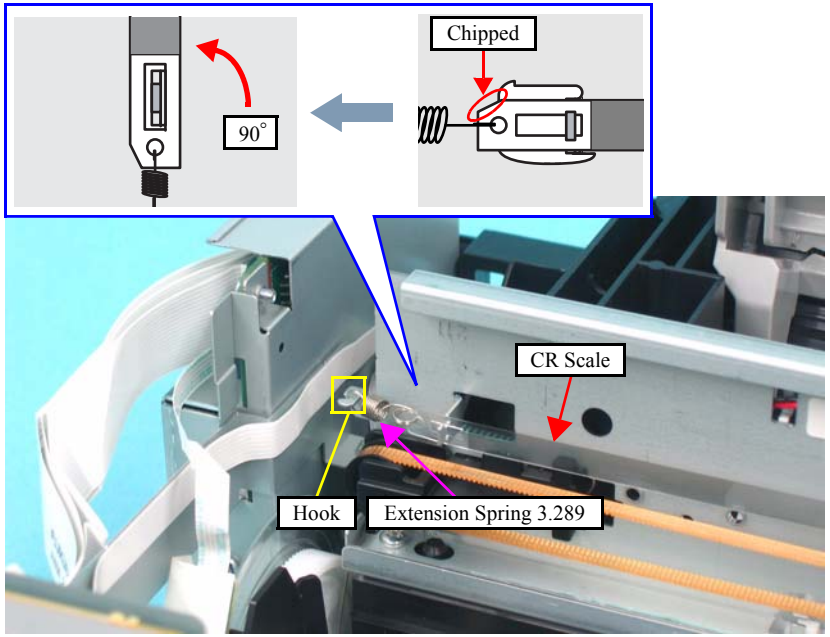


Figure 4-32. Removing CR Scale (2)

REASSEMBLY

When installing the CR Scale, pay attention to the following instructions.
- **Chipped part of the CR Scale must face upward.**
- **CR scale should be passed through the slit of the CR Encoder Sensor.**
- **Make sure that the Extension Spring 3.289 is not be twisted, and then attach its one end to the hook of the Main Frame.**

4.5.4 Hopper

☐ **Part/Unit that should be removed before removing Hopper**

Upper Housing/Lower Housing

☐ **Removal Procedure**

1. Release the dowel A of the Hopper.
2. Release the dowel B of the Hopper, and remove the Hopper together with the Compression Spring 1.94.

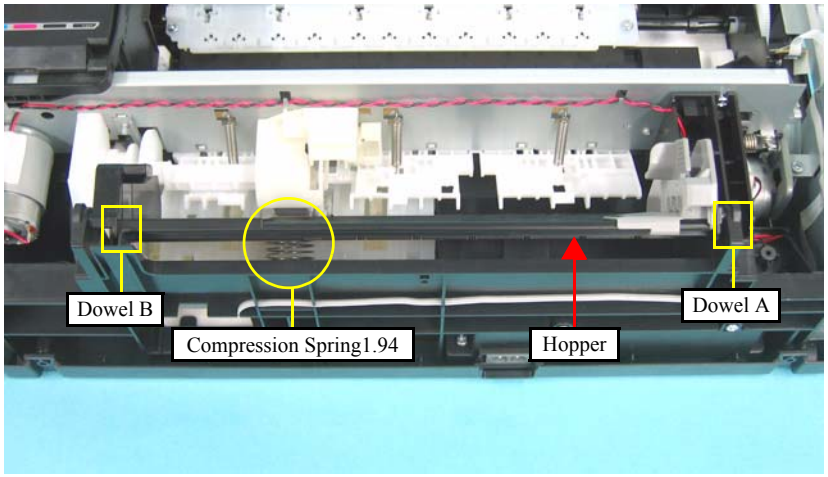


Figure 4-33. Removing Hopper

REASSEMBLY

When installing the Hopper, be sure to engage the rib of the Hopper with the guide groove of the Base Frame.

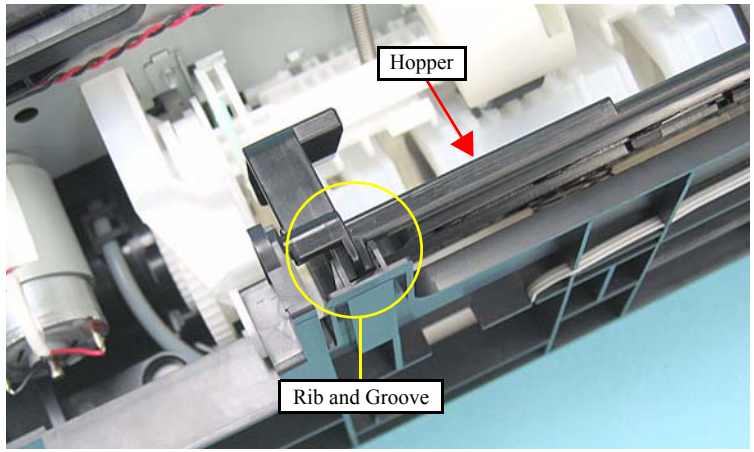


Figure 4-34. Installing Hopper

ADJUSTMENT REQUIRED

After removing/replacing the Hopper, be sure to perform the specified adjustment. See Chapter 5 " ADJUSTMENT" (p.107)

4.5.5 Front Frame/Right Frame

☐ **Part/Unit that should be removed before removing Front Frame/Right Frame**

Upper Housing/Lower Housing/Main Board Unit/Left Frame/Panel Unit

☐ **Removal Procedure**

1. Remove the double-sided tape (x1) that secures the ferrite core to the Front Frame.
2. Release the Head FFC from the hooks (x3) of the Front Frame.
3. Remove the Grounding Spring from the Front Frame.

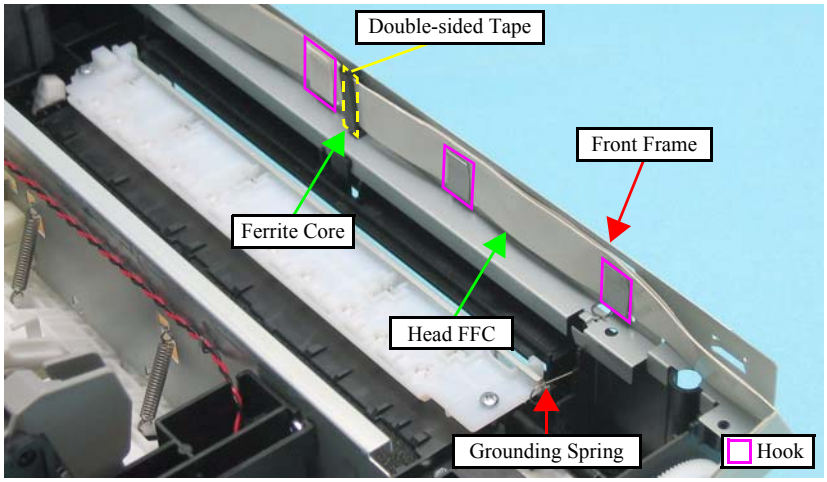


Figure 4-35. Removing Front Frame/Right Frame (1)

4. Remove the screw (x1) that secure the Front Frame and the Right Frame together.
5. Release the dowel (x1) and the hook (x1) that secure the Right Frame, and remove it.

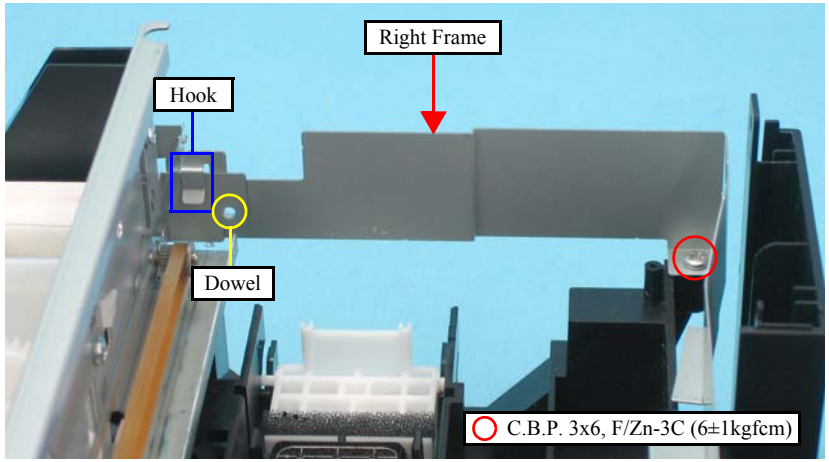


Figure 4-36. Removing Front Frame/Right Frame (2)

6. Release the hook (x1), and remove the Front Frame.

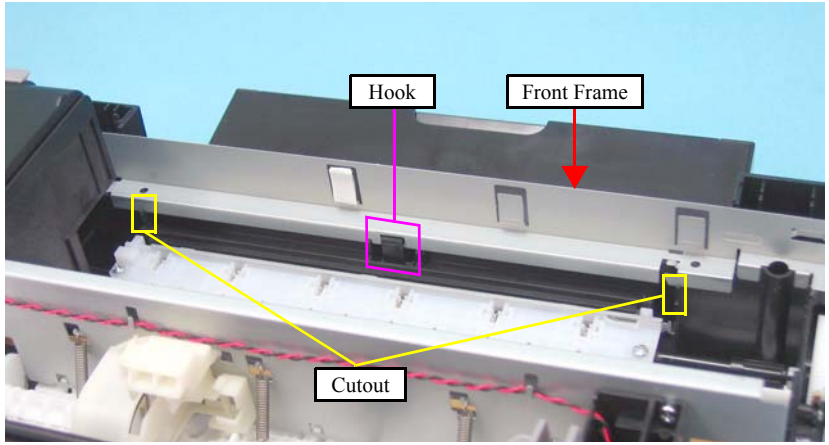


Figure 4-37. Removing Front Frame/Right Frame (3)

REASSEMBLY

■ After replacing the Front Frame, be sure to attach an acetate tape referring to the figure below.

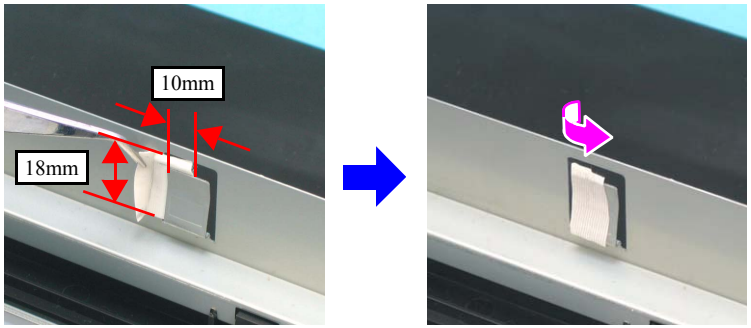


Figure 4-38. Acetate Tape Position

■ When installing the Front Frame, pay attention to the following instructions.
- As shown in Figure 4-37, be sure to secure the Front Frame with the hook (x1) and the cutouts (x2).
- As shown in Figure 4-36, secure the Front Frame and Right Frame together with the screw. (Place the Right Frame on top of the Front Frame.)

■ When attaching the ferrite core, align its edge with the reference line marked on the Front Frame, then secure the core with double-sided tape.

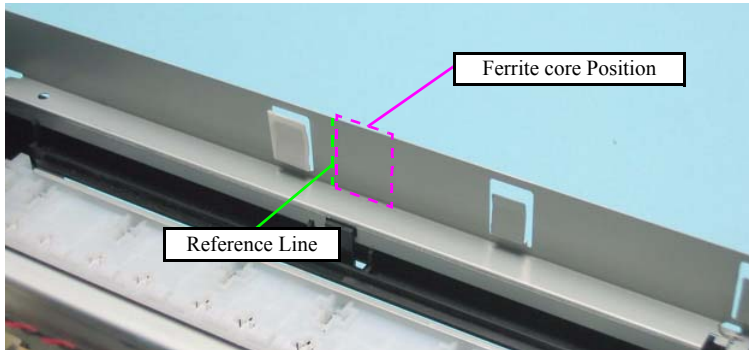


Figure 4-39. Attaching Ferrite Core

4.5.6 Star Wheel Holder Assy.

☐ **Part/Unit that should be removed before removing Star Wheel Holder Assy.**

Upper Housing/Lower Housing/Main Board Unit/Left Frame/Panel Unit

☐ **Removal Procedure**

1. Remove the Grounding Spring from the Star Wheel Holder Assy.
2. Remove the screws (x2) that secure the Star Wheel Holder Assy, and remove it.

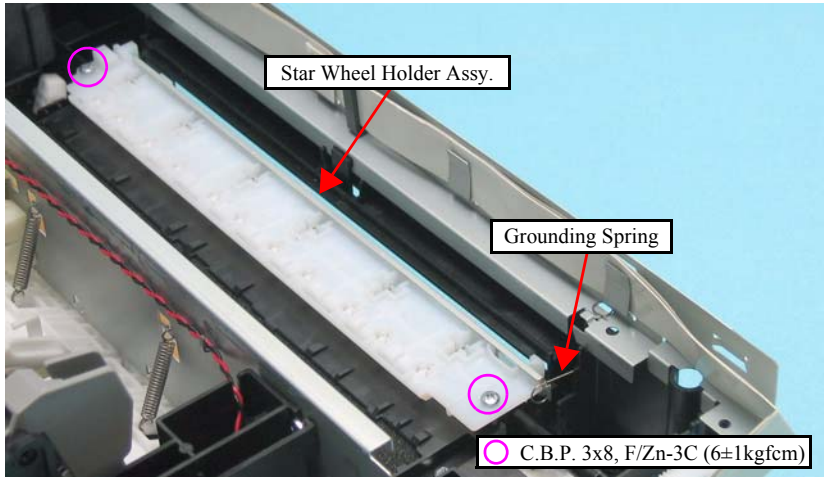


Figure 4-40. Removing Star Wheel Holder Assy.

4.5.7 EJ Roller

☐ **Part/Unit that should be removed before removing EJ Roller**
Upper Housing/Lower Housing/Main Board Unit/Left Frame/Panel Unit/Star Wheel Holder Assy.

☐ **Removal Procedure**

CHECK POINT

The Spur Gear 51.5 cannot be reused once it is removed. Whenever the gear is removed, make sure to attach a new one.

1. Insert a flathead precision screwdriver into the gap between the Spur Gear 51.5 and the EJ Roller, and push the gear with the screwdriver in the direction of the arrow to remove it.

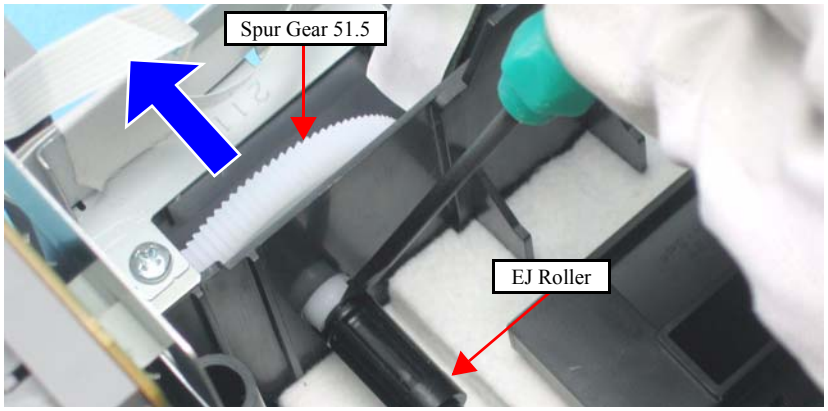


Figure 4-41. Removing EJ Roller (1)

2. Remove the EJ Roller while pushing the tab on the right side of the Base Frame in the direction of the arrow.

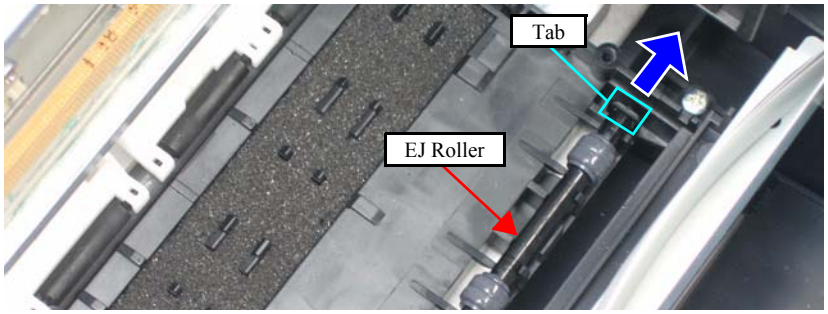


Figure 4-42. Removing EJ (2)

REASSEMBLY

■ **When installing the EJ Roller, pay attention to the following instructions.**
- **Make sure that the rubber part of the EJ Roller does not contact with the hook of the Front Paper Guide.**
- **Be cautious not to touch the rubber part of the EJ Roller.**
- **Be sure to align the rib (x1) of the Front Paper Guide with the slit on the EJ Roller.**

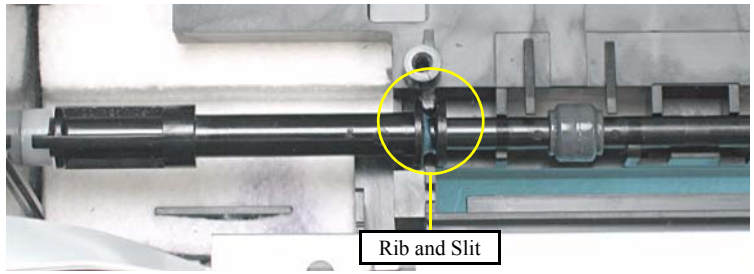


Figure 4-43. Installing EJ Roller

■ **When installing the Spur Gear 51.5, be sure to align the concave section of the Spur Gear 51.5 with the convex section of the EJ Roller.**

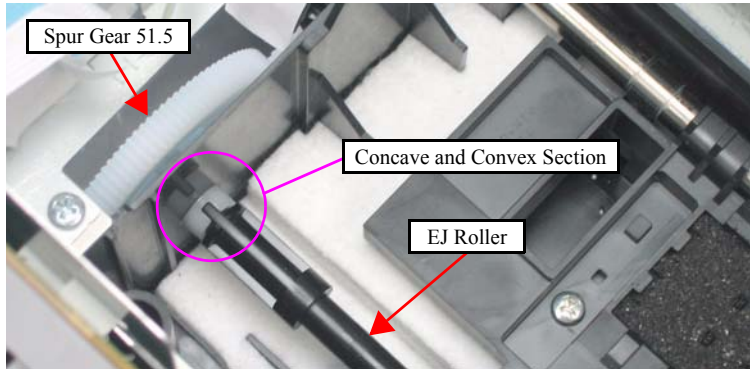


Figure 4-44. Installing Spur Gear 51.5

ADJUSTMENT REQUIRED

■ **After removing/replacing the EJ Roller, be sure to perform the specified adjustment. See Chapter 5 " ADJUSTMENT" (p.107)**

■ **After replacing the EJ roller, be sure to perform the required lubrication. See Chapter 6 " MAINTENANCE" (p.116)**

4.5.8 PF Encoder Sensor

☐ **Part/Unit that should be removed before removing PF Encoder Sensor**

Upper Housing/Lower Housing/Main Board Unit/Left Frame/Panel Unit

☐ **Removal Procedure**

1. Peel off the acetate tape (x1) from the PF Encoder Sensor.
2. Release the PF Encoder FFC from the connector (x1) of the PF Encoder Sensor.
3. Remove the screw (x1) that secures the PF Encoder Sensor, and remove it.

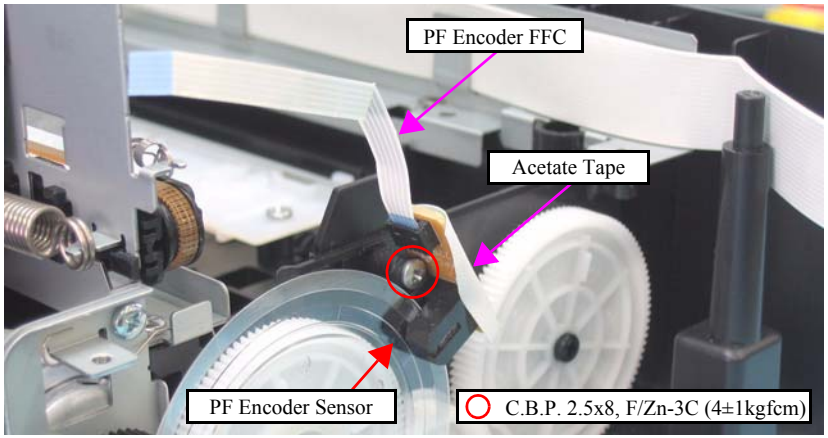


Figure 4-45. Removing PF Encoder Sensor

REASSEMBLY

When installing the PF Encoder Sensor, be sure to attach the acetate tape (x1) referring to the figure below.

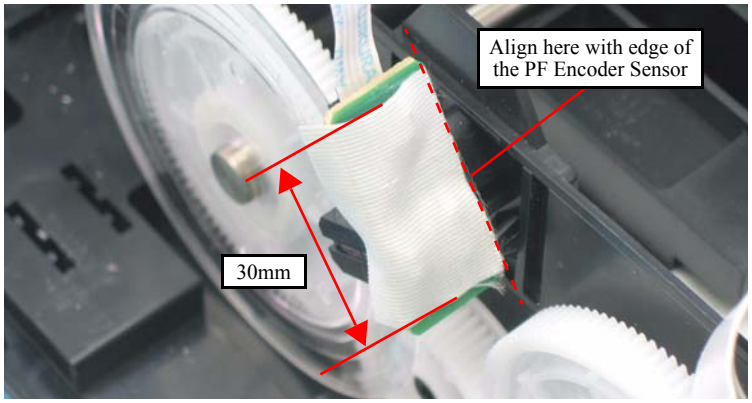


Figure 4-46. Acetate Tape Position

4.5.9 PF Scale

☐ **Part/Unit that should be removed before removing PF Scale**

Upper Housing/Lower Housing/Main Board Unit/Left Frame/Panel Unit/PF Encoder Sensor

☐ **Removal Procedure**

CAUTION

Pay attention to the following instructions.
- **Do not touch the PF Scale with bare hand.**
- **Do not damage the PF Scale.**

1. Peel of the PF Scale that is secured with the double-sided tape (x1) from the Spur Gear 32.4.

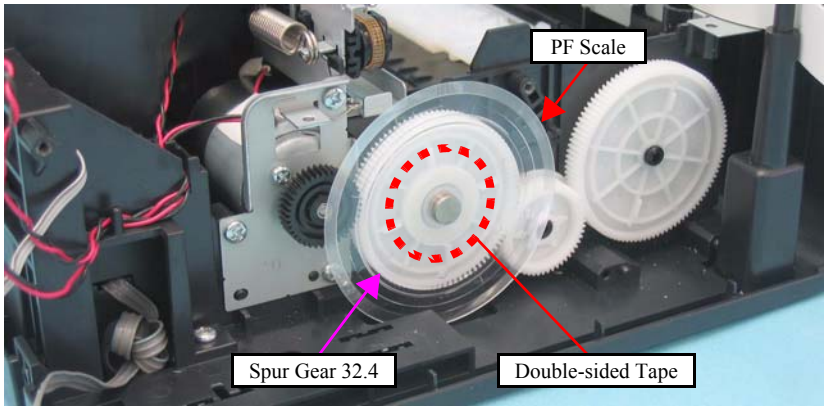


Figure 4-47. Removing PF Scale

4.5.10 PF Motor

☐ **Part/Unit that should be removed before removing PF Motor**

Upper Housing/Lower Housing/Main Board Unit/Left Frame/Panel Unit/PF Encoder Sensor/PF Scale

☐ **Removal Procedure**

1. Release the PF Motor connector cable from the notches (x2) of the Base Frame.

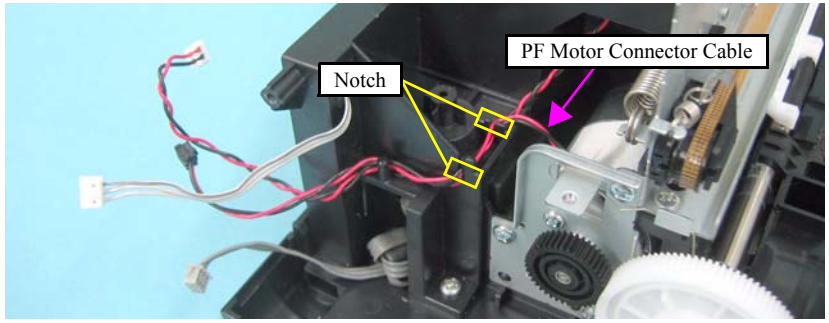


Figure 4-48. Removing PF Motor (1)

2. Remove the Grounding Spring from the PF Motor.
3. Remove the screws (x3) that secure the PF Motor, and remove it.

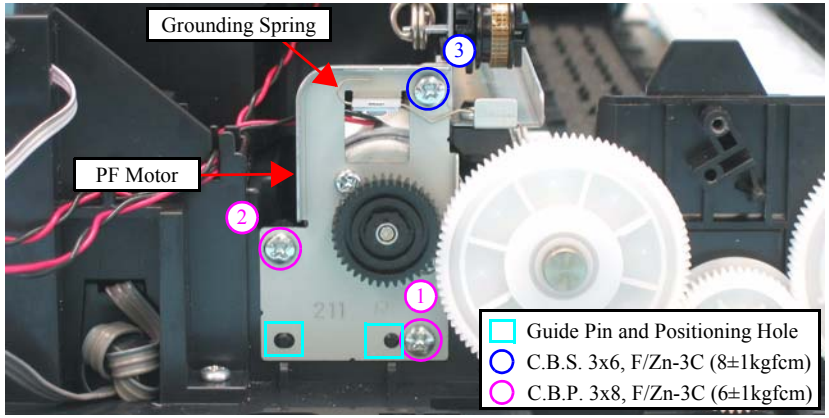


Figure 4-49. Removing PF Motor (2)

REASSEMBLY

- When installing the PF Motor, pay attention to the following instructions.
  - Do not damage the PF Scale.
  - Insert the guide pins (x2) on the Base Frame into the positioning holes (x2) of the PF Motor as shown in Figure 4-49.
  - Route the PF Motor connector cable referring to the figure below.

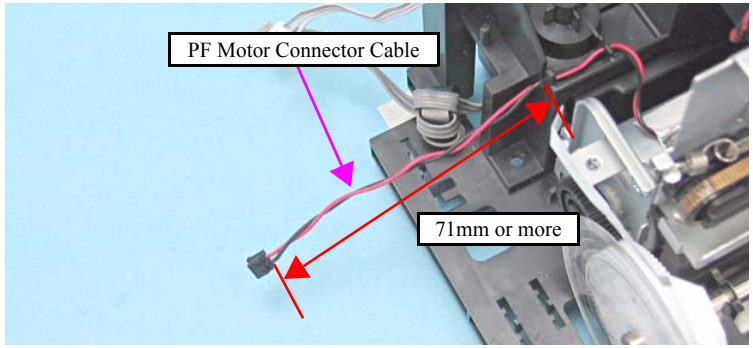


Figure 4-50. Routing PF Motor Connector Cable

- Tighten the screws in the order given in Figure 4-49.
- Follow the steps below to install the Grounding Spring.
  1. Attach the larger U-shaped end of the Grounding Spring to the PF Roller.

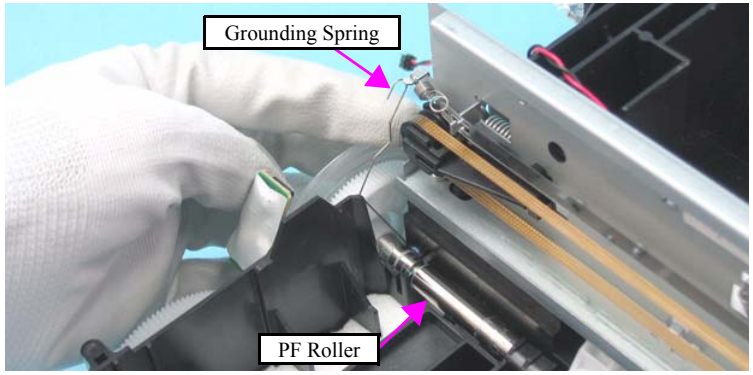


Figure 4-51. Attaching Grounding Spring (1)

REASSEMBLY

2. Pass the Grounding Spring along the inner side of the hook of the Main Frame.
3. Ground the smaller U-shaped end of the Grounding Spring with the undersurface of the frame for PF Motor.

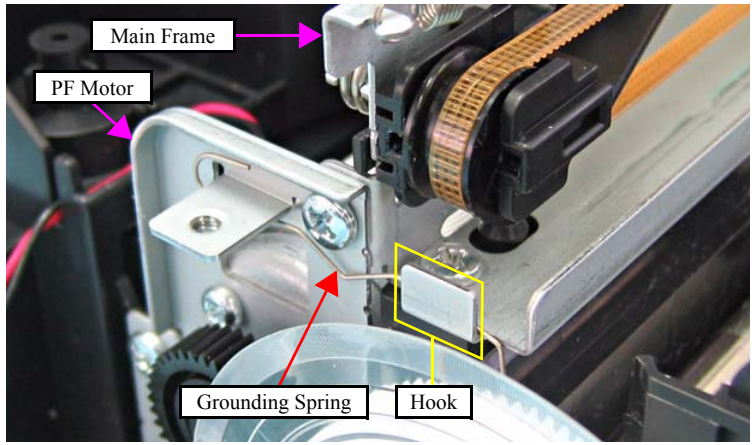


Figure 4-52. Installing Grounding Spring (2)

ADJUSTMENT REQUIRED

After replacing the PF Motor, be sure to perform the specified adjustment. See Chapter 5 " ADJUSTMENT" (p.107)

4.5.11 CR Motor

☐ **Part/Unit that should be removed before removing CR Motor**

Upper Housing/Lower Housing/Main Board Unit/Left Frame/Panel Unit/Front Frame/Right Frame

☐ **Removal Procedure**

1. Turn the Spur Gear 51.5 to release the Carriage Lock, and move the CR Unit to the center of the printer.
(Refer to 4.5.2 Printhead Step1 (p83))

CAUTION

Be careful not to damage the CR Motor cable when releasing the cable from the hooks of the Main Frame.

2. Release the CR Motor cable from the notches (x3) of the Base Frame and the hooks (x3) of the Main Frame, and then pull out the cable through the hole of the Base Frame.

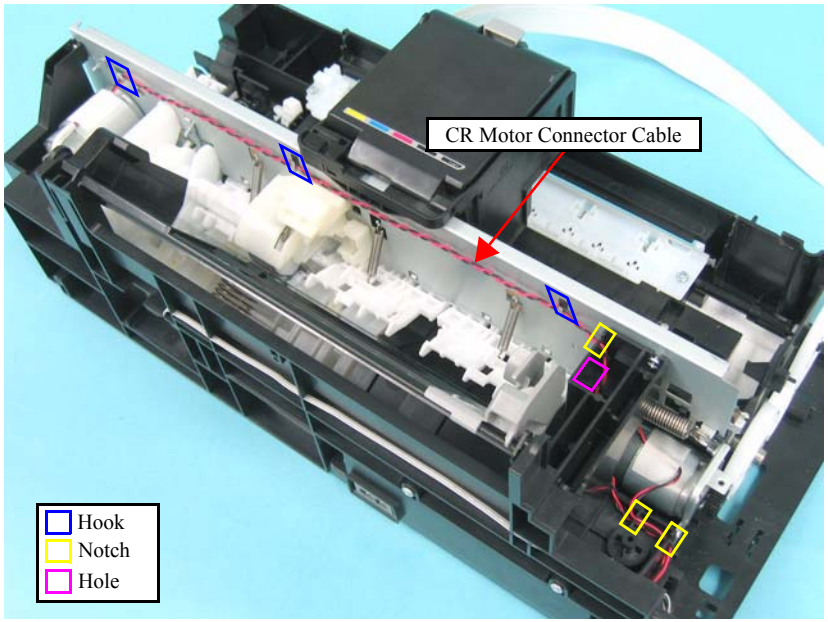


Figure 4-53. Removing CR Motor (1)

CAUTION

After releasing the Timing Belt, temporarily secure the belt to the Cartridge Cover with a tape or the like so as not to allow the grease to come in contact with the Timing Belt. Contaminating the belt with grease can result in malfunction of the printer.

3. Loosen the tension of the Timing Belt by pressing the Driven Pulley Holder in the direction of the arrow as shown in the figure, and release the Timing Belt from the pinion gear of the CR Motor.

CAUTION

Do not damage the pinion gear of the CR Motor.

4. Remove the screws (x2) that secure the CR Motor, and remove it.

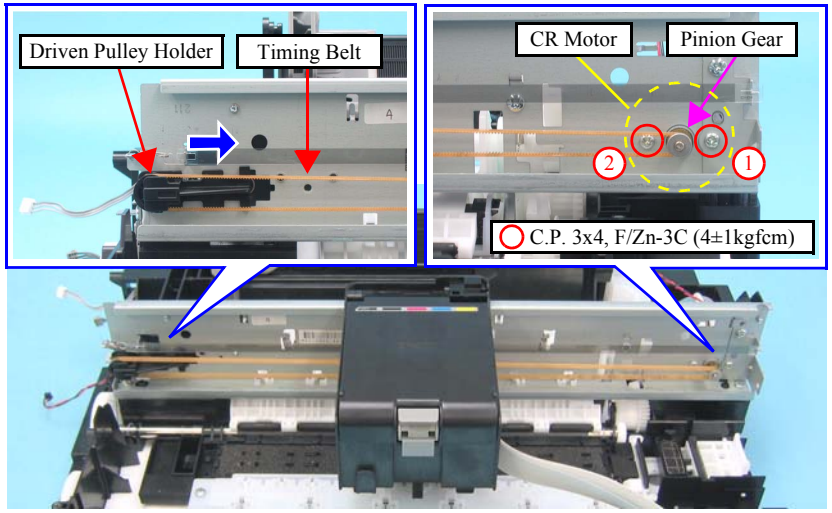


Figure 4-54. Removing CR Motor (2)

REASSEMBLY

- **Be sure to install the CR Motor so that the groove on it faces downward.**

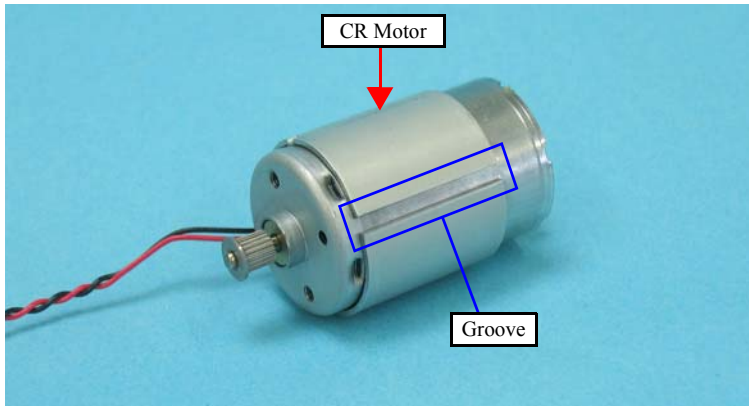


Figure 4-55. Installing CR Motor

- **Tighten the screws in the order given in Figure 4-54.**
- **Make sure that there is no gap between the CR Motor and the Main Frame.**

ADJUSTMENT REQUIRED

After replacing the CR Motor, be sure to perform the required adjustment. See Chapter 5 " ADJUSTMENT" (p.107)

4.5.12 Main Frame Assy.

☐ **Part/Unit that should be removed before removing Main Frame Assy.**

Upper Housing/Lower Housing/Main Board Unit/Left Frame/Panel Unit/Front Frame/Right Frame/CR Motor/CR Scale/Hopper

CHECK POINT

Main Frame Assy. consists of the following parts.
- **Main Frame**
- **CR Unit**
- **Printhead**
- **Upper Paper Guide**

☐ **Removal Procedure**

1. Remove the Grounding Spring from the PF Motor.
(Refer to 4.5.10 PF Motor Step2 (p91))
2. Release one end of the Extension Spring from the hook of the Main Frame with a longnose plier, and then remove the spring together with the Driven Pulley Holder.

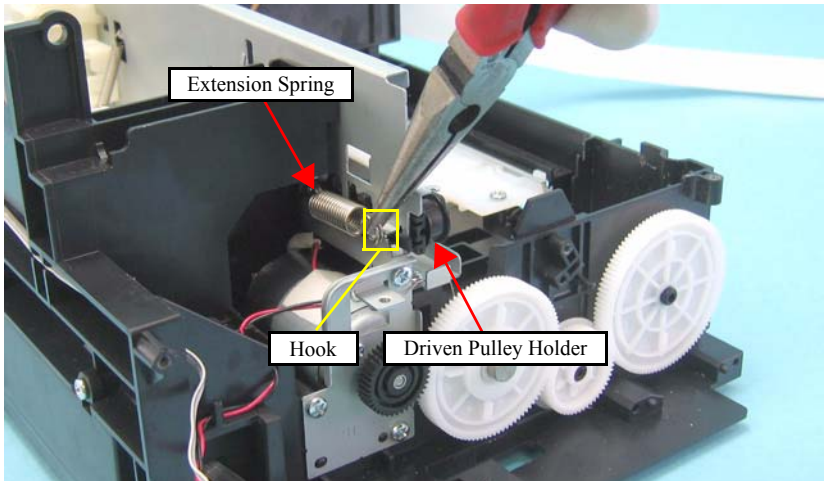


Figure 4-56. Removing Extension Spring and Driven Pulley Holder

3. Move the CR Unit to left side of the printer.
4. Remove the screw (x1) that secures the LD Shaft Holder.
5. Move the LD Shaft Holder in the direction of the arrow while holding down its tab with a flathead precision screwdriver, and remove the LD Shaft Holder.

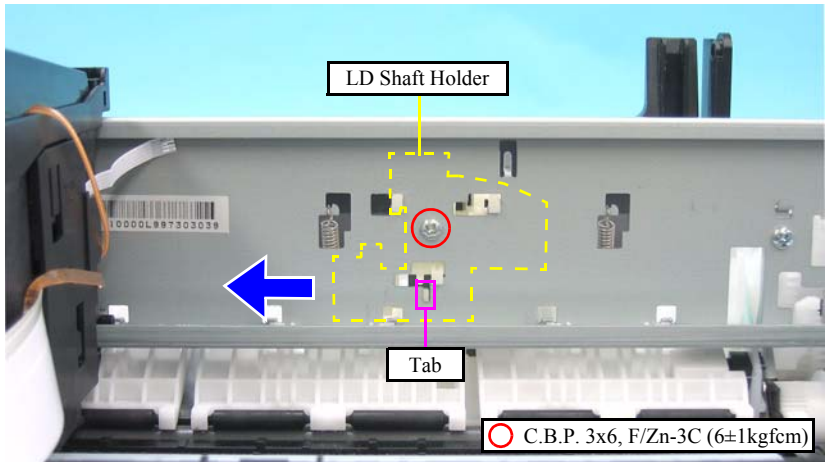


Figure 4-57. Removing LD Shaft Holder

6. Remove the Extension Springs 10.99 (x3) from each hook of the Main Frame and the Upper Paper Guide.

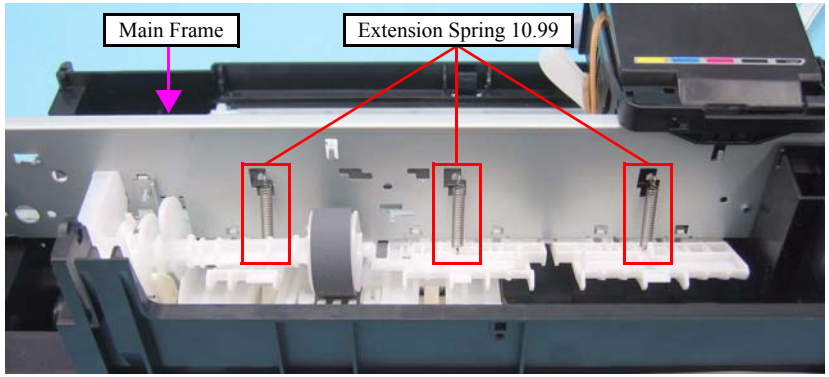


Figure 4-58. Removing Upper Paper Guide (1)

CAUTION

When laying the Main Frame Assy, make sure to put it as shown in the figure below. Do not lay it with the rollers of the Upper Paper Guide facing downward, or the rollers or the nozzle surface may get damaged.

Figure 4-59. Precaution on Handling Main Frame Assy.

7. Remove the screws (x6) that secure the Main Frame, and remove it while avoiding the LD Roller Shaft so as not to hit the Upper Paper Guide.

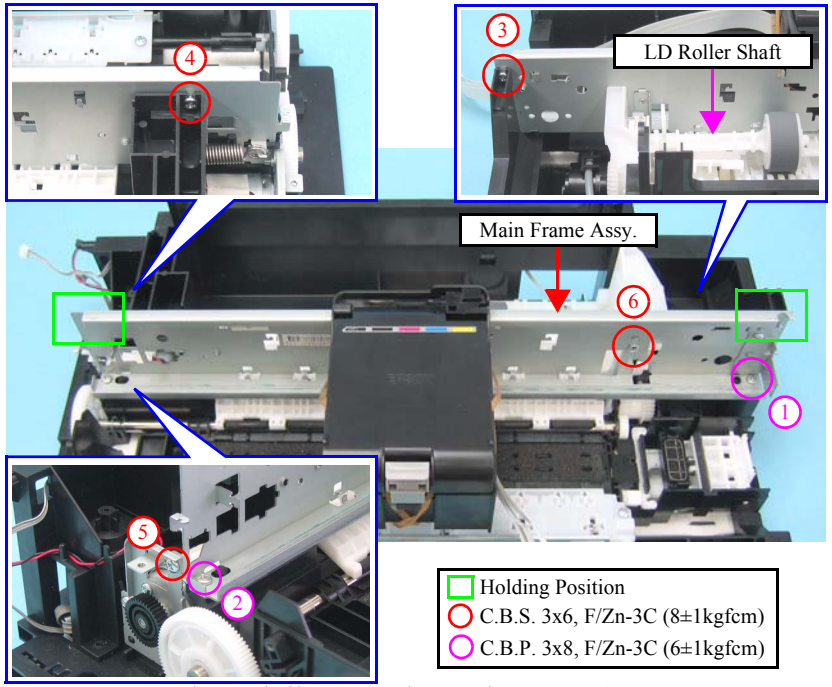


Figure 4-60. Removing Main Frame Assy.

REASSEMBLY

- **When installing the Main Frame Assy, pay attention to the following instructions.**
  1. **Put the right part of the Upper Paper Guide indicated in the figure below under the LD Roller Shaft.**
  2. **Align the hook (x1) of the Frame Support with the positioning hole (x1) of the Main Frame.**
  3. **Align the hook (x1) of the ASF Unit with the positioning hole (x1) of the Main Frame.**
  4. **Align the guide pins (x2) of the Base Frame with the positioning holes (x2) of the Main Frame.**

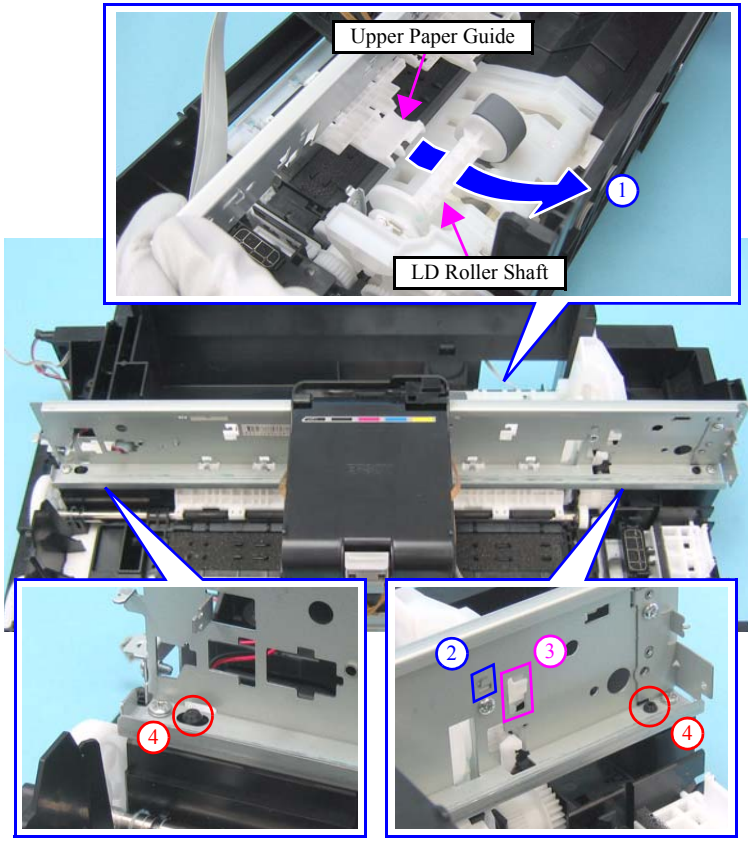


Figure 4-61. Installing Main Frame Assy.

REASSEMBLY

- **Tighten the screws in the order given in Figure 4-60.**
- **Follow the steps below to install the Extension Spring 10.99 to the Upper Paper Guide.**
  1. **Attach the one end of the Extension Spring 10.99 to the hook of the Upper Paper Guide.**
  2. **Attach the another end of the Extension Spring 10.99 to the hook of the Main Frame with a longnose plier.**

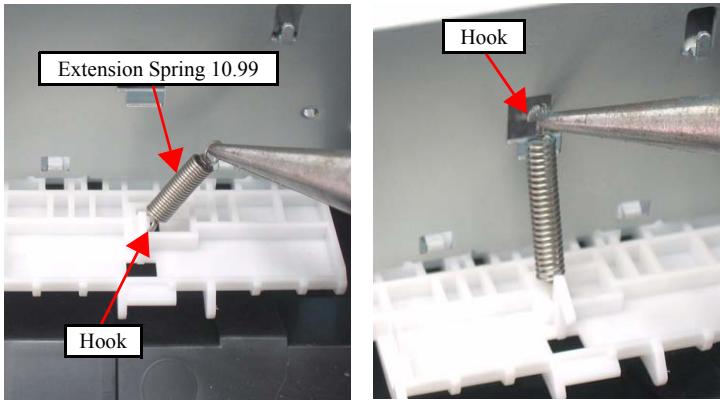


Figure 4-62. Installing Extension Spring 10.99

- **Be sure to install the Grounding Spring referring to Figure 4-49 and Figure 4-52.**

ADJUSTMENT REQUIRED

- **After replacing the Main Frame, be sure to perform the specified adjustment. See Chapter 5 " ADJUSTMENT" (p.107)**
- **After replacing the Main Frame, be sure to perform the specified lubrication. See Chapter 6 " MAINTENANCE" (p.116)**

4.5.13 CR Unit

☐ **Part/Unit that should be removed before removing CR Unit**

Upper Housing/Lower Housing/Main Board Unit/Left Frame/Panel Unit/Front Frame/Right Frame/CR Motor/CR Scale/Hopper/Main Frame Assy./Printhead

☐ **Removal Procedure**

1. Remove the screw (x1) that secures the CR Scale Holder, and remove it.
2. Move the CR Unit in the direction of the arrow to remove the unit.

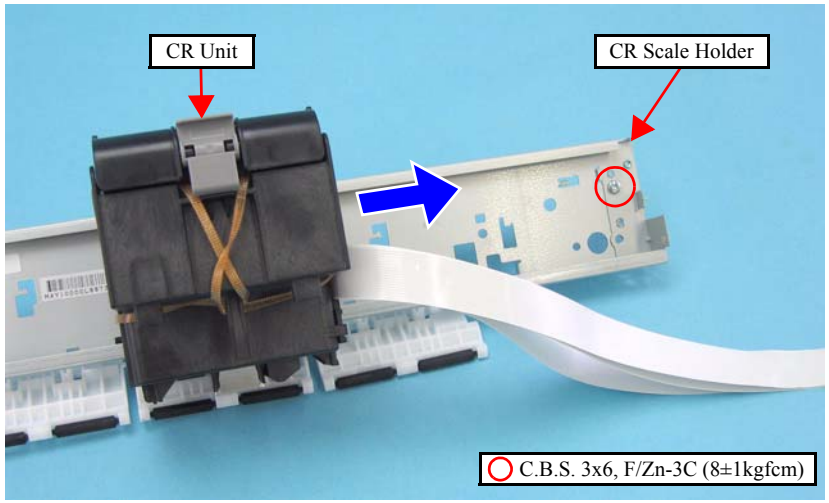


Figure 4-63. Removing CR Unit (1)

3. Release the Timing Belt from the groove of the CR Unit.

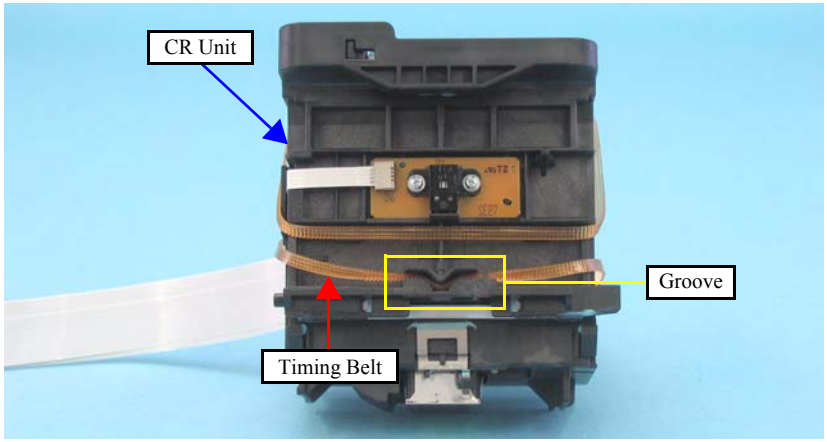


Figure 4-64. Removing CR Unit (2)

REASSEMBLY

- **The Ink Position Label is not included in the CR Unit. When replacing the CR Unit, order the Ink Position Label separately and attach the label as shown below**

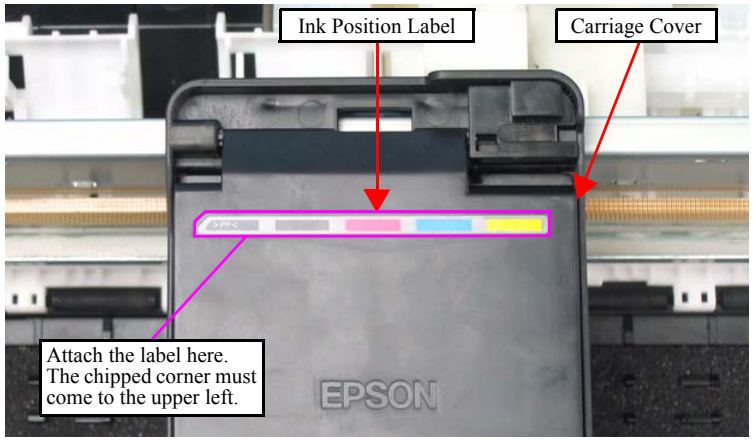


Figure 4-65. Attaching Ink Position Label

REASSEMBLY

- **Put the part of the Timing Belt that has serrated surface on its both sides into the groove of the CR Unit.**

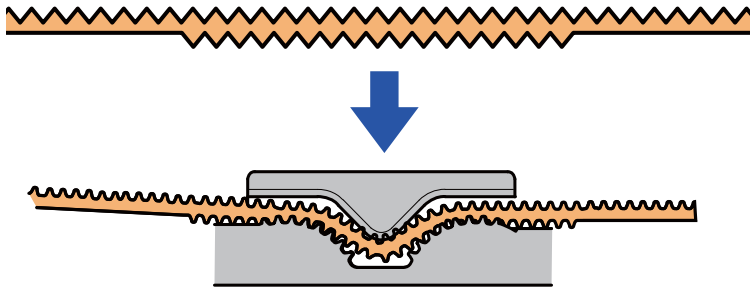


Figure 4-66. Installing Timing Belt

REASSEMBLY

- **After removing/replacing the CR Unit, be sure to perform the specified adjustment. See Chapter 5 " ADJUSTMENT" (p.107)**
- **After replacing the CR Unit, be sure to perform the required lubrication. See Chapter 6 " MAINTENANCE" (p.116)**

4.5.14 Upper Paper Guide

☐ **Part/Unit that should be removed before removing Upper Paper Guide**

Upper Housing/Lower Housing/Main Board Unit/Left Frame/Panel Unit/Front Frame/Right Frame/CR Motor/CR Scale/Hopper/Main Frame Assy.

☐ **Removal Procedure**

1. Release the hooks (x6), and remove the Upper Paper Guide.

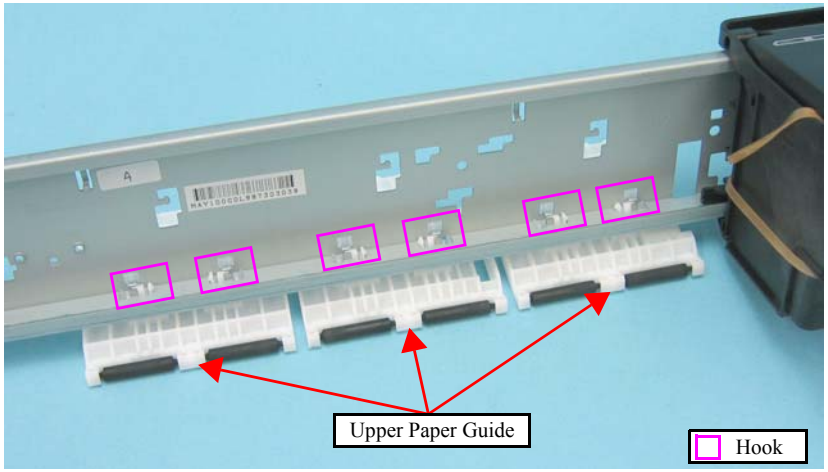


Figure 4-67. Upper Paper Guide

REASSEMBLY

After removing/replacing the Upper Paper Guide, be sure to perform the specified adjustment.
See Chapter 5 " ADJUSTMENT" (p.107)

4.5.15 ASF Unit

☐ **Part/Unit that should be removed before removing ASF Unit**

Upper Housing/Lower Housing/Main Board Unit/Left Frame/Panel Unit/Front Frame/Right Frame/CR Motor/CR Scale/Hopper/Main Frame Assy.

☐ **Removal Procedure**

1. Release the PE Sensor cable from the notches (x6) of the Base Frame and pull out the cable out of the hole (x1).

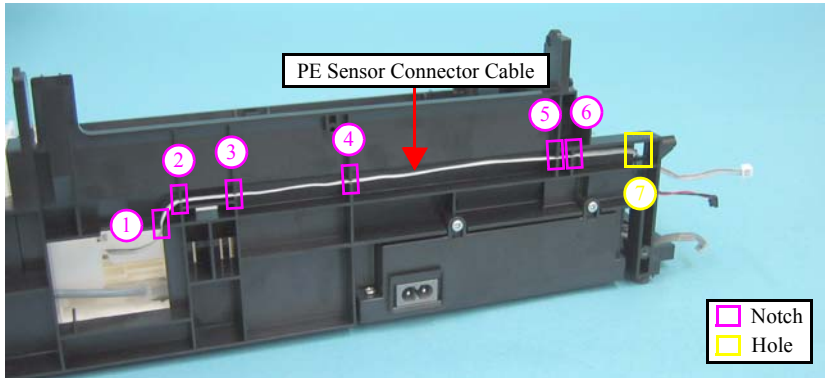


Figure 4-68. Releasing PE Sensor Cable

CAUTION

When performing the following steps, be cautious not to get injured with the sharp metal edges of the Frame Support.

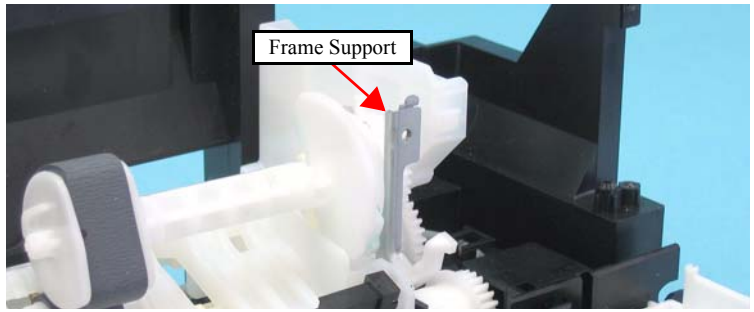


Figure 4-69. Sharp Edges of Frame Support

2. Remove the screws (x2) that secure the ASF Unit.

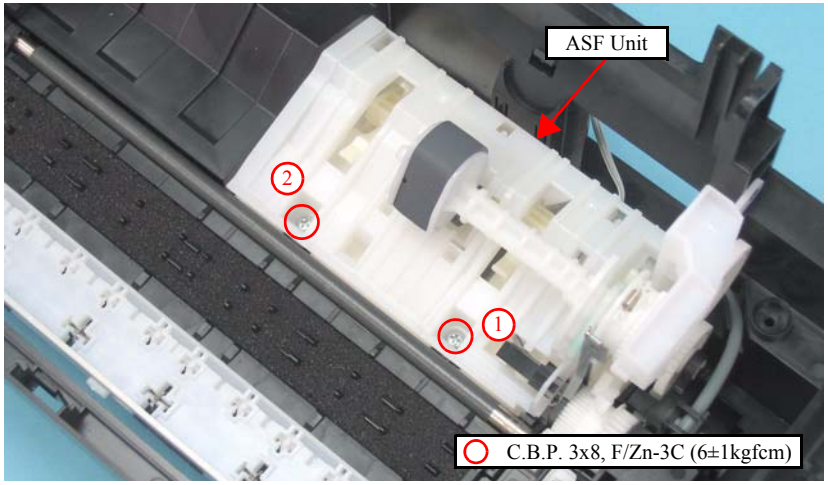


Figure 4-70. Removing ASF Unit (1)

3. Release the guide pins (x3) of the Base Frame and the shaft (x1) of the ASF Unit, and then remove the ASF Unit.

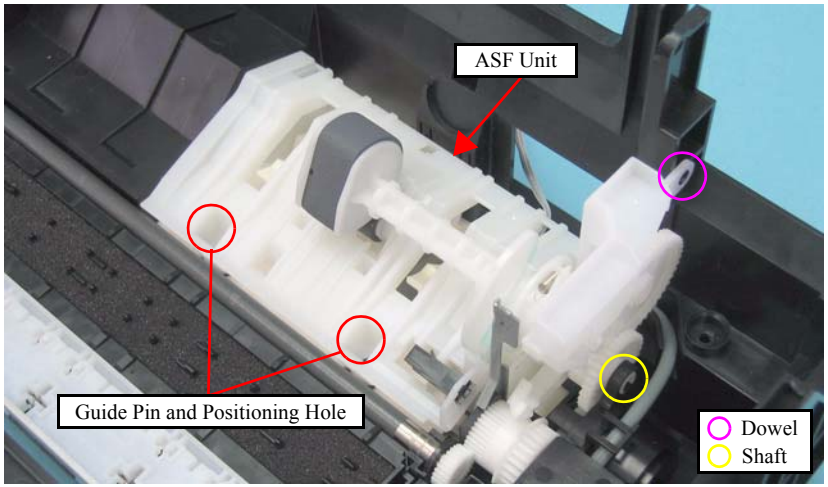


Figure 4-71. Removing ASF Unit (2)

REASSEMBLY

- **When installing the ASF Unit, be sure to align the guide pins (x2) of the Base Frame with the positioning holes (x2) of the ASF Unit shown in the Figure 4-70.**
- **When routing the PE Sensor cable, pay attention to the following instructions.**
  - **Route the cable in the order given in Figure 4-68.**
  - **Make sure to face the blue line of the cable toward the Base Frame.**

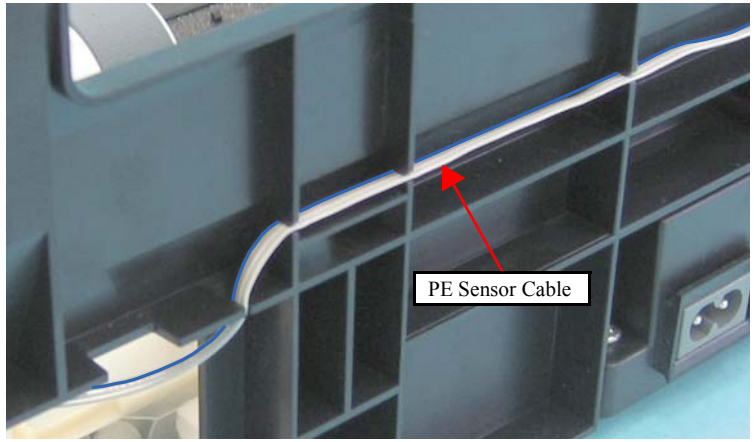


Figure 4-72. Routing PE Sensor Cable

- **Check if there is no slack in the cable.**

ADJUSTMENT REQUIRED

- **After removing/replacing the ASF Unit, be sure to perform the specified adjustment. See Chapter 5 " ADJUSTMENT" (p.107)**
- **After replacing the ASF Unit, be sure to perform the required lubrication. See Chapter 6 " MAINTENANCE" (p.116)**

4.5.16 Ink System Unit

☐ **Part/Unit that should be removed before removing Ink System Unit**

Upper Housing/Lower Housing/Main Board Unit/Left Frame/Panel Unit/Front Frame/Right Frame/CR Motor/CR Scale/Hopper/Main Frame Assy./ASF Unit

☐ **Removal Procedure**

CAUTION

When disassembling/assembling the Ink System Unit, pay attention to the following instructions.

- **Be cautious not to get injured with the sharp metal edges of the Frame Support.**

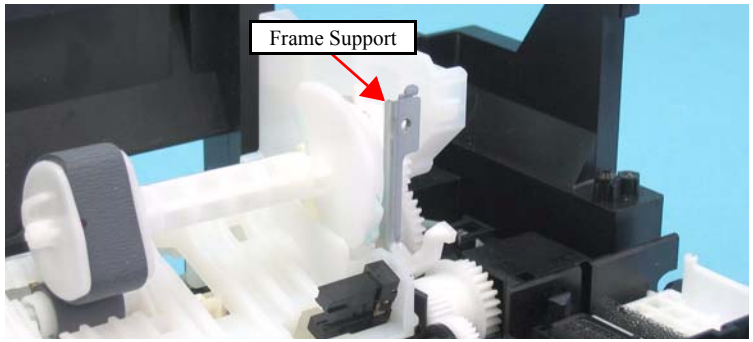


Figure 4-73. Sharp Edges of Frame Support

- **Do not touch or damage the Sealing Rubber or the Head Cleaner.**
- **Mark the connection location before removing the Ink Tube.**

1. Detach the Waste Ink Tube together with the Tube Stopper from the Waste Ink Cover.
2. Detach the Waste Ink Tube from the groove of the Base Frame.

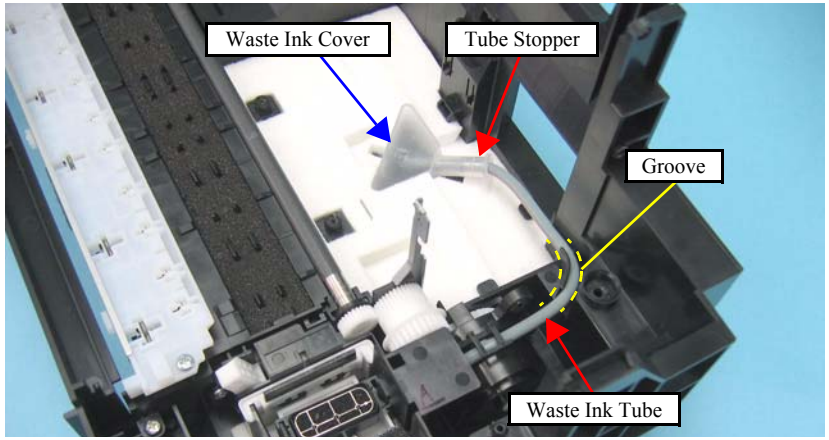


Figure 4-74. Detaching Waste Ink Tube

3. Remove the screw that secures the Ink System Unit (x1).
4. Slide the Ink System Unit in the direction of the arrow while releasing its hook with flathead precision screwdriver, and remove the Ink System Unit.

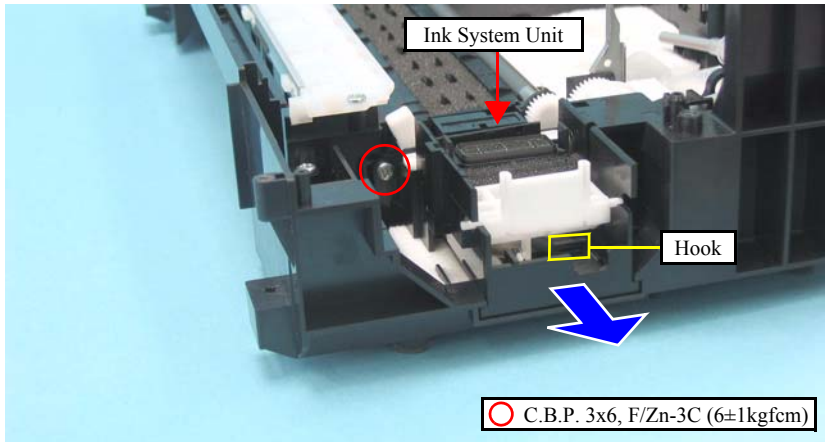


Figure 4-75. Removing Ink System Unit

REASSEMBLY

■ If the Carriage lock lever comes off, reassemble it following the steps below.

1. Attach the one end of the Extension Spring 0.8 to the hook of the Carriage Lock Lever.
2. Attach the another end of the Extension Spring 0.8 to the Ink System Unit.
3. Insert the dowel (x1) of the Carriage Lock Lever into the hole (x1) of the Ink System Unit.

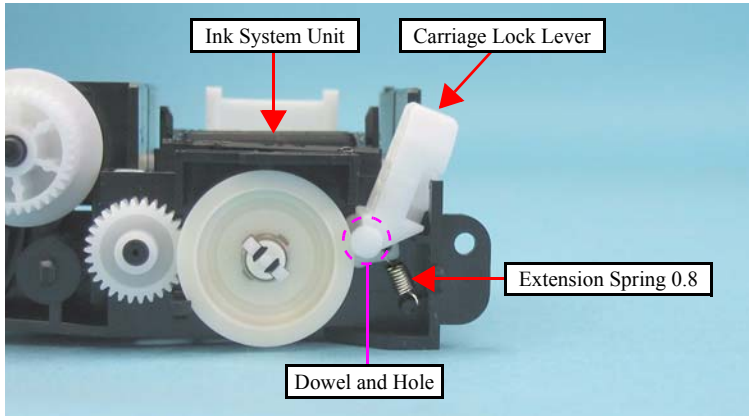


Figure 4-76. Installing Carriage Lock Lever

REASSEMBLY

■ When installing the Ink System Unit, pay attention to the following instructions.

- Align the dowels (x3) of the Ink System Unit with the positioning holes (x3) of the Base Frame.

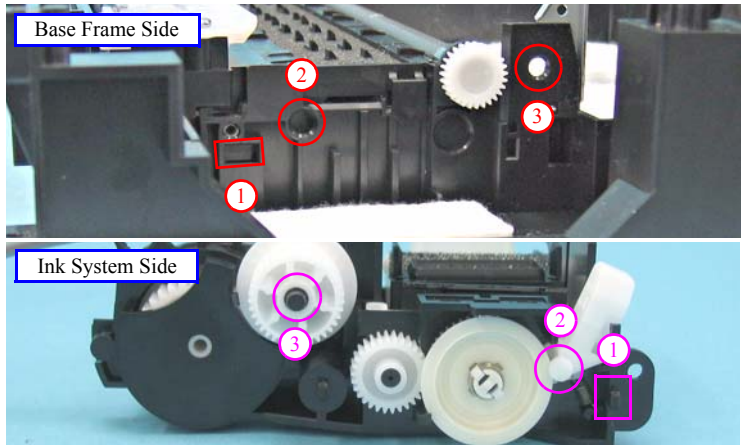


Figure 4-77. Installing Ink Stem Unit (1)

- Align the ribs (x2) of the Ink System Unit with the grooves (x2) of the Base Frame.

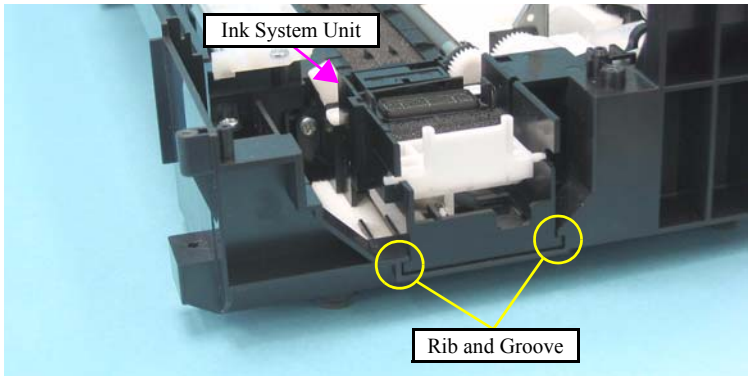


Figure 4-78. Installing Ink System Unit (2)

REASSEMBLY

■ **Pass the Waste Ink Tube through the groove of the Base Frame so that the red line of the Waste Ink Tube faces to the Ink System Unit side.**

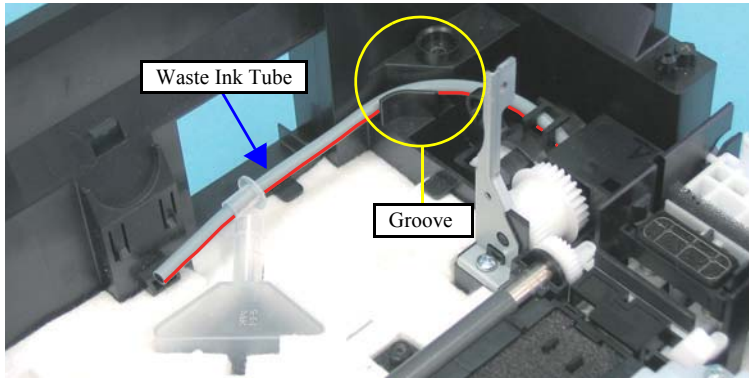


Figure 4-79. Routing Waste Ink Tube

■ **Referring to the figure below, attach the Tube Stopper to the Waste Ink Tube, and insert them into the Waste Ink Cover.**

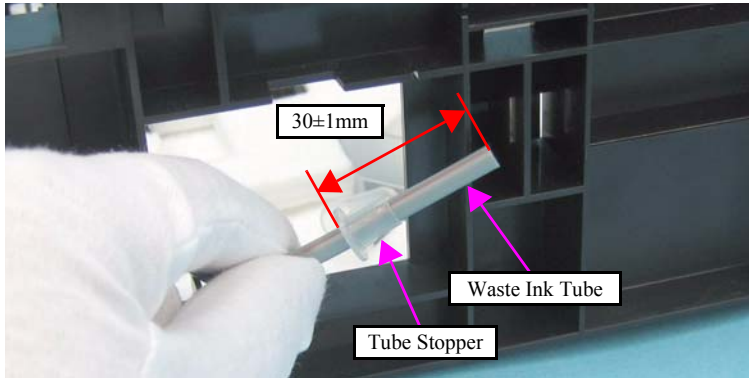


Figure 4-80. Installing Waste Ink Tube

4.5.17 Front Paper Guide

☐ **Part/Unit that should be removed before removing Front Paper Guide**

Upper Housing/Lower Housing/Main Board Unit/Left Frame/Panel Unit/Front Frame/Right Frame/CR Motor/CR Scale/Hopper/Main Frame Ashy./ASF Unit/Ink System Unit/Star Wheel Holder Assy./EJ Roller

☐ **Removal Procedure**

CAUTION

When removing the Front Paper Guide, Be cautious not to damage the rib on the upper surface of the Front Paper Guide.

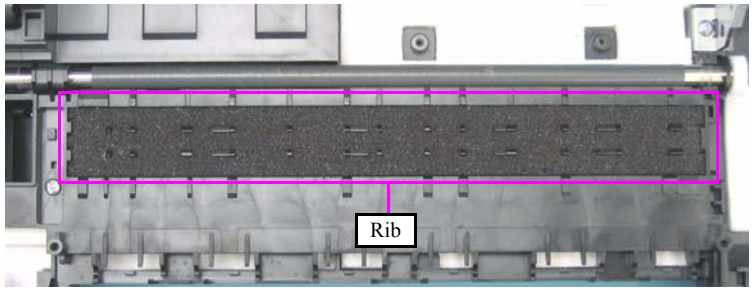


Figure 4-81. Rib of the Front Paper Guide

1. Remove the screws (x2) that secure the Front Paper Guide.

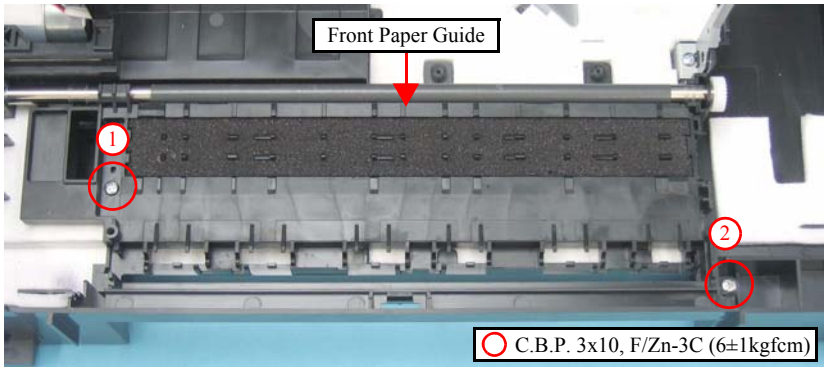


Figure 4-82. Removing Front Paper Guide (1)

2. Release the hook (x1) of the Front Paper Guide, and remove it.

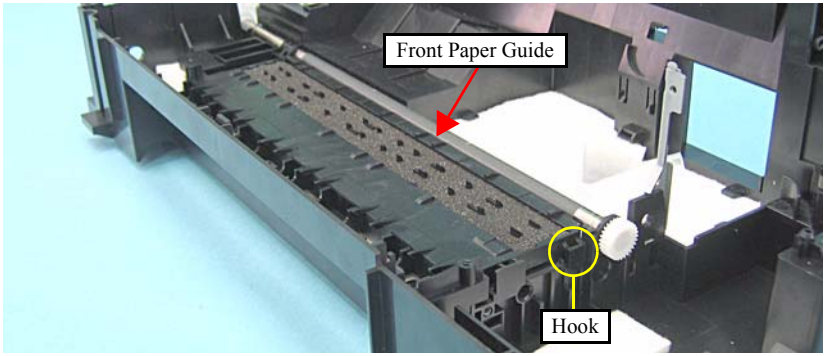


Figure 4-83. Removing Front Paper Guide (2)

REASSEMBLY

- **When installing the Front Paper Guide, be cautious not to damage the PF Roller.**
- **Make sure that the tip of the PGF Pad is put in the correct position as shown in the figure below. It should not get caught between the Front Paper Guide and the Base Frame.**

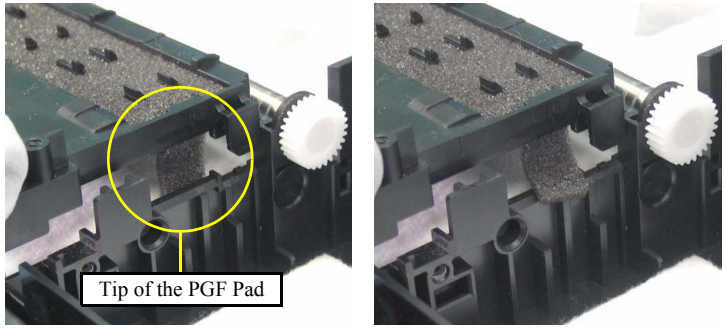


Figure 4-84. Installing Front Paper Guide

- **Tighten the screws in the order given in Figure 4-82.**

ADJUSTMENT REQUIRED

- **After removing/replacing the Front Paper Guide, be sure to perform the specified adjustment. See Chapter 5 " ADJUSTMENT" (p.107)**
- **After replacing the Front Paper Guide, be sure to perform the required lubrication. See Chapter 6 " MAINTENANCE" (p.116)**

4.5.18 PF Roller

☐ **Part/Unit that should be removed before removing PF Roller**

Upper Housing/Lower Housing/Main Board Unit/Left Frame/Panel Unit/Front Frame/Right Frame/CR Motor/CR Scale/Hopper/Main Frame Assy./ASF Unit/Ink System Unit/Star Wheel Holder Assy./EJ Roller/Front Paper Guide/PF Encoder Sensor/PF Scale

☐ **Removing Procedure**

CAUTION

When removing the PF Roller, Be cautious not to touch or damage the coated surface of the PF Roller.

1. Remove the Spur Gear 13.5 from the PF Roller with a flathead precision screwdriver or a similar tool.

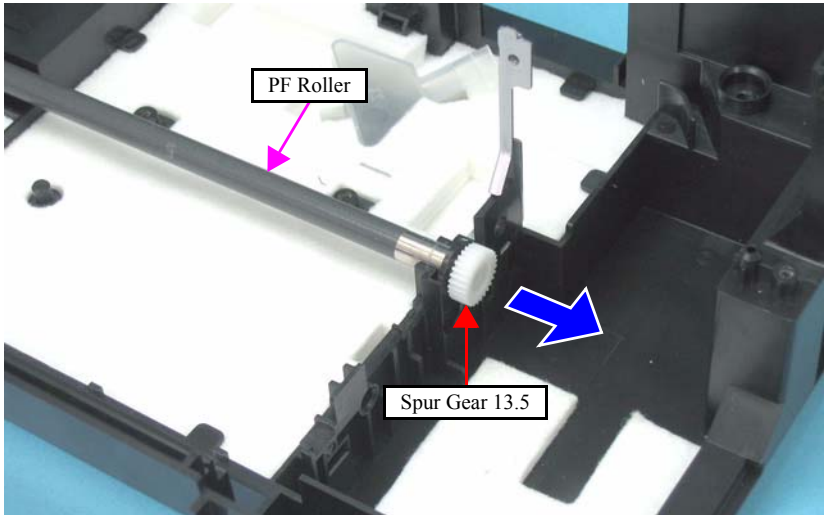


Figure 4-85. Removing PF Roller (2)

2. Release the PF Roller from the cutout of the Base Frame (Step 2-1), and remove it (Step 2-2).

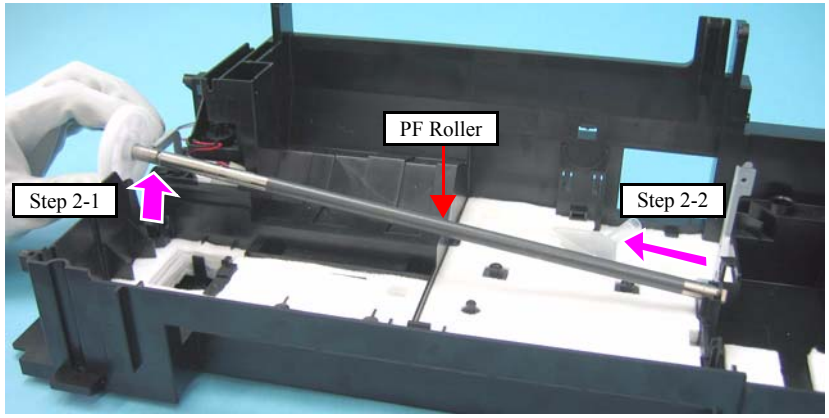


Figure 4-86. Removing PF Roller (2)

ADJUSTMENT REQUIRED

- **After removing/replacing the PF Roller, be sure to perform the specified adjustment. See Chapter 5 " ADJUSTMENT" (p.107)**
- **After replacing the PF Roller, be sure to perform the required lubrication. See Chapter 6 " MAINTENANCE" (p.116)**

4.5.19 Waste Ink Pads

☐ **Part/Unit that should be removed before removing Waste Ink Pads**

Upper Housing/Lower Housing/Main Board Unit/Left Frame/Panel Unit/Front Frame/Right Frame/CR Motor/CR Scale/Hopper/Main Frame Assy./ASF Unit/Ink System Unit/Star Wheel Holder Assy./EJ Roller/Front Paper Guide/PF Encoder Sensor/PF Scale/PF Roller

☐ **Removal Procedure**

1. Remove the Waste Ink Pads (x6) from the sections indicated with **A** to **C** of the Base Frame.

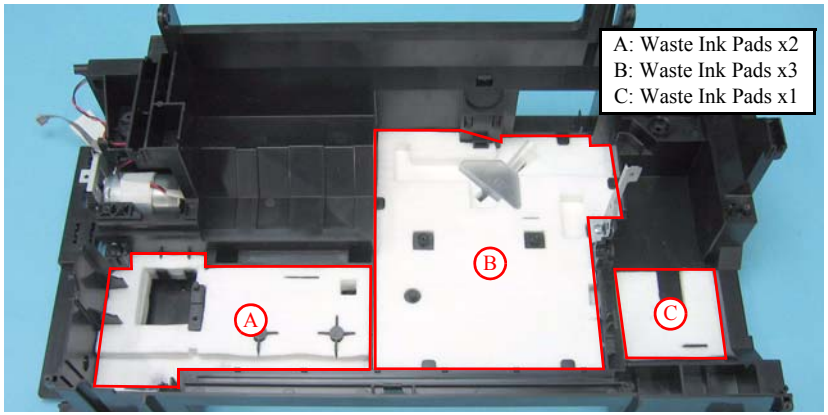


Figure 4-87. Removing Waste Ink Pads

2. Remove the Waste Ink Cover and the Diffusion Sheet.

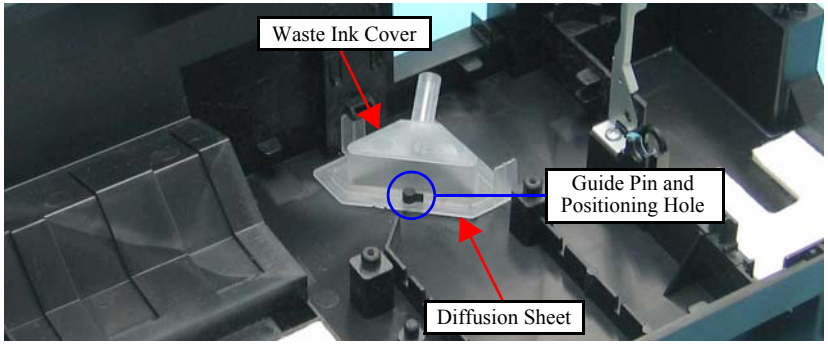


Figure 4-88. Removing Waste Ink Cover and Diffusion Sheet

REASSEMBLY

■ **When installing the Diffusion Sheet, Waste Ink Cover, and the Waste Ink Pads (x3) on section B, attach them in the order given in the figure below**

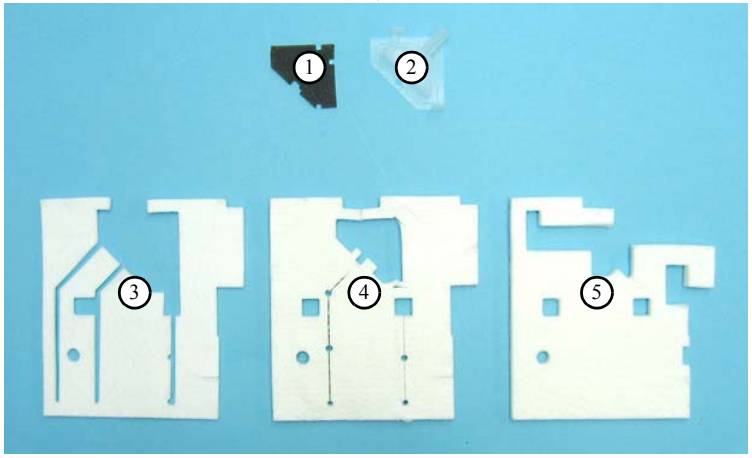


Figure 4-89. Installing Waste Ink Pads

■ **When installing the Waste Ink Cover, be sure to align the guide pin (x1) of the Base Frame with the positioning hole (x1) of the Waste Ink Cover. Make sure the cover is properly secured on the Diffusion Sheet without any gaps as shown in Figure 4-88.**

ADJUSTMENT REQUIRED

After replacing the Waste Ink Pads, be sure to perform specified adjustment. See Chapter 5 " ADJUSTMENT" (p.107)

CHAPTER

5

ADJUSTMENT

5.1 Adjustment Items and Overview

This chapter describes adjustments required after the disassembly/reassembly of the printer.

CHECK POINT

For information on how to carry out the adjustments and media required for the adjustments, see the instructions displayed by the Adjustment Program.

5.1.1 Servicing Adjustment Item List

The adjustment items of this product are as follows.

Table 5-1. Adjustment Items

Adjustment Item	Purpose	Method Outline	Tool
EEPROM data copy	When the main board needs to be replaced, use this to copy adjustment values stored on the old main board to the new board. If this copy is completed successfully, all the other adjustments required after replacing the main board are no longer be necessary.	Readout the EEPROM data from the main board before removing it. Then replace the board with a new one, and load the EEPROM data to the new board.	• Adjustment Program
Initial setting	This must be carried out after replacing the main board to apply settings for the target market.	Select the target market. The selected market settings are automatically written to the main board.	• Adjustment Program
USB ID input	This sets a USB ID of the printer. A computer identifies the printer by the ID when multiple same models are connected via a USB hub.	Enter the product serial number of the printer. The ID is automatically generated and written to the main board.	• Adjustment Program
Head ID input	This must be carried out after replacing the printhead in order to enter the new printhead ID (Head ID) that reduces variation between printheads.	Enter the ID printed on the Head QR code label attached on the printhead. The correction values are automatically written to the main board.	• Adjustment Program
TOP margin adjustment	This corrects top margin of printout.	A top margin adjustment pattern is printed. Examine the lines printed near the top edge of the printout, and enter the value for the line that is exactly 3 mm away from the top edge.	• Adjustment Program • Ruler
First dot position adjustment	This corrects left margin of printout. The print start position in the carriage moving direction is corrected by software.	A first dot adjustment pattern is printed. Examine the lines printed near the left edge of the printout and enter the value for the line that is exactly 5 mm away from the left edge.	• Adjustment Program • Ruler
Head angular adjustment	This must be carried out after replacing the printhead in order to correct tilt of the printhead by software.	A head angular adjustment pattern is printed. Examine the printed lines and enter the value for the most straight lines.	• Adjustment Program
Bi-D adjustment	This corrects print start timing in bi-directional printing to improve the print quality.	A Bi-D adjustment pattern is printed. Black and color patterns are printed for each of the five dot sizes (ECO, VSD1, VSD2, VSD3, VSD4). So, there are 10 groups. Examine the patterns and enter the value for the pattern with no gap and overlap for each mode.	• Adjustment Program
Initialize PF deterioration offset	This resets the counter to maintain paper feed accuracy which decreases due to paper dust.	Reset the counter to its default.	• Adjustment Program
Disenable PF deterioration offset	When reading the counter value from the old main board is impossible in the case of replacing the board, use this to set the counter to its maximum value.	Set the counter to tis maximum value (10000).	• Adjustment Program

Table 5-1. Adjustment Items

Adjustment Item	Purpose	Method Outline	Tool
CR motor heat protection control	This must be carried out for efficient heat control of the CR motor. Electrical variation of the motor and the power supply board are measured to acquire correction values for them.	Select the parts that you replaced. The correction values are automatically written to the main board.	• Adjustment Program
PF motor heat protection control	This must be carried out for efficient heat control of the PF motor. Electrical variation of the motor and the power supply board are measured to acquire correction values for them.	Select the parts that you replaced. The correction values are automatically written to the main board.	• Adjustment Program
PF adjustment	This corrects variations in paper feed accuracy when using the Microweave to achieve higher print quality.	A PF adjustment pattern is printed. Examine the printout patterns and select the value for the best pattern. The correction value is registered.	• Adjustment Program
PF band adjustment	This corrects variations in paper feed accuracy in the band print mode to achieve higher print quality.	A PF band adjustment pattern is printed. Examine the printout patterns and select the value for the best pattern. The correction value is registered.	• Adjustment Program

Table 5-2. Maintenance Items

Maintenance Item	Purpose	Method Outline	Tool
Waste ink pad counter	The printer causes a maintenance error when the waste ink pad counter reaches its maximum. Use this to reset the counter after replacing the Waste Ink Pad. If you find the counter is close to the maximum during servicing, carry out the pad replacement and the counter reset to avoid the printer returned from the user due to the maintenance error.	After replacing the Waste Ink Pad, reset the counter to its default.	• Adjustment Program
Ink charge	This must be carried out after replacing the printhead in order to fill ink inside the new printhead. The printhead becomes ready for print.	Filling ink inside the printhead is automatically performed. Print a nozzle check pattern to check if all nozzles are firing ink properly.	• Adjustment Program

Table 5-3. Additional Functions

Additional Functions		Purpose	Method Outline	Tool
Final check pattern print	A4 size	Use this to check if the all adjustments have been properly made.	The all adjustment patterns are printed automatically.	• Adjustment Program
	US Letter size			
EEPROM dump		Use this to readout the EEPROM data for analysis.	The all EEPROM data is automatically readout and stored as a file.	• Adjustment Program
Printer information check	Manual CL counter	Use this to readout information on the printer operations.	The printer information is automatically readout.	• Adjustment Program
	I/C exchange CL counter			
	Timer CL counter			
	Print path counter			

5.1.2 Required Adjustments

The table below lists the required adjustments depending upon the parts being repaired or replaced. Find the part(s) you removed or replaced, and check which adjustment(s) must be carried out.

Table 5-4. Required Adjustment List

Priority		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Adjustment Item / Part Name		EEPROM data copy	Initial setting	USB ID input	Waste ink pad counter	Ink charge	Head ID input	Top margin adjustment	First dot position adjustment	Head angular adjustment	Bi-D adjustment	Initialize PF deterioration offset/ Disenable PF deterioration offset	CR motor heat protection control	PF motor heat protection control	PF adjustment	PF band adjustment
Main board unit	Remove	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Replace (Read OK)	O	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Replace (Read NG)	---	O	O	O Replace the pad	---	O	O	O	O	O	O Input max. value (10000)	O	O	O	O
Printhead	Remove	---	---	---	---	---	---	O	O	O	O	---	---	---	O	O
	Replace	---	---	---	---	O	O	O	O	O	O	---	---	---	O	O
Power Supply unit	Remove	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Replace	---	---	---	---	---	---	---	---	---	---	---	O	O	---	---
Hopper	Remove	---	---	---	---	---	---	O	O	---	---	---	---	---	---	---
	Replace	---	---	---	---	---	---	O	O	---	---	---	---	---	---	---
CR motor	Remove	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Replace	---	---	---	---	---	---	---	---	---	---	---	O	---	---	---
EJ roller	Remove	---	---	---	---	---	---	---	---	---	O	---	---	---	O	O
	Replace	---	---	---	---	---	---	---	---	---	O	---	---	---	O	O
PF motor	Remove	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Replace	---	---	---	---	---	---	---	---	---	---	---	---	O	---	---
Main frame	Remove	---	---	---	---	---	---	---	---	O	O	---	---	---	---	---
	Replace	---	---	---	---	---	---	---	---	O	O	---	O	---	---	---

Table 5-4. Required Adjustment List

Priority		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Adjustment Item / Part Name		EEPROM data copy	Initial setting	USB ID input	Waste ink pad counter	Ink charge	Head ID input	Top margin adjustment	First dot position adjustment	Head angular adjustment	Bi-D adjustment	Initialize PF deterioration offset/ Disenable PF deterioration offset	CR motor heat protection control	PF motor heat protection control	PF adjustment	PF band adjustment
ASF unit	Remove	---	---	---	---	---	---	O	O	---	---	---	---	---	O	O
	Replace	---	---	---	---	---	---	O	O	---	---	---	---	---	O	O
CR unit	Remove	---	---	---	---	---	---	O	O	O	O	---	---	---	O	O
	Replace	---	---	---	---	---	---	O	O	O	O	---	---	---	O	O
Upper paper guide	Remove	---	---	---	---	---	---	O	---	---	---	---	---	---	O	O
	Replace	---	---	---	---	---	---	O	---	---	---	O Reset to 0	---	---	O	O
Front paper guide unit	Remove	---	---	---	---	---	---	O*	---	O	O	---	---	---	O	O
	Replace	---	---	---	---	---	---	O*	---	O	O	---	---	---	O	O
PF roller	Remove	---	---	---	---	---	---	O*	---	---	---	---	---	---	O	O
	Replace	---	---	---	---	---	---	O*	---	---	---	---	---	---	O	O
Waste ink pad	Remove	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Replace	---	---	---	O	---	---	---	---	---	---	---	---	---	---	---

CAUTION

- **When the EEPROM data copy is impossible with the main board that needs to be replaced, the Waste Ink Pad must be replaced after replacing the main board with a new one.**
- **After all required adjustments are completed, use the "Final check pattern print" function to print all adjustment patterns for final check. If you find a problem with the printout patterns, carry out the adjustment again.**
- **When using a new main board for replacing the Printer Mechanism, the Initial setting must have been made to the main board.**

<Meaning of the marks in the table>
"O" indicates that the adjustment must be carried out. "O*" indicates that the adjustment is recommended. "---" indicates that the adjustment is not required.
If you have removed or replaced multiple parts, make sure to check the required adjustments for the all parts. And when multiple adjustments must be carried out, be sure to carry out them in the order given in the "Priority" row.

5.2 Using the Adjustment Program

This section describes how to judge the adjustment patterns printed by the Adjustment Program. For information on how to operate the Adjustment Program, see the instructions displayed by the Adjustment Program.

5.2.1 TOP Margin Adjustment

The following pattern is printed.

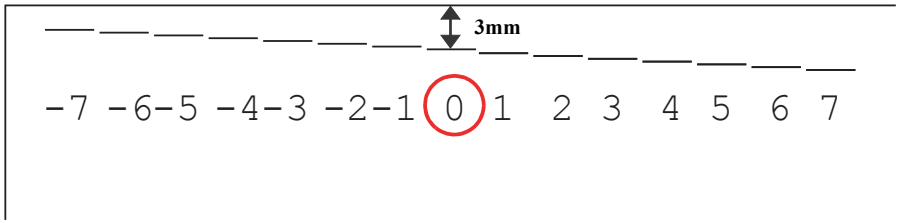


Figure 5-1. Top Margin Adjustment Printout Pattern

How to Judge

Measure the length from the top edge of the paper to the printed line. Enter the value for the line that is exactly 3 mm away from the top edge.

5.2.2 First Dot Position Adjustment

The following pattern is printed.

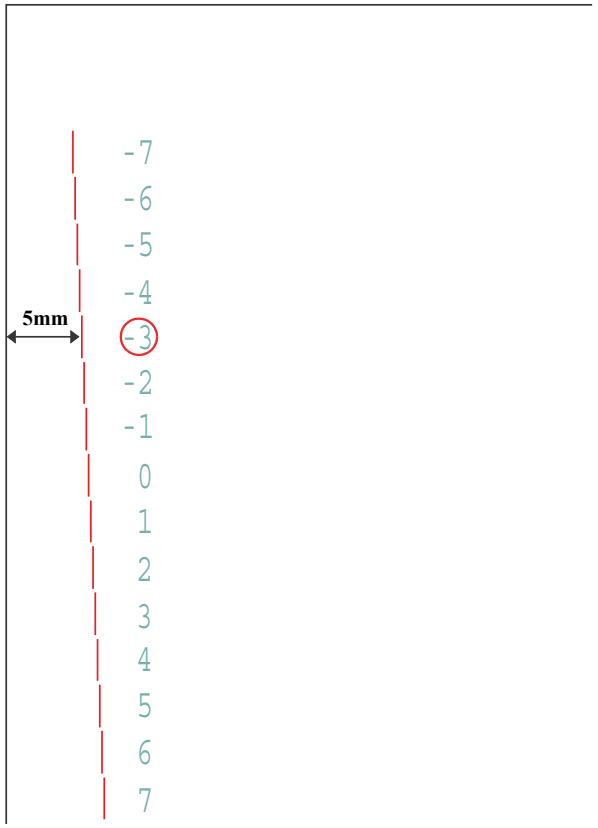


Figure 5-2. Fist Dot Position Adjustment Printout Pattern

How to judge

Measure the length from the left edge of the paper to the printed line. Enter the value for the line that is exactly 5 mm away from the left edge.

5.2.3 Head Angular Adjustment

The following pattern is printed. The lines below “1 to 80” are printed while the carriage moves from the home to the other side, and lines below “80 to 1” are printed while the carriage returns to the home.

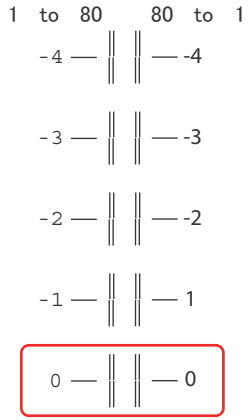


Figure 5-3. Head Angular Adjustment Printout Pattern

How to Judge

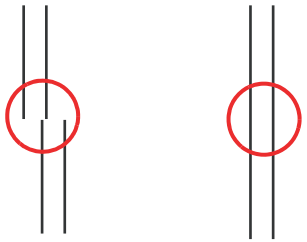
Examine the printout patterns and enter the value (-4 to 4) for the most straight lines.

Additional information

When “4” or “-4” is the most straight lines, it indicates that the printhead is not installed correctly. Reassemble the printhead and carry out this adjustment again.

CHECK POINT

Example for judgement



5.2.4 Bi-D Adjustment

The following pattern is printed for each of the five print mode (five dot size modes).

Figure 5-4. Bi-D Adjustment Printout Pattern

How to Judge

Examine the printout patterns for each of the five modes, and enter the value for the pattern with no gap and overlap for each mode.

Additional Information

If no OK pattern is printed, enter the value for the best one, and print the adjustment pattern again.

CHECK POINT

Example for judgement

5.2.5 PF Adjustment

☐ **PF- for standard print area**

The following pattern is printed.

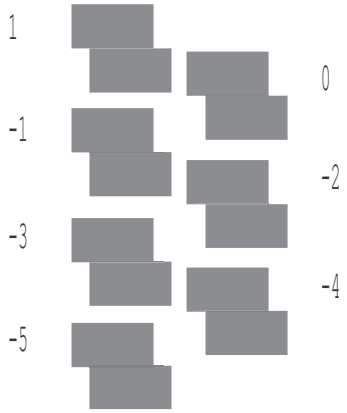


Figure 5-5. PF (standard print area) Adjustment Printout Pattern

How to Judge

Examine the printout patterns and enter the value for the pattern with no overlap and gap between the two rectangles.

CHECK POINT

Example for judgement

☐ **PF- for bottom margin area**

The following pattern is printed.

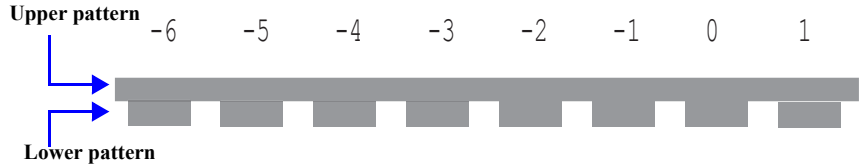


Figure 5-6. PF (bottom margin area) Adjustment Printout Pattern

How to Judge

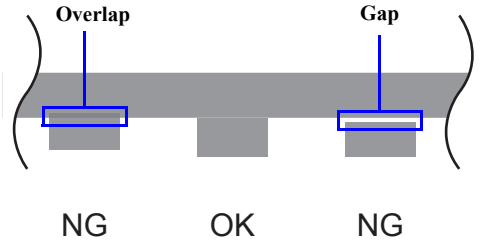
Examine the printout patterns, and enter the value for the pattern with no overlap and gap between the upper and lower ones.

Additional Information

When overlap and gap are observed in the all patterns, enter the value for the best one, and print the adjustment pattern again.

CHECK POINT

Example for judgement



5.2.6 PF Band Adjustment

The following pattern is printed.

Figure 5-7. PF Band Adjustment Printout Pattern

How to Judge

Examine the printout patterns and enter the value for the pattern with no overlap and gap between the two rectangles.

Additional Information

When overlap and gap are observed in the all patterns, enter the value for the best one, and print the adjustment pattern again.

CHECK POINT

Example for judgement

CHAPTER

6

MAINTENANCE

6.1 Overview

This section provides information to maintain the printer in its optimum condition.

6.1.1 Cleaning

This printer has no mechanical components which require regular cleaning except the Printhead. Therefore, when returning the printer to the user, check the following parts and perform appropriate cleaning if stain is noticeable.

CAUTION

- **Never use chemical solvents, such as thinner, benzine, and acetone to clean the exterior parts of the printer like the Housing. These chemicals may deform or deteriorate the components of the printer.**
- **Be careful not to damage any components when you clean inside the printer.**
- **Do not scratch the coated surface of the PF roller. Use soft brush to wipe off any dusts.**
- **Use a soft cloth moistened with alcohol to remove the ink stain.**
- **When using compressed air products; such as air duster, for cleaning during repair and maintenance, the use of such products containing flammable gas is prohibited.**

- Exterior parts
  Use a clean soft cloth moistened with water, and wipe off any dirt. If the exterior parts are stained by the ink, use a cloth moistened with neutral detergent to wipe it off.
- Inside the printer
  Use a vacuum cleaner to remove any paper dust.
- LD Roller
  When paper loading function does not operate because friction of the LD roller is lowered by any paper dust, use a soft cloth moistened with alcohol to remove the paper dust.

6.1.2 Service Maintenance

If any abnormal print (dot missing, white line, etc.) has occurred or the printer indicates the “Maintenance request error” (This error is displayed as “Service Required” in the STM3), take the following actions to clear the error.

6.1.2.1 Printhead cleaning

When dot missing or banding phenomenon has occurred, you need to perform the printhead cleaning operation* by using the printhead cleaning function. This function can be performed by the control panel operation, the printer driver utility and the Adjustment program.

* : Stylus C110/C120/D120 have three modes for manual cleaning, and even during printing, the appropriate cleaning mode is automatically selected and performed according to various conditions. Therefore the ink consumption amount for manual cleaning varies depending on each mode.

6.1.2.2 Maintenance request error

Ink is used for the Printhead cleaning or cap flushing operation as well as the printing operation. When the ink is used for the Printhead cleaning or flushing operation, the ink is drained via the pump to the Waste ink pads. the amount of the waste ink is stored as the waste ink counter into the EEPROM on the Main Board. Due to this, when the waste ink counter has reached the limit of the absorbing capability of the Waste ink pads, the Maintenance call error is indicated on Status monitor 3. However, the limit value of the waste ink counter varies according to the usage.

CHECK POINT

Refer to following chapter about indication of the maintenance request error.

- **Chapter 3 TROUBLESHOOTING *(p.42)***

When the maintenance request error has occurred, replace the waste ink pad with new one and clear the waste ink counter stored into the EEPROM. If the waste ink counter is closed to its limit, we recommend to replace the waste ink pad with new one. This is because the Maintenance request error will may occur after returning the repaired product to the customer.

6.1.3 Lubrication

The type and amount of the grease used to lubricate the printer parts are determined based on the results of the internal evaluations. Therefore, be sure to apply the specified type and amount of the grease to the specified part of the printer mechanism on the following occasion.

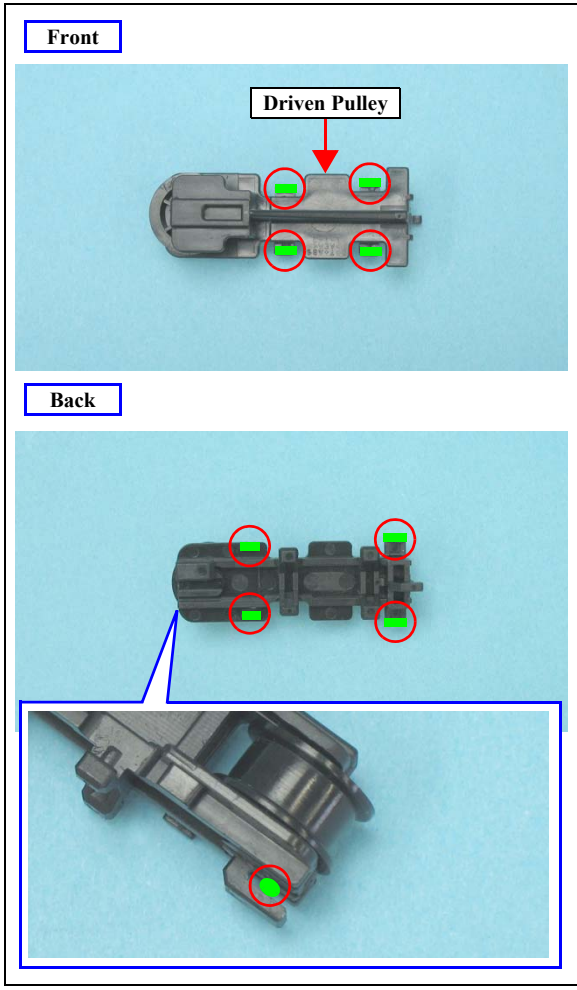
- ☐ Any parts required the lubrication are replaced.
- ☐ The printer is disassembled/assembled. (If necessary)

CAUTION

- ■ **Never use oil or grease other than those specified in this manual. Use of different types of oil or grease may damage the component or give bad influence on the printer function.**
- ■ **Never apply larger amount of grease than specified in this manual.**

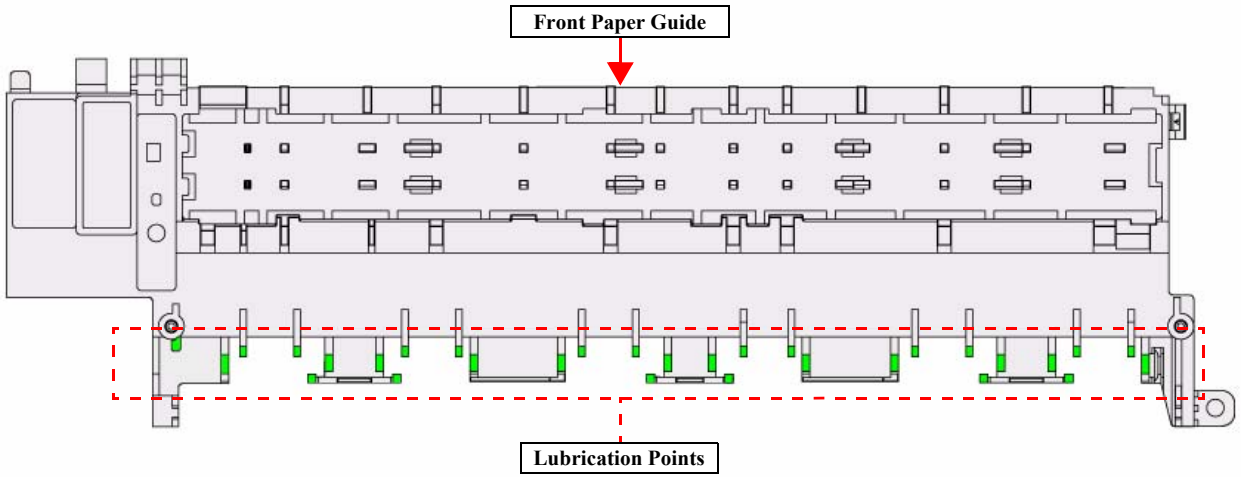
Type	Name	EPSON Code	Supplier
Grease	G-71	1304682	EPSON
Grease	G-74	1409257	EPSON

☐ **Refer to the following figures for the lubrication points.**



<Lubrication Point> Contact points (x 9) with the Main Frame.
<Lubrication Type> G-71
<Lubrication Amount> ϕ 1 mm x 1 mm
<Remarks> Use an injector to apply G-71.

Figure 6-1. Lubrication on Driven Pulley



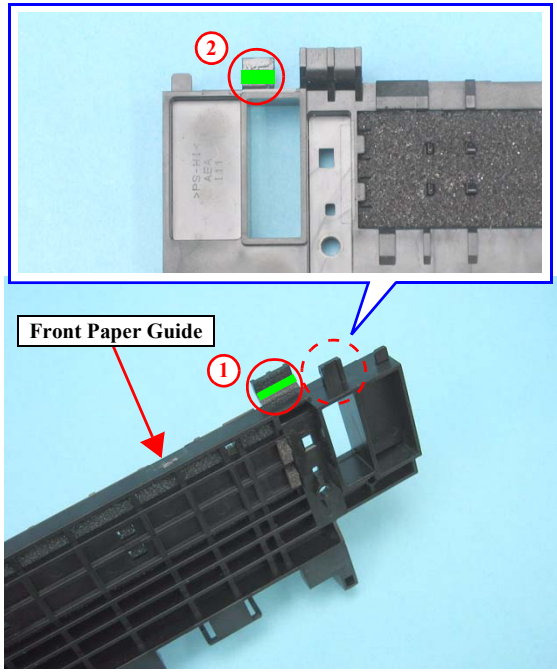
<Lubrication Point>
Contact points (x 31) with the EJ Roller.

<Lubrication Type>
G-74

<Lubrication Amount>
0.04g/point

<Remarks>
Use a brush to apply G-74.

Figure 6-2. Lubrication on Front Paper Guide (1)



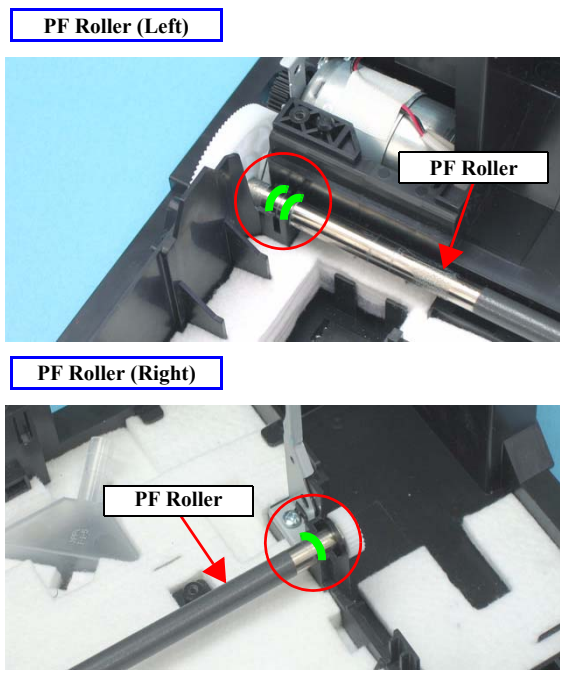
<Lubrication Point>
Contact areas (x 2) with the PF Roller.

<Lubrication Type>
G-71

<Lubrication Amount>
ϕ 1 mm x 4 mm
ϕ 1 mm x 6 mm

<Remarks>
Use an injector to apply G-71.

Figure 6-3. Lubrication on Front Paper Guide (2)



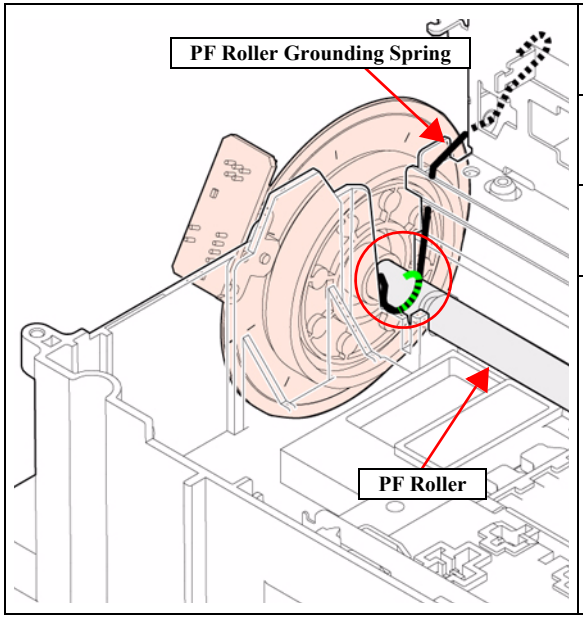
<Lubrication Point>
Bearing of the PF Roller.

<Lubrication Type>
G-71

<Lubrication Amount>
ϕ 1 mm x around shaft (x 3)

<Remarks>
- ☐ Use an injector to apply G-71.
- ☐ Rotate PF roller when lubricate it with G-71.

Figure 6-4. Lubrication on PF Roller



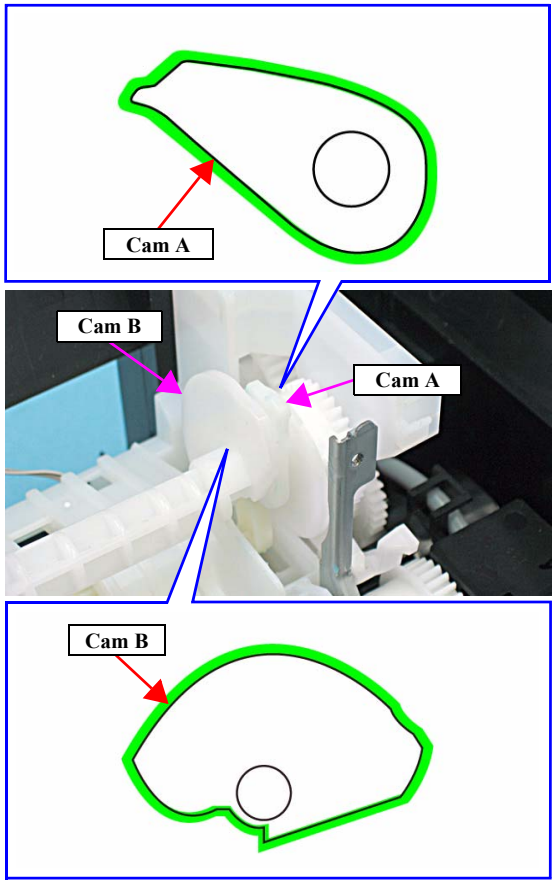
<Lubrication Point>
Contact area with the PF Roller.

<Lubrication Type>
G-71

<Lubrication Amount>
ϕ 1 mm x 4 mm

<Remarks>
- ☐ Use an injector to apply G-71.
- ☐ Lubrication must be performed only after installing the PF Roller Grounding Spring.

Figure 6-5. Lubrication on PF Roller Grounding Spring



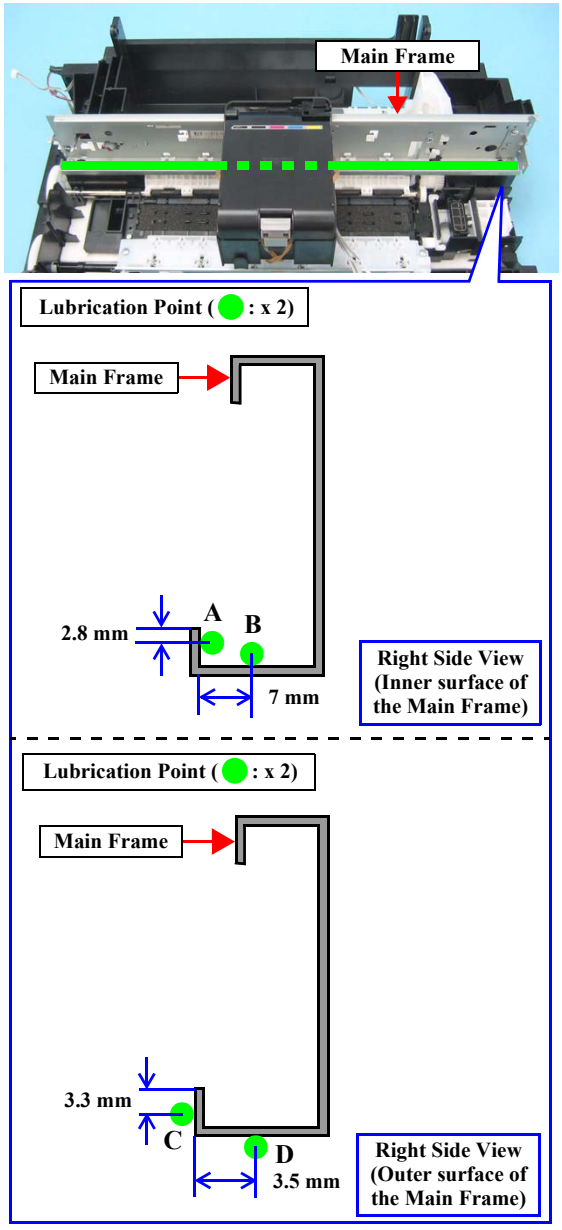
<Lubrication Point>
Cam A and Cam B of the LD Roller shaft

<Lubrication Type>
G-71

<Lubrication Amount>
ϕ 1 mm x around each cam

<Remarks>
- ☐ Use an injector to apply G-71.
- ☐ Rub off excess G-71 with a cotton bud if necessary.

Figure 6-6. Lubrication on LD Roller Shaft



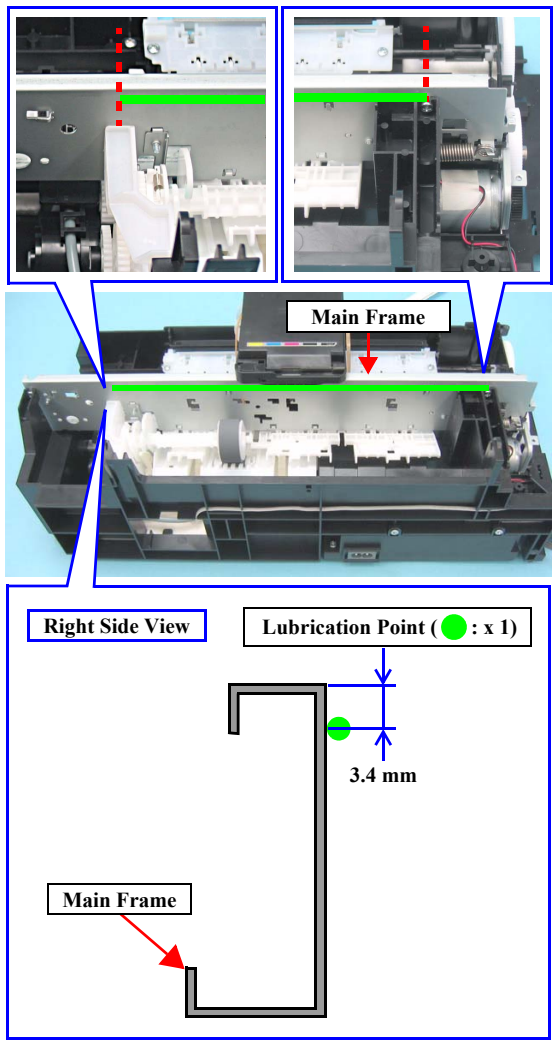
<Lubrication Point>
Along the contact areas between the front of the Main Frame and the CR Unit.
(x 4: Point A - Point D)

<Lubrication Type>
G-71

<Lubrication Amount>
ϕ 2 mm x 380 mm (x 4)

<Remarks>
- ☐ Use an injector to apply G-71.
- ☐ Clean the lubrication points with a cloth beforehand.

Figure 6-7. Lubrication on Main Frame (1)



<Lubrication Point>
Along the contact area between the back of the Main Frame and the CR Unit.

<Lubrication Type>
G-71

<Lubrication Amount>
ϕ 2 mm x 275 mm

<Remarks>
- ☐ Use an injector to apply G-71.
- ☐ Clean the lubrication point with a cloth beforehand.

Figure 6-8. Lubrication on Main Frame (2)

CHAPTER

7

APPENDIX

7.1 Exploded Diagram / Parts List

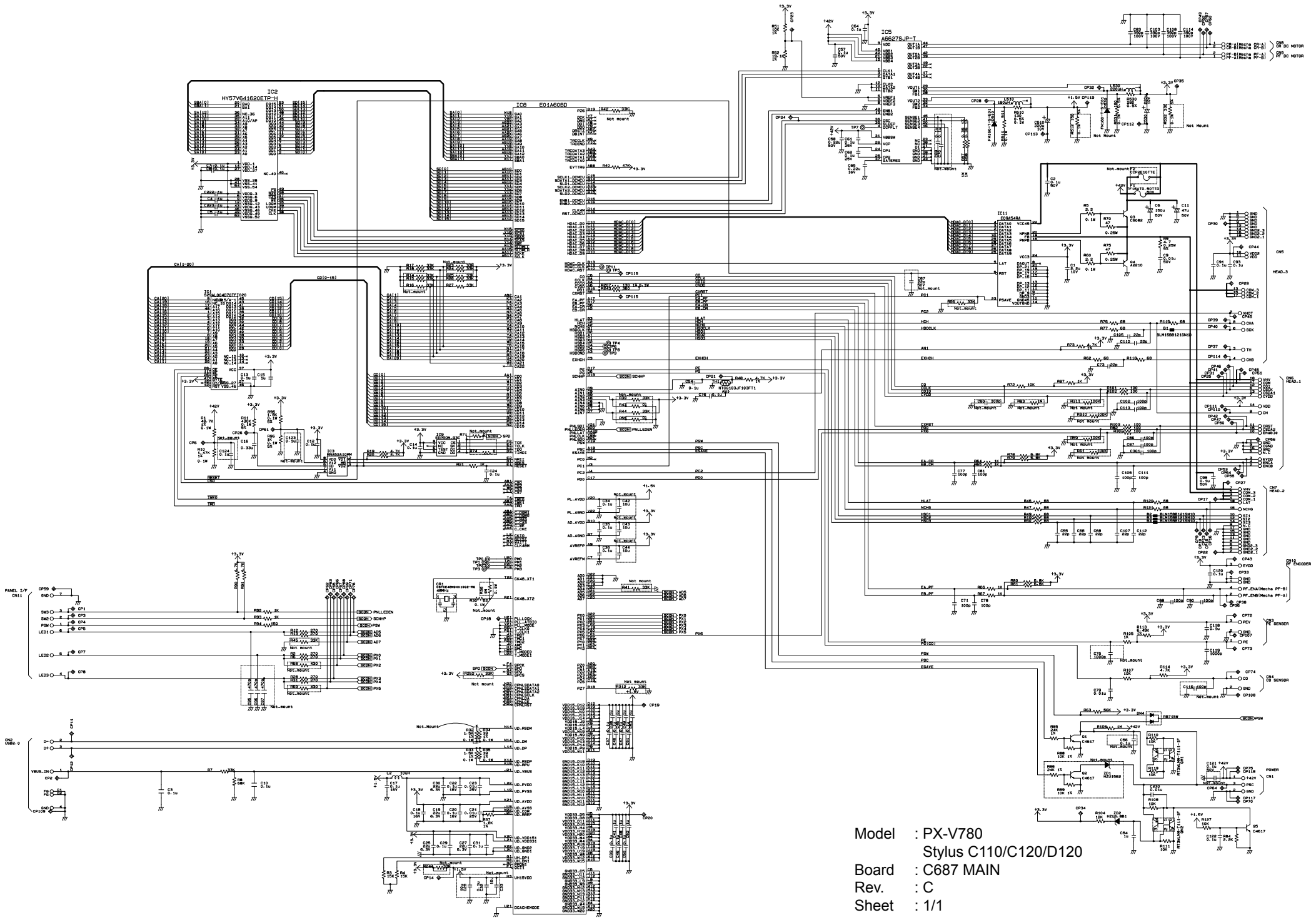
This manual does not provide exploded diagrams or parts list.

For the information, see SPI (Service Parts Information).

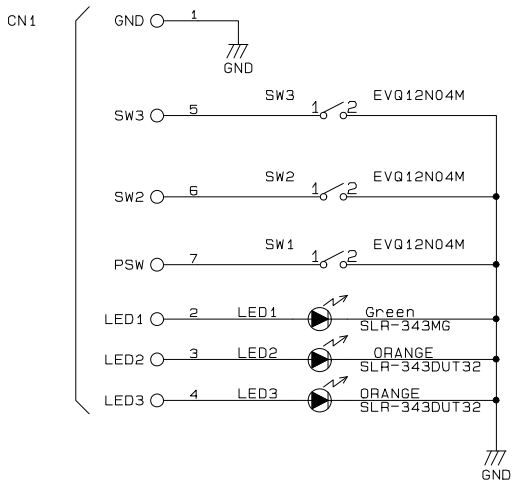
7.2 Electrical Circuits

The electric circuit diagrams below are shown at the following pages:

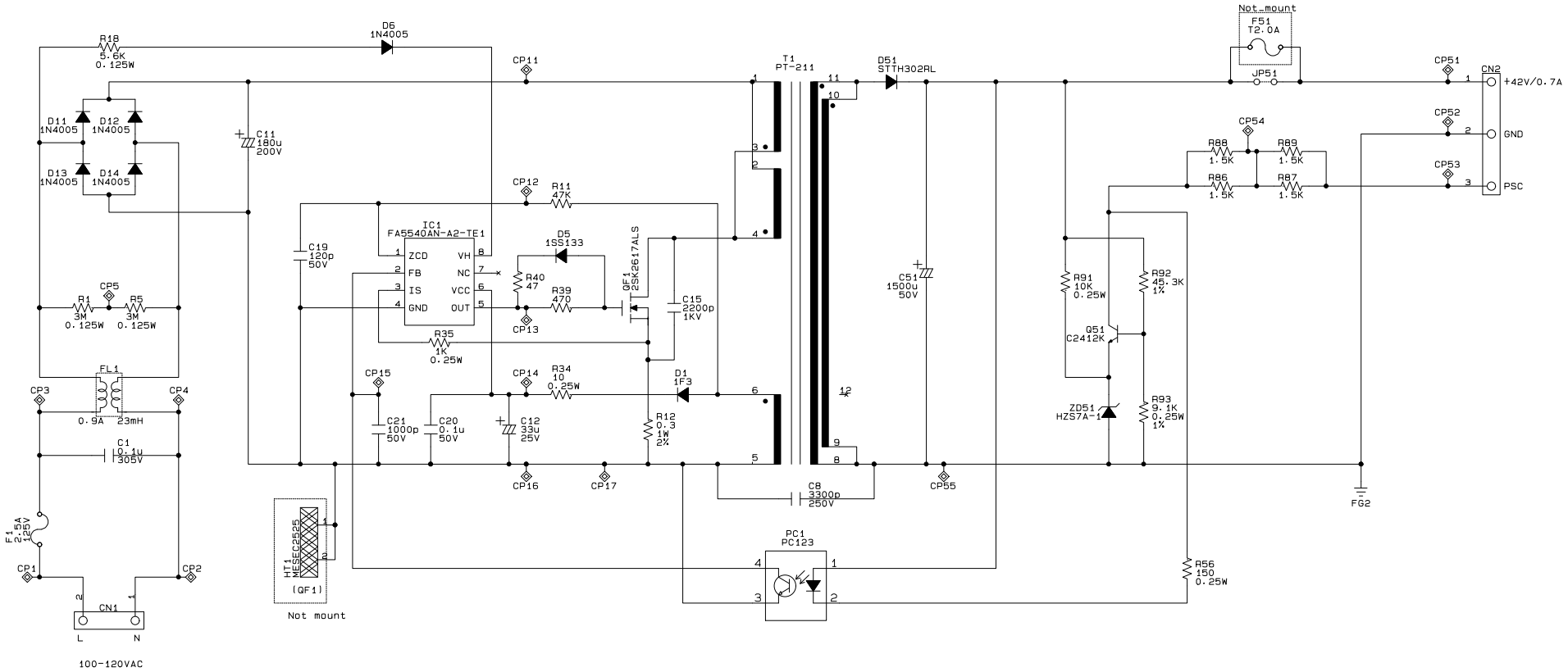
- Main Board (C687 MAIN)
- Panel Board (C687 PNL)
- Power Board (C687 PSB)
- Power Board (C687 PSE)



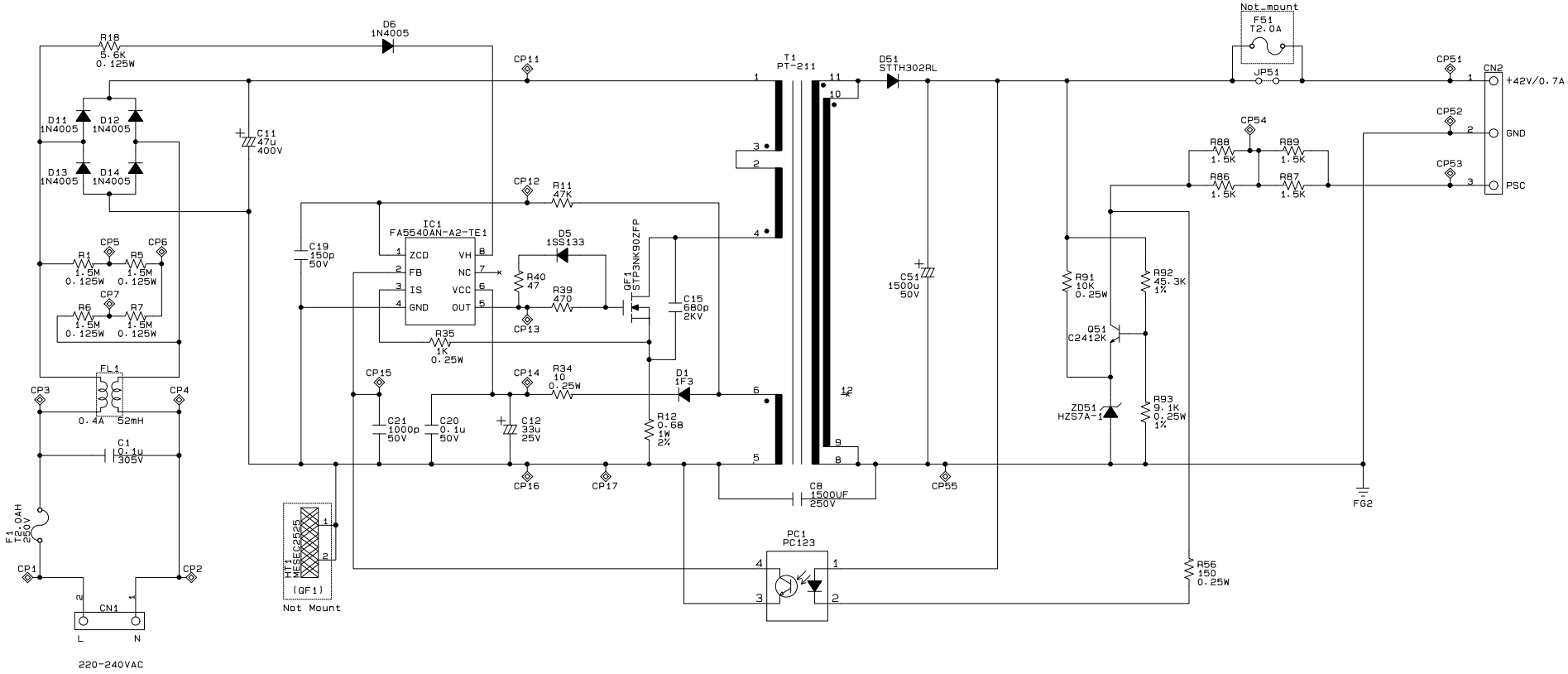
Model : PX-V780
Stylus C110/C120/D120
Board : C687 MAIN
Rev. : C
Sheet : 1/1



Model : PX-V780
Stylus C110/C120/D120
Board : C687 PNL
Rev. : A
Sheet : 1/1



Model : PX-V780
Stylus C110/C120/D120
Board : C687 PSB
Rev. : B
Sheet : 1/1



Model : PX-V780
Stylus C110/C120/D120
Board : C687 PSE
Rev. : B
Sheet : 1/1