Notice:

- All rights reserved. No part of this manual may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SEIKO EPSON CORPORATION.
- The contents of this manual are subject to change without notice.
- All effort have been made to ensure the accuracy of the contents of this manual. However, should any errors be detected, SEIKO EPSON would greatly appreciate being informed of them.
- The above not withstanding SEIKO EPSON CORPORATION can assume no responsibility for any errors in this manual or the consequences thereof.

EPSON is a registered trademark of SEIKO EPSON CORPORATION.

General Notice: Other product names used herein are for identification purpose only and may be trademarks or registered trademarks of their respective owners. EPSON disclaims any and all rights in those marks.

Copyright © 2005 SEIKO EPSON CORPORATION.
I&I CS/Quality Management & PL Department
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 INJURIES 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.

- **ADJUSTMENT REQUIRED**
  Indicates an operating or maintenance procedure, practice or condition that is necessary to keep the product’s quality.

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

- **CHECK POINT**
  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.

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

- **REASSEMBLY**
  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

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date of Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>August 1, 2005</td>
<td>First Release</td>
</tr>
</tbody>
</table>
## Contents

### Chapter 1 PRODUCT DESCRIPTION

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Features</td>
<td>9</td>
</tr>
<tr>
<td>1.2 Specifications</td>
<td>10</td>
</tr>
<tr>
<td>1.2.1 Physical Specification</td>
<td>10</td>
</tr>
<tr>
<td>1.2.2 Printing Specification</td>
<td>10</td>
</tr>
<tr>
<td>1.2.3 Paper Feeding</td>
<td>11</td>
</tr>
<tr>
<td>1.2.4 Input Data Buffer</td>
<td>11</td>
</tr>
<tr>
<td>1.2.5 Electric Specification</td>
<td>11</td>
</tr>
<tr>
<td>1.2.6 Reliability</td>
<td>12</td>
</tr>
<tr>
<td>1.2.7 Acoustic Noise</td>
<td>12</td>
</tr>
<tr>
<td>1.2.8 Black Ink Save Mode</td>
<td>13</td>
</tr>
<tr>
<td>1.3 Operator Controls</td>
<td>14</td>
</tr>
<tr>
<td>1.3.1 Operation Switch</td>
<td>14</td>
</tr>
<tr>
<td>1.3.2 Panel Functions</td>
<td>14</td>
</tr>
<tr>
<td>1.3.3 Printer Condition and LED Status</td>
<td>15</td>
</tr>
<tr>
<td>1.3.4 Duplex Printing</td>
<td>15</td>
</tr>
<tr>
<td>1.3.5 Errors</td>
<td>15</td>
</tr>
<tr>
<td>1.4 Paper</td>
<td>16</td>
</tr>
<tr>
<td>1.4.1 Paper Support</td>
<td>16</td>
</tr>
<tr>
<td>1.5 Ink Cartridge</td>
<td>21</td>
</tr>
<tr>
<td>1.5.1 Ink Cartridge Specification</td>
<td>21</td>
</tr>
</tbody>
</table>

### Chapter 2 OPERATING PRINCIPLES

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Overview</td>
<td>24</td>
</tr>
<tr>
<td>2.2 Printer Mechanism</td>
<td>24</td>
</tr>
<tr>
<td>2.2.1 Printhead Specifications</td>
<td>25</td>
</tr>
<tr>
<td>2.2.2 Carriage Mechanism</td>
<td>25</td>
</tr>
<tr>
<td>2.2.3 Paper Loading/Feeding Mechanism</td>
<td>26</td>
</tr>
<tr>
<td>2.2.4 Ink System Mechanism</td>
<td>27</td>
</tr>
<tr>
<td>2.3 Electrical Circuit Operating Principles</td>
<td>27</td>
</tr>
<tr>
<td>2.3.1 C528 PSH Board</td>
<td>28</td>
</tr>
<tr>
<td>2.3.2 C528 Main Board</td>
<td>28</td>
</tr>
</tbody>
</table>

### Chapter 3 TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Overview</td>
<td>30</td>
</tr>
<tr>
<td>3.1.1 Specified Tools</td>
<td>30</td>
</tr>
<tr>
<td>3.1.2 Preliminary Checks</td>
<td>30</td>
</tr>
<tr>
<td>3.2 Troubleshooting With LED Error Indications</td>
<td>31</td>
</tr>
<tr>
<td>3.2.1 Fatal Error</td>
<td>33</td>
</tr>
<tr>
<td>3.3 Troubleshooting for Motors and Sensors</td>
<td>35</td>
</tr>
</tbody>
</table>

### Chapter 4 DISASSEMBLY/ASSEMBLY

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Overview</td>
<td>37</td>
</tr>
<tr>
<td>4.1.1 Precautions</td>
<td>37</td>
</tr>
<tr>
<td>4.1.2 Tools</td>
<td>37</td>
</tr>
<tr>
<td>4.1.3 Screws (T.B.D)</td>
<td>38</td>
</tr>
<tr>
<td>4.1.4 Work Completion Check</td>
<td>39</td>
</tr>
<tr>
<td>4.2 Caution regarding Assembling/Disassembling of the Printer Mechanism, and How to Ensure of Quality on Re-assembled Product</td>
<td>40</td>
</tr>
<tr>
<td>4.3 Dissassembly Procedures</td>
<td>42</td>
</tr>
<tr>
<td>4.3.1 Removing Housings</td>
<td>44</td>
</tr>
<tr>
<td>4.3.2 Removing Boards</td>
<td>57</td>
</tr>
<tr>
<td>4.3.3 Disassembling Printer Mechanism</td>
<td>62</td>
</tr>
</tbody>
</table>

### Chapter 5 ADJUSTMENT

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 Adjustment Items and Overview</td>
<td>81</td>
</tr>
<tr>
<td>5.1.1 Servicing Adjustment Item List</td>
<td>81</td>
</tr>
<tr>
<td>5.1.2 Replacement Part-Based Adjustment Priorities</td>
<td>84</td>
</tr>
<tr>
<td>5.2 Adjustment by Using Adjustment Program</td>
<td>85</td>
</tr>
<tr>
<td>5.2.1 Market ID Setting</td>
<td>85</td>
</tr>
<tr>
<td>5.2.2 USB ID Input</td>
<td>85</td>
</tr>
<tr>
<td>5.2.3 Head ID Input</td>
<td>85</td>
</tr>
<tr>
<td>5.2.4 Head Angular Adjustment</td>
<td>86</td>
</tr>
<tr>
<td>5.2.5 Bi-D Adjustment</td>
<td>86</td>
</tr>
</tbody>
</table>
5.2.6 PF Adjustment ................................................................. 87
5.2.7 PW Sensor adjustment .................................................... 87
5.2.8 First Dot Adjustment ....................................................... 88
5.2.9 Top Margin Adjustment ................................................... 88
5.2.10 Offset input for CR Motor Calorific Limitation .......... 89
5.2.11 A4 Normal Paper print ............................................... 89
5.2.12 A4 Photo Quality Inkjet Paper Print ........................... 90

5.3 Adjustment Except Adjustment Program ......................... 91
  5.3.1 CR Timing Belt Tension adjustment .......................... 91

Chapter 6 MAINTENANCE

6.1 Overview ........................................................................... 93
  6.1.1 Cleaning ....................................................................... 93
  6.1.2 Service Maintenance .................................................... 93
  6.1.3 Lubrication .................................................................. 95

Chapter 7 APPENDIX

7.1 Exploded Diagram ............................................................... 99
7.2 Parts List .......................................................................... 105
7.3 Circuit Diagram ................................................................. 106
1.1 Features

The major features of EPSON Stylus C87/C88/D88 are:

- High color print quality
  - 4-color pigment ink installed
  - High quality printing on plain papers
  - 2880 (H) x 1440 (V) dpi printing (Max resolution)

- Supports two types of I/F
  - Bidirectional parallel I/F
  - USB

- Windows/Macintosh exclusive

- Built-in auto sheet feeder (ASF)
  - Comes equipped with the ASF that supports from postcard-sized papers to A4-sized papers

- CSIC compatible fully independent ink cartridges

- Borderfree printing for all sides

- Prevents printing on platen with the optical sensor

- Cancel print jobs function

- Reduced noise during paper feeding

Figure 1-1. Product Appearance
1.2 Specifications

This section covers specifications of the printer.

1.2.1 Physical Specification

- **Weight:** 4.2 kg (without the ink cartridges)
- **Dimension**
  - Storage: 460 mm (W) x 242 mm (D) x 191.2 mm (H)
  - Printing: 460 mm (W) x 437 mm (D) x 309 mm (H)

1.2.2 Printing Specification

- **Print method**
  - On demand ink jet
- **Nozzle configuration**
  - monochrome: 180 nozzles
  - color: 59 nozzles x 3 (Cyan, Magenta, Yellow)
- **Print direction**
  - Bi-direction with logic seeking
- **Print speed & Printable columns**

### Table 1-1. Character Mode

<table>
<thead>
<tr>
<th>Character Quality</th>
<th>Character Pitch</th>
<th>Printable Columns</th>
<th>CR Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>High quality</td>
<td>10 CPI (Pitch)</td>
<td>80 digits</td>
<td>622.3 mm/s (245 CPS)</td>
</tr>
</tbody>
</table>

### Table 1-2. Raster Graphics Mode

<table>
<thead>
<tr>
<th>Horizontal resolution</th>
<th>Printable area</th>
<th>Available dot</th>
<th>Dot size</th>
<th>CR speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>360 dpi</td>
<td>209.8 mm (8.26 inch)</td>
<td>2976</td>
<td>Eco</td>
<td>863.6 mm/s (340 CPS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>VSD1</td>
<td>622.3 mm/s (245 CPS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>VSD2 (Color)</td>
<td>622.3 mm/s (245 CPS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>VSD4</td>
<td>571.5 mm/s (225 CPS)</td>
</tr>
<tr>
<td>720 dpi</td>
<td>209.8 mm (8.26 inch)</td>
<td>5952</td>
<td>VSD2</td>
<td>622.3 mm/s (245 CPS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>VSD2' (Black)</td>
<td>622.3 mm/s (245 CPS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>VSD3 (Color)</td>
<td>736.6 mm/s (190 CPS)</td>
</tr>
<tr>
<td>1440 dpi</td>
<td>209.8 mm (8.26 inch)</td>
<td>11904</td>
<td>VSD3</td>
<td>736.6 mm/s (190 CPS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>VSD3' (Black)</td>
<td>736.6 mm/s (190 CPS)</td>
</tr>
</tbody>
</table>

- **Control Code**
  - ESC/P2 expanded raster graphics code
  - EPSON Remote command
- **Character tables**
  - none (ASCII 20H to 7FH code support)
- **Internal fonts**
  - Alphanumeric characters: Courier 10 CPI
1.2.3 Paper Feeding

- Paper feeding method
  - Friction feed with ASF
- PF interval
  - Programmable in 0.0175 mm (1/1440 inch)
- Paper loading method
  - Friction feed
- Feed speed
  - 196.39 mm/sec (19.05 mm (0.75 inch) feed) (T.B.D)
  - 352.8 mm/sec (High speed /Continuous feed) (T.B.D)

1.2.4 Input Data Buffer

- Input buffer size: 128 KB

1.2.5 Electric Specification

- Rated voltage: AC100 V - 240 V
- Input voltage range: AC90 - 264 V
- Rated frequency range: 50 - 60 Hz
- Input frequency range: 49.5 - 60.5 Hz
- Rated current: 0.4 A - 0.2 A
- Power consumption: ISO10561 Letter Pattern: 19W
  Sleep Mode: 4.5 W
  Power Off Mode: 0.8 W
- Dielectric resistance: 10 MΩ or more
  (between AC line and chassis at DC 500 V)
- Dielectric strength: AC 1500 V rms. 1 second
  (between AC line and chassis)

- Safety approvals
  - UPS version:
    Safety standards: UL1950
    CSA C22.2 No.950
    EN 60950(VDE)
    EMI: FCC part15 subpart B class B
    CSA C108.8 class B
    EN 55022(CISPR Pub.22) class B
    AS/NZS 3548 class B

- CE Marking
  - UPS version:
    Low Voltage Directive 73/23/EEC: EN60950
    EMC Directive 89/336/EEC: EN55022 Class B
    EN61000-3-2
    EN61000-3-3
    EN55024
Environmental Condition

Table 1-3. Environmental Condition

<table>
<thead>
<tr>
<th></th>
<th>Operating</th>
<th>Non-operating*2</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature*1</td>
<td>10~35 °C*3</td>
<td>-20~60 °C</td>
<td>1 month at 40 °C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>120 hours at 60 °C</td>
</tr>
<tr>
<td>Humidity (should be no condensation)</td>
<td>20~80 % RH</td>
<td>5~85 % RH</td>
<td>---</td>
</tr>
<tr>
<td>Resistance to shock (X, Y, and Z directions)</td>
<td>1 G, within 1 ms</td>
<td>2 G, within 2 ms</td>
<td>---</td>
</tr>
<tr>
<td>Resistance to vibration (X, Y, and Z directions)</td>
<td>0.15 G</td>
<td>0.50 G</td>
<td>---</td>
</tr>
</tbody>
</table>

Note: *1: One month at 40°C and 120 hours at 60°C
*2: Packed in the shipment container
*3: Under the following conditions

---

Figure 1-2. Temperature/Humidity Range

- Printhead must be capped during storage.
- When transporting the printer, make sure that the printhead is capped and the ink cartridges are installed in the printer.
- If the printhead is not capped when the printer is turned off, turn the printer on with the ink cartridges installed, cap the printhead, and turn the power off.
- Ink inside the ink cartridges freezes if it is left to stand at temperature of -4°C or less. If this is the case, allow the ink to stand for about three hours at 25°C temperature.

1.2.6 Reliability

- Total print volume: 50,000 pages (A4, Letter) or five years, whichever comes first.
- Print Head Life: Three billion shots (per nozzle) or five years, whichever comes first.

1.2.7 Acoustic Noise

- Level: Approx. 42 db (A)
1.2.8 Black Ink Save Mode

“Black ink save mode” allows you to print images with color ink only when the remaining amount of black ink is low. This mode can be selected when the remaining amount of color ink is sufficient since black areas of the images are printed with a mixture of other colors.

- Supported OS: Windows NT4.0, 95, 98, ME, 2000, XP
- Printing mode: Plain Paper & Text Mode (360 dpi)
- Operating procedure

1. User carries out printing from an application.
2. The printer driver checks both the printing mode and the amount of remaining ink, and displays the specific window if the conditions described below are all satisfied.
   - Selected printing mode supports black ink save mode.
   - Remaining amount of black ink is less than 5 %, or the status of the black ink is “ink low”.
   - Remaining amount of all the color ink is more than 10 %, or the status of all the color ink is NOT “ink low”.

![Figure 1-3. Black Ink Save Mode Window](image)

Starts printing in black ink save mode.
Starts printing in a normal manner.
This window will not be displayed until the black ink cartridges is replaced.

Starts printing in a normal manner.
1.3 Operator Controls

1.3.1 Operation Switch

Operation switch is located on top center of the main unit.

1.3.1.1 Switches

There are three non-lock type push switches and three LEDs.

1.3.1.2 Indicators

- **Power LED [Green]**
  Lights when the power switch is “ON” and AC power is supplied. Flashes when data is processed or ink system is operating.

- **Paper LED [Red]**
  Lights during the paper out/multi-feed condition, and flashes during the paper jam condition.

- **Ink LED [Red]**
  Lights during no ink condition, and flashes during ink low condition.

![Figure 1-4. Control Panel](image)

### Table 1-4. Panel Functions

<table>
<thead>
<tr>
<th>Switch</th>
<th>Function</th>
</tr>
</thead>
</table>
| Paper  | - Loads or ejects paper.  
|        | - Restarts when paper jam occurred.  
|        | - In the condition of printing, cancel the print job.  |
| Ink    | - Starts the ink cartridge change sequence. Moves the carriage to cartridge change position.  
|        | - In the condition of ‘Ink Low’, ‘Ink Out’ or ‘No Ink Cartridge’, moves the carriage to the ink check position.  
|        | - When the carriage is on the ink check position, moves carriage to next ink check position or cartridge change position.  
|        | - When carriage is on the ink change position, returns carriage from ink cartridge change position.  |
| Ink (Holding down for three seconds) | - Starts the cleaning of head.  
|        | - In the condition of 'Ink Low', 'Ink Out' or 'No Ink Cartridge', starts the ink cartridge change sequence.  |

### Table 1-5. Panel functions with power on

<table>
<thead>
<tr>
<th>Switch</th>
<th>Pressing with Power On function*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper + Power</td>
<td>Starts status printings.</td>
</tr>
</tbody>
</table>


### Table 1-6. Panel functions with power off

<table>
<thead>
<tr>
<th>Switch</th>
<th>Pressing with Power Off function*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ink + Power*</td>
<td>Compulsory power off.</td>
</tr>
</tbody>
</table>

1.3.3 Printer Condition and LED Status

Table 1-7. Printer Condition and LED Status

<table>
<thead>
<tr>
<th>Printer status</th>
<th>Power LED</th>
<th>Paper LED</th>
<th>Ink LED</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power on</td>
<td>On</td>
<td>--</td>
<td>--</td>
<td>11</td>
</tr>
<tr>
<td>Ink level low</td>
<td>--</td>
<td>--</td>
<td>Flashes</td>
<td>10</td>
</tr>
<tr>
<td>Data processing</td>
<td>Flashes</td>
<td>--</td>
<td>--</td>
<td>9</td>
</tr>
<tr>
<td>No ink cartridge or ink end</td>
<td>--</td>
<td>--</td>
<td>On</td>
<td>8</td>
</tr>
<tr>
<td>CSIC Error</td>
<td>--</td>
<td>--</td>
<td>On</td>
<td>8</td>
</tr>
<tr>
<td>Ink sequence</td>
<td>Flashes</td>
<td>--</td>
<td>--</td>
<td>7</td>
</tr>
<tr>
<td>Ink cartridge change mode</td>
<td>Flashes</td>
<td>--</td>
<td>--</td>
<td>6</td>
</tr>
<tr>
<td>Paper out</td>
<td>--</td>
<td>On</td>
<td>--</td>
<td>5</td>
</tr>
<tr>
<td>Multi-feed</td>
<td>---</td>
<td>On</td>
<td>---</td>
<td>5</td>
</tr>
<tr>
<td>Paper jam condition</td>
<td>--</td>
<td>Flashes</td>
<td>--</td>
<td>4</td>
</tr>
<tr>
<td>Maintenance request</td>
<td>Off</td>
<td>Flashes</td>
<td>Flashes</td>
<td>3</td>
</tr>
<tr>
<td>(Waste ink counter overflow)</td>
<td></td>
<td>alternately</td>
<td>alternately</td>
<td></td>
</tr>
<tr>
<td>Fatal error</td>
<td>Off</td>
<td>Flashes on high speed</td>
<td>Flashes on high speed</td>
<td>2</td>
</tr>
<tr>
<td>Multi-feed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper off</td>
<td>Flashes on high speed</td>
<td>Off</td>
<td>Off</td>
<td>1</td>
</tr>
<tr>
<td>Reset request</td>
<td>On</td>
<td>On</td>
<td>On</td>
<td>--</td>
</tr>
</tbody>
</table>

Note *: "---" indicates that the indicator status varies according to the printer condition at that time.

1.3.4 Duplex Printing

Select the duplex printing mode from the printer driver, and follow the steps below to perform the duplex printing.

1. Print all the odd pages.
2. Turn over the ejected pages on the paper eject tray, and load them on the ASF.
3. Print all the even pages.

1.3.5 Errors

Errors that may occur with this printer are described below.

Table 1-8. Error Status

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ink out</td>
<td>The predetermined level of ink is used.</td>
</tr>
<tr>
<td>Paper out</td>
<td>The printer fails to load a sheet.</td>
</tr>
<tr>
<td>Paper jam</td>
<td>Occurs under the following conditions:</td>
</tr>
<tr>
<td></td>
<td>• Papers could not be ejected after the specified number of times of paper feed operation.</td>
</tr>
<tr>
<td>Multi-feed</td>
<td>Multiple papers are fed to the printer.</td>
</tr>
<tr>
<td>No ink-cartridge /</td>
<td>Occurs under the following conditions:</td>
</tr>
<tr>
<td>Cartridge Error</td>
<td>• Ink cartridge is not installed or removed.</td>
</tr>
<tr>
<td></td>
<td>• CSIC information could not be read/written normally.</td>
</tr>
<tr>
<td>Maintenance request</td>
<td>Total quantity of waste ink has reached the specified level.</td>
</tr>
<tr>
<td>Fatal errors</td>
<td>Non-recoverable error such as carriage control error.</td>
</tr>
</tbody>
</table>
1.4 Paper

1.4.1 Paper Support

- Cut sheets

Table 1-9. Cut sheets

<table>
<thead>
<tr>
<th>Paper size</th>
<th>Dimensions</th>
<th>Thickness (mm)</th>
<th>Weight (g/m²)</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>A4</td>
<td>210 x 297</td>
<td>0.08-0.11</td>
<td>64-90 (17-24 lb)</td>
<td>Common paper</td>
</tr>
<tr>
<td>A5</td>
<td>148 x 210</td>
<td></td>
<td></td>
<td>Recycled paper</td>
</tr>
<tr>
<td>A6</td>
<td>105 x 148</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Half Letter</td>
<td>139.7 x 215.9 (5.5” x 8.5”)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B5</td>
<td>182 x 257</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Letter</td>
<td>215.9 x 279.4 (8.5” x 11”)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal</td>
<td>215.9 x 355.6 (8.5” x 14”)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User defined</td>
<td>50.8-329 x 127-1117.6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Envelopes

Table 1-10. Envelopes*1

<table>
<thead>
<tr>
<th>Paper type</th>
<th>Dimensions (mm)</th>
<th>Weight (g/m²)</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>#10*2</td>
<td>104.8 x 241.3</td>
<td>75-90 (20-24 lb)</td>
<td>Bond paper</td>
</tr>
<tr>
<td>DL *2</td>
<td>110 x 220</td>
<td></td>
<td>PPC paper</td>
</tr>
<tr>
<td>C6 *2</td>
<td>114 x 162</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note *1: Borderfree printing is not supported for envelops.

*2: There is flap in the long side part, and it is fold down.

- Use paper under normal conditions.
  - Temperature 15 to 25°C (59 to 77°F)
  - Humidity 40 to 60% RH
- It is necessary that there is no winkle, nap, tear, fold and so on in the form.
- The curve and swell of the form must be three mm or below.
- Don't use the adhesive envelope.
- Don't use sleeve insert envelope and cellophane window envelope.
- As for double-flap envelope, if the envelope is damaged or bent during printing, load the envelope with its flap facing in the opposite direction. (Feeding direction should be changed as well from the printer driver.)
- If the printed images are skewed or misaligned from the proper position, fold four sides of the envelope tightly.
- If multi-feed occurs, press the [Paper] switch to feed the envelope before starting printing again.

It is necessary that there is no winkle, nap, tear, fold and so on in the form.

The curve of form must be five mm or below.

The printer only accepts A4-sized papers for borderfree printing.
Exclusive papers

Quality: EPSON Exclusive paper

Table 1-11. Exclusive papers

<table>
<thead>
<tr>
<th>Item</th>
<th>Size</th>
<th>Dimensions</th>
<th>Thickness (mm)</th>
<th>Weight (g/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premium Ink Jet Plain Paper</td>
<td>A4</td>
<td>210 297</td>
<td>0.11</td>
<td>80</td>
</tr>
<tr>
<td>Bright White Ink Jet Paper</td>
<td>A4</td>
<td>210 297</td>
<td>0.13</td>
<td>93</td>
</tr>
<tr>
<td>Photo Paper</td>
<td>A4</td>
<td>210 297</td>
<td>0.23</td>
<td>194</td>
</tr>
<tr>
<td>Premium Glossy Photo Paper</td>
<td>A4</td>
<td>210 297</td>
<td>0.23</td>
<td>194</td>
</tr>
<tr>
<td>Premium Semigloss Photo Paper</td>
<td>A4</td>
<td>210 297</td>
<td>0.23</td>
<td>200</td>
</tr>
<tr>
<td>Matte Paper-Heavyweight</td>
<td>A4</td>
<td>210 297</td>
<td>0.23</td>
<td>200</td>
</tr>
<tr>
<td>Double-sided Matte Paper</td>
<td>A4</td>
<td>210 297</td>
<td>0.23</td>
<td>200</td>
</tr>
<tr>
<td>Economy Photo Paper</td>
<td>A4</td>
<td>210 297</td>
<td>0.23</td>
<td>200</td>
</tr>
<tr>
<td>Photo Quality Ink Jet paper*1</td>
<td>A4</td>
<td>210 297</td>
<td>0.12</td>
<td>102</td>
</tr>
<tr>
<td>Glossy Photo Paper</td>
<td>A4</td>
<td>210 297</td>
<td>0.12</td>
<td>102</td>
</tr>
<tr>
<td>Premium Glossy Photo Paper (RC-X)</td>
<td>A4</td>
<td>210 297</td>
<td>0.23</td>
<td>200</td>
</tr>
<tr>
<td>Ultra Glossy Photo Paper*2</td>
<td>A4</td>
<td>210 297</td>
<td>0.23</td>
<td>200</td>
</tr>
<tr>
<td>Ultra Premium Glossy Photo Paper*3</td>
<td>A4</td>
<td>210 297</td>
<td>0.23</td>
<td>200</td>
</tr>
</tbody>
</table>

Note: Borderfree printing is not supported for Photo Quality Ink Jet Paper.

*1: For Stylus C87/D88 only.

*2: For Stylus C87/D88 only.

*3: For Stylus C88 only.

Use paper under normal conditions.

- Temperature 15 to 25°C (59 to 77°F)
- Humidity 40 to 60% RH

It is necessary that there is no winkle, nap, tear, fold and so on in the form.

The curve of form must be five mm or below.
1.4.1.1 Printable Area

Cut sheet (standard printing)

- Printable area
  For paper width (PW) and paper length (PL), refer to 1.4.1 Paper Support (p16).

Table 1-12. Applicable Paper/Printing Area

<table>
<thead>
<tr>
<th>Paper type</th>
<th>LM</th>
<th>RM</th>
<th>TM</th>
<th>BM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cut Sheet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Letter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User defined</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premium Inkjet Plain Paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bright White Ink Jet Paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photo Paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premium Glossy Photo Paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premium Semigloss Photo Paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matte Paper-Heavyweight</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Double-sided Matte Paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economy Photo Paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photo Quality Ink Jet Paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glossy Photo Paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premium Glossy Photo Paper (RC-X)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ultra Glossy Photo Paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ultra Premium Glossy Photo Paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note *: It is possible to set the margins for all sides to zero under the special conditions.

Note *1: Bottom margin is expanded to 3 mm when paper dimension is defined by using command (ESC (S and Remote “SN”), otherwise it is not expanded (12.5 mm). From a form lower end 3 mm as for 12.5 mm area a printing may scramble.
Envelopes

Printable area
For paper width (PW) and paper length (PL), refer to 1.4.1 Paper Support (p16).

Table 1-13. Applicable Paper/Printing Area

<table>
<thead>
<tr>
<th>Paper type</th>
<th>LM</th>
<th>RM</th>
<th>TM</th>
<th>BM</th>
</tr>
</thead>
<tbody>
<tr>
<td>#10</td>
<td>3 mm</td>
<td>3 mm</td>
<td>3 mm</td>
<td>20 mm</td>
</tr>
<tr>
<td>DL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1-6. Printable Area for Envelopes
- Cut sheet (border-free printing)
  - Printable area
  
  For paper width (PW) and paper length (PL), refer to 1.4.1 Paper Support (p16).

Table 1-14. Applicable Paper/Printing Area

<table>
<thead>
<tr>
<th>Paper type</th>
<th>Size</th>
<th>LO</th>
<th>RO</th>
<th>TO</th>
<th>BO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photo Paper</td>
<td>A4</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td></td>
<td>4” x 6”</td>
<td>2.54</td>
<td>2.54</td>
<td>1.34</td>
<td>2.54</td>
</tr>
<tr>
<td>Premium Glossy Photo Paper</td>
<td>Letter</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td></td>
<td>A4</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td></td>
<td>8” x 10”</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td></td>
<td>5” x 7”</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td></td>
<td>4” x 6”</td>
<td>2.54</td>
<td>2.54</td>
<td>1.34</td>
<td>2.54</td>
</tr>
<tr>
<td></td>
<td>3R</td>
<td>2.54</td>
<td>2.54</td>
<td>1.34</td>
<td>2.54</td>
</tr>
<tr>
<td>Premium Semigloss Photo Paper</td>
<td>Letter</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td></td>
<td>A4</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td></td>
<td>4” x 6”</td>
<td>2.54</td>
<td>2.54</td>
<td>1.34</td>
<td>2.54</td>
</tr>
<tr>
<td>Matte Paper-Heavyweight</td>
<td>Letter</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td></td>
<td>A4</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td>Double-sided Matte Paper</td>
<td>Letter</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td></td>
<td>A4</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td>Economy Photo Paper</td>
<td>A4</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td>Glossy Photo Paper</td>
<td>Letter</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td>Premium Glossy Photo Paper (RC-X)</td>
<td>4” x 6”</td>
<td>2.54</td>
<td>2.54</td>
<td>1.34</td>
<td>2.54</td>
</tr>
<tr>
<td>Ultra Premium Glossy Photo Paper</td>
<td>Letter</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td>Ultra Glossy Photo Paper</td>
<td>A4</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td></td>
<td>8” x 10”</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td></td>
<td>5” x 7”</td>
<td>2.54</td>
<td>2.54</td>
<td>2.96</td>
<td>4.02</td>
</tr>
<tr>
<td></td>
<td>4” x 6”</td>
<td>2.54</td>
<td>2.54</td>
<td>1.34</td>
<td>2.54</td>
</tr>
</tbody>
</table>

Figure 1-7. Printable Area for Cut Sheet (Border-free Printing)
1.5 Ink Cartridge

1.5.1 Ink Cartridge Specification

- **Type/Color:** Separate ink cartridges for each color

<table>
<thead>
<tr>
<th>Color</th>
<th>Size</th>
<th>EAI</th>
<th>Latin/Asia/Pac</th>
<th>EUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>SS Size</td>
<td>---</td>
<td>T0631</td>
<td>T0611</td>
</tr>
<tr>
<td></td>
<td>S Size</td>
<td>T0601</td>
<td>T0621</td>
<td>T0641</td>
</tr>
<tr>
<td>Cyan</td>
<td>SS Size</td>
<td>---</td>
<td>T0632</td>
<td>T0612</td>
</tr>
<tr>
<td></td>
<td>S Size</td>
<td>T0602</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Magenta</td>
<td>SS Size</td>
<td>---</td>
<td>T0633</td>
<td>T0613</td>
</tr>
<tr>
<td></td>
<td>S Size</td>
<td>T0603</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Yellow</td>
<td>SS Size</td>
<td>---</td>
<td>T0634</td>
<td>T0614</td>
</tr>
<tr>
<td></td>
<td>S Size</td>
<td>T0604</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

- **Ink life:**
  - **Black ink cartridge**
    - Print capacity
      - S size: 430 pages /A4 (360 dpi, 5% duty each color)
      - SS size: 250 pages /A4 (360 dpi, 5% duty each color)
  - **Color ink cartridge**
    - Print capacity
      - S size: 470 pages /A4 (360 dpi, 5% duty each color)
      - SS size: 280 pages /A4 (360 dpi, 5% duty each color)

- **Expiration date:** Two years
  (include both the time interval that the ink cartridge is unopened and the period after it is unpacked)

- **Storage temperature**

<table>
<thead>
<tr>
<th>Situation</th>
<th>Storage temperature</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>When transported in individual boxes</td>
<td>-30°C ~ 50°C</td>
<td>Within 10 days at 50°C</td>
</tr>
<tr>
<td>When stored in individual boxes</td>
<td>-30°C ~ 40°C</td>
<td>Within 1 month at 40°C</td>
</tr>
<tr>
<td>When installed in main unit</td>
<td>-20°C ~ 40°C</td>
<td>Within 1 month at 40°C</td>
</tr>
</tbody>
</table>

Temperature difference should be less than 45°C in this period.
Dimension:  12.7 mm (W) x 73.46 mm (D) x 55.25 mm (H)

Figure 1-8. Ink Cartridge

- Ink cartridge can not re-fill, only ink cartridge is prepared for article of consumption.
- Do not use the ink cartridge which has expired.
- Ink will be frozen under -16 °C environment, however it will be usable after placing it more than three hours at room temperature.
CHAPTER 2

OPERATING PRINCIPLES
2.1 Overview

This section describes the operating principles of the printer mechanism and electrical circuit boards.

2.2 Printer Mechanism

Printer mechanism of Stylus C87/C88/D88 consists of printhead, carriage mechanism, paper loading mechanism, paper feeding mechanism, and ink system. As in the case of conventional models, Stylus C87/C88/D88 has two DC motors; one is for paper loading/feeding mechanism and the pump mechanism, and the other is for carriage mechanism. Papers are fed from the backside and ejected from the front side of the printer. Paper feeding mechanism, which is also similar to conventional models, feeds papers using the LD roller and the retard roller.
2.2.1 Printhead Specifications

This printer employs P-Match type printhead, which enables the product to perform both the variable dot printing and the economy dot printing.

- Nozzle configuration
  - Monochrome: 180 nozzles
  - Color: 59 nozzles x 3 rows/color (Cyan, Magenta, Yellow)

The following shows the arrangement of the nozzles and the color arrangement of each nozzle line when viewed the printhead from behind.

2.2.2 Carriage Mechanism

Main components of the carriage mechanism are carriage unit (including printhead, CR encoder sensor, PW sensor), CR motor, timing belt, and CR scale.

2.2.2.1 CR Motor Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Motor with DC brush</td>
</tr>
<tr>
<td>Drive voltage</td>
<td>+42 V ± 5% (applied voltage to the driver)</td>
</tr>
<tr>
<td>Electric resistance</td>
<td>22.65 Ω ± 10%</td>
</tr>
<tr>
<td>Inductance</td>
<td>17.3 mH ± 25%</td>
</tr>
<tr>
<td>Drive method</td>
<td>PWM, constant-current chopping</td>
</tr>
<tr>
<td>Drive IC</td>
<td>A6615</td>
</tr>
</tbody>
</table>
2.2.3 Paper Loading/Feeding Mechanism

Paper loading/feeding mechanism consist of switching lever inside the ink system, holder shaft unit (including clutch mechanism), and ASF unit.

Switching lever and clutch mechanism play an important role in paper loading mechanism. Refer to 2.2.3.2 Drive Process (p26) for details.

2.2.3.1 PF Motor Specifications (For both ASF and Pump motor)

Table 2-2. PF Motor Specification

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>4-phase, 200-pole HB stepping motor</td>
</tr>
<tr>
<td>Drive voltage</td>
<td>+42 V ± 5% (applied voltage to the driver)</td>
</tr>
<tr>
<td>Wire wound resistance</td>
<td>3.0 Ω ± 10% (per one phase at 25 °C)</td>
</tr>
<tr>
<td>Inductance</td>
<td>3.5 mH ± 20% (1KH, 1Vrms)</td>
</tr>
<tr>
<td>Drive method</td>
<td>Bipolar drive</td>
</tr>
<tr>
<td>Drive voltage</td>
<td>2-2 phase, 1-2 phase, W1-2, 2W1-2, 4W1-2 phase constant-current drive</td>
</tr>
<tr>
<td>Drive IC</td>
<td>A6628</td>
</tr>
</tbody>
</table>

2.2.3.2 Drive Process

1. Drive of the PF motor is transmitted to the paper eject roller and the PF roller via the PF timing belt, however, it is not transmitted to the LD roller and the retard roller owing to the clutch of the holder shaft unit.
2. The carriage unit moves to the ASF trigger position once the paper loading command is received.
3. PF motor is rotated counter clockwise, and the clutch is released by the change lever.
4. After the clutch is released, the PF motor rotates clockwise. Drive is transmitted to the LD roller and the paper loading operation begins.
5. During paper loading operation, papers are fed from the ASF unit to inside the printer by the rotating movement of the two cams of the LD roller.
   - Cam, large: releases hopper
   - Cam, small: releases paper back lever
6. Once a sheet of paper is fed, the hopper and the paper back lever bring back rest of the papers to the position in readiness by the rotating movement of the two cams mentioned above.
7. When the LD roller is turned a full circle, the change lever release the clutch and the drive to the LD roller is interfered.
2.2.4 Ink System Mechanism

The Ink system mechanism consists of pump mechanism and capping mechanism with wiper mechanism.

2.2.4.1 Pump Unit Mechanism

The PF motor is a source of power to activate the pump unit.

<table>
<thead>
<tr>
<th>Directions</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counterclockwise</td>
<td>• Absorbs the ink by the Pump Unit</td>
</tr>
<tr>
<td>Clockwise</td>
<td>• Release pump.</td>
</tr>
</tbody>
</table>

Note *: The PF Motor rotational direction = seen from the left side of the printer.

2.2.4.2 Capping Mechanism

The Capping mechanism covers the printhead with the cap to prevent the nozzle from increasing viscosity when the printer is in stand-by state or when the printer is off.

2.3 Electrical Circuit Operating Principles

The electric circuit of the Stylus C87/C88/D88 consists of the following boards.

- Main board: C528 MAIN Board
- Power supply board: C528 PSB/PSB board
- Panel board: C528 PNL board

This section provides block diagram of both C528 MAIN Board and C528 PSB/PSE Board, C528 PNL board.
2.3.1 C528 PSH Board

PSH board of Stylus C87/C88/D88 employs ZC-RRC circuit method, and supplies +42 VDC/+5VDC to the drive line. 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.

2.3.2 C528 Main Board

The logic circuit of the C528 Main Board is composed of the following:

- Logic line (CPU-ASIC 4 in 1, DRAM and so on)
- Motor control/drive circuit (CR Motor, PF Motor)
- Head control/drive circuit
- Parallel interface control circuit
- Sensor circuit
- Reset circuit
- EEPROM circuit

<table>
<thead>
<tr>
<th>IC</th>
<th>Location</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallel I/F Controller</td>
<td>IC2</td>
<td>Transceiver for centronics IF that responds to IEEE1284 and ECP or more, data transfer, and 3.3 V drive.</td>
</tr>
</tbody>
</table>
| Reset Regulator | IC1      | Reset signal is generated under the following conditions.  
- Pressure reduction from 42 V line to 35.8 V.  
- Pressure reduction from 5 V line to 4.2 V line. |
| DRAM      | IC8      | 16 Mbit DRAM with 2 CAS-type page access function. 3.3 V drive.          |
| EEPROM    | IC4      | Makes back up of default setting values and parameters.                  |
| Motor Driver | IC6     | Drives CR/PF motors, controls PWM by the program timer, drives 42 V.   |
| Head Driver | IC7      | Generates trapezoidal waveform, drives 42 V.                            |
| ASIC      | IC10     | Drives CPU (H8S/2323 base), internal 8 K bit RAM, internal MASK ROM, 24 Mhz, 3.3 V drive. |

![Figure 2-4. C528 Main Board Block Diagram](image)
CHAPTER 3

TROUBLESHOOTING
3.1 Overview

This chapter describes how to solve problems.

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 located in a well-ventilated place.
- The printer must be placed on a strong and steady level table (without an inclination larger than five degrees).
- 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 With LED Error Indications

LED error display, cause, and remedy are explained here.

<table>
<thead>
<tr>
<th>Error</th>
<th>LED status</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ink end/ No ink cartridge/</td>
<td>---</td>
<td>• Ink inside Bk, Y, M, C ink cartridges has run out.</td>
<td>• Check the ink cartridge(s) and reinstall it correctly.</td>
</tr>
<tr>
<td>CSIC error</td>
<td>---</td>
<td>• Ink cartridge(s) is not installed.</td>
<td>• Replace the ink cartridge(s) with a genuine one.</td>
</tr>
<tr>
<td></td>
<td>On</td>
<td>• Non-genuine ink cartridge(s) is installed.</td>
<td>• If there is a possibility of CSIC error, see 3.3 Troubleshooting for Motors and Sensors (p35).</td>
</tr>
<tr>
<td>Paper Out</td>
<td>---</td>
<td>• Paper loading operation is executed when there is no paper.</td>
<td>1. If there is no paper on the paper tray, load papers.</td>
</tr>
<tr>
<td></td>
<td>On</td>
<td>• Papers stopped before the PE Sensor or could not be fed.</td>
<td>2. If the paper has stopped halfway, remove the paper, check if the paper is not bent, fan the paper, and load it against the edge guide.</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>• Papers are fed without being placed against the right edge guide.</td>
<td>3. Press the [Paper] switch to release the error.</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>• Connector of the PE sensor is disconnected.</td>
<td></td>
</tr>
<tr>
<td>Multi-feed error</td>
<td>---</td>
<td>• When performing duplex printing, blank paper is ejected.</td>
<td>1. Remove the blank paper, or check the paper size.</td>
</tr>
<tr>
<td></td>
<td>On</td>
<td>• The printer detected that the paper is too long upon ejection.</td>
<td>2. Press the [Paper] switch to eject the paper and release the error.</td>
</tr>
</tbody>
</table>

**Table 3-1. Troubleshooting With LED Error Indications**
### Table 3-1. Troubleshooting With LED Error Indications

<table>
<thead>
<tr>
<th>Error</th>
<th>LED status</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
</table>
2. If paper jam occurred again after pressing the switch, open the printer cover and remove all the papers inside the printer and papers set on the hopper.  
3. Making sure there is no paper inside the printer, load paper on the hopper and press [Paper]. | 1. Even though paper feeding operation is carried out for predetermined times, leading edge or back-end of the paper could not be detected. |
| Maintenance request (Waste ink overflow)   | Off                         | As a result of cleaning and flushing, total emission of ink has exceeded the specific level. | Replace the waste ink pad, and reset the waste ink counter (protection counter A) using the adjustment program. Refer to Chapter 6 “MAINTENANCE” (p.92) for details. |
| Fatal error                                | Off                         | • Home position of the carriage could not be detected.  
• Abnormal external pressure is applied to the printer when the power is on.  
• Carriage movement is interfered during printing. | 1. Turn the power off, wait for a few seconds, and turn the power back on again.  
2. If the fatal error still appears, turn the power off, remove the papers on the hopper, and check the following:  
• Open the printer cover, check the ink cartridges, and reinstall them correctly.  
• Check is there is no foreign material or papers inside the printer. If there is any, remove them.  
3. Turn the printer power on.  
4. If the fatal error appears again, refer to 3.2.1 Fatal Error (p33) and examine/replace the parts. |

<table>
<thead>
<tr>
<th>Error</th>
<th>LED status</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
</table>
2. If paper jam occurred again after pressing the switch, open the printer cover and remove all the papers inside the printer and papers set on the hopper.  
3. Making sure there is no paper inside the printer, load paper on the hopper and press [Paper]. | 1. Even though paper feeding operation is carried out for predetermined times, leading edge or back-end of the paper could not be detected. |
| Maintenance request (Waste ink overflow)   | Off                         | As a result of cleaning and flushing, total emission of ink has exceeded the specific level. | Replace the waste ink pad, and reset the waste ink counter (protection counter A) using the adjustment program. Refer to Chapter 6 “MAINTENANCE” (p.92) for details. |
| Fatal error                                | Off                         | • Home position of the carriage could not be detected.  
• Abnormal external pressure is applied to the printer when the power is on.  
• Carriage movement is interfered during printing. | 1. Turn the power off, wait for a few seconds, and turn the power back on again.  
2. If the fatal error still appears, turn the power off, remove the papers on the hopper, and check the following:  
• Open the printer cover, check the ink cartridges, and reinstall them correctly.  
• Check is there is no foreign material or papers inside the printer. If there is any, remove them.  
3. Turn the printer power on.  
4. If the fatal error appears again, refer to 3.2.1 Fatal Error (p33) and examine/replace the parts. |
### 3.2.1 Fatal Error

As the most recent fatal error (fatal error code) is stored in the EEPROM (Address: 0AH), it is possible to check the error by using the adjustment program.

Check the parts according to the contents of the fatal error, and replace the parts as necessary.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Item</th>
<th>Description</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Error</td>
<td>PID aveTi max Error</td>
<td>Something is wrong with the CR motor.</td>
<td>Check the parts listed below, and replace them as necessary.</td>
</tr>
<tr>
<td></td>
<td>PID Overspeed Error</td>
<td>Carriage movement speed is abnormal.</td>
<td>• CR Motor</td>
</tr>
<tr>
<td></td>
<td>PID Lock Error</td>
<td>Carriage has been locked for a certain period of time due to external factors.</td>
<td>• CR Encoder</td>
</tr>
<tr>
<td></td>
<td>PID Reverse Rotation Detection Error</td>
<td>The number of the carriage reverse rotation has exceeded the predetermined times due to external factors.</td>
<td>• CR Encoder Scale</td>
</tr>
<tr>
<td></td>
<td>Encoder Abnormality Error (CR Driving Time Over Error)</td>
<td>One-pass movement cannot be completed though the CR motor has been driving longer than the specified time.</td>
<td>• Timing Belt</td>
</tr>
<tr>
<td>Load Positioning Overspeed Error</td>
<td>Abnormal carriage movement speed is detected during load positioning control.</td>
<td></td>
<td>• Main Board</td>
</tr>
<tr>
<td>Load Positioning Lock Error</td>
<td>It is detected that the carriage has been locked for a certain period of time during load positioning control.</td>
<td></td>
<td>• Connectors and harnesses of each motor or encoder</td>
</tr>
<tr>
<td>Load Positioning Cumulative Movement Distance Error</td>
<td>The cumulative movement distance during the load positioning control has exceeded the given level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head Error</td>
<td>Transistor Environment Temperature Abnormality Error</td>
<td>The environment temperature of the transistor that generates head driving waveform on the Main board is abnormal.</td>
<td>Check the parts listed below, and replace them as necessary.</td>
</tr>
<tr>
<td></td>
<td>Pre-printing X-HOT Detection Error</td>
<td>During pre-printing X-Hot detection, the temperature of the head driver IC has exceeded the given level for more than two seconds.</td>
<td>• Printhead</td>
</tr>
<tr>
<td></td>
<td>Post-flushing X-HOT Detection Error</td>
<td>During post-printing X-Hot detection, the temperature of the head driver IC has exceeded the given level for more than two seconds.</td>
<td>• Head FFC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Main Board</td>
</tr>
</tbody>
</table>
### Sequence Error

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| Left Frame Shock Detection Error | Abnormal pressure has been added to the carriage due to external factors. | Make sure that there is no obstruction on the carriage moving path, check the parts listed below, and replace them as necessary.  
  - CR Motor  
  - CR Encoder  
  - CR Encoder Scale  
  - Timing Belt  
  - Main Board |
| Between Left Frame and [TF] Shock Detection Error | | |
| Between [TF] and [HOME] Shock Detection Error | | |
3.3 Troubleshooting for Motors and Sensors

Motor

Table 3-2. Motor Resistance and Check Points

<table>
<thead>
<tr>
<th>Motor name</th>
<th>Type</th>
<th>Location</th>
<th>Check point</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR motor</td>
<td>Motor with DC brush</td>
<td>CN5</td>
<td>Pin 1&amp;3</td>
<td>22.65 Ω ± 10%</td>
</tr>
<tr>
<td>PF motor</td>
<td>4-phase, 200-pole HB stepping</td>
<td>CN6</td>
<td>Pin 1&amp;3 Pin 2&amp;4</td>
<td>3.0 Ω ± 10%</td>
</tr>
</tbody>
</table>

Sensor

Table 3-3. Sensor Check

<table>
<thead>
<tr>
<th>Sensor name</th>
<th>Detecting system</th>
<th>Location</th>
<th>Signal level</th>
<th>Sensor status</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE sensor</td>
<td>Transmission photo interrupter</td>
<td>CN9 pin 1&amp;2</td>
<td>2.4 V or more</td>
<td>Paper loaded</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.4 V or less</td>
<td>No paper</td>
</tr>
<tr>
<td>PW sensor</td>
<td>Reflective photo interrupter</td>
<td>T.B.D</td>
<td>Low</td>
<td>Low: Paper loaded</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>High</td>
<td>High: No paper</td>
</tr>
</tbody>
</table>
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.

4.1.1 Precautions

See the precautions given under the handling “WARNING” and “CAUTION” in the following columns when disassembling or assembling EPSON Stylus C87/C88/D88.

- 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 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.

4.1.2 Tools

Use only specified tools to avoid damaging the printer.

Table 4-1. Tools

<table>
<thead>
<tr>
<th>Name</th>
<th>Supplier</th>
<th>Parts No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(+) Phillips screwdriver #0</td>
<td>EPSON</td>
<td>1080531</td>
</tr>
<tr>
<td>(+) Phillips screwdriver #1</td>
<td>EPSON</td>
<td>1080530</td>
</tr>
<tr>
<td>Flathead screwdriver</td>
<td>EPSON</td>
<td>1080527</td>
</tr>
<tr>
<td>Tweezer</td>
<td>EPSON</td>
<td>1080561</td>
</tr>
<tr>
<td>Longnose pilers</td>
<td>EPSON</td>
<td>1080564</td>
</tr>
<tr>
<td>Hexagonal Box Driver [B741700100]</td>
<td>EPSON</td>
<td>1080584</td>
</tr>
</tbody>
</table>
### 4.1.3 Screws (T.B.D)

Screws used on the Stylus C87/C88/D88 are shown below.

#### Table 4-2. Screws

<table>
<thead>
<tr>
<th>No.</th>
<th>Image</th>
<th>Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image1" alt="Image" /></td>
<td>C.B.S. 3 x 6</td>
<td>C.B.S-TITE SCREW</td>
</tr>
<tr>
<td>2</td>
<td><img src="image2" alt="Image" /></td>
<td>C.B.S. 3 x 10</td>
<td>C.B.S-TITE SCREW</td>
</tr>
<tr>
<td>3</td>
<td><img src="image3" alt="Image" /></td>
<td>C.B.S. 3 x 14</td>
<td>C.B.S-TITE SCREW</td>
</tr>
<tr>
<td>4</td>
<td><img src="image4" alt="Image" /></td>
<td>C.B.S.(P4) 3 x 6</td>
<td>C.B.S-TITE (P4) SCREW</td>
</tr>
<tr>
<td>5</td>
<td><img src="image5" alt="Image" /></td>
<td>C.B.P. 2.5 x 8</td>
<td>C.B.P-TITE SCREW</td>
</tr>
<tr>
<td>6</td>
<td><img src="image6" alt="Image" /></td>
<td>C.B.P. 3 x 8</td>
<td>C.B.P-TITE SCREW</td>
</tr>
<tr>
<td>7</td>
<td><img src="image7" alt="Image" /></td>
<td>C.B.P. (P2) 3 x 8</td>
<td>C.B.P-TITE (P2) SCREW</td>
</tr>
<tr>
<td>8</td>
<td><img src="image8" alt="Image" /></td>
<td>C.P. 3 x 4</td>
<td>C.P. SCREW</td>
</tr>
<tr>
<td>9</td>
<td><img src="image9" alt="Image" /></td>
<td>C.P.B. (P1) 1.7 x 5</td>
<td>T.B.D</td>
</tr>
<tr>
<td>10</td>
<td><img src="image10" alt="Image" /></td>
<td>Hexagon nut, normal, M3</td>
<td>T.B.D</td>
</tr>
</tbody>
</table>
4.1.4 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.

**Table 4-3. Work Completion Check**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Item</th>
<th>Check Point</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Unit</td>
<td>Self-test</td>
<td>Is the operation normal?</td>
<td>Checked</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not necessary</td>
</tr>
<tr>
<td></td>
<td>ON-line Test</td>
<td>Is the printing successful</td>
<td>Checked</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not necessary</td>
</tr>
<tr>
<td></td>
<td>Printhead</td>
<td>Is ink discharged normally from all the nozzles?</td>
<td>Checked</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not necessary</td>
</tr>
<tr>
<td></td>
<td>Carriage Mechanism</td>
<td>Does it move smoothly?</td>
<td>Checked</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not necessary</td>
</tr>
<tr>
<td></td>
<td>Is there any abnormal noise</td>
<td></td>
<td>Checked</td>
</tr>
<tr>
<td></td>
<td>during its operation?</td>
<td></td>
<td>Not necessary</td>
</tr>
<tr>
<td></td>
<td>Is there any dirt or foreign</td>
<td></td>
<td>Checked</td>
</tr>
<tr>
<td></td>
<td>objects on the CR Guide</td>
<td></td>
<td>Not necessary</td>
</tr>
<tr>
<td></td>
<td>Shaft?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is the CR Motor at the</td>
<td></td>
<td>Checked</td>
</tr>
<tr>
<td></td>
<td>correct temperature?</td>
<td></td>
<td>Not necessary</td>
</tr>
<tr>
<td></td>
<td>(Not too hot to touch?)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paper Feeding Mechanism</td>
<td>Is paper advanced smoothly?</td>
<td>Checked</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No paper jamming?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No paper skew?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No multiple feeding?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No abnormal noise?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is the PF Motor at correct</td>
<td></td>
<td>Checked</td>
</tr>
<tr>
<td></td>
<td>temperature?</td>
<td></td>
<td>Not necessary</td>
</tr>
<tr>
<td></td>
<td>Is the paper path free of</td>
<td></td>
<td>Checked</td>
</tr>
<tr>
<td></td>
<td>any obstructions?</td>
<td></td>
<td>Not necessary</td>
</tr>
<tr>
<td>Adjustment</td>
<td>Specified Adjustment</td>
<td>Are all the adjustment done correctly?</td>
<td>Checked</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not necessary</td>
</tr>
<tr>
<td>Lubrication</td>
<td>Specified Lubrication</td>
<td>Are all the lubrication made at the specified points?</td>
<td>Checked</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Is the amount of lubrication correct?</td>
<td>Checked</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not necessary</td>
</tr>
</tbody>
</table>
4.2 Caution regarding Assembling/Disassembling of the Printer Mechanism, and How to Ensure of Quality on Re-assembled Product

On current low end models, we’ve basically forbidden to remove Housing, Lower from Printer mechanism in your repair. This is because there is a possibility of main frame deformation when a part (such as Ink system) is removed from Printer mechanism without Housing, Lower. For this reason, if you want to replace Ink system/PF motor, we recommend to replace with new Printer mechanism with Housing, Lower. On these models, you have to remove Housing, Lower from printer mechanism when replacing Waste Ink Pad with a new one. Therefore, we clarify caution regarding assembling/disassembling of the printer mechanism without Housing, Lower, and how to ensure of quality on repaired products in this section.

[Caution regarding assembling/disassembling of the printer mechanism]

1) Main frame

(a) Control of assembled standard position.

[Reason]
The assembled accuracy of each part composed of Printer mechanism is based on Housing, Lower.

[Service treatment]
Confirm that there is no gap between main frame and Housing, Lower.

[Reference]
To ensure the assembled accuracy, you have to control the assembled standard position of main frame against X/Y/Z-axis direction.

[X-axis direction]
- Make sure that main frame is correctly placed on the groove of Housing, Lower.
- Make sure that there is no gap between main frame and Housing, Lower.

[Y-axis direction]
Make sure that cut-out portion of main frame is correctly placed on the square protrusion of Housing, Lower.

[Z-axis direction]
- Make sure that there is no gap between main frame and Housing, Lower.
- Make sure that the left side of Printer mechanism is correctly fixed by two tabs.

(b) Control of vertical level of guide rail (Guide rail means the portion latched by hooks of IC holder & Print head assy.)

[Reason]
There is a possibility that printing failure/operation failure occurs by guide rail deformation.

[Service treatment]
- Do not remove [Mounting Plate, M/B] from Printer mechanism.
- Hold up the specified position of main frame to avoid the deformation.

(c) How to assemble of ASF unit/Circuit board/Paper guide upper

[Reason]
There is a possibility that main frame deformation is caused extra force in assembling. As the result, printing failure/operation failure occurs.

[Service treatment]
Hold the opposite side with hand while you are installing the above parts.
2) Front frame
   (a) Control of vertical level
      [Reason]
      There is a possibility that printing failure occurs by front frame deformation.
      [Service treatment]
      Handle Front frame in assembling/disassembling carefully.

3) IC holder
   (a) Handling of IC holder
      [Reason]
      If IC holder is damaged in assembling/disassembling of your repair, there is a possibility that vital problem occurs in user’s further operation.
      [Service treatment]
      Released two hooks of IC holder from the inside of IC holder by the tweezer.
      [How to ensure of quality on re-assembled product]
      We judge that the quality of re-assembled product is ensured if there is no problem about the print result by adjustment program.
4.3 Dissassembly Procedures

This section explains the procedures for disassembling the product. Unless otherwise stated, reassembly should be carried out in the reverse order of the disassembly procedure. For detailed engagement relations among main components, refer to the exploded diagrams in the Appendix. When disassembling each unit, refer to the pages described in the chart below.

Figure 4-1. Disassembling Flowchart (1)
Figure 4-2. Disassembling Procedure (2)

* Procedure in the broken-line is NOT the shortest removing procedure, but the passing point for the next removing procedure.
4.3.1 Removing Housings

**CAUTION**

- Do not damage the tabs in removing the Housings.
- Do not tilt the printer too much when removing the Housings because ink may flow if the Carriage unit is not at the home position.

4.3.1.1 Housing, Left

1) Insert a ruler or a similar tool to the notch on the bottom of the main unit to release the tab of the I/F cover, and remove the I/F cover.

2) Insert a flathead driver or a similar tool to the notch on the backside of the main unit, and release the tab.

Figure 4-3. Removing Housing, Left (1)

Figure 4-4. Removing Housing, Left (2)
3) Release the tab on the bottom of the main unit from the stopper.
4) Open the cover of the Housing, Upper Assy, release the two tabs, and remove the Housing, Left.

4.3.1.2 Housing, Right
1) Insert a flathead screwdriver or a similar tool to the notch on the backside of the main unit, and release the tab.

2) Release the two tabs on the bottom of the main unit from the stopper.

3) Open the cover of the Housing, Upper Assy.
4) Press the CR lock lever to the rear of the main unit to release the lock, and move the CR unit to the center of the printer.

```
   CR Lock Lever
   CR Unit
```

**Figure 4-8. Releasing CR Lock Lever**

5) Release the two tabs and remove the Housing, Right.

```
   Cover
   Opening
   Housing, Right
   Tabs
```

**Figure 4-9. Removing Housing, Right (3)**
4.3.1.3 Stacker Assy.
1) Remove the Housing, Left. (p44)
2) Open the Stacker Assy.
3) Push the shaft located on the left side of the Stacker Assy, with a flathead screwdriver or a similar tool, release the shaft from the slot of the Housing, Lower, and remove the Stacker Assy.

![Figure 4-10. Removing Stacker Assy.](image)

4.3.1.4 Housing, Upper Assy
1) Remove the Housing, Right. (p45)
2) Remove the Stacker Assy. (p47)
3) Release the two tabs on the front side of the main unit.
4) Insert a flathead screwdriver or a similar tool to the notch on the backside of the main unit, release the three tabs, and remove the Housing, Upper Assy.

![Figure 4-11. Removing Housing, Upper Assy. (1) and (2)](image)
4.3.1.5 ASF Unit

1) Remove the Housing, Upper Assy. (p47)

2) Remove the three screws that secure the ASF Unit to the main unit, and remove the ASF unit.

- C.B.S. 3 x 6: 1
- C.B.S. (P4) 3 x 6: 1
- C.B.P. 3 x 8: 1

When installing the ASF Unit to the main unit, follow the steps described below.

1. Make sure to match the shaft of the ASF Unit with the bearing of the Pump Unit.
2. Make sure to match the guide pin of the ASF Unit with the positioning hole of the main unit.
3. Secure the screws in the order shown in Figure 4-13.
4.3.1.6 Hopper/Retard Roller Unit

- **CAUTION**
  
  Do not touch the cork on the Retard Roller and the Hopper.

1) **Remove the ASF Unit.** (p48)

2) Lift up the Hopper toward the direction of the arrow, release the two tabs, and remove the spring and the hopper from the ASF Frame.

---

When I/C Holder or Printhead Assy. is removed or replaced with a new one, the following adjustment must be performed in the order below.

1) **Top Margin Adjustment**
2) **First Dot Adjustment**
3) **PF Adjustment**

When you replace the ASF unit with a new one, lubricate it as specified. See Chapter 6 “Lubrication” (p.95) for details.
3) Remove Extension Spring 0.585 from both the ASF Frame and the Paper Back Lever.
4) Remove the Paper Back Lever from the bearing of the ASF frame.
5) Remove Compression Spring 1.88 from the ASF Frame, and remove the Retard Roller Unit.

When installing the Retard Roller or the Paper Back Lever, attach the two springs as described below.
- Extension Spring 0.585
  Attach the spring to the tab of the ASF Frame and the one of the Paper Back Lever.
- Compression Spring 1.88
  Attach the spring to the boss of the ASF Frame and the one of the Retard Roller Unit.

When installing the spring between the Hopper and the ASF Frame, match the spring with the positioning hole (circular dent) of the Hopper and the one of the ASF Frame.
4.3.1.7 Housing, Lower Assy.

**CAUTION**
Do not remove the Housing, Lower Assy. more than is necessary.

1) Remove the Paper Guide, Front Assy. (p76)
2) Peel and remove the Right Frame Sheet from the printer mechanism.

3) Remove the two rubber feet on the PF Motor side.

Figure 4-19. Removing Right Frame Sheet

Figure 4-20. Removing Rubber Feet

**CAUTION**
When removing the Waste Ink Tube from the Waste Ink Pad, pay attention not to spill the ink.

4) Remove the Waste Ink tube from both the groove of the Housing, Lower Assy and the Waste Ink Pad.

Figure 4-21. Removing Waste Ink Tube
5) Remove the Cap Unit from the two guide pins of the Housing, Lower Assy.

6) Remove the four screws that secure the Printer Mechanism to the Housing, Lower Assy.
   - C.B.P. 3 x 8: 3
   - C.B.P.(P2) 3 x 8: 1

Figure 4-22. Removing Cap Unit

Figure 4-23. Removing Housing Lower Assy. (1)
7) Release the two tabs on the PF Motor side of the Housing, Lower Assy, and remove the Housing, Lower Assy.

To ensure the assembling accuracy, you have to control the assembled standard position of the Main Frame against X/Y/Z-axis direction as follows.

[X-axis direction]
- Make sure that main frame is correctly placed on the groove of Housing (Lower).
- Make sure that there is no gap between main frame and Housing (Lower).

[Y-axis direction]
- Make sure that cut-out portion of main frame is correctly placed on the square protrusion of Housing, Lower.
**[Z-axis direction]**

- Make sure that there is no gap between main frame and Housing, Lower.
- Make sure that the left side of Printer Mechanism is correctly fixed with two tabs.

---

**When installing the Cap Unit, pay attention to the following instructions:**

- Route the Ink Tube so that the tube is fixed with the tabs of the Housing, Lower Assy.
- Make sure that the two bosses of the Cap Unit are located under the Main Unit Frame.
4.3.1.8 Waste Ink Pad

1) Remove the Housing, Lower Assy.. (p51)

2) Remove the nine Waste Ink Pad and the protective sheet from the Housing, Lower Assy.

When installing the Pump Unit, route the Waste Ink Tube as shown below, and place it under the protective sheet.

When installing the Main Frame, match the two guide pins with the two positioning holes, and secure them with screws in the order shown in Figure 4-23.

Attach the Right Frame Sheet with double-sided tape as shown in Figure 4-19.
Attach the Waste Ink Pads in the order shown in Figure 4-31, Figure 4-32, and Figure 4-33. Waste Ink Pads ② and the Protective Sheet should be secured with double-sided tape as shown in Figure 4-32 and Figure 4-33.
4.3.2 Removing Boards

4.3.2.1 Main Board

1) Remove the ASF Unit. (p48)

2) Remove the Clump Core from the Main Unit.

3) Disconnect all the connectors from the Main Board.
   - CN2: Power Supply Cable
   - CN4: Panel Board Connector
   - CN5: CR Motor Connector
   - CN6: PF Motor Connector
   - CN7: CR Encoder FFC
   - CN8: Head FFC
   - CN9: PF Sensor Cable
4) Remove the four screws that secure the Main Board Unit to the Main Unit, and remove the Main Board Unit.

- C.B.S. 3 x 14: 2
- C.B.S. 3 x 10: 1
- C.B.S. 3 x 6: 1

![Figure 4-36. Removing Main Board (2)](image)

5) Remove the Main Board Cover from the Main Board Unit.

When installing the Main Board Unit to the Main Unit, secure the screws in the order shown in Figure 4-36.

- The Clump Core should be attached together with the connector cables (CN5, CN7, CN8, and CN9) and the Ferrite Core. When attaching the Clump Core, pay attention not to confuse left and right.

![Figure 4-37. Removing Main Board (3)](image)

When replacing the Main board with new one, perform the following service items.

- If the read-out operation succeeds by adjustment program from defective main board, replace with new board and write the read out data to new one.
  1. Ink consumption counter
  2. Waste ink pad counter
  3. Head ID Input
  4. Bi-D Adjustment
  5. Top Margin Adjustment
  6. First Dot Adjustment
  7. PW Sensor adjustment
8. USB ID Input  
9. Market ID Setting  
10. Head Angular Adjustment  
11. PF Adjustment  
12. Offset input for CR Motor Calorific Limitation

If the read-out operation is not able to succeed by adjustment program from defective main board, perform the following service items after replacing main board with new one.

1. Replace the Waste drain ink pad with a new one.
2. Head ID Input  
3. Bi-D Adjustment  
4. Top Margin Adjustment  
5. First Dot Adjustment  
6. PW Sensor adjustment  
7. USB ID Input  
8. Market ID Setting  
9. Head Angular Adjustment  
10. PF Adjustment  
11. Offset input for CR Motor Calorific Limitation
4.3.2.2 Panel Board

1) Remove the ASF Unit. (p48)
2) Remove the Clump Core from the front the Main Unit (See 4.3.2.1 Removing Main Board Step 2).
3) Disconnect the three connectors from the Main Board (See 4.3.2.1 Removing Main Board Step 3).
   - CN5: CR Motor Connector
   - CN9: PE Sensor Cable
   - CN4: Panel Board Connector
4) Release the Panel Board from the two tabs and the notch of the Holder Shaft Unit.

When installing the Panel Board, make sure to hitch the Panel Board Connector to the tab of the Holder Shaft Unit.

Figure 4-39. Removing Panel Board

Figure 4-40. Routing Panel Board Connector
4.3.2.3 PS Board

1) Remove the Main Board. (p57)

2) Remove the three screws that secure the PS Board Unit to the Main Unit, and remove the PS Board Unit.
   • C.B.P. 3 x 8: 2
   • C.B.S. 3 x 6: 1

3) Release the two tabs on both sides of the PS Board Unit, and remove the PS Board Frame, Upper.

4) Remove the four screws that secure the PS Board to the PS Board Frame, Lower, and remove the PS Board.
   • C.B.S. 3 x 6: 4

---

**Figure 4-41. Removing PS Board**

**Figure 4-42. Removing PS Board Frame, Upper**

---

**Figure 4-43. Removing PS Board**

---

**When installing the PS Board to the PS Board Frame, Lower, secure the screws in the order shown in Figure 4-43.**

**When installing PS Board Unit to the Main Unit, secure the screws in the order shown in Figure 4-41.**

---

**When PS board unit is removed or replaced with new one, the following adjustment must be performed.**

- Offset input for CR Motor Calorific Limitation
4.3.3 Disassembling Printer Mechanism

4.3.3.1 Printer Mechanism

Follow the following steps to bring out the Printer Mechanism.

1) Remove the ASF Unit. (p48)
2) Remove the Main Board. (p57)
3) Remove the Panel Board. (p60)
4) Remove the PS Board. (p61)
5) Remove the Housing, Lower Assy.. (p51)

4.3.3.2 Holder Shaft Unit

1) Remove the Panel Board. (p60)
2) Move the CR Unit to the left side of the printer.

Figure 4-44. Moving CR Unit

3) Disconnect the two connectors from the Main Board. (See 4.3.2.1 Removing Main Board Step 3)
   CN7: CR Encoder FFC
   CN8: Head FFC

4) Release both the CR Encoder FFC and the Head FFC from the tab of the Holder Shaft Unit.

Figure 4-45. Removing Holder Shaft Unit (1)
5) Release the CR Motor Cable from the three tabs of the Holder Shaft Unit.

6) Slide the concave portion of the Pump Unit toward the direction of the arrow, and release the convex portion of the Holder Shaft Unit.

7) Releasing two tabs that secure the Holder Shaft Unit to the Main Unit, Remove the Holder Shaft Unit upward.

When installing the CR Motor Cable to the Holder Shaft Unit, be sure to route the cable as shown in Figure 4-46.

When Holder shaft unit is removed or replaced with a new one, the following adjustment must be performed.
- Top Margin Adjustment
4.3.3.3 Spool Gear 36.8/Extension Spring 0.143/Clutch

- Never touch the LD Roller.
- When removing the LD Roller Shaft Unit, pay attention not to drop the Spool Gear 36.8, Extension Spring, and Clutch.

1) Remove the Holder Shaft Unit. (p62)
2) Remove the LD Roller Shaft Unit from the Holder Shaft Frame.
3) Remove the Spool Gear 36.8 from the LD Roller Shaft Unit.
4) Release the Extension Spring 0.143 that joins the LD Roller Shaft Unit and the Clutch, and remove the Clutch.

Figure 4-49. Removing LD Roller Shaft Unit

The LD Roller Shaft Unit should be reassemble as shown below.

Figure 4-50. Assembling LD Roller Shaft Unit
4.3.3.4 PE Sensor Board/PE Detection Lever/Idle Roller
1) Remove the Spool Gear 36.8/Extension Spring 0.143/Clutch. (p64)
2) Release the PE Sensor Board Cable from the Holder Shaft Frame, and remove the PE Sensor board.
3) Release the shaft of the PE Detection Lever from the bearings of the Holder Shaft Frame, and remove Torsion Spring 0.22 from the PE Detection Lever.
4) Release the Idle Roller from the bearings of the Holder Shaft Frame.

When installing the PE Detection Lever, attach Torsion Spring 0.22 as shown below.

When installing the PE Sensor Cable to the Holder Shaft Frame, route the cable as shown below.

Figure 4-51. Removing PE Sensor Board/PE Detection Lever/Idle Roller

Figure 4-52. Attaching Torsion Spring 0.22

Figure 4-53. Routing PE Sensor Cable
4.3.3.5 CR Timing Belt

1) Remove the Housing, Upper Assy. (p47)

2) Loosen the screw that secures the Drive Pulley Holder Stopper to the Main Unit.
   • C.B.S. (P4) 3 x 6: 1

3) Press the Drive Pulley Holder toward the direction of the arrow, pull the CR Timing Belt toward you, and remove the belt from the Drive Pulley Holder.

4) Remove the CR Timing Belt from the CR Motor.

5) Remove the CR Unit. (p70)

6) Remove the CR Timing Belt from the CR Unit.

When installing the CR Timing Belt to the CR Unit, make sure to attach the belt to the positioning jag as shown below.

When CR motor is removed or replaced with a new one, the following adjustment must be performed.

- CR Timing Belt Tension adjustment
- After the Drive Pulley is replaced or removed, lubricate it as specified. See Chapter 6 “Lubrication” (p.95) for details.
4.3.3.6 CR Motor

1) Remove the CR Timing Belt. (4.3.3.5 Removing CR Timing Belt Step 1 through Step 4)

2) Disconnect the CR Motor Connector (CN5) from the Main Board. (See 4.3.2.1 Removing Main Board Step 3)

3) Remove the CR Motor Cable from the Holder Shaft Unit. (See 4.3.3.2 Removing Holder Shaft Unit Step 5)

4) Remove the two screws that secure the CR Motor to the Main Unit, and remove the CR Motor.
   - C.P. 3 x 4: 2

---

**CAUTION**

Make sure to support the CR Motor with your hands when removing the screws.

---

1. Positioning hole of the CR Motor should be on the downside.
2. Secure the screws in the order shown in Figure 4-57.
3. When installing the CR Motor Cable to the Holder Shaft Unit, route the cable as shown in Figure 4-46.

---

When CR motor is removed or replaced with new one, the following adjustment must be performed.

- Offset input for CR Motor Calorific Limitation
- CR Timing Belt Tension adjustment

---

Figure 4-57. Removing CR Motor

Figure 4-58. Installing CR Motor
4.3.3.7 Front Frame

1) Remove the Housing, Upper Assy. (p47)
2) Move the CR Unit to the center of the printer. (See 4.3.3.2 Removing Holder Shaft Unit Step 2)
3) Remove both the two screws that secure the Front Frame to the Main Unit and the Front Frame Stopper.
   • C.B.S. 3 x 6: 2
4) Lift up the CR Unit, and remove the Front Frame.

Match the positioning hole with the rib as shown in Figure 4-59 when installing the Front Frame.

When Front frame is removed or replaced with new one, the following adjustment must be performed in the order below.
1. First Dot Adjustment
2. Head Angular Adjustment
3. Bi-D Adjustment

When you replace Front frame with new one, lubricate it as specified. See Chapter 6 “Lubrication” (p.95) for details.
4.3.3.8 CR Encoder Scale

1) Remove the Housing, Upper Assy. (p47)

2) Release the slit on the right side of the CR Encoder Scale from the tab of the Main Unit.

3) Disconnect the CR Encoder Scale from the slit of the CR Unit.

4) Release Extension Spring 1.494 on the left side of the CR Encoder Scale from the tab of the Main Unit.

5) Turn the CR Encoder Sensor 90 degrees as shown in the figure, and remove the CR Encoder sensor.

When installing the CR Encoder Scale, place the scale so that the chipped part is facing upper left as shown in the figure below.
4.3.3.9 CR Cable Head Cover
1) Remove the Housing, Upper Assy. (p47)
2) Slide the CR Cable Head Cover downward, and remove the CR Cable head Cover.

![Figure 4-65. Removing CR Cable Head Cover](image)

4.3.3.10 CR Unit
1) Remove the Panel Board. (p60)
2) Remove the Front Frame. (p68)

**CAUTION**
As the Head FFC and the CR Encoder FFC is attached to each other with glue, be careful not to remove them separately.

3) Disconnect the two connectors from the Main Board. (*See 4.3.2.1 Removing Main Board Step 3*)
   - CN7: CR Encoder FFC
   - CN8: Head FFC

4) Disconnect the CR Encoder FFC and the Head FFC from the Holder Shaft Unit. (*See 4.3.3.2 Removing Holder Shaft Unit Step 4*)
5) Remove the CR Timing Belt. (*4.3.3.5 Removing CR Timing Belt Step 1 through Step 4*)
6) Remove the CR Encoder Scale. (p69)
7) Remove the CR Cable Head Cover. (p70)
8) Remove the Shield Plate FFC from the Main Unit Frame.

![Figure 4-66. Removing Shield Plate FFC](image)
9) Use a flathead screwdriver or a similar tool to release the two tabs of the CR Unit.

![Figure 4-67. Removing CR Unit](image)

10) Slide the IC Holder toward you, and remove the CR Unit and the CR Timing Belt from the Main Unit.

11) Remove the Timing Belt from the CR Unit. (See 4.3.3.5 Removing CR Timing Belt Step 6)

- After replacing or removing the CR Timing Belt, make sure to perform the following adjustment.
  - CR Timing Belt Tension adjustment
- After replacing or removing the CR Unit, make sure to perform the following adjustments.
  1. Head ID Input
  2. Top Margin Adjustment
  3. PF Adjustment
  4. Bi-D Adjustment
  5. Head Angular Adjustment
  6. First Dot Adjustment
  7. PW Sensor adjustment
  8. Offset input for CR Motor Calorific Limitation

After replacing or removing the IC Holder/Printhead Assy., lubricate it as specified. See Chapter 6 “Lubrication” (p.95) for details.

- When installing the CR Unit to the Main Unit Frame, engage them as shown in Figure 4-67.
- The Shield Plate FFC should be attached to the location shown in Figure 4-66 with double-sided tape.
4.3.3.11 Printhead Assy.

1) Remove the CR Unit. (p70)

2) Remove the PW Sensor Cover while releasing the tab.

3) Disconnect the two Head FFs from the Printhead Assy.

Before starting the following work, make sure that the two tabs shown in Figure 4-67 are already released.

4) Remove the Printhead Assy from the IC Holder.

When the IC Holder is replaced or removed, make sure to perform the following adjustments.

1. Top Margin Adjustment
2. PF Adjustment
3. Bi-D Adjustment
4. Head Angular Adjustment
5. First Dot Adjustment
6. PW Sensor adjustment

After the IC Holder or the Printhead Assy is replaced or removed, lubricate it as specified. See Chapter 6 “Lubrication” (p.95) for details.
4.3.3.12 PW Sensor Board

1) Remove the CR Unit. (p70)
2) Remove the PW Sensor Cover. (See 4.3.3.11 Removing Printhead Assy. Step 2)
3) Disconnect the PW Sensor FFC, and remove the PW Sensor Board.

![Figure 4-71. Removing PW Sensor Board](image)

When replacing or removing the PW Sensor Board, make sure to perform the following adjustments in the order shown below.

1. Top Margin Adjustment
2. PF Adjustment
3. Bi-D Adjustment
4. Head Angular Adjustment
5. First Dot Adjustment
6. PW Sensor adjustment

4.3.3.13 CR Encoder Sensor Board

1) Remove the CR Unit. (p70)
2) Disconnect the CR Encoder Sensor FFC and the PW Sensor FFC from the CR Encoder Sensor Board.
3) Remove the two screws that secure the CR Encoder Sensor Board to the IC Holder, and remove the CR Encoder Sensor Board.

*C.P.B. (P1) 1.7 x 5:

![Figure 4-72. Removing CR Encoder Sensor Board](image)

When installing the CR Encoder Sensor Board, match the positioning hole with the rib as shown in Figure 4-72.

- The PW Sensor FFC should be attached to the location with double-sided tape as shown in Figure 4-72.

After replacing or removing the CR Encoder Sensor Board, make sure to perform the following adjustments.

1. Top Margin Adjustment
2. PF Adjustment
3. Bi-D Adjustment
4. Head Angular Adjustment
5. First Dot Adjustment
6. PW Sensor adjustment
4.3.3.14 CSIC Board

1) Remove the CR Unit. (p70)

2) Open the IC Holder Cover, remove the two screws that secure the IC Holder Cover to the IC Holder.
   - C.B.P. 2.5 x 8: 2

3) Release the tab and remove the IC Holder Cover.

4) Disconnect the CSIC FFC from the CSIC Board.

5) Insert a flathead screwdriver or a similar tool into the notches located on bottom of the IC Holder, and remove the CSIC Board.
4.3.3.15  Paper Guide, Upper Assy.
1) Remove the Housing, Upper Assy. (p47)
2) Move the CR Unit to the CR Motor Side. (See 4.3.3.2 Removing Holder Shaft Unit Step 2)

4) Repeat the steps above, and remove all the Paper Guide, Upper Assys.

4.3.3.16  Eject Roller
1) Remove the Front Frame. (p68)
2) Remove the PF Timing Belt from the PF Drive Pulley.
3) Remove the spacer, and remove the Eject Drive Pulley.
4) Remove the spacer that secures Bush, 6 on the right side of the printer.
5) Rotate Bush, 6 to the direction of the arrow using a longnose pliers, and remove the Bush, 6 from the Main Unit.

When Paper guide upper is removed or replaced with new one, the following adjustment must be performed in the order below.
1. Top Margin Adjustment
2. PF Adjustment
6) Slide the Eject Roller toward right, lift up the left edge of the Eject Roller, slide the Eject Roller toward left to remove the Eject Roller.

When installing the Eject Roller, make sure to match the notch of the Eject Drive Pulley with the tab of the Eject roller as shown below.

![Figure 4-80. Installing Eject Roller](image)

Be careful not to damage the rubber area when performing the following work.


**CAUTION**

---

When you replace Paper eject roller with new one, lubricate it as specified. See Chapter 6 “Lubrication” (p.95) for details.

- After replacing or removing the PF Timing Belt, make sure to perform the following adjustment.
  - **CR Timing Belt Tension adjustment**

- After replacing or removing the Eject Roller, make sure to perform the following adjustment.
  - **PF Adjustment**

---

![Figure 4-81. Rib on Paper Guide, Front Assy.](image)


---

![Figure 4-82. Paper Guide, Front Absorbent Protections](image)

Be careful not to bent the four Paper Guide, Front Absorbent Protections.

---

**ADJUSTMENT REQUIRED**
1) Remove the Eject Roller. (p75)

2) Remove the screw that secures the Paper Guide, Front Assy. to the Main Unit.
   • C.B.S. 3 x 6: 1

3) Lift up the left side of the Paper Guide, Front Assy., release the three convex portions on the right, and remove the Paper Guide, Front Assy.

After replacing or removing the Paper Guide, Front Assy., make sure to perform the following adjustment.

1. Top Margin Adjustment
2. PF Adjustment
3. Bi-D Adjustment
4. First Dot Adjustment
5. PW Sensor adjustment
4.3.3.18 Pump Unit/Cap Unit

**CAUTION**
When removing the Pump Unit and the Cap Unit, pay attention not to drop the CR Lock Lever and the Gear.

1) Remove the Housing, Lower Assy. (p51)
2) Remove the Holder Shaft Unit. (p62)
3) Release the three tabs that secure the Pump Unit to the Main Unit, and remove both the Pump Unit and the Cap Unit.

4) Remove the Ink Tube that connects the Pump Unit and the Cap Unit.

---

**Figure 4-84. Removing Pump Unit/Cap Unit (1)**

**Figure 4-85. Removing Pump Unit/Cap Unit (2)**

**Figure 4-86. Assembling Pump Unit**

Be sure to assemble the Pump Unit as shown below.

- Compound Gear 27.2, 19.2
- Compound Gear 21, 24
- CR Lock Lever
- Spool Gear 27.2
4.3.3.19 PF Motor

1) Remove the Housing, Lower Assy.. (p51)

2) Remove the PF Timing Belt, Idle Roller Assy, and Compression Spring 1.13 from the Main Unit.

3) Remove the four hexagon nuts that secure the PF Motor to the Main Unit.

4) Remove Compression Spring 1.53, and remove the PF Motor.

When installing the PF Motor, make sure to attach Compression Spring 1.53 to the part shown in Figure 4-89.

When installing the PF Motor, secure the hexagon nuts in the order shown in Figure 4-88.

When PF motor is removed or replaced with new one, the following adjustment must be performed in the order below.
1) Top Margin Adjustment
2) PF Adjustment
5.1 Adjustment Items and Overview

This chapter describes adjustments to be made after the disassembly/reassembly of this product.

In case that any parts are removed and assembled on the repair product while running the Adjustment program, make sure to turn off the printer.

5.1.1 Servicing Adjustment Item List

The adjustment items of this product are as follows. For details of the adjustment items, refer to the detailed procedures and sketches of the adjustment items.

<table>
<thead>
<tr>
<th>Function Item</th>
<th>Purpose</th>
<th>Method Outline</th>
<th>Tool</th>
<th>Used Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market setting</td>
<td>At the time of Main board replacement, this adjustment is made to write the board common information on a destination basis.</td>
<td>Select and execute this function in the exclusive servicing program to save the following data into the EEPROM. Market ID, CSIC printer ID, D4 setting (USB, parallel), First Dot adjustment fixed value.</td>
<td>Exclusive servicing program</td>
<td>Non-target</td>
</tr>
<tr>
<td>Head ID input</td>
<td>At the time of head replacement, this adjustment is made to correct head manufacturing variations and eliminate the individual differences of print quality.</td>
<td>Enter the ID of the head QR code label applied to the Printhead into the exclusive servicing program to save it to the EEPROM on the Main board. (Supplement: Read the QR code label from left to right on the top row and from top to bottom in due order.)</td>
<td>Exclusive servicing program</td>
<td>Non-target</td>
</tr>
<tr>
<td>Offset input for CR motor calorific limitation.</td>
<td>When the Main board, CR motor, PS board or Print head assy is changed individually, this adjustment is made to write the maximum offset to prevent the occurrence of damage to the motor at the time of CR motor heat generation.</td>
<td>Select and execute this function in the exclusive servicing program to save the offset into the EEPROM.</td>
<td>Exclusive servicing program</td>
<td>Non-target</td>
</tr>
<tr>
<td>Head angular adjustment</td>
<td>This adjustment is made to correct the error in the Head mounting position (angle of the Head to the paper surface) to keep the nozzle intervals uniform in the CR main scanning direction.</td>
<td>Select this function in the exclusive servicing program and print the adjustment pattern. Check the displacement amount of the pattern. Print the exclusive pattern again and adjust the displacement amount.</td>
<td>Exclusive servicing program</td>
<td>Photo Quality Ink Jet Paper (A4)</td>
</tr>
<tr>
<td>PF adjustment</td>
<td>This adjustment is made to correct the variations of paper feed accuracy in the band printing mode to improve print quality.</td>
<td>Select this function in the exclusive servicing program and print the adjustment patterns (9 patterns). Select and enter the pattern that has the smallest gap and overlap. The correction value is saved to the specific EEPROM address on the Main Board.</td>
<td>Exclusive servicing program</td>
<td>Photo Quality Ink Jet Paper (A4)</td>
</tr>
</tbody>
</table>
### Main adjustment items

<table>
<thead>
<tr>
<th>Function Item</th>
<th>Purpose</th>
<th>Method Outline</th>
<th>Tool</th>
<th>Used Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>PW sensor adjustment</td>
<td>This adjustment is made to correct the mounting position of the PW Sensor on a software basis to minimize the paper detection error caused by the variations of the mounting position.</td>
<td>Select this function in the exclusive servicing program and print the adjustment pattern. Select the pattern number 5mm away from each edge, and enter that number in the program. The correction value is saved at the specific EEPROM address of the Main Board.</td>
<td>Exclusive servicing program</td>
<td>Photo Paper/ Glossy Photo Paper (A4)</td>
</tr>
<tr>
<td>Bi-D adjustment</td>
<td>This adjustment is made to correct the print timing in the go and return paths in bi-directional printing.</td>
<td>Select this function in the exclusive servicing program and print the adjustment patterns to check the displacement amounts of the patterns. Select/enter the pattern number that has the smallest displacement amount in the program. Print the exclusive patterns again and adjust the displacement amount. The correction value is saved into the EEPROM.</td>
<td>Exclusive servicing program</td>
<td>Plain paper (A4)</td>
</tr>
<tr>
<td>USB ID input</td>
<td>This adjustment is made to allow the PC to recognize the connected printers individually when multiple printers of the same model are connected and used with the PC via a USB hub.</td>
<td>Select this function in the exclusive servicing program and enter the serial numbers of the printers. The correction value is saved to the specific EEPROM address on the Main board.</td>
<td>Exclusive servicing program</td>
<td>Non-target</td>
</tr>
<tr>
<td>First Dot adjustment</td>
<td>This adjustment is made to correct the first dot position in the CR main scanning direction.</td>
<td>Select and execute this function in the exclusive servicing program. Enter the correction value in the program using the rule position of the print pattern as a reference. The correction value is saved to the specific EEPROM address on the Main board.</td>
<td>Exclusive servicing program</td>
<td>Plain paper (A4)</td>
</tr>
<tr>
<td>Top Margin adjustment</td>
<td>This adjustment is made to correct the printout position in the paper feeding direction.</td>
<td>Select and execute this function in the exclusive servicing program. Enter the correction value in the program using the rule position of the print pattern as a reference. The correction value is saved to the specific EEPROM address on the Main board.</td>
<td>Exclusive servicing program</td>
<td>Plain paper (A4)</td>
</tr>
</tbody>
</table>

### Maintenance items

<table>
<thead>
<tr>
<th>Function Item</th>
<th>Purpose</th>
<th>Method Outline</th>
<th>Tool</th>
<th>Used Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Cleaning</td>
<td>This function is used to execute CL efficiently when ink is not delivered from the Head properly, e.g. dot missing or skewed injection. This function is used together with the nozzle check pattern to confirm the CL effects.</td>
<td>Select this function in the exclusive servicing program, and execute CL 3.</td>
<td>Exclusive servicing program</td>
<td>Non-target</td>
</tr>
<tr>
<td>Ink Charge</td>
<td>This function is used to drain the Shipping Liquid in the ASP head flow path and simultaneously fill ink in the head flow path to make all nozzles printable and stabilize the ink in the Head.</td>
<td>Select this function in the exclusive servicing program, and execute the ink sucking operation equivalent to the initial charge.</td>
<td>Exclusive servicing program</td>
<td>Non-target</td>
</tr>
</tbody>
</table>
Table 5-2. Maintenance Functions

<table>
<thead>
<tr>
<th>Function Item</th>
<th>Purpose</th>
<th>Adjustment Outline</th>
<th>Tool</th>
<th>Used Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste ink pad counter</td>
<td>This function is used after repair to read the Waste ink counter, and if the value is close to the predetermined near-end value or end value, to recommend Pad replacement to the user in order to prevent the repaired printer from being returned again for repair in a short time. The reset function is used to reset the Waste ink counter from the exclusive program after Waste ink pad replacement.</td>
<td>Select this function in the exclusive servicing program, read/display the current data from the specific EEPROM address on the Main board, and check whether the current counter value is close to the upper limit or not. For the reset function, select this function in the exclusive servicing program after Waste ink pad replacement, and reset the corresponding data at the specific address in the EEPROM on the Main board.</td>
<td>Exclusive servicing program</td>
<td>Non-target</td>
</tr>
<tr>
<td>EEPROM data copy</td>
<td>This function is used to read the above necessary information from the EEPROM of the faulty Main board using the D4 function to reduce the auxiliary adjustment items at the time of Board replacement.</td>
<td>Select this function in the exclusive servicing program, and read the data from the faulty board. After that, change the Main board and then write the read data to a new board.</td>
<td>Exclusive servicing program</td>
<td>Non-target</td>
</tr>
</tbody>
</table>

Table 5-3. Check Pattern Printing

<table>
<thead>
<tr>
<th>Function Item</th>
<th>Purpose</th>
<th>Adjustment Outline</th>
<th>Tool</th>
<th>Used Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>A4 Photo Quality Ink Jet Paper print</td>
<td>This pattern is used to check whether all adjustment results are normal.</td>
<td>Select this function in the exclusive servicing program, print the print patterns, and check the adjustment result in each pattern.</td>
<td>Exclusive servicing program</td>
<td>Photo Quality Ink Jet Paper (A4)</td>
</tr>
<tr>
<td>A4 Normal Paper print</td>
<td>This pattern is used to check whether all adjustment results are normal.</td>
<td>Select this function in the exclusive servicing program, print the print patterns, and check the adjustment result in each pattern.</td>
<td>Exclusive servicing program</td>
<td>Plain paper (A4)</td>
</tr>
<tr>
<td>Nozzle check pattern print</td>
<td>This pattern is used to check simply whether all nozzles deliver ink or not.</td>
<td>This pattern is used to make a simple print check at the EPSON service company.</td>
<td>Exclusive servicing program</td>
<td>Plain paper (A4)</td>
</tr>
<tr>
<td>Others</td>
<td>This function is used to analyze defective products.</td>
<td>Save the data of all EEPROM addresses.</td>
<td>Exclusive servicing program</td>
<td>Non-target</td>
</tr>
</tbody>
</table>

Table 5-4. Adjustment Other Than Adjustment Program

<table>
<thead>
<tr>
<th>Function Item</th>
<th>Purpose</th>
<th>Adjustment Outline</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR timing belt tension adjustment</td>
<td>This adjusts the belt tension in order to prevent jumpiness between the CR motor pinion and the CR timing belt.</td>
<td>Check the tension of the CR timing belt with a digital tension gauge.</td>
</tr>
</tbody>
</table>
## 5.1.2 Replacement Part-Based Adjustment Priorities

The following table indicates the adjustment items and priorities on a replacement part basis.

<table>
<thead>
<tr>
<th>Performance Priority</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEPROM data copy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market setting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB ID input</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste ink pad counter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ink charge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head ID input</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top margin adjustment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First dot adjustment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PW sensor adjustment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Head angular adjustment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bi-D adjustment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PF adjustment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offset input for CR motor calorific limitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: “applicable” in the table indicates the adjustment items required after removing/replacing the parts.
5.2 Adjustment by Using Adjustment Program

The procedures of the adjustment items will be explained here. The intended item is as follows.

- Market setting
- USB ID input
- Head ID input
- Head angular adjustment
- Bi-d adjustment
- PF adjustment
- PW sensor adjustment
- First dot adjustment
- Top margin adjustment
- Offset input for CR motor calorific limitation
- A4 Normal Paper print
- A4 Photo Quality Inkjet Paper print

5.2.1 Market ID Setting

[Adjustment Procedure]
1. Select the Market ID of the adjustment program.
2. Click the [OK] button to write the specific data into EEPROM.
3. Click the [Check] button to check market and model name.

5.2.2 USB ID Input

[Adjustment Procedure]
1. Select USB ID input in the adjustment program.
2. Enter the 10-digits serial number from the label applied to the bottom side of the Upper housing.

5.2.3 Head ID Input

[Adjustment Procedure]
1. Select the Head ID of the adjustment program.
2. Enter the 16-digits code of the Head ID label applied to the Printhead. Enter the Head ID from left to right on the top row and from top to bottom in due order.
5.2.4 Head Angular Adjustment

[Adjustment Procedure]

1. Select Head Angular adjustment in the adjustment program.
2. Click the [Print] button to print Head Angular adjustment pattern of checked items.
3. Select the pattern value of straight line in the printed lines.
4. Click the [Input] button to write the adjustment value of checked items.
   (Note: The range of the adjustment value is -4 to 4.)

[Treatment procedure for NG product]

Step1) Replace the print head with new one again.
Step2) Print the check pattern, and check the adjustment result.
Step3) If the result is NG level, confirm the installation condition of removed parts during disassembly.
Step4) Perform step2) again.

![Figure 5-1. Head Angular Printing Pattern](image1)

5.2.5 Bi-D Adjustment

[Adjustment Procedure]

1. Select Bi-D adjustment in the adjustment program.
2. Click the [Print] button to print Bi-D adjustment pattern of checked items.
3. Select the pattern that has the smallest displacements in each variable dot, and click the [Go to print page] button in the adjustment program.
4. Click the [Input] button to write the adjustment value of checked items.
5. Click [Go to print page].

[Treatment procedure for NG product]

Step1) Replace the print head with new one again.
Step2) Print the check pattern, and check the adjustment result.
Step3) If the result is NG level, confirm the installation condition of removed parts during disassembly.
Step4) Perform step2) again.

![Figure 5-2. Bi-D Adjustment Pattern](image2)

[Judging Standard]

- No gap/overlap between short block pattern and long one.
[Reference: Standard value in manufacture]
- VSD1: 60\(\mu\)m, VSD2: 60\(\mu\)m, VSD3: 40\(\mu\)m, VSD4: 40\(\mu\)m, ECO: 85\(\mu\)m.

Please perform Bi-d adjustment keeping all “Housing” attached.
5.2.6 PF Adjustment

[Adjustment Procedure]
1. Select PF adjustment in the adjustment program.
2. Click the [Print] button to PF adjustment pattern.
3. Select the pattern that has the smallest displacements in each variable dot,
4. Click the [Input] button to write the adjustment value of checked items.
5. If the smallest displacements is [*] or [**], and click the corresponded button.
6. Check that [*] or [**] is best of the three, input 4 in case of [*] and 
   -4 in case of [**].

[Treatment procedure for NG product]
Step1) Replace the repaired (replaced) part with new one.
Step2) Print the check pattern, and check the adjustment result.
Step3) If the result is NG level, confirm the installation condition of removed parts
   during disassembly.

5.2.7 PW Sensor adjustment

[Adjustment Procedure]
1. Select PW Sensor adjustment in the adjustment program.
2. Click the [Print] button to print PW adjustment pattern.
3. Select the pattern number 5mm away from each edge.
4. Click the [Input] button to write the adjustment value of checked items.

[Treatment procedure for NG product]
Step1) Replace the Detector PH or Encoder with new one again.
Step2) Print the check pattern, and check the adjustment result.
Step3) If the result is NG level, confirm the installation condition of removed parts
   during disassembly.
Step4) Perform step2) again.

[Judging Standard]
- Top / Bottom : 5+0.5/-1.0 mm
- Right / Left : 5+0.3/-1.0 mm

[Reference: Standard value in manufactory]
- Standard : ±35µm

Figure 5-3. PF Adjustment Pattern

Figure 5-4. PW Sensor Pattern
5.2.8 First Dot Adjustment

[Adjustment Procedure]

1. Select First Dot adjustment in the adjustment program.
2. Click the [Print] button to print First Dot adjustment pattern.
3. Determine the adjustment value in the shifting direction for the pattern printed on the left margin. Input can be made in 0.0176mm increments for the adjustment value of 1.
4. Click the [Input] button to write the adjustment value of checked items.

[Treatment procedure for NG product]

Step1) Replace the repaired (replaced) part with new one.
Step2) Print the check pattern, and check the adjustment result.
Step3) If the result is NG level, confirm the installation condition of removed parts during disassembly.

[Judging Standard]
- Standard : 3.6 ± 1.0 mm away from top edge.

Figure 5-5. First Dot Pattern

5.2.9 Top Margin Adjustment

[Adjustment Procedure]

1. Select Top Margin adjustment in the adjustment program.
2. Click the [Print] button to print Top Margin adjustment pattern.
3. Determine the adjustment value in the shifting direction for the pattern printed on the top margin. (Note: [+] input < 2.6mm, 4.6mm < [-] input )
4. Click the [Input] button to write the adjustment value of checked items.

[Treatment procedure for NG product]

Step1) Replace the repaired (replaced) part with new one.
Step2) Print the check pattern, and check the adjustment result.
Step3) If the result is NG level, confirm the installation condition of removed parts during disassembly.

[Judging Standard]
- Standard : 3 ± 1.5 mm away from left edge.

Figure 5-6. Top Margin Pattern
5.2.10 Offset input for CR Motor Calorific Limitation

[Adjustment Procedure]
1. Select Offset input for CR motor calorific limitation in the adjustment program.
2. Click the [Input] button to write the specific data in EEPROM.

5.2.11 A4 Normal Paper print

[Adjustment Procedure]
1. Select A4 Normal Paper print in the adjustment program.
2. Click the [Print] button to print A4 Normal Paper print pattern.

[Judging Standard]
- PW Sensor adjustment
  - Top / Bottom : 5.0±0.5/-1.0mm
  - Right / Left : 5.0±0.3/-1.0mm
- Beta pattern
  - No uneven printing / white line.
- Vertical alignment
  - No thin dot or thick dot / vertical alignment.
- Horizontal alignment
  - No displacement between the vertical rules of each VSD.

Figure 5-7. A4 Normal Paper Print Pattern
5.2.12  A4 Photo Quality Inkjet Paper Print

[Adjustment Procedure]

1. Select A4 Photo Quality Inkjet Paper print in the adjustment program.
2. Click the [Print] button to print A4 Photo Quality Inkjet Paper print pattern.
3. Check the adjustment result in each pattern.

[Judging Standard]
- Bi-D adjustment
  Make sure that “X” is the best pattern of the three.
- Top Margin adjustment
  $3 \pm 1\text{mm}$ from top edge.
  (This standard is different from that of individual Top Margin adjustment. The standard of individual Top Margin adjustment is added about $0.6\text{mm}$ by the circumstance.)
- First Dot adjustment
  $3 \pm 1.5\text{mm}$ from left edge.
- Head Angular adjustment
  Make sure that “X” is the best pattern of the three.
- PF adjustment
  Make sure that “X” is the best pattern of the three.
- Accumulated Pitch Line
  $259.5 \pm 1\text{mm}$ from top line.

Figure 5-8. A4 Photo Quality Inkjet Paper Print Pattern
5.3 Adjustment Except Adjustment Program

Following is adjustment except adjustment program.

5.3.1 CR Timing Belt Tension adjustment

[Purpose]
This adjustment is to optimize the timing belt tension for preventing tooth skip between the pinion of CR motor and the CR timing belt. This adjustment must be made when the CR timing belt is removed.

[Adjustment Procedure]
1. Install the CR timing belt to the printer mechanism.
2. Check the CR timing belt tension by using Digital Tension Gauge.
   [Note] Before this adjustment, the following data should be inputted into Digital Tension Gauge.
   [UNITTA : Setting of Digital Tension Gauge]
   - Weight : Input “0.4”
   - Width : Input “8”
   - Span : Input “377”
3. Return to CR unit to have position.
4. Set the sensor cable to the center of the timing belt vertically.
   (This time, the distance between the surface of the sensor cable on the timing belt is 10 ± 5mm.)
5. Push the upside of the timing belt with the tail plastic of ballpoint pen / plastic tweezers and check the timing belt tension on display of Digital Tension Gauge.
6. Check the result of tension value on the display.

[Treatment for NG product]
Step1) Replace the CR timing belt with new one again.
Step2) Check the adjustment result again.
Step3) If the result is NG level, confirm the installation condition of removed parts during disassembly.
Step4) Perform step2) again.

[Judging Standard]
- CR Timing Belt Tension : 9 ± 1.5N

Figure 5-9. CR Timing Belt Tension adjustment
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.

- 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.
- Do not use cleaning sheet included in the media for normal usage. It may damage the coated surface of the PF roller. If the adhesive surface of the cleaning sheet is set to the LD roller shaft side and used to clean the LD roller surface, it is no problem.
- 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.

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 "Maintenance call error" in the STM3), take the following actions to clear the error.

- Printhead cleaning

  When dot missing or banding phenomenon has occurred, you need to perform the printhead cleaning operation*1 by using the printhead cleaning function. This function can be performed by the control panel operation, the printer driver utility and the Adjustment program.

  In case that the cleaning sequence is performed by the control panel operation, confirm that the printer is in stand-by state (the Power LED is lighting), and hold down the Error reset button on the control panel for more than 3 seconds. Then, the printer starts the cleaning sequence (the Power LED blinks during this sequence).

  In case that you select and perform the manual cleaning by the printer driver utility, the most appropriate cleaning mode is selected. The following is the process to perform the printhead cleaning from the printer driver utility. As for the operation of the Adjustment program, refer to Chapter5 “ADJUSTMENT” (p.80).

*1: The Stylus C87/C88/D88 has four 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.

- 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, set the adhesive side up of the cleaning sheet (included in the media) to remove any paper dust. Repeat loading the cleaning sheet several times.
1. Select the “EPSON Status Monitor 3” in the printer driver utility, and make sure
that the printer is in stand-by state by using the Status monitor 3. If the printer is in
stand-by state, the following figure is indicated on the monitor.

![Figure 6-1. Status monitor 3 indication](image1)

2. Select the “Head Cleaning” in the printer driver utility, and perform the printhead
cleaning. After performing the printhead cleaning operation, print a nozzle check
pattern by selecting the “Nozzle Check”. If you repeat the printhead cleaning
operation without selecting the “Nozzle Check”, CL1, the weakest cleaning, will be
repeated.

![Figure 6-2. Head cleaning function in the printer driver utility](image2)

**Maintenance request error (Maintenance call error)**

Ink is used for the printhead cleaning operation as well as the printing operation.
When the ink is used for the printhead cleaning operation, the ink is drained to the
Waste drain ink pad and 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 max
counter has reached the limit of the absorbing capability of the Waste drain ink pad*, the Maintenance call error is indicated on Status monitor 3 as following
figure. But waste ink max counter is changed by usage, therefore waste ink max
counter is not necessarily right.

*) The range of the waste ink counter is

\[16,000 \sim 33,800.\]

(means initial maximum value of mon-used printer.)

![Figure 6-3. Maintenance error indication in STM3](image3)

In this case, replace to new Waste drain ink pad and clear the waste ink counter stored
into the EEPROM. The waste ink counter can be reset only from the Adjustment
program because this printer does not have the waste ink counter reset function by the
control panel SW. As for the procedure, refer to Chapter5“ADJUSTMENT” (p.80).

In your repair activity, check the waste ink counter along with the firmware version,
Main board checker program version and nozzle check pattern on the nozzle check
pattern printing. If the waste ink counter is closed to its limit, recommend that the
Waste drain ink pad will be replaced 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 characteristics of the grease have great affects on the mechanical function and durability, especially does the characteristics about temperature environment. 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 during servicing.

- 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.

G-58/G-26 is already on the printer mechanism for service part in the manufactory.

<table>
<thead>
<tr>
<th>Type</th>
<th>Name</th>
<th>EPSON code</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grease</td>
<td>G-58</td>
<td>1082176</td>
<td>EPSON</td>
</tr>
<tr>
<td>Grease</td>
<td>G-26</td>
<td>1080614</td>
<td>EPSON</td>
</tr>
</tbody>
</table>

- Refer to the following figures for the lubrication points.

![Figure 6-4. Lubrication on Paper Back Lever](image)

- ASF Unit
- Paper Back Lever

<table>
<thead>
<tr>
<th>&lt;Lubrication Point&gt;</th>
<th>Paper Back Lever Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;Lubrication Type&gt;</td>
<td>G-26</td>
</tr>
<tr>
<td>&lt;Lubrication Amount&gt;</td>
<td>φ1 x 1 mm</td>
</tr>
<tr>
<td>&lt;Remarks&gt;</td>
<td>• G-26 must not be adhered to other parts.</td>
</tr>
</tbody>
</table>

![Figure 6-5. Lubrication on Front Frame](image)

- Front Frame

<table>
<thead>
<tr>
<th>&lt;Lubrication Point&gt;</th>
<th>Front Frame Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;Lubrication Type&gt;</td>
<td>G-58</td>
</tr>
<tr>
<td>&lt;Lubrication Amount&gt;</td>
<td>φ1mm x 365mm</td>
</tr>
<tr>
<td>&lt;Remarks&gt;</td>
<td>• G-58 must not be adhered to the printer mechanism and other parts.</td>
</tr>
</tbody>
</table>
Figure 6-6. Lubrication on Main Frame

<Lubrication Point>
Front and rear faces of the Main Frame Carriage Slide

<Lubrication Type>
G-58

<Lubrication Amount>
360 mm x 2 face

Remarks>
• G-58 must not be adhered to other parts.

Figure 6-7. Lubrication on Roller Guide Holder

<Lubrication Point>
Contact point between Roller Guide and Roller Guide Holder

<Lubrication Type>
G-58

<Lubrication Amount>
φ 1 mm x 4 points

Remarks>
Use a injector to apply.
• G-58 must not be adhered to other parts.

Figure 6-8. Lubrication on EJ drive pulley

<Lubrication Point>
EJ drive pulley Shaft Surface

<Lubrication Type>
G-58

<Lubrication Amount>
φ 1 mm x diameter of EJ drive pulley

Remarks>
• G-58 must not be adhered to other parts.

Figure 6-9. Lubrication on Bush 6

<Lubrication Point>
Bush 6 Inside diameter

<Lubrication Type>
G-58

<Lubrication Amount>
φ 1 x 1 circle

Remarks>
• G-58 must not be adhered to other parts.
**Figure 6-10. Lubrication on PF Roller Unit**

- **Lubrication Point**: Contact point between the PF Grounding Spring and the PF Roller Unit
- **Lubrication Type**: G-58
- **Lubrication Point**: φ 1 mm x 0.5 mm
- **Remarks**: Use a brush to apply. 
  - G-58 must not be adhered to other parts.

**Figure 6-11. Lubrication on Idle Roller Assy**

- **Lubrication Point**: U-shaped part for the Idle roller assy
- **Lubrication Point**: G-58
- **Lubrication Amount**: U-shaped part: φ 1 mm x 2 points
- **Remarks**: 
  - G-58 must not be adhered to other parts such as pinion face of the PF Motor or the Timing Belt.
7.1 Exploded Diagram

The exploded diagram of this product are shown on the following pages.
7.2 Parts List

Parts list for EPSON Stylus C87/C88/D88

<table>
<thead>
<tr>
<th>Ref No.</th>
<th>Part Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>HOUSING, RIGHT; ENM3</td>
</tr>
<tr>
<td>101</td>
<td>HOUSING, LEFT; ENM3</td>
</tr>
<tr>
<td>102</td>
<td>HOUSING, FRAME; EDG2</td>
</tr>
<tr>
<td>103</td>
<td>COVER, I/F; ENM3</td>
</tr>
<tr>
<td>104</td>
<td>STACKER, EFS2 ASSY.</td>
</tr>
<tr>
<td>105</td>
<td>COVER, PRINTER, EFS2; C87 ASSY.</td>
</tr>
<tr>
<td>106</td>
<td>BUTTON, SW; B ASSY.</td>
</tr>
<tr>
<td>107</td>
<td>PAPER SUPPORT ASSY.; EFS3</td>
</tr>
<tr>
<td>108</td>
<td>COVER HOUSING, RIGHT, NO TEXTURE; ENM3-P</td>
</tr>
<tr>
<td>109</td>
<td>COVER HOUSING, LEFT, NO TEXTURE; ENM3-P</td>
</tr>
<tr>
<td>200</td>
<td>BOARD ASSY., MAIN</td>
</tr>
<tr>
<td>300</td>
<td>POWER SUPPLY ASSY.; B</td>
</tr>
<tr>
<td>400</td>
<td>POWER CABLE</td>
</tr>
<tr>
<td>500</td>
<td>PRINTER MECHANISM(ASP)MAE12-103</td>
</tr>
<tr>
<td>501</td>
<td>FOOT</td>
</tr>
<tr>
<td>504</td>
<td>POROUS PAD, INK EJECT, FB</td>
</tr>
<tr>
<td>505</td>
<td>INSULATOR, FRAME, MAIN</td>
</tr>
<tr>
<td>508</td>
<td>INKSYSTEM ASSY.</td>
</tr>
<tr>
<td>509</td>
<td>PAPER GUIDE, FRONT ASSY.; B</td>
</tr>
<tr>
<td>511</td>
<td>POROUS PAD, CAP, LOWER, SMALL</td>
</tr>
<tr>
<td>512</td>
<td>POROUS PAD, TUBE, FASTEN</td>
</tr>
<tr>
<td>513</td>
<td>HOLDER, SHAFT ASSY.; B</td>
</tr>
<tr>
<td>514</td>
<td>FRAME, FRONT ASSY.</td>
</tr>
<tr>
<td>522</td>
<td>POROUS PAD, INK EJECT, UPPER</td>
</tr>
<tr>
<td>523</td>
<td>POROUS PAD, INK EJECT, LOWER; E</td>
</tr>
<tr>
<td>524</td>
<td>POROUS PAD, INKEJECT, UPPER, SMALL</td>
</tr>
<tr>
<td>525</td>
<td>POROUS PAD, INKEJECT, LOWER, SMALL</td>
</tr>
<tr>
<td>541</td>
<td>SHEET, POROUS PAD, COVER</td>
</tr>
<tr>
<td>542</td>
<td>DIFFUSION SHEET, INK EJECT, LOWER, ASP</td>
</tr>
<tr>
<td>700</td>
<td>PRINT HEAD ASSY.</td>
</tr>
<tr>
<td>701</td>
<td>SCALE, CR</td>
</tr>
<tr>
<td>702</td>
<td>ASF UNIT</td>
</tr>
<tr>
<td>703</td>
<td>GROUNDING PLATE, HEAD</td>
</tr>
<tr>
<td>704</td>
<td>TORSION SPRING, LEVER, CARTRIDGE</td>
</tr>
<tr>
<td>706</td>
<td>Shield Plate, Cable Head Assy.</td>
</tr>
<tr>
<td>707</td>
<td>BOARD ASSY., ENCODER</td>
</tr>
<tr>
<td>708</td>
<td>BOARD ASSY., PNL</td>
</tr>
<tr>
<td>709</td>
<td>LABEL, POSITION, CARTRIDGE</td>
</tr>
<tr>
<td>710</td>
<td>LEVER, CARTRIDGE</td>
</tr>
<tr>
<td>711</td>
<td>HOLDER, I/C ASSY.</td>
</tr>
<tr>
<td>712</td>
<td>BOARD ASSY., DETECTOR, PW</td>
</tr>
<tr>
<td>713</td>
<td>HARNESS, PW</td>
</tr>
<tr>
<td>714</td>
<td>CAP, DETECTOR, PW</td>
</tr>
<tr>
<td>716</td>
<td>TIMING BELT; E</td>
</tr>
<tr>
<td>NON FIG</td>
<td>INK CART.UNBOXED, BK-SS, PIGT; G38K, A/A, AS</td>
</tr>
<tr>
<td>NON FIG</td>
<td>INK CART.UNBOXED, C-SS, PIGT; G38K, A/A, AS</td>
</tr>
<tr>
<td>NON FIG</td>
<td>INK CART.UNBOXED, M-SS, PIGT; G38K, A/A, AS</td>
</tr>
<tr>
<td>NON FIG</td>
<td>INK CART.UNBOXED, Y-SS, PIGT; G38K, A/A, AS</td>
</tr>
<tr>
<td>NON FIG</td>
<td>SOFTWARE CD, EAI-LATIN</td>
</tr>
<tr>
<td>NON FIG</td>
<td>SETTING UP MANUAL</td>
</tr>
<tr>
<td>NON FIG</td>
<td>USERS GUIDE</td>
</tr>
<tr>
<td>NON FIG</td>
<td>SETTING UP MANUAL</td>
</tr>
<tr>
<td>NON FIG</td>
<td>USERS GUIDE</td>
</tr>
</tbody>
</table>
7.3 Circuit Diagram

The control electrical circuit diagrams of this product are shown on the following pages.

- Main Board: C528 Main Board
- Power Supply Board: C528 PSH Board
- Panel Board: C528 PNL Board