DIGITAL Laser Printer LN15

SERVICE MANUAL

&

PARTS CATALOG

EK-LN15X-SV.A01

CONTENTS

ILLUSTRATIONS AND TABLES

PREFACE

This manual is for maintenance engineers and discusses the operation, installation, and maintenance of the DIGITAL Laser Printer LN15. The topics covered are:

Chapter 1: Printer specifications, performance, and configuration

Chapter 2: Installation precautions and unpacking

Chapter 3: Diagnosing mechanical and electronic problems

Chapter 4: Maintenance procedures (cleaning, lubrication, inspection, adjustment), procedures for replacing parts, and list of tools

Chapter 5: Principles of operation (mechanical and electrical operations)

Chapter 6: Replacement parts

CHAPTER 1   GENERAL DESCRIPTION

1.1 INTRODUCTION

This manual is for maintenance service engineers. The DIGITAL Laser printer LN15 is based on the QMS Desklaser 1400P printer that is manufactured by Fujitsu using the PrintPartner 14ADV printer engine. This manual is customized for the DIGITAL Laser Printer LN15 from the PrintPartner 14ADV Service Manual & Part Catalog. It covers maintenance and detailed information such as trouble-shooting and component replacement. Information unique to the DIGITAL Laser printer LN15 are documented.

DIGITAL Laser Printer LN15 Service Manual and Parts Catalog (EK-LN15X-SV)

There are two companion manuals for PrintPartner 14ADV maintenance service engineers:

PrintPartner 14ADV Page Printer Parts Catalogue (Order No. C145-G019)
PrintPartner 14ADV Page Printer Schematic Diagrams (Order No. C145-F038)

For the optional duplex unit, the following manual is available.

Duplex Unit Parts Catalogue (Order No. C145-G020)

Most information is covered in this manual. The other two manuals are mostly for reference. These three manuals contain all the information necessary for LN15 laser printer maintenance.

The LN15 laser printer is a reliable machine with a simple mechanism that requires little maintenance.

1.2 EQUIPMENT CONSTRUCTION

1.2.1 General

This section outlines the construction and features of the LN15 laser printer .

1.2.2   Model Configuration

Model and input voltage

Printer ——————————— LN15P-AC : 220–240 VAC (for Europe), 11MB, No Network card +
central Europe power cord
LN15N-AC : 220–240 VAC (for Europe), 19MB, Ethernet Card
10-BASE-2 (BNC) + Central Europe power cord
LN15N-AB : 220–240 VAC (for Europe), 19MB, Ethernet Card
10-BASE-T (Twisted pair) + Central Europe power cord

Options ———————— LN15X-TA Paper trays (tray 1; 550 sheets): A4, Letter, and Legal sizes
LN15X-TB Paper trays (tray 2; 500 sheets): A4, A5, Letter, Legal, and
Executive sizes
LN15X-TC Paper feeder (feeder unit + paper tray 2): A4 or Letter size
LN15X-DA Duplex unit (two-sided printing mechanism)
LN15X-SI Serial interface board RS-232C/422A (For LN15P)
LN15X-AT LocalTalk board: AppleTalk compatible (For LN15P)
LN15X-NA Ethernet board 10-BASE-2 (for LN15P)
LN15X-NB Ethernet board 10-BASE-T (for LN15P)
LNXXM-AE 8MB Memory expansion
LNXXM-AF 16MB Memory expansion
LNXXM-AG 32MB Memory expansion
LN15X-MF Multifunction Feeder paper tray

The entry model LN15P printer has 11 MegaBytes of RAM, HP LaserJet 4 (PCL5e) and PostScript level 2
emulations, and a Centronics parallel interface (bi-directional). Its paper tray size is A4 for Europe, Asia, and
Australia. The network printer models LN15N-AC and LN15N-BC have 19 MegaBytes HP LaserJet 4 (PCL5e)
and PostScript level 2 emulations, and a Ethernet card.

Shade cover
(cleaner assembly inside)

Stacker-full sensor

Top cover
(Paper stacker)

Control panel

Upper door

Paper guides
for manual feeding

Multi-function feeder
(MFF)

Slide cover
(Font/emulation card slot
and RAM card slots inside)

Front cover
(opened)

Paper guides
for stack feeding

Multi-function feeder
cable

Paper tray

[Front and right side view]

Interface board
slot cover

Rear stacker

Centronics parallel
interface connector

Power switch

Power cord
connector

[Rear and left side view]

Figure 1-1 LN15 Laser   Page Printer

1.2.3 Structure

The standard printer without options has the following structure.

LN15 Laser printer
- Covers
  - Upper cover assembly
    - Ozone filter
    - Control panel
    - Shade cover
  - Side cover L
  - Side cover R
  - Front frame
    - Toner empty sensor
  - Front cover
  - Back cover
  - Rear stacker
- Laser unit
- Printer mechanism
  - Metal frame
    - Fan 1
  - Process drive mechanism
    - Main motor
    - Gears
  - Paper pick-up mechanism
    - Pick-up motor
    - Base frame
      - Paper sensor
    - Paper feed mechanism
      - Resist motor
      - Resist roller
      - Paper feed roller
      - Pick-up roller
    - Transfer charger unit
  - Paper guide assembly 2
    - Paper eject roller
    - Stack full sensor
  - Print unit guide
    - Cover open switch
  - Volume board
    - Print density dial
  - MFF board
- Print unit
  - OPC drum unit
  - Developing unit
  - Toner bottle
- Cleaner assembly
  - Cleaner
  - Cleaner holder
- Power supply unit
  - Main power supply
    - Power switch
    - AC inlet
  - Fuser unit
    - Cover
    - Paper guide assembly 1
    - Paper eject sensor
    - Paper guide
    - Guide open switch
  - Fan 2
- Shield plate
- Control board
- Sensor board assembly
  - Sensor boards
  - High-voltage power supply board
  - Paper empty sensor
- Paper tray
  - Friction pad holder
- Multi-function feeder (MFF)

1 - 4

Printer + optional duplex unit + optional paper feeder

Figure 1-2 Structure

: Paper path

Print unit
Laser unit
Cleaner assembly
Toner bottle
OPC drum
Heat roller (fuser unit)
Upper cover assembly
Eject roller
Resist roller
Paper feed roller
Multi-Function feeder (Option)
Pick-up roller
Paper tray 1
Duplex unit (option)
Paper feeder (feeder unit + paper tray) (option)
Paper tray 2 (option)
Transfer charger unit
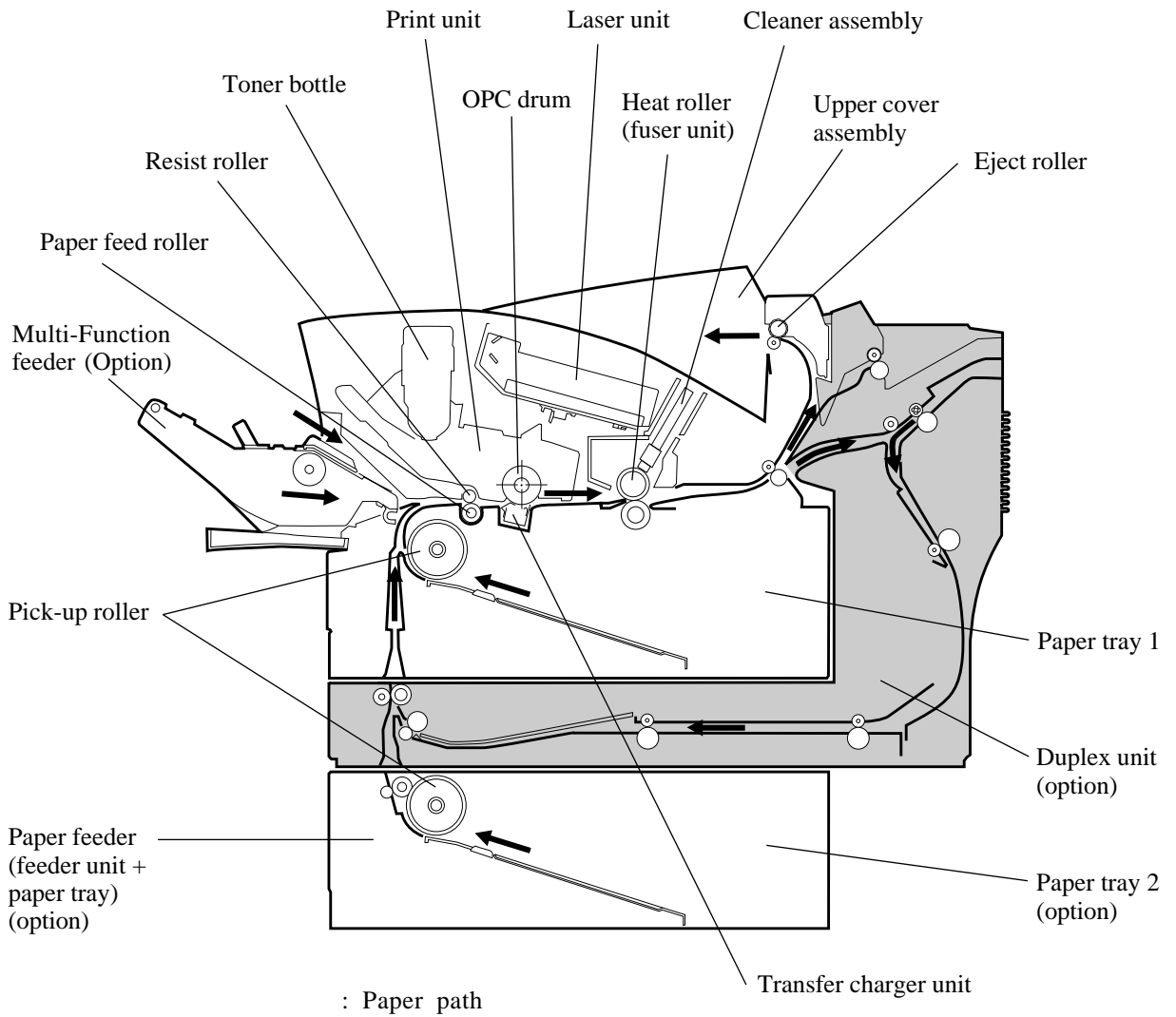
(1) Covers

The covers consist of the following:
- Upper cover assembly
- Side cover L
- Side cover R
- Front frame
- Front cover
- Back cover
- Stacker

a. Upper cover assembly

The upper cover assembly covers the top of the printer mechanism and stacks printed paper.

The upper cover assembly has a hinge to enable the front (upper door) to open. The print unit and toner bottle can be replaced when the upper door is open.

The upper cover has a hinge to enable the shade cover to open. The cleaner can be replaced when the shade cover is open.

The control panel is located at the top right and the ozone filter is inserted at the right rear. It consists of four LED indicators, an LCD, and eight push-button switches, enabling communication between the user and printer.

b. Side cover L

This cover covers the left side of the printer mechanism.

c. Side cover R

This cover covers the right side of the printer mechanism.

This cover is opened to add or replace optional cards (RAM card or emulation card).

d. Front frame

This frame is secured to the front of the printer mechanism.

e. Front cover

This cover is opened when paper is fed manually or the multi-function feeder is used.

f. Back cover

This cover covers the rear of the printer mechanism.

g. Rear stacker

The rear stacker can be opened or closed to select the output destination of printed paper. The rear stacker is usually closed to eject paper to the upper cover side.

When envelopes, labels, or transparencies are used, the rear stacker must be opened to eject paper to the rear and stack it.

Also when a paper jam occurs, the rear stacker is opened to remove the jammed paper.

(2) Laser unit

The laser unit is provided in the upper cover.

Images are written on the photoconductive drum of the print unit by laser beams emitted from the laser unit.
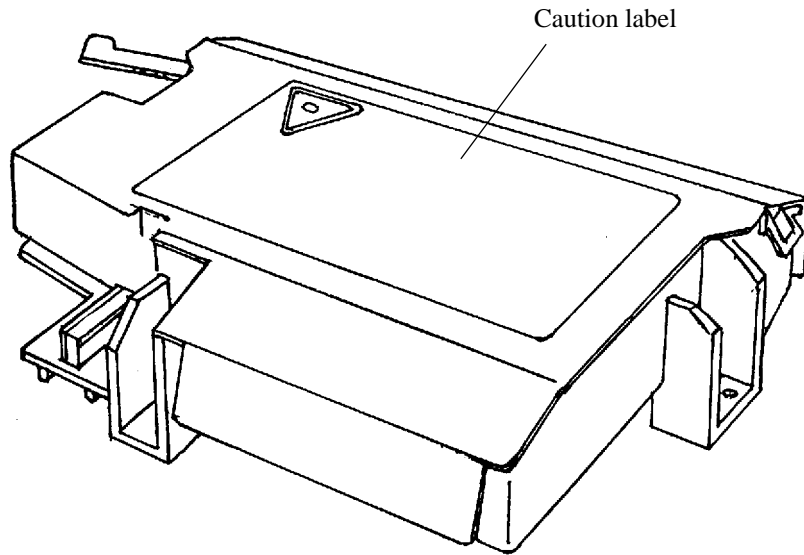
Caution label

Figure 1-3 Laser Unit

⚠**CAUTION** : Do not look at a laser beam directly.

This label is put on the laser unit.
"

(3) Printer mechanism
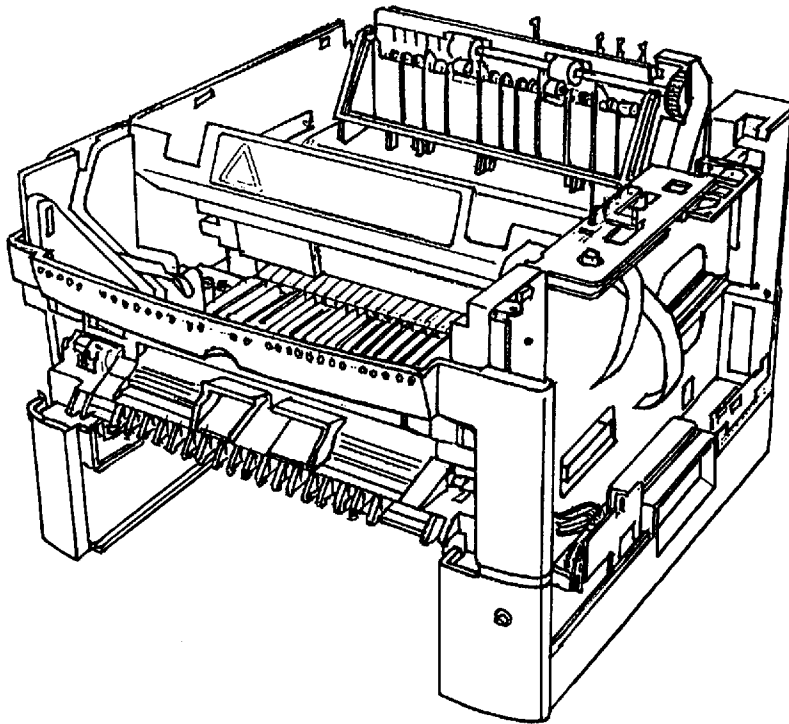
Figure 1-4　Printer Mechanism

a. Metal frame

This frame is the basic frame of the printer mechanism and made of sheet metals.

All parts are tightened with screws or snap-fitted to this frame.

The fan (FAN1) is installed on this frame.

b. Process drive mechanism

This mechanism consists of the mechanism that drives the print unit and fuser unit, a DC motor, and drive system (gears, etc.).

c. Paper pick-up mechanism

This mechanism feeds paper loaded in the paper tray to the base frame of the printer mechanism sheet by sheet.

This mechanism consists of a stepping motor and drive system (gears, etc.).

d. Base frame

This frame is main part of the mechanism that transports paper and transfers toner to the paper.

- Sensor that detects the picked paper
- Transfer charger unit (service technicians replaceable)
- Paper feed mechanism
  (A stepping motor, resist roller, paper feed roller, and pick-up roller are tightened with screws or snap-fitted to this frame.)

e. Paper guide assembly 2

This guide transports printed paper to the output stacker. This guide is snap-fitted to the frame on which the paper eject roller is installed.

The stacker-full sensor is installed on this assembly.

f. Print unit guide

This guide is used to install the print unit in the printer.

The cover open switch that detects opening and closing of the upper door is installed on the left guide.

This guide is snap-fitted to the frame.

g. Volume board

The volume board has a variable resistor to control the print density. The control dial is accessible when the upper door is open.

h. Multi-function feeder board (MFF board)

This board has a connector for the multi-function feeder (MFF).

(4) Print unit (user replaceable)

The print unit consists of a photoconductive (OPC) drum unit and a developing unit. It lasts about 30,000 pages printed at 5% coverage in continuous print mode at 25°C (77°F) and 50% RH.

It can be changed easily by the user.

a. Toner bottle (user replaceable)

The toner bottle contains new toner. It lasts for about 5,000 pages printed at 5% coverage in continuous print mode. However, the toner bottle installed on the new print unit has a shorter life. It can be changed easily by the user.

(5) Cleaner assembly

The cleaner assembly consists of a cleaner and a cleaner holder..

a. Cleaner (user replaceable)

The cleaner wipes the heat roller. It lasts for about 5,000 pages printed at 5% coverage in continuous print mode. It must be replaced by the user when the toner bottle is empty and replaced.

b. Cleaner holder (reusable)

The cleaner holder holds the cleaner. It locks the cleaner by a simple mechanism which can be easily operated by the user.

(6) Power supply unit

This unit consists of the following parts:
- • Main power supply
  - Power switch
  - AC inlet
- • Fuser unit
  - Cover
  - Paper guide assembly 1
  - Paper eject sensor
  - Paper guide
  - Guide open switch
- • Fan (FAN 2)

a. Main power supply

The main power supply supplies +5 VDC and +24 VDC for the logic devices and printer mechanism.

There are two types of power supplies: one for input voltage of 120 VAC (not used on LN15) and the other for 220 to 240 VAC.

The main power supply is equipped with a power switch and an AC inlet.

The main power supply is attached with screws to the cover of the fuser unit.
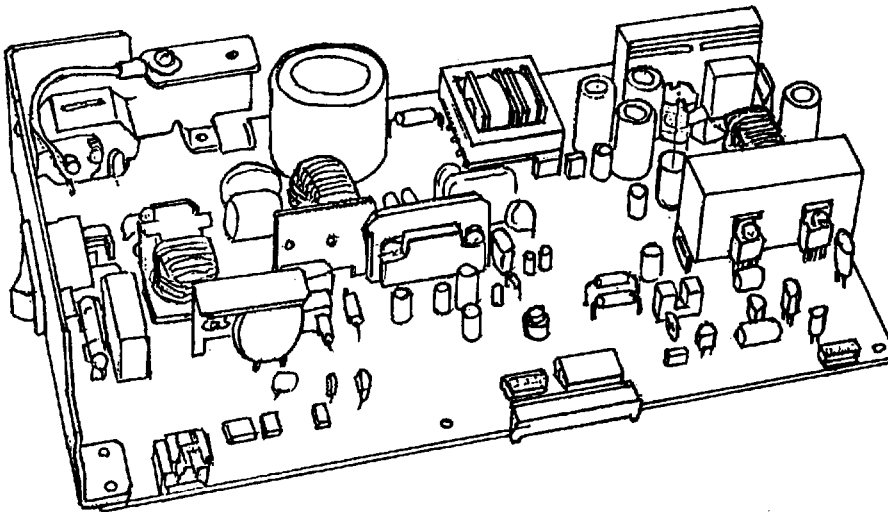
Figure 1-5   Power Supply Unit

b. Fuser unit (service technicians replaceable)

The fuser unit has an aluminium heat roller and a pressure roller. It fixes the image of toner particles on the paper using heat and pressure.

It has a temperature sensor and a thermal fuse for safety.

It lasts about for 100,000 pages printed at 5% coverage on A4 paper in continuous print mode. There are two types: one for input voltage of 120 VAC (Not used on LN15) and the other for 220 to 240 VAC.

c. Cover

This cover, classified as a component belonging under the fuser unit category, covers the main power supply. It is attached on the bottom of the fuser unit and the power supply is installed under (inside) the cover. The paper guide assembly 1 is also installed at the edge of the cover.

d. Paper guide assembly 1

This assembly transports paper from the fuser unit to the eject roller.
When a paper jam occurs, the paper guide assembly can be drawn out to remove the jammed paper.
A guide open switch detects normal installation of the paper guide assembly.

e. Fan (FAN 2)

This fan ventilates the power supply unit.
This fan is tightened with screws to the right side of the power supply unit.

(7) Shield plate

This plate covers the control board.
This plate is tightened with screws to the right side of the printer mechanism frame.

(8) Control board

The control board is the main controller of this printer. It has four ROMs for firmware, mechanism control, and interface control. It has connectors for the Centronics interface cable and an optional interface board, an optional memory expansion cards, and an emulation card of the future. The resident RAM is 3 MBytes. There is 1 x 8 MB SIMMS board on the LN15P and 2 x 8 MB SIMMS board on LN15N as standard configuration.
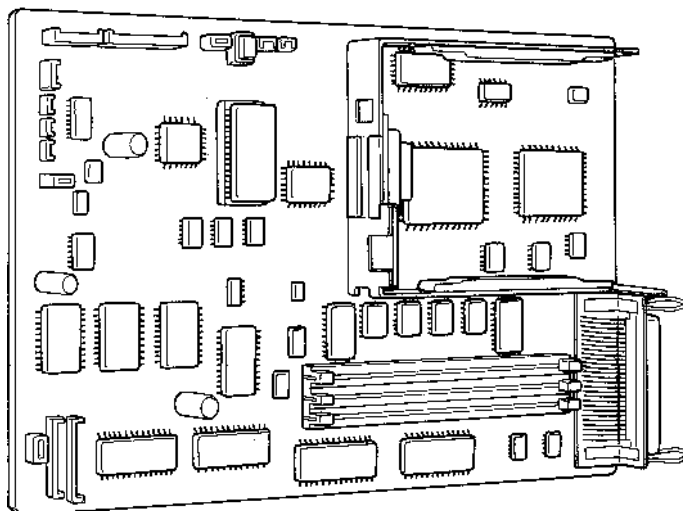
Figure 1-6   Control Board

(9) Sensor board assembly

a. Sensor boards
There are two sensor boards.
They detect the presence of paper, the size of paper, paper empty, and paper ejection.

b. High-voltage power supply board (HV board)
The high-voltage power supply, which supplies high voltage to the pre-charger and the transfer charger unit, is tightened with screws to the left side of the sensor board assembly.

(10) Paper tray

The paper size is universal among A4, Letter, and Legal. The capacity of the paper tray (tray 1) is 550 sheets for 0.09 mm thick paper. An optional 500-sheet paper feeder (tray 2) is provided. Its paper size is universal among A4, A5, Letter, Legal, and Executive.

(11) Multi-function feeder (Optional)

The multi-function feeder feeds envelopes, labels, transparencies, heavy paper, and nonstandard size paper. The capacity is 100 sheets for 0.09 mm thick paper or 30 envelopes.

CHAPTER 2   INSTALLATION

2.1 GENERAL DESCRIPTION

The LN15 laser printer is well-packed for shipping, and can be unpacked easily.

After the printer is unpacked, it should be checked with a test printing prior to final installation. Installation procedures are simple and require a minimum of time.

2.2   INSTALLATION PRECAUTIONS

Observe the following points when installing the printer:

- Install the printer on a level surface that does not have excessive vibration.

- Place the printer in a well-ventilated room, free of excessive dust.

- Do not place the printer in direct sunlight or near a heater.

- Do not expose the printer to high temperatures or high humidity. Temperature range is from 10°C to 35°C or 50°F to 95°F. Humidity range is between 20% (RH) and 80% (RH). The maximum wet-bulb temperature is 29°C or 84°F.

- Do not block the ventilation at the top and left sides of the printer.

- Use only the power cord supplied with the printer. Do not use an extension cord.

- Use a grounded AC power outlet supplying a stable voltage of the rated value marked on the nameplate at the back of the printer (85 to 110 percent for 220 to 240 VAC)

- Avoid sharing power outlets with equipment that emits electrical noise or causes power degradation.

2.3   UNPACKING

If possible, retain the carton and packing materials should the printer be reshipped.

1.   Peel off the top tape to open the four flaps.

2.   Take the toner bottle package, the power cord package, the multi-function feeder (MFF) package, and the package of user's manual, floppy disks, cleaning brush, and paper size labels from the carton. Then, take them from protective bags.

3.   Remove the two upper cushions and housing, then remove the printer out of the carton.

4.   Take the printer from the protective bag.

5.   Set the printer where it is to be installed.
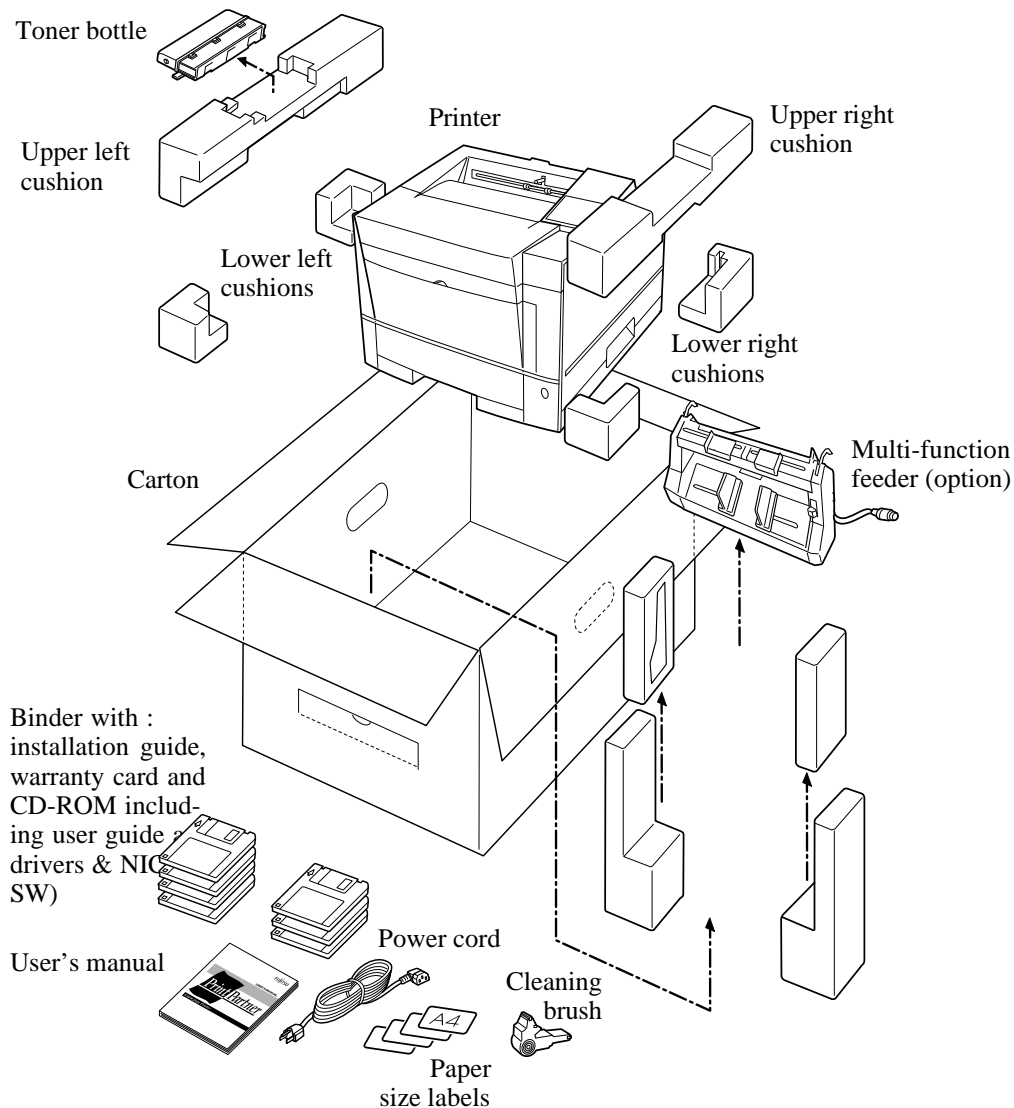
Figure 2-1 Shipping Carton and Printer and its Accessories

2.4   INSPECTION AFTER UNPACKING

2 - 3

Visually check the printer exterior. Then, turn power on and check the print quality and printer performance.
See the user's manual for details of procedures.

1. Peel off adhesive tapes from the printer. Open the upper door and remove the two restraint cardboards..
    Draw out the paper tray and remove the restraint cardboard and tapes securing the rear paper guide.
    Visually check all parts for damage.
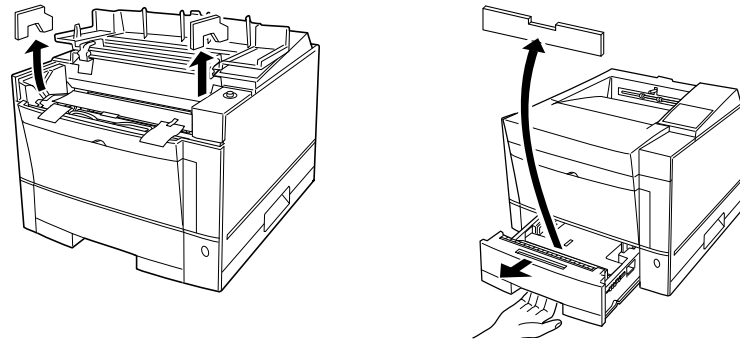
2. Set up the print unit and install the toner bottle.

    a. Remove the protective materials from the print unit.
        Remove the protective sheet q. Gently pull the narrow clear tape w until its blue end is visible and
        remove it.
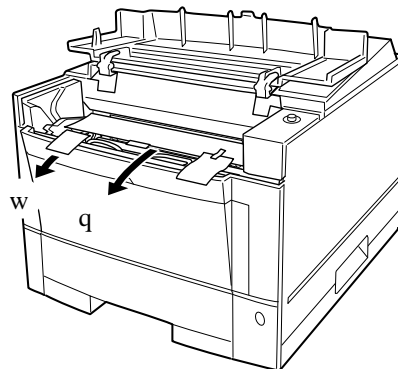
    b. Remove the toner bottle from its envelope.

    c. Fully shake the toner bottle.
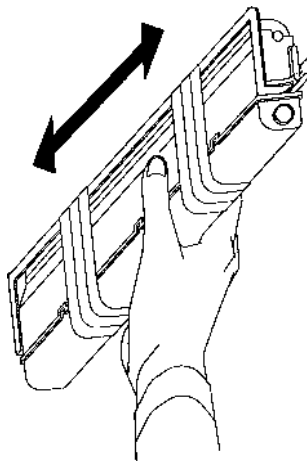
d. Remove the plastic seal from the toner bottle.

Pull off the seal as gently as possible to avoid spilling toner. Be careful not to stain yourself with toner which is stuck to the seal.
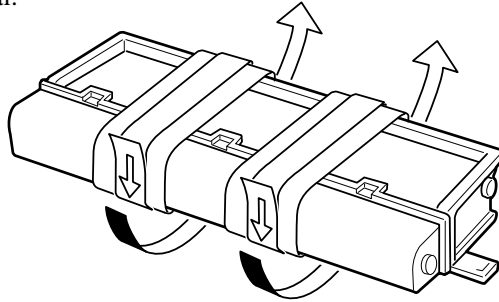
e. Install the toner bottle.

Slide in both projecting guides of the toner bottle along the grooves of the print unit.
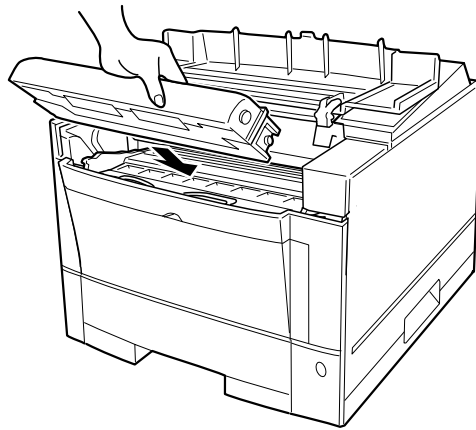
f. Lock the toner bottle.

Press the toner bottle backward until it clicks into place. (The bottle stands nearly upright when installed correctly.) Never rotate the toner bottle from an upright position except when empty or you will cause toner leak and print quality issue could occur.
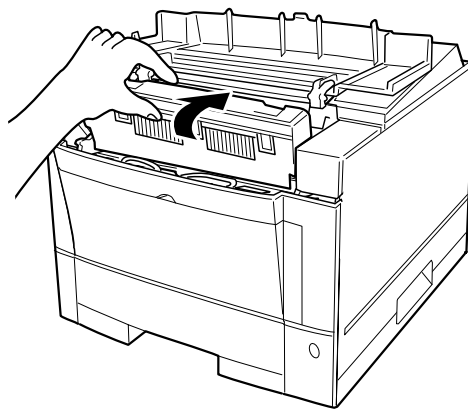
g. Close the printer's upper door.

Press down firmly on the front portion of the upper door and make sure the upper door is locked completely.
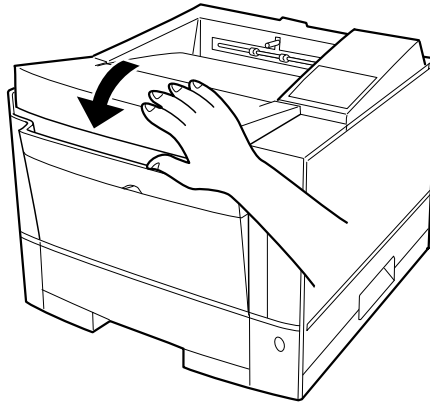
⚠CAUTION | Be sure to hold the toner bottle while removing the seal to avoid spilling toner.

If you have installed the toner bottle, never remove it from the print unit until it has no toner, to avoid spilling toner inside the printer.

3. Load paper in the paper tray.

If the front of the pressure plate is raised, push it down until the plate clicks into place. Fan a paper stack both ways to prevent sheets from sticking together. Place the paper stack on the paper tray while sliding it forwards.

4. Connect the power cord.

Be sure the voltage stated on the manufacturer's plate on the back of the printer is the voltage supplied in your area, then connect the AC power cord between the printer and the AC power outlet.

5. Turn on the power switch.

Make sure the POWER indicator on the control panel lights, printer initialization and warming-up occur, then the message display indicates READY with the ONLINE indicator lit.

6. Print a trial page.

Press the **READY** button to put the printer offline. Then, press the SELF TEST button for more than five seconds to print the status report shown on the next page. The status report is printed for either the PCL emulation or the FPS emulation according to the emulation used for last printing. FPS is selected when the printer is turned on. See the user's manual for details.

7. Check the print quality and printer performance.

Status Report

CA04040 Page Printer

Printing Menu

Copies	= 1
I/O Timeout	= 15
Paper	= a4
Manual Feed	= Off

Configuration Menu

Personality	= Auto
ACK	= Inside
Bidirection Mode	= On
NPAP Mode	= Auto
Autocont	= Off
Default Paper Thickness	= Off

Options Menu

RAM Size	= 11 MB
Smoothing (FEIT)	= On
Resolution	= 600 dpi
Duplex	= Off
Tumble	= Long Edge
Option I/O	= Ethernet

PS Menu

Jam Recovery	= Off
PS Errors	= On
Banding Mode	= Auto (Auto Model)
Printer Name	= DIGITAL Laser Printer LN15
Product Name	= CA04040
PS Code Version	= 2003.002
Firmware Level	= R04L40
Job Timeout	= 0
Manual Feed Timeout	= 60
Wait Timeout	= 300

POWERPAGE

Figure 2-2 Status Report (FPS Emulation)

CHAPTER 3   TROUBLESHOOTING

This chapter helps you determine the causes and remedies of problems that might occur.

Sections 3.1 and 3.2 are troubleshooting diagrams. Follow the flowchart steps to remedy the problem.

Section 3.3 describes the meaning of the various indicator displays on the control panel. The indicators help with troubleshooting.

Section 3.4 describes procedures to reset a counter which is used to estimate the life time of a consumable.

Section 3.5 describes miscellaneous printer operations.

Figure 3.1 shows the printer elements and their connections.
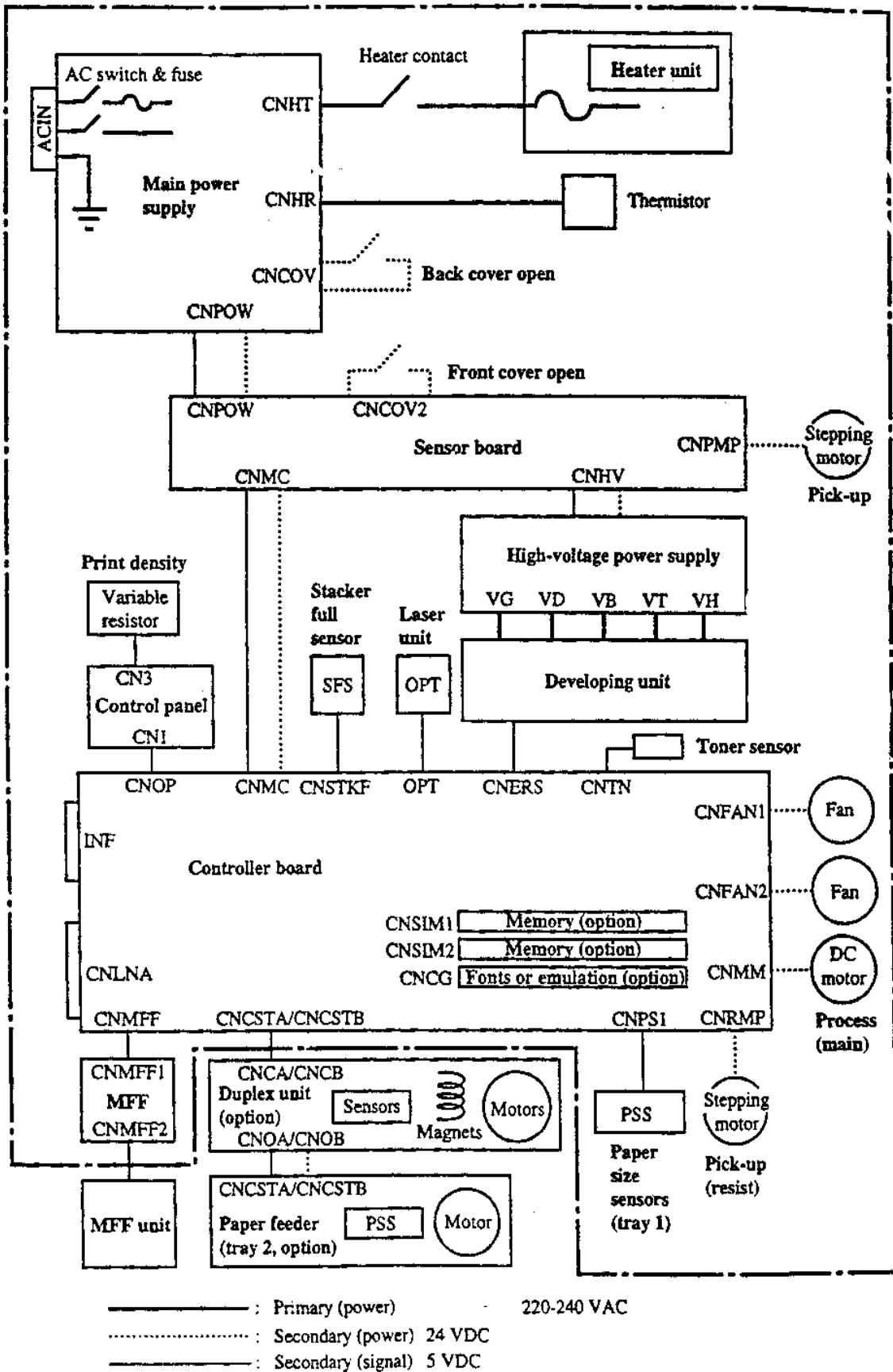
Figure 3-1 Printer Elements and Connections

3.1 WHEN THE POWER INDICATOR DOES NOT LIGHT

```
                        ┌──────────────┐
                        │    Start     │
                        └──────────────┘
                               │
                               ▼
                          ╱────────────╲
                         ╱   Is the     ╲
                        ╱  POWER lamp on  ╲ ──── Yes
                        ╲ for a while after╱
                         ╲   power on?   ╱
                          ╲────────────╱
```

Start

Is the POWER lamp on for a while after power on? — Yes

Connect connector.

No

Is connector disconnected? — Yes

No

Is the condition still the same when the motor connector is disconnected? — Yes

No

Defective power, mechanism, or controller board

See page 4-21 or 24 and other pages of Section 4.9.1.

Is motor activation sound generated? — Yes

No

Defective mechanism or controller board

See page 4-24 and other pages of Section 4.9.1.

See page 4-21, 24, 25, or 15.

Defective power, controller board, sensor board, or control panel

Defective motor or (and) controller board

See page 4-27 or 24.

End

3.2 WHEN PRINTING QUALITY IS ABNORMAL

(1) Faint

T

(2) Deep

(3) Clear or blurred black vertical line
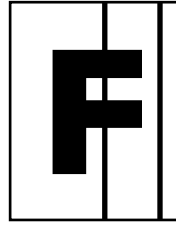
P
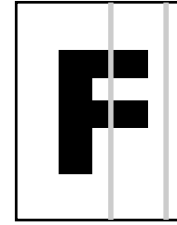
F

(4) White vertical line
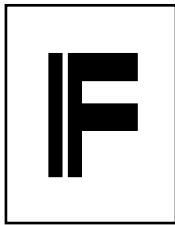
T

(5) Lacking space at the top and bottom

(6) Black point, white point
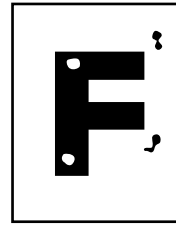
(7) Second printing (Ghost printing)

T

(8) Dirty back/edge

P

(9) Black

(10) White

(11) Blur

P

(12) Smudge

P & T

T: Transfer charger unit faulty

P: Print unit faulty

F: Fuser unit expired

Figure 3-2 Abnormal Print Quality

(1) When faint

```
                    ┌─────────────┐
                    │    Start    │
                    └─────────────┘
                           │
                           ▼
                    ╱───────────╲
                   ╱ Is density  ╲        No      ┌──────────────────────┐
                  ╱   dial        ╲──────────────▶│  Adjust density dial.│
                   ╲  proper?     ╱                └──────────────────────┘
                    ╲───────────╱
                           │                       See page 4-5.
                          Yes
                           │
                           ▼
                    ╱───────────╲
                   ╱   Does       ╲       Yes     ┌──────────────────────┐
                  ╱ LCD display    ╲─────────────▶│ Replace toner bottle.│────▶
                   ╲ TONER EMPTY? ╱                └──────────────────────┘
                    ╲───────────╱
                           │                       See pages 2-3 to 4.
                           No
                           │
                           ▼
                    ╱───────────╲
                   ╱    Is        ╲       Yes     ┌──────────────────────┐
                  ╱ transfer corona╲────────────▶│ Clean transfer corona│────▶
                   ╲ wire dirty?  ╱                │ wire.                │
                    ╲───────────╱                 └──────────────────────┘
                           │                       See page 4-8.
                           No
                           │
                           ▼
                    ╱───────────╲
                   ╱   Does       ╲       Yes     ┌──────────────────────────┐
                  ╱ LCD display    ╲─────────────▶│ Replace print unit.      │────▶
                   ╲ REPLACE       ╱               │ (Unit is at the end of life)│
                    ╲ PARTS?      ╱                └──────────────────────────┘
                    ╲───────────╱                  See pages 2-3 and 3-20 to 21.
                           │
                           No
                           │
           ┌──────────────────────┐
           │ Replace print unit.  │   See pages 2-3
           │ (Unit is defective.) │   and 3-20 to 21.
           └──────────────────────┘
                           │
                           ◀──────────────────────────────────────────────
                           │
                           ▼
                    ┌─────────────┐
                    │    End      │
                    └─────────────┘
```

(2) When deep

```
        ┌─────────────────┐
        │      Start       │
        └─────────────────┘
                 │
                 ▼
          ╱──────────────╲
         ╱  Is density dial ╲         No        ┌──────────────────────┐
         ╲     proper?      ╱ ──────────────────▶│  Adjust density dial. │
          ╲──────────────╱                       └──────────────────────┘
                 │                                  See page 4-5.
               Yes
                 │
                 │
                 ▼
        ┌──────────────────┐   See pages 2-3
        │ Replace print unit.│   and 3-20 to 21.
        └──────────────────┘
                 │
                 ▼
        ┌─────────────────┐
        │       End        │
        └─────────────────┘
```

(3) Black vertical line

```
                    ┌─────────────┐
                    │    Start    │
                    └─────────────┘
                           │
                           ▼
                      ╱─────────╲
                     ╱  Is precharger ╲      Yes        ┌──────────────────────┐
                     ╲  wire dirty?    ╱ ───────────▶   │ Clean precharger wire.│
                      ╲─────────╱                       └──────────────────────┘
                           │ No
                           │                            See page 4-9.
                           ▼
                      ╱─────────╲
                     ╱   Does      ╲
                    ╱  LCD display   ╲     Yes     ┌──────────────────────────────┐
                    ╲  REPLACE       ╱ ────────▶   │ Replace print unit.          │
                     ╲  PARTS?      ╱              │ (Unit is at the end of life)  │
                      ╲─────────╱                  └──────────────────────────────┘
                           │ No
                           │                       See pages 2-3 and 3-20 to 21.
                           ▼
              ┌──────────────────────┐
              │ Replace print unit.  │     See pages 2-3
              │ (Unit is defective.) │     and 3-20 to 21.
              └──────────────────────┘
                           │
                           ▼
                    ┌─────────────┐
                    │     End     │
                    └─────────────┘
```

(4) White vertical line

```
           ┌──────────────────┐
           │      Start        │
           └──────────────────┘
                    │
                    ▼
               ╱ Is ╲
            ╱ window of ╲    Yes    ┌─────────────────────────┐
           ╱ laser unit  ╲─────────▶│ Clean the window glass of│
            ╲   dirty?   ╱          │ laser unit.              │
               ╲      ╱             └─────────────────────────┘
                  │ No
                  │                   See page 4-18.
                  ▼
               ╱ Is ╲
          ╱ transfer corona ╲  Yes   ┌─────────────────────────┐
           ╲  wire dirty?   ╱───────▶│ Clean transfer corona wire.│
               ╲        ╱            └─────────────────────────┘
                  │ No
                  │                   See page 4-8.
                  ▼
               ╱ Does ╲
          ╱ LCD display ╲    Yes     ┌─────────────────────────┐
         ╱   REPLACE     ╲──────────▶│ Replace print unit.      │
          ╲   PARTS?    ╱            │ (Unit is at the end of life)│
               ╲      ╱              └─────────────────────────┘
                  │ No
                  │                   See pages 2-3 and 3-20 to 21.
                  ▼
      ┌─────────────────────┐   See pages 2-3
      │ Replace print unit.  │   and 3-20 to 21.
      │ (Unit is defective.) │
      └─────────────────────┘
                  │
                  ▼
           ┌──────────────────┐
           │       End         │
           └──────────────────┘
```

(5) Lacking space at the top and bottom

```
                    ┌──────────────┐
                    │    Start     │
                    └──────────────┘
                           │
                           ▼
                    ╱───────────╲
                   ╱   Within    ╲        Yes    ┌────────────────────────┐
                  ╱  5 mm from the ╲──────────────│ Move printing to area  │
                  ╲   edge of paper?╱             │ beyond 5 mm.           │
                   ╲               ╱              └────────────────────────┘
                    ╲─────────────╱
                           │ No               See pages 2-3 and 3-20 to 21.
                           ▼
                    ╱───────────╲
                   ╱ Is paper damp╲       Yes    ┌────────────────────────┐
                   ╲  and waved?  ╱──────────────│ Change to new paper.   │
                    ╲───────────╱               └────────────────────────┘
                           │ No               See page 2-5.
                           ▼
                    ╱───────────╲
                   ╱    Does     ╲
                  ╱  LCD display  ╲     Yes      ┌────────────────────────┐
                  ╲   REPLACE     ╱──────────────│ Replace print unit.    │
                   ╲   PARTS?    ╱               │ (Unit is at the end of │
                    ╲───────────╱                │  life)                 │
                           │ No                  └────────────────────────┘
                           ▼                 See pages 2-3 and 3-20 to 21.
         ┌────────────────────────┐
         │ Replace print unit.    │   See pages 2-3
         │ (Unit is defective.)   │   and 3-20 to 21.
         └────────────────────────┘
                           │
                           ▼
                    ┌──────────────┐
                    │     End      │
                    └──────────────┘
```

(6) Black point, white point

```
                         ┌─────────────┐
                         │    Start     │
                         └──────┬──────┘
                                │
                          ╱─────────╲
                         ╱    Is     ╲      Yes    ┌──────────────────────┐
                        ╱  precharger  ╲──────────▶│ Clean precharger wire.│──────────────────┐
                         ╲ wire dirty? ╱            └──────────────────────┘                  │
                          ╲────┬────╱               See page 4-9.                             │
                               │ No                                                           │
                          ╱─────────╲                                                         │
                         ╱    Is     ╲      Yes    ┌───────────────────────────┐              │
                        ╱transfer corona╲─────────▶│ Clean transfer corona wire.│─────────────▶│
                         ╲ wire dirty? ╱            └───────────────────────────┘              │
                          ╲────┬────╱               See page 4-8.                              │
                               │ No                                                           │
                          ╱─────────╲                                                         │
                         ╱ Appeared  ╲      No     ┌──────────────────┐                       │
                        ╱synchronously?╲──────────▶│ Replace print unit.│──────────────────────▶│
                         ╲           ╱             └──────────────────┘                        │
                          ╲────┬────╱               See pages 2-3 and 3-20 to 21.              │
                               │ Yes                                                          │
                          ╱─────────╲                                                         │
                         ╱ Every about╲     Yes    ┌──────────────────┐                       │
                        ╱   94 mm?    ╲──────────▶ │ Replace print unit.│──────────────────────▶│
                         ╲           ╱             └──────────────────┘                        │
                          ╲────┬────╱               See pages 2-3 and 3-20 to 21.              │
                               │ No                                                           │
```

Is precharger wire dirty? — Yes → Clean precharger wire. See page 4-9.
No ↓
Is transfer corona wire dirty? — Yes → Clean transfer corona wire. See page 4-8.
No ↓
Appeared synchronously? — No → Replace print unit. See pages 2-3 and 3-20 to 21.
Yes ↓
Every about 94 mm? — Yes → Replace print unit. See pages 2-3 and 3-20 to 21.
No ↓
Every about 78.5 mm? — Yes → Is cleaner dirty? — Yes → Replace cleaner. See page 4-9.
No ↓ (Every about 78.5 mm)   No ↓ (Is cleaner dirty)
Does LCD display REPLACE PARTS? — Yes → Replace print unit. (Unit is at the end of life.)
No ↓   Improved by cleaning heat roller? — No → Replace heat roller. See page 4-19.
Replace print unit. (Unit is defective.) See pages 2-3 and 3-20 to 21.   Yes ↓
End

(7) Second printing (ghost printing)

```
                    ┌─────────────┐
                    │    Start    │
                    └──────┬──────┘
                           │
                    ╱──────┴──────╲
                   ╱       Is      ╲      Yes    ┌──────────────────────┐
                  ╱  transfer corona ╲──────────▶│ Clean transfer corona │
                  ╲   wire dirty?    ╱           │ wire.                 │
                   ╲               ╱             └──────────────────────┘
                    ╲──────┬──────╱               See page 4-8.
                           │ No
                    ╱──────┴──────╲
                   ╱       Is      ╲
                  ╱   precharger    ╲    Yes     ┌──────────────────────┐
                  ╲ electrode apart ╱───────────▶│ Attach electrode.     │
                  ╱ from high-      ╲            └──────────────────────┘
                   ╲voltage electrode?╱
                    ╲──────┬──────╱
                           │ No
                    ╱──────┴──────╲
                   ╱       Is      ╲    Yes     ┌──────────────────────┐
                  ╱   cleaner dirty? ╲─────────▶│ Replace cleaner.      │
                  ╲                 ╱           └──────────────────────┘
                   ╲               ╱             See page 4-9.
                    ╲──────┬──────╱
                           │ No
                    ╱──────┴──────╲
                   ╱       Is      ╲    Yes
                  ╱  back-up roller  ╲──────────────┐
                  ╲ in the fuser unit╱              │
                  ╱     dirty?       ╲              │
                   ╲               ╱                │
                    ╲──────┬──────╱                 │
                           │ No                     │
                    ╱──────┴──────╲          ╱──────┴──────╲
                   ╱     Does      ╲  Yes   ╱ Improved by   ╲   No
                  ╱  LCD display    ╲──┐   ╱ cleaning back-up╲──────┐
                  ╲   REPLACE       ╱  │   ╲   roller?       ╱      │
                  ╱    PARTS?       ╲  │    ╲               ╱       │
                   ╲               ╱   │     ╲──────┬──────╱        │
                    ╲──────┬──────╱    │            │ Yes          │
                           │ No        │            │       ┌──────┴──────────┐
         ┌─────────────────┐  ┌────────┴────────┐   │       │ Replace back-up │
         │ Replace print   │  │ Replace print   │   │       │ roller.         │
         │ unit. (Unit is  │  │ unit. (Unit is  │   │       └─────────────────┘
         │ defective.)     │  │ at the end of   │   │
         └─────────────────┘  │ life.)          │   │
                              └─────────────────┘   │
               See pages 2-3 and 3-20 to 21.
                    ┌─────────────┐
                    │     End     │
                    └─────────────┘
```

(8) Dirty back / edge

```
                    ┌─────────────┐
                    │    Start     │
                    └─────────────┘
                           │
                    ╱──────────────╲        Yes      ┌──────────────────────┐
                   ╱  Is paper guide ╲──────────────▶│  Clean paper guide.   │
                   ╲     dirty?      ╱                └──────────────────────┘
                    ╲──────────────╱
                           │ No                        See pages 4-7 to 8.
                           │
                    ╱──────────────╲        Yes      ┌──────────────────────┐
                   ╱       Is        ╲──────────────▶│ Clean transfer corona │
                  ╱ transfer corona unit╲            │        unit.          │
                   ╲     dirty?      ╱                └──────────────────────┘
                    ╲──────────────╱
                           │ No                        See page 4-8.
                           │
                    ╱──────────────╲        Yes      ┌──────────────────────┐
                   ╱  Is precharger  ╲──────────────▶│ Clean precharger wire.│
                   ╲   wire dirty?   ╱                └──────────────────────┘
                    ╲──────────────╱
                           │ No                        See page 4-9.
                           │
                    ╱──────────────╲        Yes      ┌──────────────────────┐
                   ╱      Does       ╲──────────────▶│  Replace print unit.  │
                  ╱   LCD display      ╲             └──────────────────────┘
                  ╲  REPLACE PARTS?   ╱
                    ╲──────────────╱                  See pages 2-3 and 3-20 to 21.
                           │ No
                           │
                    ╱──────────────╲        Yes      ┌──────────────────────┐
                   ╱    Is cleaner   ╲──────────────▶│   Replace cleaner.    │
                   ╲     dirty?      ╱                └──────────────────────┘
                    ╲──────────────╱
                           │ No                        See page 4-9.
                           │
                    ╱──────────────╲        Yes      ┌──────────────────────┐
                   ╱  Is heat roller ╲──────────────▶│ Clean heart roller in │
                   ╲     dirty?      ╱                │    the fuser unit.    │
                    ╲──────────────╱                 └──────────────────────┘
                           │ No
                           │
                    ╱──────────────╲        Yes      ┌──────────────────────┐
                   ╱       Is        ╲──────────────▶│ Clean backup roller in│
                   ╲ backup roller dirty?╱           │    the fuser unit.    │
                    ╲──────────────╱                 └──────────────────────┘
                           │ No
    ┌──────────────────────┐
    │  Replace printer      │
    │ mechanism assembly.   │
    └──────────────────────┘
               │
        ┌─────────────┐
        │     End      │
        └─────────────┘
```

Note:
If a large amount of toner is spilled or collected in the paper path, the print unit or transfer corrona unit may be defective.

3 - 1 2

(9) Black

```
                    ┌─────────────┐
                    │    Start    │
                    └──────┬──────┘
                           │
                      ╱─────────╲
                     ╱    Is     ╲      Yes    ┌──────────────────────┐
                    ╱  precharger ╲──────────> │ Clean precharger wire.│
                    ╲    wire     ╱            └──────────────────────┘
                     ╲   dirty?  ╱              See page 4-9.
                      ╲─────────╱
                           │ No
                      ╱─────────╲
                     ╱    Is     ╲      Yes    ┌──────────────────────┐
                    ╱ precharger  ╲──────────> │  Attach electrode.    │
                    ╲electrode apart from high-╱  └──────────────────────┘
                    ╲voltage electrode?╱          See page 4-9.
                      ╲─────────╱
                           │ No
                      ╱─────────╲
                     ╱   Does    ╲      Yes    ┌──────────────────────┐
                    ╱ LCD display ╲──────────> │  Replace print unit.  │
                    ╲  REPLACE    ╱            └──────────────────────┘
                    ╲   PARTS?   ╱              See pages 2-3 and 3-20 to 21.
                      ╲─────────╱
                           │ No
                      ╱─────────╲
                     ╱    Is     ╲      No     ┌──────────────────────┐
                    ╱ –4 kV supplied╲────────> │ Replace high-voltage  │
                    ╲ from high-voltage╱       │  power supply.        │
                    ╲   power?   ╱             └──────────────────────┘
                      ╲─────────╱               See page 4-25.
                           │ Yes
                      ╱─────────╲
                     ╱ Improved by ╲    No     ┌──────────────────────┐
                    ╱ replacing controller╲──> │  Replace laser unit.  │
                    ╲    board?  ╱             └──────────────────────┘
                      ╲─────────╱               See page 4-18.
                           │ Yes
                    ┌──────┴──────┐
                    │     End     │
                    └─────────────┘
```

(10) White

```
                    ┌──────────────┐
                    │    Start     │
                    └──────┬───────┘
                           │
                  ╱────────────────╲
                 ╱        Is         ╲      No      ┌────────────────────┐
                ⟨   connector of      ⟩────────────▶│ Connect connector. │──────────────┐
                 ╲ laser unit connected?╱           └────────────────────┘              │
                  ╲────────┬───────╱                                                    │
                      Yes  │                         See page 4-18.                      │
                           │                                                            │
                  ╱────────────────╲                                                    │
                 ╱        Is         ╲      Yes     ┌────────────────────┐              │
                ⟨  transfer corona    ⟩────────────▶│ Clean corona wire. │─────────────▶│
                 ╲   wire dirty?      ╱             └────────────────────┘              │
                  ╲────────┬───────╱                                                    │
                       No  │                         See page 4-8.                       │
                           │                                                            │
                  ╱────────────────╲                                                    │
                 ╱        Is         ╲                                                   │
                ╱     precharger       ╲   Yes      ┌────────────────────┐              │
               ⟨ electrode apart from high-⟩───────▶│  Attach electrode. │─────────────▶│
                ╲  voltage electrode?   ╱           └────────────────────┘              │
                 ╲────────┬───────╱                                                    │
                       No  │                                                            │
                           │                                                            │
                  ╱────────────────╲                                                    │
                 ╱       Does         ╲    Yes      ┌────────────────────┐              │
                ⟨    LCD display        ⟩──────────▶│ Replace print unit.│─────────────▶│
                 ╲   REPLACE           ╱            │(Unit is at the end of life)│       │
                 ╲    PARTS?          ╱             └────────────────────┘              │
                  ╲────────┬───────╱                 See pages 2-3 and 3-20 to 21.       │
                       No  │                                                            │
                           │                                                            │
                  ╱────────────────╲      No        ╱────────────────╲                  │
                 ╱        Is         ╲──────────────╱       Is         ╲    No           │
                ⟨   +4 kV supplied    ⟩            ⟨   +24 V supplied   ⟩───────┐        │
                 ╲ from high-voltage  ╱             ╲  to high-voltage  ╱       │        │
                 ╲    power?          ╱              ╲    power?        ╱        │        │
                  ╲────────┬───────╱                  ╲───────┬─────╱          │        │
                      Yes  │                              Yes  │               │        │
                           │                                   │        ┌──────────────┐│
              ┌────────────────────┐               ╱────────────────╲   │Replace main  ││
              │ Replace print unit.│              ╱    Improved       ╲  │   power.     ││
              │(Unit is defective.)│             ⟨ by replacing high-   ⟩ └──────────────┘│
              └────────────────────┘              ╲  voltage power.    ╱  No             │
                                                   ╲────────┬───────╱───────┐   See page  │
               See pages                               Yes  │              │   4-21.      │
               2-3 and 3-                                    │      ┌──────────────┐      │
               20 to 21.                                     │      │Replace laser │      │
                                                            │      │   unit.      │      │
                                                            │      └──────────────┘      │
                                                            │       See page              │
                                                            │       4-18.                 │
                           ┌────────────────────────────────┴──────────────┴─────────────┘
                           │
                    ┌──────┴───────┐
                    │     End      │
                    └──────────────┘
```

(11) Blur

```
                    ┌─────────────┐
                    │    Start    │
                    └──────┬──────┘
                           │
                           │
                      ╱────┴────╲
                     ╱    Is      ╲        Yes      ┌──────────────────────┐
                    ╱ transfer corona╲──────────────│  Clean corona wire.  │
                    ╲  wire dirty?   ╱               └──────────────────────┘
                     ╲             ╱
                      ╲────┬────╱                      See page 4-8.
                           │ No
                           │
                      ╱────┴────╲
                     ╱   Does    ╲        Yes      ┌──────────────────────────┐
                    ╱ LCD display  ╲───────────────│  Replace print unit.     │
                    ╲  REPLACE    ╱                │ (Unit is at the end of life)│
                    ╲   PARTS?   ╱                 └──────────────────────────┘
                     ╲         ╱
                      ╲───┬───╱                    See pages 2-3 and 3-20 to 21.
                          │ No
         ┌────────────────┴──────┐
         │  Replace print unit.  │     See pages 2-3
         │  (Unit is defective.) │     and 3-20 to 21.
         └───────────┬───────────┘
                     │
                    ┌┴─────────────┐
                    │     End      │
                    └──────────────┘
```

(12) Smudge

```
                    ┌──────────────┐
                    │    Start     │
                    └──────────────┘
                           │
                           ▼
                     ╱──────────╲          No      ┌──────────────────────┐
                    ╱ Is density  ╲──────────────▶ │ Adjust density dial. │
                    ╲ dial proper? ╱               └──────────────────────┘
                     ╲──────────╱
                        │  Yes                        See page 4-5.
                        ▼
                     ╱──────────╲          Yes     ┌──────────────────────┐
                    ╱ Is precharger╲─────────────▶ │ Clean precharger wire.│
                    ╲ wire dirty?  ╱               └──────────────────────┘
                     ╲──────────╱
                        │  No                         See page 4-9.
                        ▼
                     ╱──────────╲          Yes     ┌──────────────────────────┐
                    ╱    Is       ╲────────────▶   │ Clean transfer corona wire.│
                    ╲ transfer     ╱               └──────────────────────────┘
                    ╲ corona wire ╱
                     ╲  dirty?  ╱                    See page 4-8.
                        │  No
                        ▼
                     ╱──────────╲          Yes     ┌──────────────────────┐
                    ╱    Is       ╲────────────▶   │  Replace cleaner.    │
                    ╲ cleaner dirty?╱              └──────────────────────┘
                     ╲──────────╱
                        │  No                         See page 4-9.
                        ▼
                     ╱──────────╲          Yes     ┌──────────────────────────┐
                    ╱   Does       ╲───────────▶   │ Replace print unit.       │
                    ╲ LCD display   ╱              │ (Unit is at the end of life)│
                    ╲ REPLACE       ╱              └──────────────────────────┘
                    ╲ PARTS?      ╱
                     ╲──────────╱                    See pages 2-3 and 3-20 to 21.
                        │  No
                        ▼
              ┌──────────────────────┐
              │ Replace print unit.  │
              │ (Unit is defective.) │
              └──────────────────────┘
   See pages 2-3
   and 3-20 to 21.
                    ┌──────────────┐
                    │    End       │
                    └──────────────┘
```

3.3 ERROR AND STATUS MESSAGES

This printer displays error and status messages on the LCD of the control panel. 16 characters by 2 lines of messages indicate information on errors and statuses in detail for maintenance personnel. The printer has also four indicators to display basic statuses: power-on, online, data presence in buffer, and error occurrence. The MarkVision and PPMENU utility programs can also indicate these messages on the computer's monitor.

This section lists these messages into the following three groups.

- Error messages
- Action-required status messages
- Printer status messages

3.3.1   Error Messages

Errors refer to a problem or condition which requires maintenance personnel to take an action. The printer shows errors by using the ERROR indicator and the message display of the control panel. Table 3-1 lists the error messages, explains causes, and suggests solutions. However, a fatal error in the controller or mechanism cannot be cleared by the user. Generally, other errors can be cleared by the user.

Table 3-1 Error Messages

Message	Causes and solutions
BD CYCLE ERROR	**Cause:** Malfunction in the laser unit **Solution:** If the error recurs, consult your dealer for service.
COMM.ERROR	**Cause:** Communication error **Solution:** Press the CONT. button and select the correct settings of the serial interface using the control panel setup mode.
COVER OPEN 1	**Cause:** Incomplete closing of upper door **Solution:** Close the upper door.
COVER OPEN 2	**Cause:** Incomplete locking of paper guide inside the rear stacker **Solution:** Lock the paper guide.
COVER OPEN 3	**Cause:** Incomplete closing of duplex unit **Solution:** Close the duplex unit.
FUSER FAILURE	**Cause:** Malfunction in the fuser unit **Solution:** If the error recurs, consult your dealer for service.
INVALID SIMM	**Cause:** Incorrect SIMM card (optional emulation or font) installed **Solution:** Press the CONT. button.
JOB TIMEOUT	**Cause:** FPS job timeout **Solution:** Press the CONT. button.
LOAD MFF *size* or LOAD TRAY*n size*	**Cause:** Paper mismatch occurred. **Solution:** Set the specified tray to the correct paper size specified.
MANUAL TIMEOUT	**Cause:** Paper was not inserted into the manual feed slot in the prescribed time. **Solution:** Press the CONT. button.
MEMORY OVER FLOW	**Cause:** Memory overflow error **Solution:** Press the CONT. button.

(To be continued)

Table 3-1 Error Messages (Continued)

Message	Causes and solutions
MEMORY SHORTAGE	**Cause:** Insufficient memory **Solution:** Add RAM board.
MFF NOT INSTALL	**Cause:** No MFF installed **Solution:** Install the MFF.
MOTOR FAILURE *n*	**Cause:** Malfunction in the feed motor, etc. **Solution:** If the error recurs, consult your dealer for service.
NO PROCESS UNIT	**Cause:** No print unit is installed. **Solution:** Install the print unit.
OVERRUN ERROR	**Cause:** Incomplete in extracting compressed data **Solution:** Press the CONT. button.
PAPER JAM*n*	**Cause:** Paper jam in the specified position **Solution:** Clear the jammed paper from the following area: 0: Pick roller, 1: Entry to paper path 2: Paper path, 3: Ejection from paper path, 4: Duplex unit
PS ERROR *mn*	**Cause:** A PostScript error **Solution:** If the error recurs, consult your dealer for service.
Source PAPER OUT	**Cause:** Paper out in the specified paper source **Solution:** Supply paper.
STACKER FULL	**Cause:** Paper stacker full **Solution:** Remove paper from the paper stacker.
SYSTEM ERROR *n*	**Cause:** A system error on the controller board **Solution:** If the error recurs, consult your dealer for service.
TRAY*n* MISS SET	**Cause:** Paper tray installed incorrectly **Solution:** Install the paper tray.
TONER EMPTY	**Cause:** Toner runs out. **Solution:** Replace toner bottle and cleaner.

3.3.2   Status Messages

Status messages in this section refer to normal conditions.

Table 3-2 lists status messages referring to conditions that require the user to take an action. It explains causes and suggests solutions. Table 3-3 lists printer status messages referring to conditions which generally require no action by the user, and explains their meaning. These tables do not include messages in menu mode.

Table 3-2 Action-required Status Messages

Message	Causes and solutions
INSERT *size*	**Cause:** Printer is ready for paper. **Solution:** Put paper into manual feed slot.
READY TONER LOW & PAD	**Cause:** Toner runs short. **Solution:** Prepare new toner bottle and cleaner.
READY REPLACE PARTS	**Cause:** Print unit is near end. Solution: Replace print unit. **Note:** Enter menu mode and select Clear Warning. After replacement, be sure to press ENTER to perform Clear Warning.

Table 3-3 Printer Status Messages

Message	Meaning
FORM FEED	The printer displays this message when you press ⌷FORM FEED⌷ with the DATA indicator off. The printer is printing data remaining in buffer.
<<<INITIALIZE>>>	The printer is initializing. This message appears whenever you turn on the printer.
MENU RESET	The printer displays this message when you press ⌷RESET MENU⌷ for five or more seconds. This reset returns parameter settings in the menu to their factory defaults except for interface settings as well as clears error latches, buffered data, and temporary soft fonts.
PRINT FONT	The printer displays this message when you press ⌷PRINT FONT⌷ for five or more seconds. The printer is printing the font report.
READY	The printer is ready to print.
RESET	The printer displays this message when you press ⌷RESET⌷ for five or more seconds. This reset clears error latches, buffered data, and temporary soft fonts.
SELF TEST	The printer displays this message when you press ⌷SELF TEST⌷ for five or more seconds. The printer is printing the status report.
WARMING UP	The printer is warming up to its operating temperature.

Warning Messages

This printer counts the number of the printed sheets to estimate the life of the consumables (print unit). The printer displays the following warning message when and after the count reaches a predetermined value. Note that this value does not necessarily indicate the actual life. The print quality may remain satisfactory to users for some time after this warning appears.

```
  READY    REPLACE PARTS
```

When the warning message is displayed, press the ⌷READY⌷ button to put the printer offline and press the ⌷MENU⌷ button to enter menu mode. The **Warning** message appears, indicating the expired unit by an asterisk. When the print unit is expired, the message is:

```
  <CLEAR WARNING>    PRINT UNIT*
```

When the print unit is replaced, be sure to reset the counter according to Section 3.4.

3.4 RESETTING THE PRINT UNIT (FUSER UNIT) COUNTER

Perform this operation whenever the print unit is replaced to reset the print unit counter, follow these steps:
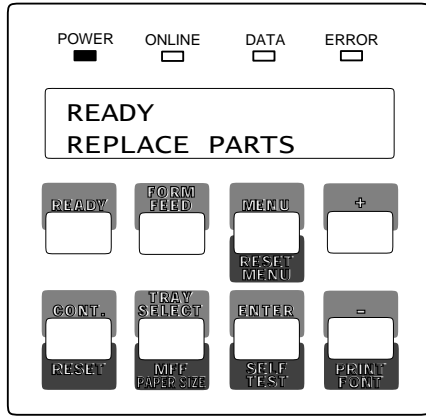
1. **Make sure the printer is offline.** If necessary, press the READY button to put the printer offline. The ONLINE indicator is off with the REPLACE PARTS message displayed.
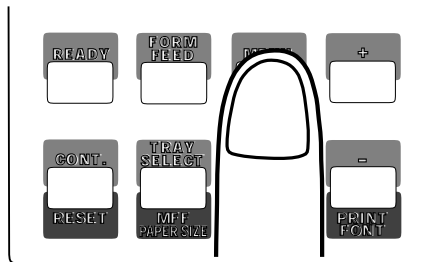
2. **Press the MENU button to put the printer in menu mode.**
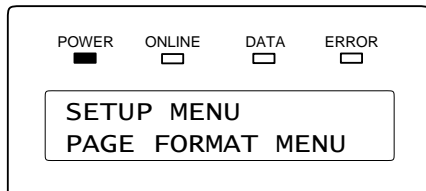
The message changes to SETUP MENU PAGE FORMAT MENU.
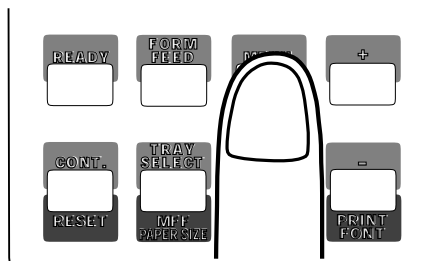
3. **Press the MENU button repeatedly until the lower message changes to CLEAR WARNING.**
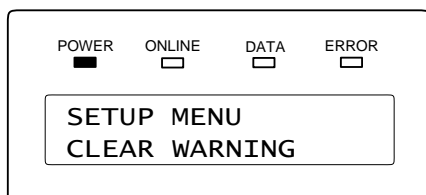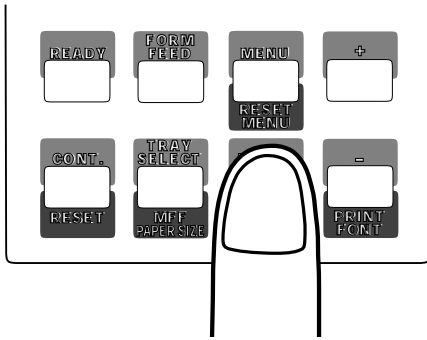
4. **Press the ENTER button to select this function.**
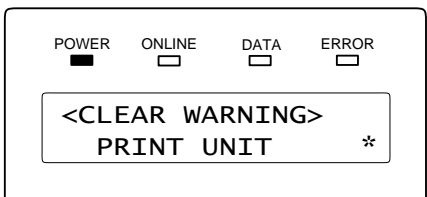
The message changes to <CLEAR WARNING> PRINT UNIT
*. The asterisk means that the print unit is expired.
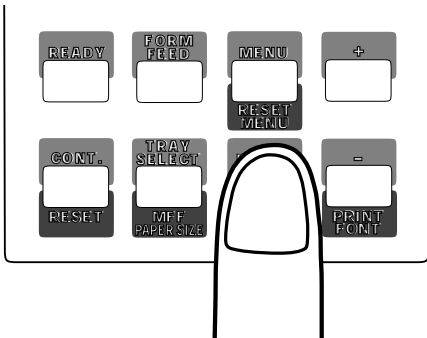
5. **Press the ENTER button again to execute the function.** The asterisk disappears, indicating the counter is reset.
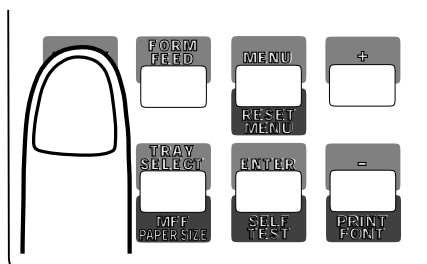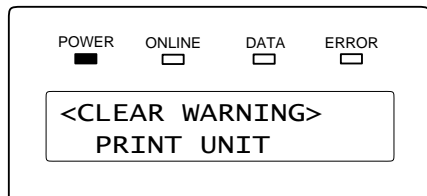
6. **Press the READY button to return the printer online.** The ONLINE indicator lights up without the REPLACE PARTS message
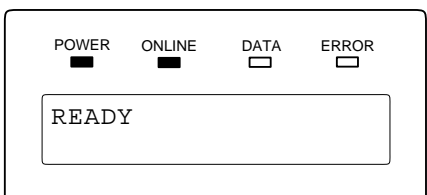
Important:

After the reset operation, check the status report or the PPMENU's main menu to make sure that the Warning Message is cleared.

3.5 OTHERS

The printer performs the following controls not under commands from the computer.

(1) Fan control

The fan 1 stops after three minute has elapsed since the last printing. The fan 2 stops after ten minutes has elapsed since the last printing.

(2) Initial control of motor

At initialization, the motor rotates when the temperature of the heater reaches 100°C and stops when the temperature reaches 170°C, then the printer goes ready to print.

(3) Heat roller temperature control

The heat roller temperature is reduced to 100°C from 170°C when printing does not occur for one minute. Power supply to the heat roller is stopped after additional one minute has elapsed without printing.

CHAPTER 4   MAINTENANCE

This chapter covers the maintenance (cleaning, lubrication, inspection, and adjustment) required for levels 1 and 2 defined in Section 4.4.

4.1 GENERAL

Using the latest in electronic technology, the Laser Printer LN15 offers high reliability and ease of maintenance. The number of parts requiring lubrication and/or adjustment has been reduced.

The LN15 printer has a self diagnostic function which briefly indicates the type of error using the indicators on the control panel if the printer malfunctions.

This printer has the status report function to help indicate whether an error is due to the printer or the host computer. This function is useful for testing printer performance after an error recovery.

4.2 GENERAL PRECAUTIONS

The following precautions will help prevent damage to the LN15 page printer.

- Do not connect or disconnect connectors or printed circuit boards while the power is turned on.

- Use screwdrivers, pliers, and other tools appropriate to the parts to be replaced. Do not leave screws or parts inside the printer.

- Use only the specified type of oil, grease, and cleaner.

- Power should be turned off before beginning any parts replacement.

- Be careful not to cause damage to the print unit by touching the surface of the OPC drum with fingers, metal, or anything. Do not set the print unit in light for extended periods of time.

4.3 MAINTENANCE TOOLS

Table 4-1 lists the tools required for maintenance.

Table 4-1 Maintenance Tools

No.	Tool Name	Q'ty	Remarks
1	Screwdriver (Phillips)	1	For M3 and M4
2	Screwdriver (standard)	1	For M3
3	Screwdriver (standard)	1	For M4
4	Long-nose pliers	1	
5	Diagonal cutting pliers	1	

4.4 MAINTENANCE LEVELS

Maintenance for the LN15 page printer is divided into two levels.

Level 1

Level 1 maintenance can be done by the printer user. It includes cleaning and consumables replacement only.

Level 2

Level 2 maintenance includes level 1 items (cleaning) plus replacement of PC boards, electrical units, and mechanical subassemblies.

4.5 PREVENTIVE MAINTENANCE

No scheduled maintenance is required. However, a clean printer has a longer service life and MTBF.

> **Note:**
> Clean the corona wire of the transfer charger unit and the precharger wire of the print unit whenever the toner bottle or the print unit is replaced.

4.6 PARTS DRAWINGS

This section shows the locations of the basic components.

Shade cover
(cleaner assembly inside)

Stacker-full sensor

Top cover
(Paper stacker)

Control panel

Upper door

Paper guides
for manual feeding

Multi-function feeder
(MFF)

Slide cover
(Font/emulation card slot
and RAM card slots inside)

Front cover
(opened)

Paper guides
for stack feeding

Multi-function feeder
cable

Paper tray

Front and right side view

Interface board
slot cover

Rear stacker

Power switch

Centronics parallel
interface connector

Power cord
connector

Rear and Left Side View

Figure 4-1 Basic Components

Toner bottle

Print density dial

Print unit
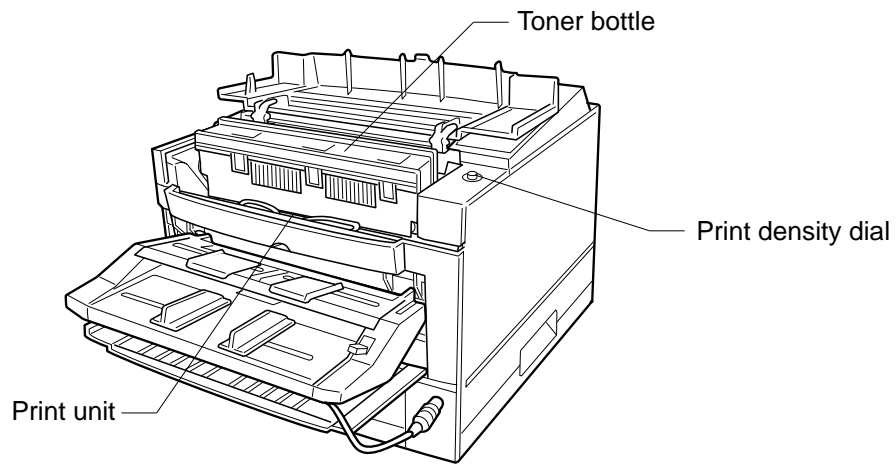
Interior with the Upper Door Open

Figure 4-1 Basic Components—Continued

4.7 PARTS THAT MUST NOT BE DISASSEMBLED

Table 4-2 lists components that are not to be disassembled.

Table 4-2 Parts That Must Not be Disassembled

No.	Parts Name	Specification	Remarks
1	Print unit	CA02758-E400 LN15X-AB (OPC Drum)	Allowed only to separate OPC drum from developing unit
2	Toner bottle	CA02758-E300 LN15X-AA	2 Bottles toner cartridges
3	Heat roller unit	CA04040-C941 LN15-AD (Fusing Unit)	For 120 VAC model
4	Transfer charger unit	CA04040-F450	

4.8 LEVEL 1 MAINTENANCE

Level 1 maintenance includes only cleaning and consumables replacement that can be performed by the operator without removing any cover.

4.8.1 Cleaning

First, check the inside of the printer for paper particles, dust, and other foreign matter. Remove them, if any, as explained in the table shown below. If replacement is necessary, see the procedures explained in this chapter.

The areas to be cleaned and the procedures for cleaning are listed in Table 4-3.

Table 4-3 Cleaning

No.	Area to be cleaned	Specification	Remarks
1	Base frame	Remove paper particles, toner, and dust.	Use a damp cloth.
2	Pressure roller	Open the upper door . Then, wipe the roller with a cloth dampened with ethyl alcohol or equivalent while rotating it by hand.	Be careful not to damage the roller. Be sure rollers are dry before operation.
3	Paper path	Remove paper dust and fragments.	
4	Corona wire	Remove toner from the tungsten wire and chassis using the cleaning tool supplied. See Figure 4-3. Replace the transfer charger unit if it is very dirty.	Be careful not to break the wire.
5	Precharger wire	Remove toner from the tungsten wire and chassis using the cleaning tool supplied. See Figure 4-4. Replace the print unit if it is very dirty. See Chapter 5 of the User's Manual.	Be careful not to break the wire.
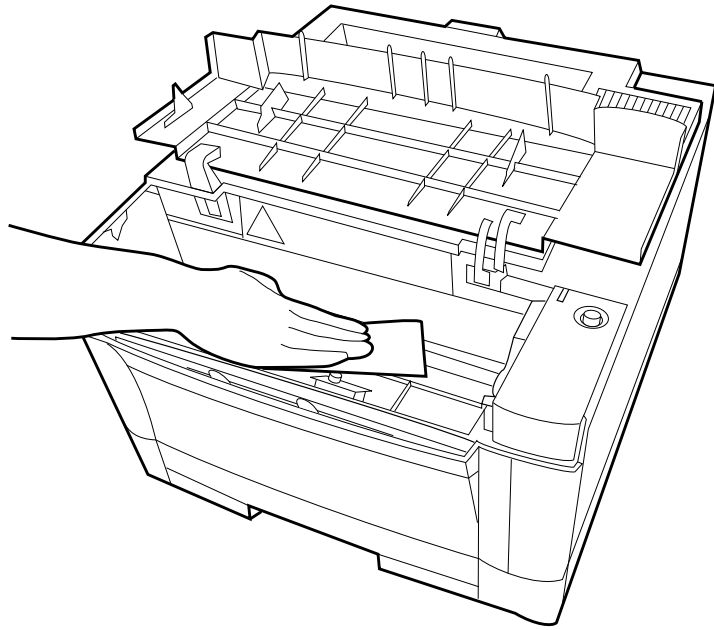
Figure 4-2 Cleaning the Paper Path
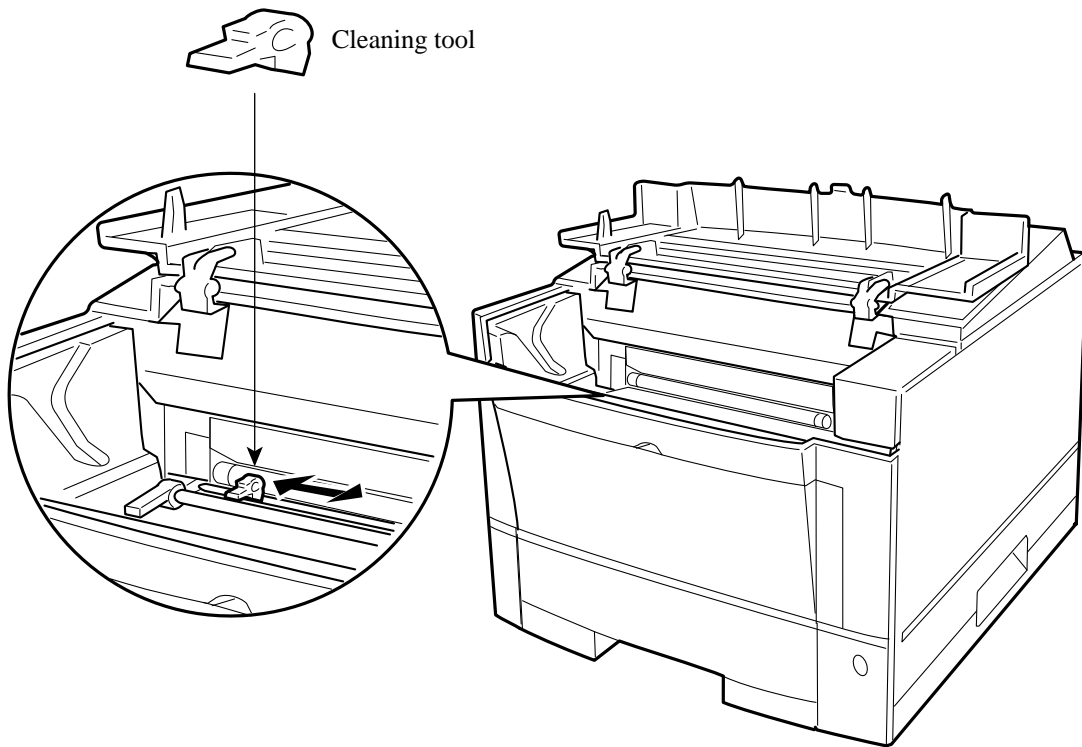
Cleaning tool

Figure 4-3 Cleaning the Corona Wire
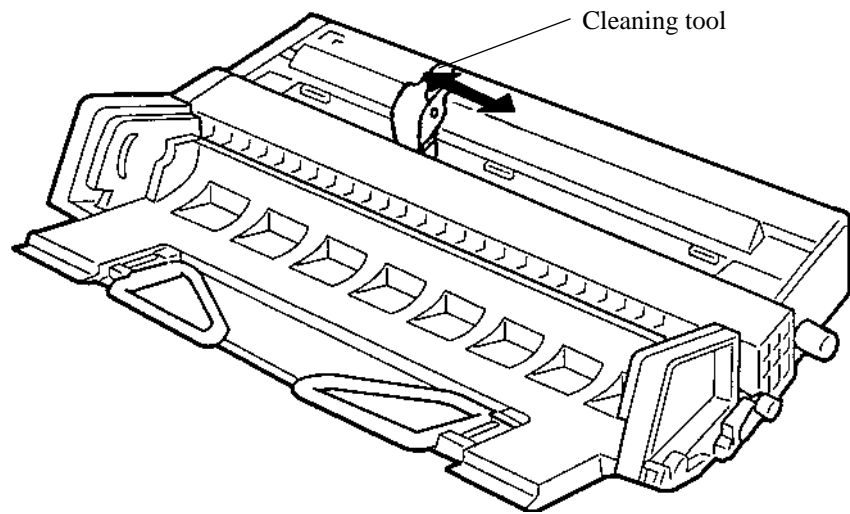
Figure 4-4 Cleaning the Precharger Wire

4.8.2 Consumables Replacement

Consumables of this printer are the toner bottle, print unit, and cleaner pad. The toner bottle and the print unit are easy to replace. So, this section explains how to replace the cleaner pad only. Follow these steps:

1. Open the cover as follows: Push the engraved portion on the stacker to unlock and open the cover. Lift the front of the cover.
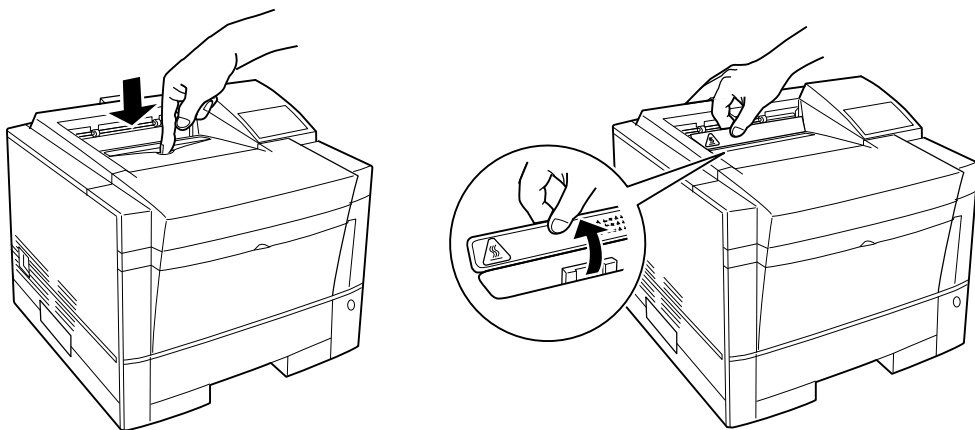
2. Remove the cleaner as follows: Push down the handle of the cleaner and push forward it to unlock the cleaner. Slide the cleaner to the left and take its right end out f the opening, and then the left end.
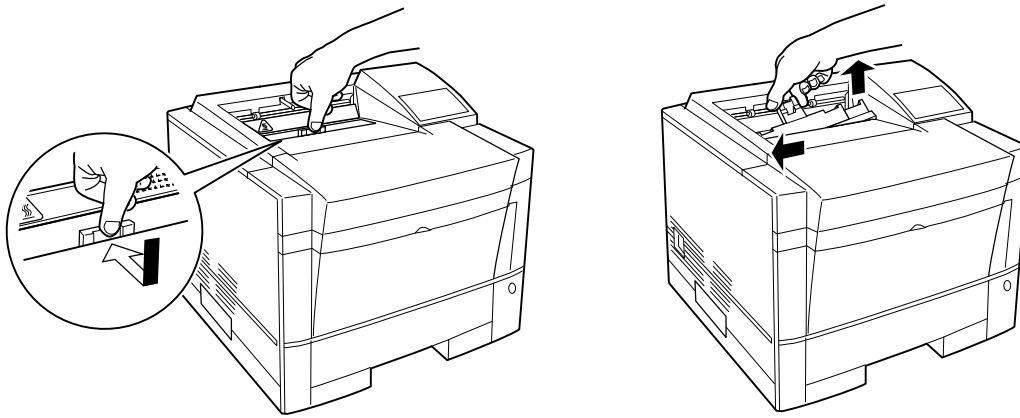
3. Mount a new cleaner pad on the cleaner as follows: Push the lock lever to unlock the cleaner pad to remove the cleaner pad from the cleaner. Slide the cleaner pad to the right and separate it from the cleaner. Put the new cleaner pad on the cleaner and slide the cleaner pad into the locked position.
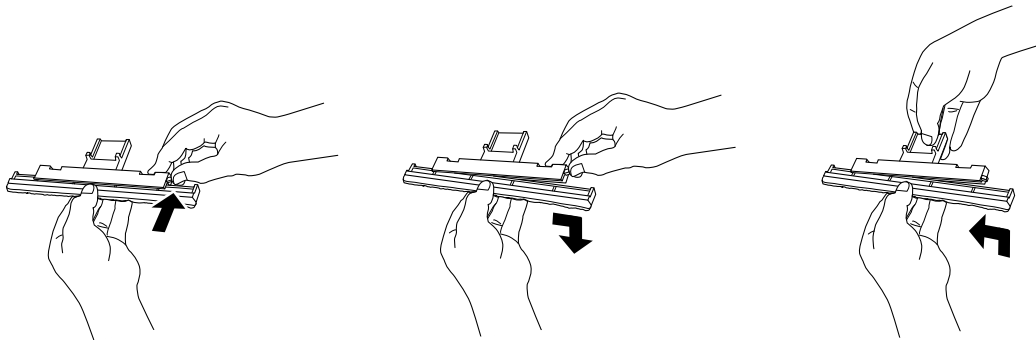
4. Install the cleaner in the printer as follows: Grasp the handle of the cleaner and put the left end of the cleaner into the opening, and then the right end. Push down the top of the handle and pull it towards you to lock the cleaner. Close the cover.
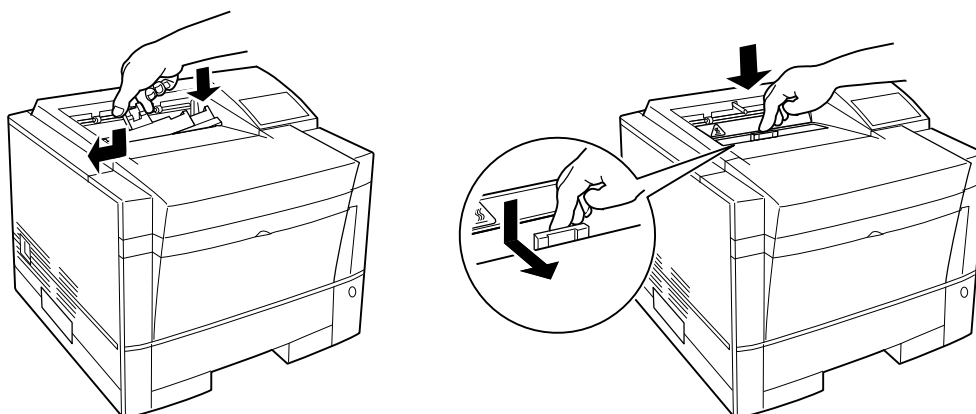
4.9 LEVEL 2 MAINTENANCE

Level 2 maintenance includes maintenance such as lubrication and parts replacement. Level 1 maintenance should also be performed when level 2 maintenance is performed.

4.9.1 Replacement

Precautions

a.   Keep assembly areas clean.

b.   Turn off the power to the printer and disconnect the power cord and interface cable before disassembly or assembly.

c.   Follow the procedures carefully. Do not loosen any parts that are not to be disassembled.

d.   Store disassembled parts in a clean place where they will not get lost.

e.   Check parts for correct numbers and shape after replacement.

f.   Reassemble the printer in the reverse order of disassembly. Be sure that all connectors are connected correctly.

g.   Do not stand the printer as shown below with the control board installed. If not so, the parallel interface connector may be damaged.

Front

Top

Parallel interface
connector
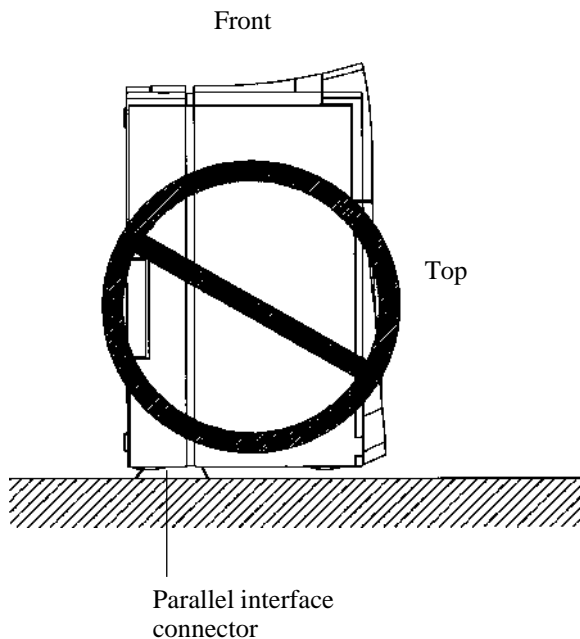
(1)   Upper cover replacement

Removal
1.   Open the upper door.
2.   Remove three screws.
3.   Remove one screw to remove the rear cover.
4.   Remove side cover R and side cover L.
5.   Remove three screws to remove the shield plate.
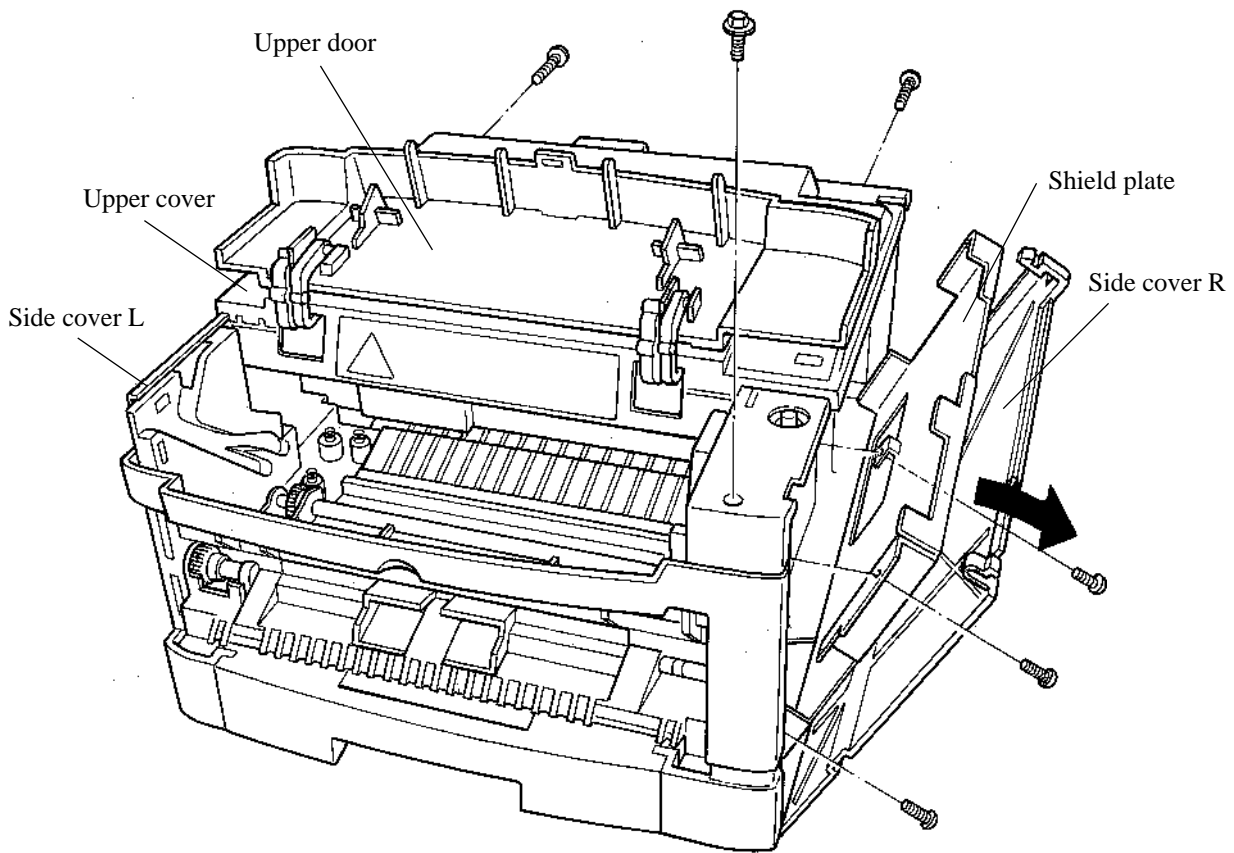
6. Disconnect the control panel connector and the volume board connector.

Control panel connector

Volume board connector

Bottom

Front
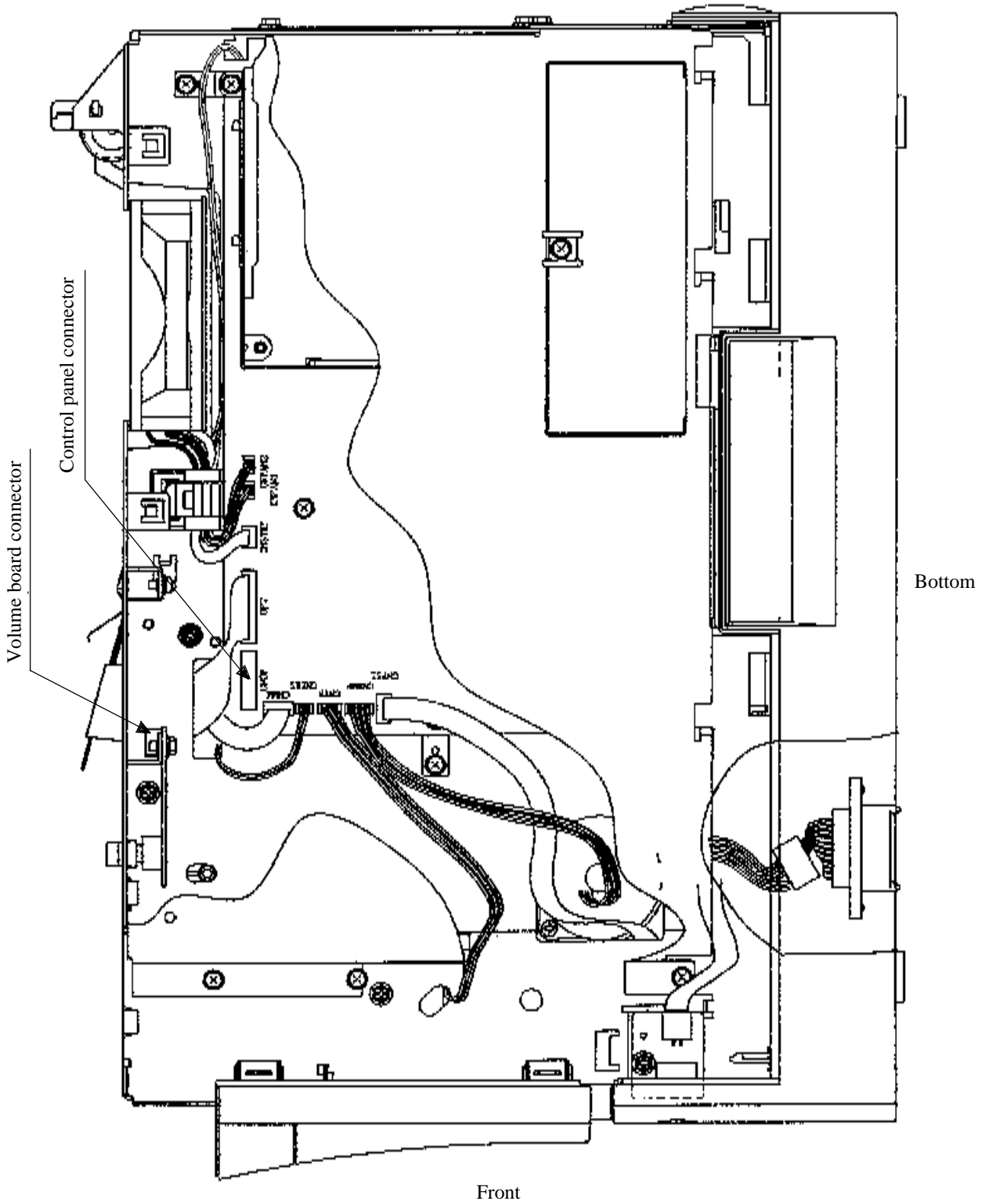
7. Lift the upper cover in an upward direction to remove it while pressing four claws on the left and right of the upper cover using a standard screw driver as shown below:
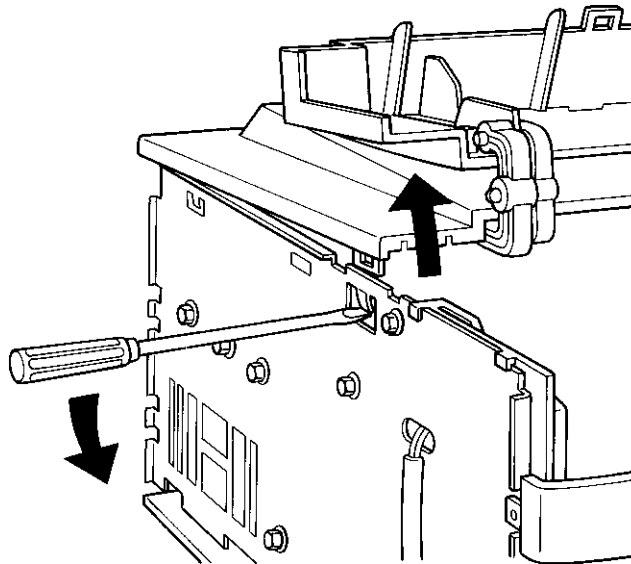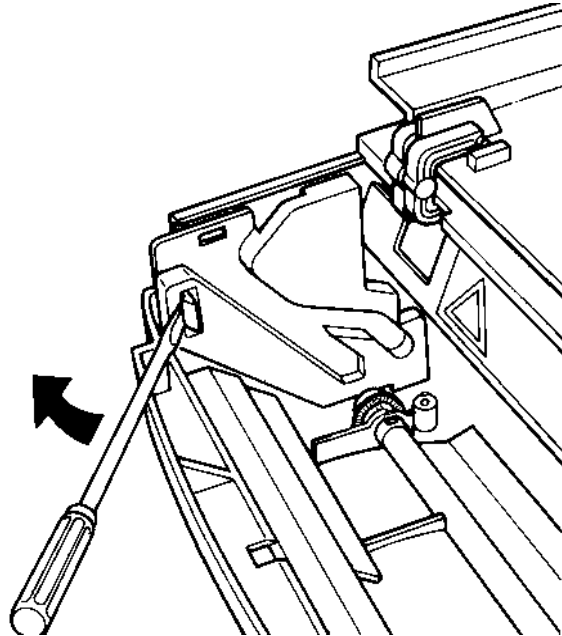
Installation

Reverse the removal procedure.

(2)   Control panel replacement

Removal
1.   Remove the upper cover. (See Item (1))
2.   Remove the control panel while pressing the two claws on the left and right of the panel, using a standard screw driver.
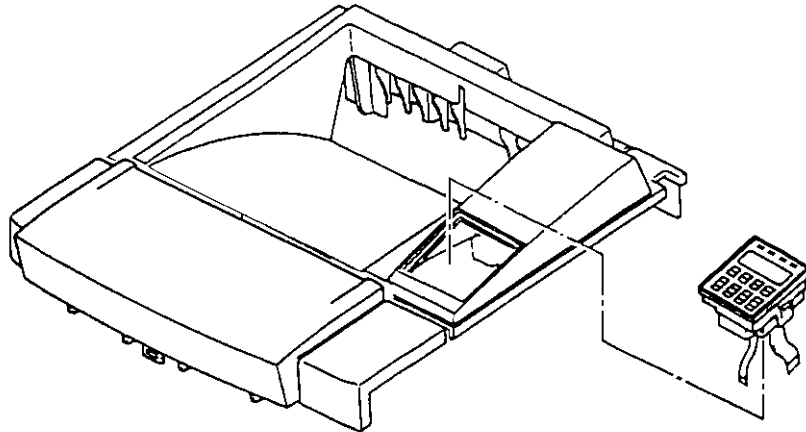
Installation
Reverse the removal procedure.

Connectors and Cable Connections of the Control Board (Right Side View)

FAN2 (White)

FAN1 (Blue)

Bottom

Front
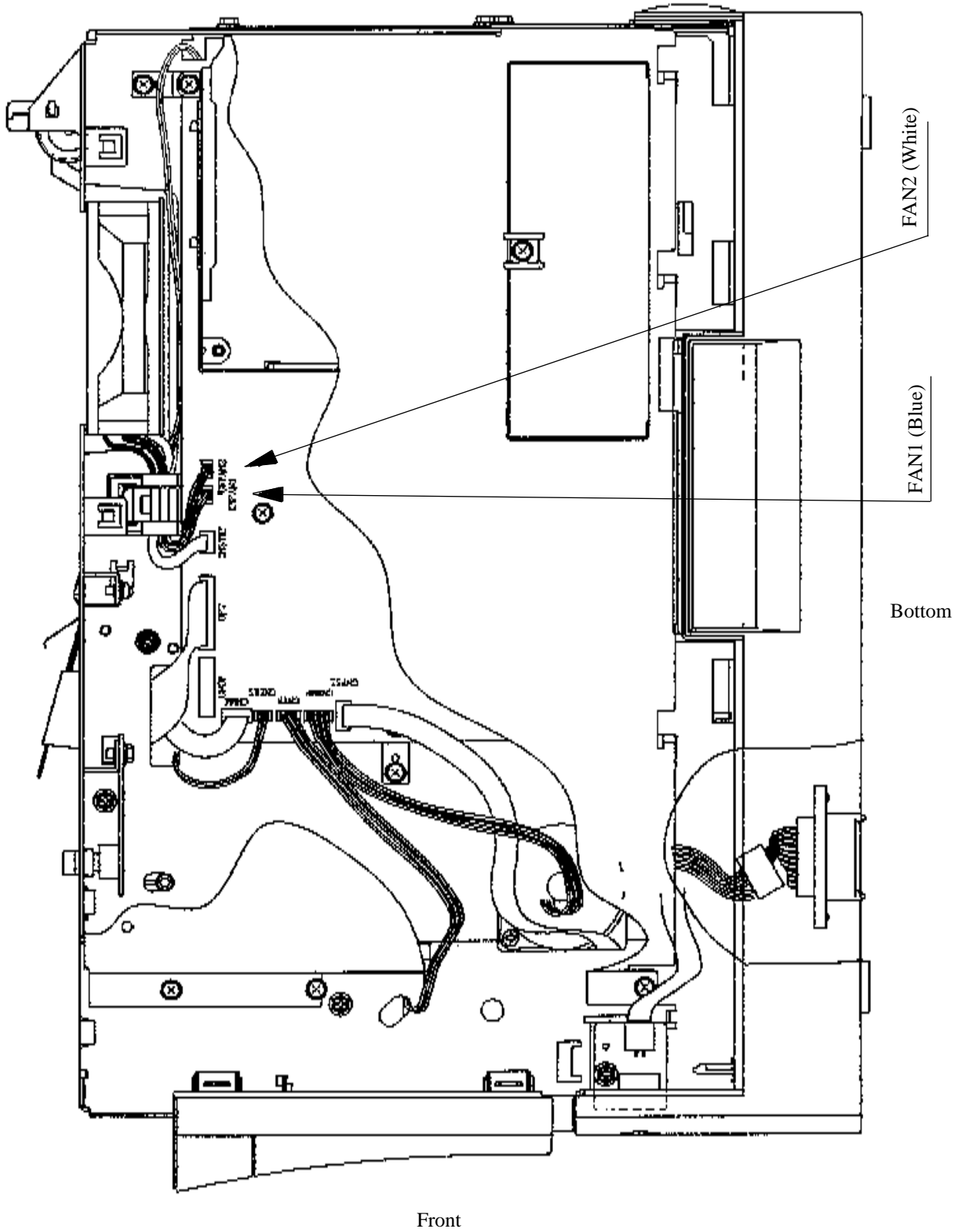
Cable Routes of the Pick-up Motor and the Cover-open Switch (Left Side View)

Front
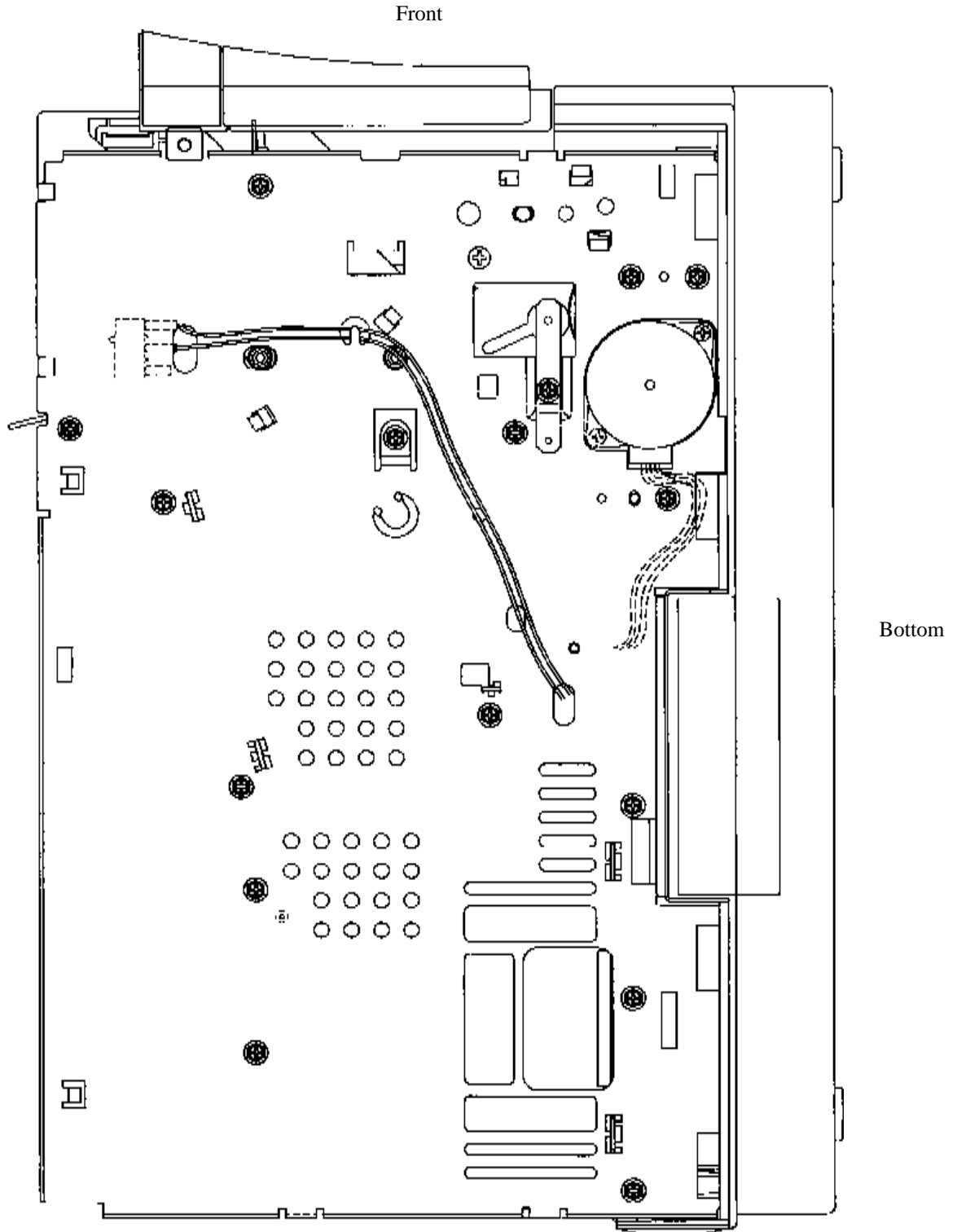
Bottom

(3)   Laser unit replacement

Removal
  1.   Remove the upper cover. (See Item (1))
  2.   Disconnect the connector from the laser unit.
  3.   Remove three screws to remove the frame ground cover and the laser unit.
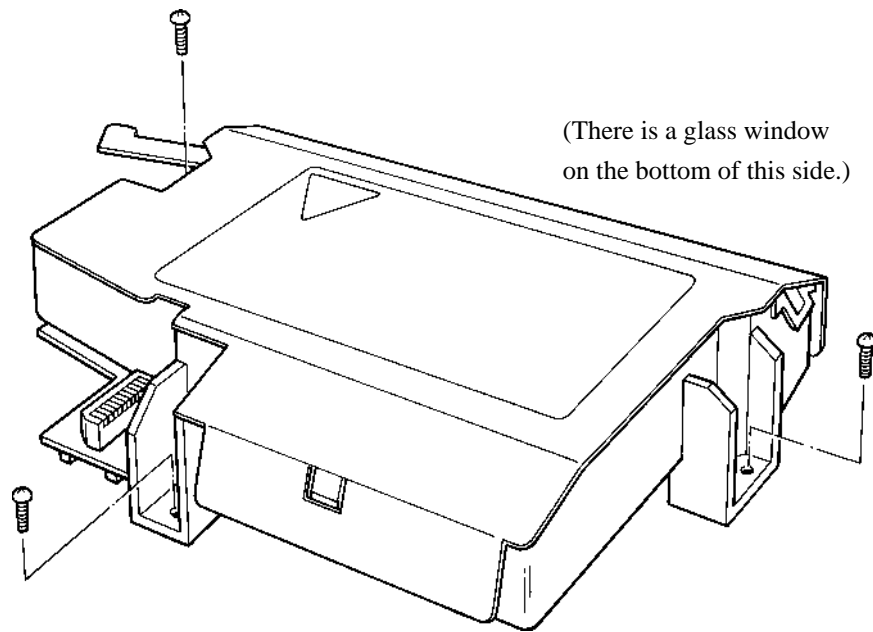
(There is a glass window
on the bottom of this side.)

(Frame ground cover is removed from the top of the laser unit)

Installation
    Reverse the removal procedure.

(4)   Fuser unit replacement

WARNING :

WAIT 5 MINUTES AFTER POWER DOWN BEFORE REMOVING THE FUSER UNIT

Removal

1.   Open the shade cover. (See Section 4.8.2 Consumables Replacement.)
2.   Remove the cleaner assembly. (See Section 4.8.2 Consumables Replacement.)
3.   Remove side cover R. (See Item (1) Upper cover replacement.)
4.   Remove the shield plate. (See Item (1) Upper cover replacement.)
5.   Disconnect the connector (for FAN2) from the control board.
6.   Remove the rear cover. (See Item (1) Upper cover replacement.)
7.   Remove four screws from the rear of the unit to draw out the subassembly of the power supply board and the fuser unit.

Notes

1. The power supply board and the fuser unit are hot immediately after printing.
2. Remove the power supply board and the fuser unit carefully.

8.   Remove the rear stacker
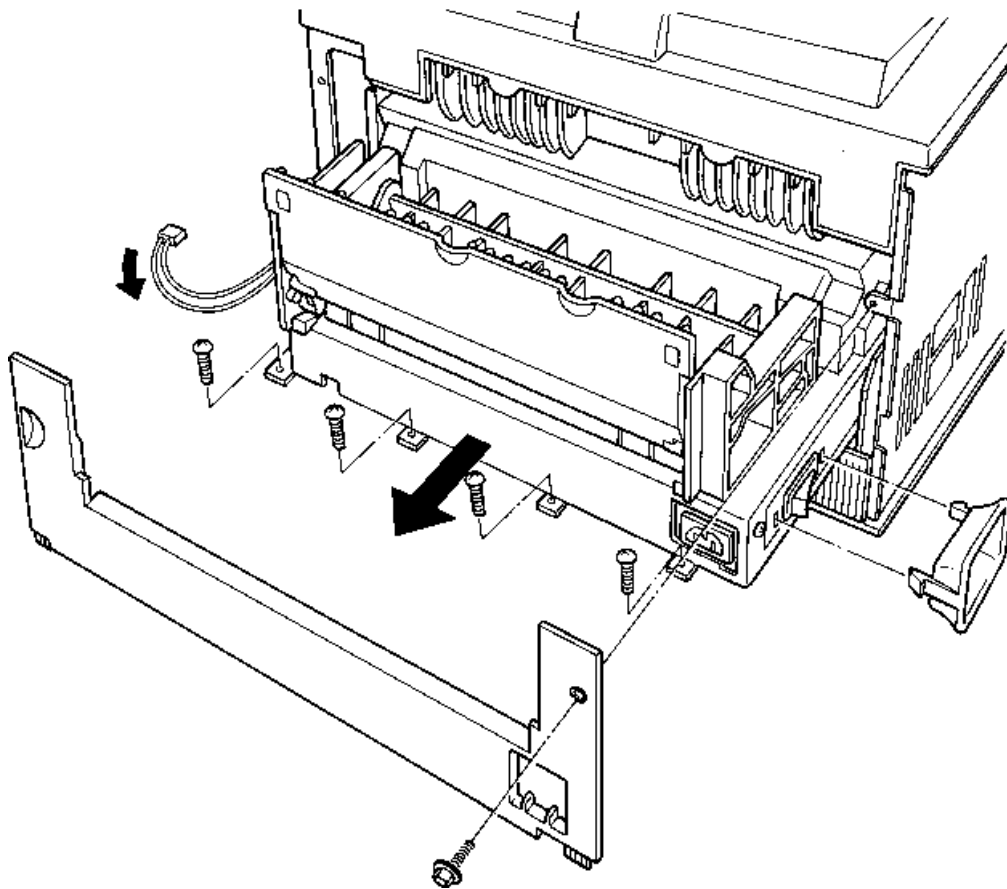
9. Disconnect the two connectors while pressing the connector lock with a standard screw driver as shown below. (The following illustration shows the side that faced to the front of the printer when the unit was installed.)

10. Remove two screws from the front of the unit to separate the fuser unit from the power supply board.

11. Remove the power supply board from the subassembly. (See Item (5) Power supply board replacement.)

12. Remove FAN2 and gears 1 to 6 from the subassembly. (See Item (7) FAN2 replacement.) Remaining is the fuser unit.

Note:
Do not disassemble the fuser unit itself.
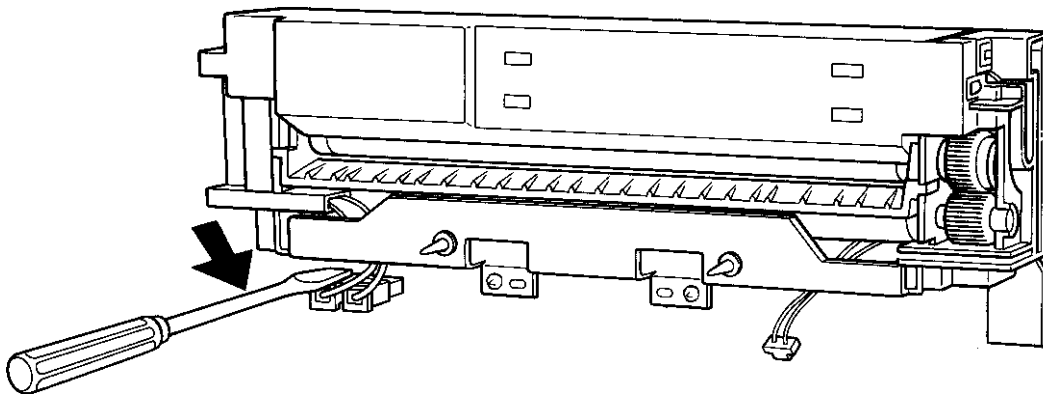
Installation
Reverse the removal procedure.

Notes:
1. Return gears 1 to 6 to the original positions and hold them by installing the FAN2 mounting plate.
2. Fasten FAN2 on the plate so that the air flow arrow is in the outward direction. (See Item (7) FAN2 replacement.)
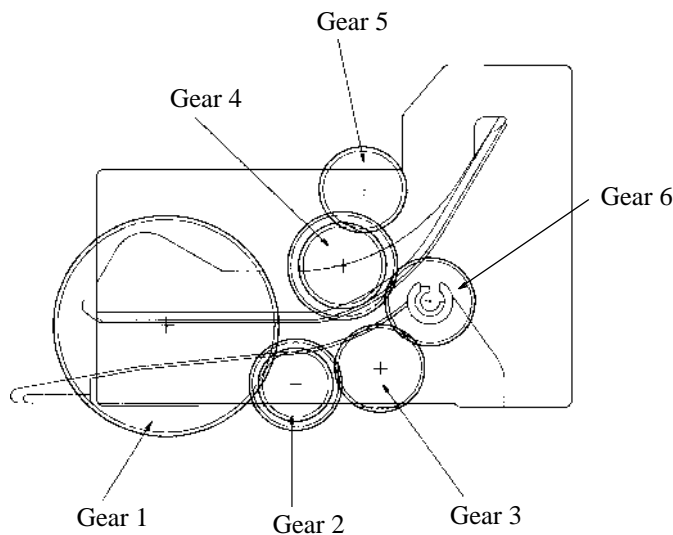
(5)   Power supply board replacement

Removal
   1. Remove side cover R and the shield plate. (See Item (1) Upper cover replacement.)
   2. Disconnect the connector (for FAN2). (See Item (4) Fuser unit replacement.)
   3. Remove the subassembly of the fuser unit and the power supply board. (See Item (4) Fuser unit replacement.)
   4. Turn the subassembly upside down
   5. Remove six screws which fasten the cover.
   6. Disconnect the two connectors (for the fuser unit) then the connector (for the sensor board) and remove the power supply board.

Power supply board
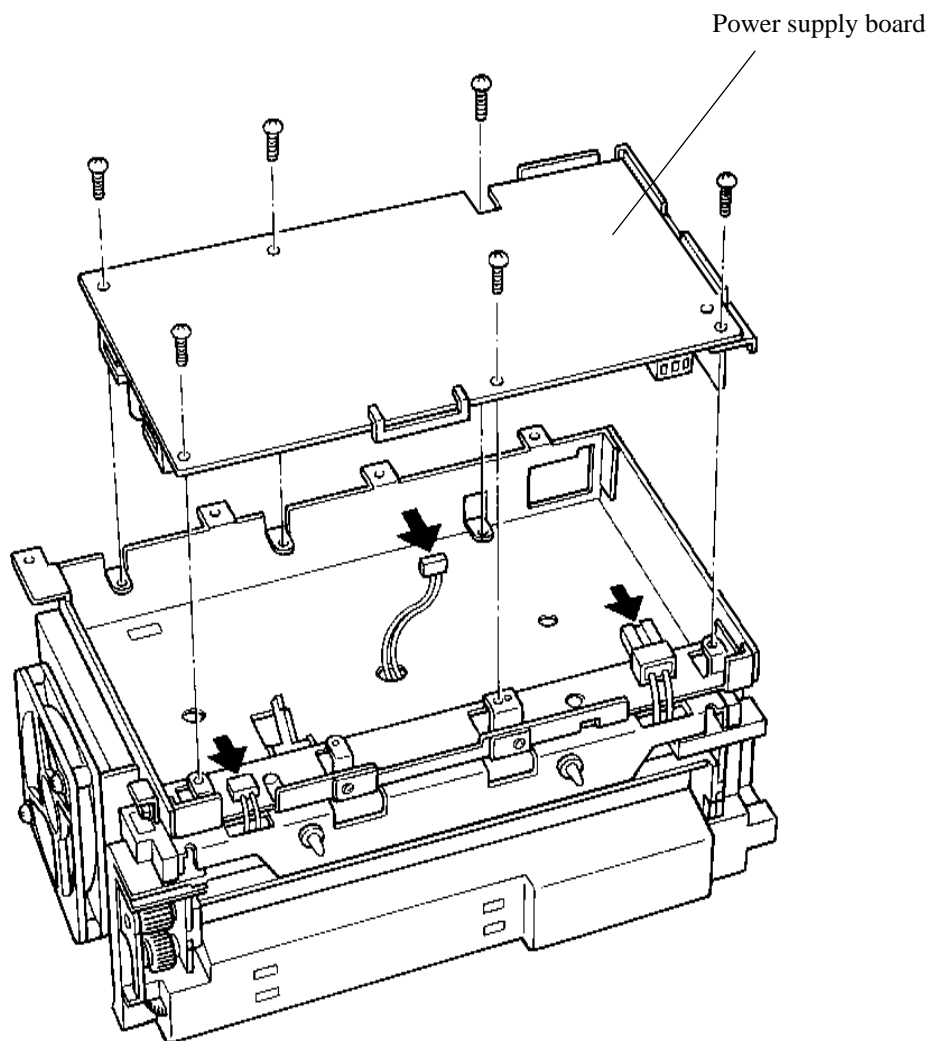
Installation
   Reverse the removal procedure.

(6)   FAN 1 replacement

Removal
   1.   Remove the upper cover. (See Item (1) Upper cover replacement.)
   2.   Disconnect the connector from FAN1.
   3.   To remove FAN1, lift it at an angle while pressing the lower mounting plate with a standard screw
         driver as shown below.
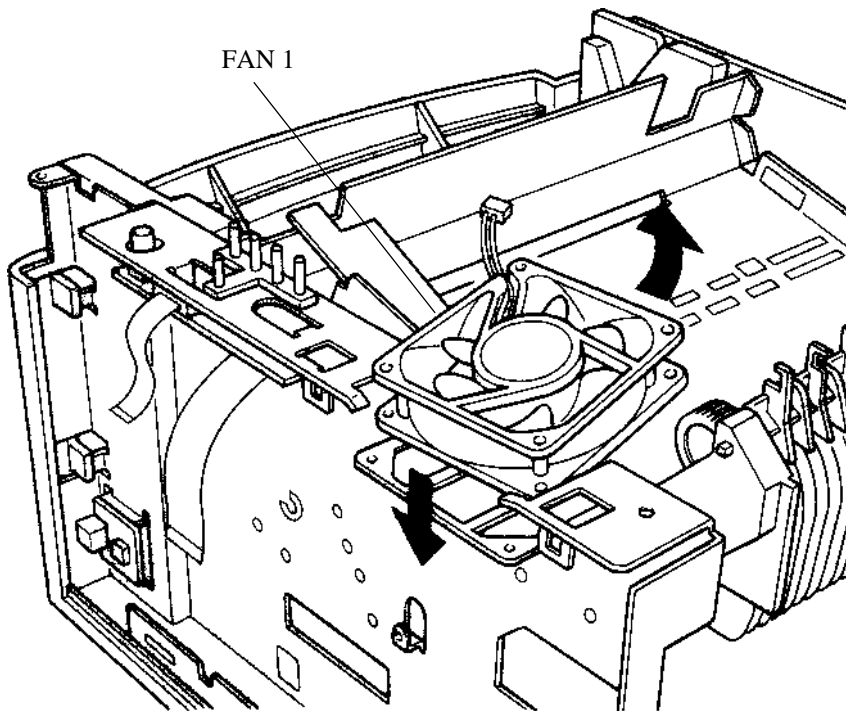
FAN 1

Installation
      Reverse the removal procedure.

   Note:
   Install the FAN1 so that the labelled air flow arrow is in the upward direction.

Air flow

Marks
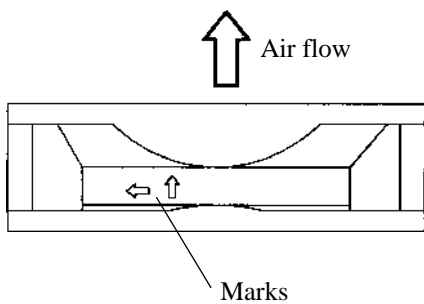
(7)   FAN 2 replacement

Removal
1.   Remove the subassembly of the fuser unit and the power supply board. (See Item (4) Fuser unit replacement.)
2.   Remove two screws to remove FAN2 from the side of the subassembly.

Power supply unit
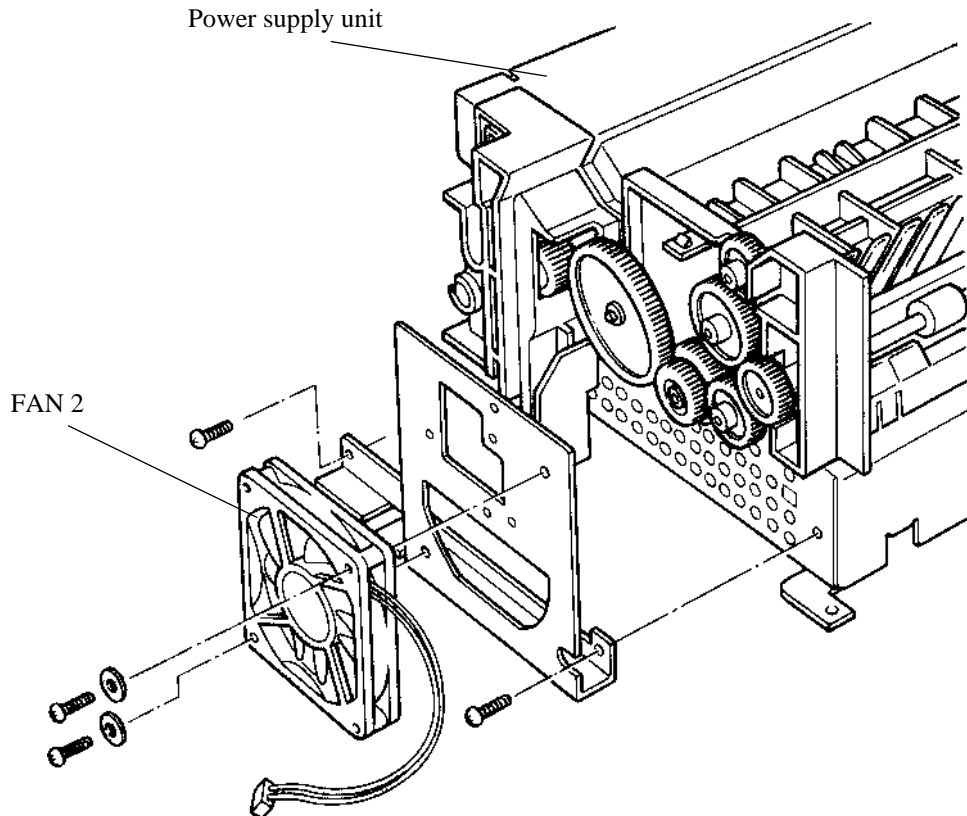
FAN 2

Installation
Reverse the removal procedure.

Note:
Install the FAN2 so that the labelled air flow arrow is in the outward direction.
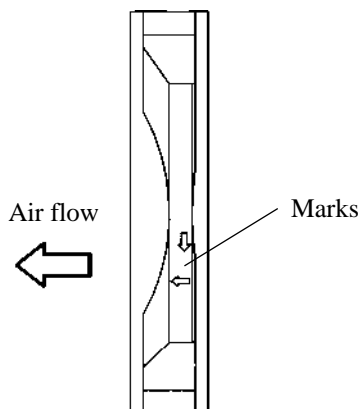
Air flow   Marks

(8)   Control board replacement

Removal
    1.   Remove the paper tray.
    2.   Remove side cover R and the shield plate. (See Item (1) Upper cover replacement.)
    3.   Disconnect the following all connectors:
        CNFAN1, CNFAN2, CNERS, CNTN, OPT, CNMM, CNRMP, CNCSTA, CNMFF, CNPS1, CNOP,
        and CNSTKF
    4.   Remove seven screws and disengage the lower hook to remove the control board.
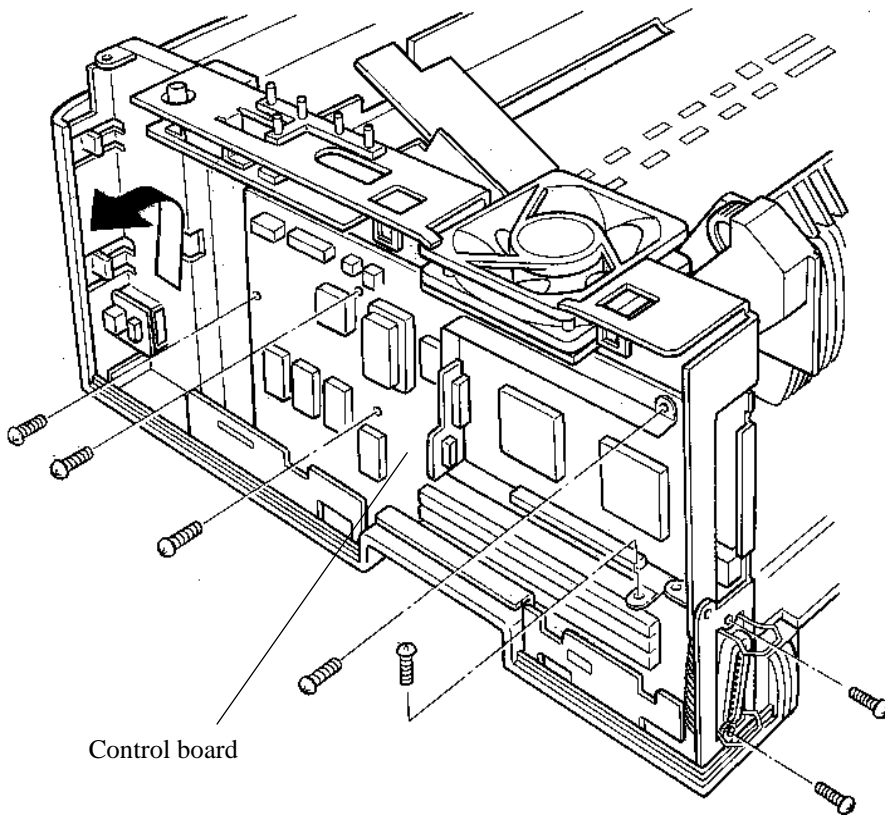
Control board

Installation
    Reverse the removal procedure.

Notes:
    1.   Engage the control board securely with the lower hook and screws.
    2.   There is a connector on the back side of the control board, which connects to the sensor boar connector.
        When installing the control board, lift it into place so that the control board connector faces the sensor
        board connector.
    3.   To CNFAN1 (left side), connect the connector with red and black cables from the upper fan. To
        CNFAN2 (right side), connect the connector with blue and red cables from the lower fan.

(9)   High-voltage power supply board and sensor board replacement

Removal

1.   Remove the paper tray.
2.   Remove side cover R and the shield plate. (See Item (1) Upper cover replacement.)
3.   Remove the control board. (See Item (8) Control board replacement.)
4.   Remove four screws from the bottom of the printer to remove.
5.   Disconnect the connector (cable from the power supply) and pull out the mechanism board from the control board.
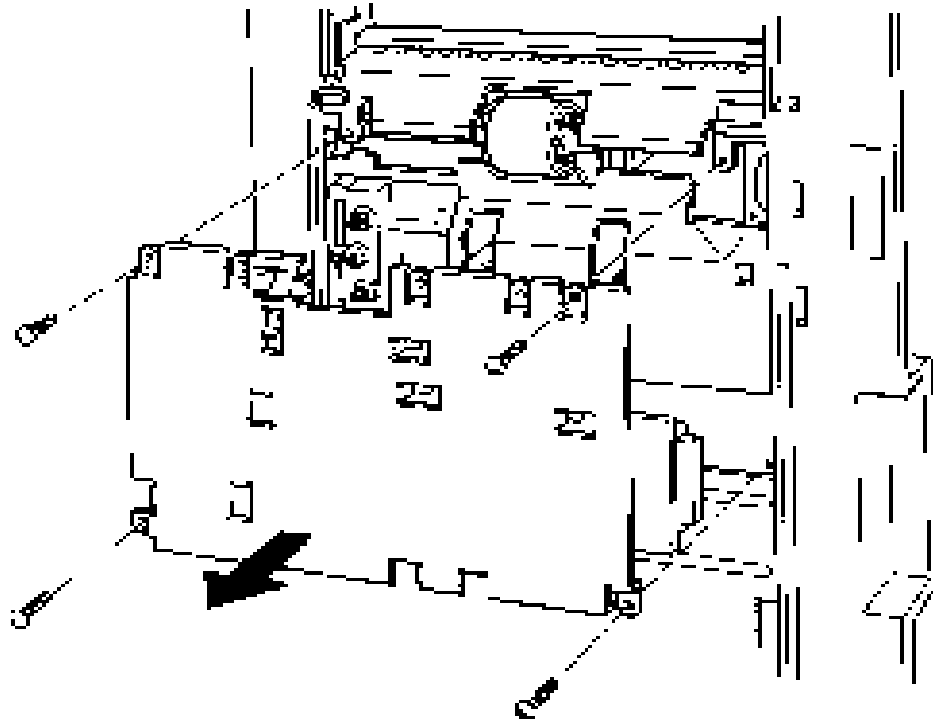
6. Remove five screws to remove the sensor board assembly.
7. Remove four screws to remove the high-voltage power supply board.

Sensor board

High-voltage power supply board
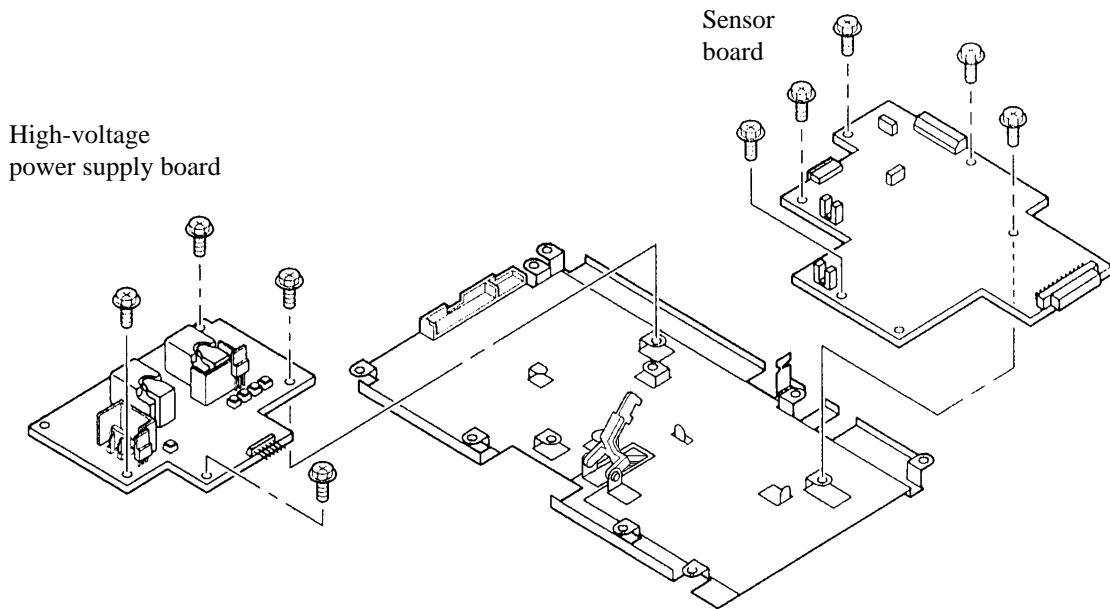
Installation

Reverse the removal procedure.

Notes:
1. When installing the sensor board, observe the order of fastening screws.
2. When installing the mechanism board, take care so that the cable does not overlap the four spring electrodes on the bottom left of the printer mechanism.
3. After connecting the connector (cable from the power supply board), install the mechanism board while matching the four screw positions.

(10) Main motor replacement

Removal

1. Remove the upper cover. (See Item (1) Upper cover replacement.)
2. Remove the control board. (See Item (8) Control board replacement.)
3. Remove FAN1. (See Item (6) FAN 1 replacement.)
4. Remove four screws to remove the main motor unit.
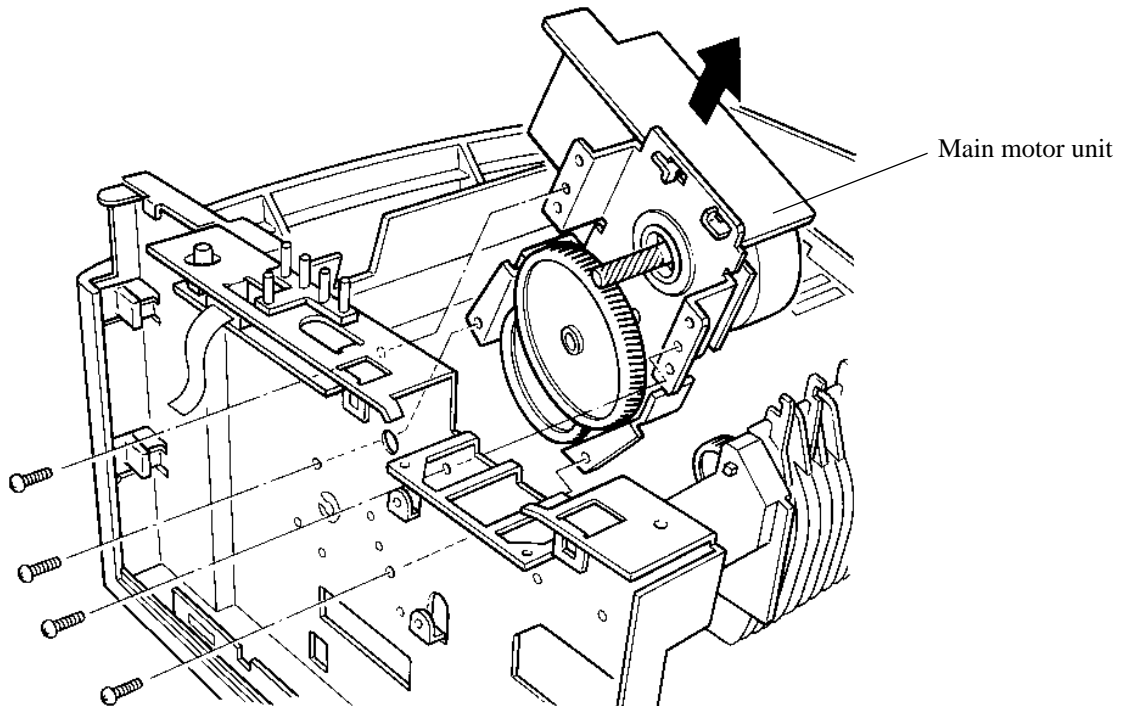
Main motor unit

5. Remove four screws and disconnect the cable to remove the main motor.
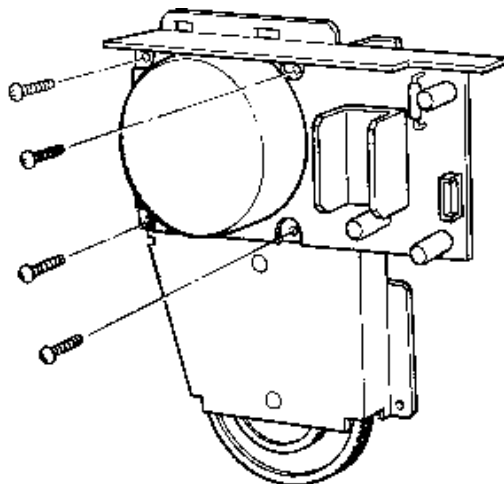
Installation

Reverse the removal procedure.

(11) Pick-up motor replacement

Removal
1. Remove side cover L. (See Item (1) Upper cover replacement.)
2. Remove the subassembly of the sensor board and the high-voltage power supply board. (See Item (9) High-voltage power supply board and sensor board replacement.)
3. Remove two screws to remove the pick-up motor.
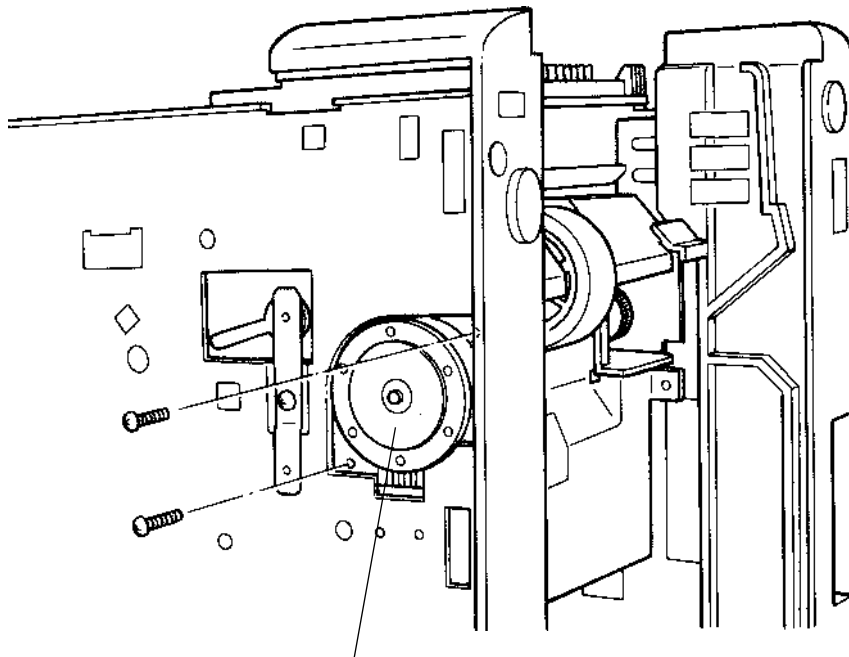
Pick-up motor

Installation
Reverse the removal procedure.

(12) Pick-up roller replacement

Removal

1. Remove the paper tray.
2. Remove side cover L. (See Item (1) Upper cover replacement.)
3. Remove the screw from the pick-up roller shaft FG plate and remove the FG plate.
4. Remove the bearing using a standard screw driver.
5. Pull the pick-up roller shaft out approximately 50 mm to remove the pick-up roller.

Note:

Do not pull out the shaft completely.

FG plate
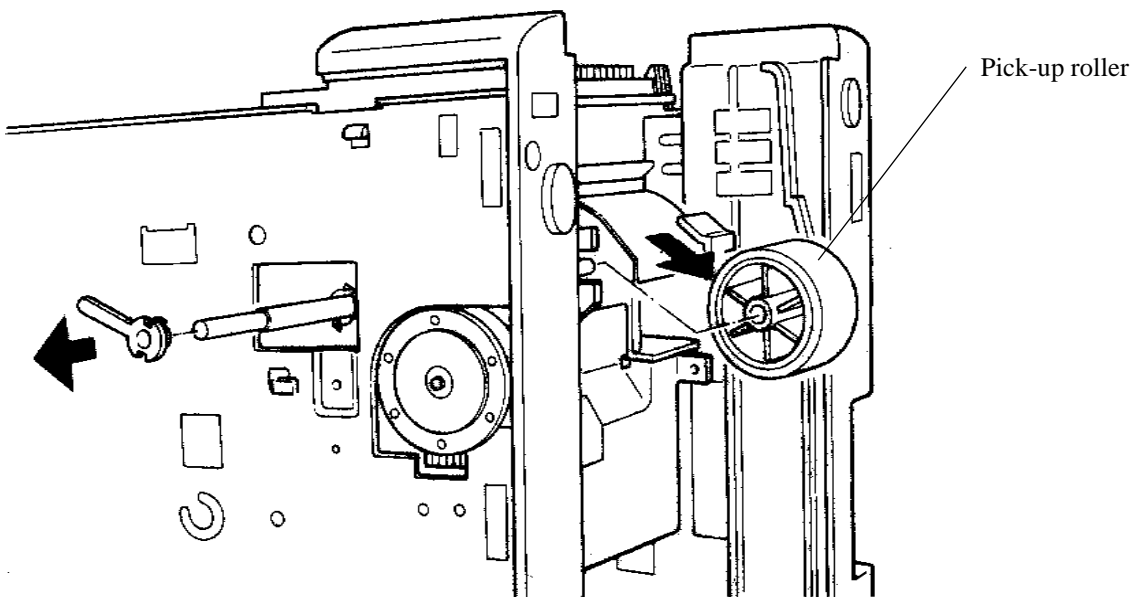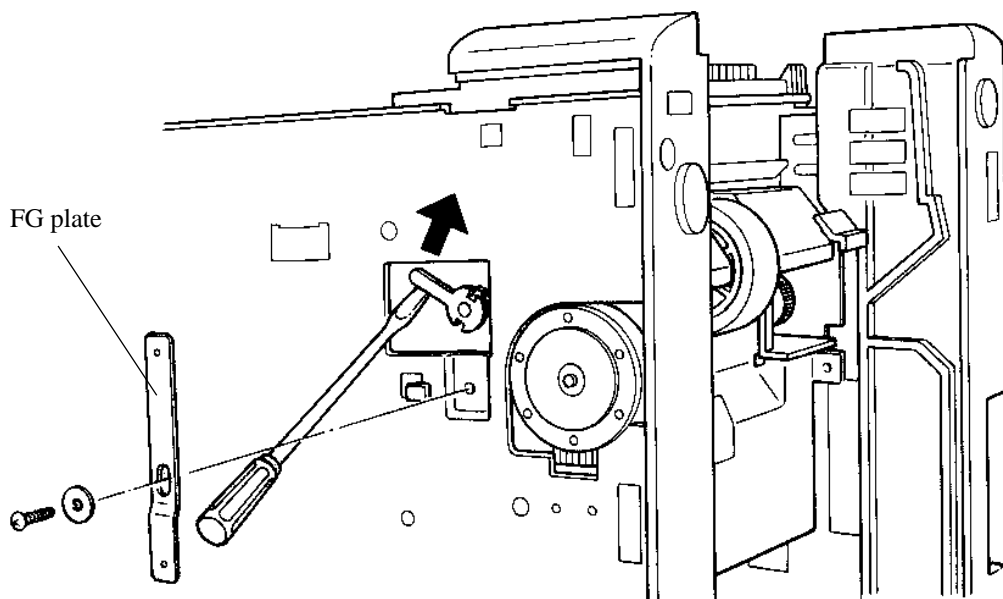
Pick-up roller

Installation

Reverse the removal procedure.

Note:

When putting the pick-up roller on the shaft, face the tapered rib of the roller toward the pick-up motor. The following shows the relative position of pick-up roller and pick-up motor viewed from the bottom.
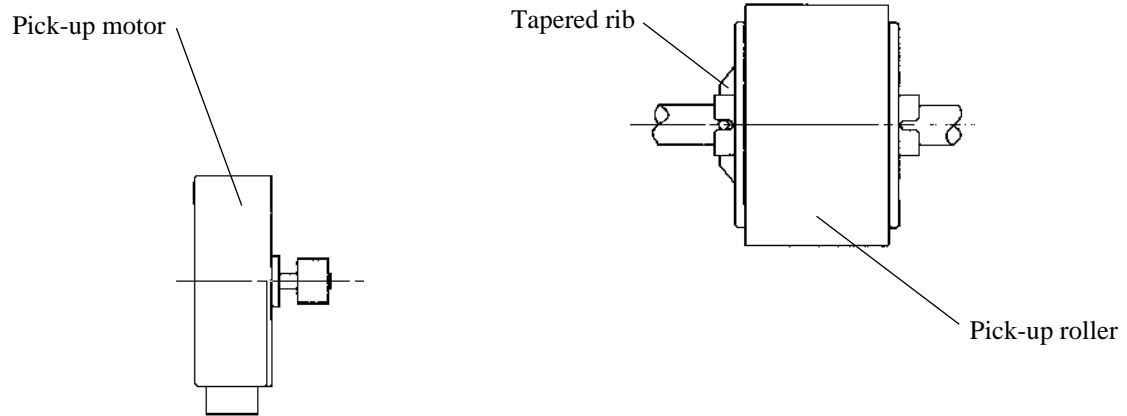
Pick-up motor

Tapered rib

Pick-up roller

Removal

1. Remove the control board. (See Item (8) Control board replacement.)
2. Remove two screws to pull out the resist motor.
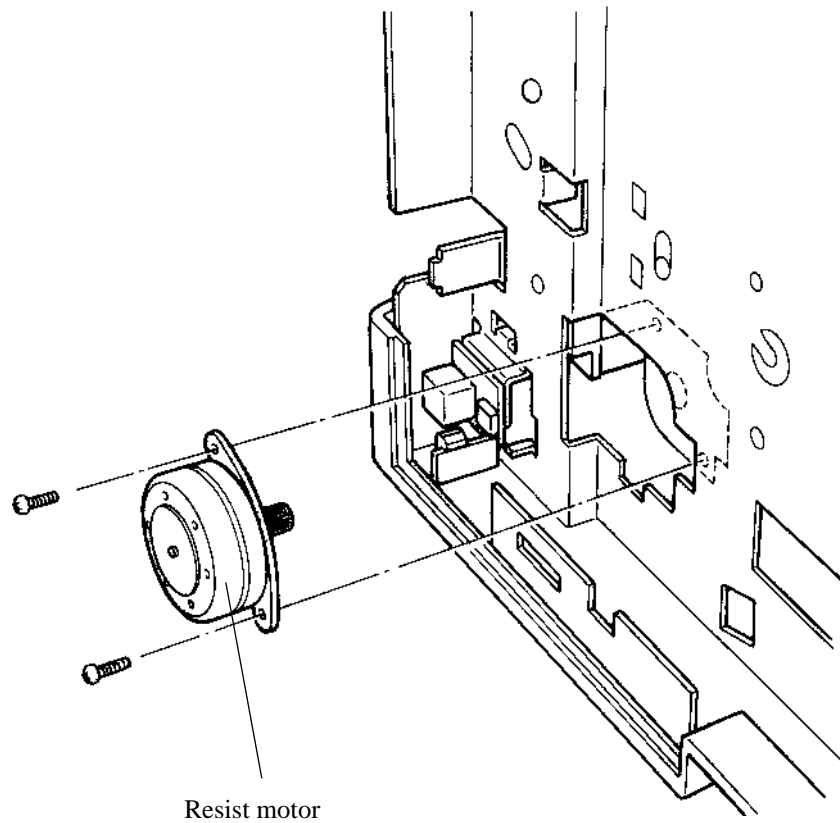
Resist motor

Installation

Reverse the removal procedure.

Reference:

The resist motor derives from the resist roller (in contact with the feed roller) which momentarily blocks the paper feed from the pick-up roller to align the paper.

(14) Paper feed roller replacement

Removal

1. Remove the upper cover and side covers L and R. (See Item (1) Upper cover replacement.)
2. Remove three screws, disengage three hooks, and disconnect the toner sensor connector to remove the front frame.

Front frame
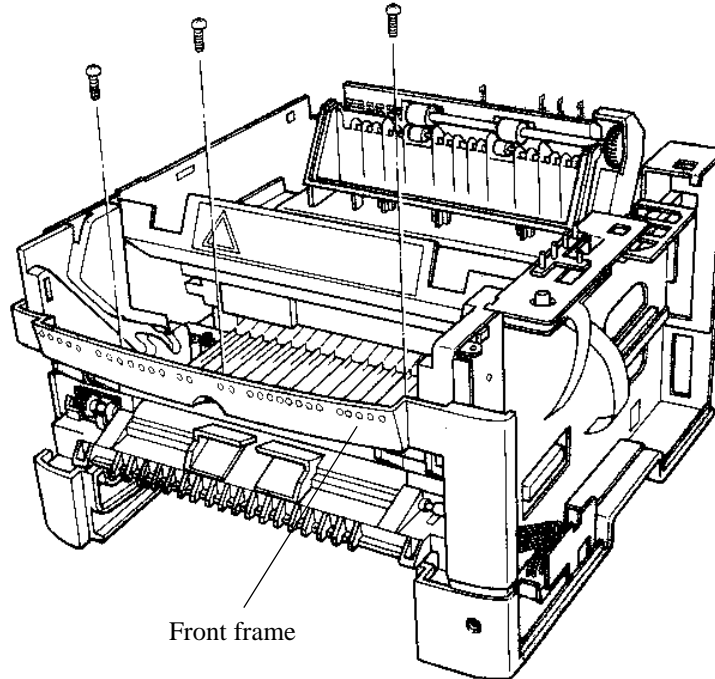
3. Remove the right and left springs of the resist roller and lift the resist roller to remove it.
4. Peel off the two guide sheets (Mylar films). Be sure to clearly remove the remaining substance of the double-sided adhesive tape.
5. Disengage the bearing phase shift levers at the both ends of the paper feed roller using a standard screwdriver and raise the levers upwards to remove the paper feed roller.

Spring

Guide sheets

Bearing

Resist roller
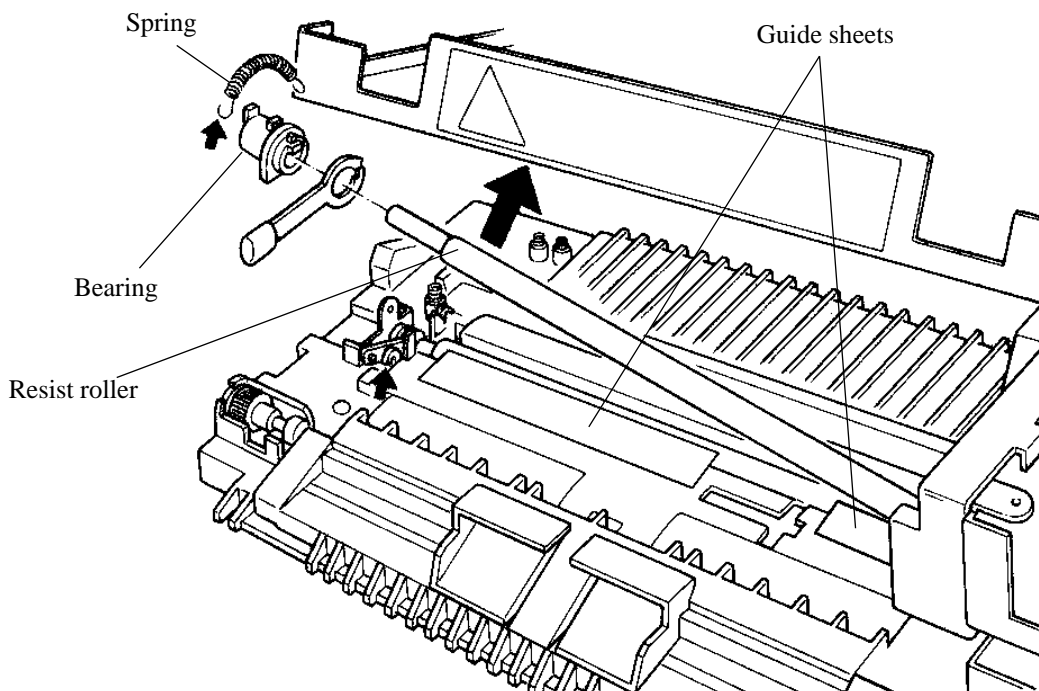
6. Cut the hook of the gear at the right end of the paper feed roller using a diagonal cutting pliers.

7. Move the paper feed roller to the left and pull out the roller from the left end.
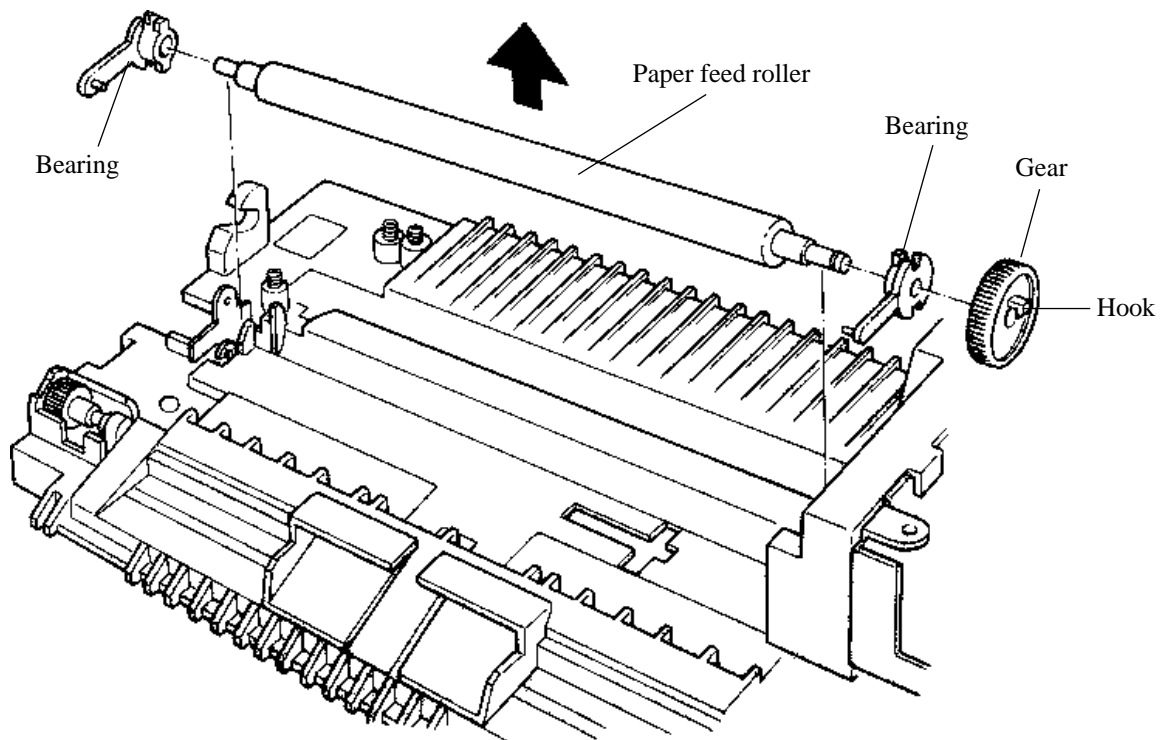
Installation

Reverse the removal procedure.

Notes:

1. When installing the paper feed roller:
    a. Fit one bearing to the left end (end without a D-cut) of the paper feed roller.
    b. Insert the right end D-cut of the paper feed roller into the hole of the other bearing then the hole of a new gear until the gear is caught by the hook.
    c. Insert the bearings into guide grooves on the base frame with the bearing phase shift levers set upwards. Then, turn the bearing levers to the initial state positions to secure the bearings to the base frame.

2. Adhere new guide sheets on the base frame: longer one to the left area and shorter one to the right area. Make sure that there is no clearance between the adhesive tape and the positioning edge as shown on the next page.

Guide sheets

Guide sheets

Rear

Positioning edge

Front

Positioning edges
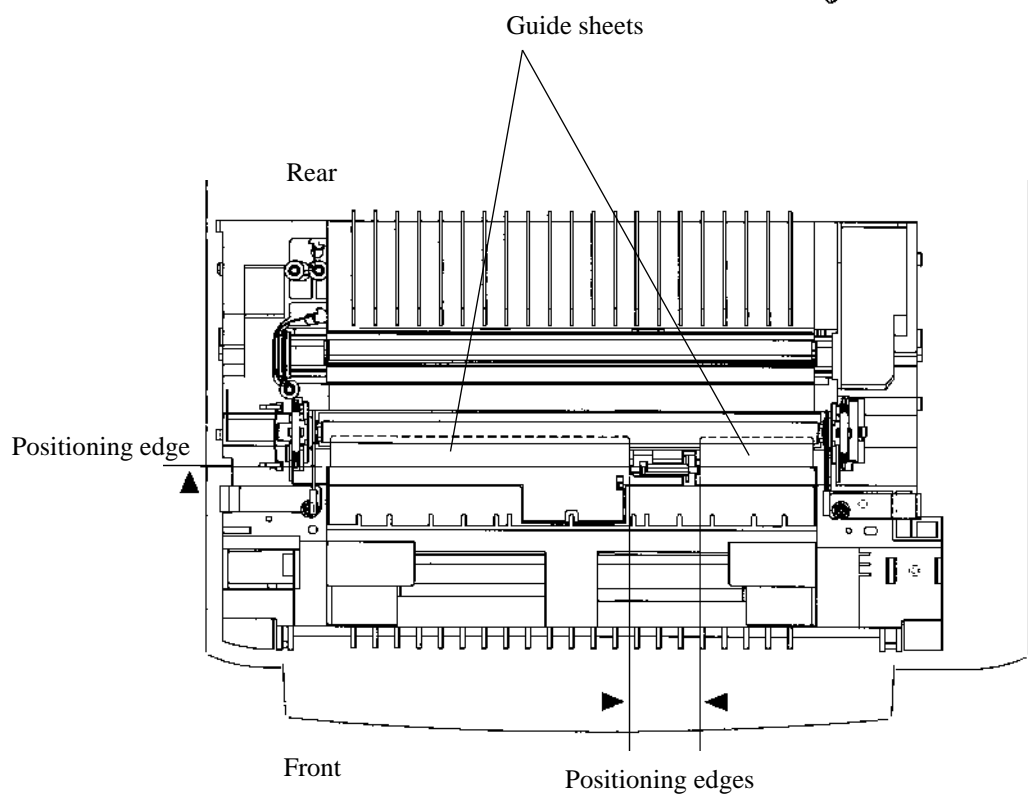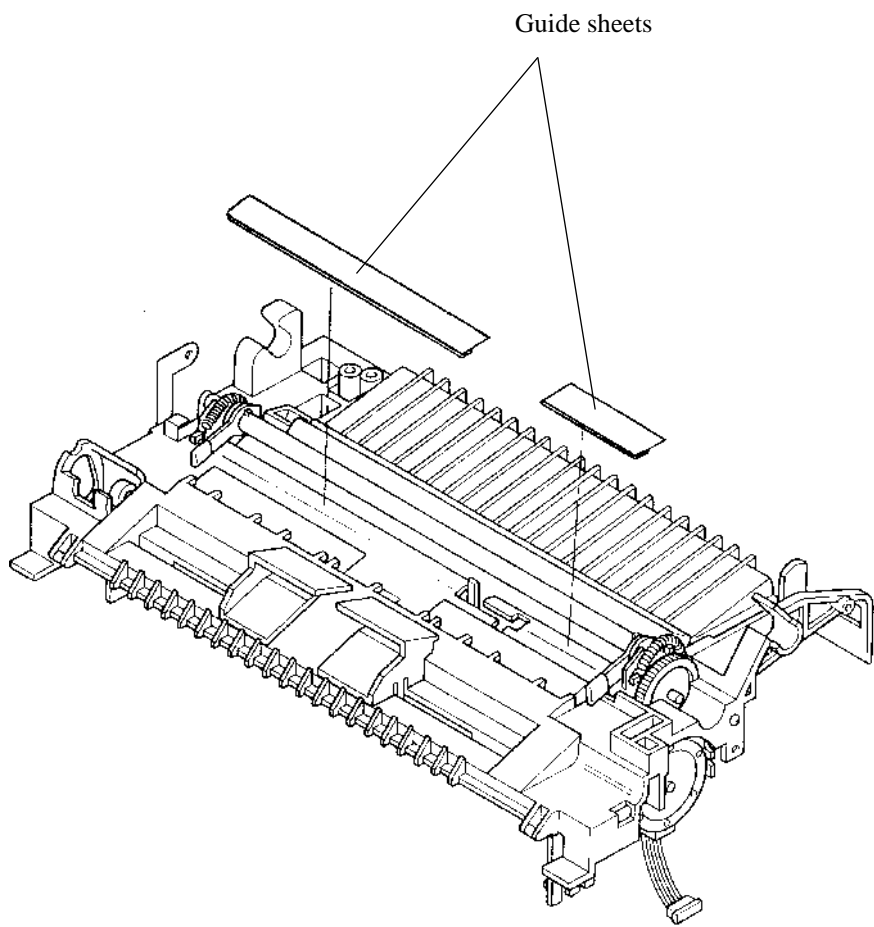
(15)   Transfer charger unit replacement

Removal
1.   Open the upper door.
2.   Remove the transfer charger unit holding block at the left side of the transfer charger unit using a screw driver.
3.   Open the claw on the left side of the base frame then lift the left side of the transfer charger unit using a screw driver to pull out the transfer charger unit toward the left side.

Note:
Be careful not to break the wire.

Holding block

Transfer charger unit
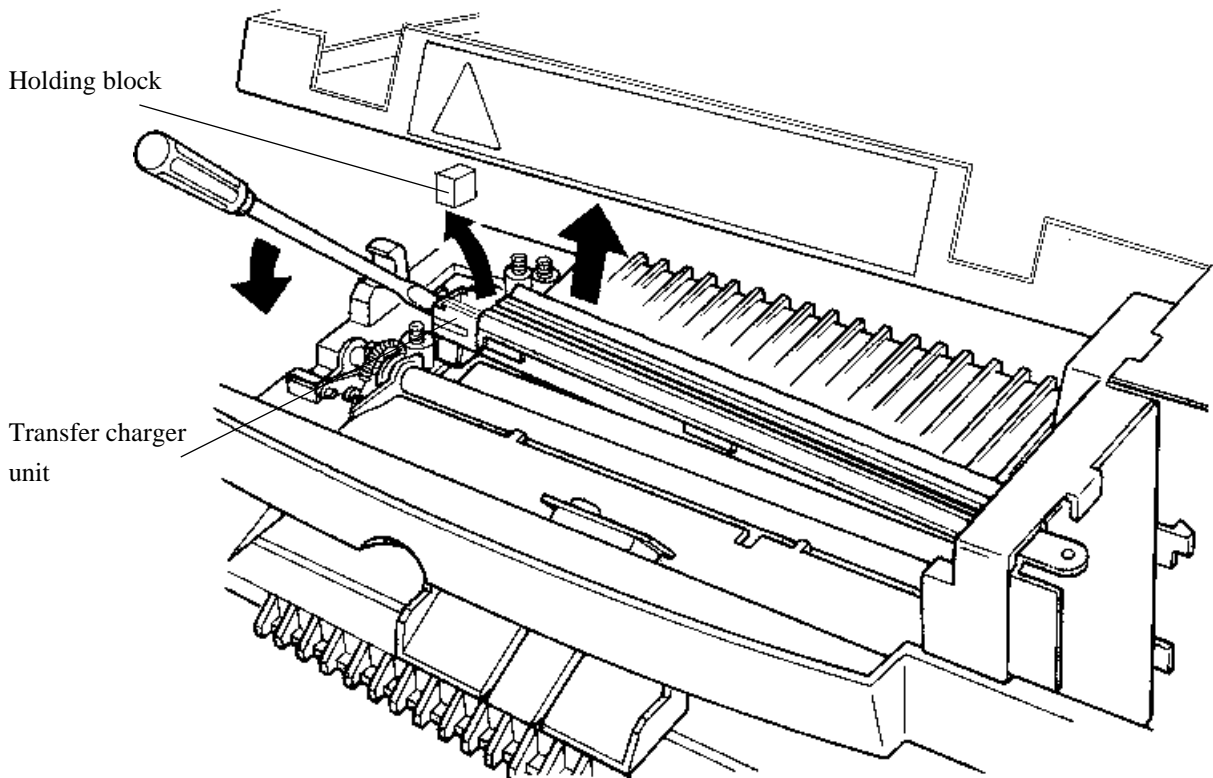
Installation
Reverse the removal procedure.

Note:
The inside is hot immediately after printing.

(16) Cover-open switch replacement

Removal
1. Remove the subassembly of the sensor board and the high-voltage power supply board. (See Item (9) High-voltage power supply board and sensor board replacement.)
2. Disconnect the connector from the cover-open switch.
3. Disengage the two claws of the left guide (for the print unit) and pull the left guide out in an upward direction to remove it.
4. Remove the cover-open switch.
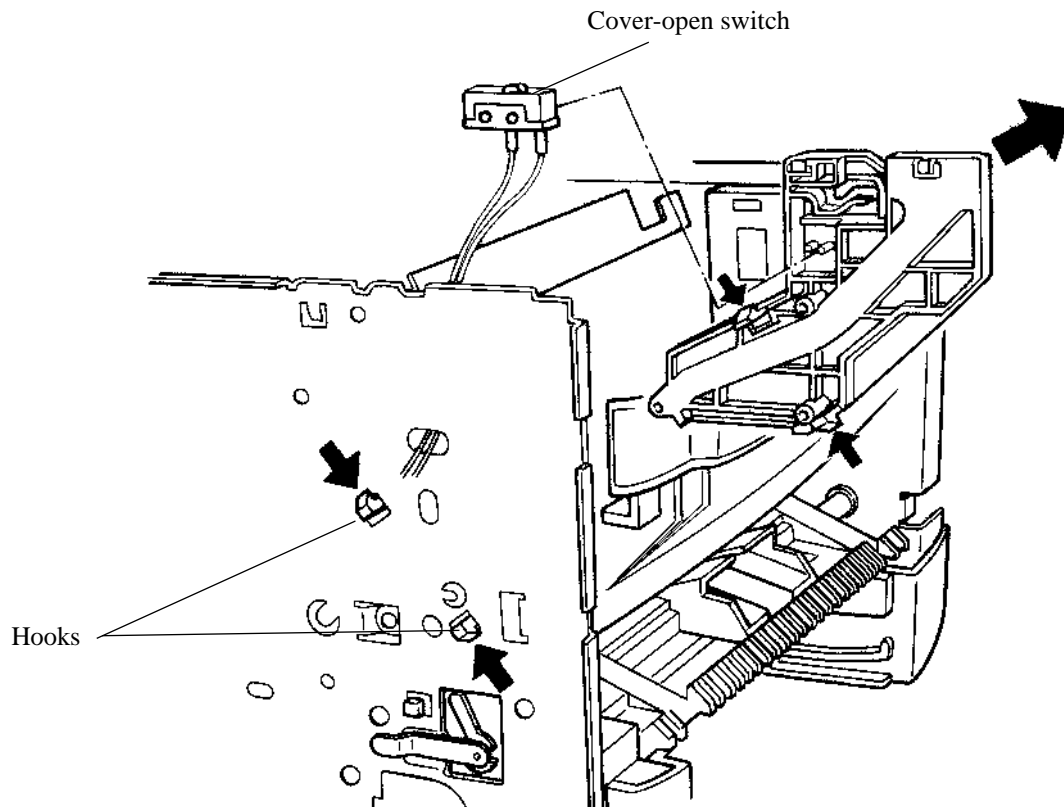
Cover-open switch

Hooks

Installation
Reverse the removal procedure.

Removal

1. Remove the control board. (See Item (8) Control board replacement.)

2. Remove the screw to remove the volume board from the bottom of the frame.

    Note:
    Use a short Phillips screwdriver.
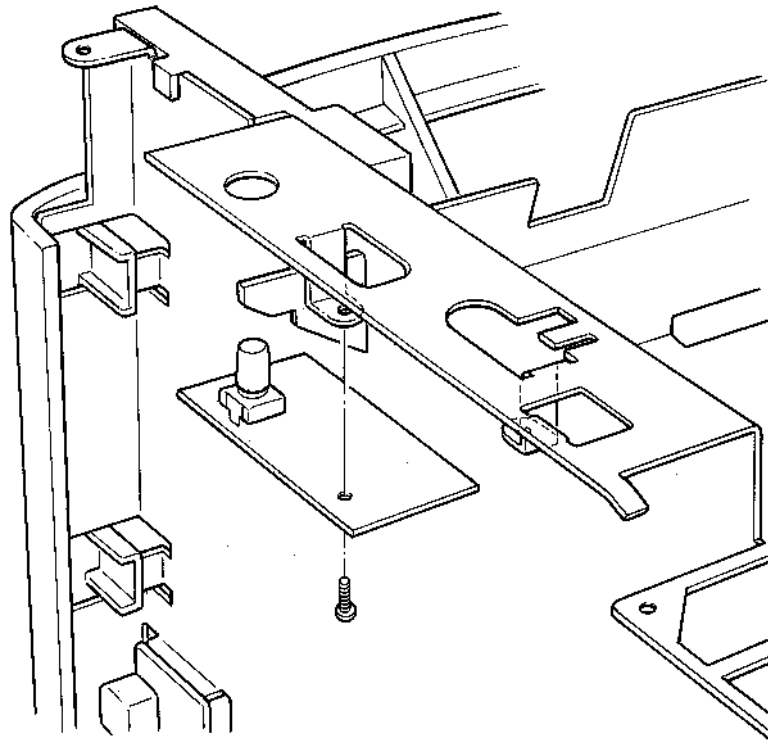
Installation

    Reverse the removal procedure.

(18)   Stacker-full sensor board (SFS board) replacement

Removal

1.   Remove the upper cover. (See Item (1) Upper cover replacement.)
2.   Remove the cable from the stacker-full sensor.
3.   Remove the screw at the rear of the board.
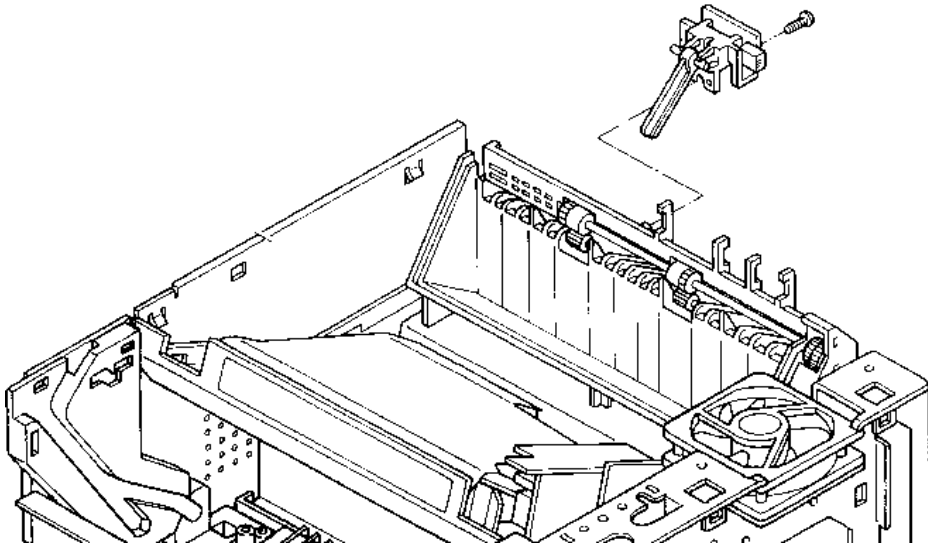
Installation
      Reverse the removal procedure.

(19) Frame-2 assembly replacement

Removal

    1.   Remove the upper cover. (See Item (1))

    2.   Remove the stacker-full sensor board. (See Item (18))

    3.   From the rear of the printer, draw out the paper guide.

    4.   Push outward the two hooks on the bottom of the frame-2 assembly to disengage them from the frame on which the laser unit is also mounted, and then lift the frame-2 assembly to remove it.

Rear view

Frame-2 assembly

CAUTION

Hook

Frame-2 assembly

Laser unit
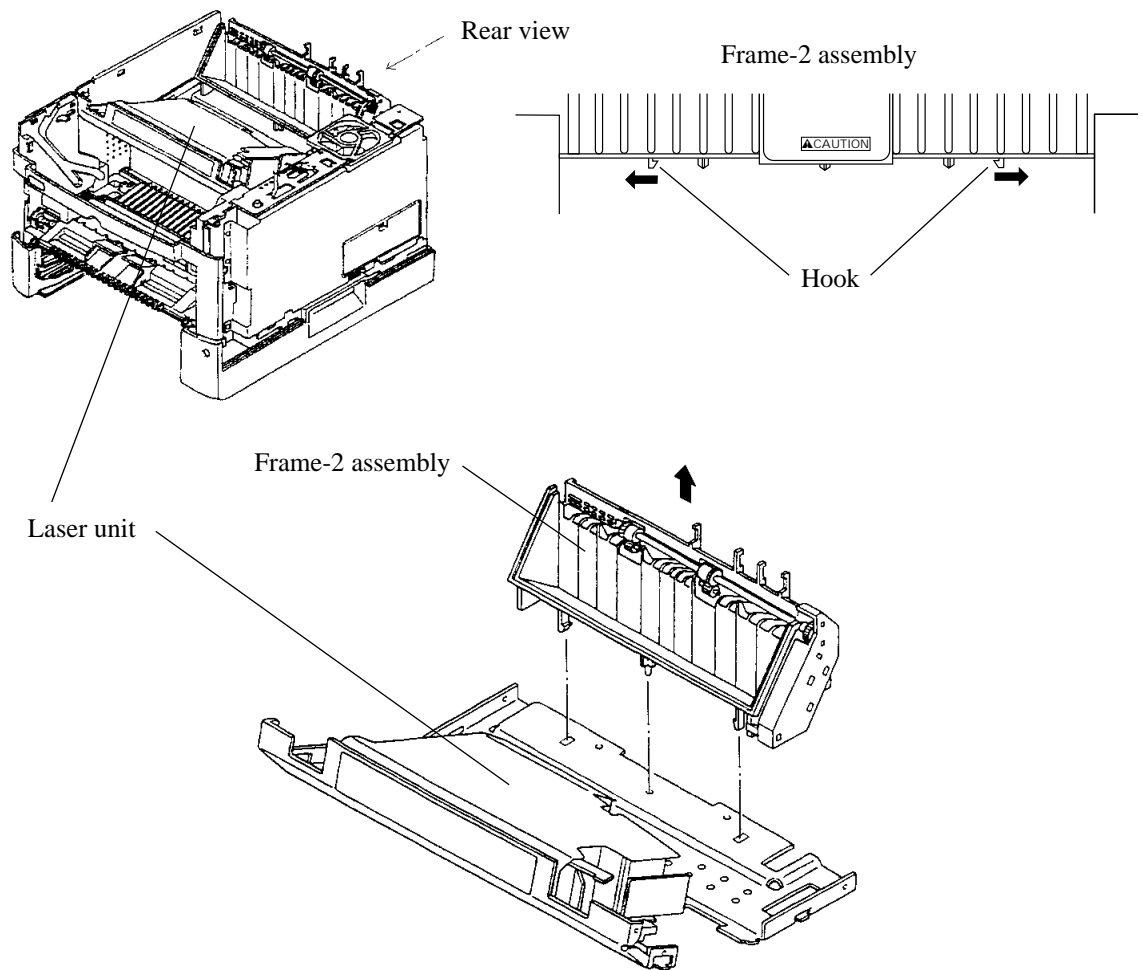
Installation

    Reverse the removal procedure.

(20) Multi-function feeder board (MFF board) replacement

Removal

1. Remove side cover R. (See Item (1) Upper cover replacement.)
2. Remove the cable from the MFF board.
3. Remove the screw at the top side of the board.
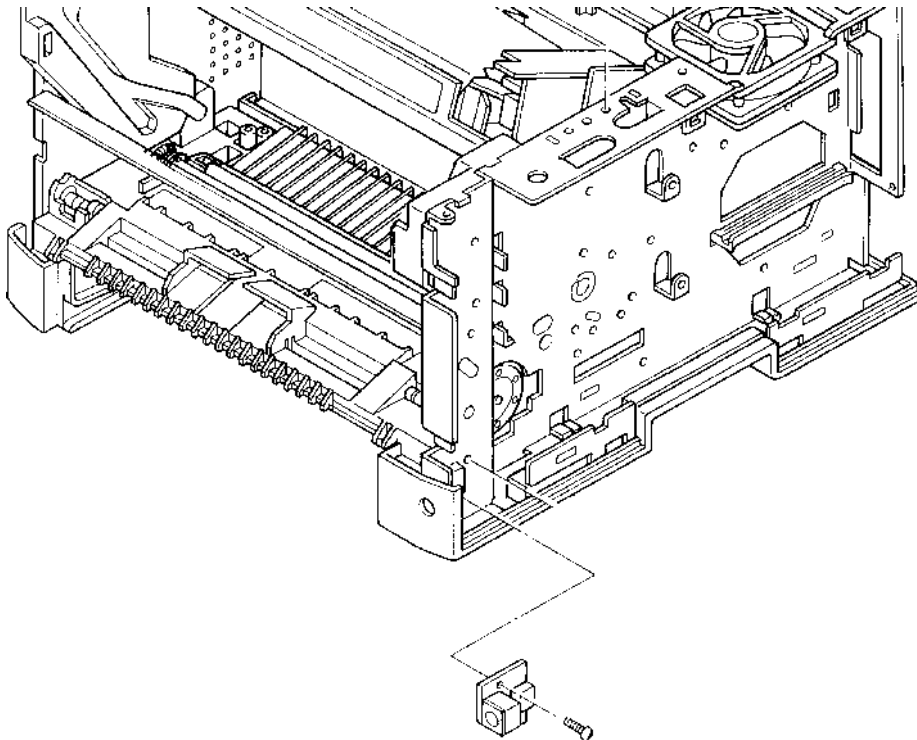
Installation

　　Reverse the removal procedure.

(21) Separator assembly (friction pad holder) replacement

Removal

1. Remove the paper tray from the printer.
2. Place the paper tray upside down and push in the four points of the lower paper guide to release and remove it.
3. Push in the two hooks of the separator assembly (friction pad holder) to release and remove it. Remember to keep the spring.
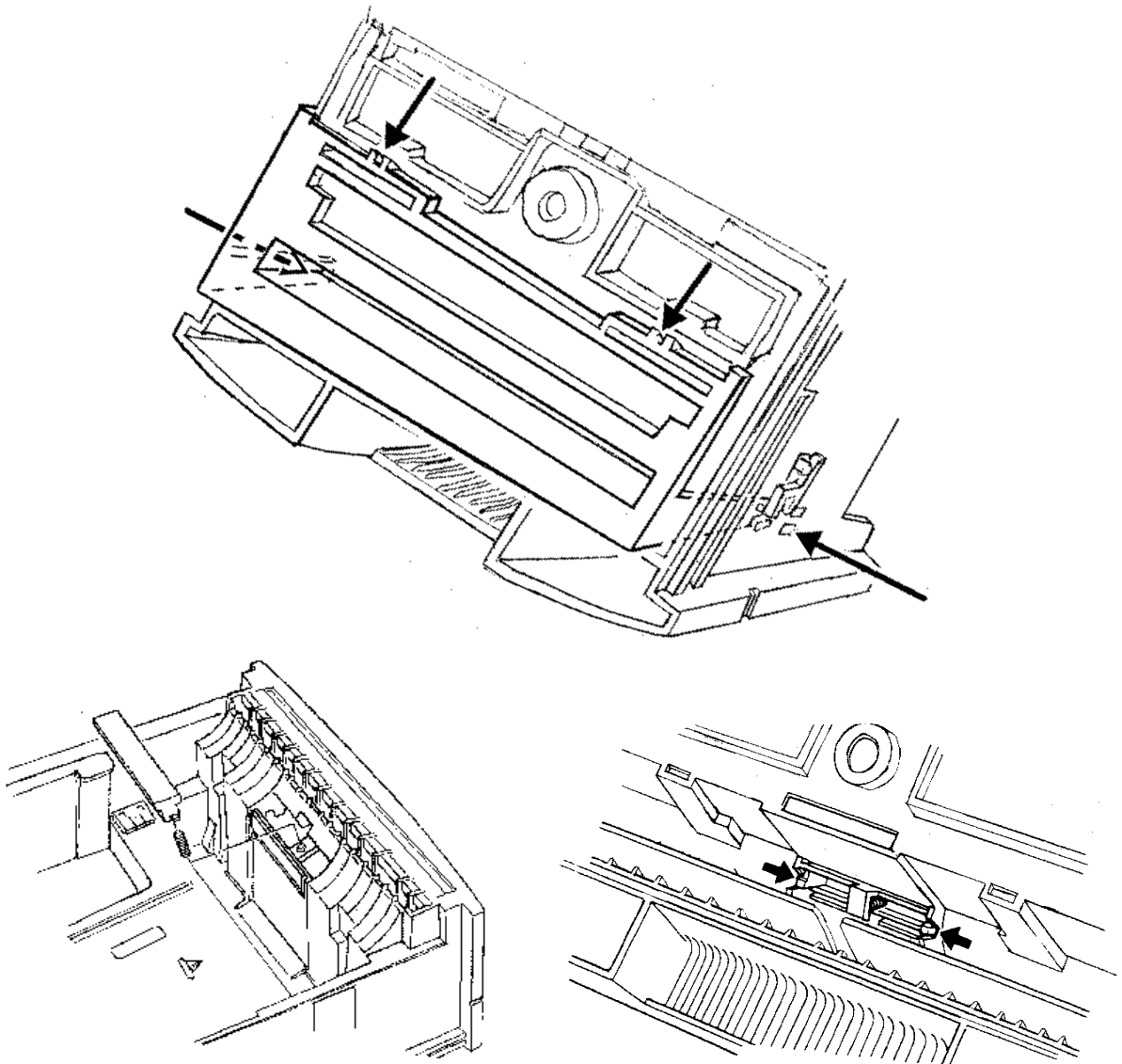
Installation

Reverse the removal procedure.

(22) Print unit disassembly

Disassembly

The print unit consists of two main parts, developing unit and OPC drum unit. They can be easily separated from each other.

1. Open the upper door and remove the print unit from the printer.
2. Remove the two clamps at both ends of the print unit.
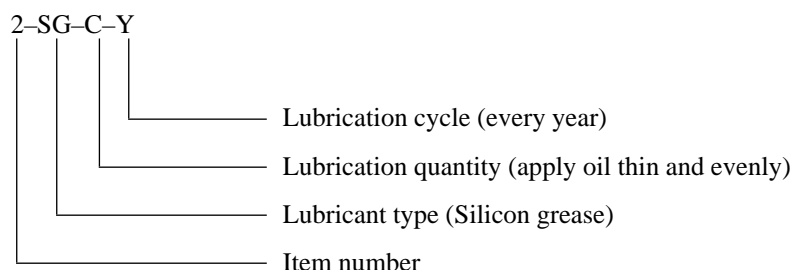3. Slide off the OPC drum unit along the grooves on the developing unit.

Developing unit

OPC drum unit

Clamp
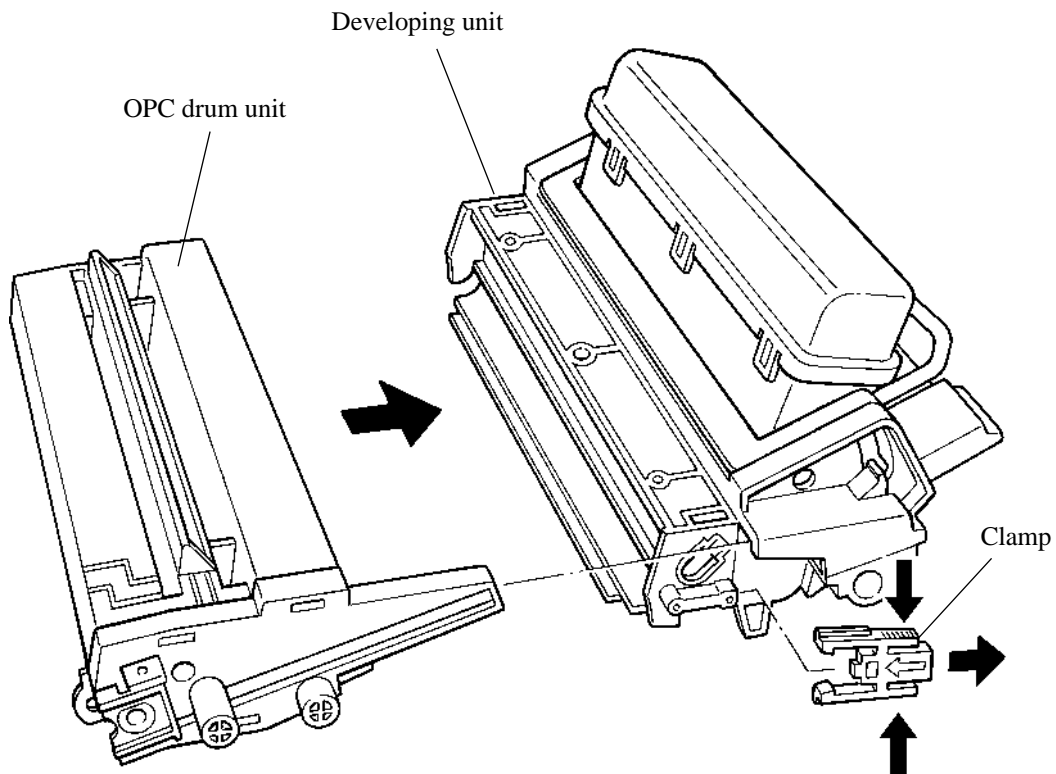
Assembly

Connect the OPC drum unit to the developer unit by reversing the procedures for removal.

4.9.2 Lubrication and Precautions

This section describes the lubrication procedures. The lubrication code is as follows:

2–SG–C–Y

- Lubrication cycle (every year)
- Lubrication quantity (apply oil thin and evenly)
- Lubricant type (Silicon grease)
- Item number

1. Item number

   Serial number of lubrication point on the diagram

2. Lubricant type

   SG: Silicon grease   Molycoat EM30L (Dow Yuning)
   "   FG: Conductive grease   FLOIL GE676 (Kanto Kasei)
   "   SSG: Silicon grease   KF-96H-10000CS (Shin-Etsu Silicon)
   "   SSG: Silicon grease   G501 (Shin-Etsu Silicon)
   "   MG: Grease   Mobile oil + Albania EP grease (1:1 mixing ratio)
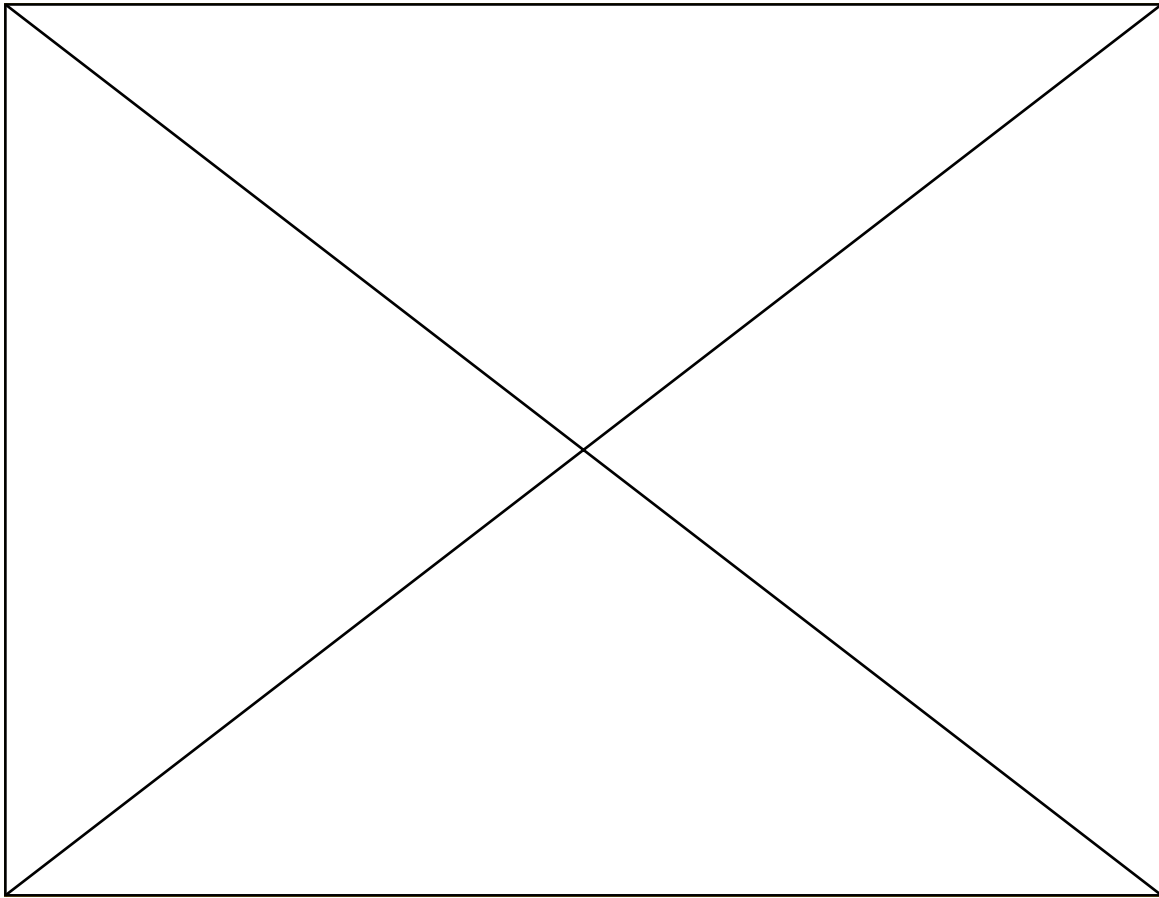   "

3. Lubricant quantity

   D: One drop
   S: Several drops
   F: Fill wick, case, etc.
   C: Apply oil thin and evenly
   H: One spray

4. Lubrication cycle

   2:   Every 2 months
   4:   Every 4 months
   6:   Every 6 months
   8:   Every 8 months
   Y: Every year
   O: At overhaul

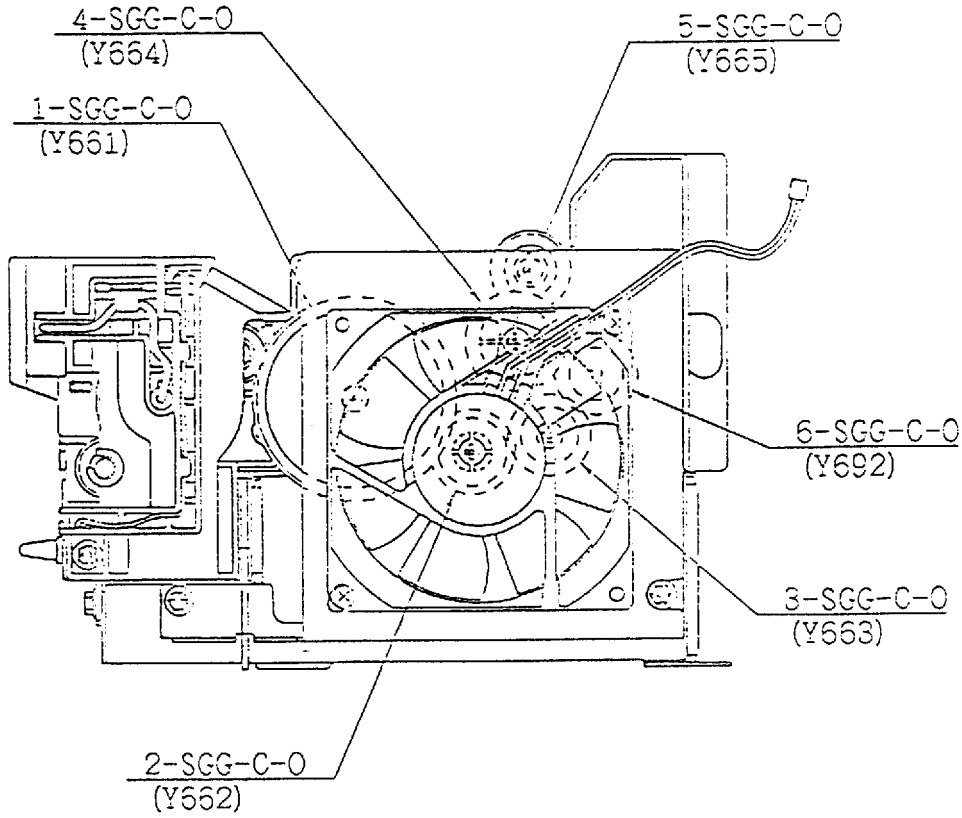(1) Base frame assembly

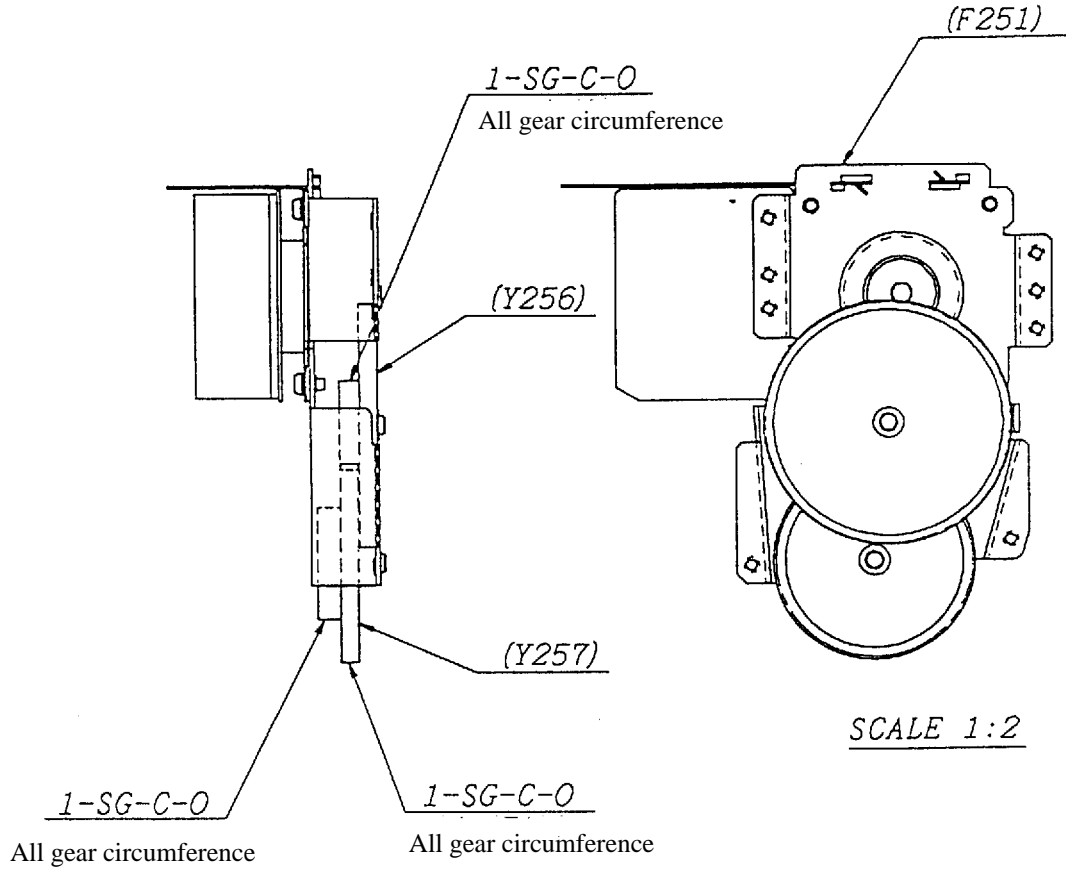| Item No.	Lubricant type	Lubricant quantity	Lubrication cycle	Part to be lubricated	Remarks
1	SGG	C	O	Y621 bearing sections with 8 mm diameter of the paper feed roller	Apply both bearings. Do not apply to roller surface and bearing sections with 10 mm diameter.

(2)   Frame L assembly
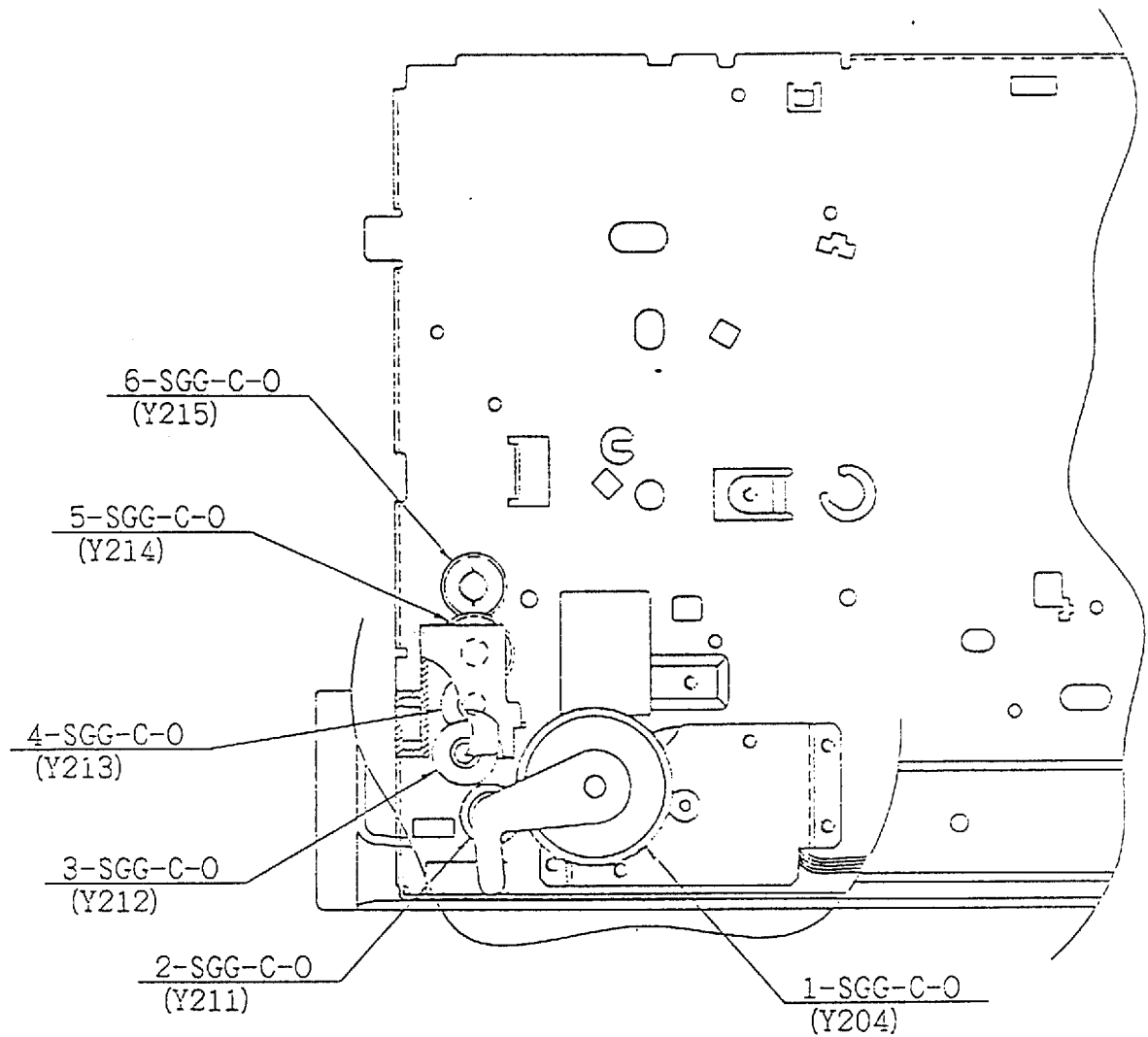
6-SGG-C-O
(Y215)

5-SGG-C-O
(Y214)

4-SGG-C-O
(Y213)

3-SGG-C-O
(Y212)

2-SGG-C-O
(Y211)

1-SGG-C-O
(Y204)

Item No.	Lubricant type	Lubricant quantity	Lubrication cycle	Part to be lubricated	Remarks
1	SGG	C	O	- Y204 gear tooth surface and shaft	
2	SGG	C	O	- Y211 gear tooth surface and shaft	
3	SGG	C	O	- Y212 gear tooth surface and shaft	
4	SGG	C	O	- Y213 gear tooth surface and shaft	
5	SGG	C	O	- Y214 gear tooth surface and shaft	
6	SGG	C	O	- Y215 gear tooth surface and shaft	

(3)　Fuser unit

Item No.	Lubricant type	Lubricant quantity	Lubrication cycle	Part to be lubricated	Remarks
1	SGG	C	O	- Y651 gear tooth surface and shaft	
2	SGG	C	O	- Y662 gear tooth surface and shaft	
3	SGG	C	O	- Y663 gear tooth surface and shaft	
4	SGG	C	O	- Y664 gear tooth surface and shaft	
5	SGG	C	O	- Y665 gear tooth surface and shaft	
6	SGG	C	O	- Y692 gear tooth surface and shaft	

(4)   Main motor unit

1-SG-C-O
All gear circumference

(F251)

(Y256)

(Y257)

1-SG-C-O
All gear circumference

1-SG-C-O
All gear circumference

SCALE 1:2

Item No.	Lubricant type	Lubricant quantity	Lubrication cycle	Part to be lubricated	Remarks
1	SG	C	O	- Gear tooth surface and shaft (2)	

(5) Frame-2 assembly
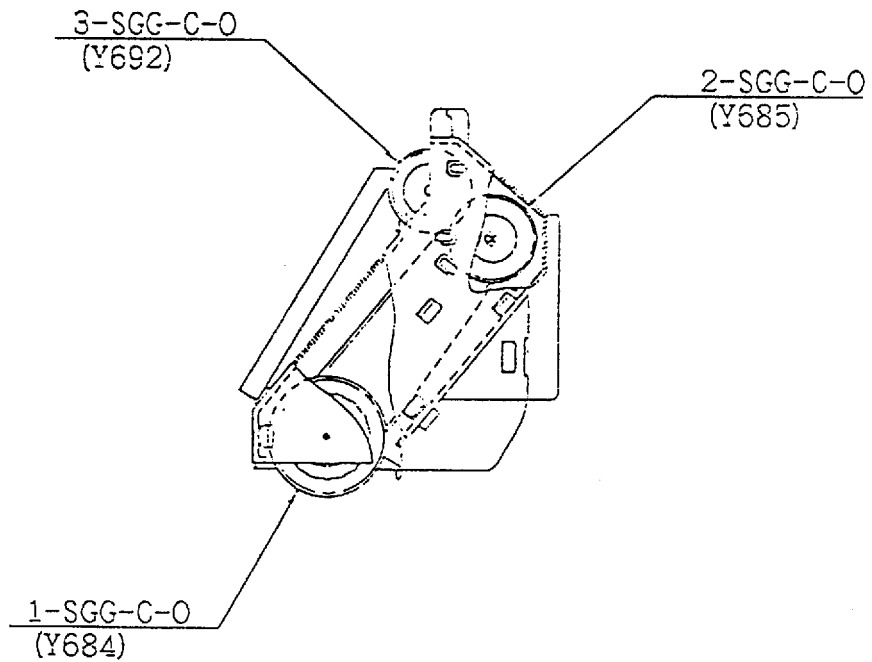
Item No.	Lubricant type	Lubricant quantity	Lubrication cycle	Part to be lubricated	Remarks
1	SGG	C	O	- Y684 gear tooth surface and shaft	
2	SGG	C	O	- Y685 gear tooth surface and shaft	
3	SGG	C	O	- Y692 gear tooth surface and shaft	

(6)   Guide assembly
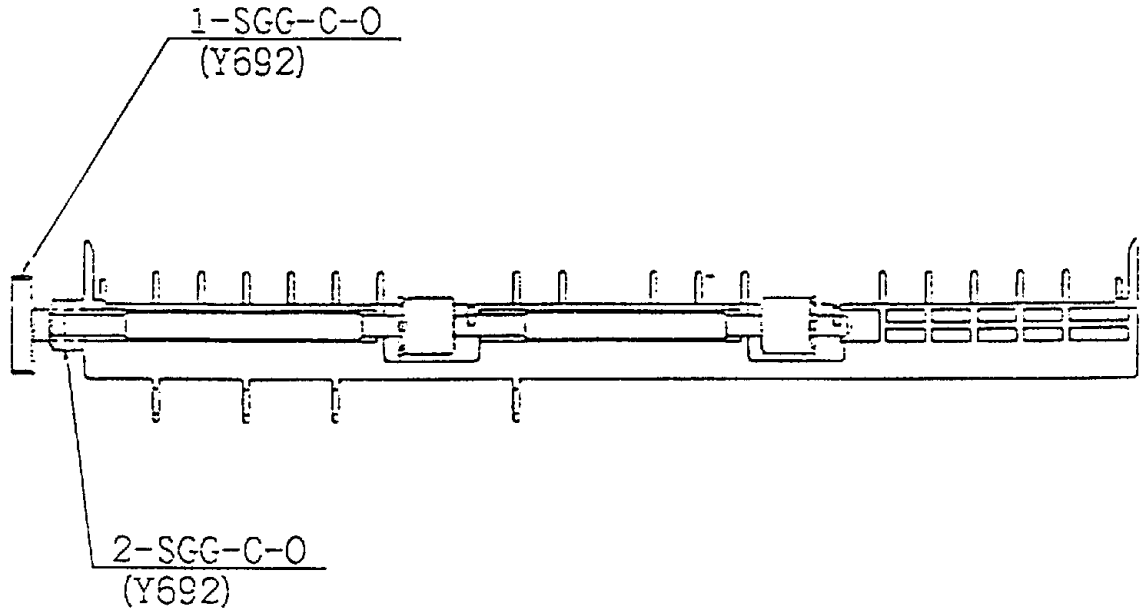
Item No.	Lubricant type	Lubricant quantity	Lubrication cycle	Part to be lubricated	Remarks
1	SGG	C	O	- Y692 gear tooth surface	
2	SGG	C	O	- Y692 shaft	

(7)   Feed-2 assembly
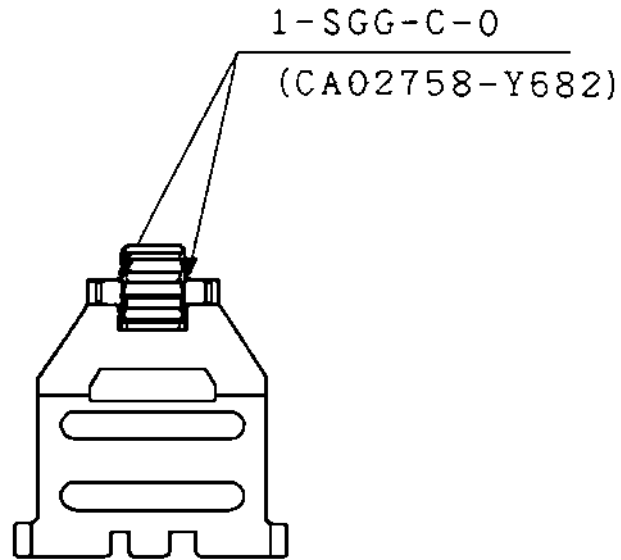
```
1-SGG-C-O
(CA02758-Y682)
```

Item No.	Lubricant type	Lubricant quantity	Lubrication cycle	Part to be lubricated	Remarks
1	SGG	C	O	- Bearing and edge of CA02758-Y682	

(8)   Gear box assembly
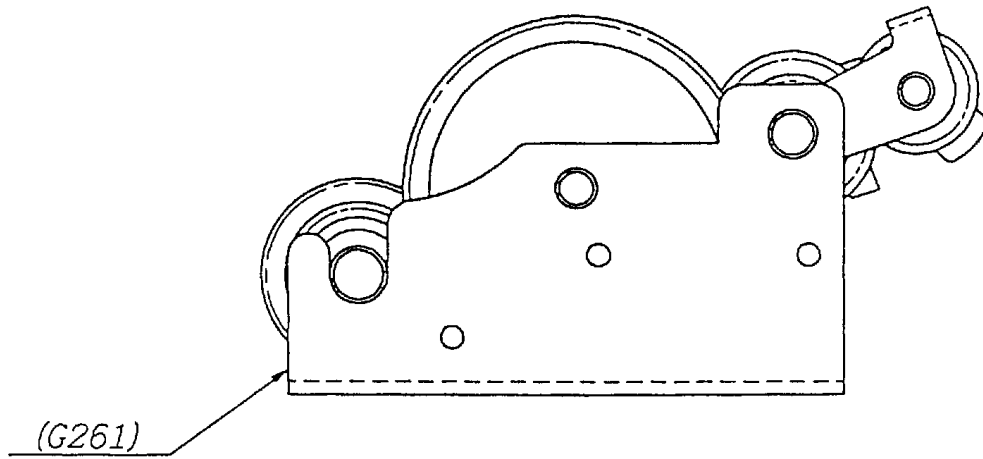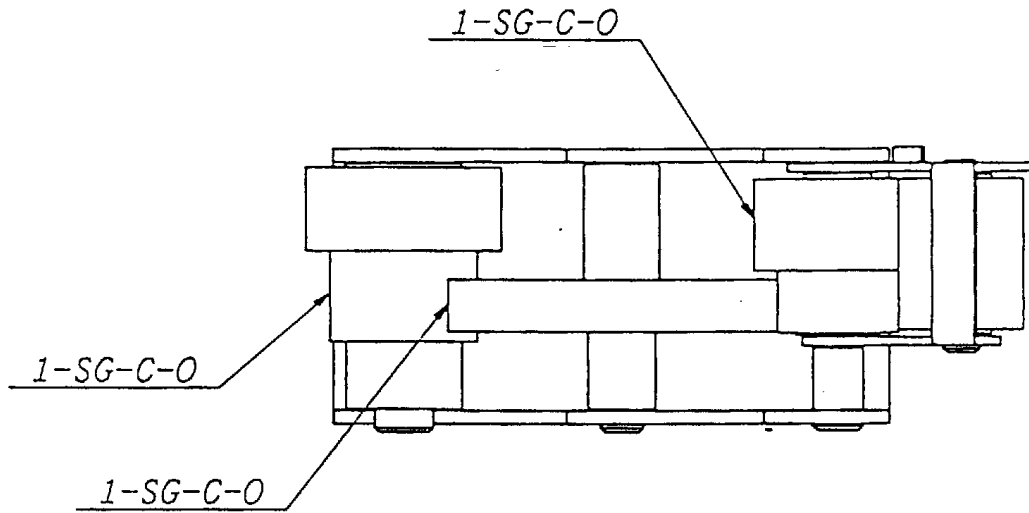
1-SG-C-O

1-SG-C-O

1-SG-C-O

(G261)

Item No.	Lubricant type	Lubricant quantity	Lubrication cycle	Part to be lubricated	Remarks
1	SG	C	O	- Gear tooth surface and shaft (2)	

(9)   Gear box lever assembly
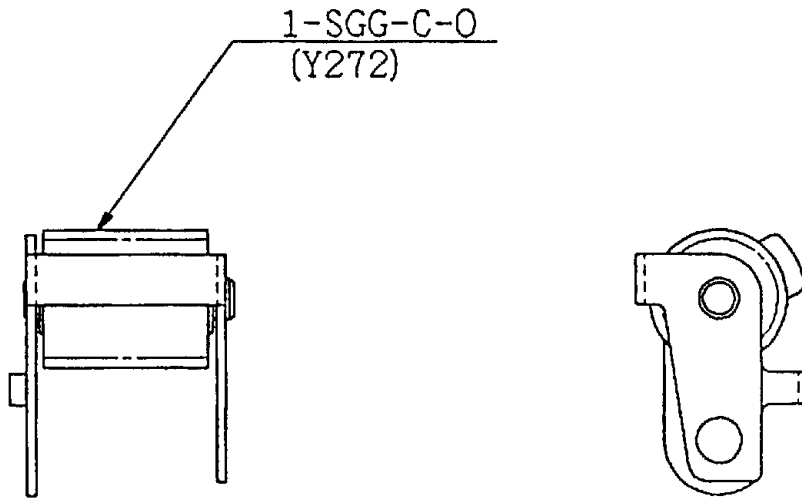
1-SGG-C-O
(Y272)

Item No.	Lubricant type	Lubricant quantity	Lubrication cycle	Part to be lubricated	Remarks
1	SGG	C	O	- Y272 gear shaft	

(10) Developing unit
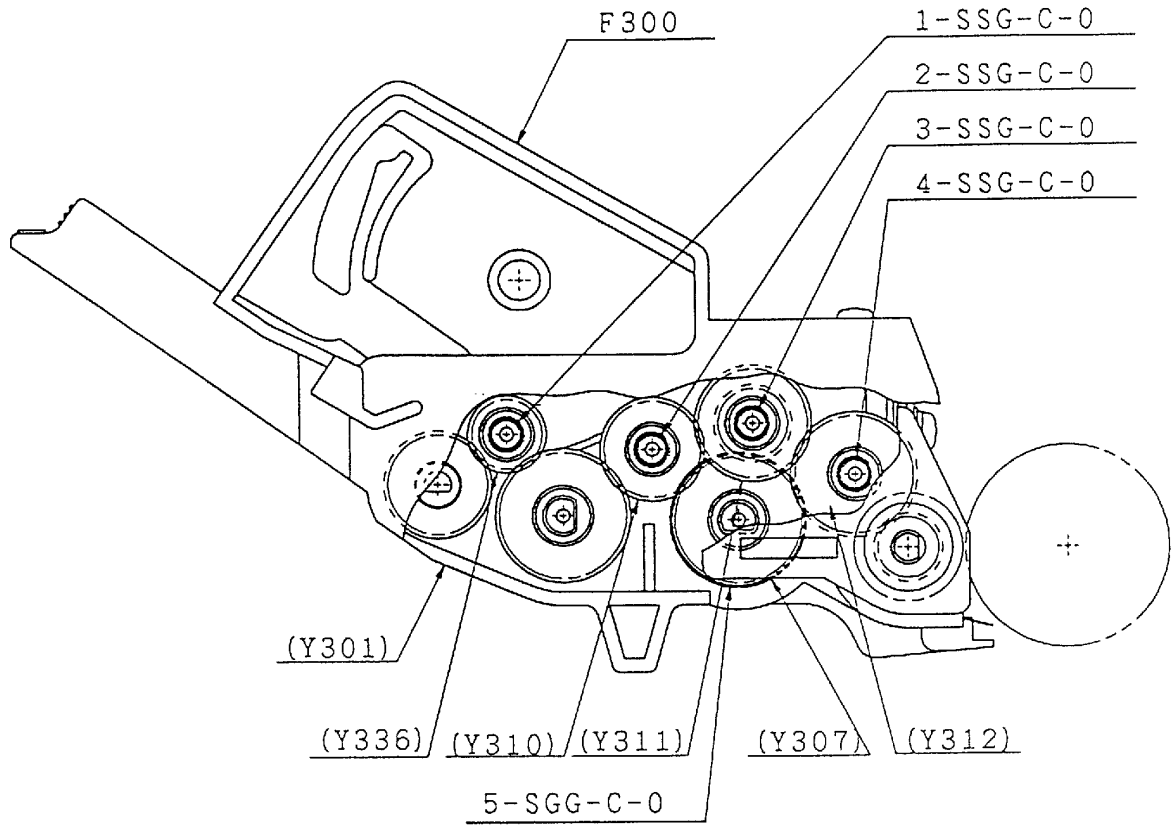
Item No.	Lubricant type	Lubricant quantity	Lubrication cycle	Part to be lubricated	Remarks
1	SSG	C	O	- Gear bore (Y336)	
2	SSG	C	O	- Gear bore (Y310)	
3	SSG	C	O	- Gear bore (Y311)	
4	SSG	C	O	- Gear bore (Y312)	
5	SGG	C	O	- Gear bore (Y307)	
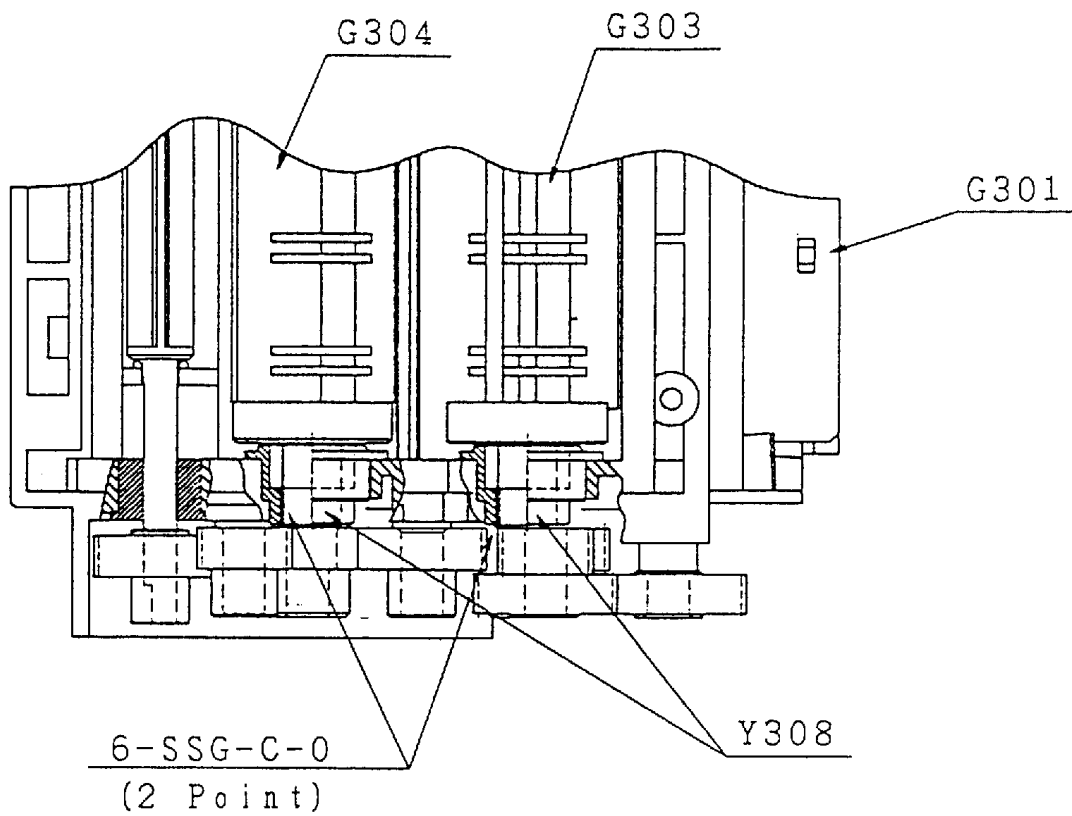
Item No.	Lubricant type	Lubricant quantity	Lubrication cycle	Part to be lubricated	Remarks
6	SSG	C	O	- Bearing slide (Y308)	Two places

(11)   Magnet roller bracket assembly
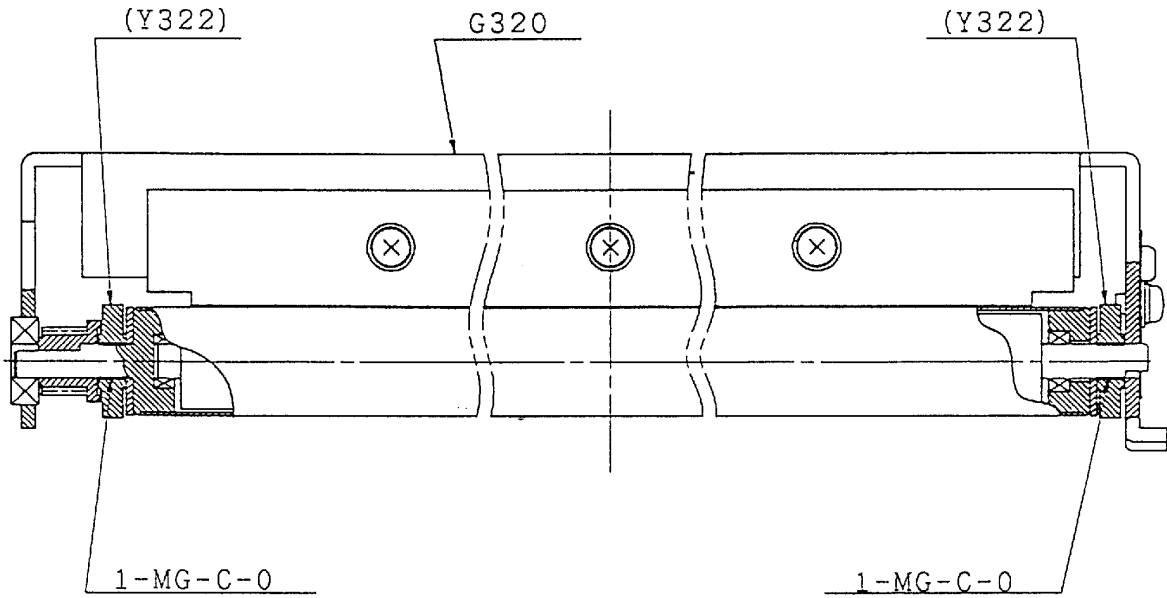
```
(Y322)              G320                    (Y322)
```

1-MG-C-O   1-MG-C-O

Item No.	Lubricant type	Lubricant quantity	Lubrication cycle	Part to be lubricated	Remarks
1	MG	C	O	- Y322 bore	Two places

(12)   Heat roller subunit
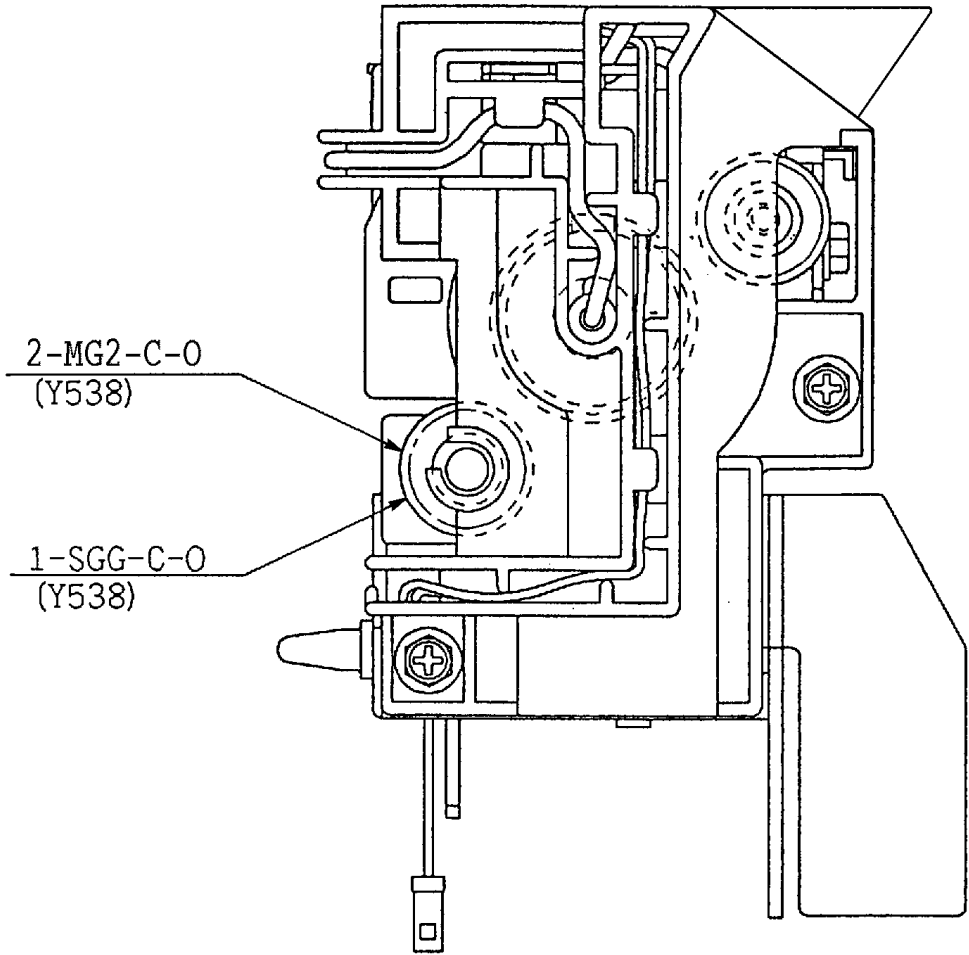
2-MG2-C-O
(Y538)

1-SGG-C-O
(Y538)

Item No.	Lubricant type	Lubricant quantity	Lubrication cycle	Part to be lubricated	Remarks
1	SGG	C	O	- Y538 gear tooth surface	
2	MG2	C	O	- Y538 gear shaft	

(13) Heat roller base unit
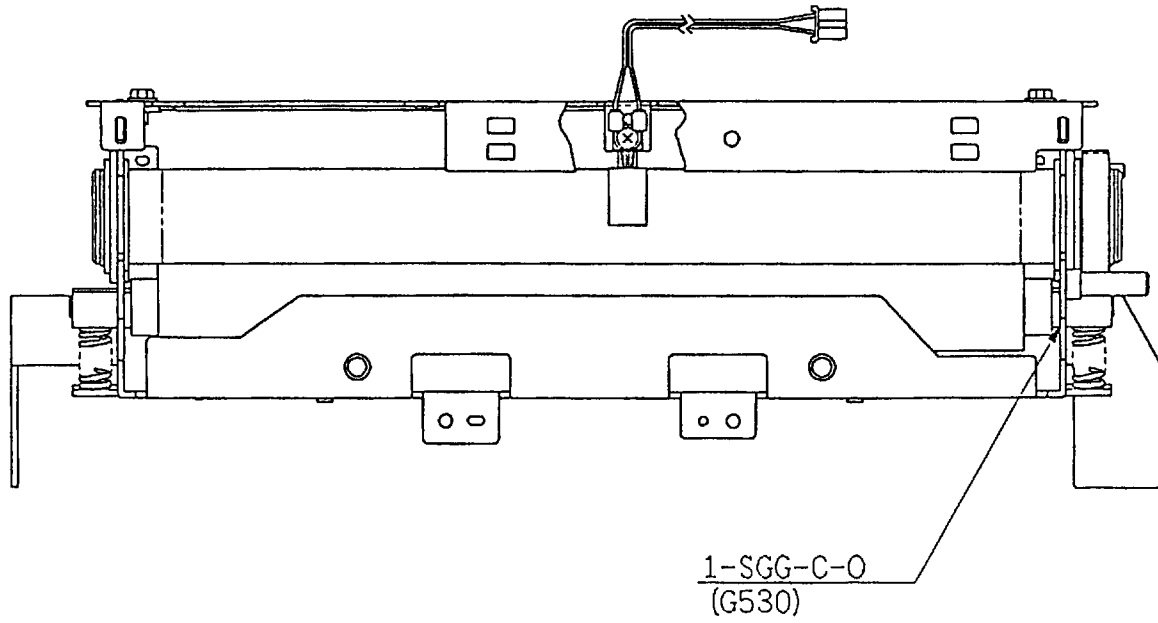
1-SGG-C-O
(G530)

Item No.	Lubricant type	Lubricant quantity	Lubrication cycle	Part to be lubricated	Remarks
1	SGG	C	O	- G530 bearing (both sides)	Do not apply to the rubber roller.

4.10 DIAGNOSTICS

4.10.1 Printing the Status Report

This function prints a page that summarizes printer option settings and lists samples of resident fonts. The option settings include information on interface parameters, available emulations, characteristics of the selected font, and firmware and font versions. See Figure 4-5. The status report includes a warning message when some of consumables reach their end of life.

The status report printing can be used in place of the test print mode (see Section 4.10.4). The method of operation and sample of results are shown below.

Operation:

1. Make sure that the message display indicates READY with the ONLINE and DATA indicators off.

2. Press the SELF TEST button for five or more seconds.

    The message changes to SELF TEST with the DATA indicator flashing and the status report begins printing. After printing, the printer returns to the original state.

Status report printing can also be started by PPMENU. See the last section in this chapter.

Pressing the PRINT FONT button instead of the SELF TEST button starts printing the font report that lists all available fonts. See Figure 4-6.

> Note:
> The status and font reports are printed for either the PCL emulation or the FPS emulation according to the emulation used for last printing. FPS is selected when the printer is turned on. The FPS font report does not include ESC sequences to print fonts.

Status Report
CA04040 Page Printer

Printing Menu

Copies	= 1
PS Errors	= On
Paper	= Letter
I/O Timeout	= 15
Manual Feed	= Off

Configuration Menu

Personality	= PS
Banding Mode	= Off (Speed Model)
ACK	= Inside
Bidirection Mode	= On
NPAP Mode	= Off
Jam Recovery	= On
Autocont	= Off
Default Paper Thickness	= Off

Options Menu

RAM Size	= 11 MB
Resolution	= 600 dpi

PS Menu

Password	= 0
Idle Font Caching	= Off
Printer Name	= CA04040
Product Name	= CA04040
PS Code Version	= 2003.002
Firmware Level	= R03L26
Job Timeout	= 0
Manual Feed Timeout	= 60
Wait Timeout	= 300

POWERPAGE

Figure 4-5 Status Report (FPS Emulation)

35 PostScript Compatible Fonts

CA04040 Page Printer

Courier	ABCDabcd1234!@#$
Courier-Bold	**ABCDabcd1234!@#$**
Courier-BoldOblique	*ABCDabcd1234!@#$*
Courier-Oblique	*ABCDabcd1234!@#$*
Helvetica	ABCDabcd1234!@#$
Helvetica-Bold	**ABCDabcd1234!@#$**
Helvetica-BoldOblique	*ABCDabcd1234!@#$*
Helvetica-Oblique	*ABCDabcd1234!@#$*
Helvetica-Narrow	ABCDabcd1234!@#$
Helvetica-Narrow-Bold	**ABCDabcd1234!@#$**
Helvetica-Narrow-BoldOblique	*ABCDabcd1234!@#$*
Helvetica-Narrow-Oblique	*ABCDabcd1234!@#$*
Times-Roman	ABCDabcd1234!@#S
Times-Bold	**ABCDabcd1234!@#$**
Times-BoldItalic	*ABCDabcd1234!@#$*
Times-Italic	*ABCDabcd1234!@#$*
Symbol	ΛΒΧΔαβχδ1234!≅#Ⅎ
Palatino-Roman	ABCDabcd1234!@#$
Palatino-Bold	**ABCDabcd1234!@#$**
Palatino-BoldItalic	*ABCDabcd1234!@#$*
Palatino-Italic	*ABCDabcd1234!@#$*
NewCenturySchlbk-Roman	ABCDabcd1234!@#$
NewCenturySchlbk-Bold	**ABCDabcd1234!@#$**
NewCenturySchlbk-BoldItalic	***ABCDabcd1234!@#$***
NewCenturySchlbk-Italic	*ABCDabcd1234!@#$*
AvantGarde-Book	ABCDabcd1234!@#$
AvantGarde-Demi	**ABCDabcd1234!@#$**
AvantGarde-DemiOblique	***ABCDabcd1234!@#$***
AvantGarde-BookOblique	*ABCDabcd1234!@#$*
Bookman-Light	ABCDabcd1234!@#$
Bookman-Demi	**ABCDabcd1234!@#$**
Bookman-DemiItalic	***ABCDabcd1234!@#$***
Bookman-LightItalic	*ABCDabcd1234!@#$*
ZapfChancery-MediumItalic	*ABCDabcd1234!@#$*
ZapfDingbats	✿✛✠✦●◐✺✸⬞➡✓✔☞☛✱

Figure 4-6 Font Report (FPS Emulation)

4.10.4 Special Functions for Maintenance

The Laser Printer LN15 provides special functions which are started by holding the + and – buttons pressed when the power is turned on.

These functions are specially provided for service technicians only and useful for checking printer performance and changing printer internal settings during maintenance.

(1) Maintenance modes

Eleven functions are provided (see Table 4-5). The first four functions are for checking printer performance and the remainder are for changing printer internal settings. The mode is indicated by the TEST PRINT message on the control panel after normal power-on initialization.

Table 4-5   Special Maintenance Modes

Mode	LCD message	Function	Remarks
1	TEST PRINT	Start continuous self-test printing	
2	EEPROM CLEAR	Clear EEPROM for controller	
2-1	EEPROM CLEAR Extension	Clear particular area of EEPROM for controller	Factory use only
3	EEPROM CLEAR (MECHA CONT. 1)	Clear EEPROM for engine 1	Factory use only
4	EEPROM CLEAR (MECHA CONT. 2)	Clear EEPROM for engine 2	Factory use only
5	TOP ADJUST (TRAY) PARA = XX	Adjust top edge of print area of paper fed from paper tray	Factory use only
6	TOP ADJUST (MANU) PARA = XX	Adjust top edge of print area of paper fed from manual feed slot	Factory use only
7	RESIST ADJUST PARA = XX	Adjust resist motor speed	Factory use only
8	LEFT ADJUST FACE PARA = XX	Adjust left edge of print area of paper face	Factory use only
9	LEFT ADJUST BACK PARA = XX	Adjust left edge of print area of paper back	Factory use only
10	ENGINE MODE PARA = XX	Send engine command and display return value from mechanism controller	Factory use only
11	ENGINE MAINTE.	Start maintenance mode	Factory use only

Note:

When executing an EEPROM clear mode, the PrintPartner 14ADV determines the default paper size depending on the paper tray installed.

(2) How to execute a maintenance mode

1. Press and hold the + and – buttons while turning the printer on.

   Note:
   Be sure to keep holding the + and – buttons until the `TEST PRINT` message appears. It takes about one minute (depending on warm-up time).

2. Release the + and – buttons when the message display shows `TEST PRINT` after `<<<INITIALIZE>>>` and `WARMING UP`.

   `TEST PRINT` is the first function in maintenance mode and indicates that the printer enters maintenance mode .

3. To select another function, press the MENU button. Each time you press the MENU button, the message display shows the next function.

   Note:
   To select `EEPROM CLEAR Extension`, press the + or – button when `EEPROM CLEAR` is shown.

4. To change a parameter, press the + or – button. Some functions involve a parameter which is shown as `PARA = XX` in the bottom line of the message. Each time you press the + or – button, the value `XX` increases or decreases.

5. To execute a function, press the ENTER button when the desired function is shown.

Notes:

1. To stop or quit the maintenance mode, turn power off.

2. Never execute function modes 2-1 to 2-11 that are for factory use only. The user's setup data or mechanism-dependent adjustments will be lost.

(3) Information printed in test print mode

The first page of the test print in maintenance mode contains the following information in the second to eighth lines of text before a continuous print of ASCII text.

VALUE 1   VALUE 2

"#$%'()*+,./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrst
[00000001519] [0000000002]:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
VALUE 3 → [DIGITAL Laser P] 56789:; <=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopq
VALUE 4 ── [MFG: DIGITAL;] 3456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnop
        ── [CMD: NDAP,PJL,PCL,PS;]<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnoqr
        ── [MDL: Laser printer LN15]<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnoqr
VALUE 5 ⇒ [00008741] 2345678:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvw
)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz
+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{

- [VALUE 1]: Total number of printed pages

  Maximum = 16,777,216 (The maximum value returns to zero.)

- [VALUE 2]: Total time of rotation of the print unit's drum. This value is 1/5120 of the actual time (second).

  Maximum   = 63 (The maximum value remains unchanged.)
              = 322,560 seconds

- [VALUE 3]: Printer name (used by PJL command)

  DIGITAL Laser P ===> DIGITAL Laser Printer LN15

- [VALUE 4]: Device ID for bi-directional Centronics

	Device ID
DIGITAL Laser P	[MFG:DIGITAL;]
	[CMD: NDAP,PJL,PCL,PS;]
	[MDL: Laser Printer LN15]

- [VALUE 5]: Serial number of printer

(4) EEPROM CLEAR and EEPROM CLEAR Extension

When EEPROM CLEAR is executed, the printer settings return to the factory default valves.
When the EEPROM CLEAR Extension is executed, the serial number of the printer is also cleared.

(5) Re-entry of the serial number of printer

If EEPROM Clear Extension is executed, the serial number of the printer must be re-entered. To do so, turn on
the printer; the printer displays a message prompting to enter the serial number of the printer. Enter it as follows:

1. Turn on the printer.
2. After initialization of the printer, the printer displays the following message for a second and

```
┌──────────────────┐
│ Enter Serial No. │
│                  │
└──────────────────┘
```

then enters the serial number enter mode where the following message is displayed.

```
┌──────────────────┐
│ S/N : 00000000   │
│        ^         │
└──────────────────┘
```

"^" indicates the digit where you can change the value.

3. Enter the printer serial number of lower 8 digits except the leading alphabets.

```
┌──────────────────┐              ┌──────────────────┐
│ S/N : 00000000   │  ◄───────►   │ S/N : 90000000   │
│        ^         │              │        ^         │
└──────────────────┘              └──────────────────┘
(—) S W ◄─────────────────────────────────► (÷) S W
```
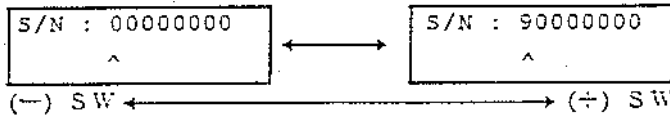
• Use the + or – button to change the digit indicated by "^".

• Press the ENTER button when the digit is decided; "^" moves to right. If you press the MENU button
   instead, "^" moves to left.

```
┌──────────────────┐
│ S/N : 00070000   │
│        ^         │
└──────────────────┘
Menu SW ◄─ |  → Enter SW
```
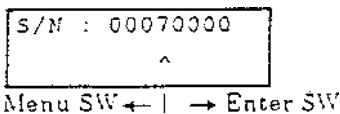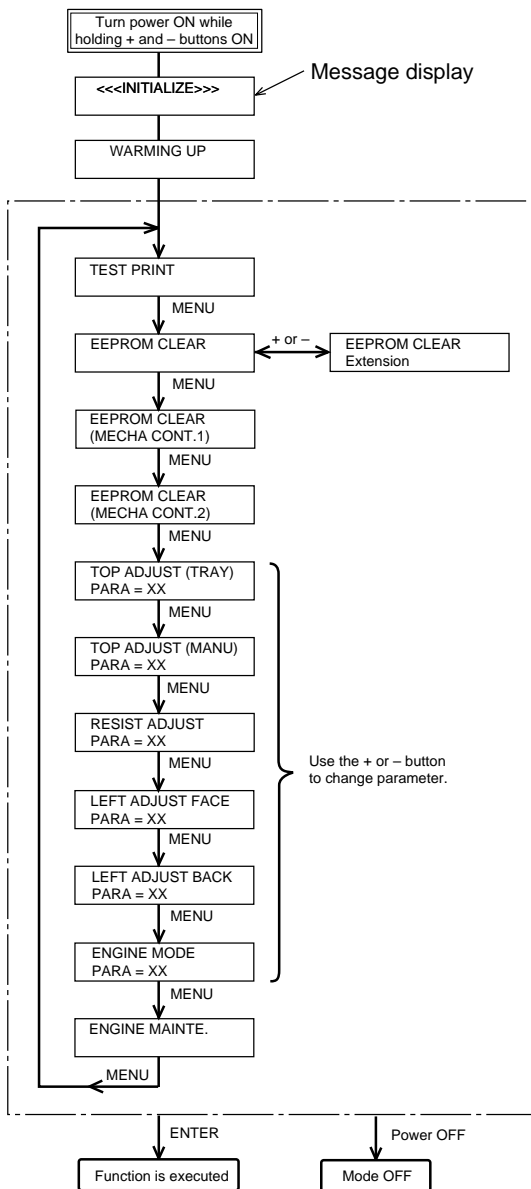
• Press the READY button after you have entered all digits; the printer displays "SELECTED" for a
   second and saves the digits to EEPROM as the serial number.

```
┌──────────────────┐  ────────►  ┌──────────────────┐
│ S/N : 00070000   │             │ SELECTED!        │
│        ^         │  ◄────────  │                  │
└──────────────────┘             └──────────────────┘
                         for a second
```
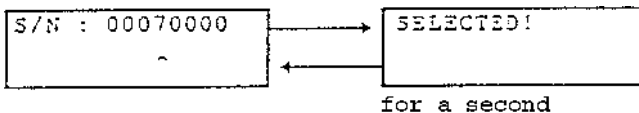
4. Turn power off.

   Note:
   The serial number of the printer is cleared by EEPROM CLEAR Extension. To reset the menu settings to
   the factory defaults, use normal EEPROM CLEAR after entering the serial number.

```
┌─────────────────────┐
│ Turn power ON while │
│holding + and – buttons ON│
└─────────────────────┘
          │
┌─────────────────────┐
│   <<<INITIALIZE>>>  │────── Message display
└─────────────────────┘
          │
┌─────────────────────┐
│     WARMING UP      │
└─────────────────────┘
          │
    ┌─────┴──────────────────────────────┐
    │                                     │
    │  ┌──────────────┐                   │
    │  │  TEST PRINT  │                   │
    │  └──────────────┘                   │
    │         │ MENU                       │
    │  ┌──────────────┐    + or –  ┌──────────────┐
    │  │ EEPROM CLEAR │◄─────────►│ EEPROM CLEAR │
    │  └──────────────┘           │  Extension   │
    │         │ MENU              └──────────────┘
    │  ┌──────────────┐
    │  │ EEPROM CLEAR │
    │  │(MECHA CONT.1)│
    │  └──────────────┘
    │         │ MENU
    │  ┌──────────────┐
    │  │ EEPROM CLEAR │
    │  │(MECHA CONT.2)│
    │  └──────────────┘
    │         │ MENU
    │  ┌──────────────┐  ┐
    │  │TOP ADJUST (TRAY)│ │
    │  │  PARA = XX   │  │
    │  └──────────────┘  │
    │         │ MENU     │
    │  ┌──────────────┐  │
    │  │TOP ADJUST (MANU)│ │
    │  │  PARA = XX   │  │
    │  └──────────────┘  │
    │         │ MENU     │
    │  ┌──────────────┐  │
    │  │ RESIST ADJUST│  │
    │  │  PARA = XX   │  ├── Use the + or – button
    │  └──────────────┘  │   to change parameter.
    │         │ MENU     │
    │  ┌──────────────┐  │
    │  │LEFT ADJUST FACE│ │
    │  │  PARA = XX   │  │
    │  └──────────────┘  │
    │         │ MENU     │
    │  ┌──────────────┐  │
    │  │LEFT ADJUST BACK│ │
    │  │  PARA = XX   │  │
    │  └──────────────┘  │
    │         │ MENU     │
    │  ┌──────────────┐  │
    │  │ ENGINE MODE  │  │
    │  │  PARA = XX   │  ┘
    │  └──────────────┘
    │         │ MENU
    │  ┌──────────────┐
    │  │ ENGINE MAINTE.│
    │  └──────────────┘
    │         │ MENU
    └─────────┘
      │              │
   ENTER          Power OFF
      │              │
┌──────────────┐ ┌──────────┐
│Function is   │ │ Mode OFF │
│executed      │ │          │
└──────────────┘ └──────────┘
```

1. Turn on the power switch while pressing and holding down the **+** and **–** buttons until the message display indicates TEST PRINT. (It takes about one minute, but depends on warming-up time.)

   TEST PRINT is the first function and means that the printer enters the maintenance mode.

2. Press the **MENU** button to select a function.
   Press the **+** or **–** button to select EEPROM CLEAR Extension as shown in flowchart.

3. Press the **+** or **–** button to change the parameter.

4. Press the **ENTER** button to execute the function.

5. Turn off the power switch to exit the maintenance mode.

Figure 4-10   Maintenance Mode Operation Flowchart

CHAPTER 5   DESCRIPTION OF OPERATION

5.1   GENERAL

This chapter explains the principles of operation of the LN15 laser page printer. A microprocessor controls all basic functions: interface, printing, and paper feeding.

Figure 5-1 shows a block diagram of the laser printer LN15 .
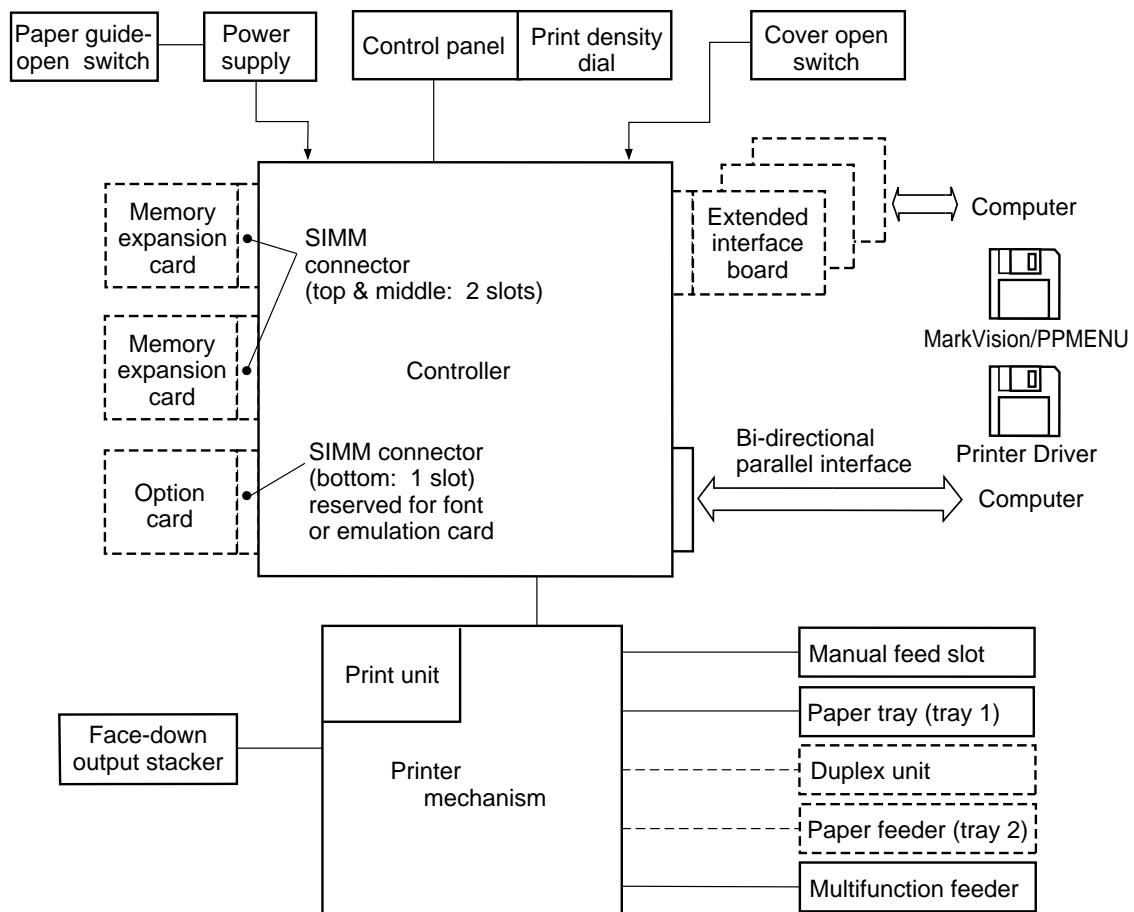
SIMM: Single inline memory module

: Option

Figure 5-1 Printer Block Diagram

The following explanation is divided into the two parts: mechanical operation and electrical operation.

5.2 MECHANICAL OPERATION

This printer uses three motors to feed the paper and to drive the print unit.

The pick-up motor drives the pick-up roller in the printer or in the multi-function feeder. The rotating direction of the motor determines which roller will be selected.

The resist motor drives the paper feed roller.

The main motor drives the print unit, the heat roller, and the paper eject roller.

The printer operations are described below.
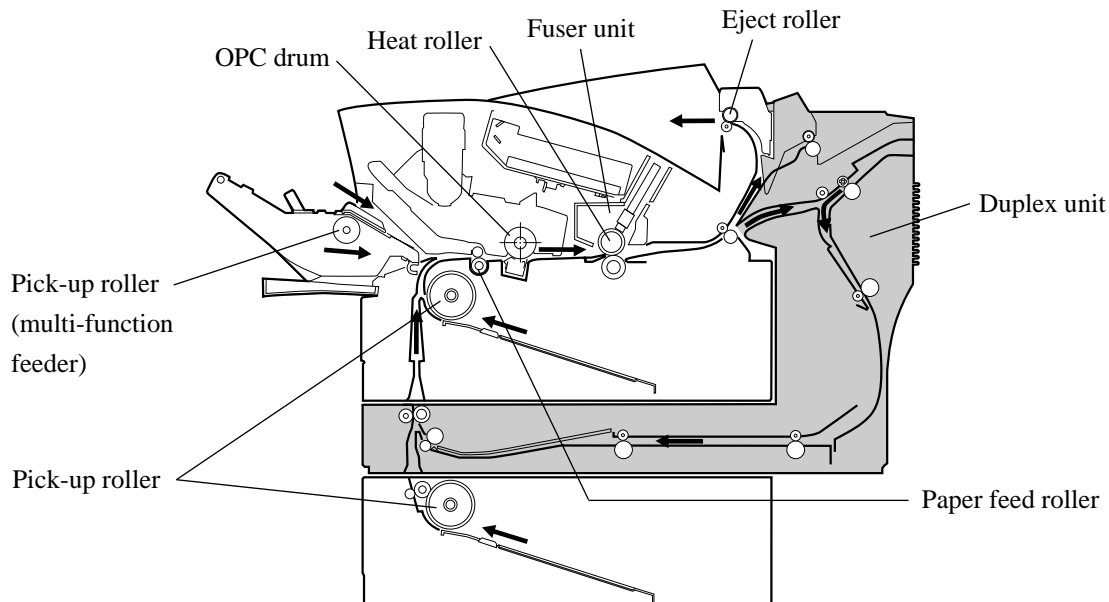
Figure 5-2 Picking, Printing, Fusing, and Ejecting Paper

1. When the printer receives a printing command, the main motor starts to rotate to initialize the print unit (including photoconductive drum, developer, cleaning roller, and toner agitator) and to warm up the heat roller.

2. The pick-up motor (not shown in Figure 5-2) rotates clockwise to pick up paper from the paper tray.

   To print using the multi-function feeder, the host sends a paper select command . When receiving it, the pick-up motor rotates counterclockwise to drive the pick-up roller of the multi-function feeder.

3. The pick-up motor and the main motor continue to rotate the paper feed roller, the print unit, the heat roller, and the eject roller until the paper passes through.

4. When the mechanism controller detects the bottom edge of the paper by the paper eject sensor, it stops both motors. The printer then waits for the next command.

Detailed Description

(1) Paper feed drive mechanism

Figure 5-3 details the paper feed drive unit. The stepping motor and the gear train are mounted on the metal frame.

- The power of the pick-up motor gear is distributed to the pick-up roller of the paper tray or that of the multi-function feeder. Selection is determined by the rotating direction of the motor.

- The power of the resist motor gear is distributed to the paper feed roller.

Operation:

1. When the pick-up motor rotates counterclockwise, the power is transmitted to the pick-up roller of the paper tray through the center gear of the epicyclic gear train.

2. When the pick-up motor rotates clockwise, the power is transmitted to the pick-up roller of the multi-function feeder through the circumferance gear of the epicyclic gear train.

3. When the resist motor rotates counterclockwise, the power is transmitted to the paper feed roller.
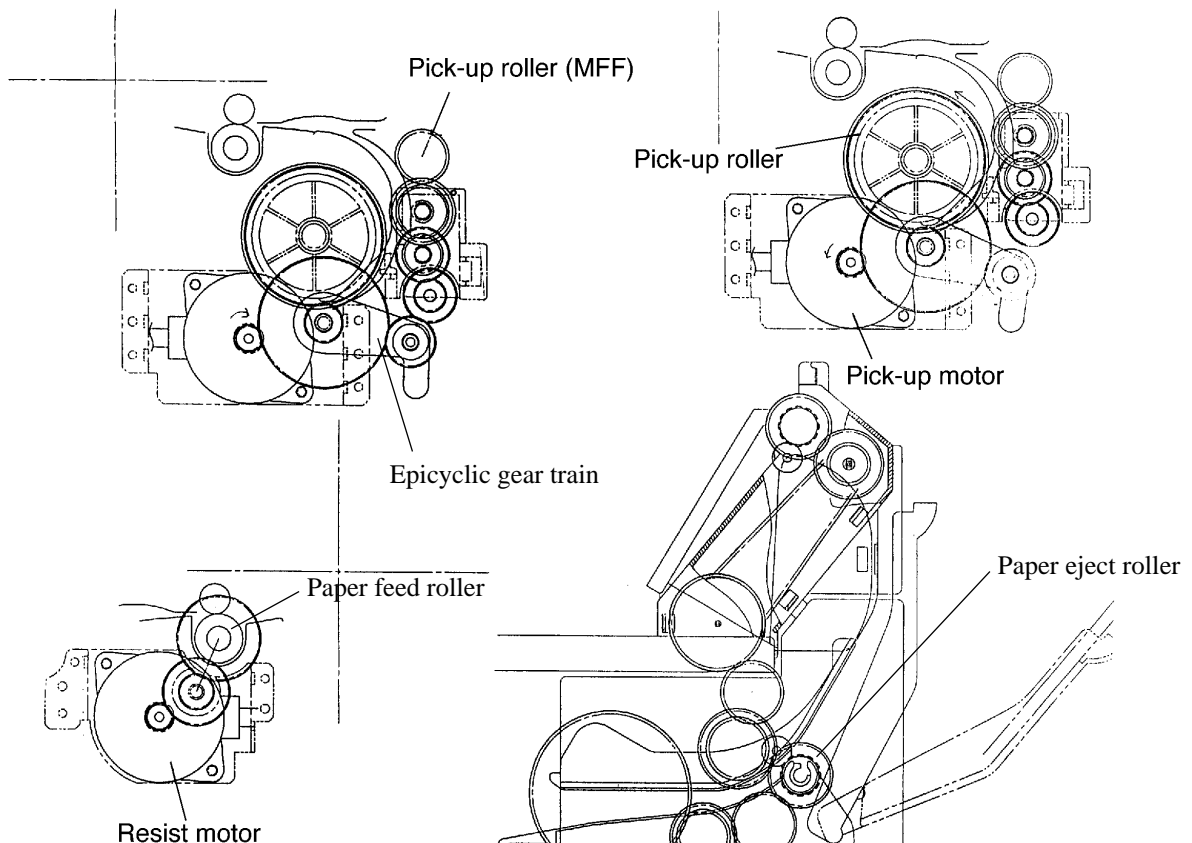
Figure 5-3 Structure of the Paper Feed Drive Unit

For paper feeding by the optional duplex unit, the following functions are performed:

- Switching single-/double-sided printing
- Switching face-up/face-down ejection
- Reversing paper for second printing
- Centering paper for second printing
- Keeping paper waiting in the unit to time second printing

(2) Process Drive Mechanism

Figure 5-4 shows the process drive unit. The DC motor and the gear train are mounted on the metal plate.

The power of the main motor is distributed to the print unit, the heat roller, and the paper eject roller.

The power of the motor is transmitted to the print unit through gears A, B, C, and D, and to the heat roller through gears A, B, C, E, and F.
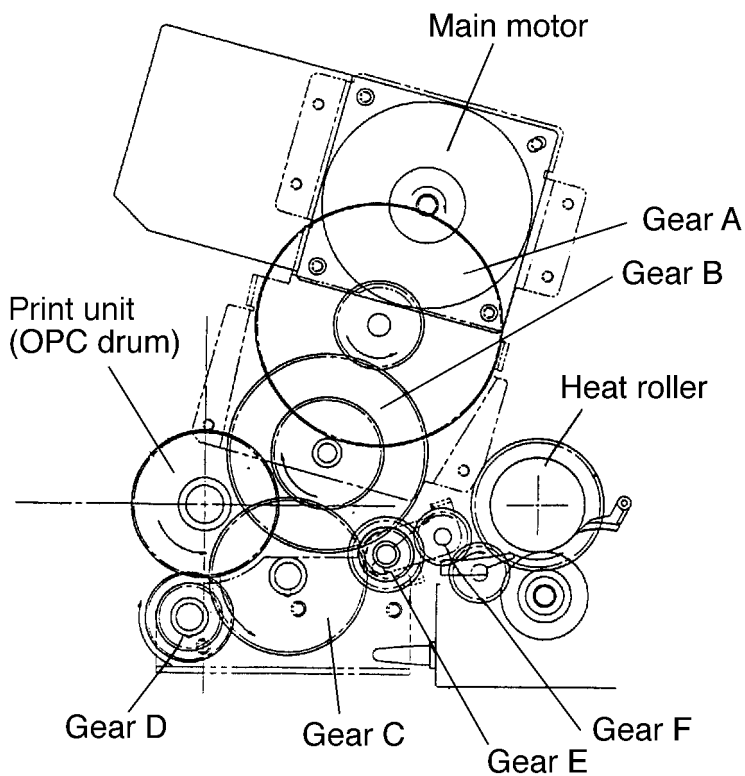
Figure 5-4 Process Drive Unit

(3) Fuser Unit

The fuser unit consists of the heat roller unit and the back-up roller (fuser pressure roller). The heat roller unit has a halogen lamp, a heat roller, a temperature sensor, a thermal fuse, and supporting parts. The back-up roller rotates with the heat roller. See Figure 5-4.

(4) Paper Ejection Unit

The paper ejection unit, which consists of the paper guide and the eject roller, is secured to the frame. Eject gears receive power from the heat roller gear. See Figures 5-2 and 5-4.

(5) Print Unit

The print unit consists of a photoconductive drum (OPC drum), a pre-charger unit, a developer unit, a recycle screw, and a toner agitator.

Gear A receives power from the process drive unit, transmitting the power to the photoconductive drum gear, the magnet roll (gear B), the toner agitator (gear C), the recycle screw, and gear D.
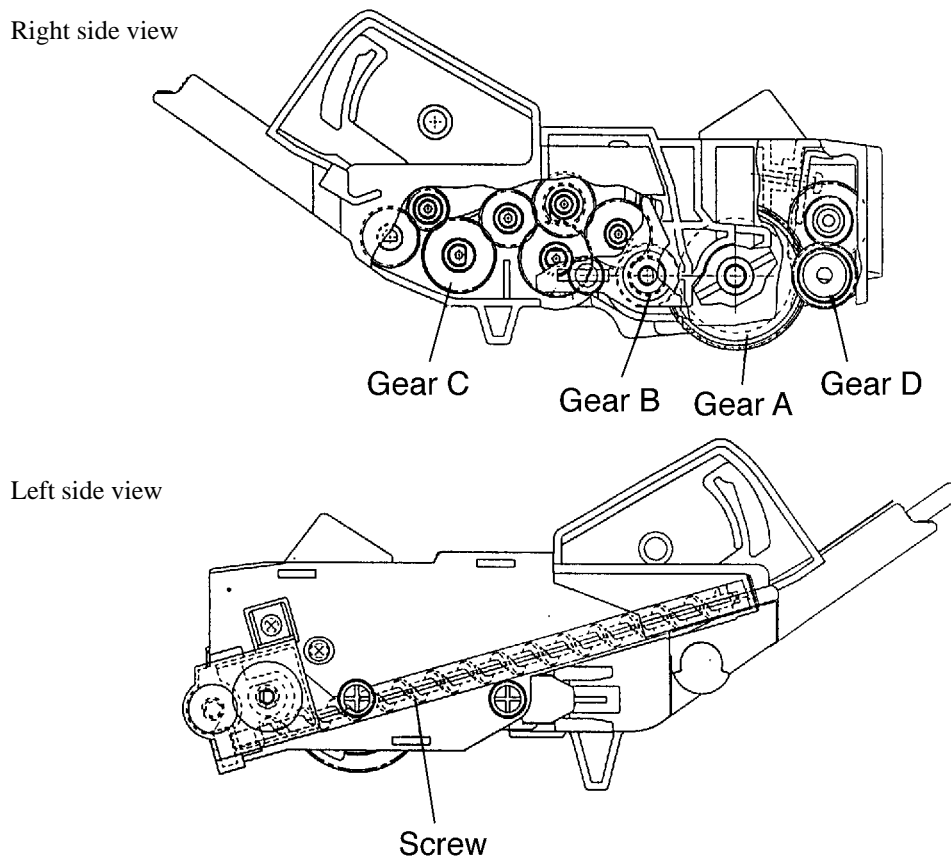
Figure 5-5 Print Unit

5.3 ELECTRICAL OPERATION

This section provides a brief description of various circuits and how they operate.

5.3.1 System Diagram

Figure 5-6 is a diagram of the system. The Fujitsu MB86936 CPU (SPARC Lite) controls the entire printer and the data received from the interface.

Figure 5-7 is a diagram of the connections.
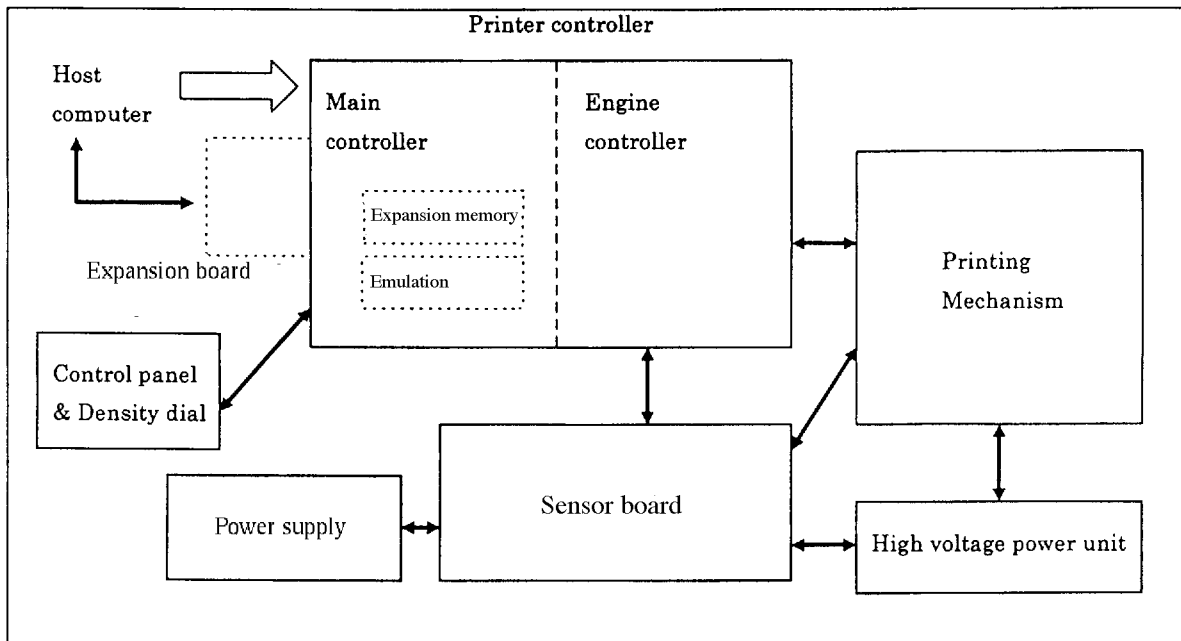
Figure 5-6 System Diagram

AC switch & fuse

ACIN

CNHT — Heater contact

Heater unit

Main power supply

CNHR

Thermistor

CNCOV — Back cover open

CNPOW

Front cover open

CNPOW   CNCOV2

Sensor board   CNPMP — Stepping motor / Pick-up

CNMC   CNHV

High-voltage power supply

Print density

Variable resistor

Stacker full sensor

Laser unit

VG   VD   VB   VT   VH

CN3 Control panel

CN1

SFS

OPT

Developing unit

Toner sensor

CNOP   CNMC   CNSTKF   OPT   CNERS   CNTN

CNFAN1 — Fan

INF

Controller board

CNFAN2 — Fan

CNSIM1   Memory (option)

CNSIM2   Memory (option)

CNLNA   CNCG   Fonts or emulation (option)   CNMM — DC motor

CNMFF   CNCSTA/CNCSTB   CNPS1   CNRMP   Process (main)

CNMFF1   CNCA/CNCB
MFF   Duplex unit (option)   Sensors   Magnets   Motors
CNMFF2   CNOA/CNOB

PSS

Stepping motor / Pick-up (resist)

MFF unit   CNCSTA/CNCSTB
Paper feeder (tray 2, option)   PSS   Motor

Paper size sensors (tray 1)

——————— : Primary (power)   ·   220-240 VAC
················· : Secondary (power) 24 VDC
——— — — : Secondary (signal) 5 VDC
━━━━━━ : High-voltage
CNxx: Connection via connector

Figure 5-7 Connection Diagram

5.3.2 Main Controller

Figure 5-8 shows a block diagram of the main controller of the laser printer LN15.
This controller provides the HP LaserJet emulation and the PostScript level 2 emulation.

The main controller uses a Fujitsu MB86936 processor. The standard amount of RAM is 3M bytes. The program ROM is 4M bytes. The font ROM is 6M bytes. Up to 64M bytes of memory can be added by installing optional memory cards.

There are three SIMM sockets for option cards. The upper two are for optional memory cards (DRAM modules) and the bottom one is for an optional emulation card or font card of the future. Each DRAM module is up to 32M bytes.

The parallel interface is a Centronics type. The printer supports Compatible mode and Nibble mode (bi-directional mode).

An EEPROM of 4K bits is used to store user settings

The control panel driver/receiver controls or reads the LCD, four LEDs, and eight switches on the control panel. The LCD displays messages (16 characters x two lines). The LEDs include POWER, ONLINE, DATA, and ERROR. The switches execute many functions like self test, reset, and menu mode.

The laser printer LN15 has an expansion interface slot in which one of the three types of interface board can be installed. Ethernet interface boards, RS-232C interface boards, and LocalTalk interface boards are available.
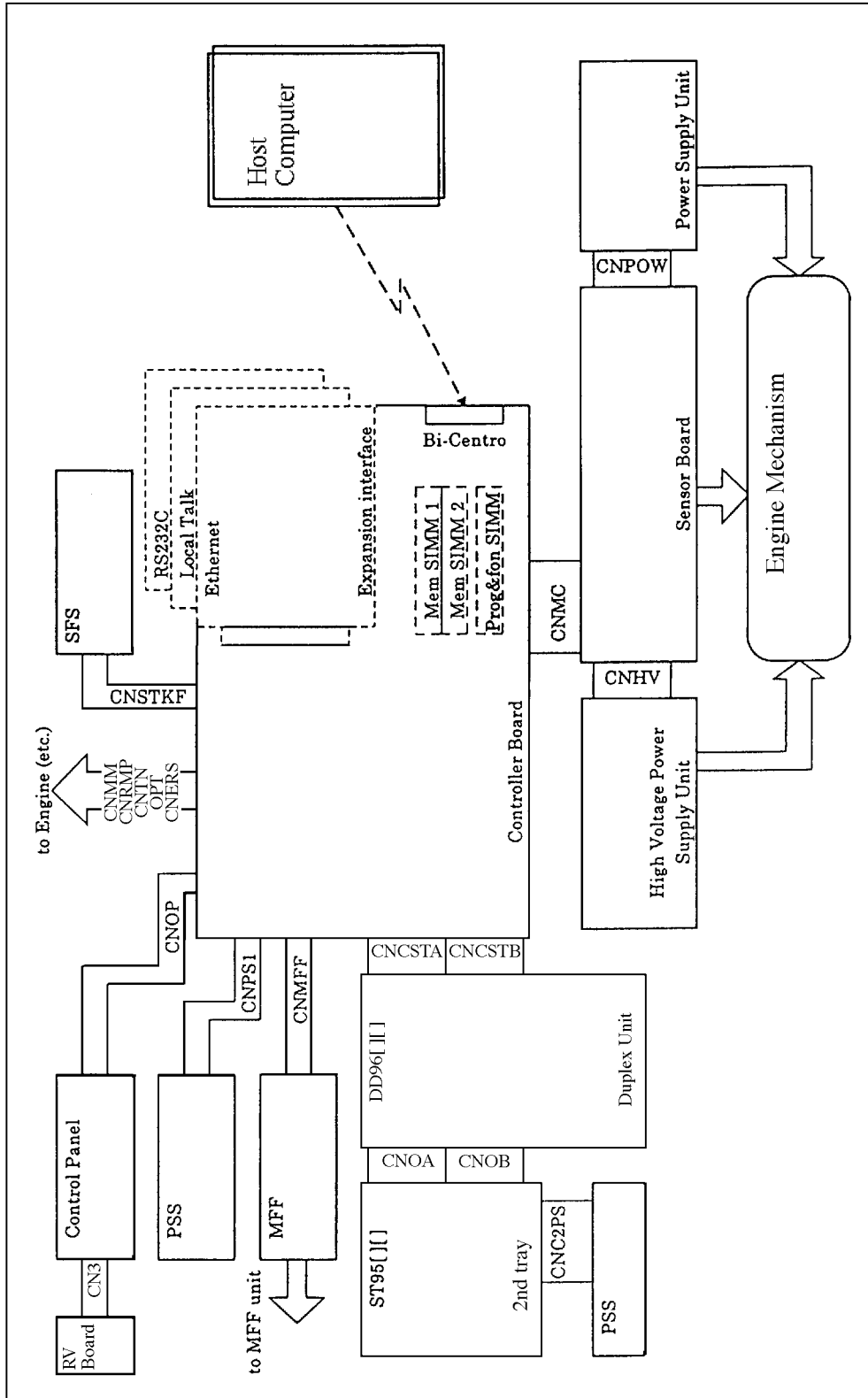
Figure 5-8 Main Controller Block Diagram

The following are additional block information.

(1) CPU

The Fujitsu MB86936 CPU is a 32-bit architecture RISC processor developed by Fujitsu. It uses on-chip caching of codes (4K bytes), which allows prefetching of blocks of instructions from memory. It reduces the number of memory accesses and improves the instruction execution pipeline.

The controller provides the 20 MHz clock.

(2) RAM

a. Resident RAM

The resident RAM is 3M bytes. The devices consist of six 4M-bit DARMs. The data width of devices is 8 bits, and a 32-bit data width is obtained by using 512K bits x 8 bits type and 256K bits x 16 bits type.

Since the refresh operation is performed by the dedicated DRAM controller, the RISC processor operates independently of the refresh operation.

b. Expansion RAM

The controller supports up to 67M bytes including the resident RAM. The expansion RAM is supplied on SIMM cards. The controller accepts 1M, 2M, 4M, 8M, 16M, or 32M-byte cards. The controller has two connectors for expansion RAM.

(3) ROM

The ROM subsystem consists of the resident ROM and an optional ROM card. The program ROM is 4M-bytes. The devices typically consist of four 8M-bit flash ROMs. The font ROM is 6M-bytes. The devices consist of two 16M-bit Mask-ROMs + 8M x 2 mask ROMs.

The ROM card is used for adding an alternate emulation. The controller has one connector for the ROM card.

(4) Expansion interface

Several interface expansion boards are available such as the serial interface board. The controller has one connector for an expansion interface. The interface controller communicates with the CPU through the expansion board.

(5) LSI-1

a.   Host interface
The printer has the Centronics parallel interface as the standard configuration. Its connector is located at the back of the printer. The RS-232C/422A serial interface is one of the optional interfaces. Its connector is located at the back of the printer.

- Parallel interface
The parallel interface is an industry-standard Centronics. This interface controlled by the processor, LSI-1, and some drivers/receivers.

A host computer sets data and sends the *STROBE pulse. When the LSI-1 receives the data, it automatically turns on the BUSY signal and stores the data in FIFO memory. After storing the data, the LSI-1 sends the *ACK signal and turns off the BUSY signal.

The controller has two types of data storing and signal returning systems. Normally, the FIFO system is selected. When the host computer requires special communications with the printer, the FIFO system is switched off. Host data is then stored in the data latch register and the return signals BUSY and ACK are controlled by a processor in the controller.

According to the FCC Class B rule, the parallel interface cable should be 3 meters (10 feet) long or less.

- Serial interface
The serial interface is an RS-232C/422A version, using a male D-SUB 25-pin connector. It is controlled by the LSI. The baud rate is selected by the control panel. The communication speed is from 1200 to 57,600 bits/second.

According to the FCC Class B rule, the serial interface cable should be 15 meters (50 feet) long or less.

b. EEPROM (Nonvolatile RAM) control
    The controller has a non-volatile RAM, X24C04 or equivalent, with a capacity of 4K bits.

    The processor communicates with the non-volatile RAM via the LSI-1 serially. One bit is read or written at a time to the EEPROM by the I/O port and firmware. The read/write speed is thus slower in comparison with the RAM connected to the bus.

c. Data processor
    The LSI-1 has the following data processing circuits.

    Data rotate
    The data size of rotation is 32 x 32 bits. Data is set by the CPU and the rotated data can be soon read by the CPU.

    Data expand/shrink.
    The expand/shrink circuit expands 16-bit data to 32-bit data or shrinks 64-bit data to 32-bit data. Data is set by the CPU and the expanded/shrunk data can be read by the CPU.

    Data mirror
    The mirror circuit mirrors 32-bit data with each bit state inverted. Data is set by the CPU and the mirrored data can be read by the CPU.

d. Video data.
    The video data is the data that is sent to the FEIT LSI.

    Video transfer DMA.
    The video transfer DMA in the LSI-1 transfers the actual image, which is created on the DRAM by firmware, from the DRAM to the video buffer in the LSI-1 according to the BD signal.

    FEIT LSI
    The FEIT LSI receives the image data from the video buffer, enhances the image, and sends the enhanced image as video data to the laser unit via the engine controller.

e. Control panel controller

    The control panel controller, a small LSI on the control panel board, controls the control panel LCD, LEDs, and switches. The LSI on the controller board controls the interface to the above LSI. Serial data is used as LCD and LED drive signals and switch read signals.

    A separate line is provided for the READY button signal to allow an interrupt to the CPU.

(6) Print density converter LSI

This LSI enables the 600-dpi laser unit to print horizontally 2400-dpi print quality.

(7) Reset circuit

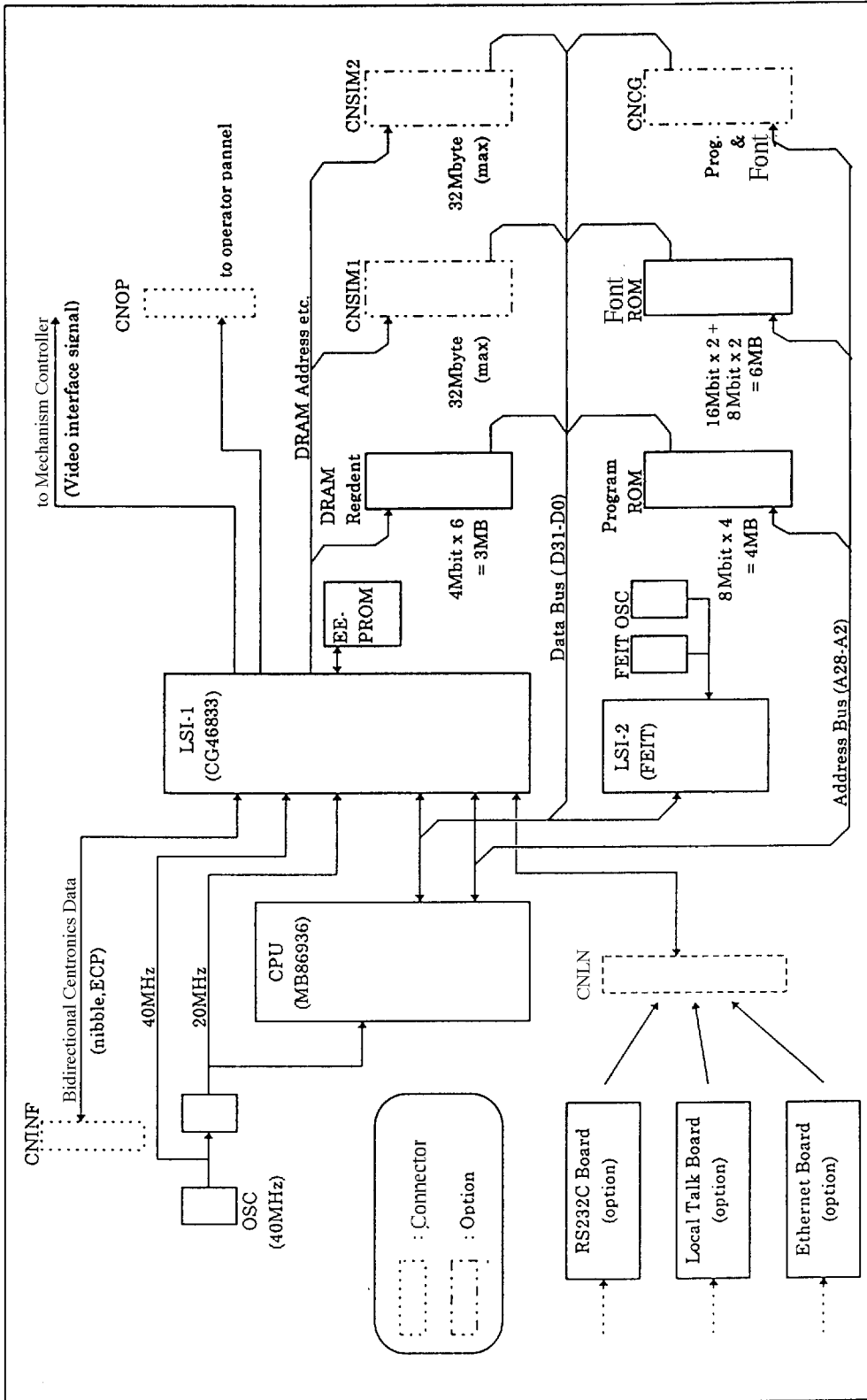The reset circuit initializes the printer when power is turned on.

Figure 5-9 Control Board Block Diagram

5.3.3 Engine controller Block Diagram

Figure 5.10 shows a block diagram of the engine controller of the laser printer LN15.
The engine controller controls the engine mechanism.

The engine controller uses an 8-bit CPU. This CPU has a RAM and a timer unit. The timer has seven channels.
It also has several I/O lines and communication functions.

The CPU also has 32K bytes of built-in ROM memory. There is no external memory in the engine control
circuit.

An EEPROM of 2K bits is used to store printer status (number of printed pages, adjustment information, replace
parts information, etc).

The LSI-3 has three functions. That is a I/O expander , a bus controller and laser unit controller.

This controller can control two stepping motors.

The engine controller is controlled by a video interface from the main controller.
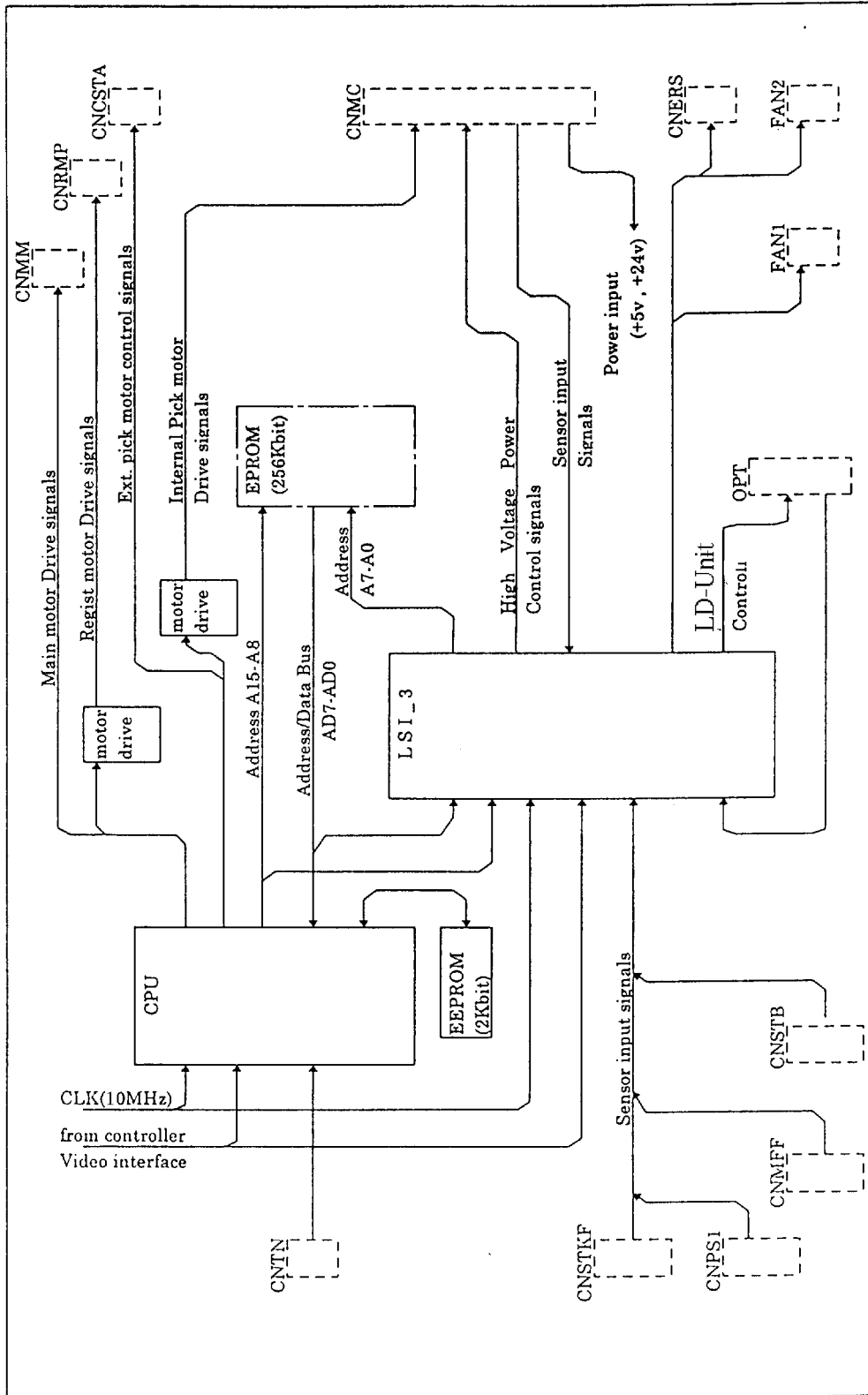
Figure 5-10 Engine Controller Block Diagram

The following are additional information on each block.

(1) CPU

The CPU is a one-chip micro processor (without built-in ROM).

Processor speed	10 MHz
Internal memory	RAM 512 bytes.
Input ports	14
Output ports	12
Input/output ports	10
Registers	8 bits x 8 bits x 4 banks (memory mapped)
Timer and Counter	16-bit timer counter (2 channels)
	8-bit timer counter 1 (2 channels)
	8-bit timer counter 2 (1 channel)
	8-bit timer counter 3 (1 channel)
Serial interface	CSI (3-wire serial I/O)
A/D converter	8 bits and 8 channels
Interrupt signals	internal: 12 and external: 7
Package	64 pins plastic QFP (14 mm x 14 mm)

The external memory (ROM) , LSI, and I/O can be accessed through the multiplexed bus (AD0-AD7), address bus (A15-A8), and *RD/*WR/ASTB signals.

The A/D converter in the CPU receives analog data from sensors and changes it to digital data. Sensors include the temperature sensor and the toner empty sensor.

The motors are controlled by the CPU timer & IRQ. The firmware sets the time data and starts the timer. When the timer has reached the setting time, IRQ is activated by the timer block. Then the firmware sets the phase switch data and sets the next time data. Thus, the motor is fully controlled by the firmware, not by the hardware.

The CPU can control the two sets of motors at the same time.

The control signals of the video interface lines are connected to the CPU I/O. If you get more information about this interface, see the Video interface specifications.
But the video data and the synchronize data lines are connected with the LSI.

The controller has a non-volatile RAM, X24c02 or equivalent, with the capacity of 2K bits. The processor communicates with the non-volatile RAM via the CPU by serial data. One bit is read or written at a time using EEPROM by the I/O port and firmware. The read/write speed is thus slower in comparison with the ROM connected to the bus.

The controller provides the 10 MHz clock for the CPU. However, the CPU divides the frequency to 5 MHz for the internal clock.

(2) ROM

The ROM is 8-bit EPROM. It contains engine control programs and data tables.

(3) LSI

    a.   I/O expander
       The output ports are provided for controlling the high-voltage power supply, fan rotation, and eraser
       LD.

       The input ports are provided for receiving signals from sensors.
       (stacker full, paper presence and paper size of paper trays 1 and 2, multi-function feeder status, etc.)

    b.   Laser unit controller
       The unit consists of two parts. One is the spindle motor, the other is the laser control.

       [Spindle motor]
       The spindle motor is a DC motor. So the control is very simple, there are only two control lines
       (spindle start/stop and alarm detect).
       The motor speed control is in the laser unit.

       [Laser control]
       First, the firmware turns on the laser unit. If the laser unit outputs the *BD="L" (indicating the start of
       the print area), the LSI turned on the laser beam. If the laser beam is at the end of the print area, the LSI
       turns off the laser beam. The LSI controls this sequence automatically. The power to the laser diode is
       controlled by the laser unit, but the density is user adjustable with a density control dial located on the
       control panel.

5.3.4   Interface Communication Method

This section describes the operation of the interface control.

(1) Centronics parallel interface

The received data, DATA1 through DATA8, is stored to the internal FIFO memory of the LSI just after the falling edge of the *DSTB (Data Strobe) signal. At the same timing, the BUSY signal is turned on. A little later the *ACK (Acknowledge) signal is sent to the host computer and the BUSY signal is turned off.

If the host computer has more data to be sent, it sends DATA1 through DATA8 with *DSTB, then the controller repeats the above operations.

When the received data is stored to the FIFO memory, the memory control circuit changes the memory empty flag. The controller CPU reads this flag and understands that the FIFO memory holds data. The CPU reads the received data from the FIFO memory. If the CPU is busy and cannot read the received data, the FIFO memory can store up to 512 bytes of data. When 512 bytes are stored, the memory full flag is turned on as an interrupt signal to the CPU.
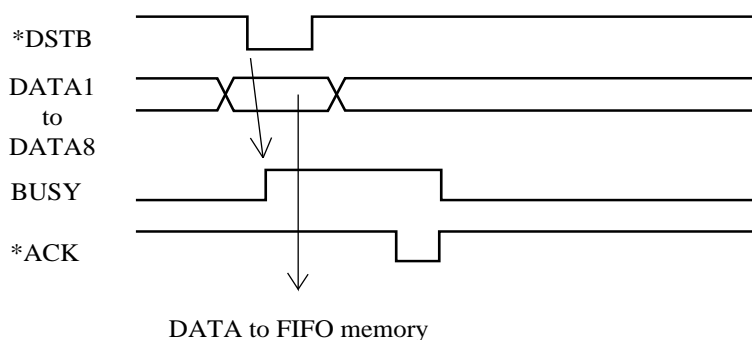

DATA to FIFO memory

Figure 5-11 Centronics Parallel Interface Signal Timing Chart

The main controller has another method of interface communication. If the host computer requires the printer to use this special communication, the controller receives data without using the FIFO memory. The received data, DATA1 through DATA8, is latched to the internal LSI at the falling edge of the *DSTB signal and the BUSY signal is turned on. At the same timing, the interrupt signal is turned on to the controller CPU. Then, the BUSY signal is turned off and the ACK signal is sent. This process is repeated for each byte received by the printer.

(2) RS-232C interface (option)

The serial data sent to the input terminal of the interface circuit is converted to TTL level by the receiver IC and is applied to the UART, PC16550D LSI. The PC16550D converts the serial data to parallel data, and activates the *IRQ signal. The LSI controls the baud rate clock, some interface signals, and interrupt.

The main controller CPU recognizes that data has been received and determines what to do. Based on its decision, the CPU saves the information in the receive buffer or processes it immediately. The *IRQ is then set high. The CPU may send out certain information such as XON, XOFF, or ACK from the serial interface output terminal if the selected protocol defines such response operations. In certain protocols, the CPU may change the status of output signals such as DTR.

Received Data
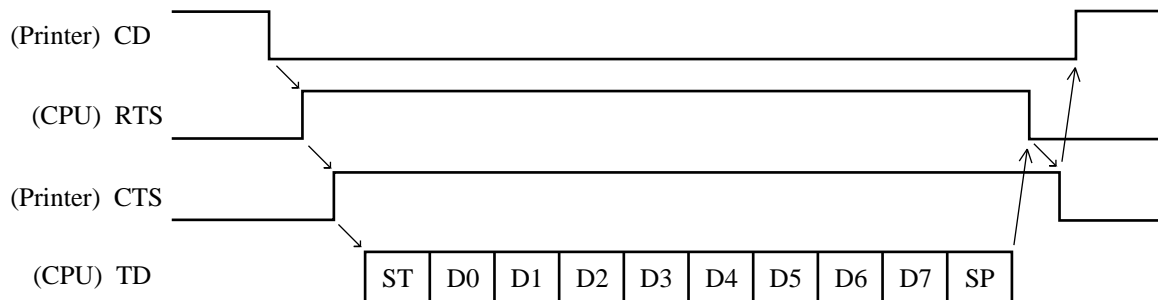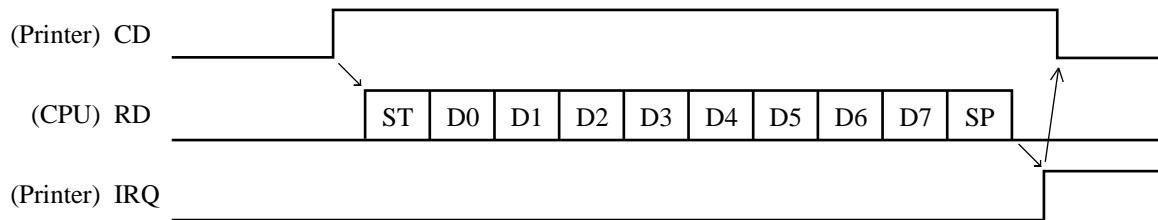
Note: If signal lines CD, RTS, and CTS are open, the printer ignores any controls related to these signals.

Figure 5-12 RS-232C Serial Interface Signal Timing Chart

(3) FEIT (Fujitsu Enhanced Imaging Technology)

This technology improves the image quality.

This technology automatically recognizes and smooths the jagged outlines of text (characters) and line art (drawings). In detail, the timing and pulse width of the video signal corresponding to print dots is controlled. FEIT accomplishes this by controlling the size of dots generated by the printer and the dot positions in the main scanning direction.

This achieves pseudo high-resolution printing.

In addition, 300 dpi print data can be printed with this 600 dpi printer engine. In this case, the circuit for the operation automatically recognizes the jagged outline and improves the image quality. Figure 5.13 shows the block diagram.
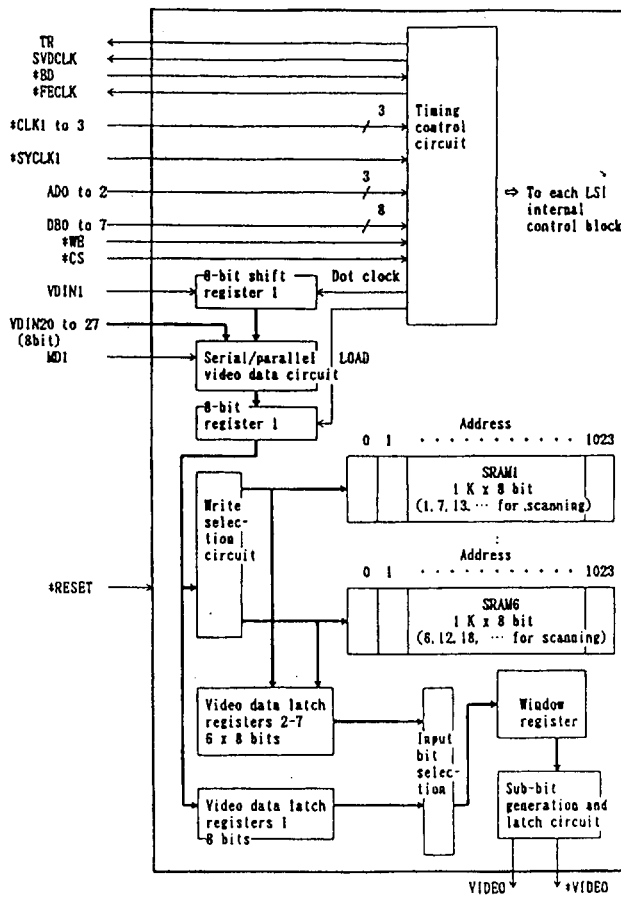

Figure 5-13 Block Diagram (Internal Configuration)

5.3.5 Printing Method

(1) Print control process

The controller receives data from the host computer. The CPU inside the controller fetches the program from the ROM and reads data sent from the host computer. The CPU manages and processes the data according to the program. The CPU converts the data to bit-map data and stores it in the bit-map memory. When the CPU recognizes that preparations for printing are complete, it starts the engine controller via the video interface. If the print start is detected, the engine controller checks the mechanism status such as paper position, heat roller temperature, etc. If the engine controller recognizes that preparations for printing are complete, it starts the motor and transfers print data to the laser diode unit (LD unit).
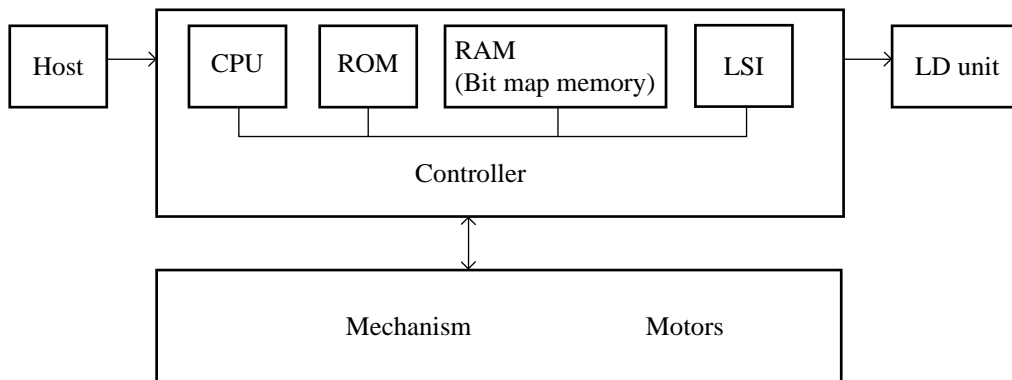
Figure 5-14 Print Process Block Diagram

(2) Bit-map data generate

The bit-map data is generated by the CPU. All data to be transferred to the FEIT LSI is stored in the bit-map memory. The bit-map memory uses parts of the resident RAM and expansion RAM.

The controller LSI has many auxiliary circuits to process data, such as rotate, expand, shrink, and mirror. The CPU generates bit-map data by itself or by the auxiliary circuits. The generated bit-map data remains until it is transferred to the FEIT LSI.

(3) Video data transfer

When the engine controller starts, the motor, and paper moves along the paper path. The engine controller checks sensors on the paper path. When the paper reaches the position from which video data must be prepared, the main controller starts the video data transfer from LSI-1. The LSI starts transferring bit-map data from the bit-map memory to the buffer memory in the LSI-1 under control of the DMA in the LSI-1. The stored data is transferred to the FEIT LSI in synchronization with the clock signals (CLD) which is generated by the FEIT LSI. This controller generates other signals for the laser unit (LD unit), such as latch pulses and strobe pulses. The timer circuit prepares the original times signal every raster, from which the video timing controller generates the above three signals.

The FEIT circuit in the LSI receives the image data from the video buffer inside he LSI-1, and it calculates the image data for enhancing the image. The calculated result is sent as video data to the LD unit synchronized with the BD signal. The BD signal detects that the laser beam is start position, and the video data transfer is requested. The BD signal prepares the synchronization signal every raster from the LD unit.
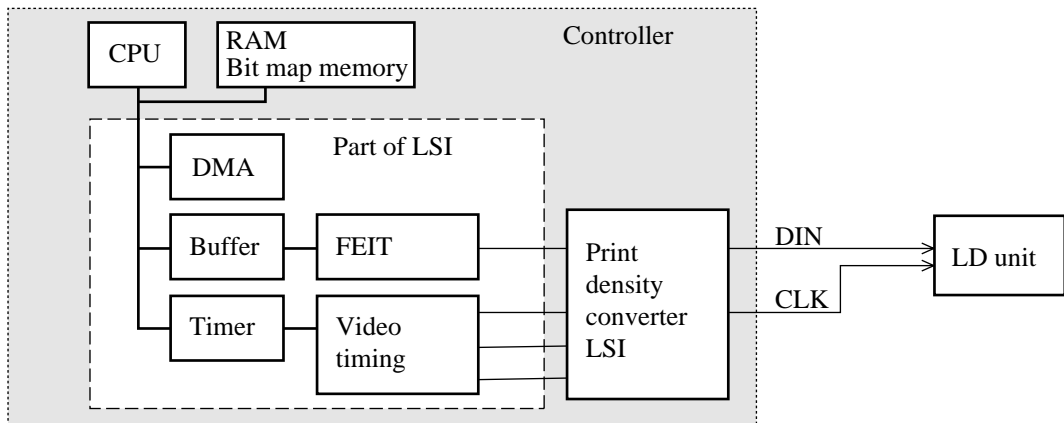
Figure 5-15 Video Data Transfer Block Diagram

(4) LD unit

The LD unit (laser diode unit) consists of the spindle motor control and the laser power control.

(5) Heat roller temperature control

The temperature of the heat roller is sensed by a thermistor. The controller senses the potential with an A/D converter.

Whenever the temperature of the heat roller is higher than 170°C, printing can occur. After the heat roller has been powered on for 115 seconds, the heat roller alarm is detected if the temperature is lower than 170°C. A high temperature check is made if the temperature exceeds 200°C. The controller board also has hardware protection. If the temperature signal detects an abnormal condition (more than 4.95 V), the power supply unit is shutdown by the protection circuit.

(6) Power saving control

The laser printer LN15 saves power which is used for the heat roller in the fuser unit. It is done by
stopping temperature control or reducing the temperature. This control is canceled when the printer receives
print data from the host or issues the release command by firmware.

Auto stand-by mode

When printing does not occur for one minute, the heat roller temperature is reduced to 100°C (normal
operating temperature: 170°C). When the printer receives a printing command, this auto stand-by control is
canceled and the printing can start when the temperature reaches 170°C.

Auto sleep mode

When printing does not occur for nine minute in auto stand-by mode, temperature control is stopped and the
heat roller is powered off. When the printer receives a printing command, this auto sleep mode is canceled
and the printing can start when the temperature reaches 170°C.

(7) Alarm detect

The controller can detect dangerous conditions in the printer engine. If the controller detects this condition,
it indicates an alarm and shuts down the power supply without firmware control.

Heat roller temperature

The controller senses the temperature of the heat roller. If the temperature exceeds 195°C, the controller
activates an alarm.

Disconnected connector

The controller senses disconnected connectors. Actually, the connectors sensed are CNHT , CNPOW, and
CNMC. If these connectors are disconnected, the controller forcibly turns power off.

Motor current alarm

The controller senses the current flowing through the pick-up motor and the resist motor. If the main motor
draws excessive current, the controller activates an alarm immediately. If the pick-up motor draws exces-
sive current, the controller also activates an alarm immediately. When the optional paper feeder (second
paper tray) or duplex unit is installed, the controller senses the current flowing through the second paper
tray's motor or the duplex unit's motor. If the motor draws excessive current, the controller also activates
an alarm immediately. These alarms cause the power supply to be shut down without firmware control.

5.3.6   Control Panel Control

The control panel has a push-button switch and four LED indicators.

The switch and indicators are connected to the controller board. Except for the "POWER" indicator, the switch and indicators are directly controlled by the controller board. The "POWER" indicator is directly connected to the +5 VDC line.

The print density dial is fastened to a variable resistor which is connected to the laser unit via the controller board. The controller senses the potential of the variable resistor with an A/D converter.

Figure 5-16 is a block diagram of the control panel circuit.
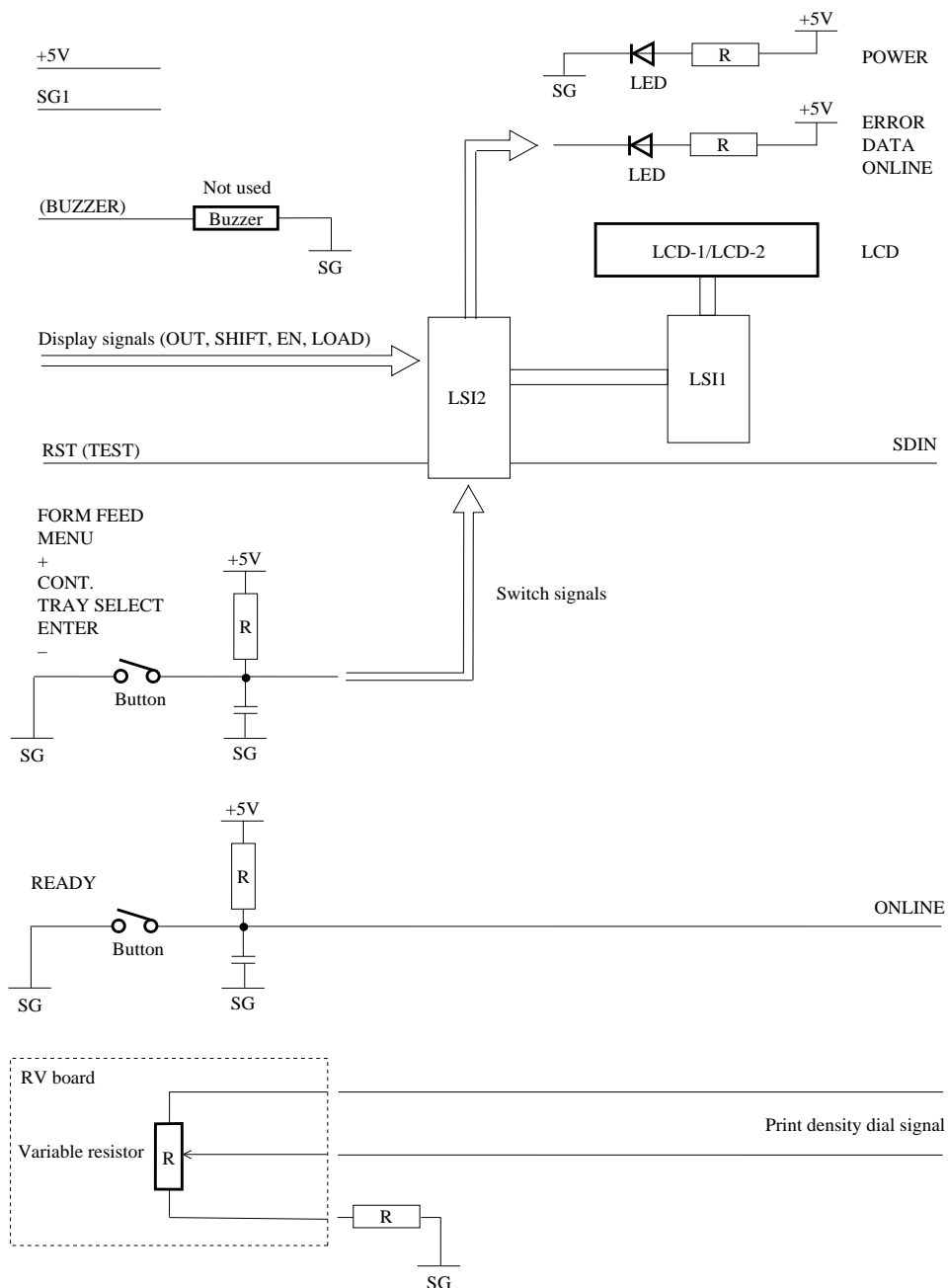
Figure 5-16 Control Panel Block Diagram

5.3.7 Power Supply

There CA02451-4265. power supply is used for 220 to 240 VAC.

The power supply outputs +5 V for the logic circuits and +24 V for the printer mechanism drivers and the high-voltage power supply. It also controls the AC input voltage for the fuser unit's heater.

Figure 5-17 shows the block diagram of the power supply. AC input to this power supply via a power switch is converted to DC by rectifier and filter circuits. The amount of inrush current is limited by a negative temperature coefficient thermistor. Next, the DC is converted to AC in a high-frequency switching circuit and its voltage is reduced by a step-down transformer. Then, the AC is again rectified and smoothed before being converted to DC. This power supply has a receiver of the input signal that turns the power supply off.

(1) Overcurrent protection

   •   If +24 V overcurrent is detected, all output voltages are automatically shut down by the emergency stop control.

(2) Overvoltage protection

   •   If a +5 V overvoltage condition occurs, all output voltages are shut down by the +5 V overvoltage protection circuit.

   •   If a +24 V overvoltage condition occurs, all output voltages are shut down by the emergency stop control.

(3) PW STOP signal

   The PW STOP signal is sent from the controller to the power supply to forcibly turn power off if the printer detects an alarm condition in the mechanism. This power stop condition is active unless the power switch is turned off. It also active for about one minute after the power switch is turned off or the power cord is disconnected.
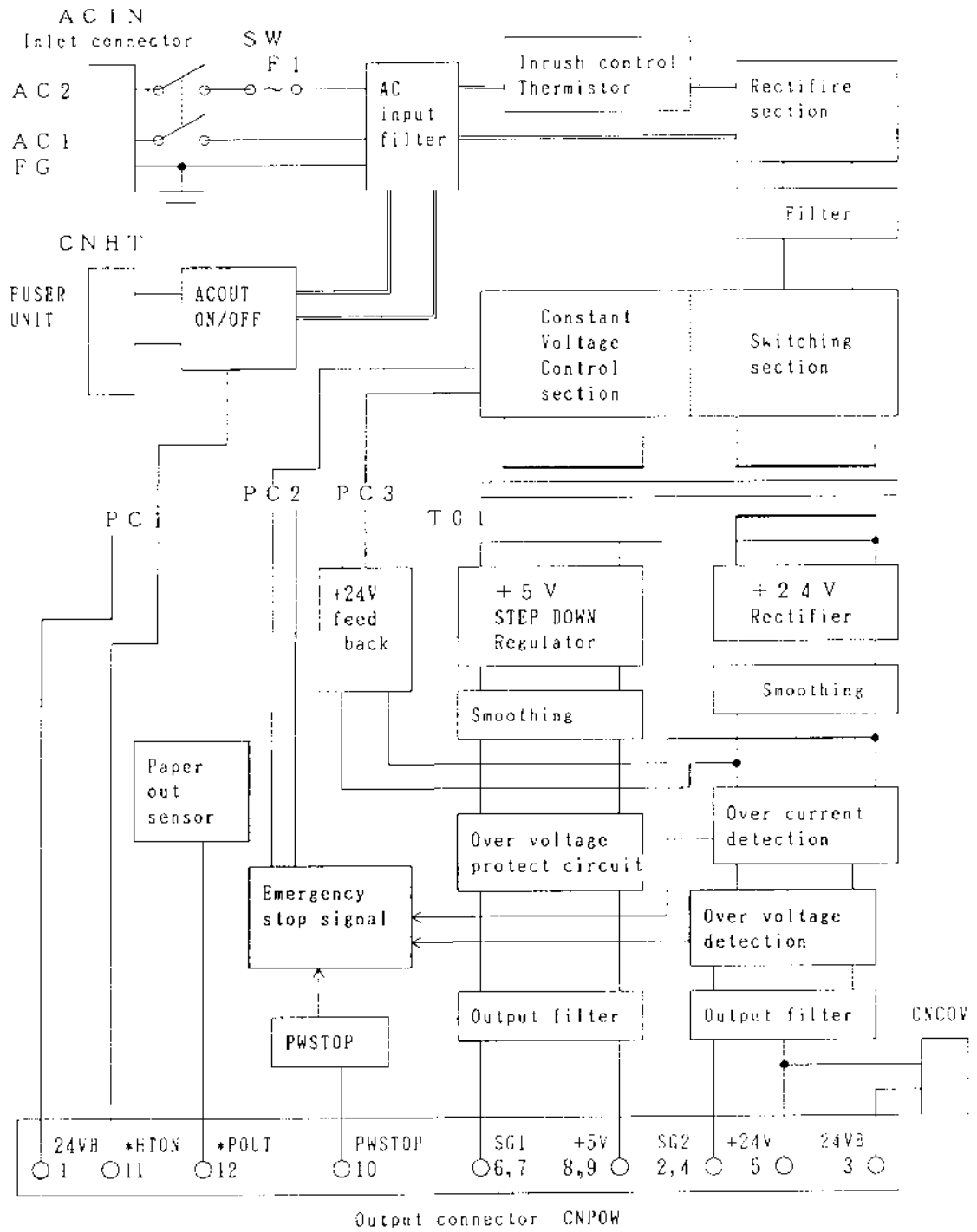
Figure 5-17 Power Supply Block Diagram

CHAPTER 6 REPLACEMENT PARTS

No.	Recommended spare parts	Product number	Section	Remarks
1	Upper cover subassembly	CA04040-G551	4.9.1 (1)	
2	Pick-up roller assembly	CA02758-G600	4.9.1 (12)	
3	Feed roller assembly	CA02758-G612	4.9.1 (14)	
4	Cover-open switch	CA02758-G127	4.9.1 (16)	
5	Main motor	CA02758-0251	4.9.1 (10)	
6	Pick-up motor	CA02758-0201	4.9.1 (11)	Same as resist motor
7	Transfer charger unit	CA04040-F450	4.9.1 (15)	
8	Fan 1	CA02758-0129	4.9.1 (6)	
9	Fan 2	CA02758-G128	4.9.1 (7)	
10	Power supply board	CA02951-4260	4.9.1 (5)	For 120 VAC
		CA02951-4265		For 220–240 VAC
11	High-voltage power supply board	CA02951-4291	4.9.1 (9)	
12	Separator assembly (friction pad)	CA04040-G730	4.9.1 (21)	
13	Stacker-full sensor assembly (SF sensor board)	CA02758-F696	4.9.1 (18)	
14	Operator panel (control panel)	CA04040-0574	4.9.1 (2)	
15	Volume board (print density dial)	CA04040-G572	4.9.1 (17)	
16	Multi-function feeder board (MFF board)	CA02758-G181	4.9.1 (20)	
17	Sensor board	CA04040-G595	4.9.1 (9)	
18	Paper sensing switch (PSS board)	CA02758-G182	4.9.1 (9)	
19	ROM board (control board and ROM)	CA04040-J500	4.9.1 (8)	
20	Frame-2 assembly	CA02758-F680	4.9.1 (19)	

Note: The section column indicates the item number of the procedure to replace the part.

The following must be replaced at the same time the transfer charger unit is replaced.

No.	Parts to be replaced periodically	Product number	Section	Remarks
1	Fuser unit	CA04040-C941 CA04040-C942	4.9.1 (4)	For 120 V model For 220-240 V model

Recommended Spares List

Parts that are to be repaired will be designated on the RSL by Genicom. All repairable under warranty will be returned to Genicom. Americas are instructed to return defective repairable parts to SR126 (Contoocook N.H.). Europe is instructed to return defective repairable parts to SR821 (Nijmegan). AP operations to return defective parts to either GSO - Singapore or GSO - Sydney.

OPTION USED-ON	DIGITAL P/N	DESCRIPTION	VENDOR P/N	SOURCE
LN15	FD-81706-C1	COVER OPEN SWITCH	CA02758-G127	GENICOM/FUJITSU
LN15	FD-81711-C1	UPPER COVER	CA04040-G551	GENICOM/FUJITSU
LN15	FD-81718-C1	FAN BRACKET	CA02758-0129	GENICOM/FUJITSU
LN15	FD-81724-C1	PICK MOTOR	CA02758-0201	GENICOM/FUJITSU
LN15	FD-81733-C1	MAIN MOTOR	CA02758-0251	GENICOM/FUJITSU
LN15	FD-81735-C1	FRAME 2 ASSY	CA02758-F680	GENICOM/FUJITSU
LN15	FD-81737-C1	SF SENSOR BOARD	CA02758-F696	GENICOM/FUJITSU
LN15	FD-81738-C1	FAN	CA02758-G128	GENICOM/FUJITSU
LN15	FD-81741-C1	MFF BOARD	CA02758-G181	GENICOM/FUJITSU
LN15	FD-81742-C1	PSS BOARD	CA02758-G182	GENICOM/FUJITSU
LN15	FD-81743-C1	ROLLER ASSY	CA02758-G600	GENICOM/FUJITSU
LN15	FD-81745-C1	FEED ROLLER ASSY	CA02758-G612	GENICOM/FUJITSU
LN15	FD-81747-C1	POWER BOARD	CA02951-4265	GENICOM/FUJITSU
LN15	FD-81748-C1	HV BOARD	CA02951-4291	GENICOM/FUJITSU
LN15	FD-81749-C1	OPERATOR PANEL	CA04040-G574	GENICOM/FUJITSU
LN15	FD-81754-C1	TRCG UNIT	CA04040-F450	GENICOM/FUJITSU
LN15	FD-81756-C1	SEPARATION ASSY	CA04040-G128	GENICOM/FUJITSU
LN15	FD-81802-C1	VOLUME BOARD	CA04040-G572	GENICOM/FUJITSU
LN15	FD-81803-C1	MECH BOARD	CA04040-G595	GENICOM/FUJITSU
LN15	FD-81804-C1	ROM BOARD	CA04040-J660	GENICOM/FUJITSU

DIGITAL Laser Printer LN15

PARTS CATALOG

EK-LN15X-SV.A01

CONTENTS

3. PARTS LIST AND PARTS DRAWING OF PRINTER MECHANISM
3.1 Visual Index of Parts

3.12 Cleaner

3.2 Upper Cover

3.11 Print Unit

3.8 Power Unit
3.9 Heat Roller Unit

3.3 Printer

3.10 Paper Tray

3.6 Base Frame

3.4 Printer Mecha Unit 1

3.7 Laser Diode Stay

3.5 Printer Mecha Unit 2
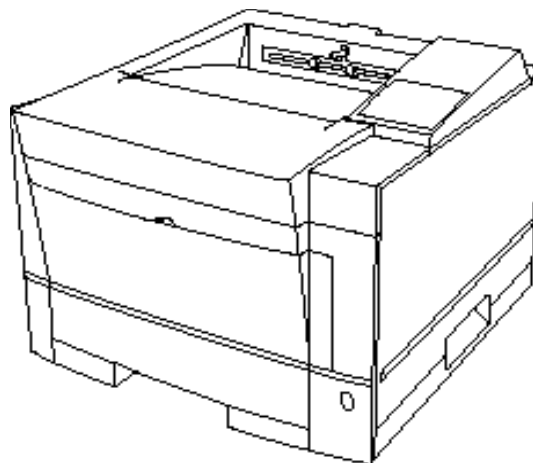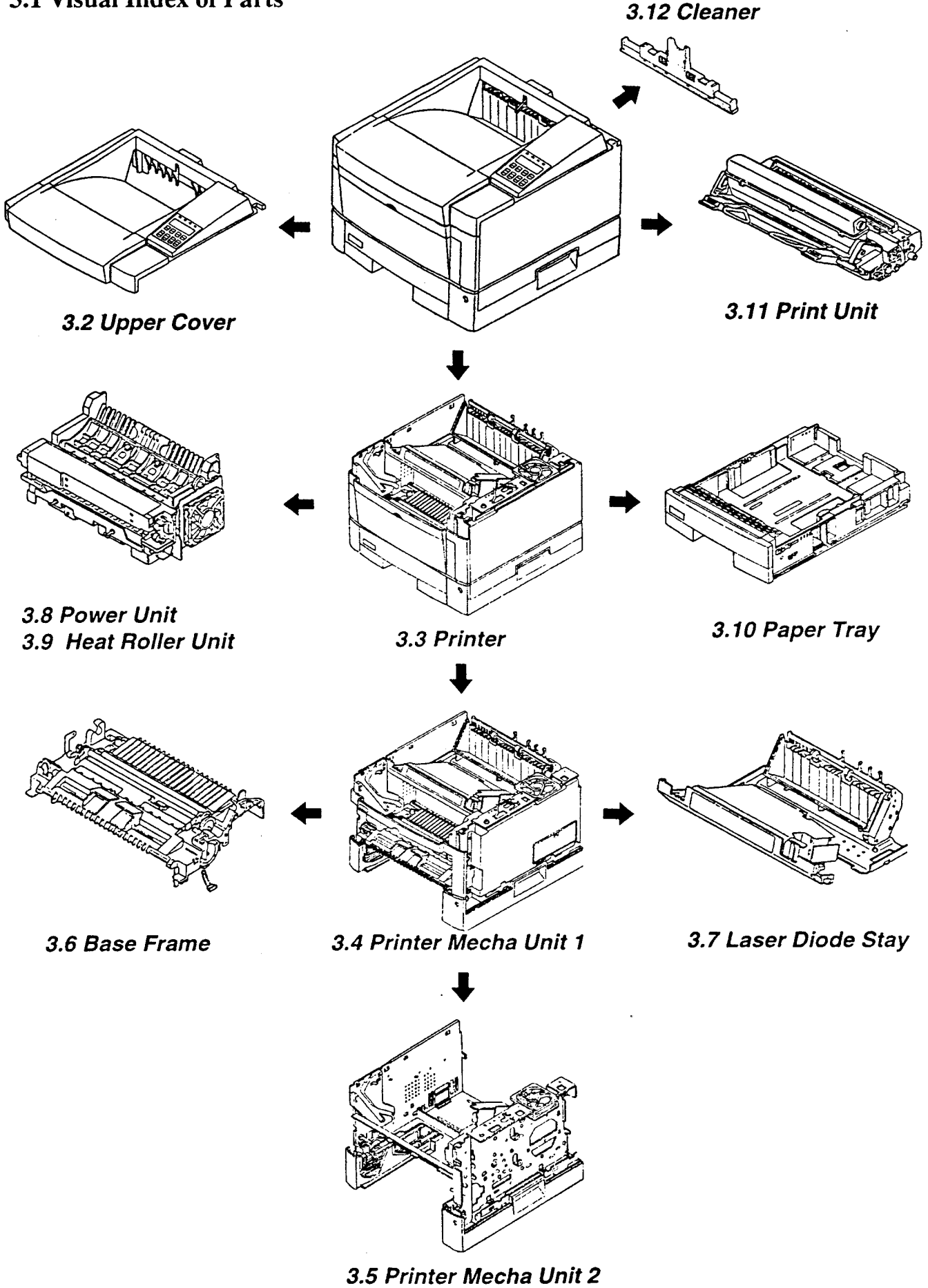
1. HOW TO REFER TO THIS MANUAL

Example:

Index No.	Composition & Quantity						S P	Specification	Parts name (Description)	Remarks
1~42	1							CA04040-G102	BASE FRAME ASY	
1~24		1						CA04040-G103	BASE FRAME S ASY	
①—1			1					CA04040-G104	FRAME ASY	
2~6			1					CA04040-G260	M BRACKET ASY	
2				1			@	CA04040-G261	M BRACKET S ASY	
③ 3				1	⑤		*	CA04040-0260	STEPPING MOTOR	
4				2			@	F6-SW2N3-06111	SCREW	
5				1			@	CA04040-Y263	GEAR V	
6				1			@	CA04040-Y265	GEAR W	
7		2			⑦		@	F6-SW2N3-06111	SCREW	
8		1					@	CA04040-Y267	GEAR X	
9		1					@	CA04040-Y269	GEAR Y	
10		1		④			@	CA04040-Y145	SENSOR LEVER ⑥	
11~13		1						CA04040-G275	SIDE GUIDE L ASY	
11				1				CA04040-Y276	SIDE GUIDE L	
12				1				CA04040-Y277	RACK L	
13				1			@	F6-SN2TP3-05	TAPPING SCREW	
14~17		1						CA04040-G278	SIDE GUIDE R ASY	

②

① This figure shows the index number of the part in the drawing .

② These columns show the construction levels. A higher level part consists of the following lower level parts listed until the quantity of the next part appears at the same level. See example ③.

③ m-n shows an assembly or unit consisting of more than one part.

④ These parts are at the same level and belong to the same upper level part.

⑤ Parts with on asterisk(*) are recommended spare parts.

⑥ The Sensor Lever is the part name of the item number 10.

⑦ Parts with an at (@) can be bought.

Parts with no marks cannot be bought.

* The Stepping Motor is a recommended spare part.

3.2 Upper Cover
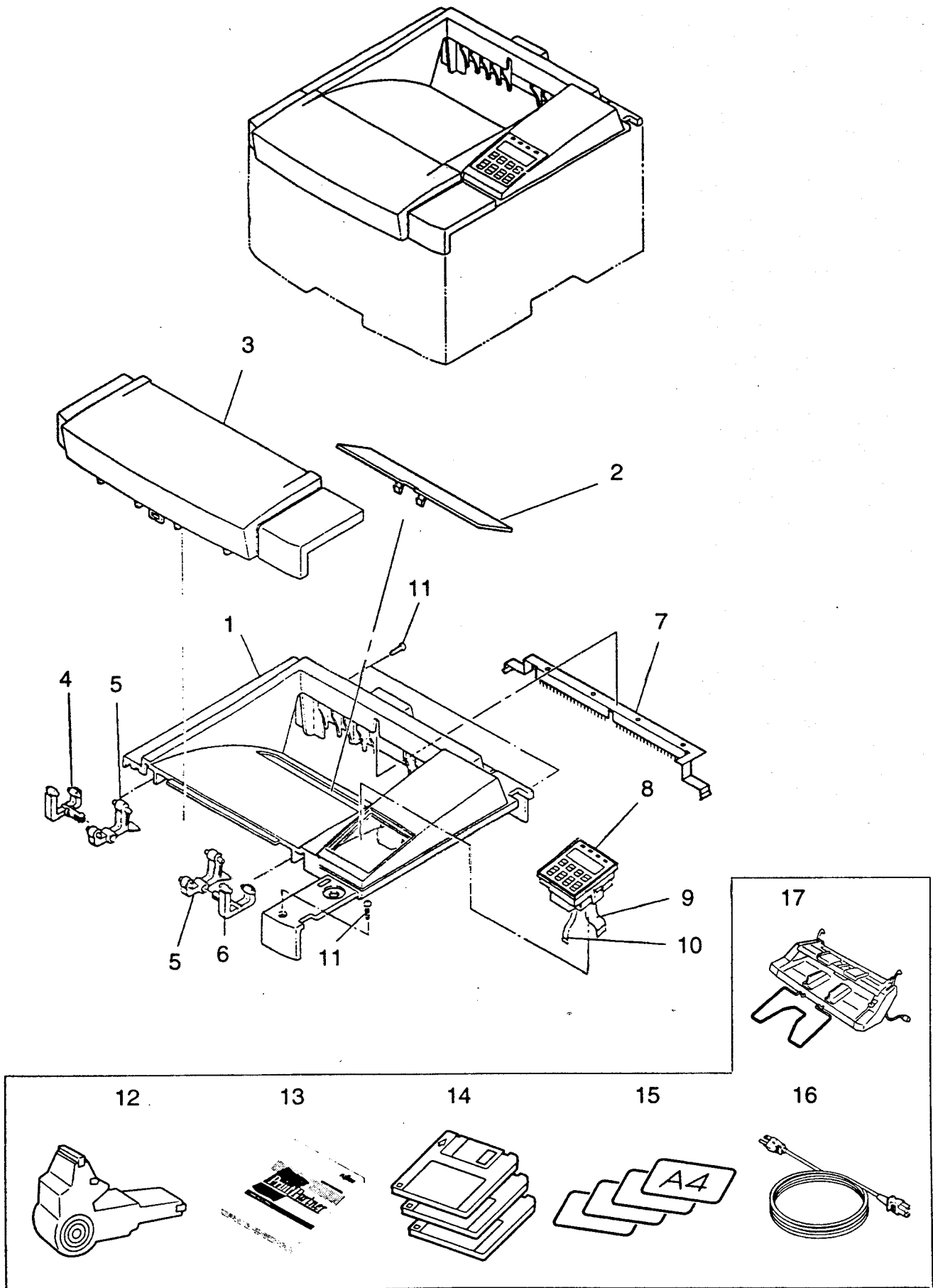
3.2 Upper Cover

Index No.	Composition & Quantity				S P	Specification	Parts name (Description)	AC(V) 120	AC(V) 220 ~240	Remarks
	1					CA04040-B500	PP14ADV(120V)	O		North America
	1					CA04040-B511	PP14ADV(120V)	O		For FCI
	1					CA04040-B521	PP14ADV(120V)	O		For FCPA
	1					CA04040-B531	PP14ADV(120V)	O		For Asia
	1					CA04040-B550	PP14ADV(220-240V)		O	For Europa
	1					CA04040-B555	T9014D		O	For Tally(EU)
	1					CA04040-B556	T9014D		O	For Tally(UK)
	1					CA04040-B561	PP14ADV(220-240V)		O	For FAL
	1					CA04040-B571	PP14ADV(220-240V)		O	For Asia
	1					CA04040-B581	PP14ADV(220-240V)		O	For Europa (Country Kit)
	1					CA04040-B591	PP14ADV(220-240V)		O	No Brand
	1					CA04040-B596	PP14ADV(220-240V)		O	For Europa (Drop ship)
1~10		1				CA04040-F552	UPPER COVER ASY	O	O	
1~ 7			1		*	CA04040-G551	U COVER SUB ASY	O	O	
1				1	@	CA04040-Y550	UPPER COVER	O	O	
2				1	@	CA04040-G562	SHADE COVER ASY	O	O	
3				1	@	CA02758-Y803	UPPER DOOR	O	O	
4				1	@	CA02758-Y805	UD GUIDE L	O	O	
5				2	@	CA02758-Y806	UD GUIDE R	O	O	
6				1	@	CA02758-Y807	UD GUIDE LL	O	O	
7				1	@	CA04040-G539	DCH FRAME ASY	O	O	
8			1		*	CA04040-0574	OP PANEL	O	O	
9			1		@	CA04040-Y564	OP CABLE	O	O	
10			1		@	CA04040-Y573	VOLUME CABLE	O	O	
11			3		@	F6-SBD3-06121	BINDING HEAD SCREW	O	O	
	1					CA04040-K500	ACCESSORIES	O		North America
	1					CA04040-K511	ACCESSORIES	O		For FCI
	1					CA04040-K531	ACCESSORIES	O		For Asia
	1					CA04040-K550	ACCESSORIES		O	For Europa
	1					CA04040-K555	ACCESSORIES		O	For Tally(EU)
	1					CA04040-K556	ACCESSORIES		O	For Tally(UK)
	1					CA04040-K561	ACCESSORIES		O	For FAL
	1					CA04040-K571	ACCESSORIES		O	For Asia
	1					CA04040-K581	ACCESSORIES		O	For Europa (Country Kit)
	1					CA04040-K591	ACCESSORIES		O	No Brand
	1					CA04040-K596	ACCESSORIES		O	For Europa (Drop ship)
12		1			@	CA02758-G461	CL BRUSH ASY	O	O	
13		1				C145-E172-EN	USER'S MANUAL	O	O	
14		1			@	CA04040-0905	PP MENU	O	O	
		1			@	CA04040-0906	Win3.1 DRIVER	O	O	
		1			@	CA04040-E909	MARKVISION	O	O	
15		1			@	CA02417-Y720	SIZE LABEL	O	O	A4
		1			@	CA02417-Y724	SIZE LABEL	O	O	LETTER
		1			@	CA02417-Y725	SIZE LABEL	O	O	EXECUTIVE
16		1			@	CA02758-0992	AC CORD SET	O		100-120V
		1			@	CA02758-0993	AC CORD SET		O	220-240V(EU)
		1			@	CA02758-0995	AC CORD SET		O	220-240V
		1			@	CA02758-0998	AC CORD SET		O	220-240V(UK)
17		1				CA02758-0880	MFF	O	O	
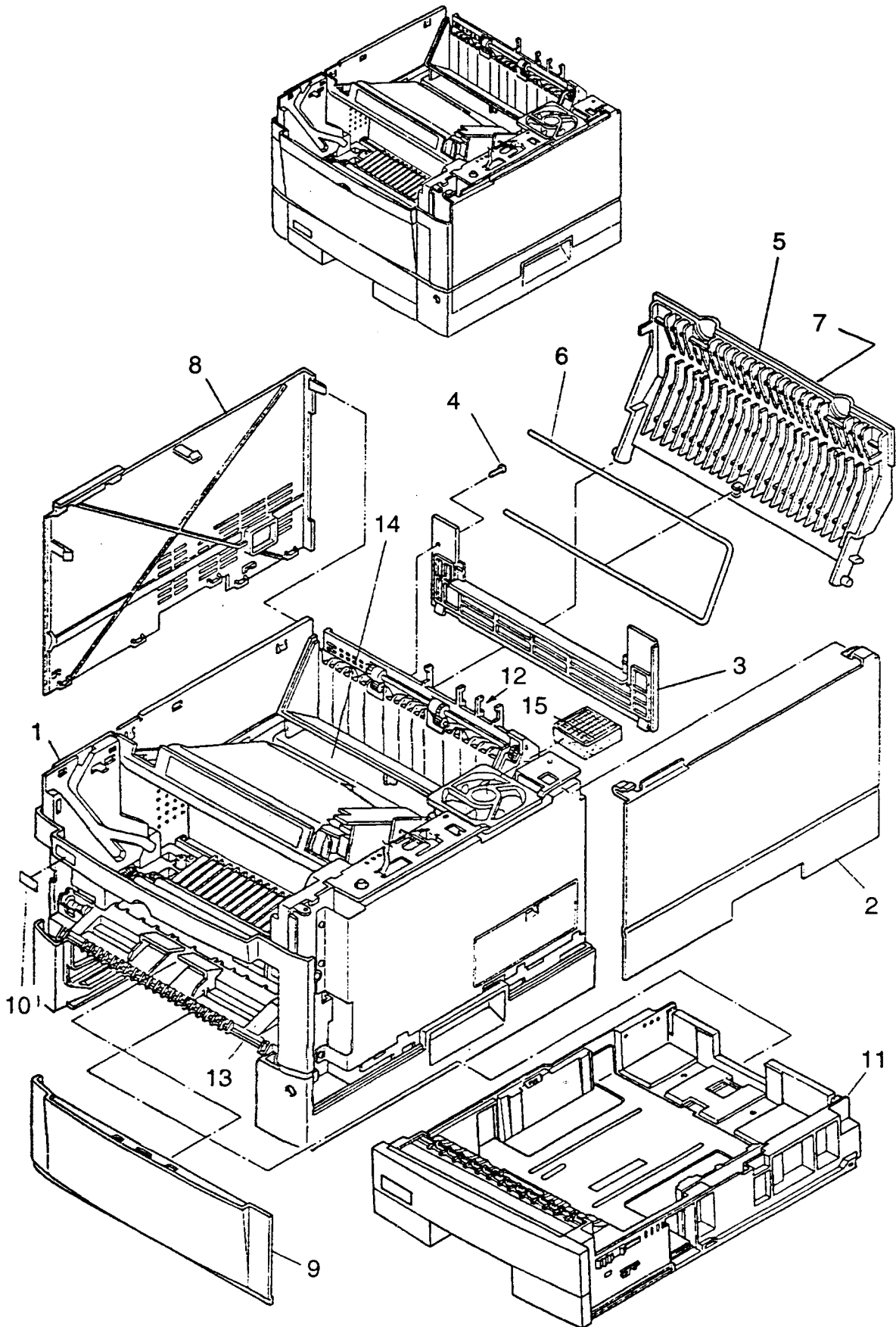
3.3 Printer

3.3 Printer

Index No.	Composition & Quantity			S P	Specification	Parts name (Description)	AC(V) 120	AC(V) 220~240	Remarks
1~14	1				CA04040-C500	PRINTER	O		120V, LETTER
	1				CA04040-C531	PRINTER	O		120V, A4
	1				CA04040-C550	PRINTER		O	220-240V,A4
1		1			CA04040-E500	MECH. UNIT	O	O	
2		1		@	CA02758-Y812	SIDE COVER R	O	O	
3		1		@	CA02758-Y814	BACK COVER	O	O	
4		1		@	F6-SBD3-06121	BINDING HEAD SCREW	O	O	
5~6		1			CA02758-G815	STACKER ASY	O	O	
5			1	@	CA02758-Y815	STACKER	O	O	
6			1	@	CA02758-Y816	REAR LABEL	O	O	
7		1		@	CA02758-Y818	S-LABEL	O	O	
8		1		@	CA02758-Y811	SIDE COVER L	O	O	
9		1		@	CA02758-Y813	FRONT COVER	O	O	
10		1		@	CA04040-Y854	LOGO LABEL	O	O	
		1		@	CA04040-Y859	LOGO LABEL		O	For Tally
11		1			CA04040-F701	PAPER TRAY	O	O	A4
		1			CA04040-F702	PAPER TRAY	O	O	LETTER
12		1			CA04040-F544	POWER UNIT	O		100-120V
		1			CA04040-F545	POWER UNIT		O	220-240V
13		1			CA04040-F470	BASE FRAME ASY	O	O	
14		1			CA04040-G525	LD STAY ASY	O	O	
		7			CA02758-0195	TAPPING SCREW	O	O	
15		1		@	CA02758-0126	OZONE FILTER	O	O	
16		1		@	CA04040-G521	CLEANER	O	O	

3.4 Printer Mecha Unit 1
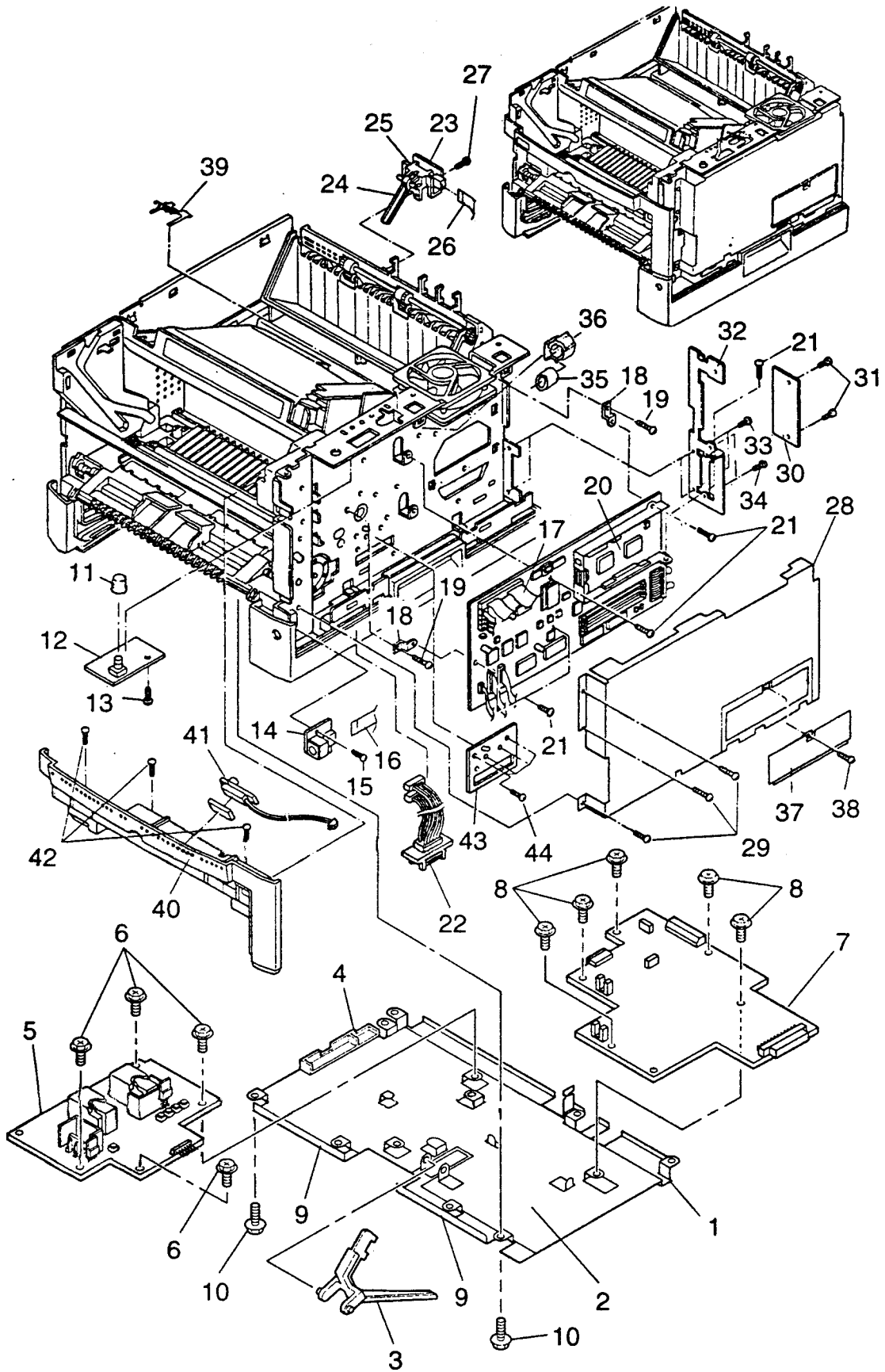
3.4 Printer Mecha Unit 1

Index No.	Composition & Quantity				S P	Specification	Parts name (Description)	AC(V) 120	AC(V) 220 ~240	Remarks
1~9	1					CA02758·y149	HV UNIT	O	O	
1		1			@	CA02758-G150	BOARD COVER ASY	O	O	
2		1			@	CA02758-Z149	SHEET	O	O	
3		1			@	CA02758-Z651	PE LEVER	O	O	
4		1			@	CA02758-Z144	HV GUIDE	O	O	
5		1			*	CA02951-4291	HV BOARD	O	O	
6		4			@	CA02758-0195	TAPPING SCREW	O	O	
7		1			*	CA04040-G595	MECH BOARD	O	O	
8		5			@	CA02758-0195	TAPPING SCREW	O	O	
9		2			@	CA04040-Y598	SHEET P1	O	O	
10	4				@	F6-SW2N3-08111	SCREW	O	O	
11	1				@	D860-1173-X826	KNOB	O	O	
12	1				*	CA04040-G572	VOLUME BOARD	O	O	
13	2				@	CA02758-0195	TAPPING SCREW	O	O	
14	1				*	CA02758-G171	MFF BOARD	O	O	
15	1				@	F6-SBD3-06121	SCREW	O	O	
16	1				@	CA04040-Y568	MFF CABLE	O	O	
17	1				@	CA02758-Y122	LD CABLE	O	O	
18	2				@	CA04040-Y556	METAL FITTING	O	O	
19	2				@	F6-SW2N3-06121	SCREW	O	O	
20	1				*	CA04040-J500	ROM BOARD	O	O	
21	5				@	F6-SW2N3-08121	SCREW	O	O	
22	1				@	CA04040-F569	CABLE ASY	O	O	
23~25	1				*	CA02758-F695	SF SENSOR ASY	O	O	
23		1				CA02758-G696	SFS BOARD	O	O	
24		1				CA02758-Y696	SFS LEVER	O	O	
25		1				CA02758-Y697	SFS COVER	O	O	
26	1				@	CA02758-Y698	SFS CABLE	O	O	
27	1				@	F6-SN2TP3-06	TAPPING SCREW	O	O	
28	1				@	CA04040-G560	SHIELD ASY	O	O	
29	3				@	F6-SW2N3-08121	SCREW	O	O	
30	1				@	CA04040-Y552	SHADE PLATE B	O	O	
31	2				@	F6-SBD3-06121	SCREW	O	O	
32	1				@	CA04040-Y555	BACK COVER	O	O	
33	2				@	F6-SBD3-06121	SCREW	O	O	
34	2				@	F6-SW2N3-06121	SCREW	O	O	
35	1				@	CT-F3RH11.8-15-7.3	FELIGHT CORE	O	O	
36	1				@	CA98001-6702	CABLE CLUMP	O	O	
37	1				@	CA04040-Y561	SIMM COVER	O	O	
38	1				@	F6-SW2N3-06121	SCREW	O	O	
39	1				@	CA04040-Y580	FG SPRING PLATE	O	O	
40~41	1				@	CA02758-G817	FRONT FRAME ASY	O	O	
40		1				CA02758-Y817	FRONT FRAME	O	O	
41		1			@	CA02758-G360	TS ASY	O	O	
42	3				@	F6-SN2TP3-06	TAPPING SCREW	O	O	
43		1				CA02758-Y024	RF PLATE	O	O	
44		1				CA02758-0196	TAPPING SCREW	O	O	

3.5 Printer Mecha Unit 2-1
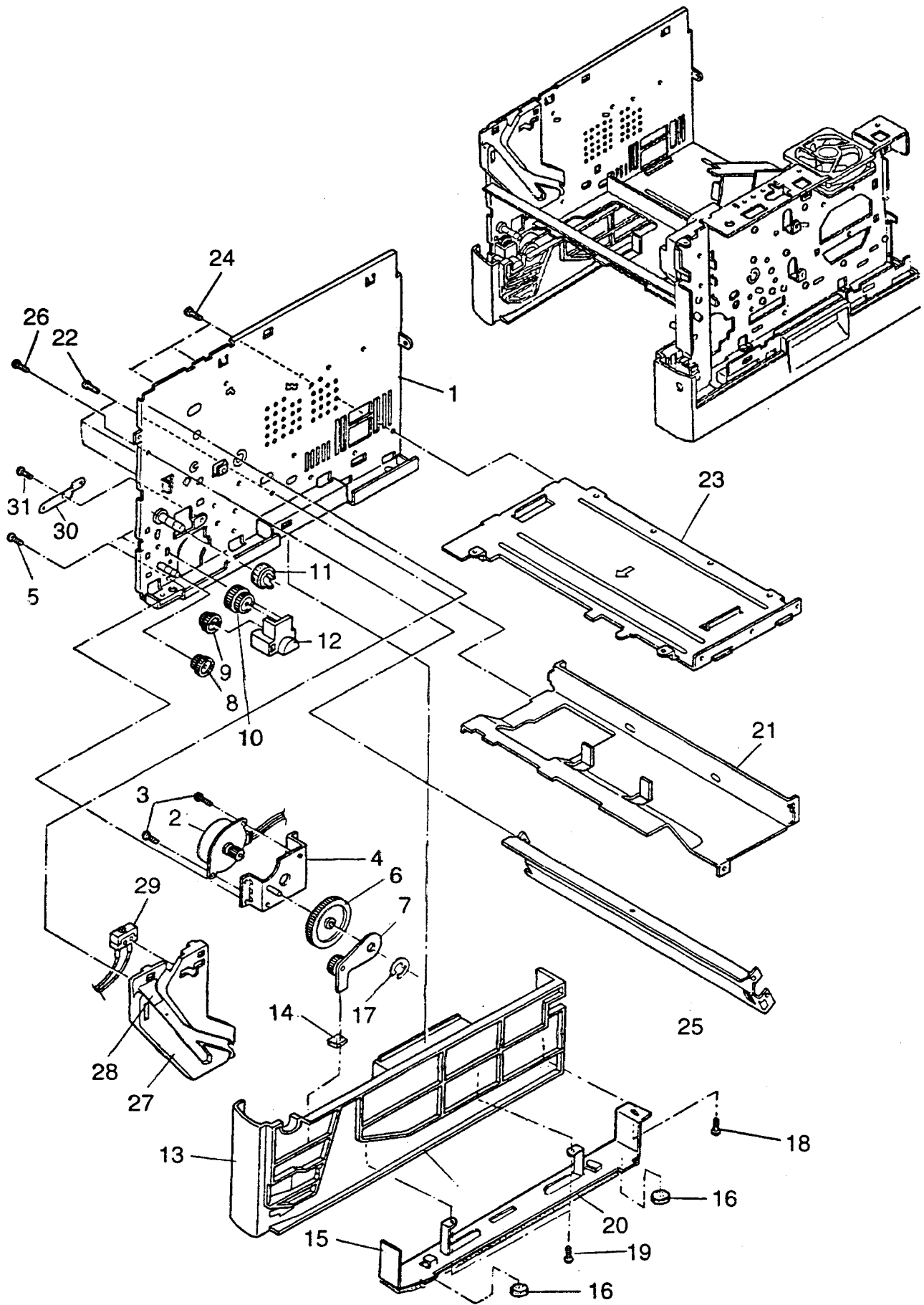
3.5 Printer Mecha Unit 2-1

Index No.	Composition & Quantity				S P	Specification	Parts name (Description)	AC(V) 120	AC(V) 220 ~240	Remarks
1~20	1					CA04040-F113	FRAME L ASY	O	O	
1		1				CA02758-G111	FRAME L SUB ASY	O	O	
2~4		1				CA02758-F201	P MOTER ASY	O	O	
2			1		*	CA02758-0201	PICK MOTOR	O	O	
3			2		@	F6-SW2N3-08111	SCREW	O	O	
4			1			CA02758-G202	PM BRACKET ASY	O	O	
5		3				CA02758-0198	TAPPING SCREW	O	O	
6		1			@	CA02758-Y204	GEAR P	O	O	
7		1			@	CA02758-G211	MFF GEAR A ASY	O	O	
8		1				CA02758-Y212	MFF GEAR B	O	O	
9		1				CA02758-Y213	MFF GEAR C	O	O	
10		1				CA02758-Y214	MFF GEAR D	O	O	
11		1				CA02758-Y215	MFF GEAR E	O	O	
12		1				CA02758-Y209	MFF GEAR BRACKET	O	O	
13~19		1			@	CA02758-G846	COVER L ASY	O	O	
13			1			CA02758-Y846	LOWER COVER L	O	O	
14			1			CA02758-Z216	MFF RUBBER	O	O	
15~16			1			CA02758-G848	PLATE L ASY	O	O	
15				1		CA02758-Y848	LOWER PLATE L	O	O	
16				2		CA02758-Y825	RUBBER FOOT	O	O	
17			1			F6-ER4-S	SNAP RING	O	O	
18			1			F6-SN2TP3-08	TAPPING SCREW	O	O	
19			1			CA02758-Z821	PTGL DUMPER	O	O	
20		2			@	CA02758-0196	TAPPING SCREW	O	O	
21	1					CA02758-Y105	L TYPE STAY	O	O	
22	3					F6-SBD3-06121	BINDING HEAD SCREW	O	O	
23	1					CA02758-Y106	LOWER STAY	O	O	
24	3					F6-SBD3-06121	BINDING HEAD SCREW	O	O	
25	1					CA02758-Y104	FRONT STAY	O	O	
26	2					CA02758-0195	TAPPING SCREW	O	O	
27~29	1					CA02758-G114	PR GUIDE L ASY	O	O	
27		1				CA02758-Y114	PR GUIDE L	O	O	
28		1				CA02758-Z114	PRGL LABEL	O	O	
29		1			*	CA02758-G127	COVER OPEN SW	O	O	
30	1				@	CA02758-Y606	FG PLATE P	O	O	
31	1				@	CA02758-0195	TAPPING SCREW	O	O	

3.5 Printer Mecha Unit 2-2 ·
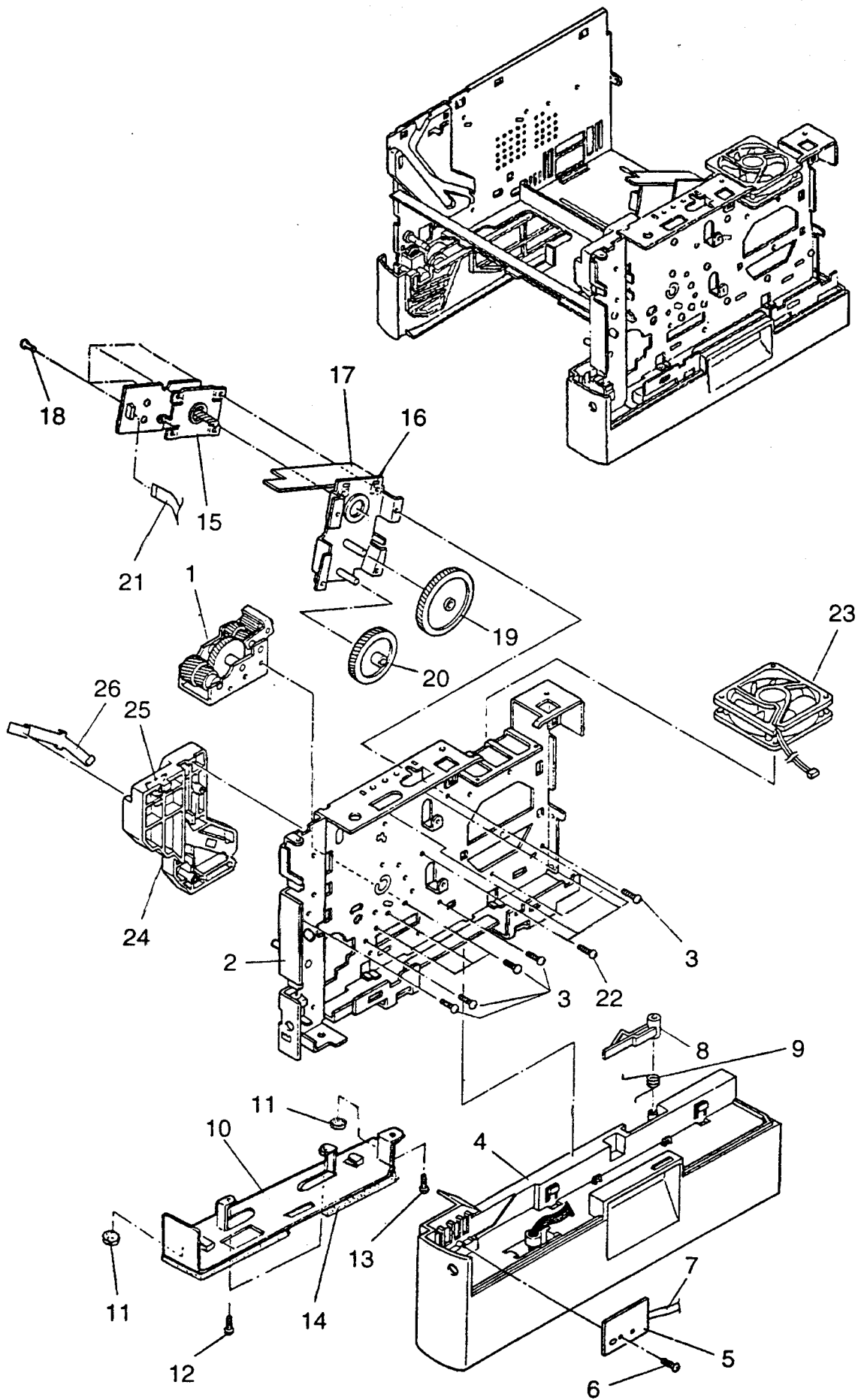
3.5 Printer Mecha Unit 2-2

Index No.	Composition & Quantity				S P	Specification	Parts name (Description)	AC(V) 120	AC(V) 220 ~240	Remarks
1	1					CA02758-G261	GEAR BOX ASY	O	O	
2	1					CA02758-G112	FRAME R SUB ASY	O	O	
3	8					CA02758-0195	TAPPING SCREW	O	O	
4~13	1				@	CA02758-G825	COVER R ASY	O	O	
4		1				CA02758-Y847	LOWER COVER R	O	O	
5		1			*	CA02758-G172	PSS BOARD	O	O	
6		1				F6-SN2TP3-08	TAPPING SCREW	O	O	
7		1				CA02758-Y164	PSS CABLE	O	O	
8		1				CA02758-Y727	PT LOCK LEVER	O	O	
9		1				CA02758-Y728	PT LOCK SPRING	O	O	
10~11		1				CA02758-G849	PLATE R ASY	O	O	
10			1			CA02758-Y849	LOWER PLATE R	O	O	
11			2			CA04040-Y825	RUBBER FOOT	O	O	
12		1				F6-SN2TP3-08	TAPPING SCREW	O	O	
13		1				CA02758-Z823	PTGR DUMPER	O	O	
14	2				@	CA02758-0196	TAPPING SCREW	O	O	
15~21	1					CA02758-F251	M MOTOR ASY	O	O	
15		1			*	CA02758-0251	MAIN MOTOR	O	O	
16		4				CA02758-Y291	DUMPER MM	O	O	
17		1			@	CA02758-G251	MM BRACKET ASY	O	O	
18		4				CA02758-0195	TAPPING SCREW	O	O	
19		1			@	CA02758-Y256	GEAR MA	O	O	
20		1			@	CA02758-Y257	GEAR MB	O	O	
21		1			@	CA02758-Y255	MM CABLE	O	O	
22	4				@	CA02758-0195	TAPPING SCREW	O	O	
23	1				*	CA02758-0129	FAN	O	O	
24~26	1					CA02758-G115	PR GUIDE R ASY	O	O	
24		1				CA02758-Y115	PR GUIDE R	O	O	
25		1				CA02758-Z115	PRGR LABEL	O	O	
26		1				CA02758-Y116	DRFG	O	O	

DIGITAL Laser Printer LN15

PARTS CATALOG

(PART 2 OF 2)
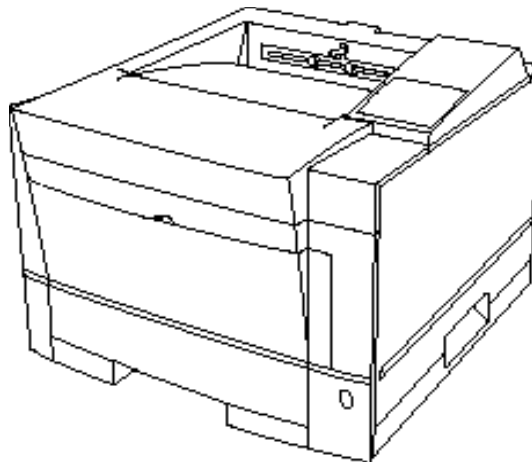
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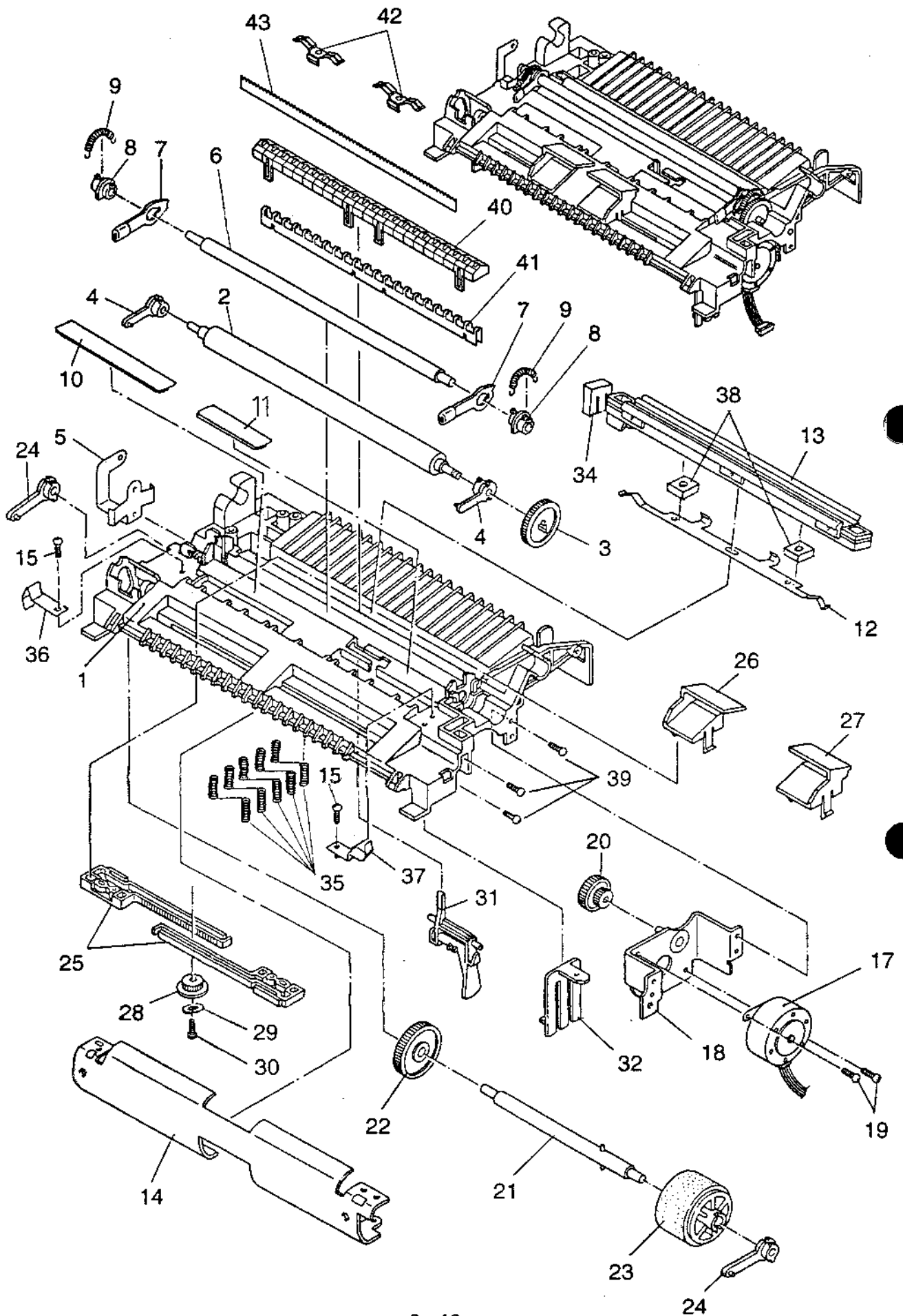
3.6 Base Frame

3.6 Base Frame

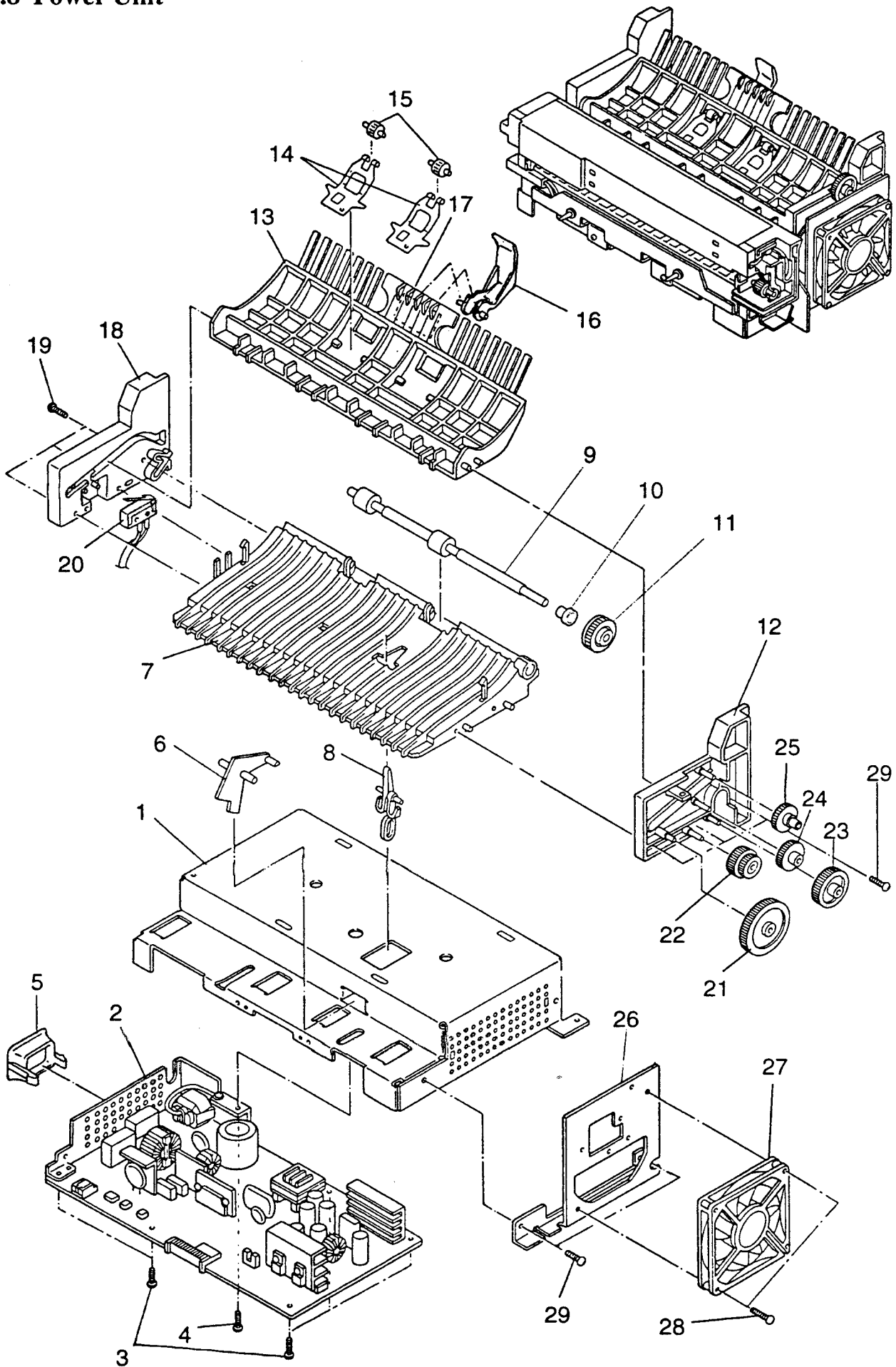| Index No.	Composition & Quantity				S P	Specification	Parts name (Description)	AC(V) 120	AC(V) 220 -240	Remarks
1~37	1					CA04040-F470	BASE FRAME ASY	O	O	
1	1					CA04040-Y471	BASE FRAME	O	O	
2	1					CA02758-G611	FEED ROLLER ASY	O	O	
3	1				@	CA02758-Y613	GEAR F	O	O	
4	1				@	CA02758-Y605	BEARING PF	O	O	
5	1				@	CA02758-Y614	FG PLATE FR	O	O	
6	1				@	CA02758-Y621	RESIST ROLLER	O	O	
7	2				@	CA02758-G627	LEVER ASY	O	O	
8	2				@	CA02758-Y623	BEARING R	O	O	
9	2				@	CA02758-Y625	SPRING R	O	O	
10	1				@	CA02758-Z011	SHEET RE1	O	O	
11	1				@	CA02758-Z012	SHEET RE2	O	O	
12	1				@	CA02758-Y458	FG PLATE T	O	O	
13	1				*	CA04040-F450	TRCG UNIT	O	O	
14	1					CA02758-Y103	PAPER GUIDE F	O	O	
15	2				@	CA02758-0195	TAPPING SCREW	O	O	
16	2					CA02758-Z806	DUMPER F	O	O	
17~20	1					CA04040-F221	R MOTOR ASY	O	O	
17		1			*	CA04040-0201	REGIST MOTOR	O	O	
18		1				CA02758-G222	RM BRACKET ASY	O	O	
19		2			@	F6-SW2N3-08111	SCREW	O	O	
20		1				CA02758-Y224	GEAR R	O	O	
21	1				@	CA02758-G604	SHAFT P ASY	O	O	
22	1				@	CA02758-0603	PICK GEAR	O	O	
23	1				*	CA02758-G600	ROLLER P ASY	O	O	
24	2				@	CA02758-Y605	BEARING PF	O	O	
25	2				@	CA02758-Y642	RACK	O	O	
26	1				@	CA02758-Y643	GUIDE FL	O	O	
27	1				@	CA02758-Y644	GUIDE FR	O	O	
28	1				@	CA02758-Y641	PINION	O	O	
29	1				@	F6-WM3-111	WASHER	O	O	
30	1				@	F6-SN2TP3-06	TAPPING SCREW	O	O	
31	1				@	CA02758-Y654	SENSOR LEVER 4	O	O	
32	1				@	CA02758-Y729	TRIDENT LEVER	O	O	
33	1					CA02758-Y152	SPRING HV1	O	O	
	1					CA02758-Y153	SPRING HV2	O	O	
	1					CA02758-Y154	SPRING HV3	O	O	
	1					CA02758-Y155	SPRING HV4	O	O	
	1					CA04040-Y466	SPRING HV5	O	O	
34	2				@	CA02758-Y477	TRCG STOPPER	O	O	
35	1					CA02758-Z805	SOUND PROOF	O	O	
36	1					CA02758-Y193	P GUIDE FG L	O	O	
37	1					CA02758-Y194	P GUIDE FG R	O	O	
38	2				@	CA02758-Y025	TRCG STOPPER	O	O	
39	3				@	CA02758-0195	TAPPING SCREW	O	O	
40~41	1					CA04040-F460	DCH GUIDE ASY	O	O	
40		1				CA04040-Y461	DCH GUIDE	O	O	
41		1				CA04040-Y462	DCH PLATE A	O	O	
42	2					CA04040-Y467	DCH PLATE C	O	O	
43	1					CA04040-Y468	DCH PLATE B	O	O	
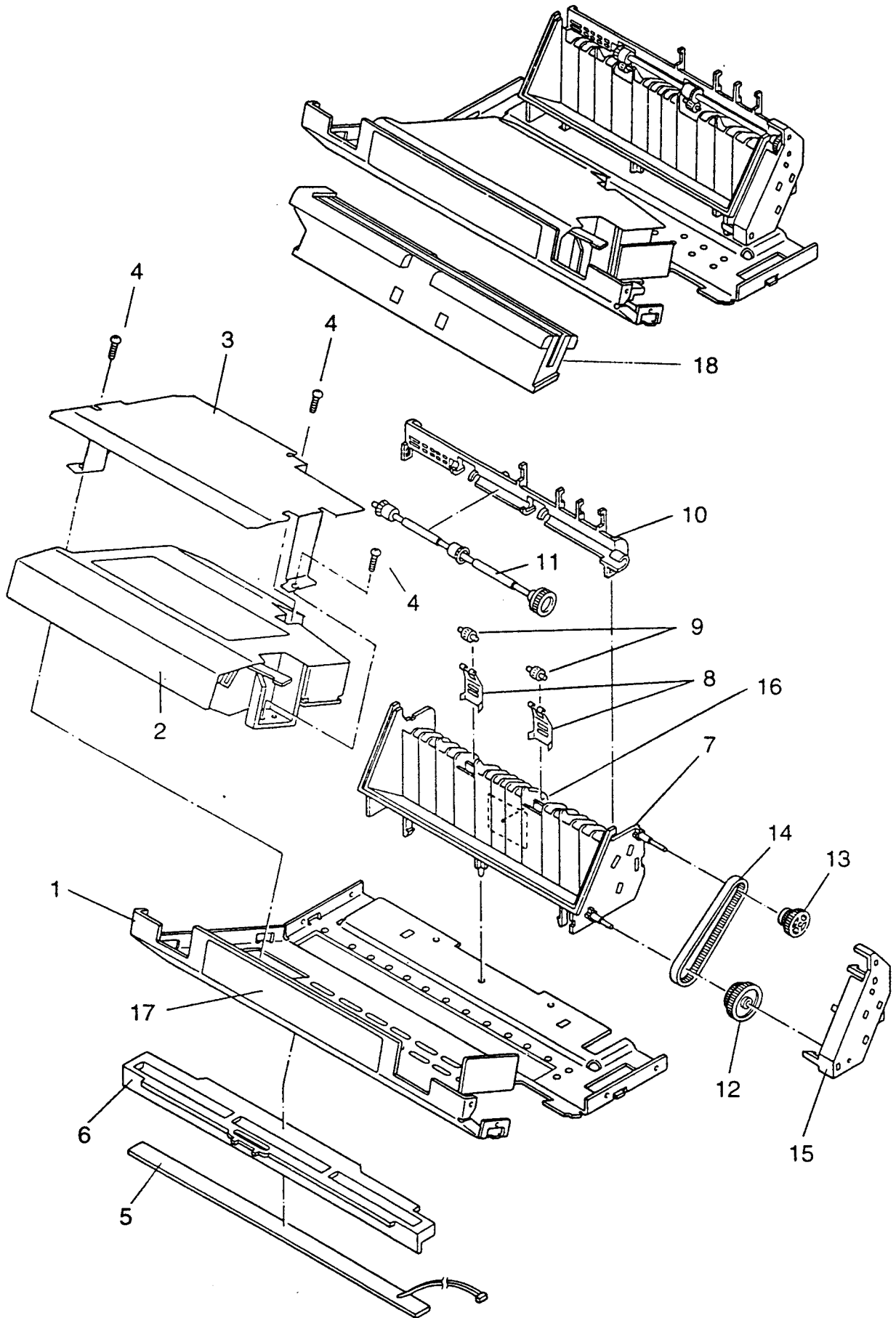
3.7 Laser Diode Stay
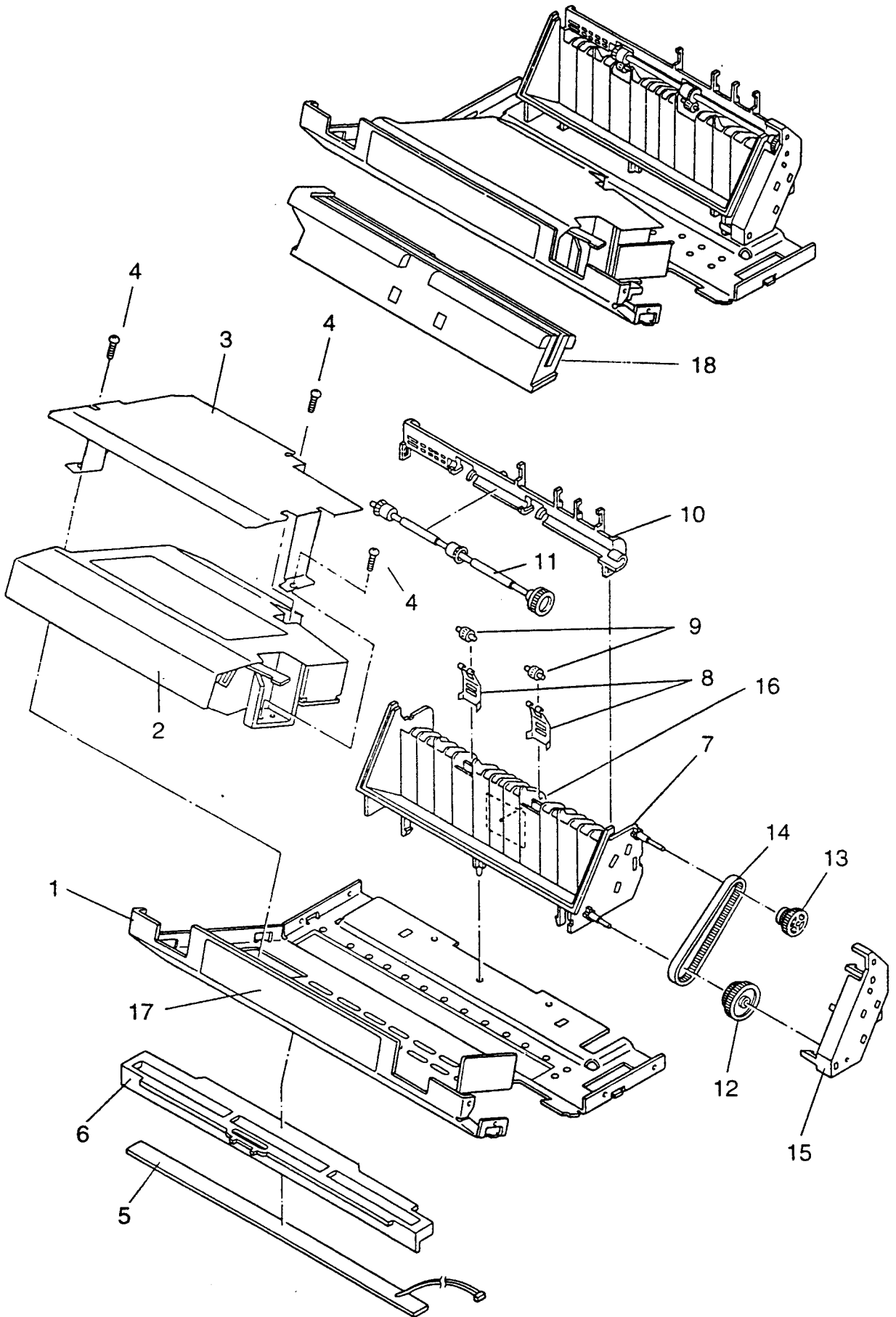
3.7 Laser Diode Stay

3.7 Laser Diode Stay

Index No.	Composition & Quantity				SP	Specification	Parts name (Description)	AC(V) 120	AC(V) 220~240	Remarks
1~18	1					CA04040-G525	LD STAY ASY	O	O	
1		1				CA02758-Y121-TK	LD STAY	O	O	
2		1			*	CA02758-012D	LD UNIT	O	O	
3		1			@	CA02758-Y063	LD FG COVER	O	O	
4		3			@	F6-SW2N3-08111	SCREW	O	O	
5~6		1			@	CA02758-G123	DCH LED UNIT	O	O	
5			1			CA02758-0123	DCH LED	O	O	
6			1			CA02758-Y124	LED HOLDER	O	O	
7~16		1			*	CA02758-F680	FRAME 2 ASY	O	O	
7			1			CA02758-Y680	PAPER FRAME 2	O	O	
8~9			2			CA02758-G682	FEED 2 ASY	O	O	
8				1		CA02758-Y682	FEED SPRING 2	O	O	
9				1		CA02758-Y673	PINCH ROLLER	O	O	
10~11			1			CA02758-F690	GUIDE ASY	O	O	
10				1	@	CA02758-Y690	ROLLER GUIDE	O	O	
11				1	@	CA02758-G692	ROLLER ASY	O	O	
12			1		@	CA02758-Y684	GEAR 6	O	O	
13			1		@	CA02758-G685	GEAR 7 ASY	O	O	
14			1		@	CA98001-5552	TIMING BELT	O	O	
15			1		@	CA02758-Y688	GEAR COVER	O	O	
16			1		@	CA02758-Y592	LABEL	O	O	CAUTION
17		1			@	CA02758-Y591	LABEL	O	O	CAUTION
18		1			@	CA04040-Y154	CL GUIDE	O	O	

3.8 Power Unit

3.8 Power Unit

Index No.	Composition & Quantity						S P	Specification	Parts name (Description)	AC(V)		Remarks
										120	220 ~240	
1~	1							CA04040-F544	POWER UNIT	O		100-120V
	1							CA04040-F545	POWER UNIT		O	220-240V
1		1						CA02758-G135	PB COVER	O	O	
2		1					*	CA02951-4260	POWER BOARD	O		100-120V
		1					*	CA02951-4265	POWER BOARD		O	220-240V
3		5					@	CA02758-0197	TAPPING SCREW	O	O	
4		1					@	F6-SW2N3-06121	SCREW	O	O	
5		1					@	CA02758-Y137	SWITCH COVER	O	O	
6		1						CA02758-Y655	SENSOR LEVER 5	O	O	
7~20		1						CA04040-F590	PAPER FRAME ASY	O	O	
7			1					CA02758-Y680	PAPER FRAME	O	O	
8			1					CA02758-Y679	SENSOR LEVER 6	O	O	
9			1					CA04040-G591	EJECT ROLLER	O	O	
10			1					CA04040-Y592	ER BEARING	O	O	
11			1					CA04040-0590	ONE WAY CLUTCH	O	O	
12			1					CA02758-Y676	SIDE FRAME LP	O	O	
13~17			1				@	CA02758-F670	PAPER GUIDE ASY	O	O	
13				1				CA02758-Y670-TK	PAPER GUIDE	O	O	
14~15				1				CA02758-G673	FEED 1 ASY	O	O	
14					1			CA04040-Y672	FEED SPRING 1	O	O	
15					1			CA02758-Y673	PINCH ROLLER	O	O	
16				1				CA02758-Z671	STACK LEVER	O	O	
17				1				CA02758-Y671	P LABEL	O	O	
18			1					CA02758-Y677	SIDE FRAME RP	O	O	
19			6				@	F6-SN2TP3-08	TAPPING SCREW	O	O	
20			1					CA02758-G678	SWITCH ASY	O	O	
21		1					@	CA02758-Y661	GEAR 1	O	O	
22		3					@	CA02758-Y662	GEAR 2	O	O	
23		1					@	CA02758-Y663	GEAR 3	O	O	
24		1					@	CA02758-Y664	GEAR 4	O	O	
25		1					@	CA02758-Y665	GEAR 5	O	O	
26		1					@	CA02758-Y668	FAN BRACKET	O	O	
27		1					*	CA02758-G128	FAN ASY	O	O	
28		2					@	F6-SW2N3-20111	SCREW	O	O	
29		2					@	CA02758-0195	TAPPING SCREW	O	O	
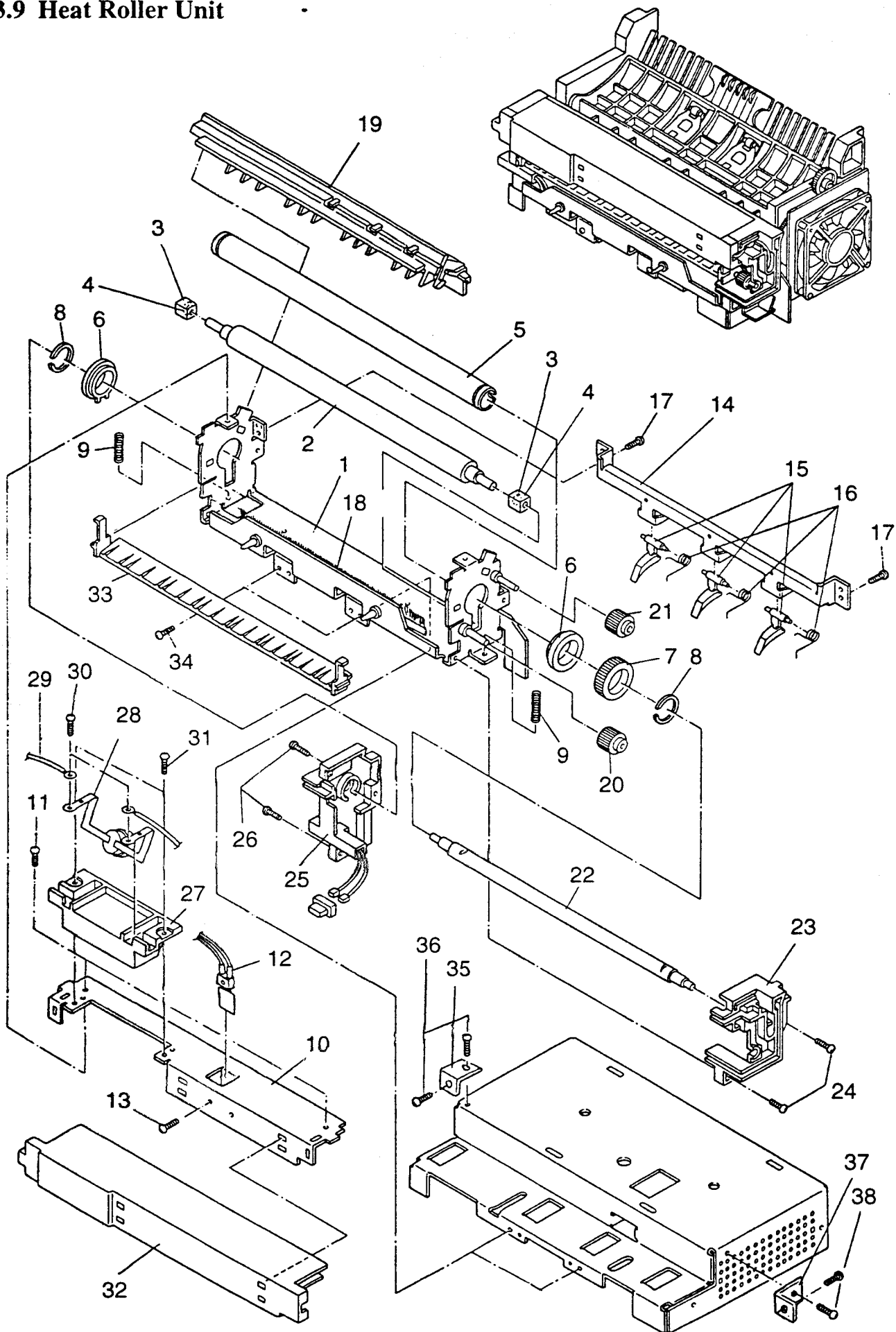
3.9 Heat Roller Unit

Index No.	Composition & Quantity					S P	Specification	Parts name (Description)	AC(V) 120	AC(V) 220~240	Remarks
1~33	1						CA04040-F501	HR UNIT	O		120V
	1						CA04040-F502	HR UNIT		O	220-240V
1~25		1					CA04040-G501	HR SUB UNIT	O		120V
		1					CA04040-G502	HR SUB UNIT		O	220-240V
1~17			1				CA04040-G510	HR BASE UNIT	O	O	
1				1			CA02758-G519	HR FRAME ASY 1	O	O	
2				1			CA04040-G513	BU ROLLER ASY	O	O	
3				2			CA02758-Z531	BEARING BR	O	O	
4				2			CA98001-6511	BEARING	O	O	
5				1			CA04040-G511	HEAT ROLLER ASY	O	O	
6				2			CA02758-Y532	BEARING HR	O	O	
7				1			CA02758-Y533	GEAR HR	O	O	
8				2			CA02758-Y535	RING HR	O	O	
9				2			CA02758-Z534	SPRING BR	O	O	
10				1			CA02758-Y541	HR FRAME U	O	O	
11				2			CA02758-0195	TAPPING SCREW	O	O	
12				1			CA02758-0544	THERMISTOR ASY	O	O	
13				1			CA02758-0199	TAPPING SCREW	O	O	
14~16				1			CA02758-G560	SEPARATOR ASY	O	O	
14					1		CA02758-Y560	PLATE SP	O	O	
15					3		CA02758-Y561	SEPARATOR	O	O	
16					3		CA02758-Y562	SPRING SP	O	O	
17				2			CA02758-0195	TAPPING SCREW	O	O	
18				1			CA04040-Y155	HR COVER R	O	O	
19				1			CA02758-Y538	GEAR HG1	O	O	
20				1			CA02758-Y539	GEAR HG2	O	O	
21				1			CA02758-0511	HEATER LAMP	O		120V
				1			CA02758-0512	HEATER LAMP		O	220-240V
22				1			CA02758-Y577	HR COVER SR	O	O	
23				2			CA02758-0195	TAPPING SCREW	O	O	
24				1			CA02758-Y573	COVER SL	O	O	
25				2			CA02758-0195	TAPPING SCREW	O	O	
26~27		1					CA02758-G581	TH HOLDER ASY	O	O	
26				1			CA02758-Y581	HOLDER	O	O	
27				1			CA02758-0582	THERMOSTAT ASY	O	O	
28				1			CA02758-0584	HR CABLE ASY	O	O	
29				2			F6-SW2N3-06121	SCREW	O	O	
30				2			CA02758-0195	TAPPING SCREW	O	O	
31				1		@	CA02758-Y579	HR COVER F	O	O	
32				1		@	CA98001-5557	CONNECTOR	O	O	
33				1		@	CA02758-G537	PAPER GUIDE HR	O	O	
34	1						CA02758-Z525	PLATE L	O	O	
35	2						CA02758-0195	TAPPING SCREW	O	O	
36	1						CA02758-Z526	PLATE R	O	O	
37	2						CA02758-0195	TAPPING SCREW	O	O	
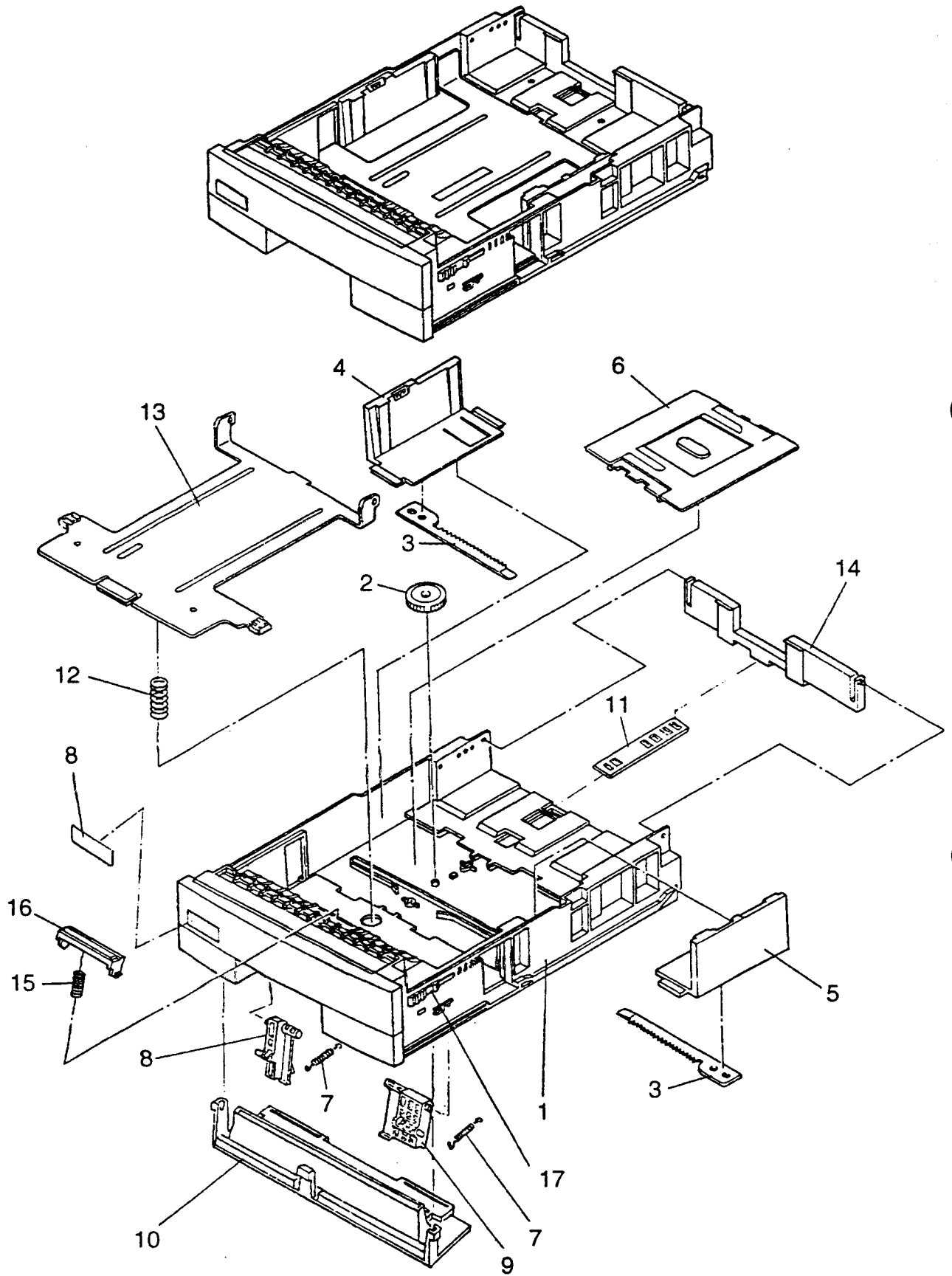
3.10 Paper Tray

3.10 Paper Tray

Index No.	Composition & Quantity					S P	Specification	Parts name (Description)	AC(V) 120	AC(V) 220 ~240	Remarks
1~	1						CA04040-F701	PAPER TRAY	O	O	A4
	1						CA04040-F702	PAPER TRAY	O	O	LETTER
1		1				@	CA04040-G701	PAPER TRAY	O	O	
2		1				@	CA04040-Y725	PINION	O	O	
3		2				@	CA04040-Y726	RACK	O	O	
4		1				@	CA04040-Y721	PAPER GUIDE L	O	O	
5		1				@	CA04040-G722	GUIDE R ASY	O	O	
6		1				@	CA04040-Y727	COVER UG	O	O	
7		2				@	CA04040-Z714	SPRING	O	O	
8		1				@	CA04040-Y714	HOLDER L	O	O	
9		1				@	CA04040-Y715	HOLDER R	O	O	
10		1				@	CA04040-Y717	LOWER GUIDE	O	O	
11		1				@	CA04040-Y719	PLATE	O	O	
12		1				@	CA04040-Y713	SPRING	O	O	
13		1				@	CA04040-G711	PLATE ASY	O	O	
14		1				@	CA04040-Y723	PAPER GUIDE E	O	O	
15		1				@	CA02417-Y708	HOLDER	O	O	
16		1				@	CA04040-G730	SEPARATOR	O	O	
17		1				@	CA02758-Y719	P SIZE LEVER	O	O	
18		1				@	CA02417-Y720	SIZE LABEL	O	O	A4
		1				@	CA02417-Y724	SIZE LABEL	O	O	LETTER
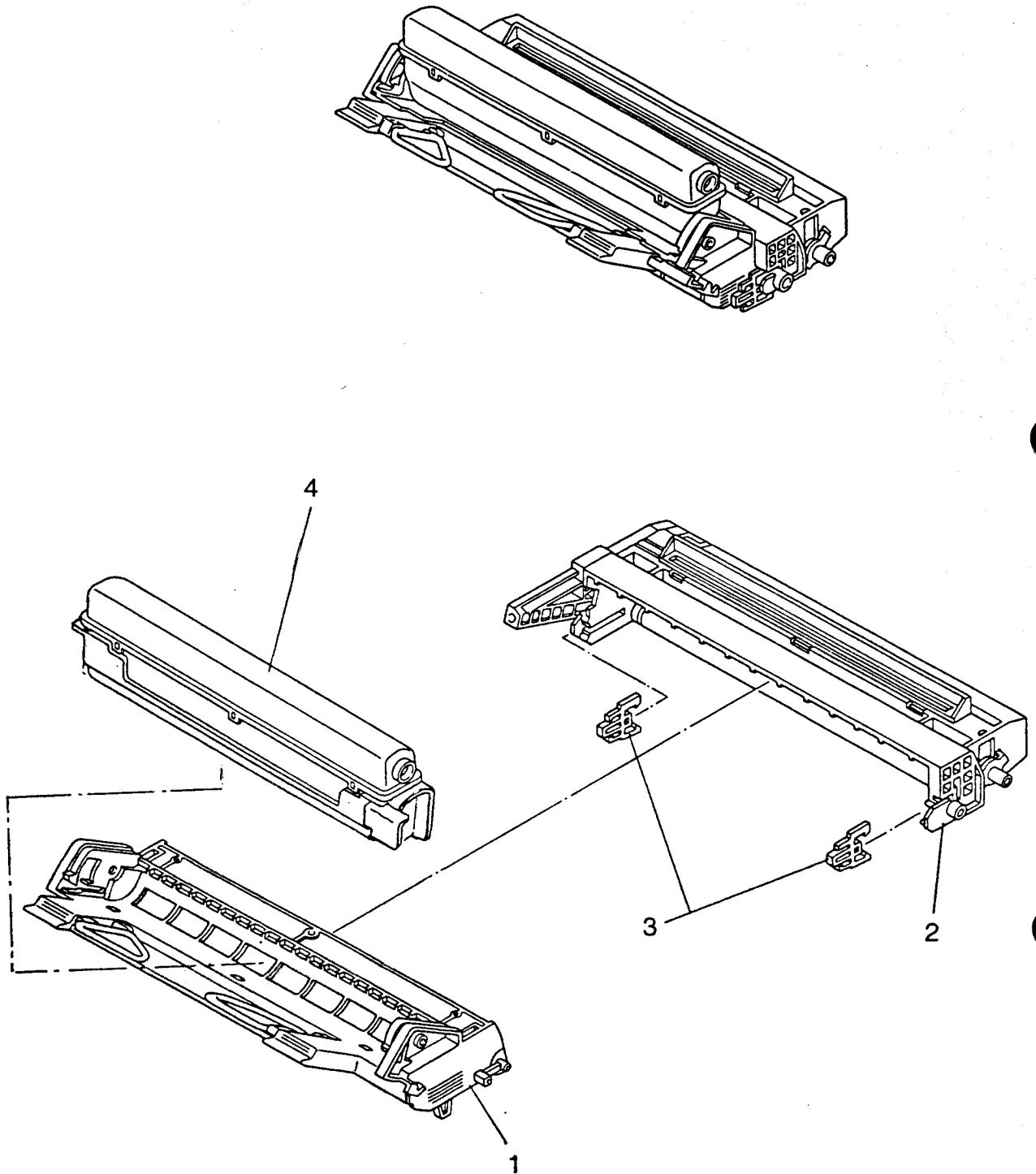
3.11 Print Unit

3.11 Print Unit

Index No.	Composition & Quantity						S P	Specification	Parts name (Description)	AC(V)		Remarks
										120	220 ~240	
1~4	1							CA02758-E400	PRINT UNIT	O	O	
1		1						CA02758-F300	DEV. UNIT	O	O	
2		2						CA02758-F400	DRUM UNIT	O	O	
3		2						CA02758-G371	P LOCK ASY	O	O	
4		1						CA02758-E300	TONER BOTTLE	O	O	
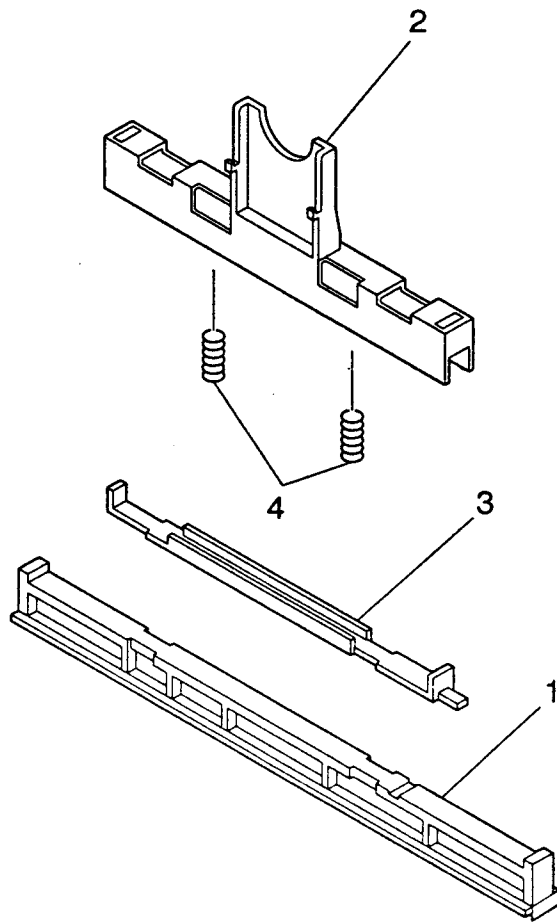
3.12 Cleaner

3.12 Cleaner

Index No.	Composition & Quantity					S P	Specification	Parts name (Description)	AC(V)		Remarks
									120	220 ~240	
1~4	1						CA04040-G521	CLEANER	O	O	
1		1					CA04040-G522	CL PAD ASY	O	O	
2~4		1				@	CA04040-G523	CL HOLDER ASY	O	O	
2			1				CA04040-Y150	CL HOLDER	O	O	
3			1				CA04040-Y151	CL P PLATE	O	O	
4			2				CA04040-Y524	CL SPRING	O	O	