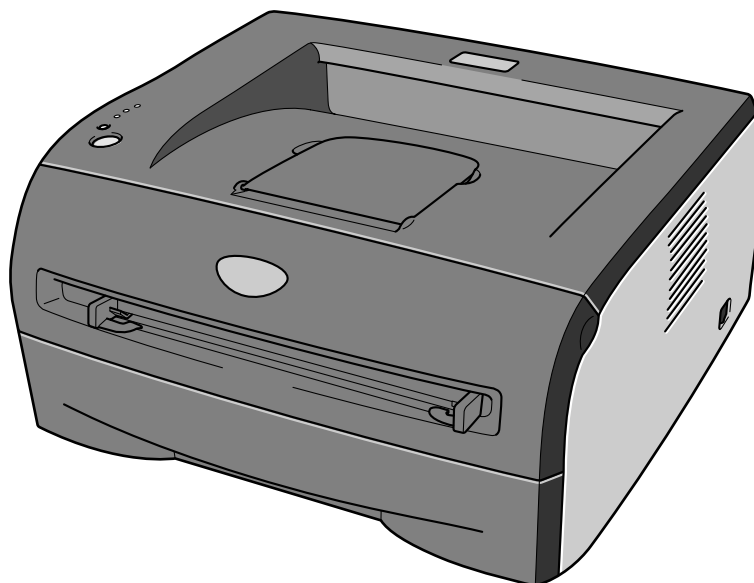




Brother Laser Printer **SERVICE MANUAL**

**MODEL:
HL-2030/2032/2040/2070N**



Read this manual thoroughly before maintenance work.

Keep this manual in a convenient place for quick and easy reference at all times.

November 2004
SM-PRN054
(6)

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PREFACE

This service manual contains basic information required for after-sales service of the laser printer (hereinafter referred to as "this machine" or "the printer"). This information is vital to the service technician to maintain the high printing quality and performance of the printer.

This service manual covers the **HL-2030/2040/2070N** printers.

This manual consists of the following chapters:

- CHAPTER 1: GENERAL**
Features, specifications, etc.
- CHAPTER 2: INSTALLATION AND BASIC OPERATION**
Installation conditions, Installation procedures, basic operation of the printer etc.
- CHAPTER 3: THEORY OF OPERATION**
Basic operation of the mechanical system, the electrical system and the electrical circuits and their timing information.
- CHAPTER 4: DISASSEMBLY AND RE-ASSEMBLY**
Procedures for disassembling and re-assembling the mechanical system.
- CHAPTER 5: PERIODIC MAINTENANCE**
Periodical replacement parts, consumable parts, etc.
- CHAPTER 6: ADJUSTMENTS AND UPDATING OF SETTING, REQUIRED AFTER PARTS REPLACEMENT**
- CHAPTER 7: TROUBLESHOOTING**
Reference values and adjustments, troubleshooting image defects, troubleshooting malfunctions, etc.
- CHAPTER 8: SERVICE SUPPORT SOFTWARE**
Test print mode and Service menu mode, etc.
- APPENDICES:** PCB circuit diagrams, etc.

Information in this manual is subject to change due to improvement or redesign of the product. All relevant information in such cases will be supplied in service information bulletins (Technical Information).

A thorough understanding of this printer, based on information in this service manual and service information bulletins, is required for maintaining its print quality performance and for improving the practical ability to find the cause of problems.

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REGULATION

LASER SAFETY (100 - 120V MODEL ONLY)

This printer is certified as a Class 1 laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. This means that the printer does not produce hazardous laser radiation.

Since radiation emitted inside the printer is completely confined within protective housings and external covers, the laser beam cannot escape from the machine during any phase of user operation.

FDA REGULATIONS (100 - 120V MODEL ONLY)

U.S. Food and Drug Administration (FDA) has implemented regulations for laser products manufactured on and after August 2, 1976. Compliance is mandatory for products marketed in the United States. One of the following labels on the back of the printer indicates compliance with the FDA regulations and must be attached to laser products marketed in the United States.

The label for Japanese manufactured products

MANUFACTURED:
Brother Industries, Ltd.,

15-1 Naeshiro-cho Mizuho-ku Nagoya, 467-8561 Japan
This product complies with FDA performance standards
for laser products except for deviations pursuant to Laser
Notice No.50, dated July 26, 2001.

The label for Chinese manufactured products

MANUFACTURED:
Brother Corporation (Asia) Ltd. Brother Buji Nan Ling
Factory

Gold Garden Ind., Nan Ling Village, Buji, Rong Gang,
Shenzhen, CHINA
This product complies with FDA performance standards
for laser products except for deviations pursuant to Laser
Notice No.50, dated July 26, 2001.

Caution

Use of controls, adjustments or performance of procedures other than those specified in this User's Guide may result in hazardous radiation exposure.

IEC 60825 (220-240V MODEL ONLY)

This printer is a Class 1 laser product as defined in IEC 60825 specifications. The label shown below is attached in countries where it is required.



This printer has a laser diode which emits invisible laser radiation in the Laser Unit. The Laser Unit should not be opened without disconnecting the two connectors connected with the AC power supply and laser unit. Since the variable resistor in the laser unit is adjusted in accordance with the standards, never touch it.

Caution

Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

For Finland and Sweden

LUOKAN 1 LASERLAITE

KLASS 1 LASER APPARAT

Varoitus! Laitteen käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.

Varning – Om apparaten används på annat sätt än i denna Bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.

Internal laser radiation

Maximum radiation power: 5 mW

Wave length: 770 – 810 nm

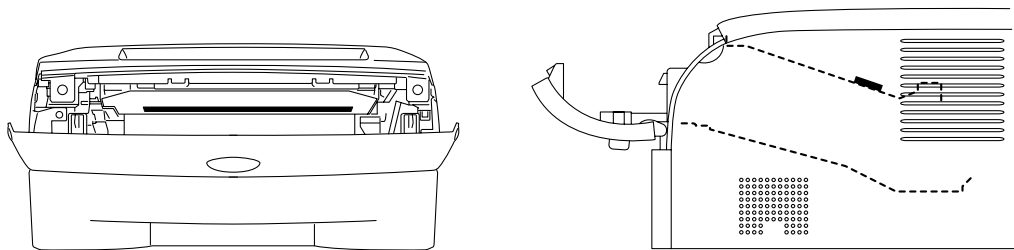
Laser class: Class 3B

SAFETY INFORMATION

CAUTION FOR LASER PRODUCT (WARNHINWEIS FÜR LASER DRUCKER)

- CAUTION:** When the machine during servicing is operated with the cover open, the regulations of VBG 93 and the performance instructions for VBG 93 are valid.
- CAUTION:** In case of any trouble with the laser unit, replace the laser unit itself. To prevent direct exposure to the laser beam, do not try to open the enclosure of the laser unit.
- ACHTUNG:** Im Falle von Störungen der Lasereinheit muß diese ersetzt werden. Das Gehäuse der Lasereinheit darf nicht geöffnet werden, da sonst Laserstrahlen austreten können.

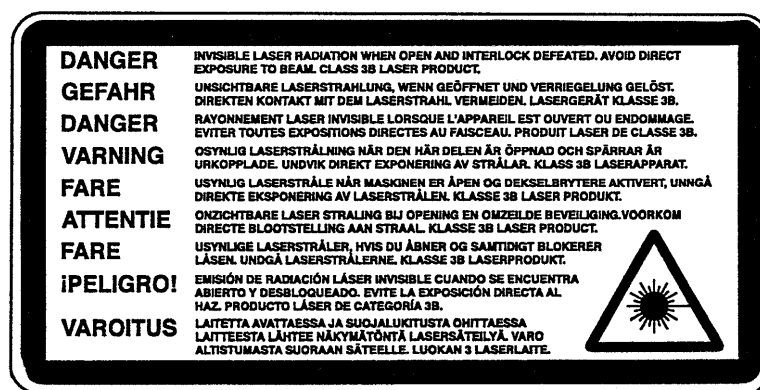
<Location of the laser beam window>



ADDITIONAL INFORMATION

When servicing the optical system of the printer, be careful not to place a screwdriver or other reflective object in the path of the laser beam. Be sure to take off any personal accessories such as watches and rings before working on the printer. A reflected beam, though invisible, can permanently damage the eyes.

Since the beam is invisible, the following caution label is attached on the laser unit.



DEFINITIONS OF WARNINGS, CAUTIONS AND NOTES

The following conventions are used in this service manual:

WARNING

Indicates warnings that must be observed to prevent possible personal injury.

CAUTION:

Indicates cautions that must be observed to service the printer properly or prevent damage to the printer.

NOTE:

Indicates notes and useful tips to remember when servicing the printer.

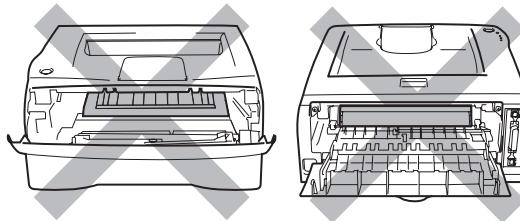
**Listed below are the various kinds of “WARNING” messages included in this manual.

WARNING

Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the printer.

WARNING

Some parts inside the printer are extremely hot immediately after the printer is used. When opening the front cover or back cover to access any parts inside the printer, never touch the shaded parts shown in the following figures.



WARNING

If you analyze malfunctions with the power plug inserted into the power outlet, special caution should be exercised even if the power switch is OFF because it is a single pole switch.

CHAPTER 1 GENERAL

1. FEATURES

This printer has the following features.

High Resolution and Fast Print Speed

True 600 x 600 dots/ true 300 x 300 dots per inch (dpi) and HQ1200 for graphics with microfine toner and up to 16 (HL-2030)/ 20 (HL-2040/2070N) pages per minute (ppm) print speed for A4 and 17 (HL-2030)/ 20 (HL-2040/2070N) pages per minute (ppm) print speed for Letter- size paper.

Versatile Paper Handling

The printer loads paper automatically from the paper tray. The paper tray can hold A4, letter, B5 (ISO), B5 (JIS), A5, B6 (ISO), A6, Executive, Folio and Legal* size of paper. The manual feed slot allows manual paper loading sheet by sheet so you can use a variety of types and sizes of paper. *Legal paper is not available in some regions.

Front Operation

Basic operation of the printer can be controlled from the control panel.

Enhanced Printing Performance and User-Friendly Operation for Windows®

The dedicated printer driver for Microsoft® Windows® 95/98/Me, Windows® NT 4.0 and Windows® 2000/XP are available on the CD-ROM supplied with your printer. You can easily install them into your Windows® system using our installer program. The driver supports our unique compression mode to enhance printing speed in Windows® applications and allows you to choose various printer settings including toner save mode, custom paper size, sleep mode, gray scale adjustment, resolution, water mark and many layout functions. You can easily setup these print options through the Printer Setup Menu.

Printer Status Monitor with Bi-directional Parallel Interface (For HL-2040/2070N)

The printer driver can monitor the status of your printer using bi-directional parallel communications. IEEE-1284 bi-directional parallel printer cable is recommended.

The printer status monitor program can show the current status of your printer. When printing, the animated dialog box appears on your computer screen to show the current printing process. If an error occurs, a dialog box will appear to let you know what to correct. If you have turned on the Interactive Help (Windows only) you can get visual guidance on your PC screen on the actions in the event of certain printer errors. The default setting is OFF.

Quick Print Setup

The Quick Print Setup is a convenient utility to allow you to make changes to frequently used driver settings easily without having to open the printer properties selection box every time. It is launched automatically when this printer driver is selected. You can change the settings by clicking on the icon with the right mouse button. The default setting is OFF.

Enhanced Memory Management

The printer provides its own data compression technology in its printer hardware and the supplied printer driver software, which can automatically compress graphic data and font data efficiently into the printer's memory. You can avoid memory errors and print most full pages 600 dpi graphic and text data, including large fonts, with the standard printer memory.

USB Interface (for Windows® 98/Me/2000/XP, Mac OS® 9.1-9.2/ Mac OS® X 10.2.4 or greater)

The printer can be connected using the Universal Serial Bus (USB) interface to a PC or Mac which has a USB interface. Drivers that allow you to use the USB port are provided on the CD-ROM supplied with the printer.

Popular Printer Emulation Support

These printers support the following printer emulation modes.

HL-2030/2040: GDI

HL-2070N: HP LaserJet (PCL6), Epson FX-850 and IBM Proprinter XL.

Environment-Friendly

<Economy Printing Mode>

This feature will cut your printing cost by saving toner. It is useful for obtaining draft copies for proof-reading. You can select the toner saving economy mode through the Windows® printer driver supplied with your printer.

<Sleep Mode (Power Save Mode)>

Sleep mode automatically reduces power consumption when the printer is not in use for a certain period of time. The printer consumes less than 5W (HL-2030/2040) or 7W (HL-2070N) when in sleep mode.

<Low Running Cost>

Since the toner cartridge is separate from the drum unit, you need to replace only the toner cartridge after printing around 2,500 (Standard toner cartridge) pages at 5% coverage for A4 paper for the standard cartridge, which is both cost effective and ecologically friendly.

Bar Code Print (for HL-2070N only)

The printer can print the following 11 types of bar codes

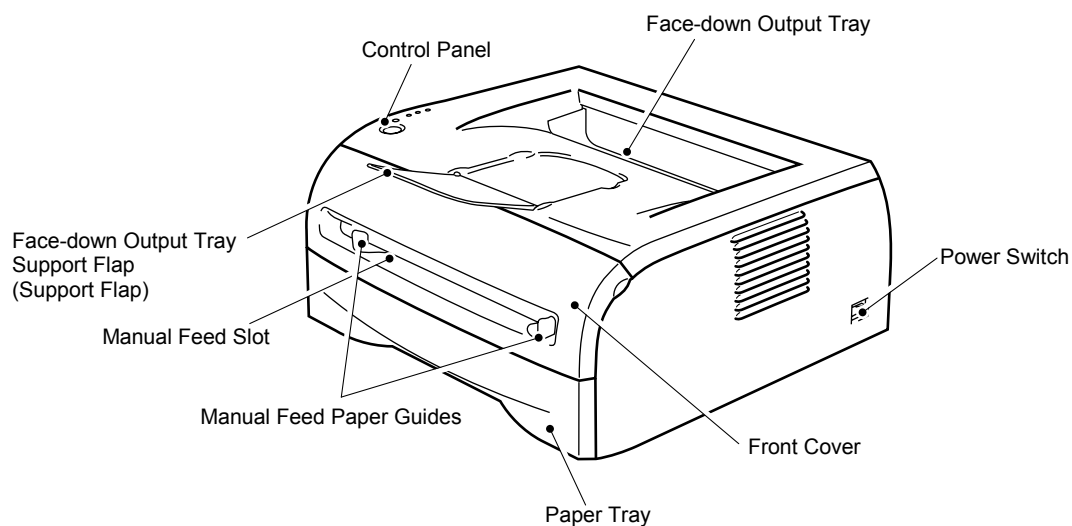
- | | | |
|----------------------|--------------|-----------|
| • Code 39 | • US-PostNet | • EAN-8 |
| • Code 128 | • ISBN | • EAN-13 |
| • Interleaved 2 of 5 | • UPC-A | • EAN-128 |
| • Codabar | • UPC-E | |

Network Feature (for HL-2070N only)

The Brother printer has built in multi protocol network capability as standard. This allows multiple host computers to share the printer on a 10/100Mbps Ethernet network. Any users can print their jobs as if the printer was directly connected to their computer. Users on Windows® 95/98/Me, Windows® NT4.0, Windows® 2000/XP, Mac OS® 9.1 to 9.2, Mac OS® X 10.2.4 or greater simultaneously can access this printer. For further information, see the Network User's Guide supplied with the printer.

2. OVERVIEW

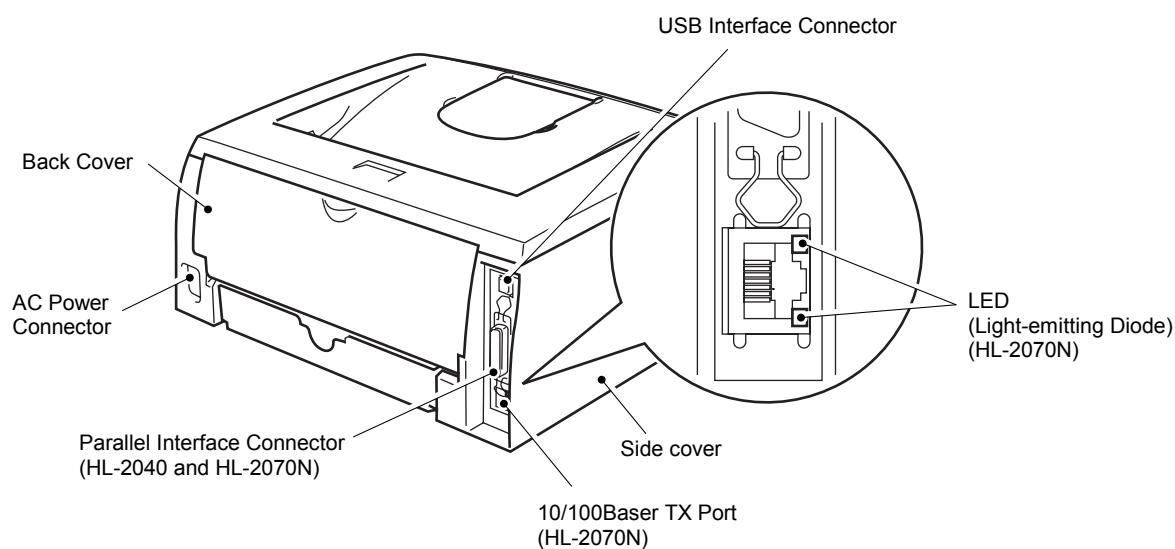
<Front View>



*The printer illustration is based on HL-2070N.

Fig. 1-1

<Rear View>



*The printer illustration is based on HL-2070N.

Fig. 1-2

3. SPECIFICATIONS

3.1 Printing

Print method Electrophotography by semiconductor laser beam scanning

Laser Wavelength: 760 - 810nm
Output: 5mW max

Resolution		HL-2030	HL-2040	HL-2070N
	Windows® 95 and WindowsNT® 4.0	N/A	HQ1200/ 600dpi/ 300dpi	
	Windows® 98/Me, Windows® 2000 and Windows® XP	HQ1200/ 600dpi/ 300dpi		
	DOS	N/A		600dpi
	Mac OS®	HQ1200/ 600dpi/ 300dpi		
	Linux	600dpi/ 300dpi		

Print quality Normal printing mode
Economy printing mode (Toner saving mode)

Print speed Normal
<HL-2030>
Up to 16 pages/minute (A4)
Up to 17 pages/minute (Letter-size paper)
<HL-2040/ HL-2070N>
Up to 20 pages/minute (A4)
Up to 20 pages/minute (Letter-size paper)

Warm-up Max. 18 seconds at 23°C (73.4°F)

First print Less than 10 seconds when the printer is in the ready state.
(when loading A4 or Letter-size paper from the standard paper tray)

Consumables <Toner cartridge>
Life expectancy:
Starter 1,500 pages / cartridge
Standard 2,500 pages / cartridge
* when printing A4 or Letter-size paper at 5% print coverage.
Shelf life: 2 years (6 months after opening)

<Drum unit>
Life expectancy: 12,000 A4 or Letter pages/drum unit
Shelf life: 2 years (6 months after opening)

The shelf life is guaranteed under the normal condition as mentioned below.

<Temperature>

Normal condition: 0 - 40 °C

Storage condition at a temperature of 40 to 50 °C: Up to 5 days

Storage condition at a temperature of -20 to 0 °C: Up to 5 days

<Humidity>

Normal condition: 35 - 85%

Storage condition at a humidity of 85 to 95%: Up to 5 days

Storage condition at a humidity of 10 to 35%: Up to 5 days

NOTE:

Print speed varies depending on the paper size or media type. For details, refer to 3.8 'Print Speeds with Various Settings' in this chapter.

3.2 Functions

CPU

HL-2030/ HL-2040: Fujitsu SPARClite 96MHz
HL-2070N: Fujitsu SPARClite 133MHz

Emulation

HL-2030/2040: GDI
HL-2070N: HP LaserJet (PCL)
EPSON FX-850 or IBM Proprinter XL

Printer driver

<HL-2030>

- GDI Driver for Windows® 98/Me, Windows® 2000 and Windows® XP
- Brother Laser Driver for Mac OS® 9.1 to 9.2 and Mac OS® X 10.2.4 or greater
- GDI Printer Driver for Linux

<HL-2040>

- GDI Driver for Windows® 95/98/Me, Windows NT® 4.0, Windows® 2000 and Windows® XP
- Brother Laser Driver for Mac OS® 9.1 to 9.2 and Mac OS® X 10.2.4 or greater
- GDI Printer Driver for Linux

< HL-2070N >

- PCL Driver for Windows® 95/98/Me, Windows NT® 4.0, Windows® 2000 and Windows® XP
- Generic PCL Driver for Windows NT® 4.0, Windows® 2000 and Windows® XP
- Brother Laser Driver for Mac OS® 9.1 to 9.2 and Mac OS® X 10.2.4 or greater
- GDI Printer Driver for Linux

Interface

Standard:

HL-2030	HL-2040	HL-2070N
Full-Speed USB 2.0	Full-Speed USB 2.0 IEEE 1284 Parallel	Full-Speed USB 2.0 IEEE 1284 Parallel, 10/100 BASE-TX

Option:

HL-2030	HL-2040	HL-2070N
IEEE 802.11b wireless (NC-2200w)	IEEE 802.11b wireless (NC-2200w) 10/100 BASE-TX (NC-2100p)	IEEE 802.11b wireless (NC-2200w)

Utilities	HL-2030/2040: Interactive Help* HL-2070N: Interactive Help, Driver Deployment Wizard* * Interactive Help: Instructional animations for problem solving. * The Driver Deployment Wizard automates the installation of a printer in a peer-to-peer network.
Memory	HL-2030/2040: 8 Mbytes HL-2070N: 16 Mbytes Option: N/A
Control Panel	<ul style="list-style-type: none"> • Display LED: 4 LEDs • Button 1 button
Diagnostics	Self-diagnostic program
Resident Fonts	HL-2030/2040: N/A HL-2070N: 49 scalable fonts, 12 bitmap fonts, 11 bar codes; Code39, Interleaved 2 of 5, EAN-8, EAN-13, UPC-A, EAN-128, Codabar, FIM (US-PostNet), ISBN, Code128

3.3 Electronics and Mechanics

Power source	U.S.A. and Canada: AC 110 to 120V, 50 Hz/60 Hz Europe and Australia: AC 220 to 240V, 50 Hz/60 Hz
Power consumption (average)	Printing: Less than 450 W at 25°C (77°F) Standing by: Less than 70 W at 25°C (77°F) Sleep: Less than 5 W (HL-2030/2040) Less than 7 W (HL-2070N)
Noise	<Sound pressure> Printing: Less than 51dB (A) Standing by: Less than 30dB (A) <Sound power> Printing: 6.2B(A) (Office equipment with LWAd<6.3B(A) is not suitable for operation in rooms where predominantly intellectual work is done. Due to there noise emissions, these devices should be separate rooms.) Standing by: 4.3B(A)
Temperature	Operating: 10 to 32.5°C (50 to 90.5°F) Non operating: 0 to 40°C (38 to 104°F) Storage: -20 to 40°C (-4 to 104°F)
Humidity	Operating: 20 to 80% (non condensing) Storage: 10 to 85% (non condensing)
Dimensions (W x D x H)	371 x 361 x 165.5 mm (14.6 x 14.2 x 6.5 inches)
Weight	Approximately 5.4 kg (12.0lb) not including the drum unit and toner cartridge. Approximately 6.5 kg (14.3lb) including the drum unit and toner cartridge

NOTE:

The power consumption figure quoted for sleep mode is when the fan has stopped.

3.4 Service Information

These are key service information to maintain the product.

Machine Life: 50,000 pages/ 5 years

MTBF (Meantime between failure): Up to 4,000 hours

MTTR (Meantime to repair): Average 30 minutes

Monthly volume: 10,000 pages

Periodical replacement parts:

There is no periodical replacement part that needs to be replaced periodically to maintain the product quality.

3.5 Network Connectivity

<Standard>	
Type/Speed	10/100 Base TX Ethernet Automatic negotiation
Protocols	TCP/IP (APR, RARP, BOOTP, DHCP, APIPA (Auto IP), NetBIOS Name Resolutions, WINS, DNS Resolver, LPR/LPD, Custom Raw Port/Port9100, SMTP Client, SMB Print, IPP, FTP Server, mDNS, TELNET, SNMP, HTTP)
Management Tool	<ul style="list-style-type: none"> • Web Based Management (HTTPD) • BRAdmin Professional • Web BRAdmin
Supplied software	<ul style="list-style-type: none"> • BRAdmin Professional utility (for Windows® 95/98/ME, Windows® NT 4.0/Windows® 2000/XP) • Web BRAdmin (Windows® 2000 Professional/ Server/ Advanced Server, Windows® XP Professional) Web BRAdmin is NOT supplied with CD-ROM. Available only on Web page. For more information on Web BRAdmin Professional, refer to http://solutions.brother.com

3.6 Paper

3.6.1 Feedable paper

(1) Paper type

Paper type	Tray1	Manual feed slot	Select the paper type from the printer driver
Plain paper 60 g/m ² to 105 g/m ² (16 to 28 lbs.)	O	O	Plain paper
Recycled paper	O	O	Recycled paper
Bond paper	O	O	Bond paper
Thick paper 105 g/m ² to 161 g/m ² (28 to 43 lbs.)	X	O	Thick paper or Thicker paper
Transparency	O Up to 10 sheets A4 or Letter	O A4 or Letter	Transparency
Label	X	O A4 or Letter	Thicker paper
Envelop	X	O	Envelope or Env.Thick or Env.Thin
Card Stock	X	O	Thick paper or Thicker paper

(2) Paper size

	Paper Tray	Manual feed slot
Paper size	A4, Letter, Legal*, B5 (ISO), Executive, A5, A6, B6 (ISO), B5 (JIS), Folio*	Width: 69.9 to 215.9 mm (2.75 to 8.5 in.) Length: 116 to 406.4 mm (4.57 to 16.0 in.)

* Legal and Folio are not available in some regions.

(3) Other paper specifications

<Paper tray>

	Cut sheet
Basis weight	60 to 105 g/m ² (16 to 28 lb.)
Caliper	0.08 to 0.12 mm (0.003 to 0.005 in.)
Moisture content	4% to 6% by weight

<Manual feed slot>

	Cut sheet
Basis weight	60 to 161 g/m ² (16 to 43 lb.)
Caliper	0.08 to 0.19 mm (0.003 to 0.007 in.)
Moisture content	4% to 6% by weight

(4) Recommended paper

	Europe	USA
Plain paper	Xerox Premier 80 g/m ² Xerox Business 80 g/m ² Modo Paper DATACOPY 80 g/m ² IGEPA X-press 80 g/m ²	Xerox 4200DP 20lb Xerox 4024 28lb Hammermill Laser Paper 24lb
Recycled paper	Xerox Recycled Supreme	N/A
Transparency	3M CG3300	3M CG 3300
Label	Avery laser label L7163	Avery laser label #5160

* This printer can use recycled paper that meets the DIN 19309 specification

**CAUTION:**

When you are choosing print media, be sure to follow the information given below to prevent any paper jams, print quality problems or printer damage;

- *It is recommended to use long-grained paper for the best print quality. If short-grained paper is being used, it might be the cause of paper jams.*
- *Use neutral paper. Do not use acid paper to avoid any damage to the drum unit.*
- *Avoid using coated paper such as vinyl coated paper.*
- *Avoid using preprinted or highly textured paper.*
- *It is recommended to use labels or transparencies which are designed for use in laser printers.*
- *Avoid feeding labels with the carrier sheet exposed, or the printer will be damaged.*
- *Before loading paper with holes such as organizer sheets, be sure to fan the stack well.*
- *Do not use organizer sheets that are stuck together. The glue that is used might caused damaged to the printer.*
- *When printing on the back of pre-printed paper, if the paper is curled, be sure to straighten the paper as much as possible.*

Different types of paper should not be loaded at the same time in the paper tray to avoid any paper jams or misfeeds.

3.6.2 Paper tray capacity

	Paper Tray	Manual feed slot
Paper Capacity	250 sheets (80 g/m ² or 21lb)	Single sheet

3.6.3 Print delivery

Face down output tray
capacity:

Maximum 100 sheets (80 g/m²)
face down only

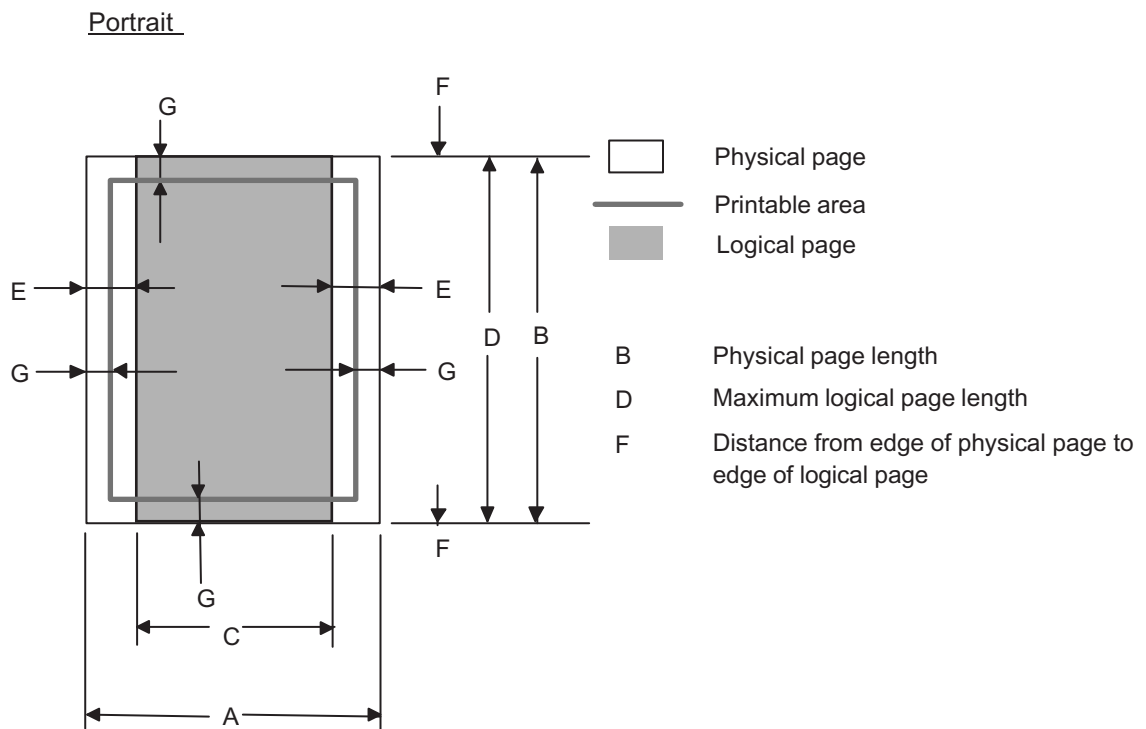
Note:

Face-down: Delivery with the printed face of the paper downwards.

3.7 Printable Area

3.7.1 PCL5e/EPSON/IBM emulation

When using PCL emulation, the edges of the paper that cannot be printed on are shown below.



NOTE:

- “Logical page” shows the printable area for a PCL driver.
- “Printable area” shows mechanical printable area of the machine.
- Therefore, the machine can only print within the shaded area when you use a PCL driver.

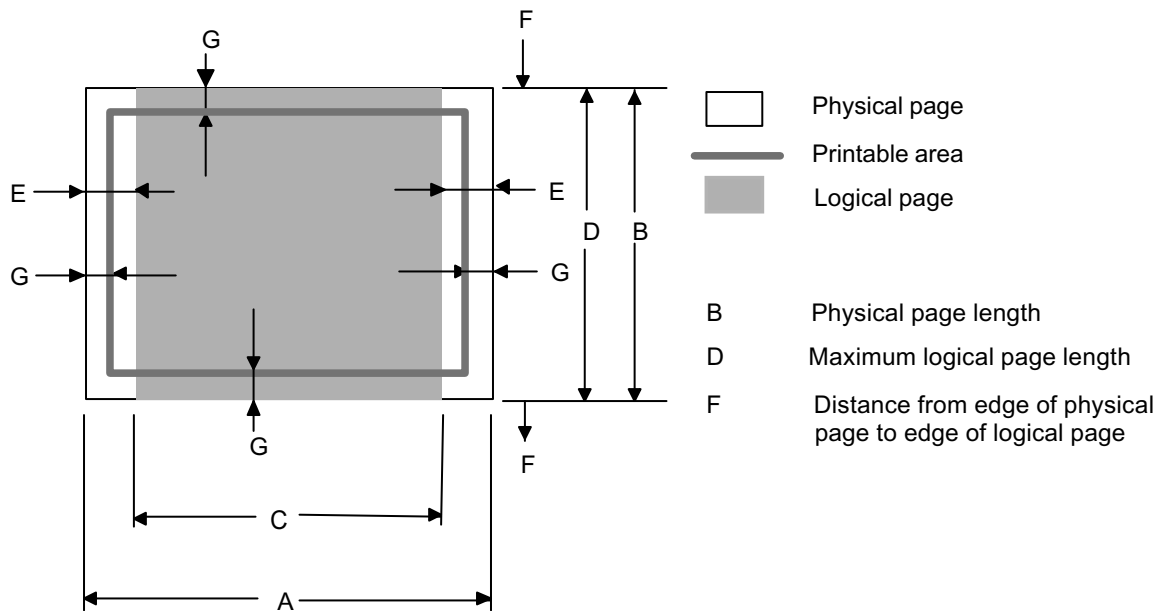
The table below shows the printable areas when printing on Portrait for each paper size.

Size	A	B	C	D	E	F	G
Letter	215.9 mm 8.5" (2,550 dots)	279.4 mm 11.0" (3,300 dots)	203.2 mm 8.0" (2,400 dots)	279.4 mm 11.0" (3,300 dots)	6.35 mm 0.25" (75 dots)	0 mm	4.2 mm 0.16" (50 dots)
Legal	215.9 mm 8.5" (2,550 dots)	355.6 mm 14.0" (4,200 dots)	203.2 mm 8.0" (2,400 dots)	355.6 mm 14.0" (4,200 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
Folio	215.9 mm 8.5" (2,550 dots)	330.2mm 13.0" (3,900 dots)	203.2 mm 8.0" (2,400 dots)	330.2mm 13.0" (3,900 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
Executive	184.15 mm 7.25" (2,175 dots)	266.7 mm 10.5" (3,150 dots)	175.7 mm 6.92" (2,025 dots)	266.7 mm 10.5" (3,150 dots)	6.35 mm 0.25" (75 dots)	0 mm	4.2 mm 0.16" (50 dots)
A 4	210.0 mm 8.27" (2,480 dots)	297.0 mm 11.69" (3,507 dots)	198.0 mm 7.79" (2,338 dots)	297.0 mm 11.69" (3,507 dots)	6.01 mm 0.24" (71 dots)	0 mm	4.2 mm 0.16" (50 dots)
A 5	148.5 mm 5.85" (1,754 dots)	210.0 mm 8.27" (2,480 dots)	136.5 mm 5.37" (1,612 dots)	210.0 mm 8.27" (2,480 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
A 6	105.0 mm 4.13" (1,240 dots)	148.5 mm 5.85" (1,754 dots)	93.0 mm 3.66" (1,098 dots)	148.5 mm 5.85" (1,754 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 5 (JIS)	182.0 mm 7.1" (2,130 dots)	257.0 mm 10.11" (3,033 dots)	170.0 mm 6.69" (2,007 dots)	257.0 mm 10.11" (3,033 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 5 (ISO)	176.0 mm 6.93" (2,078 dots)	250.0 mm 9.84" (2,952 dots)	164.0 mm 6.46" (1,936 dots)	250.0 mm 9.84" (2,952 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 6 (ISO)	125.0 mm 4.92" (1,476 dots)	176.0 mm 6.93" (2,078 dots)	164.0 mm 4.44" (1,334 dots)	176.0 mm 6.93" (2,078 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
COM10	104.78 mm 4.125" (1,237 dots)	241.3 mm 9.5" (2,850 dots)	92.11 mm 3.63" (1,087 dots)	241.3 mm 9.5" (2,850 dots)	6.35 mm 0.25" (75 dots)	0 mm	4.2 mm 0.16" (50 dots)
MONARCH	98.43 mm 3.875" (1,162 dots)	190.5 mm 7.5" (2,250 dots)	85.7 mm 3.37" (1,012 dots)	190.5 mm 7.5" (2,250 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
C 5	162.0 mm 6.38" (1,913 dots)	229.0 mm 9.01" (2,704 dots)	150.0 mm 5.9" (1,771 dots)	229.0 mm 9.01" (2,704 dots)	6.01 mm 0.24" (71 dots)	0 mm	4.2 mm 0.16" (50 dots)
DL	110.0 mm 4.33" (1,299 dots)	220.0 mm 8.66" (2,598 dots)	98.0 mm 3.86" (1,157 dots)	220.0 mm 8.66" (2,598 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
DL L	220.0 mm 8.66" (2,598 dots)	110.0 mm 4.33" (1,299 dots)	207.4 mm 8.17" (2,450 dots)	110.0 mm 4.33" (1,299 dots)	6.27 mm 0.25" (74 dots)	0 mm	6.27 mm 0.25" (74 dots)

NOTE:

- The paper sizes indicated here should confirm to the nominal dimensions specified by JIS except B5 (ISO), B6 (ISO).
- The dot size is based on 300 dpi resolution.

Landscape



NOTE:

- “Logical page” shows the printable area for a PCL driver.
- “Printable area” shows mechanical printable area of the machine.
- Therefore, the machine can only print within the shaded area when you use a PCL driver.

The table below shows the printable areas when printing on Landscape for each paper size.

Size	A	B	C	D	E	F	G
Letter	279.4 mm 11.0" (3,300 dots)	215.9 mm 8.5" (2,550 dots)	269.3 mm 10.6" (3,180 dots)	215.9 mm 8.5" (2,550 dots)	5.0 mm 0.2" (60 dots)	0 mm	4.2 mm 0.16" (50 dots)
Legal	355.6 mm 14.0" (4,200 dots)	215.9 mm 8.5" (2,550 dots)	345.5 mm 13.6" (4,080 dots)	215.9 mm 8.5" (2,550 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
Folio	330.2mm 13.0" (3,900 dots)	215.9 mm 8.5" (2,550 dots)	320.0mm 12.6" (3,780 dots)	215.9 mm 8.5" (2,550 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
Executive	266.7 mm 10.5" (3,150 dots)	184.15 mm 7.25" (2,175 dots)	256.6 mm 10.1" (3,030 dots)	184.15 mm 7.25" (2,175 dots)	5.0 mm 0.2" (60 dots)	0 mm	4.2 mm 0.16" (50 dots)
A 4	297.0 mm 11.69" (3,507 dots)	210.0 mm 8.27" (2,480 dots)	287.0 mm 11.2" (3,389 dots)	210.0 mm 8.27" (2,480 dots)	4.8 mm 0.19" (59 dots)	0 mm	4.2 mm 0.16" (50 dots)
A 5	210.0 mm 8.27" (2,480 dots)	148.5 mm 5.85" (1,754 dots)	200.0mm 7.87" (2,362 dots)	148.5 mm 5.85" (1,754 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
A 6	148.5 mm 5.85" (1,754 dots)	105.0 mm 4.13" (1,240 dots)	138.5 mm 5.45" (1,636 dots)	105.0 mm 4.13" (1,240 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 5 (JIS)	257.0 mm 10.11" (3,033 dots)	182.0 mm 7.1" (2,130 dots)	247.0 mm 9.72" (2,916 dots)	182.0 mm 7.1" (2,130 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 5 (ISO)	250.0 mm 9.84" (2,952 dots)	176.0 mm 6.93" (2,078 dots)	240.0 mm 9.44" (2,834 dots)	176.0 mm 6.93" (2,078 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 6 (ISO)	176.0 mm 6.93" (2,078 dots)	125.0 mm 4.92" (1,476 dots)	166.4 mm 6.55" (1,960 dots)	125.0 mm 4.92" (1,476 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
COM10	241.3 mm 9.5" (2,850 dots)	104.78 mm 4.125" (1,237 dots)	231.1 mm 9.1" (2,730 dots)	104.78 mm 4.125" (1,237 dots)	5.0 mm 0.2" (60 dots)	0 mm	4.2 mm 0.16" (50 dots)
MONARCH	190.5 mm 7.5" (2,250 dots)	98.43 mm 3.875" (1,162 dots)	180.4 mm 7.1" (2,130 dots)	98.43 mm 3.875" (1,162 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
C 5	229 mm 9.01" (2,704 dots)	162 mm 6.38" (1,913 dots)	219.0 mm 8.62" (2,586 dots)	162 mm 6.38" (1,913 dots)	4.8 mm 0.19" (59 dots)	0 mm	4.2 mm 0.16" (50 dots)
DL	220 mm 8.66" (2,598 dots)	110 mm 4.33" (1,299 dots)	210.0 mm 8.26" (2,480 dots)	110 mm 4.33" (1,299 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
DL L	110 mm 4.33" (1,299 dots)	220 mm 8.66" (2,598 dots)	97.5 mm 3.84" (1,151 dots)	220 mm 8.66" (2,598 dots)	6.27 mm 0.25" (74 dots)	0 mm	6.27 mm 0.25" (74 dots)

NOTE:

- The paper sizes indicated here should confirm to the nominal dimensions specified by JIS except B5 (ISO), B6 (ISO).
- The dot size is based on 300 dpi resolution.

3.7.2 PCL6 emulation

You can not print within 4.2 mm (50dots in 300 dpi mode) on all four sides of the paper.

3.8 Print Speeds with Various Settings

Print speed is up to 16 ppm for A4 size, 17 ppm for Letter size (HL-2030) and 20 ppm (HL-2040/2070N) when loading A4 or Letter size paper from the paper tray in the plain paper mode.

Actual print speed varies depending on the media type or paper size as shown in the tables below;

<A4 / Letter size>

Media type setting	All models
Transparency	Up to 16/17 ppm (HL-2030) Up to 20 ppm (HL-2040/2070N)
Thin Paper	Up to 16/17 ppm (HL-2030) Up to 20 ppm (HL-2040/2070N)
Plain Paper, Recycled Paper	Up to 16/17 ppm (HL-2030) Up to 20 ppm (HL-2040/2070N)
Thick Paper, Envelopes, Env.Thin	10 ppm (HL-2030) 10 ppm (HL-2040/2070N)
Thicker/Bond Paper, Env.Thick	4 ppm *

<Smaller size than A4 or Letter>

Media type setting	All models
Transparency	Up to 16/17 ppm (HL-2030) Up to 20 ppm (HL-2040/2070N)
Thin Paper	Up to 16/17 ppm (HL-2030) Up to 20 ppm (HL-2040/2070N)
Plain Paper, Recycled Paper	300sec. 16/17 ppm → 8 ppm (HL-2030) 300sec. 20 ppm → 8 ppm (HL-2040/2070N)
Env.Thin	300sec. 10 ppm → 8 ppm (HL-2030) 300sec. 10 ppm → 8 ppm (HL-2040/2070N)
Thick Paper, Envelopes	30sec. 10 ppm → 8 ppm (HL-2030) 30sec. 10 ppm → 8 ppm (HL-2040/2070N)
Thicker/Bond Paper, Env.Thick	4 ppm *

NOTE:

- The print speed may vary according to conditions, such as paper size and paper tray.
- When a smaller size paper than A4 or Letter is printed, the temperature on both edges of the fixing unit is much higher than the temperature on the center of the unit where the paper is fed depending on the setting or model. Therefore, the print speed is slowed in order to decrease the temperature on the edges after the specified time, it is maximum print speed when you first start printing.
- The actual print speed varies depending on the paper size.

3.9 Toner Cartridge Weight Information

Toner Cartridge Weight (approximate weight)

	TN-2000 EU/ EEU Made in BCAS, China	TN-2000 EU/EEU Made in BITM, Malaysia
Brand new Toner Cartridge Weight	630g	570g
Toner Weight at Brand New Toner Cartridge	100g	100g
Toner Cartridge Weight at Toner Near Empty	576g	516g
Remain Toner Weight at Toner Near Empty	46g	46g
Toner Cartridge Weight at Toner Life End	574g	516g
Remain Toner Weight at Toner Life End	44g	44g
You can print 500 pages (± 100 pages) with 10g toner. (5% coverage)		

For TN-2000 EU/ EEU:

- To distinguish the place of production is to check the serial number of toner cartridge.
For example, "F5JxxxxxxA" J stands for "Made in BCAS, China". "K5PxxxxxxD" P stands for "Made in BITM, Malaysia".
- Due to a change of the developing roller, the weight of TN-2000 (Made in BCAS, China) is reduced about 50g with the serial number of toner cartridge, "B6JA018935A" or later.

	TN-350 US/ TN-2025 AP/ TN-2075 RUS
Brand new Toner Cartridge Weight	570g
Toner Weight at Brand New Toner Cartridge	100g
Toner Cartridge Weight at Toner Near Empty	516g
Remain Toner Weight at Toner Near Empty	46g
Toner Cartridge Weight at Toner Life End	516g
Remain Toner Weight at Toner Life End	44g
You can print 500 pages (± 100 pages) with 10g toner. (5% coverage)	

NOTE:

- Without yellow protector
- Toner cartridge weight may vary within 2 to 3g depending on the cartridge weight.
- The weight of the starter toner cartridge is as follows,
For TN2000 model, the starter toner cartridge weight is 610g, and the toner weight is 80g.
For TN350, TN2050 and TN2025 models, the starter toner cartridge weight is 550g, and the toner weight is 80g.
- The toner weight at brand new toner cartridge is changed from 100g to 106g. (Serial number of toner cartridge is from E5JA000001B.)

4. SERIAL NO. DESCRIPTIONS

The descriptions below show how to understand the meanings of the numbers printed on the labels or bag of the printer and printer parts.

< ID for production month >

A: January	B: February	C: March	D: April
E: May	F: June	G: July	H: August
J: September	K: October	L: November	M: December

< ID for year >

4: 2004 5: 2005

< ID for factory >

9: Kariya Plant A: Mie Brother C: BIUK
J: Buji Nan Ling Factory

(1) Printer: Printed on the label attached on the rear of the main body

<Example>

<MODEL NO.>						< SERIAL NO. >				
U 5 2 6 8 2						A 3 J 1 1 1 1 0 1				
						MONTH	YEAR	FACTORY ID NO.	SEQUENTIAL NO.	
									FACTORY ID NO.	

(2) Process unit: Imprinted on the aluminum bag
(Drum unit with toner cartridge)

3	A	1	1	J	A
YEAR	MONTH	DATE		PRODUCTION LINE NO.	FACTORY ID NO.

(3) Drum unit: Printed on the bar code label attached inside the drum unit

A	3	J	5	1	0	0	1	0	4	A
MONTH	YEAR	FACTORY ID NO.	TONER VOLUME	SERIAL NO.			PRODUCTION LINE NO.			

DR/TN REUSE
The first time: M
The second time: N
The third time: P

- (4) Toner cartridge: Imprinted on the aluminum bag

3	A	30	J	A
YEAR	MONTH	DATE	FACTORY ID NO.	PRODUCTION LINE NO.

Printed on the bar code label attached on the toner cartridge

CARTRIDGE PRODUCTION INFO.	M	3	J	L	000199	A
	MONTH	YEAR	FACTORY ID NO.	TONER VOLUME	SERIAL NO.	PRODUCTION LINE NO.
				L: 80g M: 100g		

DR/TN REUSE
 The first time: M
 The second time: N
 The third time: P

- (5) Laser unit: On the laser unit

SCA	T1	2	1	0000240	51	50
LSU MODEL DISTINCTION	FRAME MANUFACTURE AND MOLD DISTINCTION	POLYGON MOTOR DISTINCTION	INSPECTION MACHINE	SERIAL NUMBER OF INSPECTION MACHINE	ADJUSTED VALUE	
	T1: THE 1st MOLD Y3: THE 3rd MOLD	1: SHINANO KENSHI CO., LTD 2: MATSUSHITA ELECTRIC INDUSTRIAL CO. 3: JVC 4: SAMSUNG				

CHAPTER 2 INSTALLATION AND BASIC OPERATION

1. CONDITIONS REQUIRED FOR INSTALLATION

1.1 Power Supply

- The source voltage must stay within $\pm 10\%$ of the rated voltage shown on the rating plate.
- The power cord, including extensions, should not exceed 5 meters (16.5 feet).
- Do not share the same power circuit with other high-power appliances, particularly an air conditioner, copier or shredder. If it is unavoidable that you must use the printer with these appliances, it is recommended that you use an isolation transformer or a high-frequency noise filter.
- Use a voltage regulator if the power source is not stable.

1.2 Environment

- Setup the printer near a power outlet, so that it can be easily unplugged from the power outlet if there is an emergency.
- The room temperature is maintained between 10°C and 32.5°C. The relative humidity is maintained between 20% and 80%.
- The printer should be used in a well-ventilated room.
- Place the printer on a flat, horizontal surface.
- Keep the printer clean. Do not place the printer in a dusty place.
- Do not place the printer where the ventilation hole of the printer is blocked. Keep approximately 100 mm (4 inches) between the ventilation hole and the wall.
- Do not place the printer where it is exposed to direct sunlight. Use a blind or a heavy curtain to protect the printer from direct sunlight when the printer is unavoidably set up near a window.
- Do not place the printer near devices that contain magnets or generate magnetic fields.
- Do not subject the printer to strong physical shocks or vibrations.
- Do not expose the printer to open flames or salty or corrosive gasses.
- Do not place objects on top of the printer.
- Do not place the printer near an air conditioner.
- Keep the printer horizontal when carrying.
- Do not cover the slots in the side cover.

1.3 System Requirements for Brother Printer Solution

Check the following system requirements to setup and operate the printer using Brother Printing Solution:

Computing System Operating System Version		Processor Speed	Minimum RAM	Recommended RAM	Available Hard Disk Space
Windows®	95, 98, 98SE	486/ 66MHz	8MB	16MB	40MB
	NT Workstation 4.0	Pentium 75MHz	16MB	32MB	50MB
	2000 Professional	Pentium 133MHz	64MB	128MD	50MB
	Me	Pentium 150MHz	32MB	64MB	50MB
	XP	Pentium 300MHz	128MB	128MB	50MB
Apple	OS® 9.1 to 9.2	All base models meet minimum system requirements	32MB	64MB	50MB
	OS® X 10.2.4 or greater		128MB	160MB	

2. UNPACKING

When unpacking the printer, check to see that all of the following components are included in the carton.

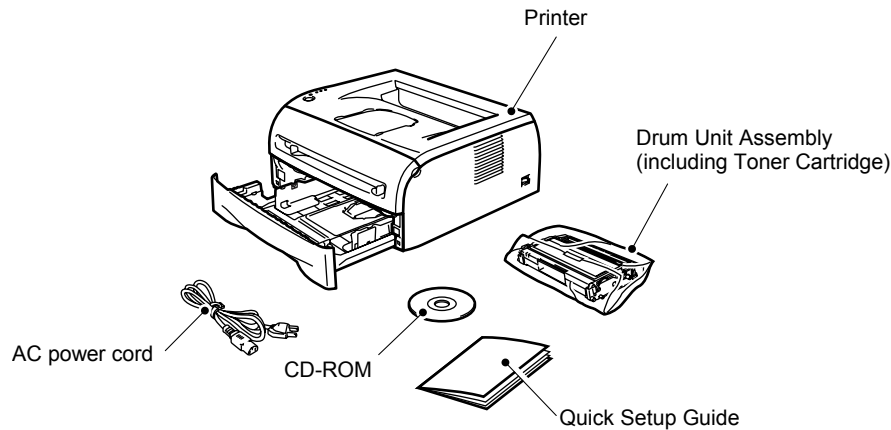


Fig. 2-1

NOTE:

Components may vary depending on the country.

Interface cable

An interface cable is not a standard accessory. Please purchase the appropriate cable for the interface you are going to use (Parallel, USB or Network).

■ Parallel cable (For HL-2040 and HL-2070N)

Most parallel cables support bi-directional communication, but some might have an incompatible pin assignment or may not be IEEE 1284-compliant. (The Parallel cable is not available for HL-2030.) Do not use a Parallel interface cable that is longer than 6 feet (2 meters).

■ USB cable (For Windows® 98/Me/2000/XP, Mac OS® 9.1–9.2/ Mac OS® X 10.2.4 or greater users only)

Please make sure that you use a Hi-Speed USB 2.0 certified cable if your computer uses a Hi-Speed USB 2.0 interface.

Do not connect the USB cable to a non-powered hub or a Mac® keyboard. Please make sure that you connect a USB cable to the USB connector of your PC when you use it.

It is recommended to use a USB interface cable that is no longer than 2 meters (6 feet).

■ Network cable (For HL-2070N)

Please use a straight-through Category5 (or greater) twist-pair cable for 10BASE-T or 100BASE-TX Fast Ethernet Network.

3. INSTALL THE PRINTER

Install the Printer

You need to implement hardware setup and driver installation to use the printer.

Firstly, identify the Operating System on your computer. (Windows® 95/98/Me, Windows NT® 4.0, Windows® 2000/XP and Macintosh) Then, purchase the appropriate interface cable (Parallel, USB or Network) for your computer. Most existing parallel cables support bi-directional communication, but some might have an incompatible pin assignment or may not be IEEE 1284-compliant.

The installation programs for the hardware setup and driver installation are contained on the supplied CD-ROM.

3.1 For All Users

For Windows® users

- (1) Turn on the PC power. Insert the supplied CD-ROM into the CD-ROM drive. The opening screen will appear automatically. Select the printer model and the language.
- (2) Click the **Initial Setup** icon on the menu screen.
- (3) You can view the Initial Setup instructions.

For Mac OS® 10.2.4 or greater users

- (1) Turn on the PC. Insert the CD-ROM into the CD-ROM drive.
- (2) Double-click the **HL2000** icon on your Desktop. Double-click the **Start Here OS X** icon. Follow the on-screen instructions.
- (3) Click the **Initial Setup** icon on the menu screen.
- (4) You can view the Initial Setup instructions.

For Mac OS® 9.1 to 9.2 users

Go to the next page and follow the instructions.

3.1.1 Install the drum unit assembly

- (1) Open the front cover of the printer.
- (2) Unpack the drum unit assembly.
- (3) Rock it from side to side several times to distribute the toner evenly inside the assembly.
- (4) Put the drum unit assembly in the printer.

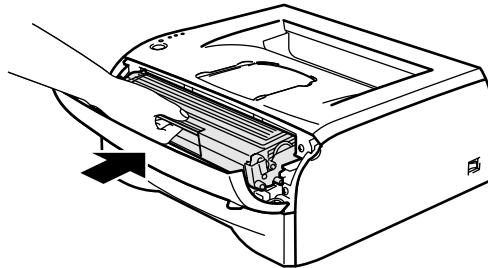


Fig. 2-2

- (5) Close the front cover of the printer.

3.1.2 Load paper in the paper tray

- (1) Pull the paper tray completely out of the printer.
- (2) While pressing the paper guide release lever, slide the adjusters to fit the paper size. Check that the guides are firmly in the slots.

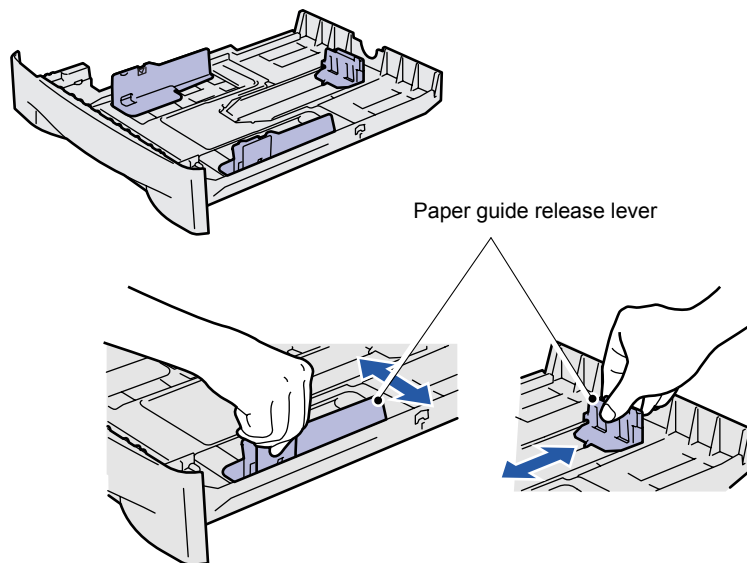
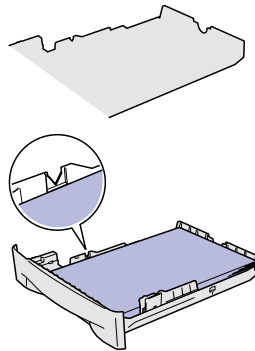


Fig. 2-3

NOTE:

For Legal size paper, pull out the back of the paper tray while holding the inside latch of the tray. (Legal size paper is not available in some regions.)

- (3) Fan the stack of paper well to avoid paper jams and misfeeds.
- (4) Put paper in the paper tray. Check that the paper is flat in the tray and below the maximum paper mark.



Follow the instructions for your operating system and interface cable type.

3.2 For Windows® Users

For USB interface cable users



CAUTION:

If the "Found New Hardware Wizard" appears on the PC, click the Cancel button.

- (1) Make sure the USB interface cable is **NOT connected** to the printer, and then begin installing the driver. If you have already connected to the cable, remove it.
- (2) Click "**Install Printer Driver**" on the Menu screen.
- (3) Select the **USB Cable**. Read the license agreement carefully. Follow the on-screen instructions.
- (4) When this screen appears, make sure the printer power switch is on. Connect the USB interface cable to your PC, and then connect it to the printer. Click the **Next** button.



Fig. 2-6

- (6) Click the **Finish** button.

For Windows® 98/Me users: The setup is now complete.

For Windows® 2000/XP users: Follow the instructions below for setting the PC as the default printer.

For Windows® 2000/XP users only (Setting your printer as the default printer.)

- (1) Click **Start**, and then **Printers and Faxes**.



Fig. 2-7

- (2) Select the icon of the appropriate printer.
- (3) From the **File** menu, select **Set as Default printer**.

For Windows® 2000/XP users: The setup is now complete.

For Parallel Interface Cable users (HL-2040/2070N users)

- (1) Click **Install Printer Driver** on the menu screen.
- (2) Select the **Parallel interface**.
- (3) Turn off the printer power switch.
- (4) Connect the parallel interface cable to your PC, and then connect it to the printer. Read the license agreement carefully. Then, follow the on-screen instructions.
- (5) Click the **Finish** button. Turn on the printer power switch. The setup is now complete.

For Network Interface Cable users (for HL-2070N only)

- For connecting the printer to a network, it is recommended to contact the system administrator prior to installation.
- For the administrator: Configure the printer referring to the following instructions.

1. For the administrator**Install the BRAdmin Professional Configuration Utility (Windows® Users Only)**

The BRAdmin Professional software is designed to manage your Brother network connected devices. For more information on BRAdmin Professional, go to <http://solutions.brother.com>

- (1) Insert the CD-ROM into your CD-ROM drive. The opening screen will appear automatically. Follow the on-screen instructions.
- (2) Click the **Install Other Drivers or Utilities** icon on the menu screen.
- (3) Click **BRAdmin Professional**. Follow the instructions on the screen.

NOTE:

- *The default password for the print server is "access". You can use the BRAdmin Professional software or a web browser to change this password.*
- *Please use the BRAdmin Professional utility version that was supplied on the CD-ROM with your Brother product. You can also download the latest Brother BRAdmin Professional utility version from <http://solutions.brother.com>. This utility is only available for Windows® users.*
- *If you are using Personal Firewall software, disable it. Once you are sure that you can print, re-start your Personal Firewall software.*

Setting your IP Address, Subnet Mask and Gateway using BRAdmin Professional (Windows® Users Only)**NOTE:**

If you have a DHC/BOOTP/RARP server in your network, you don't have to do the following operation. Because the printer server will automatically obtain its IP address.

- (1) Start BRAdmin Professional, and select **TCP/IP**.
- (2) Select **Search Active Devices** from the **Devices** menu. BRAdmin will search for new devices automatically.
- (3) Double-click the new device.
- (4) Enter the **IP Address**, **Subnet Mask** and **Gateway**, and then click the **OK** button.
- (5) The address information will be saved to the printer.

2. Install the driver

- (1) Click **Install Printer Driver** on the Menu screen.
- (2) Select the **Network interface**.
- (3) Turn the printer power switch off.
- (4) Connect the cable to your printer, and then connect it to a free port on your hub.
- (5) Turn the printer power switch on.
- (6) Read the license agreement carefully. Then, follow the on-screen instructions
- (7) Select **Brother Peer-to-Peer Network Printer**, and then click the **Next** button.
- (8) Follow the instructions below depending on it.

For Network shared printer users: Go to [3. For Network shared printer users](#).

For LPR users: Go to [4. For Brother Peer-to-Peer network printer users \(LPR-recommended Peer-to- Peer printing method\)](#)

For NetBIOS users: Go to [5. For Brother Peer-to-Peer network printer users \(NetBIOS\)](#)

3. For Network shared printer users

Install the driver and select the appropriate printer queue or “share name”.

- (1) Select the current printer's queue, and then click the **OK** button.
- (2) Click the **Finish** button.
- (3) The setup is now complete.

4. For Brother Peer-to-Peer network printer users (LPR-recommended Peer-to-Peer printing method)

Configuring the LPR port

- (1) Select **Search the network for devices and choose from a list of discovered devices (Recommended)**. Or enter your printer's IP address or its node name. Click the **Next** button.



Fig. 2-8

NOTE: Contact your Administrator about the Printer's IP Address.

- (2) Select your printer and **LPR (Recommended)**, and then click the **Next** button.



Fig. 2-9

- (3) Click the **Finish** button.

For WindowsNT® 4.0 and Windows® 2000/XP users: The setup is now complete.

For Windows® 95/98/ME users: After your PC has restarted, the setup will be complete.

5. For Brother Peer-to-Peer network printer users (NetBIOS)

Configuring the NetBIOS port

- (1) Select **Search the network for devices and choose from a list of discovered devices (Recommended)**, and then click the **Next** button.
- (2) Select your printer and **NetBIOS**, and then select "NetBIOS". Click the **Next** button.
- (3) Click the **Finish** button.

For WindowsNT® 4.0 and Windows® 2000/XP users: The setup is now complete.

For Windows® 95/98/ME users: After your PC has restarted, the setup will be complete.

3.3 For Macintosh Users

For USB interface cable users

Connecting the printer to your Macintosh and installing the driver

<For Mac OS® X 10.2.4 or greater Users>

- (1) Click **Install Printer Driver** on the Menu screen.
- (2) Select the **USB interface**.
- (3) Connect the USB interface cable to your Macintosh, and then connect it to the printer.

NOTE:

Do not connect the USB cable to the keyboard USB Port or a non-powered USB Hub.

- (4) Make sure the printer power switch is on.
- (5) From the **Go** menu, select **Applications**.
- (6) Open the **Utilities** folder.
- (7) Open the **Printer Setup Utility** icon.
- (8) Click **Add**. And select **USB**.
- (9) Select the appropriate printer, and then click the **Add** button.
- (10) From the **Printer Setup Utility** menu, select **Quit Printer Setup Utility**.
- (11) The Setup is now complete.

<For Mac OS® 9.1 to 9.2 Users>

- (1) Insert the CD-ROM into your CD-ROM drive. Open the **Mac OS 9** folder.
- (2) Open your language folder.
- (3) Double-click the **Printer Driver Installer** icon to install the printer driver. Follow the on-screen instructions.
- (4) Connect the USB interface cable to your Macintosh, and then connect it to the printer.
- (5) Make sure the printer power switch is on.
- (6) From the **Apple** menu, open the **Chooser**.
- (7) Click the **Brother Laser** icon, and then select the appropriate printer. Close the **Chooser**.
- (8) The setup is now complete.

For network users (HL-2070N only)

Connect the printer to the Macintosh & install the BR-Script PPD file

<For Mac OS® X 10.2.4 or greater Users>

- (1) Click **Install Printer Driver** on the Menu screen.
- (2) Click the **Network interface** and follow the on screen instructions.
- (3) Turn off the printer power switch.
- (4) Connect the network interface cable to the printer, and then connect it to a free port on your hub.
- (5) Turn on the printer power switch.
- (6) From the **Go** menu, select **Applications**.
- (7) Open the **Utilities** folder.
- (8) Double-click the **Printer Setup Utility** icon.
- (9) Click **Add**. Make the following selection.
- (10) Select **Brother HL-2070N** series, and then click the **Add** button.

NOTE:

If there is more than one of the same model printer (HL-2070N) connected on your network, the Ethernet address (MAC address) will be displayed after the model name.

- (11) From the **Printer Setup Utility** menu, select **Quit Printer Setup Utility**.
- (12) The setup is now complete.

<For Mac OS® 9.1 to 9.2 Users>

- (1) Turn off the printer power switch.
- (2) Connect the network interface cable to the printer, and then connect it to a free port on your hub.
- (3) Turn on the printer power switch.
- (4) Insert the CD-ROM into your CD-ROM drive. Open the **Mac OS 9** folder.
- (5) Open your language folder.
- (6) Double-click the **Printer Driver Installer** icon to install the printer driver. Follow the on-screen instructions.
- (7) From the **Apple** menu, open the **Chooser**.
- (8) Click the **Brother Laser (IP)** icon, and then select **BRN_XXXXXX**. Click the **Setup...** button.
*XXXXXX are the last six digits of the Ethernet address.
- (9) Click the **OK** button. Close the **Chooser**. The setup is now complete.

4. PRINTING METHODS

The printer provides two types of printing method; printing from the paper tray and printing from the manual feed slot.

4.1 Printing on Plain Paper, Recycled Paper or Transparency from the Paper Tray

You can load plain paper, recycled paper or transparency into the paper tray. If paper is loaded into the paper tray, the printer automatically feeds paper sheet by sheet and ejects the printed page into the output tray.

For the details on paper tray loading, refer to [subsection 3.1.2 'Load paper into the paper tray' in this chapter](#) and [subsection 3.6 'Paper' in Chapter 1](#).

NOTE:

- *It is recommended that lifting up the support flap prevents from sliding off the facedown output tray. If you choose not to lift up the output tray support flap, we recommend that you remove printed pages immediately after they come out of the printer.*
- *Paper jams may occur if you put more than 250 sheets of plain paper in the paper tray at one time.*
- *Paper jams may occur if you put more than 10 transparency in the paper tray at one time.*
- *When you use pre-printed paper, put the side that is going to be printed on (blank side) face down, with the top of the paper at the front of the tray.*



CAUTION:

If you print on transparency, remove each transparency immediately. Stacking the printed transparency may cause a paper jam or the transparency to curl.

4.2 Printing on Plain Paper, Recycled Paper, Bond Paper and Transparency from the Manual Feed Slot

NOTE:

The printer automatically turns on the Manual Feed mode when you put paper in the manual feed slot.

- (1) Select the Paper Size, Media Type, Paper Source and other settings in the printer driver.
- (2) Send the print data to the printer.

NOTE:

*A **MANUAL FEED** status is shown by the control panel LEDs until you put a sheet of paper in the manual feed slot.*

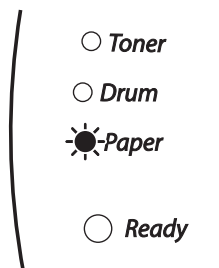


Fig. 2-10

- (3) Lift up the support flap to prevent paper from sliding off the facedown output tray.

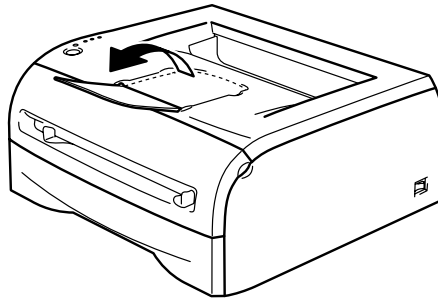


Fig. 2-11

NOTE:

If you choose not to lift up the output tray support flap, we recommend that you remove printed pages as soon as they come out of the printer.

- (4) Using both hands, slide the manual feed slot paper guides to the width of the paper that you are going to use.

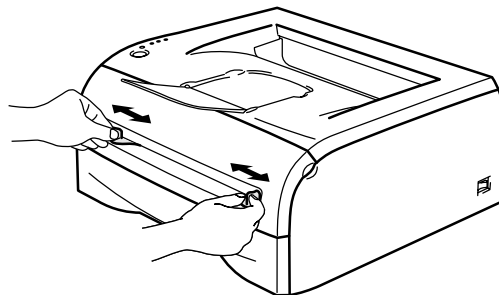


Fig. 2-12

NOTE:

- *Put the paper into the manual feed slot with the side to be printed face up.*
- *Make sure the paper or transparency is straight and in the proper position on the manual feed slot. If it is not, the paper or the transparency may not be fed correctly, resulting in a skewed printout or a paper jam.*
- *Do not put more than one piece of paper in the manual feed slot at one time, or it may cause a jam.*
- *If you put any Media (paper, transparency and so on) in the manual feed slot before the printer is in the ready state, the media may be ejected without being printed on.*

- (5) Using both hands, put the paper or the transparency into the manual feed slot until its front edge touches the paper feed roller. Hold the paper or transparency in this position until the printer automatically feeds it in for a short distance, and then let it go.

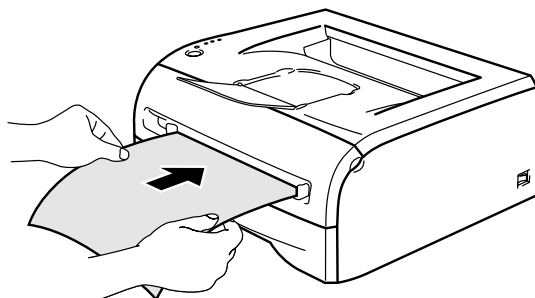


Fig. 2-13

- (6) After the printed page comes out of the printer, put in the next sheet of paper as in Step (4) above. Repeat for each page that you want to print.

**CAUTION:**

If you print on transparency, remove each transparency immediately after printing. Stacking the printed transparency may cause a paper jam or the transparency to curl.

4.3 Printing on Thick Paper, Card Stock, Labels, and Envelopes from the Manual Feed Slot

NOTE:

The printer automatically turns on the Manual Feed mode when you put paper in the manual feed slot.

- (1) Select the **Paper Size**, **Media Type** and **Paper Source** and other settings in the printer driver.

NOTE:

For envelope users

- When you use Envelope #10, select **Com-10** from Paper Size in the printer driver.
- For other envelopes which are not in the selection of the printer driver, such as Envelope #9 or Envelope C6, use **User Defined...** Size.

- (2) Send the print data to the printer.

NOTE:

*A **MANUAL FEED** status is shown by the control panel LEDs until you put a sheet of paper or envelope in the manual feed slot.*

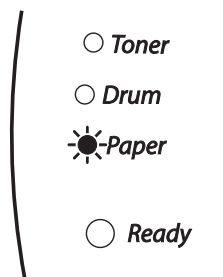


Fig. 2-14

- (3) Lift up the support flap to prevent paper from sliding off the facedown output tray.

NOTE:

If you choose not to lift up the output tray support flap, we recommend that you remove printed pages as soon as they come out of the printer.

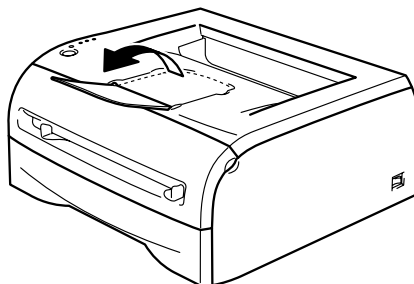


Fig. 2-15

- (4) Using both hands, slide the manual feed slot paper guides to the width of the paper that you are going to use.

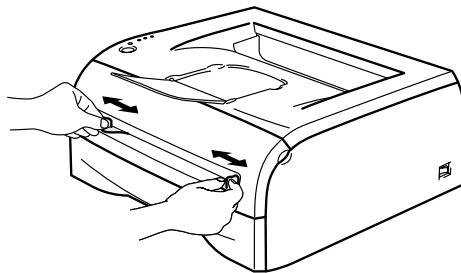


Fig. 2-16

- (5) Using both hands, put the paper or the envelope into the manual feed slot until the front edge of the paper touches the paper feed roller. Hold the paper or the envelope in this position until the printer automatically feeds the paper or the envelope in for a short distance, and then let it go.

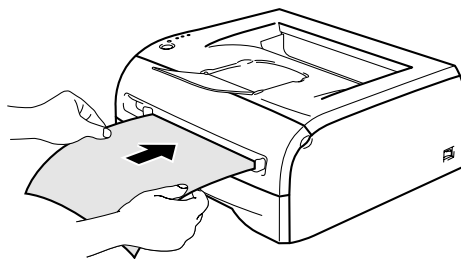


Fig. 2-17

NOTE:

- Put the paper into the manual feed slot with the side to be printed face up.
- Make sure the paper is neatly stacked and in the proper position on the manual feed slot. If it is not, the paper may not be fed correctly, resulting in a skewed printout or a paper jam.
- Do not put more than one piece of paper in the manual feed slot at one time, or it may cause a jam.
- If you put any Media (paper, transparency and so on) in the manual feed slot before the printer is in the ready state, the media may be ejected without being printed on.

- (6) After the printed envelope comes out of the printer, the printer will wait until you put in the next envelope. Repeat Step (5) for each envelope you want to print.

NOTE:

- Envelopes joints that are sealed by the manufacturer should be secure.
- All sides should be properly folded without wrinkles or creases.



CAUTION:

Remove each sheet or envelope immediately after printing. Stacking the sheets or envelopes may cause a paper jam or the paper to curl.

Printing on envelopes

Use of any of the envelopes listed below may cause damage to the printer.

- Envelopes that are damaged, curled, wrinkled, or unusual shape
- Envelopes that are extremely shiny or highly textured
- Envelopes with clasps, snaps or tie strings
- Envelopes with self-adhesive closures
- Envelopes of baggy construction
- Envelopes that are not sharply creased
- Embossed envelopes
- Envelopes that were previously printed by a laser printer
- Envelopes that are pre-printed on the inside
- Envelopes that cannot be arranged when put in a pile
- Envelopes made of paper that weighs more than the paper weight specifications for the printer.
- Envelopes that have been badly made, with edges that are not straight or consistently square.
- Envelopes with windows, holes, cutouts or perforations.



WARNING

- ***If you use any of the types of envelopes listed above, they may damage your printer. This damage is not covered under any Brother warranty or service agreement.***

NOTE:

- *Before printing on envelopes, fan the stack well to avoid paper jams and misfeeds.*
- *Do not put different types of paper at the same time in the paper tray because it may cause paper jams or misfeeds.*
- *Do not print on envelopes using manual duplex printing.*
- *For proper printing, you must choose the same paper size from your software application as the paper in the tray.*
- *Most envelopes will be suitable for your printer. However, some envelopes will have feed and print-quality problems because of the way they have been made. A suitable envelope should have edges with straight, well-creased folds and the leading edge should not be thicker than two pieces of paper. The envelope should lie flat and not be of baggy or flimsy construction. You should buy quality envelopes from a supplier who understands that you will be using the envelopes in a laser printer. Before you print a lot of envelopes, test one to make sure that the print results are what you want.*
- *Brother will not recommend a particular envelope because envelope manufacturers may change the envelope specifications. You are responsible for the quality and performance of envelopes you use.*

4.4 Duplex Printing

The supplied printer drivers for Windows® 95/98/Me, Windows NT® 4.0 and Windows® 2000/XP all allow manual duplex printing.

NOTE:

- *If the paper is thin, it may wrinkle.*
- *If paper is curled, straighten it and then put it back in the paper tray or the manual feed slot.*
- *If the paper is not feeding properly, it may be curled. Remove the paper and straighten it.*
- *When you use the manual duplex function, it is possible that there may be paper jams or poor print quality. If there is a paper jam, see paper jams and how to clear them on [4.2 'Paper Jams' in Chapter 7](#).*
- *Use plain paper and recycled paper. Do not use bond paper.*

Printing on both sides of the paper (manual duplex printing)

Manual duplex printing from the paper tray

NOTE:

You should use plain paper or recycled paper. Do not use bond paper.

When printing on both sides of the paper, follow the steps below;

- (1) From the **Advanced** tab choose the **Manual Duplex** printing mode, and from the **Basic** tab choose the **Paper Source** to be **Auto Select** or **Tray1**.
- (2) The printer will automatically print all the even-numbered pages on one side of the paper first.
- (3) Remove the printed even-numbered pages from the output tray and put them back in the paper tray, placing the paper with the side that is going to be printed on (blank side) face down. Follow the instructions on the computer screen.

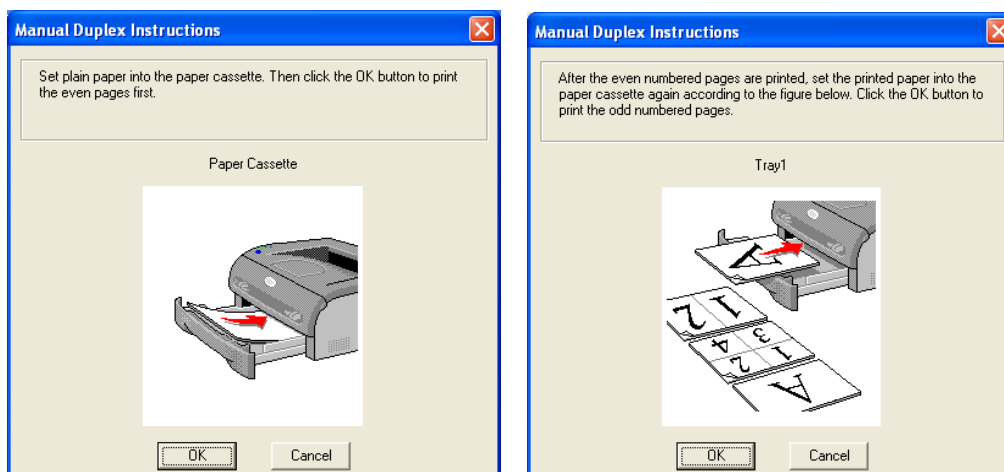


Fig. 2-18

- (4) The printer will now automatically print all the odd-numbered pages on the other side of the paper.

Note:

When you put paper in the paper tray, first empty the tray then put the printed pages in the tray, with the printed side face up. (Do not add the printed pages to the top of a stack of unprinted paper.)

Manual duplex printing from the manual feed slot**NOTE:**

You should not use very thin or very thick paper.

CAUTION:

* Before you put the sheets back in the manual feed slot, you will have to straighten them, or you may get paper jams.

* You should not use very thin or very thick paper.

* When you use the manual duplex function, it is possible that there may be paper jams or poor print quality. If there is a paper jam, see **4. PAPER PROBLEMS** in Chapter 7.

- (1) From **Advanced** tab choose the **Manual Duplex** printing mode, and from the **Basic** tab choose the **Paper Source** to be **Manual feed**.
- (2) Using both hands put the paper in the manual feed slot with the side that is going to be printed on first facing up. Follow the instructions on the computer screen. Repeat this step until you have printed all the even-numbered pages.

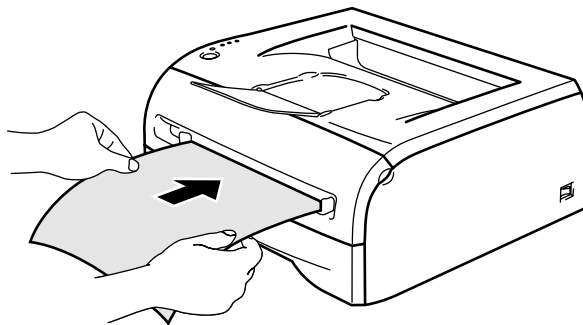


Fig. 2-19

- (3) Remove the printed even-numbered pages from the output tray and put them into the manual feed slot in the same order. Place the paper with the side that is going to be printed on (the blank side) face up. Follow the instructions on the computer screen.

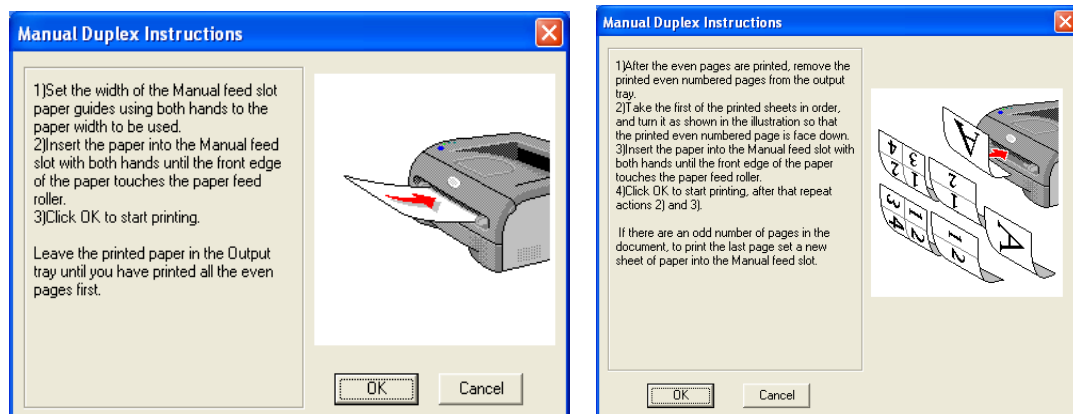


Fig. 2-20

- (4) Repeat Step (3) until you have printed all the odd-numbered pages on the other side of the paper.

4.5 Paper Orientation for Manual Duplex Printing

The printer prints the second page first.

If you print 10 pages on 5 sheets of paper, it will print page 2 then page 1 on the first sheet of paper.

It will print page 4 then page 3 on the second sheet of paper.

It will print page 6 then page 5 on the third sheet of paper, and so on.

When doing manual duplex printing, the paper must be put in the paper tray in the following way:

*** For the manual feed slot:**

Put the side to be printed on first, in face-up, with the leading edge (top) of the paper in first.

To print the second side, put the paper face down, with the leading edge (top) of the paper in first.

If letterhead paper is used, this would be put in with the heading face down, and in first.

To print the second side, put the heading face up and in first.

*** For the paper tray:**

Put the side to be printed on first, face down, with the leading edge (top) of the paper at the front of the tray.

To print the second side, put the paper face up, with the leading edge (top) of the paper at the front of the tray.

If letterhead paper is used, this would be put in to the paper tray with the heading face up, and at the front of the tray.

To print the second page, put the heading face down and at the front of the tray.

5. CONTROL PANEL OPERATION

There are four Light Emitting Diodes (LEDs) (**Toner**, **Drum**, **Paper**, **Ready**) and a control panel button (**Go**) on the control panel.



Fig. 2-21




5.1 Control Panel Button & LED Functions (Printer Status)

5.1.1 Control panel button

Go button: Cancel printing, Wake-up, Form feed, Error recovery and Reprint.

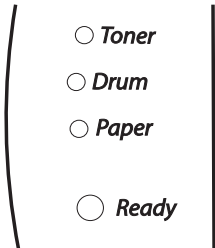
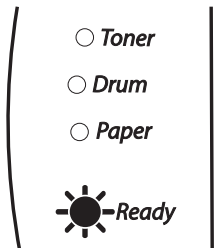
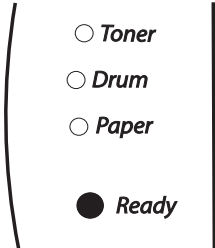
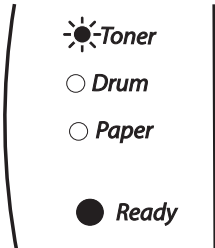
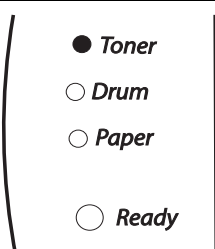
5.1.2 LEDs

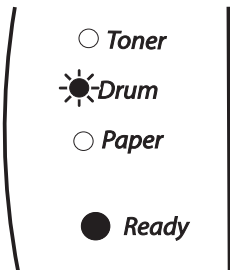
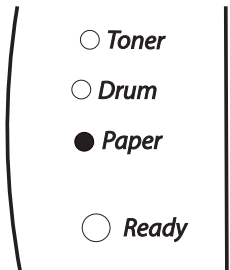
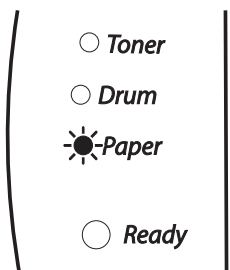
- 1) **Toner** LED (Yellow) indicates when the toner is low or empty.
- 2) **Drum** LED (Yellow) indicates when the drum is nearing end of life.
- 3) **Paper** LED (Red) indicates when an error occurs, such as cover open or paper jam.
- 4) **Ready** LED (Green) indicates when the printer is ready or if data is remaining.

	LED is off
	LED is on
	LED is blinking

NOTE:
When the power switch is off or the printer is in Sleep mode, all LEDs are off.

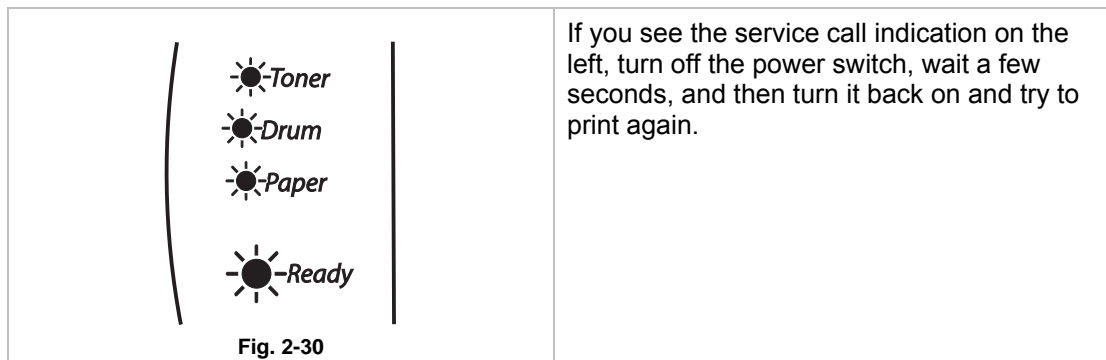
5.2 LED Indications

LED	Printer status
 <p>○ Toner ○ Drum ○ Paper ○ Ready</p> <p>Fig. 2-22</p>	<p>Sleep mode The power switch is off or the printer is in Sleep mode. Pressing the Go button wakes up the printer from Sleep mode to Warming up mode. After warming up, the printer will be ready state.</p>
 <p>○ Toner ○ Drum ○ Paper ☀ Ready</p> <p>Fig. 2-23</p>	<p>Warming up The printer is warming up.</p>
	<p>Receiving data The printer is either receiving data from the computer, processing data in memory or printing the data.</p>
	<p>Data remaining in memory Print data is left in the printer memory. If the Ready LED blinks for a long time and nothing has been printed, press the Go button to print the data that is still in memory.</p>
 <p>○ Toner ○ Drum ○ Paper ● Ready</p> <p>Fig. 2-24</p>	<p>Ready to print The printer is ready to print.</p>
 <p>☀ Toner ○ Drum ○ Paper ● Ready</p> <p>Fig. 2-25</p>	<p>Toner low Indicates that the toner cartridge is nearly empty. Purchase a new toner cartridge and have it ready for when "Toner Life End" is indicated.</p> <p>The Toner LED alternates turning on for 2 seconds and off for 3 seconds.</p>
 <p>● Toner ○ Drum ○ Paper ○ Ready</p> <p>Fig. 2-26</p>	<p>Toner life end Replace the toner cartridge with a new one. See 1.2 'Toner Cartridge' in Chapter 5.</p>
	<p>Cartridge position error The toner cartridge is not installed correctly. Take out the toner cartridge and put it back into the printer again.</p>

LED	Printer status
 <p>Fig. 2-27</p>	<p>Drum life end soon The drum unit is near the end of its life. We recommend that you obtain a new drum unit to replace the current one. See 1.1 'Drum Unit' in Chapter 5.</p> <p>The Drum LED alternates turning on for 2 seconds and off for 3 seconds alternately.</p>
 <p>Fig. 2-28</p>	<p>No paper Load paper in the printer. Then press the Go button.</p>
 <p>Fig. 2-29</p>	<p>Front Cover Open Close the front cover of the printer.</p>
	<p>Back Cover Open Close the back cover of the printer.</p>
	<p>Jam Clear the paper jam. If the printer does not start printing, press Go button.</p>
	<p>Manual feed Put the paper in the manual feed slot.</p>
	<p>Memory full The printer memory is full and the printer is unable to print the page.</p>
	<p>Print overrun The printer memory is full and the printer is unable to print the page.</p>
	<p>Dust on drum The corona wire needs to be clean. See 3.2 'Cleaning the Corona Wire' in Chapter 5.</p>





















5.3 Service Call Indications

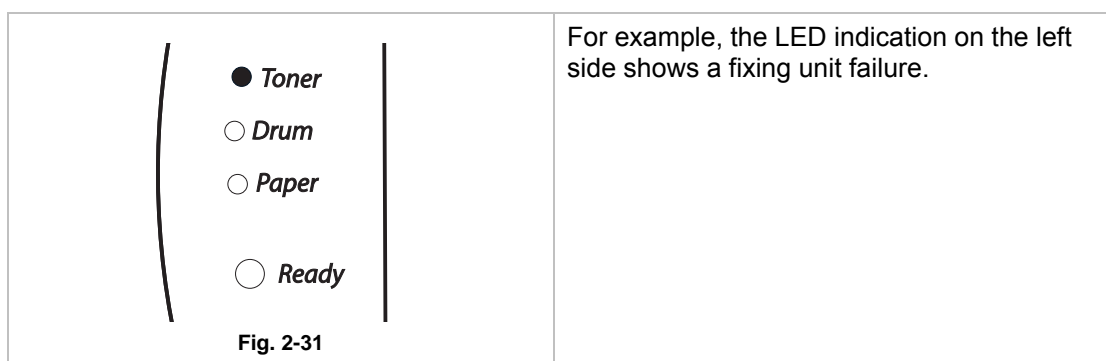
If there is an error that can not be cleared by the user, the printer will show that a service call is needed by lighting up all the LEDs as shown in the figure below.



When you press the **Go** button, the LEDs will light up as shown Table 1: LED indications while pressing **Go** button as follows.

Table 1: LED indications while pressing Go button

LEDs	Fuser unit failure*	Laser unit failure	Main motor failure	Main PCB failure	High Voltage Error
Toner	 Yellow		 Yellow		 Yellow
Drum		 Yellow			 Yellow
Paper			 Red	 Red	
Ready					



NOTE:

- Make sure that the front cover is fully closed before you report a service call.
- If this error occurs, turn the power switch off, wait a few seconds, and then turn it on again. Leave the printer for 10 minutes with the power on.

5.4 Control Panel Button (Go button)

The control panel button is used for the following purposes depending on the situation.

Operation	Description
Cancel printing	When there is the receiving data or printing data press the Go button for about 4 seconds until all LEDs light up. The Ready and Paper LEDs will flash as the job is being canceled.
Wake-up	If the printer is in Sleep mode, press the Go button to wake the printer up and go to the ready state.
Form feed	If the green Ready LED blinks for a long time, press the Go button. The printer will print any data that is left in the printer memory.
Error recovery	If there is an error, the printer will recover automatically from some errors. If an error is not automatically cleared, press the Go button to clear the error, and then continue to use the printer.
Reprint	If reprinting the last document when there is no receiving data or printing data press the Go button for about 4 seconds until all LEDs light up.

5.5 Other Control Features

The printer has the following useful features;

5.5.1 Print a test page

You can use the **Go** button or the printer driver to print a test page.

<Using control panel button>

- (1) Turn off the printer.
- (2) Make sure that the front cover is closed and the power cord is plugged in.
- (3) All LEDs light up, and keep the **Go** button pressed down until the **Ready** LED goes off. Release the **Go** button. Then the **Toner**, **Drum** and **Paper** LEDs go off.
- (4) Press the **Go** button again. The printer will print a test page.

<Using the printer driver>

If you are using Brother's Windows® printer driver, click the "Print Test Page" button. It is in the General tab of the Windows® printer driver.

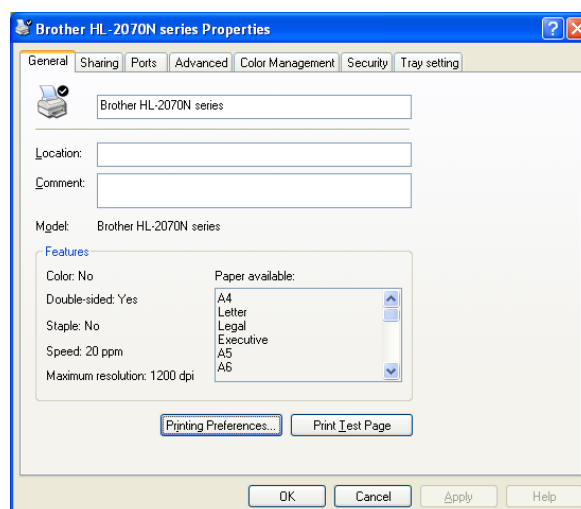


Fig. 2-32

5.5.2 Print a printer settings page

You can print the current settings using the control panel button or printer driver.

<Using control panel button>

- (1) Make sure that the front cover is closed and the power cord is plugged in.
- (2) Turn on the printer and wait until the printer is in ready state.
- (3) Press the **Go** button three times within 2 seconds. The printer will print the current printer settings.

<Using the printer driver>

If you are using Brother's Windows® printer driver, you can print the current printer settings by clicking the Print Settings button in the Support tab.

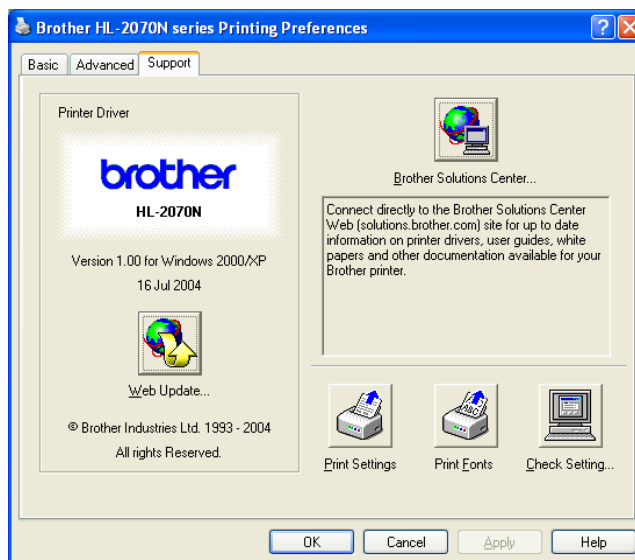


Fig.2-33

5.5.3 Print fonts (For HL-2070N)

You can print a list of the internal fonts using the control panel button or printer driver.

<Using the control panel button>

- (1) Turn off the printer.
- (2) Make sure that the front cover is closed and the power cord is plugged in.
- (3) All LEDs light up, and keep the **Go** button pressed down until the **Ready** LED goes off. Release the **Go** button. Then the **Toner**, **Drum** and **Paper** LEDs go off.
- (4) Press the **Go** button twice. The printer will print a list of the internal fonts.

<Using the printer driver>

If you are using Brother's Windows® printer driver, you can print a list of the internal fonts by clicking the Print Fonts button in the Support tab.

6. NETWORK FUNCTIONS (FOR HL-2070N)

6.1 LED Functions

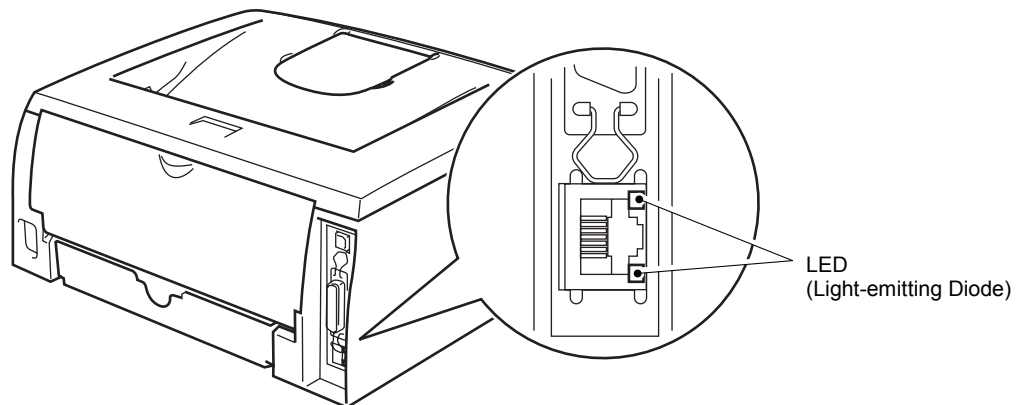


Fig. 2-34

No light:

If both of the two LEDs are off, then the print server is not connected to the network.

Link LED is orange:

This Link LED will be orange if the print server is connected to a 100BaseTX Fast Ethernet network.

Link LED is green:

This Link LED will be green if the print server is connected to a 10 Base T Ethernet.

Active LED is yellow:

The Active LED will blink if the print server is receiving or transmitting data.

6.2 Network Factory Default Setting (For HL-2070N)

If you wish to reset the print server back to its default factory settings (resetting all information such as the password and IP address information), please follow these steps;

- (1) Turn off the printer.
- (2) Make sure that the front cover is closed and the power cord is plugged in.
- (3) All LEDs light up, and keep the **Go** button pressed down until the **Ready** LED goes off. Release the **Go** button. Then the **Toner**, **Drum** and **Paper** LEDs go off.
- (4) Press the **Go** button six times. Make sure that all the LEDs light up to indicate the printer server has been reset to its default factory settings.

NOTE:

- If you wish to reset the printer and automatically disable the APIPA protocol, follow steps (1) to (3) above. Press the **Go** button seven times and make sure that all the LEDs light up to indicate the printer server has been reset to its default factory settings.
- For more information on APIPA, see the Network User's Guide or visit <http://solutions.brother.com>
- You can also disable the APIPA protocol using EWS, BRAdmin Professional or Web BRAdmin.

6.3 Network Factory Default Setting with APIPA Protocol Disabled (For HL-2070N)

If you wish to reset the print server back to its default settings with APIPA protocol disabled, please follow these steps.

- (1) Turn off the printer.
- (2) Make sure that the front cover is closed and the power cord is plugged in.
- (3) Hold down the **Go** button as you turn on the power switch. All LEDs light up, and keep the **Go** button pressed down until the **Ready** LED goes off. Release the **Go** button. Make sure that the **Toner**, **Drum** and **Paper** LEDs are off.
- (4) Press the **Go** button seven times. Make sure that all the LEDs light up to indicate the print server has been reset to its default factory settings.

NOTE:

- *You can disable the APIPA protocol using Web browser, BRAdmin Professional or Web BRAdmin.*
- *For more information of APIPA, please refer to the Network User's Guide.*

7. OPTIONAL PRINT SERVER

This printer has the following optional print servers.

Model	NC-2200w	NC-2100p
HL-2030	O	N/A
HL-2040	O	O
HL-2070N	O	N/A

Wireless print server (NC-2200w)

An optional network print server (NC-2200w) allows you to print in a wireless environment through the USB interface. The NC-2200w is compatible with Windows® 98/ME, Windows NT® 4.0 and Windows® 2000/XP.

The Brother NC-2200w wireless print server supports the IEEE 802.11b wireless networking standard and can work in infrastructure or Ad-hoc mode using common wireless authentication and security methods.

For more information, please visit our web site at <http://solutions.brother.com>.

Network interface	IEEE 802.11b wireless
Communication Mode	Infrastructure / Ad-hoc 802.11
Security	SSID, WEP (64/128bit)
Printer Interface	USB 2.0 (Full-speed)
Support Protocol	TCP/IP
Management Features	Embedded web server support
	SNMP/MIB support
	TELNET remote console
	BRAdmin Professional compatible
	Flash memory for easy updating of firmware

Print server (NC-2100p) (For HL-2040)

An optional network print server (NC-2100p) allows you to connect to your network through the parallel interface.

Network interface	10/100BASE-TX Ethernet
Printer Interface	Parallel
Support Protocol	TCP/IP, NetBEUI
Management Features	Embedded web server support
	SNMP/MIB support
	TELNET remote console
	BRAdmin Professional compatible
	Flash memory for easy updating of firmware

Note:

HL-2070N already has a built-in 10/100BASE-TX Ethernet Print Server.

CHAPTER 3 THEORY OF OPERATION

1. ELECTRONICS

1.1 General Block Diagram

Fig. 3-1 shows a general block diagram. (HL-2030/2040/2070N)

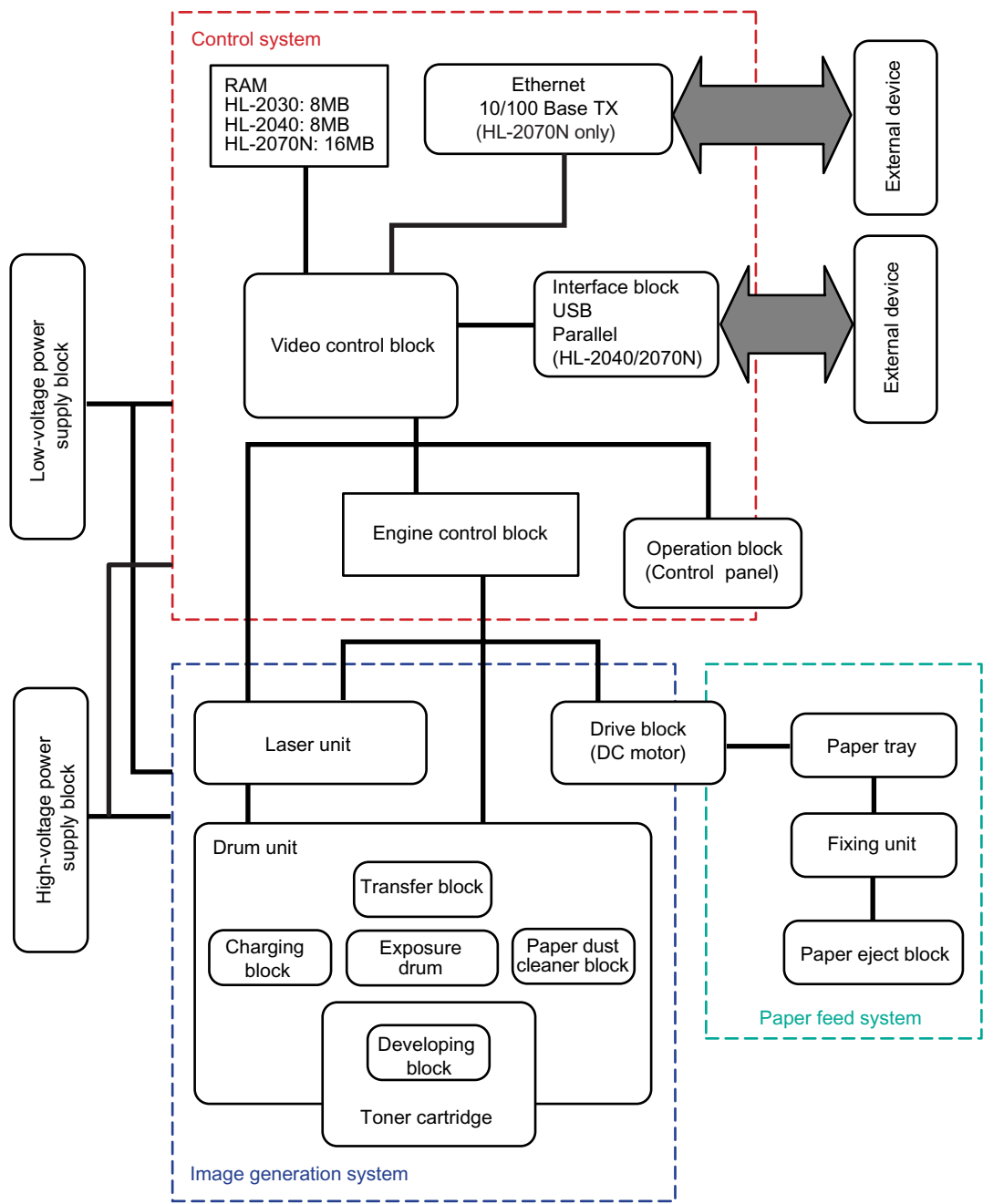


Fig. 3-1

1.2 Main PCB Block Diagram

Fig. 3-2 shows the block diagram of the main PCB. (HL-2030/2040/2070N)

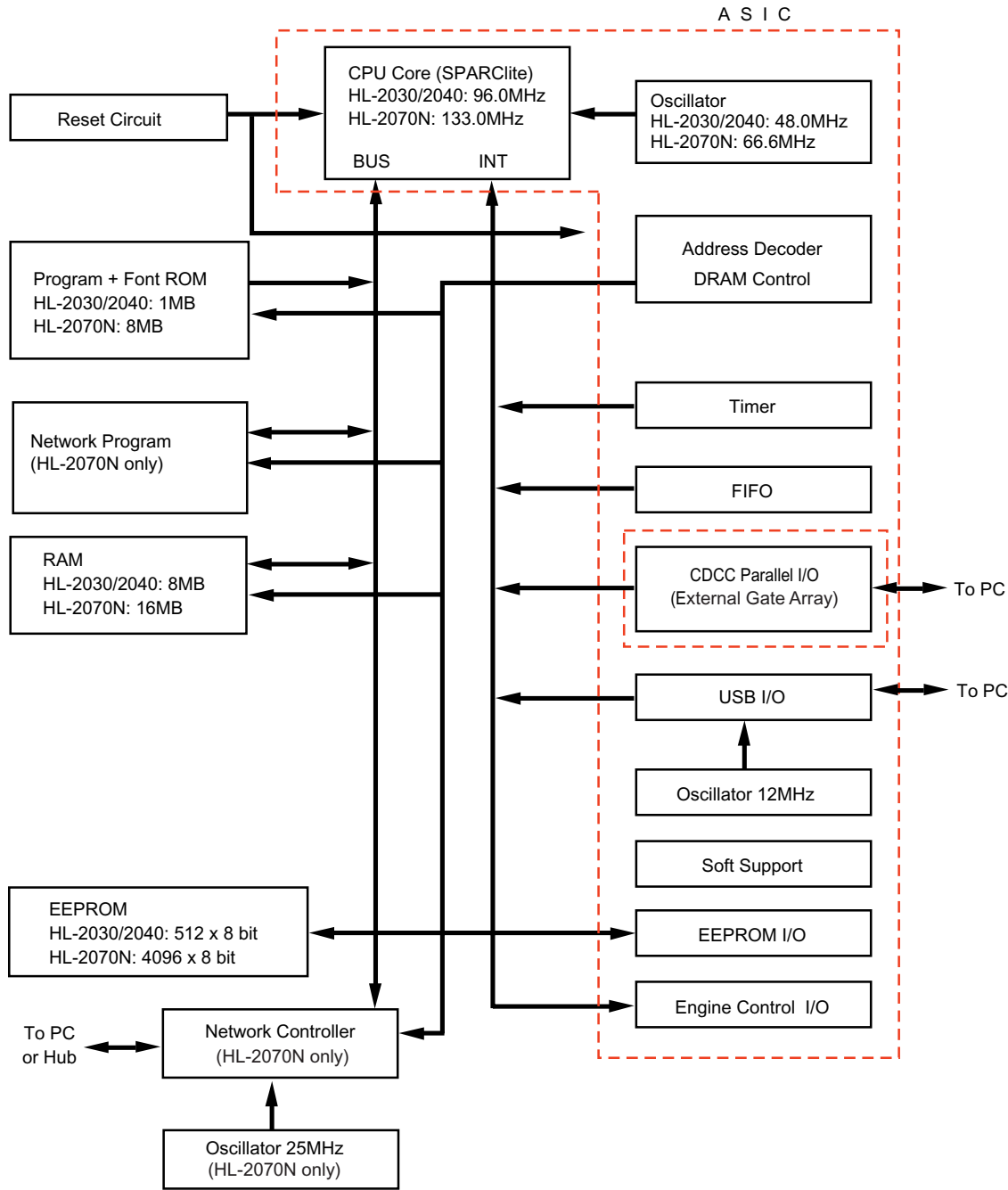


Fig. 3-2

1.3 Main PCB

For the entire circuit diagram of the main PCB, see **APPENDIX 1. to 6. 'MAIN PCB CIRCUIT DIAGRAM'** in this manual.

1.3.1 CPU

A Fujitsu 32bit RISC CPU, SPARClite is built in the ASIC. While the CPU is driven with a clock frequency of 48.00 MHz (HL-2030/2040) or 66.66 MHz (HL-2070N) in the user logic block, it itself runs at 96.0 (HL-2030/2040) or 133.0 MHz (HL-2070N), which is generated by multiplying the source clock by two.

< HL-2030/2040 >

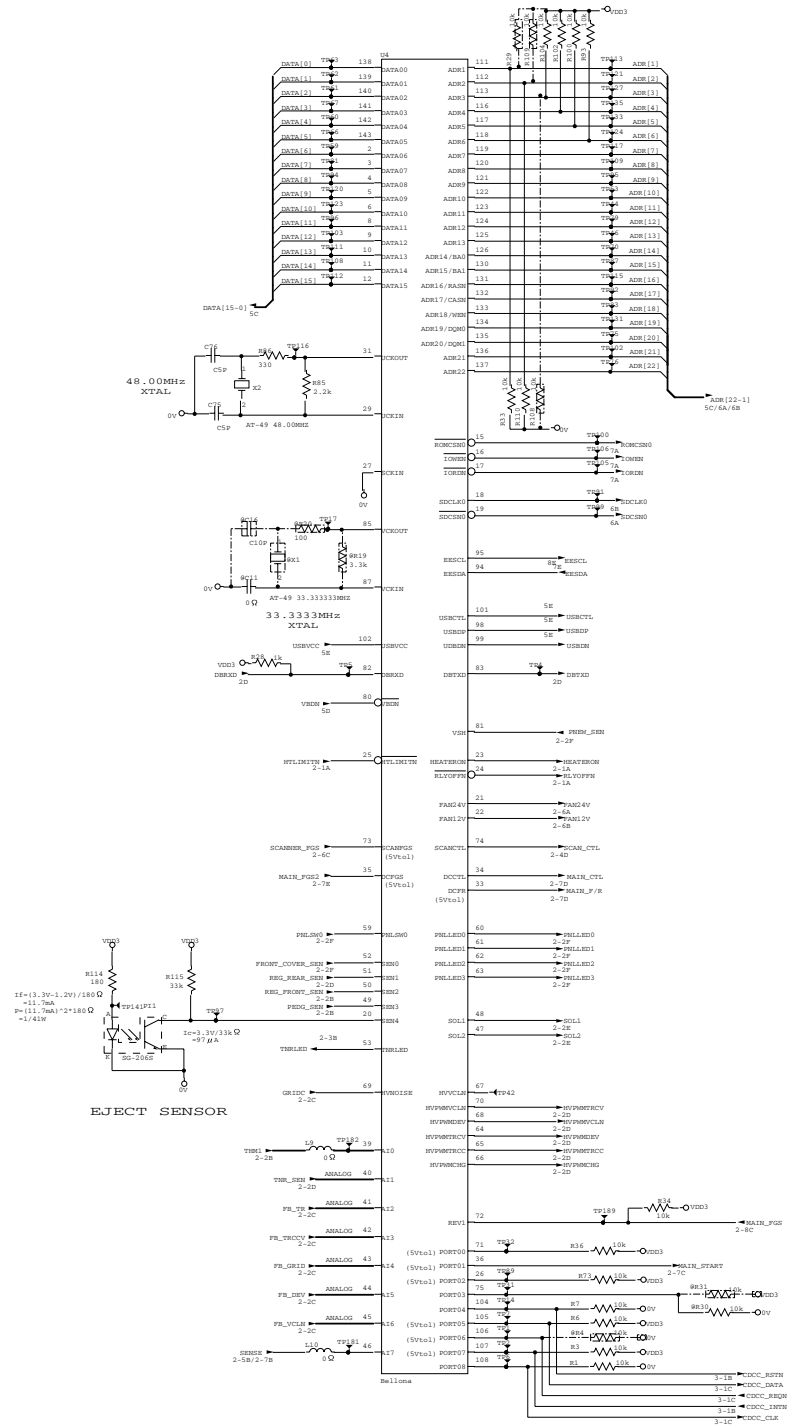


Fig. 3-3

The functions of the interface block communication with external devices are described below;

1.3.2 USB interface

Stores the data received from the PC into DRAM as controlled by the DMA controller. The transmission speed is 12Mbps.

< HL-2030/2040 >

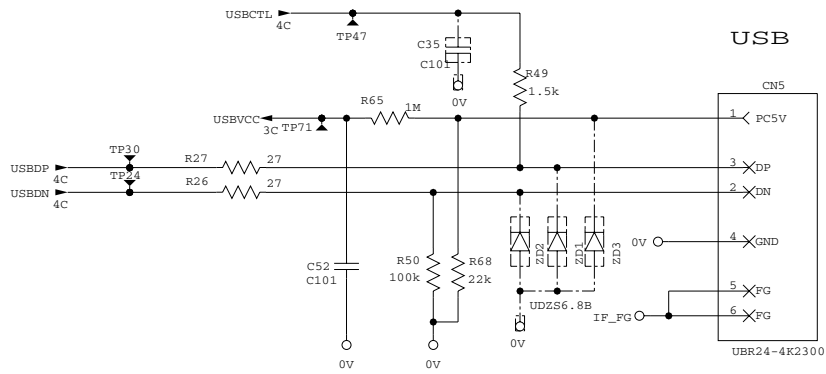


Fig. 3-5

< HL-2070N >

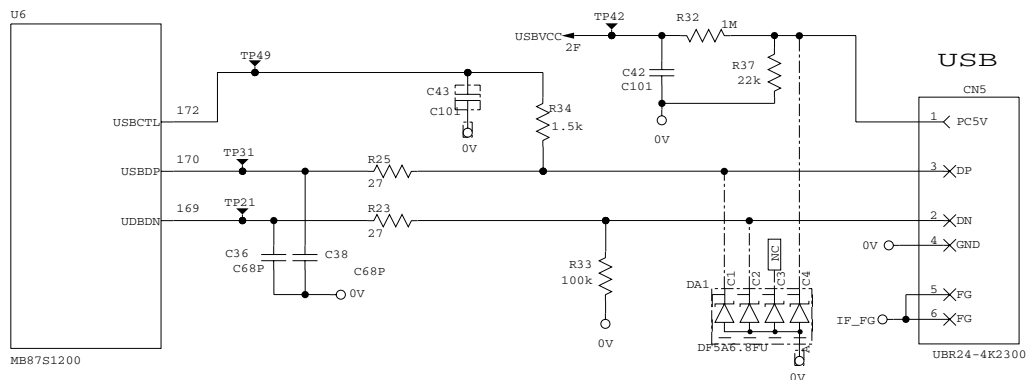


Fig. 3-6

1.3.3 IEEE1284 interface

Stores the data received from the PC into DRAM by DMA using the Gate Array (UPD65421MC-11) exclusive for parallel I/F. It is for the normal receipt and dual direction communication (nibble mode, byte mode, ECP mode).

< HL-2040 >

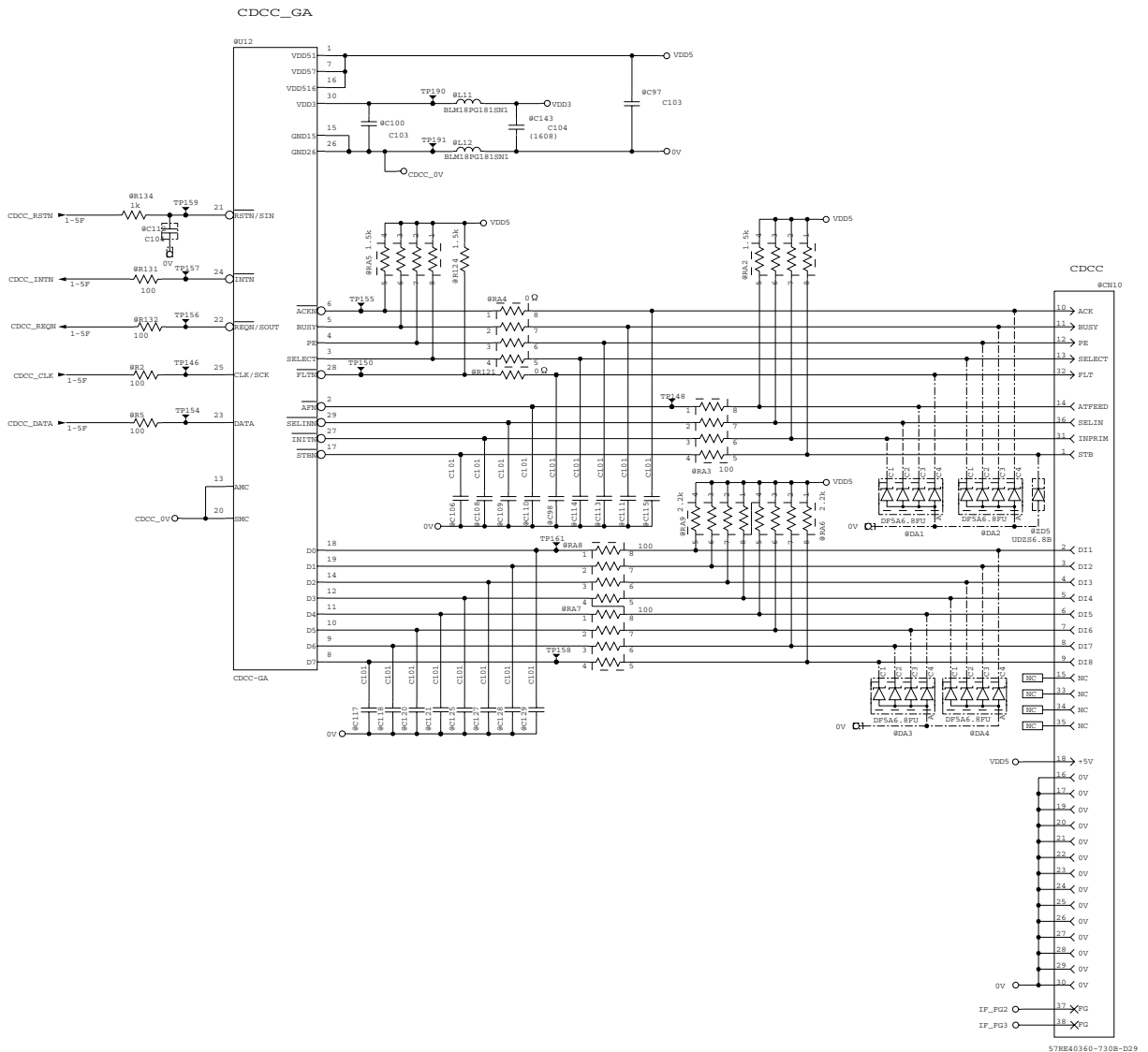


Fig. 3-7

< HL-2070N >

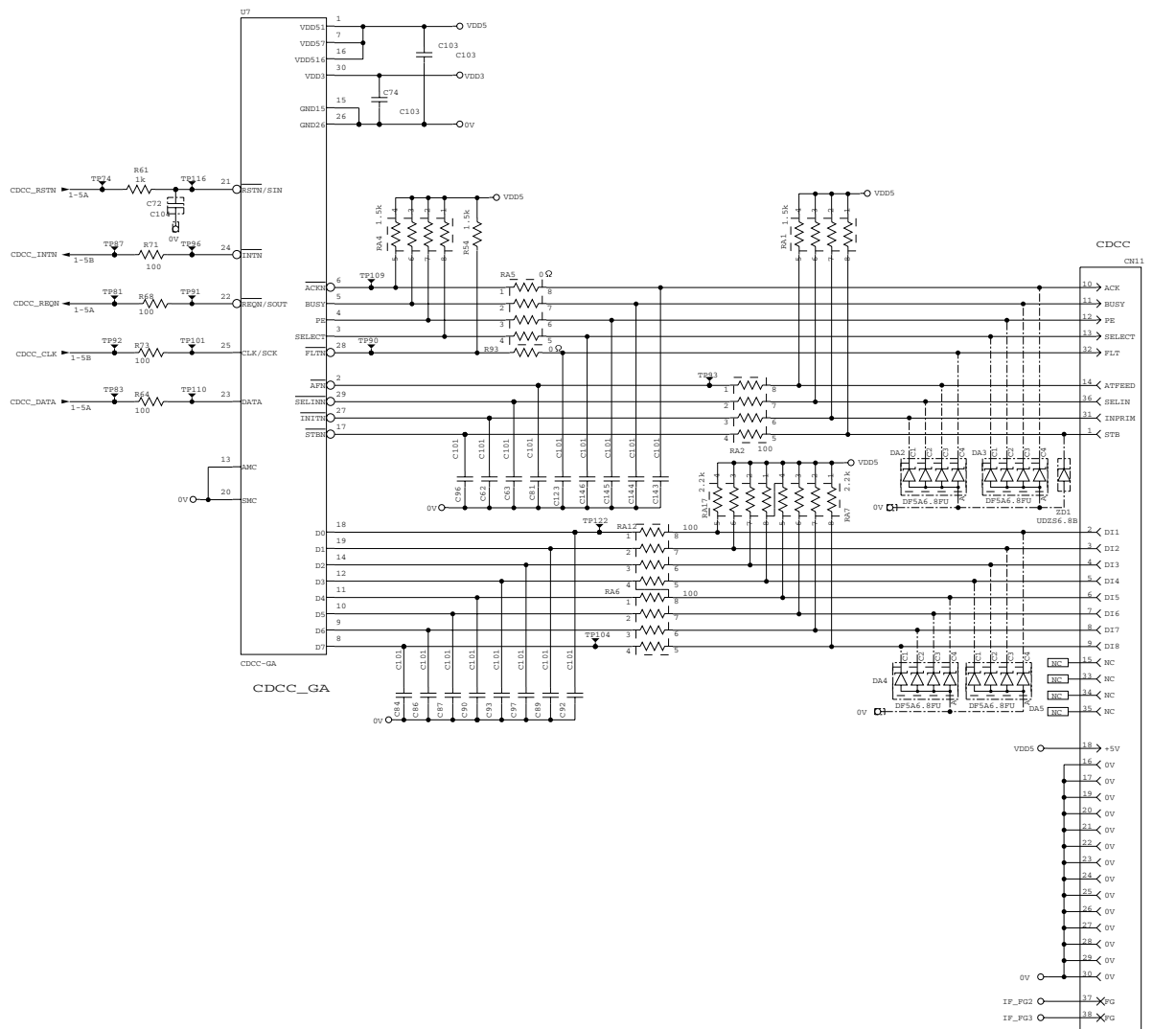


Fig. 3-8

1.3.4 Network interface

It uses the National Semiconductor brand 10 Base-T/100 Base-TX network controller (LAN91C1131-NE). The pulse transformer and the Link/Active LED are built in the RJ-45 connector.

< HL-2070N >

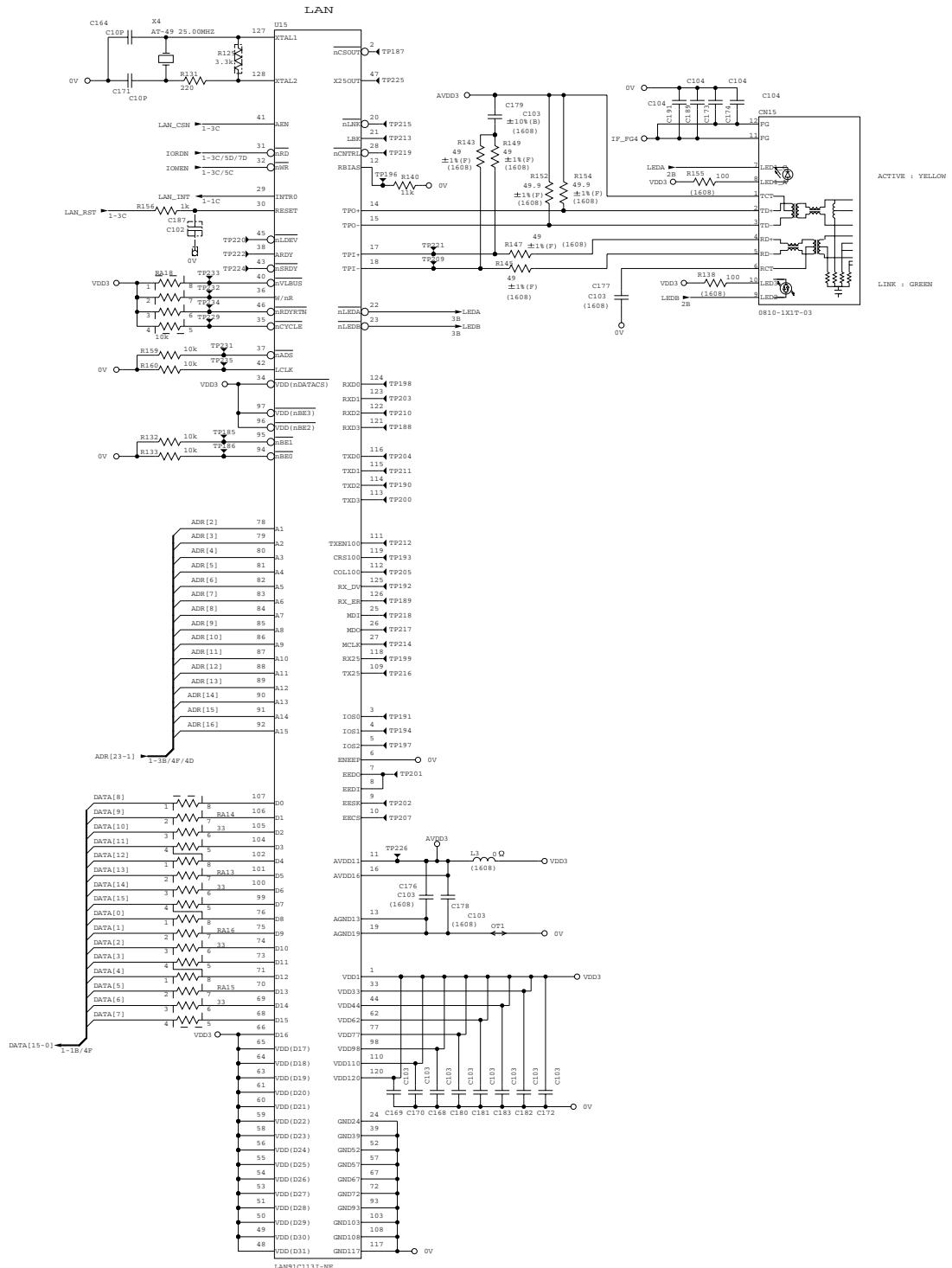


Fig. 3-9

1.3.5 ROM

A 32Mbit ROM (x 16bit) is fitted.
< HL-2030/2040 >

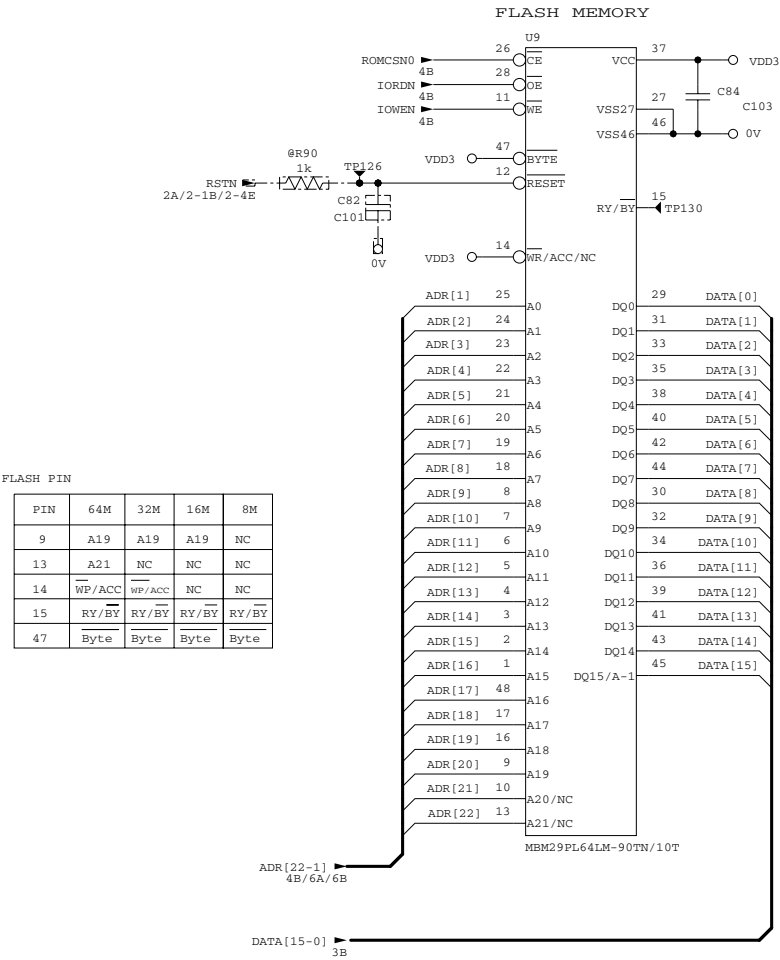


Fig. 3-10

A 64Mbit ROM (x 16bit) is fitted.

< HL-2070N >

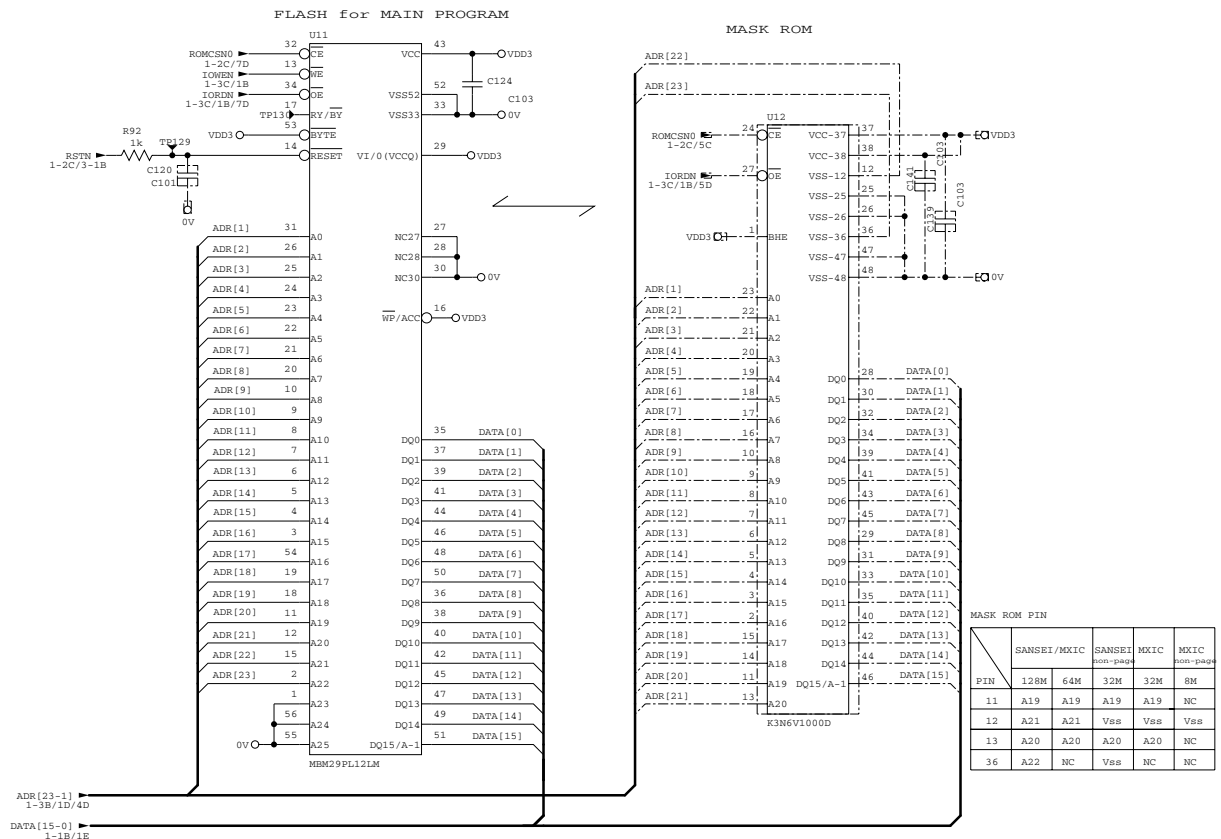


Fig. 3-11

1.3.6 SDRAM

A 64Mbit SDRAM (x 16bit) is used as the RAM.

< HL-2030/2040 >

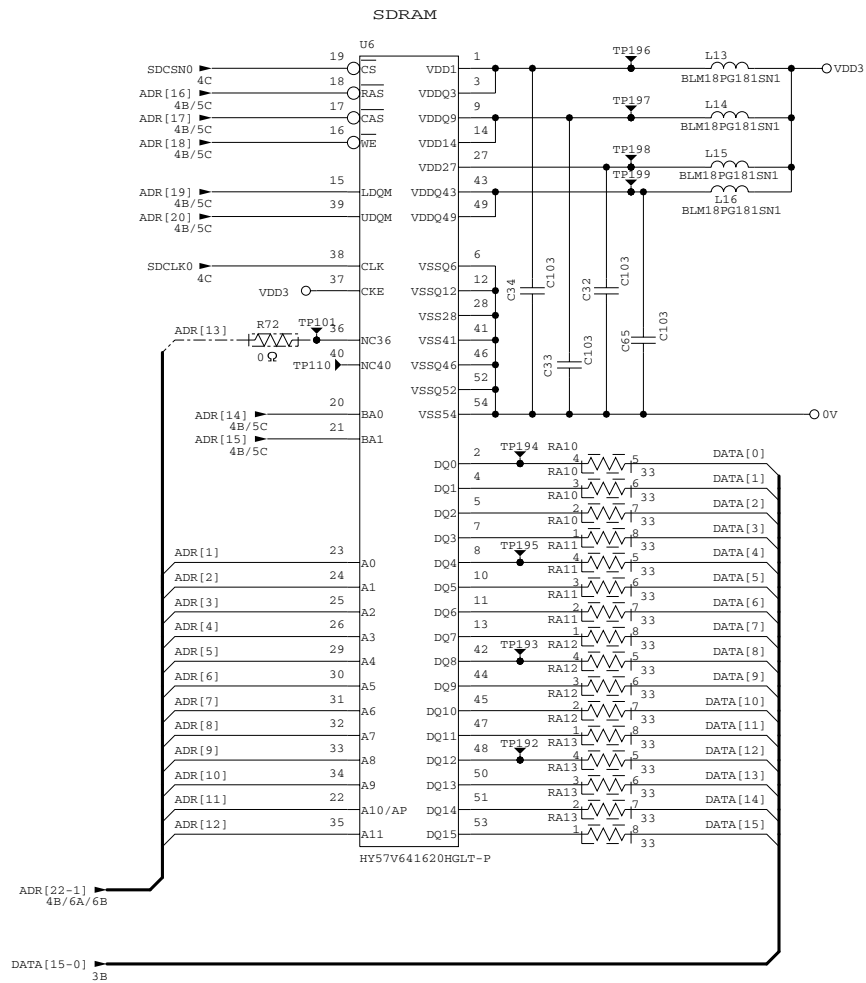


Fig. 3-12

A 128Mbit SDRAM (x 16bit) is used as the RAM.

< HL-2070N >

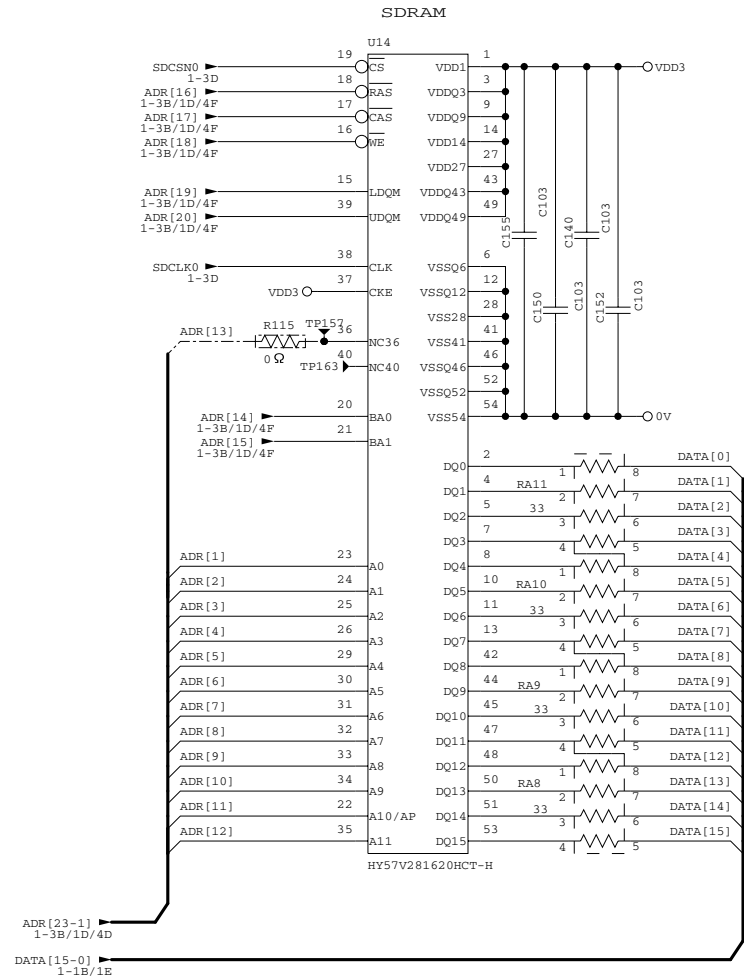


Fig. 3-13

1.3.7 EEPROM

The EEPROM is BR24C04 type of two-wire method with a 512 x 8bit configuration.

< HL-2030/2040 >

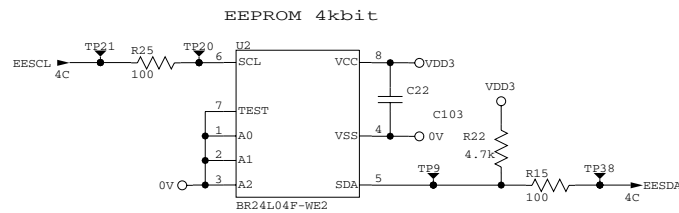


Fig. 3-14

The EEPROM is BR24C64 type of two-wire method with a 4096 x 8bit configuration.

< HL-2070N >

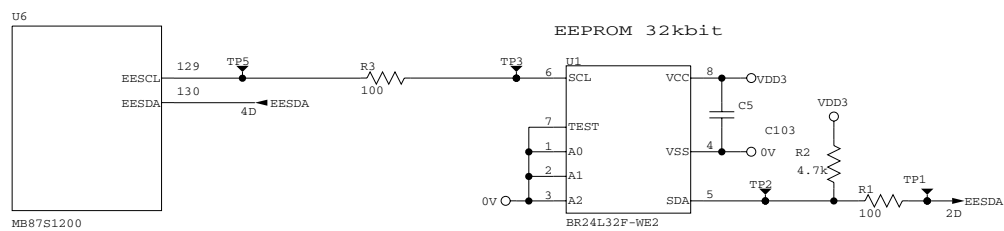


Fig. 3-15

1.3.8 Reset circuit

The reset IC is a S-B0928ALMP. The reset voltage is 2.8V (typ.) and the low period of reset is 22.4ms (typ.)

< HL-2030/2040 >

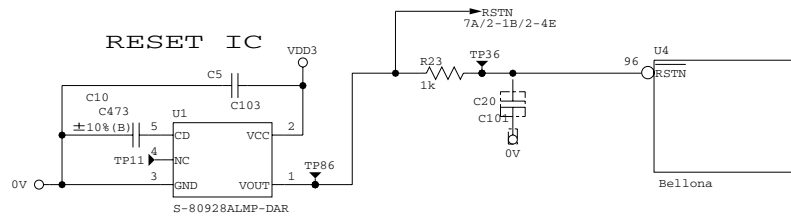


Fig. 3-16

< HL-2070N >

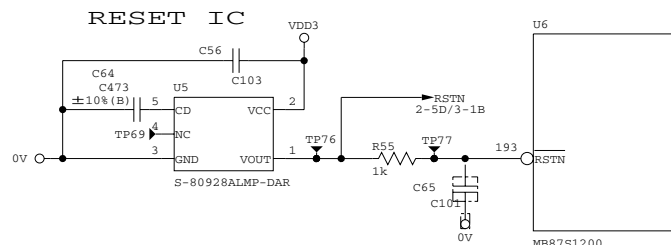


Fig. 3-17

1.3.9 Panel I/O

The interface with the panel board is connected by ASIC.

< HL-2030/2040 >

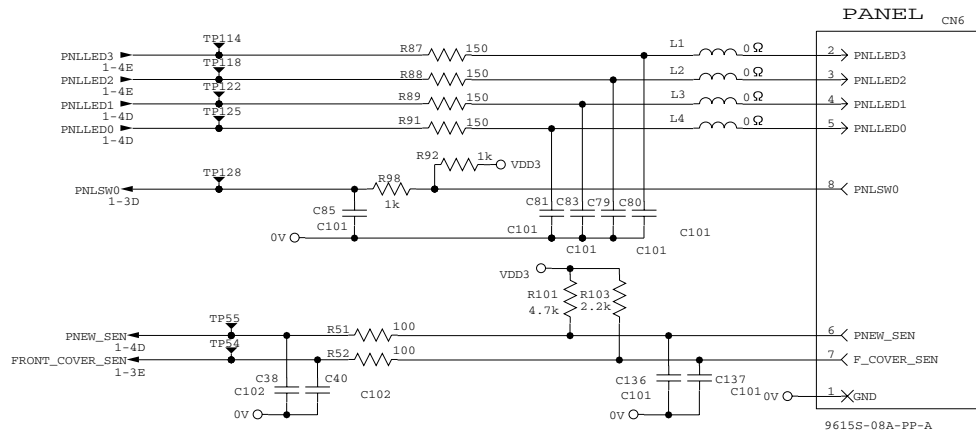


Fig. 3-18

< HL-2070N >

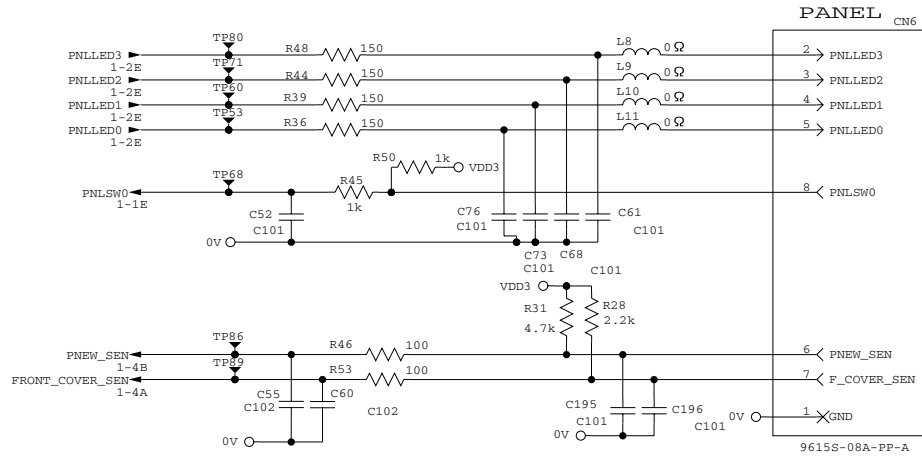


Fig. 3-19

1.3.10 Video I/O

The video signal from ASIC is directly output.

< HL-2030/2040 >

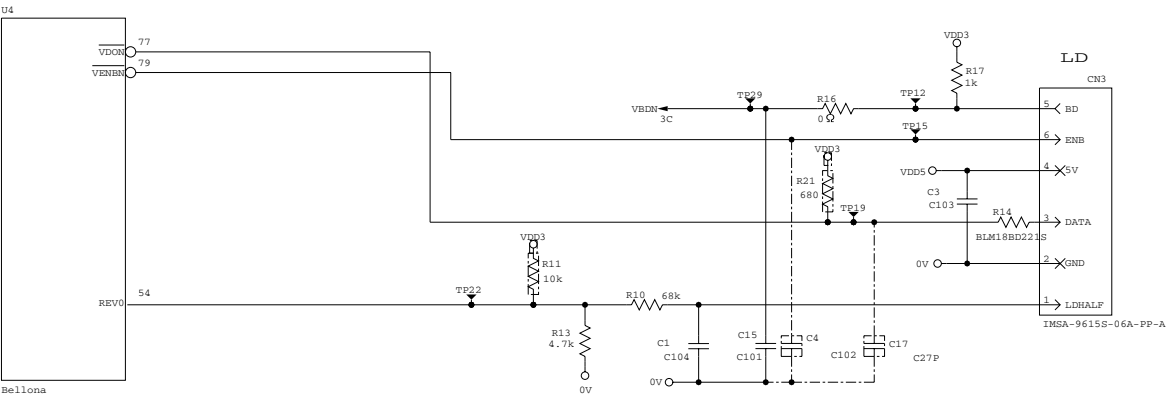


Fig. 3-20

<HL-2070N>

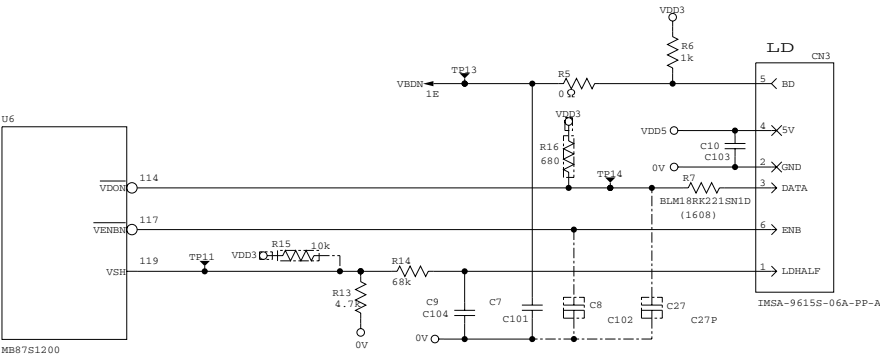


Fig. 3-21

1.3.11 Power supply

+5V is supplied from LVPS. +5V is used by IEEE1284 interface.

In addition, +3.3V is generated by the 3-pin regulator from +5V supplied from the LVPS. +1.9V is used for the CPU within the ASIC and the logic circuit.

24V is used for the motors and solenoids.

<HL-2030/2040>

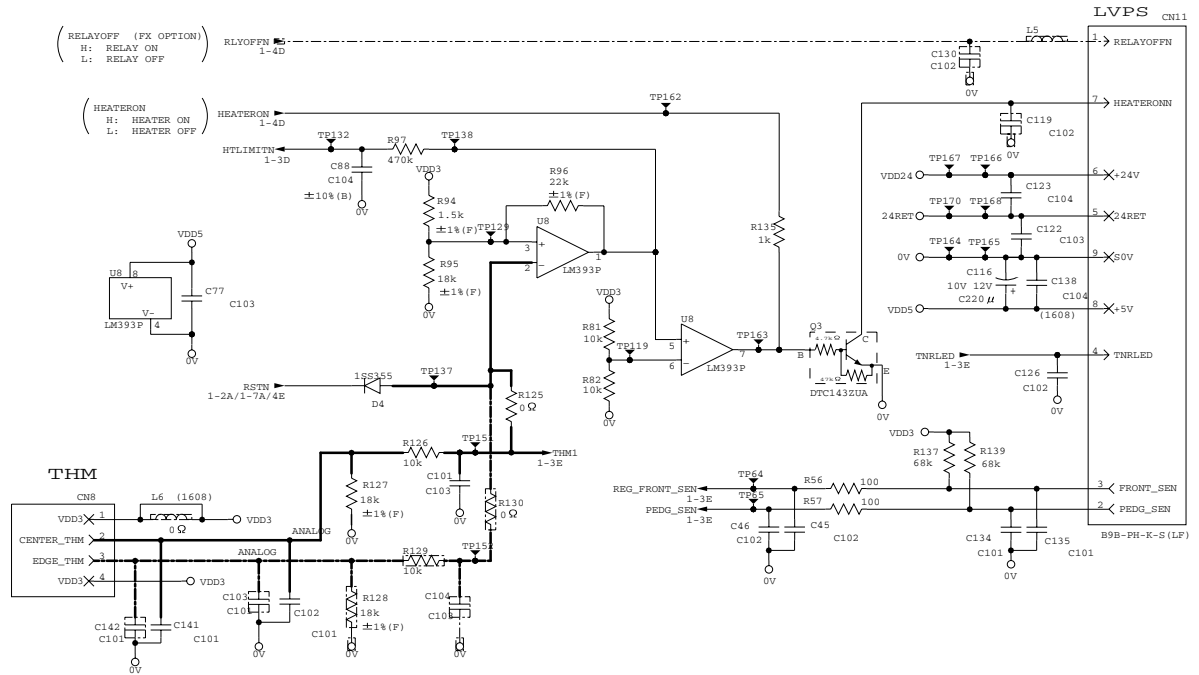


Fig. 3-22

<HL-2070N>

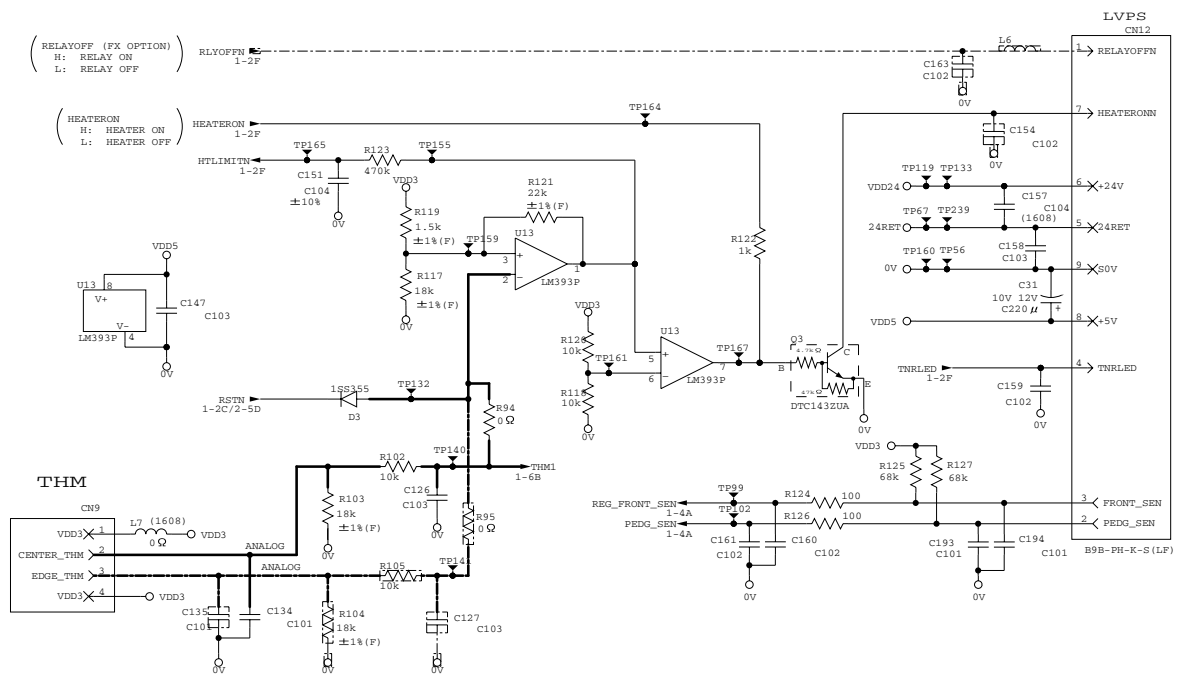


Fig. 3-23

1.4 Power Supply

1.4.1 Low-voltage power supply

The power supply uses a switching regulation system to generate the regulated DC power (+5V and +24V), which are converted from the AC line.

The regulated output and the production code of each power supply are listed below;

Regulated Output	Production Code
+5V / 0.7A	100V: MPW5215
+24V / 1.5A	200V: MPW5115

For the circuit diagram of the low-voltage power supply PCB, see [APPENDIX 8](#) or [9](#). 'LOW-VOLTAGE POWER SUPPLY PCB CIRCUIT DIAGRAM' in this manual.

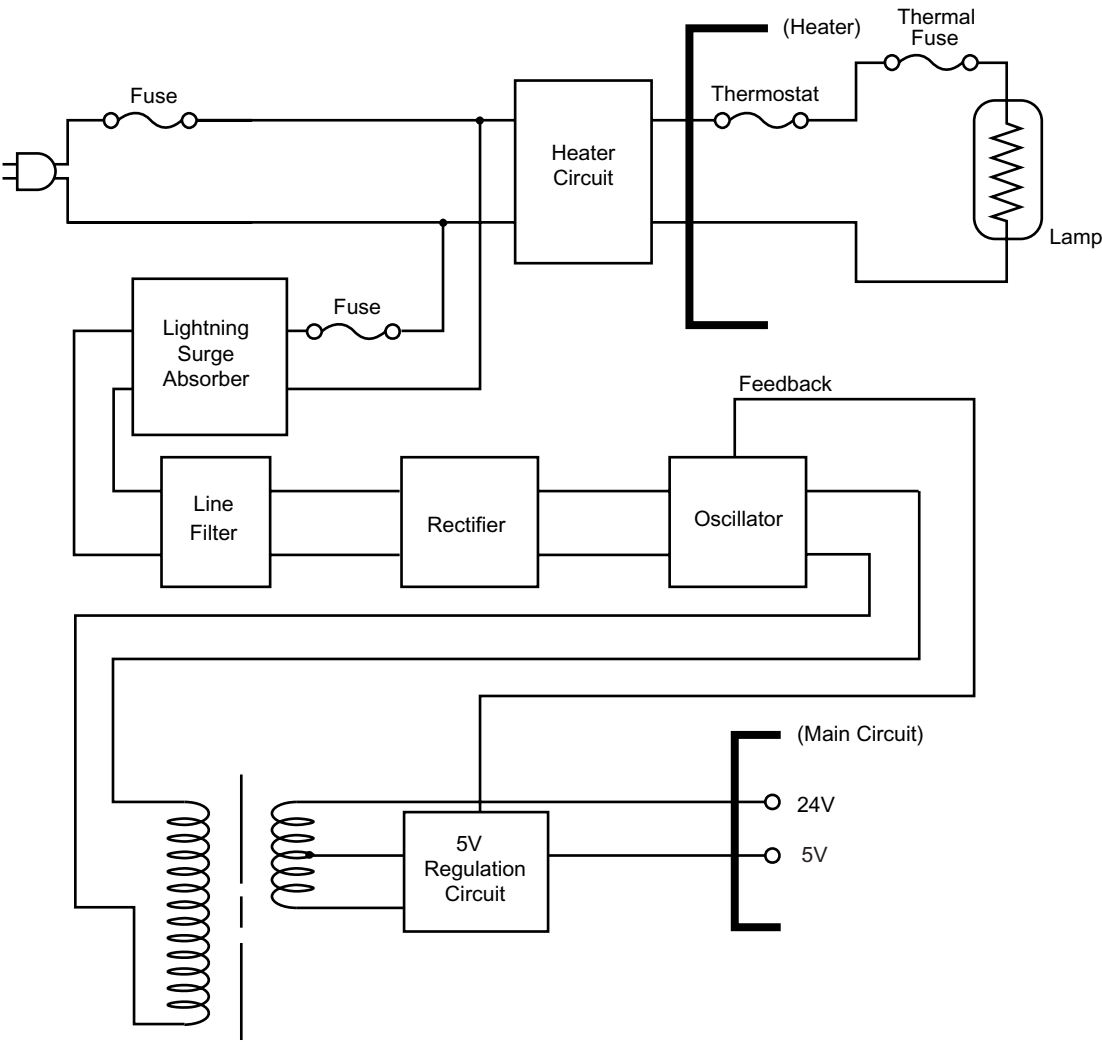


Fig. 3-24

1.4.2 High-voltage power supply

The high-voltage power supply generates and outputs the voltages and currents for the charging, development and transfer functions.

For the circuit diagram of the high-voltage power supply PCB, see [APPENDIX 10. 'HIGH-VOLTAGE POWER SUPPLY PCB CIRCUIT DIAGRAM'](#) in this manual.

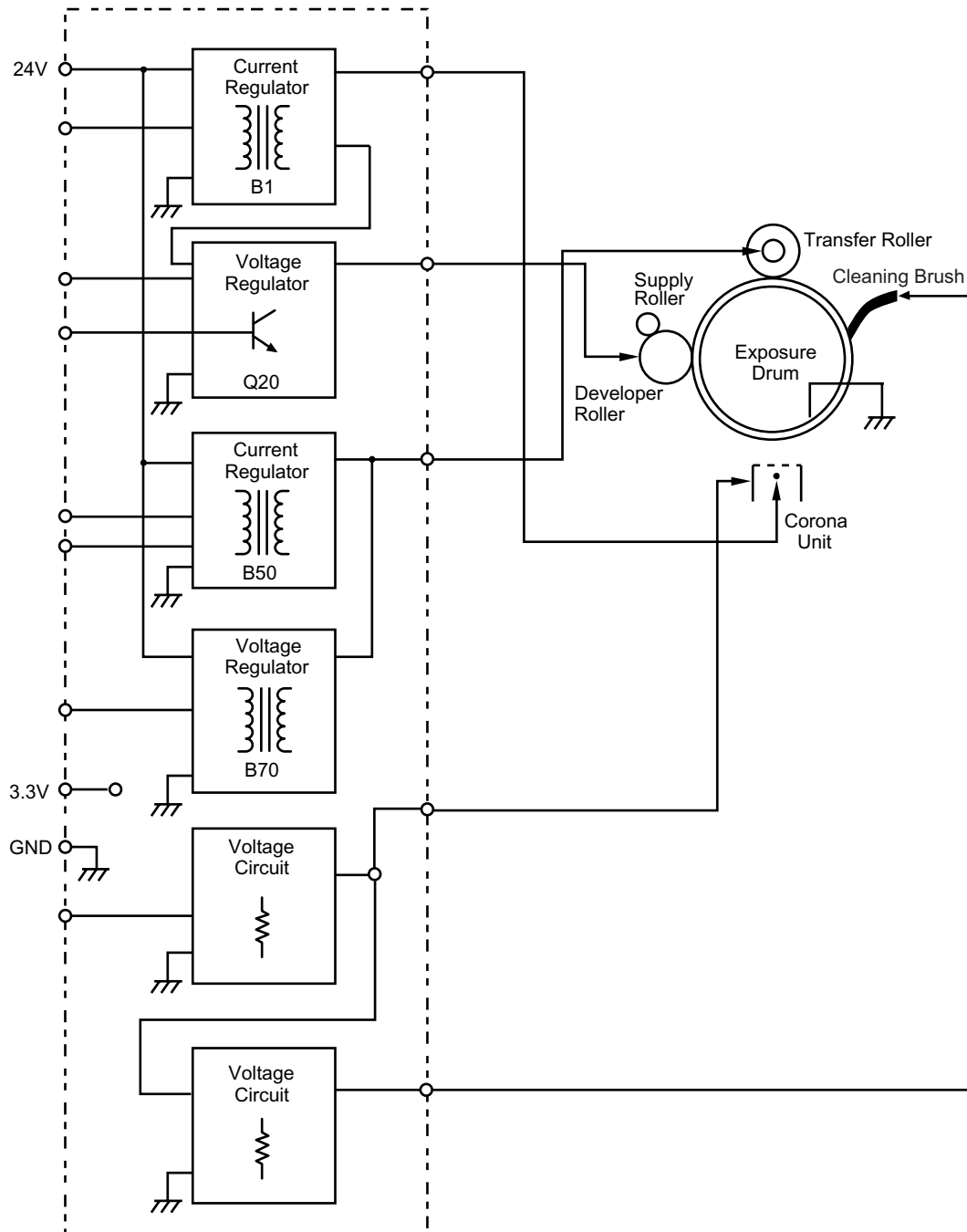


Fig. 3-25

2. MECHANICS

2.1 Overview of Printing Mechanism

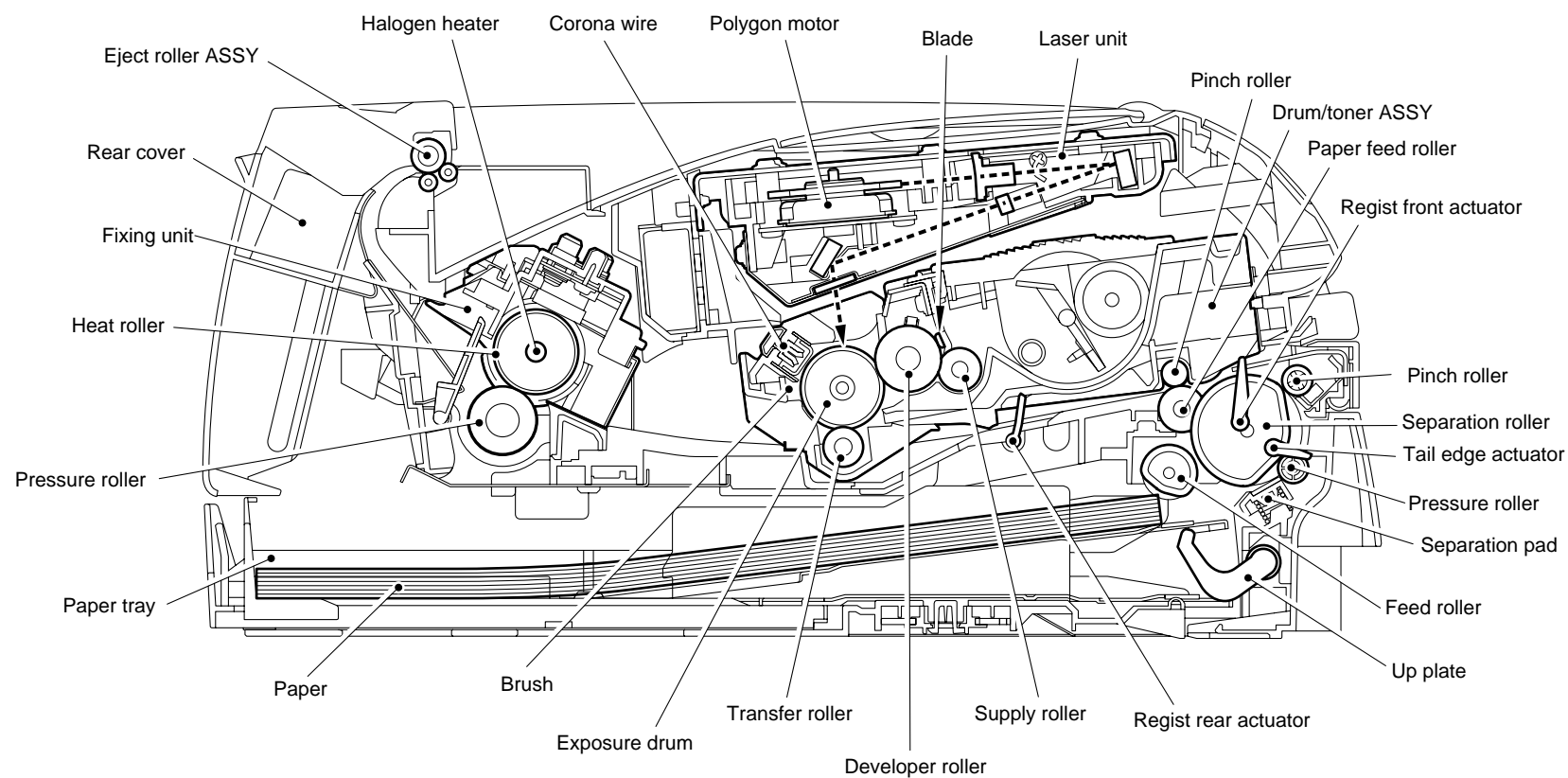


Fig. 3-26

2.2 Paper Transfer

2.2.1 Paper supply

The feed roller picks up a few sheets or one sheet of paper from the paper tray every time it is rotated and feeds it to the separation roller.

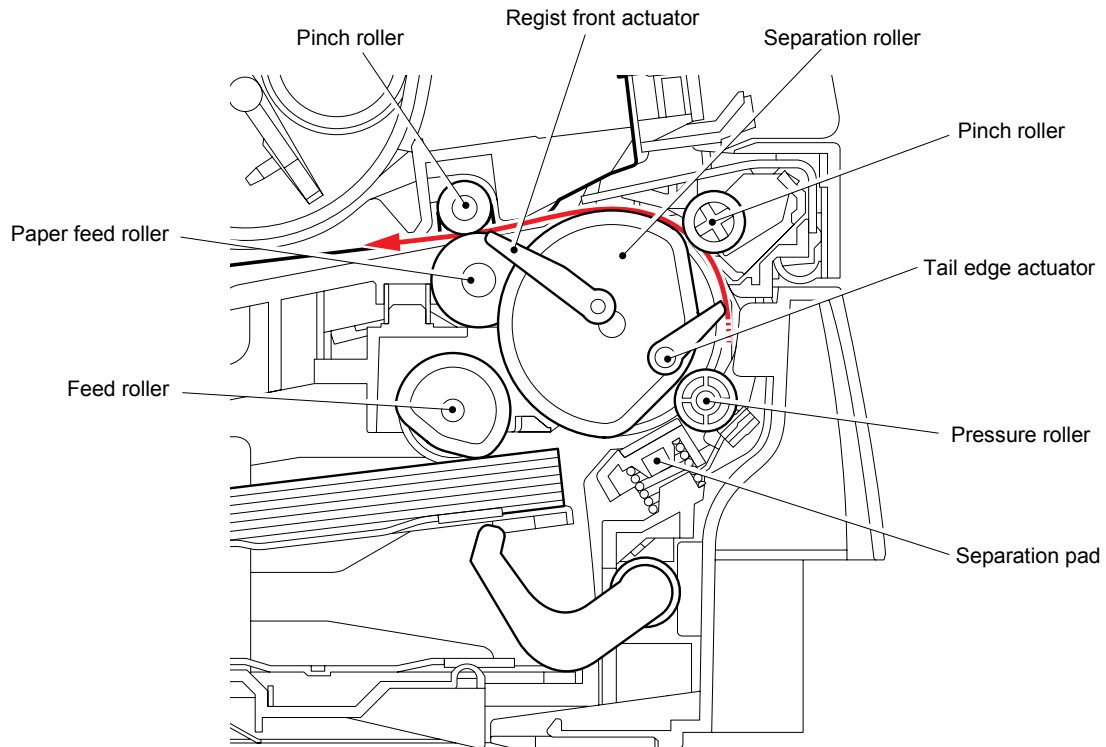
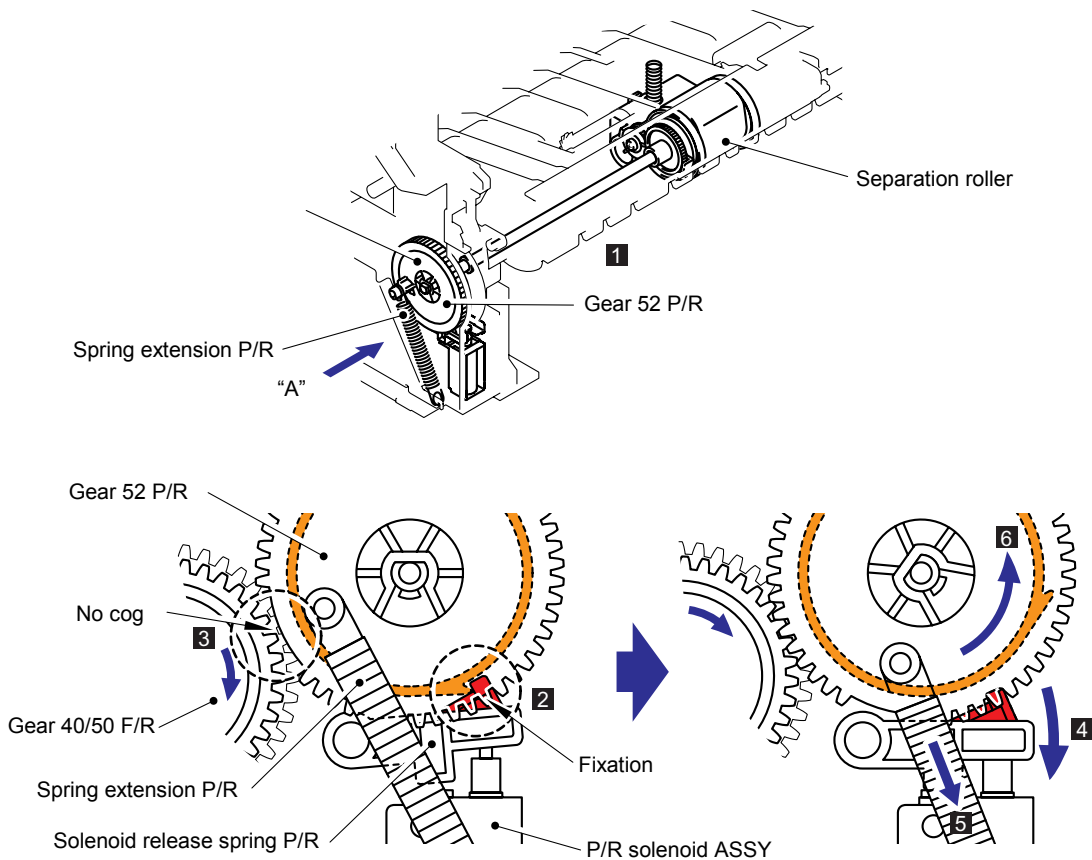


Fig. 3-27

- (1) The paper is gripped between the separation roller and separation pad and separated into individual sheets. The separation roller is connected to the gear 52 P/R.
- (2) The section of the gear 52 P/R, where there is no cog, is normally fixed at the position as shown in the figure below by the P/R solenoid ASSY.
- (3) Therefore, the main motor drive is not transmitted to the gear 52 P/R.
- (4) When the paper is fed, the P/R solenoid ASSY is activated first.
- (5) Then, the gear 52 P/R is pulled by the spring extension P/R so that the gears are engaged.
- (6) The main motor drive is transmitted to the gear 52 P/R, and the separation roller is turned.

The paper drawn out of the paper tray pushes against the regist front actuator, and the paper top position or absence of paper is detected by the actuator movement. The tail edge actuator detects the end of the paper fed.



<"A" arrow view>

Fig. 3-28

2.2.2 Push-up function of paper tray

In order to improve the transfer function of the paper tray, the pressure plate in the paper tray is lifted up by the motor.

- (1) The pressure plate comes down while the paper tray is inserted into the machine. When the main motor rotates, it drives through some gears to actuate the gear 45 arm/FR. The driving force that 45 arm/FR received is to be transferred to gear 13 center P/R, it then drives through some gears to gear 17. The gear 17 actuates the up plate gear of the paper tray to push up the pressure plate.
- (2) When the pressure plate is pushed up, the paper placed on the pressure plate is contacted with the pick up roller holder ASSY so that the pick up roller holder ASSY is pushed up.
- (3) When the pick up roller holder ASSY is pushed up more, one end of the link lever assembled on the pick up roller holder ASSY is pushed up. Since the center of the link lever is held as a fulcrum, the other end of the link lever comes down.
- (4) The other end of the link lever is contacted with the hook B and hook C so that the hook B is pushed down when the link lever comes down.
- (5) When the hook B is pushed down, the catch of the hook B is released from the lock of the sector cam.
- (6) The sector cam is rotated by approximately three quarters when the catch of the hook B is released.
- (7) Then, the sector cam is stopped rotating by the catch of the hook C. (The hook B and hook C is connected with the spring. When the hook B is pushed down, the hook C is also pushed down, and the catch of the hook C is released from the lock of the sector cam.)
- (8) When the sector cam is fixed at the position of the catch of the hook C, the hook A is lifted up by the sector cam.
- (9) The inside gear of the gear 13 center P/R, which has been fixed, is released.
- (10) When the inside gear of the gear 13 center P/R is released, the central gear of the gear 13 center P/R is stopped rotating. Then, the gear pushing up the pressure plate in the paper tray is stopped so that the pressure plate is stopped lifting up.

The gear 13 center P/R consists of the three gears, and power of the main motor is added onto the outside gear. When the inside gear is fixed while the main motor power being added, the central gear is started rotating. When the fixed inside gear is released, the central gear is stopped, and the inside gear is rotated.

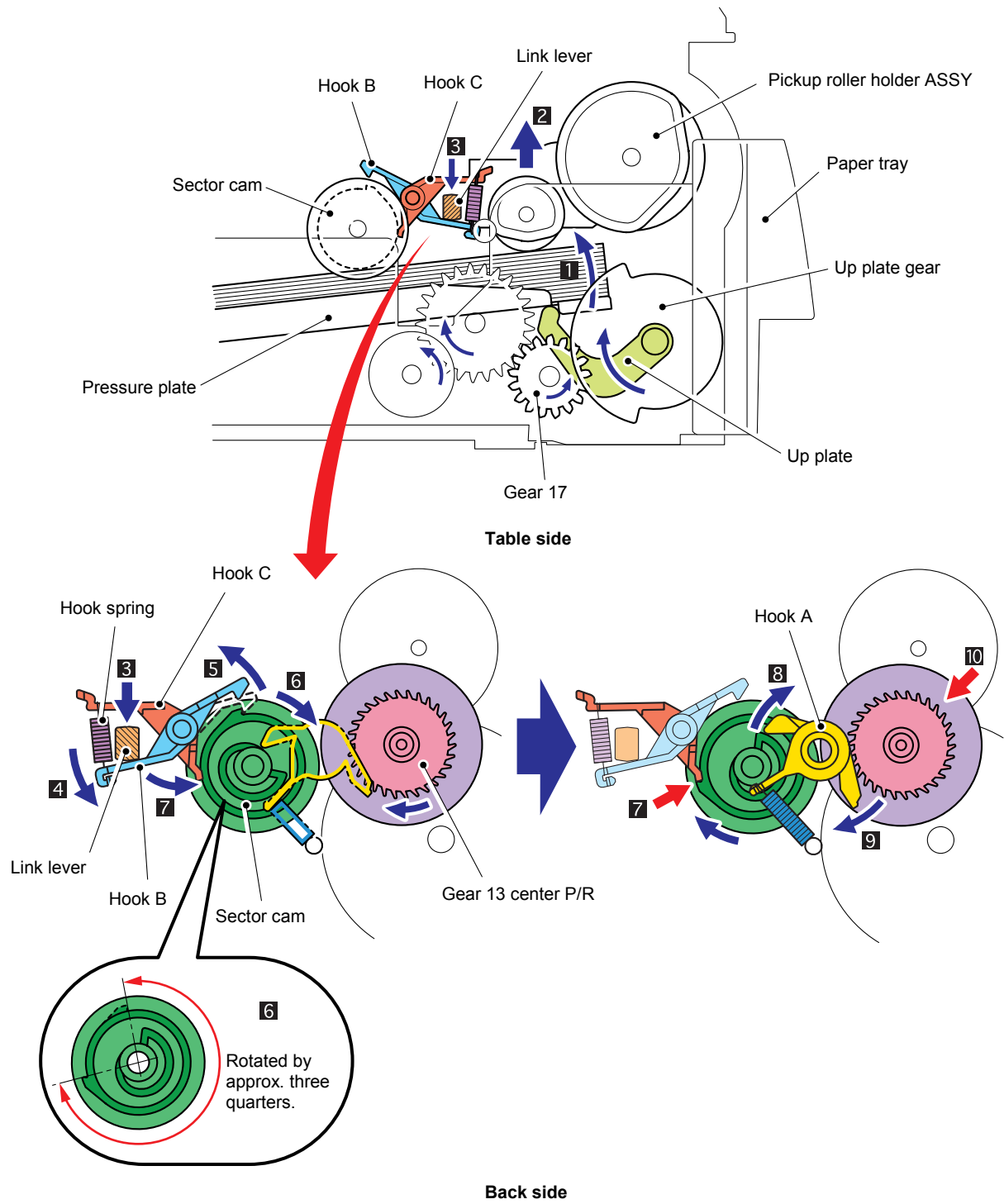


Fig. 3-29

2.2.3 Paper registration

After the paper top position is detected by the regist front actuator, the paper, separated into individual sheets by the separation roller, is fed further for a specified time, and the paper top position reaches the paper feed roller so that the paper skew is adjusted. Then, the F/R solenoid is turned off, the paper feed roller starts turning, and the paper is fed to the transfer roller in the drum/toner ASSY.

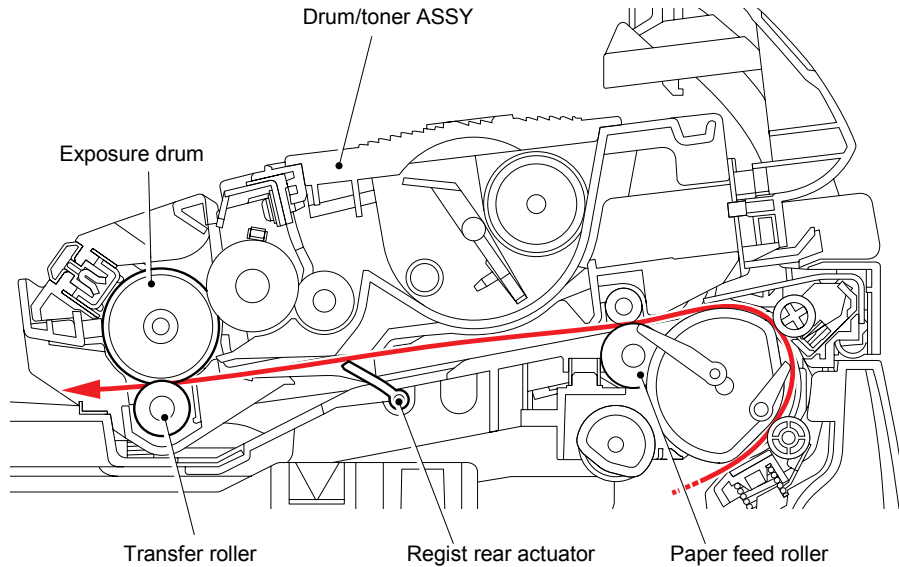


Fig. 3-30

The regist rear actuator in the path from the feed roller to the transfer roller controls the first print position on the paper. The printer starts transferring an image when a definite time passes after the paper is passed through the regist rear actuator.

2.2.4 Paper eject

After the printing image on the exposure drum is transferred onto the paper, the paper is fed to the fixing unit to fix unfixed toner onto the paper by the heat roller and the pressure roller in the fixing unit.

Afterwards, the paper is ejected from the fixing unit. The paper eject actuator detects whether the paper is ejected correctly or not.

After the paper exits from the heat roller, the paper is turned by the rear cover and ejected face down into the top output tray through the eject roller ASSY.

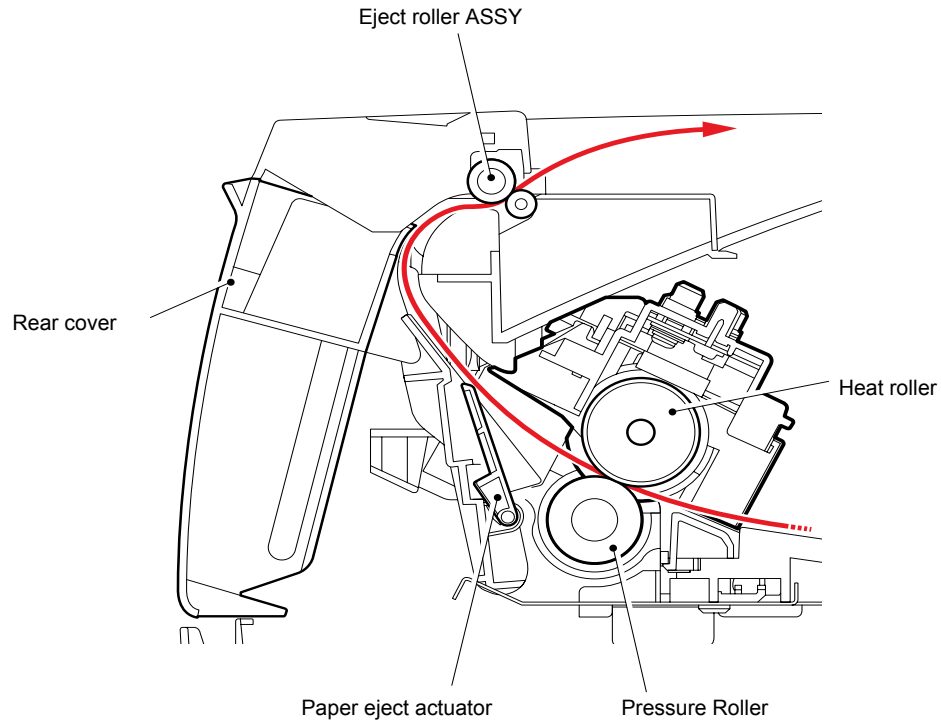


Fig. 3-31

2.3 Drum Unit

2.3.1 Exposure drum

Generates the latent electrostatic image and develops the image on the drum surface.

2.3.2 Primary charger

Forms a uniform charge on the drum surface.

- (1) Corona wire
Generates the ion charge on the drum.
- (2) Grid
Spreads the ion charge evenly over the drum surface.

2.3.3 Transfer roller

Transfers the toner image to the paper from the drum surface.

2.3.4 Cleaner

Removes the paper dust or dirt on the surface of the exposure drum.

2.4 Toner Cartridge

Develops the electrostatic latent image on the exposure drum with toner and forms the visible image.

2.4.1 Toner life end mode

The life of the toner cartridge is starter: 1,500, standard: 2,500 pages at the 5% coverage. In the case of low- duty printing, "Toner Life End" is indicated by lighting **Toner** LED before toner runs out because the developer roller surface or other toner sealing is worn out due to rotation of the rollers. The upper limit of the drum rotation is 45,000 = 3000 sheets x 15 rotations.

The following graph shows the number of printable pages in the case of A4 printing.

HL-2030/2040/2070N (Standard toner)

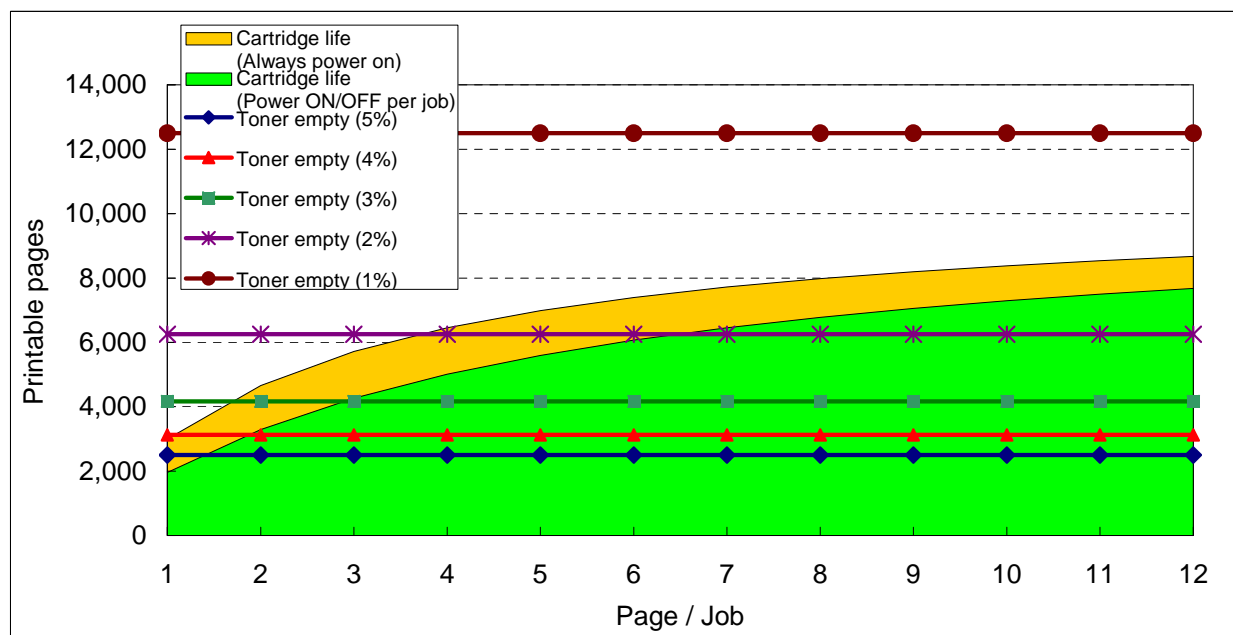
Page/job	1	2	3	4	5	6	7	8	9	10	11	12
Cartridge life (Always power on)	3,000	4,663	5,720	6,452	6,988	7,397	7,721	7,982	8,198	8,380	8,534	8,668
Cartridge life (Power ON/OFF per job)	1,957	3,297	4,272	5,014	5,597	6,067	6,455	6,780	7,056	7,293	7,500	7,681
Toner empty (5%)	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
Toner empty (4%)	3,125	3,125	3,125	3,125	3,125	3,125	3,125	3,125	3,125	3,125	3,125	3,125
Toner empty (3%)	4,167	4,167	4,167	4,167	4,167	4,167	4,167	4,167	4,167	4,167	4,167	4,167
Toner empty (2%)	6,250	6,250	6,250	6,250	6,250	6,250	6,250	6,250	6,250	6,250	6,250	6,250
Toner empty (1%)	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500

$$\text{Cartridge life} = 15a \times 3000 / (4.3 \times (a - 1) + 15)$$

a : Page / job

$$\text{Cartridge life+ON/OFF} = 15a \times 3000 / (4.3 \times (a - 1) + 15 + 8)$$

$$\text{Cartridge life (Mechanical limit)} : 3000 \text{ (1page / job)}$$



2.4.2 New toner detection mechanism

The printer detects the amount of the remaining toner with the sensor and indicates the timing to replace the toner cartridge by lighting up the **Toner** LED to the user. The problem such as toner leak or image defect may occur when low-duty printing is continued for a long time. To prevent such a problem, the printer provides the function lighting up the **Toner** LED when the toner is used to a certain degree to indicate it to the user.

When replacing the toner cartridge with a new one, the printer detects that the toner cartridge is replaced with a new one by the new toner detection switch and cancels that the **Toner** LED lights up.

The mechanism to detect the new toner cartridge is as follows:

- (1) A new toner cartridge is installed into the drum unit, and the drum unit is installed into the printer.
- (2) The reset gear of the toner cartridge is contacted with the new toner actuator to push the new toner actuator.
- (3) Then, the new toner actuator pushes the new toner detection switch so that it is detected that a new toner cartridge is installed.
- (4) When the toner cartridge is installed into the printer, the reset gear is rotated gradually by the main motor drive and moved to the position of "Toner in use".

When the reset gear is moved to the position of "Toner in use", the new toner actuator is pulled back by the new toner actuator spring and returned to the original position. When the reset gear is at the position of "Toner in use", the reset gear is not returned to the original position since the reset gear and drive gear of the main motor are not engaged, and the reset gear is not rotated.

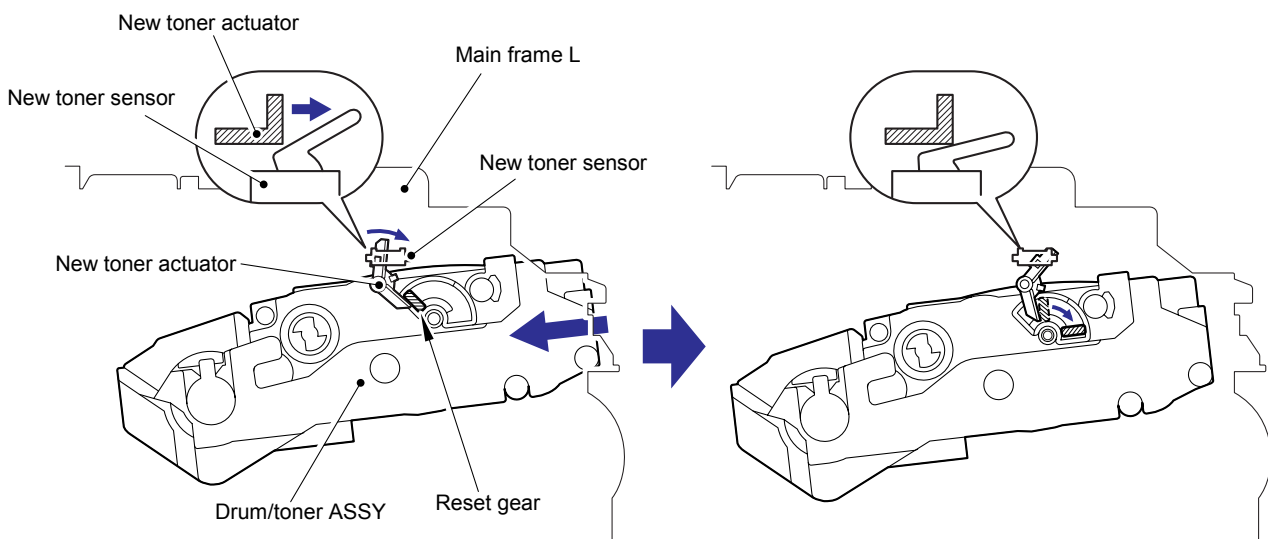
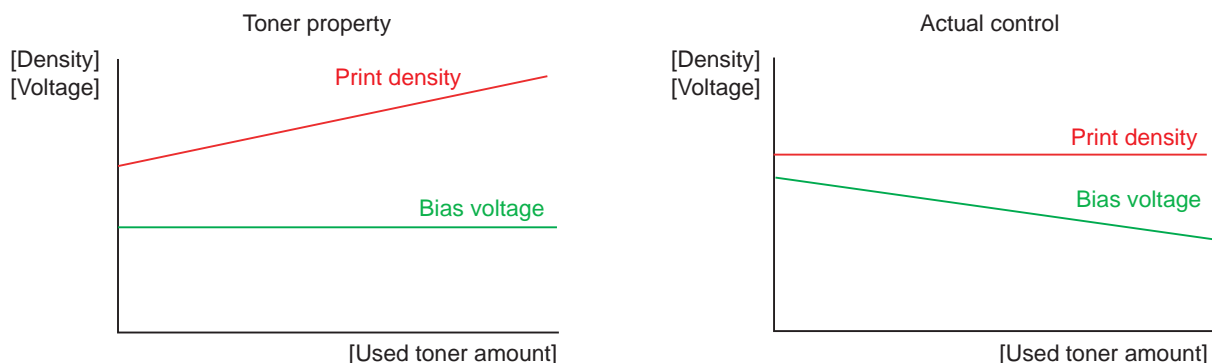


Fig. 3-32

When the new toner detection switch detects that the toner cartridge is replaced with a new one, the developing bias voltage is initialized at the same time.

The toner used for the printer has a property that print density is light first and gradually darker in the course of usage. The developing bias controls the toner property so that the print density is constant from first to last.



To always obtain a print result of a constant density, the printer counts the number of print pages immediately after the toner cartridge is replaced and changes the bias voltage according to the accumulated number of prints with the toner cartridge.

The bias voltage is changed with the steps described below:

- (1) When the new toner sensor detects that the toner cartridge is replaced with a new (full) one, the developing bias is set to 450V (initialized).
- (2) After that, the bias voltage is stepped down according to the number of prints.

2.4.3 Counter reset during indication of “Toner Life End”

The counter resetting method during indication of “Toner Life End” depends on the cause of toner life end and the condition of the inserted toner cartridge. Refer to the following table for details.

	Toner Life End (Toner empty)	Toner Life End (Developer count full)
When a used toner is inserted (Reset gear is at the position of in use.)	Toner exchange count: +0 Page counter of each toner: Continued Coverage of each toner: Continued Development bias: Reset (Default)	Not used.
When a new toner is inserted (Reset gear is at the position of factory set.)	Toner exchange count: +1 Page counter of each toner: Reset (0) Coverage of each toner: Reset (0) Development bias: Reset (Default)	

2.5 Print Process

2.5.1 Charging

The drum is charged to approximately 897V by an ion charge which is generated by the primary charger. The charge is generated by ionization of the corona wire, which has a DC bias from the high-voltage power supply applied to it. The flow of the ion charge is controlled by the grid to ensure it is distributed evenly on the drum surface. The aluminum drum sleeve in the exposure drum is grounded.

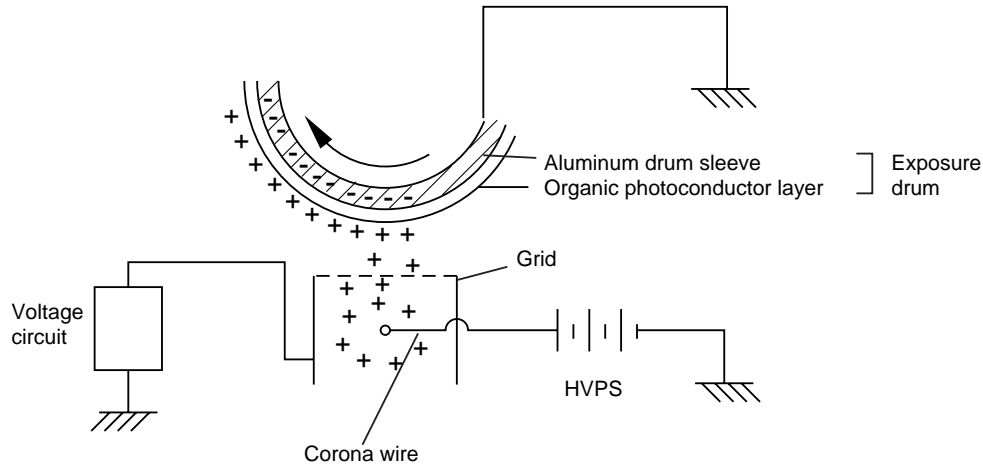


Fig. 3-33

The primary charge uses a corona wire, but since the drum is positively charged, only less than 1/10 of the usual quantity of ozone is generated compared with the negatively charged drum. The level of ozone expelled from the printer is therefore not harmful to the human body. Applicable safety standards have been complied with.

2.5.2 Exposure stage

After the drum is positively charged, it is exposed to the light emitted from the laser unit.

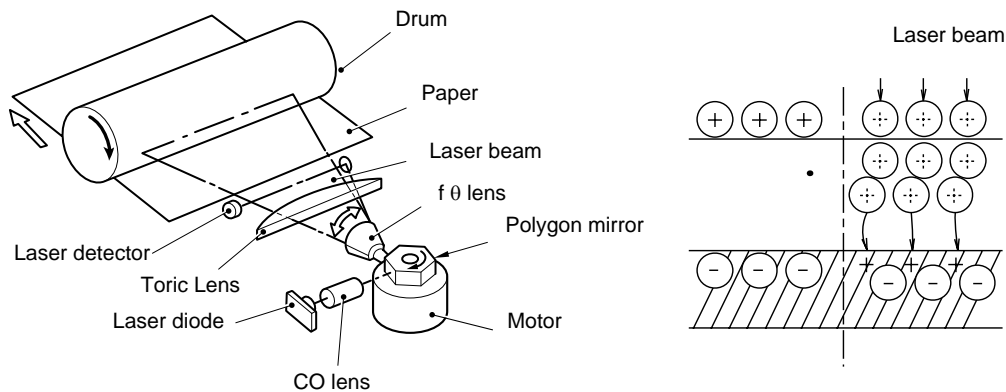


Fig. 3-34

< Laser exposure unit >

1. The laser beam radiated from a laser diode inside the laser unit are concentrated into a constant width by a slit in the CO lens cell and then reflected by a polygon mirror rotating at high speed.
2. The laser beam reflected by the polygon mirror are refracted by the theta lens and radiated from the right through to the left end of the reflection mirror as the polygon mirror rotates. At this time, blur of the vertical direction of the laser beam by inclination of a polygon mirror is corrected by passing a Toric lens.

3. The laser beams reflected by the reflection mirror go straight toward the exposure drum below it, then expose the exposure drum.

The area exposed to the laser beam is the image to be printed. The surface potential of the exposed area is reduced, forming the electrostatic image to be printed.

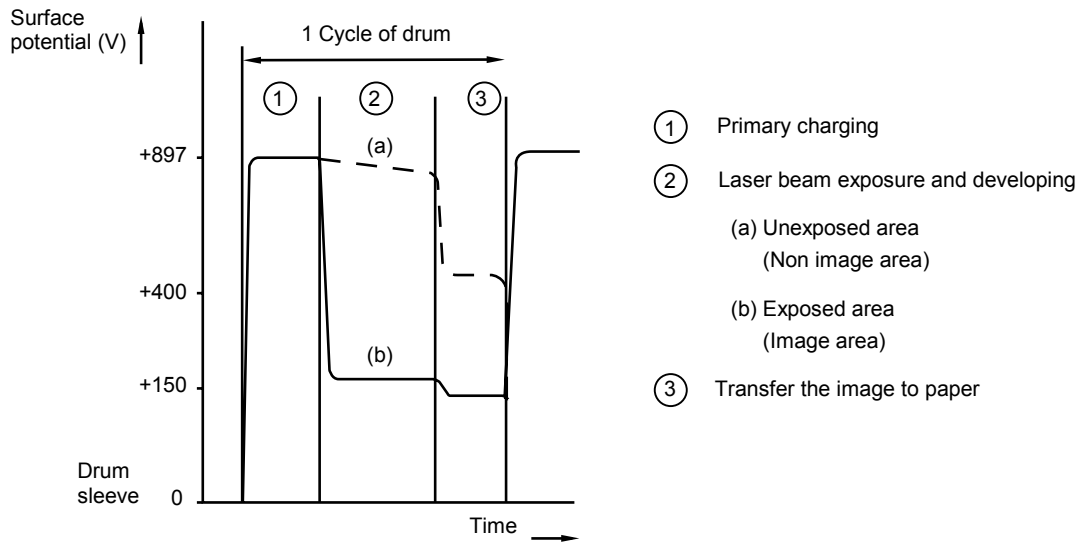


Fig. 3-35

2.5.3 Developing

Developing causes the toner to be attracted to the electrostatic image on the drum so as to transform it into a visible image.

The developer consists of a non-magnetic toner. The developer roller is made of conductive rubber and the supply roller (which is also made of conductive sponge) rotate against each other. The toner is charged and carried from the supply roller to the developer roller. The toner adheres to the developer roller and is conveyed to the exposure drum at an even thickness controlled by the blade. The toner is nipped between the developer roller and the drum and developed onto the latent image on the drum. The electrostatic field between the drum and the developer roller, which is DC-biased from the high-voltage power supply, creates the electrostatic potential to attract toner particles from the developer roller to the latent image area on the drum surface.

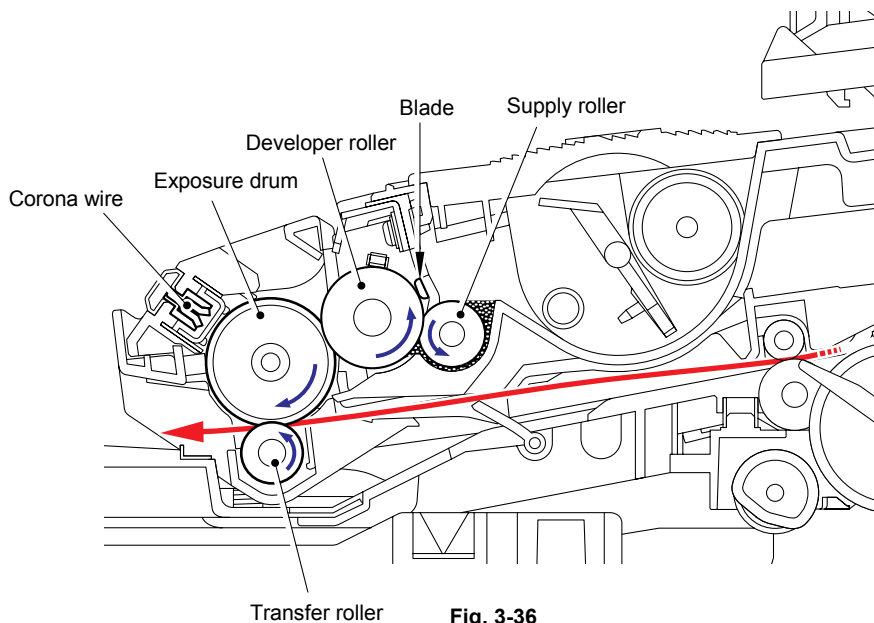


Fig. 3-36

2.5.4 Transfer

(1) Transfer process

After the drum has been charged and exposed, and has received a developed image, the toner formed is transferred onto the paper by applying a negative charge to the back of the paper. The negative charge applied to the paper causes the positively charged toner to leave the drum, and adhere to the paper. As a result, the image is visible on the paper.

(2) Cleaning process of transfer roller

If the toner is not transferred onto the paper perfectly it is possible that there may be residual toner on the drum which will adhere to the transfer roller. The transfer roller voltage changes to a positive voltage during non-printing rotation of the drum. Therefore the transfer roller is cleaned by returning the positively charged toner adhering to the transfer roller onto the exposure drum.

2.5.5 Fixing stage

The image transferred to the paper by static electricity is fixed by heat and pressure when passing through the heat roller and the pressure roller in the fixing unit. The thermistor keeps the surface temperature of the heat roller constant by detecting the surface temperature of the heat roller and turning on or off the halogen heater lamp.

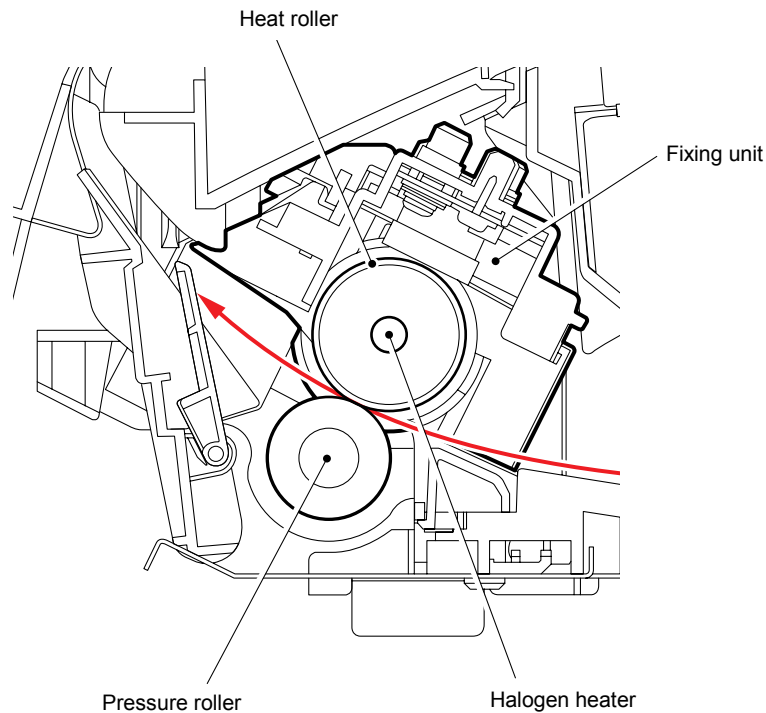


Fig. 3-37

2.6 Sensors

Sensor name	Type	Located on
Cover sensor	Mechanical switch	Main frame L
Toner LED PCB (Light emission)	Photo sensor	Main frame R
Toner sensor PCB (Light reception)	Photo sensor	Main frame L
Paper eject sensor	Photo sensor	Main PCB
Regist front sensor	Photo sensor	Regist sensor PCB
Regist rear sensor	Photo sensor	High-voltage PS PCB
Tail edge sensor	Photo sensor	Regist sensor PCB
New toner sensor	Mechanical switch	Main frame L

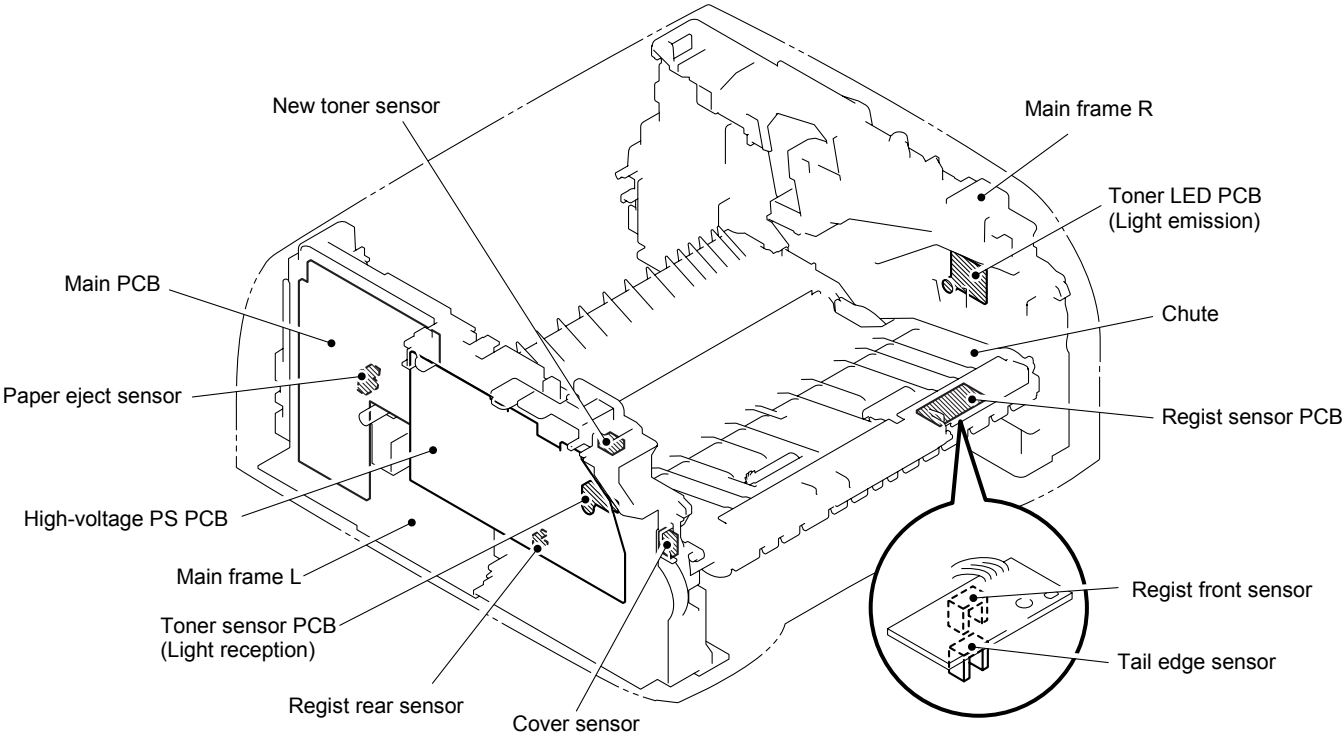


Fig. 3-38

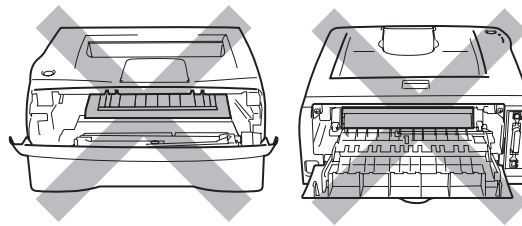
CHAPTER 4 DISASSEMBLY AND RE-ASSEMBLY

1. SAFETY PRECAUTIONS

To avoid creating secondary problems by mishandling, follow the warnings and precautions below during maintenance work.

WARNING

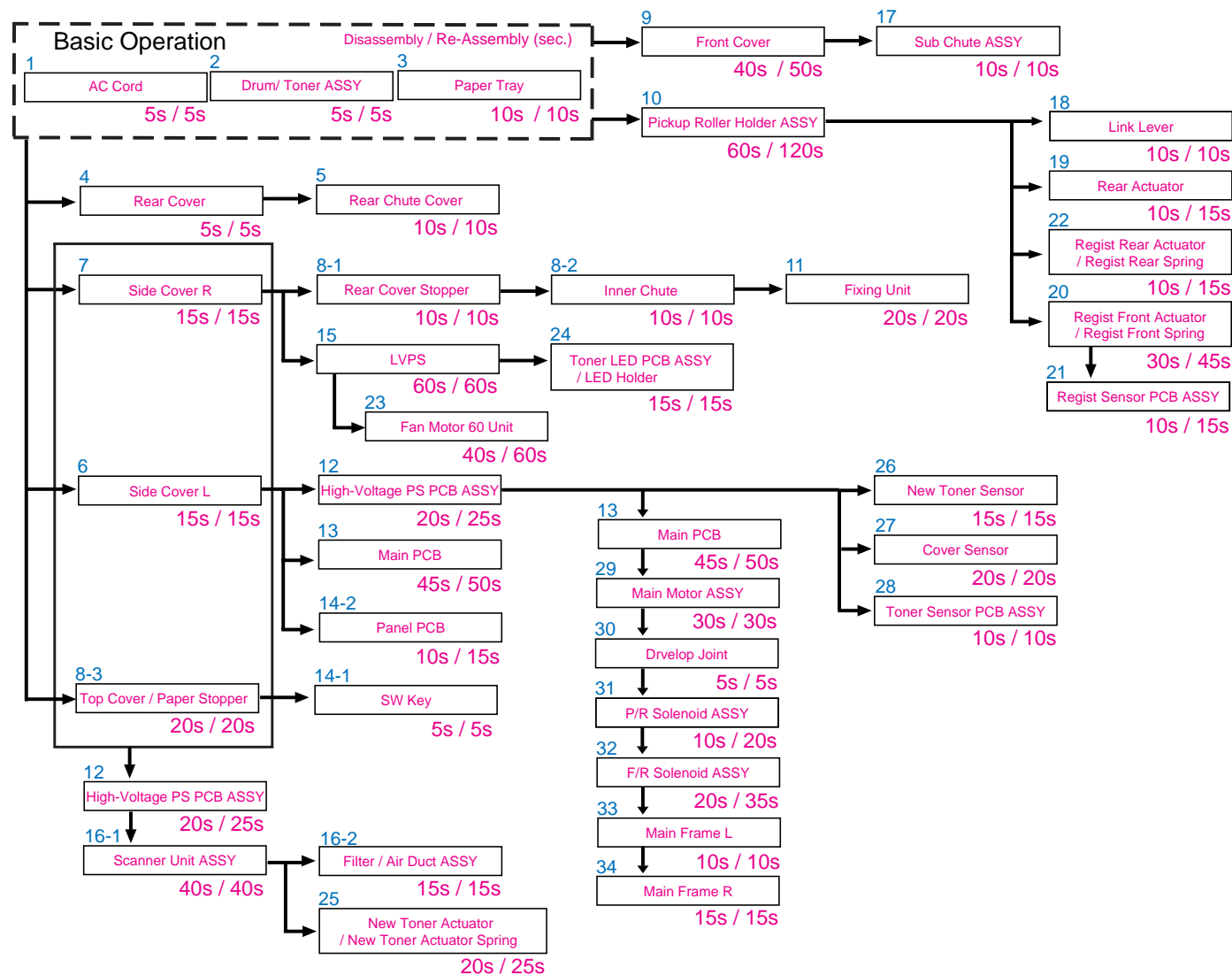
- **Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the printer.**
- **Some parts inside the printer are extremely hot immediately after the printer is used. When opening the front cover or rear cover to access any parts inside the printer, never touch the red colored parts shown in the following figures.**



CAUTION:

- (1) Be careful not to lose screws, washers, or other parts removed.
- (2) Be sure to apply grease to the gears and applicable positions specified in this chapter.
- (3) When using soldering irons or other heat-generating tools, take care not to accidentally damage parts such as wires, PCBs and covers.
- (4) Before handling any PCBs, touch a metal portion of the equipment to discharge any static electricity charge on your body, or the electronic parts or components may be damaged.
- (5) When transporting PCBs, be sure to wrap them in the correct protective packaging.
- (6) Be sure to replace self-tapping screws correctly, if removed. Unless otherwise specified, tighten screws to the following torque values.
 - TAPTITE, BIND or CUP B
 - M3: 0.5N • m
 - M4: 0.8N • m
 - TAPTITE, CUP S
 - M3: 0.8N • m
- (7) When connecting or disconnecting cable connectors, hold the connector body, not the cables. If the connector has a lock, release the connector lock first to release it.
- (8) After a repair, check not only the repaired portion but also all connectors. Also check that other related portions are functioning properly before operational checks.

2. DISASSEMBLY FLOW



3. DISASSEMBLY PROCEDURE

3.1 AC Cord

- (1) Disconnect AC cord from the printer.

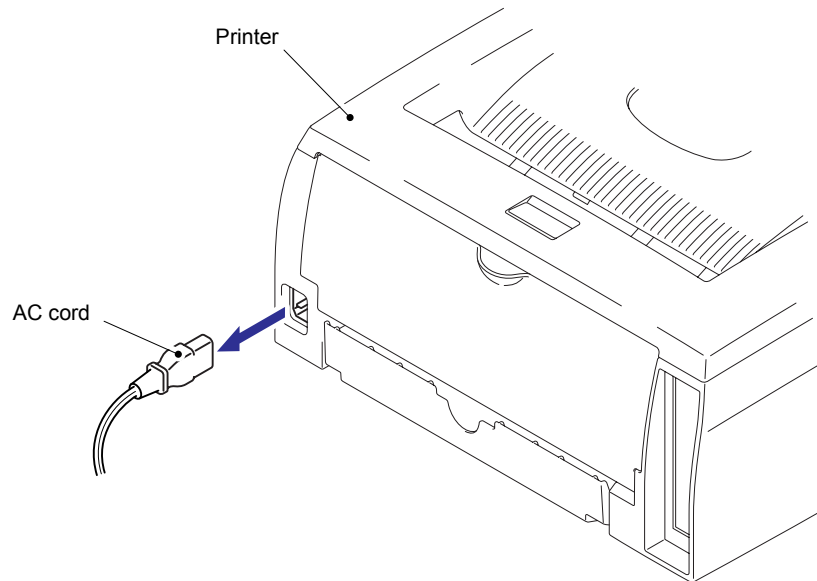


Fig. 4-1

3.2 Drum/Toner ASSY

- (1) Open the front cover and remove the drum/toner ASSY.

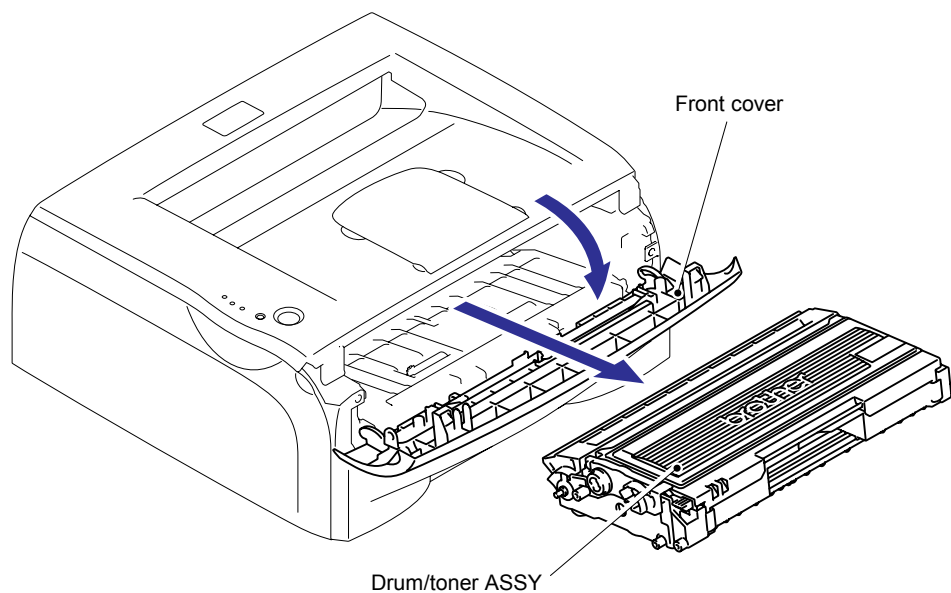


Fig. 4-2

3.3 Paper Tray

- (1) Close the front cover and pull out the paper tray.
- (2) Remove the paper from the paper tray.

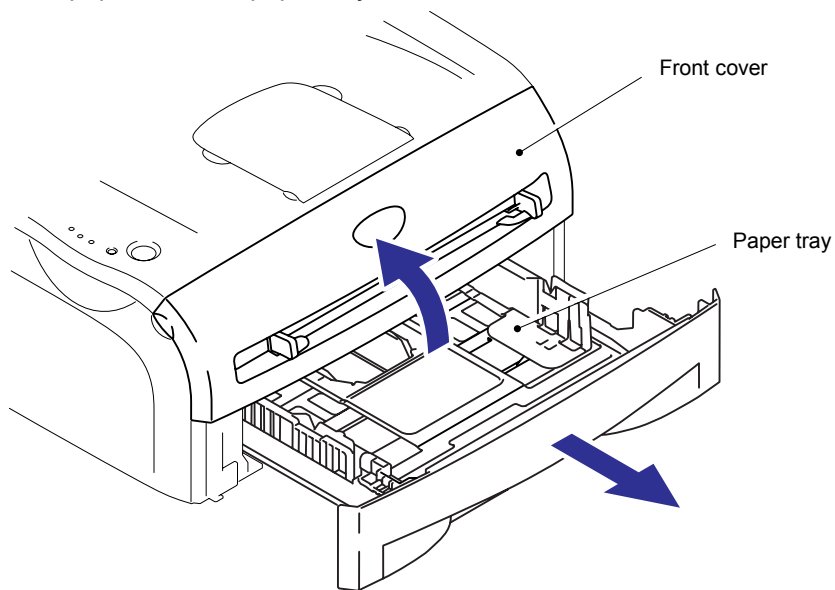


Fig. 4-3

- (3) Remove the separation pad holder ASSY and the separation pad spring.

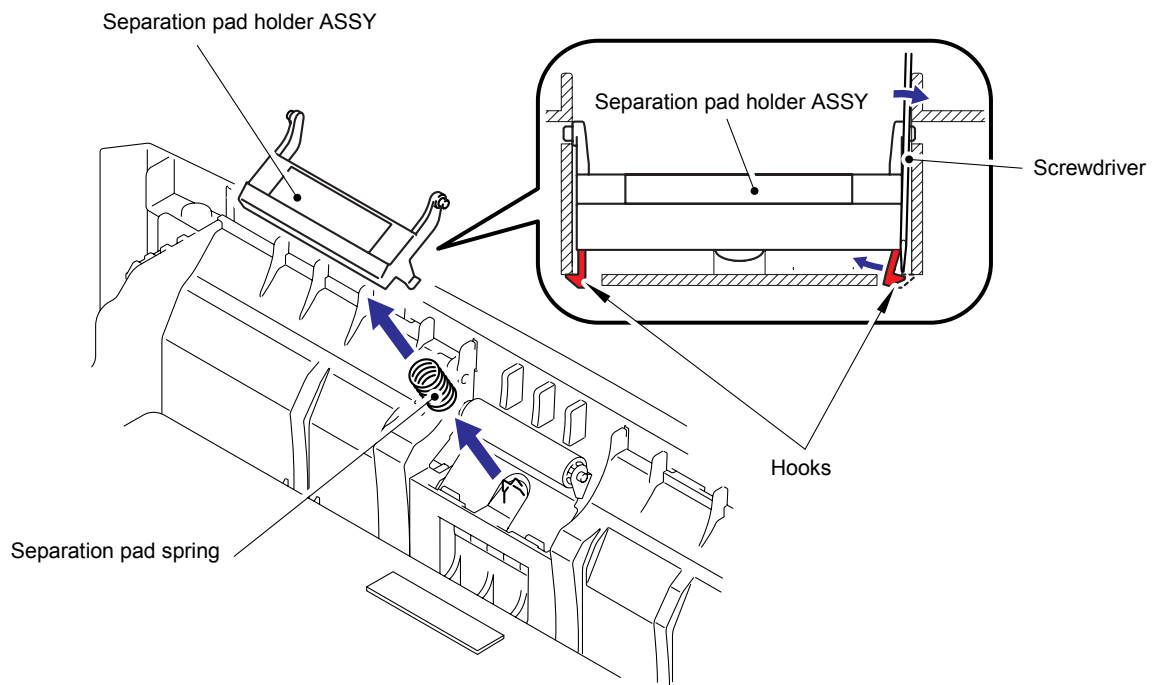


Fig. 4-4

3.4 Rear Cover

- (1) Remove the rear cover.

NOTE:

Remove the "A" section of the rear cover while opening the rear cover slightly.

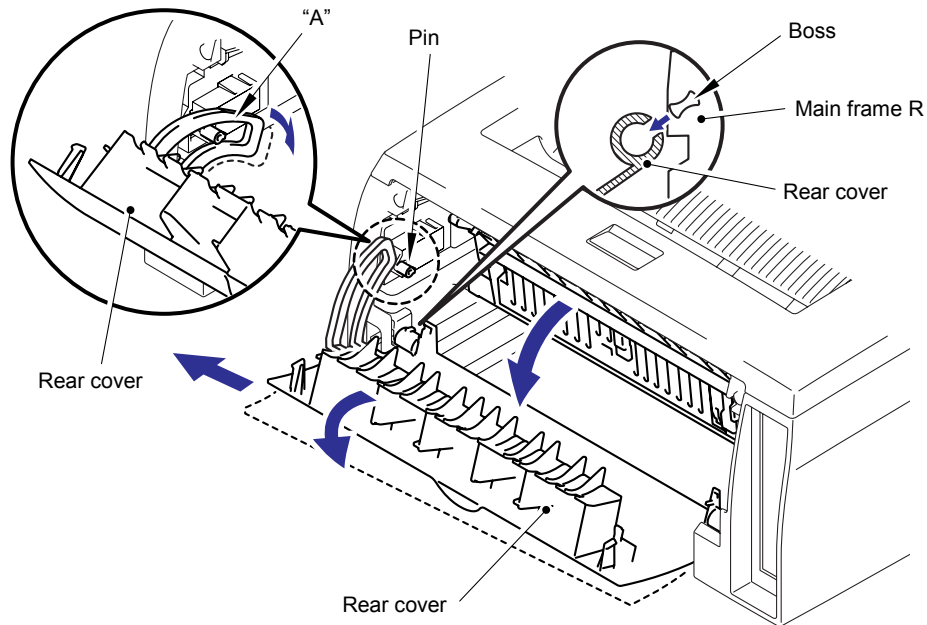


Fig. 4-5

3.5 Rear Chute Cover

(1) Remove the rear chute cover.

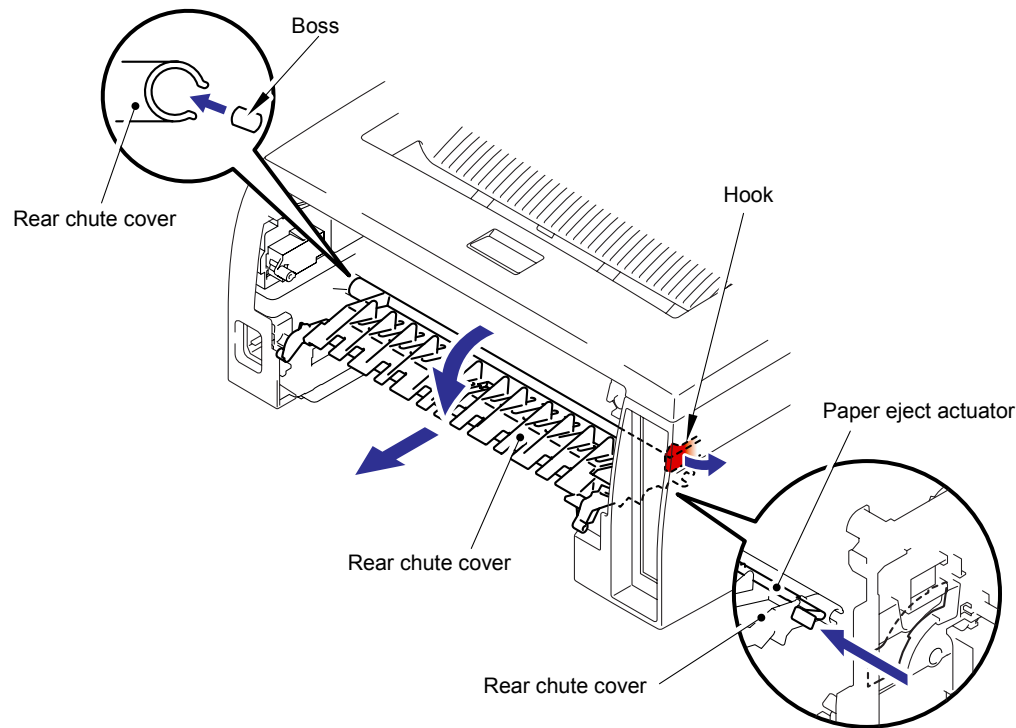


Fig. 4-6

(2) Remove the paper eject actuator and the eject actuator spring.

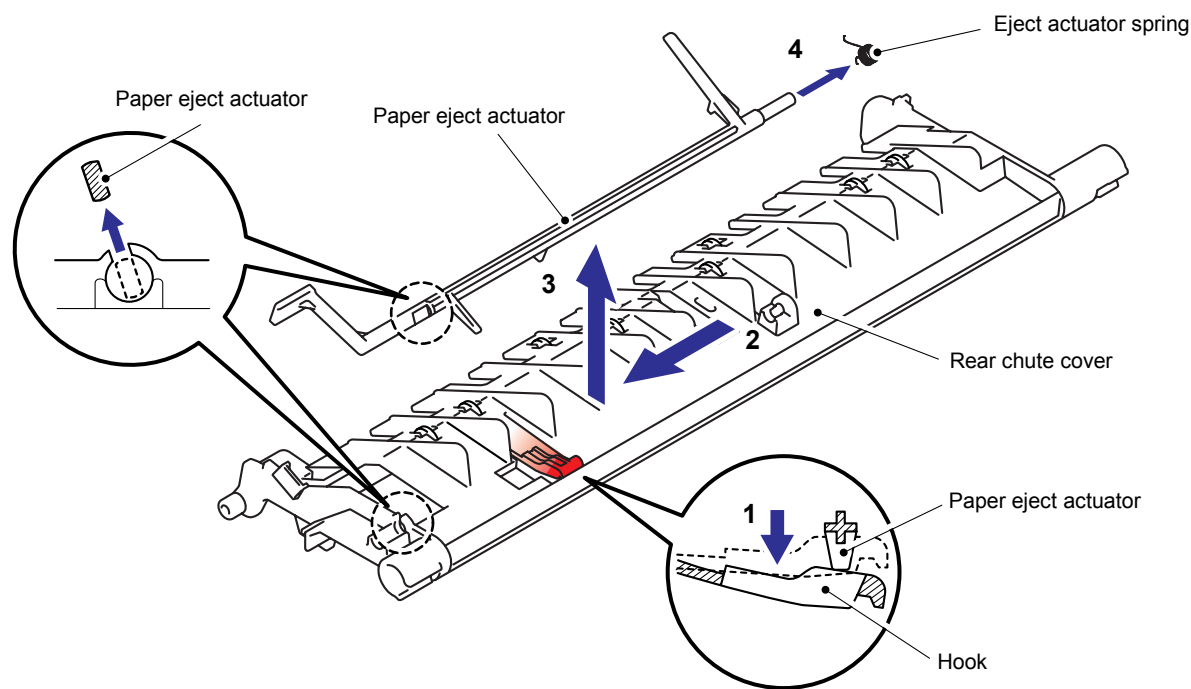


Fig. 4-7

3.6 Side Cover L

- (1) Open the front cover.
- (2) Remove the two bind B M4x12 taptite screws, and then remove the side cover L.

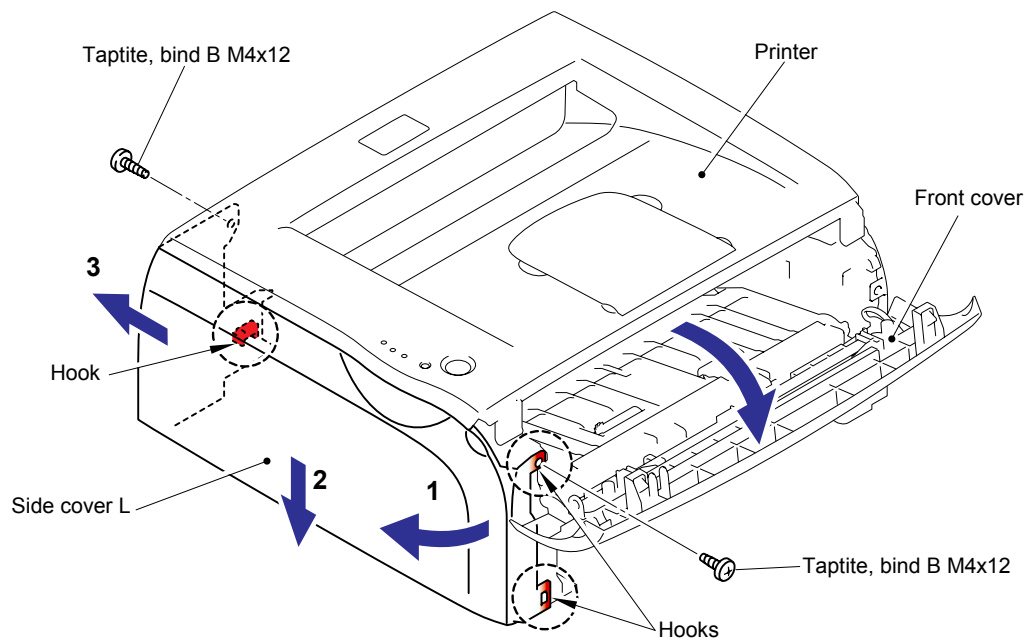


Fig. 4-8

3.7 Side Cover R

- (1) Remove the two bind B M4x12 taptite screws, and then remove the side cover R.

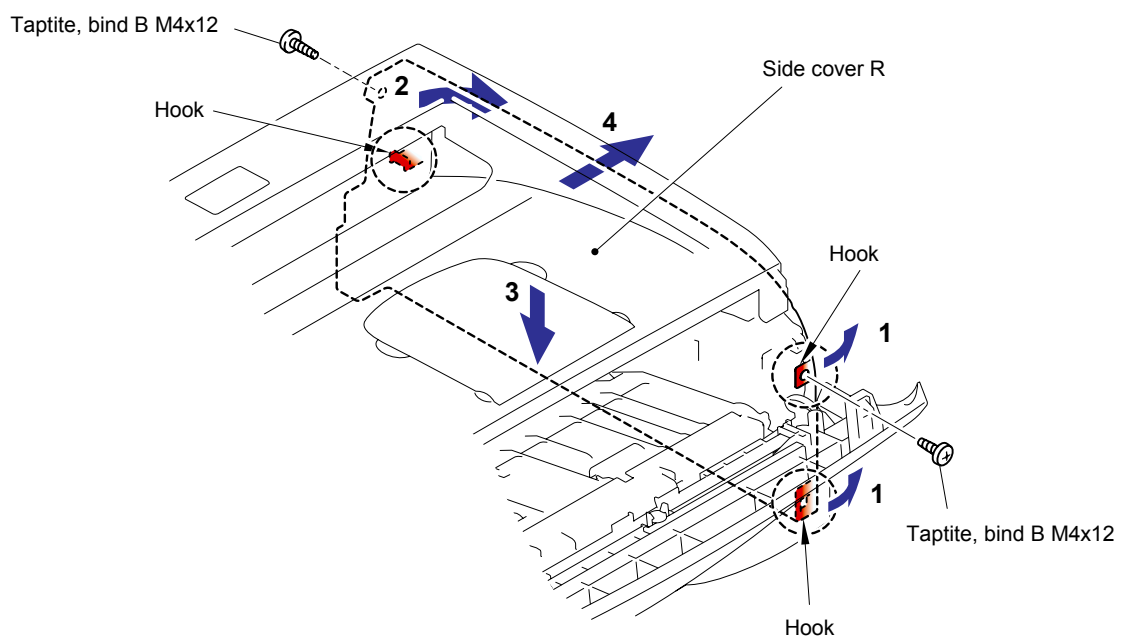


Fig. 4-9

3.8 Top Cover / Paper Stopper

- (1) Remove the bind B M4x12 taptite screw, and then remove the rear cover stopper.

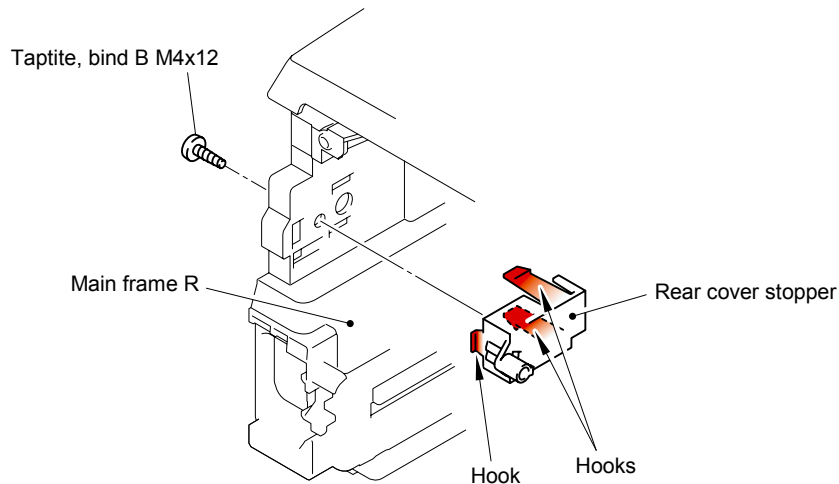


Fig. 4-10

- (2) Remove the two bind B M4x12 taptite screws and the rear chute cover spring.
- (3) Remove the inner chute.

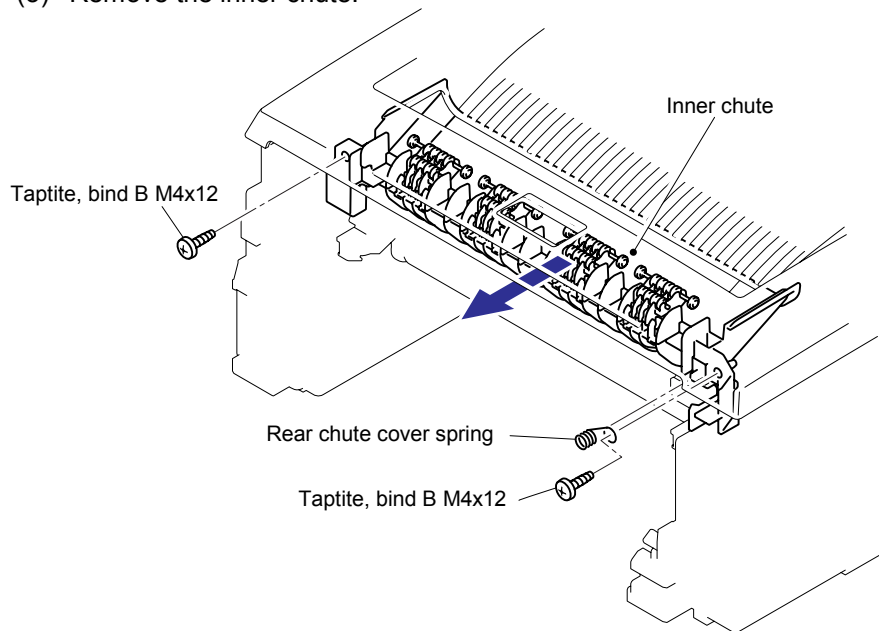


Fig. 4-11

NOTE:

Re-assemble the inner chute while pushing onto the pinch roller of the inner chute with the eject roller of the top cover.

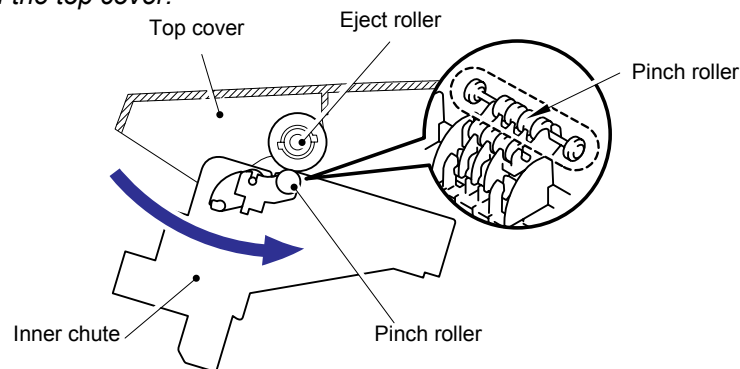


Fig. 4-12

- (4) Remove the two bind B M4x12 taptite screws, and then remove the top cover.

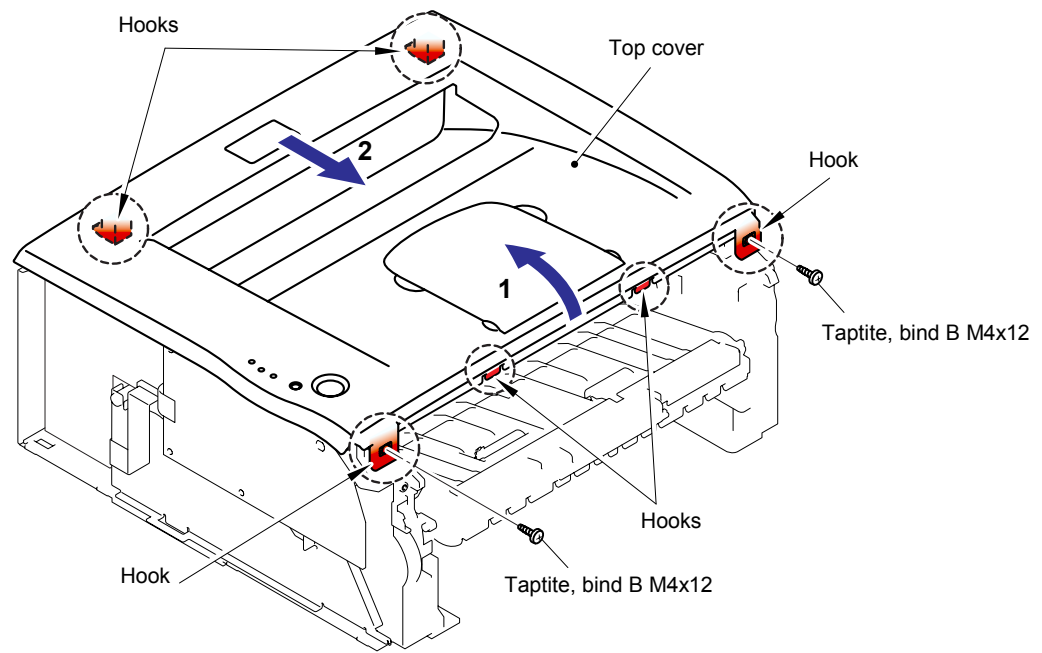


Fig. 4-13

- (5) Remove the paper stopper.

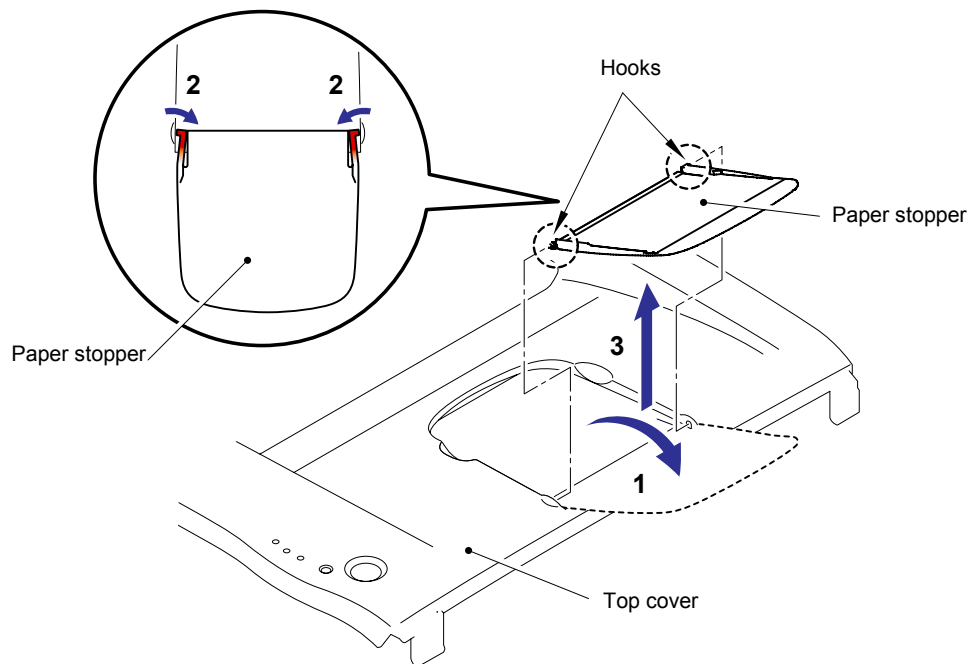


Fig. 4-14

3.9 Front Cover

- (1) Release the hook of the drive release cam from the front cover ASSY.

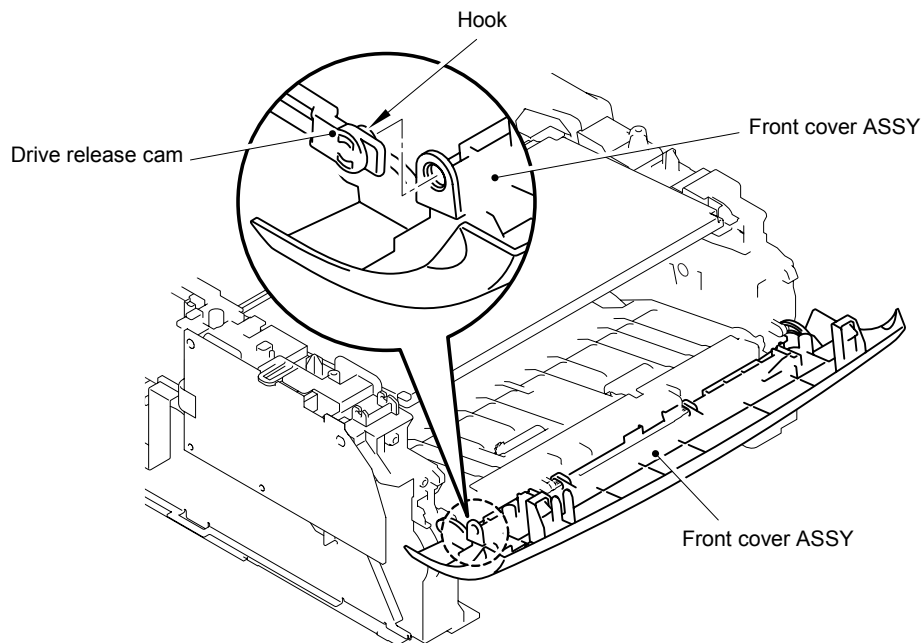


Fig. 4-15

- (2) Release the hook "A" on the front cover ASSY from the chute.
- (3) Slide the front cover ASSY to the direction of the arrow shown in the figure below to remove it.

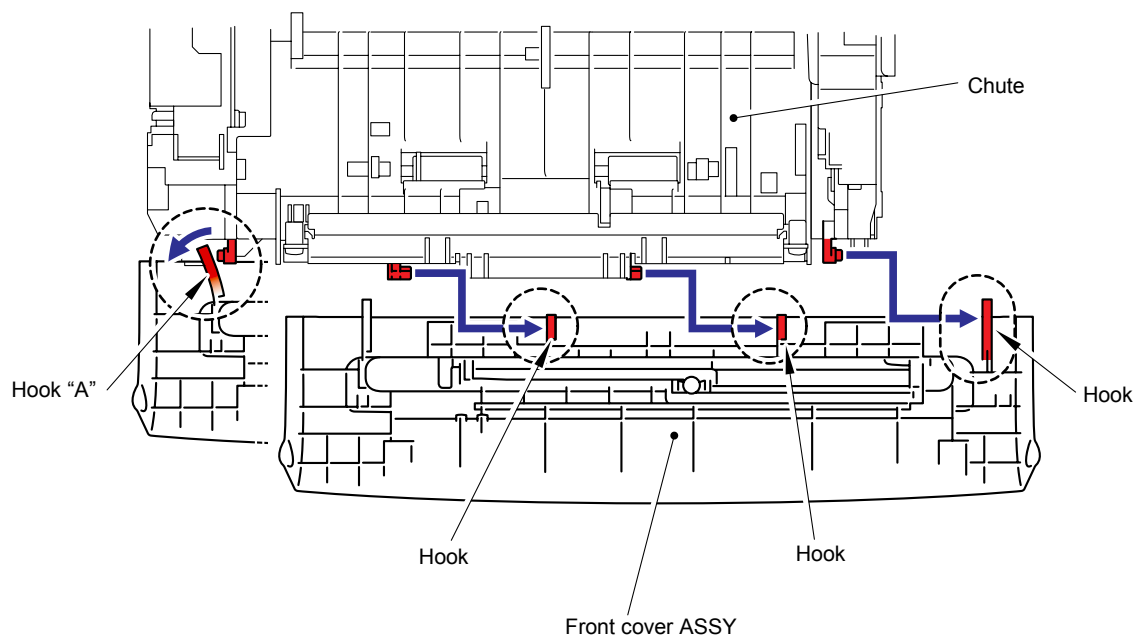


Fig. 4-16

3.10 Pickup Roller Holder ASSY

- (1) Turn the printer upside down.
- (2) Remove the six bind B M4x12 taptite screws, and then remove the chute base.

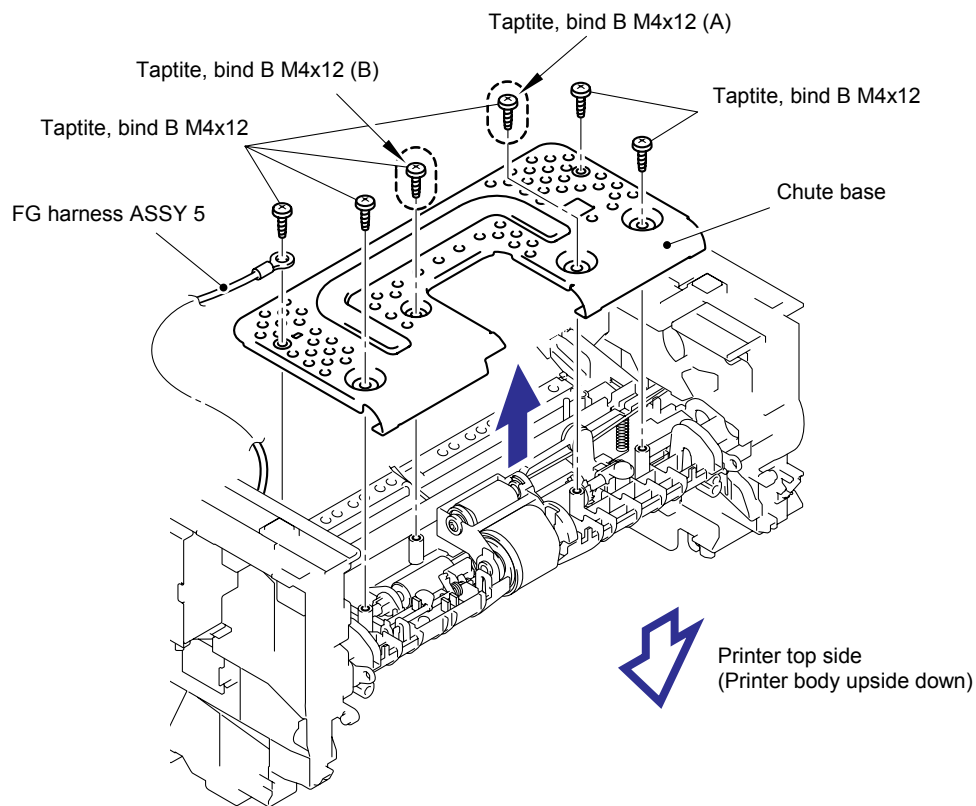


Fig. 4-17

NOTE:

When re-assembling the chute base, check that the bind B M4x12 taptite screws (A) and (B) shown in the figure above are secured correctly.

<How to check>

Take the Drum/Toner Unit out from the printer. Check that the distance between the floor and the separation roller collar of the pickup roller holder ASSY is 45.5 to 47.5mm by using the plate jig. If not, re-assemble the chute base.

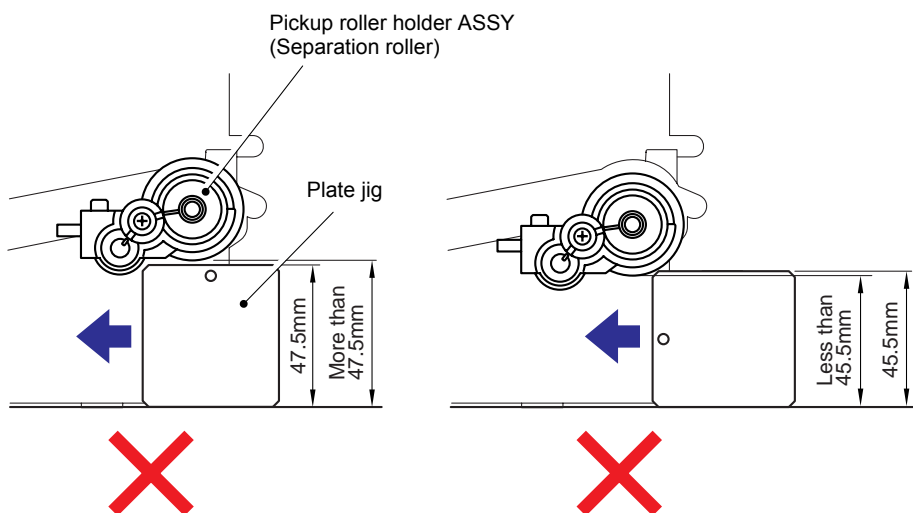
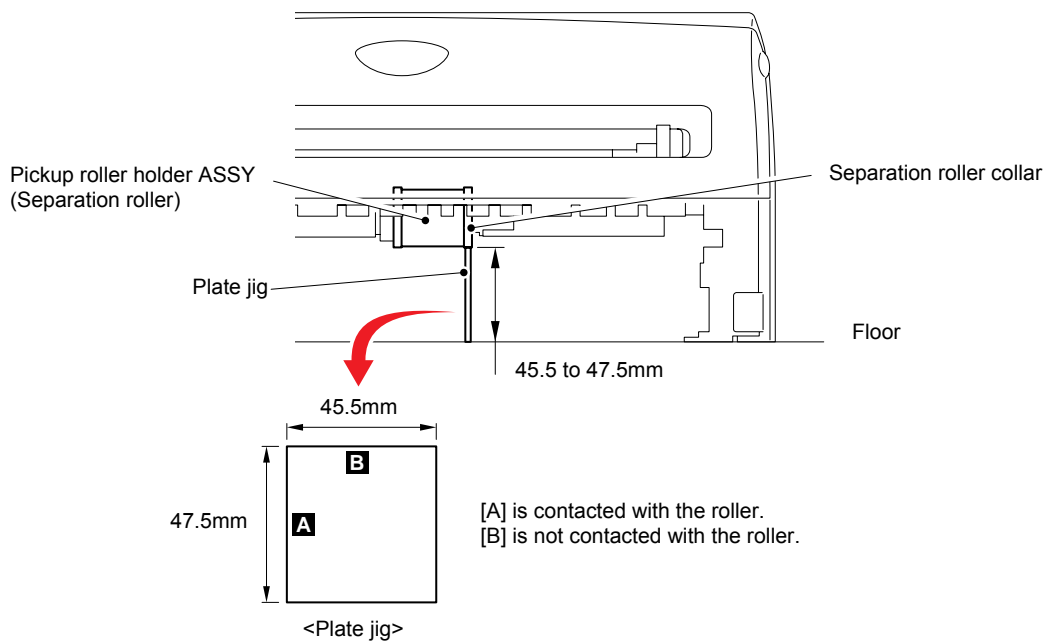


Fig. 4-18

- (3) Remove the spring extension P/R from the gear 52 P/R.
- (4) Release the hook and remove the gear 52 P/R.

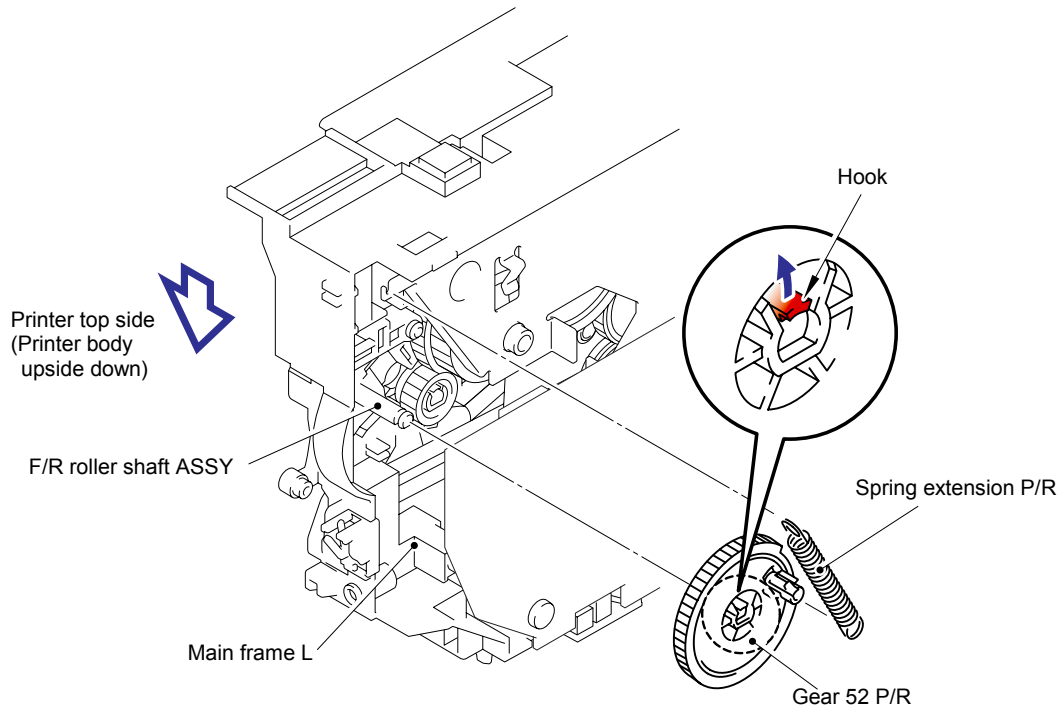


Fig. 4-19

- (5) Remove the bush F/R.
- (6) Remove the F/R roller shaft ASSY.

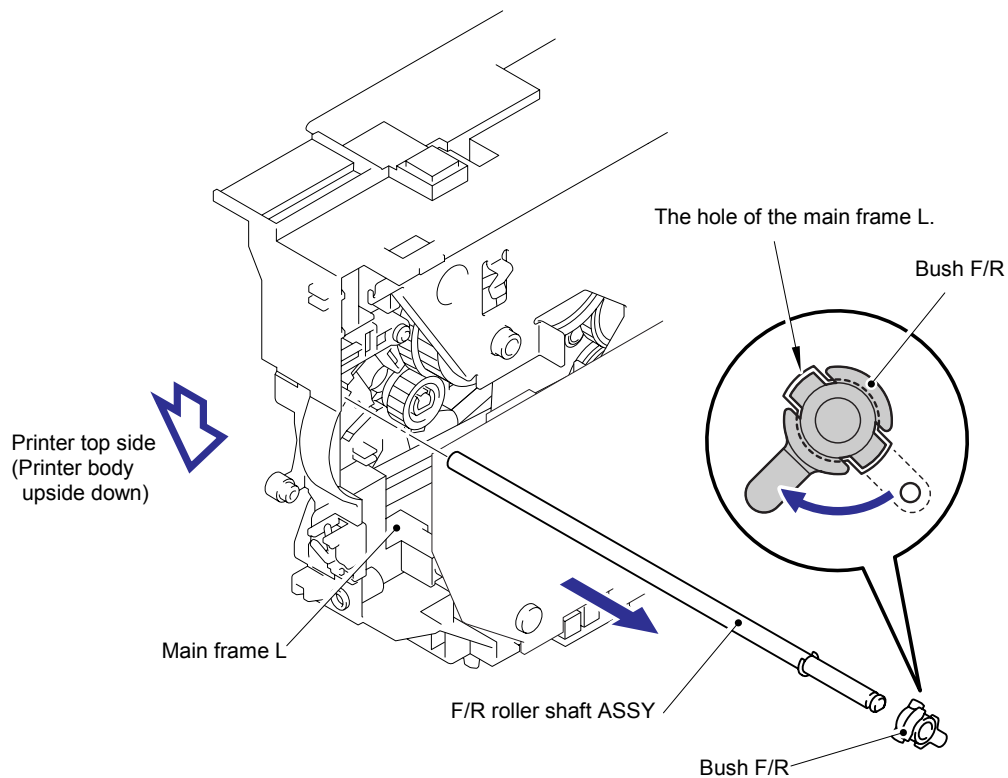


Fig. 4-20

- (7) Remove the link lever from the hook of the pickup roller holder ASSY.
- (8) Remove the pickup roller holder ASSY.

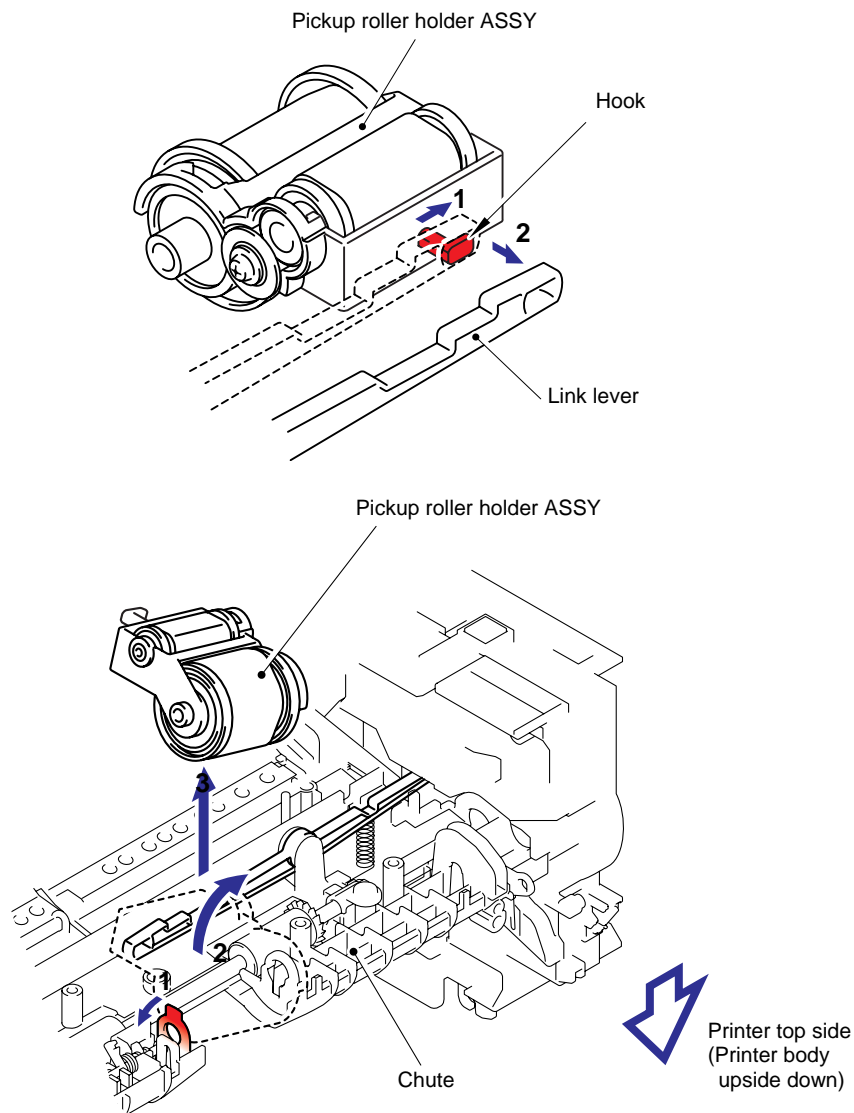


Fig. 4-21

NOTE:

The pickup roller holder spring is assembled on the bottom of the pickup roller holder ASSY. Be careful not to lose the spring.

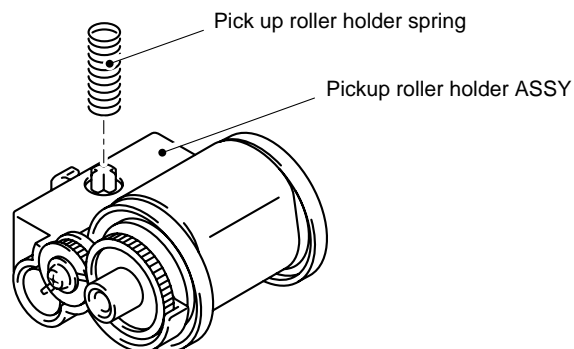


Fig. 4-22

3.11 Fixing Unit

- (1) Disconnect the heater harness connector and thermistor harness connector.
- (2) Remove the two cup B M4x12 taptite screws, and then remove fixing unit.

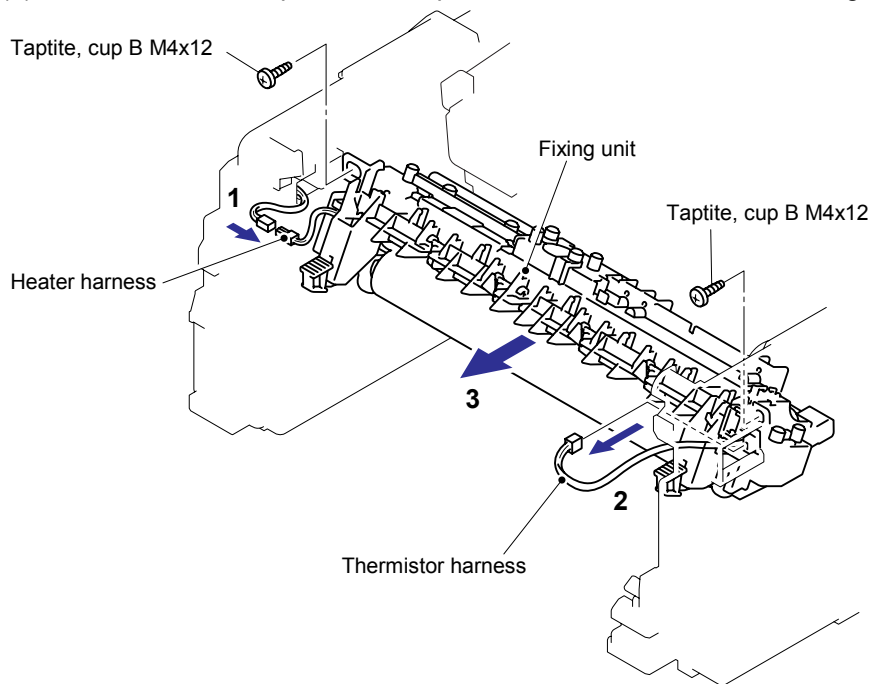


Fig. 4-23

NOTE:

Be sure not to touch the pressure roller.

- (3) Remove the two PR spring.
- (4) Remove the pressure roller ASSY (pressure roller, PR arm ASSY, PR bush) from the fuser frame.

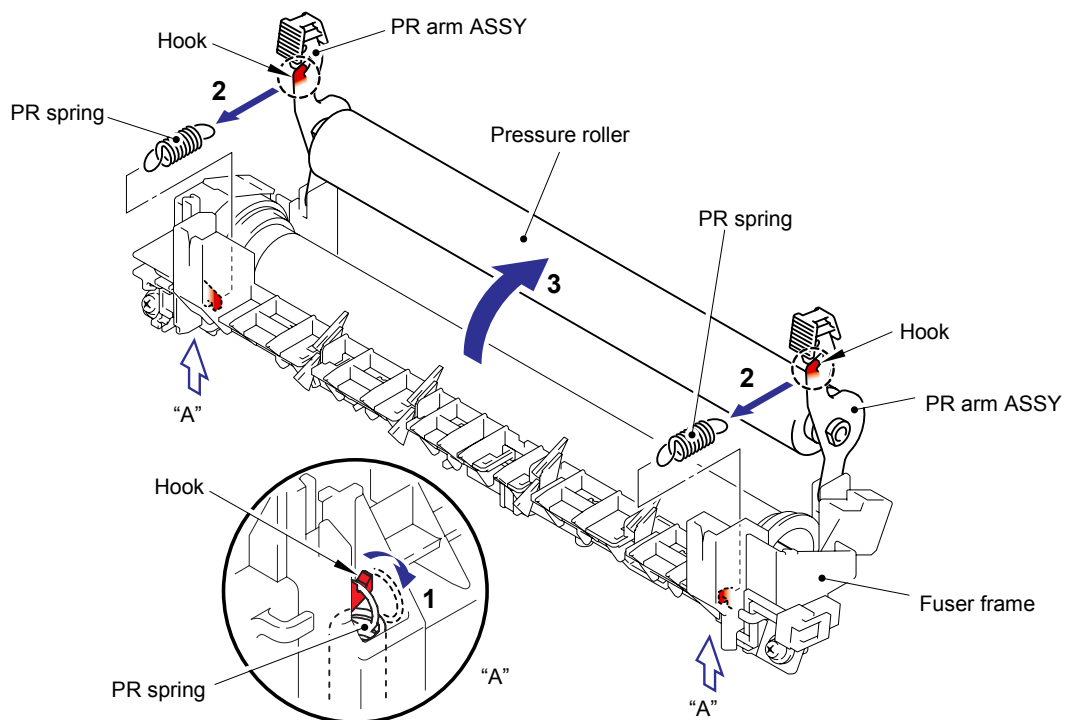


Fig. 4-24

- (5) Remove the two PR arm ASSY and two PR bush from the pressure roller.

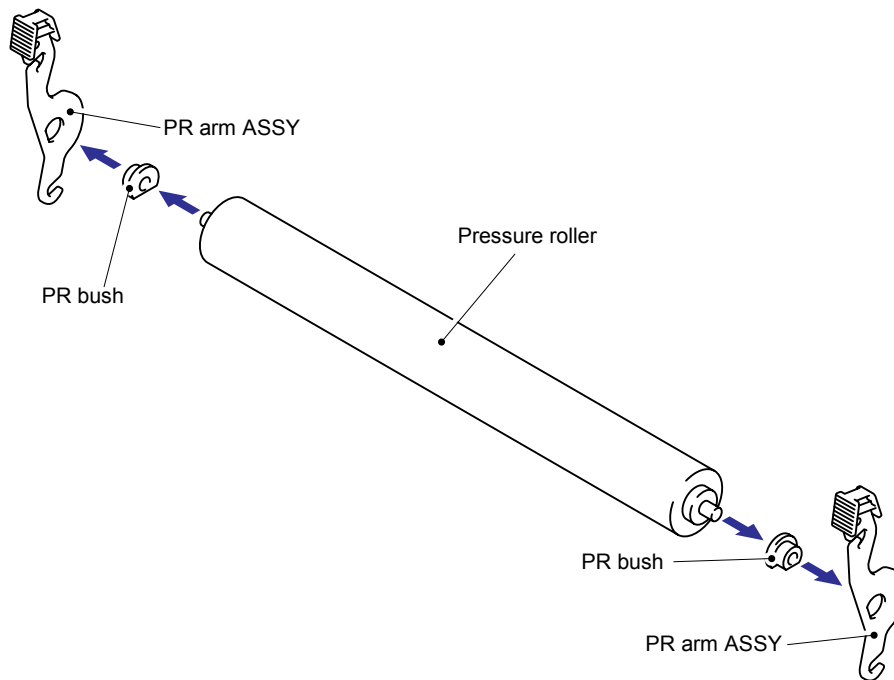


Fig. 4-25

- (6) Release each hook of the springs from the fuser frame and remove the four separate claw ASSYs.

NOTE:

Be careful not to damage the heat roller when removing the separate claw ASSY.

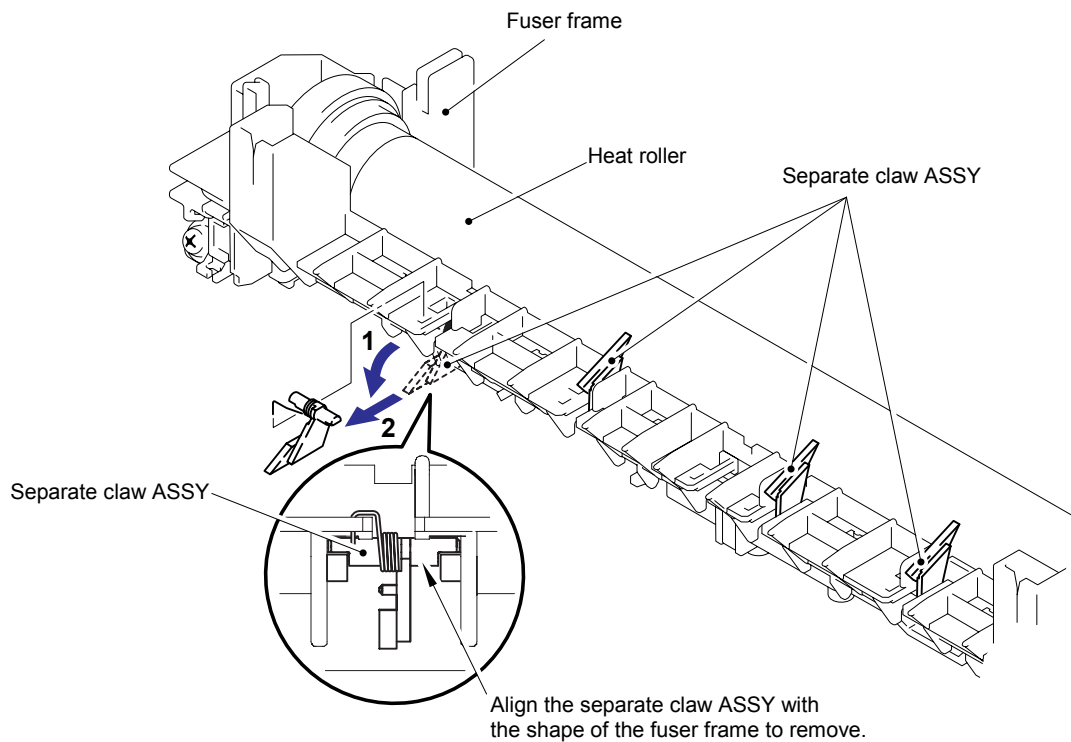


Fig. 4-26

- (7) Remove the two pan (S/P washer) M3x8 screws.
- (8) Remove the heat roller.
- (9) Remove the halogen heater.

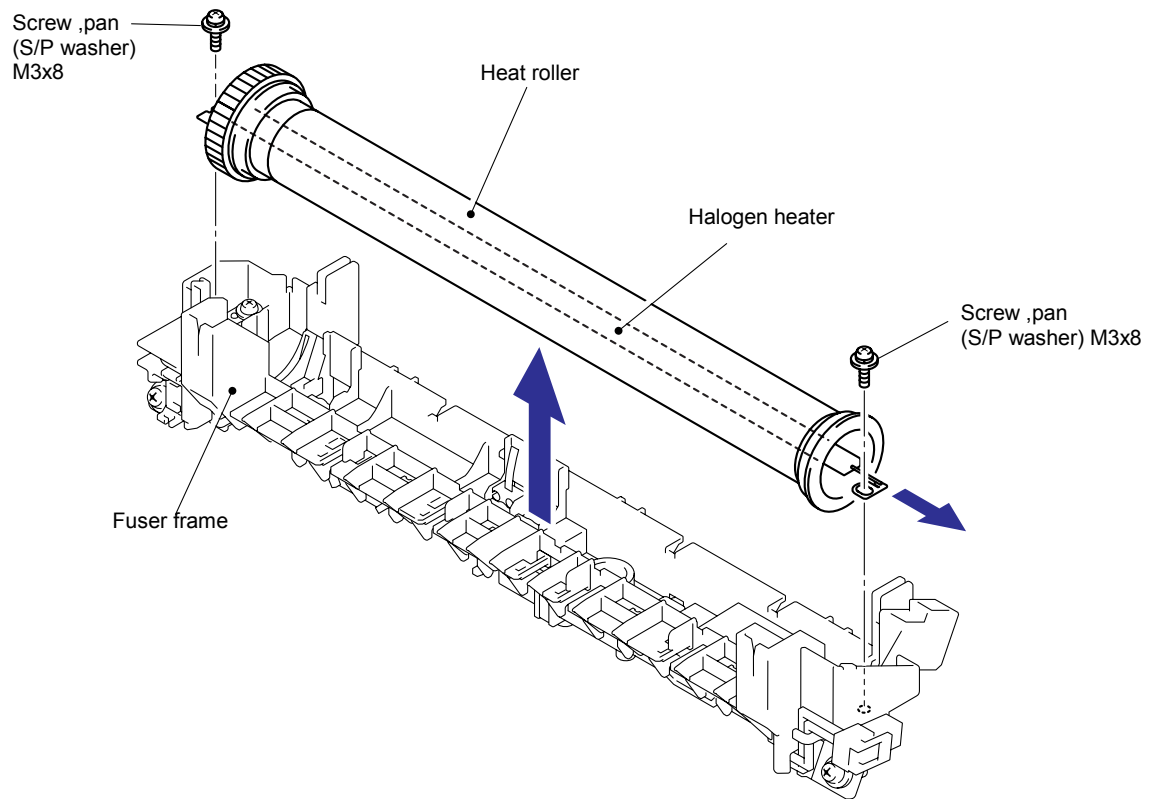


Fig. 4-27

NOTE:

When re-assembling the heat roller, assemble the HR bush onto the fuser frame referring to the figure below.

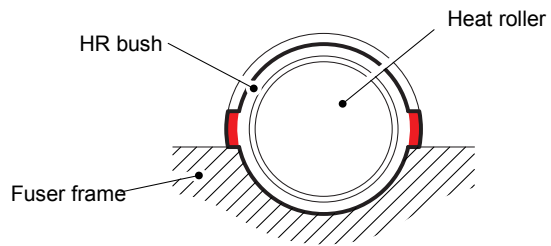


Fig. 4-28

NOTE:

When re-assembling the halogen heater, put the halogen heater onto the fuser frame so that the terminal of the heater harness is at the top, and secure the screws in the order shown in the figure below.

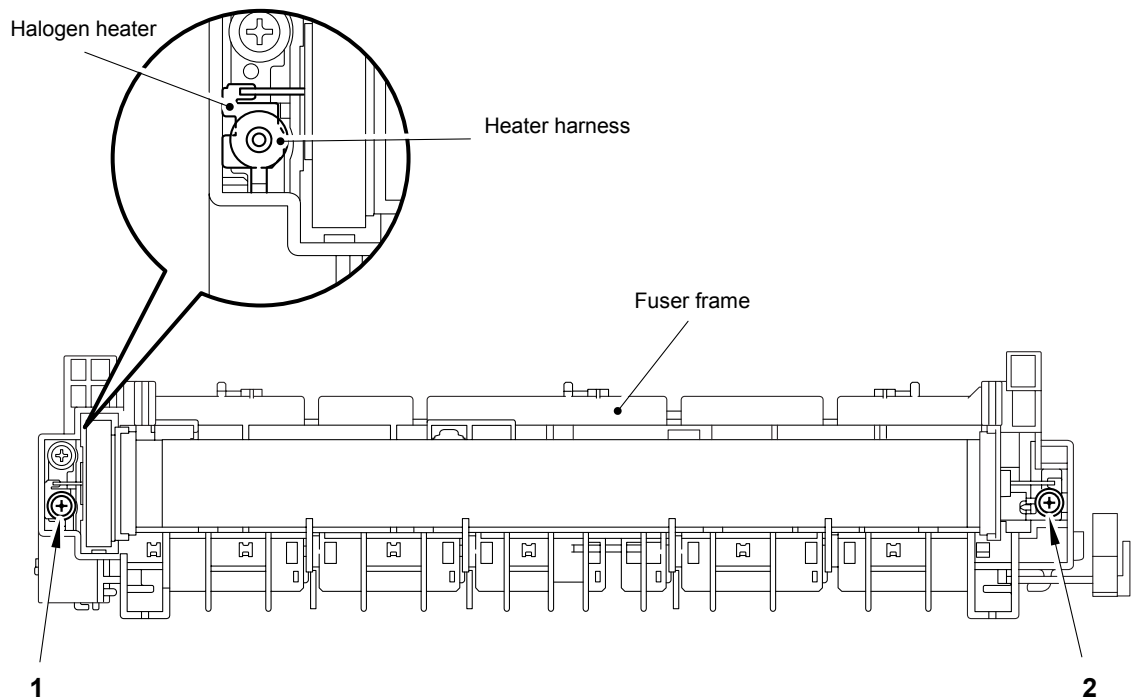


Fig. 4-29

(10) Remove the HR gear.

(11) Remove the two HR bush.

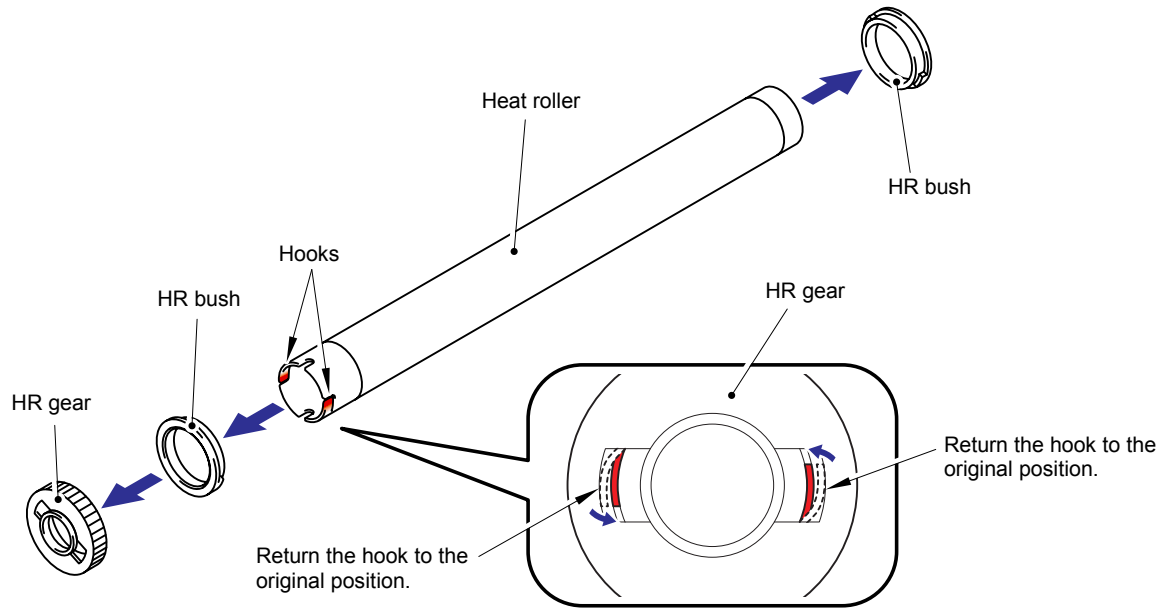


Fig. 4-30

(12) Remove the thermistor ASSY harness from the four hooks.

(13) Remove the cup B M3x12 taptite screw, and then remove the thermistor ASSY.

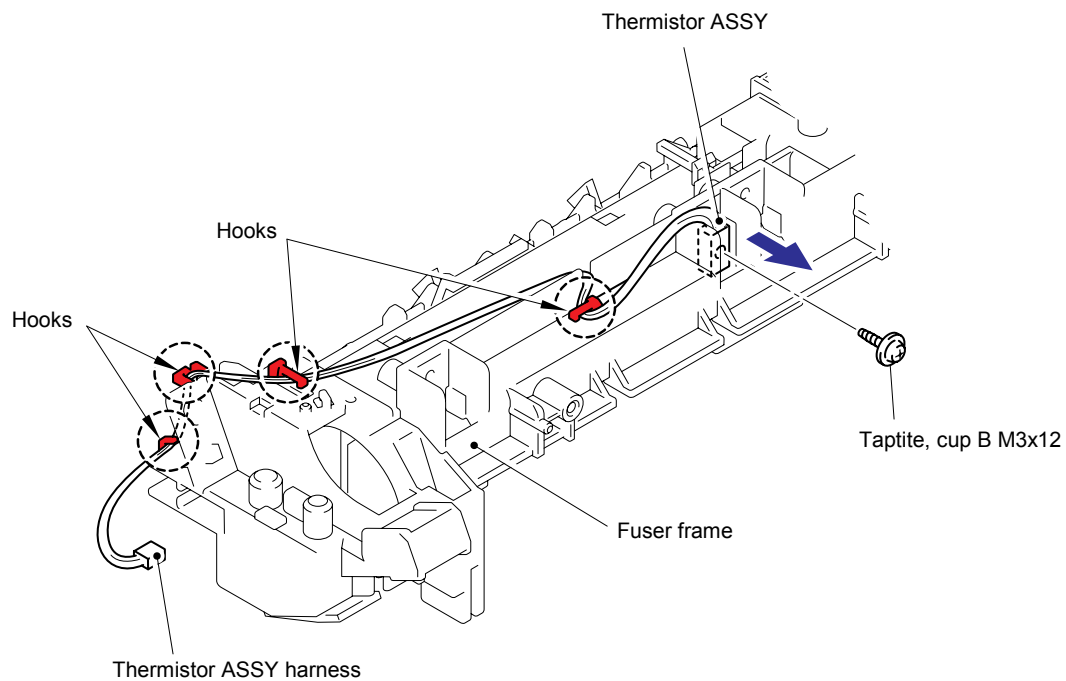


Fig. 4-31

NOTE:

When re-assembling the thermistor ASSY to the fuser frame, ensure the direction of the thermistor ASSY is correct referring to the figure below;

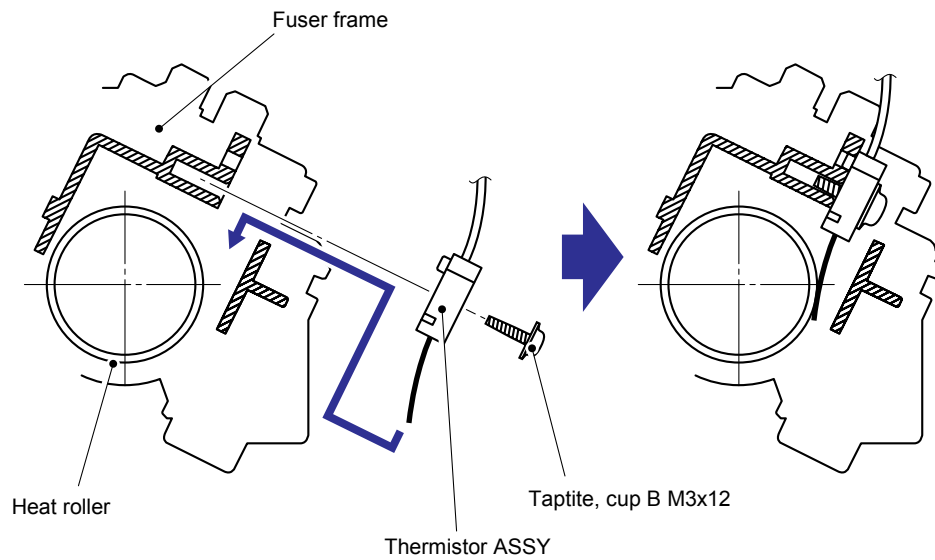


Fig. 4-32

3.12 High-Voltage PS PCB ASSY

NOTE:

After you have just used the printer, some internal parts are extremely hot. Turn off the printer and wait for the printer to cool down before you touch the internal parts of the printer.

- (1) Disconnect the three connectors from the high-voltage PS PCB ASSY.
- (2) Disconnect the high-voltage PS PCB harness from the main PCB.

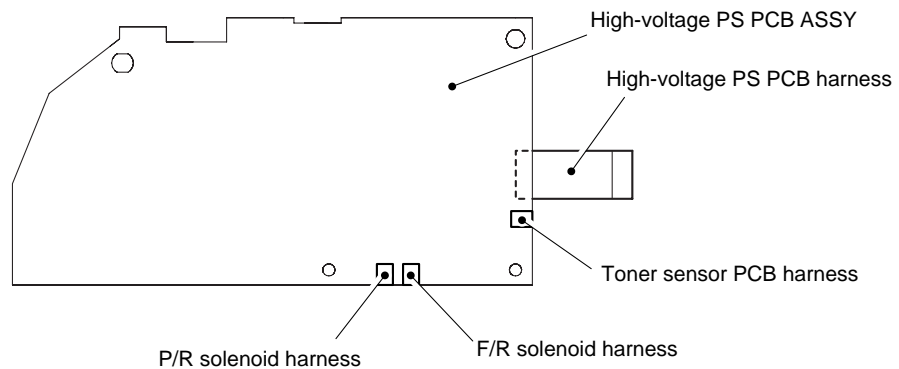


Fig. 4-33

- (3) Remove the two bind B M4x12 taprite screws and the two cup S M3x6 taprite screws.
- (4) Remove the high-voltage PS PCB from main frame L.

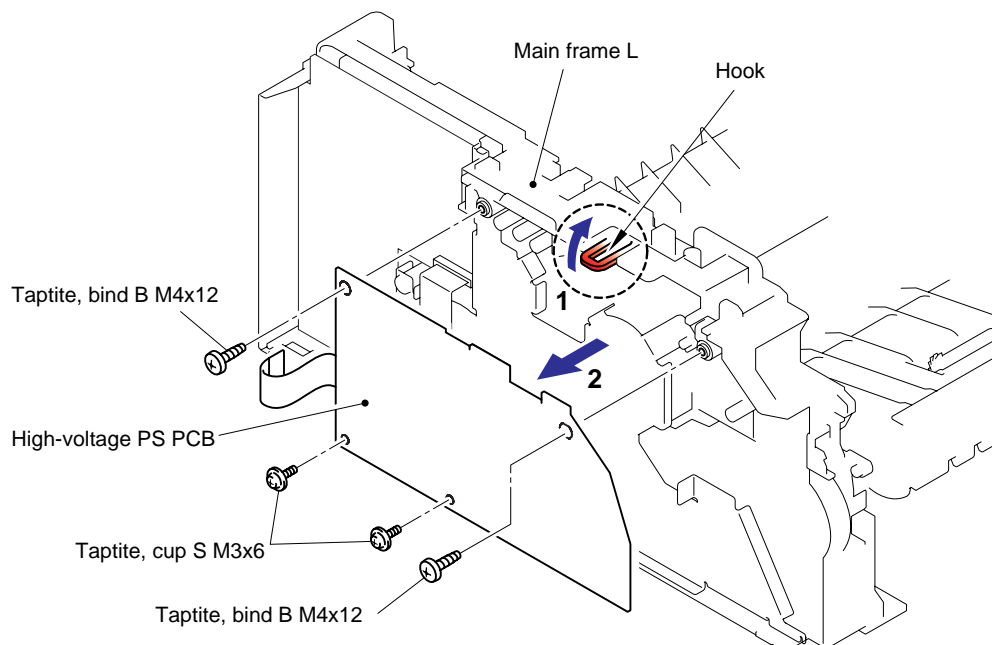


Fig. 4-34

3.13 Main PCB

<HL-2030/2040>

- (1) Disconnect the eight connectors from the main PCB.

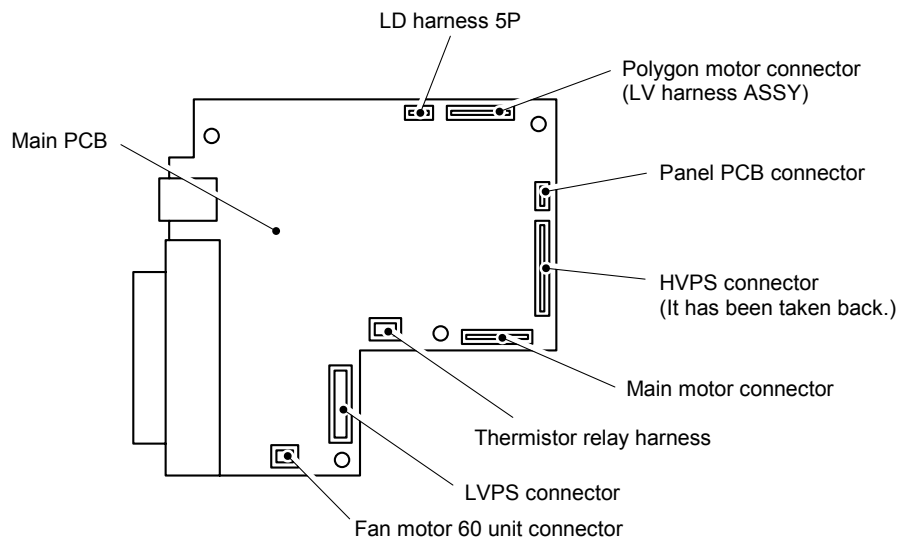


Fig. 4-35

- (2) Remove the four cup S M3x6 taptite screws and FG harness ASSY 6.
 (3) Remove the two flat S M3x8 taptite screws.
 (4) Remove the main PCB from main frame L.

NOTE:

When replacing the main PCB, refer to 'ADJUSTMENTS AND UPDATING OF SETTINGS, REQUIRED AFTER PARTS REPLACEMENT' in Chapter 6.

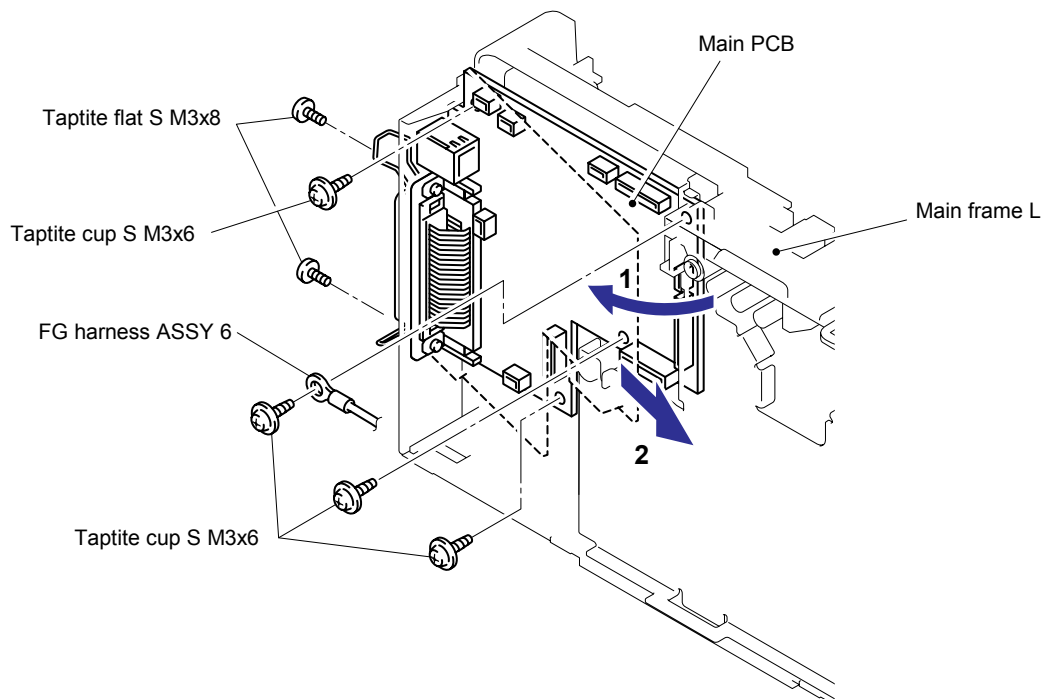


Fig. 4-36

<HL-2070N>

- (1) Disconnect the eight connectors from the main PCB.

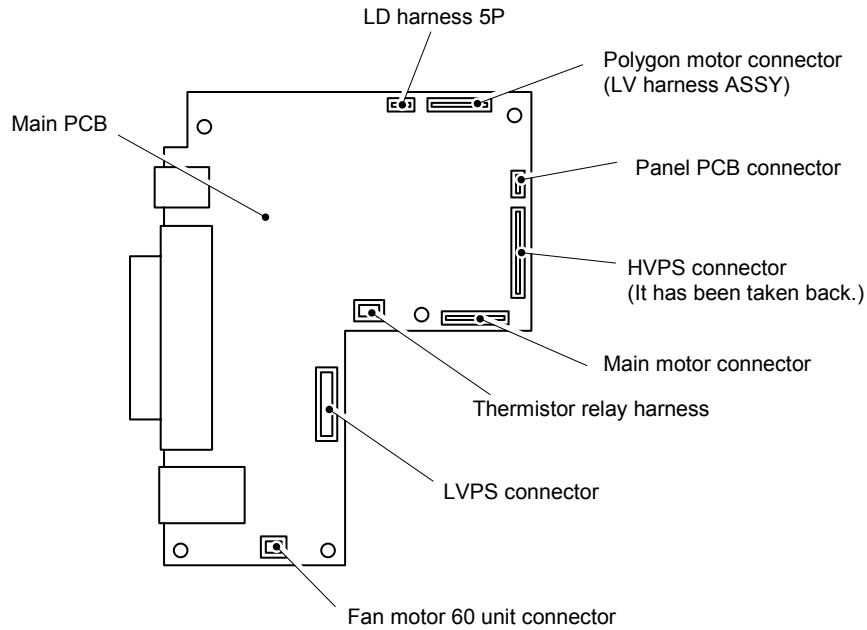


Fig. 4-37

- (2) Remove the five cup S M3x6 taptite screws and FG harness ASSY 6.
 (3) Remove the two flat S M3x8 taptite screws.
 (4) Remove the main PCB from main frame L.

NOTE:

When replacing the main PCB, refer to 'ADJUSTMENTS AND UPDATING OF SETTINGS, REQUIRED AFTER PARTS REPLACEMENT' in Chapter 6.

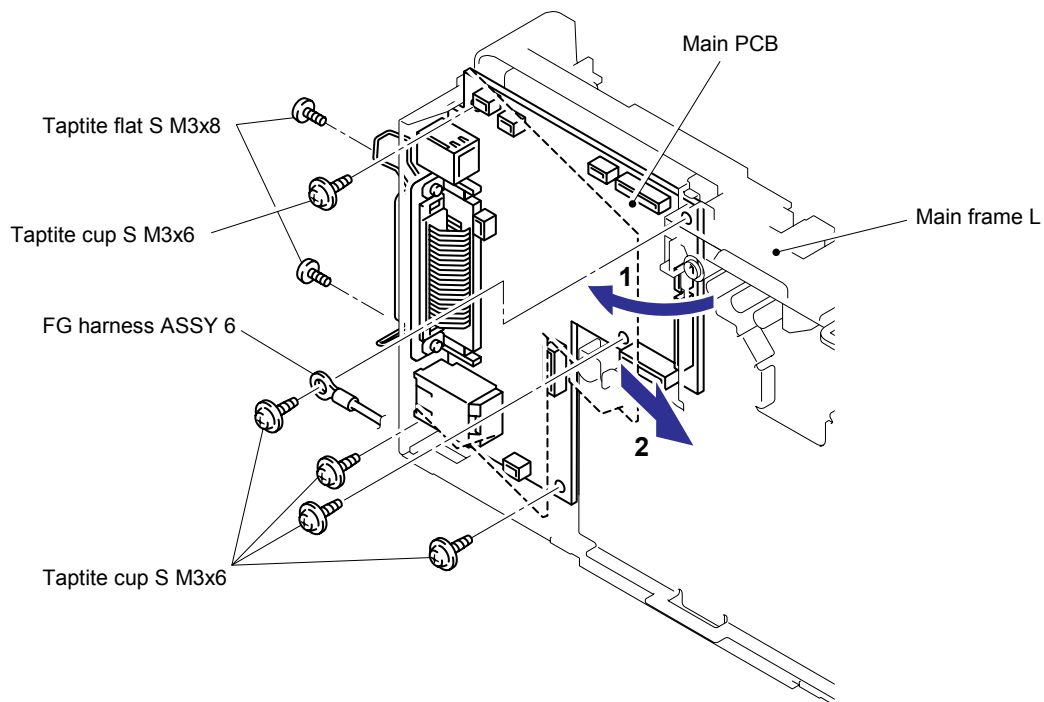


Fig. 4-38

3.14 SW Key / Panel PCB

- (1) Remove the SW key.

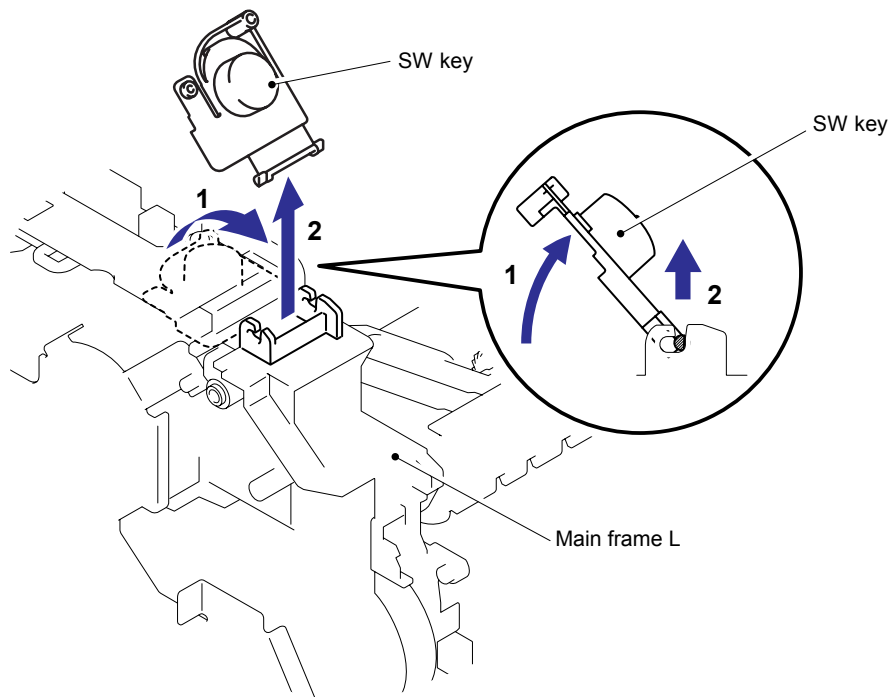


Fig. 4-39

- (2) Disconnect the two connectors from the panel PCB.
- (3) Remove the cup B M3x8 taprite screw, and then remove the panel PCB.

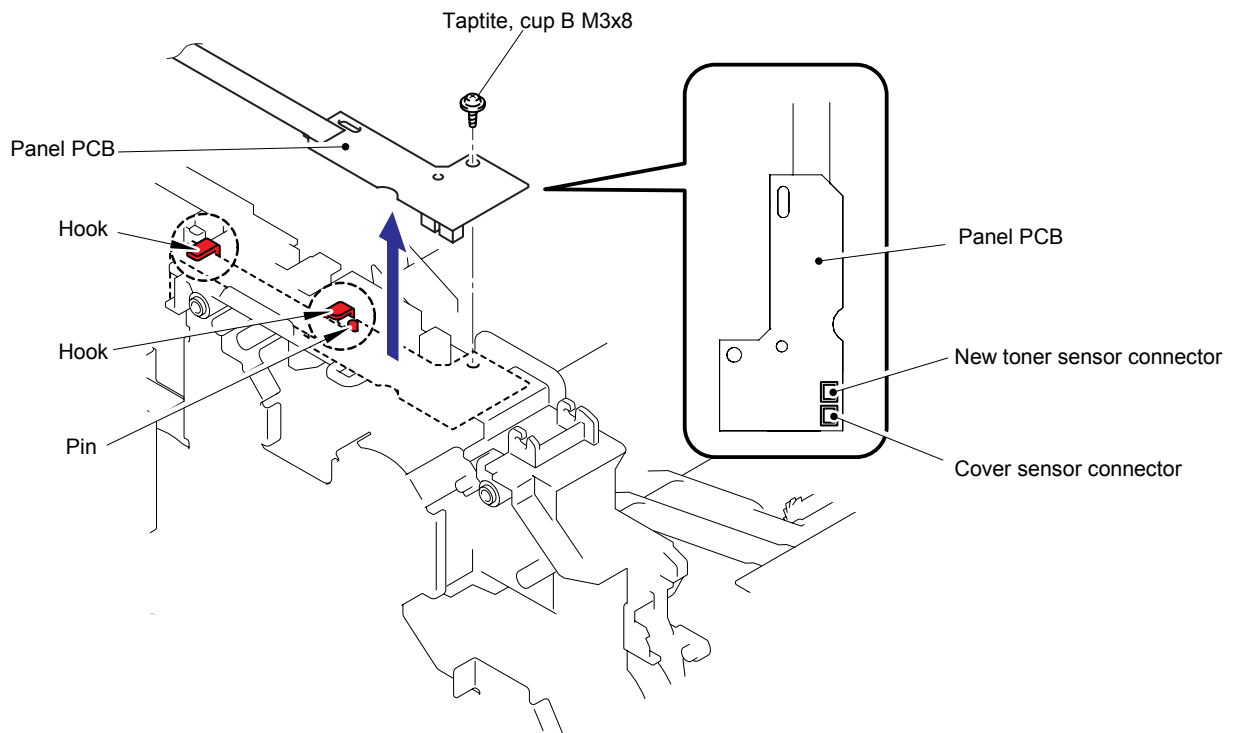


Fig. 4-40

3.15 PS PCB Unit

- (1) Remove the duct film.
- (2) Remove the pan (S/P washer) M3.5x6 screw and the two cup S M3x6, taptite screws.
- (3) Remove the pan (S/P washer) M3.5 x 6 screw and two FG harness ASSY 1, 2.
- (4) Remove the LV shield plate cover from the main frame R.

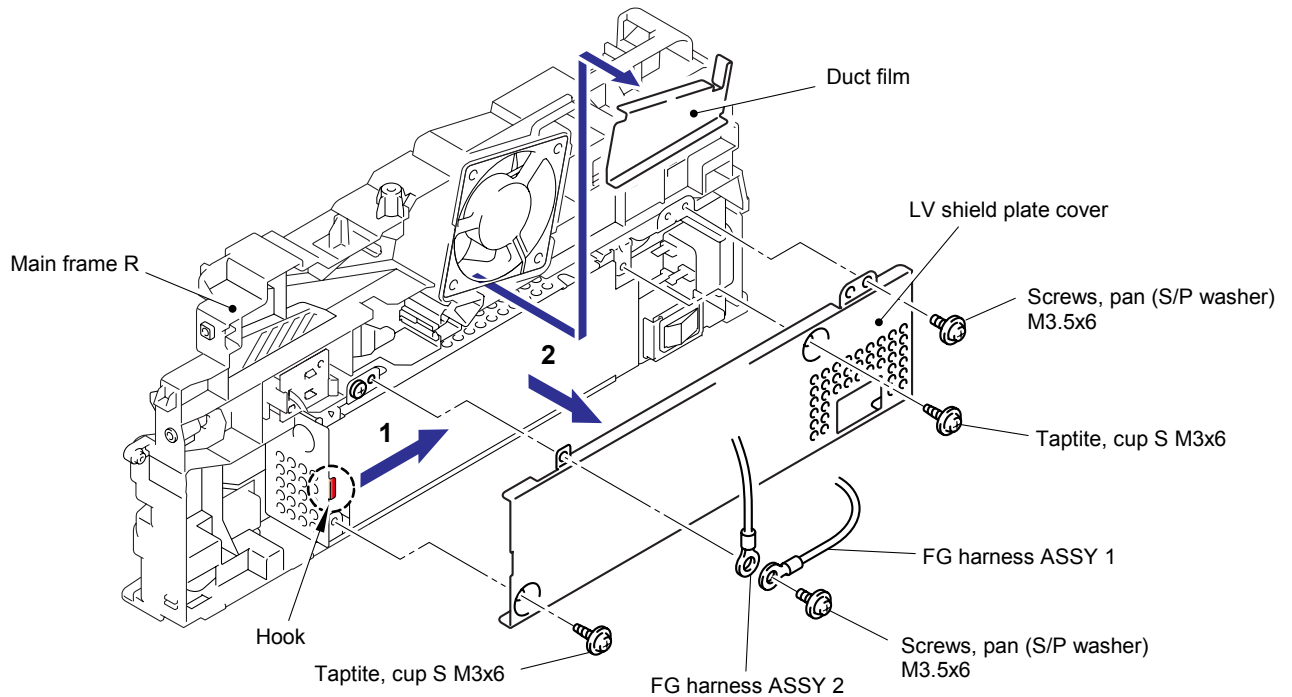


Fig. 4-41

- (5) Remove the LV insulation sheet.

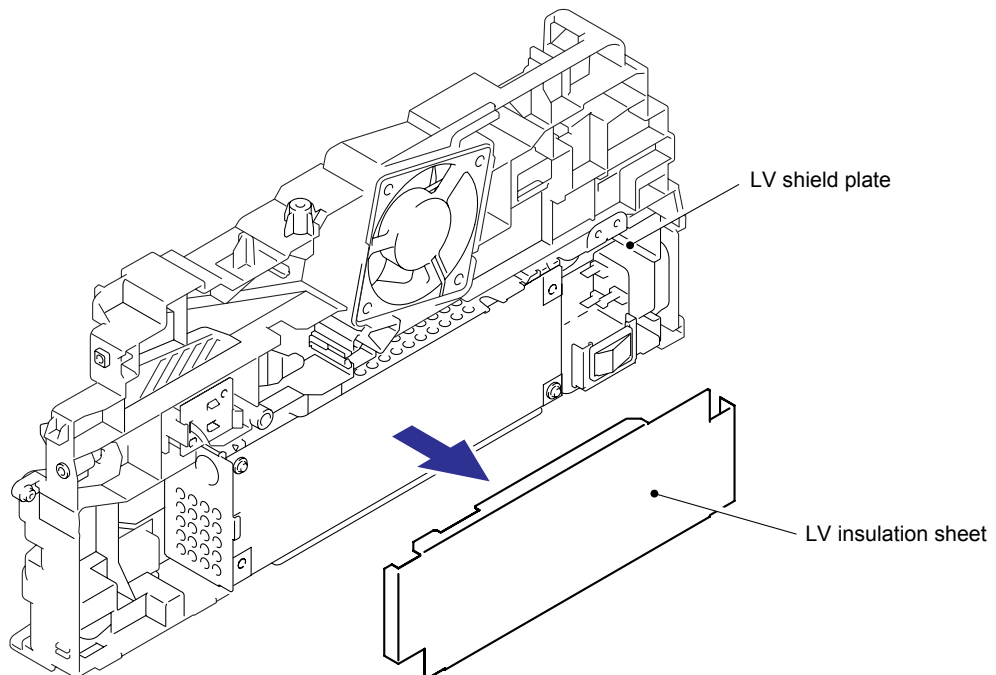


Fig. 4-42

- (6) Remove the pan (S/P washer) M3.5x6 screw, and then remove the ground wire.
- (7) Remove the bind B M4x12, taptite screw, and then remove the LV shield plate.

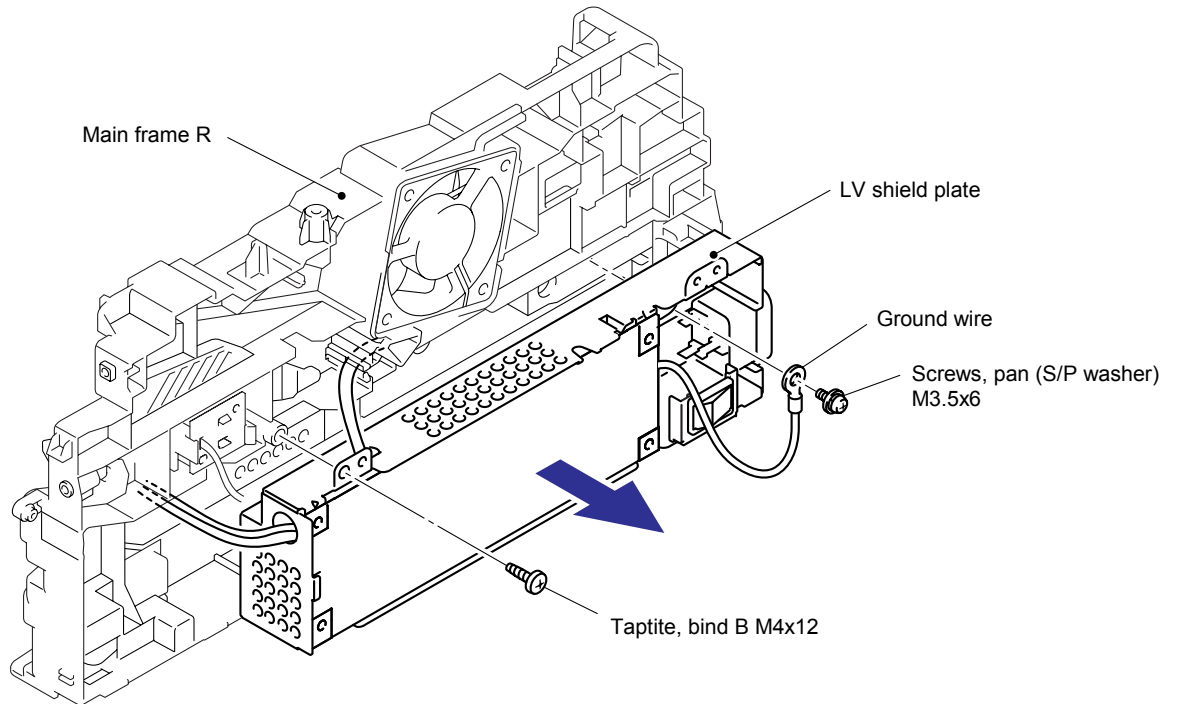


Fig. 4-43

- (8) Remove the two flat S M3x8, taptite screws, and then remove the inlet harness ASSY.

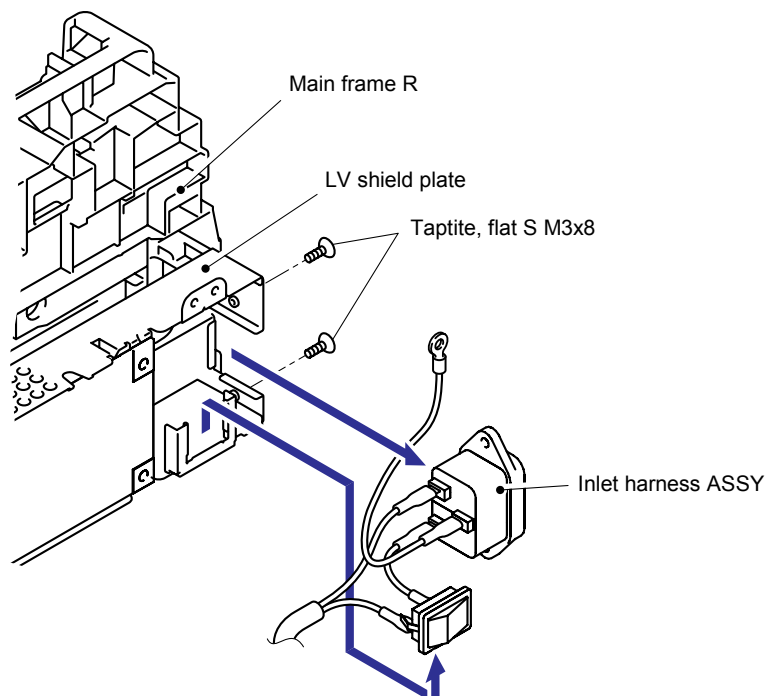


Fig. 4-44

- (9) Remove the two cup S M3x6 tapite screws.
- (10) Disconnect the three connectors from the PS PCB unit, and then remove the PS PCB unit.

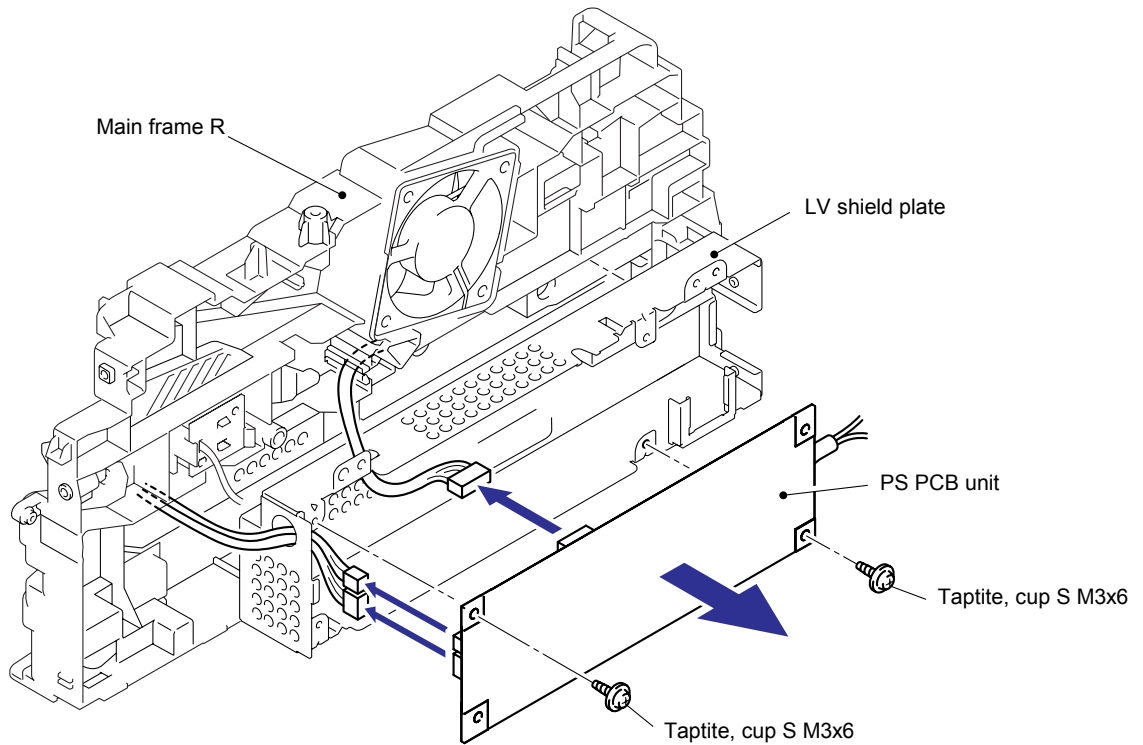


Fig. 4-45

NOTE:

When disconnecting the connectors, disconnect the regist sensor PCB connector and toner LED PCB unit ASSY connector first, lift up the PS PCB unit from the LV shield plate, and disconnect the main PCB connector.

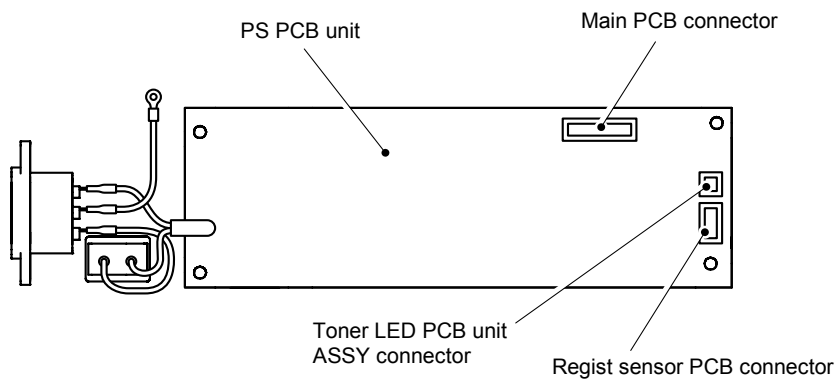


Fig. 4-46

3.16 Laser Unit

- (1) Remove the cup S M3x6, taptite screw (A) and FG harness ASSY 6.
- (2) Remove the four cup S M3x6, taptite screws (B) and FG harness ASSY 2.
- (3) Remove the laser unit.

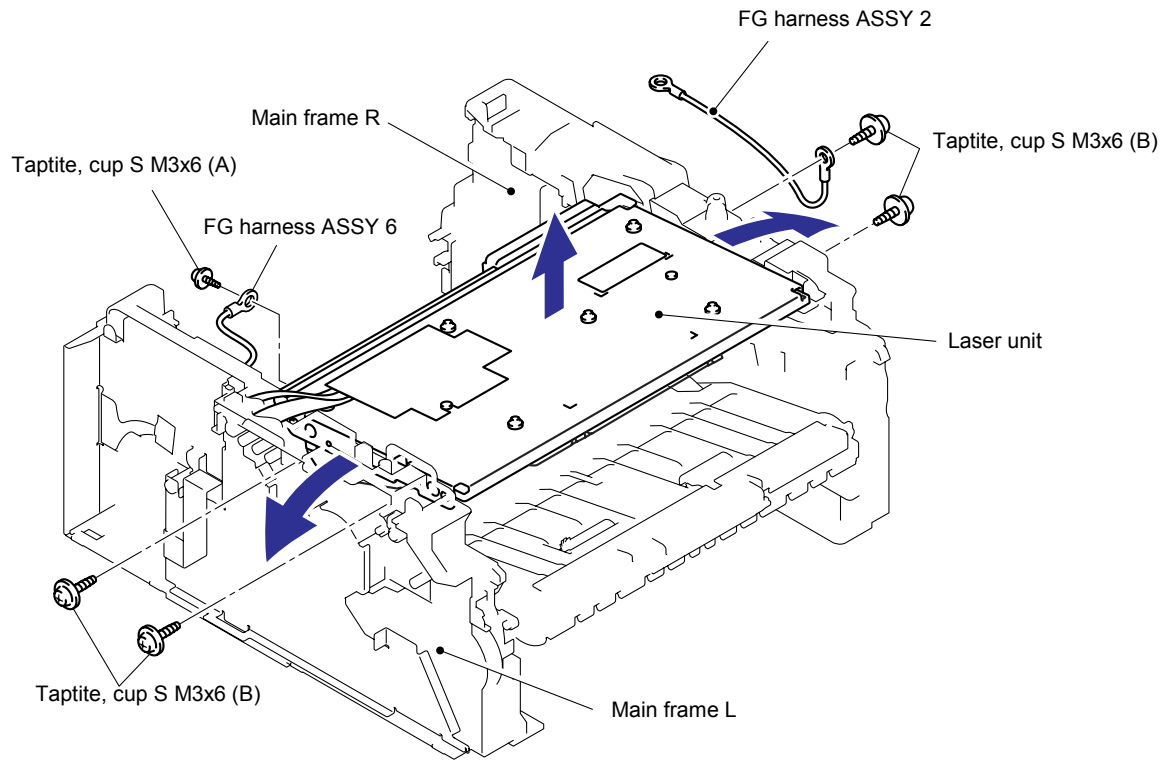


Fig. 4-47

- (4) Remove the filter ASSY from the air duct.
- (5) Remove the two cup S M3x6, taptite screws, and then remove the air duct.

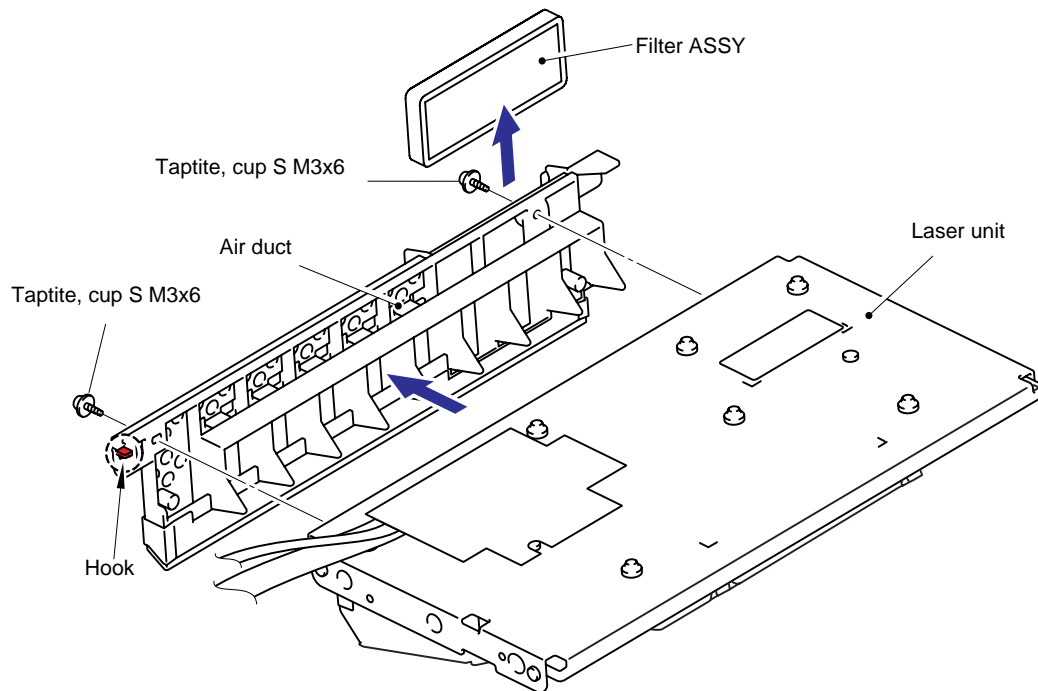


Fig. 4-48

NOTE:

- When replacing the laser unit, replace the barcode label attached on the gear plate calking ASSY with a new one supplied with a new unit.
- Another barcode label supplied with a new unit is spare. Make sure to throw it out.

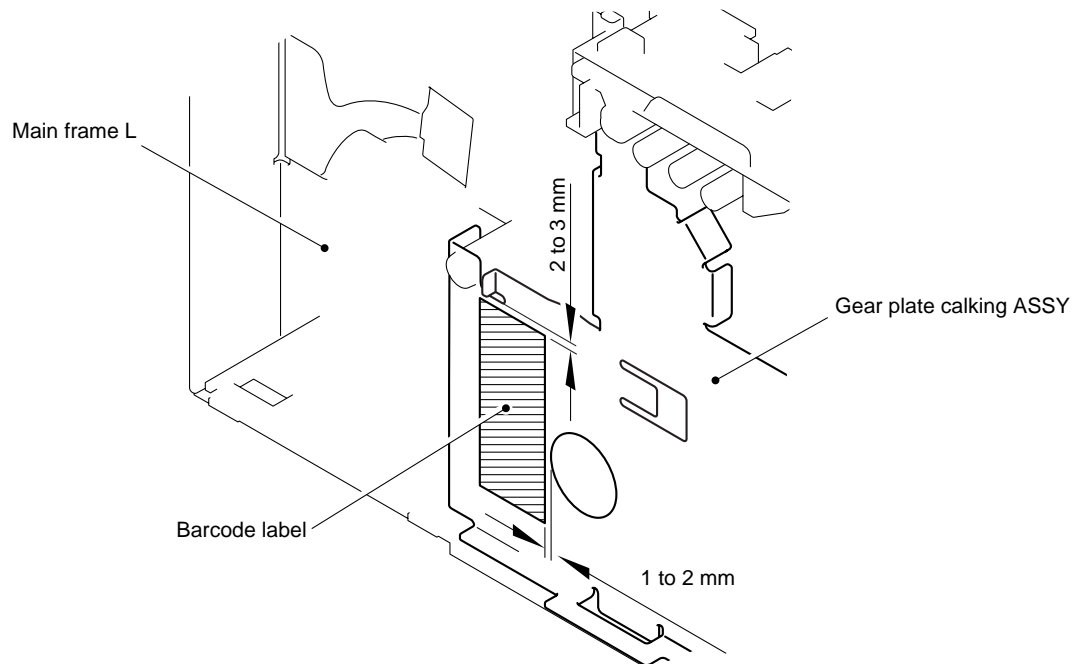


Fig. 4-49

3.17 Sub Chute ASSY

- (1) Remove the two bind B M4x12, taptite screws, and then remove the sub chute ASSY.

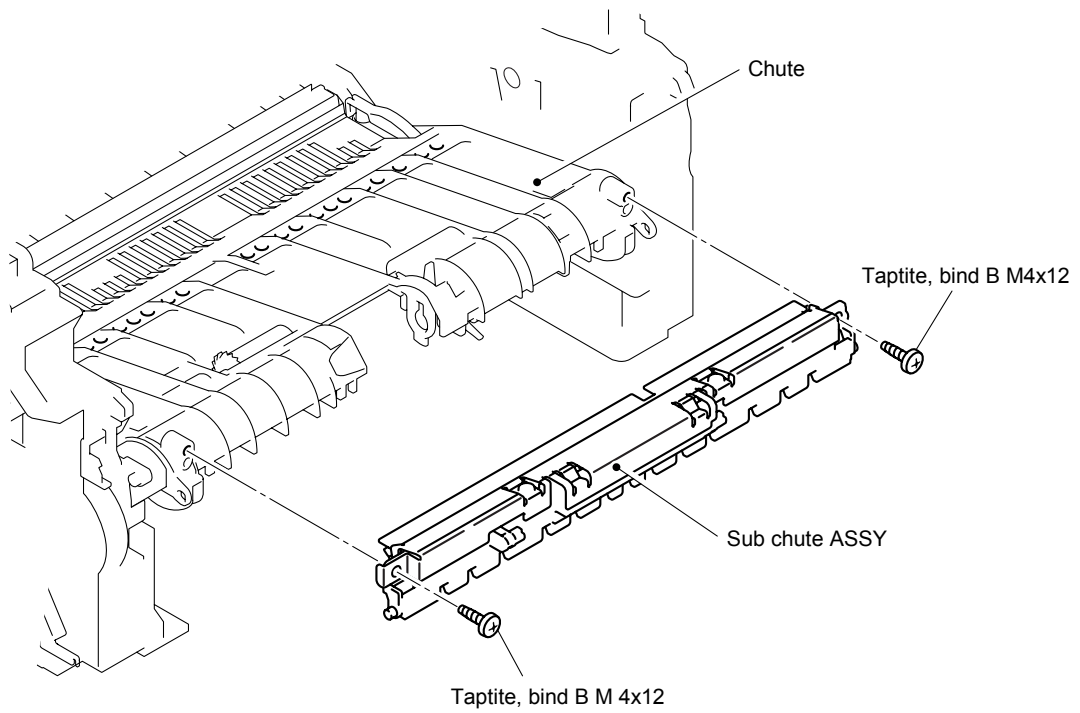


Fig. 4-50

3.18 Link Lever

- (1) Turn the printer body upside down.
- (2) Pull the "A" section outwards and remove the link lever.

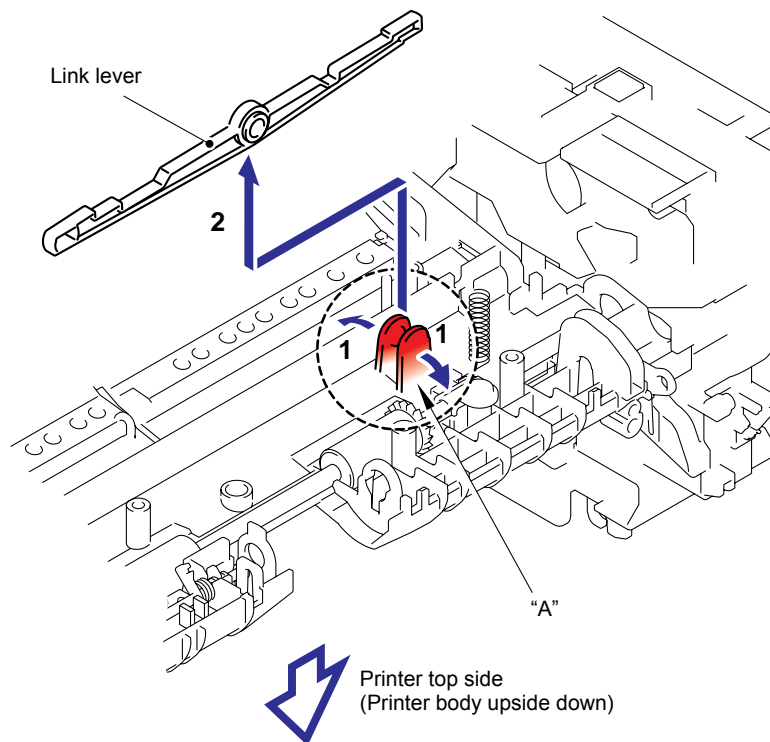


Fig. 4-51

NOTE:

When re-assembling the link lever, insert the end of the link lever into the main frame L referring to the figure below.

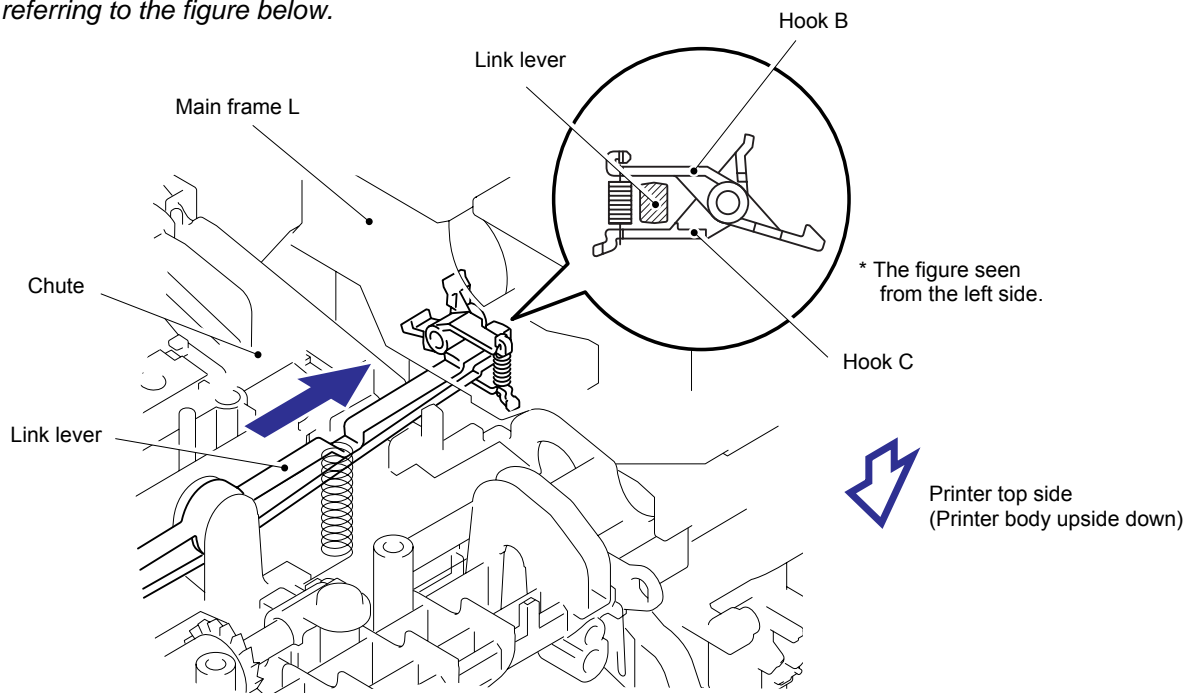


Fig. 4-52

3.19 Tail Edge Actuator

- (1) Remove the tail edge actuator with the tail edge spring.
- (2) Remove the tail edge spring from the tail edge actuator.

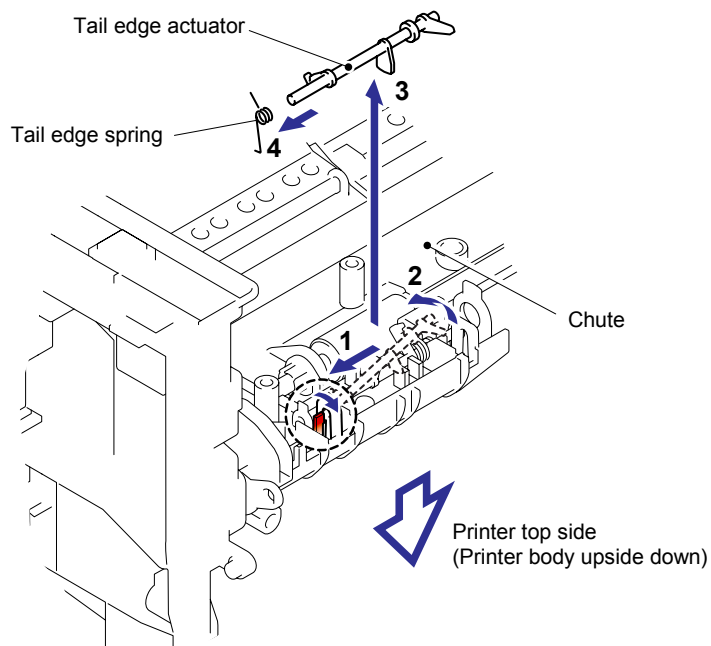


Fig. 4-53

3.20 Regist Front Actuator / Regist Front Spring

- (1) Remove the regist front actuator with the regist front spring.
- (2) Remove the regist front spring from the regist front actuator.

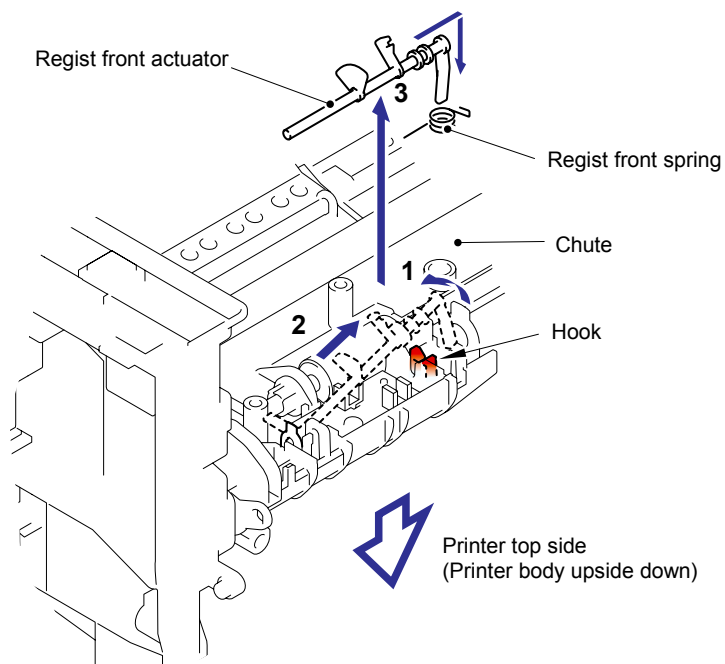


Fig. 4-54

3.21 Regist Sensor PCB ASSY

- (1) Remove the bind B M3x6, taptite screw.
- (2) Release the harness from the hook and remove the regist sensor PCB ASSY.

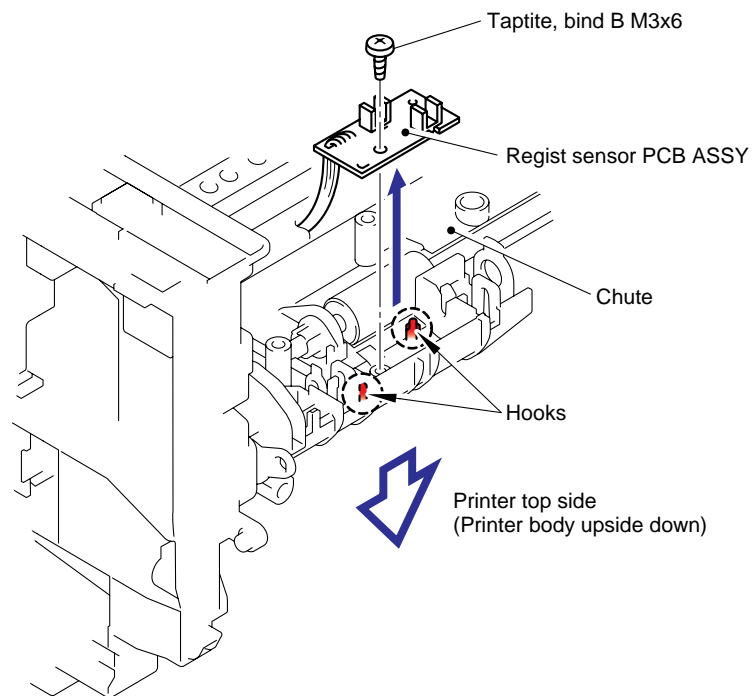


Fig. 4-55

3.22 Regist Rear Actuator / Regist Rear Spring

- (1) Remove the regist rear spring.
- (2) Remove the regist rear actuator.

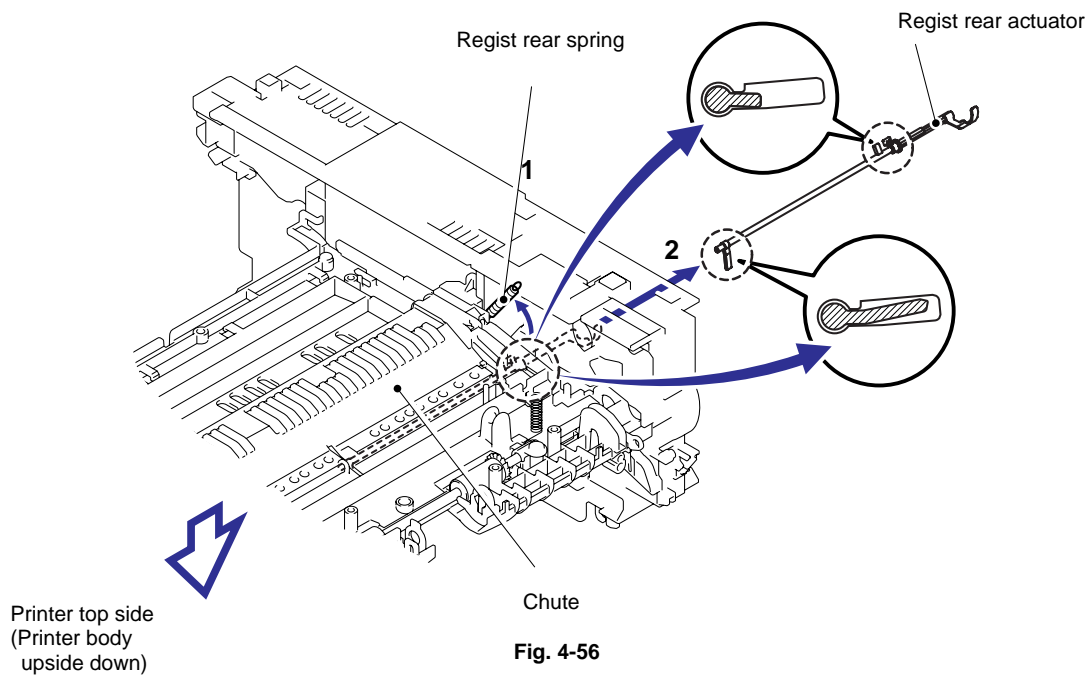


Fig. 4-56

3.23 Fan Motor 60 Unit

- (1) Remove the three bind B M4x12, taptime screws and three FG harness ASSY 1, 4, 5.
- (2) Remove the base plate.

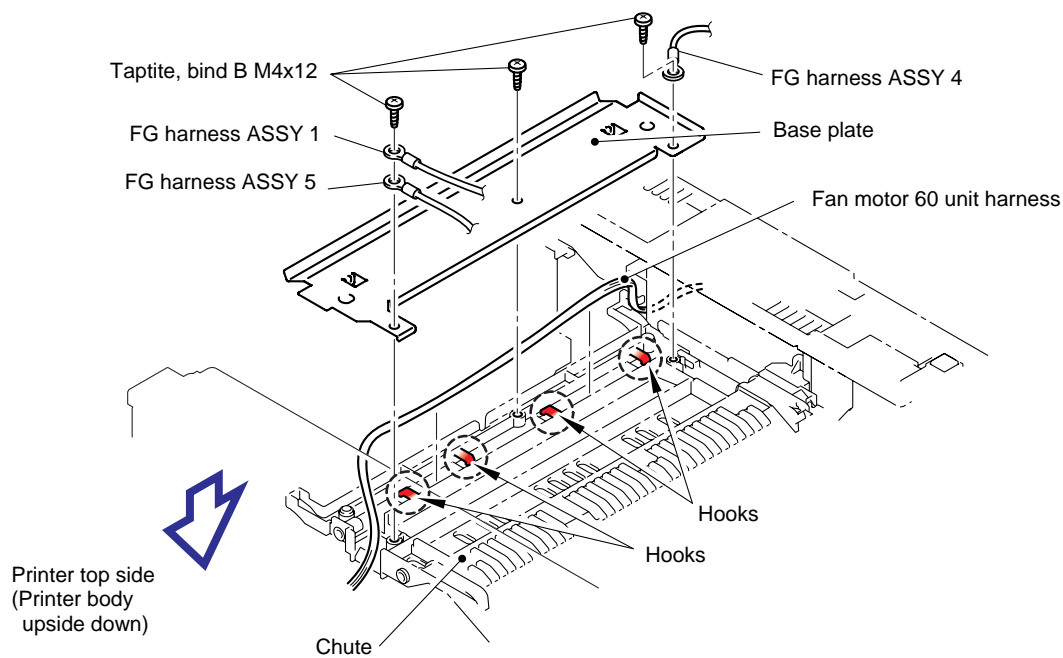


Fig. 4-57

- (3) Release the harness from the hook, and then remove the fan motor 60 unit from the main frame R.

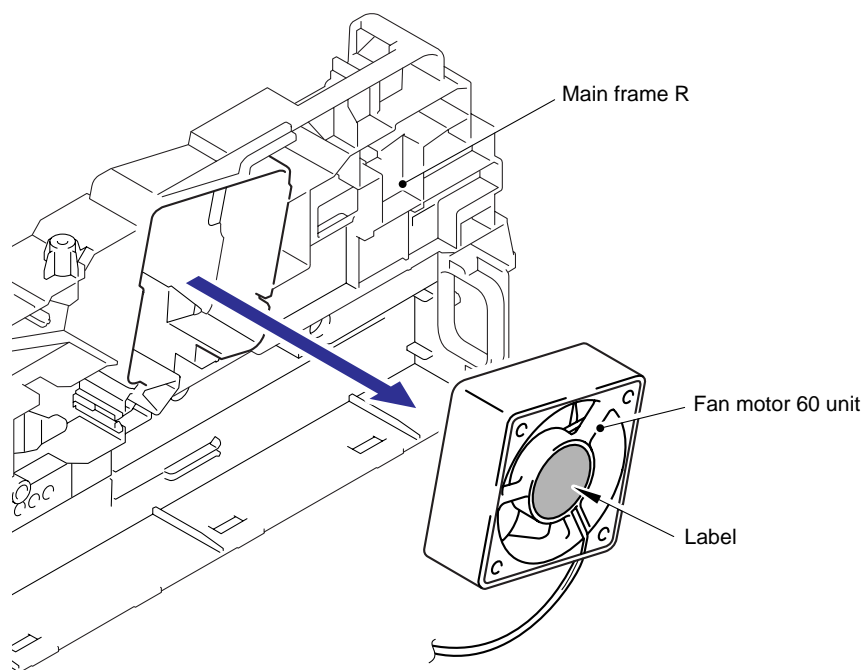


Fig. 4-58

CAUTION:

When re-assembling the Fan Motor 60 Unit, make sure to turn the side with a label outwards.

3.24 Toner LED PCB ASSY / LED Holder

- (1) Remove the toner LED PCB ASSY from the main frame R.

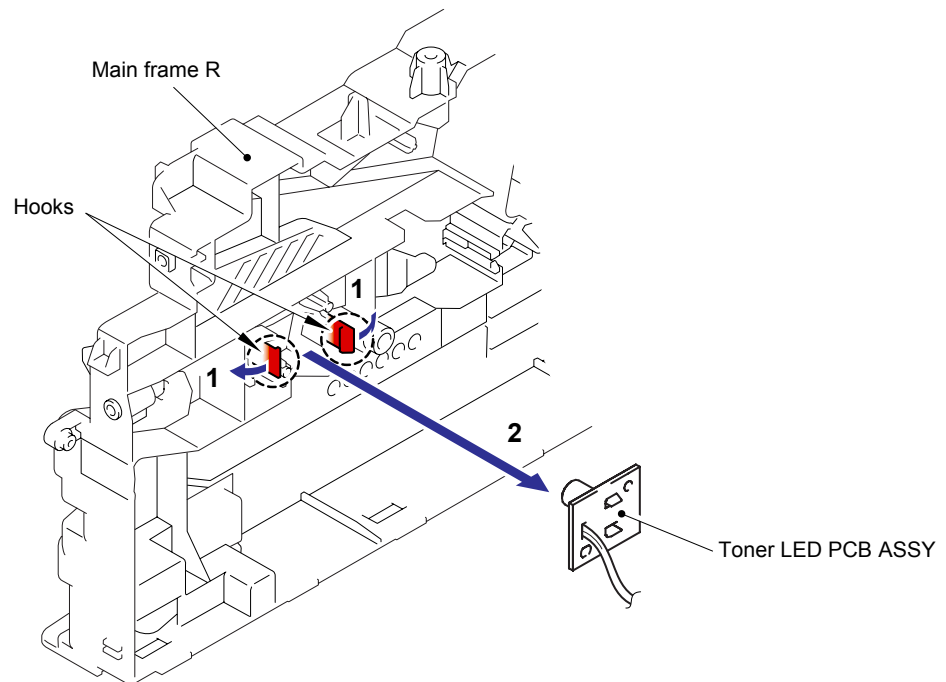


Fig. 4-59

- (2) Remove the LED holder from the toner LED PCB ASSY.

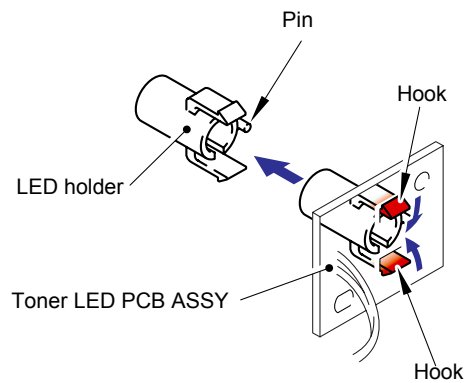


Fig. 4-60

3.25 New Toner Actuator / New Toner Actuator Spring

- (1) Remove the new toner actuator spring.
- (2) Release the hook and remove the new toner actuator from the main frame L.

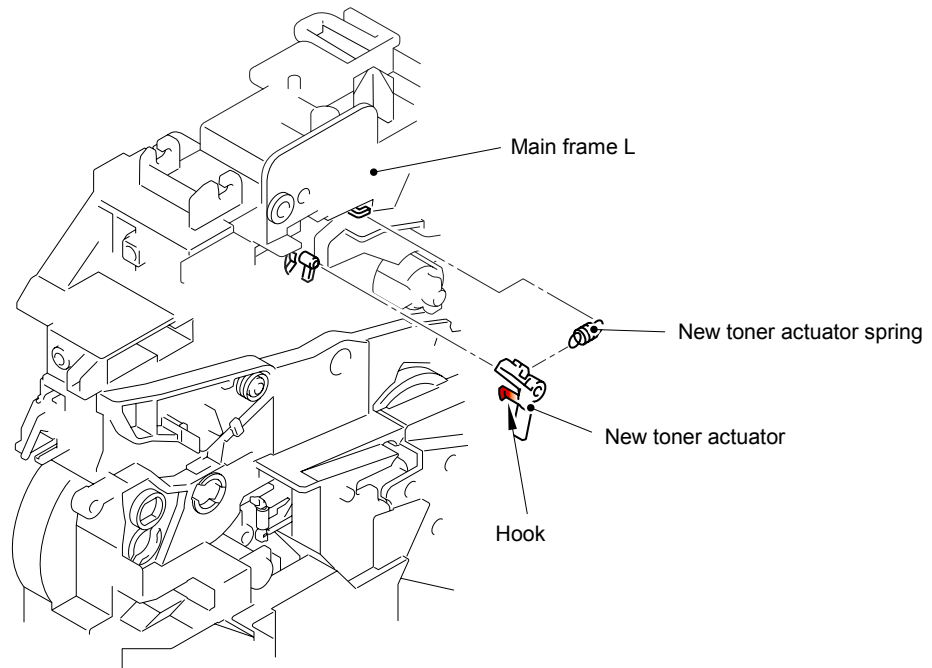


Fig. 4-61

3.26 New Toner Sensor

- (1) Release the two hooks and remove the new toner sensor from the main frame L.

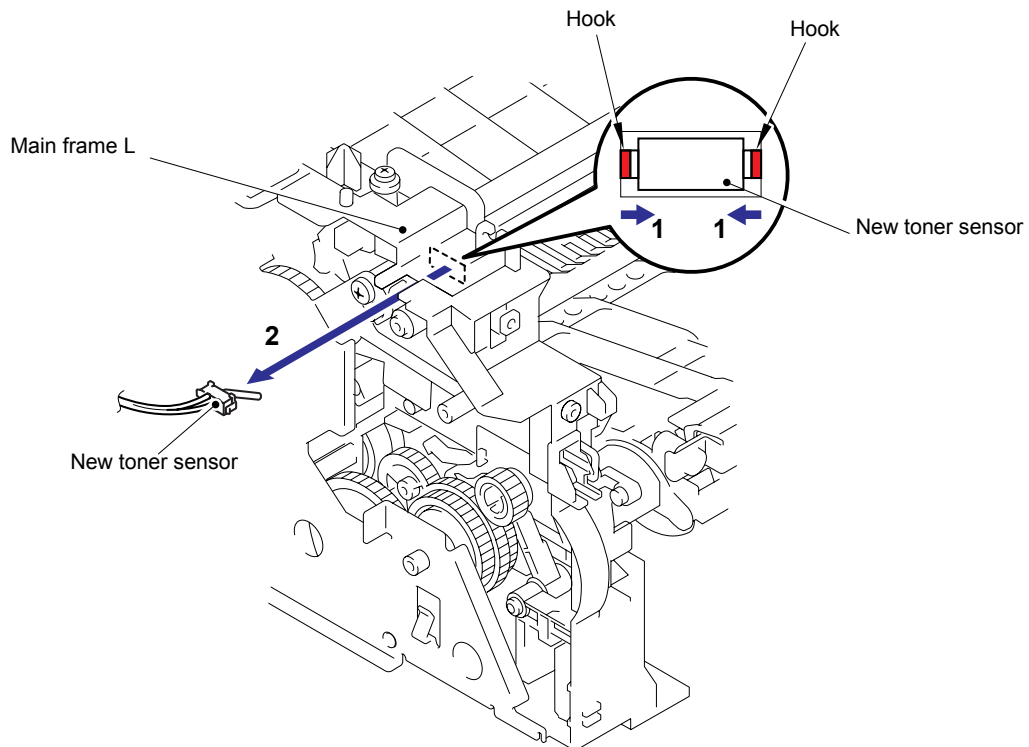


Fig. 4-62

3.27 Cover Sensor

- (1) Release the two hooks and remove the cover sensor from the main frame L.

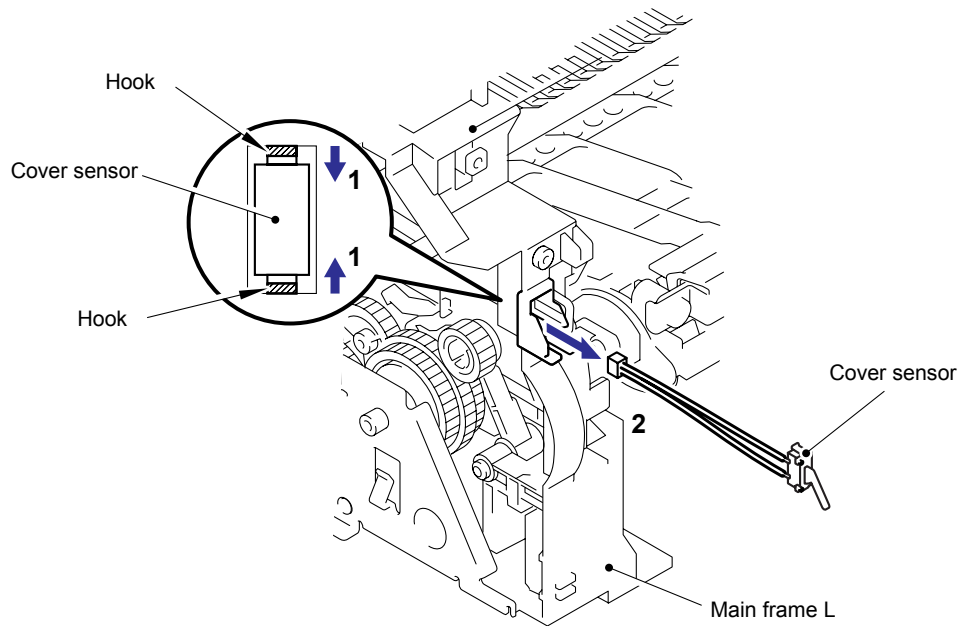


Fig. 4-63

3.28 Toner Sensor PCB ASSY

- (1) Remove the cup B M3x6, taptite screw, and then remove the toner sensor PCB ASSY.

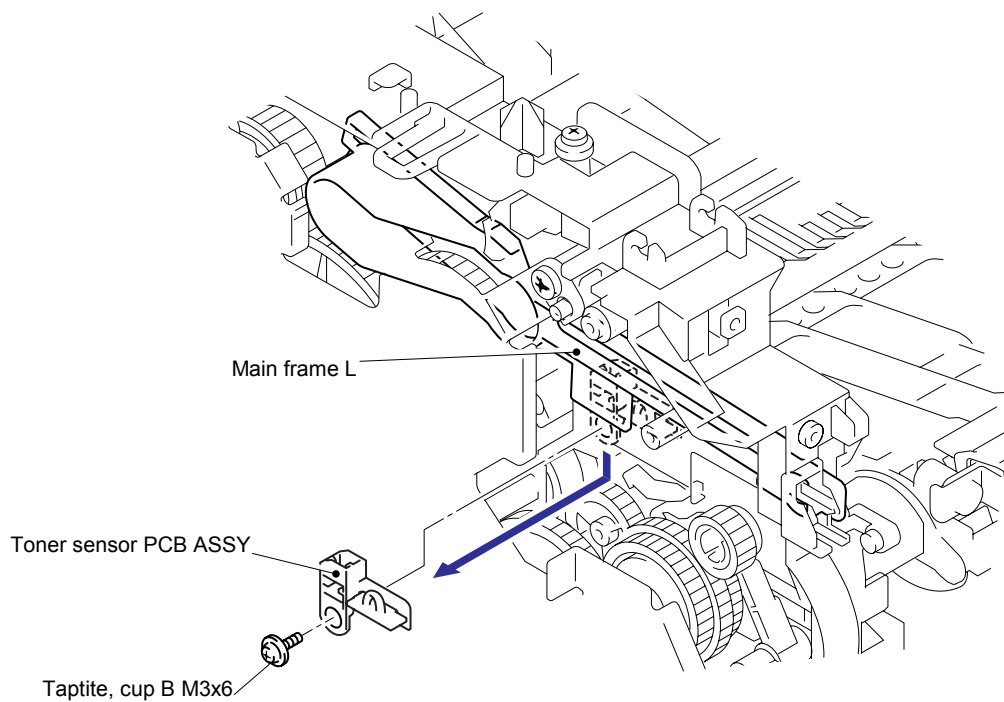


Fig. 4-64

3.29 Main Motor ASSY

- (1) Remove the Main PCB sheet.
- (2) Remove the four bind B M4x12, taptite screws and FG harness ASSY 4, and then remove the main shield plate.

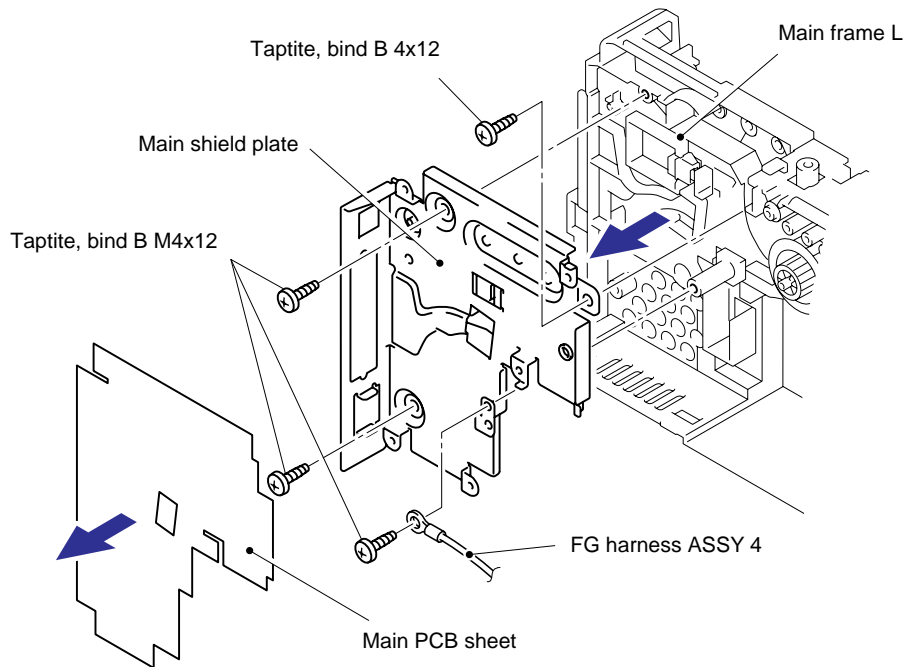


Fig. 4-65

- (3) Remove the HVPS insulation sheet.
- (4) Remove the five bind B M4x12, taptite screws, and then remove the gear plate calking ASSY.

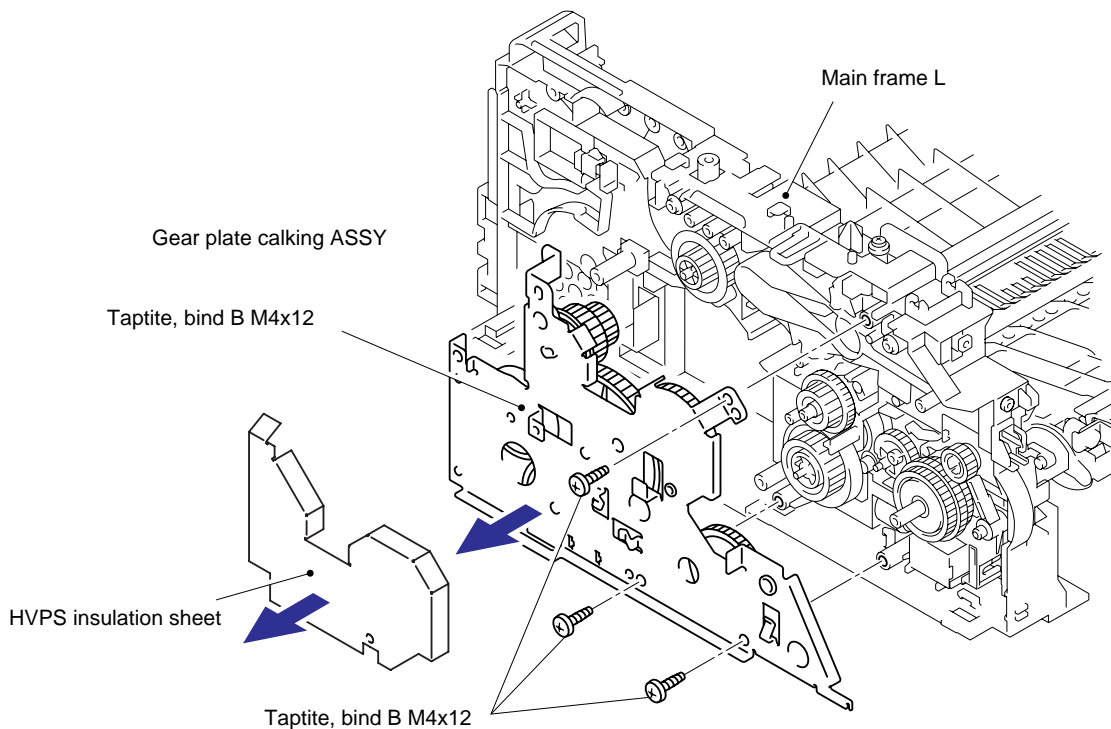


Fig. 4-66

- (5) Remove the three cup S M3x6, taptite screws, and then remove the main motor ASSY.

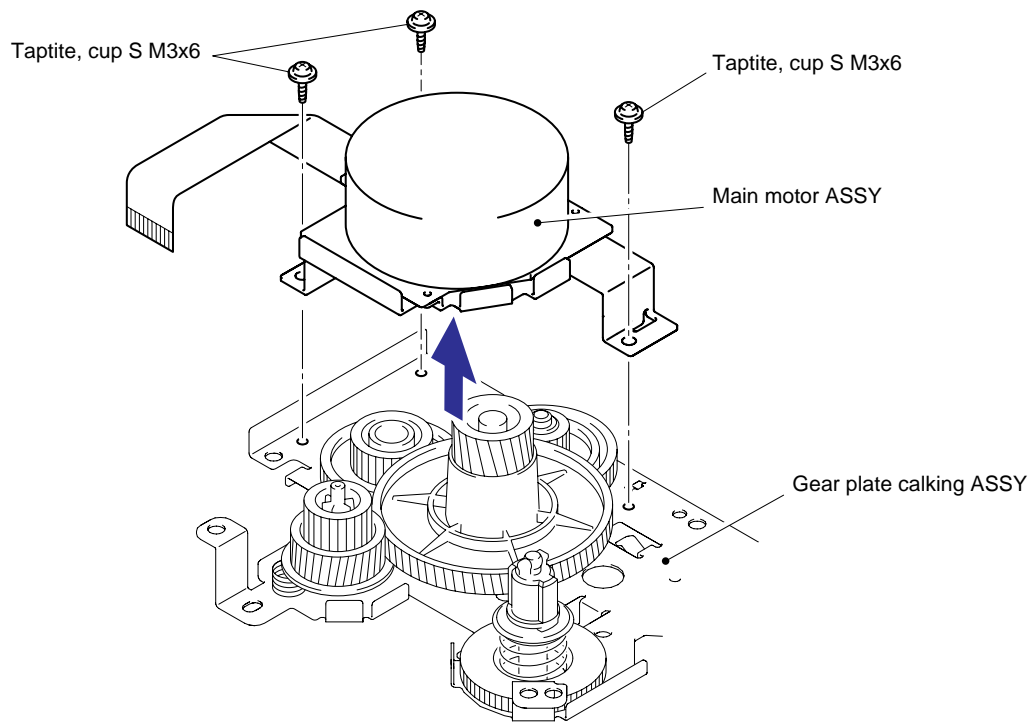


Fig. 4-67

3.30 Develop Joint

- (1) Remove the develop joint from the gear plate calking ASSY.

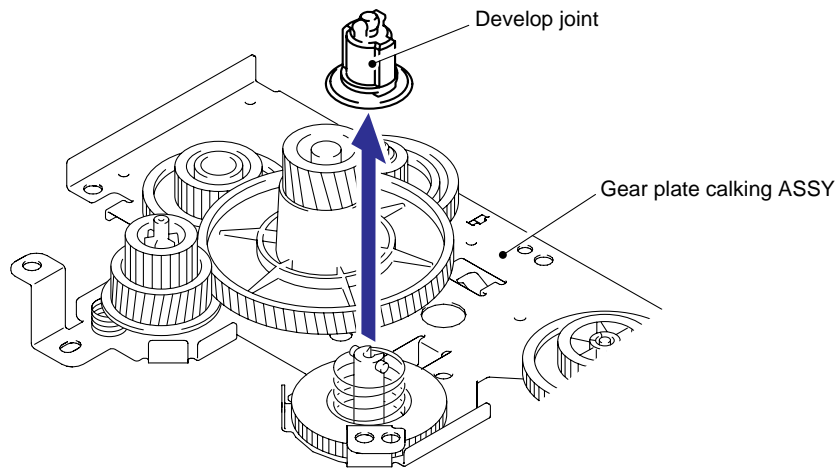


Fig. 4-68

3.31 P/R Solenoid ASSY

- (1) Remove the bind B M3x10, tapite screw.
- (2) Remove the P/R solenoid ASSY, the P/R solenoid lever and the solenoid release spring P/R.

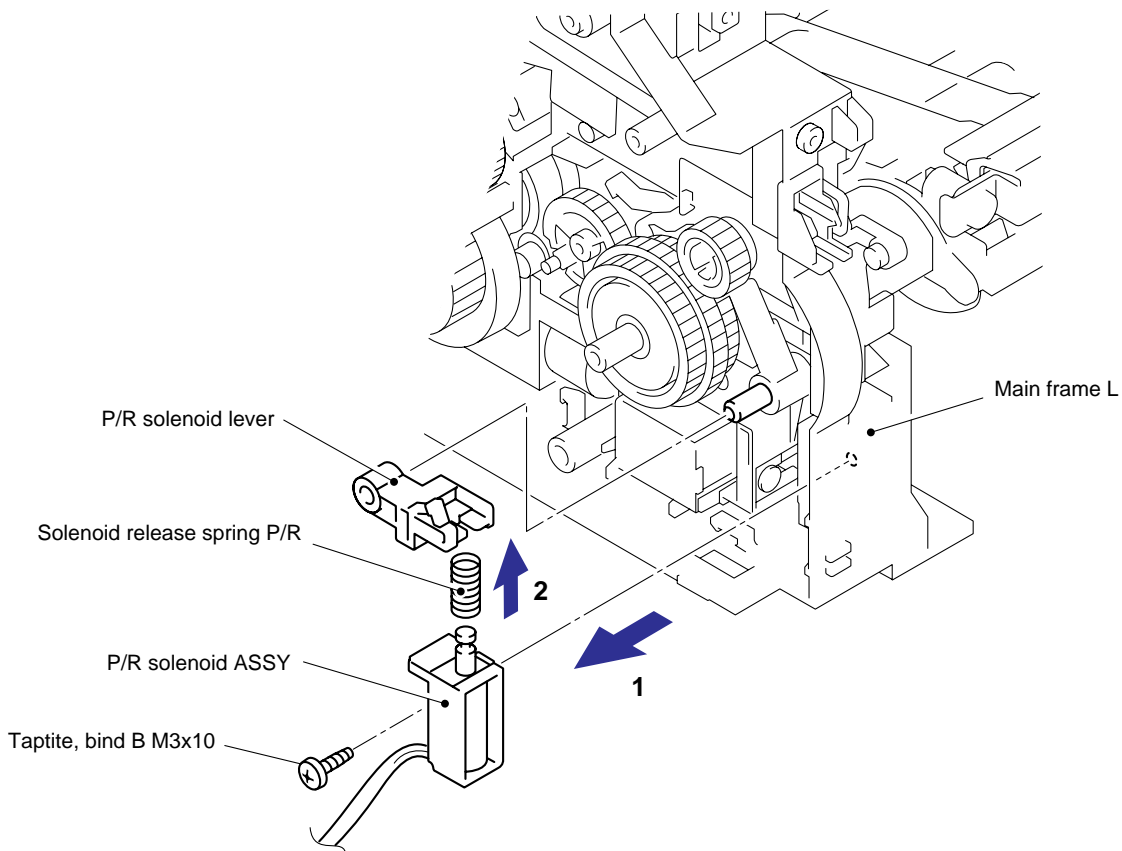


Fig. 4-69

3.32 F/R Solenoid ASSY

- (1) Remove the gear ASSY from the main frame L.

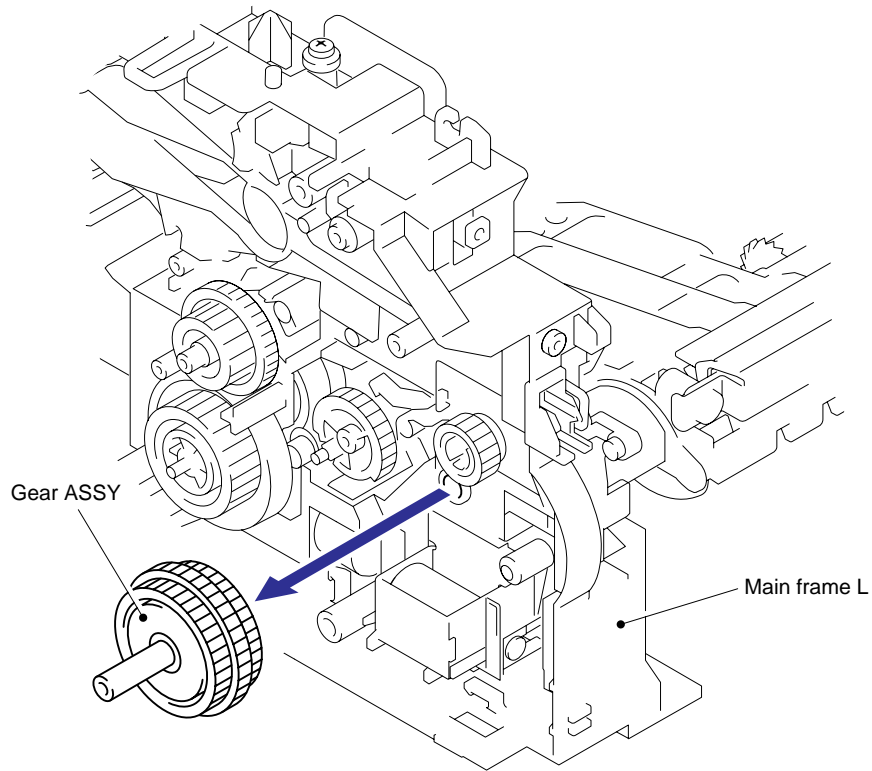


Fig. 4-70

NOTE:

The gear ASSY contains the small gears. Be careful not to lose them by disassembling the gear ASSY.

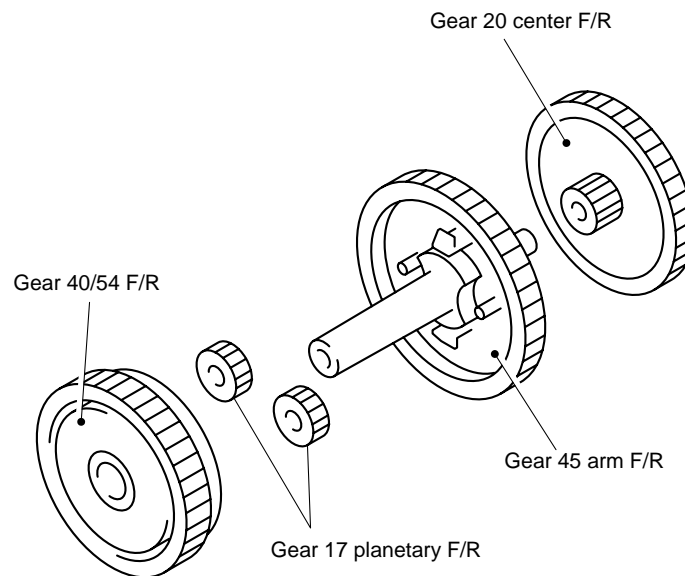


Fig. 4-66

- (2) Remove the bind B M3x10, taptite screw.
- (3) Remove the F/R solenoid ASSY, the F/R solenoid lever and the solenoid release spring F/R.

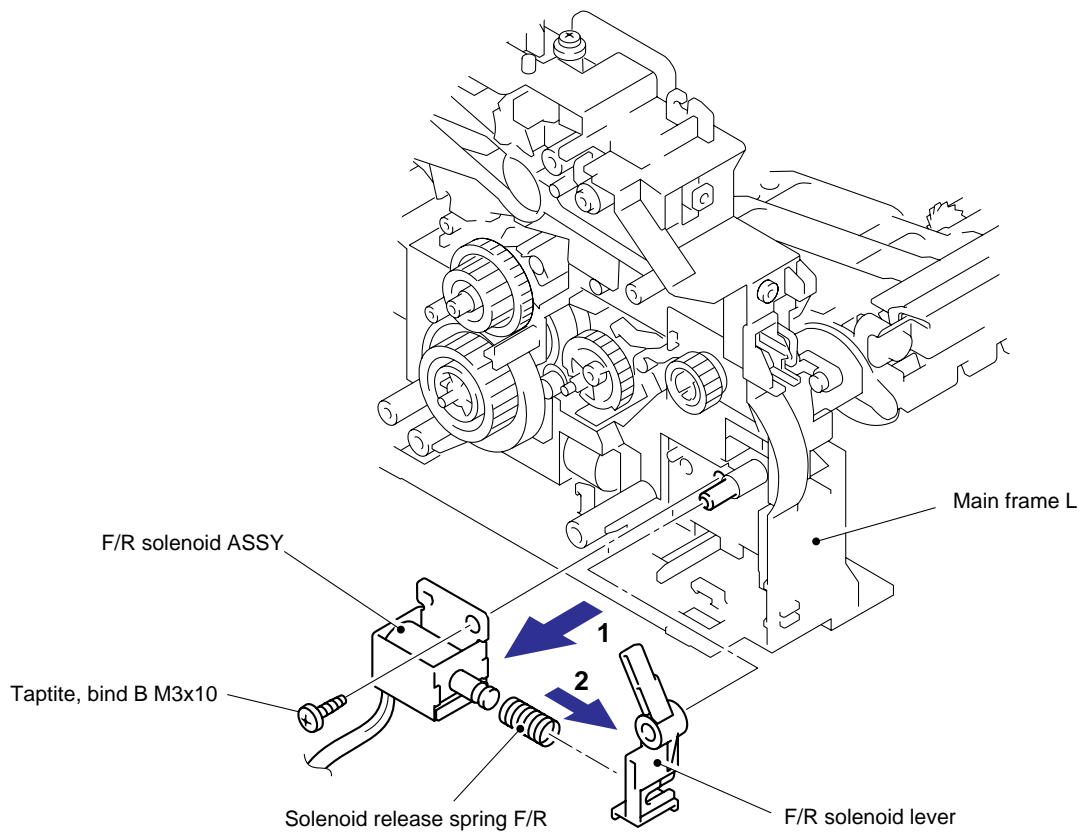


Fig. 4-72

3.33 Main Frame L

- (1) Remove the two bind B M4x12, taptite screws, and then remove the main frame L.

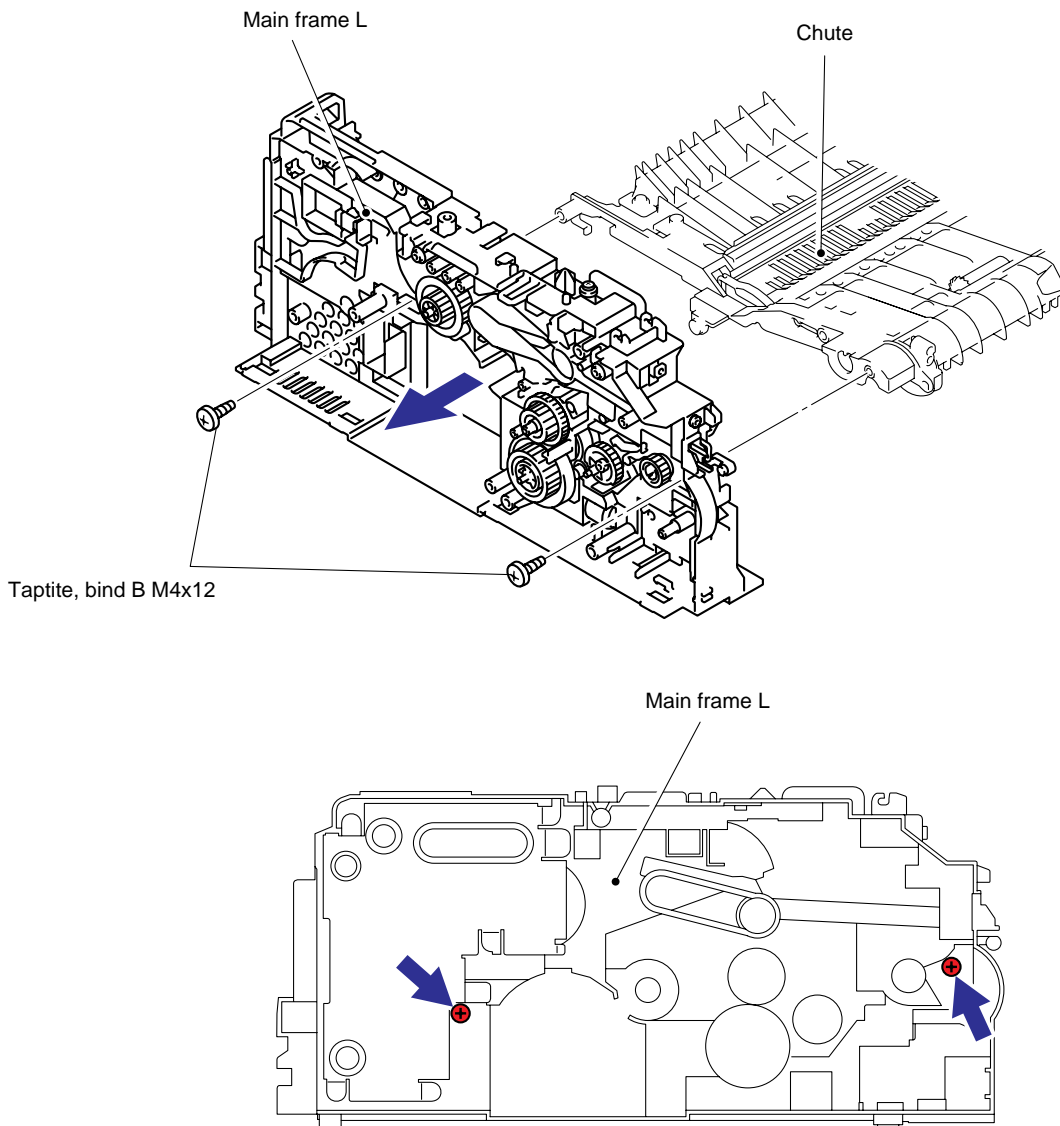


Fig. 4-73

3.34 Main Frame R

- (1) Remove the three bind B M4x12, taptite screws, and then remove the main frame R.

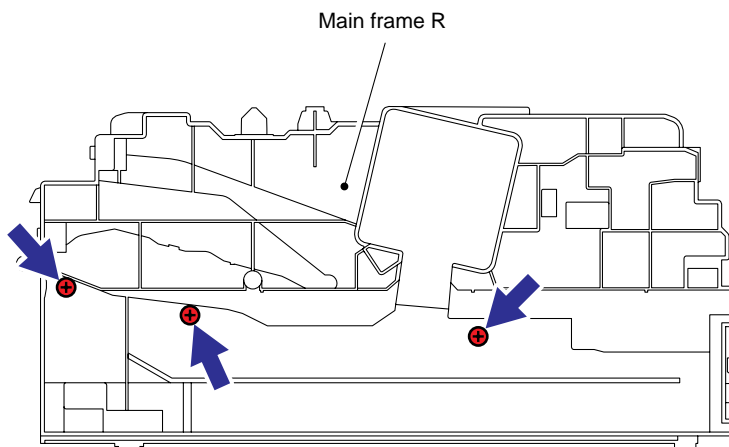
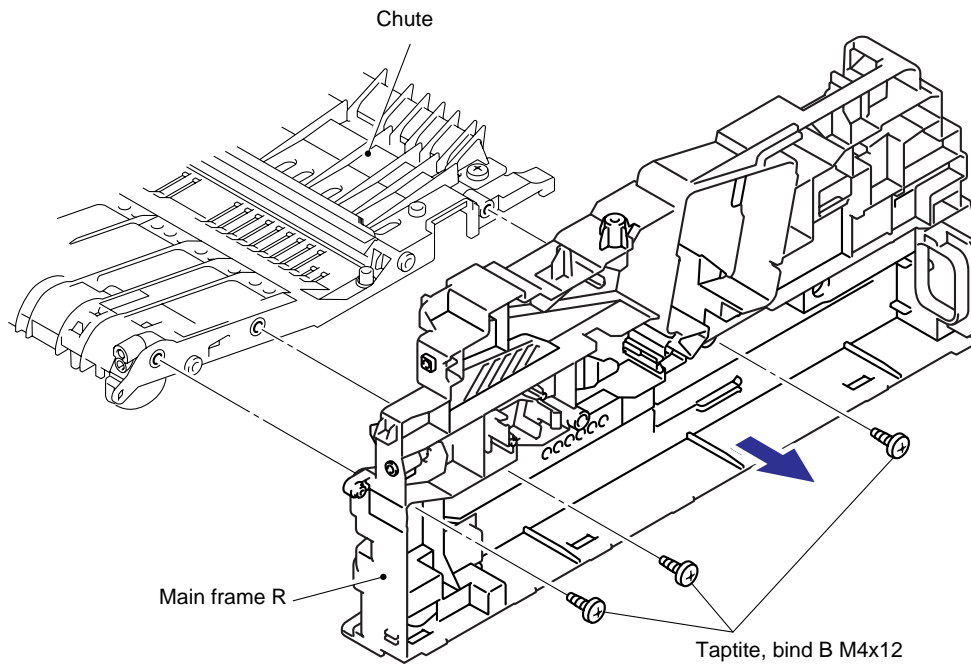


Fig. 4-74

4. PACKING

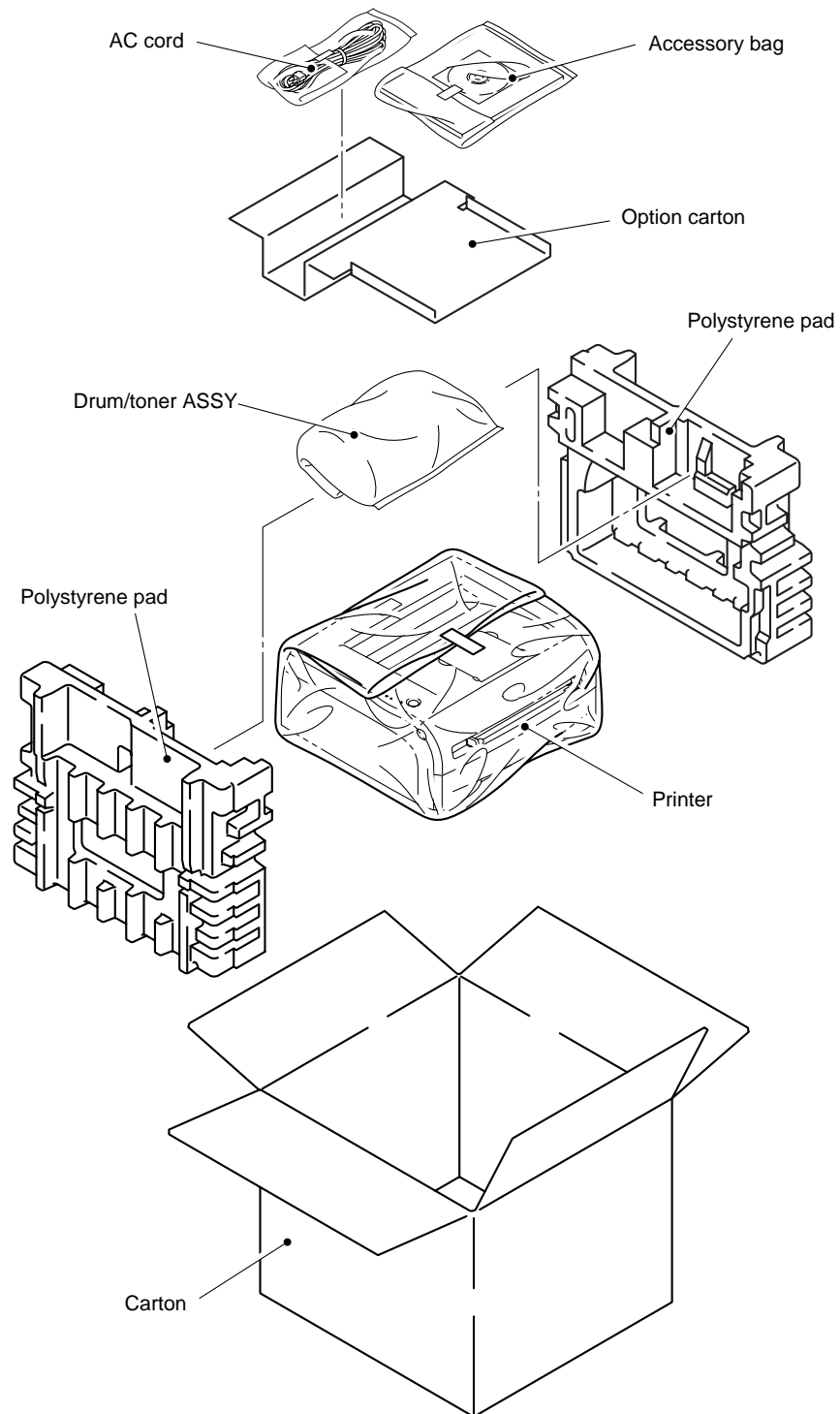
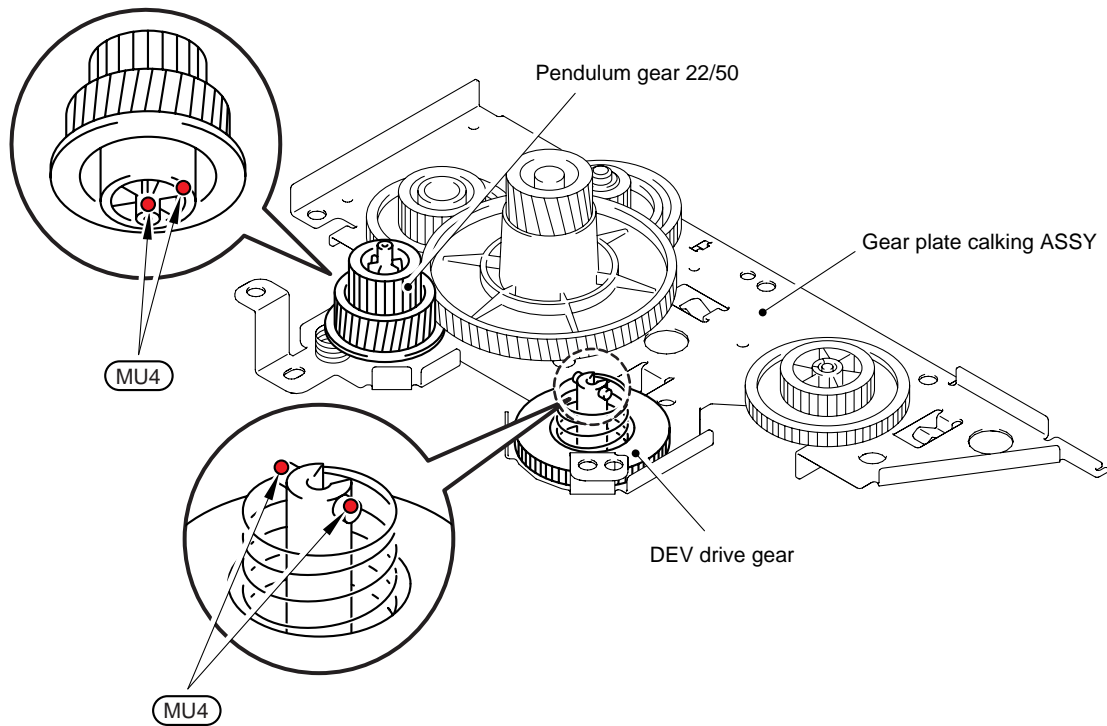
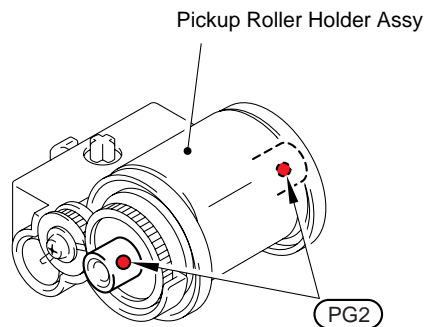


Fig. 4-75

5. LUBRICATION



* BG4: KANTO KASEI BG- MU (4 mm dia. Ball)



* PG2: PG- 661 (2mm dia. Ball)

6. GUIDELINES FOR LEAD FREE SOLDER

All components are soldered using lead free solder, be sure to use **lead free solder** that meets the following specification in the case of repair.

Lead free solder ; NIHON GENMA DHB-RMA3 NP303

(This can be distinguish from the lead free identification sign “LFH” on the MAIN PCB ASSY REV.)

However, the solder side of the MAIN PCB ASSY and other PCBs are soldered using lead content solder, use conventional lead content solder in the case of repair.

Since the reliability of soldering cannot be guaranteed if lead free solder and lead content solder are mixed, take care not to use the incorrect solder or mix the solder types.

Information on Manually Repairing PCB Soldered with Lead-Free Solder

This document provides information on how to correctly make manual repairs to a printed circuit board (PCB) soldered with lead-free solder.

1. Characteristics of lead-free solder

Melting point higher than that of conventional tin-lead solder

(Lead-free solder: approx. 220°C, Conventional tin-lead solder: approx. 180°C)

Relatively poor solder wettability and spread (difficult to wet and spread), and hard

Appearance (dull and grainy surface) different from that of conventional solder

Relatively poor wettability, rough surface (bumps are likely to be formed), and solder dragging

Poor solder elevation

Poor thermal conductivity and heat resistant (difficult to melt)

2. Metal composition & wire solder

The metal composition of lead-free solder allowed for use on PCBs for Brother's products is following.

LF Indication		Compositon	Manufacturer	Origin	Name
1		Sn/Ag/Cu	Nihon Genma	Japan	DHB-RMA3 NP303
H	only Component-side	Sn/Ag/Cu	Nihon Genma	Japan	DHB-RMA3 NP303

We use wire solder which is indicated by digit after LF indication on PCB.

Wire solder made in the contries except Japan are under investigation, and will be evaluated.

3. Appearance quality criteria

The appearance of the surface of portions soldered with lead-free solder is basically the same as that for those soldered with conventional lead-tin solder, except for the following points.

- 1) The surface of a portion soldered with lead-free solder is dull and not smooth.
- 2) Shrinkage cracks can be observed on the surface of a portion soldered with lead-free solder. (They can be observed using a magnifying glass with approx. 10x magnification.)

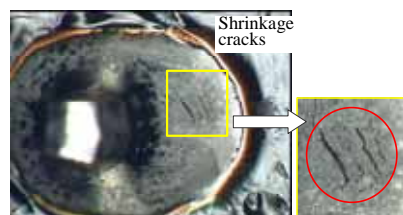


Fig. 1 Shrinkage Cracks

4. Identification of lead-free solder on PCBs

For PCBs that use lead-free solder, "LF" is indicated by silk-screen printing or attaching a label. "LF" stands for lead free and indicates that the PCBs bear such an indication have been soldered with lead-free solder. A digit is given in a box following "LF" if produced by silk-screen printing or follows "LF" without a box on an attached label, the digit indicating the metal composition and wire solder.

5. Precautions for hand soldering operations

- 1) Soldering operations using lead-free solder are basically the same as those using tin-lead solder, however, due to the lead-free solder's characteristics of being difficult to melt, wet, and spread, as well as being hard, a soldering iron needs to be applied for a longer period of time than when soldering with conventional tin-lead solder. While soldering is being performed, it must be confirmed that the lead-free solder is spreading. When solder needs to be added when repairing PCBs, the solder must only be added after sufficiently melting the previously soldered area. When poor soldering is repaired, the solder of the poorly soldered area must be sufficiently removed and lead-free solder newly supplied.
- 2) Before starting soldering operations, it must be determined whether or not the PCB has an "LF" indication. If the PCB has an "LF" indication, lead-free solder corresponding to the digit following "LF" must be used. Conventional solder including lead (tin-lead solder) must not be used on a PCB that has an "LF" indication. (Use of tin-lead solder on a PCB having an "LF" indication is prohibited.)
- 3) A soldering iron for exclusive use with lead-free solder must only be used; a soldering iron used for soldering with tin-lead solder must not be used with lead-free solder. The use of soldering irons designed for lead-free solder is desirable (see "7. Soldering iron" below).
- 4) The requirement for the temperature of the soldering iron's tip is the same as that for soldering using conventional solder; the temperature of the soldering iron's tip must not be raised even though the melting point of the lead-free solder is higher. The temperature of the soldering iron's tip is restricted to the temperature that the component to be soldered can resist. It should be noted that the temperature that the components to be soldered with lead-free solder can resist has not increased even though the melting point of the solder has.
- 5) A soldering iron must be correctly applied.
Even though the melting point of the solder has increased, soldering operations must be performed with the soldering iron's tip at the same temperature as prescribed before. Therefore, heat needs to be effectively applied from the tip of the soldering iron to the base metal. For effective heat application, the shape of the soldering iron's tip and application of the soldering iron (position and angle relative to the base metal) need to be more strictly controlled than before.
- 6) The soldered point must be left as it is after the soldering iron is removed for a period of time longer than that required when soldering is performed with conventional solder.
The amount of heat applied to the base metal increases due to the higher melting point of the lead-free solder, and the base metal is heated to higher temperatures. Consequently, it takes time for the melted solder to cool and to solidify and, therefore, the soldered area must be left as it is after the soldering iron is removed for a longer period of time.
- 7) A localized ventilation system and gloves are required for soldering operations.
Lead-free solder does not contain the toxic substance lead, however, inhalation of the fumes may adversely affect the health of workers. The silver contained in lead-free solder is also a toxic substance, though it is not as toxic as lead, and, therefore, a localized ventilation system and gloves are required for lead-free solder soldering operations, as required for those with conventional solder.

6. Soldering irons

When soldering is performed manually using lead-free solder, a soldering iron that has little reduction in its temperature needs to be used. This refers to a soldering iron that has a smaller degree of decrease in the temperature at the soldering iron's tip, such as when the soldering iron is applied to the base metal or solder is supplied, and the temperature is soon returned to the specified temperature.

With soldering operations using lead-free solder, the requirement for the temperature of the soldering iron's tip is the same as that for conventional solder, however, the melting point of lead-free solder is higher than that of conventional solder so productivity will decrease with conventional soldering irons.

Some tool manufacturers sell soldering irons designed for lead-free solder and that can maintain the productivity of the soldering operations.

The soldering irons used at BIL are model no. 941 manufactured by HAKKO and M6-SIC-40 manufactured by BONKOTE. The prices of these soldering irons for use with lead-free solder are three to four times higher than those for conventional soldering irons with a temperature controller built in.

7. No mixing of different solders

When repairs are made on a PCB with an "LF" indication on it, lead-free solder with the same metal composition, which is expressed by the digit following "LF", must be used on a single PCB. For a PCB with an "LF" indication on it, neither tin-lead solder nor lead-free solder with a different metal composition must be used.

Compatible solder for each countries are listed below. Solders are freely available from each manufacturer. Visit the web site below for more detail.

Countries	Manufacturer	Origin	Name	Web site
For Japan, UK, Finland, Germany, France, Sweden	ALMIT	JAPAN	KR-19 SH RMA LFM-48	http://www.almit.com
For World wide except Australia, New Zealand	KESTER	U.S.A.	KESTER245 KESTER285	http://www.kester.com
For Worldwide	AIM	CANADA	CASTIN RMA2	http://www.aimsolder.com

7. SCREW TORQUE LIST

1 Frame

No.	Parts code	Parts name	Location	Pcs	Tightening torque N m (kgf • cm)
1	085411216	Taptite, bind B M4 x 12	Gear plate	5	0.8 ±0.1(8±1)
			Main shield plate 3	2	
			Sub chute	2	
			Base plate	3	
			Chute	5	
			HVPS PCB	2	
			LV shield	1	
			Chute base	6	
2	087320616	Taptite, cup S M3 x 6	Main motor	3	0.7 ±0.1(7±1)
			Air duct	2	
			Scanner plate	4	
			Main PCB (HL-2030/2040)	4	
			(HL-2070N)	5	
			HVPS PCB	2	0.5 ±0.05(5±0.5)
			PS PCB	2	
3	084320815	Taptite, flat S M3 x 8	LV shield plate cover	2	
4	LM2048001	Screw pan (S/P washer) M3.5 x 6	PS PCB (AC inlet)	2	0.6 ±0.1(6±1)
			PS PCB (Ground wire)	1	0.6 ±0.1(6±1)
			LV shield plate cover	2	
5	085310616	Taptite, bind B M3 x 6	Regist sensor PCB	1	0.25 ±0.05 (2.5±0.5)
6	085311016	Taptite, bind B M3 x 10	P/R solenoid, F/R solenoid	2	0.5 ±0.1(5±1)
7	087411216	Taptite, cup B M4 x 12	Fixing unit	2	0.8 ±0.1(8±1)
8	087310816	Taptite, cup B M3 x 8	Panel PCB	1	0.4 ±0.1(4±1)
9	087310616	Taptite, cup B M3 x 6	Toner sensor PCB	1	0.4 ±0.1(4±1)
10	002300803	Screw, pan M3 x 8	Parallel port	2	0.5 ±0.1(5±1)

2 Fixing Unit

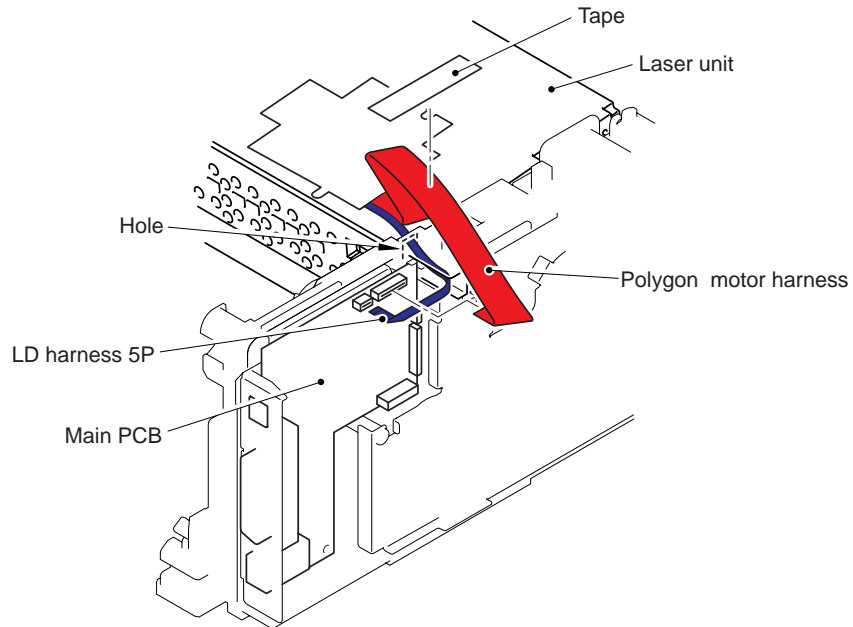
No.	Parts code	Parts name	Location	Pcs.	Tightening torque N m (kgf • cm)
1	LM3855001	Screw pan (S/P washer) M3 x 8DA	Halogen heater	2	0.6 ±0.05 (6±0.5)
2	LM3855001	Screw pan (S/P washer) M3 x 8DA	Thermostat, Thermal fuse	4	0.6 ±0.1(6±1)
3	087311216	Taptite, cup B M3 x 12	Thermistor	1	0.6 ±0.1(6±1)

3 Cover

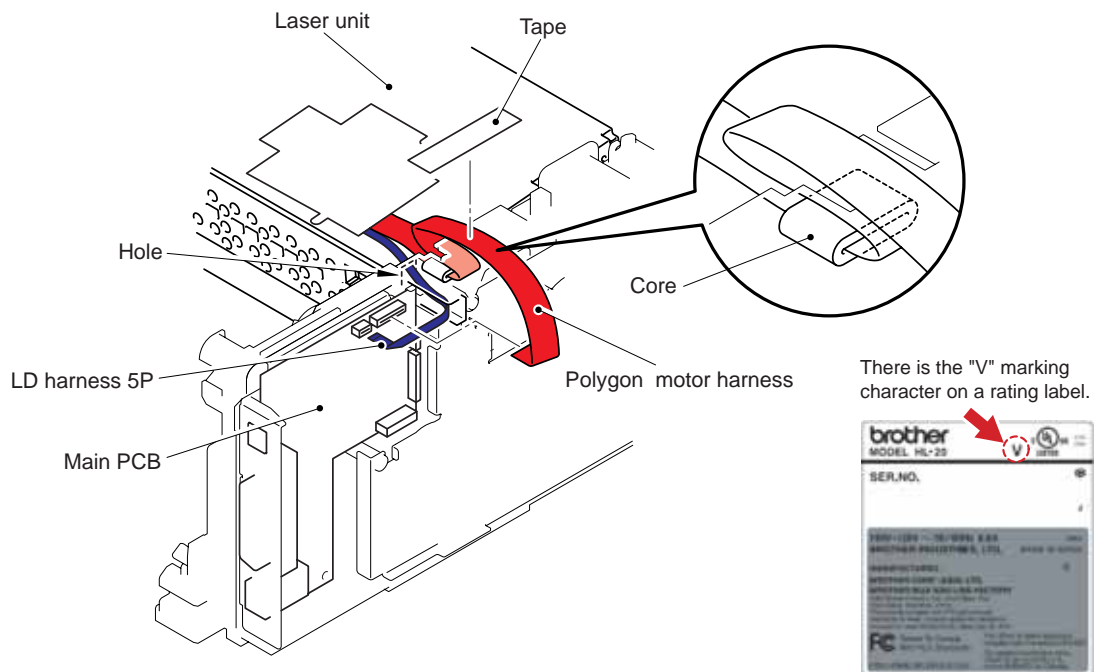
No.	Parts code	Parts name	Location	Pcs.	Tightening torque N m (kgf • cm)
1	085411216	Taptite, bind B M4 x 12	Top cover	2	0.8 ±0.1(8±1)
			Inner chute	2	
			Side cover L	2	
			Side cover R	2	

8. HARNESS ROUTING

1 · Laser unit

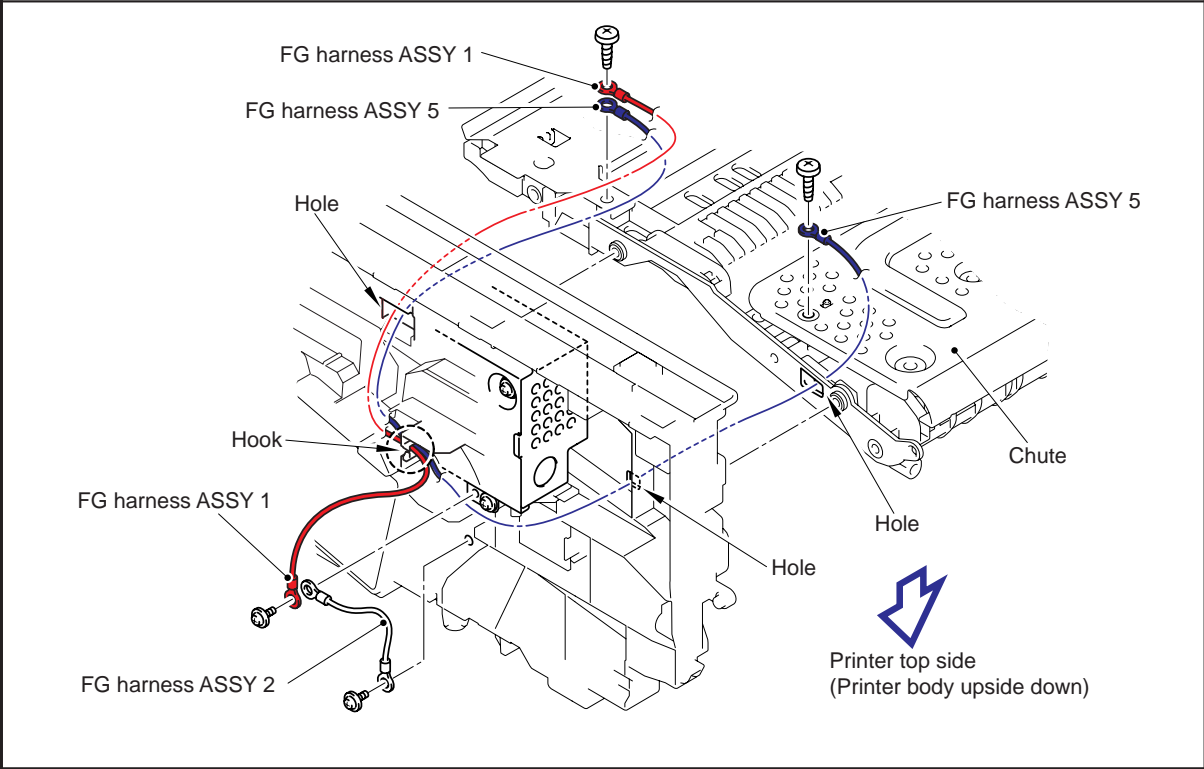


2 · Laser unit (with the "V" marking character on a rating label)



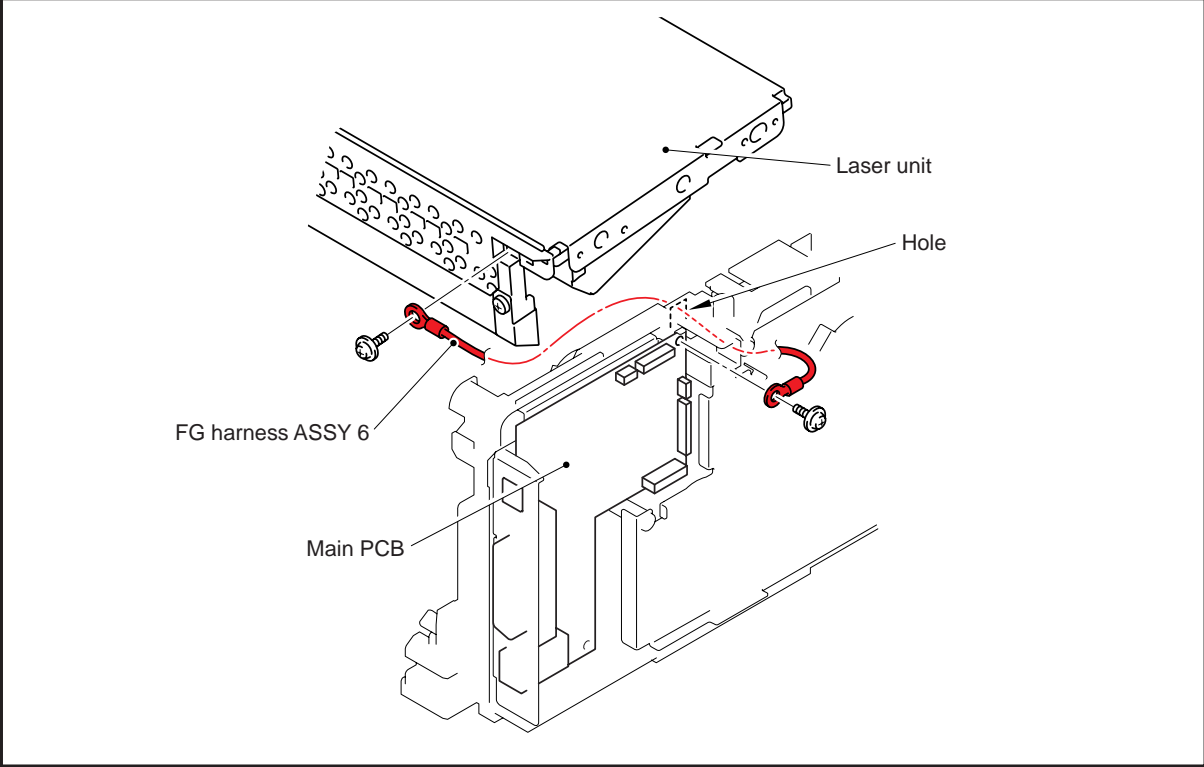
3

· FG harness ASSY 1 / FG harness ASSY 2 / FG harness ASSY 5

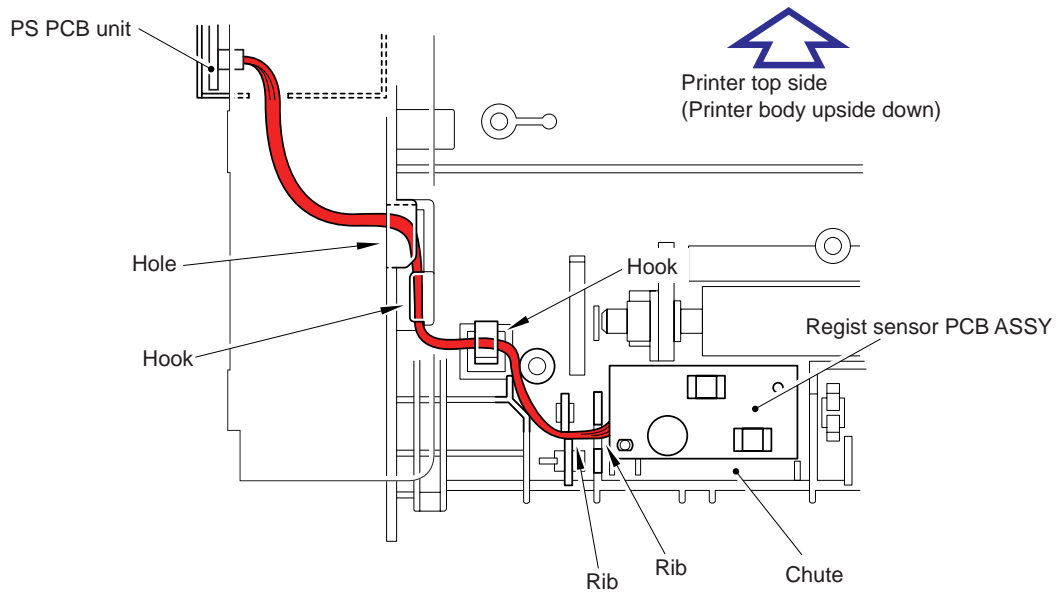


4

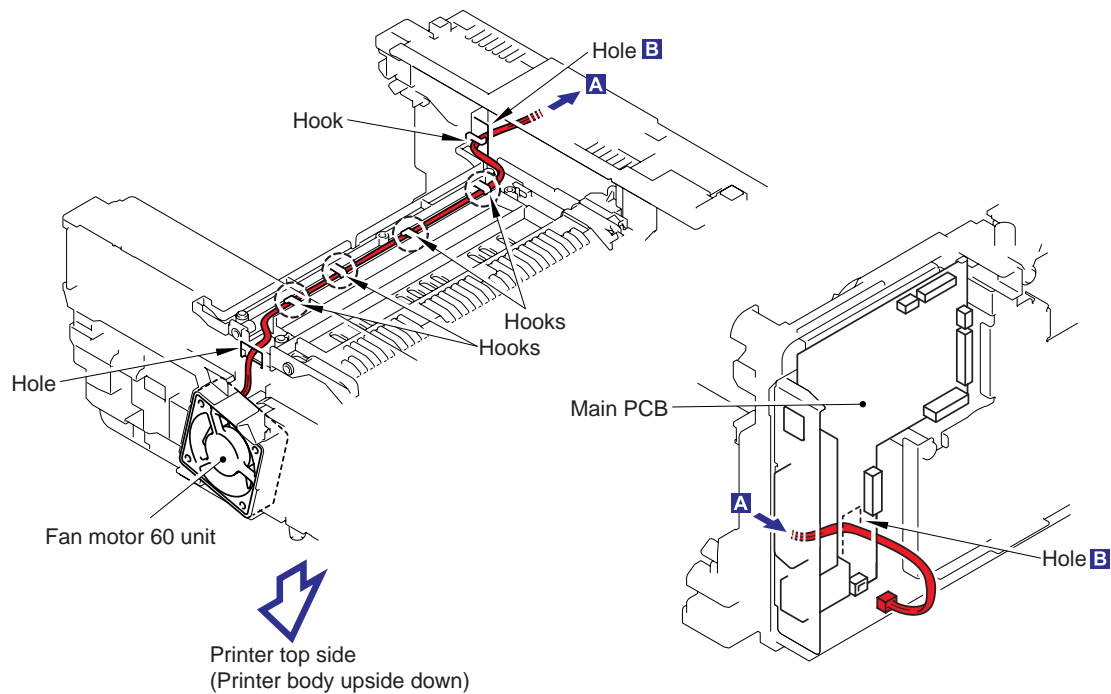
· FG harness ASSY 6



5 · Regist sensor PCB ASSY

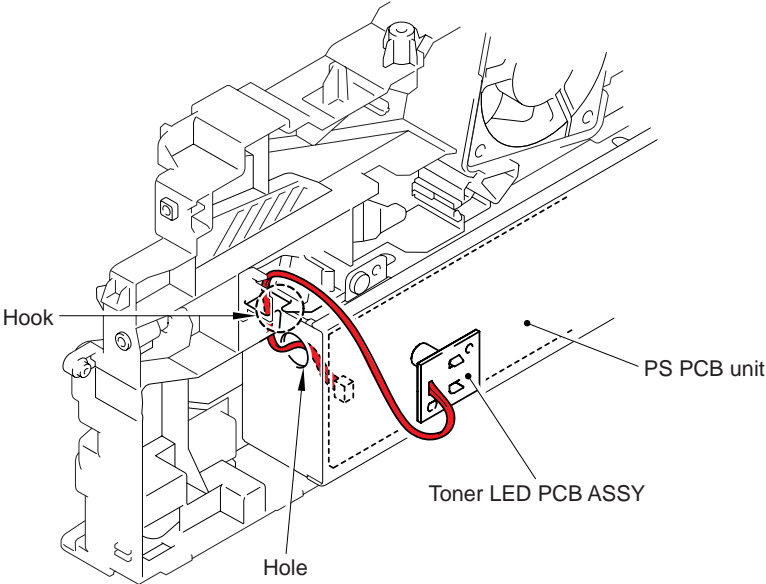


6 · Fan motor 60 unit



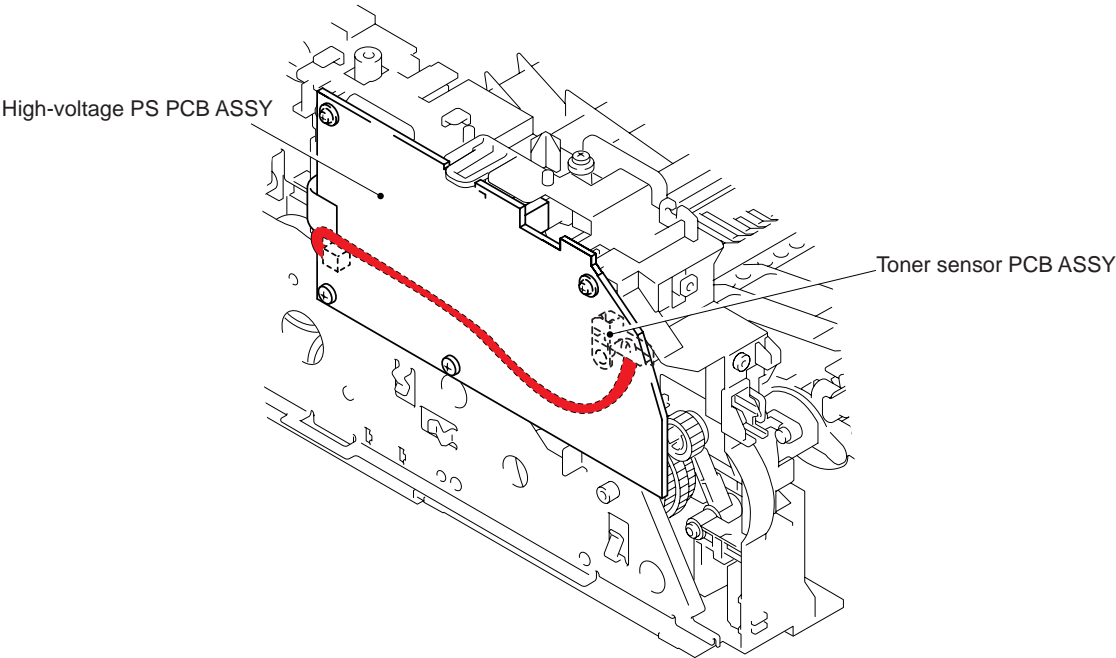
7

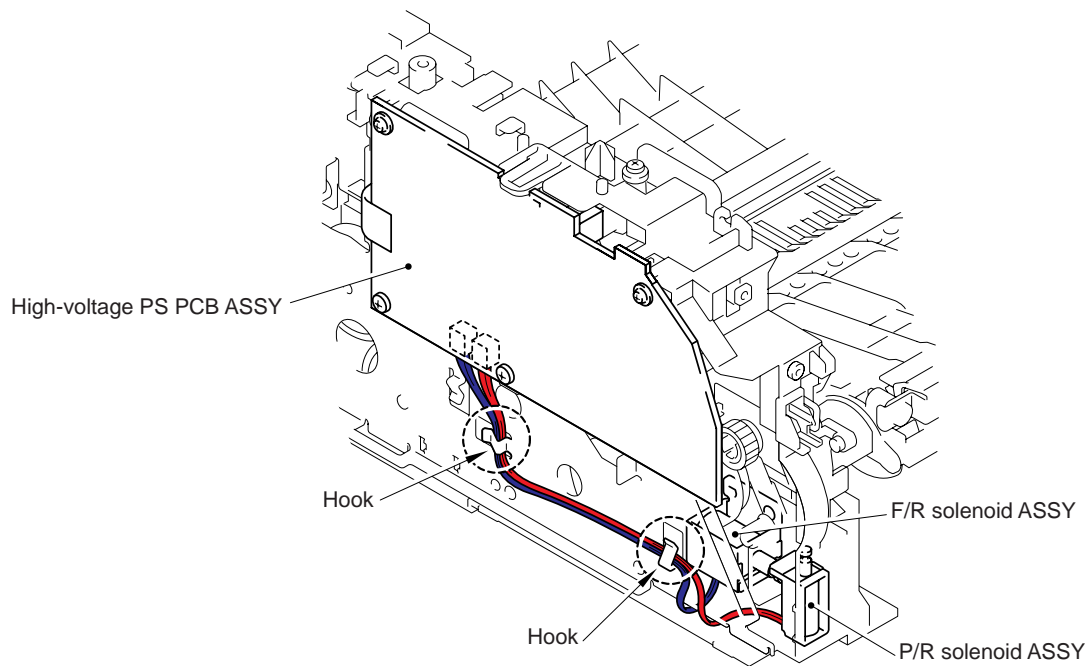
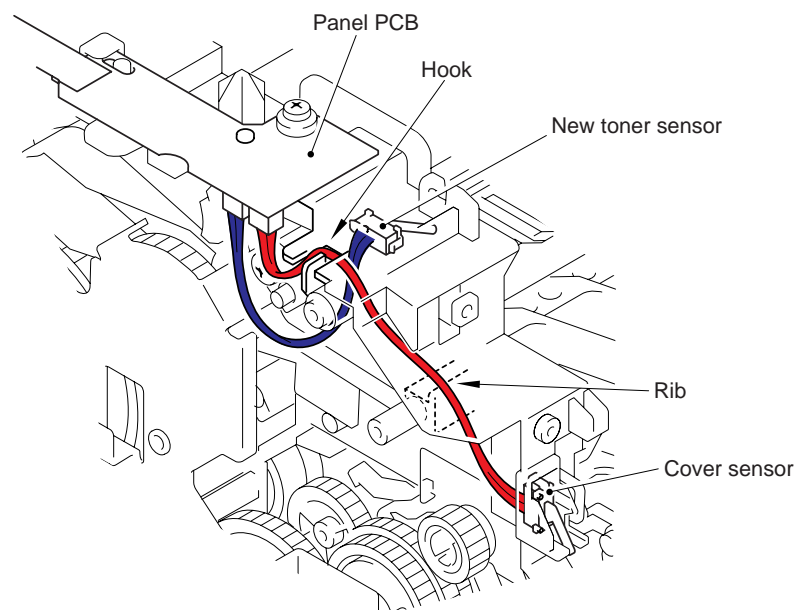
· Toner LED PCB ASSY



8

· Toner sensor PCB ASSY



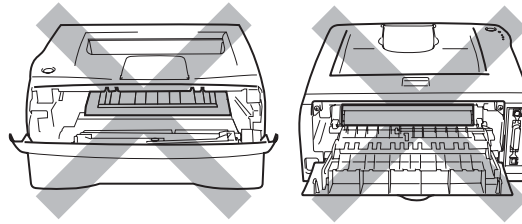
9**· P/R solenoid ASSY / F/R solenoid ASSY****10****· New toner sensor / Cover sensor**

CHAPTER 5 PERIODIC MAINTENANCE

To avoid creating secondary problems by mishandling, follow the warnings below during maintenance work.

WARNING

- **Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the printer.**
- **Some parts inside the printer are extremely hot immediately after the printer is used.**
- **When opening the front cover or rear cover to access any parts inside the printer, never touch the shaded parts shown in the following figures.**



1. CONSUMABLE PARTS

The consumable parts described in this section are parts which are subject to deterioration or damage and should be replaced at least once during the period of warranty of the product if any printing quality problem appears.

1.1 Drum Unit

Life expectancy: 12,000 pages with one drum unit

* At 5% print coverage (A4 or Letter size). The actual number of printed pages will vary depending on the average type of print job and paper.

NOTE:

* There are many factors that determine the actual drum life, such as temperature, humidity, type of paper, type of toner used, the number of pages per print job and so on. Under ideal conditions, the average drum life is estimated at up to 12,000 pages. The actual number of pages that your drum will print may be significantly less than this estimate. Because we have no control over the many factors that determine the actual drum life, we cannot guarantee a minimum number of pages that will be printed by your drum.

* For best performance, use only genuine Brother toner. The printer should be used only in a clean, dust-free environment with adequate ventilation.

* Printing with a third-party drum unit may reduce not only the printing quality but also the quality and life of the printer itself. Warranty coverage does not apply to problems caused by the use of third-party drum unit.

<Change Drum Message>

If the LED shows the message below, it means the drum unit is near the end of its life. We recommend that you replace the drum unit with a new one before there is a noticeable deterioration in the print quality.

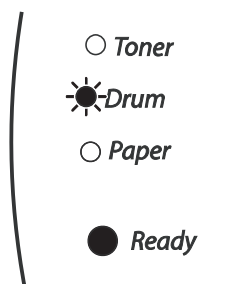


Fig. 5-1

! CAUTION:

- * While removing the drum unit, handle it carefully as it may contain toner.
- * Every time you replace the drum unit, be sure to clean the inside of the printer.

<Replacement Procedure>

- (1) Open the front cover of the printer. Make sure that the printer is turned on and the **Drum** LED is blinking.
- (2) Press and hold down the **Go** button for about 4 seconds until all the LEDs light up. Once all four LEDs are lit, release the **Go** button. Do not reset the drum counter when you replace only the toner cartridge.
- (3) Pull out the drum unit and toner cartridge.

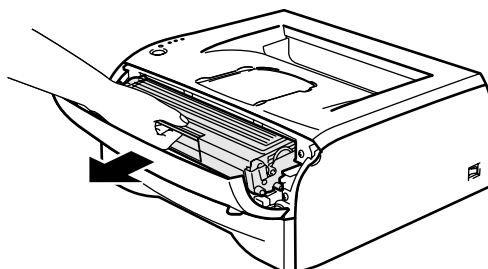


Fig. 5-2

! CAUTION:

- * We recommend that you place the drum/toner ASSY on a piece of disposable paper or cloth in case you accidentally spill or scatter toner.
- * To prevent damage to the printer from static electricity, do not touch the electrodes shown in the figure below.

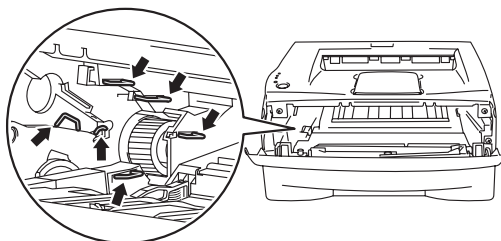


Fig. 5-3

- (3) Push down the blue lock lever and take the toner cartridge out of the drum/toner ASSY.

NOTE:

* Discard the used drum unit according to local regulations, keeping it separate from domestic waste. If you have questions, call your local waste disposal office.

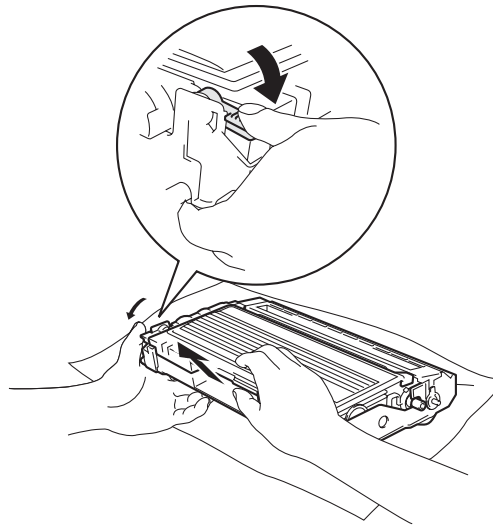


Fig. 5-4

- (4) Unpack the new drum unit.
 (5) Put the toner cartridge firmly into the new drum unit until you hear it lock into place. When the toner cartridge is installed correctly, the blue lock lever is lifted automatically.

NOTE:

* Make sure you insert the toner cartridge properly, or it may separate from the drum unit when you pick up the drum unit.

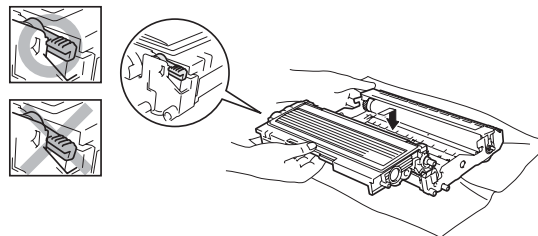


Fig. 5-5

- (6) Put the drum/toner ASSY in the printer.
 (7) Reset the drum counter. See the instructions supplied with the new drum unit.
 (8) Close the front cover of the printer.
 (9) Make sure that the **Drum** LED is now off.



CAUTION:

- * Handle the toner cartridge carefully. If toner scatters on your hands or clothes, wipe or wash it off with cold water immediately.
- * Wait to unpack a drum unit immediately before you put it in the printer. Exposure to direct sunlight or room light may damage the drum unit.
- * Do not reset the drum counter when replacing the toner cartridge only.
- * It is recommended to clean the printer when you replace the drum unit. Refer to [subsection 3. 'PERIODICAL CLEANING' in this Chapter](#).

1.2 Toner Cartridge

The life of the original toner cartridge that comes with the printer may be either a starter or standard toner cartridge, and depends on the model and country you bought in.

A starter toner cartridge will print up to 1,500 A4 or Letter-size single-sized pages at 5% coverage. A standard and a replacement toner cartridge print up to 2,500 A4 or Letter-size single sized pages at 5% coverage.

NOTE:

- * *The life of a toner cartridge may be different, depending on which country you bought the printer in.*
- * *There are many factors that determine the actual toner life, such as temperature, humidity, type of paper used, the number of pages per print job, etc.*
- * *The amount of toner used varies according to what is printed on the page and the print density setting.*
- * *The more that is printed, the more toner will be used.*
- * *If you change the print density setting for lighter or darker printing, the amount of toner that is used will change.*
- * *Wait to unpack the toner cartridge immediately before you put it in the printer.*

<Toner Low Message>

The **Toner** LED alternates turning on for 2 seconds and off for 3 seconds.

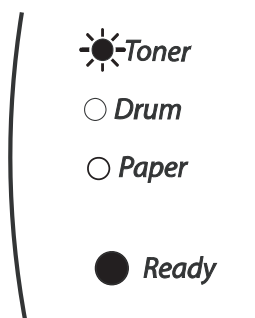


Fig. 5-6

If the LED shows this message, the toner cartridge has nearly run out of toner. Buy a new toner cartridge and have it ready before you get a “Toner Life End” message.

NOTE:

The **Toner** LED will blink continuously if the toner cartridge is nearly empty.

<Toner Life End Message>

If the LED shows the message below, the printer has run out of toner or the toner is not evenly distributed inside the cartridge.

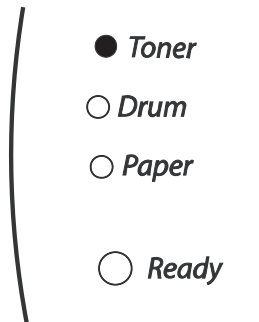


Fig. 5-7

NOTE:

- * To ensure high quality printing, make sure you use genuine Brother toner cartridges.
- * We recommend that you clean the printer when you replace the toner cartridge.

<Replacement Procedure>

- (1) Open the front cover of the printer.
- (2) Pull out the drum/toner ASSY.

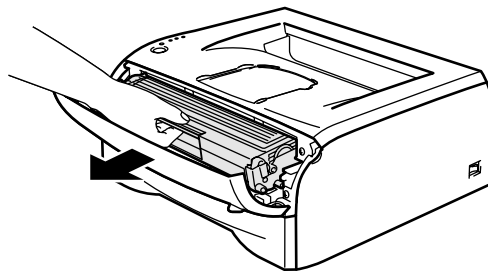


Fig. 5-8

! CAUTION:

- * It is recommended to place the drum/toner ASSY on a piece of disposable paper or cloth in case you accidentally spill or scatter toner.
- * To prevent damage to the printer from static electricity, do not touch the electrodes shown in the figure below.

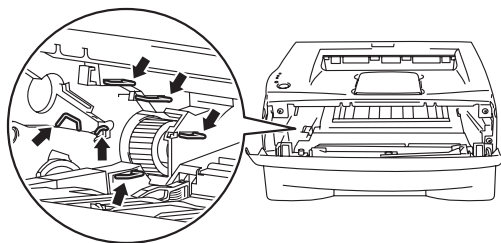


Fig. 5-9

- (3) Push down the blue lock lever and take the toner cartridge out of the drum/toner ASSY.

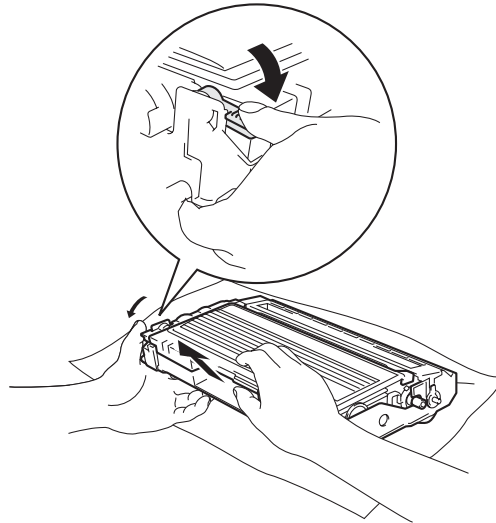


Fig. 5-10

- (4) Unpack the new toner cartridge. Hold the cartridge level with both hands and gently rock it from side to side five or six times to spread the toner evenly inside the cartridge.

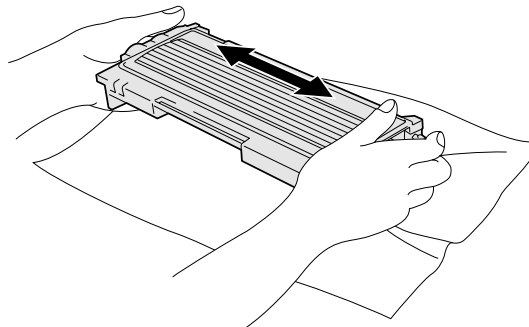


Fig. 5-11

- (5) Pull off the protective cover.

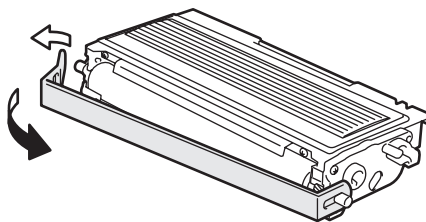


Fig. 5-12

- (6) Put the new toner cartridge firmly into the drum unit until you hear it lock into place. If you put it in properly, the lock lever will lift automatically.

NOTE:

** Make sure you insert the toner cartridge properly, or it may separate from the drum unit when you pick up the drum unit.*

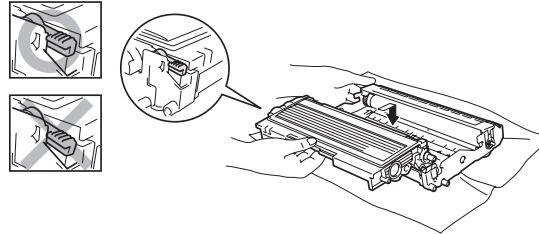


Fig. 5-13

- (7) Clean the primary Corona wire inside the drum/toner ASSY by gently sliding the blue tab from right to left and left to right several times. Return the tab to the home position before you put the drum/toner ASSY back into the printer. If you do not, printed pages may have a vertical stripe.

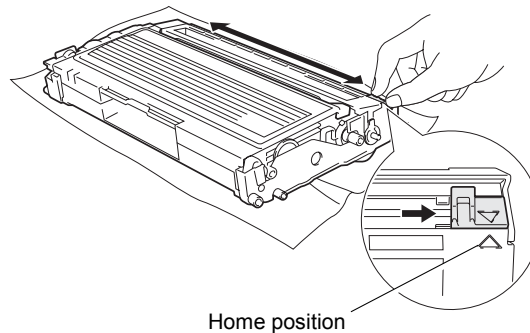


Fig. 5-14

- (8) Put the drum/toner ASSY back into the printer. Close the front cover of the printer.

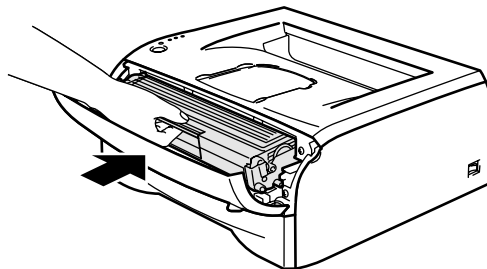


Fig. 5-15

! CAUTION:

- * Handle the drum unit and toner cartridge carefully. If toner scatters on your hands or clothes, wipe or wash it off with cold water immediately.
- * Be sure to seal the toner cartridge tightly so that toner powder does not spill out of the cartridge.
- * Only unpack a toner cartridge immediately before you need to install it into the printer.
- * If an unpacked drum unit is subjected to excessive direct sunlight or room light, the unit may be damaged.
- * Use a Brother genuine toner cartridge which is specially formulated to ensure top print quality.
- * Printing with a 3rd party toner or toner cartridge may reduce not only the printing quality but also the quality and life of the printer itself. It may also cause serious damage to the performance and life of a genuine Brother drum unit. Warranty coverage is not applied to problems caused by the use of 3rd party toner or toner cartridges.
- * Brother strongly recommends that you do not refill the toner cartridge provided with the printer. We also strongly recommend that you continue to use only Genuine Brother Brand replacement toner cartridges. Using or attempting to use potentially incompatible toner and/or toner cartridges in the printer may cause damage to the printer itself and/or it may result in unsatisfactory printing quality.
- * Make sure that the wire cleaner on the drum/toner ASSY is returned to the home position (▼ mark position) before re-installing the drum/toner ASSY into the printer, or printed pages may have vertical stripes. (Refer to Fig. 5-14)
- * Install the toner cartridge immediately after you remove the protective cover. Do not touch the shaded parts shown in the illustrations to prevent any degradation to the print quality.

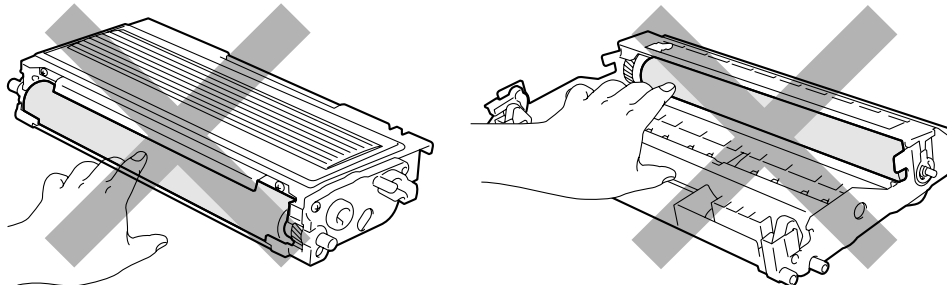


Fig. 5-16

NOTE:

It is recommended to clean the printer when you replace the toner cartridge. Refer to subsection 3. 'PERIODICAL CLEANING' in this Chapter.

2. PERIODICAL REPLACEMENT PARTS

There are no periodical replacement parts that need to be replaced periodically to maintain product quality.

3. PERIODICAL CLEANING

Clean the outside and inside of the printer regularly with a dry soft cloth. When you replace the toner cartridge or the drum unit, make sure you clean the inside of the printer. If printed pages are stained with toner, clean the inside of the printer with a dry soft cloth.

! CAUTION:

While drum/toner ASSY and scanner window cleaning can be implemented by the end user, the electrical terminals inside the printer and on the drum/toner ASSY should be cleaned by a service technician. Instruct the users not to touch those terminals.

! WARNING

There are high voltage electrodes inside the printer. Before cleaning the printer, make sure that the power switch has been turned off and the power cord has been unplugged from the power outlet.

3.1 Cleaning the Inside of the Printer

Clean the inside of the printer as follows:

Turn off the power switch and unplug the printer from the power outlet.

- 1) Open the front cover of the printer.
- 2) Pull out the drum/toner ASSY.
- 3) Wipe the scanner window with a dry soft cloth to remove dust.
- 4) Put the drum/toner ASSY back in the printer.
- 5) Close the front cover of the printer.
- 6) Plug the printer back in and turn on the printer power switch.

! CAUTION:

** Use water or neutral detergents for cleaning. Cleaning with volatile liquids such as thinner or benzene will damage the surface of the printer.*

** Do not use cleaning materials that contain ammonia. They will damage the printer and the toner cartridge.*

3.2 Cleaning the Corona Wire

If you are experiencing printing quality problems, please clean the corona wire as follows:

- 1) Turn off the power switch and unplug the power cord.
- 2) Open the front cover of the printer.
- 3) Pull out the drum/toner ASSY.

! CAUTION:

It is recommended to place the drum/toner ASSY on a piece of disposable paper or cloth in case you accidentally spill or scatter toner.

- 4) Clean the primary corona wire inside the drum/toner ASSY by gently sliding the blue tab from right to left and left to right several times. Return the tab to the home position before you put the drum/toner ASSY back into the printer. If you do not, printed pages may have a vertical stripe.

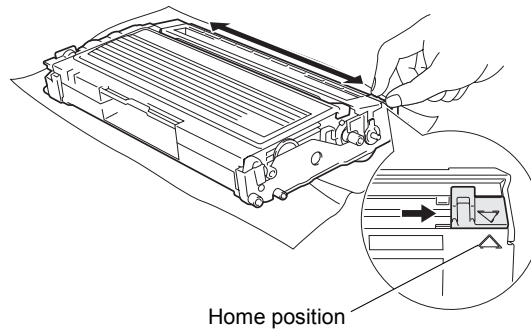


Fig. 5-17

- 5) Put the drum/toner ASSY back in the printer.
- 6) Close the front cover of the printer.

3.3 Cleaning the Scanner Window

When replacing the drum unit or toner cartridge with a new one, be sure to clean the scanner window.

- 1) Turn off the power switch and unplug the power cord.
- 2) Press the cover release button, and then open the front cover.
- 3) Pull the drum/toner ASSY out of the printer.



CAUTION:

It is recommended to place the drum/toner ASSY on a piece of disposable paper or cloth in case you accidentally spill or scatter toner.

- 4) Gently wipe the scanner window with a dry soft cloth.

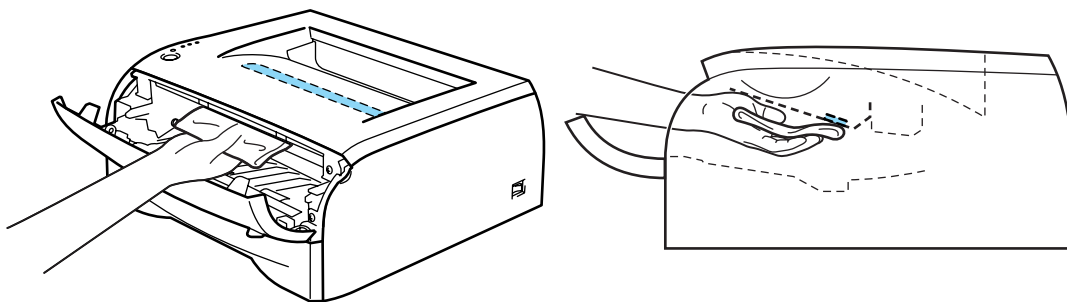


Fig. 5-18

- 5) Re-install the drum/toner ASSY into the printer. Close the front cover of the printer.
- 6) Plug in the power cord, and then turn on the power switch.

! CAUTION:

** Handle the drum unit carefully since it contains toner. If toner scatters and your hands or cloths get dirty, immediately wipe or wash it off with cold water.*

** Do not touch the scanner window with your fingers.*

** Do not wipe the scanner window with isopropyl alcohol.*

3.4 Cleaning the Electrical Terminals

To obtain the best print performance, be sure to clean the electrical terminals inside the printer.

- 1) Turn off the power switch and unplug the power cord.
- 2) Remove the drum/toner ASSY from the printer.
- 3) Wipe the electrical terminals as shown in the figure below with a dry soft cloth.

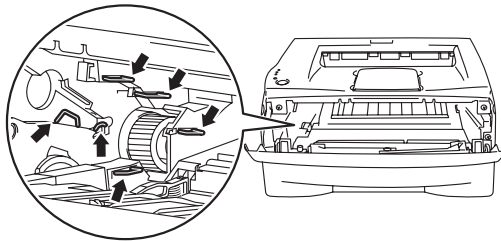


Fig. 5-19

CHAPTER 6 ADJUSTMENTS AND UPDATING OF SETTINGS, REQUIRED AFTER PARTS REPLACEMENT

1. IF YOU REPLACE THE MAIN PCB

The table below shows the ROM type of each main PCB.

Model		Main PCB
		ROM 0
HL-2030	For a production part	8 Mbit Mask ROM x 1
	For a supplied part	16 Mbit Flash ROM x 1
HL-2040	For a production part	8 Mbit Mask ROM x 1
	For a supplied part	16 Mbit Flash ROM x 1
HL-2070N	For a production part	64 Mbit Mask ROM x 1
	For a supplied part	64 Mbit Flash ROM x 1

<What to do when replacing the main PCB>

- Rewriting the firmware (ROM) of the printer
- Setting the default paper size.
- Setting the serial number.
- Inputting the adjusted value of the laser scanner.
- Setting the starter toner cartridge.

<Which part to use for the operation>

HL-2030	LJ9712001	MAIN PCB ASSY 2030 FLASH
	LZ0405001	FW: MAIN CONTROLLER 2040
HL-2040	LJ9797001	MAIN PCB ASSY 2040 FLASH
	LZ0405001	FW: MAIN CONTROLLER 2040
HL-2070N	LJ9764001	MAIN PCB ASSY 2070N FLASH
	LZ0406001	FW: MAIN CONTROLLER 2070N

<What you should prepare>

- 1) Computer (Windows® XP/2000 or later)
Create the "hl2000" folder in the C drive, for example.
- 2) HL-2030/2040/2070N target printer
- 3) USB cable (one piece)
- 4) FILEDG32.EXE file
Install it into the PC. Then, copy the installed program into the "hl2000" folder which has been created in the C drive.
- 5) Target firmware: LZXXXX_\$.BLF (firmware of the printer)

LZXXXX_\$.BLF	LZXXXX: First six digits of the part number of the firmware \$: Alphabet representing the revision of the firmware.
---------------	--

Extract it and copy the extracted files into the "hl2000" folder which has been created in the C drive.

- 6) Setting file of the default paper size (for HL-2070N only):
Extract this file.
s2000E (A4 size), s2000U (Letter size),
s2000I (A4 size, Israeli font for Israel)
ALL_CHN.pjl (A4 size, Thin paper setting for China)
- 7) DRV2000.zip file (Install all the drivers of the HL-2030/2040/2070N printers at the same time.)
Copy it into the "hl2000" folder which has been created in the C drive. Extract the copied file and run the SETUP2.BAT file in the extracted file.
HL-2030/2040/2070N printer drivers (for USB) will be copied.
- 8) MAINT.EXE file
Copy it into the "hl2000" folder which has been created in the C drive. Extract the copied file and run the bramainte.exe file by double-clicking.

<Procedures>

Refer to the following steps for the detailed procedures.

■ Rewriting the firmware (ROM) of the printer

- 1) Connect the PC and printer with the USB cable.
- 2) Open the front cover, and turn the power supply of the printer on while holding down the **Go** button. Make sure that the **Ready** LED is off, and release the **Go** button. Make sure that all LEDs are off, and press the **Go** button for two seconds. Then, release the **Go** button and close the front cover when the **Paper** LED lights up. These operations make the printer into the PIT3 mode. (The USB serial number is fixed to "987654321".)
- 3) Start the PC. When doing this operation at the first time, the Plug & Play program is performed, and the driver is installed.
- 4) Open the "hl2000" folder and double-click the FILEDG32 icon to start. Make sure that there is the printer icon of the connected printer, and that no error occurs.

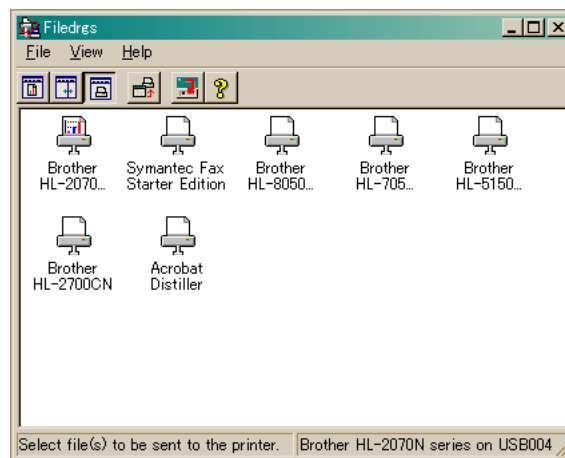


Fig. 6-1

- 5) Click the applicable model in FILEDG32 to select.
- 6) Drag the firmware (LZ.....) in the same folder and drop it onto the icon of the applicable model in FILEDG32.

The files in the firmware are sent to the printer so that they are started to write into the flash ROM automatically. After finishing receiving the files, the printer starts to rewrite the firmware.

The **Paper** LED blinks irregularly while the firmware being rewritten. Then, be sure not to disconnect the USB cable or to turn off the power supply of the PC before the printer is in the ready mode automatically.

- 7) Turn the power supply of the printer off.

■ Setting the default paper size (for HL-2070N only)

- 1) Open the "hl2000" folder and double-click the FILEDG32 icon to start. Select the applicable printer and click it. (Make sure that there is the icon of the connected printer and that no error occurs.)
- 2) Drag "s2000E" (A4 size), "s2000U" (Letter size) or "s2000I" (A4 size, Israeli font for Israel) "ALL_CHN.pjl" (A4 size, Thin paper setting for China) in the same folder and drop it onto the icon of the applicable model in FILEDG32. When the **Ready** LED of the printer lights up for an instant and goes off immediately after dropping it, the setting is completed. Then, set the serial number following the steps described in the next section.

Refer to the following page for the next procedures.

■ **Setting the serial number**

- 1) Make sure that the power supply of the printer is turned ON.
- 2) Double-click the brmainte.EXE file (maintenance utility) which has been copied in the “hl2000” folder to start.
- 3) Select Input Information from Menu. Select the applicable model name.
- 4) Check the port (USB) which the printer is connected through and click “Serial No.” in the lower box.



Fig. 6-2

Enter the serial number (the last nine digits) of the printer into the box at the right hand side. The serial number is shown in the window, and check that it is correct. Follow the next step without clicking the **OK** button.

■ **Inputting the adjusted value of the laser scanner**

- 1) Select 'Adjust Scanner' from Menu. Enter the figures (the last four digits) shown on the label attached on the chassis at the right hand side of the main PCB into the box at the right hand side.

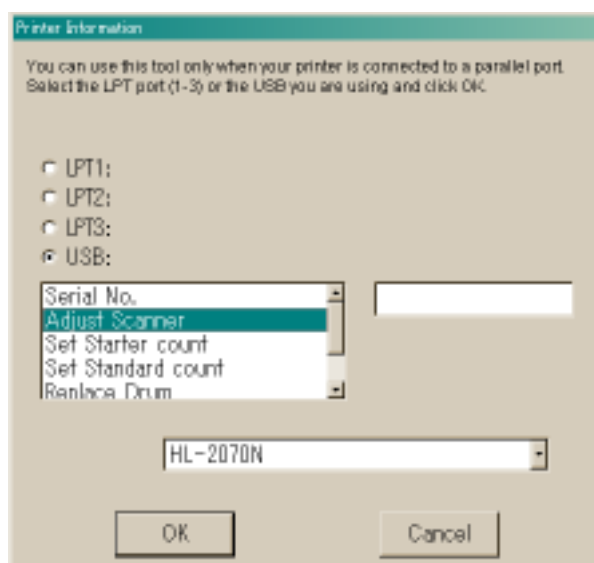


Fig. 6-3

Follow the next step without clicking the **OK** button.

■ Setting the starter toner cartridge

The “Toner Life End” message is displayed according to the upper limit value of the developing roller rotation. The upper limit value is different between the starter toner cartridge and standard one. Therefore, it is necessary to set the conformable value to the toner cartridge installed in the printer following the steps below.

- 1) Select ‘Set Starter count’ or ‘Set Standard count’ from Menu according as the currently used toner cartridge.



Fig. 6-4



Fig. 6-5

- 2) Check ON in the check box at the right hand side.

NOTE:

It is impossible to set both types of the toner cartridge. If selecting both, the NG message is displayed.

- 3) Click the **OK** button in the end. All of the settings are completed.
- 4) Turn the power supply of the printer off.

CHAPTER 7 TROUBLESHOOTING

1. INTRODUCTION

1.1 Initial Check

(1) Operating environment

Check if :

- The source voltage stays within $\pm 10\%$ from the rated voltage shown on the rating plate.
- The printer is installed on a solid, level surface.
- The room temperature is maintained between 10°C and 32.5°C. The relative humidity is maintained between 20% and 80%.
- The printer is not located in a dusty place.
- The printer is not exposed to ammonia fumes or other harmful gases.
- The printer is not located in a hot or humid area (such as near water or a humidifier).
- The printer is not exposed to direct sunlight.
- The room is well-ventilated.
- The printer is not placed where the ventilation hole of the printer is blocked.

(2) Print paper

Check if :

- A recommended type of print paper is being used. [If the paper is too thick or too thin, or tends to curl, paper jams or paper feed problems may occur, or printed images may be blurred.]
- The print paper is damp. [If so, use fresh paper, and check whether the print quality improves or not.]
- The print paper is short-grained paper or acid paper. [If so, print quality problems may occur.]

For further information on paper, refer to [subsection 3.6 'Paper' in Chapter 1](#).

(3) Consumable parts

Check if:

- The LEDs on the printer control panel indicate "Toner Life End". If the LEDs indicate "Toner Life End", replace the toner cartridge with a new one.

For further information on consumable parts, refer to [1. 'CONSUMABLE PARTS' in Chapter 5](#).

(4) Others

Condensation:

When the printer is moved from a cold room into a warm room in cold weather, condensation may occur inside the printer, causing various problems as listed below:

- Condensation on the optical surfaces such as the scanning mirror, lenses, the reflection mirror and the protection glass may cause the print image to be light.
- If the exposure drum is cold, the electrical resistance of the photosensitive layer is increased, making it impossible to obtain the correct contrast when printing.
- Condensation on the corona unit may cause corona charge leakage.
- Condensation on the pressure plate and separation pad may cause paper feed troubles.

If condensation has occurred, print several pages or leave the printer for 2 hours to allow it to reach room temperature.

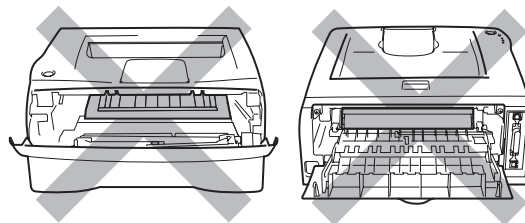
If the drum unit is unpacked soon after it is moved from a cold room to a warm room, condensation may occur inside the unit, which may cause incorrect images. Instruct the user to allow the unit to come to room temperature before unpacking it. This will take one or two hours.

1.2 Warnings for Maintenance Work

To avoid creating secondary problems by mishandling, follow the warnings below during maintenance work.

WARNING

- ***Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the printer.***
- ***Some parts inside the printer are extremely hot immediately after the printer is used. When opening the front cover or rear cover to access any parts inside the printer, never touch the shaded parts shown in the following figures.***

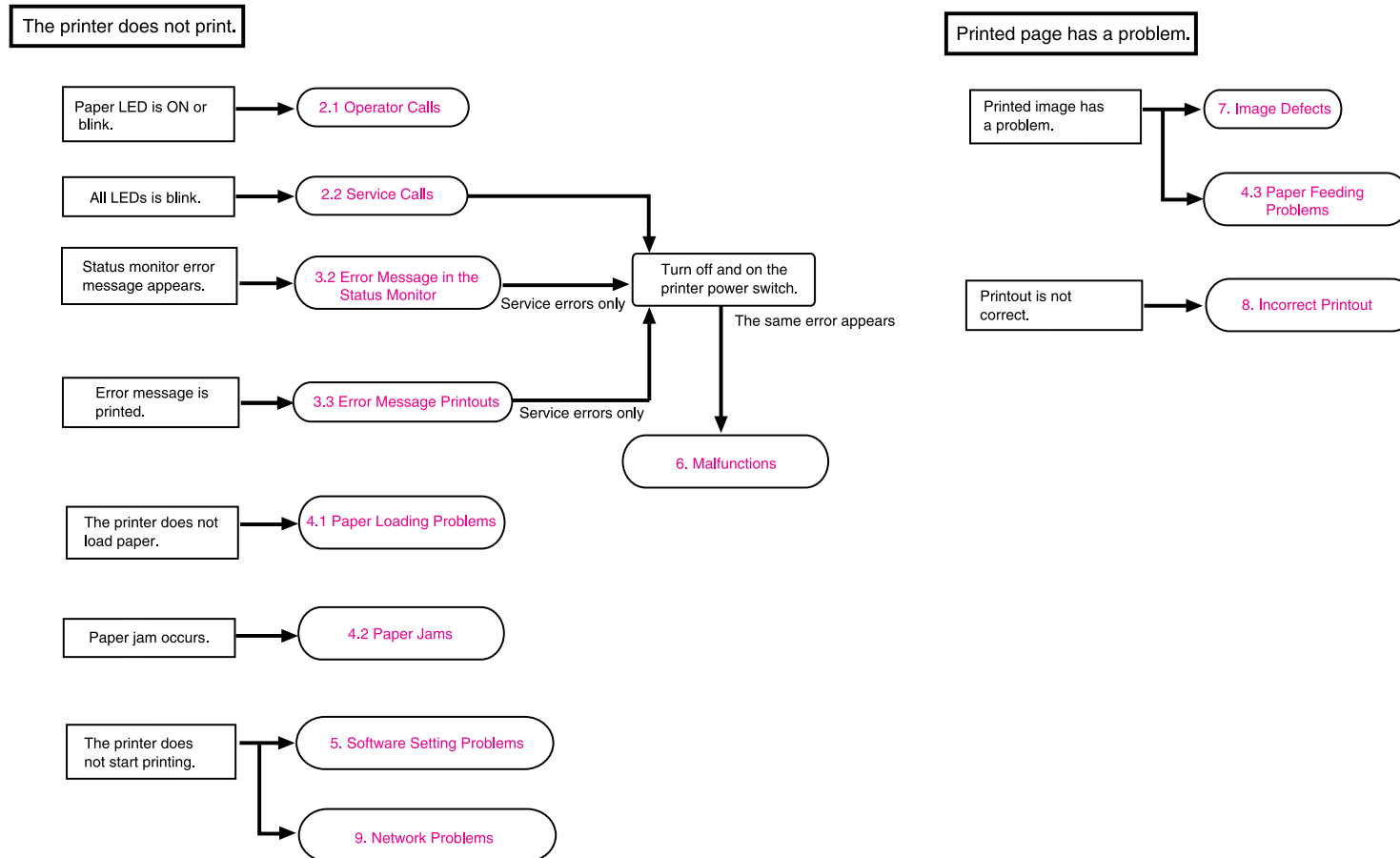


1.3 Identify the Problem

If you encounter any printer error or problem, first identify it referring to the chart below, then see the appropriate section.

NOTE:

The following troubleshooting sections contain both the actions which users should take or check and the ones which service technicians should perform.



2. OPERATOR CALLS & SERVICE CALLS

2.1 Operator Calls

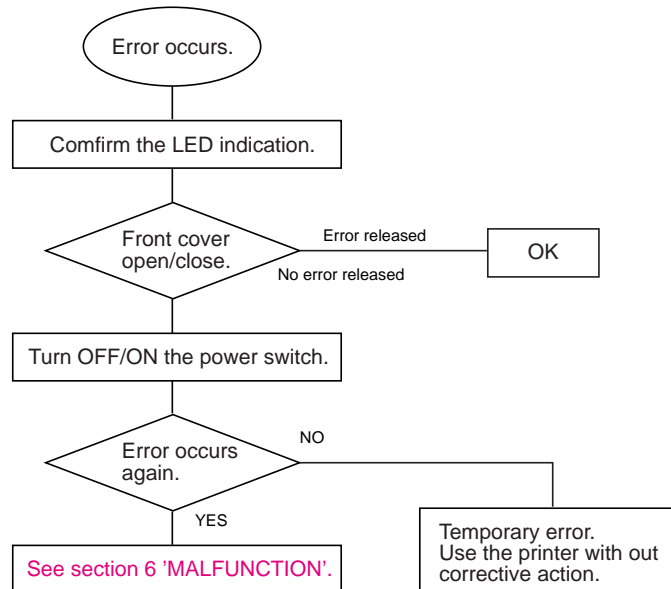
When an operator call occurs, the red **Paper** LED is ON or blinking to indicate it. An 'operator call' which the printer indicates on the LEDs is user recoverable. Identify the error from the table below and take the corrective action described for each indication to correct it. The printer automatically recovers from most errors, but some of errors are necessary to reset the printer by holding down the **Go** button.

LED	Type of error	Error clearance by pressing the Go button.	Remedy
	Toner life end	X	Replace the toner cartridge with a new one.
	Cartridge position error	X	The toner cartridge is not installed correctly. Take out the toner cartridge and put it back into the printer again.
	Drum life end soon	X	The drum unit is near the end of its life. We recommend that you get a new drum unit to replace the current one. The Drum LED alternates turning on for 2 seconds and off for 3 seconds.
	No paper fed tray	○	Put paper in the tray. Press the Go button.
	Front cover is open	X	Close the front cover of the printer.
	Back cover is open	X	Close the back cover of the printer.
	Paper jam	○	Clear the paper jam. If the printer does not start printing, press the Go button.
	No paper fed manual feed slot	○	Put the paper in the manual feed slot.
	Memory full	X	An error is cleared when deleting the data by the job cancel operation.
	Print overrun	X	An error is cleared when deleting the data by the job cancel operation.
	Dust on drum	X	The corona wire needs to be cleaned.

2.2 Service Calls

If service calls occur, all four LEDs blink on and off to notice it. In this state execute the operation described on the top of Table 1 to notify a fault location from the specific combination of ON/OFF and status color of the LED.

Instruct the user to turn off the power switch, wait a few seconds and then turn it on again and try to print again. If the error is not cleared and the same service call appears, see [Section 6 'MALFUNCTIONS'](#) to take the corrective action.



<To show the service call type>

If **Go** button is pressed, LED is lighted by one of the combinations in the table below.

LED	Type of service call	LED	Type of service call
<div> <div>● Toner</div> <div>○ Drum</div> <div>○ Paper</div> <div>○ Ready</div> </div>	Fixing unit failure	<div> <div>○ Toner</div> <div>○ Drum</div> <div>● Paper</div> <div>○ Ready</div> </div>	Main PCB failure
<div> <div>○ Toner</div> <div>● Drum</div> <div>○ Paper</div> <div>○ Ready</div> </div>	Laser unit failure	<div> <div>● Toner</div> <div>○ Drum</div> <div>● Paper</div> <div>○ Ready</div> </div>	Main motor failure
<div> <div>● Toner</div> <div>● Drum</div> <div>○ Paper</div> <div>○ Ready</div> </div>	High voltage error	<Table 1>	

<Recovering from the service call>

The printer starts recovering from all service calls by the front cover being opened and closed. For an unrecoverable error, however, the printer detects a service call again and indicates it.

3. ERROR MESSAGE

3.1 List of Error Message

Error message (Print Settings)	Error message (Maintenance sheet / PjL)	Error descriptions
ERROR S01	ERROR S01	FATAL ERROR EX
ERROR S02	ERROR S02	ADRL ERROR EX
ERROR S03	ERROR S03	ADRS ERROR EX
ERROR S04	ERROR S04	BUS ERROR EX (INSTRUCT)
ERROR S05	ERROR S05	BUS ERROR EX (DATA L/S)
ERROR S06	ERROR S06	SYSCALL EX
ERROR S07	ERROR S07	BREAKPOINT EX
ERROR S08	ERROR S08	RESERVED INSTRUCT EX
ERROR S09	ERROR S09	COPROCESSOR UNUSAB EX
ERROR S10	ERROR S10	ARITHMETIC OVERFLOW EX
ERROR S11	ERROR S11	UNDEFINED INTERRUPT
ERROR S12	ERROR S12	SOFTWARE1 INTERRUPT
ERROR S13	ERROR S13	SOFTWARE2 INTERRUPT
ERROR E49	FUSER MALF 2	FIXING UNIT MALFUNCTION
ERROR E50	FUSER MALF	FIXING UNIT MALFUNCTION
ERROR E51	LASER BD MALF	LASER BEAM DETECTION ERROR
ERROR E52	SCANNER MALF	SCANNER MOTOR MALFUNCTION
ERROR E54	MOTOR MALF	MAIN MOTOR LOCK ERROR
ERROR E55	HIGH VOL MALF	HIGH-VOLTAGE POWER SUPPLY MALFUNCTION
ERROR H60	BUS ERROR	BUS ERROR
ERROR H61	PROG ERROR	ROM CHECKSUM ERROR
ERROR H63	ERROR H63	DRAM ACCESS ERROR
ERROR H66	NV-W ERROR	NVRAM WRITE ERROR
ERROR H67	NV-R ERROR	NVRAM READ ERROR
ERROR H68	NV-B ERROR	NVRAM BUS ERROR
ERROR H73	FLASH R ERROR	FLASH ROM READ ERROR
ERROR H74	FLASH W ERROR	FLASH ROM WRITE ERROR

3.2 Error Message in the Status Monitor

The Status Monitor will report problems with the printer. Take the corrective actions listed in the following table for the error message that the Status Monitor reports.

The default setting for the Status Monitor is off. If you would like to turn the status monitor on, you can change the setting of the Status Monitor in the **Device Options** of the **Advanced** tab.

Error message	Remedy
Cover is open	<ul style="list-style-type: none"> Close the front cover of the printer.
Back Cover is open	<ul style="list-style-type: none"> Close the back cover of the printer.
Memory Full	<ul style="list-style-type: none"> Press the Go button to print the data remaining in the printer. Cancel the print job if you want to delete the data remaining in the printer. Reduce the print resolution or reduce the complexity of your document.
Print Overrun	<ul style="list-style-type: none"> Press the Go button to print the data left in the printer. Cancel the print job if you want to delete the data remaining in the printer. If this does not clear the error, reduce the complexity of your document or reduce the print resolution. Set page protection to AUTO by using the supplied Windows[®] driver or RPC program. Change the following settings in the supplied Windows[®] driver and try again. The best combination of these settings will vary depending on your document: <ul style="list-style-type: none"> Graphics Mode TrueType mode Use Printer TrueType[®] Fonts
No Paper Fed Tray No Paper Fed Manual slot	<ul style="list-style-type: none"> The paper tray may be out of paper or not properly installed. If it is empty, put a new stack of paper in the paper tray and then press the Go button. If there is paper in the paper tray, make sure it is straight. If the paper is curled, straighten it before printing. Sometimes it is helpful to remove the paper, turn the stack over and put it back in the paper tray. Reduce the amount of paper in the paper tray, and then try again. Make sure you use paper that meets Brother's recommended paper specifications. See 3.6 'Paper' in Chapter 1.
Paper Jam Tray 1 Paper Jam Inside Paper Jam Rear	<ul style="list-style-type: none"> Take out the jammed paper from the indicated area. See 4.2 'Paper Jams' in this Chapter.
Toner Life End	<ul style="list-style-type: none"> See 1.2 'Toner Cartridge' in Chapter 5.
Toner Low	<ul style="list-style-type: none"> Purchase a new toner cartridge and have it ready for when the Toner Life End status is indicated.
Cartridge Position Error	<ul style="list-style-type: none"> Take out the toner cartridge and put it back into the printer again.

Error message	Remedy
Drum Life End Soon	<ul style="list-style-type: none"> The drum is near the end of its life. Purchase a new drum unit to replace the current one. See 1.1 'Drum Unit' in Chapter 5.
Dust on Drum	<ul style="list-style-type: none"> See 3.2 'Cleaning the Corona Wire' in Chapter 5.
Service Call	<ul style="list-style-type: none"> Check the LED indication to identify the error.

3.3 Error Message Printouts

The printer will report problems by printing an error message as defined in the following table. Take the corrective actions for the error message.

Error message	Remedy
MEMORY FULL	<ul style="list-style-type: none"> Press the Go button to print the data left in the printer. Cancel the print job if you want to delete the data remaining in the printer. Reduce the print resolution or reduce the complexity of your document.
PRINT OVERRUN	<ul style="list-style-type: none"> Press the Go button to print the data left in the printer. Cancel the print job if you want to delete the data remaining in the printer. If this does not clear the error, reduce the complexity of your document or reduce the print resolution. Set page protection to AUTO by using the supplied Windows[®] driver or RPC program. Change the following settings in the supplied Windows[®] driver and try again. The best combination of these settings will vary depending on your document: <ul style="list-style-type: none"> Graphics Mode TrueType mode Use Printer TrueType[®] Fonts
RESOLUTION REDUCED TO ENABLE PRINTING (The printer has printed the document at a reduced resolution)	<ul style="list-style-type: none"> Reduce the complexity of your document before you print to prevent automatic reduction in the resolution.

***NOTE:**

The communication parameter settings are printed on the Print Settings sheet. For details on how to print the Print Settings page, see ['Print Settings' in Chapter 8.](#)

4. PAPER PROBLEMS

4.1 Paper Loading Problems

First, make sure that you are using paper that meets Brother recommended paper specifications. [See 3.6 'Paper' in Chapter 1.](#)

Problem	Remedy
The printer does not feed paper.	<ul style="list-style-type: none"> • If there is paper in the paper tray, make sure it is straight. If the paper is curled, you should straighten it before printing. Sometimes it is helpful to remove the paper, turn the stack over and put it back in the paper tray. • Reduce the amount of paper in the paper tray, and then try again. • Check that manual feed mode is not selected in the printer driver.
The printer does not feed paper from the manual feed slot.	<ul style="list-style-type: none"> • Re-insert the paper firmly, one sheet at a time. • Make sure that manual feed mode is selected in the printer driver.
The printer will not feed envelopes.	<ul style="list-style-type: none"> • The printer can feed envelopes from the manual feed slot. Your application software must be set up correctly to print on the envelope size you are using. This is usually done in the page setup or document setup menu of your software. Please see your software application manual.
A paper jam has occurred.	<ul style="list-style-type: none"> • Clear the jammed paper. See 4.2 'Paper Jams' in this Chapter.

4.2 Paper Jams

4.2.1 Clearing jammed paper

Clear the jammed paper as follows.

If the jammed paper is removed completely by following the steps below, you can install the paper tray first, and then close the front cover and the printer will resume printing automatically.

If the printer does not start printing automatically, press the **Go** button. If the printer still does not start printing, please check that all the remaining jammed paper has been removed from the printer. Then try printing again.

NOTE:

Always remove all paper from the paper tray and straighten the stack when you add new paper. This helps to prevent multiple sheets of paper from feeding through the printer at one time and reduces paper jams.

- (1) Pull the paper tray completely out of the printer.

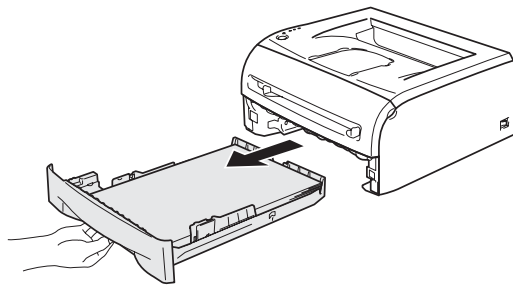


Fig. 7-1

- (2) Pull the jammed paper up and out of the printer.

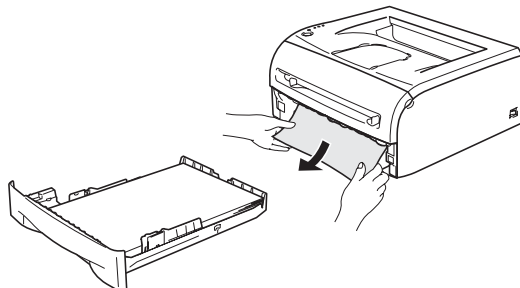


Fig. 7-2

- (3) Open the front cover.

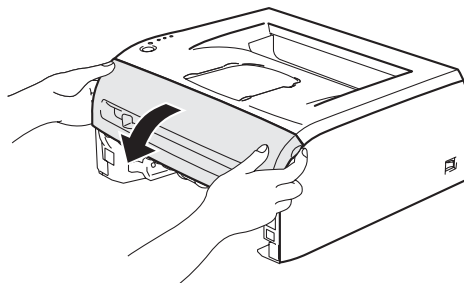


Fig. 7-3

- (4) Pull out the drum/toner ASSY slowly. The jammed paper will be pulled out with the drum/toner ASSY.

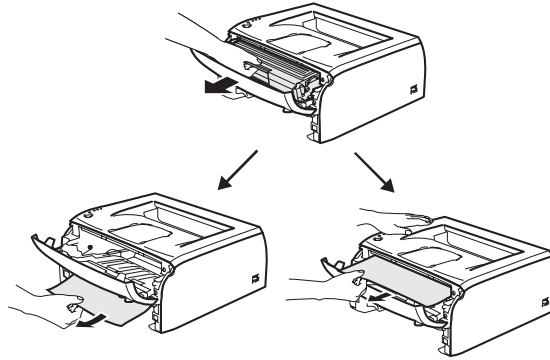


Fig. 7-4

! CAUTION:

To prevent damage to the printer caused by static electricity, do not touch the electrodes shown in Figure 7-5.

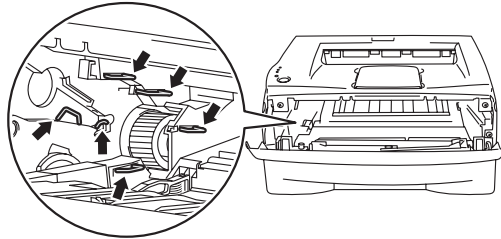


Fig. 7-5

- (5) Open the back cover.

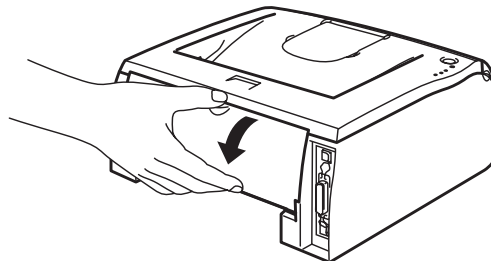


Fig. 7-6

- (6) Pull the tab toward you to open the rear chute cover.

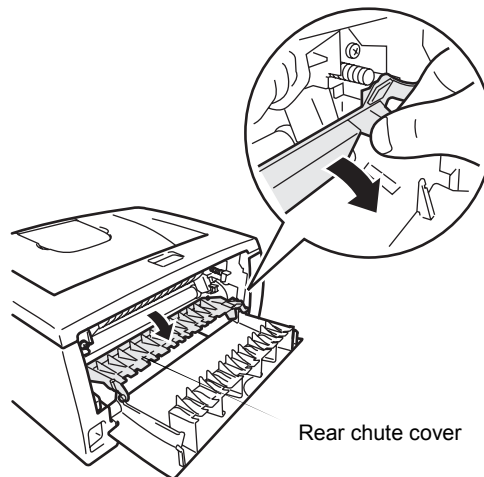


Fig. 7-7

- (7) Pull the jammed paper out of the fixing unit. If the jammed paper cannot be pulled out easily, push down the tab with one hand as you gently pull the paper out with other.

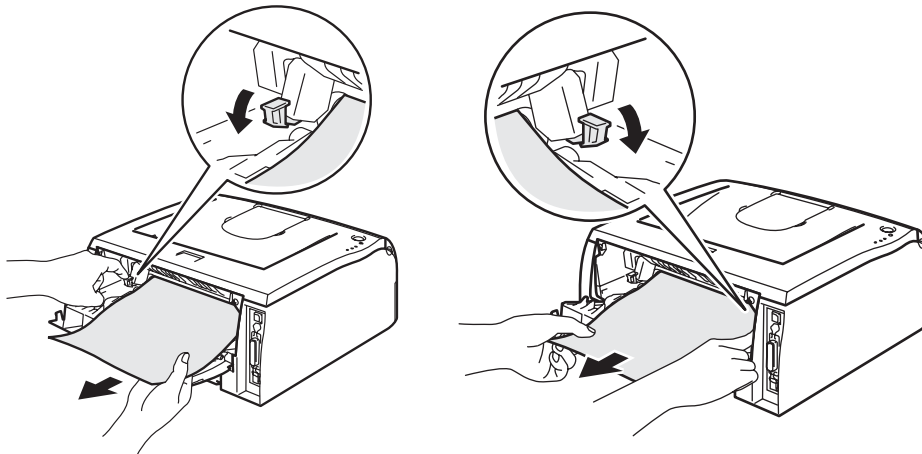
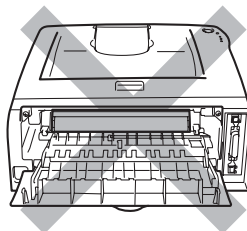


Fig. 7-8

! WARNING

After you have just used the printer, some internal parts of the printer are extremely hot. Wait for the printer to cool down before you touch the internal parts of the printer.



- (8) Close the back cover.
- (9) Push the lock lever down and take the toner cartridge out of the drum unit. Take out the jammed paper if there is any inside the drum unit.

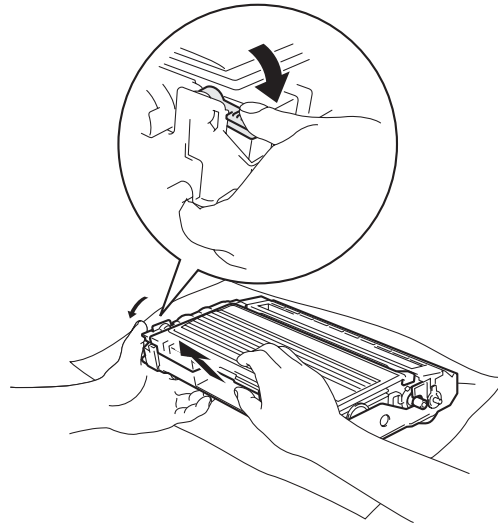


Fig. 7-9

- (10) Put the toner cartridge back into the drum unit until you hear it lock into place. If you put it in properly, the lock lever will lift automatically.

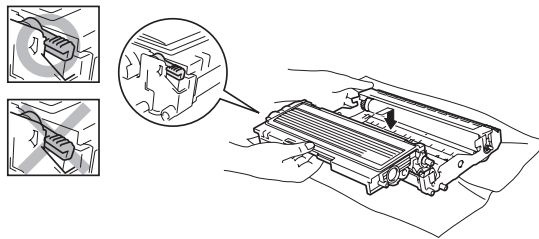


Fig. 7-10

- (11) Put the drum/toner ASSY back in the printer.

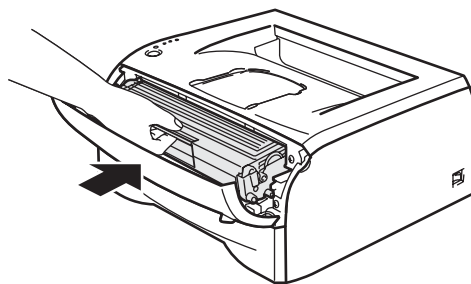


Fig. 7-11

- (12) Put the paper tray firmly back in the printer.
- (13) Close the front cover.
- (14) Make sure that the **Paper** LED is now off and the printer is ready.

4.2.2 Causes & countermeasures

The causes for paper jam problems vary depending on the location of the paper jam. When a paper jam occurs inside the printer, you have to find the location of the paper jam first, remove the jammed paper and then take the appropriate countermeasure referring to the table below;

Problem	Type of Jam	Cause	Remedy
Jam when the printer is turned on.	Paper stuck	The regist front sensor or paper eject sensor is turned on.	Remove the paper inside the printer. If there is no paper, check the suspect sensors referring to 'Factory Inspection Mode' in Chapter 8.
Paper stopped in the middle of feeding.	Jam caused by paper length detected as longer than 410mm (16 in).	The regist front sensor is not returning properly and is not turning off.	Check front registration sensor motion referring to 'Factory Inspection Mode' in Chapter 8.
Bottom of paper stopped around the transfer roller.	Jam caused by paper length detected as shorter than 80mm.	The regist front sensor was turned off early. Malfunction of actuator or hardware noise.	Check the front registration sensor referring to 'Factory Inspection Mode' in Chapter 8.
Top of paper stopped between the paper feed roller and the pick-up roller.	Jam caused by a paper feed delay.	Paper was not fed in at the proper timing due to paper dust or wear of the rubber pick-up roller.	Remove the paper dust attached to the pick-up roller. If the rubber is worn out, replace it with a new one.
Top of paper stopped at 60mm from the contact point of the heat roller and pressure roller.	Jam caused by the paper not being sensed when ejected from the paper eject sensor.	The paper eject sensor is not working properly and has not turned off. (single printing)	Check sensor motion referring to 'Factory Inspection Mode' in Chapter 8.
Jam after paper is ejected.	Jam caused by the paper not being sensed when ejected from the paper eject sensor.	The paper eject sensor or front registration sensor is not working properly and has not turned off. (continuous printing)	Check sensor motion referring to 'Factory Inspection Mode' in Chapter 8.

4.3 Paper Feeding Problems

Even if the paper is printed and ejected without any problems such as paper jams, paper feeding problems below may appear.

Users can clear these problems by following the 'User Check' items for each problem. Even if the same problem occurs again, follow the procedures in the table below.

F-1	Double feeding
-----	----------------



User Check

Check the paper used meets the recommended paper specifications. (Refer to 3.6 "Paper" in Chapter 1.)

Possible cause	Step	Check	Result	Remedy
Separation pad	1	Is the surface of the separation pad worn out?	Yes	Replace the separation pad.

F-2	Wrinkles or creases
-----	---------------------



User Check

(1) Check that paper is loaded into the paper tray correctly.

(2) Check the paper used meets the recommended paper specifications. (Refer to 3.6 "Paper" in Chapter 1.)

(3) Turn over the stack of paper in the tray or try rotating the paper 180° in the tray.

Possible cause	Step	Check	Result	Remedy
Paper	1	Is the problem solved if new paper is used?	Yes	Instruct the user how to store paper so that it does not absorb moisture.
Fixing unit entrance guide	2	Is the entrance guide dirty?	Yes	Clean the entrance guide.
Fixing unit	3	Is the pressure roller dirty?	Yes	Clean the pressure roller.
			No	Replace the fixing unit.

F-3	Waves in the paper / folds in the paper at the eject roller
-----	---

Possible cause	Step	Check	Result	Remedy
Paper	1	Is the problem solved if new paper is used?	Yes	Instruct the user how to store paper so that it does not absorb moisture.
Eject roller	2	Is the eject roller dirty? (Dust and dirt)	Yes	Clean the eject roller.

F-4	Page skew
-----	-----------

User Check

- (1) Check that the paper or other media is loaded into the paper tray correctly and that the paper guides are not too tight or too loose against the paper stack.
- (2) If using the manual feed slot, check how to load paper into the manual feed slot correctly.
- (3) The paper tray may be too full. Load paper below ▼ mark in depth.
- (4) Check the paper used meets the recommended paper specifications. (Refer to 3.6 "Paper" in Chapter 1.)

F-5	Curl or Wave
-----	--------------

User Check

- (1) Check the paper used meets the recommended paper specifications. Both high temperature and humidity will cause paper to curl.
- (2) If the printer is used infrequently, the paper may have sat for too long in the paper tray. Turn over the stack of paper in the paper tray. Also, try rotating the paper 180° in the paper tray.
- (3) Check that the paper used meets the Media Type setting in the driver.

NOTE:

For no paper supplied as the cause of a malfunction, see M-4 'No paper supplied' in 6. 'MALFUNCTIONS' in this Chapter.

F-6	Paper pickup
-----	--------------

Possible cause	Step	Check	Result	Remedy
Disconnection of the pickup solenoid harness	1	Is the harness of the pickup solenoid disconnected?	Yes	Reconnect the harness.
Pickup solenoid harness failure	2	Does the harness of the pickup solenoid work correctly?	No	Replace the pickup solenoid.
Pressure plate gear damage	3	Is the pressure plate gear damaged?	Yes	Replace the pressure plate gear.
Clutch gear damage	4	Is the clutch gear damaged?	Yes	Replace the gear unit.

5. SOFTWARE SETTING PROBLEMS

The printer may not print the data correctly if there are incorrect software settings.

S-1	"There was an error writing to LPT1: (or BRUSB) for the printer" error message appears.
-----	---

User Check

- (1) Check that the printer cable is not damaged or broken. Check also that the cable is connected to the correct interface connectors of both the printer and PC.
- (2) Check that the correct printer is selected if you have an interface switching device.
- (3) Check that the appropriate printer driver is selected as 'Set as Default'. Check also that the correct print port is set for the selected printer driver.
- (4) Check that the printer is not connected to the same port which is also connected to a mass storage device or scanner. Remove all other devices and connect the port to the printer only. Turn off the printer status monitor in the device options tab in the printer driver.
- (5) If the print port is set as an ECP port, change it to a normal port.
- (6) Try printing the test page refer to 'Test Sample Page' in Chapter 8.
- (7) Try resetting the factory settings.

Possible cause	Step	Check	Result	Remedy
Failure inside the printer	1	Is it possible to print the test page with the method of 'Test Sample Page' in Chapter 8.?	No	Identify the error type, then refer to the specified section of this chapter.
Main PCB failure	2	Is it possible to print with another PC and printer cable?	No	Replace the main PCB.
			Yes	This problem may appear under the specified system environment. Check the environment which the user used.

S-2	Although the USB driver is installed, it is unable to find the BRUSB: port. (Windows98/Me only)
-----	--

 **User Check**

- (1) Re-install the USB driver by following the steps below;
- i) Turn the printer off.
 - ii) Double-click the file "Deins USB.exe" in the USB directory of the CD-ROM.
 - iii) Re-boot the PC.
 - iv) Turn the printer on.
 - v) "Add New Hardware Wizard" is launched again, follow the instructions in the Wizard to re-install the driver.
- (2) Try to connect the printer directly to the computer if it is connected through a USB hub.

Possible cause	Step	Check	Result	Remedy
Computer Operating System	1	Windows 95 or Windows NT4.0?	Yes	The operating system does not support USB.
Computer settings	2	Does 'Universal Serial Bus Controllers' appear in the Device Manager tab of 'System Properties' in Control Panel?	No	This problem can be caused by your computer settings. See the computer manual.
USB cable/ printer damage	3	Does "Add New Hardware Wizard" appear on the screen or Does test print complete?	No	The USB cable is damaged. Replace the cable. If the same problem appears, the printer will be damaged.

S-3	This printer does not appear in Chooser (Mac OS [®] 9.1 to 9.2) or Print center (Mac OS [®] X 10.2.4 or greater).
-----	---

User Check

- (1) Check the printer is turned on.
- (2) Check the USB cable is connected correctly.
- (3) Check the printer driver is installed correctly.

Possible cause	Step	Check	Result	Remedy
Printer connection	1	Select 'Apple System Profiler' in Apple Menu. Are the following items indicated in the USB box of the Device and Volumes tab? <ul style="list-style-type: none"> • Product ID: 0x27 (for HL-2030), 0x28 (for HL-2040), 0x29 (for HL-2070N) • Vender: Brother International Corporation (or 0x4f9) 	No	Check the printer is turned on and the USB cable is connected correctly. Check that the USB cable used is the shielded twisted pair type and 5 m or less. Try to connect the printer and PC with the USB cable directly.
Driver installation	2	Are there the following files in the Extensions Folder of System Folder? <For System 9.1 – 9.2> <ul style="list-style-type: none"> • BR_PrintMonitor (laser) • Brother Laser 	No	Try to re-install the printer driver.
			Yes	Turn off the printer and PC power switch, and check all connections between them. Then, turn them on again.

S-4	Make sure that the supplied Macintosh [®] printer driver is installed in the Hard Disk and that it is selected with Chooser (Mac OS [®] 9.1 to 9.2) or Print Center (Mac OS [®] X 10.2.4 or greater).
-----	--

6. MALFUNCTIONS

When taking countermeasures for malfunctions as described in this section, check connectors for contact failure before measuring the voltage at the specified connector pins.

M-1	No AC power supplied
-----	----------------------

Possible cause	Step	Check	Result	Remedy
Supply voltage	1	Is the correct voltage present at the outlet?	No	Inform the user that the correct voltage is not supplied at the outlet.
Power plug	2	Is the power cord securely plugged into the outlet?	No	Plug the power cord securely into the outlet.
Fuse (F1, F2)	3	Is the fuse blown?	Yes	If the fuse blows again immediately after replacing the low-voltage power supply PCB, check that there is not a short circuit somewhere in the AC power supply line.
Wiring	4	Unplug the power supply plug. Is there a broken wire between the AC input connector of the low-voltage power supply and the power plug?	Yes	Replace the AC power cord.

M-2	No DC power supplied
-----	----------------------

Possible cause	Step	Check	Result	Remedy
AC power supply	1	Is AC power supplied between connectors CN1-L and CN1-N when the power plug is plugged into the outlet?	No	Follow the same check procedure of M-1 "No AC power supplied".
Wiring, DC load	2	Turn on the power switch. Measure the voltages between the terminals. Do the measured voltage satisfy the prescribed value in the table below?	Yes	Turn off the power switch, reconnect the connector and turn the power switch on again. If the protector circuit is activated, check the connector, the wiring from the connector, and the DC load.
Low-voltage power supply PCB	3	Refer to the chart *1 below.	No	Replace the low-voltage power supply PCB.

*1

PCB	+lead pin	- lead pin	Voltage
Main	CN12-6 CN12-8	CN12-9 CN12-9	Approx. 24V Approx. 5V

**WARNING**

If you analyze malfunctions with the power plug inserted into the power outlet, special caution should be exercised even if the power switch is OFF because it is a single pole switch.

M-3	Main motor failure
-----	--------------------

Possible cause	Step	Check	Result	Remedy
Failure of connector	1	Is the connection of connector CN9 on the main PCB correct?	No	Reconnect the connector.
Main motor	2	Is the problem solved by replacing the main motor?	Yes	Replace the main motor.
Main PCB	3	Is the problem solved by replacing the main PCB?	Yes	Replace the main PCB.

M-4	No paper supplied
-----	-------------------

Possible cause	Step	Check	Result	Remedy
Separation pad / pickup roller failure	1	Is the surface of the separation pad or the pickup roller dirty or worn out?	Yes	1) Clean the surface of the separation pad or pickup roller. 2) Replace the separation pad or pickup roller.
Failure of connector	2	Is the contact of the solenoid connector on the High-voltage power supply PCB good?	No	Reconnect the connector.
HVPS circuit	3	Set paper in the manual feed slot and make a test print by pressing the Go button.	Yes	Replace the HVPS.
Paper pickup clutch solenoid		Does the voltage between pins 2 (SOLENOID) and 1 (24V) of the CN16 connector on the main PCB change from approx. 24V DC to 0V within the specified time?	No	Replace the paper pickup clutch solenoid.
Main PCB	4	Is the problem solved by replacing the main PCB?	Yes	Replace the main PCB.

M-5	Insufficient output from high-voltage power supply unit
-----	---

Possible cause	Step	Check	Result	Remedy
High-voltage contact	1	Do any of the terminals on the high-voltage contacts have dirt or contact burns?	Yes	Clean the terminals.
High-voltage power supply PCB	2	Check the connections of the connector between the high-voltage power supply and the main PCB are secured correctly?	Yes	Replace the high-voltage power supply PCB.
			No	Reconnect the connector between the high-voltage power supply and the main PCB.

M-6	Fixing heater temperature failure
-----	-----------------------------------

Possible cause	Step	Check	Result	Remedy
Poor thermistor harness contact	1	Is the contact of connector CN7 on the main PCB good?	No	Reconnect the connector.
Blown thermal fuse	2	Remove the fixing unit and measure the resistance of the thermal fuse. Is it open circuit?	Yes	Replace the fixing unit.
Blown thermostat	3	Remove the fixing unit and measure the resistance of the thermostat. Is it open circuit?	Yes	Replace the fixing unit.
Halogen heater lamp failure	4	Remove the fixing unit and measure the resistance of the halogen heater lamp. Is it open circuit?	Yes	Replace the halogen heater lamp.

M-7	Laser Unit failure
-----	--------------------

Possible cause	Step	Check	Result	Remedy
Harness connection failure (1)	1	Is connector CN3 on the main PCB secured correctly?	No	Reconnect the connector securely.
			Yes	Replace the laser unit.
Harness connection failure (2)	2	Is the connection of the scanner motor connector CN6 on the main PCB secure?	No	Reconnect the connector securely.
			Yes	Replace the laser unit.

M-8	Fixing unit failure
-----	---------------------

Possible cause	Step	Check	Result	Remedy
Poor thermistor harness contact	1	Is the contact of connector CN7 on the main PCB good?	No	Reconnect the connector.
Blown thermal fuse	2	Remove the fixing unit and measure the resistance of the thermal fuse. Is it open circuit?	Yes	Replace the fixing unit.
Thermistor assembling failure	3	Is the thermistor installed properly?	Yes	Replace the fixing unit.
			No	Reinstall the thermistor properly.
Halogen heater lamp failure	4	Remove the fixing unit and measure the resistance of the halogen heater lamp. Is it open circuit?	Yes	Replace the halogen heater lamp.
Heater harness connection failure	5	Is the heater harness connector connected to the low-voltage power supply PCB and fixing unit secure?	No	Reconnect the connectors securely.

NOTE:

- This problem will be cleared if leaving the printer power ON for ten minutes.
- If the heater is cooled down sufficiently, this problem may be cleared by the following steps; 1) Check that the front cover is open. 2) Turn on the printer power switch while pressing the **Go** button. **Be warned, however, that this operation will melt the fixing unit if the heater is hot.**

M-9	Main PCB failure
-----	------------------

Possible cause	Step	Check	Result	Remedy
Main PCB	1	Is it possible to print the test page with the method of 'Test Sample Page' in Chapter 8?	No	Replace the main PCB.
Software bug	2	Does this problem appear when printing specific data or printing under a specific environment?	Yes	Inform the Brother office of the used specific data, printer condition and system environment.

M-10	Pickup function of paper tray does not work.
------	--

Possible cause	Step	Check	Result	Remedy
Link lever does not move smoothly.	1	Does the link lever work? Isn't the link lever bent?	Yes	Remove the cause of non-smooth operation of the link lever. Replace the link lever.
Pickup roller holder ASSY does not move smoothly.	2	Does the pickup roller holder ASSY move up and down?	No	Replace the pickup roller holder ASSY.
Main motor failure	3	Does the main motor work?	No	Replace the main motor.
Pressure plate drive cam failure	4	Does the pressure plate drive cam rotate?	No	Replace the main frame L ASSY.

M-11	The new toner is not sensed.
------	------------------------------

Possible cause	Step	Check	Result	Remedy
The toner cartridge is not set to the main body correctly.	1	The toner cartridge is not inserted completely.	Yes	Reset the cartridge.
New toner detection switch failure	2	Isn't the toner sensed even if the switch is held?	Yes	Replace the switch.
Main PCB failure	3	Is the problem solved by replacing the main PCB?	No	Replace the main PCB.

M-12	Maximum speed is slow.
------	------------------------

Possible cause	Step	Check	Result	Remedy
Two or more sheets of the paper in the tray are pulled to feed.	1	Does paper double feeding occur?	Yes	Replace the separation pad.
Foreign body attached to the tail edge actuator	2	Is a foreign body caught on the tail edge actuator?	Yes	Remove a foreign body.
Tail edge actuator failure	3	Is the tail edge actuator deformed?	Yes	Replace the tail edge actuator.
Tail edge sensor malfunction	4	Is the tail edge sensor turned ON?	Yes	Replace the tail edge sensor.

M-13	LED failure
------	-------------

Possible cause	Step	Check	Result	Remedy
Three LEDs light up after turning the power ON.	A1	Is the printer in the service mode?	Yes	Check that the Go button has been pressed or not.
Panel PCB failure	A2	Does any LED light up when pressing the Go button?	No	Replace the panel PCB.
Disconnection of the high-voltage power supply PCB harness	B1	Is the harness connected securely?	No	Reconnect the harness securely.
Regist front sensor failure	B2	Does the regist front sensor work correctly?	No	Replace the regist front sensor.
Regist rear sensor failure	B3	Does the regist rear sensor work correctly?	No	Replace the regist rear sensor.
Paper eject sensor failure	B4	Does the paper eject sensor work correctly?	No	Replace the paper eject sensor.
Main cover switch malfunction	B5	Is the main cover switch closed securely?	Yes	Check the switch.

M-14	Service error indication when turning the power ON
------	--

Possible cause	Step	Check	Result	Remedy
Disconnection of the main motor harness	1	Is the harness of the main motor connected?	No	Reconnect the harness securely.
Disconnection of the scanner motor harness	2	Is the harness of the scanner motor connected?	No	Reconnect the harness securely.
Fixing unit failure	3	Does the printer resume after opening the cover, turning the power ON and leaving the printer for ten minutes?	No	Replace the thermistor.

M-15	The printer stops while idling.
------	---------------------------------

Possible cause	Step	Check	Result	Remedy
Front cover failure	1	Is the cover opened by vibration during idling?	Yes	Replace the front cover.
New toner detection switch failure	2	Does the new toner detection switch work correctly?	No	Replace the new toner detection switch.
Process unit terminal failure	3	Are the terminals of the process unit dirty?	Yes	Clean the terminals.
Laser unit failure	4	Does the laser unit work correctly?	No	Replace the laser unit.

7. IMAGE DEFECTS

7.1 Image Defect Examples

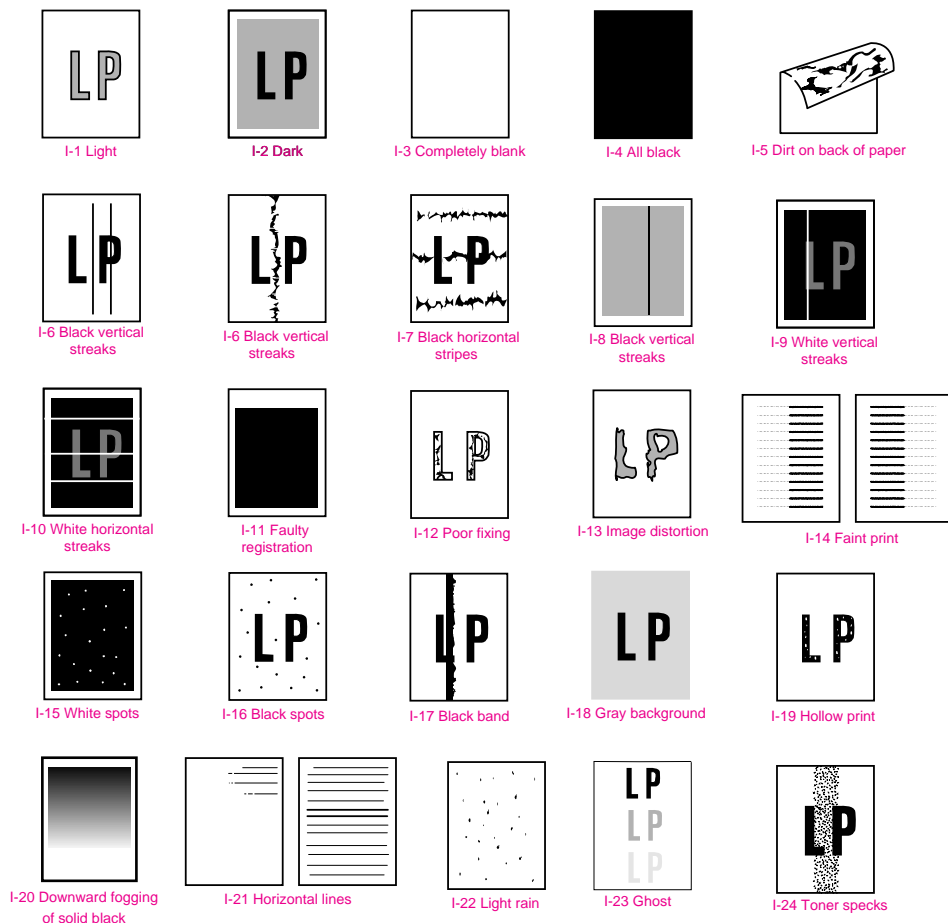


Fig. 7-12

7.2 Diameter of Rollers

The diameter of each roller and the pitch which appears in the image are listed below.

No.	Parts Name	Diameter (The pitch which appears in the image)
1	Paper Feed Roller	Ø 14.0 mm (44.0 mm)
2	Transfer Roller	Ø 12.1 mm (37.9 mm)
3	Exposure Drum	Ø 24.0 mm (75.3 mm)
4	Heat Roller	Ø 25.0 mm (78.5 mm)
5	Pressure Roller	Ø 25.0 mm (78.5 mm)
6	Developer Roller	Ø 20.0 mm (62.8 mm)

7.3 Troubleshooting Image Defect

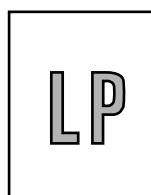
Several types of the image defects can be cleared by end users. For those defects, instruct the user to check the 'User Check' items described in each table. Even if the same image defect appears, the following procedures should be followed in the event of specific image defects.

See also [subsection 7.4 'Location of Ground Contacts' in this Chapter](#) for information about the location of the grounding contacts.


CAUTION:

When using the printer for a special job, such as printing of name cards, print quality cannot be guaranteed.

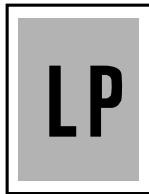
I-1	Light
-----	-------


✓ User Check

- (1) Check the printer's environment. Conditions such as humidity, high temperatures, etc. may cause this situation to occur.
- (2) If the whole page is light, toner save mode may be on. Disable toner save mode within Printer Properties tab of the driver.
- (3) Try installing a new toner cartridge or drum unit.

Possible cause	Step	Check	Result	Remedy	Ground contacts
Toner sensor failure (printer side)	1	Can printing be started with the drum unit and toner cartridge removed?	Yes	Check if the toner sensor is dirty and check the toner sensor connection.	
Toner sensor failure (toner cartridge side)	2	Is the problem solved when 4 or 5 pages are printed after the toner cartridge is replaced with a full one?	Yes	The wiper of the toner cartridge is defective. Replace the toner cartridge.	
Drum connection failure	3	Are all the contacts between the drum unit and printer body connected correctly?	No	Clean contact electrodes both on the drum unit and in the printer body.	(1), (4), (5), (6)
HVPS / Main PCB failure	4	Is the harness connection between the HVPS and the main PCB correct?	Yes	Replace the HVPS or the main PCB.	
Dirt on the scanner window	5	Is there any dirt on the scanner window?	Yes	Wipe it off with a soft clean paper.	
Laser unit failure	6	Is the problem solved after replacing the laser unit?	Yes	Replace the laser unit.	

I-2	Dark
-----	------



 **User Check**

- (1) Check the paper used meets the recommended paper specifications.
- (2) Check the printer's environment. High temperature and high humidity conditions can increase the amount of background shading.
- (3) Clean the corona wire with the wire cleaner.
- (4) Try installing a new toner cartridge or drum unit.

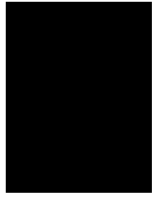
Possible cause	Step	Check	Result	Remedy	Ground contacts
Corona failure (contact failure)	1	Are the charge electrodes between the printer body and the drum unit dirty?	Yes	Clean both electrodes.	(3)
Drum unit failure	2	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit with a new one.	
Toner cartridge failure	3	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge with a new one.	
High-voltage power supply PCB failure	4	Is the connections of the connector between the high-voltage power supply PCB and the main PCB secured correctly?	Yes	Replace the high-voltage power supply PCB.	
Main PCB failure	5	Are there any disconnected connectors?	No	Replace the main PCB.	

I-3	Completely blank
-----	------------------



Possible cause	Step	Check	Result	Remedy	Ground contacts
Developing bias contact failure	1	Are the developing bias contacts between the printer body and drum unit dirty?	Yes	Clean the electrodes at both sides.	(4)
Drum unit	2	Are the drum shaft and drum electrode of the printer body connected correctly?	Yes	Clean the shaft and the electrode.	(1)
			No	Check the connection between the shaft and the electrode.	(1)
Drum unit failure	3	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit.	
Toner cartridge failure	4	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge with a new one.	
Scanner harness connection failure	5	Is the scanner harness connected securely? (Check if there is any play in the connection.)	No	Reconnect the connector correctly.	
Main PCB failure	6	Are printing signals being input to the laser unit? Is the problem solved after replacing the main PCB?	Yes	Replace the main PCB.	
Laser unit failure	7	Is the scanner interlock lever damaged? Is the scanner mirror broken or loose?	Yes	Replace the laser unit.	
			No	Replace the high-voltage power supply PCB.	

I-4	All black
-----	-----------

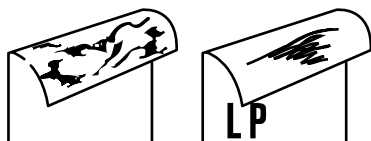


 **User Check**

- (1) Clean the corona wire of the drum unit.
 (2) The drum unit may be damaged. Install a new drum unit.

Possible cause	Step	Check	Result	Remedy	Ground contacts
Corona failure	1	Is the corona wire dirty?	Yes	Clean the corona wire with the wire cleaner.	(2)
	2	Is the corona wire broken?	Yes	Replace the drum unit.	
	3	Are the charge electrodes between the printer body and the drum unit dirty?	Yes	Clean both electrodes.	(3)
Harness connection	4	Is the laser unit connected to the main PCB correctly?	No	Connect the harness between the laser unit and the main PCB correctly.	
High-voltage power supply PCB failure	5	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.	
Main PCB failure	6	Is the problem solved after replacing the main PCB?	Yes	Replace the main PCB.	
Laser unit failure	7	Is the problem solved after replacing the laser unit?	Yes	Replace the laser unit.	

I-5	Dirt on the back of paper
-----	---------------------------



Possible cause	Step	Check	Result	Remedy
Fixing unit dirty	1	Is the pressure roller dirty? Is any other area in the printer dirty?	Yes	Clean the pressure roller referring to the following procedure.
Dirt in the drum unit	2	Is the transfer roller dirty?	Yes	Replace the drum unit
		Is the problem solved after replacing the drum unit?	No	Replace the high-voltage power supply PCB.

NOTE:

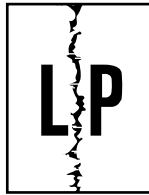
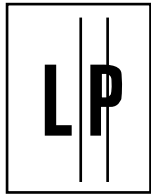
This problem may disappear after printing approximately 10 pages of completely blank sheets.

How to clean the pressure roller

Clean the pressure roller as follows;

- (1) Set 5 or more sheets of paper in the paper tray.
- (2) Open the front cover, and turn on the power switch while holding down the **Go** button.
- (3) All LEDs light up, and keep the **Go** button pressed down until the **Ready** LED goes off. Then, release the **Go** button and make sure that all LEDs are off.
- (4) Press the **Go** button once and make sure that **Toner**, **Drum** and **Paper** LEDs light up.
- (5) Press the **Go** button twice and wait for two seconds. Then, the printer starts printing the grid pattern continuously.
- (6) Close the front cover, print approximately 5 pages and keep holding down the **Go** button until the **Toner**, **Drum** and **Paper** LEDs light up. Release the **Go** button so that the **Paper** and **Ready** LEDs blink alternately. After two seconds, the **Ready** LED lights up and is off.

I-6	Black and blurred vertical streaks
-----	------------------------------------



User Check

- (1) Clean the corona wire in the drum unit.
- (2) Check that the wire cleaner is at the home position.
- (3) Check that the toner cartridge is not empty.
- (4) The drum unit may be damaged. Install a new drum unit.
- (5) The toner cartridge may be damaged. Install a new toner cartridge.

Possible cause	Step	Check	Result	Remedy
Corona failure	1	Is the corona wire dirty?	Yes	Clean the corona wire with the wire cleaner.
Corona failure	2	Is the vertical block streak about 10mm wide? (Check if the wire cleaner is at its home position.)	Yes	Return the wire cleaner to its home position.
Dirt in the paper feed system	3	Is the paper tray or feed system on the drum unit dirty with toner?	Yes	Clean the toner off.
Scratch on the drum	4	Is the surface of the drum scratched?	Yes	Replace the drum unit.
Cleaning failure	5	Is the surface of the drum dirty with toner in streaks?	Yes	Replace the drum unit.
Scratch on the heat roller	6	Is the surface of the heat roller scratched?	Yes	Replace the fixing unit.

NOTE:

- If you print the same pattern (especially vertical streaks) continuously, electrostatic charge performance of the drum will decrease temporarily and black vertical streaks may appear on the paper.
- This problem may occur with noise due to the corona wire being dirty. In that case, clean the corona wire with the wire cleaner.

I-7	Black and blurred horizontal stripes
-----	--------------------------------------

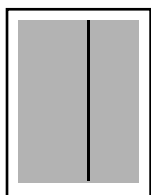


 **User Check**

- (1) The drum unit may be damaged. Install a new drum unit.
- (2) Check the paper used meets the recommended paper specifications.
- (3) Clean inside of the printer and the corona wire in the drum unit.

Possible cause	Step	Check	Result	Remedy	Ground contacts
Scratch on the drum	1	Are the horizontal stripes at 74mm (exposure drum) intervals?	Yes	The exposure drum was scratched. Replace the drum unit.	
Toner stuck on the developer roller	2	Are the horizontal stripes at 37mm (developer roller) intervals?	Yes	After printing several pages, the problem will disappear. If not, replace the toner cartridge.	
Scratch on the heat roller	3	Are the horizontal stripes at 79mm (heat roller) intervals?	Yes	Replace the heat roller.	
Corona contact failure	4	Are the charge electrodes between the printer body and the drum unit dirty?	Yes	Clean both electrodes.	(3)
High-voltage power supply PCB failure	5	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.	

I-8	Black vertical streaks (in a gray background)
-----	---



Possible cause	Step	Check	Result	Remedy	Ground contacts
Corona failure	1	Is the corona wire dirty?	Yes	Clean the corona wire with the wire cleaner.	(2)

I-9	White vertical streaks
-----	------------------------

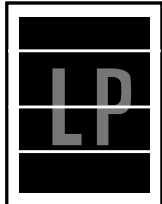


 **User Check**

- (1) Try to wipe the scanner window with a soft cloth.
- (2) The toner cartridge may be damaged. Install a new toner cartridge.
- (3) Check the printer's environment. High temperature and high humidity conditions can cause this problem.
- (4) Damp (wet) paper might be used. Try to change to freshly unpacked paper.

Possible cause	Step	Check	Result	Remedy
Translucent stain on the scanner window	1	Is there any dirt on the scanner window?	Yes	1) Clean the scanner window. 2) If it is not effective, replace the laser unit.
Transfer failure	2	Is the transfer roller scratched?	Yes	Replace the drum unit.
Condensation	3	Has condensation occurred inside the printer?	Yes	Try to print several pages or leave the printer 2 hours to allow it to reach room temperature.

I-10	White horizontal streaks
------	--------------------------

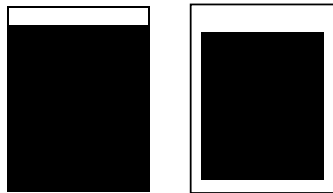


 **User Check**

- (1) Check the paper used meets the recommended paper specifications. A rough surfaced paper, damp paper or thick media can cause the problem.
- (2) Check that the appropriate media type is selected in the printer driver.
- (3) The problem may disappear by itself. Try printing multiple pages to clear this problem especially if the printer has not been used for a long time.
- (4) The drum unit may be damaged. Install a new drum unit.

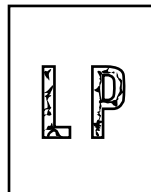
Possible cause	Step	Check	Result	Remedy	Ground contacts
Developing bias contact failure	1	Are the developing bias contacts between the printer body and toner cartridge dirty?	Yes	Clean the electrodes at both sides.	(4)

I-11	Faulty registration
------	---------------------



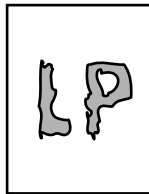
Possible cause	Step	Check	Result	Remedy
Excessive paper load	1	Is the paper loaded in the paper tray more than 27mm high?	Yes	Instruct the user to keep paper loads below 27mm in depth.
Print paper	2	Is the specified weight of the recommended paper being used?	No	Recommend to use the specified types of paper.
	3	Is the first printing position within ± 1 mm of the tolerance specification?	Yes	Adjust the Y offset by using the utility software supplied.
Regist rear sensor position incorrect	4	Is the regist rear sensor off from the correct position?	Yes	Reposition the sensor to the correct position.
Drum unit failure	5	Is the rotation torque of the drum unit heavy?	Yes	Replace the drum unit.

I-12	Poor fixing
------	-------------



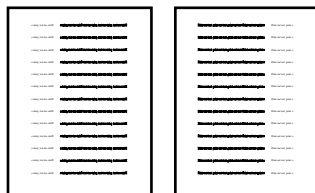
Possible cause	Step	Check	Result	Remedy
Print paper	1	Is thick paper of more than 43lb being used?	Yes	Recommend to use the specified types of paper.
Toner sensor failure (When printing is faint.)	2	Is the problem solved by replacing the drum unit or the toner cartridge?	Yes	1) Toner is empty. 2) The toner sensor is defective. Clean the toner sensor. 3) If the wiper in the toner cartridge is broken, replace the toner cartridge with a new one.
Fixing unit thermistor failure	3	Is the thermistor fitted correctly?	No	Fit the thermistor correctly.
Low-voltage power supply	4	Is the problem solved by replacing the low-voltage	Yes	Replace the low-voltage power supply PCB.

I-13	Image distortion
------	------------------



Possible cause	Step	Check	Result	Remedy
Laser unit installation	1	Is the laser unit secured to the frame incorrectly? (Check if there is any play.)	Yes	Secure the unit correctly and tighten the screws.
Scanner LD emission failure Scanner motor rotation failure	2	Is the laser diode or the scanner motor defective?	Yes	Replace the laser unit.
Scanner connection failure	3	Is the scanner harness connected properly? (Check if it is coming loose.)	No	Connect the harness correctly.

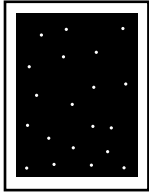
I-14	Faint print
------	-------------



Possible cause	Step	Check	Result	Remedy
Printer installation	1	Is the printer placed horizontally?	No	Place the printer on a flat surface.
Toner cartridge	2	Does the problem happen immediately after replacing the toner cartridge with a new one?	Yes	Remove and carefully shake the toner cartridge horizontally.
Scanner window dirty	3	Is the scanner window dirty?	Yes	Clean the scanner window with a soft dry cloth.
Laser unit failure	4	Is the problem solved by replacing the laser unit?	Yes	Replace the laser unit.

I-15

White spots



 **User Check**

- (1) If the problem is not solved after printing a few pages, the drum unit may have glue from label stock on the exposure drum surface. Refer to Step 1 in the table below and **NOTE** in the next page.
- (2) The drum unit may be damaged. Install a new drum unit.

Possible cause	Step	Check	Result	Remedy
Drum unit failure	1	Are the white spot at 75.3mm intervals?	Yes	1) If toner or glue remains stuck, wipe it off gently with a cotton swab. (Refer to NOTE in the next page.) 2) If the drum surface is scratched, replace the drum unit.
	2	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit.
No toner	3	Is the toner in the toner cartridge almost empty?	Yes	Replace the toner cartridge with a new one.
Print paper	4	Is the problem solved after changing to specified freshly unpacked paper?	Yes	Damp (wet) paper might be used. Recommend to change freshly unpacked paper.
Environment	5	Does the problem still appear after the printer has warmed up?	Yes	1) Replace the drum unit. 2) Advise the user of the specified print environment.

NOTE:

Clean the drum unit as follows.

- (1) *Remove the toner cartridge from the drum unit. Place the printing samples in front of the drum unit, and find the exact position of the image defect.*

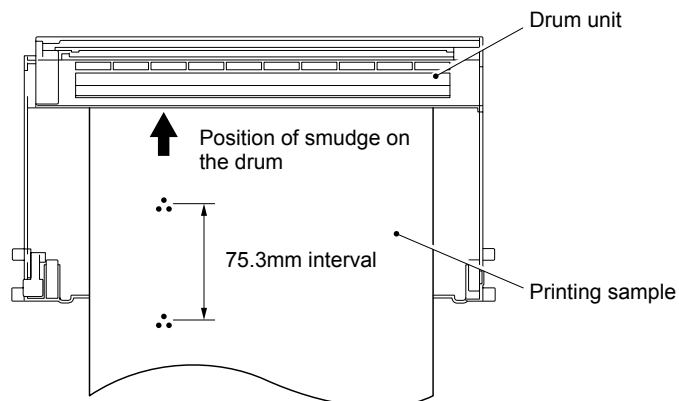


Fig. 7-13

- (2) *Turn the drum gear by hand while looking at the surface of the exposure drum.*

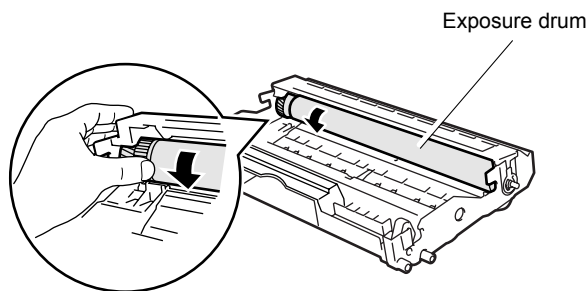


Fig. 7-14

- (3) *Wipe the surface of the exposure drum with a cotton swab until the dust or paper powder on the surface comes off.*

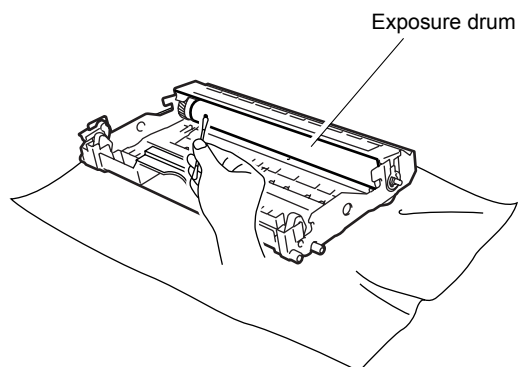


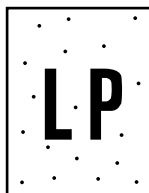
Fig. 7-15

**CAUTION:**

- *Do not wipe the surface of the exposure drum with something sharp. (ball-point pen etc.)*
- *Use cleaning liquid which is a 50-50 mixture of ethyl alcohol and pure water.*

I-16

Black spots

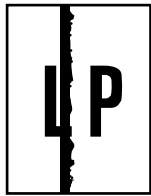


 **User Check**

- (1) If the problem is not solved after printing a few pages, the drum unit may have glue from label stock on the exposure drum surface. Refer to Step 1 in the table below and **NOTE** in the previous page.
- (2) The drum unit may be damaged. Install a new drum unit.

Possible cause	Step	Check	Result	Remedy	Ground contacts
Drum unit	1	Are the spots at 74mm intervals? (The problem is not solved after printing a few pages.)	Yes	1) If toner or glue remains stuck, wipe it off gently with a cotton swab. (Refer to NOTE in the previous page.) 2) If the exposure drum is scratched or deteriorated (exposed), replace the drum unit.	
Drum connection failure	2	Is the contact between the drum unit and printer body connected correctly?	No	Clean contact electrode both on the drum unit and in the printer body.	(7)
Fixing unit	3	Are the spots at 79mm intervals? (The problem is not solved after printing a few pages.)	Yes	1) Check and clean the heat roller with a cloth dampened with alcohol. 2) Replace the fixing unit.	
High-voltage power supply PCB failure	4	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.	

I-17	Black band
------	------------



Possible cause	Step	Check	Result	Remedy	Ground contacts
Corona failure	1	Is the wire cleaner at its home position?	No	Return the wire cleaner to its home position.	(2)
Corona dirty	2	Is the corona wire dirty?	Yes	1) Clean the corona wire. 2) If the problem still appears after cleaning, replace the drum unit.	(2)

I-18	Gray background
------	-----------------



Possible cause	Step	Check	Result	Remedy
Print paper	1	Does the paper being used meet the paper specification (weight, etc.).	No	Recommend to use the specified types of paper.
			Yes	Recommend to change to freshly unpacked paper.
Toner sensor failure (printer side)	2	Is Ready LED still lighted after the toner cartridge and drum unit are taken out? (The front cover is closed.)	Yes	Toner sensor failure. Clean the toner sensor and check the toner sensor connection.
Toner cartridge failure	3	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge.
Drum unit failure	4	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit.
			No	Replace the high-voltage power supply PCB.

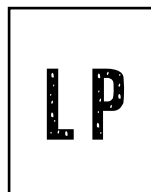
NOTE:

The following cases increase the possibility of this problem.

- Acid paper is being used.
- The drum unit is at the end of its life.
- There is dust or paper powder.

I-19

Hollow print



 **User Check**

- (1) Check the paper used meets the recommended paper specifications.
- (2) Select the 'Thick paper mode' in the printer driver, or use thinner paper than you are currently using.
- (3) Check the printer's environment, conditions such as high humidity may cause this situation to occur.

Possible cause	Step	Check	Result	Remedy
Print paper	1	Is thick paper of more than 43lb being used or extremely rough surface paper?	Yes	Recommend to use the specified types of paper.
			No	Refer and compare with I-15.

I-20

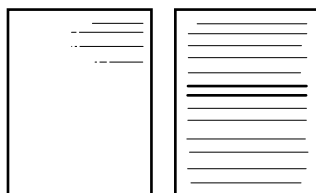
Downward fogging of solid black



Possible cause	Step	Check	Result	Remedy
Toner cartridge failure	1	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge.
High-voltage power supply PCB failure	2	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.

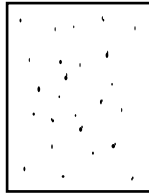
I-21

Horizontal lines



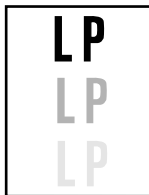
Possible cause	Step	Check	Result	Remedy
Paper tray contacts	1	Are the ground contacts on the right side of the paper tray connecting correctly?	No	Clean the contacts.
Drum unit	2	Are the high-voltage power supply and drum unit contacted correctly?	No	Clean the contacts.

I-22	Light rain
------	------------



Possible cause	Step	Check	Result	Remedy	Ground contact
Drum unit failure	1	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit.	
Drum connection failure	2	Is the contact between the drum unit and printer body connected correctly?	No	Clean contact electrode both on the drum unit and in the printer body.	(7)
High-voltage power supply PCB failure	3	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.	

I-23	Ghost
------	-------

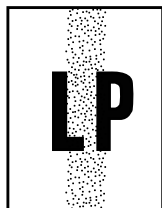


 **User Check**

- (1) Check the paper used meets the recommended paper specifications. Damp paper, thick media or rough surfaced paper can cause the problem.
- (2) Check the printer's environment. High temperature and high humidity conditions can cause the problem.
- (3) Check that the appropriate media type is selected in the printer driver.
- (4) Try installing a new drum unit.

Possible cause	Step	Check	Result	Remedy
Driver setting	1	Is thin paper such as 64g/m ² used under the thick paper mode?	Yes	1) Change the current mode to the normal mode from the driver setting. 2) Print 5 or 6 blank pages if this problem occurs.
Drum unit failure	2	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit.
High-voltage power supply PCB failure	3	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.

I-24	Toner specks
------	--------------



 **User Check**

- (1) Check the paper used meets the recommended paper specifications. A rough surfaced paper may cause the problem.
- (2) The toner cartridge may be damaged. Install a new toner cartridge.
- (3) The drum unit may be damaged, or may be nearly at the end of life. Install a new drum unit.

7.4 Location of Grounding Contacts

7.4.1 Drum unit

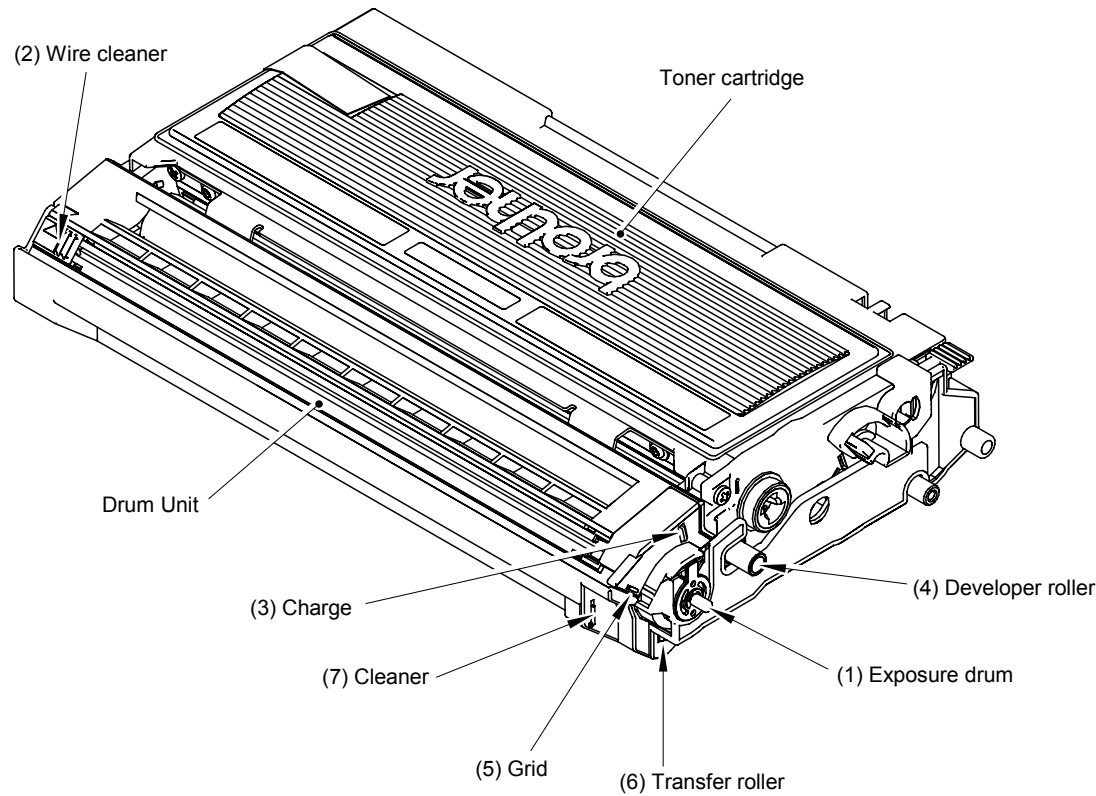


Fig. 7-16

7.4.2 Printer body & paper tray

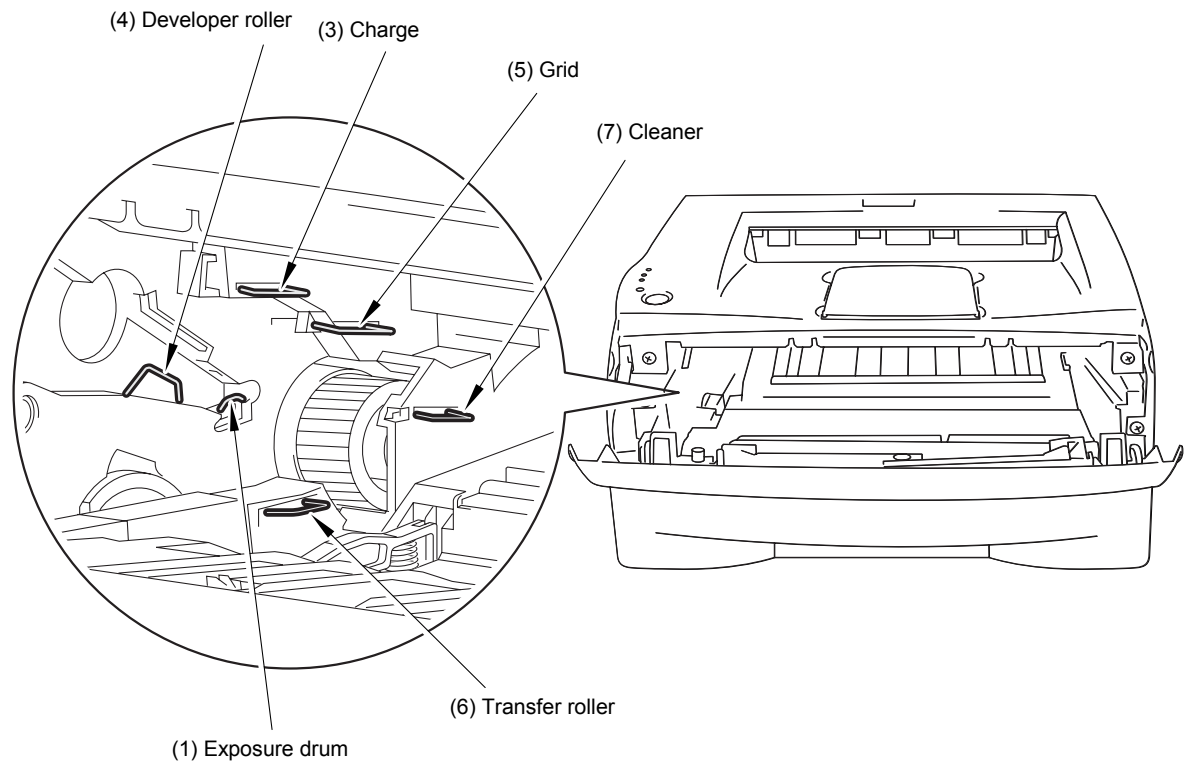


Fig. 7-17

8. INCORRECT PRINTOUT

When the data is not printed correctly as it is seen on the PC screen, follow the procedures below in the event of a specific error.

P-1	The printer prints unexpectedly or it prints garbage.
-----	---

User Check

- (1) Check if the printer cable is not too long. It is recommended to use a parallel cable of less than 2 meters (6.6 feet) in length.
- (2) Check that the printer cable is not damaged or broken. Check also that the printer cable is connected to the correct interface connectors of both the printer and PC.
- (3) If an interface switching device is used, remove it and connect the computer directly to the printer and try again.
- (4) Check that the appropriate printer driver is selected as 'Set as Default'. Check also that the correct print port is set for the selected printer driver.
- (5) Check that the printer is not connected to the same port which is also connected to a mass storage device or scanner. Remove all other devices and connect the port to the printer only. Turn off the printer status monitor in the device options tab in the printer driver.
- (6) If the print port is set as an ECP port, change it to a normal port.
- (7) Try printing the test page referring to '[Test Sample Page](#)' in Chapter 8.
- (8) Try resetting the factory settings.

Possible cause	Step	Check	Result	Remedy
Failure inside the printer	1	Is it possible to print the test page with the method of ' Test Sample Page ' in Chapter 8?	No	Identify the error type, then refer to the specified section of this chapter.

NOTE:

If the printer prints garbage or incorrect fonts, instruct the user to use the 'Troubleshooting for Printer won't print' tool of the self-diagnostics tools. If the problem cannot be solved, instruct user to use the 'Diagnostics' tool described in the Chapter 7 so that you can get a log file to investigate the cause of the problem. For details on the self-diagnostics tools, see 2. '[HOW TO USE SELF-DIAGNOSTICS TOOLS](#)' in Chapter 8.

P-2	Unable to print full pages of a document with the "PRINT OVERRUN" message.
-----	--

User Check

- (1) Press the **Go** button on the control panel to print the data remaining in the printer.
- (2) If this does not clear the error, reduce the complexity of your document or reduce the printer resolution.
- (3) Change the following setting in the printer driver and try again. The best combination of settings below will vary depending on your document.
Graphic Mode / TrueType™ mode (for HL-2070N) / Use Printer TrueType™ Fonts (for HL-2070N)

NOTE:

This problem may appear if the data is too complex. If it is not cleared by taking the actions above, it will be impossible to print such data under the printer specifications.

P-3	Unable to print full pages of a document with the “MEMORY FULL” message.
-----	--

 **User Check**

- (1) Press the **Go** button on the control panel to print the data remaining in the printer.
- (2) Reduce the complexity of your document or reduce the printer resolution.

NOTE:

This problem may appear if the data is too complex.

Possible cause	Step	Check	Result	Remedy
Main PCB failure	1	Is it possible to print after reducing the data of a document?	Yes	Replace the main PCB.

P-4	Headers or footers are not printed out even though they are viewed on PC screen.
-----	--

 **User Check**

Most laser printers have a restricted area that cannot be printed on. Usually the first two lines and last two lines of text cannot print (leaving 62 printable lines). Adjust the top and bottom margins in your document to allow for this.

P-5	The printer sometimes prints a couple of characters and then ejects the page.
-----	---

 **User Check**

(For DOS environment only)

The application printer emulation setting and the printer's emulation do not match. Check in the application software which printer you have selected to make sure the printer is set up correctly. Remember that the printer emulates widely used printer selections:

HP Laser Jet 6P, HP Laser Jet 6P, Epson FX-850, IBM Proprinter XL

Try setting the printer into HP emulation and then select the HP LaserJet 6P printer in the application software.

9. NETWORK PROBLEM

If the error related to network occurs, refer to the following sections;

9.1 Installation Problem

The Brother print server is not found during setup of the network print software installation or from the printer driver of the Brother printer in Windows®.

The Brother print server is not found using the Simple Network Configuration capabilities of Mac OS® X.

Make sure you have completed the IP address setting of the Brother print server according to Chapter 2 of this User's Guide before installing the network print software or printer driver.

Check the following:

1. Make sure that the printer is powered on, is on-line and ready to print.
2. Check to see if there is any LED activity. Brother print servers have two LEDs on the back panel of the printer. The upper side LED shows Link status. The lower side LED shows Activity (Receive/Transmit) status.
 No light: If both LEDs are off, then the print server is not connected to the network.
 Link LED is green: The Link LED indicates green if the print server is connected to a Ethernet network.
3. Print the Printer Settings Page and check if the settings such as IP address settings are correct for your network. The problem may be the result of mismatched or duplicate IP address. Verify that the IP address is correctly loaded into the print server. And make sure that no other nodes on the network have this IP address. For information on how to print the Printer Settings Page, see Printing the Printer Settings Page on page 7-2.
4. Verify that the print server is on your network as follows:

For Windows®

Try pinging the print server from the host operating system command prompt with the command:

```
ping ipaddress
```

Where `ipaddress` is the print server IP address (note that in some instances it can take up to two minutes for the print server to load its IP address after setting the IP address).

For Macintosh®

For Mac OS® 9.1 to 9.2

- (1) From the **Apple** menu, open the **Chooser**.
- (2) Click the **Brother Laser (IP)** icon, and make sure that your print server name appears in the right frame. If it is visible, then the connection is good. Otherwise, go to Step 5.

For Mac OS® X 10.2.4 or greater

- (1) From the **Go** menu, select **Applications**.
- (2) Open the **Utilities** folder.
- (3) Double-click the **Printer Setup Utility** icon.
- (4) Click **Add**.

- (5) Make the following selection. Make sure that your print server appears. If it is visible, then the connection is good. Otherwise, go to Step 5.

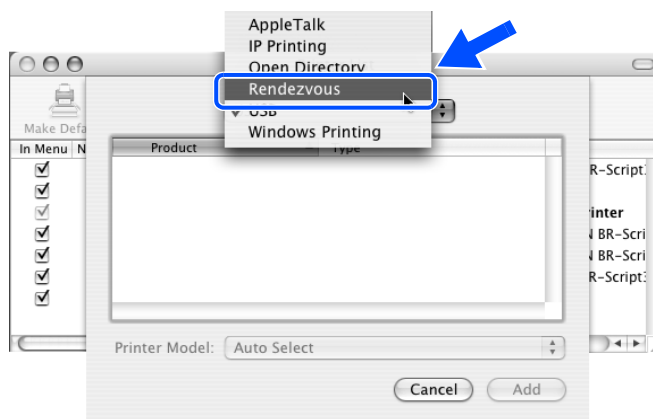


Fig. 7-18

5. If you have tried 1 to 4 above and it does not work, then reset the print server back to the default factory settings and try from the initial setup again. For information how to reset to the default factory settings, see Restoring the network settings to factory default on page 7-2.
6. Check if a personal firewall such as ICF (Internet Connecting Firewall) for Windows XP is running on your computer. If it is running, temporarily turn it off and try again.

NOTE:

If none of the above steps are successful, there is almost certainly a hardware or network problem.

9.2 Printing Problem

<Print job is not printed>

Make sure the status and configuration of the print server. Check following:

1. Make sure that the printer is powered on, is on-line and ready to print.
2. Print the Printer Settings Page of the printer and check if the settings such as IP address settings are correct for your network. The problem may be the result of mismatched or duplicate IP address. Verify that the IP address is correctly loaded into the print server. And make sure that no other nodes on the network have this IP address.
3. Verify that the print server is on your network as follows:

For Windows®

- (1) Try pinging the print server from the host operating system command prompt with the command:

```
ping ipaddress
```

Where *ipaddress* is the print server IP address (note that in some instances it can take up to two minutes for the print server to load its IP address after setting the IP address).

- (2) If a successful response is received, then proceed to Windows® 95/98/Me and Windows NT® 4.0 Peer-to-Peer print (LPR) troubleshooting, and Windows® 2000/XP IPP troubleshooting. Otherwise, proceed to Step 4.

For Macintosh®

For Mac OS® 9.1 to 9.2

- (1) From the **Apple** menu, open the **Chooser**.
- (2) Click the **Brother Laser (IP)** icon, and make sure that your print server name appears in the right frame. If it is visible, then the connection is good. Otherwise, go to Step (4).

For Mac OS® X 10.2.4 or greater

- (1) From the **Go** menu, select **Applications..**
- (2) Open the **Utilities** folder.
- (3) Double-click the **Printer Setup Utility** icon.
- (4) Click **Add**.
- (5) Make the following selection. Make sure that your print server appears. If it is visible, then the connection is good.

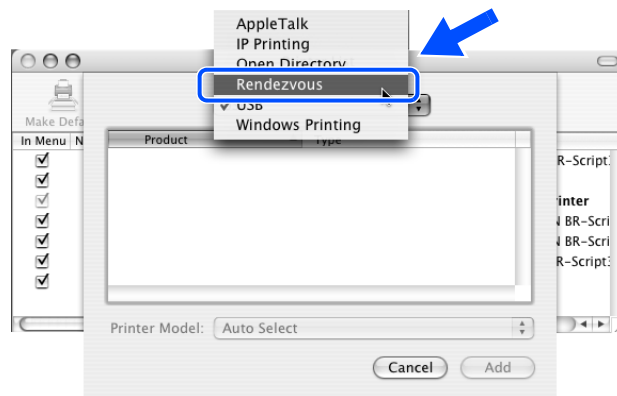


Fig. 7-19

4. If you have tried 1 to 4 above and it does not work, then reset the print server back to the default factory settings and try from the initial setup again. For information how to reset to the default factory settings, see Restoring the network settings to factory default on page 7-2.

<Error during printing>

If you try to print while other users are printing large amounts of data (e.g. many pages or color pages with high resolution), the printer is unable to accept your print job until the ongoing printing is finished. If the waiting time of your print job exceeds a certain limit, a time out situation occurs, which causes the error message. In such situations, execute the print job again after the other jobs are completed.

9.3 Protocol-Specific Troubleshooting

<Windows® 95/98/Me and Windows NT® 4.0 Peer-to-Peer print (LPR) troubleshooting>

If you are having trouble printing on a Windows® 95/98/Me, Windows NT® 4.0 or later Peer-to-Peer network (LPR method), check the following:

1. Make sure that the Brother LPR Port driver is correctly installed and configured according to the Windows® 95/98/Me or Windows NT® 4.0 Peer-to-Peer chapters.
2. Try to turn the **Byte Count** on in the **Configure port** area of printer driver properties.

You may find that during the installation of BLP software, the screen that prompts you for a Port name is not displayed. This may happen on some Windows® 95/98/Me and Windows NT® 4.0 computers. Press the ALT and TAB keys to make it appear.

<Windows® 95/98/Me and Windows NT® 4.0 Peer-to-Peer print (NetBIOS) troubleshooting>

If you are having trouble printing on a Windows® 95/98/Me, Windows NT® 4.0 or later Peer-to-Peer network (NetBIOS), check the following:

1. Make sure that the Brother NetBIOS Port driver is correctly installed and configured according to the Windows® 95/98/Me or Windows NT® 4.0 Peer-to-Peer (NetBIOS) chapters. You may find that during the installation of the port driver, the screen that prompts you for a Port name is not displayed. This happens on some Windows® 95/98/Me and Windows NT® 4.0 computers. Press the ALT and TAB keys to make it appear.
2. Make sure that the print server is configured to be in the same workgroup or domain as the rest of your computers. It may take several minutes for the print server to appear in the network neighborhood.

<Windows® 2000/XP IPP troubleshooting>

Want to use a different Port number other than 631.

If you are using Port 631 for IPP printing, you may find that your firewall may not let the print data through. If this is the case, use a different port number (port 80), or configure your Firewall to allow Port 631 data through.

To send a print job using IPP to a printer using Port 80 (the standard HTTP port) enter the following when configuring your Windows® 2000/XP system.

`http://ip_address/ipp`

Get More Info option in Windows® 2000 not working

If you are using a URL of:

`http://ip_address:631` or `http://ip_address:631/ipp` ,

the **Get More Info** option in Windows® 2000 will not function. If you wish to use the **Get More Info** option, use the following URL:

`http://ip_address`

This will then force Windows® 2000/XP to use Port 80 to communicate with the Brother print server.

<Web browser troubleshooting (TCP/IP)>

1. If you can not connect to the print server using your web browser it may be worth checking the Proxy Settings of your browser. Look in the Exceptions setting and if necessary, type in the IP address of the print server. This will stop your PC from trying to connect to your ISP or proxy server every time you wish to look at the printer server.
2. Make sure that you are using the proper web browser, we recommend Netscape Navigator® version 4.0 or later/ Microsoft Internet Explorer® version 5.0 or later.

CHAPTER 8 SERVICE SUPPORT SOFTWARE

1. CONTROL PANEL

Various modes can be used if the power switch is set to ON while the **Go** button is held.

There are two types of modes: User Mode and Service Mode.

Three types of LED display are used to indicate that the **Go** button is being held or execution of functions is completed. (i), (ii), and (iii) correspond to the numbers in the operation procedure.

- (i) **Toner/Drum/Paper** LEDs are lighted at the same time to show that transfer to the specified mode is completed.
- (ii) **Ready** LED is lighted to show that the **Go** button is held when the mode or function is selected. The LED is out if the **Go** button is not held.
- (iii) All LEDs are lighted for 1 second at the same time to show that initialization or change of set values is completed.

1.1 User Mode

Operation procedure of User Mode is shown below.

1. Check that the front cover is closed.
2. Turn ON the power switch while holding down the **Go** button.
3. Check that **Toner/Drum/Paper** LEDs are lighted.
4. Release the **Go** button and check that all LEDs are off.
5. Press the **Go** button. (The mode changes every time the button is pressed.)

Press the Go button	Each mode starts after 2 seconds.
Once	(1) Test Sample Page
Twice	(2) Print Fonts
Three times	(3) Hex Dump Mode
Four times	(4) PCB ONLY Mode
Five times	(5) 1push Printing Recovery Mode * Check that all LEDs are out. → (iii)
Six times	(6) Network Factory Reset 1 (APIPA: ON) * Check that all LEDs are out. → (iii) (HL-2070 only)
Seven times	(7) Network Factory Reset 2 (APIPA: OFF) * Check that all LEDs are out. → (iii) (HL-2070 only)
Eight times	(8) NV-RAM Factory Reset * Check that all LEDs are out. → (iii)
More than nine times	(1) Test Sample Page

NOTE:

* Each mode starts 2 seconds after pressing the **Go** button.

* Pressing of the **Go** button 2, 6, or 7 times is ineffective for GDI model.

* If the **Go** button is pressed, the **Ready** LED is lighted. If the **Go** button is released, the LED is out. → (ii)

Explanation of functions of each User Mode is shown below.

< Functions of each “User Mode” >

(1) Test Sample Page

The printer prints a demo page. The printer returns to the ready status after printing.

(2) Print Fonts

The printer prints a list of the internal fonts. The printer returns to the ready status after printing.

(3) Hex Dump Mode

You can print data as hexadecimal code. To exit from this mode, you have to turn off the printer.

(4) PCB ONLY Mode

Even when the engine error occurs and PCB exchange is required for recovery, the printer can be started, ignoring the engine error if this mode is used. NVRAM data can be obtained.

(5) 1push Printing Recovery Mode

Demo page print is possible by pressing **Go** button after the power supply is turned on.

The data for printing is cleared since the mode can be executed only once.

This mode enables to recover demo page printing. However, the design of printing is not demo page printing, but test printing.

(6) Network Factory Reset 1 (APIPA: ON)

The network setting is reset to its factory setting. (APIPA is ON) Refer to [Section 6.2 of Chapter 2](#).

(7) Network Factory Reset 2 (APIPA: OFF)

The network setting is reset to its factory setting. (APIPA is OFF) Refer to [Section 6.3 of Chapter 2](#).

(8) NV-RAM Factory Reset

The printer is restored to the factory setting and permanent fonts and macros are cleared. The printer returns to the ready status after printing.

1.2 User Maintenance Mode

This section describes what the user should do when replacing the consumable parts.

<Resetting the drum counter>

The printed image may deteriorate when using the drum unit to a certain degree. The printer detects how much the drum unit is used with the drum counter and lights up the **Drum** LED when the drum unit life is nearly at the end of its life to indicate to the user that the drum unit life reaches the end of its life soon, in order to prevent the printed image defects due to drum unit deterioration.

The printer does not provide the function which resets the drum counter automatically when the drum unit is replaced with a new one. If replacing the drum unit with a new one without resetting the drum counter, the counted value of the old drum unit is used continuously so that the **Drum** LED is not off.

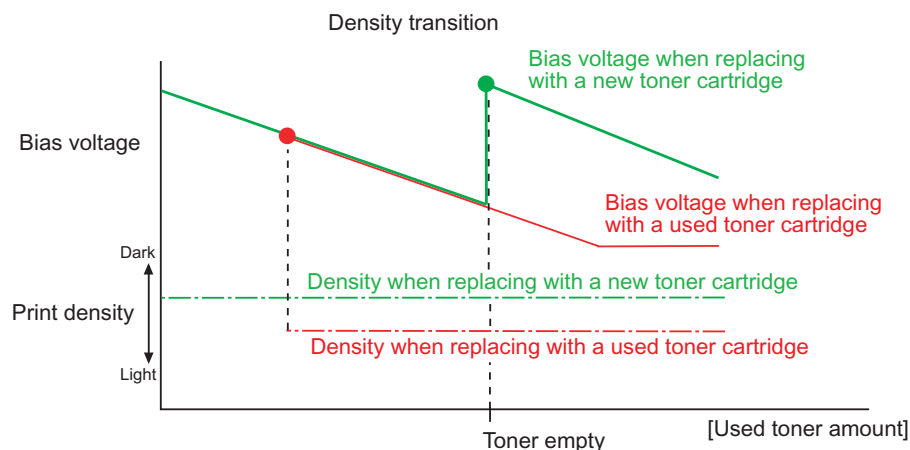
When replacing the drum unit with a new one, it is required to reset the drum counter following the steps below:

- (1) Open the front cover while the power supply of the printer is ON.
(while the old drum unit is being installed in the printer)
- (2) Keep the **Go** button pressed down until all LEDs on the control panel light up. (approx. four seconds)
- (3) Release the **Go** button when all LEDs light up and take the old drum unit out of the printer.
- (4) Install a new drum unit into the printer.
- (5) Close the front cover and make sure that the LEDs are off.

<Initializing the developing bias>

When replacing the toner cartridge with a new one, the new toner sensor detects that the toner cartridge is replaced, and the developing bias is initialized automatically. Therefore, the user is not necessary to initialize the developing bias.

If replacing the toner cartridge which contains enough toner with a used one, the new toner sensor cannot detect that the toner cartridge is replaced so that the developing bias is not initialized. In this case, the print density may be lighter than usual.



In such a case, initialize the developing bias forcibly following the steps below:

- (1) Open the front cover.
- (2) Take the drum unit out of the printer.
- (3) Press the **Go** button.
- (4) Install the drum unit into the printer.
- (5) Press the **Go** button.
- (6) Close the front cover.

1.3 Service Mode

Operation procedure of Service Mode is shown below.

1. Check that the front cover is open.
2. Turn ON the power switch while the **Go** button is held.
3. Check that **Toner/Drum/Paper** LEDs are lighted.
4. Release the **Go** button and check that all LEDs are out.
5. Press the **Go** button once or twice.
6. Check that **Toner/Drum/Paper** LEDs are lighted. → (i)
7. Press the **Go** button. (The mode changes every time the button is pressed.)

Press the Go button	Press the Go button	Each mode starts after 2 seconds.
Press the Go button once. * Check that Toner/Drum/Paper LEDs are lighted. → (i)	Once	(1) Factory Inspection Mode
	Twice	(2) Continuous Grid Pattern Print Mode
	Three times	(3) Fixing Unit Test Print
	Four times	(4) NV-RAM Value Dump Mode
	Five times	(5) RAM Check * Check that all LEDs are out. → (iii)
Press the Go button twice. * Check that Toner/Drum/Paper LEDs are lighted. → (i)	Once	(6) Printing for Maintenance
	Twice	(7) Print Settings
	Three times	(8) Sleep Mode Indication (OFF/Dimmed)
	Four times	(9) Sleep Mode Setting (ON/OFF) * Check that all LEDs are out. → (iii)
	Five times	(10) Developer Roller Counter Reset 1 (For the starter toner) * Check that all LEDs are out. → (iii)
	Six times	(11) Developer Roller Counter Reset 2 (For the standard toner) * Check that all LEDs are out. → (iii)

Explanation of functions of each Service Mode is shown below.

The procedure from 1 to 4 is the same as the above.

Number of times of pressing the Go button	
Press the Go button for 2 seconds (long push). (Check that Paper LED is lighted.)	PIT3 Inspection Mode * Factory use.

NOTE:

* Each mode starts 2 seconds after pressing the **Go** button.

* If the **Go** button is pressed, the **Ready** LED is lighted. If the **Go** button is released, the LED is out. → (ii)

< Functions of each “Service Mode” >

(1) Factory Inspection Mode

This mode is to check each sensor at the assembly line. Since the number of sensors in the ALL series is small, the sensors can be checked by performing a print operation in principle.

- 1) This mode is included in the product software.
- 2) The machine goes into the inspection mode by a special operation when the power is turned on.
- 3) In the inspection mode, the **Ready** LED blinks once when the state of a sensor or a switch is changed (from ON to OFF, or from OFF to ON).
- 4) The **Toner** LED is lit when the state of all switches and sensors, except the tail edge sensor, is detected.

1. How to go into Factory Inspection Mode

(In this operation, you can check the **Go** button, the **Toner/Drum/Paper/Ready** LEDs, the open state of the cover, and the halt state of the fan.)

- i) Turn on the power switch as pressing the **Go** button while the front cover is open. After all LEDs on the panel are lit, only the **Ready** LED goes out.
- ii) Press the **Go** button.
- iii) All the LEDs go off.
- iv) Press the **Go** button once again. (Turn it on and off.)
- v) The three LEDs, or **Toner/Drum/Paper** LEDs are lit.
- vi) Press the **Go** button once again. (Turn it on and off.)
- vii) All the LEDs go out.

2. Sensor Inspection Check Procedure

You can conduct the following inspections i) to v) in any order.

- i) Check sensors.
Manually activate the sensors listed below, and verify that the **Ready** LED is lit. (When the state is changed continuously, the **Ready** LED keeps blinking.)
Cover sensor, New toner sensor, Regist rear sensor
Paper eject sensor, Regist front sensor, Toner sensor
Tail edge sensor (This sensor cannot be activated from outside.)
When the verification of all the sensors, except the tail edge sensor, is completed, the **Toner** LED becomes lit.
- ii) Check that the **Toner** LED goes out.
Verify that the **Ready** LED is lit when pressing the **Go** button while the front cover is closed.
(When you press the **Go** button while the front cover is closed, the **Toner** LED goes out. It remains off while the **Go** button is being pressed.)
- iii) Check the fan operation.
Close the front cover and verify the fan operation. (Verify full- speed and half-speed rotations, and halt.)
The fan must repeat the following operations whenever the cover sensor is pressed.
Full-speed rotation → Half-speed rotation → Halt → Full-speed rotation.
- iv) Check the Sol.
Verify that the pick-up sol is turned on when the new toner sensor is turned on.
Verify that the regist sol is turned on when the regist front sensor is turned on.

- v) Check the scanner motor and the main motor.
Close the front cover as pressing the **Go** button while the front cover is open. The scanner motor starts rotating, and in two seconds the main motor starts rotating. When you stop pressing the **Go** button or open the front cover, the scanner motor and the main motor stop rotating.
- vi) Turn the power off.

(2) Continuous Grid Pattern Print Mode

This mode is to continuously print a grid pattern with a serial number on it. The number of grid pattern prints is displayed at the same time.
The machine does not go back to the ready state unless the power is turned off and on.

(3) Fixing Unit Test Print

This is to print the following three patterns to check the fixing unit.

- Grid pattern with a serial number on it
- Gray pattern
- Black pattern

When this operation is completed, the machine automatically goes back to the ready state.

(4) NV-RAM Value Dump Mode

This is to collectively print the present state of the NV-RAM of all printers.
When this operation is completed, the machine automatically goes back to the ready state.

(5) RAM Check

This is to execute a stricter RAM check than a standard one. If the result turns out unaccepted, it considers an error, and all the LEDs blink. If it turns out accepted, the **Ready** LED keeps blinking.
The machine does not go back to the ready state unless the power is turned off and on.

(6) Printing for Maintenance

This is to print a list of all maintenance information including printer coverage information.

- Series name
- Serial Number:
- <Device Status>
Page Count:
Drum Count:
Average Coverage:
- <Drum Information>
Estimated Pages Remaining:
- <Total Pages Printed>
MANUAL FEED:
TRAY 1:
- <Total Pages Printed>
Previously Used Toner:
Current Toner:
- <Total Pages Printed>
A4/LETTER:
LGL/A4LONG/FOLIO:
B5/EXECUTIVE:
ENVELOPE:
OTHERS:

- <Total Paper Jams>
JAM TRAY 1:
JAM INSIDE:
JAM REAR:
- <Error History (last 10 errors)>
- <Replace Count>
DRUM:
TONER:
- <Developing Bias>

NOTE:

Some margin of error must be taken into consideration because coverage for the printable area of A4-size paper is calculated using video signals

(7) Print Settings

If you want to know the drum unit life or the number of printed pages, you should print out the Print Settings.

1. Printing out the print settings

- 1) Turn off the power switch of the printer and check that the front cover is open.
- 2) Turn on the power switch while holding down the **Go** button. All LEDs light up, and keep the **Go** button pressed down until the **Ready** LED goes off.
- 3) Release the **Go** button and make sure that all LEDs are off.
- 4) Press the **Go** button twice and wait for a two seconds.

NOTE:

- The descriptions printed in Print Settings vary depending on the countries.
- It is also allowed you to print the print settings by pressing the **Go** button three times continuously when the front cover is closed and when the printer is in the ready mode.

< HL-2030/2040 series >

PRINT SETTINGS		SERIAL NO. 1000000							
HL-2040 series									
SETUP	USER SETTINGS	INTERFACE	USER SETTINGS						
LANGUAGE	ENGLISH	AUTO IF TIME	15 SEC						
POWER SAVE	ON	UNIT BUFFER	16KB, 3						
POWER SAVE TIME	15 MINUTE	PARALLEL SPEED	ON						
		4800 SPEED	ON						
		81-000	ON						
		1000000	ON						
COMP. ROM VERSION 10.10		PRINT MENU							
RAM SIZE 1 MB/byte		PRINT POSITION							
		X OFFSET 10 DOTS							
		Y OFFSET 10 DOTS							
Remaining life of :									
<table border="1"> <tr> <td>DRUM</td> <td>5.38</td> <td>100%</td> </tr> <tr> <td>TONER</td> <td>5.38</td> <td>100%</td> </tr> </table>				DRUM	5.38	100%	TONER	5.38	100%
DRUM	5.38	100%							
TONER	5.38	100%							
<Device Status> Page Count:1381 MANUAL FEED:0 COPY:1381 AA/LETTER:1381 L&J/MAILING/PALD:0 B&J/EXECUTIVE:0 ENVELOPE:0 OTHER:0 <Total Paper Jams:16 > JAM TRAY 1:1 JAM INSIDE:12 JAM REAR:3		<Error History (last 10 errors)> 1.JAM PAPER 11 2.CLEAN DRUM UNIT 3.CLEAN DRUM UNIT 4.CLEAN DRUM UNIT 5.JAM PAPER 11 6.JAM INSIDE 7.JAM PAPER 11 8.JAM REAR 9.JAM PAPER 11 10.JAM INSIDE <Replace Count> DRUM:0 TONER:1 *Based on A4/Letter printing.							

< Page 1 >

This page includes various setting information of the printer. Each term is indicated when it fulfills the condition. Except for HL-2070N model, Printer information and Maintenance information are indicated on Page 1.

< Page 2 (HL-2070 only) >

This page includes the printer and maintenance information in the following order.

(1) Printer information

The following terms are indicated in the order.

- Controller version (CONT.ROM VERSION)
- Equipped network version (NET ROM VERSION)
- RAM SIZE (Mbyte)

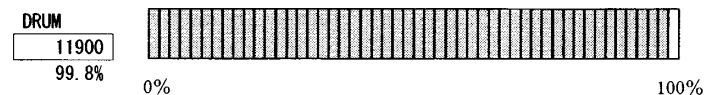
(2) Maintenance information

(i) Consumable information

The printable pages remained for the consumable part is indicated. Also, the percentage of life remained over the total printable pages is indicated in numerical value and band graph.

A sample (DRUM) is as follows:

From the top left, the consumable part name, number of printable pages remained, and percentage of life remained are indicated. The right column is a band graph separated into 50 scale marks.



The consumable part indicated is as follows:

- DRUM

< How to Read the Drum Unit Life >

The drum unit life is shown by the band graph at the center of Print Settings;

- It initially indicates 100% and gradually decreases.
- It indicates 0% when the **Drum** LED is blinking.
- It stays at 0% even if further printing is done.

< The difference of the Drum Unit Life and the Drum Counter >

The drum unit life is based on the page counter. If the average number of drum rotations is more than the number of drum rotations in non-continuous printing, however, the drum unit life is counted by the number of drum rotations.

Since the drum counter printed in Print Settings is an actual page counter after a new drum unit is replaced, the drum unit life may be different from the drum counter.

For details on the difference between the drum unit life and drum counter, refer to the drum unit life calculation below;

< How to calculate Drum Unit Life >

The number of drum rotations per one page printing is about 15 rotations.

(Page counter reduced by the number of drum rotations) =

(the number of drum rotations) ÷ 15

- The number of drum rotations per one page printing continuously = 4.3 rotations.

- The number of drum rotations while warming-up = 9 rotations

Example:

	The number of pages calculated from drum rotations	
	Cold start (page)	Hot start (page)
1 page/job	$(9 + 15) / 15 = 1.60$	$15 / 15 = 1$
2 pages/job	$(9 + 15 + 4.3) / 15 = 1.88$	$(15 + 4.3) / 15 = 1.28$
18 pages/job	$(9 + 15 + 4.3 \times 17) / 15 = 6.47$	$(15 + 4.3 \times 17) / 15 = 5.87$

If printing 1 page per job with cold start, the drum unit life is decreased earlier.

(ii) Counter information, history information

The counter and history information related to the following term are included. When it reaches the maximum count, each term is no longer counted.

- Device status
The total number of pages printed. The maximum count is 1 million pages.
- Total pages printed (TRAY)
For Manual Feed Slot and TRAY, it is indicated only when they are equipped. The maximum count for each item is 1 million times.
- Total pages printed (PAPER)
The number of A4/Letter, A4Long/Legal/Folio, B5/Excute, Envelope, and other paper types used. The maximum count for each item is 1 million times.
- Total paper jams
Number of jams occurred in Tray, Inside and Rear. (It is indicated only when they are equipped.) The maximum count for each item is 255 times.
- Replace count
Number of times which the Drum and Toner are replaced. The maximum count for each item is 65535 times.
- Error history
The latest 10 errors are indicated. However, the cover open error is excluded.

< Page 3 (HL-2070N only) >

This page includes various network settings information of the printer.

(8) Sleep Mode Indication (OFF/Dimmed)

This is to select whether the **Ready** LED is turned off completely or lit in green with low light intensity during the Sleep mode. Whenever you switch this mode, the setting is changed over from the present one to the other. When you take your finger off from this switch, the **Ready** LED is lit in 100% light intensity or low light intensity according to the setting so that you can verify the present setting.

(9) Sleep Mode Setting (ON/OFF)

This is to allow you to turn on and off the sleep mode of the printer. The default setting is ON. The machine automatically goes back to the ready state after the operation is completed.

(10) Developer Roller Counter Reset 1 (For the starter toner)**(11) Developer Roller Counter Reset 2 (For the standard toner)**

Since print density is likely to become darker as toner is getting older, the developing bias is lowered by degrees according to the number of prints so that an almost fixed density can be maintained from the start of the use of brand-new toner to the end of it. The value of the developing bias is printed on the maintenance sheet. The developing bias is a parameter which depends on the developing assembly, so it needs to be reset when the developing assembly is replaced. At that time, the developing roller counter reading is also reset. This mode is to enable to execute these operations (equivalent to those done when the developing assembly is replaced) manually from the service mode.

2. HOW TO USE THE SELF-DIAGNOSTICS TOOLS

Two self-diagnostics tools below are automatically installed when the printer driver is installed;

- 1) Diagnostics
- 2) Printer Information

The following sections describe the details on each tool.

2.1 Diagnostics

This tool helps you to report your PC environment to investigate the cause of problem such as 'Printer won't print' or 'Printer prints garbage or incorrect fonts'.

- (1) When you start the program, the dialog box shown below appears. Follow the steps described in the box, then click the **OK** button.

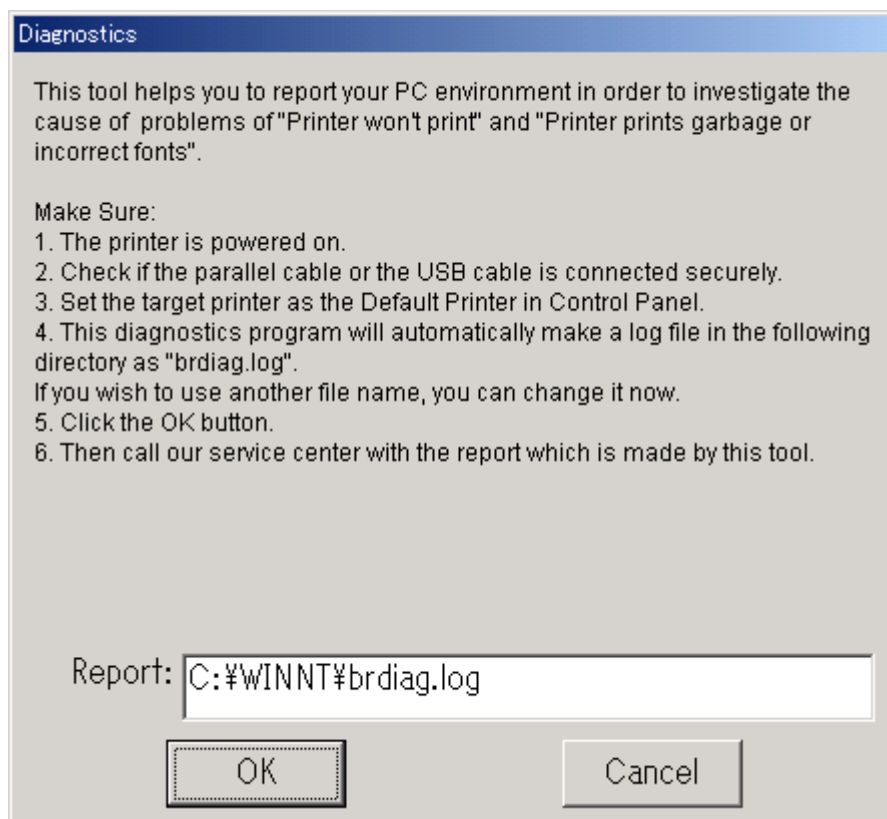


Fig. 8-1

- (2) The message below appears, click the **OK** button if you want to check whether there is any incorrect data or not. If you do not want to check it, click the **Cancel** button.

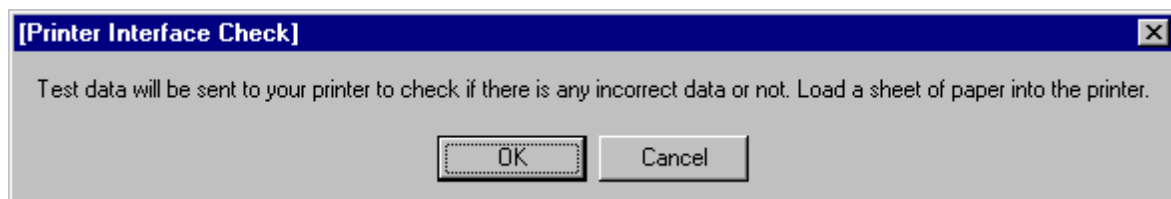


Fig. 8-2

- (3) If you click the **OK** button in Step (2), the dialog box below appears.

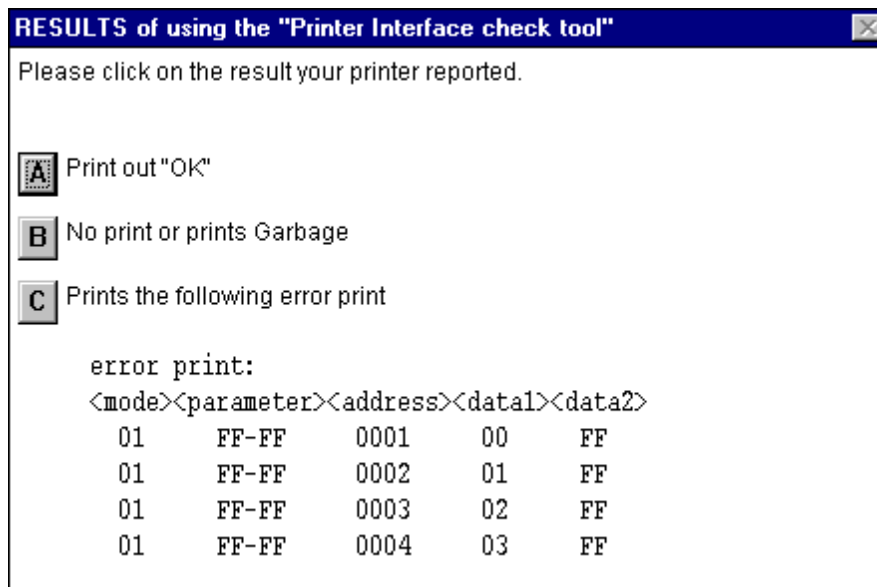


Fig. 8-3

- (4) Check the result that the printer reported and click the **A**, **B** or **C** button depending on the result.
- (5) The created log file is shown on the PC screen. (The software will ask whether you wish to print the log file or not.)

Send the log file created with this tool to investigate the problem to the authorized service center.

2.2 Printer Information

The drum unit life or page counter is printed on Print Settings in some countries as described in 'Print Settings'

This tool also shows the printer information such as printer version or page counter for all models only when the printer is connected to a parallel port or USB.

- (1) When you start the program, the dialog box shown below appears.
- (2) Select the model name of the printer, and select the port.

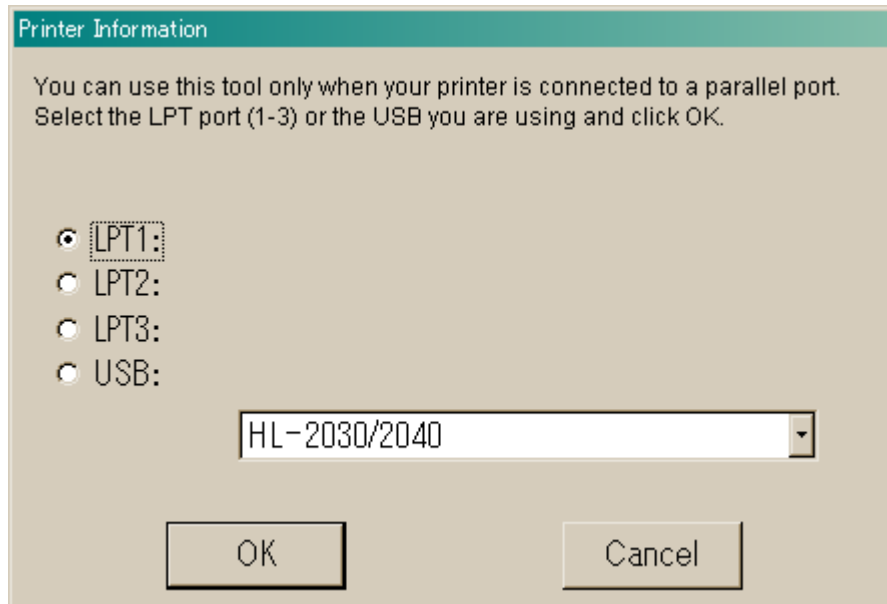


Fig. 8-4

- (3) Select the LPT port or USB you are using and click the **OK** button.
- (4) The dialog box below appears and indicates the printer information, printer ID, version, drum unit life, page counter and drum counter.

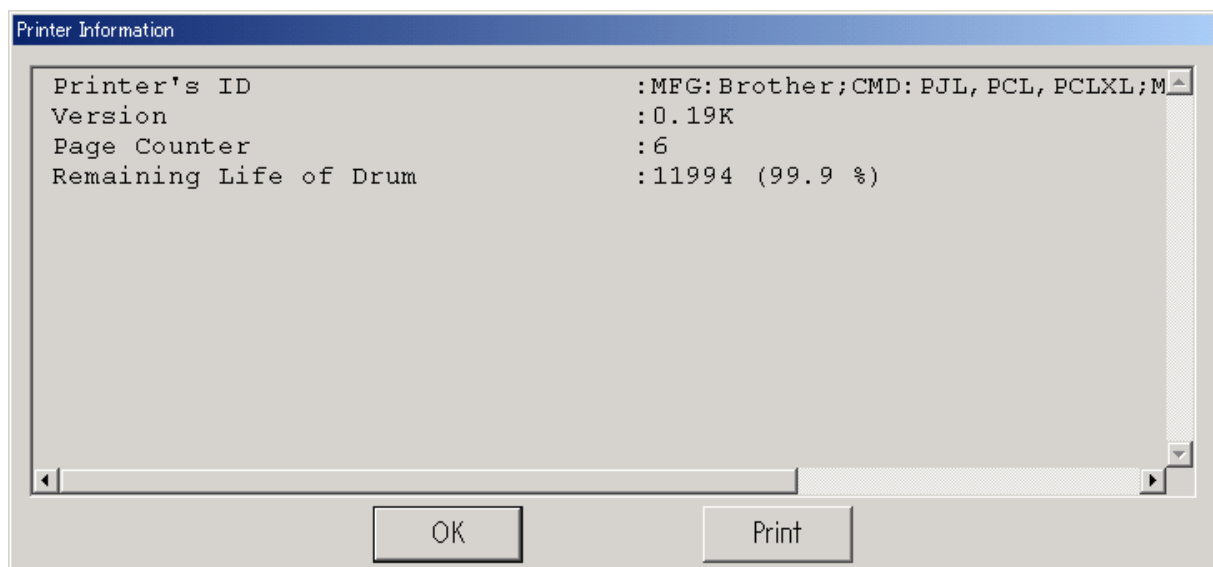


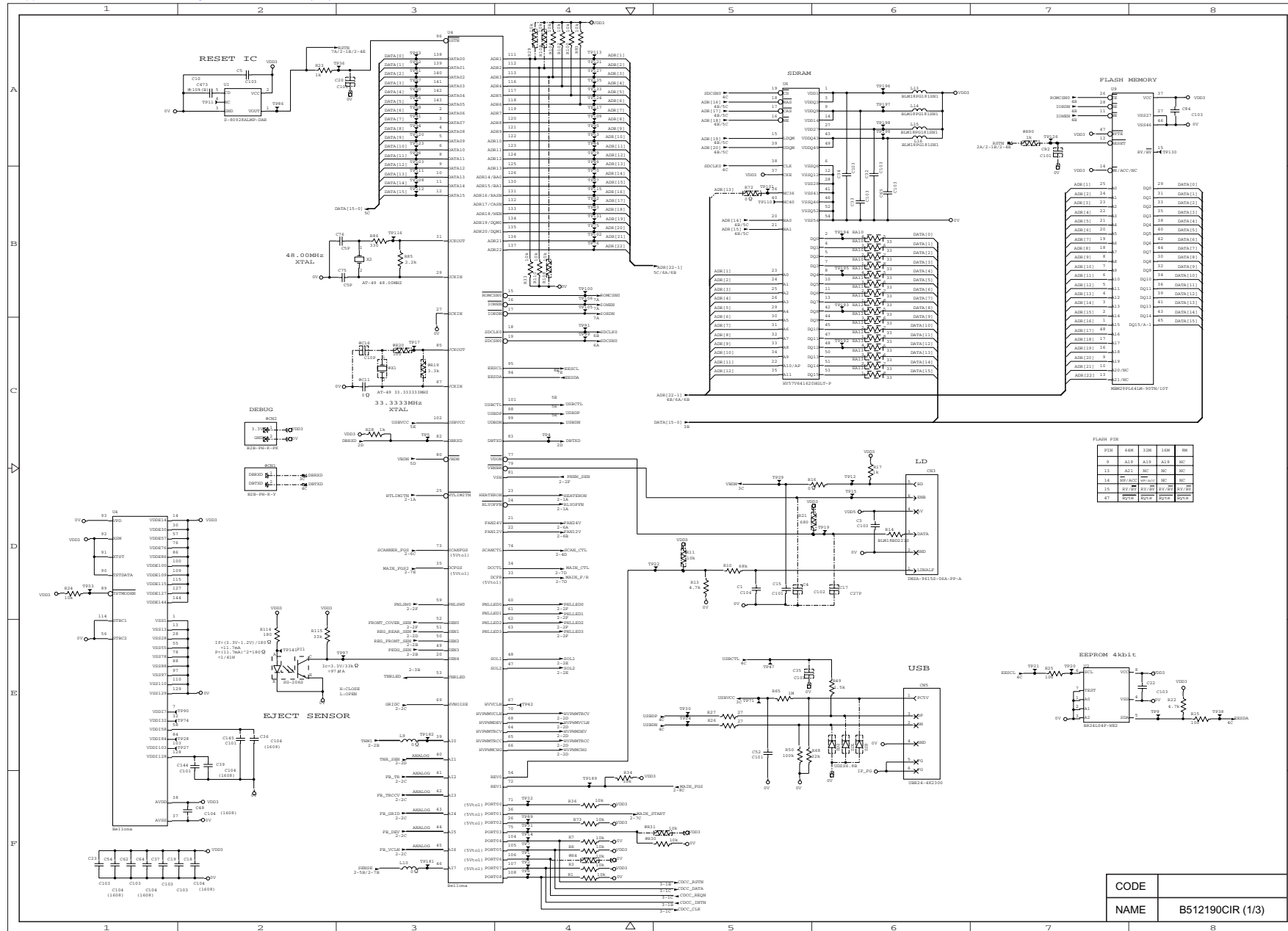
Fig. 8-5

3. NVRAM DEFAULT VALUE

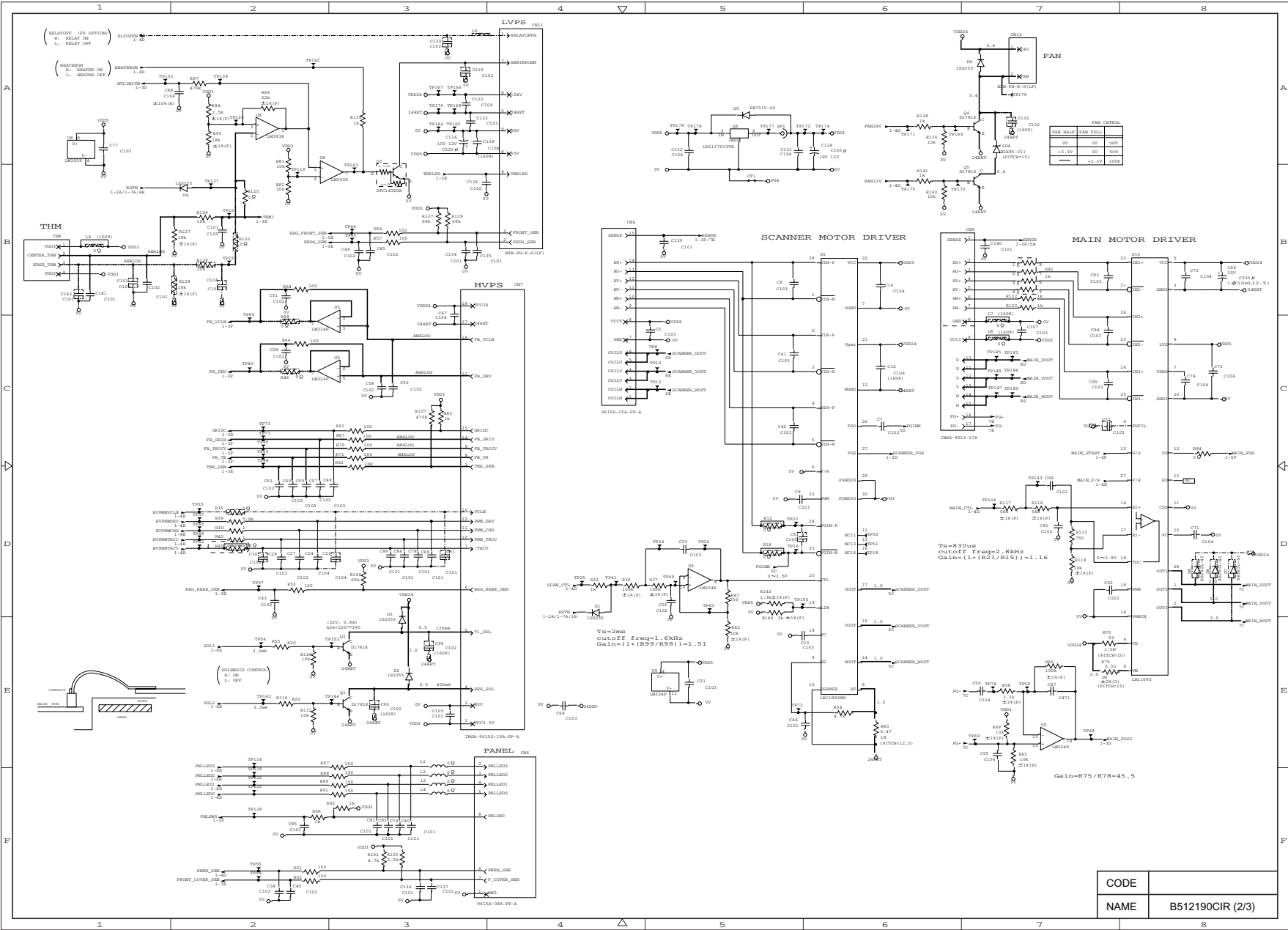
The default values for the main items to be set in NVRAM are as follows;

Items	Descriptions
Timing of Drum LED ON	12,000 pages (Counted from the drum unit life.)
Development switching timing	The developing bias is switched from 450V to 300V gradually when 2,500 pages are printed. It is switched to 450V again when the toner cartridge is replaced with the new one. (Counted from the number of the drum rotation in non-continuous printing)
Fixing temperature	<ul style="list-style-type: none"> • Transparency: 185°C • Thin paper: 195°C • Plain paper: 213°C • Thick paper: 200°C • Thicker/Bond paper: 200°C (in non-continuous printing)
Smaller size mode	See 3.8 'PRINT SPEEDS WITH VARIOUS SETTINGS' in Chapter 1.
Paper size	The default paper size is "Letter". The paper size needs to be changed in Europe and other countries.

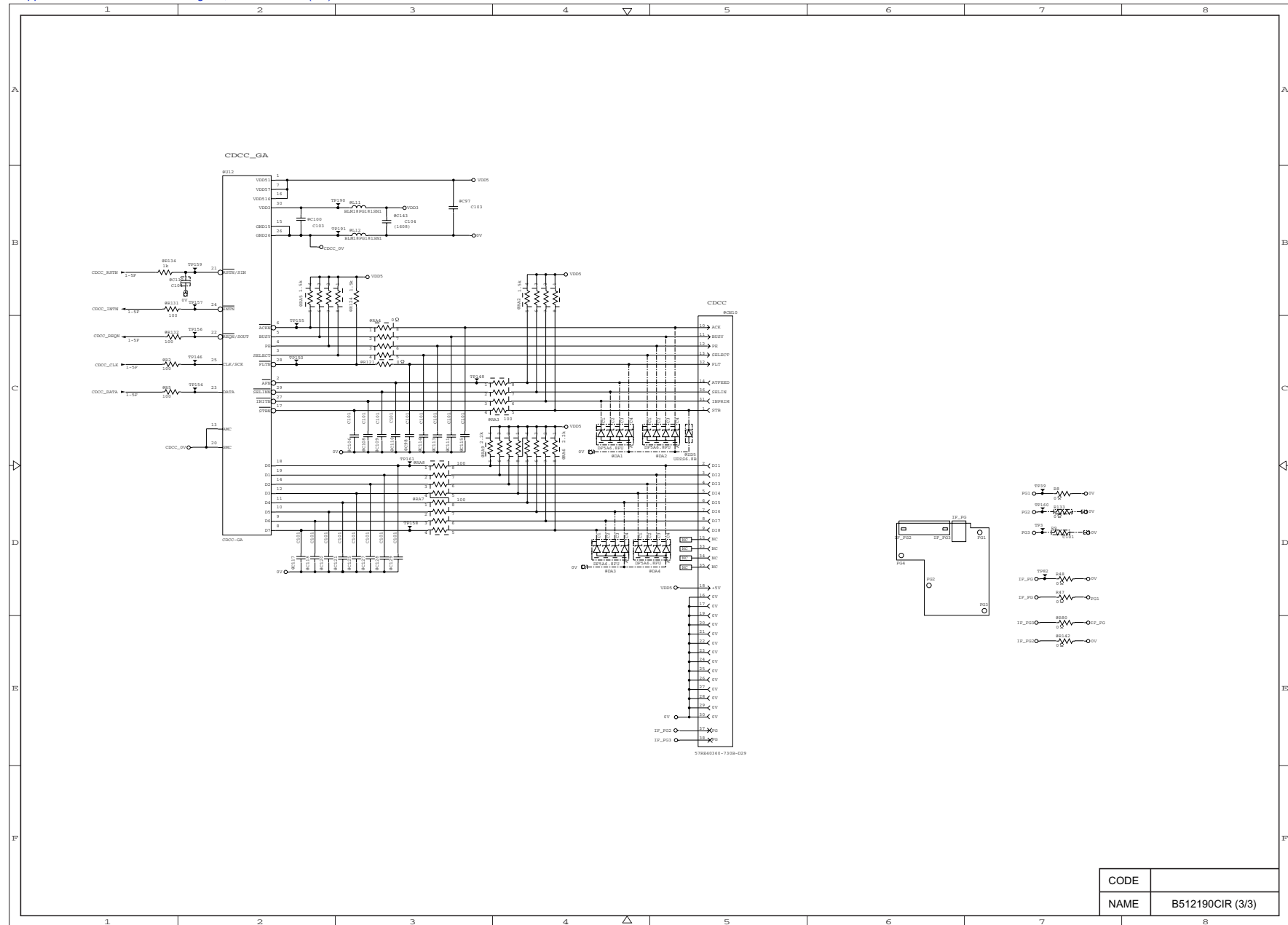
Appendix 1. Main PCB Circuit Diagram, HL-2030/2040 (1/3)



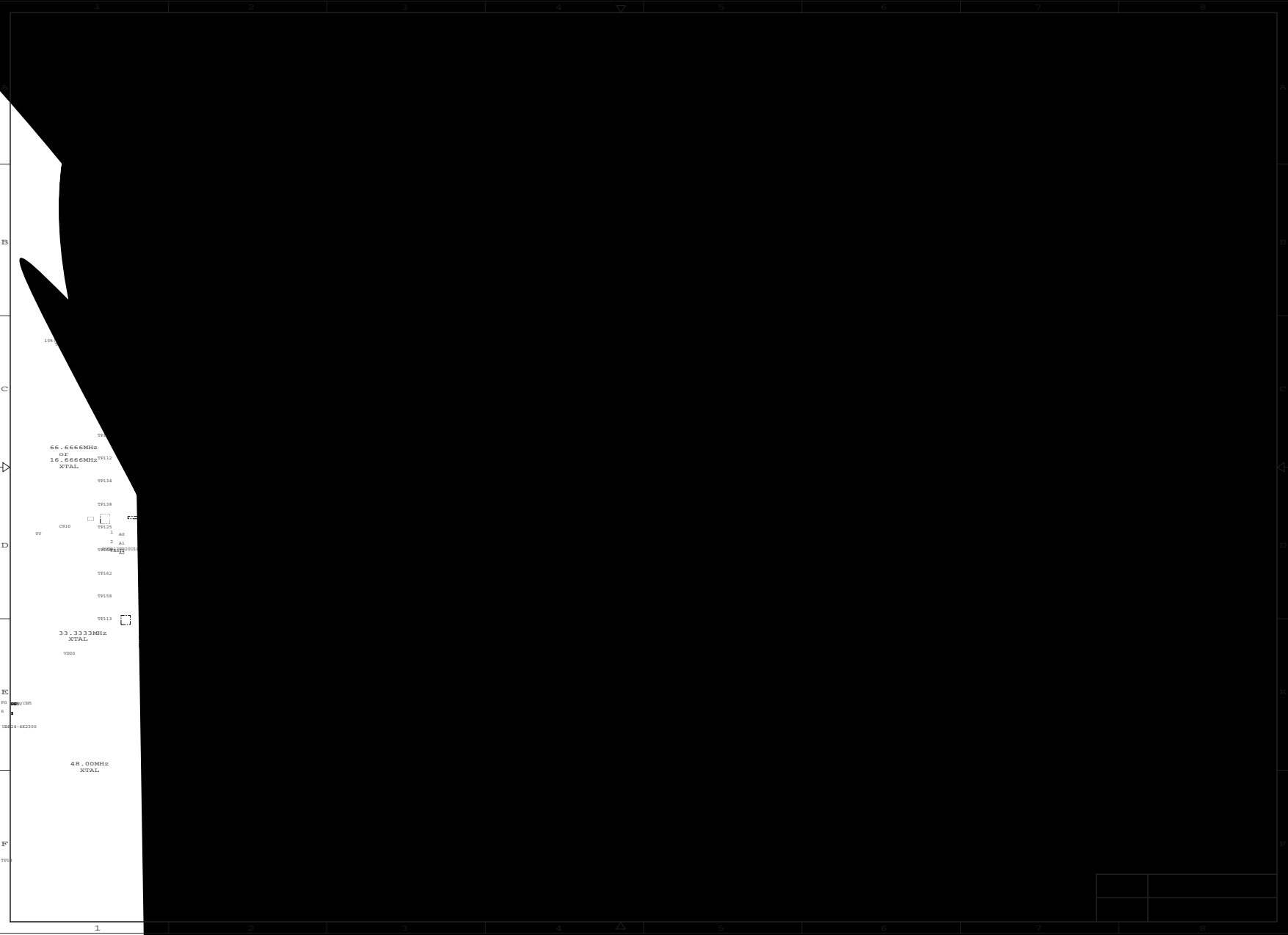
Appendix 2. Main PCB Circuit Diagram, HL-2030/2040 (2/3)



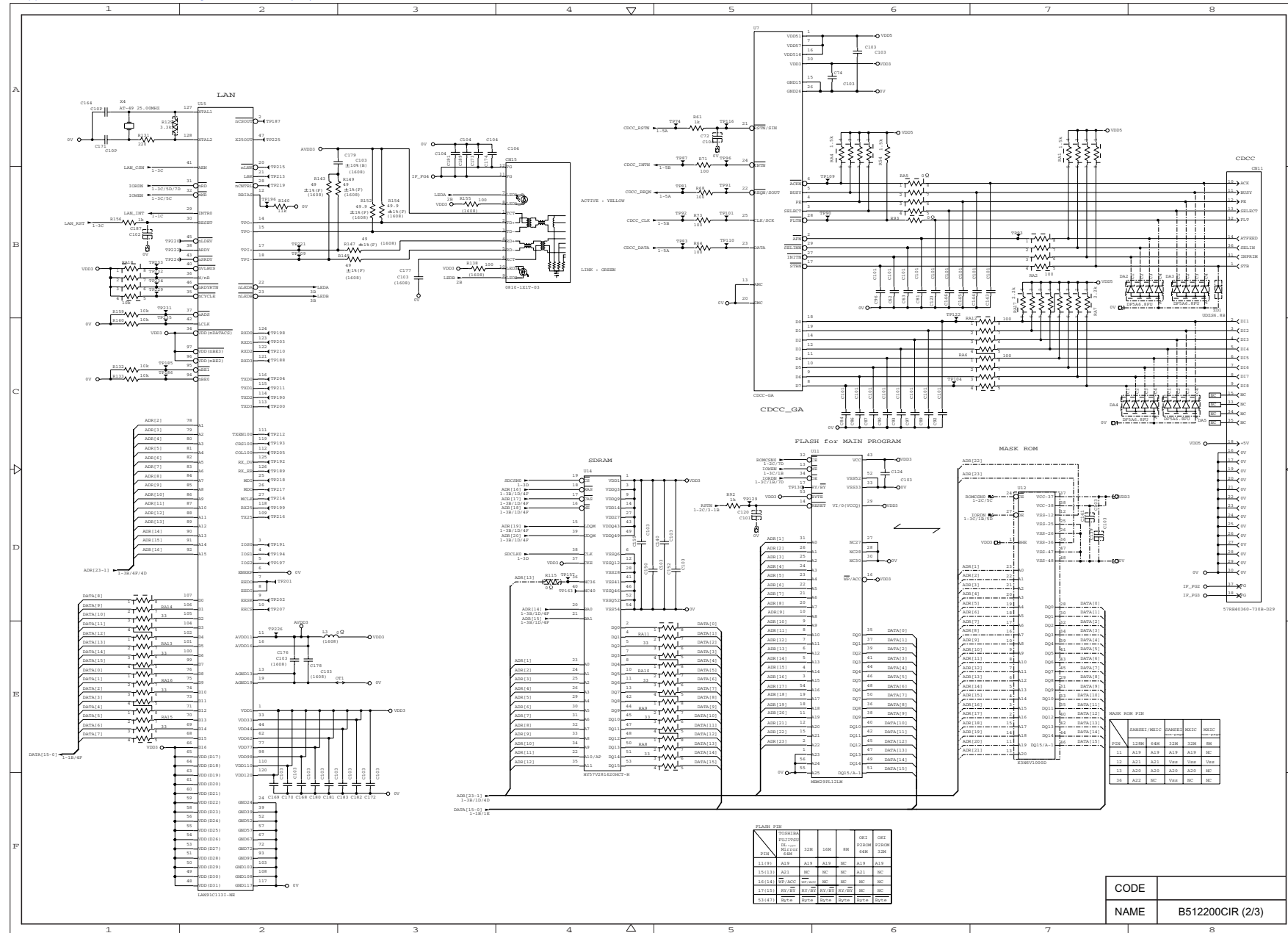
Appendix 3. Main PCB Circuit Diagram, HL-2030/2040 (3/3)



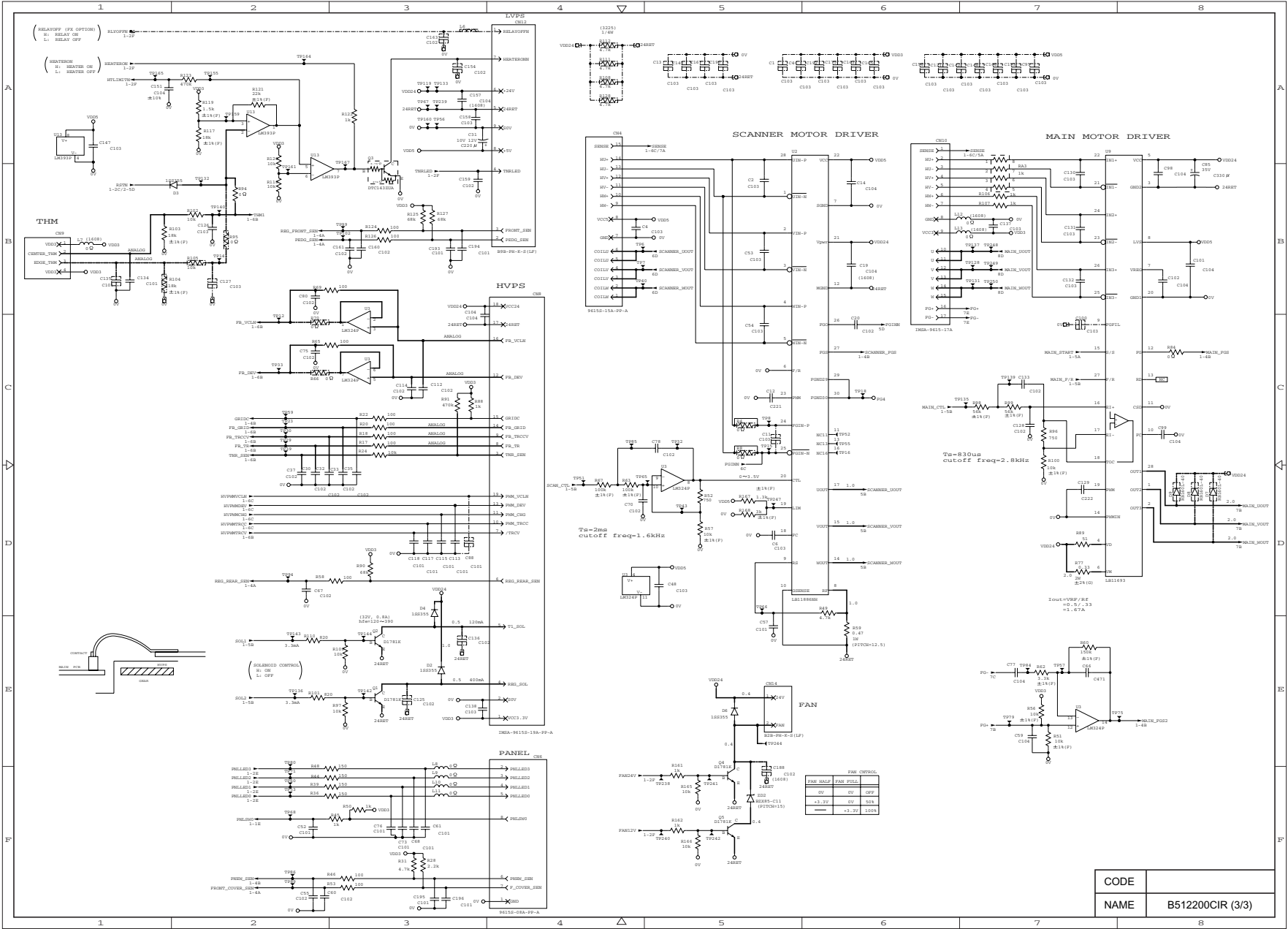
Appendix 4. Main PCB Circuit Diagram, HL-2070N (1/3)

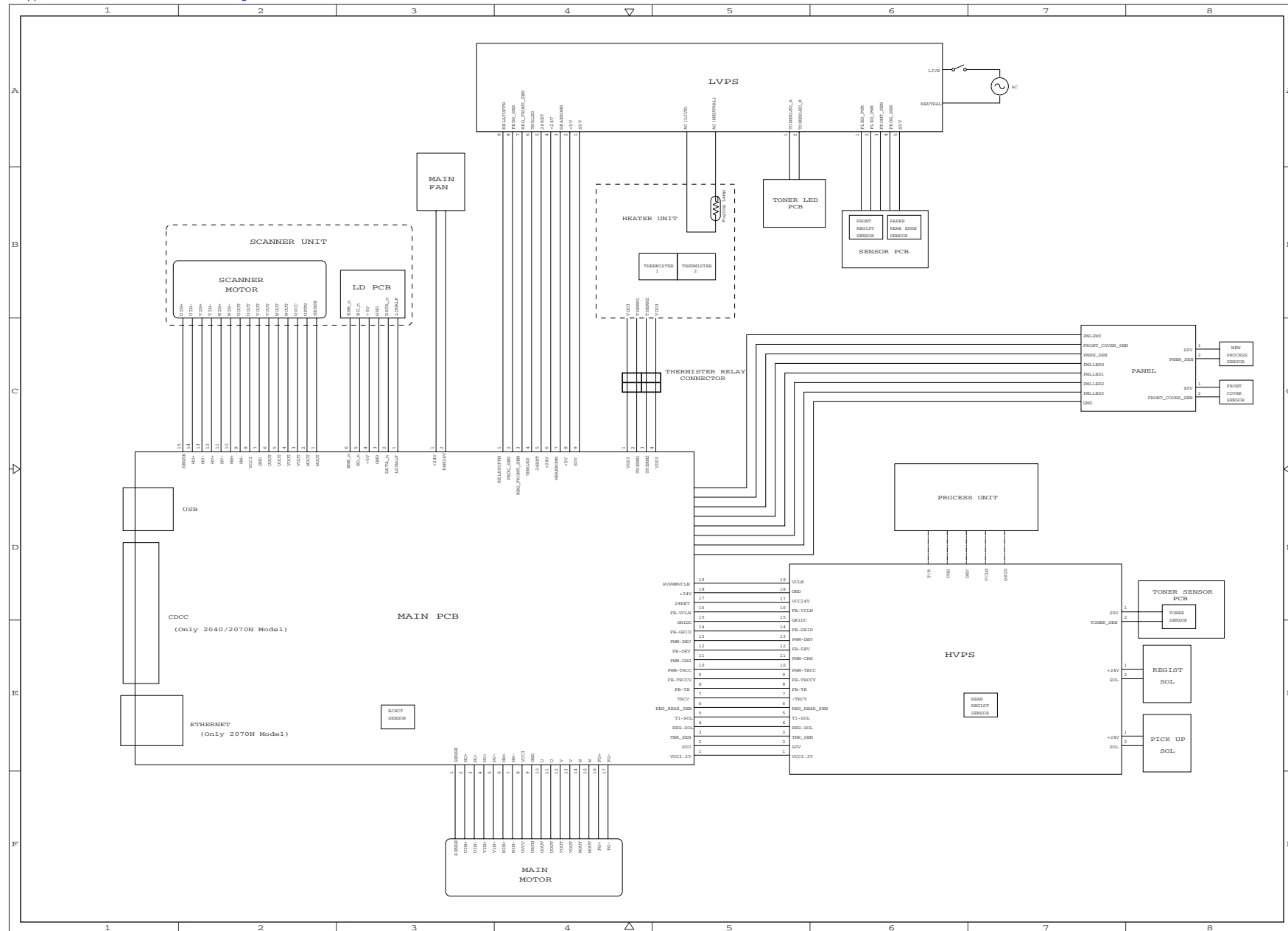


Appendix 5. Main PCB Circuit Diagram, HL-2070N (2/3)

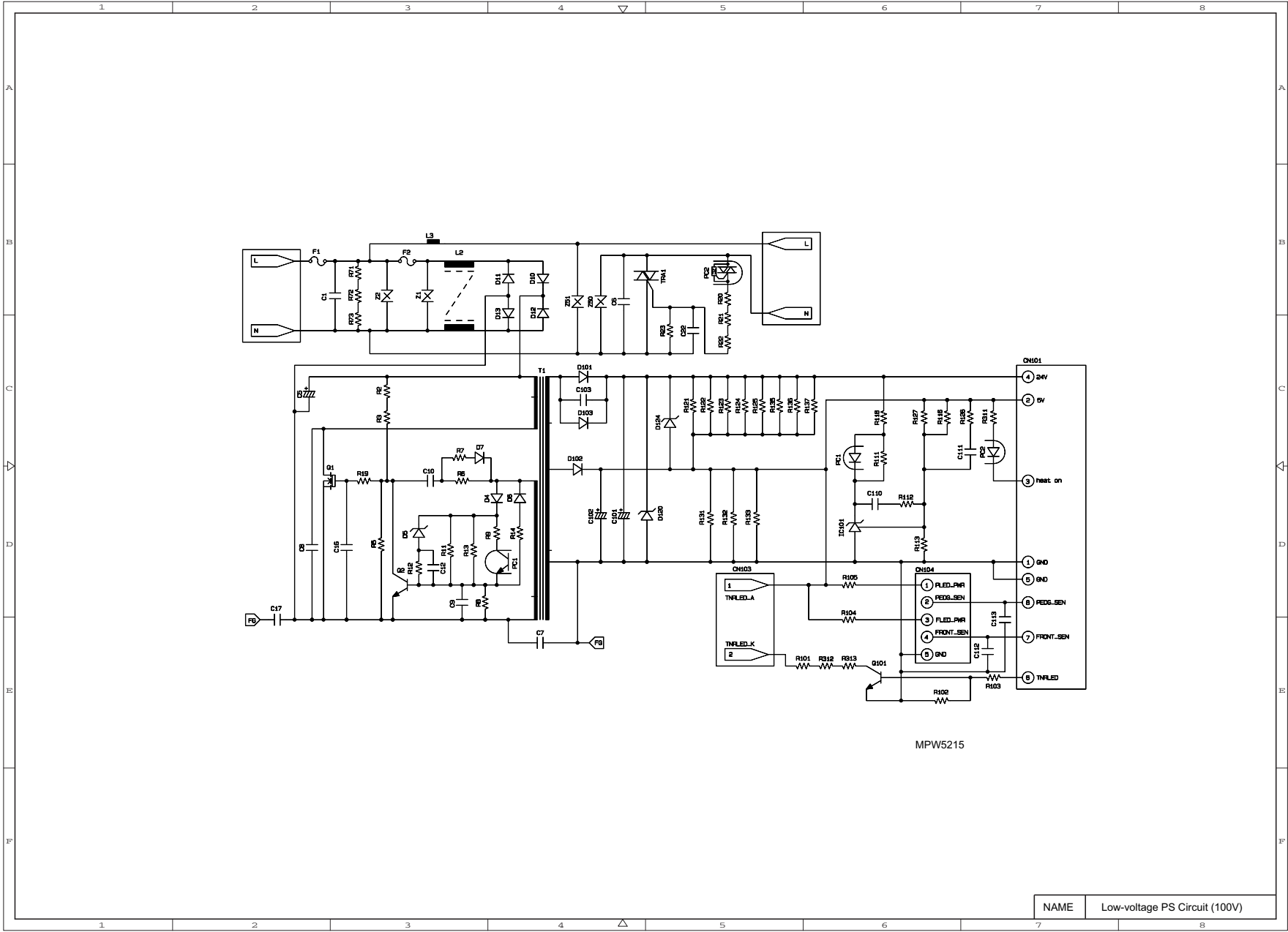


Appendix 6. Main PCB Circuit Diagram, HL-2070N (3/3)

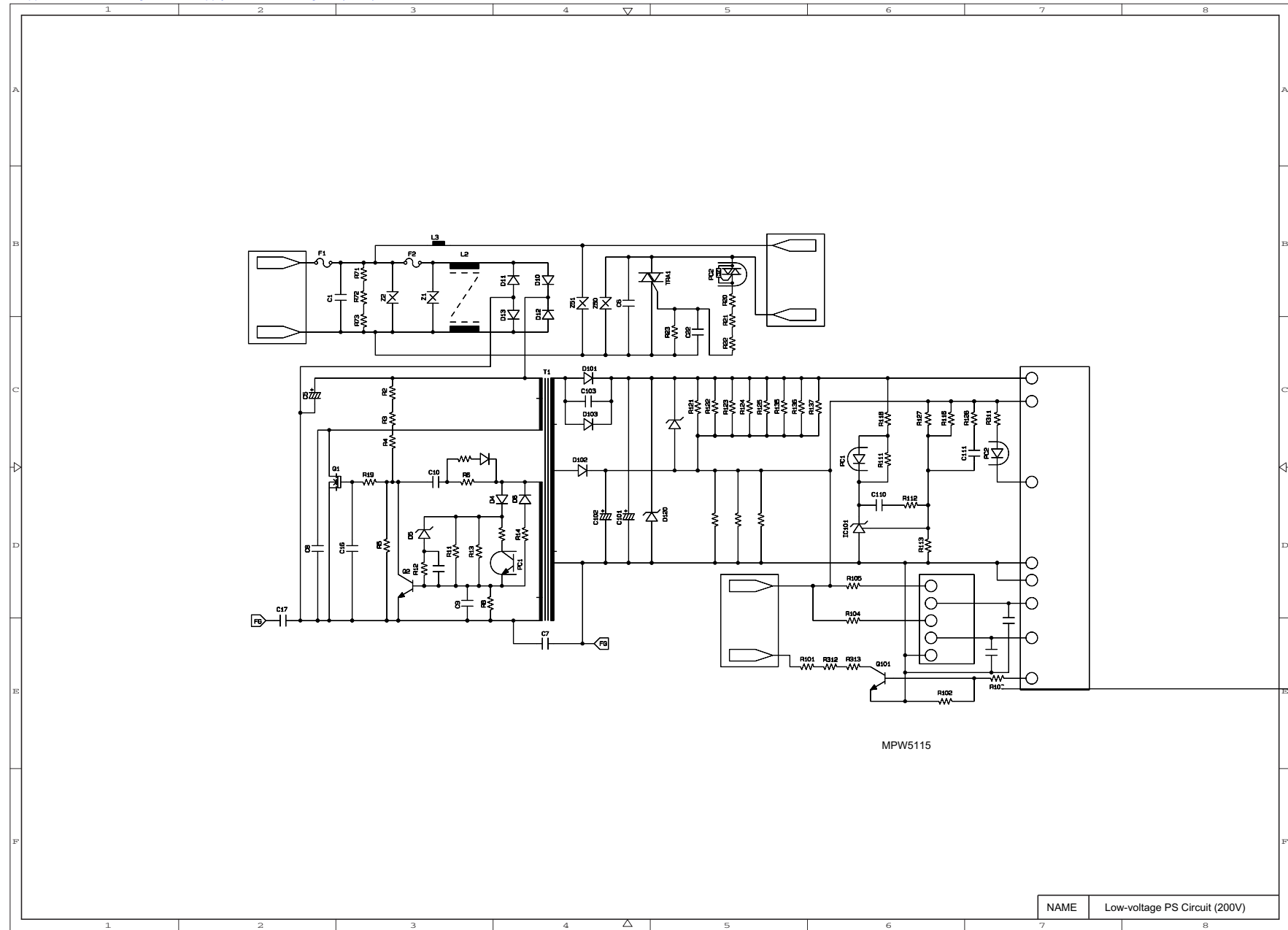




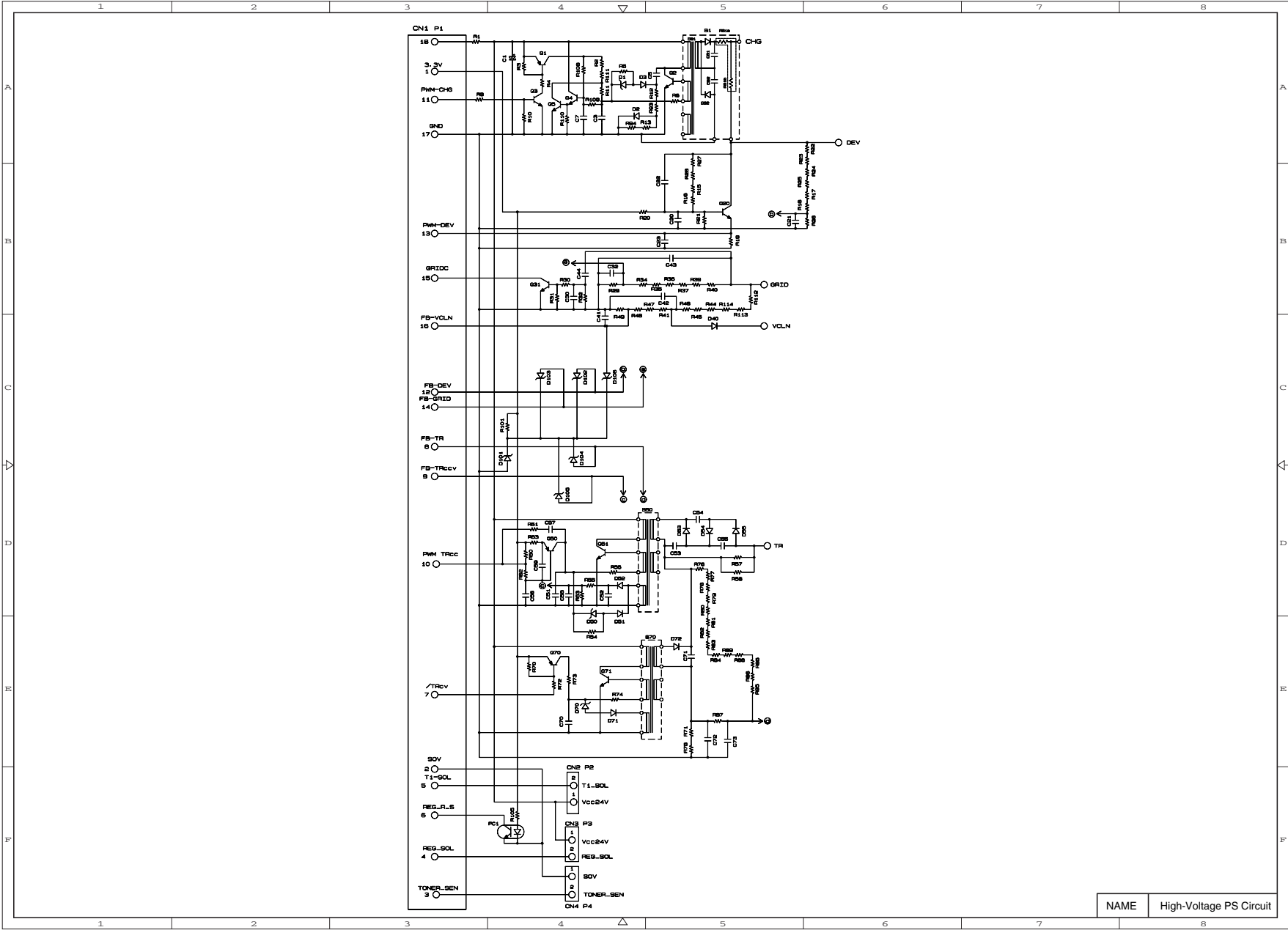
Appendix 8. Low-voltage Power Supply PCB Circuit Diagram (100V)



Appendix 9. Low-voltage Power Supply PCB Circuit Diagram (200V)



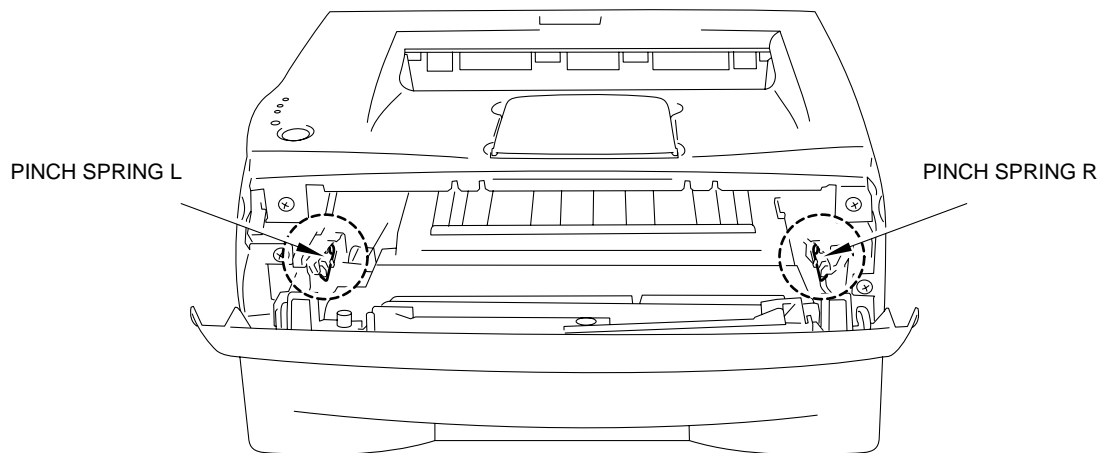
Appendix 10. High-Voltage Power Supply Circuit Diagram



APPENDIX 11 REPLACEMENT OF PINCH SPRING L AND PINCH SPRING R

Replacement of PINCH SPRING L and PINCH SPRING R is effective for paper skew. (Refer to Parts Change Information: PrPn050016, PrPn060001 in detail.)

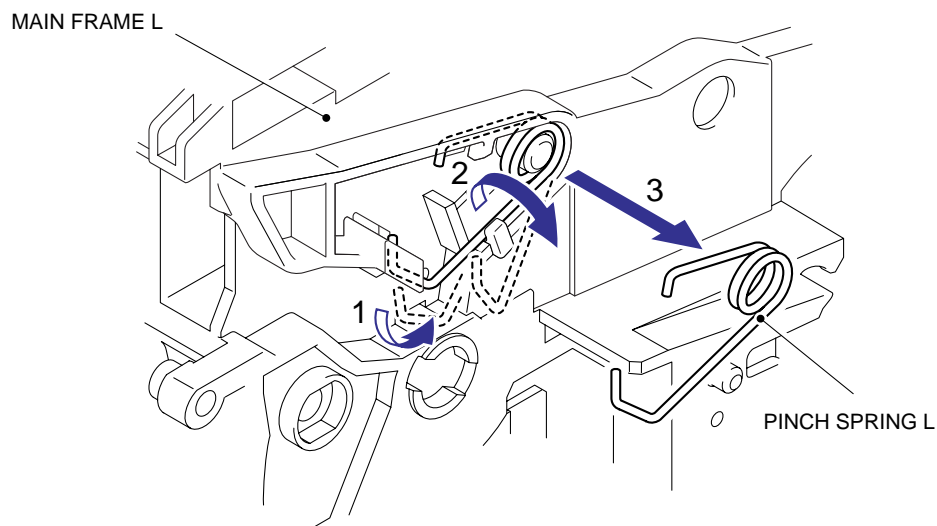
<Location>



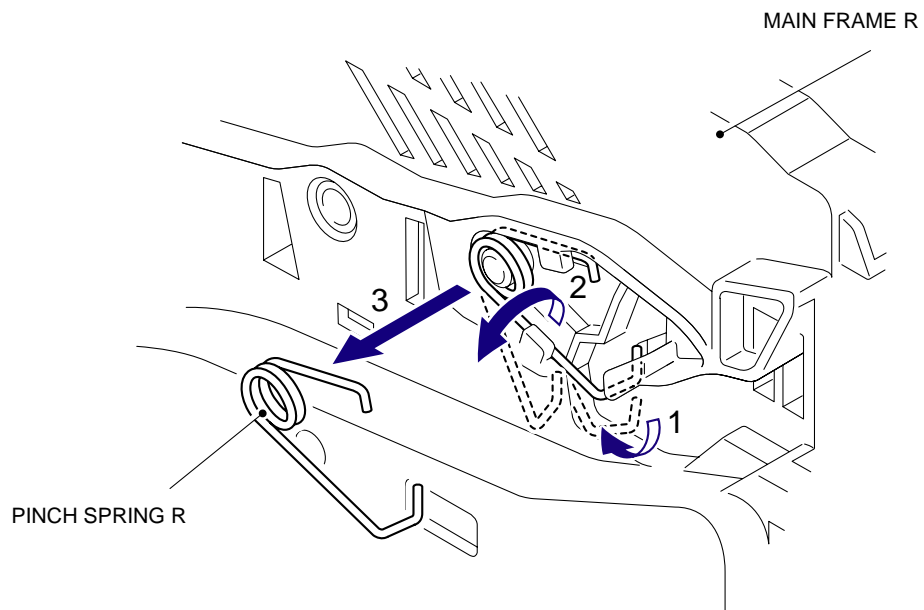
New Parts: ~~LM4904001~~ LM6480001 PINCH SPRING L
~~LM4905001~~ LM6481001 PINCH SPRING R

<Replacement procedure>

- 1) Remove the previous PINCH SPRING L and replace this with the new parts.



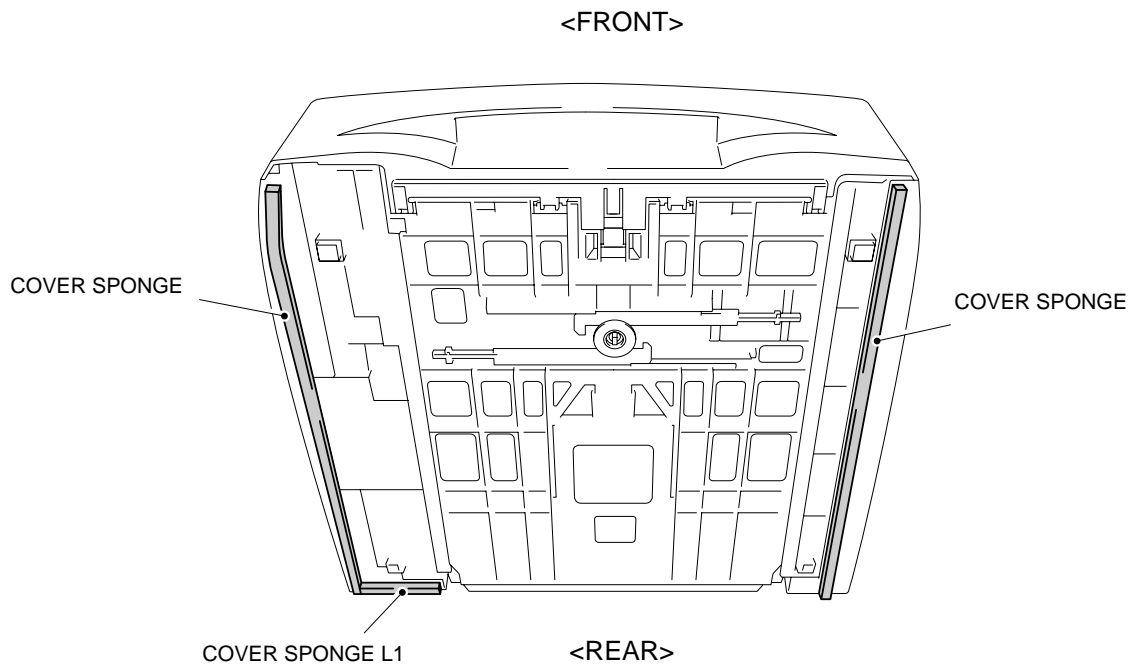
- 2) Remove the previous PINCH SPRING R and replace this with the new parts.



APPENDIX 12 LOCATION OF COVER SPONGE L1 AND COVER SPONGE

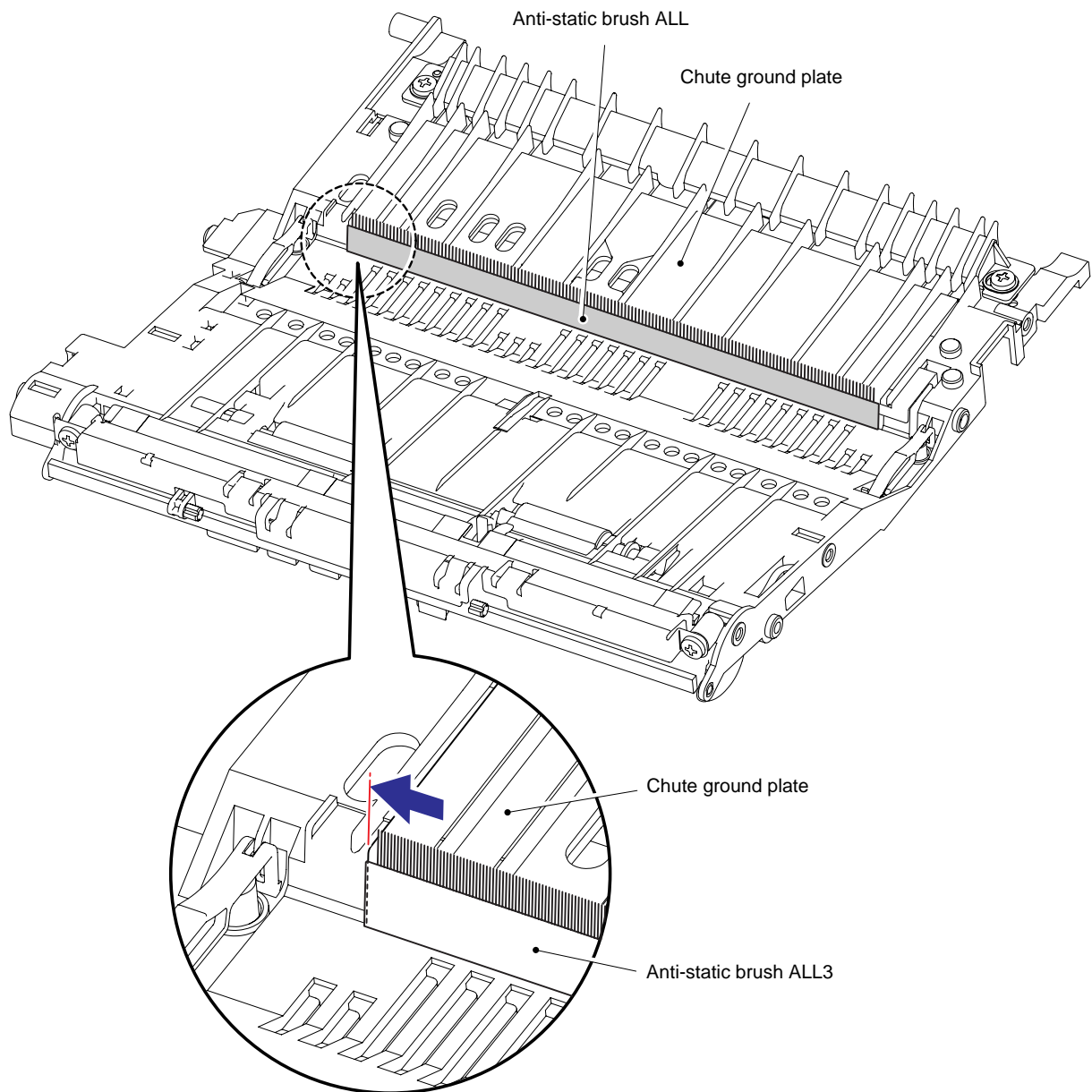
Location of COVER SPONGE L1 and COVER SPONGE for replacement is as follows. (Refer to Parts Change Information: PrPn050032 in detail.)

<Location> bottom view



Parts code: LM4626001 COVER SPONGE L1
LM4625001 COVER SPONGE (Right side and Left side)

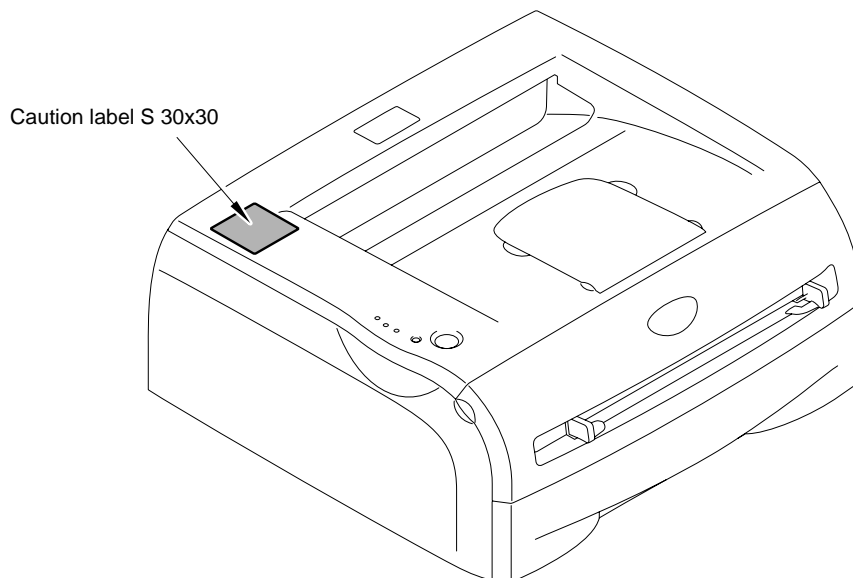
(B)



* Place the "ANTI-STATIC BRUSH ALL" on the edge of the Chute ground plate.

APPENDIX 14 LOCATION TO ATTACH THE CAUTION LABEL S

■ CAUTION LABEL S 30x30



■ CAUTION LABEL S 13x40

