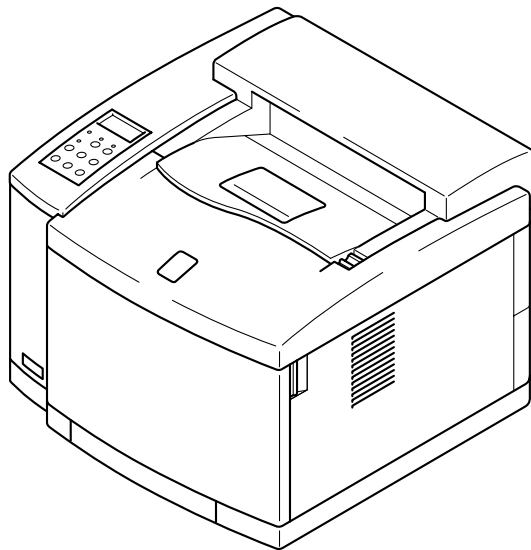




Brother Color Laser Printer **SERVICE MANUAL**

MODEL: HL-2600CN



Read this manual thoroughly before maintenance work.

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

October 2001
SM-PRN023

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PREFACE

This service manual contains basic information required for after-sales service of the color laser printer (here-in-after 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-2600CN color laser printer.

This manual consists of the following chapters:

CHAPTER I : OUTLINE OF PRODUCT

Features, parts names, internal structure, and description of the control panel.

CHAPTER II : SPECIFICATIONS

Specifications, etc.

CHAPTER III : INSTALLATION

Installation conditions and installation procedures.

CHAPTER IV : STRUCTURE OF SYSTEM COMPONENTS

Basic operation of the mechanical system, the electrical system and the electrical circuits and their timing information.

CHAPTER V : CONTROL PANEL OPERATION

Operation and setting procedures on the control panel.

CHAPTER VI : PERIODIC MAINTENANCE

Description of periodic maintenance parts, and procedures for periodic replacement and cleaning.

CHAPTER VII : DISASSEMBLY

Procedures for replacement of the mechanical system parts.

CHAPTER VIII : TROUBLESHOOTING

Description of error messages on the control panel, troubleshooting image failure, etc.

APPENDICES : SERIAL NO. DESCRIPTIONS, ETC.

Information in this manual is subject to change due to improvement or re-design 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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REGULATIONS

LASER SAFETY (FOR 110-120 V MODEL ONLY)

This printer is certified as a Class I 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 (FOR 110-120 V MODEL ONLY)

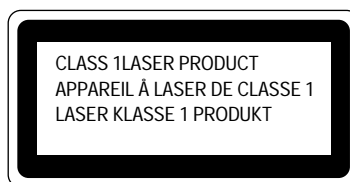
U.S. Food and Drug Administration (FDA) has implemented regulations for laser products manufactured on and after August 2, 1976. Compliance is mandatory for products marketed in the United States. One of the following labels on the back of the printer indicates compliance with the FDA regulations and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

Caution

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

IEC 60825 SPECIFICATION (FOR 220-240 V 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 required.

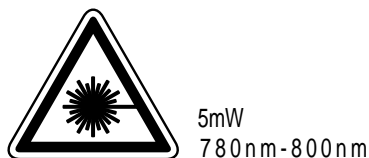


This printer has a Class 3B Laser Diode which emits invisible laser radiation in the Scanner Unit. The Scanner Unit should not be opened under any circumstances.

Caution

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

The following caution label is attached near the scanner unit.



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.

SAFETY INSTRUCTIONS

SAFETY PRINCIPLE

- 1) Before starting any operations, read this manual thoroughly. Especially read the safety instructions in this section carefully and ensure that you understand the contents.
- 2) Perform all the operations by following the procedures described in this manual. Follow all the cautions and warnings set out in the procedures and on safety labels affixed to the machine. Failure to do so may result in human injury or equipment damage.
- 3) Perform only the procedures explained in this manual. Refrain from opening or touching any portions that are not related to your required operation(s).
- 4) Repair and replacement of parts should be performed by trained and qualified persons only. Operators should not attempt to do such repair or replacement work.
- 5) It must be appreciated that the above-mentioned cautions and warnings do not cover everything because it is impossible to evaluate all the circumstances of repair situations.

SPECIAL SAFETY INFORMATION

Introductory Information

Cautions and warnings are made clear by following the 'Safety Alert Symbols' or 'Signal Words' such as DANGER, WARNING and CAUTION.

<SAFETY ALERT SYMBOL>

This is the safety alert. When you find this symbol placed on the equipment or marked in this manual, be aware of the potential of human injuries. Follow the recommended precautions and safety operation practices.

<Understanding Signal Words>

DANGER is used to indicate the presence of a hazard which will cause severe human injuries or a fatal accident if the warning is ignored.

WARNING is used to indicate the presence of a hazard or unsafe practices which may cause severe human injuries or a fatal accident if the warning is ignored.

CAUTION is used to indicate the presence of a hazard or unsafe practices which may cause minor human injuries if the warning is ignored. CAUTION also calls your attention to safety messages in this manual.

<Follow Safety Instructions>

Carefully read all the safety messages set out in this manual and also in the safety warning signs placed on the equipment. In this manual, the safety instructions (safety alert symbols and signal words) are enclosed in a rectangular enclosure to bring them to your attention. Keep the safety signs on the equipment in good condition and ensure none are missing or damaged. Replace the safety signs if unreadable or damaged. Learn how to operate the equipment and how to use the controls properly. Do not let anyone operate this equipment without following the instructions. Keep the equipment in proper working condition. Unauthorized modification to the equipment may impair the function & safety and affect the life of the equipment.

Listed below are the various kinds of "WARNING" messages contained in this manual.

<Caution for the battery>

There is a danger of explosion if the battery is incorrectly replaced.

Do not replace the battery.

Do not disassemble, recharge or dispose of in fire.

Used battery should be disposed of according to local regulations.



WARNING

HAZARDOUS VOLTAGE

May cause serious injuries or fatal accidents. Voltage is now applied from the power supply of printer. There is a danger of electrical shock if you touch the active area inside the printer.

Be sure to turn the power supply switch OFF and pull the plug out from the power outlet before starting maintenance work on the printer.



WARNING

HARMFUL OZONE GAS

Inhalation of an excessive amount of ozone gas may adversely affect the respiratory organs.

An Ozone Filter is fitted to this printer to reduce the exhausted ozone. This filter must be replaced with a new filter periodically in accordance with the manual supplied with the printer.



WARNING

HOT SURFACE

The Fusing Unit reaches a temperature of approx. 170°C and adjacent parts are also very hot.

When you need to change the cleaning pad or remove jammed paper, wait about 20 minutes after opening the paper exit unit to allow the unit to cool down.



CAUTION

ROTATING PARTS

Be aware of the potential danger of various rollers and take care not to get your fingers or hand caught into the machine, this can cause serious injuries. Note that the exit roller that ejects the printed paper is rotating while printing.

Be careful not to get your hair, fingers, hands, sleeve or necktie caught in the machine while operating the machine.



CAUTION

HAZARDOUS POWDER

Toner is a fine powder which can cause a powder explosion if disposed of into a fire. Under no circumstances dispose of toner into a fire.



CAUTION

HAZARDOUS POWDER

Toner is a fine powder which may cause irritation to the eyes and respiratory organs if inhaled.

Handle the toner cartridge, waste toner pack and developing unit carefully so as not to spill the toner.



CAUTION

POWER CORDS & PLUGS

This printer is equipped with a 3-wire power cord fitted with a 3-pronged plug (bi-polar plug with grounding) for the user's safety.

Use these power cords in conjunction with a properly grounded electrical outlet to avoid an electrical shock.



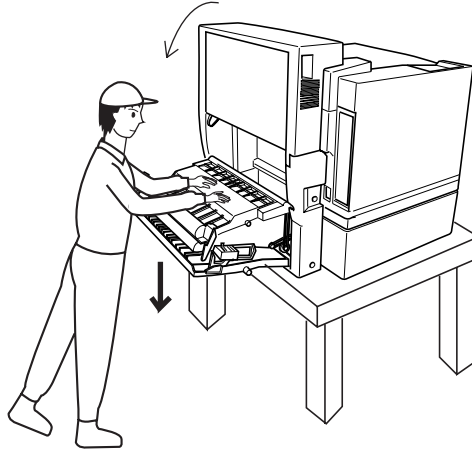
CAUTION

SAFETY INTERLOCK

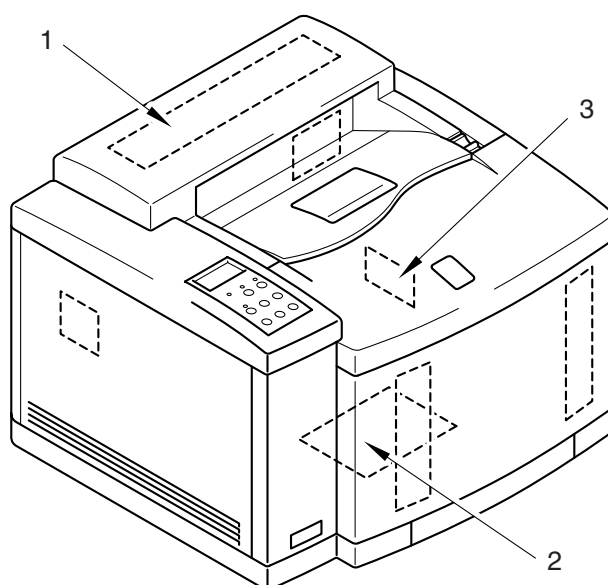
The front cover, paper exit unit and transfer unit of this printer have electrical safety interlocks to turn the power off whenever they are opened. Do not attempt to circumvent these safety interlocks.

CAUTION

Do not lean against or apply any excessive force to the paper cassette, open cover of Duplex unit. Otherwise it may cause the product to decline or fall down and result in the injuries.



<Label Location>



1. Hot Caution Label



2. Laser Caution Label

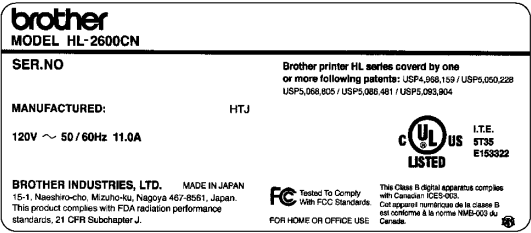


5mW
780nm-800nm

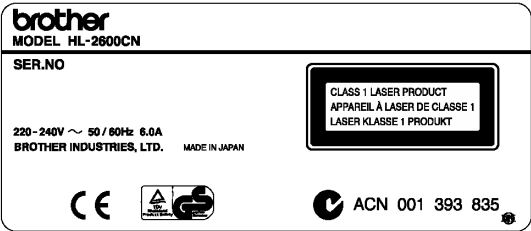


3. Rating Label

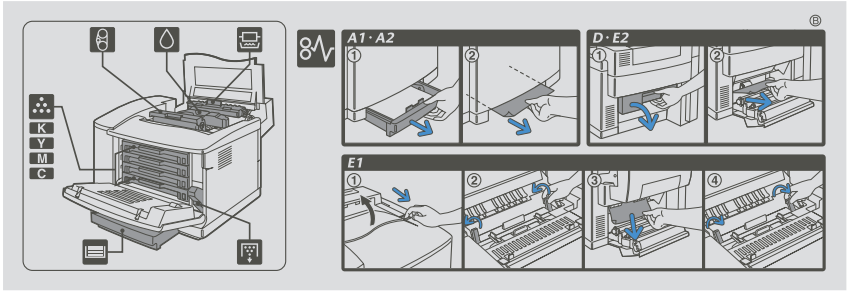
(For US)



(For Europe)



(Jam label)

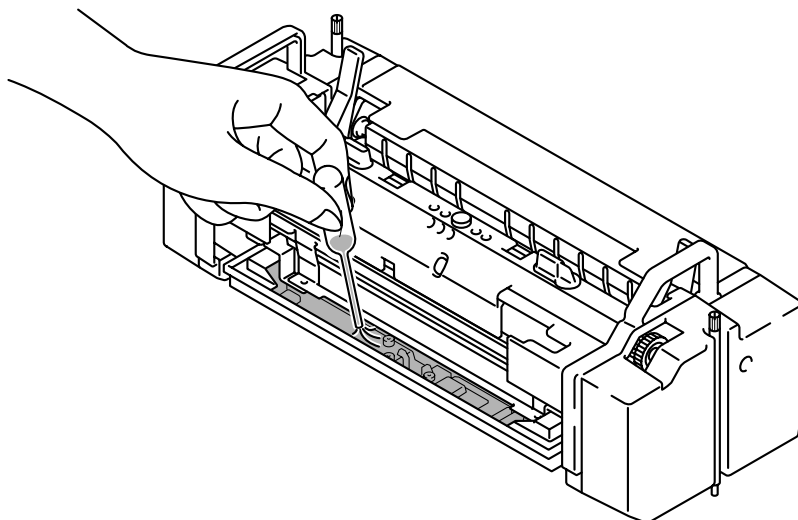


SHIPMENT OF THE PRINTER

If for any reason you must ship the printer, carefully package the printer to avoid any damage during transit. It is recommended that you save and use the original packaging. The printer should also be adequately insured with the carrier.

CAUTION

- *When shipping the printer, remove the toner cartridges, the OPC belt cartridge and the waste toner pack from the printer to prevent toner spill in the printer or damage of the toner cartridge and the OPC belt cartridge.*
- *When shipping the printer, remove the oil bottle and the fuser cleaner from the fusing unit. After removing the oil bottle, be sure to remove the oil remaining in the fusing unit with the supplied syringe. Failure to do so will cause severe damage to the printer.*



CHAPTER I

PRODUCT OUTLINE

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CHAPTER I PRODUCT OUTLINE

1. FEATURES

This printer has the following features:

2400 x 600 dpi Class Resolution

The printer prints pages with a resolution of 600 dots per inch (dpi) as default. It also provides higher quality printout which is the equivalent of 2400 x 600 dpi resolution when using HRC or CAPT.

High Speed Color Laser Printing

The printer allows crisp printing in 24 bit brilliant color. The printer prints at a speed of 24 pages per minute in monochrome mode and 6 pages per minute in full color mode. The controller utilizes a high speed 32-bit RISC microprocessor and special hardware chips, which provides a very fast processing speed.

High Resolution Control (HRC)

The high resolution control (HRC) technology provides clear and crisp printouts and improves even the 600 dpi resolution. This mode is effective when printing text data.

Color Advanced Photoscale Technology (CAPT)

The printer can print graphics in 256 shades for each color in HP® color printer PCL5C™ and BR-Script 3 emulations, producing nearly photographic quality. This mode is effective when printing photographic images.

Maintenance-Free Toner Cartridge

A toner cartridge can print up to 12,000 (Black) and 7,200 (Cyan, Magenta and Yellow) single-sided pages at 5% coverage. The one piece, easy-to-replace toner cartridges do not require difficult maintenance.

Universal Media Cassette

This printer loads paper automatically from the media cassette. Since the media cassette is a universal type, a number of different sizes of paper can be used. Even envelopes can be loaded from the media cassette.

Three Interfaces

This printer has a high speed, bi-directional parallel interface, USB and Ethernet 10/100BaseTX.

If your application software supports the bi-directional parallel interface, you can monitor the printer status. It is fully compatible with the industry-standard bi-directional parallel interface.

The Brother network board (NC-4100h) is factory installed in the HL-2600CN, which enables you to use this printer in the TCP/IP, IPS/SPX, Apple Talk, DLC/LLC, Banyan VINES, DEC LAT and NetBEUI environments. Also, many useful utilities, such as BRAdmin Professional for the administrator and Brother network printing software, are included in the CD-ROM supplied with the HL-2600CN printer. For setup, see the Network User's Guide.

Automatic Interface Selection

The printer can automatically select the bi-directional parallel, USB, NETWORK depending on the interface port through which it receives data. With this feature, the printer can be connected to more than one computer.

Five Emulation Modes

The printer can emulate Hewlett-Packard Color PCL® 5C (PCL6® in monochrome mode) and PostScript® 3 language emulation (Brother BR-Script 3) printers, the industry-standard HP-GL™ plotter as well as EPSON® FX-850™, and IBM® Proprinter XL® printers (in monochrome mode). It is possible to print with all application programs that support one of these printers.

Automatic Emulation Selection

The printer can automatically select the printer emulation mode depending on the print commands it receives from the computer software. With this feature, many users can share the printer on a network.

Data Compression Technology

The printer can internally compress the received graphics and font data in its memory so that it can print larger graphics and more fonts without additional memory.

Various Fonts

The printer has 66 scalable and 12 bitmapped fonts. The fonts that can be used will vary according to the selected emulation mode.

In PCL mode, you can also print the 13 kinds of bar codes listed below. In BR-Script mode, the printer has 165 scalable fonts.

< Bar Code Printing >

This printer can print the following 13 types of bar codes:

- Code 39
- Interleaved 2 of 5
- EAN-8
- EAN-13
- EAN-128
- Code 128
- UPC-A
- UPC-E
- Codabar
- FIM (US-PostNet)
- Post Net (US-PostNet)
- ISBN (EAN)
- ISBN (UPC-E)

CCITT G3/G4

Since the printer supports the CCITT G3/G4 format in addition to HP-compatible formats, it can quickly receive and print data compressed in this format.

Lock Panel

If the panel button settings have been changed, the printer may not work as expected. It is possible for the administrator of the printer to lock the settings to prevent changes from being made.

Power Save Mode

The printer has a power saving mode. As laser printers consume power to keep the fixing assembly at a high temperature, this feature can save electricity when the printer is on but not being used. The factory setting of the Power Save mode is ON so that it complies with the EPA Energy Star new specification. Compared with conventional laser printers, this printer consumes less power even when the power saving mode is turned off.

Toner Save Mode

The printer has an economical toner save mode. This mode allows you to reduce the printer running cost substantially in addition to the improved life expectancy of the toner cartridge.

Reprint Function

A touch of a panel button allows reprinting of the last print job without sending the data again from the computer. When there is not enough memory to print the last complete job out, the last print page can be reprinted.

Saving User Settings

It is possible to operate the printer differently from other users with the panel button settings. One set of user settings can be stored.

2. PARTS NAMES & FUNCTIONS

<Front View>

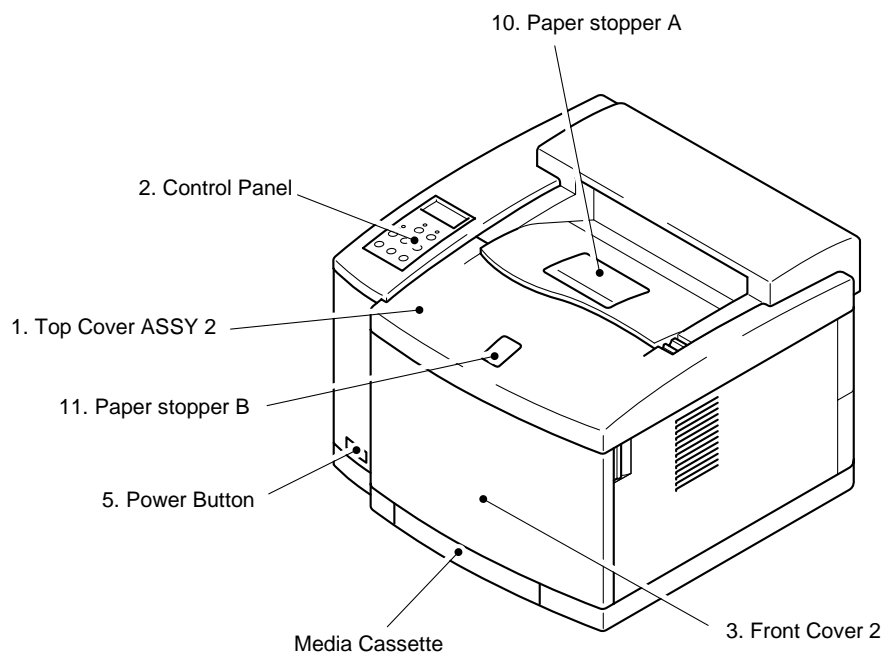


Fig.1-1

<Rear View>

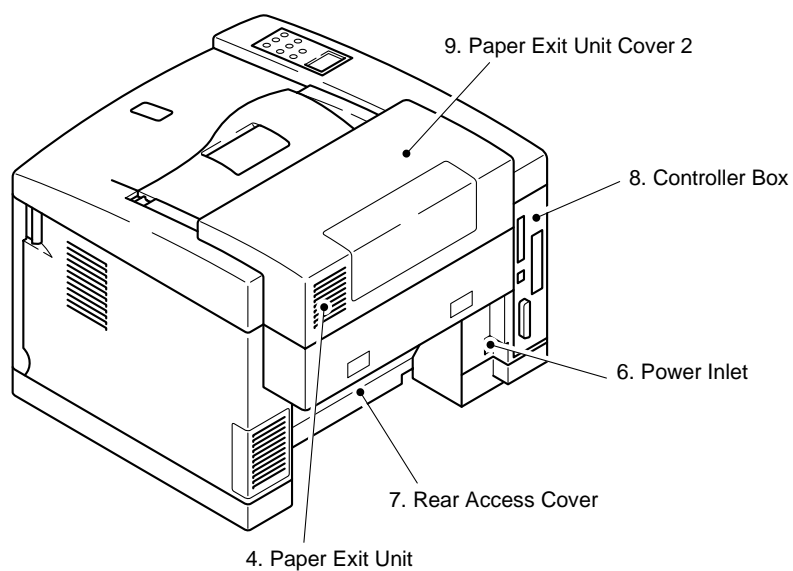


Fig.1-2

No.	Part Name	Outline of Functions
1	Top Cover ASSY 2	To act as an upper enclosure and also as a paper tray for printed paper.
2	Control Panel	To display the status of printer operation.
3	Front Cover 2	To act as a front enclosure, opened when replacing a toner cartridge or waste toner pack.
4	Paper Exit Unit	To exit a printed paper onto a top cover ASSY 2, acting also as paper tray for printed paper. To be opened when replacing an OPC belt cartridge.
5	Power Button	To operate power-on and off to the printer. (Push for On/Off operation)
6	Power Inlet	To connect a power supply cable.
7	Rear Access Cover	To act as a rear enclosure, opened when clearing an internal jam or doing maintenance work.
8	Controller Box	Space for a controller PCB to be installed.
9	Paper Exit Unit Cover 2	Cover to be provided at duplex transportation inlet and to be removed when installing the duplex transportation unit.
10	Paper Stopper A	Stopper to be erected for alignment of exited papers and also prevention of falling down.
11	Paper Stopper B	Stopper to be erected for preventing exited papers from falling down.

3. INTERNAL STRUCTURE

<Cross Sectional View >

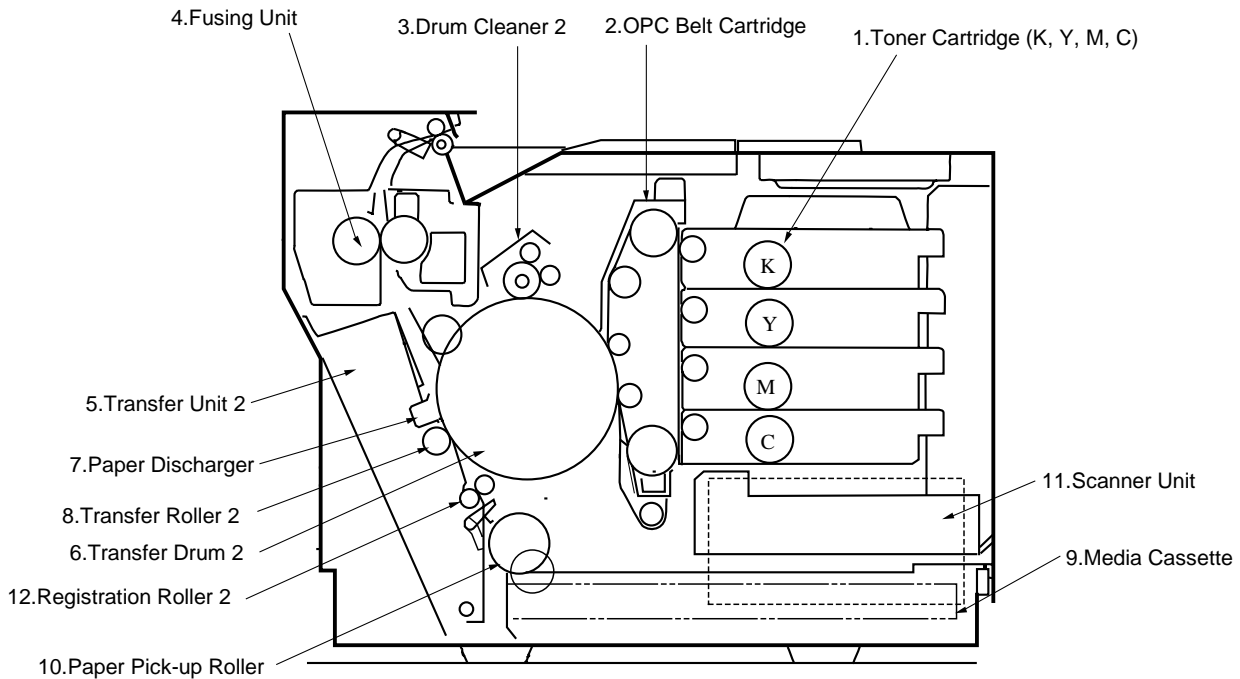


Fig.1-3

No.	Components Name	Outline of Functions
1	Toner Cartridge	Contain the toner (K, Y, M, C) for developing. Each toner cartridge (K, Y, M, C) is independent.
2	OPC Belt Cartridge	Forms images and includes the photoconductive belt.
3	Drum Cleaner 2	Cleans and collects waste toner adhering to the transfer drum 2.
4	Fusing Unit	Fixes by heat and pressure the toner image onto the paper.
5	Transfer unit 2	Transfers toner images from the transfer drum 2 to the paper.
6	Transfer Drum 2	Forms color images, combining the toner images from the OPC belt on the drum.
7	Paper Discharger	Emits a corona charge for separating the paper from the transfer drum 2.
8	Transfer Roller 2	Transfer the toner image on the transfer drum 2 to the paper.
9	Media Cassette	Feeds paper automatically.
10	Paper Pick-up Roller	Feeds paper automatically from the paper cassette.
11	Scanner Unit	Generates a laser beam and scans the OPC belt.
12	Registration Roller 2	Aligns the paper correctly ready for printing

4. DESCRIPTION OF CONTROL PANEL

The printer control panel provides control of the printer including test printing, maintenance operations performed by the video controller and also the ones which are performed by the engine controller.

The Video Controller Mode and the Engine Controller Mode have some common functions. Under normal circumstances the functions in the Video controller mode will be used. Refer to Chapter V for further information.

4.1 Video Controller Mode

The printer goes into the Video Controller Mode when the power is turned on by pressing the power button.

The Video Controller Mode supplies the general test printing and setting functions and some of the maintenance operations. If further engine settings are required, use the Engine Controller Mode.

4.2 Engine Controller Mode

The printer goes into the Engine Controller Mode when power is turned on by pressing the power button at the same time as holding down the secure print, back, set. (Refer to Fig.1-4.)

Note:

This mode provides unique control panel display and operation functions which are completely different from the ones described on the actual control panel or in the user's guide. Refer to Chapter V for detailed information.

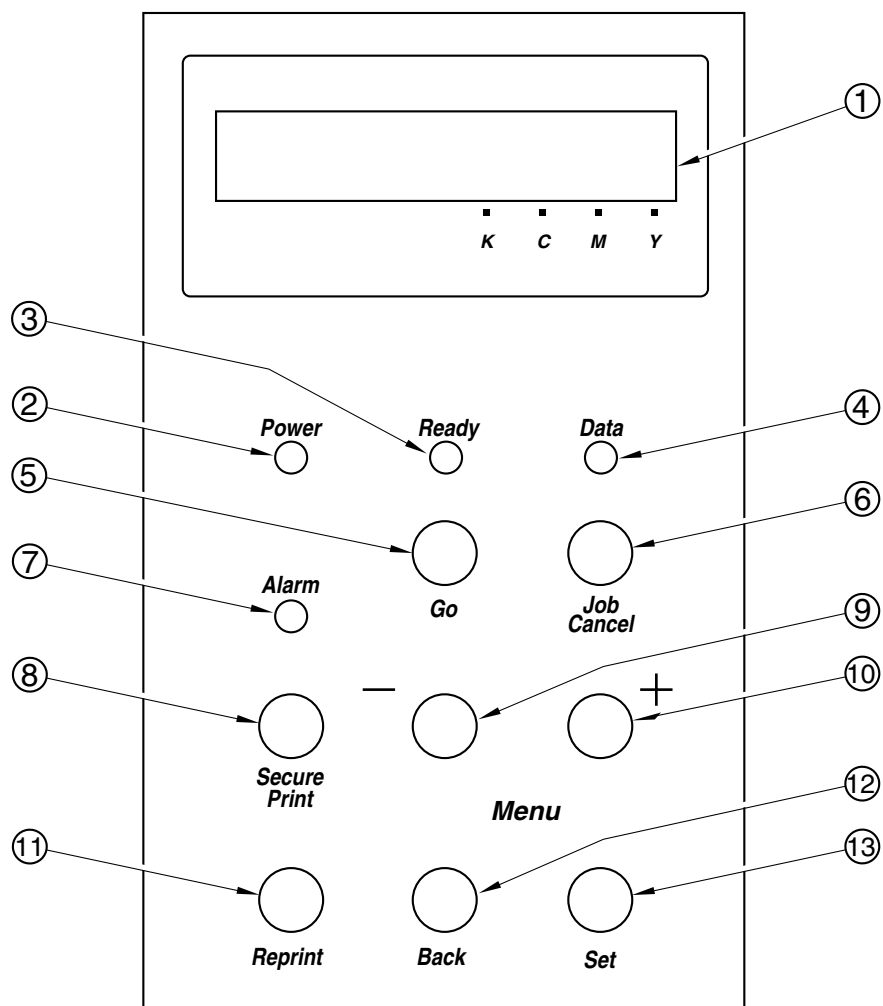


Fig.1-4

No.	LED / Button Name
1	LCD: 16 character by 2 lines
2	Power LED
3	Ready LED
4	Data LED
5	Go button
6	Job Cancel button
7	Alarm LED
8	Secure Print button
9	- button
10	+ button
11	Reprint button
12	Back button
13	Set button

CHAPTER II

SPECIFICATIONS

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CHAPTER II SPECIFICATIONS

1. RATING



WARNING

Use the power supply cable supplied with the printer, or a similar cable complying with the following specification (3-wire power cable with ground).

Use of an “out of specification” cable may result in an electric shock.

Destination	Voltage (V)	Frequency (Hz)	Input Current (A)	Power Cord (Piece)
US / Canada	120	50/60	11	1
Europe	220 - 240	50/60	6	1 *

* For the model for Europe, the power supply cable depends on the country as follows;

Figure	Rating	Approval Agency	Applicable Area
A	250VAC, 6A	VDE, DEMKO, SEV	Europe (Continent)
B		BS	UK

Figure A: For Europe (Sample)

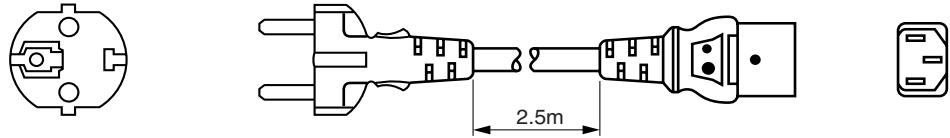
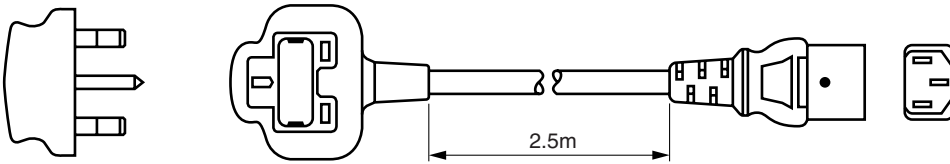


Figure B: For UK



Note:

For details of other power supply cables, refer to the parts reference list.

** For rating labels, refer to the Safety Instruction on Page vi.

2. GENERAL SPECIFICATIONS

2.1. Printing

Print method: Electrophotography by semiconductor laser beam scanning

Resolution: 600 x 600 dots per inch (Fine)
The resolution can be enhanced to 2400 dpi class by using the HRC(High Resolution Control) and CAPT (Color Advanced Photoscale Technology) features.

Print speed: Monochrome mode: 24 page/minute (A4/Letter-size)
Full color mode: 6 page/minute (A4/Letter-size)

Warm-up: Max. 4 minute at 20°C (68°F)

First print: Monochrome mode: 15 seconds or less
Full color mode: 22.5 seconds or less
(when loading A4/Letter-size paper by face down print delivery from standard upper cassette feed)

Print media: Toner in a single-color single-component cartridge
Life Expectancy: 12,000 single-sided pages/cartridge (Black)
7,200 single-sided pages/cartridge (Cyan, Magenta, Yellow)

Note: These figures are based on an average of 5% coverage of the printable area for one color using laser paper. The frequency of replacement will vary, depending on the complexity of the prints, the percentage of coverage, and the type of media. Transparencies, glossy coated paper and other special media will result in shortened consumable life.

Resident Printer Fonts:
<HP PCL, EPSON FX-850, and IBM Proprinter XL modes>
66 scalable fonts and 12 bitmapped fonts, 11 bar codes
<BR-Script 3 mode>
165 scalable fonts

2.2. Functions

CPU:	Toshiba TMPR 4955AF-266 (TX4955 266MHz)
Emulation:	Automatic emulation selection HP Color Printer (PCL5C) including HP LaserJet 4+ (PCL5e) and HP LaserJet 5 (PCL6 monochrome) BR-Script 3 (Adobe PostScript 3 compatible) HP-GL EPSON FX-850 IBM Proprinter XL
Interface:	Bi-directional parallel Universal Serial Bus (USB) Ethernet 10/100 Base-TX
RAM:	Standard model: 64Mbytes (Expandable up to 384Mbytes with DIMMs) The standard memory fitted can vary depending on the printer model and country
Control panel:	8 buttons, 4 LEDs and a 16-column x 2 lines liquid crystal display
Diagnostics:	Self-diagnostic program

2.3. Electrical and Mechanical

Power source:	U.S.A. and Canada: AC 120V, 50/60Hz Europe and Australia: AC 220 to 240V, 50/60Hz
Power consumption:	Printing: 600W or less Standing by: 260W or less Sleep: 30W or less
Noise:	Printing: 55dB A or less Standing by: 48dB A or less
Temperature:	Operating: 10 to 32.5°C (50 to 90.5°F) Non Operating: 5 to 35°C (41 to 95°F) Storage: 0 to 35°C (38 to 95°F)
Humidity:	Operating: 20 to 80% (non condensation) Storage: 20 to 80% (non condensation)
Dimensions (W x D x H):	500 x 520 x 410 mm (19.7 x 20.5 x 16.1 inches) 500 x 520 x 555 mm (19.7 x 20.5 x 21.9 inches) with the optional lower tray unit fitted
Weight:	Approx. 39kg (86lbs.) Approx. 54.4kg with the optional lower tray unit and toner cartridges fitted

2.4. Network

Type / Speed:	Ethernet 10/100BaseTX Printer server (NC-4100h) Auto speed detection
Protocols:	TCP/IP (DHCP, BOOTP, RARP, DHCP, NetBIOS over IP LPR/LPD, Port9100, Custom Port, POP3/SMTP SMB Print TELNET, SNMP, HTTP, TFTP), EtherTalk, IPX/SPX, DEC LAT, Banyan VINES, NetBEUI, DLC/LLC
Management:	Web Based Management BAdmin Professional Windows® based management utility
Firmware update:	8MB flash ROM. Use BAdmin Professional when upgrading print server software or BOOTP, TFTP PUT/GET or IPX for Netware.
Supplied software:	BAdmin Professional (for Windows® 95/98/ME/NT 4.0/2000/XP) Driver Deployment Wizard (for Windows® 95/98/ME/ NT 4.0/2000/XP) Network Print Software (for Windows® 95/98/ME/NT 4.0/2000/XP) Storage Manager (for Windows® 95/98/ME/NT 4.0/2000/XP) Analysis Tool (for Windows® 95/98/ME/NT 4.0/2000/XP)

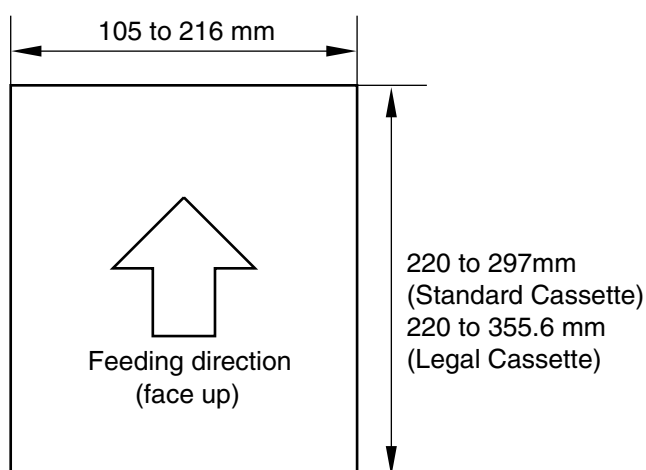
2.5. Paper Specification

2.5.1 Printable Media & Cassette Capacity

The standard media cassette (upper cassette) is supplied with the printer. The optional lower tray unit and the optional Legal cassette can also be installed.

- 1) Printable Media: Plain paper / Transparency / Thick Stock / Label / Envelope
- 2) Printable size: (Refer to the list below.)
- 3) Feedable paper weight: 64 (18lb.) to 163 (43lb.) g/m²
- 4) Maximum load height : 27mm
 - Plain paper: 250 sheets of 75g/m² (20lb) paper
 - Envelopes : 15 sheets
 - Transparency: 50 sheets
 - Label: 80 sheets
- 5) Setting method: Pull the media cassette out of the printer toward you, insert the paper into the cassette after aligning the top edge of the sheets, then push the cassette back into its original position.

Paper Source	Printable Media Size
The Standard Media Cassette	Plain paper: A4, Letter, B5, Executive Envelope: COM10, DL Other size: width 105-216mm (4.1"-8.5") length 220-297mm (8.7"-11.7")
The Optional Legal Cassette	Plain paper: Legal, A4, Letter, B5, Executive Envelope: COM10, DL Other size: width 105-216mm (4.1"-8.5") length 220-355.6mm (8.7"-14")



2.5.2 Printed Output

250 sheets of 75g/m² (20lb) paper / plain paper can be stacked in the output tray.

Face-down print delivery

Note: Face down: Delivers the printed side of the paper downwards

Environment: 17.5 ~ 27.0°C, 50 ~ 70%RH

2.5.3 Recommended Paper Specifications

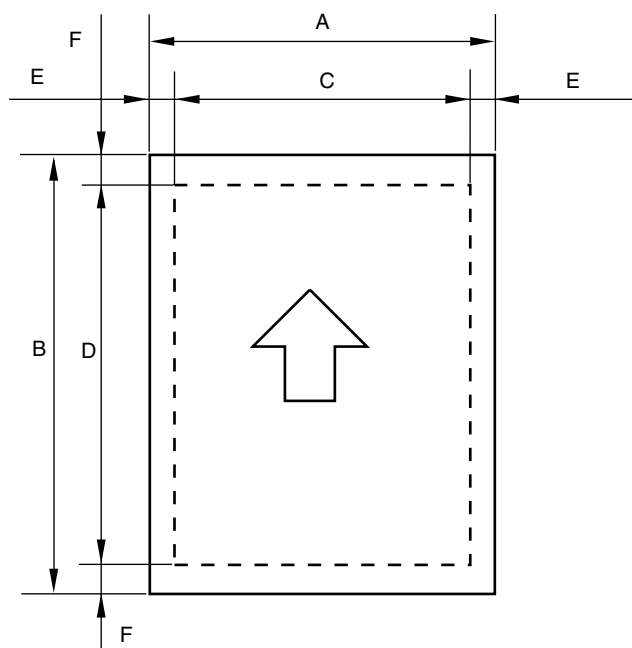
Item	Description
Basis Weight (g/m ²)	82 ± 5
Thickness (μ m)	95 ± 6
Smoothness (Bekk) (seconds)	90 ± 20
Stiffness (Clark)	100 ± 15
Brightness (%)	85 ± 2
Surface Resistance (Ω)	10 ¹⁰ ~ 10 ¹¹
Grain Direction	Long

Measurement Condition: 17.5 ~ 27.0°C, 50 ~ 70%RH

Note: Keep the paper sealed in the bag as supplied and do not open the paper bag until the paper is required for use.

2.5.4 Effective Printing Area

(1) Printable area



The effective printing area means the area within which the printing of all the data received without any omissions can be guaranteed. (Refer to Table 2-1 for details.)

Table 2-1: Effective Printing Areas

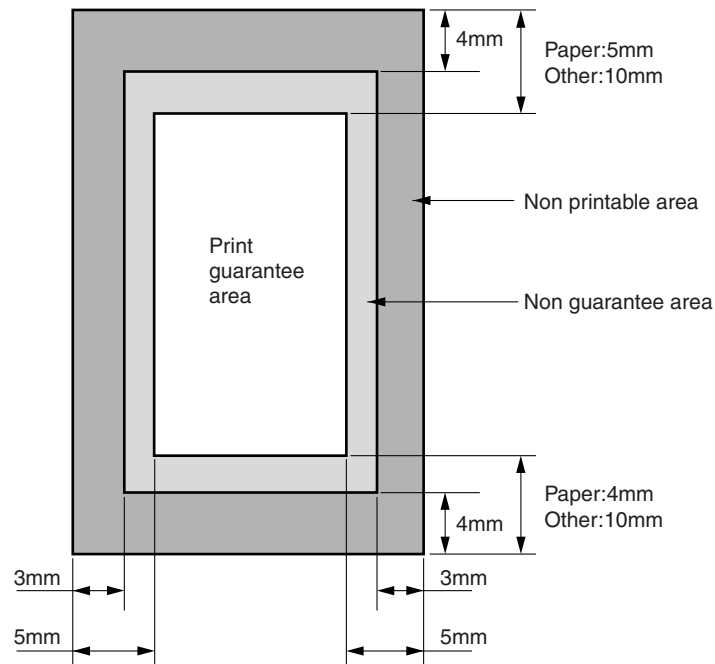
Size	A	B	C	D	E	F
A 4	210.0mm 8.27" (2,480 dots)	297.0mm 11.69" (3,507 dots)	203.2mm 8.0" (2,400 dots)	288.5mm 11.36" (3,407 dots)	3.4mm 0.13" (40 dots)	4.23mm 0.17" (50 dots)
Letter	215.9mm 8.5" (2,550 dots)	279.4mm 11.0" (3,300 dots)	207.44mm 8.16" (2,450 dots)	271.0mm 10.67" (3,200 dots)	4.23mm 0.17" (50 dots)	↑
Legal	215.9mm 8.5" (2,550 dots)	355.6mm 14.0" (4,200 dots)	207.44mm 8.16" (2,450 dots)	347.1mm 13.67" (4,100 dots)	↑	↑
B 5 (JIS)	182.0mm 7.16" (2,149 dots)	257.0mm 10.12" (3,035 dots)	173.54mm 6.82" (2,049 dots)	248.5mm 9.78" (2,935 dots)	↑	↑
B 5 (ISO)	176.0mm 6.93" (2,078 dots)	250.0mm 9.84" (2,952 dots)	167.54mm 6.59" (1,978 dots)	241.5mm 9.5" (2,852 dots)	↑	↑
Executive	184.2mm 7.25" (2,175 dots)	266.7mm 10.5" (3,150 dots)	175.74mm 6.91" (2,075 dots)	258.3mm 10.17" (3,050 dots)	↑	↑
COM-10	104.8mm 4.125" (1,237 dots)	241.3mm 9.5" (2,850 dots)	96.34mm 3.785" (1,137 dots)	232.8mm 9.16" (2,750 dots)	↑	↑
D L	110.1mm 4.33" (1,299 dots)	221mm 8.66" (2,598 dots)	101.64mm 3.99" (1,199 dots)	211.5mm 8.33" (2,498 dots)	↑	↑

(Note that the paper sizes indicated here should conform to the nominal dimensions specified by JIS.)

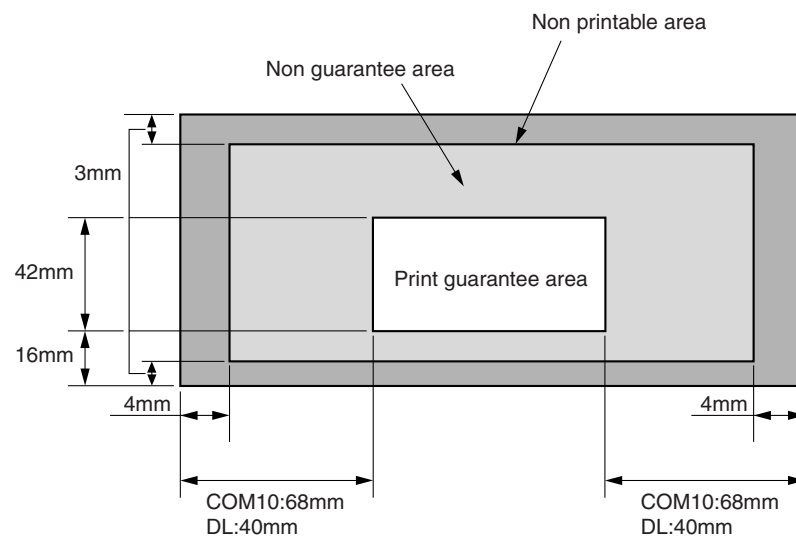
A4 paper must accommodate 80 characters printed in pica pitch (203.2 mm).

The dot size is based on 300 dpi resolution.

- (2) Print guarantee area
<Plain paper>



<Envelope>



2.5.5 Paper Feed Jam Rate

Less than 1 misfeed per 2000 pages under normal environmental conditions.

Less than 1 misfeed per 1000 pages outside the normal environmental conditions.

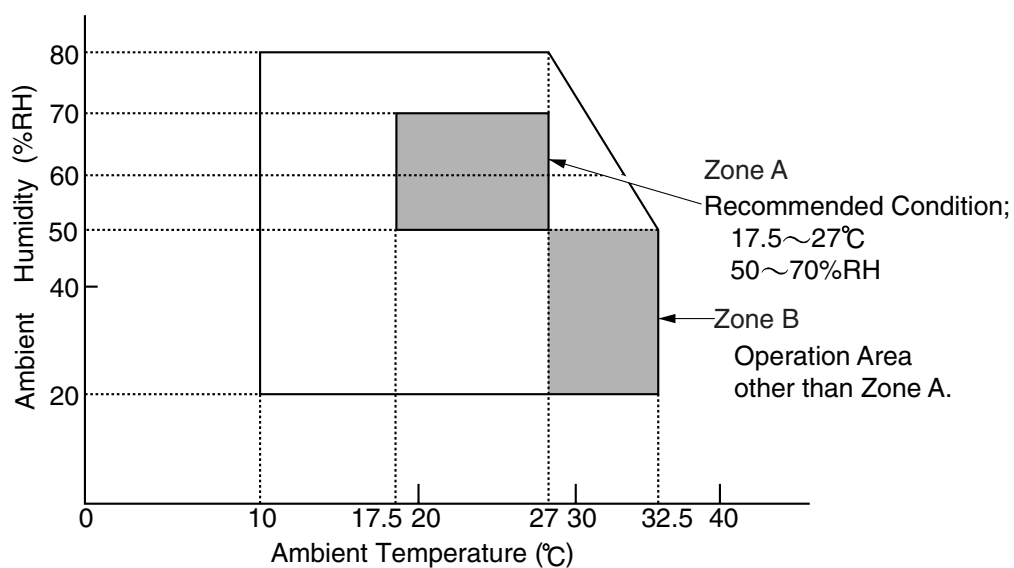
Note:

These figures are based on the paper whose specification is recommended. For the recommended specifications, refer to Section 2.4.3 of this chapter.

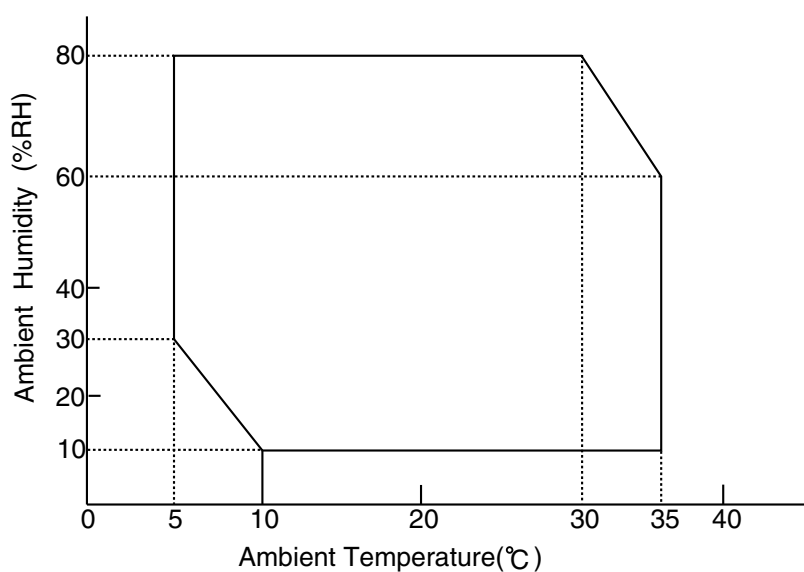
3. ENVIRONMENTAL CONDITION

3.1 Ambient Temperature / Humidity / Altitude

- (1) Under Operational conditions: 10.0 ~ 32.5°C, 20 ~ 80%RH (See the figure below.)



- (2) Under Non Operational conditions: 5.0 ~ 35.0°C, 10 ~ 80%RH (See the figure below.)



(3) Storage and Transportation Environment of Printer

The following defines the storage and transportation environment of printers that have been packed according to Brother specification. However, this section does not cover the OPC belt cartridge and toner cartridges.

Temperature	Normal Conditions	0°C ~ 35°C (32°F ~ 95°F)
	Severe Conditions	High Temperature: 35°C ~ 40°C (95°F ~ 104°F) Low Temperature: -10°C ~ 0°C (14°F ~ 32°F)
Humidity	10% ~ 90%RH	
Period of Storage	One Year after EX-works	
Other	No Condensation	
Atmosphere	613 ~ 1,067hpa (460 ~ 880mmHg)	

The period under the severe conditions should not be continuous, and is assumed as an accumulation of intermittent time. However, an individual period of intermittent time under severe conditions should not be allowed to exceed 48 hours.

Note:

Normal conditions should occupy more than 90% of total storage period.

Severe conditions should be less than 10% of total storage period.

CHAPTER III

INSTALLATION

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CHAPTER III INSTALLATION

1. CONDITIONS REQUIRED FOR INSTALLATION

Any Laser beam printer is likely to be influenced by the environment of the set-up location. If the printer is set-up in an inappropriate location, the printer may not perform as expected. Therefore, the following factors should be taken into consideration before deciding where to set-up the printer.

1.1. Environmental Conditions

The printer should not be set up in the locations referred to in the following items (a) through (d) which specify inappropriate locations for set-up.

- (a) Where it is likely to receive direct sunlight or similar light. (For example, next to a window)
- (b) Where it is likely to suffer a big difference in temperature and humidity between the maximum and minimum levels. (Normal operation environment is within 10°C ~ 35°C, 20 ~ 80%RH and without any condensation.)
- (c) Where it is likely to be in a draft of cold air from an air-conditioner or warm air from a heater, or to receive direct radiant heat.
- (d) Where it is likely to be excessively dusty or be subject to corrosive gases such as ammonia.
- (e) Users should select a location with good ventilation and set the printer on a flat surface.
- (f) Users should check that the maximum angle of the set-up location is horizontal to within $\pm 1^\circ$.

1.2. Basic Layout of Printer Set-up Location

Fig.3-1 shows the basic layout of the printer set-up location that is suitable for smooth operation and maintenance of the printer.

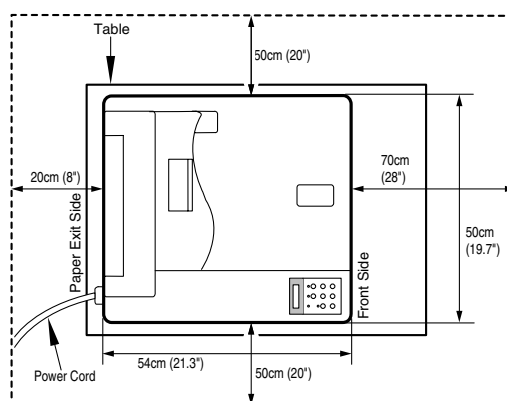


Fig.3-1

- The space in front of the printer (70cm) is necessary to open the front cover.
- The space at back of the printer (20cm) is necessary to open / close the rear access cover.
- The space on both sides of the printer (50cm) is necessary for general access.

2. UNPACKING



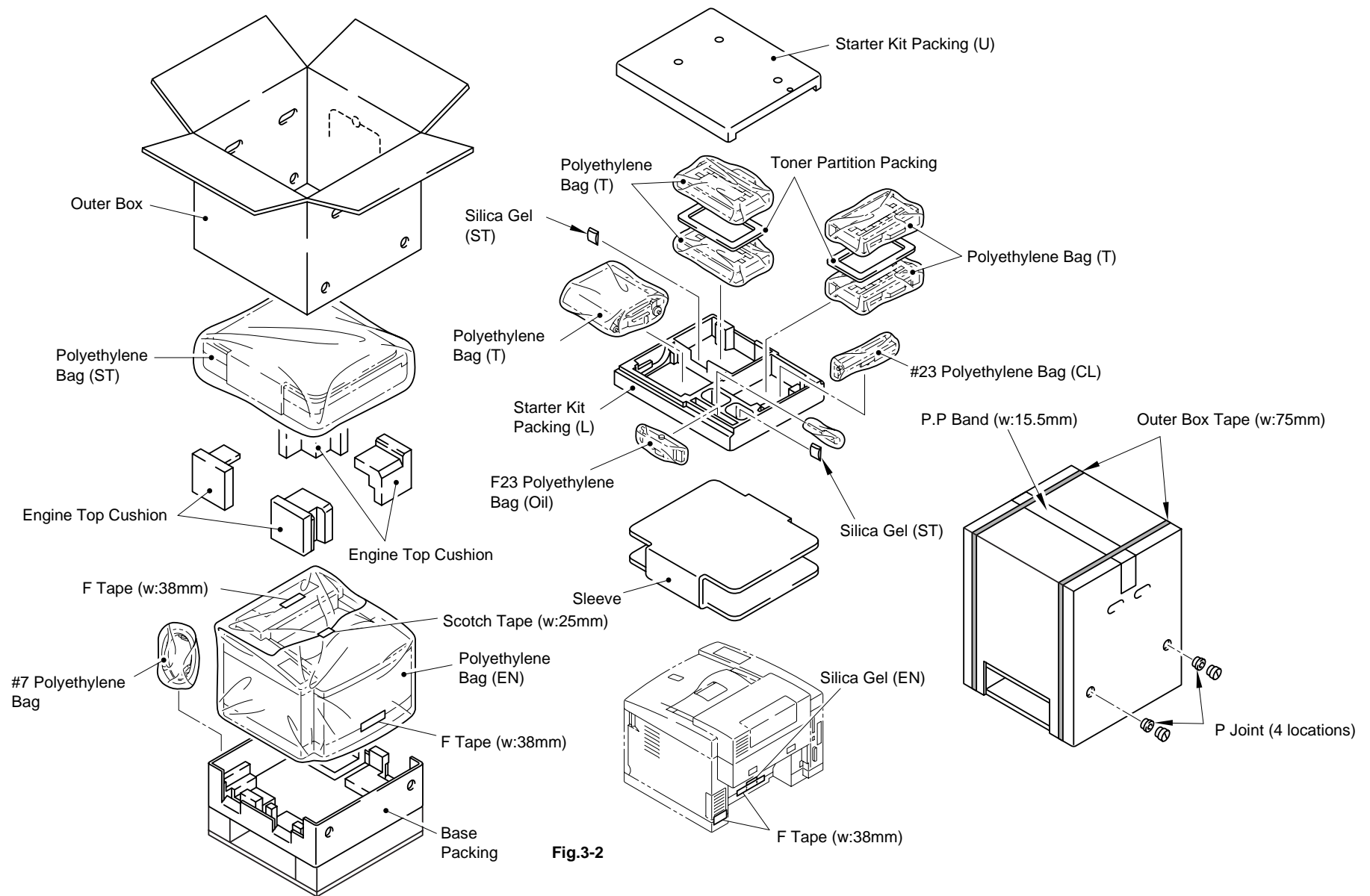
WARNING

- *The package containing a printer weighs approximately 45kg, so it is too heavy for one person to carry. It needs two adults to move the printer. Since the printer is a precision machine, make sure that it is carried slowly with care so that no impact occurs to the printer while moving it.*
- *Do not attempt to lift a printer when it is covered by the vinyl bag because it is slippery and may result in damage and injury if dropped.*

2.1 Unpacking the Printer

Refer to Fig.3-2 on the next page.

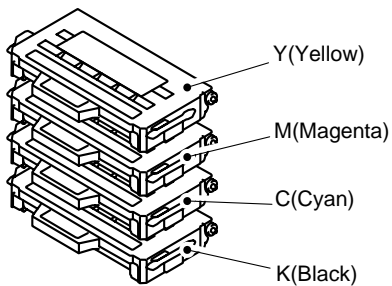
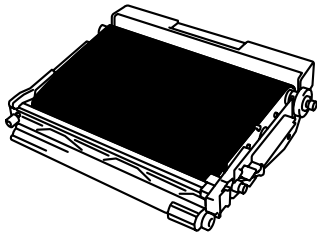
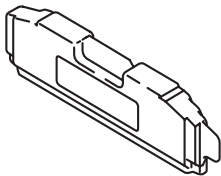
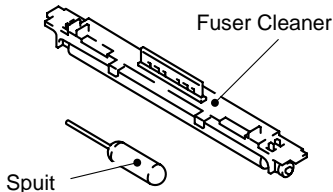
- 1) Cut the P.P band (2 pieces).
- 2) Remove the plastic joints (4 locations).
- 3) Remove the outer box tape.
- 4) Open the top of the package and take the starter kit out.
- 5) Lift the outer box up from around the printer.
- 6) Remove the upper packing (4 locations).
- 7) Take out the power code.
- 8) Open up the polyethylene bag enclosing the printer.
- 9) Lift up the printer with another person's help, and move it away from the polyethylene bag.
- 10) Remove the shipping tape (4 locations).
- 11) Remove the fixing tape of the silica gel the printer rear side.
- 12) Remove the silica gel.



2.2 Unpack the Starter Kit

<Unpacking Procedure>

- 1) Open the polyethylene bag and slide off the cardboard sleeve covering the starter kit.
- 2) Confirm all of the following parts are inside the starter kit packing box.

No.	Kit Name	Appearance	Quantity
1	Toner Cartridge (Y,M,C,K)		4
2	OPC Belt Cartridge		1
3	Oil Bottle		1
4	Fuser Cleaner		1



CAUTION

When shipping the printer, remove the oil bottle and the fuser cleaner from the fusing unit. After removing the oil bottle, be sure to remove the oil remaining in the fusing unit with the supplied syringe. Failure to do so will cause severe damage to the printer.

3. INSTALLATION WORK

Install the unit parts of the starter kit into the printer according to the following procedures:

3.1 Install the Fuser Cleaner and Oil Bottle

- 1) Open the paper exit cover.
Pressure has been released by the fusing release lever between the fuser roller and back-up roller while the transportation and storage.
Release the fusing release lever.

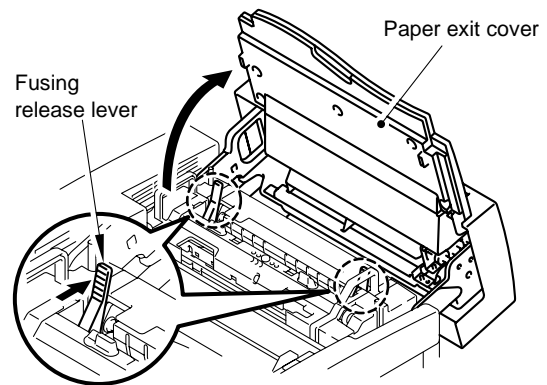
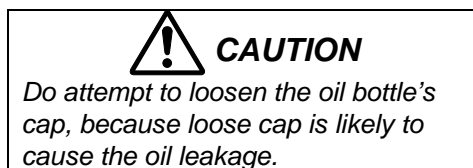


Fig.3-3

- 2) Open the retainer lock lever of oil bottle and the fuser cleaner.
- 3) Install the oil bottle to the fusing unit.

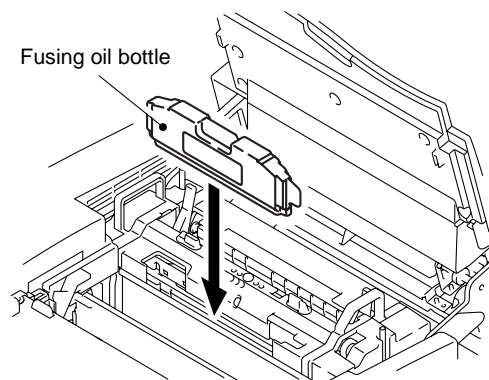


Fig.3-4

- 4) Install the fuser cleaner to the fusing unit.
- 5) Hold the fuser cleaner with the retainer lock lever.
- 6) Close the paper exit cover.

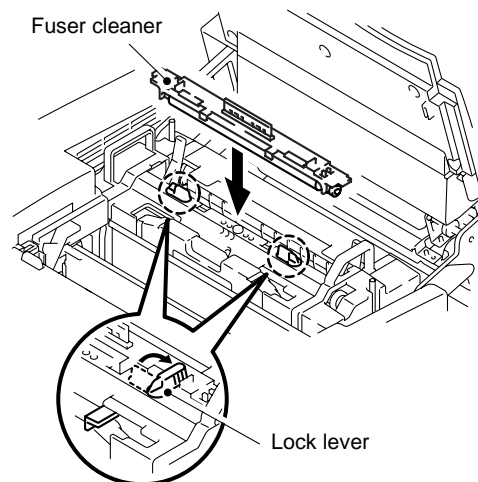


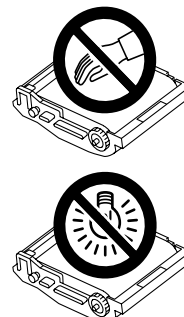
Fig.3-5

3.2 Install the OPC Belt Cartridge



CAUTION

- Do not directly touch the OPC belt surface with bare hands or gloves.
- If the OPC belt is exposed for more than two minutes under the light of 800 lux, the belt may be damaged.



- 1) Open the front cover and the paper exit unit cover 2 by releasing the latches.



CAUTION

When installing or removing the OPC belt, be sure to open the front cover first. Failure to do so will cause the OPC belt to be damaged due to contact with the toner cartridges.

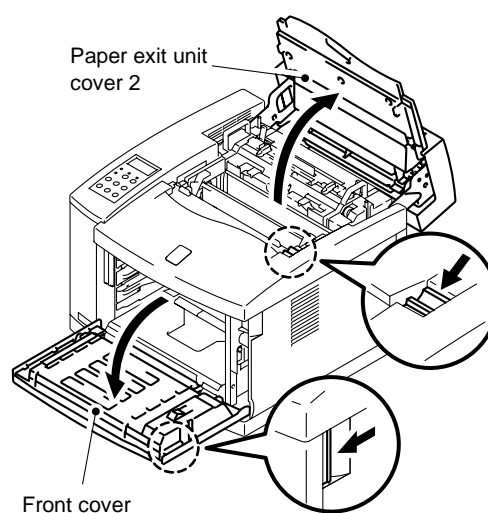


Fig.3-6

- 2) Release the belt cartridge lock levers (left & right).

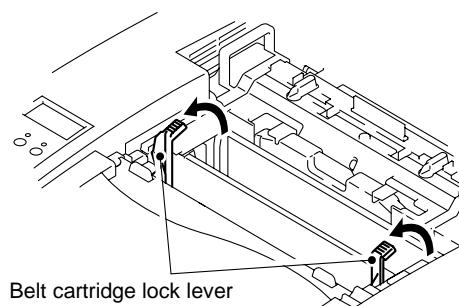


Fig.3-7

- 3) Pull and remove the tension release pins on both sides (left & right) of the OPC belt cartridge.
- 4) Remove the protective sheet from the new OPC belt cartridge.

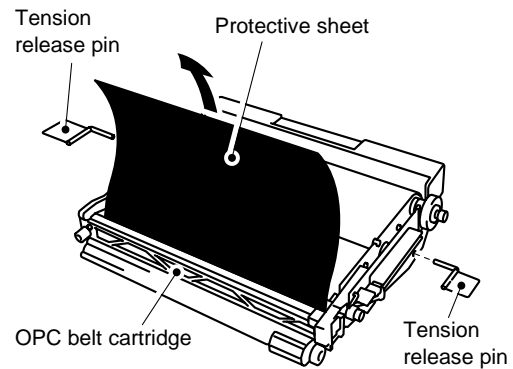


Fig.3-8

- 5) Install the new OPC belt cartridge into the printer, along the guide of belt cartridge lock lever provided at both sides.

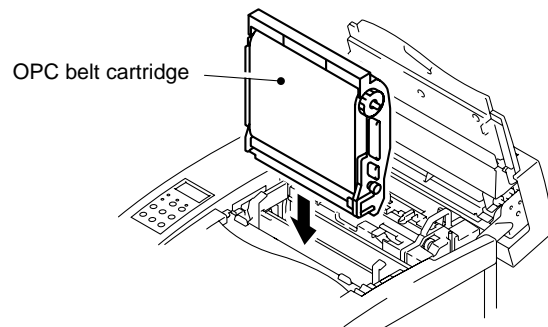


Fig.3-9

- 6) Set the belt cartridge lock lever at both sides (left and right).
- 7) Close the paper exit unit cover 2.

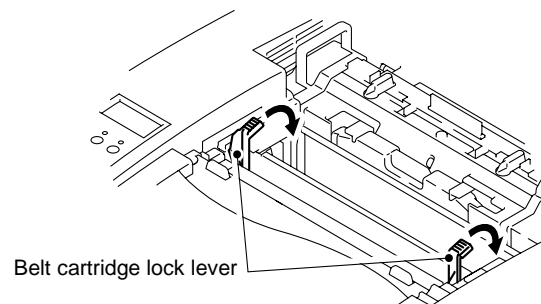


Fig.3-10

3.3 Install the Toner Cartridges into the Printer



CAUTION

- Refrain from holding a toner cartridge vertically, otherwise, it may adversely affect the print quality.
- Do not hold the toner cartridge vertically (neither long nor short edge), otherwise, it adversely affect the print quality.

- 1) Open the front cover.
- 2) Holding a toner cartridge horizontally, shake it to left and right for three to four times.

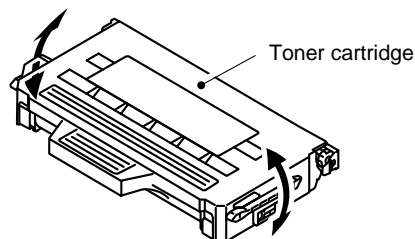


Fig.3-11

- 3) Remove the seal tape and remove a protective cover of toner cartridge.

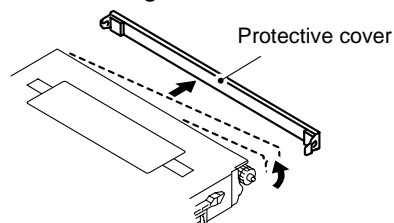


Fig.3-12

- 4) Push the new toner cartridge along the guide into the printer.

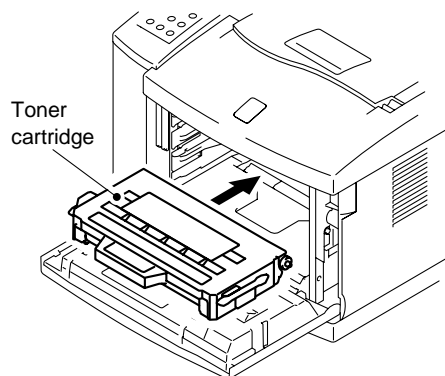


Fig.3-13

- 5) Installation order of toner cartridge in terms of color shall be Cyan (C), Magenta (M), Yellow (Y), and Black (K).
- 6) Close the front cover.

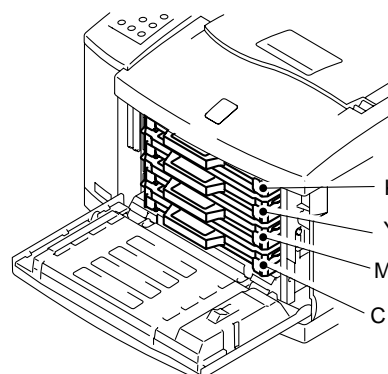


Fig.3-14

3.4 Test Print

- 1) Make sure the printer power button is off. Do not connect the interface cable.

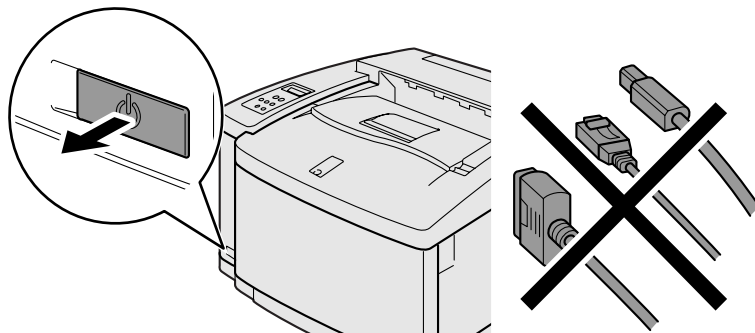


Fig.3-15

- 2) Connect the AC power cord to the printer, and then plug it into the AC outlet.

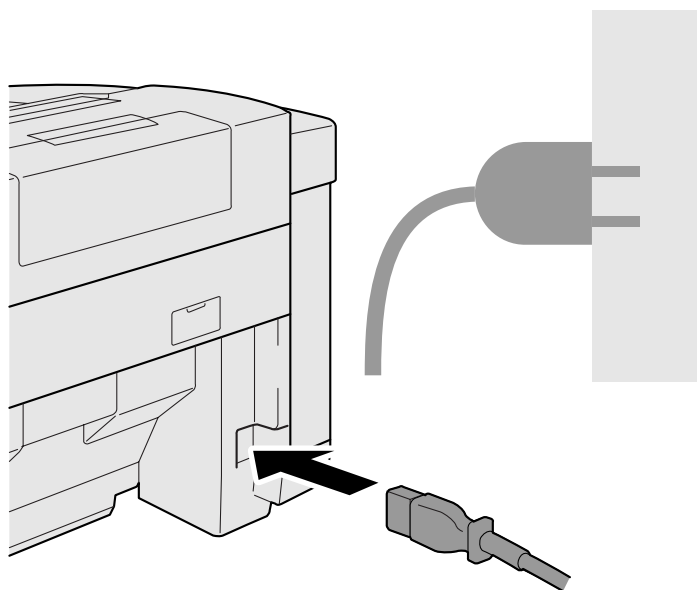


Fig.3-16

- 3) Turn on the power button.

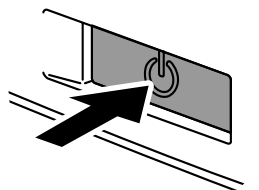


Fig.3-17

- 4) After the printer warms, the READY message will appear.

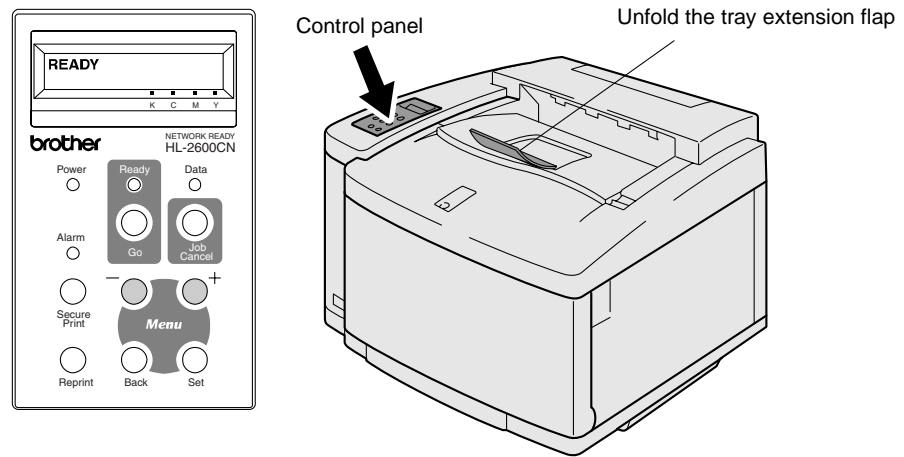


Fig.3-18

- 5) Press the Go button. The printer will print a test page. Check that the test page is printed correctly.

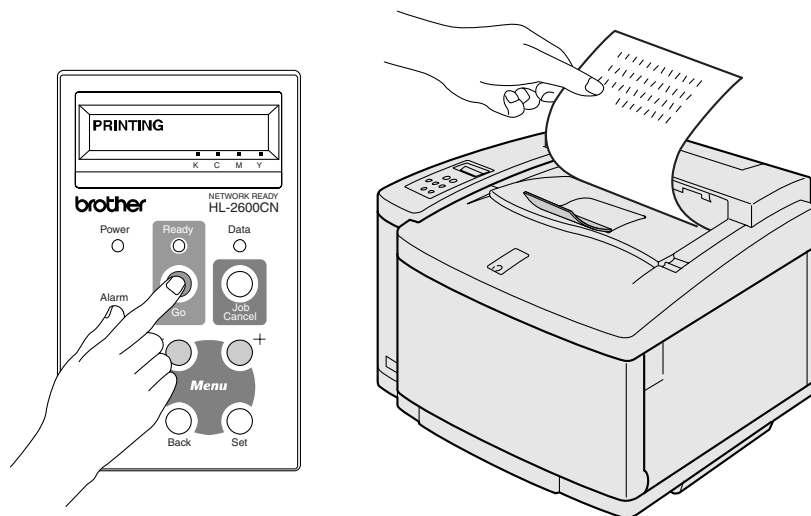


Fig.3-19

CHAPTER IV

STRUCTURE OF SYSTEM COMPONENTS

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CHAPTER IV STRUCTURE OF SYSTEM COMPONENTS

1. BASIC STRUCTURE

<Mechanical & Electrical Structures>

This laser beam color printer (hereinafter called "Printer") consists of five mechanical systems; Print, Transfer, Scanning, Paper Transport and Control System. The printer produces color printing through the interactive operations of these five systems as shown in Fig.4-1.

(1) Print System

The print system consists of the following 6 (six) functional parts located around the OPC belt which form a toner image on the OPC Belt.

- Charger Part
- Exposure Part
- Development Part
- First Transfer Part
- Discharger Part
- Cleaner Part

(2) Scanning System

The scanning system consists of the following 2 (two) functional parts which form an electrostatic latent image on the OPC Belt by scanning it with a laser beam.

- Scanner Unit
- Scanner Motor (SCM)

(3) Transfer System

The transfer system consists of the following 3 (three) functional parts and transfers the toner image formed on the transfer drum onto the page.

- Transfer Drum
- Second Transfer Part
- Drum Cleaner Unit

(4) Paper Transport System

The paper transport system consists of the following 5 (five) functional parts and picks up paper from the media cassette, separates the paper from the transfer drum and exits it from the printer body after fusing the toner image on the paper.

- Media Cassette
- Transport rollers
- Paper Discharger
- Fusing unit
- Paper Exit

Fig.4-1

(5) Control System

The control system consists of the following 4 (four) control parts and runs the printer by processing the interface signals transmitted from the Host computer and interfacing to the print, transfer, scanning and transport systems.

- Sequence Control
- Laser Control
- Fusing Temperature Control
- Interface Control

<Basic Mechanism of Color Printing>

(1) Principle of Color Printing

Color printing is made through the subtractive process by combining the three primary colors, yellow, magenta, and cyan. Fig.4-2 shows the three primary colors and subtractive process:

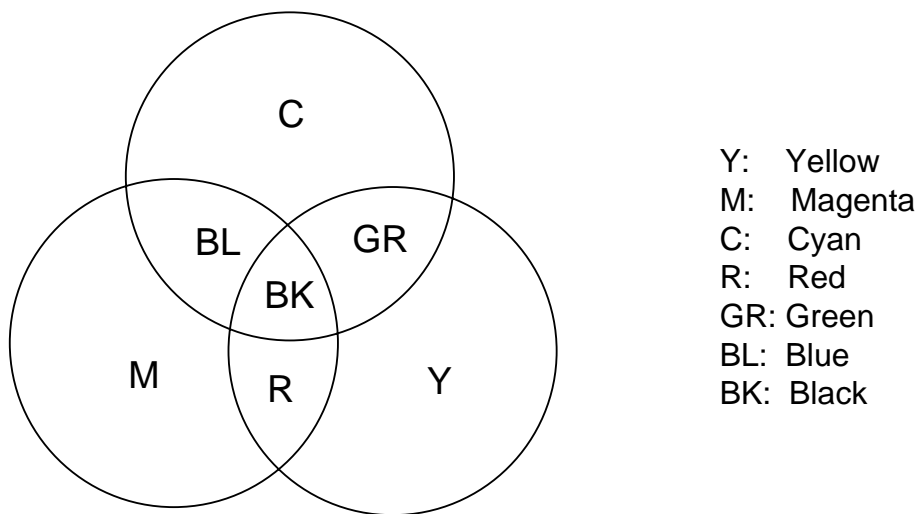


Fig.4-2

(2) Basic Color Printing Process

- (a) The printer has a Toner Cartridge of each color yellow, magenta, cyan and black as shown in Fig.4-3.
- (b) The toner image developed using the primary colors is transferred to the transfer drum for the printed color combination as shown in Fig.4-4 (a).
- (c) The toner image formed on the transfer drum is transferred to the transported paper as shown in Fig.4-4 (b).
- (d) The toner on the paper is fused by the thermal fixing unit to fix the toner image onto the paper as shown in Fig.4-4 (c).

Summarizing the above processes, a toner color layer is formed on the transported paper, and subsequently, the color image is made through the subtractive process.

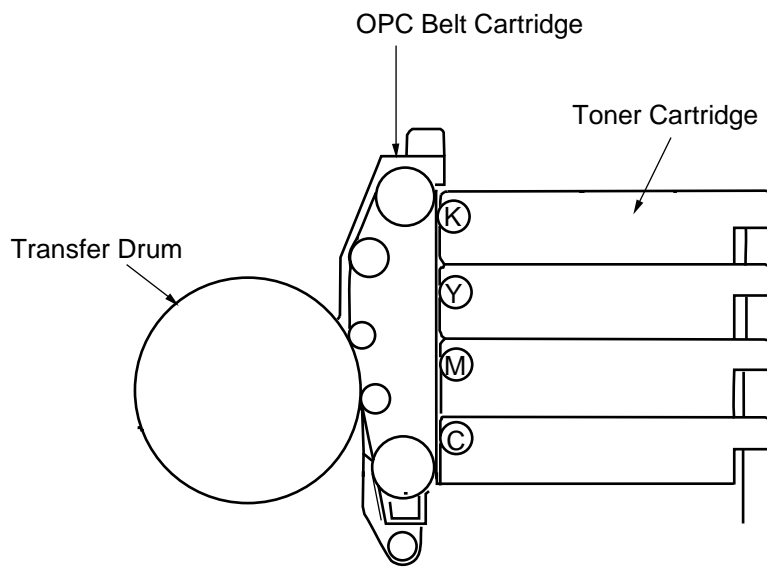


Fig.4-3

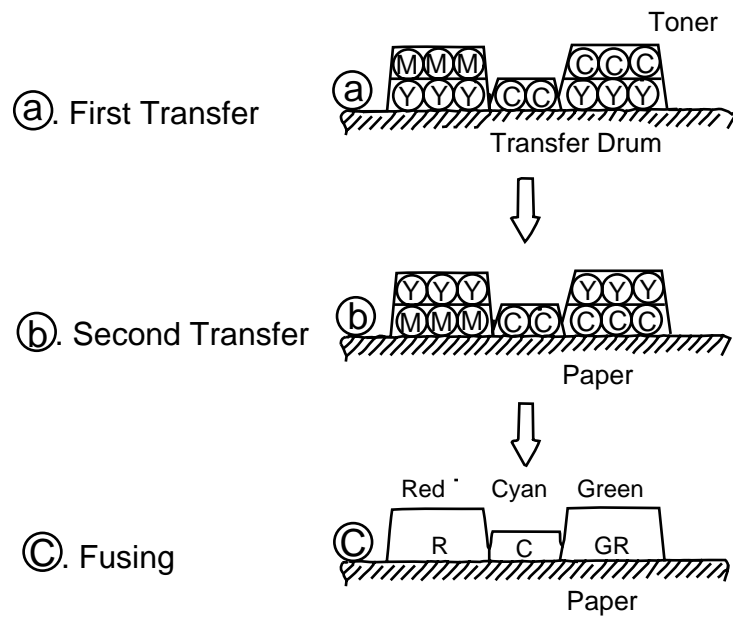


Fig.4-4

<Structure of the OPC Belt>

The OPC belt consists of a surface layer having a photoconductor (OPC) of organic material, the inner layer of an insulator material (PET / Mylar) and an aluminum deposit layer in between. The OPC belt is located as shown in Fig.4-5 as the main part of the print system.

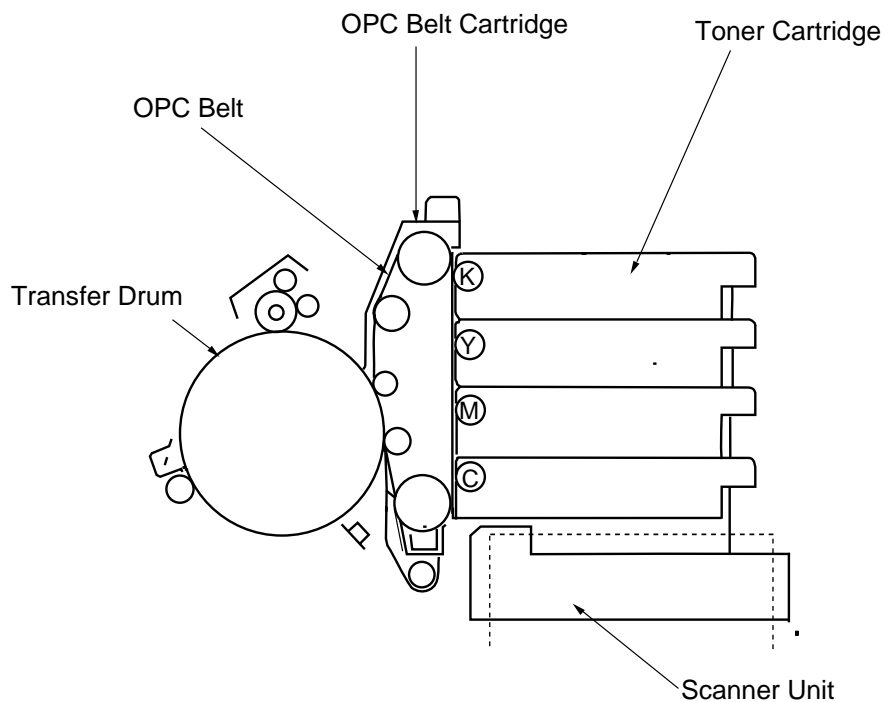


Fig.4-5

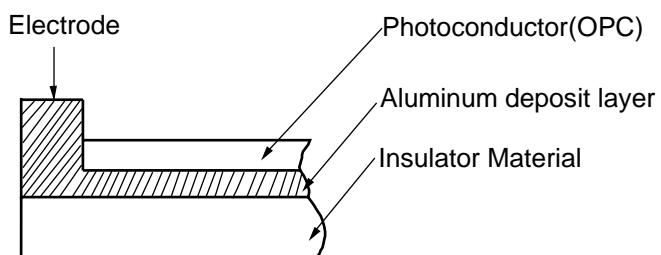


Fig.4-6

1.1 Print System and Transfer System

Fig.4-7 shows the basic structure of the print system having the OPC belt as the main part and the transfer system having the transfer drum as the main part. Color printing is achieved by actuating in sequence each process in the print system and transfer system.

4 cycles of actions 1 to 6 are required to form a full 24 bit color image on the transfer drum, only one cycle of actions 7, 8 and 9 is required to transfer the image to the paper from the transfer drum ready for fixing by actions 10 and 11.

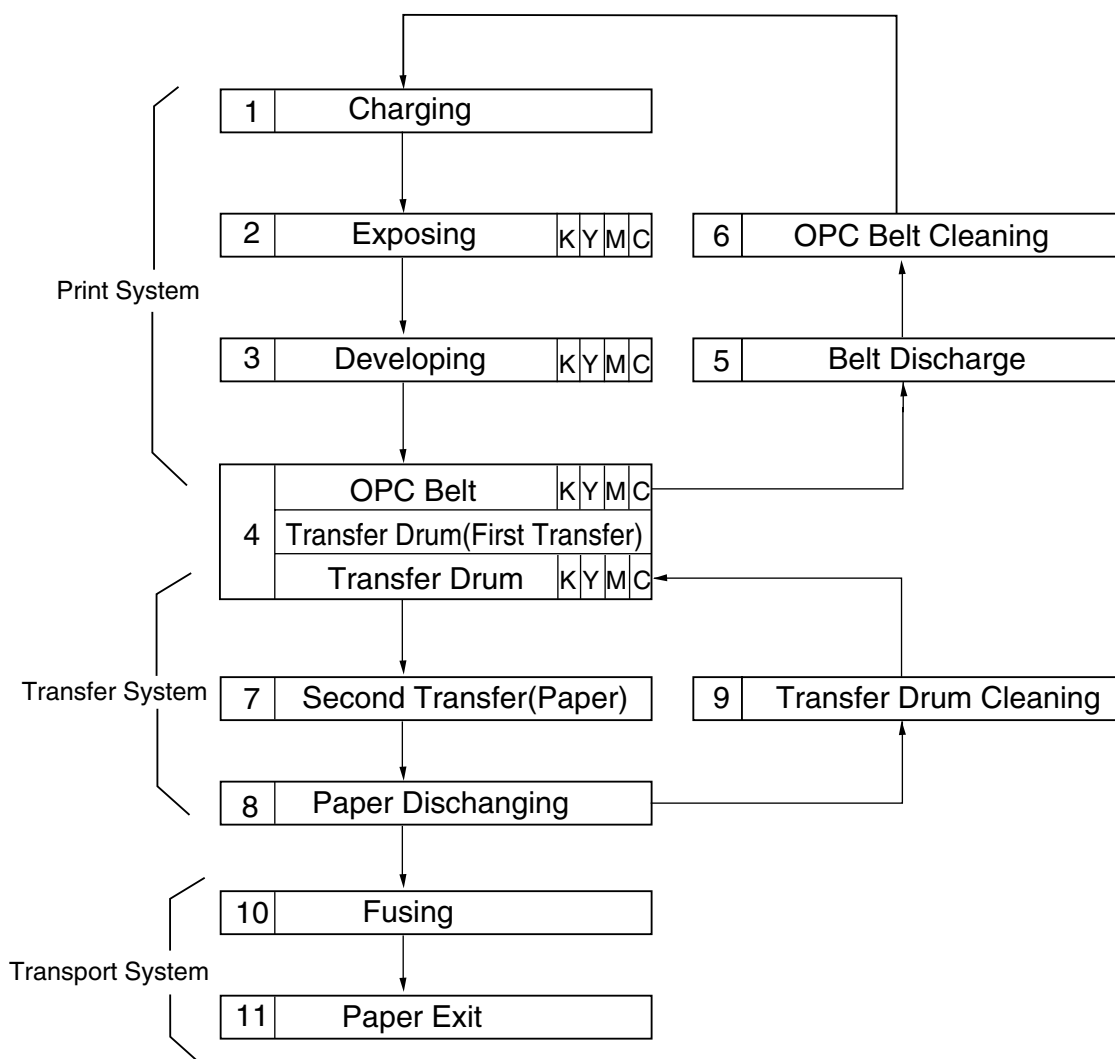


Fig.4-7

1.1.1 Structure of the Printer

No.	Component Part	Process
1	Charger	Charging
2	Scanner Unit	Exposing
3	Toner Cartridge	Developing
4	OPC Belt Cartridge	Receives the Image
5	Transfer Drum	Transfers the Image
6	Belt Discharger Erase Lamp	Discharges the Belt
7	Cleaning Blade	Cleaning the Belt
8	Transfer Roller	Transferring
9	Paper Discharger	Discharges the Paper
10	Drum Cleaner	Cleans the Drum
11	Fusing Unit	Fusing
12	Paper Exit Unit	Exits the Paper
13	Registration Roller	Paper Alignment

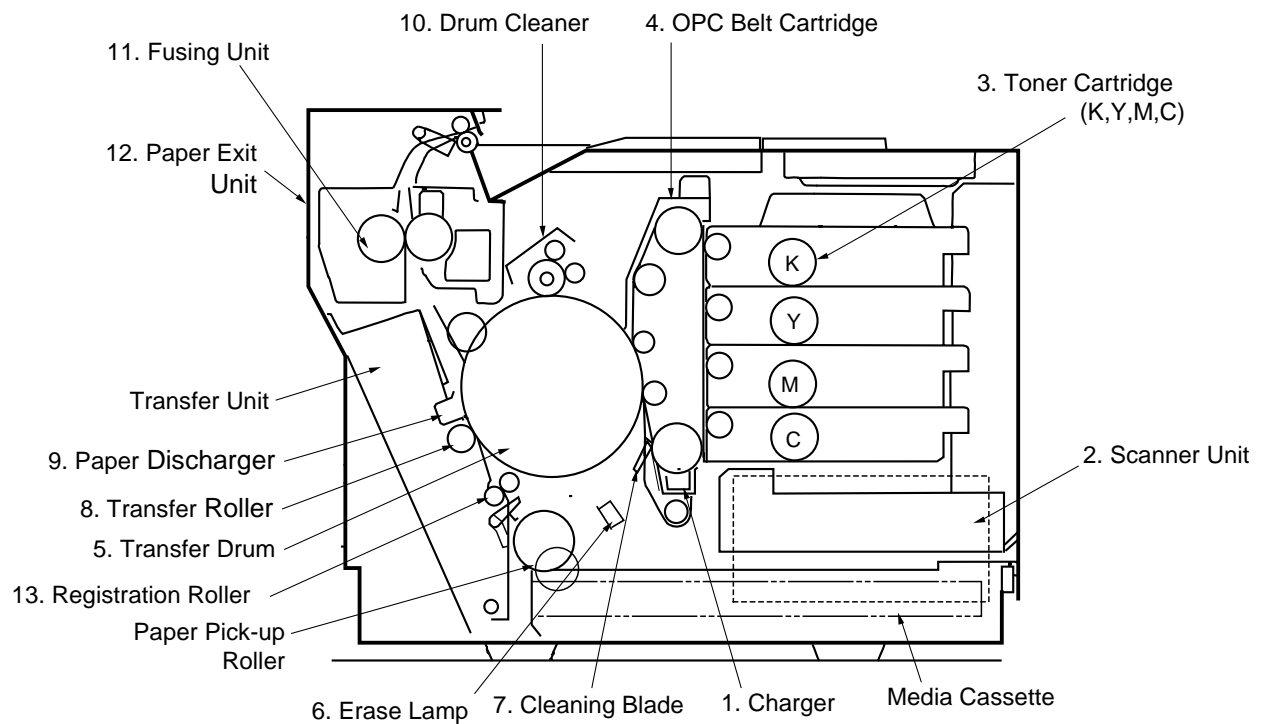


Fig.4-8

- (2) Variation of OPC Belt Potential (See Fig.4-10.)
- The OPC belt is initially biased to $-CBV(V)$.
 - The OPC belt surface is evenly charged to $V_0(V)$ in the charging process.
 - The potential of the exposure part of the OPC belt is reduced to $-VR(V)$ as it is exposed to the laser beam in the process of exposing, and an electrostatic latent image is formed on the OPC belt as the result.
 - Negatively charged toner is moved onto the exposed part of the OPC belt in the development process due to the difference of potential between $-VR(V)$ (the latent image) and $-DBV(V)$, and a visible toner image is formed as the result.
 - Negatively charged toner on the OPC belt moves to the transfer drum surface in the transfer process because the GND potential of the transfer drum is greater than $-VR(V)$ of the OPC belt.
 - The OPC belt is discharged by the erase lamp.

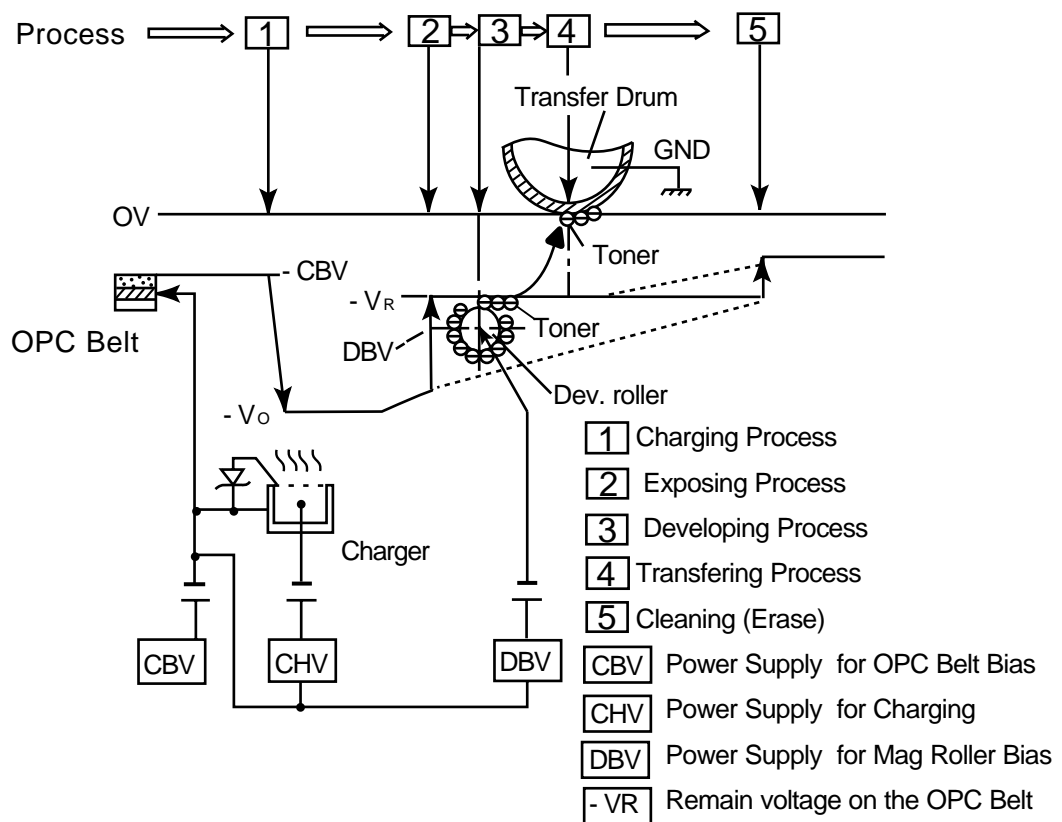


Fig.4-10

1.1.3 Details of Each Process

1	Charging
---	----------

The charging process ensures that the OPC belt is evenly charged by the charger system.

- (1) Structure of the Charger Unit (Refer to Fig.4-8 and Fig.4-11)
 - i) The charger unit is located as shown in Fig.4-8.
 - ii) The charger unit consists of the case, corona wire and grid.
 - iii) The charger unit charges the OPC belt surface to the potential $-V_0(V)$ with the corona charge.
 - iv) The charger unit has the grid controlled to the constant voltage $ZD(V)$ for even charging.
- (2) Process of Charging (Refer to Fig.4-12.)
 - i) The status of the OPC belt surface before charging is $-CBV(V)$.
 - ii) The charger unit charges the OPC belt surface evenly to $-V_0(V)$ by generating a negative charge.

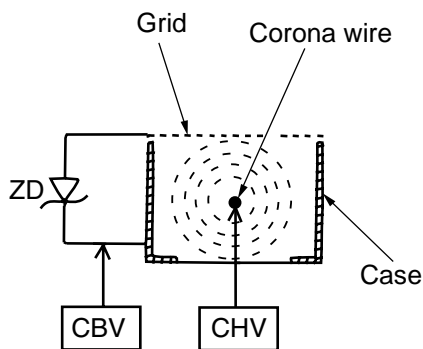


Fig.4-11

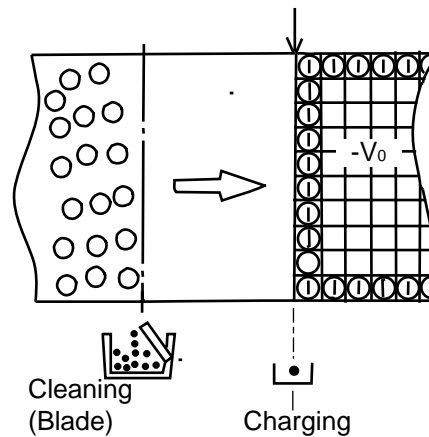


Fig.4-12

2	Exposing
---	----------

The exposing process means that the OPC belt surface is exposed to the laser beam to form an electrostatic latent image.

(1) Structure of Scanner Unit

- i) The scanner unit is located as shown in Fig.4-8.
- ii) The source of the laser beam is a semiconductor laser.
- iii) The laser light is scanned onto the OPC belt by converting the laser light to a beam of light through the lens and reflective mirror to form an electrostatic latent image.

(2) Process of Exposing (Refer to Fig.4-13.)

- i) The OPC belt surface has been charged to the potential $-V_o(V)$ in the charging process.
- ii) The laser light is scanned at right angles to the forward direction of the OPC belt.
- iii) High speed switching of the laser is made according to the transmitted image data.
- iv) The charge of the areas radiated by the laser light is reduced to the potential $-V_R(V)$.
- v) An invisible electrostatic latent image is formed on the OPC belt as shown in Fig. 4-13.

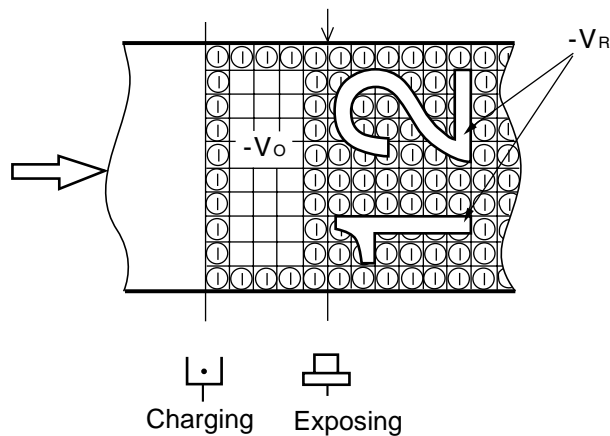


Fig.4-13

The developing process means that an electrostatic latent image on the OPC belt is made visible by depositing toner onto the exposed areas of the OPC belt.

- (1) Structure of the Toner Cartridge (Refer to Fig.4-8 & 4.14.)
 - i) The toner cartridge is located as shown in Fig.4-8.
 - ii) Four toner cartridges are made available from the top to bottom in the order black, yellow, magenta and cyan.
 - iii) Each color toner is loaded in the corresponding toner cartridge.
- (2) Process of Developing (Refer to Fig.4-8, 4-14, 4-15, and 4-16)
 - i) Toner adheres to the developer roller of the toner cartridge. Developing is processed by this roller contacting the OPC belt surface.
 - ii) The developer roller has been biased to the potential $-DBV(V)$. Fig.4-15 describes the relationship established between the potential of the toner, the potential $-V_o(V)$ at the non-exposed area of OPC belt and the potential $-VR(V)$ on the exposed area of the OPC belt.
 - iii) Developing is processed by the toner adhering to the OPC belt due to the attraction between the potential of the toner and the potential $-VR(V)$ on the exposed area of the OPC belt. A visible Toner image is formed on the OPC belt.
 - iv) No developing takes place on the non-exposed area because the potential of the toner and that of the OPC belt is the same polarity and therefore repel each other.

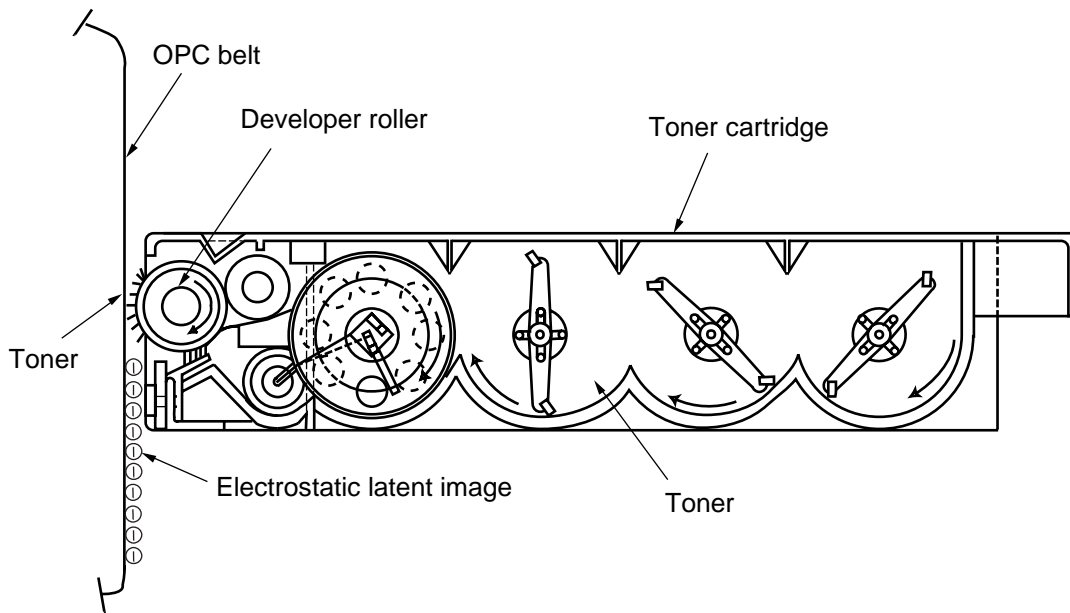


Fig.4-14

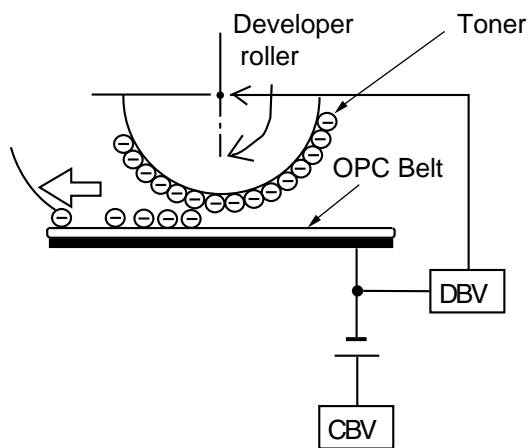


Fig.4-15

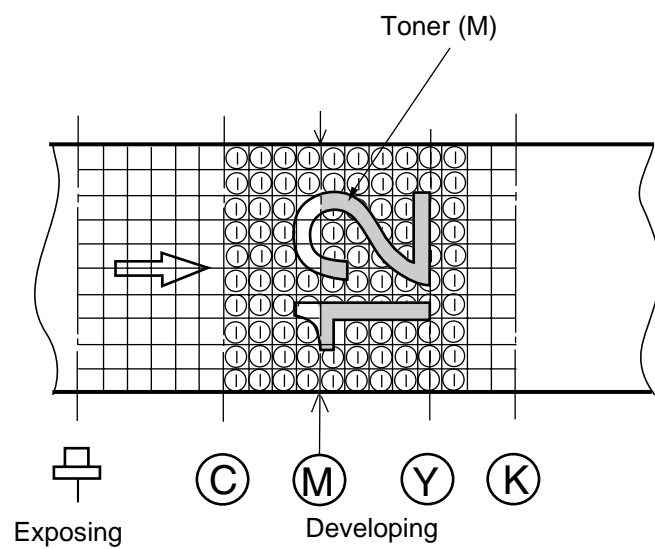


Fig.4-16

4	First Transfer (Drum)
---	-----------------------

The first transfer process means that the toner image on the OPC belt is transferred onto the transfer drum.

- (1) Structure of the Transfer Drum (Refer to Fig.4-8.)
 - i) The drum is located as shown in Fig.4-8.
 - ii) Material of the drum is aluminum.
 - iii) Semiconductor rubber is used to provide the drum surface as shown in Fig.4-17.
 - iv) The transfer drum rotates by contacting and synchronizing with the OPC belt.

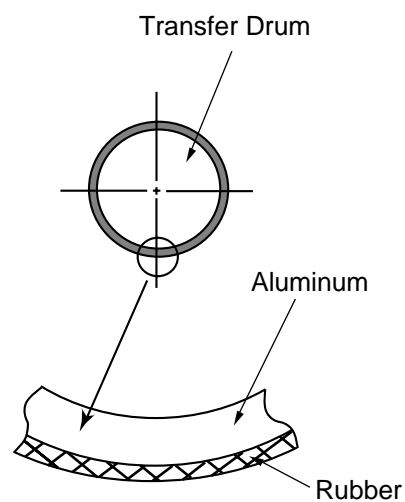


Fig.4-17

- (2) First Transfer Process (Refer to Fig.4-18.)
- i) The OPC belt has been through the development process and contacts and synchronizes with the transfer drum.
 - ii) The OPC belt has been biased to the potential of $-CBV(V)$. The potential of the transfer drum is nearly GND.
 - iii) Toner on the OPC belt is moved onto the transfer drum due to the difference of potential between the OPC belt and the transfer drum.
 - iv) Toner that has been developed by each color in sequence is moved from the OPC belt onto the transfer drum and the color toner images overlap on the transfer drum.
 - v) Upon completion of the drum transfer process, the complete toner image is transferred onto paper in the paper transfer process.

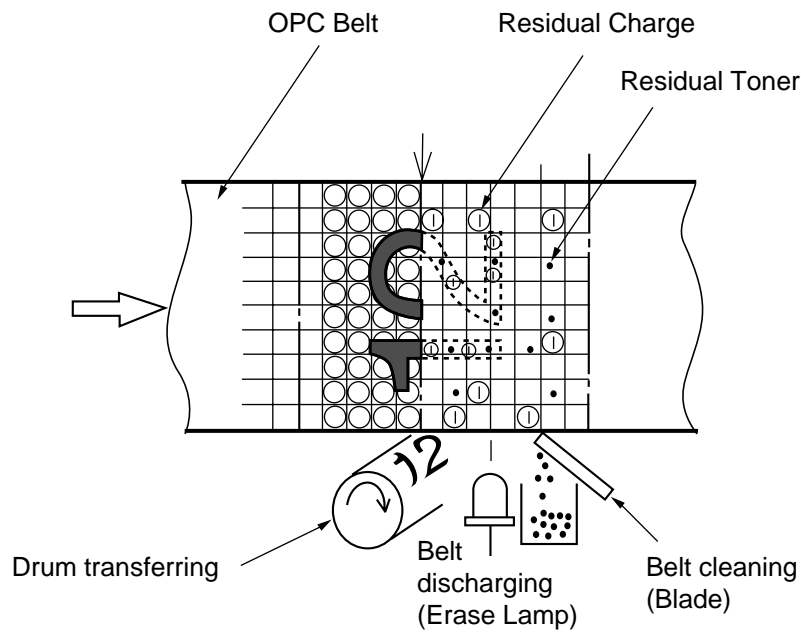


Fig.4-18

5	Belt Discharging (Erase Lamp)
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The belt discharging process means that upon completion of the drum transfer process, an LED light is radiated onto the OPC belt prior to mechanically cleaning the belt to discharge the residual charge.

- (1) Structure of Erase Lamp
 - i) The erase lamp is located as shown in Fig.4-8.
 - ii) The light source of the erase lamp is 24 light emitting diodes (LEDs).
- (2) Process of Discharging (Refer to Fig.4-19.)
 - i) Though the toner image was transferred to the transfer drum in the drum transfer process, there is still a residual charge on the OPC belt.
 - ii) The residual charge (-VR) on the OPC belt is discharged by the radiation of the erase lamp light prior to cleaning the belt.

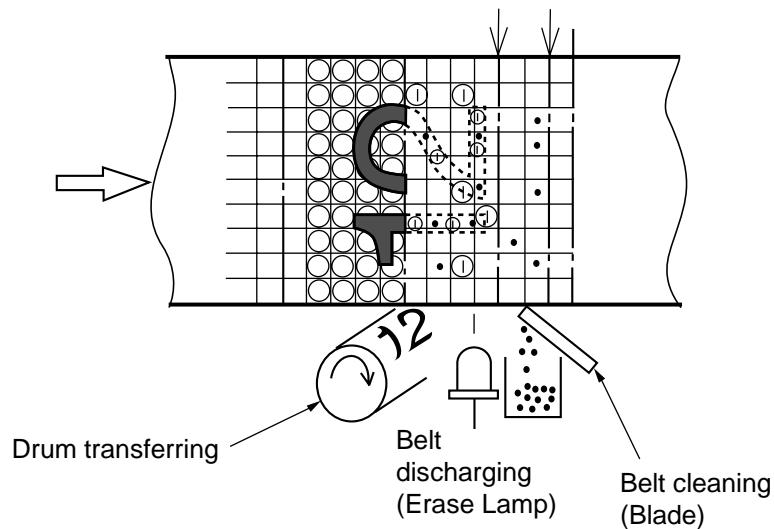


Fig.4-19

6	Belt Cleaning
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The belt cleaning process means that the residual toner adhering to the OPC belt surface is mechanically scavenged.

(1) Structure of Belt Cleaning

The blade for the belt cleaning is located relative to the OPC belt cartridge as shown in Fig.4-8.

(2) Process of Belt Cleaning (Refer to Fig.4-20.)

There is residual toner on the OPC belt as it has not been completely transferred in the drum transfer process.

Residual toner is mechanically scavenged by the blade edge.

The scavenged residual toner is collected in the waste toner pack by the waste toner feeder.

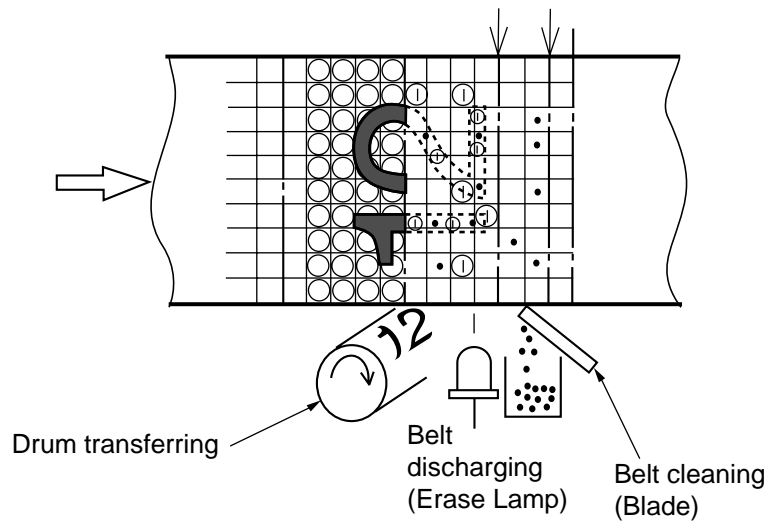


Fig.4-20

The second transfer process is where the toner image on the transfer drum is transferred onto the transported paper.

(1) Second Transfer Structure

- i) The transfer roller for the paper transfer is located as shown in Fig.4-8.
- ii) The transfer roller is normally kept out of contact with the transfer drum until the second transfer process starts.
- iii) The transfer roller is positively biased by the power supply THV.
- iv) The transfer roller is in contact with the transfer drum only in the second transfer process.
- v) Transported paper passes between the transfer roller and transfer drum.

(2) Second Transfer Process (Refer to Fig.4-21.)

- i) Paper is transported and is synchronized with the transfer drum.
- ii) The transfer roller operates and is synchronized with the transported paper and is in contact with the transfer drum through the transported paper.
- iii) The transported paper passes between the transfer roller and transfer drum. At this time the positive high voltage (THV) is fed to the transfer roller.
- iv) Negatively charged toner on the transfer drum is moved to the positively charged paper.
- v) The transported paper with the toner transferred to it is moved to the paper discharging process.

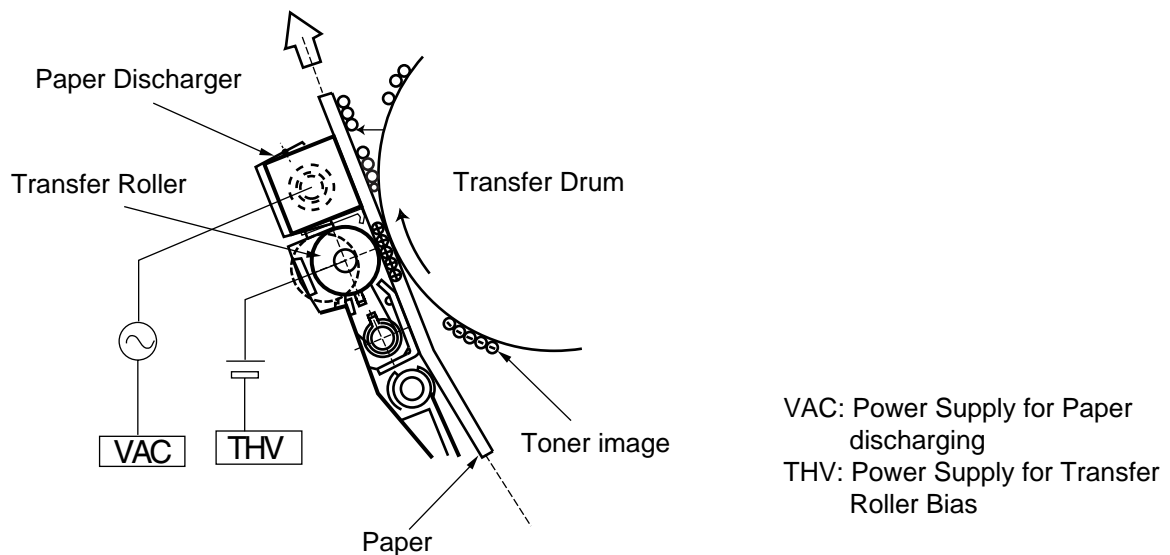


Fig.4-21

The paper discharging process is where the transported paper onto which the toner transfer has been completed is separated from the transfer drum by applying an AC charge to the paper.

- (1) Structure of Paper Discharger (Refer to Fig.4-22.)
 - i) The AC charger unit for discharge the paper is located as shown in Fig.4-8.
 - ii) The AC charger unit consists of the case and a charger wire.
 - iii) A high alternating voltage (VAC) is fed to the AC charger unit.
- (2) Process of Paper Discharging (Refer to Fig.4-22.)
 - i) The paper adheres to the transfer drum in the transfer process.
 - ii) The paper is neutralized (discharged) in terms of any electrical charge by the alternate voltage generated by the discharger.
 - iii) Paper is separated from the transfer drum and subsequently transported to the fusing (fixing) process.

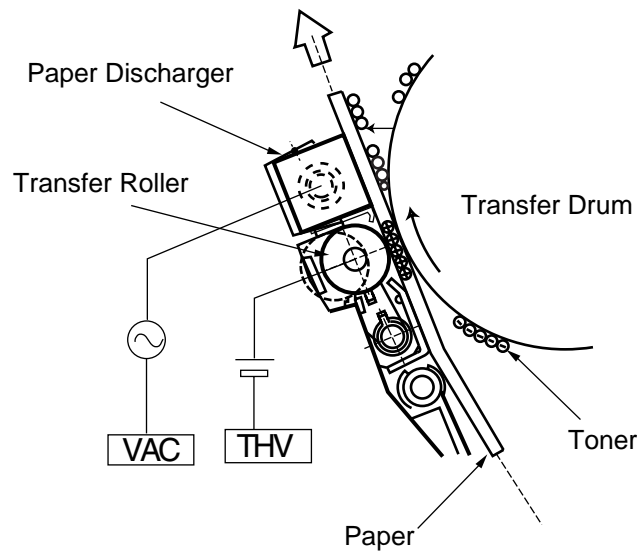


Fig.4-22

The drum cleaning process is where the residual toner on the transfer drum is removed.

- (1) Structure of Drum Cleaning (Refer to Fig.4-23.)
 - i) The drum cleaning unit is located as shown in Fig.4-8.
 - ii) The drum cleaning brush is a semiconductor type so that the brush can clean the surface of the rotating transfer drum. The Drum cleaning brush is kept out of contact with the transfer drum when the print image on the transfer drum is being created.
 - iii) The drum cleaning roller is positively biased by the positive voltage FCBV(V).
 - iv) FCBV(V) is fed to the cleaning brush in contact with the roller and the cleaning brush is self-biased by the resistance of the brush.
 - v) The drum cleaning roller rotates in contact with the drum cleaning brush.
- (2) Process of Belt Cleaning (Refer to Fig.4-23.)
 - i) There is residual toner on the surface of the transfer drum after the paper transfer process.
 - ii) The Drum cleaning brush is positively self-biased and so the negatively charged residual toner is removed from the surface of the transfer drum onto the drum cleaning brush.
 - iii) The Drum cleaning roller has been biased to the positive voltage FCBV(V). As the cleaning brush rotates, the residual toner absorbed into the brush from the transfer drum is attracted by the positive FCBV(V) voltage on the roller and adheres to the surface of the drum cleaning roller.
 - iv) Waste toner adhering to the surface of the drum cleaning roller is scavenged by the cleaning blade and collected into the waste toner pack by the waste toner feeder.

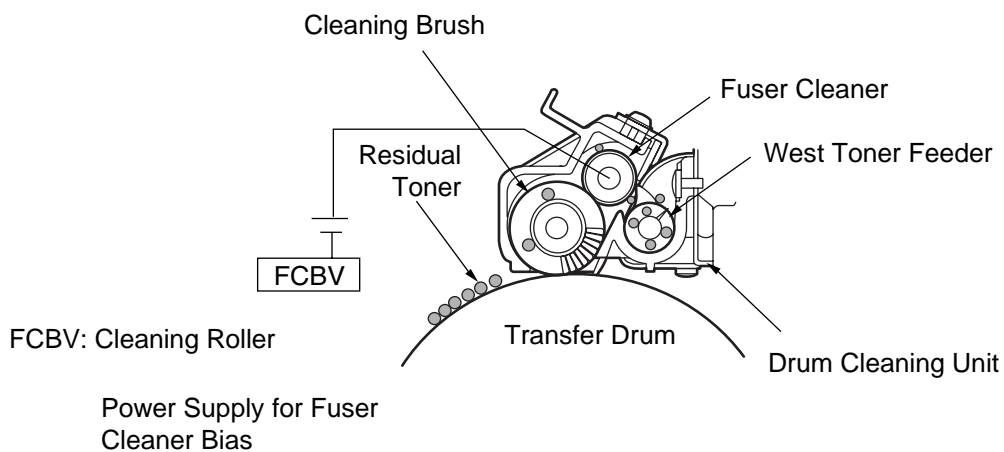


Fig.4-23

1.2 Scanning System

This printer employs a semiconductor laser diode as a light source. This laser diode is switched according to the transmitted image data (video signal).

The generated laser light scans over the OPC belt through a polygon mirror and lens, by which method electrostatic latent images will be formed on the OPC belt.

(1) Structure of the Scanning System (Refer to Fig.4-24.)

The scanner unit is located as shown in Fig.4-8.

The scanner unit consists of the following parts;

- | | |
|---------------------|---|
| ① Laser Unit: | Light emitting source incorporating a laser diode. |
| ② Cylinder Lens: | Condenser for the laser beam. |
| ③ Polygon Mirror: | Hexahedral mirror for scanning the laser beam. |
| ④ F- θ Lens: | Focus lens for the laser beam. |
| ⑤ Scanner Motor: | Motor to rotate the polygon mirror. |
| ⑥ Mirror: | Reflecting mirror for the laser beam path. |
| ⑦ LDC: | Laser diode control circuit. |
| ⑧ PD: | Beam detector. |
| ⑨ BTD Mirror: | Beam timing detector mirror to guide the laser beam to the PD sensor. |

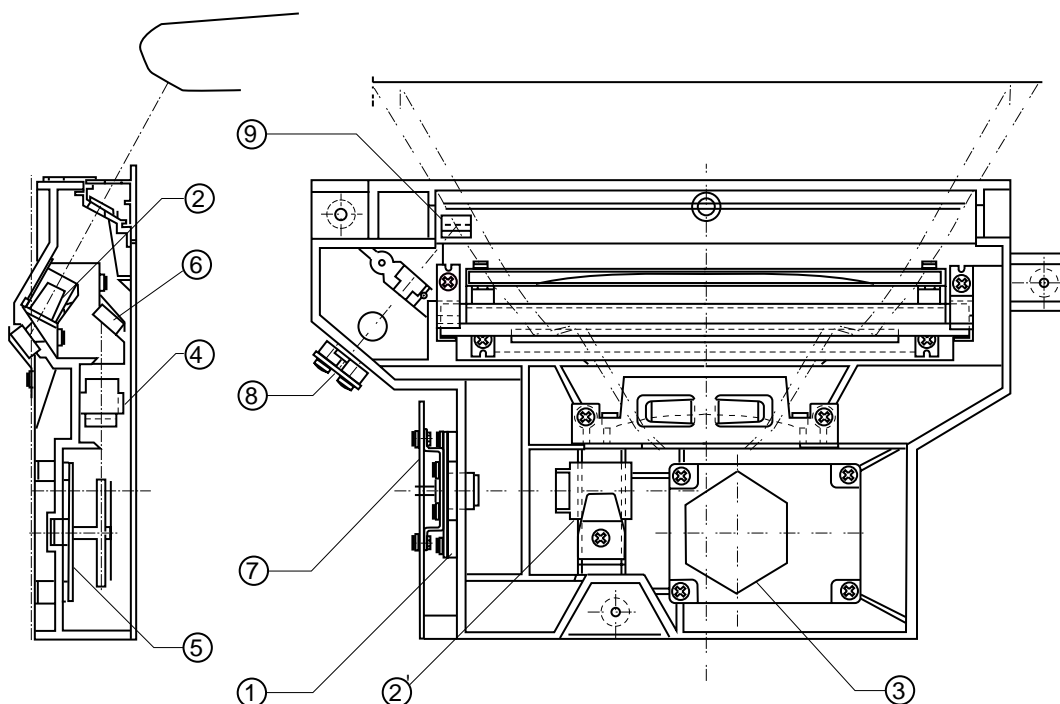


Fig.4-24

- (2) Specification:
Specification of the Scanner Unit is as follows;

Item	Specifications
Rated Output of Laser Diode	5mW.
Wave Length of Laser Beam	Approx.785nm.
Scanning Density	600dpi
Scanning Width	314mm
Scanner Motor speed	35,904rpm
Number of Polygon Mirror Faces	6

1.3 Paper Transportation System

(1) Outline

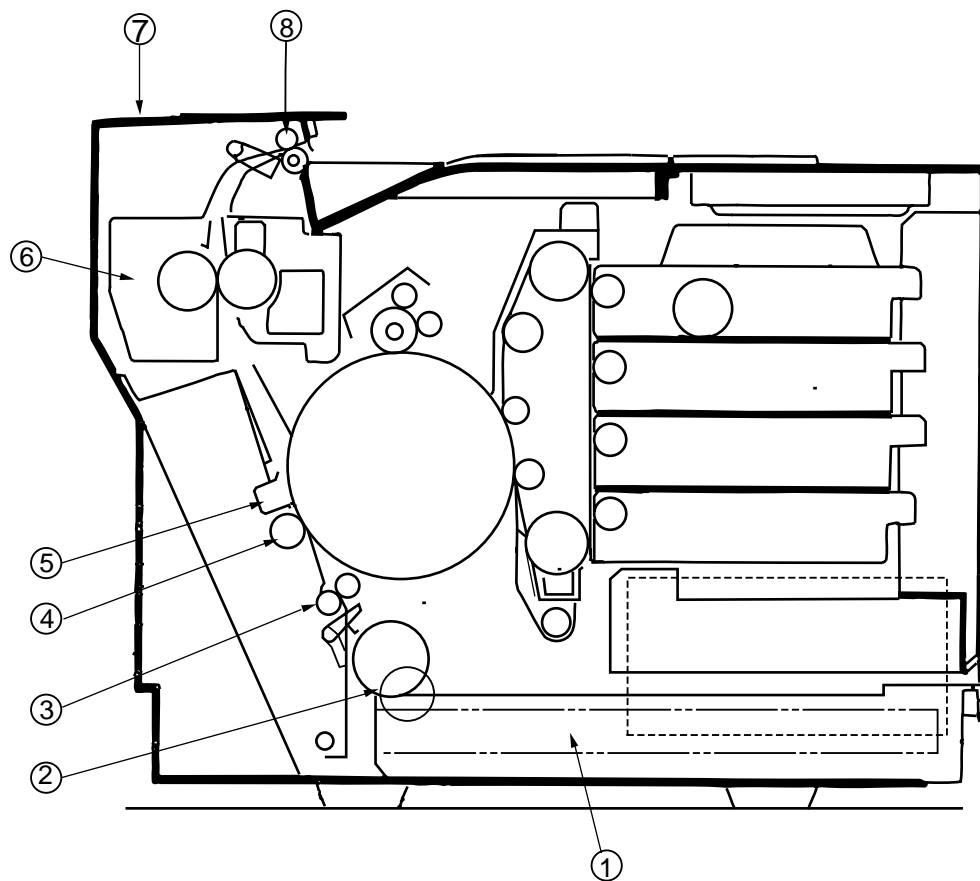
This printer employs automatic paper feeding from the media cassette.

When toner images are formed on the transfer drum through the operations of the print system and transfer system, paper is fed by the pick-up roller and transported to the register roller. The transported paper is further transported to the transfer, fuser and exit parts by the register roller synchronizing with the rotation of the transfer drum.

(2) Structure of Paper Transportation System (Refer to Fig.4-25.)

The paper transportation system consists of the following parts;

- | | |
|--------------------------|---|
| ① Media Cassette: | Case to accommodate paper to be fed automatically. |
| ② Paper Pick-up Roller: | Roller to feed sheets of paper one by one, preventing multi-feed. |
| ③ Registration Roller: | Roller to transport papers synchronized with the transfer drum. |
| ④ Transfer System: | Print processing part consisting of transfer drum and transfer roller to transfer the toner image onto the paper. |
| ⑤ Paper Discharger Unit: | Corona generator to generate AC corona for separating paper from the transfer drum. |
| ⑥ Fusing Unit: | Mechanical part to fuse the toner image with heat rollers and fix it on the paper. |
| ⑦ Paper Exit Unit: | Mechanical part to exit the fused paper from the printer. |
| ⑧ Paper Exit Roller: | Roller to feed paper from the printer. |



- | | |
|------------------------|-------------------------|
| ① Media Cassette | ⑤ Paper Discharger Unit |
| ② Paper Pick-up Roller | ⑥ Fusing Unit |
| ③ Registration Roller | ⑦ Paper Exit Unit |
| ④ Transfer Roller | ⑧ Paper Exit Roller |

Fig.4-25

1.4 Fusing Unit

The fusing unit employs a thermal fusing system using heater lamps in the rollers. Paper carrying the combined toner image passes between the heat rollers. Heat and pressure is applied to the paper when passing between the heat rollers so that the toner image is melted and fused onto the paper.

(1) Structure

The fusing unit consists of the following component parts; (Refer to Fig.4-26.)

- | | | |
|---|-----------------|--|
| ① | Back-up Roller: | is a pressure roller and incorporates a heater lamp. |
| ② | Fusing Roller: | incorporates a heater lamp. |
| ③ | Fusing Heaters: | halogen lamps to heat the rollers. |
| ④ | Thermal Fuse: | prevent the fuser roller from being excessively heated up. |
| ⑤ | Thermistor: | is a sensor to detect the temperature of the fuser roller's surface. |
| ⑥ | Oil Bottle: | contains silicone oil for fusing. |
| ⑦ | Fuser Cleaner: | cleans the fuser roller. |

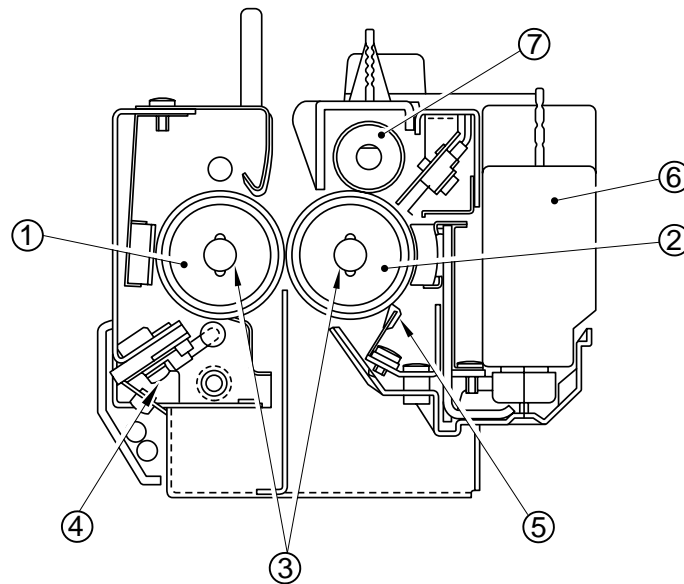


Fig.4-26

(2) Fusing Process (Refer to Fig.4-27.)

- ① Silicone oil supplied from the oil bottle is applied to the surface of fuser roller.
- ② The toner image has been transferred onto the paper, but not yet fused.
- ③ Transported paper passes between the heater roller and back-up roller.
- ④ Each roller is heated up to approx.140°C, and receives approximately 156N pressure from the opposite heat roller.
- ⑤ When the paper carrying the toner images passes between the two heat rollers, the toner images are melted and fused on the transported paper.
- ⑥ The paper carrying the fused image is separated from the heat rollers, and ejected from the printer.

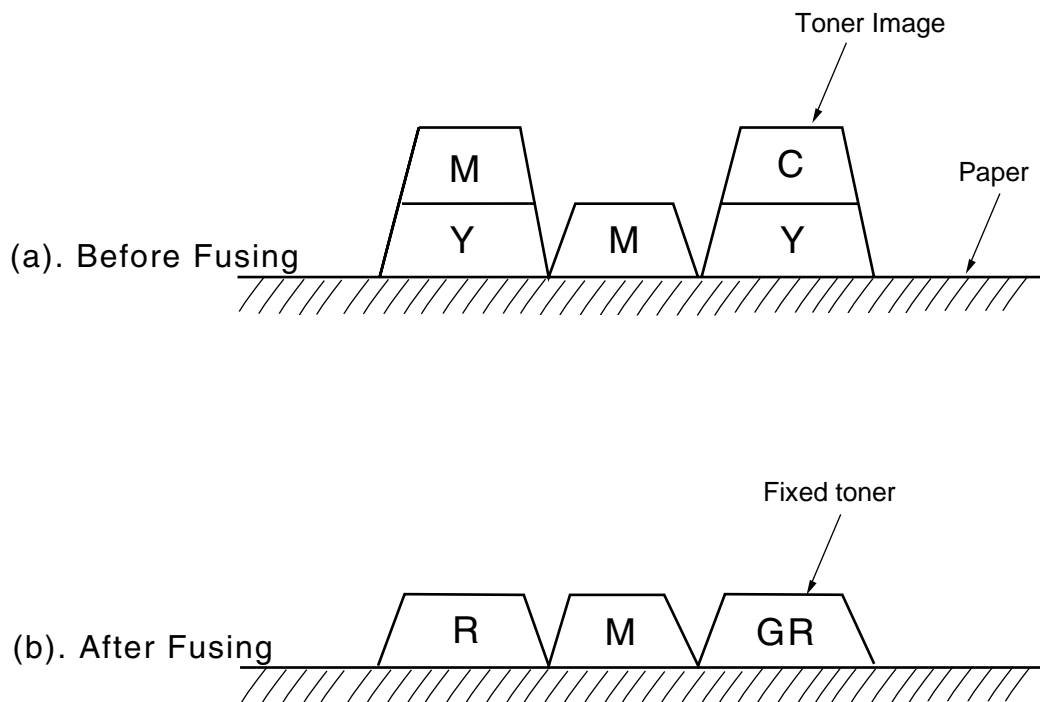


Fig.4-27

2. STRUCTURE OF THE CONTROL SYSTEM

2.1 Basic Structure

2.1.1 Electrical System and Functions

Most of the main electrical parts of this printer are controlled by the MCTL (engine controller) PCB.

<Structure of the Sequence Control>

The basic structure of the sequence control is shown in Fig.4-28.

- | | | |
|---|--------------------------------------|---|
| ① | Print Process Control: | To control the print process from the paper feed through to the paper exit. |
| ② | Laser Output Control: | To automatically control the laser output. |
| ③ | Fuser Temperature Control: | To control the fixer heater so that the temperature of the fuser roller and back-up roller will be correct. |
| ④ | Toner Sensing Control: | To control the sensing of the toner empty status. |
| ⑤ | Interface Control:
(Video Signal) | To process the input and output signals to and from the external controller (host). |
| ⑥ | Control Panel Indicator: | To display the printer operational status on the control panel indicator. |
| ⑦ | Error Control: | To control the safety stop procedures when errors occur in the printer. |

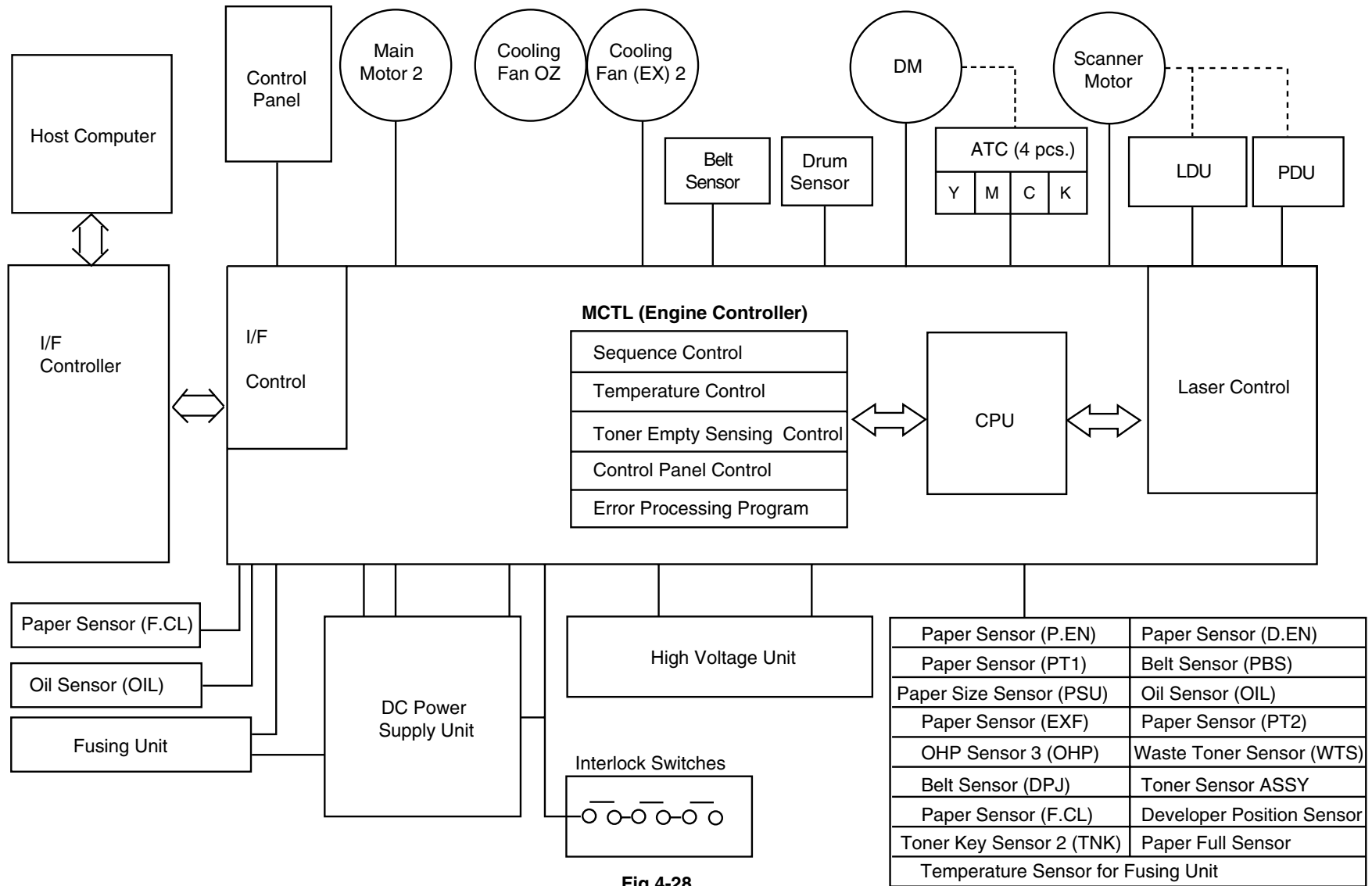
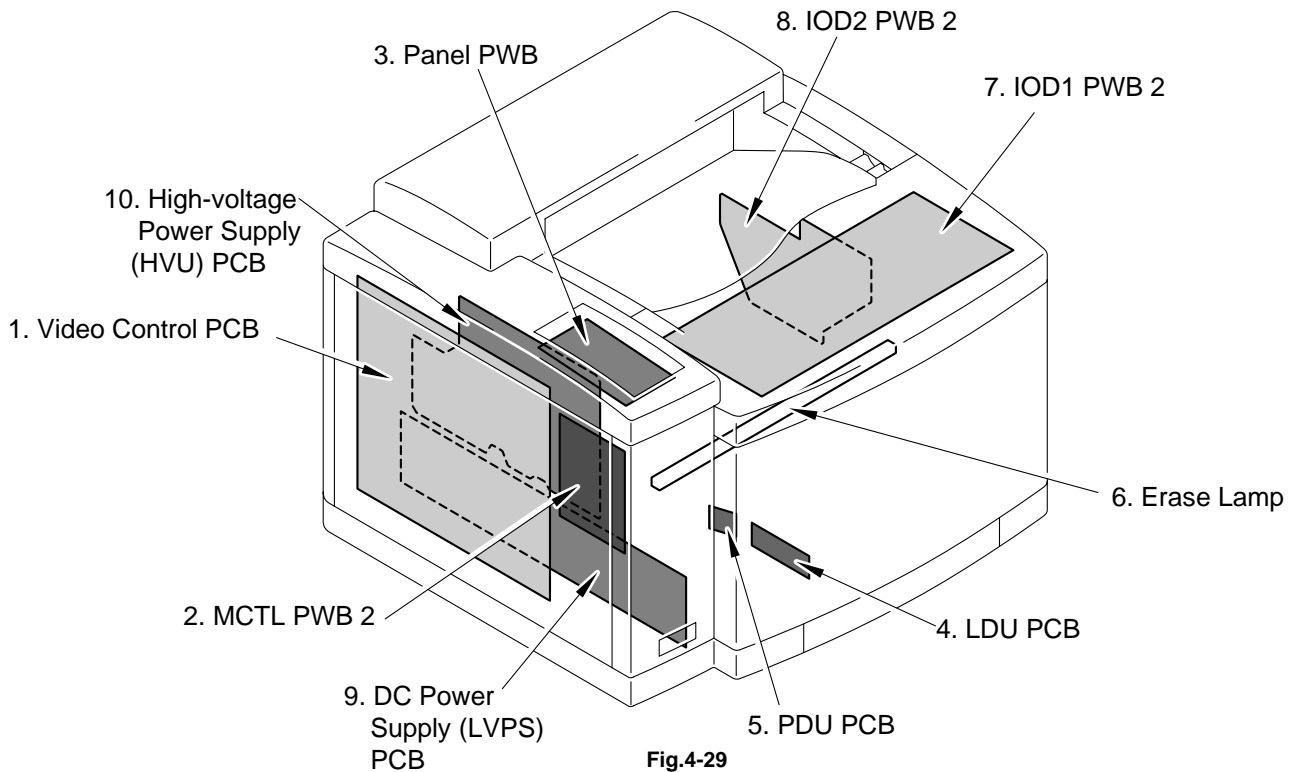


Fig.4-28

<Layout & Function of the Electrical Parts>

(1) Print PCB (Refer to Fig. 4-29.)

No.	Name	Function
1	Video Controller PCB	To receive the print data from the host computer, convert it into image data and then send the printing image data to the MCTL PWB 2.
2	MCTL PWB 2	To control the sequence of processes of the printer: Fusing Temperature Control, Laser Output Control, Control Panel Indications, Toner Empty Sensing Control, Error Processing Control, Interface Control.
3	Panel PWB	To display the printer's operation status and support the control panel switches.
4	LDU PCB	To control the drive and output to the laser diode in the scanner unit.
5	PDU PCB	To sense the emission of the laser diode and the beam position in the scanner unit.
6	Erase Lamp	To discharge the OPC belt with the LEDs.
7	IOD1 PWB 2	To send the signals from the sensors to the MCTL PWB 2, and to drive the outputs from the MCTL PWB 2 to the motors, clutches and solenoids.
8	IOD2 PWB 2	- Ditto -
9	DC Power Supply (LVPS) PCB	To provide the printer with the power for printer control.
10	High-voltage Power Supply (HVU) PCB	To provide the printer with the high voltage power supplies necessary for the printing process.



(2) Motors (Refer to Fig.4-30.)

No.	Name	Code	Function
1	Main Motor 2	MM	To drive the OPC belt and the paper transport system.
2	Developer Motor 2	DM	To drive the toner cartridge and the developing system.
3	Scanner Motor	SCM	To scan the laser beam.
4	Cooling Fan OZ	OZFAN	To exhaust the ozone from the printer (charger unit).
5	Cooling Fan (EX) 2	HTFAN2	To exhaust the heat of the fusing unit.
6	SL2 PS Fan	CTLFAN	To exhaust the heat of the power supply unit and Interface Controller.

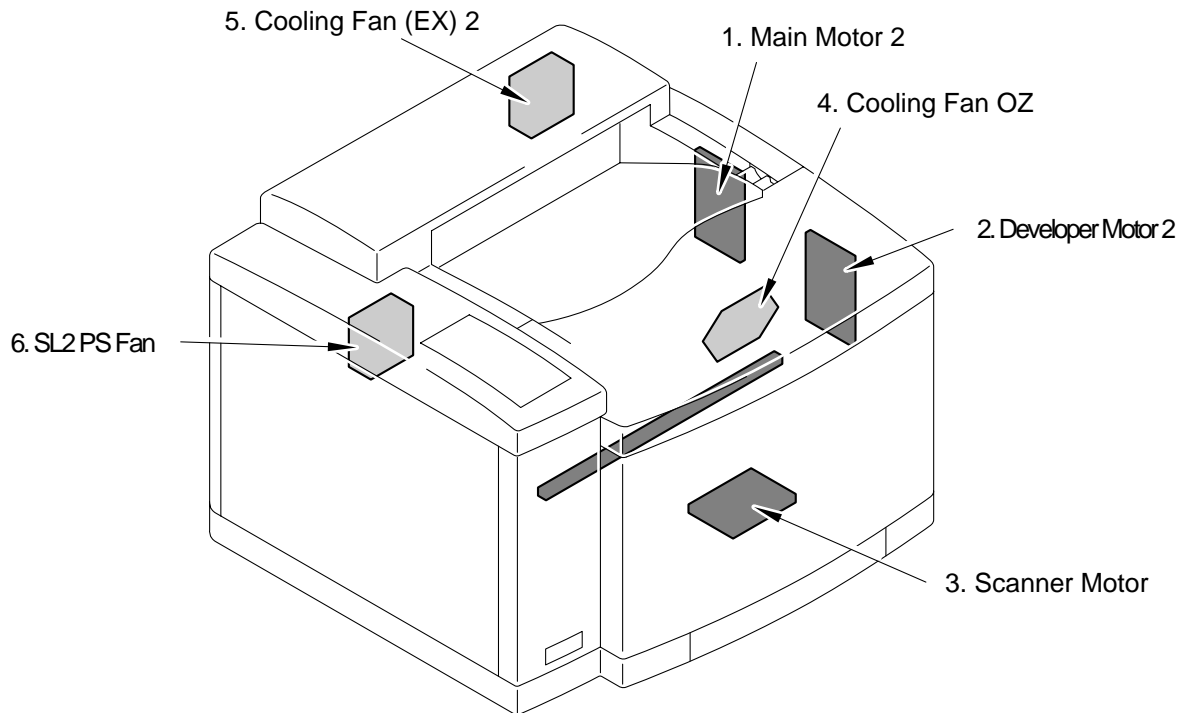


Fig.4-30

(3) Clutches and Solenoids (Refer to Fig.4-31.)

No.	Name	Code	Function
1	Paper Pick-up Clutch	PCLU	To feed paper by coupling the feeding roller to the main gear unit at the correct timing for paper feeding.
2	Registration Clutch	RECL	To transport paper by coupling the register roller to the main gear unit synchronized with the rotation of the transfer drum.
3	Fusing Clutch	FUCL	To drive the fusing rollers by coupling the fusing unit to the main gear unit.
4	Cleaner Clutch 3	FBCL	To drive the brush of the drum cleaner by coupling the cleaner clutch to the main gear unit at the correct timing for drum cleaning.
5 ~ 8	Developer Clutch 2	DCL (Y,M,C,K)	To drive the magnetic roller of the desired color toner cartridge by coupling that toner cartridge to the developer gear unit during developing.
9	Developer Solenoid Unit	PSL(MC) PSL(KY)	To position the desired color toner cartridge in the developing position during developing.
10	TR Cam Clutch 3	TRCM	To make the transfer roller contact the transfer drum surface at the time of the second transfer.
11	TR Cam Clutch 3	FBCM	To make the drum cleaner contact the transfer drum surface at the correct timing for drum cleaning.

Layout of Clutches and Solenoids

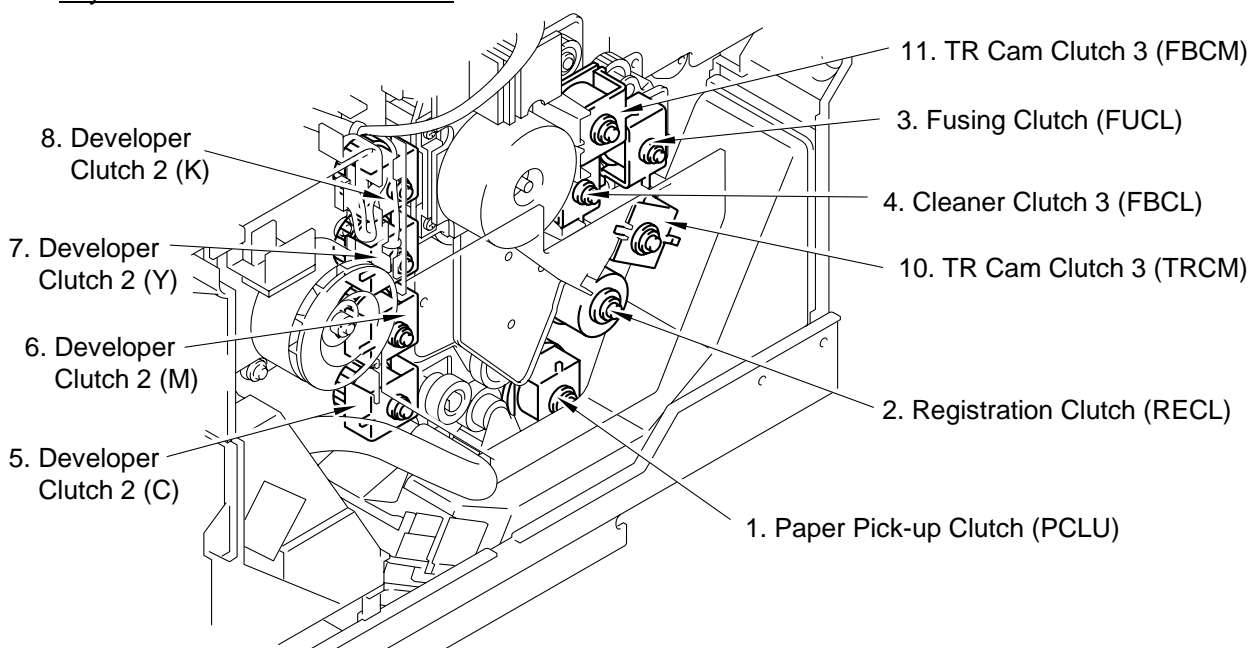


Fig.4-31

(4) Sensors

No.	No.	No.	Function
1	Paper Size Sensor	PSU	Photo sensor to detect the paper size.
2	Paper Sensor	PT1	Photo sensor to detect when paper is fed from the media cassette.
3	Paper Sensor	PT2	Photo sensor to detect that paper is exited from the paper exit unit.
4	Paper Sensor	P.EN	Photo sensor to detect if paper is loaded in the media cassette.
5	Oil Sensor	OIL	Photo sensor to detect if the fusing unit oil is empty.
6	OHP Sensor 3	OHP	Photo sensor to detect if media in the media cassette is an OHP.
7	Belt Sensor	DPJ	Photo sensor to detect if paper is wound around the transfer drum.
8	Paper Sensor	D.EN	Photo sensor to detect rotation of the transfer drum.
9	Belt Sensor	PBS	Photo sensor to detect the home position of the OPC belt.
10	Toner Sensor ASSY	TPD/TTR	Photo sensor to detect if the toner is empty for each toner cartridge.
11	Waste Toner Sensor	WTS	Photo sensor to detect if the waste toner bottle is full of toner.
12	Developer Position Sensor	DHP1, DHP2	Photo sensor to detect the position of the toner cartridge.
13	Paper Sensor	F.CL	Photo sensor to detect if the fuser cleaner is fitted in the fixing unit.
14	Temperature Sensor for Fusing Unit	TH	Thermistor to detect the fuser temperature.
15	Paper Sensor	EXF	This is the sensor to detect that the paper exit tray is full of exited papers.
16	Toner Key Sensor 2	TNK	To detect the availability of key to be provided to the toner cartridge.
17	Interlock Switch		This the safety interlock switch when opening the cover.
17-1	Interlock Switch (FRONT)	DSW1	
17-2	Interlock Switch (TOP)	DSW2	
17-3	Interlock Switch (REAR)	DSW3	

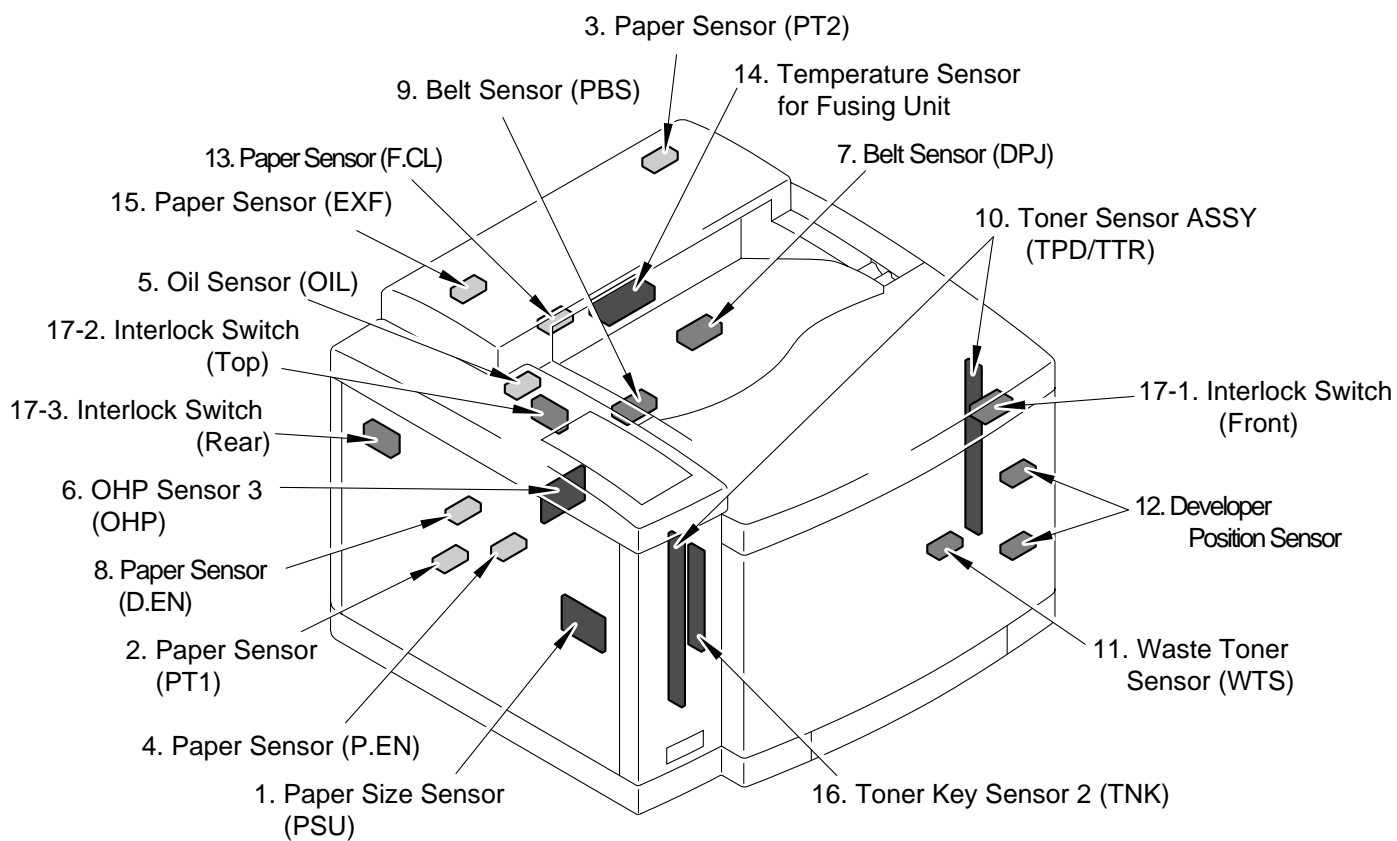


Fig.4-32

2.2 Control System

2.2.1 Control of the Print Process

A Micro CPU mounted on the MCTL PCB controls the print processes.

<Print Sequence Diagram>

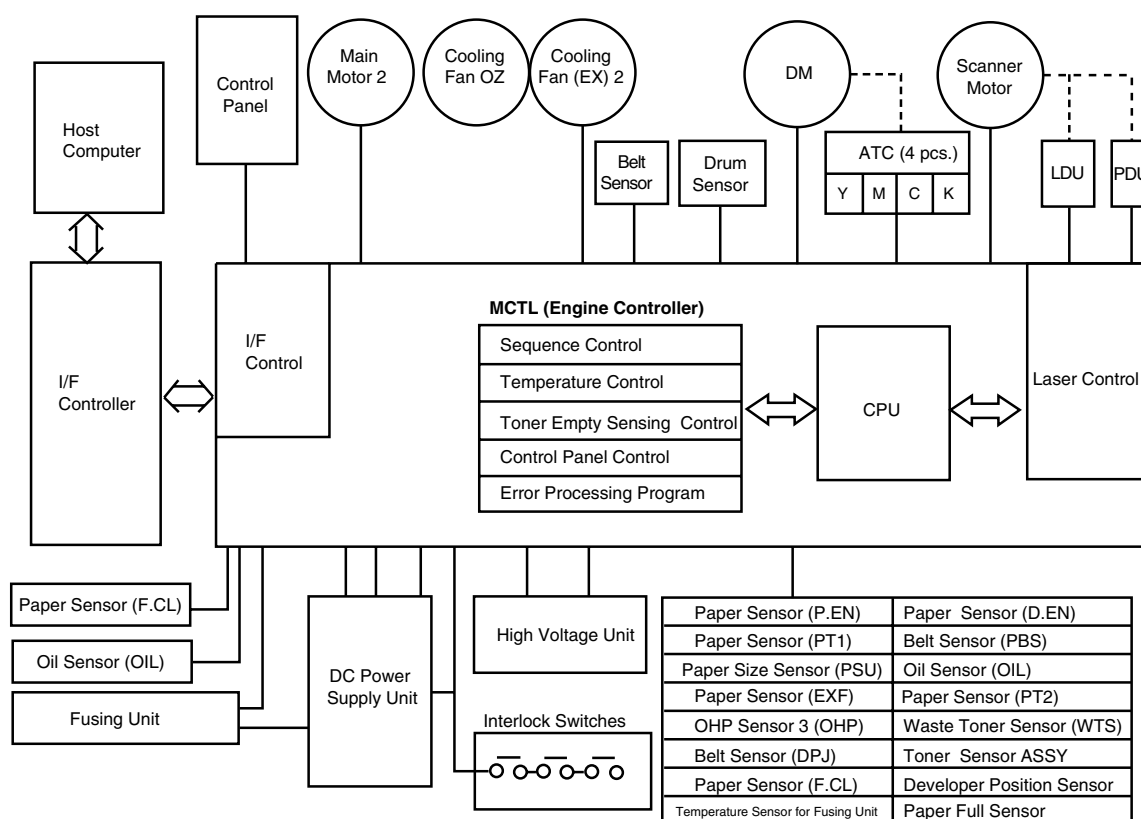


Fig.4-33

(1) Control Block Diagram (Refer to Fig.4-33.)

No.	Name	Function
1	Sequence Control	To control the sequence of printer operations.
2	Temperature Control	To control the temperature of the fixing unit.
3	Toner Empty Sensing Control	To detect the toner empty status of each toner cartridge.
4	Control Panel Control	To control the control panel indications and the operational signals.
5	Error Processing Control	To sense errors occurring in the printer and control the stop procedures.
6	Interface Control	To control the receipt and transmission of the interface signals from the external controller.
7	Laser Control	To control laser scanning and laser power.

(2) Laser Drive Control Circuit

Laser Drive Control Circuit (LDC) consists of the video signal input circuit, laser drive circuit, laser diode, output sensing circuit and output control circuit, as shown in Fig.4-34.

<Operation>

- (1) When the video signal is received, the laser drive control circuit switches the laser diode according to the video signal data.
- (2) The radiated laser beam is sensed by the photo detector (PD) and the signal is fed back to the output control circuit.
- (3) The output control circuit controls the laser output to make the level constant by comparing the laser output with the feed-back value transmitted from the output sensing circuit.
- (4) The scanning laser beam is sensed by the beam detector (PD), then the beam detecting timing (BDT) signal is output.

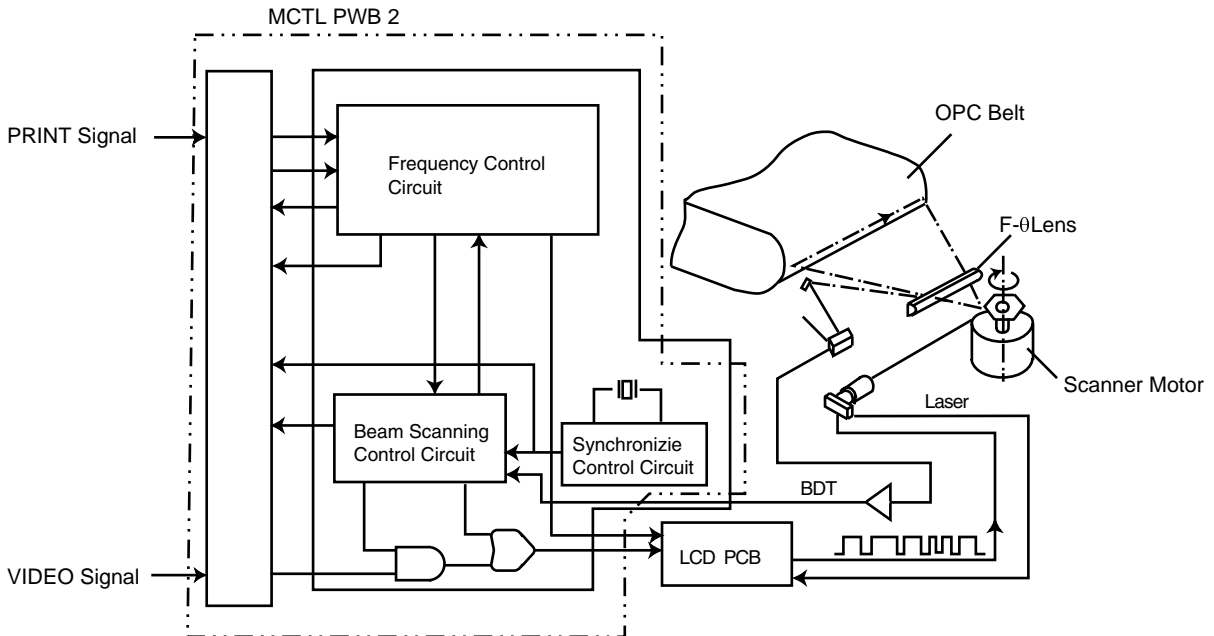


Fig.4-34

(3) Control of the Fusing Temperature

Each roller of the fusing unit is controlled to maintain the appropriate temperature so that toner will be fixed correctly onto the print paper.

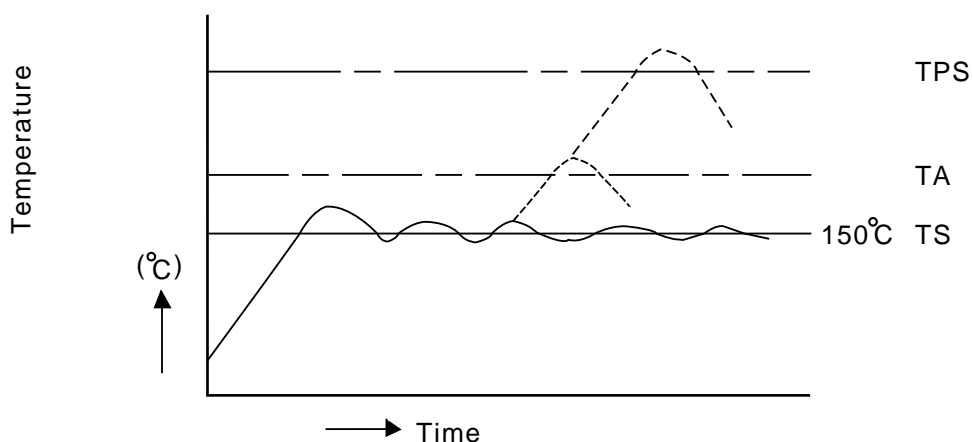
<Basic Structure of Temperature Control (Fig.4-35)>

FLS:	Thyristor to switch the power supply to the heat lamp.
TFU1/TFU2 :	Temperature fuse to shut down the circuit for safety when the temperature becomes too hot within the fixing unit.
TH:	Temperature sensor to detect the surface temperature of the heat roller (HR).
RY:	Relay to prevent further heating when it becomes hotter than the set temperature within the fixing unit.
GA/CPU:	Process circuit to control the temperature signal (micro computer).
CM1:	Sensor circuit for temperature signal (for ACOFF signal).
CM2:	Sensor circuit for temperature signal (for HON signal).
CM3:	Sensor circuit for temperature signal (for processing).
Q:	Sensor circuit for shut-down by the thermistor (for THERR signal).
HR:	Heat lamp for the heat roller.
BR:	Heat lamp for the back-up roller.

< Signal Functions >

HON-N	To turn on/off the heater inside the fuser roller.
ACOFF	To turn off the relay RY1 if overheat occurs.
THERR	To detect the shut-down by the thermistor.
AD	To convert the temperature sensing signal to AD.

<Controlled Temperature and Safety>



IV-37



- TS: To maintain the temperature for fixing of the toner at approx. 146°C by turning the thyristor on and off.
- TA: Reference temperature (approx. 185°C) to identify that it is excessively hot inside the fusing unit. When it reaches this point (approx. 185°C), the relay RY turns off, the power supply to the heat lamp is shut down and the printer stops operating.
- TPS: Limit temperature when the thermal fuse will start to melt and shut down the power supply to the heat lamp if the temperature control circuit should break down. When the thermal fuse melts, the printer will stop operating.

<Safety Control by Temperature Control Signal>

- H0: When the THERR signal is input, the control panel indicates "H0", and the printer will stop operating.
- H2: If the temperature of the fixing unit does not reach the required point "T1" after a certain time, the control panel indicates "H2" and the printer will stop operating.
- H3: If the "Heater On" signal still continues after a certain time, the control panel indicates "H3", and the printer will stop operating.
- H4: If the temperature within the fusing unit becomes unusually hot and when ACOFF signal is input, the control panel indicates "H4", and the printer will stop operating.

(4) Interface Control

<General>

(a) Interface Type

This Document describes the Video and Command/Status Interface between Laser Printer Contriller (LPC) and engine controller.

Printer controller acts as a slave to LPC. Through Video Interface, LPC controls the Printer & Control Panel using Command/Status communication and transmits the synchronized video data to Printer laser diode. Control Panel is physically resident on the engine.

(b) Interface Connection

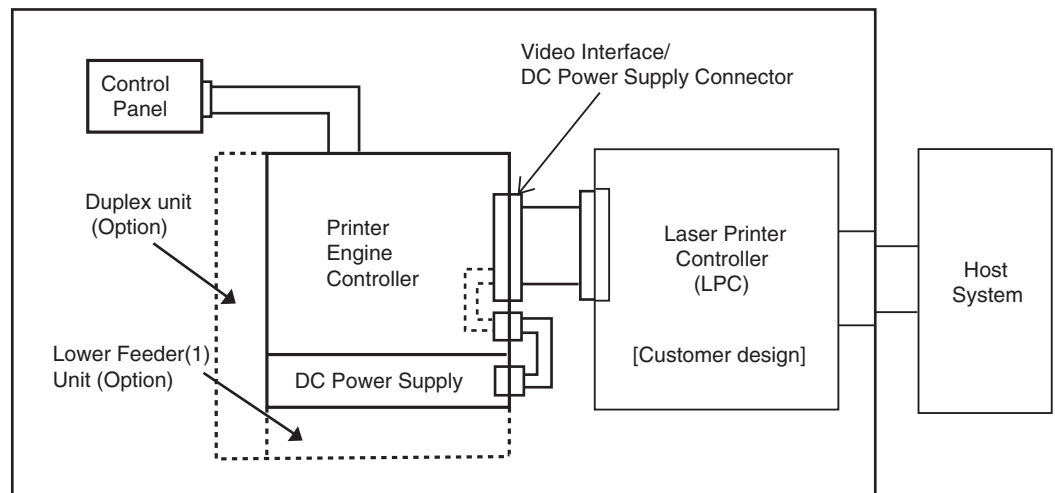
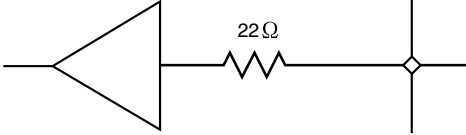
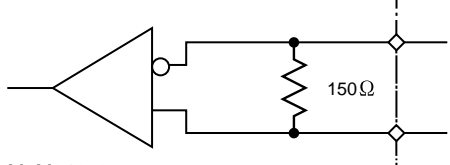
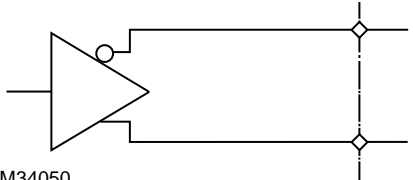
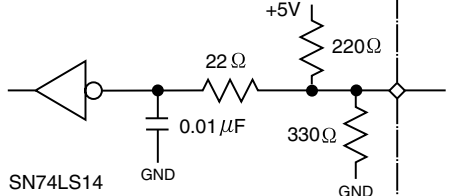
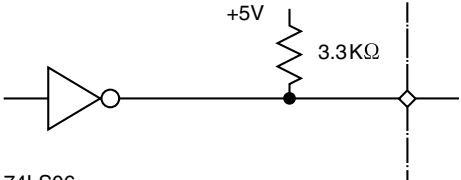


Fig.4-36

The interface connector of this laser printer is connected to the host system as shown in Fig.4-36.

(c) Interface Circuit (Printer side)

Table 4-1: Interface Circuit

No.	Interface Circuit	Signal Name
1	 <p>Fast TTL</p>	<ul style="list-style-type: none"> • VIDEO-P
	 <p>M5M34050</p>	<ul style="list-style-type: none"> • VIDEO-N • VIDEO-P
2	 <p>M5M34050</p>	<ul style="list-style-type: none"> • HSYNC-N • HSYNC-P
3	 <p>SN74LS14</p>	<ul style="list-style-type: none"> • PRREQ-N • COMMAND-N • ID1-N • ID2-N
4	 <p>74LS06</p>	<ul style="list-style-type: none"> • VSYNC-N • IREADY-N • STATUS-N • KEY-STATUS-N

(d) Connector Pin Assignment

The connector in the printer to connect to the controller board is type 128A-064S2B-:L14A (DDK) or the equivalent.

Table 4-2: Connector Pin Assignment

Pin No.	Signal Name	Pin No.	Signal Name
1A	PSGND	1B	+5V-2 (Max 3A)
2A	PSGND	2B	+5V-2 (Max 3A)
3A	PSGND	3B	+5V-2D (Max 7A)
4A	PSGND	4B	+5V-2D (Max 7A)
5A	PSGND	5B	+5V-2D (Max 7A)
6A	PSGND	6B	+5V-2D (Max 7A)
7A	PSGND	7B	+5V-2D (Max 7A)
8A	PSGND	8B	+5V-2D (Max 7A)
9A	VIDEO-P	9B	VIDEO-N
10A	RET(GND)	10B	Reserve
11A	HSYNC-P	11B	HSYNC-N
12A	ID2-N	12B	Reserve
13A	RET(GND)	13B	VSYNC-N
14A	RET(GND)	14B	Reserve
15A	RET(GND)	15B	STATUS
16A	RET(GND)	16B	IREADY-N
17A	RET(GND)	17B	Reserve
18A	RET(GND)	18B	COMMAND
19A	RET(GND)	19B	PRREQ-N
20A	RET(GND)	20B	Reserve
21A	ID1-N	21B	Reserve
22A	RET(GND)	22B	KEY_STATUS-N
23A	12C-CLK	23B	Reserve
24A	12C-DAT	24B	FRIRQPN
25A	RET(GND)	25B	Reserve
26A	RET(GND)	26B	Reserve
27A	RET(GND)	27B	Reserve
28A	RET(GND)	28B	Reserve
29A	RET(GND)	29B	Reserve
30A	RET(GND)	30B	Reserve
31A	RET(GND)	31B	Reserve
32A	RET(GND)	32B	Reserve

2.3 Main PCB (Video Controller PCB)

2.3.1 Outline

The Main PCB consists of the circuits which perform the following functions;

- Receive the printing data from the computer.
- Convert the received data to the bitmap data such as characters or graphics.
- Control the engine and send the generated bitmap data as a video signal.

The control panel is controlled by communicating with the engine CPU to display LCD messages, light the LEDs and display the button status, etc.

The power for the Main PCB is supplied from the engine through the engine interface connector.

<Main PCB Block Diagram>

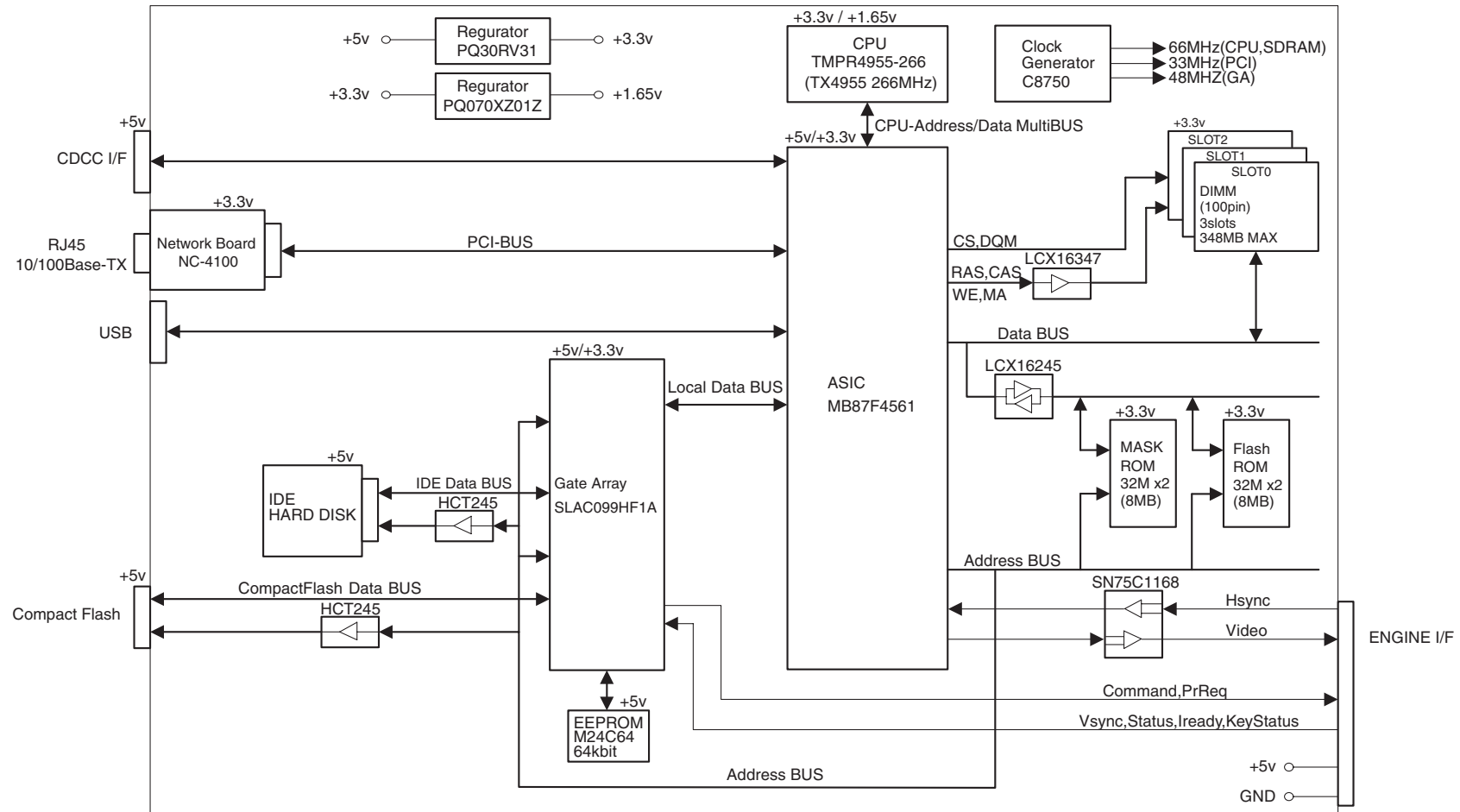


Fig.4-37

2.3.2 Circuit

(1) CPU block

- Model name: TMPR4955AF-266,
MIPS 64bit RISC CPU manufactured by TOSHIBA
- Clock speed: 66.7MHz (external) / 266MHz (internal)
- Cache memory: 32KB (Command cache) / 32KB (Data cache)
- Bus width: 32bit (external) / 64bit (internal)
Internal Floating Point Unit (FPU)
- Appearance: 160-pin QFP

(2) ASIC block

- Model name: MF87F4561 manufactured by Fujitsu
- Appearance: 420pin BGA
- Functions:
 - * Controls CPU
 - * Controls memory
 - * Controls interrupts
 - * Timer
 - * External interfaces (Centronics, BR-NET, IDE, Compact Flash, USB)
 - * Engine interface (Video signal control)
 - * Supports Software

(3) Gate Array block

- Model name: SLAC099HF1A manufactured by Epson
- Appearance: 160pin QFP
- Functions: Engine control

(4) ROM block

The ROM stores the CPU control program and font data. ROMs used are an 16Mbytes masked ROM, and an 8 Mbytes flash ROM which can be rewritten on the board.

<Masked ROM>

- Access time: less than 100nsec. (page access: less than 30nsec)
- Appearance: 48pin TSOP

<Flash ROM>

- Model name: MBM29DL32BD-90 manufactured by Fujitsu
- Access time: less than 90nsec.
- Appearance: 48-pin TSOP

(5) DIMM

DIMM (Dual-inline-Memory-Module) allows memory extension by up to 384MB.

3 DIMM sockets are available. (1 slot pre-installed 64MB DIMM)

The following type of DIMM can be installed into each slot.

- Appearance: 100-pin
- Memory type: SDRAM
- Access time: PC66, CL2
- Parity: either Parity or Non-parity can be used
- Memory capacity 16MB, 32MB, 64MB, 128MB

<Recommended DIMM type>

- * 16MB: Techworks PM-HP 16M
- * 32MB: Techworks PM-HP 32M
- * 64MB: Techworks PM-HP 64M
- * 128MB: Techworks PM-HP 128M

Any combination of DIMM size can be installed into any slot in any order but it is recommended that the larger DIMM is install in Slot 0.

(6) External interface block

- Centronics Interface
- USB
- Compact Flash
- IDE Interface

(7) Engine interface block

The engine interface consists of the following signals;

<IREADY>

The signal indicating the engine is ready

<PRREQ>

Signal requesting printing from the controller

<KEY_STATUS>

Signal indicating that a key switch status on the control panel has changed.

<VSYNC>

Vertical synchronization signal for printing

<HSYNC>

Horizontal synchronization signal for printing

<VIDEO>

Video data signal

<COMMAND>

Command signal sent from the controller to the engine

<STATUS>

Status signal sent from the engine to the controller

Fig.4-39 shows the timing of each signal after the power switch is turned on.

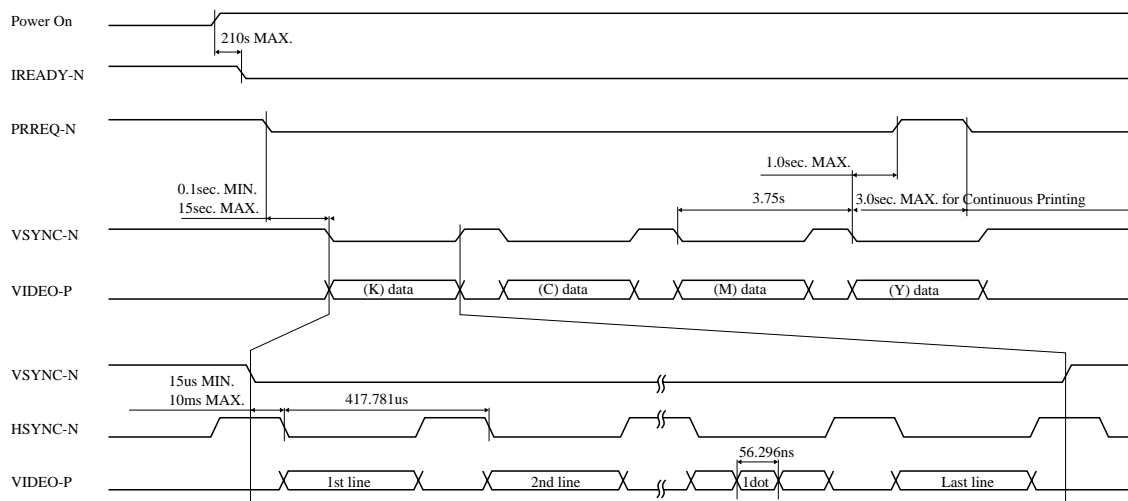


Fig.4-38

The COMMAND signal and STATUS signal are the signals that are used to transfer the data between the controller and the engine, which perform as a half-duplex asynchronous serial communication. Refer to Fig.4-40.

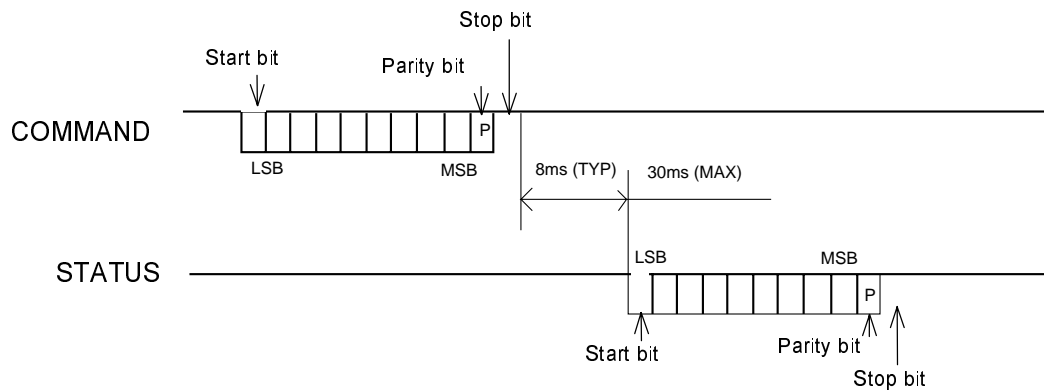


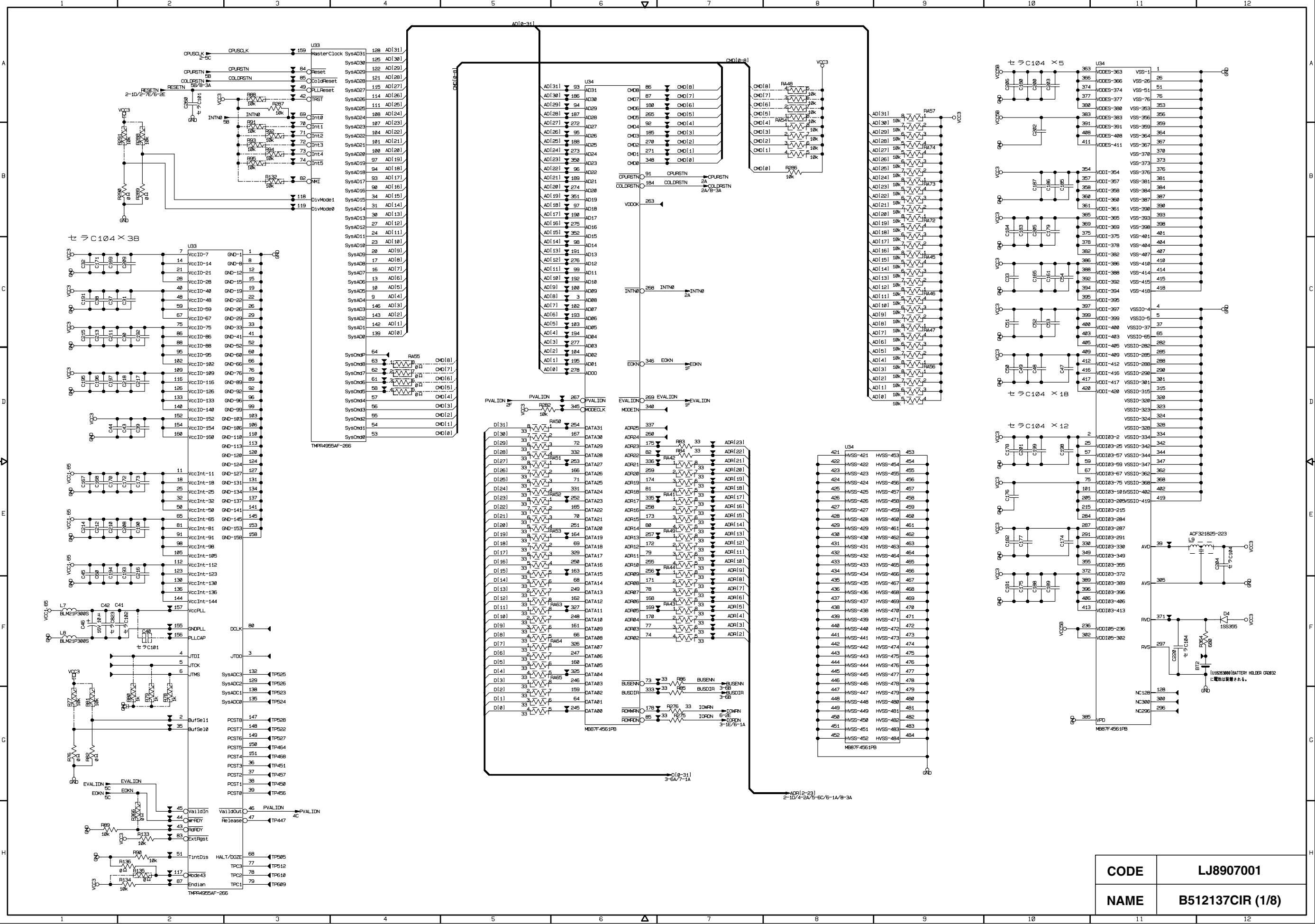
Fig.4-39

Note:

- Based on “Asynchronous Communication” method.
- Command/Status communication must keep the “Handshake Rule”.
- Baud rate is 9600 bps.
- Frame format:
 - one (1) start bit,
 - eight (8) data bits
(Start bit side is LSB, Parity bit is MSB),
 - one (1) odd parity bit,
 - one (1) stop bit.
- The video controller has to send an “Initialize Command” to the engine controller after power on in order to establish communication.

The power for the Main PCB is supplied through the engine interface connector.

Main PCB Circuit Diagram (1/8)



PCB layout of the B512137CIR (2/8) board. The schematic includes various components and their connections. A table of component values is provided:

	HL-2680C	HL-3458C
C223	18P	18P
R294	100 Ω	100 Ω
XT3	21.315712MHz	21.913200MHz

The board is labeled with the following information:

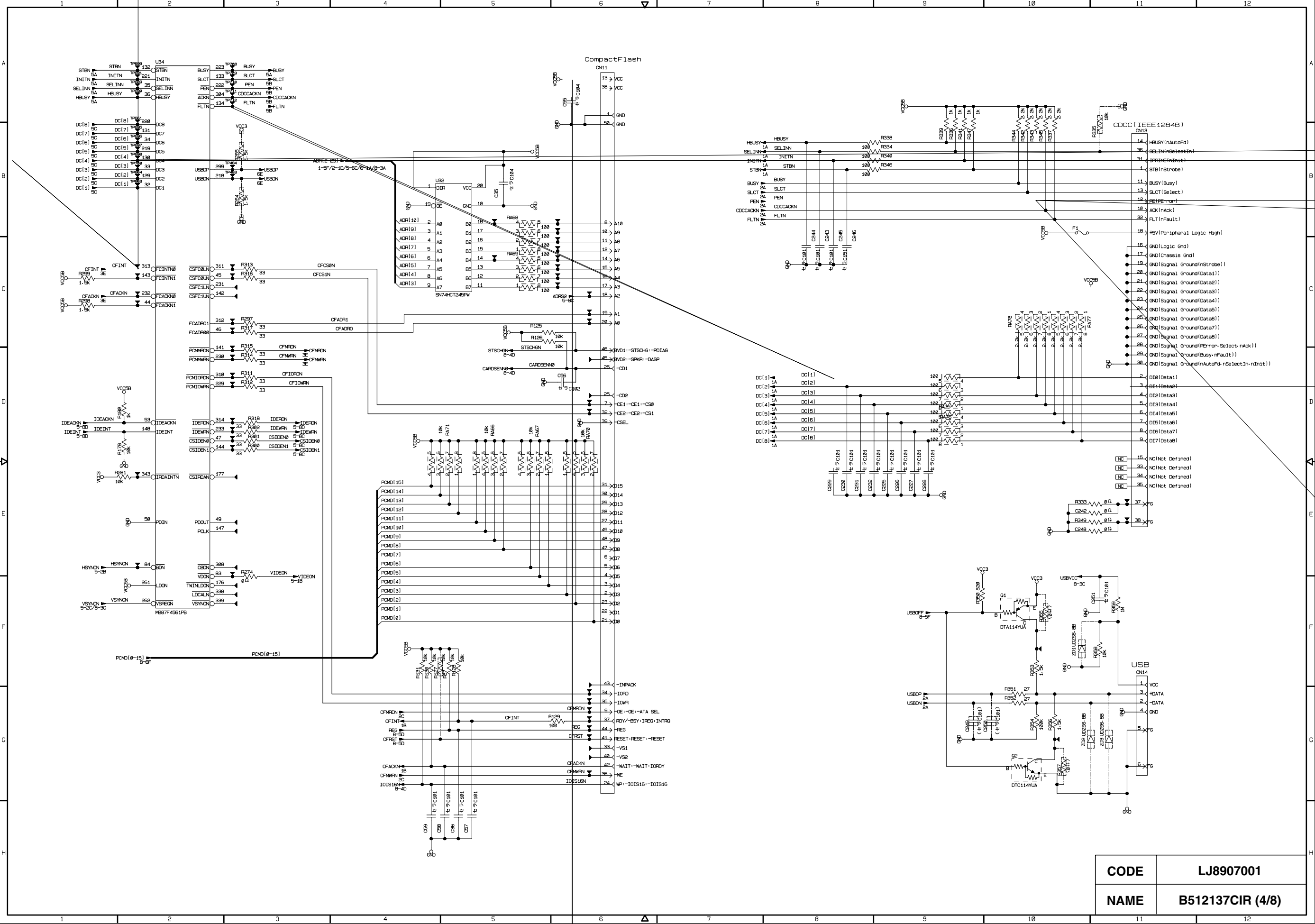
- CODE: LJ8907001
- NAME: B512137CIR (2/8)

CODE	LJ8907001
NAME	B512137CIR (2/8)

[illegible]

CODE	LJ8907001
NAME	B512137CIR (3/8)

Main PCB Circuit Diagram (4/8)



CODE	LJ8907001
NAME	B512137CIR (4/8)

PCB layout for B512137CIR (5/8) board. The layout includes various components, connectors, and signal traces. The board is populated with numerous components, including a large IC labeled 'MB874561PB' and several smaller ICs like 'U34' and 'U35'. The layout is organized into a grid with letters A-H and numbers 1-12. A legend at the bottom right identifies the board as 'B512137CIR (5/8)' with code 'LJ8907001'.

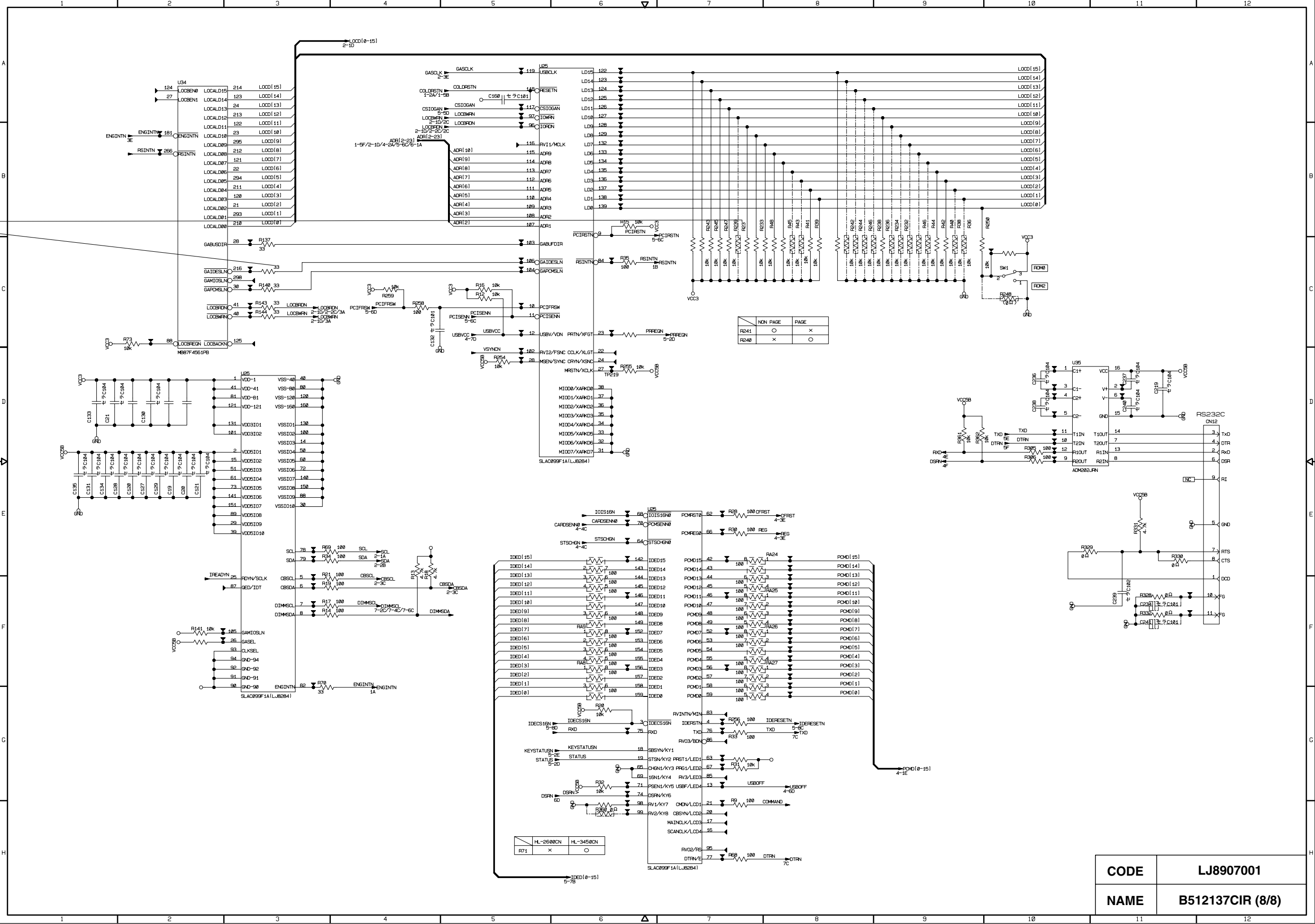
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NAME	B512137CIR (5/8)

[illegible]

CODE	LJ8907001
NAME	B512137CIR (7/8)

CODE	LJ8907001
NAME	B512137CIR (7/8)

Main PCB Circuit Diagram (8/8)



2.4 Power Supply Unit

(1) Outputs and Use

Output Terminal	Rated Output	Use
+5V-1	+5V, 2A	For control of the printer.
+5V-1R		For control of the laser.
+5V-2 +5V-2D	+5V, 8A MAX	For control of the interface. (8A MAX)
+24V-1	+24V, 6.5A	For control of printer charging.
HP HN	120V, 8A 1000W 220V, 5A 1000W	For connection of the fuser heater (HP). For connection of the fuser heater (HN).

(2) Layout of Connector Pin Assignment See Fig.4-40 on the following page.

Layout of Connector Pin Assignment - Power Supply Unit -

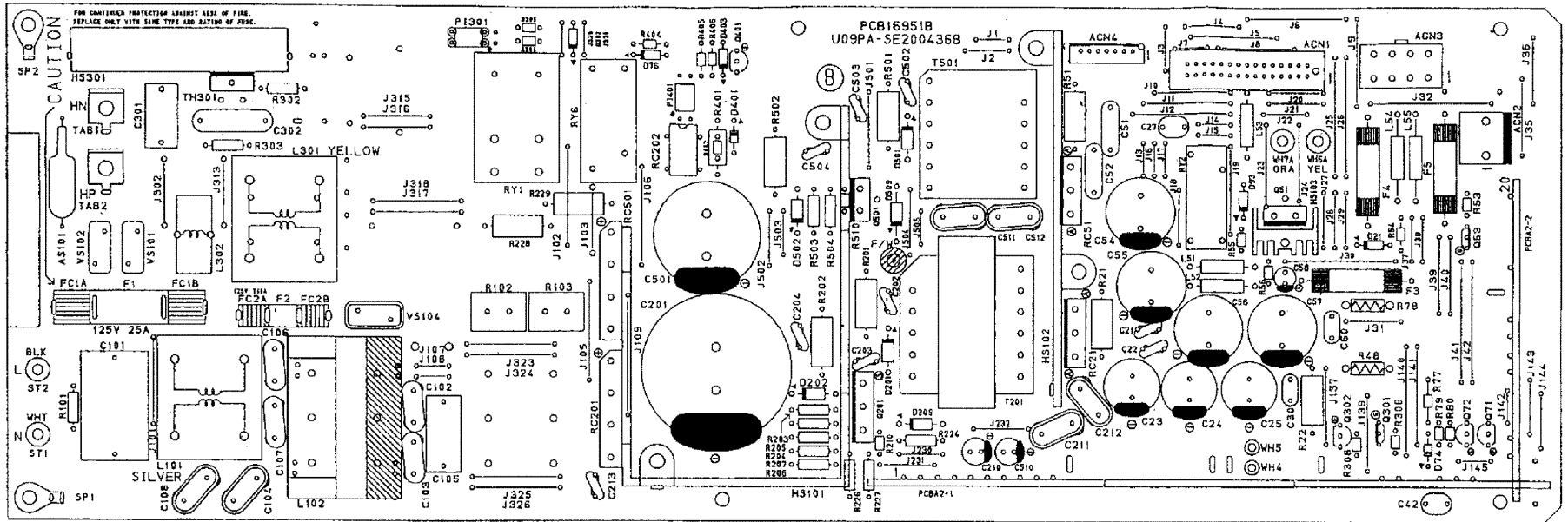


Fig.4-40

(3) Connector Pin Assignment

ACN1

Manufacture: MoLex Type: 53313-2815

Pin No	Signal Name	Interface	Pin No	Signal Name	Interface
1	+5V-1	+5V-1 Output	2	DCOFF2-P	+5V-2D OFF Signal
3	+5V-1	+5V-1 Output	4	SGND	Signal Ground (+5V type ground)
5	+5V-D	+5V-D Output	6	SGND	Signal Ground (+5V type ground)
7	+5V-D	+5V-D Output	8	SGND	Signal Ground (+5V type ground)
9	ACSYNC-N	AC Zero-Cross Signal (Open Collector Output).	10	SGND	Signal Ground (+5V type ground)
11	+24V	+24V Output corresponding to Door Switch.	12	DCOFF1-P	OFF Signal (Pull-up required)
13	+5V-1R	+5V through the relay when +24V-1 is shut down.	14	ACOFF-P	AC Forced Shut-Down Signal (Pull-Up required).
15	HON-N	Heater On Signal (Pull-up required).	16	TestI2	Terminal for Dielectric Strength Test.
17	+24V-1	+24V Output through Door Switch.	18	TestO2	Terminal for Dielectric Strength Test.
19	+24V-1	+24V Output through Door Switch.	20	TestI1	Terminal for Dielectric Strength Test.
21	+24V-1	+24V Output through Door Switch.	22	TestO1	Terminal for Dielectric Strength Test.
23	+24V-1	+24V Output through Door Switch.	24	PGND	Power Ground (+24V type ground)
25	PGND	Power Ground (+24V type ground)	26	PGND	Power Ground (+24V type ground)
27	PGND	Power Ground (+24V type ground)	28	PGND	Power Ground (+24V type ground)

ACN1

Manufacture: MoLex Type: 53324-0710

Pin No	Signal Name	Interface	Pin No	Signal Name	Interface
1	+5V-1	+5V-1 Output	2	+5V-D	+5V-D Output
3	SGND	Signal Ground (+5V type ground)	4	+24V-2	+24V-2 Output
5	+24V-2	+24V-2 Output	6	PGND	Power Ground (+24V type ground)
7	PGND	Power Ground (+24V type ground)			

ACN2

Manufacture: MoLex Type: 5277-02A

Pin No	Signal Name	Interface	Pin No	Signal Name	Interface
1	DSW-O	+24V Output through Door Switch.	2	DSW-I	+24V Output through Door Switch.

ACN3

Manufacture: MoLex Type: 5566-08A

Pin No	Signal Name	Interface	Pin No	Signal Name	Interface
1	SWRUS-P	Power Supply (OPEN)	2	+5V-2	+5v-2 Output
3	+5V-2D	+5V-2D Output	4	+5V-2D	+5V-2D Output
5	+24VDO-N	+24V Door Open	6	SGND	Signal Ground (+5V type ground)
7	SGND	Signal Ground (+5V type ground)	8	SGND	Signal Ground (+5V type ground)

2.5 High Voltage Power Supply Unit

(1) Outputs and Function

No.	Function		Power Supply (P/S)		
			P/S Name	Approx. Output Voltage Max (V)	Approx. Output Typical (V)
1	Charging		CHV(-)	-7kV Max -650 μ A	-5.5kV -550 μ A
2	First Transfer		CBV(-)	-1200V Max	-600V -1.5 μ A
3	Developing Bias	Y,M	DBV(-A)	-1600V Max	-240V -1.5 μ A
		C,K	DBV(-B)	-1600V Max	
4	Second Transfer		THV(+)	4.0kV Max	1.3kV 1.3 μ A
5	Transfer Roller Cleaning		THV(-)	-1500V Max	-800V -0.8 μ A
6	Paper Discharging		ACV(~)	5.5kV Max	4.9kV
			DCV(+)	-800V Max	-800V
7	Drum Cleaning		FCBV	1200VMax	500V 10 μ A

(2) Layout of Connector Pin Assignment

See Fig.4-41 on the following page.

Layout of Connector Pin Assignment - High Voltage Power Supply Unit -

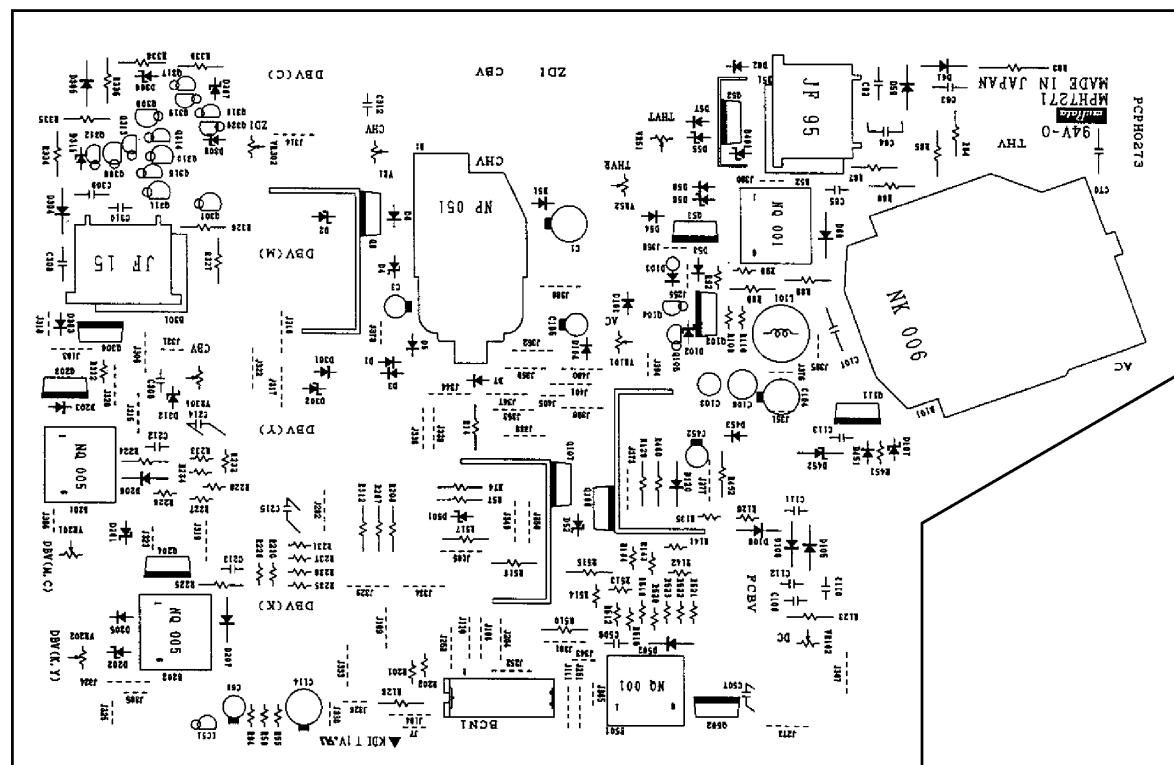


Fig.4-41

(3) Connector Pin Assignment

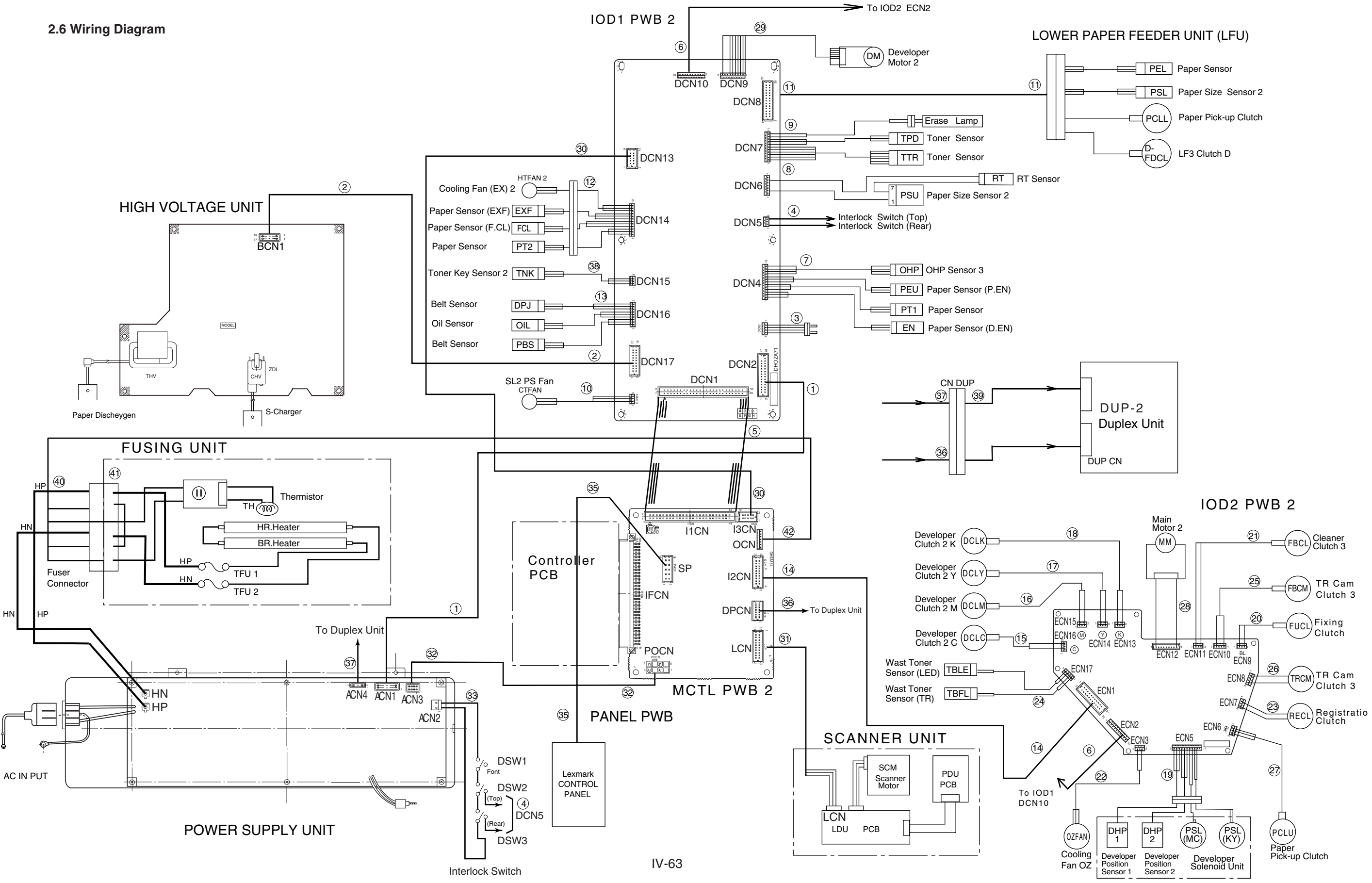
BCN1

Manufacture: MoLex

Type: 53313-1815

Pin #	Signal Name	Interface
1	+24V-1	+24V-1
2	PGND	PGND
3	FUCHK	Sensor Signal of Fusing Unit Installation.
4	PGND	PGND
5	ACVON-N	AC Output ON Signal.
6	PWMON-N	PWM Control ON Signal.
7	CHVON-ON	CHV Output ON Signal.
8	CHVERR	CHV ERROR Sensor Signal.
9	CBVPWM-N	CBV PWM Control Signal.
10	THVRON-N	THV ON Signal
11	DBVYMPWM-N	DBV PWM Control Signal.
12	THVPWM-N	THV PWM Control ON Signal.
13	DBVCKPWM-N	CBV PWM Control Signal.
14	THV-I	Transfer Voltage Select Signal.
15	FCBVPWM-N	FCBV PWM Control Signal.
16	TH1	Termistor Temperature Sensor Signal.
17	AC DCON-N	AC, DC Control Signal
18	TH2	Termistor Temperature Sensor Signal.

2.6 Wiring Diagram



(1) DCN2: IOD1 PWB 2 - Power Supply Unit ACN1 (30 pins)

Pin No.	Signal Name	Pin No.	Signal Name
1	+5v-1	2	DCOFF2-P
3	+5v-1	4	SGND
5	+5v-D	6	SGND
7	+5v-D	8	SGND
9	ACSYNC-N	10	SGND
11	+24	12	DCOFF1-P
13	+5v-1R	14	ACOFF-P
15	HON-N	16	TESTI2
17	+24V-1	18	TESTO2
19	+24V-1	20	TESTI1
21	+24V-1	22	TESTO1
23	+24V-1	24	PGND
25	PGND	26	PGND
27	PGND	28	PGND
29	DCOFF3-P	30	NC

(2) DCN17: IOD1 PWB 2 - High Voltage Unit BCN1 (18 pins)

Pin No.	Signal Name	Pin No.	Signal Name
1	+24v-1	2	PGND
3	ACVERR	4	PGND
5	ACVON-N	6	PWMON-N
7	CHVON-N	8	CHVERR
9	CBVPWM-N	10	THVRON-N
11	DBV (MC) PWM-N	12	THVPWM-N
13	DBV (KY) PWM-N	14	THV-I
15	FCBVPWM-N	16	(Reserved)
17	AC_DCON-N	18	(Reserved)

(3) DCN3: For Factory Use Only (4 pins)

Pin No.	Signal Name
1	TESTO1
2	TESTI1
3	TESTO2
4	TESTI2

(4) DCN5: IOD1 PWB 2 - Interlock Switch

Pin No.	Signal Name
1	REARDOPEN-P
2	NC
3	TOPDOPEN-P

(5) I1CN1: MCTL PWB 2 - IOD1 PWB 2 DCN1 (50 pins)

Pin No.	Signal Name	Pin No.	Signal Name
1	I/OAD2	2	DMON-N
3	I/OAD1	4	DCOFF1-P
5	I/OAD0	6	DMCLK
7	I/ODATA3	8	ACVON-N
9	I/ODATA2	10	CHVON-N
11	I/ODATA1	12	PWMON-N
13	I/ODATA0	14	CBVPWM-N
15	LEDON-N	16	DBV (MC) PWM-N
17	DMRDY-N	18	DBV (KY) PWM-N
19	I/ODATA4	20	FCBVPWM-N
21	(Reserved)	22	THVRON-N
23	AC_DCON-N	24	THVPWM-N
25	PKCLL1ON-P	26	THV-I
27	ELON-P	28	(Reserved)
29	PBSEN-N	30	(Reserved)
31	HPSEN-N	32	OILLES-P
33	CTFANON-P	34	(Reserved)
35	HTFANON-P	36	HON-N
37	+5v-1R	38	ACOFF-P
39	SGND	40	ACSYNC-N
41	SGND	42	+24
43	SGND	44	PGND
45	+5v-1	46	PGND
47	+5v-1	48	+24v-1
49	+5v-D	50	+24v-1

(6) DCN10: IOD1 PWB 2 – IOD2 PWB 2 ECN2 (10 pins)

Pin No.	Signal Name	Pin No.	Signal Name
1	+24v-1	2	+24v-1
3	+24v-1	4	PGND
5	PGND	6	PGND
7	+5v-1	8	SGND
9	SGND	10	+5v-S

(7) DCN4: IOD1 PWB 2 - Paper Sensor (D.EN), Paper Sensor (PT1)
Paper Sensor (P.EN), OHP Sensor 3 (OHP)

Pin No.	Signal Name	Pin No.	Signal Name
1	+5v-S	2	HPSEN-N
3	SGND	4	+5v-S
5	PT1-N	6	SGND
7	+5v-S	8	PEU-P
9	SGND	10	+5v-S
11	OHPSENU	12	SGND
13	SGND		

(8) DCN6: IOD1 PWB 2 - Paper Size Sensor 2 (PSU)

Pin No.	Signal Name	Pin No.	Signal Name
1	+5v-D	2	PSU1
3	PSU2	4	PSU3
5	PSU4	6	PSU5
7	SGND	8	TH3

(9) DCN7: IOD1 PWB 2 - Toner Sensor (Y, M, C, K), Erase Lamp

Pin No.	Signal Name	Pin No.	Signal Name
1	TLES (K)-P	2	TLES (Y)-P
3	TLES (M)-P	4	TLES (C)-P
5	TLES-G	6	SGND
7	LEDON-P	8	TLESCHK
9	SGND	10	+24v-1
11	ELON-N		

(10) DCN18: IOD1 PWB2 – SL2 PS Fan

Pin No.	Signal Name	Pin No.	Signal Name
1	CTFANON-P	2	PGND
3	CTFANERR		

(11) DCN8: IOD1 PWB 2 - Lower Paper Feeding Unit

Pin No.	Signal Name	Pin No.	Signal Name
1	+24v-1	2	PKCLL1ON-N
3	FDCLL1ON-N	4	PSL1
5	PSL2	6	PSL3
7	PSCST1	8	PEL1-P
9	OCST1-N	10	NC
11	+5v-D	12	SGND
13	NC	14	+24v-1
15	NC	16	NC
17	NC	18	NC
19	NC	20	NC
21	NC	22	NC
23	NC	24	+5v-D
25	SGND	26	SGND

(12) DCN14: IOD1 PWB 2 - Paper Sensor (PT2), Paper Sensor (F.CL)
Paper Sensor (EXF), Cooling Fan (EX) 2

Pin No.	Signal Name	Pin No.	Signal Name
1	+5v-S	2	PT2-N
3	SGND	4	+5v-S
5	CLROL-N	6	SGND
7	+5v-S	8	PEFULL-N
9	SGND	10	HTFANON-P
11	PGND	12	HTFANERR

(13) DCN16: IOD1 PWB 2 - Belt Sensor (PBS), Oil Sensor (OIL), Belt Sensor (DPJ)

Pin No.	Signal Name	Pin No.	Signal Name
1	PBSEN-N	2	+5v-1
3	SGND	4	OILLES-P
5	+5v-1	6	SGND
7	PDSEN-P	8	+5v-S
9	SGND	10	NC

(14) I2CN: MCTL PWB 2 – IOD2 PWB 2 ECN1 (22 pins)

Pin No.	Signal Name	Pin No.	Signal Name
1	DCL (C) ON-P	2	DCL (M) ON-P
3	DCL (Y) ON-P	4	DCL (K) ON-P
5	PSL (KY) ON-P	6	PSL (MC) ON-P
7	MMCLK	8	MMON-N
9	MMREV-N	10	MMENC
11	RECLON-P	12	AHUMB
13	ISCK	14	IDATA
15	ILOAD	16	FBCLON-P
17	FBSLON-P	18	TRSLON-P
19	OZFANON-P	20	FUCLON-P
21	PKCLU1ON-P	22	(Reserved)

(15) ECN16: IOD2 PWB 2 - Developer Clutch 2 (C)

Pin No.	Signal Name	Pin No.	Signal Name
1	+24v-1	2	NC
3	DCL (C) ON-N		

(16) ECN15: IOD2 PWB 2 - Developer Clutch 2 (M)

Pin No.	Signal Name	Pin No.	Signal Name
1	+24v-1	2	NC
3	DCL (M) ON-N		

(17) ECN14: IOD2 PWB 2 - Developer Clutch 2 (Y)

Pin No.	Signal Name	Pin No.	Signal Name
1	+24v-1	2	NC
3	DCL (Y) ON-N		

(18) ECN13: IOD2 PWB 2 - Developer Clutch 2 (K)

Pin No.	Signal Name	Pin No.	Signal Name
1	+24v-1	2	NC
3	DCL (K) ON-N		

(19) ECN5: IOD2 PWB 2 - Developer Position Sensor 1, Developer Position Sensor 2
Developer Solenoid Unit (MC), Developer Solenoid Unit (KY)

Pin No.	Signal Name	Pin No.	Signal Name
1	+5v-S	2	GHPSEN1-N (MC)
3	SGND	4	+5v-S
5	GHPSEN2-N (KY)	6	SGND
7	PSL (MC) ON-N	8	+24v-1
9	+24v-1	10	PSL (KY) ON-N
11	NC		

(20) ECN9: IOD2 PWB 2 - Fixing Clutch (FUCL)

Pin No.	Signal Name	Pin No.	Signal Name
1	+24v-1	2	NC
3	FUCLON-N		

(21) ECN11: IOD2 PWB 2 - Cleaner Clutch 3 (FBCL)

Pin No.	Signal Name	Pin No.	Signal Name
1	+24v-1	2	NC
3	FBCLON-N		

(22) ECN3: IOD2 PWB 2 - Cooling Fan OZ

Pin No.	Signal Name	Pin No.	Signal Name
1	OZFANON-P	2	PGND
3	OZFANERR		

(23) ECN7: IOD2 PWB 2 - Registration Clutch (RECL)

Pin No.	Signal Name	Pin No.	Signal Name
1	+24v-1	2	NC
3	RECLON-N		

(24) ECN17: IOD2 PWB 2 – Waste Toner Sensor (WTS)

Pin No.	Signal Name	Pin No.	Signal Name
1	TBFL1-N	2	SGND
3	WTLEDON	4	SGND

(25) ECN10: IOD2 PWB 2 – TR Cam Clutch 3 (FBCM)

Pin No.	Signal Name	Pin No.	Signal Name
1	+24v-1	2	NC
3	NC	4	FBSLON-N

(26) ECN8: IOD2 PWB 2 - TR Cam Clutch 3 (TRCM)

Pin No.	Signal Name	Pin No.	Signal Name
1	+24v-1	2	NC
3	NC	4	TRSLON-N

(27) ECN6: IOD2 PWB 2 - Paper Pick-up Clutch (PCLU)

Pin No.	Signal Name	Pin No.	Signal Name
1	+24v-1	2	NC
3	PKCLU1ON-N		

(28) ECN12: IOD2 PWB 2 - Main Motor 2

Pin No.	Signal Name	Pin No.	Signal Name
1	MMRDY-N	2	MMON-N
3	MMCLK	4	PGND
5	+24v-1	6	SGND
7	+5v-1	8	MMENC
9	MMREV-N		

(29) DCN9: IOD1 PWB 2 - Developer Motor 2

Pin No.	Signal Name	Pin No.	Signal Name
1	DMRDY-N	2	DMON-N
3	DMCLK	4	PGND
5	PGND	6	+24v-1
7	+24v-1	8	SGND
9	+5v-1		

(30) I3CN: MCTL PWB 2 - IOD1 PWB 2 DCN13 (10 pins)

Pin No.	Signal Name	Pin No.	Signal Name
1	NC	2	(Reserved)
3	DCOFF3-N	4	(Reserved)
5	CTFANERR	6	IDO1VOFF-P
7	TH3	8	DCOFF2-N
9	(Reserved)	10	(Reserved)

(31) LCN: MCTL PWB 2 - LDU PCB (20 pins)

Pin No.	Signal Name	Pin No.	Signal Name
1	+5v-1R	2	LDREF2
3	LDREF3	4	+5v-1
5	LDREF1	6	LDREF0
7	LREADY	8	LCONT2
9	LCONT1	10	VIDEO-N
11	LDREF4	12	BDT-P
13	BDT-N	14	SGND
15	SGND	16	SCMCLK
17	SCMRDY-N	18	SCMON-N
19	PGND	20	+24v-1

(32) ACN3: Power Supply Unit - MCTL PWB 2 POCN

Pin No.	Signal Name	Pin No.	Signal Name
1	SWRUS-P	2	+5v-2
3	+5v-2D	4	+5v-2D
5	+24VDO-N	6	SGND
7	SGND	8	SGND

(33) ACN2: Power Supply Unit - Interlock Switch

Pin No.	Signal Name	Pin No.	Signal Name
1	DSW-O	2	DSW-I

(35) MCTL PWB 2 PACN - PANEL PWB (16 pins)

Pin No.	Signal Name	Pin No.	Signal Name
1	PAI/ODATA0	2	PAI/ODATA1
3	PAI/ODATA2	4	PAI/ODATA3
5	PAI/ODATA4	6	PAI/ODATA5
7	PAI/ODATA6	8	PAI/ODATA7
9	LCDRS	10	LCDE
11	PASWRDN	12	PALEDWRN
13	SGND	14	+5v-1
15	LCDBLED	16	NC

(36) MCTL PWB 2 DPCN - Duplex Unit CNDUP

Pin No.	Signal Name	Pin No.	Signal Name
1	D-COMMAND	2	SGND
3	DUMBUSY2-N	4	SGND
5	D-STATUS	6	SGND
7	Reserved	8	DUPCHK-N
9	DUMBUSY1-N	10	PT-1
11	DUPRES-N	12	SGND

(37) ACN4:Power Supply Unit - Duplex Unit CNDUP

Pin No.	Signal Name	Pin No.	Signal Name
1	+5v-1	2	+5v-D
3	SGND	4	+24v-2
5	+24v-2	6	PGND
7	PGND		

(38) DCN15:IOD1 PWB 2 - Toner Key Sensor 2 (TNK)

Pin No.	Signal Name	Pin No.	Signal Name
1	TONEROK-N	2	+5v-S
3	SGND		

(39) PRINTER CNDUP - Duplex Unit

Pin No.	Signal Name	Pin No.	Signal Name
1	D-COMMAND	2	SGND
3	DUMBUSY2-N	4	SGND
5	D-STATUS	6	SGND
7	Reserved	8	DUPCHK-N
9	DUMBUSY1-N	10	PT-1
11	DUPRES-N	12	SGND
13	NC	14	NC
15	PGND	16	PGND
17	+24v-2	18	+24v-2
19	+5v-D	20	SGND
21	+5v-1	22	NC
23	NC	24	NC

(40) Fusing Unit

Pin No.	Signal Name	Pin No.	Signal Name
1	HN	2	HP
A1	TH2	B1	GND
A2	TH2	B2	FUTEMP
A3	TH1	B3	NC
A4	TH1	B4	NC
3	NC	4	NC

(41) Fusing Unit

Pin No.	Signal Name	Pin No.	Signal Name
2	HP	1	HN
B4	GND	A1	TH1
B3	FUTEMP	A2	TH1
B2	NC	A3	TH2
B1	NC	A4	TH2
4	NC	3	NC

(42) MCTL PWB 2 FUCN - Fusing Unit

Pin No.	Signal Name	Pin No.	Signal Name
1	TH1	2	TH1
3	TH2	4	TH2
5	FUTEMP	6	FUCHKGND

CHAPTER V

CONTROL PANEL OPERATION

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CHAPTER V CONTROL PANEL OPERATION

1. PANEL LAYOUT

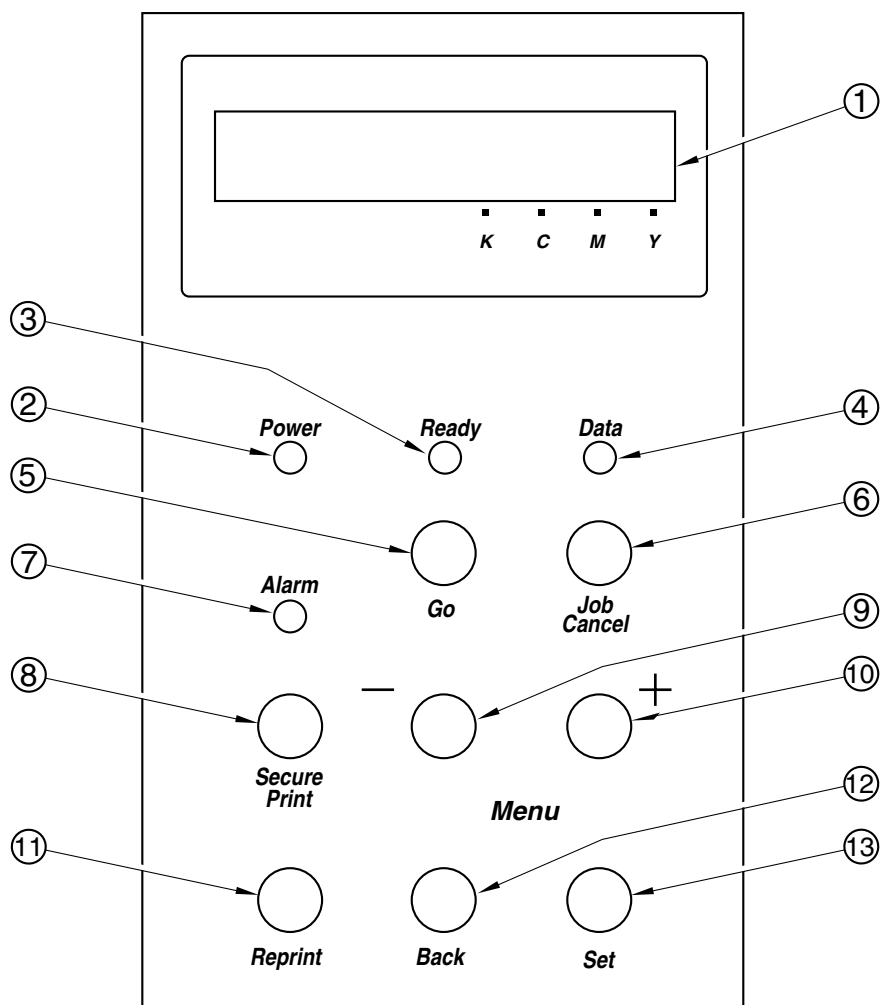


Fig.5-1

No.	LED / Button Name
1	LCD: 16 character by 2 lines
2	Power LED
3	Ready LED
4	Data LED
5	Go button
6	Job Cancel button
7	Alarm LED
8	Secure Print button
9	- button
10	+ button
11	Reprint button
12	Back button
13	Set button

2. VIDEO CONTROLLER MODE

This section describes the operation and maintenance functions in the Video Controller Mode.

2.1 Configuration of Operational Mode

This printer has various functions as set out in Table 5-1 for users to easily perform general test printing, general settings and some maintenance work.

- (1) Normal Mode: After turning on the printer, the printer goes into Normal Mode. This mode provides normal printing for the end user. The following section describes the toner save mode and the power save mode. For other modes, refer to the user's guide.
- (2) Line Test Mode: This mode provides a self-test for each function in the Video Controller Mode mainly for use when replacing the main (video controller) PCB. Whenever the video controller is replaced, these checks should be carried out. This mode provides performance tests for the engine LCD, control panel buttons and various sensors.
- (3) DRAM Test Mode: This mode is provided to test installed DIMM(s) on the main (video controller) PCB.
- (4) Test Print Mode: This mode allows you to print the selected test pattern in order to check the engine.
- (5) NVRAM Reset Mode: This mode forces the NVRAM values of the video controller to be reset to the factory settings. When replacing the main PCB, the NVRAM value is automatically reset to the factory setting. However, this mode is effective when the video controller does not work due to errors.

Table 5-1

Power on	→	Normal Mode
+ button + - button + Power on	→	Line Test Mode
Go button + + button + Power on	→	DRAM Test Mode
Press the –, + and Set buttons in this order while holding down the Go button.	→	Test Print Mode
Set button + Power on	→	NVRAM Reset Mode

2.2 Line Test Mode

This mode tests the following items;

Item	Self-test Description
LCD TEST	Displays the checker pattern
LED TEST	Checks that all LEDs are on / off.
SW TEST	Checks that all buttons work correctly.
SENSOR TEST	Checks that all sensors work correctly.
RAM SIZE TEST	Displays the NVRAM size
TRAY 1 CHECK	Displays the paper size of the upper cassette (Tray 1).
TRAY 2 CHECK	Displays the paper size of the lower cassette (Tray 2).
FLASH CARD-R/W TEST	Checks the compact flash card.

<Procedure>

Note:

- *It is possible to skip the test and proceed with the next test by pressing the Go button.*
- *If any errors occur during the following procedures, an error message appears on the LCD. By pressing the Go button, it is possible to proceed with the test.*

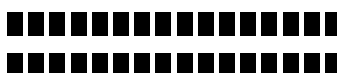
- 1) Turn on the power while holding down the + and – buttons. The following message appears.

LINE TEST

- 2) Press the Go button to implement the LCD TEST.

All columns of the LCD are turned on as shown below and also the LEDs are all turned on.

Check that the LCDs are all displayed correctly and none of the dots have dropped. Also, check that the LEDs are all on.

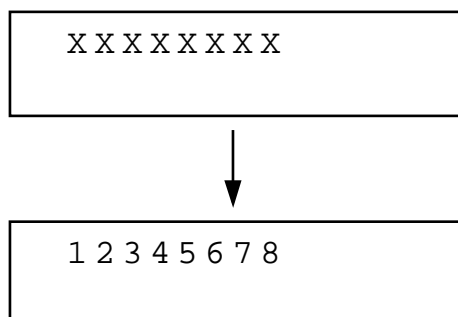


All of the LCDs are displayed at a time.

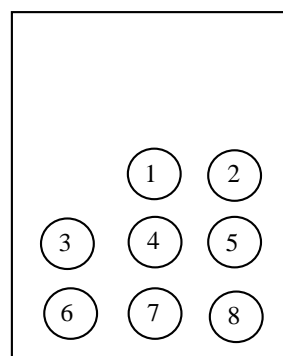
3) Press the Go button to implement the SW TEST.

The following display appears on the LCD and the LEDs are all turned off.

Check that the LEDs are turned on and the corresponding number appears as follows when pressing the buttons on the control panel in order.



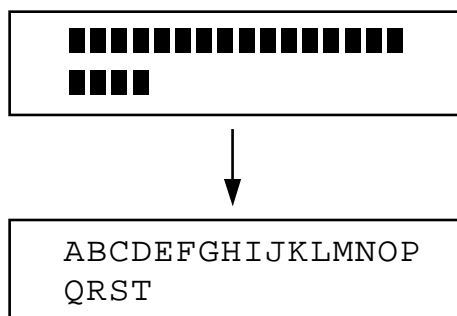
Corresponding button number on the panel



4) Press the Go button to implement the SENSOR TEST.

The following display appears on the LCD.

Check that the display of each sensor is changed to the corresponding character.



Corresponding sensor code

A:	Front Cover
B:	Top Cover
C:	Rear Cover (Transfer Unit)
D:	Toner Cartridge (K)
E:	Toner Cartridge (C)
F:	Toner Cartridge (M)
G:	Toner Cartridge (Y)
H:	OPC Belt Cartridge
I:	Fuser Cleaner
J:	Fusing Unit
K:	Waste Toner
L:	Upper Cassette
M:	Lower Cassette
N:	Upper Cassette Paper
O:	Lower Cassette Paper
P:	Upper Cassette Media
Q:	Lower Cassette Media
R:	Paper Sensor 1
S:	Paper Sensor 2
T:	Paper Sensor 3

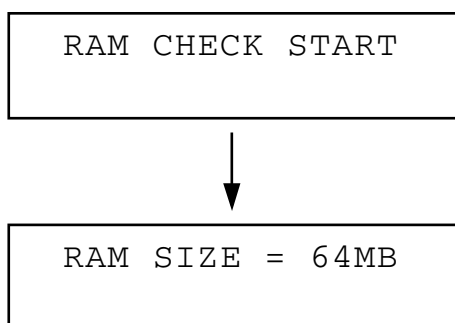
<Ex. Toner cartridge (K)>

■ → (Open the cover) → (Remove the toner cartridge.) → (Close the cover and wait for 20 seconds.) → (Open the cover.) → (Install the toner cartridge.) → (Close the cover and wait for 20 seconds.) → 'D'

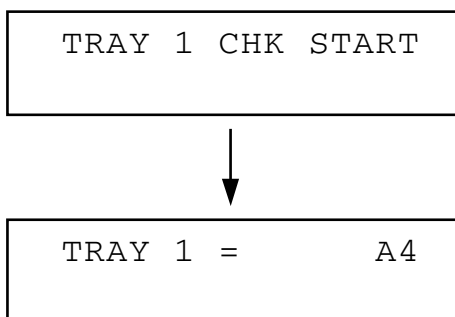
Note:

- Since the sensors respond only when the cover is closed, be sure to close the cover before re-installing any items.
- The sensors tests, especially the OPC test, require time to respond on the LCD panel. Operate a sensor in one sense for at least 20 seconds before restoring it to the original condition for reliable operation of these tests.
- As for HL-2600CN, Lower Cassette does not have the media sensor, so the display will not be changed to 'Q'. (The display will stay ■ .)

- 5) Press the Go button to implement the RAM SIZE CHECK.
The RAM size installed into the printer is displayed.
Check that the RAM size is correct.

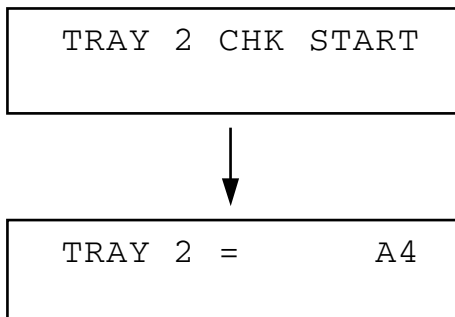


- 6) Press the Go button to implement the TRAY1 CHECK.
The paper size of the installed cassette 1 is displayed.
Check that the paper size is correct.



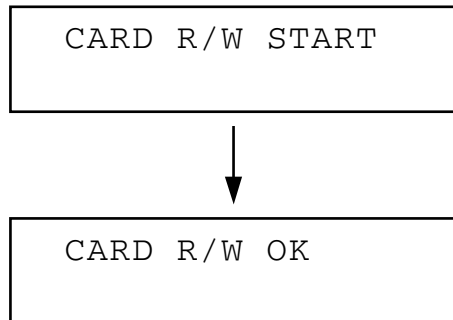
TRAY 1 = A4: A4 size cassette is installed.
TRAY 1 = LETTER: Letter size cassette is installed.
TRAY 1 = NO: No cassette is installed.
TRAY 1 = SIZE ERR: The paper size is other than A4 or Letter size.

- 7) Press the Go button to implement the TRAY2 CHECK.
The paper size of the installed cassette 2 is displayed.
Check that the paper size is correct.



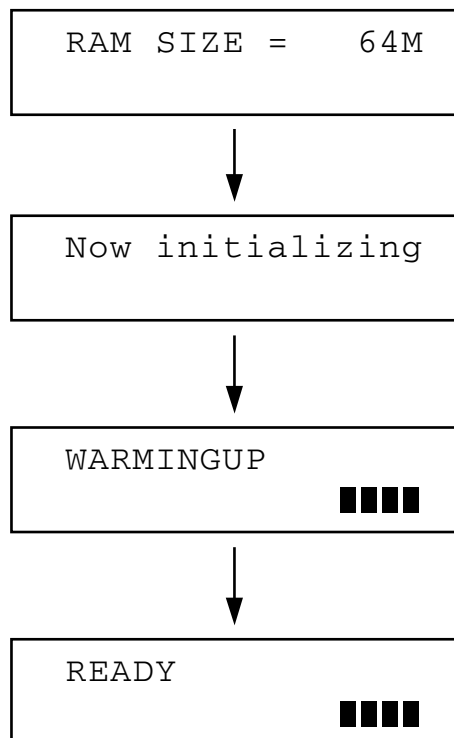
TRAY 2 = A4: A4 size cassette is installed.
TRAY 2 = LETTER: Letter size cassette is installed.
TRAY 2 = NO: No cassette is installed.
TRAY 2 = SIZE ERR: The paper size is other than A4 or Letter size.

- 8) Press the Go button to implement the COMPACT FLASH - R/W TEST.
The reading/writing test of the compact flash card is implemented. Check that no error occurs.



CARD R/W OK: The compact flash card works correctly.
CARD R/W ERROR: The compact flash card has a problem.
NO FLASH CARD: The compact flash card is not installed.

- 9) Press the Go button to exit the LINE TEST mode and reset the printer.



When this message appears, the printer may be turned off.

- 10) Turn off the power.

2.3 DRAM Test Mode

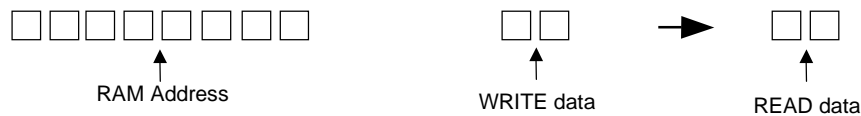
This mode tests DIMMs installed on the main (video controller) PCB.

<Procedure>

- 1) To start the test program:

While holding down the Go button and + button, turn on the power. "DRAM CHECK START" will be displayed. Press the Job Cancel button to start the DRAM check.

- 2) The LCD will display "START DRAM TEST", and the Data LED blinks.
- 3) On satisfactory completion of all the RAM tests, the LCD will display: "DRAM OK!!", and the Alarm LED is on.
- 4) If any DRAM error has occurred, the LCD will display a fail message as follows;



- 5) Enter the hidden menu mode as follows to confirm the current memory map;
 - i) Press the -, + and Set buttons in this order while holding down the Go button.
 - ii) The LCD will display "HIDDEN PANEL"
 - iii) Select the "DRAM ADDRESS" menu using the scroll buttons.
 - iv) Whenever the Set button is pressed, the LCD will display the DRAM error address on Slot 1, Slot 2, and Slot 3 in turn.
- 6) If a DIMM DRAM has an error, replace the DIMM corresponding to the above memory map information.

Note:

- *There may be a case where the above sequence does not work correctly due to complete RAM failure, or in faulty assembly such as a solder bridge or ineffective soldering etc.*
- *"PRINT CHECK" may be displayed when exiting from the Test mode. It will disappear in 20 or 30 seconds, displaying "READY" on the LCD. It is not a fault.*

2.4 Test Print Mode

This mode prints the specified pattern in order to check the engine.

<Procedure>

- 1) Press the -, + Set buttons in this order while holding down the Go button to enter the test print mode.
- 2) The 'PRINT MENU' message is displayed on the LCD. Select 'single test print' or 'repeat test print' by pressing the – or + button, then press the Set button.
- 3) If selecting 'single test print', select one of the following items by pressing the – or + button, then press the Set button.

Single test print

TEST PTN=A – H	Halftone Reproduction
TEST PTN=G – H	Line Reproduction
TEST PTN=K2	Color Reproduction, registration and jitter
TEST PTN=STRIPE	Fusing
TEST PTN=NORMAL	Prints the test print page normally.
TEST PTN=GRID	10mm grid pattern (to check the magnification and paper skew.)
TEST PTN=LINE	Horizontal line with 2 dots and 3 spaces (to check the pitch of paper feeding.)
TEST PTN=BLACK	Prints the all black page. (to check the damage on the fusing unit.)
TEST PTN=WHITE	Prints the blank page. (to check the black spots or dark printing.)

- 4) If selecting 'repeat test print', select one of the following items by pressing the – or + button, then press the Set button.

Repeat test print (For the printed page, refer to 'single test print' described above.)

TEST PTN=NORMAL
TEST PTN=GRID
TEST PTN=LINE
TEST PTN=BLACK
TEST PTN=WHITE

2.5 NVRAM Reset Mode

This mode forces the NVRAM value of the video controller to be reset to the factory settings.

<Procedure>

- 1) While holding down the Set button, turn on the power.
- 2) Hold down the Set button until "RAM SIZE" is displayed on the LCD panel and the LEDs are all on momentarily.
- 3) The printer is reset to the factory setting.

3. ENGINE CONTROLLER MODE

This section describes the operation and setting procedures for each engine test in the Engine Controller Mode.

In order to go into the Engine Controller Mode, turn on the printer while holding down the Secure Print, Back, Set buttons.

3.1 Configuration of Operational Mode

This printer has the various functions as set out in Table 5-2 for the user to easily understand the operation status of the printer engine during maintenance work.

- (1) Normal Mode: After removing the main PCB from the printer and pressing the On Line button under the Engine Controller Mode, the printer goes into the Engine Normal Mode.

This mode provides functions to indicate the operation status of the printer and also messages relating to normal operations which the operator is controlling.

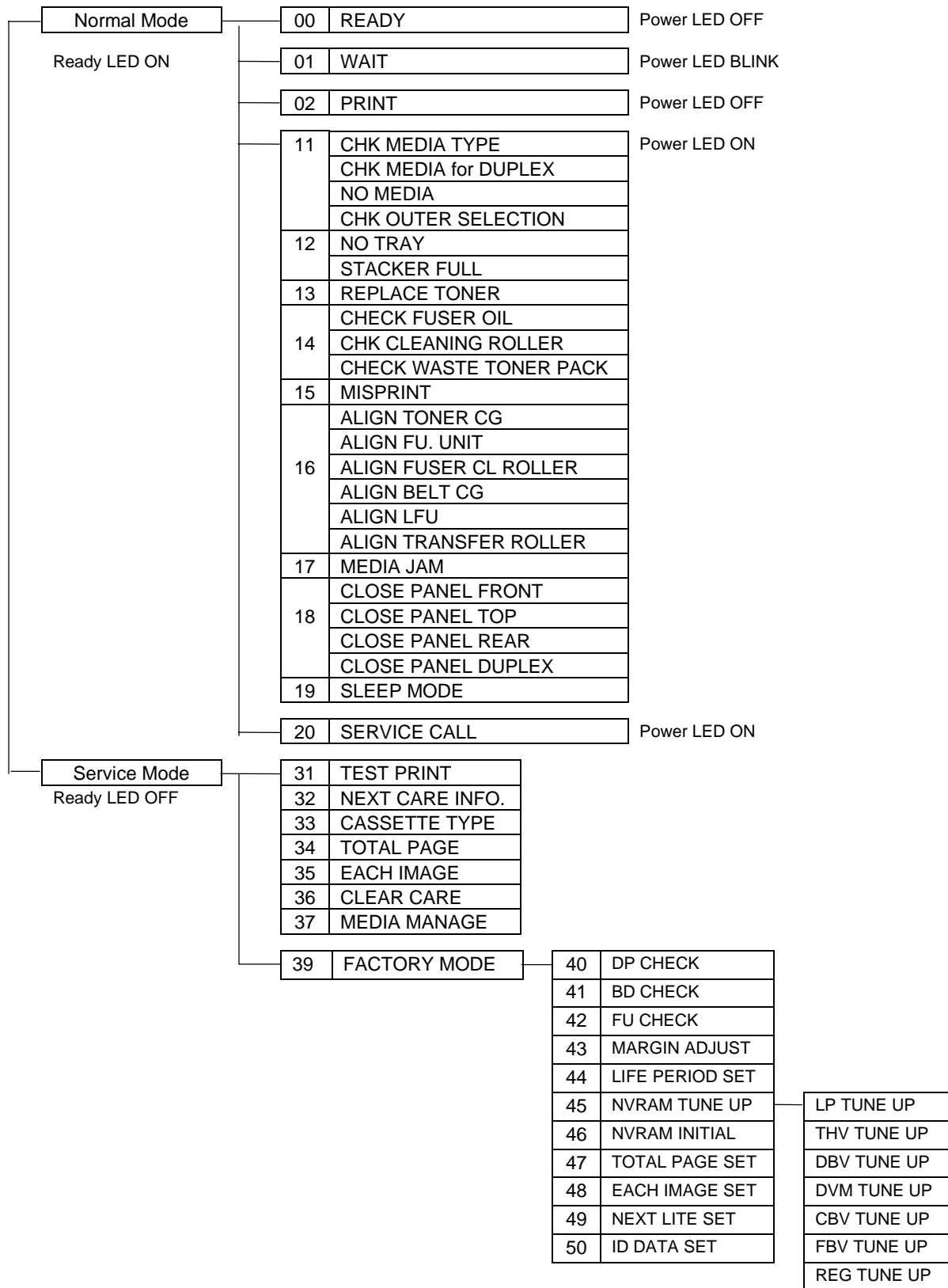
Note:

Be sure to remove the main PCB before the printer goes into the Engine Normal Mode. If you fail to do so, the printer goes into the sleep mode.

- (2) Service Mode: After turning on the printer in the off-line status, the printer goes into Service Mode.

This mode is a unique mode for the serviceman only and provides additional functions (codes 31 through 37) to confirm the operational status during maintenance work and '39 FACTORY MODE' to confirm and set the operational status of the main components.

Table 5-2



3.2 Operation of Normal Mode

Normal Mode displays on the control panel the operational status of the printer when in the "ONLINE" state and the necessary information for the operator to implement ordinary maintenance work.

Operation Procedures

- 1) Press the power button to turn on the printer while holding down the Secure Print, Back, Set buttons Refer to Fig.5-1.
- 2) Press the Go button so that the printer is on-line and the Power LED starts to flash.
- 3) The Power LED lights approximately 250 seconds after power-on and the printer is ready to print.

Normal Mode

See Table 5-2 for details of indications available in normal mode.

Code No.	LCD Message	Description of Message
00	<div>00 READY [*1] [*2] [*4]</div>	<ul style="list-style-type: none"> The Power LED is lit. The engine has completed the warming-up process and is now ready to print. The engine is ready to receive "PRREQ", signal from LPC. <p>[*1]: Applicable paper feeder is indicated as follows; /UPP: Upper Cassette /LOW: Lower Cassette</p> <p>[*2]: Size of the paper loaded on the upper or lower cassette is indicated as follows. Indication to be displayed from the left in the order of upper cassette, lower cassette.</p> <p>LT: Letter size DL: Envelope EX: Executive size CM: Envelope PC: Post Card Commercial #10 LG: Legal size FR: Free size A4: A4 size B5: B5 size</p> <p>[*4]: The code numbers of consumables or periodical replacement parts will be indicated if they have reached their life or should be replaced now. If no periodical replacement is required, there will be no indication in the LCD.</p> <p>For details of the periodical replacement parts, see 36. CLEAR CARE in the next section.</p>
01	<div>01 WAIT [*1] [*2] [*4]</div>	<ul style="list-style-type: none"> The Power LED is lit. The engine is in the process of warming-up. For messages [*1], [*2] and [*4] that appearing in the LCD, see the description of code number 00 above.
02	<div>02 PRINT [*5] [*1] [*2] [*4]</div>	<ul style="list-style-type: none"> The Power LED lit. The engine is ready to print. For messages [*1], [*2], [*3] and [*4] that appearing in the LCD, see the description of code number 00 above. <p>[*5]: Print color is indicated as follows; Y: Yellow M: Magenta C: Cyan K: Black YM: Yellow & Magenta YMCK Full Color</p>

Code No.	LCD Message	Description of Message
11-1	<p>CHECK MEDIA TYPE</p> <div> 11 CHK MEDIA [*1] TYPE [*4] </div>	<ul style="list-style-type: none"> Engine stands by as "CHECK MEDIA TYPE" status. The Power LED is lit. <p>[*1]: Applicable paper feeder is indicated as follows; /UPP: Upper Cassette /LOW: Lower Cassette</p> <ul style="list-style-type: none"> Confirm whether the applicable paper cassette is loaded with paper. Press the Job Cancel button if the media needs to be changed.
11-2	<p>NO MEDIA</p> <div> 11 NO MEDIA [*1] [*4] </div>	<ul style="list-style-type: none"> Engine stands by as "NO MEDIA" status. The Power LED is lit. <p>[*1]: Applicable paper feeder paper empty condition is indicated as follows; /UPP: Upper Cassette /LOW: Lower Cassette</p> <ul style="list-style-type: none"> Replenish the empty cassette with paper.
11-3	<p>CHECK MEDIA for DUPLEX</p> <div> 11 CHK MEDIA [*1] for DUPLEX [*4] </div>	<ul style="list-style-type: none"> Engine stands by a CHECK MEDIA Duplex. The Power LED is lit. <p>[*1]: Media check is indicated with the following messages for each feeder. /UPP: Upper Cassette /LOW: Lower Cassette /DPL: Duplex Unit Inside</p> <ul style="list-style-type: none"> Changes the applicable media. Changes the designation of media.
11-4	<p>CHECK OUTER SELECTION</p> <div> 11 CHK OUTER [*1] SELECTION [*4] </div>	<ul style="list-style-type: none"> Engine stands by a CHECK OUTER SELECTION. The Power LED is lit. <p>[*1]: Media check is indicated with the following messages for each feeder. /UPP: Upper Cassette /LOW: Lower Cassette</p> <ul style="list-style-type: none"> Confirm the paper cassette/paper exit tray, and reset properly.

Code No.	LCD Message	Description of Message
12-1	NO TRAY UPP/LOW <div>12 NO TRAY [*1] [*4]</div>	<ul style="list-style-type: none"> The engine is idling. The Power LED is lit. <p>[*1]: Paper feeder without the paper cassette is indicated as follows; /UPP: Upper Cassette /LOW: Lower Cassette</p> <ul style="list-style-type: none"> Install the applicable media cassette to the paper feeder indicated on the LCD.
12-2	STACKER FULL <div>12 STACKER FULL [SF]</div>	<ul style="list-style-type: none"> Engine stands by as "STACKER FULL" status. The Power LED is lit. Remove the paper on the stacker (paper exit tray) , and then press – button.
13	REPLACE TONER <div>13 REPLACE [*5] TONER [*4]</div> <p>* Display of [4] C : YT Y Toner Cartridge C : CT C Toner Cartridge C : MT M Toner Cartridge C : KT K Toner Cartridge</p>	<ul style="list-style-type: none"> The engine is idling. The Power LED is lit. <p>[*5]: The toner empty condition is indicated by the color code as follows;</p> <p>Y: Yellow M: Magenta C: Cyan K: Black</p> <ul style="list-style-type: none"> Replace the indicated toner cartridge with a new one of the correct color.
14-1	CHECK FUSER OIL <div>14 CHECK FUSER OIL [*F0]</div>	<ul style="list-style-type: none"> The engine is idling. The Power LED is lit. Replace the fuser oil bottle with a new one. This message will be automatically cleared by open & close operation of the paper exit cover.
14-2	CHECK CLEANING ROLLER <div>14 CHK CLEANING ROLLER [*FC]</div>	<ul style="list-style-type: none"> The engine is idling. The Power LED is lit. Replace the cleaning roller with a new one. Execute the Clear Care Mode after the replacement of the cleaning roller to clear the Care Code [FC].

Code No.	LCD Message	Description of Message
14-3	<p>CHECK WASTE TONER PACK</p> <div>14 CHECK WASTE TONER PACK [* 4]</div>	<ul style="list-style-type: none"> The engine is idling. The Power LED is lit. Replace the waste toner pack with a new one. This message will be automatically cleared by open & close operation of the paper exit cover taking place while replacement of the waste toner pack. The message is cleared also by pressing the - button.
15	<p>MISPRINT</p> <div>15 MISPRINT [* 6] [* 4]</div>	<ul style="list-style-type: none"> The engine is idling. The Power LED is lit. <p>[*6] The type of misprint will be indicated as follows;</p> <p>NOPQR: No PRREQ-N signal is available.</p> <p>PAPER: No paper is available in the feeder while executing the print operation after receipt of the print command.</p> <p>MEDIA: While executing the print process after receipt of print command, the media type of feeder is not consistent with the specified media type.</p> <p>Misprint occurred while the Duplex printing.</p> <ul style="list-style-type: none"> This message can be cleared by pressing the - button.
16-1	<p>ALIGN FU.UNIT</p> <div>16 ALIGN FU.UNIT [* 4]</div>	<ul style="list-style-type: none"> The engine is standstill. The Power LED is lit. The fusing unit is not installed. Reconfirm the installation status of the fusing unit. This message will be automatically cleared by open & close operation of the paper exit cover. The message is cleared also by pressing the - button.
16-2	<p>ALIGN FUSER CL ROLLER</p> <div>16 ALIGN FUSER CL ROLLER [* 4]</div>	<ul style="list-style-type: none"> The engine is idling. The Power LED is lit. The cleaning roller is not installed. Reconfirm the installation status of the cleaning roller. This message will be automatically cleared by opening & closing the paper exit cover. The message can also be cleared by pressing the - button.

Code No.	LCD Message	Description of Message
16-3	ALIGN TONER CG <div> 16 ALIGN [* 5] TONER CG [* 4] </div>	<ul style="list-style-type: none"> The engine is idling. The Power LED is lit. <p>[*5]: The color of the incorrectly installed toner cartridge will be indicated as follows;</p> <p>Y: Yellow M: Magenta C: Cyan K: Black</p> <ul style="list-style-type: none"> Reinstall the toner cartridge correctly. This message will be automatically cleared by open & close operation of the front cover.
16-4	ALIGN BELT CG <div> 16 ALIGN BELT CG [* 4] </div>	<ul style="list-style-type: none"> The engine is standstill. The Power LED is lit. The OPC belt cartridge is not installed. Reconfirm the installation status of the OPC belt cartridge. This message will be automatically cleared by open & close operation of the paper exit cover or front cover.
16-5	ALIGN LFU <div> 16 ALIGN LFU [* 4] </div>	<ul style="list-style-type: none"> Engine stands by as "ALIGN LFU" status. Turn the power off, and then connect the harness between the engine and LFU. Turn the power on. If the warming-up process starts, it means that proper connection is made.
16-6	ALIGN TRANSFER ROLLER <div> 16 ALIGN TRANSFER ROLLER [* 4] </div>	<ul style="list-style-type: none"> Engine stands by as "ALIGN TRANSFER ROLLER" status. The Power LED is lit. Transfer roller is not installed. Reconfirm the installation status of transfer roller. This message will be automatically cleared by open & close operation of back cover (L).

Code No.	LCD Message	Description of Message
17	<p>MEDIA JAM</p> <div> 17 MEDIA JAM [*7] [*4] </div>	<ul style="list-style-type: none"> The engine is standstill. The Power LED is lit. <p>[*7]: The kind of jam (location of jam) is indicated as follows;</p> <p>FEED: Paper Feeder INNER: Inside of Printer OUTER: Paper Exit DRUM: Transfer Drum DPL: Jam inside the duplex unit.</p> <ul style="list-style-type: none"> This message can be cleared by pressing the - button after open & close operation of the front cover, back cover and paper exit cover.
18	<p>CLOSE PANEL</p> <div> 17 CLOSE PANEL [*8] [*4] </div>	<ul style="list-style-type: none"> Engine halts as "CLOSE PANEL" status. The Power LED is lit. <p>[*8]: One of following message appears to indicate the kind of cover being open.</p> <p>FRONT: Front Cover TOP: Paper Exit Cover REAR: Rear Cover DPL: Rear Cover</p> <ul style="list-style-type: none"> Close the indicated cover, and then above message is cleared.
19	<p>SLEEP MODE</p> <div> 19 SLEEP MODE [*4] </div>	<ul style="list-style-type: none"> The engine is idling. The Power LED is lit. This mode is cleared by sending a WAKE-UP command (EC24) from the LPC. The printer is ready to print after the warming-up process of the engine.
20	<p>SERVICE CALL</p> <div> 20 SERVICE CALL [*9] </div>	<ul style="list-style-type: none"> The engine is in standstill. The Power LED is lit. <p>[*9]: Service Call error code is indicated as follows; For the details of error codes, refer to Chapter VIII "Troubleshooting" in this manual.</p>

3.3 Service Mode

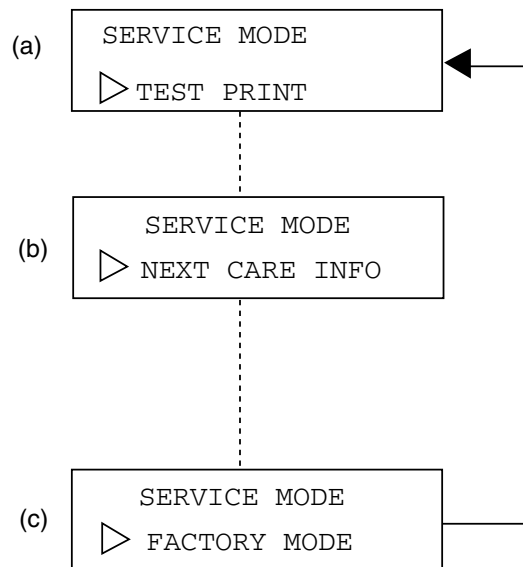
Service mode is a unique mode for the maintenance of the printer only, without the video controller card. In this mode, you can check the operation status of the printer engine Off-line and also carry out maintenance work for each of the printer components.

Procedure

- 1) Hold down the Secure Print, Back, Set buttons and turn the printer Power on.
- 2) Using the -, Reprint, Back and Set buttons, select the mode necessary for the maintenance work from the test list shown in Table 5-2.

How to designate the necessary mode

- 1) Press the Back or Set button so that service modes (a), (b) and (c) show up in sequence to be selected.
- 2) After selecting the desired mode, execute the selected mode by pressing the Reprint button.
- 3) Press the - button to exit the mode.



31	GRID PRINT
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A single color or two color (R,G,B) Grid Pattern and a full color Stripe Pattern can be printed as Test Prints.

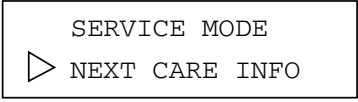
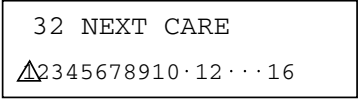
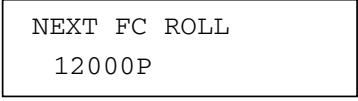
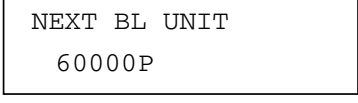
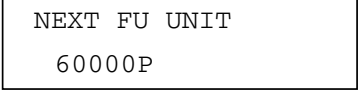
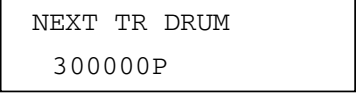
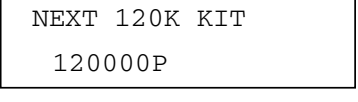
Procedure

Description of Procedures	LCD Message
1) Press the Reprint button. (a) → (b)	a) <div>SERVICE MODE ▷ TEST PRINT</div>
2) Using the Back or Set button, select the desired pattern (ex. grid pattern), and then press the Reprint button. (b) → (c)	b) <div>31 TEST PRINT ▷ GRID STRIPE</div>
3) Using the Back or Set button, select the desired color (ex. red color), and then, press the Reprint button. (c) → (d)	c) <div>31 GRID PRNT ▷ Y/M/C/K/R/G/B</div> R:YM G:YC B:MC
4) After completion of the warming-up process, the desired pattern of the selected color will be continuously printed. (d)	
5) Print operation is suspended by pressing the - button. (d) → (e)	d) <div>31 GRID PRNT [YM]</div>
If it is desired to return to the previous screen (message), press the - button one more time. (e) → (d)	
6) If it is desired to return to On-line mode, press the Go button. (f) → (g)	e) <div>31 GRID PRNT ▷ Y/M/C/K/R/G/B</div> f) <div>SERVICE MODE ▷ TEST PRINT</div> g) <div>01 WAIT [] [] []</div>

32	NEXT CARE INFORMATION
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Information relating to the replacement timing of periodical replacement parts can be obtained. This is the life for each of the components in images or pages.

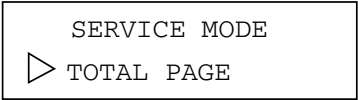
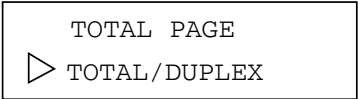
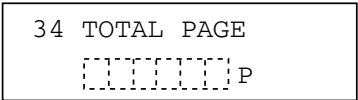
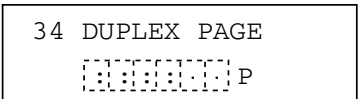
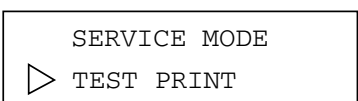
Procedure

Description of Procedures	LCD Message
1) Press the Reprint button after selecting Screen (a) "NEXT CARE INFO". (a) → (b)	a) 
2) Using the Back or Set button, select the care code for which you need the information. 2: Fuser Cleaner (FC) 7: OPC Belt Cartridge (BL) 8: Fusing Unit (FU) 9: Transfer Drum (TD) 10: Replacement Kit by every 120K (OW) 13: Pick-up Roller (PK) 14: Pick-up Roller (PL) 16: Paper Discharger (PD) (b)	b)  
3) After selecting the desired information's code, press the Reprint button. Then, the number of images or printouts corresponding to the selected code is displayed. (b) → (c) through (f)	c)  
4) Screen (c) through (f) can be cleared by pressing the - button. (f) → (e) → (d) → (c) → (b) Press the - button one more time at screen (b) to return to the service mode. (b) → (a)	d)  

34	TOTAL PAGE
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The total number of printouts can be confirmed.



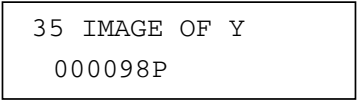
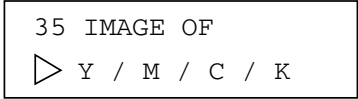

Procedure

Description of Procedures	LCD Message
1) Press the Reprint button after selecting "TOTAL PAGE" mode. (a) → (b)	a) 
2) Select one type of page from among TOTAL PAGE, DPL PAGE.	b) 
3) 6 digit number is displayed. This number represents the total number of pages that have been printed out. (b)	c) 
3) Press the - button to clear the screen (c). (d) → (e)	d) 
	e) 

35	EACH IMAGE
----	------------

Number of created images for each color used in printing can be confirmed.

Procedure

Description of Procedures	LCD Message
1) Press the Reprint button after selecting "EACH IMAGE" mode. (a) → (b)	a) 
2) Using the Back or Set button, select the subject color and then press the Reprint button. (b) → (c)	b) 
3) The number of images created in the selected color is displayed. (Ex. Yellow) (c)	c) 
4) Press the - button to exit this mode from screen (c). (c) → (d)	
5) Using the Back or Set button, select another color and then press the Reprint button to confirm the number of images created in that color.	d) 
6) Press the - button to return to the Service mode. (d) → (e)	e) 

Care Code counters displayed on the LCD can be cleared. Make sure that you clear the relevant CLEAR CARE mode whenever replacing the applicable periodical replacement parts with new ones.

Procedure

Description of Procedures	LCD Message																														
1) Press the Reprint button after selecting “CLEAR CARE” mode. (a) → (b)	a) <div>SERVICE MODE ▷ CLEAR CARE</div>																														
2) Using the Back or Set button, have the cursor meet the applicable CARE code and then press the Reprint button. (b) → (c)	b) <div>36 CLEAR CARE 12345678910·12···16</div>																														
3) When implementing CLEAR CARE, use the Back or Set button to select YES and then press the Reprint button. (c) → (d)	c) <div>CARED FC ROLL ? ▷ YES/NO</div>																														
<table><tr><th>No.</th><th>Periodic Maintenance Parts</th><th>Code</th></tr><tr><td>2</td><td>Fuser Cleaner</td><td>FC</td></tr><tr><td>7</td><td>OPC Belt Cartridge</td><td>BC</td></tr><tr><td>8</td><td>Fusing Unit</td><td>FU</td></tr><tr><td>9</td><td>Drum Cleaner</td><td>120K</td></tr><tr><td></td><td>Transfer Roller</td><td>OW</td></tr><tr><td>10</td><td>Transfer Drum</td><td>TD</td></tr><tr><td>13</td><td>Paper Pick-up Roller</td><td>PK</td></tr><tr><td>14</td><td>Paper Pick-up Roller (LFU)</td><td>PL</td></tr><tr><td>15</td><td>Paper Discharger</td><td>PD</td></tr></table>	No.	Periodic Maintenance Parts	Code	2	Fuser Cleaner	FC	7	OPC Belt Cartridge	BC	8	Fusing Unit	FU	9	Drum Cleaner	120K		Transfer Roller	OW	10	Transfer Drum	TD	13	Paper Pick-up Roller	PK	14	Paper Pick-up Roller (LFU)	PL	15	Paper Discharger	PD	d) <div>36 CLEAR CARE 12345678910·12···16</div>
No.	Periodic Maintenance Parts	Code																													
2	Fuser Cleaner	FC																													
7	OPC Belt Cartridge	BC																													
8	Fusing Unit	FU																													
9	Drum Cleaner	120K																													
	Transfer Roller	OW																													
10	Transfer Drum	TD																													
13	Paper Pick-up Roller	PK																													
14	Paper Pick-up Roller (LFU)	PL																													
15	Paper Discharger	PD																													
6) Press the - button to clear the CLEAR CARE mode. (d) → (e)	e) <div>SERVICE MODE ▷ TEST PRINT</div>																														

37	MEDIA MANAGE
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The signal from the OHP sensor can be ignored when the media is selected to OHP. However, this mode should not be used under normal circumstances.

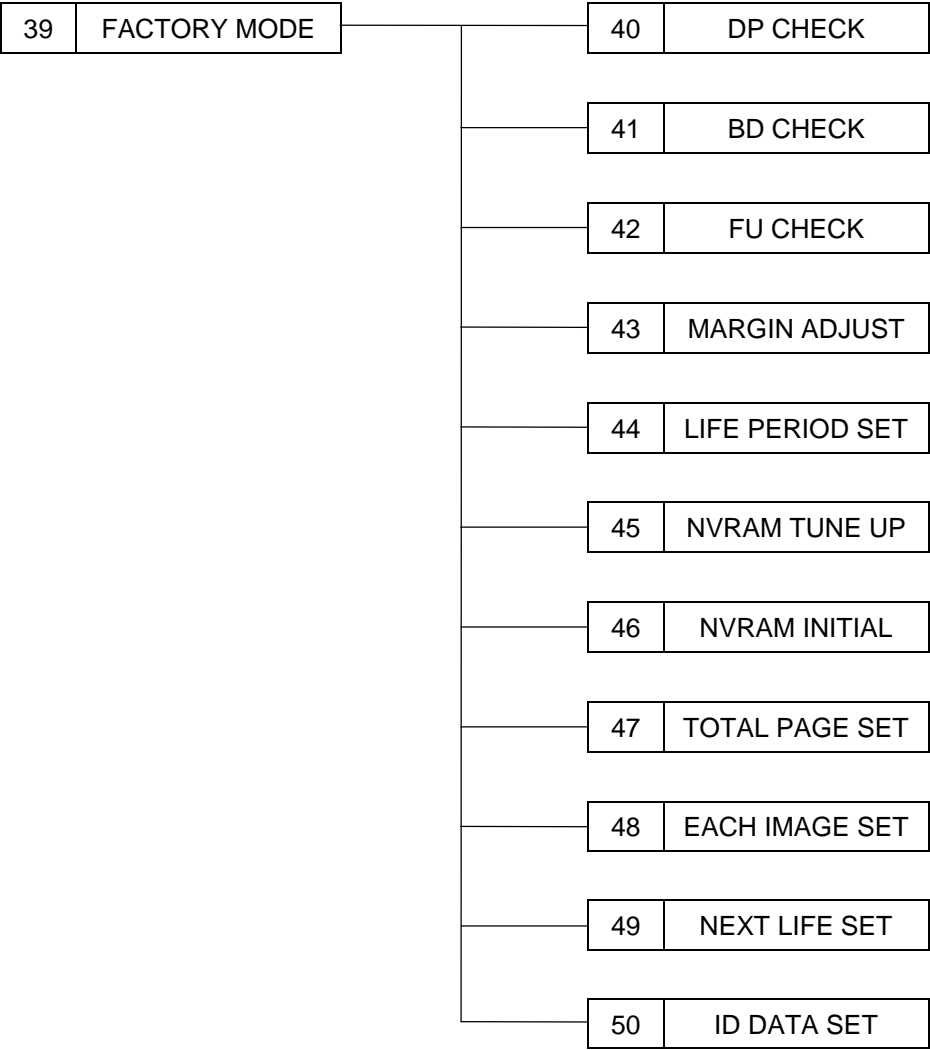
Procedure

Description of Procedures	LCD Message
1) Press the Reprint button after selecting "MEDIA MANAGE". (a) → (b)	a) <div> <div>SERVICE MODE</div> <div>▶ MEDIA MANAGE</div> </div>
2) Select DEFIANCE and then press the Reprint button if the OHP sensor signal should be ignored. (b) → (c) In normal operation, the mode is preset to MANAGE.	b) <div> <div>37 MEDIA MANAGE</div> <div>▶ MANAGE/DEFIANCE</div> </div>
	c) <div> <div>SERVICE MODE</div> <div>▶ TEST PRINT</div> </div>

39	FACTORY MODE
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This mode consists of 9 (nine) subordinate modes for the confirmation of operation and the resetting functions necessary for maintenance work.

Basic Configuration



40	DP CHECK
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Each individual color Toner cartridge can be driven.

Procedure

Description of Procedures	LCD Message
1) Press the Reprint button after selecting "DP CHECK". (a) → (b)	a) <div>39 FACTORY MODE ▷ DP CHECK</div>
2) Using the Back or Set button, select the desired color and then press the Reprint button. (Ex. yellow color) (b) → (c)	b) <div>40 DP CHECK ▷ Y/M/C/K</div>
3) The selected color toner cartridge starts to drive. If no error occurs in driving, the message "GOOD" is displayed in the LCD, otherwise "FAIL". (c) Toner cartridge drive will automatically stop after 60 seconds. (c) → (d)	c) <div>40 DP CHECK Y GOOD</div>
4) Press the - button to stop the DP CHECK mode. (d) Press the - button one more time to return to the status of screen (a). (d) → (e)	d) <div>40 DP CHECK ▷ Y/M/C/K</div> e) <div>FACTORY MODE ▷ DP CHECK</div>

41	BD CHECK
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Laser beam position and laser power can be checked.

Procedure

Description of Procedures	LCD Message
1) Press the Reprint button after selecting "BD CHECK". (a) → (b)	a) <div>39 FACTORY MODE ▷ BD CHECK</div>
2) The scanner motor scans the laser beam as it is rotating. If the scanning position of the laser beam is normal, "GOOD" is displayed on the LCD, otherwise "FAIL". (b) or (c) Scanner motor automatically stops rotating after 60 seconds. (d)	b) <div>41 BD CHECK GOOD</div>
3) Press the - button to exit the BD CHECK mode. (b) → (d)	c) <div>41 BD CHECK FAIL</div>
	d) <div>39 FACTORY MODE ▷ DP CHECK</div>

42	FU CHECK
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Availability of oil in the fusing unit can be checked.

Procedure

Description of Procedures	LCD Message
1) Press the Reprint button after selecting "FU CHECK". (a) → (b)	a) <div>39 FACTORY MODE ▷ FU CHECK</div>
2) When powered on, the fusing unit starts the heating-up process and subsequently checks the fusing temperature. If the fusing temperature reaches the "print ready" status, "GOOD" message appears in LCD. If not, "FAIL" message. (b)	b) <div>43 FU CHECK TEMP:GOOD</div>
3) Press the - button to exit the FU CHECK mode. (b) → (c)	c) <div>39 FACTORY MODE ▷ DP CHECK</div>

43	MARGIN ADJUST
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The position of the top margin and left margin can be confirmed and adjusted within the range -3.5mm max. and +3.5mm max.

Procedure

Description of Procedures	LCD Message
1) Press the Reprint button after selecting "MARGIN ADJUST". (a) → (b)	a) <div>39 FACTORY MODE ▷ MARGIN ADJUST</div>
2) Using the Back or Set button, select either TOP or LEFT1/LEFT3 and then press the Reprint button. (b) → (c) LEFT: For adjustment of left edge of upper cassette. LEFT1: For adjustment of left edge of lower cassette. LEFT3: For adjustment of left edge from duplex unit.	b) <div>43 MARGIN ADJUST ▷ TOP/LEFT/LEFT1/ NONE/LEFT3</div>
3) The margins can be adjusted by up to 3.5mm left and right in 0.5mm steps from the reference value "0". Using the Back or Set button, select the amount of adjustment by selecting a number displayed in screen (c) or (d). The amount of adjustment selected will be displayed at the upper right corner of Screen (c) or (d). After confirming the desired amount of adjustment is displayed, press the Reprint button to set the adjustment.	c) <div>43 TOP -2.0mm -<765432101>+</div>
	d) <div>43 TOP +2.5mm -<101234567>+</div>
4) Press the - button to exit the MARGIN ADJUST mode. (d) → (e)	e) <div>43 MARGIN ADJUST ▷ TOP/LEFT/LEFT1/ NONE/LEFT3</div>
5) Press the - button one more time to return to FACTORY MODE. (e) → (f)	f) <div>39 FACTORY MODE ▷ DP CHECK</div>

Replacement life of the periodical replacement parts can be set.

Procedure

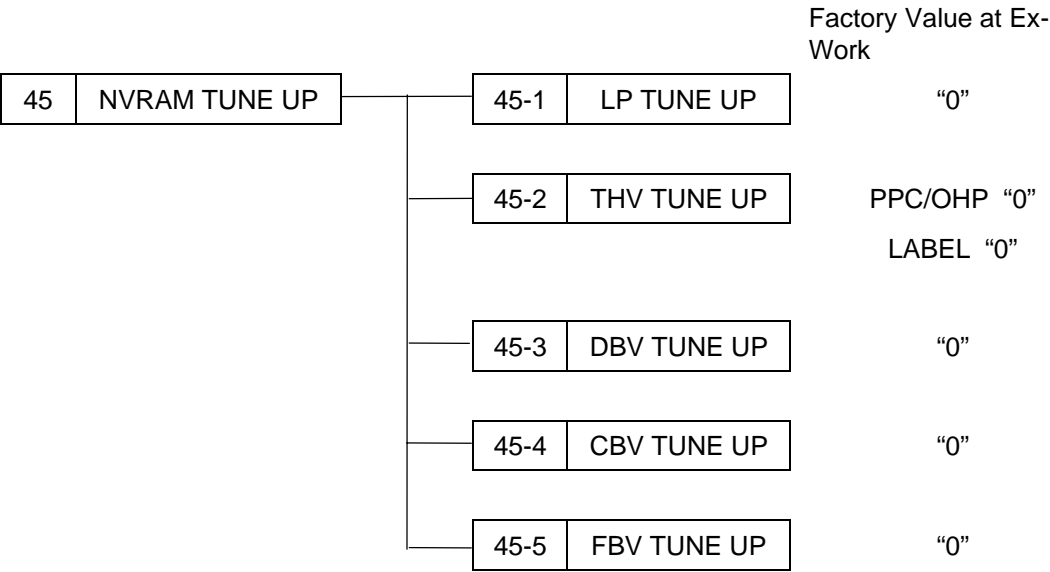
Description of Procedures	LCD Message
1) Press the Reprint button after selecting "LIFE PERIOD" mode. (a) → (b)	a) <div>39 FACTORY MODE ▷ LIFE PERIOD SET</div>
2) Using the Back or Set button, select the desired code to be set and then press the Reprint button. 2: Fuser Cleaner (FC) (a) → (b) 7: OPC Belt Cartridge (BC) (d) 8: Fusing Unit (FU) (e) 9: Transfer Drum (TD) (f) 10: 120K Replacement Kit (OW) (g) 13: Paper Pick-up Roller (PK) 14: Paper Pick-up Roller (PL) 16: Paper Discharger (PD)	b) <div>44 LIFE PERIOD 12345678910·12···16</div> c) <div>PERIOD FC ROLL 012000 P SET</div> d) <div>PERIOD BC UNIT 60000 P SET</div>
3) Use the Back or Set button to select the desired digit. Use the Reprint button to input value to the blinking digit. Upon completion of inputting the values to be set, use the Back or Set button to select SET on the LCD and then press the Reprint button to register the set value.	e) <div>PERIOD FU UNIT 60000 P SET</div> f) <div>PERIOD TR DRUM 300000 P SET</div>
4) Press the - button to complete the setting work. (g)	g) <div>PERIOD 120K UNIT 120000 P SET</div>
5) Press the - button one more time to return to FACTORY MODE. (g) → (h)	h) <div>44 LIFE PERIOD 12345678910·12···16</div> i) <div>39 FACTORY MODE ▷ DP CHECK</div>

45	NVRAM TUNE UP
----	---------------

This mode is not used in normal operations, but is used when fine adjustment of the adjust value is required.

This mode consists of following 8 (eight) subordinate modes:

Configuration of NVRAM TUNE UP



45-1	LP TUNE UP
------	------------

This mode should be used when optical density, line thickness and/or color reproduction needs to be adjusted. The adjustment is made by changing the laser power against the reference value 0 (zero) in the range -4 to +4.

Description of Procedures	LCD Message
1) Press the Reprint button after selecting "NVM TUNE UP". (a) → (b)	a) <div>39 FACTORY MODE ▷ NVM TUNE UP</div>
2) After selecting LP TUNE UP Code 1, press the Reprint button. (b) → (c)	
3) After selecting the color to be adjusted, press the Reprint button. (Ex. Yellow). (c) → (d)	b) <div>45 NVM TUNE UP △2345678910·12··· 16</div>
4) The adjustment value can be adjusted in 8 steps between the -4 and +4. After selecting the required number press the Reprint button. (d)	c) <div>45 LP TUNE UP ▷ Y/M/C/K</div>
5) Press the - button to finish the adjustment for yellow. (d) → (e) Repeat steps 3 to 5 if adjustment work is required for another color.	d) <div>45 YELLOW [O] -<4321△1234>+</div>
6) Press the - button to finish the adjustments. (e) → (f)	e) <div>45 LP TUNE UP ▷ Y/M/C/K</div>
	f) <div>45 NVM TUNE UP △2345678910·12··· 16</div>

45-2	THV TUNE UP
------	-------------

This mode shall be used when the transfer voltage needs to be adjusted due to errors such as transfer failure onto the media. The adjustment is used to change the transfer voltage, subject to the media to be used, against the reference value 0 (zero) in the range -4 to +4.

Description of Procedures	LCD Message
1) Press the Reprint button after selecting "NVM TUNE UP". (a) → (b)	a) <div>39 FACTORY MODE ▷ NVM TUNE UP</div>
2) After selecting THV TUNE UP Code 2, press the Reprint button. (b) → (c)	
3) After selecting the media to be adjusted, press the Reprint button. (Ex. PPC). (c) → (d)	b) <div>45 NVM TUNE UP △2345678910·12···16</div>
4) Adjustment can be made in 8 steps between -4 and +4. After selecting a given number, press the Reprint button. (d)	c) <div>45 THV TUNE UP ▷ PPC/OHP/LABEL</div>
5) Press the - button to wrap up the adjustment for PPC. (d) → (e) Repeat steps 3 to 5 for other media such as OHP or Labels.	d) <div>45 THV PPC [] -<4321△1234>+</div>
6) Press the - button to wrap up the adjustments. (e) → (f)	e) <div>45 THV TUNE UP ▷ PPC/OHP/LABEL</div>
	f) <div>45 NVM TUNE UP △2345678910·12···16</div>

45-3	DBV TUNE UP
------	-------------

This mode shall be used when the image optical density needs to be adjusted.
Adjustment of the developer bias voltage against the reference value 0 (zero) in the range between the step -4 and +4.

Description of Procedures	LCD Message
1) Press the Reprint button after selecting "NVM TUNE UP". (a) → (b)	a) <div>39 FACTORY MODE ▷ NVM TUNE UP</div>
2) After selecting DBV TUNE UP Code 3, press the Reprint button. (b) → (c)	
3) After selecting the color to be adjusted, press the Reprint button. (Ex. Magenta). (c) → (d)	b) <div>45 NVM TUNE UP 12345678910.12...16</div>
4) The adjustment value can be adjusted in 8 steps between -4 and +4. After selecting a given number, press the Reprint button. (d) → (e)	c) <div>45 DBV TUNE UP ▷ Y/M/C/K</div>
5) Press the - button to finish the adjustment work for Magenta. (d) → (e) Repeat steps 3 to 5 for each color.	d) <div>45 MAGENTA [-1] -<432101234>+</div>
6) Press the - button to finish the DBV adjustment work. (e) → (f)	e) <div>45 DBV TUNE UP ▷ Y/M/C/K</div>
	f) <div>45 NVM TUNE UP 12345678910.12...16</div>

45-4	CBV TUNE UP
------	-------------

This mode should be used when image defects attributed to the OPC belt need to be improved. Adjustment is to alter the OPC belt bias voltage against the reference value 0 (zero) in the range between the step -4 to +4.

Description of Procedures	LCD Message
1) Press the Reprint button after selecting "NVM TUNE UP". (a) → (b)	a) <div>39 FACTORY MODE ▷ NVM TUNE UP</div>
2) After selecting CBV TUNE UP Code 5, press the Reprint button. (b) → (c)	b) <div>45 NVM TUNE UP 1234△678910·12···16</div>
3) The adjustment value can be adjusted in 8 steps between -4 and +4. After selecting a given number, press the Reprint button. (c)	c) <div>45 CBV TUNE UP -<4321△1234>+</div>
4) Press the - button to finish the adjustment work for CBV. (c) → (d)	d) <div>45 NVM TUNE UP △2345678910·12···16</div>

45-5	FBV TUNE UP
------	-------------

This mode should be used when image defects attributed to the transfer drum need to be improved. Adjustment is to adjust the drum cleaner bias voltage against the reference value 0 (zero) in the range between the step -4 and +4.

Description of Procedures	LCD Message
1) Press the Reprint button after selecting "NVM TUNE UP". (a) → (b)	a) <div>39 FACTORY MODE ▷ NVM TUNE UP</div>
2) After selecting FBV TUNE UP Code 6, press the Reprint button. (b) → (c)	b) <div>45 NVM TUNE UP 12345△78910·12···16</div>
3) The adjustment value can be adjusted in 8 steps between -4 and +4. After selecting a given number, press the Reprint button. (c)	c) <div>45 FBV TUNE UP -<4321△1234>+</div>
4) Press the - button to finish the adjustment work for FBV. (c) → (d)	d) <div>45 NVM TUNE UP △2345678910·12···16</div>

46	NVRAM INITIAL
----	---------------

This mode can initialize (data clear) all the data of NVRAM on MCTL PWB 2, and also can execute NVRAM CLEAR to clear C3 error when occurred.



WARNING

NVRAM INITIAL is not used under normal circumstances; Bear in mind that execution of this mode is beset with loss of all the data in NVRAM.

Therefore, all the data in NVRAM should be stored prior to executing NVRAM INITIAL.

Description of Procedures	LCD Message												
<p>1) Press the Reprint button after selecting "NVRAM INITIAL". (a) → (b)</p> <p>2) Select YES if NVRAM should be executed. If not select NO. Press the Reprint button so that the RAM INITIAL will be executed. (All the data will be cleared.) (b) → (c)</p> <p>4) Following modes shall be executed to set the RAM data.</p> <table border="1"> <tr><td>43</td><td>MARGIN ADJUST</td></tr> <tr><td>44</td><td>LIFE PERIOD SET</td></tr> <tr><td>45</td><td>NVRAM TUNE UP</td></tr> <tr><td>47</td><td>TOTAL PAGE SET</td></tr> <tr><td>48</td><td>EACH IMAGE SET</td></tr> <tr><td>49</td><td>NEXT LIFE SET</td></tr> </table> <p>* When setting NVRAM TUNE UP, LP TUNE UP to be set at "-3".</p>	43	MARGIN ADJUST	44	LIFE PERIOD SET	45	NVRAM TUNE UP	47	TOTAL PAGE SET	48	EACH IMAGE SET	49	NEXT LIFE SET	<p>a)</p> <div> 39 FACTORY MODE ▷ NVRAM INITIAL </div> <p>b)</p> <div> 46 NVRAM INITIAL ▷ YES / NO </div> <p>c)</p> <div> 39 FACTORY MODE ▷ DP CHECK </div>
43	MARGIN ADJUST												
44	LIFE PERIOD SET												
45	NVRAM TUNE UP												
47	TOTAL PAGE SET												
48	EACH IMAGE SET												
49	NEXT LIFE SET												

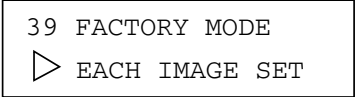
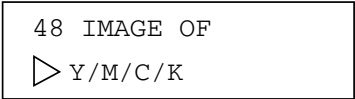
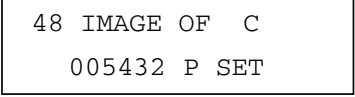
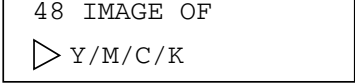
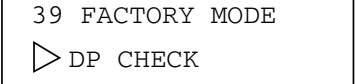
47	TOTAL PAGE SET
----	----------------

This mode can reset the number of total pages in the NVRAM whenever NVRAM INITIAL has been executed or the MCTL PWB 2 is replaced.

Description of Procedures	LCD Message
<p>1) Press the Reprint button after selecting "TOTAL PAGE SET". (a) → (b)</p> <p>2) Select one type of page from among TOTAL PAGE, DPL PAGE. (b) → (c)</p> <p>2) Use the Back or Set button to select the desired digit.</p> <p>Use the Reprint button to input values to the blinking digit.</p> <p>Upon completing the input of the values, use the Back or Set button to select SET displayed on the LCD and then press the Reprint button to store the set value. (c) → (d)</p>	<p>a)</p> <div>39 FACTORY MODE ▷ TOTAL PAGE SET</div> <p>b)</p> <div>47 TOTAL PAGE ▶ TOTAL /DUPLEX</div> <p>c)</p> <div>47 TOTAL PAGE [][][][][][] P</div> <p>c)</p> <div>47 DUPLEX PAGE [][][][][][] P</div> <p>d)</p> <div>39 FACTORY MODE ▷ DP CHECK</div>

48	EACH IMAGE SET
----	----------------

This mode can reset the number of total pages of each color in the NVRAM whenever NVRAM INITIAL is executed or the MCTL PWB 2 is replaced.

Description of Procedures	LCD Message
<p>1) Press the Reprint button after selecting "EACH IMAGE SET". (a) → (b)</p> <p>2) Select the desired color to reset in EACH IMAGE SET. (b) → (c)</p> <p>3) Use the Back or Set button to select the desired digit. Use the Reprint button to input values to the selected (blinking) digit. Upon completing the input of the values, use the Back or Set button to select SET on the LCD and then press the Reprint button to store the set value. (c) → (d)</p> <p>4) Press the - button to exit the EACH IMAGE SET mode. (d) → (e)</p>	<p>a) </p> <p>b) </p> <p>c) </p> <p>d) </p> <p>e) </p>

49	NEXT LIFE SET
----	---------------

This mode is to set the replacement timing (number of prints) of periodic replacement parts.

Description of Procedures	LCD Message
<p>1) After selecting NEXT LIFE SET, press Reprint button.</p> <p>2) After selecting the code to be set, press Reprint button. (Example : Fuser Cleaner) 2:Fuser Cleaner (FC) 7:OPC Belt Cartridge (BC) 8:Fusing Unit (FU) 9:Transfer Drum (TD) 10:120K Volume Stack Kit (OW) 13:Paper Pick-up Roller (PK) 14:Paper Pick-up Roller (PL) 16:Paper Discharger (PD)</p> <p>(a) → (b)</p> <p>3) Designate or alter the figure with the Back or Set button (b) → (c)</p> <p>Use the Reprint button to input the number to the blinking figure. (for example, 7800) After inputting the desired number (7800 as example), move the cursor to SET with the Back or Set button. Then, press Reprint button to complete the registration of desired number (7800 as example) (c) → (d) (e)</p> <p>4) Press the - button to complete the procedure of NEXT LIFE SET. (e) → (f)</p>	<p>a)</p> <div>39 FACTORY MODE ▷ NEXT LIFE SET</div> <p>b)</p> <div>49 NEXT LIFE SET 1△345678910·12...16</div> <p>c)</p> <div>PERIOD FC ROLL 007800 P SET</div> <p>d)</p> <div>PERIOD FC ROLL 007800 P △SET</div> <p>e)</p> <div>49 NEXT LIFE SET △2345678910·12...16</div> <p>f)</p> <div>39 FACTORY MODE ▷ DP CHECK</div>

3.4 Adjustment Work Procedures

3.4.1 Adjustment of Top and Left Margin

The top and left margins can be adjusted by button operation on the control panel.

<Purpose>

If there is no top margin or left margin set for the print guarantee area or when the MCTL PWB 2 is replaced, the adjustment of top and left margin will be required.

<Adjustment Method>

- 1) Execute "GRID PRINT" in Service Mode.
- 2) Measure the position 'A' and 'B' of top margin.
$$[\text{Leading edge}] (A + B) / 2 \leq \text{Specification Value } 4.5 \pm 1.5\text{mm}$$
- 3) Measure the position 'C' and 'D' of left margin.
$$[\text{Left edge}] (C + D) / 2 \leq \text{Specification Value } 3.5 \pm 1.5\text{mm}$$
- 4) If the specification value is not met, implement the adjustment.
 - i) Execute "43 MARGIN ADJUST" in the FACTORY MODE.
- 5) After adjustment execute "GRID PRINT" and confirm the margins.

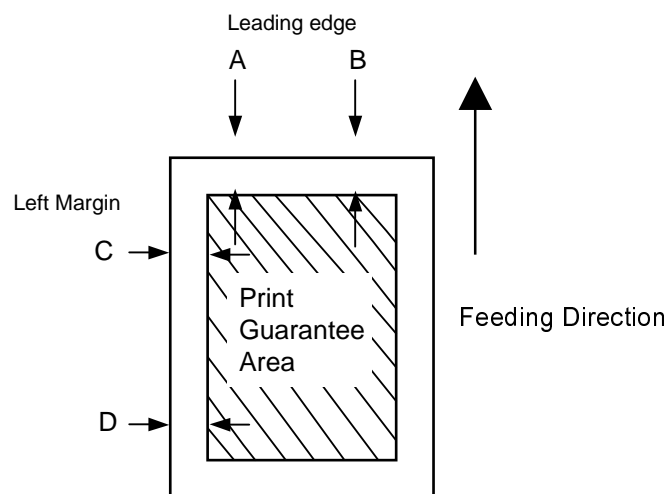


Fig.5-2

3.4.2 Setting of Engine NVRAM Data

As data in the NVRAM has been preset to the optimum value at the factory, it is not necessary to change the preset values under normal conditions. However, fine adjustment may be required subject to the media or operational conditions.

<Purpose>

Print quality can be improved by changing the preset value in the engine NVRAM.

<Procedures of Setting>

- 1) Follow the procedures set out in Section 2.3 'Service Mode' in this chapter.
- 2) Select RAM TUNE UP mode.
- 3) Select the desired TUNE UP mode.
- 4) Adjust the preset value to the appropriate value (step).
- 5) Carry out a test print to confirm the print quality.

<Subject TUNE UP Mode>

Mode	Subject of Adjustment	Purpose
LP TUNE UP	Adjustment of laser power	Optical density
THV TUNE UP	Adjustment of transfer voltage	Transfer efficiency
DBV TUNE UP	Adjustment of developer bias	Optical density
CBV TUNE UP	Adjustment of OPC belt bias	Optical density
FBV TUNE UP	Adjustment of cleaning roller bias	Drum cleaning efficiency

3.4.3 Confirmation and Setting of Total Number of Printouts

The total number of printouts is stored in the RAM. Confirmation and setting of total number of printouts can be carried out on the control panel.

<Purpose>

Total number of printouts will be reset when changing the MCTL PWB 2 or executing an NVRAM INITIAL.

<Procedures of Setting>

- 1) Execute 47 TOTAL PAGE in the Factory Mode.
- 2) Reset the total number of printouts.
- 3) After making the setting, execute 34 TOTAL PAGE to confirm that the desired number of printouts is now set.

3.4.4 Setting of Number of Images for Each Color

The number of printouts for each color (4 colors) is stored in the RAM. Confirmation and setting of the number of images for each color can be carried out on the control panel.

<Purpose>

Number of images for each color will be reset when changing the MCTL PWB 2 or executing NVRAM INITIAL.

<Procedures of Setting>

- 1) Execute 48 EACH IMAGE in the Factory Mode.
- 2) Reset the number of printouts for each color.
- 3) After making the setting, execute 35 EACH IMAGE SET to confirm that the desired number of images is now set.

3.4.5 Initial Setting of Engine NVRAM

Implement the initial setting at the replacement of MCTL PWB 2 after clearing the contents of NVRAM.

<Purpose>

The number of images for each color will be reset when changing the MCTL PWB 2 or executing NVRAM INITIAL.

<Procedures of Setting>

- 1) Before replacing the MCTL PWB 2, confirm the contents of the NVRAM for the following items.

“Factory Mode”

Code	Subject	Confirmation Value
43	MARGIN ADJUST	Top Margin Set Value (Default in ordinary case)
43	MARGIN ADJUST	Left Margin Set Value(Default in ordinary case)
44	LIFE PERIOD SET	Life Period Set Value(Default in ordinary case)
45	LP TUNE UP	Adjustment Value (“0” in ordinary case)
45	THV TUNE UP	Adjustment Value (“0” in ordinary case)
45	DBV TUNE UP	Adjustment Value (“0” in ordinary case)
45	CBV TUNE UP	Adjustment Value (“0” in ordinary case)
45	FBV TUNE UP	Adjustment Value (“0” in ordinary case)
47	TOTAL PAGE SET	Total Print Count
48	EACH IMAGE SET	Image Count of 4 Colors

- 2) Execute 46 NVRAM INITIAL in the Factory Mode.
- 3) After implementing the NVRAM INITIAL, input the values obtained in procedure 1) into the NVRAM to complete the settings.

CHAPTER VI

PERIODIC MAINTENANCE

CONTENTS

CHAPTER VI PERIODIC MAINTENANCE..... VI-1

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CHAPTER VI PERIODIC MAINTENANCE

1. GENERAL

1.1 Handling Precautions

Since this high quality laser printer is a precision equipment, daily checking and periodic maintenance is indispensable to maintain the expected high performance.

The following is the list of important precautions & action items for maintenance and periodic replacement parts:

- 1) Refrain from any operation, disassembly or modification that is not set out in this manual.
- 2) When assembling or disassembling the printer, turn off the power supply and unplug the power cord from the power outlet before commencing any work.
- 3) Whenever any parts are replaced, confirm that all the removed and replaced parts are re-installed correctly prior to testing the printer.
- 4) Read carefully and take note of any precaution or warning labels affixed to any parts.
- 5) Unless otherwise specified, follow exactly the reverse order of the disassembly procedures for re-assembly. Do not get the types of removed screws mixed up and check that the screw is the correct length.
- 6) Do not use any solvent for cleaning, both inside and outside the printer.
- 7) It is strictly forbidden to dump waste toner with flammable substances or throw it into a fire. This is a very important caution to respect.

1.1.1 List of Maintenance Tools

Table 6-1 below lists the maintenance tools required for the printer.

Table 6-1

No.	Tool Name	Function
1	Phillips Screwdriver #1	For M3
2	Phillips Screwdriver #2	For M4
3	Phillips Screwdriver (short shank) #2	For M4
4	Slotted Screwdriver #1	For slotted head screw
5	Slotted Screwdriver #2	For slotted head screw
6	Long-Nose Pliers	For general use
7	Pincette	For general use
8	Precision Driver Set (#1 ~ #6)	For general use
9	Gap gauge	For gap adjustment
10	Pliers for C Ring	C Ring
11	Ruler (150mm)	For general use
12	Slide Caliper (150mm)	For general use
13	Digital Meter (DC1000V)	For general use
14	Handy Type Cleaner unique for toner	For cleaning
15	Soft Fur Brush	For cleaning

1.1.2 List of Consumables for Maintenance

Table 6-2 below lists the consumables for maintenance.

Table 6-2

No.	Tool Name	Quantity	Function
1	Toner Cartridge (Y)	1 piece	Test Print
2	Toner Cartridge (M)	1 piece	Test Print
3	Toner Cartridge (C)	1 piece	Test Print
4	Toner Cartridge (K)	1 piece	Test Print
5	Fuser Cleaner / Oil Bottle	1 piece	Test Print
6	OPC Belt Cartridge	1 piece	Test Print
7	Recommended Paper (A4 or letter)	5 sheets	Test Print
8	Recommended Paper (Transparency)	2 sheets	Test Print
9	Cotton Cloth	10~15 pcs.	Cleaning
10	Cotton Swab	10~15 pcs.	Cleaning
11	Grease	10 grams	M.G** PS265
12	Vinyl Bag	2 bags	Disposal

** M.G stands for Molybdenum Grease.

1.2 Periodic Maintenance Cleaning

See Table 6-3 for details of periodic maintenance cleaning for the following parts.

- 1) Registration Roller 2 / Paper Pick-up Roller
- 2) Transfer Roller 2
- 3) Paper Discharger
- 4) OPC Belt Cartridge
- 5) Dustproof Glass of the Optical Unit 2
- 6) Printer Interior



WARNING

- *Before starting any maintenance work, make sure you have unplugged the power cord from the power outlet*
- *There is a risk of electric shock working on the printer with the power connected.*

Periodic Maintenance Cleaning Work

Table 6-3

No.	Parts Name	Cleaning Work		Cleaning Cycle *1 (Condition or Case)
		Description	Section	
1	Registration Roller 2 / Paper Pick-up Roller	<ol style="list-style-type: none"> 1. Pull out the media cassette. 2. Open the transfer unit 2. 3. Clean the registration roller 2 and surrounding area using a dry cloth. 4. Clean the paper pick-up roller while rotating it using a dry cloth. 	1.2.1	<ul style="list-style-type: none"> • Defective image • Smeared paper • Periodic maintenance
2	Transfer Roller 2	<ol style="list-style-type: none"> 1. Open the transfer unit 2. 2. Clean roller and surrounding area using a dry cloth. 	1.2.2	<ul style="list-style-type: none"> • Defective image • Smeared paper • Periodic maintenance
3	Paper Discharging Roller	<ol style="list-style-type: none"> 1. Open the transfer unit 2. 2. Remove the paper discharger unit. 3. Clean the corona wire and case, using a cotton swab. 	1.2.3	<ul style="list-style-type: none"> • Defective image • Paper jam • Periodic maintenance
4	OPC Belt Cartridge	<ol style="list-style-type: none"> 1. Remove the OPC belt cartridge. 2. Clean up spilt toner around the OPC belt cartridge and cleaning blade. 3. Clean the corona wire using the wire brush. 	1.2.4	<ul style="list-style-type: none"> • Defective image • Periodic maintenance

Periodic Maintenance Cleaning Work

Table 6-3

No.	Parts Name	Cleaning Work		Cleaning Cycle *1 (Condition or Case)
		Description	Section	
5	Dustproof Glass of Optical Unit 2	1. Remove the toner cartridges and the OPC belt cartridge. 2. Remove the dust-proof glass. 3. Using a dry cloth and swab, clean the dirt from the dust-proof glass.	1.2.5	<ul style="list-style-type: none"> Defective image Periodic maintenance
6	Printer Interior Unit	1. Remove the toner cartridges and OPC belt cartridge. 2. Clean the printer's base, using a toner vacuum cleaner and dry cloth.	1.2.6	<ul style="list-style-type: none"> Defective image Periodic maintenance
[Note] *1: If a periodic maintenance agreement has been made, checks will be made at every periodic maintenance service to prevent any problems from occurring.				

1.2.1 Cleaning the Registration Roller 2 / Paper Pick-up Roller

The registration roller 2 and paper pick-up roller should be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.

1) Registration Roller 2

<Tools to Prepare>

Cotton cloth (2 ~ 3 pieces)

<Cleaning Procedure>

- 1) Turn off the remote switch and power supply, and unplug the power code.
- 2) Open the transfer unit 2.
- 3) Using a cotton cloth, clean the registration roller 2 incorporated in the transfer unit 2 to remove the paper dust.

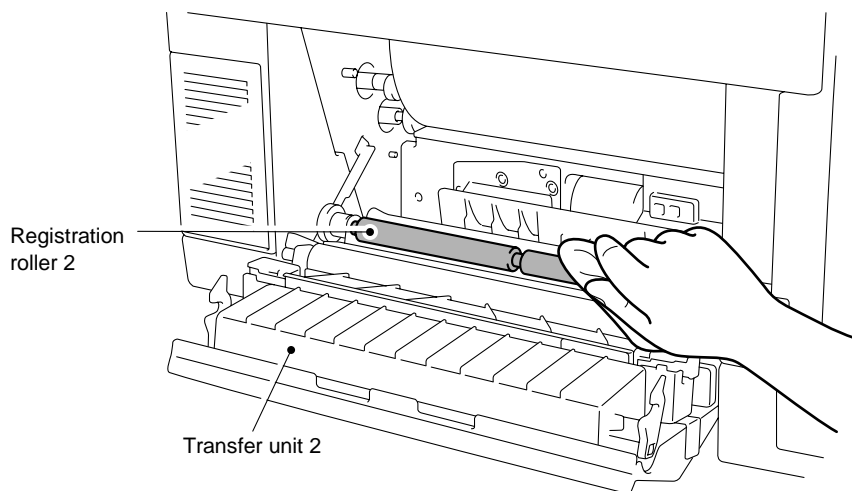


Fig.6-1



CAUTION

NEVER use alcohol or similar solvents for cleaning the registration roller 2.

2) Paper Pick-up Roller

<Tools to Prepare>

Cotton cloth (1 pieces)

<Cleaning Procedure>

- 1) Turn off the remote switch and power supply, and unplug the power code.
- 2) Pull out the media cassette.
- 3) Open the transfer unit 2.
- 4) With the cotton cloth, wipe off the stains such as paper dust adhered to the surface of paper pick-up roller. In this instance, softly wipe the roller by manually rotating it slowly.

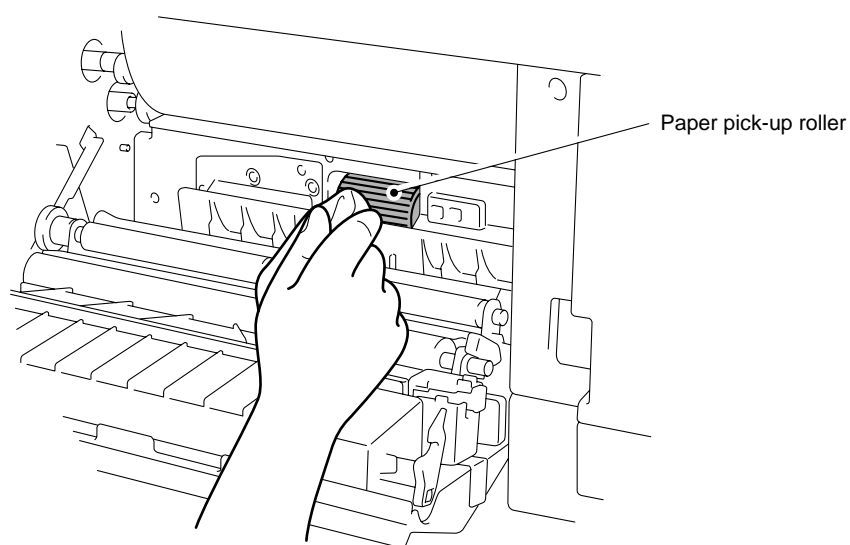


Fig.6-2



- *NEVER use alcohol or similar solvents for cleaning the paper pick-up roller.*
- *Application of strong force to the paper pick-up roller may result in the failure of misfeed.*

1.2.2 Cleaning the Transfer Roller 2

The transfer roller 2 should be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.

<Tools to Prepare>

Cotton cloth (2 ~ 3 pieces)

<Cleaning Procedure>

- 1) Turn off the remote switch and power supply, and unplug the power code.
- 2) Open the transfer unit 2.
- 3) Using a cotton cloth, clean the transfer roller 2.

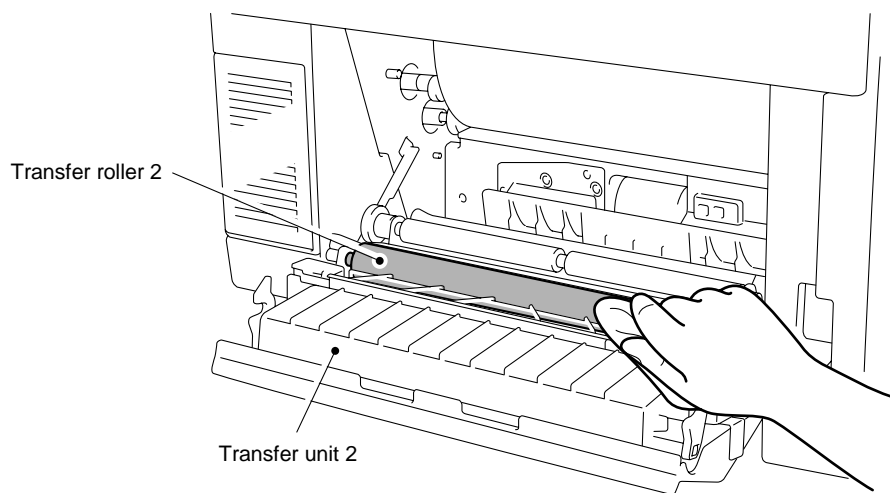


Fig.6-3



NEVER use alcohol or similar solvents for cleaning the transfer roller 2.

1.2.3 Cleaning the Paper Discharger

The paper discharger should be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.

<Tools to Prepare>

Cotton cloth (2 ~ 3 pieces)

Cotton swab (2 ~ 3 pieces)

<Cleaning Procedure>

- 1) Turn off the remote switch and power supply, and unplug the power code.
- 2) Open the transfer unit 2.
- 3) Remove the paper discharger unit.
 - i) Sliding AC charger to the arrow direction, release it from the locking claw.

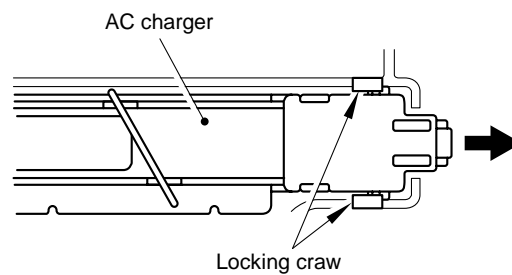


Fig.6-4

- ii) Pull the paper discharger unit upwards to remove it from the holder of the transfer unit 2.

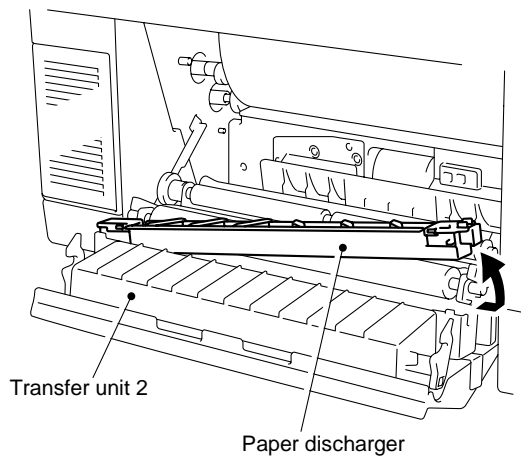


Fig.6-5

- 4) Clean the discharger case housing with a cotton cloth.

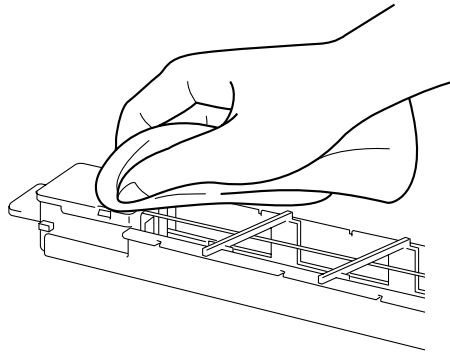


Fig.6-6

- 5) Clean the corona wire and the inside of the charger case with a cotton swab.
- 6) Re-install the charger unit into the transfer unit 2.

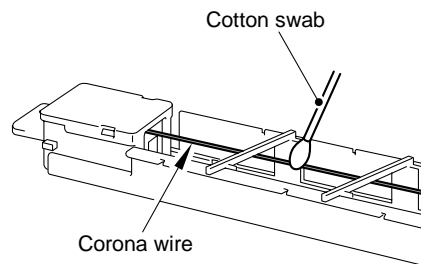


Fig.6-7



CAUTION

Do not break the corona wire while cleaning the paper discharger unit.

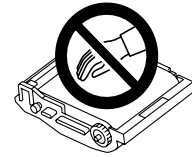
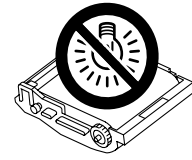
1.2.4 Cleaning the OPC Belt Cartridge

The OPC belt cartridge should be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.



PRECAUTION

- *If the belt is exposed for more than two minutes to a light source of 800 lux, the belt may be damaged.*
- *Do not directly touch the OPC belt surface with bare hands or gloves.*



<Tools to Prepare>

Cotton cloth (2 ~ 3 pieces)

<Cleaning Procedure>

- 1) Turn off the remote switch.
- 2) Open the paper exit unit cover 2 and the paper exit front cover 2.
- 3) Release the belt cartridge lock levers to pull out the OPC belt cartridge.
- 4) Clean the OPC belt cartridge with a cotton cloth.
 - i) Remove any toner on the back of the OPC belt cartridge.

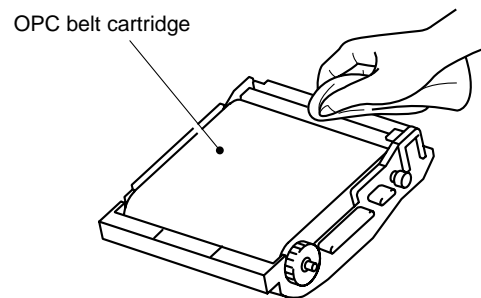


Fig.6-8

- ii) Slide the wire cleaner attached on the corona case to the right end and left end several times. Return the wire cleaner to the home position.
- iii) Clean the OPC belt cartridge case.

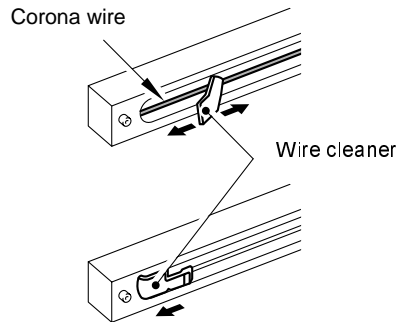


Fig.6-9



CAUTION

- Do not break the corona wire while cleaning the corona wire.
- Make sure that the wire cleaner is returned to the home position as shown in Fig. 6-9 after cleaning the corona wire.

Replacing the charge unit

When the problem of print quality such as a blur in the image or lines still occur after cleaning the corona wire, replace the charge unit following the procedures below;

<Tools to Prepare>

- 1) Protective sheet (1 piece)
- 2) Cotton cloth (2 ~ 3 pieces)

<Parts to Prepare>

Charge unit (one unit)

<Replacing Procedure>

- 1) Remove the OPC belt cartridge.
- 2) Cover the belt cartridge with the protective sheet and place the belt cartridge on the flat surface.

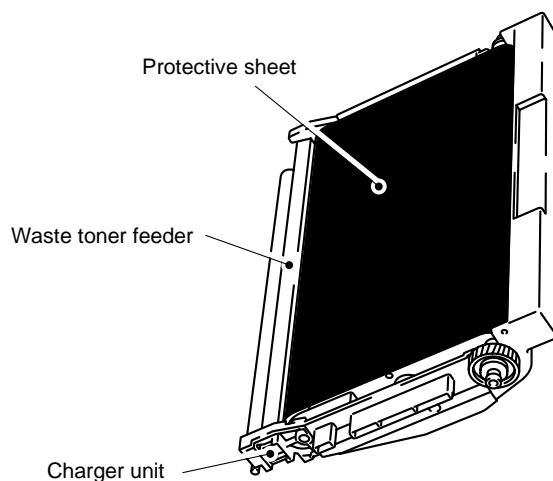


Fig.6-10

- 3) Open the green hooks at the right and left hand sides.
- 4) Remove the charge unit from the OPC belt cartridge.

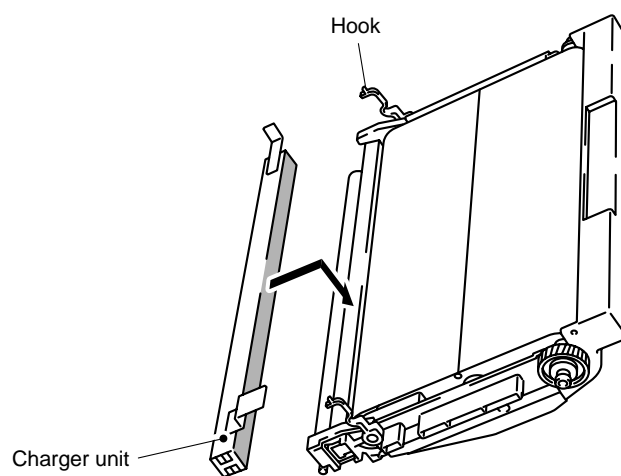


Fig.6-11

- 5) Clean the area where the charge unit is mounted.
- 6) Install the new charge unit onto the OPC belt cartridge.
- 7) Close the hooks at both sides to hold the charge unit.



There remains the waste toner in the OPC belt cartridge. Take care not to spill toner due to any shock or vibration.

1.2.5 Cleaning the Dustproof Glass in the Optical Unit 2

The dustproof glass in the optical unit 2 should be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.

<Tools to Prepare>

- 1) Cotton cloth (2 ~ 3 pieces)
- 2) Cotton swab (2 ~ 3 pieces)

<Cleaning Procedure>

- 1) Turn off the remote switch and power supply, and unplug the power code.
- 2) Open the paper exit unit cover 2 and the paper exit front cover 2.
- 3) Remove the toner cartridges and the OPC belt cartridge.
- 4) Remove the cover of the dust-proof glass from the optical unit 2.
- 5) Clean the surface of the dustproof glass with a cotton cloth and swab.
- 6) Replace the dustproof glass by aligning the Δ marks on the optical unit 2 and the dustproof glass, ensuring it is locked correctly into place and cannot move.



CAUTION

NEVER use alcohol or similar solvents for cleaning the dustproof glass, otherwise it will be a cause of image failures.

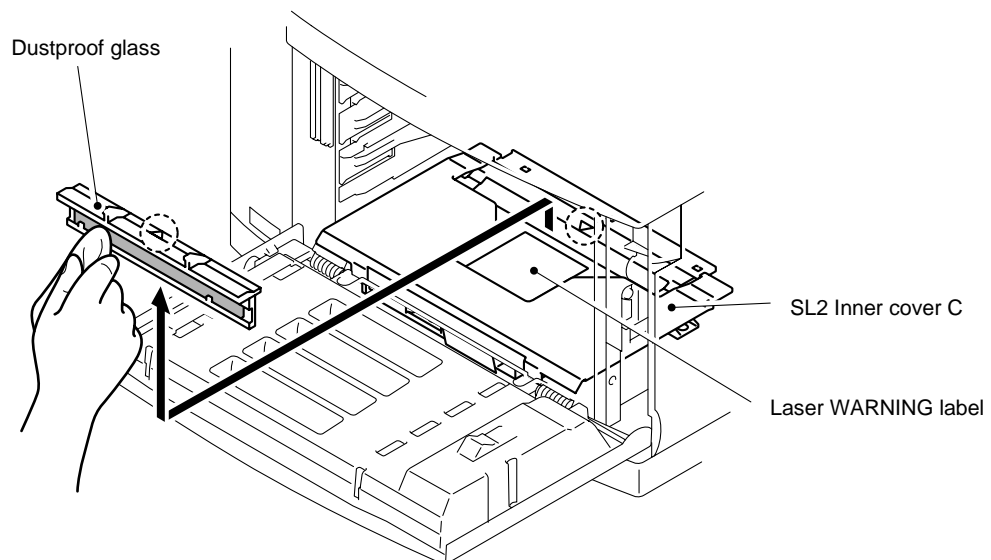


Fig.6-12

1.2.6 Cleaning the Printer Interior

The printer interior (bottom) should be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.



CAUTION

Before cleaning the printer interior, protect the transfer drum with a piece of paper so that the nozzle of the vacuum cleaner is not contacted directly with the surface of the transfer drum 2.

<Tools to Prepare>

- 1) Toner vacuum cleaner
- 2) Cotton cloth

<Cleaning Procedure>

- 1) Turn off the remote switch and power supply, and unplug the power code.
- 2) Open the paper exit unit cover 2 and the paper exit front cover 2.
- 3) Remove the toner cartridges and the OPC belt cartridge.
- 4) Vacuum up toner scattered on the bottom of printer interior with a vacuum cleaner designed to handle toner particles.
- 5) Clean the printer interior with a cotton cloth.
- 6) Replace the removed items.

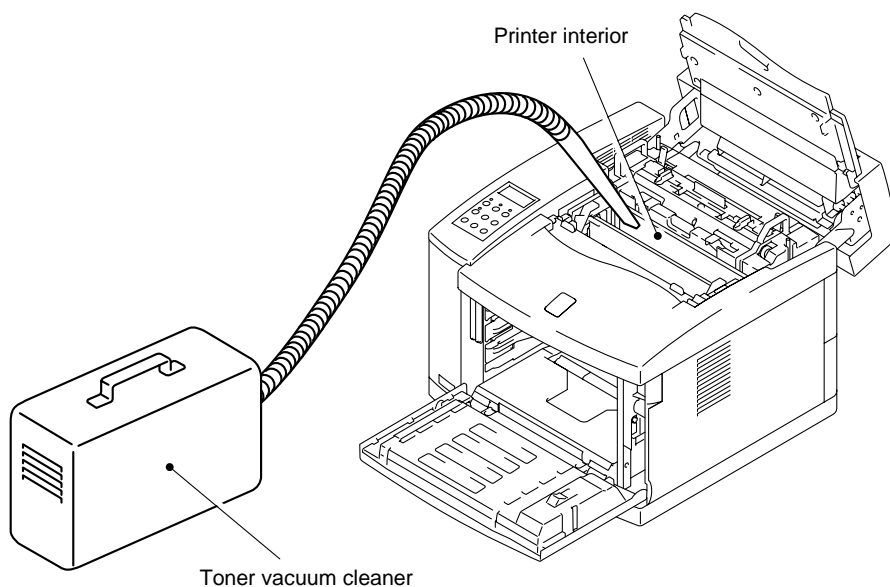


Fig.6-13

1.3 Periodic Maintenance Parts and Maintenance Cycle

Maintenance Work should be implemented according to the "Periodic Maintenance Parts and Maintenance Cycle" set out in Table 6-4.

Table 6-4: Periodic Maintenance Parts and Maintenance Cycle

No.	Maintenance Parts		Description		Replacement Cycle *1
	Parts Name	No.	Function	Section	(Condition or Case)
1	OPC Belt Cartridge	Accessory	Consists of the OPC belt and forms an electrostatic latent image.	2.1	60K images or 12 months whichever comes first.
2	Fusing Unit	LJ3875001(US) LJ3876001(EC)	Fixes the toner image onto the transported paper.	2.2	60K prints
3	Transfer Roller 2 *2	LJ3877001	Transfers the toner image from the transfer drum 2 onto the transported paper.	2.3	120K prints
4	Paper Discharger 2 *2	LJ3878001	Separates paper from the transfer drum 2.	2.4	120K prints
5	Drum Cleaner 2 *2	LJ3879001	Cleans residual toner from the transfer drum 2.	2.5	120K prints
6	Ozone Filter E *2	LM0310001	Absorbs ozone.	2.6	120K pages or 12 months whichever comes first.
7	Paper Pick-up Roller / Separator Pad 2 *2	UH3485001 LJ2317001	Picks up sheets of paper one by one from the media cassette.	2.7	120K prints
8	Transfer Drum 2 *2	LJ3924001	Forms the toner image and transfers it onto paper.	2.8	120K pages or 300K images whichever comes first.

9	Fuser cleaner	Accessory	Cleans the fusing unit.		20,000pages
10	Toner cartridge	Accessory	Supplies toner to the OPC Belt cartridge.		K: 12,000pages/ CMY: 7,200 pages
11	Oil bottle	Accessory	Supplies oil to the fuser unit.		12,000pages
12	Waste toner bottle	Accessory	Collects the waste toner.		18,000pages

- *1: These figures are based on an average of 5% coverage of the printable area for one color using laser paper. The frequency of replacement will vary, depending on the complexity of the prints, the percentage of coverage, and the type of media. Transparencies, glossy coated paper, and other specialty media will result in shortened consumable life.
- *2: You can order these item as a 120K Kit (include. transfer roller 2 / paper discharger unit / drum cleaner 2 / ozone filter / paper pick-up roller / separator pad 2 / transfer drum 2) (LM0085001)

** After completing maintenance work, clear the message displayed on the control panel. (Refer to the list below.)

LCD Maintenance Message	Consumables
(Toner nearly empty) <div> <div> <div></div> <div></div> <div></div> <div></div> </div> <div> <div>K</div> <div>C</div> <div>M</div> <div>Y</div> </div> </div>	Toner cartridge Black
(Toner nearly empty) <div> <div> <div></div> <div></div> <div></div> <div></div> </div> <div> <div>K</div> <div>C</div> <div>M</div> <div>Y</div> </div> </div>	Toner cartridge Cyan, Magenta, or Yellow
FUSER OIL LOW	Oil Bottle
REPLACE FCR	Fuser Cleaner
REPLACE OPC BELT	OPC Belt Cartridge
REPLACE PF kit 1	Paper feeding roller / separator pad
REPLACE PF kit 2	Paper feeding roller / separator pad
REPLACE PF kit 3	Paper feeding roller / separator pad
REPLACE FUSER	Fusing Unit
REPLACE 120K KIT	Drum Cleaner 2/ Paper Discharger / Transfer Roller 2 / Paper Pick-up Roller / Separator Pad 2/ Transfer Drum 2

LCD Operator Call Message	Consumables
TONER EMPTY K	Toner cartridge Black
TONER EMPTY CMY	Toner cartridge Cyan, Magenta, or Yellow
WASTE TONER	Waste Toner Pack
OIL EMPTY	Oil Bottle
CHANGE FCR	Fuser Cleaner

2. PERIODIC MAINTENANCE PROCEDURES

The printer displays messages on the control panel screen to indicate replacement is due for most of the periodic maintenance parts in both the Video Controller Mode and the Engine Controller Mode.

However, the procedure to clear the message differs between the two modes. The following sections describe the Video Controller Mode messages only and should be used when replacing parts that have reached their life.

If replacement parts have to be replaced for Service reasons before their life cycle is completed then the Engine Controller Mode should be used to reset the part life.

2.1 OPC Belt Cartridge Replacement

<Criterion of Replacement>

The OPC belt cartridge should be replaced with a new one at 60,000 images or 12 months whichever comes first.

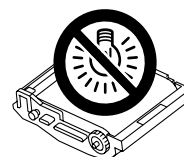
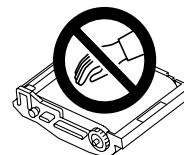
When time is due for replacement of the OPC belt cartridge, the following message appears on the control panel. (The display is blinked.)

REPLACE OPC BELT
■■■■■



PRECAUTION

- Do not directly touch the OPC belt surface with bare hands or gloves.
- If the belt is exposed for more than two minutes to a light source of 800 lux, the belt may be damaged.



<Replacement Procedure>

- 1) Press the remote switch and power supply to turn off the printer.
- 2) Open the paper exit front cover 2 and the paper exit unit cover 2.



CAUTION

When installing or removing the OPC belt, be sure to open the paper exit front cover 2 first. Failure to do so will cause the OPC belt to be damaged due to contact with the toner cartridges.

- 3) Release the belt cartridge lock levers at both sides (left & right).

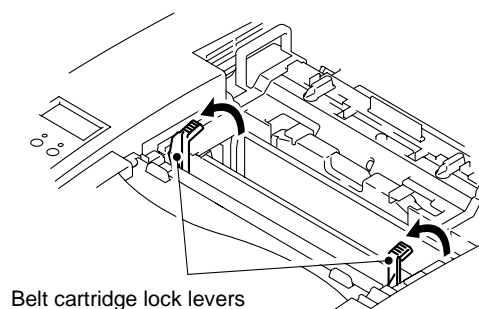


Fig.6-14

- 4) Pull out the OPC belt cartridge.

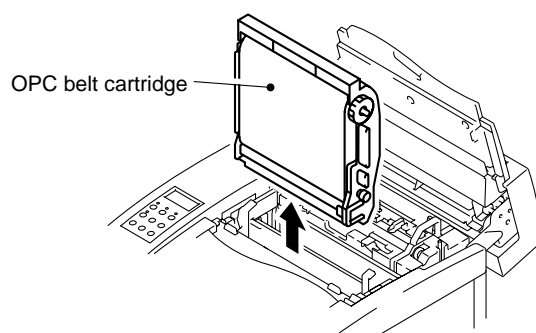


Fig.6-15

- 5) Prepare a new belt cartridge.
Pull and remove the tension release pins from both sides (left & right), and then remove the protective sheet from a new OPC belt cartridge.

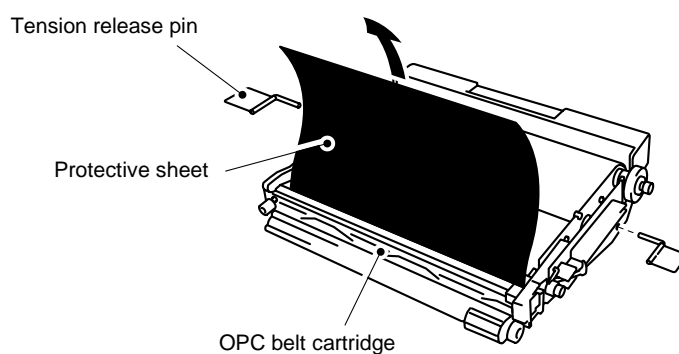


Fig.6-16

- 6) Install the new OPC belt cartridge into the guides at both sides in the printer.

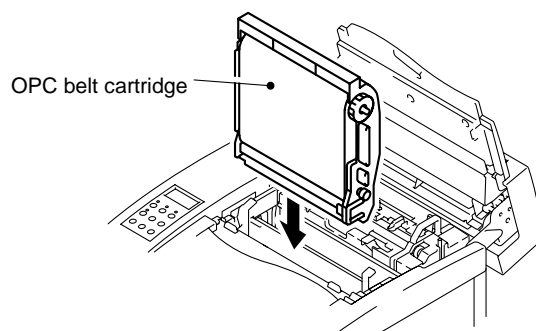


Fig.6-17

- 7) Set the belt cartridge lock levers at both sides (left and right).

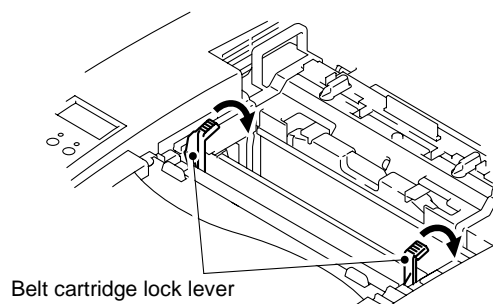


Fig.6-18

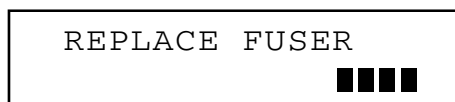
- 8) Close the paper exit unit cover 2 and the paper exit front cover 2.
- 9) Turn on the printer.
- 10) The printer starts the warming-up process.
- 11) Press any of the Menu buttons (+, -, Set or Back) to take the printer Off Line.
- 12) Press + or – until "RESET MENU" appears.
- 13) Press Set to proceed to the next menu level, and then press + or – until "PARTS LIFE" appears.
- 14) Press Set, and then press + until "OPC BELT" appears.
- 15) Press Set, and then press Go. The printer is now in the READY state.

2.2 Fusing Unit Replacement

<Criterion of Replacement>

The fusing unit should be replaced with a new one according to the periodical maintenance cycle set out in Table 6-4.

When the time is due for replacement of the fusing unit, the following message appears on the control panel. (The display is blinked.)



<Purpose of Replacement>

To prevent the print quality from declining due to the deterioration of the fixing unit's fuser rollers.



WARNING

The fusing unit and its surrounding area are very hot. Make sure prior to starting the replacement work that the fusing unit and its surrounding area are well cooled down, otherwise you may get burned.

<Necessary Tools and Replacement Materials>

- 1) Two or three pieces of cotton cloth for cleaning
- 2) Fusing Unit (one unit)

<Work Procedure>

Sequence of Disassembling

- 1) After turning off the remote switch and power supply, unplug the power code from the power outlet.
- 2) Open the paper exit unit cover 2.
- 3) Slacken the two securing screws securing the fusing unit.
- 4) Holding the handles at both ends of the fusing unit and remove the fusing unit from the printer.
- 5) Remove the oil bottle and the fuser cleaner.

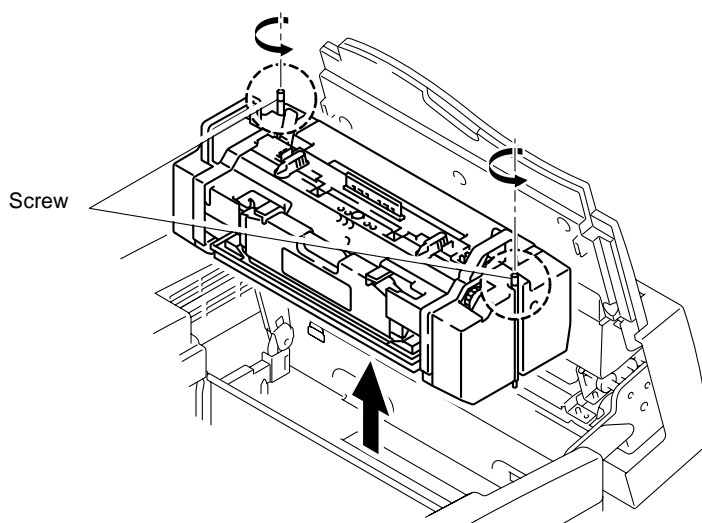


Fig.6-19



PRECAUTION

- When removing the fusing unit, take care to keep the unit level so that no oil leakage or spillage occurs.
- When shipping the printer, remove the oil bottle and the fuser cleaner from the fusing unit. After removing the oil bottle, be sure to remove the oil remaining in the fusing unit following the procedure below. Failure to do so will cause severe damage to the printer.
 - i) Absorb the oil with the supplied syringe.
 - ii) After absorbing the oil, stuff the soft paper into the oil pan so that no oil leakage occurs.

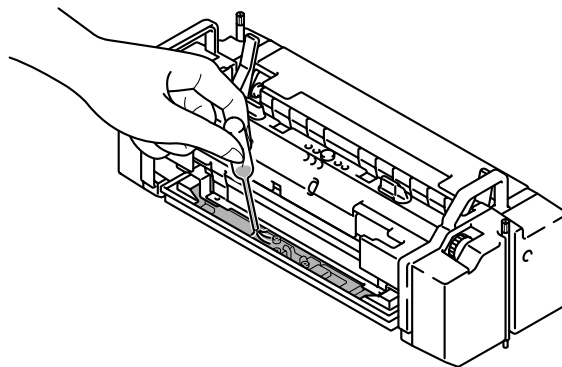


Fig.6-20

Sequence of Replacement

- 1) Prepare a new fusing unit before starting the replacement work.
- 2) Return the roller tension release levers at both sides to the direction of the arrows.
- 3) Install the oil bottle and fuser cleaner onto the new fusing unit.

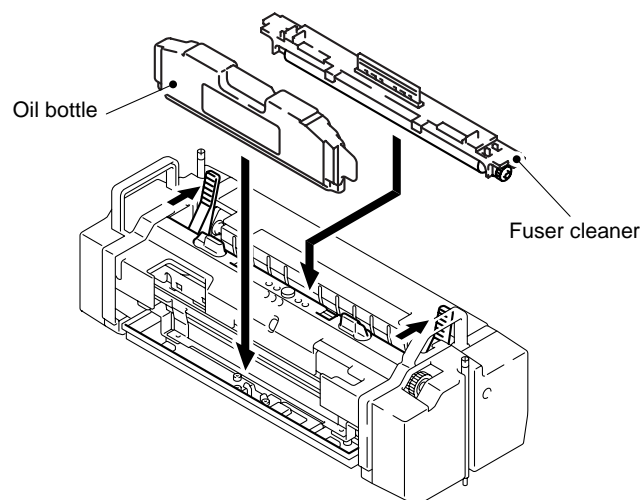


Fig.6-21

Sequence of Assembling

- 1) Install the new fusing unit onto the printer.
 - i) Tighten the securing screws.
 - ii) Close the paper exit unit cover 2.

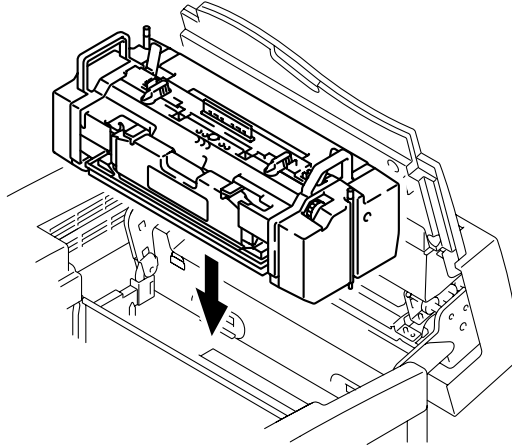


Fig.6-22



PRECAUTION

When replacing the fusing unit, take time and great care to complete the job properly. Application of strong force to the fusing unit may result in the failure of the fusing unit and other parts.

- 2) Plug the power cord into the power outlet and turn on the printer.
- 3) Upon completion of the warming-up process.
- 4) Press any of the Menu buttons (+, -, Set or Back) to take the printer Off Line.
- 5) Press + or - until "RESET MENU" appears.
- 6) Press Set to proceed to the next menu level, and then press + or - until "PARTS LIFE" appears.
- 7) Press Set, and then press + until "FUSER UNIT" appears.
- 8) Press Set, and then press Go. The printer is now in the READY state.

Note:

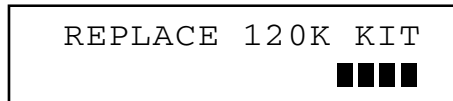
When installing the new fusing unit into the printer, you have to wait approximately for 30 minutes after the unit is installed to allow the fusing oil to circulate in the unit.

2.3 Transfer Roller 2 Replacement

<Criterion of Replacement>

The transfer roller 2 should be replaced at the same time as a new discharger unit according to the periodical maintenance cycle set out in Table 6-4.

When time is due for replacement of the transfer roller 2, the following message appears on the control panel. (The display is blinked.)



<Purpose of Replacement>

To prevent the transfer efficiency declining due to deterioration of the transfer roller 2.

<Necessary Tools and Replacement Materials>

- 1) Two or three pieces of cotton cloth for cleaning.
- 2) Transfer roller 2 (one unit)

<Work Procedures>

Sequence of Disassembling

- 1) After turning off the remote switch and power supply, unplug the power code from the power outlet.
- 2) Open the transfer unit 2.

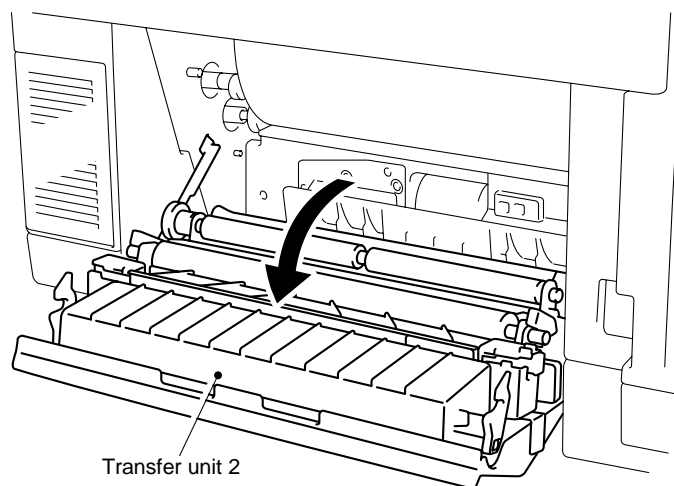


Fig.6-23

Sequence of Replacement

- 1) Lift the transfer roller 2 lock levers at both sides (right & left) to the arrow direction A. (Fig.6-25)
- 2) Holding the lock levers at both sides, pull them upwards to remove the transfer roller 2.

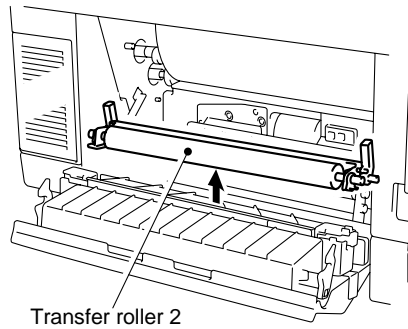


Fig.6-24

- 3) Install a new transfer roller 2 into the printer.
 - i) Prepare a new transfer roller 2.
 - ii) Hold the lock levers at both sides and align both ends of the shaft to the slit on the transfer base.
 - iii) Push the transfer roller 2 shaft into the slit and place the bearing of the roller onto the spring. Ensure that the spring is not bent as shown in Fig. 6-25.
 - iv) Fix the transfer roller 2 by pulling down the lock levers at both sides to the arrow direction B.

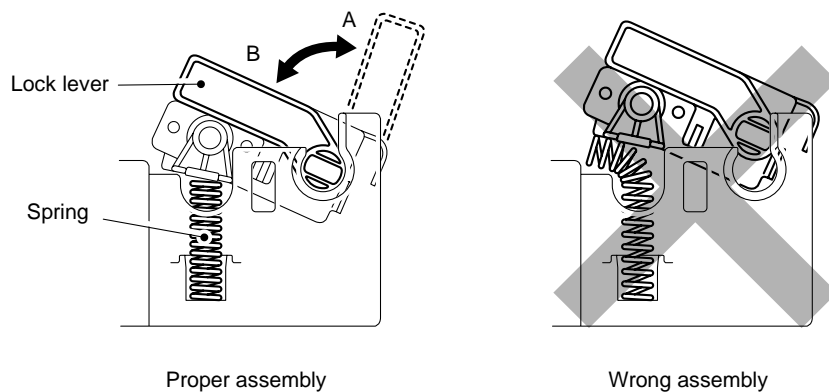


Fig.6-25

Sequence of Assembling

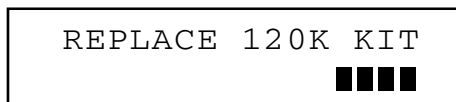
- 1) Close the transfer unit 2.
- 2) Plug the power code into the power outlet and turn on the printer.
- 3) Upon completion of the warming-up process.
- 4) Press any of the Menu buttons (+, -, Set or Back) to take the printer Off Line.
- 5) Press + or – until “RESET MENU” appears.
- 6) Press Set to proceed to the next menu level, and then press + or – until “PARTS LIFE” appears.
- 7) Press Set, and then press + until “120K KIT” appears.
- 8) Press Set, and then press Go. The printer is now in the READY state.

2.4 Paper Discharger Unit Replacement

<Criterion of Replacement>

The paper discharger should be replaced with a new discharger unit at the same time as the transfer roller 2 according to the periodical maintenance cycle set out in Table 6-4.

When time is due for replacement of paper discharger unit, the following message appears on the control panel. (The display is blinked.)



<Purpose of Replacement>

To prevent the discharging efficiency from declining due to deterioration of the paper discharger unit.



<Necessary Tools and Replacement Materials>

- 1) Two or three pieces of cotton cloth for cleaning
- 2) Paper discharger (one unit)

<Work Procedures>

Sequence of Disassembling

- 1) After turning off the remote switch and power supply, unplug the power cord from the power outlet.
- 2) Open the transfer unit 2.

Sequence of Replacement

- 1) Remove the paper discharger referring to section 1.2.3 'Cleaning the Paper Discharger'.

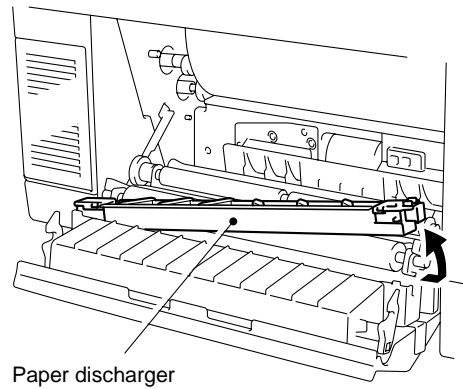


Fig.6-26

- 2) Clean the area where the paper discharger unit is mounted.
- 3) Install a new paper discharger unit into the transfer unit 2.
Make sure to replace the transfer roller 2 with a new one at this time.

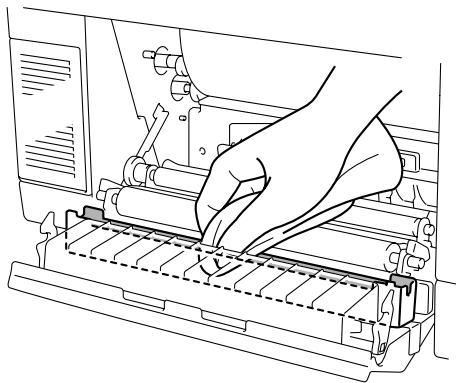


Fig.6-27

Sequence of Assembling

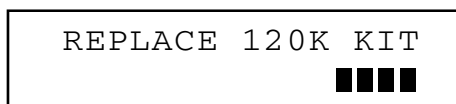
- 1) Close the transfer unit 2.
- 2) Plug the power cord into the printer, and turn on the printer.
- 3) Upon completion of the warming-up process.
- 4) Press any of the Menu buttons (+, -, Set or Back) to take the printer Off Line.
- 5) Press + or - until "RESET MENU" appears.
- 6) Press Set to proceed to the next menu level, and then press + or - until "PARTS LIFE" appears.
- 7) Press Set, and then press + until "120K KIT" appears.
- 8) Press Set, and then press Go. The printer is now in the READY state.

2.5 Drum Cleaner 2 Replacement

<Criterion of Replacement>

The drum cleaner 2 should be replaced with a new one according to the periodical maintenance cycle set out in Table 6-4.

When time is due for replacement of the drum cleaner 2, the following message appears on the control panel. (The display is blinked.)



<Purpose of Replacement>

To prevent the cleaning efficiency from declining due to deterioration of the drum cleaner 2.



PRECAUTION

When installing the drum cleaner 2, firstly locate the bearing and the bias pole into the contacts. Reconfirm this connection prior to testing the printer.

<Necessary Tools and Replacement Materials>

- 1) Two or three pieces of cotton cloth for cleaning.
- 2) Drum cleaner 2 (one unit)

<Work Procedure>

Sequence of Disassembling

- 1) Turn off the printer.
- 2) Open the paper exit unit cover 2 .

Sequence of Replacement

- 1) Remove the cleaner cover by releasing the two hooks.

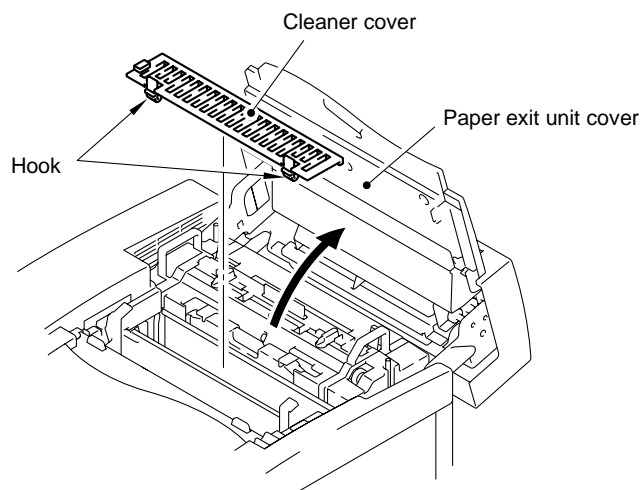


Fig.6-28

- 2) Pull the drum cleaner 2 upwards to remove both ends of the cleaner from the bearings.
- 3) Holding the handle located on the top of the drum cleaner 2, lift the cleaner to remove it.

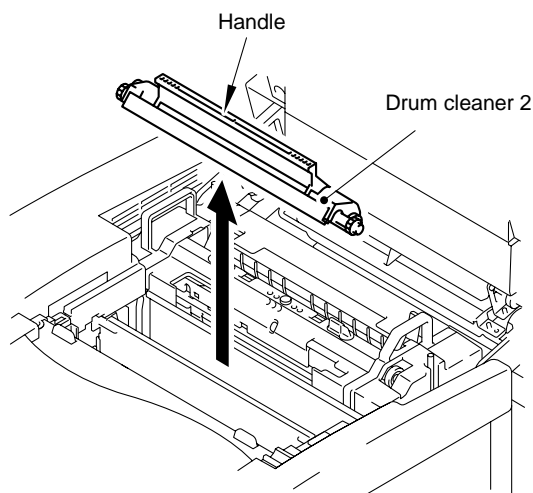


Fig.6-29

- 4) Clean the area where the drum cleaner 2 is mounted.
- 5) Install a new drum cleaner 2 to the printer.
Align both ends of the drum cleaner 2 to the bearings in the printer and push the drum cleaner 2 into the printer.

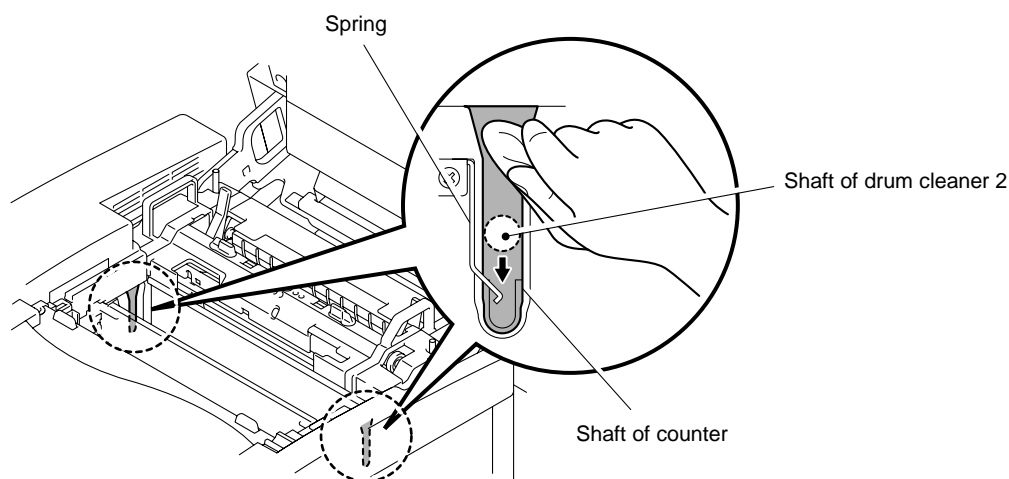


Fig.6-30



CAUTION

When installing the drum cleaner 2, be sure to put it into the printer correctly, indicated by a click.

Sequence of Assembling

- 1) Install the drum cleaner cover.
- 2) Close the paper exit unit cover 2.
- 3) Plug the power code into the printer, and turn on the printer.
- 4) Upon completion of the warming-up process.
- 5) Press any of the Menu buttons (+, -, Set or Back) to take the printer Off Line.
- 6) Press + or - until "RESET MENU" appears.
- 7) Press Set to proceed to the next menu level, and then press + or - until "PARTS LIFE" appears.
- 8) Press Set, and then press + until "120K KIT" appears.
- 9) Press Set, and then press Go. The printer is now in the READY state.

2.6 Ozone Filter Replacement

<Criterion of Replacement>

The ozone filter should be replaced with a new one according to the periodical maintenance cycle set out in Table 6-4. This is to prevent ozone from being exhausted due to the deterioration of the ozone filter.



CAUTION

Ozone filter should be replaced with a new filter every 12 months, otherwise it may cause an offensive smell.

<Necessary Tools and Replacement Materials>

No special tools and equipment are necessary for the replacement of the ozone filter.

<Work Procedure>

- 1) Remove the ozone filter case provided at the rear of the side cover (R) 2.
- 2) Remove the ozone filter from the ozone filter case.
- 3) Install a new ozone filter to the filter case.
- 4) Install the ozone filter case to the side cover (R) 2.

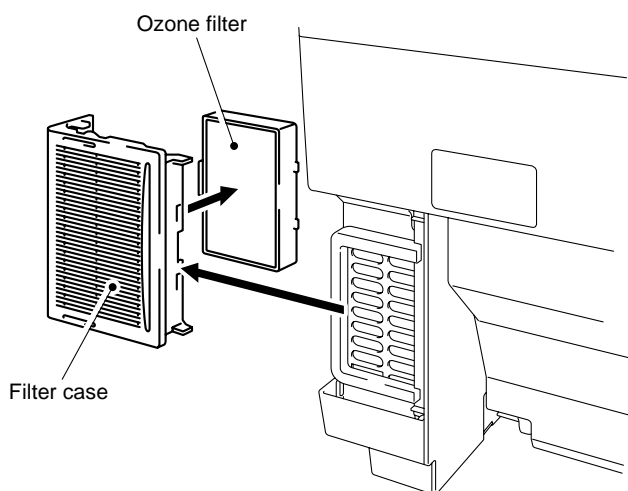


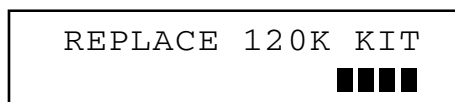
Fig.6-31

2.7 Paper Pick-up Roller and Separator Pad 2 Replacement

<Criterion of Replacement>

The paper pick-up roller and separator pad 2 should be replaced with new ones according to the periodical maintenance cycle set out in Table 6-4.

When time is due for replacement of the paper pick-up roller and separator pad 2, the following message appears on the control panel. (The display is blinked.)



They also should be replaced when paper feed jams occur.

<Work Procedure>

- 1) Whenever paper feed jams occur, confirm the cause by following the information in Section 3 of Chapter VIII.
- 2) If the paper jam still occurs, replace the paper pick-up roller and separator pad 2 referring to Section 4.6.6 of Chapter VII.

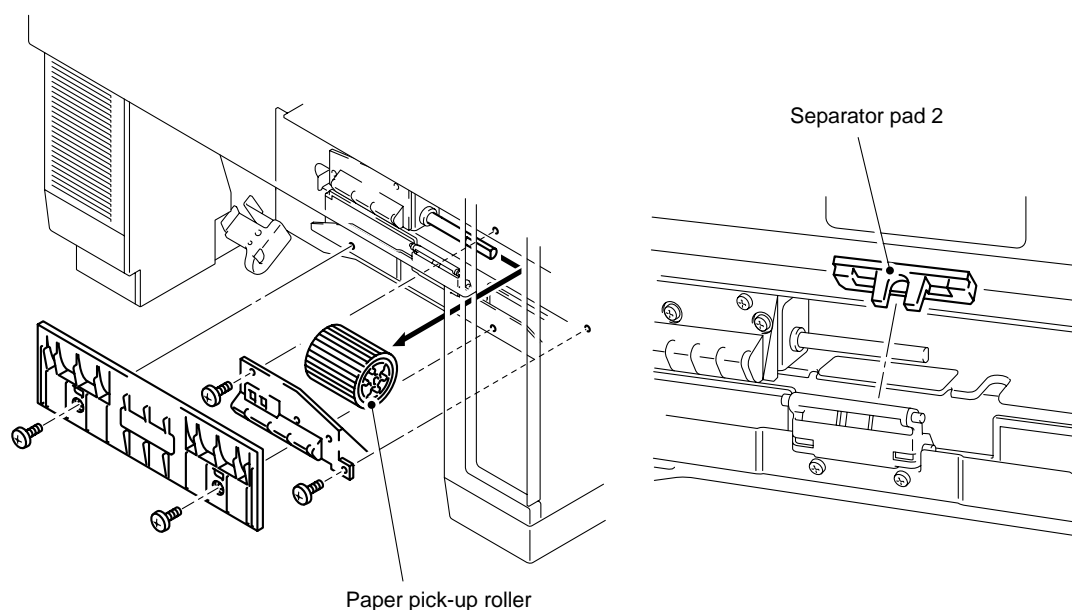


Fig.6-32



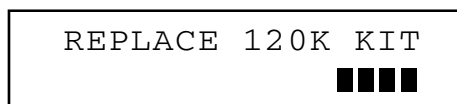
- *This is one of the periodic replacement items, not customer service. It should be implemented upon request of the customer or at periodic maintenance.*
- *After replacement, confirm the improvement of feeding for the normal paper, transparency, thick paper, etc.*

2.8 Transfer Drum 2 Replacement

<Criterion of Replacement>

The transfer drum 2 should be replaced with a new one according to the periodical maintenance cycle set out in the Table 6-4.

When time is due for replacement of the transfer drum 2, the following message appears on the control panel. (The display is blinked.)



It should be also replaced when an image failure occurs due to transfer drum 2 damage.

<Work Procedure>

- 1) Whenever an image failure occurs, confirm the cause by following the information in Section 5 of Chapter VIII.
- 2) If the image failure still occurs, replace the transfer drum 2 referring to Section 4.1.12 of Chapter VII.

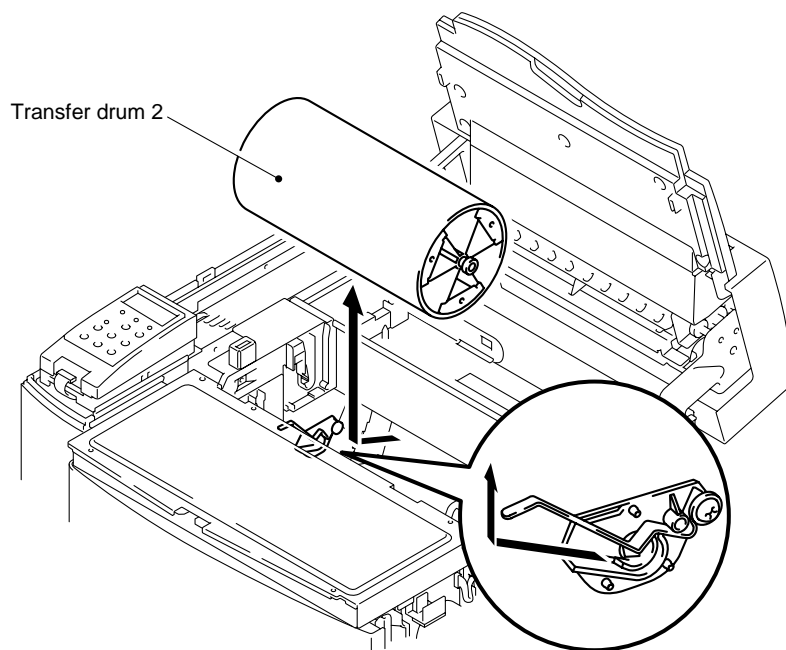


Fig.6-33



CAUTION

- This is one of the periodic replacement items, not customer service. It should be implemented upon request of the customer or at periodic maintenance.
- After replacement, confirm the improvement of print quality failure by test printing.

CHAPTER VII

DISASSEMBLY

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CHAPTER VII DISASSEMBLY

1. BEFORE STARTING DISASSEMBLY

1.1 Precautions

Follow the precautions described below during maintenance work.

- 1) Do not implement any operation, disassembly or modification which is not set out in this manual.
- 2) When assembling or disassembling the printer, turn off the power supply and unplug the power cable from the power outlet before commencing any work.
- 3) This printer incorporates dangerous parts subject to warnings such as "High Temperature", "High Voltage" and "Laser Radiation". Before starting any work on this printer, make sure you have read and understand the warnings set out in this manual.
- 4) Collect and dispose of any waste toner cartridges removed during maintenance correctly in accordance with local regulations. Do not dispose of them with inflammable materials or dispose of them into a fire.
- 5) The grounding wire is disconnected when replacing or removing the DC power supply unit. After completing the replacement work, confirm that the grounding wire is reconnected correctly to the earth mark .
- 6) Ensure that the type and length of screws removed during replacement of maintenance parts is noted and the correct screws are used during re-assembly. (See Table 7-1.)
- 7) Do not use any solvent such as alcohol for the maintenance of this printer.
- 8) Confirm that all the parts and covers are installed or assembled correctly before starting the test run after replacement of maintenance parts.
- 9) The re-assembly order is the reverse of the dis-assembly order. In all cases, follow the flow chart in reverse to re-assemble the printer. Where there is any change to the order, this is noted in the relevant section.

1.2 Preparation of Disassembly

Follow the procedure described below for preparation before commencing any work.

- (1) Ensure that the power cable is disconnected from the power outlet.
- (2) Remove **all consumable parts** (OPC belt cartridge, fuser cleaner, oil bottle, all toner cartridges, ozone filter) and **the Main (Video Controller) PCB**, and then store them correctly before starting disassembly.



PRECAUTION

- *Do not directly touch the OPC belt surface with bare hands or gloves.*
- *If the belt is exposed for more than two minutes to a light source of 800 lux, the belt may be damaged.*

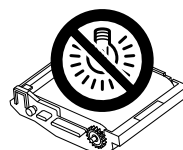
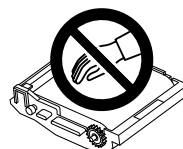

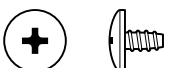




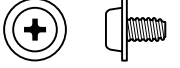
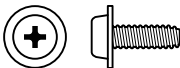




Table 7-1: Table of Screw Sizes Used in the Printer

Class Code	Name of Scerw	Size and shape of Screw			Remarks
		M-Threed TS	Length	Sharp	
BT3 x 8	Cross recessed head tapping screw.	T3	8mm		To be used for installation of plastic parts.
BT4 x 8		T4	8mm		
BT4 x 10		T4	10mm		
ST3 x 6	S tight screw	ST	6mm		To be used for installation of parts to steel plate.
ST4 x 6					
ST4 x 10			10mm		To be used for flame and fuser connector.
F3 x 6	Cross recessed head with flange.	M3	6mm		Fan case.
F3 x 10		M3	10mm		Optical Unit
M3 x 6	Cross recessed head screw with washer.	M3	6mm		For fuser wiring.
M4 x 6	Cross recessed head screw (Brass).	M4	6mm		For GND.

2. PARTS NAME

2.1 Cover

<Front View>

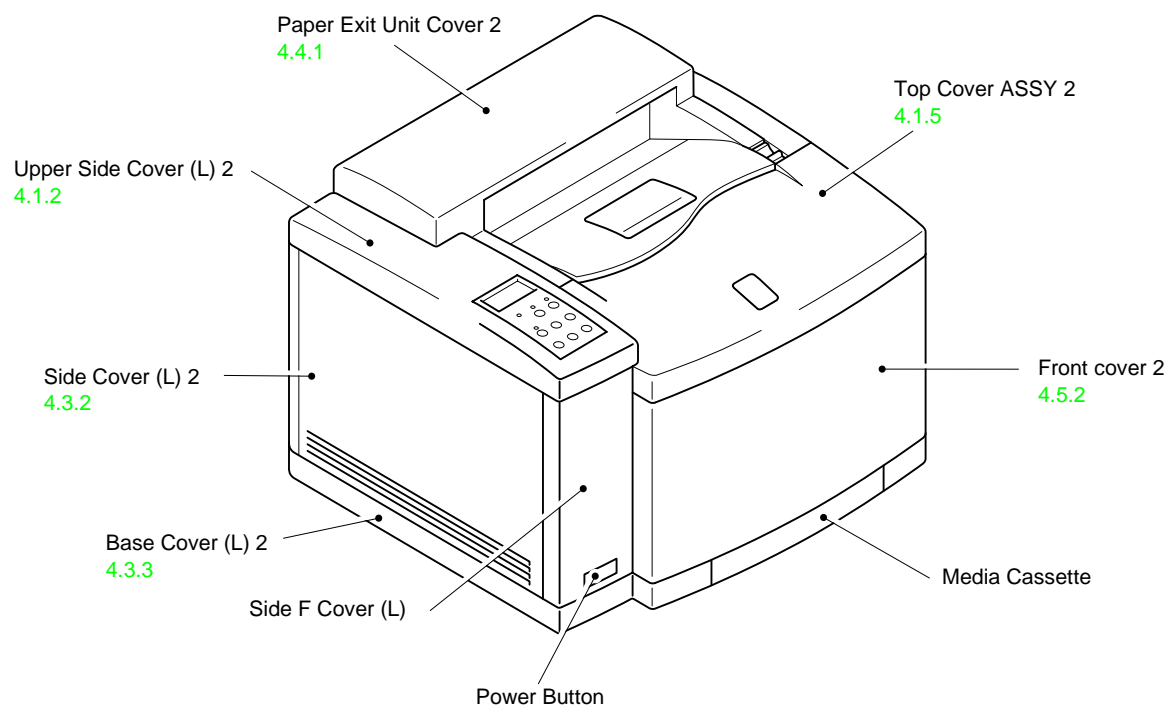


Fig.7-1

<Rear View>

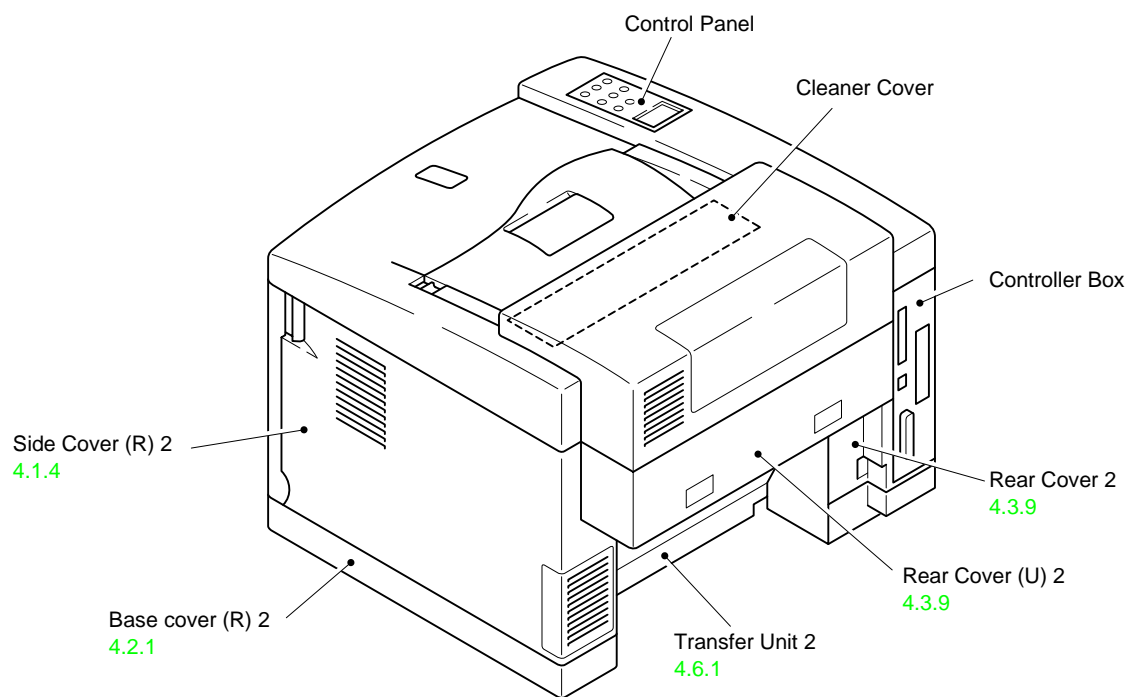


Fig.7-2

2.2 Circuit Boards (PCBs)

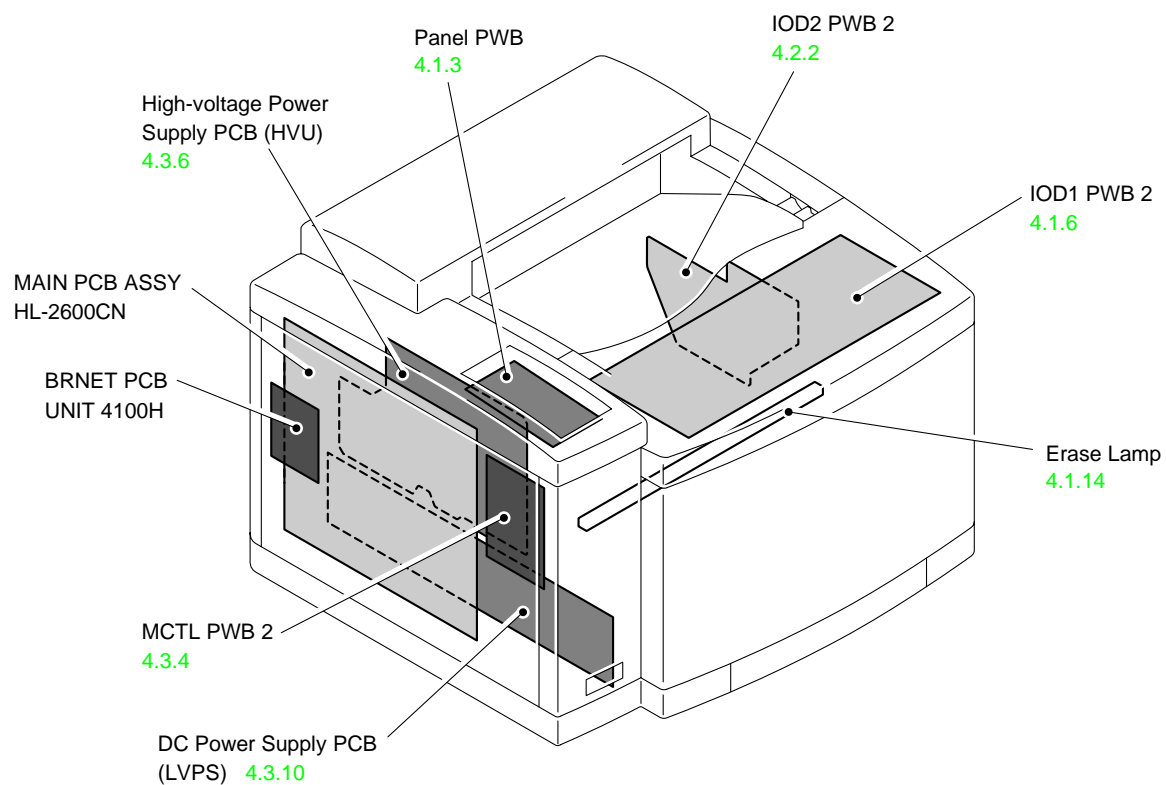


Fig.7-3

2.3 Motor Units

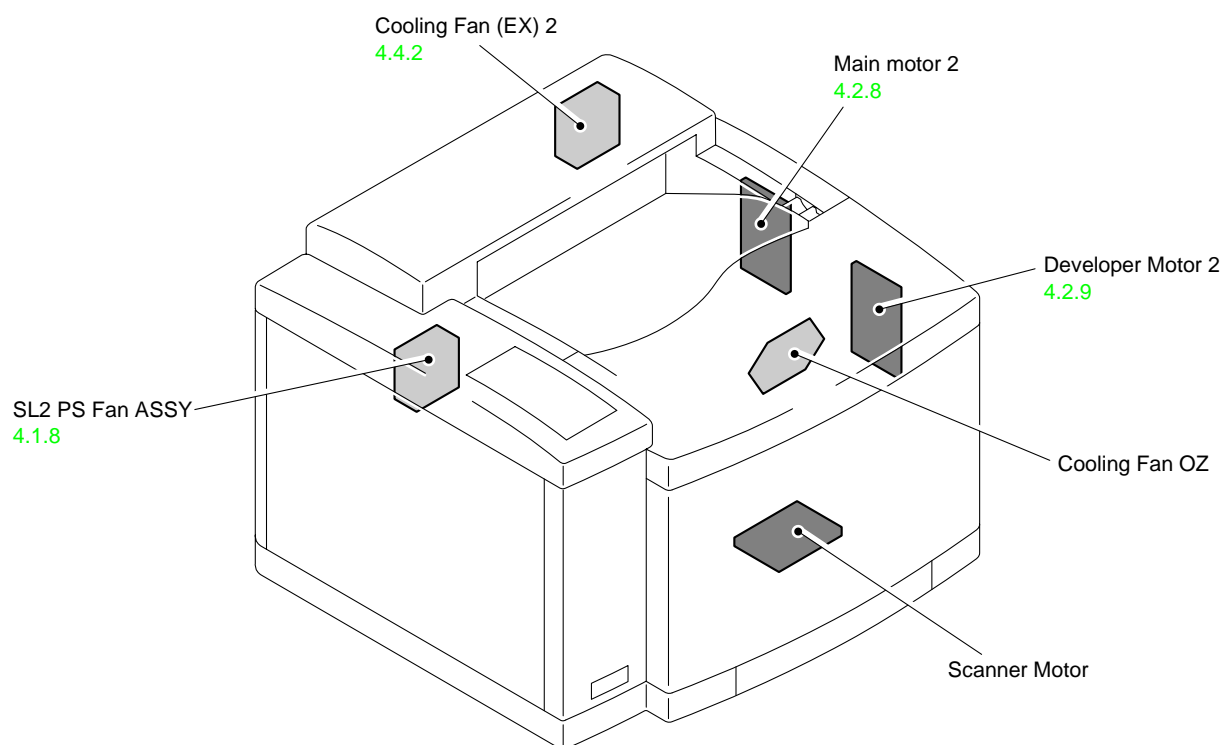


Fig.7-4

2.4 Clutches and Solenoids

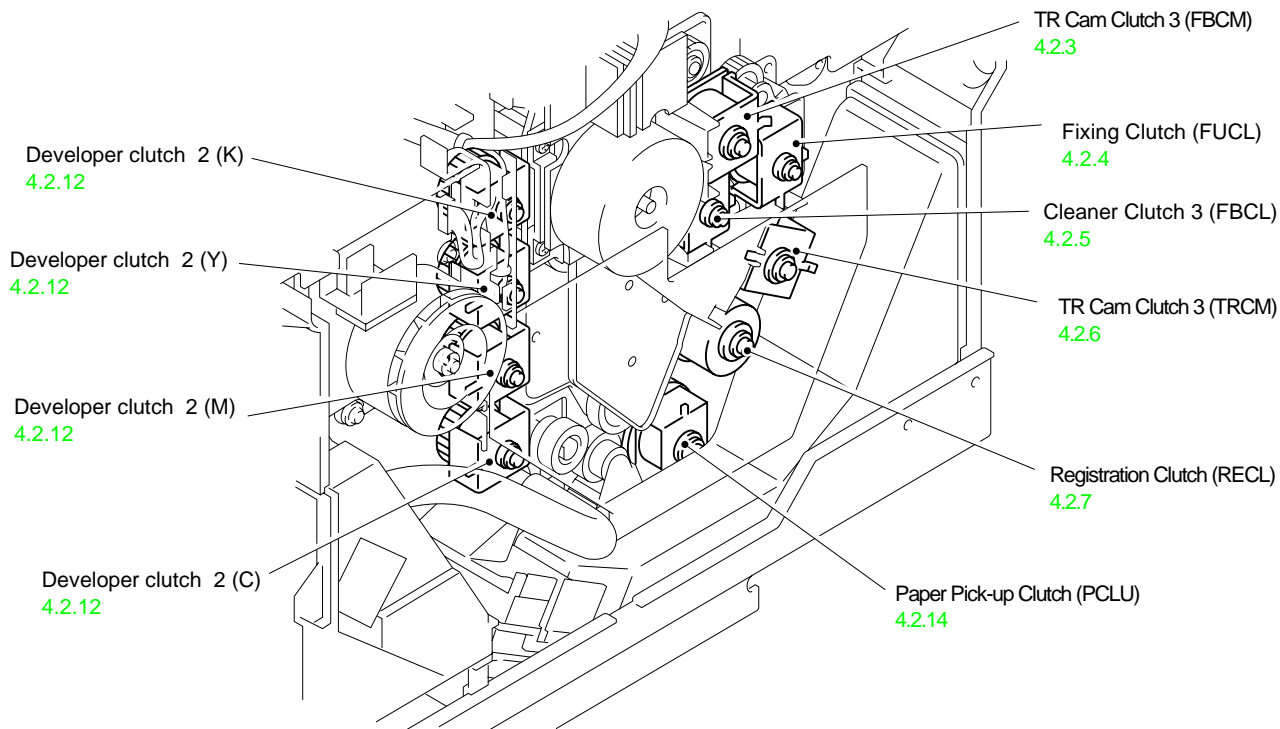


Fig.7-5

2.5 Sensors

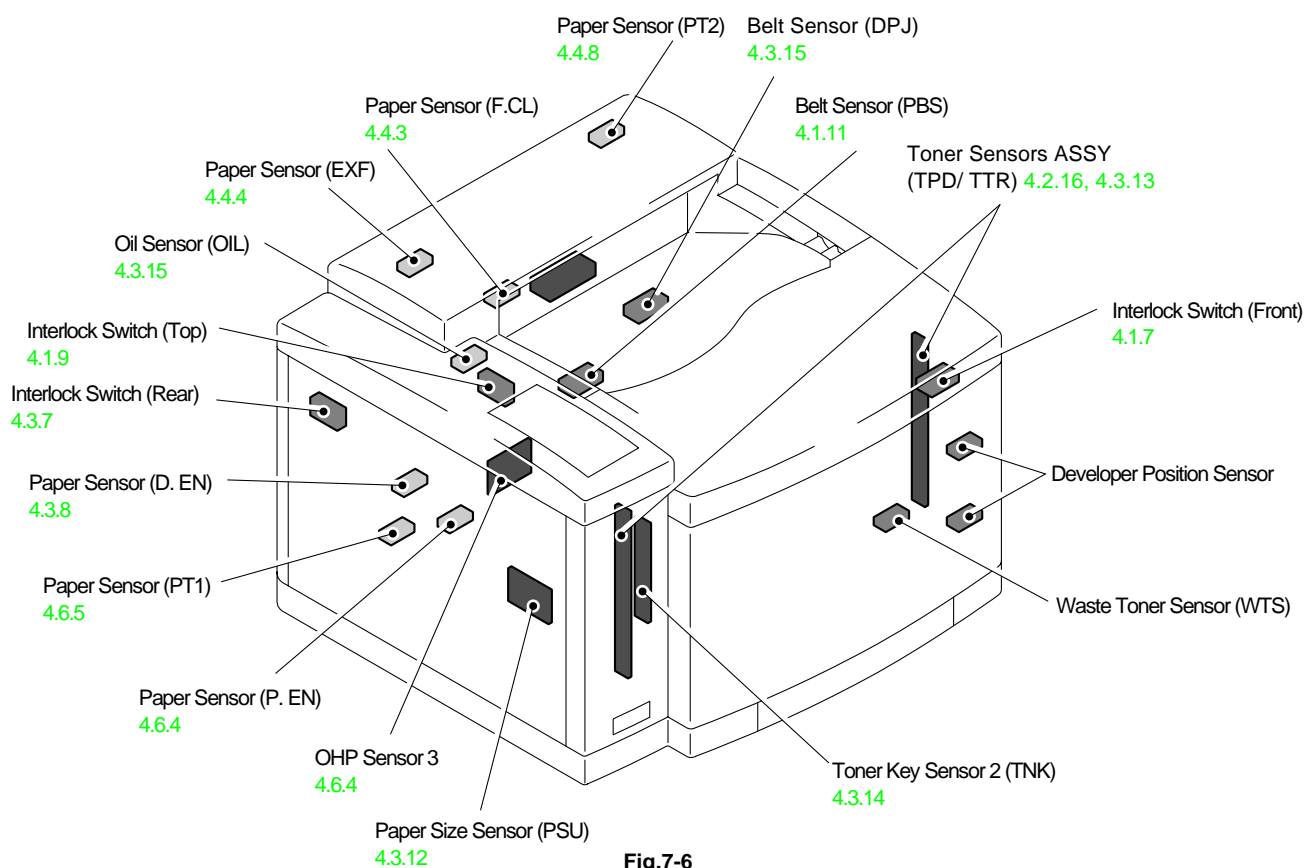
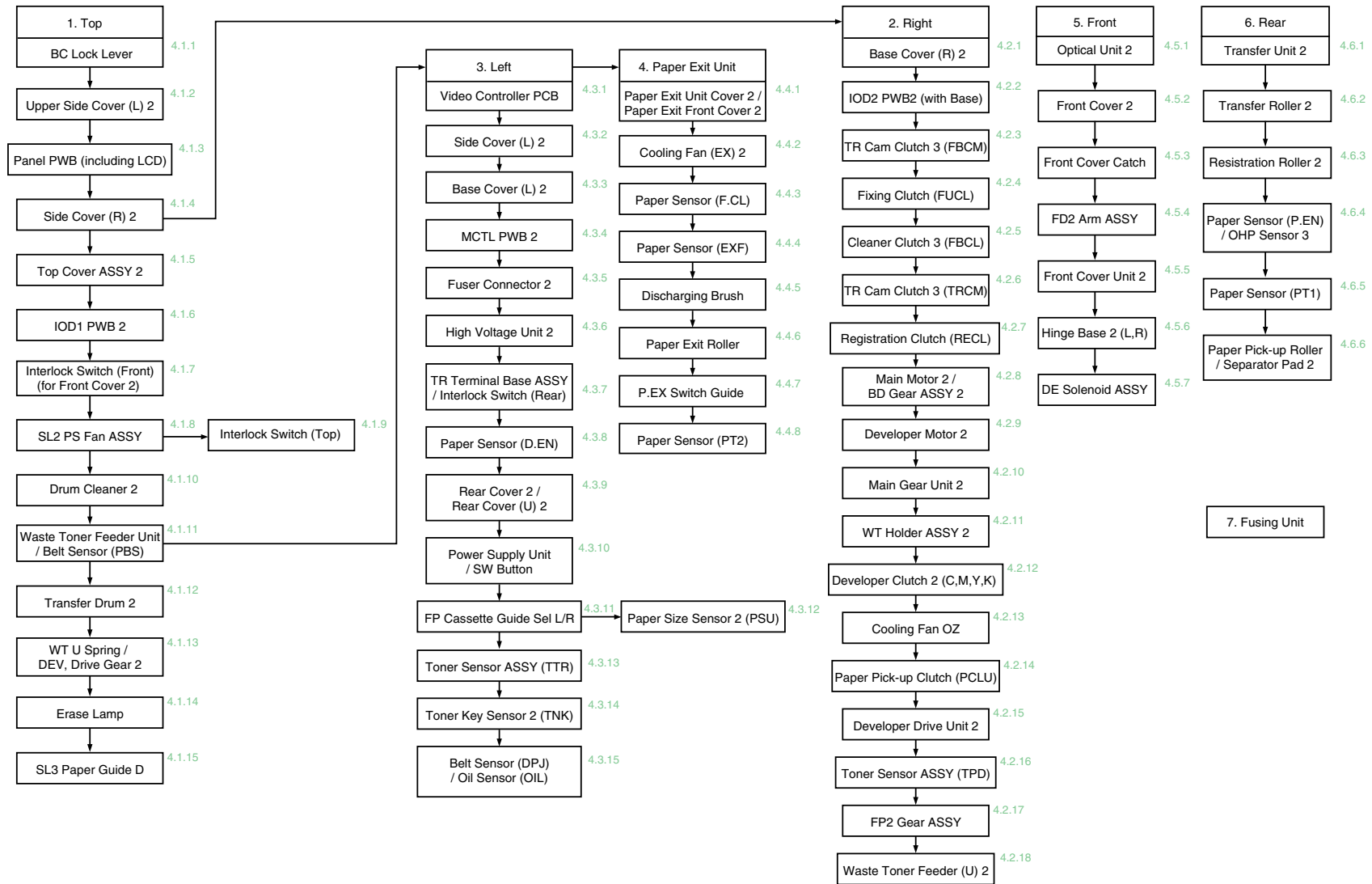


Fig.7-6

3. DISASSEMBLY FLOW



4. DISASSEMBLY PROCEDURE

4.1 Top of the Printer

4.1.1 BC Lock Lever

- 1) Remove the set screws (2 pcs.) to remove the BC lock levers at the right and left hand sides.

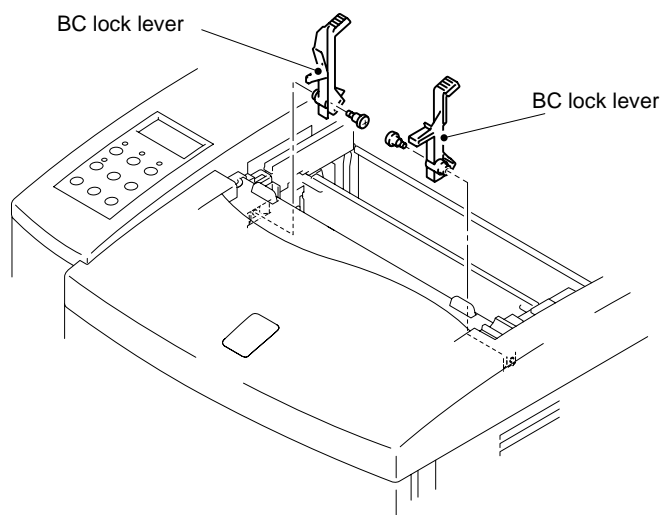


Fig.7-7

4.1.2 Upper Side Cover (L) 2

- 1) Open the paper exit unit 2.
- 2) Remove the set screw BT4X8 securing the side cover (L) 2.

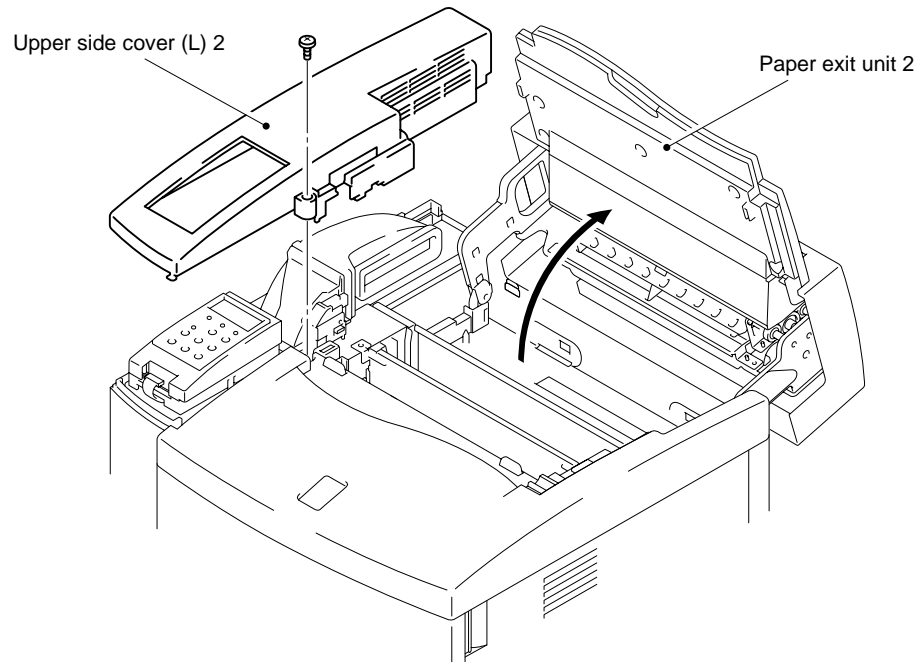


Fig.7-8

- 3) Press the exterior of the side cover inwards(L) and unlock the hooks (three locations) from the side cover (L) 2.

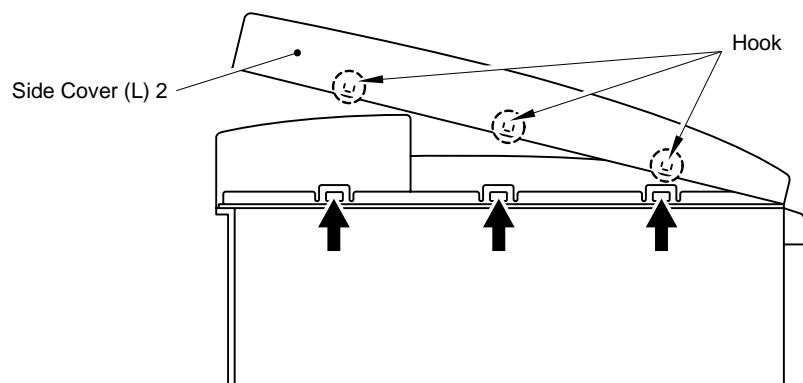


Fig.7-9

4.1.3 Panel PWB (including LCD)

- 1) Disconnect the connector from the panel case ASSY.
- 2) Release the two hooks on the panel base to remove the panel case ASSY and panel base from the printer.

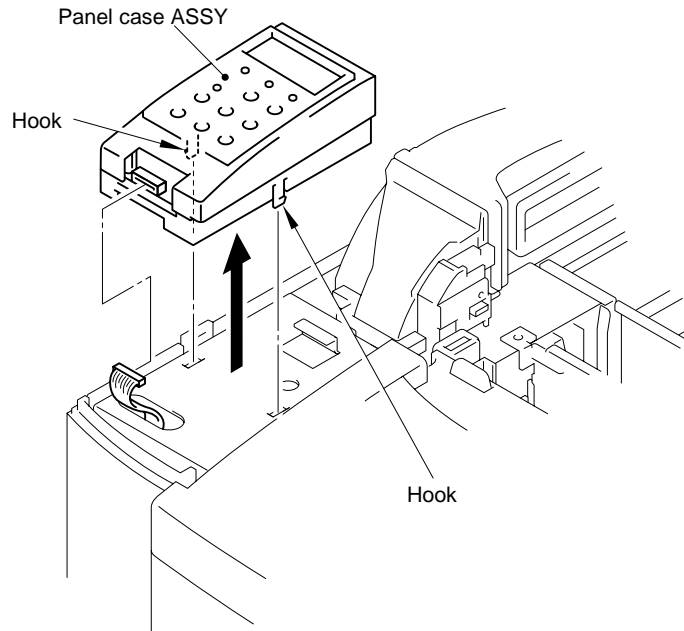


Fig.7-10

- 3) Remove the set screw BT4X10 (1 pc.) to remove the panel case ASSY from the panel base.
- 4) Remove the set screws BT3X12 (4 pcs.) to remove the panel shield plate, panel PWB and panel button from the panel case ASSY.

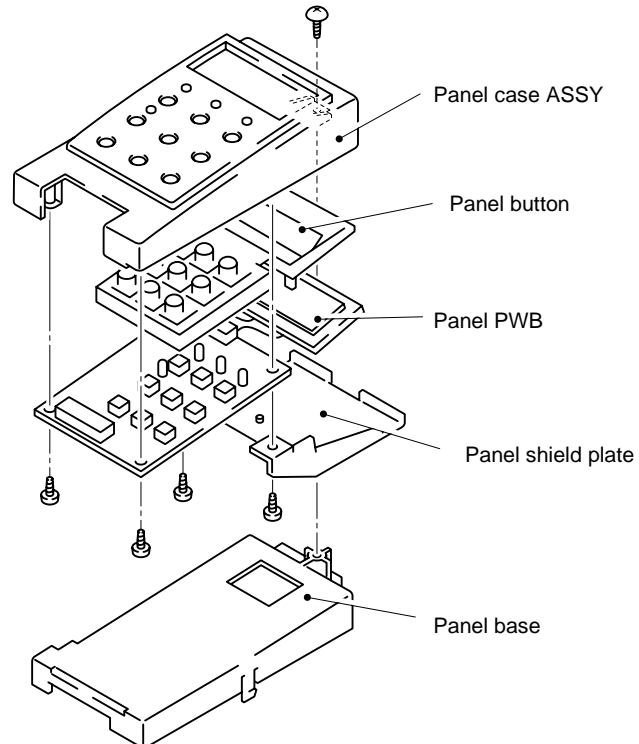


Fig.7-11

4.1.4 Side Cover (R) 2

- 1) Remove the set screw BT4X8 (1 pc.) of side cover (R) 2 at the rear of the printer.

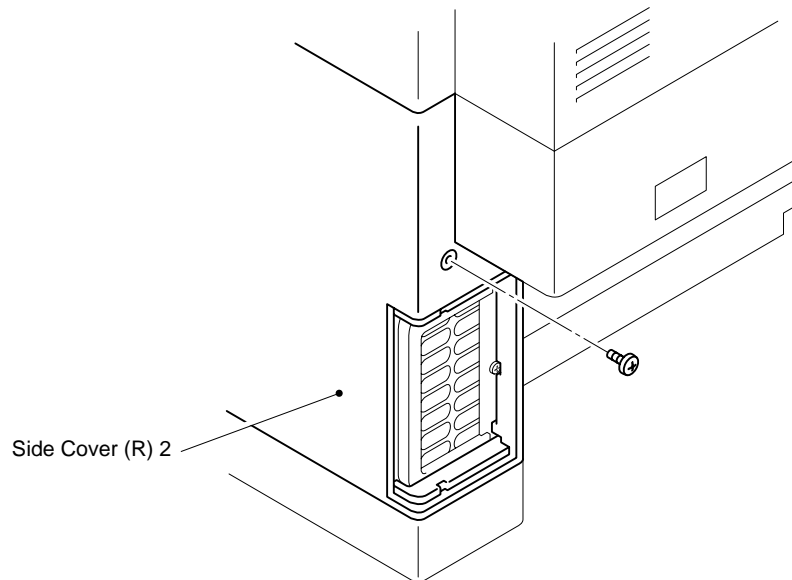


Fig.7-12

- 2) Slide the side cover (R) 2 in the direction of the arrows as shown in Fig.7-13.
- 3) Remove the side cover (R) 2 by releasing the two hooks.

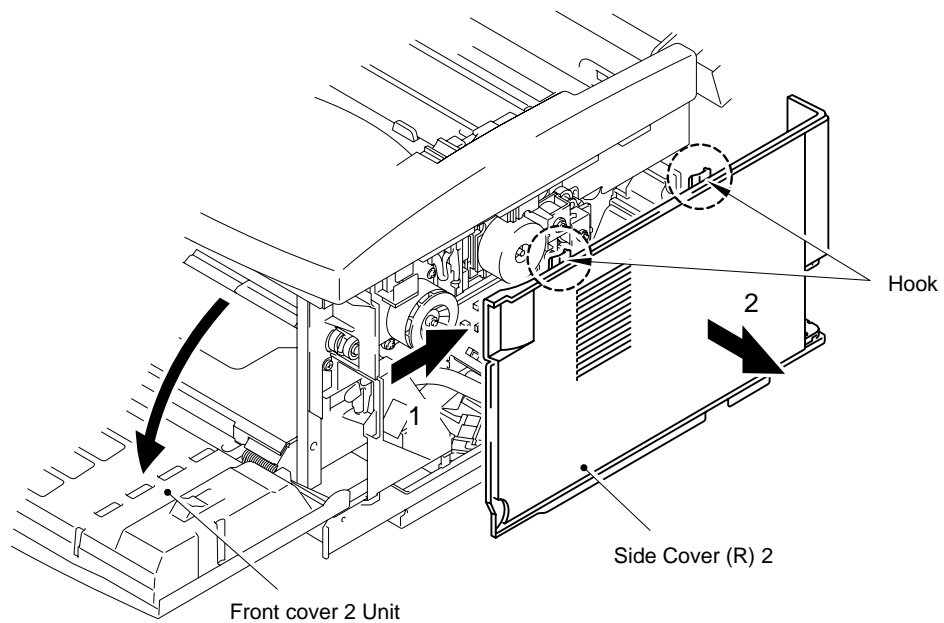


Fig.7-13

4.1.5 Top Cover ASSY 2

- 1) Remove the set screws BT4X8 (2 pcs.) from the top cover ASSY 2. (Top X 1 and Right hand side X 1)
- 2) Remove the top cover ASSY 2 from the printer.

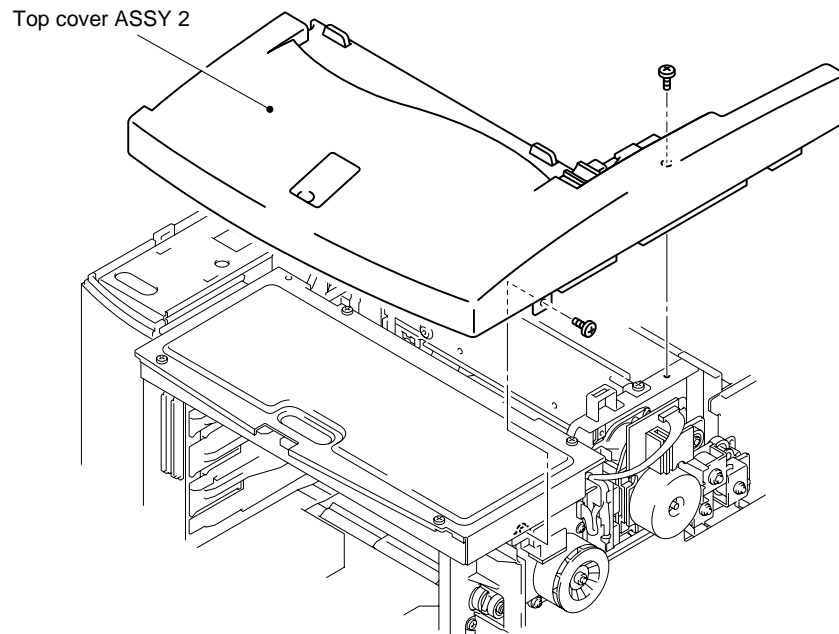


Fig.7-14

- 3) Push the paper stopper set up from the back side of the top cover ASSY 2 to remove the paper stopper set.
- 4) Remove the set screw BT3X8 (1 pc.) and remove the P. EX button from the top cover ASSY 2.

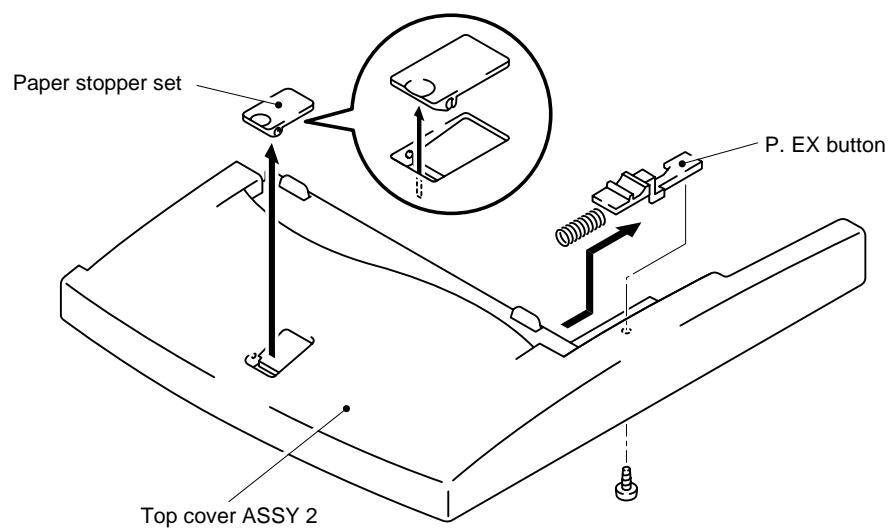


Fig.7-15

4.1.6 IOD1 PWB 2

- 1) Remove the set screws ST3X6 (4 pcs.) to remove the shield upper from the printer.
- 2) Disconnect all the harness connectors (15 pcs.) connected to the IOD1 PWB 2.
- 3) Remove the set screws ST3X6 (6 pcs.) to remove the IOD1 PWB 2 from the printer.

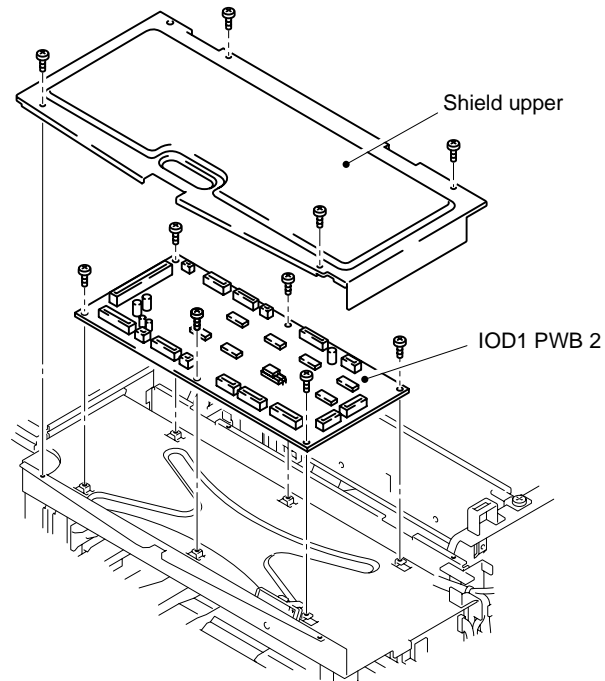


Fig.7-16



PRECAUTION

When handling the IOD1 PWB 2, take care that no damage is caused due to electrostatic charges.

4.1.7 Interlock Switch (Front) (for Front Cover 2)

- 1) Remove the set screw (1 pc.) to remove the SW ASSY from the printer.
- 2) Disconnect the connector.

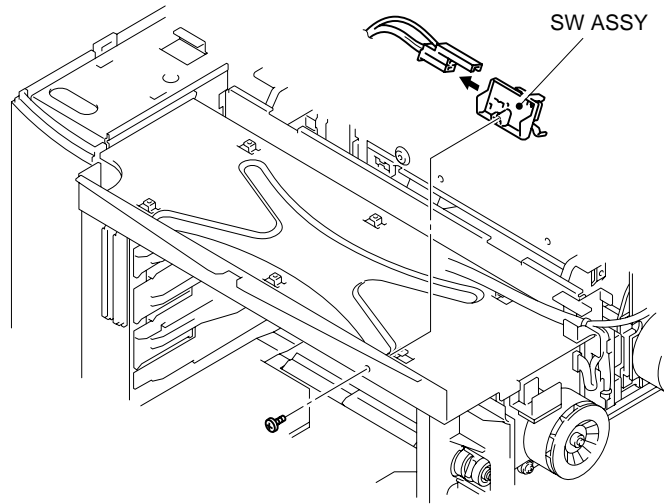


Fig.7-17

- 3) Release the two hooks and remove the interlock switch from the SW base F.

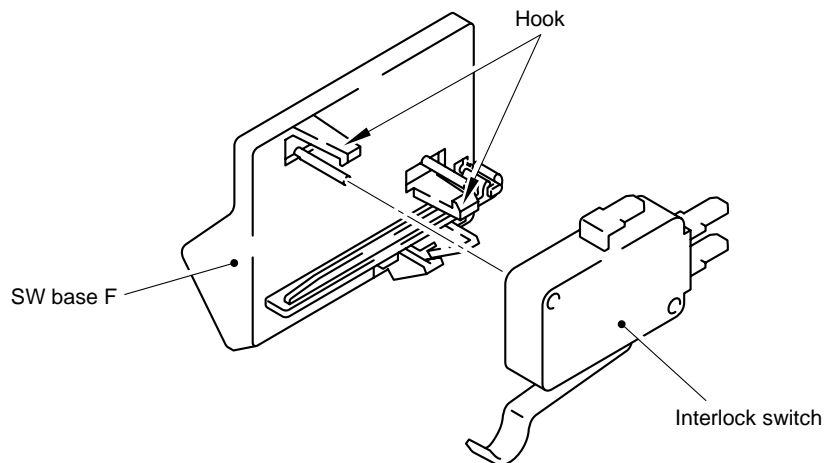


Fig.7-18



CAUTION

Since the interlock switch is an important safety item, after installation confirm that the switch operates correctly.

4.1.8 SL2 PS Fan ASSY

- 1) Disconnect the connector from the PS fan ASSY.
- 2) Remove the set screw FT3X6 (1 pc.) to remove the SL2 PS fan ASSY from the printer.

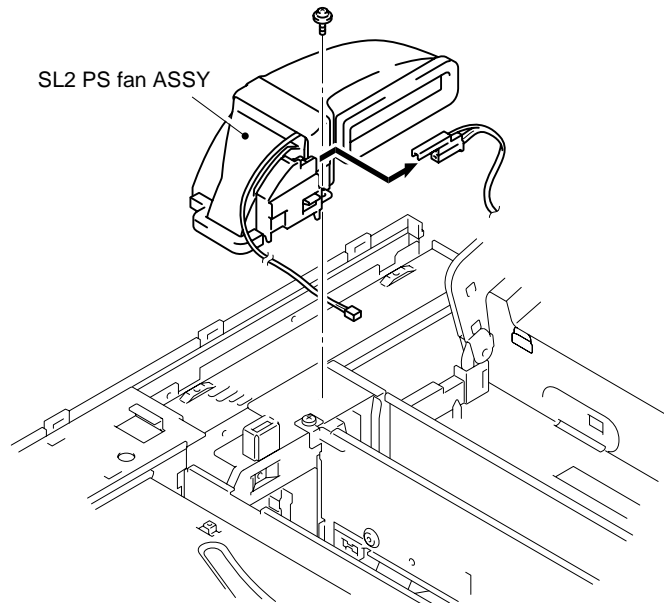


Fig.7-19

- 3) Remove the tape to remove the PS fan case and PS fan duct from the cooling fan (EX) 2.

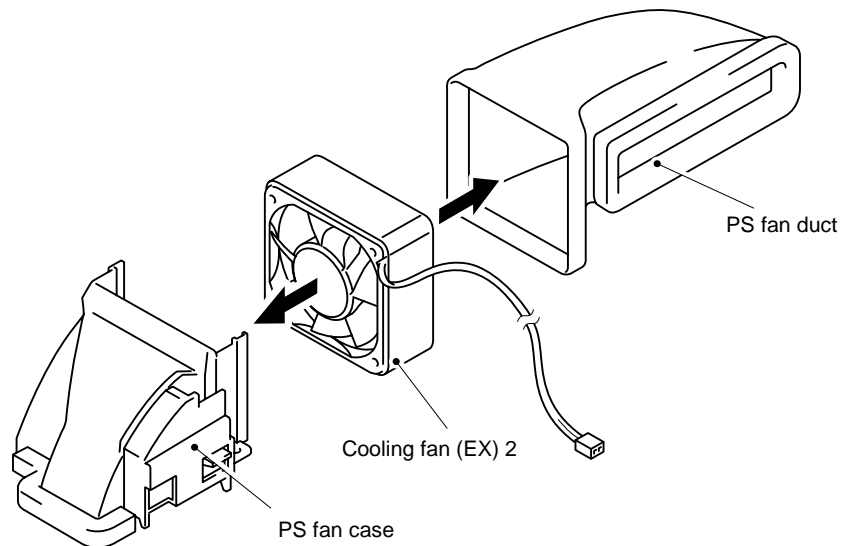


Fig.7-20

4.1.9 Interlock Switch (Top)

- 1) Remove the set screw BT3X8 (1 pc.) to remove the switch holder case from the PS fan case.
- 2) Remove the interlock switch from the switch holder case.



CAUTION

Since the interlock switch is an important safety item, after installation confirm that the switch operates correctly.

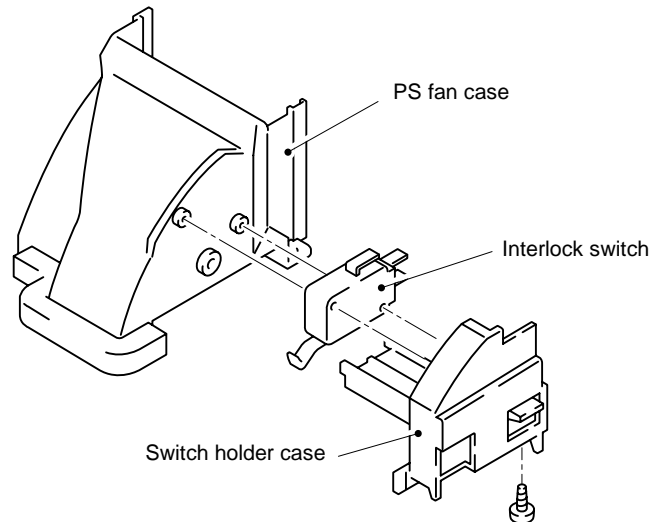


Fig.7-21

4.1.10 Drum Cleaner 2

- 1) Push the two hooks on the cleaner cover backwards to release them and remove the cleaner cover.
- 2) Remove the drum cleaner 2 by pushing the handle backwards until it releases from the contacts at the left and right hand ends, then lift out the drum cleaner assembly.

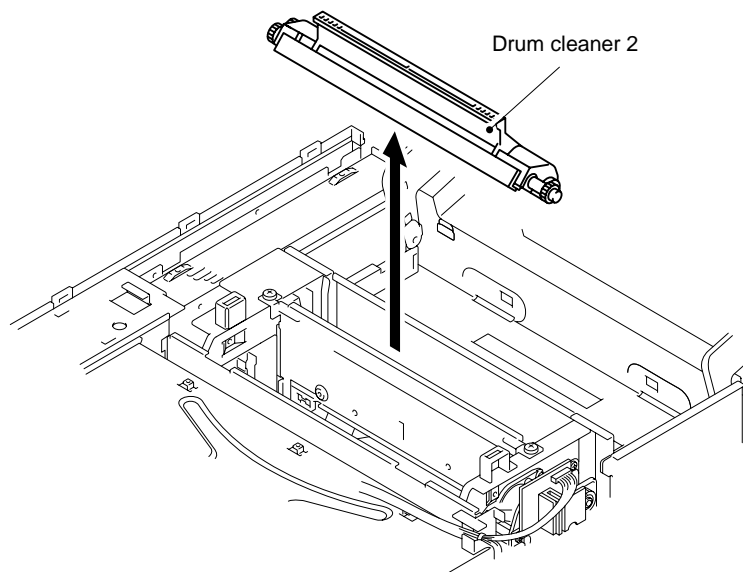


Fig.7-22

4.1.11 Waste Toner Feeder Unit / Belt Sensor (PBS)

- 1) Remove the set screws ST3X6 (2 pcs.) from the waste toner feeder unit.
- 2) Remove the waste toner feeder unit complete with the belt sensor.
- 3) Unclip and remove the belt sensor from the waste toner feeder unit.

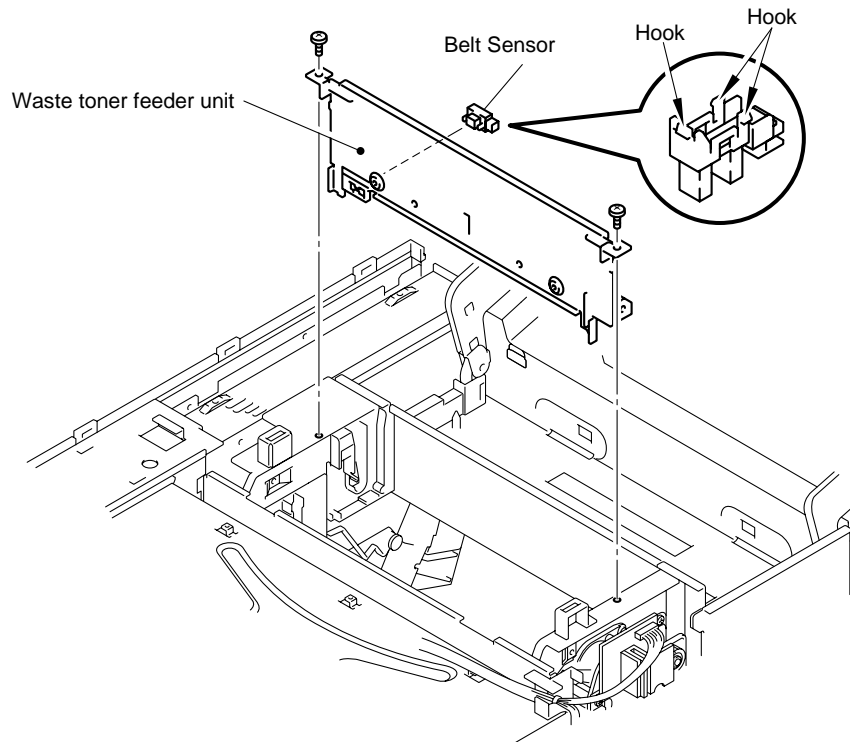


Fig.7-23

4.1.12 Transfer Drum 2

- 1) Open the transfer unit cover 2.
- 2) Protect the surface of the transfer drum 2 by covering it with paper.
- 3) Lift the transfer drum 2 up and forwards from the transfer unit 2 side.
- 4) Release the transfer drum 2 from the shaft supports.
- 5) Pull up and remove the transfer drum 2 from the top of the printer.

Note:

- *For easier removal, push the drum upwards and diagonally forwards.*
- *When re-assembling the transfer drum 2, slide the drum shaft between the metal plates and ensure the drum is fully located into the correct retaining position.*



PRECAUTION

Do not touch the transfer drum 2 surface with your bare hands or scratch it. Protect the drum surface during handling.

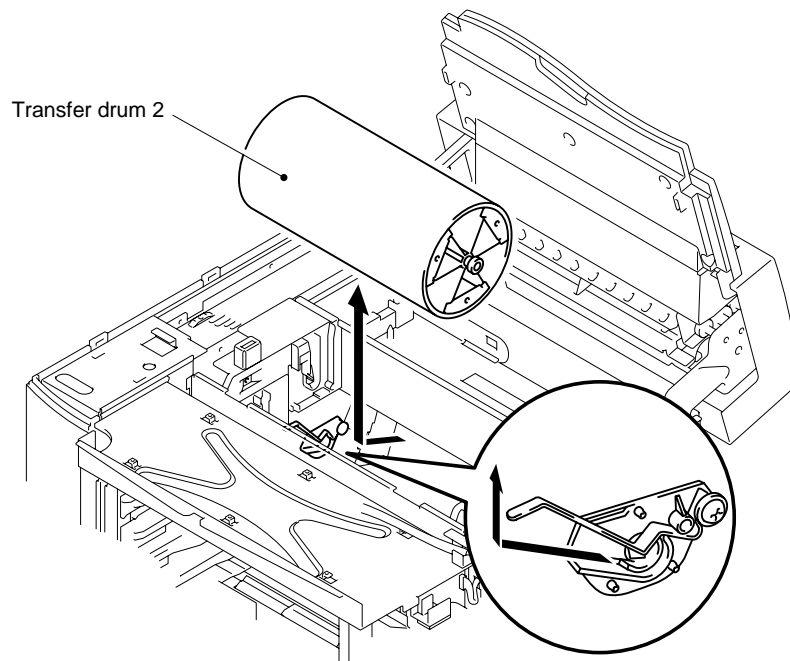


Fig.7-24

4.1.13 WT U Spring / DEV, Drive Gear 2

- 1) Remove the C ring and remove the four DEV, drive gears 2 from the (gear base).

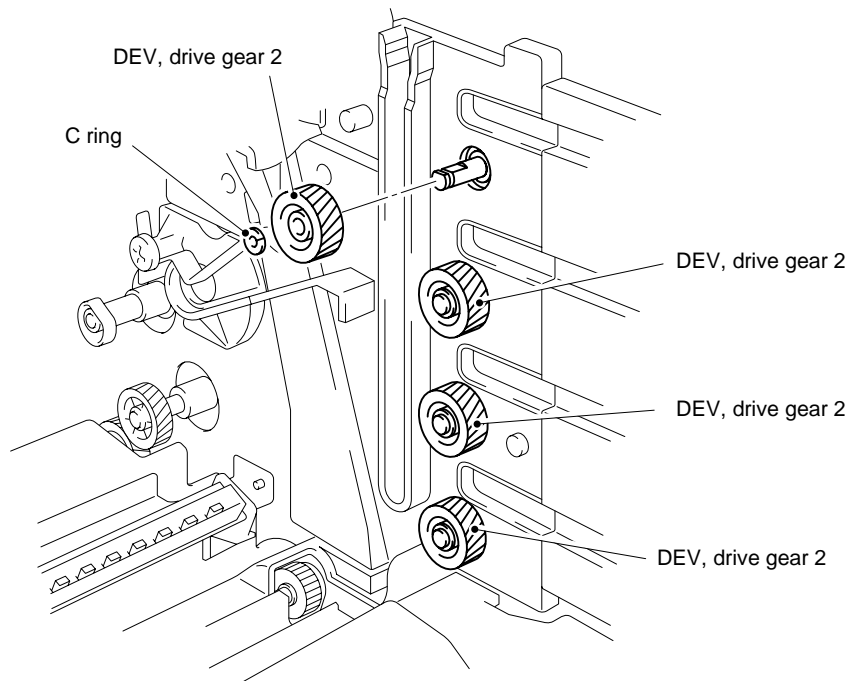


Fig.7-25

- 2) Remove the set screw (1 pc.) to remove the (gear) and (gear holder) from the shaft.
- 3) Remove the end of the WT U spring from the shaft of the frame to remove the WT U spring from the frame.

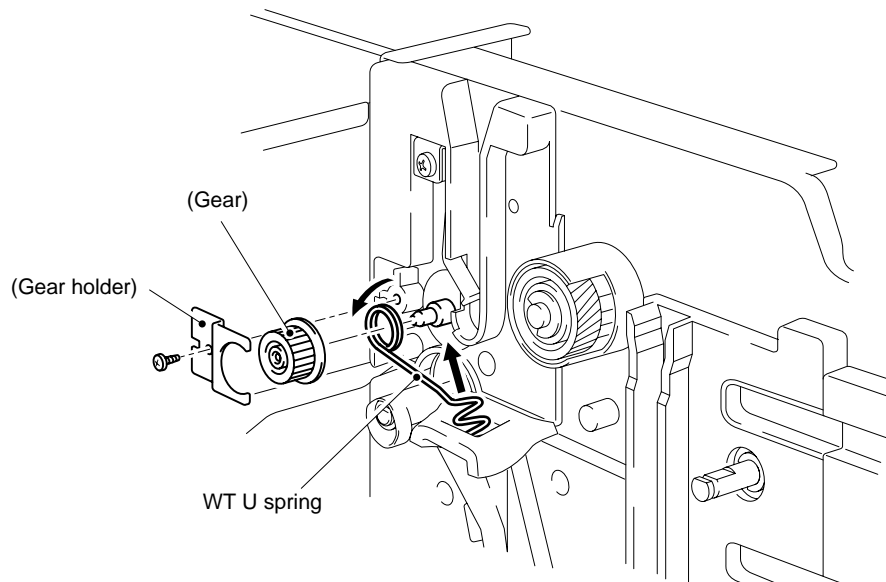


Fig.7-26

4.1.14 Erase Lamp

- 1) Remove the both ends of the erase lamp from the erase holder.
- 2) Disconnect the connector of the erase lamp.

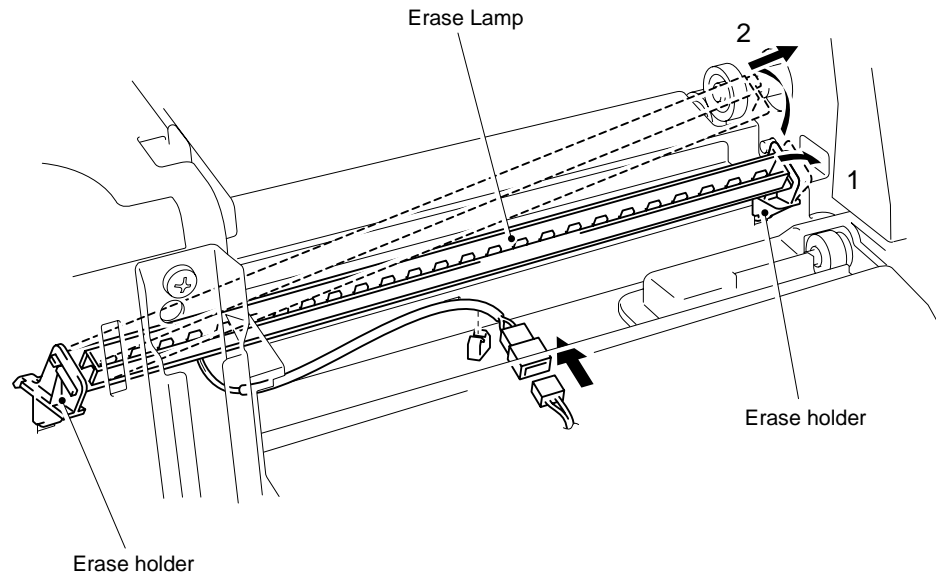


Fig.7-27

4.1.15 SL3 Paper Guide D

- 1) Release the two hooks of the SL3 paper guide D.
- 2) Slide the SL3 paper guide D upwards and remove it from the frame.

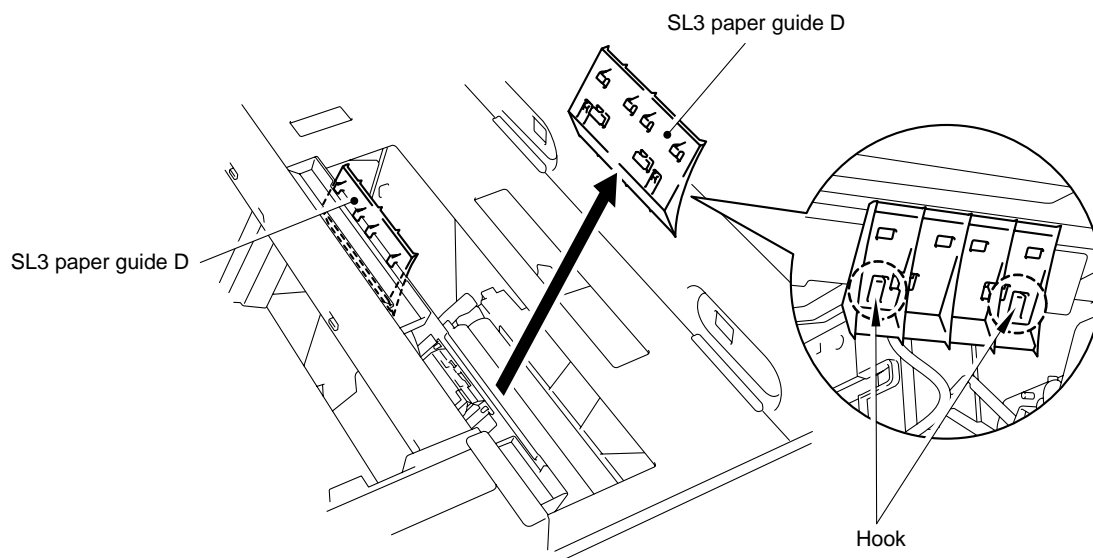


Fig.7-28

4.2 Right Side of the Printer

4.2.1 Base Cover (R) 2

- 1) Remove the set screws BT4X8 (2 pcs.) from the base cover (R) 2.
- 2) Remove the base cover (R) 2 from the base.

Note:

If the optional lower tray unit is fitted, it will be necessary to remove the lower tray clamp screw and locking bar to release the base cover (R) 2.

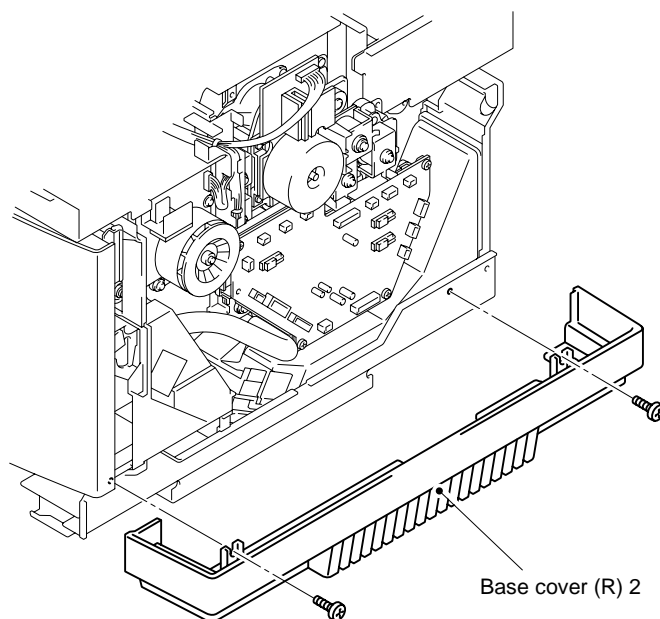



Fig.7-29



PRECAUTION

- When assembling the base cover, insert the leading edge of the base cover (R) 2 into the hook provided at the bottom (left and right) of the base plate.
- Ensure that projecting part () of the base cover (R) 2 goes into the hole in the base plate bottom.

4.2.2 IOD2 PWB 2 (with Base)

- 1) Disconnect all the harness connectors (16 pcs.) connected to the IOD2 PWB 2.
- 2) Remove the IOD harness guide.
- 3) Remove the set screws ST3X6 (2 pcs.) to remove the IOD2 PWB 2 (with base) from the printer.
- 4) Remove the set screws ST3X6 (4 pcs.) to remove the IOD2 PWB 2 from the (base).



PRECAUTION

When handling the IOD2 PWB 2 take care not to cause electrostatic damage to the PWB.

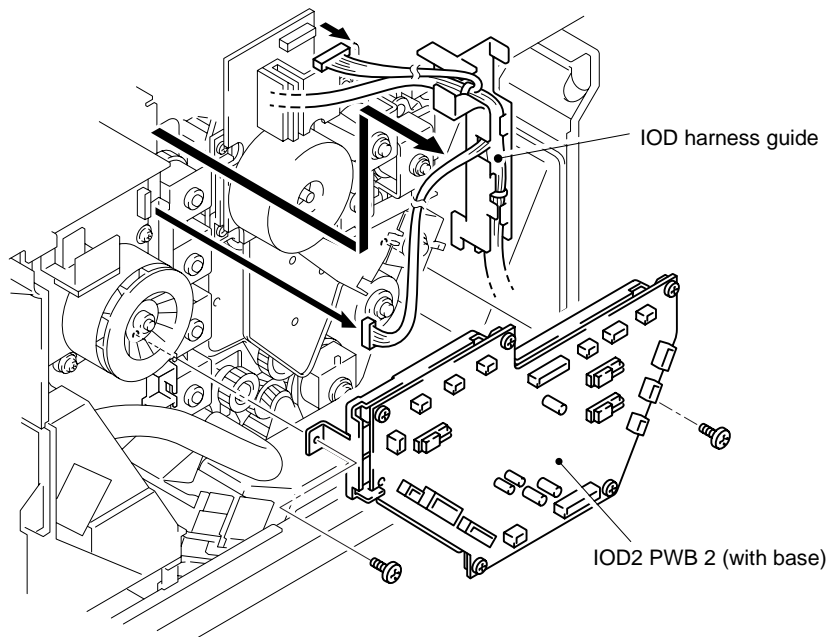


Fig.7-30

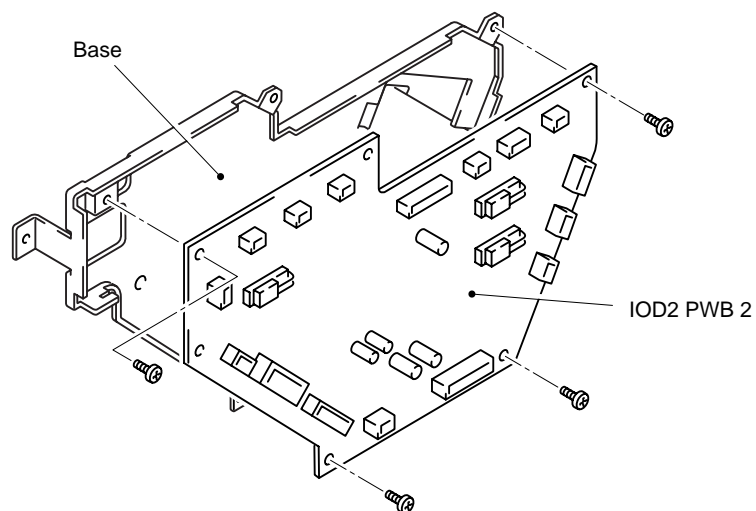


Fig.7-31

4.2.3 TR Cam Clutch 3 (FBCM)

- 1) Remove the outer plastic C ring from the shaft.
- 2) Pull out the TR cam clutch 3 (FBCM) from the shaft.

4.2.4 Fixing Clutch (FUCL)

- 1) Remove the outer plastic C ring from the shaft.
- 2) Pull out the fixing clutch (FUCL) from the shaft.

4.2.5 Cleaner Clutch 3 (FBCL)

- 1) Remove the outer plastic C ring from the shaft.
- 2) Pull out the cleaner clutch 3 (FBCL) from the shaft.

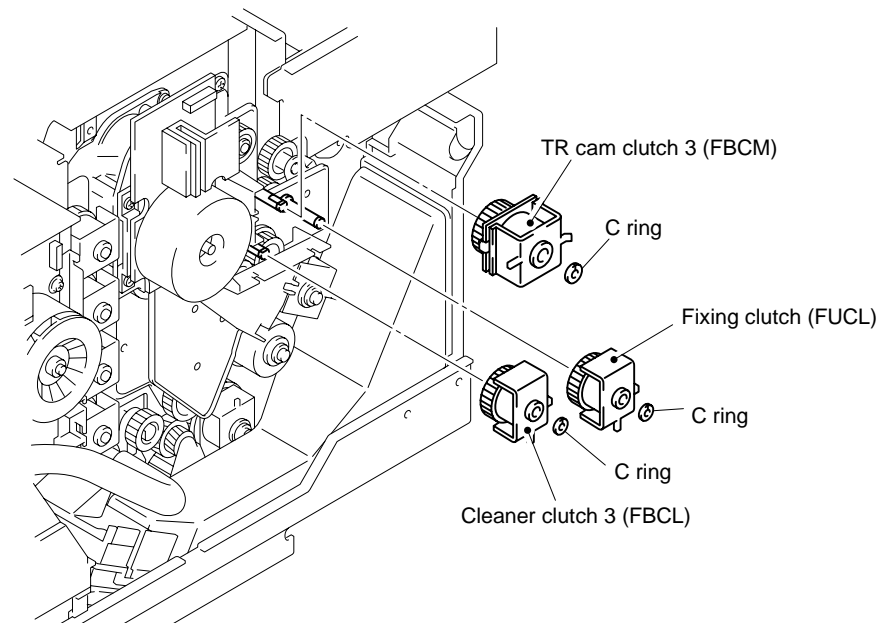


Fig.7-32

4.2.6 TR Cam Clutch 3 (TRCM)

- 1) Remove the outer plastic C ring from the shaft.
- 2) Pull out the TR cam clutch 3 (TRCM) from the shaft.

4.2.7 Registration Clutch (RECL)

- 1) Remove the outer plastic C ring from the shaft.
- 2) Pull out the registration clutch (RECL) from the shaft.

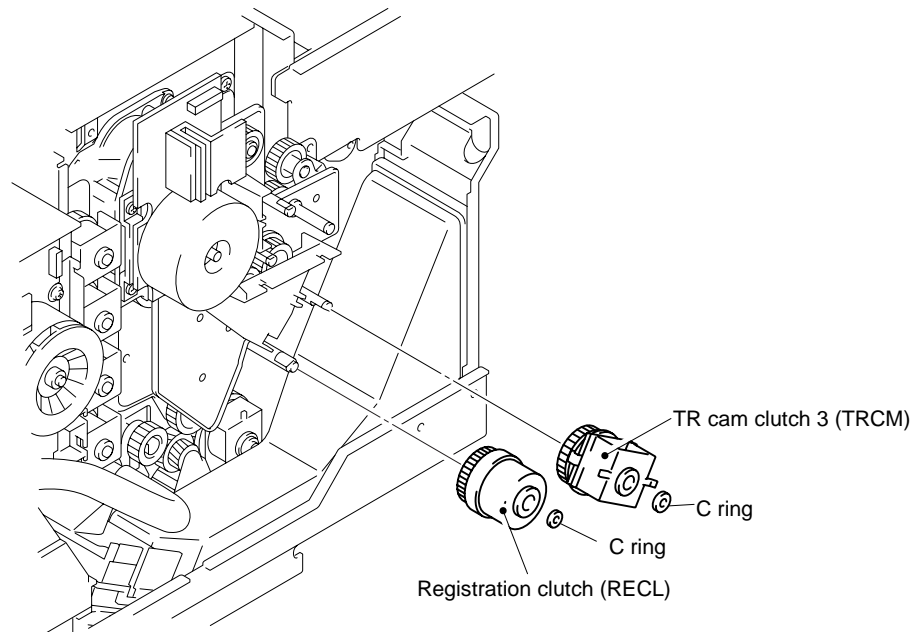


Fig.7-33

4.2.8 Main Motor 2 / BD Gear ASSY 2

- 1) Remove the connector (1 pc.) from the main motor 2 PCB.
- 2) Remove the screws ST3X6 (4 pcs.) holding the main motor 2 to the BD gear ASSY 2.
- 3) Remove the main motor 2 from the BD gear ASSY 2.
- 4) Remove the screws ST3X6 (3 pcs.) holding the BD gear ASSY 2.
- 5) Remove the BD Gear ASSY 2.

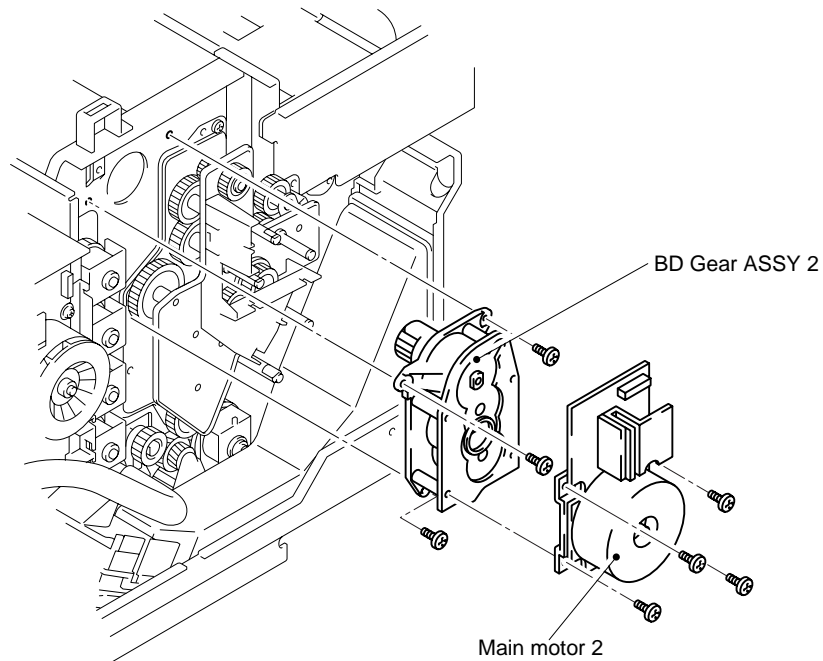


Fig.7-34

4.2.9 Developer Motor 2



CAUTION

Take care not to stress the motor drive PCB when removing the connector or handling the motor / PCB assembly.

- 1) Remove the connector (1 pc.) from the developer motor 2 PCB.
- 2) Remove the set screws ST3X6 (4 pcs.) holding the developer motor 2 to the developer drive unit 2.
- 3) Remove the developer motor 2.

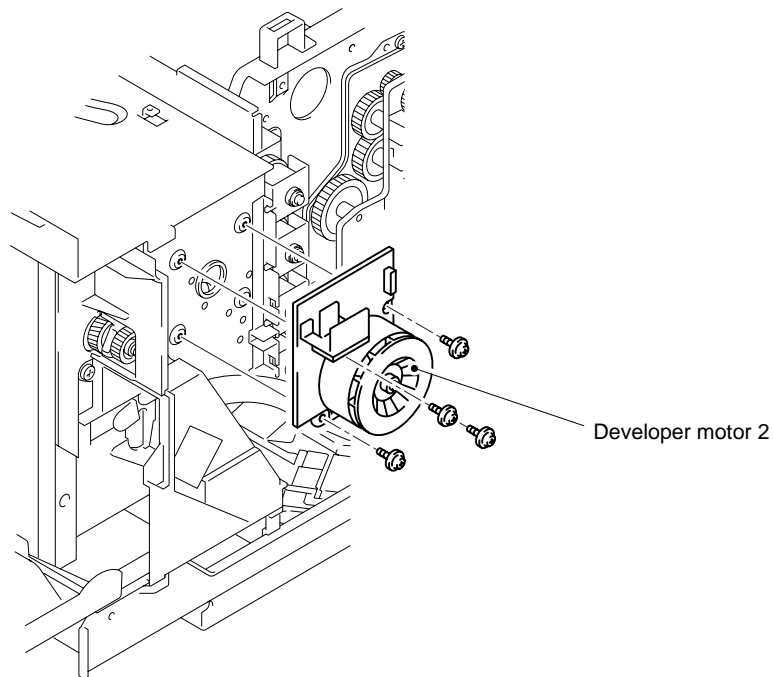


Fig.7-35

4.2.10 Main Gear Unit 2

- 1) Remove the screws ST3X6 (4 pcs.) to remove the main gear unit 2 from the printer.

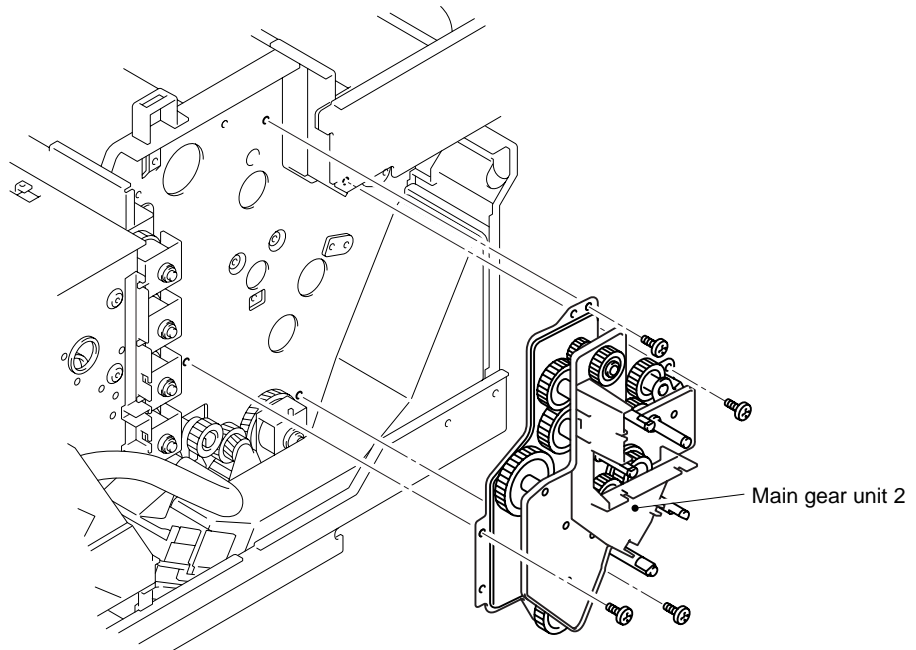


Fig.7-36

4.2.11 WT Holder ASSY 2

- 1) Open the front cover 2.
- 2) Remove the waste toner box.
- 3) Remove the set screw BT3X8 (1 pc.) to remove the cover (FR) by pulling the cover (FR) forwards to release the lower hook.
- 4) Remove the set screw ST3X6 (1 pc.) to remove the WT holder ASSY 2 from the frame.

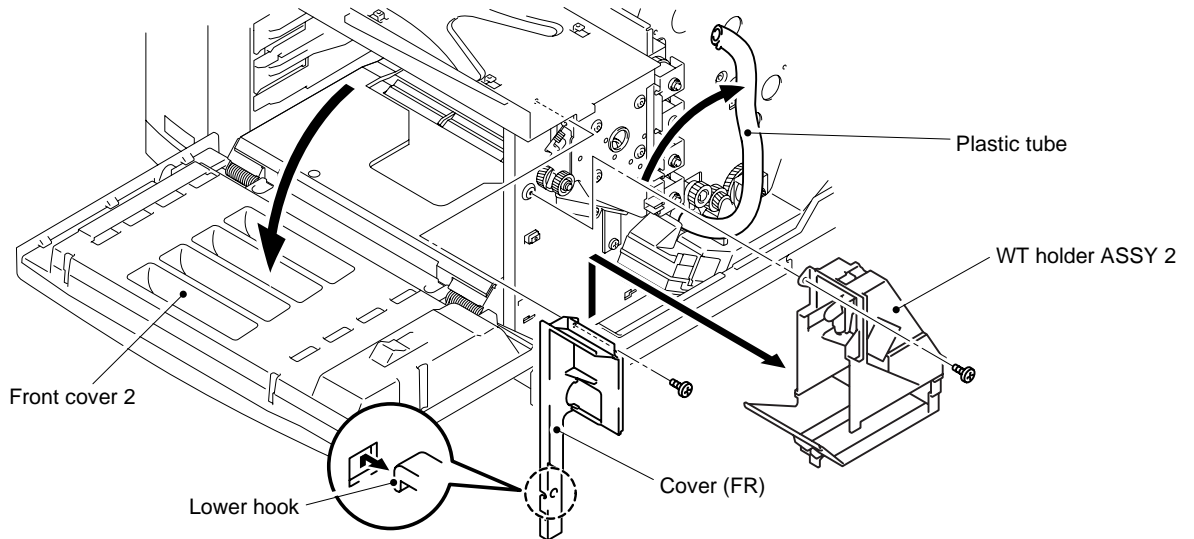


Fig.7-37

4.2.12 Developer Clutch 2 (C, M, Y, K)

- 1) Remove the outer plastic C ring of each developer clutch 2 from the shaft.
- 2) Pull out the developer clutch 2 from the shaft.

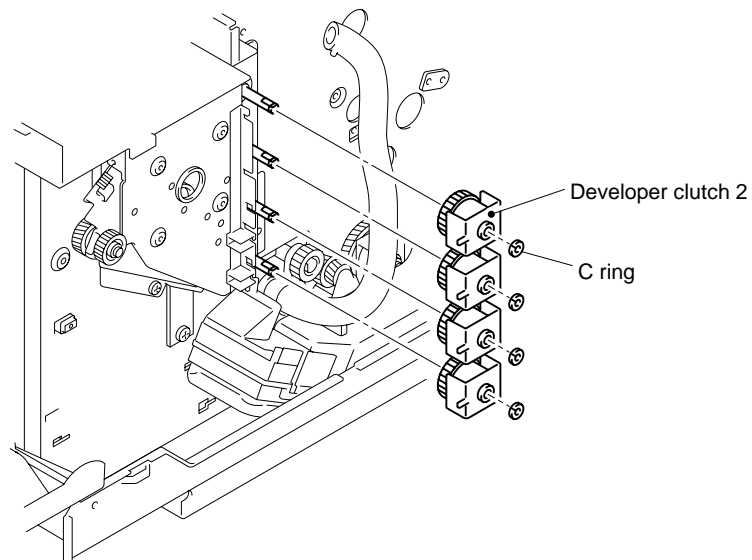


Fig.7-38

4.2.13 Cooling Fan OZ

- 1) Remove the tape holding the cable harness to the top of cooling fan OZ.
- 2) Remove the set screw F3X6 (1 pc.) from the fan case assembly.
- 3) Remove the fan case assembly from the printer.

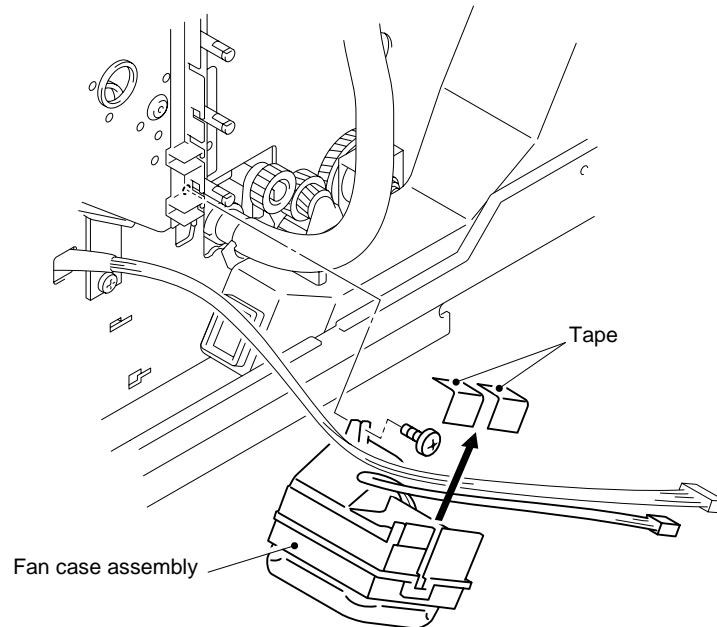


Fig.7-39

- 4) Remove the cooling fan OZ from the fan case.

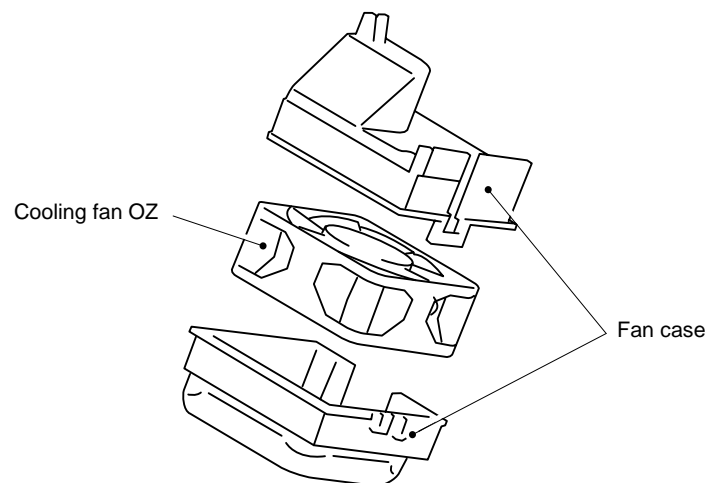


Fig.7-40

4.2.14 Paper Pick-up Clutch (PCLU)

- 1) Remove the screws (2 pcs.) holding the inner plastic cover and remove the cover.
- 2) Remove the screws ST3X8 (3 pcs.) and BT4X8 (1 pc.) to remove the ozone fan duct and stay (R).

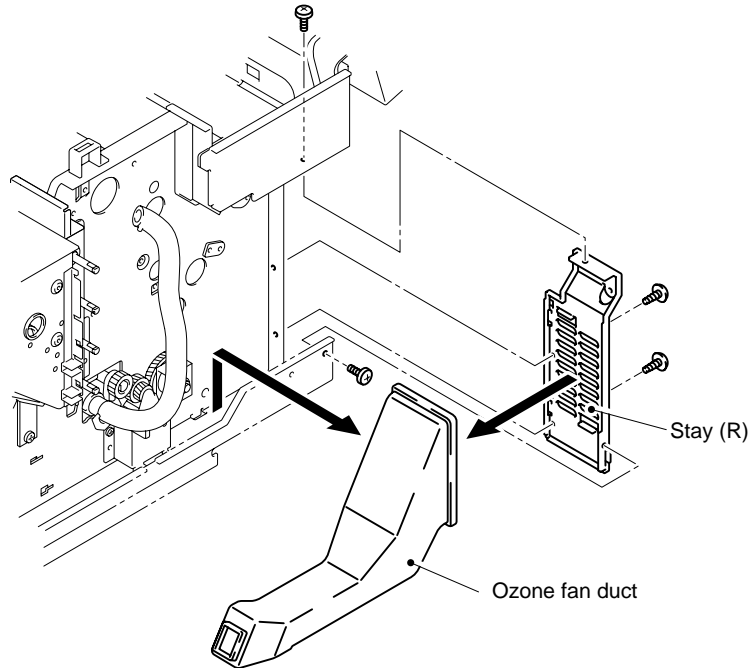


Fig.7-41

- 3) Remove the outer plastic C ring from the shaft.
- 4) Remove the paper pick-up clutch from the shaft.

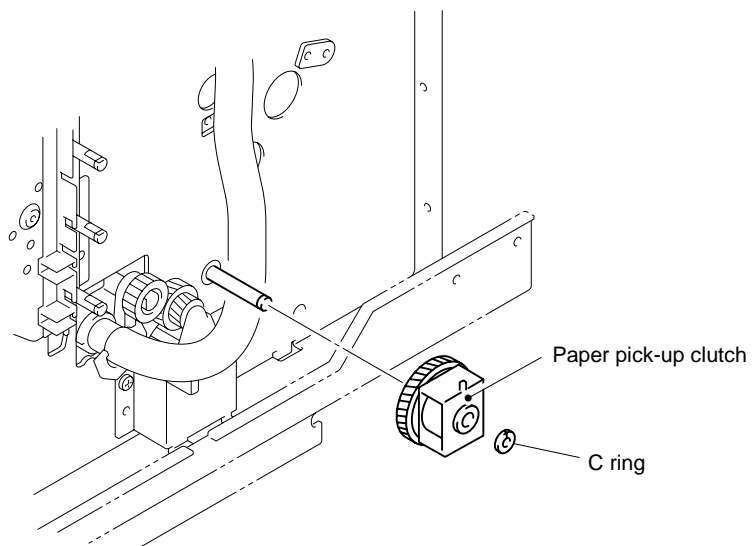


Fig.7-42

4.2.15 Developer Drive Unit 2

- 1) Remove the set screws ST3X6 (4 pcs.) from the developer drive unit 2.
- 2) Remove the developer drive unit 2 from the frame.

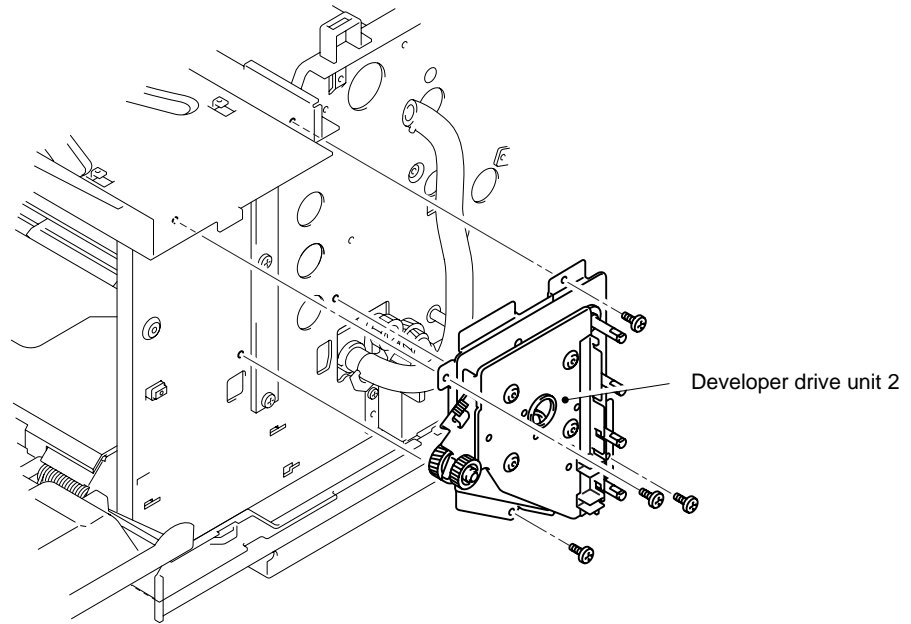


Fig.7-43

4.2.16 Toner Sensor ASSY (TPD)

- 1) Remove the set screws ST3X6 (2 pcs.) from the toner sensor ASSY.
- 2) Disconnect the connector to the toner sensor ASSY.

Note:

If the optional lower tray unit is fitted, remove the left hand screw of the front cross rail to release the media cassette guide.

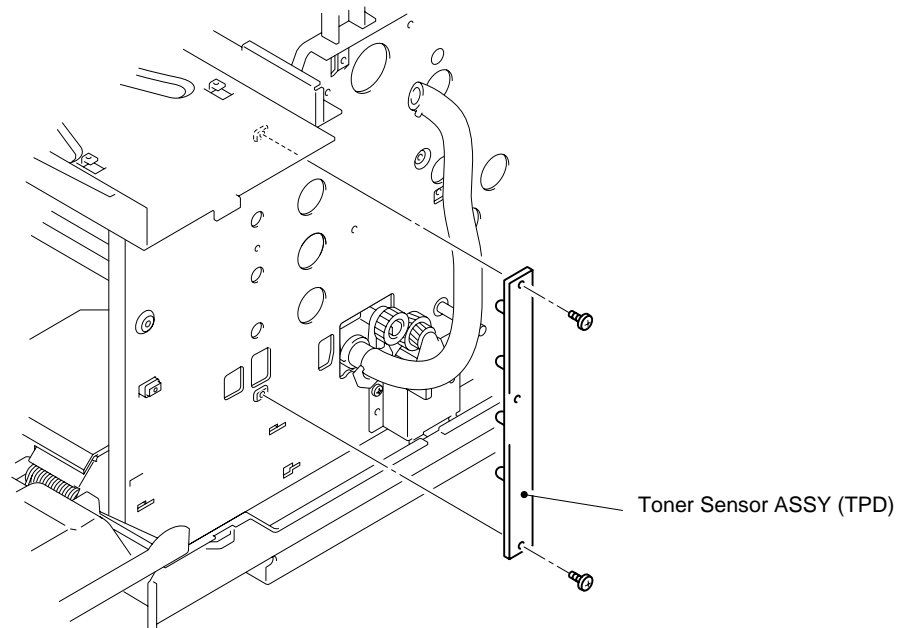


Fig.7-44

4.2.17 FP2 Gear ASSY

- 1) Remove the set screws ST3X6 (2 pcs.) to remove the FP2 gear ASSY from the frame.

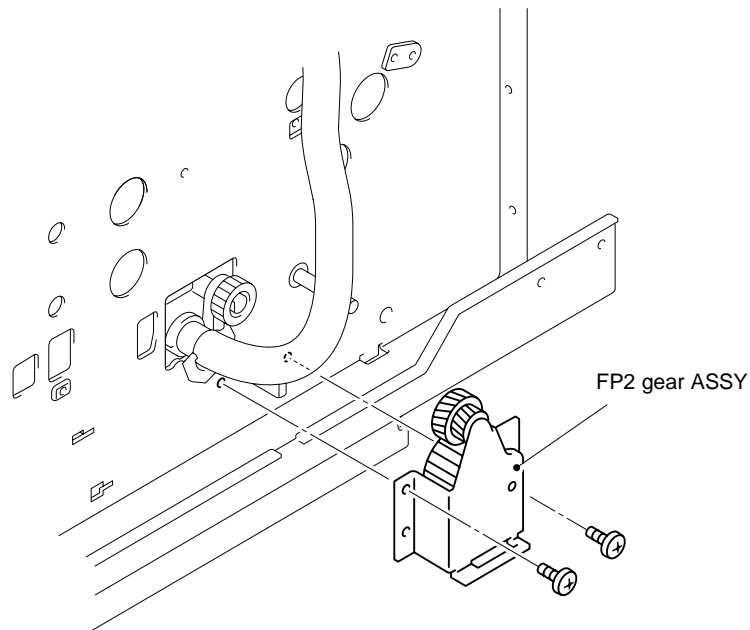


Fig.7-45

4.2.18 Waste Toner Feeder (U) 2

Note:

The waste toner feeder (L) is composed of plastic tube and auger spring gear unit.

- 1) Remove the set screw ST3X6 (1 pc.) to remove the waste toner feeder plate from the frame.
- 2) Pull the waste toner feeder (U) 2 out of the printer.

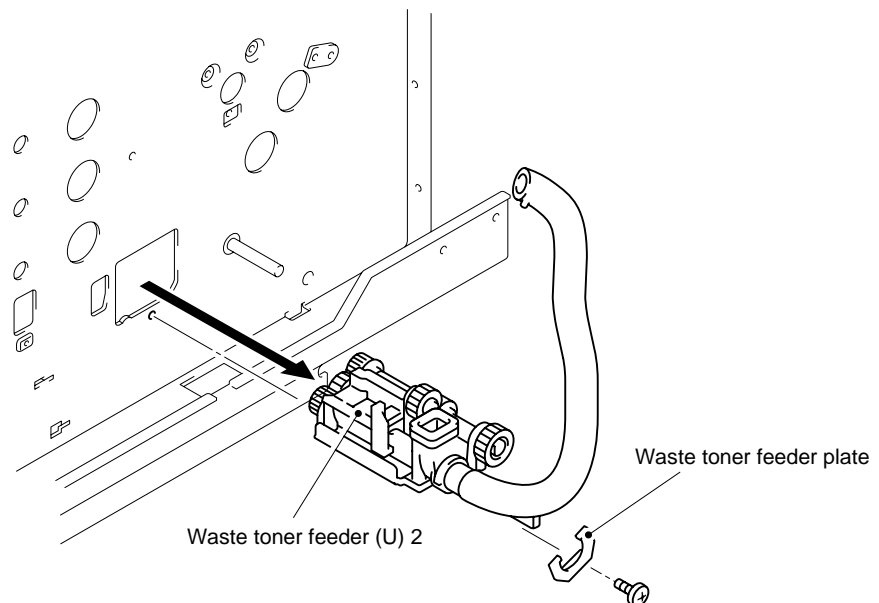


Fig.7-46

4.3 Left Side of the Printer

4.3.1 Video Controller PCB



CAUTION

- Turn off the printer power switch and unplug the power cable from the outlet.
- Remove the interface cable connector.

- 1) Remove the two screws to remove the main controller board from the printer.

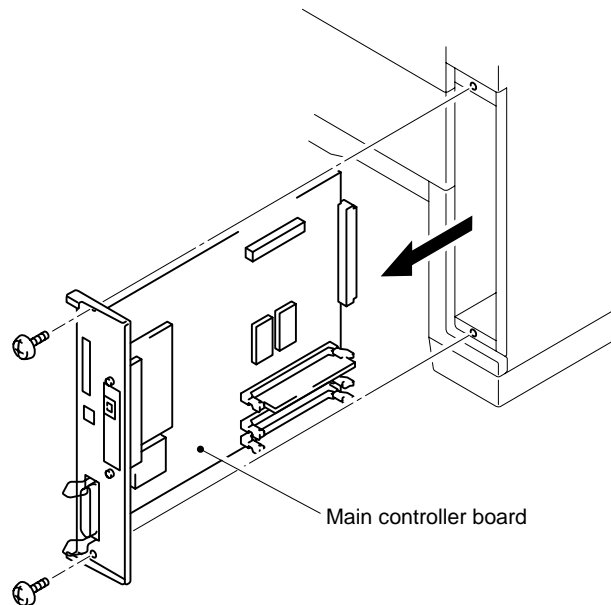


Fig.7-47

- 2) Remove the two screws securing the NC-4100h and remove the NC-4100h by pulling it upwards.

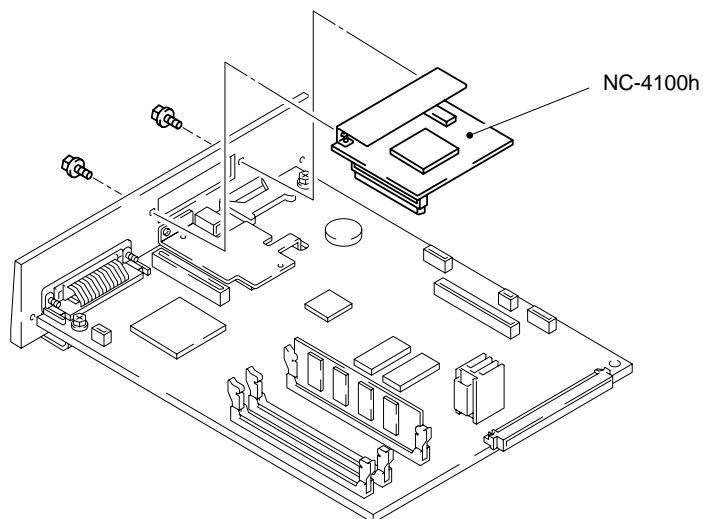


Fig.7-48

- 3) Remove the DIMM.
- 4) Remove the screw at the center of the main PCB base plate.
- 5) Remove the CPU heatspred.
- 6) Remove the sheet (GP1-2.0-025025Y).
- 7) Remove the two screws on the CDCC IF.
- 8) Remove the two screws to remove the main PCB base plate.

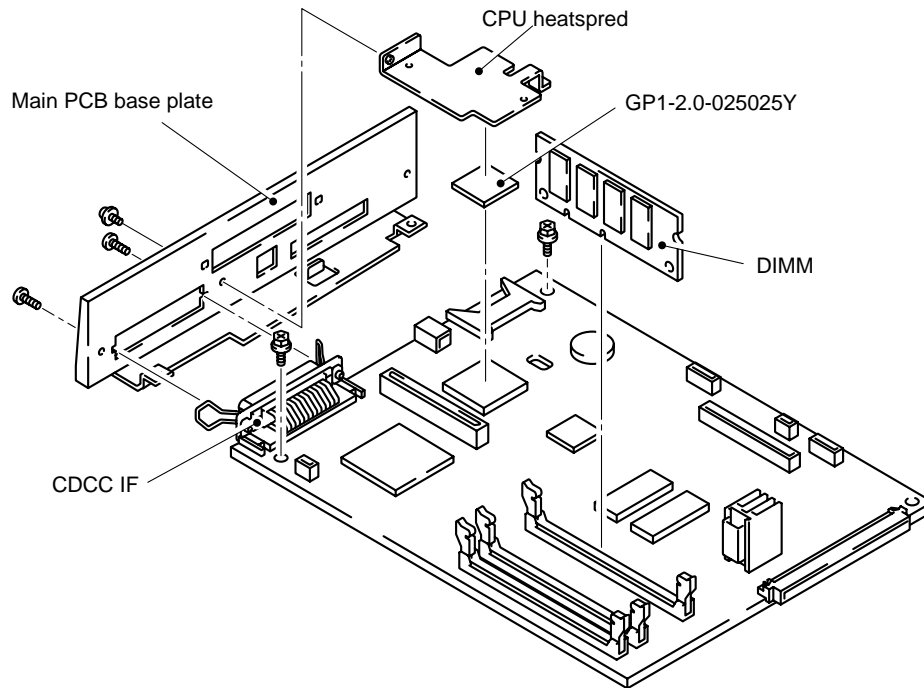


Fig.7-49

4.3.2 Side Cover (L) 2

- 1) Remove the set screw BT4X8 (2 pcs.) of side cover (L) 2.
- 2) Remove the side cover (L) 2.
(Slowly pull up the side cover (L) 2, and release the hook from the front of the Upper cover.)

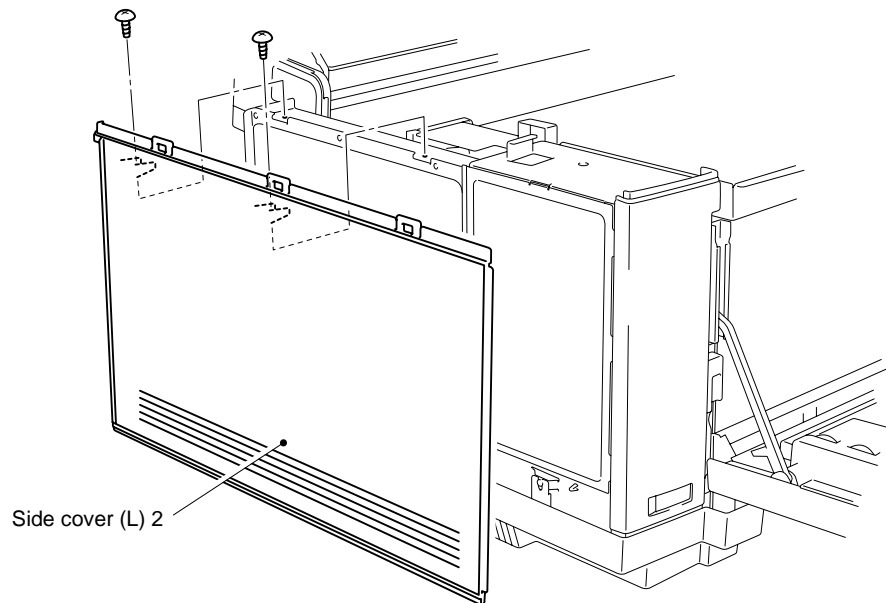


Fig.7-50

4.3.3 Base Cover (L) 2

- 1) Remove the set screws TS4X8 (2 pcs.) from the base cover (L) 2.
- 2) Remove the base cover (L) 2 from the base.

Note:

If the optional lower tray unit is fitted, it will be necessary to remove the lower tray clamp screw and locking bar to release the base cover (R). For further information, refer to the User Guide.

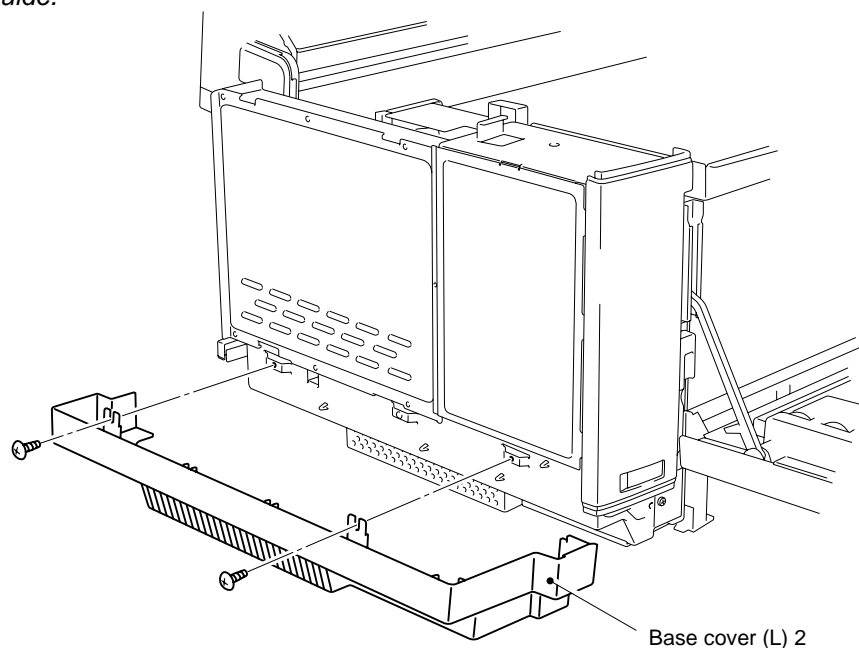



Fig.7-51



PRECAUTION

- When re-assembling the base cover, insert the leading edge of the base cover (L) 2 into the hook provided at the bottom (left and right) of the base plate.
- Ensure that the projecting part () of the base cover (L) 2 goes into the hole in the base plate bottom.

4.3.4 MCTL PWB 2



CAUTION

Remove the Main (Video Controller) PCB before starting this disassembly.

- 1) Remove the set screw ST3X6 (1 pc.). Open the shield cover B as shown in Fig.7-49 to release the three hooks and remove the shield cover B from the printer.



PRECAUTION

- Read the internal RAM counter information from the MCTL PWB 2 prior to replacing the MCTL PWB 2.
- When handling the MCTL PWB 2, ensure that no damage is caused due to electrostatic charges.

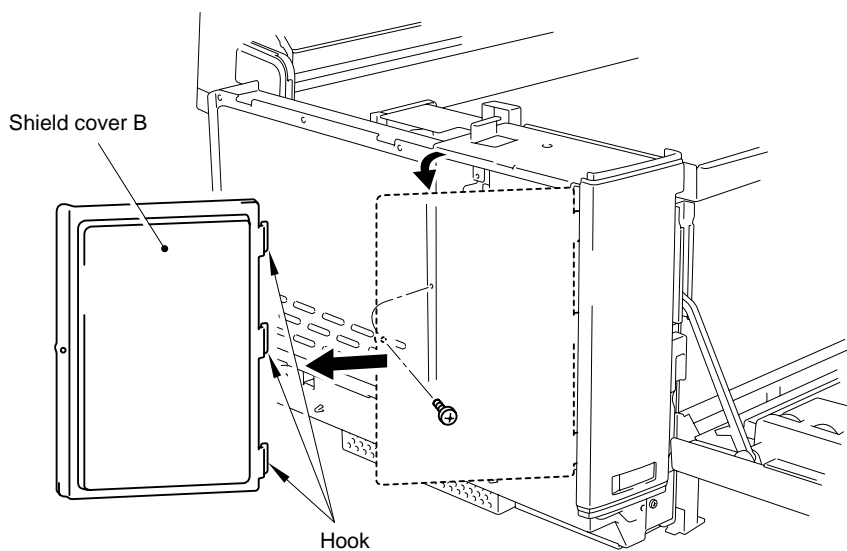


Fig.7-52

- 2) Disconnect all the harness connectors (8 pcs.) connected to the MCTL PWB 2.
- 3) Remove the set screws ST3X6 (4 pcs.) to remove the MCTL PWB 2 from the frame.

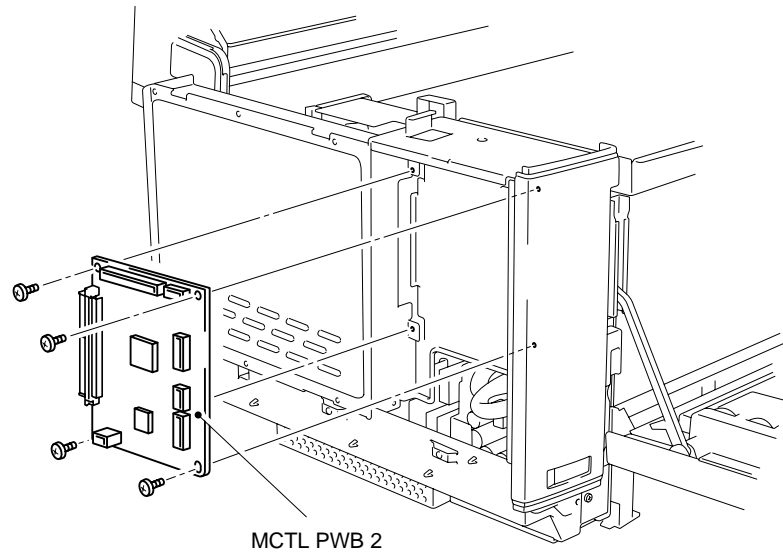


Fig.7-53

4.3.5 Fuser Connector 2

- 1) Remove the set screws ST3X6 (4 pcs.) to remove the shield cover A from the shield case ASSY.
- 2) Remove the set screw BT4X10 (1 pc.) to remove the side F cover (L) from the frame.
- 3) Remove the set screws BT3X6 (4 pcs.) to remove the shield case ASSY from the frame.

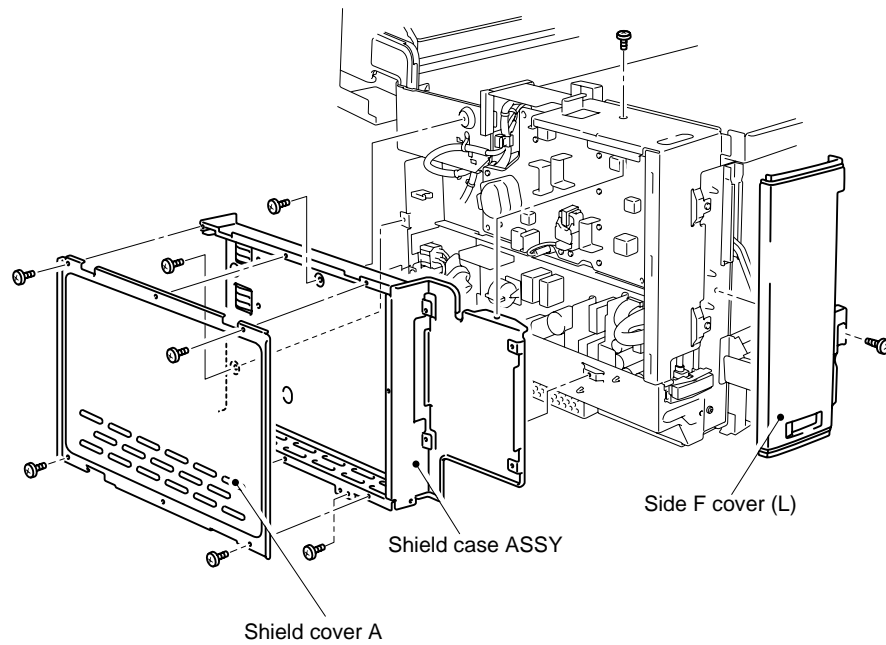


Fig.7-54

- 4) Disconnect the PN/PH connectors connected to the power supply unit.
- 5) Remove the set screws M4X10 (2 pcs.) to remove the fuser connector 2 from the frame.

* The set screw of the fuser connector 2 is unique.

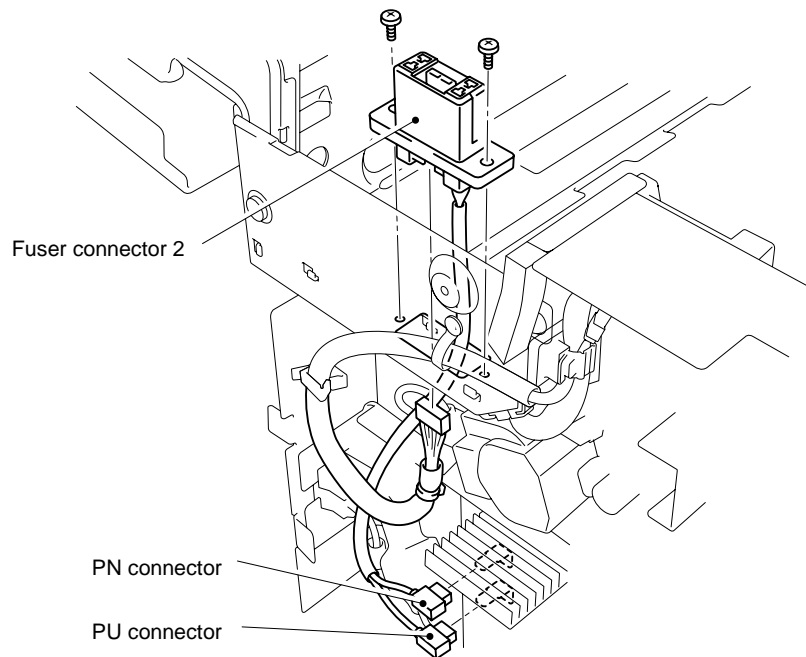


Fig.7-55

4.3.6 High Voltage Unit 2

- 1) Disconnect all the harness connectors (3 pcs.) connected to the high voltage unit 2.
- 2) Remove the set screws ST3X6 (1 pc.) and BT3X8 (8 pcs.) from the high voltage unit 2.
- 3) Remove the high voltage unit 2 from the frame.

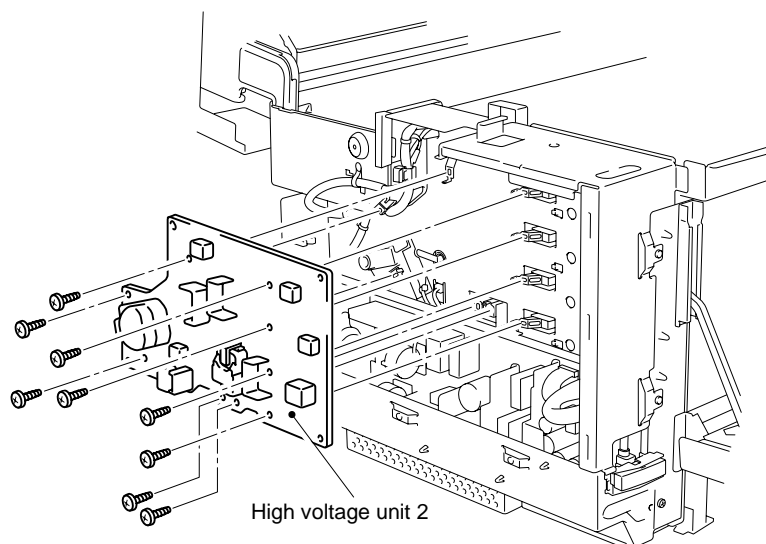


Fig.7-56



WARNING

*The high voltage power supply unit generates high voltages of up to 5KV. You can get an electric shock if you touch the unit while it is powered on.
Turn on the power to the unit only after having refitted and secured side cover (L) 2.*

4.3.7 TR Terminal Base ASSY / Interlock Switch (Rear)

- 1) Open the back door.
- 2) Remove the set screws ST3X6 (2 pcs.) to remove the TR terminal base ASSY from the printer.
- 3) Disconnect the harness connector (1 pc.) connected to the interlock switch.
- 4) Remove the interlock switch from the TR terminal base ASSY.

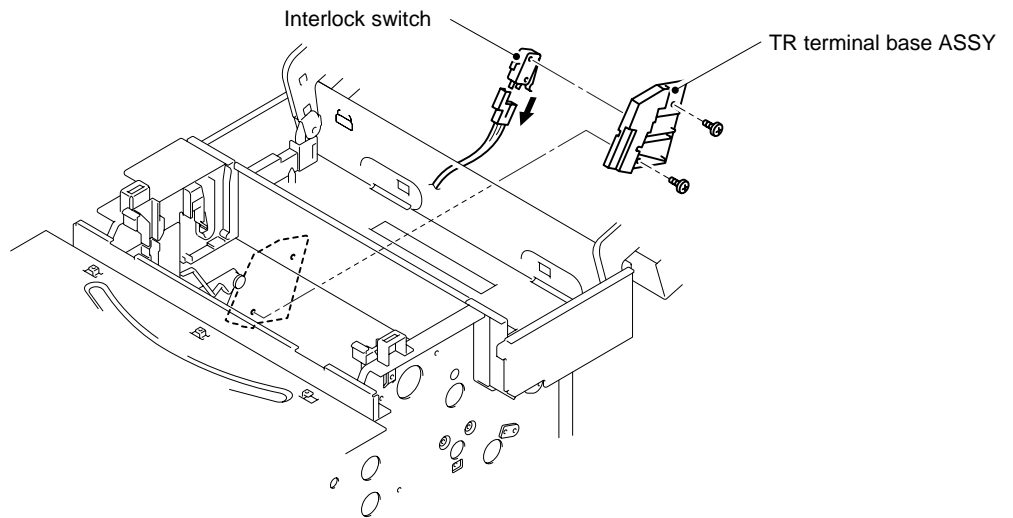


Fig.7-57



CAUTION

Since the interlock switch is an important safety item, after installation confirm that the switch operates correctly.

4.3.8 Paper Sensor (D. EN)

- 1) Disconnect the connector (1 pc.) connected to the paper sensor (D. EN).
- 2) Release the three hooks inside the frame to remove the paper sensor (D. EN) from the frame.

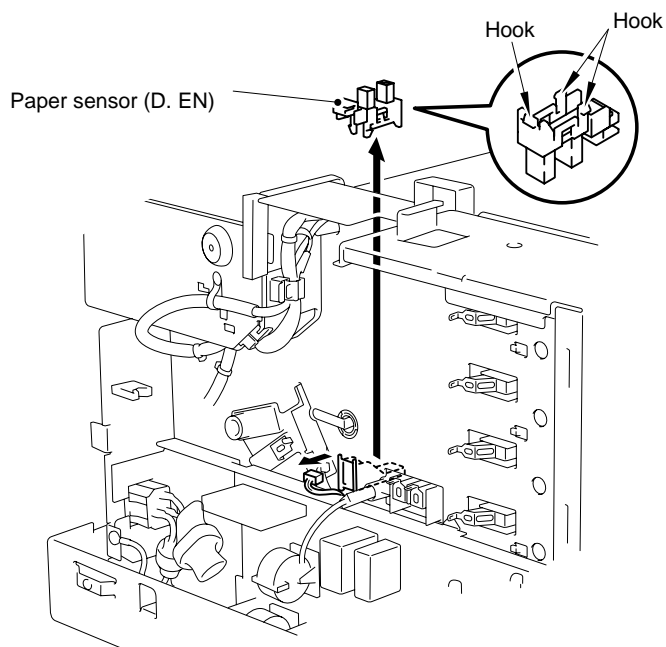


Fig.7-58

4.3.9 Rear Cover 2 / Rear Cover (U) 2

- 1) Remove the set screw BT4X8 (1 pc.) of rear cover 2.
- 2) Remove the rear cover 2 from the frame.
- 3) Push the two hooks downwards to release them and remove the rear cover (U) 2 from the frame.

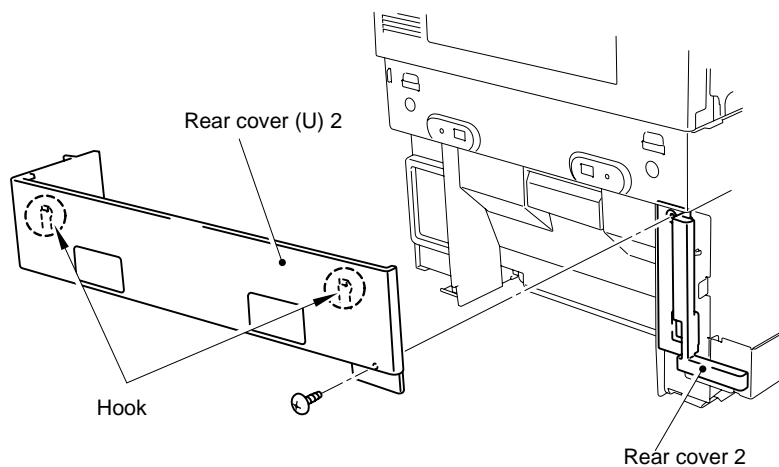


Fig.7-59

4.3.10 Power Supply Unit / SW Button

- 1) Disconnect all the harness connectors connected to the power supply unit.
- 2) Remove the set screws ST3X6 (2 pcs.) to remove the bottom stay (L) from the frame.

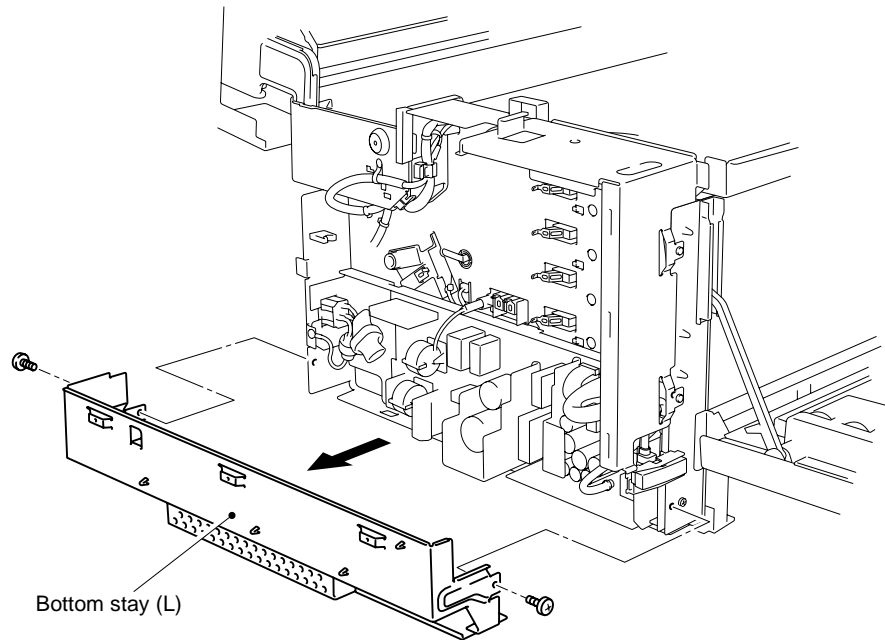


Fig.7-60

- 3) Pull the SW unit upwards to remove it from the frame.
- 4) Remove the set screw M4X6 (1 pc.) complete with the shakeproof washer to release the earthing harness.
- 5) Remove the set screws ST3X6 (4 pcs.) to remove the power supply unit from the frame (two hooks at bottom).

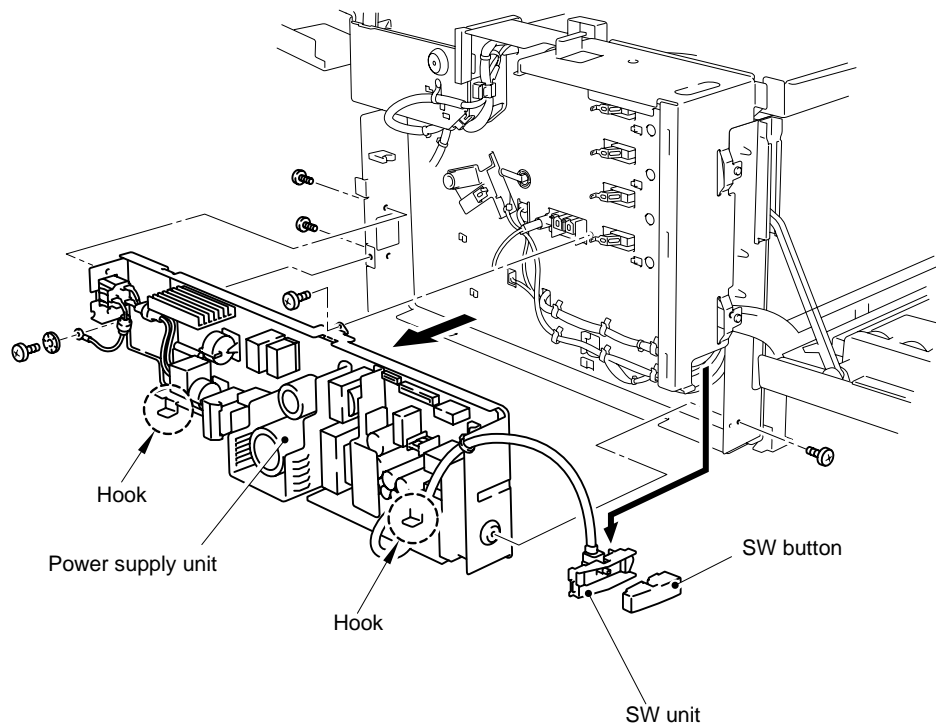



Fig.7-61



WARNING

*The earthing wire is very important for the safety of users.
Upon replacement of the power supply unit, confirm that the earthing wire (green and yellow color) is securely connected to the  connector.*

4.3.11 FP Cassette Guide L/R

Note:

If the optional lower tray unit is fitted, remove the left hand screw of the front cross rail to release the media cassette guide.

- 1) Close the front cover unit 2.
- 2) Remove the set screw ST3X8 (1 pc.) from the FP cassette guide L assembly.
- 3) Move the FP cassette guide L to the direction of the arrow as shown in the figure below and release the plastic catches (4 pcs.). Disconnect the cable to remove the FP cassette guide L from the frame.
- 4) Remove the set screw ST3X8 (1 pc.) from the FP cassette guide R assembly.
- 5) Move the FP cassette guide R to the direction of the arrow as shown in the figure below and release the plastic catches (4 pcs.). Disconnect the cable to remove the FP cassette guide R from the frame.

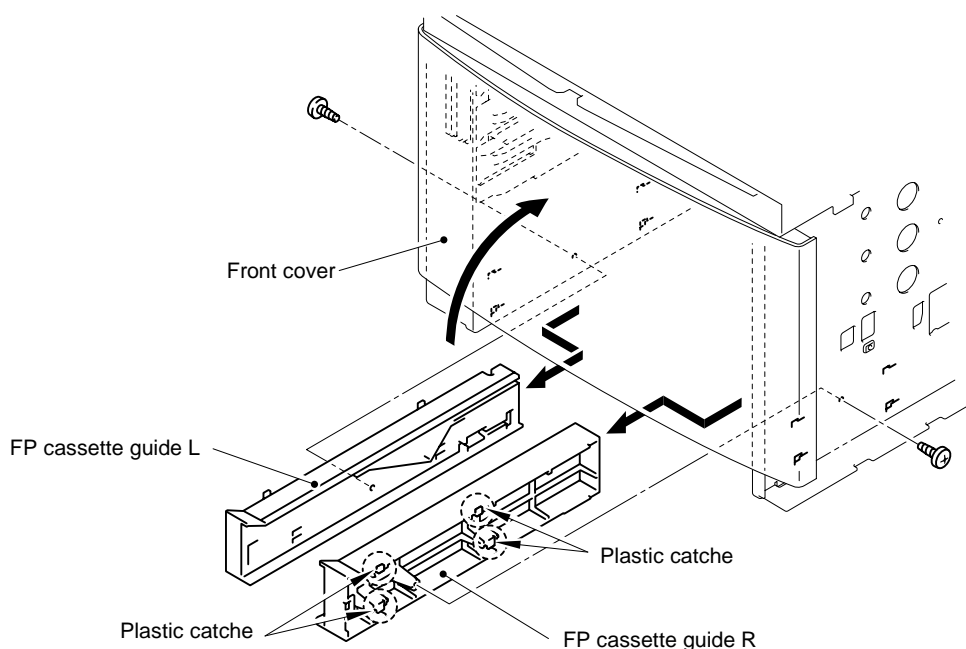


Fig.7-62

Note:

When assembling the FP cassette guide, be sure to correctly locate the 4 (four) catches.

4.3.12 Paper Size Sensor 2 (PSU)

- 1) Remove the set screws ST3X8 (2 pcs.) to remove the paper size sensor 2 from the FP cassette guide L.

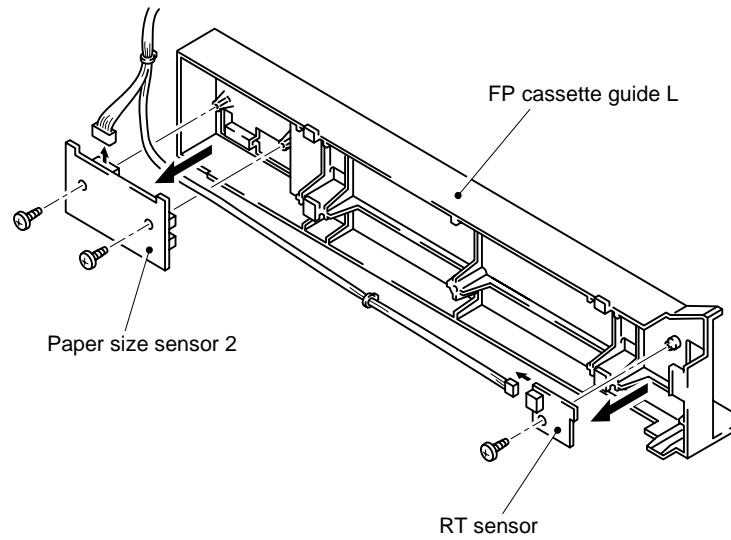


Fig.7-63

4.3.13 Toner Sensor ASSY (TTR)

- 1) Remove the set screws ST3X6 (2 pcs.) from the toner sensor.
- 2) Disconnect and remove the toner sensor.

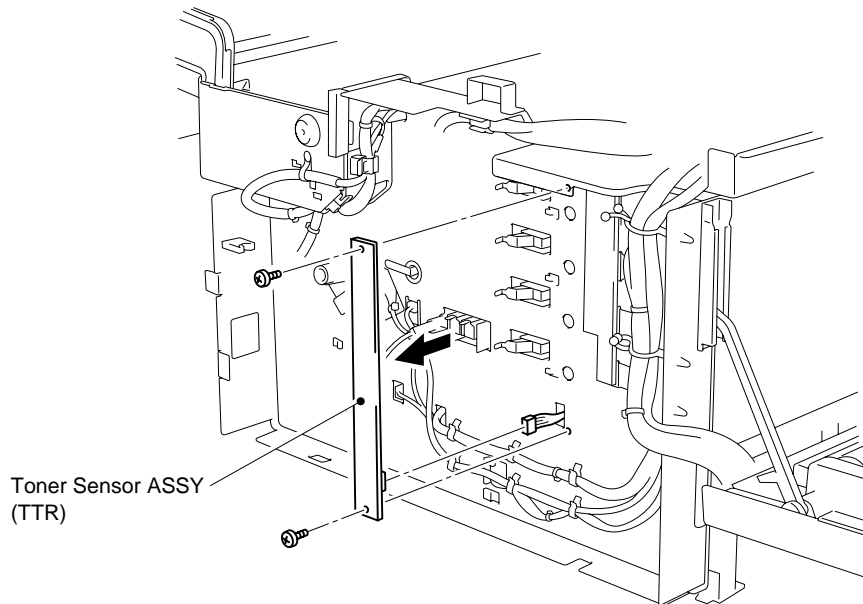


Fig.7-64

4.3.14 Toner Key Sensor 2 (TNK)

- 1) Remove the set screws ST3X6 (2 pcs.) to remove the toner key sensor 2 from the frame.

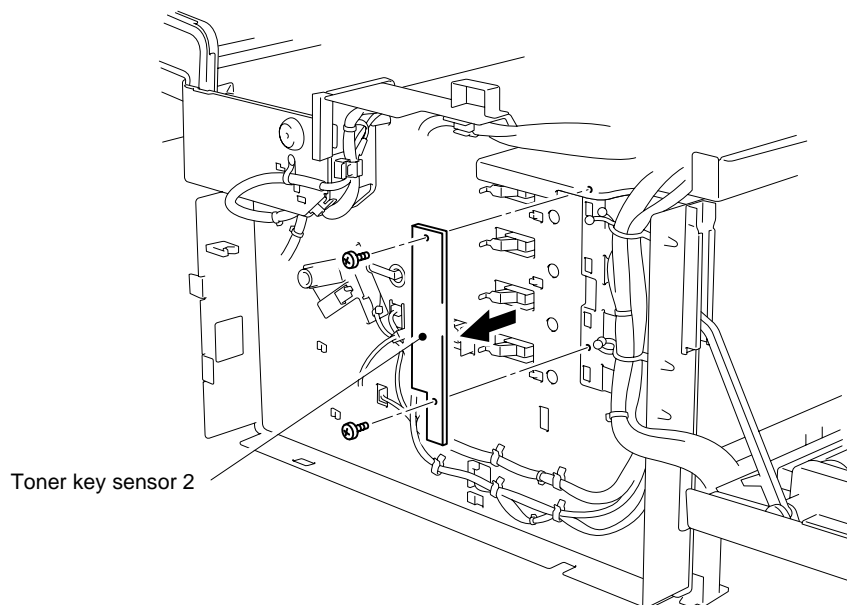


Fig.7-65

4.3.15 Belt Sensor (DPJ) / Oil Sensor (OIL)

- 1) Release the three hooks. Then release the one hook by lifting the oil sensor cover slightly.

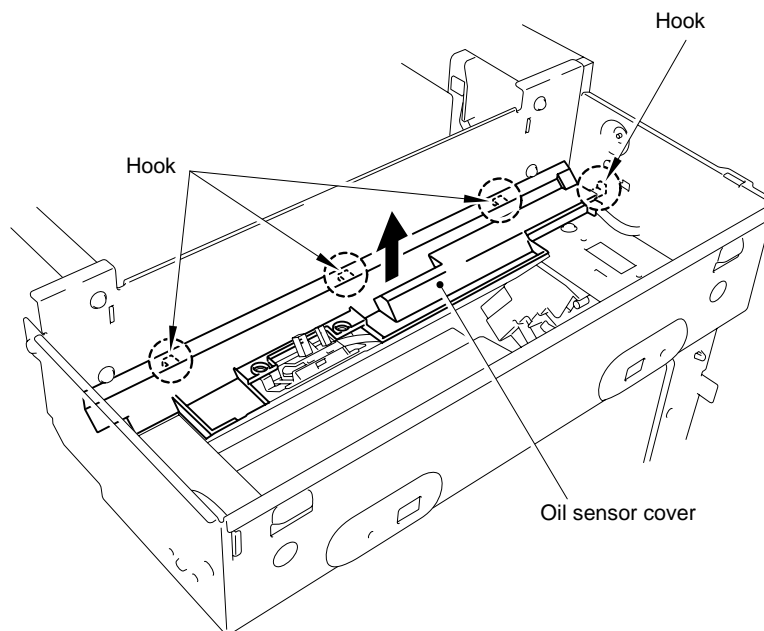


Fig.7-66

- 2) Remove the set screw ST3X6 (2 pc.) to remove the oil sensor from the frame.
- 3) Release the two hooks to remove the belt sensor from the frame.

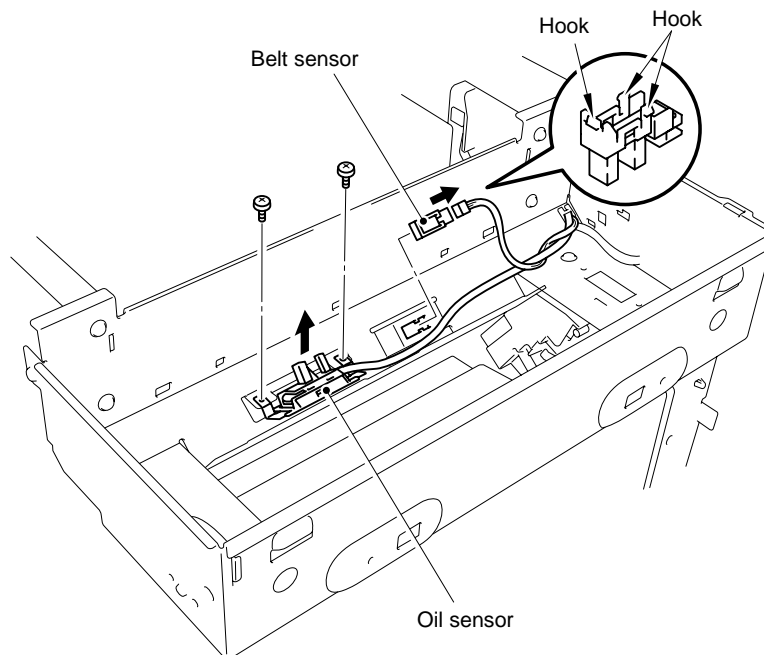


Fig.7-67

4.4 Paper Exit Unit

4.4.1 Paper Exit Unit Cover 2 / Paper Exit Front Cover 2

- 1) Open the paper exit unit cover 2.
- 2) Slide the four hooks to the direction of the arrow as shown in the figure below and remove the (P. EX harness cover) from the printer.
- 3) Disconnect the cable harness.
- 4) Remove the support pin SP4X3 (2 pcs.) from both sides of the frame to remove the paper exit unit from the frame.

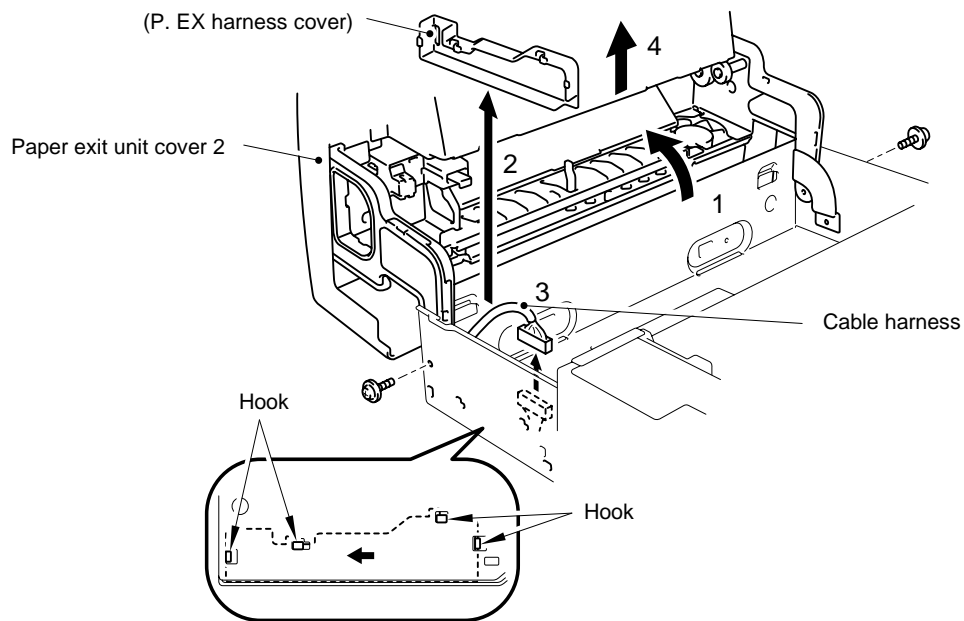


Fig.7-68

- 5) Remove the set screws BT3X8 (4 pcs.). Bend the top of the paper exit unit slightly as shown in the figure below and release the top end of the paper exit front cover 2 from the paper exit unit to remove it.
- 6) Remove the set screws (2 pcs.) to remove the (P. EX frame holders R/L) from the paper exit cover 2.

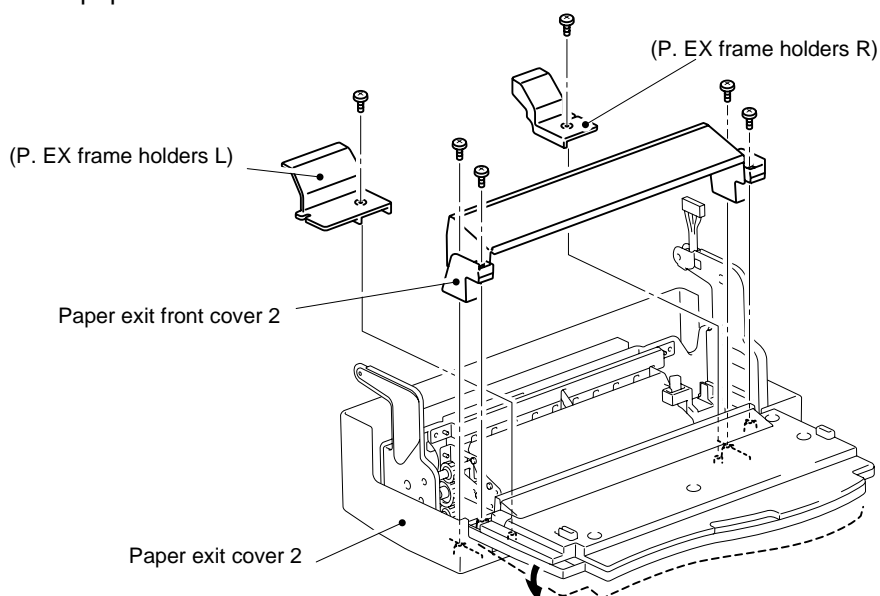


Fig.7-69

- 7) Remove the set screws (4 pcs.) to remove the P. EX frame ASSY from the paper exit cover 2.

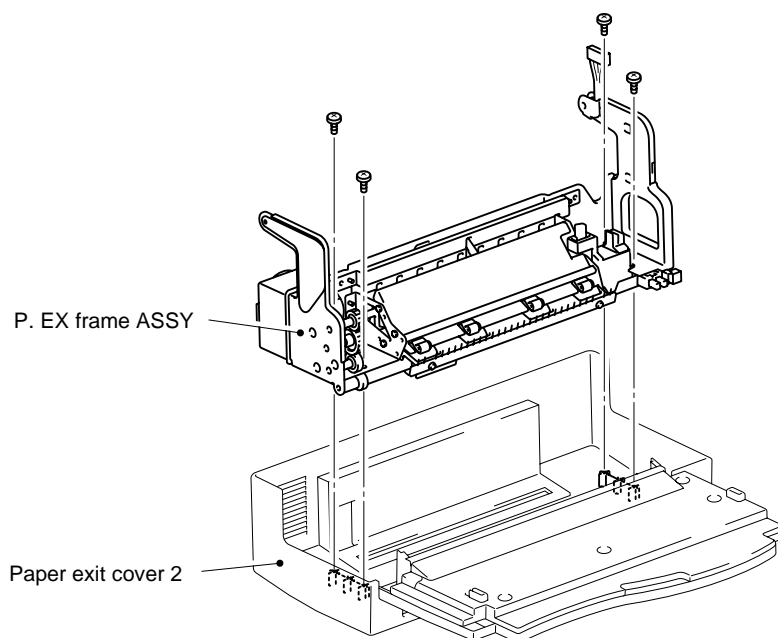


Fig.7-70

4.4.2 Cooling Fan (EX) 2

- 1) Remove the paper exit filter (with case) from the cooling fan (EX) 2.
- 2) Remove the set screws (3 pcs.) and disconnect the harness connector of the cooling fan (EX) 2 to remove the cooling fan (EX) 2 from the P. EX frame assembly.

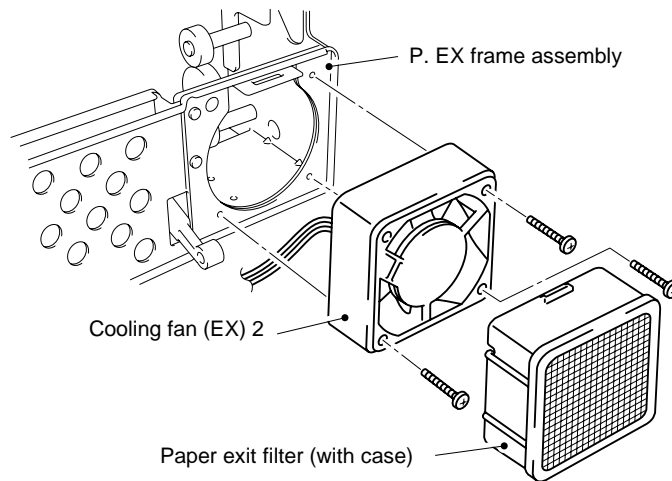


Fig.7-71

Note:

When assembling the cooling fan (EX) 2, be sure that the motor face attached the rating label is set to the outside.

4.4.3 Paper Sensor (F. CL)

- 1) Remove the set screw ST3X6 (1 pc.) and lift the FCS cover ASSY to release the three hooks. Remove the paper sensor (F. CL) from the FCS cover ASSY.
- 2) Disconnect the harnesses connector connected to the paper sensor (F. CL).

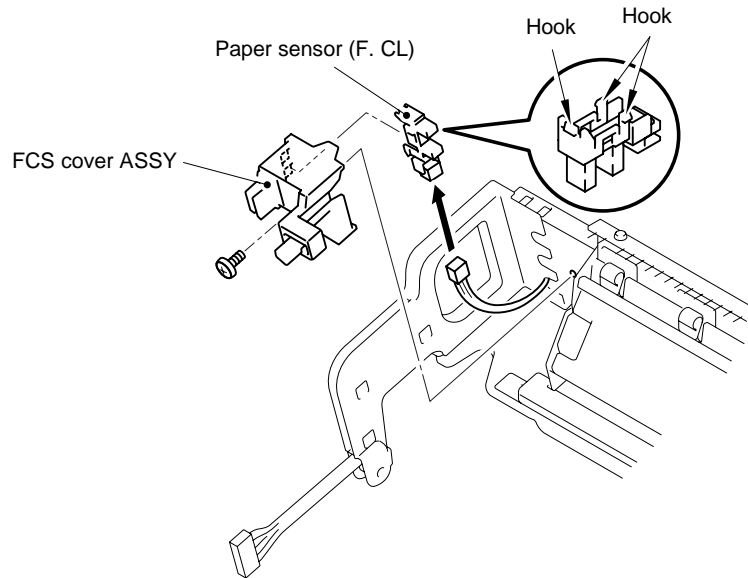


Fig.7-72

4.4.4 Paper Sensor (EXF)

- 1) Disconnect the harnesses connector connected to the paper sensor (EXF).
- 2) Release the three hooks to remove the paper sensor (EXF) from the P. EX frame ASSY.

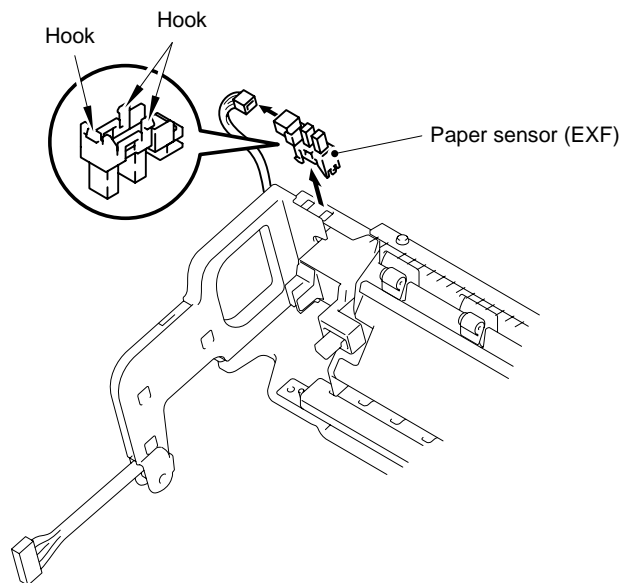


Fig.7-73

4.4.5 Discharging Brush

- 1) Remove the set screws BT4X6 (2 pcs.) from the discharger brush.
- 2) Remove the discharger brush and the plastic retainer.



PRECAUTION

Do not deform the fur brush of the discharger brush.

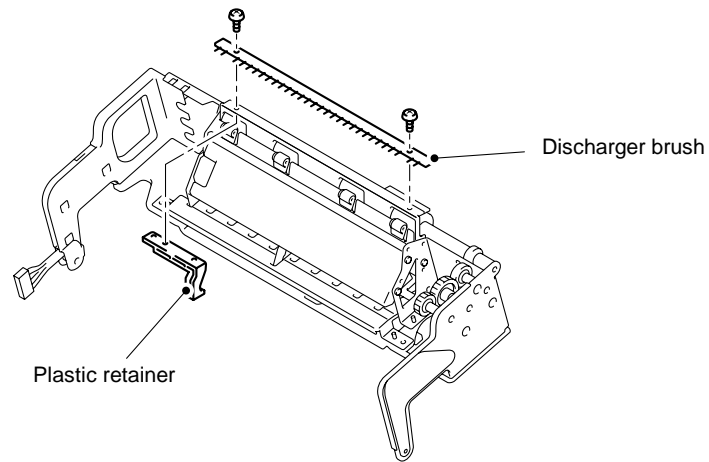


Fig.7-74

4.4.6 Paper Exit Roller

- 1) Remove the C ring and plastic bush from the left and right hand sides.
- 2) Remove the shaft support at both sides.
- 3) Remove the paper exit roller from the paper exit guide.

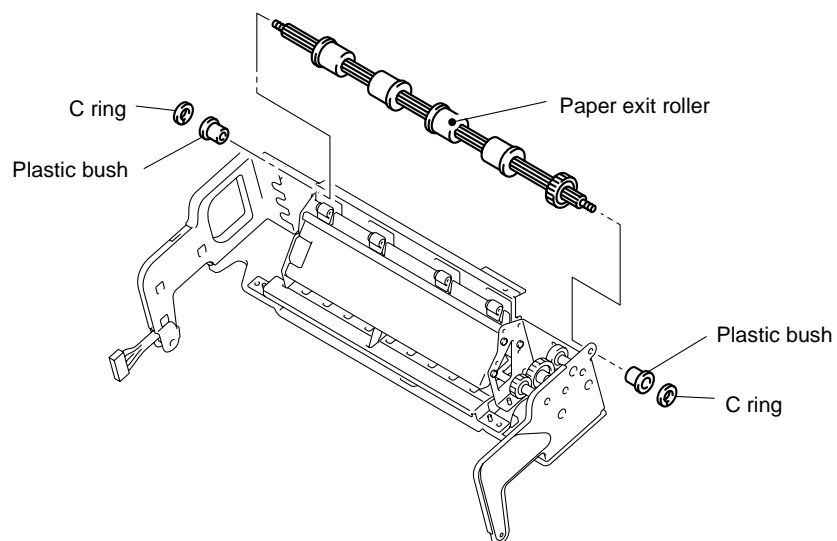


Fig.7-75

4.4.7 P. EX Switch Guide

- 1) Remove the set screws BT3X8 (4 pcs.) to remove the (paper exit sensor base) from the paper exit frame ASSY.

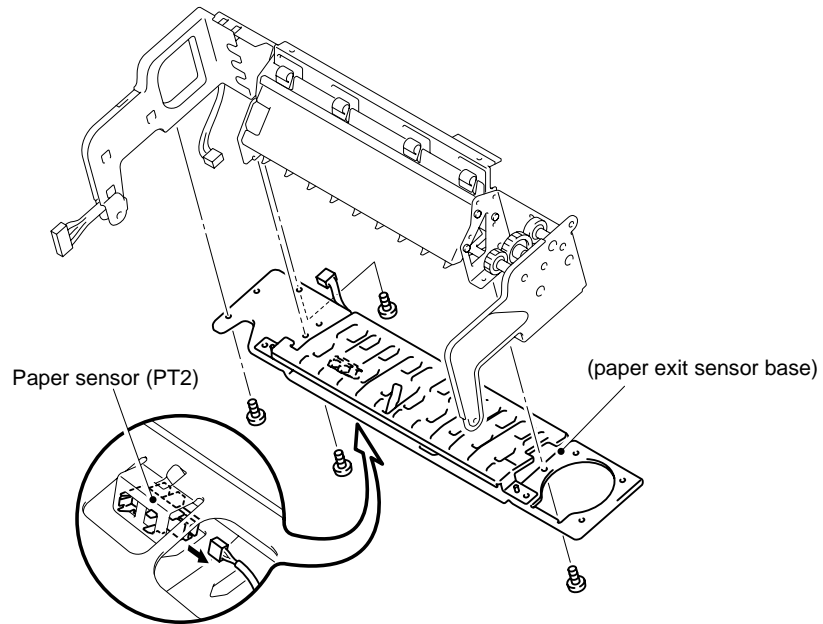


Fig.7-76

- 2) Remove the P. EX switch spring from the paper exit frame and P. EX switch guide.
- 3) Bend the P. EX switch guide slightly to remove it from the paper exit frame.

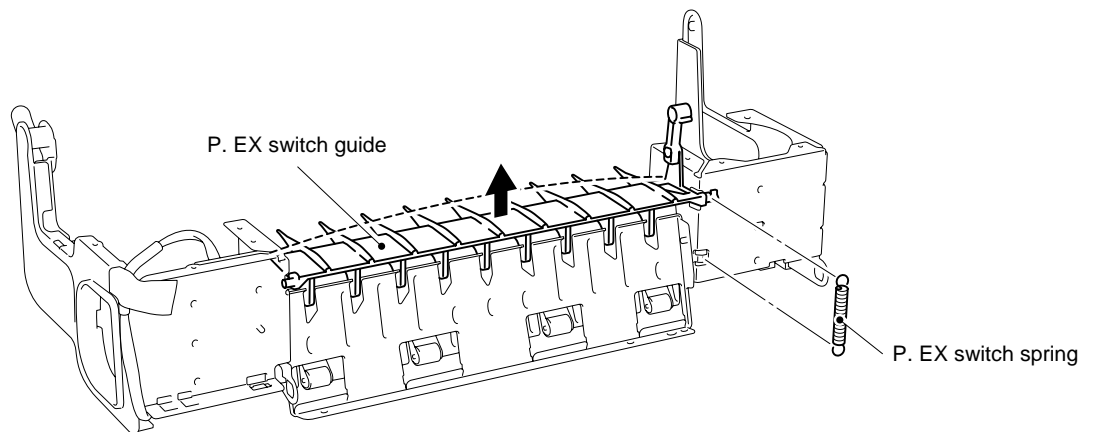


Fig.7-77

4.4.8 Paper Sensor (PT2)

- 1) Remove the set screws BT3X8 (2 pcs.) to remove the (guide) from the (paper exit sensor base).
- 2) Disconnect the harnesses connector connected to the paper sensor (PT2).
- 3) Release the three hooks to remove the paper sensor (PT2).

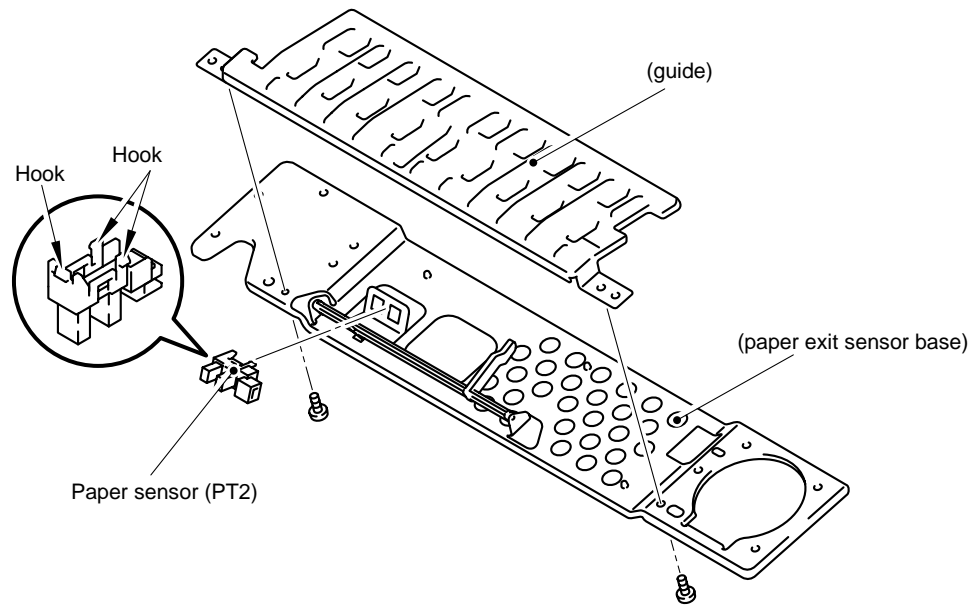


Fig.7-78

4.5 Front of the Printer

4.5.1 Optical Unit 2

- 1) Open the front cover 2.
- 2) Release the two hooks at the front and three hooks at the top to remove the inner cover C from the printer.

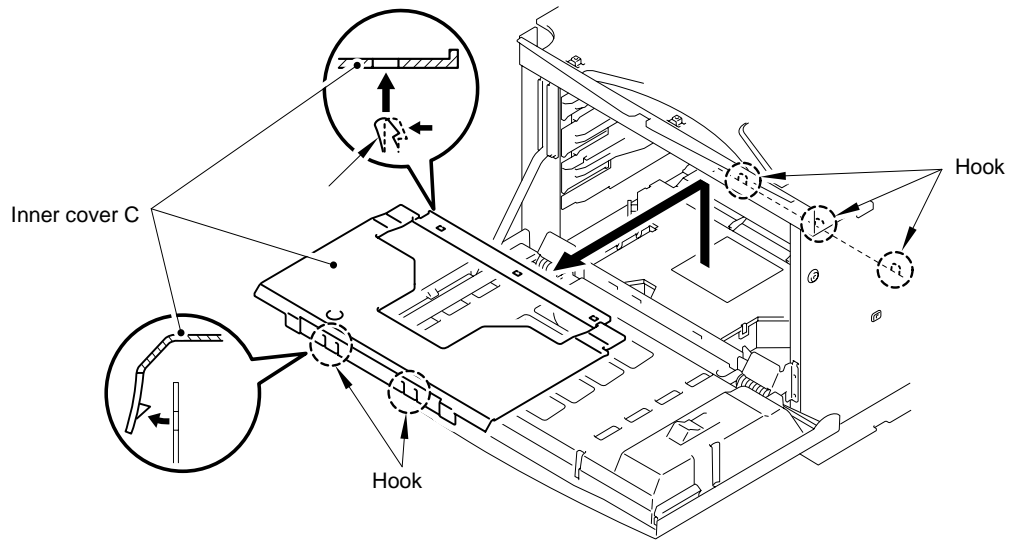


Fig.7-79

- 3) Remove the set screws F3X10 (4 pcs.) from the optical unit 2.
- 4) Disconnect the harness connector (1 pc.) to remove the optical unit 2 from the printer.

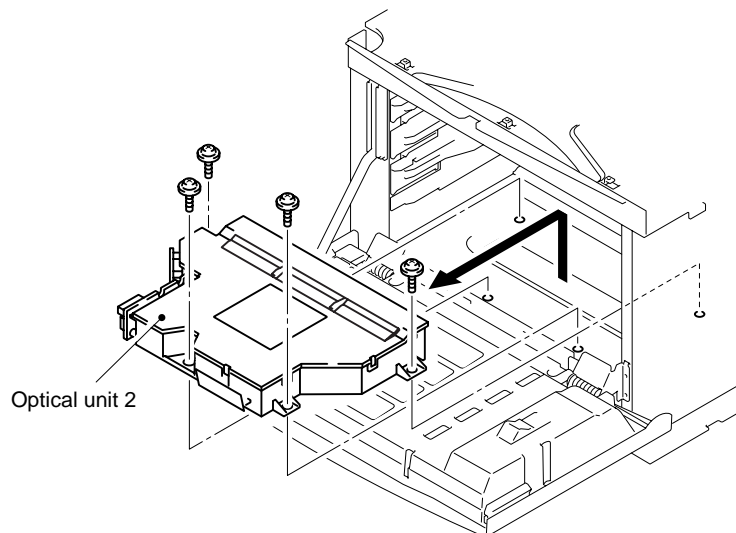


Fig.7-80



WARNING

- *There is a class IIIb laser within the optical unit 2. Do not attempt to disassemble the laser.*
- *The optical unit 2 is replaced as a complete unit. No adjustment is required to the replacement optical unit 2.*
- *Confirm that all the covers have been correctly installed prior to any test run or operation in order to prevent any laser radiation escaping from the printer.*

4.5.2 Front Cover 2

- 1) Remove the set screws BT4X10 (2 pcs.) from the front cover unit 2.
- 2) Release the four hooks to remove the front cover 2 from the front cover unit 2.

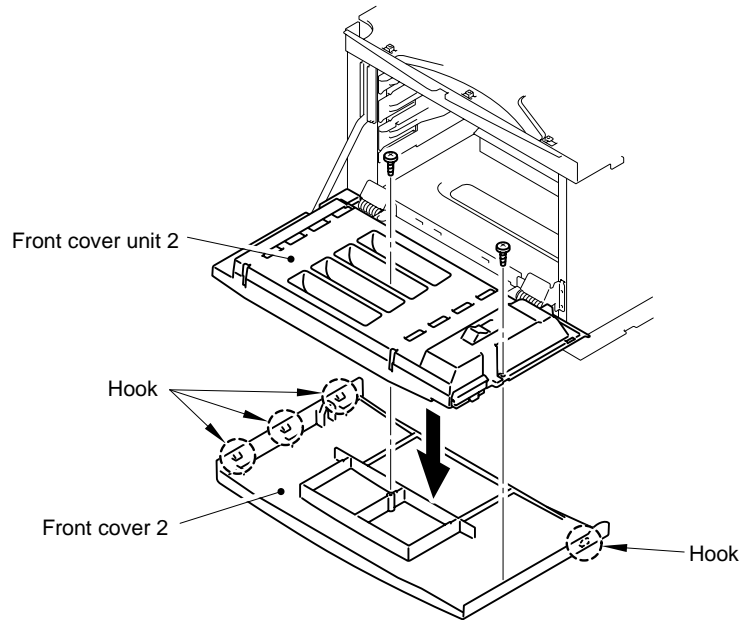


Fig.7-81

4.5.3 Front Cover Catch

- 1) Release the hook to remove the front cover catch from the front cover unit 2.

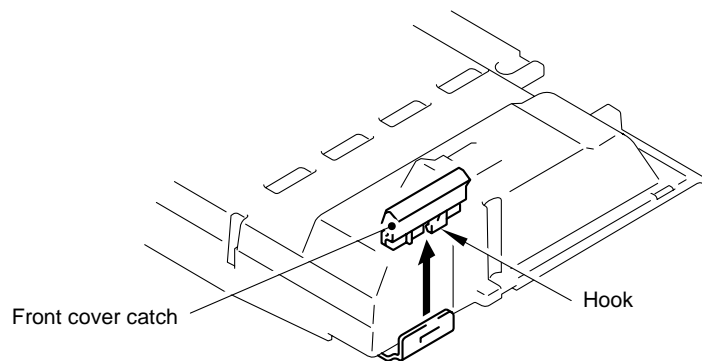


Fig.7-82

4.5.4 FD2 Arm ASSY

- 1) Release the hook to remove the FD2 arm ASSY from the front cover unit 2.
- 2) Remove the set screw ST3X6 (1 pc.) of the FD arm ASSY.
- 3) Incline the FD arm ASSY toward you and release the hook to remove the FD arm ASSY from the printer.

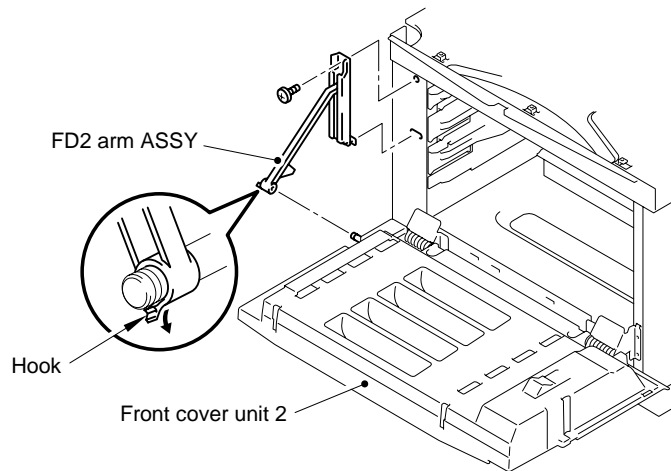


Fig.7-83

4.5.5 Front Cover Unit 2

- 1) Close the front cover unit 2.
- 2) Disconnect the connector from the front cover unit 2.
- 3) Remove the set screws M4X6 (6 pcs.).

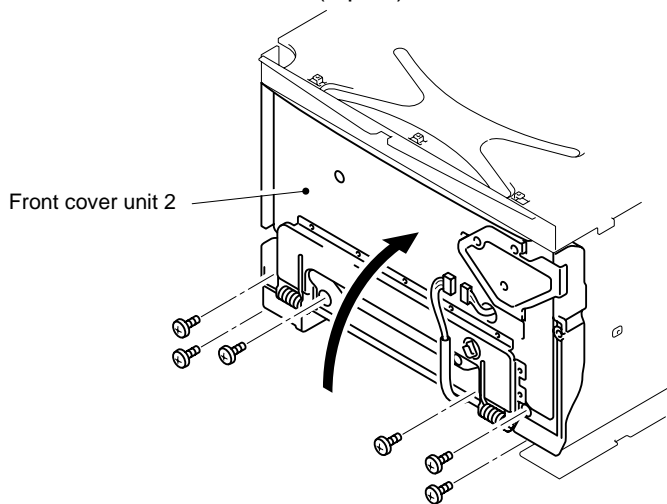


Fig.7-84



CAUTION

- When removing the hinge of front cover unit 2, watch out the rebound of spring.
- In above instance, holding the fixture of hinge, remove the hook from the frame.

- 4) Open the front cover unit 2. Incline the front cover unit 2 upwards while holding the hinge bases 2 (L, R) to release the hooks of the hinge bases 2 (L, R). Then, remove the front cover unit 2 from the printer.

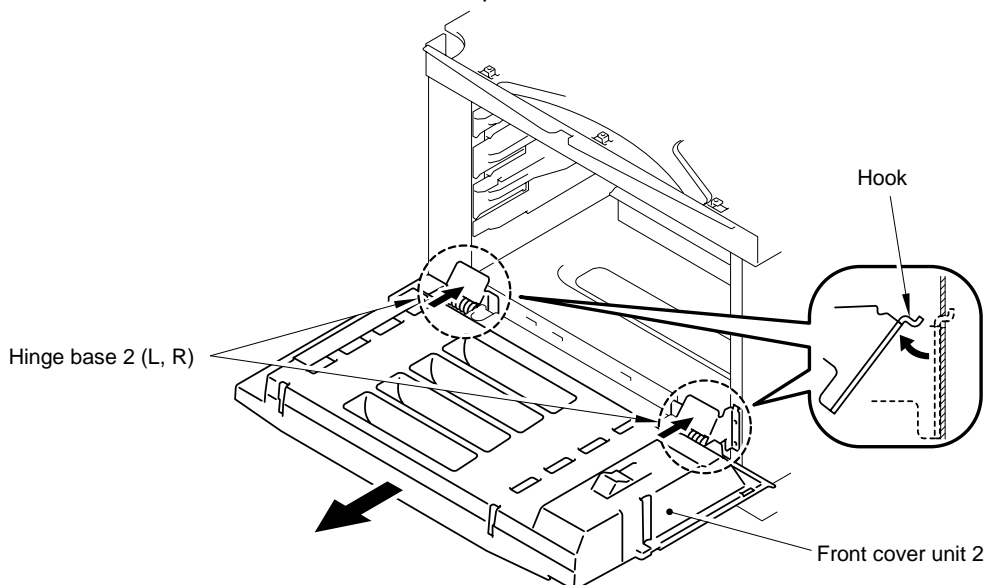


Fig.7-85

4.5.6 Hinge Base 2 (L, R)

- 1) Remove the C ring (1 pc.) to remove the (shaft) from the hinge base 2.
- 2) Remove the hinge base 2 from the front cover unit 2.

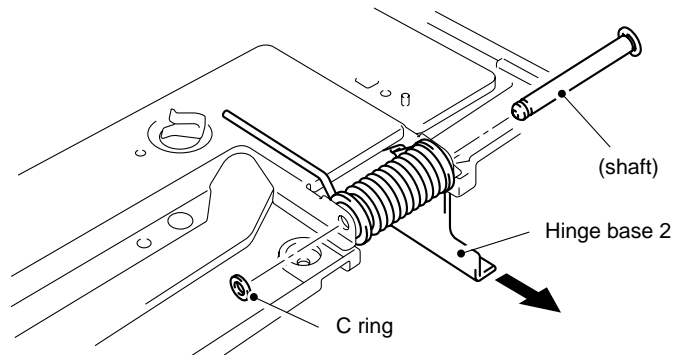


Fig.7-86

- 3) Remove the pin (1 pc.) of the bearing to remove the two bearings and (spring) from the hinge base 2.
- 4) Remove the hinge base 2 at the other side as well.

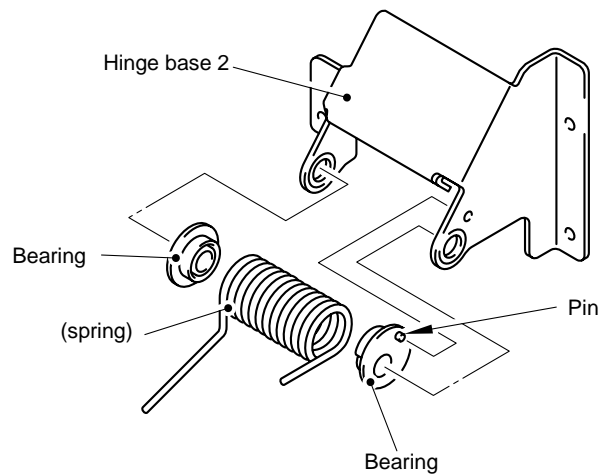


Fig.7-87

4.5.7 DE Solenoid ASSY

- 1) Remove the set screws BT4X10 (4 pcs.) to remove the front inner cover from the front unit base.
- 2) Remove the set screws BT4X10 (4 pcs.) to remove the DE solenoid ASSYs and developer cam ASSY from the front unit base.
- 3) Remove the developer cam ASSYs (4 pcs.) from the DE solenoid ASSY.

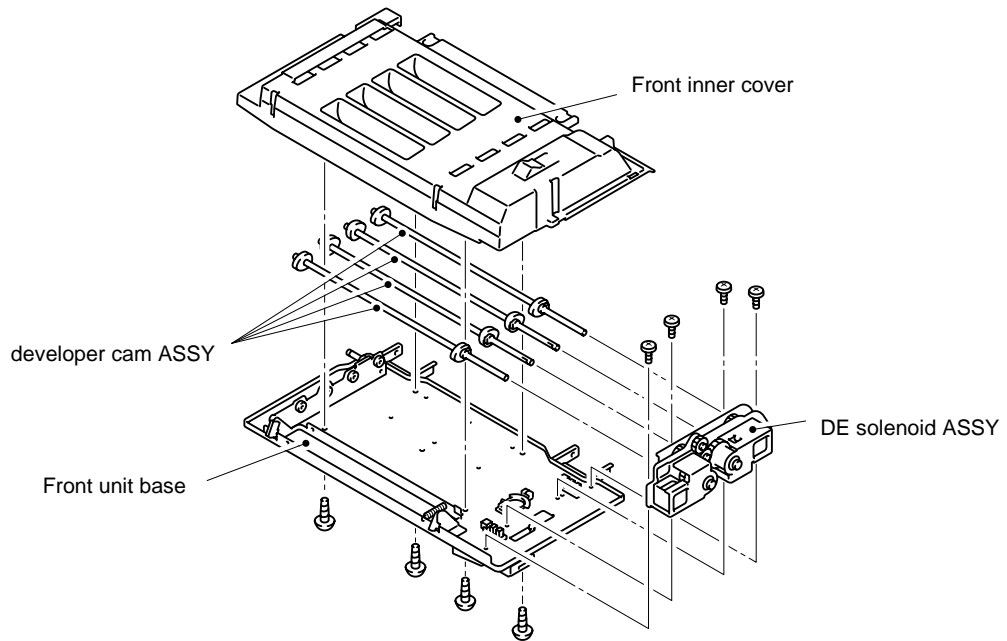


Fig.7-88

4.6 Rear of the Printer

4.6.1 Transfer unit 2

- 1) Open the transfer unit 2.
- 2) Remove the end of the TR3 rear band being attached to the frame as shown in the figure below.
- 3) Remove the set screw ST3X6 (1 pc.) to remove the TR3 hinge support from the printer.
- 4) Remove the transfer unit 2 from the printer.

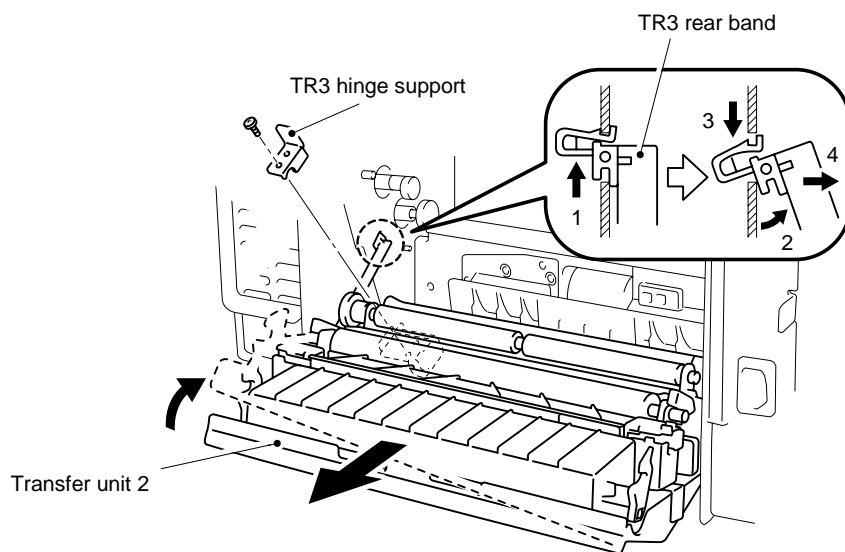


Fig.7-89

- 5) Remove the set screw BT4X10 (1 pc.) to remove the TR3 rear band from the transfer unit 2.
- 6) Remove the set screws BT3X8 (4 pcs.) to remove the transfer unit 2 cover 2 from the transfer unit 2.

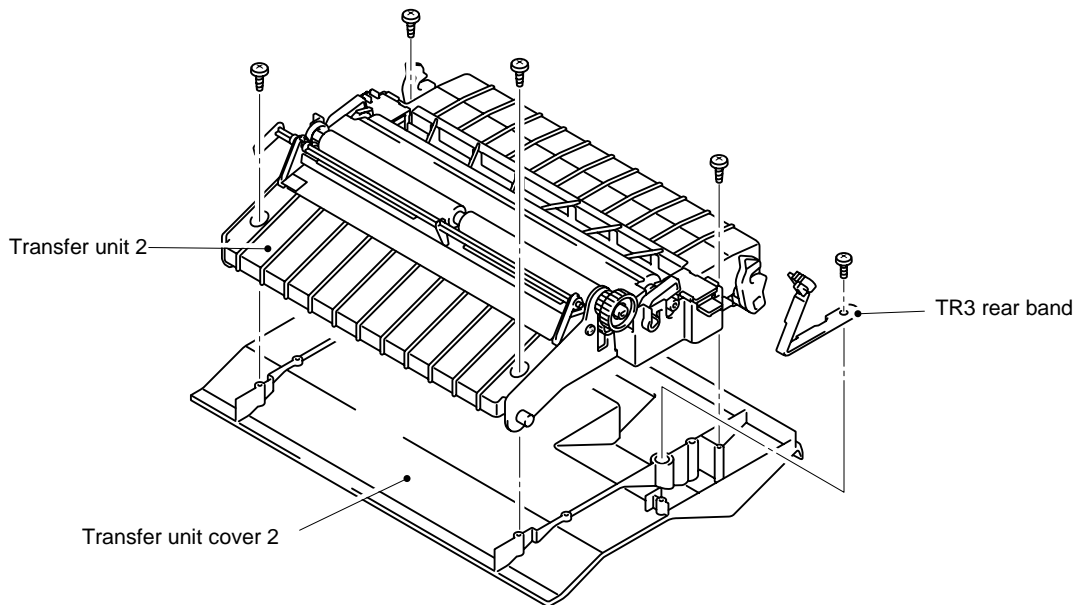


Fig.7-90

Note:

When assembling the transfer unit cover 2 onto the transfer unit 2, push the (lever) of the transfer unit 2 and put the lever on the back side of the transfer unit 2 into the square hole on the transfer unit cover 2.

4.6.2 Transfer Roller 2

- 1) Lift the transfer roller lock levers at the right and left hand sides to remove the transfer roller 2 from the transfer unit 2.

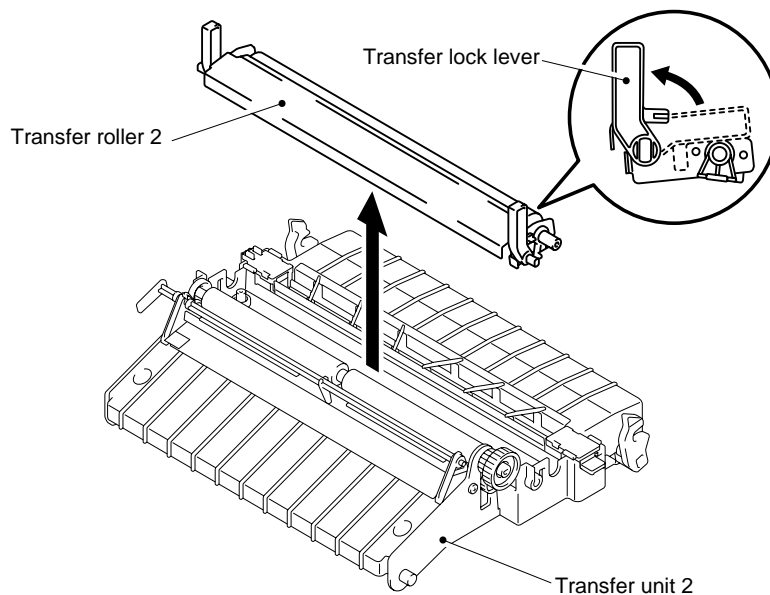


Fig.7-91

4.6.3 Registration Roller 2

- 1) Remove the roller fixing C rings from both ends of the roller.
- 2) Remove the gear from the shaft (right hand side).
- 3) Remove the plastic bushes at both ends.
- 4) Remove the shaft support from the frame while pressing down on the pressure roller to release the pressure from the registration roller 2.
- 5) Remove the registration roller 2.

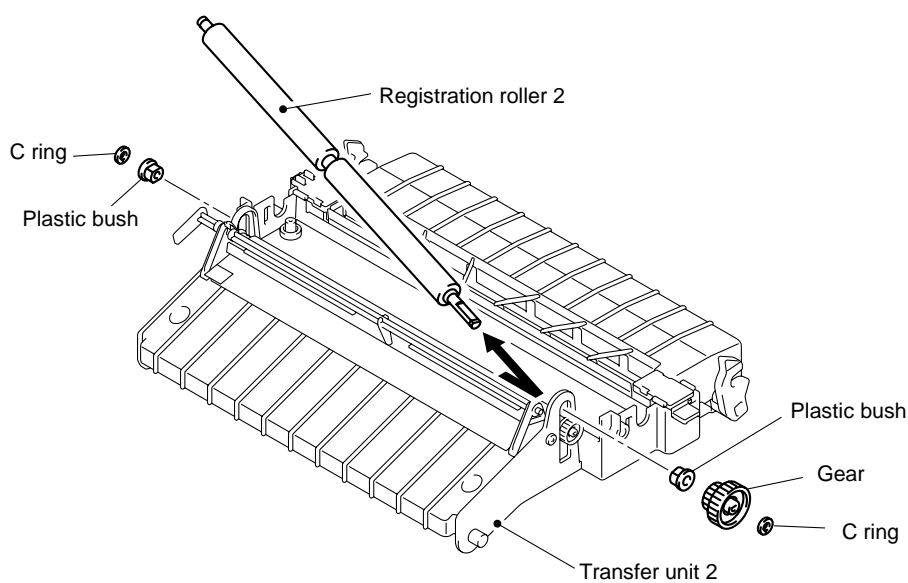


Fig.7-92

4.6.4 Paper Sensor (P. EN) / OHP Sensor 3

- 1) Remove the set screws ST3X6 (2 pcs.) to remove the paper guide L from the printer.
- 2) Remove the set screws BT3X6 (2 pcs.) to remove the paper guide (UL) ASSY 2.
- 3) Disconnect the connectors (2 pcs.).

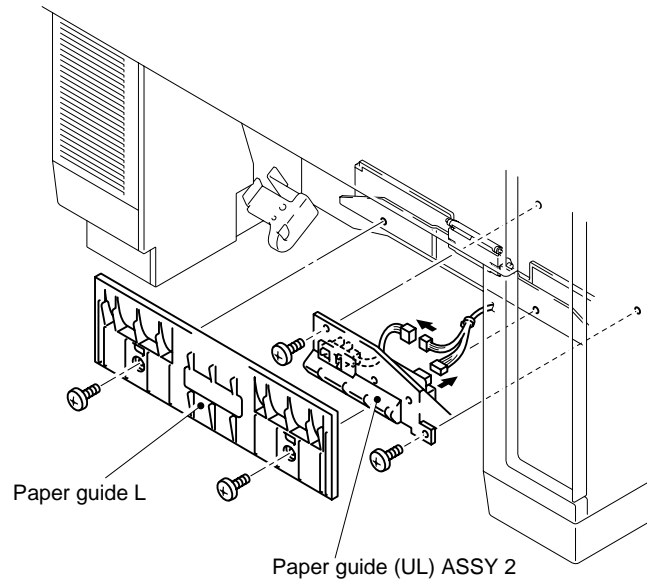


Fig.7-93

- 4) Release the three hooks to remove the paper sensor (P. EN).
- 5) Remove the set screws BT3X8 (2 pcs.) to remove the OHP sensor 3.

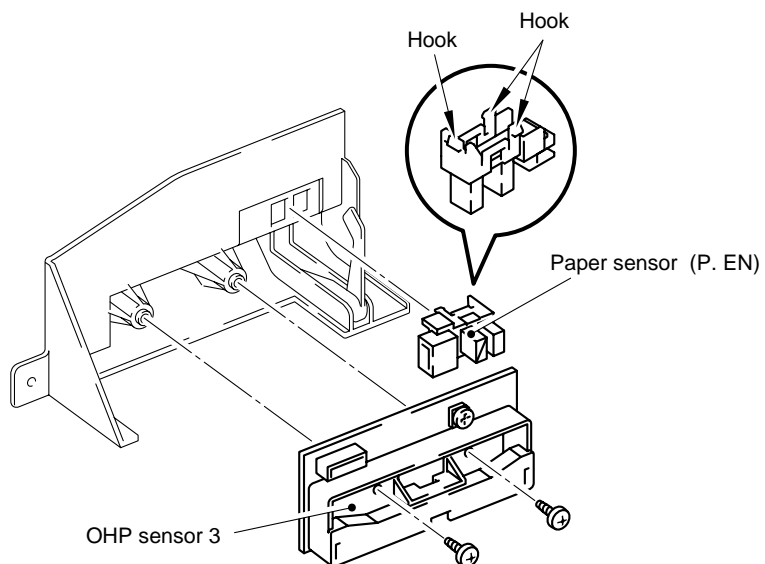
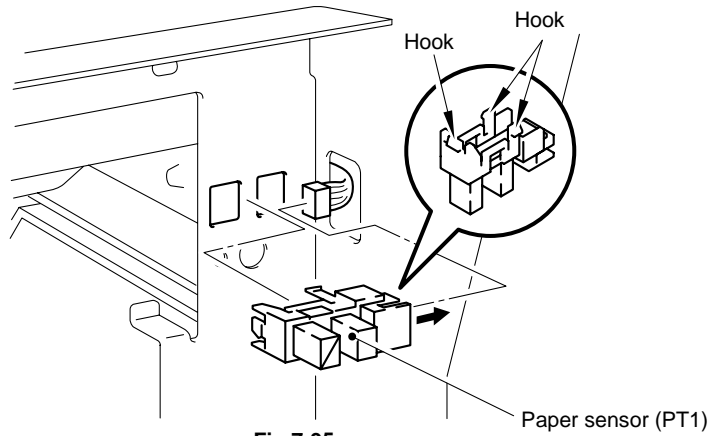


Fig.7-94

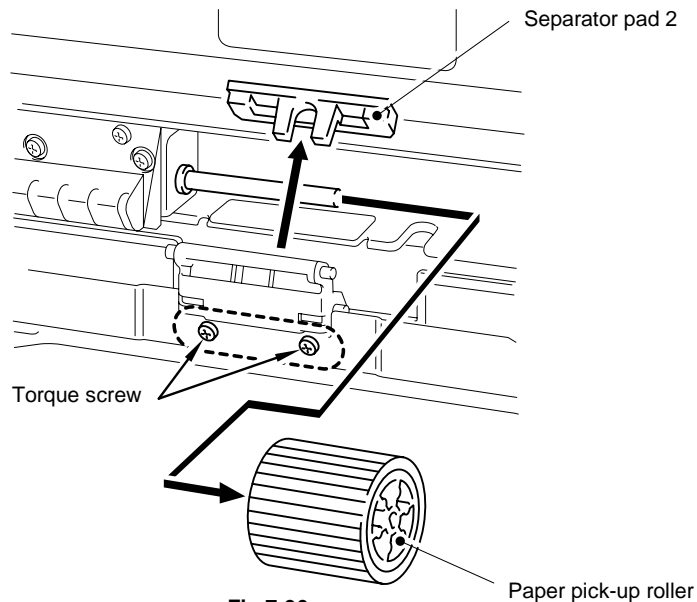
4.6.5 Paper Sensor (PT1)

- 1) Release the three hooks to remove the paper sensor from the frame.
- 2) Disconnect the connector connected to the paper sensor.



4.6.6 Paper Pick-up Roller / Separator Pad 2

- 1) Move the paper pick-up roller to the direction of the arrow in the figure below to remove it.
- 2) Move the separator pad 2 to the direction of the arrow in the figure below to remove it.



PRECAUTION

- Do not touch the surface of the paper pick-up roller and separator pad 2.
- Never remove the torque screws indicated in the figure above.

4.7 Fusing Unit



DANGER

[Note in Parts Replacement]

- *The fuser unit consists of important safety parts. Replacement of parts or disassembly and maintenance work should only be done at an appropriate service facility by skilled service personnel acquainted with electrical safety. After re-assembly the product safety should be reconfirmed.*
- *Since the fuser unit is very hot, make sure that the fuser unit and surrounding area are well cooled down prior to starting the replacement of parts. You may get burned when touching hot areas.*
- *The fusing unit contains silicone oil. Take care not to spill the silicone oil, especially on the floor, as the floor will become very slippery and dangerous.*

- 1) Remove the set screw ST3X6 (1 pc.) to remove the fuser cover (R) from the fusing unit.
- 2) Remove the set screw ST3X6 (1 pc.) to remove the fuser cover (L) from the fusing unit.
- 3) Remove the set screws ST3X6 (2 pcs.) to remove the fuser cover B from the fusing unit.
- 4) Remove the set screws ST3X6 (3 pcs.) to remove the BR felt ASSY 2 from the fusing unit.
- 5) Remove the set screws (2 pcs.) to remove the fu paper guide from the fusing unit.

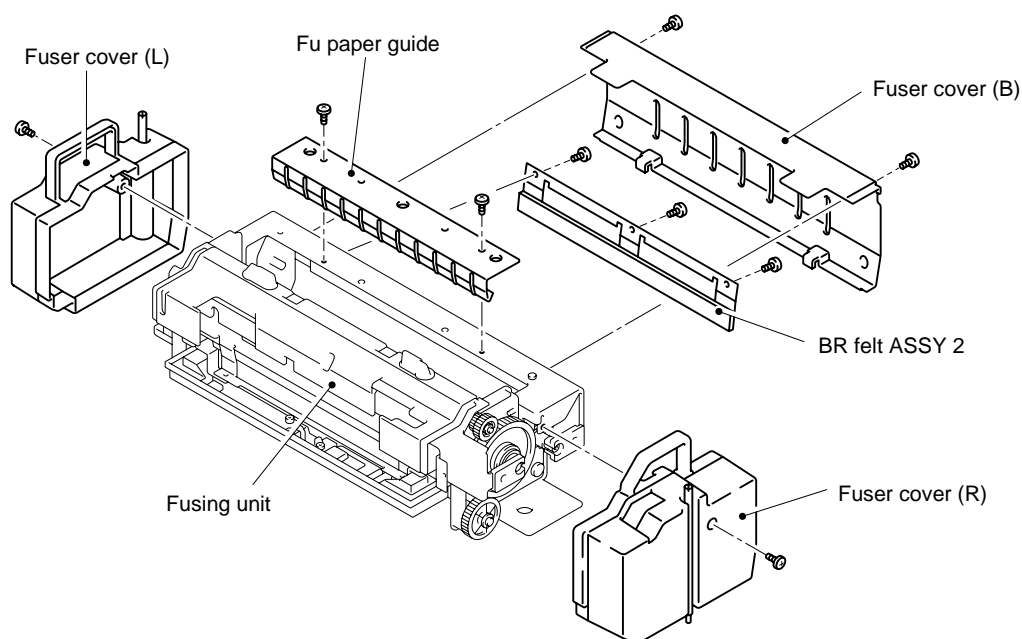


Fig.7-97

- 6) Remove the set screws ST3X6 (2 pcs.) to remove the oil pan unit 2 and FU felt ASSY 2 from the fusing unit.
- 7) Remove the set screws ST3X6 (2 pcs.) to remove the FU felt ASSY 2 from the oil pan unit.
- 8) Remove the set screws (2 pcs.) to remove the low guide from the fusing unit.

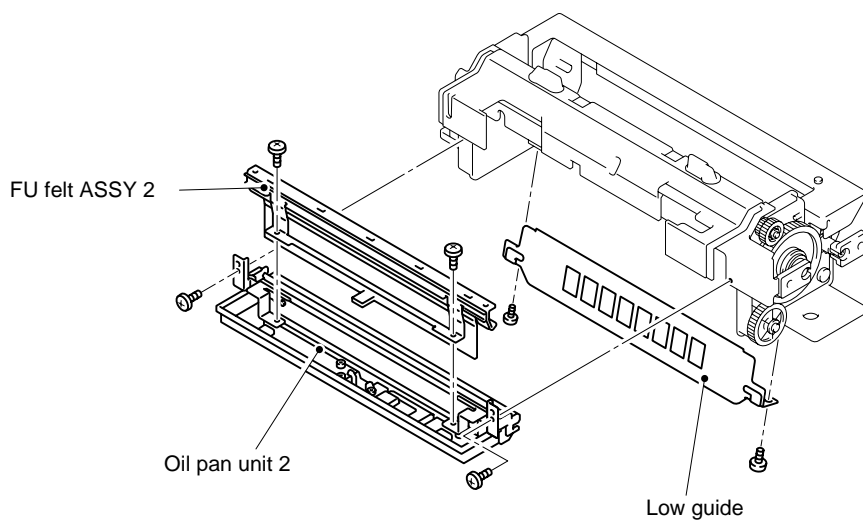


Fig.7-98

- 9) Remove the set screws ST3X6 (2 pcs.) to remove the heater wire (white) from the fusing unit.
- 10) Remove the set screw ST3X6 (1 pcs.) from the left hand side of the terminals on each of the fusing heater 2 (2pcs.).
- 11) Remove the set screws ST3X6 (2 pcs.) to remove the lamp holders (2 pcs.).
- 12) Remove the fusing heaters 2 (2 pcs.), then remove the heater wire.

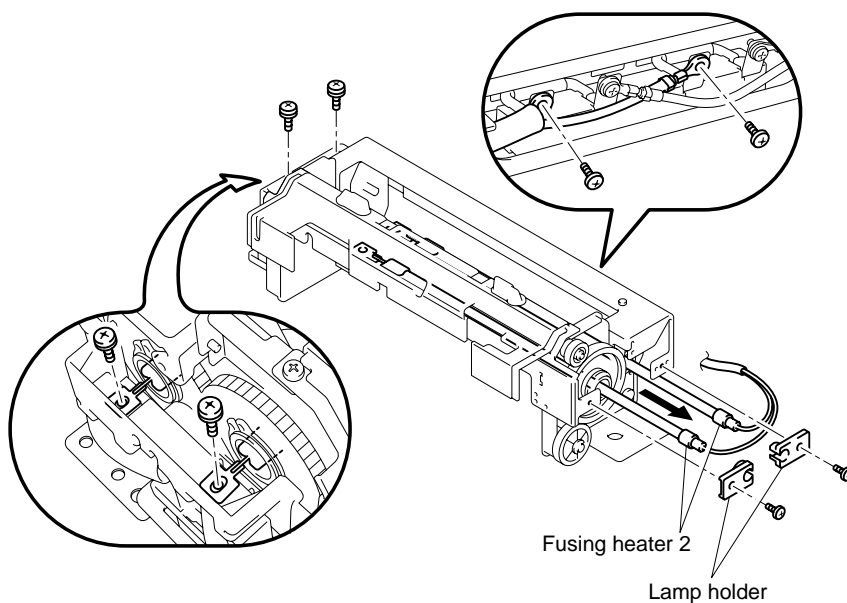


Fig.7-99

- 13) Remove the set screws ST3X6 (3pcs.). Open the fusing unit as shown in the figure below.

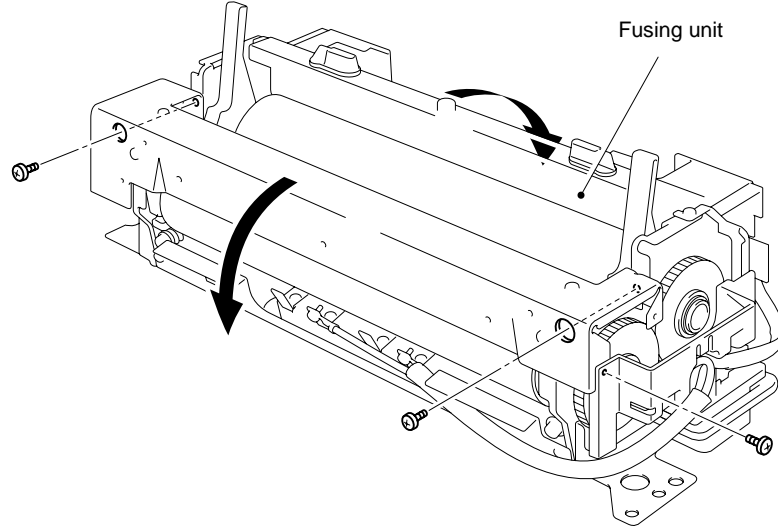


Fig.7-100

- 14) Remove the back-up roller 2 from the fusing unit.
15) Remove the C ring from the gear to remove the gear (FU) (BR) 2.
16) Remove the ball bearing FU2 (2 pcs.) from the back-up roller 2.

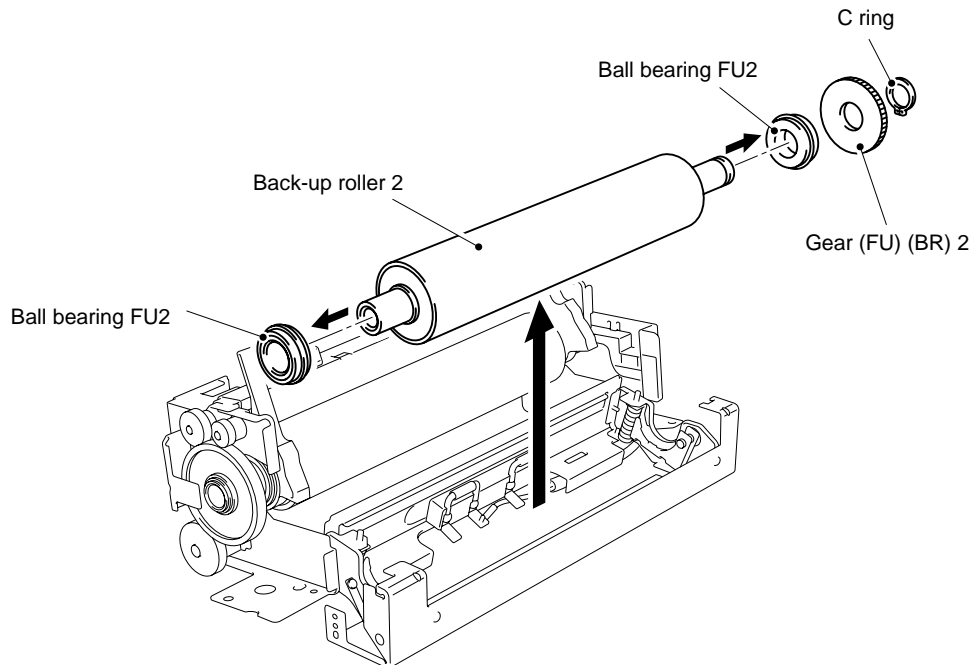


Fig.7-101

- 17) Remove the fusing roller 2 as shown in the figure below.
- 18) Remove the release levers (R) and (L).
- 19) Remove the Crings on both ends of the fusing roller 2.
- 20) Remove the gear (FU) (BR) 2 and FU2 gear 63.
- 21) Remove the C rings at both sides.
- 22) Remove the ball bearing FU2 (2 pcs.) from the fusing roller 2.

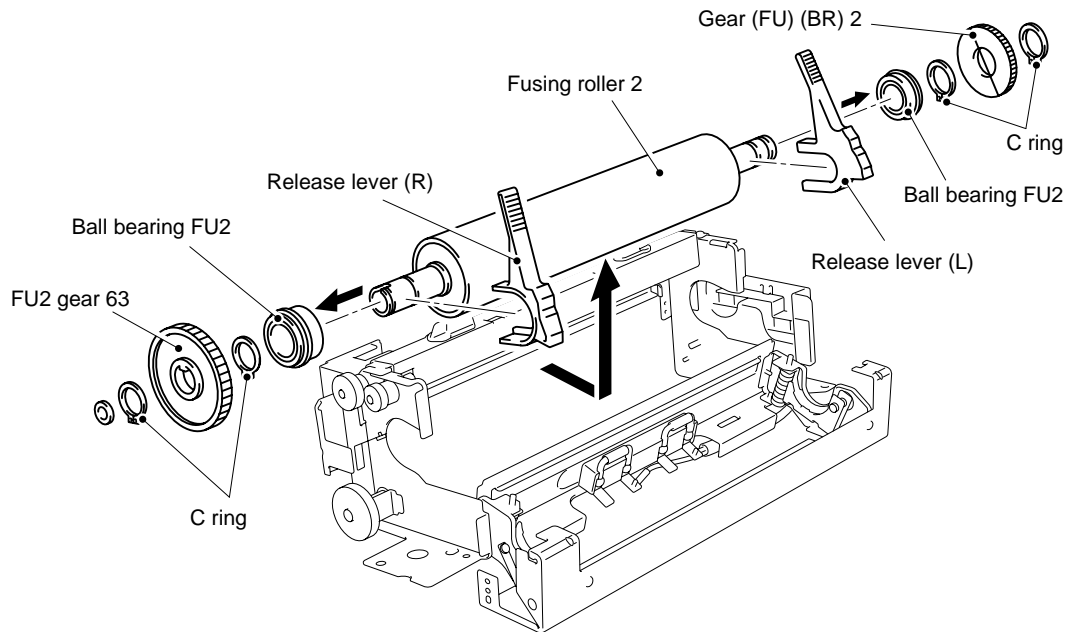


Fig.7-102

- 23) Remove the E rings (1 pc.) to remove the (gear A) from the fusing unit.
- 24) Remove the E rings (1 pc.) to remove the (gear B) from the fusing unit.
- 25) Remove the E rings (1 pc.) to remove the (gear C) from the fusing unit.
- 26) Remove the E rings (1 pc.) to remove the (gear D) from the fusing unit.
- 27) Remove the E ring (1 pc.) to remove the (shaft).

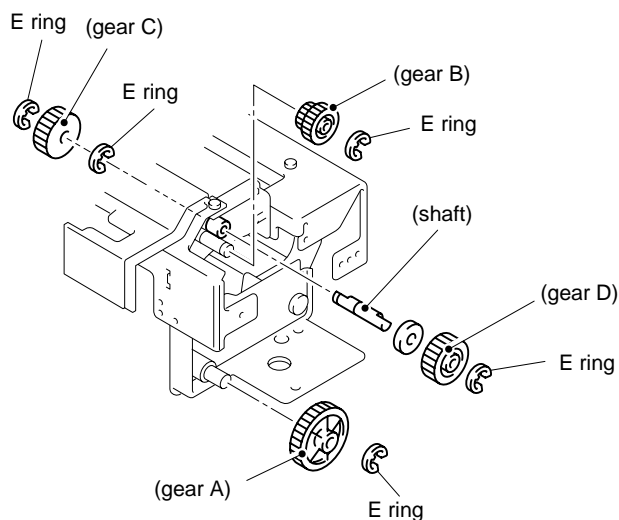


Fig.7-103



PRECAUTION

- Do not touch the surface of the heater lamp with your hands, the small traces of oil you leave on the lamp will affect the life of the lamp.
- The wattage of the heater lamp is different between the fuser roller and the back-up roller. The wattage is marked on the insulator of the lamp electrode.

Fuser roller: 560W

Back-up roller : 420W

Note:

When installing the new fusing unit into the printer, you have to wait approximately for 30 minutes after the unit is installed to allow the fusing oil to circulate in the unit.

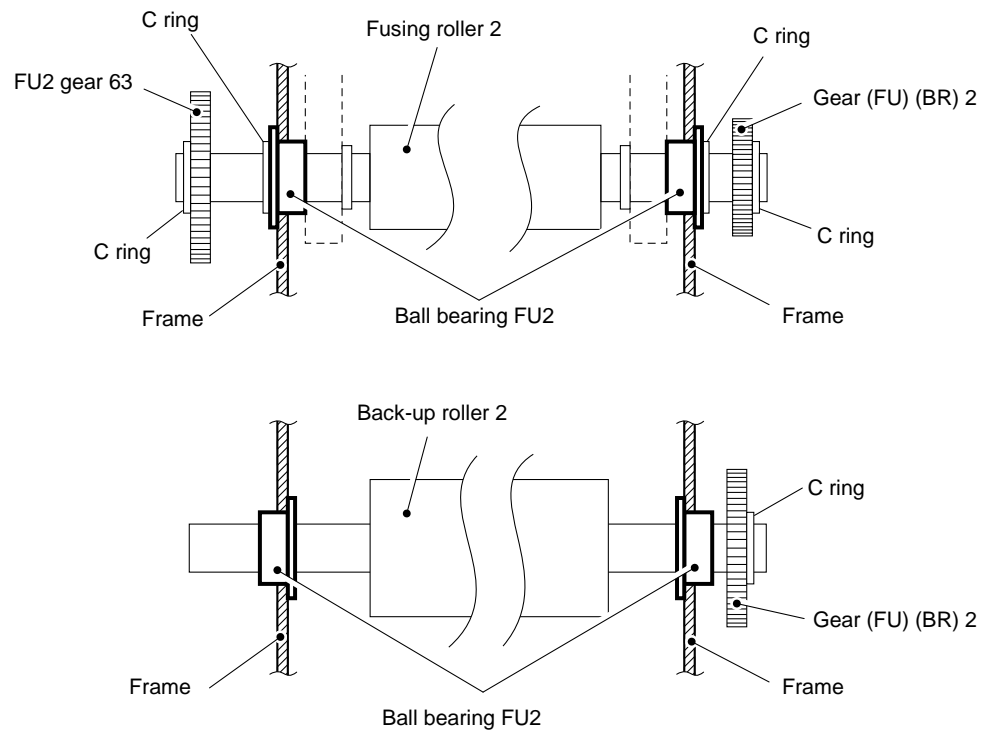


Fig.7-104



CAUTION

When re-assembling the fusing roller 2 and back-up roller 2, ensure to assemble the ball bearing FU2 correctly referring to the figures above.

CHAPTER VIII

TROUBLESHOOTING

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CHAPTER VIII TROUBLESHOOTING

This chapter contains troubleshooting information for both the Video Controller Mode and the Engine Controller Mode.

If any problem occurs during the normal usage of the printer, which means the printer is being used in the Video Controller Mode, clear the problem by referring to the troubleshooting information in the following sections for the Video Controller Mode or the user's guide.

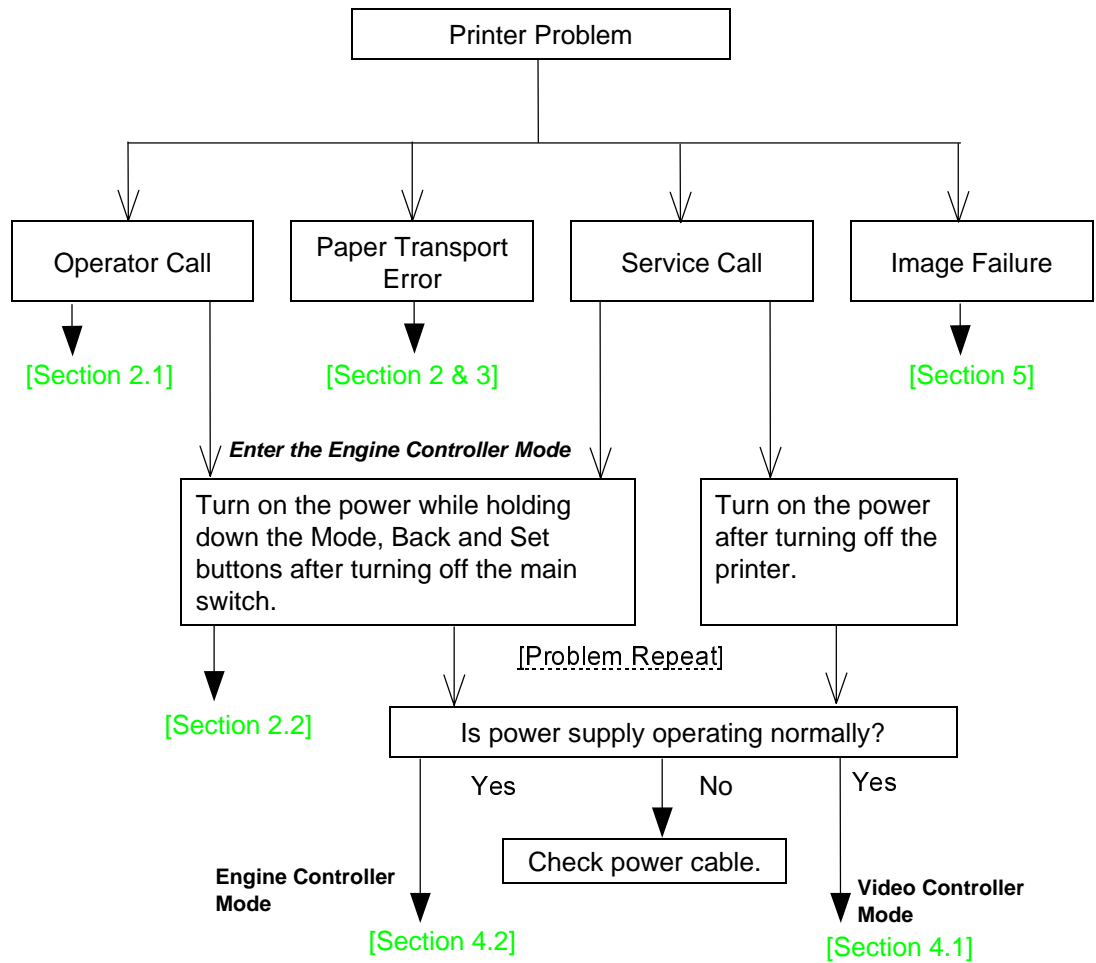
However, if a problem occurs in the video controller itself, use the Engine Controller Mode information as it may be easy to understand the cause of the problem because the Engine Controller mode can separate the problem in the video controller from the printing operations.

The error messages used in the Video Controller Mode basically contain the same ones that are used in the Engine Controller Mode. All error status messages are displayed in the Video Controller Mode other than when an error occurs in the video controller itself or in the communication between the video controller and the engine controller.

Note:

The operation of the control panel and the display on the LCD vary depending on the mode selected.

1. OUTLINE OF TROUBLESHOOTING



2. OPERATOR CALL

2.1 Video Controller Mode

The Ready LED is lit and an applicable message appears on the liquid crystal display (LCD) in the following cases;

- 1) Consumables require to be replenished.
- 2) Waste toner pack is full of waste toner.
- 3) Paper jam.
- 4) Periodic maintenance.
- 5) Maintenance work incomplete.

The above cases are not regarded as a breakdown, and should be treated in accordance with Table 8-1;

Table 8-1

Display Message	Remarks
TONER EMPTY X Replace the X toner cartridge.	X = C, M, Y, K
NO TONER X Install the X toner cartridge.	X = C, M, Y, K
COVER OPEN Close the Front Cover.	
COVER OPEN Close the Top Cover.	
COVER OPEN Close the Rear Access Cover.	
COVER OPEN Close the Lower Feeder Unit Cover.	
COVER OPEN Close the Duplex Unit Cover.	
JAM X Refer to the diagram, and check the location. Remove the jammed paper.	X = A1, A2, B, C, D, E1 ,E2
NO PAPER T1/2 Load paper into Tray 1/2.	
WASTE TONER Replace the waste toner pack.	
OIL EMPTY Replace the oil bottle.	
CHANGE FCR Replace the cleaning roller.	
NO OPC BELT Install the OPC belt.	
NO FC ROLLER Install the cleaning roller.	

Display Message	Remarks
NO LFU Install the lower tray unit.	
NO TR ROLLER Install the transfer roller 2.	
ILLEGAL TONER Use only Brother genuine toner cartridges.	
NO TRAY 1/2 The indicated paper Tray was not detected, install it, or ensure it is inserted correctly.	
SIZE ERROR T1/2 Specify the correct paper size for the indicated tray.	
SIZE ERROR DX The duplex unit can only print in the sizes specified. Specify the correct paper size.	
STACKER FULL Remove the paper from the output tray.	
MEDIA MISMATCH Media mismatch between the Printer and the Printer Driver setting. Load XX into Tray <1/2>.	XX = Plain Paper, Transparencies, Thick Paper
SIZE MISMATCH Paper mismatch between the Printer and the Printer Driver setting. Load Paper <size> size into Tray <1/2>.	
MANUAL FEED Load paper <size> into tray1 and press GO.	
MEDIATYPE ERROR Specify the correct media type : XX.	XX = T1, T2, DX
NO FUSING UNIT A fusing Unit was not detected, please install one.	
CARD ERROR An error when accessing the Flash card, check the drive is formatted and not in Write Protect mode.	
HDD ERROR An error occurred accessing the HDD, power cycle the printer and check that it is formatted.	
DIMM ERROR Ensure that the DIMM is installed correctly.	
CARD REMOVAL The Flash card was removed while the printer was powered on. Power cycle the printer.	
BUFFER ERROR Check the cable connection between the computer and printer.	
STORAGE FULL There is no space on the Hard Disk.	

Display Message	Remarks
STORAGE FULL The RAMDISK SIZE is set to 0MB there is no more space to store jobs.	
STORAGE FULL There is no space in the Compact Flash.	
STORAGE FULL There is no space on the Flash Memory.	
DOWNLOAD FULL The download buffer of the printer is full. Add more memory to the printer.	
FONT FULL The font memory area is full. Delete fonts or add more memory to the printer.	
MEMORY FULL The printer memory is full and the printer is unable to print the page. Add more memory.	
PRINT OVERRUN Select a lower resolution or set the page protect option in the driver to the correct size.	
IGNORE DATA Check that the correct driver is being used and/or try adding more printer memory.	
MEMORY SHORTAGE Add memory.	Install additional DIMM memory so that the total memory size is 32MB or less.

2.2 Engine Controller Mode

The Ready LED is lit, and applicable messages appear on the liquid crystal display (LCD) in the following cases;

- 1) Consumables require to be replenished.
- 2) Waste toner pack is full of waste toner.
- 3) Paper jam.
- 4) Periodic maintenance.
- 5) Maintenance work being incomplete.

The above cases are not regarded as a breakdown, and should be treated in accordance with Table 8-2;

Table 8-2

Display Message	Meaning	Countermeasure
11 NO MEDIA UPP/LOW	No paper in the upper cassette / lower cassette	Replenish paper.
11 CHK MEDIA UPP/LOW	Inconsistency of media	Change media.
12 NO TRAY UPP/LOW	No upper / lower media cassette	Install cassette(s).
13 REPLACE TONER Y/M/C/K	Toner (Y, M, C, K) empty	Replace with new toner cartridge(s).
14 CHECK WASTE TONER	Waste toner pack full of toner	Replace with a new waste toner pack.
14 CHECK FUSER OIL	Change the oil bottle	Replace with a new oil bottle.
14 CHK CLEANING ROLLER	Change the fuser cleaner	Replace with a new fuser cleaner
15 MISPRINT PAPER/PRREQ/MEDIA	Misprinting occurred	Confirm status of media cassette. Confirm correct paper size. Confirm consistency of media.
16 ALIGN TONER CG Y/M/C/K	Toner cartridge not installed	Confirm the installation of the toner cartridge(s).
16 ALIGN FU UNIT	Fusing unit not installed	Remove the fusing unit and refit it. Confirm it is correctly installed.
16 ALIGN BELT CG	OPC belt cartridge not installed	Confirm the installation of the OPC belt cartridge.
17 MEDIA JAM FEED	Paper jam at feeding area	Remove the media cassette, and remove paper jammed at feeding entrance.
17 MEDIA JAM INNER	Paper jam inside printer	Open the transfer unit 2, and remove paper jammed inside.

Display Message	Meaning	Countermeasure
17 MEDIA JAM OUTER	Paper jam at paper exit area	Open the transfer unit 2 / paper exit unit and remove paper jammed inside.
17 MEDIA JAM DRUM	Paper jam wound around the transfer drum 2	Open the transfer unit 2 and remove the OPC belt cartridge. Remove the paper jam by unwinding the paper from the transfer drum 2.
18 CLOSE PANEL FRONT/TOP	Covers open	Confirm that the covers are firmly closed.
18 CLOSE TR UNIT	Transfer unit 2 open	Confirm that the transfer unit 2 is firmly closed.
19 SLEEP MODE	Printer under idling condition	Printer automatically returns to the operating condition when a PRINT signal is sent.
01 WAIT	Printer warming-up	These are normal operation modes.
00 READY	Printer ready to print in standby status	
02 PRINT	Printing in progress	

3. PAPER TRANSPORT ERROR

Paper is transported through the path shown in Fig.8-1. Paper jams at the following locations are easily cleared.

- Paper Pick-up Roller
- Transfer unit 2
- Fusing Unit
- Paper Exit Unit

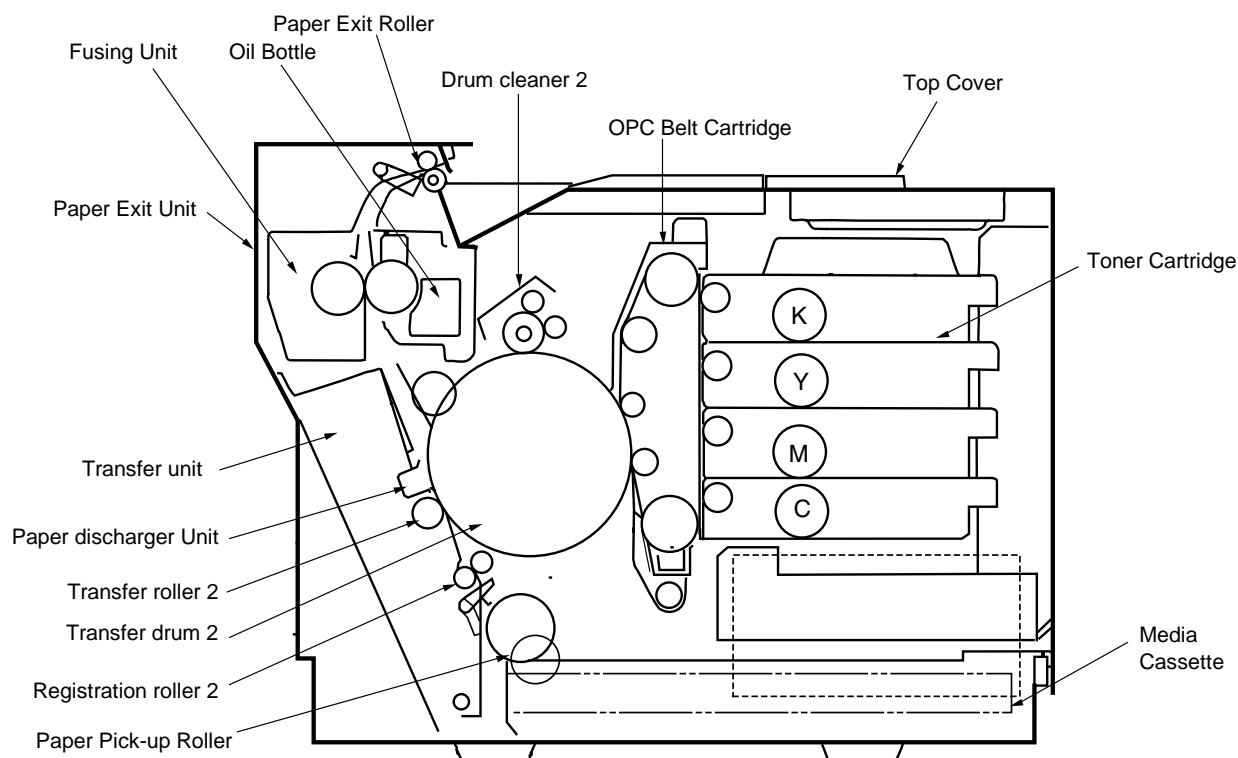


Fig.8-1

3.1 Feed Jam

Table 8-3-1

Problem Item	Step	Check Item	Result	Action
Print Paper	1	Is the print paper a recommended paper?	NO	Use a recommended paper.
	2	Is the print paper damp?	YES	Replace the existing paper with new.
	3	Was the paper fanned before loading in the media cassette?	NO	Fan the paper before loading.
Media Cassette	4	Is the print paper set in place?	NO	Set the paper in the correct place.
	5	Is the end plate properly set up?	NO	Set the end plate to meet the paper size.
	6	Is the paper stacked above the line on the paper guide?	YES	Stack the paper below the line.
	7	Is there paper dust around the paper guide?	YES	Clean the paper guide with a cotton cloth.
Paper Pick-up Roller / Separation Pad 2	8	Is the print paper caught in the paper feeding part?	YES	Remove the paper.
	9	Is the paper pick-up roller damaged?	YES	Service call required to replace the damaged paper pick-up roller.

3.2 Inner Jam

Table 8-3-2

Problem Item	Step	Check Item	Result	Action
Transfer unit 2		Open the transfer unit 2 and check.		
	1	Is there any paper inside the unit?	YES	Remove the paper inside.
	2	Is the transfer roller 2 firmly locked by the lock lever?	NO	Fix the transfer roller 2 with the lock lever.
	3	Is the paper discharger unit installed in place?	NO	Install the paper discharger unit firmly in place.
	4	Is there paper dust around the registration roller 2?	YES	Clean the registration roller 2 with a cotton cloth.
	5	Is the wire of the paper discharger unit damaged?	YES	Replace the existing paper discharger unit with a new one.
Fusing Unit	6	Is the fusing unit installed in place?	NO	Install the fusing unit firmly in place.
	7	Is there any paper trapped between the rollers?	YES	Remove the trapped paper.
	8	Is there fuser oil still in the oil bottle?	NO	Replace the existing oil bottle with a new one.

3.3 Outer Jam

Table 8-3-3

Problem Item	Step	Check Item	Result	Action
Print Paper	1	Is the print paper a recommended paper?	NO	Use a recommended paper.
Paper Exit Unit	1	Is the paper exit unit firmly locked by the lock lever?	NO	Open and close the paper exit unit again.
	2	Is there paper dust around the exit roller?	YES	Clean the exit roller with a cotton cloth.

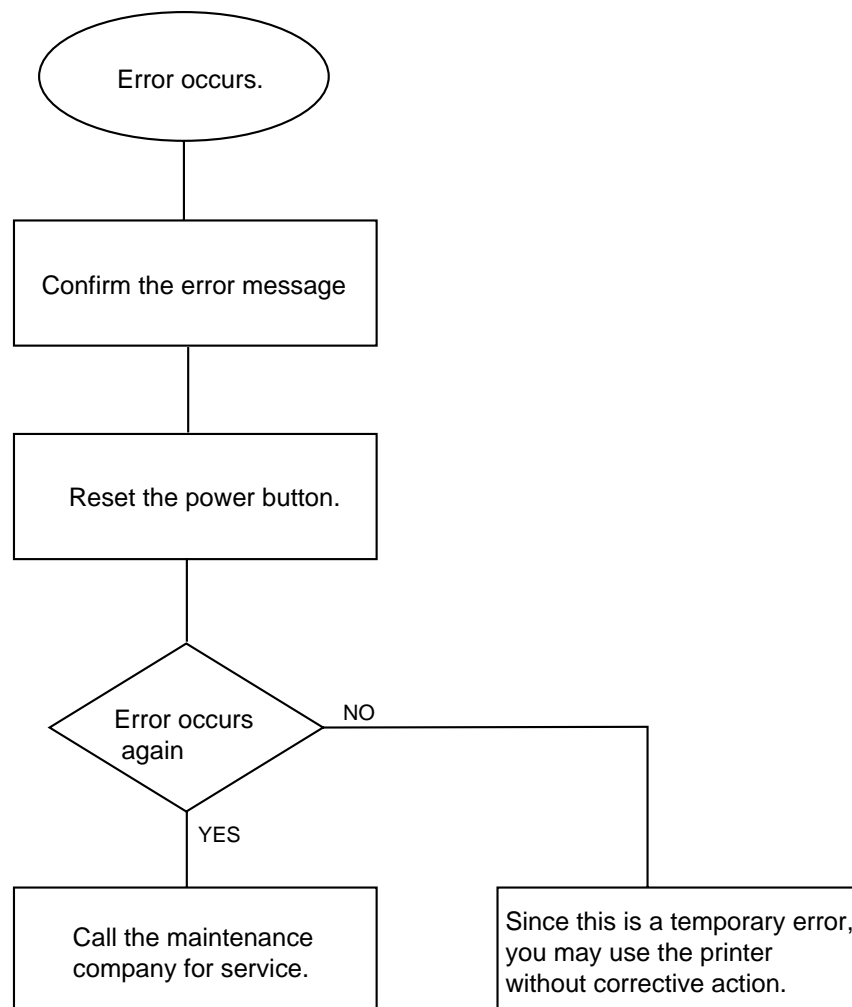
3.4 Others

Table 8-3-4

Problem Item	Cause	Result	Action
The edge of print paper is creased.	Is the curled paper edge creased when the paper is loaded through the pick-up roller?	YES	Turn over the paper in the media cassette.

4. SERVICE CALL

If errors or failures occurred inside the printer, the applicable error message will be displayed on the control panel, and the printer stops. If errors or failures repeat even after resetting the power button, confirm the error code and then call your Service provider.



4.1 Video Controller Mode

Table 8-4-1

Service Call Message	Meaning	Countermeasure
ERROR S01 SERVICE CALL	FATAL ERROR EX	Update with a new Firmware.
ERROR S02 SERVICE CALL	ADRL ERROR EX	Update with a new Firmware.
ERROR S03 SERVICE CALL	ADRS ERROR EX	Update with a new Firmware.
ERROR S04 SERVICE CALL	BUS ERROR EX (INSTRUCT)	Update with a new Firmware.
ERROR S05 SERVICE CALL	BUS ERROR EX (DATA L/S)	Update with a new Firmware.
ERROR S06 SERVICE CALL	SYSCALL EX	Update with a new Firmware.
ERROR S07 SERVICE CALL	BREAKPOINT EX	Update with a new Firmware.
ERROR S08 SERVICE CALL	RESERVED INSTRUCT EX	Update with a new Firmware.
ERROR S09 SERVICE CALL	COPROCESSOR UNUSAB EX	Update with a new Firmware.
ERROR S10 SERVICE CALL	ARITHMETIC OVERFLOW EX	Update with a new Firmware.
ERROR S11 SERVICE CALL	UNDEFINED INTERRUPT	Update with a new Firmware.
ERROR S12 SERVICE CALL	SOFTWARE 1 INTERRUPT	Update with a new Firmware.
ERROR S13 SERVICE CALL	SOFTWARE 2 INTERRUPT	Update with a new Firmware.
ERROR E41 PRINT CHECK	Engine interface error	Update with a new Firmware.
ERROR H60 BUS ERROR	Bus error	Replace with a new main (video controller) PCB.
ERROR H61 PROG ERROR	Program ROM checksum error	Replace with a new main (video controller) PCB.

Service Call Message	Meaning	Countermeasure
ERROR H63 D-RAM ERROR	DIMM error	Replace with a new DIMM.
ERROR H66 NV_W ERROR	NVRAM write error	Replace with a new main (video controller) PCB.
ERROR H67 NV_R ERROR	NVRAM read error	Replace with a new main (video controller) PCB.
ERROR H68 NV_B ERROR	NVRAM read/ write error	Replace with a new main (video controller) PCB.
ERROR H73 FLASH_R ERROR	FLASH ROM read error	Replace with a new main (video controller) PCB.
ERROR H74 FLASH_W ERROR	FLASH ROM write error	Replace with a new main (video controller) PCB.
PCI BUS ERROR	PCI BUS error	Replace with a new NC-4100h.

Table 8-4-2

Status Display	Description
ERROR EC3 WARNING	NVRAM error
ERROR EC4 WARNING	Engine controller hardware error
ERROR EC7 WARNING	Process timing clock error
ERROR ED1 WARNING	Yellow Switching clutch error
ERROR ED2 WARNING	Magenta Switching clutch error
ERROR ED3 WARNING	Cyan Switching clutch error
ERROR ED4 WARNING	Black Switching clutch error
ERROR ED5 WARNING	YK Switching solenoid error
ERROR ED6 WARNING	MC Switching solenoid error

Status Display	Description
ERROR EE1 WARNING	Developing motor error
ERROR EE2 WARNING	Main motor error
ERROR EE3 WARNING	Drum error
ERROR EE4 WARNING	Toner empty sensor error
ERROR EE5 WARNING	Transfer roller 2 solenoid error
ERROR EE6 WARNING	Drum cleaning solenoid error
ERROR EE7 WARNING	Drum cleaning clutch error
ERROR EE8 WARNING	Fuser unit clutch error
ERROR EE9 WARNING	Belt marker sensor error
ERROR EEL WARNING	Erase LED error
ERROR EF0 WARNING	Cooling fan error
ERROR EF2 WARNING	Ozone fan error
ERROR EF4 WARNING	Fuser fan error
ERROR EF5 WARNING	Charger HV unit error
ERROR EH0 WARNING	Fuser thermistor error
ERROR EH2 WARNING	Fuser temperature 2 error
ERROR EH3 WARNING	Fuser temperature 3 error

Status Display	Description
ERROR EH4 WARNING	Fuser temperature 4 error
ERROR EL1 WARNING	Beam detector error
ERROR EL2 WARNING	Scanner motor error
ERROR ELL WARNING	Laser power error
ERROR EP1 WARNING	Duplex controller hardware error
ERROR EP3 WARNING	Feeder pass select solenoid error
ERROR EP4 WARNING	Duplex motor error
ERROR EP5 WARNING	Outer pass select solenoid error
ERROR EP6 WARNING	Optional fan error

Note:

For further actions for the error messages described in Table 8-4-2, refer to the flow charts later in this section.

4.2 Engine Controller Mode

Table 8-4-3

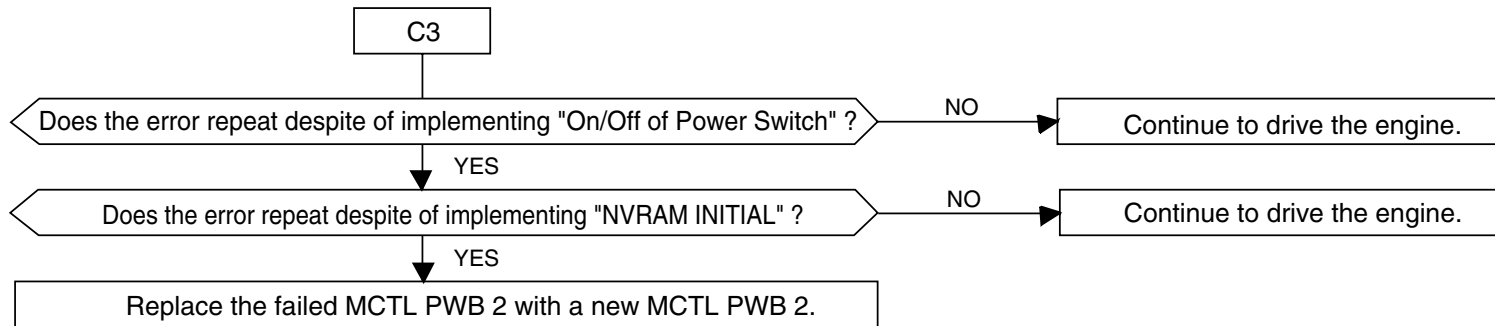
Code	Description
C3	NVRAM Error (MCTL PCB)
C4	Engine Controller MCTL PCB Hardware Error
C7	Process Timing Clock Error (Main Motor Clock Error)
D1	Clutch Error of the Yellow Developing Unit
D2	Clutch Error of the Magenta Developing Unit
D3	Clutch Error of the Cyan Developing Unit
D4	Clutch Error of the Black Developing Unit
D5	HPSI Signal Error (Retract Error of Black and Yellow Toner Cartridge)
D6	HPSI Signal Error (Retract Error of Cyan and Magenta Toner Cartridge)
E1	Developing Motor Error
E2	Main Motor Error
E3	Transfer drum 2 Rotational Error
E4	Toner Sensor PCB Error
E5	Transfer roller 2 Solenoid Error
E6	Brush Cleaner Solenoid Error
E7	Brush Cleaner Clutch Error
E8	Fusing Unit Clutch error
E9	Belt Sensor Error
EL	Erase Lamp Error
F0	Control Fan Error
F2	Ozone Fan (1) Error
F4	Fuser Fan Error
F5	Charging HV (DC High Voltage) Error
H0	Fuser Thermistor Error
H2	Fusing Temperature Error (Warming-up Time Error)
H3	Fusing Temperature (3) Error (Heater Continuous ON Time Error)
H4	Fusing Temperature (4) Error (Heater Continuous ON Time Error)
L1	Beam Sensor Error
L2	Scanner Motor Error
LL	Laser Power Error

Note:

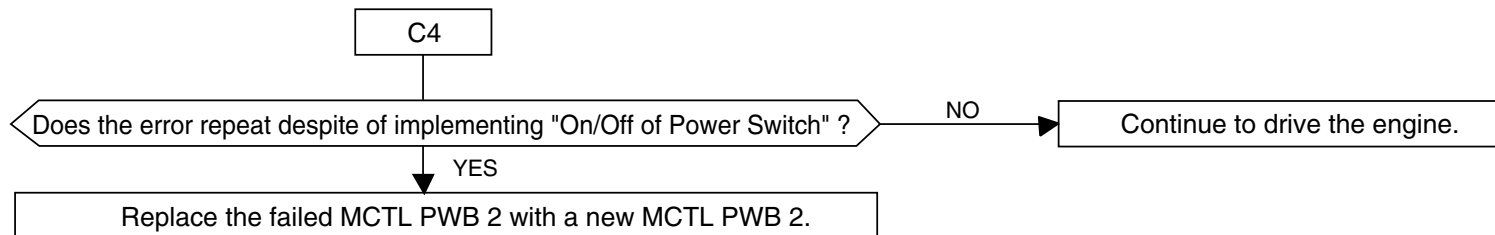
For further actions for the error messages described in Table 8-4-3, refer to [the flow charts later in this section](#).

Chart 8-4 Troubleshooting

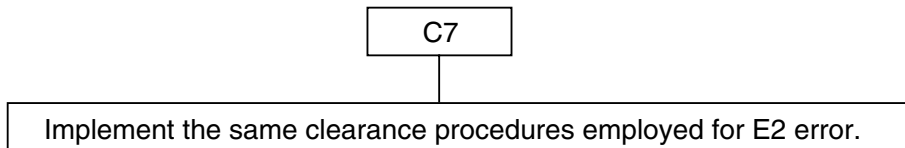
Code	Description of Error	Cause of Error	Clearance Method
C3	NVRAM Error	1. Failure of MCTL PWB 2. · CPU · EEPROM	1. Turn on and off the power switch. 2. Above method 1 does not work, implement "C3 Error Clearance Procedure". 3. Replace the failed MCTL PWB 2 with a new MCTL PWB 2.

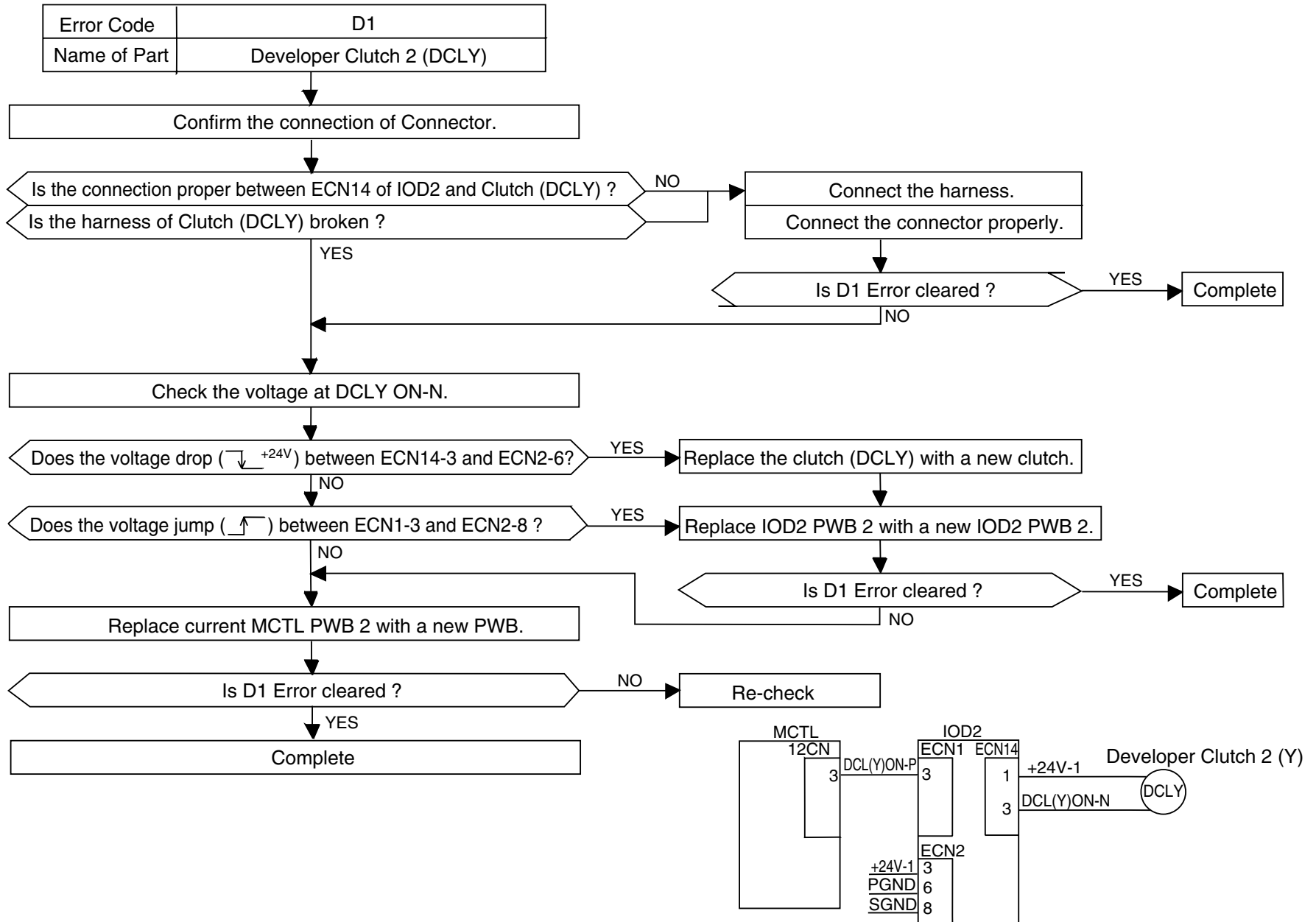


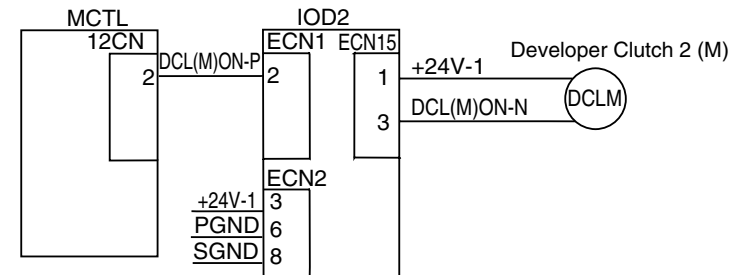
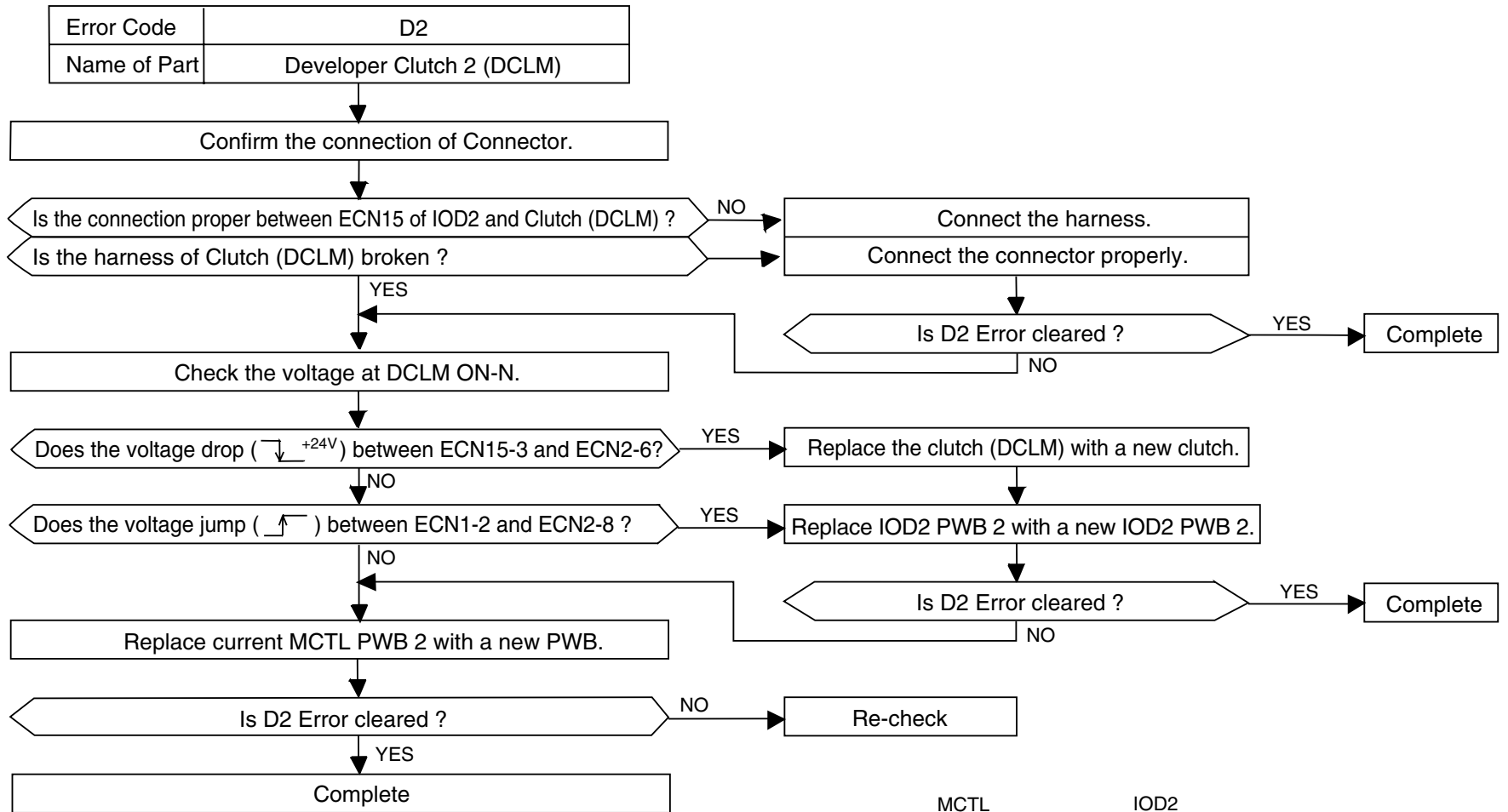
Code	Description of Error	Cause of Error	Clearance Method
C4	Hard Error of MCTL Control Circuit.	1. Failure of MCTL PWB 2.	1. Turn on and off the power switch. 2. Replace the failed MCTL PWB 2 with a new MCTL PWB 2.

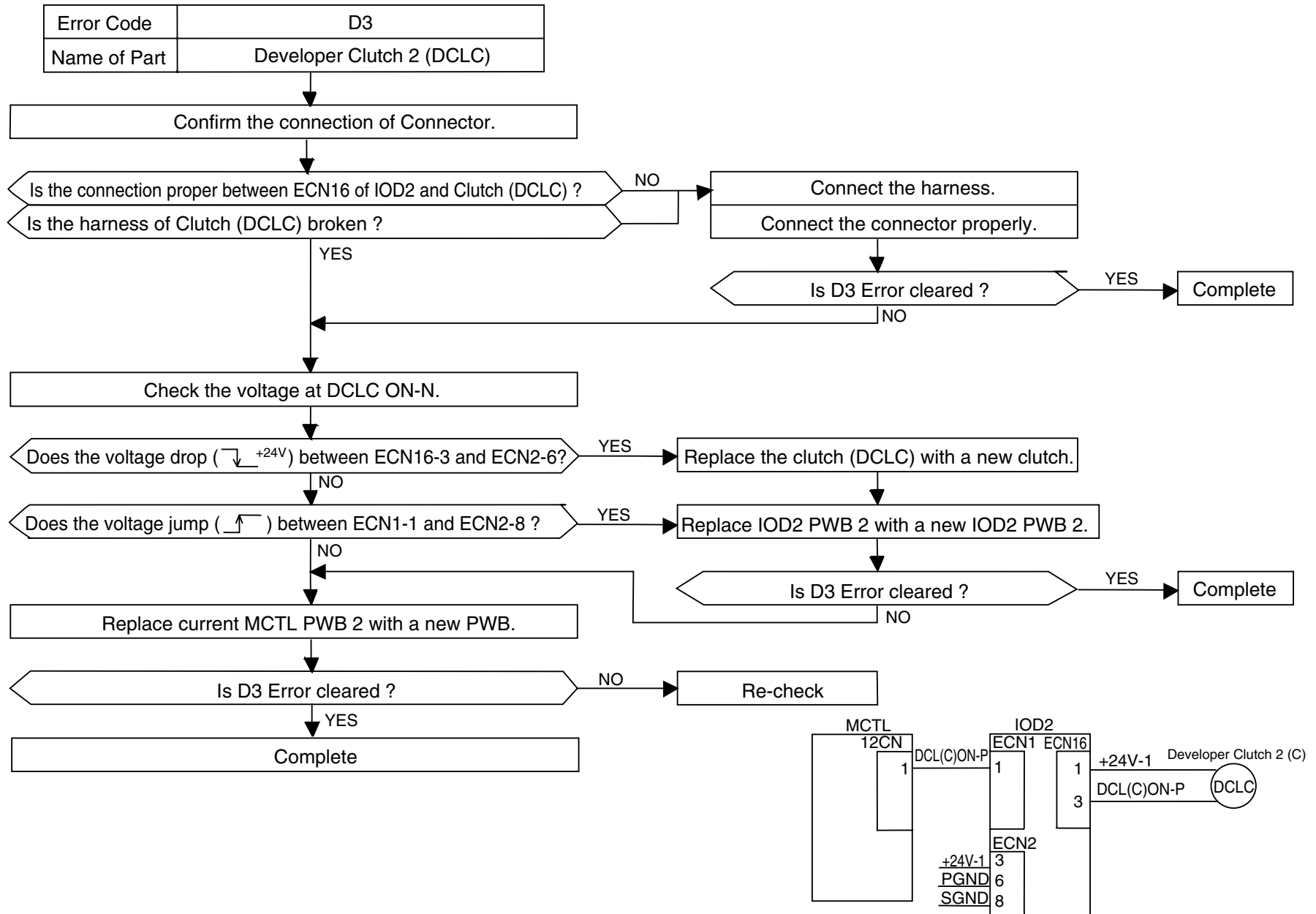


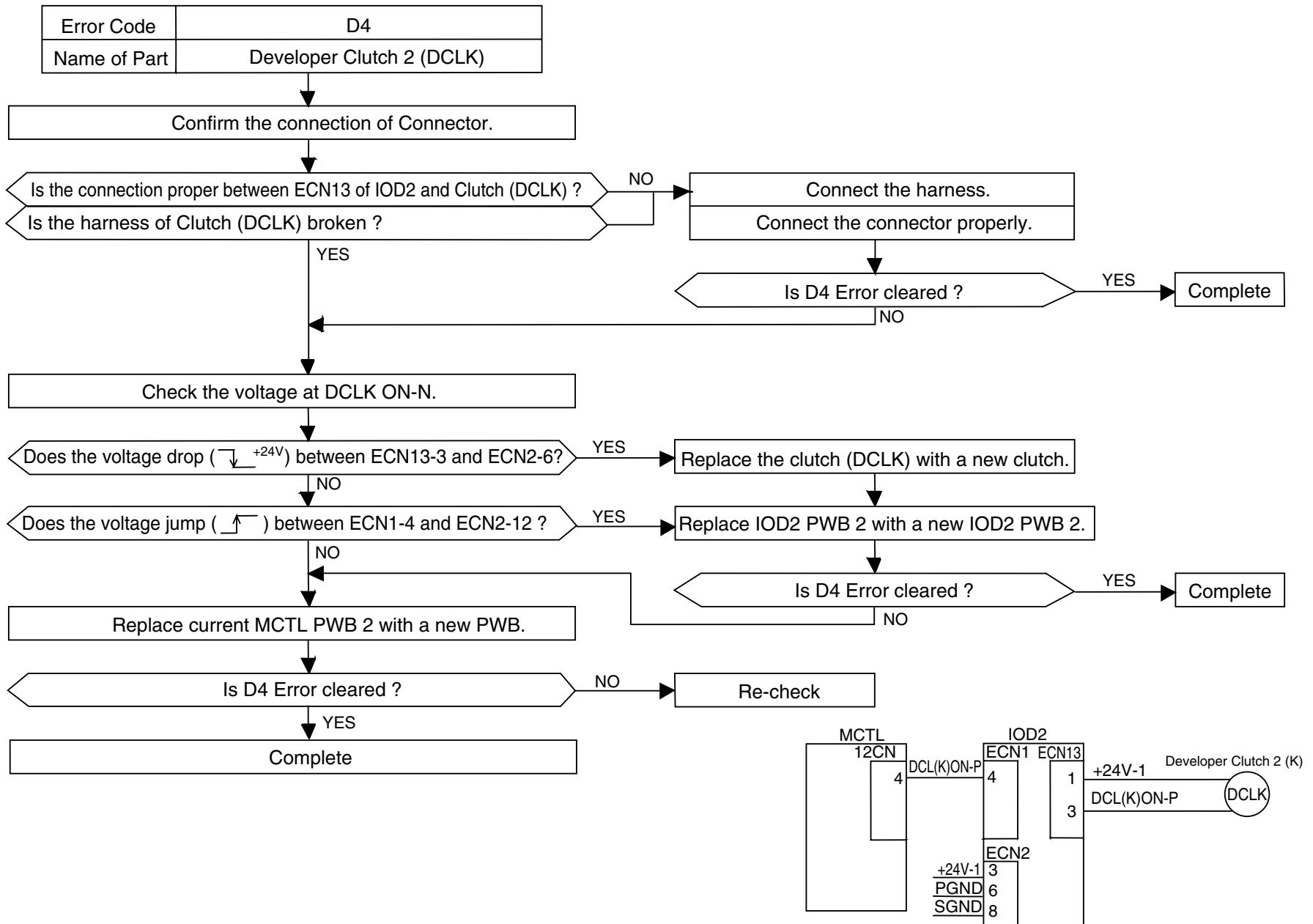
Code	Description of Error	Cause of Error	Clearance Method
C7	Process Timing Error.	1. Power Feeding Failure 2. MM Failure 3. MM Input Circuit Failure	1. Implement the same clearance procedures employed for E2 error. [Note]: MM stands for OPC Belt Drive Main Motor.

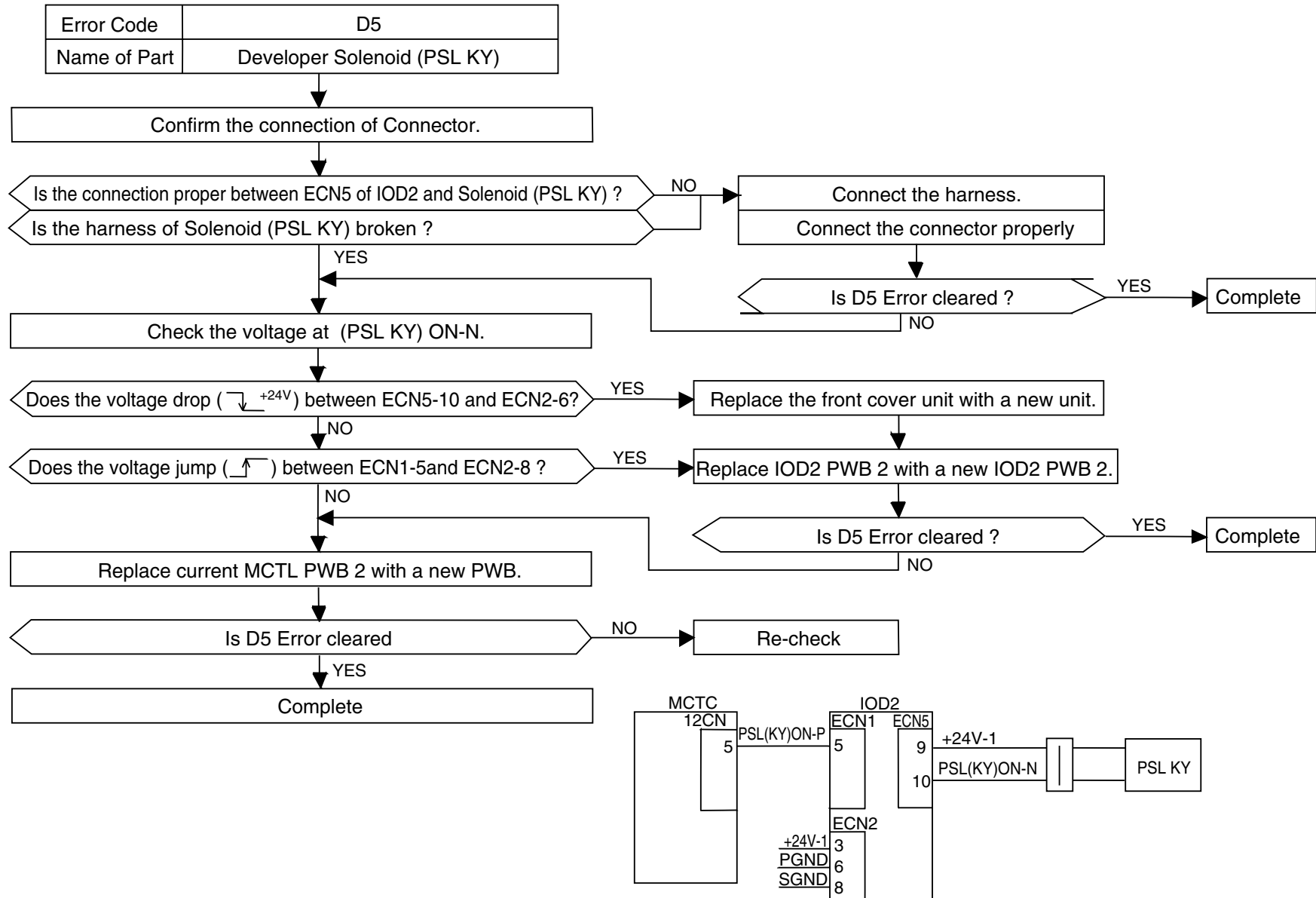


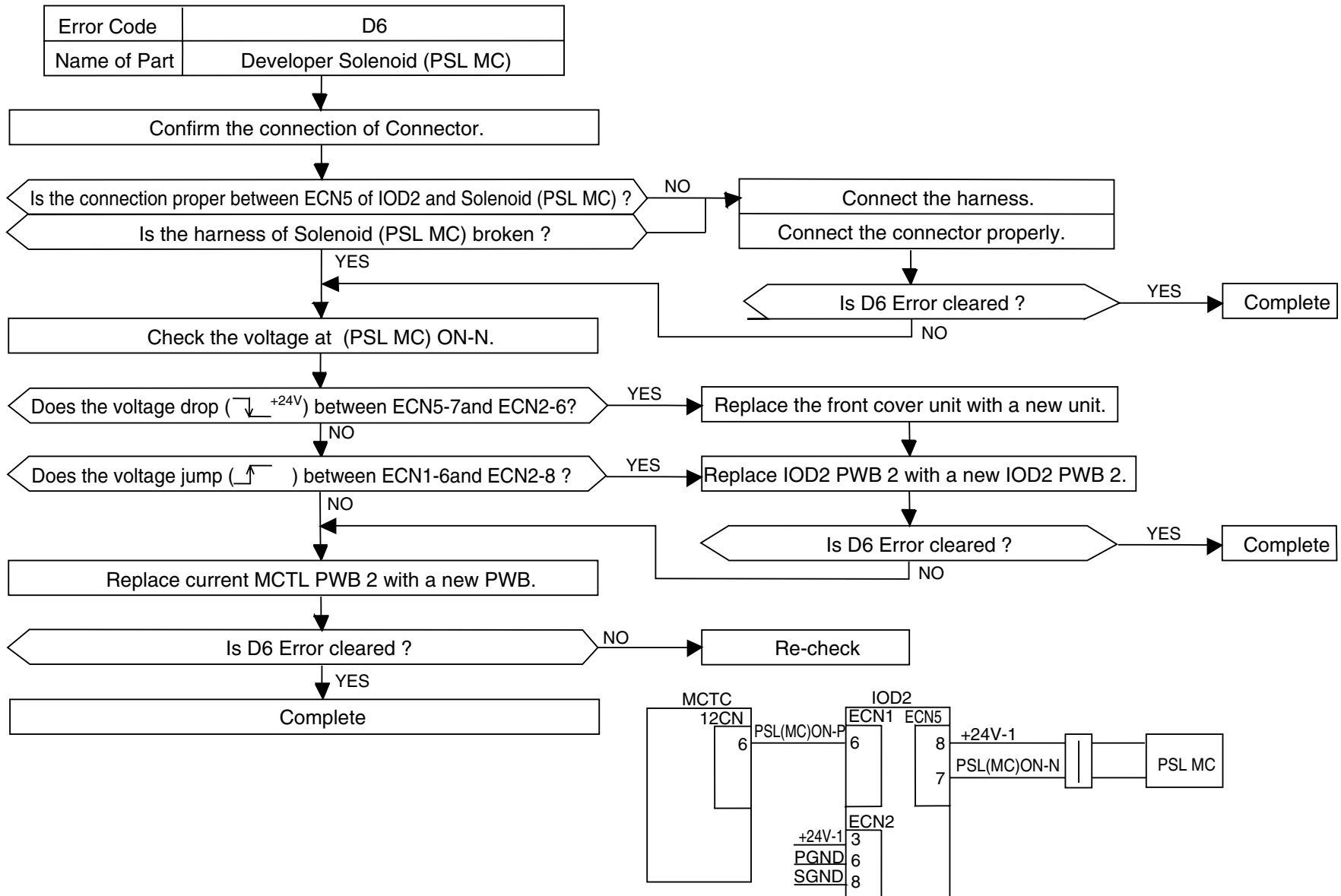


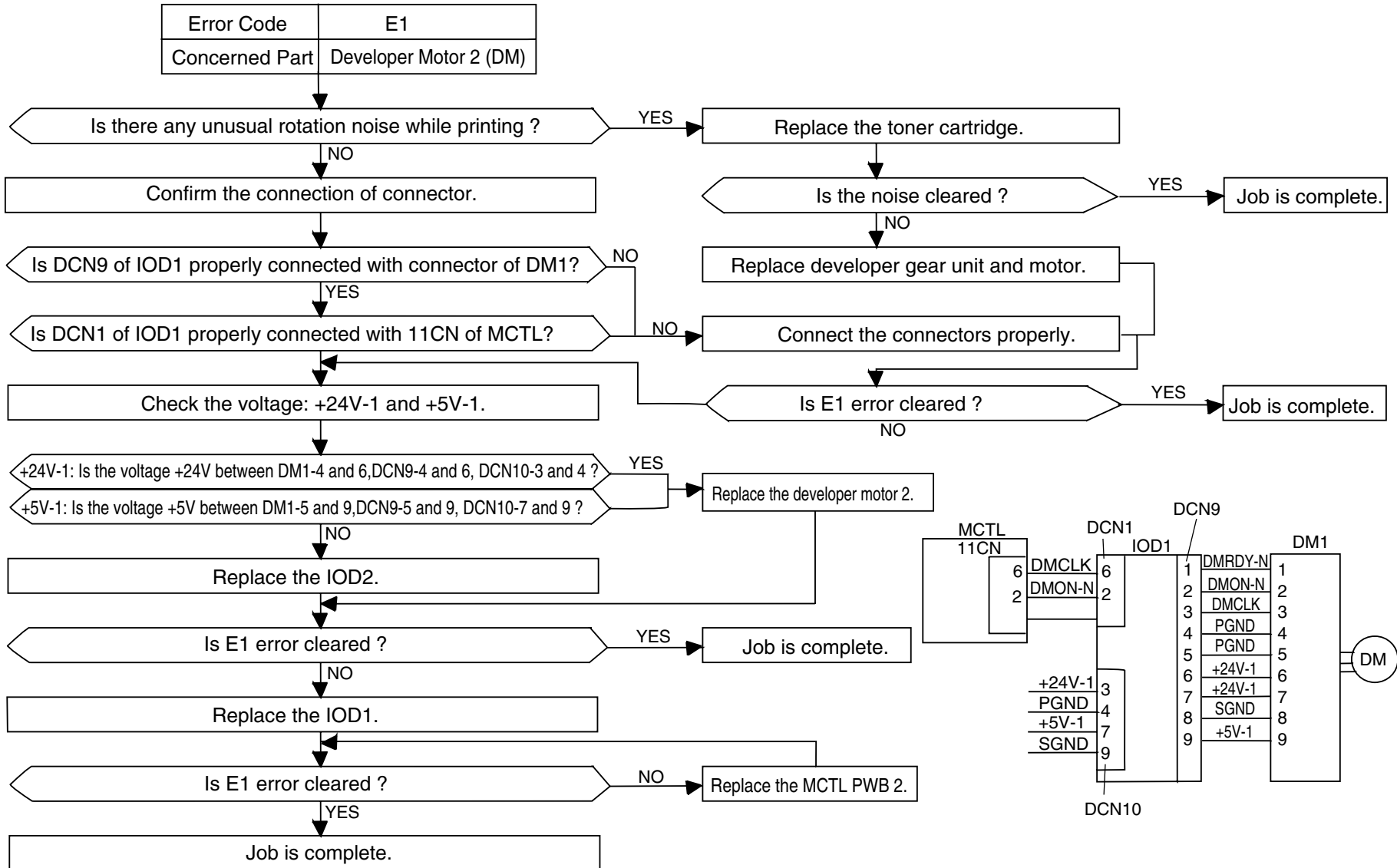


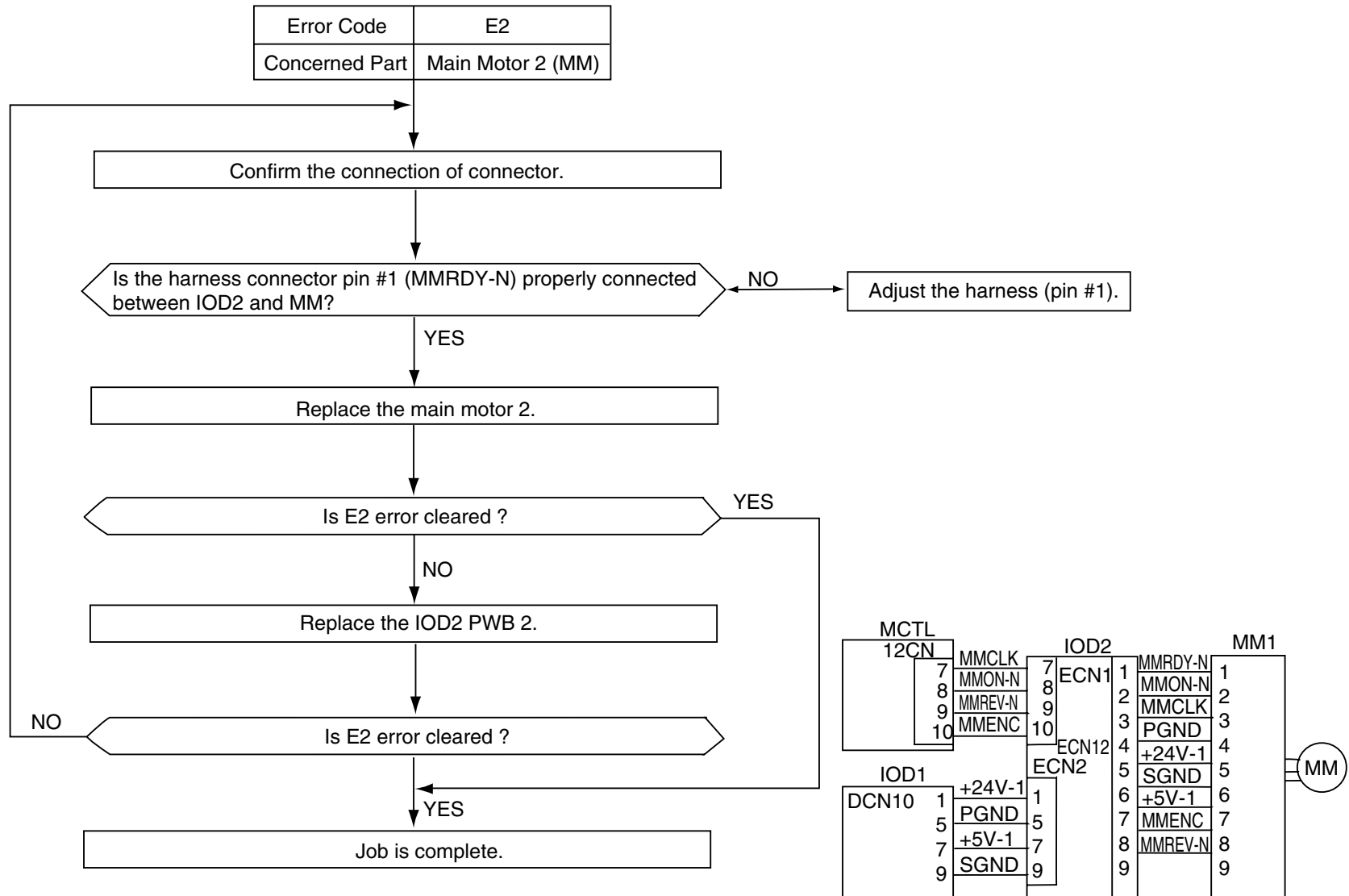


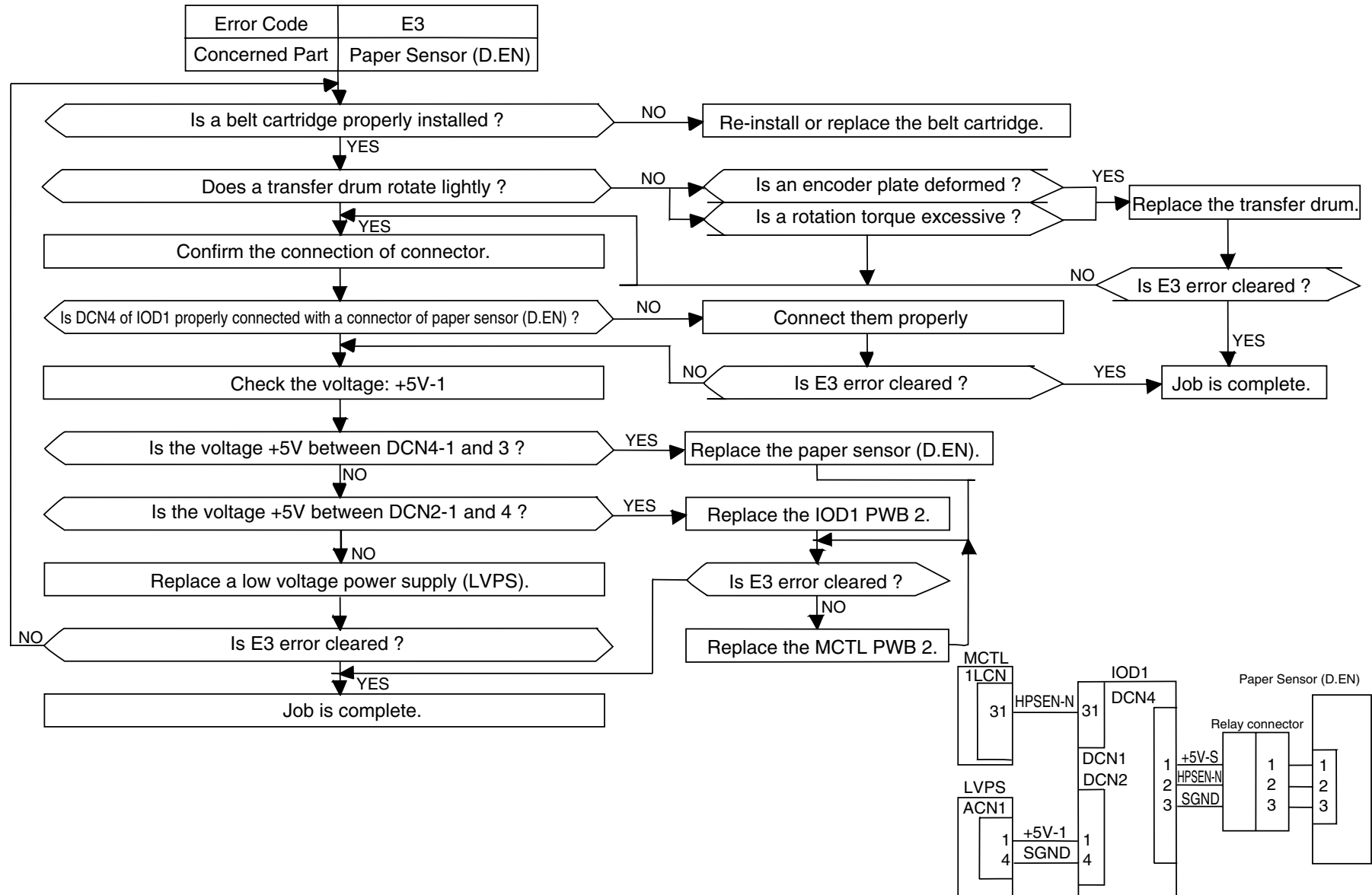












Error Code	E4
Concerned Part	Toner Sensor PCB.(LED side)

Confirm the connection of a toner sensor PCB.(LED side) connector.

Is DCN7 of IOD1 properly connected with a connector of the toner sensor ?

NO

Connect them properly.

YES

Check the voltage(LEDON-N/P)

NO

Is E4 error cleared ?

YES

Job is complete.

Is a signal voltage between DCN7-7 and 9 to be a rising edge(+24V) ?

YES

Replace the toner sensor PCB.

NO

Is a signal voltage between DCN1-15 and 41 to be a trailing edge ?

NO

Replace the IOD1 PWB 2.

YES

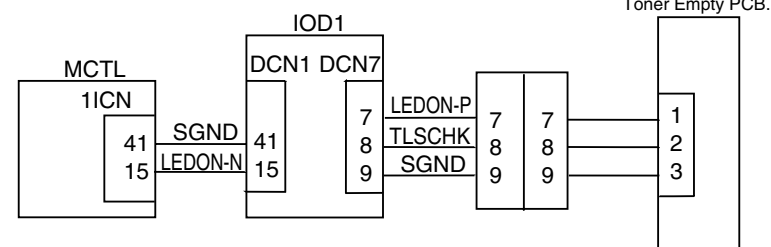
Is E4 error cleared ?

NO

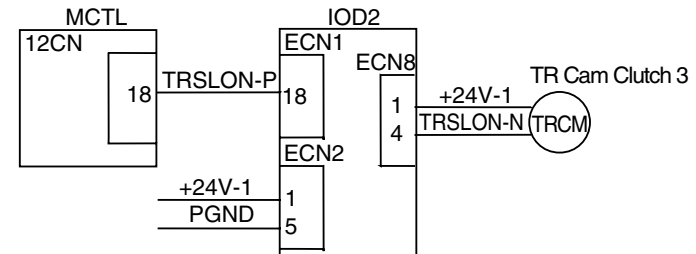
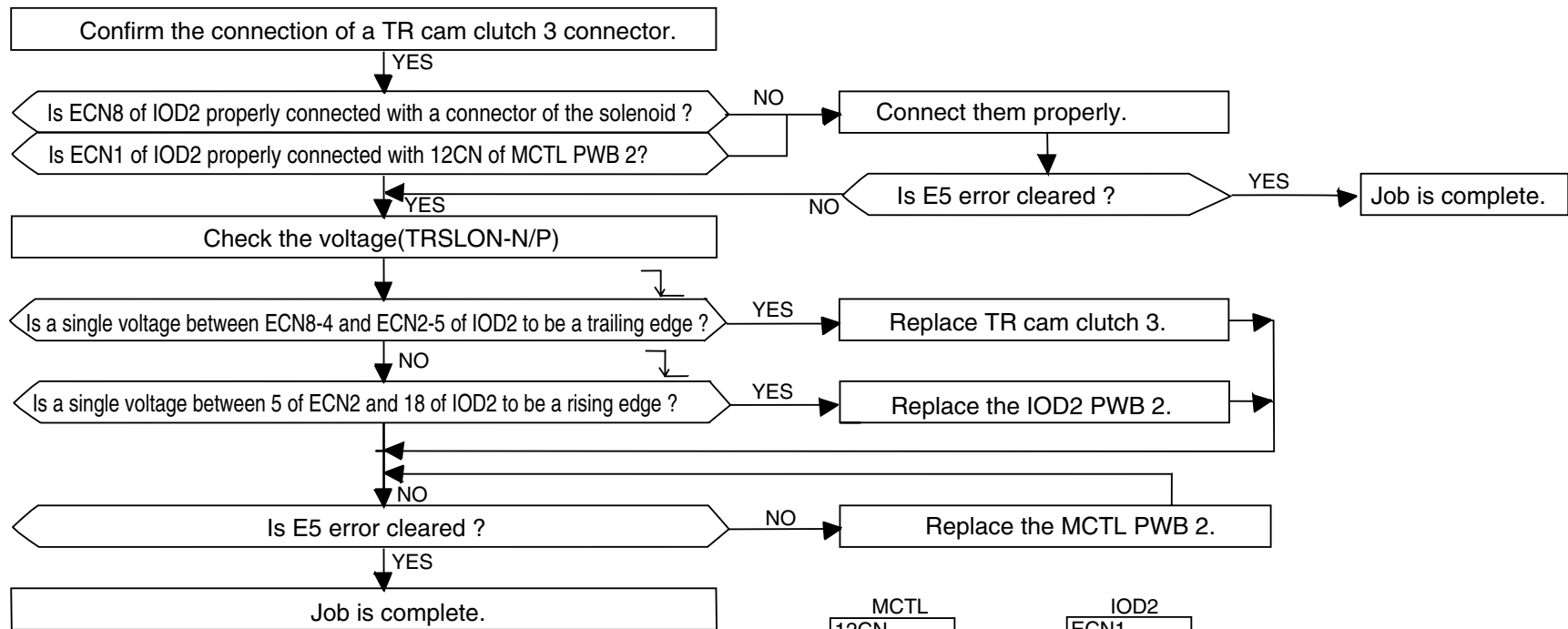
Replace the MCTL PWB 2.

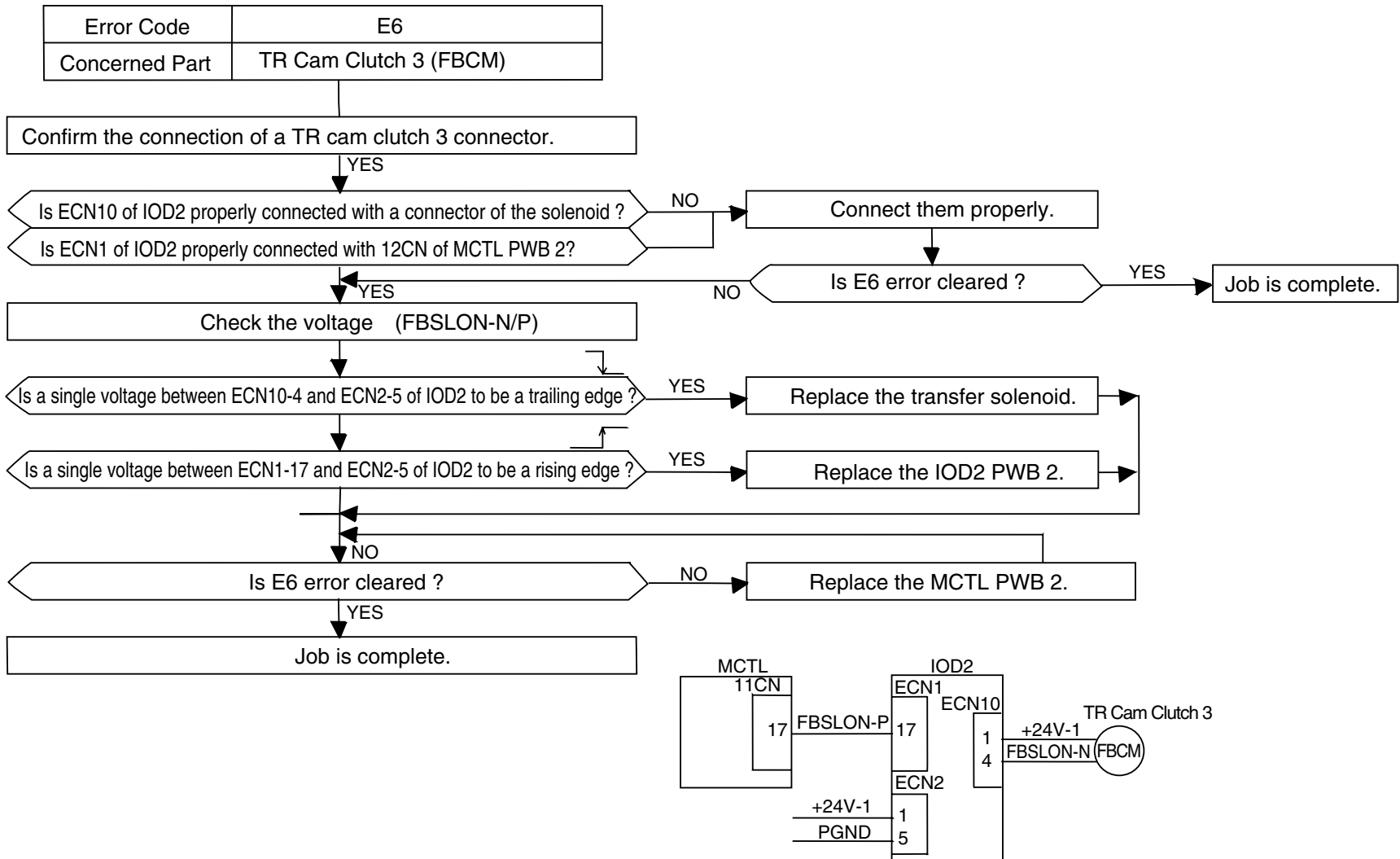
YES

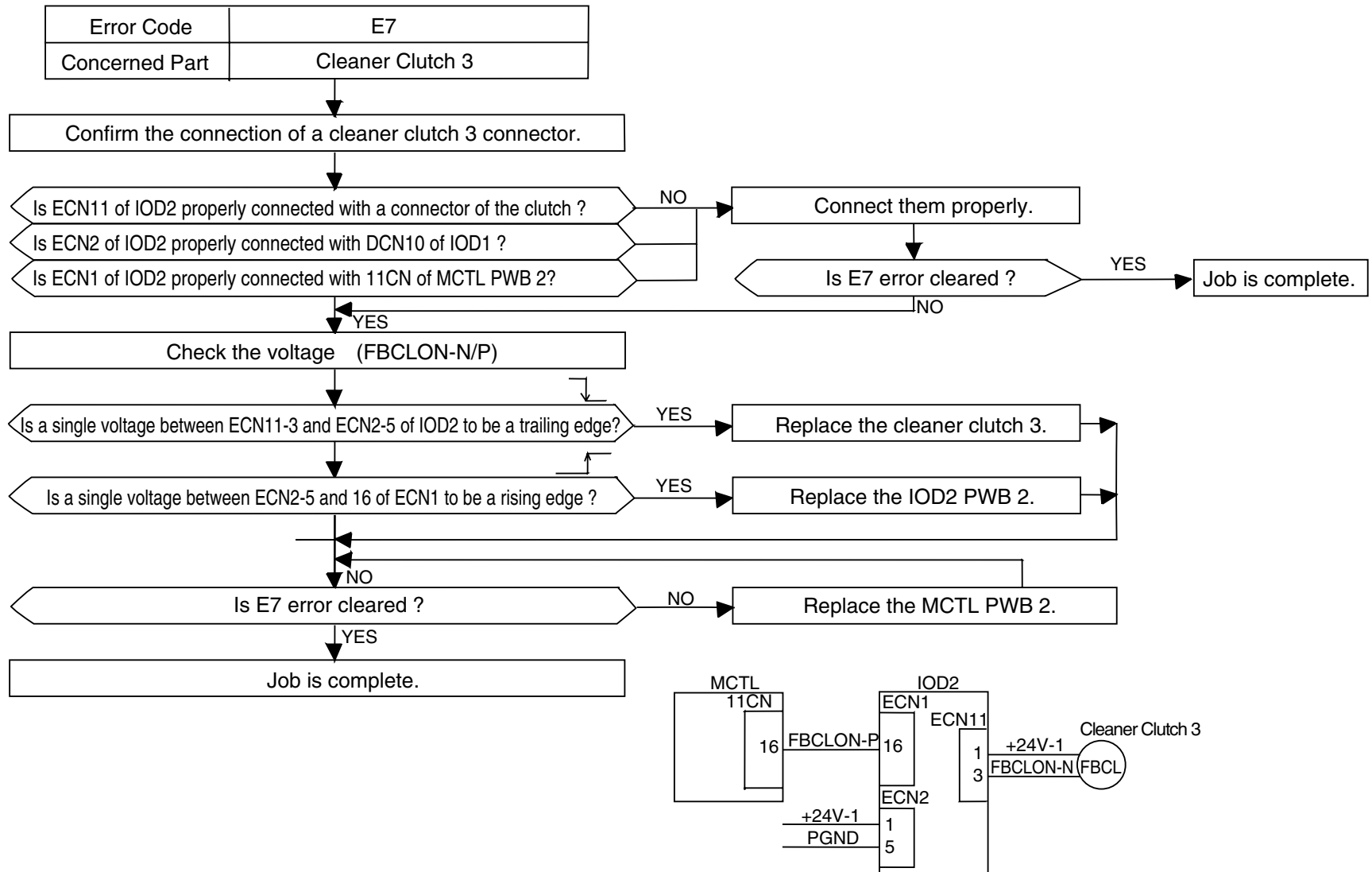
Job is complete.

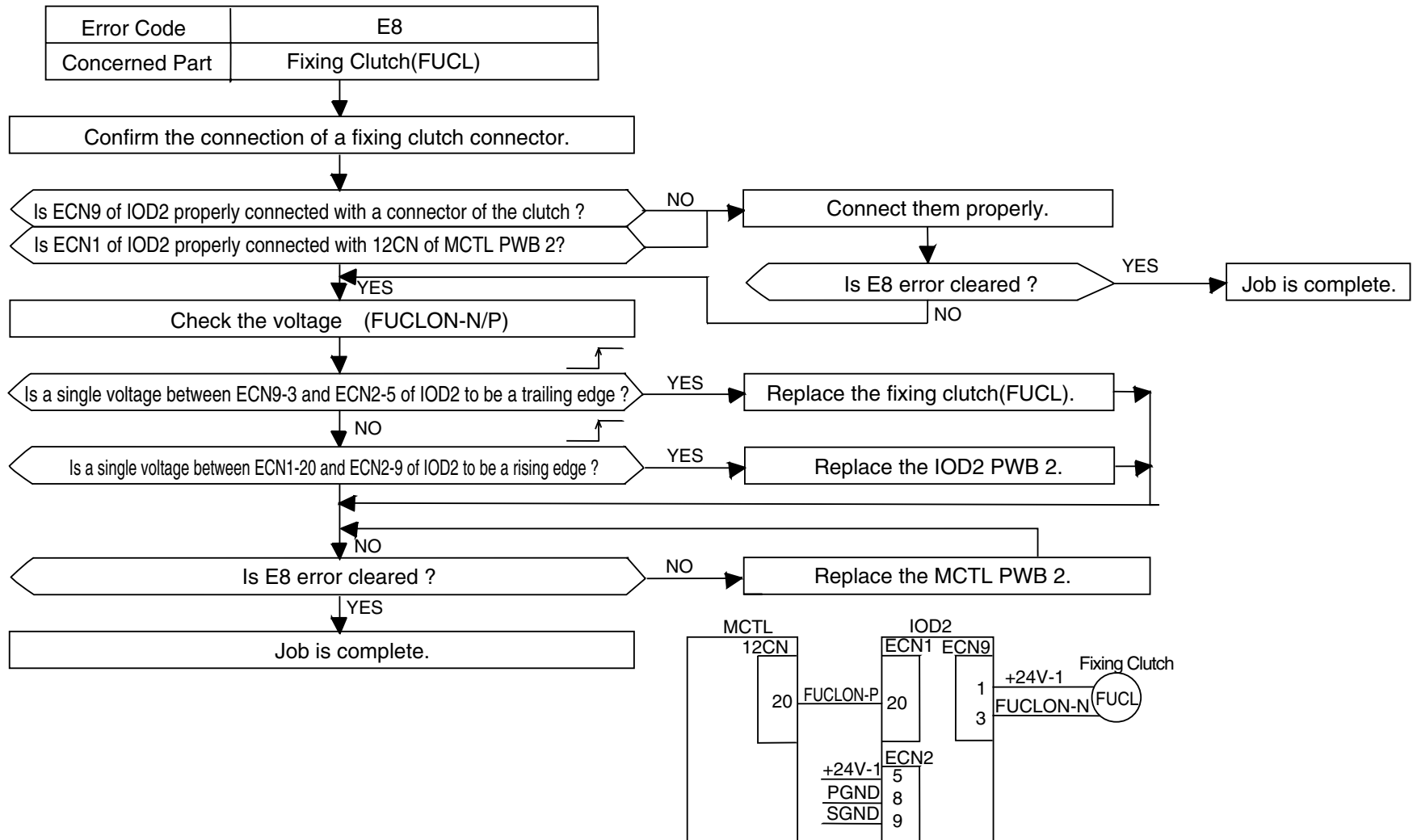


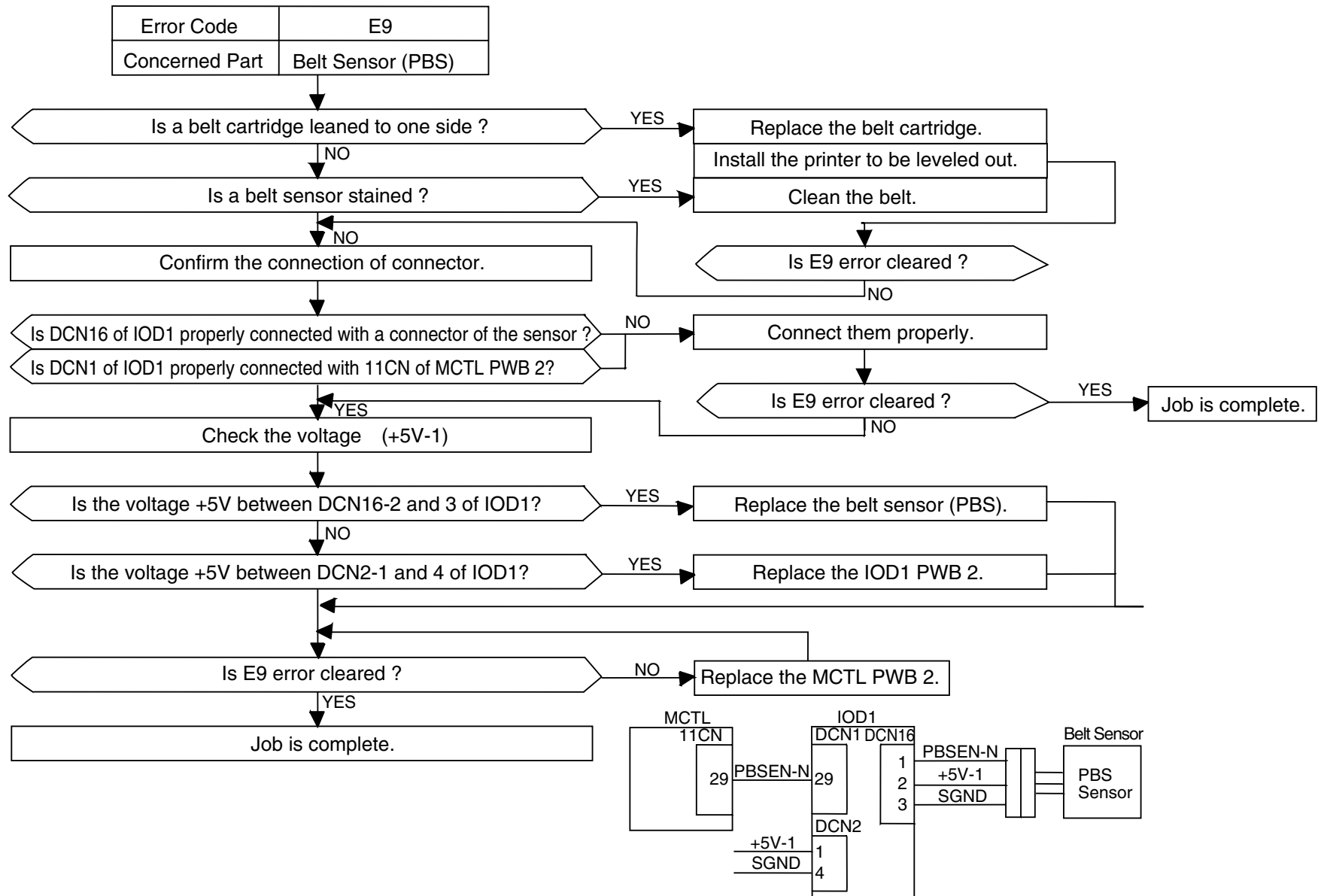
Error Code	E5
Concerned Part	TR Cam Clutch 3 (TRCM)

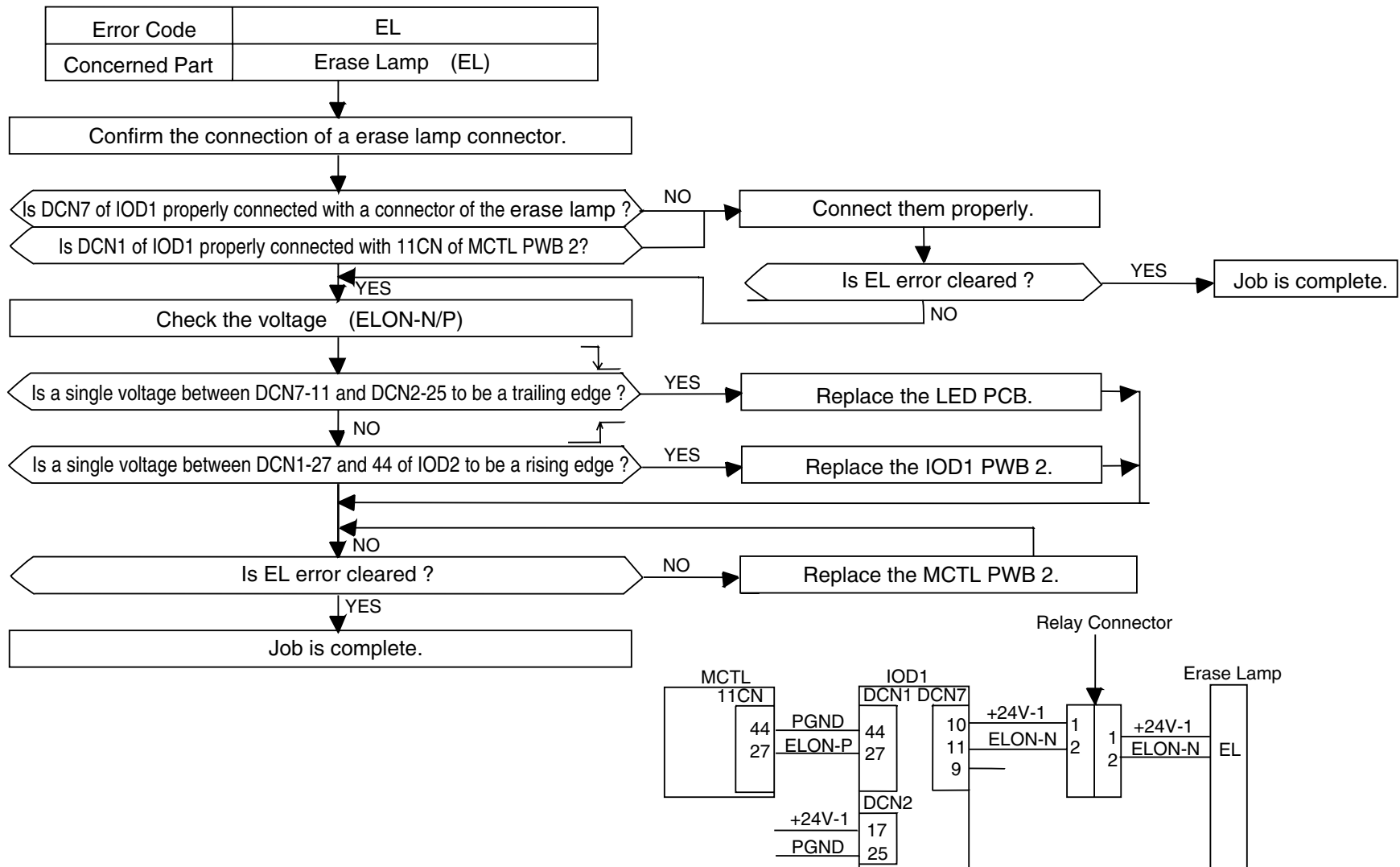


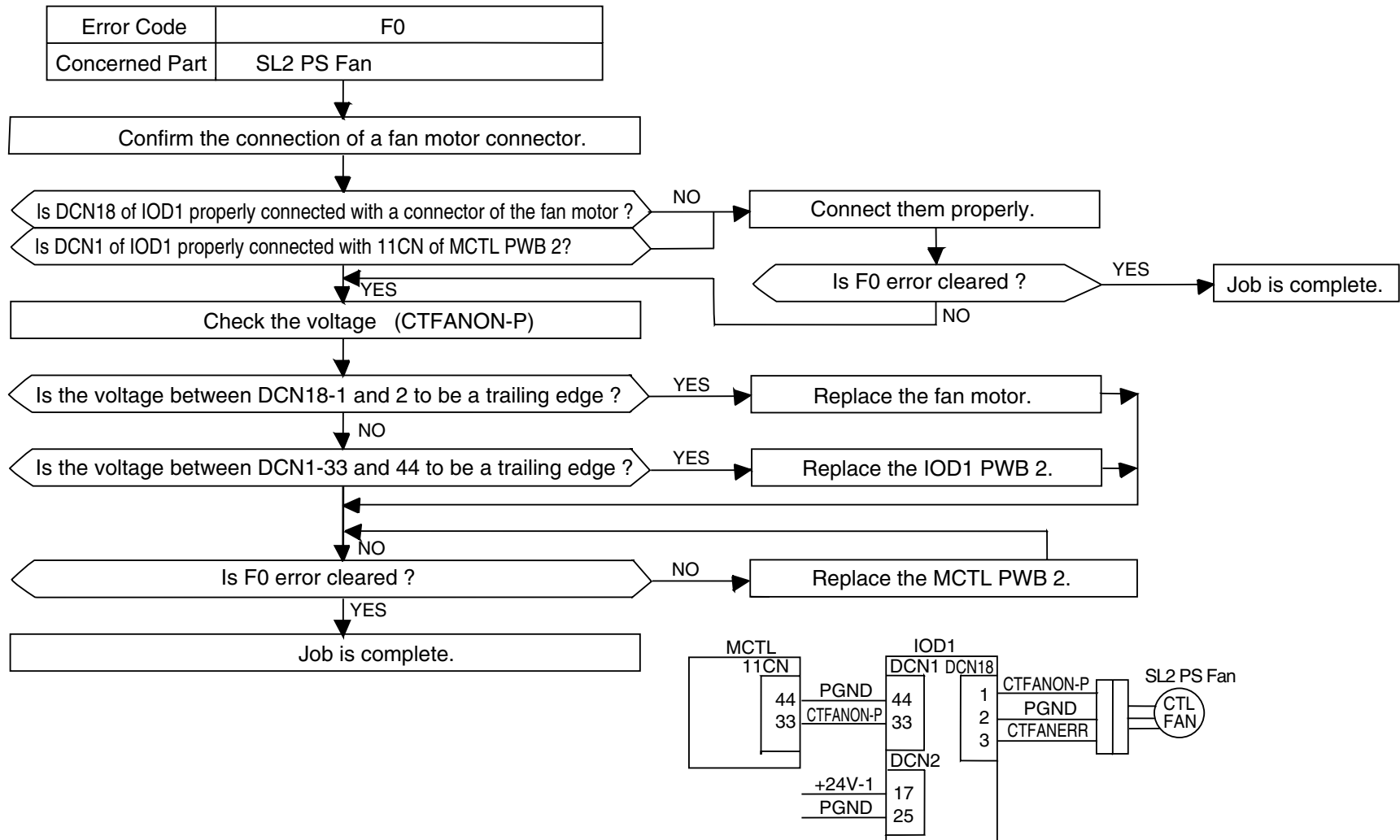


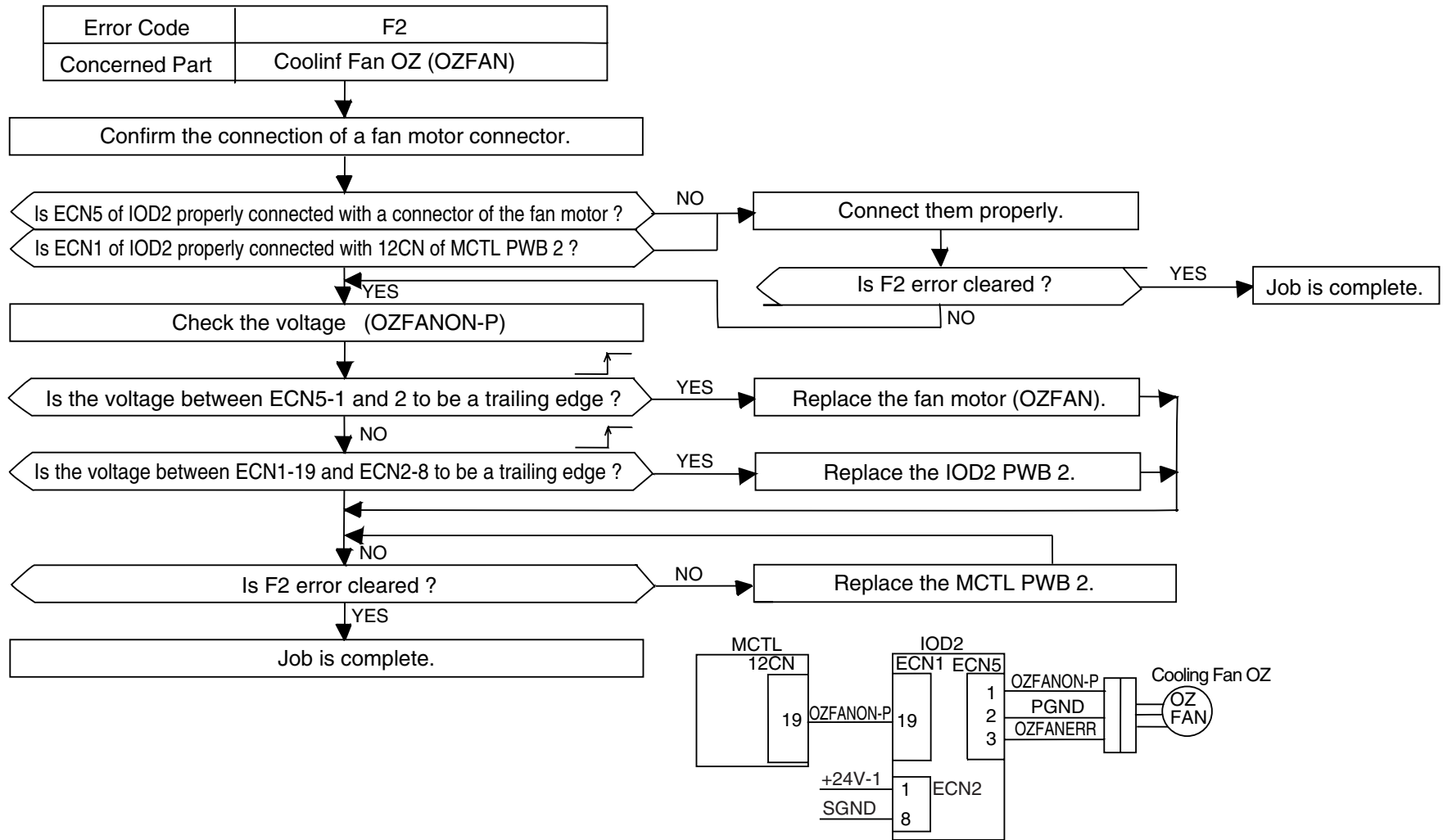


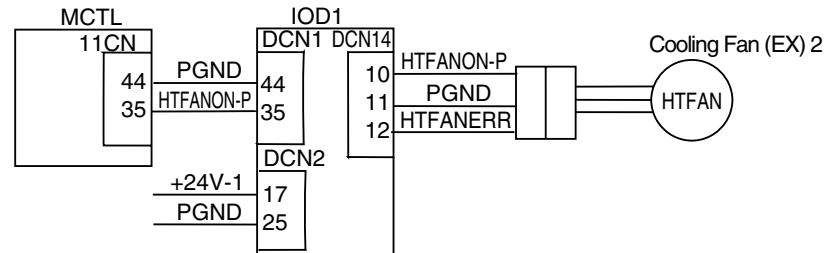
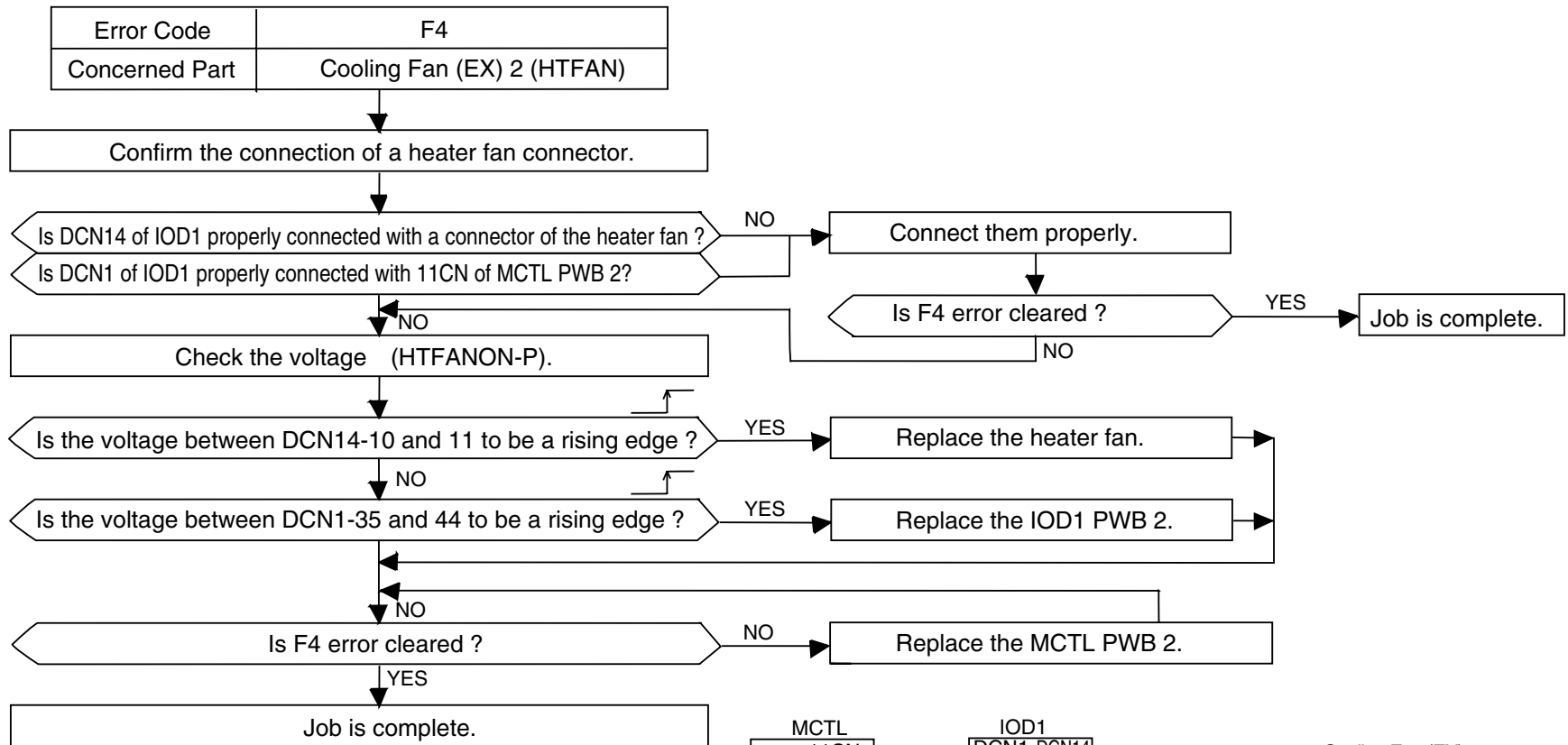




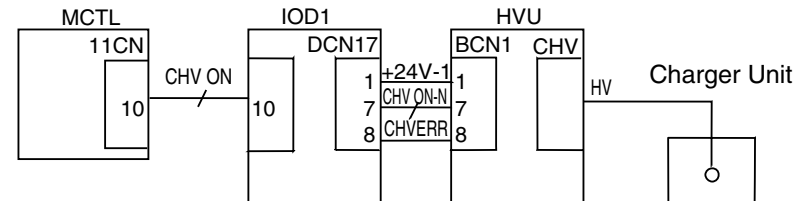
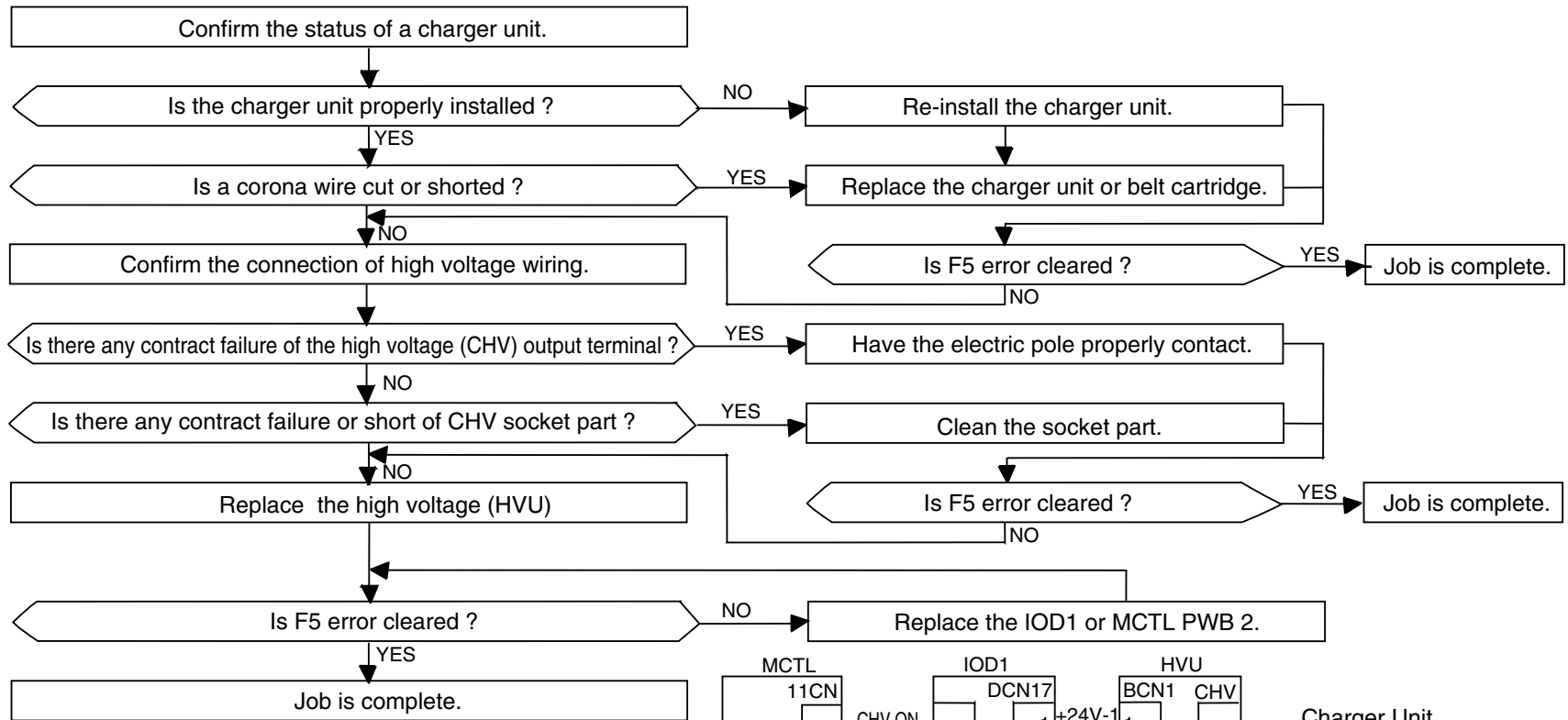




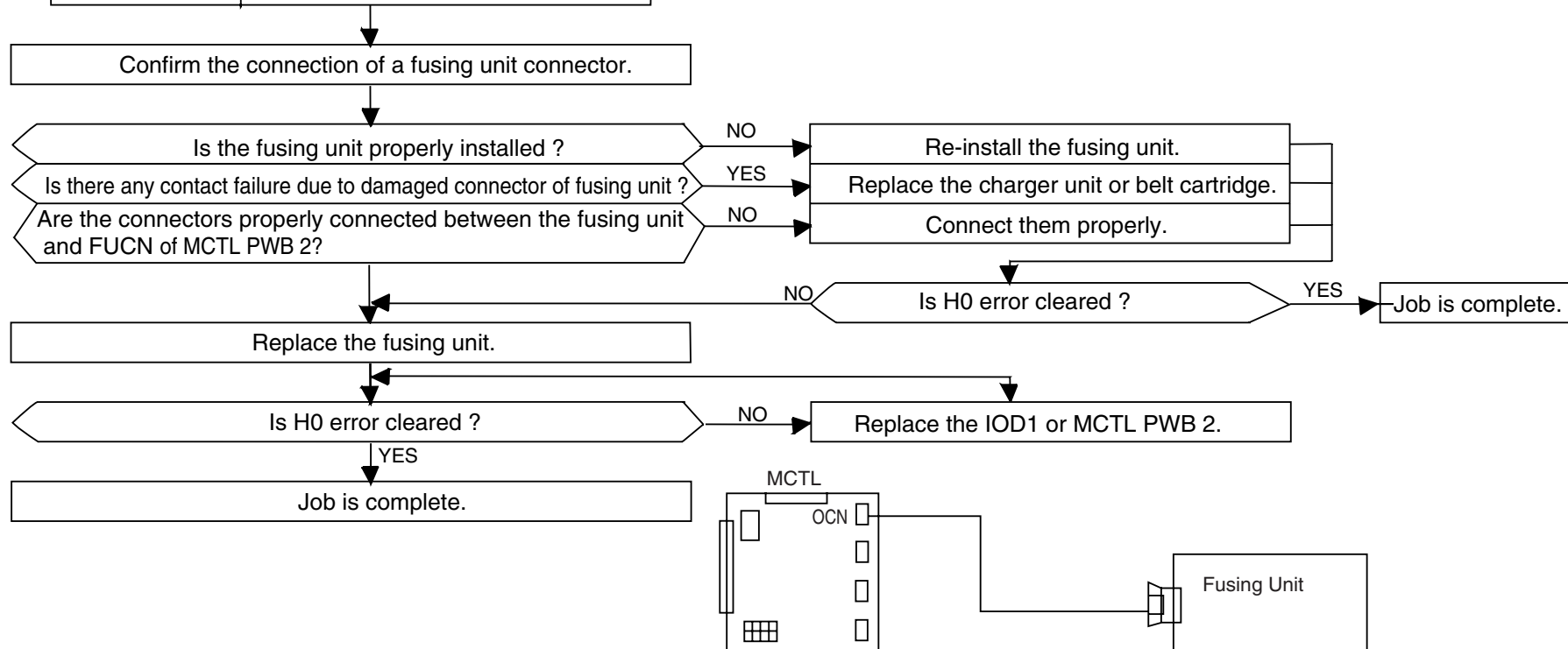




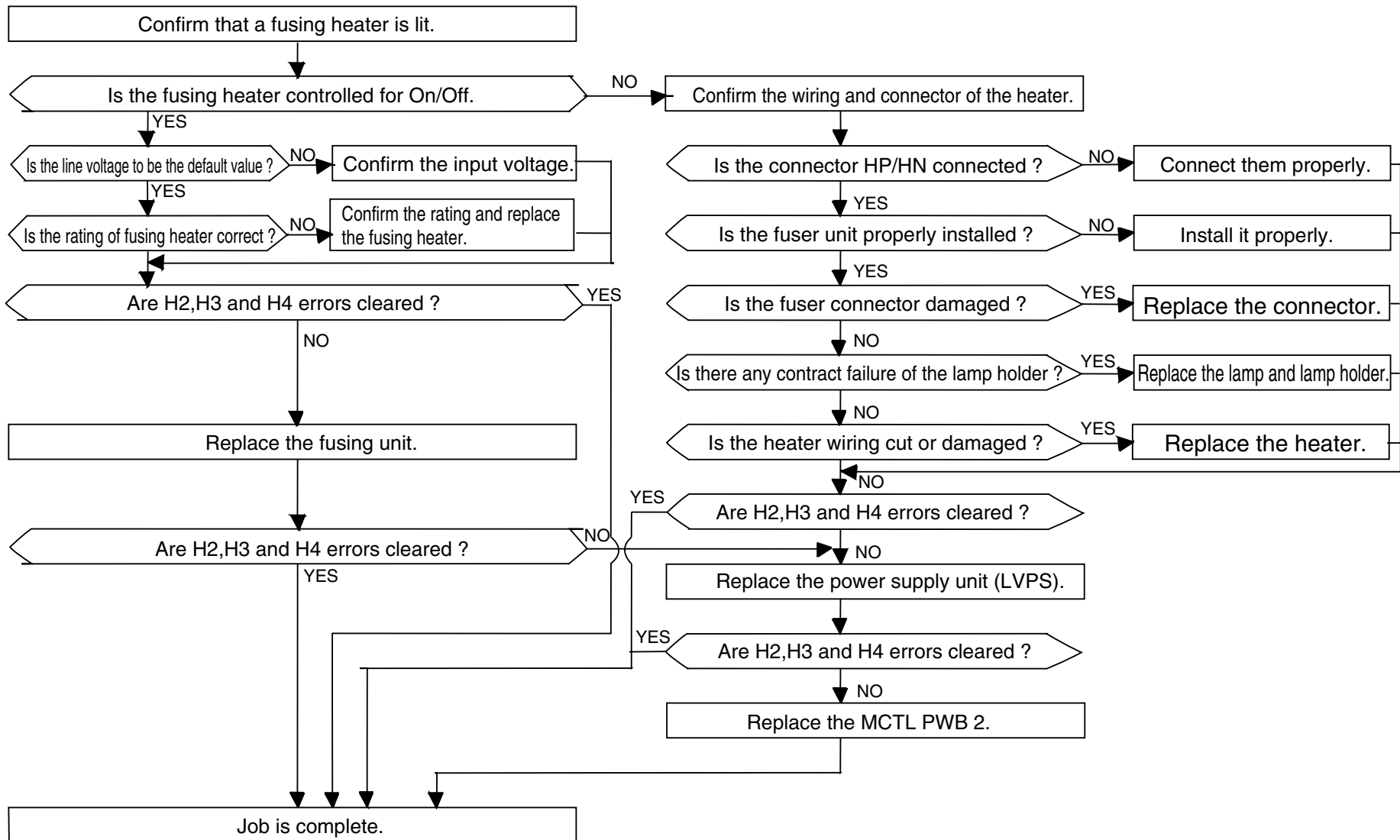
Error Code	F5
Concerned Part	High Voltage Unit (HVU)

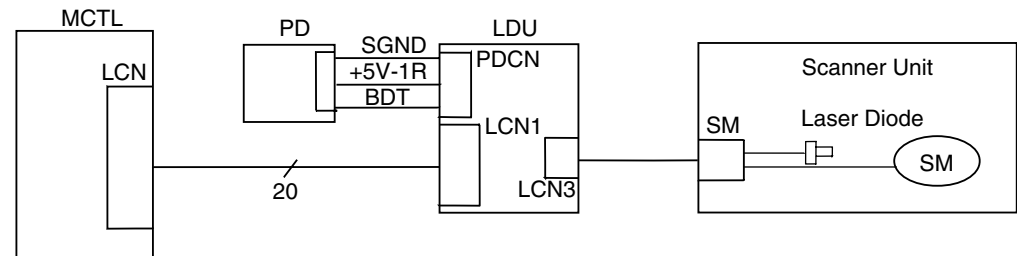
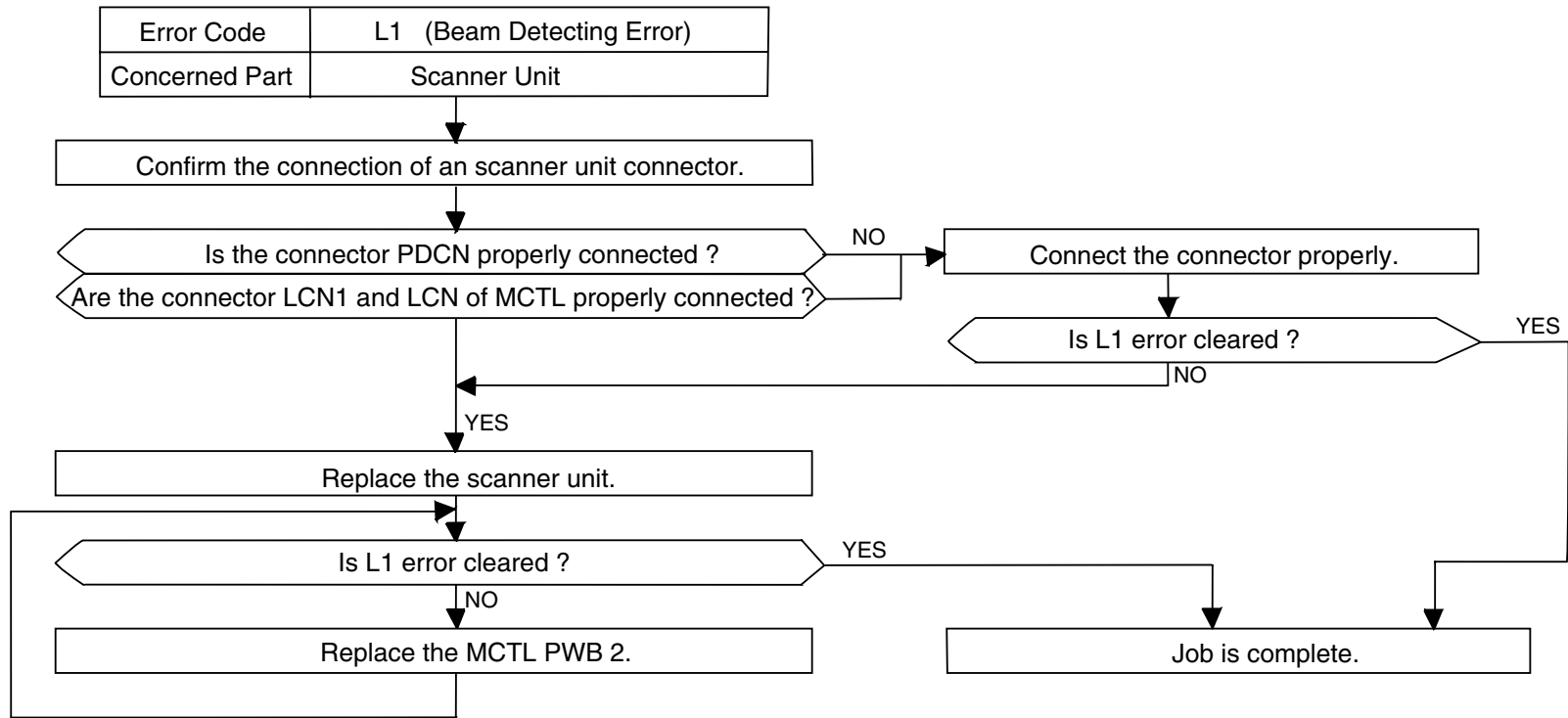


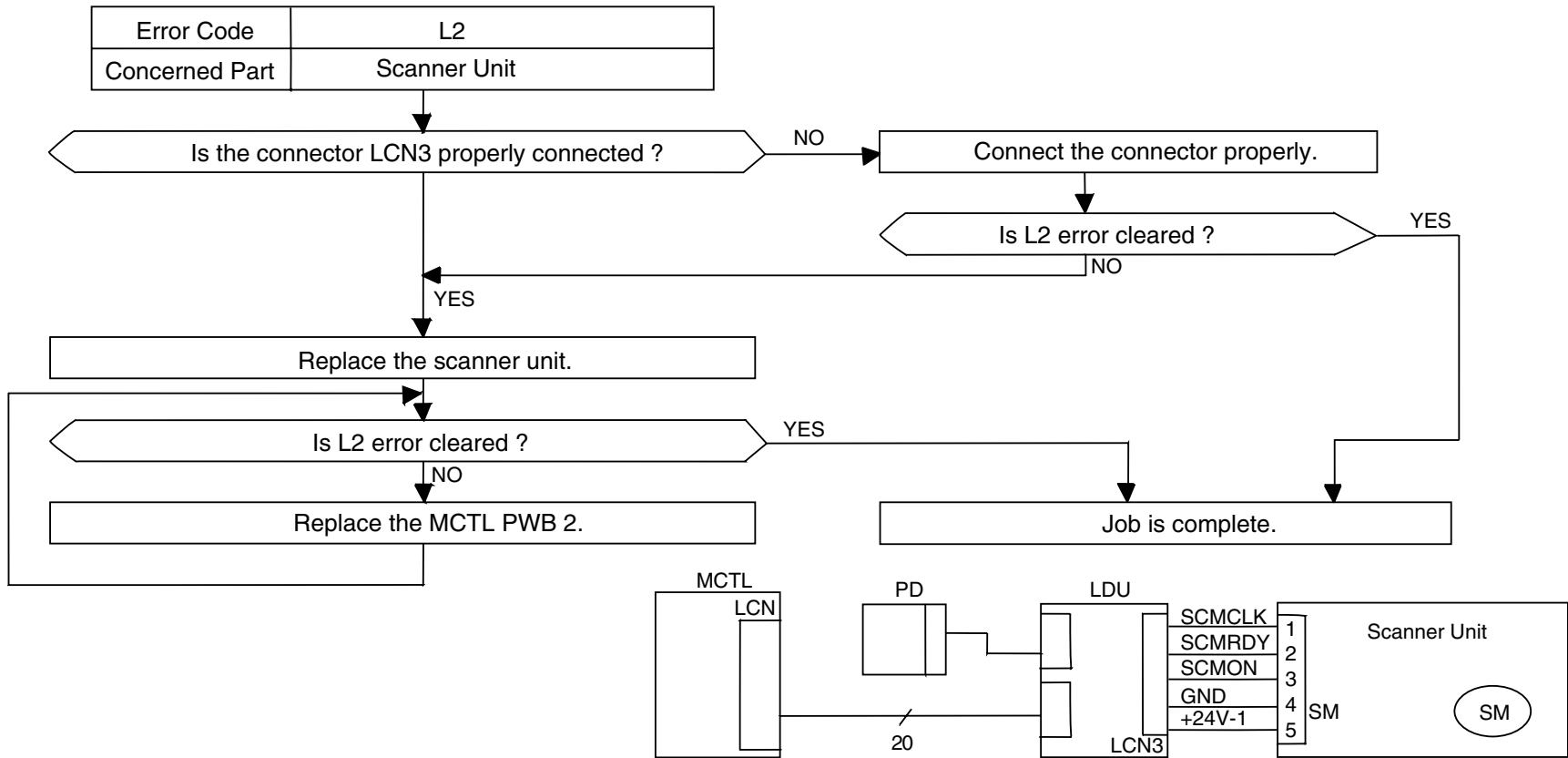
Error Code	H0 (wire cut/ short error of thermistor)
Concerned Part	Fusing Unit

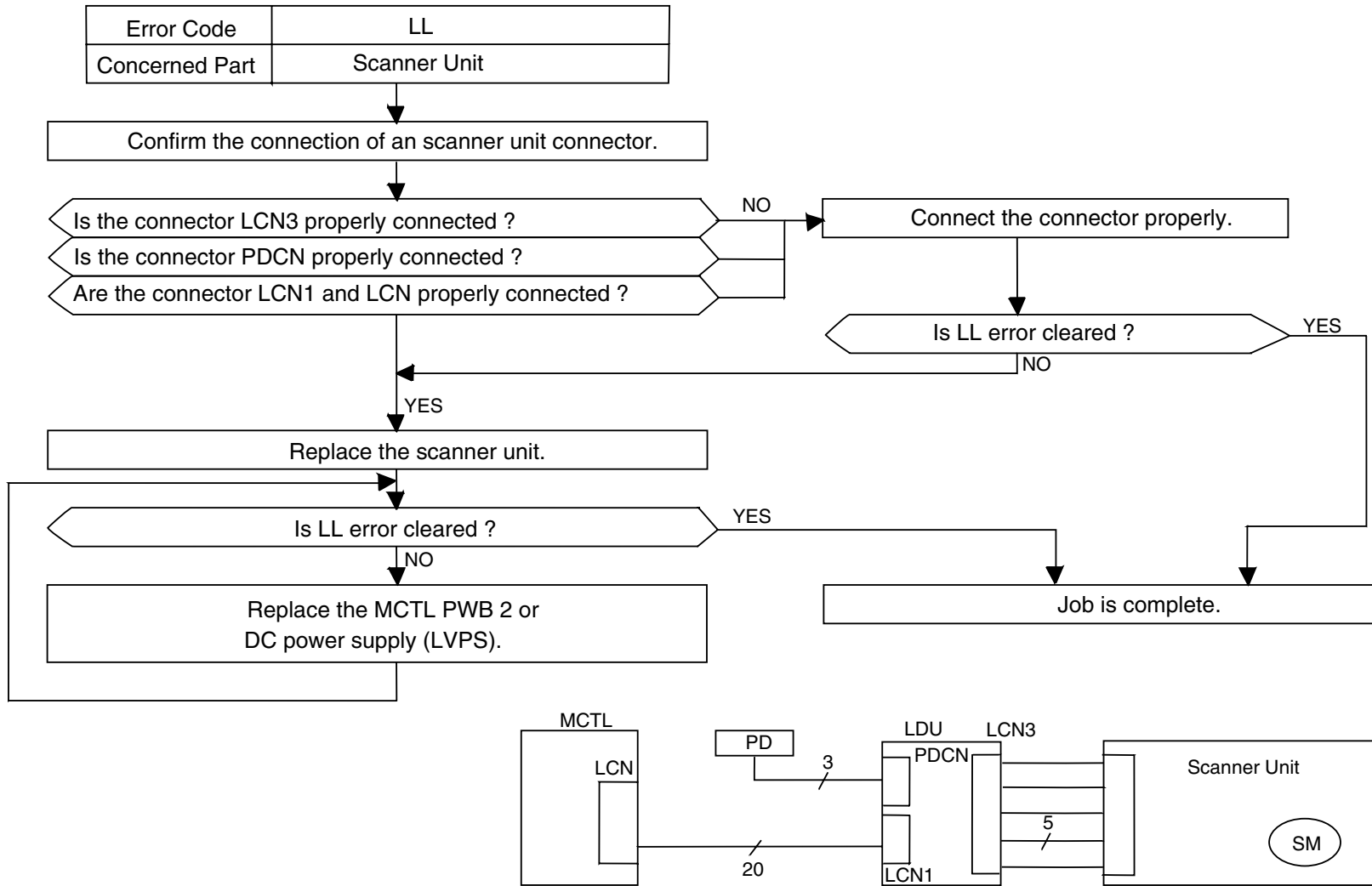


Error Code	H2,H3,H4
Concerned Part	Fusing Unit and Others



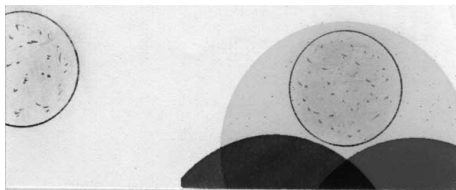




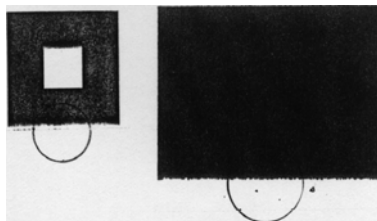


5. IMAGE FAILURE

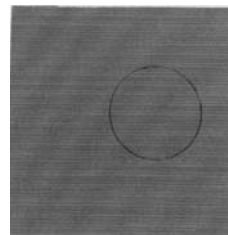
(1)



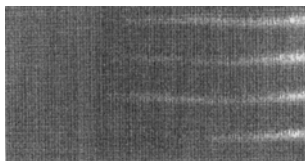
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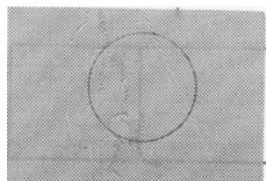
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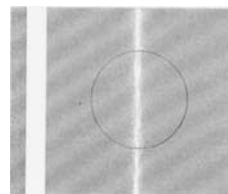
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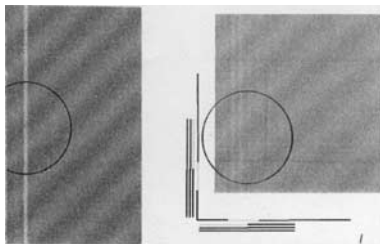
(5)



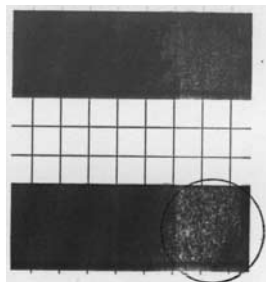
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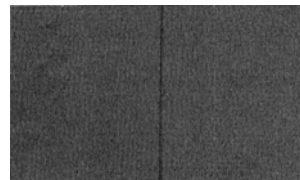
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(8)



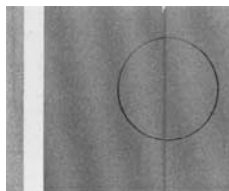
(9)-a



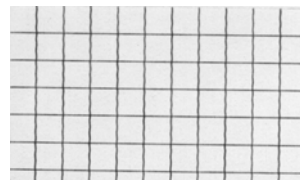
(9)-b



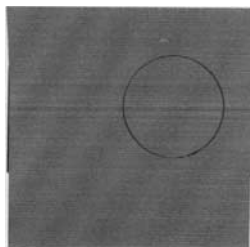
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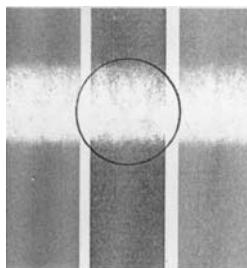
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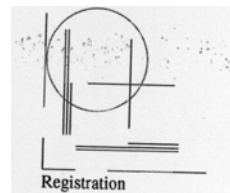
(12)



(13)



(14)



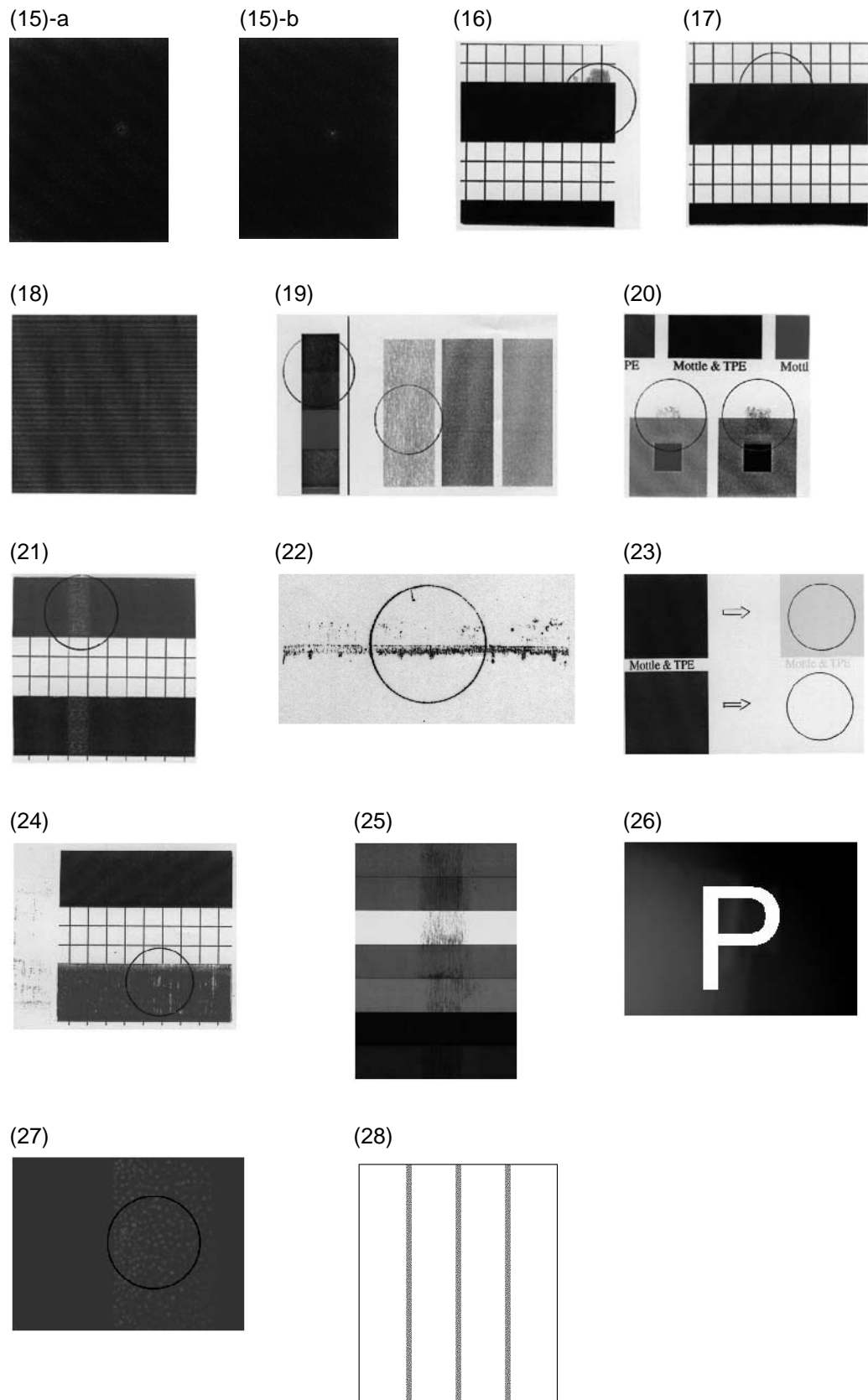


Fig.8-2

I-1	Background
-----	------------

Phenomenon

Background is smeared due to toner spread as shown in [print sample \(1\) of Fig.8-2](#).

Main Causes

- 1) Too small toner mass and charging level in the developing process.
- 2) Poor contact of the developer roller's bias pole.
- 3) Life expired or failure of the OPC belt cartridge.
- 4) Failure of the high voltage power supply unit (HVU).

Countermeasures

- 1) Replace the toner cartridge. (See [Section 3.3 of Chapter III](#).)
- 2) Confirm if the developer bias pole is deformed or not.
- 3) Replace the OPC belt cartridge. (See [Section 2.1 of Chapter VI](#).)
- 4) Replace the high voltage unit (HVU).

I-2	Missing Image at Edge
-----	-----------------------

Phenomenon

There is missing or peeling toner found in the image at the edge as shown in the [print sample \(2\) of Fig.8-2](#).

Main Causes

- 1) Too small toner mass and charging level in the developing process.
- 2) The OPC belt is deformed (waving).

Countermeasures

- 1) Replace the toner cartridge with a new one.
- 2) Replace the OPC belt cartridge with a new one.

I-3	Jitter
-----	--------

Phenomenon

Uneven optical density appears periodically in the horizontal direction on the printed image as shown in [print sample \(3\) of Fig.8-2](#).

Main Causes

Failure of main motor.

- 1) Irregular rotation of the drive motor.
- 2) Failure of the gears.
- 3) Variation of OPC belt running speed due to above reasons.
- 4) Too much rotational load of the OPC belt.

Countermeasures

- 1) Replace the main motor with a new one. (See [Section 4.2.8 of Chapter VII](#).)
- 2) Replace the OPC belt cartridge with a new one. (See [Section 2.1 of Chapter VI](#).)

I-4	Ribbing
-----	---------

Phenomenon

Light print occurs on the right or left hand side of the image as shown in [print sample \(4\) of Fig.8-2](#).

Main Causes

- 1) Slight tilt on the surface of printer installation table.
(Tilt should be less than 1°.)
- 2) Toner amount in the toner cartridge is insufficient.
(The amount in a full cartridge should be 175g for Y, M, & C and 275g for K.)
- 3) Toner cartridge is not laid as level, and as the result, toner concentrates to one side.

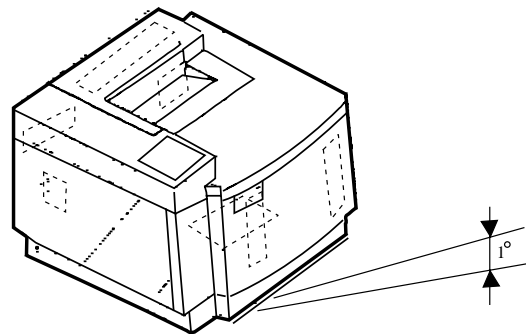


Fig.8-3

Countermeasures

- 1) Confirm that the printer installation table is flat and level.
- 2) Replace the toner cartridge with a new one.
- 3) Shake the toner cartridge horizontally for several times to remedy the concentration.

I-5	Wrinkle / Image Migration
-----	---------------------------

Phenomenon

Banding shadows of different optical density appear due to wrinkle, image migration and color misregistration occurring on the print paper as shown in [print sample \(5\) of Fig.8-2](#).

Main Causes

- 1) Print paper other than the recommended paper is being used.
- 2) The paper discharger unit of the transfer unit 2 is not functioning.
- 3) One side of the fusing unit is lifted up slightly.
- 4) Fusing unit reaches to the end of life.

Countermeasures

- 1) Use a recommended paper.
- 2) Confirm if the transfer unit 2 is properly installed to the paper discharger unit and functioning normally.
 - 2-1) Confirm the installation status.
 - 2-2) Clean the paper discharger unit, or replace it with a new one. (See [Section 1.2.3 and 2.4 of Chapter VI](#).)
- 3) Refit the fusing unit correctly and lock it in position or replace the fusing unit with a new one. (See [Section 2.2 of Chapter VI](#).)
- 4) Replace the fusing unit with a new unit.

Phenomenon

Vertical white line appears in the specific color area when test-printed in the four color mode (Stripe Mode), as shown in [print sample \(6\) of Fig.8-2](#).

Main Causes

- 1) Foreign particles adhering to the following places around the developer roller. (Refer to Fig.8-8.)
 - Between the cartridge cover and developer roller (a)
 - On the surface of the developer roller (b)
 - Between the blade fixing plate and the developer roller (c)
 - Between the blade and the developer roller (d)
- 2) Foreign particles adhering to the toner cartridge's main blade of the color in question.

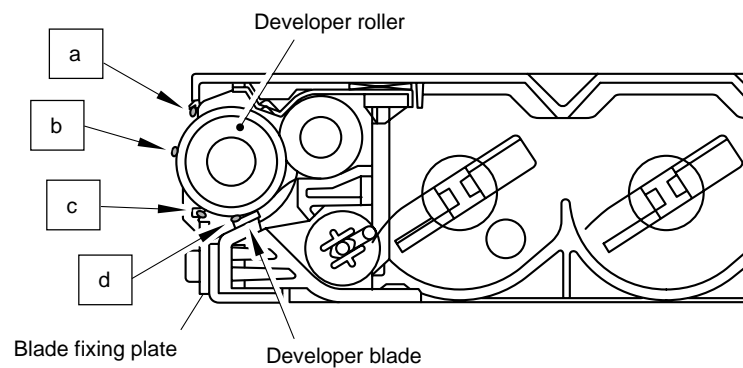


Fig.8-4

Countermeasures

- 1) Implement the test print.
- 2) Confirm the color of the toner cartridge in question that has caused the white line.
- 3) Remove the foreign particles adhering to the developer roller.

If foreign particles adhere to (d) of Fig.8-8, remove them referring to one of the figures below.

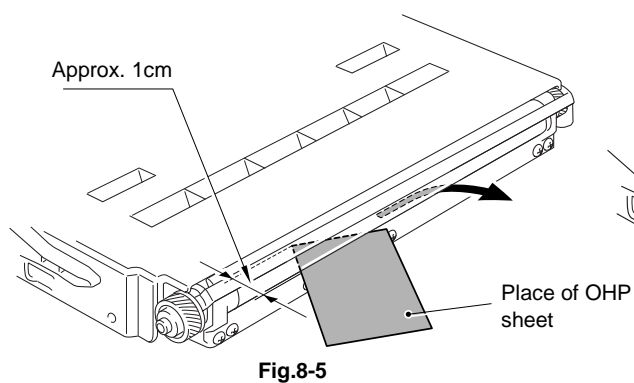


Fig.8-5

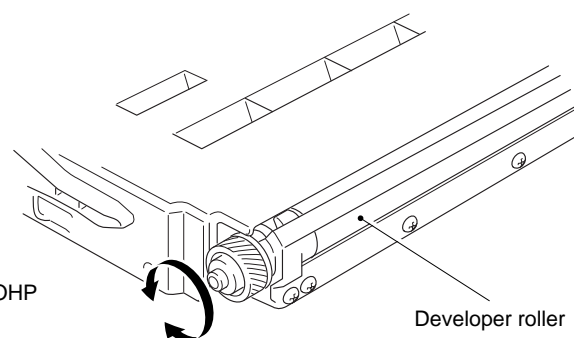


Fig.8-6

I-7	White Line (2)
-----	----------------

Phenomenon

Vertical white line appears from the leading edge to the trailing edge of the printed image as shown in [print sample \(7\) of Fig.8-2](#).

Main Causes

The dustproof glass of the optical unit 2 is smeared with toner or foreign particles.

Countermeasures

Clean the dustproof glass.

- 1) Remove the OPC belt cartridge and toner cartridges. (See [Section 2.1 of Chapter VI](#).)
- 2) Remove the dustproof glass from the optical unit 2.
- 3) Clean the dustproof glass. (See [Section 1.2.5 of Chapter VI](#).)

I-8	Vertical White Band
-----	---------------------

Phenomenon

White band appears in the vertical direction of printed image as shown in [print sample \(8\) of Fig.8-2](#).

Main Causes

Silicone oil adhering to the transfer drum 2.

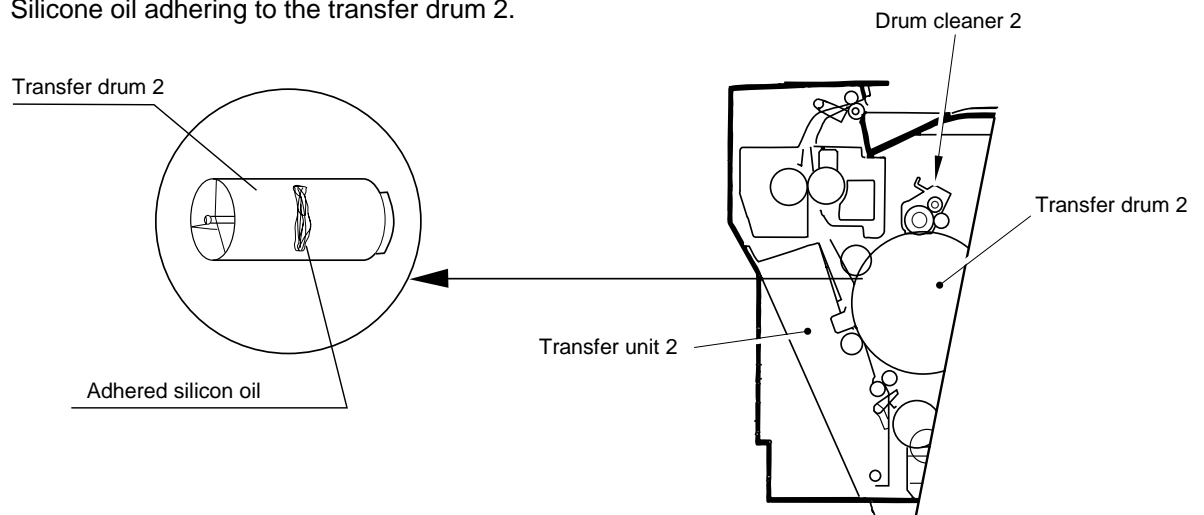


Fig.8-7

Countermeasures

- 1) Wipe off the oil adhering to the transfer unit 2 and its perimeter.
- 2) Replace the transfer drum 2 with a new one. (See [Section 2.8 of Chapter VI](#).)
- 3) If the oil adhesion is excessive, replace the OPC belt cartridge and drum cleaner 2 with new ones. (See [Section 2.1 and 2.5 of Chapter VI](#).)

I-9	Black Line / Blur in the Image
-----	--------------------------------

Phenomenon

Fine black line or blur appears in the printed image as shown in [print sample \(9\) of Fig.8-2](#).

Main Causes

- 1) The corona wire of the charger unit is dirty.
- 2) OPC belt surface is damaged.
- 3) Foreign particles (paper dust, etc.) are stuck between the cleaning blade and OPC belt.
- 4) Debris adhering to the base of the toner cartridge's developer roller where it contacts with the OPC belt.

Countermeasures

- 1) Remove the OPC belt cartridge.
 - 1-1) Clean the charger unit (corona wire). (See [Section 1.2.3 of Chapter VI](#).)
 - 1-2) Replace the OPC belt cartridge with a new one. (See [Section 2.1 of Chapter VI](#).)
- 2) Clean the surface of the developer roller.

I-10	Vertical Line
------	---------------

Phenomenon

Vertical line appears in the printed image as shown in [print sample \(10\) of Fig.8-2](#).

Main Causes

- 1) Foreign particles (dust, etc.) adhering to the parts located around the transfer drum 2, and consequently in contact with the toner image on the transfer drum 2.

Countermeasures

- 1) Clean the paper discharger unit. (See [Section 1.2.3 of Chapter VI](#).)
- 2) Clean the charger unit (corona wire) of the OPC belt cartridge. (See [Section 1.2.4 of Chapter VI](#).)
- 3) Remove the drum cleaner 2, and then, clean the inside and outside of waste toner feeder.
- 4) Clean the separator pawl.

I-11	Vertically Staggered Image
------	----------------------------

Phenomenon

Printed image staggered in the vertical direction as shown in [print sample \(11\) of Fig.8-2](#).

Main Causes

- 1) Shock or vibration applied to the printer.
- 2) Failure of the optical unit 2; Vibration from rotation of the scanner motor.

Countermeasures

- 1) Do not apply shock or vibration to the printer body.
- 2) Installation location should be appropriate with no possibility of shock or vibration.
- 3) Replace the optical unit 2 with a new one. (See [Section 4.5.1 of Chapter VII](#).)

I-12	Banding
------	---------

Phenomenon

Banding line appears in the horizontal direction as shown in [print sample \(12\) of Fig.8-2](#).

Main Causes

This is a transfer failure due to the shock caused when the OPC belt seam passes over the cleaning blade.

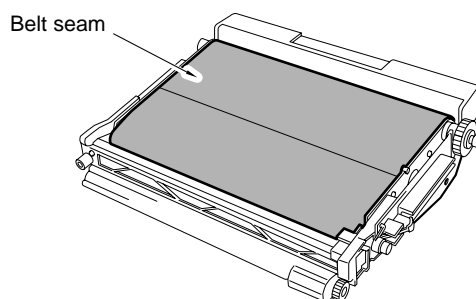


Fig.8-8

Countermeasures

Replace the OPC belt cartridge with a new one. (See [Section 2.1 of Chapter VI](#).)

I-13	White Band
------	------------

Phenomenon

White banding line appears in the horizontal direction, and consequently causes a missing image as shown in [print sample \(13\) of Fig.8-2](#).

Main Causes

- 1) Installation failure of the transfer unit 2, and deformation of the transfer roller 2.
- 2) Contact failure of the transfer roller 2 bias pole.
- 3) Transfer solenoid failure.

Countermeasures

- 1) Confirm if the transfer unit 2 is properly locked in position and that both ends of the transfer unit 2 are held by the hooks.
- 2) Confirm if the transfer unit 2 is properly installed or not.
- 3) Replace the TR cam clutch 3 with a new one. (See [Section 4.2.6 of Chapter VII](#).)
- 4) Replace the transfer unit 2 with a new one. (See [Section 4.6.1 of Chapter VII](#).)

Phenomenon

Toner spot stain is caused on the print by toner dropping within the printer engine as shown in [print sample \(14\) of Fig.8-2](#).

Main Causes

- 1) Toner drops onto the transfer drum 2 due to the breakdown of the waste toner feeder.
 - 1-1) Mylar of the waste toner feeder is deformed.
 - 1-2) Waste toner is not properly collected by the waste toner feeder.

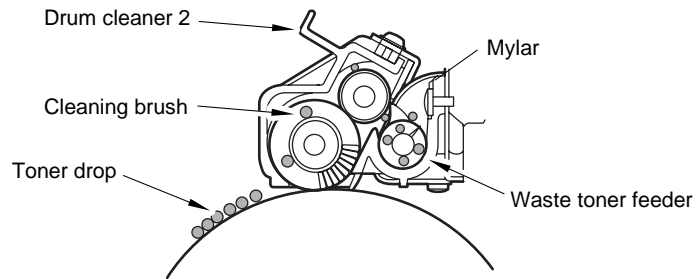


Fig.8-9

- 2) Toner adhering to the developer roller drops on the OPC belt .

Countermeasures

- 1) Check the cleaning brush and waste toner feeder.
 - 1-1) Clean the perimeter of the cleaning brush installation location.
 - 1-2) Check if the seal is deformed or damage. If there is any deformation or damage, replace the waste toner feeder with a new one.
 - 1-3) Check if waste toner is stuck in the printer engine. Remove the waste toner with a vacuum cleaner designed to manage toner.
- 2) Remove the toner cartridge.
 - 2-1) Clean the surface of the developer roller.
 - 2-2) Replace the toner cartridge with a new one.

I-15	White Spot / Black Spot
------	-------------------------

Phenomenon

White spots and black spots appear on the print as shown in [print sample \(15\) of Fig.8-2](#).

Main Causes

- 1) Foreign particles adhering to the OPC belt or transfer drum 2.
- 2) The OPC belt or transfer drum 2 is damaged.
- 3) Foreign particles mixed in the toner.
- 4) Foreign particles adhering to the transfer roller 2, or local deformation of the transfer roller 2.

Countermeasures

- 1) Remove the OPC belt cartridge.
 - 1-1) Lightly wipe off the foreign particles adhering to the OPC belt using a cotton cloth.
 - 1-2) Replace the damaged OPC belt cartridge with a new one. (See [Section 2.1 of Chapter VI](#).)
- 2) Open the transfer unit 2, and check the transfer drum 2.
 - 2-1) Lightly wipe off the foreign particles adhering to the transfer drum 2 using a cotton cloth.
 - 2-2) Replace the damaged transfer drum 2 with a new one. (See [Section 4.1.12 of Chapter VII](#).)
- 3) Remove the toner cartridge.
 - 3-1) Clean the surface of the developer roller.
 - 3-2) Replace the toner cartridge with a new one.
- 4) Replace the transfer unit 2 with a new one. (See [Section 4.6.1 of Chapter VII](#).)

I-16	Mixed Color Image
------	-------------------

Phenomenon

Mixed color image appears in the print as shown in [print sample \(16\) of Fig.8-2](#).

Main Causes

- 1) Failure of toner cartridge: Blade pressure of the developer roller is incorrect or the blade is deformed.
- 2) Restitution error of toner cartridge.

Countermeasures

- 1) Confirm the toner cartridge can be inserted smoothly.
- 2) Replace the toner cartridge with a new one.
- 3) Reconfirm that the front cover unit is locked.

I-17	Color Misregistration
------	-----------------------

Phenomenon

Color misregistration is caused between two colors as shown in [print sample \(17\) of Fig.8-2](#).

Main Causes

- 1) The OPC belt cartridge is not properly installed.
 - 2) The OPC belt cartridge is deformed.
 - 3) The cleaning brush of the drum cleaner 2 is unstable in operation.
 - 4) Rotational load on the OPC belt cartridge is excessive.
- ** This problem might occur in the first page printed in color mode immediately after printing in monochrome mode, or the first page immediately after turning on the printer.

Countermeasures

- 1) Reset the OPC belt cartridge properly.
- 2) Replace the OPC belt cartridge with a new one. (See [Section 2.1 of Chapter VI](#).)
- 3) Replace the drum cleaner 2 with a new one.

I-18	Toner Streak
------	--------------

Phenomenon

Brush mark line of uneven scanning density is caused in the image as shown in [print sample \(18\) of Fig.8-2](#).

Main Causes

- 1) Main blade of the developer unit and the reset roller is not normal.
- 2) Location of the toner cartridge is not correct.
- 3) Transport paddle in the toner cartridge is deformed.
- 4) Brush mark line appears in the continuous printing of high coverage (solid) patterns.

Countermeasures

- 1) Replace the toner cartridge with a new one.
- 2) Temporarily suspending the printing, agitate the toner cartridge and stabilize the replenishment of toner.

I-19	Mottle
------	--------

Phenomenon

Variation of the scanning density is found in the image as shown in [print sample \(19\) of Fig.8-2](#).

Main Causes

- 1) The transfer unit 2 is not fixed in place.
- 2) Assembly of the transfer roller 2 is inaccurate.
- 3) THV output of high voltage unit is not normal.
- 4) Failure of the toner cartridge.
- 5) Deformation of the print paper.

Countermeasures

- 1) Confirm that the transfer unit 2 is firmly locked in place.
- 2) Confirm that the transfer roller 2 is properly installed.
- 3) Replace the high voltage unit with a new one. (See [Section 4.3.6 of Chapter VII](#).)
- 4) Replace the toner cartridge with a new one.
- 5) Replace the paper with new paper from a freshly opened ream.

I-20	Residual Image
------	----------------

Phenomenon

Image of the preceding page appears on every other page as shown in [print sample \(20\) of Fig.8-2](#).

Main Causes

- 1) Cleaning failure due to lifting of the cleaning brush of the drum cleaner 2.
- 2) Contact failure of the drum cleaner 's bias pole.
- 3) Failure of high voltage unit.

Countermeasures

- 1) Check if the drum cleaner 2 is properly installed or not.
- 2) Replace the failed high voltage unit with a new one. (See [Section 4.3.6 of Chapter VII](#).)

I-21	Insufficient Gloss
------	--------------------

Phenomenon

Gloss of the print is not sufficient as shown in [print sample \(21\) of Fig.8-2](#).

Main Causes

- 1) The fuser cleaner is stained.
- 2) The fusing roller 2 is deteriorated.

Countermeasures

- 1) Replace the fuser cleaner with a new one. (See [Section 3.1 of Chapter III](#).)
- 2) Replace the fusing unit with a new one. (See [Section 2.2 of Chapter VI](#).)

Note:

When replacing the fusing unit, wait approximately for 30 minutes after the new unit is installed to allow the fusing oil to circulate in the new fusing unit.

I-22	Back Stain
------	------------

Phenomenon

Back side of the print paper is stained as shown in [print sample \(22\) of Fig.8-2](#).

Main Causes

Fusing unit:

- 1) The cleaning pad of the fuser cleaner is stained.
- 2) Silicone oil in the oil bottle is short.
- 3) The fusing roller 2 and back-up roller are dirty.

Countermeasures

- 1) Replace the fuser cleaner with a new one. (See [Section 3.1 of Chapter III](#).)
- 2) Clean the fusing roller 2 and back-up roller.
- 3) Replace the fusing unit with a new one. (See [Section 2.2 of Chapter VI](#).)

I-23	White Print
------	-------------

Phenomenon

A blank page (no print at all) is output or a specific color is missing (not printed) as shown in [print sample \(23\) of Fig.8-2](#).

Main Causes

- 1) Laser light path is blocked by paper or other material stuck at the opening of the optical unit 2.
- 2) The transfer solenoid is broken (not functioning).
- 3) There is no belt bias voltage (CBV).
- 4) There is no output from the high voltage unit (HVU) due to breakdown.

Countermeasures

- 1) Confirm that there are no foreign objects stuck in the opening of the optical unit 2.
- 2) Replace the TR cam clutch 3 with a new one. (See [Section 4.1.14 of Chapter VII](#).)
- 3) Replace the OPC belt cartridge with a new one. (See [Section 2.1 of Chapter VI](#).)
- 4) Replace the high voltage unit with a new one. (See [Section 4.3.6 of Chapter VII](#).)

I-24	Insufficient Fusing
------	---------------------

Phenomenon

Printed image is partially missing as shown in [print sample \(24\) of Fig.8-2](#). This proves that the fusing is insufficient.

Main Causes

- 1) Wrong selection of print media (label or envelope, etc.) at the Host (driver) side.
- 2) Recommended paper is not being used.
- 3) Double-feed paper.
- 4) Failure of the fusing unit.

Countermeasures

- 1) Adjust the mode of Host side to suit the print media in use.
- 2) Use the recommended paper.
- 3) Fan the paper before loading in the media cassette.
- 4) Replace the failed fusing unit with a new one. (See [Section 2.2 of Chapter VI](#).)

I-25	Vertical Smear
------	----------------

Phenomenon

Printed image is smeared vertically as shown in [print sample \(25\) of Fig.8-2](#).

Main Causes

- 1) Paper dust between the cleaning blade and OPC belt.
- 2) Debris adhering to the base of a toner cartridge's developer roller where it contacts with the OPC belt.

Countermeasures

- 1) Remove paper dust between the cleaning blade and OPC belt referring to the figure below.

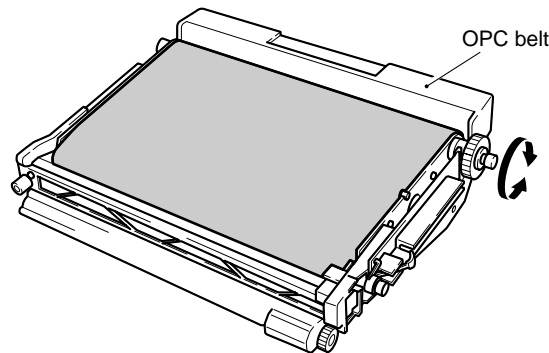


Fig.8-10

- 2) Replace the OPC belt cartridge with a new one.

I-26	Black Toner Light
------	-------------------

Phenomenon

Black color of printed image is light as shown in [print sample \(26\) of Fig.8-2](#), and the printer clatters at the same time.

Main Causes

Black toner in the cartridge has solidified because the printer is used under high temperature circumstance or due to continuous printing.

Countermeasures

Replace the black toner cartridge with a new one.

I-27	Color Missing
------	---------------

Phenomenon

Color is missing in the printed image as shown in [print sample \(27\) of Fig.8-2](#).

Main Causes

Fusing failure due to using damp paper or using the printer under high humidity conditions.

Countermeasures

- 1) Use the paper immediately after open the paper bag.
- 2) Change the NVRAM setting. (Refer to 'THV TUNE UP' in [Section 3.4.2 of Chapter V](#).)

I-28	Vertical Lines on OHP
------	-----------------------

Phenomenon

Vertical lines appear when printing the OHP sheet as shown in [print sample \(29\) of Fig.8-2](#).

Main Causes

Paper dust around the paper exit roller adhering to the OHP sheet.

Countermeasures

- 1) Use the recommended OHP sheet.
- 2) Clean the paper exit roller.

APPENDIX A

1. SERIAL NO. DESCRIPTIONS

The descriptions as below shows how to read labels on each place.

< ID for production month of Printer >

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

< ID for production month of other parts than the printer >

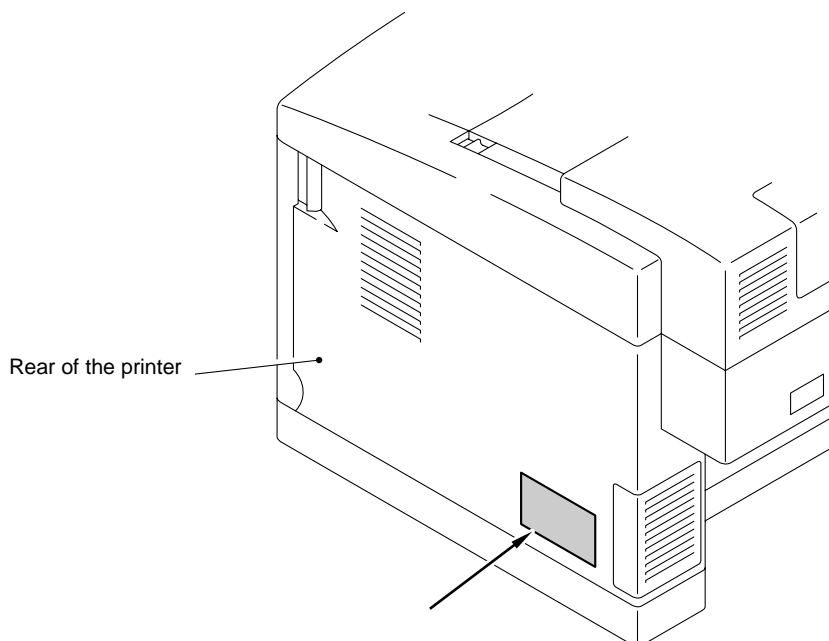
1:	January	5:	May	9:	September
2:	February	6:	June	X:	October
3:	March	7:	July	Y:	November
4:	April	8:	August	Z:	December

(1) Printer

U 6 0 1 5 7 L 1 S 1 1 1 1 0 1

(120V) |
MODEL NO. |
YEAR MONTH |
FACTORY NO. |
SERIAL NO.

<Location>



(2) Toner Cartridge

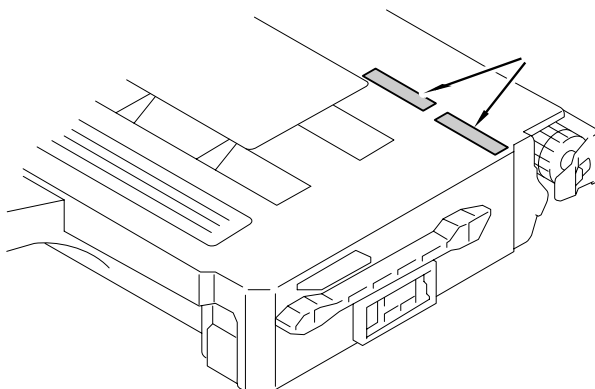
BR 1 2 2 1 1 XXXXXXX

<Location>

Toner
Production
year

Toner
cartridge
production
date

SERIAL NO.



NOTE: There are two seals on each toner cartridge. On the starter toner, there is a “S” written at the beginning of the first seal. Toner cartridges of accessories have “BR” written as the above.

(3) OPC Belt Cartridge

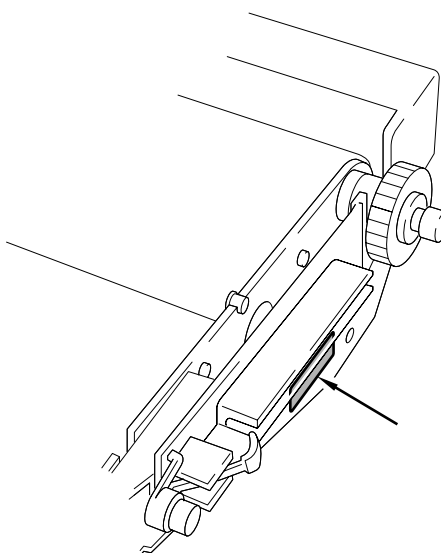
1 2 XXXXX

YEAR

MONTH

SERIAL NO.

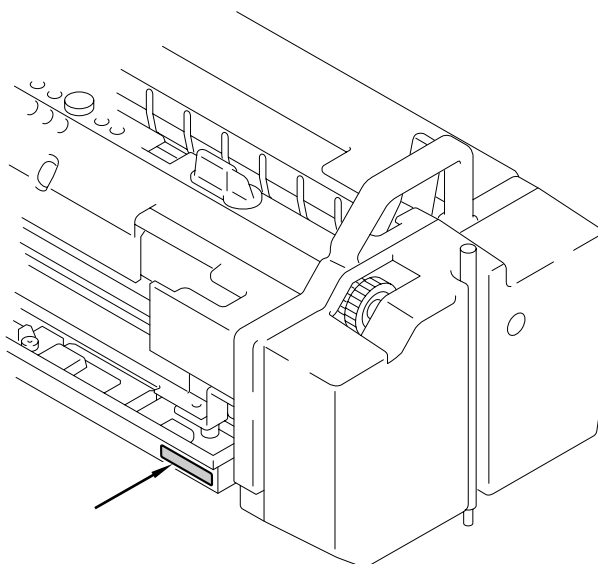
<Location>



(4) Fusing Unit

XXXX 7 1 2 3 A — REV.(-, A - Z)
DATA
MONTH
YEAR
VOLTAGE (100V, 120V, 240V)

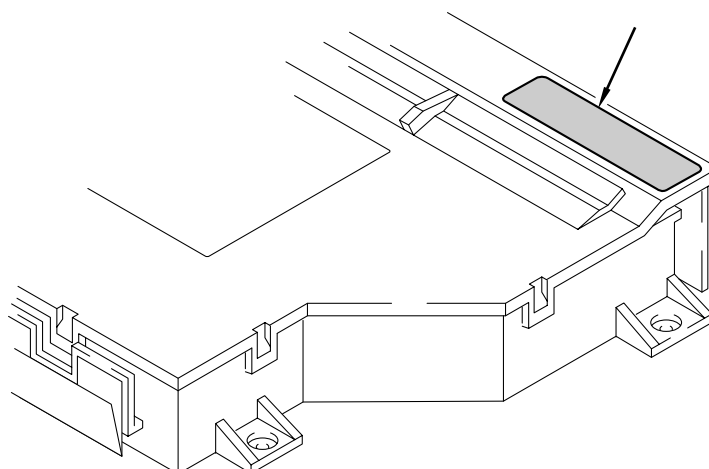
<Location>



(5) Scanner Unit

7 1 2 3 A — REV.(-, A - Z)
DATE
MONTH
YEAR

<Location>

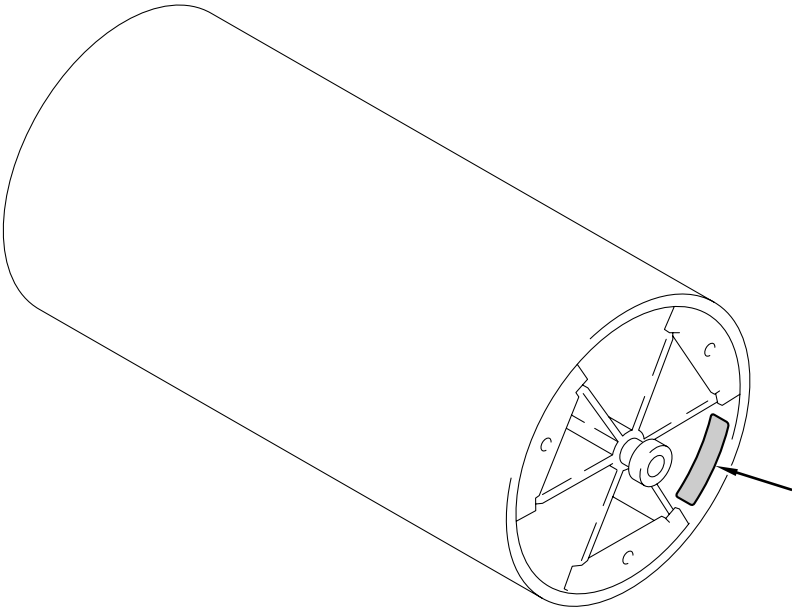


(6) Transfer Drum (Hand-writing)

XXXXXX - 7 1 2 3

SERIAL NO. YEAR MONTH DATE

<Location>



2. DIAMETER / CIRCUMFERENCE OF ROLLERS

The diameter or circumference of each roller is listed below;

No.	Parts Name	Diameter (Circumference)
1	OPC Belt	(380 mm)
2	Developer Roller	φ 18 mm (56.52 mm)
3	Transfer Roller	φ 20 mm (62.80 mm)
4	Paper Pick-up Roller	φ 40 mm (125.60 mm)
5	Transfer Drum	φ 121 mm (379.94 mm)
6	Back-up Roller	φ 50 mm (157.00 mm)
7	Fusing Roller	φ 50 mm (157.00 mm)
8	Drum cleaner 2	φ 25 mm (78.50 mm)
9	Cleaning Roller	φ 18 mm (56.52 mm)
10	Registration Roller	φ 13.5 mm (42.39 mm)
11	Paper Exit Roller	φ 16 mm (50.24 mm)

3. SHELF LIFE OF EACH CONSUMABLE

Each consumable follows has its own shelf life. Shelf life varies whether the package of consumable is unpacked or not.

Consumable	Before unpacking *1	After unpacking *2
Toner cartridge (all colors)	3 years	1 year
OPC belt cartridge	3 years	1 year
Fuser cleaner	N/A	N/A

Note:

**1: It means that the consumable life is 1 year if it is stored for 2 years.*

**2: Even though shelf life is one year after unpacking, the consumable life will be getting less than one year if it is stored more than 2 years before unpacking.*

4. CONSUMABLES REPLACEMENT

Each consumable follows should be replaced according its own life.

1) Toner Cartridge

Life: K = 12,000 pages, CYM = 7,200 pages

Condition: Above figures are based on 5% coverage. Life is detected by the toner empty sensor.

Note:

Life of the starter toner cartridge is half of the above figures.

2) Oil Bottle

Life: 12,000 pages

Condition: Life is detected by the oil empty sensor.

3) Waste Toner Pack

Life: 18,000 images

Condition: Above figure is based on 5% coverage. Life is detected by the waste toner sensor.

4) 120K Kit

Life: 120,000 pages

Condition: None

5) OPC Belt Cartridge

Life: 60,000 images

Condition: Above figure varies depending on pages/job. Refer to the list below.

Pages per job	1 page	2 page	3 page	4 page	5 page	6 page	7 page	8 page	9 page
	24,000	30,000	35,000	39,000	43,000	46,000	49,000	51,000	53,000

Pages per job	10 page	11 page	12 page	13 page	14 page	15 page ~
	54,000	56,000	57,000	58,000	59,000	60,000

5) Cleaning Roller

Life: 12,000 pages

Condition: Above figure varies depending on coverage. Refer to the list below.

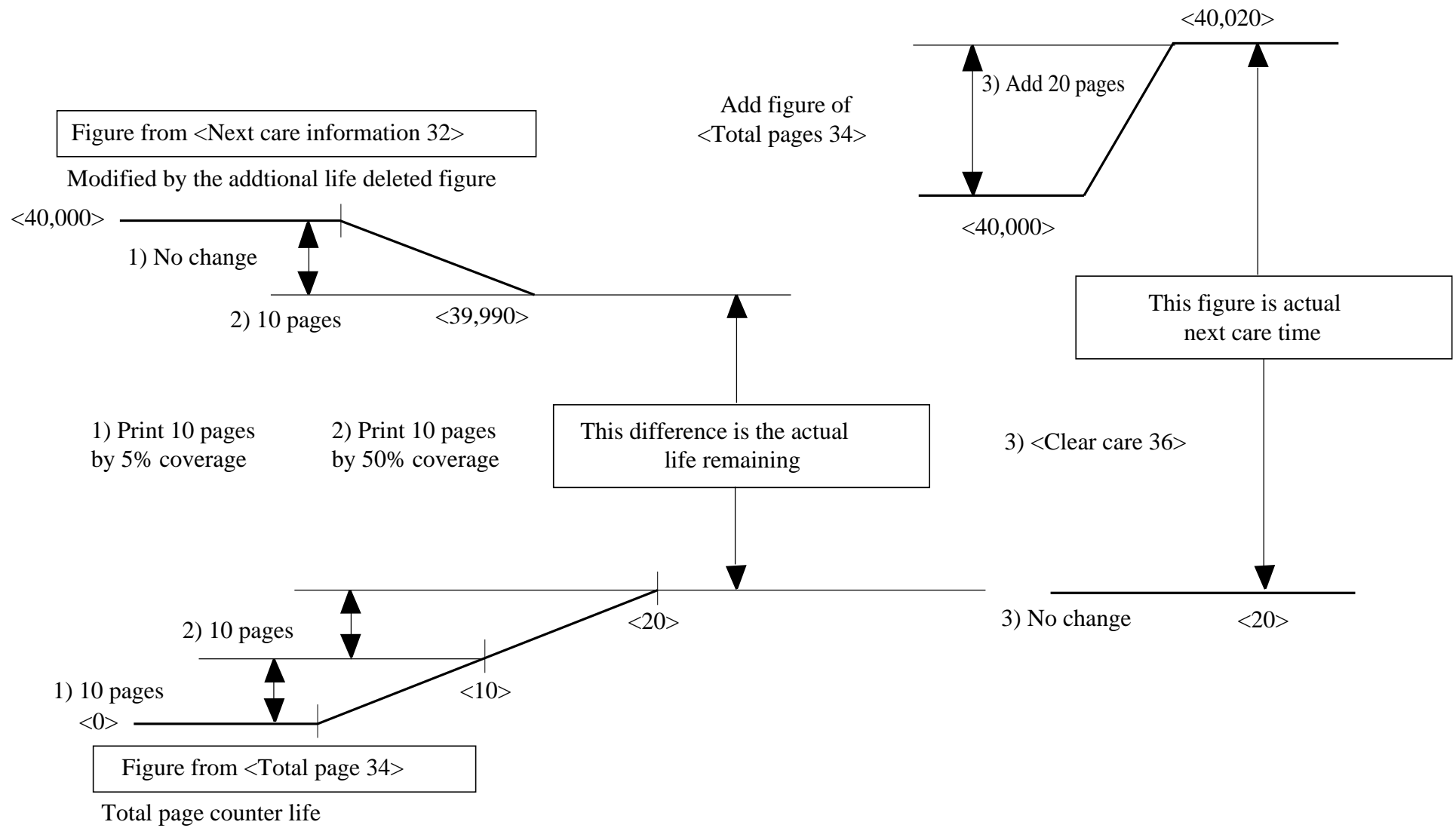
Coverage	~ 20%	20% ~ 40%	40% ~
Additional life deleted	0	1	2
Life (pages)	12,000	6,000	4,000

6) Fusing Unit

Life: 60,000 pages

Condition: Above figure varies depending on coverage. Refer to the list below.

Coverage	~ 12.5%	12.5% ~ 20%	20% ~ 40%	40% ~ 60%	60% ~
Additional life deleted	0	0.2	0.5	1	2
Life (pages)	60,000	50,000	40,000	30,000	20,000



5. HOW TO RE-ENTER ORIGINAL DATA TO THE MCTL PWB 2



CAUTION

Actions 1) and 2) MUST be carried out BEFORE the MCTL PWB 2 is removed or the NVRAM initialized otherwise ALL READINGS WILL BE LOST.

- 1) Go into the Engine Controller Mode. (Refer to Section 3 "ENGINE CONTROLLER MODE" of Chapter V.)
- 2) Before initializing the NV-RAM or replacing the MCTL PWB 2, record the following values;
 - i) Display **TOTAL PAGE** to record the value.
(i.e.) TOTAL PAGE (T) = 412P
 - ii) Display **EACH IMAGE** to record the values.
(i.e.) EACH IMAGE (IY)=348P
(IM)=353P
(IC)=365P
(IK)=439P
 - iii) Display **NEXT CARE** to record the values.
(i.e.) FC ROLL (NC2) = 12,050P
BL UNIT (NC7) = 49,135P
FU UNIT (NC8) = 39,684P
120K KIT (NC9) = 120,000P
 - iv) Display **LIFE PERIOD SET** of FACTORY MODE to record the values.
(i.e.) FC ROLL (LP2) = 12,000P
BL UNIT (LP7) = 50,000P
FU UNIT (LP8) = 60,100P
120K KIT (LP9) = 120,000P
- 3) When you have recorded all the values above, initialize the data in the NV-RAM on the MCTL PWB 2 or replace the MCTL PWB 2.

After initializing all the data in the NV-RAM on the MCTL PWB 2, or replacing the MCTL PWB 2, all the original counter values for the cleaning roller, OPC belt cartridge, fusing unit, and 120K kit should be re-entered as below;

The method used to correct the counters is to reset the page counter to a calculated TOTAL PAGE value and then to perform a CLEAR CARE for the item to reset the NEXT CARE for that item to the value recorded in 2) iii).

The basic formula used in these calculations is:-

$$\text{TOTAL PAGE} = \text{NEXT CARE} - \text{LIFE PERIOD}$$

Where this formula would result in a negative number, the LIFE PERIOD should be temporarily set to a lower value so that the result is a positive number and then this number and LIFE PERIOD used to perform the CLEAR CARE to reset the NEXT CARE counter.

- 4) Re-enter the FC ROLL (NC2) value as follows;
 - i) Enter the value of NC2 - LP2 into the TOTAL PAGE counter.
(i.e.) $NC2 - LP2 \Rightarrow 12,050P - 12,000P = 50$
Enter the value '50' in the TOTAL PAGE counter.
 - ii) Perform CLEAR CARE 2. (Refer to '36 CLEAR CARE' in page V-23 of Chapter V.)
 - iii) Check that the value of NEXT CARE is reset to the recorded value in 2) iii).
(i.e.) $NC2 = 12,050P$

- 5) Re-enter the BL UNIT (NC7) value as follows;
 - i) After calculating the values so that they work in the following formula
 $(IY + IM + IC + IK) = NC7 - LP7$,
 enter each value of LP7, IY, IM, IC, IK.
 (i.e.) $(IY + IM + IC + IK) = NC7 - LP7$
 $\Rightarrow (348 + 353 + 365 + 439) = 49,135 - 50,000$
 Since the above result is minus, reduce the value of LP7 is 40,000P in order to make the result plus, then enter it into the LIFE PERIOD SET counter in FACTORY MODE.
 The formula is as follows;
 $(IY + IM + IC + IK) = NC7 - LP7$
 $\Rightarrow (348 + 353 + 365 + 439) = 49,135 - 40,000$
 $\Rightarrow (348 + 353 + 365 + 439) = 9,135$
 Change the value of IK from 439 to 8,069 so that the formula works out.
 $(348 + 353 + 365 + 8,069) = 9,135$
 Then, enter each value for IY=348, IM=353, IC=365, and IK=8,069 in the EACH IMAGE SET counter in FACTORY MODE.
 - ii) Perform CLEAR CARE 7. (Refer to '36 CLEAR CARE' in page V-23 of Chapter V.)
 - iii) Check that the value of NEXT CARE is reset correctly.
(i.e.) $NC7 = 49,135P$
 - iv) Reset the LIFE PERIOD counter in FACTORY MODE to 50,000.

- 6) Re-enter the FU UNIT (NC8) value as follows;
 - i) Enter the value of NC8 - LP8 into the TOTAL PAGE counter.
(i.e.) $NC8 - LP8 = 39,684 - 60,100 = - 20,416$
 Since the above result is minus, reduce the value of LP8 is 30,000P in order to make the result plus, then enter it into the LIFE PERIOD SET counter in FACTORY MODE.
 The formula is as follows;
 $NC8 - LP8 = 39,684 - 30,000 = 9,684$
 Enter the value '9,684' in TOTAL PAGE.
 - ii) Perform CLEAR CARE 8. (Refer to '36 CLEAR CARE' in page V-23 of Chapter V.)

- iii) Check that the value of NEXT CARE is reset correctly.
(i.e.) $NC8 = 39,684P$
 - iv) Reset the LIFE PERIOD counter in FACTORY MODE to 60,100.
- 7) Re-enter the 120K KIT (NC9) value as follows;
 - i) Enter the value of NC9 - LP9 into the TOTAL PAGE counter.
(i.e.) $NC9 - LP9 = 120,000 - 120,000 = 0$
Enter the value '0' into the TOTAL PAGE counter.
 - ii) Perform CLEAR CARE 9. (Refer to '36 CLEAR CARE' in page V-23 of Chapter V.)
 - iii) Check that the value of NEXT CARE is reset correctly.
(i.e.) $NC9 = 120,000P$
- 8) Re-enter the original TOTAL PAGE (T) value in TOTAL PAGE SET in FACTORY MODE.
(i.e.) $T = 412P$
- 9) Re-enter the original EACH IMAGE (IY, IM, IC, IK) values in EACH IMAGE SET in FACTORY MODE.
(i.e.) $(IY)=348P, (IM)=353P, (IC)=365P, (IK)=439P$
- 10) Ensure that the values in the LIFE PERIOD SET counters in FACTORY MODE are correct.
(i.e.)
 - FC ROLL (LP2)=12,000P
 - BL UNIT (LP7)=50,000P
 - FU UNIT (LP8)=60,100P
 - 120K KIT (LP9)=120,000P
- 11) Completed.

6. RE-PACKING INSTRUCTIONS

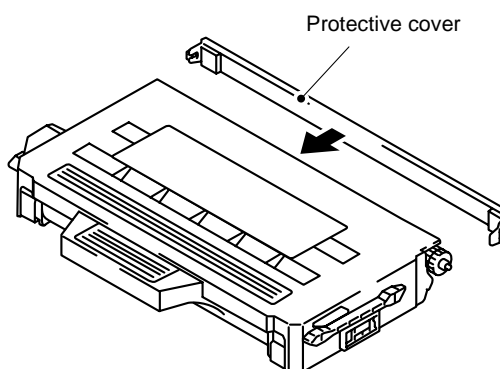


PRECAUTION

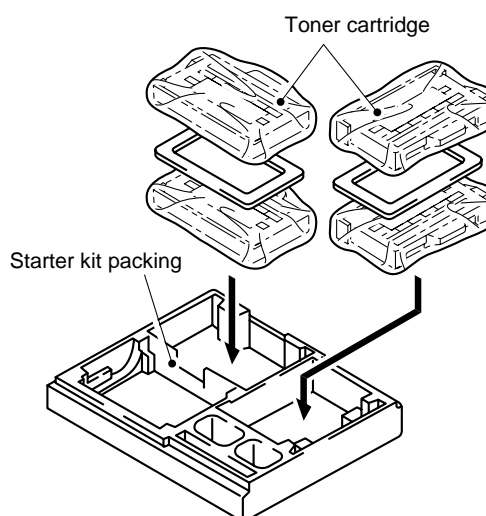
When re-packing the printer before shipping, be sure to follow the steps and cautions below. Failure to do so will cause toner or oil spill in the printer and severe damage to the printer.

6.1 Toner Cartridge

- 1) Open the front cover 2 and remove all the toner cartridges (K, Y, M, C) from the printer.
- 2) Put the original protective cover (orange) onto each cartridge and put it into the polyethylene bag.



- 3) Put the toner cartridges into the original starter kit packing.

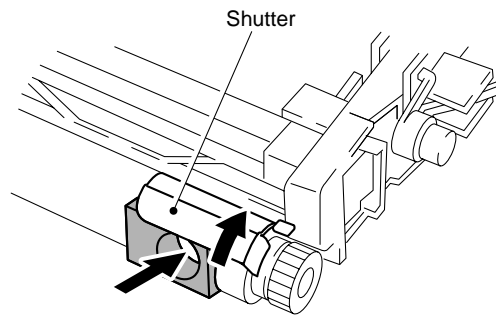


CAUTION

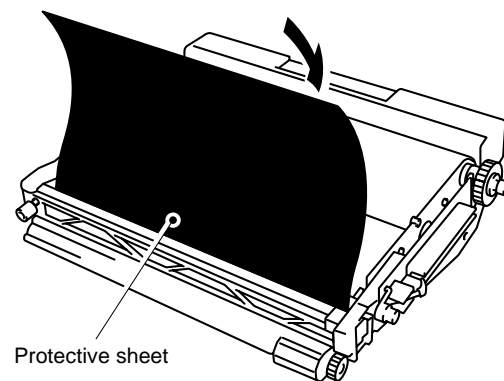
- *If you do not have the original protective cover, cover each toner cartridge with bubble sheet to protect the developer roller.*
- *If you do not have the original starter kit packing, pack each toner cartridge firmly with bubble sheet and put them into the outer carton.*

6.2 OPC Belt Cartridge

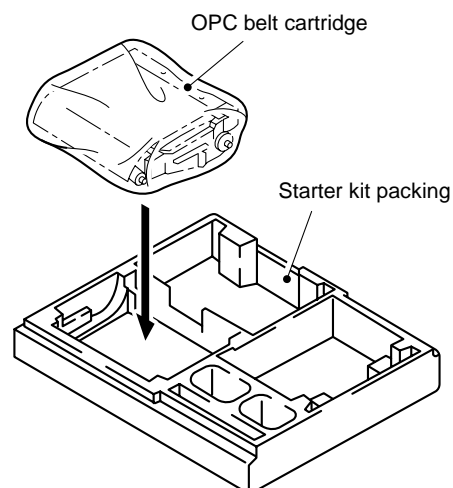
- 1) Open the top cover ASSY 2 and remove the OPC belt cartridge from the printer.
- 2) Open the shutter on the OPC belt cartridge and remove toner in the cartridge with a vacuum cleaner.



- 3) Cover the OPC belt cartridge with the original protective sheet (black).
- 4) Put the cartridge into the polyethylene bag.



- 5) Put the OPC belt cartridge into the original starter kit packing.

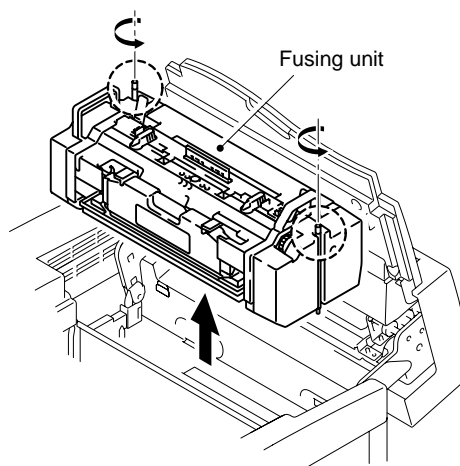


CAUTION


- Do not directly touch the OPC belt surface with bare hands or gloves.
- If the belt is exposed for more than two minutes to a light source of 800 lux, the belt may be damaged.
- If you do not have the original starter kit packing, pack the OPC belt cartridge firmly with bubble sheet and put it into the outer carton.

6.3 Fusing Unit

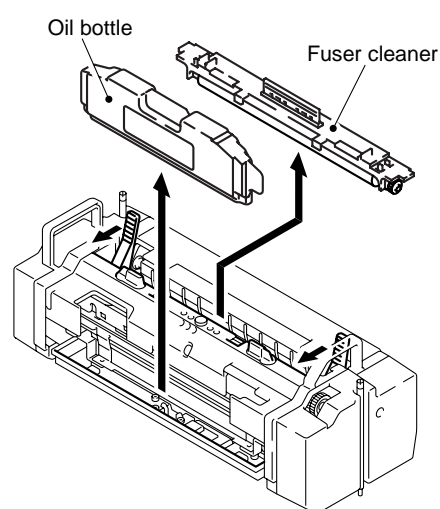
- 1) Open the rear access cover and slacken the fusing unit securing screws (2 pcs.)
- 2) Holding the handles at both ends of the fusing unit and remove the fusing unit from the printer.



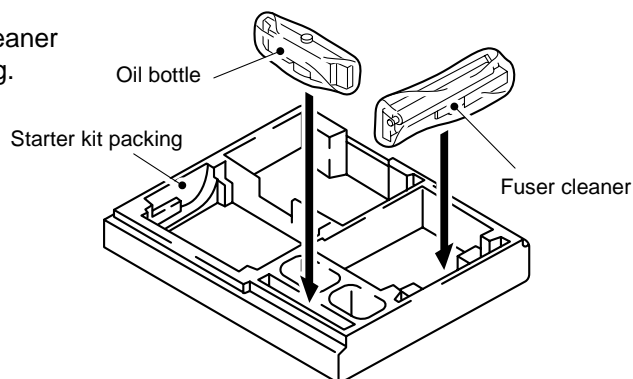
- 3) Remove the oil bottle and the fuser cleaner from the fusing unit and put each of them into the polyethylene bag.

**CAUTION**

Pack the oil bottle in the polyethylene bag and seal it firmly. Failure to do so will cause oil spill during shipping and damage to the printer.



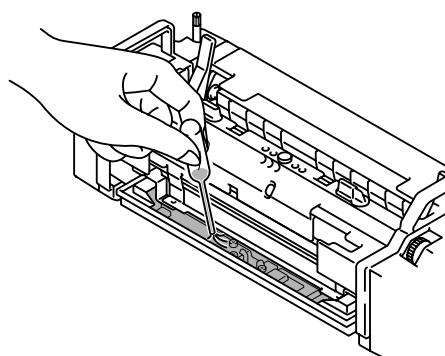
- 4) Put the oil bottle and the fuser cleaner into the original starter kit packing.



- 5) Remove the oil remaining in the fusing unit with the supplied syringe to avoid oil spill in the printer.

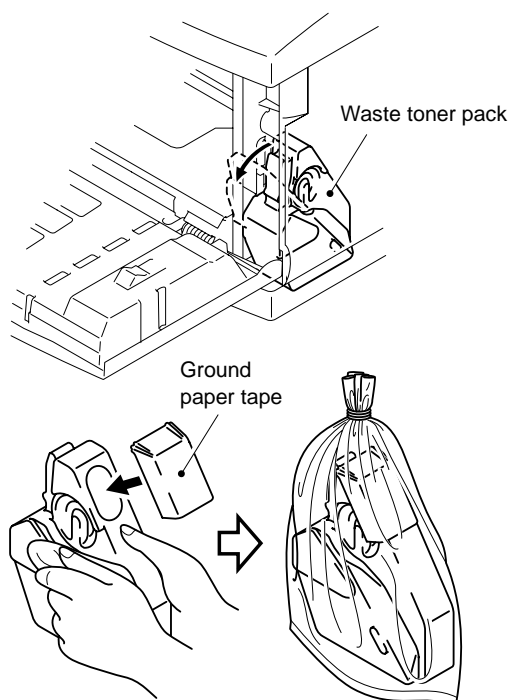
Note:

Re-install the fusing unit into the printer after cleaning the printer as instructed in the following section. For re-install of the fusing unit, see Section 6.6 'Packing'.



6.4 Waste Toner Pack

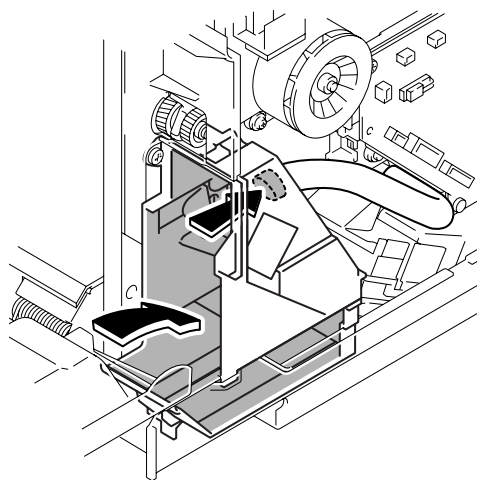
- 1) Remove the waste toner pack from the printer.
- 2) Clean toner around the pack and cover the hole of the waste toner pack firmly with gummed paper tape.
- 3) Put the waste toner pack into the polyethylene bag and seal it firmly.



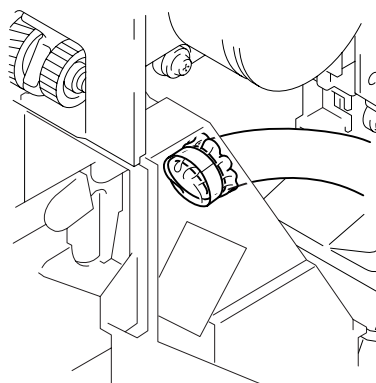
6.5 Cleaning

Clean the following areas with a vacuum cleaner to remove toner.

- 1) Around the waste toner pack / Waste toner feeder tube.
 - i) Vacuum toner from the exit of the waste toner feeder tube and around the waste toner pack holder.

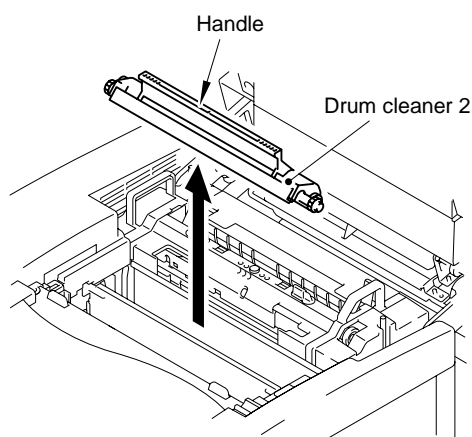


- ii) Cover the exit of the waste toner feeder tube with vinyl wrap.



2) Drum cleaner 2

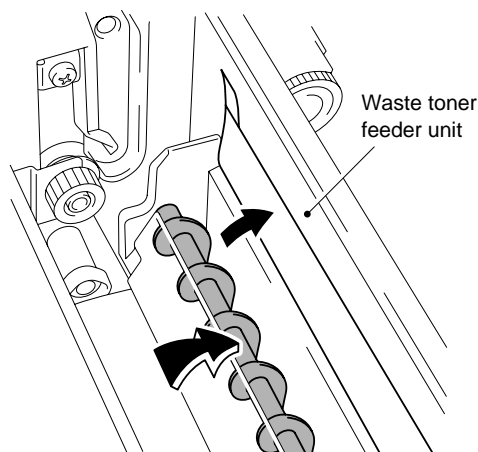
- i) Remove the cleaner cover by releasing the two hooks.
- ii) Holding the handle located on the top of the drum cleaner 2, push it backwards.
- iii) Remove the drum cleaner 2 by lifting it out.



- iv) Clean the area where the drum cleaner 2 is mounted with a vacuum cleaner and a cloth. (Refer to the figure as shown on the right.)

3) Inside the printer

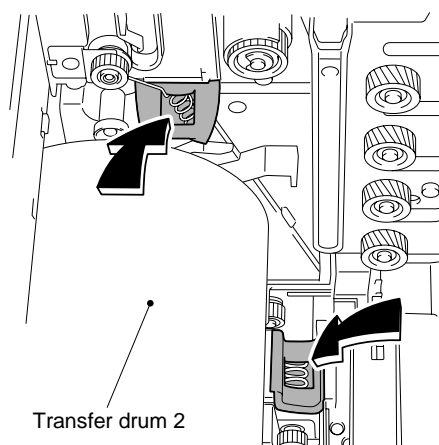
- i) Remove the upper side cover, side cover (L), and upper cover from the printer.
- ii) Remove the control fan, and then remove the waste toner feeder unit.



- iii) Vacuum toner around the other side of the waste toner feeder tube and inside the printer. (Refer to the figure as shown on the right.)

- iv) Reassemble the waste toner feeder unit, control fan, upper cover, side cover (L), and upper side cover.

- v) Re-install the drum cleaner 2 and cleaner cover.



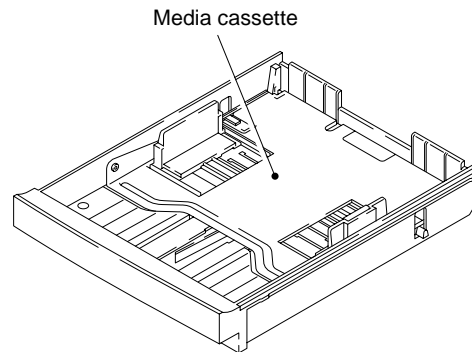


CAUTION

- *Be sure not to damage the surface of the transfer drum 2 with a vacuum cleaner when cleaning the areas around the transfer drum 2.*
- *Be sure not to contact the nozzle of the vacuum cleaner with the terminals of the interior. Failure to do so will cause damage to the electrical parts in the printer.*
- *It is recommended to ground the nozzle of the vacuum cleaner by using the earth wire.*

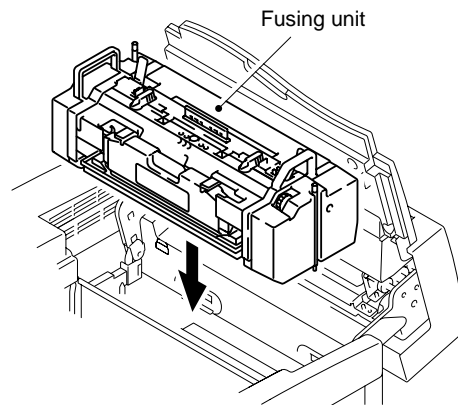
4) Media cassette

- Remove the media cassette from the printer and remove paper from the cassette.
- Vacuum paper dust in the media cassette.
- Reinstall the media cassette.

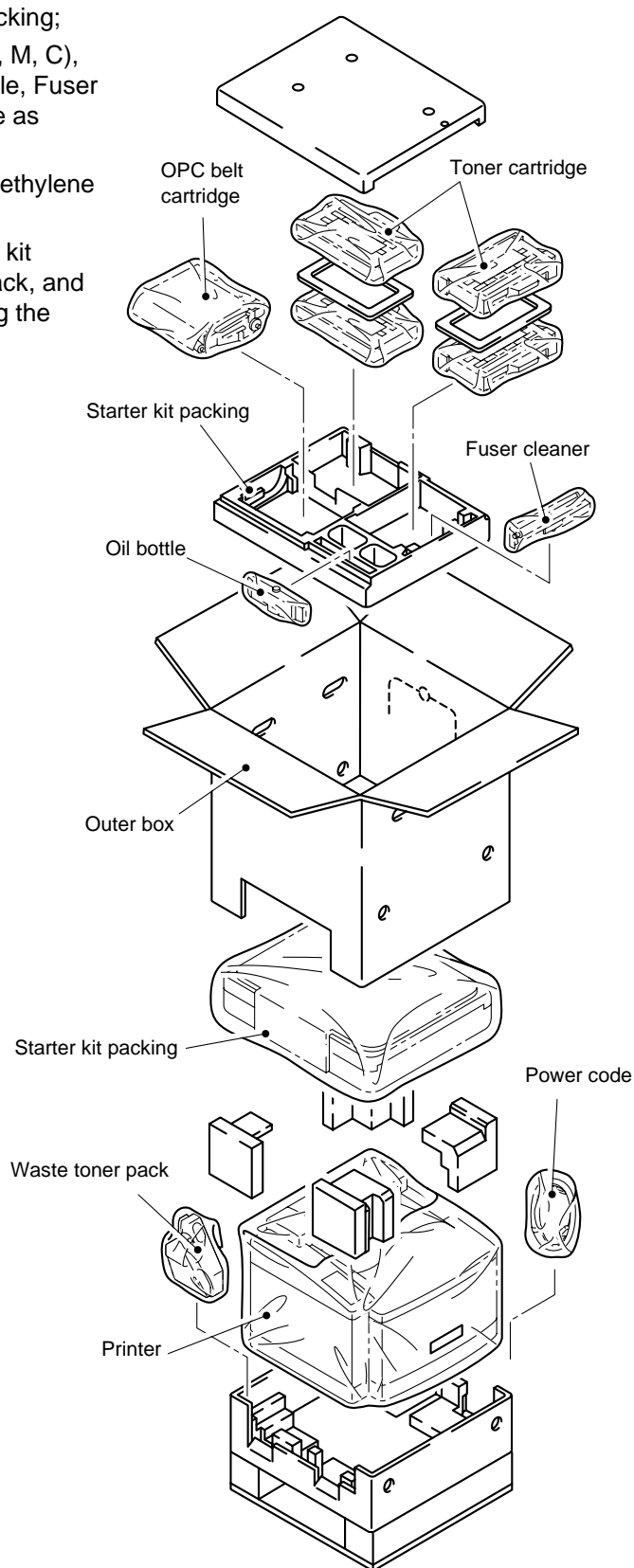


6.6 Packing

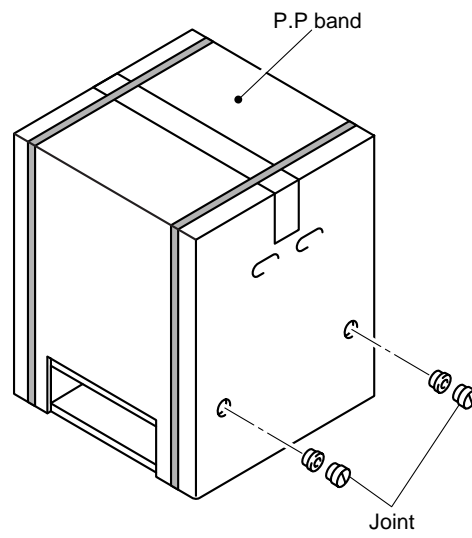
- Re-install the fusing unit into the printer.
 - After setting the fusing unit in place, lightly press down the unit to firmly connect to the connector on the base.
 - Tighten the securing screws while pressing down the fusing unit. Check the metal hook of the screw at the left hand secures the fusing unit correctly.
 - Close the rear access cover and top cover ASSY 2.



- 2) Check the following items are packed in the starter kit packing;
Four toner cartridges (K, Y, M, C),
OPC belt cartridge, Oil bottle, Fuser cleaner. (Refer to the figure as shown on the right.)
- 3) Put the printer into the polyethylene bag.
- 4) Pack the printer, the starter kit packing, the waste toner pack, and power code in the box using the original packing material.
- 5) Seal the outer box firmly.



- 6) Fix the four joints, then band the box with two plastic bands.



7. HIDDEN FUNCTION MENU

7.1 Line Test Menu

Hold down the + and - buttons and turn the print ON

LINE TEST ----- < Press the Go button >

	Item	Descriptions
1	LCD TEST	All columns of the LCD are turned on to check that the LCDs are all displayed correctly.
2	LED TEST	All LEDs are turned on in LCD TEST above and turned off in SW TEST below to check the LED performance.
3	SW TEST	The corresponding number appears when pressing the button to check the performance of all buttons.
4	SENSOR TEST	The corresponding character appears when the sensor performs to check the performance of all sensors.
5	RAM SIZE TEST	Displays the size of the RAM installed in the printer and checks that the size is correct.
6	TRAY1 CHECK	Displays the paper size of the installed cassette 1 to check it.
7	TRAY2 CHECK	Displays the paper size of the installed cassette 2 to check it.
8	FLASH CARD R/W TEST	Implements the reading/writing test of the compact flash card to check the interface and flash card.

DRAM CHECK START ----- < Press the Go button >

DRAM test mode

NV-RAM CLEAR ----- < Press the Go button >

SURE? (SET/ELSE) NV-RAM clear

ROM/RAM WAIT SET ----- < Press the Go button >

CARD/CART SEL (WAIT LEVEL = 4*)

ROM/RAM wait setting (0 to 15)

7.2 Professional Menu

The professional menu is open to users as per request to customize the printer functions mainly.

To enter the professional menu, press the Go and Set buttons together.

The details for each menu are described as follows;

TRAY SETTING

TRAY PRIORITY ----- T1>T2(>T3), (T3>)T2>T1

Specifies the priority of the paper source when selecting 'Auto' in the paper source setting.

ENGINE ADJUST

LEFT MARGIN

Adjusts the horizontal gap of the printing position when the optional lower cassette is installed.

The setting in the main PCB is changed.

-3.5mm ~ +3.5mm The setting value can be changed by 5mm.

TRAY1 = *** mm

TRAY2 = *** mm

TRAY3 = *** mm

DUPLEX = *** mm

YPOS ADJUST

Adjusts the vertical gap of the printing position when the optional lower cassette is installed.

The range of the setting value is +100 ~ -100. (Default is 0.)

The setting value can be changed by 1 dot.

TRAY1 = **** dot

TRAY2 = **** dot

TRAY3 = **** dot

DUPLEX = **** dot

RESET SETTINGS

RESET SETTING1

Sets the current printer setting to the user setting 1.

SAVE SETTINGS

SAVE SETTING1

Saves the current printer setting to the user 1.

SAVE FONT

(Only when selecting the LaserJet emulation.)

PRIMARY FONT

Saves the fonts to be currently registered as the primary font into the storage device (compact flash card, hard disk).

FONT ID = #####

SECONDARY FONT

Saves the fonts to be currently registered as the secondary font into the storage device (compact flash card, hard disk).

FONT ID = #####

DOWNLOAD FONT

Saves the current download font into the storage device (compact flash card, hard disk).

FONT ID = #####

exit SAVE

SAVE MACRO

(Only when selecting the LaserJet emulation and any macros are registered.)

Saves the macros to be currently registered into the storage device (compact flash card, hard disk).

MACRO ID = #####

SPOOL PRINT

Specifies the collated printing when implementing reprint (secure print, proof print, public print).

COLLATE = ON*

COLLATE = OFF

TRAYCOMMAND MODE

Makes the command to select the paper source compatible with HP LaserJet 3.

TRAY COM. = NORM * HP LaserJet 4 command

TRAY COM. = SPEC. HP LaserJet 3 command

READOUT SELECT

Specifies that the printer reads DC3 in the FX emulation or not.

READOUT = ON The data is ignored until DC1 is received when DC3 is received.

READOUT = OFF * The data is not ignored even when DC3 is received.

FONT SELECT

SCALABLE FONT

(Only when selecting the LaserJet emulation.)

FONT = ALL * All scalable fonts can be selected when selecting the PCL font.

FONT = LJ4 The following fonts cannot be selected when selecting the PCL font.

Atlanta, BermudaScript, PCBrussels, Copenhargen, Germany, Portugal, Calgary, San Diego, UR Roman

FONT SELECT

(Only when selecting the LaserJet emulation.)

Selects the default font in the LaserJet emulation.

PRIMARY FONT Selects the primary font.

SELECT FONT

SYMBOL FONT

SECONDARY FONT Selects the secondary font.

SELECT FONT

SYMBOL FONT

IBM CHR SET MODE

IBM E1H = Beta	Places 'Beta' on E1h of the IBM character set.
IBM E1H = Esszet *	Places the character of 'Esszet' on E1h of the IBM character set.

W BOLD ON/OFF

The application software is provided for the dot printer, which reprints the character onto the same position to make the bold font. On the other hand, the laser printer detects the reprinted character and converts it to the bold font. After the HL-8V model, however, the function has caused that print speed gets slow in the FX and XL emulations. Therefore the setting is added, which selects to implement the function or to print fast without using the function.

W BOLD = OFF *	Not converts the reprinted character to the bold font in the FX and XL emulations.
W BOLD = ON	Converts the reprinted character to the bold font in the FX and XL emulations. (The print speed is decreased.)

DLFNT Bd / It

Brother has an original function such that the printer creates the bold font when receiving the command of the bold font which the printer does not have. If the download font is selected by ID, however, the bold font which has been specified before can remain in the printer so that the download font is printed in bold.

Though the function was deleted from the printer for the mean time, it also caused the claims. Therefore the setting which deletes the function is added.

DLFNT Bd / It = YES	Creates the bold or italic font from the download font.
DLFNT Bd / It = NO *	Not creates the bold or italic font from the download font.

B PROD ON/OFF

B PROD = ON*	Creates the bold or italic font from the bitmap font.
B PROD = OFF	Creates the bold or italic font from the bitmap font.

CONDENCE SELECT

The condensed font is printed at 16.66cpi in the dot printer emulation for the Brother laser printers in conjunction with that the 16.66cpi font is used. However, some customers need the same pitch with the one of the dot printer, and many customers still use the printer at 16.66cpi on the other hand. Therefore the setting which selects the pitch of the condensed font is added.

CONDENCE = 16.66p *

Sets the pitch of the Epson/IBM condensed character 16.66cpi.

CONDENCE = 17.14p

Sets the pitch the Epson/IBM condensed character 17.14cpi.

OEM FONT SELECT

The special character set is necessary when the printer is supplied to the European countries. For the HL-1260 printer, the special character set is stored into the program ROM additionally. Since the font number is moved due to the addition, the character set is disabled for the normal model.

OEM FONT = DISABL*	Disables to select the European character.
OEM FONT = ENABLE	Enables to select the European character.

BRO FONT SELECT

The Brougham bitmap font of 10 pitch and 12 pitch is built in due to the user's request.

BROBITM = DISABL*	Disables the internal 10/12 pitch Brougham bitmap font.
BROBITM = ENABLE	Enables the internal 10/12 pitch Brougham bitmap font.

ISR FONT SELECT

ISRFONT = DISABLE	Normal mode
ISRFONT = ENABLE	Israel mode

300DPI PRIORITY

Though it was necessary to select and print the cartridge font of Courier for the US customer, the 300dpi bitmap font could not be selected because the priority of the font selection was low in rank. Since the current model is compatible with HP LaserJet 4, the setting is added, which disables the compatibility with HP LaserJet 4 and makes the priority of the 300dpi bitmap font high.

3B PRIO = LOW *	Makes the priority of selection for the 300dpi bitmap font standard (low) in the font setting. Command: <ESC><CR>!1T
3B PRIO = HIGH	Makes the priority of selection for the 300dpi bitmap font high in the font setting. Command: <ESC><CR>!2T

The priority in each setting is as follows;

< When the printer resolution is 600dpi >

3B PRIO = LOW

1. DOWNLOAD 600
2. DOWNLOAD SCALABLE
3. CARD 600
4. CARD SCALABLE
5. CART 600
6. CART SCALABLE
7. RESIDENT 600
8. RESIDENT SCALABLE
9. DOWN 300
10. CARD 300
11. CART 300
12. RESIDENT 300

3B PRIO = HIGH

1. DOWNLOAD 600
2. DOWNLOAD 300
3. DOWNLOAD SCALABLE
4. CARD 600
5. CARD 300
6. CARD SCALABLE
7. CART 600
8. CART 300
9. CART SCALABLE
10. RESIDENT 600
11. RESIDENT 300
12. RESIDENT SCALABLE

< When the printer resolution is 300dpi >

3B PRIO = either of low or high

1. DOWNLOAD 300
2. DOWNLOAD SCALABLE
3. CARD 300
4. CARD SCALABLE
5. CART 300
6. CART SCALABLE
7. RESIDENT 300
8. RESIDENT SCALABLE

FX / XL SCALE FONT

Specifies the setting for the default font and font selected on the control panel in the Epson/IBM emulation.

SCAL.F = NORMAL* Enables to select the only similar size of the font when the scalable font is selected.

SCAL.F = ALL SIZE Enables to select all sizes of the font when the scalable font is selected.

FX / XL SCALE ITA

Specifies the setting for the italic font of the scalable font in the Epson/IBM emulation.

ITA = OBLIQUE* Makes the upright font oblique to have italic when the scalable font is selected.

ITA = ITALIC SEL Uses the upright font to have italic when the scalable font is selected.

PAPER&TRAY SIZE

Specifies the default paper size.

DEF PAPER =LT	The default paper size is letter for the US and Canada models.
DEF PAPER =A4	The default paper size is A4 for the other models.

PARALLEL MENU

Changes the signal timing of the Centronics interface

PARALLEL TIMING

CDCC PSW = L The BUSY signal gets high when the STROBE signal goes up.

CDCC PSW = H* The BUSY signal gets high when the STROBE signal goes down.

STB / ACK DELAY

CDCC BSSL = H The ACK signal is output when the BUSY signal goes down.

CDCC BSSL = L* The ACK signal is output before the BUSY signal goes down.

INPUT PRIME

INPUT PRIME = OFF* The INPUT PRIME signal does not reset the printer.

INPUT PRIME = ON The INPUT PRIME signal resets the printer.

REPRINT ON/OFF

Specifies that the reprint function is enabled or disabled forcedly.

REPRINT = ON* The reprint function is enabled or disabled following the setting of the user menu.

REPRINT = OFF The reprint function is enabled forcedly.

AUTO HRC OFF

Specifies that the smoothing control is enabled or disabled automatically depending on the contents of the file.

AUTO HRC = OFF*

AUTO HRC = ON

APPLETALK AT/PS

Specifies that the emulation is switched to the PS mode forcedly with AppleTalk.

APPLE TALK = PS* Switches the emulation to the PS mode with AppleTalk.

APPLE TALK = AUTO Uses the auto emulation function with AppleTalk.

PS BINARY SELECT

Specifies that the data from the parallel interface is handled as the binary data.

PS BINARY = ASCII* Default. Enables the commands such as Ctrl-T, Ctrl-C and disables to use the binary data.

PS BINARY = BIN Enables to print the binary data and disables the commands such as Ctrl-T.

PS QUOTE BINARY

PS QUOTEBIN = OFF* Disables to input the binary data even by the special codes.

PS QUOTEBIN = ON Enables to input the binary data by the special codes.

PS IMAGE MASK

Revises the image mask procedure to make print speed faster with an OS/2 driver.

PS IMAGEMSK = OFF* Not revises the image mask procedure.

PS IMAGEMSK = ON Revises the image mask procedure.

PS CEIL MODE

PS CEIL = FLOOR*

PS CEIL = CEIL

PS STATUS

STATUS ECHO = ON*

STATUS ECHO = OFF

PROTECT OFF MODE

Specifies the performance of the page protection function.

- PRO.OFF = AUTO* Protects the data spuriously even when the page protection is turned off. (Countermeasure for the memory full or print overrun error.)
- PRO.OFF = NORMAL Specification up to the 4th mask ROM.

HP ESC E COMMAND

Specifies the performance of the ESC E command.

- HP ESC E = RESET* Resets the printer.
- HP ESC E = F / F Implements form feed.

PS300RESO

Specifies that the resolution is reduced to 300dpi in the PS mode automatically.

- PS300RESO = NO* Not reduces the resolution automatically.
- PS300RESO = IF 2M Reduces the resolution to 300dpi when the RAM size is 2MB.
- PS300RESO = FORCE Reduces the resolution to 300dpi.

COPY PAGES

Fixes the copy page number to one page when COPY PAGES = OFF.

- COPY PAGES = ON*
- COPY PAGES = OFF

PANEL RESET MODE

Changes the setting of the reset printer function.

- RESET = JOB Resets the data per job.
- RESET = NORMAL*

JOB TIMEOUT SEL

Specifies the setting of the job timeout.

Though the job timeout has been set to 5 minutes in the PJP emulation since the HL-1260 printer, the setting to disable the timeout is added due to the user's request.

TIME OUT = ON* Enables the job timeout.

TIME OUT = OFF Disables the job timeout.

DEMO PAGE ON/OFF

Specifies that the demo page is printed or not.

When the setting is OFF, the demo page is deleted from the control panel and printer Web page, and the demo page is not printed by the PJP command and MIB.

DEMO PAGE = ON*

DEMO PAGE = OFF

JOB CANCEL TIME

Specifies the timeout of job cancel. (1~255)

TIME OUT = ???sec

PSCOPYPAGE

PSCOPYPAGE = L3*

PSCOPYPAGE = L2

Switches the copy page operator in the PS mode between Level2 and Level3.

@PJP DEFAULT PSCOPYPAGE = L3, L2

@PJP SET PSCOPYPAGE = L3, L2

@PJP DINQUIRE PSCOPYPAGE

@PJP INQUIRE PSCOPYPAGE

APPLEUSBPS

BINARY = OFF*

BINARY = ON

Enables to print the PS pure binary data through the Mac USB interface.

@PJP DEFAULT APPLEUSBPS = ON / OFF

@PJP SET APPLEUSBPS = ON / OFF

@PJP DINQUIRE APPLEUSBPS

@PJP INQUIRE APPLEUSBPS

7.3 Reset Parts Life

The Reset parts life menu is implemented when the service personnel replaces the periodic maintenance parts. For the parts to be replaced easily, however, it is assumed that the user replaces them by him/herself. Therefore the reset parts life menu is distinguished from the service menu described in the next section, '4. Service Menu'.

(The following descriptions are not open to other than the service personnel in principal. You may let users know as necessary.)

To enter the reset parts life menu, press the Go and + buttons together.

The details for the menu are described as follows;

RESET PARTS LIFE

FC Roller	Initializes the life of the fuser cleaner.
OPC Belt	Initializes the life of the OPC belt cartridge.
FUSER UNIT	Initializes the remaining life of the fusing unit.
120K Kit	Initializes the life of the 120K kit.
PF KIT1	Initializes the remaining life of the paper feeding kit 1.
PF KIT2	Initializes the remaining life of the paper feeding kit 2.

7.4 Service Menu

The service menu provides the printer information for the service personnel. (The following descriptions are not open to other than the service personnel.)

To enter the service menu, press the + and Set buttons in this order while holding down the Go button.

The details for each menu are described as follows;

--SERVICE MENU-- SERVICE INFO

PAGE COUNT	Number of printing pages
IMAGECOUNTERS	
C =	The number of printing pages with using cyan.
M =	The number of printing pages with using magenta.
Y =	The number of printing pages with using yellow.
K =	The number of printing pages with using black.
TOTAL =	The number of printing pages with using all colors.
JAM COUNT	Paper jam frequency
REPLACE COUNT	Number of replacement (Counts the frequency after clearing the counter when 100 pages or more are printed.)
C TONER	The number of the cyan toner cartridge replacement.
M TONER	The number of the magenta toner cartridge replacement.
Y TONER	The number of the yellow toner cartridge replacement.
K TONER	The number of the black toner cartridge replacement.
FC Roller	The number of the fuser cleaner replacement.
OPC Belt	The number of the OPC belt cartridge replacement.
FUSER UNIT	The number of the fusing unit replacement.
120K Kit	The number of the 120K kit replacement.
PF KIT1	The number of the paper feeding kit 1 replacement.
PF KIT2	The number of the paper feeding kit 2 replacement.
Waste Toner Box	The number of the waste toner box replacement.
Oil Bottle	The number of the oil bottle replacement.
COVERAGE	Average coverage (Based on that the letter size printed all black is 100%)
C =	Average coverage of cyan.
M =	Average coverage of magenta.
Y =	Average coverage of yellow.
K =	Average coverage of black.

PRINT PAGES	Number of printing pages depending on the paper size. (Counted up to 100K.)
A4 PAGE	The number of printing pages of the A4 size.
LETTER PAGE	The number of printing pages of the letter size
LEGAL PAGE	The number of printing pages of the legal size
B5 PAGE	The number of printing pages of the ISO B5 size
JISB5 PAGE	The number of printing pages of the JIS B5 size
EXEC PAGE	The number of printing pages of the EXECUTIVE size
A3 PAGE	The number of printing pages of the A3 size
COM-10 PAGE	The number of printing pages of the COM10 size.
DL PAGE	The number of printing pages of the DL size.

* The number of replacement is counted after clearing the counter when 100 pages or more are printed.

--SERVICE MENU--
ERROR HISTORY

1 : #####	The 10 latest errors in order of the newest to the oldest.
2 : #####	
3 : #####	
....	
10 : #####	

--SERVICE MENU--
MODIFY COUNT

* For modifying of the number of pages and remaining life, the digit to be modified is raised whenever pressing the Set button. The pages and remaining life are fixed on when pressing the Set button on the highest digit.

JAM COUNT	Paper jam frequency
REPLACE COUNT	
C TONER	The number of the cyan toner cartridge replacement.
M TONER	The number of the magenta toner cartridge replacement.
Y TONER	The number of the yellow toner cartridge replacement.
K TONER	The number of the black toner cartridge replacement.
FC Roller	The number of the fuser cleaner replacement.
OPC Belt	The number of the OPC belt cartridge replacement.
FUSER UNIT	The number of the fusing unit replacement.
120K Kit	The number of the 120K kit replacement.
PF KIT1	The number of the paper feeding kit 1 replacement.
PF KIT2	The number of the paper feeding kit 2 replacement.
Waste Toner Box	The number of the waste toner box replacement.
Oil Bottle	The number of the oil bottle replacement.

--SERVICE MENU--
RESET COUNT

COVER AGE

Clears the average coverage of the cyan, magenta, yellow and black toner.

Caution 1

The counter is limited for the following items;

COVERAGE : The number of pages over 100K is not stored.

PRINT PAGE : Counted up to 100K pages.

ERROR HISTORY : Up to 100K errors are stored.

Caution 2

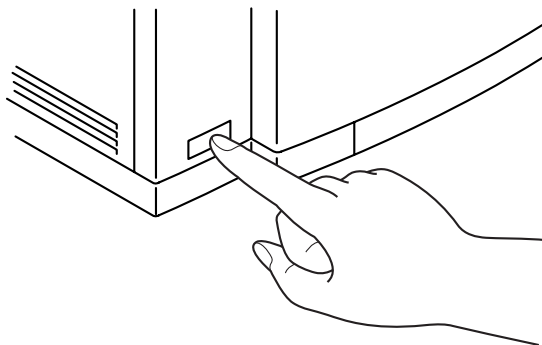
When modifying the life period, enter the Hitachi mode.

8. TO INSTALL THE PRINTER CORRECTLY

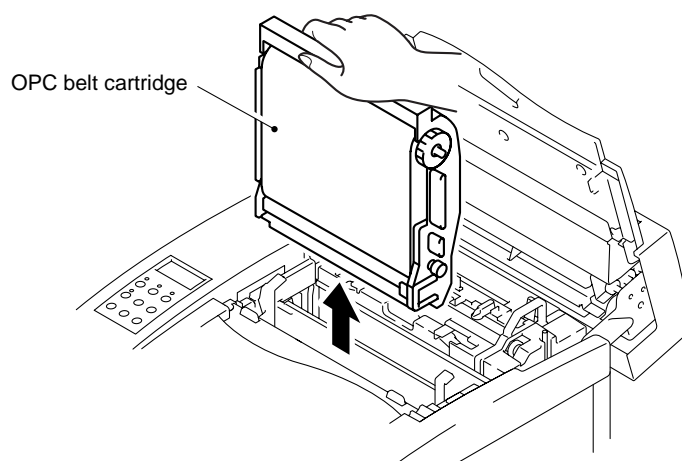
Please read the installation steps described below carefully.

If the printer is not installed correctly, image failures may occur or the life expectancy of the OPC belt cartridge may be shortened.

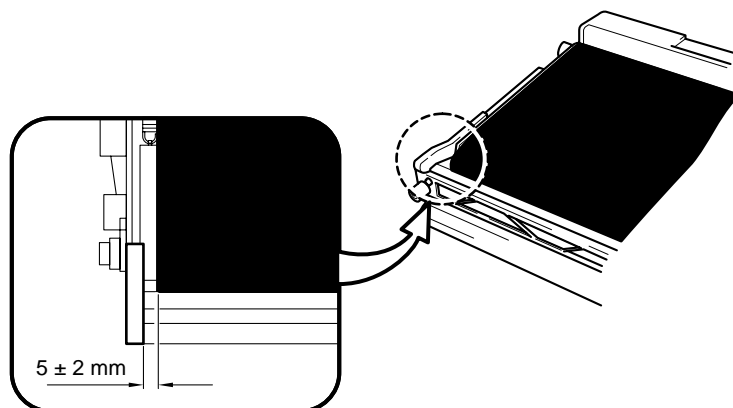
- 1) Turn ON the power switch of the printer.



- 2) After the printer has initialized, open the front cover 2 and then the top cover ASSY 2 of the printer and pull up the OPC belt cartridge from the printer.



- 3) Measure the gap on the OPC belt cartridge shown in the figure below. If the gap is in the range of 5 ± 2 mm, the printer is installed correctly.

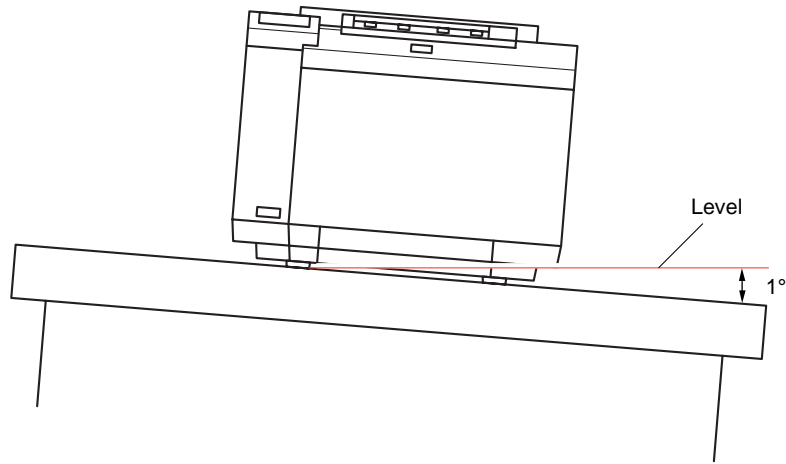


- 4) If the gap is NOT in the range of 5 ± 2 mm, check the following items;

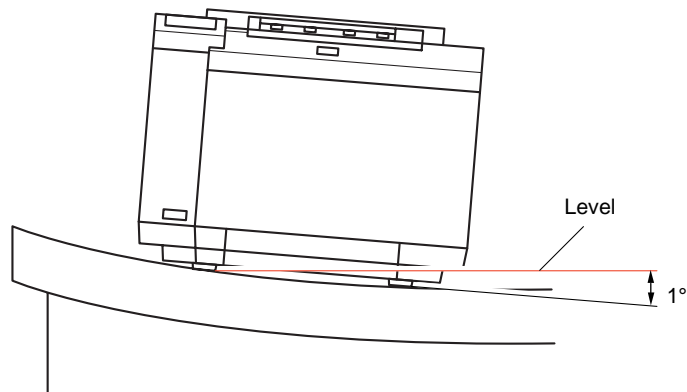
Note:

If the printer is inclined at 1° as shown in the figures below, the printer is approximately 9mm out of level from one side to the other.

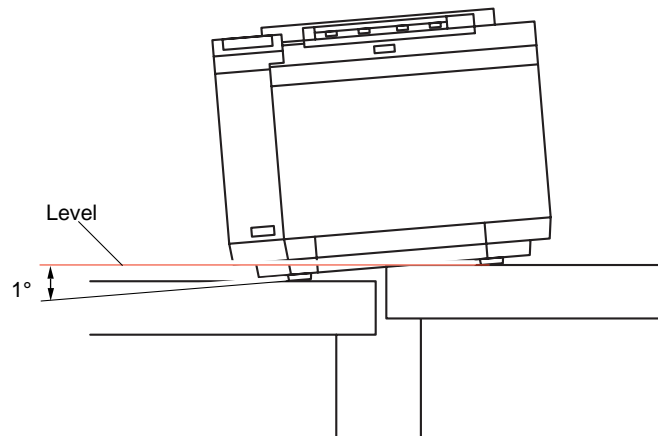
- i) Is the printer inclined because the table the printer is installed on is unlevel?



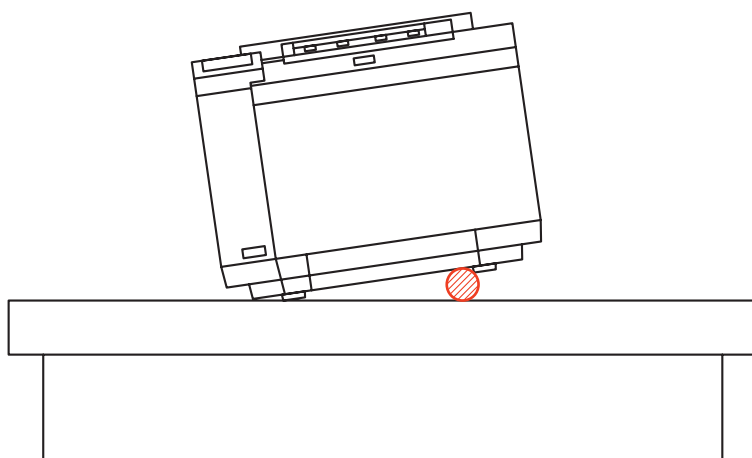
- ii) Is the printer inclined because the table surface the printer is installed on is not strong enough?



- iii) Is the printer inclined because it is installed across two or more tables?



- iv) Is there anything under the printer, or is there something stuck to the printer base?



- 5) After checking these items, initialize the printer again (opening/closing the top cover automatically initializes the OPC belt cartridge), and measure the gap on the OPC belt cartridge again.

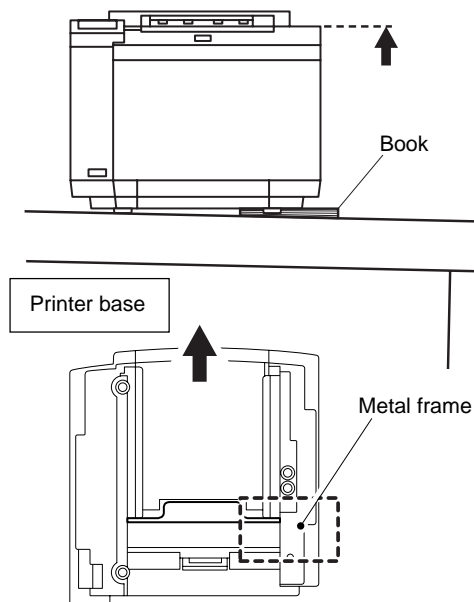
If the gap is in the range of 5 ± 2 mm, the printer is installed correctly. (Refer to the figure for Step 3.)

- 6) If the gap is NOT in the range of 5 ± 2 mm, follow the steps below;

- i) When the gap is more than 7 mm; (the OPC belt has moved to the right.)

Place something 1 cm thick such as a book under the right hand side of the printer as shown in the figure on the right.

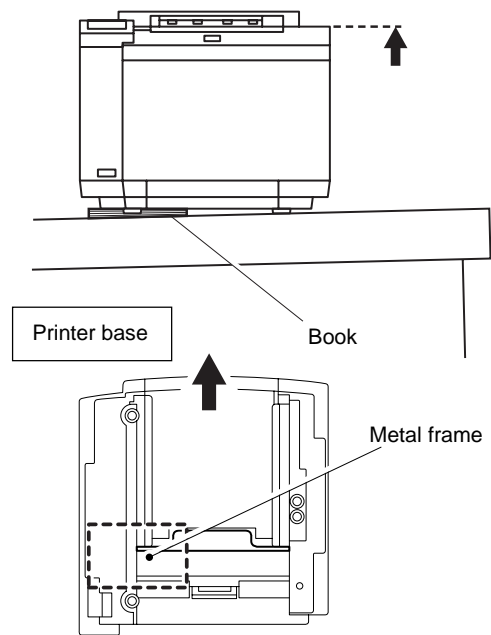
Initialize the printer again and then measure the gap on the OPC belt cartridge. If the gap is in the range of 5 ± 2 mm, the printer is installed correctly.



- ii) When the gap is less than 3 mm;
(the OPC belt has moved to the left.)

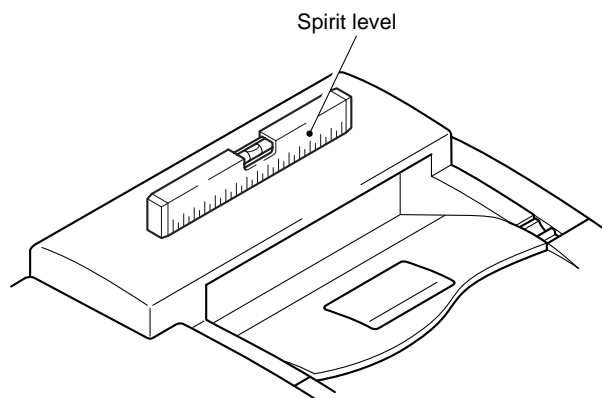
Place something 1 cm thick such as a book under the left hand side of the printer as shown in the figure on the right.

Initialize the printer again and then measure the gap on the OPC belt cartridge. If the gap is in the range of 5 ± 2 mm, the printer is installed correctly.



Note:

- *Place the book or other object 1 cm thick under the printer metal frame as shown in the figures above. Even if the Lower Tray unit is installed onto the printer, the book should be positioned in the same position.*
- *If you have a spirit level, put it on the output tray and install the printer as level as possible referring to the level.*
- *The surface that the printer is placed on should have its level corrected properly.*
- *The temporary action with a 1 cm thick object should only be used to determine the correct leveling action required and should not be used as a permanent solution.*



9. HOW TO REWRITE HL-2600CN FLASH ROM

Object parts: LJ8900001 MAIN PCB ASSY, HL2600CN

Preparation tool

- *PC (Windows 98 or later)
Create the folder "2600" in C drive.
- *1 HL-2600CN printer
- *1 parallel cable
- *FILEDG32.EXE
Download "FILEDG32.EXE" from Utility DB, then copy it to "2600" folder in C drive.

Rewriting procedure (For BLF file)

- (1) Install the printer driver to the PC. Make a short-cut icon for FILEDG32 on the Desktop.
- (2) Connect the parallel cable to the printer, then turn the printer power switch **ON**.
Wait until "READY" message appears on the LCD display.
- (3) Double click the FILEDG32 icon, and drag and drop the firmware data to the printer icon in the FILEDG32.

Data LED (orange) blinks for approx. 2 minutes and 40 seconds.
>>>>> Alarm LED (red) blinks for approx. 2 minutes and 20 seconds.
("NOW WRITING" and "NOW ERASING" appears on the LCD display alternately while the Alarm LED is blinking.)
- (4) After finishing rewriting, the system will be rebooted. Wait until "READY" message appears on the LCD display of the printer.
- (5) Set the paper size as "A4" or "LETTER".
- (6) Print out the Print Settings by pushing the "Set" button three times to check the version of the firmware.