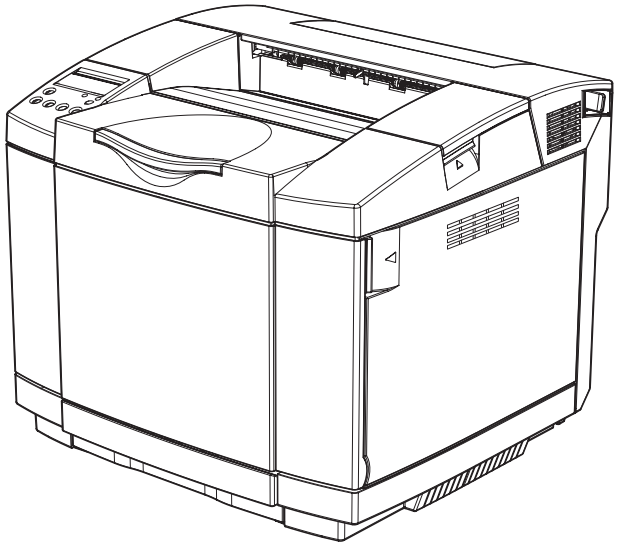
Brother Color Laser Printer

SERVICE MANUAL

MODEL: HL-2700CN



Read this manual thoroughly before maintenance work.

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

December 2003
SM-PRN040

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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-2700CN 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.

CONTENTS

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 Safely 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.

⚠ *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*

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.

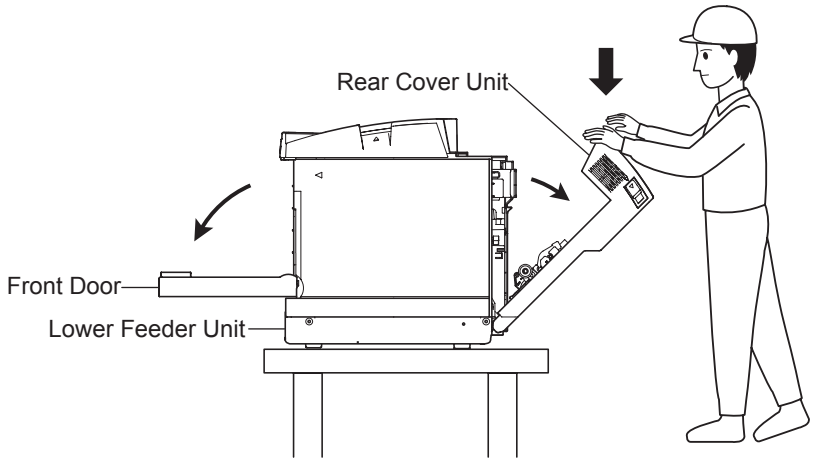
⚠CAUTION

SAFETY INTERLOCK

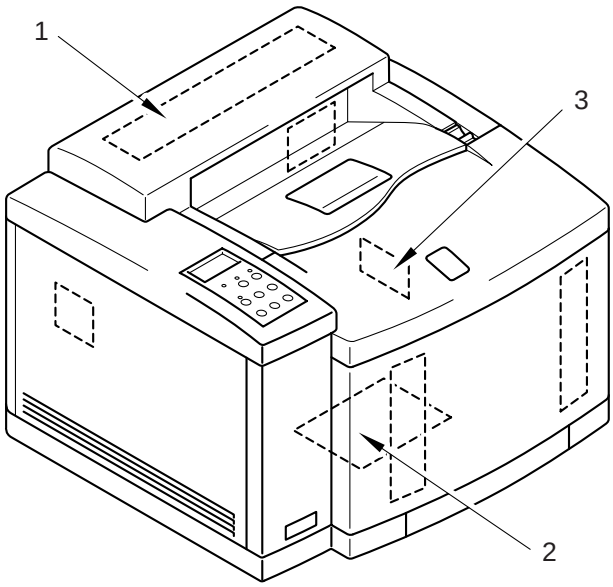
The front cover, paper exit unit and transfer unit of this printer have electrical safety interlocks to turn the power off whenever they are opened. Do not attempt to circumvent these safety interlocks.

⚠ *CAUTION*

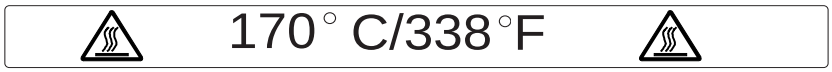
Do not lean against or apply any excessive force to the paper cassette, open cover of Duplex unit. Otherwise it may cause the product to decline or fall down and result in the injuries.



<Label Location>

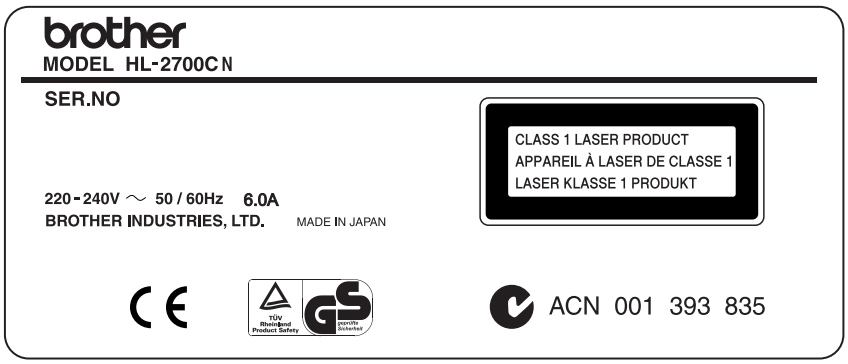


1. Hot Caution Label

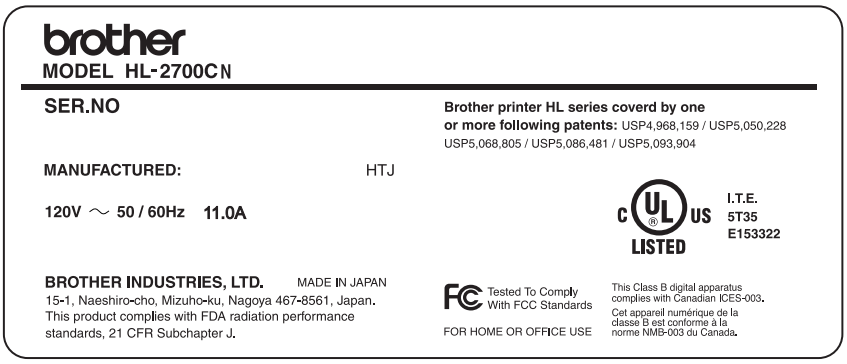


2. Laser Caution Label

3. Rating Label (For Europe)



(For US)



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.

CHAPTER I
PRODUCT OUTLINE

CHAPTER I PRODUCT OUTLINE

1. FEATURES

This printer has the following features:

2400 dpi Class Resolution

The printer prints at a default resolution of 600 dots per inch (dpi). You can get a higher print quality, equivalent to 2400 dpi class resolution by using Brother technologies: High Resolution Control (HRC) and Color Advanced Photoscale Technology (CAPT).

High Speed Color Laser Printing

You can print crisp images in brilliant 24-bit color.

This printer can print at speeds up to 31 pages per minute in monochrome mode and 8 pages per minute in full color mode. The HL-2700CN controller uses a high speed 64-bit RISC microprocessor and special hardware chips, to ensure fast print job processing.

High Resolution Control (HRC)

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

Color Advanced Photoscale Technology (CAPT)

This printer can print graphics in 256 shades for each color in PCL6 emulation and BR-Script3, producing nearly photographic quality. CAPT is most effective when printing photographic images.

Maintenance-Free Toner Cartridge

This printer uses four easy-to-replace toner cartridges. The toner cartridges can print up to 6,600 (Cyan, Magenta and Yellow) and 10,000 (Black) single-sided pages at approximately 5% coverage.

Universal Paper Tray

This printer loads paper automatically from the paper tray. Since the paper tray is a universal type, a number of different paper sizes (one paper size at a time) can be used. Even envelopes can be loaded from the paper tray.

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.

HL-2700CN can use the TCP/IP, IPS/SPX, Apple Talk, DLC/LLC, Banyan VINES, DEC LAT and NetBEUI environments. Also, many useful utilities, such as BRAdminProfessional for the administrator and Brother network printing software, are included in the CD-ROM supplied with the HL-2700CN printer.

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). You can 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 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 35 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)

Panel Lock Setting

If the panel button settings have been changed, the printer may not work as expected. If you are an administrator of this printer, you can lock the settings to prevent changes from being made.

Power Save Mode

The printer has a power saving mode. Since 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.

Toner Save Mode

The printer has an economical toner save mode. By using this feature you can substantially reduce operating costs and extend the life expectancy of the toner cartridges.

Reprint Setting

The printer saves data that you reprinted. You can reprint a document without sending the data again from your PC. If you do not install a CompactFlash™ card, you can reprint from RAM.

Network

Ethernet 10/100BASE-TX enables you to use the printer in the following environments:
(TCP/IP, IPX/PSX, Apple Talk, DLC/LLC, NetBEUI)

Also, many useful utilities, such as BRAdminProfessional Utility, Driver Development Wizard and Web BRAdmin software for the Network administrator, are included.

2. PARTS NAMES & FUNCTIONS

<Front View>

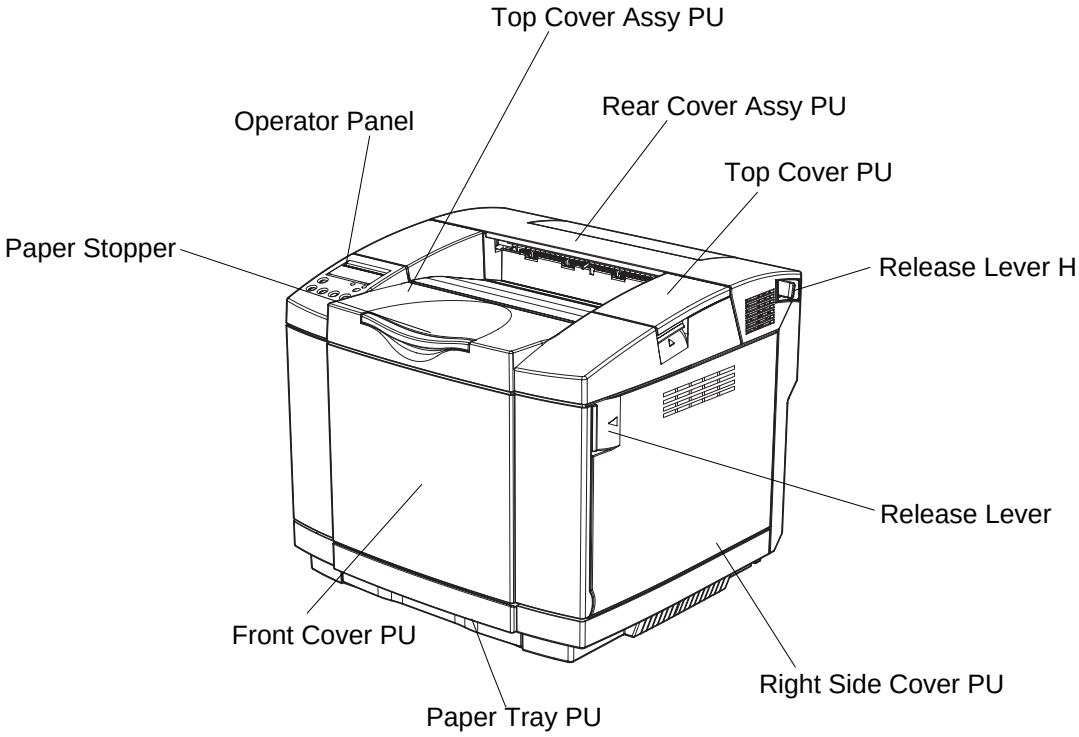


Fig.1-1

<Rear View>

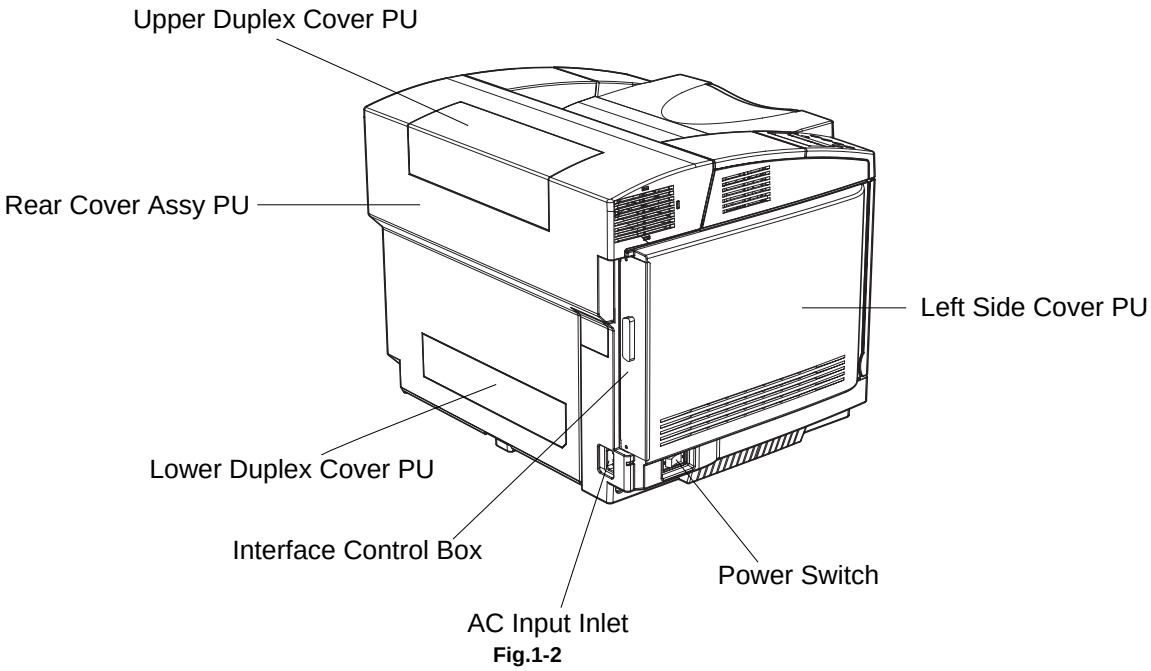


Fig.1-2

No.	Part Name	Outline of Functions
1	Top Cover PU	To act as both of the upper enclosure and paper tray for printed papers, and to be opened up at the maintenance.
2	Operator Panel	To display a status of printer operation and motion.
3	Front Cover PU	To act as a front enclosure, and to be opened when replacing a toner cartridge or waste toner pack.
4	Rear Cover Assy PU	To exit the printed paper for transportation. (To be opened when clearing the internal jam or doing the maintenance.)
5	Power Switch	To power on or off the printer. (Located at the lower left of the left side cover PU)
6	AC Input Inlet	To connect a power supply cable.
7	Interface Connector Box	Space for a controller board to be installed.
8	Upper Duplex Cover PU	Cover to be provided at the duplex transportation inlet and to be removed when installing the duplex unit.
9	Lower Duplex Cover PU	Cover to be provided at duplex transportation outlet and to be removed when installing the duplex unit.
10	Paper Stopper	Stopper to be pulled for alignment of exited papers and also prevention of falling down.

3. INTERNAL STRUCTURE

<Cross Sectional View >

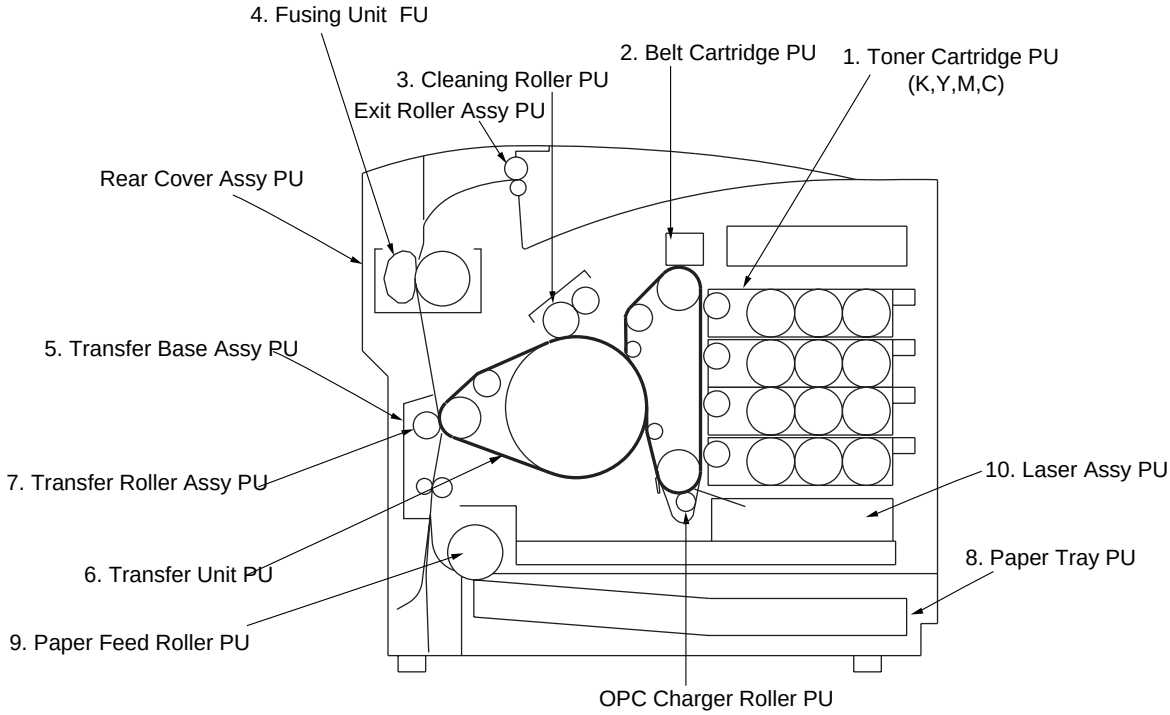


Fig.1-3

No.	Components Name	Outline of Functions
1	Toner Cartridge PU	To contain the toners (K, Y, M, C) for developing. Each toner cartridge (K, Y, M, C) is independent.
2	Belt Cartridge PU	To forms images, including the OPC belt.
3	Cleaning Roller PU	To clean and collect waste toner adhered to the transfer belt unit PU.
4	Fusing Unit FU	To fuse by heat the toner images on the paper.
5	Transfer Base Assy PU	To transfer toner images from the transfer belt to the paper.
6	Transfer Unit PU	To form color images, maintaining the toner images of belt cartridge PU on the OPC belt.
7	Transfer Roller Assy PU	To transfer the toner image of transfer belt to the paper.
8	Paper Tray PU	To feed papers automatically.
9	Paper Feed Roller PU	To feed papers automatically from the paper cassette PU..
10	Laser Assy PU	To generate a laser beam and scan over the OPC belt..

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 -, +, back. (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.

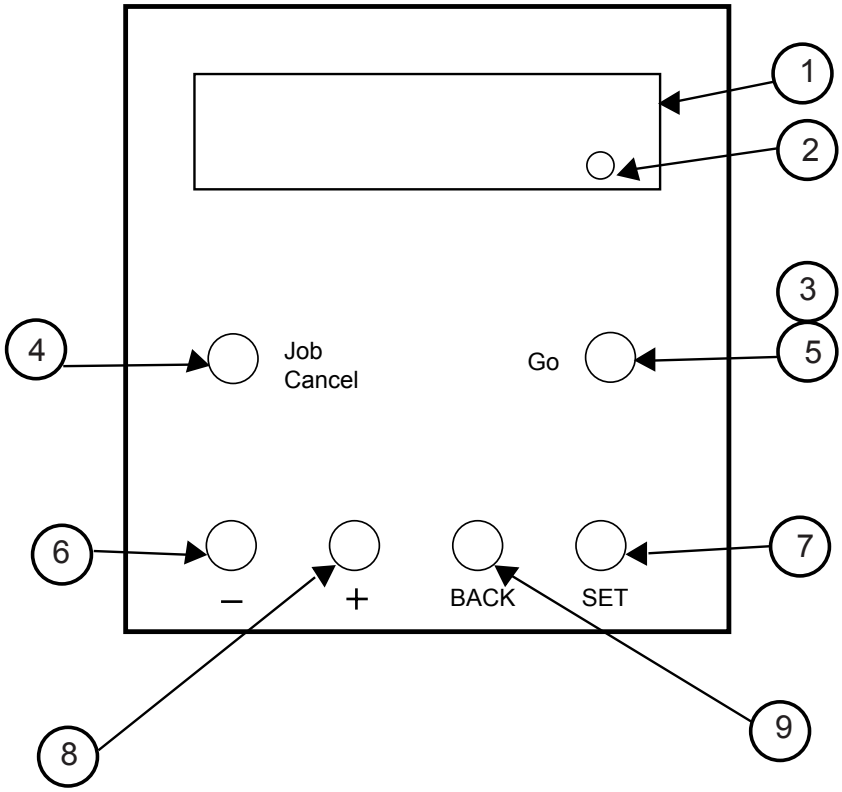


Fig.1-4

No.	LED / Button Name
1	LCD: 16 character by 2 lines
2	Alarm LED
3	Online LED
4	Job Cancel Key
5	Go Key
6	- Key
7	Set Key
8	+ Key
9	Back Key

CHAPTER II
SPECIFICATIONS

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)

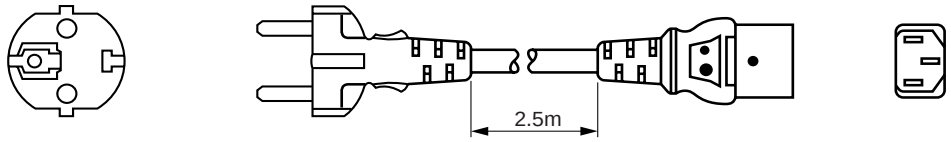
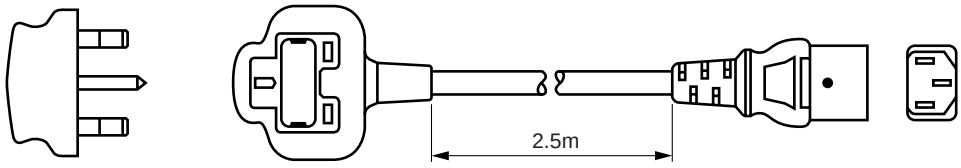


Figure B: For UK



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 dpi
600 x 600 dpi with CAPT (The resolution can be enhanced to 2400 dpi class by using CAPT (Color Advanced Photoscale Technology) and Brother exclusive HRC (High Resolution Control).)
600 dpi class
600 dpi class with CAPT

Print speed: Standard: 31 page/minute (A4/Letter-size in monochrome)
8 page/minute (A4/Letter-size in full color)

Warm-up: Less than 45 seconds at 22°C (71.6°F)

First print: Monochrome mode: 15 seconds (average)
Full color mode: 21 seconds (average)
(when loading A4/Letter-size paper by face down print delivery from standard upper tray feed)

Print media: Toner in a single-color single-component cartridge
Life Expectancy: 10,000 single-sided pages/cartridge (Black)
6,600 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, 13 bar codes
<BR-Script 3 mode>
35 scalable fonts

2.2. Functions

CPU:	MIPS TMPR4955 (300 MHz)
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:	IEEE 1284 parallel Universal Serial Bus 2.0 (High Speed) Ethernet 10/100 Base-TX
RAM:	Standard model: 64Mbytes (Expandable up to 576Mbytes with SO-DIMM) The standard memory fitted can vary depending on the printer model and country.
Control panel:	6 buttons, 2 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:	670W or less
Standing by:	200W or less
Sleep:	17W or less

Noise:	Printing:	Lwad 6.6B or less (second power level)
	Standing by:	Lwad 5.4B 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:	15 to 80% (non condensation)
	Storage:	10 to 90% (non condensation)

Dimensions (W x D x H):
480 x 420 x 385 mm (18.9 x 16.5 x 15.2 inches)

Weight: Approx. 31.5kg (69.4lbs.)

2.4. Network

Type / Speed:	10BaseT/100BaseTX Ethernet Auto speed detection
Protocols:	TCP/IP (DHCP, BOOTP, RARP, ARP, APIPA, WINS/NetBIOS, NetBIOS over IP, NetBEUI, DNS, LPR/LPD, Port9100, Custom Raw Port, POP3/SMTP, SMB Print, TELNET, SNMP, HTTP, TFTP, IPP, FTP, Rendezvous, SSDP, XHTML-Print), Apple Talk, IPX/SPX, DLC/LLC
Management:	Web Based Management BRAdmin Professional Windows® based management utility TELENET Command Console SNMP (MIB-2, Host Resource MIB, Printer MIB, Brother MIB) HP JetAdmin Compatible
Firmware update:	8MB flash ROM. Use parallel I/F or BRAdminProfessional with following protocols when upgrading print server software. Protocols: TFTP PUT/GET, NETWARE GET, FTP PUT
Supplied software:	BRAdminProfessional (for Windows® 95/98/ME/NT 4.0/2000/XP) A port driver for Windows® 95/98/ME/NT 4.0 LPR port driver (for Windows® 95/98/ME/NT 4.0) NetBIOS port driver (for Windows® 95/98/ME/NT 4.0/2000/XP) SMTP port driver (for Windows® 95/98/ME/NT 4.0/2000/XP)

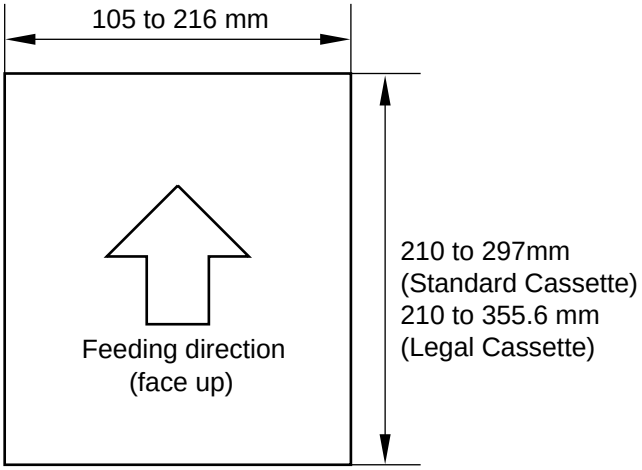
2.5. Paper Specification

2.5.1 Printable Media & Tray Capacity

The standard media tray (upper tray) 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 / Label / Envelope
   Thick paper
2) Printable size: (Refer to the list below.)
3) Feedable paper weight: 60 (16lb.) to 210 (55lb.) g/m^2
4) Maximum load height : 26mm
   - Plain paper: 250 sheets of 75g/m^2 (20lb) paper
   - Thick stock: 120 sheets
   - Envelopes : 15 sheets
   - Post Card: 25 cards
   - Transparency: 50 sheets
   - Label: 80 sheets
5) Setting method: Pull the media tray out of the printer toward you, insert the paper into the tray after aligning the top edge of the sheets, then push the tray back into its original position.

Paper Source	Printable Media Size	
The Standard Paper Tray	Plain paper:	A5, A4, Letter, B5, Executive
	Envelope:	COM10, DL
	Other size:	width 105-216mm (4.1”-8.5”) length 210-355.6mm (8.3”-14”)
The Optional Legal Cassette	Plain paper:	A5, Legal, A4, Letter, B5, Executive
	Envelope:	COM10, DL
	Other size:	width 105-216mm (4.1”-8.5”) length 210-355.6mm (8.3”-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℃, 50 ~ 70%RH

2.5.3 Recommended Paper Specifications

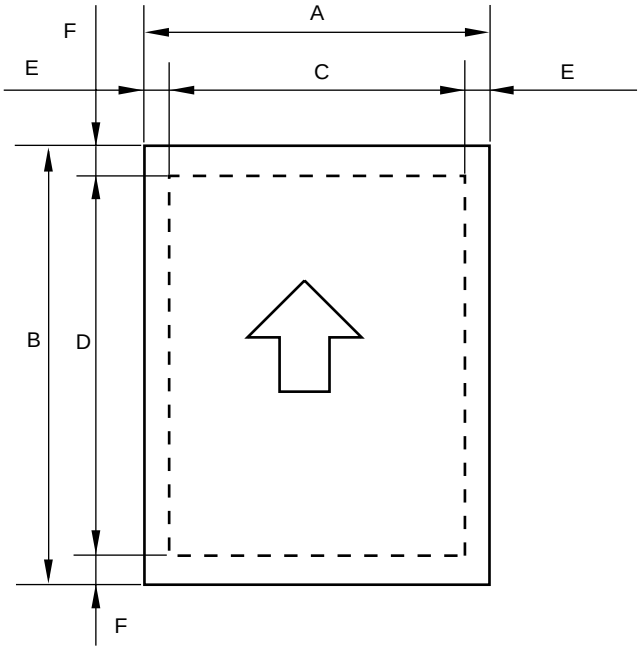
Item	Description
Basis Weight (g/m^2)	82 ± 5
Thickness (μ m)	95 ± 6
Smoothness (Bekk) (seconds)	90 ± 20
Stiffness (Clark)	100 ± 15
Brightness (%)	85 ± 2
Surface Resistance (Ω)	10^{10} ~ 10^{11}
Grain Direction	Long

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)	↑	↑
B5 (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)	↑	↑
B5 (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)	↑	↑

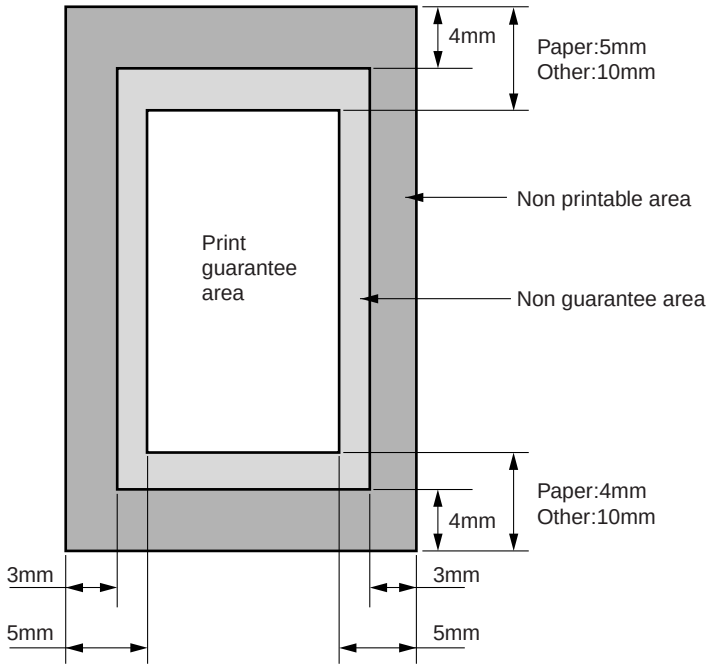
(Note that the paper sizes indicated here should conform to the nominal dimensions specified by JIS.)

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

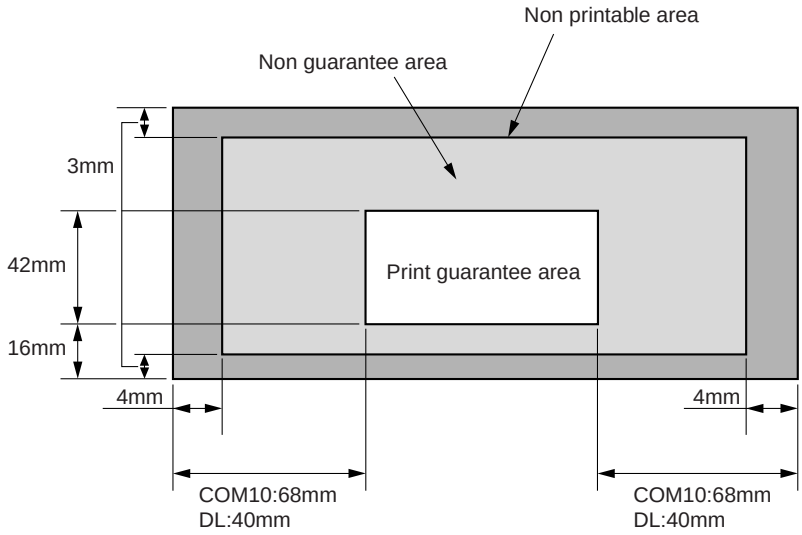
The dot size is based on 300 dpi resolution.

(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.

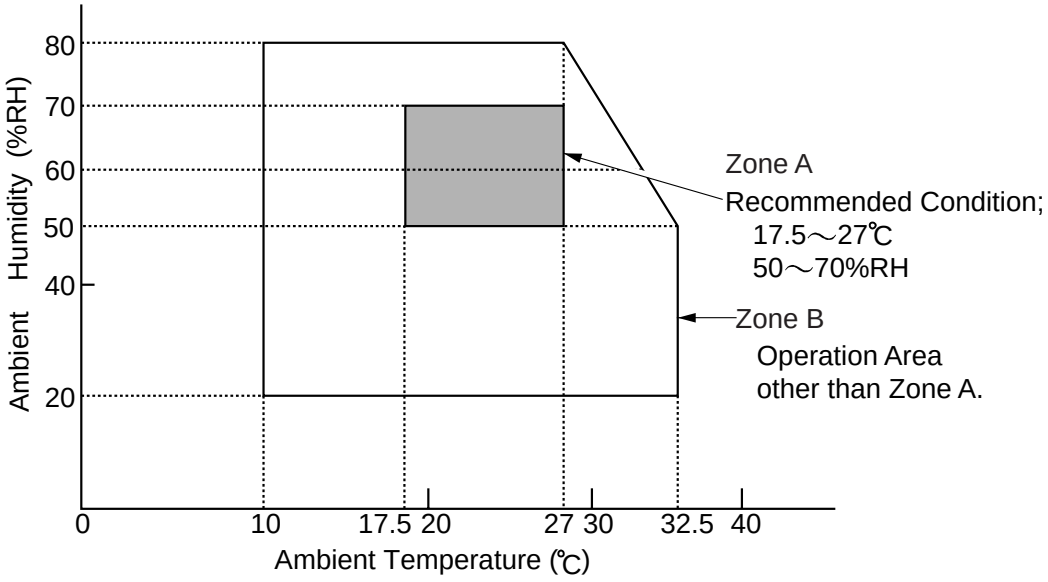
Note:

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

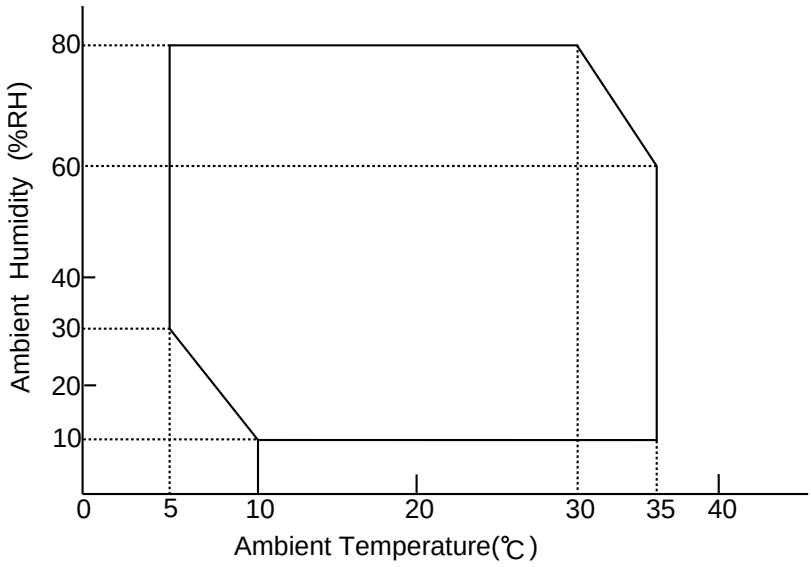
3. ENVIRONMENTAL CONDITION

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

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.

> ***WARNING***
>
> *This printer may have to be powered off by turning off the power switch or unplugged in some cases. The power switch is located at the lower left of the left side cover PU.*
>
> *The power cord is connected to the back of the printer. Set the printer so that the power switch or cord can be easily accessible just in case.*

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 ~ 32.5°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 cause humid, dust, smoke, oil mist or ammonia gas.

(e) Where it is likely to use the ultrasonic humidifier.

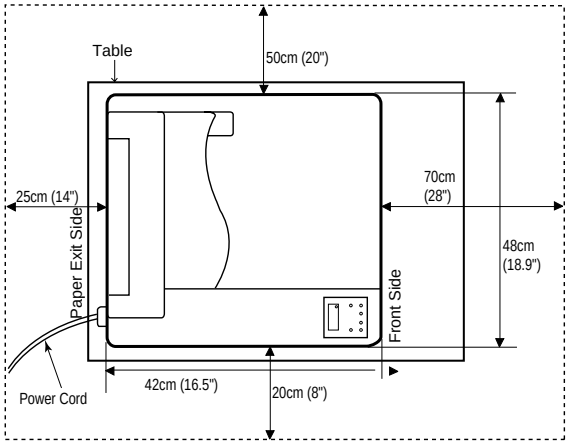
(f) Where it is likely to have poor ventilation.

(g) Where it is likely to have unstable condition in terms of set-up table etc.

(h) Where it is likely to have poor set-up surface (skew greater than ±1°).

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.



480 (W) x 420 (D) x 385 (H) (mm)
18.9(W) x 16.5(D) x 15.2(H) (inch)

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 (25cm) is necessary to open / close the rear access cover.
- The space on right side of the printer (50cm) is necessary for general access.
- The space on left side of the printer (20cm) is necessary for general access.

2. UNPACKING

WARNING

- *The package containing a printer weighs approximately 35kg, 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 (4) P.P Band (2 Pieces).
2) Remove (3) Plastic Joint (4 locations).
3) Remove (5) Upper Tape.
4) Open the top flap remove the (B) starter kit and (C) power code.
5) Remove (7) Upper Cushion and (8) Upper Cushion (2 each).
6) Lift and remove (1) Outer Box.
7) Open up (9) Polyethylene Bag wrapping the printer engine.
8) Lift up the Laser printer (A) and put it in the setting location.
   (This work needs more than 2 persons due to heavy mass of printer engine.)
9) Remove (12) /(13) /(!4)/(15)Shipping Tape (4 locations).

1. Packing List

No.	Name of Parts	Q'ty
A	Laser Printer	1
B	Starter Kit	1
C	Power Code	1

2. Construction of Packing

No.	Name of Parts	Q'ty
1	Outer Box	1
2	Base Packing	1
3	P Joint	4
4	P.P Band	2
5	Outer Box Tape	1
6	Power Code Tray	1
7	Upper Cushion L	2
8	Upper Cushion R	2
9	Polyethylene Bag	1
10	Silica Gel	1
11	Base Cushion	4
12	F Tape	1
13	F Tape	1
14	F Tape	1
15	F Tape	1
16	Front Cushion	1

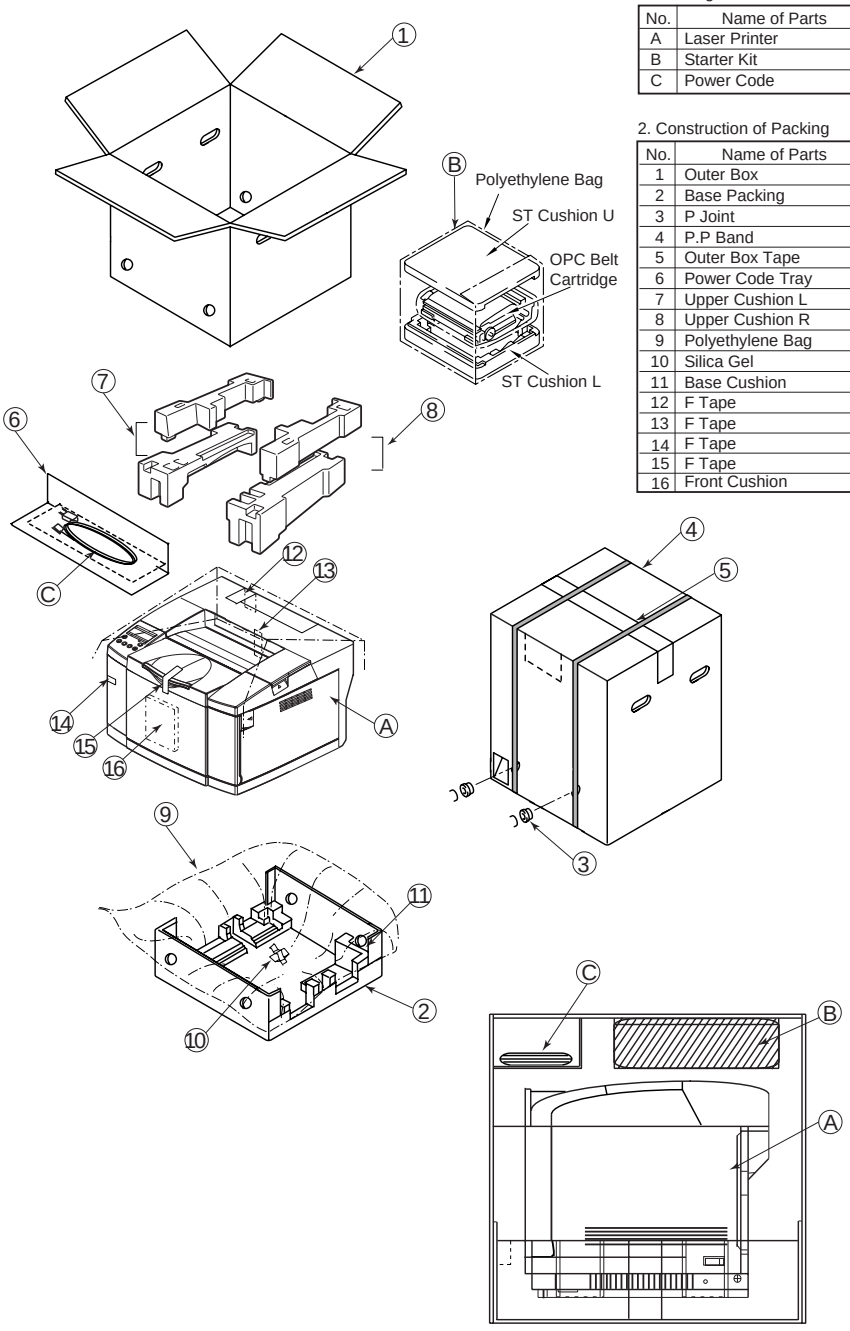


Fig.3-2

2.2 Unpack the Starter Kit

<Unpacking Procedure>

1) Remove (1) polyethylene bag covering the starter kit.
2) Remove the (2) ST Cushion U of Starter Kit.
3) Remove the (3) Belt Cartridge PU with (4) polyethylene bag from (5) ST Cushion L.
4) Remove (4) polyethylene bag from Belt Cartridge PU.

> ***CAUTION***
>
> *Starter Kit (belt cartridge PU) is unique for this printer. If you use any non-unique consumables, it may deteriorate the print quality and break down the engine.*

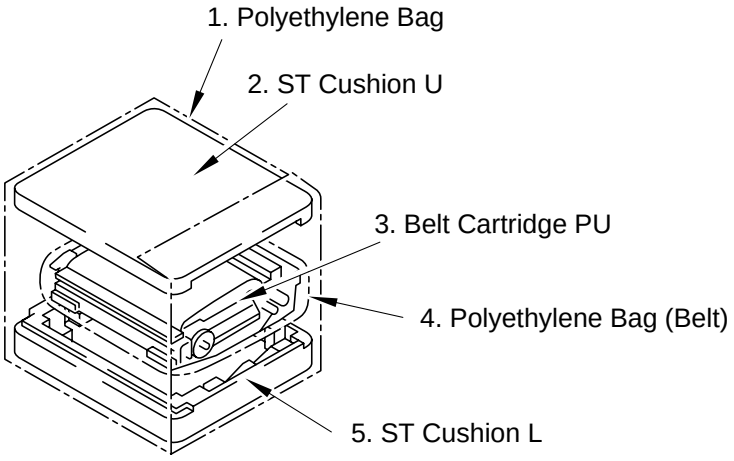
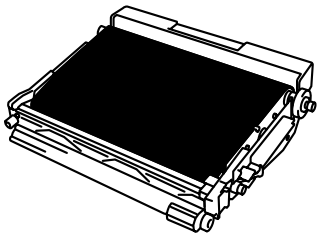


Fig.3-3

No.	Kit Name	Appearance	Quantity
1	Belt Cartridge PU		1

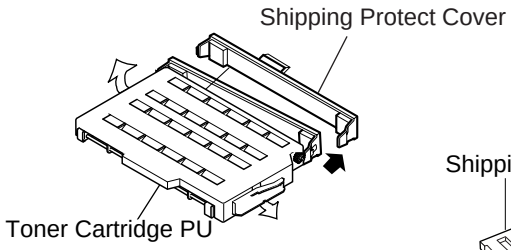
3. INSTALLATION WORK

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

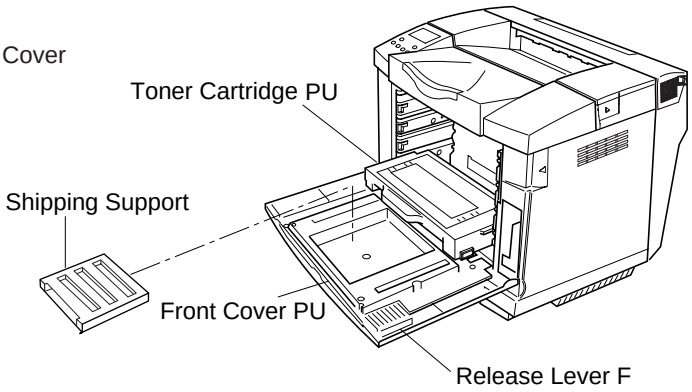
3.1 Install the Toner Cartridge PU

> ***CAUTION***
>
> *Make sure to remove the shipping support and cover of the toner cartridge prior to starting the installation of the belt cartridge PU. Otherwise, the belt cartridge PU may break down.*

1) Open the front cover.
2) Remove the shipping support.
3) Remove each toner cartridge PU
4) Remove the shipping protect cover. In this instance, remove the tape attached around the shipping cover.
5) Install each toner cartridge to the printer.
6) Close the front cover PU.



Remove the protective cover.



Open the front door of the printer.

Fig.3-4

> ***CAUTION***
>
> - *Do not push hard nor pound the toner cartridge. It may be the cause of toner leakage.*
> - *Do not lay the toner cartridge in the landscape or portrait orientation. Otherwise, the toner powder leans to one side, which may be a cause of the print quality failure.*

3.2 Tension-Release Piece of Fuser Unit

> ***CAUTION***
>
> *Make sure to remove the tension-release piece of the fuser unit prior to the test drive, otherwise, the paper jam and fusing error are caused while driving.*

1) Open the Rear Cover Assy PU.
2) Pull out the tension-release pin provided at the left and right side of fuser unit.
3) Close the Rear Cover Assy PU.

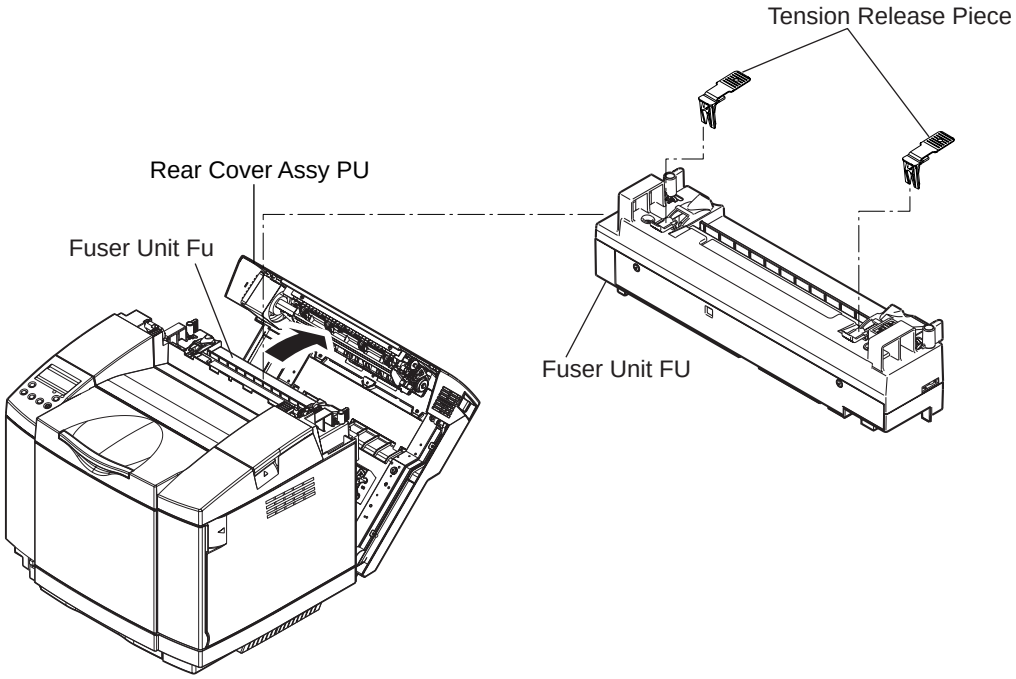
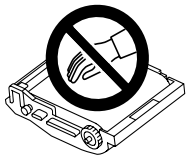


Fig.3-5

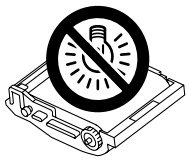
3.3 Install the Belt Cartridge PU

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) Prepare the belt cartridge PU to be installed.
2) Open the top cover PU.

Fig.3-6

3) Pull out the belt tension-release pin (1 piece for both sides) provided for shipping.

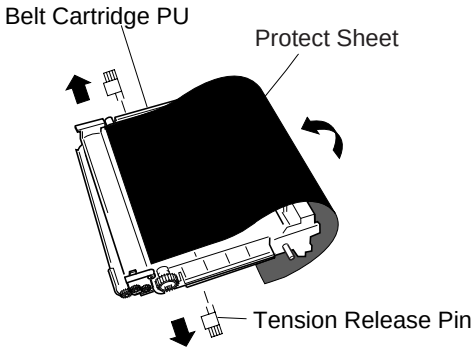


Fig.3-7

4) Remove the protective sheet covering the surface of belt cartridge PU.
5) Push the belt cartridge PU along the guide (left and right) into the printer.

6) Fix the belt cartridge and turning out the lock lever BC provided at the left and right side of the belt cartridge PU.

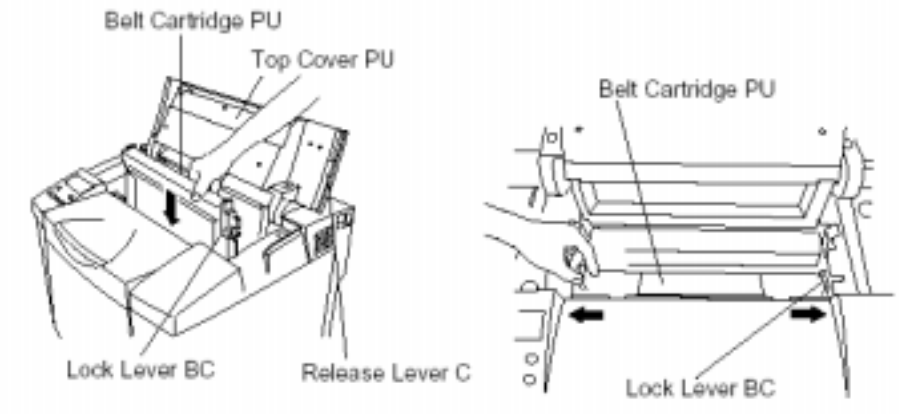


Fig.3-8

7) Confirm by lightly pulling the belt cartridge up that the belt cartridge is fixed.
8) Close the top cover PU.

3.4 Test Run & Test Print

3.4.1 Power-On & OFF

<Power-On:>
Printer has the power switch located at the lower side of the left side panel.

1) Prior to connecting the power cord, set the power switch to the 'OFF' position.

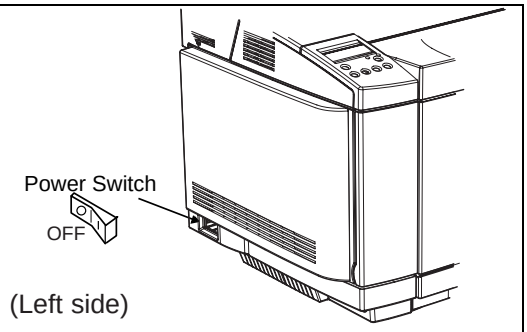


Fig.3-11

2) Connect a the connector of power supply cord to the printer.

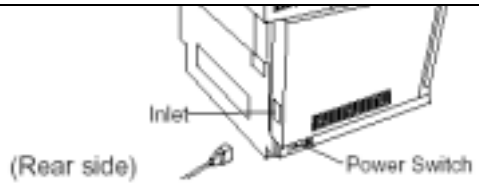


Fig.3-12

3) Plug the power supply cord in the outlet.

Fig.3-13

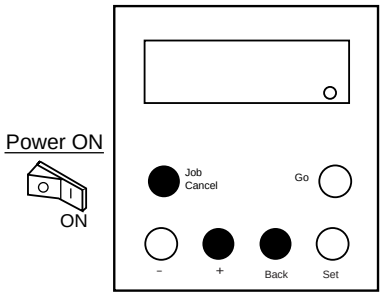
4)
(1)Simultaneously pressing • -marked three keys on the operator panel, turn the power switch ON.

(2)Press the Job Cancel key.

as shown in the Figure (b).

5) "Alarm" LED lamp changes to be lit within 45 seconds at max., when screen (b) appears on the operator panel display.

(a). Indication at Warming-UP



(b). Indication at "Ready to Print" status

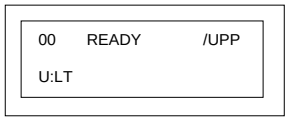


Fig.3-14

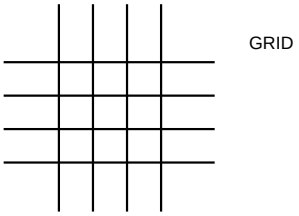
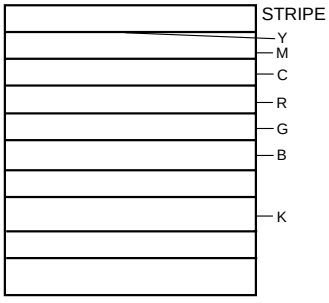
CAUTION

Prior to unplugging the power cord, confirm that the power switch has been set as OFF condition. Strictly refrain from turning off the power switch or unplugging the power cord while the printer is operating the printing job. Wait at least 5 seconds immediately after turning off the printer power switch.

3.4.2 Test Print

After power-on, confirm the normal printing by test printing according to the following procedures:

(1). Procedure of Test Print

Step	Operation	Details of Operation
1	Power-on	Upon completion of the warming-up process, printer is ready to print and waits for PRINT signal. [See the power-on in Section 3.4.1.]
2	Test Print See Item (2) "Test Print Procedures" for details.	Printer has the following built-in print patterns for test printing. 1). Grid Pattern : Available in mono color print of Y, M, C, K, and two color print of R, G, B.  2). Stripe Pattern: Available in color print of Y, M, C, K, R, G, B. 

(2). Test Print Procedures

Implement the test print according to the following procedures upon completion of the warming-up process.

Procedure	Indication of Operator Panel
① Warming-up process is completed.	a) 00 READY [ ] [ ] [ ] [ ] [ ]
② Press Job Cancel key so that display changes from the screen (a) to (b).	b) SERVICE MODE ▷TEST PRINT / NEXT
③ Press Set key so that display changes from the screen (b) to (c).	c) 31 GRID PRT ▷ GRID / STRIPE
④ Select GRID or STRIPE pattern with scroll key. (GRID to be selected.)	
⑤ Press Set key so that display changes from the screen (c) to (d).	d) 31 GRID PRT ▷ Y / M / C / K / R / G / B
⑥ Select the color to be printed with scroll key. (R to be selected.)	
⑦ Press Set key so that display changes from the screen (d) to (e).	e) 31 GRID PRT ▷ SPL / DP1 / DP2
⑧ Warming-up starts, and continuous print will be automatically carried out upon completion of the warming-up.	f) 31 GRID PRT YM
⑨ Printing operation can be suspended by pressing - key , and display changes from the screen (f) to (b).	Continuous Print
⑩ Printer will be returned to ONLINE mode by pressing Job Cancel key	CLEAR

(3). Selection of Media

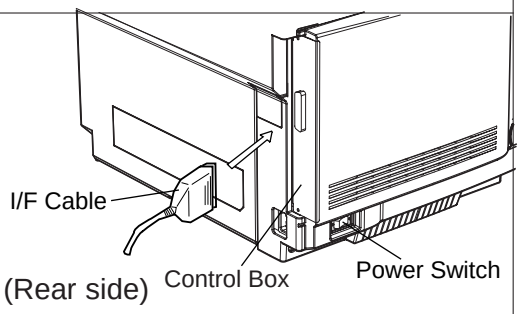
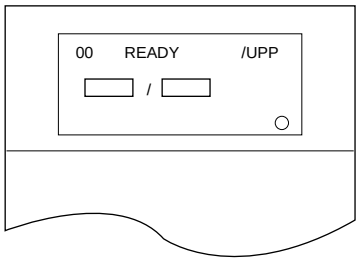
Pressing the media select key on the operator panel, select the suitable process for the media to be used.

When the media select key is pressed, the media lamp changes as follows:

Condition of Media Lamp	Selected Media
Lit Out	Plain Paper
Lit	Transparency
Blinking	Thick Stock, Label, Envelope

3.4.3 On-Line Print

After confirming that the printer has completed the test print in the test print mode, carry out the online print according to the following procedures.

<table>
<tr><th>Step</th><th>Operation</th><th>Details of Operation</th></tr>
<tr><td>1</td><td>Connect the interface cable to the control box.</td><td rowspan="2"> 
</td></tr>
<tr><td>2</td><td>Set the power switch to 'ON' side.</td></tr>
<tr><td>3</td><td>Confirm that the printer is set to the online mode. (See the figure in the right column for details.) Confirm the indication of the operator panel.</td><td rowspan="2">Confirm what is indicated on the operator panel.
 
</td></tr>
<tr><td>4</td><td>Upon completion of the warming-up procedure, 'Alarm' LED lamp is lit. The warming-up procedure takes about approximate 45 seconds.</td></tr>
<tr><td>5</td><td>Upon receipt of the 'PRINT' signal transmitted from the host, the printer starts to print.</td><td></td></tr>
</table>

CHAPTER IV

STRUCTURE OF SYSTEM COMPONENTS

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.

- First Transfer (Transfer Belt)
- Second Transfer Part (Paper Transfer)
- 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 paper tray, separates the paper from the transfer drum and exits it from the printer body after fusing the toner image on the paper.

- Paper Tray
- Transport rollers
- Paper Discharger
- Fusing unit
- Paper Exit

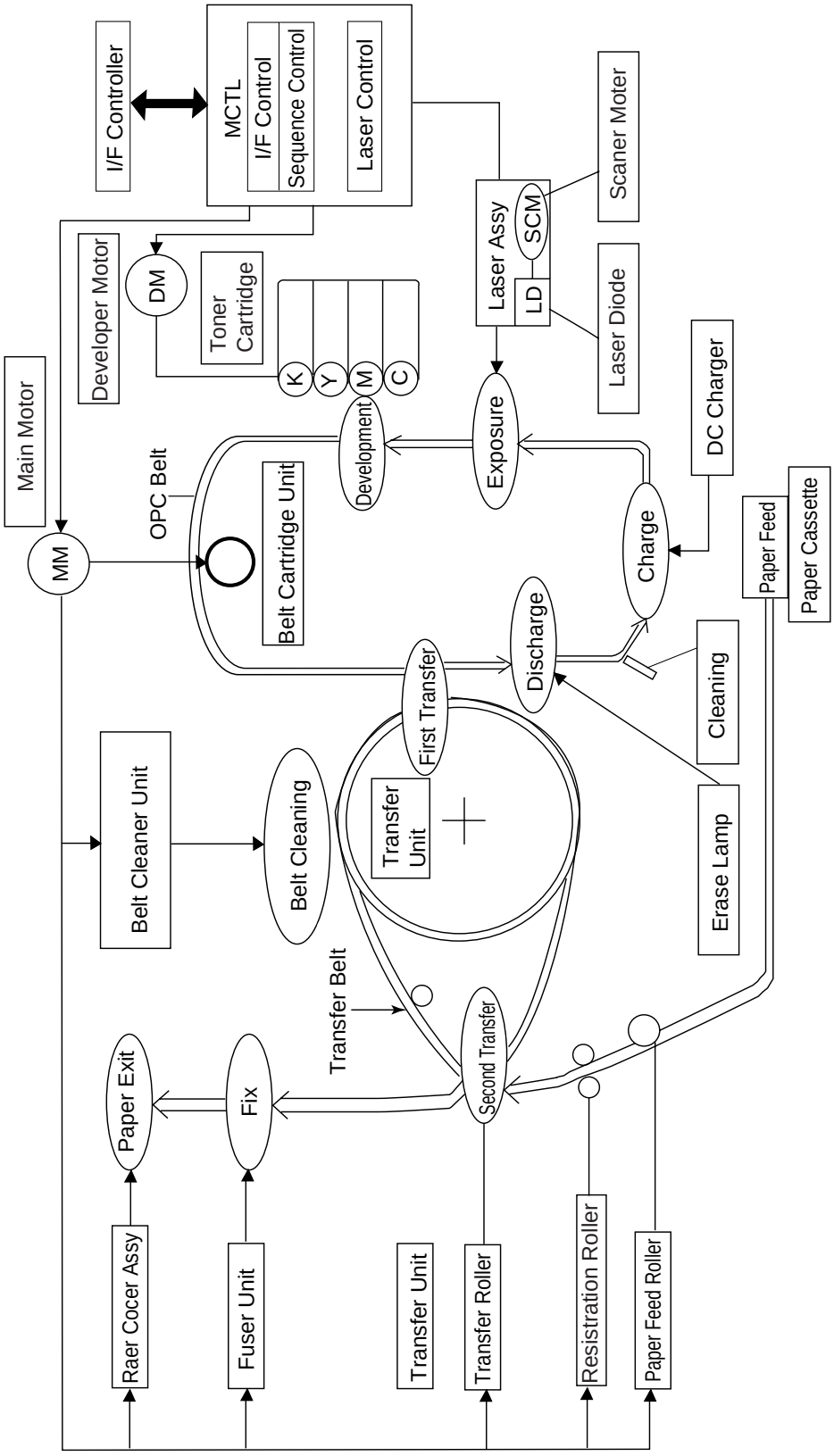

I/F Controller
MCTL
I/F Control
Sequence Control
Laser Control
Scaner Moter
Laser Assy
SCM
LD
Laser Diode
Developer Motor
DM
Toner Cartridge
K
Y
M
C
Development
Exposure
DC Charger
Main Motor
OPC Belt
Belt Cartridge Unit
MM
Charge
Paper Feed
Paper Cassette
Discharge
First Transfer
Cleaning
Belt Cleaner Unit
Belt Cleaning
Transfer Unit
Erase Lamp
Transfer Belt
Second Transfer
Paper Exit
Fix
Raer Cocer Assy
Fuser Unit
Transfer Unit
Transfer Roller
Resistration Roller
Paper Feed Roller

Fig.4-1

(5) Control System

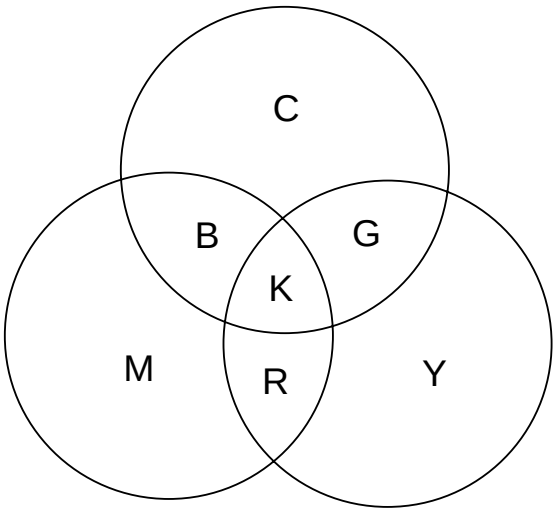
The control system consists of the following 4 (four) control parts and runs the printer by processing the interface signals transmitted from the Host computer and interfacing to the print, transfer, scanning and transport systems.

- 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:



Y: Yellow
M: Magenta
C: Cyan
R: Red
G: Green
B: Blue
K: Black

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ⓐ.

(c) The toner image formed on the transfer drum is transferred to the transported paper as shown in Fig.4-4ⓑ.

(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ⓒ.

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.

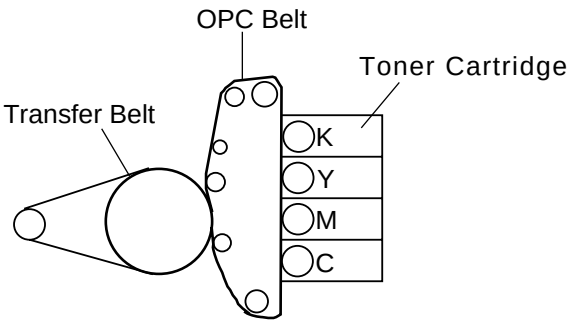

OPC Belt
Toner Cartridge
Transfer Belt
K
Y
M
C

Fig.4-3

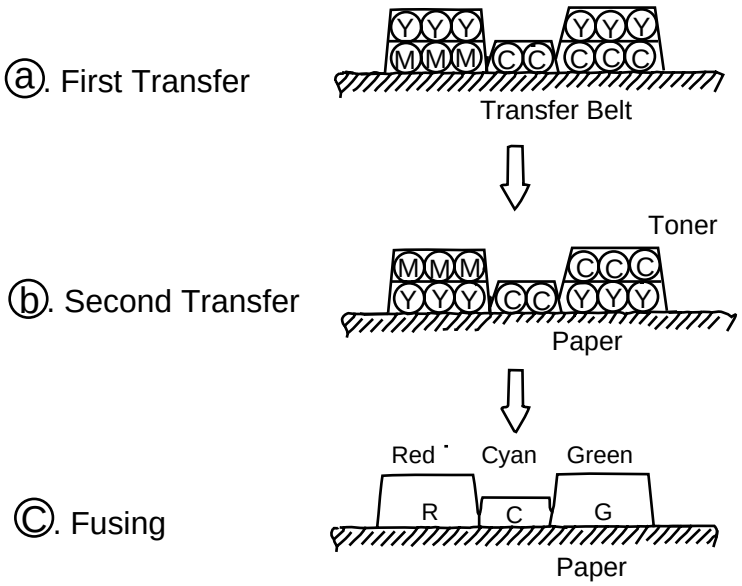

ⓐ. First Transfer
Transfer Belt
Toner
ⓑ. Second Transfer
Paper
Red
Cyan
Green
Ⓒ. Fusing
R
C
G
Paper

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.

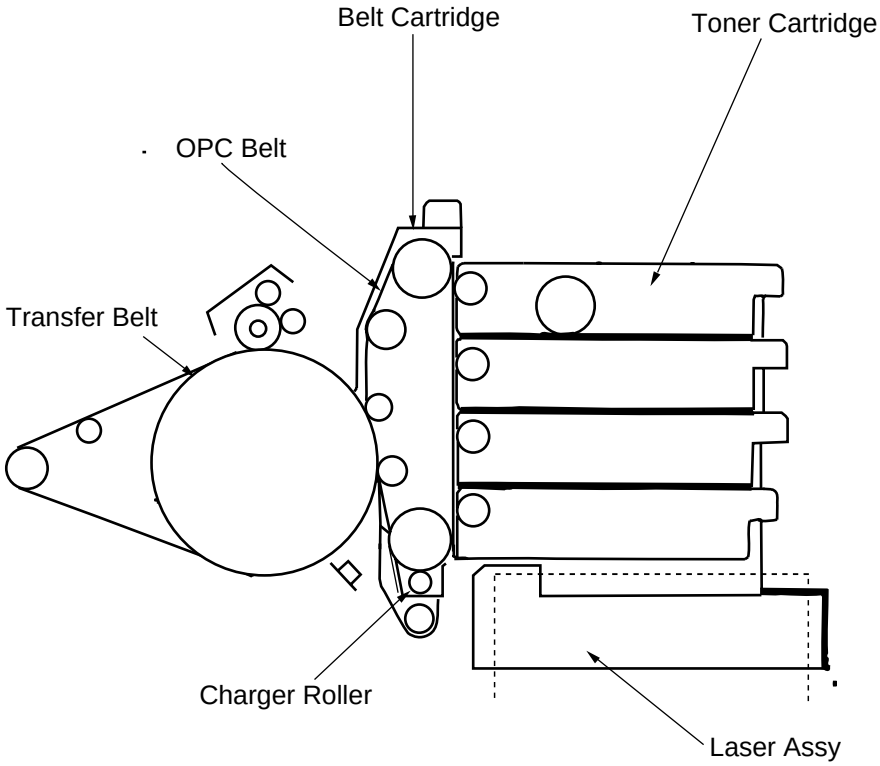


Fig.4-5

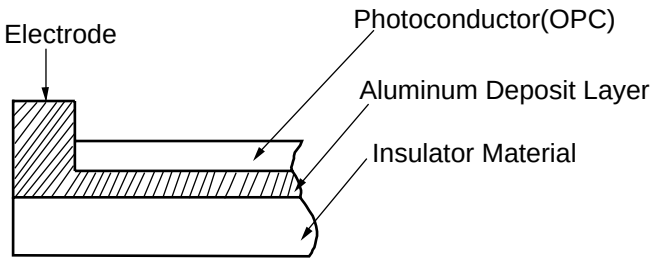


Fig.4-6

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 made by actuating the 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.

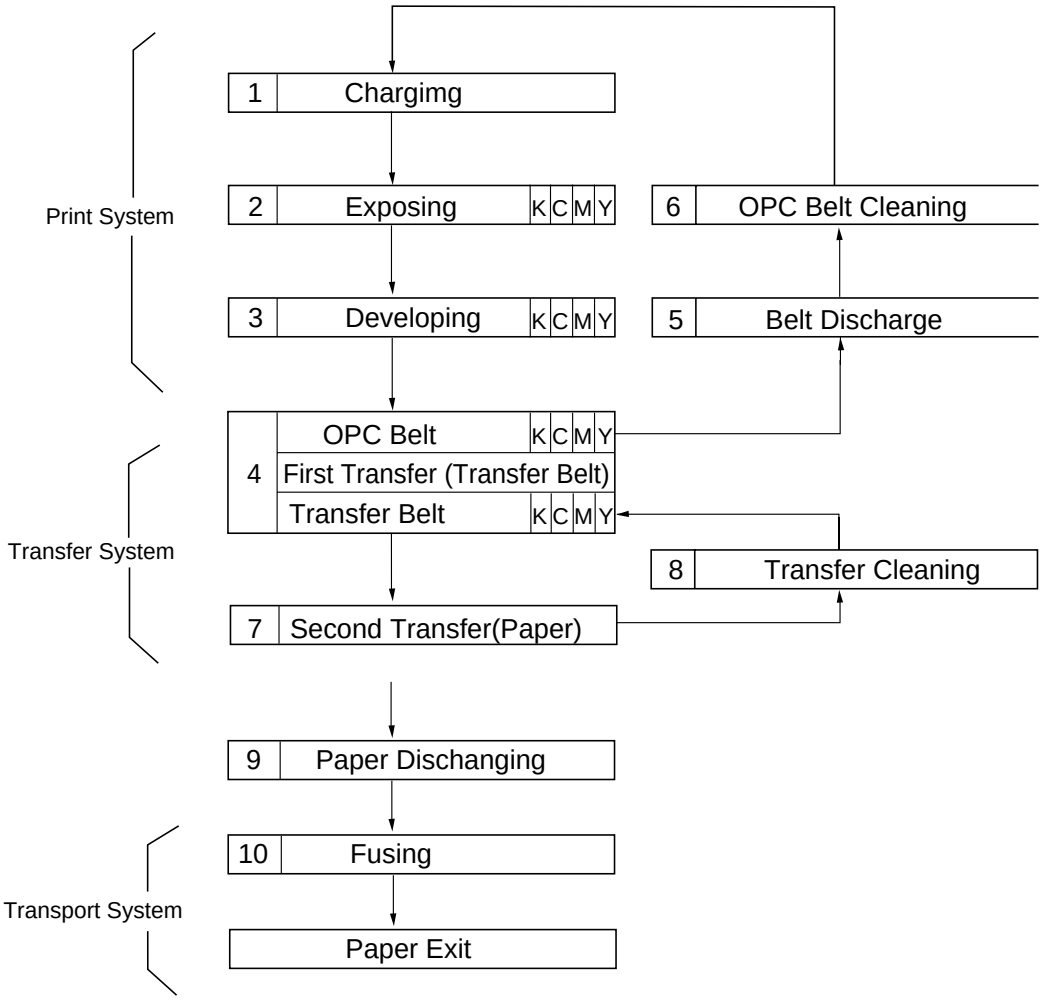


Fig.4-7

1.1.1 Structure of the Printer

No.	Component Part	Process
1	OPC Charger Roller PU	Charging
2	Laser Assy PU	Exposing
3	Toner Cartridge PU	Developing
4	Belt Cartridge PU	Receiving of image
5	Transfer Belt (Transfer Unit PU)	Transferring of image
6	Belt Discharger Erase Lamp	Discharging of OPC Belt
7	Cleaning Blade	Cleaning of OPC Belt
8	Transfer Roller Assy PU	Transferring
9	Cleaning Roller PU	Cleaning of Transfer Belt
10	Fuser Unit FU	Fusing
11	Rear Cover Assy PU (Paper Exit Unit)	Exiting of Paper

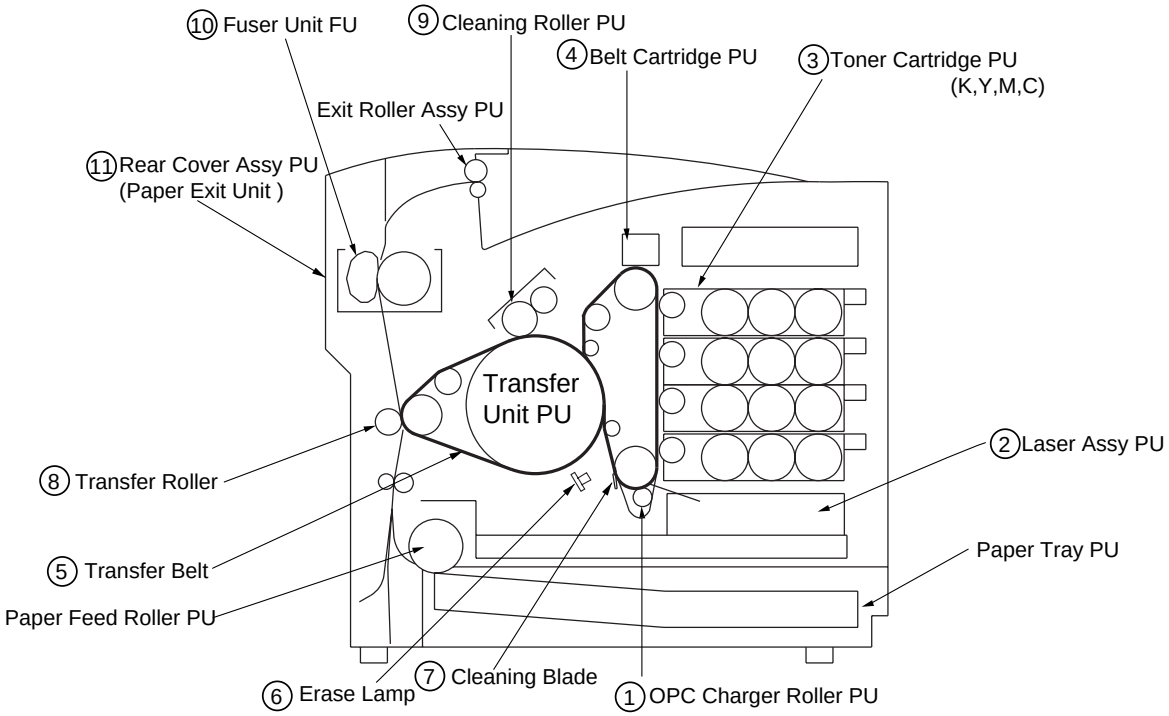


Fig.4-8

1.1.2 Basic Structure of the Printing System

A toner image is formed through the potential of the OPC belt varying in each of the charger, exposure, development, transfer and cleaning processes.

(1) Process of Print System (See Fig.4-9.)

i) The OPC belt is biased to the voltage -CBV(V) by the power supply CBV.

ii) A negative high voltage is applied to the charger unit by the power supply CHV, and a corona is generated as the result.

iii) The developer magnetic roller of the toner cartridges is biased to -DBV(V) by the power supply DBV.

iv) The frame potential of the transfer drum is GND.

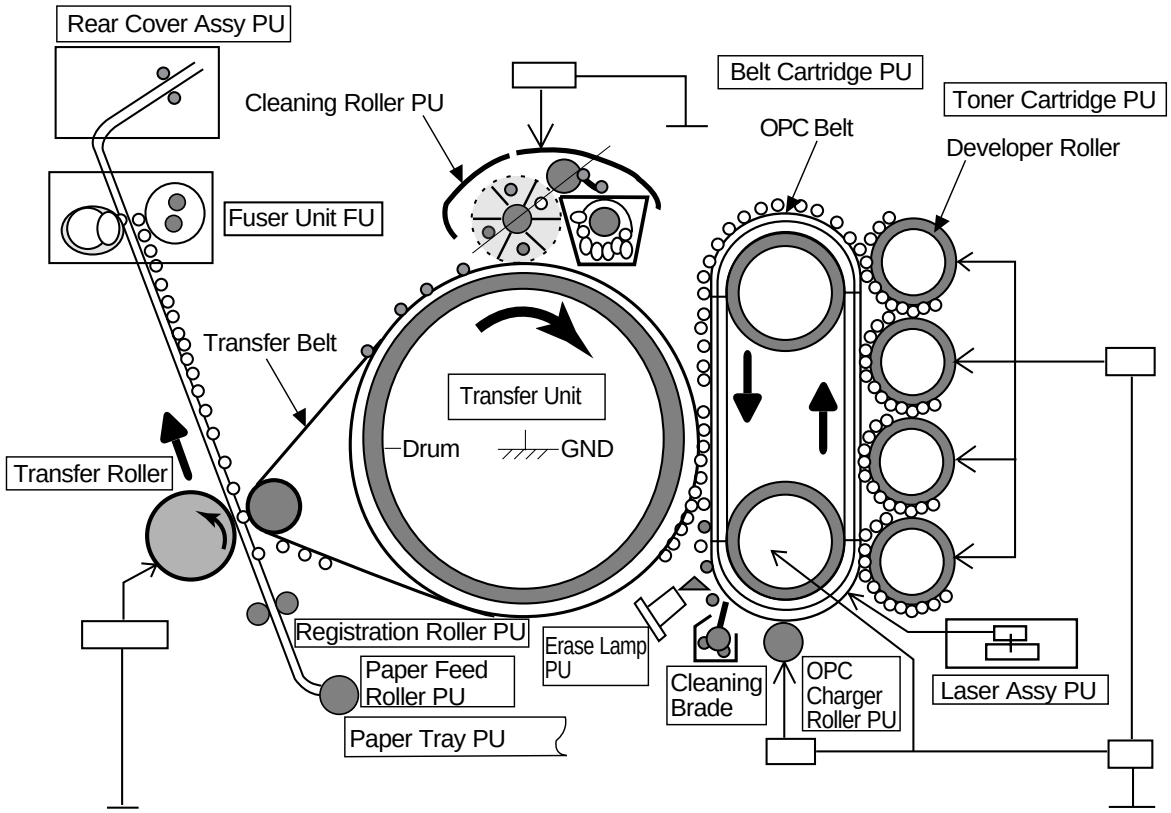


Fig.4-9

No.	Function		Power Supply (P/S)	
			P/S Name	Approx.Output Voltage
1	Charging		CHV(-)	4.6KV
			HVRD6190	619V
2	First Transfer		CBV(-)	200V ~ 900V
3	Developing Bias	Y,M	DBV(-A)	200V ~ 400V
		C,K	DBV(-B)	200V ~ 400V
4	Second Transfer		THV(+)	400V ~ 3,000V
5	Transfer Roller Cleaning		THV(-)	600V
6	Paper Discharging		ACV(~)	4.9KV
			DCV(+)	200V
7	Drum Cleaning		FCBV	200V ~ 1,500V

(2) Variation of OPC Belt Potential (See Fig.4-10.)

i) The OPC belt is initially biased to -CBV(V).

ii) The OPC belt surface is evenly charged to V_0(V) in the charging process.

iii) 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.

iv) 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.

v) 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.

vi) The OPC belt is discharged by the erase lamp.

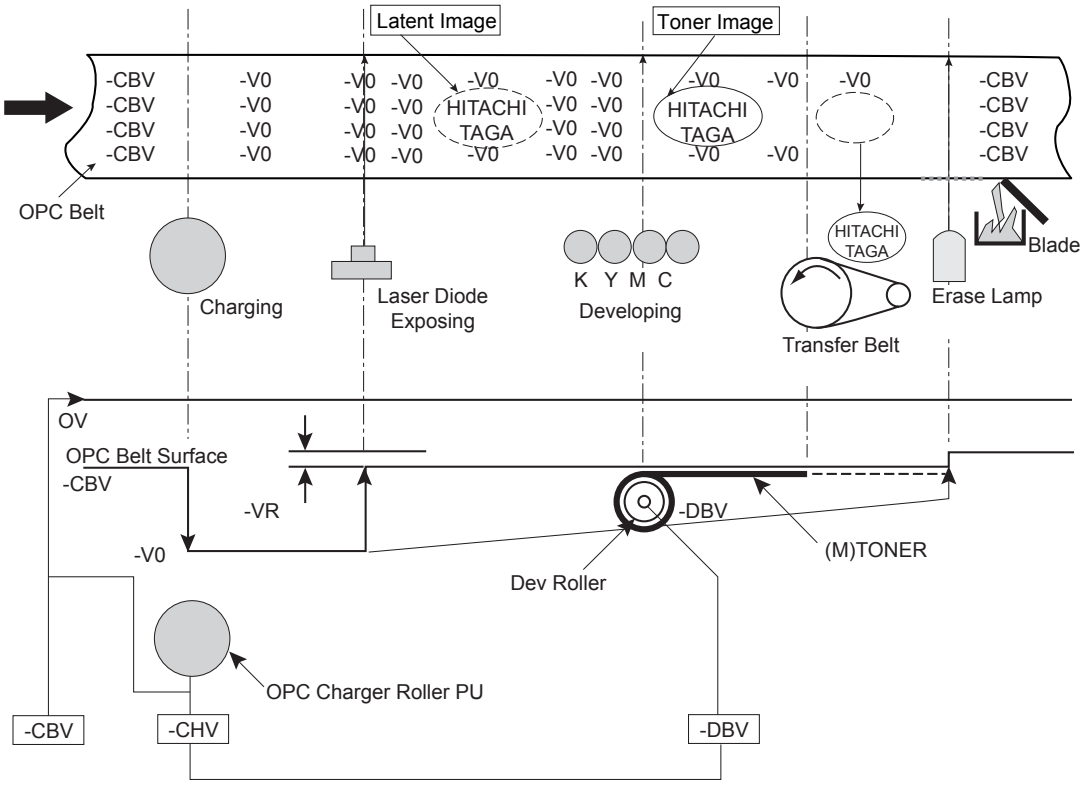


Fig.4-10

1.1.3 Details of Each Process

1	Charging

The charging process means that OPC belt is evenly charged by the OPC charger roller PU.

(1) Structure of the Charger Unit (Refer to Fig.4-8 and Fig.4-11)

i) OPC Charger roller PU is located as shown in Fig.4-8.

ii) Charge High Voltage is applied to the OPC charger roller PU.

iii) Brush surface of the charger roller contacts and charges the OPC belt surface evenly.

(2) Process of Charging (Refer to Fig.4-12.)

i) The status of the OPC belt surface before charging is -CBV(V).

ii) OPC charger roller PU charges evenly the OPC belt surface till $-V_0$(V) by generating negative charge..

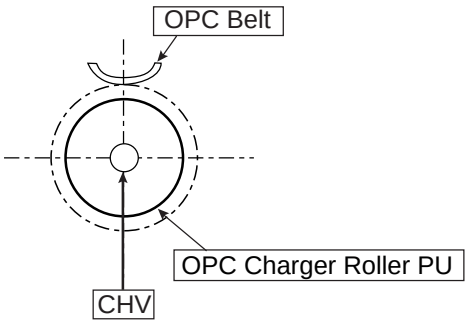


Fig.4-11

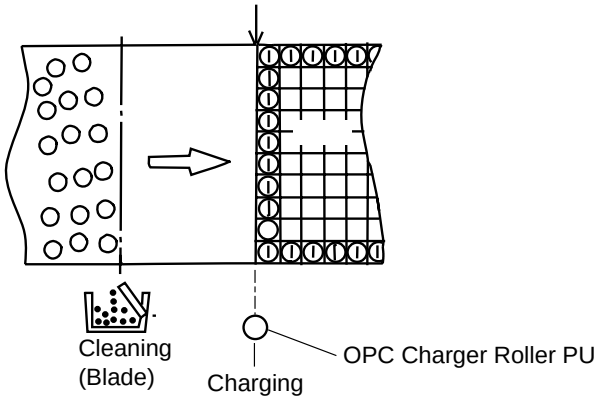


Fig.4-12

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 Laser Assy PU

i) Laser Assy PU is located as shown in Fig.4-8.

ii) Luminous source of the laser beam is a semiconductor laser.

iii) Scanning is made to laser light on OPC belt as converting the laser beam to the beam light through 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 -Vo(V) in the charging process.

ii) Laser beam is scanned as rectangular to the forwarding direction of OPC belt.

iii) High speed switching of laser is made according to the transmitted image data.

iv) Charge of the areas radiated by the laser beam is discharged, where the potential is -VR(V).

v) An invisible electrostatic latent image is formed on the OPC belt as shown in Fig. 4-13.

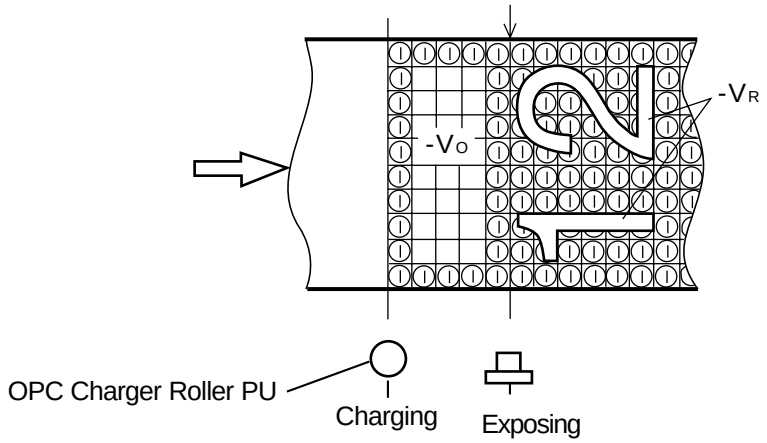


Fig.4-13

3	Developing

Developing Process means that an electrostatic latent image on OPC belt is made visible with toner.

(1) Structure of Toner Cartridge PU (Refer to Fig.4-8 & 4.14.)

i) Toner cartridge PU is located as shown in Fig.4-8.

ii) Four toner cartridges are made available from the top to bottom in the order of specified color as black, yellow, magenta and cyan.

iii) Each color toner is loaded in the corresponding toner cartridge PU.

(2) Process of Developing (Refer to Fig.4-8, 4-14, 4-15, and 4-16)

i) Toner adheres to the Dev.roller of toner cartridge PU.

Developing is processed by this Dev.roller contacting the OPC belt surface.

ii) Dev.roller has been biased to the potential -DBV(V). Fig.4-15 describes the relationship established between the potential of toner, the potential $-V_0$(V) at the non-exposed area of OPC belt and the potential -VR(V) at the exposed area of OPC belt.

iii) Developing is processed by the toner adhering to the OPC belt due to the attraction between the potential of toner and the potential -VR(V) at the exposed area of OPC belt. (Toner image is formed (visible) on the OPC belt.)

iv) On the other hand, no development takes place at the non-exposed area because the potential of toner and that of OPC belt is identical pole and therefore repels each other.

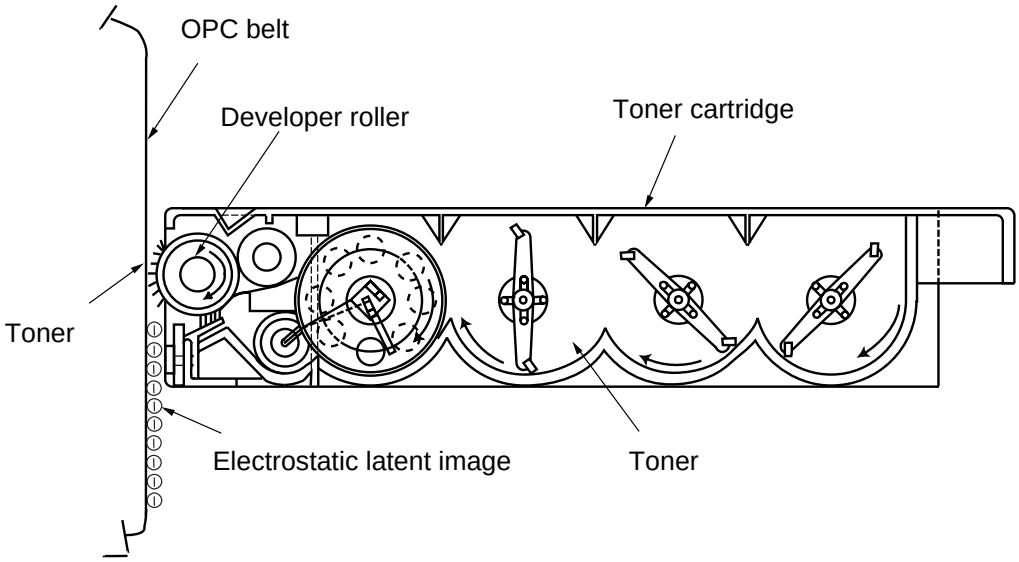


Fig.4-14

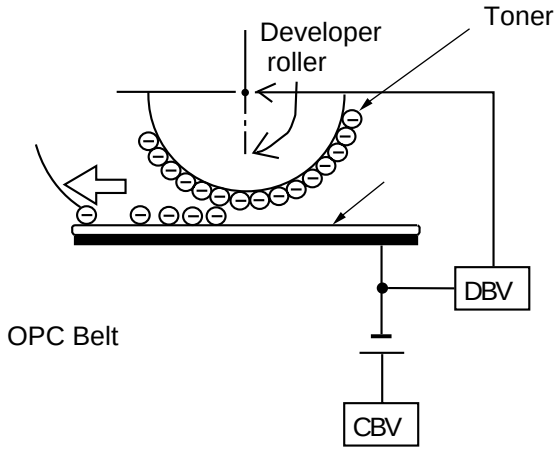


Fig.4-15

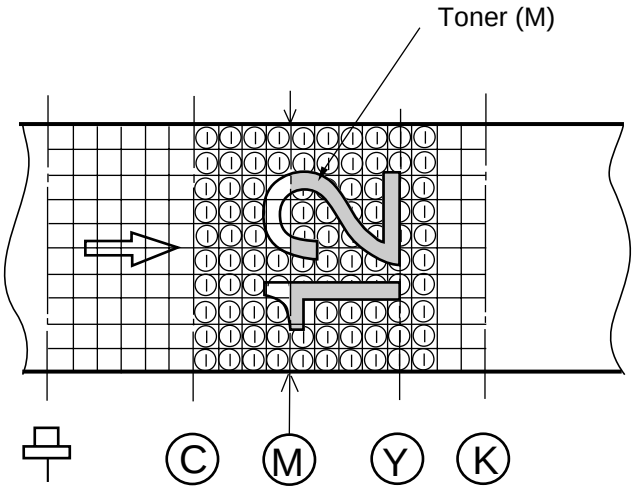


Fig.4-16

4	First Transfer (Belt)

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

(1) Structure of the Transfer Belt (Refer to Fig.4-8.)

i) First transfer part is located as shown in Fig.4-8.

ii) Material of the drum is aluminum.

iii) The belt composed of the special film is provided to the drum surface as shown in Fig.4-17.

iv) As Transfer Belt contacts the OPC belt, it rotates synchronous with the drum.

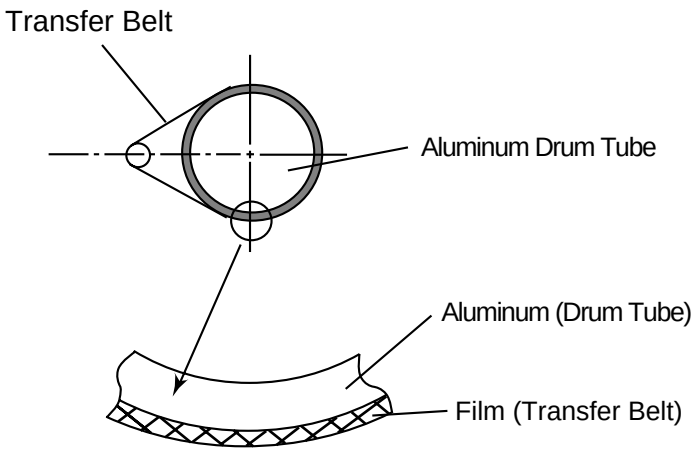


Fig.4-17

(2) Process of First Transfer (Refer to Fig.4-18.)

i) OPC belt that has been through the development process rotates as contacting and synchronizing with the transfer belt and drum.

ii) OPC belt has been biased to the potential of -CBV(V). Potential of the transfer belt is nearly GND.

iii) Toner on the OPC belt is moved onto the transfer belt due to the difference of potential between the OPC belt and transfer belt.

iv) Toner that has been developed by each color is moved from the OPC belt onto the transfer belt, and two color toner image is overlapped on the transfer belt.

v) Upon completion of the first transfer process, the toner image is transferred onto a paper in the process of paper transfer.

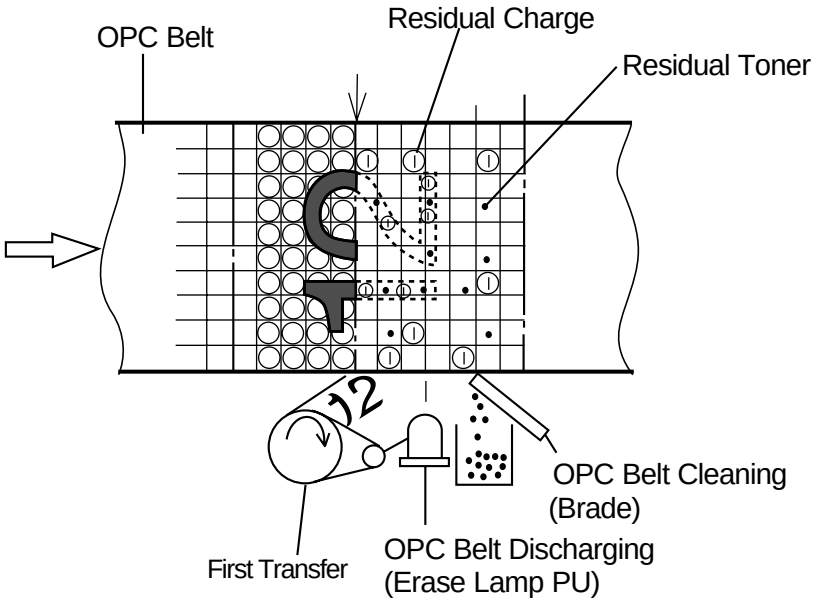


Fig.4-18

5	Belt Discharging (Erase Lamp)

OPC Belt Discharging Process means that upon completion of the first transfer process, LED light is radiated on the OPC belt prior to cleaning the belt to discharge the residual charge for electrical cleaning.

(1) Structure of Erase Lamp PU

i) Erase lamp PU is located as shown in Fig.4-8.

ii) Luminous source of erase lamp is the 6 pieces of light emitting diodes (LED).

(2) Process of Discharging (Refer to Fig.4-19.)

i) Though a toner image is transferred to the transfer belt in the first transfer process, there is still a residual charge on the OPC belt.

ii) Residual charge -VR(V) on the OPC belt is discharged by the radiation of erase lamp's light prior to cleaning the belt.

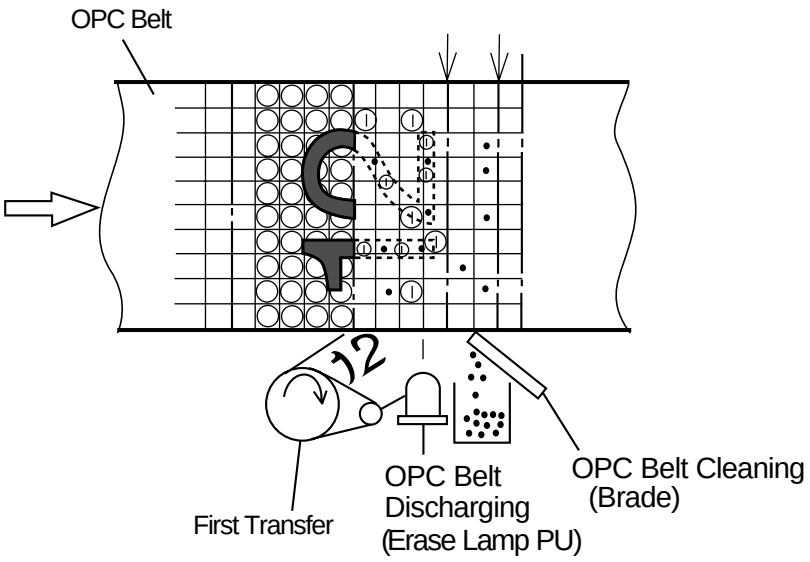


Fig.4-19

6	Belt Cleaning

OPC Belt Cleaning Process means that the residual toner adhering to the OPC belt surface is mechanically scavenged.

(1) Structure of Belt Cleaning

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

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

i) There is a residual toner on the OPC belt as it has not been transferred in the process of first transfer.

ii) Residual toner is mechanically scavenged by the blade edge.

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

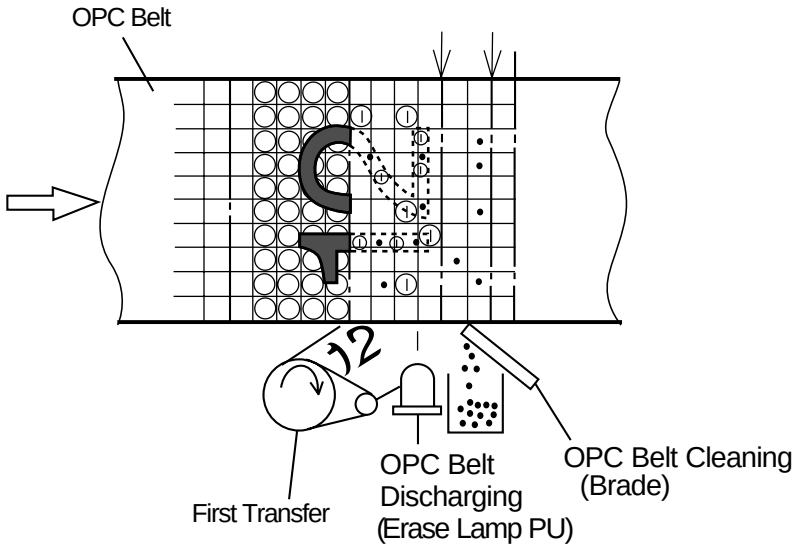


Fig.4-20

7	Second Transfer (Paper)

Second Transfer Process means that the toner image on the transfer belt is transferred onto the transported paper.

(1) Structure of Belt Cleaning

i) Transfer roller for the second transfer is located as shown in Fig.4-8.

ii) Transfer roller is normally separated from the transfer belt.

iii) Transfer roller is positively biased by the power supply THV.

iv) Transfer roller contacts to the transfer belt in the second transfer process.

v) Transported paper passes between the transfer roller and transfer belt.

(2) Process of Belt Cleaning (Refer to Fig.4-21.)

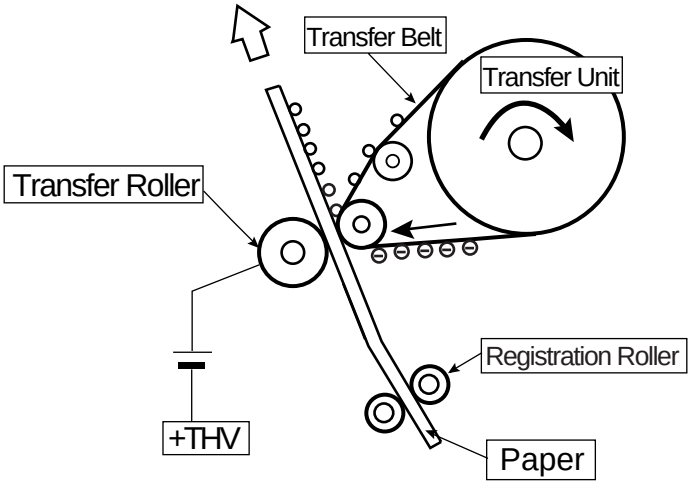
i) Paper is transported as synchronizing with the transfer belt.

ii) Transfer roller operates as synchronizing with the transported paper, and contacts with the transfer belt through the transported paper.

iii) Transported paper passes between the transfer roller and transfer belt. In this instance, the positive high voltage (THV) is injected to the transfer roller.

iv) Negatively charged toner is moved to the positively charged paper.

v) Transported paper with the toner transferred is transported to the paper discharging process.



THV: Power Supply for Transfer Roller Bias.

Fig.4-21

8	Drum Cleaning

Transfer Belt Cleaning Process means that the residual toner on the transfer belt is removed.

(1) Structure of Transfer Unit Cleaner PU (Refer to Fig.4-22)

i) Transfer Unit Cleaner PU is located as shown in Fig.4-8.

ii) Cleaning brush is a semiconductor type fur brush to clean the surface of transfer belt as rotating. However, the cleaning brush stays away from the transfer belt while imaging on the transfer belt.

iii) Belt cleaning roller is positively biased by the positive voltage FCBV(V).

iv) FCBV(V) is injected to the cleaning brush as well, and the cleaning brush is self-biased by the resistance of brush.

v) Cleaning roller rotates as contacting to the belt cleaning brush.

(2) Process of Transfer Belt Cleaning (Refer to Fig.4-22)

i) There is the residual toner on the surface of transfer belt after the paper transfer process.

ii) Cleaning brush is positively self-biased. Cleaning brush has the negatively charged residual toner fall off from the surface of transfer belt, and electrically absorbs the residual toner into the belt cleaning brush.

iii) Cleaning roller has been biased to the positive FCBV(V), the residual toner absorbed into the cleaning brush is attracted by the positive FCBV(V) is adhered to the surface of cleaning roller.

iv) Waste toner adhering to the surface of cleaning roller PU is scavenged by the cleaning blade and collected to the waste toner pack by the waste toner feeder.

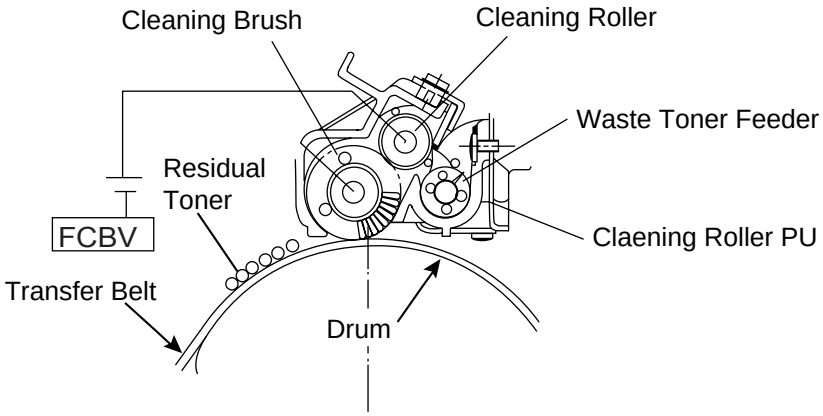


Fig.4-22

1.2 Laser Assy PU

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

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

(1) Structure of Laser Unit (Refer to Fig.4-23.)

Laser assy PU is located as shown in Fig.4-23.

Laser assy PU consists of following parts;

①	Laser Assy:	Light emitting source incorporating a laser diode.
②	Cylinder Lens:	Condenser of laser beam.
③	Polygon Mirror:	Hexahedral mirror scanning the laser beam.
④	F-θ Lens:	Focus lens for 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:	Photo detector.
⑨	BTD Mirror:	Beam timing detector mirror to guide the laser beam to PD.

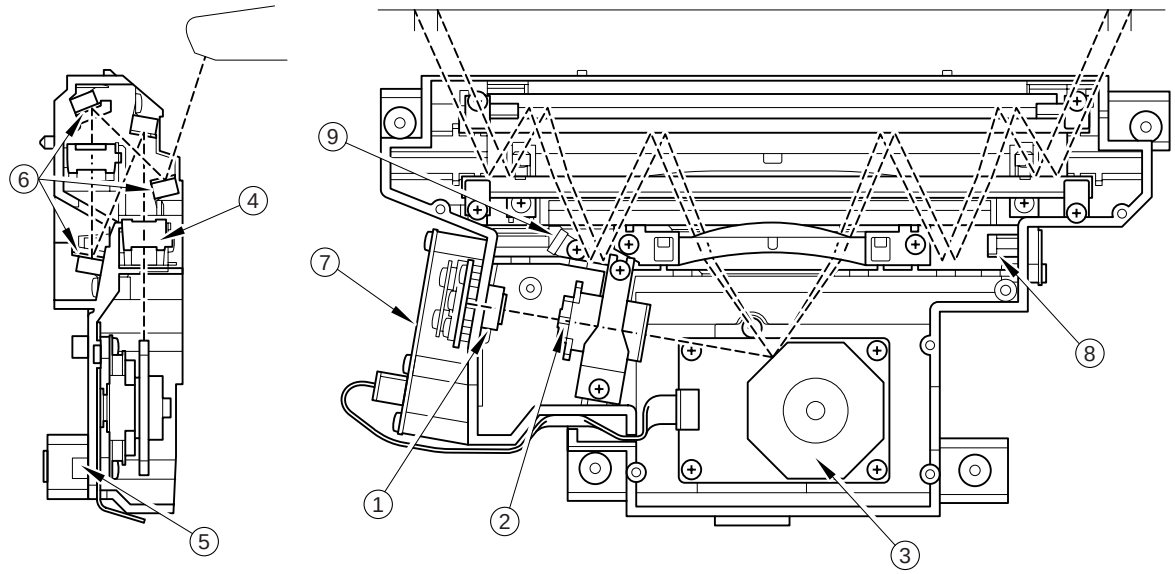


Fig.4-23

(2) Specification:

Specification of Laser Unit is described as follows:

Item	Specifications
Rated Output of Laser Diode	5mW.
Wave Length of Laser Beam	Approx.785nm.
Scanning Density	600dpi
Scanning Width	314mm
Rotations Per Minutes of Scanner Motor	35,904rpm
Number of Polygon Mirror Faces	8

1.3 Paper Transportation System

(1) Outline

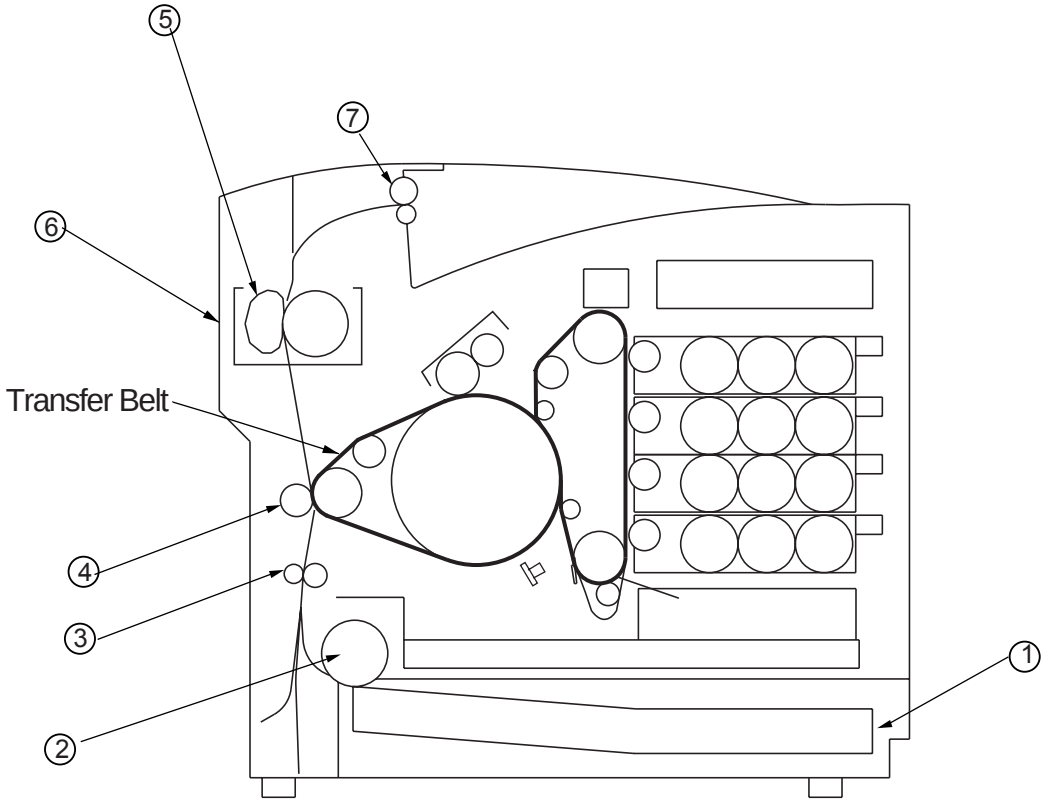
This printer employs the automatic paper feeding with the paper tray.

When toner images are formed on the transfer belt through the operations of print system and transfer system, a paper is fed by the paper feed roller and transported to the registration roller. The transported paper is further transported to the transfer, fuser and exit part by the registration roller synchronizing with the rotation of the transfer belt.

(2) Structure of Paper Transportation System (Refer to Fig.4-24.)

Paper Transportation System consists of following parts.

①	Paper Tray PU:	Case to accommodate papers to be automatically fed.
②	Paper Feed Roller PU:	Roller to feed paper one by one, preventing multi-feed.
③	Registration Roller PU:	Roller to transport papers as synchronizing with the transfer belt.
④	Transfer Roller PU:	Component to be built in the paper exit unit, consisting of the paper guide, registration roller and transfer roller.
⑤	Fuser Unit FU:	Mechanical part to fuse the toner image with the heat roller and fix it on the paper.
⑥	Paper Cover Assy PU (Paper Exit Unit):	Component to consist of the paper guide and paper exit roller that exits the fusing-completed paper.
⑦	Exit Roller Assy PU:	Roller to exit papers from of the printer.



①. Paper Tray PU
②. Paper Feed Roller PU
③. Resistration Roller PU
④. Transfer Roller PU
⑤. Fuser Unit FU
⑥. Rear Cover Assy PU (Paper Exit Unit)
⑦. Exit Roller Assy PU

Fig.4-24

1.4 Fusing Unit

Fuser Unit employs the thermal fusing system containing the heater in the roller. Papers carrying the toner images pass 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 on the paper.

(1) Structure

Fuser Unit consists of the following component members; (Refer to Fig.4-25.)

①	Fuser Roller:	Heating roller that incorporates the heater in the roller.
②	Back-Up Roller:	Belt unit that presses the paper against the fuser roller.
③	Fusing Heater:	Halogen lamp.
④	Thermistor:	Sensor that detects temperature of fuser roller's surface.
⑤	Thermostat:	Device that prevents the fuser roller from being excessively heated up.

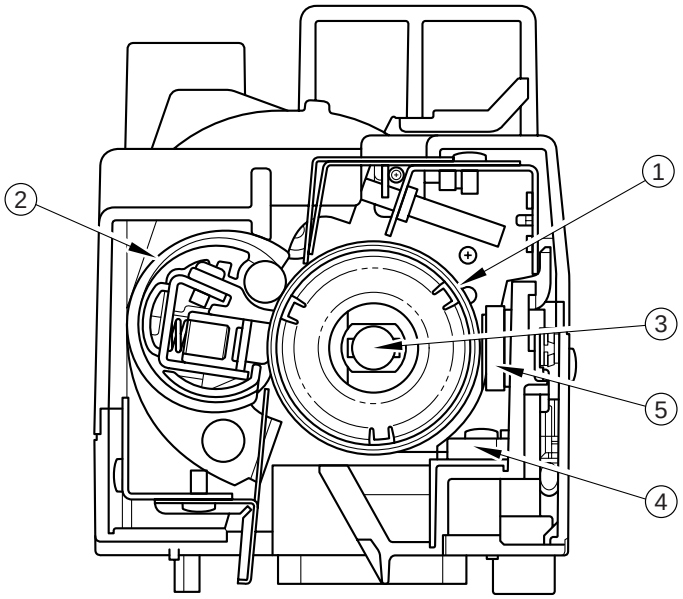


Fig.4-25

(2) Process of Fusing (Refer to Fig.4-26.)

① The toner image that has been transferred onto the paper is simply adhered on the paper but not fused yet.

② Transported paper passes between the heater roller and back-up roller.

③ Each roller is heated up to approx. 150°C, and received approx.200N from the opposite heat roller.

④ When the paper carrying the toner images passes between the tow heat rollers, the toner images are melted and fused on the transported paper.

⑤ The paper carrying the fused image is separated from the heat rollers, and ejected from the printer.

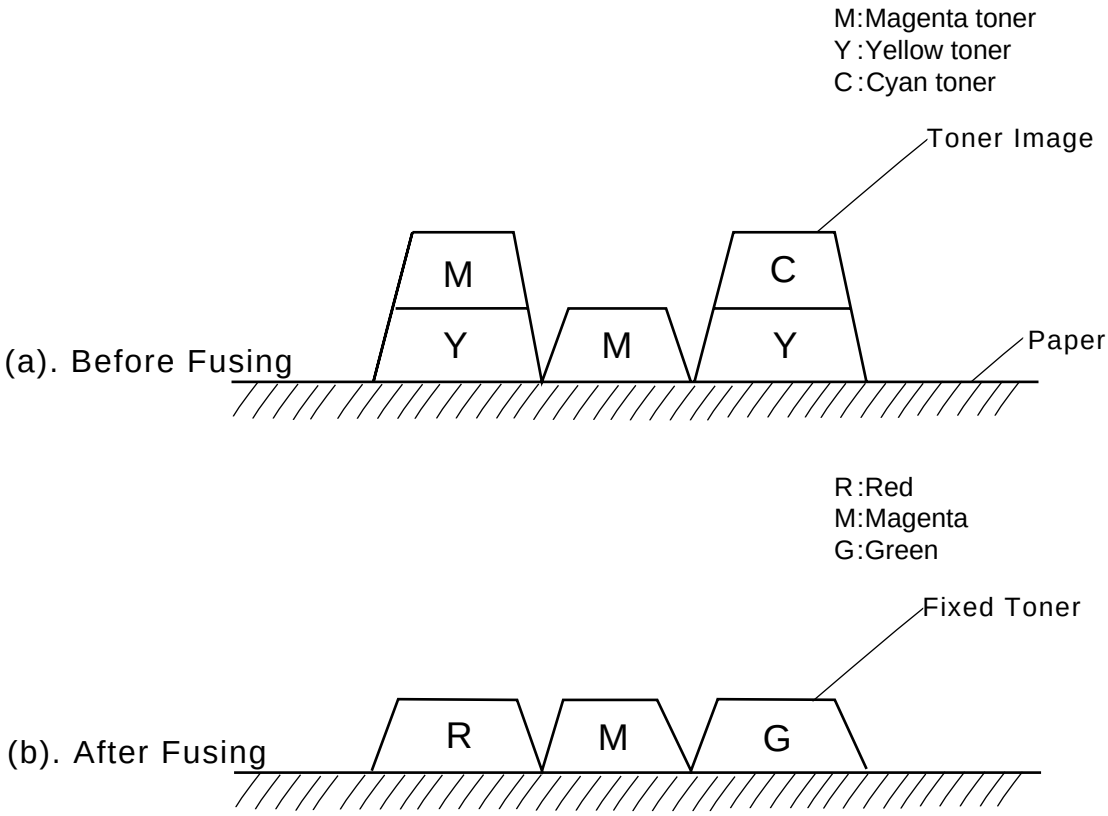


Fig.4-26

2. STRUCTURE OF THE CONTROL SYSTEM

2.1 Basic Structure

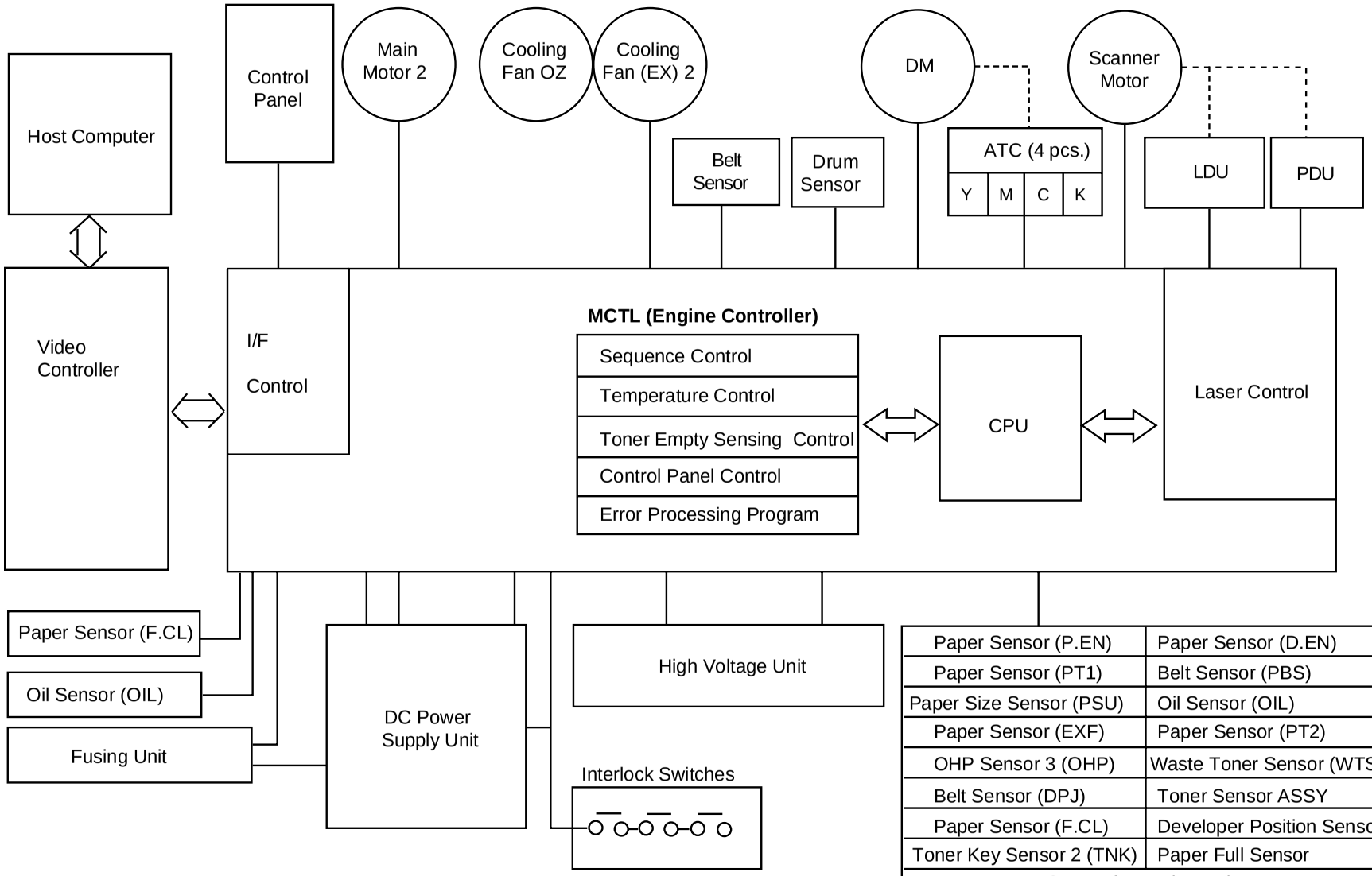
2.1.1 Electrical System and Function

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.4-27.

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



Paper Sensor (P.EN)	Paper Sensor (D.EN)
Paper Sensor (PT1)	Belt Sensor (PBS)
Paper Size Sensor (PSU)	Oil Sensor (OIL)
Paper Sensor (EXF)	Paper Sensor (PT2)
OHP Sensor 3 (OHP)	Waste Toner Sensor (WTS)
Belt Sensor (DPJ)	Toner Sensor ASSY
Paper Sensor (F.CL)	Developer Position Sensor
Toner Key Sensor 2 (TNK)	Paper Full Sensor
Temperature Sensor for Fusing Unit	

Fig.4-27

<Layout & Function of the Electrical Parts>

(1) Print PCB (Refer to Fig. 4-28.)

No.	Name	Function
1	Engine Controller Board PU (MCTL P.W.B.)	To control the series of processes of the Printer: Fuser Temperature Control, Laser Output Control, Operator Panel Indication, Toner Empty Sensing Control, Error Processing Control, Interface Control.
2	Panel Assy PU	To display the Printer's operation status and support the manual input switch.
3	LDU P.W.B.	To control the drive and output of the laser diode to be included in the optical unit.
4	PDU P.W.B.	To sense the emission of laser diode and also the beam position to be included in the Optical unit.
5	Erase Lamp PU	To discharge the OPC belt by radiating the LED beam onto the OPC belt to be included in the Optical unit.
6	I/O Board PU (IOD P.W.B.)	To relay the signals between the controlled parts and MCTL P.W.B., and to drive the controlled parts.
7	LV Power Supply PU (DC Power Supply Unit) (LVPS)	To provide the Printer with the power supply for the printer control.
8	HV Power Supply PU (High Voltage Power Supply Unit (HVU))	To provide the Printer with the high voltage power supply that is necessary for the printing process.
9	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.

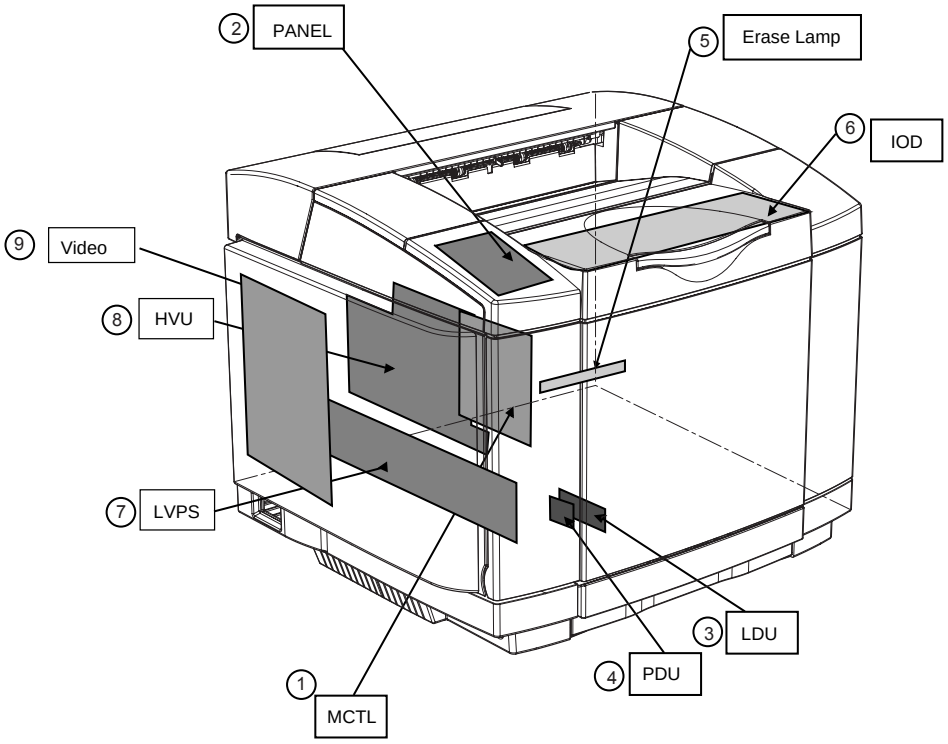


Fig.4-28

(2) Motors (Refer to Fig.4-29.)

No.	Name	Code	Function
1	Main Motor PU	MM	To drive the OPC belt and the paper transport system.
2	Developer Motor PU	DM	To drive the toner cartridge and the developing system.
3	Scanner Motor (Laser Assy)	SCM	To scan the laser beam.
4	Exit Fan PU	EXFAN	To exhaust the heat of fusing unit.
5	Power Supply Fan PU	PSFAN	To exhaust the heat of power supply unit and Interface Controller.
6 6-1 6-2 6-3	Interlock Switch PU Front Cover Switch Paper Exit Cover Switch Rear Cover Switch	 DSW1 DSW2 DSW3	This the safety interlock switch when opening the cover.
7	Laser Fan PU	LDFAN	To exhaust the heat of laser assy.

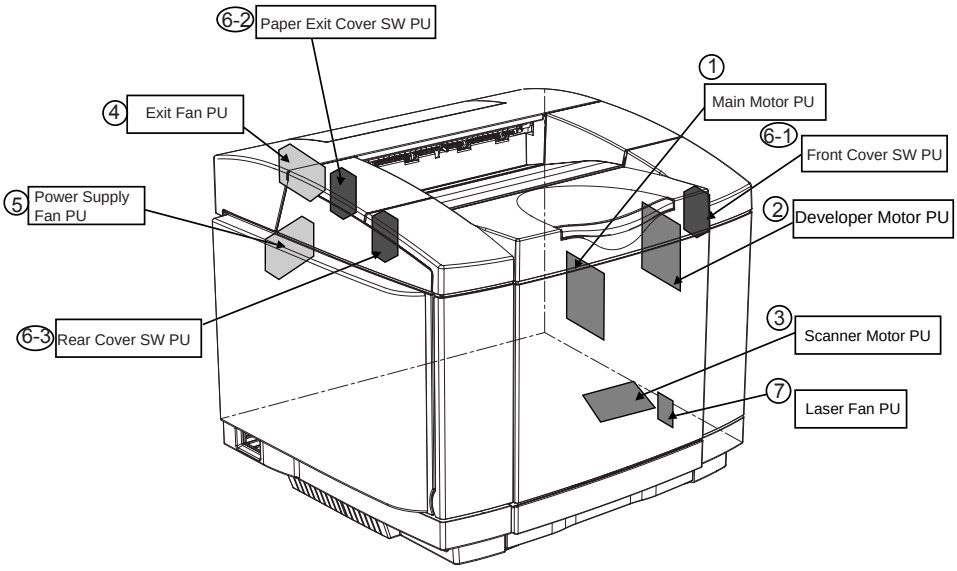


Fig.4-29

(3) Clutches and Solenoids (Refer to Fig.4-30.)

No.	Name	Code	Function
1	Paper Feed Clutch PU	PCLU	To feed papers by coupling the feeding roller to the main gear unit at timing of the paper feeding.
2	Registration Clutch PU	RECL	To transport papers by coupling the registration roller to main gear unit as synchronized with the rotation of transfer drum.
3	Fuser Clutch PU	FUCL	To drive the fusing roller by coupling the fuser unit to the main gear unit.
4	Cleaning Roller Solenoid PU	FBSOL	To drive the brush of drum cleaner by coupling the cleaner clutch to the main gear unit at timing of the drum cleaning.
5 ~ 8	Developer Clutch PU	DCL (Y,M,C,K)	To drive the Mg. roller of desired color toner cartridge by coupling said toner cartridge to the developer gear unit at timing of the developing.
9	Toner Retract Solenoid PU (in visible)	DSL (Y,N,C,K)	To relocate the desired color toner cartridge to developing position at timing of the developing.
10	Transfer Roller Clutch PU	TRCL	To have the transfer roller contact to the transfer roller's surface at timing of the second transfer.

Layout of Clutches and Solenoids

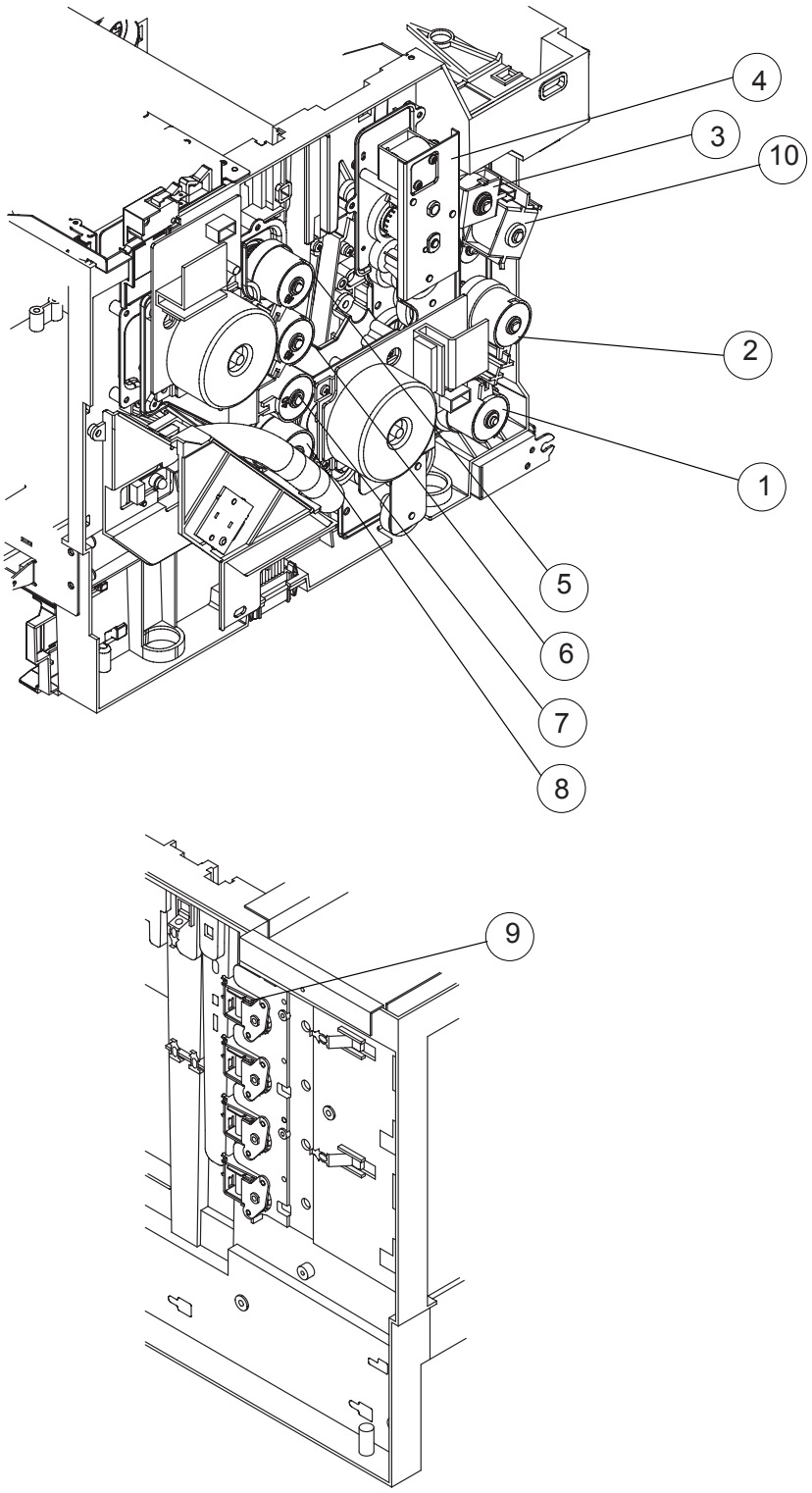


Fig.4-30

(4) Sensors

No.	No.	No.	Function
1	Paper Size Sensor PU	PSU	Photo sensor to detect the paper size.
2	Registration Sensor PU	PT1	Photo sensor to detect the paper is fed from the paper tray.
3	Fuser Exit Sensor PU	PT2	Photo sensor to detect that paper is exited from the paper exit unit.
4	Tray Empty Sensor PU	PEU	Photo sensor to detect if paper is loaded or empty in the paper tray.
5	OHP Sensor PU	OHP	Photo sensor to detect that material in the paper tray is OHP.
6	Toner Density Sensor PU	TDS	Photo sensor to detect the toner density of images formed on the transfer belt surface.
7	Transfer Unit Sensor PU	TBS	Photo sensor to detect irregular rotation of the transfer belt.
8	OPC Marker Sensor PU	PBS	Photo sensor to detect the connecting position of the OPC belt.
9	Toner Sensor PU	TPD/TTR	Photo sensor to detect if the toner is empty or not for each toner cartridge.
10	Waste Toner Sensor PU	WTS (LED/TR)	Photo sensor to detect that the waste toner bottle is full of waste toner.
11	Temperature Sensor for Fuser unit	TH	Thermistor to detect the fuser temperature.
12	Output Tray Full Sensor PU	PFUL	This is the sensor to detect that the paper exit tray is full of exited papers.
13	Toner Key Sensor PU	TNK	To detect the availability of key to be provided to the toner cartridge..
14	Room Temp. Thermistor Sensor PU	RTS	Sensor to detect the ambient temperature of the printer setting location.

Layout of Sensors

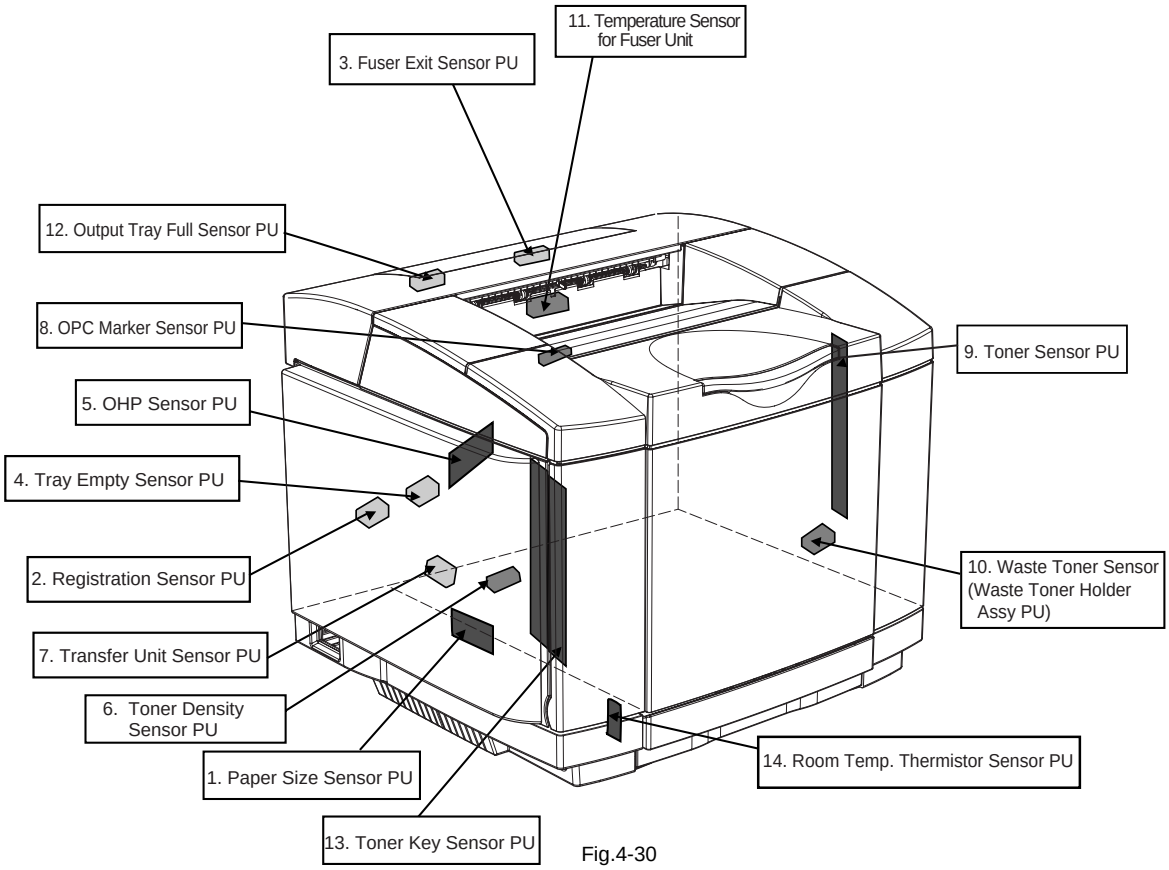


Fig.4-30

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>

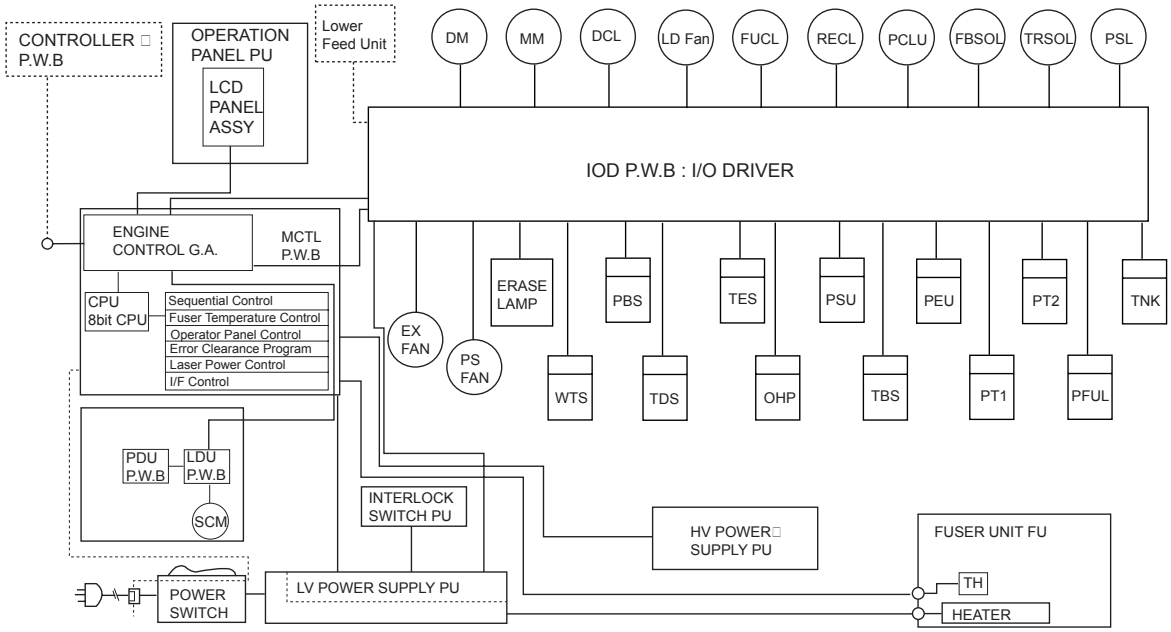


Fig.4-32

(1) Control Block Diagram (Refer to Fig.4-32.)

No.	Name	Function
1	Sequence Control	To control the print sequence of printer.
2	Temperature Control	To control the temperature of fuser unit.
3	Consumables' Life Control	To control the toner empty status and the life of periodic replacement parts.
4	Operator Panel Control	To control the operator panel indication and the operation signals.
5	Error Processing Control	To sense the errors occurring in the printer and 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 the 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.4-33.

<Operation>

(1) When the video signal is inputted, the laser drive control circuit has the laser diode switched on and radiated according to the video signal.
(2) Radiated laser beam is sensed by the photo detector (PD), and the detecting signal is fed back to the output control circuit.
(3) Output control circuit controls the radiation output to be constant, by comparing the laser output default with the feed-back value transmitted from the output sensing circuit.
(4) Laser beam scanned by the scanner motor is sensed by the beam detector (PD), and then, the beam detecting timing (BDT) signal will be outputted.

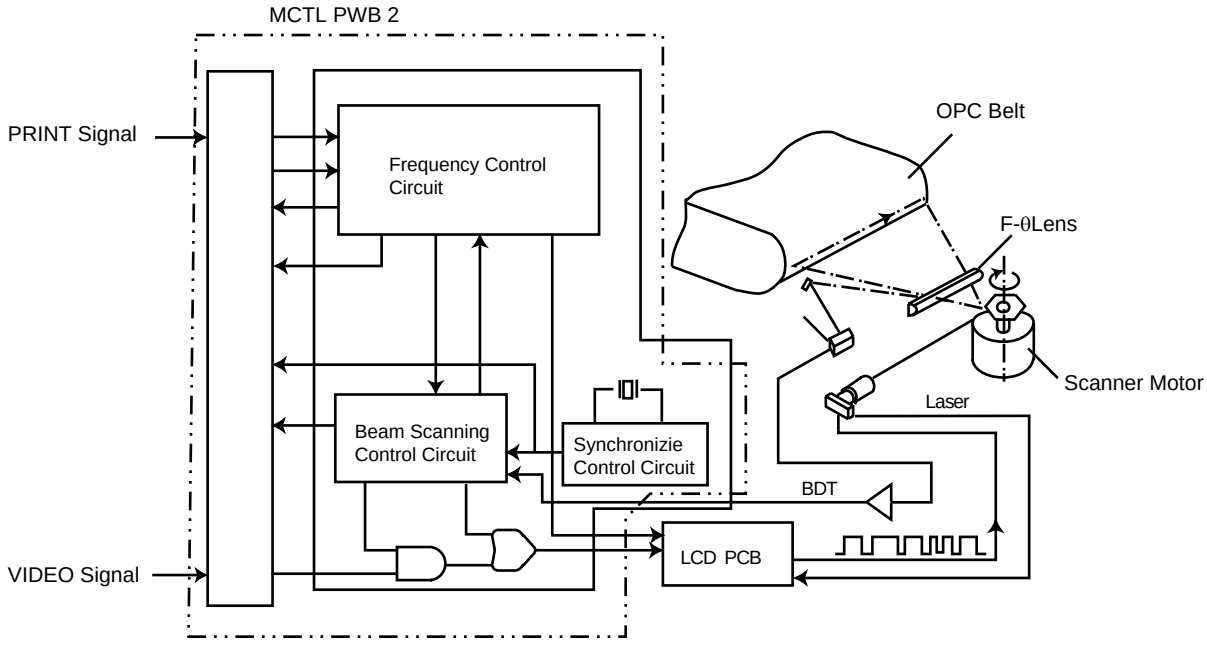


Fig.4-33

(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.4-34)>

FLS:	Thyristor to control the on/off operation of power supply to the heat lamp.
THS1 / THS2:	Thermostat to shut down the circuit for safety when it will be too hot within the fuser unit FU.
TH:	Temperature sensor to detect the surface temperature of the heat roller (HR).
RY:	Relay to prevent the further heating when it will be hotter than the set point within the fuser unit FU.
GA/CPU:	Process circuit to process 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:	Back-up roller.

< Signal Functions >

HON-N	To turn on/off the heater in side the fusing roller.
ACOFF	To turn off the relay RY1 when it is sensed too hot.
THERR	To detect the shut-down by the thermistor.
AD	To convert the temperature sensing signal to AD.

<Controlled Temperature and Safety>

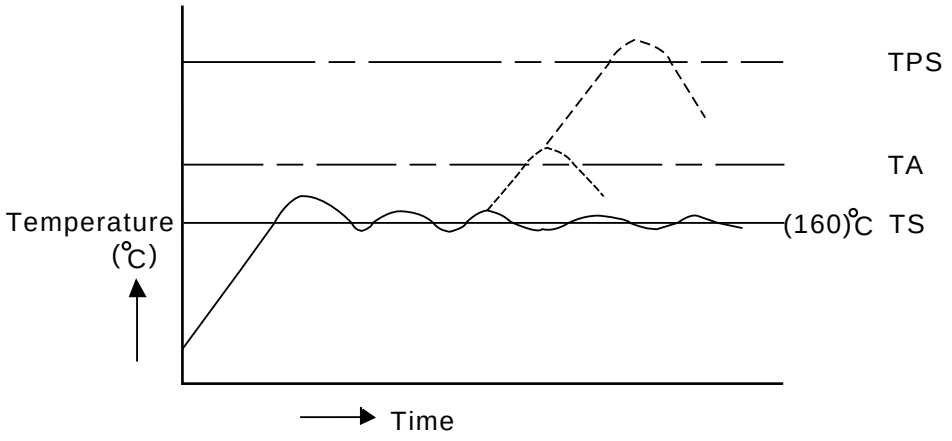


Fig.3-34

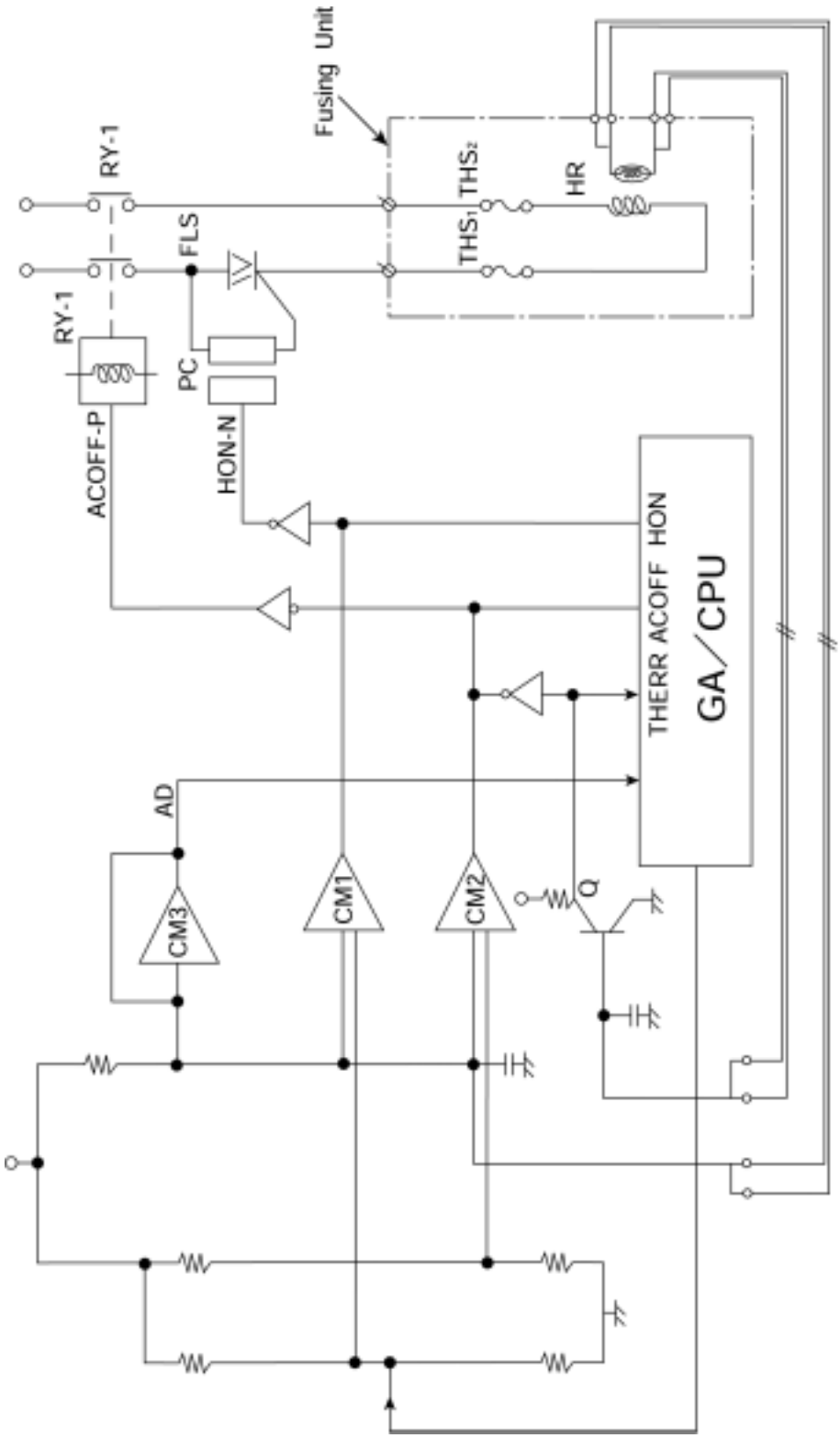


Fig 4-35: Basic Structure of Fuser Control

TS: To maintain the set point (temperature) for fusing of toner to be approx. 160°C as appropriate by turning on/off the thyristor.

TA: Reference temperature (approx. 185°C) to identify that it is excessively hot inside the fusing unit. When it reaches to this point, the relay RY turns off, the power supply to the heat lamp is shut down, and the printer stops the operation.

TPS: Limit temperature to have the thermal cut-off start melting and shutting down the power supply to the heat lamp if the temperature control circuit should break down.

< Temperature Control and Safety >

The detection of the fusing temperature is performed by the thermistor and transmitted to the temperature control circuit. The temperature control circuit makes the comparative control with the basic control temperature signal and ON/OFF control over the triac (FLS) so that the temperature of the heat roller will be the preset temperature (PS). The temperature control is made in terms of the both hardware and software, and detects any error with the following detection meanings. Upon the detection of such error, the printer stops and the error message is displayed on the operator panel.

H0: If the wire-cut occurred in the temperature sensor thermistor (TH) or the breakdown such as wire-cut occurred in the circuit, the wire-cut detection signal (THERR) is outputted. This signal works to turn off the relay (RY-1) and the triac (FLS) and subsequently stops the printer.

H1: If the surface temperature of the heat roller continues to be higher than the preset value of abnormal temperature (TA) for more than the specified time, CPU forces the HON signal and ACOFF signal to turn off according to the timer control so that the printer stops.

H2: If the surface temperature of the heat roller does not reach to the preset temperature (TS) in the specified time after power-on, CPU forces the HON signal and ACOFF signal to turn off according to the timer control so that the printer stops.

H3: If the surface temperature of the heat roller continues to be lower than the preset temperature (TS) for more than the specified time, CPU forces the HON signal and ACOFF signal to turn off according to the timer control so that the printer stops.

H4: If the surface temperature of the heat roller continues to be higher than the preset temperature (TS) for more than the specified time, CPU forces the HON signal and ACOFF signal to turn off according to the timer control so that the printer stops.

HA: If the temperature of the heat roller becomes abnormal due to the break-down of the control circuit etc., the temperature detection circuit (CM2) transmits the ACOFF signal. This signal turns off the relay (RY-1), and simultaneously makes the CPU stop the printer.

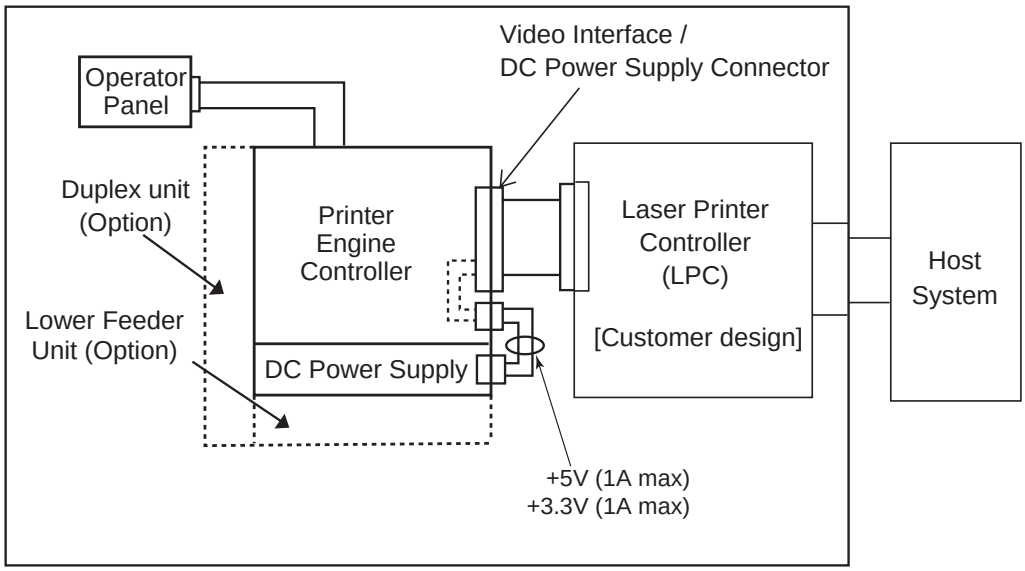
(4) Interface Control

<General>

(a) Interface Type

This Document describes the Video and Command/Status Interface between Laser Printer Controller (LPC) and engine controller. Printer controller acts as a slave to LPC. Through Video Interface, LPC controls the Printer & Operator Panel using Command/Status communication and transmits the synchronized video data to Printer laser diode. Operator Panel is physically resident on the engine.

(b) Interface Connection



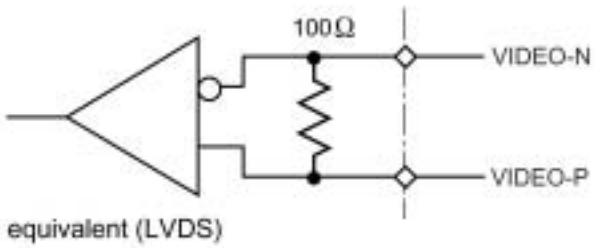
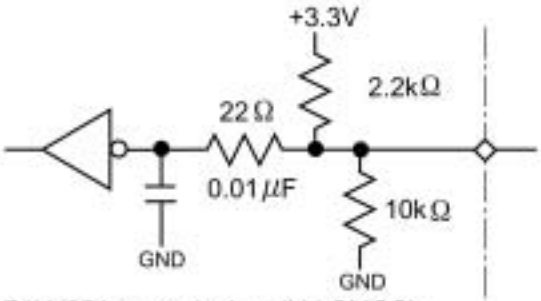
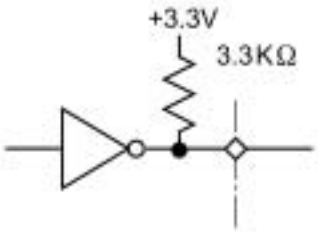
Interface Circuit (Internal Connecting System)

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	Name of Signal
1	 equivalent (LVDS)	• VIDEO-N • VIDEO-P
2	 74LV05A or equivalent (LV-CMOS)	• PRREQ-N • COMMAND • ID2-N
3	 74V06A or equivalent (LV-CMOS)	• HSYNC-N • VSYNC-N • IREADY-N • STATUS • 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 for Video Interface Signals and DC Power Supply (Engine side)

Pin No.	Signal Name	Pin No.	Signal Name
1A	PSGND	1B	+5V
2A	PSGND	2B	+5V
3A	PSGND	3B	+3.3V
4A	PSGND	4B	+3.3V
5A	PSGND	5B	+3.3V
6A	PSGND	6B	+3.3V
7A	PSGND	7B	+3.3V
8A	PSGND	8B	+3.3V
9A	VIDEO-P	9B	VIDEO-N
10A	RET(GND)	10B	Reserve
11A	Reserved	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	Reserved	21B	Reserve
22A	RET(GND)	22B	KEY_STATUS-N
23A	Reserved	23B	Reserve
24A	Reserved	24B	Reserve
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

*Pin No. 26A, 28A, 30A and 32A should be connected to the GND at the LPC side.

2.3 Main PCB (Video Controller PCB)

2.3.1 Outline

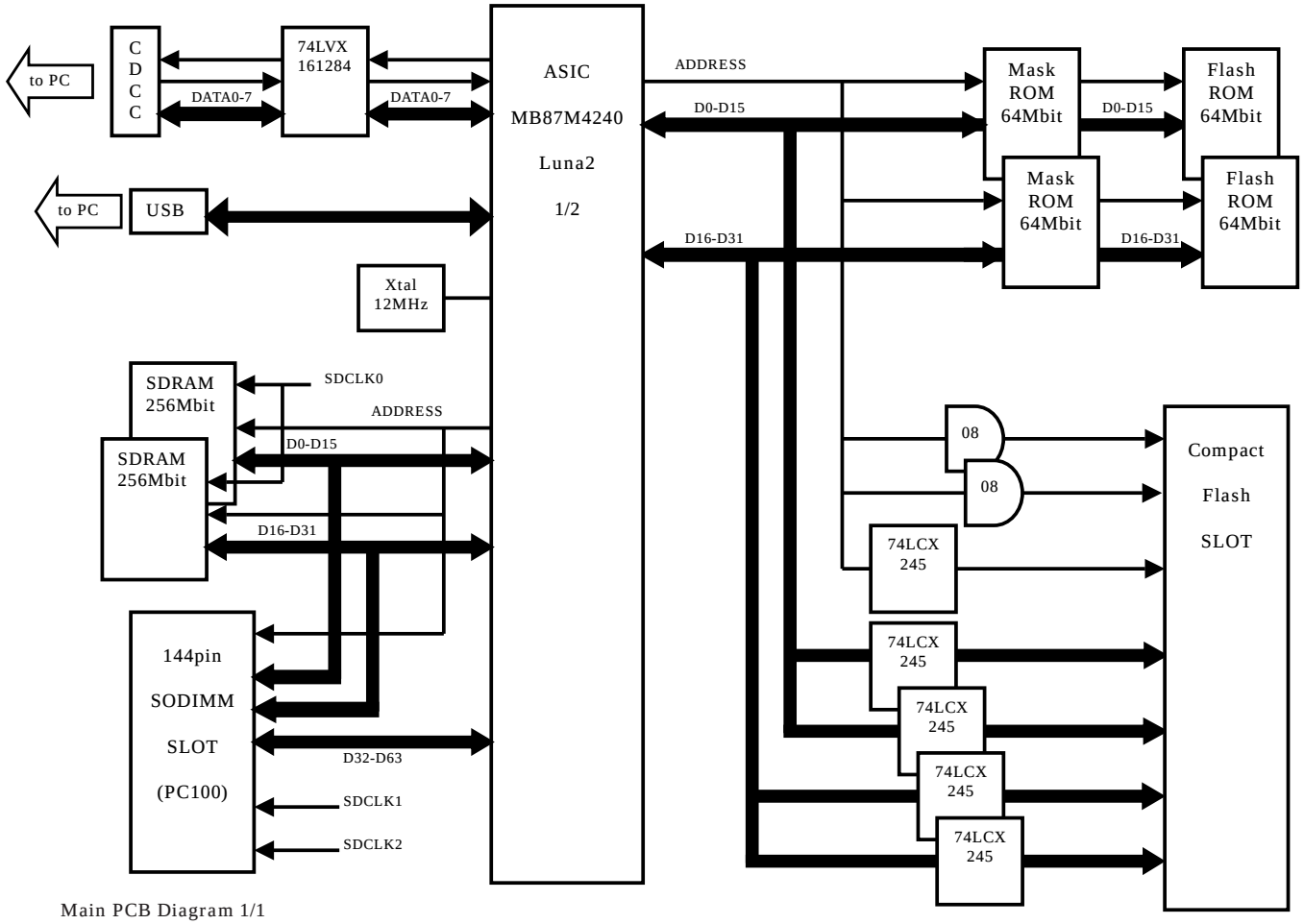
The Main PCB consists of the circuits which perform the following functions;

- 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.

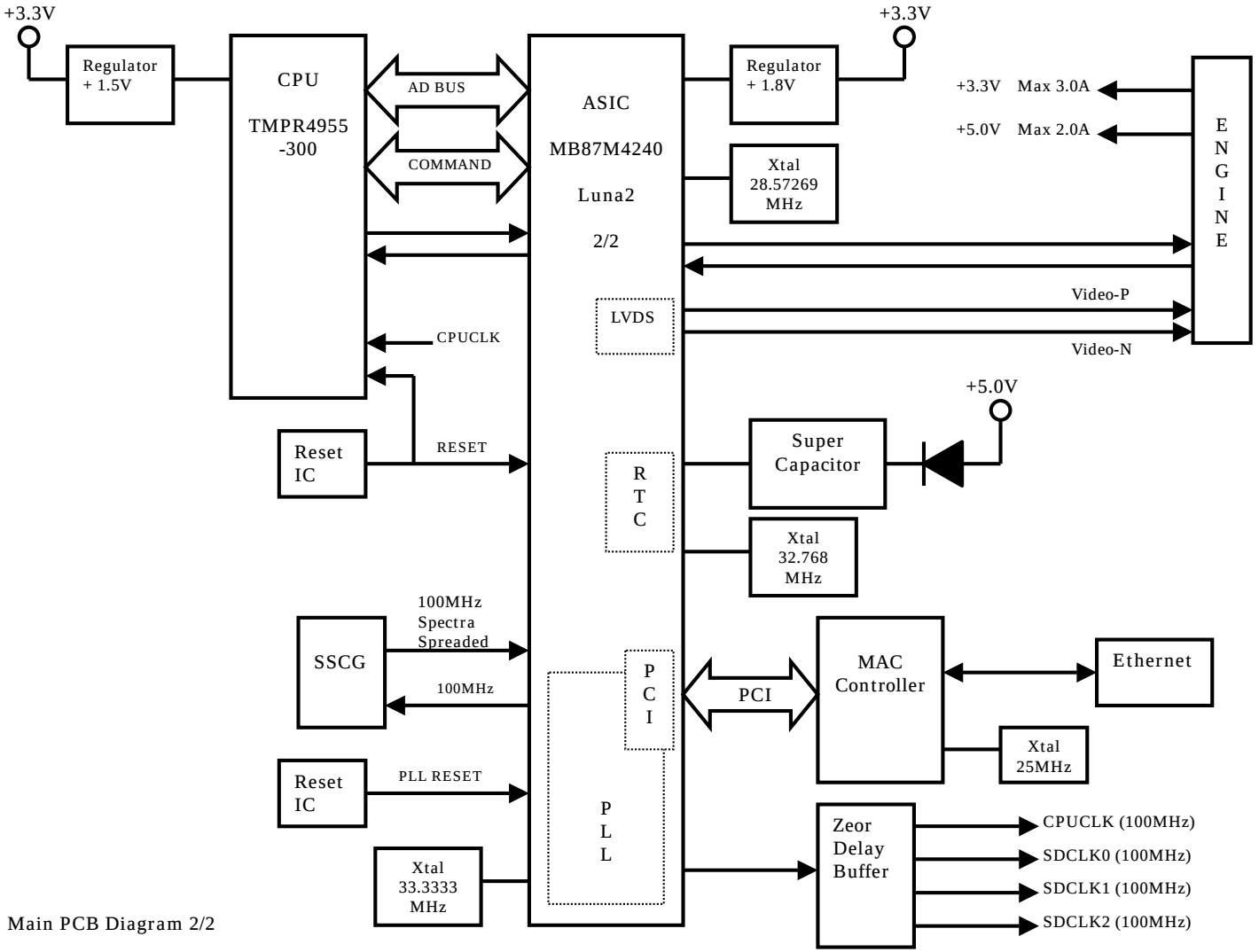
The power for the Main PCB is supplied from the engine through the engine interface connector.

<Main PCB Block Diagram>



Main PCB Diagram 1/1

Fig.4-37a



Main PCB Diagram 2/2

Fig.4-37b

2.3.2 Circuit

(1) CPU block

- Model name: TMPR4955BFG-300,
  MIPS 64bit RISC CPU manufactured by TOSHIBA
- Clock speed: 100MHz (external) / 300MHz (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: MB87M4240 manufactured by Fujitsu
- Appearance: 576pin BGA
- Functions:
  - Controls CPU
  - Controls memory
  - Controls interrupts
  - Timer
  - External interfaces (Centronics, PCI, IDE, Compact Flash, USB)
  - Engine interface (Video signal control, LVDS)
  - Supports Software

(3) ROM block

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

<Masked ROM>

- Access time: less than 100nsec.
- Appearance: 48pin TSOP

<Flash ROM>

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

(4) SO-DIMM

SO-DIMM allows memory extension by up to 576MB.
1 SO-DIMM socket is available.

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

- Appearance: 144-pin
- Memory type: SDRAM
- Access time: PC100, CL2
- Parity: Non-parity can be used
- Memory capacity 64MB, 128MB, 256MB, 512MB

<Recommended DIMM type>
<US>

* 64MB: Techworks 12345-0001
* 128MB: Techworks 12462-0002
* 256MB: Techworks 12469-0001

<Europe>

* 64MB: Buffalo Technology VN133-64M
* 128MB: Buffalo Technology VN133-128M
* 256MB: Buffalo Technology VN133-256M
* 512MB: Buffalo Technology VN133-512M

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.

For more information, visit Techworks web site at www.techworks.com

In general, SO-DIMM must have the following specifications:

Type: 144 pin and 64 bit output
CAS latency: 2 or 3
Clock frequency: 100 MHz or more
Capacity: 64 MB to 512 MB
DRAM type: SDRAM

(5) External interface block

- Centronics Interface
- USB
- Compact Flash

(6) 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.

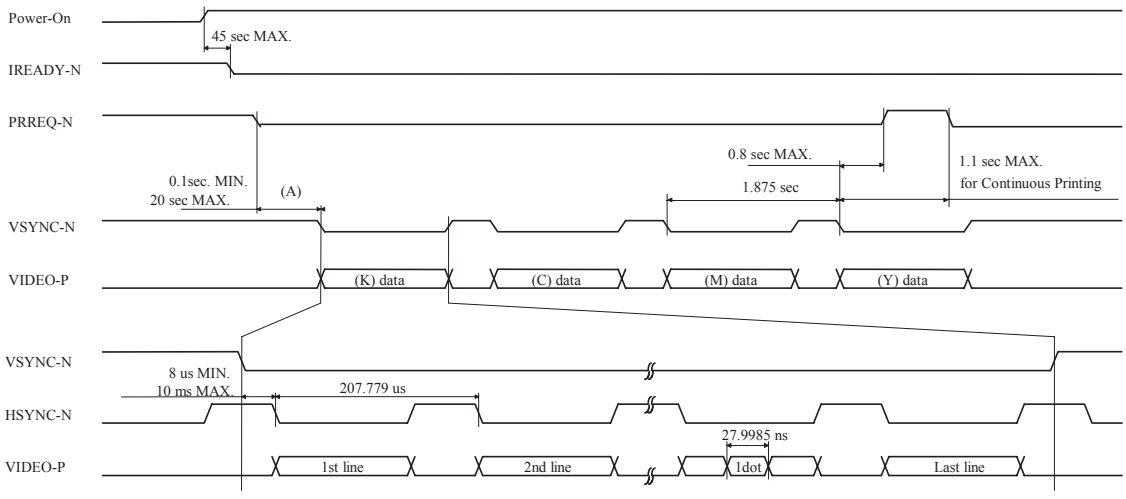


Fig.4-38

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.

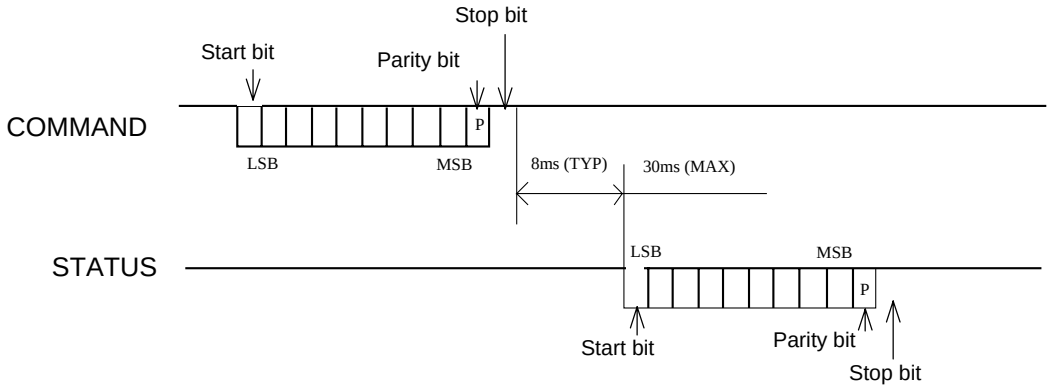


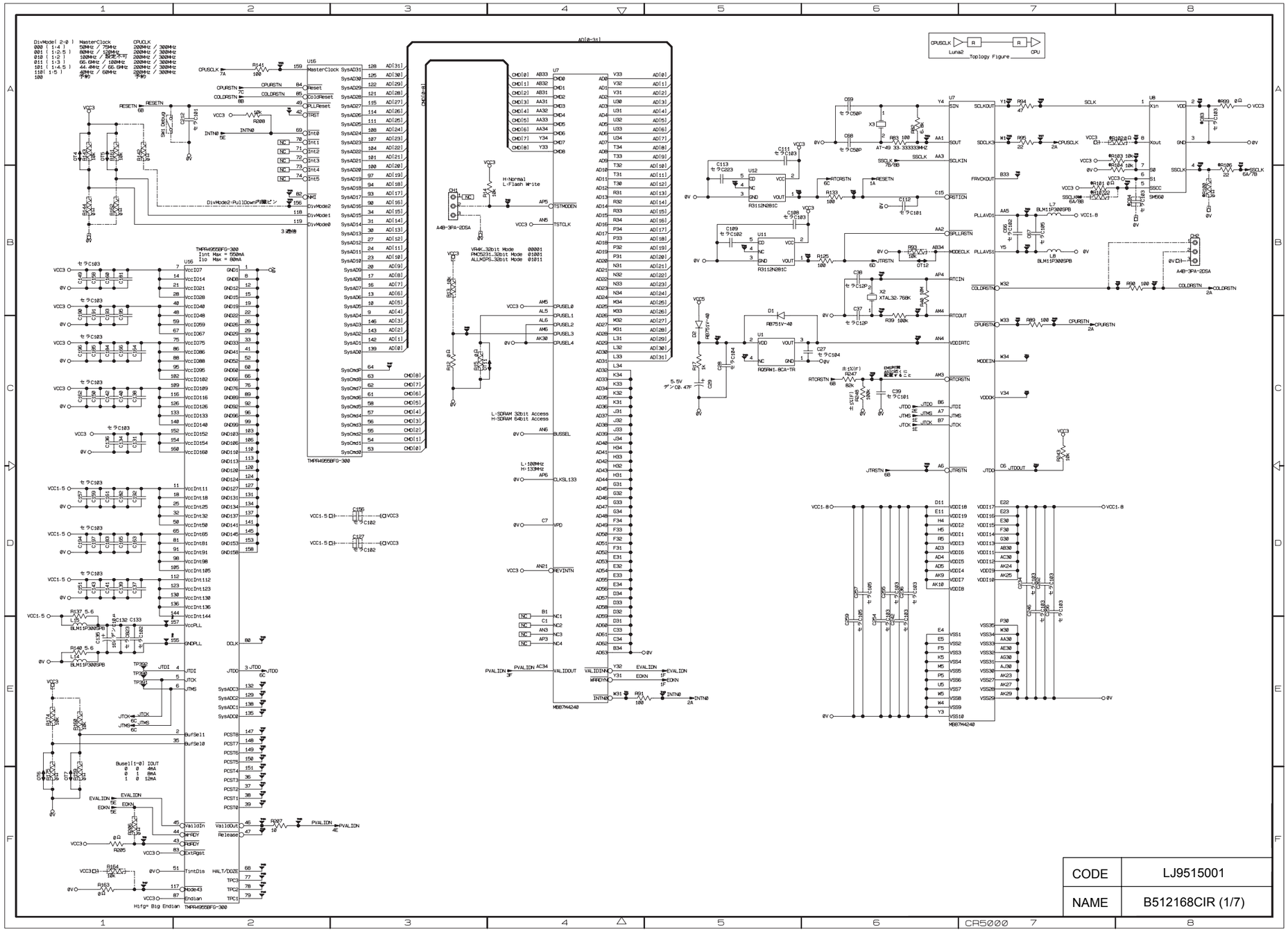
Fig.4-39

Note:

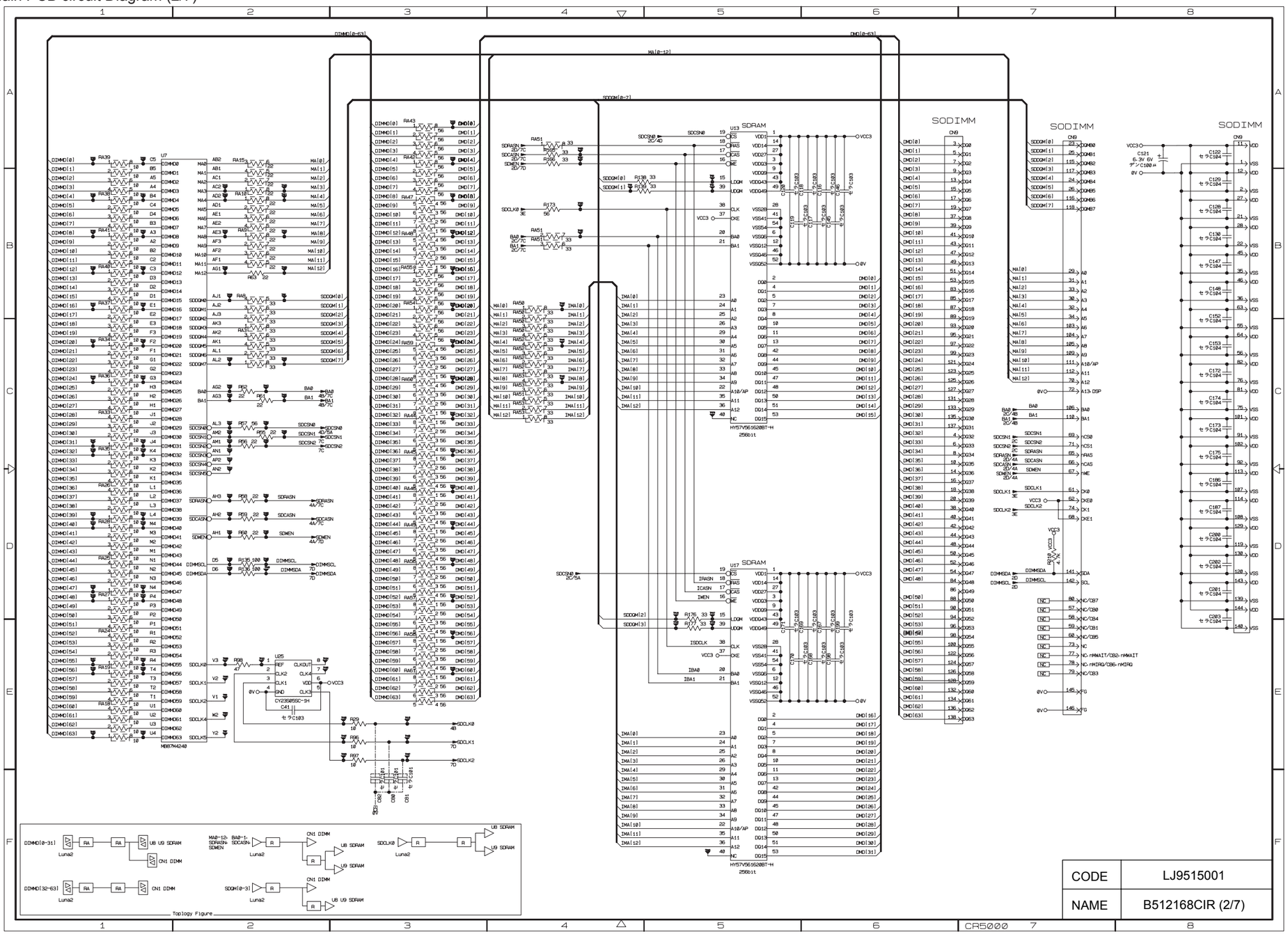
- *Based on "Asynchronous Communication" method.*
- *Command/Status communication must keep the "Handshake Rule".*
- *Baud rate is 9600 bps.*
- *Frame format: - one (1) start bit,*
  - eight (8) data bits
  (Start bit side is LSB, Parity bit is MSB),
  - one (1) odd parity bit,
  - one (1) stop bit.
- *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.

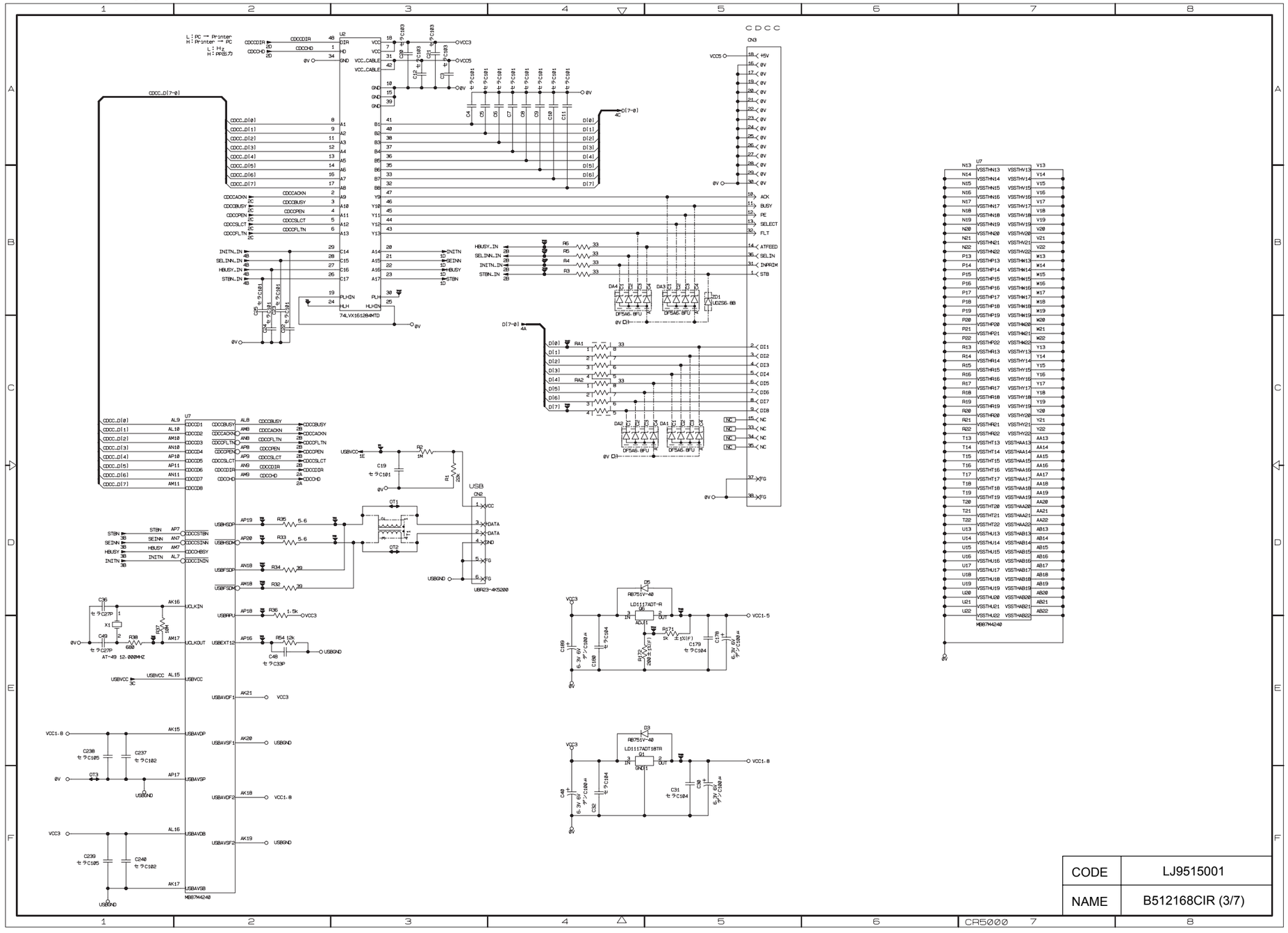
Main PCB circuit Diagram (1/7)



Main PCB circuit Diagram (2/7)

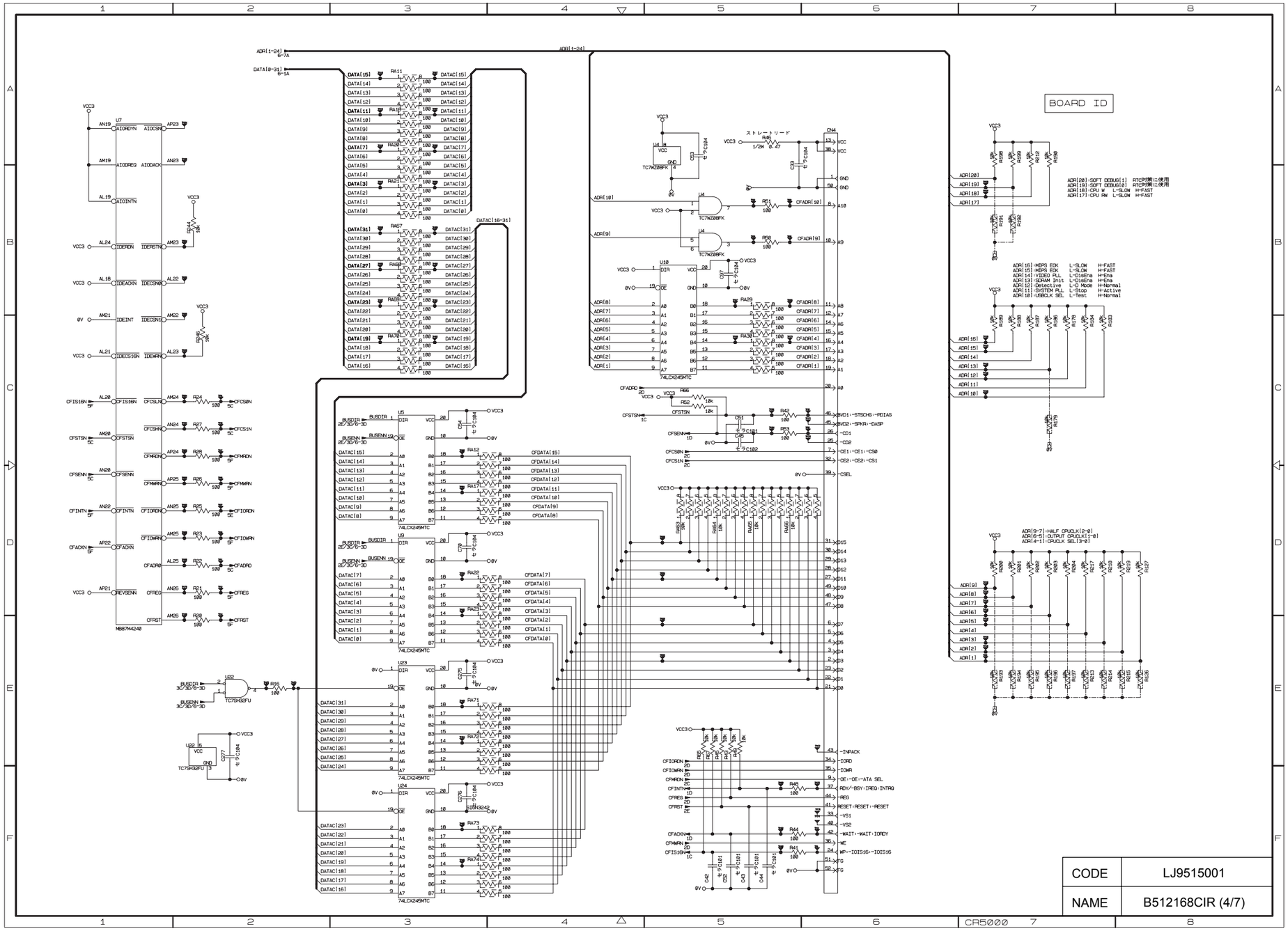


Main PCB circuit Diagram (3/7)

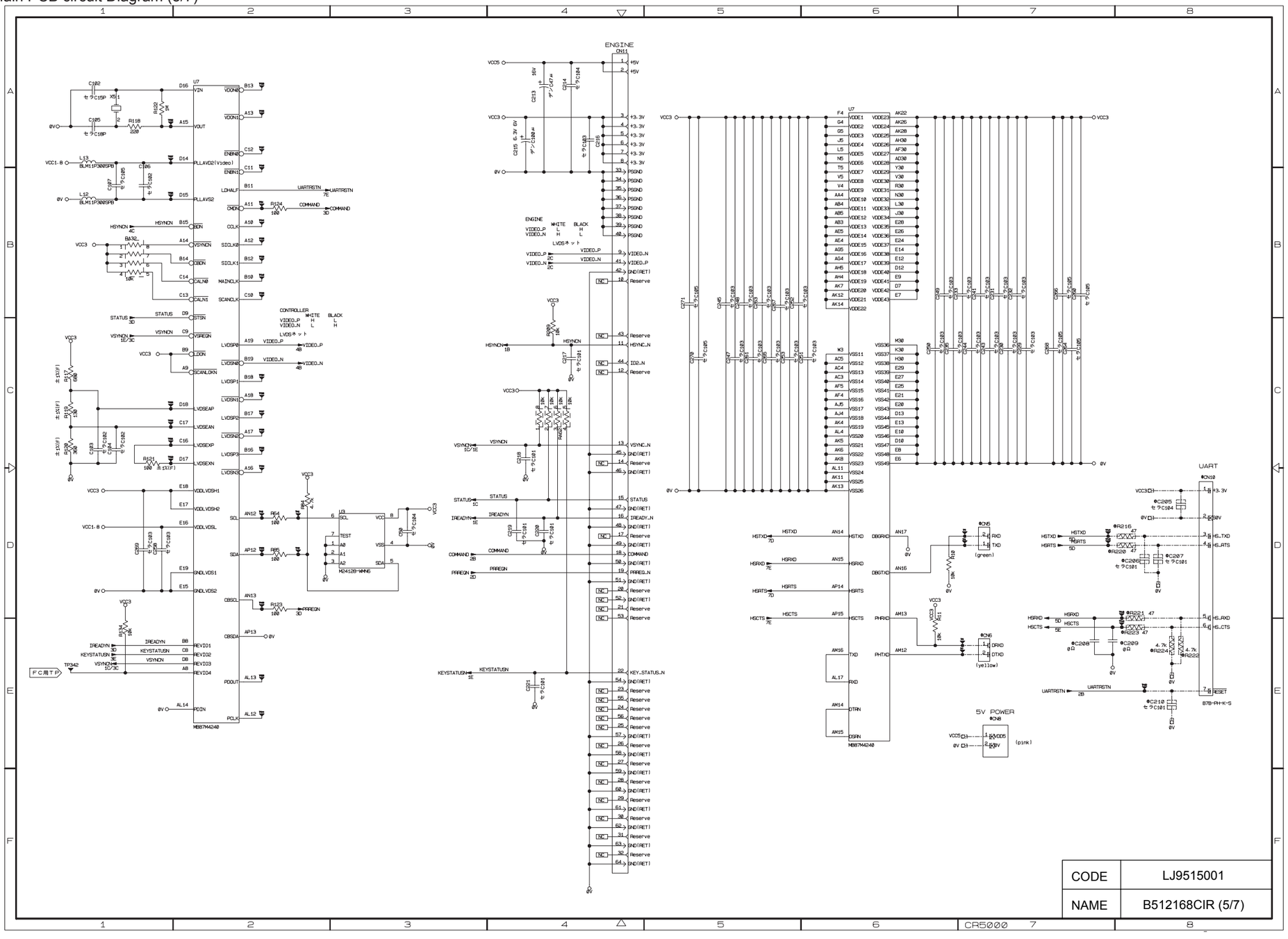


CODE	LJ9515001
NAME	B512168CIR (3/7)

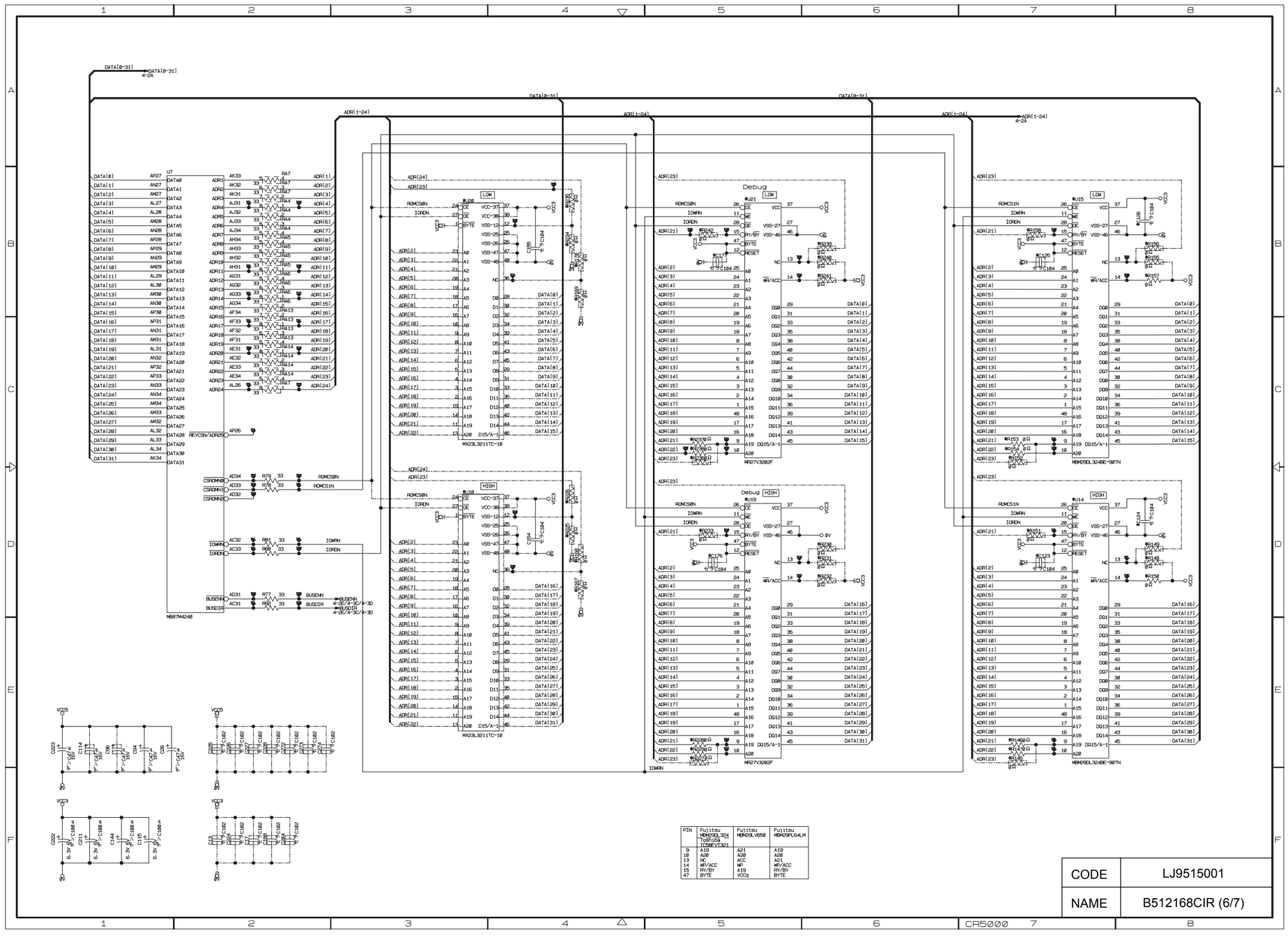
Main PCB circuit Diagram (4/7)



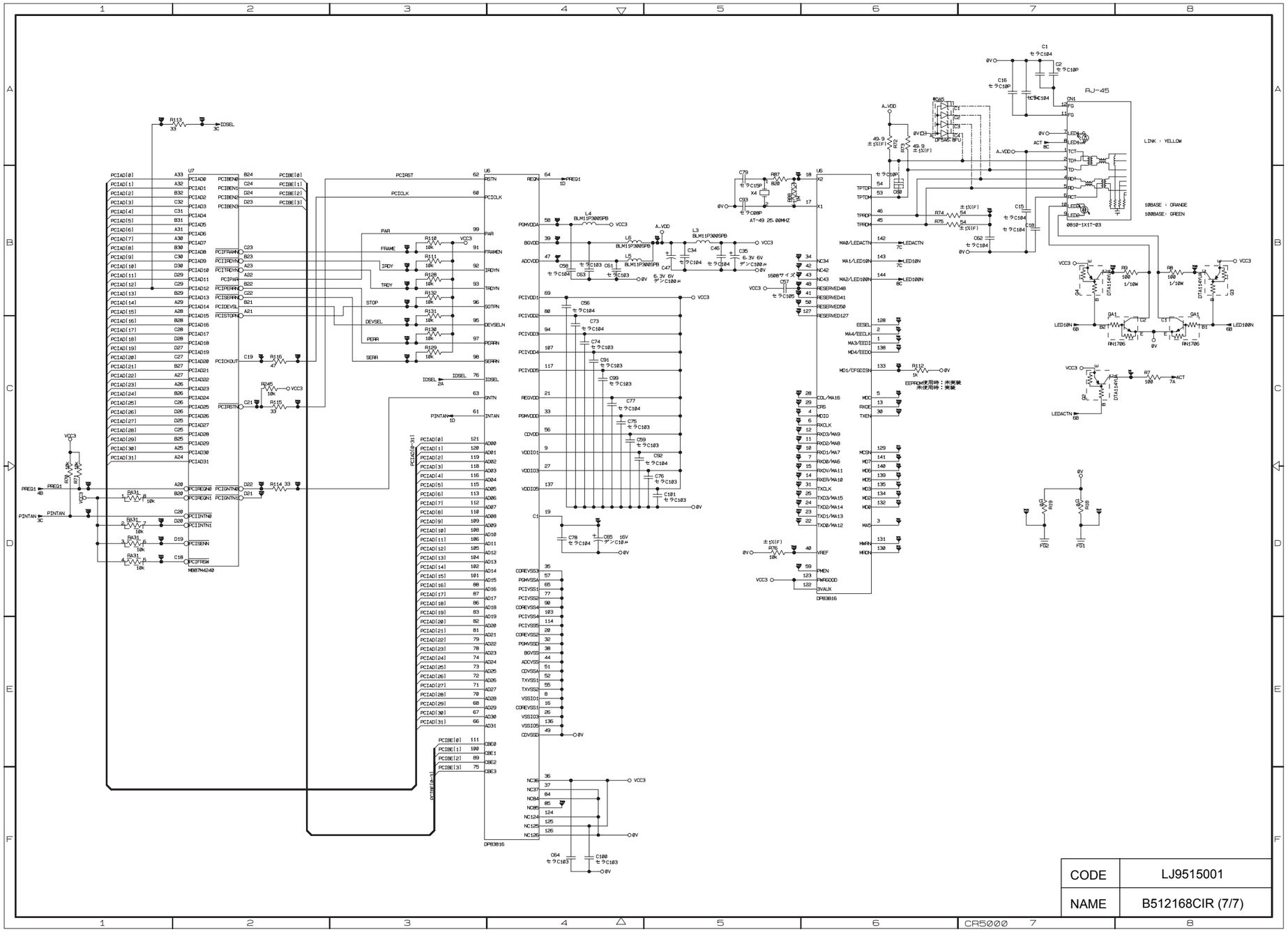
Main PCB circuit Diagram (5/7)



Main PCB circuit Diagram (6/7)



Main PCB circuit Diagram (7/7)



2.4 Power Supply Unit

(1) Outputs and Use

Output Terminal	Rated Output	Use
+5V-1	+5V, 4.0A	For control of Printer.
+5V-1R		For control of Laser.
+5V-2		For control of Interface. (2.0A MAX)
3.3V-2	3.3V, 3.5A	For control of Printer
+24V-1	+24V, 6.5A	For control of printer charging.
HP HP2	120V, 8A 1000W 220V, 5A 1000W	For connection of the fuser heater (HP).

(2) Layout of Connector Pin Assignment

See Fig.4-40 on the following page.

Layout of Connector Pin Assignment - Power Supply Unit -

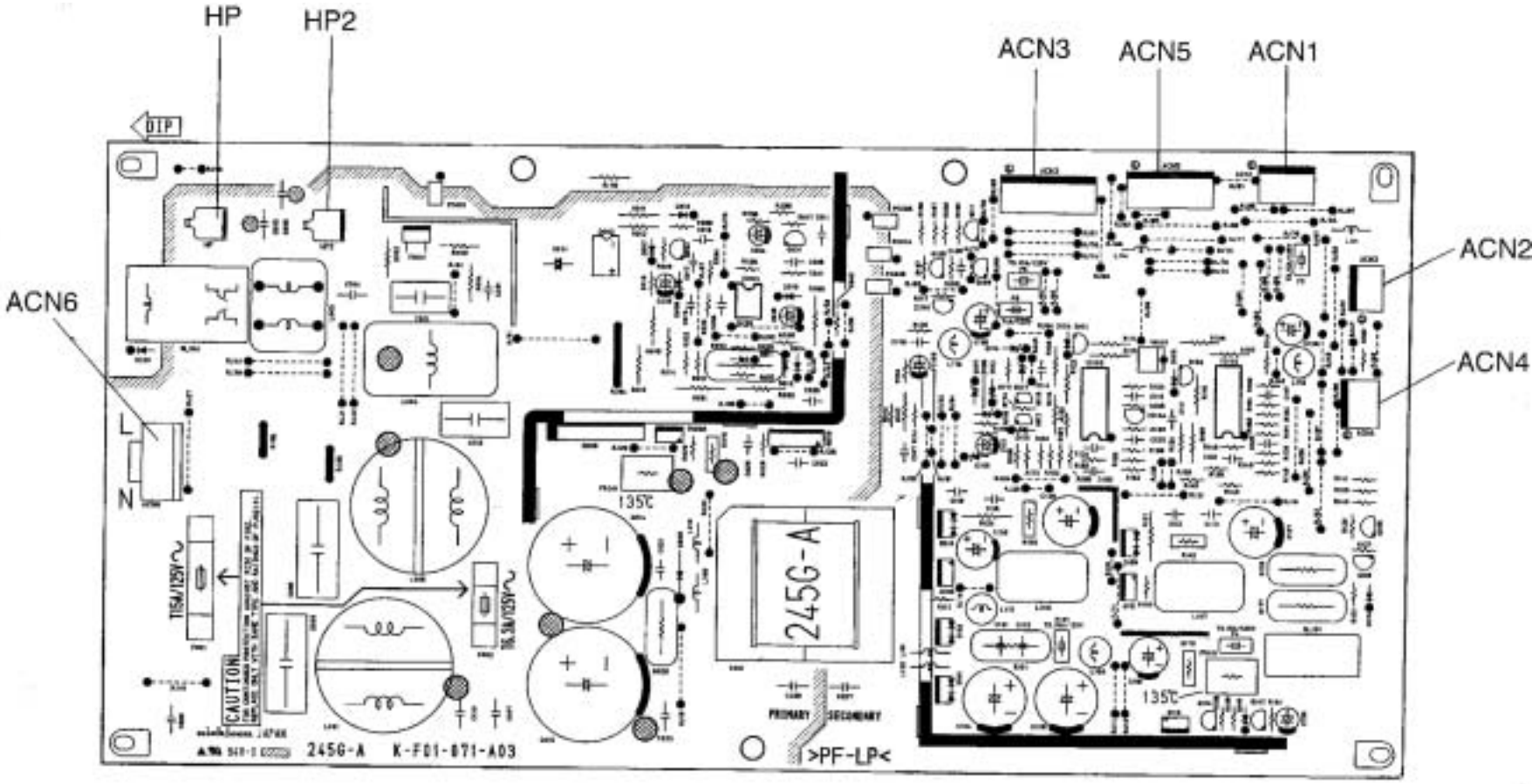


Fig.4-40

(3) Connector Pin Assignment

DC Power Supply – IOD P.W.B

ACN1

Manufacture: MoLex Type:

Pin No	Signal Name	Interface	Pin No	Signal Name	Interface
1	PGND	Power Ground (+24V Type)	2	+24V-1D	+24V Output through Relay
3	PGND	Power Ground (+24V Type)	4	+24V-1D	+24V Output through Relay
5	PGND	Power Ground (+24V Type)	6	+24V-1D	+24V Output through Relay
7	PGND	Power Ground (+24V Type)	8	+24V-1D	+24V Output through Relay
9	SGND	Signal Ground (+5V Type)	10	+5V-1	+5V-1 Output
11	SGND	Signal Ground (+5V Type)	12	+5V-1	+5V-1 Output

DC Power Supply – Interlock Switch

ACN2

Manufacture: MoLex Type:

Pin No	Signal Name	Interface
1	DSW-O	+5V Output through Door Switch
3	DSW-I	+5V Output through Door

DC Power Supply Unit – MCTL P.W.B

ACN3

Manufacture: MoLex Type:

Pin No	Signal Name	Interface	Pin No	Signal Name	Interface
1	SGND(CNT)	Signal Ground (+5V Type)	2	+5V-2(CNT)	+5V-2 Output (CNT)
3	SGND(CNT)	Signal Ground (+5V Type)	4	+5V-2(CNT)	+5V-2 Output (CNT)
5	SGND(CNT)	Signal Ground (+5V Type)	6	+5V-2(CNT)	+5V-2 Output (CNT)
7	SGND(CNT)	Signal Ground (+5V Type)	8	+3.3V-2(CNT)	+3.3V-2 Output (CNT)
9	SGND(CNT)	Signal Ground (+5V Type)	10	+3.3V-2(CNT)	+3.3V-2 Output (CNT)
11	SGND(CNT)	Signal Ground (+5V Type)	12	+3.3V-2(CNT)	+3.3V-2 Output (CNT)
13	SGND(MCTL)	Signal Ground (+5V Type)	14	+5V-1(MCTL)	+5V-1 Output (CNT)
15	SGND(MCTL)	Signal Ground (+5V Type)	16	+5V-1(MCTL)	+5V-1 Output (CNT)
17	PGND	Power Ground (+24V Type)	18	+24V-1D	+24V-1 Output through Releay
19	PGND	Power Ground (+24V Type)	20	+24V-1D	+24V-1 Output through Releay
21	PGND	Power Ground (+24V Type)	22	+24V-1D	+24V-1 Output through Releay

DC Power Supply Unit– Duplex

ACN4

Manufacture: MoLex Type:

Pin No	Signal Name	Interface	Pin No	Signal Name	Interface
1	+5V-1	+5V-1 Output	2	CNCHK-RET	Connected to Signal Ground
3	+5V-1	+5V-1 Output	4	SGND	Signal Ground (+5V Type)
5	+24V-2	+24V-2 Output	6	SGND	Signal Ground (+5V Type)
7	+24V-2	+24V-2 Output	8	PGND	Power Ground (+24V Type)
9	CN-CHK	Check for Connection (Connected to ACN15-18)	10	PGND	Power Ground (+24V Type)

DC Power Supply Unit – MCTL P.W.B

ACN5

Manufacture: MoLex Type:

Pin No	Signal Name	Interface	Pin No	Signal Name	Interface
1	TESTO1	Terminal for the dielectric strength test	2	TESTO2	Terminal for the dielectric strength test
3	TESTI1	Terminal for the dielectric strength test	4	TESTI2	Terminal for the dielectric strength test
5	+5VDO-N	For sensing the door open+5V	6	+5V-1R	+5V through Door Switch
7	BRON-N	Back-Up Roller Heater ON Signal (Pull-Up required)	8	DCOFF1-P	+24V-1 OFF Signal
9	ACOFF-P		10	HIRON-N	Heater ON signal
11	ACSYNC-N	AC Zero-Cross Signal	12	SWRUS-P	Power Supply ID (Connection to GND)
13	PGND	Power Ground (+24V Type)	14	+24	+24V Output
15	PGND	Power Ground (+24V Type)	16	+24	+24V Output
17	PGND	Signal Ground (+5V Type)	18	CN-CHK	Connection Check
19	PGND	Signal Ground (+5V Type)	20	SGND	Signal Ground (+5V Type)

DC Power Supply – AC Inlet Connector (Input)

ACN2

Manufacture: MoLex Type:

Pin No	Signal Name	Interface
1	AC IN-L	AC Input L
-	Non Center Pin	
2	AC IN-N	AC Input N

2.5 High Voltage Power Supply Unit

(1) Output and Function

No.	Function		Power Supply (P/S)	
			Name of P/S	Approx. Output Typical (V)
1	Charging	Charging	BRV	-850
		Cleaning	OLV	+200
2	First Transfer	Transfer	THVT	+1.3k
		Cleaning	THVR	-300
3	Developing Bias	YK	DBV(YK)	-180
		MC	DBV(MC)	-180
4	Belt Bias		CBV	-350
5	Belt Cleaning		FCBV	+1.0k

(2) Layout of Connector Pin Assignment
See Fig.4-41

Layout of Connector Pin Assignment - High Voltage Power Supply Unit

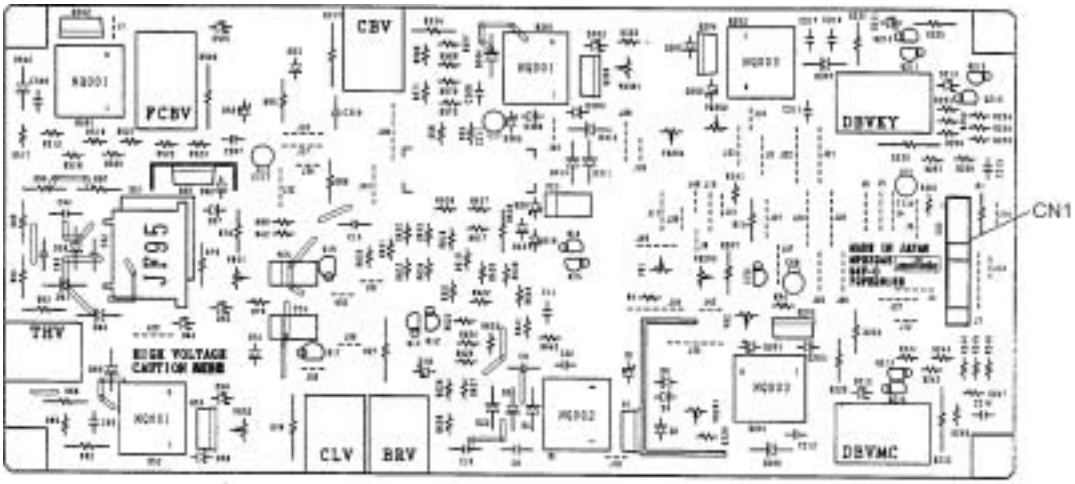


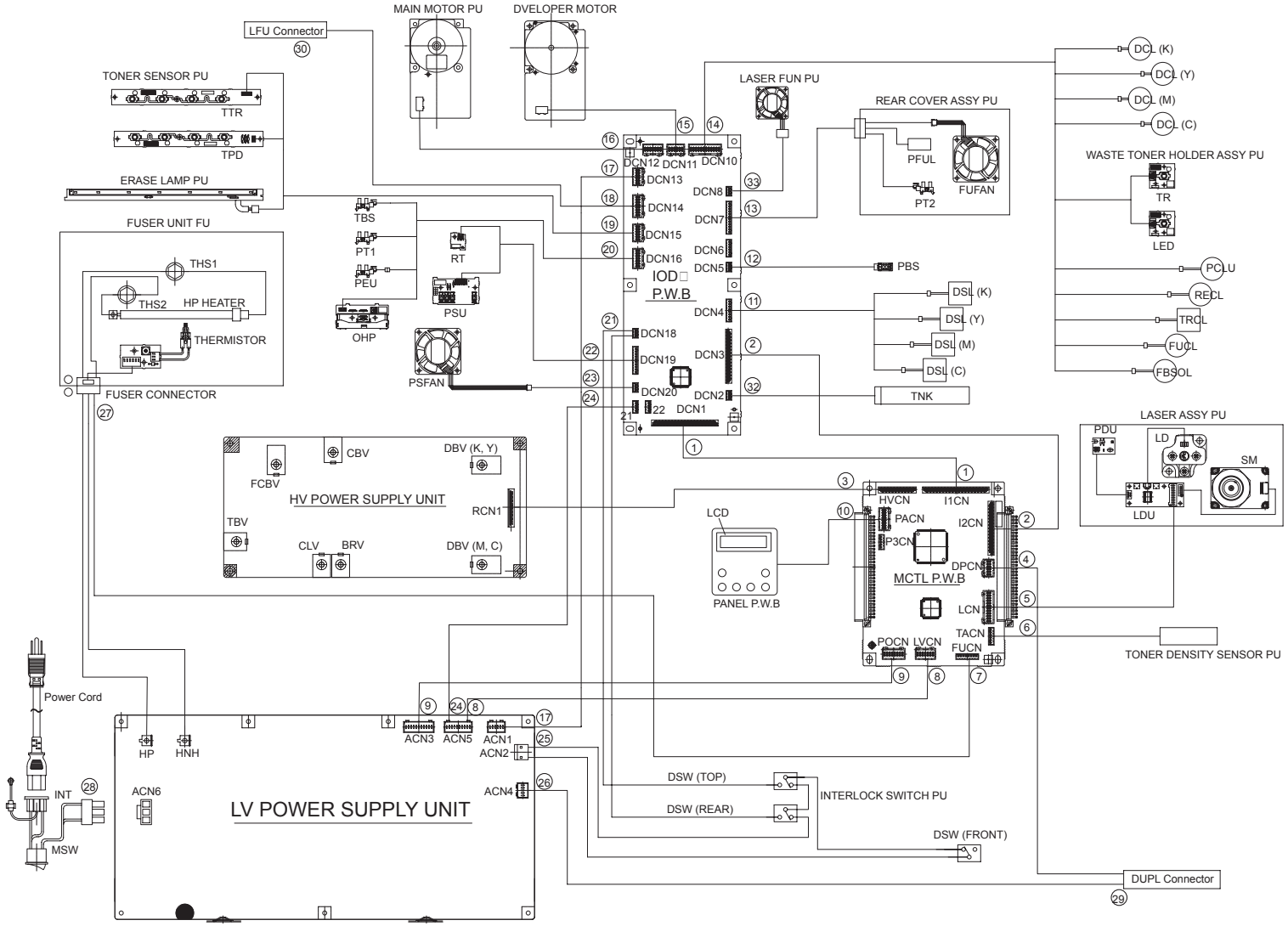
Fig.4-41

(3) Connector Pin Assignment

Manufacture: MoLex Type:

Pin #	Signal Name	Interface
1	PGND	GROUNDING
2	PGND	GROUNDING
3	PND	GROUNDING
4	+24V-1	+24V-1
5	+24V-1	+24V-1
6	+24V-1	+24V-1
7	BRVON-N	BRV Output on signal
8	CLVP-N	CLV Output on signal
9	PWMON-N	PWM control on signal
10	BRVPWM-N	BRV PWM control on signal
11	BRVERR	BRV ERR sensor signal
12	CBVPWM-N	CBV PWM on signal
13	THVRON-N	THVR output on signal
14	DBV(MC) PWM-N	DBV(MC) PWM control signal
15	THVPWM-N	THV PWM on signal
16	DBV(YK) PWM-N	DBV(YK) PWM control signal
17	THV-1	THV-1 Output select signal
18	FCBVPWM-N	FCBV PWM control signal
19		BRV ERR2 sensor signal
20	PGND	N.C
21	HVUCNCHK-N	Check terminal

2.6 Wiring Diagram



<Symbol and Parts Name>

Symbol	Parts Name	Symbol	Parts Name
LVPS	LV Power Supply Unit PU	IOD	I/O Board PU
DSW.F	Interlock Switch PU (Front)	OHP	OHP Sensor PU
DSW.T	Interlock Switch PU (Top)	PEU	Tray Empty Sensor PU
DSW	Interlock Switch PU	PT1	Registration Sensor PU
FUSER UNIT	Fuser Unit FU	Erase Lamp	Erase Lamp PU
TH	Thermistor	TPD TTR	Toner Sensor PU
HR	Fusing Roller	TNK	Toner Key Sensor PU
BR	Back-Up Roller	PSU	Paper Size Sensor PU
THS1 THS2	Thermostat	PFUL	Output Tray Full Sensor PU
HVU	HV Power Supply Unit PU	PT2	Fuser Exit Sensor PU
MCTL	Engine Controller Board PU (MCTL P.W.B)	PBS	OPC Maker Sensor PU
PANEL	Operator Panel Assy PU	TBLE TBFL	Waste Toner Holder Assy
LCD	LCD P.W.B	TBS	Transfer Unit Sensor PU
Laser Assy	Laser Assy PU	SM	Scanner Motor
PDU	PDU P.W.B 2	LDU	Laser Drive Unit P.W.B 2
MM	Main Motor PU	FBSOL	Cleaning Roller Solenoid PU
DM	Developer Motor PU	TRCL	Transfer Roller Clutch PU
FUFAN	Exit Fan PU	DCLK DCLY DCLM DCLC	Developer Clutch PU (K.Y.M.C)
LDFAN	Laser Fan PU	DSLK DSLY DSLM DSLC	Toner Retoract Solenoid PU
PSFAN	Power Supply Fan PU	TDS	Toner Density Sensor PU
PCLU	Paper Feed Clutch PU	RT	Room Temperature Thermistor PU
RECL	Registration Clutch PU	FUCL	Fuser Clutch PU

(1) MCTL P.W.B I1CN - IOD P.W.B DCN1

Pin No.	Signal Name	DCN1 Pin No.
39	SGND	1
38	+5V-S	2
37	I1RDWR	3
36	I1DATA	4
35	I1CK	5
34	I1LOAD	6
33	I1SCDO	7
32	I2C-CLK	8
31	I2C-DATA	9
30	DSL(K)ON-P	10
29	DSL(C)ON-P/FDCLL2ON-P	11
28	DSL(M)ON-P/FDCLL1ON-P	12
27	DSL(Y)ON-P/FDCLL2ON-P	13
26	TH3	14
25	IDATA	15
24	ILOAD	16
23	ISCK	17
22	SGND	18
21	LEDON-N	19
20	HTFANON-P	20
19	CTFANON-P	21
18	TBEN-N	22
17	PBSEN-N	23
16	ELON-P	24
15	PKCLL1ON-P	25
14	IOD1VOFF-P (+5V-SOFF-P)	26
13	OILLES-P	27
12	PWMSEND	28
11	BANKSEL	29
10	I/ODATA0	30
9	I/ODATA1	31
8	I/ODATA2	32
7	I/ODATA3	33
6	I/ODATA4	34
5	I/ODATA5	35
4	I/OAD0	36
3	I/OAD1	37
2	I/OAD2	38
1	SGND	39

(2) MCTL P.W.B I2CN - IOD P.W.B DCN3

Pin No.	Signal Name	DCN3 Pin No.
31	SGND	1
30	COLSEL1	2
29	COLSEL2	3
28	DCL(C)ON-P	4
27	DCL(M)ON-P	5
26	DCL(Y)ON-P	6
25	DCL(K)ON-P	7
24	PSL(KY)ON-P	8
23	PSL(MC)ON-P	9
22	SGND	10
21	MMCLK	11
20	MMON-N	12
19	MMREV-N	13
18	MMENC	14
17	MMGAIN	15
16	GARESET-N	16
15	RECLON-P	17
14	FBCLON-P	18
13	FBSLON-P	19
12	TRSLON-P	20
11	HTFANON-P/* OZFANON-P	21
10	FUCLON-P	22
9	PKCLU1ON-P	23
8	SGND	24
7	DMCLK	25
6	DMRDY-N	26
5	DMON-N	27
4	DMGAIN	28
3	TALWDDA	29
2	SEPASLON-P	30
1	SGND	31

(3) HV Power Supply Unit BCN1 - MCTL P.W.B HUCN

Pin No.	Signal Name	CN1 Pin No.
21	PGND	1
20	PGND	2
19	PGND	3
18	+24V-1D	4
17	+24V-1D	5
16	+24V-1D	6
15	BRVON-N	7
14	CLVP-N	8
13	PWMON-N	9
12	BRVPWM-N	10
11	BRVERR	11
10	CBVPWM-N	12
9	THVRON-N	13
8	DBV(MC)PWM-N	14
7	THVPWM-N	15
6	DBV(KY)PWM-N	16
5	THV-I	17
4	FCBVPWM-N	18
3	BRVERR2	19
2	PGND	20
1	HVUCNCHK-N	21

(4) MCTL P.W.B PPCN - Duplex Unit

Pin No.	Signal Name	Pin No.	Signal Name
1	D-COMMAND	2	DPCN-RET
3	DUMBUSY2-N	4	SGND
5	D-STATUS	6	SGND
7	DUPMONP/*D_SLA(+24VOFF-P)	8	SGND
9	DUREON-P/*DUPRES-N	10	DUPCHK-N
11	DPCN-CHK	12	SLEEP-P

(5) LCN : MCTL-Laser Assy

Pin No.	Signal Name	Pin No.	Signal Name
1	+5V-1R	2	LCONT1
3	LREADY	4	LCONT2
5	SGND	6	LDREF4
7	VIDEO-N	8	LDREF3
9	VIDEO-P	10	LDREF2
11	SGND	12	LDREF1
13	BDT-P	14	LDREF0
15	BDT-N	16	+5V-1
17	SGND	18	SGND
19	SCMRDY-N	20	SCMCLK
21	PGND	22	SCMON-N
23	+24V-1	24	+3.3V

(6) MCTL P.W.B

Pin No.	Signal Name
1	+5V-1
2	LED
3	SGND
4	Vo2:K
5	Vo1:YMC
6	NC

(7) MCTL P.W.B FUCN-Fuser Connector

Pin No.	Signal Name
1	TH1
2	TH1
3	TH2
4	TH2
5	FUTEMP
6	SGND
7	TH4
8	TH5

(8) LV Power Supply Unit ACN5-MCTL P.W.B LVCN

Pin No.	Signal Name	Pin No.	Signal Name
1	TESYO1	2	TESTO2
3	TESTI1	4	TESTI2
5	+5VDO-N	6	+5V-1R
7	BRON-N	8	DCOFF1-P
9	ACOFF-P	10	HRON-N
11	ACSYNC-N	12	SWRUS-P
13	PGND	14	+24
15	PGND	16	+24
17	SGND	18	CN-CHK
19	SGND	20	SGND

(9) LV Power Supply Unit ACN3 - MCTL P.W.B POCN

Pin No.	Signal Name	Pin No.	Signal Name
1	SGND(CNT)	2	+5V-2(CNT)
3	SGND(CNT)	4	+5V-2(CNT)
5	SGND(CNT)	6	+5V-2(CNT)
7	SGND(CNT)	8	+5V-2(CNT) or 3.3v-2
9	SGND(CNT)	10	+5V-2(CNT) or 3.3v-2
11	SGND(CNT)	12	+5V-2(CNT) or 3.3v-2
13	SGND(MCTL)	14	+5V-1(MCTL)
15	SGND(MCTL)	16	+5V-1(MCTL)
17	PGND	18	+24V-1D
19	PGND	20	+24V-1D
21	PGND	22	+24V-1D

(10) MCTL P.W.B PACN - PANEL P.W.B PCN2

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	SGND	16	SGND

(11) MCTL P.W.B P3CN - PANEL P.W.B

Pin No.	Signal Name	Panel Side
1	SGND	11
2	VCC(+5V-1)	10
3	VCC(+5V-1)	9
4	RESET	8
5	SGND	7
6	THROTTLE	6
7	SGND	5
8	FP_STS	4
9	SGND	3
10	FP_CMD	2
11	SGND	1

(12) IOD P.W.B DCN4 - Developer Solenoid

Pin No.	Signal Name
1	DSL(K)ON-N
2	+24V-1
3	DSL(Y)ON-N
4	+24V-1
5	DSL(M)ON-N
6	+24V-1
7	DSL(C)ON-N
8	+24V-1

(13) IOD P.W.B DCN5-OPC Marker Sensor

Pin No.	Signal Name
1	PBSEN-N
2	+5V-S
3	SGND

(14) IOD P.W.B DCN7 - Paper Exit Unit

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

(15) IOD P.W.B DCN10 - Clutches

Pin No.	Signal Name	Pin No.	Signal Name
1	NC	2	NC
3	+24V-1D	4	FBCLON-N
5	+24V-1D	6	FUCLON-N
7	+24V-1D	8	TRSLON-N
9	+24V-1D	10	RECLON-N
11	+24V-1D	12	PKCLU1ON-N
13	TBFULL-N	14	SGND
15	WTLEDON	16	SGND
17	+24V-1D	18	DCL(C)ON-N
19	+24V-1D	20	DCL(M)ON-N
21	+24V-1D	22	DCL(Y)ON-N
23	+24V-1D	24	DCL(K)ON-N

(16) IOD P.W.B DCN11- Developer Motor

Pin No.	Signal Name	Pin No.	Signal Name
1	DMRDY-N	2	DMON-N
3	DMCLK	4	+24V-1D
5	PGND	6	+24V-1D
7	PGND	8	PGND
9	SGND	10	+5V-1
11	DMGAIN	12	DMOVLD

(17) IOD P.W.B DCN12 - Main Motor

Pin No.	Signal Name	Pin No.	Signal Name
1	MMRDY-N	2	MMON-N
3	MMCLK	4	+24-1D
5	PGND	6	+24-1D
7	PGND	8	PGND
9	SGND	10	+5V-1
11	MMENC	12	MMREV-N
13	MMGAIN	14	MMOVLD

(18) IOD P.W.B DCN13 - LV Power Supply Unit ACN1

Pin No.	Signal Name	Pin No.	Signal Name
1	PGND	2	+24V-1D
3	PGND	4	+24V-1D
5	PGND	6	+24V-1D
7	PGND	8	+24V-1D
9	SGND	10	+5V-1
11	SGND	12	+5V-1

(19) IOD P.W.B DCN14 - Lower Feeder Unit

Pin No.	Signal Name	Pin No.	Signal Name
1	LFCN-RET	2	+24V-1D
3	PKCLL1ON-N	4	NC/FDCLL1ON-N
5	PSL1	6	PSL2
7	PSL3	8	PSCST1
9	PEL1-P	10	OCST1-N
11	SGND	12	I2C-CLK
13	+5V-S	14	I2C-DATA
15	+5V-1	16	LFCN-CHK-N

(20) IOD P.W.B DCN15- Toner Sensor

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	TLESCN-N	6	SGND
7	LEDON-P	8	LEDON2-P
9	TLESCHK	10	SGND
11	+24V-1D	12	ELON-N

(21) IOD P.W.B DCN16 - Paper Sensors

Pin No.	Signal Name	Pin No.	Signal Name
1	+5V-S	2	TBEN-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	14	NC

(22) IOD P.W.B DCN18 - Inter Lock Switch

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

(23) IOD P.W.B DCN19 - Paper Size Sensor

Pin No.	Signal Name
1	+5V-1
2	PSU1
3	PSU2
4	PSU3
5	PSU4
6	PSU5
7	SGND
8	+5V-S
9	SGND
10	TH3

(24) IOD P.W.B DCN20 - Power Supply Fan

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

(25) IOD P.W.B DCN21 - LV Power Supply Unit ACN5

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

(26) ACN2 (Interlock Switch)

Pin No.	Signal Name
1	DSW-O:F
2	DSW-I :R

(27) LV Power Supply Unit ACN4-Duplex Unit

Pin No.	Signal Name	Pin No.	Signal Name
1	+5V-1	2	CNCHK-RET
3	+5V-1	4	SGND
5	+24V-2	6	SGND
7	+24V-2	8	PGND
9	CN-CHK	10	PGND

(28) LV Power Supply Unit ACN7-Fuser Connector

Pin No.	Signal Name
1	HP
2	HNK

(29) LV Power Supply Unit ACN6-Input

Pin No.	Signal Name
1	AC IN-N
—	
3	AC IN-L

(30) Duplex Connector

Pin No.	Signal Name	Pin No.	Signal Name
1	D-COMMAND	2	DUMBUSY2-N
3	SGND	4	D-STATUS
5	SGND	6	DUPMON-P
7	SGND	8	DUREON-P
9	DUPCHK-N	10	SLEEP
11	+5V-1	12	+5V-1
13	SGND	14	SGND
15	NC	16	NC
1	+24V-2	2G	PGND
3	+24V-2	4G	PGND

(31) Lower Feeder Connector

Pin No.	Signal Name	Pin No.	Signal Name
1	+24V-1	2	PKCLL1ON-N
3	PSL1	4	PSL2
5	PSL3	6	PSCST1
7	PEL1-P	8	OCST1-N
9	I2C-DATA	10	I2C-CLK
11	+5V-1	12	SGND
13	+5V-S		

(32) DCN2:IOD

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

(33) DCN8:IOD - Laser Fan

Pin No.	Signal Name
1	LDFANON-P
2	PGND
3	LDFAN ERR

CHAPTER V
CONTROL PANEL OPERATION

CHAPTER V CONTROL PANEL OPERATION

1. PANEL LAYOUT

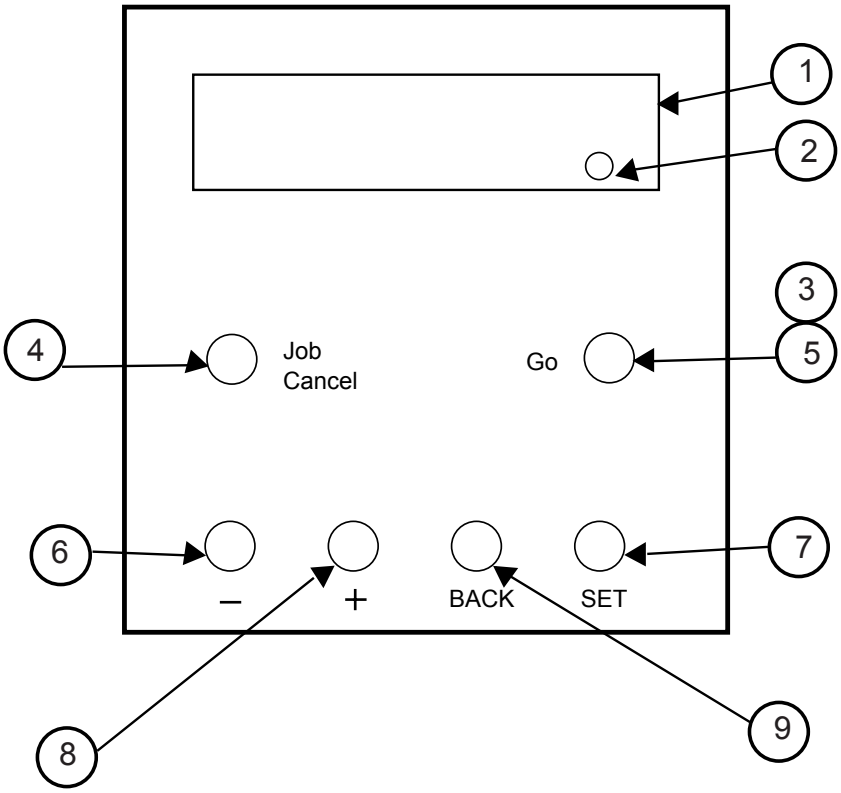


Fig.5-1

No.	LED / Key Name
1	LCD: 16 character by 2 lines
2	Alarm LED
3	Online LED
4	Job Cancel Key
5	Go Key
6	- Key
7	Set Key
8	+ Key
9	Back Key

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 keys and various sensors.

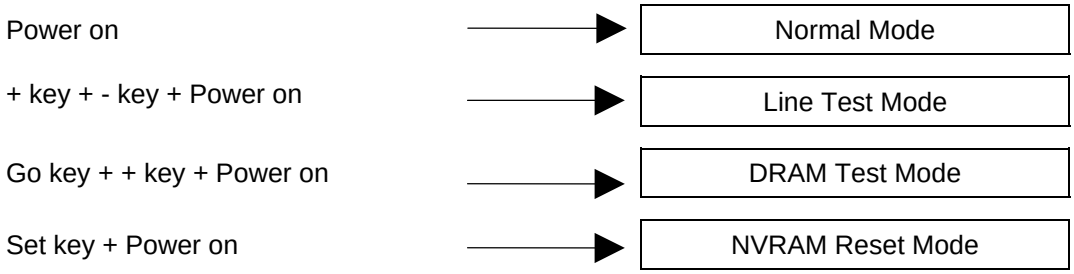
(3) DRAM Test Mode: This mode is provided to test installed DIMM(s) on the main (video controller) PCB.

(4) 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



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 keys 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 tray (Tray 1).
TRAY 2 CHECK	Displays the paper size of the lower tray (Tray 2).
FLASH CARD-R/W TEST	Checks the compact flash card.

<Procedure>

Note:

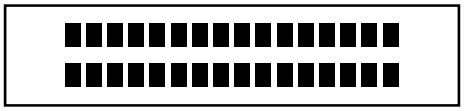
- *It is possible to skip the test and proceed with the next test by pressing the Go key.*
- *If any errors occur during the following procedures, an error message appears on the LCD. By pressing the Go key, it is possible to proceed with the test.*

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

2) Press the Go key 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.

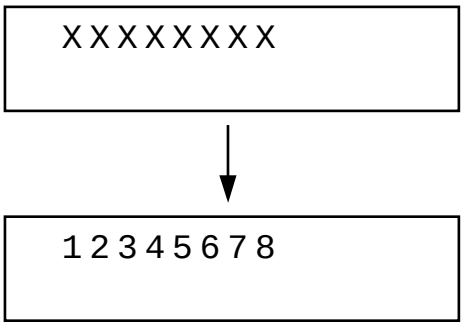


   All of the LCDs are displayed at a time.

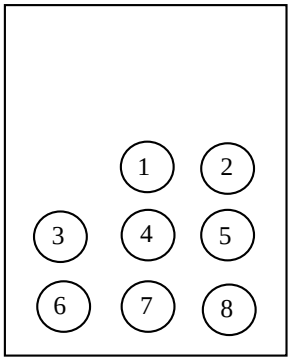
3) Press the Go key to implement the SW TEST.

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 keys on the control panel in order.



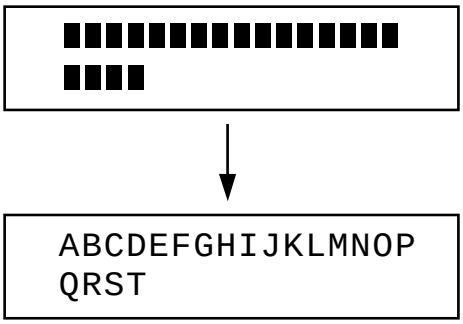
Corresponding key number on the panel



4) Press the Go key 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.



<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'

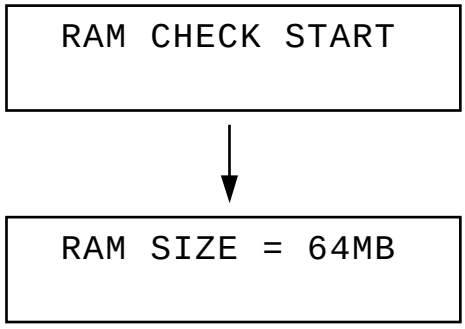
Corresponding sensor code

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 Tray
M:	Lower Tray
N:	Upper Tray Paper
O:	Lower Tray Paper
P:	Upper Tray Media
Q:	Lower Tray Media
R:	Paper Sensor 1
S:	Paper Sensor 2
T	Paper Sensor 3

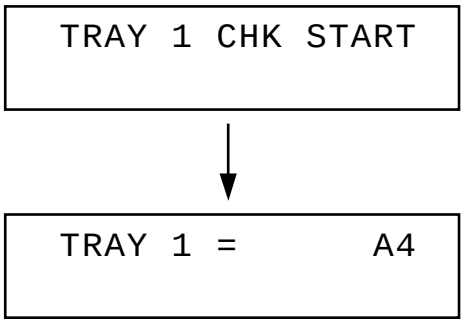
Note:

- *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-2700CN, Lower Tray does not have the media sensor, so the display will not be changed to 'Q'. (The display will stay* ■ *.)*

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

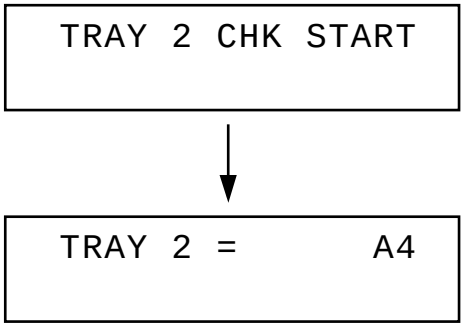


6) Press the Go key to implement the TRAY1 CHECK.
The paper size of the installed tray 1 is displayed.
Check that the paper size is correct.



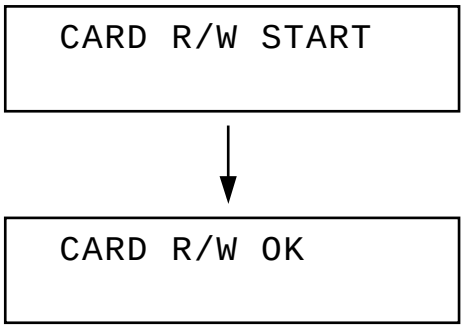
TRAY 1 =	A4:	A4 size tray is installed.
TRAY 1 =	LETTER:	Letter size tray is installed.
TRAY 1 =	NO:	No tray is installed.
TRAY 1 =	SIZE ERR:	The paper size is other than A4 or Letter size.

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



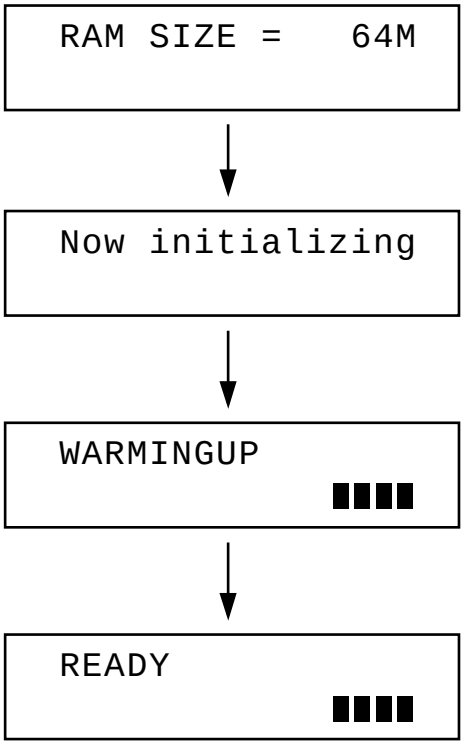
TRAY 2 =	A4:	A4 size tray is installed.
TRAY 2 =	LETTER:	Letter size tray is installed.
TRAY 2 =	NO:	No tray is installed.
TRAY 2 =	SIZE ERR:	The paper size is other than A4 or Letter size.

8) Press the Go key 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 key 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>

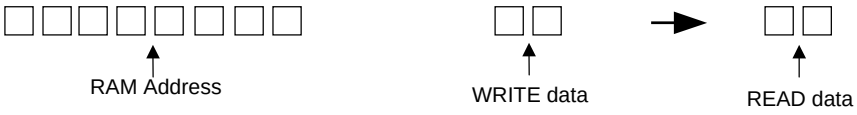
1) To start the test program:

   While holding down the Go key and + key, turn on the power. “DRAM CHECK START” will be displayed. Press the Job Cancel key 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 keys in this order while holding down the Go key.

   ii) The LCD will display “HIDDEN PANEL”

   iii) Select the “DRAM ADDRESS” menu using the Back and + keys.

   iv) Whenever the Set key is pressed, the LCD will display the DRAM error address on Slot 1.

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 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 key, turn on the power.
2) Hold down the Set key until “WARMING UP” is displayed on the LCD panel and the LEDs are all on momently.
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 -, +, Back keys.

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 Job Cancel key 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.

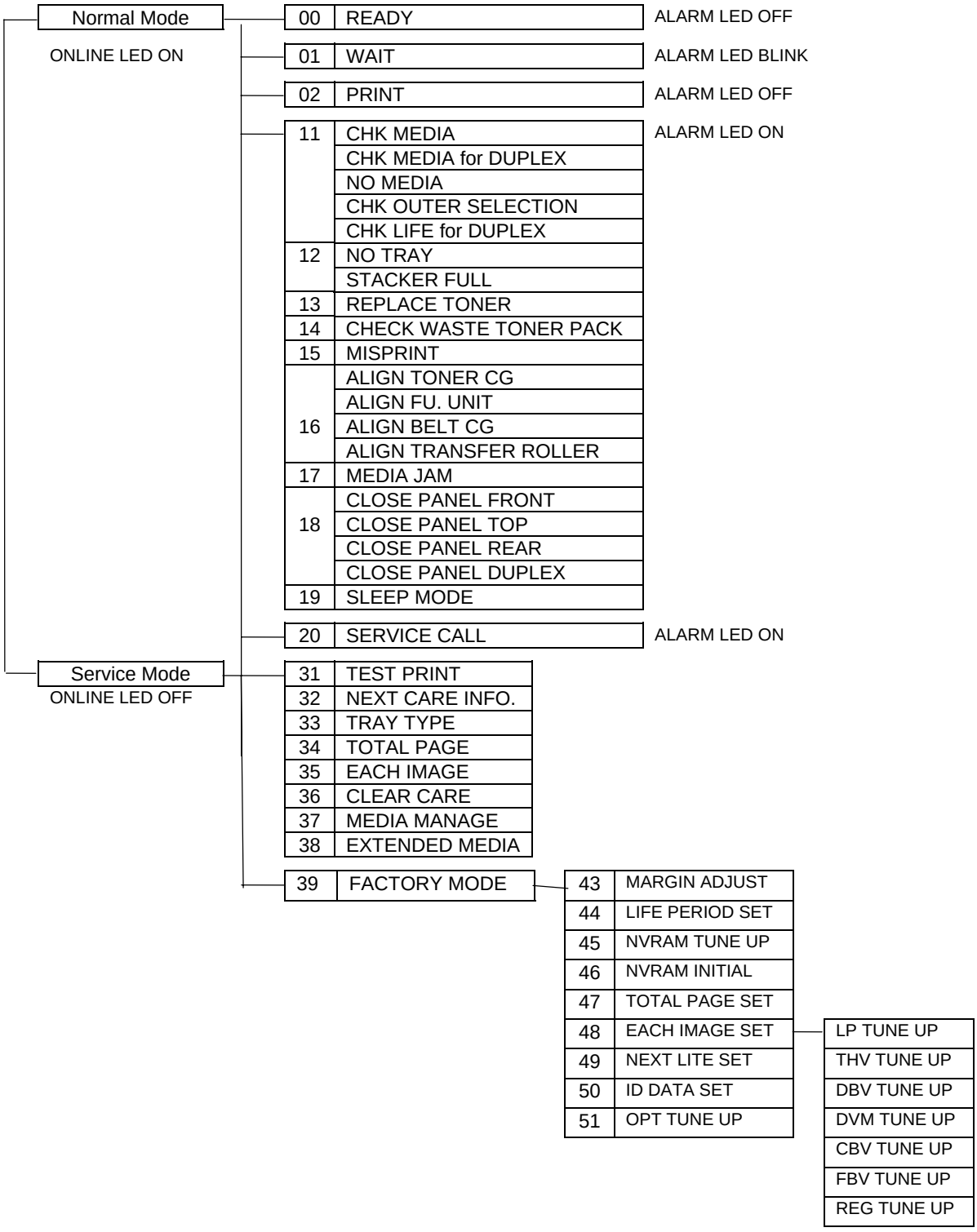
Note:

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 Construction of Operational Mode



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) Push on the power switch.
2) The Alarm lamp blinks.
3) Alarm lamp is lit off approximately 45 seconds after switching on the power supply, and then the printer is ready to print as READY status.

Normal Mode

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

Code No.	LCD Message	Description of Message
00	00 READY [*1] [*2] [*4]	• ONLINE LED is lit. • Engine has completed the warming-up process and now is ready to print. • Engine is ready to receive "PRREQ", signal from LPC. [*1]: Applicable paper feeder is indicated as follows; /UPP: Upper Tray /LOW: Lower Tray /DPL: Duplex Unit [*2]: Size of the paper loaded on the upper or lower tray is indicated as follows. Indication to be displayed from the left in the order of Upper Tray, Lower Tray. LT…Letter size DL…Envelope EX…Executive size PC…Post Card LG…Legal size CM…Envelope Commercial #10 A4…A4 size FR…Free size B5…B5 size [*4]: Code numbers of the consumables or periodical replacement parts will be indicated if they reach to their life or should be replaced now. If no periodical replacement is required, there will be no indication in the LCD. For details of the periodical replacement parts, see 36. CLEAR CARE in the next section.
01	01 WAIT [*1] [*2] [*4]	• Alarm LED is lit. • 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	02 PRINT [*5][*1] [*2] [*4]	• Alarm LED is lit. • 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. [*5]: Print color is indicated as follows; Y: Yellow M: Magenta C: Cyan K: Black YM: Yellow & Magenta YMCK Full Color

Code No.	LCD Message	Description of Message
11-1	CHECK MEDIA 11 CHK MEDIA [*1] [*4]	• Engine stands by as “CHECK MEDIA” status. • Alarm LED is lit. [*1]: Applicable paper feeder is indicated as follows; /UPP: Upper Tray /LOW: Lower Tray /DPL: Duplex Unit Inside • Confirm whether the applicable paper tray is loaded with paper. • Press Go Key if media shall be changed.
11-2	NO MEDIA 11 NO MEDIA [*1] [*4]	• Engine stands by as “NO MEDIA” status. • Alarm LED is lit. [*1]: Applicable paper feeder paper empty condition is indicated as follows; /UPP: Upper Tray /LOW: Lower Tray /DPL: Duplex Unit Inside • Replenish the empty tray with paper.
11-3	CHECK MEDIA for DUPLEX 11 CHK MEDIA [*1] for DUPLEX[*4]	• Engine stands by a CHECK MEDIA Duplex. • Alarm LED is lit. [*1]: Media check is indicated with the following messages for each feeder. /UPP: Upper Tray /LOW: Lower Tray /DPL: Duplex Unit Inside • Changes the applicable media. • Changes the designation of media.
11-4	CHECK OUTER SELECTION 11 CHK OUTER [*1] SELECTION [*4]	• Engine stands by a CHECK OUTER SELECTION. • Alarm LED is lit. [*1]: Media check is indicated with the following messages for each feeder. /UPP: Upper Tray /LOW: Lower Tray • Confirm the paper tray/paper exit tray, and reset properly.

Code No.	LCD Message	Description of Message

11-5	CHECK LIFE for DUPLEX
	`11 CHK LIFE`
	`for DUPLEX`
		• Engine idles when the error message “CHK MEDIA FOR DUPLEX” appears.
		• Alarm LED is lit.
		• The error message “CHK MEDIA FOR DUPLEX” means the printer status that toner runs out, the waste toner bottle is full, or the paper tray is full during the duplex printing. In this instance, the paper in the duplex unit is printed out and then printer stop.

12-1	NO TRAY UPP/LOW
	`12 NO TRAY [*1]`
	`[*4]`
		• Engine is idling.
		• Alarm LED is lit.
		[*1]: Paper feeder without the paper tray is indicated as follows;
		/UPP: Upper Tray
		/LOW: Lower Tray
		• Install the applicable media tray to the paper feeder indicated on the LCD.

12-2	STACKER FULL
	`12 STACKER`
	`FULL [SF]`
		• Engine stands by as “STACKER FULL” status.
		• Alarm LED is lit.
		• Remove the paper on the stacker (paper exit tray), and then press "-" key.

13	REPLACE TONER
	`13 REPLACE [*5]`
	`TONER [*4]`
	* Display of [4]
	C : YT Y Toner Cartridge
	C : CT C Toner Cartridge
	C : MT M Toner Cartridge
	C : KT K Toner Cartridge
		• The engine is idling.
		• Alarm LED is lit.
		[*5]: The toner empty condition is indicated by the color code as follows;
		Y: Yellow
		M: Magenta
		C: Cyan
		K: Black
		• Replace the indicated toner cartridge with a new toner cartridge of subject color.

Code No.	LCD Message	Description of Message
14	CHECK WASTE TONER PACK 14 CHECK WASTE TONER PACK[*4]	• Engine is idling. • Alarm LED is lit. • Replace the waste toner pack with a new pack. • 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 - Key.
15	MISPRINT 15 MISPRINT [*6] [*4]	• Engine is idling. • Alarm LED is lit. [*6] Kind of the misprint will be indicated as follows; NOPQR: No PRREQ-N signal is available. PAPER: No paper is available in the feeder while executing the print operation after receipt of the print command. MEDIA: While executing the print process after receipt of print command, the media type of feeder is not consistent with the specified media type. Misprint occurred while the Duplex printing. • This message can be cleared by pressing the - Key.
16-1	ALIGN FU.UNIT 16 ALIGN FU.UNIT [*4]	• Engine is standstill. • Alarm LED is lit. • Fuser unit is not installed. Reconfirm the installation status of the fuser unit.. • This message will be automatically cleared by open & close operation of the paper exit cover. The message is cleared also by pressing the - Key.

Code No.	LCD Message	Description of Message
16-2	ALIGN TONER CG 16 ALIGN [*5] TONER CG [*4]	• Engine is idling. • Alarm LED is lit. [*5]: The color of the incorrectly installed toner cartridge will be indicated as follows; Y: Yellow M: Magenta C: Cyan K: Black TK: Toner Key • Reinstall the toner cartridge correctly. • This message will be automatically cleared by open & close operation of the front cover.
16-3	ALIGN BELT CG 16 ALIGN BELT CG [*4]	• Engine is standstill. • Alarm LED is lit. • Belt cartridge is not installed. Reconfirm the installation status of the belt cartridge. • This message will be automatically cleared by open & close operation of the paper exit cover or front cover.
16-4	ALIGN TRANSFER ROLLER 16 ALIGN TRANSFER ROLLER [*4]	• Engine stands by as “ALIGN TRANSFER ROLLER” status. • Alarm 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).
16-5	ALIGN OPC CHARGER 16 ALIGN OPC CHARGER	• Engine stands by as “ALIGN TRANSFER ROLLER” status. • Alarm 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	MEDIA JAM 17 MEDIA JAM [*7] [*4]	• Engine is standstill. • Alarm LED is lit. [*7]: Kind of jam (location of jam) is indicated as follows; FEED: Paper Feeder INNER: Inside of Printer OUTER: Paper Exit TRNS: Transfer Belt DPLEX: Jam inside the duplex unit. • This message can be cleared by pressing the - Key after open & close operation of the front cover, back cover and paper exit cover.
18	CLOSE PANEL 17 CLOSE PANEL [*8] [*4]	• Engine halts as “CLOSE PANEL” status. • Alarm LED is lit. [*8]: One of following messages appears to indicate the kind of cover being open. FRONT: Front Cover TOP: Paper Exit Cover REAR: Rear Cover DPLEX: Rear Cover • Close the indicated cover, and then above message is cleared.
19	SLEEP MODE 19 SLEEP MODE [*4]	• Engine is idling. • Alarm 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	SERVICE CALL 20 SERVICE CALL [*9]	• Engine is standstill. • Alarm LED is lit. [*9]: Service Call error code is indicated as follows; For the details of error codes, refer to Chapter VIII “Troubleshooting” in this manual.

3.3 Service Mode

Service mode is a unique mode for the maintenance of printer only. In this mode, you can check the operation status of printer engine as OFFLINE, and also carry out the maintenance work of each printer components.

Procedure

1) Simultaneously pressing the three keys, namely, + key, Back key, and - key, turn the power switch on by push-on operation.

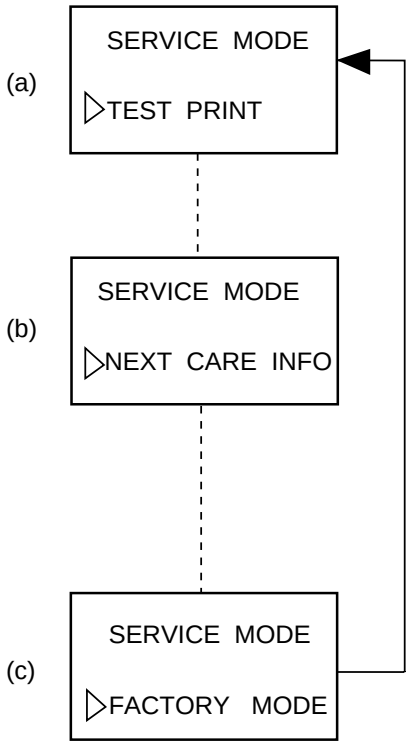
2) Using the Back key, + key, Set key, and - key, select the mode necessary for the maintenance work from the configuration shown in Table 5-2.

How to designate the necessary mode

1) Press the Back and + keys so that service mode (a), (b) and (c) shows up one after another to be selected.

2) After selecting the desired mode, execute the selected mode by pressing the Set key.

3) Press the - key if the mode should be cleared.



31	GRID PRINT

Grid Pattern of single color or two color (R, G, B) and Stripe Pattern of full color can be printed for Test Print.

Procedure

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

32	NEXT CARE INFORMATION

Information relating to the replacement timing of periodical replacement parts can be obtained, namely, the number of motion images and printouts.

Procedure

Description of Procedures	LCD Message
1) Press Set key after selecting Screen (a) "NEXT CARE INFO". (a) → (b) 2) Using Back and + keys, select the care code of desired information. 3: Yellow toner 4: Magenta toner 5: Cyan toner 6: Black toner 7: Belt Cartridge (BL) 8: Fuser Unit (FU) 9: Transfer Belt (TB) 10: Replacement Kit by every 120K (OW) (b) 11: Waste toner bottle is full 12: Paper exit tray is full 13: Pick-up Roller (PK) 14: Pick-up Roller (PL) * When the replacement is suggested by the sensor's detection, the necessary information can be obtained one after another. 3) After selecting the desired information's code, press Set key. Then, number of images or printouts corresponding to the selected code is displayed. (b) ---> (c) through (f) 4) Screen (c) through (f) can be cleared by pressing the - key. (f) → (e) → (d) → (c) → (b) Press the - key one more time at the screen (b) to return to the service mode. (b) → (g)	(a) SERVICE MODE ▷NEXT CARE INFO /
	(b) 32 NEXT CARE 1 2 3 4 5 6 7 8 9 10•12•••16 No.=1 2 3 4 5 6 7 8 9 10 12 16
	(c) NEXT BL UNIT 60000P
	(d) NEXT FU UNIT 60000P
	(e) NEXT TR DRUM 300000P
	(f) NEXT 120K KIT 120000P
	(g) SERVICE MODE ▷TEST PRINT

33	TRAY TYPE

Desired paper feeding tray can be selected.

Procedure

Description of Procedures	LCD Message
1) Press Set key after selecting Screen (a) "TRAY TYPE". (a) → (b) 2) Using Back and + keys, select the applicable code of desired tray (A, B, C or D), and then, press the Set key. 3) Return to SERVICE MODE by pressing the - key. (b) → (c) A : US B : EC C : JPN D:FREE SIZE	(a) SERVICE MODE ▷TRAY TYPE (b) 33 TRAY TYPE TYPE=<A / B / C / D / E /F> (c) SERVICE MODE ▷TEST PRINT

34	TOTAL PAGE

Total number of printouts can be confirmed.

Procedure

Description of Procedures	LCD Message
1) Press Set key after selecting TOTAL PAGE mode. (a) → (b) 2) Select one type of page from among TOTAL PAGE, DPL PAGE. 3) 6 digit number is displayed. This number represents the total number of pages that have been printed out. (b) 3) Press the - key to clear the screen (c). (d) → (e)	(a) SERVICE MODE ▷TOTAL PAGE (b) 34 TOTAL PAGE ▷TOTAL/DUPLEX (c) 34 TOTAL PAGE □□□□□□ P (d) 34 DUPLEX PAGE ::::·· P (e) SERVICE MODE ▷ TEST PRINT

35	EACH IMAGE

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

Procedure

Description of Procedures	LCD Message
1) Press Set key after selecting EACH IMAGE mode. (a) → (b) 2) Using Back and + keys, select the subject color, and then, press Set key. (b) → (c) 3) Number of created images per the selected color is displayed. (Ex. Yellow) (c) 4) Press the - key to clear the screen (c). (c) → (d) 5) Using Back and + keys, select other color, and then, press Set key to confirm the number of created images per each colors. 6) Press the - key to return to the Service mode. (d) → (e)	(a) SERVICE MODE ▷EACH IMAGE (b) 35 IMAGE OF ▷ Y / M / C / K (c) 35 IMAGE OF Y 000098P (d) 35 IMAGE OF ▷ Y / M / C / K (e) SERVICE MODE ▷TEST PRINT

36	CLEAR CARE

Care Code displayed in the LCD can be cleared. Make sure to implement the displayed CLEAR CARE mode whenever replacing the applicable periodical replacement parts with new parts.

Procedure

Description of Procedures	LCD Message
1) Press Set key after selecting CLEAR CARE mode. (a) → (b) 2) Using Back and + keys, have the cursor meet the applicable CARE code, and then, press Set key. (b) → (c) 3) When implementing CLEAR CARE, use the Back and + keys to have the cursor meet YES, and then, press Set key. (c) → (d) 4) Press the - key to clear the CLEAR CARE mode. (d) → (e)	(a) SERVICE MODE ▷CLEAR CARE (b) 36 CLEAR CARE 1 2 3 4 5 6 7 8 9 10•12•••16 (c) CARED BL UNIT ? ▷ YES/NO (d) 36 CLEAR CARE 1 2 3 4 5 6 7 8 9 10•12•••16 (e) SERVICE MODE ▷TEST PRINT

No.	Periodic Maintenance Parts	Code
7	Belt Cartridge	BL
8	Fusing Unit	FU
9	Drum Cleaner Transfer Roller	OW
10	Transfer Belt	TB
13	Paper Feeding Roller	PK
14	Paper Feeding Roller (LFU)	PL

37	MEDIA MANAGE

Signal from OHP sensor can be ignored at the media select (OHP). However, this mode should not be used under the normal circumstances.

Procedure

Description of Procedures	LCD Message
1) Press Set key after selecting MEDIA MANAGE. (a) → (b) 2) Select the DEFIANCE, and then, press the Set key if OHP sensor signal should be ignored. (b) In the normal operation, the mode is preset to MANAGE. 3) Return to SERVICE MODE by pressing the - key. (b) → (c)	(a) SERVICE MODE ▷MEDIA MANAGE (b) 37 MEDIA MANAGE ▷MANAGE/DEFIANCE (c) SERVICE MODE ▷ TEST PRINT

38	EXTEND MEDIA

The detail of media selection can be specified.

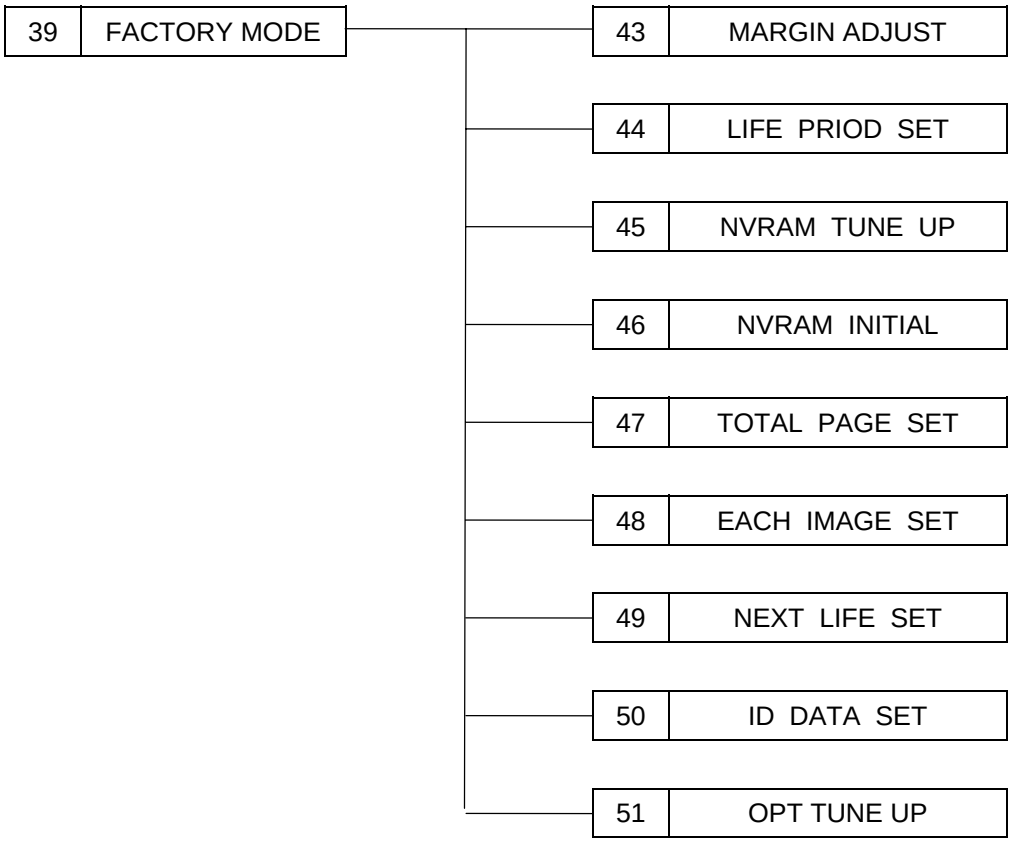
Procedure

Description of Procedures	LCD Message
1) Press the Set key after selecting EXTEND MEDIA. (a) → (b) 2) Using the Back and + keys, select the desired media, and then press the Set key. (b) → (c)	(a) SERVICE MODE ▷EXTEND MEDIA (b) 38 EXTEND MEDIA ▷PPC / MTS / TS
Using the Back and + keys, select the desired detail type, and then press the Set key. (c)	(c) 38 EXTEND PPC ▷NORMAL / THIN (c) 38 EXTEND MTS ▷NORMAL / GLOSSY (c) 38 EXTEND LABEL ▷TS1 / TS2
4) Press the - key to return to the Service Mode. (b) → (c)	(d) SERVICE MODE ▷TEST PRINT

39	FACTORY MODE

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

Basic Configuration



43	MARGIN ADJUST

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

Procedure

Description of Procedures	LCD Message
1) Press Set key after selecting MARGIN ADJUST. (a) → (b) 2) Using Back and + keys, select either TOP or LEFT1/ LEFT3, and then, press Set key. (b) → (c) LEFT: For adjustment of left edge of upper tray. LEFT1: For adjustment of left edge of lower tray. LEFT3: For adjustment of left edge from duplex unit. 3) Margin can be adjusted 3.5mm max. to both end (left and right) by 0.5mm pitch against the reference value "0". Using Back and + keys, select amount of adjustment by picking up a number displayed in Screen (c) or (d). In this instance, 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 displayed, press Set key to set the adjustment. 4) Press the - key to terminate MARGIN ADJUST mode. (d) → (e) 5) Press the - key one more time to return to FACTORY MODE. (e) → (f)	(a) 39 FACTORY MODE ▷ MARGIN ADJUST (b) 43 MARGIN ADJUST ▷ TOP/LEFT/LEFT1/ NONE/LEFT3 (c) 43 TOP -2.0mm - < 7 6 5 4 3 2 1 0 1 > + (d) 43 TOP +2.5mm - < 1 0 1 2 3 4 5 6 7 > + (e) 43 MARGIN ADJUST ▷ TOP/LEFT/LEFT1/ NONE/LEFT3 (f) 39 FACTORY MODE ▷ MARGIN ADJUST

44	LIFE PERIOD SET

Replacement life of the periodical replacement parts can be set.

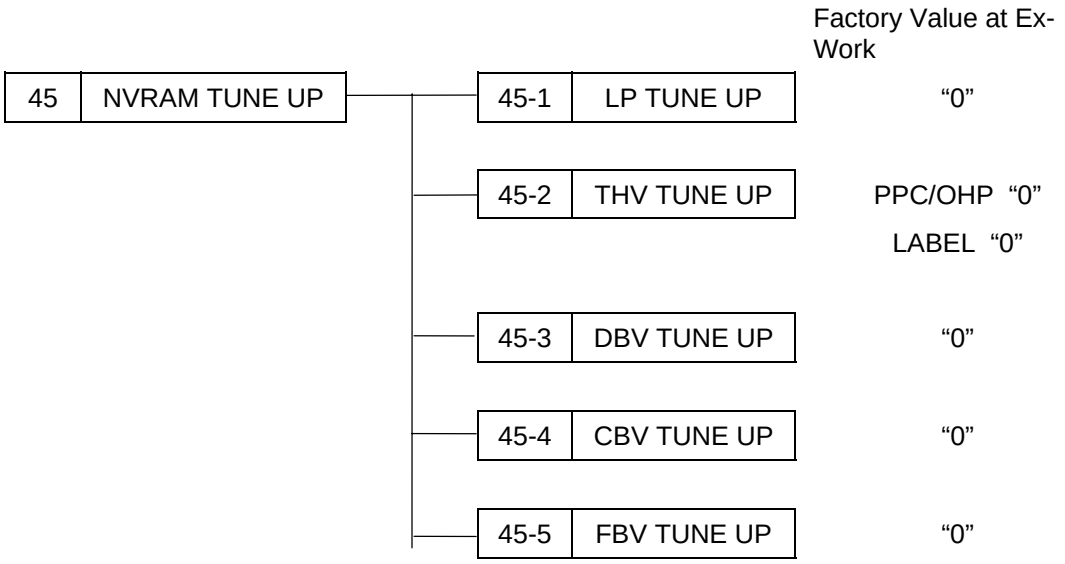
Procedure

Description of Procedures	LCD Message
1) Press Set key after selecting LIFE PERIOD mode. (a) → (b) 2) Using Back and + keys, select the desired code to be set, and then, press Set key. 7: Belt Cartridge (BC) (d) 8: Fuser Unit (FU) (e) 9: Transfer Belt (TB) (f) 10: 120K Replacement Kit (OW) (g) 13: Pick-up Roller (PK) 14: Pick-up Roller (PL) 3) Use Back and + keys to designate or change the desired digit. Use Set key to input values to the blinking digit. Upon completing the input of values to be set, use the Back and + keys to move the cursor to SET displayed in the LCD, and then, press the Set key to register the set value. 4) Press the - key to complete the setting work. (h) 5) Press the - key one more time to return to FACTORY MODE. (h) → (i)	(a) 39 FACTORY MODE ▷ LIFE PERIOD SET (b) 44 LIFE PERIOD 1 2 3 4 5 6 7 8 9 10 •12 •••16 (d) PERIOD BL UNIT 60000 P SET (e) PERIOD FU UNIT 60000 P SET (f) PERIOD TR BELT 300000 P SET (g) PERIOD 120K UNIT 120000 P SET (h) 44 LIFE PERIOD 1 2 3 4 5 6 7 8 9 10 •12 •••16 (i) 39 FACTORY MODE ▷ MARGIN ADJUST

45	NVRAM TUNE UP

This mode is not used in the normal operation, 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 shall be used when optical density, line thickness and/or color reproduction need to be adjusted. The adjustment will be made by changing the laser power against the reference value 0 (zero) in the range between the step -7 and +7.

Description of Procedures	LCD Message
1) Press Set key after selecting NVM TUNE UP. (a) → (b) 2) After selecting LP TUNE UP Code 1, press Set key. (b) → (c) 3) After selecting the color to be tuned up, press Set key. (Ex. Yellow) (c) → (d) 4) Tune Up value can be adjusted within 8 steps between the step -7 and +7. After selecting a given number, press Set key. (d) 5) Press the - key to wrap up the tune-up work for yellow color. (d) → (e) Repeat the step 3 through 5 whenever the tune-up work is required to each color. 6) Press the - key to wrap up the tune-up work. (e) → (f)	(a) 39 FACTORY MODE ▷ NVM TUNE UP (b) 45 NVM TUNE UP △1 2 3 4 5 6 7 8 9 10 •12 ••• 16 (c) 45 LP TUNE UP ▷ Y / M / C / K (d) 45 YELLOW [0] -< 7 6 5 4 3 2 1 △0 1 >+ (e) 45 LP TUNE UP ▷Y / M / C / K (f) 45 NVM TUNE UP △1 2 3 4 5 6 7 8 9 10 •12 ••• 16

45-2	THV TUNE UP

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

Description of Procedures	LCD Message
1) Press Set key after selecting NVM TUNE UP. (a) → (b) 2) After selecting THV TUNE UP Code 2, press Set key. (b) → (c) 3) After selecting the media to be tuned up, press Set key. (Ex. PPC) (c) → (d) → (e) <SIMPLEX> PPC : Adjustment for the first page of PPC signal face / duplex faces. OHP : Adjustment of OHP. ENV : Adjustment of Envelope. MTS : Adjustment of Media on Label / Middle Thick Stock mode. TS1 : Adjustment of Media on Thick Stock 1 (1/3 speed). TS2 : Adjustment of Media on Thick Stock 2 (1/4 speed). <DUPLEX> PPC : Adjustment for the second page of PPC duplex faces. MTS : Adjustment for the second page of the Label / Middle Thick Stock duplex faces. TS1 : Adjustment for the second page of the Thick Stock 1 duplex faces. TS2 : Adjustment for the second page of the Thick Stock 2 duplex faces. 4) Tune Up value can be adjusted within 8 steps between the step -4 and +4. After selecting a given number, press Set key. (e) 5) Press the - key to wrap up the tune-up work for PPC. (e) → (f) Repeat the step 3 through 5 for other media such as OHP or Label. 6) Press the - key to wrap up the tune-up work. (e) → (f)	(a) 39 FACTORY MODE ▷ NVM TUNE UP (b) 45 NVM TUNE UP △1 2 3 4 5 6 7 8 9 10•12•••16 (c) 45 THV TUNE UP ▷ SIMPLEX / DUPLEX (d) 45 THV TUNE UP ▷PPC / OHP / ENV / MTS / TS1 / TS2 (e) 45 THV (PPC) [ ] -< 4 3 2 1△0 1 2 3 4 >+ (f) 45 THV TUNE UP ▷SIMPLEX / DUPLEX (g) 45 NVM TUNE UP △1 2 3 4 5 6 7 8 9 10•12•••16

45-3	DBV TUNE UP

This mode shall be used when image optical density needs to be adjusted. Adjustment is to adjust the developer bias voltage against the reference value 0 (zero) in the range between the step -7 and +7.

Description of Procedures	LCD Message
1) Press Set key after selecting NVM TUNE UP. (a) → (b) 2) After selecting DBV TUNE UP Code 3, press Set key. (b) → (c) 3) After selecting the color to be tuned up, press Set key. (Ex. Magenta) (c) → (d) 4) Tune Up value can be adjusted within 8 steps between the step -7 and +7. After selecting a given number, press Set key. (d) → (e) 5) Press the - key to wrap up the tune-up work for Magenta. (d) → (e) Repeat the step 3 through 5 for each color. 6) Press the - key to wrap up the DBV tune-up work. (e) → (f)	(a) 39 FACTORY MODE ▷ NVM TUNE UP (b) 45 NVM TUNE UP 1 2 3 4 5 6 7 8 9 10•12•••16 (c) 45 DBV TUNE UP ▷ Y / M / C / K (d) 45 MAGENTA [-1] -< 7 6 5 4 3 2 1 0 1 >+ (e) 45 DBV TUNE UP ▷Y / M / C / K (f) 45 NVM TUNE UP 1 2 3 4 5 6 7 8 9 10•12•••16

45-4	CBV TUNE UP

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

Description of Procedures	LCD Message
1) Press Set key after selecting NVM TUNE UP. (a) → (b) 2) After selecting CBV TUNE UP Code 5, press Set key. (b) → (c) 3) Tune Up value can be adjusted within 8 steps between the step -4 and +4. After selecting a given number, press Set key. (c) 4) Press the - key to wrap up the tune-up work for CBV. (c) → (d)	(a) 39 FACTORY MODE ▷ NVM TUNE UP (b) 45 NVM TUNE UP 1 2 3 4 △5 6 7 8 9 10 •12 ••• 16 (c) 45 CBV TUNE UP [0] -< 4 3 2 1 △0 1 2 3 4 >+ (d) 45 NVM TUNE UP △1 2 3 4 5 6 7 8 9 10 •12 ••• 16

45-5	FBV TUNE UP

This mode shall be used when the image defects attributing to 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 Set key after selecting NVM TUNE UP. (a) → (b) 2) After selecting FBV TUNE UP Code 6, press Set key. (b) → (c) 3) Tune Up value can be adjusted within 8 steps between the step -4 and +4. After selecting a given number, press Set key. (c) 4) Press the - key to wrap up the tune-up work for FBV. (c) → (d)	(a) 39 FACTORY MODE ▷ NVM TUNE UP (b) 45 NVM TUNE UP 1 2 3 4 5 △6▽ 7 8 9 10•12•••16 (c) 45 FBV TUNE UP [0] -< 4 3 2 1 △0▽ 1 2 3 4 >+ (d) 45 NVM TUNE UP △1▽ 2 3 4 5 6 7 8 9 10•12•••16

46	NVRAM INITIAL

This mode can initialize (data clear) all the data of NVRAM on MCTL PWB, 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
1) Press Set key after selecting NVRAM INITIAL. (a) → (b) 2) Select YES if NVRAM should be executed. If not, select NO. Press Set key so that RAM INITIAL will be executed. (All the data will be cleared.) (b) → (c) 4) Following modes shall be executed to set the RAM data. 43 MARGIN ADJUST 44 LIFE PERIOD SET 45 NVRAM TUNE UP 47 TOTAL PAGE SET 48 EACH IMAGE SET 49 NEXT LIFE SET * When setting NVRAM TUNE UP, LP TUNE UP to be set at “-3”.	(a) 39 FACTORY MODE ▷ NVRAM INITIAL (b) 46 NVRAM INITIAL ▷ YES / NO (c) 39 FACTORY MODE ▷ MARGIN ADJUST

47	TOTAL PAGE SET

This mode can reset the number of total pages on NVRAM whenever executing NVRAM INITIAL or replacing the MCTL PWB.

Description of Procedures	LCD Message
1) Press Set key after selecting TOTAL PAGE SET. (a) → (b) 2) Select one type of page from among TOTAL PAGE, DPL PAGE. (b) → (c) - TOTAL PAGE : Total Number of Printed Pages (One duplex print is counted as 2 pages) - DUPLEX PAGE : Number of Duplex Printed Sheet 3) Use Back and + keys to designate or change the desired digit. Use Set key to input values to the blinking digit. Upon completing the input of values to be set, use the Back and + keys to move the cursor to SET displayed in the LCD, and then, press the Set key to register the set value. (c) → (d)	(a) 39 FACTORY MODE ▷ TOTAL PAGE SET (b) 47 TOTAL PAGE ▶TOTAL /DUPLEX (c) 47 TOTAL PAGE □□□□□□ P or (c) 47 DUPLEX PAGE □□□□□□ P (d) 39 FACTORY MODE ▷DP MARGIN ADJUST

48	EACH IMAGE SET

This mode can reset the number of total pages of each color on NVRAM whenever executing NVRAM INITIAL or replacing the MCTL PWB.

Description of Procedures	LCD Message
1) Press Set key after selecting EACH IMAGE SET. (a) → (b) 2) Select the desired color subject to EACH IMAGE SET. (b) → (c) 3) Use Back and + keys to designate or change the desired digit. Use Set key to input values to the blinking digit. Upon completing the input of values to be set, use the Back and + keys to move the cursor to SET displayed in the LCD, and then, press the Set key to register the set value. (c) → (d) 4) Press the - key to wrap up the EACH IMAGE SET mode. (d) → (e)	(a) 39 FACTORY MODE ▷ EACH IMAGE SET (b) 48 IMAGE OF ▷ Y / M / C / K (c) 48 IMAGE OF C 005432 P SET (d) 48 IMAGE OF ▷ Y / M / C / K (e) 39 FACTORY MODE ▷ MARGIN ADJUST

49	NEXT LIFE SET

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

Description of Procedures	LCD Message
1) After selecting NEXT LIFE SET, press Set key. (b) → (f) 2) After selecting the code to be set, press Set key. (Example : Belt Cartridge) 7: Belt Cartridge (BC) 8: Fuser Unit (FU) 9: Transfer Belt (TB) 10: 120K Volume Stack Kit (OW) 13: Pick-up Roller (PK) 14: Pick-up Roller (PL) (b) → (c) 3) Designate or alter the figure with Back and + keys. (b) → (c) Use Set key to input the number to the blinking figure. (for example, 120,000) After inputting the desired number (120,000 as example), move the cursor to SET with Back and + keys. Then, press Set key to complete the registration of desired number (120,000 as example). (c) → (d) (e) 4) Press - key to complete the procedure of NEXT LIFE SET. (e) → (f)	(a) 39 FACTORY MODE ▷ NEXT LIFE SET (b) 49 NEXT LIFE SET 1 2 3 4 5 6 7 8 9 10•12•••16 (c) PERIOD BL UNIT 120000 P SET (d) PERIOD BL UNIT 120000 P SET (e) 49 NEXT LIFE SET 1 2 3 4 5 6 7 8 9 10•12•••16 (f) 39 FACTORY MODE ▷ MARGIN ADJUST

50	ID DATA SET

This mode is not used.

51	OPT TUNE UP

For details of this mode, refer to [TMA CAL MODE] in 7.1 Professional Menu in Appendix 7. HIDEN FUNCTION MENU.

3.4 Adjustment Work Procedures

3.4.1 Adjustment of Top and Left Margin

Top and left margin can be adjusted by the key operation on the operator panel.

<Purpose>

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

<Adjustment Method>

1) Execute "GRID PRINT" in the SERVICE MODE.
2) Measure the position 'A' and 'B' of top margin.

   [Leading edge] (A + B) / 2 ≤ Default Value 4.0 ± 1.5mm
3) Measure the position ‘C’ and ‘D’ of left margin.

   [Left edge] (C + D) / 2 ≤ Default Value 3.0 ± 1.5mm
4) If the specification value is not met, implement the adjustment.

   i) Execute “43 MARGIN ADJUST” in the FACTORY MODE.
5) After above adjustment, execute “GRID PRINT” and confirm the margin.

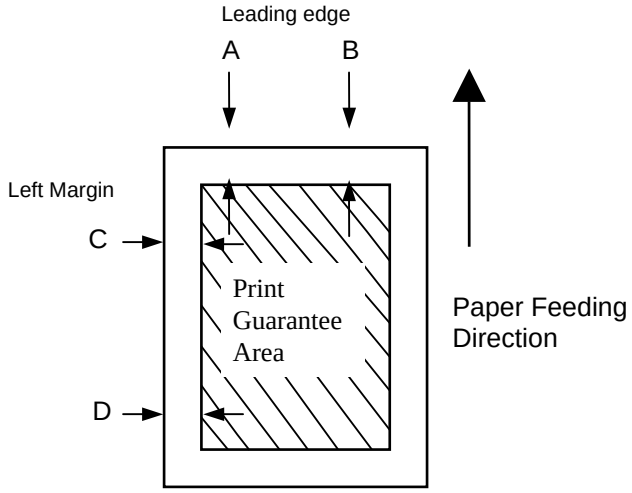


Fig.5-2

3.4.2 Setting of Engine NVRAM Data

As Data in the RAM has been preset to the optimum value at the ex-work, it is not necessary to change the preset value under the normal condition. 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 RAM.

<Procedures of Setting>

1) Follow the procedures set out in Section 3.3 '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) Implement the 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

Total number of printouts is stored in the RAM. Confirmation and setting of total number of printouts can be confirmed and reset by manipulating the key on the operator panel.

<Purpose>

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

<Procedures of Setting>

1) Execute 47 TOTAL PAGE in the Factory Mode.
2) Reset the total number of printouts.
3) After the above 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

Number of printouts of each colors (4 colors) is stored in the RAM. Confirmation and setting of number of images per each color can be confirmed and reset by manipulating the key on the operator panel.

<Purpose>

Number of images per each color shall be reset when changing the MCTL P.W.B. or executing the NVRAM INITIAL.

<Procedures of Setting>

1) Execute 48 EACH IMAGE in the Factory Mode.
2) Reset the number of printouts per each color.
3) After the above setting, execute 35 EACH IMAGE 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 P.W.B. after clearing the contents of RAM.

<Purpose>

Number of images per each color shall be reset when changing the MCTL P.W.B. or executing the NVRAM INITIAL.

<Procedures of Setting>

1) Prior to replacing the MCTL P.W.B., confirm the contents of RAM regarding the following subjects.

"Factory Mode"

Code	Subject	Confirmation Value
43	MARGIN ADJUST	Top Margin Set Value
43	MARGIN ADJUST	Left Margin Set Value
45	LP TUNE UP	Adjustment Value ("0" in ordinary case)
45	THV TUNE UP	Adjustment Value SIMPLEX (PPC/OHP/ENV/MTS/TS1/TS2) "0" DUPLEX (PPC/MTS/TS1/TS2) "0"
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
47	DPL PAGE SET	Print Count from Duplex
48	EACH IMAGE SET	Formed Image Count of 4 Colors
49	NEXT LIFE	Print Count for Maintenance Replacement Parts

2) Execute 46 NVRAM INITIAL in the FACTORY MODE.

3) After implementing the NVRAM INITIAL, input the value confirmed in the step 1) to the RAM for completing the setting.

   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 confirmed in the step 1).

   The basic formula used in these calculations is:

   TOTAL PAGE = NEXT CARE – LIFE PERIOD

CHAPTER VI
PERIODIC MAINTENANCE

CHAPTER VI PERIODIC MAINTENANCE

1. GENERAL

1.1 Precaution in Handling

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

Following is the list of important precautions & action items as to the maintenance and periodic replacement parts:

1) Refrain from any operation, disassembly, and modification that are not set out in this manual.
2) When assembling or disassembling the printer, turn the power supply off at first and unplug the power supply cord prior to commencing any work.
3) Whenever having replaced any parts, confirm the replaced parts in place prior to driving the printer.
4) Read carefully and understand well any precaution or warning labels affixed to any parts.
5) Unless otherwise specified, precisely follow the reverse order of the disassembly procedures for the re-assembly. Do not get confused with the kind of removed screws and also length.
6) Do not use any solvent for cleaning, no matter inside or outside of printer.
7) It is strictly forbidden to dump the waste toner together with flammable substances or throw it into the fire. This is a very important caution to be respected.

1.1.1 List of Maintenance Tools

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

Table 6-1

No.	Name of Tool	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	Adjustment of Gap
10	Pliers for C Ring	C Ring
11	Ruler (150mm)	For general use
12	Slide Caliper	For general use
13	Digital Meter	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 up the consumables for maintenance.

Table 6-2

No.	Name of Tool	Quantity	Function
1	Toner Cartridge PU (Y)	1 piece	Test Print
2	Toner Cartridge PU (M)	1 piece	Test Print
3	Toner Cartridge PU (C)	1 piece	Test Print
4	Toner Cartridge PU (K)	1 piece	Test Print
5	OPC charge roller PU	1 piece	Test Print
6	Recommended Paper (A4 or Letter)	5 sheets	Test Print
7	Recommended Paper (OHP)	2 sheets	Test Print
8	Cotton Cloth (Unwoven fabric)	10~15 pieces.	Cleaning
9	Grease	10 gram	M.G** PS265
10	Polyethylene Bag	2 bags	Disposal

** M.G stands for Molybdenum Grease.

1.2 Cleaning for Periodic Maintenance

<Component Subject To Cleaning>

	Name of Component	Name of Part
(1)	Transfer / Paper Guide Part	Registration Roller Assy PU Transfer Roller Assy PU Paper Guides
(2)	OPC Charge Roller PU	OPC Charge Roller PU OPC Cartridge Roller PU
(3)	Inside of Printer	Dustproof Glass Perimeter of Laser Assy PU Waste Toner Transportaion Parts

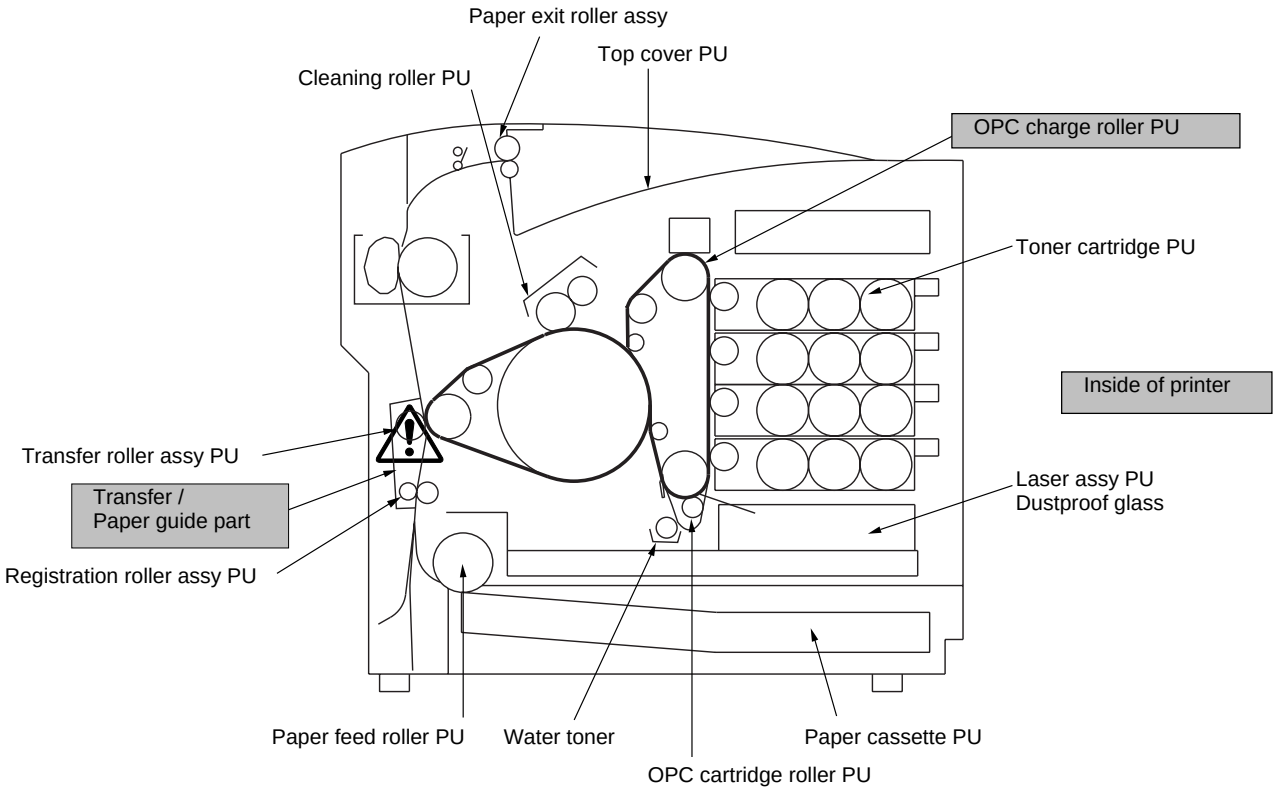


Fig.6-1

CAUTION

- *Prior to starting the maintenance work, make sure to pull out the power supply cord plug from the outlet.*
- *Check up the electric conductivity to be dead. If alive, there is the danger of electric shock.*

Table 6-3: Periodic Maintenance Cleaning Work

No.	Name of Parts	Cleaning Work		Cleaning Cycle *1 (Condition or Case)	Time *2 (minute)	Skill *3 Level
		Description	Section			
1	Registration Roller Assy PU	1. Open the paper exit unit. 2. Clean the rollers and neighbor with a dry cloth.	1.2.1	• Defective image • Smeared paper • Periodic maintenance	2	A, B, or User
2	Transfer Roller Assy PU	1. Open the paper exit unit. 2. Clean the rollers and neighbor with a dry cloth.	1.2.1	• Damaged image • Smeared paper • Periodic maintenance	2	A, B, or User
3	Paper Guide	1. Open the paper exit unit. 2. Clean the paper guide with a dry cloth.	1.2.1	• Damaged image • Periodic maintenance	2	A, B, or User
4	OPC Charge Roller PU	1. Remove the OPC charge roller PU. 2. Clean the toner around the OPC charge roller and the cleaning blade.	1.2.2	• Defective print quality • Periodic maintenance	3	A, B, or User
5	Dustproof Glass of Laser Assy	1. Remove toner cartridge PU. 2. Remove the OPC charge roller PU. 3. Using a dry cloth and applicator, clean the stain of dust-proof glass.	1.2.3	• Defective print quality • Periodic maintenance	3	B or C
6	Printer Interior Unit	1. Remove toner cartridge PU and OPC charge roller PU. 2. Clean printer's base, using the handy cleaner and dry cloth.	1.2.4	• Defective print quality • Periodic maintenance	5	B or C

[Note] *1: If periodic maintenance agreement has been made, checking will be made at every periodic maintenance service for preventing any trouble from occurring.

*2: Normal time for replacement of above parts.

*3: Technical level required for replacement work.

A: Beginner, B: Experienced, C: Expert

1.2.1 Cleaning of Transfer Base Assy PU and Paper Guide Assy PU

Stained paper and inner jam may be attributed to the transfer base assy PU. Clean the transfer base assy PU according to the following procedures:

<Tools to Prepare>

1) Cotton Cloth (Unwoven): 2 to 3 pieces
2) Cotton Applicator: 2 to 3 pieces

<Cleaning Procedure>

1) Turn off the power switch, and unplug the power supply cord.
2) Open the paper exit unit.
3) Clean the stains of following parts with the cotton cloth.
   - Registration Roller Assy PU
   - Transfer Roller Assy PU
   - Transfer Roller Guide PU

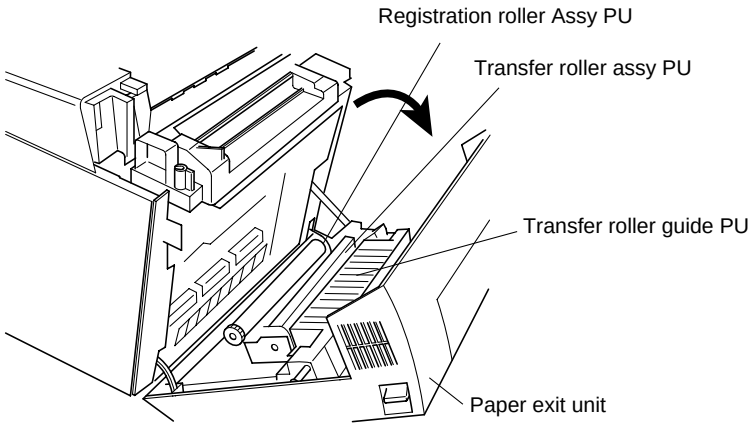


Fig.6-2

CAUTION

- *When cleaning the registration roller or transfer roller, do not apply any excessive force on the roller surface. Such excessive force may get the roller deformed or damaged.*
- *Since the deformed or damaged roller may cause the defective image, softly wipe off the stain from the roller surface.*

1.2.2 Cleaning of OPC Charge Roller PU / OPC Cartridge Roller PU (Brush Roller)

If the vertical streak or black line occurred on the print, the cause may be the stained OPC charge roller . In this case, carry out the cleaning work according to the following procedures:

CAUTION

- *Do not expose the OPC belt of OPC charge roller PU for more than 2 minutes under the light brighter than 800 lux (normal office light).*
- *Do not touch the OPC belt surface with bare hands.*

<Tools to Prepare>

1) Cotton Cloth (Unwoven): 2 to 3 pieces

<Cleaning Procedure>

1) Remove the OPC charge roller PU.
2) With the cotton cloth, wipe off the stain around the OPC charge roller PU.
3) Release the lock lever interlocking the OPC cartridge roller PU.
4) Remove the OPC cartridge roller PU.
5) Clean the installation part of the OPC cartridge roller PU.
6) Clean the stain around the OPC cartridge roller PU.

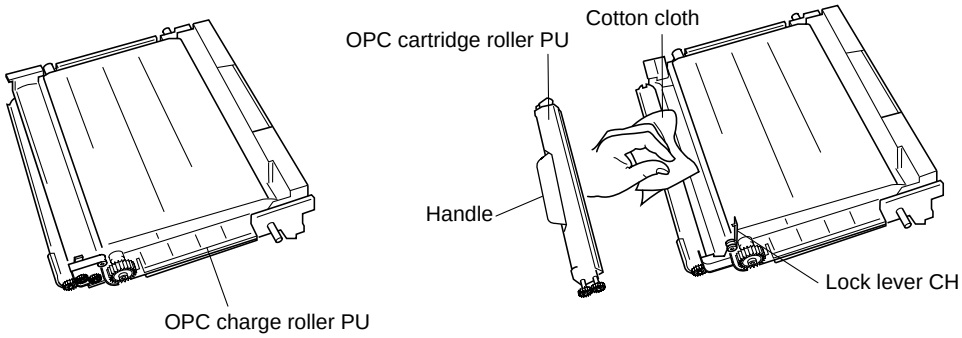


Fig.6-3

CAUTION

- *Do not apply any force onto the brush of the OPC cartridge roller PU.*
- *Do not attempt to clean the brush with the solvents.*
- *Do not touch the OPC Charger Brush directly with your bare hands.*

7) Install the OPC cartridge roller PU.
8) Fix the OPC cartridge roller PU with the lock lever CH.
9) Install the OPC charge roller PU to the printer.

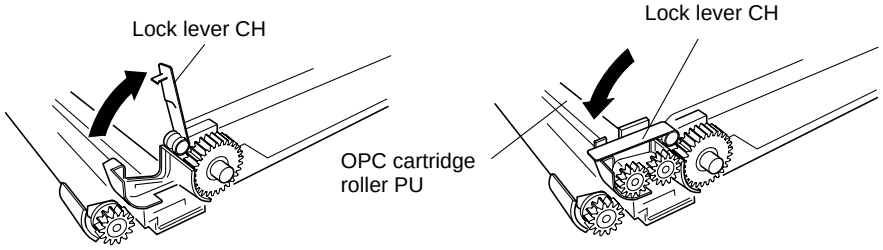


Fig.6-4

1.2.3 Cleaning of Printer (Inside) and Laser Assy PU

White streak error may be attributed to the laser assy PU. Clean the laser assy PU according to following procedures:

<Tools to Prepare>

1) Cotton Cloth (Unwoven): 2 to 3 pieces

<Cleaning Procedure>

1) Turn the power switch off, and unplug the power cord.
2) Remove all the toner cartridges PU.
3) Remove the OPC charge roller PU.
4) Clean the stain on the upper face of laser assy PU.
5) Cleaning of dustproof glass surface:
   • Open the dustproof cover and clean the dustproof glass.
6) Clean the spread toner around the waste toner transportation part.

Laser WARNING Label

<Inside of Printer>

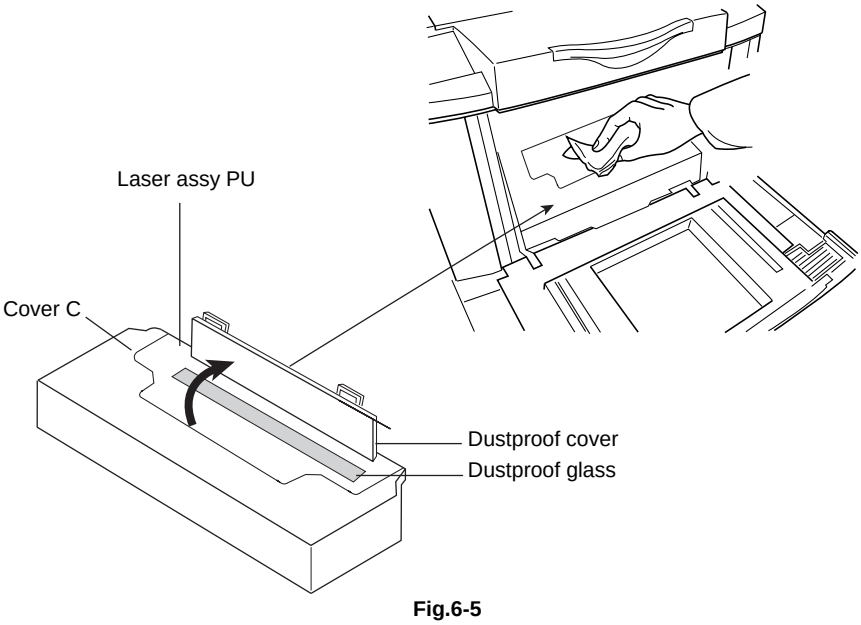


Fig.6-5

1.2.4 Cleaning of Printer Interior

Printer Interior (bottom) shall be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.

> ***CAUTION***
>
> *Prior to cleaning the inside of printer, protect the transfer drum with paper so that the mouth of cleaner will not directly contact the transfer drum.*

<Tools to Prepare>

1) Handy vacuum cleaner unique for toner
2) Cotton Cloth: 2 to 3 pieces

<Cleaning Procedure>

1) After push off the remote switch and turn off the main switch, remove the power supply cord from the inlet.
2) Open the top cover PU and paper exit unit.
3) Open the front cover PU.
4) Remove the toner cartridge PU.
5) Remove the OPC charge roller PU.
6) Absorb toner scattered on the bottom of printer interior with a vacuum cleaner.
7) Clean the printer interior with a cotton applicator.
8) Put back the removed units as they were.

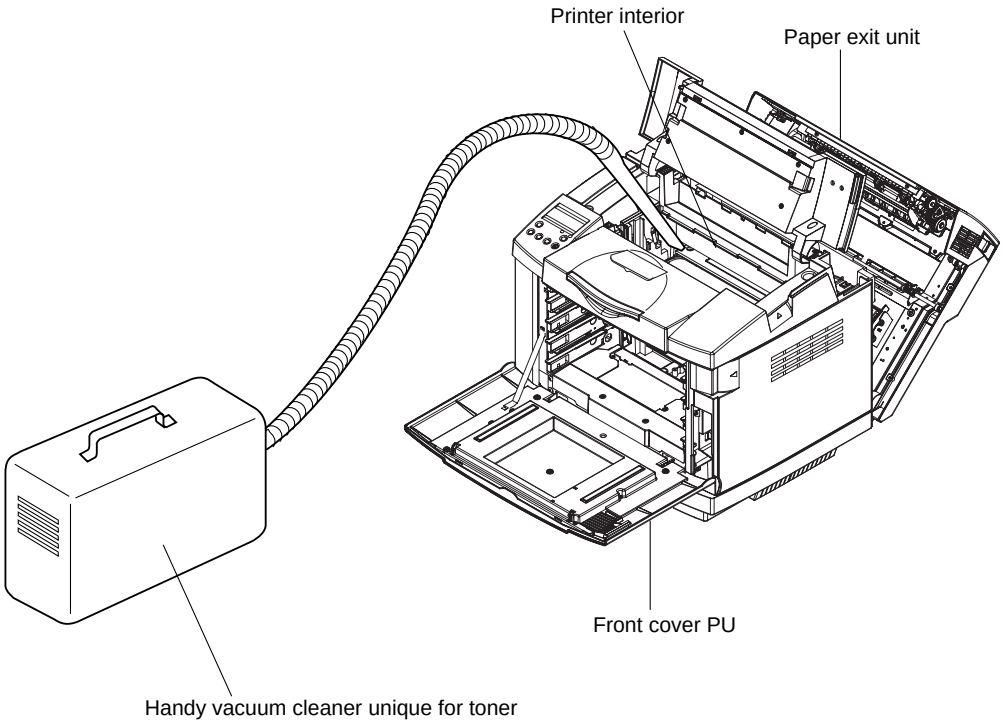


Fig.6-6

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

No.	Name of Replacement Part	Replacement Cycle	Operator
1	OPC Charge Roller PU	Every 60,000 pages	Serviceperson or Customer
2	Fuser Unit	Every 60,000 pages	Serviceperson or Customer
3	Cleaning Roller PU	Every 120,000 pages	Serviceperson or Customer
4	Transfer Roller Assy PU	Every 120,000 pages	Serviceperson or Customer
5	Paper Feed Roller	Every 120,000 pages	Serviceperson only
6	Transfer Unit PU	Every 300,000 pages	Serviceperson only

[Note]

*1: 1, 2, and 3 can be replaced by the customer. However it is recommended for the customer to call the service company to carry out the periodic maintenance.

*2: No. 4 and 5 should be replaced by the serviceman only. So, if you see the alarm for the replacement, call the nearest service company.

Table 5-4: Periodic Maintenance Parts and Maintenance Cycle

No.	Name of Parts	Description		Cleaning Cycle *1 (Condition or Case)	Time *2 (minute)	Skill *3 Level
		Function	Section			
1	OPC Charge Roller PU	To consist of OPC belt and form an electrostatic latent image.	2.1	60K images or 12 months whichever comes first. Maintenance Code=C: BC	2	A or B
2	Fuser Unit	To fix toner image on a transported paper.	2.2	60K prints Maintenance Code =C:FU	2	A or B
3	Transfer Roller Assy PU	To transfer toner image from transfer transfer drum to a transported paper.	2.3	120K prints Maintenance Code =C:OW	2	A or B
4	Cleaning Roller PU	To clean residual toner on transfer belt.	2.4	120K prints Maintenance Code =C:OW	3	A or B
5	Paper Feed Roller (Separate Pad)	To pick up paper one by one from paper cassette.	2.5	120K prints No maintenance code.	8	B or C
6	Transfer Unit PU	To form toner image and transfer it onto paper.	2.6	300K images No maintenance code.	3	B or C

[Note] *1: After completion of maintenance work, clear the maintenance code displayed on the operator panel indicator.
*2: Normal time for replacement of specific parts.
*3: Technical level required for replacement work.
A: Beginner, B: Experienced, C: Expert

1	C: YT	Toner Empty (Y)	7	C: TB	Transfer Belt
2	C: MT	Toner Empty (M)	8	C:OW	120K pages per unit
3	C: CT	Toner Empty (C)	9	C: WT	Near Full Waste Toner Pack
4	C: KT	Toner Empty (K)	10	C: SF	Near Full Outer Stacker
5	C: BC	OPC charge roller	11	C: PK	Pick-up Roller
6	C: FU	Fuser Unit, 100K Unit	12	C: PL	Pick-up Roller in LFU

2. PERIODIC MAINTENANCE PROCEDURES

2.1 Replacement of OPC Charge Roller PU

<Criterion of Replacement>

OPC charge roller PU should be replaced with a new cartridge at 60,000 images or 12 months whichever comes earlier.

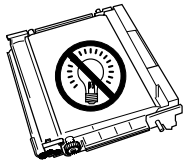
When time is due for replacement of OPC charge roller PU, the warning code "BC" appears in LCD of the operator panel.

00 READY	[ ]
[ ] [ ] [ ] [ ]	[BC]

CAUTION

- *Do not directly touch the OPC belt surface with bare hands or gloves.*

- *If OPC belt is exposed for more than 2 minutes under the light of 800 lux, it may cause the defective image.*



<Work Procedure>

Sequence of Disassembling

1) Turn off the printer power switch.
2) Open the top cover PU of the printer.
3) To release the lock, push the green lock lever BC on both sides inwards.
4) Remove the OPC charge roller PU from the printer.

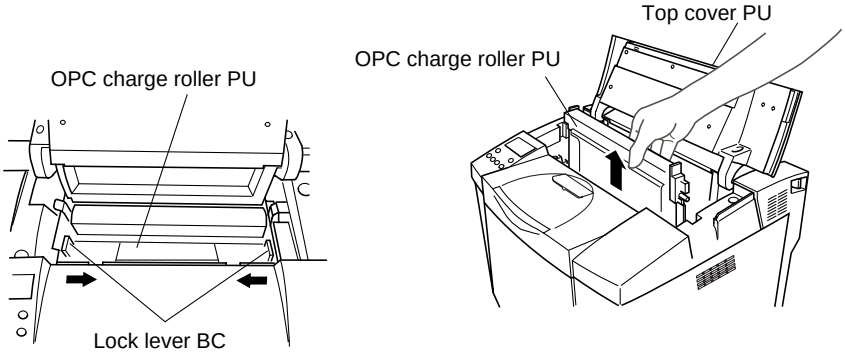


Fig.6-7

Sequence of Assembling

1) Remove the belt tension-release pins from both sides of the new OPC charge roller PU.
2) Remove the protective sheet from the new OPC charge roller PU. Do not touch the green part of the OPC charge roller PU.

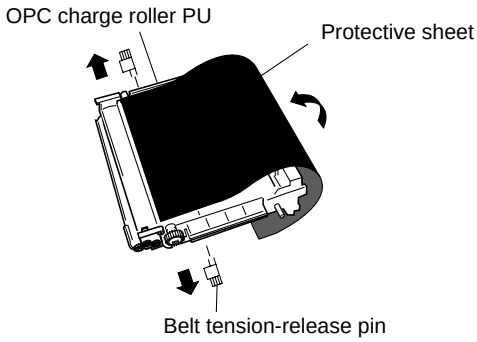


Fig.6-8

3) Put the new OPC charge roller PU into the printer guides with the flat side facing you.
4) To lock the OPC charge roller PU into the printer, push the lock lever BC that are on both sides of the OPC charge roller PU outwards.
5) Close the top cover PU.
6) Turn the printer power switch back on.
7) Clear the code BC in the CLEAR CARE mode.
8) Code BC disappears, and the printer starts the warming-up process.

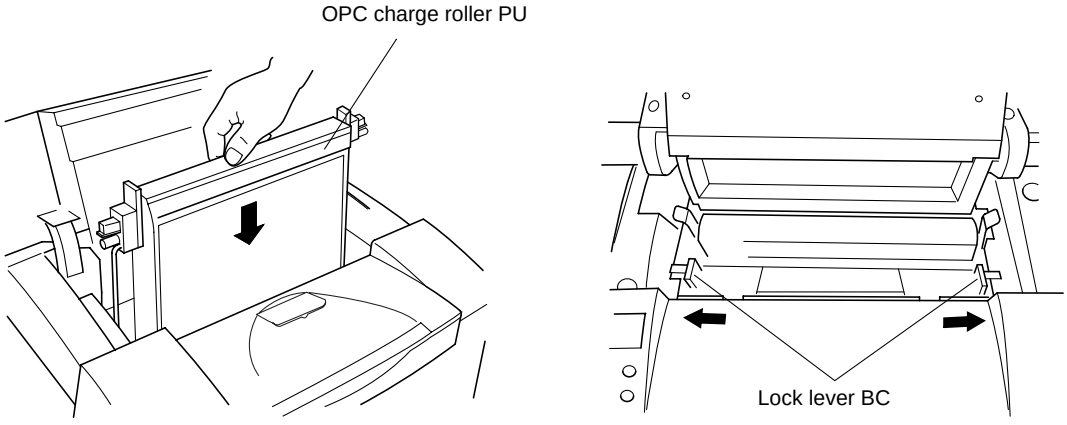


Fig.6-9

2.2 Replacement of Fuser Unit

<Criterion of Replacement>

It is recommended to replace with a new fuser unit according to the periodic maintenance cycle listed in the table 1 to maintain the satisfactory print quality.

The suggested replacement timing is indicated on the operator panel with “FU” message.

<Purpose of Replacement>

To prevent the decline of fusing strength and print quality due to the deterioration of the fuser roller.

<Tools and Replacement Materials>

Fuser unit (1 unit): Voltage specification to be confirmed.

> ***WARNING***
>
> - *Fuser unit and its peripheral parts are very hot.*
> - *Prior to starting the replacement work, please confirm that the unit and parts are well cooled down after turning off the power switch.*

<Work Procedure>

Sequence of Disassembling

1) Turn off the printer power switch. To avoid injury, wait until the printer has cooled down sufficiently before you replace the fuser unit.
2) Open the paper exit unit.
3) To release the fuser unit from the printer, release the lock lever (FU) that are on both sides of fuser unit as shown below.
4) Hold the handles on both sides as you take the fuser unit out of the printer.

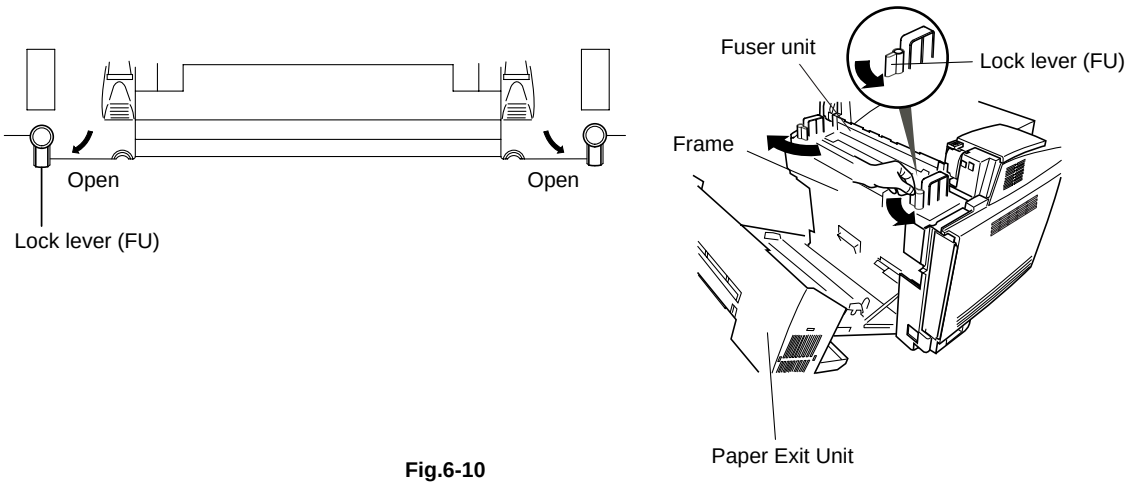


Fig.6-10

Sequence of Assembling

1) Put the new fuser unit into the printer. Be sure to insert the fuser unit completely into the printer.
2) Secure the fuser unit with the two lock lever (FU) that are on both sides of the fuser unit.

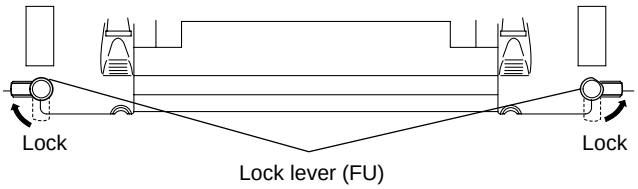


Fig.6-11

3) Move the fuser unit tension release levers to the set position.
4) Close the paper exit unit.
5) Turn the printer power switch back on.
6) Confirm the normal printing operation by test printing after the warming-up process.
7) Clear “FU” with the Clear Care mode.

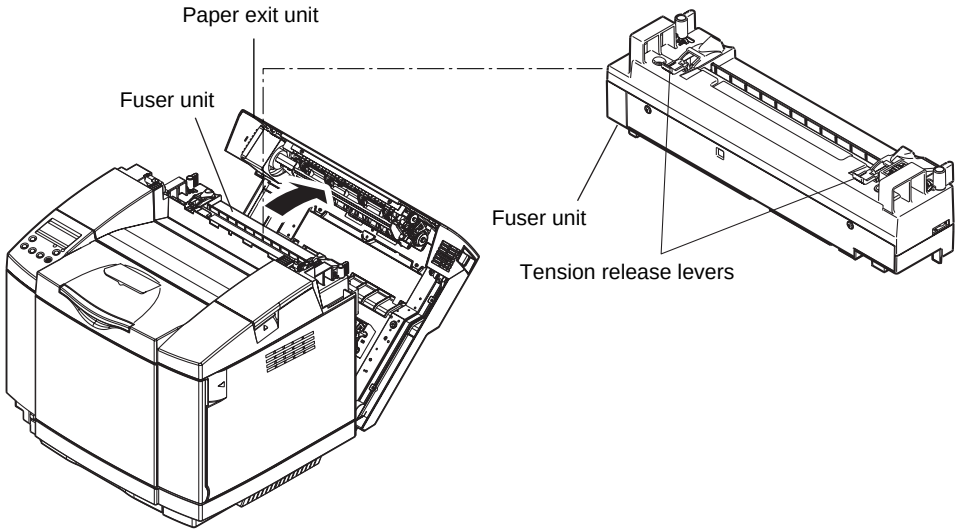


Fig.6-12

2.3 Replacement of Transfer Roller Assy PU

<Criterion of Replacement>

Transfer roller assy PU 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 transfer roller assy PU, the warning code "OW" appears in LCD of the operator panel.

```
00   READY              [   ]

[   ] [   ] [   ]       [ OW ]
```

<Purpose of Replacement>

To prevent the transfer efficiency from declining due to deterioration of the transfer roller assy PU.

<Necessary Tools and Replacement Materials>

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

<Work Procedures>

Sequence of Disassembling

1) Turn off the printer power switch.
2) Open the paper exit unit.
3) Release the lock lever TR on the right and left-hand sides, and then lift the levers to release the transfer roller assy PU.
4) Take out the transfer roller assy PU by gently pulling the right-hand side up and sliding the transfer roller assy PU to the right.

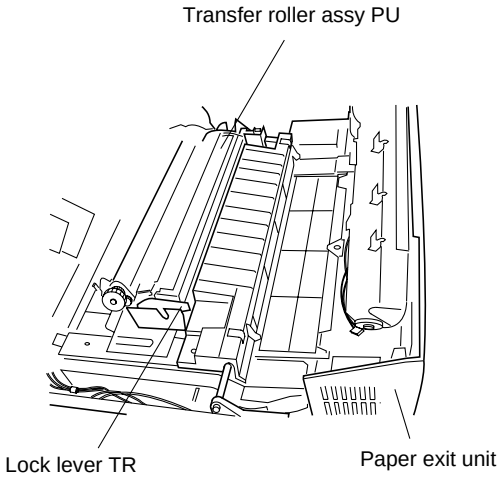


Fig.6-13

Sequence of Assembling

1) Put in the new transfer roller assy PU by holding the lock lever TR of the transfer roller assy PU and adjusting the angle of the transfer roller lever shafts (both sides) to match the transfer unit grooves. Put the transfer roller assy PU onto the shafts and place the roller onto the springs as shown blow.
2) Push the lock lever TR down to lock the transfer roller assy PU into place.
3) Close the paper exit unit.
4) Turn the printer power switch back on.
5) Upon completion of the warming-up process, clear the code [OW] by the "CLEAR CARE" mode.

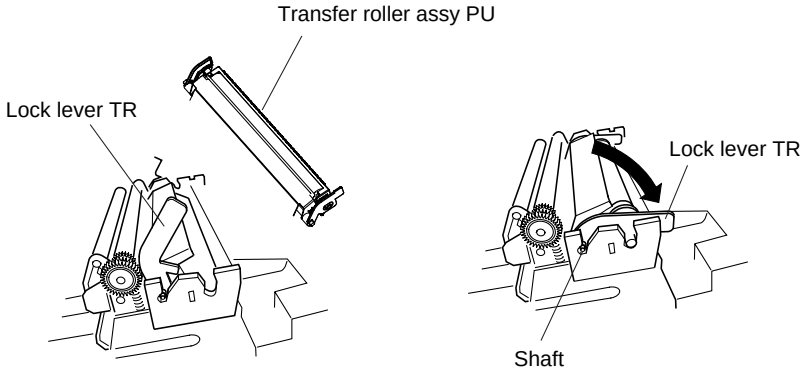


Fig.6-14

2.4 Replacement of Cleaning Roller PU

<Criterion of Replacement>

Cleaning roller PU 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 cleaning roller PU, the warning code "OW" appears in LCD of the operator panel.

```
00   READY            [   ]

[   ] [   ] [   ]     [ OW ]
```

<Purpose of Replacement>

To prevent the cleaning efficiency from declining due to deterioration of the cleaning roller PU.

CAUTION

When assembling the cleaning roller PU, firstly connect the bearing and the bias pole.

Prior to starting above assembling, reconfirm this connection to have been done properly.

<Necessary Tools and Replacement Materials>

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

<Work Procedures>

Sequence of Disassembling

1) Turn off the printer power switch.
2) Open the top cover PU.
3) Remove the cleaning roller cover PU.

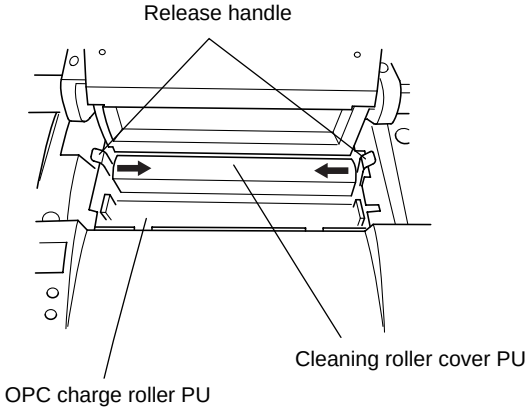


Fig.6-15

4) Remove cleaning roller PU by grasping the handle and lift it up.

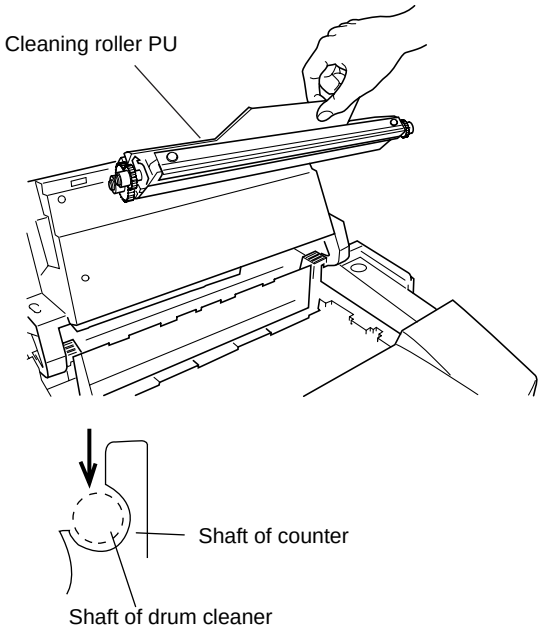


Fig.6-16

Sequence of Assembling

1) Clean the area where the new cleaning roller PU is to be installed with a dry cotton cloth.
2) Put the new cleaning roller PU into the printer by gently placing the brass bearings into the guides, and then pushing the handle down until the bearings click into place. Make sure the cleaning roller PU is free to move slightly upwards (rotating slightly around the bearings) in the housing after you have installed it.
3) Put the cleaning roller cover PU back in, and then close the top cover PU.
4) Turn the printer power switch back on.
5) Upon completion of the warming-up process, clear the code [OW] by the “CLEAR CARE” mode.

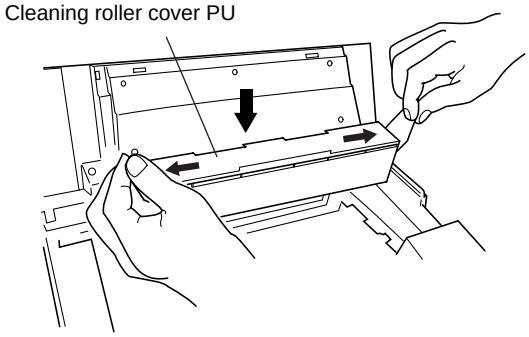


Fig.6-17

2.5 Replacement of Paper Feed Roller and Separator Pad

<Criterion of Replacement>

Since the paper feed roller and separator pad are defined as periodic replacement parts as per Table 6-4, they should be replaced when the feeding jam (17. MEDIA JAM FEED) occurs. The warning code “PK” appears in LCD of the operation panel.

<Work Procedures>

Sequence of Disassembling

1) Turn off the printer power switch.
2) Release the three hooks and remove the lower duplex cover from the paper exit unit.
3) Remove the setscrew (BT3x8, 2 pieces) of the paper guide (B) PU.

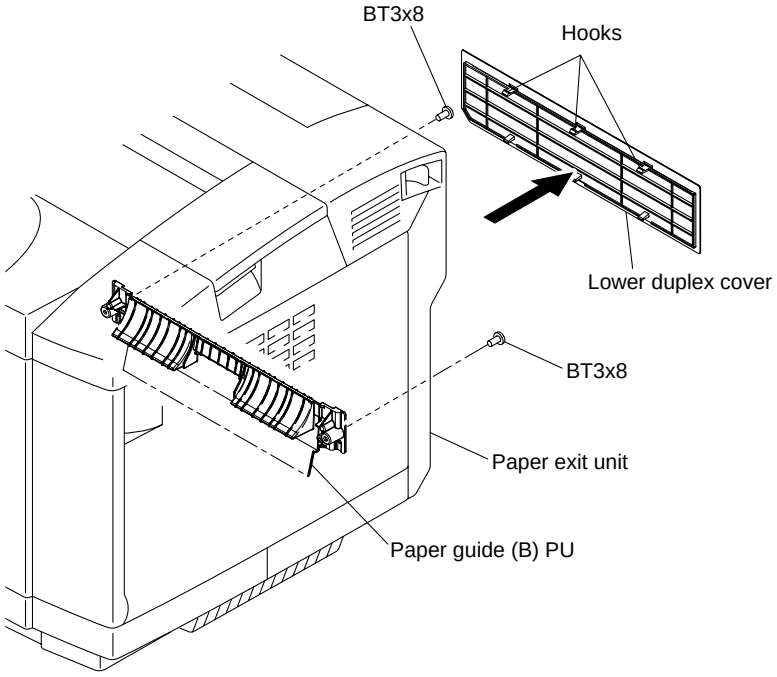


Fig.6-18

4) Open the paper exit unit.
5) Remove the paper guide (B) PU.
6) Remove the setscrew from the support band.

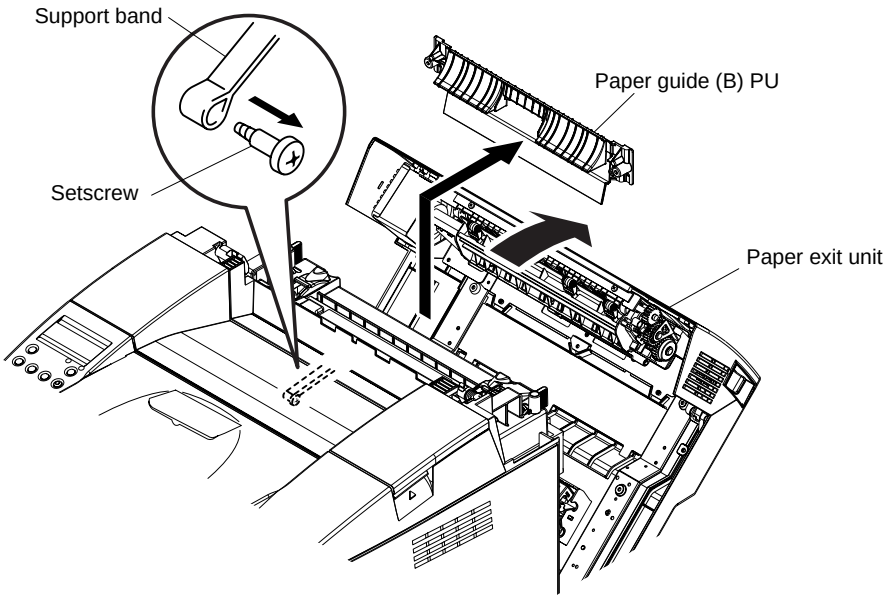


Fig.6-19

7) Remove the setscrew (BT3x8, 2 pieces) from the paper guide (C) PU.
8) Remove the paper guide (C) PU.
9) Sliding the paper feed roller along the shaft, remove it from the shaft.
10) Pull out the separator pad from the frame.

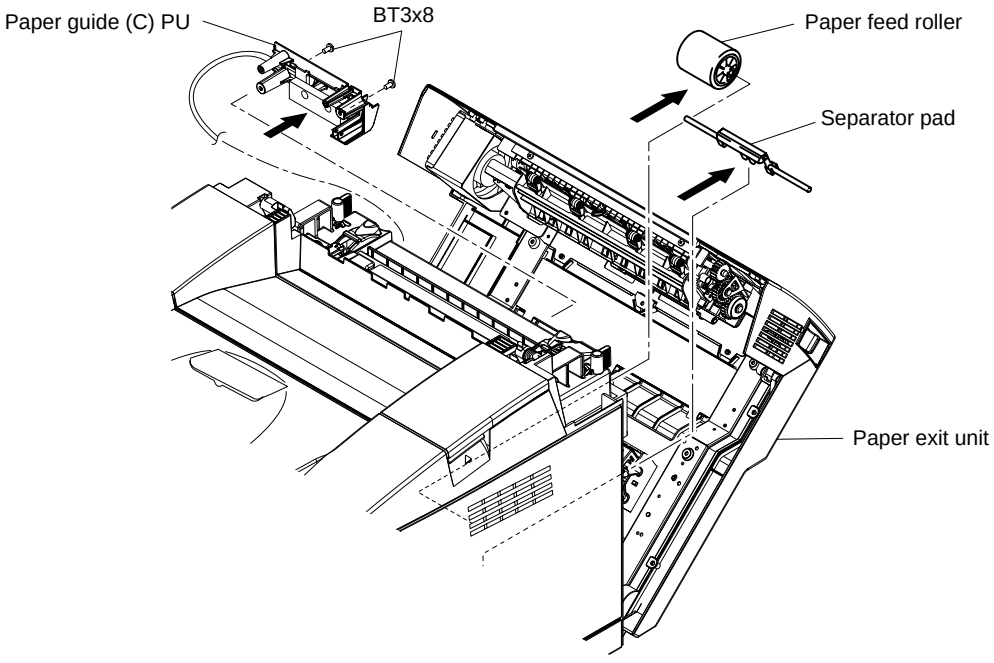


Fig.6-20

Sequence of Assembling

1) Set the separator pad.
2) Set the paper feed roller.
3) Secure the paper guide (C) PU with the setscrew (BT3x8, 2 pieces).

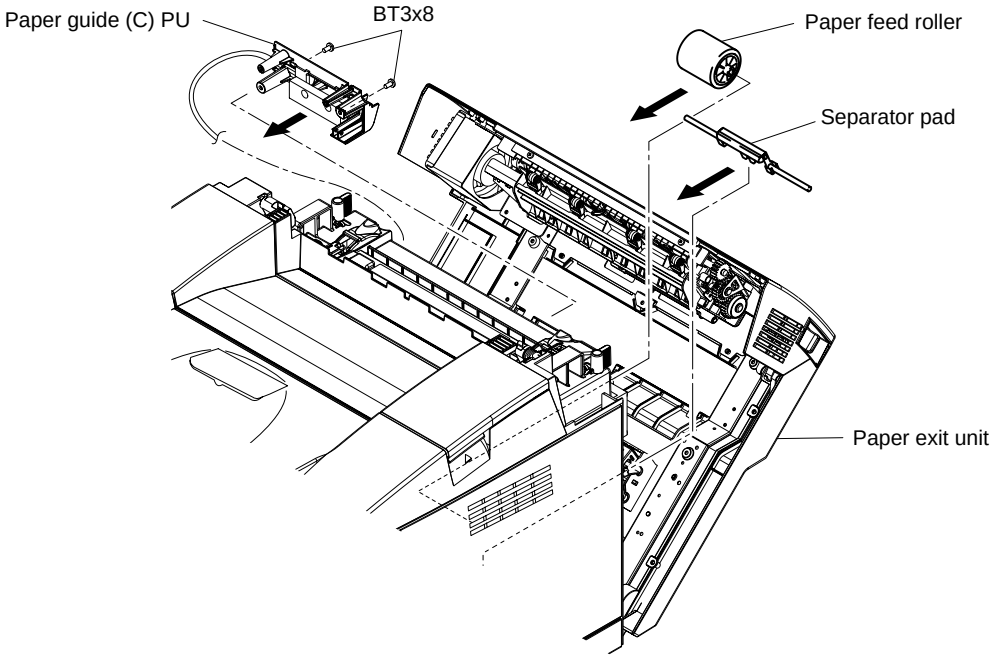


Fig.6-21

4) Secure the support band with the setscrew.
5) Install the paper guide (B) PU into the printer.
6) Close the paper exit unit.

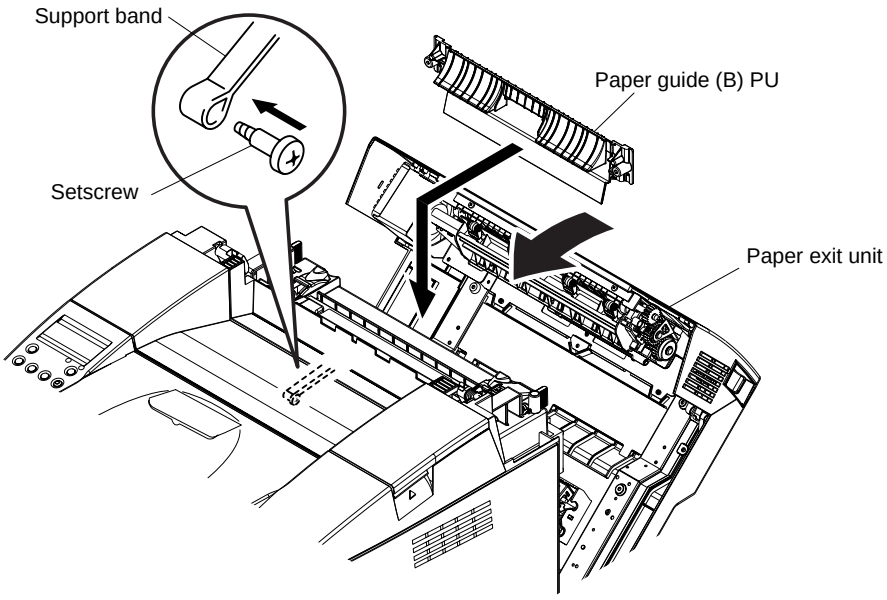


Fig.6-22

7) Secure the paper guide (B) PU with the setscrew (BT3x8, 2 pieces).
8) Set the lower duplex cover.

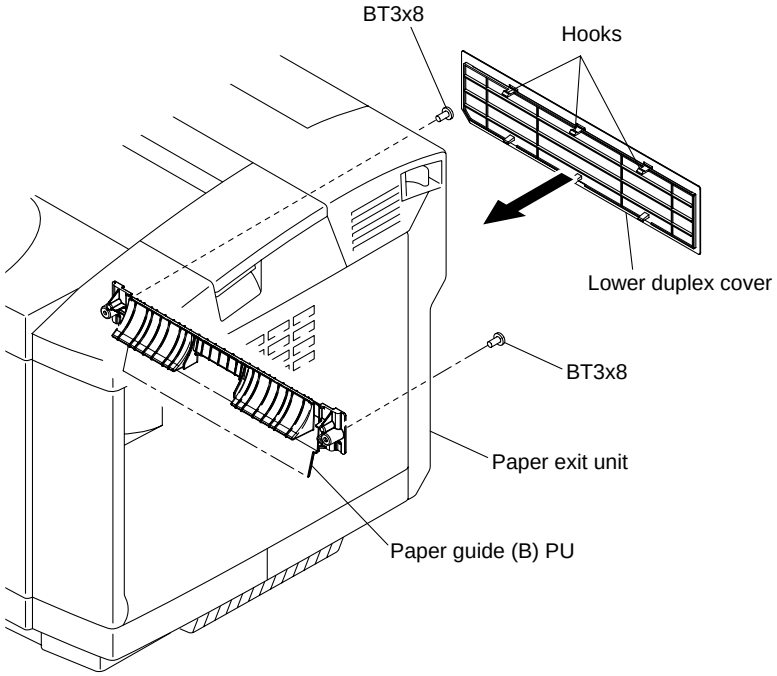


Fig.6-23

<Cautions>

1) This work is one of periodic replacement jobs, but cannot be the customer. This should be implemented upon request of customer or at periodic maintenance.
2) After the replacement, confirm the feeding of media such as plain paper, OHP, and stack paper.

2.6 Replacement of Transfer Unit PU

<Criterion of Replacement>

Since the transfer drum is defined as periodic replacement parts as per Table 6-4, it should be replaced when the print quality failure occurs due to failed transfer drum. The warning code “TB” appears in LCD of the operator panel.

<Work Procedures>

Sequence of Disassembling

1) Turn off the printer power switch.
2) Open the paper exit unit.
3) Remove the knob screw (2 pieces) of the transfer unit PU from rear.
4) Holding the band provided at the top side of the transfer unit PU, pull out the transfer unit PU from the inside of the frame. In this instance, do not cause the belt surface touch the peripheral parts.

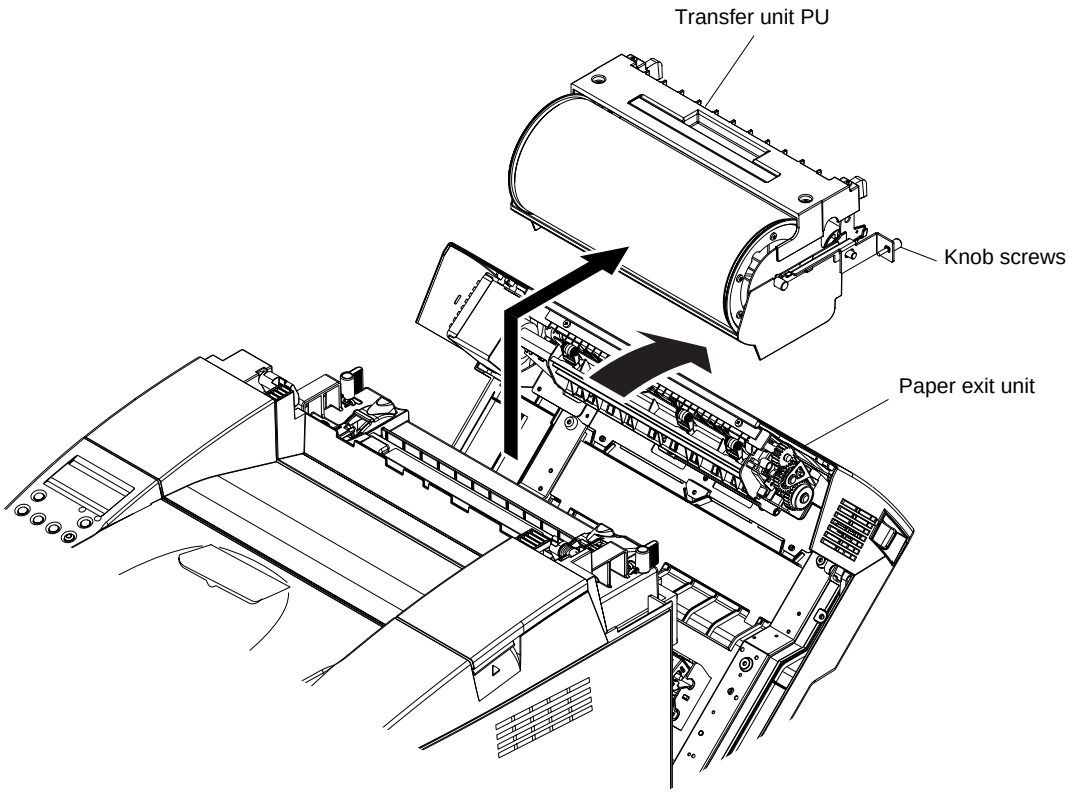


Fig.6-24

Sequence of Assembling

1) Install the transfer unit PU into the printer.
2) Secure the transfer unit PU with the knob screw (2 pieces).
3) Close the paper exit unit.

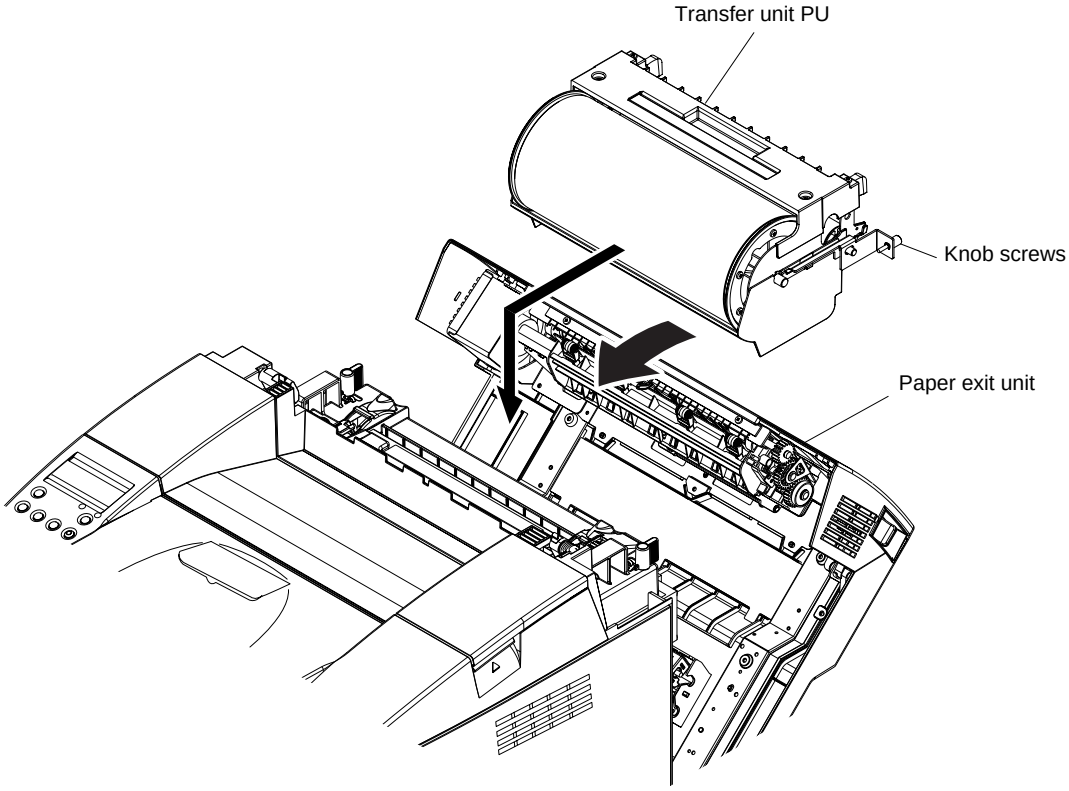


Fig.6-25

<Cautions>

1) This work is one of periodic replacement jobs, but cannot be the customer. This should be implemented upon request of customer or at periodic maintenance.
2) After the replacement, confirm the improvement of print quality failure by test print.

CHAPTER VII
DISASSEMBLY

CHAPTER VII DISASSEMBLY

1. REPLACEMENT PROCEDURE OF MAINTENANCE PARTS

Respect the procedures and precautions described below for the maintenance work.

1) Do not implement any operation, disassembly, and modification etc., which are not set out in this Manual.
2) Turn the power supply OFF and unplug the power supply cable from the outlet prio to starting the disassembly or check.
3) Prior to starting the disassembly of printer, remove the toner cartridge, the belt cartridge, the waste toner bottle, the cleaning roller and the fuser unit.
4) This printer incorporates the dangerous parts subject to the warnings such as "High Temperature", "High Voltage", and "Laser Radiation". Prior to starting any work to this printer, make sure to read and understand the warnings set out in this Manual.
5) Collect and dispose the waste toner or toner cartridge in this maintenance. However, strictly refrain from dumping them together with the inflammable or throwing them into the fire.
6) Remove the grounding when replacing or removing HV power supply unit. After completing the replacement work, confirm the grounding wire to be put back and connected to the earth mark ⏚.
7) While replacing the maintenance parts, check the connection of the harness and the connectors.
   • The harness should not be caught or damaged.
   • The harness should not be modified by cutting or extending it.
8) When replacing the maintenance parts, confirm the installation direction of parts and the length of screws to meet the requirements listed in Table 7-1.
9) Do not attempt to use any liquid such as alcohol for the maintenance of this printer.
10) Prior to implementing the test operation after the replacement of maintenance parts, confirm that all the parts are properly installed and all the covers are set in place.

    See Chapter 8 "Troubleshooting" and Chapter 9 "List of Maintenance Parts" for reference.

Test on Product Safety

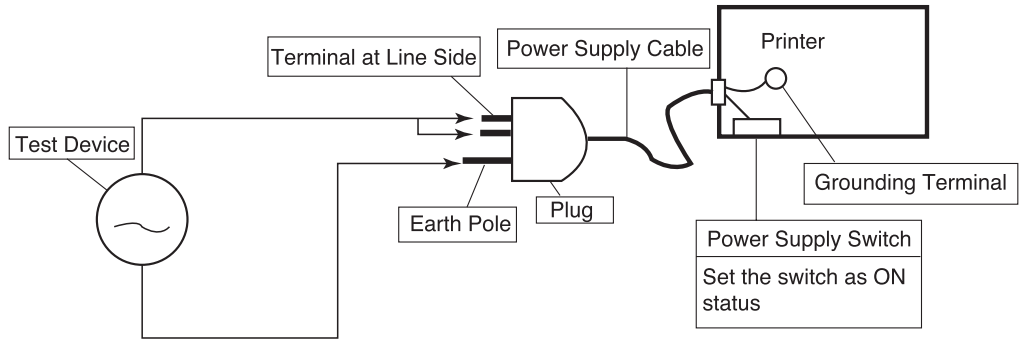
This laser printer has the safety structure in compliance with IEC950, but there is still concern of the electric shock due to the current leakage that may be caused if the replacement work of maintenance parts was not implemented properly and accurately. After the replacement and/or disassembling of the parts subject to the safety test described in this document is completed, please confirm the safety requirements according to the following procedures prior to powering on and carrying out the test drive.

1. Qualification of Test Operator: Skillful personnel having completed the appropriate training program on the product safety.

2. Test Devices:
   ①. Insulation dielectric strength tester (500VA, Output 1500VAC) or,
   ②. Insulation resistance tester (500VDC, 100 MΩ)

3. Method of Measurement and Criteria of Judgment:

   ï Connection Circuit

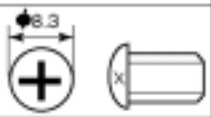
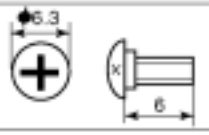
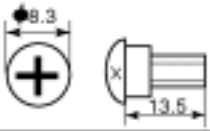


   ï Test Condition and Judgment Criteria

Insulation Dielectric Strength Test	
Voltage Injection	: US Spec. 1000VAC EC Spec. 1500VAC
Current (Default)	: 10mA
Injection Time	: 1 minute
Judgment Criteria	: No Dielectric Breakdown

Measurement of Insulation Resistance	
Voltage Injection	: DC500V
Insulation Resistance	: 100MΩ or greater
Judgment Criteria	: Insulation resistance to be 100M or greater.

Table 7-1: Table of Applicable Screws

Class Code	Name of Screw	Size and Shape of Screw		Remarks
		Length	Sharp	
BT3X6	Cross Recessed Head Tapping Screw.	6mm		Installation of parts to the plastic frame and base.
BT3X8		8mm		
BT3X12		12mm		
BT4X8	Cross Recessed Head Tapping Screw.	8mm		Installation of large parts to the plastic frame and base. • Cover • Unit Parts
BT4X10		10mm		
ST3X6	Cross Recessed Head Self Tapping Screw.	6mm		Installation of parts to the metal base. • Silver Cover • PWB • Base of HVPS or LVPS
ST4X6	Cross Recessed Head Self Tapping Screw.	6mm		Installation of parts to the metal base. • Rear Cover Unit
FST3X10	Cross Recessed Head Screw with Flange.	10mm		Installation of plastic parts to the metal base. • Front Base • Paper Guide
M4X6	Cross Recessed Head Screw (Brass)	6mm		Connection of Earth to the frame.
Special	Cross Recessed Head Self Tapping Shoulder Screw.	6mm		• Fuser Unit Installation of Fuser Cover.
Special	Cross Recessed Head Tapping Shoulder Screw.	13mm		• Fuser Unit Installation of Fuser Connector.

2. PARTS NAME

2.1 Cover

<Front View>

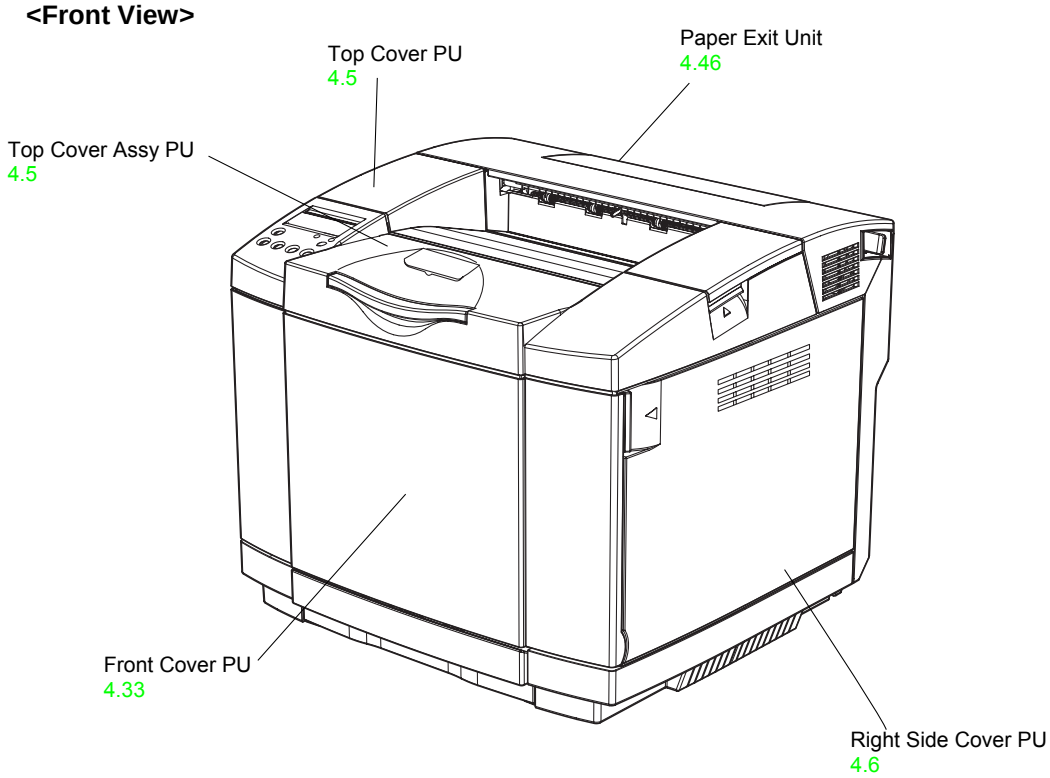


Fig.7-1

<Rear View>

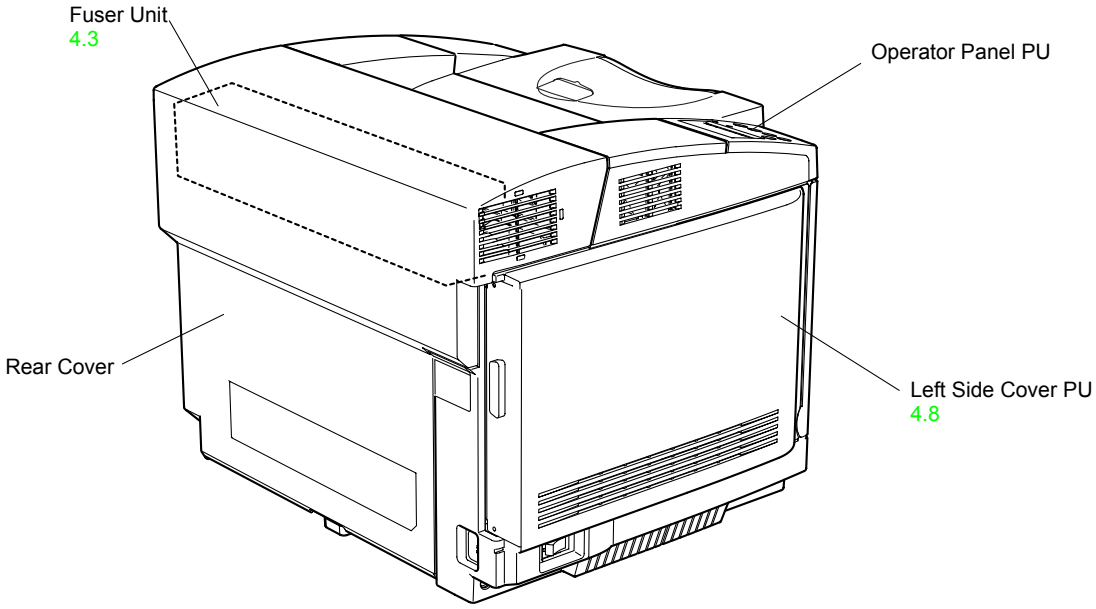


Fig.7-2

2.2 Arrangement Boards

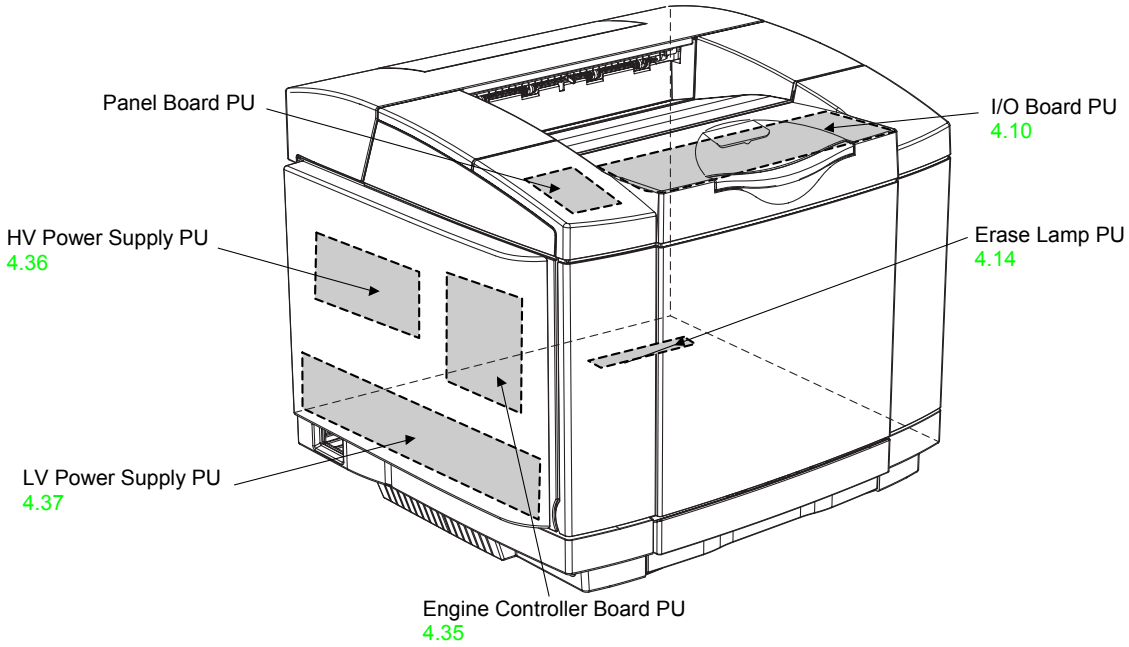


Fig.7-3

2.3 Motor Units

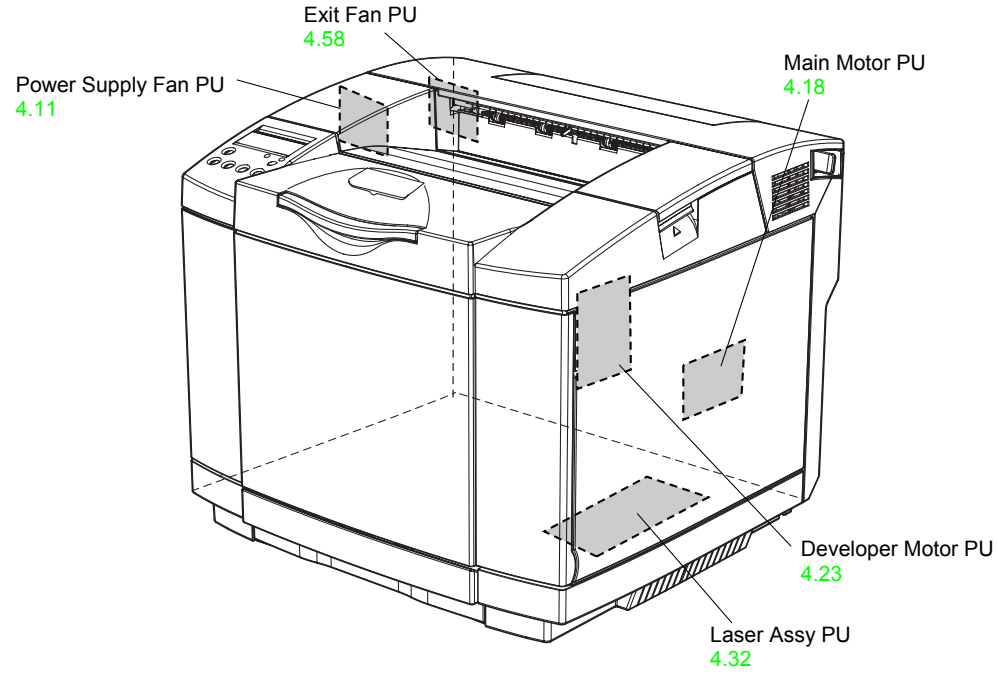


Fig.7-4

2.4 Clutches and Solenoids

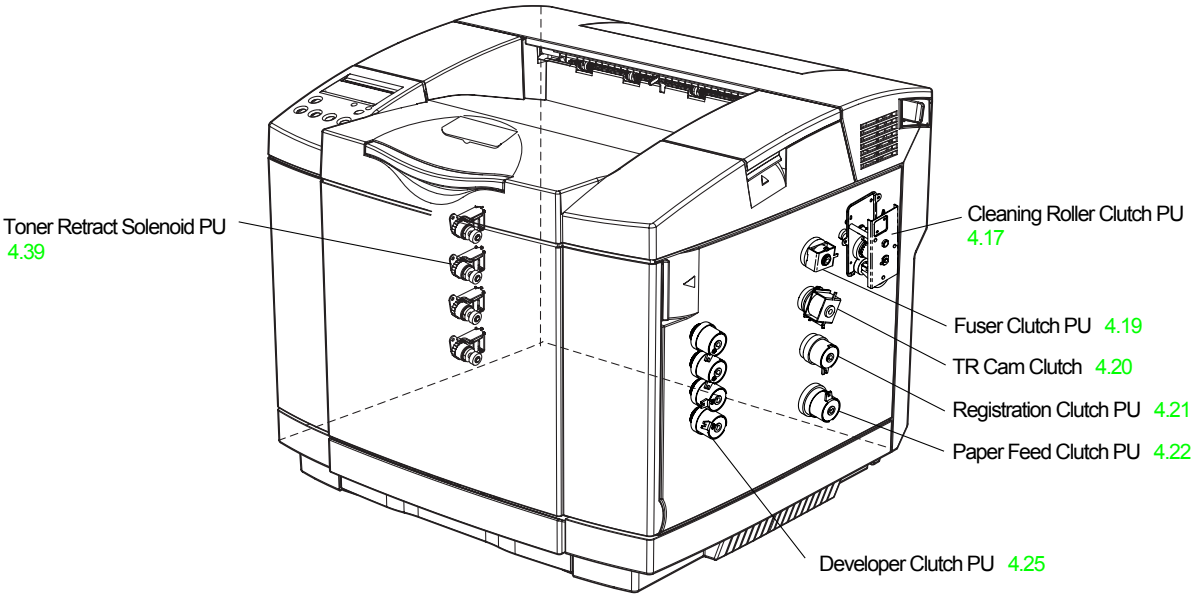


Fig.7-5

2.5 Sensors

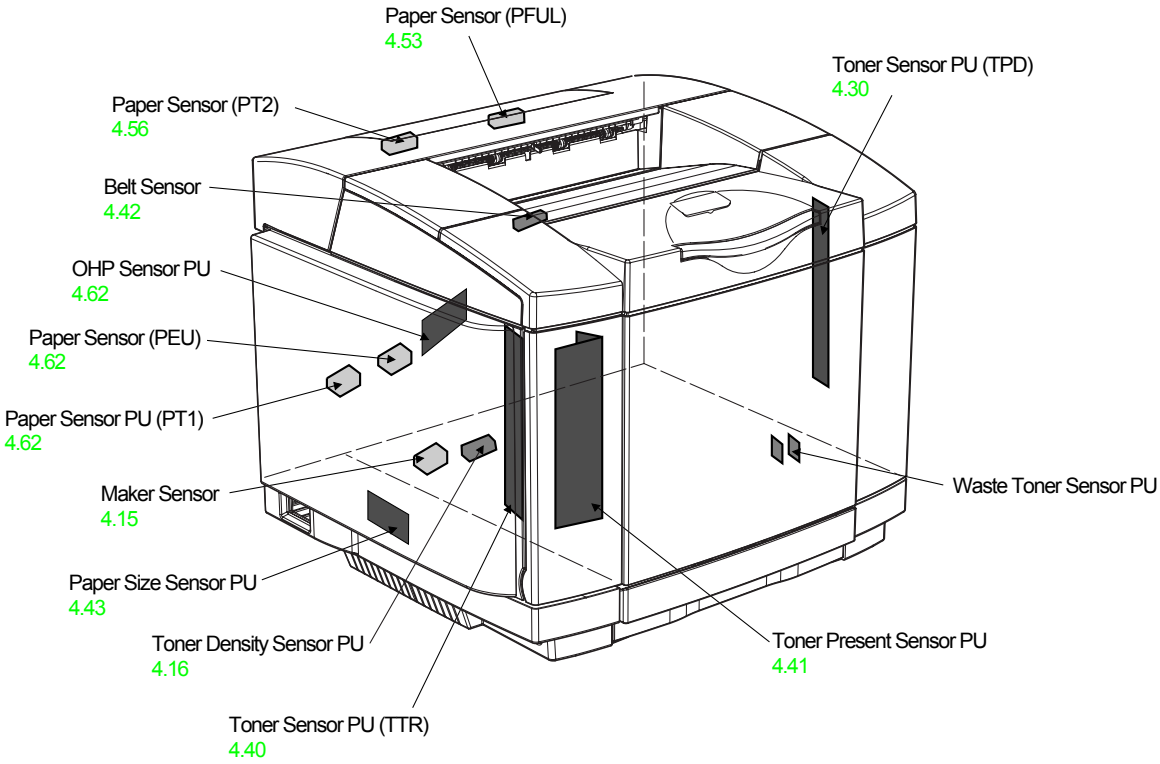
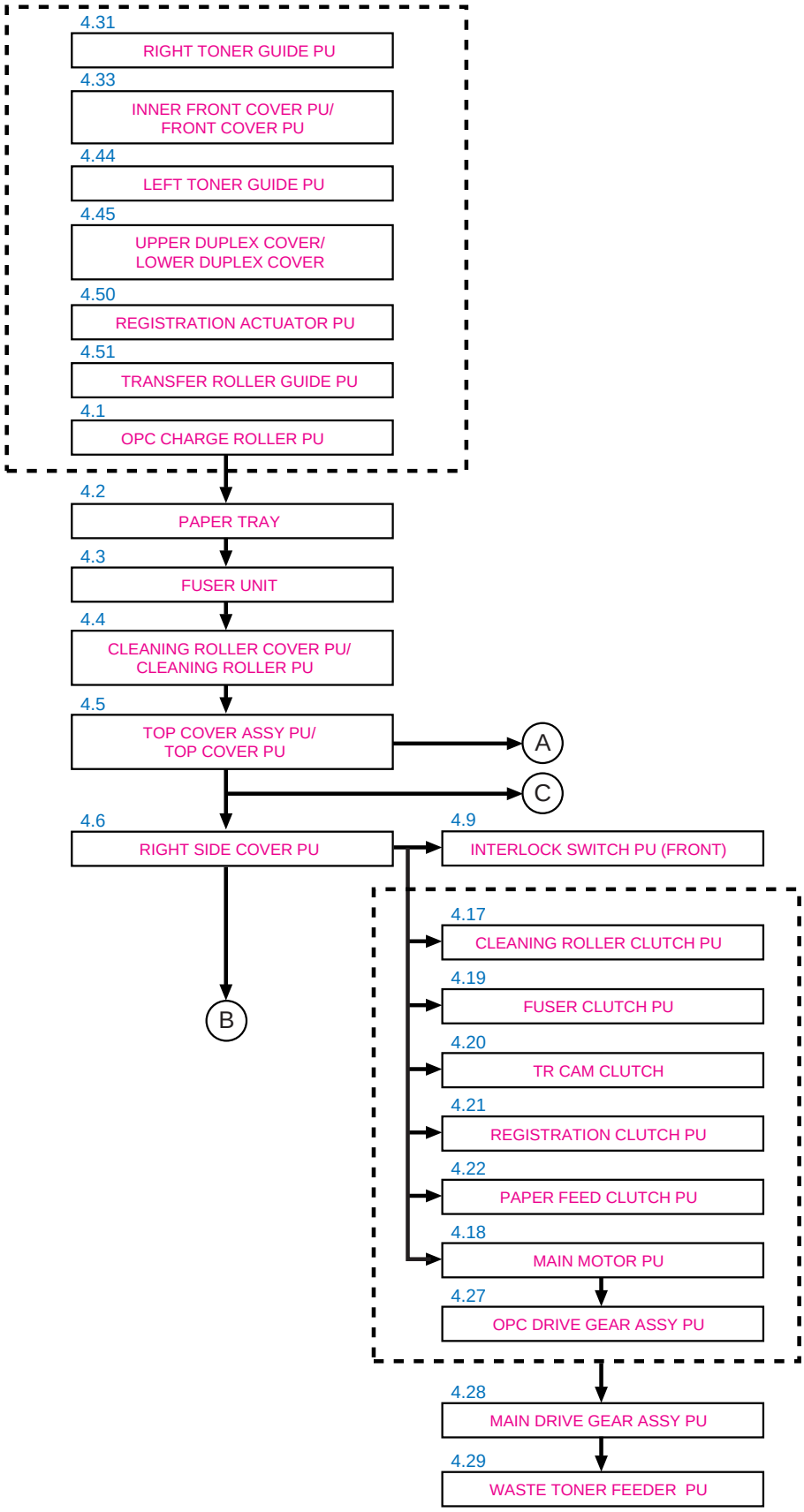
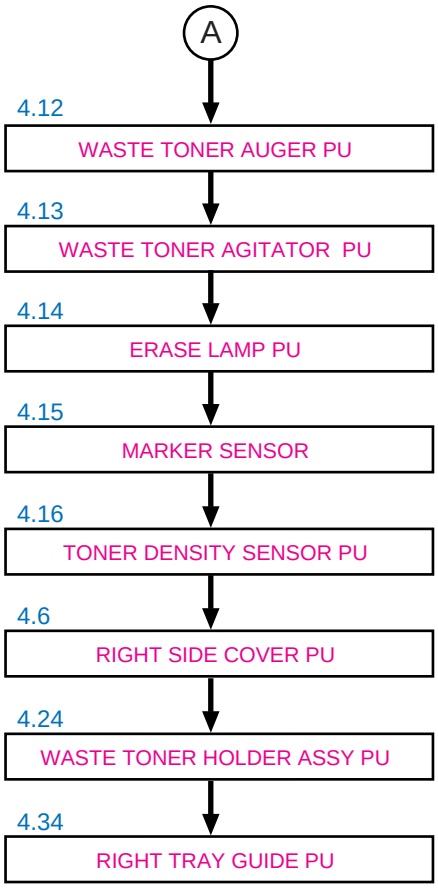
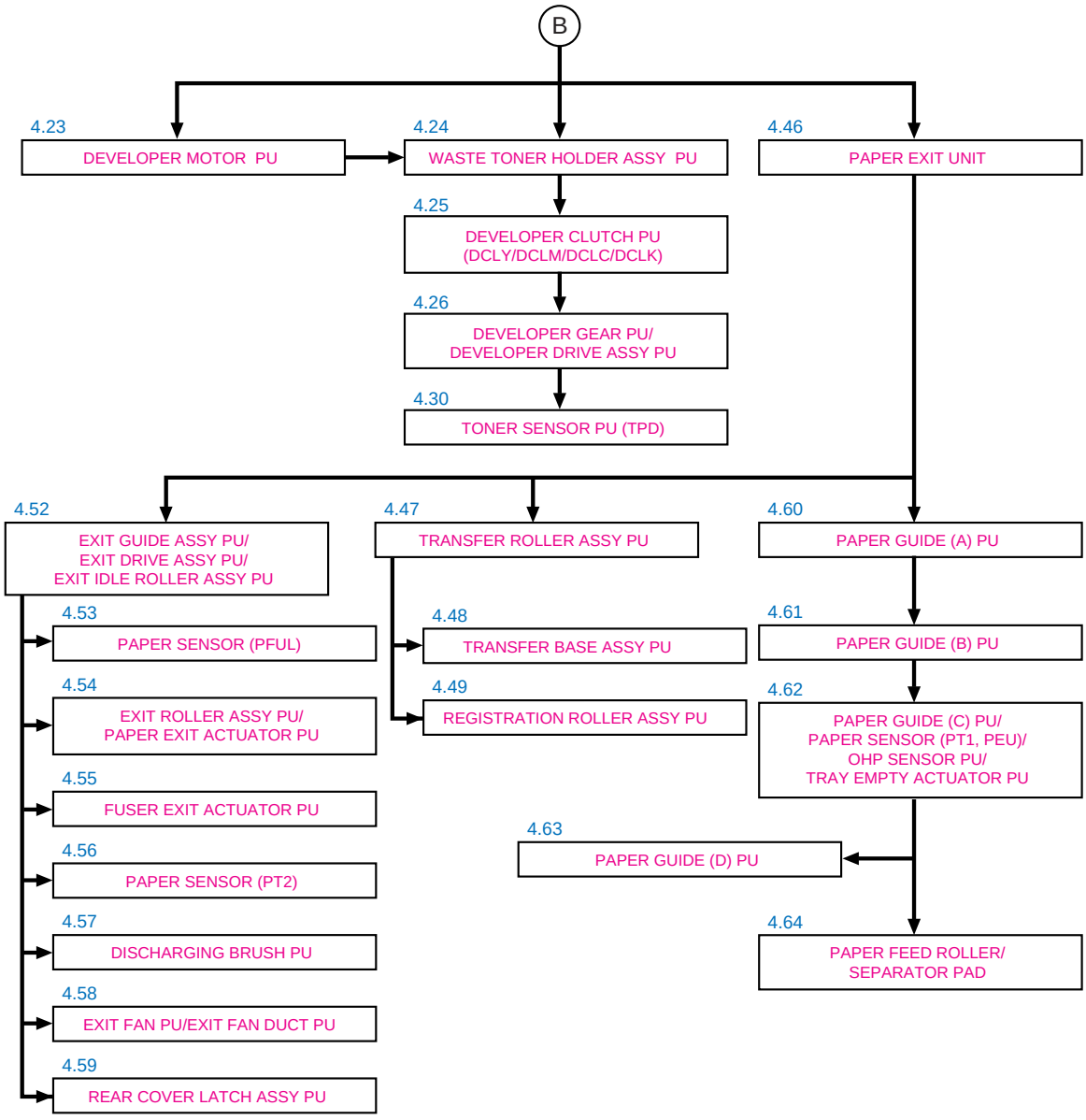


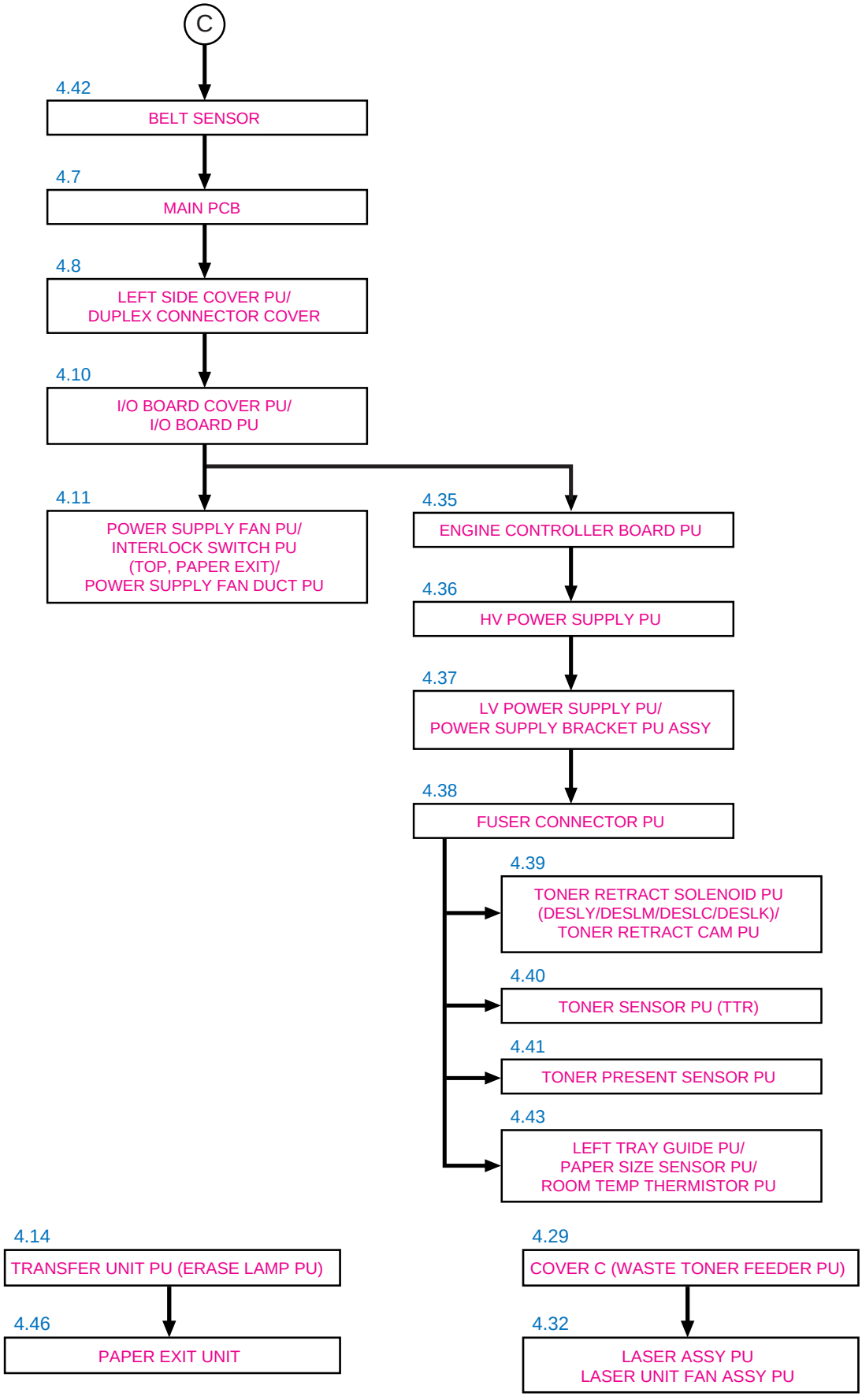
Fig.7-6

3. DISASSEMBLY FLOW




A
4.12
WASTE TONER AUGER PU
4.13
WASTE TONER AGITATOR PU
4.14
ERASE LAMP PU
4.15
MARKER SENSOR
4.16
TONER DENSITY SENSOR PU
4.6
RIGHT SIDE COVER PU
4.24
WASTE TONER HOLDER ASSY PU
4.34
RIGHT TRAY GUIDE PU


B
4.23
DEVELOPER MOTOR PU
4.24
WASTE TONER HOLDER ASSY PU
4.46
PAPER EXIT UNIT
4.25
DEVELOPER CLUTCH PU
(DCLY/DCLM/DCLC/DCLK)
4.26
DEVELOPER GEAR PU/
DEVELOPER DRIVE ASSY PU
4.30
TONER SENSOR PU (TPD)
4.52
EXIT GUIDE ASSY PU/
EXIT DRIVE ASSY PU/
EXIT IDLE ROLLER ASSY PU
4.47
TRANSFER ROLLER ASSY PU
4.60
PAPER GUIDE (A) PU
4.53
PAPER SENSOR (PFUL)
4.48
TRANSFER BASE ASSY PU
4.61
PAPER GUIDE (B) PU
4.54
EXIT ROLLER ASSY PU/
PAPER EXIT ACTUATOR PU
4.49
REGISTRATION ROLLER ASSY PU
4.62
PAPER GUIDE (C) PU/
PAPER SENSOR (PT1, PEU)/
OHP SENSOR PU/
TRAY EMPTY ACTUATOR PU
4.55
FUSER EXIT ACTUATOR PU
4.63
PAPER GUIDE (D) PU
4.56
PAPER SENSOR (PT2)
4.57
DISCHARGING BRUSH PU
4.64
PAPER FEED ROLLER/
SEPARATOR PAD
4.58
EXIT FAN PU/EXIT FAN DUCT PU
4.59
REAR COVER LATCH ASSY PU


C
4.42
BELT SENSOR
4.7
MAIN PCB
4.8
LEFT SIDE COVER PU/
DUPLEX CONNECTOR COVER
4.10
I/O BOARD COVER PU/
I/O BOARD PU
4.11
POWER SUPPLY FAN PU/
INTERLOCK SWITCH PU
(TOP, PAPER EXIT)/
POWER SUPPLY FAN DUCT PU
4.35
ENGINE CONTROLLER BOARD PU
4.36
HV POWER SUPPLY PU
4.37
LV POWER SUPPLY PU/
POWER SUPPLY BRACKET PU ASSY
4.38
FUSER CONNECTOR PU
4.39
TONER RETRACT SOLENOID PU
(DESLY/DESLM/DESLC/DESLK)/
TONER RETRACT CAM PU
4.40
TONER SENSOR PU (TTR)
4.41
TONER PRESENT SENSOR PU
4.43
LEFT TRAY GUIDE PU/
PAPER SIZE SENSOR PU/
ROOM TEMP THERMISTOR PU
4.14
TRANSFER UNIT PU (ERASE LAMP PU)
4.46
PAPER EXIT UNIT
4.29
COVER C (WASTE TONER FEEDER PU)
4.32
LASER ASSY PU
LASER UNIT FAN ASSY PU

4. DISASSEMBLY PROCEDURE

Note:
Always remove the toner cartridge before disassembling any parts.

4.1 OPC Charge Roller PU

1) Turn off the printer power switch.
2) Remove the AC cord.
3) Open the top cover PU.
4) To release the lock, push the green lock lever BC on both sides inwards.
5) Remove the OPC charge roller PU.

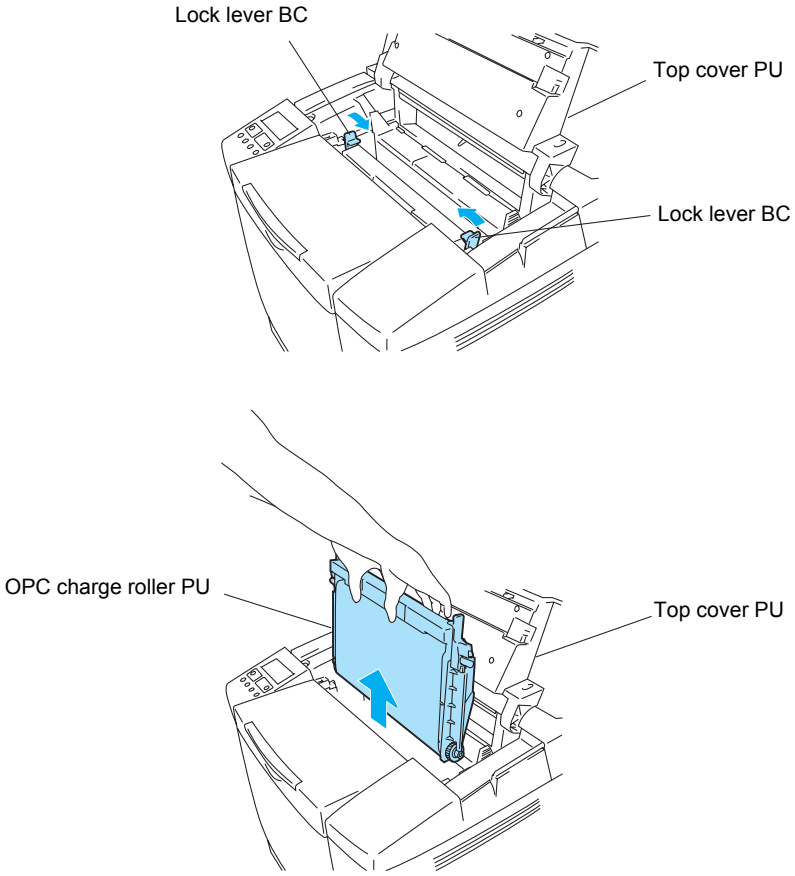


Fig.7-7

4.2 Paper Tray

1) Remove the paper tray.

4.3 Fuser Unit

⚠ Caution

[Caution and Request for Replacement of Maintenance Parts]

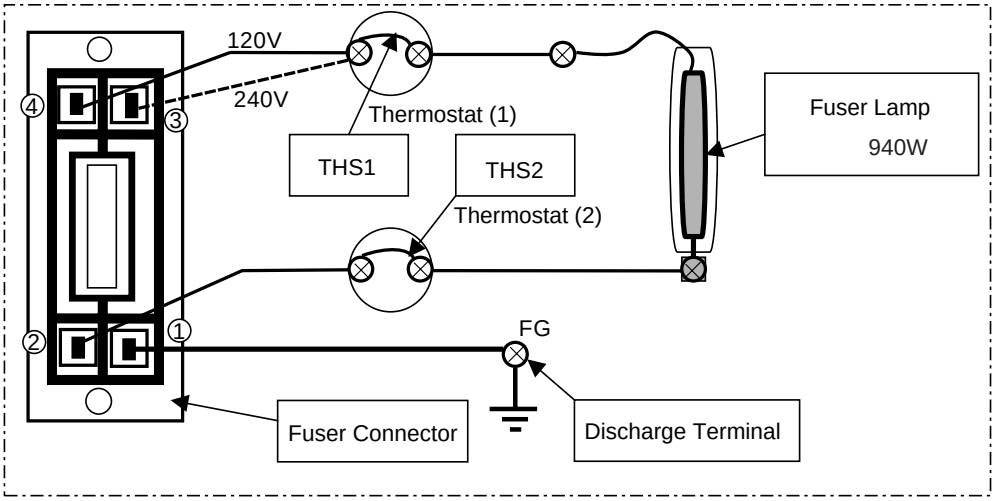
(1). The fuser unit is the unit replaceable component and consists of the important parts that are important for the product safety. The disassembly and replacement of the maintenance parts shall be performed by the skillful personnel having completed the appropriate training and at the appropriate location having the test facilities for the product safety test.

(2). The wiring of the fusing unit is different subject to the voltage specification, and therefore the wrong installation may cause the H2 error.

[Description of Applicable Work]

①.Replacement of Fuser Lamp, Installation of Heater, and Internal Wiring:

Pin Assignment : 120V ① - ④, 240V ① - ③



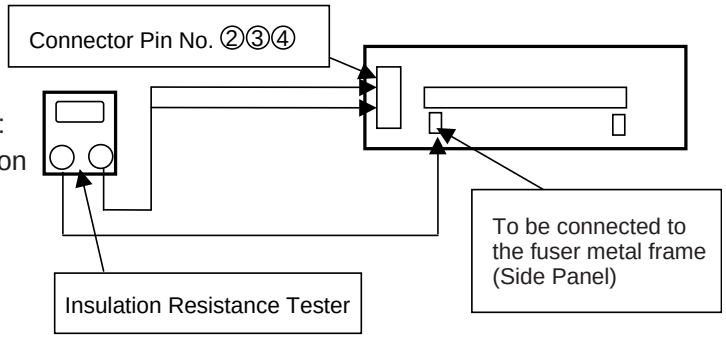
[Confirmation of Safety]

①. Method of Measurement for Insulation Resistance:

- Connect the insulation resistance tester as shown in the figure above.

②. Judgment Criteria:

- The insulation resistance to be 100MΩ or greater.



1) Open the paper exit unit.
2) Release the two lock knobs to remove the fuser unit from the printer.

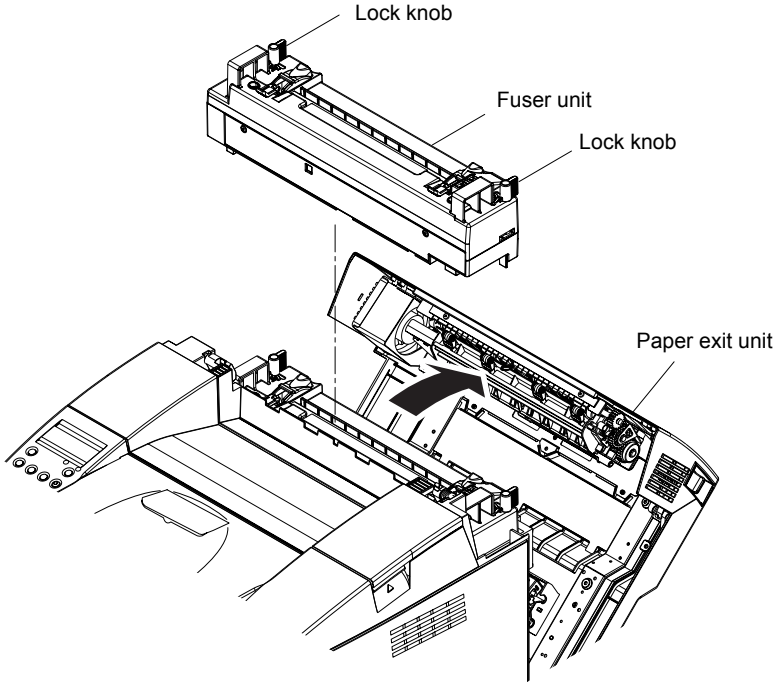


Fig.7-8

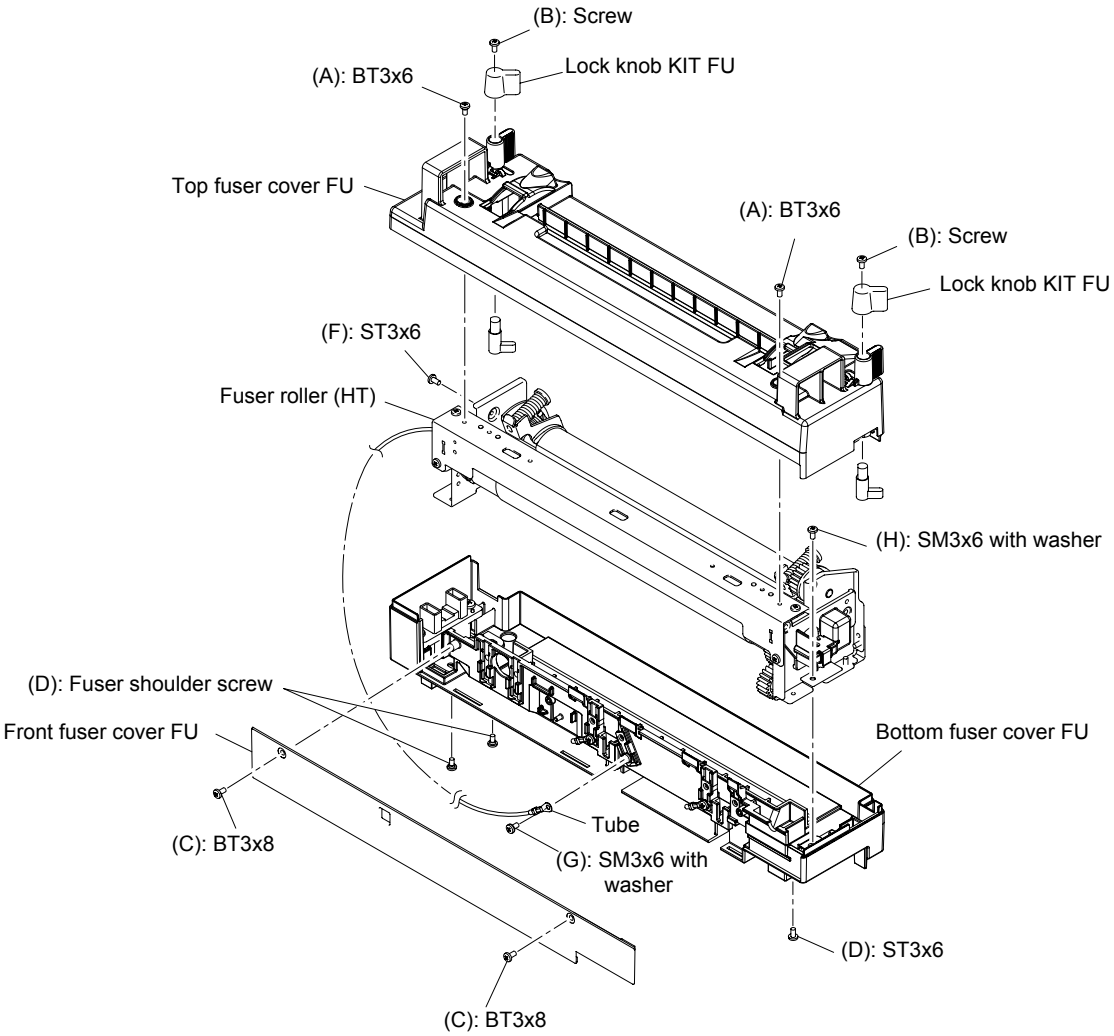
3) Remove the setscrew (A) (BT3x6, 2 pieces) and pull up the two release levers to remove the top fuser cover FU.
4) Remove the screw (B) to remove the lock knob KIT FU. (2 places)
5) Remove the setscrew (C) (BT3x8, 2 pieces) of the front fuser cover FU.
6) Remove the front fuser cover FU.
7) Remove the setscrew (D) (ST3x6, 1 piece and FU shoulder screw, 2 pieces) of the bottom fuser cover FU.
8) Remove the setscrew (E) (SM3x6 with washer, 1 piece) from the bottom fuser cover FU.
9) Remove the setscrew (F) (ST3x6, 1 piece) to remove the ground wire.
10) Remove the setscrew (G) (SM3x6 with washer, 1 piece) of the fuser lamp from the terminal; Pull out the tube from the harness.
11) Remove the bottom fuser cover FU from the fuser roller assy FU.
12) Remove the setscrew (H) (SM3x6 with washer, 1 piece) of the fuser lamp terminal from the terminal.
13) Remove the setscrew (I) (SM3x6 with washer, 2 pieces) of the lamp holder, and then remove the lamp holder.
14) Pull out the fuser lamp from the fuser roller (HT).
    Note:
    Since the voltage of heater lamp is subject to the destination, confirm the specified rated voltage. (US : 120V 940W, EC : 240V 940W, JP : 100V 940W)
15) Remove the setscrew (J) (ST3x6 with washer, 2 pieces) to remove the two terminals of the fuser connector harness.
16) Disconnect the connector connecting to the fuser connector FU.
17) Remove the FU shoulder screws (K) (2 pieces) to remove the fuser connector FU from the bottom fuser cover FU.
18) Remove the setscrew (L) (BT3x6, 1 piece and BT3x12, 1 piece) to remove the thermistor assy FU from the bottom fuser cover FU.

CAUTION

This is the replacement work of important part in terms of the product safety. Therefore, this work should be performed by the skillful personnel having the sound knowledge and at the location where the safety is ensured. (Measurement of the insulation resistance needs to be done.)

CAUTION

The fuser unit and its peripheral parts are very hot (approximately 100°C). Prior to starting the replacement work, confirm that the fuser unit and its peripheral parts are well cooled down.



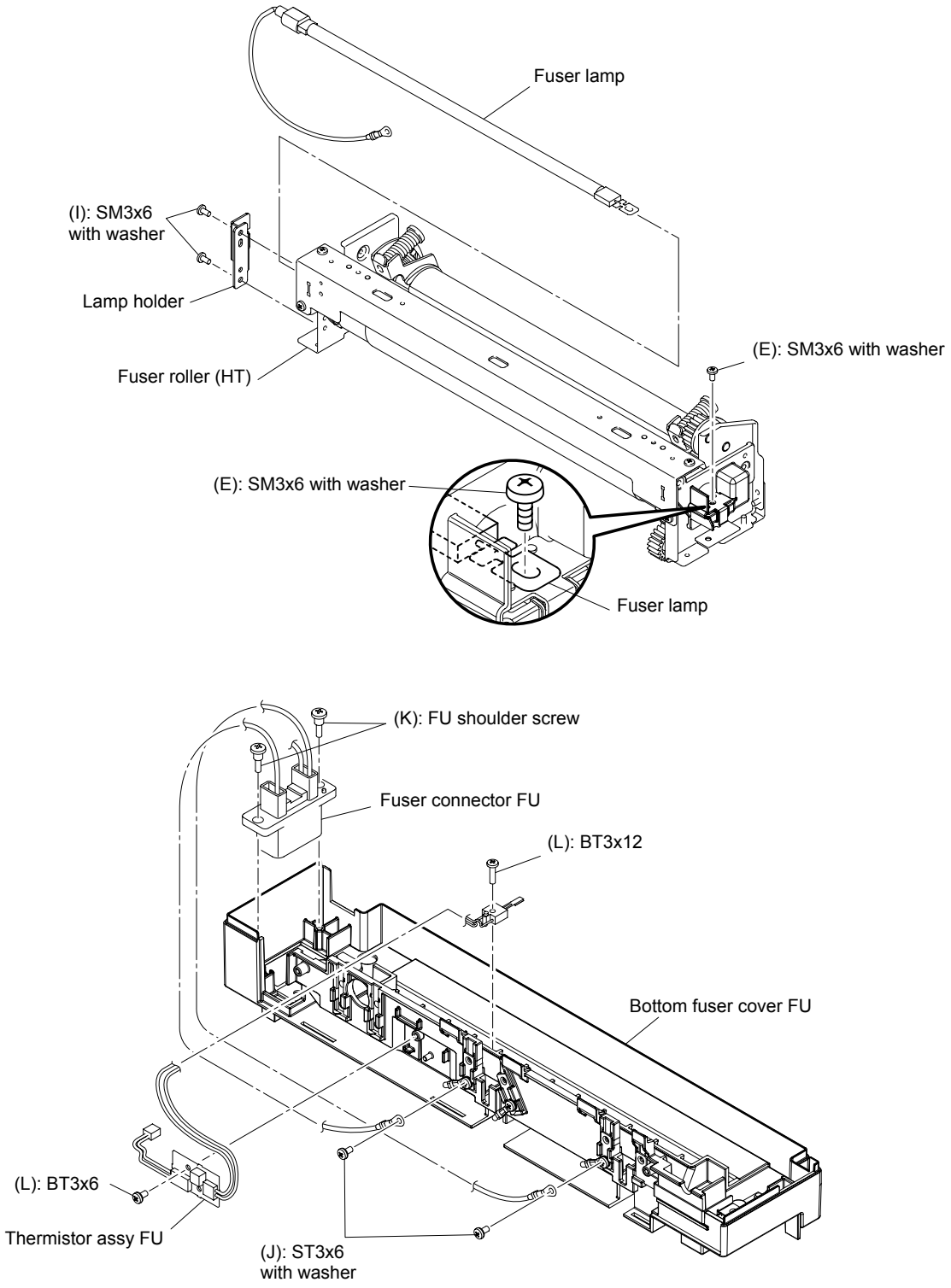

Fuser lamp
(I): SM3x6
with washer
Lamp holder
Fuser roller (HT)
(E): SM3x6 with washer
(E): SM3x6 with washer
Fuser lamp
(K): FU shoulder screw
Fuser connector FU
(L): BT3x12
Bottom fuser cover FU
(L): BT3x6
Thermistor assy FU
(J): ST3x6
with washer

Fig.7-9

4.4 Cleaning Roller Cover PU / Cleaning Roller PU

1) Open the top cover PU.
2) Release the two hooks to remove the cleaning roller cover PU.
3) Remove the cleaning roller PU.

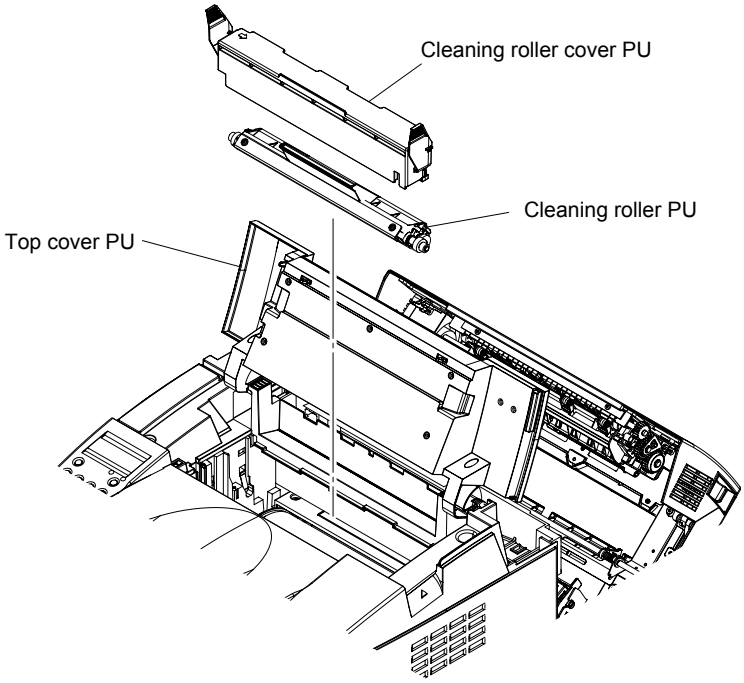


Fig.7-10

4.5 Top Cover Assy PU / Top Cover PU

1) Remove the setscrew (BT4x10, 1 piece) of the operator panel cover PU.
2) Remove the operator panel cover PU and operator panel PU.
3) Disconnect the harness connector of operator panel PU.
4) Open the front cover PU and paper exit unit.
5) Remove the setscrew (BT4x10, 2 pieces) from the top cover assy PU.
6) Remove the top cover assy PU from the printer.
7) Release the hinge of the top cover PU to remove the top cover PU from the top cover assy PU.

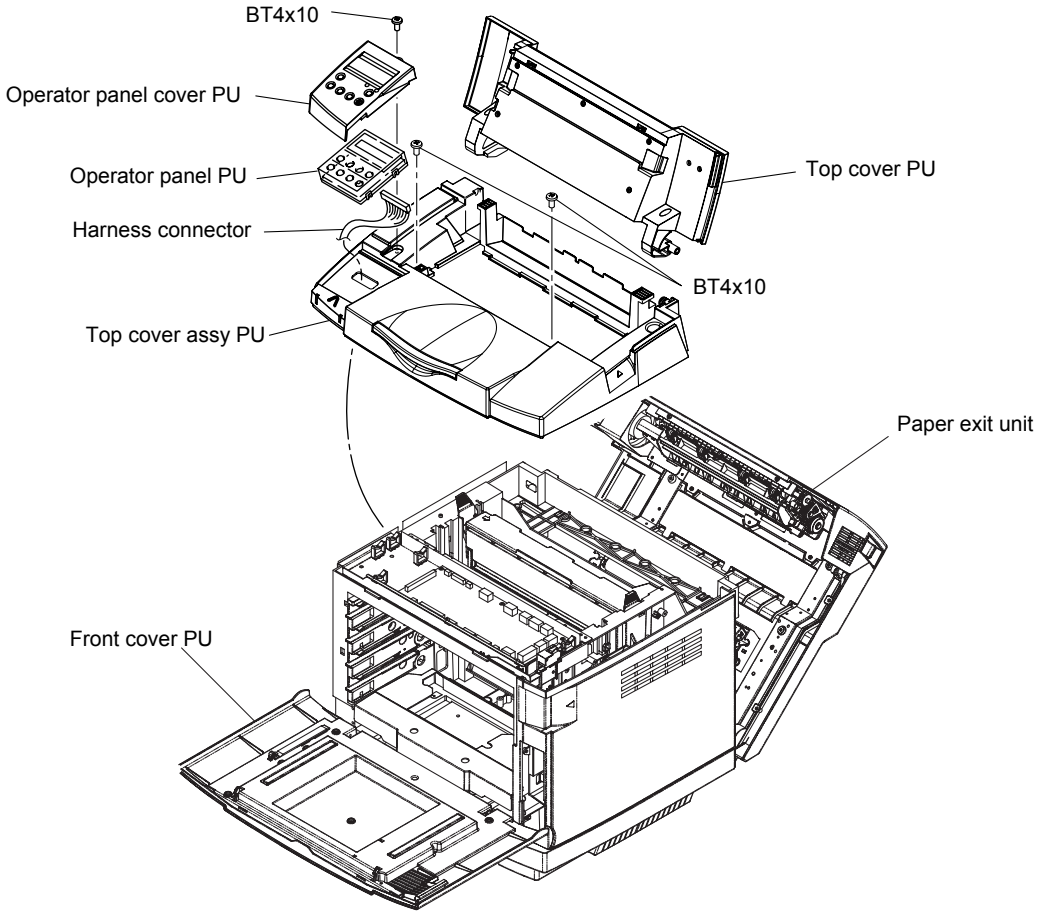


Fig.7-11

4.6 Right Side Cover PU

1) Remove the waste toner pack PU.
2) Remove the setscrew (BT4x10, 2 pieces) of right side cover PU.
3) Remove the right side cover PU from the printer.

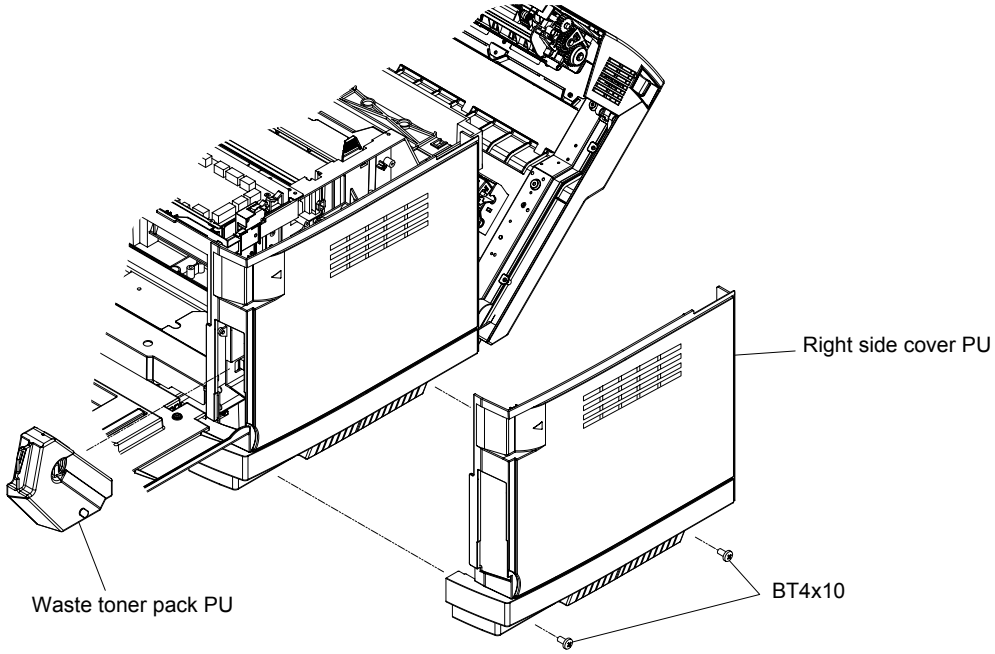


Fig.7-12

4.7 Main PCB

1) Remove the two setscrews.
2) Pull out the main PCB.

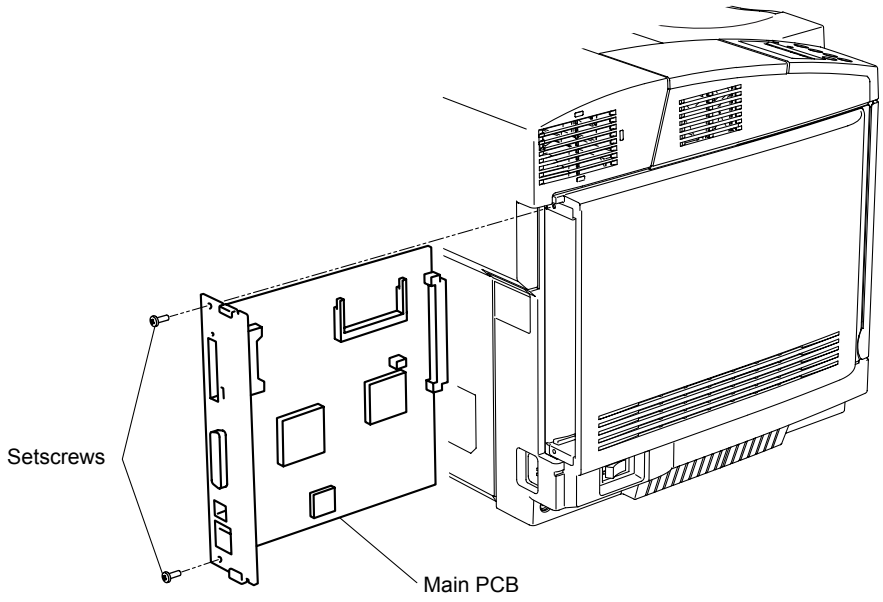


Fig.7-13

4.8 Left Side Cover PU / Duplex Connector Cover

1) Remove the duplex connector cover.
2) Remove the setscrew (BT4x10, 2 pieces) of the left side cover PU.
3) Remove the left side cover PU from the printer.

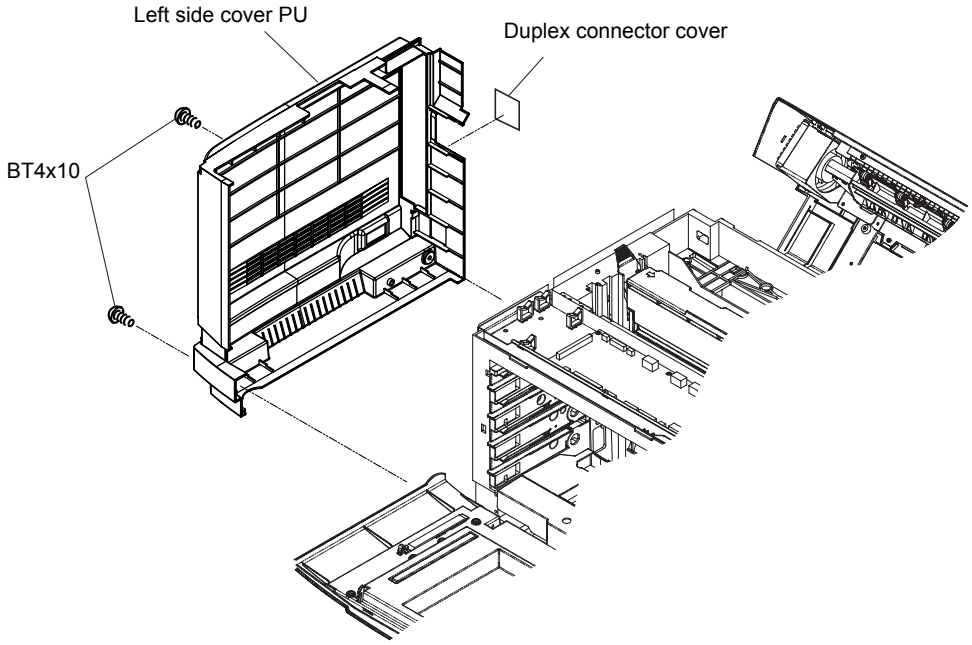


Fig.7-14

4.9 Interlock Switch PU (Front)

1) Disconnect the connector connecting to the interlock switch PU (front).
2) Remove the interlock switch PU (front) from the switch base (DF). The switch is supported by the hooks and shaft.

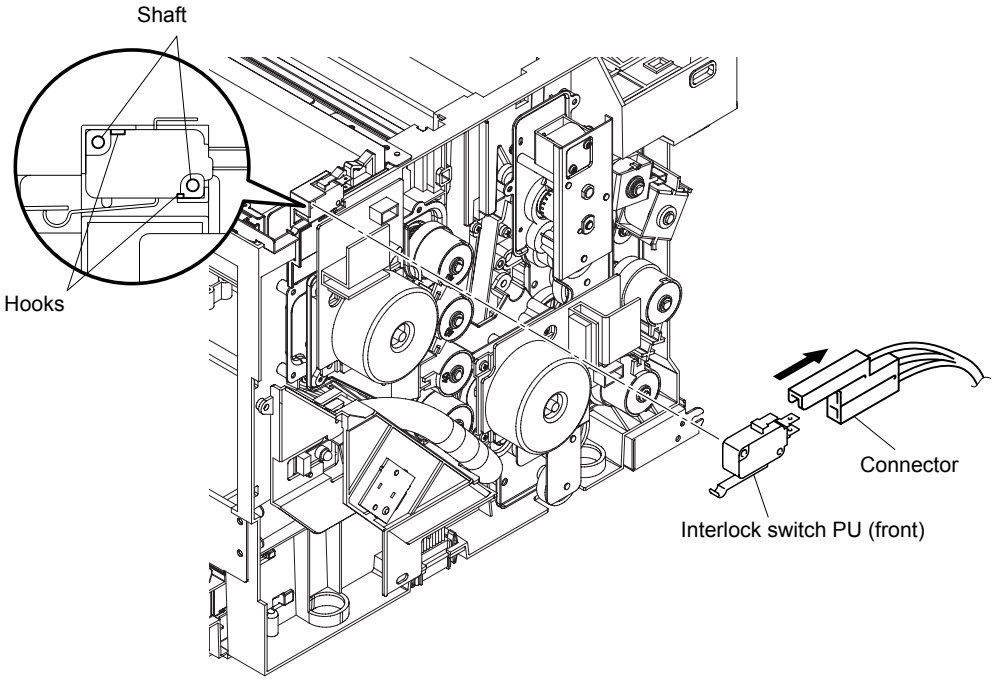


Fig.7-15

4.10 I/O Board Cover PU / I/O Board PU

1) Remove the setscrew (ST3x6, 3 pieces) of the shield cover (A).
2) Remove the shield cover (A).
3) Remove the setscrew (ST3x6, 5 pieces) of the I/O board cover PU.
4) Remove the I/O board cover PU.
5) Disconnect all the connectors connecting to the I/O board PU.
6) Remove the setscrew (ST3x6, 6 pieces) of the I/O board PU.
7) Remove the I/O board PU.

⚠ *CAUTION*

- *Handle the IOD board. carefully in the replacement work not to cause the destruction due to the electrostatic.*
- *While installing the shield cover, do not get the harness caught by the cover.*

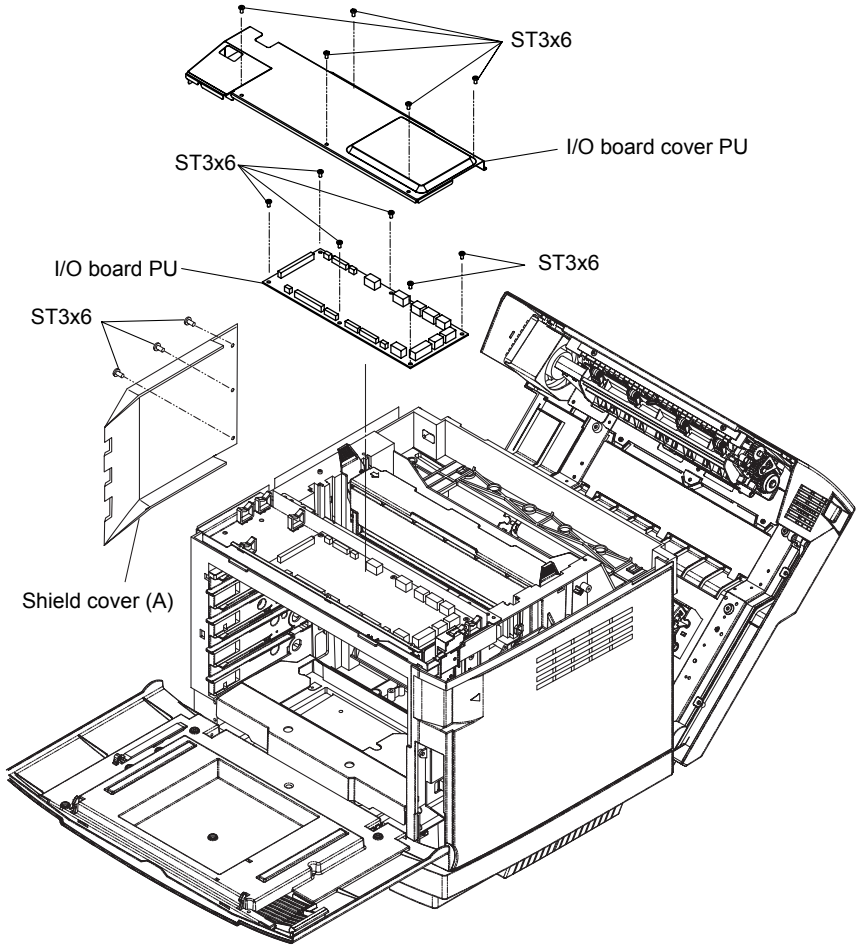


Fig.7-16

4.11 Power Supply Fan PU / Interlock Switch PU (Top, Paper Exit) / Power Supply Fan Duct PU

1) Remove the setscrew (BT4x10, 1 piece) of the power supply fan assy PU.
2) Remove the power supply fan assy PU from the frame.
3) Disconnect the connector connecting to the power supply fan assy PU. [Interlock switch PU (top, paper exit)]
4) Remove the power supply fan PU from the power supply fan duct PU.
5) Remove the setscrew (BT3x8, 1 piece) of the switch cover (top).
6) Remove the switch cover (top) from the power supply fan duct PU.
7) Remove the interlock switch PU (top) from the power supply fan duct PU.
8) Remove the setscrew (BT3x8, 1 piece) of the switch cover (paper exit).
9) Remove the switch cover (paper exit) from the power supply fan duct PU.
10) Remove the interlock switch PU (paper exit) from the power supply fan duct PU.

⚠ *CAUTION*

- *Do not have the fan duct assy step on the harness.*
- *Interlock Switch is the important part in terms of the safety. The replacement work of the interlock switch should be done by the skilled personnel having the sound knowledge on the product safety.*
- *This interlock switch PU is the part of unique specification. Do not use any switch other the specified.*
- *Each interlock switch PU (3 kinds) at the front, top and paper exit is the same specification.*
- *After the replacement, confirm the normal operation of the interlock switch.*
- *Confirm that the message "Door Open" is indicated on the operator panel when the front door is open.*

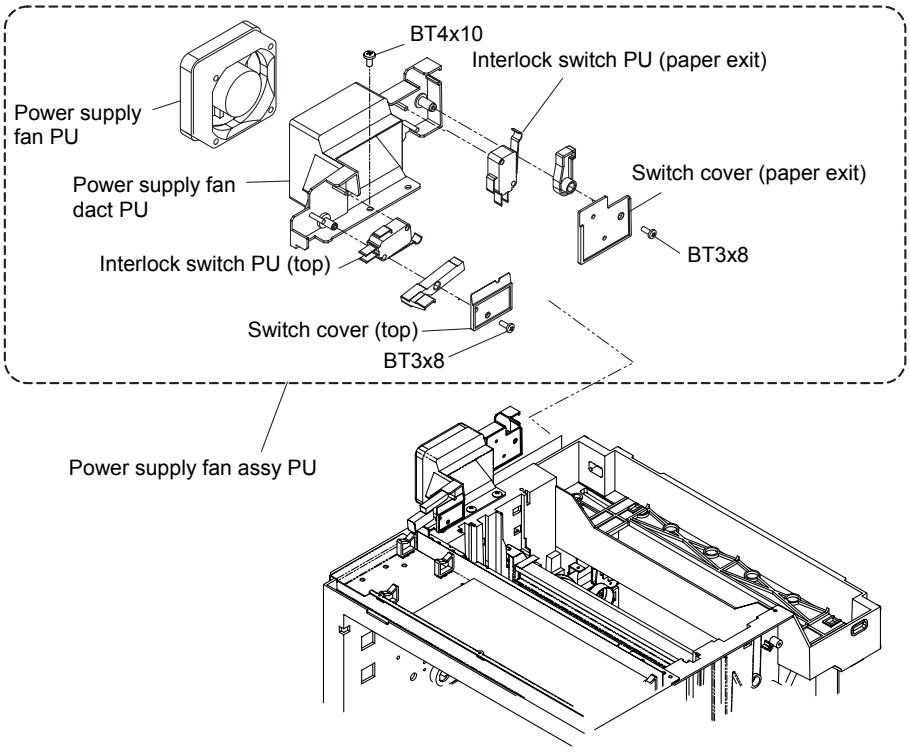


Fig.7-17

4.12 Waste Toner Auger PU

1) Remove the setscrew (BT3x8, 2 pieces) of the waste toner auger PU.
2) Remove the waste toner auger PU from the frame.

Note:

• In this instance, do not cause the waste toner fall on the floor.

• If the installation part is stained, clean it off with the vacuum cleaner that is for the toner only or with cloth.

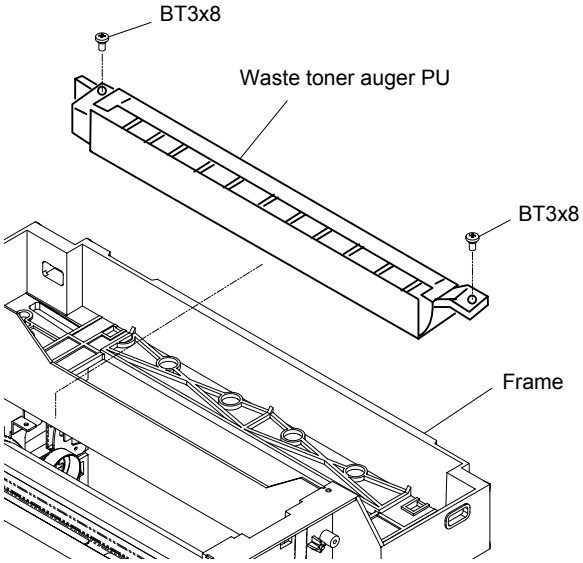


Fig.7-18

4.13 Waste Toner Agitator PU

1) Remove the coupling gear from the inside of the frame.
2) Pull out the waste toner agitator PU.

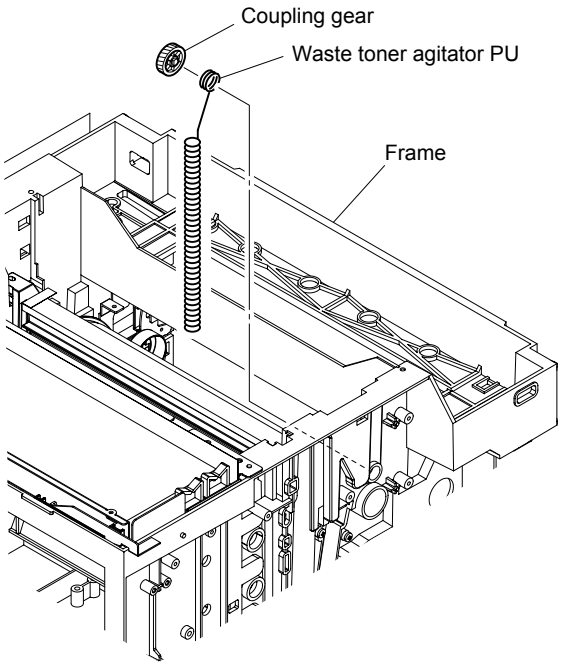


Fig.7-19

4.14 Erase Lamp PU

1) Remove the knob screw (2 pieces) of the transfer unit PU from rear.
2) Holding the band provided at the top side of the transfer unit PU, pull out the transfer unit PU from the inside of the frame. In this instance, do not cause the belt surface touch the peripheral parts.
3) Remove the setscrew (BT3x8, 2 pieces) fixing the erase lamp PU to the sensor base (TB).
4) Disconnect the harness connector connecting to the erase lamp PU.
5) Remove the erase lamp PU from the sensor base (TB).

> ***CAUTION***
>
> • *Do not scratch the belt surface.*
> • *Do not touch the belt surface with bare hands.*
> • *When replacing the erase ramp board, do not touch the transfer belt surface with your bare hands.*

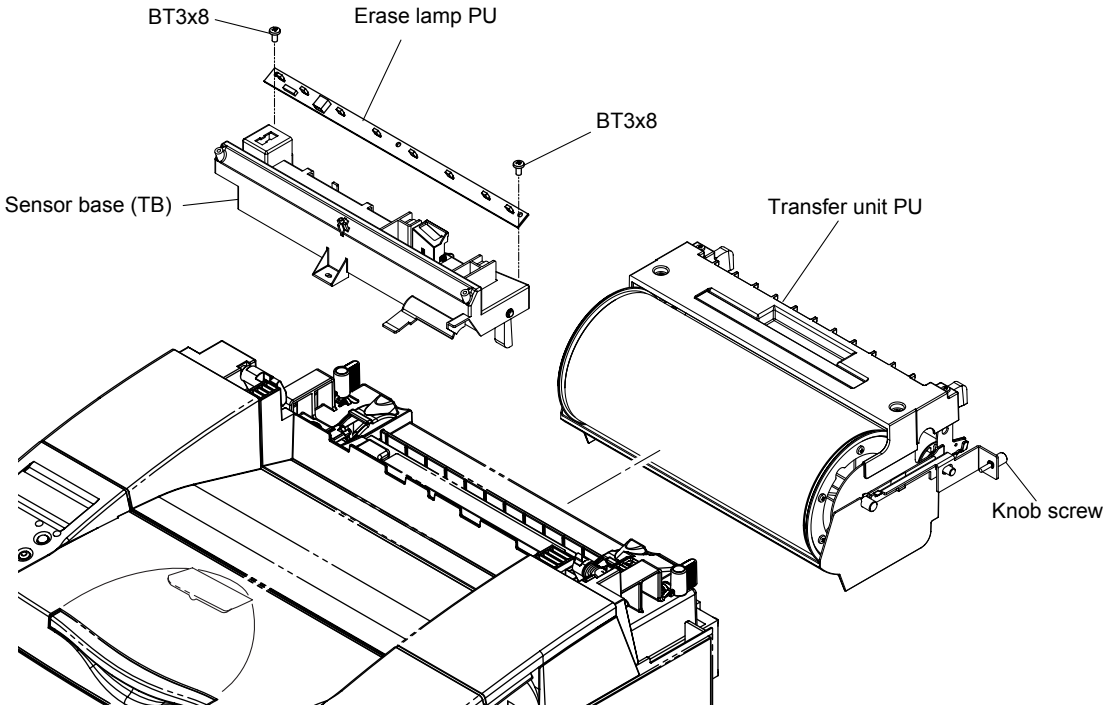


Fig.7-20

4.15 Marker Sensor

1) Disconnect the two connectors connecting to the maker sensor and toner density sensor PU.
2) Remove the setscrew (BT4x8, 2 pieces), and remove the sensor base (TB) from the frame.
3) Remove the maker sensor from the sensor base (TB).

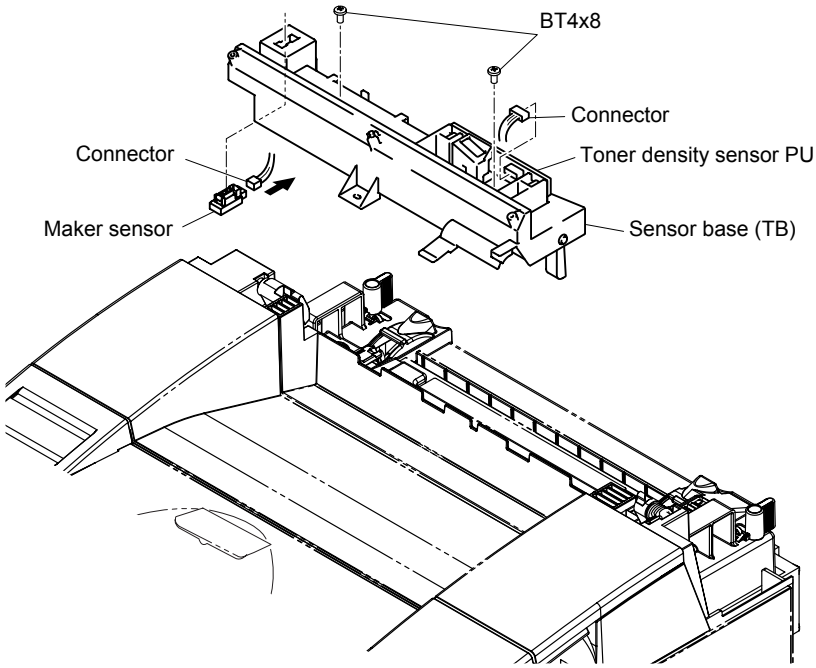


Fig.7-21

4.16 Toner Density Sensor PU

1) Remove the setscrew (BT3x8, 2 pieces) of the toner density sensor PU from the sensor base (TB).
2) Remove the toner density sensor PU from the sensor base (TB).

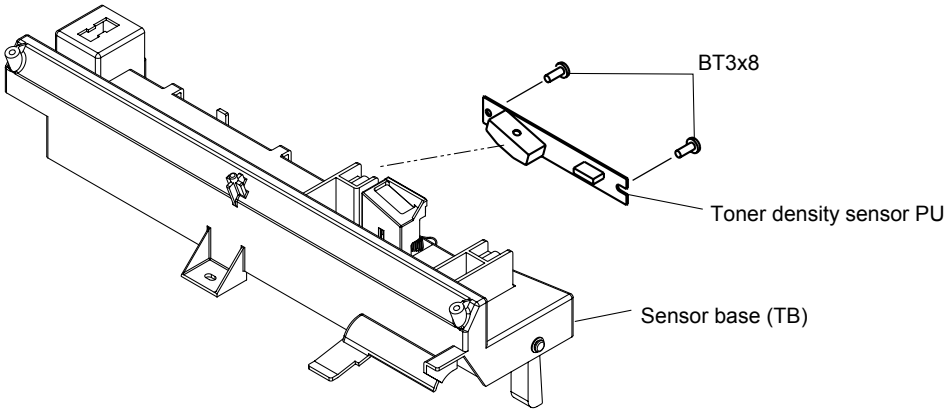


Fig.7-22

4.17 Cleaning Roller Clutch PU

1) Remove the harness connector of the cleaning roller clutch PU.
2) Remove the setscrew (TS3x8, 3 pieces) fixing the cleaning roller clutch PU.
3) Remove the cleaning roller clutch PU from the frame.

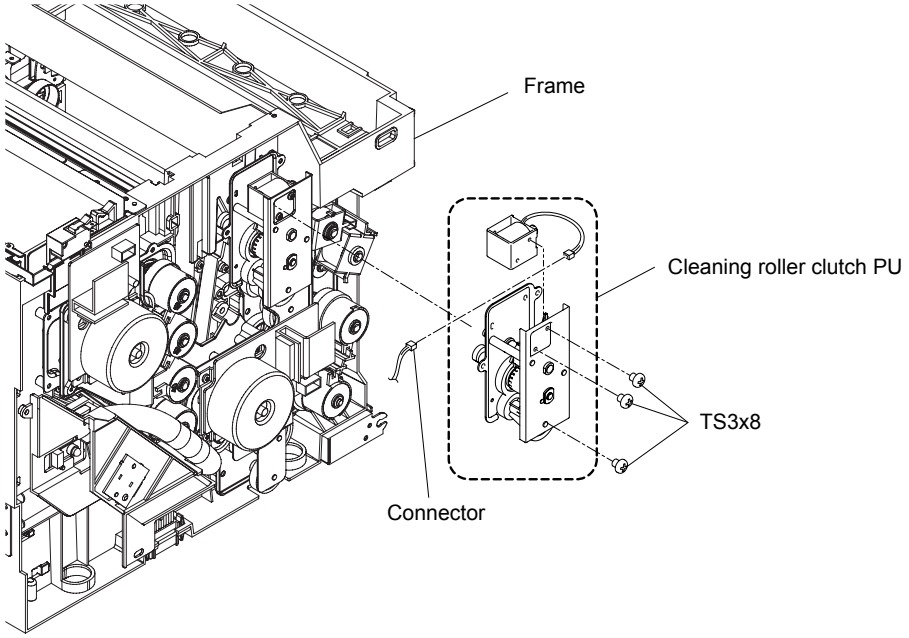


Fig.7-23

4.18 Main Motor PU

1) Disconnect the connectors of all harnesses connecting to the harness duct.
2) Release the two hooks of the harness duct and remove the harness duct.
3) Remove all harnesses from the harness duct.

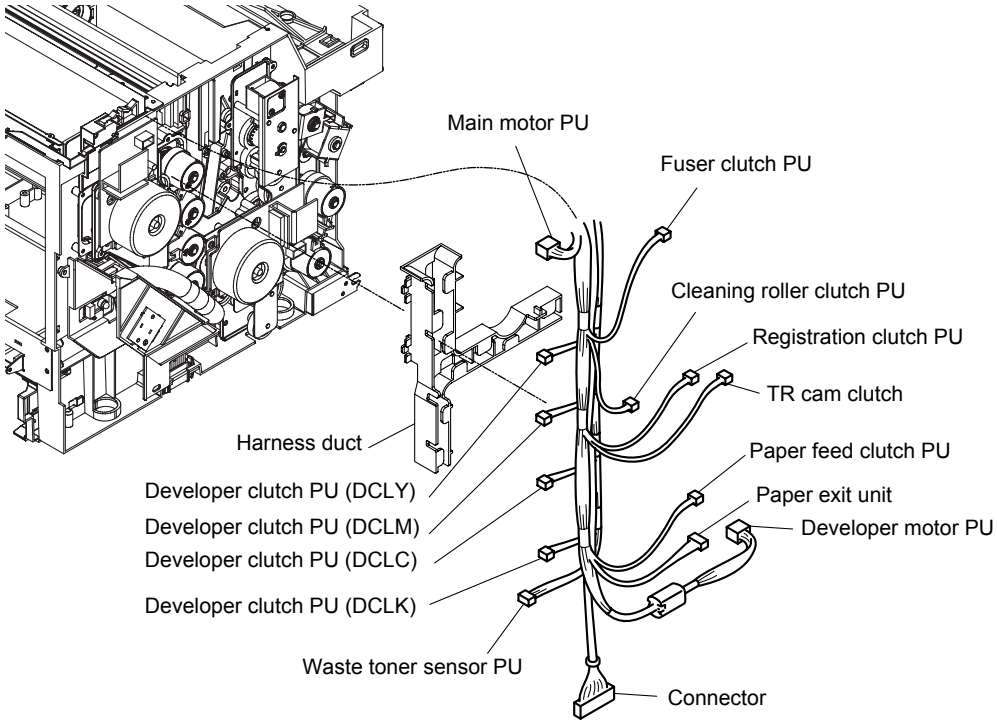


Fig.7-24

4) Remove the setscrew (BT3x12, 4 pieces) of the main motor PU.
5) Remove the main motor PU from the OPC drive gear assy PU.

> ***CAUTION***
> *Do not damage the output shaft, otherwise, it may cause the degradation of print quality.*

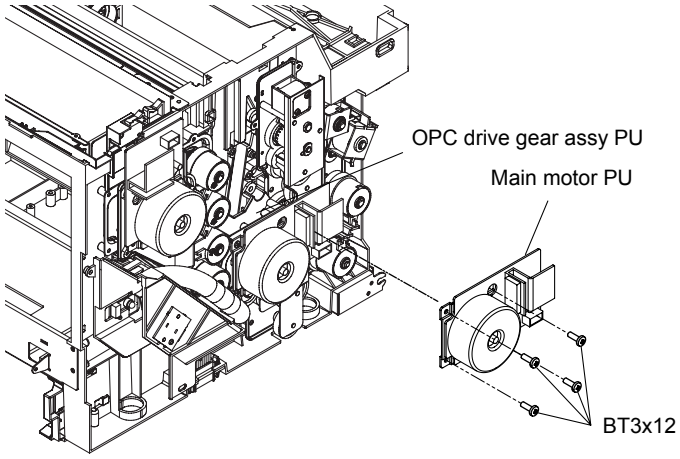


Fig.7-25

4.19 Fuser Clutch PU

1) Remove the washer fixing the fuser clutch PU to the shaft.
2) Remove the fuser clutch PU from the shaft.

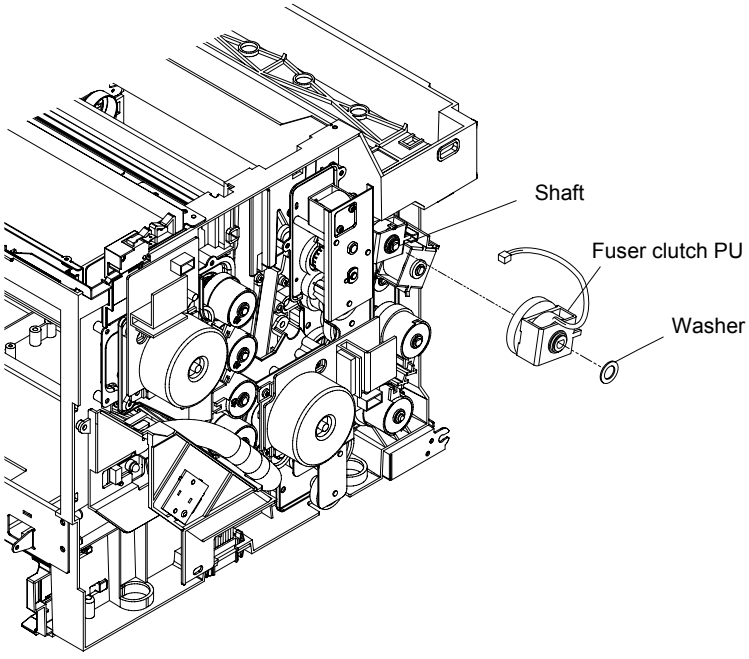


Fig.7-26

4.20 TR Cam Clutch

1) Remove the washer fixing the TR cam clutch.
2) Remove the TR cam clutch from the shaft.

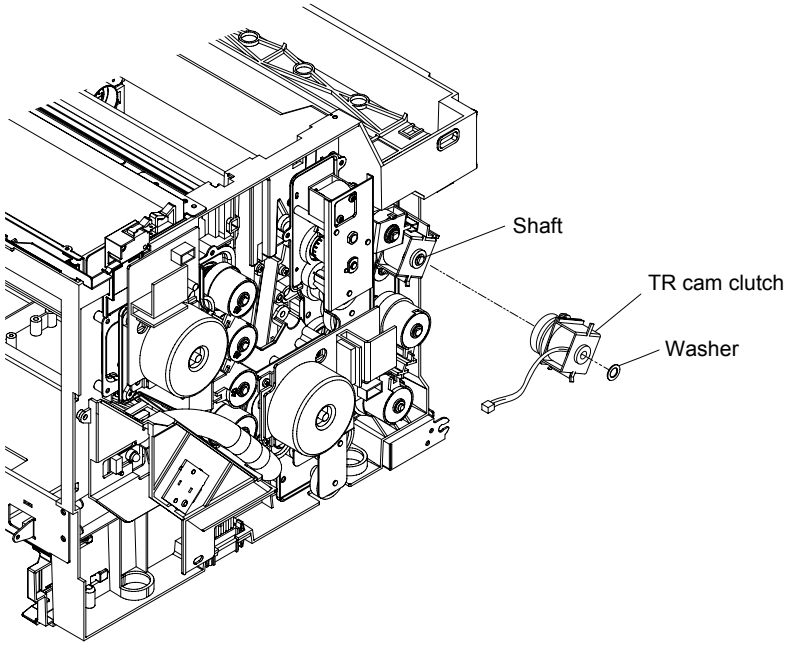


Fig.7-27

Note:
When reassembling the motors, ensure to secure each of them onto the correct position since they are exactly alike. If they cannot be identified, check their parts numbers.

4.21 Registration Clutch PU

1) Remove the washer fixing the registration clutch PU to the shaft.
2) Remove the registration clutch PU from the shaft.

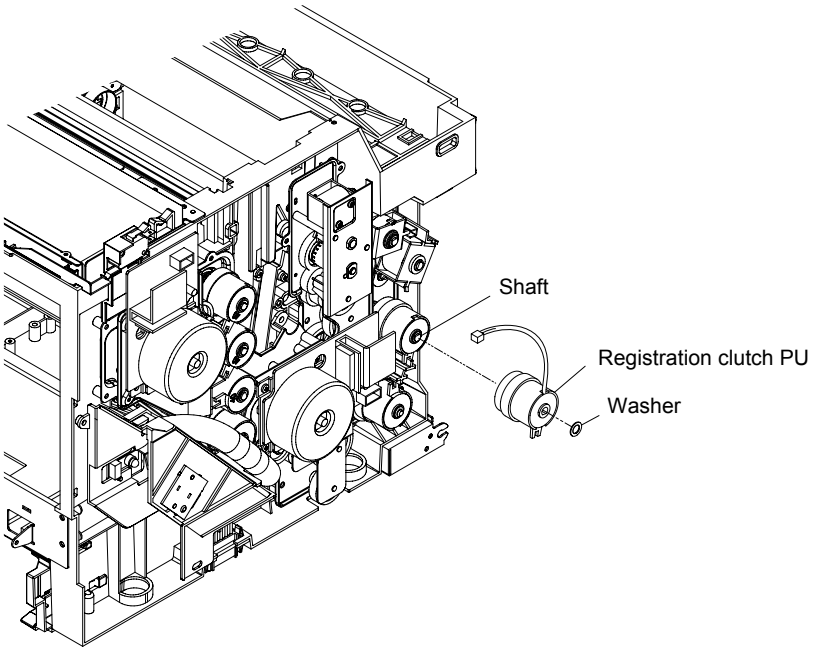


Fig.7-28

4.22 Paper Feed Clutch PU

1) Remove the washer fixing the paper feed clutch PU to the shaft.
2) Remove the paper feed clutch PU from the shaft.

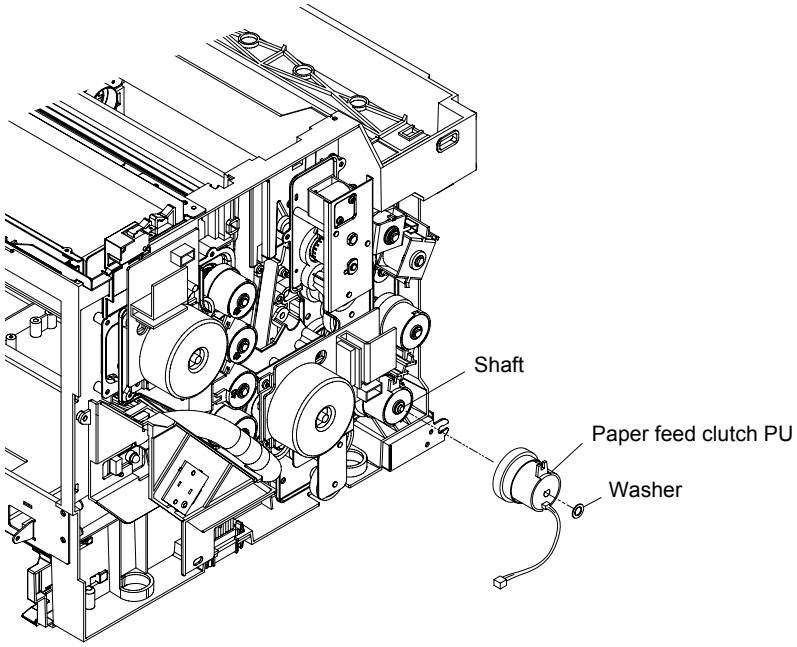


Fig.7-29

4.23 Developer Motor PU

1) Remove the setscrew (ST3x6, 4 pieces) fixing the developer motor PU.
2) Remove the developer motor PU from the developer drive assy PU.
   Note:
   Do not damage the output shaft, otherwise, it may cause the degradation of print quality.

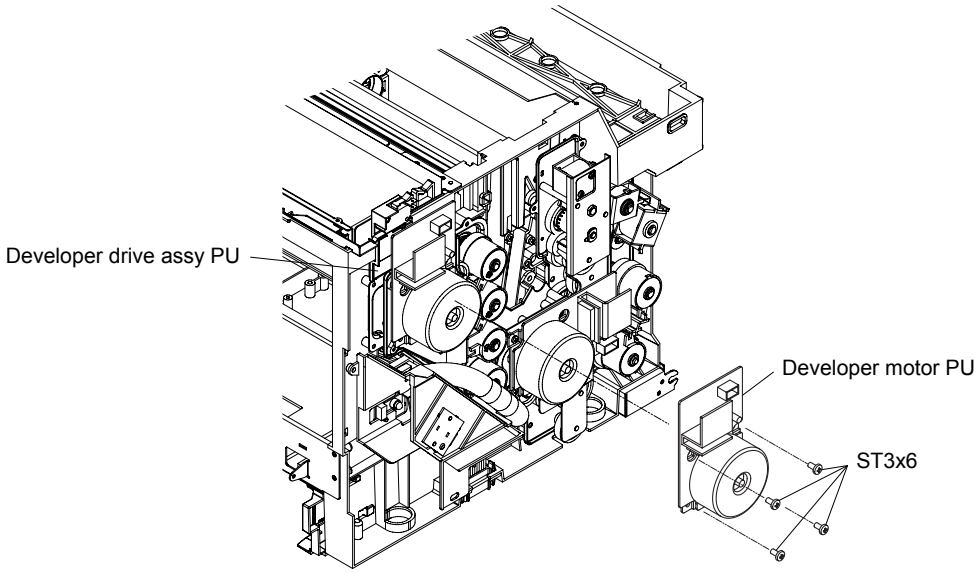


Fig.7-30

4.24 Waste Toner Holder Assy PU

1) Loosen the setscrew (BT3x8, 1 piece) of the plate.
2) Uprear (Do not remove) the waste toner feeder pipe.
3) Remove the setscrew (BT3x8, 1 piece and BT3x12, 1 piece) of the waste toner holder assy PU.
4) Remove the waste toner holder assy PU.
   The waste toner sensor PU is built in the holder assy PU, and therefore is replaced by a waste toner holder assy PU as the module.
5) Remove the base from the frame.

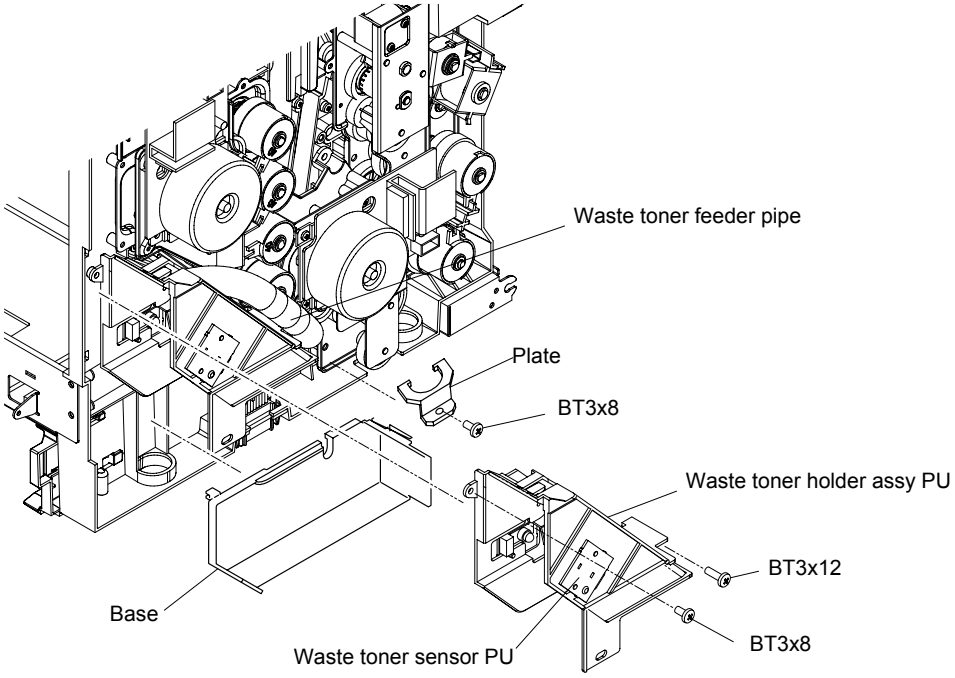


Fig.7-31

4.25 Developer Clutch PU (DCLY/DCLM/DCLC/DCLK)

1) Remove the washer fixing the developer clutch PU to the shaft.
2) Remove the developer clutch PU from the shaft.

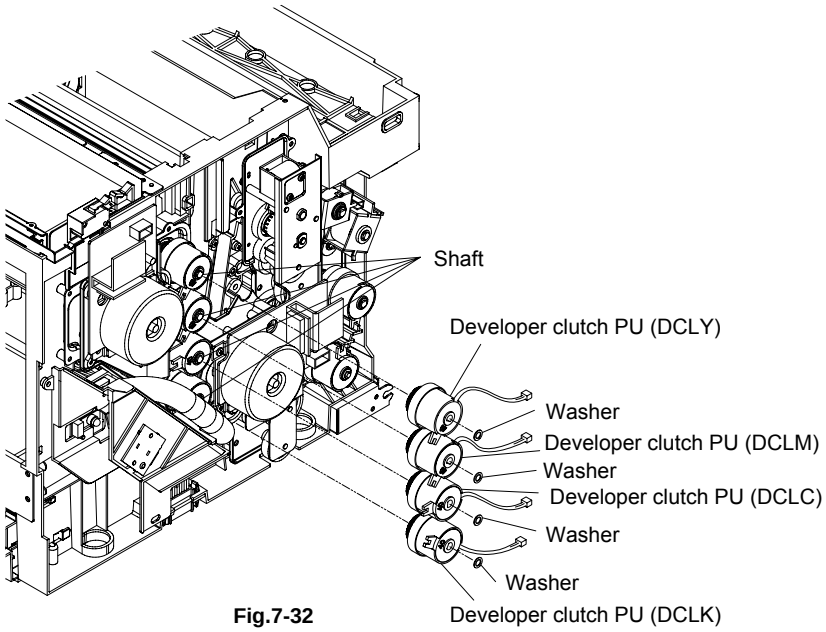


Fig.7-32

4.26 Developer Gear PU / Developer Drive Assy PU

1) Remove the washer (4 places) fixing the developer gear PU to the shaft.
2) Remove the developer gear PU (4 places) from the inside of the frame.
3) Remove the setscrew (BT3x8, 4 pieces) of the developer drive assy PU.
4) Remove the developer drive assy PU from the frame.

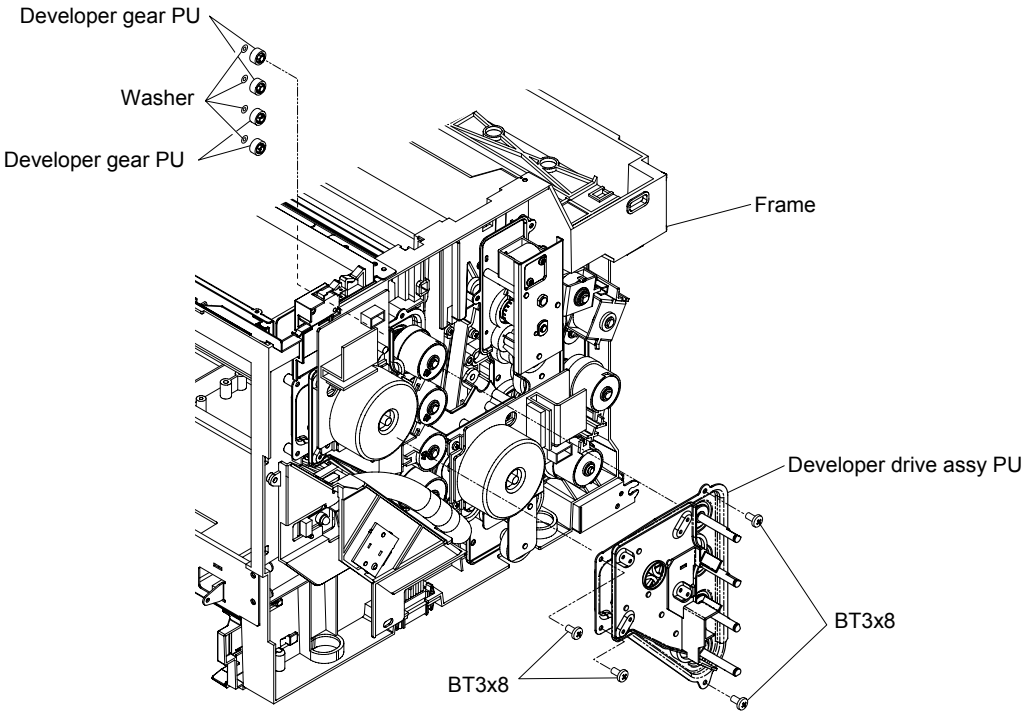


Fig.7-33

4.27 OPC Drive Gear Assy PU

1) Remove the setscrew (BT4x10, 4 pieces) of the OPC drive gear assy PU.
2) Remove the OPC drive gear assy PU from the frame.

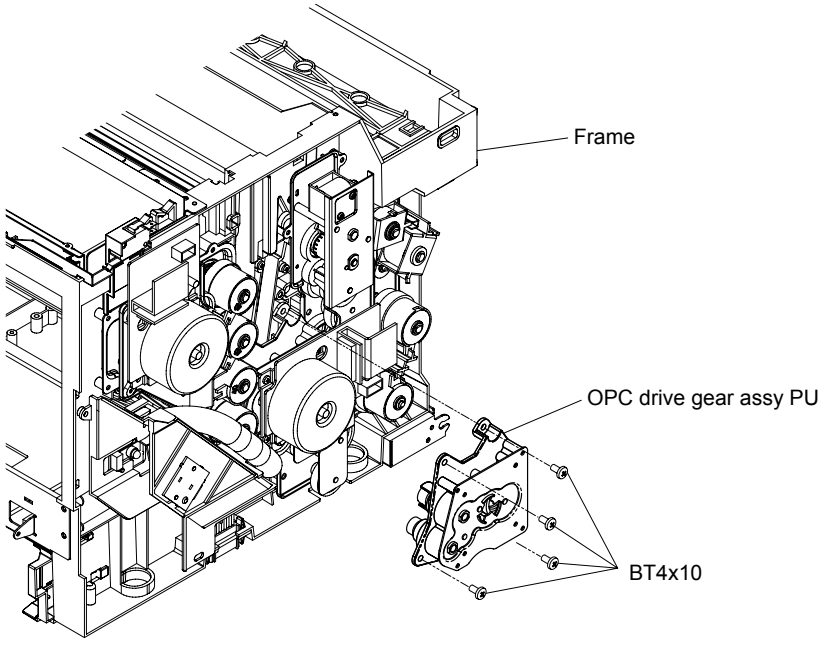


Fig.7-34

4.28 Main Drive Gear Assy PU

1) Close the paper exit unit.
2) Remove the setscrew (ST4x6, 1 piece) of the side base stay (R).
3) Open the paper exit unit.
4) Remove the setscrew (BT4x10, 3 pieces and ST3x6, 2 pieces) of the side base stay (R) to remove the side base stay.
5) Remove the setscrew (BT4x10, 4 pieces) fixing the main drive gear assy PU.
6) Pull out the main drive gear assy PU from the frame.

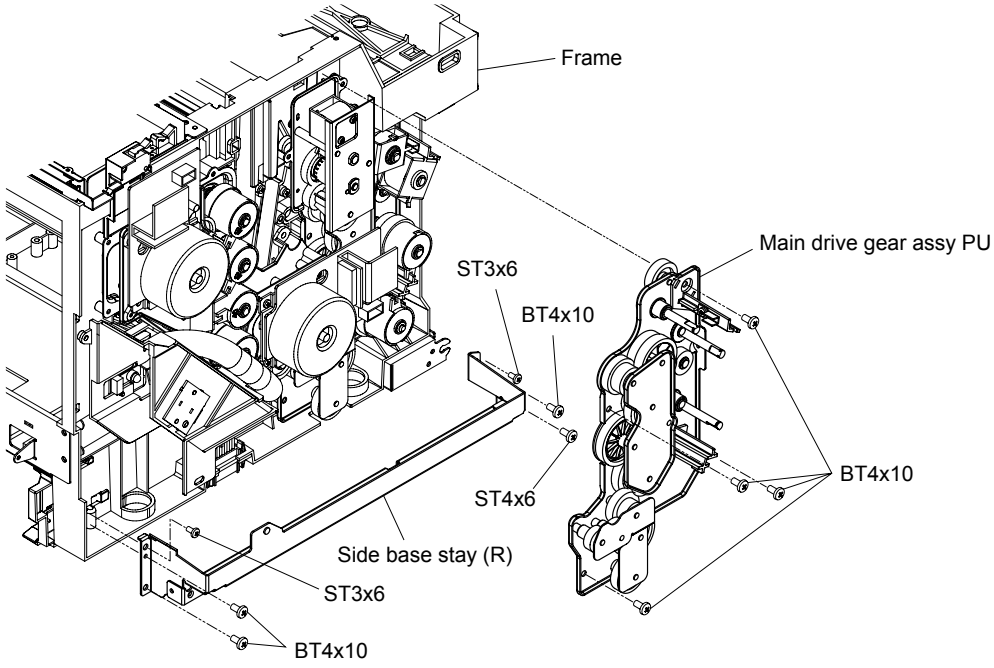


Fig.7-35

4.29 Waste Toner Feeder PU

1) Remove the setscrew (BT3x8, 2 pieces) to remove the cover C.
2) Remove the setscrew (BT3x8, 1 piece) to remove the plate.
3) Remove the waste toner feeder PU from the frame.

Note:

- *One end of waste toner feeder PU is supported by the hole inside the frame.*
- *In this instance, as the waste toner may leak from the toner feeder part in the pipe, prepare the waste toner tray to prevent the waste toner from falling on the floor.*
- *Clean the inside of the printer, if any stain, with the vacuum cleaner that is for the toner only.*
- *It would be better to apply a grounding wire to the vacuum cleaner to prevent static charge.*
- *Vacuum the toner remained in the waste toner feeder pipe.*

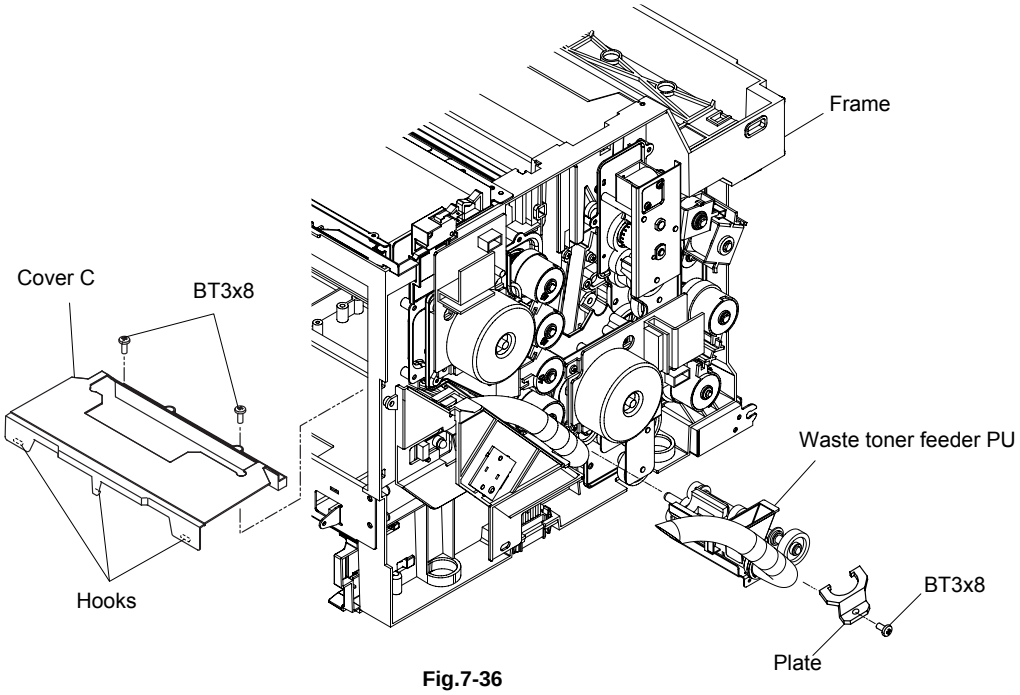


Fig.7-36

4.30 Toner Sensor PU (TPD)

1) Remove the setscrew (BT3x8 and BT3x6, 1each) of the toner sensor PU (TPD).
2) Remove the connector (inside the frame) connecting to the toner sensor PU (TPD).
3) Remove the toner sensor PU (TPD) from the frame.

<Confirmation Items>

- Is the grounding wire securely installed to the indicated position?
- Isn't any harness caught?
- Is the appropriate screw used?
- Is each output terminal of the HV power supply PU installed properly?
- After above confirmation, confirm the safety through the withstand voltage test or with the insulation tester.

> ***CAUTION***
>
> *Replacement of the toner sensor PU (TPD/TTR) requires the substantial disassembly and also reassem-bly. As the inappropriate assembly procedures and the wrong use of screws affect the product safety and the product performance, the appropriate assembly proce-dures and the caution items must be respected. (This work requires the insulation withstand voltage test and the measurement of the insulation resistance.)*

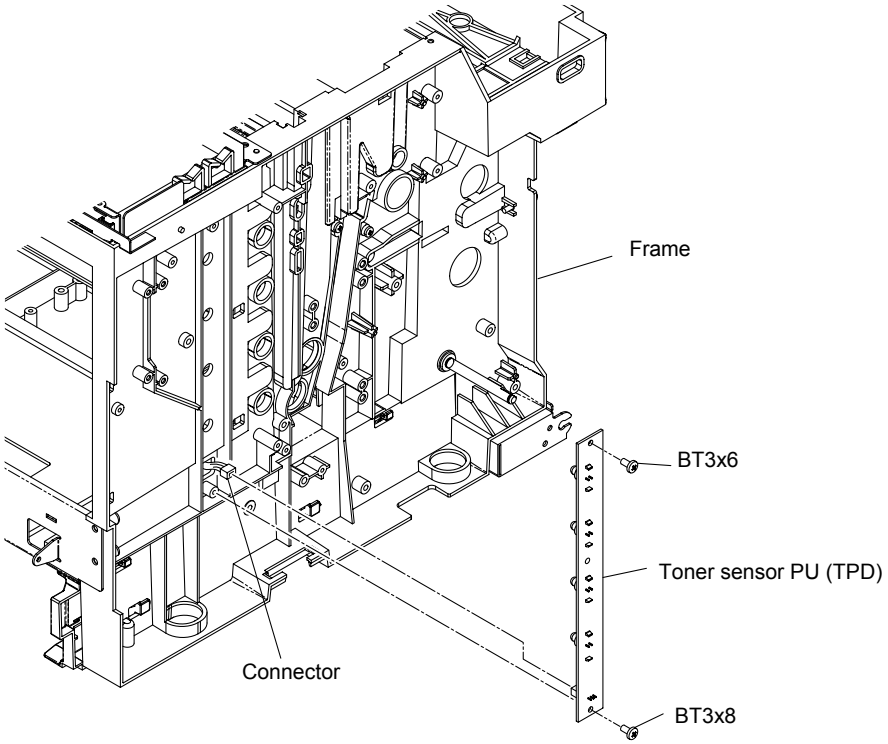


Fig.7-37

4.31 Right Toner Guide PU

1) Remove the setscrew (BT4x8, 1piece) of the right toner guide PU.
2) Remove the right toner guide PU from the frame.

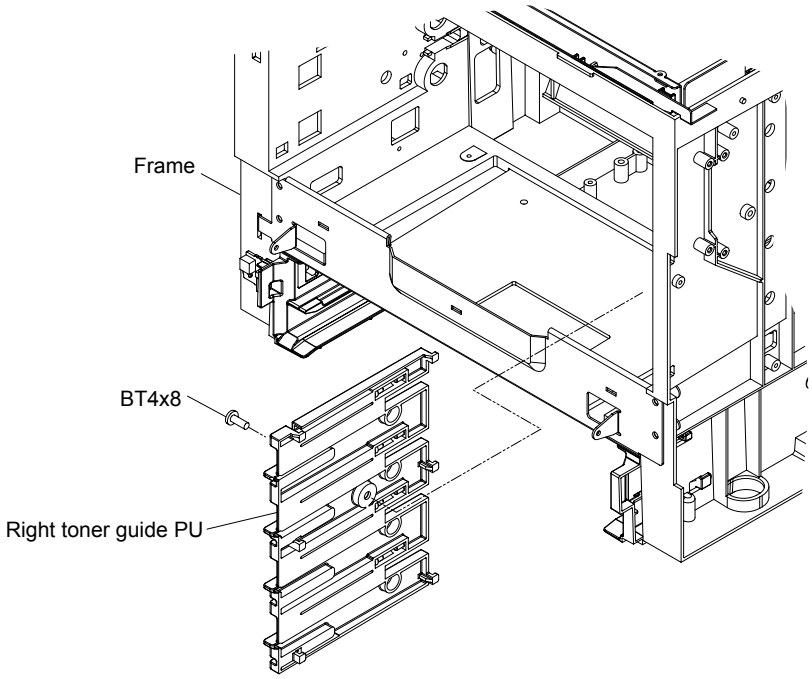


Fig.7-38

4.32 Laser Assy PU / Laser Unit Fan Assy PU

1) Disconnect the connector connecting to the laser unit fan assy PU.
2) Remove the setscrew (BT4x8, 1 piece) of the laser unit fan assy PU and remove the laser unit fan assy PU.

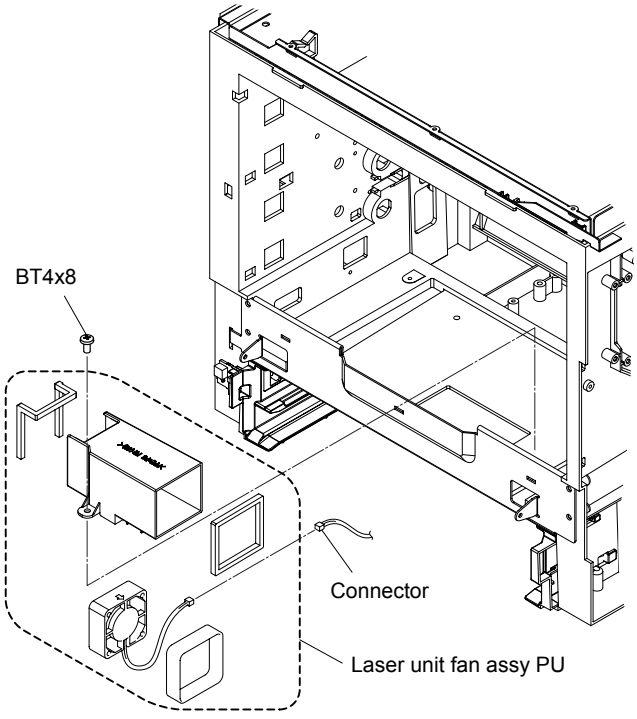


Fig.7-39

3) Remove the setscrew (TS3x12, 4 pieces) of the laser assy PU.
4) Disconnect the connector connecting to the laser assy PU.
5) Remove the laser assy PU from the frame.

CAUTION

- *Laser beam of the class IIIB is scanned in the laser assy PU. Do not attempt to disassemble the laser assy PU because it is dangerous.*
- *The laser assy PU for maintenance is replaceable by the unit. No internal adjustment is required for the laser assy PU.*
- *Test drive and confirmation of the drive must be done only after installing the cover to prevent the laser beam from being transmitted out of the printer.*

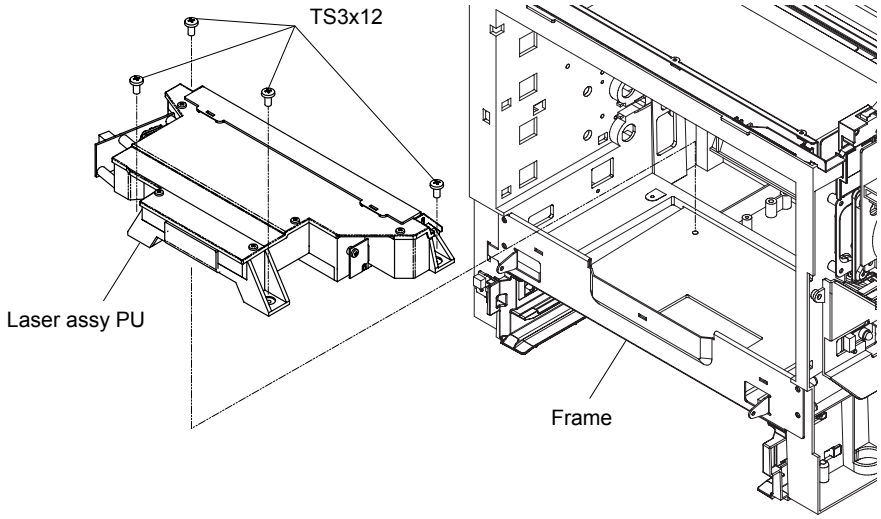


Fig.7-40

4.33 Inner Front Cover PU / Front Cover PU

1) Remove the setscrew (BT3x8, 8 pieces) of the front cover PU.
2) Remove the front cover PU from the inner front cover PU.
3) Remove the fixing band from the machine side.
4) Decline toward you the support pin (left and right) connecting to the frame with the front door unit closed, and then disconnect the connection.
5) Remove the inner front cover PU from the frame.

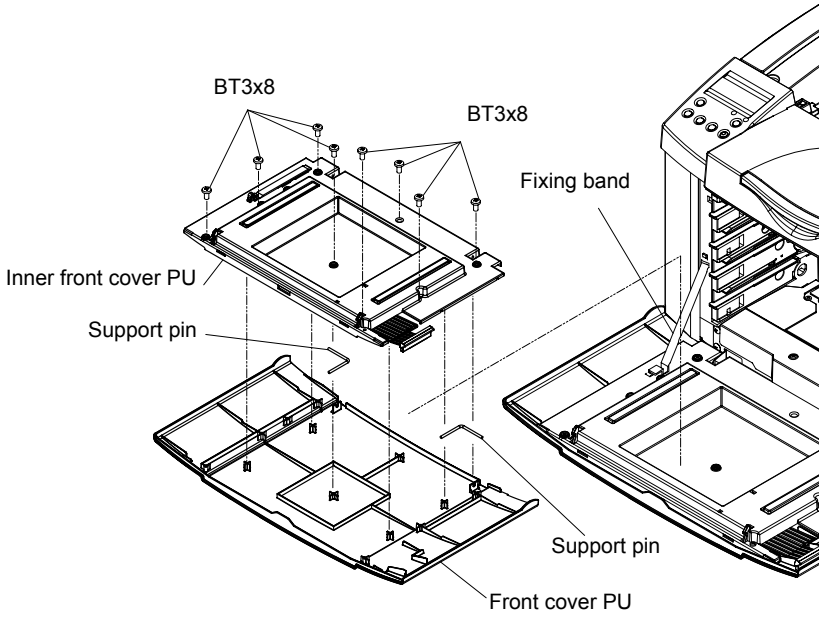


Fig.7-41

4.34 Right Tray Guide PU

1) Remove the setscrew (BT3x8, 2pieces) of the right tray guide PU.
2) Remove the right tray guide PU from the frame.

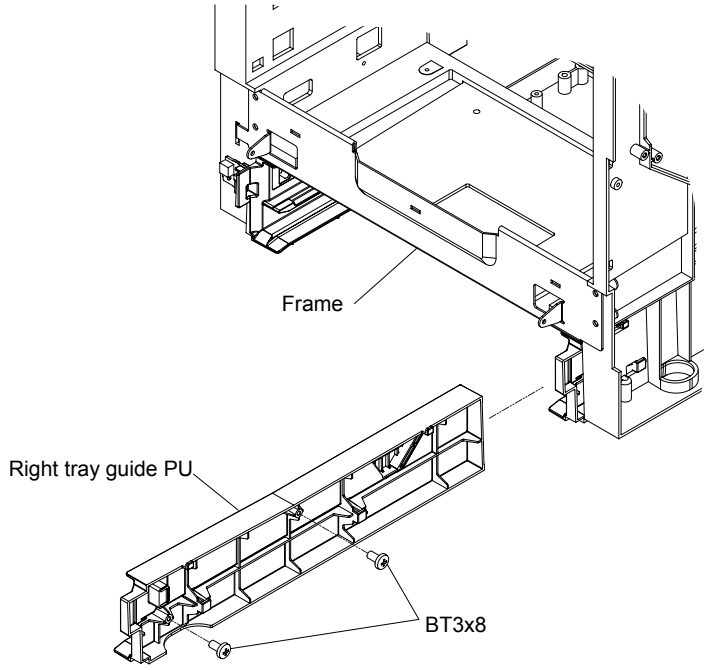


Fig.7-42

4.35 Engine Control Board PU

1) Disconnect all the connectors connecting to the engine controller board PU.
2) Remove the setscrew (ST3x6, 4 pieces) of the engine controller board PU.
3) Remove the engine controller board PU from the frame.

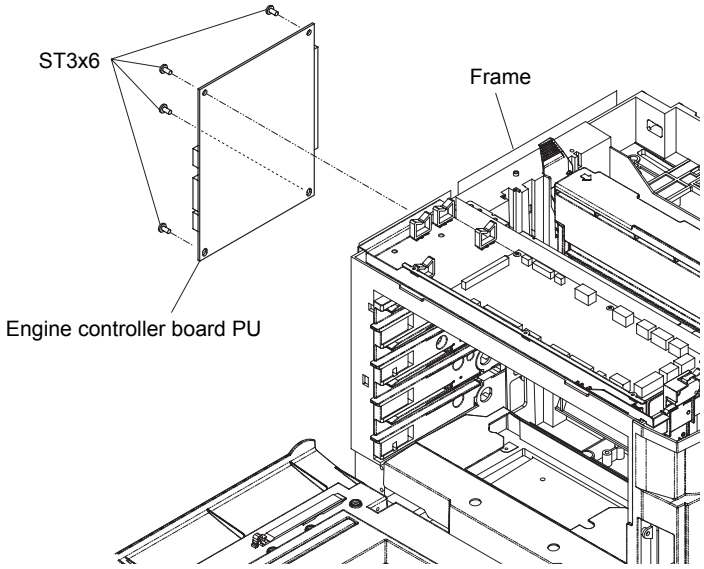


Fig.7-43

4.36 HV Power Supply PU

1) Unhook the two hooks and remove the air guide from the controller box.
2) Remove the setscrew (ST3x6, 4 pieces) of the shield cover (B).
3) Remove the shield cover (B) from the frame.
4) Remove the setscrew (ST3x6, 3 pieces) of the controller box.
5) Remove the controller box from the frame.
6) Remove the flat cable from the HV power supply PU.
7) Remove the setscrew (ST3x6, 4 pieces and BT3x8, 7 pieces) of the HV power supply PU. (Since 2 kinds of the screw are used, confirm the screw before using.)
8) Remove the HV power supply PU from the frame.

> ***CAUTION***
>
> *This is the replacement work of the unit that generates high voltage. Therefore this work should be done by the qualified personnel having the sound knowledge on the product safety.*

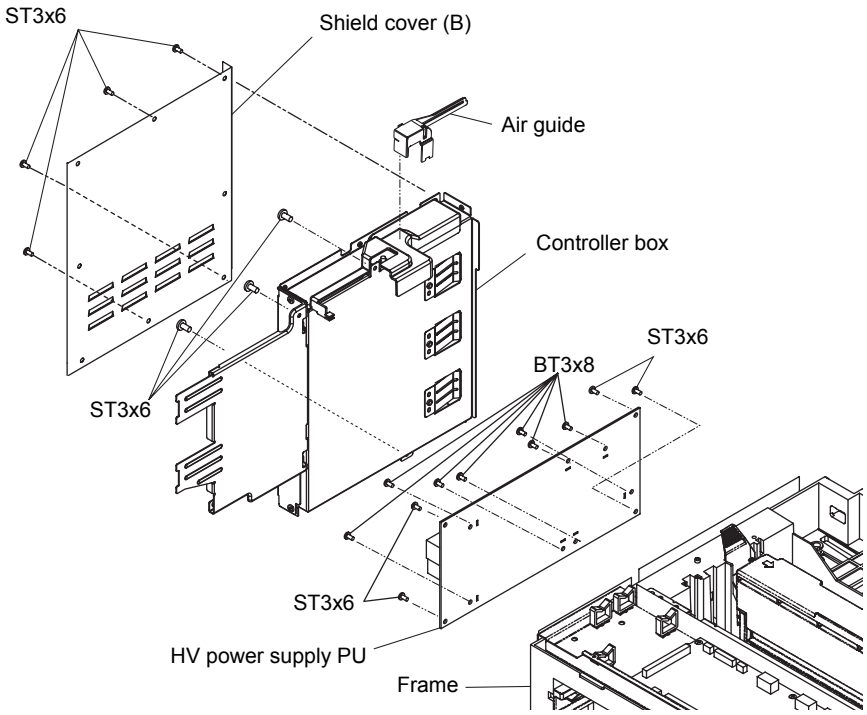


Fig.7-44

4.37 LV Power Supply PU / Power Supply Bracket PU Assy

1) Remove the setscrew (M4x6, 1 piece with star washer) of the grounding terminal.
2) Disconnect the connector of the switch harness from the LV power supply PU.
3) Remove the setscrew (ST3x6, 3 pieces) of the power supply bracket PU assy.
4) Remove the power supply bracket PU assy (with the switch).
5) Disconnect all the connectors connecting to the LV power supply PU.
6) Remove the setscrew with washer (7 pieces) of the LV power supply PU.
7) Remove the LV power supply from the frame.

> ***CAUTION***
> *This is the replacement work of the important parts pertaining to the product safety. This work must be done by the skillful personnel having the sound knowledge on the product safety and in the facility where the safety can be ensured. (This work requires the insulation withstand voltage test and the measurement of the insulation resistance.)*

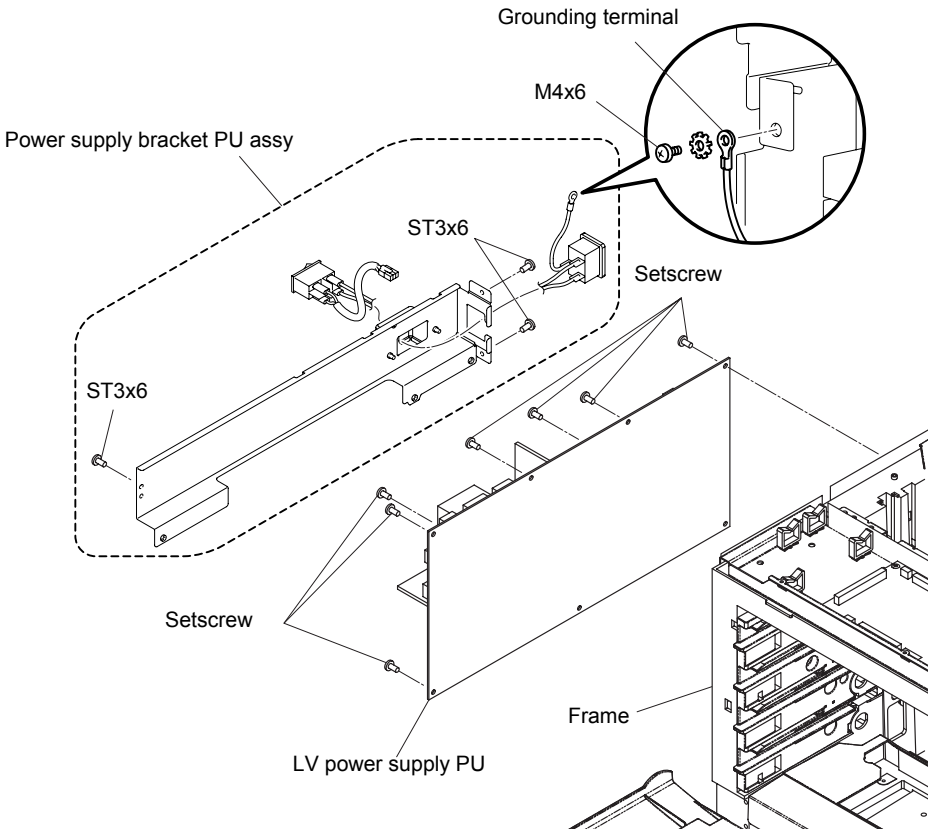


Fig.7-45

4.38 Fuser Connector PU

1) Remove the setscrew (ST3x6,4 pieces and BT3x8,3 pieces) of the shield base (LV).
2) Remove the shield base (LV) from the frame.
3) Remove the setscrew (M4x6, 1 pieces) of the ground wire.
4) Remove the setscrew (BT3x8 2 pieces and TS3x6, 2 pieces) of the shield base (HV).
5) Remove the shield base (LV) from the frame.
6) Disconnect the connector from the fuser connector PU.
7) Remove the setscrew (FST3x10, 2 pieces) of the fuser connector PU.
8) Remove the fuser connector PU from the shield base (HV).

> ***CAUTION***
>
> *This the replacement work of the unit generating high voltage, and therefore must be done by the skill personnel having the sound knowledge on the product safety.*

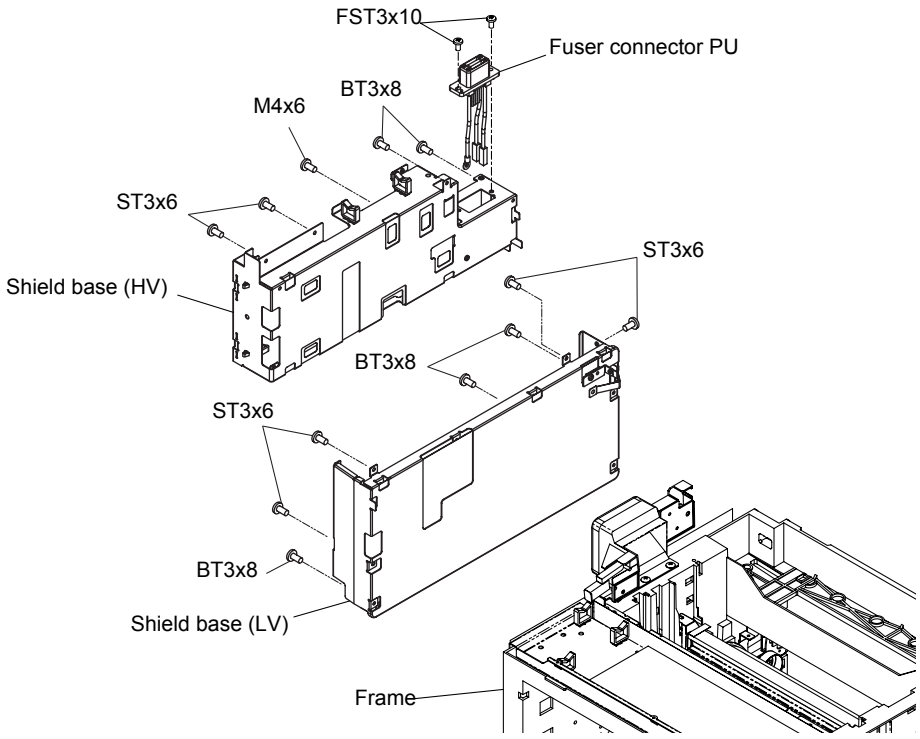
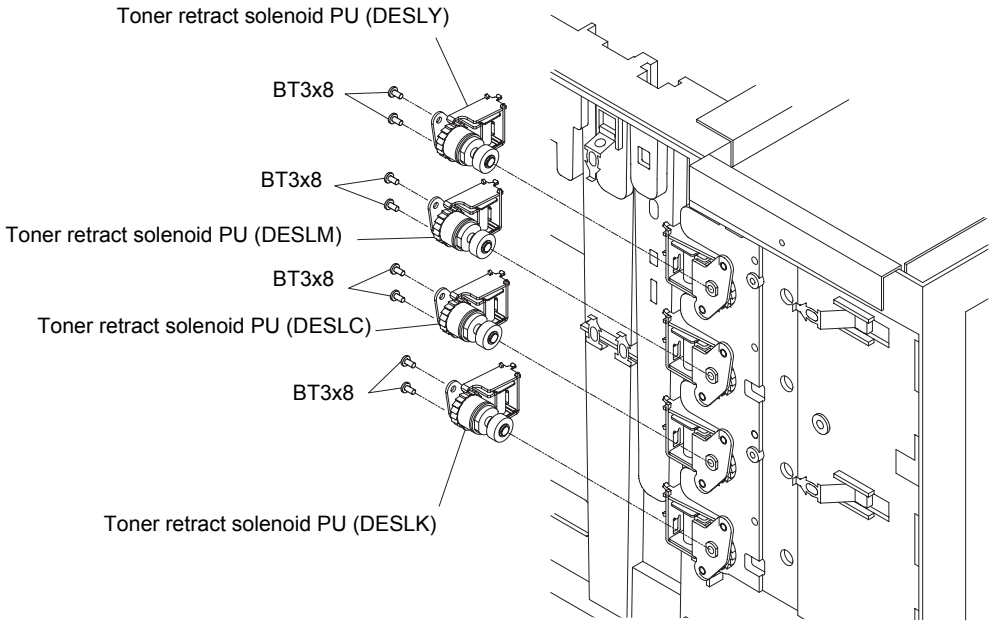


Fig.7-46

4.39 Toner Retract Solenoid PU (DESLY/DESLM/DESLC/DESLK) / Toner Retract Cam PU

1) Remove the harness connector of the developer retract solenoid PU.
2) Remove the setscrew (BT3x8, 2 pieces) of the developer retract solenoid PU.
3) Remove the toner retract solenoid PU and toner retract cam PU from inside of the frame.
4) Remove the toner retract cam PU from the toner retract solenoid PU (DESLY/DESLM/DESLC/DESLK).

> ***WARNING***
>
> *Replacement of the developer retract solenoid requires the substantial disassembly and also reassembly. As the inappropriate assembly procedures and the wrong use of screws affect the product safety and the product performance, the appropriate assembly procedures and the caution items must be respected. (This work requires the insulation withstand voltage test and the measurement of the insulation resistance.)*



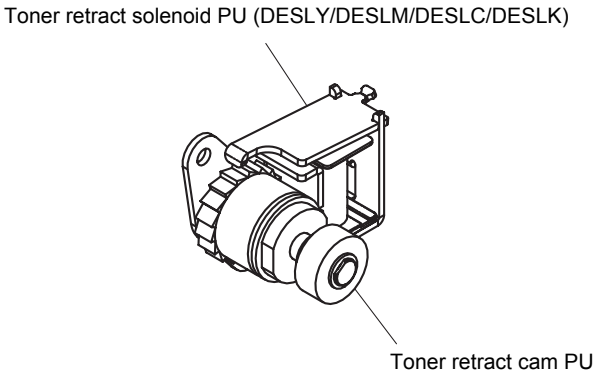


Fig.7-47

4.40 Toner Sensor PU (TTR)

1) Remove the setscrew (BT3x8 and BT3x6, 1 each) of the toner sensor PU (TTR).
2) Disconnect the connector connecting to the toner sensor PU (TTR).
3) Remove the toner sensor PU (TTR) from the frame.

<Confirmation Items>

- Is the grounding wire securely installed to the indicated position?
- Isn't any harness caught?
- Is the appropriate screw used?
- Is each output terminal of the HV power supply PU installed properly?
- After above confirmation, confirm the safety through the withstand voltage test or with the insulation tester.

CAUTION

Replacement of the toner sensor PU (TPD/TTR) requires the substantial disassembly and also reassem-bly. As the inappropriate assembly procedures and the wrong use of screws affect the product safety and the product performance, the appropriate assembly proce-dures and the caution items must be respected. (This work requires the insulation withstand voltage test and the measurement of the insulation resistance.)

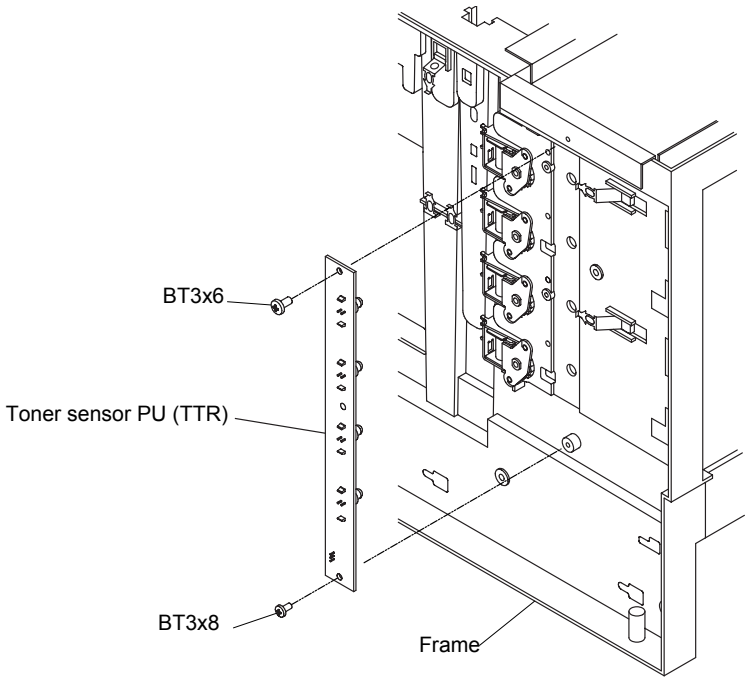


Fig.7-48

4.41 Toner Present Sensor PU

1) Remove the setscrew (BT3x6, 2 pieces) of the toner present sensor PU.
2) Remove the toner present sensor PU from the frame.

Note:
When installing the toner key sensor PU, pushing the sensor to the front side and then tighten the setscrew to fix the sensor.

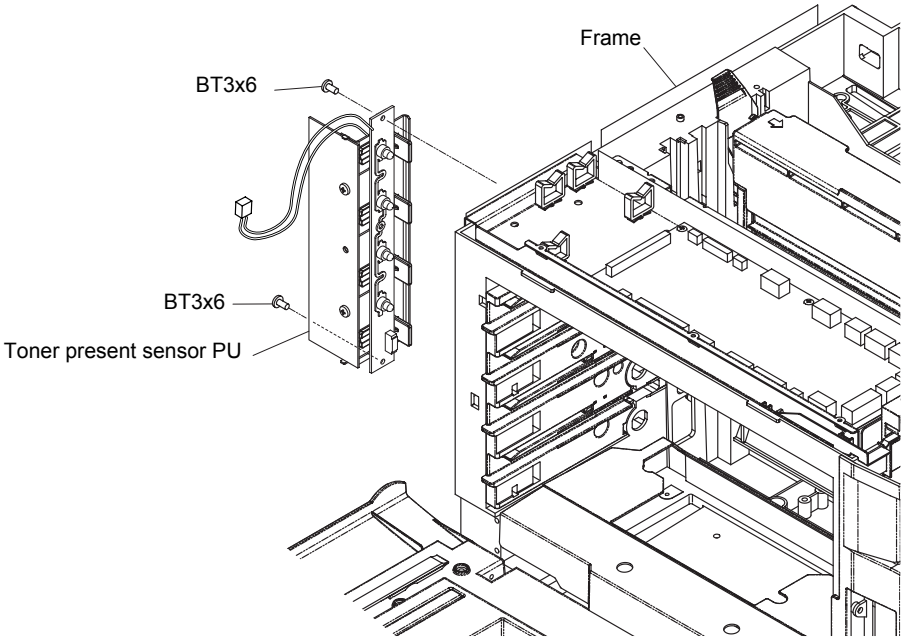


Fig.7-49

4.42 Belt Sensor

1) Remove the setscrew (ST3x6, 1 piece) of the sensor base (PB).
2) Remove the sensor base (PB) from the IOD base.
3) Disconnect the connector connecting to the belt sensor.
4) Remove the belt sensor from the sensor base (PB).

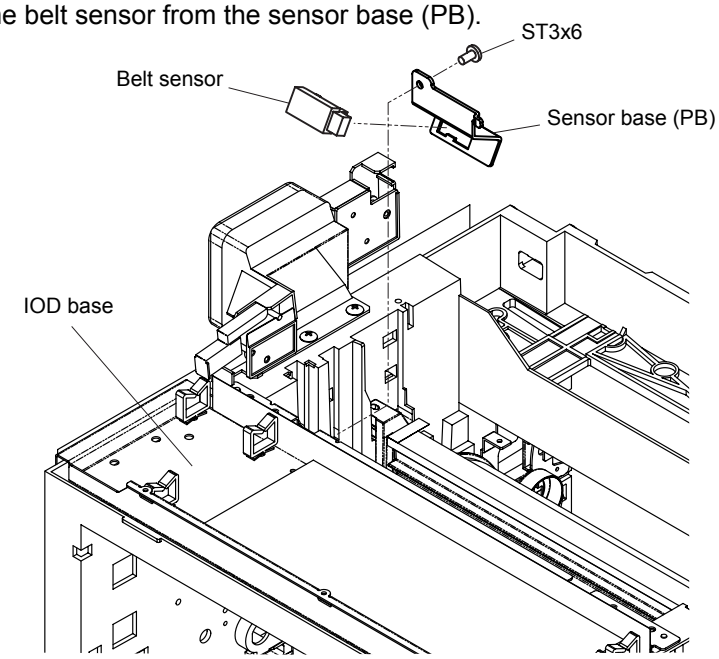


Fig.7-50

4.43 Left Tray Guide PU / Paper Size Sensor PU / Room Temp Thermistor PU

1) Remove the setscrew (BT3x8, 2 pieces) of the left tray guide PU.
2) Pull out the left tray guide PU from the cassette side.
3) Disconnect the connector connecting to the paper size sensor PU.
4) Remove the connector tape.
5) Remove the pin to remove the room temp termistor PU.
6) Disconnect the connector connecting to the room temp thermistor PU.
7) Remove the setscrew (BT3x8, 2 pieces) of the paper size sensor PU and then remove the paper size sensor PU from the left tray guide PU.

<Confirmation Items>

- Is the grounding wire securely installed to the indicated position?
- Isn't any harness caught?
- Is the appropriate screw used?
- After above confirmation, confirm the safety through the withstand voltage test or with the insulation tester.

WARNING

Replacement of the paper size sensor PU (PSU) requires the substantial disassembly and also reassembly. As the inappropriate assembly procedures and the wrong use of screws affect the product safety and the product performance, the appropriate assembly procedures and the caution items must be respected. (This work requires the insulation withstand voltage test and the measurement of the insulation resistance.)

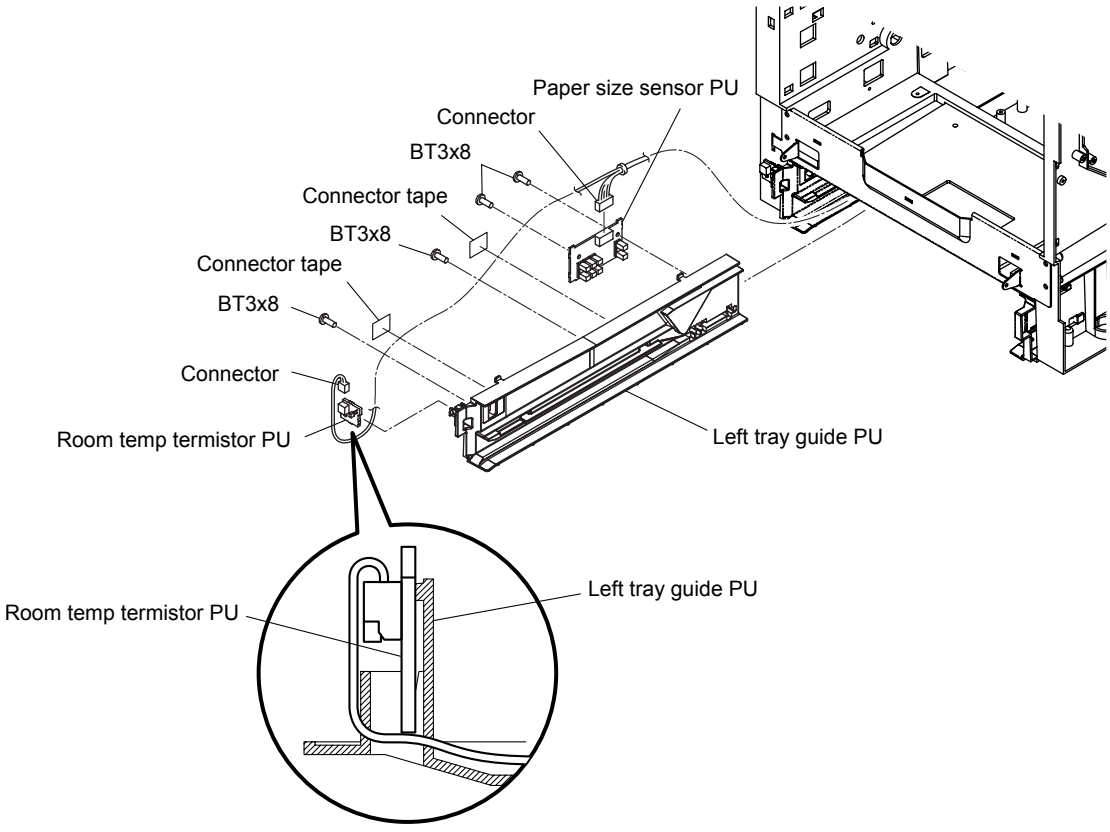


Fig.7-51

4.44 Left Toner Guide PU

1) Remove the setscrew (BT4x8, 1 piece and BT3x6, 2 pieces) of the left toner guide PU.
2) Remove the left toner guide PU from the frame.

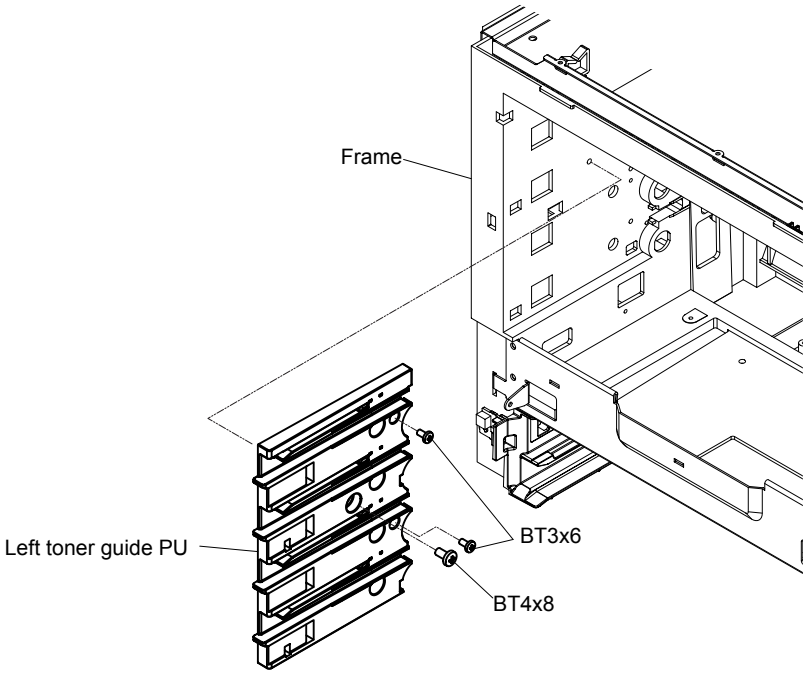


Fig.7-52

4.45 Upper Duplex Cover / Lower Duplex Cover

1) Close the paper exit unit.
2) Release the three hooks on the upper duplex cover to remove the upper duplex cover from the paper exit unit.
3) Release the three hooks on the lower duplex cover to remove the lower duplex cover from the paper exit unit.

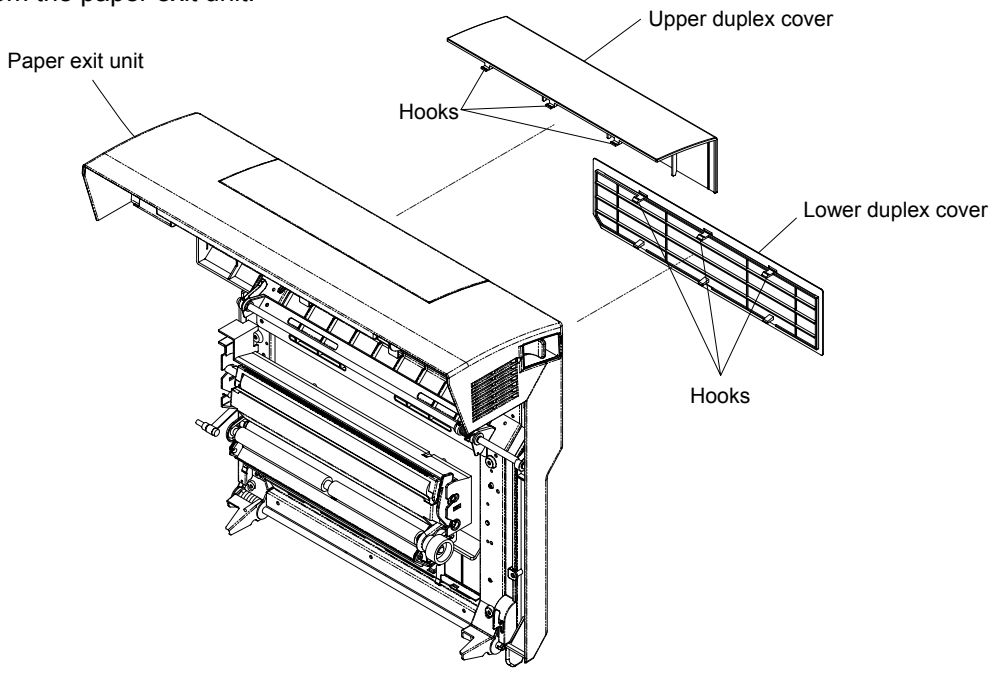


Fig.7-53

4.46 Paper Exit Unit

1) Open the paper exit unit.
2) Remove the setscrew (BT4x20, 1 piece and collar) from the support band.
3) Remove the setscrew (ST4x6, 1 piece) from the support plate. In this instance, maintain the paper exit unit closed.
4) Open the paper exit unit and pull its right side to the backside, so that the hinge shaft can be removed from the right-side base assy.
5) Slide the paper exit unit to the right side, to release the hinge shaft from the frame.
6) Pull the paper exit unit to the backside, and then remove it.

> **⚠ *CAUTION***
>
> *When pulling the rear cover Assy PU, make it slowly by releasing the tension of the rear unit support. Be careful about the abrupt return of the rear unit support due to the reaction of the spring.*

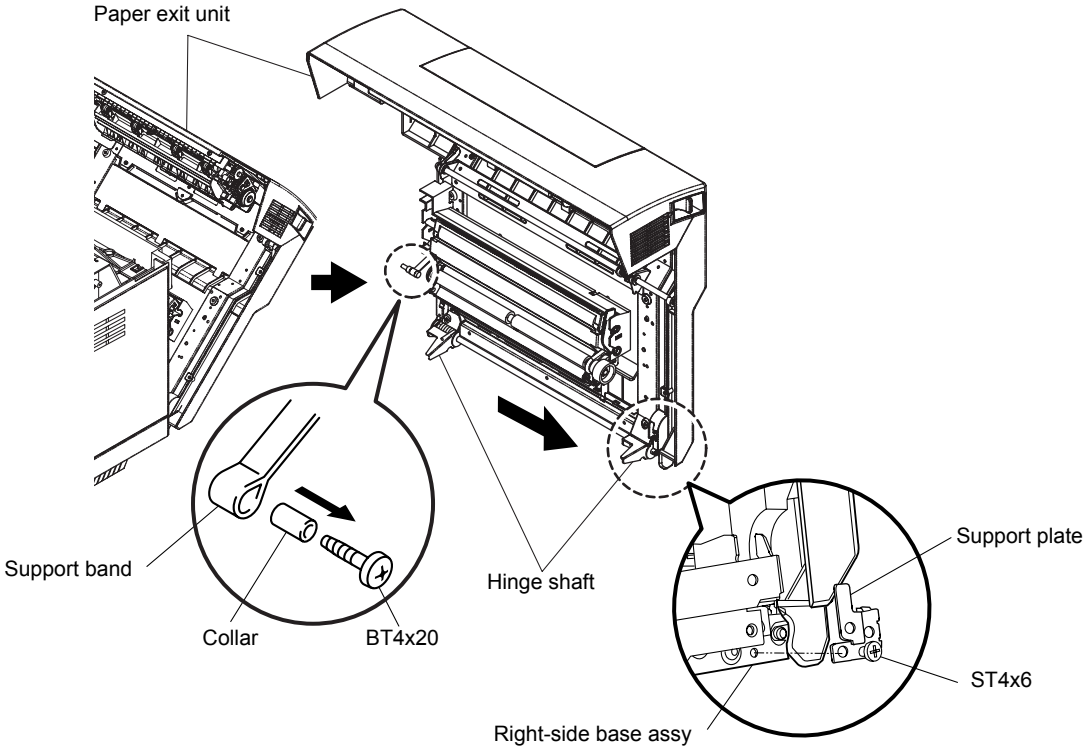


Fig.7-54

4.47 Transfer Roller Assy PU

1) Remove the transfer roller assy PU.

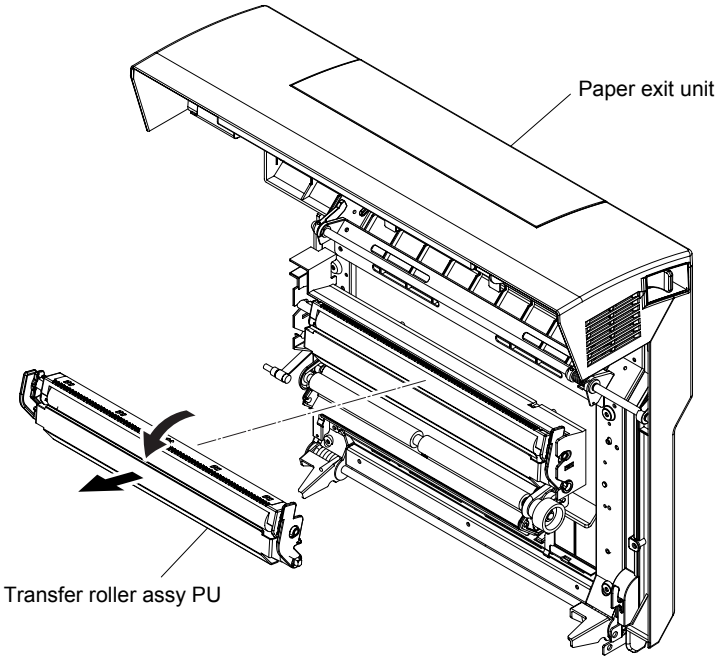


Fig.7-55

4.48 Transfer Base Assy PU

1) Remove the setscrew (ST3x6, 3 pieces and BT3x8, 3 pieces) of the transfer base assy PU.
2) Remove the transfer base assy PU.

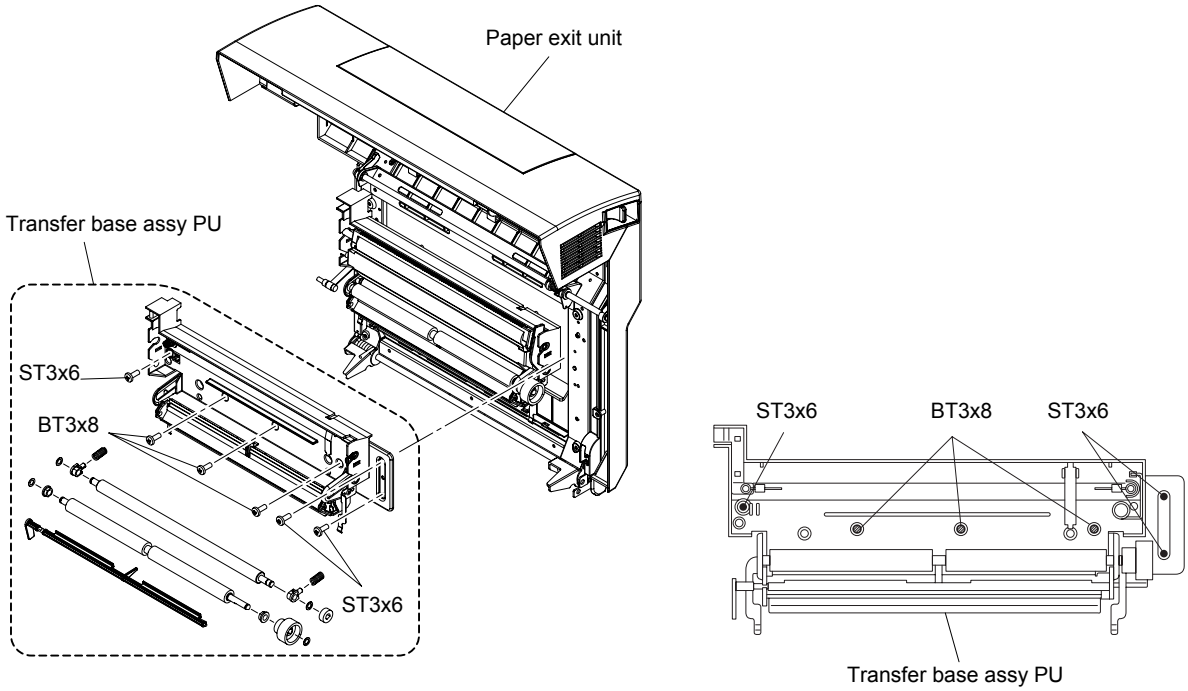


Fig.7-56

4.49 Registration Roller Assy PU

1) Remove the washer, coupling gear and bearing from the registration roller assy PU.
2) Remove the washer and bearing of counter-coupling gear side.
3) Remove the registration roller assy PU from the transfer unit base.

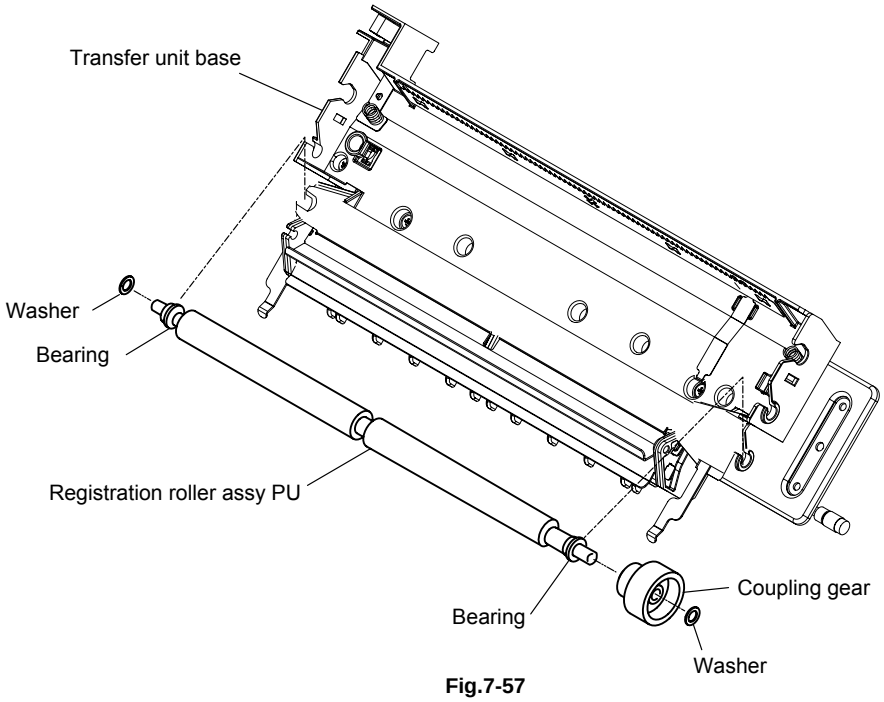


Fig.7-57

4.50 Registration Actuator PU

1) Remove the registration actuator PU that is installed to the transfer unit base.

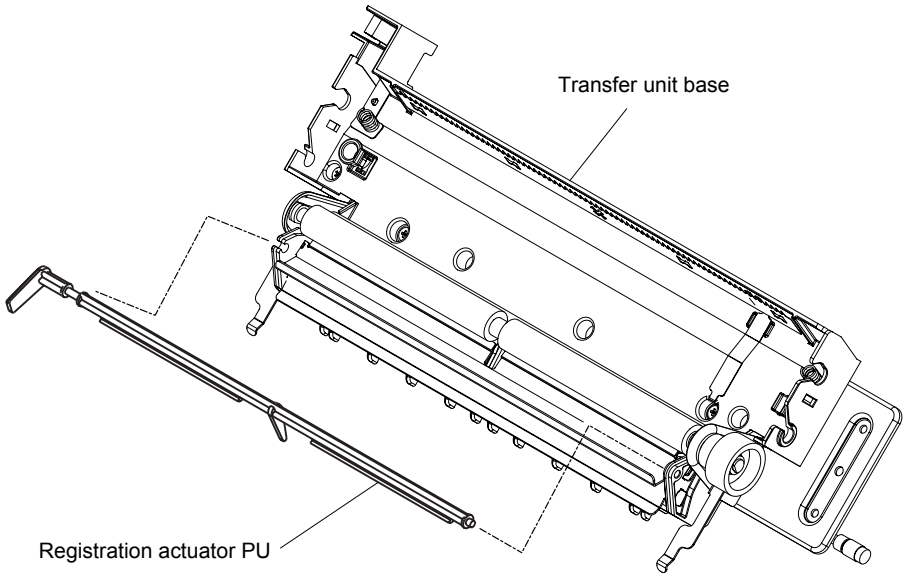


Fig.7-58

4.51 Transfer Roller Guide PU

1) Disconnect the connection of the arm ring.
2) Remove the setscrew (ST3x6, 4 pieces) of the transfer roller guide PU.
3) Remove the transfer roller guide PU from the rear cover.

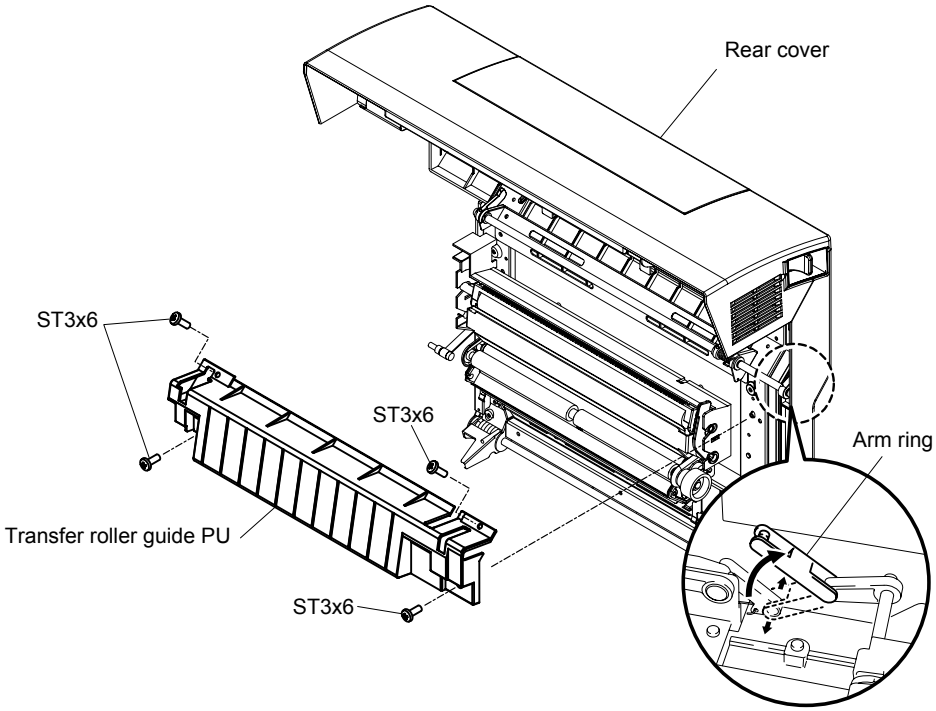


Fig.7-59

4.52 Exit Guide Assy PU / Exit Drive Assy PU / Exit Idle Roller Assy PU

1) Remove the connector cover from the exit guide assy PU.
2) Disconnect the two connectors connecting to the exit guide assy PU.
3) Remove the exit guide assy PU by removing the setscrew (ST3x6, 2 pieces and FST3x10, 2 pieces).

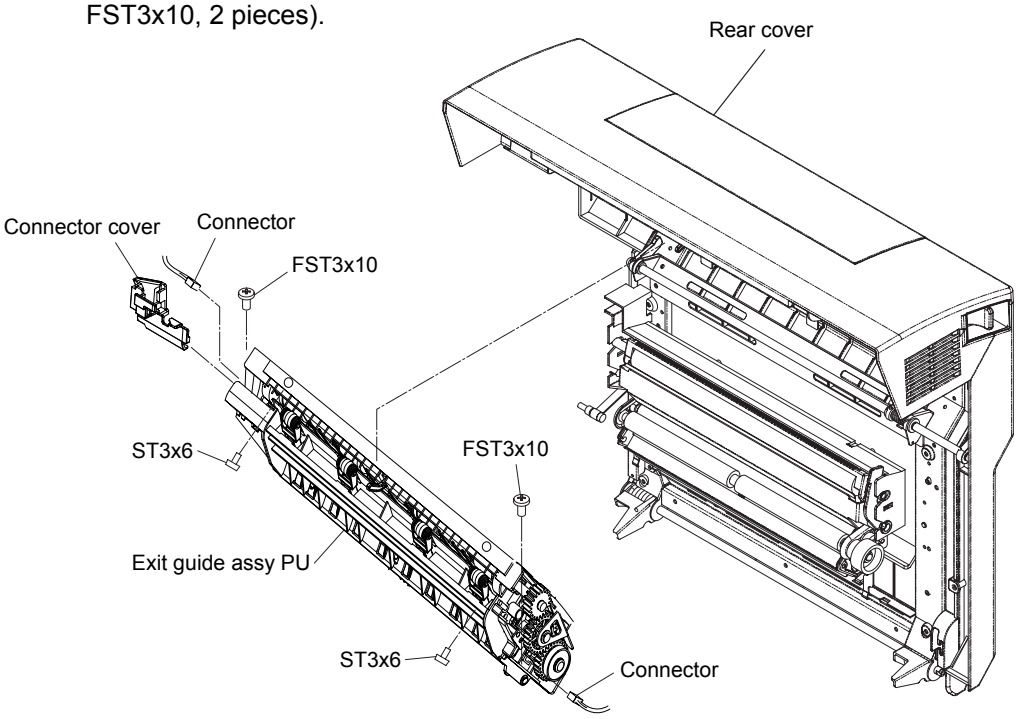


Fig.7-60

4) Remove the spring from the exit drive assy PU.
5) Remove the setscrew (A) (BT3x12, 1 piece and BT3x8, 1 piece) and collar of the exit drive assy PU. (Remove the setscrew by turning the gear holder.)
6) Remove the exit drive assy PU from the exit guide assy PU.
7) Remove the setscrew (B) (BT3x12, 1 piece) and collar of the rear cover latch arm.
8) Remove the rear cover latch arm from the exit guide assy PU.
9) Remove the setscrew (ST3x8, 2 pieces) of the exit idle roller assy PU.
10) Remove the exit idle roller assy PU from the exit guide assy PU.

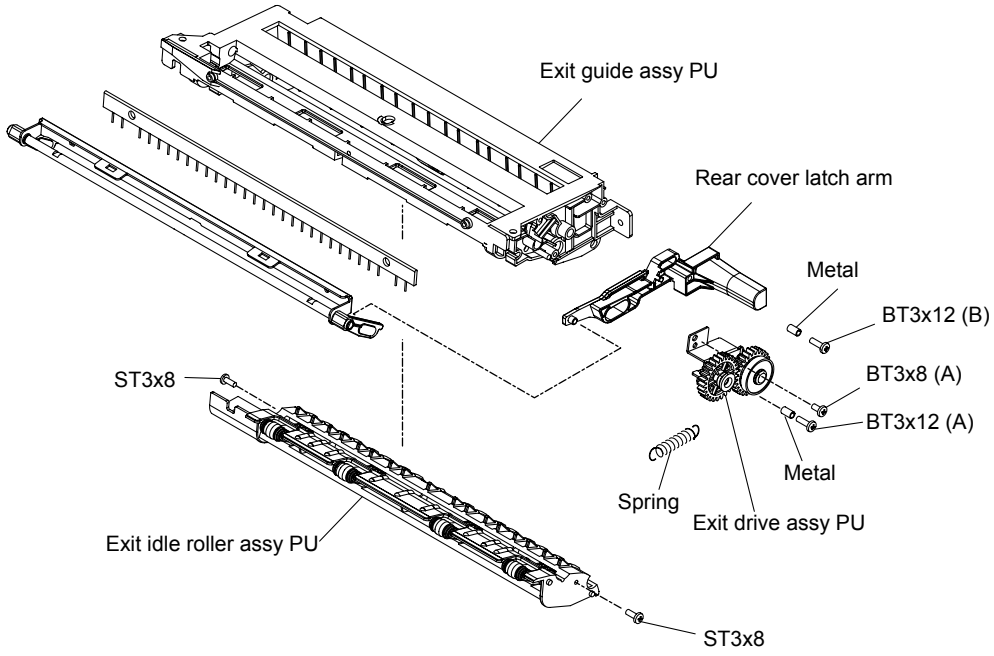


Fig.7-61

4.53 Paper Sensor (PFUL)

1) Remove the paper sensor (PFUL) from the exit idle roller assy PU.

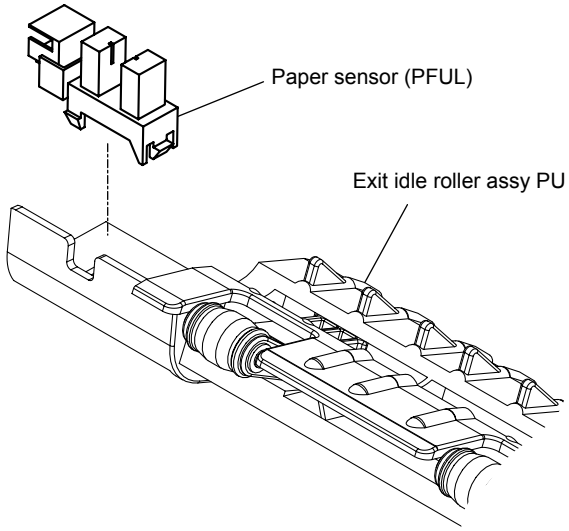


Fig.7-62

4.54 Exit Roller Assy PU / Paper Exit Actuator PU

1) Pull out the coupling gear from the exit roller assy PU.
   (This gear is the snap-in type.)
2) Remove the actuator from the paper exit actuator PU.
3) Remove the roller shaft sagging.
   (This roller shaft sagging.)
4) Remove the paper exit actuator PU.
5) Remove the washer (a) and bearing (a) from the exit roller assy PU.
6) Remove the washer (b) and bearing (b) from the exit roller assy PU.
7) Remove the exit roller assy PU from the exit guide assy PU.

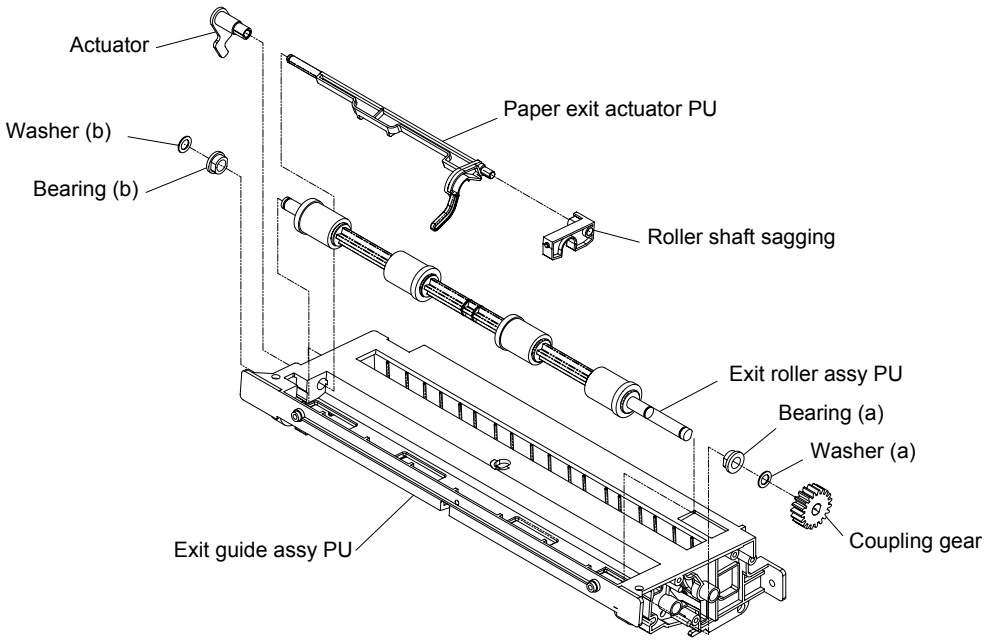


Fig.7-63

4.55 Fuser Exit Actuator PU

1) Remove the washer.
2) Slide the fuser exit actuator PU to the arrow direction.
3) Remove the fuser exit actuator PU from the exit guide assy PU.

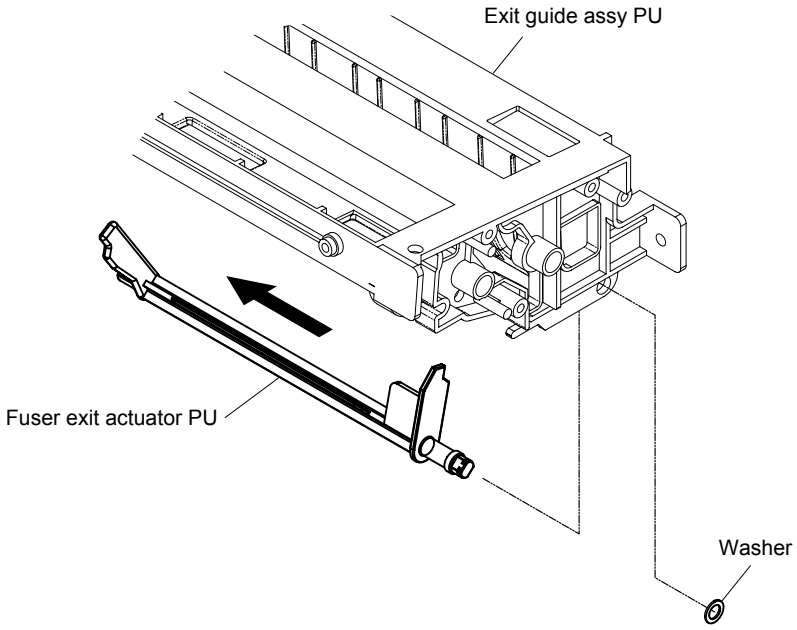


Fig.7-64

4.56 Paper Sensor (PT2)

1) Remove the paper sensor (PT2) from the exit guide assy PU.

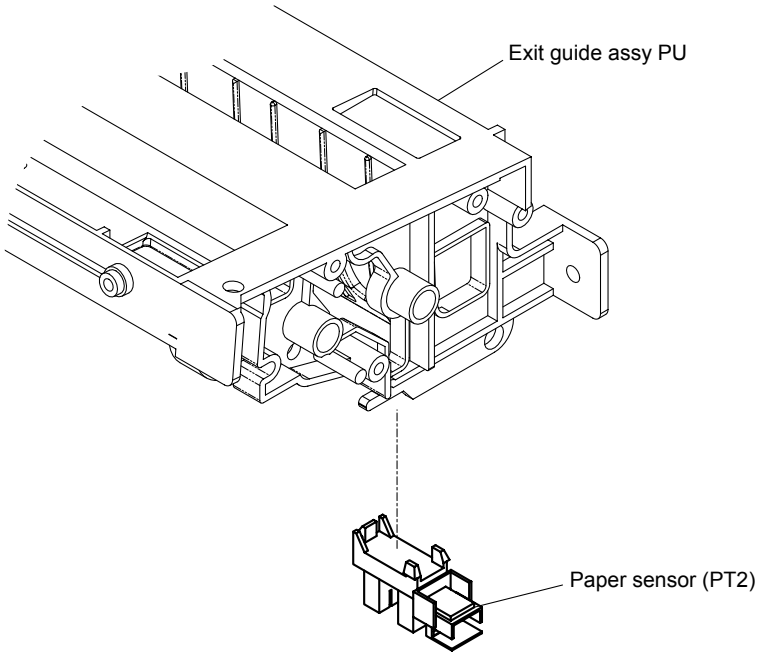


Fig.7-65

4.57 Discharging Brush PU

1) Remove the hinge cover.
2) Remove the setscrew (BT3x8, 2 pieces) of the shaft holder.
3) Remove the shaft holder from the exit guide assy PU.
4) Remove the discharging brush PU from the exit guide assy PU.

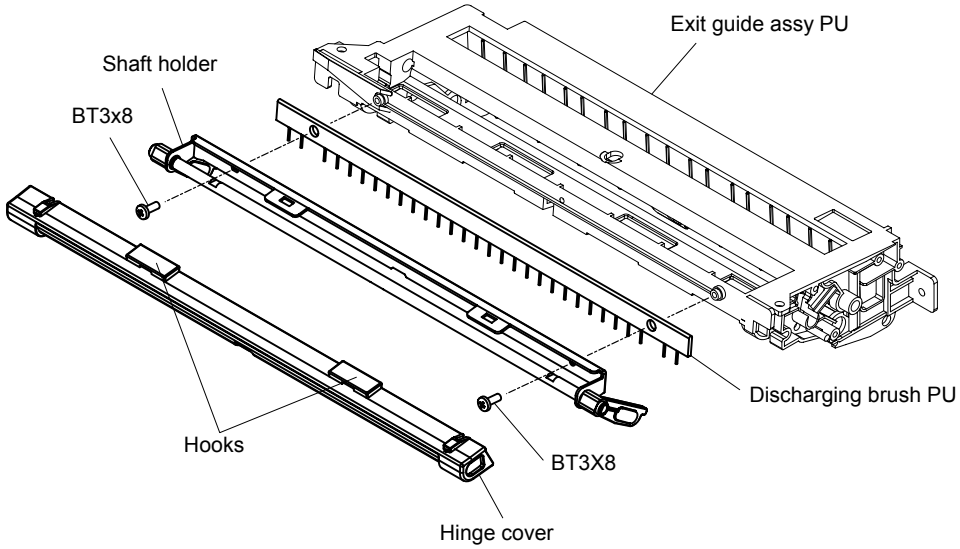


Fig.7-66

4.58 Exit Fan PU / Exit Fan Duct PU

1) Remove the setscrew (ST3x6, 2piece) of the harness cover.
2) Remove the harness cover from the rear cover.
3) Disconnect the connector connecting to the exit fan PU.
4) Remove the setscrew (BT3x8, 1 piece) of the exit latch (L) to remove the exit latch (L).
5) Remove the setscrew (BT3x8 and ST3x6, 1 piece each), then remove the fan support.
6) Remove the setscrew (BT3x8, 1 piece and ST3x6, 2 piece) of the exit fan assy PU.
7) Remove the paper exit fan assy PU.
8) Remove the exit fan PU from the exit fan duct PU.

Note:
When installing the fan, make the label side face outwards.

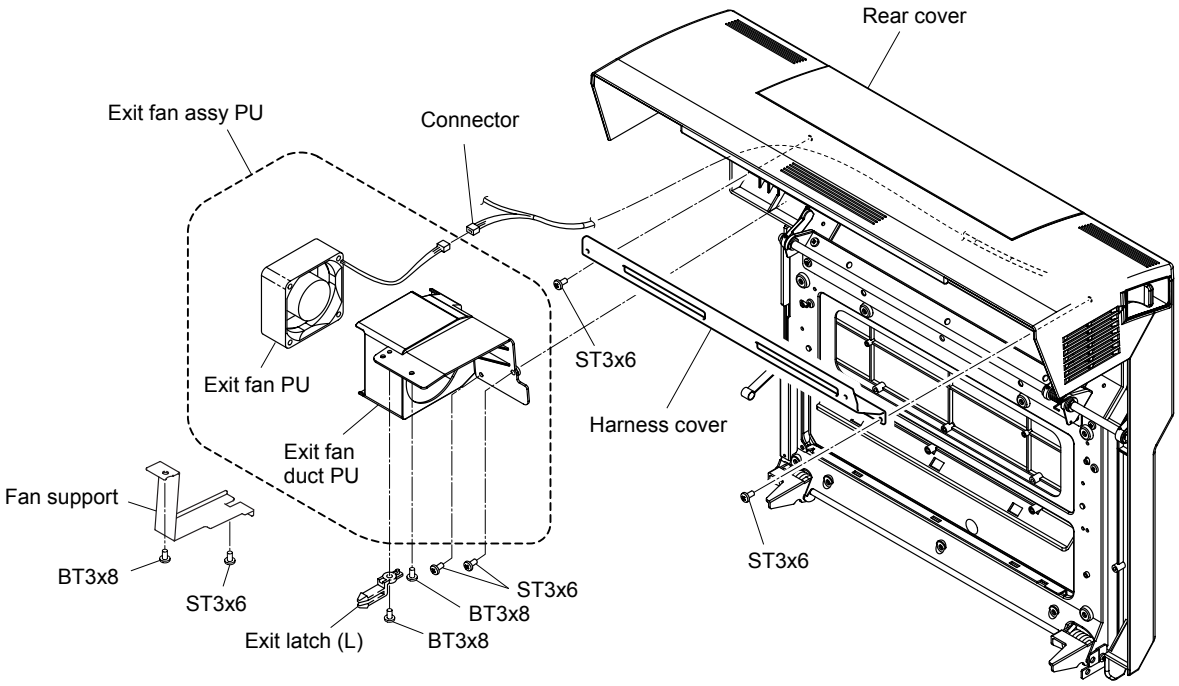


Fig.7-67

4.59 Rear Cover Latch Assy PU

1) Remove the setscrew (BT3x8, 1 piece) of the exit latch (R) to remove the exit latch (R).
2) Remove the setscrew (BT3x8, 1 pieces and ST3x6, 1 piece) of the rear cover latch assy PU.
3) Remove the rear cover latch assy PU from the rear cover.

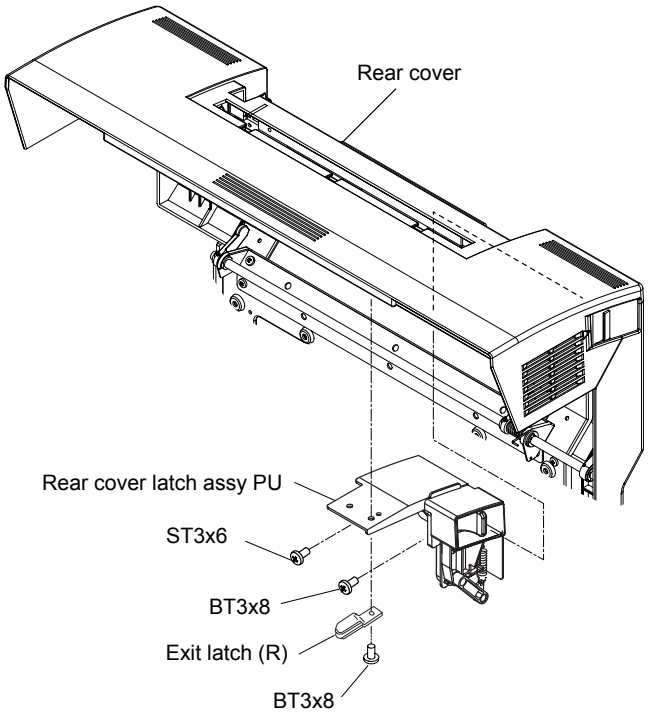


Fig.7-68

4.60 Paper Guide (A) PU

1) Remove the setscrew (BT3x8, 2 pieces) of the paper guide (A) PU.
2) Remove the paper guide (A) PU.

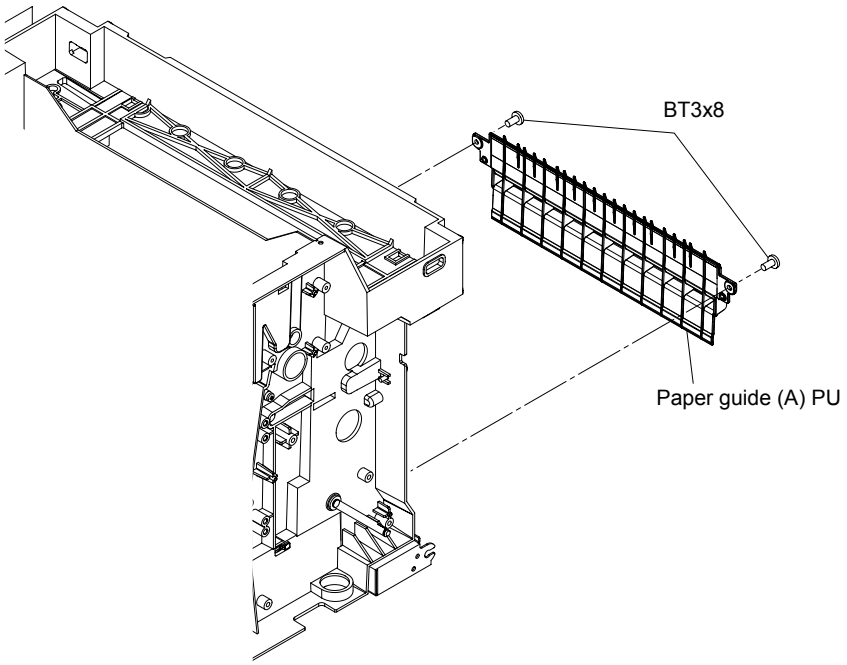


Fig.7-69

4.61 Paper Guide (B) PU

1) Remove the setscrew (BT3x8, 2 pieces) of the paper guide (B) PU.
2) Remove the paper guide (B) PU.

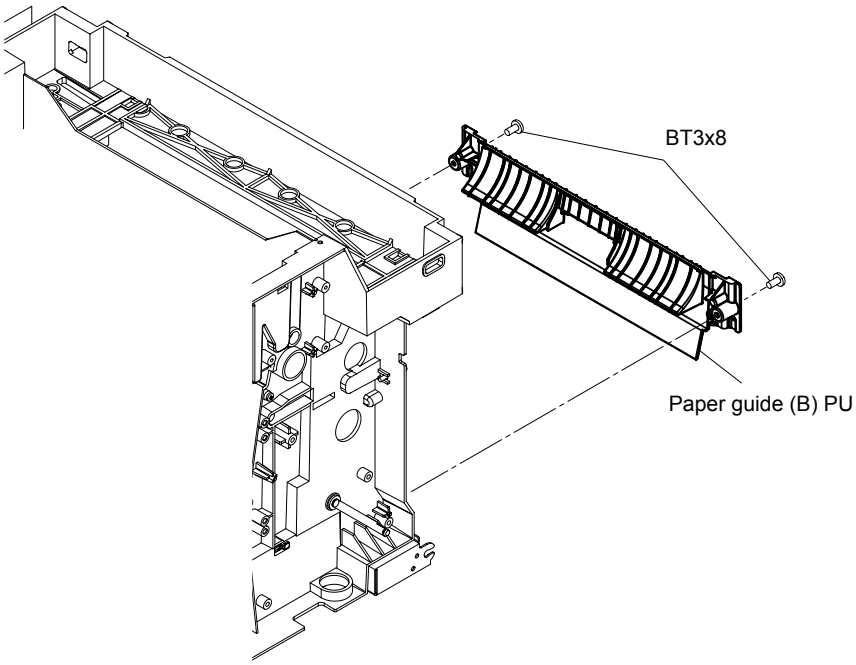


Fig.7-70

4.62 Paper Guide (C) PU / Paper Sensor (PT1, PEU) / OHP Sensor PU / Tray Empty Actuator PU

1) Disconnect the connector connecting to the paper sensor (PT1).
2) Remove the setscrew (BT3x8, 2 pieces) of the paper guide (C) PU.
3) Disconnect the connector connecting to each sensor of the paper guide (C) PU.
4) Remove the paper guide (C) PU from the frame.
5) Remove the paper sensor (PT1) from the paper guide (C) PU.
6) Remove the setscrew (BT3x8, 2 pieces) fixing the OHP sensor PU.
7) Remove the OHP sensor PU (Board) from the paper guide (C) PU.
8) Remove the tray empty actuator PU from the paper guide (C) PU.
9) Remove the harness from the paper sensor (PEU).
10) Remove the paper sensor (PEU) from the paper guide (C) PU.

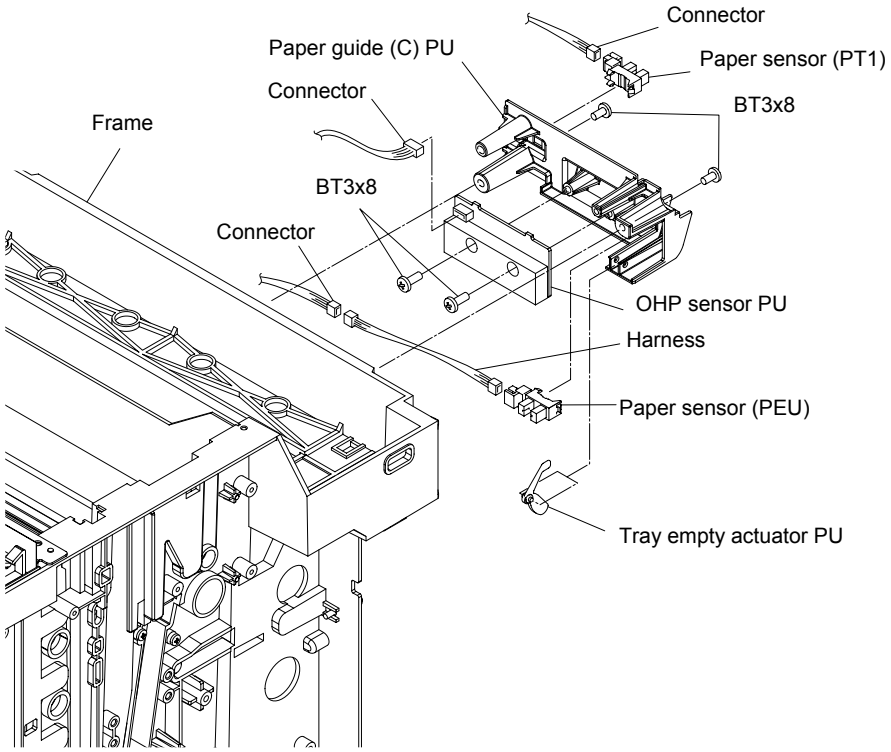


Fig.7-71

4.63 Paper Guide (D) PU

1) Remove the setscrew (BT3x8, 2 pieces) of the paper guide (D) PU.
2) Remove the paper guide (D) PU from the frame.

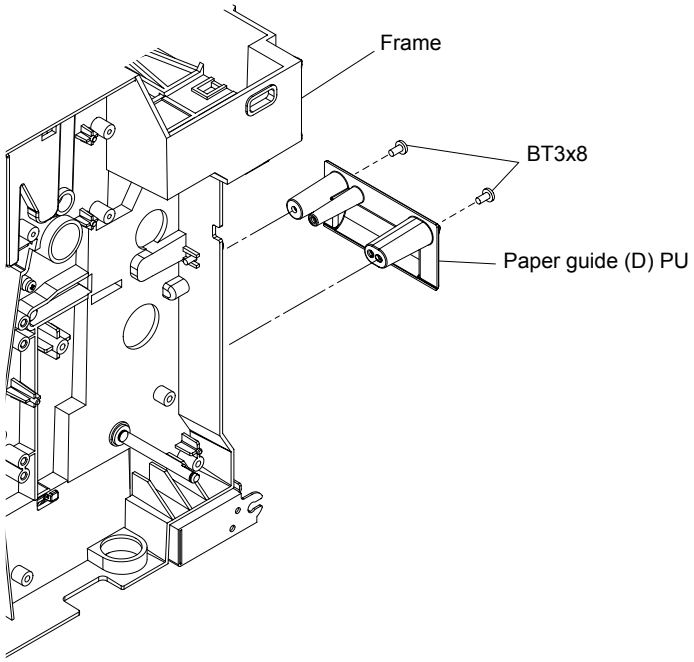


Fig.7-72

4.64 Paper Feed Roller / Separator Pad

1) Sliding the paper feed roller along the shaft, remove it from the shaft.
2) Pull out the separator pad from the frame.

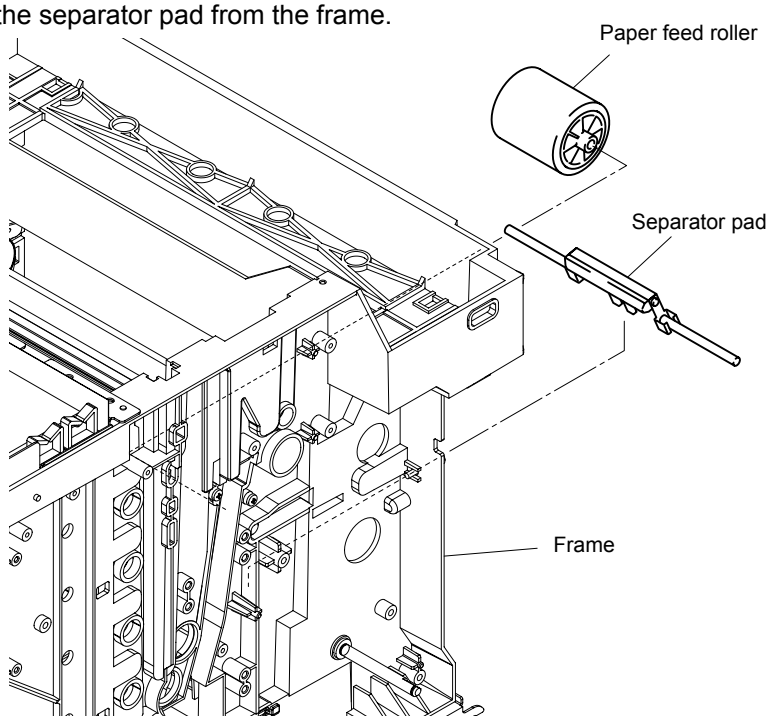


Fig.7-73

5. ADJUSTMENTS AND UPDATING OF SETTINGS, REQUIRED AFTER PARTS REPLACEMENT

5.1 Adjustment of the Guide B position of Top Fuse Cover FU

1) Install the Top Fuse Cover FU with the setscrews (ST3x6, 2 pieces).
2) Loosen the Guide B setscrews (BT3x8, 2 pieces) to make the Guide B attached to the Separation Guide.
3) Tighten the setscrews (BT3x8, 2 pieces) to clamp the Guide B.
4) Put the protective seal on the head of setscrews.

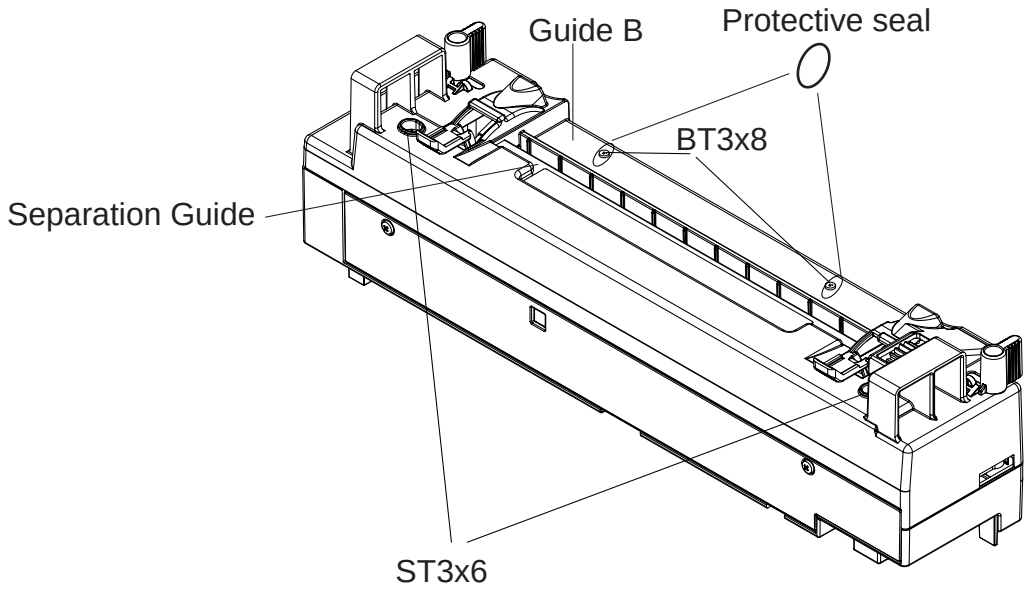


Fig.7-74

5.2 Adjustment of Top and Left Margin

1) Execute “GRID PRINT” in the Service Mode.
2) Measure the position “A” and “B” of top margin.
   [Leading edge] (A + B) / 2 ≤ Default Value 4.0 ± 1.5mm
3) Measure the position “C” and “D” of top margin.
   [Leading edge] (C + D) / 2 ≤ Default Value 3.0 ± 1.5mm
4) If the specification value is not met, implement the adjustment.
   ex) Execute “43 MARGIN ADJUST” in the Factory mode.
5) After above adjustment, execute “GRID PRINT” and confirm the margin.

   Note: This adjustment should be done when the paper tray, regist roller, or transfer unit, is changed.

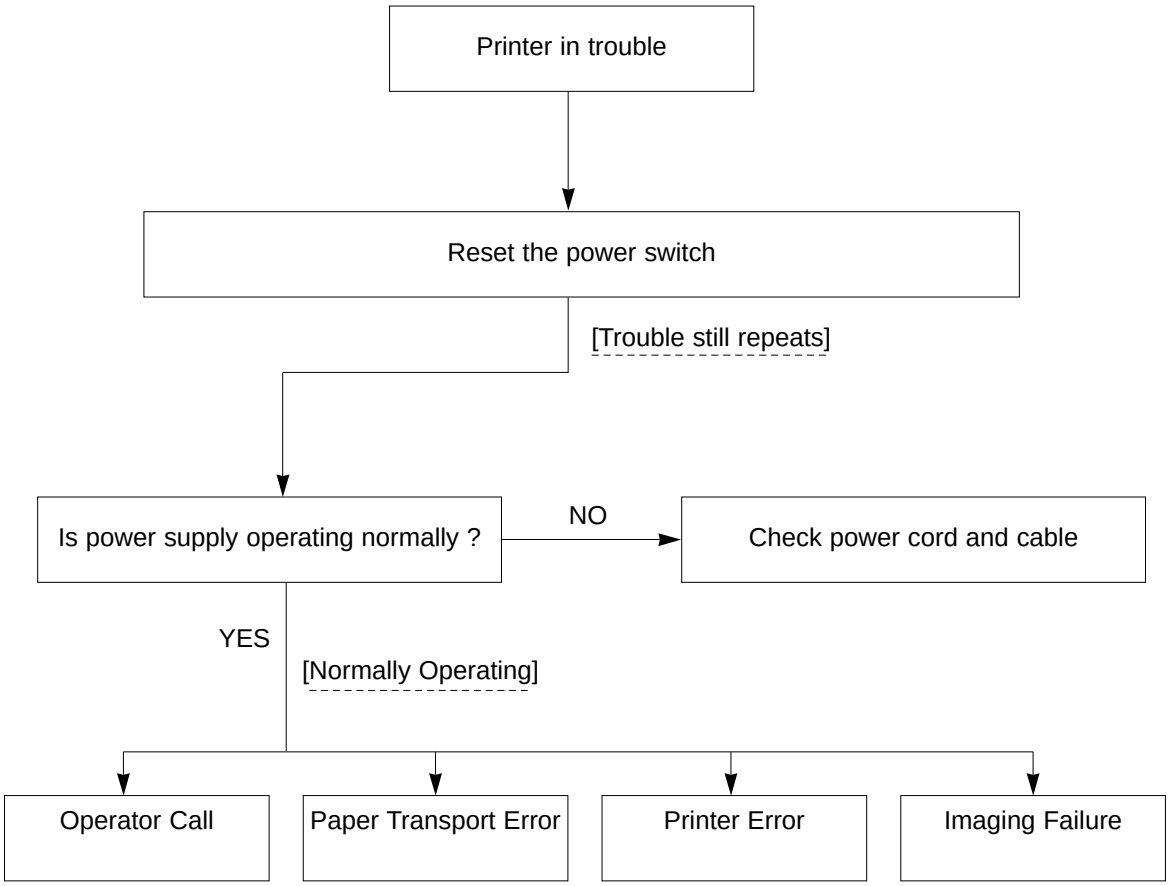
5.3 Resetting of NVRAM information

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

CHAPTER VIII
TROUBLESHOOTING

CHAPTER VIII TROUBLESHOOTING

1. OUTLINE OF TROUBLESHOOTING



2. OPERATOR CALL

2.1 Operator Call

Alarm LED is lit, and applicable messages appear on the liquid crystal display (LCD) in the following cases:

(1). Consumables need to be replenished.

(2). Waste toner bottle is full.

(3). Paper jam occurred.

(4). Periodic maintenance is required.

(5). Maintenance work is incomplete.

(6). Paper Output Tray is full of outputted papers.

Usually the above cases are not regarded as a breakdown, but treated in accordance with Table 8-1.

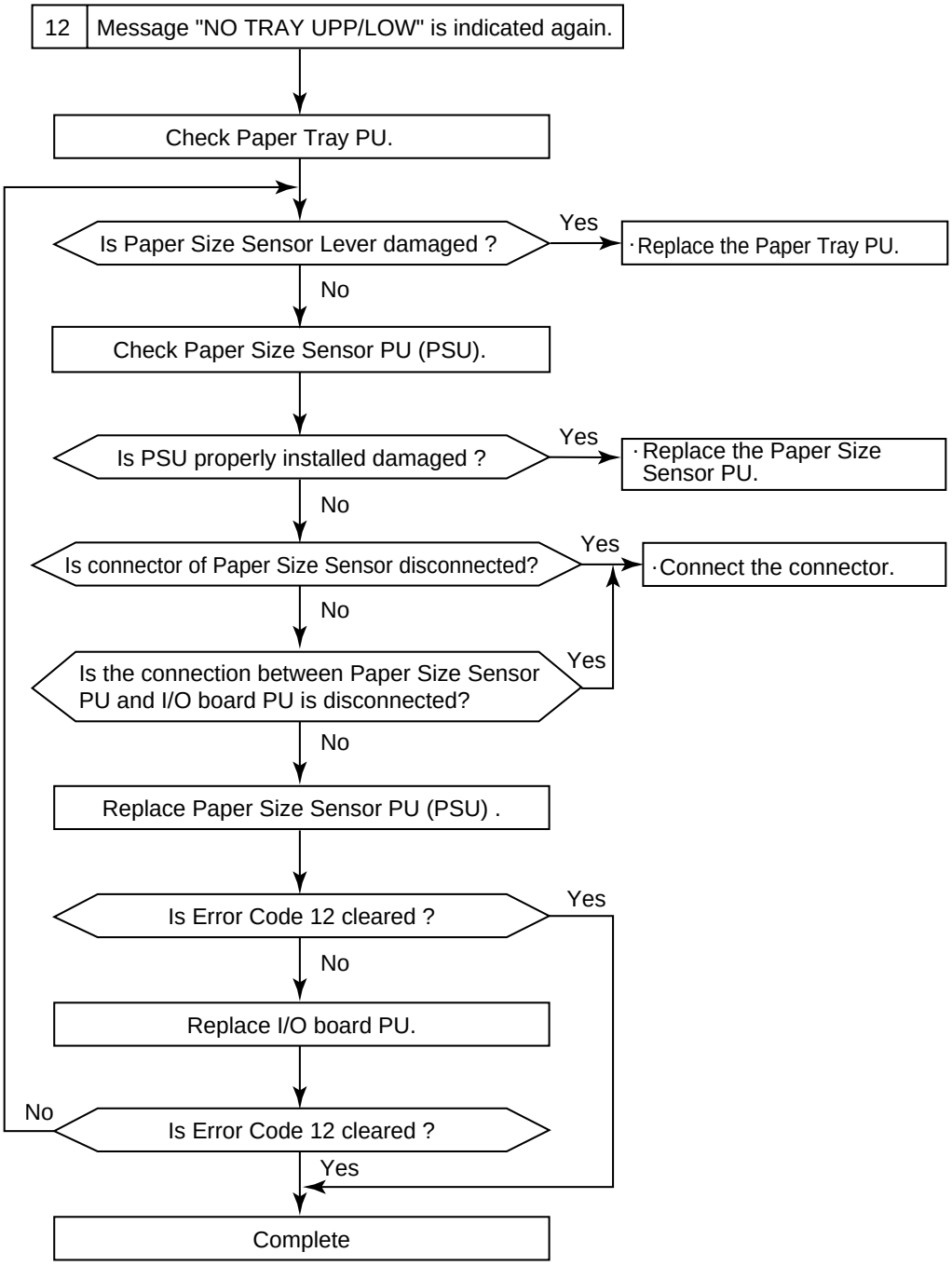
Table 8-1

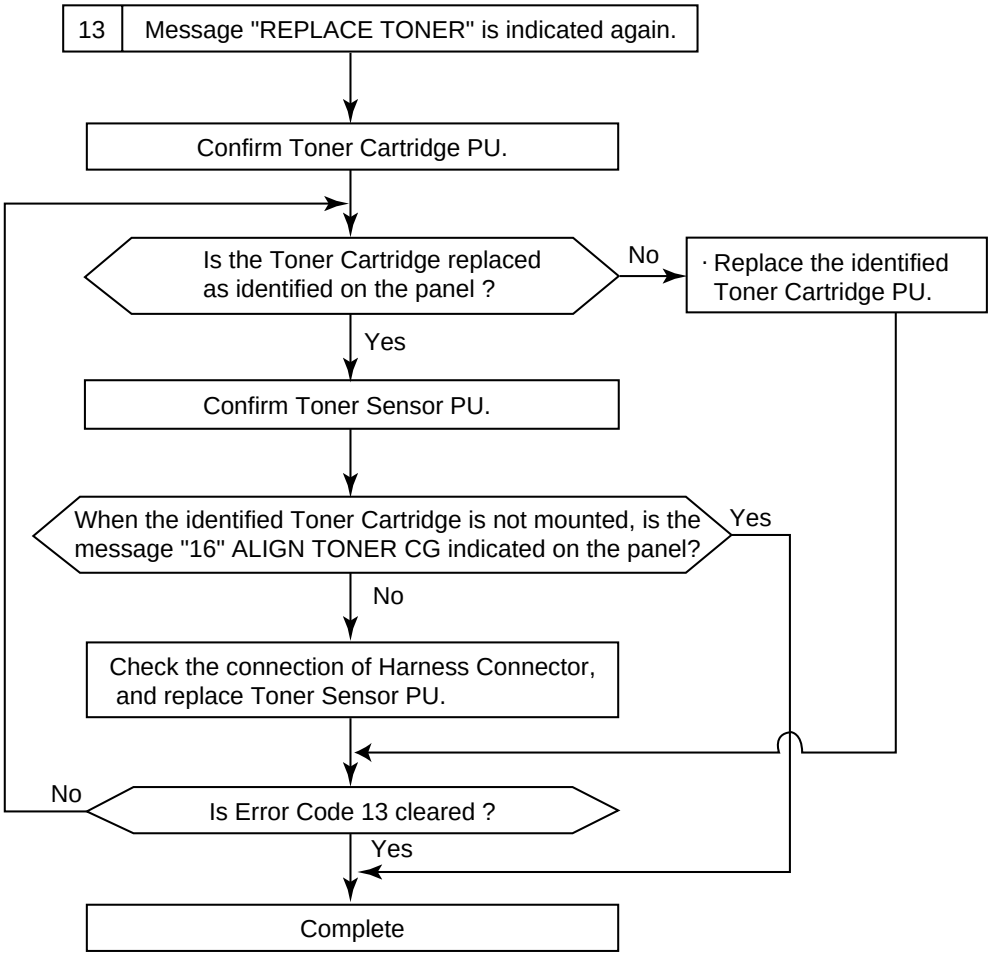
Subject of Operator Call		Countermeasure
Code	Message of Display	
11	CHK MEDIA TYPE UPP/LF1 [Inconsistency of media]	Replace with the correct media type.
	NO MEDIA UPP/LOW [No paper in the upper tray] [No paper in the lower tray]	Replenish papers.
	CHK MEDIA for DUPLEX [No duplex printing is possible for the designated media]	Change the media or designation.
	CHK OUTER SELECTION [Designation of paper feed and exit is wrong for the duplex printing]	Confirm the paper feed and exit, and change it accordingly.
	CHK FILE [Consumable life is beyond the specified life limit, and then the one-side printed paper remains in the duplex unit.]	Host side instructs the duplex printing. Printer stops the operation after completing the duplex printing. Operator is requested to replenish the consumables.
12	NO TRAY UPP/LOW [No upper paper tray] [No lower paper tray]	Install trays.
	STACKER FULL [Outputted paper is full at Paper Exit]	Remove the papers.
13	REPLACE TONER Y/M/C/K [Toner (Y, M, C, K) empty]	Replace with new toner cartridges.
14	CHECK WASTE TONER [Waste toner pack full of toner, or not installed]	Replace with a new waste toner pack.
15	ALIGN FU UNIT [Fuser unit not installed]	Remove fuser unit once and reset it. Reconfirm with firm installation.
16	MISPRINT PAPER/NOPRQ/MEDIA [Misprinting occurred]	Confirm with status of paper tray. Confirm with correct paper size. Confirm with consistency of media.
	ALIGN TONER CG Y/M/C/K [Toner cartridge not installed]	Confirm with installation of toner cartridge.

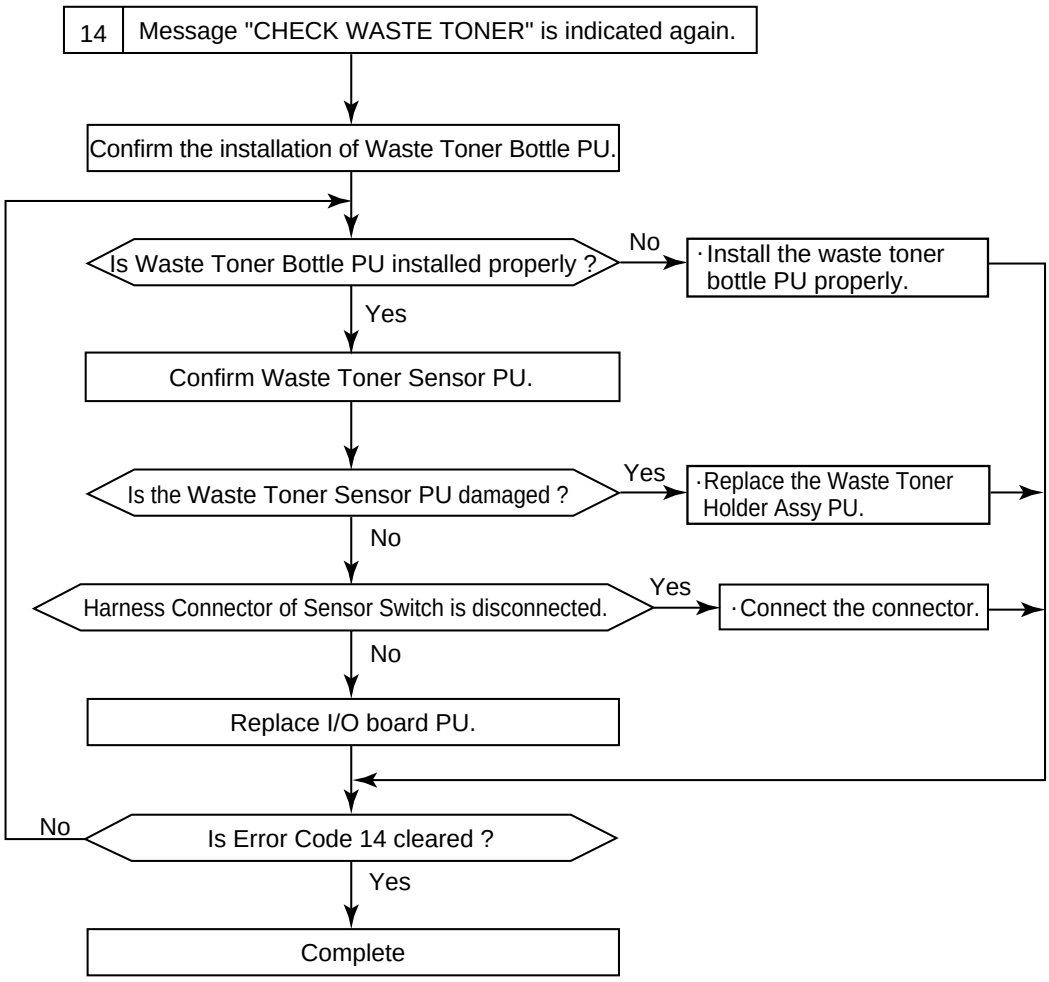
Subject of Operator Call		Countermeasure
Code	Message of Display	
16	ALIGN BELT CG [Belt cartridge not installed.]	Confirm the installation of belt cartridge.
	ALIGN TRANSFER ROLLER [Transfer Roller is not installed.]	Install the transfer roller properly.
	ALIGN OPC CHARGER [Charger Roller is not installed.]	Install the charger roller.
17	MEDIA JAM FEED [Paper jamming at feeding area]	Remove paper tray, and remove paper jamming at feeding entrance.
	MEDIA JAM INNER [Paper jamming inside printer]	Open rear cover assy , and remove paper jammed inside.
	MEDIA JAM OUTER [Paper jamming at paper exit area]	Open rear cover assy, and remove paper jammed inside.
	MEDIA JAM DPULEX [Duplex Paper Transportation Jam]	Open the rear cover, and remove the jammed paper from inside of printer. Open the D center cover, and remove the jammed paper from inside of printer.
18	CLOSE PANEL FRONT/TOP/REAR [Front cover is open.] [Rear cover assy is open.] [Top Cover is open.]	Confirm THAT the covers or rear cover assy are securely closed.
	CLOSE PANEL DPL [Duplex Unit's cover is open.]	Confirm that the transfer unit is securely closed.
19	SLEEP MODE [Printer under idling condition (sleep).]	Printer automatically returns to the operating conditions with W ake-Up Command transmitted from the upper controller.
01	WAIT [Printer under warming-up.]	These are normal operation modes.
00	READY [Printer ready to print as standby status.]	
02	PRINT [Printer under printing process.]	

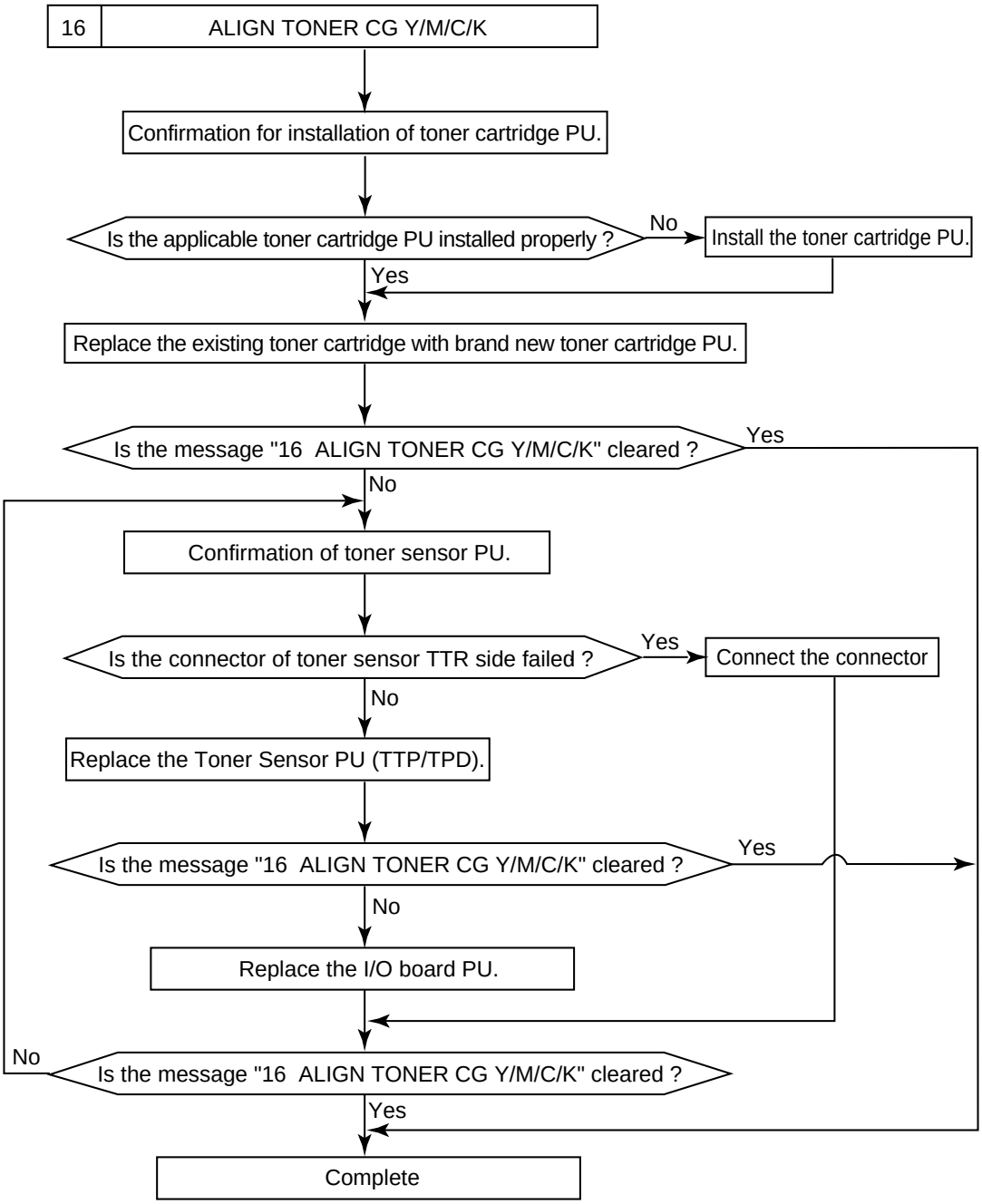
2.2 In case that the operator call is not cleared

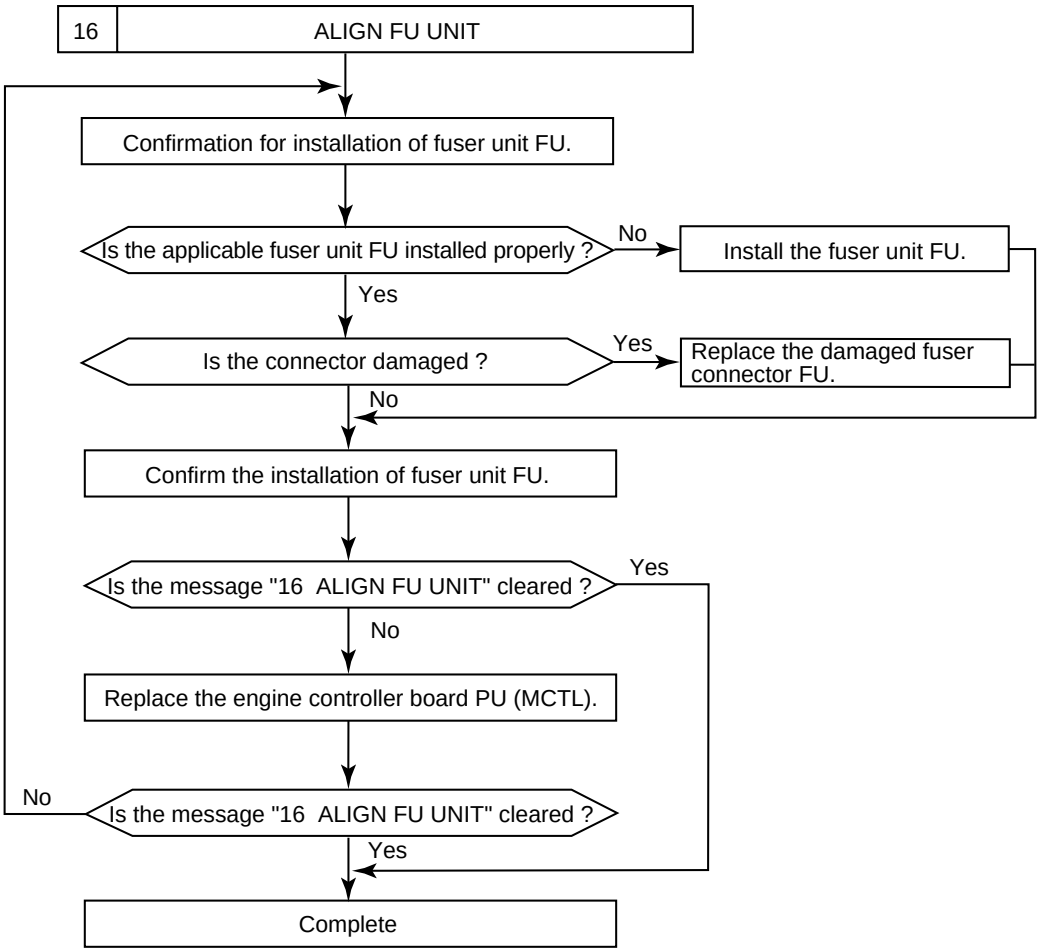
Normally, the operator call can be cleared by the implementation of applicable countermeasures listed in Table 8-1. If not cleared, the printer engine may be in trouble. Check and implement appropriate countermeasures in accordance with the following procedures.

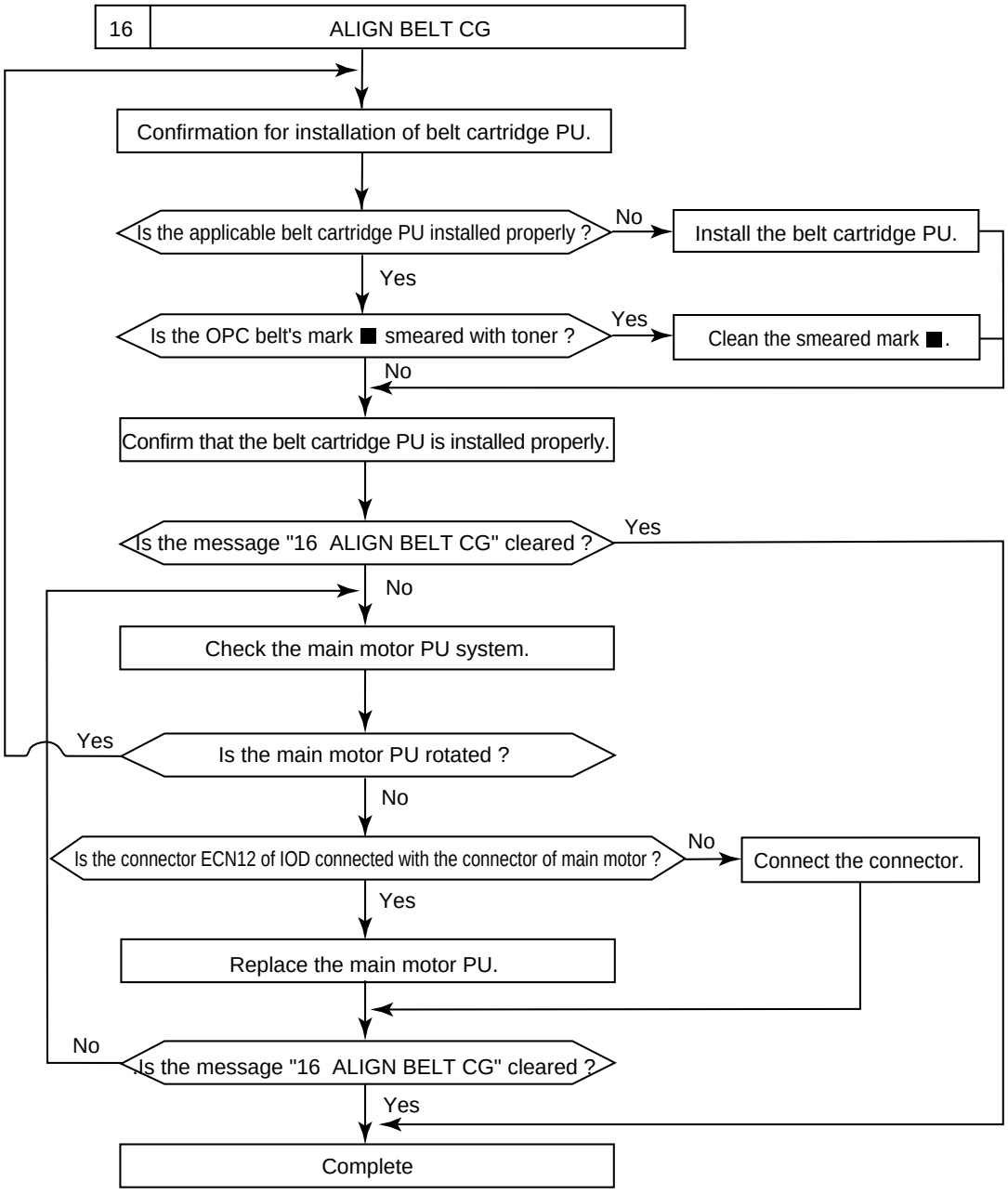

12
Message "NO TRAY UPP/LOW" is indicated again.
Check Paper Tray PU.
Is Paper Size Sensor Lever damaged ?
Yes
·Replace the Paper Tray PU.
No
Check Paper Size Sensor PU (PSU).
Is PSU properly installed damaged ?
Yes
·Replace the Paper Size Sensor PU.
No
Is connector of Paper Size Sensor disconnected?
Yes
·Connect the connector.
No
Is the connection between Paper Size Sensor PU and I/O board PU is disconnected?
Yes
No
Replace Paper Size Sensor PU (PSU) .
Is Error Code 12 cleared ?
Yes
No
Replace I/O board PU.
No
Is Error Code 12 cleared ?
Yes
Complete

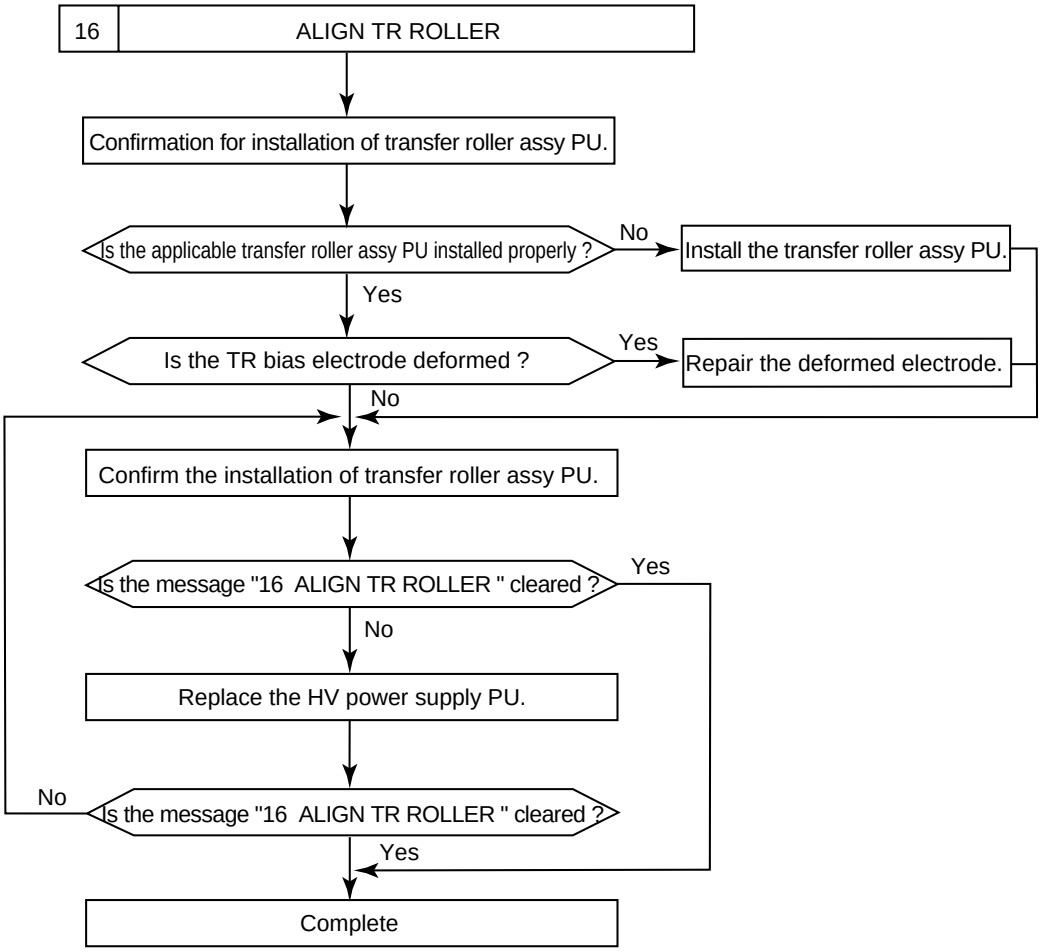

13
Message "REPLACE TONER" is indicated again.
Confirm Toner Cartridge PU.
Is the Toner Cartridge replaced as identified on the panel ?
No
· Replace the identified Toner Cartridge PU.
Yes
Confirm Toner Sensor PU.
When the identified Toner Cartridge is not mounted, is the message "16" ALIGN TONER CG indicated on the panel?
Yes
No
Check the connection of Harness Connector, and replace Toner Sensor PU.
No
Is Error Code 13 cleared ?
Yes
Complete

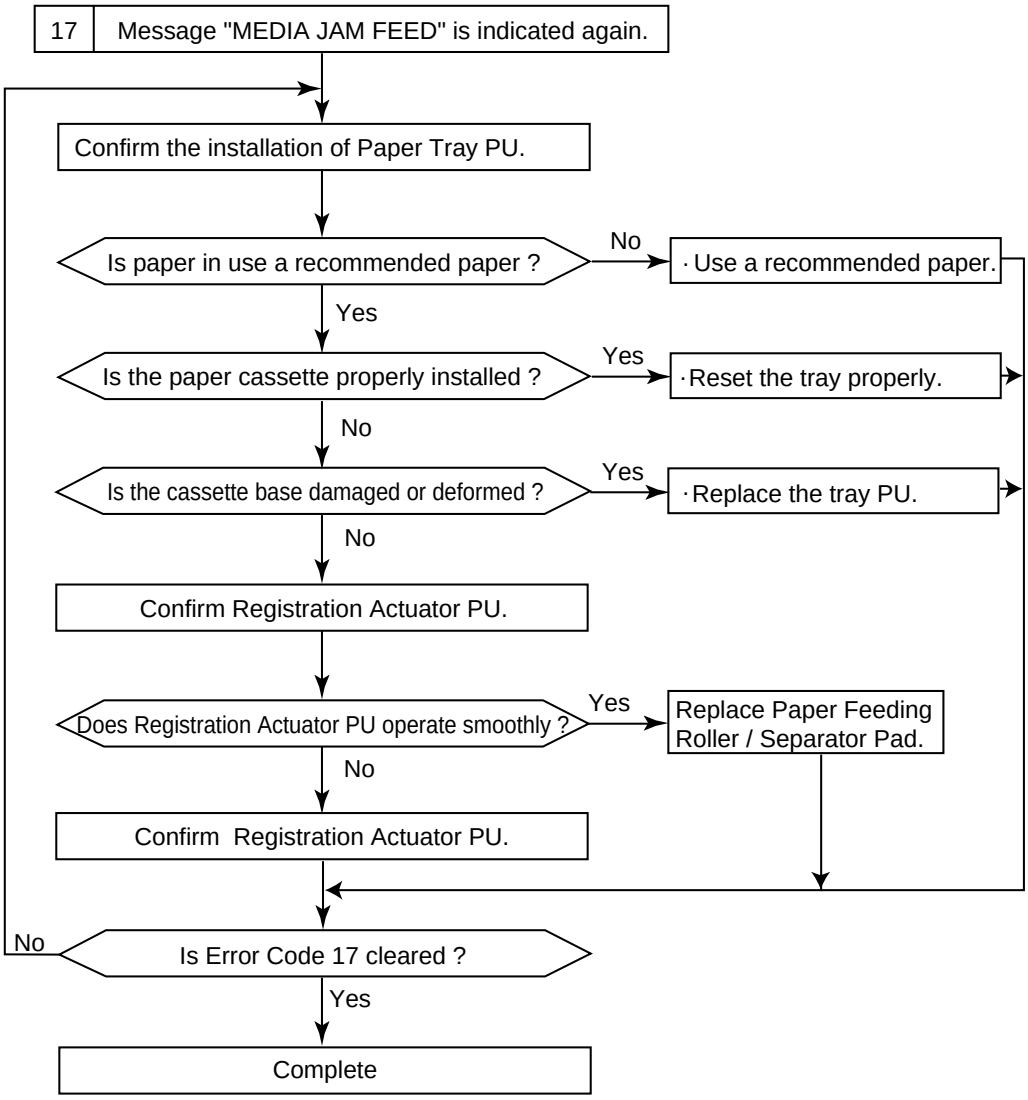

14
Message "CHECK WASTE TONER" is indicated again.
Confirm the installation of Waste Toner Bottle PU.
Is Waste Toner Bottle PU installed properly ?
No
· Install the waste toner bottle PU properly.
Yes
Confirm Waste Toner Sensor PU.
Is the Waste Toner Sensor PU damaged ?
Yes
· Replace the Waste Toner Holder Assy PU.
No
Harness Connector of Sensor Switch is disconnected.
Yes
· Connect the connector.
No
Replace I/O board PU.
No
Is Error Code 14 cleared ?
Yes
Complete


16
ALIGN TONER CG Y/M/C/K
Confirmation for installation of toner cartridge PU.
Is the applicable toner cartridge PU installed properly ?
No
Install the toner cartridge PU.
Yes
Replace the existing toner cartridge with brand new toner cartridge PU.
Is the message "16 ALIGN TONER CG Y/M/C/K" cleared ?
Yes
No
Confirmation of toner sensor PU.
Is the connector of toner sensor TTR side failed ?
Yes
Connect the connector
No
Replace the Toner Sensor PU (TTP/TPD).
Is the message "16 ALIGN TONER CG Y/M/C/K" cleared ?
Yes
No
Replace the I/O board PU.
No
Is the message "16 ALIGN TONER CG Y/M/C/K" cleared ?
Yes
Complete

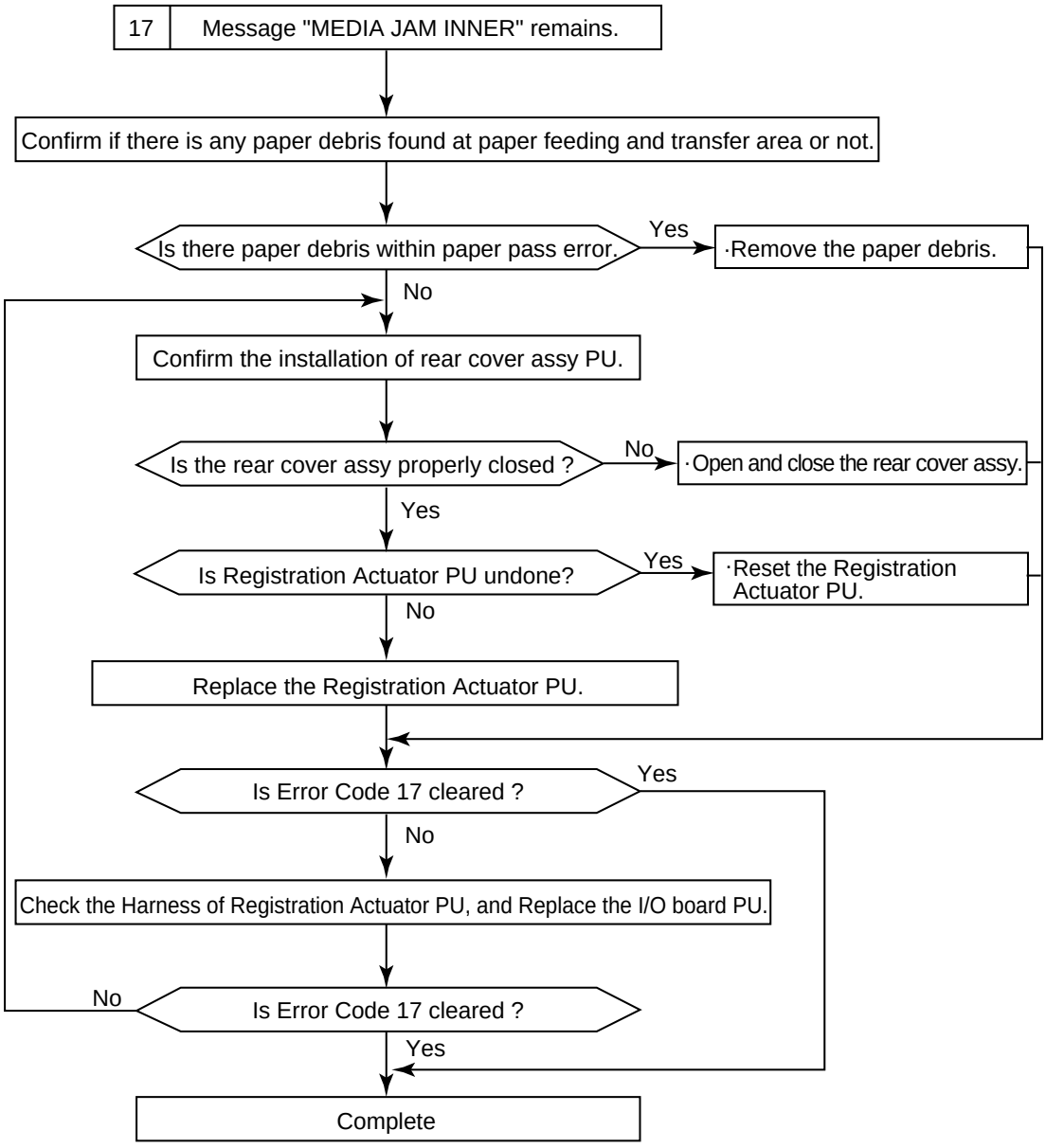

16
ALIGN FU UNIT
Confirmation for installation of fuser unit FU.
Is the applicable fuser unit FU installed properly ?
No
Install the fuser unit FU.
Yes
Is the connector damaged ?
Yes
Replace the damaged fuser connector FU.
No
Confirm the installation of fuser unit FU.
Is the message "16 ALIGN FU UNIT" cleared ?
Yes
No
Replace the engine controller board PU (MCTL).
No
Is the message "16 ALIGN FU UNIT" cleared ?
Yes
Complete

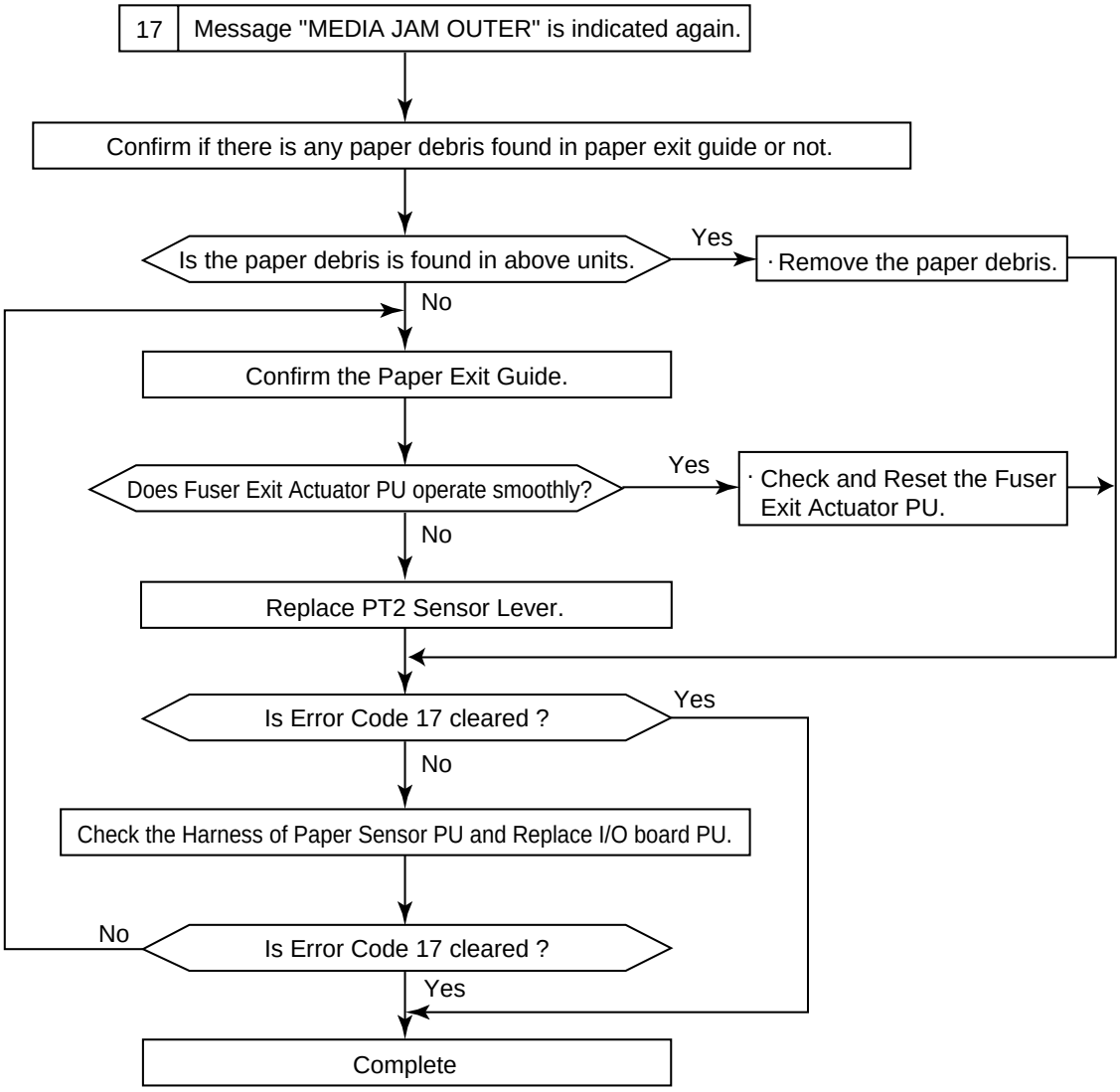

16
ALIGN BELT CG
Confirmation for installation of belt cartridge PU.
Is the applicable belt cartridge PU installed properly ?
No
Install the belt cartridge PU.
Yes
Is the OPC belt's mark ■ smeared with toner ?
Yes
Clean the smeared mark ■.
No
Confirm that the belt cartridge PU is installed properly.
Is the message "16 ALIGN BELT CG" cleared ?
Yes
No
Check the main motor PU system.
Yes
Is the main motor PU rotated ?
No
Is the connector ECN12 of IOD connected with the connector of main motor ?
No
Connect the connector.
Yes
Replace the main motor PU.
No
Is the message "16 ALIGN BELT CG" cleared ?
Yes
Complete


16
ALIGN TR ROLLER
Confirmation for installation of transfer roller assy PU.
Is the applicable transfer roller assy PU installed properly ?
No
Install the transfer roller assy PU.
Yes
Is the TR bias electrode deformed ?
Yes
Repair the deformed electrode.
No
Confirm the installation of transfer roller assy PU.
Is the message "16 ALIGN TR ROLLER " cleared ?
Yes
No
Replace the HV power supply PU.
No
Is the message "16 ALIGN TR ROLLER " cleared ?
Yes
Complete

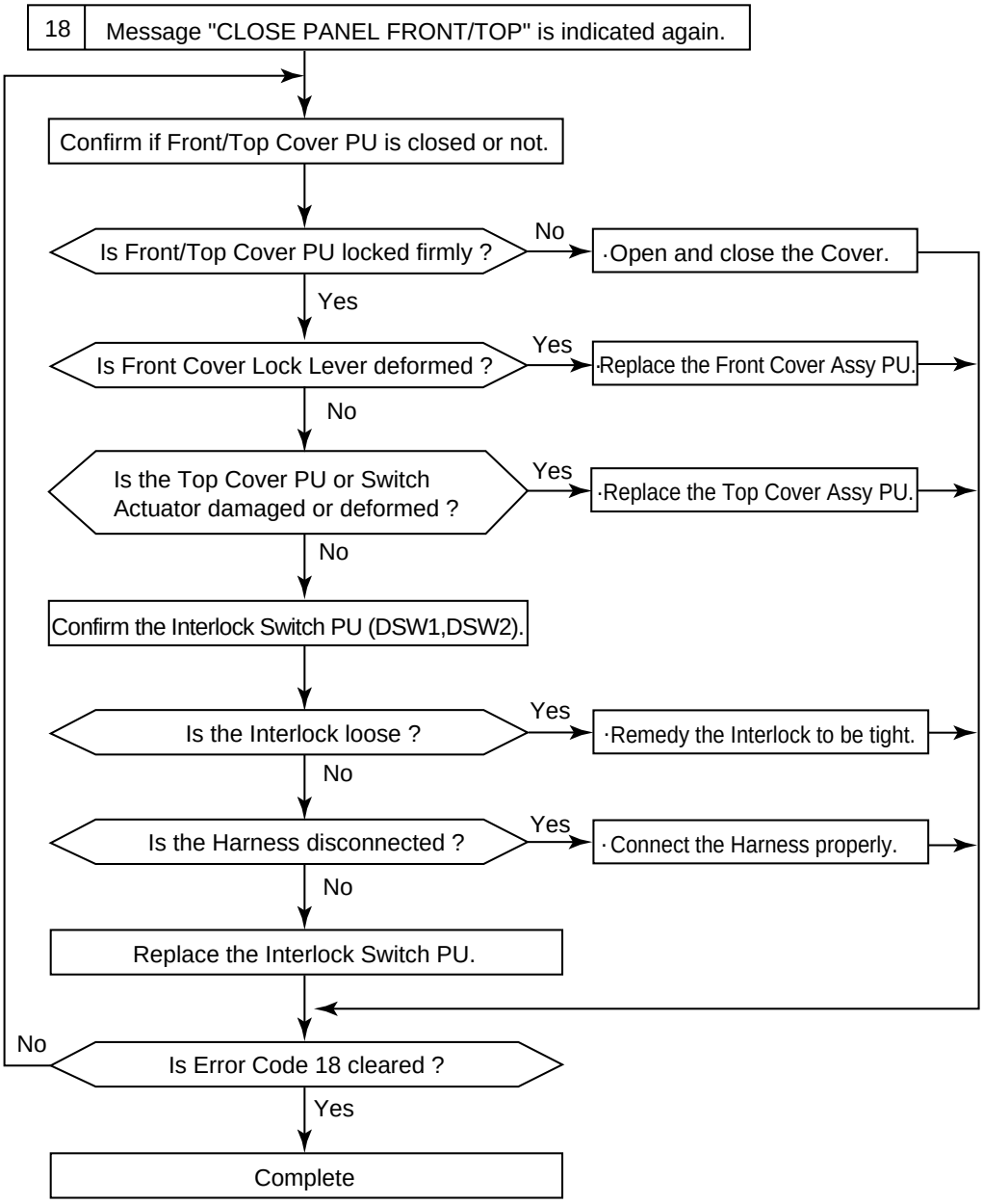


PT1 Sensor : Registration Sensor

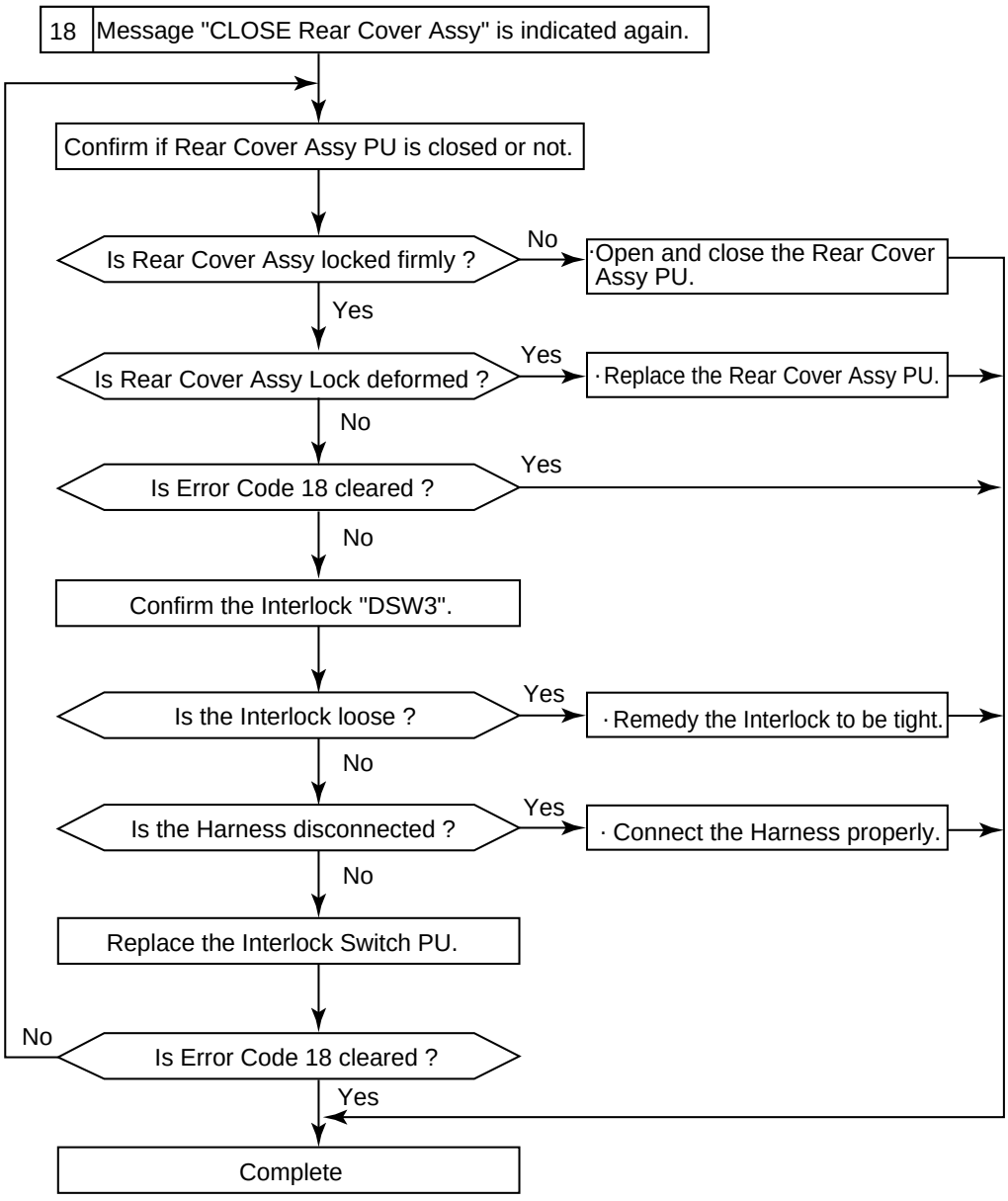

17
Message "MEDIA JAM INNER" remains.
Confirm if there is any paper debris found at paper feeding and transfer area or not.
Is there paper debris within paper pass error.
Yes
·Remove the paper debris.
No
Confirm the installation of rear cover assy PU.
Is the rear cover assy properly closed ?
No
·Open and close the rear cover assy.
Yes
Is Registration Actuator PU undone?
Yes
·Reset the Registration Actuator PU.
No
Replace the Registration Actuator PU.
Is Error Code 17 cleared ?
Yes
No
Check the Harness of Registration Actuator PU, and Replace the I/O board PU.
No
Is Error Code 17 cleared ?
Yes
Complete



PT2 Sensor : Fuser Exit Sensor



DSW1 : Front Cover Interlock Switch
DSW2 : Top Cover Interlock Switch



DSW3 : Rear Cover Interlock Switch

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 Feeding Part
- Fuser Part
- Transfer Part
- Paper Exiting Part

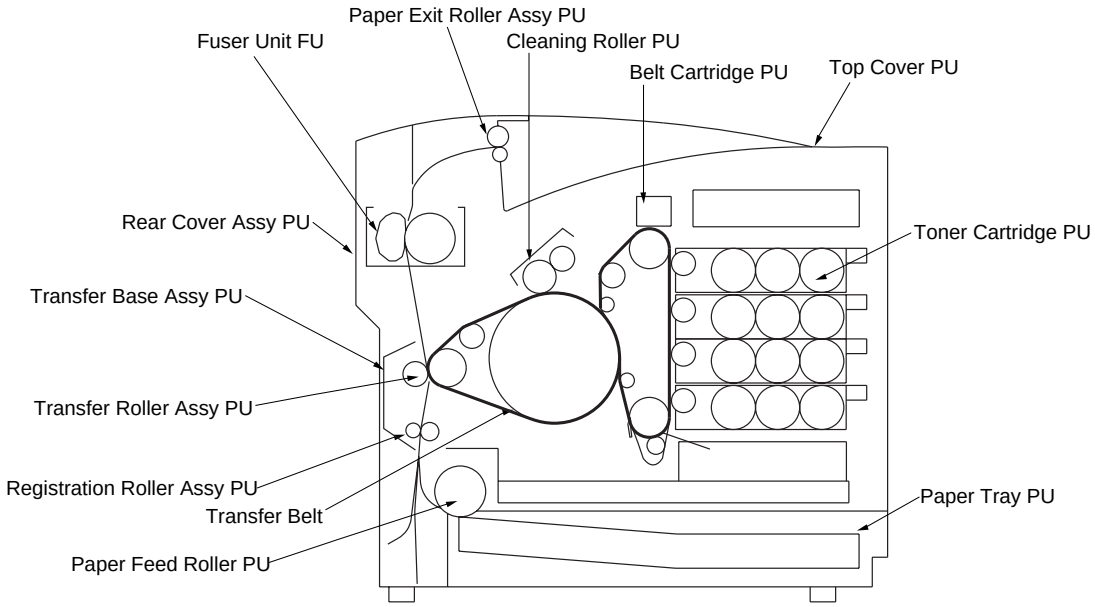


Fig.8-1

3.1 Feed Jam

Table 8-3-1

Problem Item	P#	Check Item	Result	Corrective Action
Print Paper	1	Is the print paper the recommended paper ?	NO	Use the recommended paper.
	2	Is the print paper humid ? (Has the paper been abandoned ?)	YES	Replace the existing papers with new papers.
Paper Cassette PU	3	Is the print paper set in place ?	NO	Set the paper in the proper place.
	4	Is the end plate properly set up ?	NO	Set the end plate to meet the paper size.
Pick-Up Roller PU	5	Is the print paper caught in the paper feeder part ?	YES	Remove the paper being caught.
	6	Is the paper feed roller damaged ?	NO	Replace the damaged paper feed roller.

P# : Procedure Number

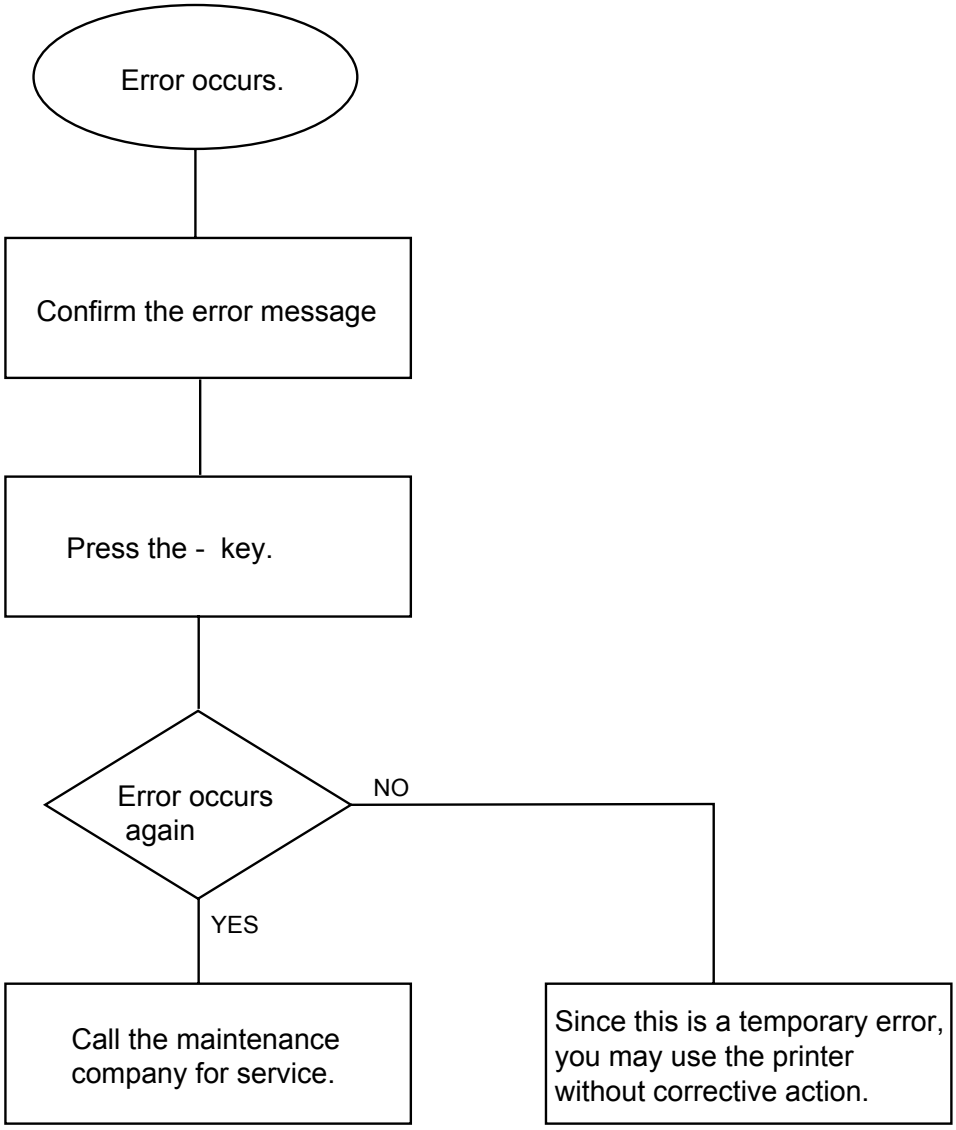
3.2 Inner Jam

Table 8-3-2

Problem Item	P#	Check Item	Result	Corrective Action
Transportation Part		Open the rear cover assy PU for check.		
	1	Is there any paper inside the unit ?	Yes	Remove the paper inside.
	2	Is the transfer roller firmly locked by the lock lever ?	No	Fix the transfer roller with the lock lever.
Fuser Unit	3	Is the fuser unit properly locked ?	No	Fix the fuser unit with the FU lock lever.
	4	Is there any paper caught between the rollers ?	Yes	Remove the caught paper.

4. PRINTER ERROR

If errors or failures occurred inside the printer, the applicable error message will be displayed on the operator panel, and the printer stops. If errors or failures would repeat even after pressing the - key, confirm the error code, and take the clearance method described in section 4.2 in this chapter.



4.1 Error Code

Table 8-4-3

Code	Error Message	Description
S1	ERROR S01 SERVICE CALL	Fatal Error EX
S2	ERROR S02 SERVICE CALL	ADRL Error EX
S3	ERROR S03 SERVICE CALL	ADRS Error EX
S4	ERROR S04 SERVICE CALL	Bus Error EX (INSTRUCT)
S5	ERROR S05 SERVICE CALL	Bus Error EX (DATA L/S)
S6	ERROR S06 SERVICE CALL	Syscall EX
S7	ERROR S07 SERVICE CALL	Breakpoint EX
S8	ERROR S08 SERVICE CALL	Reserved INSTRUCT EX
S9	ERROR S09 SERVICE CALL	Coprocessor UNUSAB EX
S10	ERROR S10 SERVICE CALL	Arithmetic Overflow EX
S11	ERROR S11 SERVICE CALL	Undefined Interrupt
S12	ERROR S12 SERVICE CALL	Software 1 Interrupt
S13	ERROR S13 SERVICE CALL	Software 2 Interrupt
S21	ERROR S21 SERVICE CALL	Unknown Operator Call
E41	ERROR E41 SERVICE CALL	Engine Communication Error
H37	ERROR H37 SERVICE CALL	PCI Register Error
H38	ERROR H38 SERVICE CALL	PCI bus Connection Error
H39	ERROR H39 SERVICE CALL	BRNET Typing Error
H60	ERROR H60 SERVICE CALL	Bus Error
H61	ERROR H61 SERVICE CALL	ROM Check Sum Error
H63	ERROR H63 SERVICE CALL	DRAM Access Error

H66	ERROR H66 SERVICE CALL	NVRAM Write Error
H67	ERROR H67 SERVICE CALL	NVRAM Read Error
H68	ERROR H68 SERVICE CALL	NVRAM Bus Error
H73	ERROR H73 SERVICE CALL	Flash Read Error
H74	ERROR H74 SERVICE CALL	Flash Write Error
C3	ERROR EC3 SERVICE CALL	NVRAM Error
C4	ERROR EC4 SERVICE CALL	Engine Controller Hardware Error
C7	ERROR EC7 SERVICE CALL	Process Timing Clock Error
D1	ERROR ED1 SERVICE CALL	Yellow Developer Clutch Error
D2	ERROR ED2 SERVICE CALL	Magenta Developer Clutch Error
D3	ERROR ED3 SERVICE CALL	Cyan Developer Clutch Error
D4	ERROR ED4 SERVICE CALL	Black Developer Clutch Error
D5	ERROR ED5 SERVICE CALL	Yellow Retract Solenoid Error
D6	ERROR ED6 SERVICE CALL	Magenta Retract Solenoid Error
D7	ERROR ED7 SERVICE CALL	Cyan Retract Solenoid Error
D8	ERROR ED8 SERVICE CALL	Black Retract Solenoid Error
E1	ERROR EE1 SERVICE CALL	Developer Motor Error
E2	ERROR EE2 SERVICE CALL	Main Motor Error
E3	ERROR EE3 SERVICE CALL	Transfer Belt Error
E5	ERROR EE5 SERVICE CALL	Transfer Roller Clutch Error
E6	ERROR EE6 SERVICE CALL	Transfer Belt Cleaning Solenoid Error
E8	ERROR EE8 SERVICE CALL	Fuser Unit Clutch Error
E9	ERROR EE9 SERVICE CALL	OPC Marker Sensor Error

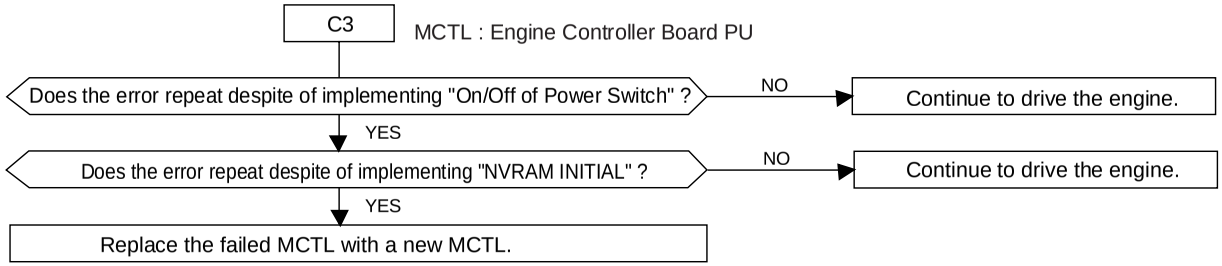
EL	ERROR EEL SERVICE CALL	Erase LED Error
F0	ERROR EF0 SERVICE CALL	Power Supply Fan Error
F3	ERROR EF3 SERVICE CALL	Laser Fan Error
F4	ERROR EF4 SERVICE CALL	Exit Fan Error
F5	ERROR EF5 SERVICE CALL	HV Power Supply Error
F6	ERROR EF6 SERVICE CALL	LV Power Supply Error
H0	ERROR EH0 SERVICE CALL	Fuser Thermistor Error
H1	ERROR EH1 SERVICE CALL	Fuser 1 Lamp Error
H2	ERROR EH2 SERVICE CALL	Fuser Temperature Error
H3	ERROR EH3 SERVICE CALL	Fuser Temperature Low Error
H4	ERROR EH4 SERVICE CALL	Fuser Temperature High Error
HA	ERROR EHA SERVICE CALL	Fuser ACOFF Error
L1	ERROR EL1 SERVICE CALL	Beam Detector Error
L2	ERROR EL2 SERVICE CALL	Scanner Motor Error
LL	ERROR ELL SERVICE CALL	Laser Power Error
N1	ERROR EN1 SERVICE CALL	Duplex Connection Error 1
N2	ERROR EN2 SERVICE CALL	Duplex Connection Error 2
N3	ERROR EN3 SERVICE CALL	HVU Connection Error
N4	ERROR EN4 SERVICE CALL	Toner Empty Sensor Connection Error 1
N5	ERROR EN5 SERVICE CALL	Toner Empty Sensor Connection Error 2
N6	ERROR EN6 SERVICE CALL	LFU Connection Error
P1	ERROR EP1 SERVICE CALL	Duplex Controller Hardware Error 1
P2	ERROR EP2 SERVICE CALL	Duplex Controller Hardware Error 2

P3	ERROR EP3 SERVICE CALL	Duplex Solenoid (U) Error
P4	ERROR EP4 SERVICE CALL	Duplex Motor Error
P5	ERROR EP5 SERVICE CALL	Duplex Solenoid (L) Error

Note:
Cleaning Method of "SERVICE CALL" state
Step1: For retry, press "-" key except for C3, P1, P2, F6, N and H* error.*
Step2: Turn the main power switch off.

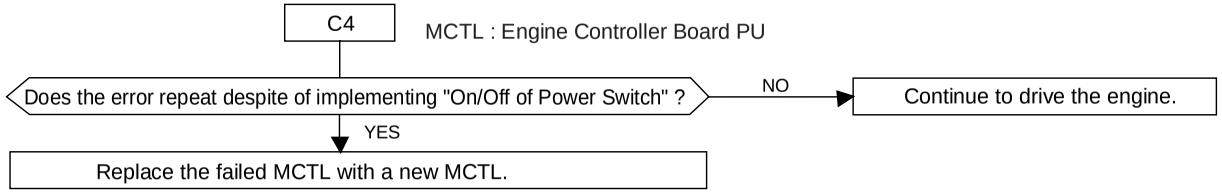
MCTL : Engine Controller Board PU

Code	Description of Error	Cause of Error	Clearance Method
C3	NVRAM Error	1. Failure of MCTL 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 with a new MCTL.

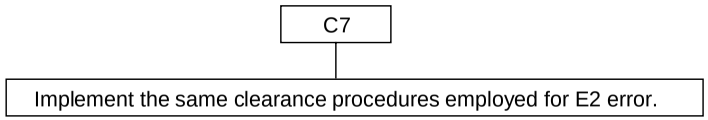


MCTL : Engine Controller Board PU

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



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



Error Code	D1
Name of Part	Developer Clutch PU (DCLY)

MCTL : Engine Controller Board PU
IOD : I/O Board PU

Confirm the connection of Connector.

Is the connection proper between DCN10 of IOD and Clutch (DCLY) ?
Is the harness of Clutch (DCLY) broken ?
Is the connection proper between DCN3 of IOD and I2CN of MCTL ?

NO → Connect the harness. / Connect the connector properly.

YES

Is D1 Error cleared ?
YES → Complete
NO

Check the voltage at DCLY ON-N.

Does the voltage drop (+24V) between DCN10-22 and DCN13-1?
YES → Replace the clutch (DCLY) with a new clutch.
NO

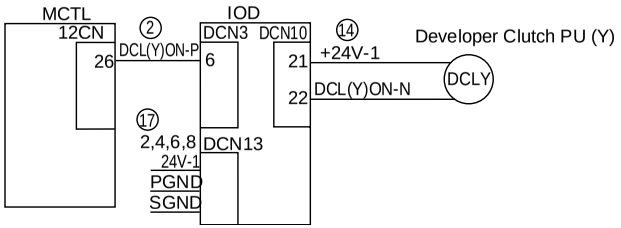
Does the voltage jump (+5V) between DCN3-6 and DCN13-1 ?
YES → Replace IOD with a new IOD.
NO

Is D1 Error cleared ?
YES → Complete
NO

Replace current MCTL with a new MCTL.

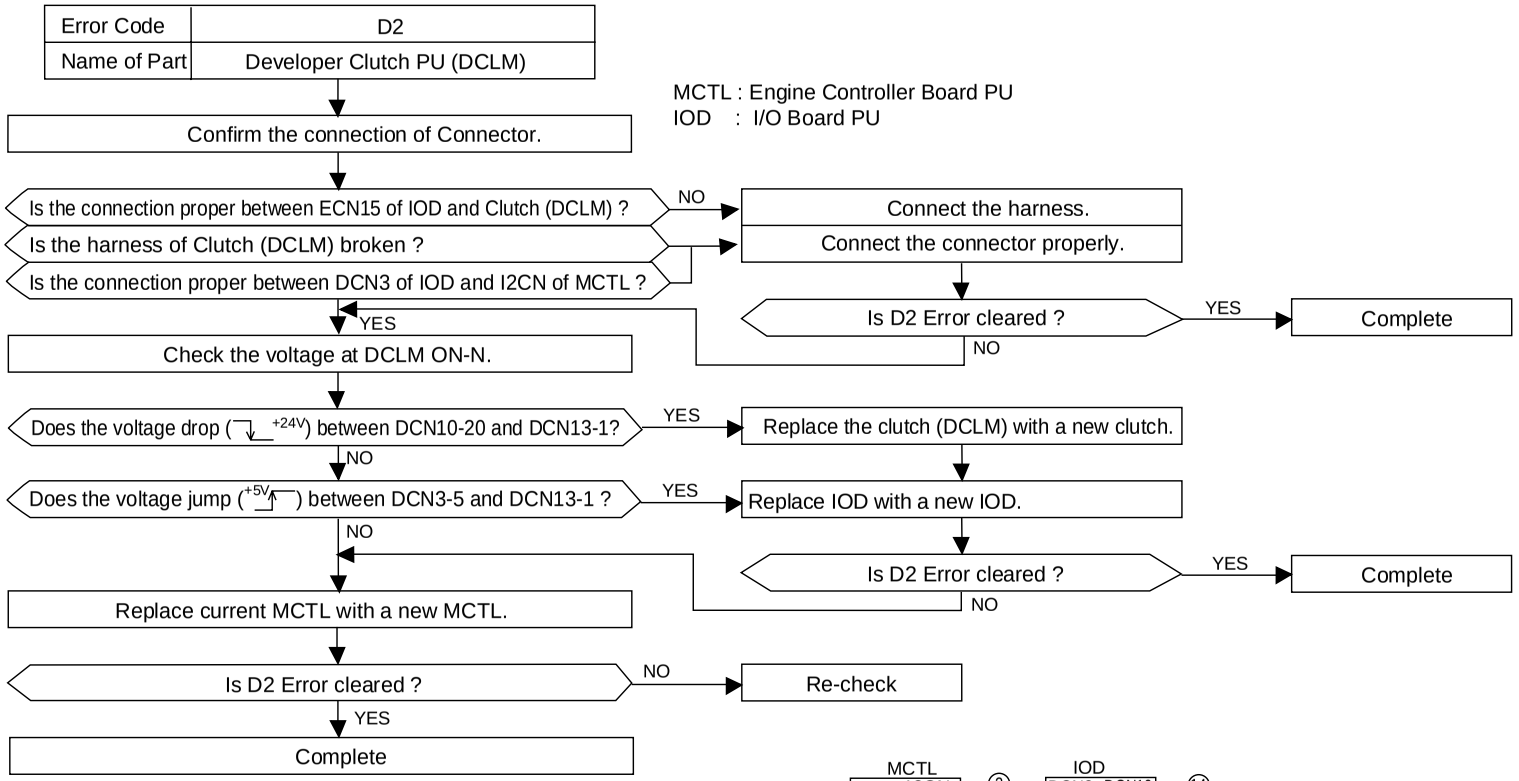
Is D1 Error cleared ?
NO → Re-check
YES

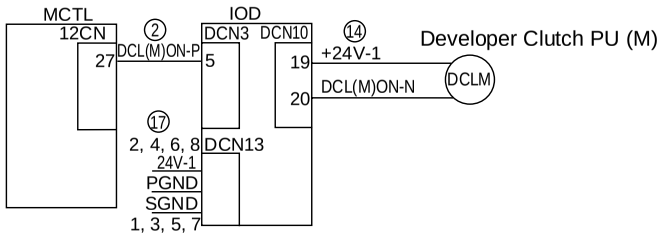
Complete



Error Code	D2
Name of Part	Developer Clutch PU (DCLM)

MCTL : Engine Controller Board PU
IOD : I/O Board PU





Error Code	D3
Name of Part	Developer Clutch PU (DCLC)

MCTL : Engine Controller Board PU
IOD : I/O Board PU

Confirm the connection of Connector.

Is the connection proper between ECN16 of IOD and Clutch (DCLC) ?
Is the harness of Clutch (DCLC) broken ?
Is the connection proper between DCN3 of IOD and I2CN of MCTL ?

NO → Connect the harness. / Connect the connector properly.

Is D3 Error cleared ?
YES → Complete
NO

YES

Check the voltage at DCLC ON-N.

Does the voltage drop (+24V) between DCN10-18 and DCN13-1?
YES → Replace the clutch (DCLC) with a new clutch.
NO

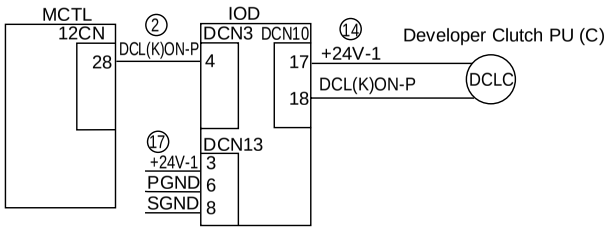
Does the voltage jump (+5V) between DCN13-4 and DCN13-1 ?
YES → Replace IOD with a new IOD.
NO

Is D3 Error cleared ?
YES → Complete
NO

Replace current MCTL with a new MCTL.

Is D3 Error cleared ?
NO → Re-check
YES

Complete



Error Code	D4
Name of Part	Developer Clutch PU (DCLK)

MCTL : Engine Controller Board PU
IOD : I/O Board PU

Confirm the connection of Connector.

Is the connection proper between ECN13 of IOD and Clutch (DCLK) ? NO
Is the harness of Clutch (DCLK) broken ? NO
Is the connection proper between DCN3 of IOD and I2CN of MCTL ? NO
→ Connect the harness. / Connect the connector properly.

YES

Is D4 Error cleared ? YES → Complete
NO

Check the voltage at DCLK ON-N.

Does the voltage drop (+24V) between DCN10-24 and DCN13-1? YES → Replace the clutch (DCLK) with a new clutch.
NO

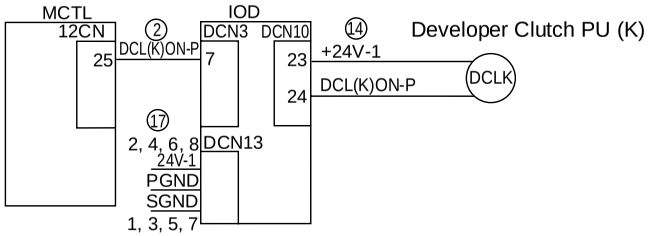
Does the voltage jump (+5V) between DCN3-7 and DCN13-1 ? YES → Replace IOD with a new IOD.
NO

Is D4 Error cleared ? YES → Complete
NO

Replace current MCTL with a new MCTL.

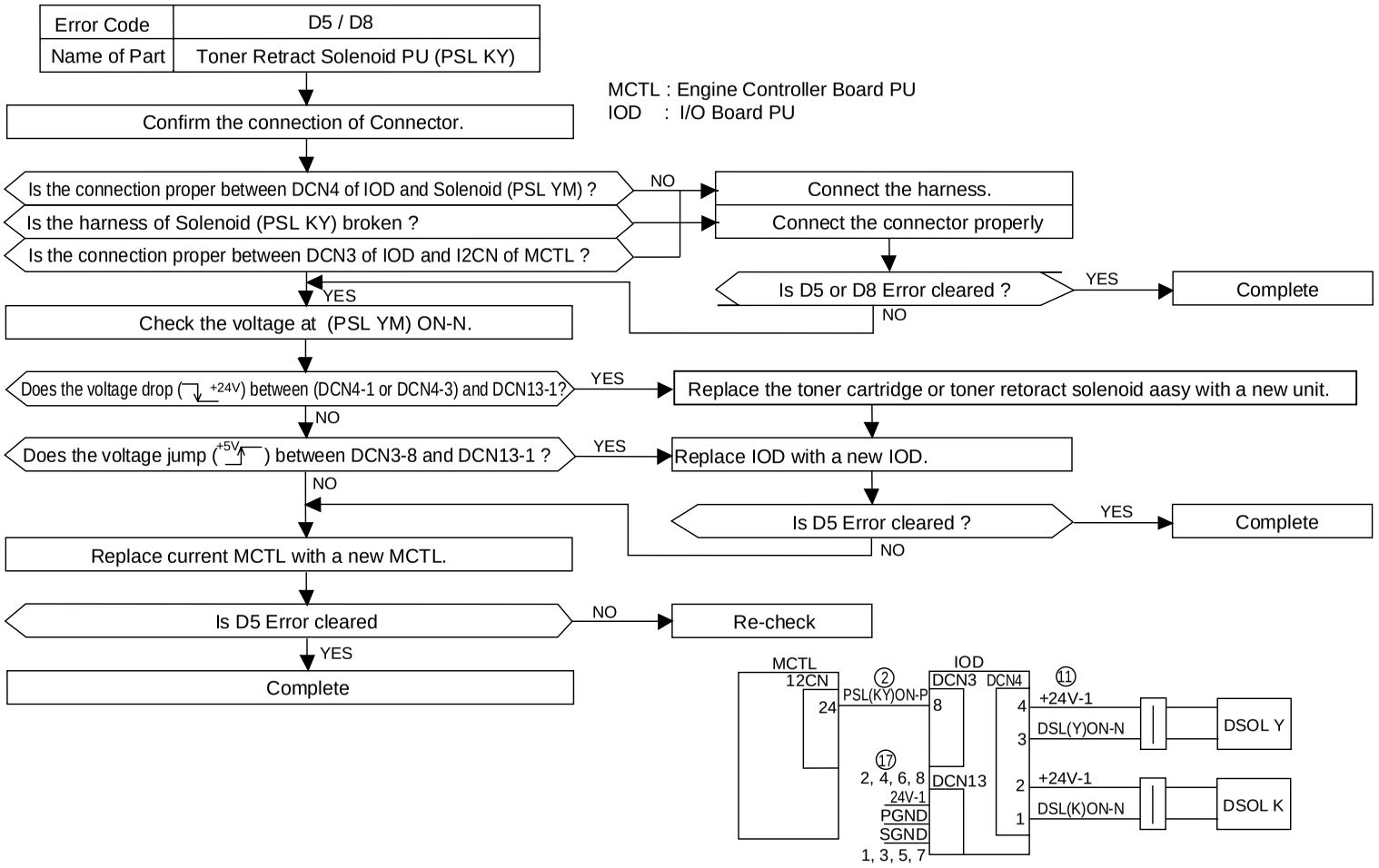
Is D4 Error cleared ? NO → Re-check
YES

Complete



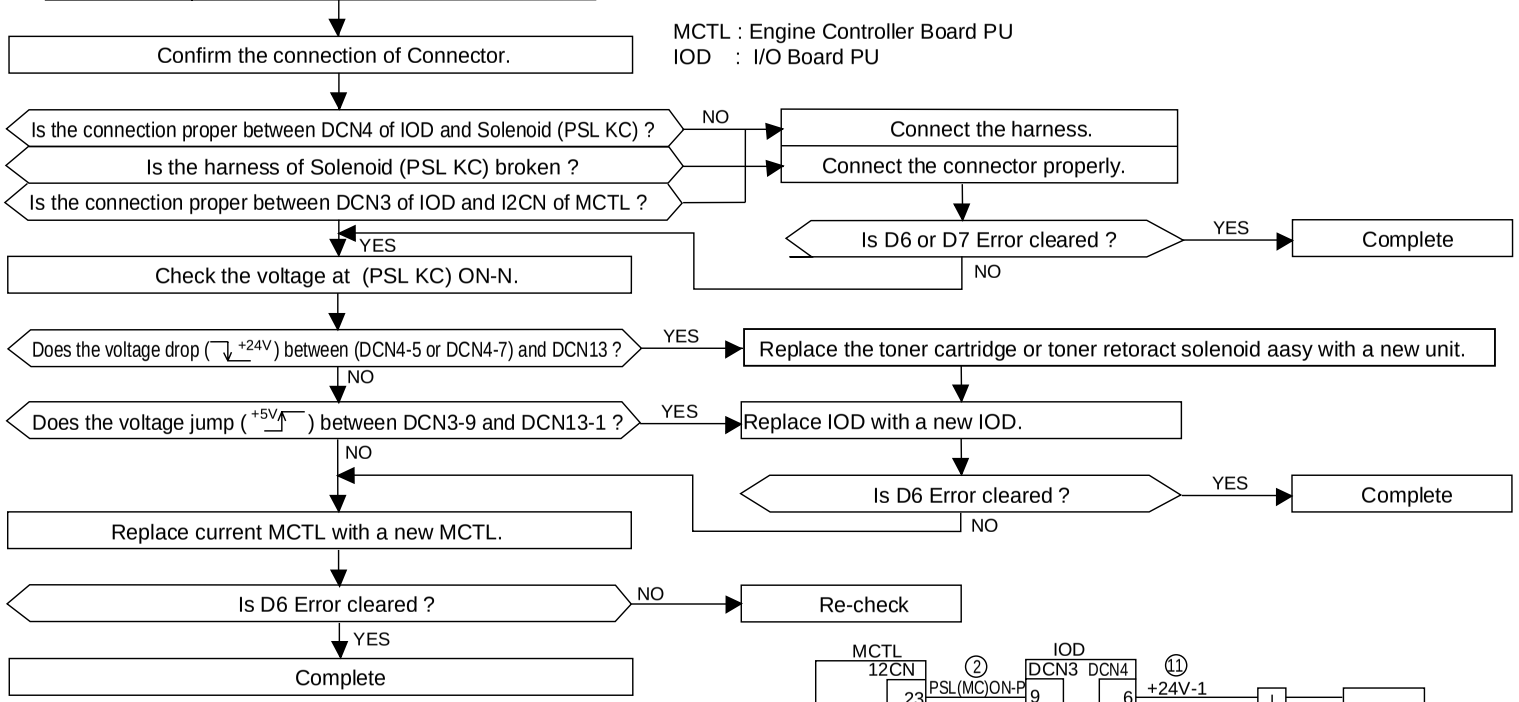
Error Code	D5 / D8
Name of Part	Toner Retract Solenoid PU (PSL KY)

MCTL : Engine Controller Board PU
IOD : I/O Board PU



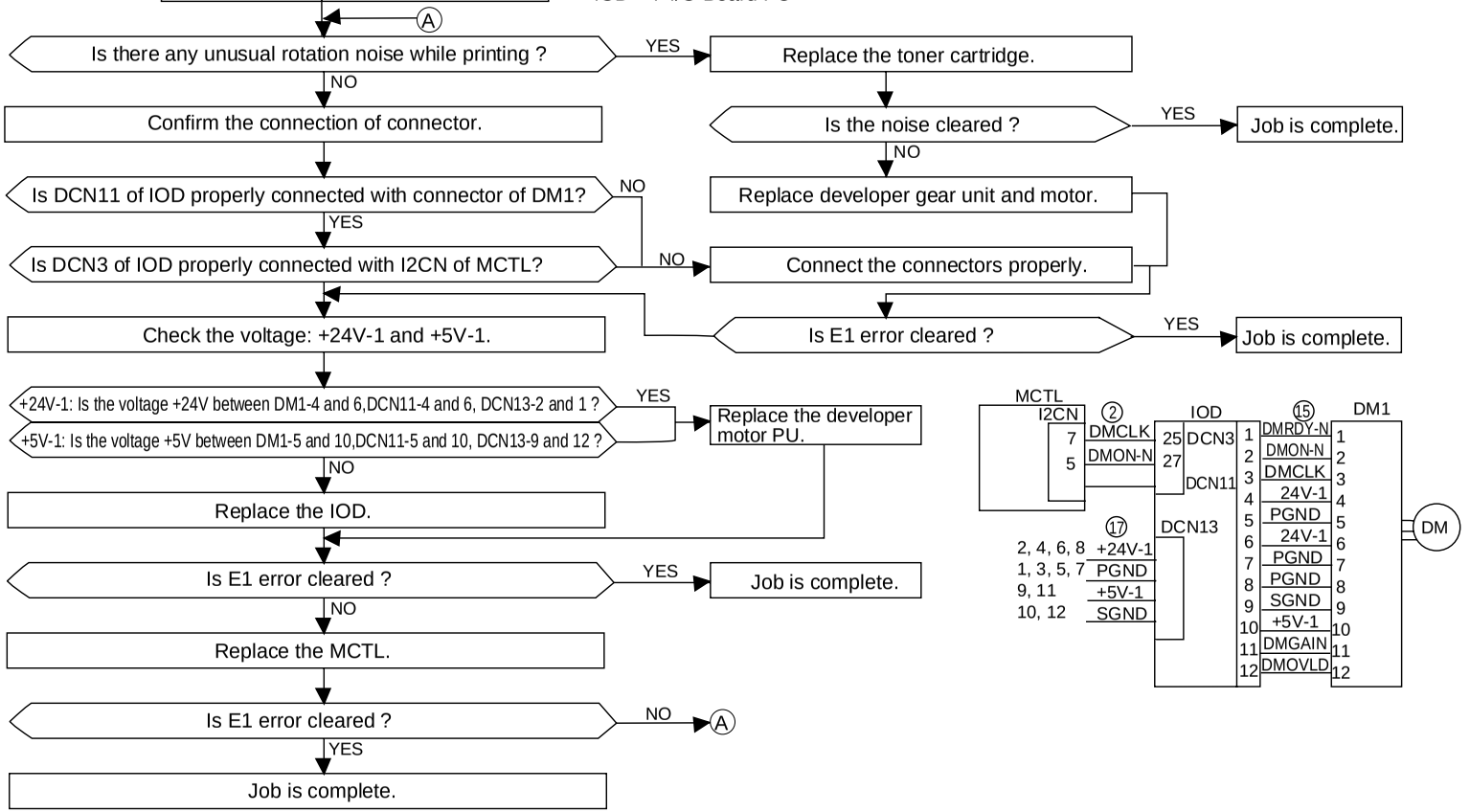
Error Code	D6 / D7
Name of Part	Toner Retoract Solenoid PU (PSL MC)

MCTL : Engine Controller Board PU
IOD : I/O Board PU



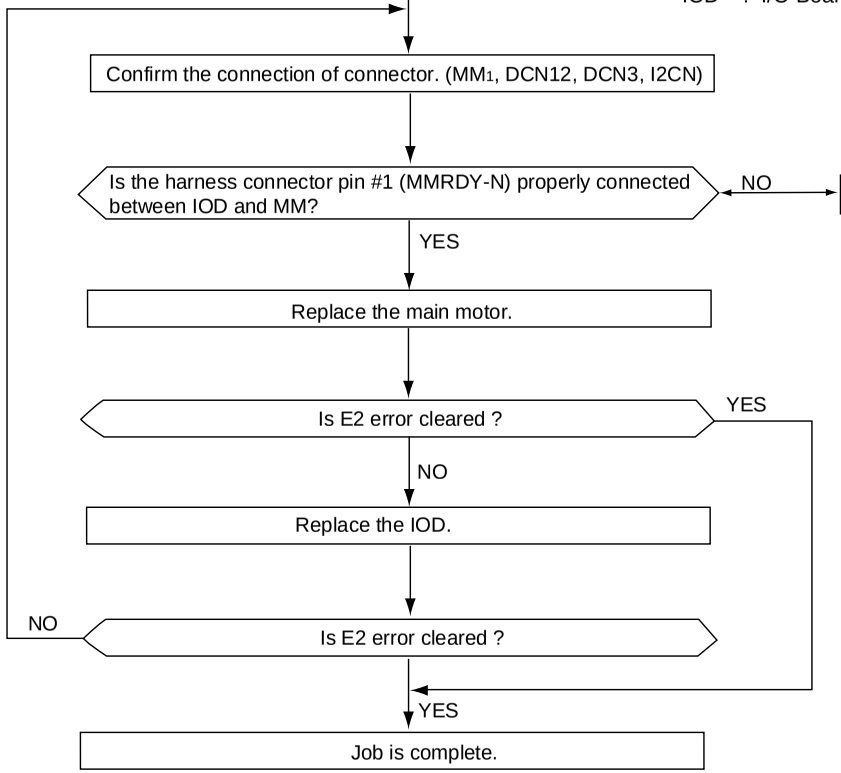
Error Code	E1
Concerned Part	Developer Motor PU (DM)

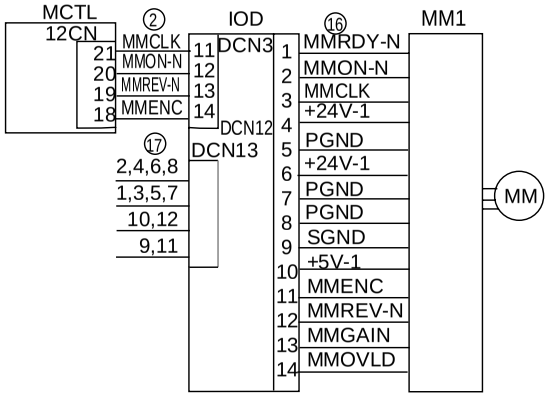
MCTL : Engine Controller Board PU
IOD : I/O Board PU



Error Code	E2
Concerned Part	Main Motor PU (MM)

MCTL : Engine Controller Board PU
IOD : I/O Board PU

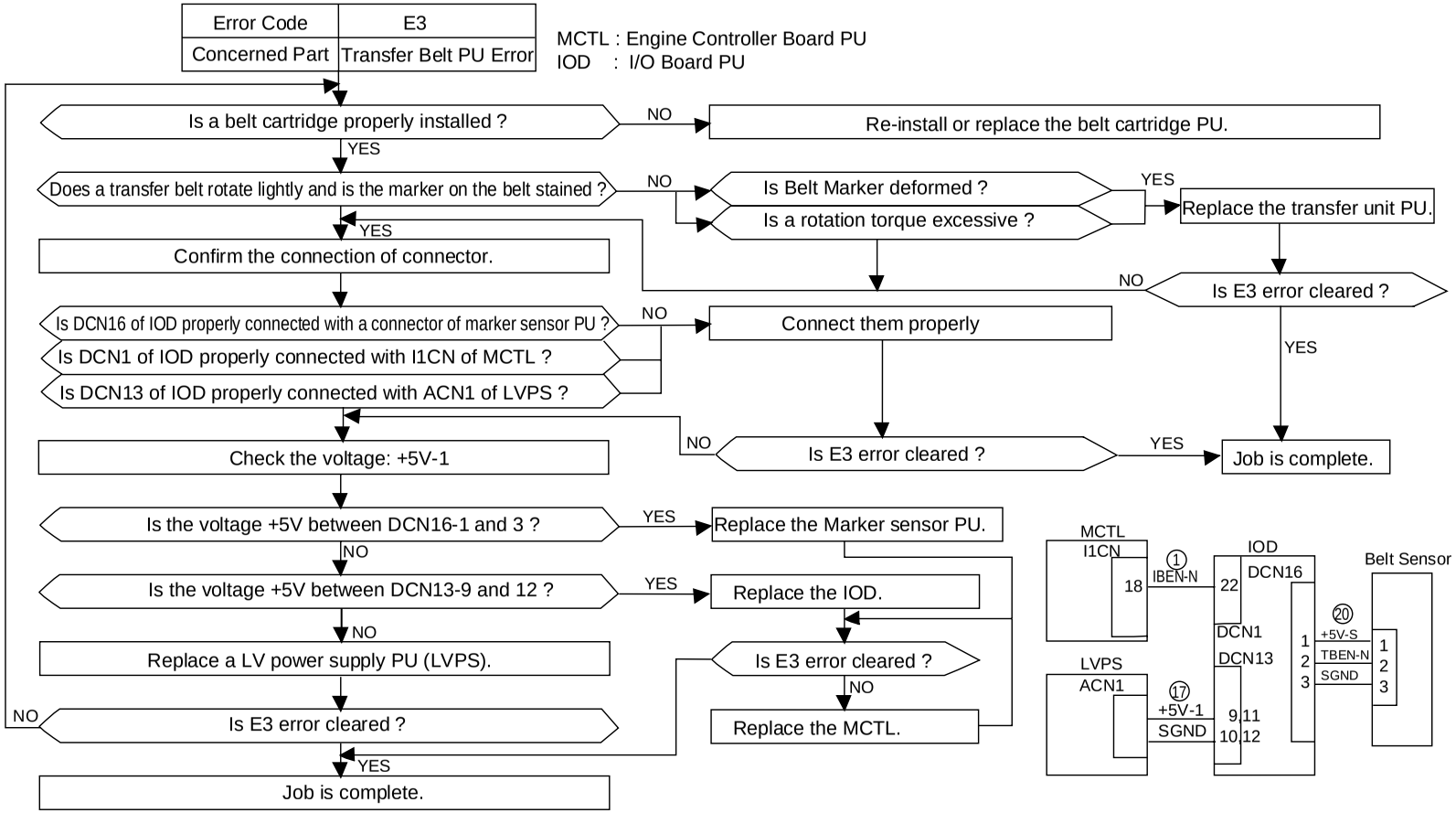




Cause of E2 Error
① MMRDY-N and MMCLK singnal from the main motor is not inputted to IOD; Connection failure of harness.
② MMRDY-N and MMCLK singnal is not outputted due to the breakdown of main motorʼs control circuit.; Main motor failure.
③ IOD break down.

Error Code	E3
Concerned Part	Transfer Belt PU Error

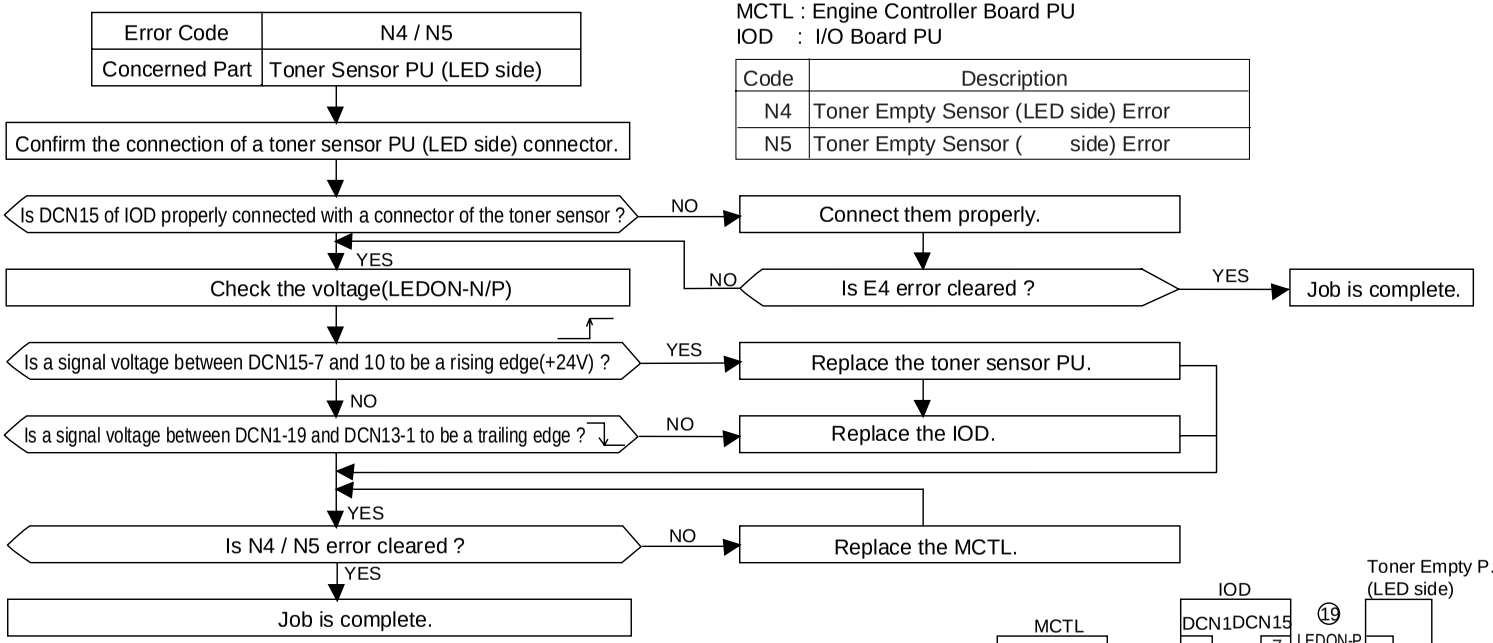
MCTL : Engine Controller Board PU
IOD : I/O Board PU

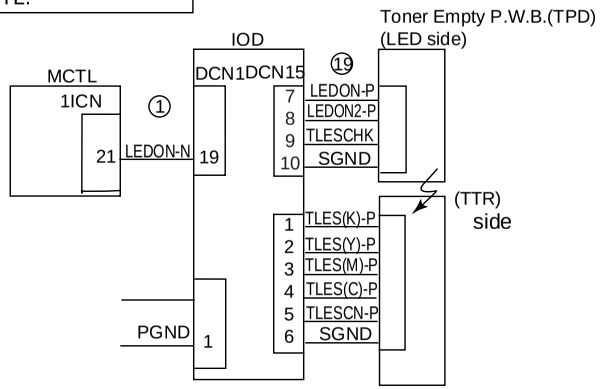


Error Code	N4 / N5
Concerned Part	Toner Sensor PU (LED side)

MCTL : Engine Controller Board PU
IOD : I/O Board PU

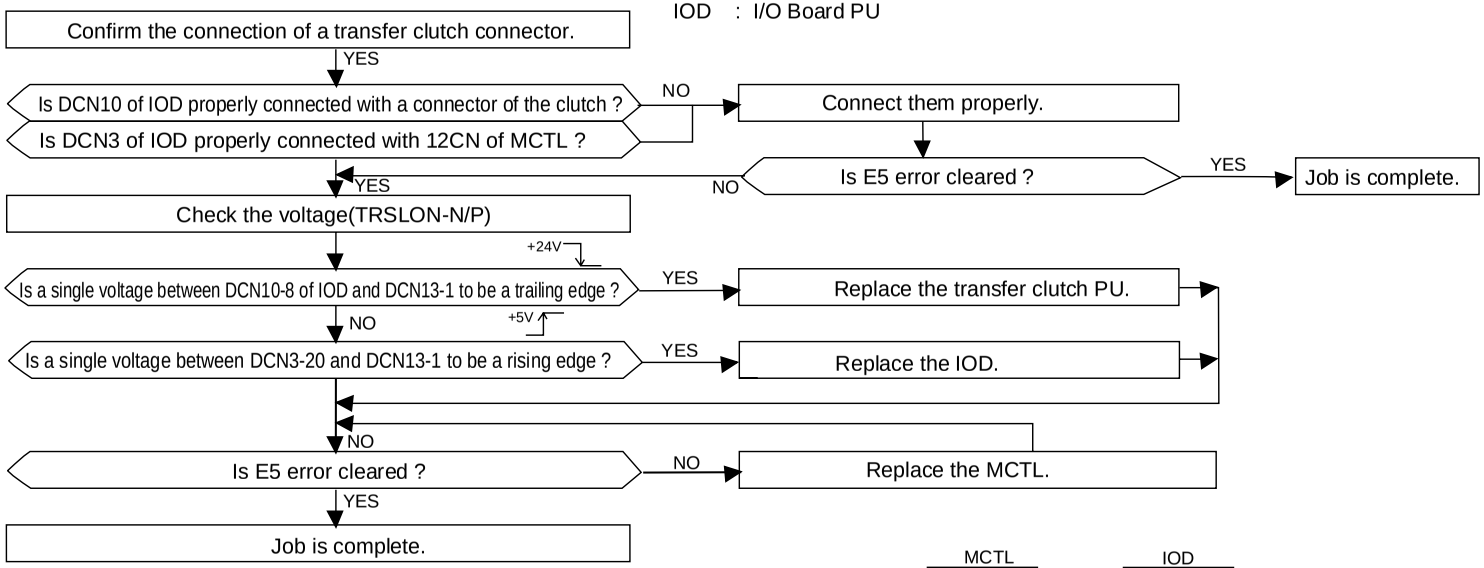
Code	Description
N4	Toner Empty Sensor (LED side) Error
N5	Toner Empty Sensor (side) Error

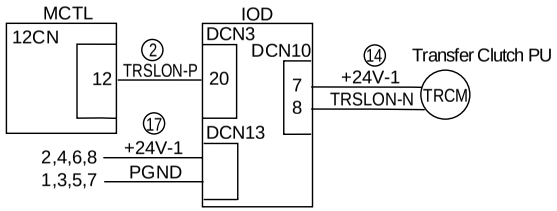




Error Code	E5
Concerned Part	Transfer Clutch PU (TRCM)

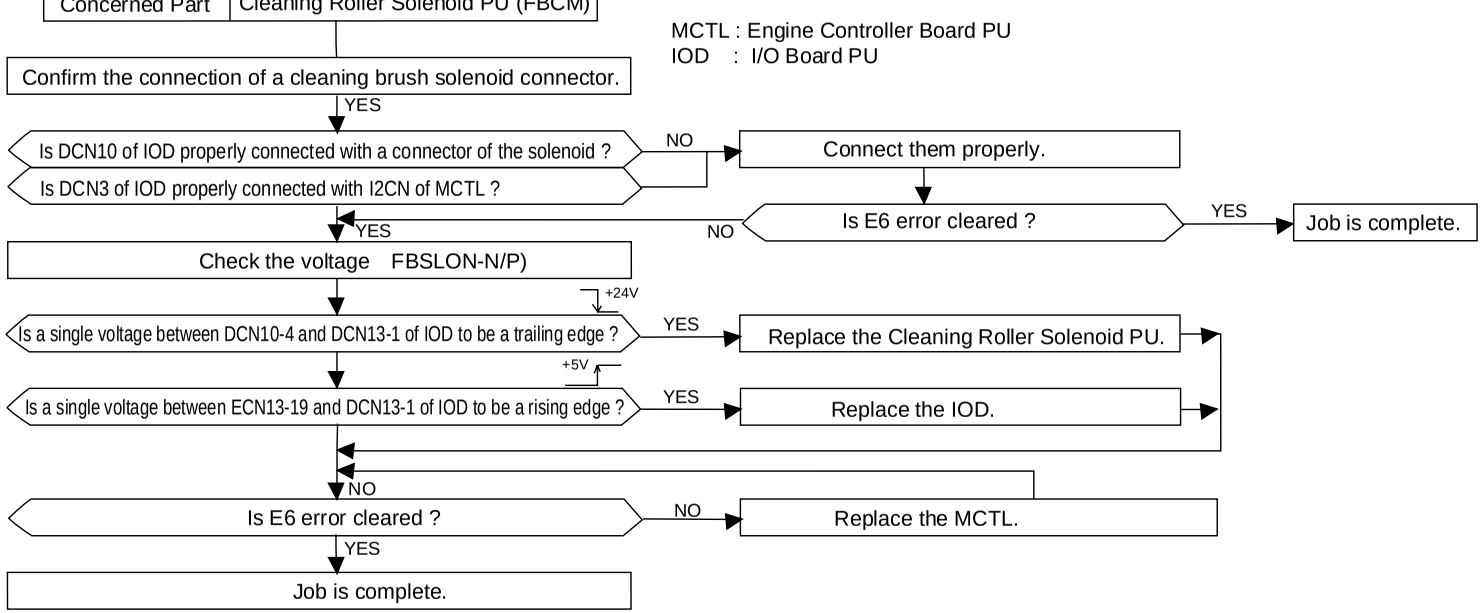
MCTL : Engine Controller Board PU
IOD : I/O Board PU

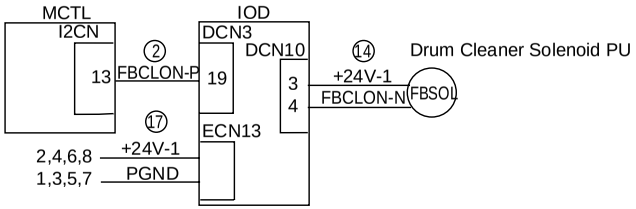




Error Code	E6
Concerned Part	Cleaning Roller Solenoid PU (FBCM)

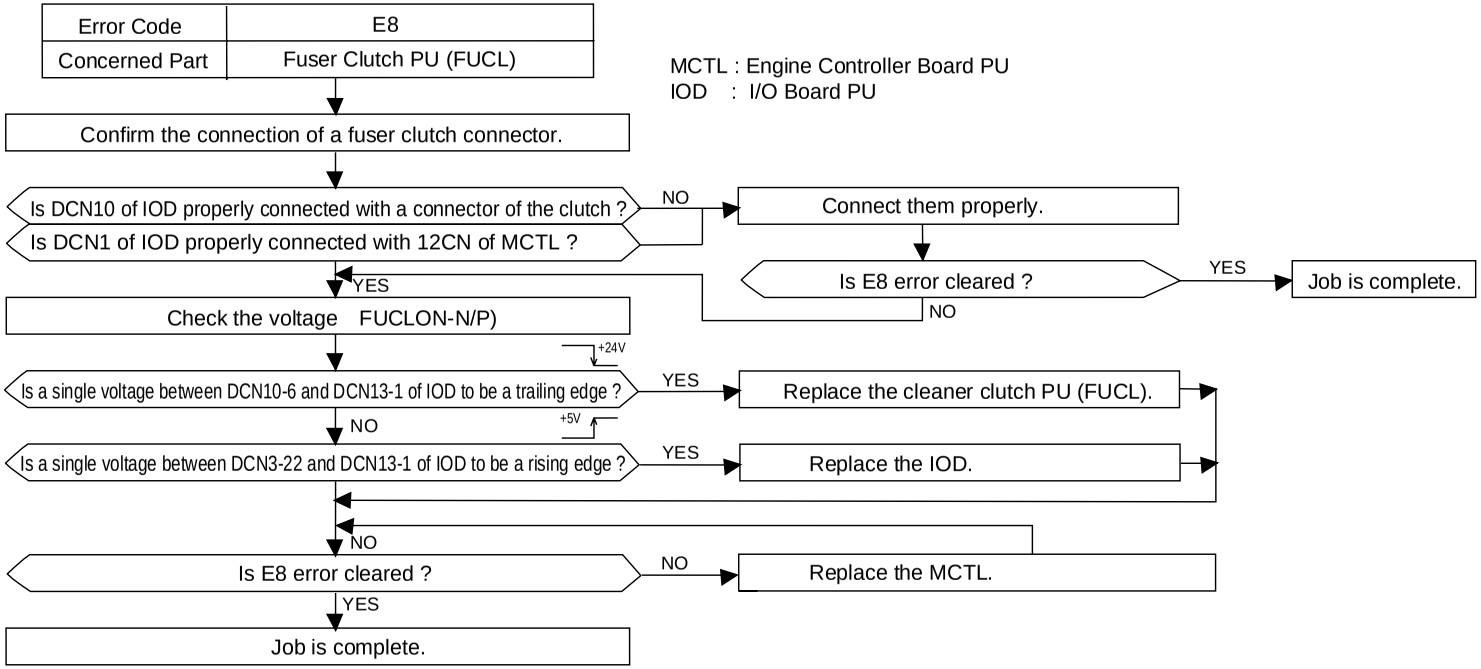
MCTL : Engine Controller Board PU
IOD : I/O Board PU

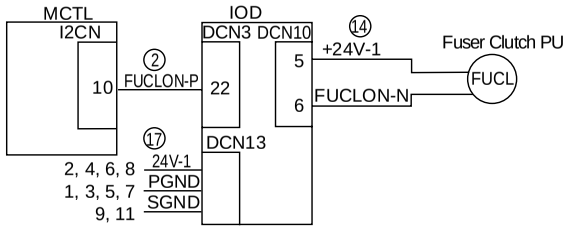




Error Code	E8
Concerned Part	Fuser Clutch PU (FUCL)

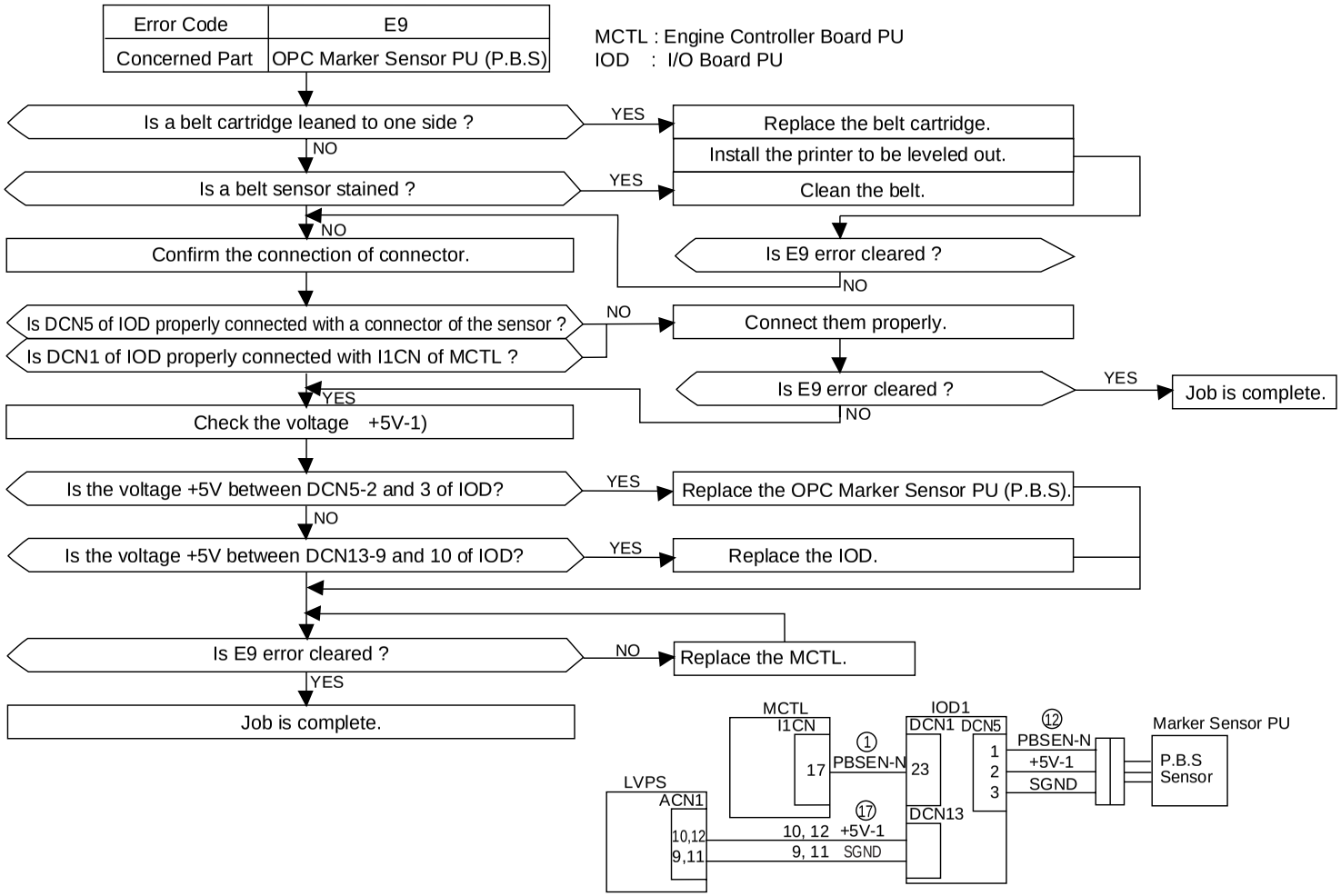
MCTL : Engine Controller Board PU
IOD : I/O Board PU





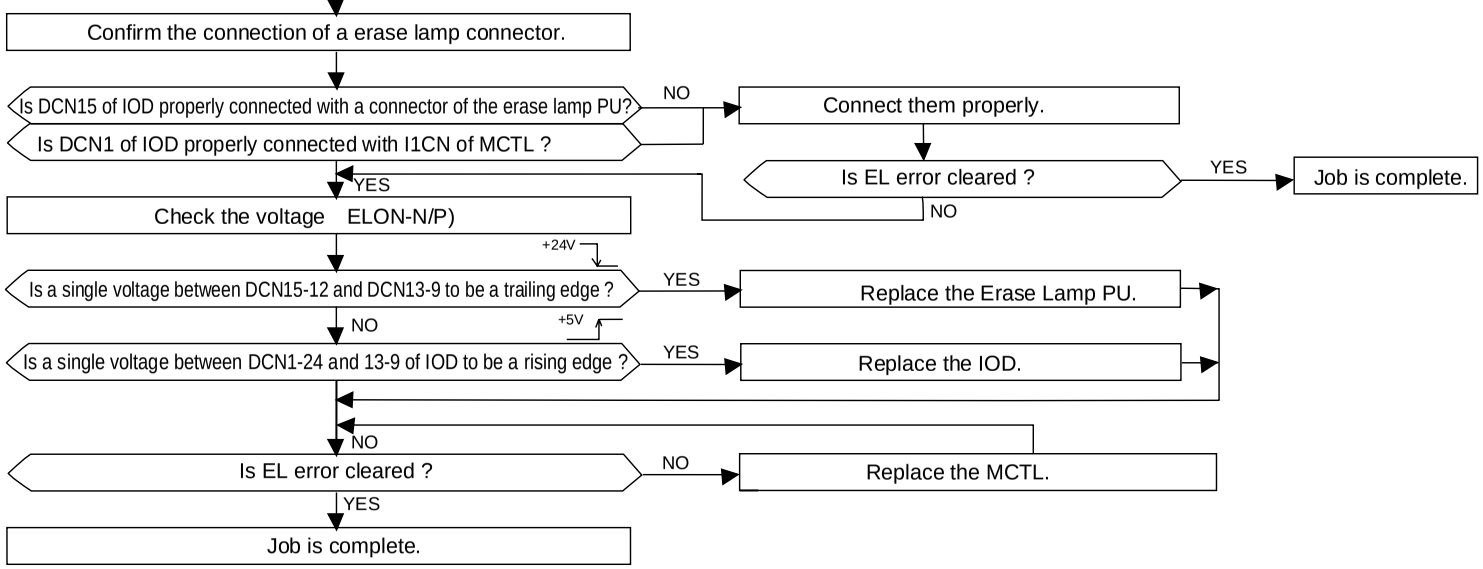
Error Code	E9
Concerned Part	OPC Marker Sensor PU (P.B.S)

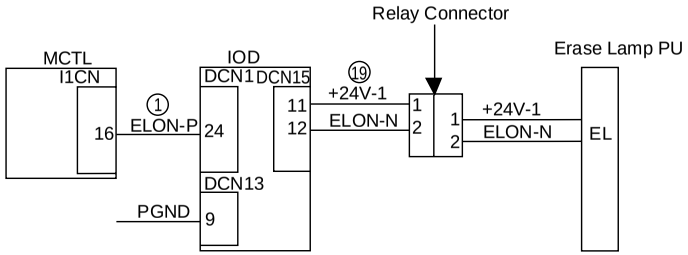
MCTL : Engine Controller Board PU
IOD : I/O Board PU



Error Code	EL
Concerned Part	Erase Lamp PU Error

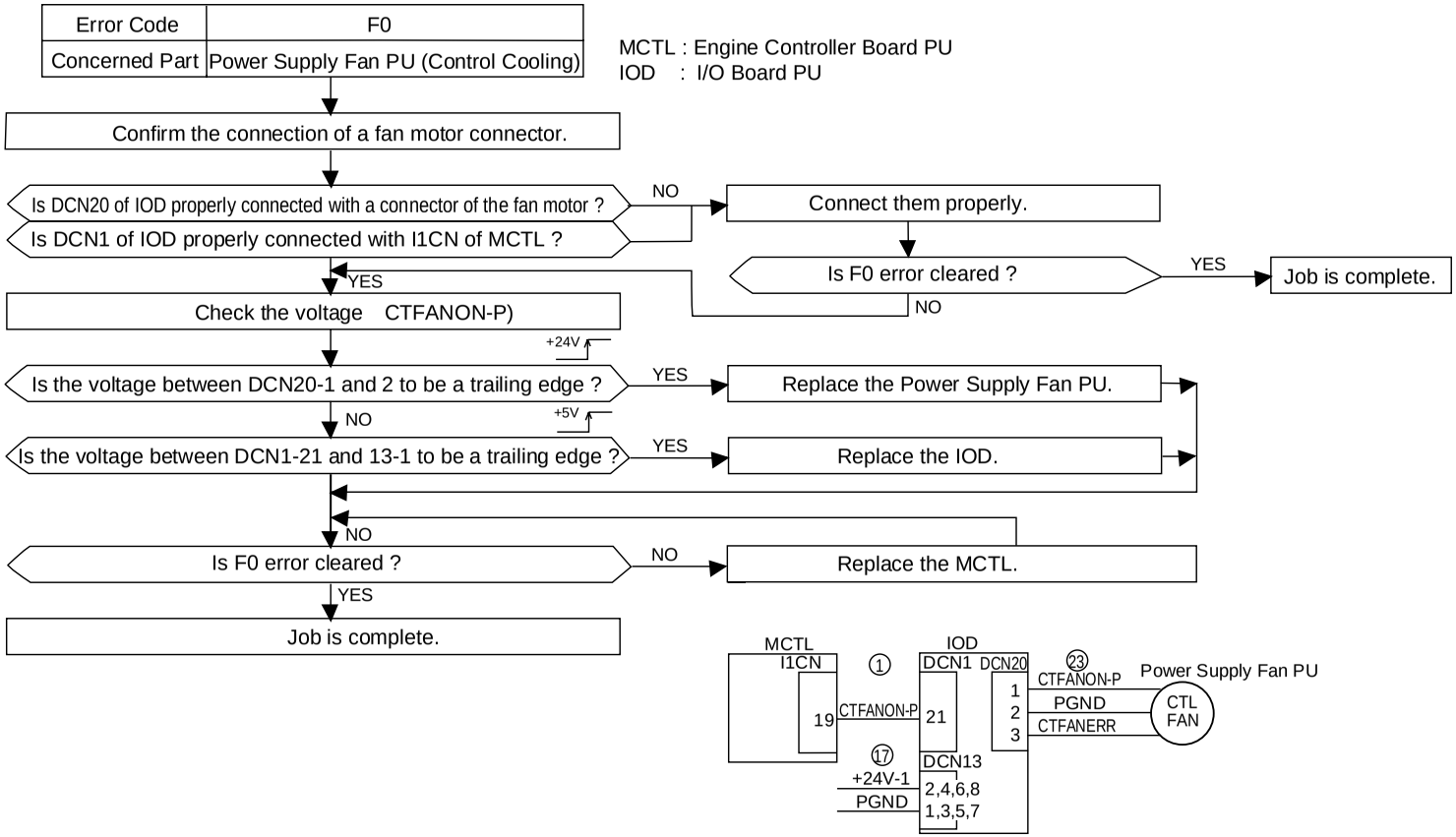
MCTL : Engine Controller Board PU
IOD : I/O Board PU





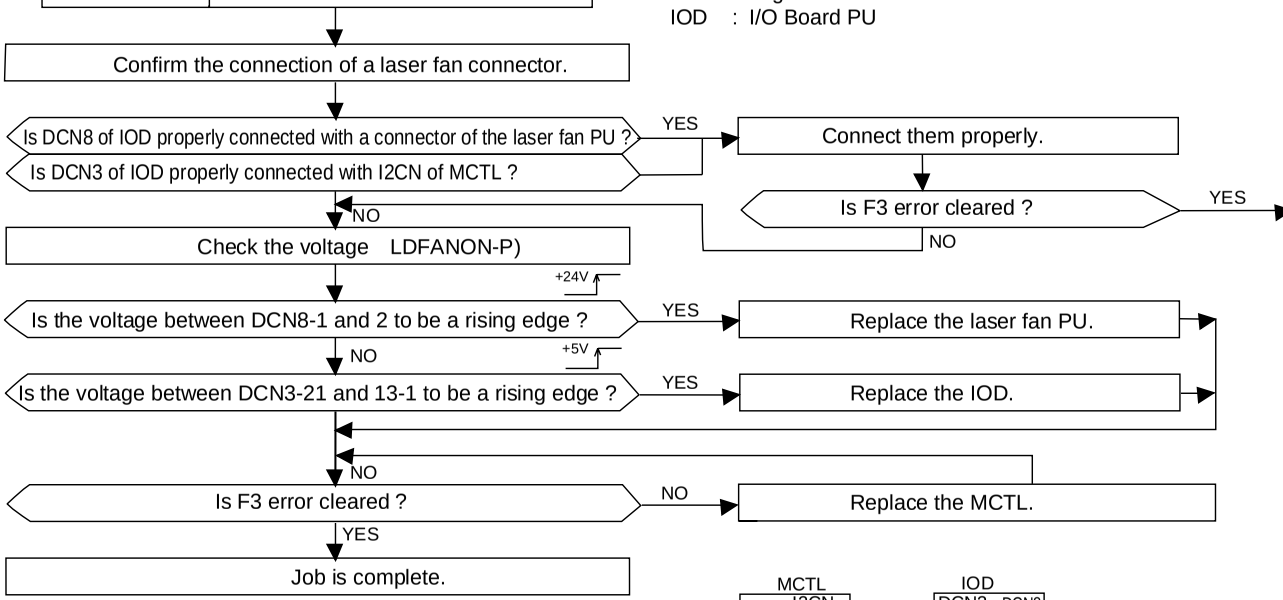
Error Code	F0
Concerned Part	Power Supply Fan PU (Control Cooling)

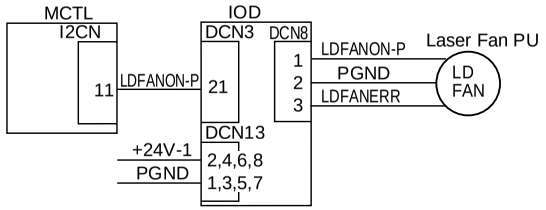
MCTL : Engine Controller Board PU
IOD : I/O Board PU



Error Code	F3
Concerned Part	Laser Fan PU

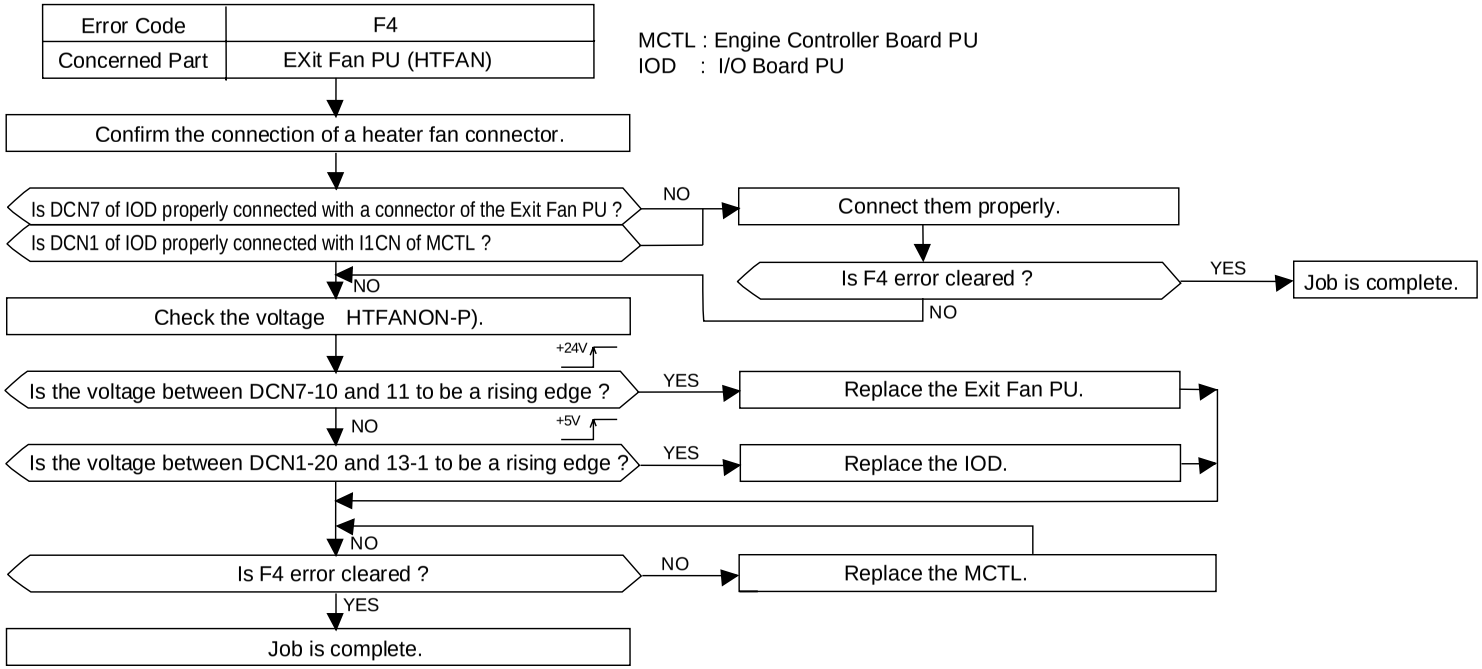
MCTL : Engine Controller Board PU
IOD : I/O Board PU

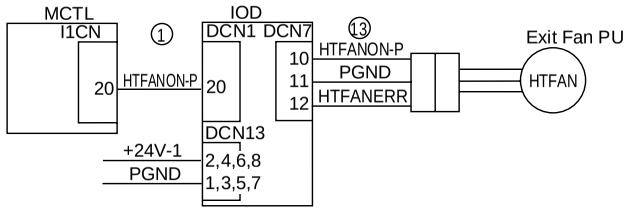




Error Code	F4
Concerned Part	EXit Fan PU (HTFAN)

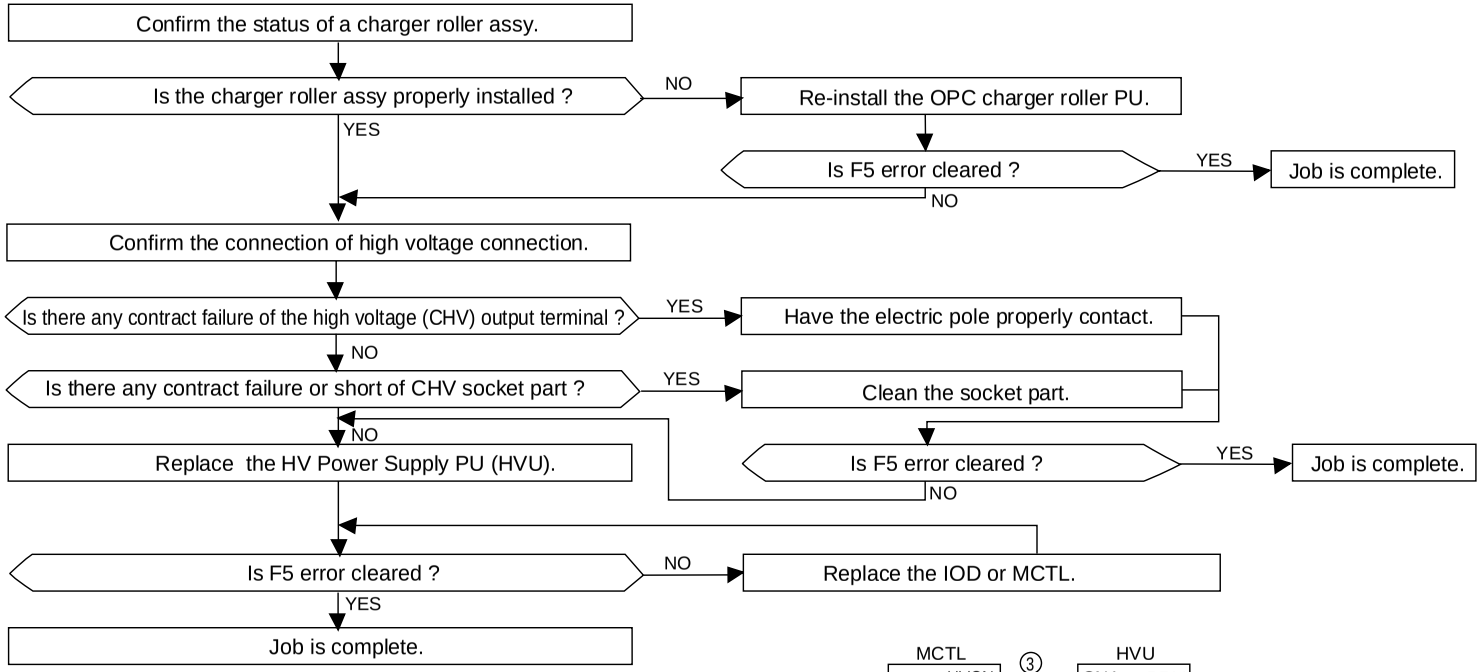
MCTL : Engine Controller Board PU
IOD : I/O Board PU

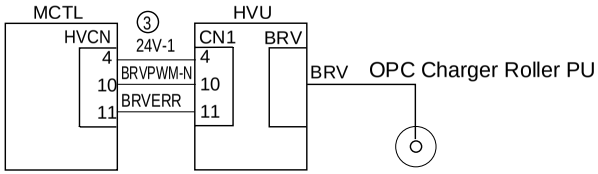




Error Code	F5
Concerned Part	HV Power Supply PU (HVU)

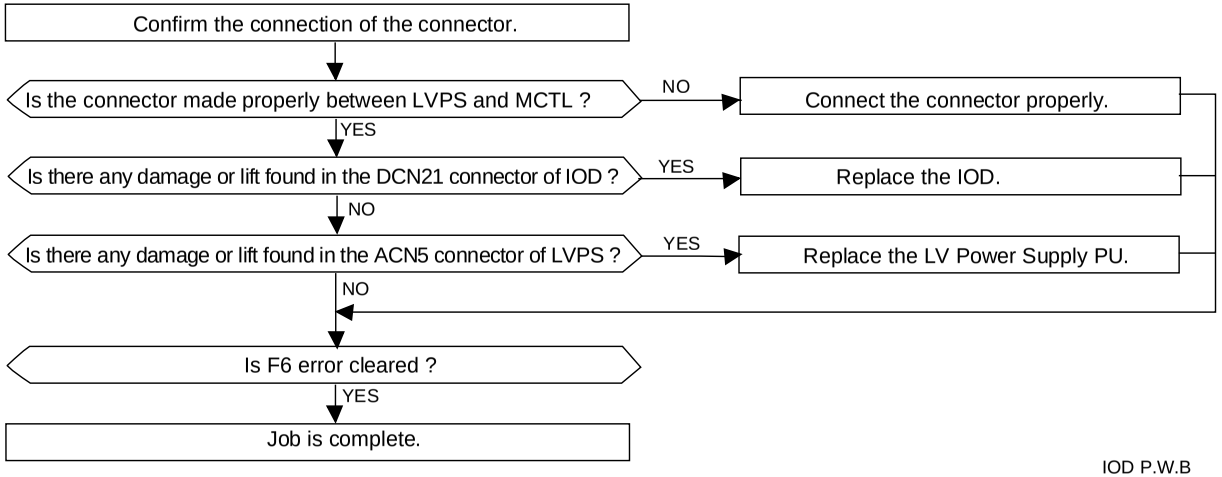
MCTL : Engine Controller Board PU
IOD : I/O Board PU

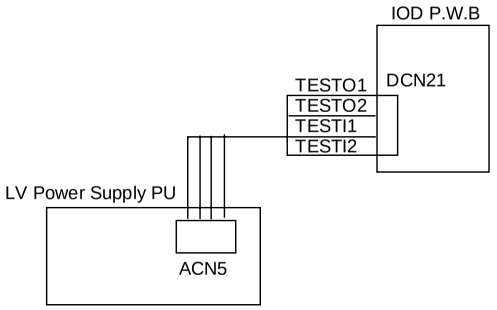


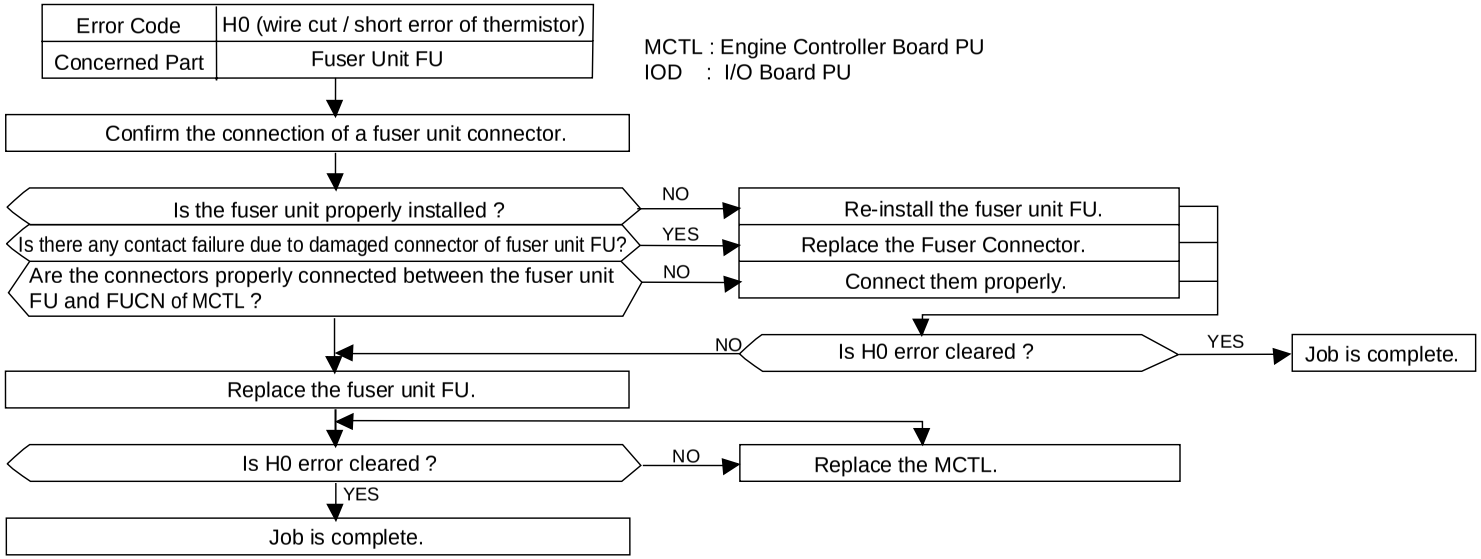


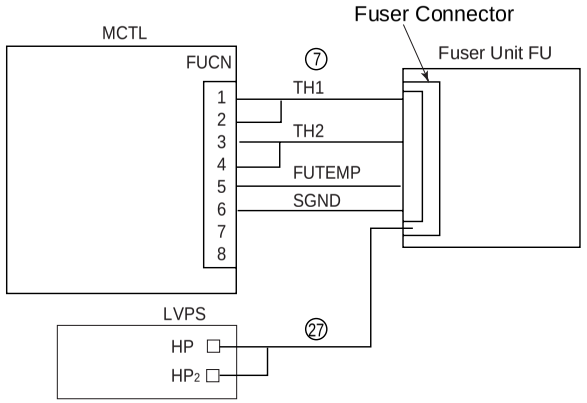
Error Code	F6
Concerned Part	LV Power Supply PU (LVPS)

MCTL : Engine Controller Board PU
IOD : I/O Board PU
LVPS : LV Power Supply PU





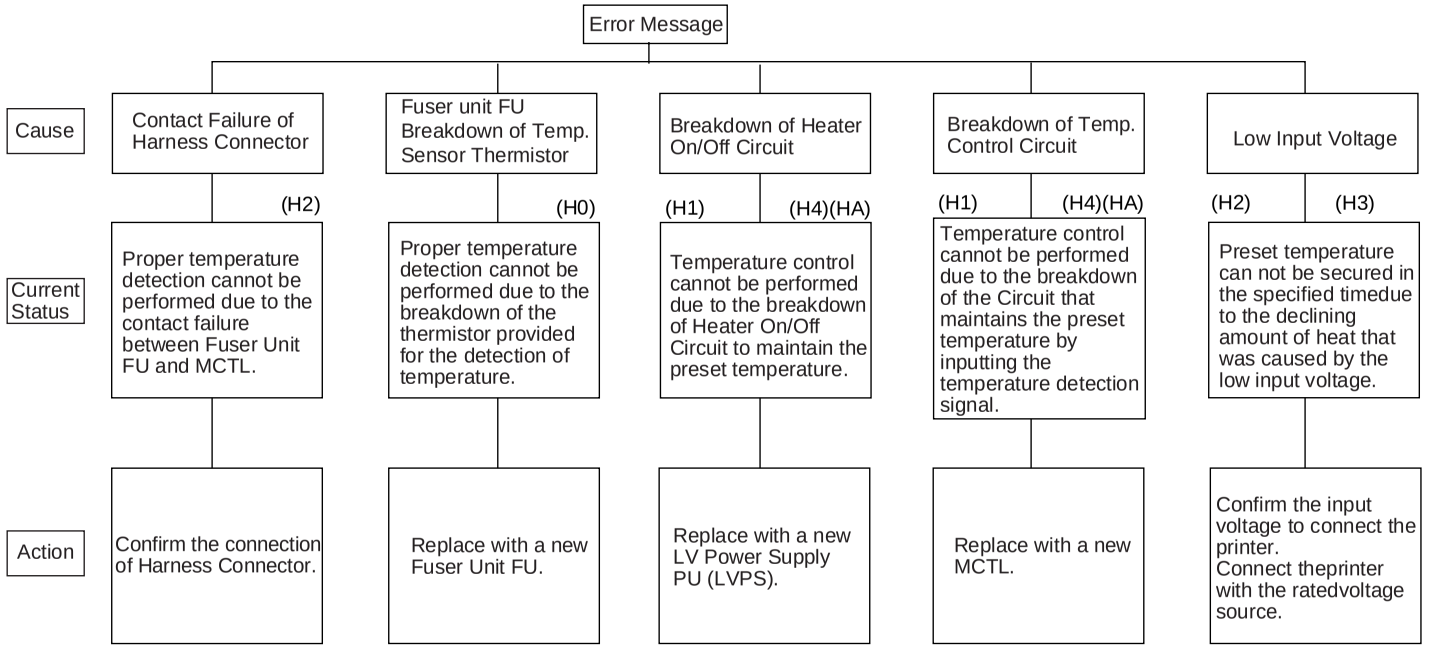

Error Code
H0 (wire cut / short error of thermistor)
Concerned Part
Fuser Unit FU
MCTL : Engine Controller Board PU
IOD : I/O Board PU
Confirm the connection of a fuser unit connector.
Is the fuser unit properly installed ?
NO
Re-install the fuser unit FU.
Is there any contact failure due to damaged connector of fuser unit FU?
YES
Replace the Fuser Connector.
Are the connectors properly connected between the fuser unit FU and FUCN of MCTL ?
NO
Connect them properly.
NO
Is H0 error cleared ?
YES
Job is complete.
Replace the fuser unit FU.
Is H0 error cleared ?
NO
Replace the MCTL.
YES
Job is complete.

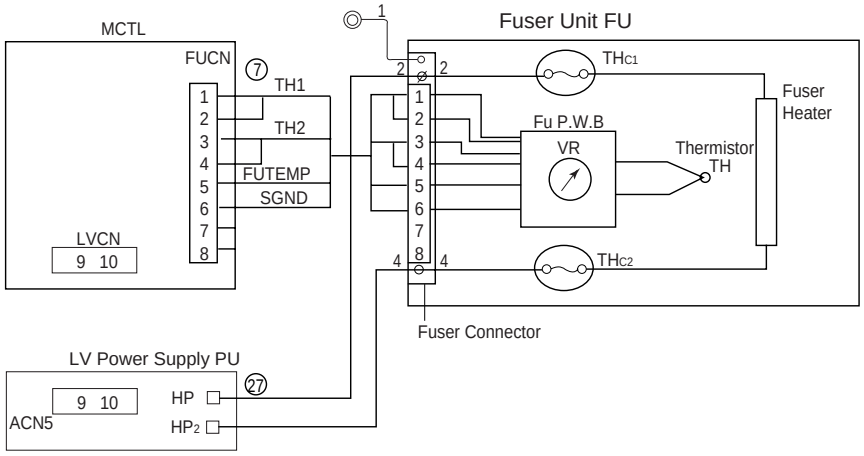

Fuser Connector
MCTL
FUCN
Fuser Unit FU
⑦
1
2
3
4
5
6
7
8
TH1
TH2
FUTEMP
SGND
LVPS
⑰
HP
HP2

Error Code	H1, H2, H3, H4, HA
Concerned Part	Fuser Unit FU, LV Power Supply PU and MCTL

MCTL : Engine Controller Board PU
IOD : I/O Board PU

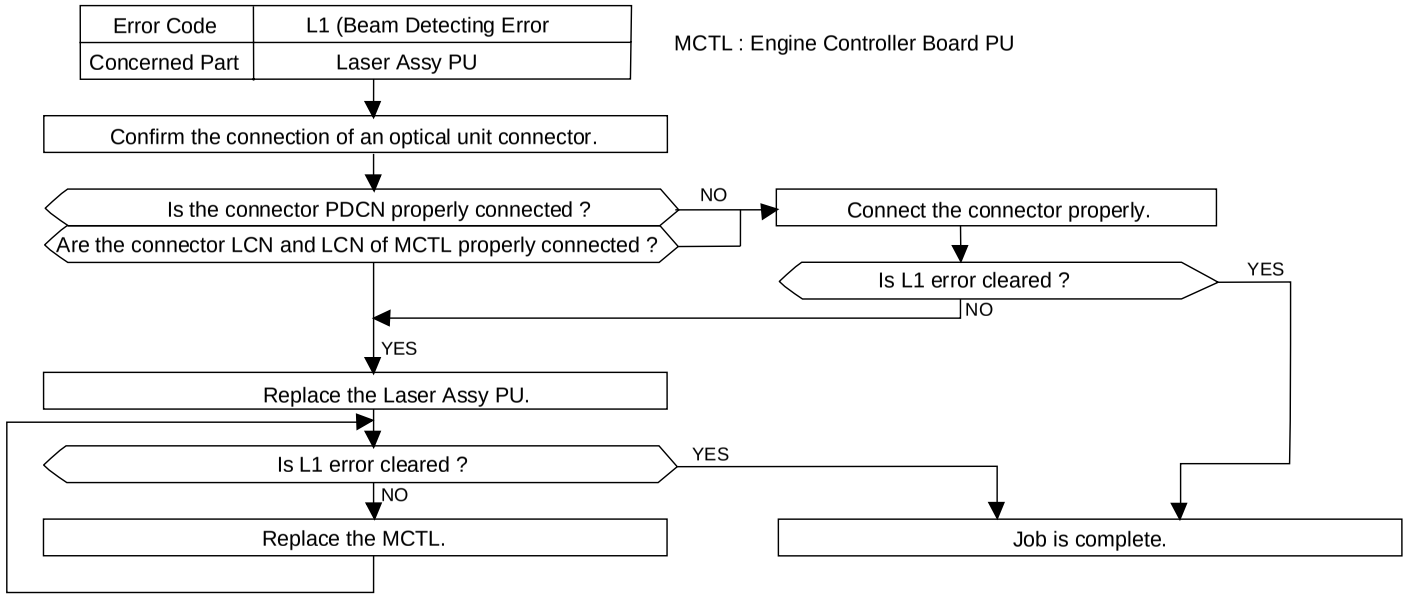
Code	Description
H0	Thermistor is failure.
H1	Abnormal temperature continued for more than the specified time.
H2	Warming-up was not completed within the specified time.
H3	Lower temperature continued for more than the specified time.
H4	Higher temperature continued for more than the specified time.
HA	AC relay turned off due to the abnormal temperature.

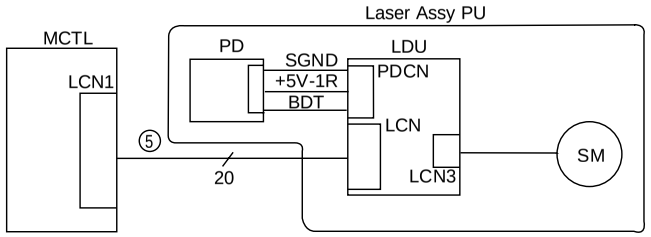


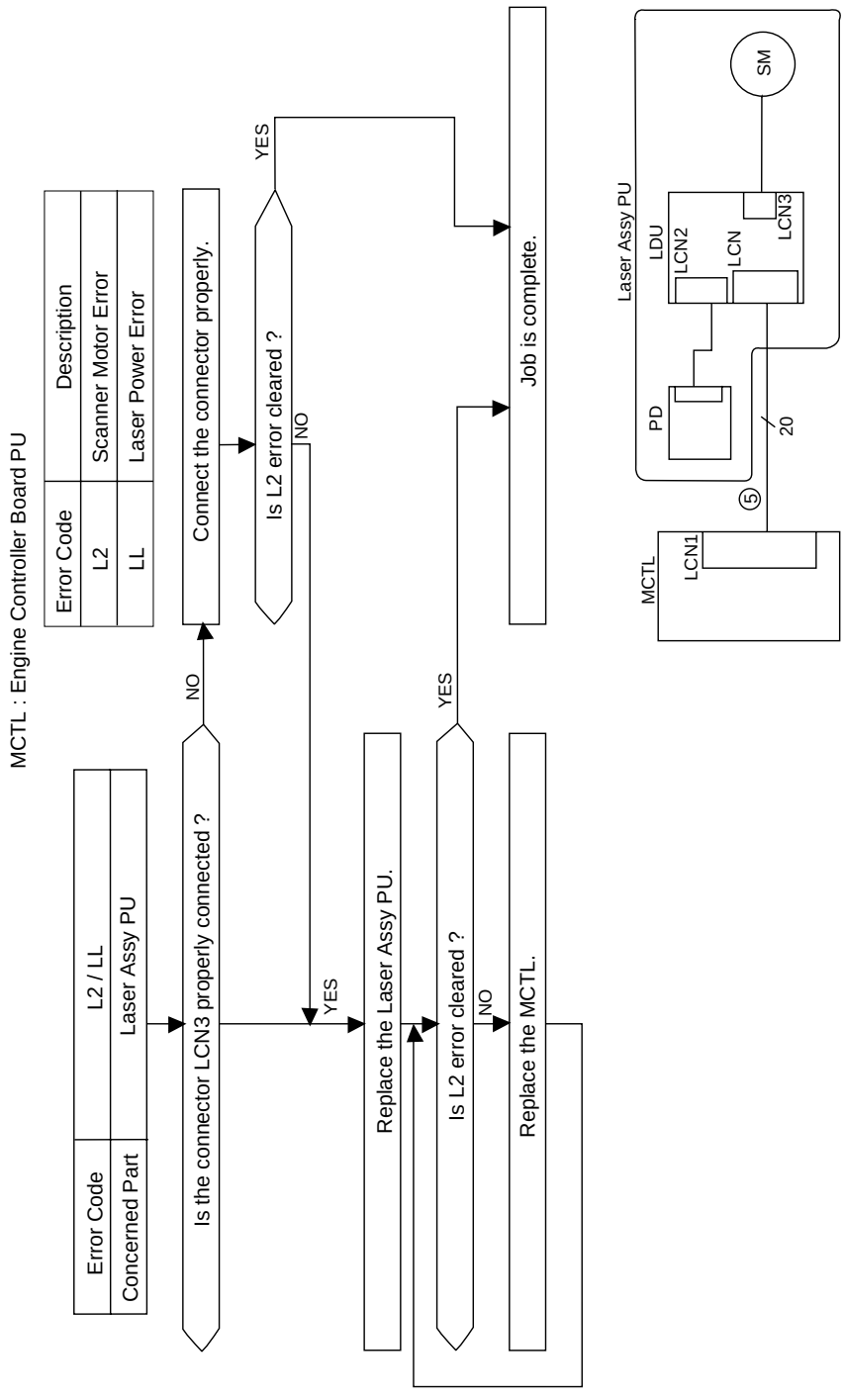

MCTL
FUCN
7
TH1
TH2
FUTEMP
SGND
1
2
3
4
5
6
7
8
LVCN
9 10
LV Power Supply PU
27
9 10
ACN5
HP
HP2
1
Fuser Unit FU
2
2
1
2
3
4
5
6
7
8
4
4
THC1
THC2
Fu P.W.B
VR
Thermistor
TH
Fuser
Heater
Fuser Connector

Error Code	L1 (Beam Detecting Error
Concerned Part	Laser Assy PU

MCTL : Engine Controller Board PU





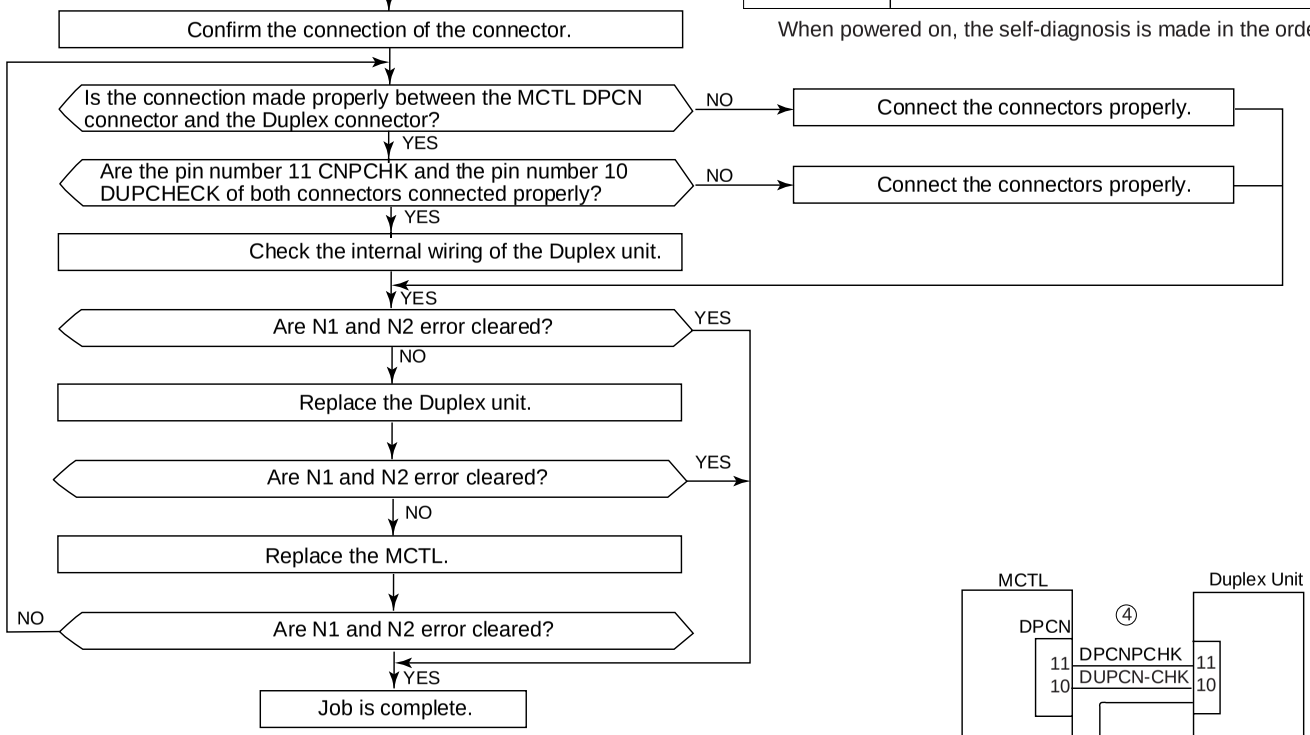

MCTL : Engine Controller Board PU
Error Code
Concerned Part
L2 / LL
Laser Assy PU
Is the connector LCN3 properly connected ?
NO
Connect the connector properly.
Is L2 error cleared ?
YES
NO
Job is complete.
YES
Replace the Laser Assy PU.
Is L2 error cleared ?
YES
NO
Replace the MCTL.
Error Code
Description
L2
Scanner Motor Error
LL
Laser Power Error
Laser Assy PU
LDU
LCN2
LCN
LCN3
SM
PD
20
⑤
MCTL
LCN1

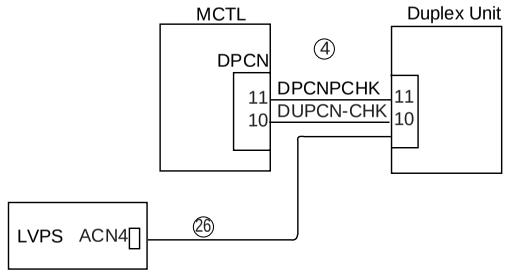
MCTL : Engine Controller Board PU

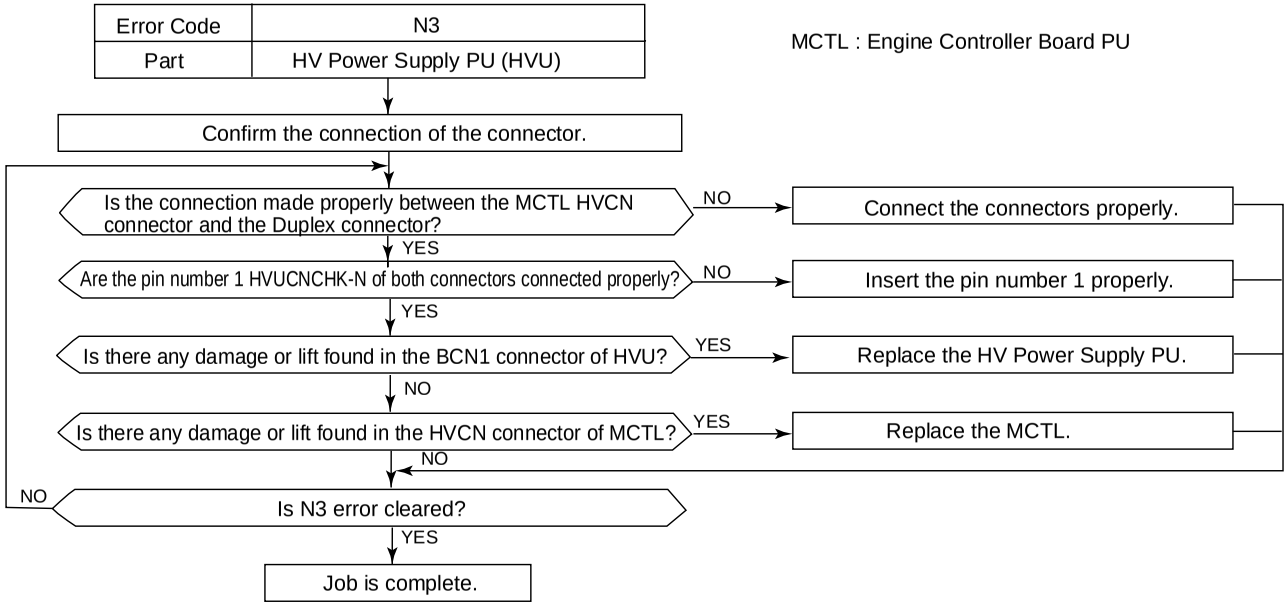
Error Code	Description
N1	Connection failure of the connector to the Duplex unit. (pop-out or cut)
N2	Connection failure of the connector to the Duplex unit. (pop-out or cut)

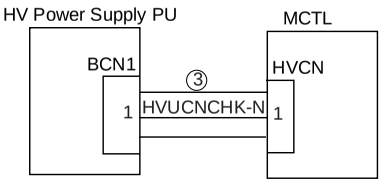
When powered on, the self-diagnosis is made in the order of N1 and N2.

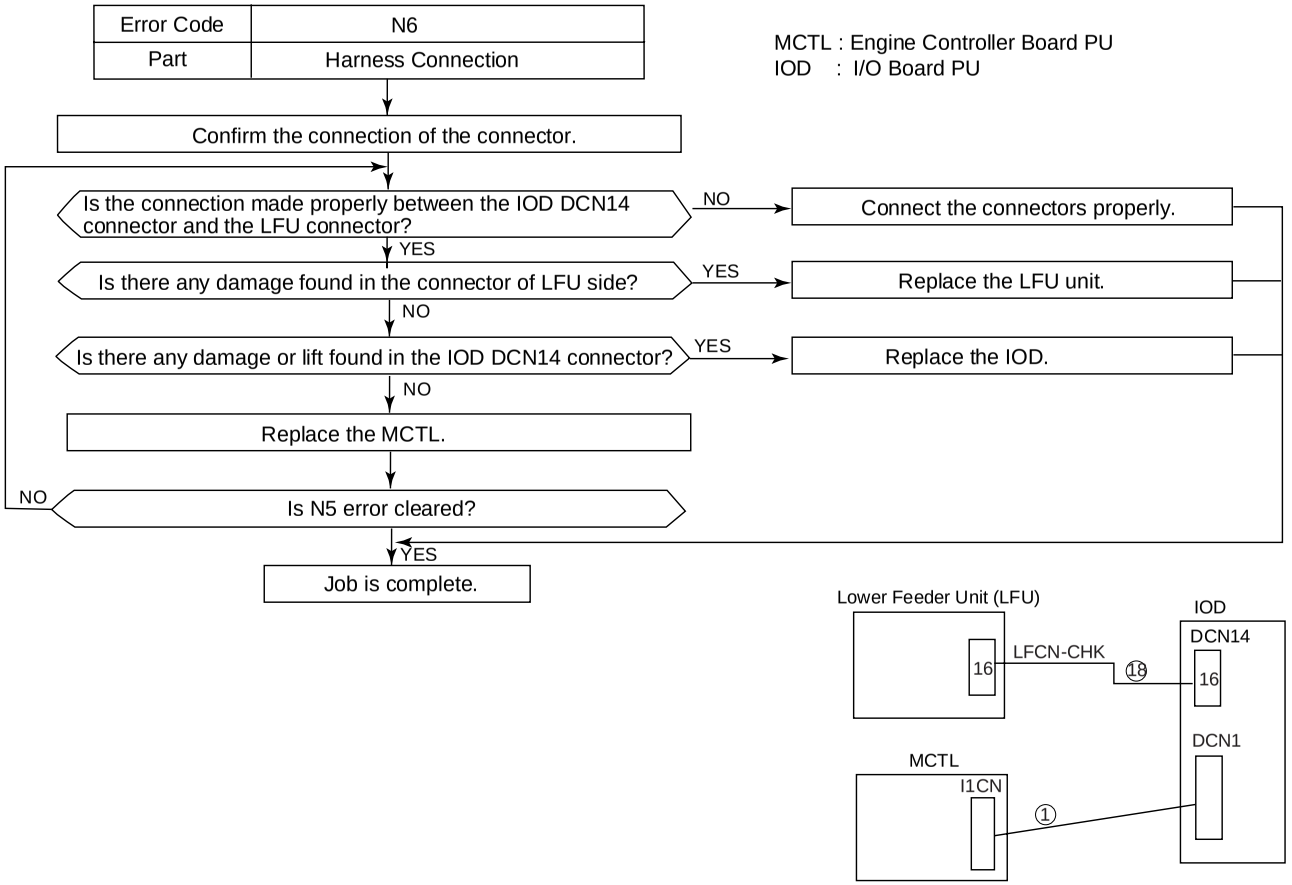
Error Code	N1/N2
Description	Harness Connection (DPCN)



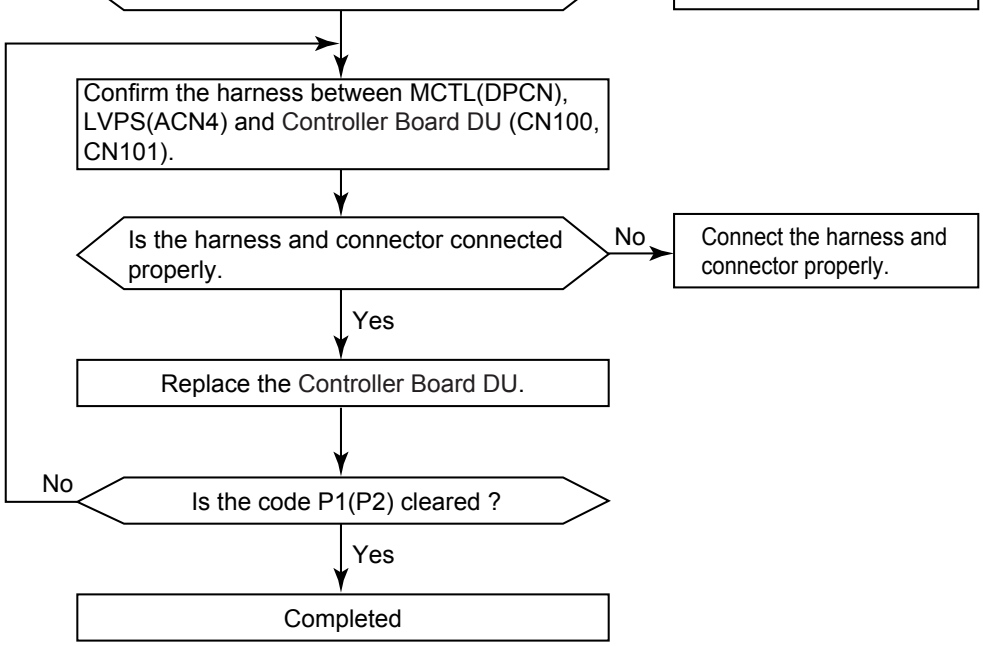


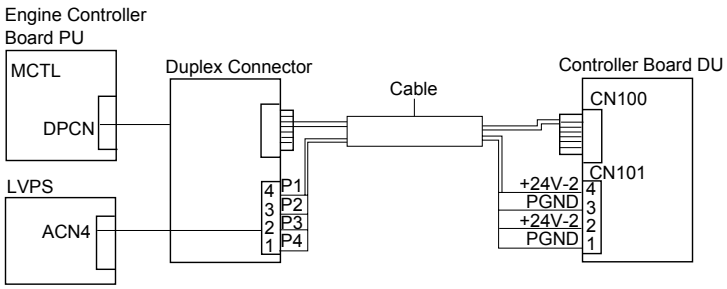

Error Code
N3
Part
HV Power Supply PU (HVU)
MCTL : Engine Controller Board PU
Confirm the connection of the connector.
Is the connection made properly between the MCTL HVCN connector and the Duplex connector?
NO
Connect the connectors properly.
YES
Are the pin number 1 HVUCNCHK-N of both connectors connected properly?
NO
Insert the pin number 1 properly.
YES
Is there any damage or lift found in the BCN1 connector of HVU?
YES
Replace the HV Power Supply PU.
NO
Is there any damage or lift found in the HVCN connector of MCTL?
YES
Replace the MCTL.
NO
NO
Is N3 error cleared?
YES
Job is complete.


HV Power Supply PU
MCTL
BCN1
HVCN
③
1
HVUCNCHK-N
1

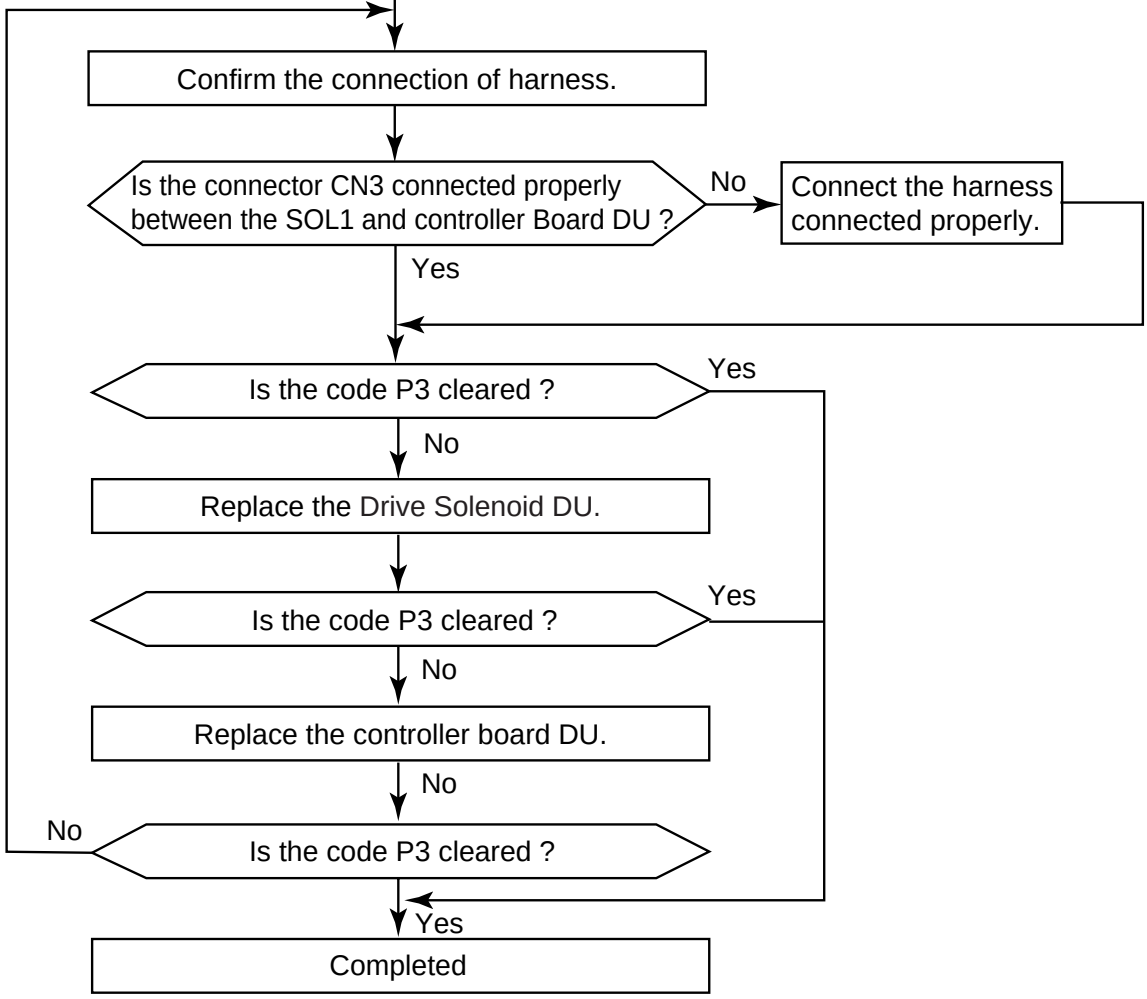

Error Code
N6
Part
Harness Connection
MCTL : Engine Controller Board PU
IOD : I/O Board PU
Confirm the connection of the connector.
Is the connection made properly between the IOD DCN14 connector and the LFU connector?
NO
Connect the connectors properly.
YES
Is there any damage found in the connector of LFU side?
YES
Replace the LFU unit.
NO
Is there any damage or lift found in the IOD DCN14 connector?
YES
Replace the IOD.
NO
Replace the MCTL.
NO
Is N5 error cleared?
YES
Job is complete.
Lower Feeder Unit (LFU)
16
LFCN-CHK
⑱
IOD
DCN14
16
DCN1
MCTL
I1CN
①

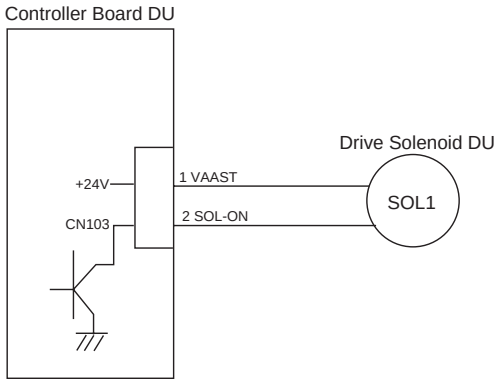
Error Code	P1, P2
Part Name	Controller Board DU



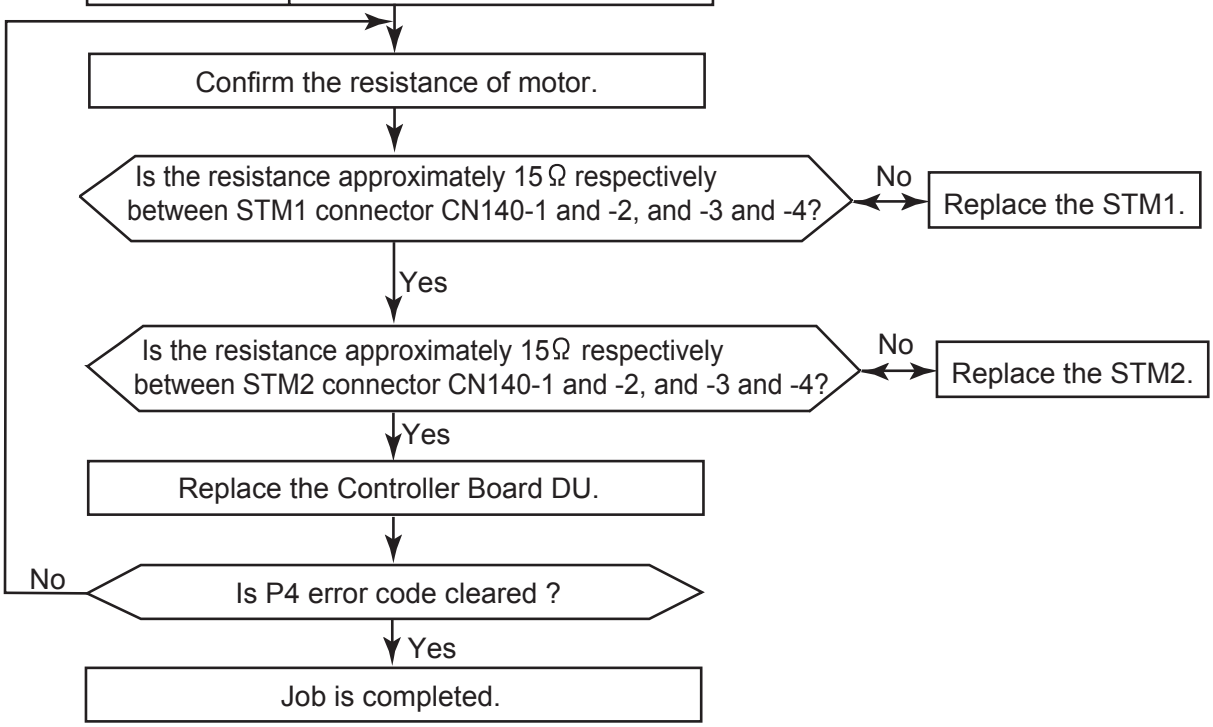


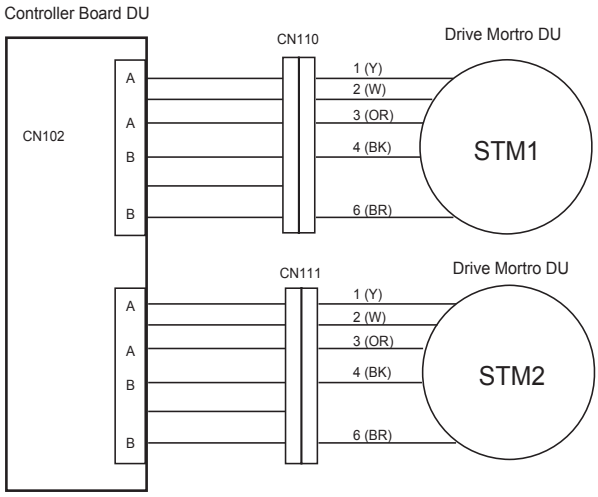
Error Code	P3
Part Name	Drive Solenoid DU (SOL1)



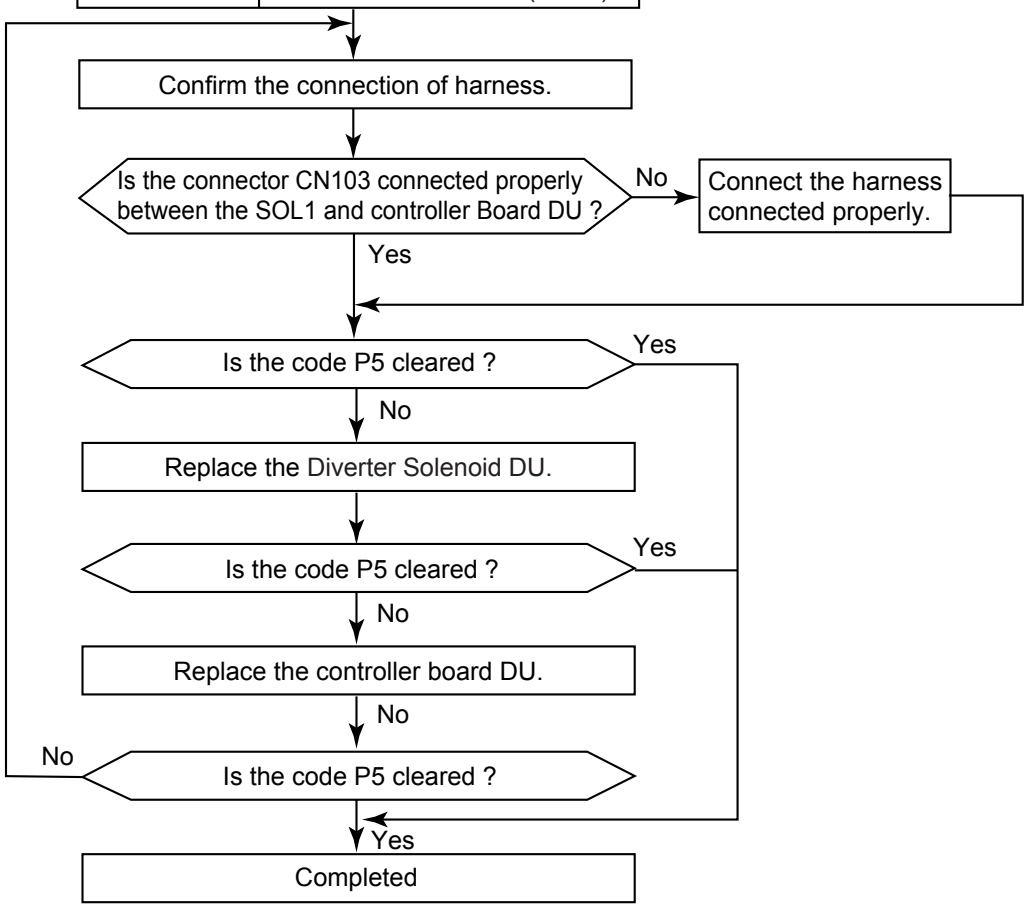


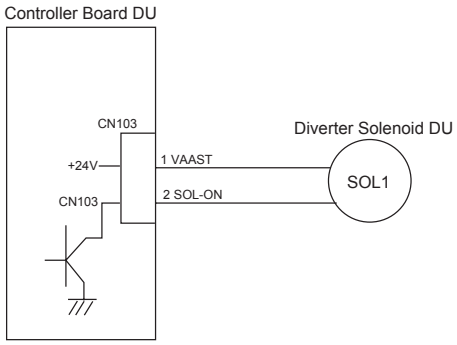
Error Code	P4
Part Name	Drive Motor DU





Error Code	P5
Part Name	Diverter Solenoid DU (SOL1)

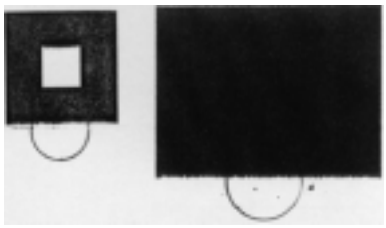




5. IMAGE FAILURE

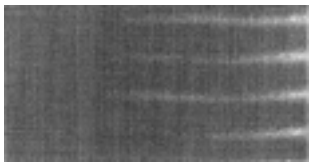
(1)

(2)

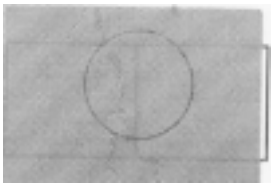


(3)

(4)

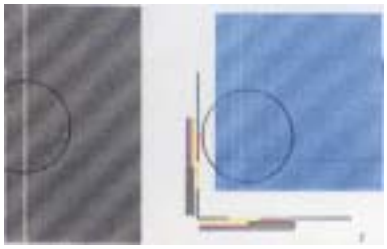


(5)



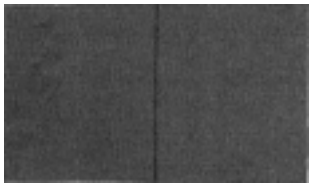
(6)

(7)



(8)

(9)



(10)

(11)

(12)

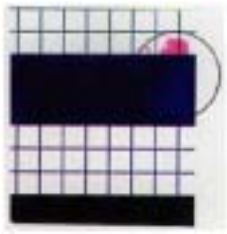
(13)

(14)

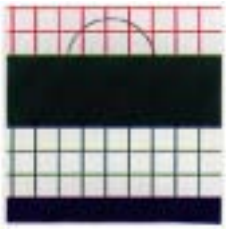
(15)-a

(15)-b

(16)

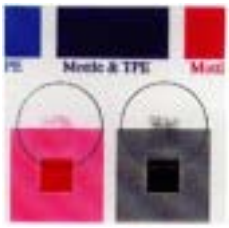


(17)



(18)

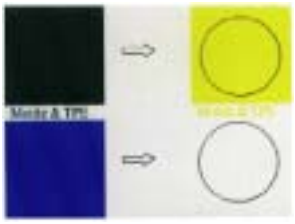
(19)



(20)

(21)

(22)



(23)

Fig.8-2

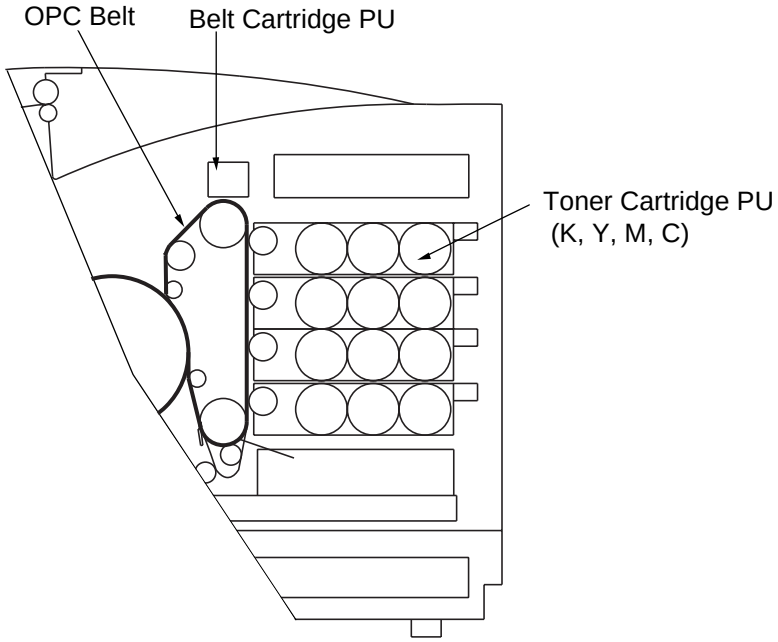
I-1	Background

Phenomenon

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

Main Causes

1) Too small charging amount in the development process.
2) Insufficient contact of the developer roller's bias pole.
3) Life or failure of the belt cartridge PU.
4) Failure of the HV power supply unit PU (HVU).



Countermeasures

1) Replace the toner cartridge Pu. (See Section 3.1 of Chapter III.)
2) Confirm if the developer bias pole is deformed or not.
3) Replace the belt cartridge Pu. (See Section 2.1 of Chapter VI.)
4) Replace the HV power supply unit (HVU).

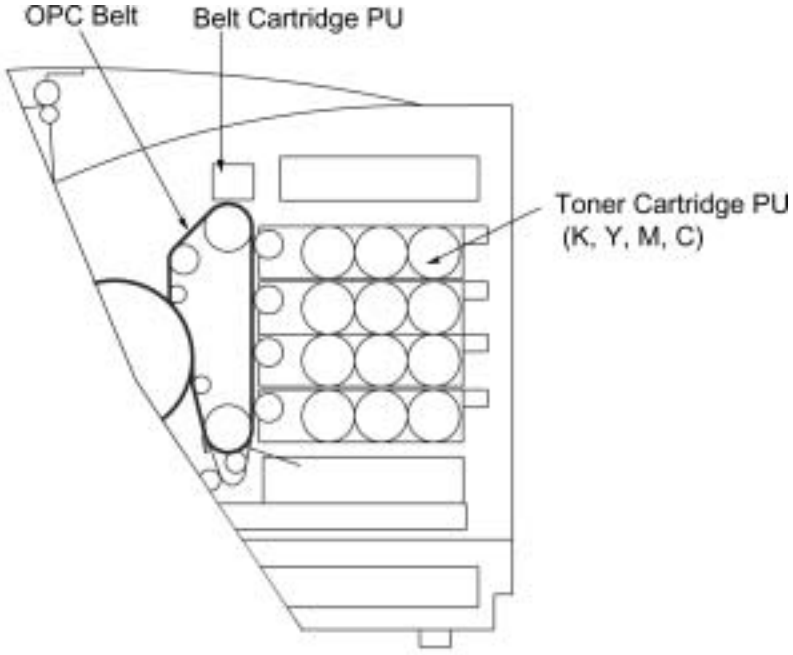
I-2	Missing Image at Edge

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 amount and charging amount in the development process.
2) The OPC belt is deformed as waving.



Countermeasures

1) Replace the toner cartridge PU with a brand new toner cartridge PU.
2) Replace the belt cartridge PU with a brand new belt cartridge PU.

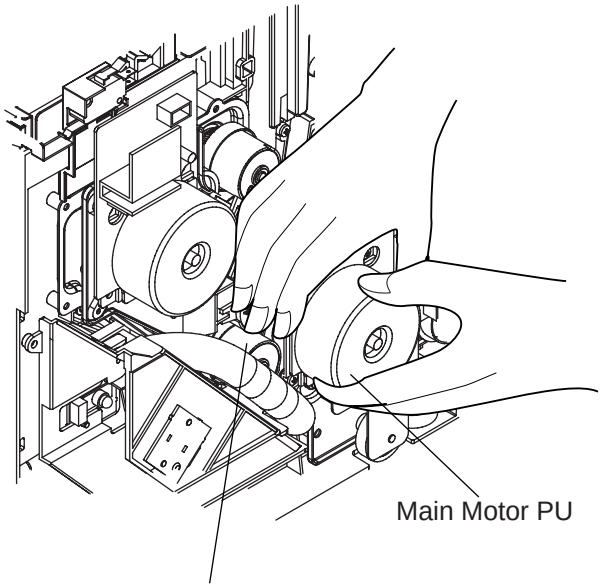
I-3	Jitter

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

1) Failure of main motor.
   1-1) Irregular rotation of the drive motor.
   1-2) Failure of the OPC drive gear ASSY PU.
   1-3) Variation of OPC belt running speed due to above reasons.
2) Failure of the belt cartridge PU.
3) Failure of the main drive gear ASSY PU.
4) Failure of the developer drive ASSY PU.



Countermeasures

1) Replace the OPC drive gear ASSY PU with a new OPC drive gear ASSY PU
2) Replace the belt cartridge PU with a new belt cartridge PU.
3) Replace the main drive gear ASSY PU with a new main drive gear ASSY PU.
4) Replace the developer drive ASSY PU with a new developer drive ASSY PU.

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 PU is insufficient.
3) Toner cartridge PU is not laid as level, and as the result, toner concentrates to one side.
4) The rear cover ASSY is not properly closed.
5) The OPC belt is off the truck and gets deformed.
6) Retract failure of the toner cartridge PU.

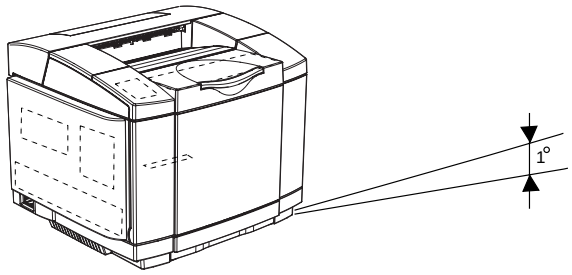


Fig.8-3

Countermeasures

1) Confirm the printer installation table to be flat and appropriate.
2) Shake the toner cartridge horizontally for several times to remedy the concentration.
3) Replace the toner cartridge PU with a new cartridge PU.
4) Close the rear cover ASSY properly.
5) Replace the belt cartridge PU with a new belt cartridge PU.
6) Replace the developer retract solenoid PU with a new developer retract solenoid PU.

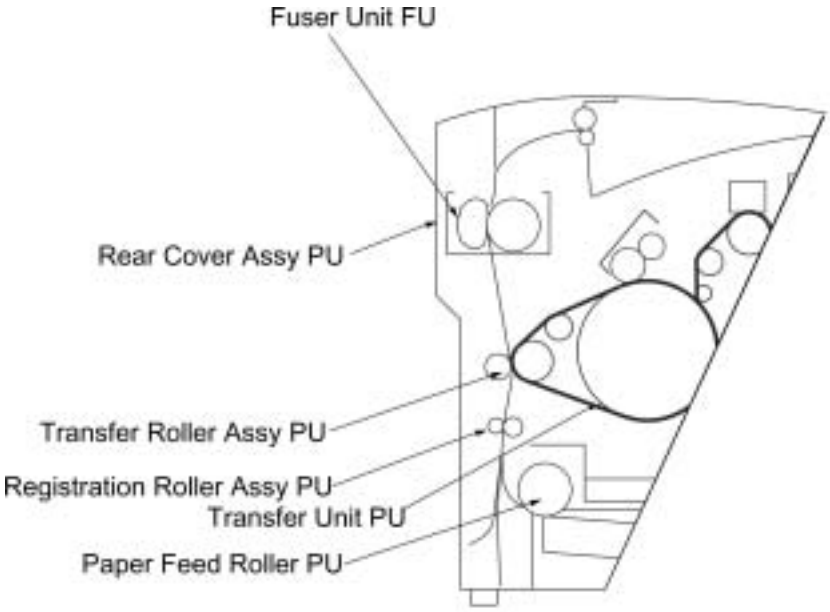
I-5	Wrinkle / Image Migration

Phenomenon

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

Main Causes

1) Paper in use is not a recommended paper, or is an abandoned paper.
2) The rear cover ASSY PU is not locked properly.
3) Fuser roller is deformed or reaches to the end of life.
4) One side of fuser unit FU is lifted when installed.



Countermeasures

1) Use a recommended paper or fresh paper from a paper bag.
2) Push the rear cover ASSY PU and ensure the locking at the both sides (left and right).
3) Confirm that the fuser unit FU is installed properly and fixed with the lock lever lock lever of the left and right.
4) Replace the fuser unit FU with a new unit FU.

I-6	White Line (1)

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 adhere to Developer Roller of specific color in question.
2) Developer Roller's surface is damaged.

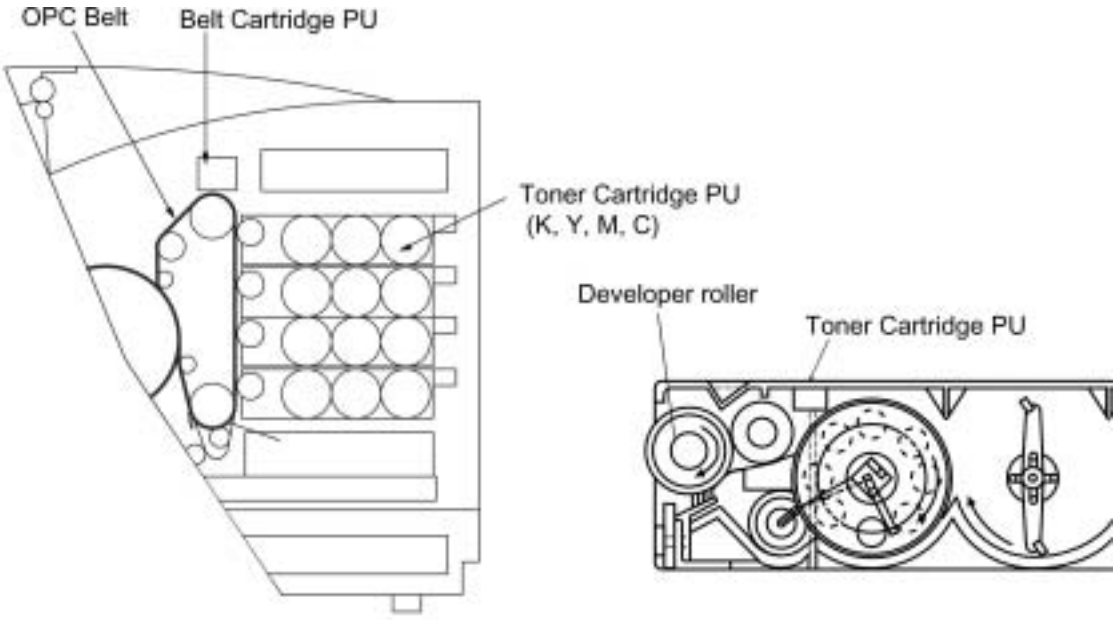


Fig.8-4

Countermeasures

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

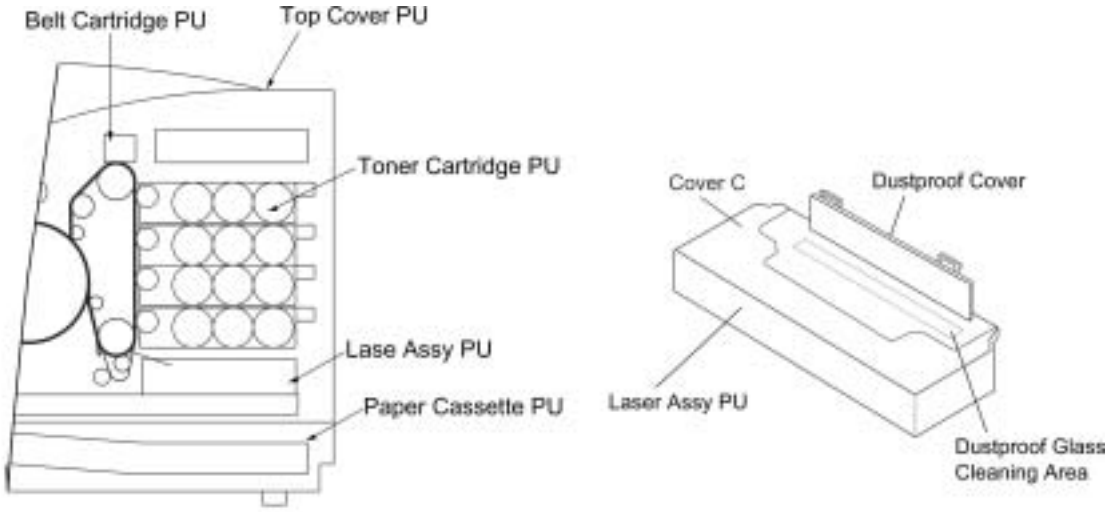
I-7	White Line (2)

Phenomenon

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

Main Causes

1) Dustproof Glass of Laser ASSY PU is smeared with toner or foreign particles.
2) Hairy foreign particles adhere to the laser beam opening of Laser ASSY PU.
3) There are foreign particles mixed in the toner cartridge PU.



Countermeasures

1) Clean the dustproof glass.
   1-1) Remove the belt cartridge PU and toner cartridge PU.
   1-2) Open the developer cover.
   1-3) Clean the dustproof glass.
2) Clean the laser beam opening of laser ASSY PU.
3) If White Line II failure is attributed to toner cartridge PU, replace it with a new cartridge PU.

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

1) Failure of the toner cartridge PU (blade).
2) Stain of the OPC charger roller PU.
3) Stain of the OPC belt.
4) Stain of the transfer belt.

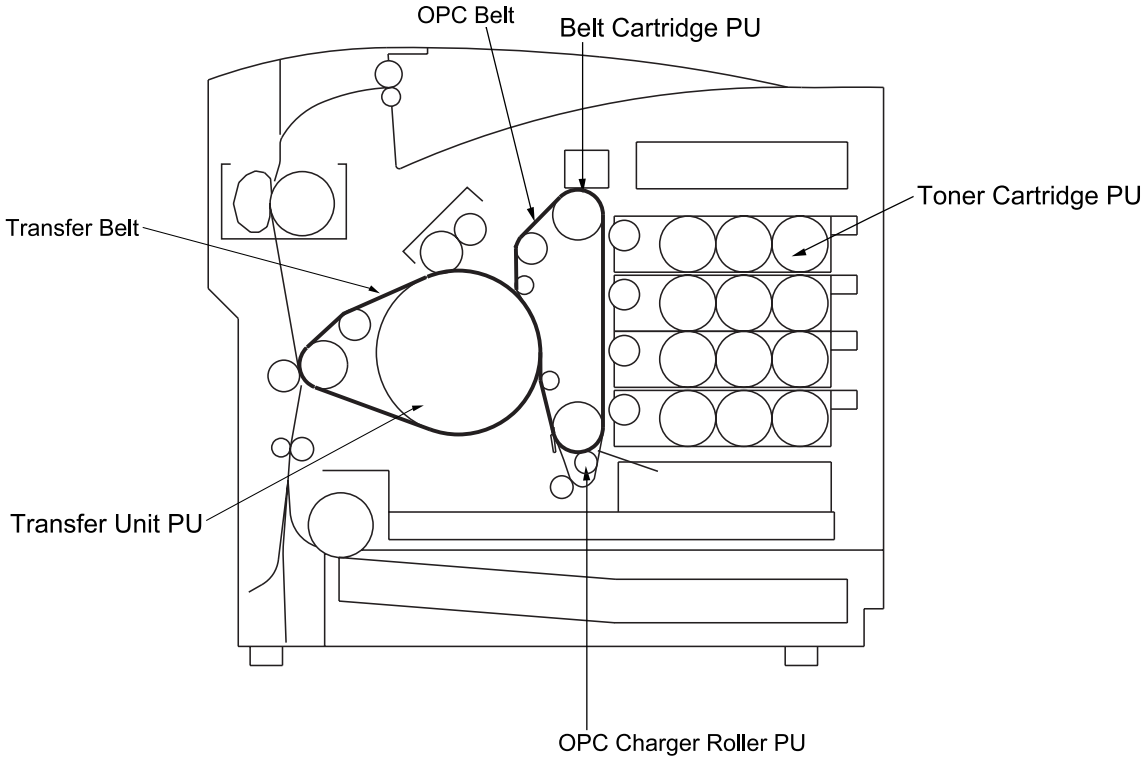


Fig.8-7

Countermeasures

1) Replace the toner cartridge PU with a new toner cartridge PU.
2) Replace the belt cartridge PU with a new belt cartridge PU.
3) Replace the transfer unit PU with a new transfer unit PU.

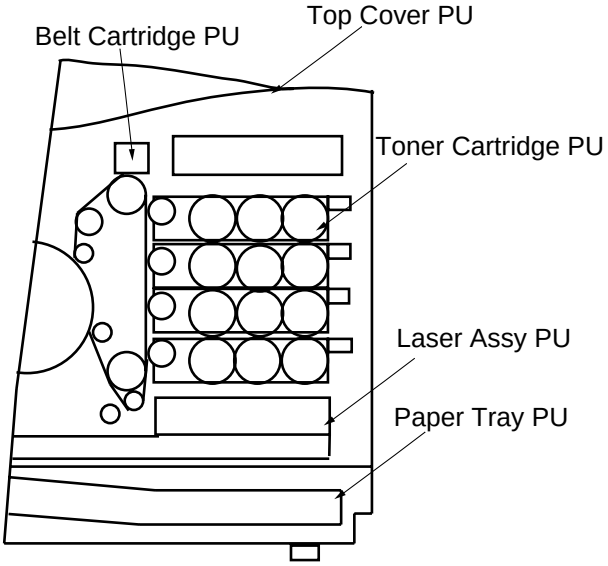
I-9	Black Line

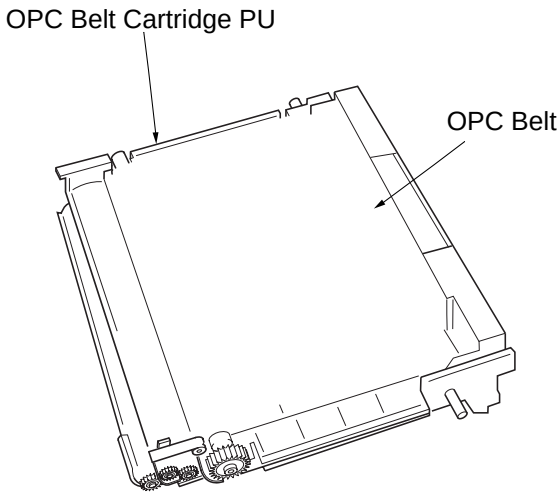
Phenomenon

Fine black line appears in the printed image as shown in print sample (9) of Fig.8-2.

Main Causes

1) The toner cartridge PU blade is deformed.
2) The OPC belt surface is damaged.
3) Foreign particles (paper dust, etc.) are stuck in between the cleaning blade and the OPC belt.
4) Foreign particles adhere to the perimeter parts of the OPC belt and the transfer belt, and consequently contact the toner image formed on the belt.





Countermeasures

1) Replace the toner cartridge PU with a new toner cartridge PU.
2) Replace the belt cartridge PU with a new belt cartridge PU.
3) Clean the perimeter of the mounting area of the OPC belt and transfer belt.

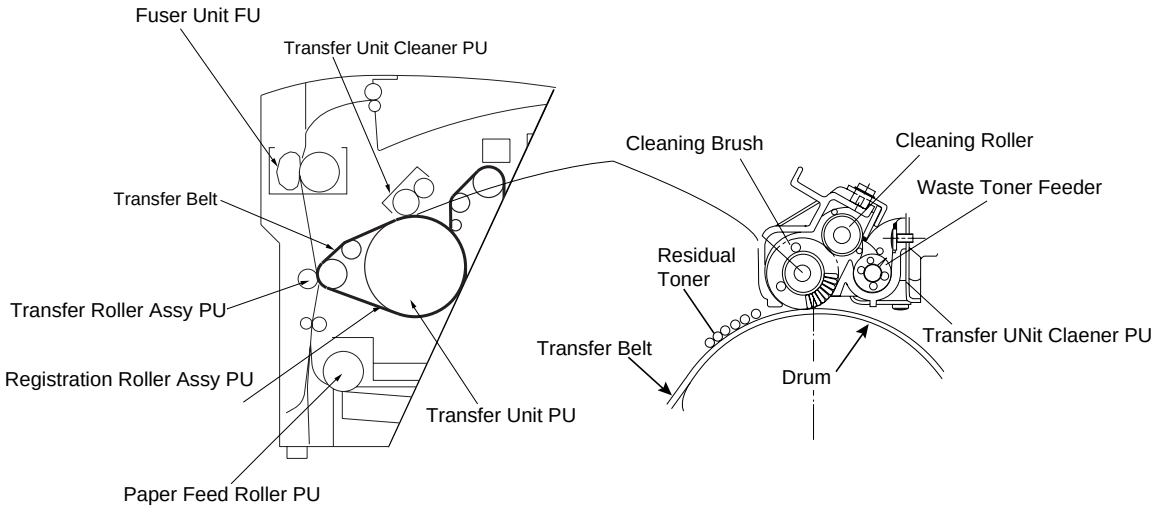
I-10	Vertical Line

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.) adhere to the parts located around the OPC belt and the transfer belt, and consequently contact the toner image formed on the belt surface.



Countermeasures

1) Clean the stain of the belt cartridge PU.
2) Clean the stain of the transfer belt.
3) Remove the transfer unit cleaner PU, and then clean the inside and outside of the waste toner feeder.

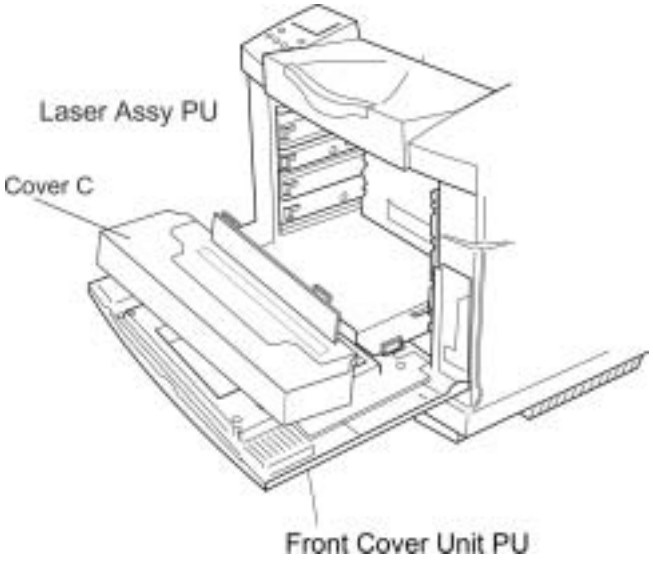
I-11	Vertically Staggered Image

Phenomenon

Printed image staggered in the vertical direction as shown in print sample (11) of Fig.8-2.

Main Causes

1) Shock or vibration is applied to the printer.
2) Failure of the laser ASSY PU : Vibration from the rotation of scanner motor.



Countermeasures

1) Do not apply shock or vibration to the printer body.
2) Replace the laser ASSY PU with a new laser ASSY PU.

I-12	Banding

Phenomenon

Banding line appears in the horizontal direction as shown in print sample (12) of Fig.8-2.

Main Causes

1) This is a transfer failure due to the uneven rotational speed caused by the shock which occurs when the seam of OPC belt passes over the cleaning blade.
2) The OPC belt and the transfer belt fail to maintain the regular and proper rotation due to the impact caused during the retract of the toner cartridge.

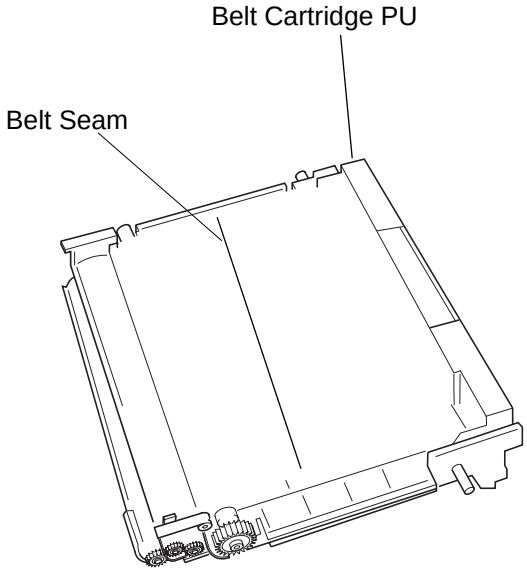


Fig.8-8

Countermeasures

1) Replace the belt cartridge PU with a new belt cartridge PU.
2) Replace the toner cartridge PU with a new toner cartridge PU.

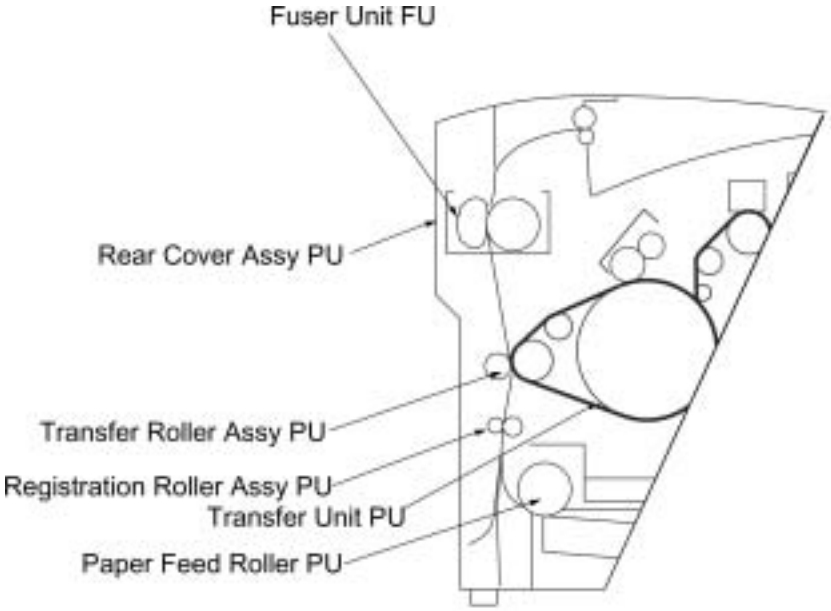
I-13	White Band

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) Deformation of the transfer roller.
2) Contact failure of the transfer roller's bias terminal.
3) Failure of the transfer roller clutch PU.



Countermeasures

1) Replace the transfer roller ASSY PU with a new transfer roller ASSY PU.
2) Check up the transfer roller's bias terminal.
3) Check up the transfer roller clutch and cam structure.

I-14	Toner Drop

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.

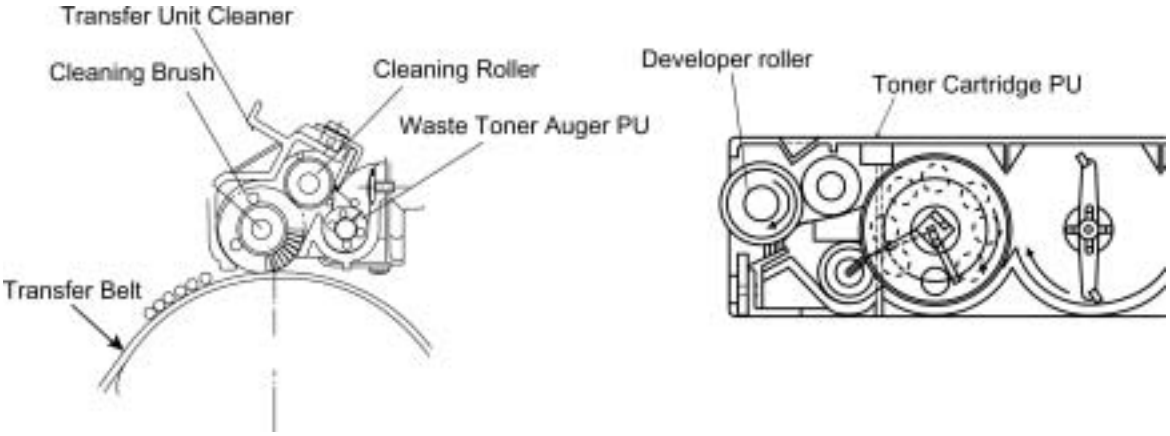
Main Causes

1) Toner drops on the transfer belt due to the breakdown of the waste toner auger.

1-1) Mylar of the waste toner auger is deformed.

1-2) Waste toner is not properly collected by the waste toner auger.

2) Toner adhering to the developer roller drops on the OPC belt.



Countermeasures

1) Check up the cleaning brush and the waste toner auger PU.
   1-1) Clean the perimeter of the transfer unit cleaner installation location.
   1-2) Check if the seal is deformed or damaged. If any deformation or damage, replace the transfer unit cleaner with a new transfer unit cleaner PU.
   1-3) Check if the waste toner is stuck in the printer engine. If stuck, absorb and remove the waste toner with the vacuum cleaner.
2) Remove the toner cartridge PU.
   2-1) Clean the toner cartridge PU.
   2-2) Replace the toner cartridge PU with a new cartridge PU.

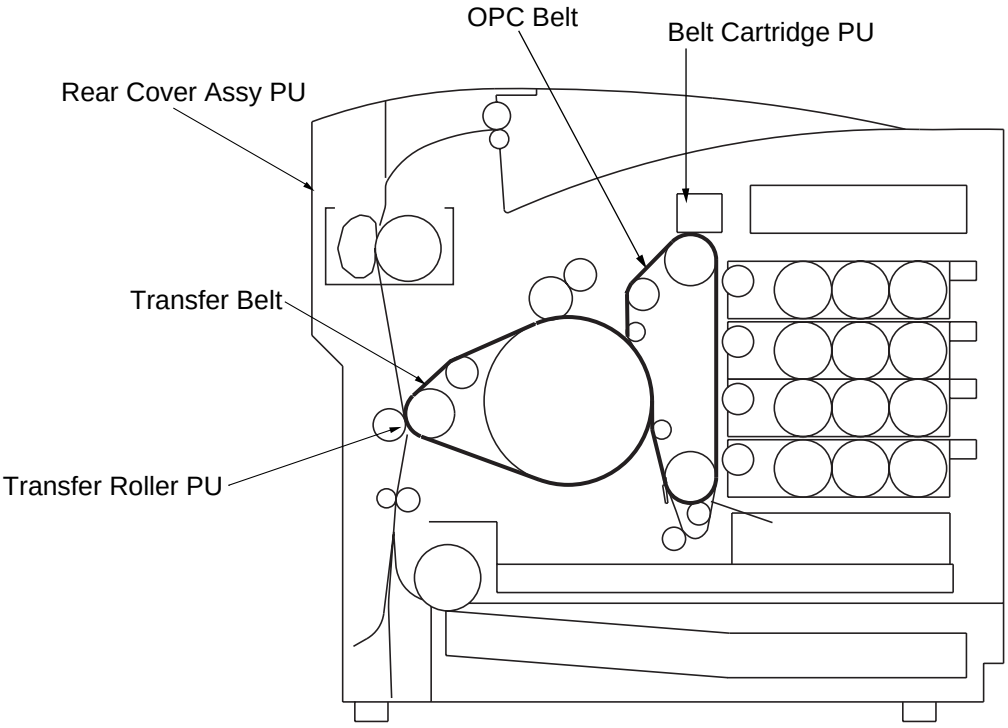
I-15	White Spot / Black Spot

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 adhere to the OPC belt or the transfer belt.
2) The OPC belt or the transfer belt is damaged.
3) Foreign particles mixed in the toner.
4) Foreign particles adhering to the transfer roller PU, or local deformation of transfer roller PU.



Countermeasures

1) Remove the belt cartridge PU.
   1-1) Lightly wipe off the foreign particles adhering to OPC belt, using cotton cloth.
   1-2) Replace the damaged belt cartridge with a new cartridge.
2) Open the rear cover ASSY PU, and check the transfer belt surface.
   2-1) With the cotton cloth, lightly wipe off the foreign particles adhering to the transfer belt.
   2-2) Replace the damaged rear cover ASSY PU with a new rear cover ASSY PU.
3) Remove the toner cartridge PU.
   3-1) Replace the toner cartridge PU with a new cartridge PU.
4) Replace the transfer roller ASSY PU with a new transfer roller ASSY PU.

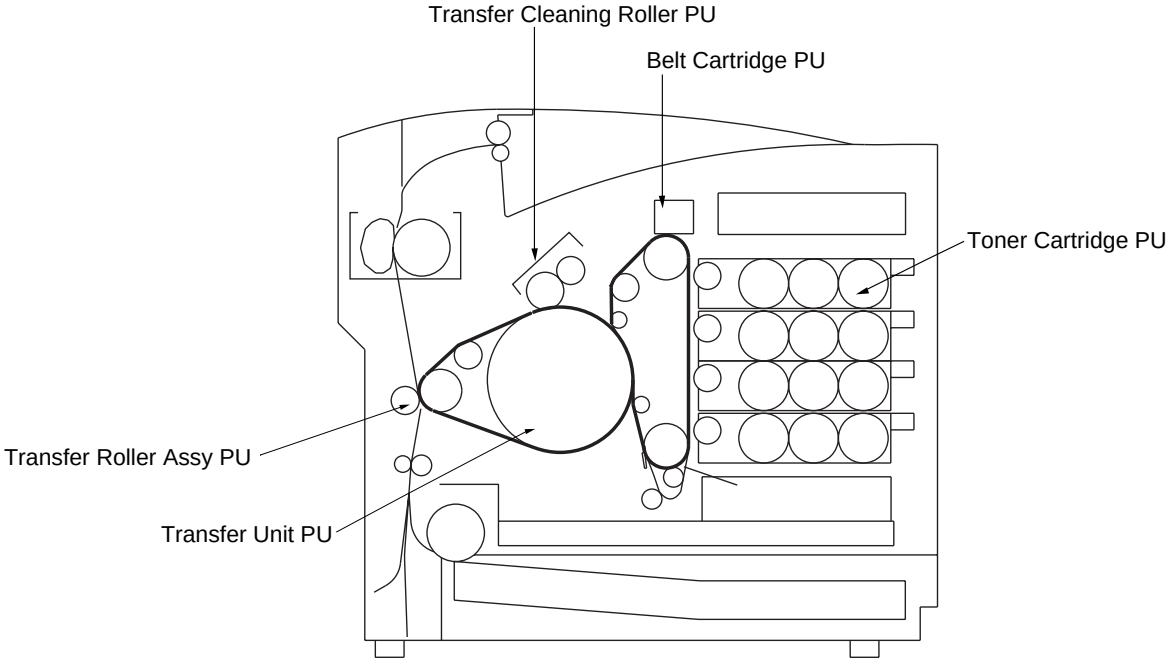
I-16	Mixed Color Image

Phenomenon

Mixed color image appears in the print as shown in print sample (16) of Fig.8-2.

Main Causes

1) Retract error of the toner cartridge PU.
2) Retract error of the transfer roller ASSY PU.
3) Retract error of the transfer belt cleaning roller PU.



Countermeasures

1) Confirm where the mixed color image is caused.

1-1) If it is on the OPC belt, the cause is the retract error of the toner cartridge.

1-2) If it is on the transfer belt, the cause is the retract error of the transfer belt or cleaning roller.

2) Replace the toner cartridge retract gear PU or the retract solenoid PU with a new one.
3) Replace the transfer roller clutch PU with a new transfer roller clutch PU.
4) Replace the belt cleaning roller solenoid PU with a new belt cleaning roller solenoid PU.

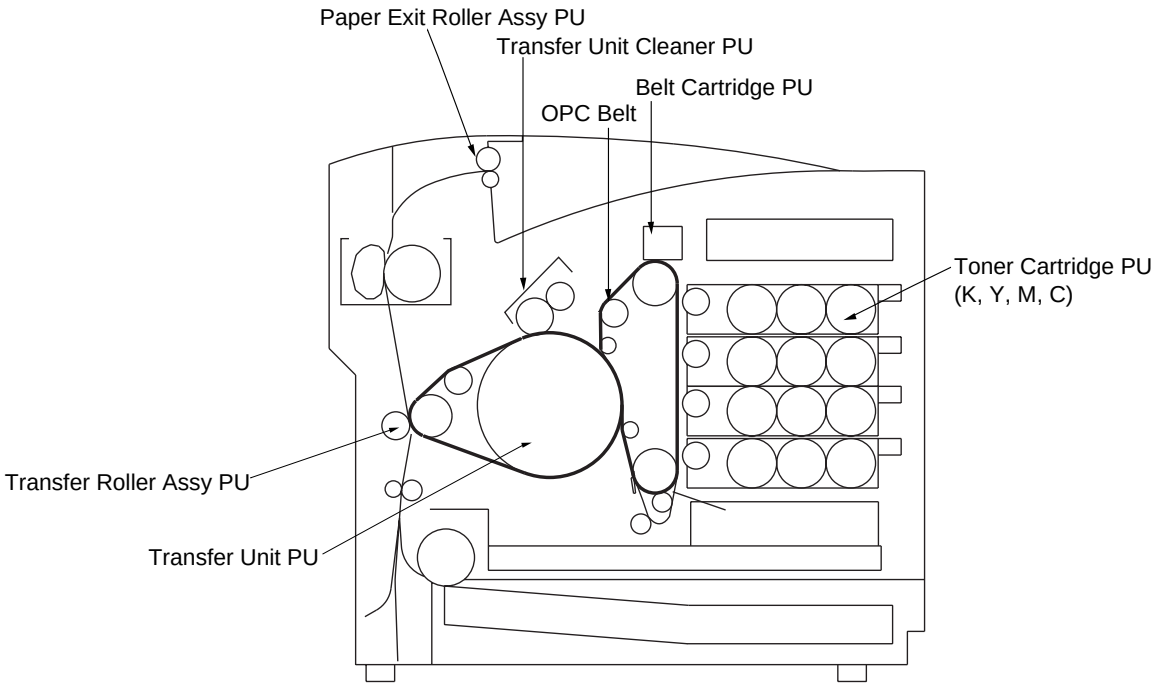
I-17	Color Misregistration

Phenomenon

Color misregistration is caused between two colors as shown in print sample (17) of Fig.8-2.

Main Causes

1) The OPC belt off-track error.
2) The OPC belt fails to maintain the regular and proper rotation due to the impact caused when the toner cartridge contacts the OPC belt.
3) The transfer belt off-track error.
4) The transfer belt fails to maintain the regular and proper rotation due to the impact caused when the transfer roller contacts the transfer belt.



Countermeasures

1) Confirm that the transfer roller ASSY PU is properly installed.
2) Confirm that the transfer unit cleaner PU is properly installed.
3) Replace the belt cartridge PU with a new belt cartridge PU.
4) Replace the transfer unit PU with a new transfer unit PU.

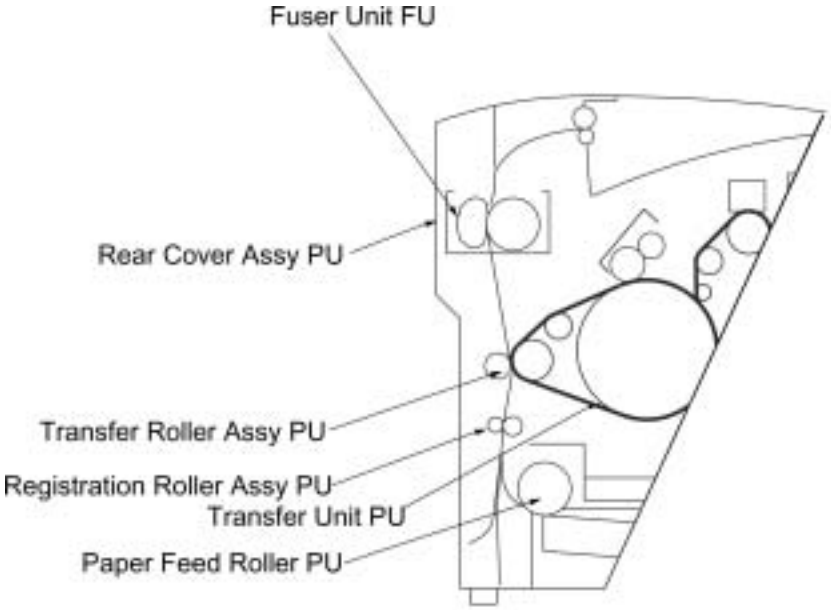
I-18	Mottle

Phenomenon

Variation of the optical density is found in the image as shown in print sample (18) of Fig.8-2.

Main Causes

1) The rear cover ASSY is not fixed in place.
2) Installation of the transfer roller is not accurate.
3) THV output of DC high voltage unit is not normal.
4) Failure of the toner cartridge PU.
5) Deformation of the print paper.



Countermeasures

1) Confirm if the rear cover ASSY PU is firmly locked or not.
2) Replace the papers with new papers.
3) Replace the toner cartridge PU with a new toner cartridge PU.
4) Confirm if the transfer roller ASSY PU is properly installed or not.
5) Replace the HV power supply unit PU with a new HV power supply unit PU.

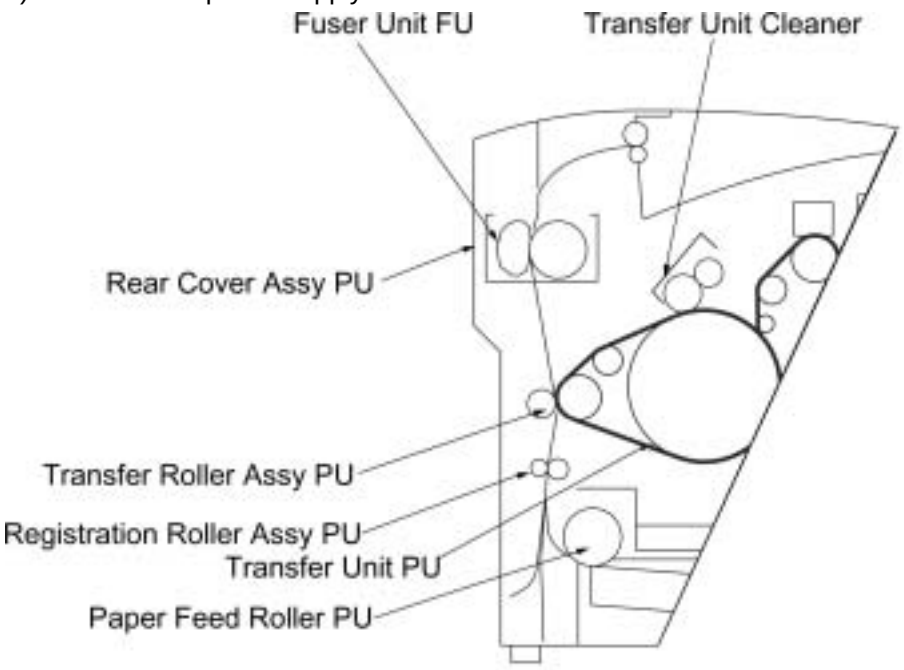
I-19	Residual Image

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 the lifted cleaning brush of the transfer unit cleaner.
2) Contact failure of the belt cleaner's bias terminal.
3) Failure of HV power supply unit PU.



Countermeasures

1) Check if the transfer unit cleaner PU is properly installed or not.
2) Replace the HV power supply unit PU with a new HV power supply unit PU.

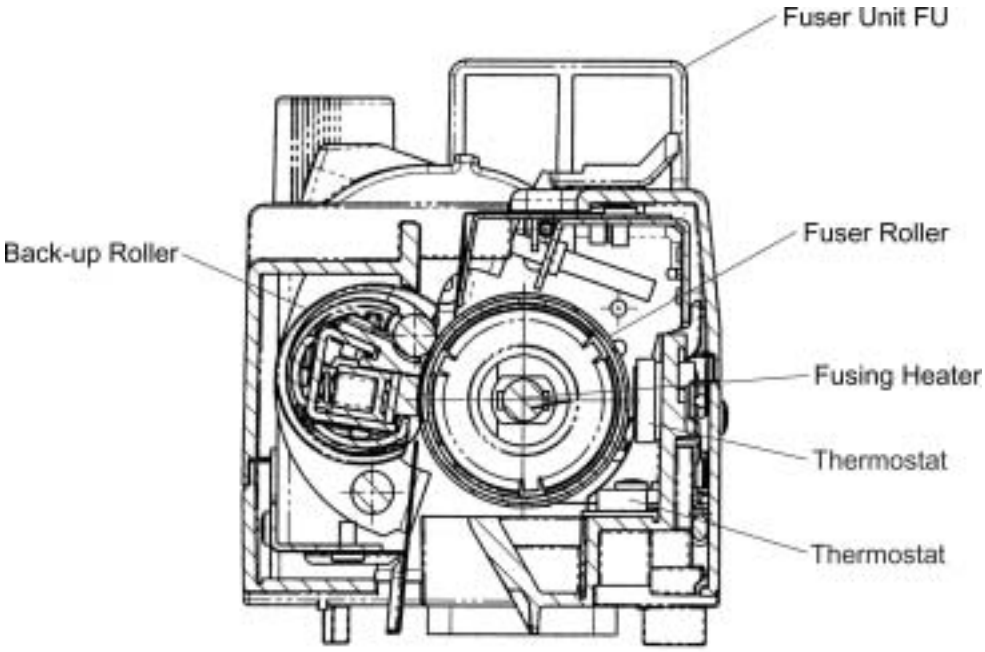
I-20	Insufficient Gloss

Phenomenon

Gloss of the print is not sufficient as shown in print sample (20) of Fig.8-2.

Main Causes

1) The fuser roller is deteriorated.
2) The fusing temperature is not properly controlled.
3) The mode setting of the paper is not correct.



Countermeasures

1) Replace the fuser unit FU with a new fuser unit FU.
2) Confirm the mode setting (ordinary paper or thick stock) of the paper.

I-21	Back Stain

Phenomenon

Back side of the print paper is stained as shown in print sample (21) of Fig.8-2.

Main Causes

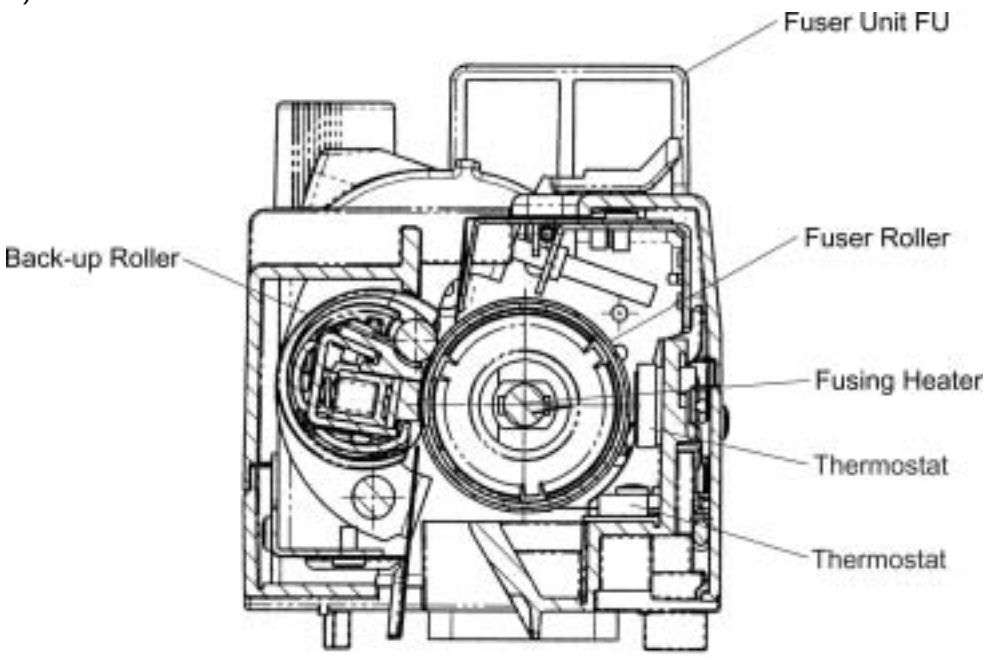
1) Fuser Unit:

1-1) The fuser roller and the back-up roller is stained.
(Print immediately after the inner jam occurred.)

1-2) Fusing off-set error occurred. (Fusing temperature is not correct.)

1-3) The fuser roller and the back-up roller are deteriorated.

2) The transfer roller is stained.



Countermeasures

1) Clean off the stain of the fuser roller by carrying out the blank printing for couple of pages.
2) Replace the fuser unit FU with a new fuser unit FU.
3) Replace the transfer roller ASSY PU with a new transfer roller ASSY PU.

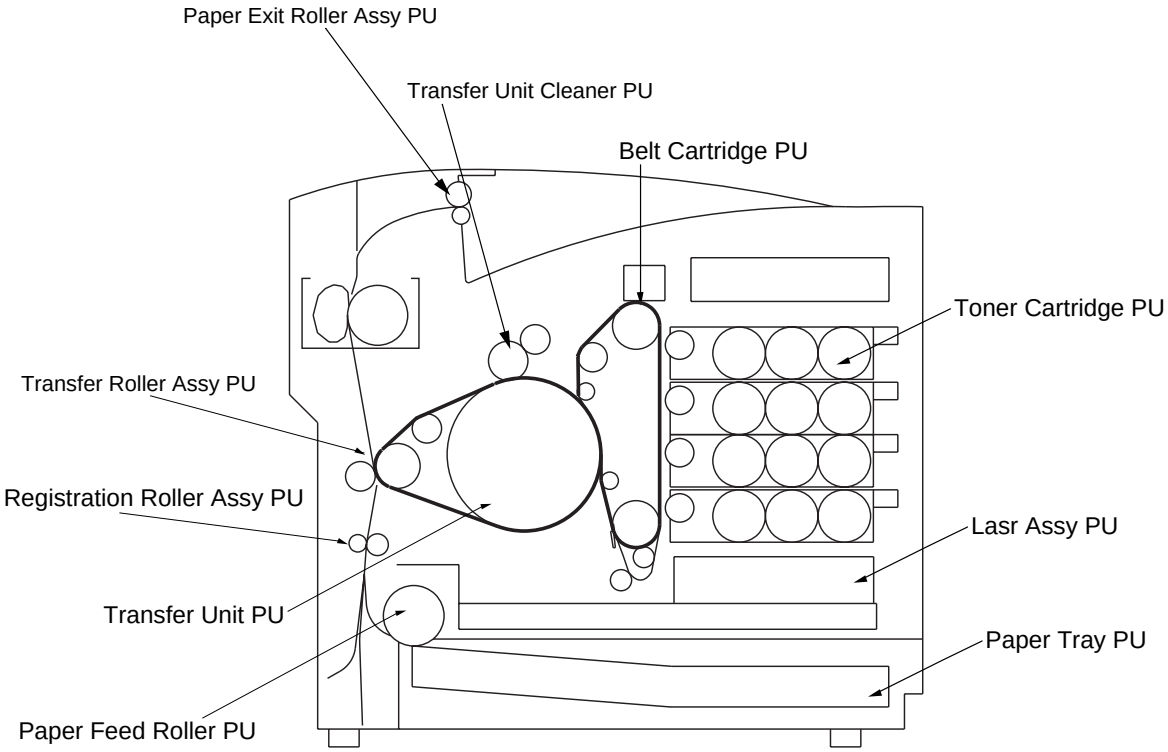
I-22	White Print

Phenomenon

A blank page (no print at all) is output or a specific color is missing (not printed) as shown in print sample (22) of Fig.8-2.

Main Causes

1) The laser beam path is shielded by the paper.
2) The toner cartridge is not sufficiently pressed in.
3) The bias voltage of the transfer roller is not enough.
   (Contact failure of the bias terminal of the HV power supply unit PU.)



Countermeasures

1) Check any paper or other foreign particles to lie in the laser beam path.
2) Replace the toner cartridge PU with a new toner cartridge PU.
3) Check the retract solenoid structure.
4) Check if the transfer roller ASSY PU is installed properly or not.
5) Replace the HV power supply unit PU with a new HV power supply unit PU.

I-23	Insufficient Fusing

Phenomenon

Printed image is partially missing as shown in print sample (23) of Fig.8-2. This proves that the fusing is insufficient.

Main Causes

1) The fuser tension-release lever is open. The shipping pieces are not removed.
2) Wrong selection of print media (label or envelope, etc.) at the Host (driver) side.
3) Recommended paper is not being used.
4) Failure of the fusing unit.

Countermeasures

1) Return the fuser tension-release lever. Remove the shipping pieces.
2) Adjust the mode of Host side to suit the print media in use.
3) Use the recommended paper.
4) Replace the failed fusing unit with a new one.

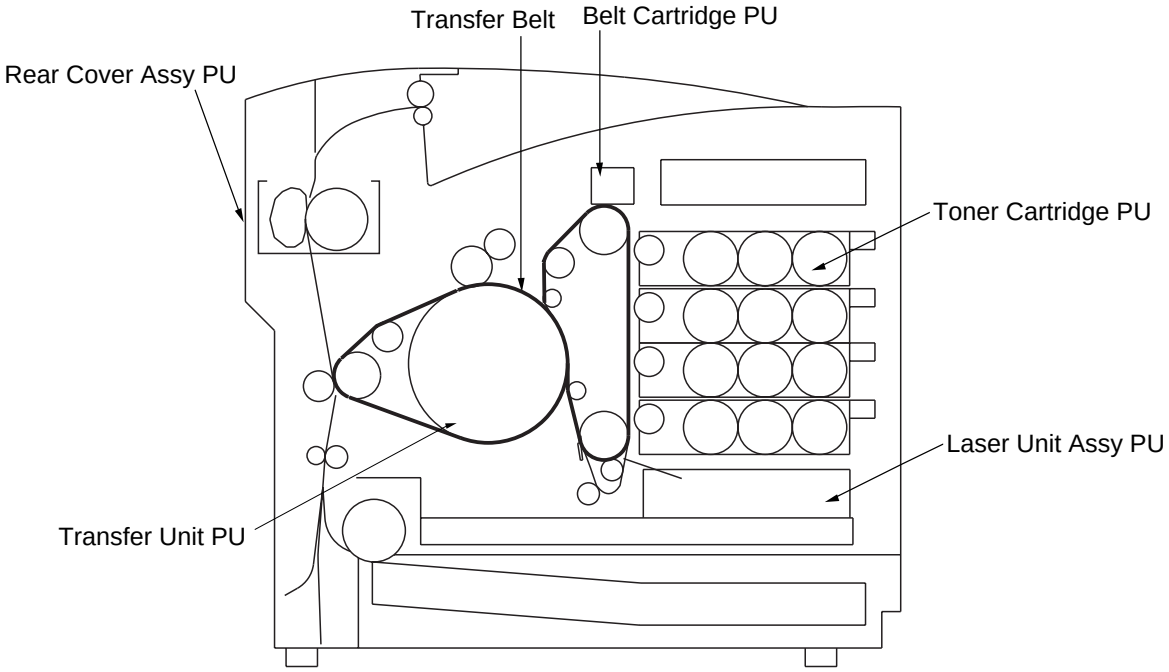
I-24	Uneven Density (Right & Left)

Phenomenon

The optical density is different between the right and left side of the printed image.

Main Causes

1) The amount of toner in the toner cartridge PU is short.
2) The retract operation of the toner cartridge PU is not properly done.
3) The belt of the toner cartridge PU is deformed.
4) The belt of the transfer unit is deformed.
5) The transfer roller ASSY PU is not properly installed.
6) The rear cover ASSY PU is deformed.
7) The rear cover ASSY PU is not locked sufficiently
8) The dustproof glass of laser ASSY PU is stained.



Countermeasures

1) Replace the toner cartridge PU.
2) Check the toner retract clutch PU.
3) Replace the belt cartridge PU.
4) Confirm the proper installation of the transfer roller ASSY PU.
5) Replace the transfer roller ASSY PU.
6) Ensure to lock the rear cover ASSY PU.
7) Replace the rear cover ASSY PU.
8) Clean the laser ASSY PU.
9) Replace the laser ASSY PU.

APPENDIX A

1. SERIAL NO. DESCRIPTIONS

The descriptions as below show how to read labels on each place.

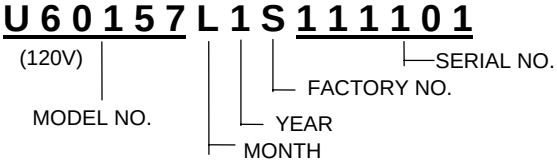
< ID for production month of Printer >

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

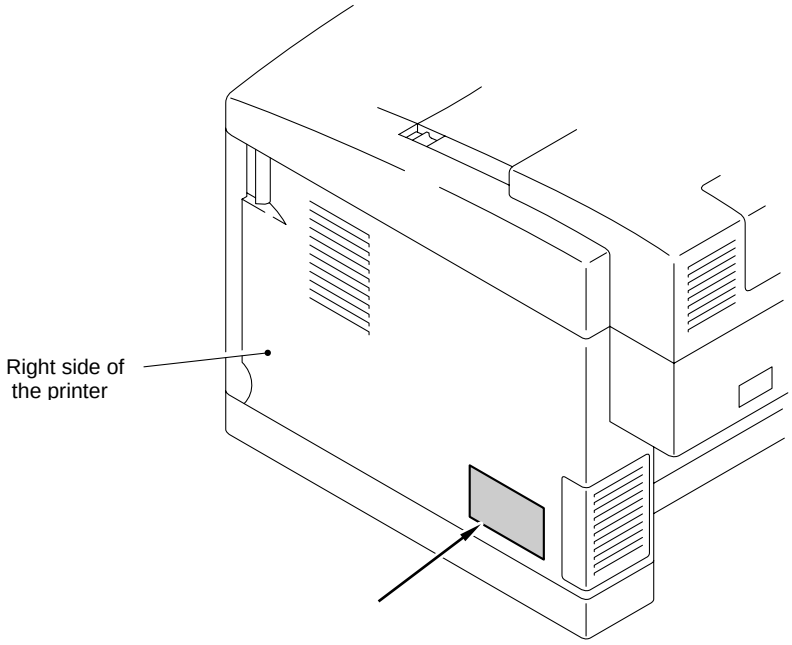
< ID for production month of other parts than the printer >

1:	January	5:	May	9:	September
2:	February	6:	June	X:	October
3:	March	7:	July	Y:	November
4:	April	8:	August	Z:	December

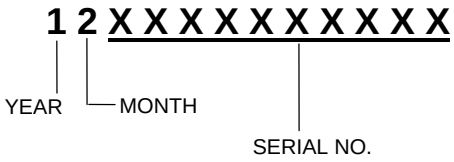
(1) Printer



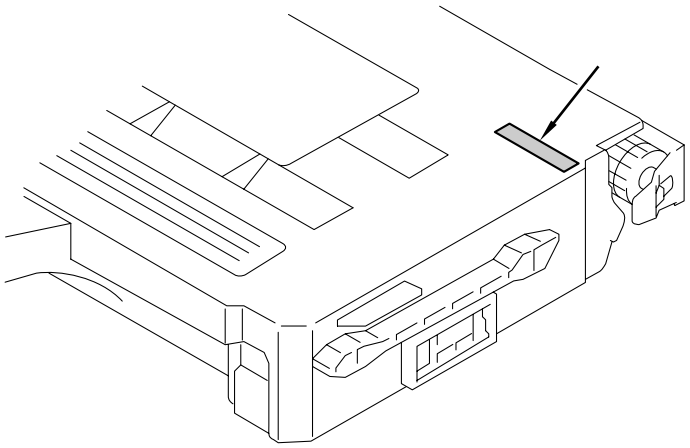
<Location>



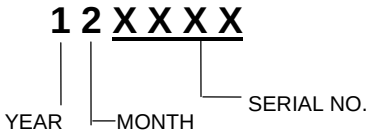
(2) Toner Cartridge



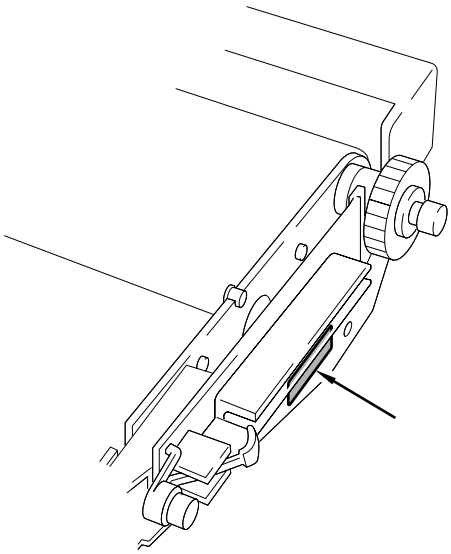
<Location>



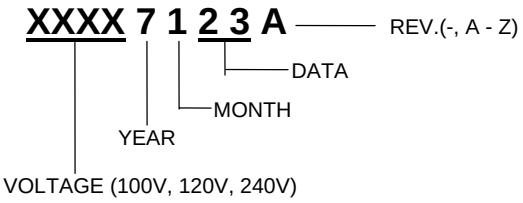
(3) OPC Belt Cartridge



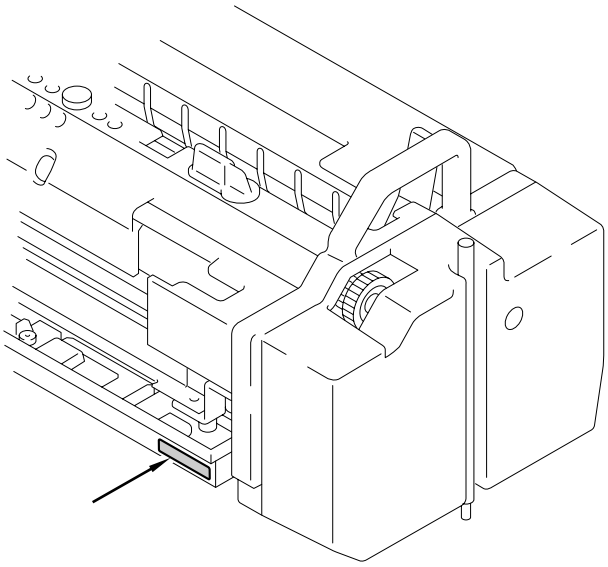
<Location>



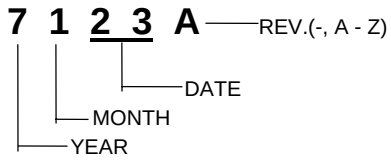
(4) Fusing Unit



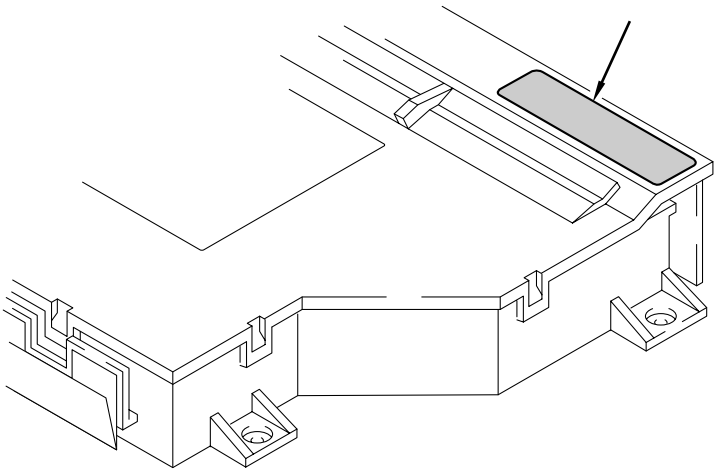
<Location>



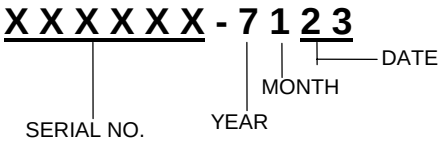
(5) Scanner Unit



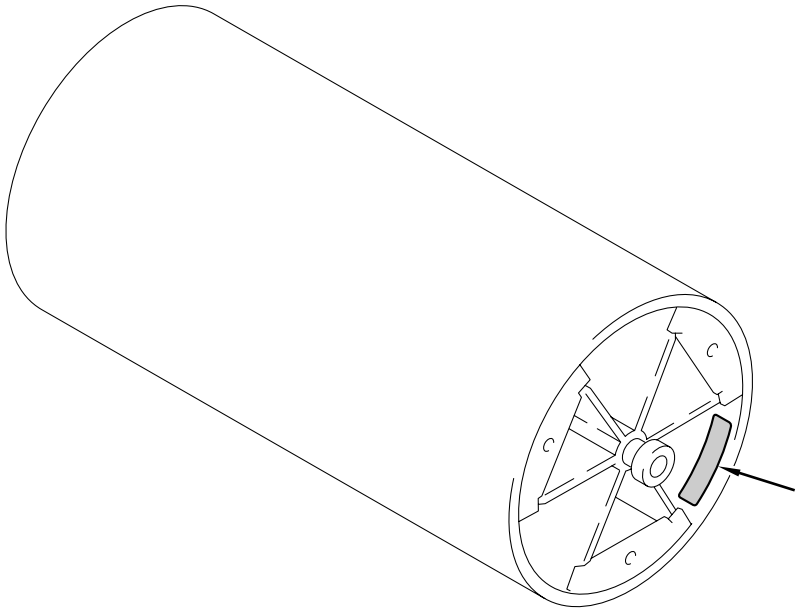
<Location>



(6) Transfer Unit



<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 32 mm (100.48 mm)
7	Fusing Roller	ϕ 32 mm (100.48 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) Waste Toner Pack

Life: 12,000 images

Condition: Above figure is based on 5% coverage. Life is detected by the waste toner sensor.

3) 120K Kit

Life: 120,000 pages

Condition: None

4) 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

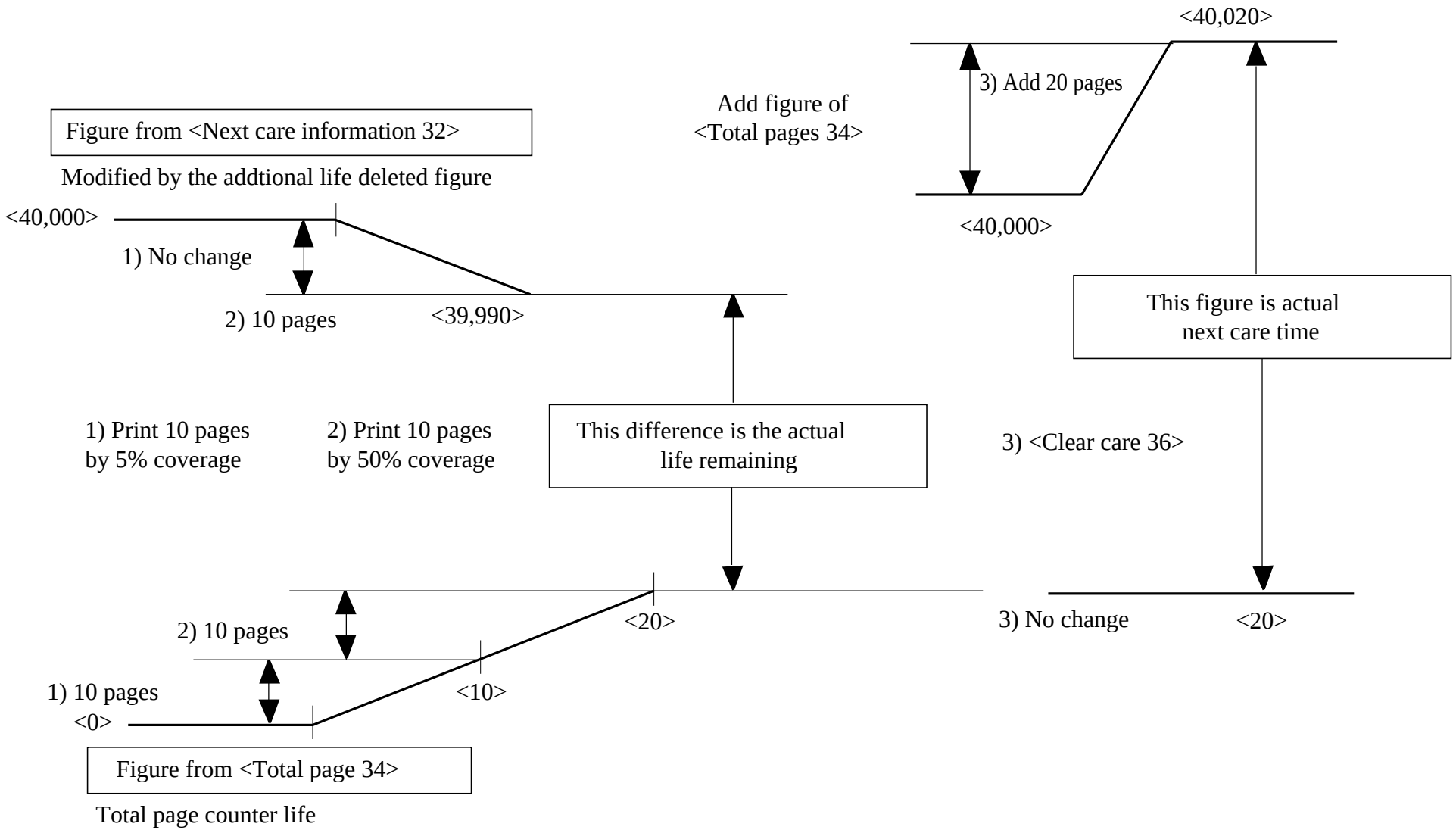
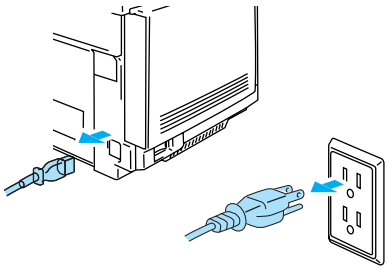


Figure from <Next care information 32>
Modified by the addtional life deleted figure
<40,000>
1) No change
2) 10 pages
<39,990>
Add figure of
<Total pages 34>
<40,020>
3) Add 20 pages
<40,000>
This figure is actual
next care time
1) Print 10 pages
by 5% coverage
2) Print 10 pages
by 50% coverage
This difference is the actual
life remaining
3) <Clear care 36>
<20>
2) 10 pages
1) 10 pages
<0>
<10>
3) No change
<20>
Figure from <Total page 34>
Total page counter life

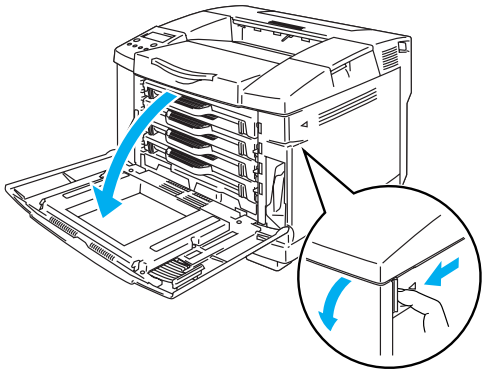
5. RE-PACKING INSTRUCTIONS

> ***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.***

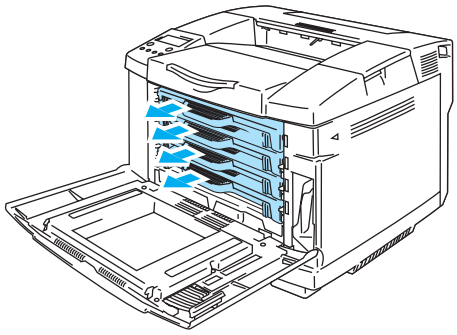
1) Turn off the printer power switch, and then unplug the printer. Disconnect the interface cable from the printer.



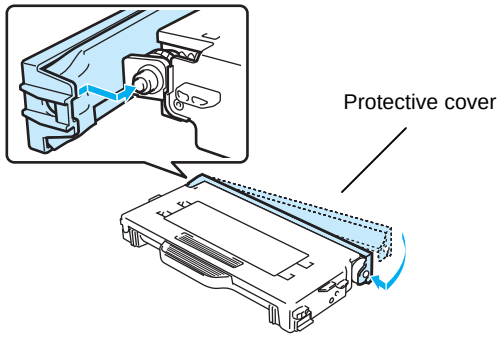
2) Open the front cover of the printer.



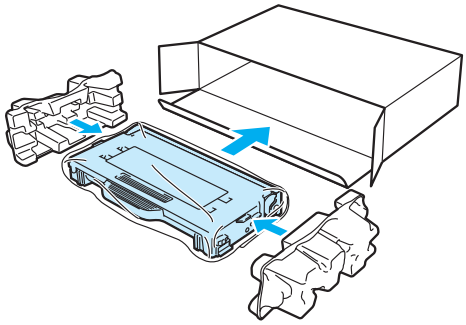
3) Pull out the all toner cartridges from the printer.



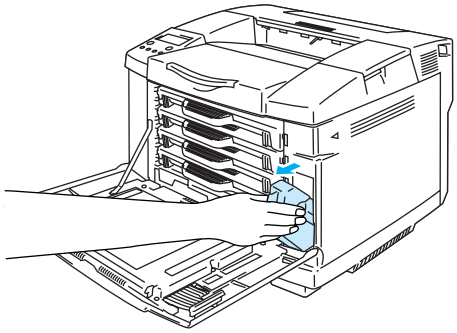
4) Install the orange protective cover to the each toner cartridge as shown in the illustration.



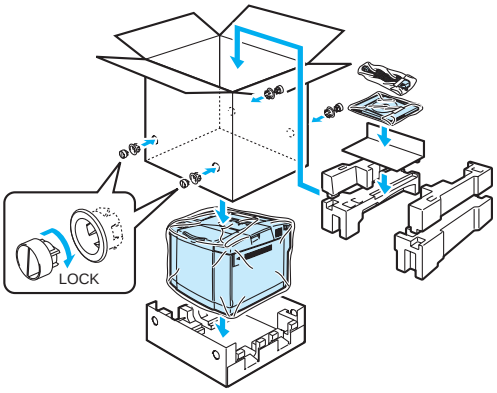
5) Repack the toner cartridges into the box.



6) Remove the waste toner pack from the holder at the lower right hand side of the printer. Be careful not to spill the toner.
7) Take the cap off the new waste toner pack, and put the cap on the used waste toner pack.
8) Put the new waste toner pack into the waste toner pack holder.
9) Close the front cover.



10) Repack the printer into the carton.



6. HIDDEN FUNCTION MENU

6.1 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 0.5mm.

TRAY1 = *** mm

TRAY2 = *** mm

DUPLEX = *** mm

YPOS ADJUST

Adjusts the vertical gap of the printing position when the optional lower tray is installed.

The range of the setting value is –4.9mm ~ 4.9mm.

The setting value can be changed by 0.7mm.

```
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, Calgry, 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	3B PRIO = HIGH
1. DOWNLOAD 600	1. DOWNLOAD 600
2. DOWNLOAD SCALABLE	2. DOWNLOAD 300
3. CARD 600	3. DOWNLOAD SCALABLE
4. CARD SCALABLE	4. CARD 600
5. CART 600	5. CARD 300
6. CART SCALABLE	6. CARD SCALABLE
7. RESIDENT 600	7. CART 600
8. RESIDENT SCALABLE	8. CART 300
9. DOWN 300	9. CART SCALABLE
10. CARD 300	10. RESIDENT 600
11. CART 300	11. RESIDENT 300
12. 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 ECHO

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 PJL 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 PJL 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.

@PJL DEFAULT PSCOPYPAGE = L3, L2

@PJL SET PSCOPYPAGE = L3, L2

@PJL DINQUIRE PSCOPYPAGE

@PJL INQUIRE PSCOPYPAGE

APPLEUSBPS

BINARY = OFF*

BINARY = ON

Enables to print the PS pure binary data through the Mac USB interface.

@PJL DEFAULT APPLEUSBPS = ON / OFF

@PJL SET APPLEUSBPS = ON / OFF

@PJL DINQUIRE APPLEUSBPS

@PJL INQUIRE APPLEUSBPS

NET HEAP SIZE

HeapSize = xxxxK* (The unit is Kbyte)

Specifies the size of heap area to use with BR-Net.

In HL-2700, the minimum size is 1100K and the maximum is 4860K.

To get the heap area size:

@PJL INFO HEAPSIZE

To specify the heap area size:

@PJL DEFAULT NETHEAPLEVEL = 1 ~ 15

PS FONT CACHE

CLEAR CACHE = OFF *

CLEAR CACHE = ON

Specifies to clear the font cache or not when finishing the PS mode printing.

@PJL DEFAULT PSFONTCACHE = ON / OFF

@PJL SET PSFONTCACHE = ON / OFF

@PJL DINQUIRE PSFONTCACHE

@PJL INQUIRE PSFONTCACHE

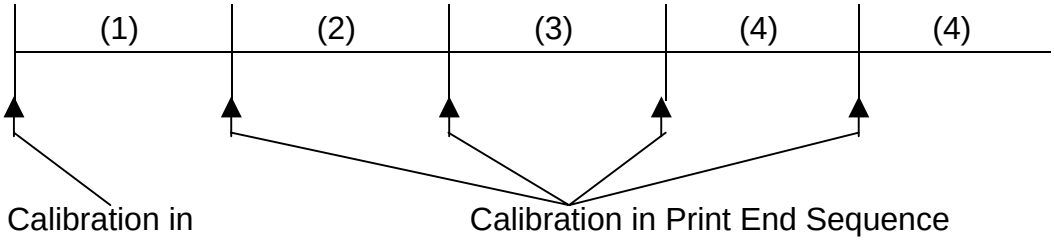
TMA CAL MODE

TMA CAL MODE = 8 *

Specified to enable or disable Toner Mss Amount (TMA) control setting and the TMA calibration timing (1~15).

The table in the next page shows the timing of calibration for each mode.

TMA Calibration timing



Warming-UP from Power ON

Mode	(1) Page or Minute	(2) Page or Minute	(3) Page or Minute	(4) Repeat Page or Minute
1	100	200	300	300
2	100	200	200	200
3	100	100	100	100
4	50	200	300	300
5	50	200	200	200
6	50	100	300	300
7	50	100	200	200
8	30	60	150	250
9	30	60	100	200
10	30	60	100	100
11	30	60	60	200
12	30	60	60	100
13	50	50	50	50
14	Not Available	Not Available	Not Available	Not Available
15	Not Available	Not Available	Not Available	Not Available

6.2 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
```

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.

6.3 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
COM-10 PAGE	The number of printing pages of the COM10 size.
DL PAGE	The number of printing pages of the DL size.
OTHER PAGE	The number of printing pages of the other size.

* The number of replacement is counted after clearing the counter when 100 pages or more are printed.

```
--SERVICE MENU--
ERROR HISTORY
```

1 : #######
2 : #######
3 : #######
…..
10 : #######

The 10 latest errors in order of the newest to the oldest.

```
--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.
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.

```
--SERVICE MENU--
RESET COUNT
```

COVERAGE	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

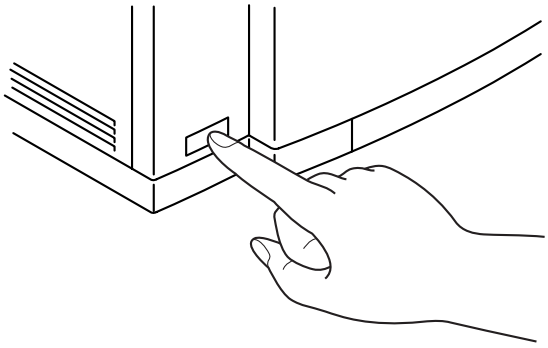
When modifying the life period, enter the Hitachi mode.

7. TO INSTALL THE PRINTER CORRECTLY

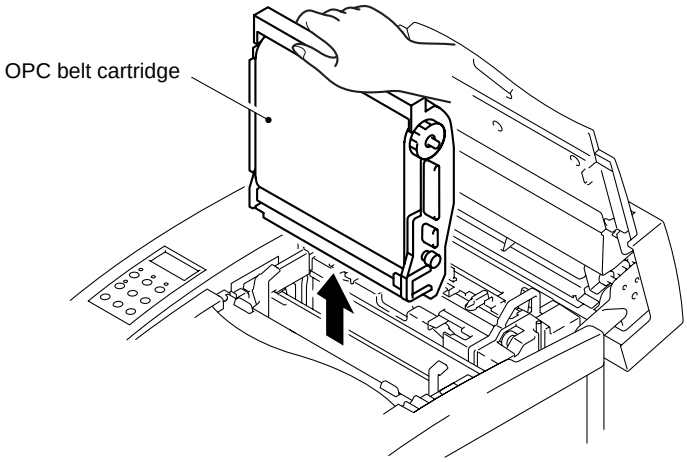
Please read the installation steps described below carefully.

If the printer is not installed correctly, image failures may occur or the life expectancy of the OPC belt cartridge may be shortened.

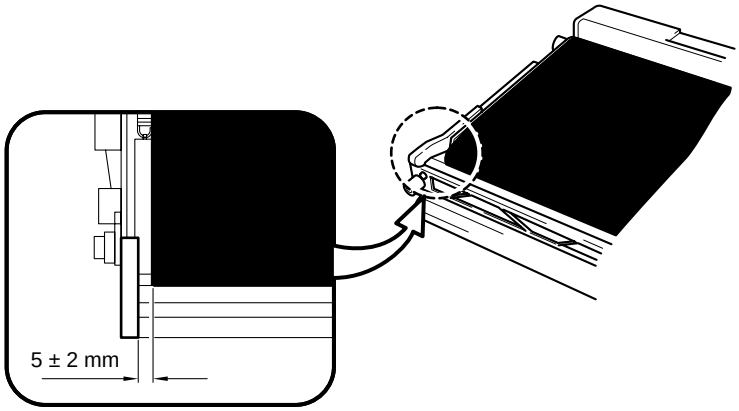
1) Turn ON the power switch of the printer.



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.

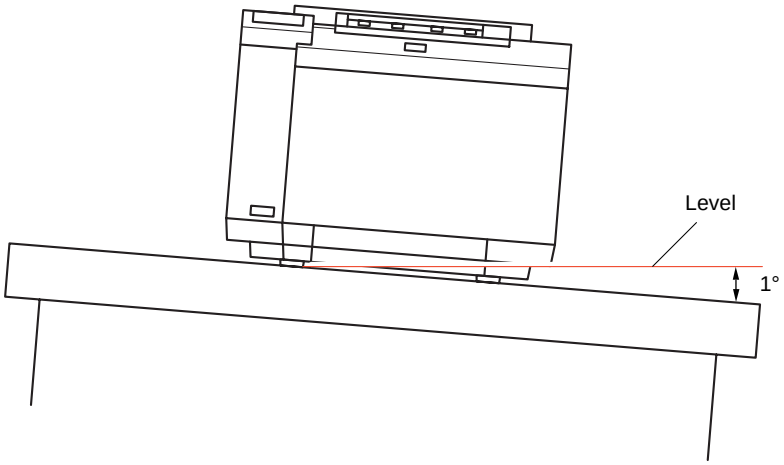


4) If the gap is NOT in the range of 5 ± 2 mm, check the following items;

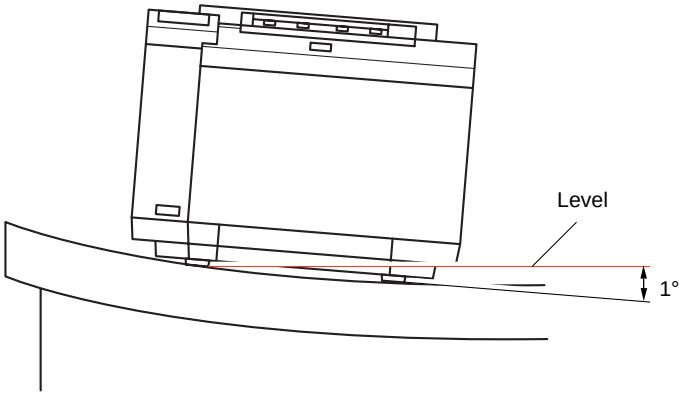
Note:

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.

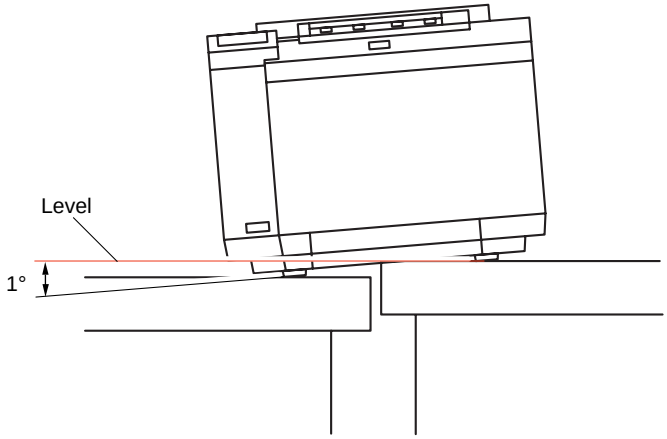
i) Is the printer inclined because the table the printer is installed on is unlevel?



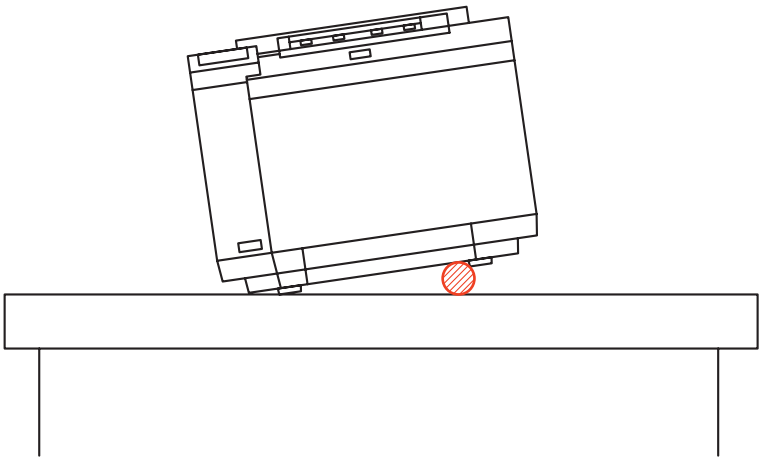
ii) Is the printer inclined because the table surface the printer is installed on is not strong enough?



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.

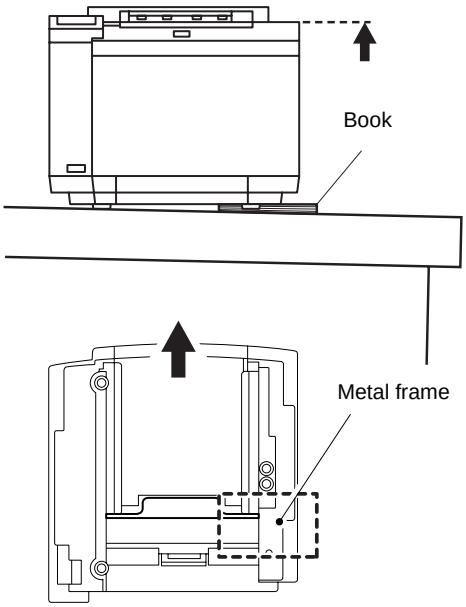
If the gap is in the range of 5 ± 2 mm, the printer is installed correctly. (Refer to the figure for Step 3).)

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.

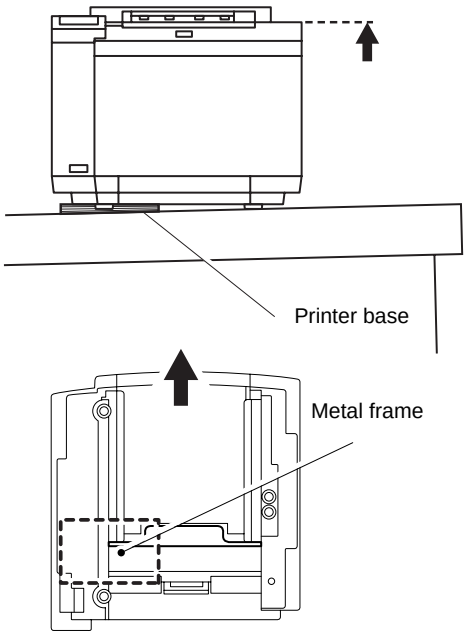
Initialize the printer again and then measure the gap on the OPC belt cartridge. If the gap is in the range of 5 ± 2 mm, the printer is installed correctly.



ii) When the gap is less than 3 mm; (the OPC belt has moved to the left.)

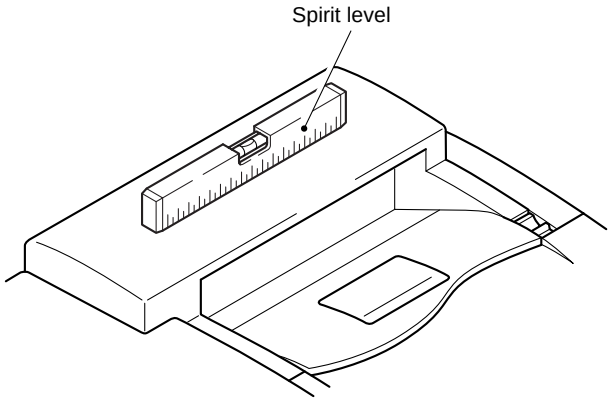
Place something 1 cm thick such as a book under the left hand side of the printer as shown in the figure on the right.

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.*



8. HOW TO REWRITE HL-2700CN FLASH ROM

Object parts: LJ8900001 MAIN PCB ASSY, HL2700CN

Preparation tool

*PC (Windows 98 or later)
Create the folder “2700” in C drive.
*1 HL-2700CN printer
*1 parallel cable
*BRUSBSN.EXE
*FILEDG32.EXE
Download “FILEDG32.EXE” and “BRUSBSN.EXE” from Utility DB, then copy it to “2700” 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.

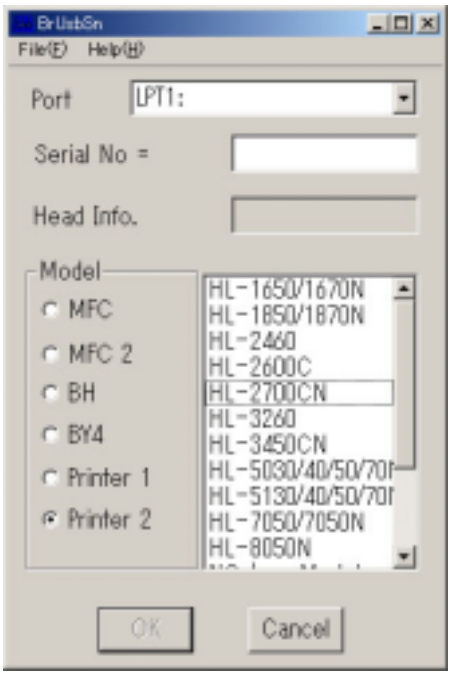
(2) Connect the parallel cable to the printer, then turn the printer power switch **ON**. Wait until “READY” message appears on the LCD display.

(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) On your PC, run the USB ID Setting tool (BRUSBSN.EXE). The following window will appear.



(6) On the **Model** menu, click **Printer 2**.
In **Port**, make sure that the **LPT1:** is selected.
In the **Serial No =** box, type the 9-digit serial number (e.g. G01012345) printed on the nameplate labeled to the back of the machine as an ID code. Then press the **OK** button.
The setup utility will transmit the ID code data from your PC to the machine and then it will terminate.

(7) Set the paper size as “A4” or “LETTER”.

(8) Print out the Print Settings by pushing the “Set” button three times to check the version of the firmware.

9. NVRAM BACKUP

NVRAM includes following data:

1. USB serial number
2. Network setting
3. Maintenance counter (except life counter)
4. Panel setting (Paper size, power save mode, etc.)

The following two methods can be used to copy the whole NVRAM with CompactFlash:

1. Write in NVRAM to CompactFlash
2. Write back NVRAM from CompactFlash

1. To write in NVRAM to CompactFlash:
   1. Turn off the power.
   2. Insert the CompactFlash into the printer slot.
   3. Turn on the power while pressing the “Go” and “-“ keys.
   4. Keep pressing down the “Go” and “-“ keys until “Complete” appears on the LCD display.
   5. If “Complete” appears, release the “Go” and “-“ keys. NVRAM is now successfully copied.

2. To write back NVRAM from CompactFlash:
   1. Turn off the power.
   2. Insert the CompactFlash into the printer slot.
   3. Turn on the power without pressing any keys.
   4. The “SELF TEST” appears on the LCD, followed by “Now initializing”.
   5. If “Complete” appears, NVRAM is successfully copied.

NOTE

1) If the serial number information written in the CompactFlash and the printer’s serial number are different, the NVRAM will not be written in the printer.
2) Once the NVRAM is written back from CompactFlash, the data on the CompactFlash will be eliminated automatically.