MANUAL NO. :

MAINTENANCE MANUAL

FOR

HITACHI COLOR LASER PRINTER

MODEL SL1

Hitachi, Ltd.

Tokyo, Japan

February, 27 , 1998

Read & Keep This Manual

- Read the safety instructions carefully, and understand the contents before starting the maintenance Work.
- Keep this manual always available for reference.

Revision Control Table

No,	Date of Revision	Revision Code	Description of Revision
1	July 14, 1997	First Edition	First Edition (Original)
2	October 13, 1997	Revision “A”	First revision made and issued as Rev.”A”
3	February 27, 1998	Revision “B”	First revision made and issued as Rev.”B”

FCC Notice

⚠ WARNING

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of FCC Rules. These limits are specified to provide the reasonable protection against harmful interference in a residential installation.

Since this equipment generates, uses, and radiates the radio frequency, it may cause harmful interference to the radio communications if not installed or used in accordance with the instructions set out hereunder. However, there is no guarantee that such interference will not occur in a particular installation.

If this equipment causes harmful interference to the radio or television reception, which can be checked and confirmed by powering the equipment off and on, the users are encouraged to correct the interference by taking one or more of the following counter-measures:

①. Reorient or relocate the receiving antenna.
②. Give more clearance between the equipment and receiver.
③. Connect the equipment into the outlet of other circuit which is different from the one being used for the receiver.
④. Consult the dealer or experienced radio/television technician for help.

Canadian Compliance

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

"Le presnt appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques (de la Class B) prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada."

Product Safety

Laser Product

SL1 is certified as a Class 1 laser product and complies with DHHS Laser-Radiation Standards, 21 CFR Chapter 1, Subchapter J.

⚠ Caution

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

Ozone Gas

⚠ Caution

SL1 is provided with the ozone filter in order to reduce exhausted ozone in compliance with Product Safety Standards. Ozone filter must be replaced with new filter yearly, otherwise, it may cause strong odor which will likely have ill effects to bronchial tubes. Therefore, this periodical replacement with new filter must be strictly respected.

Documentation Disclaimer

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SAFETY INSTRUCTIONS

1. Safety Instructions

1.1 Safety Principle

(1). Before starting your operation, read this Manual thoroughly. Especially, read the safety instructions of this section carefully and 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 on the machine. Failure to do so may result in the human injuries or equipment damages.

(3). Perform only the procedures explained in this Manual. Refrain from opening or touching any portions that are not related with your operation.

(4). Repair and replacement of parts should be performed by trained and qualified persons only. Operator should not attempt to do such repair or replacement works.

(5). It must be appreciated that above-mentioned cautions and warnings do not cover everything, because it is impossible to guess or evaluate all the circumstances beforehand.

1.2 Special Safety Information

(1). Introductory Information

The cautions and warnings are made clear by following the "Safety Alert Symbol" or "Signal Words" such as DANGER, WARNING and CAUTION.

①. Safety Alert Symbol

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

(1). Introductory Information (..... continue)

②. Understanding Signal Words

DANGER is used to indicate the presence of a hazard which will cause severe human injuries or 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 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 attention to safety messages in this Manual.

③. Follow Safety Instructions

Carefully read all the safety messages set out in this Manual and also in the safety signs placed on your equipments. In this Manual, the safety instructions (safety alert symbols and signal words) are bracketed by rectangular enclosure to call for attention. Keep the safety signs in good condition without missing or damage. Replace the safety signs if smeared or damaged. Learn how to operate the equipment and how to use the control properly. Do not let anyone operate without acknowledging the instructions. Keep the equipments in proper working condition. Unauthorized modification to equipments may impair the function & safety, and affect the life of equipments.

Listed below is the various kind of "WARNING" contained in this Manual.

⚠ WARNING

HAZARDOUS VOLTAGE

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

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

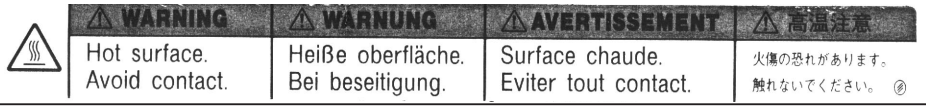
⚠ WARNING

HARMFUL OZONE GAS

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

Ozone Filter is provided to this printer to reduce the exhausted ozone. This filter must be replaced with new filter periodically in accordance with the Manual attached to this printer.

Listed below are the various kinds of "CAUTION" contained in this Manual.



HOT SURFACE

Can cause a burn.

Fusing Unit is approx.160 °C hot , so that perimeter is also very hot.

When you need to change the cleaning pad or remove jammed papers, wait about 20 minutes after opening up the paper exit unit and confirm the unit to be well cooled down.

⚠ CAUTION

ROTATING PARTS

Be cautioned about the potential danger of various rollers to get your fingers or hand caught into the machine and cause serious injuries. Note that the exit roller ejecting printed papers is rotating while printing.

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

⚠ CAUTION

HAZARDOUS POWDER

Toner is fine powder to cause powder explosion if dumped into the fire. Strictly refrain from dumping toner into the fire for disposal.

⚠ CAUTION

HAZARDOUS POWDER

Toner is fine powder to cause troubles to eyes and respiratory organs if inhaled.

Handle carefully toner cartridge, waste toner pack and developing unit not to spread the toner.

⚠ CAUTION

POWER CORDS & PLUGS

This printer is equipped with 3-wire power cords and 3-pronged plugs (bi-polar plug with grounding) for the user's safety.

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

⚠ CAUTION

SAFETY INTERLOCK

Cover and Paper Delivery 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.

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PREFACE and SAFETY INSTRUCTIONS

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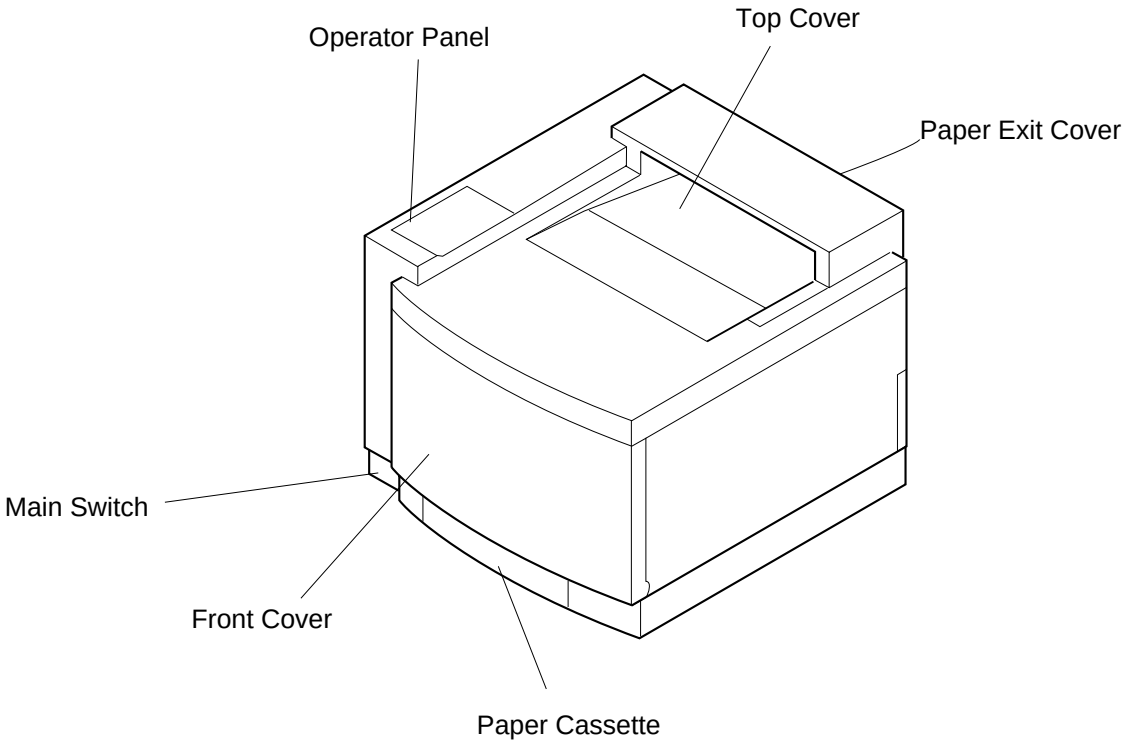
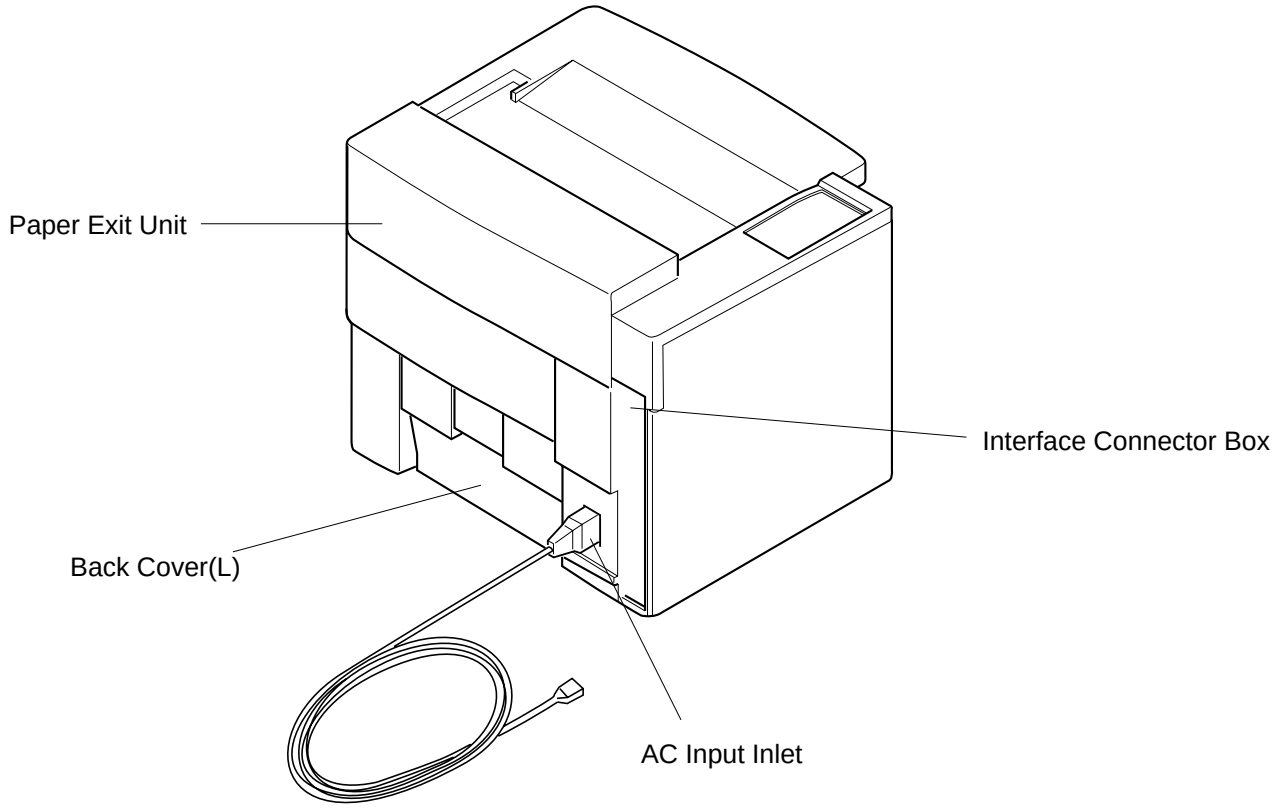
1. Outline of Product

1.1 Name & Function of Each Parts



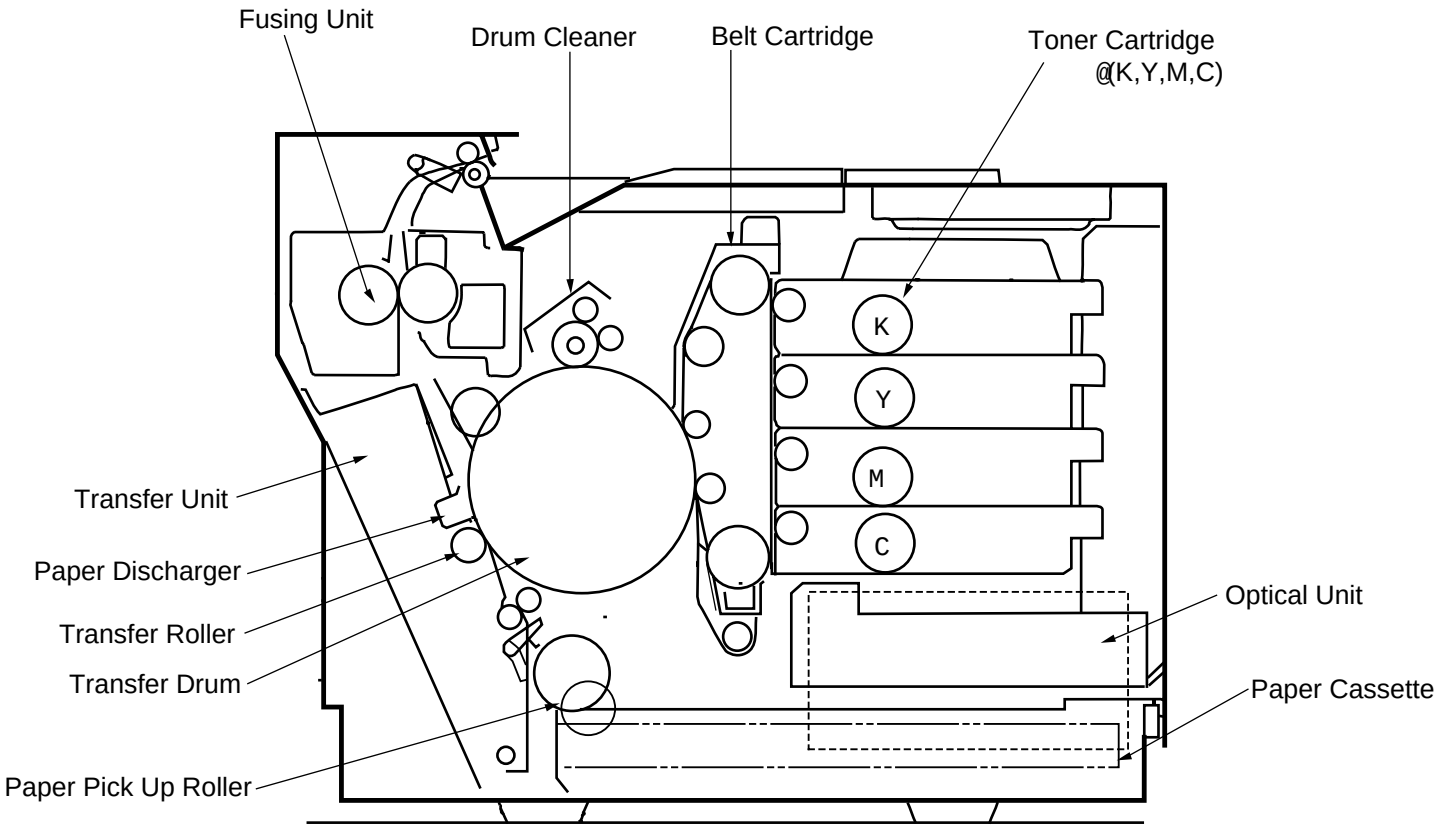
[Front Face]



[Back Face]

No.	Name of Parts	Outline of Functions
1	Top Cover	To act as an upper enclosure and also a paper tray for printed papers.
2	Operator Panel	To display a status of printer operation and motion.
3	Front Cover	To act as a front enclosure, and to be opened when replacing a toner cartridge or waste toner pack.
4	Paper Exit Cover	To exit a printed paper onto a top cover, acting also as paper tray for printed paper. To be opened when replacing an OPC belt cartridge.
5	Main Switch	To operate power-on and off of printer. (Pushing for On/Off operation)
6	AC Input Inlet	To connect a power supply cable.
7	Back Cover (L)	To act as a rear enclosure, and to be opened when clearing an internal jam or doing a maintenance work.
8	Interface Connector Box	Space where a controller PWB to be installed.

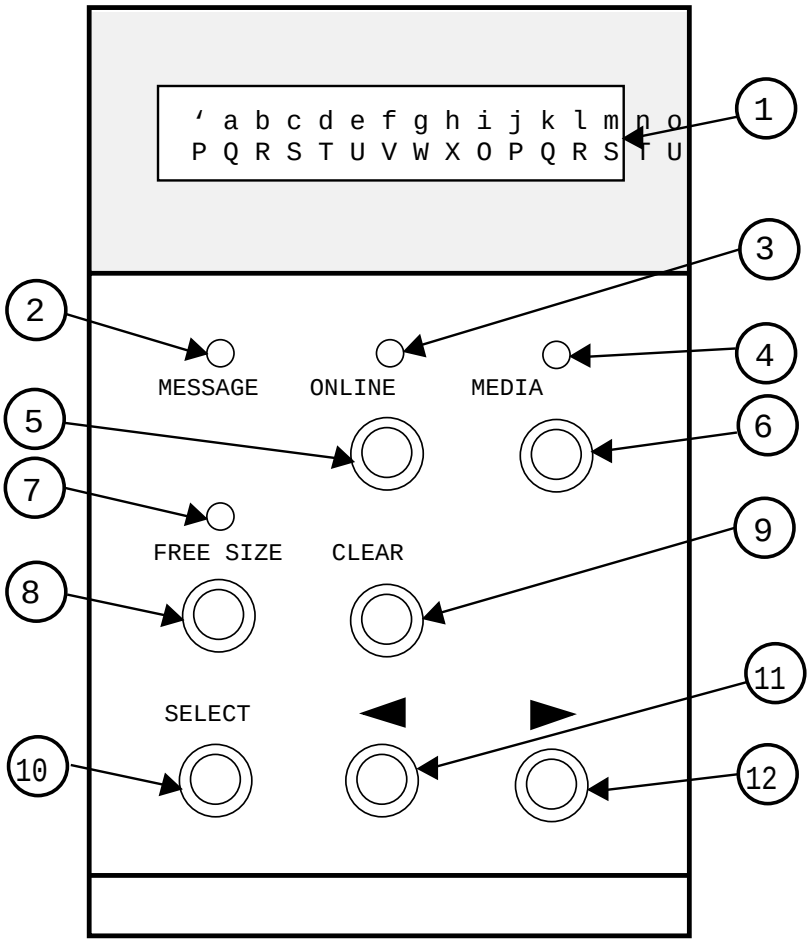
1.2 Internal Structure



No.	Name of Components	Outline of Functions
1	Toner Cartridge	To contain the toners (K, Y, M, C) for developing. Each toner cartridge of K,Y, M, C is independent.
2	Belt Cartridge	To form images, including the OPC belt.
3	Drum Cleaner	To clean and collect waste toner adhering to the transfer drum.
4	Fusing Unit	To fuse by heat the toner images on the paper.
5	Transfer Unit	To transfer toner images from the transfer drum to the paper.
6	Transfer Drum	To form color images, maintaining the toner images of OPC belt on the drum.
7	Paper Discharger	To emit the corona for separating a paper from transfer drum.
8	Transfer Roller	To transfer the toner image of transfer drum to a paper.
9	Paper Cassette	To feed papers automatically.
10	Paper Pick Up Roller	To feed papers automatically from the paper cassette.
11	Optical Unit	To generate a laser beam and scan over the OPC belt.

1.3 Description of Operator Panel

(1) Standard



Description:

①	LCD:16 characters by 2 lines
②	Message LED
③	Online LED
④	Media LED
⑤	Online Key
⑥	Media Select Key
⑦	Free Size LED (Red)
⑧	Free Size Key
⑨	Clear Key
⑩	Select Key
⑪	Scroll Key (Left)
⑫	Scroll Key (Right)

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2. Specifications of Product

2.1 Rating

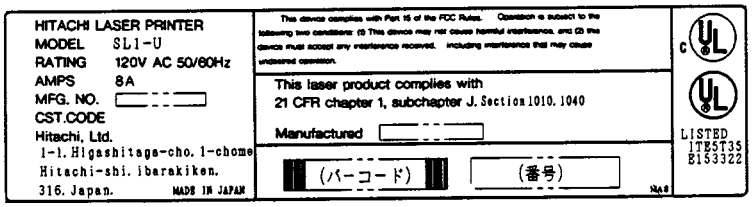
⚠ WARNING

Use the power supply cord provided as an accessory, or the similar cord complying with following specification (3-wire power cord with grounding). Use of the "out of specification" cord may result in the electric shock.

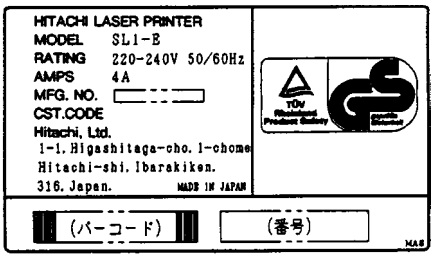
Name of Model	Voltage (V)	Frequency (Hz)	Input Current (A)	Power Cord (Piece)
SL1-U	120	50/60	8	1 (Standard)
SL1-E	220 - 240	50/60	4	Not included. *1
SL1-J	100	50/60	10	1 (Standard)

*1: As to SL1-E, customers are requested to purchase and use the power cord complying with the following specifications.

Figure	Name of Model	Rating	Approval Agency	Applicable Area
A	H05VV-F3G0.75	250VAC, 6A	VDE, OVE, SEMKO, CEBEC, NEMKO, DEMKO, FIMKO	Europe (Continent)
B	H05VV-F3-0.75	250VAC, 6A	BS	UK



Rating label of SL1-U



Rating label of SL1-E

Fig.A: Power Cord for Europe

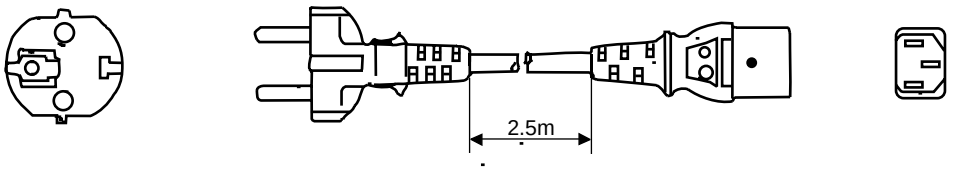
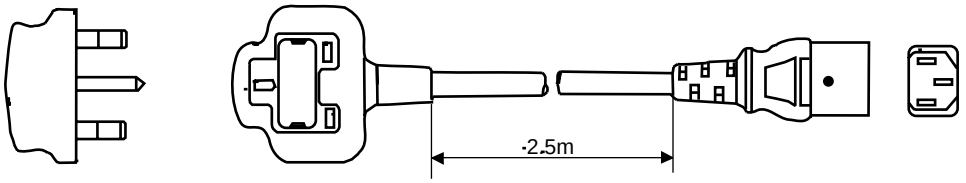


Fig.A: Power Cord for Europe



2.2 General Specification

No.	Item	Description
1	Printing Method	Semiconductor Laser and Electrophotography
2	Print Speed a). Monochrome b). 2 (two) Color c). 3 (three) Color d). 4 (four) Color	Cassette Feed and Continuous Print: a). 16 sheets per minutes (Letter size) b). 8 sheets per minutes (Letter size) c). 5.3 sheets per minutes (Letter size) d). 4 sheets per minutes (Letter size)
3	Warming-Up Time	210 seconds (max.), 180 seconds (Normal)
4	Resolution	600dpi
5	Feeding Method	Cassette Feed
6	Cassette Capacity	Ordinary Paper: 250 sheets, OHP: 50 sheets Envelope: 30 envelopes, Post Card: 50 cards
7	Printable Media	Letter, Legal, Executive (A4, B5), OHP, Label, SPHINX
8	Paper Exit System	Face Down, 250 sheets (capacity)
9	External Dimension	500 (W) × 490 (D) × 388 (H) (unit: mm) 19.7 (W) × 19.3 (D) × 15.3 (H) (unit: inch)
10	Weight of Printer	Approximately 36kg (79 pounds)

Table 2-1: Characteristics of Hitachi Paper

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

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

[Note]: Keep the paper sealed, and do not open the paper bag until using the papers.

Table 2-2: Characteristics of Hitachi Recommend Paper, OHP Sheet, and Label

Item \ Media		Paper Xerox 4024	Paper Hammermill Laserprint (white)	Label Avery 5260	OHP Sheet	SPHINX Auto Fil #1914
Basis Weight (g/m^2)		75±4	90±4	163±7	142±4	90±4
Thickness (μ /m)		102±6	105±6	184±7	110±6	125±10
Smoothness(Bekk)		35±4	120±20	20±6	500±100	22±10
Stiffness (Clark)		100±15	90±15	65±15	56±15	70±20
Surface Resistance $\times 10^9$ (Ω)		10 ～ 100	10 ～ 100	1 ～100	10 ～ 1000 ☆ 10 ～ 1000 ★	1～100
CIE LAB L*a*b*	L*	94±2	94±2	93±2	≧80% (Transmittance)	----------
	a*	0.4±1	−0.5±1	−0.2±1		
	b*	1.6±1	2.2±1	4.5±1		
Brightness (%)		80±2	85±2	77±3	----------	82±5
Grain Direction		Long	Long	Long	----------	----------

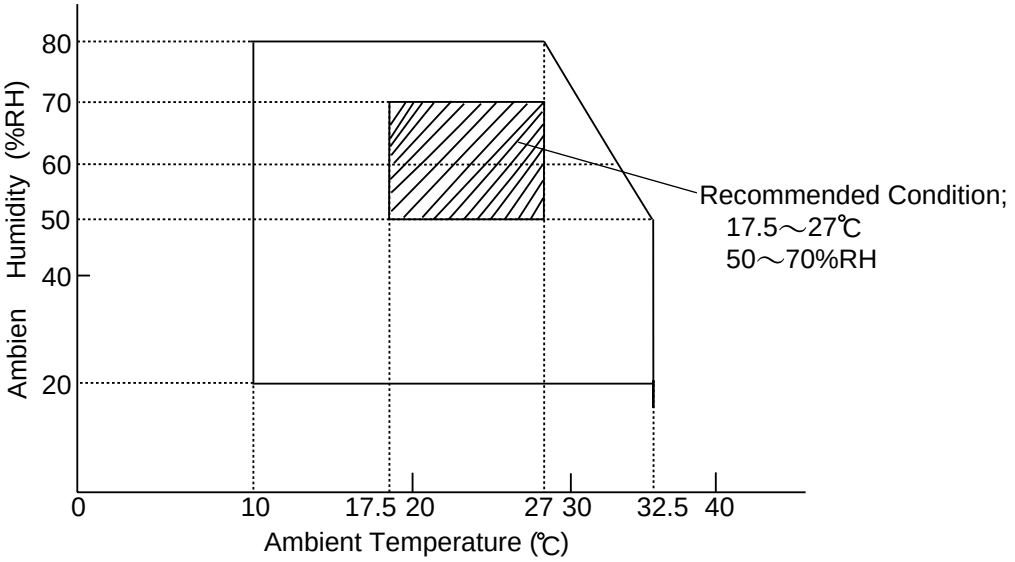
☆ : Printed Side
★ : Back Side

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

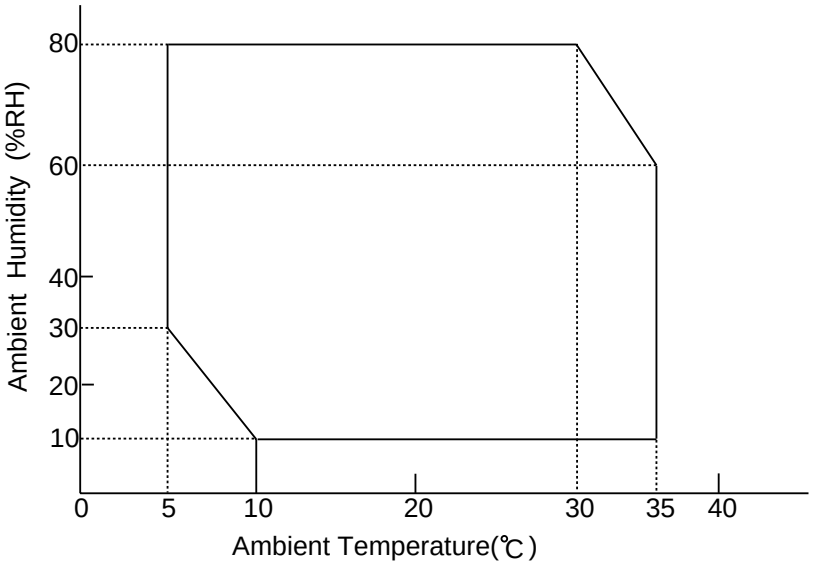
2.3 Environmental Condition

(1). Ambient Temperature / Humidity / Altitude:

(a). Under Operation: 10.0 ～ 32.5 °C , 20 ～ 80%RH
(See the figure below.)



(b). Under No Operation: 5.0 ~ 35.0 °C , 10 ~ 80%RH
(See the figure below.)



(c). Storage and Transportation Environment of Printer

The following defines the storage and transportation environment of the printers that have been packed according to Hitachi specification. However, this section does not cover the belt cartridges, toner cartridges and developer cartridges. In particular, since consumables such as toner etc. are packaged, the following environmental conditions should be respected. During transportation, strictly refrain from leaving the goods on the ground or under the blazing sun.

Temperature	Normal Condition	0°C ~ 35°C (32°F ~ 95°F)
	Severe Condition	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	
Other	No Condensation	
Atmosphere	613 ~ 1,067hpa (460 ~ 800mmHg)	

The period under the severe condition should not be continuous, but assumed as accumulation of intermittent time. However, the accumulation of intermittent time should not by any means exceed 48 hours at maximum.

[Note]: Normal condition should occupy more than 90% of total storage period.
Sever condition should be less than 10% of total storage period.

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3. Installation

3.1 Conditions for Installation

Laser beam printer is likely influenced by the environment of set-up location. IF Printer was set up at the inappropriate location, the printer may not perform the characteristic functions as expected. Therefore, the following factors should be taken into consideration prior to deciding where to set.

(1). Environmental Conditions

Printer should not be set up at the locations referred to by the following items (a) through (d) specifying the inappropriate locations for set-up.

(a). Likely to receive the direct sunbeam or similar light.
(For example, window side)

(b). Likely to cause the big difference in temperature and humidity between the maximum and minimum level. (Normal operation environment is within 10°C ~ 35°C , 20 ~ 80%RH and without any condensation.)

(c). Likely to receive cold wind from air-conditioner or worm wind from heater, or to receive direct radiant heat.

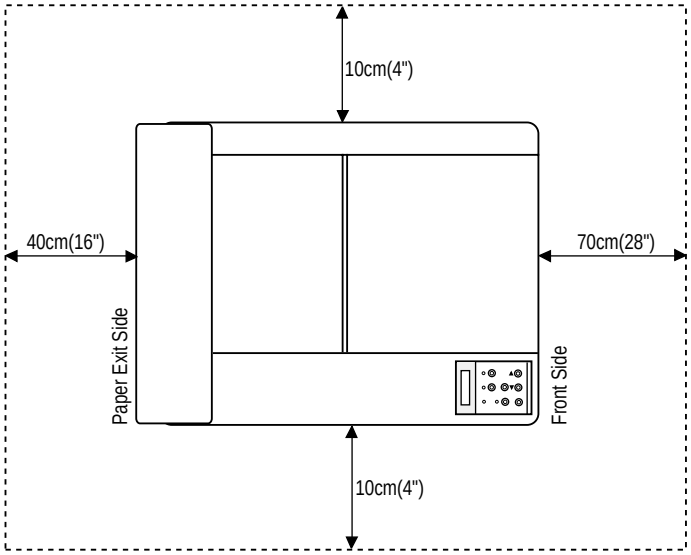
(d). Likely to cause much dust or have corrosive gas like ammonia.

(e). Users to select the location of good ventilation and set a printer on the flat surface.

(f). Users to check the maximum tilt of set-up location to be within ±1°.

(2). Basic Layout of Printer Set-Up Location

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



[Fig.3-1]

3.2 Unpacking

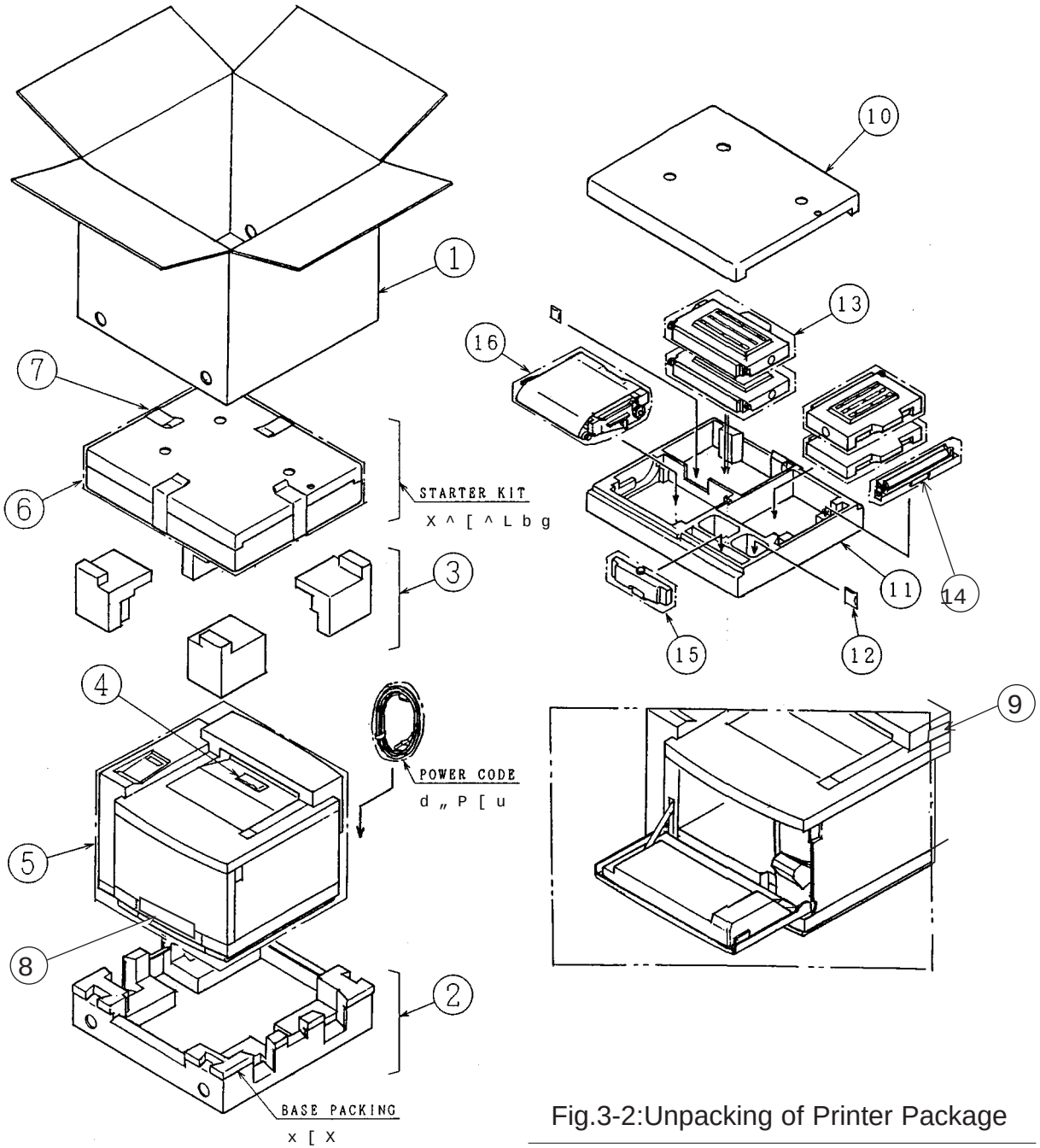
⚠ WARNING

- The package containing a printer weighs approximately 40kg, so that it is too heavy for one person to carry. It needs more than two adults to move the printer. Since this printer is a precision machine, ensure to carry it slowly with good care so that no impact shall be given to the printer while moving.

- Do not attempt to hold a printer as covered by vinyl sheet, because it is slippery and results in damage and injury if dropped from your hand.

3-2-1 Unpacking of Printer (Fig.3-2)

①. Cut the bands (2 pcs.) binding the package.
②. Remove the plastic joints ⑰ (4 locations).
③. Remove the tape ⑱ binding the top of package.
④. Open up the top of package to take the starter kit out.
⑤. Lift the outer box ① up for removal.
⑥. Remove the top partition packing ③.
⑦. Take the power cable out.
⑧. Open up the vinyl sheet ⑤ covering the printer body.
⑨. Lift up the printer body with another person's help, and lay it on the floor.
⑩. Set up the printer on the suitable location.
⑪. Remove the tape ⑧ fixing the paper cassette.
⑫. Remove the protective tape ⑨ (1 location).



No.	NANE OF PARTS	Q'TY
1	OUTER BOX	1
2	BASE	1
3	UPPER PACKING	1
4	SILICA GEL (EN)	1
5	POLYETHYLENE BAG (EN)	1
6	POLYETHYLENE BAG (ST)	1
7	ST KIT TAPE	4
8	TAPE	1
9	PR TAPE	1
10	STARTER KIT PACKING (U)	1
11	STARTER KIT PACKING (L)	1
12	SILICA GEL (ST)	2
13	POLYETHYLENE BAG (T)	4
14	POLYETHYLENE BAG (CL)	1
15	POLYETHYLENE BAG (OIL)	1
16	POLYETHYLENE BAG (OPC)	1
17	JOINT	4
18	OUTER BOX TAPE	1

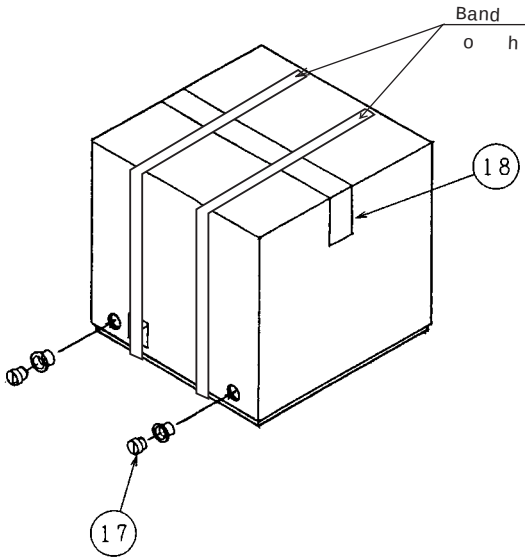
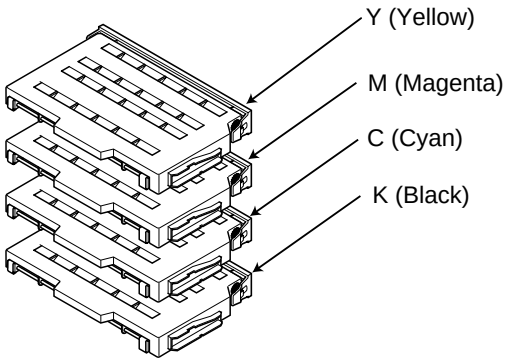
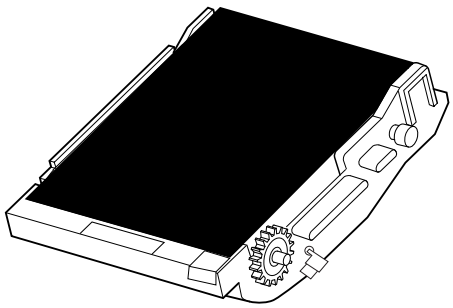
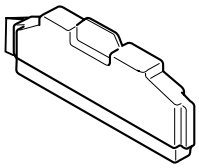
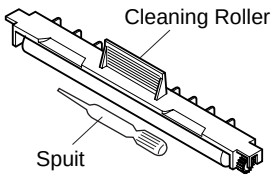


Fig.3-2:Unpacking of Printer Package

3-2-2 Unpacking of Starter Kit

Procedure of Unpacking

①. Open up the vinyl sheet covering the starter kit.
②. Confirm all of the following kits to be inside the starter kit's packing box.

No.	Name of Kit	Appearance	Quantity
1	Toner Cartridge (Y.M.C.K)		4
2	OPC Belt Cartridge		1
3	Oil Bottle		1 set.
4	Cleaning Roller		1

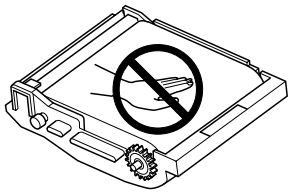
3.3 Installation Work

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

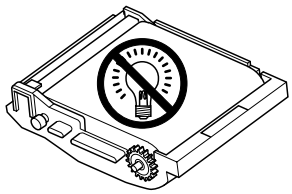
3.3.1 Installation of OPC Belt Cartridge: (Fig.3-3 ~ 3-6)

⚠ PRECAUTION

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



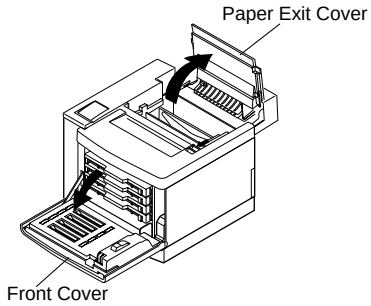
If OPC belt is exposed for more than two minutes under the light of 800 lux, the belt may be defective.



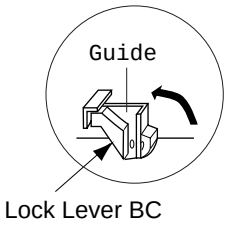
Procedures of Installation

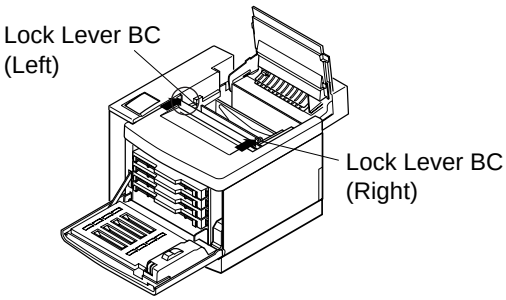
①. Open the front cover.
②. Open the paper exit cover.

③. Erect the lock lever BC provided at both sides (left and right).



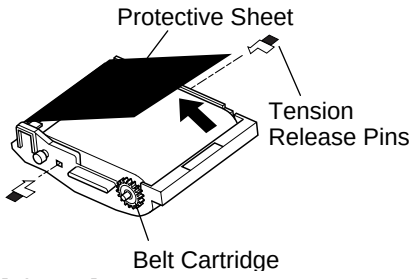
[Fig.3-3]





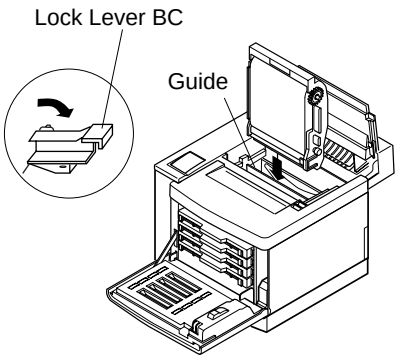
[Fig.3-4]

④. Pull and remove the tension release pins of both sides (left & right).
⑤. Remove the protective sheet from a new belt cartridge.
⑥. Push the new belt cartridge into the printer, along the guide of lock lever BC provided at both sides.



[Fig.3-5]

⑥. Push new belt cartridge along the guide of both sides into the printer.
⑦. Set the lock lever BC.
⑧. Close the paper exit cover.
⑨. Close the front cover.

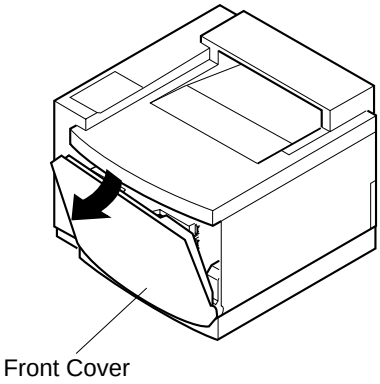


[Fig.3-6]

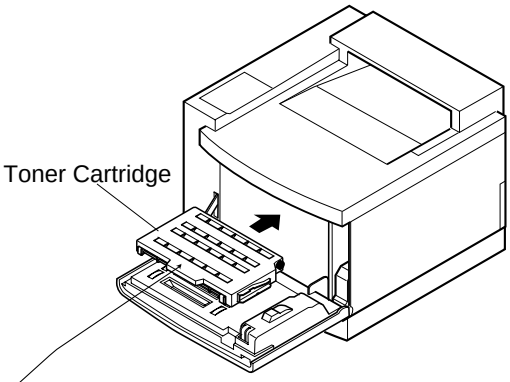
3.3.2 Installation of toner cartridge to the printer: (Fig.3-7~3-9)

> **⚠ Caution**
>
> Refrain from holding a toner cartridge vertically, otherwise, it may adversely affect the print quality.

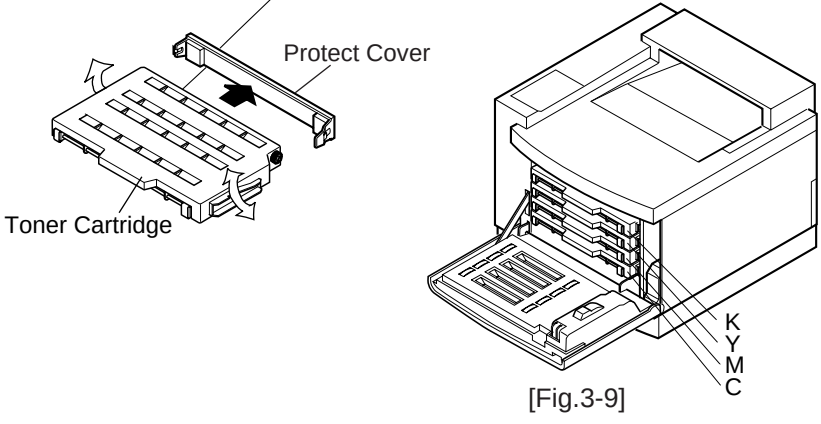
①. Open the front cover unit.
②. Holding a toner cartridge horizontally, shake it to left and right for three to four times.
③. Remove a protective cover of toner cartridge.
④. Push the new toner cartridge along the guide into the printer.
Installation order of toner cartridge in terms of color shall be Cyan (C), Magenta (M), Yellow (Y), and Black (K).
⑤. Close the front cover unit.



[Fig.3-7]



[Fig.3-8]

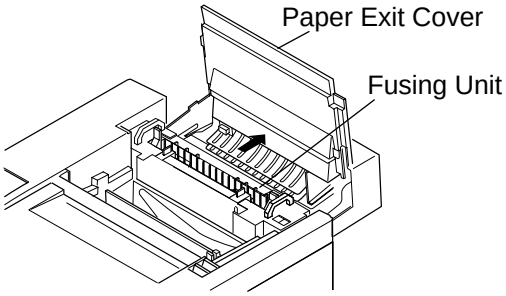


[Fig.3-9]

3.3.3 Installation of Cleaning Roller and Oil Bottle:(Fig.3-10 ~ 3-13)

Procedures of Installation

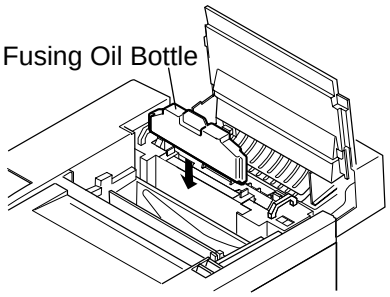
①. Open the paper exit unit.



[Fig.3-10]

②. Open the retainer lock lever of oil bottle and the cleaning roller.

③. Install the oil bottle to the fusing unit.

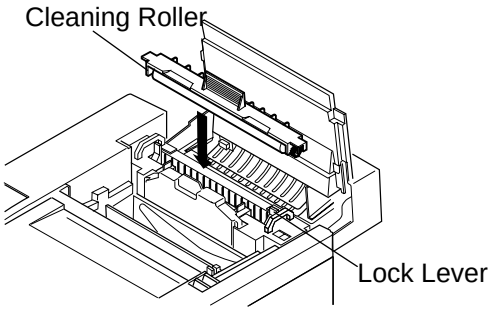


[Fig.3-11]

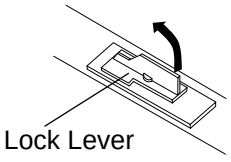
④. Install the cleaning roller to the fusing unit.

⑤. Hold the cleaning roller with the retainer lock lever.

⑥. Close the paper exit cover.



[Fig.3-12]

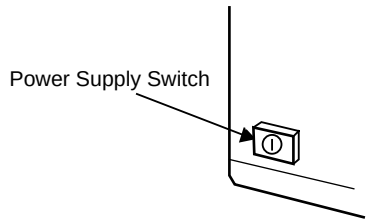
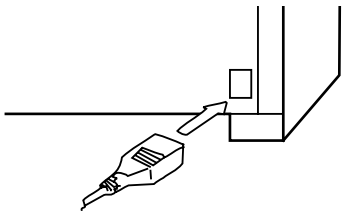
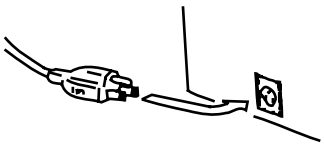
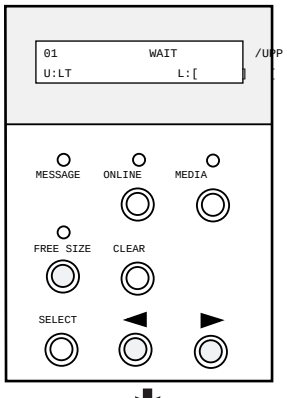
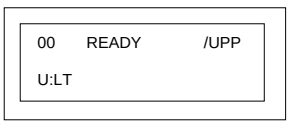


3.3.4 Test Run & Test Print

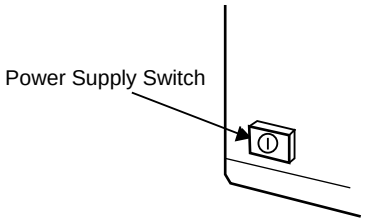
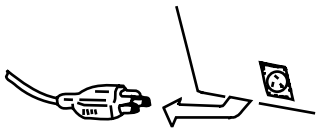
(1). Power-On & Off

(i). Power-On:

There is ⏻ mark on the power supply switch located on the side panel of the printer. ⏻ represents the power supply switch with push-on/push-off function.

1	Prior to connecting a power cable, confirm that the push button top of power supply switch located at the lower left front of printer projects from the cover surface. This means that the printer is in the power-off status.	
2	Connect a connector of power supply cable to the printer.	
3	Insert a plug of the power supply cable to the inlet.	
4	Pressing the scroll keys (left & right) and Free Size key, push the push button top of power supply switch. Next, press the ONLINE key. Then, the display of operator panel turns to be the status of (a), and "MESSAGE" LED lamp starts to blink. This blinking means that the printer is in the warming-up process.	(a). Indication at Warming-UP 
5	"MESSAGE" LED lamp changes to be lit within 210 seconds at max., when screen (b) appears on the operator panel display.	(a). Indication at Warming-UP 

(ii). Power-Off:

1	Push the push button top of power supply switch in order to shut off the power supply to the printer. (This switch is push-on/push-off type.)	
2	Unplug the power supply cord from the inlet.	

(iii). Precaution while power-on & off operation:

⚠ PRECAUTION

Prior to unplugging the power supply cord, confirm that the main switch located on the side panel of printer is set to the Push-Off.

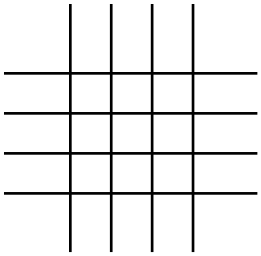
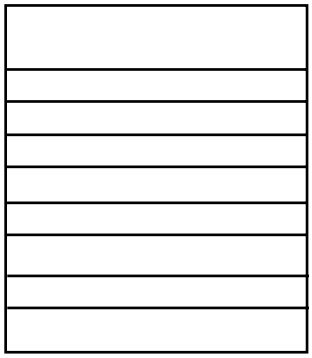
Strictly refrain from powering off or unplugging while the printer is performing the printing operation.

When resetting the power-on, make sure to wait at least 5 seconds after powering off.

(2). Test Print

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

(i). 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 4.1-(1).]
2	Test Print See Item (ii) "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.  GRID 2). Stripe Pattern: Available in color print of Y, M, C, K, R, G, B.  STRIPE

(ii) Test Print Procedures

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

Procedure

① Warming-up process is completed.

② Press ONLINE key so that display changes from screen (a) to (b).

③ Press SELECT key so that display changes from screen (b) to (c).

④ Select GRID or STRIPE pattern with scroll key.
(GRID to be selected.)

⑤ Press SELECT key so that display changes from screen (c) to (d).

⑥ Select the color to be printed with scroll key.
(R to be selected.)

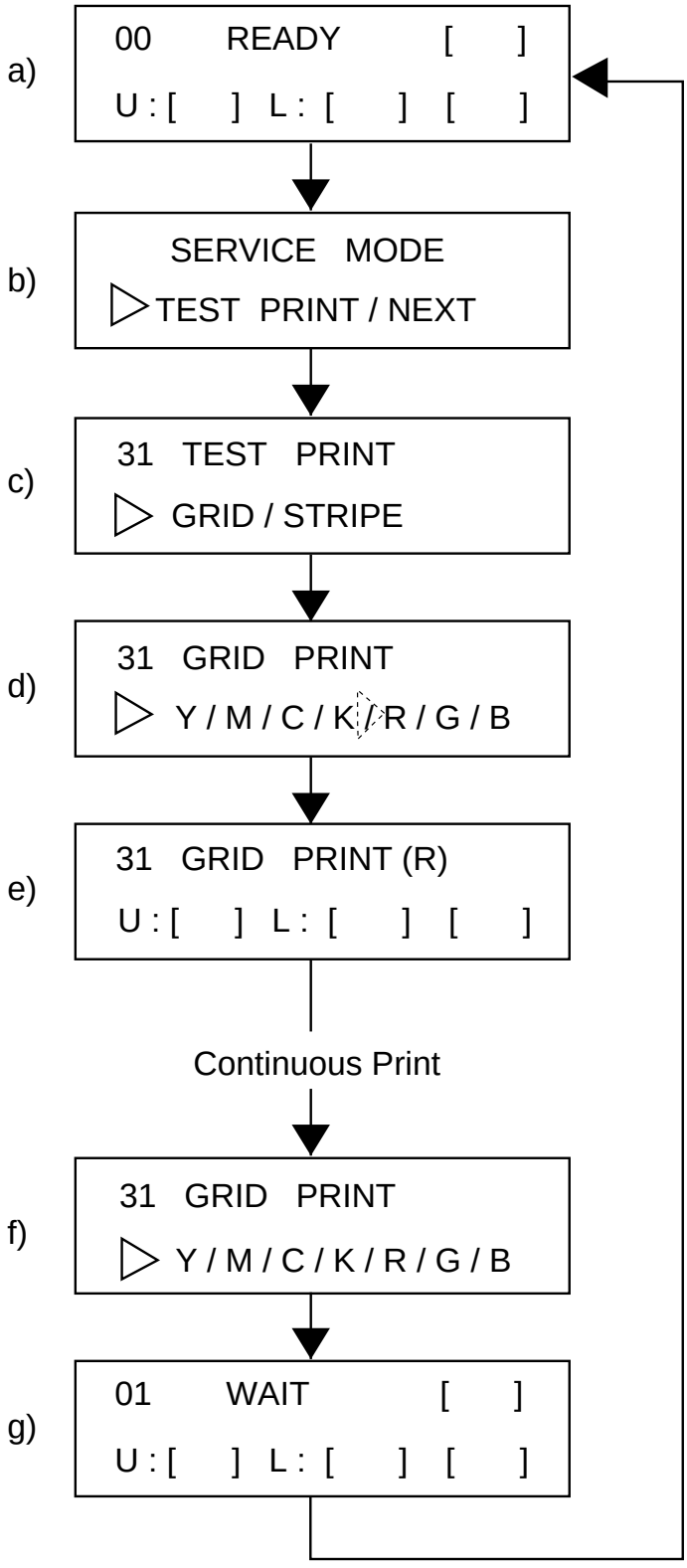
⑦ Press SELECT key so that display changes from screen (d) to (e).

⑧ Warming-up starts, and continuous print will be automatically carried out upon completion of the warming-up.

⑨ Printing operation will be suspended by pressing CLEAR key, and display changes from screen (e) to (f).

⑩ Printer will be returned to ONLINE mode by pressing ONLINE key, and display changes from screen (f) to (g).

Indication of Operator Panel



(iii). 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	Ordinary Paper
Blinking	Stock Paper, Label
Lit	OHP Sheet

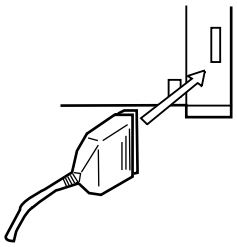
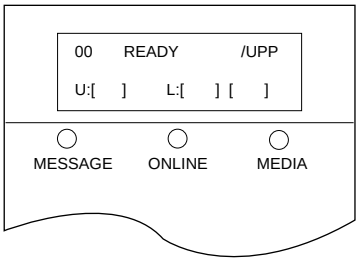
(iv). Operator Call

When "Operator Call" is indicated on the operator panel, see "Operator Call" column in Sub-section 8.1- (1), and take necessary actions accordingly.

(3). On-Line Print

Upon confirmation of normal printing by the test print mode, proceed with the On-Line Print according to the following procedures. However, since this Operator Manual does not refer to the connection method of Interface, or the operating method of Host side, make sure to read the operation procedure of the Host prior to starting the On-Line Print.

(i). Procedure of Operation

<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 host machine.</td><td rowspan="2">  </td></tr>
<tr><td>2</td><td>Push the push button top of power supply.</td></tr>
<tr><td>3</td><td>Confirm that the printer is set to the On-Line mode.
(Display as per right-hand figure.)</td><td rowspan="2">Confirm what is indicated on the operator panel.
  </td></tr>
<tr><td>4</td><td>Upon completion of warming-up process, "MESSAGE" LED lamp is lit.

This warming-up process is 210 seconds at maximum.</td></tr>
<tr><td>5</td><td>Printer start the printing operation upon receipt of the PRINT signal transmitted from the Host.</td><td></td></tr>
</table>

4. Structure of Each Component Systems

4.1 Basic Structure 4-1

4.1.1 Print System and Transfer System 4-6

4.1.2 Optical System 4-24

4.1.3 Paper Transportation System 4-26

4.1.4 Fusing Unit 4-28

4.2 Structure of Control System 4-30

4.2.1 Basic Structure 4-30

4.2.2 Operation of Control System 4-40

4.2.3 DC Power Supply Unit 4-50

4.2.4 High Voltage Power Supply Unit 4-53

4.2.5 General Wiring Diagram 4-55

4. Structure of Each Component Systems

4.1 Basic Structure

(1). Mechanical & Electrical Structures

This laser beam color printer (hereinafter called "Printer") consists of the five engineering systems such as Print, Transfer, Optical, Paper Transport, and Control System. Printer runs a color printing through the interactive operations of above five systems as shown in Fig. 4-1.

①. Print System

Print system consisting of the following 6 (six) functional parts located around OPC Belt forms a toner image on the OPC Belt.

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

②. Optical System

Optical system consisting of the following 2 (two) functional parts forms electrostatic latent images on the OPC Belt by scanning a laser beam.

- •Optical Unit
- •Scanner Motor(SCM)

③. Transfer System

Transfer system consisting of the following 3 (three) functional parts transfers to the transported paper the toner image formed on the transfer drum.

- •Transfer Drum
- •Second Transfer Part
- •Drum Cleaner Part

④. Paper Transport System

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

- •Paper Cassette
- •Transport Part
- •Paper Discharger Part
- •Fuser Part
- •Paper Exit Part

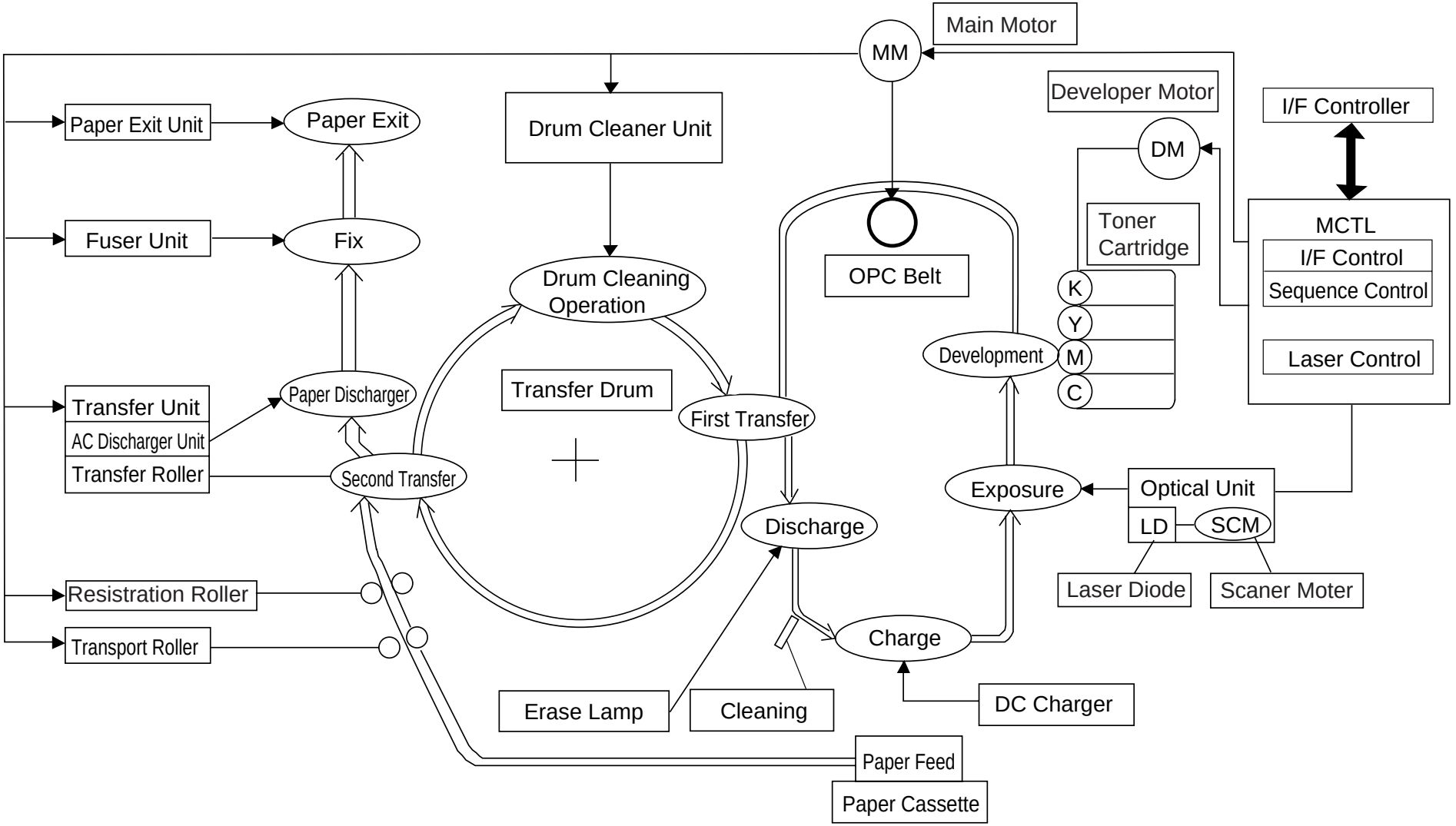

Main Motor
MM
Developer Motor
DM
I/F Controller
Paper Exit Unit
Paper Exit
Drum Cleaner Unit
Toner Cartridge
MCTL
I/F Control
Sequence Control
Laser Control
Fuser Unit
Fix
Drum Cleaning Operation
OPC Belt
K
Y
M
C
Development
Transfer Unit
AC Discharger Unit
Transfer Roller
Paper Discharger
Transfer Drum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

Fig4-1

⑤. Control System

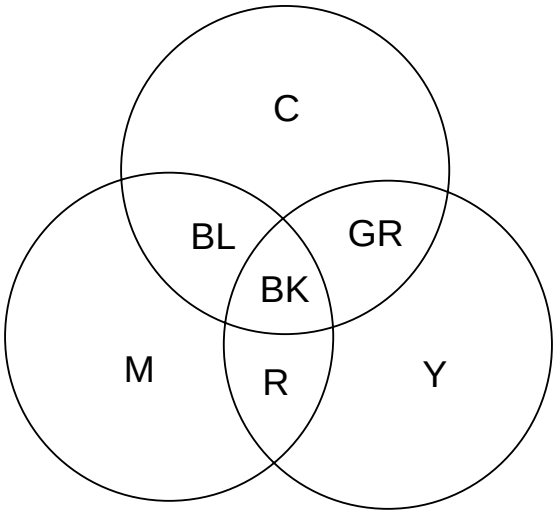
Control system consisting of the following 4 (four) control parts runs the printer by processing the interface signals transmitted from the Host and each systems such as the print, transfer, optical, transport system.

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

(2). 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 Process of Color Printing

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

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

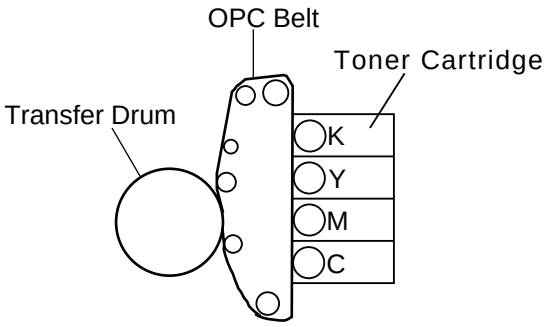

OPC Belt
Toner Cartridge
Transfer Drum
K
Y
M
C

Fig4-3

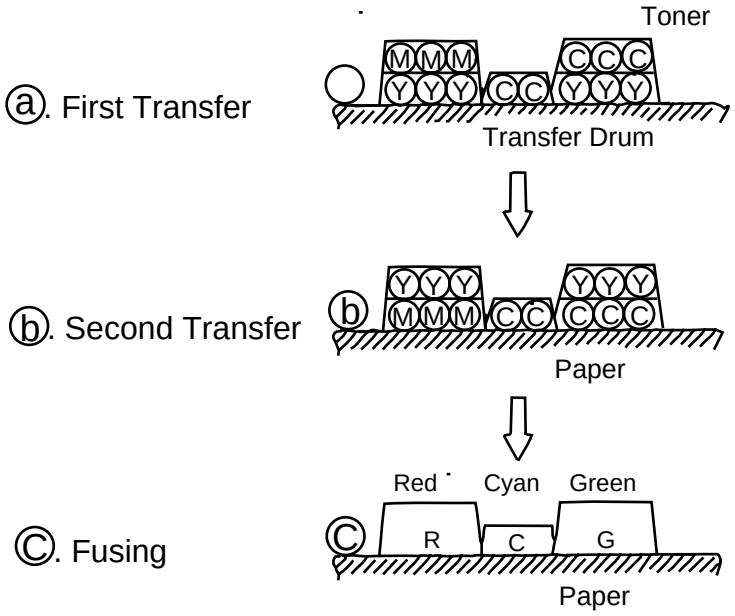

Toner
ⓐ. First Transfer
Transfer Drum
ⓑ. Second Transfer
Paper
Red
Cyan
Green
Ⓒ. Fusing
R
C
G
Paper

Fig4-4

(3). Structure of OPC Belt

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

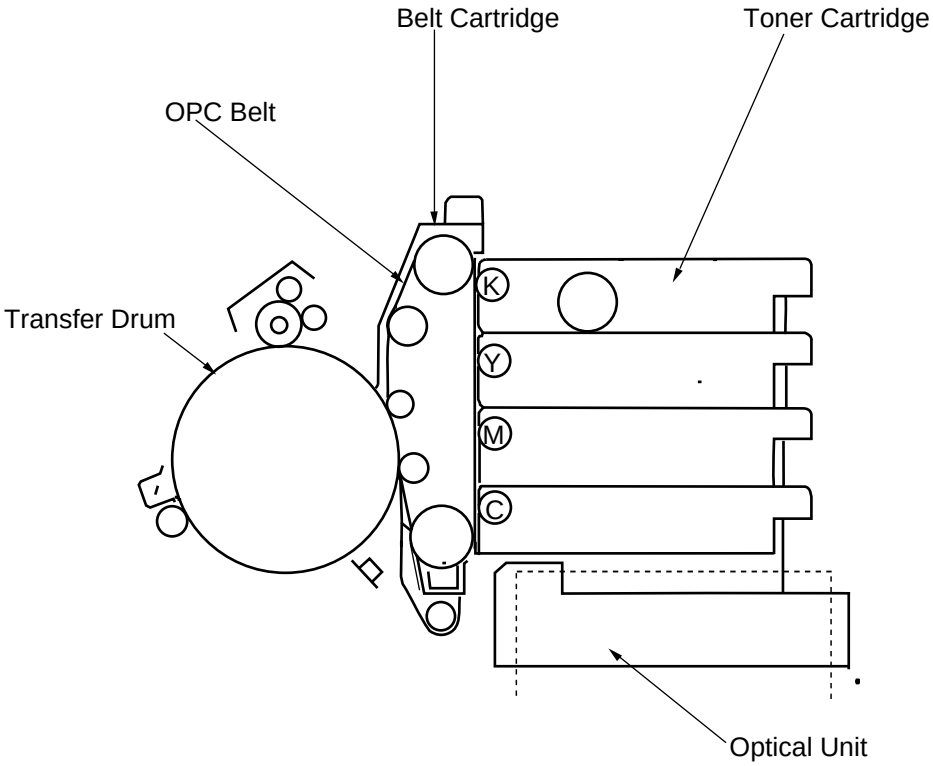


Fig4-5

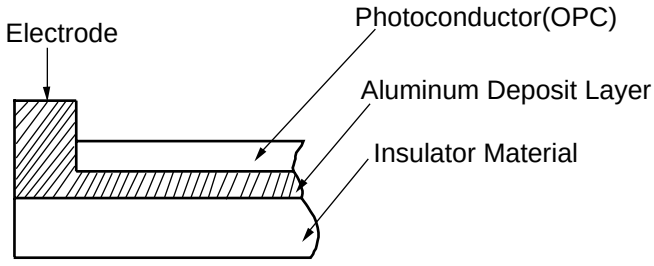


Fig4-6

4.1.1 Print System and Transfer System

Fig.4-7 shows the basic structures of the print system having OPC belt as a main part, and the transfer system having the transfer drum. Color print is made by actuating the each processes in the print system and transfer system.

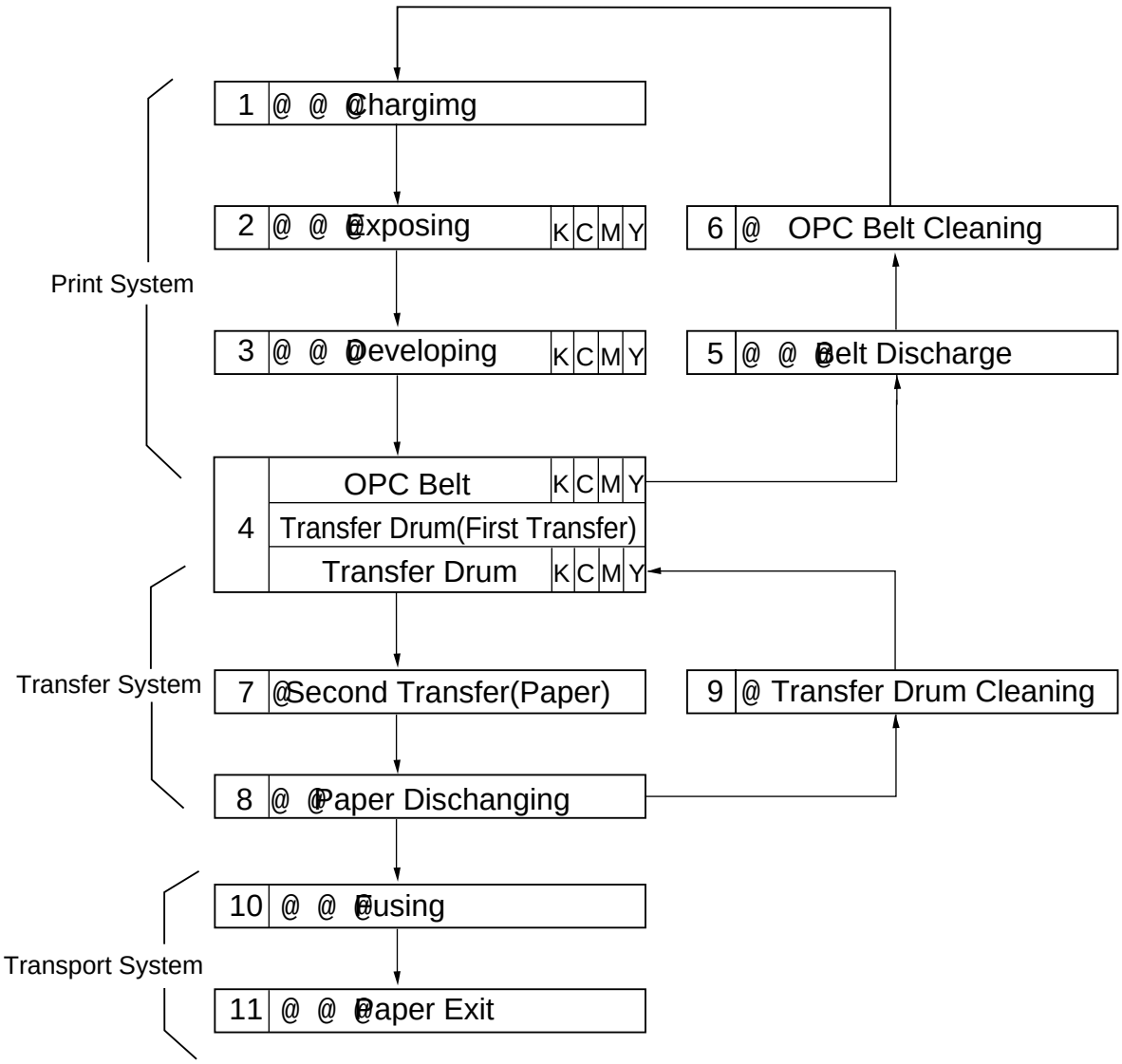
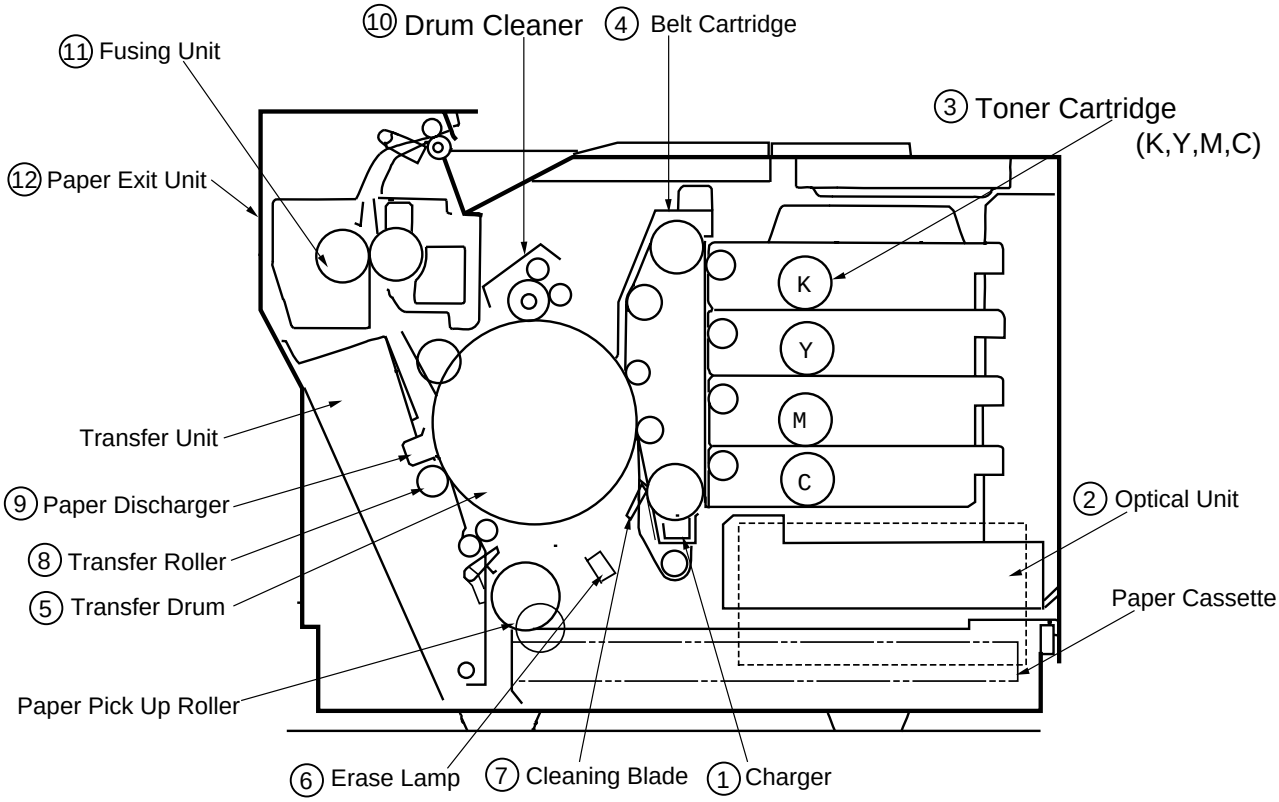


Fig.4-7: Basic Structure of Print System

(Ⅱ) Structure of Printer

No.	Name of Component Part	Process
①	Charger	Charging
②	Optical Unit	Exposing
③	Toner Cartridge	Developing
④	Belt Cartridge	Receiving of Image
⑤	Transfer Drum	Transferring of Image
⑥	Belt Discharger Erase Lamp	Discharging of Belt
⑦	Cleaning Blade	Cleaning of Belt
⑧	Transfer Roller	Transferring
⑨	Paper Discharger	Discharging of Paper
⑩	Drum Cleaner	Cleaning of Drum
⑪	Fuser Unit	Fusing
⑫	Paper Exit Unit	Exiting of Paper



(Ⅱ) Basic Structure of Printing System

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

①. Process of Print System (See Fig.4-8-a)

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

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

(iii). Developer Roller of the toner cartridge is biased to -DBV(V) by the power supply DBV.

(iv). Frame potential of the transfer drum is GND.

②. Variation of OPC Belt's Potential (See Fig.4-8-b)

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

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

(iii). Potential of the exposure part is discharged till -VR(V) as 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 to OPC belt in the development process due to difference of potential between -VR(V) and -DBV(V), and the visible image is formed as the result.

(v). Negatively charged toner on the OPC belt is moved to the transfer drum in the transfer process because the potential GND of transfer drum is greater than -VR(V) of OPC belt.

(vi). OPC belt is discharged by the erase lamp radiating the OPC belt.

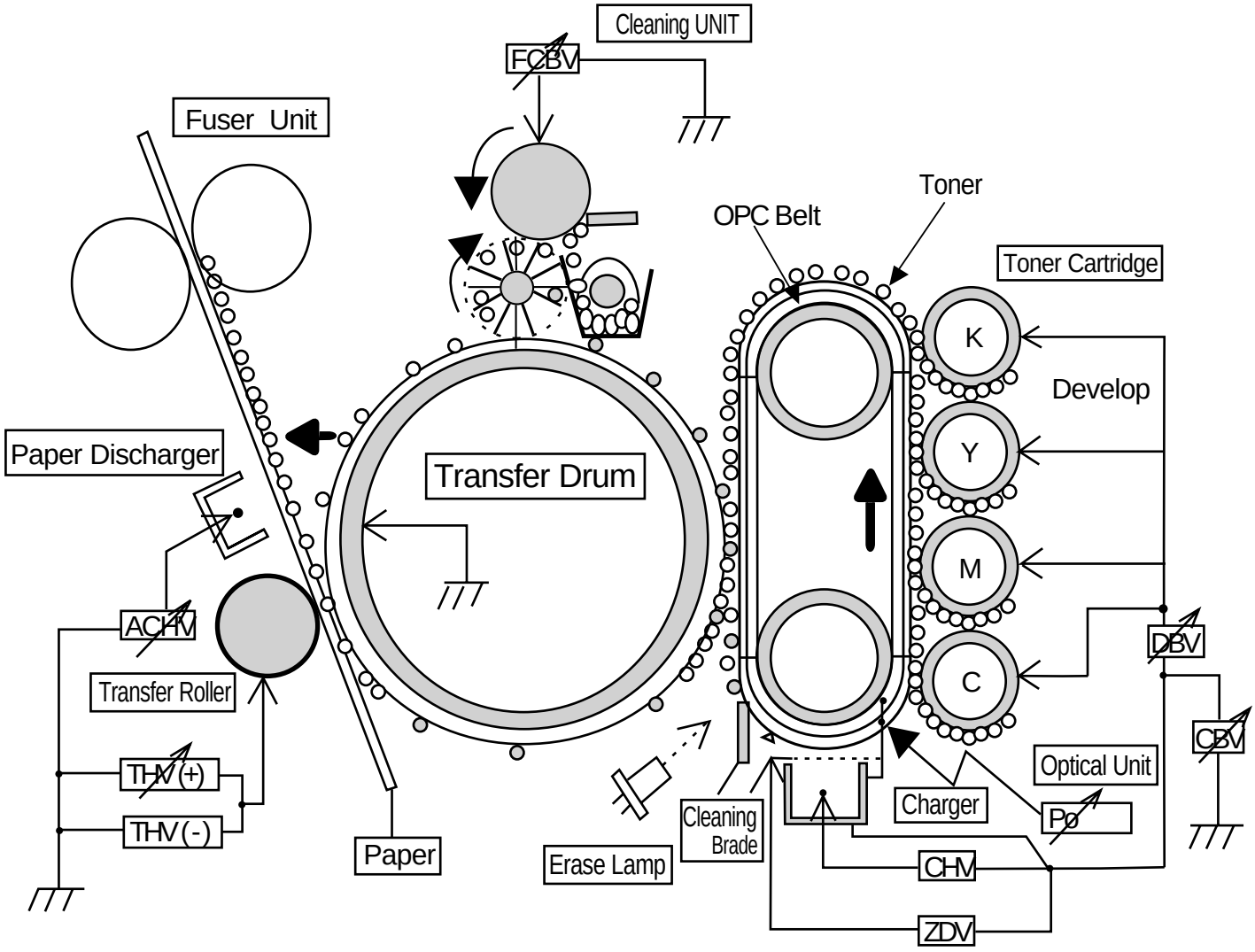


Fig.4-8-a: Basic Structure of Print System

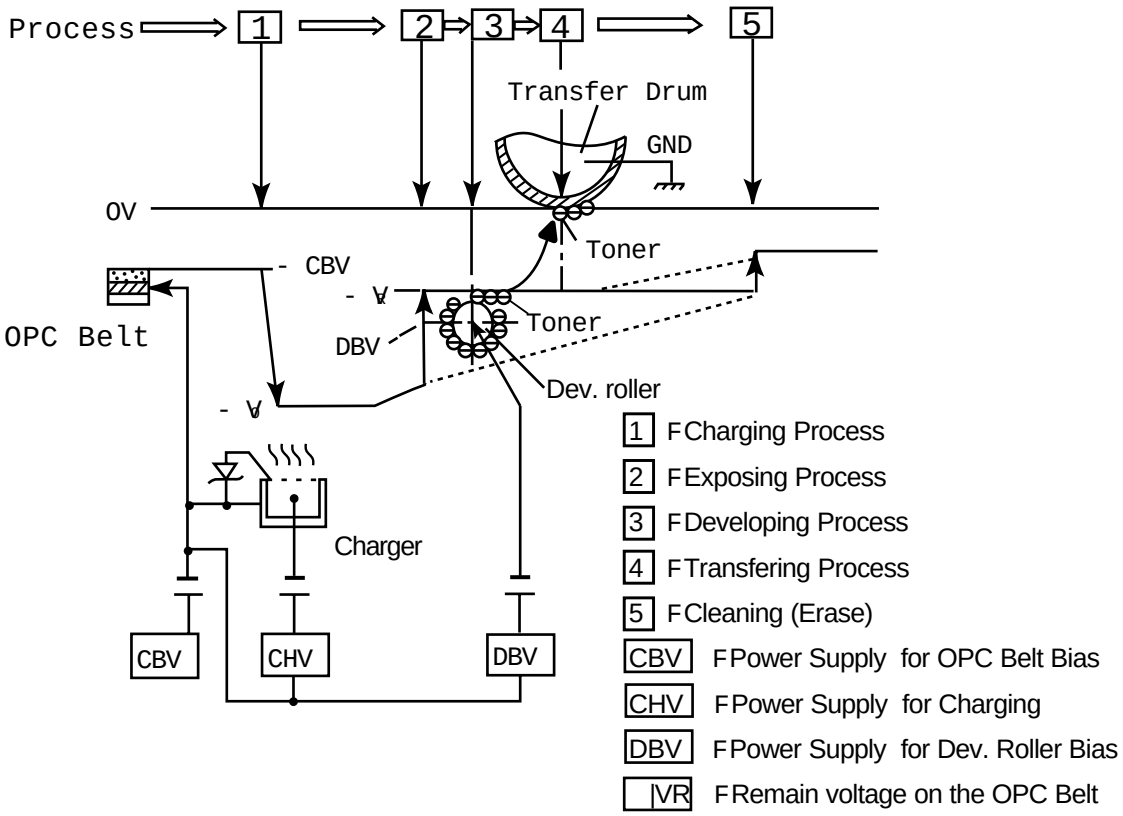

Process
1
2
3
4
5
Transfer Drum
GND
0V
Toner
- CBV
- VR
OPC Belt
DBV
Toner
Dev. roller
- VD
Charger
CBV
CHV
DBV
1 : Charging Process
2 : Exposing Process
3 : Developing Process
4 : Transfering Process
5 : Cleaning (Erase)
CBV : Power Supply for OPC Belt Bias
CHV : Power Supply for Charging
DBV : Power Supply for Dev. Roller Bias
VR : Remain voltage on the OPC Belt

Fig.4-8-b

(Ⅲ) Details of Each Process

1	Charging

Charging Process means that OPC belt is evenly charged by the charger.

(1). Structure of Charger Unit (Fig.4-7 and Fig.4-9)

①. Charger unit is located as shown in Fig.4-7.

②. Charger unit consists of the case, corona wire and grid.

③. Charger unit charges the OPC belt surface to the potential $-V_0$(V) with the corona charge.

④. Charger unit has the grid controllable to the constant voltage ZD(V) for even charging.

(2). Process of Charging (Fig.4-10)

①. Status of OPC belt surface before charging is -CBV(V).

②. Charger unit charges evenly the OPC belt surface till $-V_0$(V) by generating negative charge.

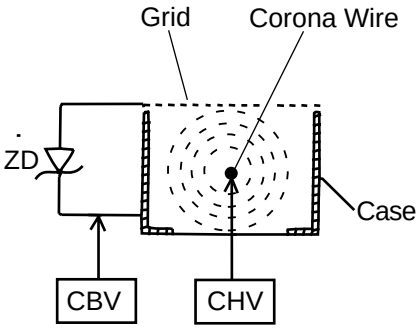


Fig.4-9

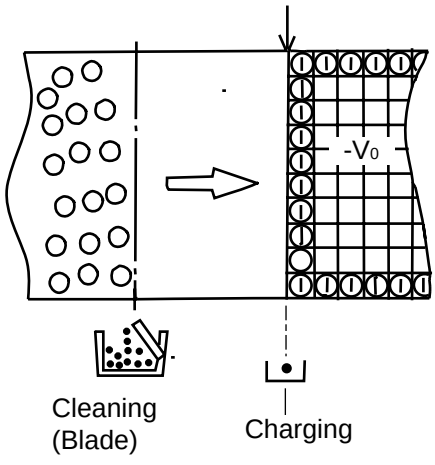


Fig.4-10

2	Exposing

Exposing Process means that OPC belt surface is exposed to the laser beam to form an electrostatic latent image.

(1). Structure of Optical Unit

①. Optical unit is located as shown in Fig.4-7.

②. Luminous source of laser beam is a semiconductor laser.

③. Scanning is made to laser light on OPC belt as converting the laser light to the beam light through lens and reflective mirror to form an electrostatic latent image.

(2). Process of Exposing (Fig.4-11)

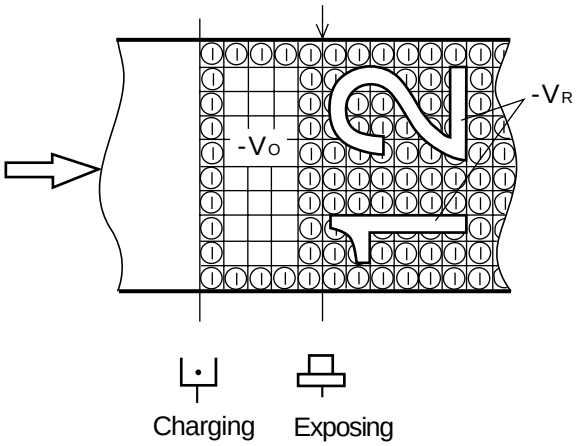
①. OPC belt surface has been charged to the potential $-V_0$(V) in the process of charging

②. Laser light is scanned as rectangular to the forwarding direction of OPC belt.

③. High speed switching of laser is made according to the transmitted image data.

④. Charge of the areas radiated by the laser light is discharged, where the potential is -VR(V).

⑤. An electrostatic latent image is formed (invisible) on the OPC belt as shown Fig.4-11.



3 Developing

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

(1). Structure of Toner Cartridge (Fig.4-7)

①. Toner cartridge is located as shown in Fig.4-7.

②. Four toner cartridges are made available from the top to bottom in the order of specified color as black, yellow, magenta and cyan.

③. Each color toner is loaded in the corresponding toner cartridge.

(2). Process of Developing (Fig.4-7 and Fig.4-12,-13,-14)

①. Toner adheres to the Dev.roller of toner cartridge.
Developing is processed by this Dev.roller contacting the OPC belt surface.

②. Dev.roller has been biased to the potential -DBV(V). Fig.4-13 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.

③. 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.)

④. 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.

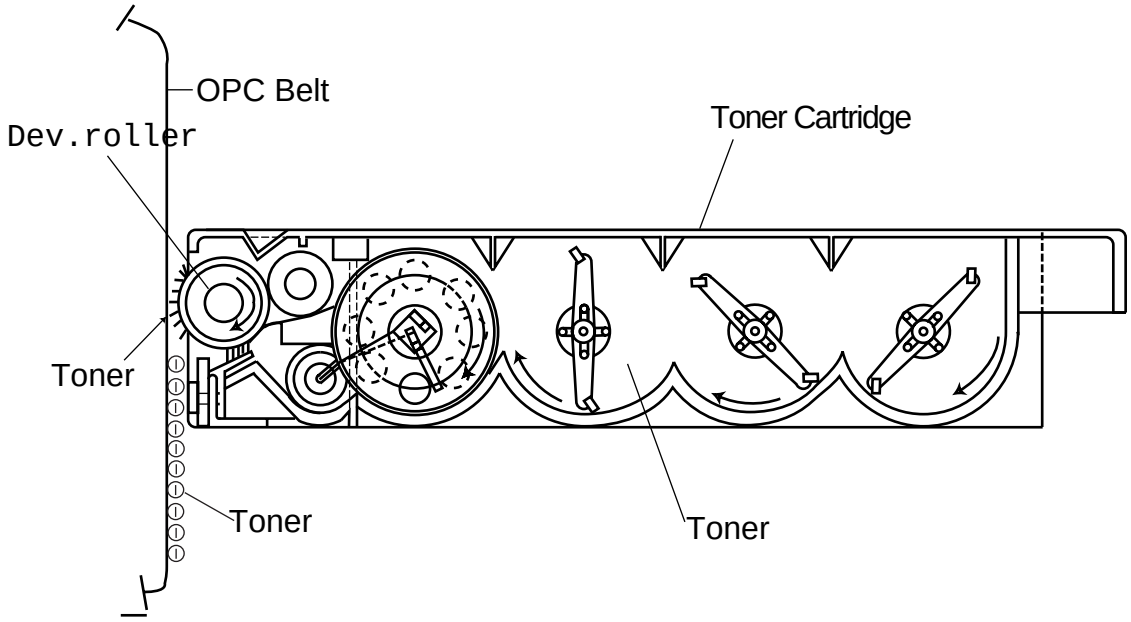


Fig.4-12

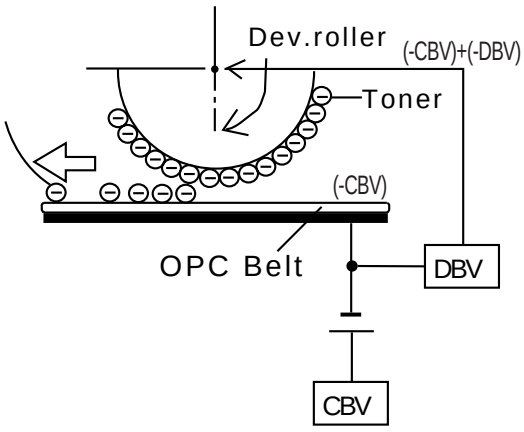


Fig.4-13

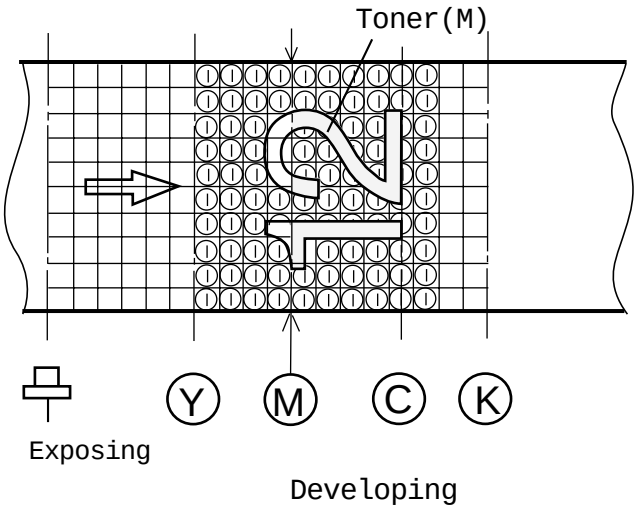


Fig.4-14

4	First Transfer (Drum)

First Transfer Process means that toner images on the OPC belt is transferred onto the transfer drum.

(1). Structure of Drum Transfer (Fig.4-7)

①. First transfer part is located as shown in Fig.4-7.
②. Material of the drum is aluminum.
③. Semiconductor rubber is provided to the drum surface as shown in Fig.4-16.
④. Transfer drum rotates as contacting and synchronizing with the OPC belt.

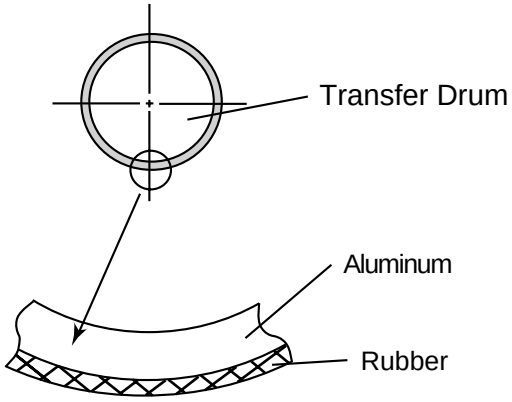


Fig.4-16

(2). Process of First Transfer (Fig.4-17)

①. OPC belt that has been through the development process rotates as contacting and synchronizing with the transfer drum.

②. OPC belt has been biased to the potential of -CBV(V). Potential of the transfer drum is nearly GND.

③. Toner on the OPC belt is moved onto the transfer drum due to the difference of potential between the OPC belt and transfer drum.

④. Toner that has been developed by each color is moved from the OPC belt onto the transfer drum, and two color toner image is overlapped on the transfer drum.

⑤. Upon completion of the drum transfer process, the toner image is transferred onto a paper in the process of paper transfer.

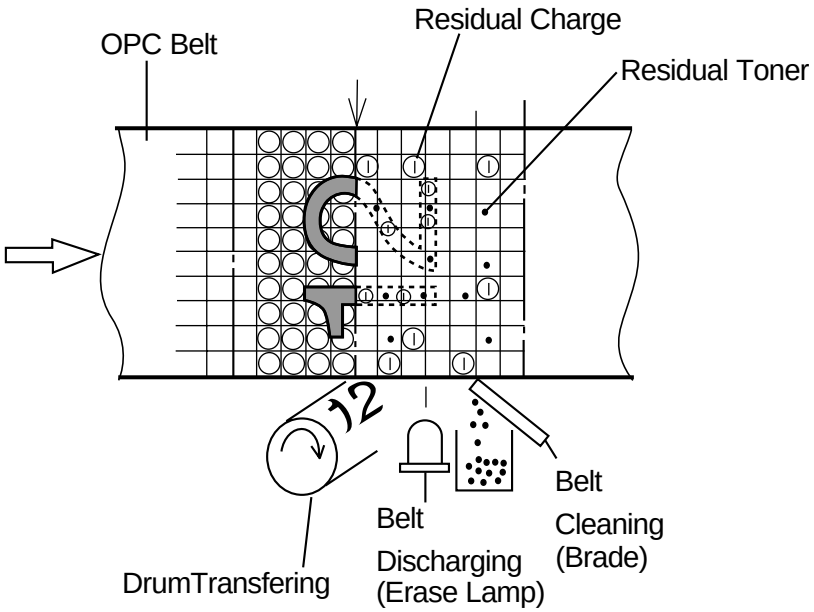


Fig.4-17

5	Belt Discharging (Erase Lamp)

Belt Discharging Process means that upon completion of the drum 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

①. Erase lamp is located as shown in Fig.4-7.
②. Luminous source of erase lamp is the 24 pieces of light emitting diodes (LED).

(2). Process of Discharging (Fig.4-18)

①. Though a toner image is transferred to the transfer drum in the drum transfer process, there is still a residual charge on the OPC belt.
②. Residual charge -VR(V) on the OPC belt is discharged by the radiation of erase lamp's light prior to cleaning the belt.

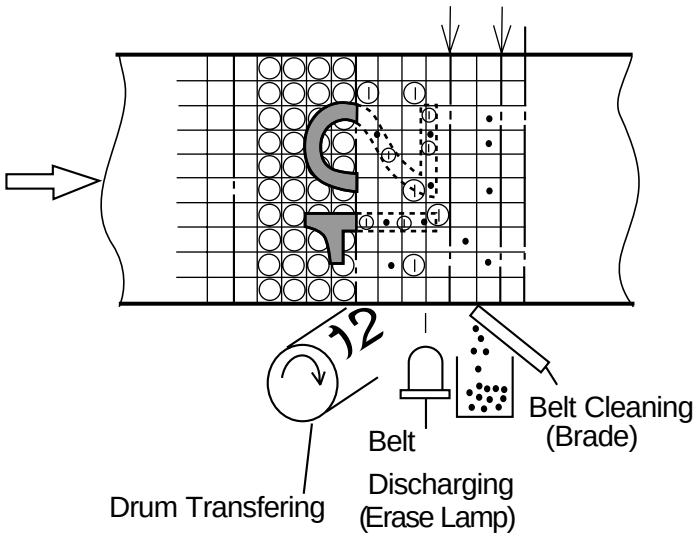


Fig.4-18

6 Belt Cleaning

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

(1). Structure of Belt Cleaning

①. Blade for the belt cleaning is located to the belt cartridge as shown in Fig.4-7.

(2). Process of Belt Cleaning (Fig.4-19)

①. There is a residual toner on the OPC belt as it has not been transferred in the process of drum transfer.
②. Residual toner is mechanically scavenged by the blade edge.
③. Scavenged residual toner is collected to the waste toner pack by the waste toner feeder.

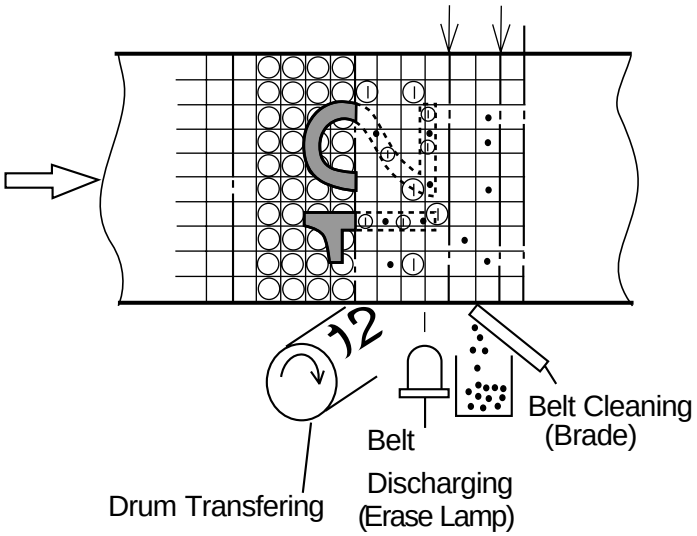


Fig.4-19

7 Second Transfer (Paper)

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

(1). Structure of Belt Cleaning

①. Transfer roller for the second transfer is located as shown in Fig.4-7.
②. Transfer roller is normally separated from the transfer drum.
③. Transfer roller is positively biased by the power supply THV.
④. Transfer roller contacts to the transfer drum in the second transfer process.
⑤. Transported paper passes between the transfer roller and transfer drum.

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

① . Paper is transported as synchronizing with the transfer drum.
② . Transfer roller operates as synchronizing with the transported paper, and contacts with the transfer drum through the transported paper.
③ . Transported paper passes between the transfer roller and transfer drum. In this instance, the positive high voltage (THV) is injected to the transfer roller.
④ . Negatively charged toner is moved to the positively charged paper.
⑤ . Transported paper with the toner transferred is transported to the paper discharging process.

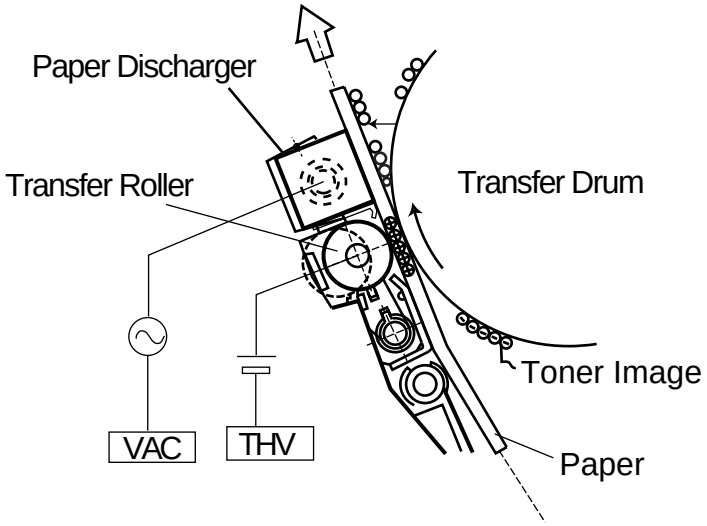


Fig.4-20

VAC: Power Supply for Paper dischargeing
THV: Power Supply for Transfer Roller Bias.

8 Paper Discharging

Paper Discharging Process means that the transported paper on which the transfer has been completed is separated from the transfer drum by applying AC charge to the paper.

(1). Structure of Paper Discharge (Fig.4-21)

①. AC charger unit for discharge of paper is located as shown in Fig.4-7.
②. AC charger unit consists of the case and charger wire.
③. High alternate voltage (VAC) is injected to AC charger unit.

(2). Process of Paper Discharge (Fig.4-21)

①. Paper has been adhered to the transfer drum in the transfer process.
②. Paper is neutralized (discharged) in terms of the electrical charge by injecting to the paper the alternate voltage generated by the discharger.
③. Paper is separated from the transfer drum and subsequently transported to the fusing (fixing) process.

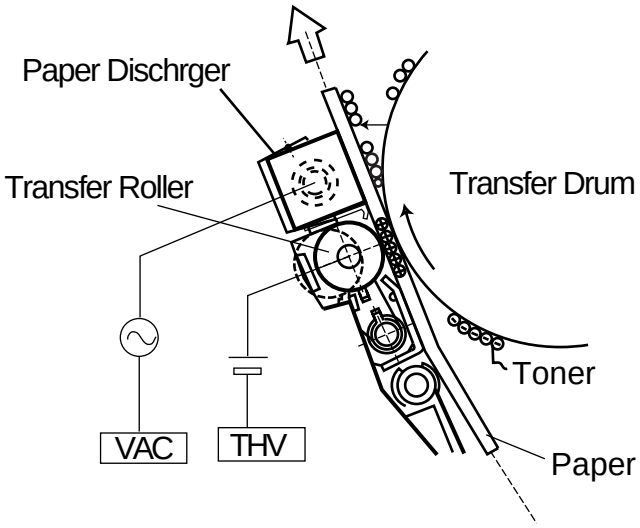


Fig.4-21

9	Drum Cleaning

Drum Cleaning Process means that the residual toner on the transfer drum is removed.

(1). Structure of Drum Cleaning(Fig.4-22)

①. Drum cleaning unit is located as shown in Fig.4-7.
②. Drum cleaning brush is a semiconductor type fur brush to clean the surface of transfer drum as rotating. However, the cleaning brush stays away from the transfer drum while imaging on the transfer drum.
③. Drum cleaning roller is positively biased by the positive voltage FCBV(V).
④. FCBV(V) is injected to the cleaning brush as well, and the cleaning brush is self-biased by the resistance of brush.
⑤. Drum cleaning roller rotates as contacting to the drum cleaning brush.

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

①. There is the residual toner on the surface of transfer drum after the paper transfer process.
②. Drum cleaning brush is positively self-biased. Drum cleaning brush has the negatively charged residual toner fall off from the surface of transfer drum, and electrically absorbs the residual toner into the drum cleaning brush.
③. Drum cleaning roller has been biased to the positive FCBV(V), the residual toner absorbed into the drum cleaning brush is attracted by the positive FCBV(V) is adhered to the surface of drum cleaning roller.
④. Waste toner adhering to the surface of drum cleaning roller is scavenged by the cleaning blade and collected to the waste toner pack by the waste toner feeder.

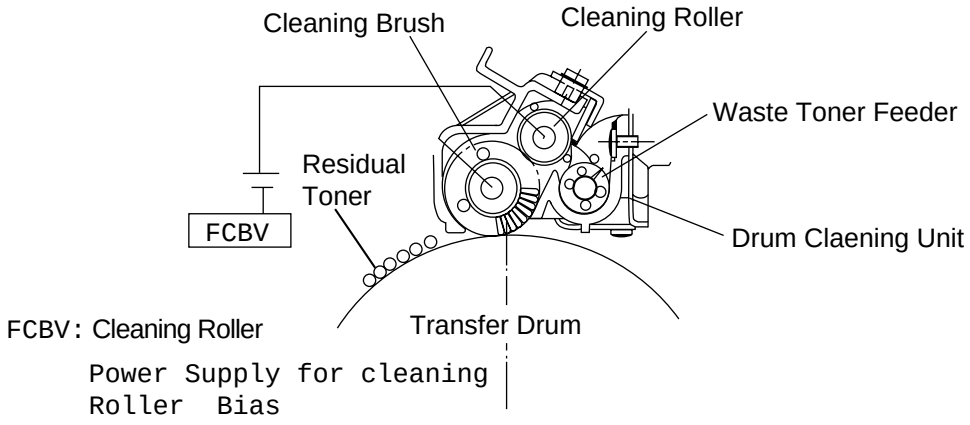

Cleaning Brush
Cleaning Roller
Waste Toner Feeder
Residual
Toner
FCBV
Drum Claening Unit
Transfer Drum
FCBV: Cleaning Roller
Power Supply for cleaning
Roller Bias

Fig.4-22

4.1.2 Optical System

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 Optical System (Fig.4-23)

Optical unit is located as shown in Fig.4-23.
Optical unit consists of following parts.

①. Laser Unit : Light emitting source incorporating a laser diode.
②. Cylinder Lens : Condenser of laser beam.
③. Polygon Mirror : Hexhedral 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.

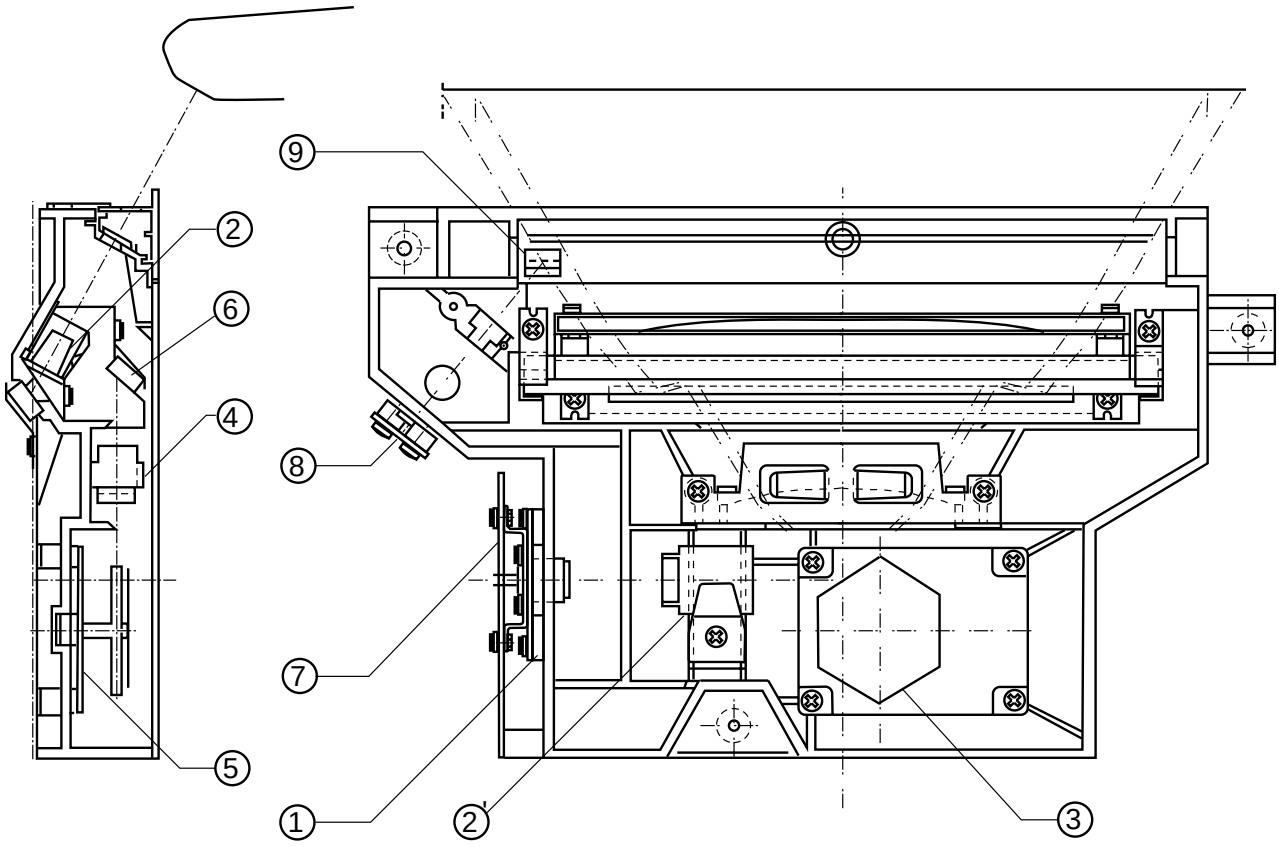


Fig.4-23

(2) Specification : Specification of Optical Unit is described as follows:

Item	Specification for SL1
Rated Output of Laser Diode	5 mW.
Wave Length of Laser Beam	Approx.785 nm.
Scanning Density	600 dpi.
Scanning Width	220 mm.
Rotations Per Minutes of Scanner Motor	23,936 rpm.
Number of Polygon Mirror Faces	6.

4.1.3 Paper Transportation System

(1). Outline

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

When toner images are formed on the transfer drum through the operations of print system and transfer system, a paper is fed by the pick-up 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 drum.

(2). Structure of of Paper Transportation System (Fig.4-23)

Paper Transportation System consists of following parts.

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

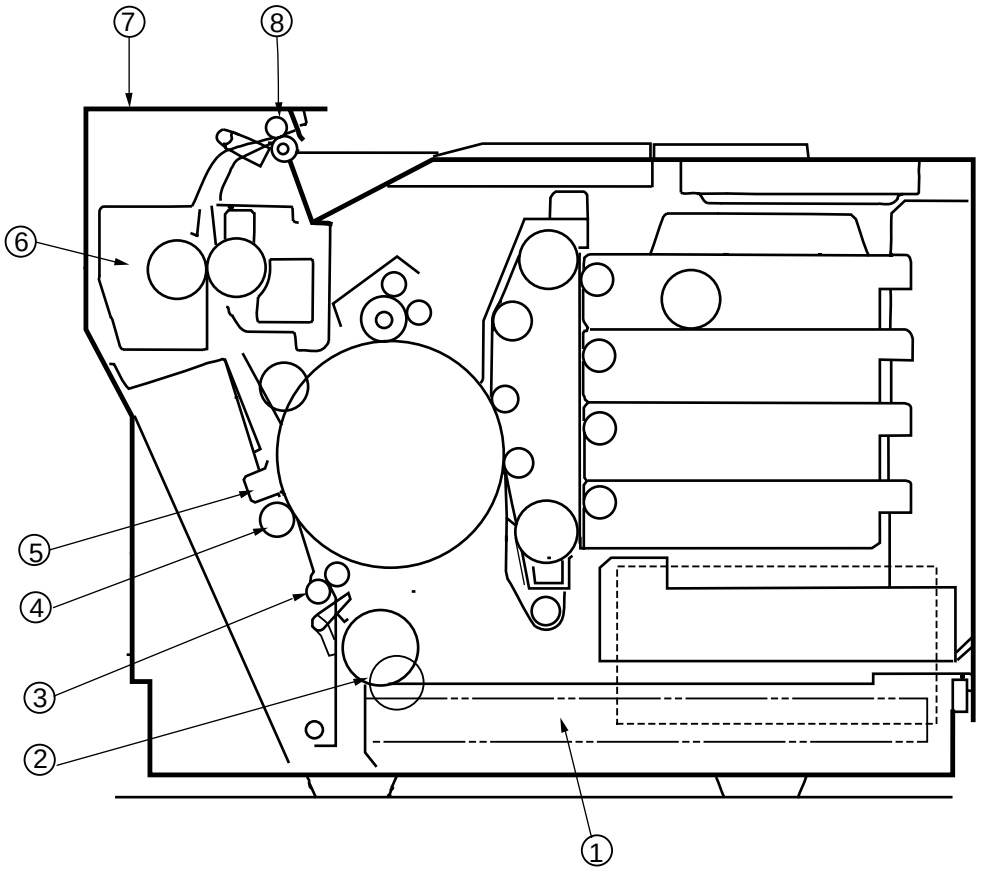


Fig.4-24

①. Paper Cassete @ ⑤@Paper Discharger Unit
②. Pick-Up Roller @ @ ⑥.@Fuser Unit
③. Resistration Roller ⑦. Paper Exit Unit
④. Transfer Part @ @ ⑧. Paper Exit Roller

4.1.4 Fusing Unit (Fig.4-25)

Fusing 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

Fusing Unit consists of the following component members:

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

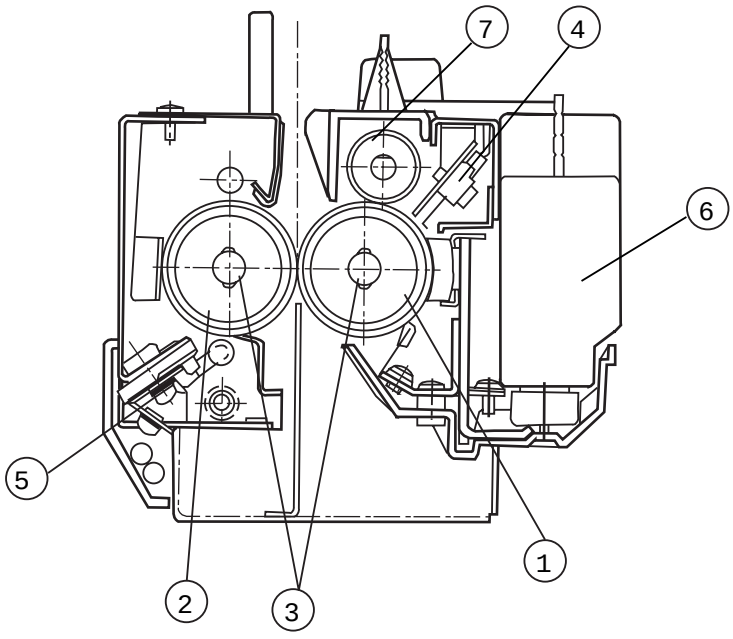


Fig.4-25

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

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

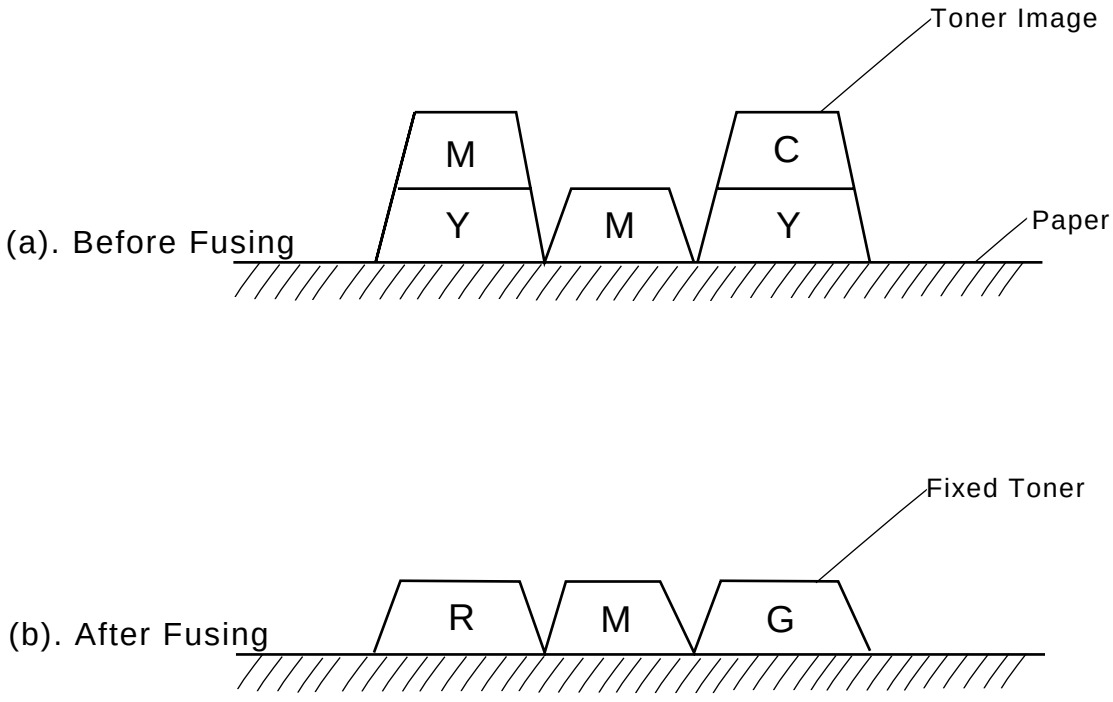


Fig.4-26

4.2 Structure of Control System

4.2.1 Basic Structure

(1). Electrical System and Function

Most of main electrical parts of this printer is controlled by MCTL P.W.B.

Structure of Sequence Control

Basic structure of the sequence control is exhibited 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. Operator 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.

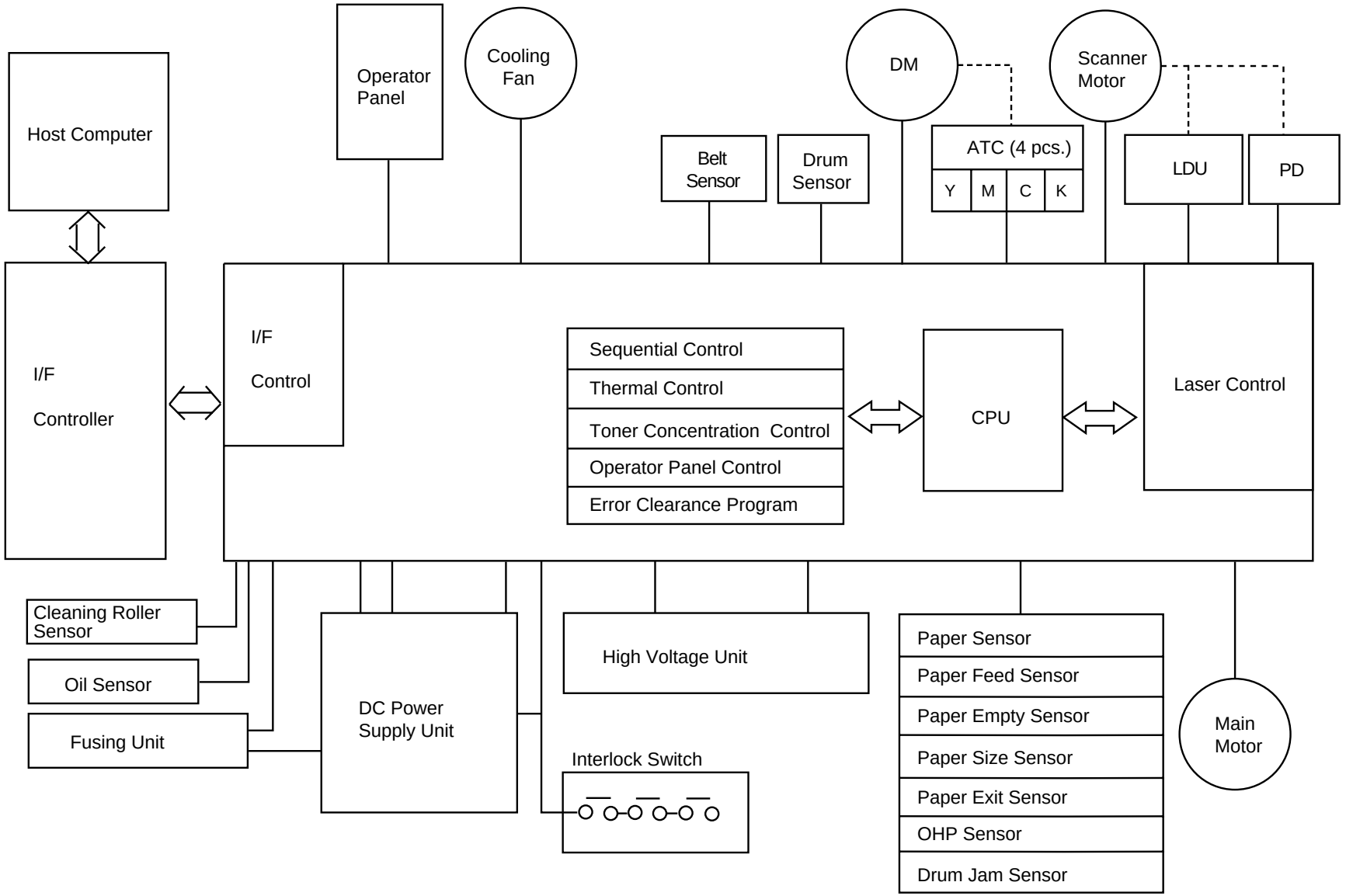

Host Computer
Operator Panel
Cooling Fan
DM
Scanner Motor
Belt Sensor
Drum Sensor
ATC (4 pcs.)
Y
M
C
K
LDU
PD
I/F Controller
I/F Control
Sequential Control
Thermal Control
Toner Concentration Control
Operator Panel Control
Error Clearance Program
CPU
Laser Control
Cleaning Roller Sensor
Oil Sensor
Fusing Unit
DC Power Supply Unit
High Voltage Unit
Interlock Switch
Paper Sensor
Paper Feed Sensor
Paper Empty Sensor
Paper Size Sensor
Paper Exit Sensor
OHP Sensor
Drum Jam Sensor
Main Motor

Fig.4-27

①. Print P.W.B. (Fig.4-28)

No.	Name	Function
1	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 Indicator P.W.B.	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	To discharge the OPC belt by radiating the LED beam onto the OPC belt to be included in the Optical unit.
6	IOD1 P.W.B.	To relay the signals between the controlled parts and MCTL P.W.B., and to drive the controlled parts.
7	IOD2 P.W.B.	- Ditto -
8	DC Power Supply (LVPS) P.W.B.	To provide the Printer with the power supply for the printer control.
9	High Voltage Power Supply (HVU) P.W.B.	To provide the Printer with the high voltage power supply that is necessary for the printing process.

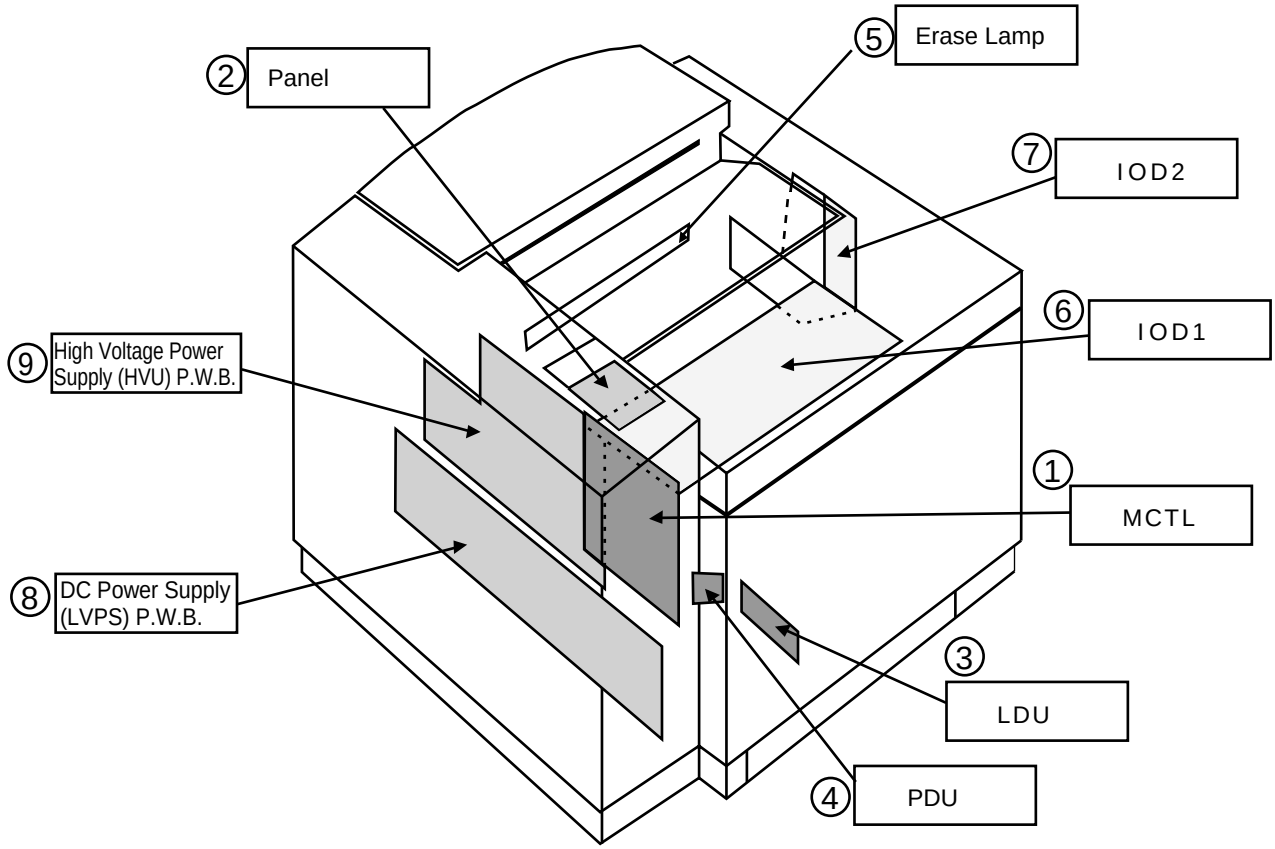

⑤ Erase Lamp
② Panel
⑦ IOD2
⑥ IOD1
⑨ High Voltage Power Supply (HVU) P.W.B.
① MCTL
⑧ DC Power Supply (LVPS) P.W.B.
③ LDU
④ PDU

Fig4-28

② . Motor (Fig.4-29)

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

② . Layout of Motors

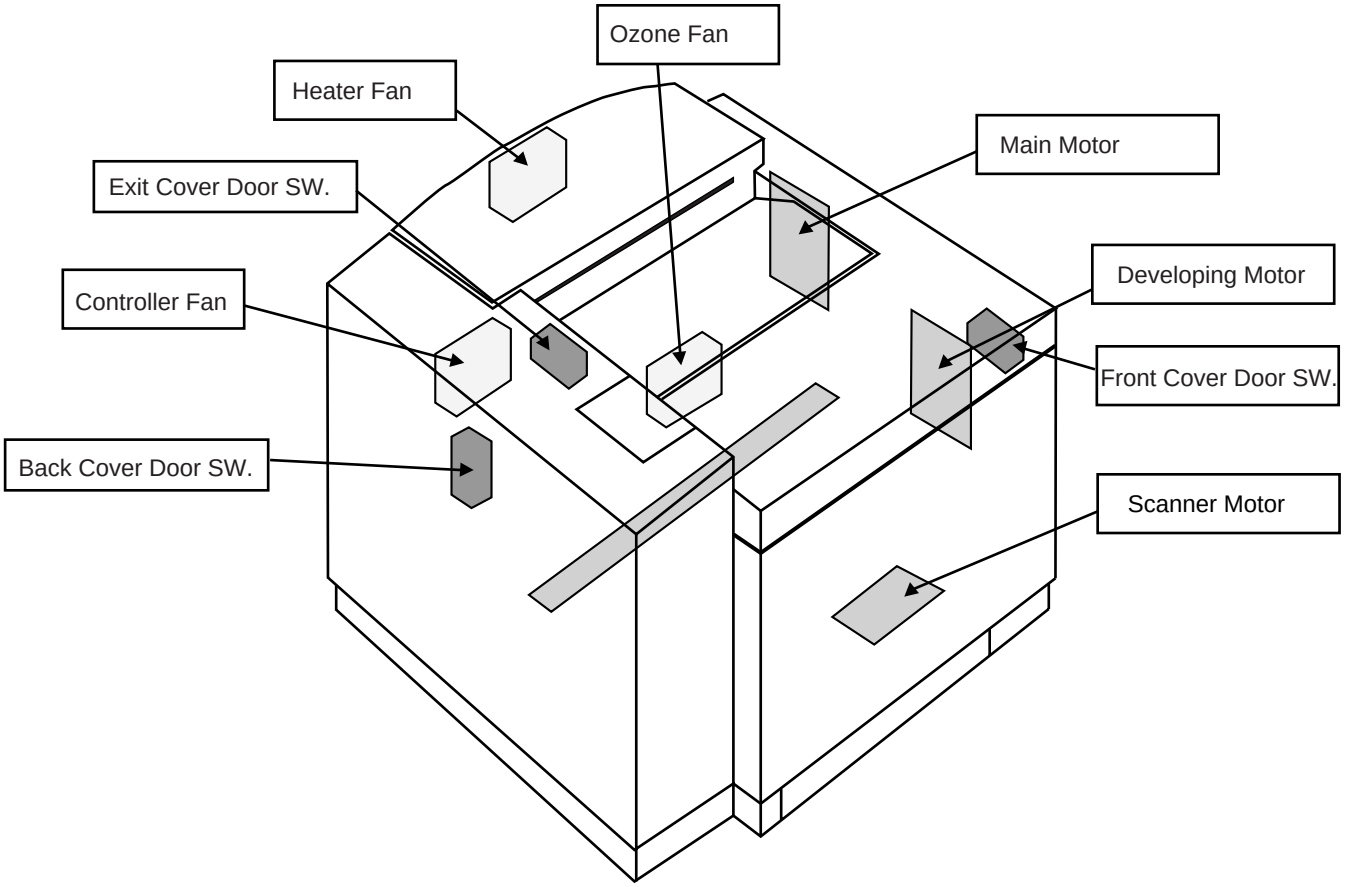


Fig.4-29

③. Clutch and Solenoid (Fig.4-30)

No.	Name	Code	Function
1	Feeder Clutch	PCLU	To feed papers by coupling the feeding roller to the main gear unit at timing of the paper feeding.
2	Registration Clutch	RECL	To transport papers by coupling the registration roller to main gear unit as synchronized with the rotation of transfer drum.
3	Fuser Clutch	FUCL	To drive the fusing roller by coupling the fuser unit to the main gear unit.
4	Cleaner Clutch	FBCL	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	DVCL (Y,M,C,K)	To drive the Mg. roller of desired color toner cartridge by coupimg said toner cartridge to the developer gear unit at timing of the developing.
9	Developer Solenoid Unit	PSL(MC) PSL(KY)	To relocate the desired color toner cartridge to developing position at timing of the developing.
10	Transfer Retract Solenoid	TRSOL	To have the transfer roller contact to the transfer roller's surface at timing of the second transfer.
11	Cleaner Retract Solenoid	FBSOL	To have the drum cleaner contact to the transfer roller's surface at timing of the drum cleaning.

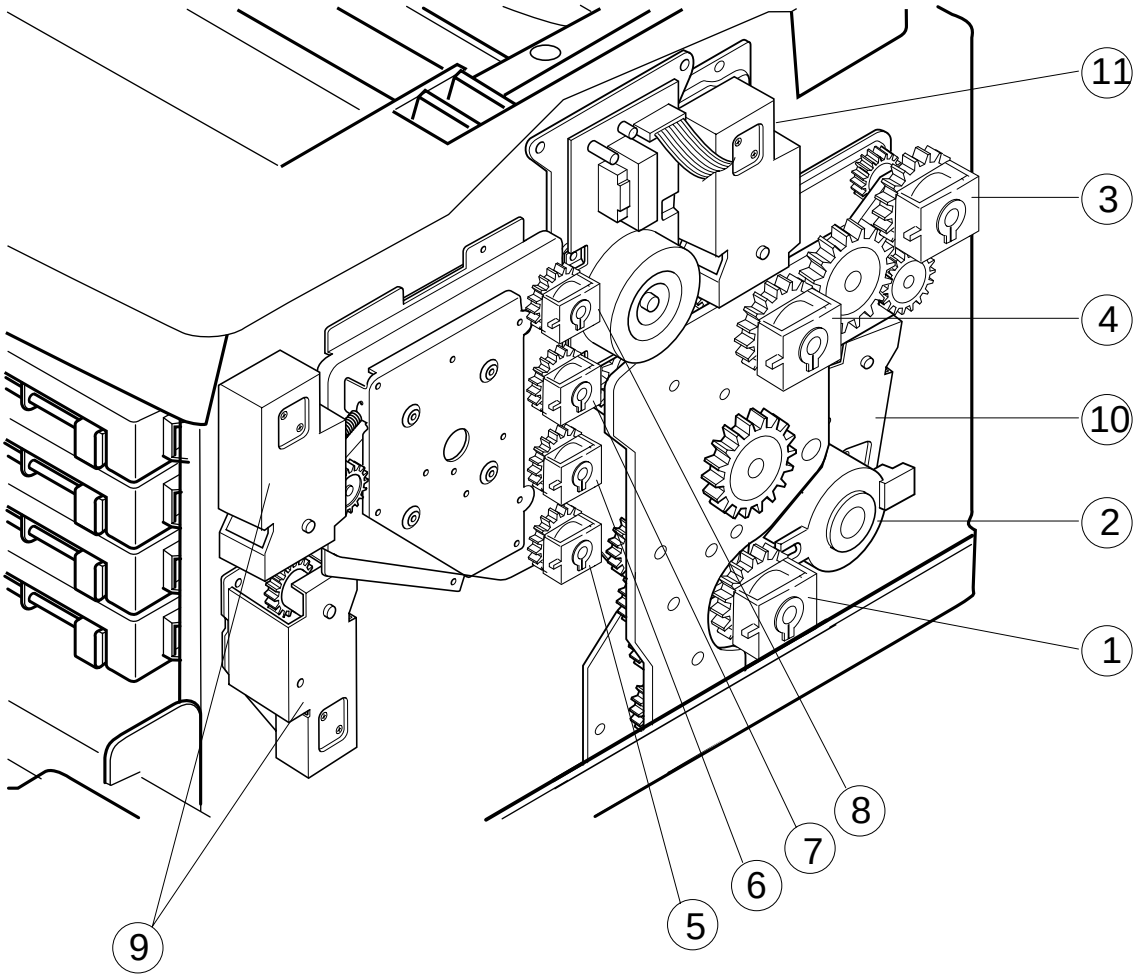


Fig.4-30

④. Sensors

No.	Name	Code	Function
1	Paper Size Sensor	PSU	Photo sensor to detect the paper size.
2	Paper Feeder Sensor	PT1	Photo sensor to detect the paper is fed from the paper cassette.
3	Paper Exit Sensor	PT2	Photo sensor to detect that paper is exited from the paper exit unit.
4	Paper Sensor	PEU	Photo sensor to detect if paper is loaded or empty in the paper cassette.
5	Oil Sensor	OIL	Photo sensor to detect if the fuser unit oil is empty or not.
6	OHP Sensor	OHP	Photo sensor to detect that material in the paper cassette is OHP.
7	Drum Paper Jam Sensor	DPJ	Photo sensor to detect that paper is winding around the transfer drum.
8	Drum Encoder	EN	Photo sensor to detect irregular rotation of the transfer drum.
9	Photo Belt Sensor	PBS	Photo sensor to detect the connecting position of the OPC belt.
10	Toner Detecting Sensor	TPD/TTR	Photo sensor to detect if the toner is empty or not for each toner cartridge.
11	Waste Toner Sensor	WTS	Photo sensor to detect that the waste toner bottle is full of waste toner.
12	Developing Photo Sensor	GHP1, GHP2	Photo sensor to detect the early position of toner cartridges.
13	Cleaning Roller Sensor	CRS	Photo sensor to detect if the cleaning roller is available or not in the fuser unit.
14	Temperature Sensor for Fuser unit	TH	Thermistor to detect the fuser temperature.

Layout of Sensors

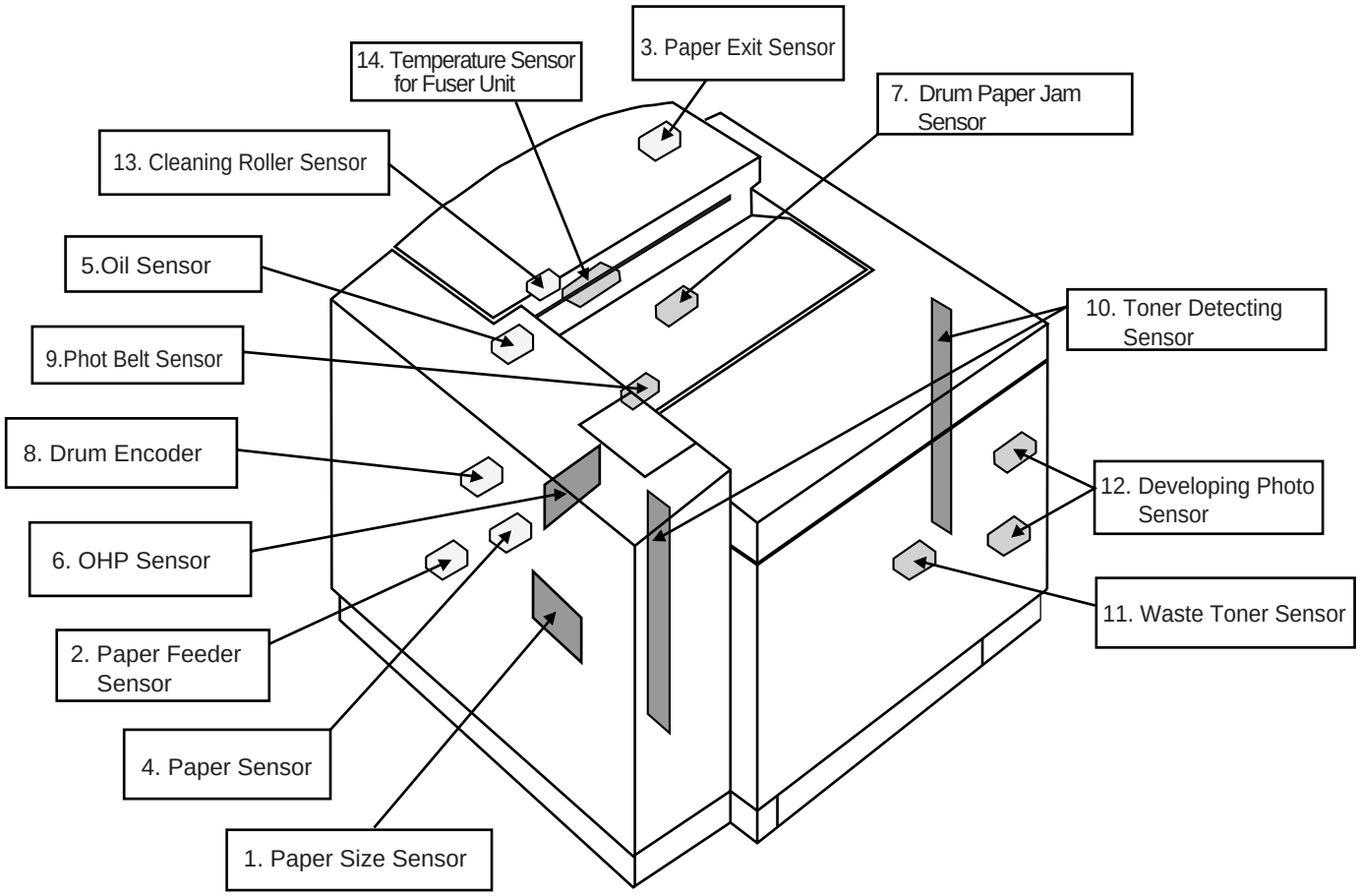


Fig.4-31

4.2.2 Control System

(1). Control of Print Process

Micro CPU mounted on the MCTL P.W.B. controls the print processes.

[Print Sequence Diagram]

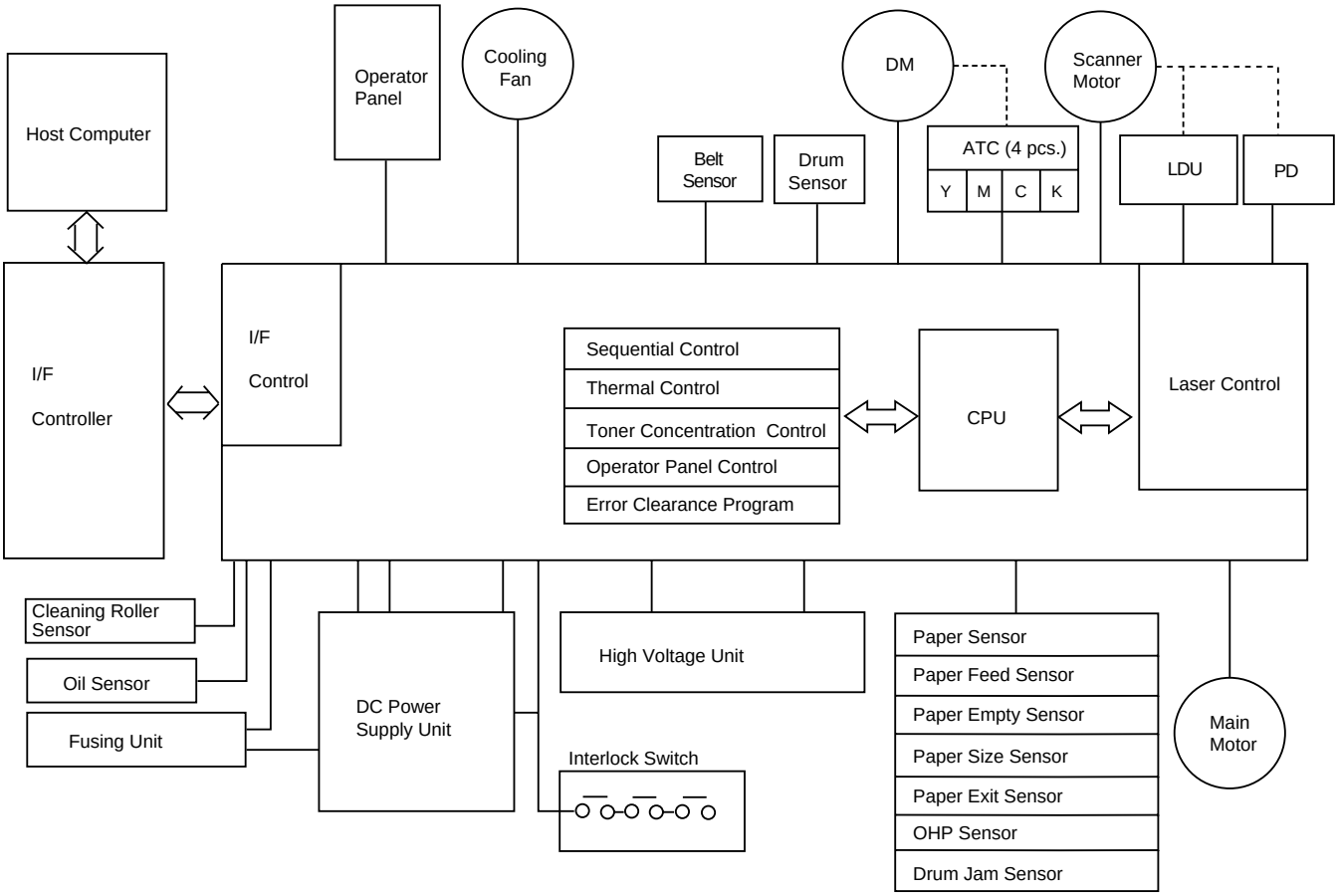


Fig.4-32

①. Control Block Diagram(Fig.4-32)

No.	Name of Control	Description
(a)	Sequence Control	To control the print sequence of printer.
(b)	Temperature Control	To control the temperature of fuser unit.
(c)	Toner Empty Sensing Control	To control the toner empty status of each toner cartridges.
(d)	Operator Panel Control	To control the operator panel indication and the operation signals.
(e)	Error Processing Control	To sense the errors occurring in the printer and the stop procedures.
(f)	Interface Control	To control the receipt and transmission of the interface signals from the external controller.
(g)	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.

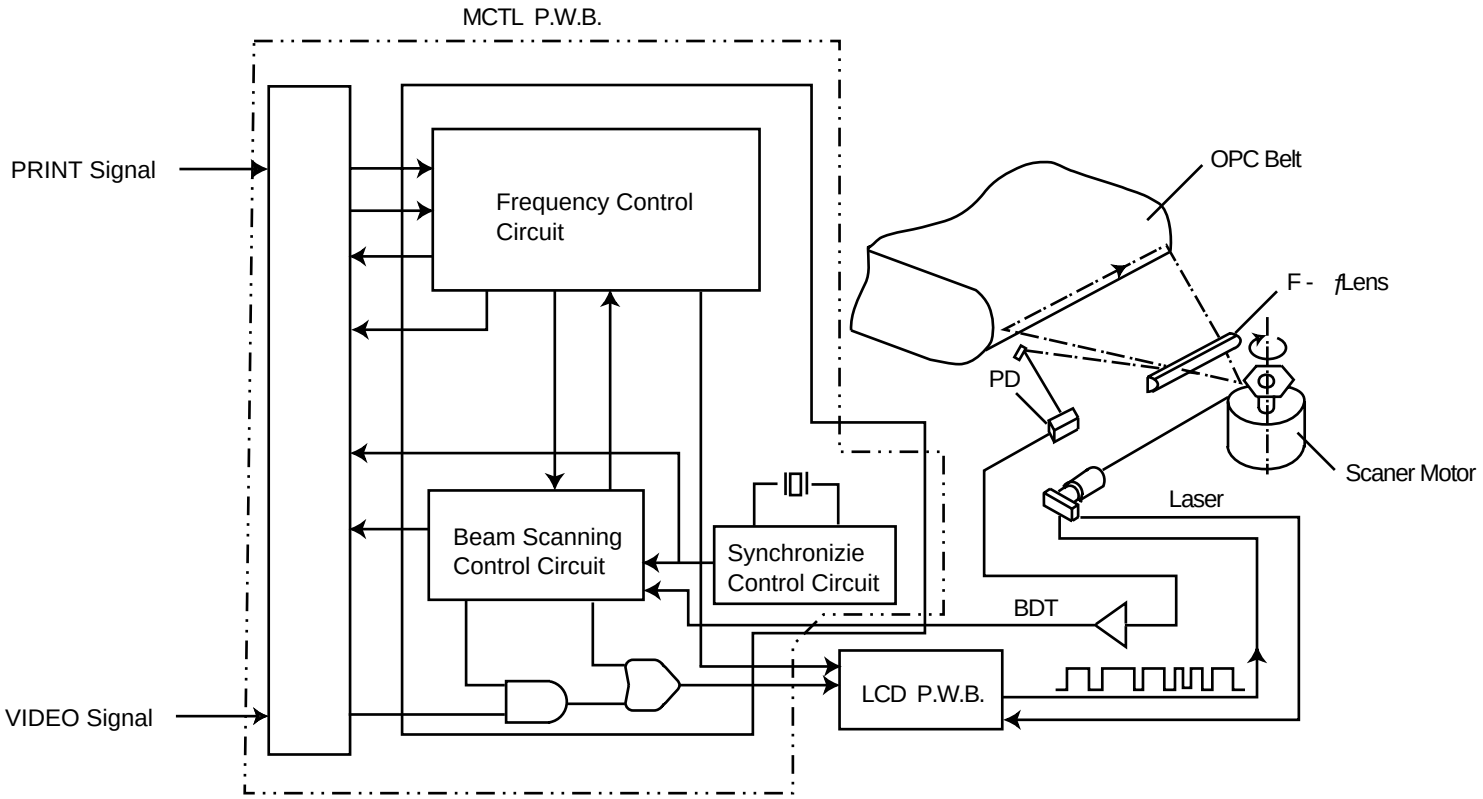

MCTL P.W.B.
PRINT Signal
VIDEO Signal
Frequency Control Circuit
Beam Scanning Control Circuit
Synchronizie Control Circuit
LCD P.W.B.
OPC Belt
F - θ Lens
PD
Scaner Motor
Laser
BDT

Fig.04-33

(3) Control of Fusing Temperature

Each rollers of the fusing unit are controlled to maintain the appropriate temperature so that toner will be fixed on a print paper.

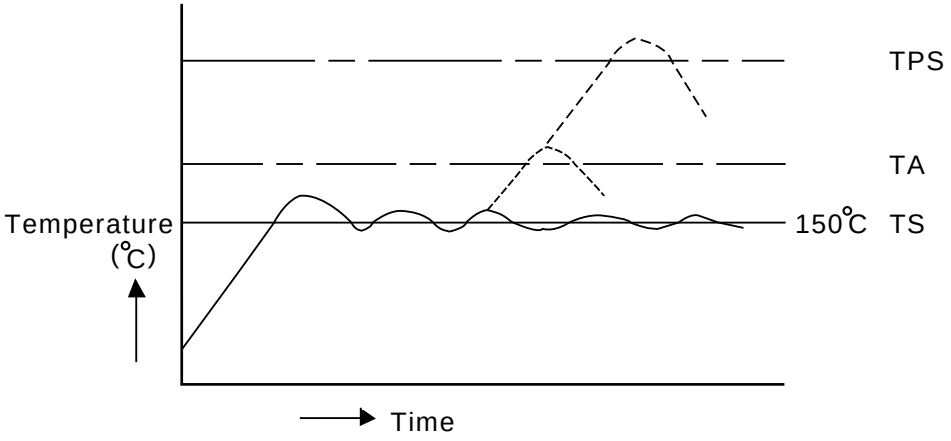
①. Basic Structure of Temperature Control(Fig.4-34)

FLS	: Thyristor to control the on/off operation of power supply to the heat lamp.
TFU1/TFU2	: Temperature fuse to shut down the circuit for safety when it will be too hot within the fusing unit.
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 fusing unit.
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	: Heat lamp for the heat roller.
BR	: Heat lamp for the back-up roller.

②. Characteristics of Signal

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.

③. Controlled Temperature and Safety



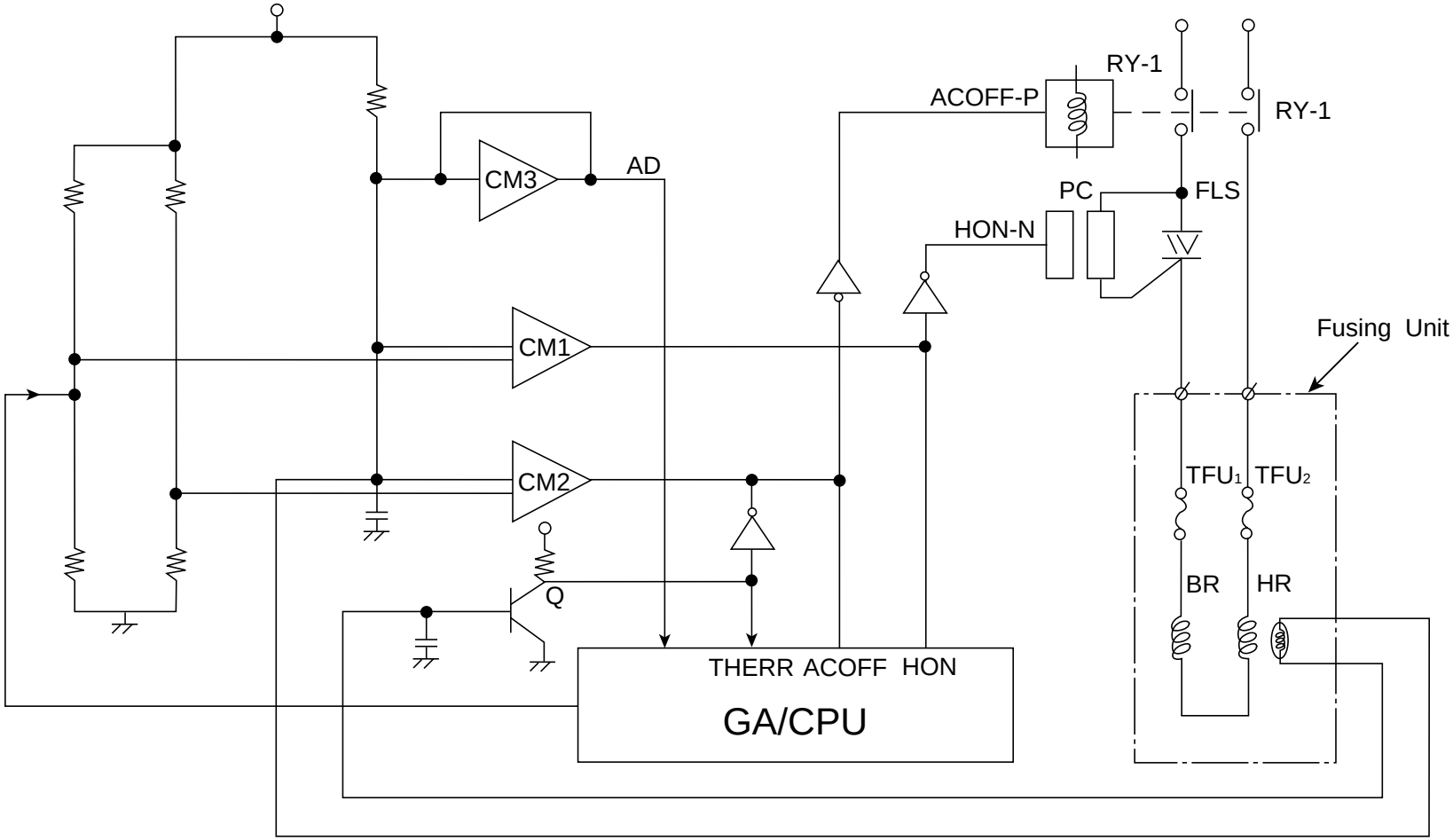


Fig 4-34: Basic Structure of Fuser Control

TS : To maintain the set point (temperature) for fusing of toner to be approx.150℃ as appropriate by turning on/off the thyristor.

TA : Reference temperature (approx.175℃) 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 temperature fuse start melting and shutting down the power supply to the heat lamp if the temperature control circuit should break down. When the temperature fuse is molten, the printer will stop the operation.

④. Safety Control by Temperature Control Signal

H0 : When THERR signal is inputted, the operator panel indicates “H0”, and the printer will stop the operation.

H2 : If the temperature of fusing unit will not reach to the required point “T1” after the elapse of certain time, the operator panel indicates “H2”, and the printer will stop the operation.

H3 : If the “Heater On” signal is still continued after the elapse of certain time, the operator panel indicates “H3”, and the printer will stop the operation.

H4 : If the temperature within the fusing unit becomes unusually hot and when ACOFF signal is inputted, the operator panel indicates “H4”, and the printer will stop the operation.

(5). Interface Control

①. General

(a). Interface Type

Video Interface handles image data and corresponds to print dots, but does not accumulate images with the buffer. Video signals of the inputted image data switches the semiconductor laser diode to form a print image.

(b). Interface Connection

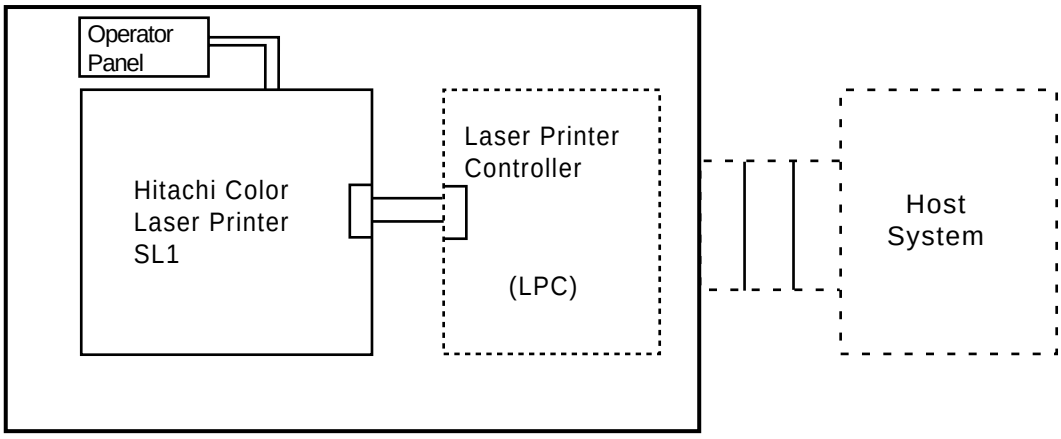
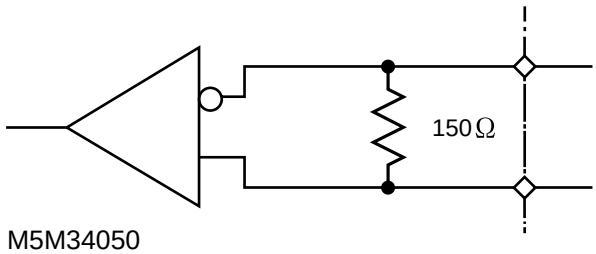
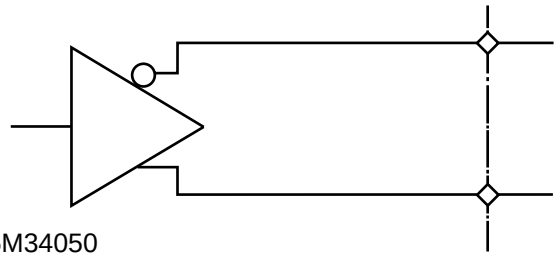
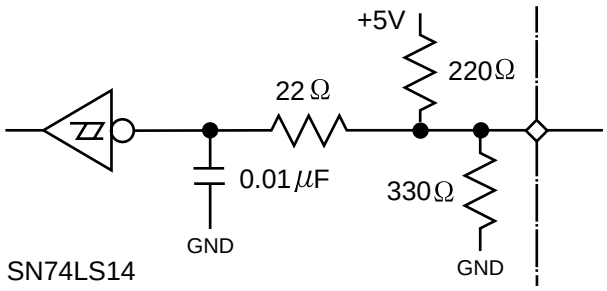
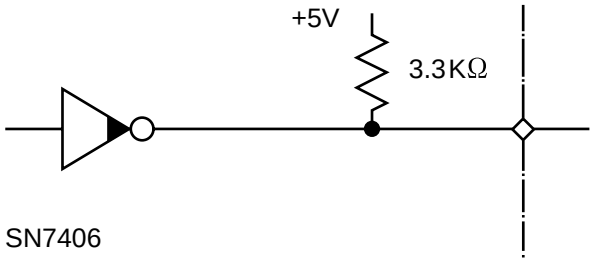


Fig.4-36: Interface Circuit (Internal Connecting System)

Interface connector of the laser printer SL1 is connected to the host system as shown in Fig.4-36.

(c). Interface Circuit (Printer side)

Table4.1 Interface Circuit

No.	Interface Circuit	Name of Signal
1	 M5M34050	• VIDEO-N • VIDEO-P
2	 M5M34050	• HSYNC-N • HSYNC-P
3	 SN74LS14	• PRREQ-N • COMMAND-N • ID1-N • ID2-N
4	 SN7406	• VSYNC-N • IREADY-N • STATUS-N • KEY-STATUS-N

(d). Connector Pin Assignment:

Connector type of the Printer side is 128A-064S2B-:13A(DDK) or the equivalent.

Table 4.2: Connector Pin Assignment

Pin No.	Signal Name	Pin No.	Signal Name
1A	PSGND	1B	+5V
2A	PSGND	2B	+5V
3A	PSGND	3B	+5V
4A	PSGND	4B	+5V
5A	PSGND	5B	+5V
6A	PSGND	6B	+5V
7A	PSGND	7B	+5V
8A	PSGND	8B	+5V
9A	VIDEO-P	9B	VIDEO-N
10A	RET(GND)	10B	Reserve
11A	HSYNC-P	11B	HSYNC-N
12A	ID2-N	12B	Reserve
13A	RET(GND)	13B	VSYNC-N
14A	RET(GND)	14B	Reserve
15A	RET(GND)	15B	STATUS
16A	RET(GND)	16B	IREADY-N
17A	RET(GND)	17B	Reserve
18A	RET(GND)	18B	COMMAND
19A	RET(GND)	19B	PRREQ-N
20A	RET(GND)	20B	Reserve
21A	ID1-N	21B	Reserve
22A	RET(GND)	22B	KEY_STATUS-N
23A	Reserve	23B	Reserve
24A	Reserve	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

4.2.3 DC Power Supply Unit

① . Output and Use

Output Terminal	Rated Output	Use
+5V-1	4.8~5.3V, 7.5A (8.5A)	For control of Printer.
+5V-1R		For control of Laser.
+5V-2		For control of Interface.
+24V-1	+24V, 4.5A	For control of Printer charging.
HP	120V, 8A	For connection of Fuser Heater (HP).
HN	220V, 5A	For connection of Fuser Heater (HN).

② . Layout of Connector Pin Assignment(Fig.4-37)

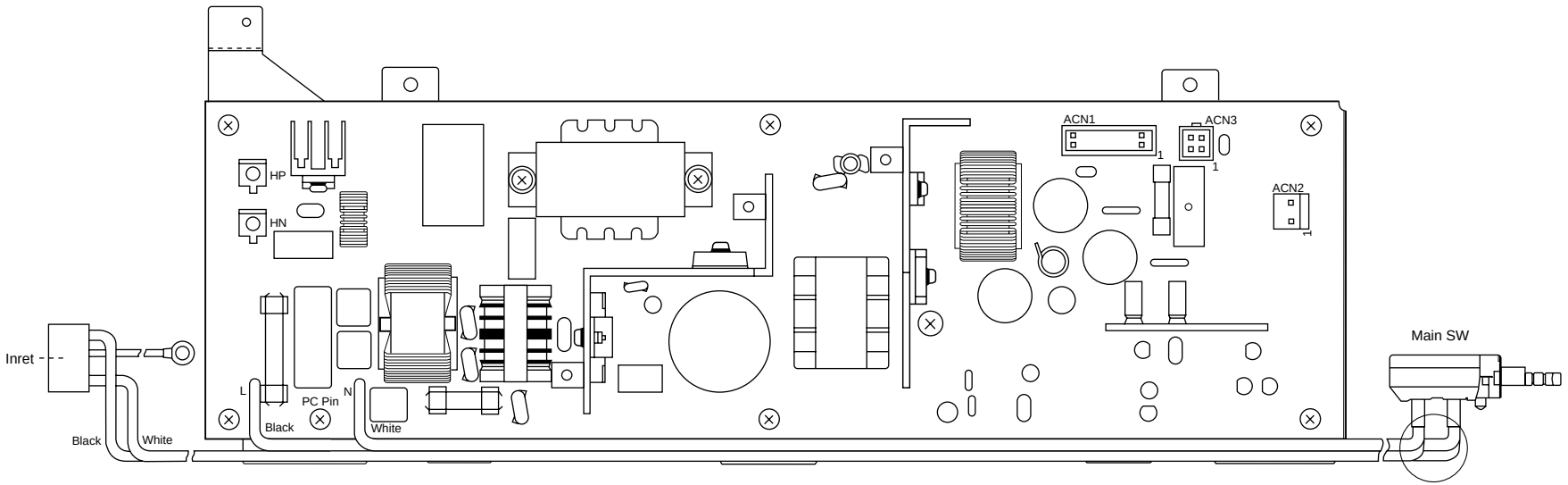

HP
HN
ACN1
ACN3
ACN2
Inret
L
PC Pin
N
Black
White
Black
White
Main SW

Fig.4-37

②. Connector Pin Assignment

ACN1

Manufacturer: MoLex
Type: 53313-2215

Pin#.	Signal Name	Interface
1	+5V-1	+5V-1 Output
2	SGND	Signal Ground (+5V type ground)
3	+5V-1	+5V-1 Output
4	SGND	Signal Ground (+5V type ground)
5	ACSYNC-N	AC Zero-Cross Signal (Open Collector Output)
6	SGND	Signal Ground (+5V type ground)
7	+24V	+24V Output not through Door Switch
8	SGND	Signal Ground (+5V type ground)
9	+5V-1R	+5V through the relay when +24V-1 is shut down.
10	ACOFF-P	AC Forced Shut-Down Signal(Pull-Up required).
11	HON-N	Heater On Signal (Pull-Up required).
12	Test I2	Terminal for Dielectric Strength Test.
13	+24V-1	+24V Output corresponding to Door Switch.
14	Test O2	Terminal for Dielectric Strength Test.
15	+24V-1	+24V Output through Door Switch.
16	Test I1	Terminal for Dielectric Strength Test.
17	+24V-1	+24V Output through Door Switch.
18	Test O1	Terminal for Dielectric Strength Test.
19	PGND	Power Ground (+24V type ground)
20	PGND	Power Ground (+24V type ground)
21	PGND	Power Ground (+24V type ground)
22	PGND	Power Ground (+24V type ground)

ACN2

Manufacturer: MoLex
Type: 5277-02A

Pin#.	Signal Name	Interface
1	DSW-O	+24V Output through Door Switch.
2	DSW-I	+24V Output through Door Switch.

ACN3

Manufacturer: MoLex
Type: 5566-04A

Pin#.	Signal Name	Interface
1	+5V-2	+5V-2 Output
2	+5V-2	+5V-2 Output
3	SGND	Signal Ground (+5V type ground)
4	SGND	Signal Ground (+5V type ground)

4.2.4 DC High Voltage Power Supply Unit

①. Output and Function

No.	Function		Power Supply (P/S)	
			Name of P/S	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

②Layout of Connector Pin Assignment

Connector Pin Assignment

BCN1
Manufacturer: MoLex
Type: 53313-1815

Pin#	Signal Name	Interface	Pin#	Signal Name	Interface
1	{24v |1	{24V |1	2	PGND	PGND
3	FUCHK	Senor Signal of Fuser Unit Installation.	4	PGND	PGND
5	ACVON-N	AC Output ON Signal	6	PWMON-N	PWM Control On Signa
7	CHVON-ON	CHV Output ON Signal	8	CHVERR	CHV ERROR Sensor Signal.
9	CBVPWM-N	CBV PWM Control Signal.	10	THVRON-N	THV ON Signal
11	DBVYMPWM-N	DBV PWM ControlSignal.	12	THVPWM-N	THV PWM Control ON Signal.
13	DBVCKPWM-N	CBV PWM Control Signal.	14	THV |I	Transfer Voltage Select Signal.
15	FCBVPWM-N	FCBV PWM Control Signal.	16	TH1	Thermistor Temperature Sensor Signal.
17	NC	NC	18	TH2	Thermistor Temperature Sensor Signal.

BCN2
Manufacturer: MoLex
Type: 53324-0410

Pin#	Signal Name	Interface
1	TH1	Thermistor1
2	TH2	Thermistor2
3	FUCHK	Fuser Check
4	FUCHKGND	GND

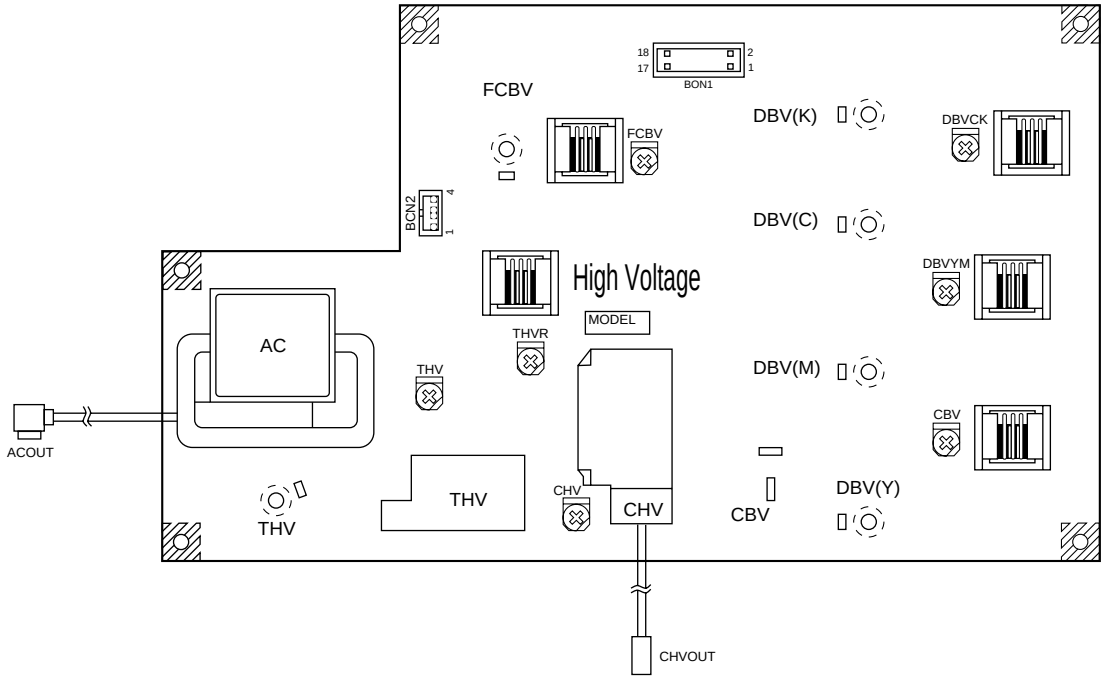
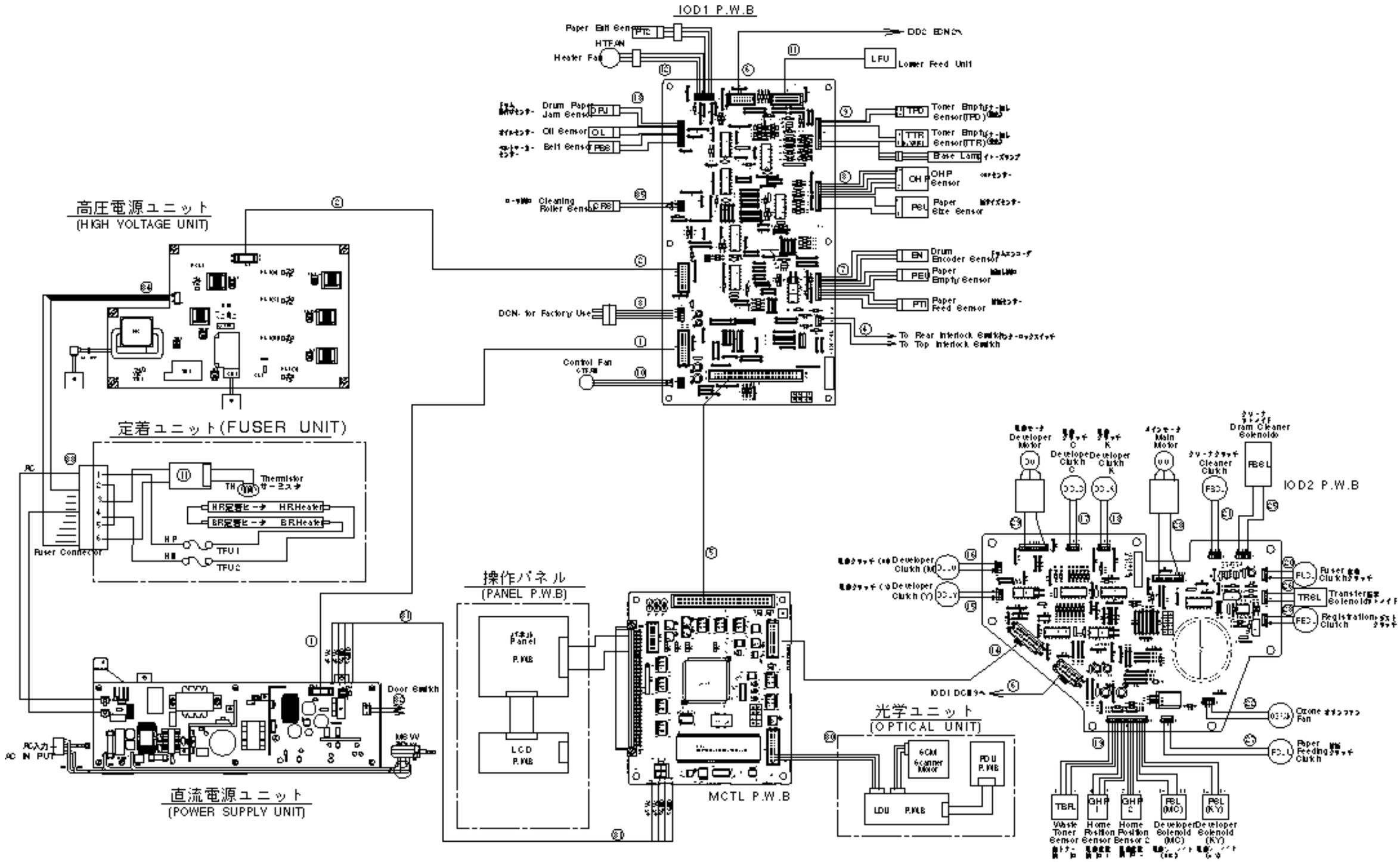


Fig.4-38

SL1 展開結線図
(WIRING DIAGRAM)



1

EDCN2 FIOD1 ´ | … ‹ (2 „æ^ C 22 s)
FIOD1 P.W.B |Power Supply(22Pin)

s	No.	M …	s	No.	M …
	1	{5v |1		2	SGND
	3	{5v |1		4	SGND
	5	ACSYNC |N		6	SGND
	7	{24V		8	SGND
	9	{5v |1R		10	ACOFF |P
	11	HON |N		12	TESTI2
	13	{24 |1		14	TESTO2
	15	{24 |1		16	TESTI1
	17	{24 |1		18	TESTO1
	19	PGND		20	PGND
	21	PGND		22	PGND

2

EDCN14 FIOD1 ´ | ‡ (18 s 2 æ ´ ‰ [l)
FIOD1 P.W.B |High Voltage(18Pin)

s	No.	M …	s	No.	M …
	1	{24v |1		2	PGND
	3	FUCHK		4	PGND
	5	ACVON |N		6	PWMON |N
	7	CHVON |N		8	CHVERR
	9	CBVPWM |N		10	THVRON |N
	11	DBV(MC)PWM |N		12	THVPWM |N
	13	DBV(KY)PWM |N		14	THV |I
	15	FCBVPWM |N		16	TH1
	17	NC		18	TH2

3

EDCN3 F H Œ , p
FFor Factory Use(4Pin)

s	No.	M …
	1	TESTO1
	2	TESTI1
	3	TESTO2
	4	TESTI1

4

EDCN4 FIOD1 |h A X C b ‘
FIOD1 |Interlock Switch

s	No.	M …
	1	REARDOPEN |P
	2	N.C
	3	TOPDOPEN |P

⑤

EDCN1 FMCTL ´ |IOD1 (50ｓ 2 æ)
FMCTL P.W.B |IOD1 P.W.B (50Pin)s

s No.	M …	s No.	M …
1	SGND	2	PGND
3	SGND	4	PGND
5	{5v |1	6	{24v |1
7	{5v |1	8	HON |N
9	{5v |1	10	SGND
11	{5v |1	12	ACOFF |P
13	I ^OAD2	14	{5v |1R
15	I ^OAD1	16	{24v
17	I ^OAD0	18	RHSON
19	I ^ODATA3	20	AHUMB
21	I ^ODATA2	22	ACVON |N
23	I ^ODATA1	24	CHVON |N
25	I ^ODATA0	26	PWMON |P
27	TMLEDON |P	28	CBVPWM |N
29	LEDON |N	30	DB(MC) PWM |N
31	TRSLON |P	32	DB(KY) PWM |N
33	FBSLON |P	34	FCBVPWM |N
35	FBCLON |P	36	THVRON |N
37	SPSLLON |P	38	THVPWM |N
39	PKCLLON |P	40	THV |I
41	ELON |P	42	TH2
43	PBSEN |N	44	TH1
45	HPSEN |N	46	OILLES |P
47	CTFANON |P	48	TMASEN1
49	HTFANON |P	50	TMASEN2

⑭

EECN1 FMCTL |IOD2(20ｓ 2 æ)
FMCTL P.W.B |IOD2(20Pin)s

s No.	M …
1	DCL(C)ON |P
2	DCL(M)ON |P
3	DCL(Y)ON |P
4	DCL(K)ON |P
5	PS(KY)ON |P
6	PS(MC)ON |P
7	MMCLK
8	MMON |N
9	MMREV |N
10	MMENC
11	DMCLK
12	DMON |N
13	ISCK
14	IDATA
15	ILOAD
16	PKCLUON |P
17	RECLON |P
18	SPSLUON |P
19	OZFANON |P
20	FUCLON |P

⑥

EDCN9 FIOD1 ´ |IOD2(A N ʻ G [)^ (14ｓ 2 æ ´ ɲ [l)
FIOD1 P.W.B |IOD2 P.W.B (14Pin)s

s No.	M …
1	FBCLON |P
2	FBSLON |P
3	TRSLON |P
4	OZFANERR
5	{24v |1
6	{24v |1
7	{24v |1
8	PGND
9	PGND
10	PGND
11	{5v |1
12	SGND
13	PHSON |P
14	AHUMB

㉟

EDCN15 FIOD1 |N [j 0 [¢
FIOD1 |Cleaning Roller Sensor

s No.	M …
1	{5v |1
2	CLROL |N
3	SGND

7

EDCN5 FIOD1 | ªJ Z b g L ‡ m
@ @ @ FIOD1 | Ø s1
@ @ @ @FIOD1 |h Z T
@ @ @ @FIOD1 |Upper Paper Empty Sensor (PEU)
@ @ @ FIOD1 |Paper Feeding (PT1) Sensor
@ @ @ @FIOD1 |Drum Encoder Sensor (EN)

s	No.	M …
	1	{5v |1
	2	HPSEN |N
	3	SGND
	4	{5v |1
	5	PEU |P
	6	SGND
	7	{5v |1
	8	PT1 |N
	9	SGND

8

EDCN6 FIOD1 | ªJ Z b g T C Y Z T
@ @ @ FIOD1 |OHPT
@ @ @ FIOD1 |Upper Paper Size Sensor
@ @ @ FIOD1 |OHP Sensor

s	No.	M …
	1	{5v |1
	2	PSU1
	3	PSU2
	4	PSU3
	5	PSU4
	6	SGND
	7	{5v |1
	8	OHPSENU
	9	SGND
	10	SGND

9

EDCN7 FIOD1 ´ ¶ i [‡Y
@ @ @ FIOD1 g´ i [‡M
@ @ @ @FIOD1 ´ ¶ i [‡C
@ @ @ FIOD1 g´ i [‡K
@ @ @ @FIOD1 ´ ¢ [Y
@ @ @ @FIOD1 P.W.B |Toner Empty Sensor (Y,M,C,K)

s	No.	M …
	1	TLES(K) |P
	2	TLES(Y) |P
	3	TLES(M) |P
	4	TLES(C) |P
	5	TLES |G
	6	SGND
	7	LEDON |P
	8	TLESCHK
	9	SGND
	10	{24v |1
	11	ELON |N

10

EDCN13 FIOD1 ´ ¶ g [t @
FIOD1 P.W.B |Controller Fan

s	No.	M …
	1	CTFANON |P
	2	PGND
	3	CTFANERR

12

EDCN10 FIOD1 ´ | t @
@ @ @ FIOD1 ´ PT2
@ @ @ FIOD1 P.W.B |Paper Exit (PT2) Sensor
@ @ @ FIOD1 P.W.B |Heater Fan (HTFAN)

s	No.	M …
	1	{5v |1
	2	PT2 |N
	3	SGND
	4	HTFANON |P
	5	PGND
	6	HTFANERR

13

EDCN11 FIOD1 ´ ¥ g
@ @ @ FIOD1 I´C |
@ @ @ @ FIOD1 ´ | “ t
@ @ @ @ FIOD1 P.W.B |Belt (BS) Sensor
@ @ @ @ FIOD1 P.W.B |Oil (OIL) Sensor
@ @ @ @ FIOD1 P.W.B |Drum Paper Jam Sensor

s	No.	M …
	1	PBSEN |N
	2	{5v |1
	3	SGND
	4	OILLES |P
	5	{5v |1
	6	SGND
	7	E4SEN |N
	8	{5v |1
	9	SGND

15

EECN17 FIOD2 | » N b Y
FIOD2 |Developer Clutch (Y)

s No.	M …
1	{24v |1
2	NC
3	DCL(C)ON |N

16

EECN16 FIOD2 | » N b M
FIOD2 |Developer Clutch (M)

s No.	M …
1	{24v |1
2	NC
3	DCL(M)ON |N

17

EECN14 FIOD2 | » N b C
FIOD2 |Developer Clutch (C)

s No.	M …
1	{24v |1
2	NC
3	DCL(Y)ON |N

18

EECN13 FIOD2 | » N b K
FIOD2 |Developer Clutch (K)

s No.	M …
1	{24v |1
2	NC
3	DCL(K)ON |N

20

EECN9 FIOD2 | Ł N b ‘
FIOD2 |Fuser Clutch

s No.	M …
1	{24v |1
2	NC
3	FUCLON |N

21

EECN11 FIOD2 |N [i N b ‘
FIOD2 |Cleaner Clutch

s No.	M …
1	{24v |1
2	NC
3	FBCLON |N

19

EECN3 FIOD2 | » SLYMC
FIOD2 |Developer Solenoid

s No.	M …
1	{5v |1
2	TBFL2 |N
3	SGND
4	{5v |1
5	GHPSEN1
6	SGND
7	{5v |1
8	GHPSEN2
9	SGND
10	PSL(M)
11	{24v |1
12	{24v |1
13	PSL(C)

22

EECN6 FIOD2 |I] t @
FIOD2 |Ozen Fan

s No.	M …
1	OZFANON |P
2	PGND
3	OZFANERR

23

EECN7 FIOD2 | W X g N b ‘
FIOD2 |Registlation Clutch

s No.	M …
1	{24v |1
2	NC
3	NC
4	RECLON |N

25

EECN10 FIOD2 |N [i \ mCh
FIOD2 |Cleaner Clutch

s No.	M …
1	{24v |1
2	NC
3	NC
4	FBSLON |N

26

EECN8 FIOD2 |] \ mCh
FIOD2 |Transfer Solenoid

s No.	M …
1	{24v |1
2	NC
3	NC
4	TRSLON |N

27

EECN5 FIOD2 | N b ‘
FIOD2 |Paper Feeding Clutch

s No.	M …
1	{24v |1
2	NC
3	PKCLUON |N

28

EECN12 FIOD2 | C [^
FIOD2 |Main Motor

s No.	M …
1	MMRDY |N
2	MMON |N
3	MMCLK
4	PGND
5	{24v |1
6	SGND
7	{5v |1
8	MMENC
9	MMREV |N

29

EECN15 FIOD2 | » [^
FIOD2 |Developer Motor

s No.	M …
1	DMRDY |N
2	DMON |N
3	DMCLK
4	PGND
5	{24v |1
6	SGND
7	{5v |1
8	NC
9	DMREV |N

32

EACN2 F … < d „ h SW (d <^ C 2 s)
FPower Supply Unit |Interlock Switch (2Pin)

s No.	M …
1	DSW |O
2	DSW |I

31

EACN3 F … < d „ R g [d „ (d <^ C 4 s)
FPower Supply Unit |MCTL

s No.	M …
1	{5v |2
2	{5v |2
3	SGND
4	SGND

33

E Ł (V 0 } / p6s) |MCTL POCN
@Fuser Unit |MCTL P.W.B (6Pin)

s No.	M …
1	ACOUT |HP
2	FUCHKGND
3	TH2
4	ACOUT |HN
5	FUCHK
6	TH1

34

EBCN2 F ‡ ´ | Ł (M n [l 4 s)
FHigh Voltage Unit |Fuser Unit (4Pin)

s No.	M …
1	TH1
2	TH2
3	FUCHK
4	FUCHKGND

30

ELCN FMCTL |LDU (20 s 2 æ)
FMCTL |LDU(20Pins

s No.	M …
1	{5v |R
2	LDREF2
3	LDREF3
4	{5v |1
5	LDREF1
6	LDREF0
7	LREADY
8	LCONT2
9	LCONT1
10	VIDEO |P
11	VIDEO |N
12	BDT |P
13	BDT |N
14	SGND
15	SGND
16	SCMCLK
17	SCMRDY |N
18	SCMON |N
19	PGND
20	{24v |1

(11)

EDCN8 FIOD1 | ″ j b g
FIOD1 |Lower Feeder Unit

s No.	M …
1	{24v |1
2	NC
3	PKCLLON |N
4	NC
5	{5v |1
6	{5v |1
7	PEL |P
8	PSL1
9	SGND
10	PSL2
11	{5v |1
12	PSL3
13	OHPSENL
14	PSL4
15	SGND
16	SGND
17	OCST |N
18	NC

(11) -1

ELFU R l N ^
LFU Connector

s No.	M …
1	{24v |1
2	PKCLLON |N
3	{5v |1
4	PEL |P
5	SGND
6	{5v |1
7	OHPSENL
8	SGND
9	OCST |N
10	NC
11	NC
12	{5v |1
13	PSL1
14	PSL2
15	PSL3
16	PSL4
17	SGND
18	NC

(11) -2

PKCLL

s No.	M …
1	{24v |1
2	NC
3	PKCLLON |N

(11) -3

PSL

s No.	M …
1	{5v |1
2	PSL1
3	PSL2
4	PSL3
5	PSL4
6	SGND

(11) -4

PEL

s No.	M …
1	{5v |1
2	PEL |P
3	SGND

(11) -5

OHPL

s No.	M …
1	{5v |1
2	OHPSENL
3	SGND
4	OCST |N(SGND)

5. Periodic Maintenance

5.1 General 5-1

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5. Periodic Maintenance

5.1 General

5.1.1 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 hig 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). List of Maintenance Tools

Table 5-1 below lists up the maintenance tools for the printer.

Table 5-1

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

(2). List of Consumables for Maintenance

Table 5-2 below lists up the consumables for maintenance.

Table 5-2

No.	Name of Tool	Parts Code	Quantity	Function
1	Toner Cartridge (Y)		1 piece	Test Print
2	Toner Cartridge (M)		1 piece	Test Print
3	Toner Cartridge (C)		1 piece	Test Print
4	Toner Cartridge (K)		1 piece	Test Print
5	Cleaning Pad / Oil Bottle		1 piece	Test Print
6	Belt Cartridge		1 piece	Test Print
7	Recommended Paper (A4 or Letter)		5 sheets	Test Print
8	Recommended Paper (OHP)		2 sheets	Test Print
9	Cotton Cloth (Unwoven fabric)		10~15 pieces	Cleaning
10	Cotton Applicator		10~15 pieces	Cleaning
11	Grease		10 gram	M.G*1PS265
12	Vinyl Bag		2 bags	Disposal

*1: M.G stands for Molybdenum Grease.

5.1.2 Cleaning for Periodic Maintenance

See Table 5-3 for details of periodic maintenance cleaning to the following parts.

(1). Registration Roller

(2). Transfer Roller

(3). Paper Discharger

(4). Belt Cartridge

(5). Dustproof Glass of Optical Unit

(6). Printer Interior

⚠ WARNING

- Before starting any maintenance work, make sure to unplug the power supply cord from the outlet.
- There is a risk of electric shock in working while the printer is energized.

Table 5-3

No.	Name of Parts	Cleaning Work		Cleaning Cycle *1 (Condition or Case)	Time *2 (minute)	Skill *3 Level
		Description	Page			
1	Registration Roller.	1. Open transfer unit. 2. Clean rollers and neighbor, using a dry cloth.	5-7	• Defective image • Smeared paper • Periodic maintenance.	2	A,B,or User.
2	Transfer Roller.	1. Open transfer unit. 2. Clean rollers and neighbor, using a dry cloth.	5-8	• Damaged image • Smeared paper • Periodic maintenance.	2	A,B,or User.
3	Paper Discharging Roller.	1. Open transfer unit. 2. Remove paper discharging unit. 3. Clean corona wire & case, using cotton applicator and dry cloth.	5-9	• Damaged image • Paper jam • Periodic maintenance.	3	A,B,or User.
4	Belt Cartridge	1. Remove belt cartridge. 2. Clean toner around belt cartridge and cleaning Blade 3. Clean the corona wire with the wire blush.	5-10	• Defective print quality •Periodic maintenance	3	A,B Charger unit to be either B or C.

Table 5-3

No.	Name of Parts	Cleaning Work		Cleaning Cycle *1 (Condition or Case)	Time *2 (minute)	Skill *3 Level
		Description	Page			
5	Dustproof Glass of Optical Unit.	1. Remove toner cartridge. 2. Remove the belt cartridge. 3. Remove the dust-proof glass. 4. Using a dry cloth and applicator, clean the stain of dust-proof glass.	5-11	• Defective print quality • Periodic maintenance.	3	B or C
6	Printer Interior Unit.	1. Remove toner cartridge and belt cartridge. 2. Clean printer's base, using the handy cleaner and dry cloth.	5-12	• 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). Cleaning of Registration Roller

Registration Roller shall be cleaned according to the periodic maintenance cleaning cycle set out in Table 5-3.

Tools to be prepared

①. Cotton cloth (Unwoven fabric) (2 ~ 3 pieces)

Cleaning Procedures

①. Turn off the power supply, and unplug the power supply cord.
②. Open the transfer unit.
③. Using a cotton cloth, clean the registration roller incorporated in the transfer unit.

⚠ CAUTION

Strictly refrain from using alcohol or similar solvent for cleaning the registration roller.

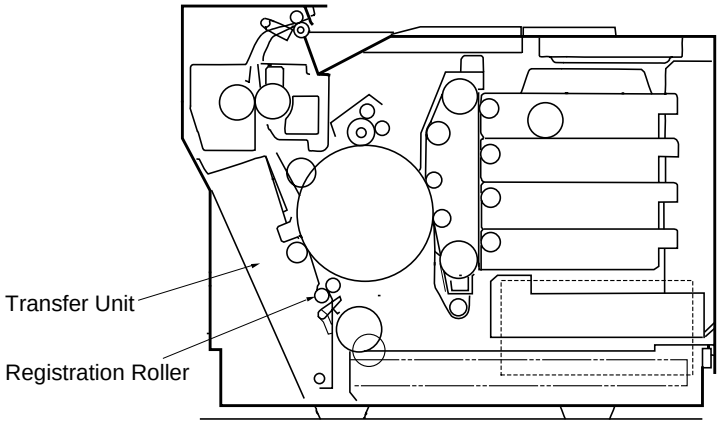


Fig.5-1

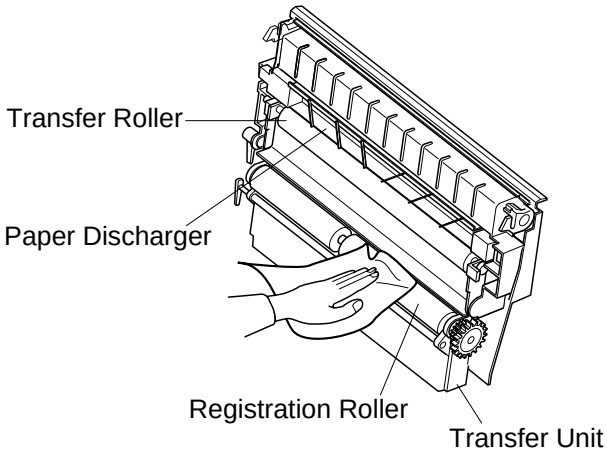


Fig.5-2

(2). Cleaning of Transfer Roller

Transfer Roller shall be cleaned according to the periodic maintenance cleaning cycle set out in Table 5-3.

Tools to be prepared

①. Cotton cloth (2 ~ 3 pieces)

Cleaning Procedures

①. Turn off the power supply, and unplug the power supply cord.
②. Open the transfer unit.
③. Using a cotton cloth, clean the transfer roller.

⚠ CAUTION

Strictly refrain from using alcohol or similar solvent for cleaning the transfer roller.

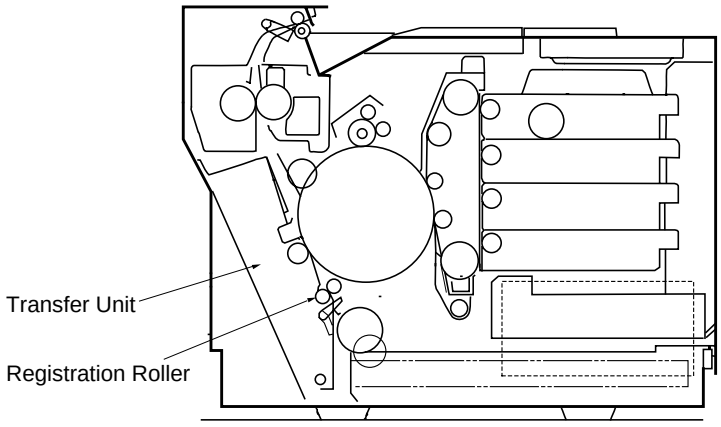


Fig.5-3

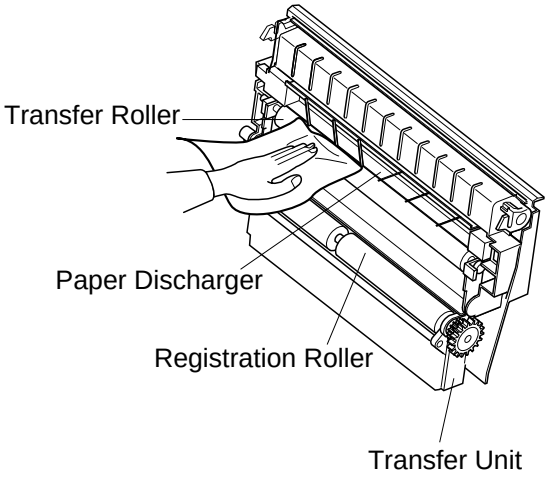


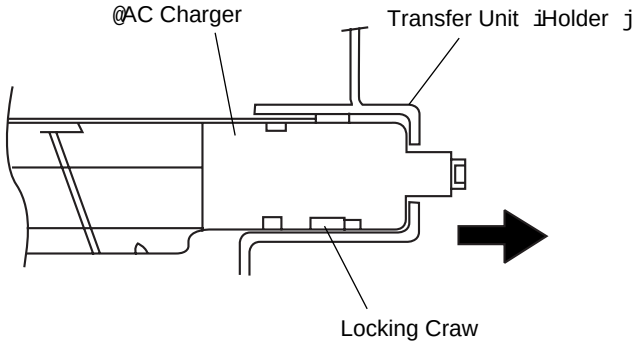
Fig.5-4

(3). Cleaning of Paper Discharger (AC Charger)

Paper Discharger shall be cleaned according to the periodic maintenance cleaning cycle set out in Table 5-3.

Tools to be prepared

①. Cotton cloth (2 ~ 3 pieces).
②. Cotton applicator (2 ~ 3 pieces).



Cleaning Procedures

①. Turn off the power supply switch, and unplug the power supply cord.
②. Open the transfer unit.
③. Remove the paper discharger unit.
  i). Sliding AC charger to the arrow direction, release it from the locking craw.
  ii). Pulling up AC charger, remove it from the transfer unit holder.

④. Clean the charger case with a cotton cloth.
⑤. Clean the charger wire and inside of charger case with a cotton applicator.
⑥. Install the charger unit to the transfer unit.

⚠ CAUTION

• Do not cut the corona wire when cleaning the discharger unit.

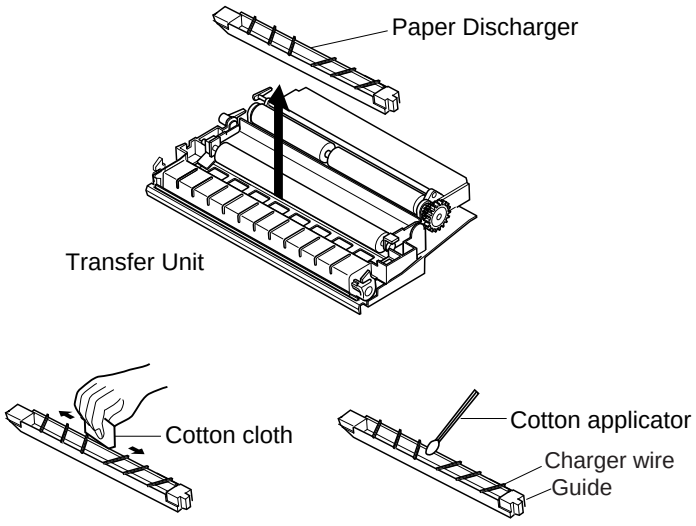


Fig.5-6

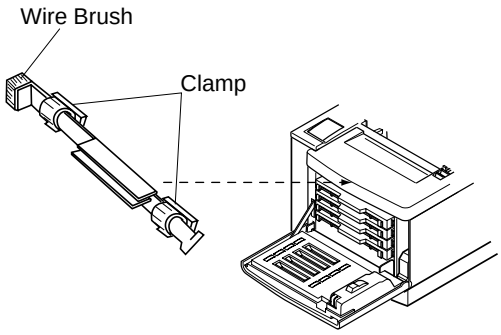
(4). Cleaning of Belt Cartridge

Belt Cartridge shall be cleaned according to the periodic maintenance cleaning cycle set out in Table 5-3.

⚠ WARNING

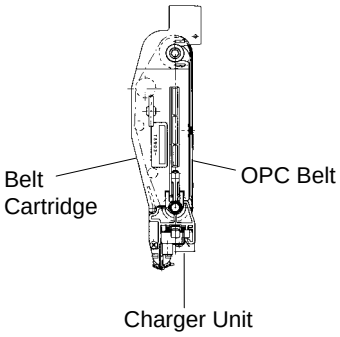
- Do not expose OPC belt to the light of more than 800 luces (ordinary office) for more than 2 (two) minutes.
- Do not touch the surface of OPC belt.

Tools to be prepared



①. Cotton cloth (Unwoven fabric) (2 ~ 3 pieces)
②. Wire Brush; Held by the clamp under the eaves of top cover behind front cover.

Cleaning Procedures



①. Turn off the power supply switch.
②. Open the paper exit cover.
③. Open the front cover unit.
④. Release the lock lever BC.
⑤. Pull out the belt cartridge.
⑥. Clean the belt cartridge with a cotton cloth.
(i). Clean the rear side of belt cartridge.
(ii). Clean the corona wire with a wire brush; Put the wire brush in the corona case, and slide it to the arrow direction for several times.
(iii). Clean the belt cartridge case.

⚠ WARNING

Do not cut the corona wire when cleaning the corona wire.

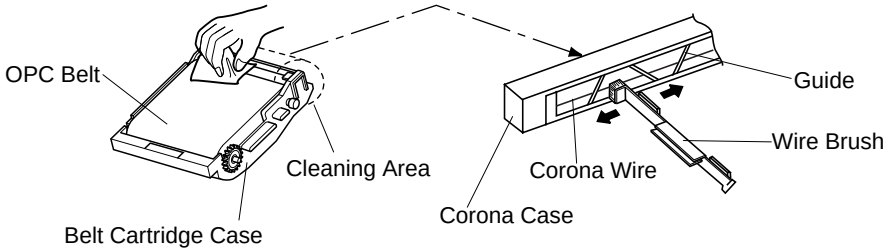


Fig.5-7

(5). Cleaning of Dustproof Glass in Optical Unit

Dustproof Glass of the Optical Unit shall be cleaned according to the periodic maintenance cleaning cycle set out in Table 5-3.

Tools to be prepared

①. Cotton cloth (2 ~ 3 pieces).
②. Cotton applicator (2 ~ 3 pieces).

Laser WARNING Label

Cleaning Procedures

①. Turn off the power supply switch.
②. Open the paper exit cover.
③. Open the front cover unit.
④. Remove the toner cartridge.
⑤. Remove the belt cartridge.
⑥. Holding the ear of dust-proof glass, remove the dust-proof glass from the optical unit.
⑦. Clean the surface of dustproof glass with a cotton applicator.
⑧. Having the dust-proof glass meet the mark (▽) of OU cover, push the dust-proof glass in until it is firmly locked so that it will not be floated.

⚠ CAUTION

Strictly refrain from using any alcohol or similar solvent for cleaning the dustproof glass, otherwise, it will be a cause of the image failures.

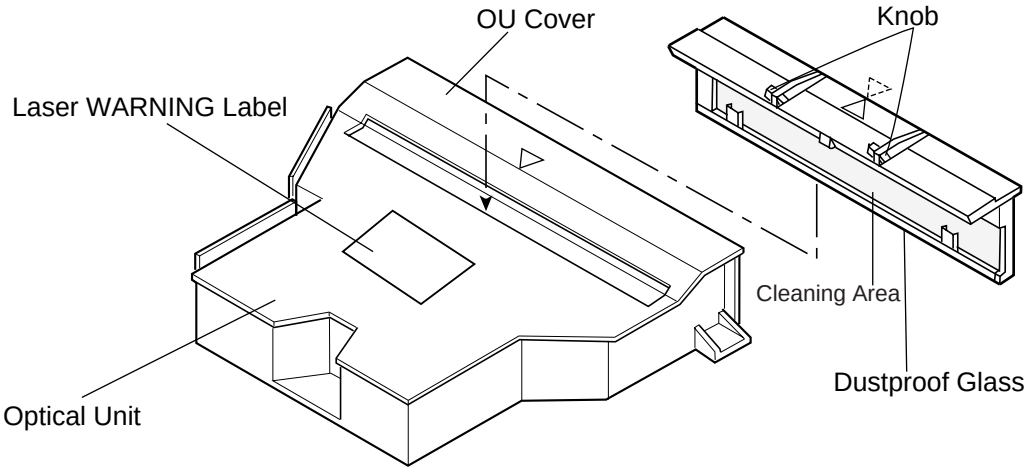


Fig.5-8

(6). Cleaning of Printer Interior

Printer Interior (bottom) shall be cleaned according to the periodic maintenance cleaning cycle set out in Table 5-3.

> **⚠ 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 be prepared

①. Handy vacuum cleaner unique for toner.
②. Cotton cloth (2 ~ 3 pieces).

Cleaning Procedures

①. Open the paper exit cover.
②. Open the front cover unit.
③. Remove the toner cartridge.
④. Remove the belt cartridge.
⑤. Absorb toner scattered on the bottom of Printer Interior with a vacuum cleaner
⑥. Clean the Printer Interior with a cotton applicator.
⑦. Put back the removed units as they were.

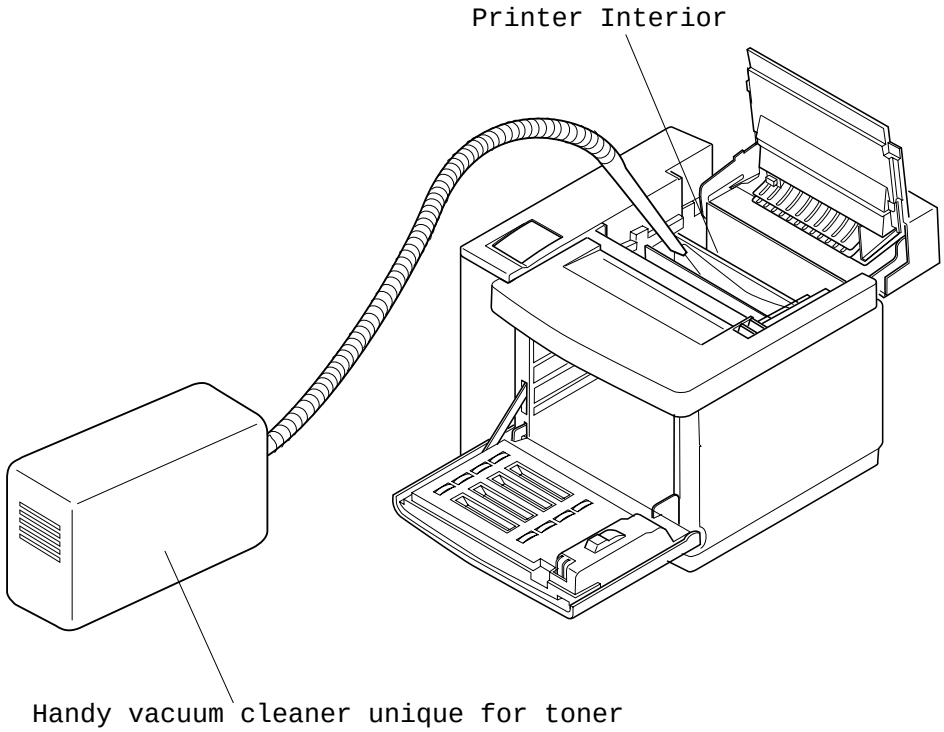


Fig.5-9

5.1.3 Periodic Maintenance Parts and Maintenance Cycle

Maintenance Work shall be implemented according to the "Periodic Maintenance Parts and Maintenance Cycle" set out in Table 5-4.

Table 5-4 : Periodic Maintenance Parts and Maintenance Cycle

No.	Maintenance Parts			Description		Cleaning Cycle *1 (Condition or Case)	Time *2 (minute)	Skill *3 Level
	Name of Parts		No.	Function	Clause			
1	Fuser Unit	US		To fix toner image on a transported paper.	5.2.1	50K prints *4 Maintenance Code =C:FU	2.0	A or B
		EC						
		JPN						
2	Belt Cartridge			To consist of OPC belt and form an electrostatic latent image.	5.2.2	60K images or 12 months whichever comes first. Code =C:BC	4.0	A or B
3	Transfer Roller			To transfer toner image from transfer transfer drum to a transported paper.	5.2.3	120K prints Maintenance Code =C:OW	2.0	A or B
4	Paper Discharger Unit			To separate paper from transfer drum.	5.2.4	120K prints Maintenance Code =C:OW	2.0	A or B
5	Drum Cleaner			To clean residual toner on transfer drum.	5.2.5	120K prints Maintenance Code =C:OW	2.0	A or B
6	Ozone Filter			To absorb ozone.	5.2.6	Every 12 months.	1.0	A or B
7	Paper Feeding Roller			To pick up paper one by one from paper cassette.	5.2.7	120K prints. No maintenance code.	20	B or C
8	Transfer Drum			To form toner image and transfer it onto paper.	5.2.8	300K images. No maintenance code.	20	B or C

*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: F0	Fuser Oil	6	C: KT	Toner Empty(K)
2	C: FC	Fuser Cleaning Roller	7	C:BC	Belt Cartridge
3	C: YT	Toner Empty (Y)	8	C: FU	Fuser Unit
4	C: MT	Toner Empty (M)	9	C: OW	120K pages per unit
5	C: CT	Toner Empty (C)			

5.2 Periodic Maintenance Procedures

5.2.1 Replacement of OPC Belt Cartridge

(1). Criterion of Replacement

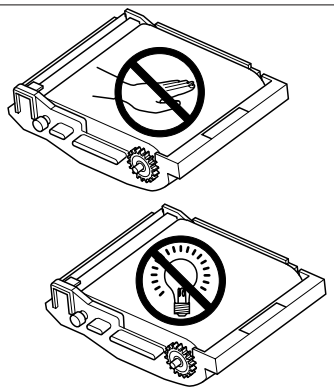
OPC Belt Cartridge should be replaced with new cartridge at 50,000 images or 12 months whichever comes earlier.
When time is due for replacement of OPC belt cartridge, the warning code "BC" appears in LCD of the operator panel.

00	READY		[ ]
U: [ ]		L: [ ]	[BC]

(2). Caution

⚠ PRECAUTION

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



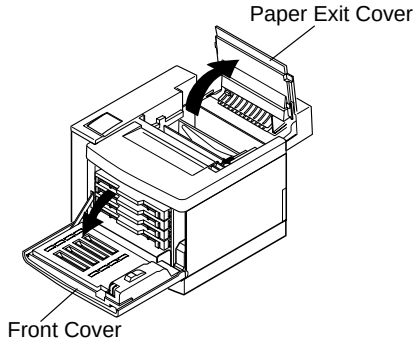
(3). Procedure of Replacement (Fig.5-10 ~ 5-15)

Replacement of Cleaning Roller

①. Turn the power supply switch off.

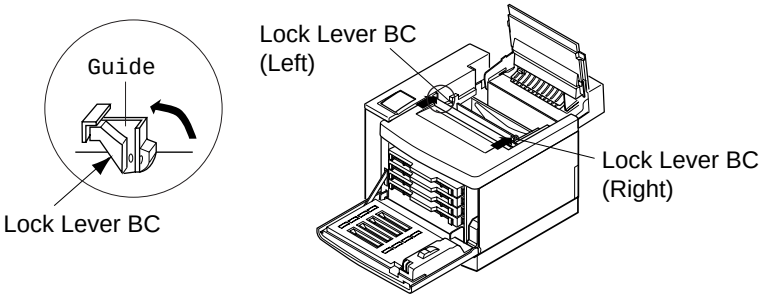
②. Open the paper exit cover.

③. Remove the top cover.



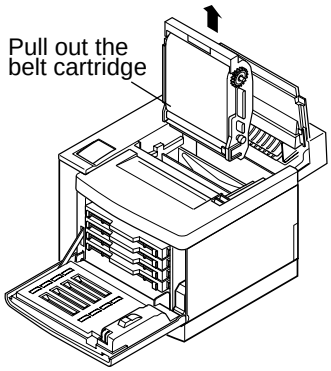
[Fig.5-10]

④. Unlock the lock lever BC of both sides (left and right).



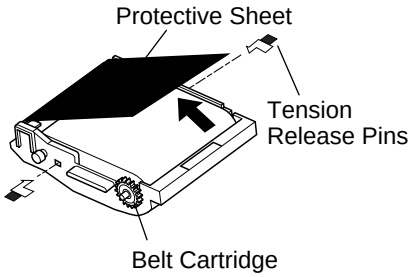
[Fig.5-11]

⑤. Pull out the belt cartridge.



[Fig.5-12]

⑥. Prepare a new belt cartridge.
- i). Pull and remove the tension release pin.
- ii). Remove the protective sheet.



[Fig.5-13]

⑦. Push new belt cartridge along the guide into the printer body.

⑧. Set the lock lever BC of both sides (left and right).

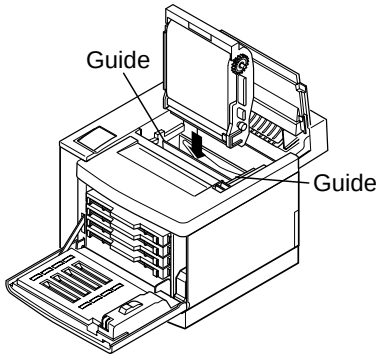
⑨. Close the front cover unit.

⑩. Close the paper exit cover.

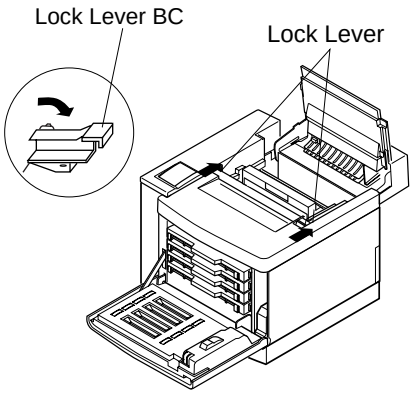
⑪. Turn the power supply switch on.

⑫. Clear the code [BC] by CLEAR CARE mode.

⑬. The code [BC] disappears, and the warming-up process starts.



[Fig.5-14]



[Fig.5-15]

5.2.2 Replacement of Fusing Unit(Fig.5-16 ~ 5-20)

(1). Criterion of Replacement

Fusing unit should be replaced with new unit according to the periodical maintenance cycle set out in the Table 7-1. When time is due for replacement of fusing unit, the warning code "FU" appears in LCD of the operator panel.

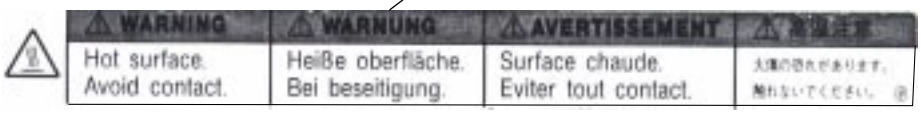
00	READY		[ ]
U: [ ]		L: [ ]	[FU]

(2). Purpose of Replacement

To prevent the print quality from declining due to the deterioration of fusing unit's roller.

(3). Precaution

WARNING Label



⚠ WARNING

- Fusing unit and its perimeter parts are very hot. Make it sure prior to starting the replacement work that the fusing unit and its perimeter parts are well cooled down, otherwise, you may get burned.

(4). Necessary tools and replacement materials

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

(5). Work Procedures

Sequence of Disassembling

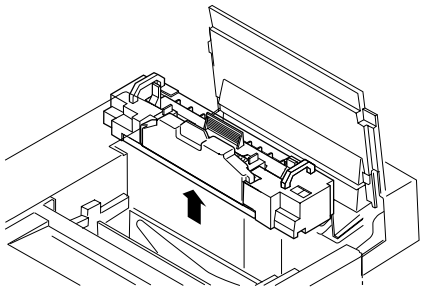
①. After turning the power switch off, unplug the power supply cord from outlet.
②. Open the paper exit unit.

③. Remove the metal fixture of fusing unit.

i) Open the back cover (L).

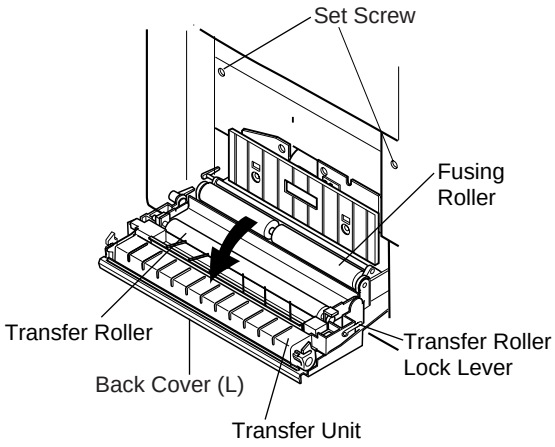
ii) Place a paper on top of transfer drum surface to protect the transfer drum surface.

iii). Loosen the set screw of both left and right side so that the hook of metal fixture comes off from the base of fusing unit.



[Fig.5-16]

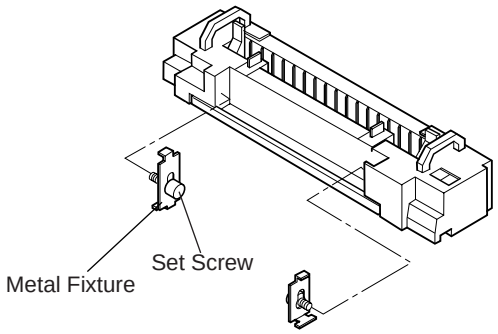
④. Holding the handle provided at both sides of fusing unit, remove the fusing unit.



[Fig.5-17]

⚠ CAUTION

• When removing the fusing unit, take care to keep the unit in good level so that no oil leakage occurs.



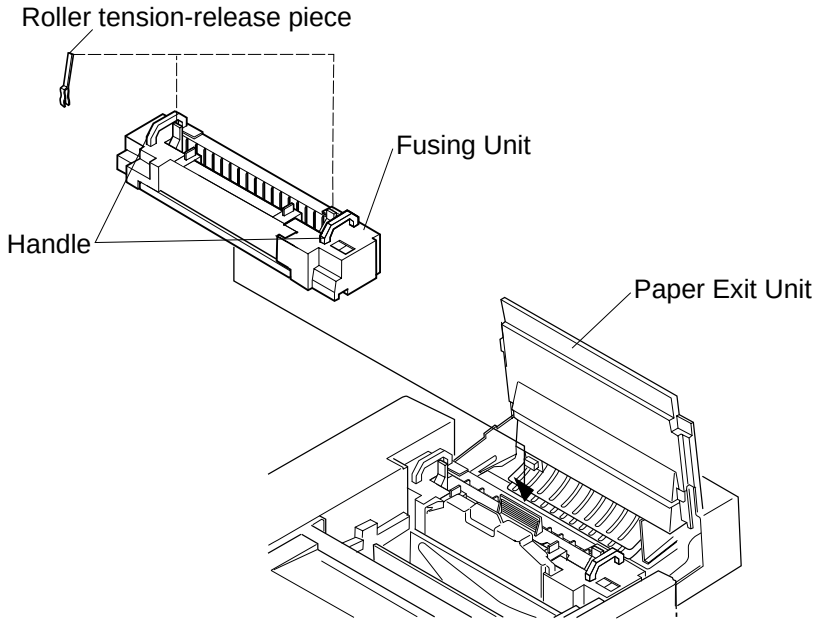
[Fig.5-18]

Sequence of Replacement

①. Prepare new fusing unit prior to starting the replacement work.

②. Remove the roller tension-release piece of left and right.

③. Install the oil bottle and cleaning roller to the fusing unit.



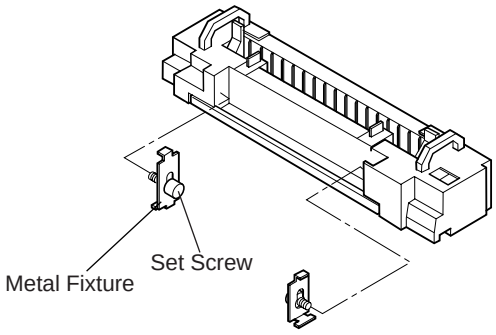
[Fig.5-19]

Sequence of Assembling

①. Install new fusing unit to the printer

(i). After setting the fusing unit in place, lightly press down the unit to firmly connect to the connector of base.

(ii). Screw the fixture of fusing unit from the transfer unit side.



[Fig.5-20]

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

②. Upon completion of warming-up process, clear the code [FU] by "CLEAR CARE" mode.

5.2.3 Replacement of Transfer Roller

(1). Criterion of Replacement

Transfer roller should be replaced with new discharger unit according to the periodical maintenance cycle set out in the Table 7-1. When time is due for replacement of transfer roller, the warning code "OW" appears in LCD of the operator panel.

00	READY	[ ]
U: [ ]	L: [ ]	[OW]

(2). Purpose of Replacement

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

(3). Necessary tools and replacement materials

①. Two or three pieces of cotton cloth for cleaning.

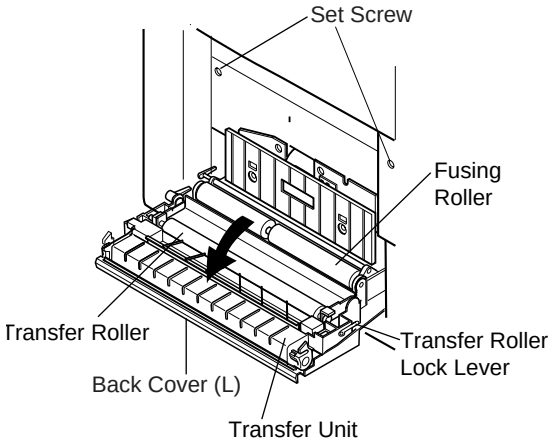
②. Transfer unit (one unit)

(4). Work Procedures

Sequence of Disassembling

①. After pushing the push button top of power supply to turn the power off, remove the power supply cord from the inlet.

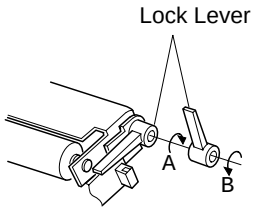
②. Open the back cover (L).



[Fig.5-21]

Sequence of Replacement

①. Release the lock lever of transfer roller by turning it to the arrow direction 'A'. (Fig.5-22-A)



[Fig.5-22-A]

②. Remove the transfer roller. (Fig.5-22-B & Fig.5-22-C)

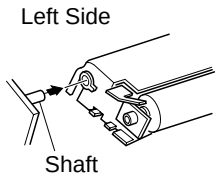
i). After lifting up the right end of transfer roller, slide it to the right.

③. Install a new transfer roller to the printer. (Fig.5-22-D)

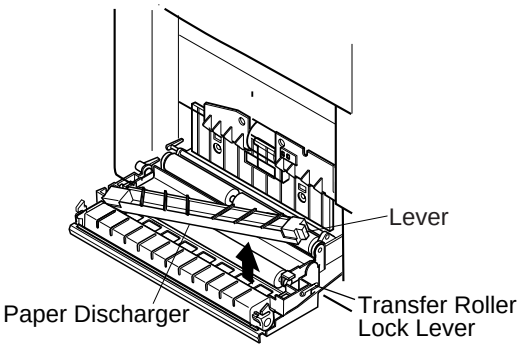
i). Have the hole of left end meet the projecting shaft.

ii). Have the recessed hole of right end meet the shaft of lock lever.

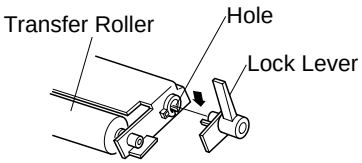
④. Fix the transfer roller by turning the lock lever to the arrow direction 'B'. (Fig.5-22-A)



[Fig.5-22-C]



[Fig.5-22-B]



[Fig.5-22-D]

Sequence of Assembling

①. Close the back cover (L).

②. Plug the power supply cord to the outlet.

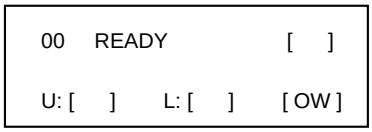
③. Push the push button top of power supply to turn the power on.

④. Upon completion of the warming-up process, clear the code [OW] by CLEAR CARE mode.

5.2.4 Replacement of Paper Discharger Unit(Fig.5-23)

(1). Criterion of Replacement

Paper discharger should be replaced with new discharger unit according to the periodical maintenance cycle set out in the Table 7-1. When time is due for replacement of paper discharger unit, the warning code "OW" appears in LCD of the operator panel.



(2). Purpose of Replacement

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

(3). Precaution

⚠ PRECAUTION

Do not touch the charging wire of paper discharger unit.

(4). Necessary tools and replacement materials

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

(5). Work Procedures

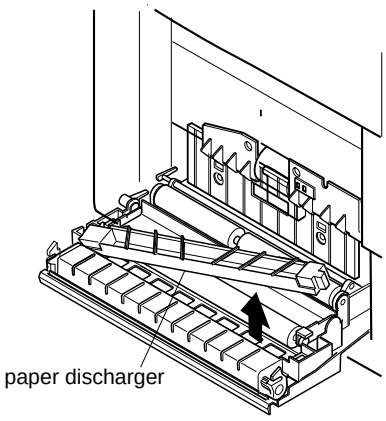
Sequence of Disassembling

①. After pushing the push button top of power supply to turn the power off, remove the power supply cord from the outlet.
②. Open the back cover (L).

Sequence of Replacement

Refer to the item 4.1.2 (3) for the removal of paper discharging unit (AC charger).

①. Remove the paper discharger unit from the transfer unit.
②. Clean the area where the paper discharging unit shall be mounted.
③. Install new paper discharging unit to the transfer unit.



[Fig.5-23]

Sequence of Assembling

①. Close the back cover (L).

②. Plug the power supply cord to the printer.

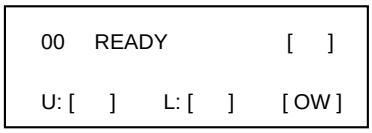
③. Turn the power supply switch on.

④. Upon completion of the warming-up process, clear the code [OW] by CLEAR CARE mode.

5.2.5 Replacement of Drum Cleaner(Fig.5-24 and 5-25)

(1). Criterion of Replacement

Drum cleaner should be replaced with new drum cleaner according to the periodical maintenance cycle set out in the Table 7-1. When time is due for replacement of drum cleaner, the warning code "OW" appears in LCD of the operator panel.



(2). Purpose of Replacement

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

(3). Precaution

⚠ PRECAUTION

When installing the drum cleaner, firstly connect the bearing and the bias pole. Reconfirm this connection prior to starting the installation.

(4). Necessary tools and replacement materials

①. Two or three pieces of cotton cloth for cleaning.

②. Drum cleaner (one unit)

(5). Work Procedures

Sequence of Disassembling

①. Push the push button top of power supply to turn the power off.

②. Open the paper exit cover.

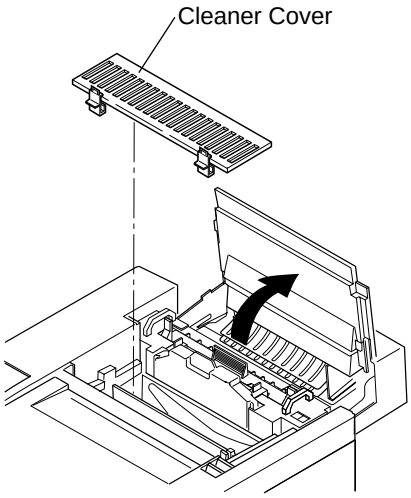
Sequence of Replacement

①. Remove the cleaner cover. (Fig.5-24)

②. Holding the knob and band located on the top of drum cleaner, remove the drum cleaner.
  i). Turning the handle of center part to the arrow direction, dislocate the drum cleaner shaft from the bearing. (Fig.5-25-a)

③. Clean the area where the drum cleaner shall be mounted.

④. Install a new drum cleaner to the printer. (Fig.5-25-b)
  i). Connect the shaft of counter gear side to the bearing.
  ii). Connect the shaft of gear side to the bearing.



[Fig.5-24]

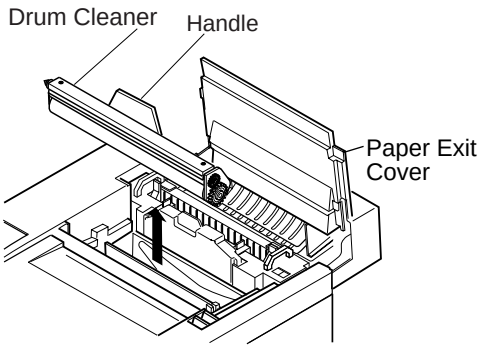
Sequence of Assembling

①. Install the cleaner cover.

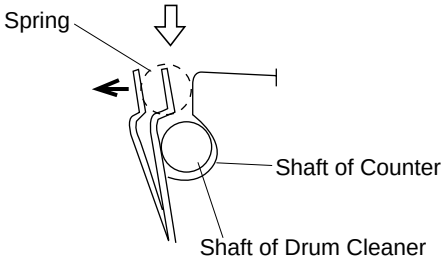
②. Close the paper exit cover.

③. Push the push button top of power supply to turn the power on.

④. Upon completion of the warming-up process, clear the code [OW] by "CLEAR CARE" mode.



[Fig.5-25-a]



[Fig.5-25-b]

5.2.6 Replacement of Ozone Filter(Fig.5-26)

(1). Criterion of Replacement

Ozone filter should be replaced with new filter according to the periodical maintenance cycle set out in the Table 7-1. This is to prevent the ozone from being exhausted due to the deterioration of ozone filter.

(2). Precaution

⚠ CAUTION

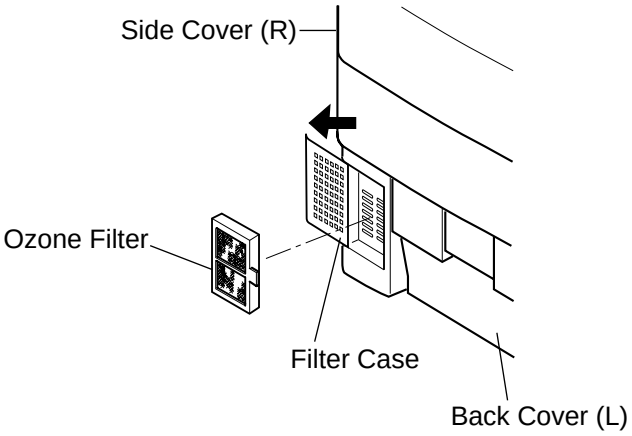
- Ozone filter should be replaced with new filter every 12 months, otherwise, it may cause an offensive smell.

(3). Necessary tools and replacement materials

①. No special tool and equipment are necessary for the replacement of ozone filter.

(4). Work Procedures

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



[Fig.5-26]

5.2.7 Checking of Paper Feeding Roller and Separator Pad

(1). Replacement Criteria

Since the paper feeding roller and separator pad are defined as periodic replacement parts as per Table 7-1, they should be replaced when the feeding jam (17. MEDIA JAM FEED) occurs.

(2). Replacement Procedures

①. Whenever the feeding jam occurs, confirm the cause pursuant to the item 8.1.2 "Paper Transportation Error"

②. If the cause of feeding jam is rested on the paper feeding roller or separator pad, replace them pursuant to the replacement procedures set out in the item 7.6.4.

(3). Cautions

①. This work is one of periodic replacement jobs, but cannot be the customer service. 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.

5.2.8 Replacement of Transfer Drum

(1). Replacement Criteria

Since the transfer drum is defined as periodic replacement parts as per Table 7-1, it should be replaced when the print quality failure occurs due to failed transfer drum.

(2). Replacement Procedures

①. Whenever the feeding jam occurs, confirm the cause pursuant to the item 8.3 "Print Quality Failure".

②. If the cause of failure is rested on the transfer drum, replace it pursuant to the replacement procedures set out in the item 7.6.3.

(3). Cautions

①. This work is one of periodic replacement jobs, but cannot be the customer service. 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.

6. Operation and Adjustment of Operator Panel

6.1 Panel Layout 6-1

6.2 Configuration of Operational Mode 6-2

6.3 Motion and Operation of Normal Mode 6-4

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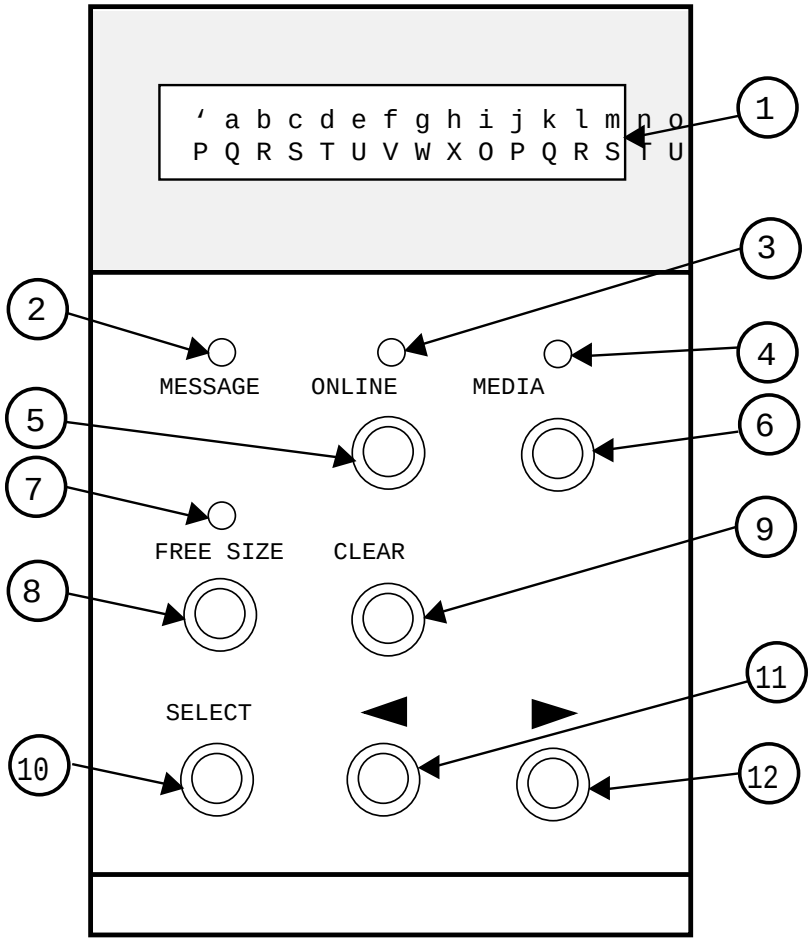
6. Operation and Adjustment of Operator Panel

6.1 Panel Layout



Description:

①	LCD:16 characters by 2 lines
②	Message LED
③	Online LED
④	Media LED
⑤	Online Key
⑥	Media Select Key
⑦	Free Size LED (Red)
⑧	Free Size Key
⑨	Clear Key
⑩	Select Key
⑪	Scroll Key (Left)
⑫	Scroll Key (Right)

6.2 Configuration of Operational Mode

This printer has the various functions set out in the table 6-1 for the users to easily understand the operation status of printer engine during the maintenance work.

(1). Normal Mode : Provides the function to indicate the operation status and also messages relating with the normal operations which the operators are driving.

(2). Service Mode : Is a unique mode for the serviceman only, and provides the function (code 31 through 37) to confirm the operation status during the maintenance work and 39 FACTORY MODE to confirm and set the operational status of main components.

6.3 Operation of Normal Mode

Normal Mode displays on the operator panel the operation status as connected to the ONLINE driving, and the necessary information for the operator to implement an ordinary maintenance work.

Operation Procedures

(1). Turn the power switch on by push-on.

(2). ONLINE LED is lit, and MESSAGE LED starts to blink.

(3). MESSAGE LED is lit approx. 250 seconds after power-on, and READY LED is lit as the printer is ready to print.

Operation Procedures

See the table 6-2 for details of indications to be available in the normal mode.

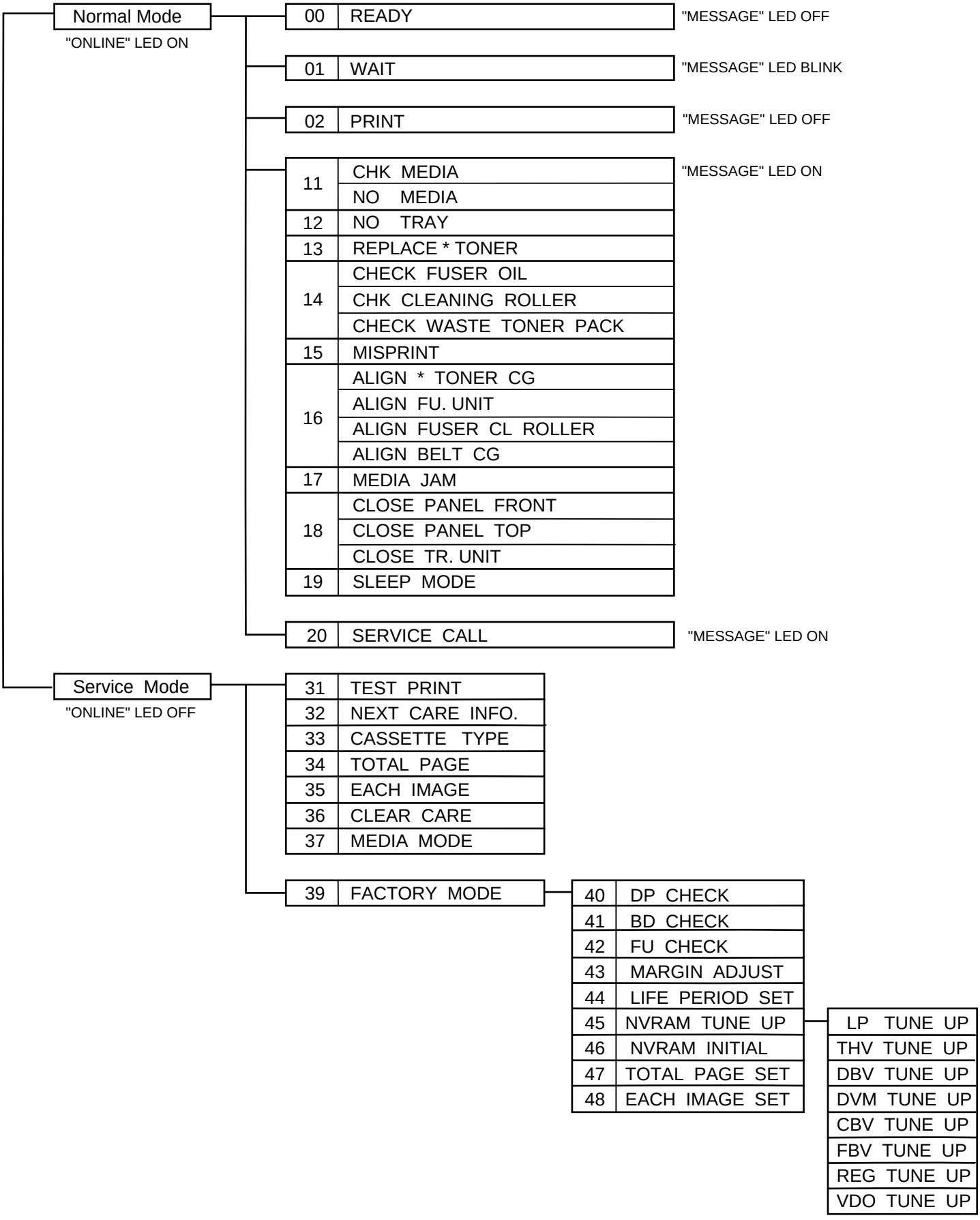


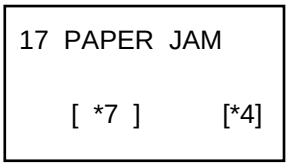
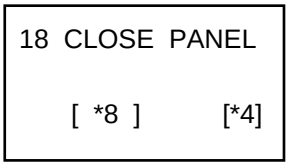
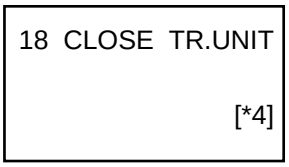
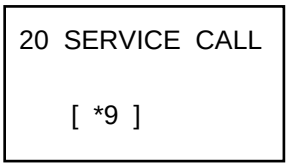
Table 6-1: Configuration of Operational Mode

Code No.	Message in LCD	Description of Message
00	00 READY [*1] U F[*2] L F[*3][*4]	• READY LED is lit • Engine has completed the warming-up process and now is ready to print. • Engine is ready to receive "PRREQ", "TPREQ" signal from LPC. [*1] : Applicable paper feeder is indicated as follows: /UPP…Upper Cassette /LOW…Lower Cassette [*2] and [*3] : Size of the paper loaded on the upper or lower cassette is indicated as follows: 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 UK…UK Quarto FO…OHP [*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 the item6.1.4, 36 CLEAR CARE .
01	01 WAIT [*1] U F[*2] L F[*3][*4]	• Message LED is lit. • Engine is in the process of warming-up. • For [*1], [*2], [*3] and [*4] appearing in the LCD, see the description of code number 00 above.

Code No.	Message in LCD	Description of Message
02	02 PRINT [*5][*1] U F[*2] L F[*3][*4]	• Message LED is lit. • Engine is ready to print. • For [*1], [*2], [*3] and [*4] 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
11-1	11 CHK MEDIA [*1] [*4]	• Engine is idling. • Message LED is lit. [*1] : Applicable paper feeder is indicated as follows: /UPP …Upper Cassette /LOW…Lower Cassette • Confirm whether applicable paper cassette is loaded with papers. • Press Media Key if media shall be changed.
11-2	NO PAPER 11 NO MEDIA [*1] [*4]	• Engine is idling. • Message LED is lit. [*1] : Applicable paper feeder of paper empty condition is indicated as follows: /UPP…Upper Cassette /LOW…Lower Cassette • Replenish the empty cassette with papers.
12	NO TRAY 12 NO TRAY [*1] [*4]	• Engine is idling. • Message LED is lit. [*1] : Paper feeder without the paper cassette is indicated as follows: UPPER…Upper Cassette LOWER…Lower Cassette • Install the applicable paper cassette to the paper feeder indicated in the LCD.

Code No.	Message in LCD	Description of Message
13	REPLACE TONER 13 REPLACE [*5] TONER [*4]	• Engine is idling. • Message LED is lit. [*5] : 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.
14-1	CHECK FUSER OIL 14 CHECK FUSER OIL [*F0]	• Engine is idling. • Message LED is lit. • Replace the fuser oil bottle with a new bottle. • This message will be automatically cleared by open & close operation of the paper exit cover.
14-2	14 CHK CLEANING ROLLER [*4] [*FC]	• Engine is idling. • Message LED is lit. • Replace the cleaning roller with a new roller. • Execute the Clear Care Mode after the replacement of the cleaning roller to clear the Care Code [FC].
14-3	CHECK WASTE TONER PACK 14 CHECK TONER PACK [*4]	• Engine is idling. • Message 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 Clear Key.
15	MISPRINT 15 MISPRINT [*6] [*4]	• Engine is idling. • Message LED is lit. [*6] : Kind of the misprint will be indicated as follows: NOPQR…No PRREQ-N signal is a vailable. PAPER …No paper is available in the feeder while executing the print operation after receipt of the print command. • This message can be cleared by pressing the Clear Key.

Code No.	Message in LCD	Description of Message
16-1	16 ALIGN FU.UNIT [*4]	• Engine is standstill. • Message 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 Clear Key.
16-2	ALIGN FUSER CL ROLLER 16 ALIGN FUSER CL ROLLER [*4]	• Engine is idling. • Message LED is lit. • Cleaning roller is not installed. Reconfirm the installation status of the cleaning roller. • This message will be automatically cleared by open & close operation of the paper exit cover. The message is cleared also by pressing the Clear Key.
16-3	ALIGN TONER CG 16 ALIGN [*5] TONER CG [*4]	• Engine is idling. • Message LED is lit. [*5] : Color of the incorrectly installed toner cartridge will be indicated as follows: Y…Yellow M…Magenta C…Cyan K…Black • Reinstall the toner cartridge correctly. • This message will be automatically cleared by open & close operation of the front cover.
16-4	16 ALIGN BELT CG [*4]	• Engine is standstill. • Message 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.
19	SLEEP MODE 19 SLEEP MODE [*4]	• Engine is idling. • Message LED is lit. • This mode is cleared by sending WAKE-UP command (EC24) from LPC. • Printer is ready to print after the warming-up process of engine.

Code No.	Message in LCD	Description of Message
17	PAPER JAM 	• Engine is standstill. • Message LED is lit. [*7] : Kind of jam (location of jam) is indicated as follows: FEED …Paper Feeder INNER …Inside of Printer OUTER…Paper Exit DRUM …Transfer Drum • This message will be cleared by pressing the Clear Key after open & close operation of the front cover, back cover and paper exit cover.
18-1	CLOSE PANEL 	• Engine is standstill. • Message LED is lit. [*8] :Kind of the cover being open is indicated as follows: FRONT… Front Cover TOP … Paper Exit Cover • This message will be cleared by open & close operation of the indicated cover.
18-2	SET TR.UNIT 	• Engine is standstill. • Message LED is lit. • Transfer unit is not open. Reconfirm the installation status of the transfer unit. • This message will be cleared by open & close operation of the transfer unit.
20	SERVICE CALL 	• Engine is standstill. • Message LED is lit. [*9] : Service Call error code is indicated as follows: For the details of error codes, refer to the Section 8 "Troubleshoot" of this manual.

6.4 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, scroll keys (left ◁ & right ▷) and FREE SIZE key, turn the power switch on by push-on operation.

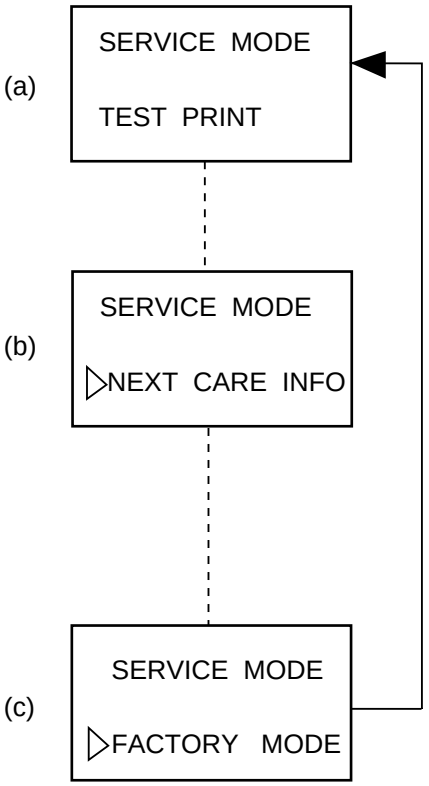
(2). Using the scroll keys, select key and clear key, select the mode necessary for the maintenance work from the configuration shown in the table 6-1.

How to designate the necessary mode

(1). Press the scroll key 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 select key.

(3). Press the clear key if the mode should be cleared.



31 GRID PRINT

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

Procedure

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

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

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting Screen (a) "NEXT CARE INFO". (a) ---> (b)	(a) SERVICE MODE ▷NEXT CARE INFO (b) 32 NEXT CARE No.=<1,2,3,4,5,6,7,8,9>
2	Using Scroll key, select the care code of desired information. 2: Fuser Cleaning Roller (FC) 7: Belt Cartridge (BL) 8: Fuser Unit (FU) 9: Replacement Kit by every 120K (120K) (b)	(b) NEXT FC ROLL 012000P
3	After selecting the desired information's code, press Select key. Then, number of images or printouts corresponding to the selected code is displayed. (b) ---> (c) through (f)	(c) NEXT BL UNIT 05000P (d) NEXT FU UNIT 060000P
4	Screen (c) through (f) can be cleared by pressing the Clear key. (f) ---> (e) ---> (d) ---> (c) ---> (b) Press the Clear key one more time at the screen (b) to return to the service mode. (b) ---> (a)	(e) NEXT 120K KIT 120000P (f)

33 CASSETTE TYPE

Desired paper feeding cassette can be selected.

Procedure

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting Screen (a) "CASSETTE TYPE". (a) ---> (b)	(a) SERVICE MODE ▷CASSETTE TYPE
2	Using Scroll key, select the applicable code of desired cassette (A, B or C), and then, press the Select key.	(b) 33 CASSETTE TYPE TYPE=< A / B / C >
3	Press the Clear key to clear the screen (b). (b) ---> (c)	(c) SERVICE MODE ▷CASSETTE TYPE

A:US
B:EC
C:JPN

34 TOTAL PAGE

Total number of printouts can be confirmed.

Procedure

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting TOTAL PAGE mode. (a) ---> (b)	(a) SERVICE MODE ▷TOTAL PAGE
2	6 digit number is displayed. This number represents the total number of pages that have been printed out. (b)	(b) 34 TOTAL PAGE 0 0 3 6 0 0 P
3	Press the Clear key to clear the screen (b). (b) ---> (c)	(c) SERVICE MODE TEST PRINT

35 EACH IMAGE

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

Procedure

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

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

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting CLEAR CARE mode. (a) ---> (b)	(a) SERVICE MODE / ▷CLEAR CARE (b) 36 CLEAR CARE / No.=< FC, BC, FU, OW>
2	Using Scroll key, have the cursor meet the applicable CARE code, and then, press Select key. (b) ---> (c)	(c) CARED FC ROLL / ▷ YES/NO (d) CARED BC UNIT / ▷ YES/NO (e) CARED FU UNIT / ▷ YES/NO (f) CARED 120K UNIT / ▷ YES/NO
3	When implementing CLEAR CARE, use the Scroll key to have the cursor meet YES, and then, press Select key. Fuser cleaning roller (c) → g Belt cartridge (d) Fuser unit (e) 120k replacement kit (f)	
4	Press the Clear key to clear the CLEAR CARE mode. (g) ---> (h)	(g) 36 CLEAR CARE / No.=< FC, BC, FU, OW> (h) SERVICE MODE / ▷TEST PRINT

37 MEDIA MAMAGE

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

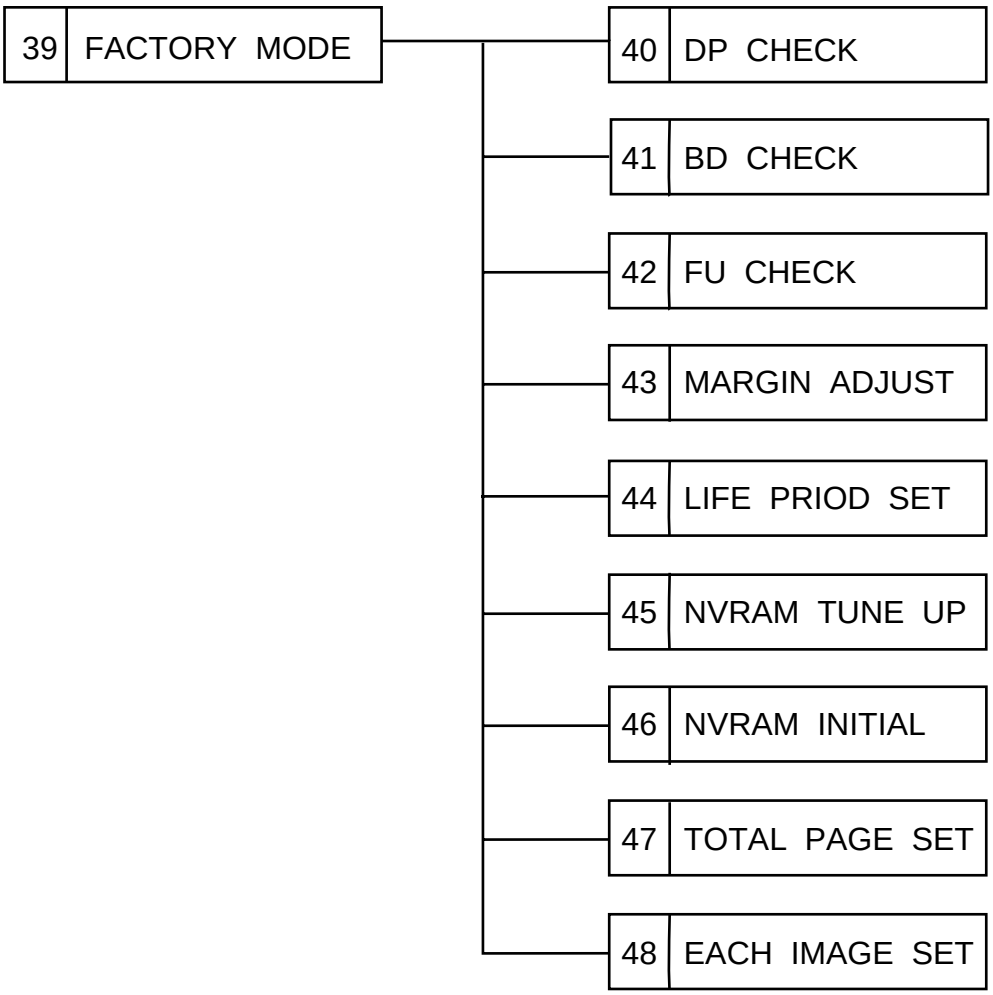
Procedure

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting MEDIA MANAGE. (a) ---> (b)	(a) SERVICE MODE ▷MEDIA MANAGE (b) 37 MEDIA MANAGE ▷MANAGE/DEFIANCE
2	SELECT the DEFIANCE, and then, press the Select key if OHP sensor signal should be ignored. (b) ---> (c) In the normal operation, the mode is preset to MANAGE.	(c) SERVICE MODE DP CHECK

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



40 DP CHECK

Toner cartridge of each color can be driven.

Procedure

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting DP CHECK. (a) ---> (b)	(a) 39 FACTORY MODE ▷ DP CHECK
2	Using Scroll key, select the desired color, and then, press Select key. (Ex. yellow color) (b) ---> (c)	(b) 40 DP CHECK ▷ Y/M/C/K (c) 40 DP CHECK Y GOOD
3	When the yellow toner cartridge is driven and no error is observed by the toner sensor, "Good" will be displayed on the panel, otherwise, "Fail". (c) Operation of the toner cartridge will be halted automatically after 60 seconds.	(d) 40 DP CHECK ▷ Y/M/C/K
4	(c) ---> (d) Press the Clear key to stop the DP CHECK mode. (d) Press the Clear key one more time to return to the status of screen (a). (d) ---> (e)	(e) FACTORY MODE ▷ DP CHECK

41 BD CHECK

Laser beam position and laser power can be confirmed.

Procedure

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting BD CHECK. (a) ---> (b)	(a) 39 FACTORY MODE ▷ BD CHECK
2	Scanner motor scans the laser beam as rotating. If the scanning position of laser beam is normal, "GOOD" is displayed in the LCD, otherwise, "FAIL". (b) or (c) Scanner motor automatically halts to rotate 60 seconds after initial rotation. (d)	(b) 41 BD CHECK GOOD (c) 41 BD CHECK FAIL
3	Press the Clear key to stop the BD CHECK mode. (b) ---> (d)	(d) 39 FACTORY MODE ▷ DP CHECK

42 FU CHECK

Availability of oil in the fuser unit can be confirmed.

Procedure

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting FU CHECK. (a) ---> (b)	(a) 39 FACTORY MODE ▷ FU CHECK
2	Upon energized, fuser unit starts the heat-up process, and checks the availability of fuser oil. If the oil is available in the fuser unit, "GOOD" is displayed in the LCD, otherwise, "FAIL". (b)	(b) 43 FU CHECK OIL:GOOD (c) 39 FACTORY MODE ▷ DP CHECK
3	Press the Clear key to stop the FU CHECK mode. (b) ---> (c)	

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

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting MARGIN ADJUST. (a) ---> (b)	(a) 39 FACTORY MODE ▷ MARGIN ADJUST
2	Using Scroll key, select either TOP or LEFT, and then, press Select key. (Ex. Top) (b) ---> (c)	(b) 43 MARGIN ADJUST ▷ TOP/LEFT/LEFT2
3	Margin can be adjusted 3.5mm max. to both end (left and right) by 0.5mm pitch against the reference value "0". Using Scroll key, 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 Select key to set the adjustment.	(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/LEFT2
4	Press the Clear key to terminate MARGIN ADJUST mode. (d) ---> (e) Press the Clear key one more time to return to FACTORY MODE. (e) ---> (f)	(f) 39 FACTORY MODE ▷ DP CHECK

44 LIFE PERIOD SET

Replacement life of the periodical replacement parts can be set.

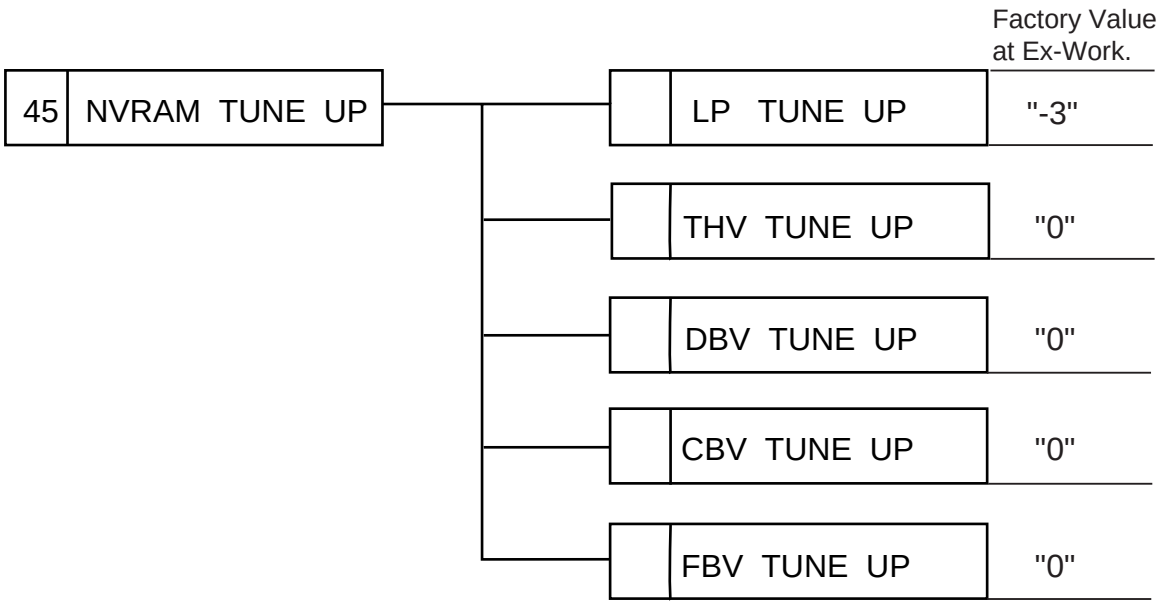
Procedure

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting LIFE PERIOD mode. (a) ---> (b)	(a) 39 FACTORY MODE ▷ LIFE PERIOD SET (b) 44 LIFE PERIOD No.=< 1 2 3 4 5 6 7 8 9 >
2	Using Scroll key, select the desired code to be set, and then, press Select key. 2: Fuser Cleaning Roller (b) ---> (c) 7: Belt Cartridge (d) 8: Fuser Unit (e) 9: 120K Replacement Kit (f)	(c) PERIOD FC ROLL 012000 P SET (d) PERIOD BC UNIT 05000 P SET
3	Use Scroll key to designate or change the desired digit. Use Select key to input values to the blinking digit. Upon completing the input of values to be set, use the scroll key to move the cursor to SET displayed in the LCD, and then, press the select key to register the set value.	(e) PERIOD FU UNIT 060000 P SET (f) PERIOD 120K UNIT 120000 P SET
4	Press the Clear key to complete the setting work. (g) Press the Clear key one more time to return to FACTORY MODE. (g) ---> (h)	(g) 44 LIFE PERIOD No.=< 1 2 3 4 5 6 7 8 9 > (h) 39 FACTORY MODE ▷ DP CHECK

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 -4 and +4.

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting NVM TUNE UP. (a) ---> (b)	(a) 39 FACTORY MODE ▷ NVM TUNE UP
2	After selecting LP TUNE UP Code 1, press Select key. (b) ---> (c)	(b) 45 NVM TUNE UP ▷No.=< 1 2 3 4 5 6 7 8 9 >
3	After selecting the color to be tuned up, press Select key. (Ex. Yellow) (c) ---> (d)	(c) 45 LP TUNE UP ▷ Y / M / C / K
4	Tune Up value can be adjusted within 8 steps between the step -4 and +4. After selecting a given number, press Select key. (d)	(d) 45 YELLOW [O] -< 4 3 2 1 △0 1 2 3 4 >+
5	Press the Clear 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.	(e) 45 LP TUNE UP ▷Y / M / C / K (f) 45 NVM TUNE UP ▷No.=< 1 2 3 4 5 6 7 8 9 >
6	Press the Clear key to wrap up the tune-up work. (e) ---> (f)	

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.

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting NVM TUNE UP. (a) ---> (b)	(a) 39 FACTORY MODE ▷ NVM TUNE UP
2	After selecting THV TUNE UP Code 2, press Select key. (b) ---> (c)	(b) 45 NVM TUNE UP ▷No.=< 1 2 3 4 5 6 7 8 9 >
3	After selecting the media to be tuned up, press Select key. (Ex. PPC) (c) ---> (d)	(c) 45 THV TUNE UP ▷ PPC / OHP / LABEL
4	Tune Up value can be adjusted within 8 steps between the step -4 and +4. After selecting a given number, press Select key. (d)	(d) 45 THV PPC [ ] -< 4 3 2 1 0 1 2 3 4 >+
5	Press the Clear key to wrap up the tune-up work for PPC. (d) ---> (e) Repeat the step 3 through 5 for other media such as OHP or Label.	(e) 45 THV TUNE UP ▷PPC / OHP / LABEL (f) 45 NVM TUNE UP ▷No.=< 1 2 3 4 5 6 7 8 9 >
6	Press the Clear key to wrap up the tune-up work. (e) ---> (f)	

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 -4 and +4.

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting NVM TUNE UP. (a) ---> (b)	(a) 39 FACTORY MODE ▷ NVM TUNE UP
2	After selecting DBV TUNE UP Code 3, press Select key. (b) ---> (c)	(b) 45 NVM TUNE UP ▷No.=< 1 2 3 4 5 6 7 8 9 >
3	After selecting the color to be tuned up, press Select key. (Ex. Magenta) (c) ---> (d)	(c) 45 DBV TUNE UP ▷ Y / M / C / K
4	Tune Up value can be adjusted within 8 steps between the step -4 and +4. After selecting a given number, press Select key. (d) ---> (e)	(d) 45 MAGENTA [ ] -< 4 3 2 1 0 1 2 3 4 >+ (e) 45 DBV TUNE UP ▷Y / M / C / K
5	Press the Clear key to wrap up the tune-up work for Magenta. (d) ---> (e) Repeat the step 3 through 5 for each color.	(f) 45 NVM TUNE UP ▷No.=< 1 2 3 4 5 6 7 8 9 >
6	Press the Clear key to wrap up the DBV tune-up work. (e) ---> (f)	

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.

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting NVM TUNE UP. (a) ---> (b)	(a) 39 FACTORY MODE ▷ NVM TUNE UP
2	After selecting CBV TUNE UP Code 5, press Select key. (b) ---> (c)	(b) 45 NVM TUNE UP ▷No.=< 1 2 3 4 5 6 7 8 9 >
3	Tune Up value can be adjusted within 8 steps between the step -4 and +4. After selecting a given number, press Select key. (c)	(c) 45 CBV TUNE UP -< 4 3 2 1 0 1 2 3 4 >+
4	Press the Clear key to wrap up the tune-up work for CBV. (c) ---> (d)	(d) 45 NVM TUNE UP ▷No.=< 1 2 3 4 5 6 7 8 9 >

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.

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting NVM TUNE UP. (a) ---> (b)	(a) 39 FACTORY MODE ▷ NVM TUNE UP
2	After selecting FBV TUNE UP Code 6, press Select key. (b) ---> (c)	(b) 45 NVM TUNE UP ▷No.=< 1 2 3 4 5 6 7 8 9 >
3	Tune Up value can be adjusted within 8 steps between the step -4 and +4. After selecting a given number, press Select key. (c)	(c) 45 FBV TUNE UP -< 4 3 2 1 0 1 2 3 4 >+
4	Press the Clear key to wrap up the tune-up work for FBV. (c) ---> (d)	(d) 45 NVM TUNE UP ▷No.=< 1 2 3 4 5 6 7 8 9 >

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.

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting NVRAM INITIAL. (a) ---> (b)	(a) 39 FACTORY MODE ▷ NVRAM INITIAL (b) 46 NVRAM INITIAL ▷ YES / NO
2	Select YES if NVRAM should be executed. If not, select NO. Press Select key so that RAM INITIAL will be executed. (All the data will be cleared.) (b) ---> (c)	(c) 39 FACTORY MODE ▷ DP CHECK
3	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 * When setting NVRAM TUNE UP, LP TUNE UP to be set at "-3".	

47 TOTAL PAGE SET

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

Step	Description of Procedures	Message in LCD
1	Press Select key after selecting TOTAL PAGE SET. (a) ---> (b)	(a) 39 FACTORY MODE ▷ TOTAL PAGE SET (b) 47 TOTAL PAGE 0 1 2 3 4 5 P SET
2	Use Scroll key to designate or change the desired digit. Use Select key to input values to the blinking digit. Upon completing the input of values to be set, use the scroll key to move the cursor to SET displayed in the LCD, and then, press the select key to register the set value.	(c) 39 FACTORY MODE ▷ DP CHECK

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.

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

6.5 Procedures of Adjustment Work

6.5.1 Adjustment of Top and Left Margin

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

(1). 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.

(2). 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 top 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.

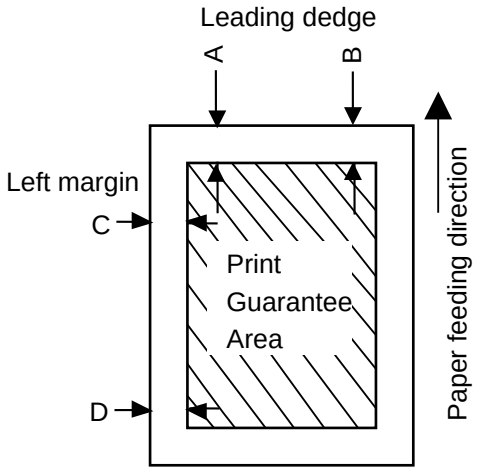


fig.6-14

6.5.2 Setting of RAM 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.

(1). Purpose :

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

(2). Procedures of Setting :

i). Follow the procedures set out in 6.4 Service Mode.
ii). Select RAM TUNE UP mode.
iii). Select the desired TUNE UP mode.
iv). Adjust the preset value to the appropriate value (step).
v). Implement the test print to confirm the print quality.

(3). 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

6.5.3 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.

(1). Purpose :

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

(2). 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.

6.5.4 Setting of Number of Images Per 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.

(1). Purpose :

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

(2). 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.

6.5.5 Initial Setting of RAM

Implement the initial setting at the replacement of MCTL P.W.B. after clearing the contents of RAM.

(1). Purpose :

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

(2). 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 ("-3" in ordinary case)
45	THV TUNE UP	Adjustment Value ("0" in ordinary case)
45	DBV TUNE UP	Adjustment Value ("0" in ordinary case)
45	CBV TUNE UP	Adjustment Value ("0" in ordinary case)
45	FBV TUNE UP	Adjustment Value ("0" in ordinary case)
47	TOTAL PAGE SET	Total Print Count
48	EACH IMAGE SET	Formed Image Count of 4 Colors

②. Execute 46 NVRAM INITIAL in the FACTORY MODE.
③. After implementing the NVRAM INITIAL, input the value confirmed in the procedure ① to the RAM for completing the setting.

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7. 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 prior to starting the disassembly or check.

(3). 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.

(4). 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.

(5). Remove the grounding when replacing or removing DC power supply unit. After completing the replacement work, confirm the grounding wire to be put back and connected to the earth mark ⏚.

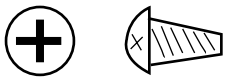
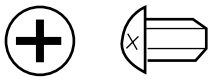
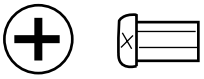
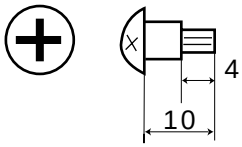
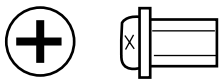
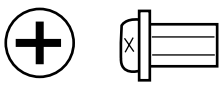
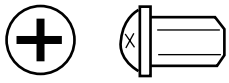
(6). Confirm the direction of parts and length of screws in replacement work of the maintenance parts. (See Table 7-1.)

(7). Do not use any solvent such as alcohol for the maintenance of this printer.

(8). Confirm all the parts and covers installed or assembled properly prior to starting the test run after replacement of the maintenance parts.

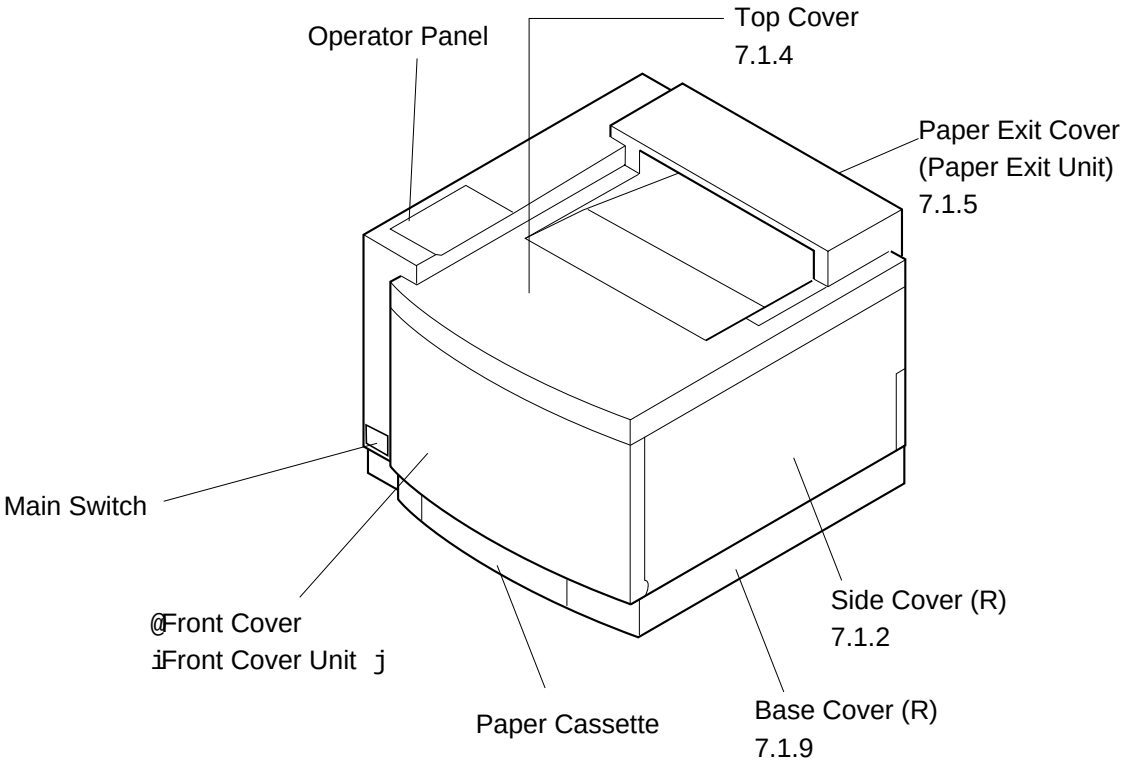
See Chapter 8 "Troubleshooting" and 9 "List of Maintenance Parts" for reference.

Table 7-1: Table of Applicable Screws

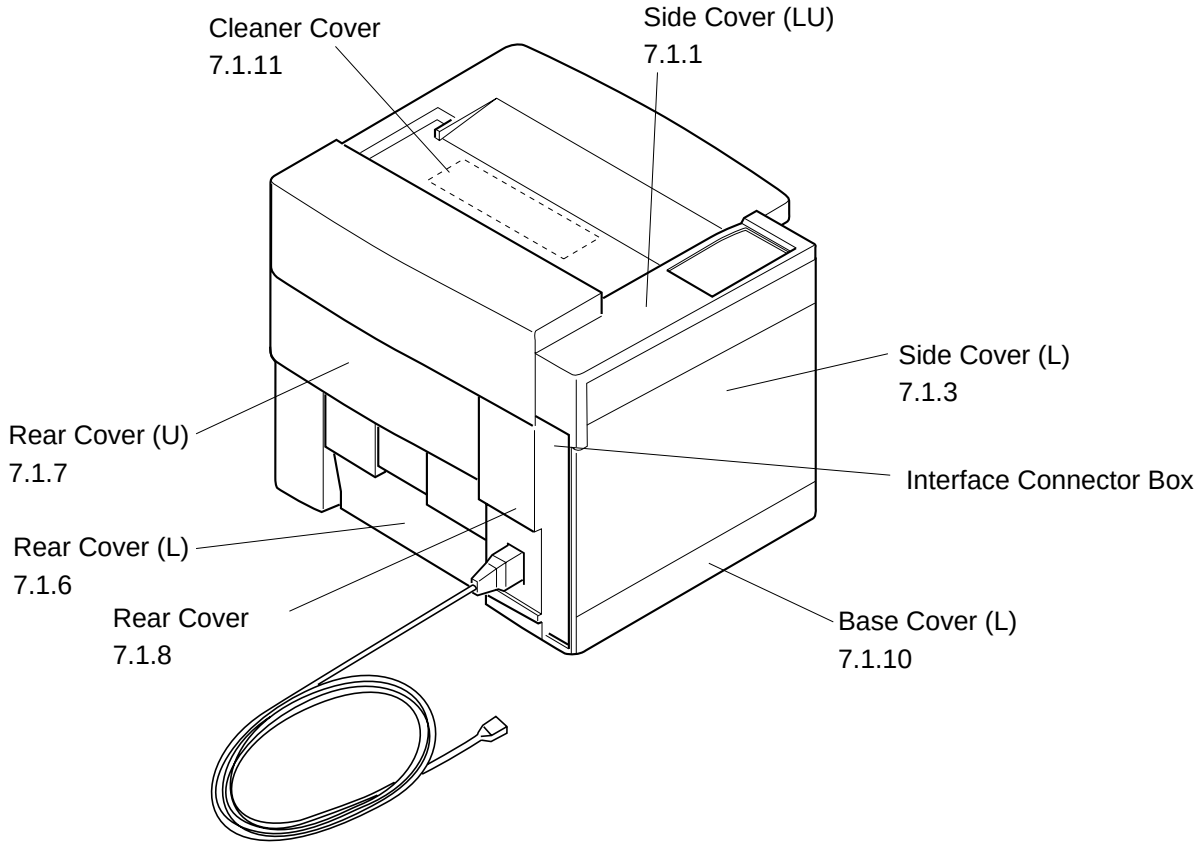
Class Code	Name of Screw	Size and Shape of Screw			Remarks
		M-Threed TS	Length	Sharp	
BT3×8	Cross recessed head tapping screw.	T3	8mm		To be used for installation of plastic parts.
BT3×12		T3	10mm		
		T4	6mm		
BT4×8		T4	8mm		
BT4×10		T4	10mm		
ST3×6	S tight screw	ST	6mm		To be used for installation of parts to steel plate.
M4×6	Cross recessed head tapping screw. (Pan head)	M4	6mm		To be used for flame and GND.
SP3	Unique screw for heater connector.	M3	10mm		For fuser connector.
F3×6	Cross recessed head screw with flange.	M3	6mm		
F4×6	Cross recessed head screw with flange.	F4	6mm		For fuser unit.
FST3×10	Cross recessed head S tight screw with flange.	FST	10mm		For fuser unit.

7.1 Replacement of Cover

[Name of Each Covers]



[Front Face]



[Back Face]

7.1.1 Upper Side Cover (LU)

Tools

①. Phillips Screwdriver #2

Disassembly Procedures

①. Open the paper exit unit.
②. Remove the set screw BT4×8 of side cover (LU).
③. Pressing the exterior of the side cover (L), unlock the interlock (three locations) with the side cover (LU).

Assembly Procedures

①. Prepare a new side cover (LU).
②. Assemble the side cover (LU) according to the reverse order of disassembling.

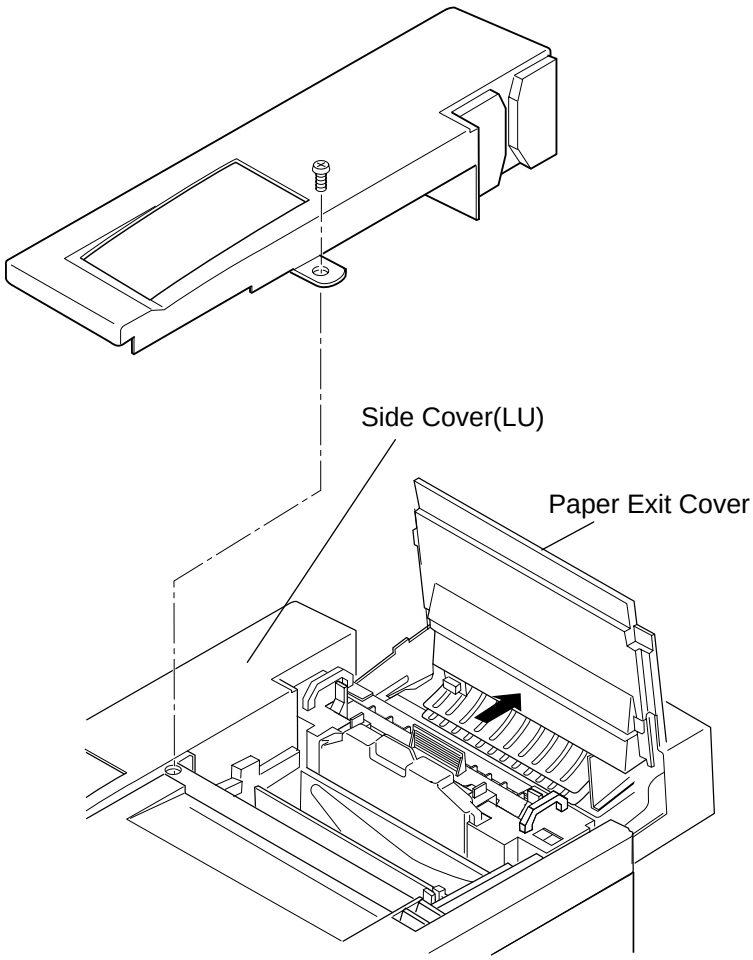


Fig.7-1-a

Precautions

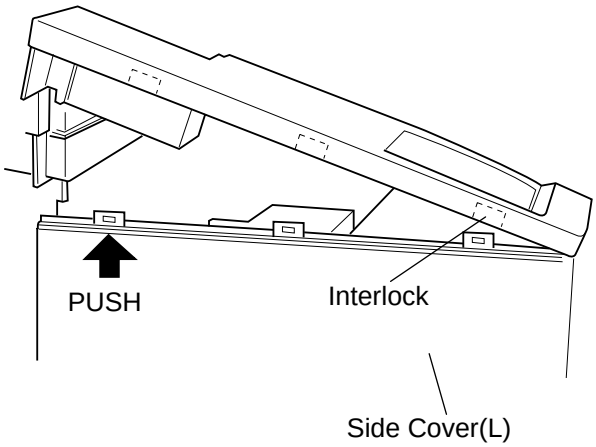


Fig.7-1-b

7.1.2 Side Cover (R)

Tools

①. Phillips Screwdriver #2

Disassembly Procedures

①. Open the front cover unit.
②. Remove the set screw BT4 × 8 (1 pc.) of side cover (R) at the rear side. (Fig.7-3)
③. Slide the side cover (R) to the arrow direction. (Fig.7-4)
④. Remove the side cover (R).

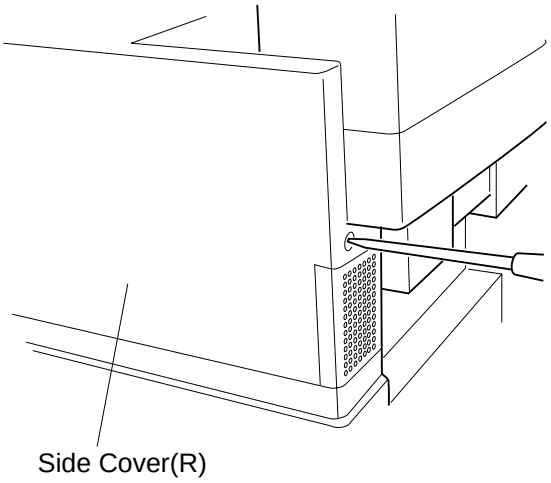


Fig.7-2-a

Assembly Procedures

①. Prepare a new side cover (R).
②. Assemble the side cover (R) according to the reverse order of disassembling.

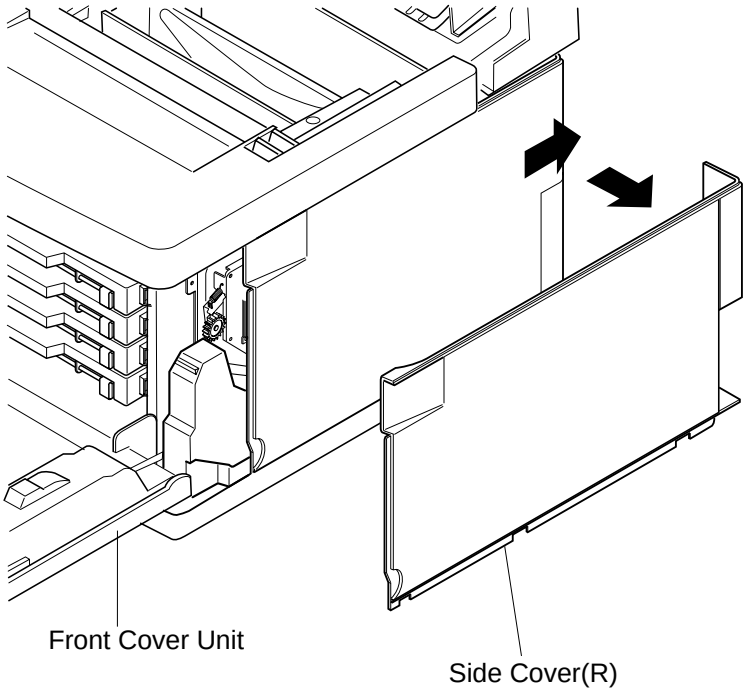


Fig.7-2-b

Precautions

7.1.3 Side Cover (L)

Tools

①. Phillips Screwdriver #2

Disassembly Procedures

①. Open the paper exit unit.
②. Remove the side cover (LU).
(See the item 7.1.1.)
③. Remove the set screw BT4×8 (2 pcs.) of side cover (L).
④. Remove the side cover (L).
(Slowly pull up the side cover (L), and unhook the hook from the top cover.)

Assembly Procedures

①. Prepare a new side cover (L).
②. Assemble the side cover (L) according to the reverse order of disassembling.

Precautions

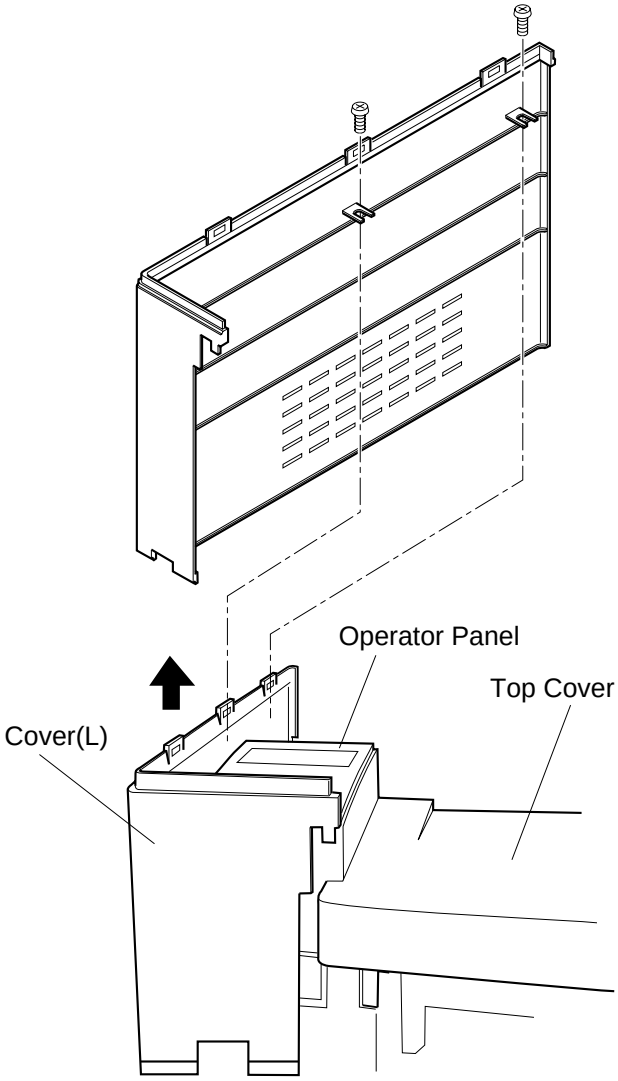


Fig.7-3

7.1.4 Top Cover

Tools

①. Phillips Screwdriver #2

Disassembly Procedures

①. Open the paper exit unit and the front cover Unit.
②. Remove the side cover (LU). (See the item 7.1.1)
③. Remove the side cover (L) and side cover (R). (See the item 7.1.2 and 7.1.3.)
④. Remove the lock lever BC provided for the belt cartridge.
⑤. Remove the set screw BT4×8 (3 pcs.) of top cover. (Top side×2 and Right side × 1)
⑥. Remove the connector of operator panel.
⑦. Slightly lift up the upper side of top cover.
⑧. Pull the top cover toward you, and unhook the hook from the frame.
⑨. Remove the panel assembly from the operator panel. (One BT4×8 screw to be removed.)

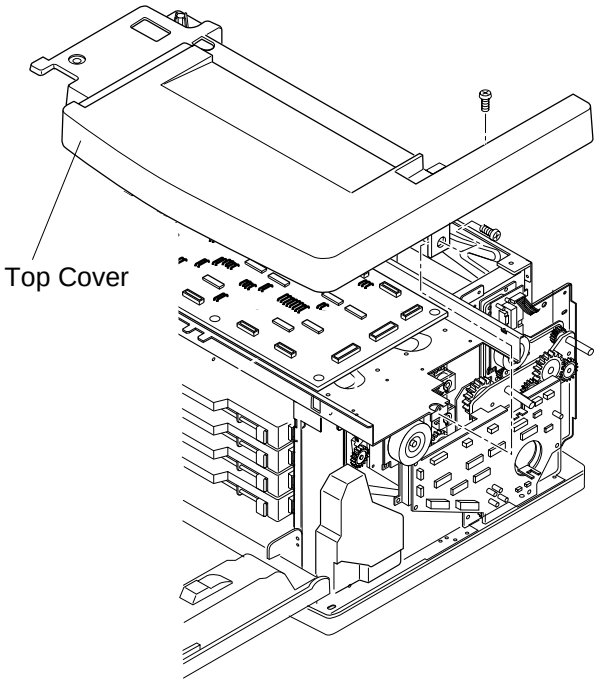


Fig.7-4-a

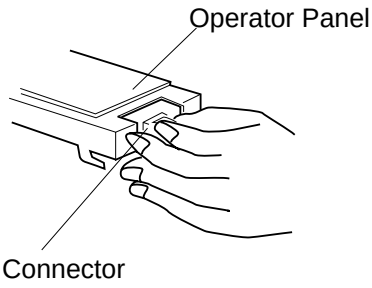


Fig.7-4-b

Assembly Procedures

①. Prepare a new top cover.
②. Assemble the top cover according to the reverse order of disassembling.

Precautions

7.1.5 Paper Exit Cover

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the side cover (LU).
(See the item 7.1.1)
②. Remove the side cover (L).
(See the item 7.1.2)
③. Remove the side cover (R).
(See the item 7.1.3)
④. Remove the top cover.
(See the item 7.1.4)
⑤. Remove the Shield Cover A assembly.
(See the item 7.2.1)
⑥. Remove the set screw (2 pcs.) of paper exit unit's shaft.
⑦. Remove the paper exit inner cover by removing the set screws BT3×8 (4 pcs.), release arm, hook (R) & (L) and spring.
⑧. Unscrew the set screw (ST3X6), and then, remove the harness cover.
⑨. Remove the fan case assembly.
⑩. Remove the set screws BT3 8 (4 pcs.) of paper exit guide unit.
⑪. Remove the paper exit guide unit from the cover.

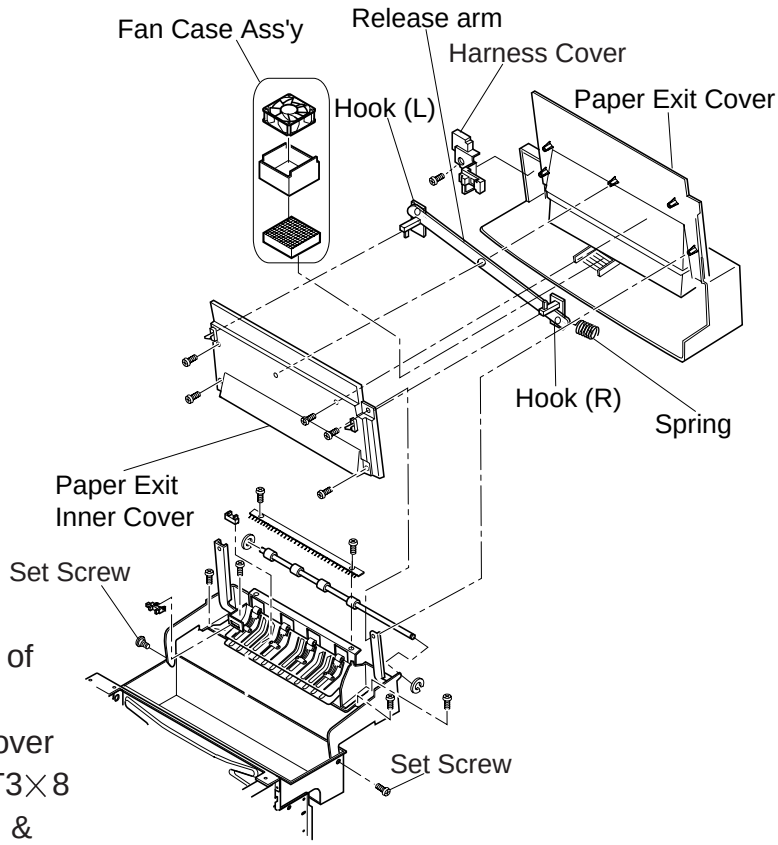


Fig.7-5-a

Assembly Procedures

①. Prepare a new paper exit cover.
②. Assemble the release arm, hook (R) & (L), and spring as shown in Fig.7-5-b.
③. Assemble according to the reverse order of disassembling.

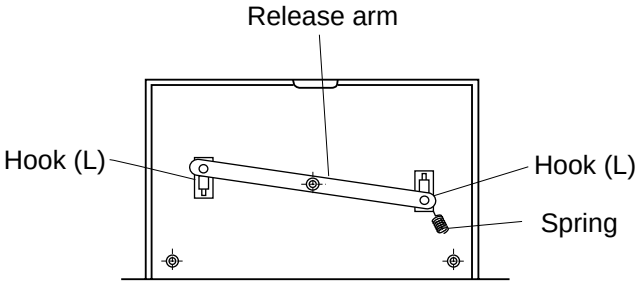


Fig.7-5-b

7.1.6 Rear Cover (L) (Transfer Unit Cover)

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Open the transfer unit.
②. Remove the set screw ST3×6 (1 pc.) of transfer unit and fixing Metal.
③. Remove the transfer unit.
④. Remove the set screw BT3×10 (4 pcs.) of rear cover.
⑤. Remove the rear cover (L) from the transfer unit.

Assembly Procedures

①. Prepare a new rear cover (L).
②. Install the rear cover to the transfer unit.
③. Assemble according to the reverse order of disassembling.

Precautions

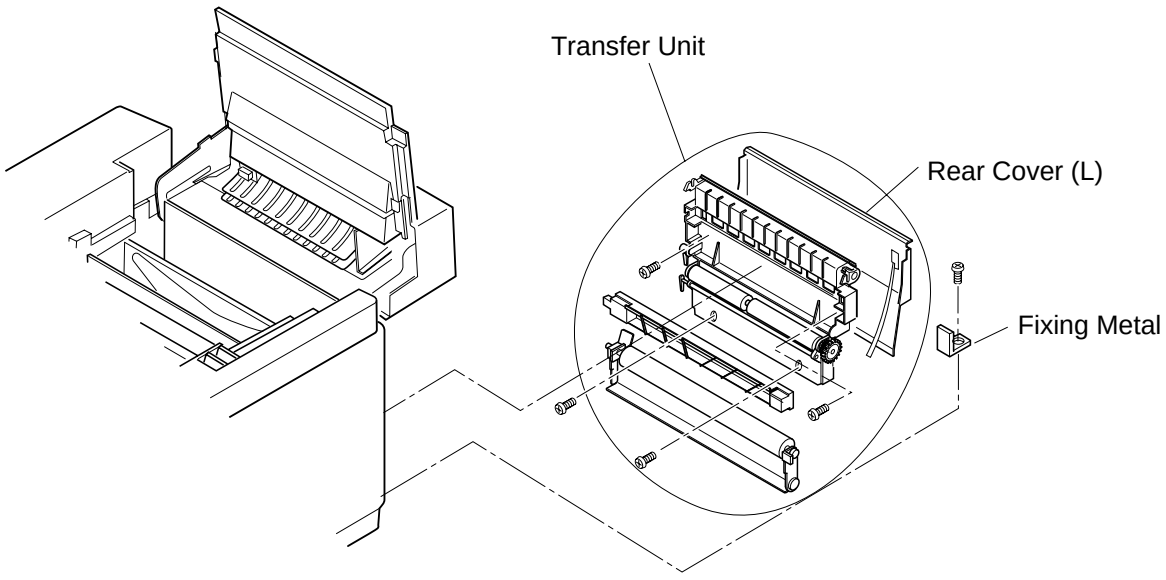


Fig.7-6

7.1.7 Rear Cover (U)

Tools

①. Phillips Screwdriver #2

Disassembly Procedures

①. Open the transfer unit.
②. Unplug the power supply cable from the inlet.
③. Remove the rear cover. (See the item 7.1.8.)
④. Remove the side cover (R). (See the item 7.1.2.)
⑤. Remove the set screw [BT4 × 6 (1 pc.)] of rear cover (U).
⑥. Remove the rear cover (U).

Assembly Procedures

①. Assemble the rear cover (U) according to the reverse sequence of disassembling.

Precautions

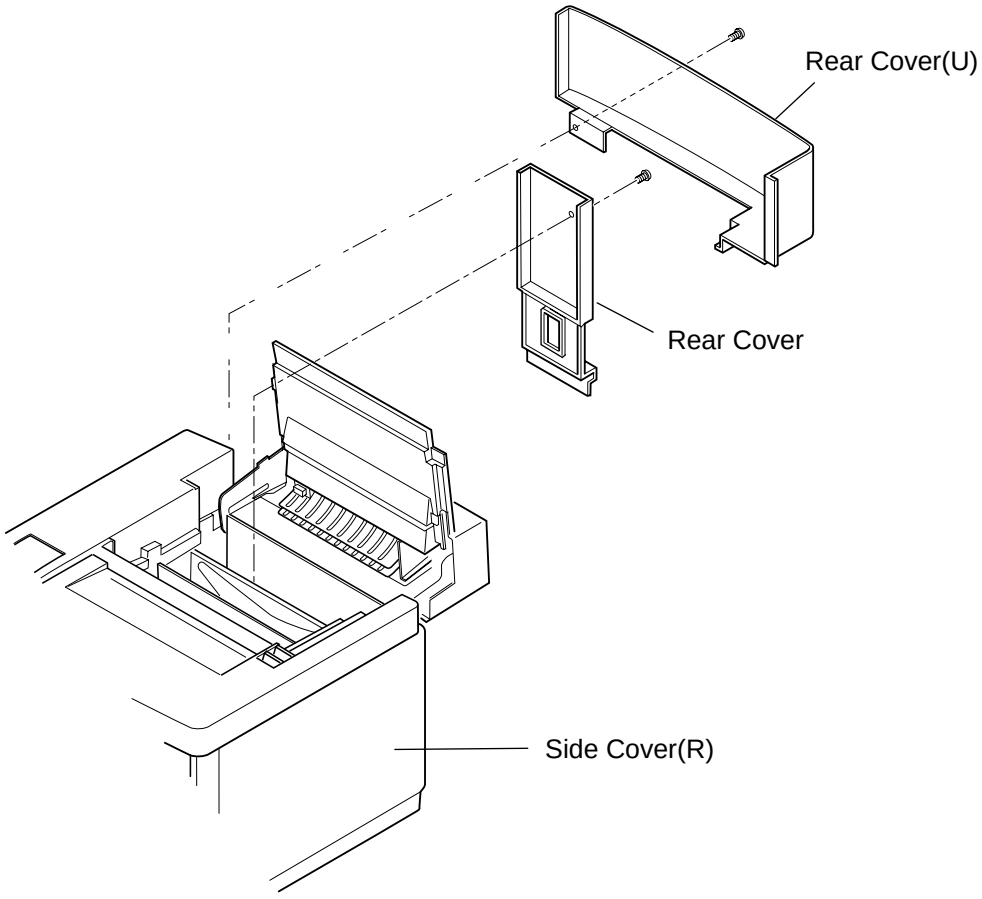


Fig.7-7

7.1.8 Rear Cover

Tools

①. Phillips Screwdriver #2

Disassembly Procedures

①. Unplug the power cable from the inlet.
②. Remove the set screw BT4× 8 (1 pc.) of rear cover.
③. Remove the rear cover.

Assembly Procedures

①. Install a new rear cover.
②. Plug the power cable to the inlet.

Precautions

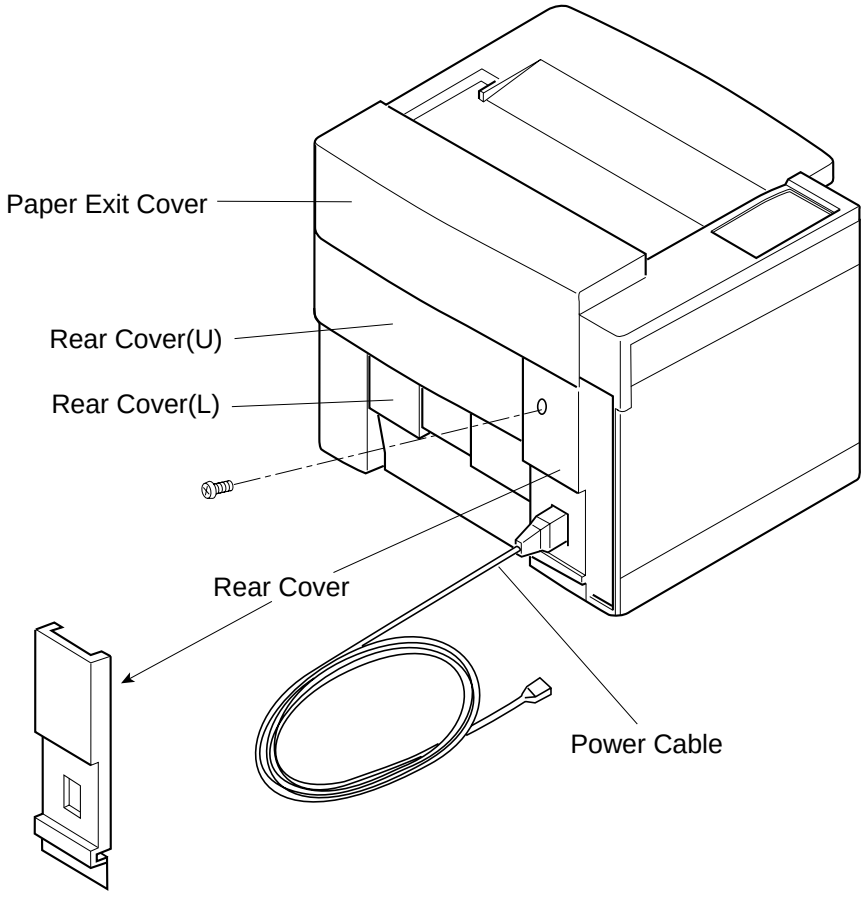


Fig.7-8

7.1.9 Base Cover (R)

Tools

①. Phillips Screwdriver #2

Disassembly Procedures

①. Remove the side cover (R).
(See the item 7.1.3.)
②. Remove the set screw [BT4× 8 (2 pcs.)] of base cover (R).
③. Remove the base cover (R) from the base.
i). Pull and remove the front side.
ii). Pull and remove the rear side.

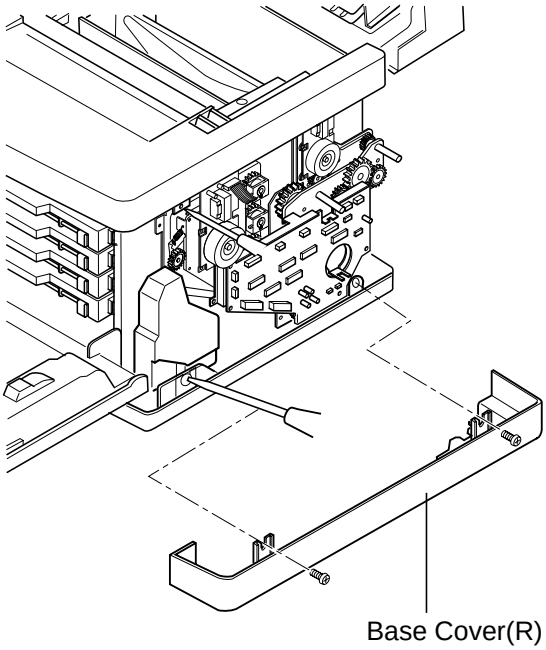


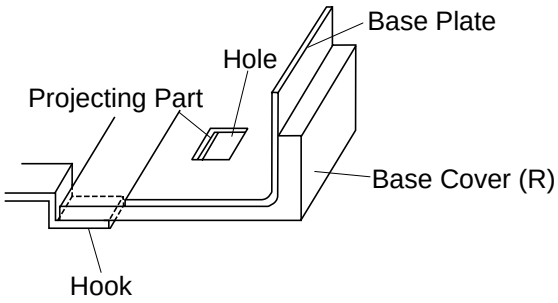
Fig.7-9

Assembly Procedures

①. Prepare a new base cover (R).
②. Assemble the new base cover (R) according to the reverse order of disassembling.
i). Insert the front side of base cover (R).
ii). Insert the rear side of base cover (R).

Precautions

- When assembling the base cover, insert the leading edge of base cover (R) into the hook provided at the bottom (left and right) of the base plate.
- Have the projecting part of base cover (R) meet the hole of base plate bottom.



7.1.10 Base Cover (L)

Tools

①. Phillips Screwdriver #2

Disassembly Procedures

①. Remove the side cover (L).
(See the item 7.1.3.)
②. Remove the set screw [BT4 × 8 (2 pcs.)] of base cover (L).
③. Remove the base cover (L) from the base.
i). Pull and remove the front side.
ii). Pull and remove the rear side.

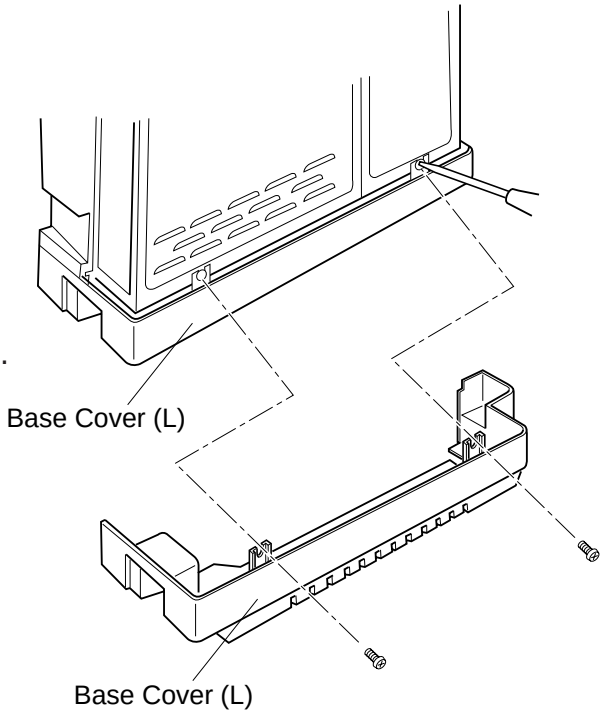


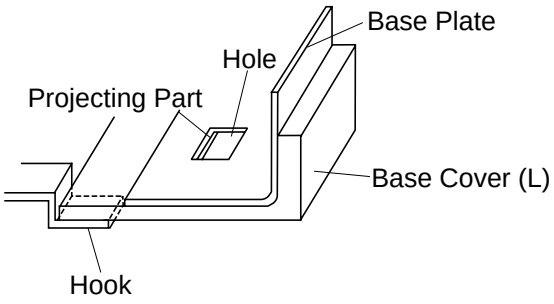
Fig.7-10

Assembly Procedures

①. Prepare a new base cover (L).
②. Assemble the new base cover (L) according to the reverse order of disassembling.
i). Insert the front side of base cover (L).
ii). Insert the rear side of base cover (L).

Precautions

- When assembling the base cover, insert the leading edge of base cover (L) into the hook provided at the bottom (left and right) of the base plate.
- Have the projecting part of base cover (L) meet the hole of base plate bottom.



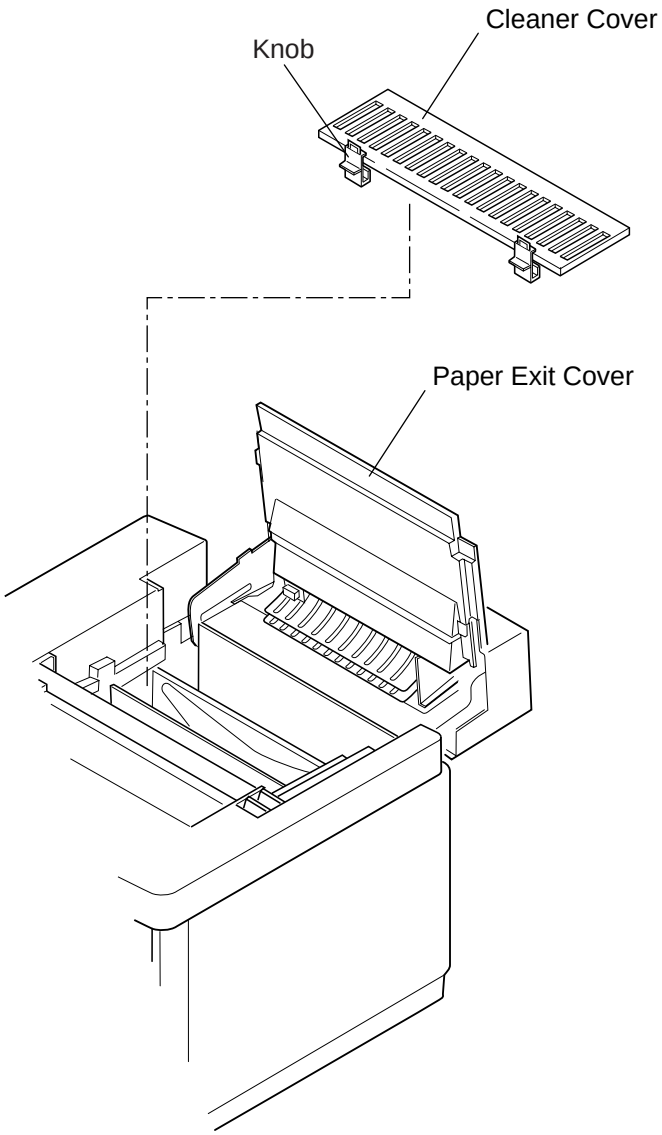
7.1.11 Cleaner Cover

Tools

No tool is required.

Disassembly Procedures

①. Open the paper exit cover.
②. Holding the ears, remove the cleaner cover.



Assembly Procedures

①. Install a new cleaner cover.
②. Close the paper exit cover.

Precautions

Fig.7-11

7.2 Replacement of Printed Wire Board (P.W.B)

[Layout of Printed wire Board]

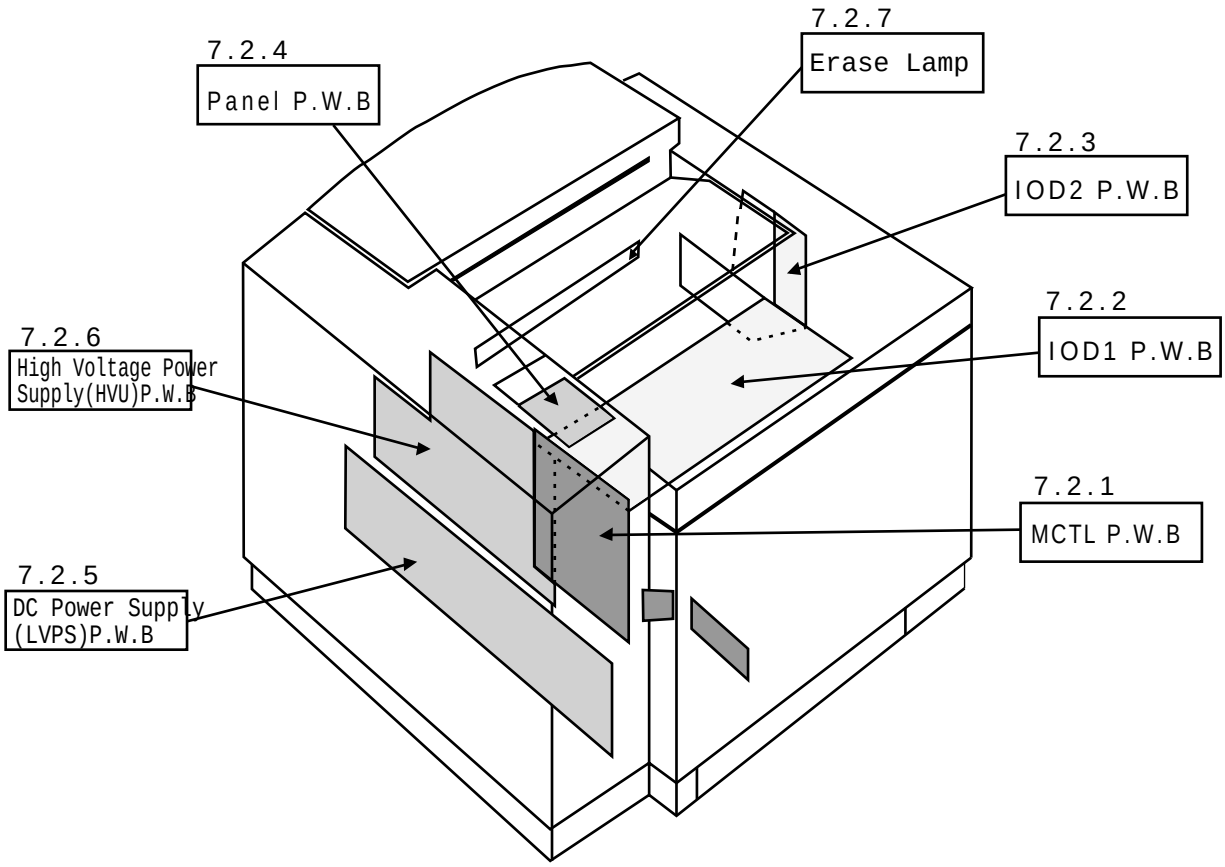


Fig.7-12

7.2.1 MCTL P.W.B.

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the side cover (L). (See the item 7.1.2)
②. Remove the top cover. (See the item 7.1.4)
③. Remove the set screw ST3×6 (3 pcs.) of shield cover 'A'.
④. Remove the shield cover 'A'.
⑤. Remove the set screw ST3×6 (3 pcs.) of shield (upper).
⑥. Remove the shield (upper).
⑦. Remove the set screw ST3×6 (1 pc.) of shield cover 'B'.
⑧. Disconnect all the harness connectors (5 pcs.) connected with the MCTL.
⑨. Remove the set screw ST3×6 (4 pcs.) of MCTL.
⑩. Remove the MCTL.

Assembly Procedures

①. Assemble a new MCTL P.W.B.
②. After above assembling, follow the reverse order of above disassembling for set-up.
③. Upon completion of above set-up, connect the power supply cable.
④. Turn on the power switch of the printer.
⑤. Execute the RAM clear in Service Mode.
⑥. Input content of RAM before replacement in Service Mode. (See the item 6.5.2.)
⑦. Confirm the operation and print quality by implementing the test print.
⑧. Input "Information before Replacement to RAM of MCTL P.W.B", as necessary.
Refer to item 6.4, 39 FACTORY MODE for the details of input method.

Precautions

①. Read the information of NVRAM to replacing the MCTL P.W.B.

②. When replacing the MCTL P.W.B, pay a good attention so that no damage is caused due to electrostatic.

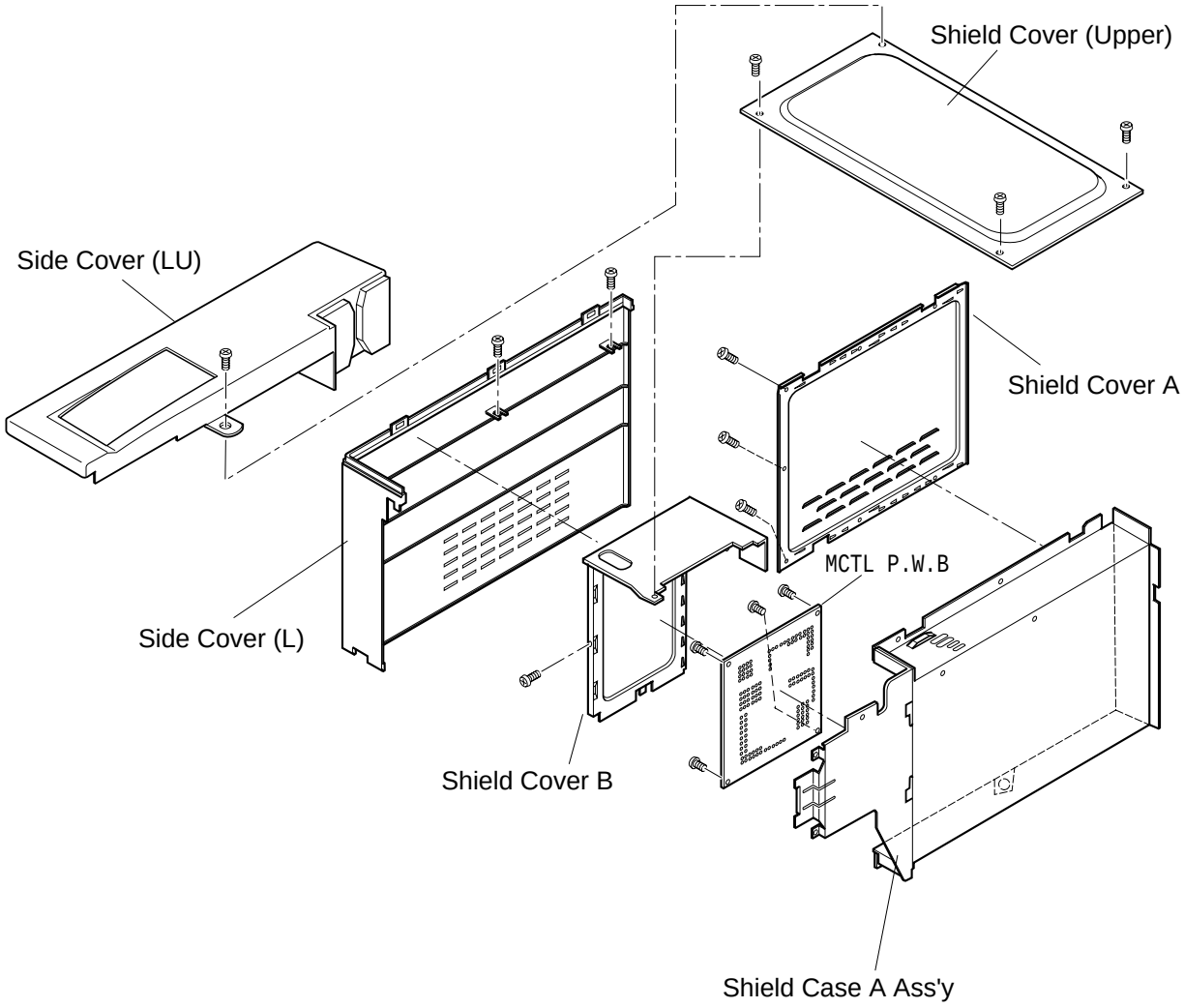

Shield Cover (Upper)
Side Cover (LU)
Shield Cover A
MCTL P.W.B
Side Cover (L)
Shield Cover B
Shield Case A Ass'y

Fig.7-13

7.2.2 IOD1 P.W.B.

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the side cover (LU).
(See the item 7.1.1.)
②. Remove the top cover.
(See the item 7.1.4.)
③. Remove the set screw ST3×6
(3 pcs.) of shield (upper).
④. Remove the shield (upper).
⑤. Disconnect all the harness
connectors (14 pcs.) connected
with the IOD1 P.W.B.
⑥. Remove the set screw ST3×6
(6 pcs.) of IOD1 P.W.B.
⑦. Remove the IOD1 P.W.B.

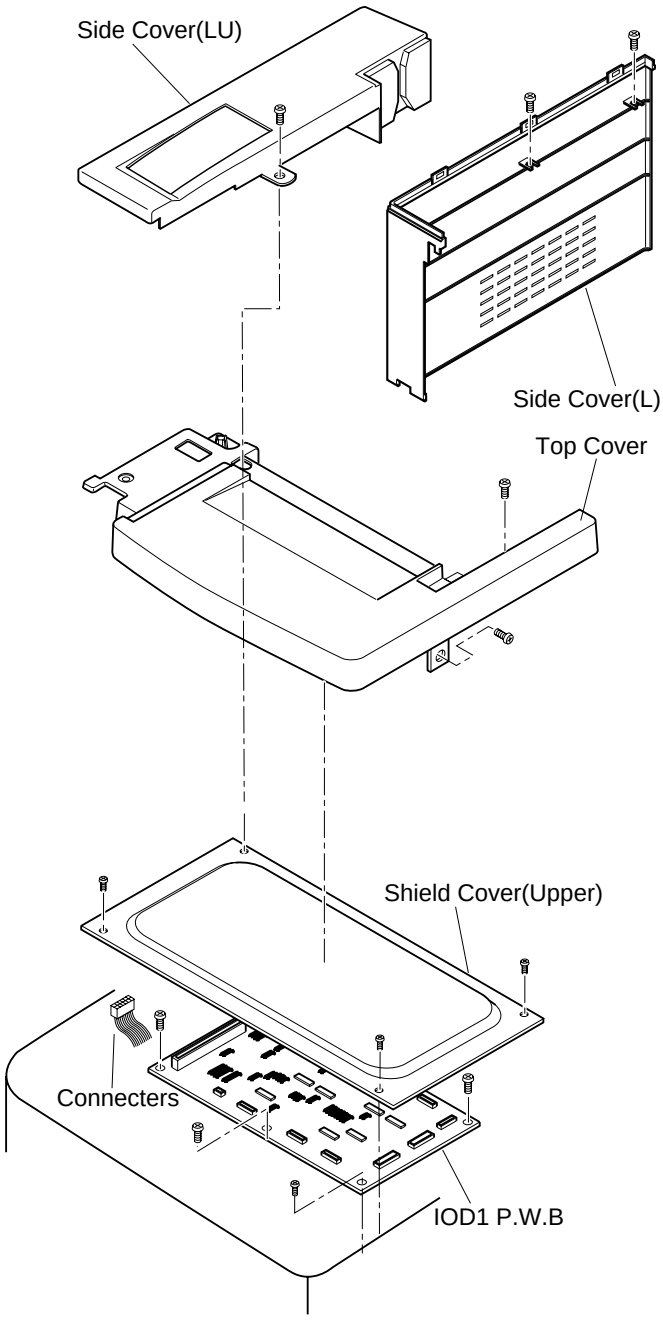


Fig.7-14

Assembly Procedures

①. Assemble a new IOD1 P.W.B.
②. After above assembling, follow
the reverse order of above
disassembling for set-up.
③. Upon completion of above set-up,
connect the power supply cable.
④. Turn on the power switch of the
printer.
⑤. Execute the test print in Service
Mode.
⑥. Confirm the operation and print
quality of printer.

Precautions

①. When replacing the IOD1 P.W.B, pay a good attention so that no damage is caused due to electrostatic.

7.2.3 IOD2 P.W.B. (with the base)

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the side cover (R). (See the item 7.1.3.)
②. Disconnect all the harness connectors (15 pcs.) connected with the IOD2 P.W.B.
③. Remove the C ring of registration clutch.
④. Remove the registration clutch from the shaft.
⑤. Remove the set screw ST3×6 (2 pcs.) of IOD2 P.W.B base.
⑥. Remove the IOD2 P.W.B (with the base) from the main body.

Assembly Procedures

①. Assemble a new IOD2 P.W.B.
Having the recess of P.W.B. base meet the stopper of paper feeding clutch, install IOD2 P.W.B. (See the Fig. 7-16)
②. After above assembling, follow the reverse order of above disassembling for set-up.
③. Upon completion of above set-up, connect the power supply cable.
④. Turn on the power switch of the printer.
⑤. Execute the test print in Service Mode.
⑥. Confirm the operation and print quality of printer.

Precautions

①. When replacing the IOD1 P.W.B, pay a good attention so that no damage is caused due to electrostatic.

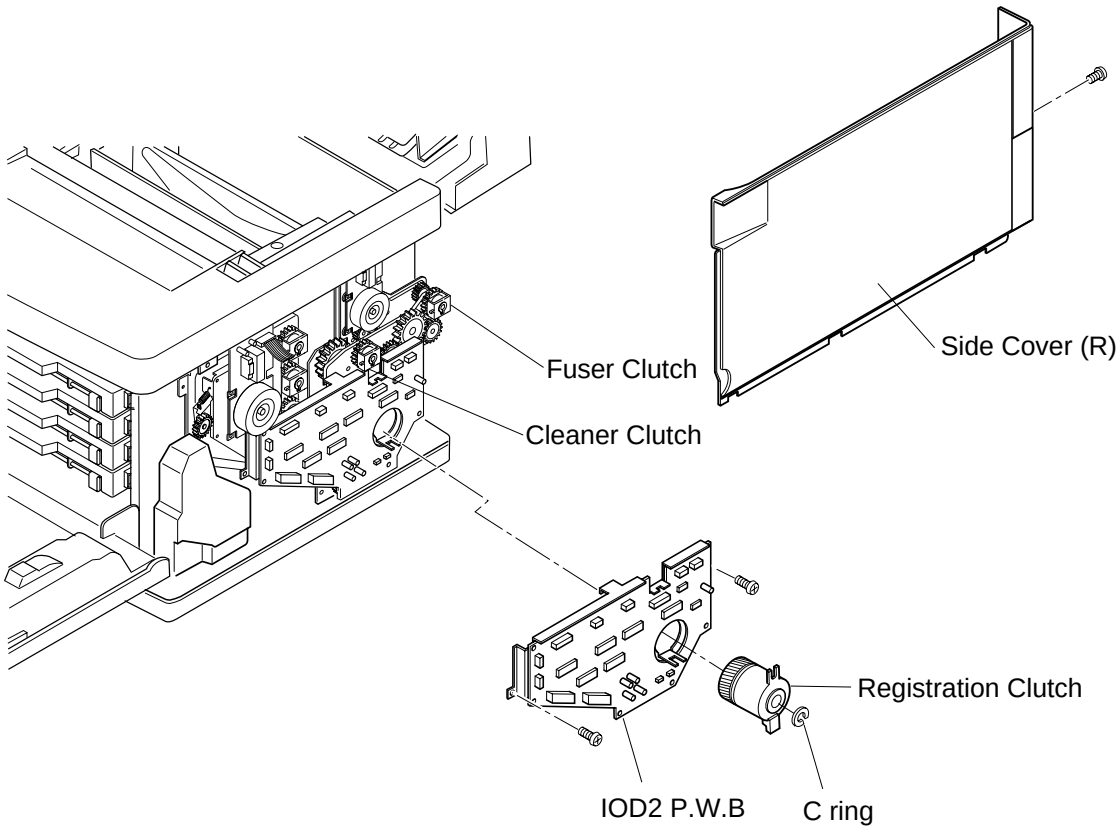


Fig.7-15

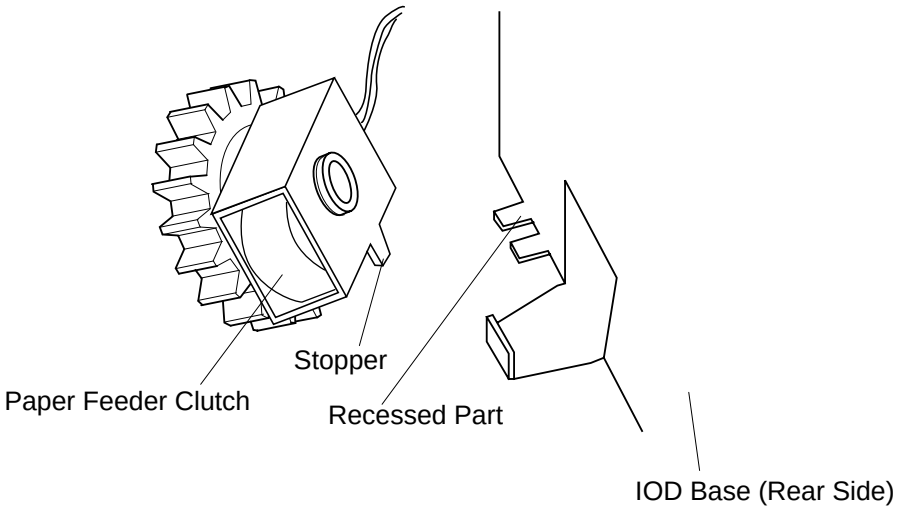


Fig.7-16

7.2.4 Panel P.W.B. (LCD inclusive)

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the side cover (LU).
(See the item 7.1.1.)
②. Remove the set screw [BT4 × 10 (1 pc.)] of the panel case assembly.
③. Disconnect the connector.
④. Remove the set screw [BT3 × 8 (4 pcs.)] of panel P.W.B and LCD from the panel case assembly; Upon removal of the panel P.W.B., the shield plate, panel button and panel shield can be removed as shown in Fig.7-17.

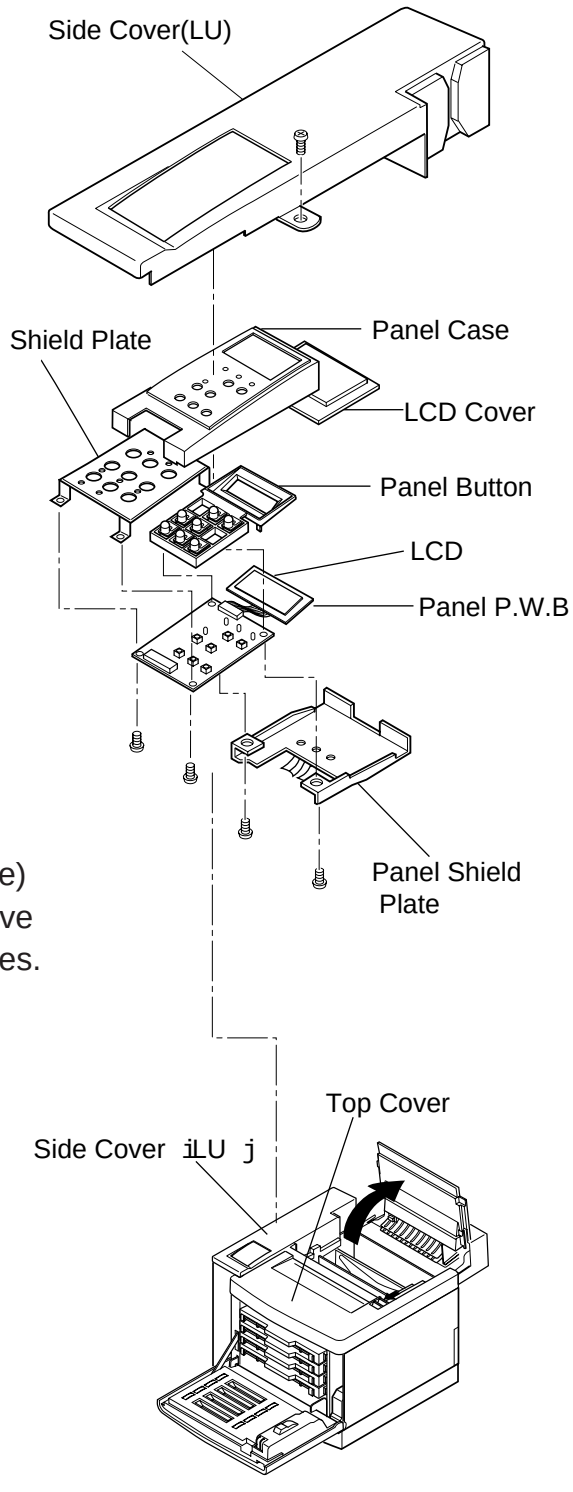


Fig.7-17

Assembly Procedures

①. Assemble a new panel P.W.B (LCD inclusive) to the panel case; Install each parts that have been removed in the disassembly procedures.
②. Install the panel case to the top cover and connect the connector.
③. Upon completion of above installation, connect the power supply cable.
④. Turn on the power switch of the printer.
⑤. Execute the test print in Service Mode.
⑥. Confirm the panel switch and indicator.

Precautions

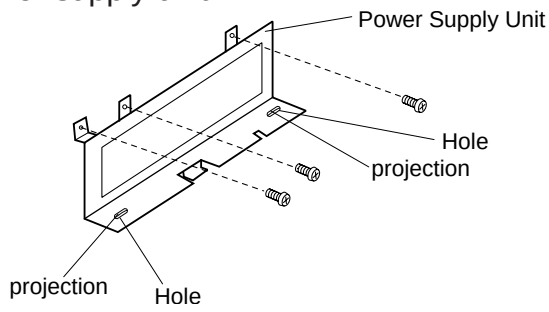
7.2.5 Power Supply Unit

Tools

①. Phillips Screwdriver
②. Slotted Screwdriver

Disassembly Procedures

①. Remove the side cover (LU). (See the item 7.1.1.)
②. Remove the side cover (L). (See the item 7.1.2.)
③. Remove the shield cover (upper). (See the item 7.2.1.)
④. Remove the shield cover A. (See the item 7.2.1.)
⑤. Remove the shield cover B. (See the item 7.2.1.)
⑥. Disconnect all the harness connectors (5 pcs.) connected to the MCTL P.W.B.
⑦. Remove the set screw ST3×6 (2 pcs.) of controll fan assembly. (See the item 7.3.4.)
⑧. Remove I/F P.W.B guide rail (upper).
⑨. Remove the set screw ST3×6 (5pcs.) of shield case 'A' assembly.
⑩. Remove the set screw BT4×10 (2 pcs.) of base cover (R).
⑪. Remove the base cover (R).
⑫. Remove the fan duct of power supply.
⑬. Disconnect all the harness connectors connected to the power supply unit.
⑭. Remove the set screw ST3×6 (2 pcs.) of power supply switch from the switch base.
⑮. Remove the metal fixture for switch.
⑯. Remove the set screw ST3× 6 (2 pcs.) of power supply switch from the switch base.
⑰. Remove the rear cover. (See the item 7.1.8.)
⑱. Remove the inlet from the frame.
⑲. Remove the set screw M4×6 (1 pc.) with spring washer of earthing harness.
⑳. Remove the set screw ST3× 6 (3 pcs.) of power supply unit.
㉑. Remove the power supply unit.



Assembly Procedures

①. Install a new power supply unit.
When installing, have a lower hole of the power supply unit meet a projection of the base (2 locations, left and right).
②. After installing the new power supply unit, follow exactly the reverse order of disassembly procedures.
③. Upon completion of the installation, reconfirm the earthing wires are provided to the frame.
④. Connect the power supply cable.
⑤. Turn the power supply switch ON.
⑥. Execute the test print in Service Mode to confirm the operation and print quality.

⚠ WARNING

Earthing wire is very important to secure the safety of users.
Upon removal of the power supply unit, confirm that the earthing wires (green and yellow color) is securely connected to the ⏚ part.

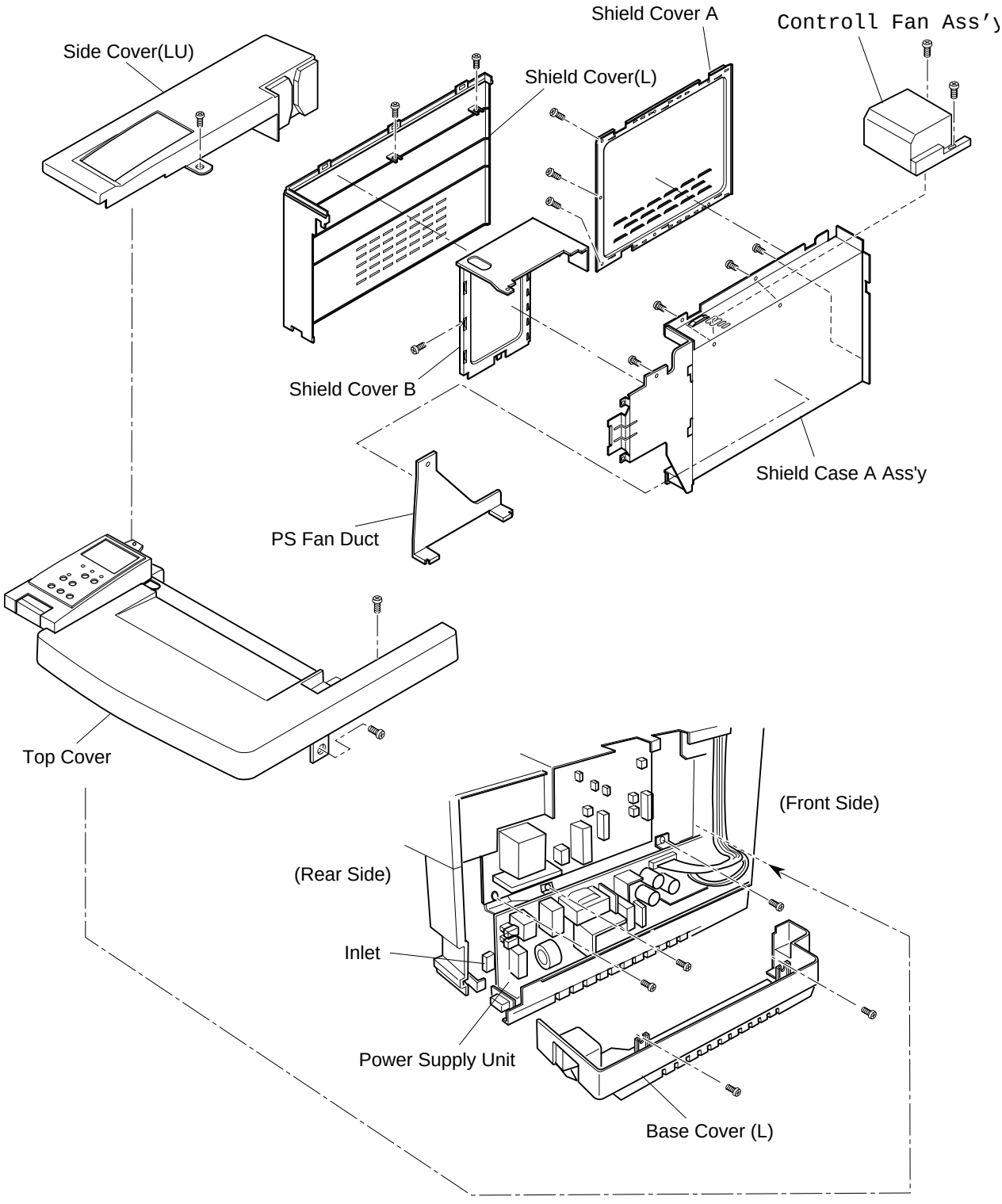


Fig.7-18

7.2.6 High Voltage Unit

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

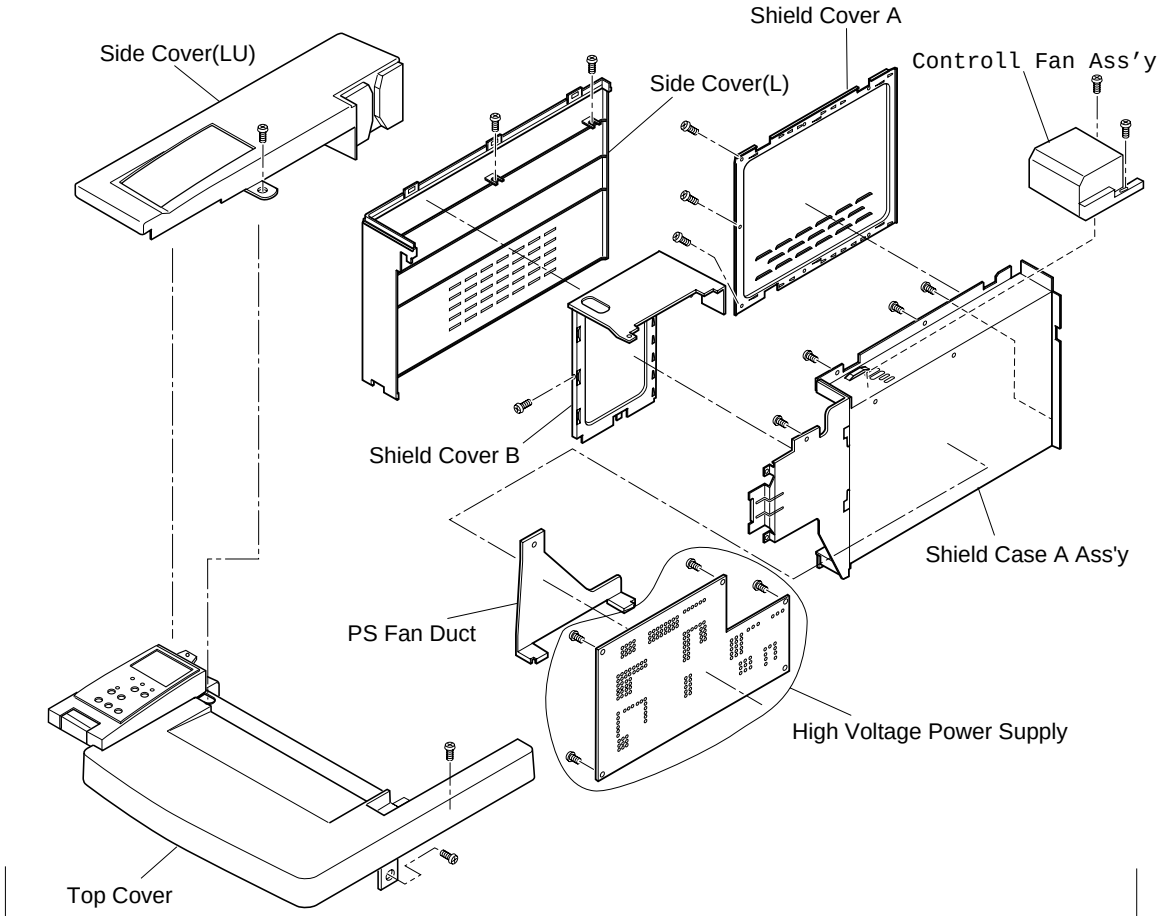
①. Remove the side cover (LU). (See the item 7.1.1.)
②. Remove the side cover (L). (See the item 7.1.2.)
③. Remove the shield cover (upper). (See the item 7.2.1.)
④. Remove the shield cover A. (See the item 7.2.1.)
⑤. Remove the shield cover B. (See the item 7.2.1.)
⑥. Disconnect all the harness connectors (5 pcs.) connected to the MCTL P.W.B.
⑦. Remove the set screw ST3×6 (2 pcs.) of fun assembly. (See the item 7.3.4.)
⑧. Remove I/F P.W.B guide rail (upper).
⑨. Remove the set screw ST3×6 (5pcs.) of shield case 'A' assembly.
⑩. Remove the set screw ST4×10 (2 pcs.) of base cover (R).
⑪. Remove the base cover (R).
⑫. Remove the fan duct of power supply.
⑬. Disconnect all the harness connectors (5 pcs.) connected to the high voltage unit.
⑭. Remove the set screw ST3×6 (1 pc.) and BT3×8 (6 pcs.) of high voltage unit.
⑮. Remove the high voltage unit.

Assembly Procedures

①. Install a new hight voltage unit. When installing, have a lower hole of the hight voltage P.W.B meet a projection (凸) of the base.
(i). When installing, put each electrode terminal through the holes of P.W.B. from the back.
(ii). Having the set holes for the electrode meet the installation hole of PWB, fix the both by screwing.
②. After the above , follow exactly the reverse order of disassembling procedures.
③. Upon completion of the installation, connect the power supply cable.
④. Turn the power supply switch ON.
⑤. Execute the test print in Service Mode.
⑥. Confirm the operation and print quality.

⚠ WARNING

High Voltage Unit generates high voltage (5KV). You may get electric shock if you touch the unit while it is powered on.
Therefore, turn on the unit only after having installed the side cover (L).



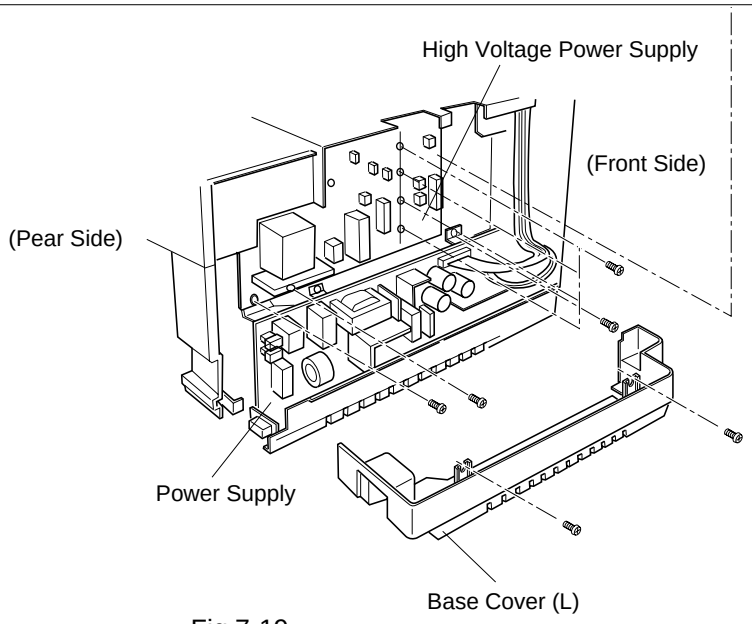


Fig.7-19

7.2.7 Erase Lamp

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the drum cleaner assembly.
(See the item 7.6.3.)
②. Disconnect the harness connectors
connected to the erase lamp.
③. Remove the erase lamp from the holder.

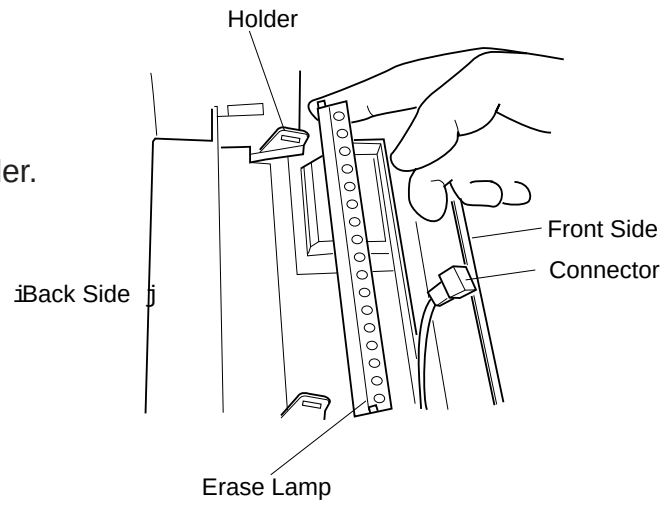


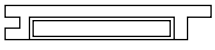
Fig.7-20

Assembly Procedures

①. Install a new erase lamp.
②. Install the erase lamp to the base frame.
③. After the above , follow exactly the
reverse order of disassembling
procedures.
④. Upon completion of the installation,
connect the power supply cable.
⑤. Turn the power supply switch ON.
⑥. Execute the test print in Service Mode.
⑦. Confirm the operation and print quality.

Precautions

①. Erase lamp has the directional characteristics; If installed to the wrong direction, the transfer drum may be damaged.

(Left Side)  (Right Side)

(as viewed from the front side)

7.3 Replacement of Motor Unit

[Layout of Motors]

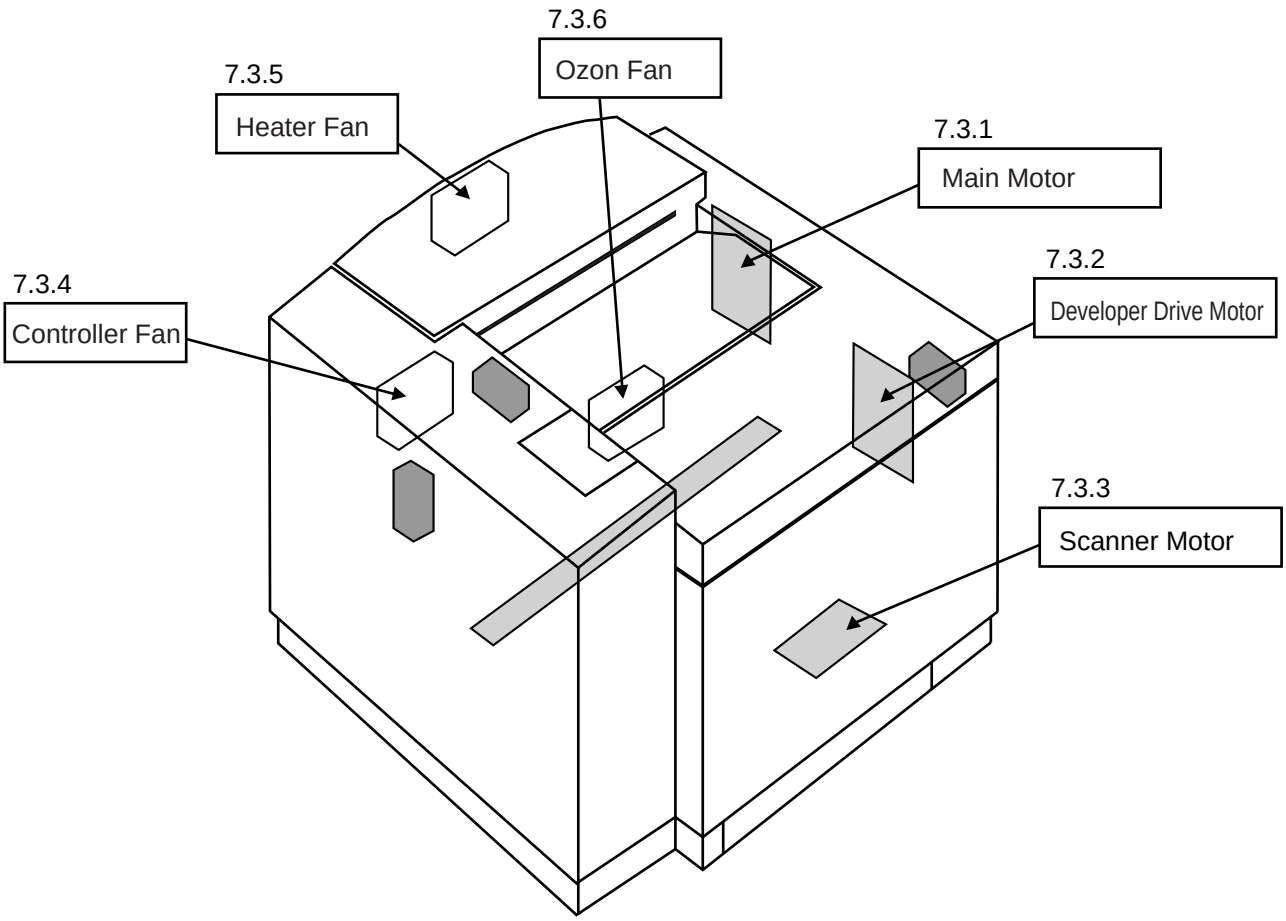


Fig.7-21

7.3.1 Main Motor (MM) / Main Gear Unit

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the belt cartridge.
②. Remove the side cover (R). (See the item 7.1.3.)
③. Remove the base cover (R). (See the item 7.1.9.)
④. Remove the IOD2 P.W.B base. (See the item 7.2.3.)
⑤. Disconnect all the harness connector connected with the main motor by removing the set screws [ST3 × 6 (3 pcs.)]; After this disconnection, the main motor assembly can be removed.
⑥. Remove the set screws [BT4 × 8 (3 pcs.)] of TR side cover to be removed.
⑦. Remove the the set screws [ST3 × 6 (3 pcs.)] of stay (R) to be removed.
⑧. Loosen the set screw [ST3 × 6 (1 pc.)] of fan case (ozone fan).
⑨. Remove the ozone fan duct.
⑩. Remove the paper feeder clutch. (See the item 7.4.1.)
⑪. Remove the set screws [ST3 × 6 (4 pcs.)] of main gear unit.
⑫. Pull out the main gear unit from the frame.
⑬. Remove the set screws [ST3 × 6 (4 pcs.)] of main motor from main gear unit.
⑭. Remove the main motor from the main gear unit.

Assembly Procedures

①. Install a new main motor to the main gear unit.
②. Install the main gear unit to the main body.
③. After the above , follow exactly the reverse

Precautions

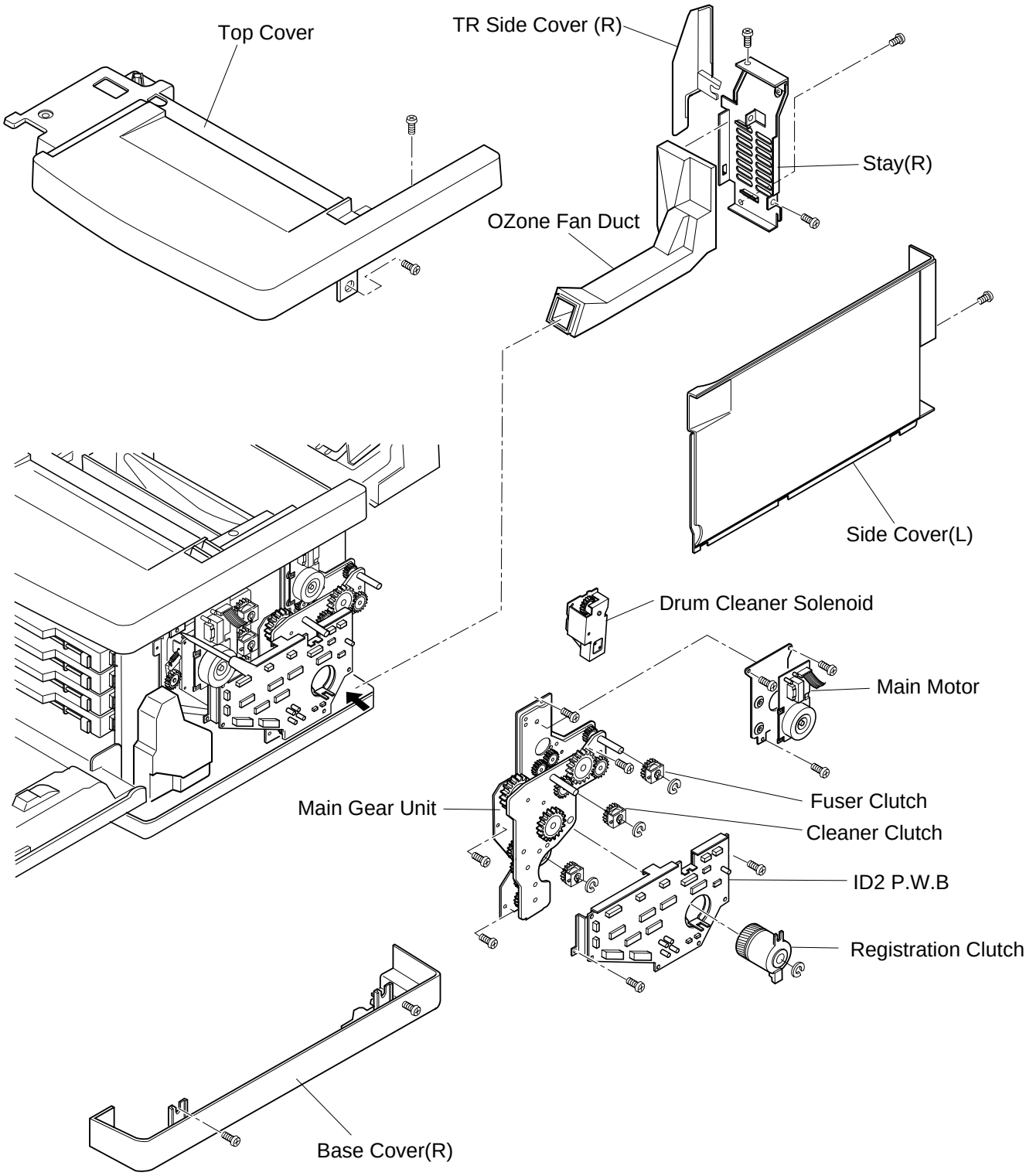

Top Cover
TR Side Cover (R)
Stay(R)
OZone Fan Duct
Side Cover(L)
Drum Cleaner Solenoid
Main Motor
Fuser Clutch
Main Gear Unit
Cleaner Clutch
ID2 P.W.B
Registration Clutch
Base Cover(R)

Fig.7-22

7.3.2 Developer Drive Motor (DM) / Developer Drive Unit

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the toner cartridge.
②. Remove the side cover (R).
(See the item 7.1.3.)
③. Remove the top cover.
(See the item 7.1.4.)
④. Remove the IOD2 P.W.B.
(See the item 7.2.3.)

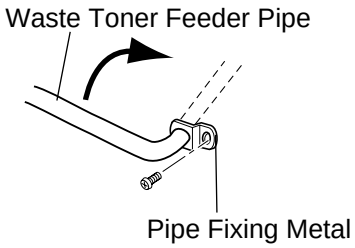


Fig.7-23-b

⑤. Remove the harness guide.
⑥. Remove the set screws [ST3 × 6 (1 pc.)] of waste toner feeder pipe, and slowly turn the waste toner feeder pipe by approximately 90 degrees.
⑦. Disconnect the connector connected with developer drive motor.
⑧. Remove the set screws [ST3 × 6 (4 pcs.)] of developer gear unit.
⑨. Remove the developer drive motor.
⑩. Remove the set screws [ST3 × 6 (4 pcs.)] of developer drive motor from the developer drive unit.
⑪. Remove the developer drive motor.
⑫. Remove the developer clutch. (See the item 7.4.5.)

Assembly Procedures

①. Install a new developer drive motor to the developer drive unit.
②. Install the developer drive unit to the main body.
③. After the above , follow exactly the reverse order of disassembling procedures.

Precautions

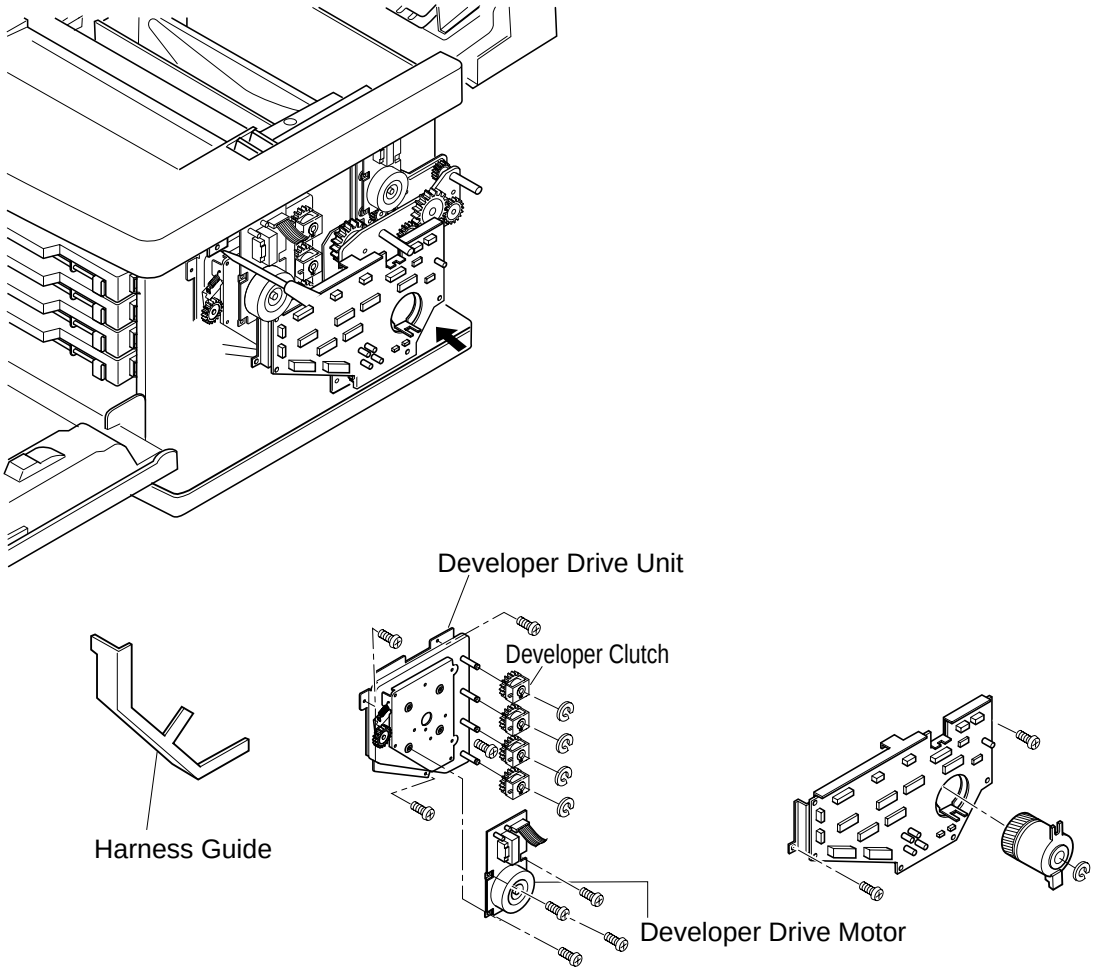

Developer Drive Unit
Developer Clutch
Harness Guide
Developer Drive Motor

Fig.7-23-a

7.3.3 Optical Unit (Scanner Motor inclusive)

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the toner cartridge.
②. Remove the belt cartridge.
③. Remove the cover 'C'.
Cover 'C' is fixed by the plastic projection and hole at three locations each in the front side and rear side.
i). Release the fixing of three locations (three holes at the rear side).
ii). Pulling the cover C toward you, release the fixing of front side lock.
④. Remove the cover C from the printer.
Unhook the harness tube from the hook.
⑤. Remove the set screws [BT3 × 8 (4 pcs.)] of optical unit.
⑥. Disconnect all the harness connector connected with the optical unit.
⑦. Remove the optical unit from the printer.

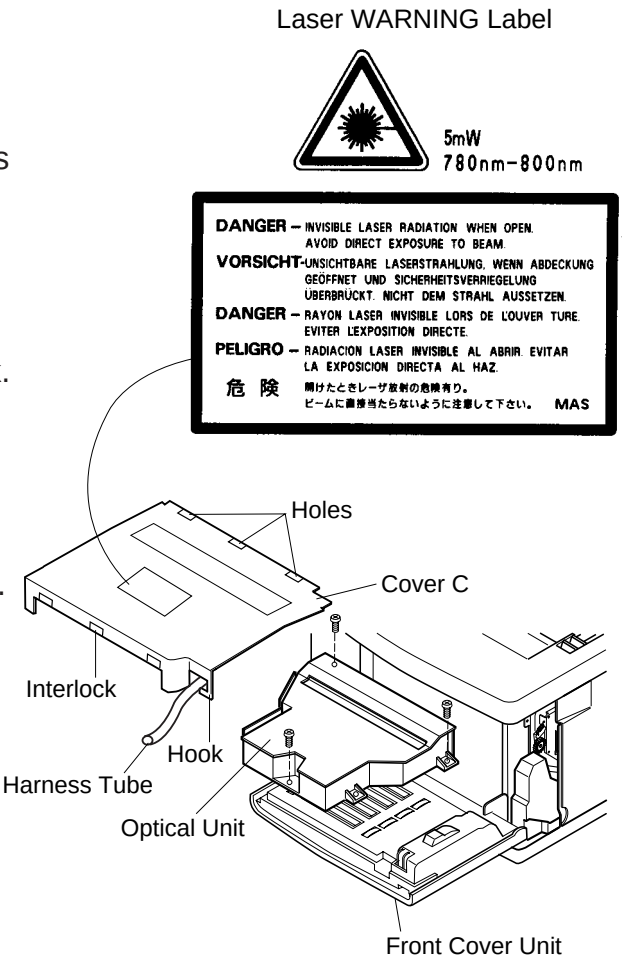


Fig.7-24

Assembly Procedures

①. Having a new optical unit align the locating boss, install the optical unit to the printer base.
②. After the above , follow exactly the reverse order of disassembling procedures.

Precautions

⚠ WARNING

① . There is a class Ⅲb laser within the optical unit. Do not attempt to disassemble the laser.

② . Optical unit is replaced as a whole unit. No adjustment is required to the replaced optical unit.

③ . Confirm all the covers have been installed prior to any test run or operation in order to prevent any laser radiation from occurring.

7.3.4 Control Fan (CTFAN)

Tools

①. Phillips Screwdriver #1, #2

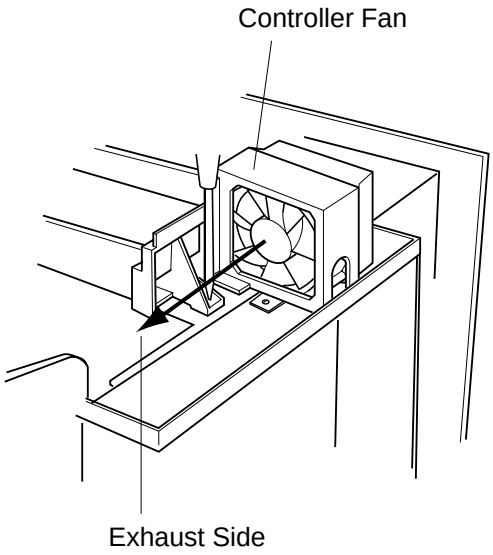


Fig.7-25-a

Disassembly Procedures

①. Remove the side cover (LU).
(See the item 7.1.1.)
②. Remove the side cover (L).
(See the item 7.1.2.)
③. Remove the top cover.
(See the item 7.1.4.)
④. Remove the set screw ST3×6 (3 pcs.), and shield cover (upper).
⑤. Disconnect all the fan motor harness connectors.
⑥. Remove the set screws [ST3 × 6 (1 pc.) and F3 × 6 (1 pc.)] of fan case assembly.
⑦. Remove the fan motor from the fan case assembly.

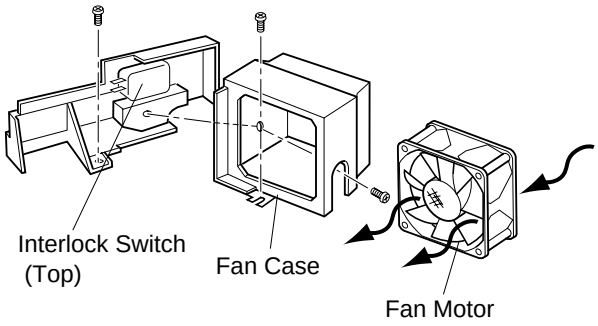


Fig.7-25-b

Assembly Procedures

①. Install a new fan motor to the fan case.
②. Install the fan duct assembly to the main body.
③. After the above , follow exactly the reverse order of disassembling procedures.
④. Upon completion of the installation, connect the power supply cable.
⑤. Turn the power supply switch ON.
⑥. Execute the test print in Service Mode.
⑦. Confirm the operation and print quality.

Precautions

①. When installing the fan motor, make sure that rating label of fan motor faces the exhaust side.

7.3.5 Fuser Fan (FUFAN)

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the side cover (LU).
(See the item 7.1.1.)
②. Remove the side cover (L).
(See the item 7.1.2.)
③. Remove the shield case A assembly.
(See the item 7.2.5.)
④. Remove the paper exit unit.
(See the item 7.1.5.)
⑤. Remove the paper exit harness cover.
⑥. Disconnect the harness connector of fuser fan.
⑦. Remove the fan case assembly from the paper exit guide assembly.
⑧. Remove the fan motor from the fan case assembly.
i). Opening the paper exit cover, remove the fuser fan case assembly.
ii). Remove the fuser fan from the fuser fan case assembly.

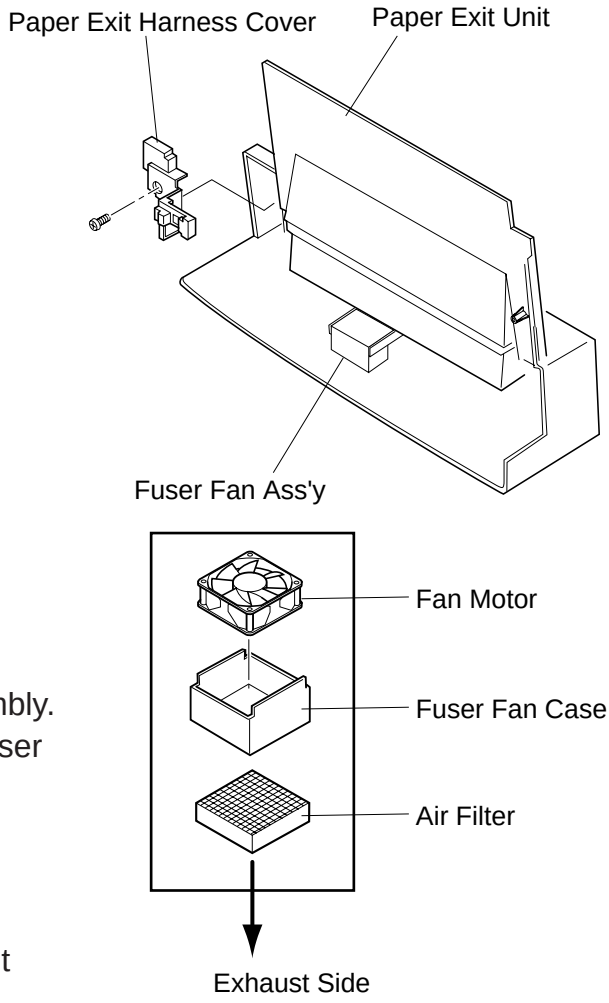


Fig.7-26

Assembly Procedures

①. Install a new fan motor to the paper exit guide assembly.
②. Install the paper exit cover to the paper exit guide assembly.
③. Install the paper exit unit.
④. After the above , follow exactly the reverse order of disassembling procedures.

Precautions

①. When installing the fan motor, make sure that rating label of fan motor faces the exhaust side.

7.3.6 Ozone Fan (OZFAN)

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the toner cartridge.
②. Remove the side cover (R).
(See the item 7.1.3.)
③. Remove the IOD2 P.W.B.
(See the item 7.2.3.)
④. Remove the set screws [ST3 × 6 (2 pcs.)] of developer gear unit.
(See the item 7.3.2.)
⑤. Remove the developer gear unit.
(See the item 7.3.2.)
⑥. Remove the set screws [ST3 × 6 (1 pc.)] of fan case.
⑦. Remove the ozone fan case assembly.
⑧. Remove the fan motor from the ozone fan case.

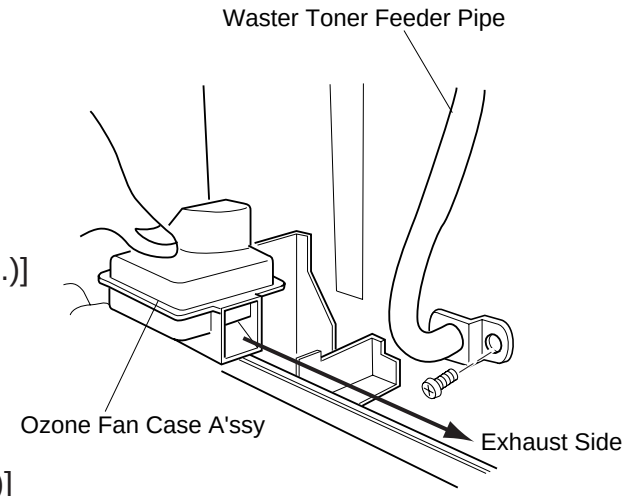


Fig.7-27-a

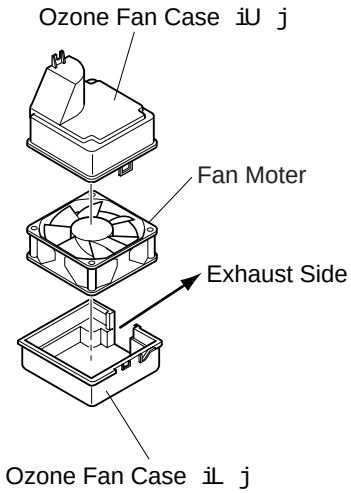


Fig.7-27-b

Assembly Procedures

①. Install a new fan motor to the ozone fan case.
②. After the above , follow exactly the reverse order of disassembling procedures.

Precautions

①. When installing the fan motor, make sure that rating label of fan motor faces the exhaust side.

7.4 Replacement of Clutch and Solenoid

[Layout of Clutch and Solenoid]

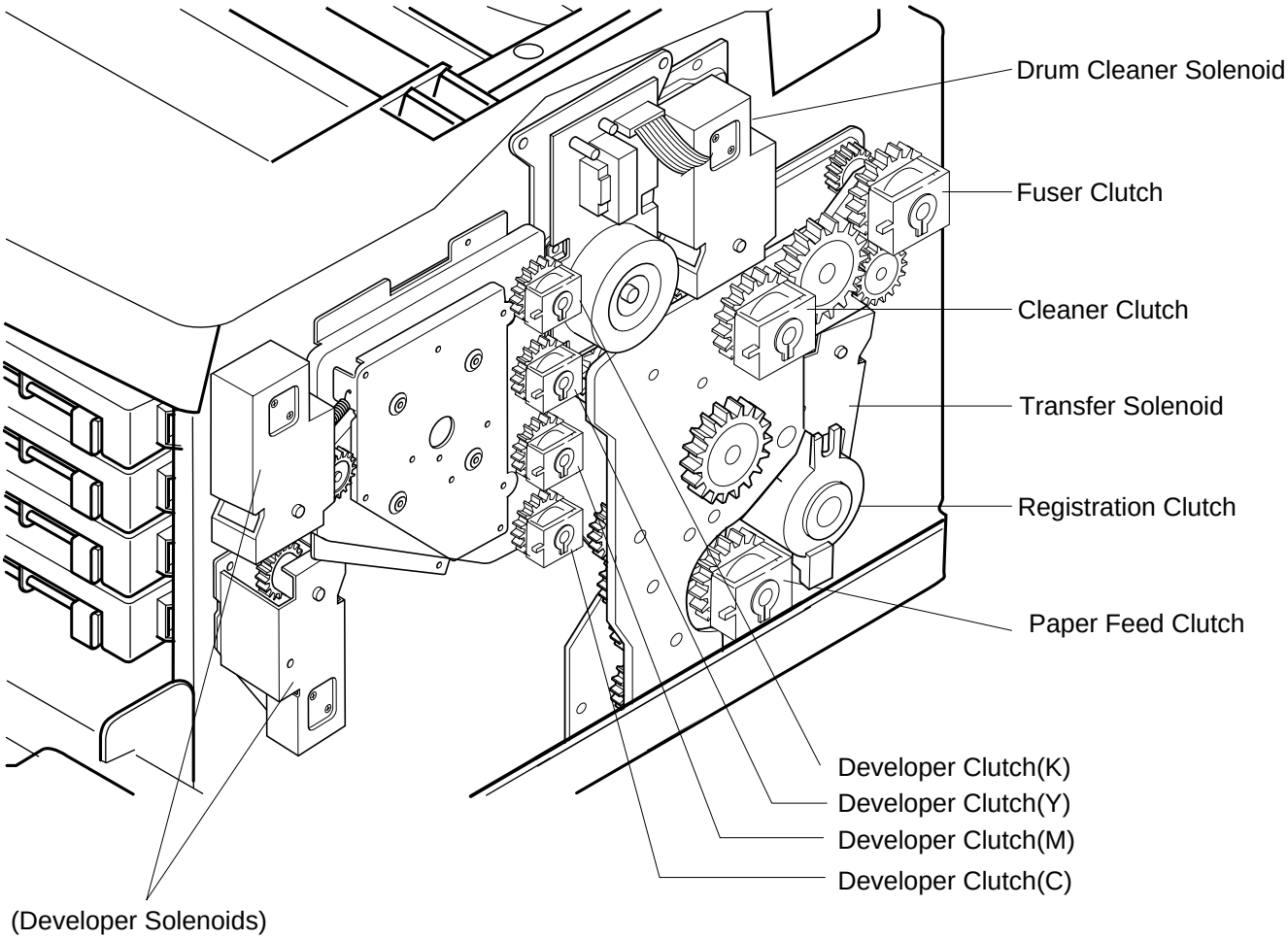


Fig.7-28

7.4.1 Paper Feeding Clutch (PCLU)

Tools

①. Phillips Screwdriver #1, #2
②. Slotted Screwdriver #1

Disassembly Procedures

①. Remove the side cover (R). (See the item 7.1.3)
②. Remove the IOD2 P.W.B base. (See the item 7.2.3)
③. Remove the C ring fixing the paper feeding clutch.
④. Remove the paper feeding clutch from the shaft.

Assembly Procedures

①. Install a new paper feeding clutch to the shaft.
Having the recess of P.W.B. base meet the stopper of paper feeding clutch, install IOD2 P.W.B.
②. Install the C ring to the shaft's groove, and fix the paper feeding clutch.
③. After the above , follow exactly the reverse order of disassembling procedures.

Precautions

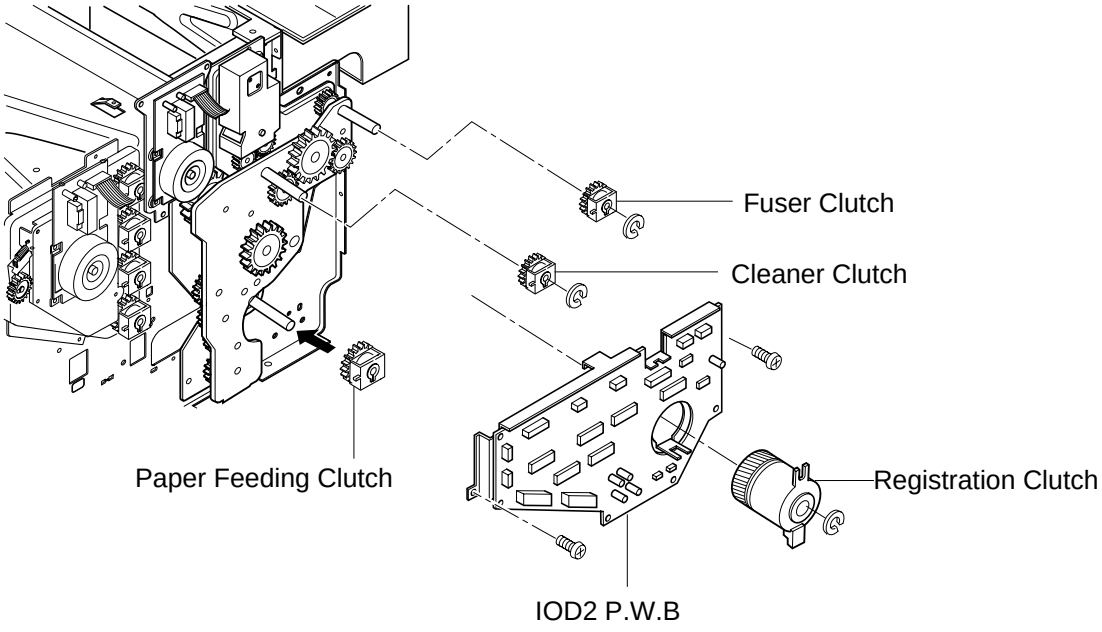


Fig.7-29

7.4.2 Registration Clutch (RECL)

Tools

①. Phillips Screwdriver #1, #2
②. Slotted Screwdriver #1

Disassembly Procedures

①. Remove the side cover (R). (See the item 7.1.3.)
②. Remove all the connector of registration clutch connected with IOD2 P.W.B.
③. Remove the C ring from the shaft.
④. Pull out the registration clutch from the shaft.

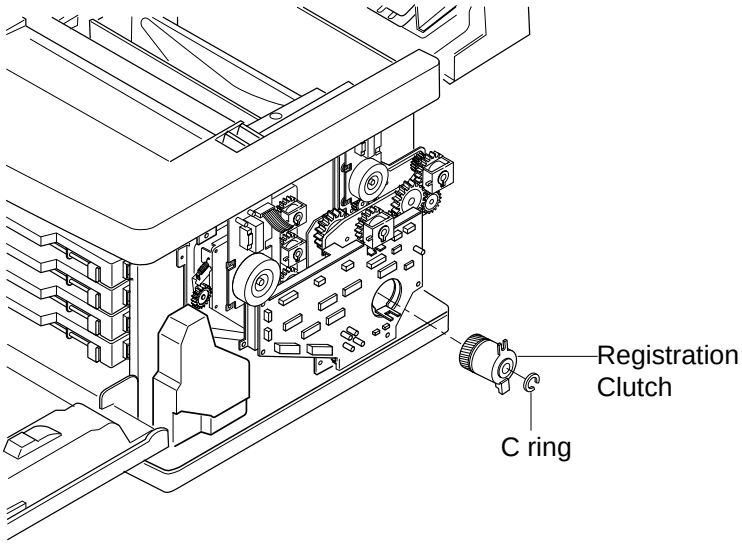


Fig.7-30

Assembly Procedures

①. Install a new registration clutch to the shaft.
②. Install the C ring to the shaft's groove, and fix the registration clutch.
③. Connect the connector with the IOD2 P.W.B.
④. After the above , follow exactly the reverse order of disassembling procedures.

Precautions

7.4.3 Fuser Clutch (FUCL)

Tools

①. Phillips Screwdriver #1, #2
②. Slotted Screwdriver #1

Disassembly Procedures

①. Remove the side cover (R). (See the item 7.1.3.)
②. Remove the connector connected with IOD2 P.W.B.
③. Remove the C ring from the shaft.
④. Pull out the fuser clutch from the shaft.

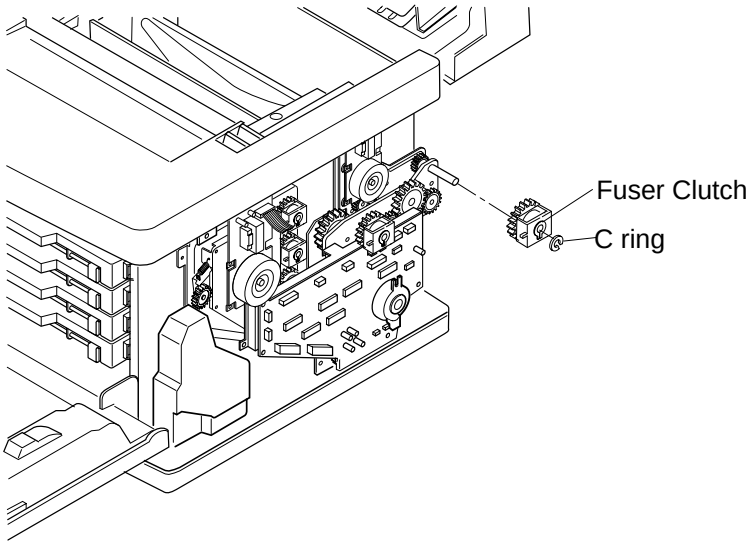


Fig.7-31

Assembly Procedures

①. Install a new fuser clutch to the shaft.
②. Install the C ring to the shaft's groove, and fix the fuser clutch.
③. Connect the connector with the IOD2 P.W.B.
④. After the above , follow exactly the reverse order of disassembling procedures.

Precautions

7.4.4 Cleaner Clutch (FBCL)

Tools

①. Phillips Screwdriver #1, #2
②. Slotted Screwdriver #1

Disassembly Procedures

①. Remove the side cover (R). (See the item 7.1.3 .)
②. Remove the connector of cleaner clutch from IOD2 P.W.B.
③. Remove the C ring from the shaft.
④. Pull out the cleaner clutch from the shaft.

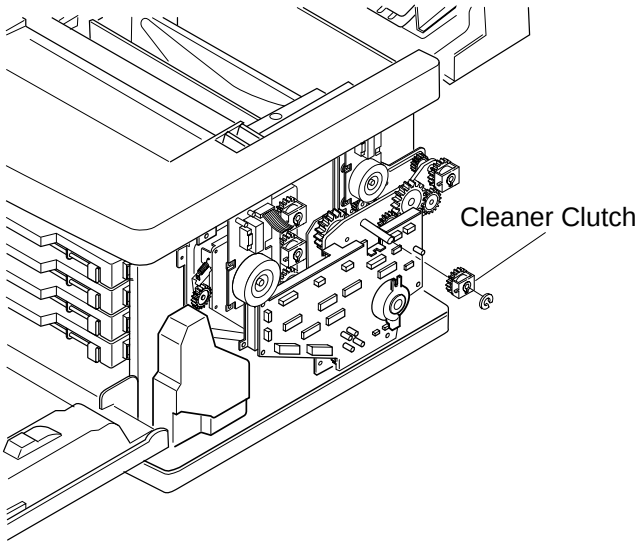


Fig.7-32

Assembly Procedures

①. Install a new cleaner clutch to the shaft.
②. Install the C ring to the shaft's groove, and fix the cleaner clutch.
③. After the above, follow exactly the reverse order of disassembling procedures.

Precautions

7.4.5 Developer Clutch (K, Y, M, C)

Tools

①. Phillips Screwdriver #1, #2
②. Slotted Screwdriver #1

Disassembly Procedures

①. Remove the side cover (R). (See the item 7.1.3.)
②. Remove IOD2 P.W.B. base. (See the item 7.2.3.)
③. Remove the C ring of subject developer clutch from the shaft.
④. Pull out the subject developer clutch from the shaft.

Assembly Procedures

①. Install a new developer clutch to the shaft.
②. Install the C ring to the shaft's groove, and fix the developer clutch.
③. After the above , follow exactly the reverse order of disassembling procedures.
④. Upon completion of the installation, connect the power supply cable.

Precautions

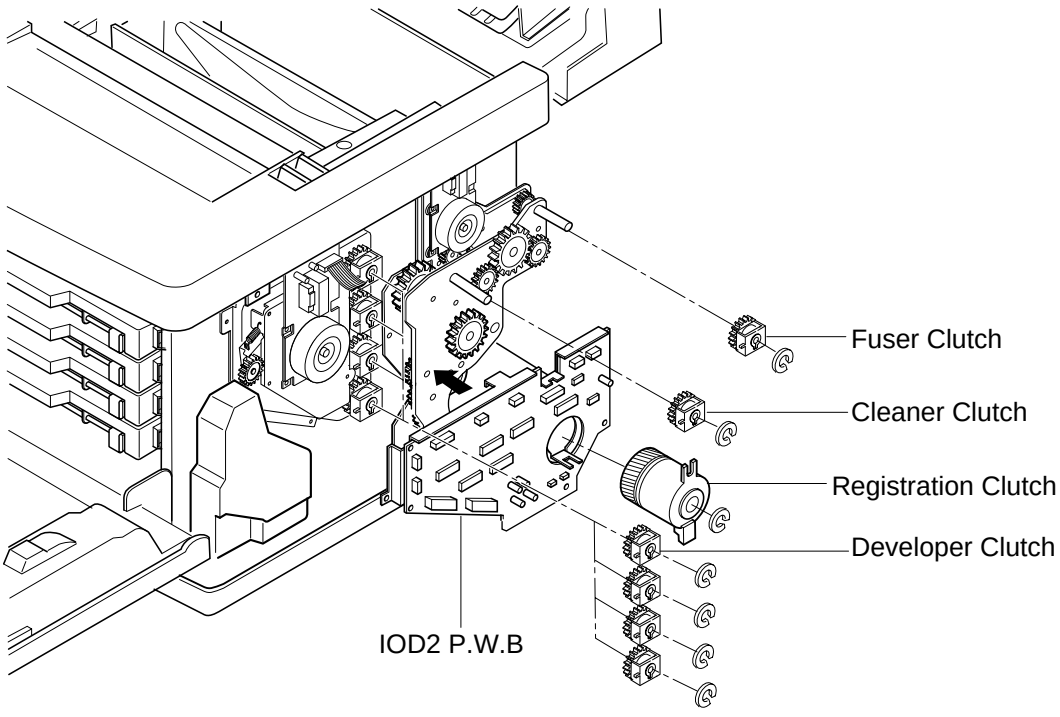


Fig.7-33

7.4.6 Transfer Solenoid (TRSOL)

Tools

①. Phillips Screwdriver #1, #2
②. Slotted Screwdriver #1

Disassembly Procedures

①. Remove the side cover (R). (See the item 7.1.3.)
②. Remove the IOD2 P.W.B. (See the item 7.2.3.)
③. Remove the main gear unit. (See the item 7.3.1.)
④. Remove the set screw ST3×6 (2 pcs.) of tension solenoid.
⑤. Remove the tension solenoid.

Assembly Procedures

①. Install a new tension solenoid.
②. After the above , follow exactly the reverse order of disassembling procedures.

Precautions

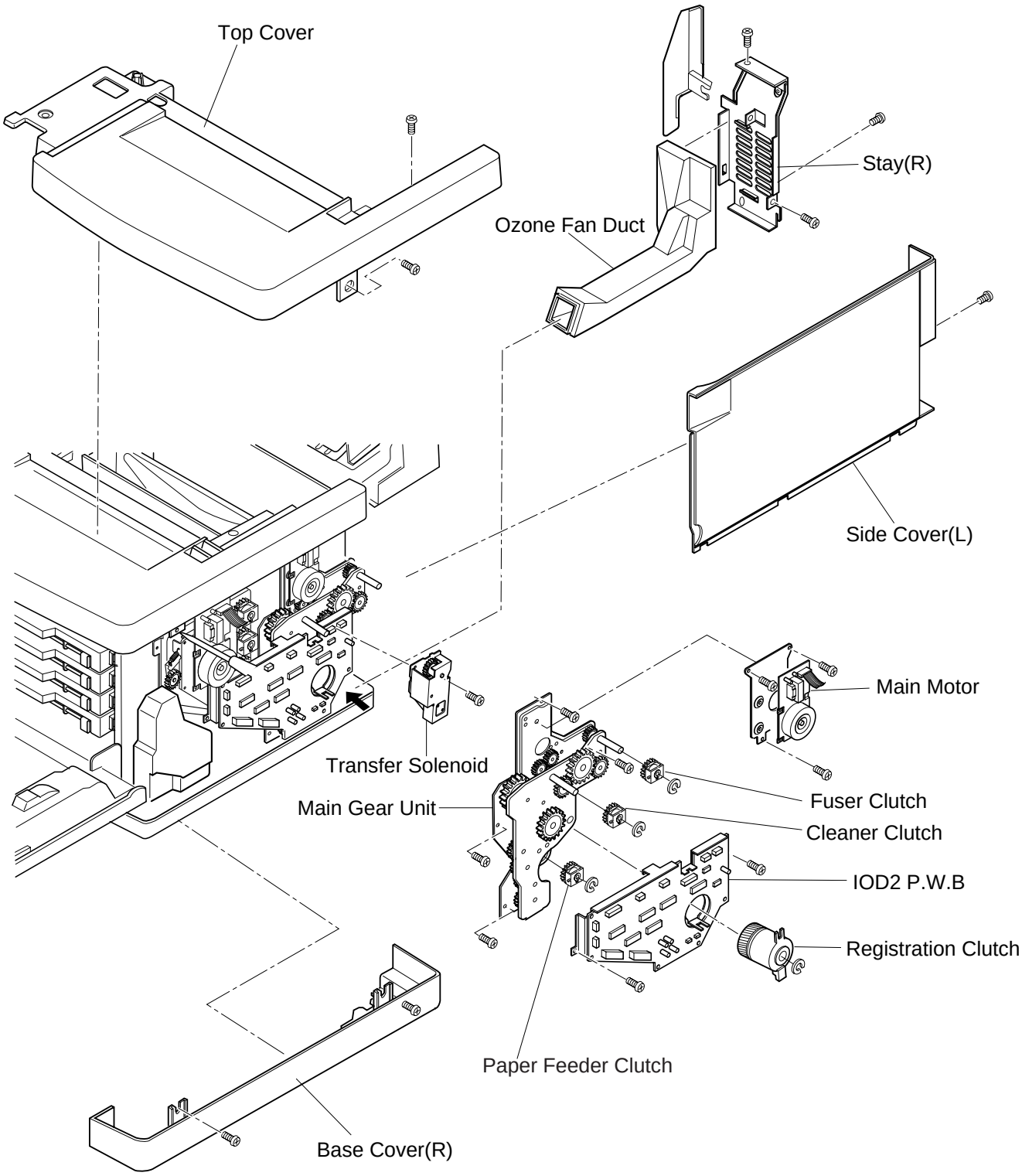

Top Cover
Stay(R)
Ozone Fan Duct
Side Cover(L)
Main Motor
Transfer Solenoid
Fuser Clutch
Main Gear Unit
Cleaner Clutch
IOD2 P.W.B
Registration Clutch
Paper Feeder Clutch
Base Cover(R)

Fig.7-34

7.4.7 Drum Cleaner Solenoid (FBSOL)

Tools

①. Phillips Screwdriver #1, #2
②. Slotted Screwdriver #1

Disassembly Procedures

①. Remove the side cover (R). (See the item 7.1.3.)
②. Remove IOD2 P.W.B base. (See the item 7.2.3.)
③. Remove the main motor / gear unit. (See the item 7.3.1.)
④. Remove the set screw ST3×6 (2 pcs.) of drum cleaner solenoid.
⑤. Remove the drum cleaner solenoid.

Assembly Procedures

①. Install a new drum cleaner solenoid.
②. After the above , follow exactly the reverse order of disassembling procedures.
③. Upon completion of the installation, connect the power supply cable.
④. Turn the power supply switch ON.
⑤. Execute the test print in Service Mode.
⑥. Confirm the operation and print quality.

Precautions

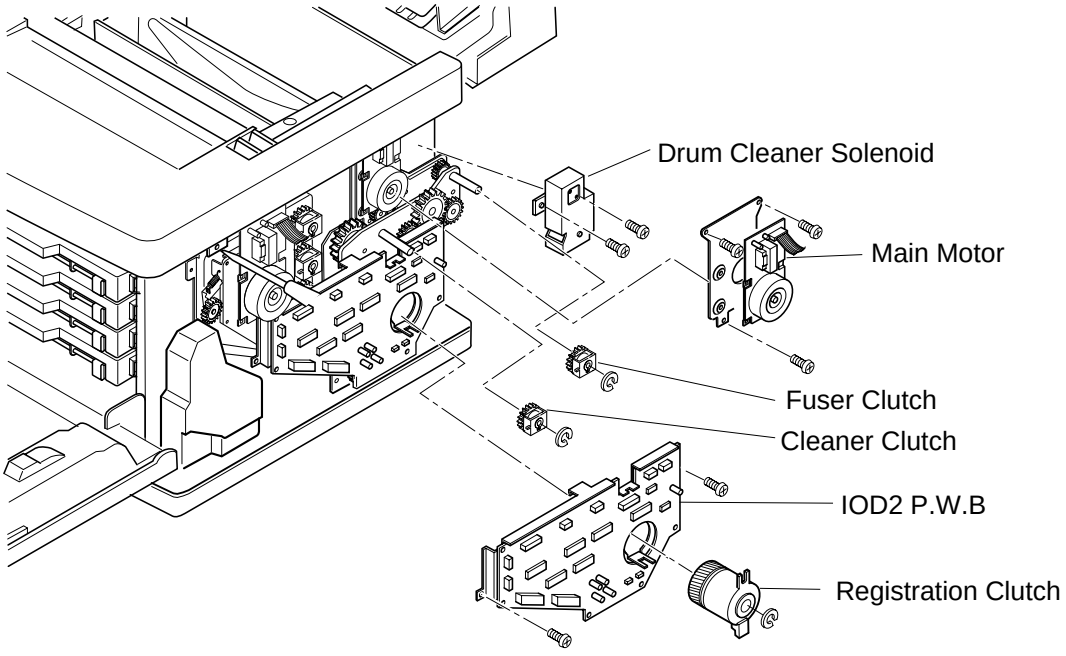


Fig.7-35

7.5 Replacement of Sensor

[Layout of Sensors]

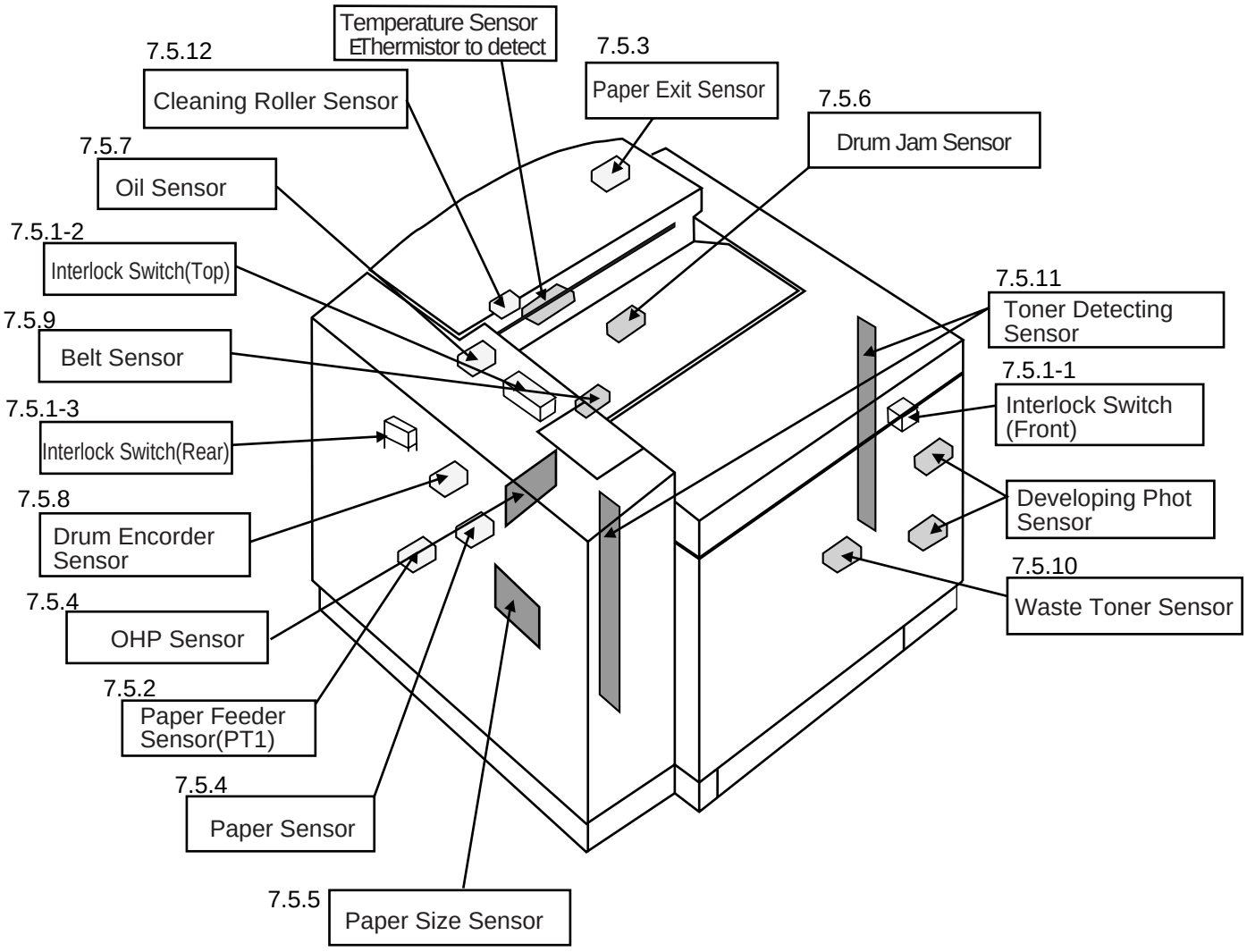


Fig.7-36

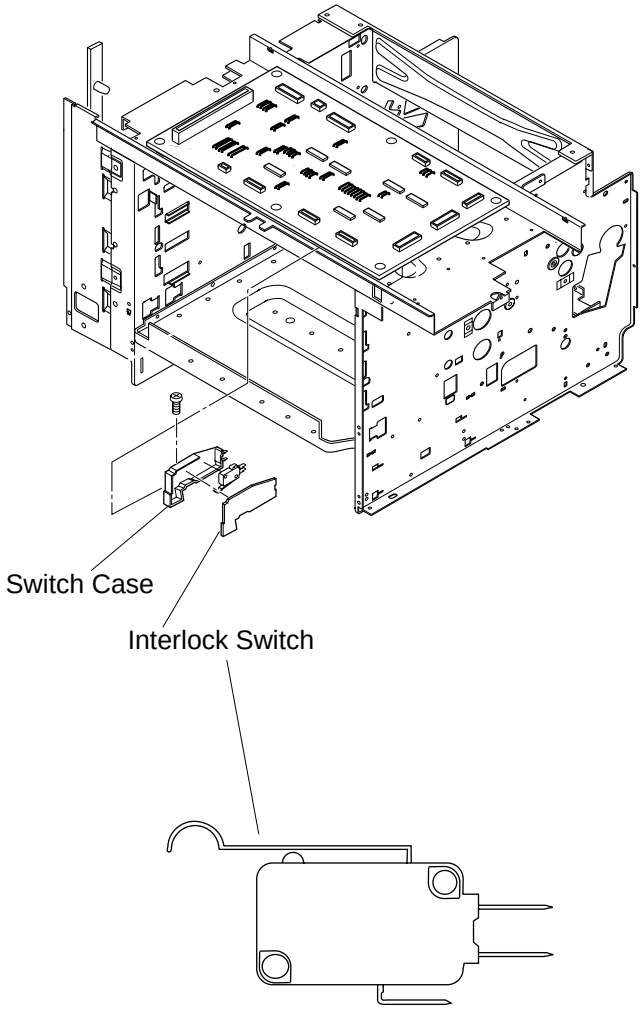
7.5.1-1 Interlock Switch (DSW1) (for Front Cover)

Tools

①. Phillips Screwdriver #1

Disassembly Procedures

①. Remove the top cover. (See the item 7.1.4.)
②. Remove the shield cover (upper).
③. Remove the switch from the stay U.
④. Remove the connector.
⑤. Remove the switch from the switch case.



Assembly Procedures

①. Install a new switch to the switch base.
②. Connect the connector.
③. Install the switch case to the stay U.

Fig.7-37

Precautions

⚠ Caution

Since the interlock switch is an important part for the safety, confirm after installation that the switch operates normally.

7.5.1-2 Interlock Switch (DSW2) (for Paper Exit Unit)

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the side cover (LU). (See the item 7.1.1.)
②. Remove the top cover. (See the item 7.1.4.)
③. Remove the control fan assembly. (See the item 7.3.4.)
④. Remove the set screw BT3×8 (1 pc.), and switch base from the control fan assembly.
⑤. Remove the connector of paper exit unit.
⑥. Remove the switch from the switch base.

Assembly Procedures

①. Install a new switch to the switch base.
②. After the above, follow exactly the reverse order of disassembling procedures.

Precautions

⚠ Caution

Since the interlock switch is an important part for the safety, confirm after installation that the switch operates normally.

7.5.1-3 Interlock Switch (DSW3)

Tools

①. Phillips Screwdriver #1

Disassembly Procedures

①. Remove the side cover (L).
(See the item 7.1.2.)
②. Remove the transfer drum.
(See the item 7.6.3.)
③. Remove the set screw ST3×6 (2 pcs.)
of transfer electrode base.
④. Remove the transfer electrode base
from the frame.
⑤. Disconnect all the harness connectors
connected with the interlock switch.
⑥. Remove the micro switch from the
transfer electrode base.

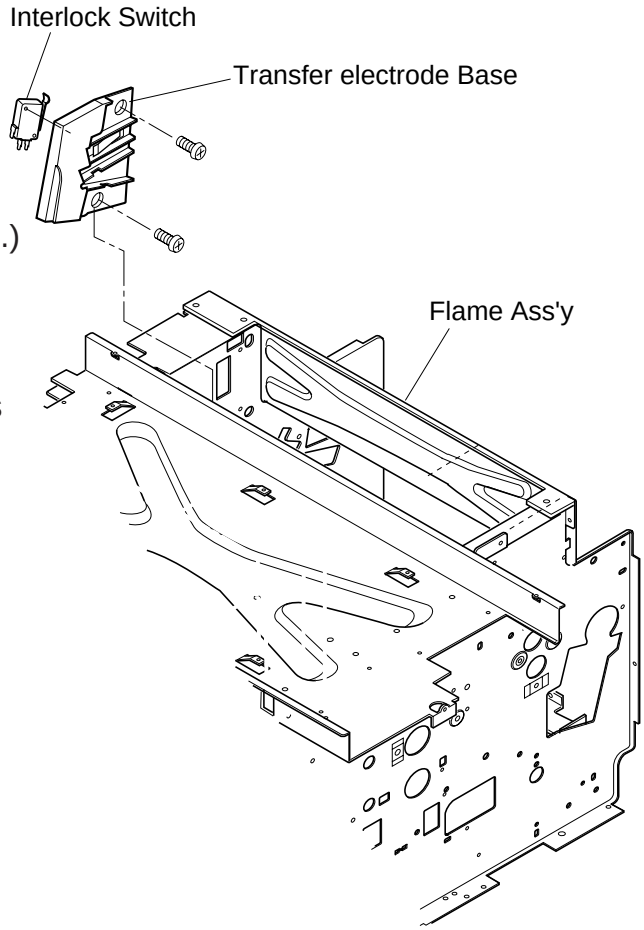


Fig.7-39

Assembly Procedures

①. Install a new interlock switch to the
transfer electrode base.
②. After the above , follow exactly the
reverse order of disassembling
procedures.

Precautions

⚠ Caution

Since the interlock switch is an important part for the safety,
confirm after installation that the switch operates normally.

7.5.2 Paper Sensor (Paper Feeding Sensor PT1)

Tools

①. Phillips Screwdriver #1

Disassembly Procedures

①. Remove the transfer drum. (See the item 7.6.1.)
②. Remove the set screw ST3×6 (2 pcs.), and the paper guide (UR) assembly.
③. Unlock the paper feeding sensor from the rear side of the hole where the paper guide (UR) has been removed.
④. Remove the paper feeding sensor from the stay feeder.
⑤. Disconnect the all the connectors connected with the paper feeding sensor.

Assembly Procedures

①. Install a new paper feeding sensor to the stay feeder.
②. Connect the harness connectors with the paper feeding sensor.
③. After the above , follow exactly the reverse order of disassembling procedures.

Precautions

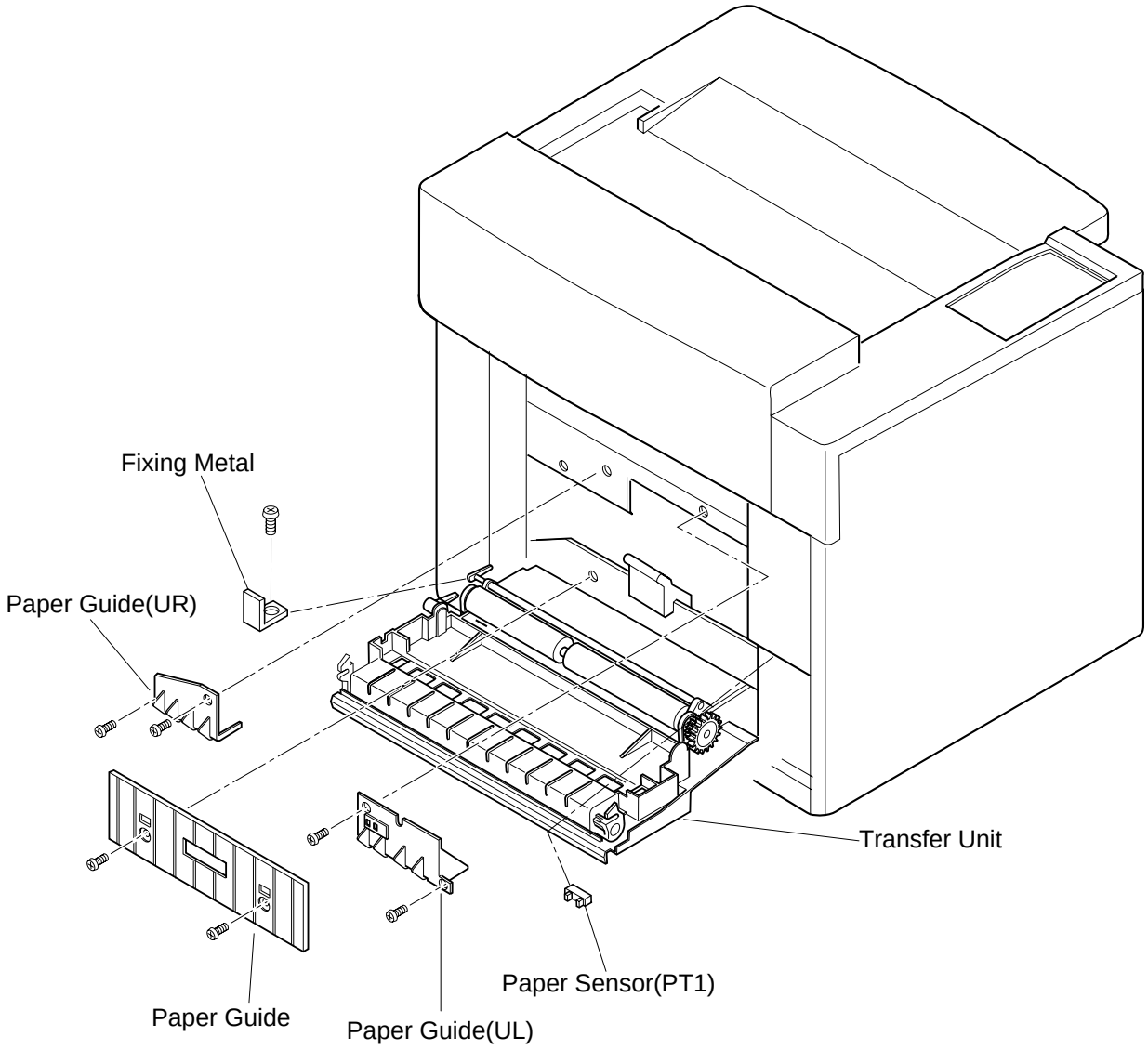

Fixing Metal
Paper Guide(UR)
Transfer Unit
Paper Sensor(PT1)
Paper Guide
Paper Guide(UL)

Fig.7-40

7.5.3 Paper Sensor (Paper Exit Sensor PT2)

Tools

①. Phillips Screwdriver #2

Disassembly Procedures

①. Remove the paper exit cover. (See the item 7.1.5.)
②. Disconnect the harness connector connected to the the paper exit sensor (PT2).
③. Remove the paper exit sensor from the paper exit guide (paper exit stay).

Assembly Procedures

①. Install a new paper exit sensor to the paper guide.
②. Connect the harness connectors with the paper exit sensor.
③. After the above , follow exactly the reverse order of disassembling procedures.

Precautions

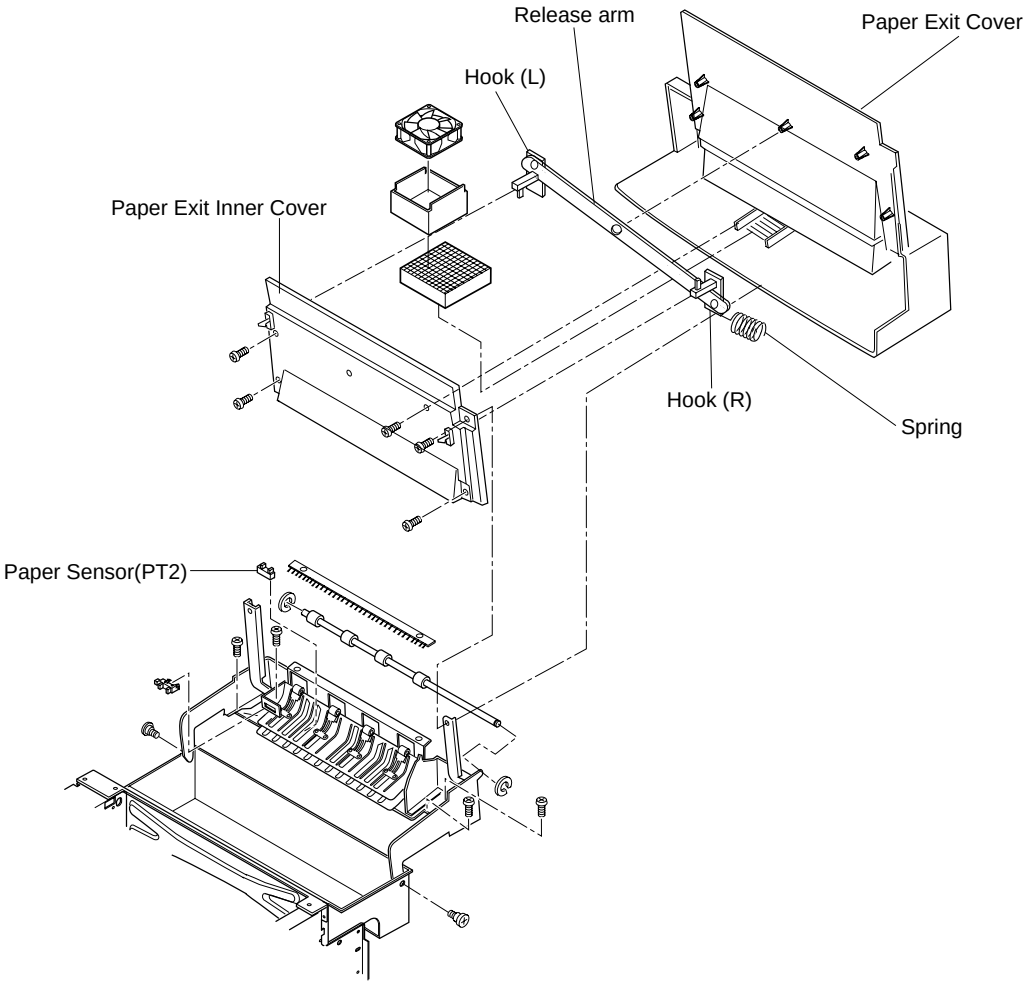


Fig.7-41

7.5.4 Paper Empty Sensor (PE) / OHP Sensor (OHP)

Tools

①. Phillips Screwdriver #1

Disassembly Procedures

①. Remove the transfer unit. (See the item 7.6.1.)
②. Remove the set screw ST3×6 (2 pcs.) of paper guide (L).
③. Remove the paper guide (L).
④. Remove the set screw ST3×6 (2 pcs.) of paper guide assembly (UL).
⑤. Remove the connector connected with the sensor.
⑥. Remove the paper guide assembly (UL).
⑦. Remove the paper empty sensor (PE) from the paper guide assembly (UL), or remove the set screw BT3×8 (2 pc.) of OHP sensor (OHP) from the paper guide assembly (UL).
⑧. Remove the OHP sensor (OHP).

Assembly Procedures

①. Install a new paper empty sensor (PE) or a new OHP sensor (OHP) to the paper guide assembly (UL).
②. After the above , follow exactly the reverse order of disassembling procedures.

Precautions

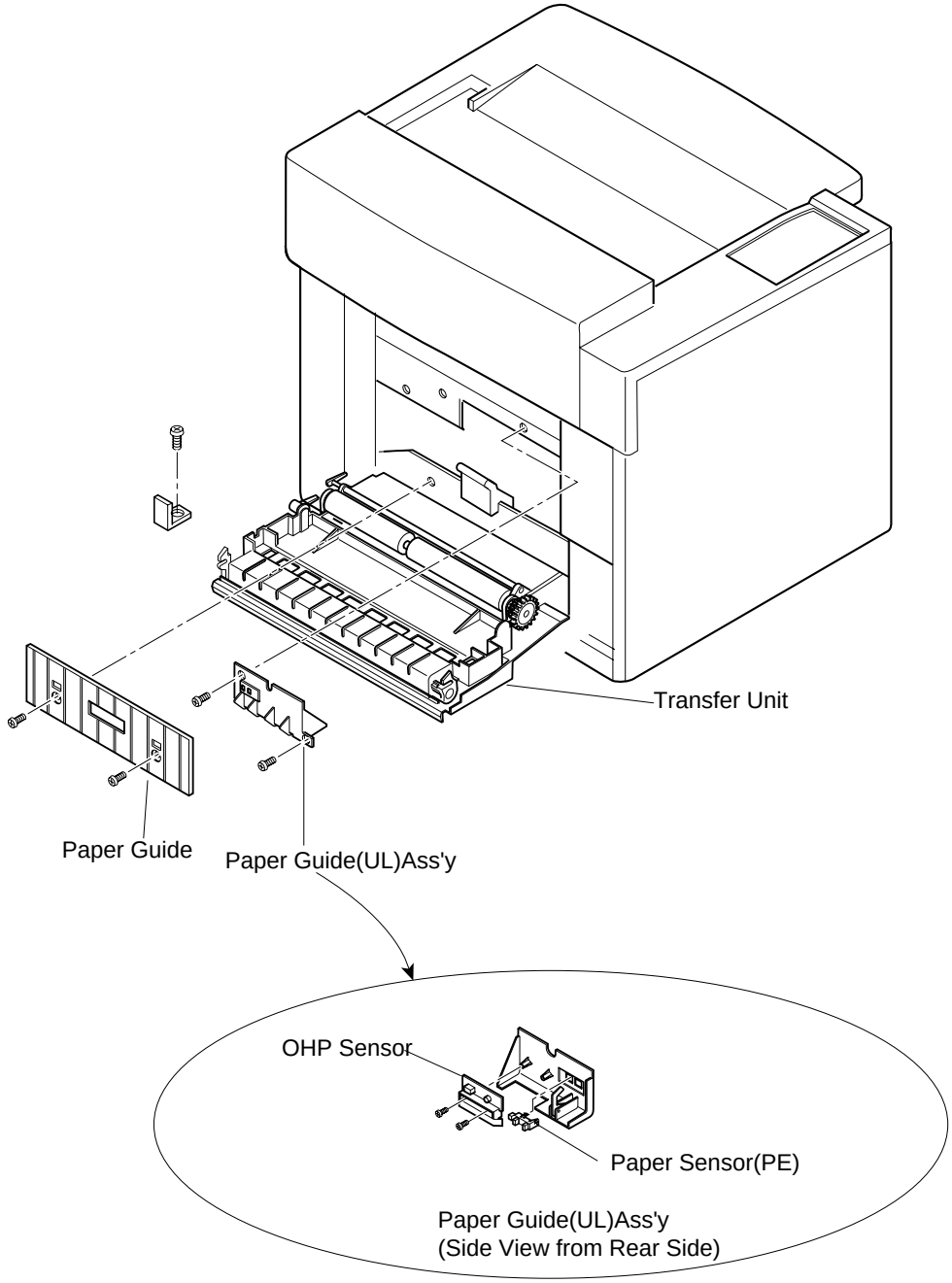

Transfer Unit
Paper Guide
Paper Guide(UL)Ass'y
OHP Sensor
Paper Sensor(PE)
Paper Guide(UL)Ass'y
(Side View from Rear Side)

Fig.7-42

7.5.5 Paper Size Sensor (PSU)

Tools

①. Phillips Screwdriver

Disassembly Procedures

①. Remove the side cover (L). (See the item 7.1.2.)
②. Remove the power supply unit. (See the item 7.2.5.)
③. Remove the set screw BT3×8 (2 pcs.) of the paper cassette guide (L) assembly.
④. Pull the paper cassette guide toward you.
⑤. Remove the connector for the paper size sensor.
⑥. Remove the paper cassette guide (L) assembly from the frame.
⑦. Remove the set screw BT3×8 (2 pcs.) of paper size sensor from the cassette guide (L).

Assembly Procedures

①. Install a new paper size sensor (PSU) to the paper cassette guide (L).
②. After the above, follow exactly the reverse order of disassembling procedures.

Precautions

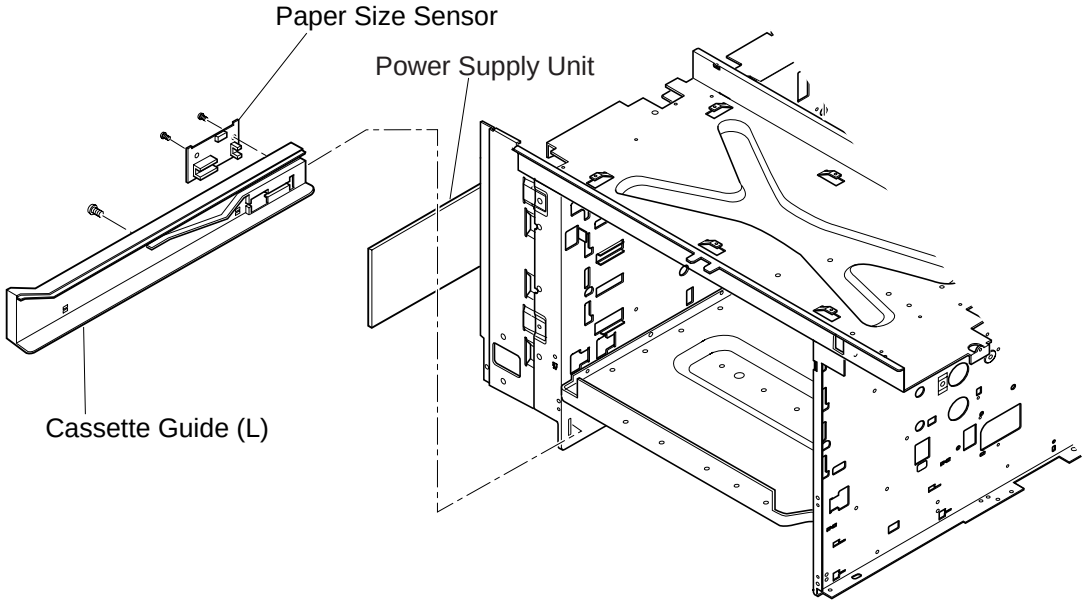


Fig.7-43

7.5.6 Drum Jam Sensor (DPJ)

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the fuser unit.
②. Remove the belt cartridge.
③. Remove the drum cleaner.
④. Remove the transfer drum. (See the item 7.6.3.)
⑤. Remove the cover F.
⑥. Disconnect all the connectors connected with the drum jam sensor.
⑦. Remove the drum jam sensor from the stay B.

Assembly Procedures

①. Install a new drum jam sensor (DPJ) to the stay B.
②. After the above, follow exactly the reverse order of disassembling procedures.

Precautions

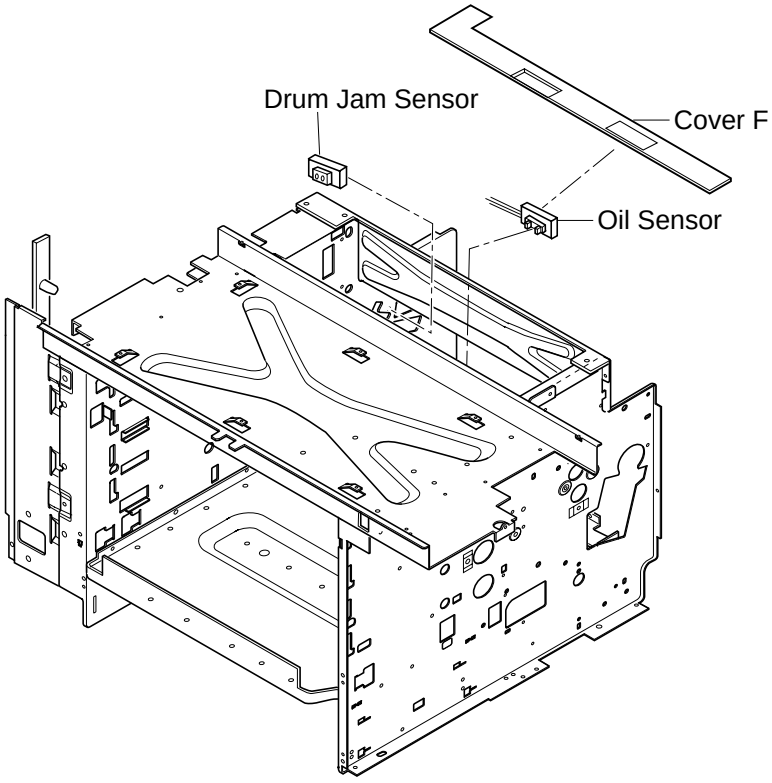


Fig.7-44

7.5.7 Oil Sensor (OIL)

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the fuser unit.
②. Remove the side cover (LU). (See the item 7.1.1.)
③. Remove the side cover (L). (See the item 7.1.2.)
④. Remove the top cover. (See the item 7.1.4.)
⑤. Remove the controller case 'A' assembly. (See the item 7.2.5.)
⑥. Disconnect the oil sensor connector.
⑦. Remove the cover F.
⑧. Remove the set screw ST3×6 (2 pcs.) of oil sensor.
⑨. Remove the oil sensor.

Assembly Procedures

①. Install a new oil sensor.
②. After the above , follow exactly the reverse order of disassembling procedures.

Precautions

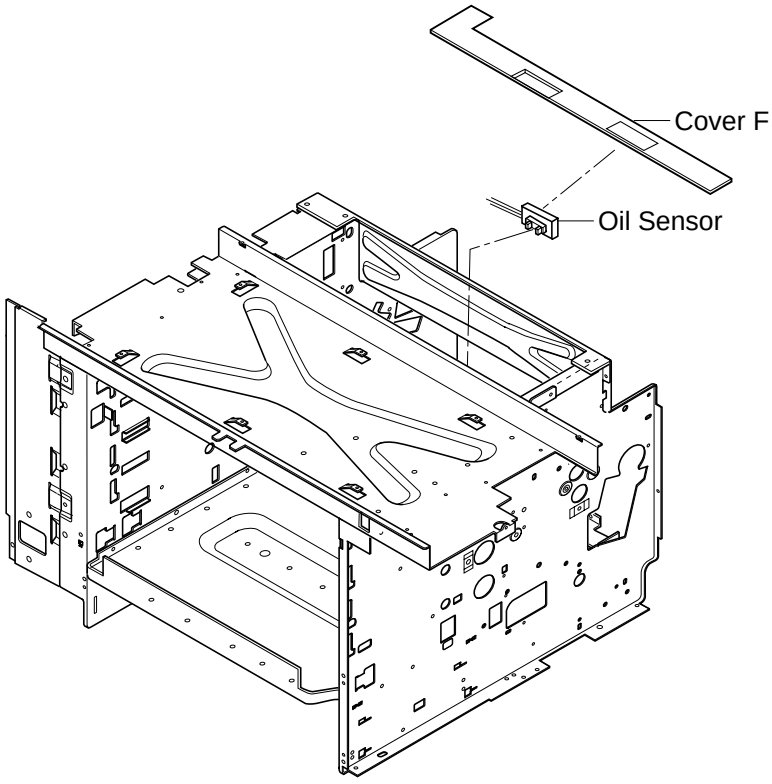


Fig.7-45

7.5.8 Drum Encoder Sensor (EN)

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

① . Remove the toner cartridge.
② . Remove the belt cartridge.
③ . Remove the drum cleaner.
④ . Remove the fuser unit.
⑤ . Remove the side cover (L).
(See the item 7.1.2.)
⑥ . Remove the top cover.
(See the item 7.1.4.)
⑦ . Remove the transfer drum.
(See the item 7.6.3.)
⑧ . Remove the high voltage unit.
(See the item 7.2.6.)
⑨ . Remove the sensor holder assembly from the frame (L).
⑩. Disconnect the connectors connected with the encoder sensor.
⑪. Remove the encoder sensor from the sensor holder.

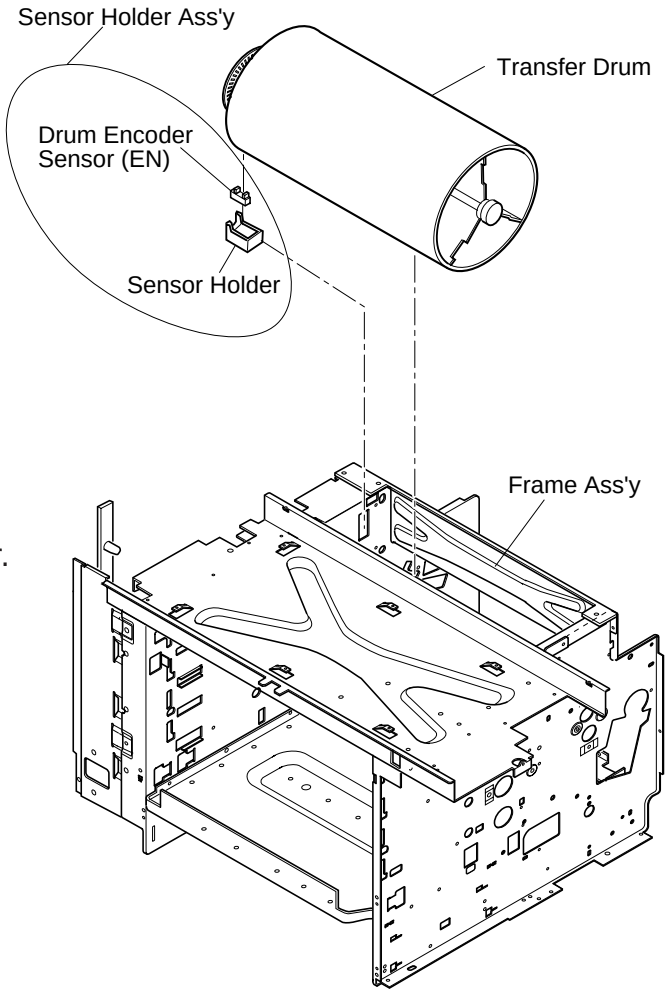


Fig.7-46

Assembly Procedures

①. Install a new drum encoder sensor to the sensor holder.
②. Connect the connectors with the encoder sensor.
③. Install the sensor holder assembly to the frame (L).
④. After the above , follow exactly the reverse order of disassembling procedures.

Precautions

7.5.9 Belt Sensor (PBS)

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the toner cartridge.
②. Remove the belt cartridge.
③. Remove the drum cleaner.
④. Remove the top cover.
(See the item 7.1.4.)
⑤. Remove the control fan assembly.
(See the item 7.3.4.)
⑥. Remove the set screw ST3×6
(2 pcs.) of the stay 'A'.
⑦. Pull up the stay 'A'.
⑧. Disconnect all the connectors
connected with the belt sensor.
⑨. Remove the belt sensor from the
stay 'A'.

Assembly Procedures

①. Install a new belt sensor
to the stay 'A'.
②. Connect the connectors
with the belt sensor.
③. After the above ,
follow exactly
the reverse order
of disassembling
procedures.

Precautions

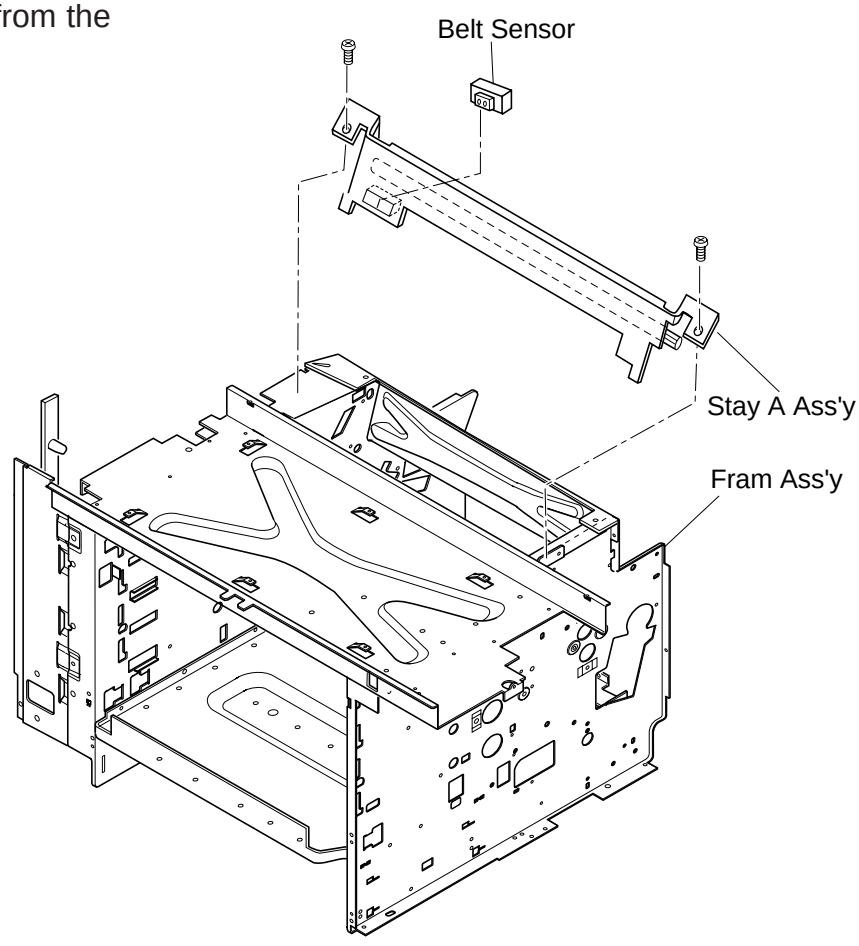


Fig.7-47

7.5.10 Waste Toner Sensor (WTS)

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the side cover (R).
(See the item 7.1.3.)
②. Lift up the bottle holder.
(Remove the waste toner sensor by removing the hooked pawl.)
③. Disconnect all the connectors connected with the waste toner sensor.

Assembly Procedures

①. Install a new waste toner sensor.
②. Connect the connectors with the waste toner sensor.
③. After the above, follow exactly the reverse order of disassembling procedures.

Precautions

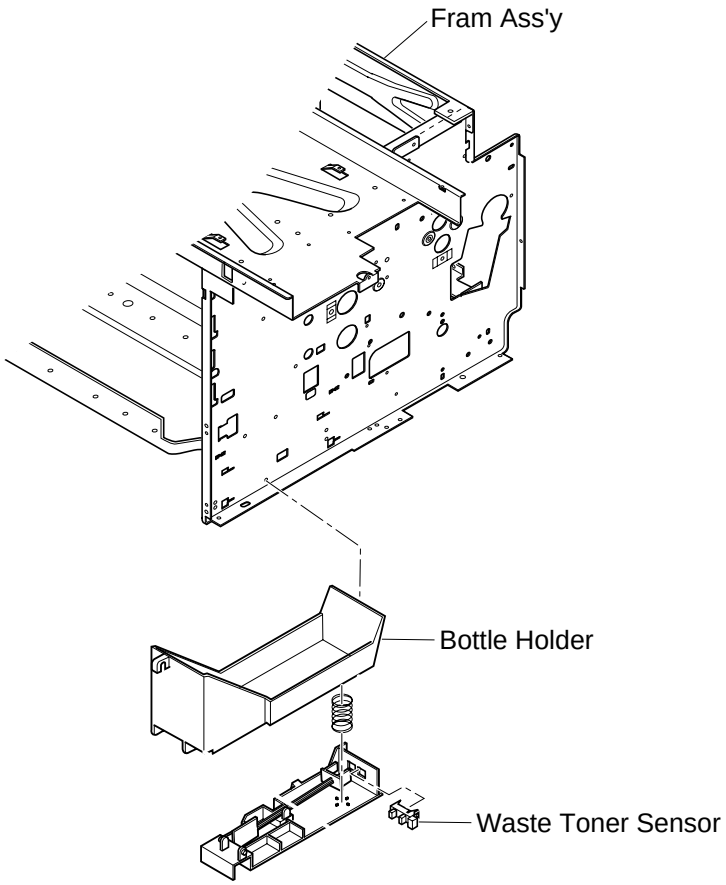


Fig.7-48

7.5.11 Toner Sensor Assembly (TPD) / (TTR)

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

(TPD):

①. Remove the side cover (R). (See the item 7.1.3.)
②. Remove the developer drive unit. (See the item 7.3.2.)
③. Remove the set screw ST3×6 (3 pcs.) of toner sensor P.W.B.
④. Disconnect all the connectors connected with the toner sensor P.W.B.

(TTR):

①. Remove the side cover (L). (See the item 7.1.2.)
②. Remove the high voltage unit (HVU). (See the item 7.2.6.)
③. Remove the DC power supply unit (LVPS). (See the item 7.2.5.)
④. Remove the set screw ST3×6 (3 pcs.) of toner sensor P.W.B.
⑤. Remove the toner sensor P.W.B.

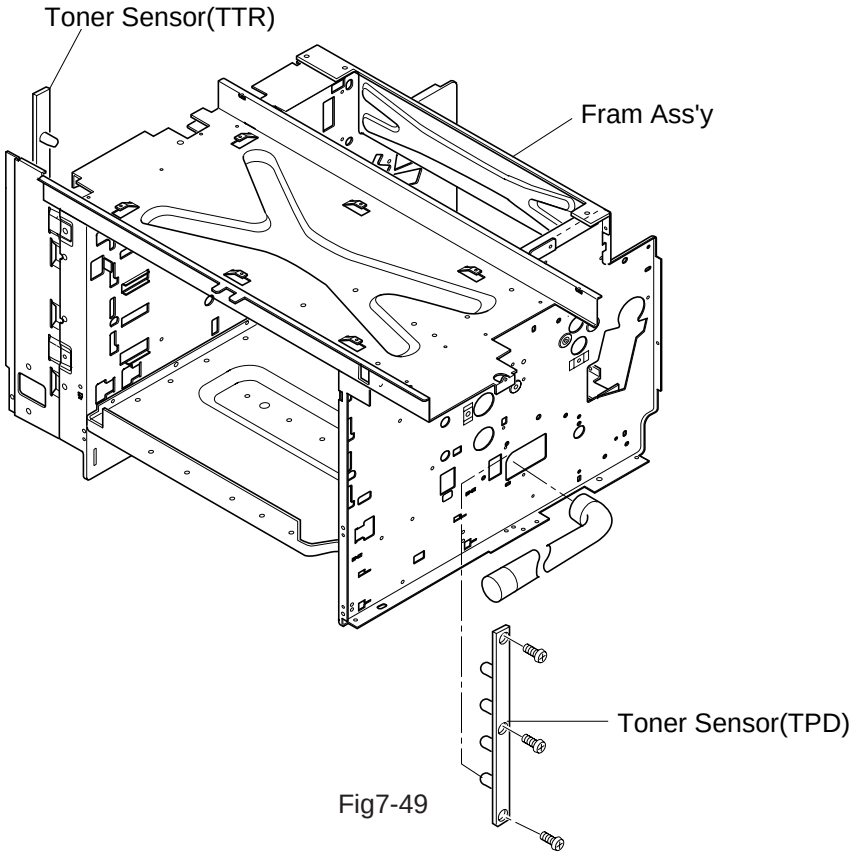


Fig7-49

Assembly Procedures

(TPD):

①. Connect the connectors with a new toner sensor P.W.B.
②. Install the toner sensor P.W.B. to the engine frame (R).

(TTR):

①. Connect the connectors with a new toner sensor P.W.B.
②. Install the toner sensor P.W.B. to the engine frame (L).
③. After the above, follow exactly the reverse order of disassembling procedures.

Precautions

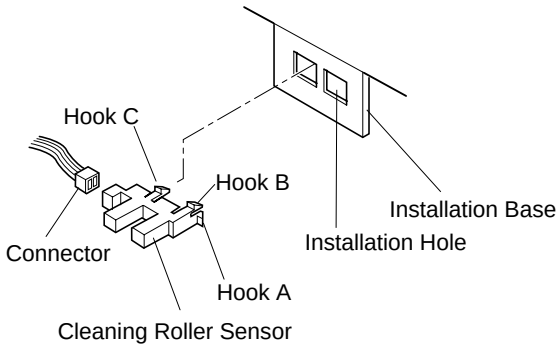
7.5.12 Cleaning Roller Sensor (CRS)

Tools

①. Phillips Screwdriver #1

Disassembly Procedures

①. Open the paper exit cover.
②. Remove the paper exit harness cover by removing set screw [ST3 × 6 (1 pc.)].
③. Remove the connector connected with the cleaning roller sensor.
④. Remove the cleaning roller sensor.
  i). Unhook the hook by inserting a finger into the rear side of installation base.
  ii). Remove the sensor.



Assembly Procedures

①. Prepare a new cleaning roller sensor.
②. Put the sensor in the installation hole from the hook 'b' side of hook.
③. Push the sensor into the hole as having it meet the hook 'c'.
④. Connect the connector with the sensor.
⑤. Confirm that the sensor is firmly hooked over the hook 'a', 'b' and 'c'.

Precautions

①. When connecting the connector to the sensor, do not apply any excessive force to the connector (P.W.B) of the sensor side.

7.6 Replacement of Roller and Drum

7.6.1 Transfer Unit

Necessary Tools

①. Phillips Screwdriver #1

Disassembly Procedures

①. Remove the set screw [ST3 × 6 (1 pc.)] of metal fixture for transfer unit.
②. Open the transfer unit, and remove the shaft from the frame installation hole.
i). Lifting the left side (as viewed from you), undo the shaft from the hole.
ii). Slide the transfer unit to the left end, undo the shaft of right side (as viewed from you) from the hole.
③. Remove the transfer unit.

Assembly Procedures

①. Have a new transfer unit meet the installation hole of base.
i). Put the shaft of transfer unit into the hole of right side (as viewed from you).
ii). Sliding the transfer unit to the left end, put the left shaft to the hole.
②. Install and fix the transfer unit with the metal fixture.

Precautions

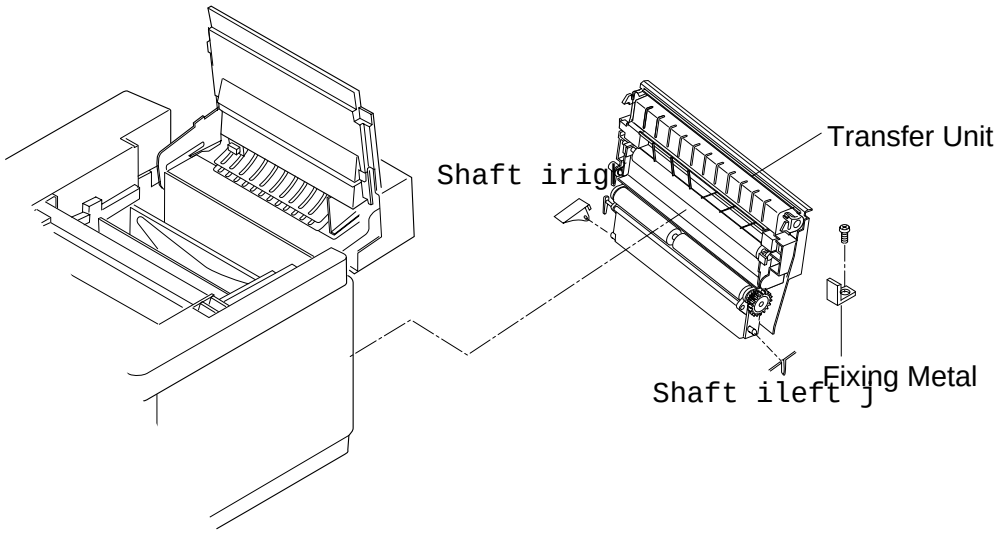


Fig.7-50

7.6.2 Register Roller

Tools

①. Phillips Screwdriver #1
②. Slotted Screwdriver #1

Disassembly Procedures

①. Open the transfer unit.
②. Remove the roller fixing C ring at both sides.
③. Remove the gear from the shaft.
④. Remove the shaft support at the both sides.
⑤. Remove the register roller.

Assembly Procedures

①. Prepare a new register roller.
②. Install the register roller to the frame's hole.
③. Install the shaft support at the both sides.
④. Install the gear to the shaft.
⑤. Fix the shaft support and gear with the C ring.

Precautions

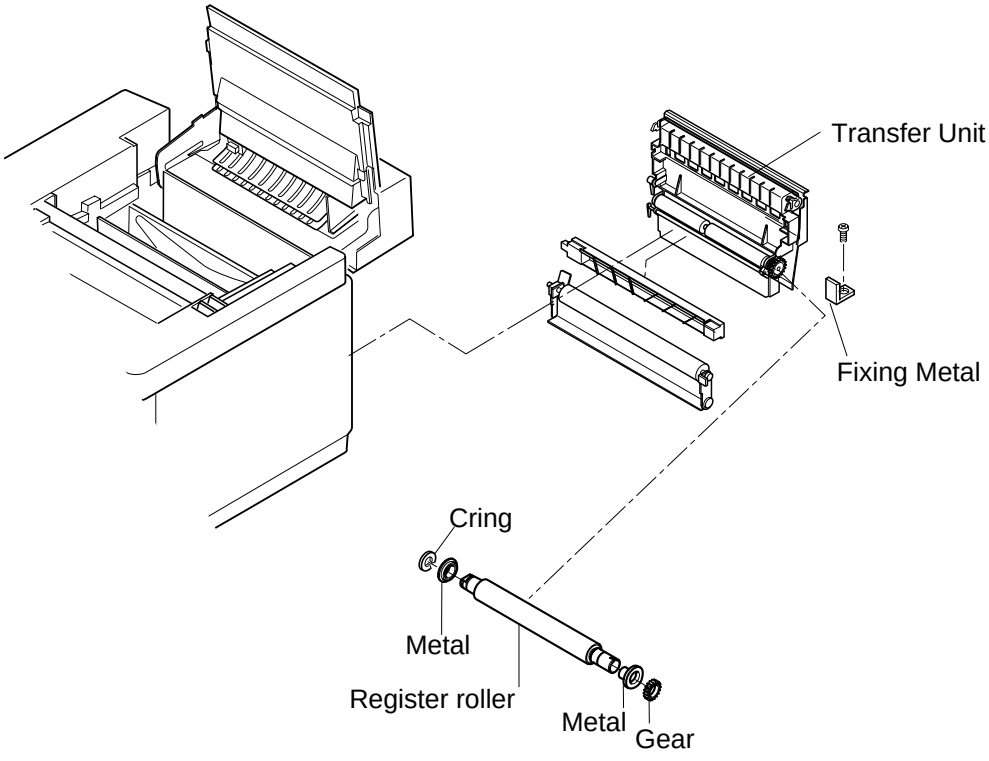


Fig.7-51

7.6.3 Transfer Drum

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the toner cartridge.
②. Remove the belt cartridge.
③. Remove the fuser unit.
④. Remove the cleaner cover.
⑤. Remove the drum cleaner.
⑥. Open the transfer unit.
⑦. Remove the top cover. (See the item 7.1.4.)
⑧. Remove the control fan assembly. (See the item 7.3.4.)
⑨. Remove the connector connected to the belt marker sensor.
⑩. Remove the set screw ST3×6 (2 pcs.) of stay 'A'.
  • Wrap transfer drum surface with paper so that the transfer drum will not be scratched.
⑪. Remove the stay 'A' assembly.
⑫. Push the transfer drum from the transfer unit side, and remove the transfer drum from the shaft support.
⑬. Pull up and remove the transfer drum from the top.

Assembly Procedures

①. Put a new transfer drum into main body from the top.
②. Have the transfer drum's shaft meet the drum shaft support.
③. Pushing the transfer drum, fit it into the shaft support.
④. Install the stay A assembly.
⑤. After the above, follow exactly the reverse order of disassembling procedures.

Precautions

Do not touch the transfer drum surface with bare hands, or scratch it.

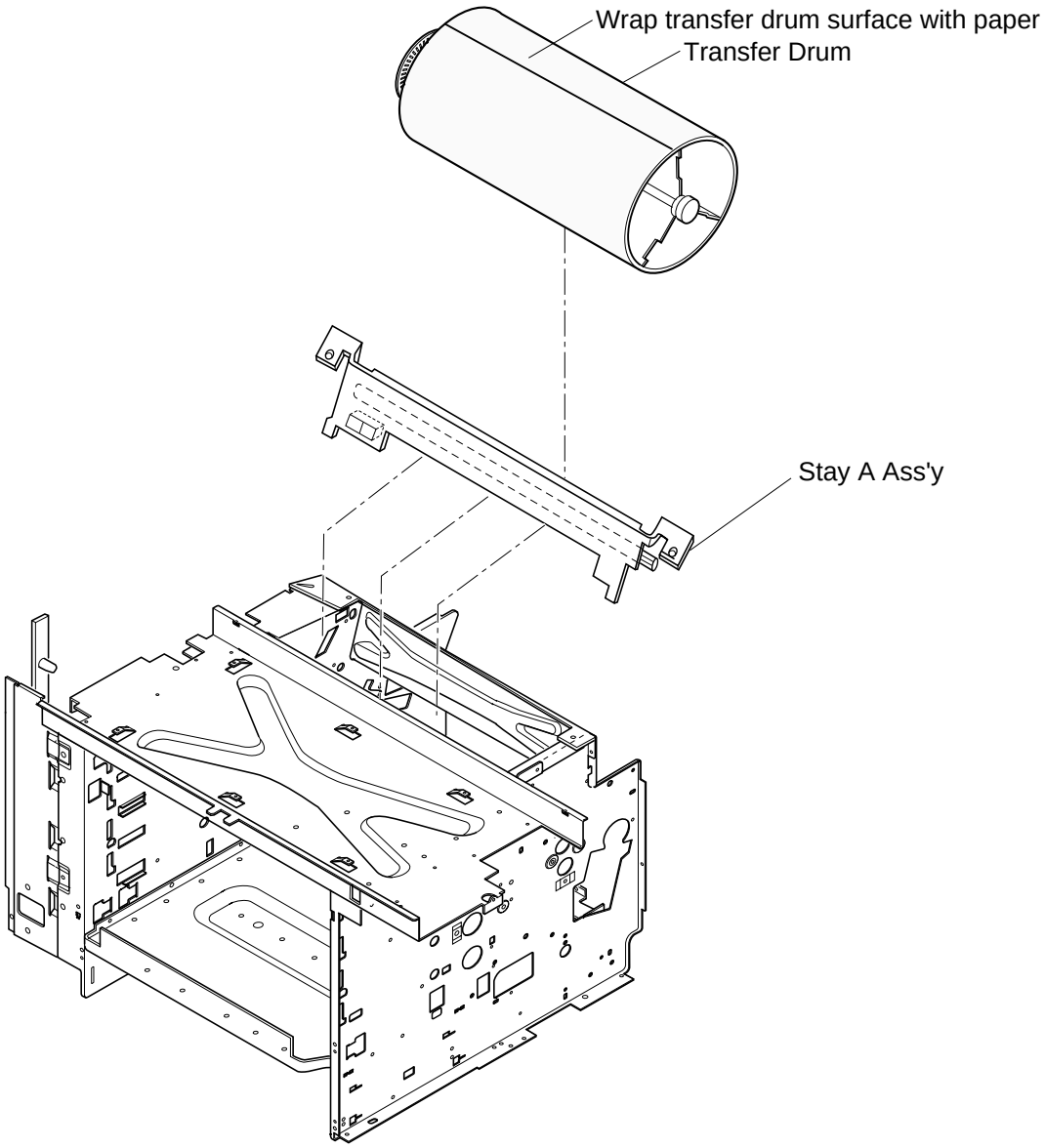

Wrap transfer drum surface with paper
Transfer Drum
Stay A Ass'y

Fig.7-52

7.6.4 Paper Feed Roller / Separator Pad

Tools

①. Phillips Screwdriver #1

Disassembly Procedures

①. Remove the paper feeding cassette.
②. Remove the transfer unit. (See the item 7.6.1.)
③. Remove the set screw ST3×6 (2 pcs.) of paper guide (L).
④. Remove the paper guide (L).
⑤. Remove the set screw ST3×6 (2 pcs.) of paper guide (UL).
⑥. Remove the paper guide (UL).
⑦. Disconnect all the harness connectors connected with the OHP sensor and paper sensor.
⑧. Sliding the paper feeding roller to the right side, remove it from the shaft.
⑨. Pull up and remove the separator pad.

Assembly Procedures

①. Install a new separator pad.
②. Install a new paper feed roller.
③. After the above, follow exactly the reverse order of disassembling procedures.

Precautions

Do not touch the surface of paper feed roller and separator pad.

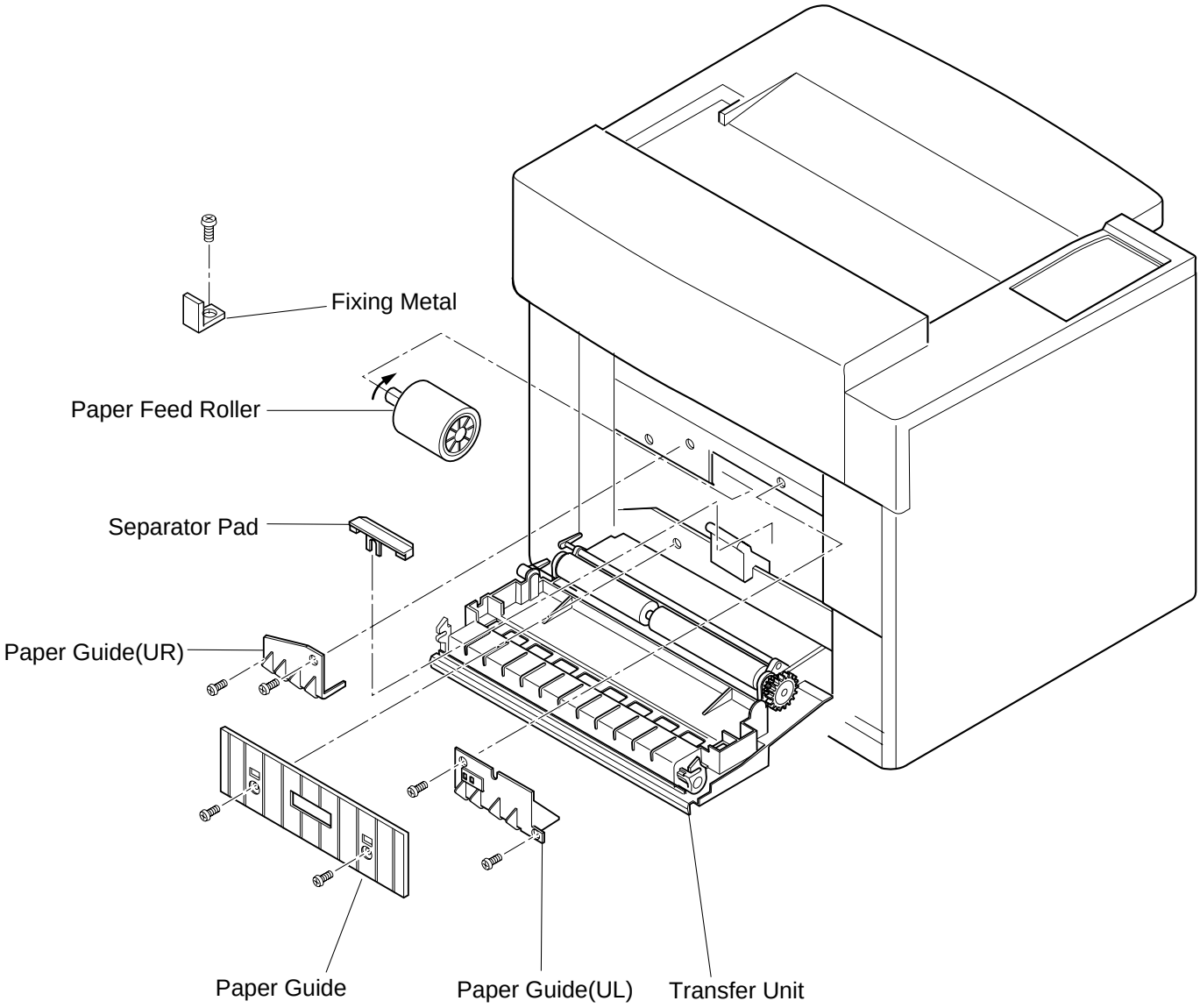

Fixing Metal
Paper Feed Roller
Separator Pad
Paper Guide(UR)
Paper Guide
Paper Guide(UL)
Transfer Unit

Fig.7-53

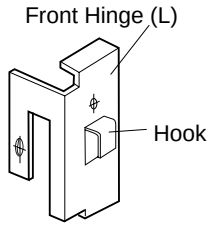
7.6.5 Front Cover Unit

Necessary Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the side cover (L). (See the item 7.1.2.)
②. Remove the base cover (L). (See the item 7.1.10.)
③. Open the front cover unit.
④. Remove the set screws [BT4 × 8 (2 pcs.)] of front cover (inner).
⑤. Replace the hinge holder of hinge arm's fixing pin.
  i). Undo the craw of hinge holder.
  ii). Turn the hinge holder to the arrow direction.
⑥. Remove the fixing pin, and remove the coupling of hinge arm.
⑦. Remove the front cover (inner).
⑧. Disconnect all the harness connectors connected with the developer position sensor and developer solenoid.
⑨. Remove the set screws [ST3 × 6 (2 pcs.)] of front hinge (L).
⑩. Remove the front hinge (L) from the frame.
  i). Lifting up the front hinge (L), undo the hook from the frame.
⑪. Sliding the front cover unit to the right side, remove the coupling of hinge's fixing pin at the right side.



Assembly Procedures

①. Prepare a new front cover unit assembly.
②. Couple the hinge pin of right side with the front cover unit.
③. Have the hook of left front hinge (L) meet the frame, hook the left front hinge.
④. Fix the front hinge (L) by screwing.
⑤. Couple the hinge arm to the front cover with the fixing pin.
⑥. Lock the fixing pin with the hinge holder.
⑦. After the above, follow exactly the reverse order of disassembling procedures.

Precautions

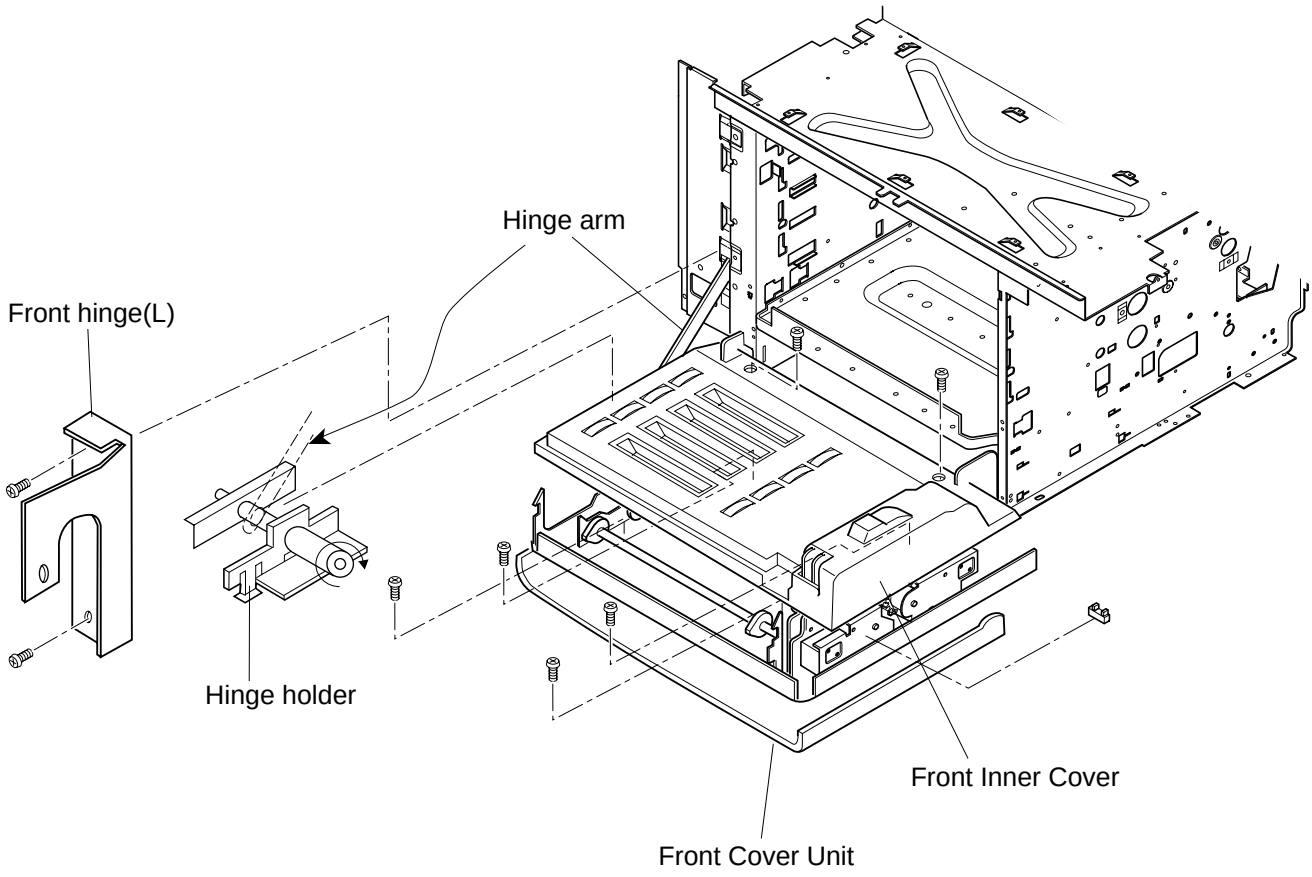

Hinge arm
Front hinge(L)
Hinge holder
Front Inner Cover
Front Cover Unit

Fig.7-54

7.6.6 Paper Exit Roller

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the paper exit unit. (See the item 7.1.5.)
②. Remove the paper exit cover. (See the item 7.1.5.)
③. Remove the C ring of both sides (left and right).
④. Remove the shaft support at the both sides.
⑤. Remove the paper exit roller from the frame.

Assembly Procedures

①. Put a new paper exit roller through the frame's hole.
②. Install the shaft support of both sides (left and right).
③. Install the C ring of both sides to the groove of paper exit roller.

Precautions

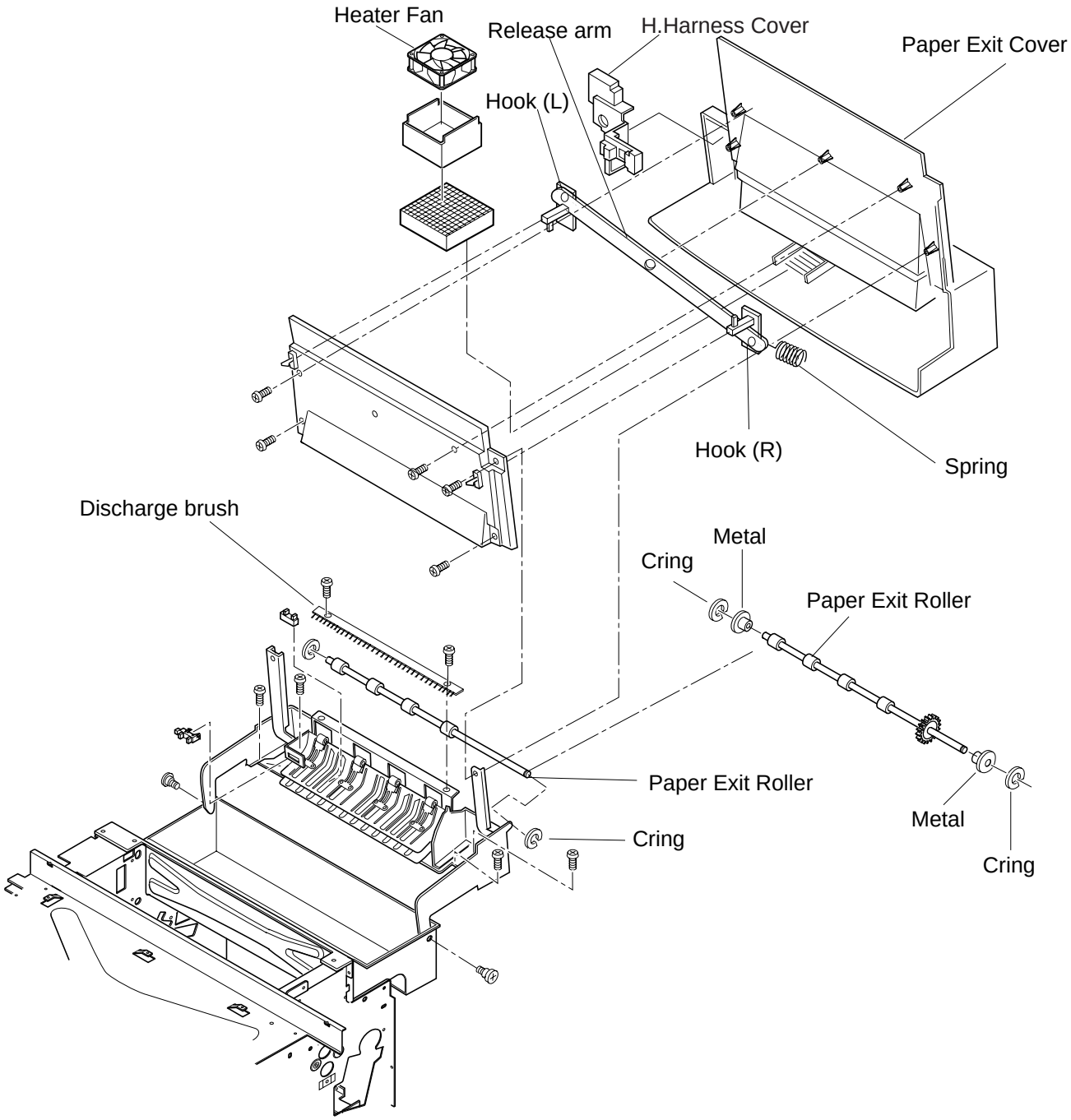

Heater Fan
Release arm
H.Harness Cover
Paper Exit Cover
Hook (L)
Hook (R)
Spring
Discharge brush
Metal
Cring
Paper Exit Roller
Paper Exit Roller
Metal
Cring
Cring

Fig.7-55

7.6.7 Discharger Brush

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the paper exit unit. (See the item 7.1.5.)
②. Remove the paper exit cover. (See the item 7.1.5.)
③. Remove the paper exit front cover.
④. Remove the set screw BT4×6 (2 pcs.) of discharger brush.
⑤. Remove the discharger brush.

Assembly Procedures

①. Install a new discharger brush to the paper exit unit.

Precautions

Do not deform the fur brush of discharger brush.

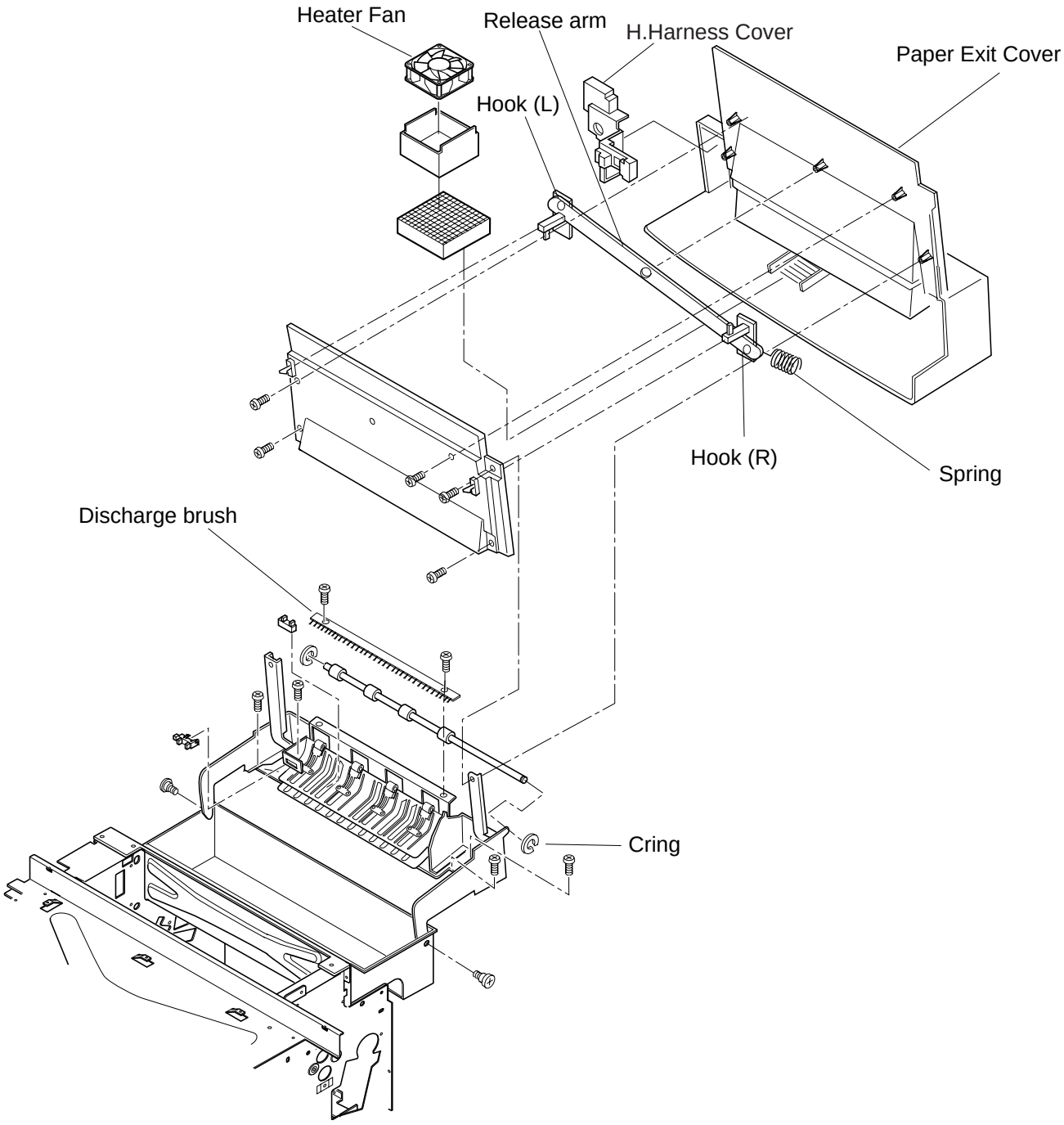

Heater Fan
Release arm
H.Harness Cover
Paper Exit Cover
Hook (L)
Hook (R)
Spring
Discharge brush
Cring

Fig.7-56

7.6.8 Waste Toner Feeder D (Stay 'A' Assembly)

Tools

①. Phillips Screwdriver #2

Disassembly Procedures

①. Remove the belt cartridge.
②. Remove the toner cartridge.
③. Remove the drum cleaner.
④. Remove the side cover (LU). (See the item 7.1.1.)
⑤. Remove the top cover. (See the item 7.1.4.)
⑥. Remove the control fan assembly. (See the item 7.3.5.)
⑦. Remove the set screw ST3×6 (2 pcs.) of stay 'A'.
⑧. Disconnect the connector connected with the belt sensor.
⑨. Pull up the stay 'A' assembly along the guide.

Assembly Procedures

①. Install the new stay 'A' assembly.
②. After the above, follow exactly the reverse order of disassembling procedures.

Precautions

①. Do not touch or scratch the transfer drum.
②. Do not deform the sealing mylar of waste toner feeder D.

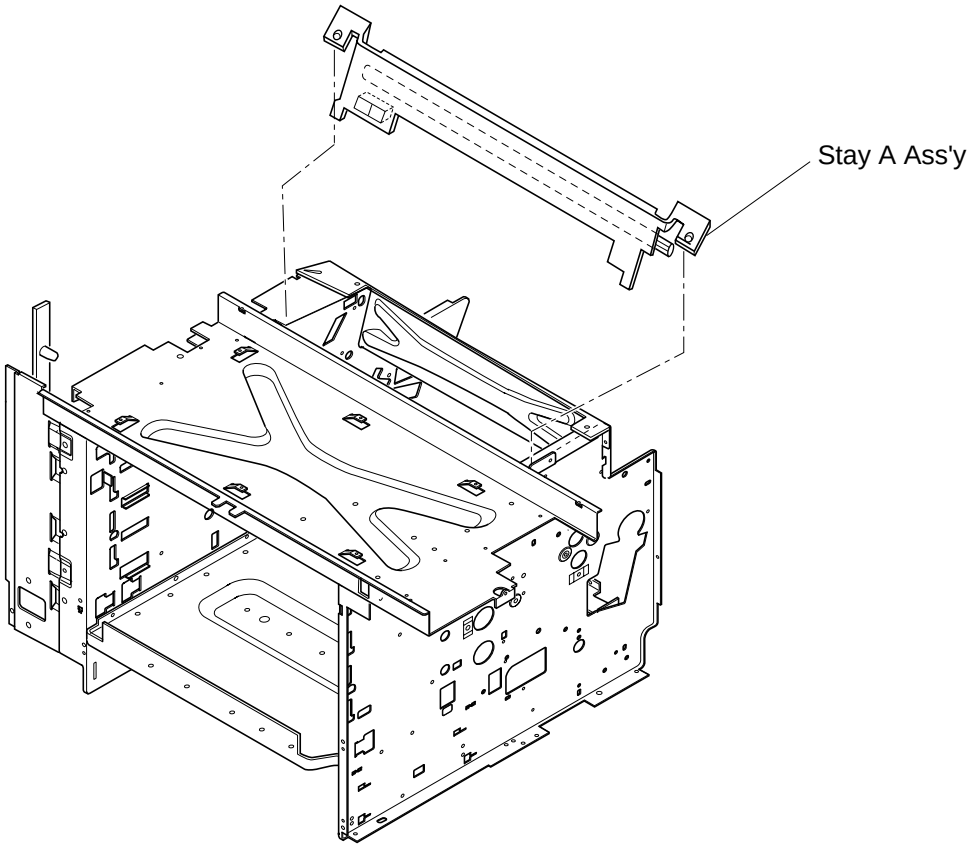


Fig.7-57

7.6.9 Fuser Connector

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures

①. Remove the fuser unit.
②. Remove the side cover (L).
(See the item 7.1.2.)
③. Remove the shield case A assembly.
(See the item 7.2.5.)
④. Remove the PN/PH connector connected with the DC power supply unit.
⑤. Remove the set screw SP3×8 (2 pcs.) of fuser connector.
⑥. Remove the fuser connector.
* Set screw of fuser connector is unique.

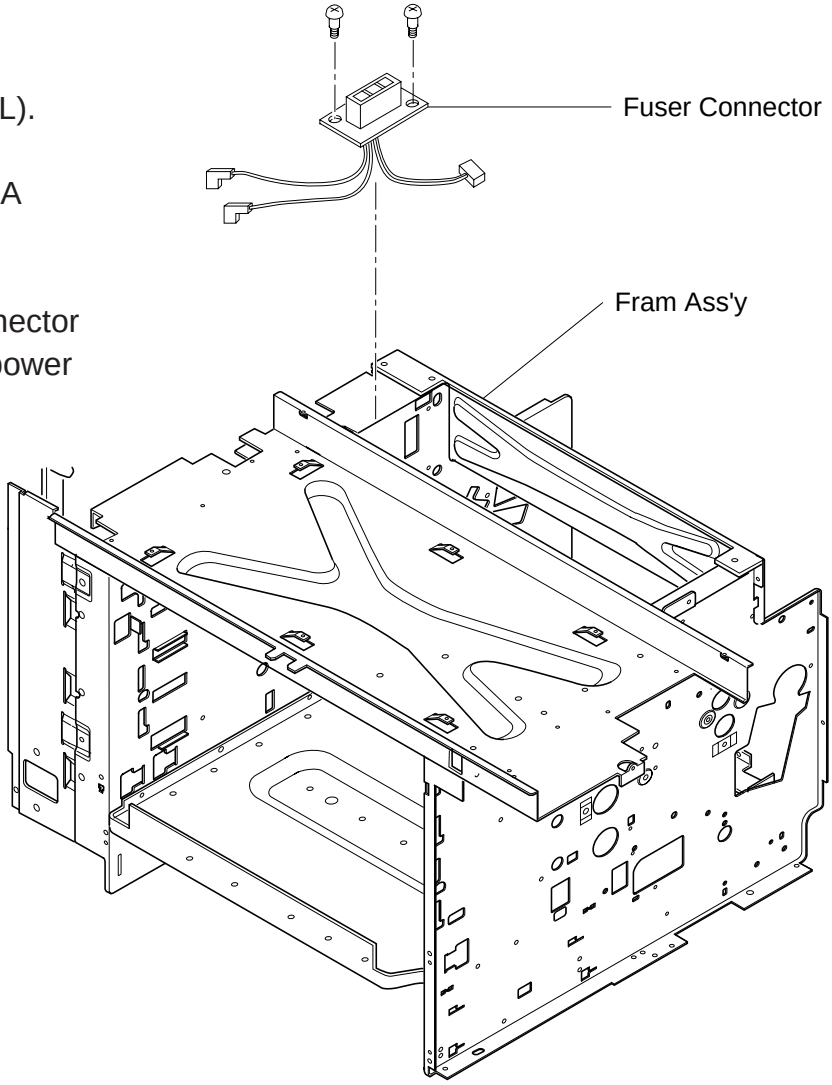


Fig.7-58

Assembly Procedures

①. Install a new fuser connector.
②. After the above, follow exactly the reverse order of disassembling procedures.

Precautions

7.7 Replacement of Fuser Unit

[Layout of Fuser Unit Parts]

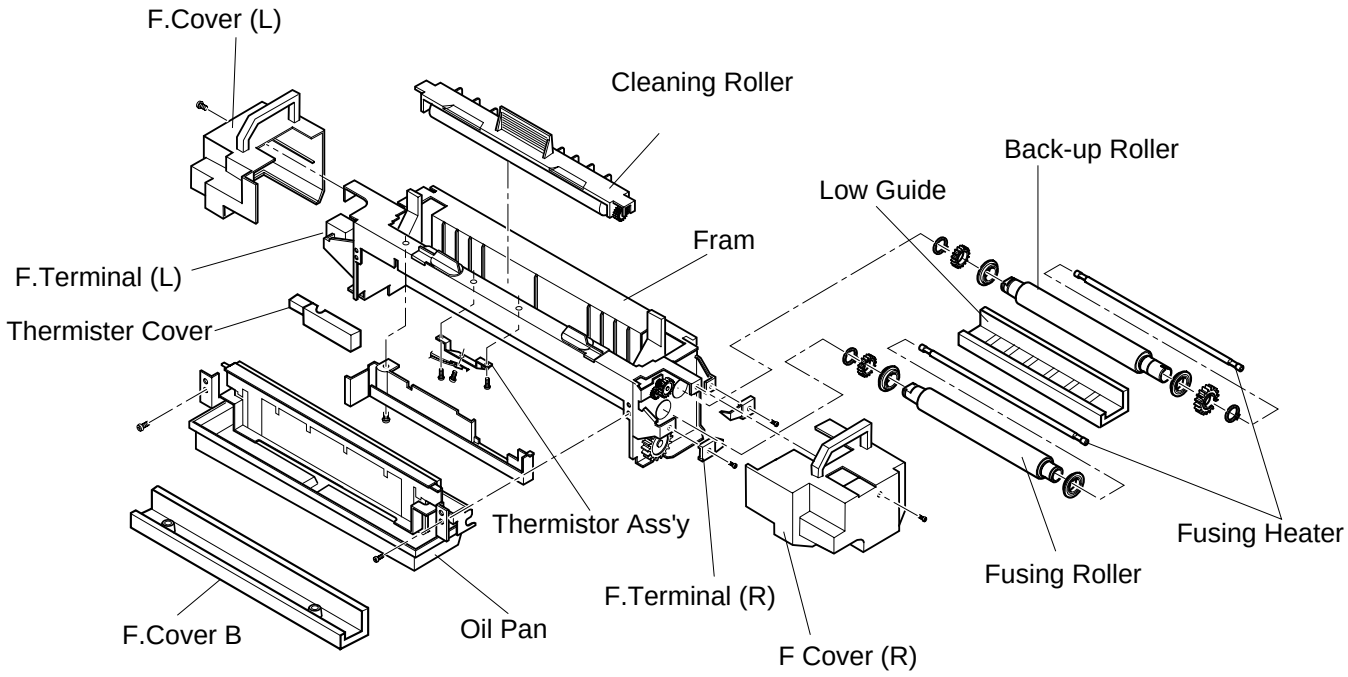


Fig.7-59

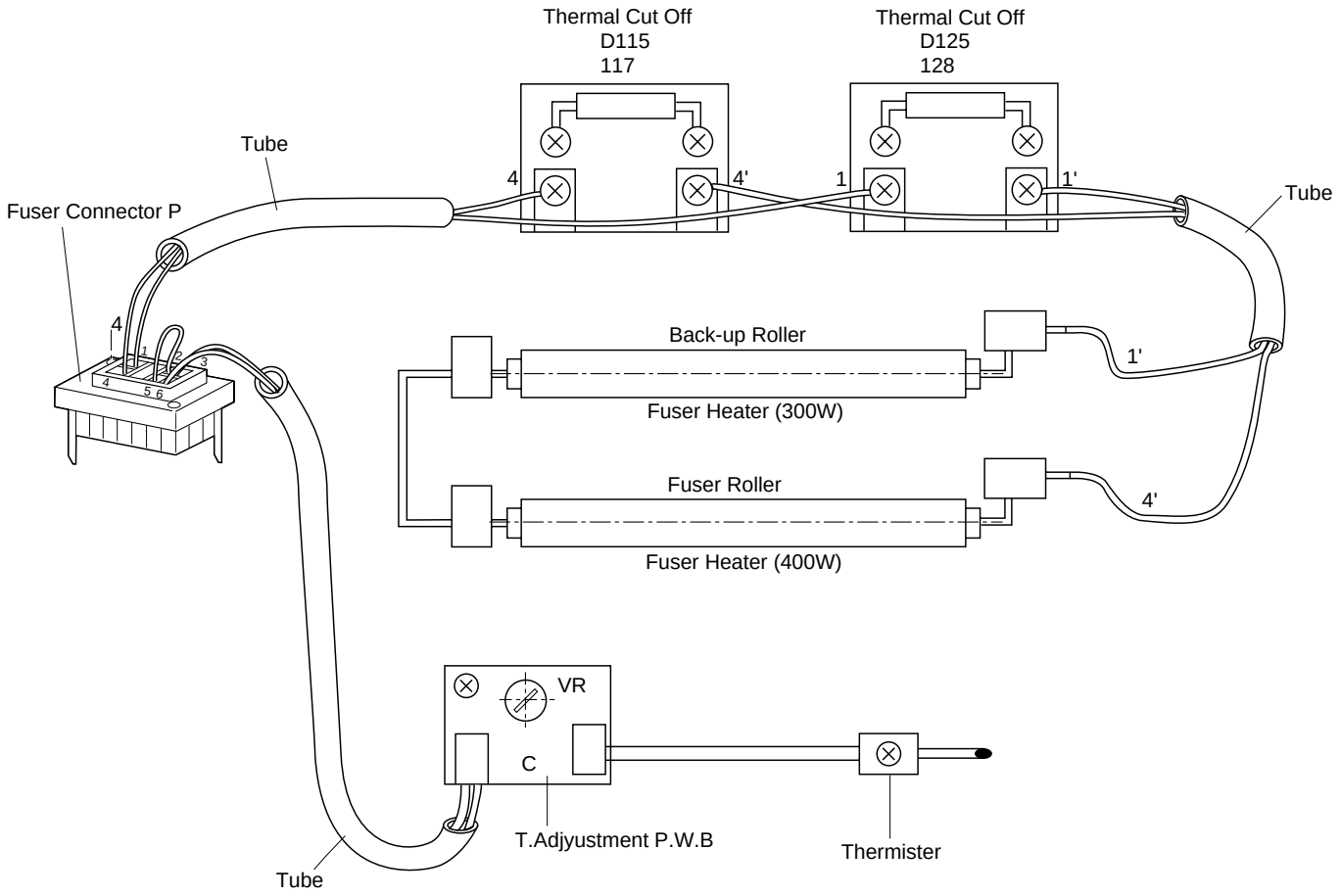
⚠ DANGER

[Note in Parts Replacement]

1. Fuser unit consists of important parts in terms of the safety. Therefore, replacement of parts or disassembly and maintenance work should be done at the appropriate facilities by skillful service personnel acquainted with electrical safety. After the assembling work, the product safety should be reconfirmed.

2. Since the fuser unit is very hot, make sure that the fuser unit and perimeter is well cooled down prior to starting the replacement of parts. Otherwise, you may get burn when touching the hot areas.

3. Fuser unit contains the silicone oil. Care not to drop the silicone oil on the floor, otherwise, the floor is very slippery and dangerous.



Wiring of Fuser Unit

7.7.1 Fusing Heater Lamp

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures : See the layout of fuser unit parts.

①. Remove the set screw ST3×6 (1 pc.) of F. cover (L), and F. cover (L).
②. Remove the set screw ST3×6 (1 pc.) of F. cover (R), and F. cover (R).
③. Pull F. terminal (L) of fuser roller side toward you, and remove the fusing heater lamp (400W) from F. terminal.
④. Pull out the fusing heater lamp (400W) from the fuser roller (inside).
⑤. Pull F. terminal (L) of back-up roller side toward you, and remove the fusing heater lamp (300W) from F. terminal.
⑥. Pull out the fusing heater lamp (300W) from the back-up roller (inside).

Assembly Procedures

①. Prepare a new heater lamp (300W)/(400W). (2 heater lamps come in one set.)
②. Insert the heater lamp (300W) into the back-up roller.
③. Support the electrode of heater lamp with the F. terminal (R) and (L) at the back-up roller side.
④. Insert the heater lamp (400W) into the fuser roller.
⑤. Support the electrode of heater lamp with the F. terminal (R) and (L) at the fuser roller side.
⑥. Install F. terminal (L) and F. terminal (R).

Precautions

[Caution Item]

- Do not touch the surface of heater lamp with dirty hands.
- Capacity of the heater lamp is different between the fuser roller side and back-up roller side. Each capacity is marked on the insulator of lamp's electrode.
  Fuser roller side : 400W (Length: 342mm)
  Back-up roller side : 300W (Length: 332mm)

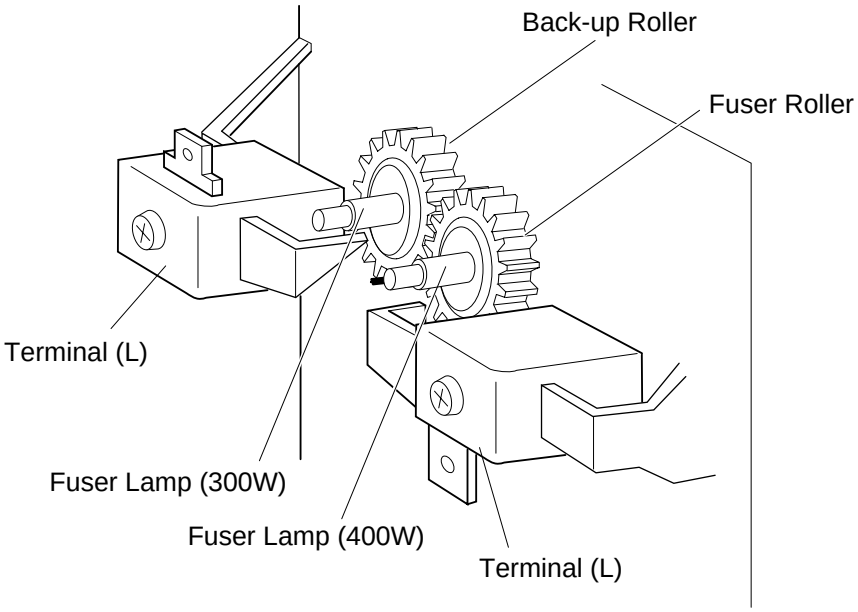

Back-up Roller
Fuser Roller
Terminal (L)
Fuser Lamp (300W)
Fuser Lamp (400W)
Terminal (L)

Fig.7-60

7.7.2 Fuser Roller

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures : See the layout of fuser unit parts.

①. Remove the fusing heater lamp (400W). (See the item 7.7.1.)
②. Remove the set screw FST3×10 (1 pcs.) of F. terminal (R), and remove F. terminal (R)
③. Remove the set screw ST3×6 (2 pcs.) of oil pan.
④. Remove the oil pan.
⑤. Remove the set screw ST3×6 (2 pcs.) of frame assembly.
⑥. Open the upper face of frame assembly.
⑦. Remove the fuser roller from the frame.

Assembly Procedures

①. Install a new fuser roller to the frame.
②. After the above, follow exactly the reverse order of disassembling procedures.

Precautions

- Do not touch the surface of fuser roller with bare hands.
- Do not let any foreign particle such as debris adhere to the surface of fuser roller.

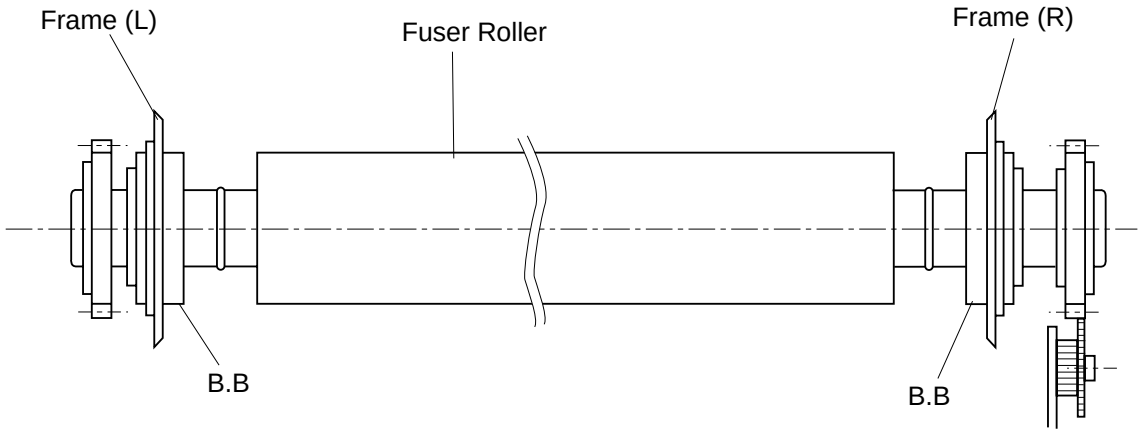


Fig.7-61

7.7.3 Back-Up Roller

Tools

①. Phillips Screwdriver #1, #2

Disassembly Procedures : See the layout of fuser unit parts.

①. Remove the fusing heater lamp (300W). (See the item 7.7.1.)
②. Remove the set screw ST3×6 (2 pcs.) of oil pan.
③. Remove the oil pan.
④. Remove the set screw ST3×6 (2 pcs.) of F. cover 'B'.
⑤. Remove the F. cover 'B'.
⑥. Remove the set screw F4×6 (2 pcs.) of low guide.
⑦. Remove the low guide.
⑧. Remove the set screw ST3×6 (2 pcs.) of frame assembly.
⑨. Open the upper face of frame assembly.
⑩. Remove the back-up roller from the frame.

Assembly Procedures

①. Install a new back-up roller to the frame.
②. After the above, follow exactly the reverse order of disassembling procedures.

Precautions

- Do not let any foreign particle such as debris adhere to the surface of back-up roller.

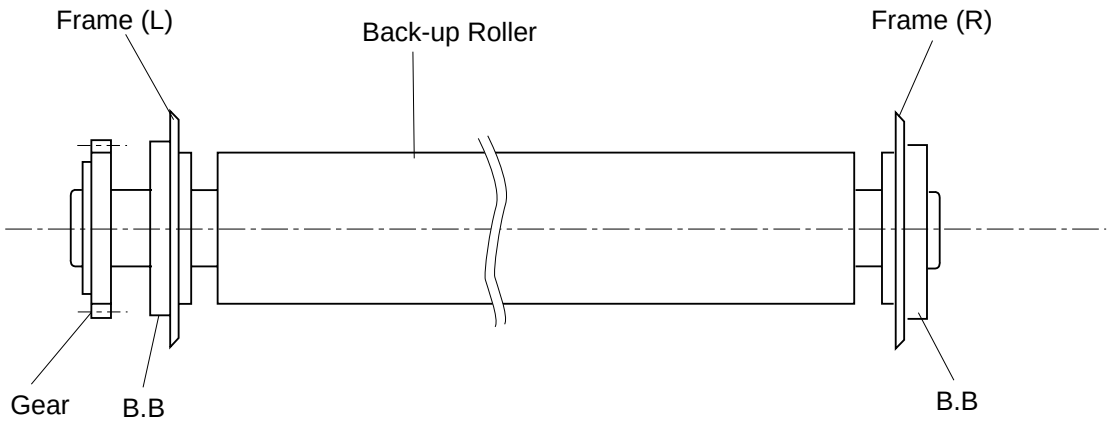


Fig.7-62

8. Troubleshooting

8.1 Outline of Troubleshooting 8-1

8.1.1 Operator Call 8-1

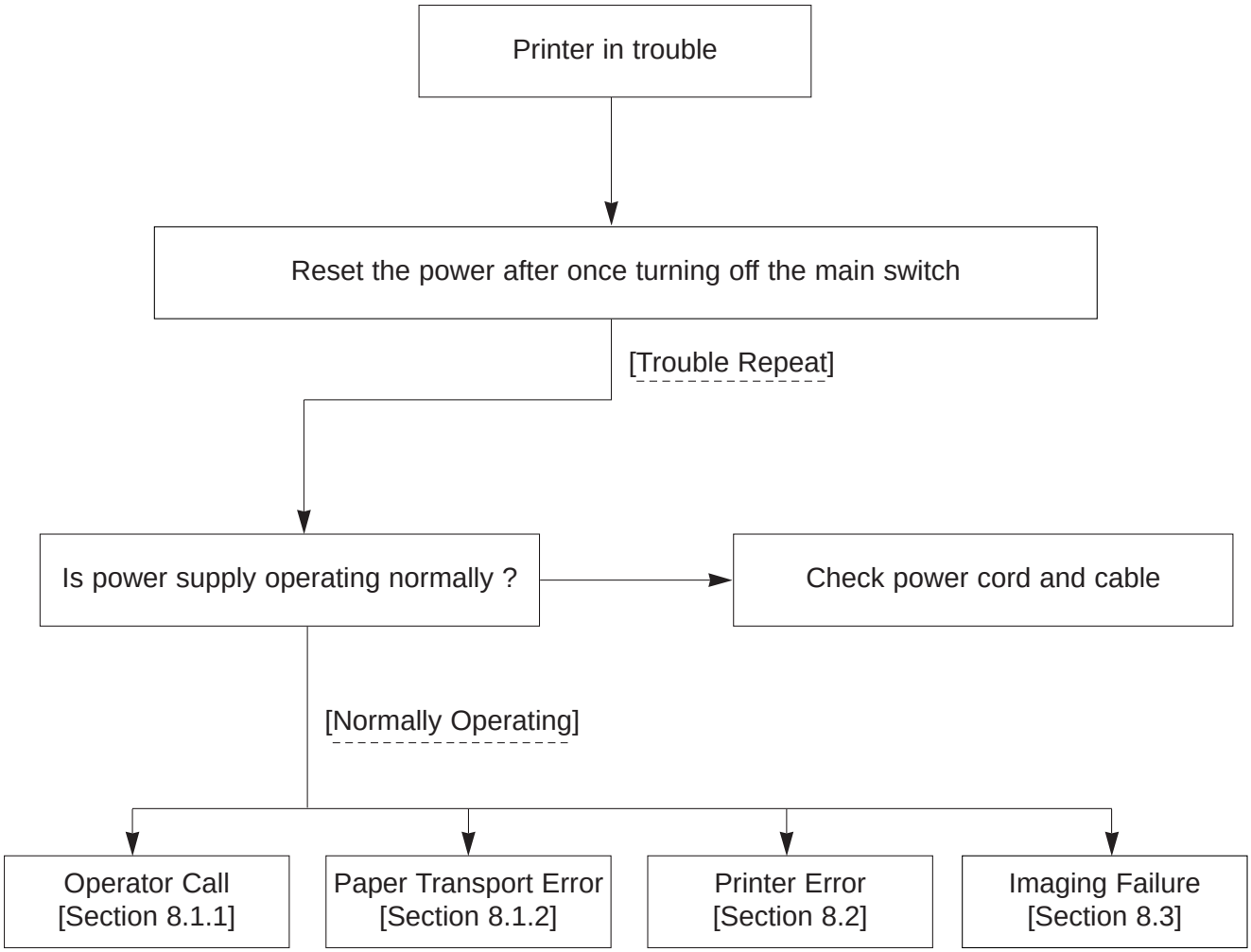
8.1.2 Paper Transport Error 8-4

8.2 Printer Error 8-7

8.3 Imaging Failure 8-37

8. Troubleshooting

8.1 Outline of Troubleshooting



8.1.1 Operator Call

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

(1). Consumables to be replenished.
(2). Waste toner pack being full of waste toner.
(3). Paper jam
(4). Periodic maintenance.
(5). Maintenance work being incomplete.
(6). In case that operator call is not cleared.

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

If the operator call is still indicated after the treatment, breakdown is occurring. Check the printer in accordance with (6). In case that operator call is not cleared.

1. Operator Call

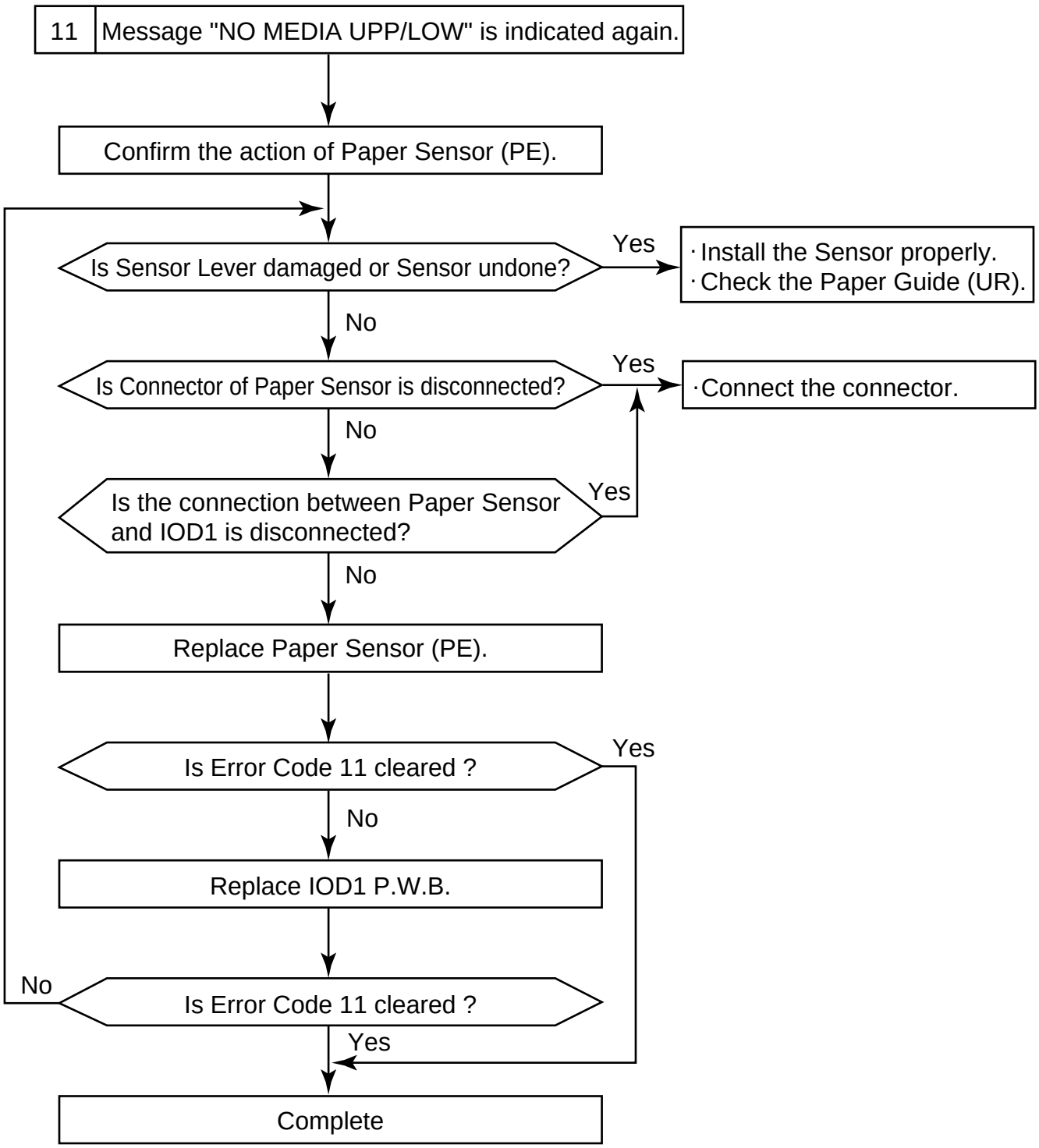
Table 8-1

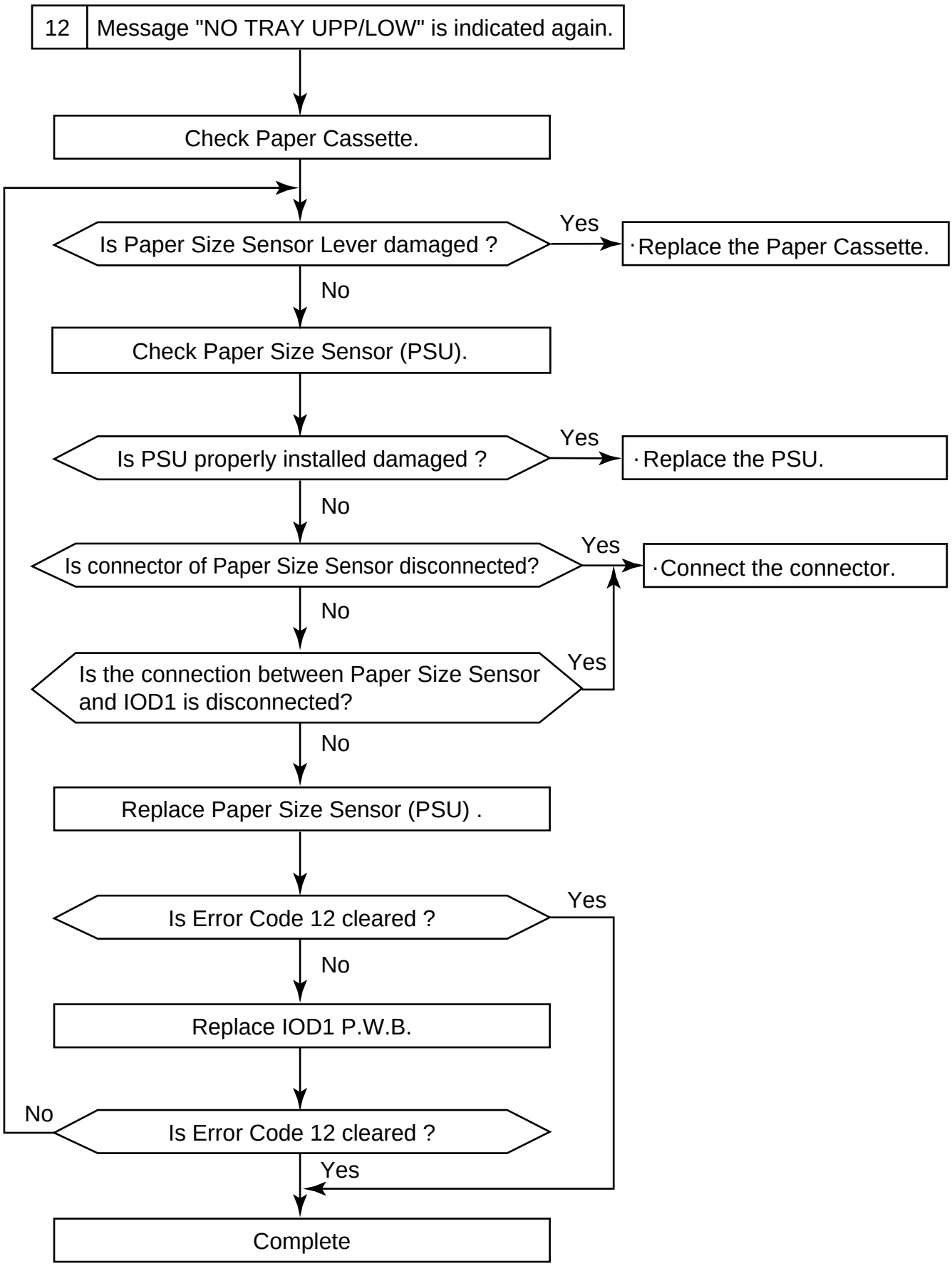
Subject of Operator Call		Countermeasure
Code	Message of Display	
11	NO MEDIA UPP/LOW [No paper in the upper cassette.] [No paper in the lower cassette.]	• Replenish papers.
	CHK MEDIA UPP/LOW [Inconsistency of media.]	• Change media.
12	NO TRAY UPP/LOW [No upper paper cassette.] [No lower paper cassette.]	• Install cassettes.
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]	• Replace with new waste toner pack.
	CHECK FUSER OIL [About time to change oil bottle.]	• Replace with new oil bottle.
	CHK CLEANING ROLLER [About time to change cleaning roller.]	• Replace with new cleaning roller.
15	MISPRINT PAPER/PRREQ/MEDIA [Misprinting occurred]	• Confirm with status of paper cassette. • Confirm with correct paper size. • Confirm with consistency of media.
16	ALIGN TONER CG Y/M/C/K [Toner cartridge not installed]	• Confirm with installation of toner cartridge.
	ALIGN FU UNIT [Fusing unit not installed]	• Remove fusing unit once and reset it. • Reconfirm with firm installation.
	ALIGN BELT CG [Belt cartridge not installed.]	• Confirm the installation of belt cartridge.
17	MEDIA JAM FEED [Paper jamming at feeding area]	• Remove paper cassette, and remove paper jamming at feeding entrance.

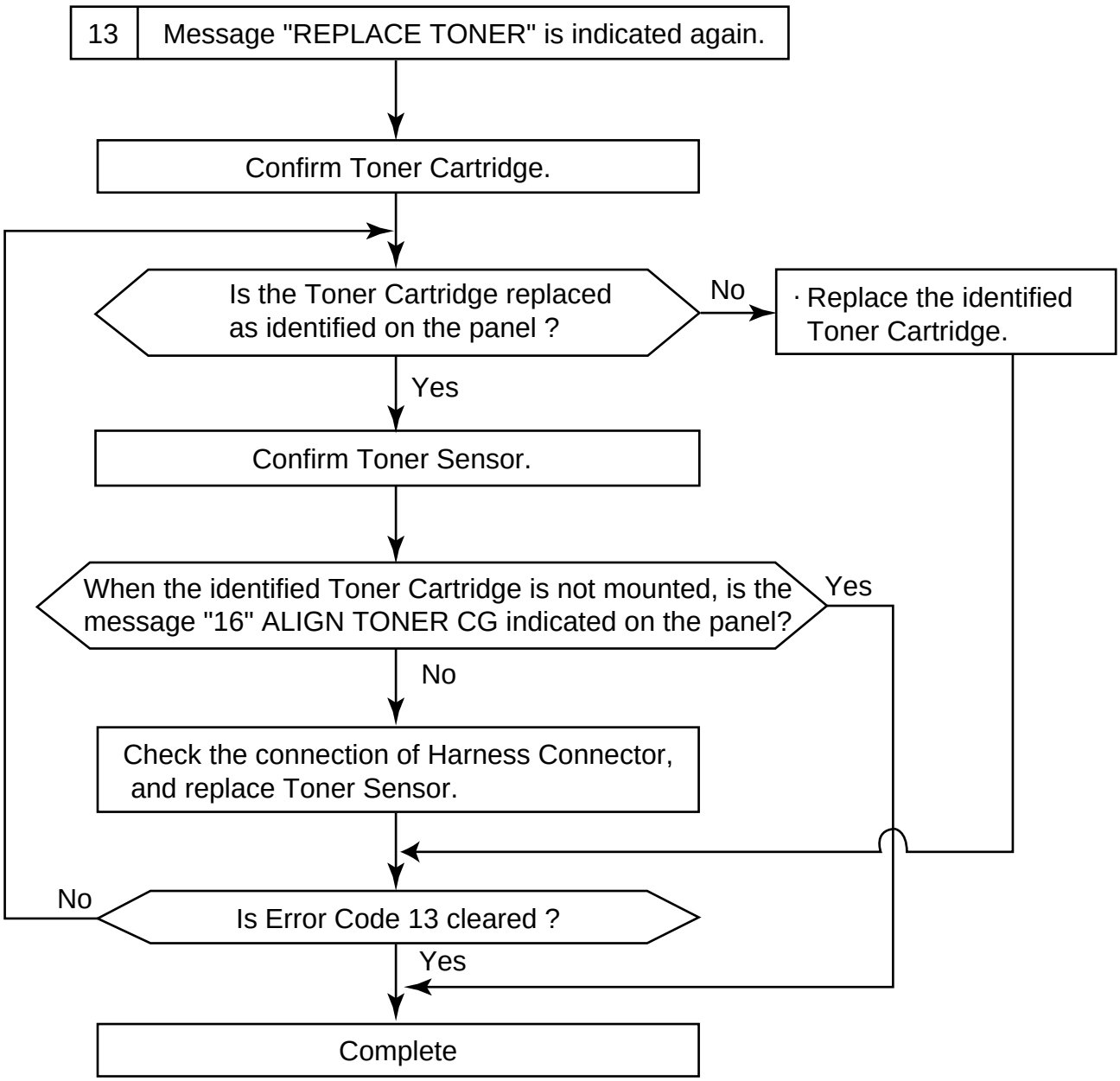
Subject of Operator Call		Countermeasure
Code	Message of Display	
17	MEDIA JAM INNER [Paper jamming inside printer]	• Open transfer unit, and remove paper jammed inside.
	MEDIA JAM OUTER [Paper jamming at paper exit area]	• Open transfer unit / paper exit unit, and remove paper jammed inside.
	MEDIA JAM DRUM [Paper jamming as winding around transfer drum]	• Open transfer unit, and remove belt cartridge. And then, remove paper jamming as winding transfer drum.
18	CLOSE PANEL FRONT/TOP [Covers open]	• Confirm that covers are firmly closed.
	CLOSE TR UNIT [Transfer unit open]	• Confirm that transfer unit is firmly closed.
19	SLEEP MODE [Printer under idling condition]	• Printer automatically returns to operating condition with PRINT signal.
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.]	

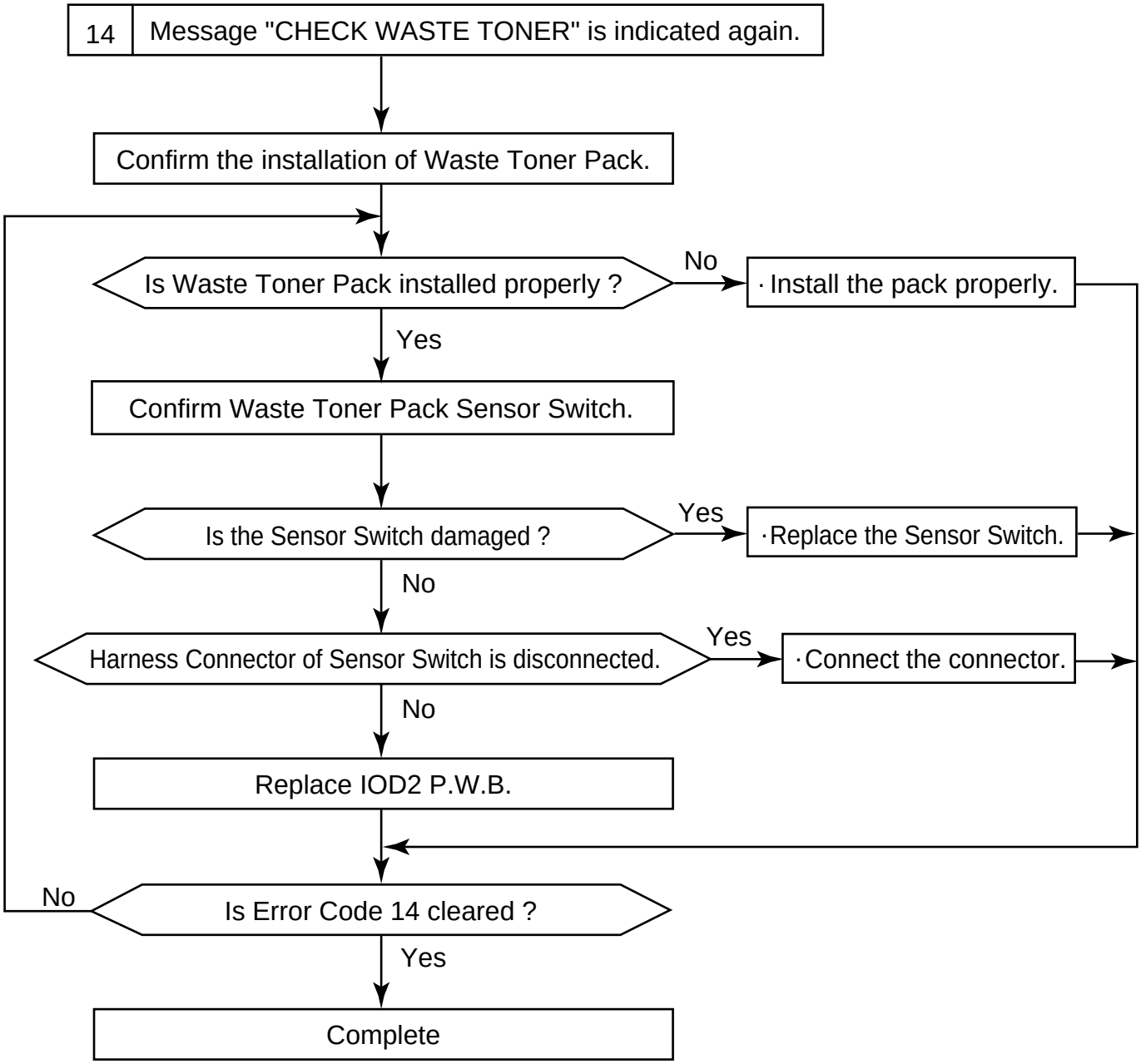
(6). In case that the operator call is not cleared:

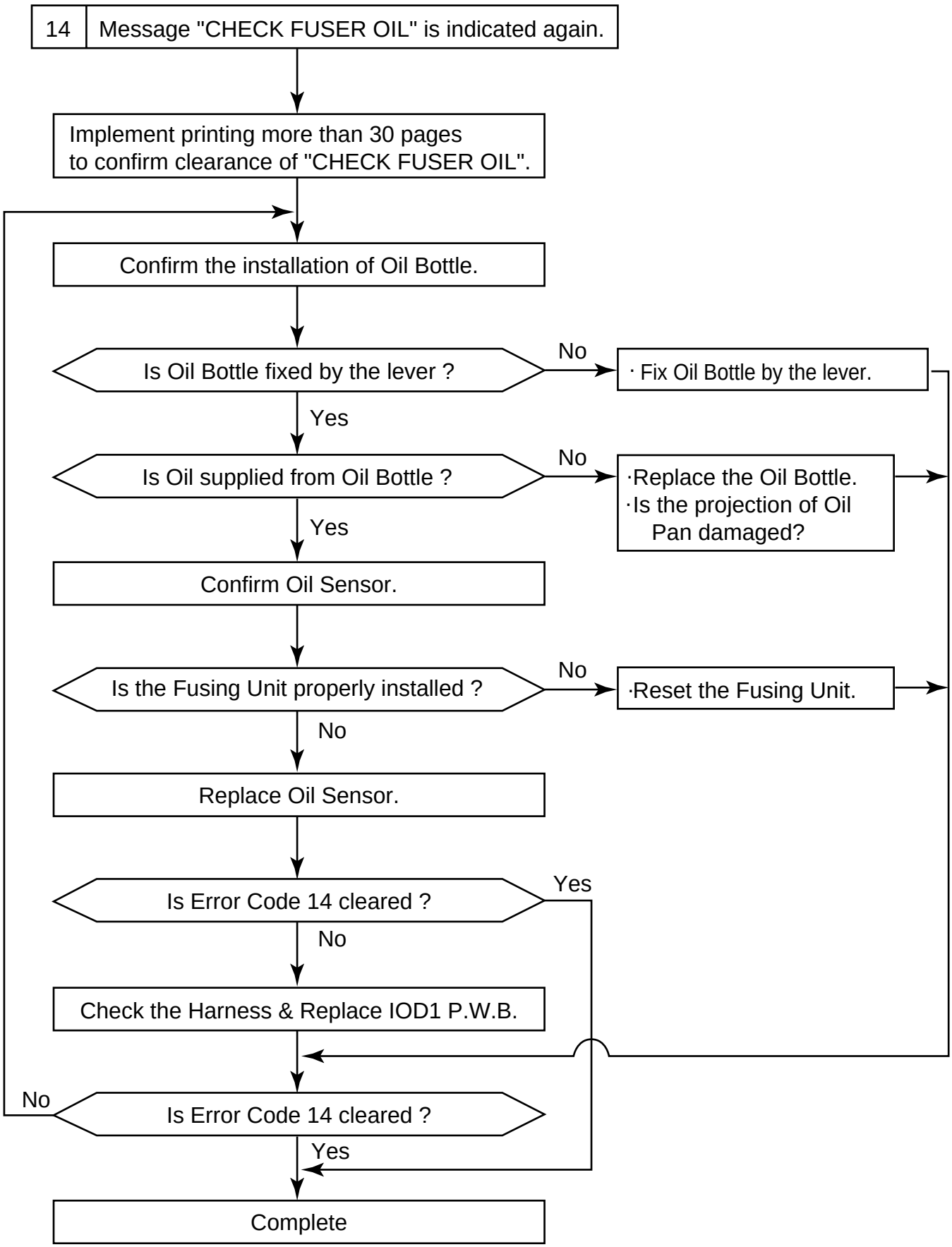
Normally, the operator call can be cleared by the implementation of applicable countermeasures listed in Table 8-1. If not cleared, the printer engine may be in trouble. Check and implement appropriate countermeasures in accordance with the following procedures.

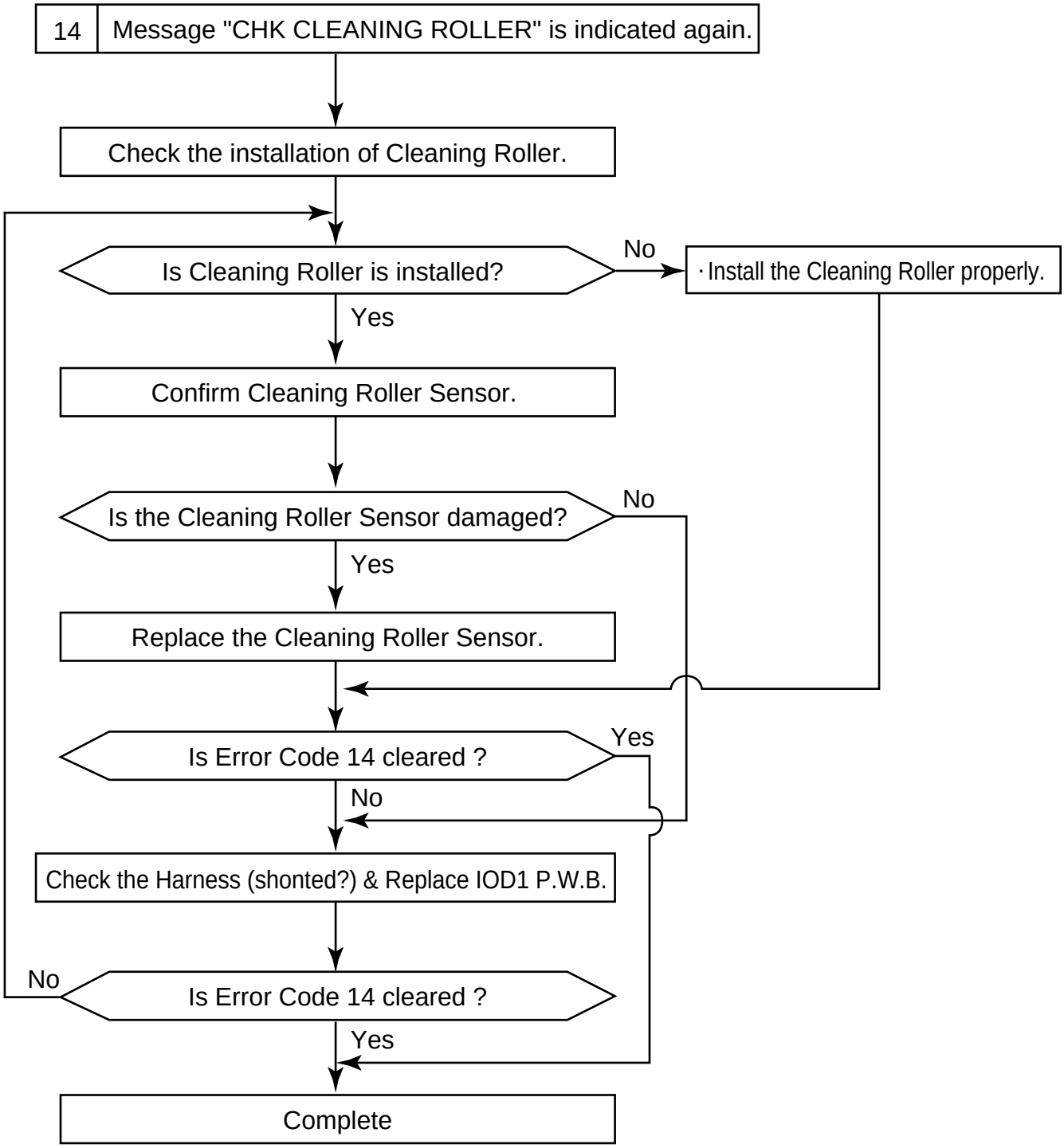

11
Message "NO MEDIA UPP/LOW" is indicated again.
Confirm the action of Paper Sensor (PE).
Is Sensor Lever damaged or Sensor undone?
Yes
· Install the Sensor properly.
· Check the Paper Guide (UR).
No
Is Connector of Paper Sensor is disconnected?
Yes
· Connect the connector.
No
Is the connection between Paper Sensor and IOD1 is disconnected?
Yes
No
Replace Paper Sensor (PE).
Is Error Code 11 cleared ?
Yes
No
Replace IOD1 P.W.B.
Is Error Code 11 cleared ?
No
Yes
Complete

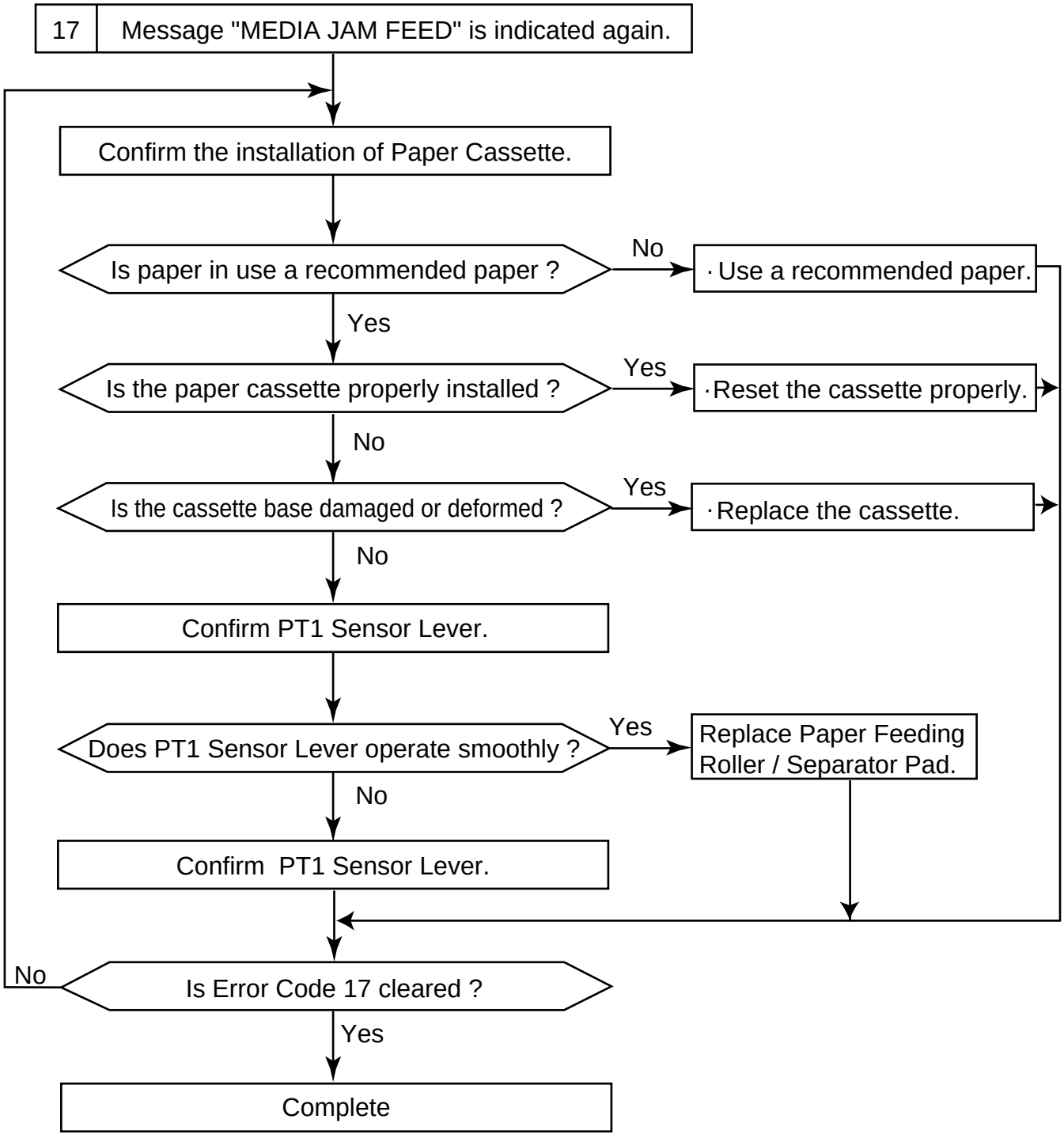

12
Message "NO TRAY UPP/LOW" is indicated again.
Check Paper Cassette.
Is Paper Size Sensor Lever damaged ?
Yes
·Replace the Paper Cassette.
No
Check Paper Size Sensor (PSU).
Is PSU properly installed damaged ?
Yes
·Replace the PSU.
No
Is connector of Paper Size Sensor disconnected?
Yes
·Connect the connector.
No
Is the connection between Paper Size Sensor and IOD1 is disconnected?
Yes
No
Replace Paper Size Sensor (PSU) .
Is Error Code 12 cleared ?
Yes
No
Replace IOD1 P.W.B.
Is Error Code 12 cleared ?
No
Yes
Complete

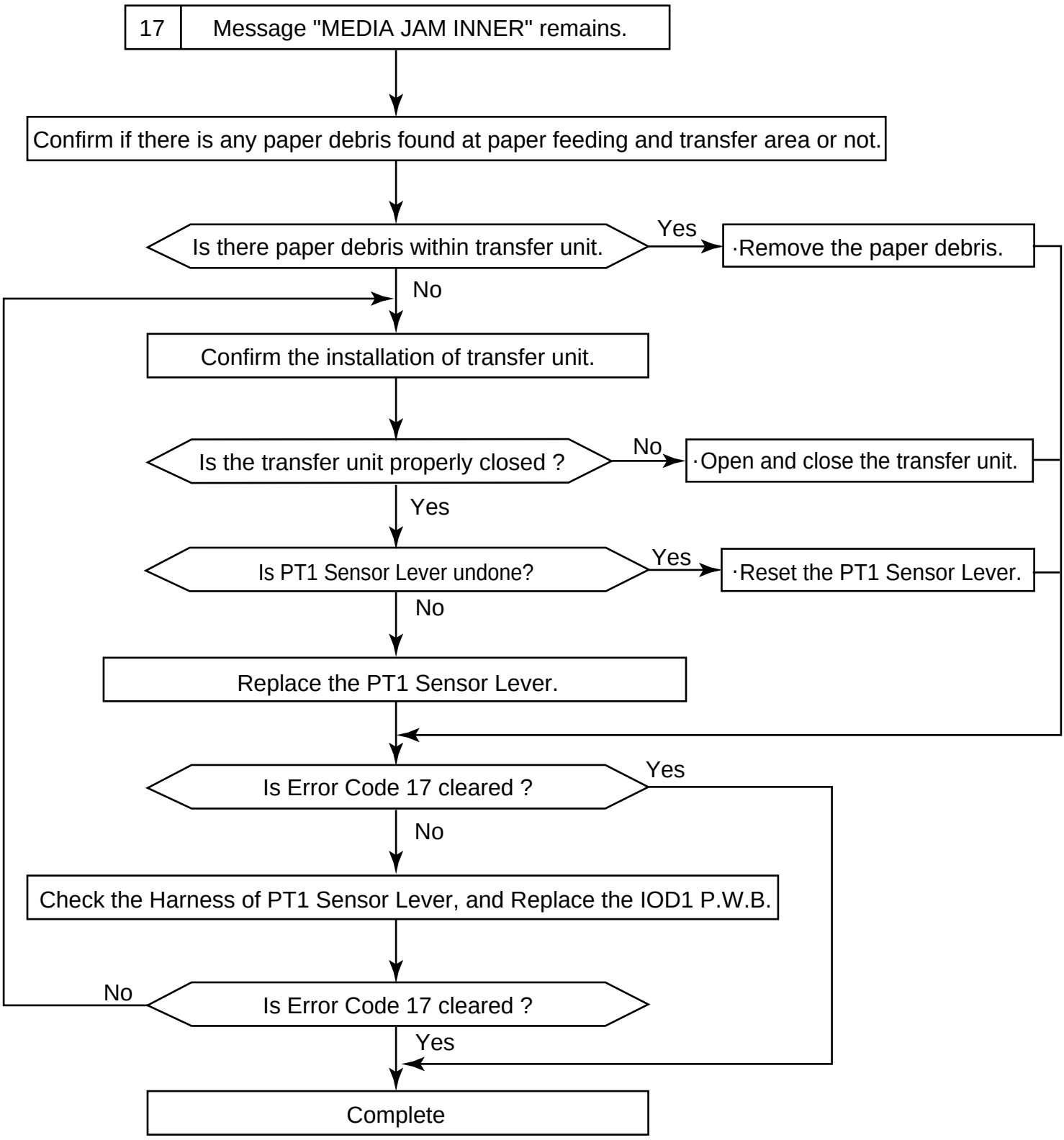

13
Message "REPLACE TONER" is indicated again.
Confirm Toner Cartridge.
Is the Toner Cartridge replaced as identified on the panel ?
No
· Replace the identified Toner Cartridge.
Yes
Confirm Toner Sensor.
When the identified Toner Cartridge is not mounted, is the message "16" ALIGN TONER CG indicated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

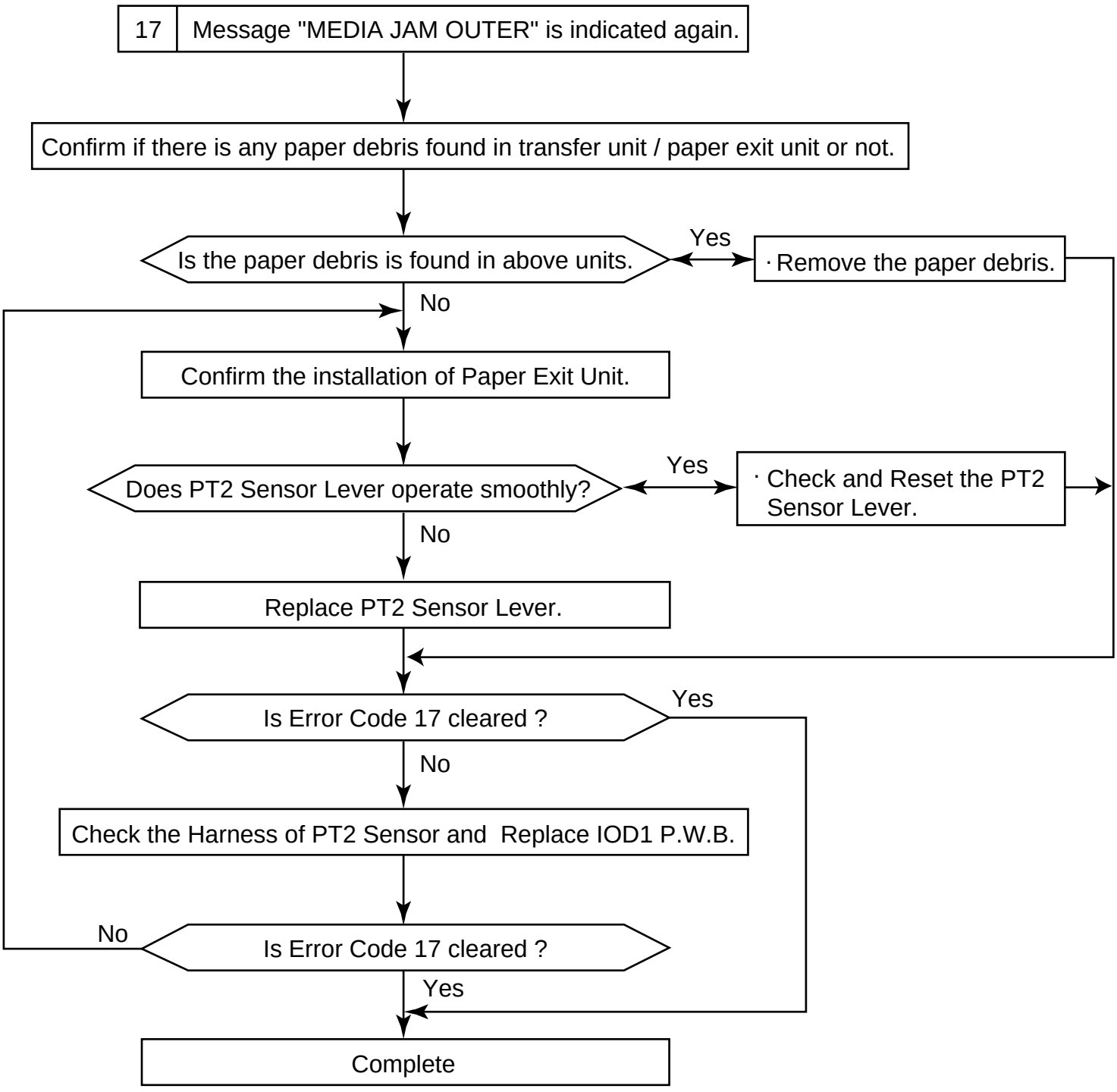

14
Message "CHECK WASTE TONER" is indicated again.
Confirm the installation of Waste Toner Pack.
Is Waste Toner Pack installed properly ?
No
· Install the pack properly.
Yes
Confirm Waste Toner Pack Sensor Switch.
Is the Sensor Switch damaged ?
Yes
·Replace the Sensor Switch.
No
Harness Connector of Sensor Switch is disconnected.
Yes
·Connect the connector.
No
Replace IOD2 P.W.B.
No
Is Error Code 14 cleared ?
Yes
Complete

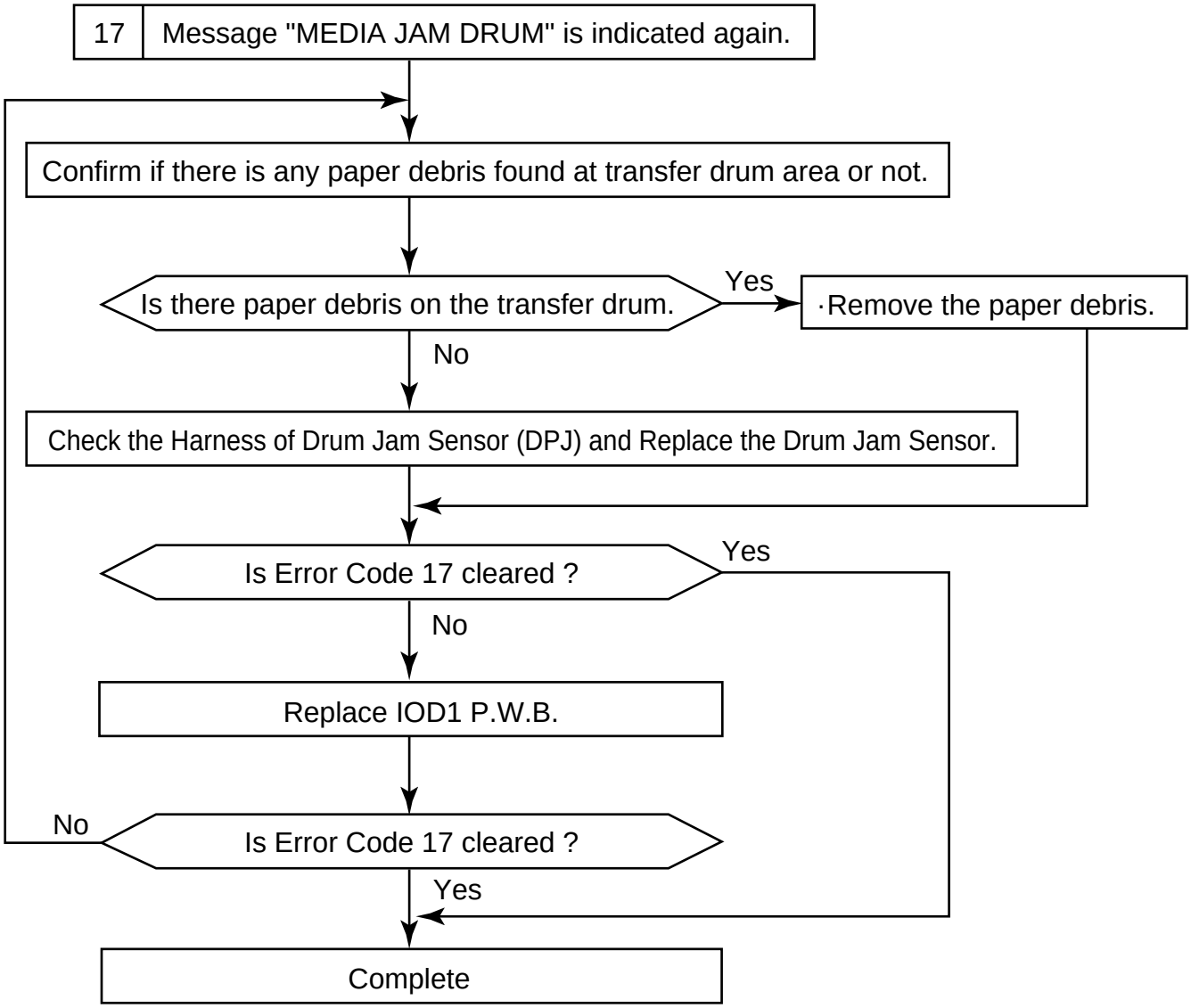

14
Message "CHECK FUSER OIL" is indicated again.
Implement printing more than 30 pages to confirm clearance of "CHECK FUSER OIL".
Confirm the installation of Oil Bottle.
Is Oil Bottle fixed by the lever ?
No
· Fix Oil Bottle by the lever.
Yes
Is Oil supplied from Oil Bottle ?
No
·Replace the Oil Bottle.
·Is the projection of Oil Pan damaged?
Yes
Confirm Oil Sensor.
Is the Fusing Unit properly installed ?
No
·Reset the Fusing Unit.
No
Replace Oil Sensor.
Is Error Code 14 cleared ?
Yes
No
Check the Harness & Replace IOD1 P.W.B.
Is Error Code 14 cleared ?
No
Yes
Complete

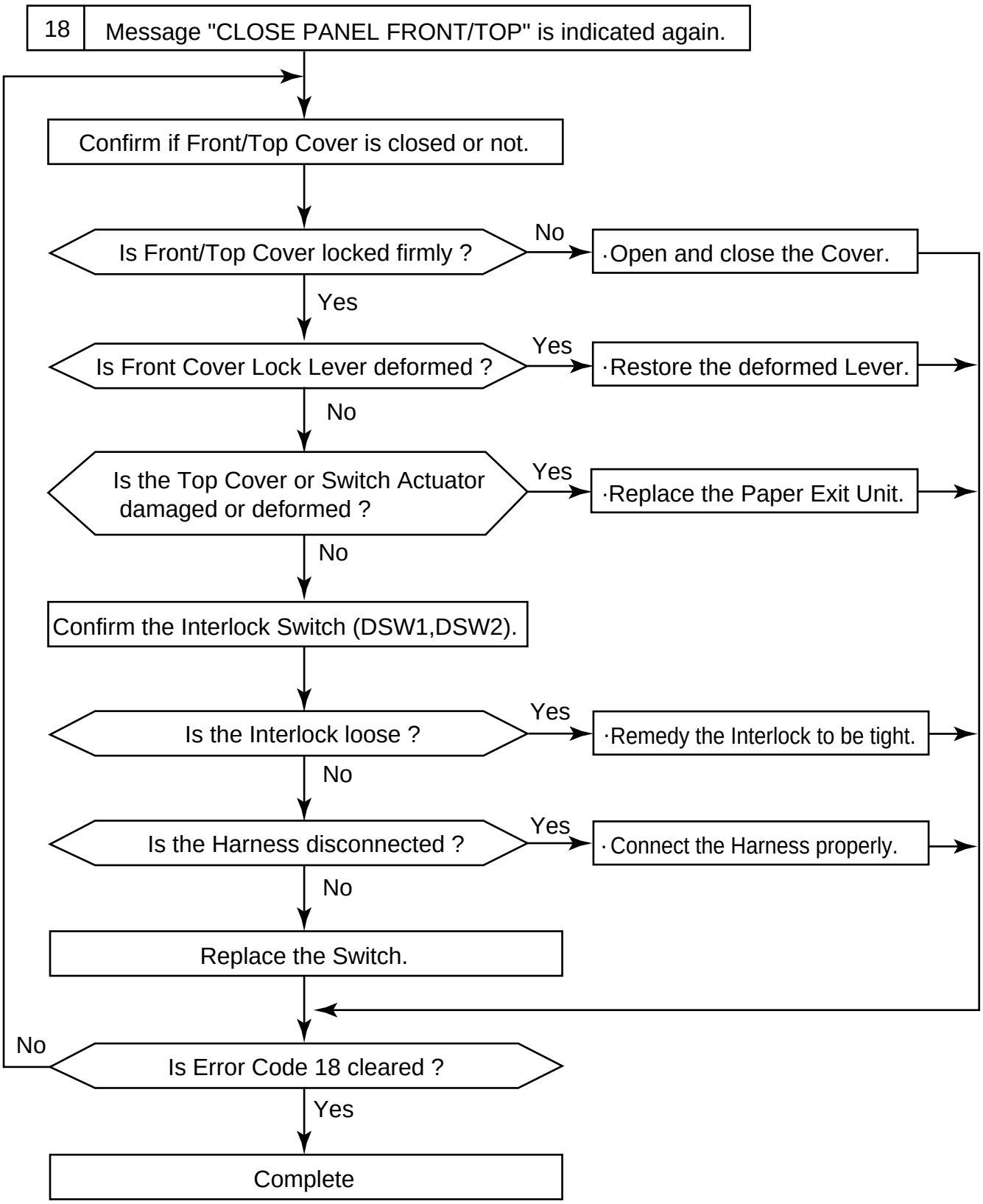

14
Message "CHK CLEANING ROLLER" is indicated again.
Check the installation of Cleaning Roller.
Is Cleaning Roller is installed?
No
· Install the Cleaning Roller properly.
Yes
Confirm Cleaning Roller Sensor.
Is the Cleaning Roller Sensor damaged?
No
Yes
Replace the Cleaning Roller Sensor.
Is Error Code 14 cleared ?
Yes
No
Check the Harness (shonted?) & Replace IOD1 P.W.B.
No
Is Error Code 14 cleared ?
Yes
Complete

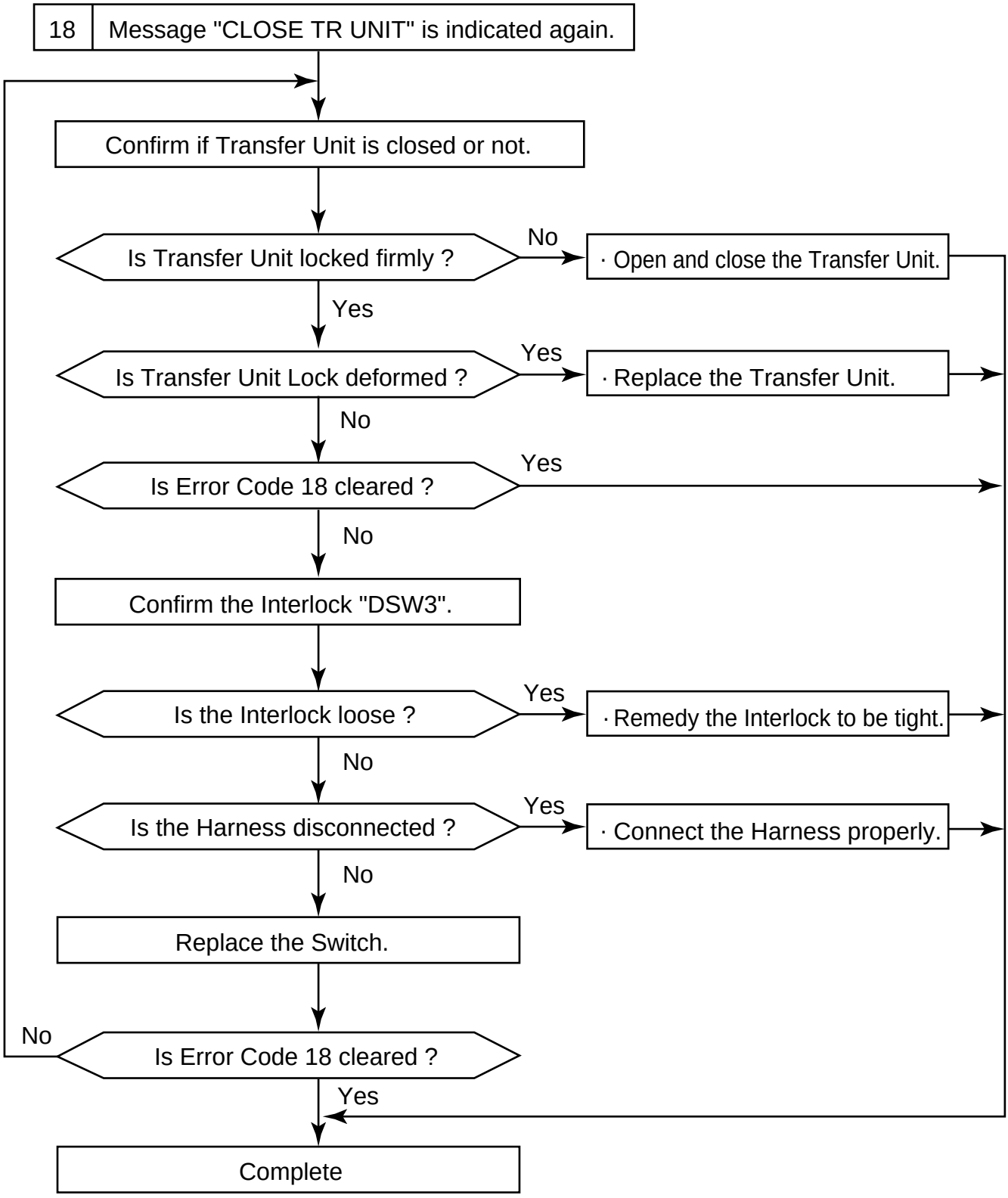

17
Message "MEDIA JAM FEED" is indicated again.
Confirm the installation of Paper Cassette.
Is paper in use a recommended paper ?
No
· Use a recommended paper.
Yes
Is the paper cassette properly installed ?
Yes
·Reset the cassette properly.
No
Is the cassette base damaged or deformed ?
Yes
·Replace the cassette.
No
Confirm PT1 Sensor Lever.
Does PT1 Sensor Lever operate smoothly ?
Yes
Replace Paper Feeding Roller / Separator Pad.
No
Confirm PT1 Sensor Lever.
Is Error Code 17 cleared ?
No
Yes
Complete


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 transfer unit.
Yes
·Remove the paper debris.
No
Confirm the installation of transfer unit.
Is the transfer unit properly closed ?
No
·Open and close the transfer unit.
Yes
Is PT1 Sensor Lever undone?
Yes
·Reset the PT1 Sensor Lever.
No
Replace the PT1 Sensor Lever.
Is Error Code 17 cleared ?
Yes
No
Check the Harness of PT1 Sensor Lever, and Replace the IOD1 P.W.B.
No
Is Error Code 17 cleared ?
Yes
Complete


17
Message "MEDIA JAM OUTER" is indicated again.
Confirm if there is any paper debris found in transfer unit / paper exit unit or not.
Is the paper debris is found in above units.
Yes
· Remove the paper debris.
No
Confirm the installation of Paper Exit Unit.
Does PT2 Sensor Lever operate smoothly?
Yes
· Check and Reset the PT2 Sensor Lever.
No
Replace PT2 Sensor Lever.
Is Error Code 17 cleared ?
Yes
No
Check the Harness of PT2 Sensor and Replace IOD1 P.W.B.
No
Is Error Code 17 cleared ?
Yes
Complete


17
Message "MEDIA JAM DRUM" is indicated again.
Confirm if there is any paper debris found at transfer drum area or not.
Is there paper debris on the transfer drum.
Yes
·Remove the paper debris.
No
Check the Harness of Drum Jam Sensor (DPJ) and Replace the Drum Jam Sensor.
Is Error Code 17 cleared ?
Yes
No
Replace IOD1 P.W.B.
Is Error Code 17 cleared ?
No
Yes
Complete

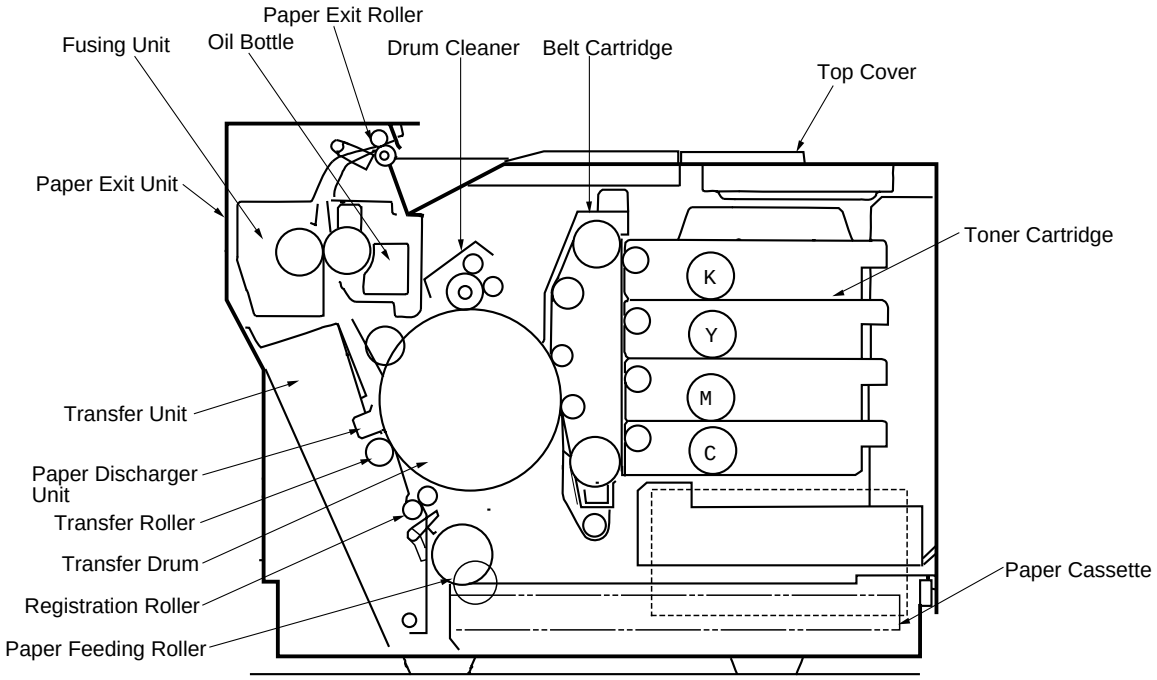

18
Message "CLOSE PANEL FRONT/TOP" is indicated again.
Confirm if Front/Top Cover is closed or not.
Is Front/Top Cover locked firmly ?
No
·Open and close the Cover.
Yes
Is Front Cover Lock Lever deformed ?
Yes
·Restore the deformed Lever.
No
Is the Top Cover or Switch Actuator damaged or deformed ?
Yes
·Replace the Paper Exit Unit.
No
Confirm the Interlock Switch (DSW1,DSW2).
Is the Interlock loose ?
Yes
·Remedy the Interlock to be tight.
No
Is the Harness disconnected ?
Yes
· Connect the Harness properly.
No
Replace the Switch.
No
Is Error Code 18 cleared ?
Yes
Complete


18
Message "CLOSE TR UNIT" is indicated again.
Confirm if Transfer Unit is closed or not.
Is Transfer Unit locked firmly ?
No
· Open and close the Transfer Unit.
Yes
Is Transfer Unit Lock deformed ?
Yes
· Replace the Transfer Unit.
No
Is Error Code 18 cleared ?
Yes
No
Confirm the Interlock "DSW3".
Is the Interlock loose ?
Yes
· Remedy the Interlock to be tight.
No
Is the Harness disconnected ?
Yes
· Connect the Harness properly.
No
Replace the Switch.
No
Is Error Code 18 cleared ?
Yes
Complete

8.1.2 Paper Transport Error

Paper is transported through the path shown in Fig.8-1. Paper jam at the following locations is the user-friendly for clearance.

• Paper Feeding Part / • Transfer Part / • Fuser Part / • Paper Exiting Part.



[Fig.8-1]

(1). Feed Jam

Table 8-2-1

Problem Item	P#	Check Item	Result	Corrective Action
Print Paper	1	Is the print paper a recommended paper ?	NO	Use a recommended paper.
	2	Is the print paper humid ? (Has the paper been abandoned ?)	YES	Replace the existing papers with new papers.
Paper Cassette	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	5	Is the print paper caught in the paper feeding part ?	YES	Remove the paper being caught.
	6	Is the pick-up roller damaged ?	NO	Ask the serviceman to replace the damaged pick-up roller.

P# : Procedure Number

(2). Inner Jam

Table 8-2-2

Problem Item	P#	Check Item	Result	Corrective Action
Transfer Unit		Open the transfer unit 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 by the lock lever.
	3	Is the paper discharger unit installed in place ?	NO	Install the paper discharger unit firmly in place.
	4	Is the wire of paper discharger unit damaged ?	YES	Replace the existing paper discharger unit with new unit.
Fusing Unit	5	Is the fuser unit installed in place ?	NO	Install the fuser unit firmly in place.
	6	Is there any paper pinched between the rollers ?	YES	Remove the pinched paper.
	7	Is there fuser oil still in the oil bottle ?	NO	Replace the existing oil bottle with new bottle.

P# : Procedure Number

(3). Outer Jam

Table 8-2-3

Problem Item	P#	Check Item	Result	Corrective Action
Print Paper	1	Is the print paper a recommended paper ?	NO	Use a recommended paper.
Paper Exit Unit	1	Is the paper exit unit firmly locked by the lock lever ?	NO	Open and close the paper exit unit again.

P# : Procedure Number

8.2 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 clear switch, confirm the error code, and then call for the service of maintenance company nearby.

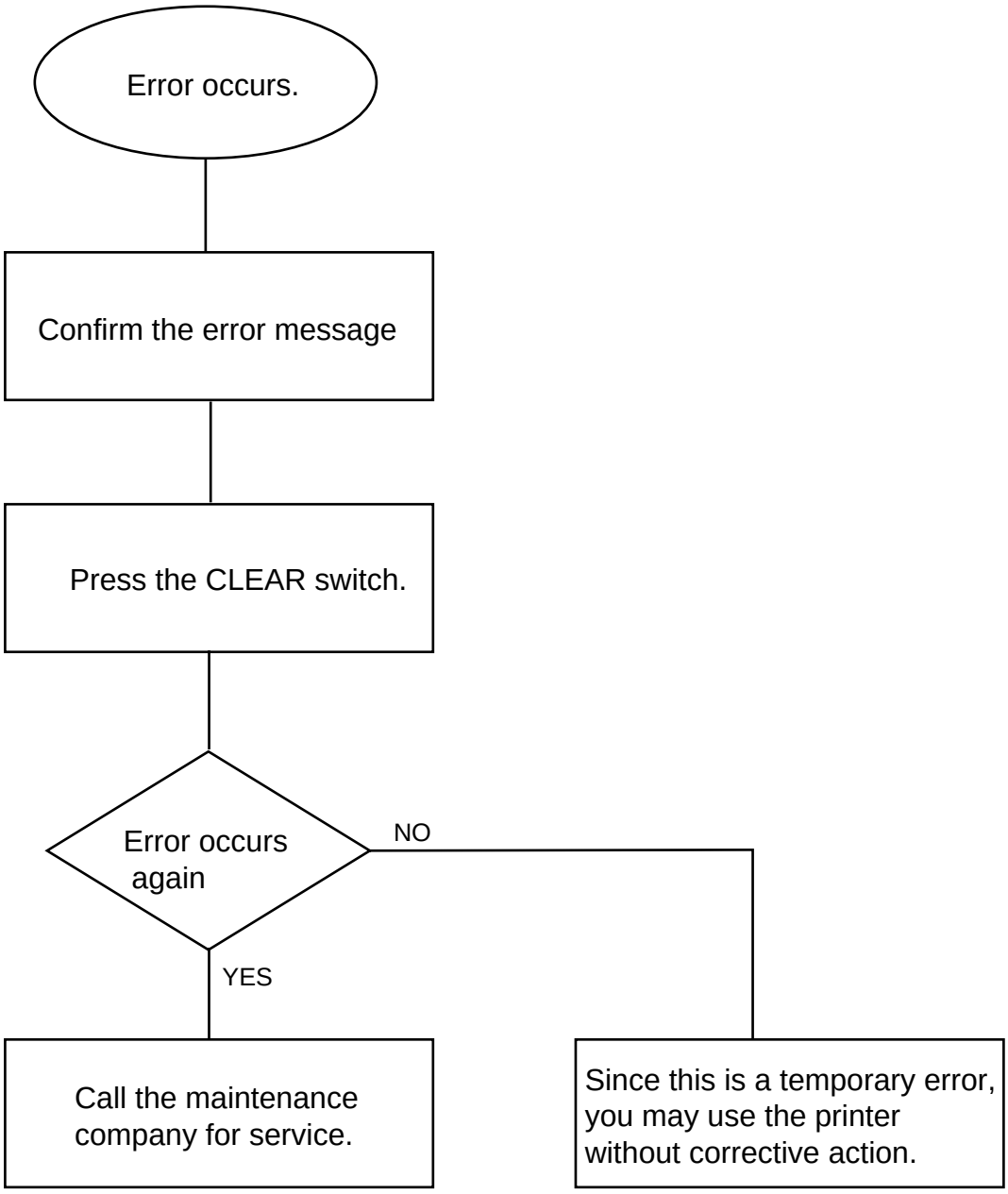


Table 8-1 : Error Code

[1/2]

No.	Code	Description
1	C3	NVRAM Error (MCTL P.W.B.)
2	C4	Engine Controller MCTL P.W.B. Hardware Error
3	C7	Process Timing Clock Error (Main Motor Clock Error)
4	D1	Clutch Error of Yellow Developing Unit
5	D2	Clutch Error of Magenta Developing Unit
6	D3	Clutch Error of Cyan Developing Unit
7	D4	Clutch Error of Black Developing Unit
8	D5	HPSI Signal Error (Retract Error of Black and Yellow Toner Cartridge)
9	D6	HPSI Signal Error (Retract Error of Cyan and Magenta Toner Cartridge)
10	E1	Developing Motor Error
11	E2	Main Motor Error
12	E3	Transfer Drum Rotational Error
13	E4	Toner Empty Sensor Error (TPD)
14	E5	Transfer Roller Solenoid Error
15	E6	Brush Cleaner Solenoid Error
16	E7	Brush Cleaner Clutch Error
17	E8	Clutch Error of Fusing Unit
18	E9	Belt Sensor Error
19	EL	Erase Lamp Error
20	F0	Control Fan Error
21	F2	Ozone Fan (1) Error
22	F4	Fuser Fan Error

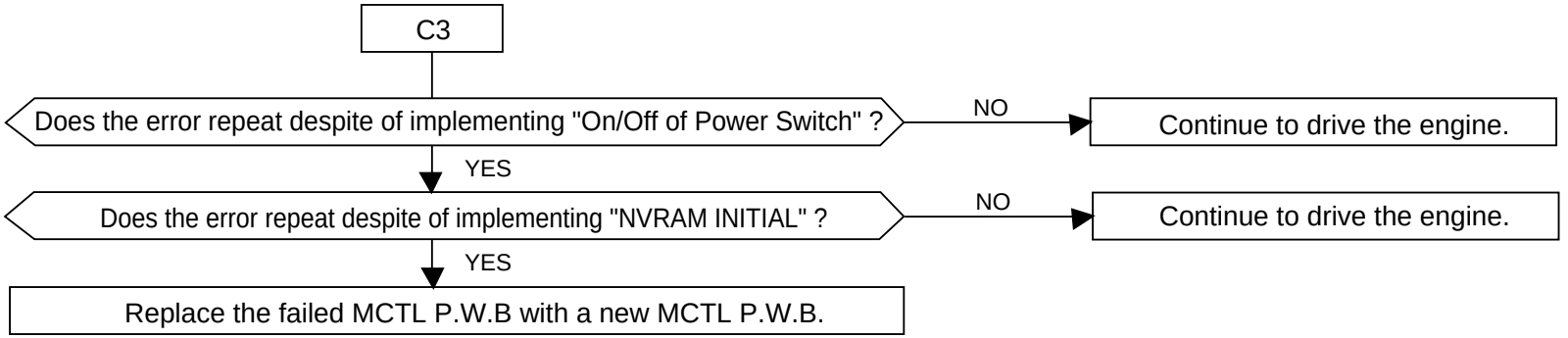
Table 8-1 : Error Code

[2/2]

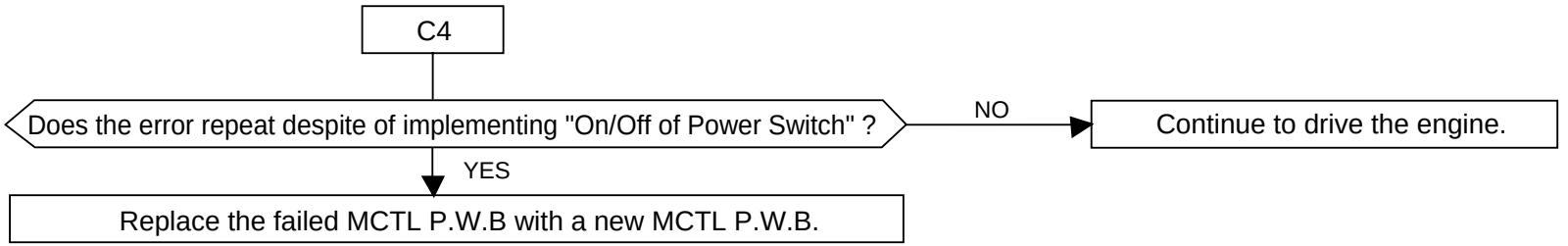
No.	Code	Description
23	F5	Charging HV (DC High Voltage) Error
24	H0	Fuser Thermistor Error
25	H2	Fusing Temperature Error (Warming-Up Time Error)
26	H3	Fusing Temperature (3) Error (Heater Continuous ON Time Error)
27	H4	Fusing Temperature (4) Error (Heater Continuous OFF Time Error)
28	L1	Beam Sensor Error
29	L2	Scanner Motor Error
30	LL	Laser Power Error

8.2 Troubleshoot

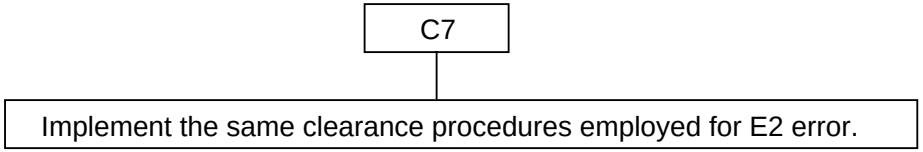
Code	Description of Error	Cause of Error	Clearance Method
C3	NVRAM Error	1. Failure of MCTL P.W.B. ECPU EEEPROM	1. Turn on and off the power switch. 2. Above method 1 does not work, implement "C3 Error Clearance Procedure". 3. Replace the failed MCTL P.W.B with a new MCTL P.W.B.



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



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



Error Code	D1
Name of Part	Developer Clutch (DCLY)

Confirm the connection of Connector.

Is the connection proper between ECN17 of IOD2 and Clutch (DCLY) ?
Is the harness of Clutch (DCLY) broken ?

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 ECN17-3 and ECN2-8?

YES → Replace the clutch (DCLY) with a new clutch.

NO

Does the voltage jump (@ @) between ECN1-1 and ECN2-12 ?

YES → Replace IOD2 PWB with a new IOD2 P.W.B.

NO

Is D1 Error cleared ?

YES → Complete

NO

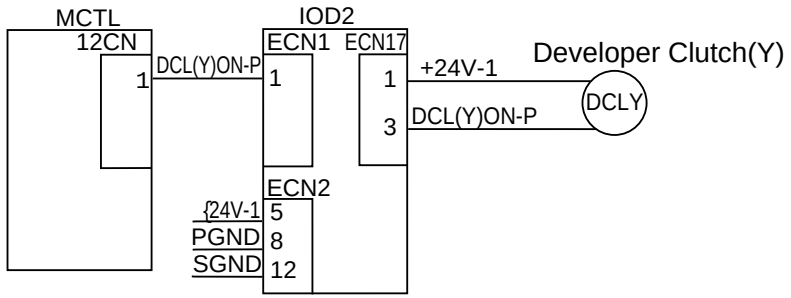
Replace current MCTL PWB with a new P.W.B.

Is D1 Error cleared ?

NO → Re-check

YES

Complete



Error Code	D2
Name of Part	Developer Clutch (DCLM)

Confirm the connection of Connector.

Is the connection proper between ECN16 of IOD2 and Clutch (DCLM) ? — NO → Connect the harness.

Is the harness of Clutch (DCLM) broken ? — NO → Connect the connector properly.

YES

Check the voltage at DCLM ON-N.

Does the voltage drop (@ @ @) between ECN16-3 and ECN2-8? — YES → Replace the clutch (DCLM) with a new clutch.

NO

Does the voltage jump (@ @) between ECN1-2 and ECN2-12 ? — YES → Replace IOD2 P.W.B with a new IOD2 P.W.B.

NO

Replace current MCTL P.W.B with a new P.W.B.

Is D2 Error cleared ? — NO → Re-check

YES

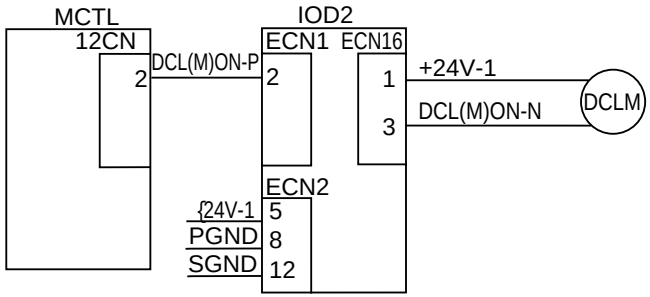
Complete

Connect the connector properly. → Is D2 Error cleared ? — YES → Complete

NO → Check the voltage at DCLM ON-N.

Is D2 Error cleared ? — YES → Complete

NO → Replace current MCTL P.W.B with a new P.W.B.



Error Code	D3
Name of Part	Developer Clutch (DCLC)

Confirm the connection of Connector.

Is the connection proper between ECN14 of IOD2 and Clutch (DCLC) ?
Is the harness of Clutch (DCLC) broken ?

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

YES

Is D3 Error cleared ?

YES → Complete

NO

Check the voltage at DCLC ON-N.

Does the voltage drop (@ @24V @) between ECN14-3 and ECN2-8?

YES → Replace the clutch (DCLC) with a new clutch.

NO

Does the voltage jump (@ @) between ECN1-3 and ECN2-12 ?

YES → Replace IOD2 P.W.B with a new IOD2 P.W.B.

NO

Is D3 Error cleared ?

YES → Complete

NO

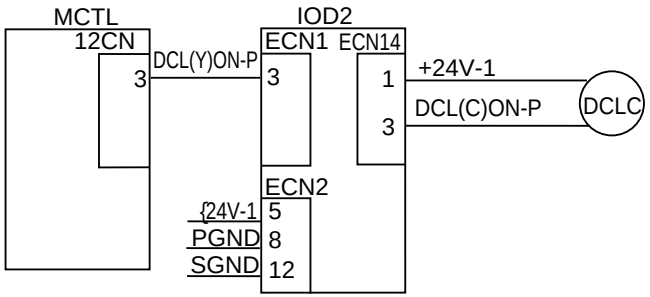
Replace current MCTL P.W.B with a new P.W.B.

Is D3 Error cleared ?

NO → Re-check

YES

Complete



Error Code	D4
Name of Part	Developer Clutch (DCLK)

Confirm the connection of Connector.

Is the connection proper between ECN13 of IOD2 and Clutch (DCLK) ?
Is the harness of Clutch (DCLK) broken ?

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 (@ @ @) between ECN13-3 and ECN2-8?

YES → Replace the clutch (DCLK) with a new clutch.

NO

Does the voltage jump (@ @) between ECN1-4 and ECN2-12 ?

YES → Replace IOD2 P.W.B with a new IOD2 P.W.B.

NO

Is D4 Error cleared ?

YES → Complete

NO

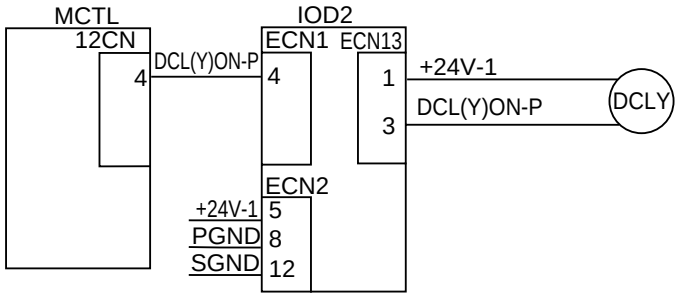
Replace current MCTL P.W.B with a new P.W.B.

Is D4 Error cleared ?

NO → Re-check

YES

Complete



Error Code	D5
Name of Part	Developer Solenoid (PSL YM)

Confirm the connection of Connector.

Is the connection proper between ECN3 of IOD2 and Solenoid (PSL YM) ?
Is the harness of Solenoid (PSL YM) broken ?

NO → Connect the harness.
Connect the connector properly

YES

Is D5 Error cleared ?

YES → Complete

NO

Check the voltage at (PSL YM) ON-N.

Does the voltage drop (@ @24V @) between ECN3-11 and ECN2-8?

YES → Replace the front cover unit with a new unit.

NO

Does the voltage jump (@ @) between ECN1-5and ECN2-12 ?

YES → Replace IOD2 P.W.B with a new IOD2 P.W.B.

NO

Is D5 Error cleared ?

YES → Complete

NO

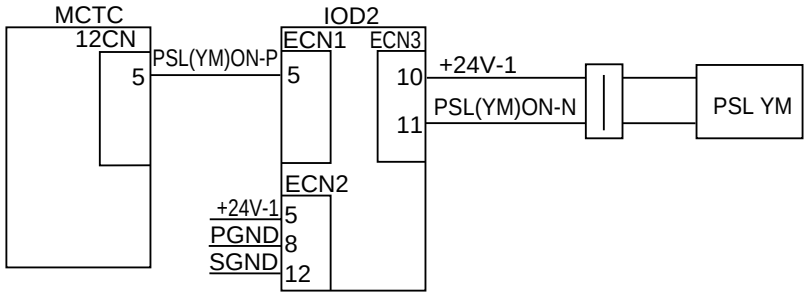
Replace current MCTL P.W.B with a new P.W.B.

Is D5 Error cleared

NO → Re-check

YES

Complete



Error Code	D6
Name of Part	Developer Solenoid (PSL KC)

Confirm the connection of Connector.

Is the connection proper between ECN3 of IOD2 and Solenoid (PSL KC) ?

Is the harness of Solenoid (PSL KC) broken ?

NO → Connect the harness. Connect the connector properly.

YES

Is D6 Error cleared ? YES → Complete

NO

Check the voltage at (PSL KC) ON-N.

Does the voltage drop (@ @ @ +24V) between ECN3-13 and ECN2-8? YES → Replace the front cover unit with a new unit.

NO

Does the voltage jump (@ @ @) between ECN1-6and ECN2-12 ? YES → Replace IOD2 P.W.B with a new IOD2 P.W.B.

NO

Is D6 Error cleared ? YES → Complete

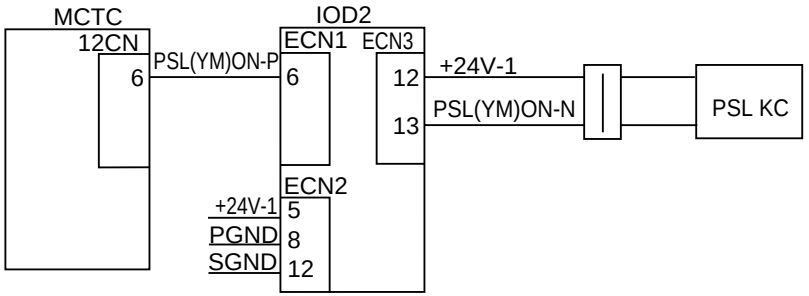
NO

Replace current MCTL P.W.B with a new P.W.B.

Is D6 Error cleared ? NO → Re-check

YES

Complete



Error Code	E1
Concerned Part	Developer Motor(DM)

Is there any unusual rotation noise while printing ?
YES → Replace the toner cartridge.
NO → Confirm the connection of connector.

Is the noise cleared ?
YES → Job is complete.
NO → Replace developer gear unit and motor.

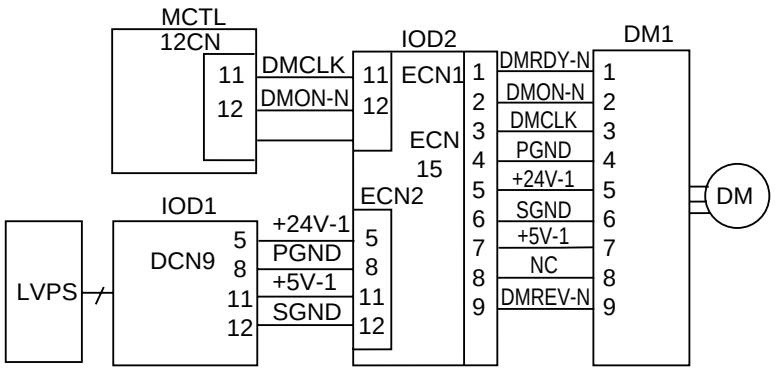
Is ECN15 of IOD2 properly connected with connector of DM1?
NO → Connect the connectors properly.
YES → Is ECN1 of IOD2 properly connected with DCN9 of IOD1?
NO → Connect the connectors properly.
YES → Is ECN1 of IOD2 properly connected with I2CN of MCTL?

Is E1 error cleared ?
YES → Job is complete.
NO → Check the voltage: +24V-1 and +5V-1.

+24V-1: Is the voltage +24V between DM1-4 and 5,ECN15-4 and 5, ECN2-5 and 8 ?
+5V-1: Is the voltage +5V between DM1-6 and 7,ECN15-6 and 7, ECN2-11 and 12 ?
YES → Replace the developer motor.
NO → Replace the IOD2.

Is E1 error cleared ?
YES → Job is complete.
NO → Replace the IOD1.

Is E1 error cleared ?
NO → Replace the MCTL P.W.B.
YES → Job is complete.



Error Code	E2
Concerned Part	Main Motor(MM)

Does a belt cartridge rotate lightly ?
NO → Replace the belt cartridge.
YES

Does a fuser unit rotate lightly ?
NO → Replace the fuser unit.
YES

Confirm the connection of connector.

Is E2 error cleared ?
YES → Job is complete.
NO

Is ECN12 of IOD2 properly connected with connector of DM1 ?
Is ECN2 of IOD2 properly connected with DCN9 of IOD1 ?
Is ECN1 of IOD2 properly connected with 12CN of MCTL ?
NO → Replace developer gear unit and motor.

Is E2 error cleared ?
YES → Job is complete.
NO

YES

Check the voltage:+24V-1 and +5V-1.

+24V-1: Is the voltage +24V between MM1-4 and 5, ECN12-4 and 5, ECN2-5 and 8 ?
+5V-1: Is the voltage +5V between MM1-6 and 7, ECN12-6 and 7, ECN2-11 and 12 ?
YES → Replace the main motor.

Is E2 error cleared ?
YES → Job is complete.
NO

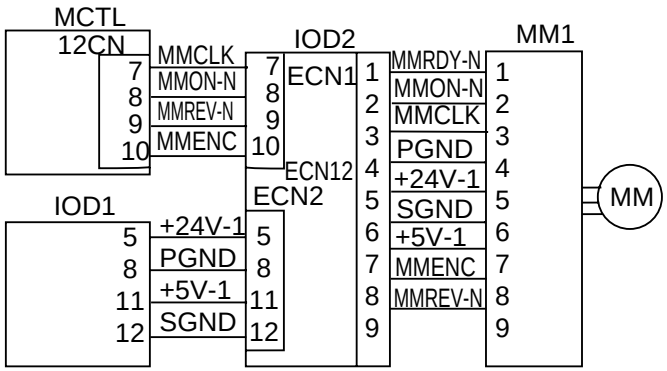
Replace the IOD2.

Is E2 error cleared ?
YES → Job is complete.
NO

Replace the IOD1.

Is E2 error cleared ?
NO → Replace the MCTL P.W.B
YES

Job is complete.



Error Code	E3
Concerned Part	Drum HP Sensor

Is a belt cartridge properly installed ?
NO → Re-install or replace the belt cartridge.
YES

Does a transfer drum rotate lightly ?
NO → Is an encoder plate deformed ? / Is a rotation torque excessive ?
YES → Replace the transfer drum.
YES

Confirm the connection of connector.

Is DCN5 of IOD1 properly connected with a connector of drum HP sensor ?
NO → Connect them properly

Check the voltage: +5V-1

Is the voltage +5V between DCN5-1 and 3 ?
YES → Replace the drum HP sensor.
NO

Is the voltage +5V between DCN2-1 and 2 ?
YES → Replace the IOD1 P.W.B.
NO

Replace a low voltage power supply (LVPS).

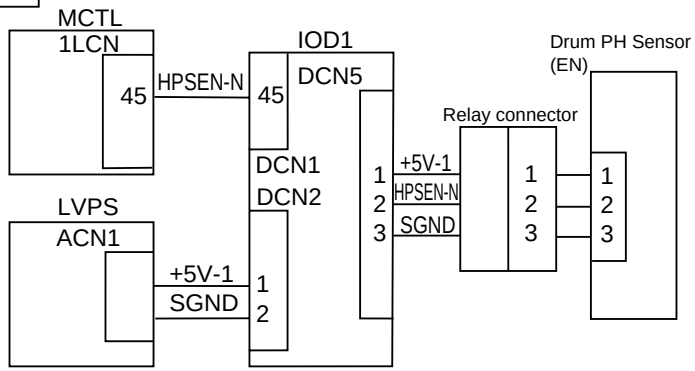
Is E3 error cleared ?
NO → Replace the MCTL P.W.B.
NO

Is E3 error cleared ?
YES → Job is complete.

Is E3 error cleared ?
NO → Is DCN5 of IOD1 properly connected with a connector of drum HP sensor ?

Is E3 error cleared ?
NO → Check the voltage: +5V-1
YES → Job is complete.

Is E3 error cleared ?
NO → Is an encoder plate deformed ? / Is a rotation torque excessive ?
YES → Job is complete.



Error Code	E4
Concerned Part	Toner Sensor P.W.B.(LED side)

Confirm the connection of a toner sensor P.W.B.(LED side) connector.

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

NO → Connect them properly.

YES

Check the voltage(LEDON-N/P)

Is E4 error cleared ?

NO

YES → Job is complete.

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

YES → Replace the toner sensor P.W.B.

NO

Is a signal voltage between DCN1-29 and 1 to be a trailing edge ?

NO → Replace the IOD1 P.W.B.

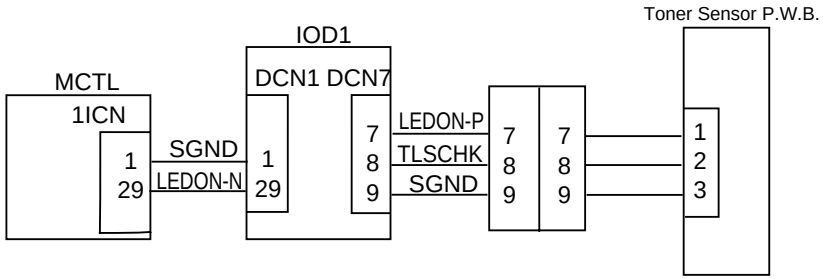
YES

Is E4 error cleared ?

NO → Replace the MCTL P.W.B.

YES

Job is complete.



Error Code	E5
Concerned Part	Transfer Solenoid

Confirm the connection of a transfer solenoid connector.

YES

Is ECN8 of IOD2 properly connected with a connector of the solenoid ?
Is ECN2 of IOD2 properly connected with DCN9 of IOD1 ?
Is DCN1 of IOD1 properly connected with 11CN of MCTL P.W.B ?

NO → Connect them properly. → Is E5 error cleared ? YES → Job is complete.
NO → (back to Is E5 error cleared ?)

YES

Check the voltage(TRSLON-N/P)

Is a single voltage between ECN8-4 and ECN2-8 of IOD2 to be a trailing edge ? YES → Replace the transfer solenoid.

NO

Is a single voltage between ECN2-3 and 12 of IOD2 to be a rising edge ? YES → Replace the IOD2 P.W.B.

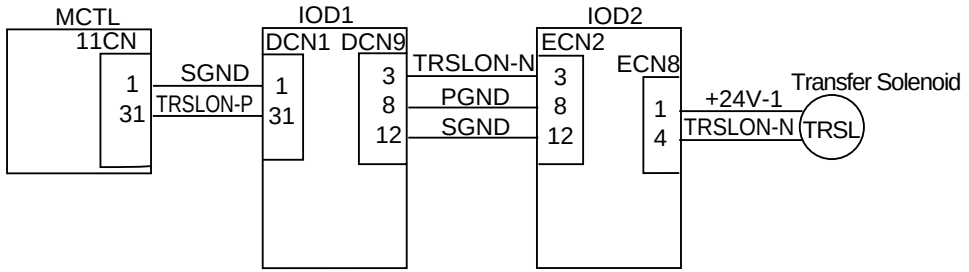
Is a single voltage between ECN2-31 and 1 of IOD1 to be a rising edge ? YES → Replace the IOD1 P.W.B.

NO

Is E5 error cleared ? NO → Replace the MCTL P.W.B.

YES

Job is complete.



Error Code	E6
Concerned Part	Cleaning Brush Solenoid

Confirm the connection of a cleaning brush solenoid connector.

YES

Is ECN10 of IOD2 properly connected with a connector of the solenoid ?
Is ECN2 of IOD2 properly connected with DCN9 of IOD1 ?
Is ECN1 of IOD1 properly connected with 11CN of MCTL P.W.B ?

NO → Connect them properly.

Is E6 error cleared ?

YES → Job is complete.

NO

YES

Check the voltage (FBSLON-N/P)

Is a single voltage between ECN10-4 and 8 of IOD2 to be a trailing edge ?

YES → Replace the transfer solenoid.

Is a single voltage between ECN2-2 and 12 of IOD2 to be a rising edge ?

YES → Replace the IOD2 P.W.B.

Is a single voltage between ECN1-33 and 1 of IOD1 to be a rising edge ?

YES → Replace the IOD1 P.W.B.

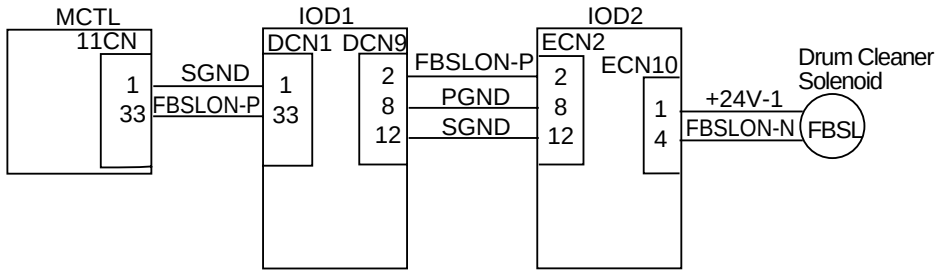
NO

Is E6 error cleared ?

NO → Replace the MCTL P.W.B.

YES

Job is complete.



Error Code	E7
Concerned Part	Cleaner Clutch

Confirm the connection of a cleaner clutch connector.

Is ECN11 of IOD2 properly connected with a connector of the clutch ?
Is ECN2 of IOD2 properly connected with DCN9 of IOD1 ?
Is ECN1 of IOD1 properly connected with 11CN of MCTL P.W.B ?

NO → Connect them properly.

Connect them properly. → Is E7 error cleared ?

Is E7 error cleared ? YES → Job is complete.

Is E7 error cleared ? NO

YES

Check the voltage (FBCLON-N/P)

Is a single voltage between ECN11-3 and ECN2-8 of IOD2 to be a trailing edge? YES → Replace the cleaner clutch.

Is a single voltage between ECN2-1 and 12 of IOD2 to be a rising edge ? YES → Replace the IOD2 P.W.B.

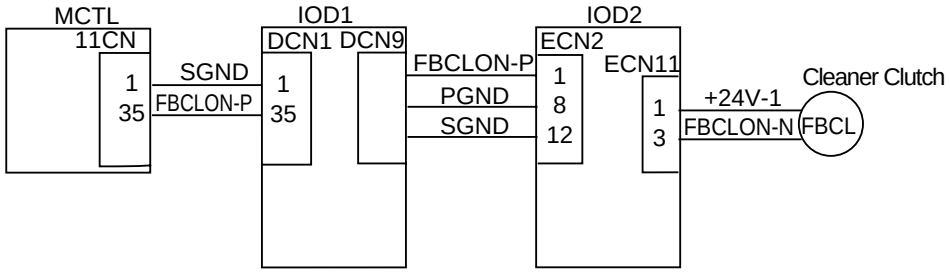
Is a single voltage between ECN1-35 and 1 of IOD1 to be a rising edge ? YES → Replace the IOD1 P.W.B.

NO

Is E7 error cleared ? NO → Replace the MCTL P.W.B.

YES

Job is complete.

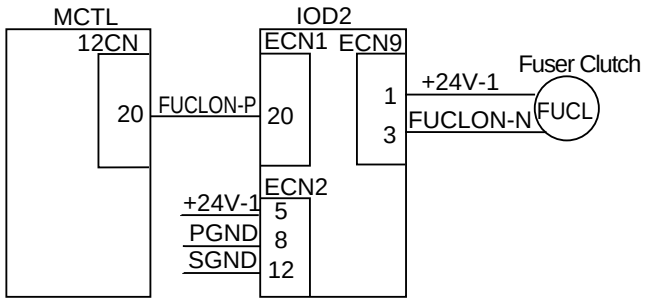


Error Code	E8
Concerned Part	Fuser Clutch(FUCL)

Confirm the connection of a fuser clutch connector.

Is ECN9 of IOD2 properly connected with a connector of the clutch ?
Is ECN1 of IOD2 properly connected with 11CN of MCTL P.W.B ?
NO → Connect them properly.
Connect them properly. → Is E8 error cleared ?
Is E8 error cleared ? YES → Job is complete.
Is E8 error cleared ? NO → (loop back)
YES → Check the voltage at FUCLON-N/P)

Check the voltage at FUCLON-N/P) → Is a single voltage between ECN9-3 and ECN2-8 of IOD2 to be a trailing edge ?
YES → Replace the cleaner clutch(FUCL).
NO → Is a single voltage between ECN1-20 and ECN2-12 of IOD2 to be a rising edge ?
YES → Replace the IOD2 P.W.B.
NO → Is E8 error cleared ?
NO → Replace the MCTL P.W.B.
YES → Job is complete.



Error Code	E9
Concerned Part	Belt Sensor (P.B.S)

Is a belt cartridge leaned to one side ? — YES → Replace the belt cartridge. / Install the printer to be leveled out.

NO

Is a belt sensor stained ? — YES → Clean the belt.

NO

Confirm the connection of connector.

Is E9 error cleared ? — NO → (back to Is a belt sensor stained ?)

Is DCN11 of IOD1 properly connected with a connector of the sensor ? — NO → Connect them properly.

Is DCN1 of IOD1 properly connected with 11CN of MCTL P.W.B ?

Is E9 error cleared ? — YES → Job is complete. / NO → (back to Is DCN11 of IOD1 properly connected with a connector of the sensor ?)

YES

Check the voltage (+5V-1)

Is the voltage +5V between DCN11-2 and 3 of IOD1? — YES → Replace the belt sensor (P.B.S).

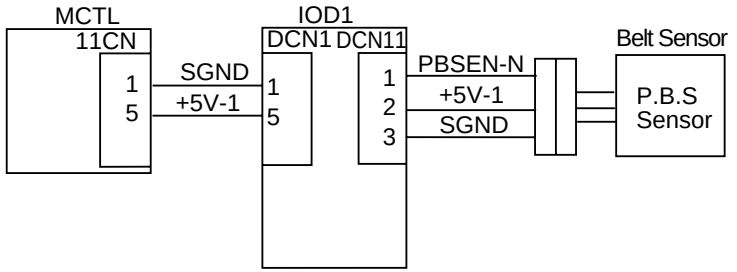
NO

Is the voltage +5V between DCN1-5 and 1 of IOD1? — YES → Replace the IOD1 P.W.B.

Is E9 error cleared ? — NO → Replace the MCTL P.W.B.

YES

Job is complete.



Error Code	EL
Concerned Part	Erase Lamp (EL)

Confirm the connection of a erase lamp connector.

Is DCN7 of IOD1 properly connected with a connector of the erase lamp ? — NO → Connect them properly.

Is DCN1 of IOD1 properly connected with 11CN of MCTL P.W.B ? — NO → Connect them properly.

Connect them properly. → Is EL error cleared ? — YES → Job is complete. / NO

YES

Check the voltage (ELON-N/P)

Is a single voltage between DCN7-11 and 9 to be a trailing edge ? — YES → Replace the LED P.W.B.

NO

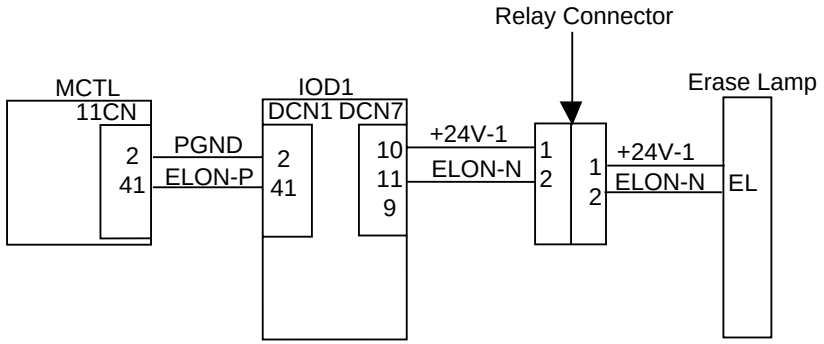
Is a single voltage between DCN1-41 and 2 of IOD2 to be a rising edge ? — YES → Replace the IOD1 P.W.B.

NO

Is EL error cleared ? — NO → Replace the MCTL P.W.B.

YES

Job is complete.



Error Code	F0
Concerned Part	Fan Motor(Control Cooling)

Confirm the connection of a fan motor connector.

Is DCN13 of IOD1 properly connected with a connector of the fan motor ?
Is DCN1 of IOD1 properly connected with 11CN of MCTL P.W.B ?

NO → Connect them properly.

Is F0 error cleared ?

YES → Job is complete.

NO

YES

Check the voltage (CTFANON-P)

Is the voltage between DCN13-1 and 2 to be a trailing edge ?

YES → Replace the fan motor.

NO

Is the voltage between DCN1-47 and 1 to be a trailing edge ?

YES → Replace the IOD1 P.W.B.

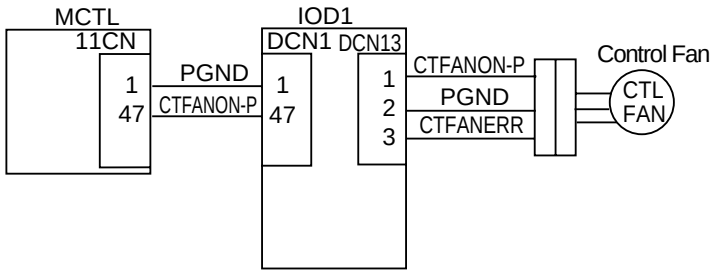
NO

Is F0 error cleared ?

NO → Replace the MCTL P.W.B.

YES

Job is complete.



Error Code	F2
Concerned Part	Fan Motor (OZFAN)

Confirm the connection of a fan motor connector.

Is ECN6 of IOD2 properly connected with a connector of the fan motor ?
Is ECN1 of IOD2 properly connected with 11CN of MCTL P.W.B ?

NO → Connect them properly.

Is F2 error cleared ?

YES → Job is complete.

NO

YES

Check the voltage (OZFANON-P)

Is the voltage between ECN6-1 and 2 to be a trailing edge ?

YES → Replace the fan motor (OZFAN).

NO

Is the voltage between ECN1-19 and 2 to be a trailing edge ?

YES → Replace the IOD2 P.W.B.

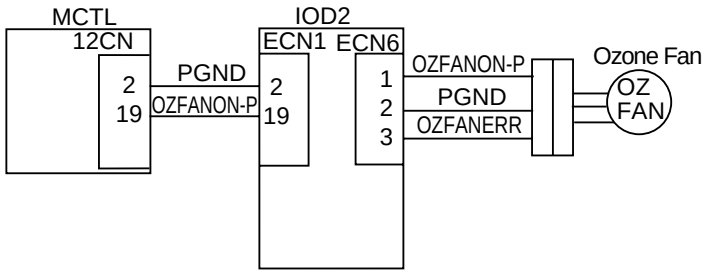
NO

Is F2 error cleared ?

NO → Replace the MCTL P.W.B.

YES

Job is complete.



Error Code	F4
Concerned Part	Heater Fan iHTFAN j

Confirm the connection of a heater fan connector.

Is DCN10 of IOD1 properly connected with a connector of the heater fan ?
Is DCN1 of IOD1 properly connected with 11CN of MCTL P.W.B ?

NO → Connect them properly.

Is F4 error cleared ?

YES → Job is complete.

NO

NO

Check the voltage iHTFANON-P).

Is the voltage between DCN10-4 and 5 to be a rising edge ?

YES → Replace the heater fan.

NO

Is the voltage between DCN1-49 and 2 to be a rising edge ?

YES → Replace the IOD1 P.W.B.

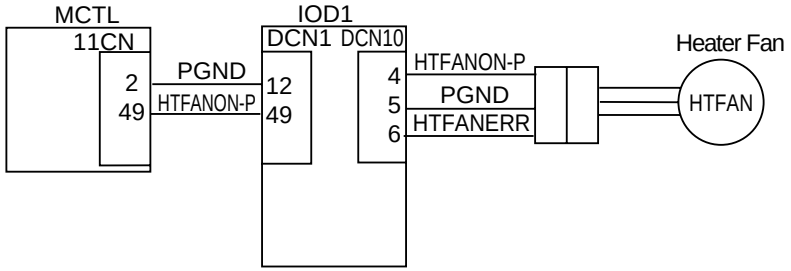
NO

Is F4 error cleared ?

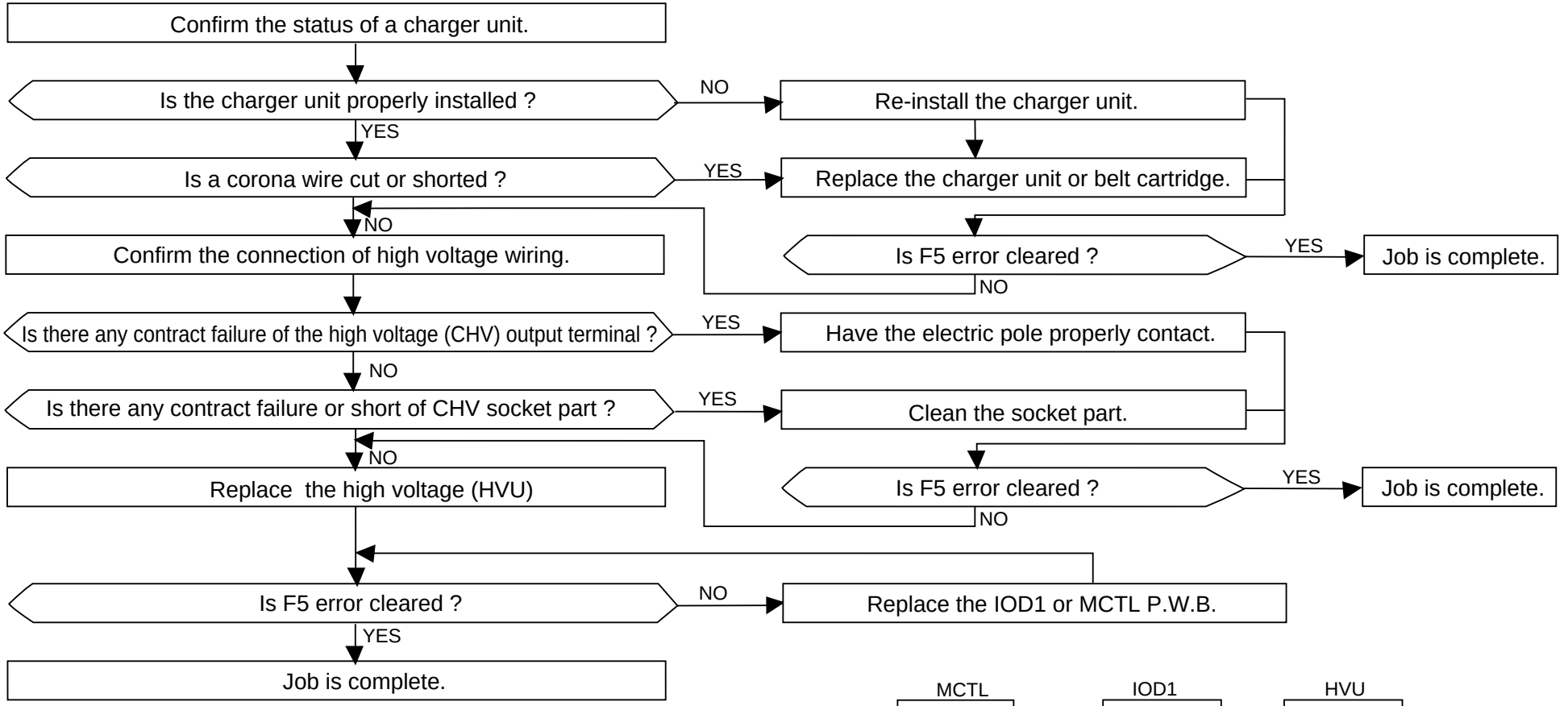
NO → Replace the MCTL P.W.B.

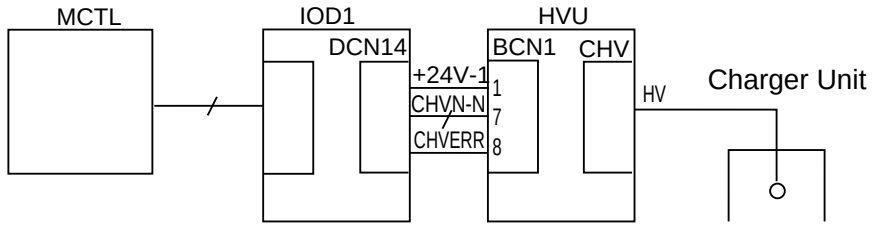
YES

Job is complete.



Error Code	F5
Concerned Part	High Voltage Unit iHVU j





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

Confirm the connection of a fuser unit connector.

Is the fuser unit properly installed ? — NO → Re-install the fuser unit.

Is there any contact failure due to damaged connector of fuser unit ? — YES → Replace the charger unit or belt cartridge.

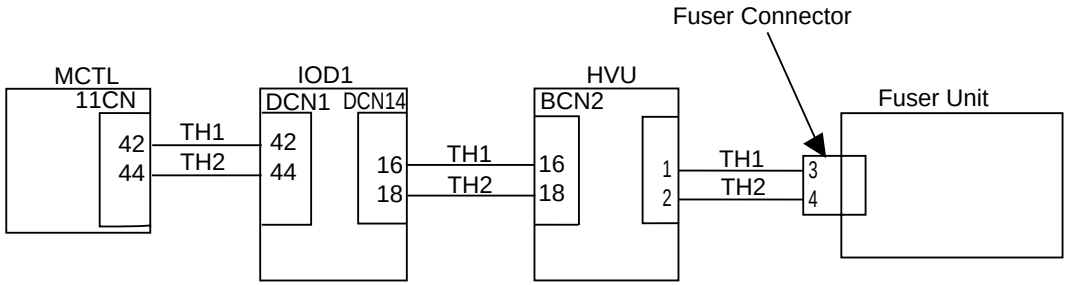
Are the connectors properly connected between the fuser unit and BCN2 of the high voltage unit (HVU) ? — NO → Connect them properly.

Is H0 error cleared ? — YES → Job is complete.

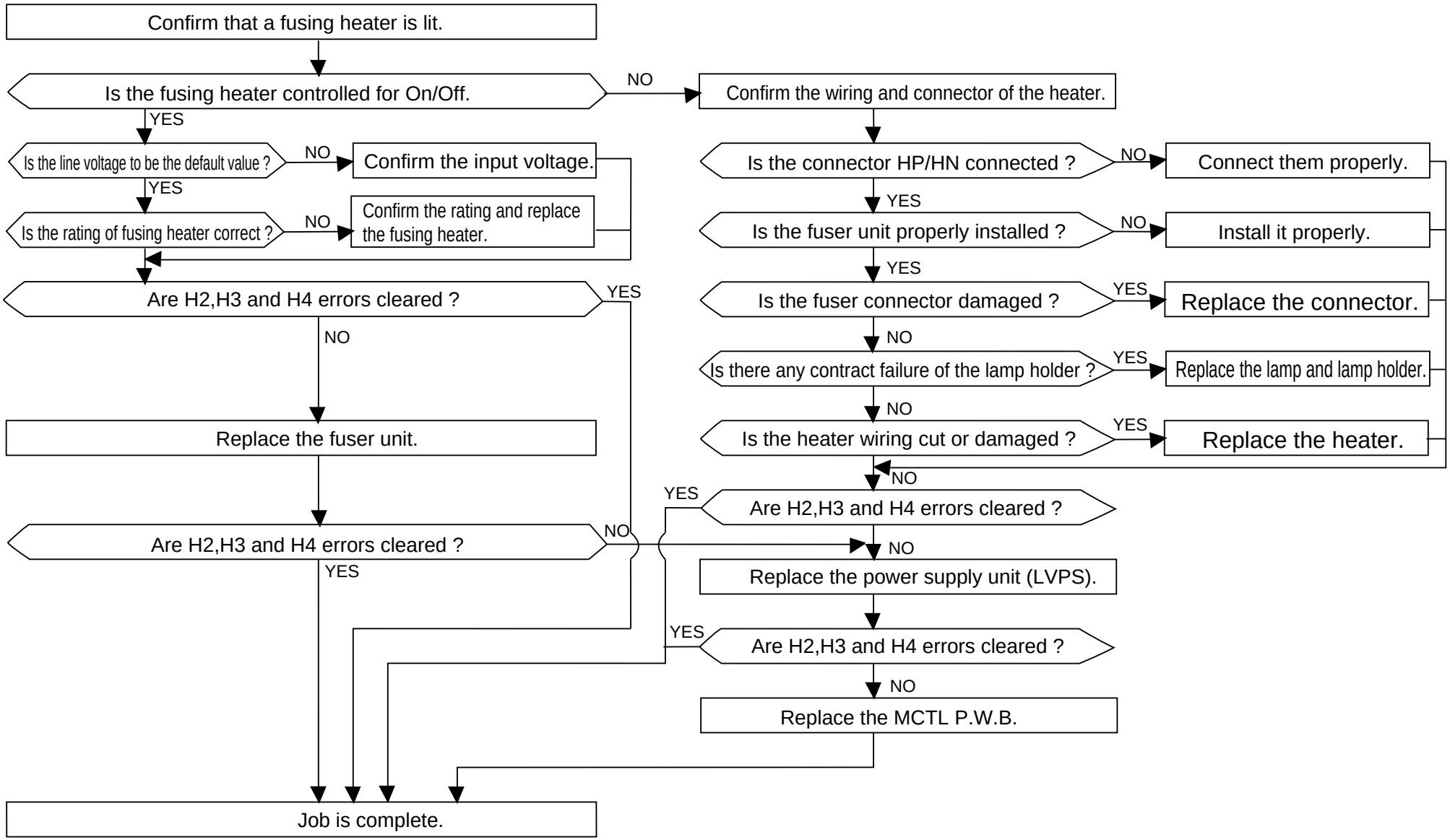
NO → Replace the fuser unit.

Is H0 error cleared ? — NO → Replace the IOD1 or MCTL P.W.B.

YES → Job is complete.



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



Error Code	L1(Beam Detecting Error j
Concerned Part	Optical Unit

Confirm the connection of an optical unit connector.

Is the connector PDCN properly connected ?

Are the connector LCN1 and LCN of MCTL properly connected ?

NO

Connect the connector properly.

Is L1 error cleared ?

YES

NO

YES

Replace the optical unit.

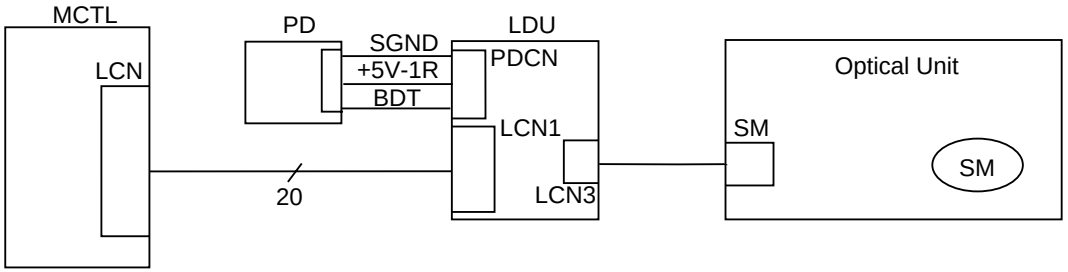
Is L1 error cleared ?

YES

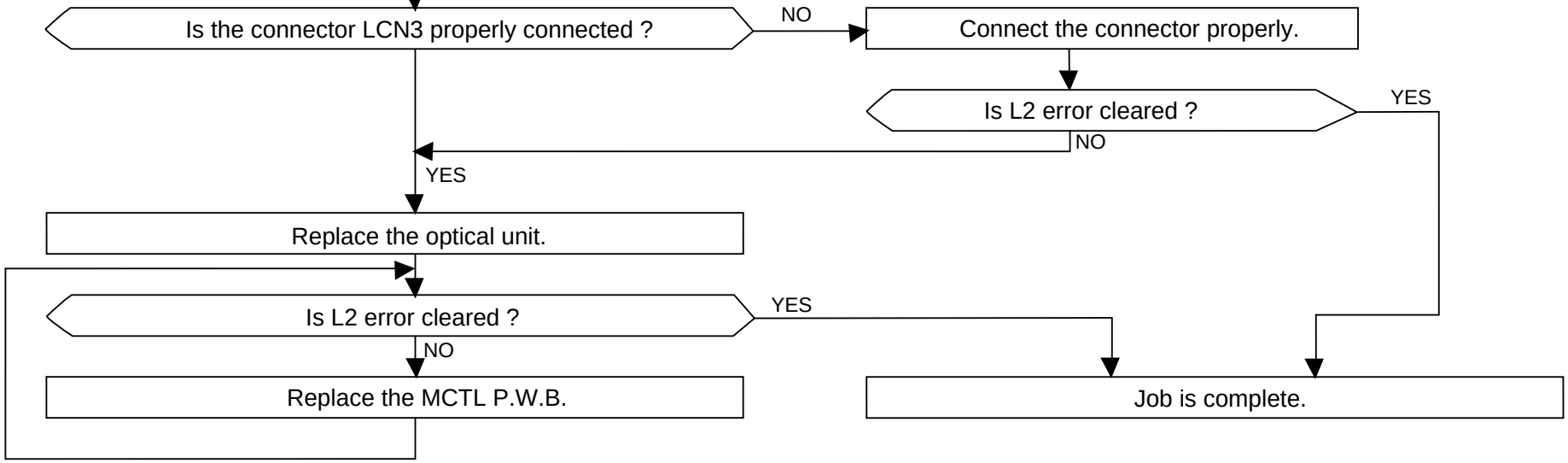
NO

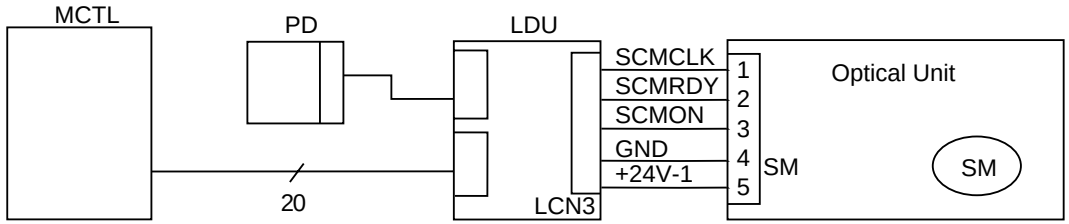
Replace the MCTL P.W.B.

Job is complete.



Error Code	L2
Concerned Part	Optical Unit





Error Code	LL
Concerned Part	Optical Unit

Confirm the connection of an optical unit connector.

Is the connector LCN3 properly connected ?
Is the connector PDCN properly connected ?
Are the connector LCN1 and LCN properly connected ?

NO → Connect the connector properly.

Is LL error cleared ?

YES → Job is complete.

NO

YES

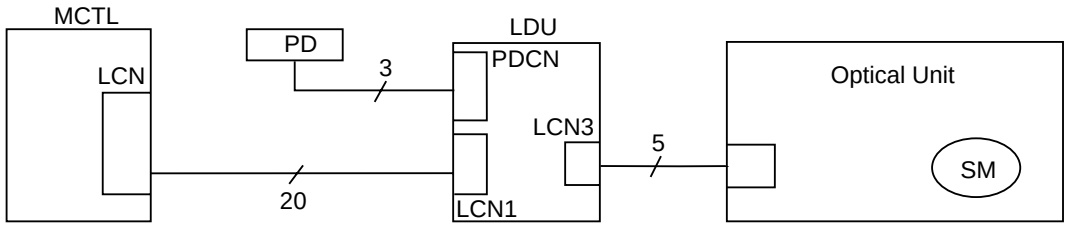
Replace the optical unit.

Is LL error cleared ?

YES → Job is complete.

NO

Replace the MCTL P.W.B. or
DC power supply (LVPS).



8.3 Imaging Failure

(1). Background 8-38
(2). Missing Image at Edge 8-39
(3). Jitter 8-40
(4). Ribbing 8-41
(5). Wrinkle/Image Migration 8-42
(6). White Line Ⅰ 8-43
(7). White Line Ⅱ 8-44
(8). Vertical White Band 8-45
(9). Black Line 8-46
(10). Vertical Line 8-47
(11). Vertical Staggering Image 8-48
(12). Banding 8-49
(13). White Band 8-50
(14). Toner Drop 8-51
(15). White Spot / Black Spot 8-52
(16). Mixed Color Image 8-53
(17). Color Misregistration 8-54
(18).
(19). Mottle 8-56
(20). Residual Image 8-57
(21). Insufficient Gloss 8-58
(22). Back Stain 8-59
(23). White Print 8-60
(24). Insufficient Fusing 8-61

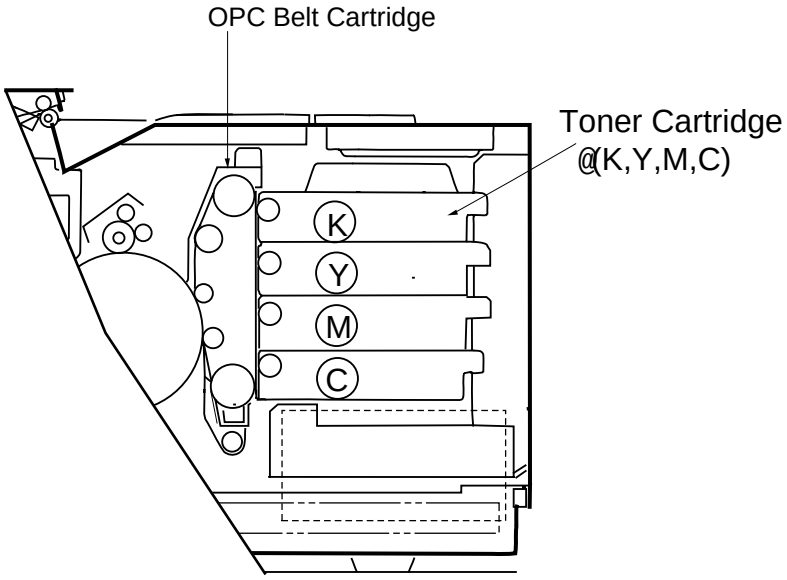
No.1	Background

Phenomenon

Background is smeared due to the toner spread as shown in the print sample of upper right corner.

Main Causes

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



Countermeasures

1). Replace the toner cartridge. (See Section 3.3.)
2). Confirm if the developer bias pole is deformed or not.
3). Replace the belt cartridge. (See Section 5.2.1.)
4). Replace the high voltage power supply unit (HVU). (See Section 7.2.6.)

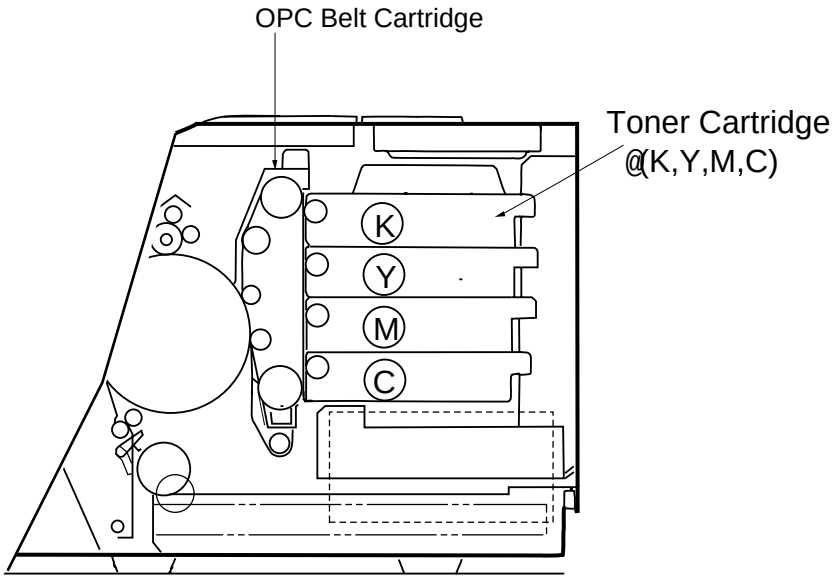
No.2	Missing Image at Edge

Phenomenon

There are missing or peeling found in the image at edge as shown in the print sample of upper right corner.

Main Causes

1). Too small toner mass amount and charging amount in the development process.
2). The belt is deformed as waving.



Countermeasures

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

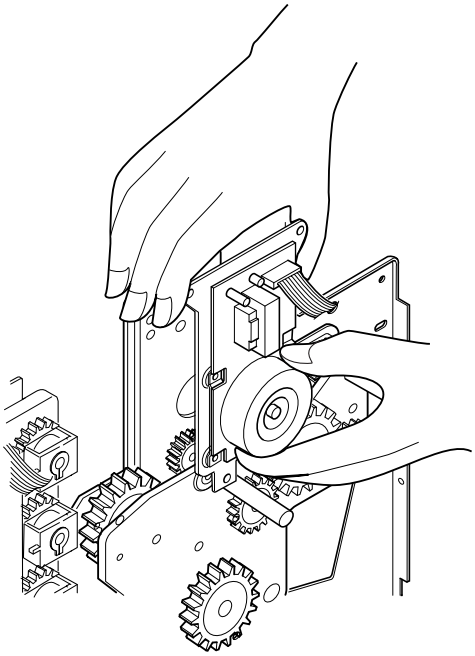
No.3	Jitter

Phenomenon

Uneven optical density appears periodically in the horizontal direction of printed image as shown in the print sample of upper right corner.

Main Causes

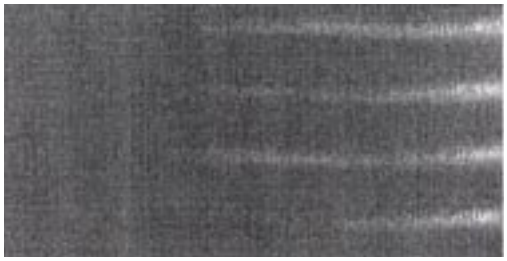
1). Failure of main motor.
  1-1). Irregular rotation of the drive motor.
  1-2). Failure of the gear.
  1-3). Variation of OPC belt running speed due to above reasons.
2). Failure of OPC belt.



Countermeasures

1). Replace the OPC belt drive motor (BM) with a new motor. (See Section 7.3.1.)
2). Replace the belt cartridge with a new cartridge. (See Section 5.2.1.)

No.4	Ribbing

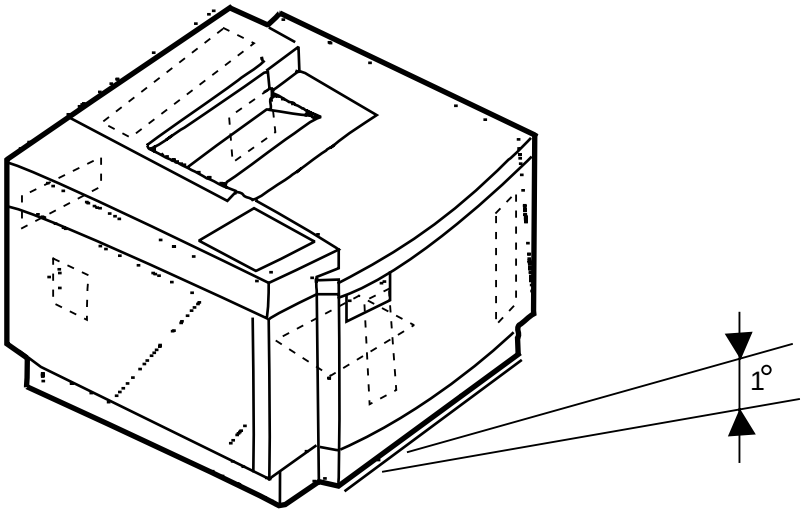


Phenomenon

Light print occurs in the right or left side of image as shown in the print sample of upper right corner.

Main Causes

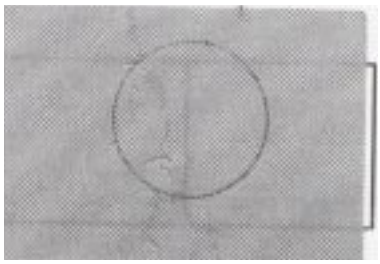
1). Slight tilt on the surface of printer installation table.
(Tilt should be less than 1°)
2). Toner amount in the toner cartridge is insufficient.
3). Toner cartridge is not laid as level, and as the result, toner concentrates to one side.



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.
(See Section 3.3.3.)
3). Replace the toner cartridge with a new cartridge.

No.5	Wrinkle / Image Migration

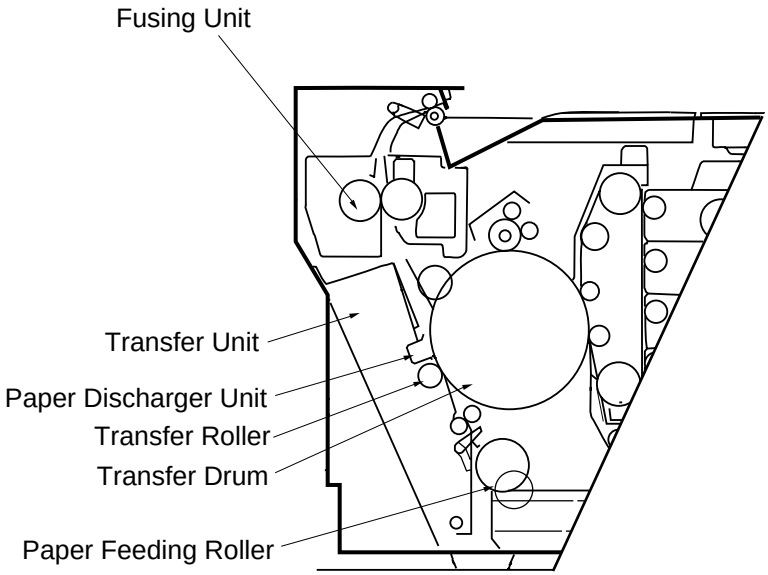


Phenomenon

Banding shadows of different optical density appear due to the wrinkle, image migration and color misregistration occurring on the print paper as shown in the print sample of upper right corner.

Main Causes

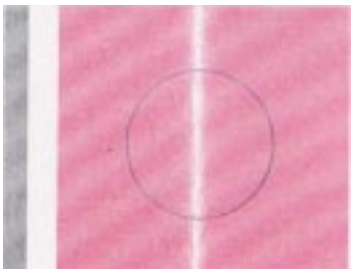
1). Paper in use is not a recommended paper, or is an abandoned paper.
2). Paper discharger unit of transfer unit is not functioning.
3). Transfer unit is not locked properly.
4). Fuser roller is deformed or reaches to the end of life.
5). One side of fuser unit is lifted when installed.



Countermeasures

1). Use a recommended paper or fresh paper from a paper bag.
2). Confirm that the paper discharger unit is properly installed to the transfer unit and also functioning normally.
2-1). Push the transfer unit and ensure the locking at both sides (right and left). (See Item 3 of Section 5.1.2., and Section 5.2.4.)
3). Confirm that the fusing unit is installed properly and fixed with set screws.
4). Replace the fusing unit with a new unit.

No.6	White Line Ⅰ

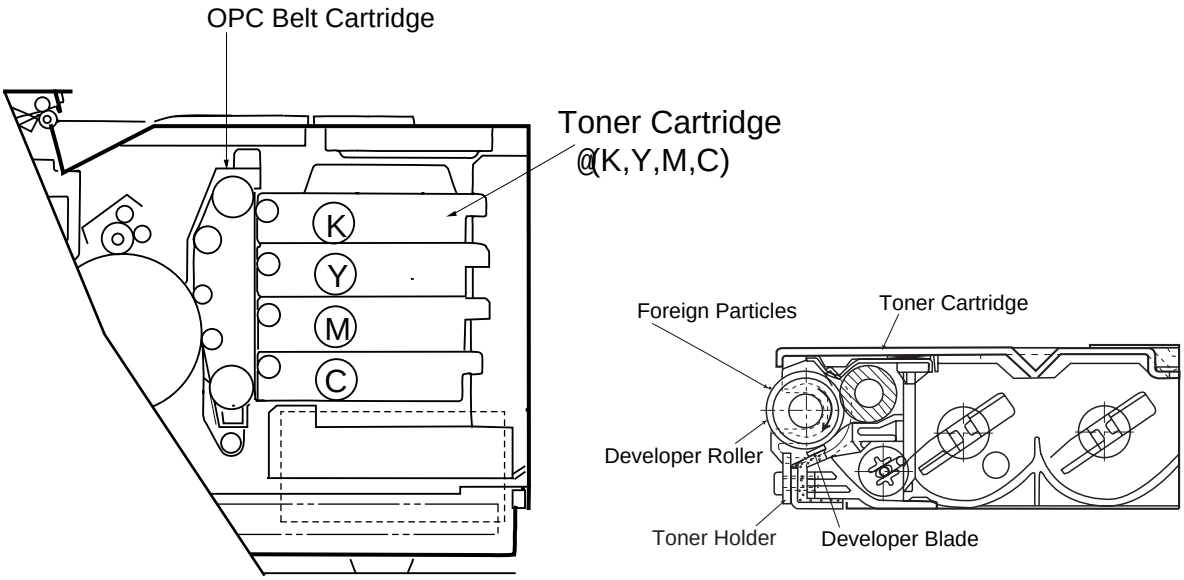


Phenomenon

Vertical white line appears in the specific color area when test-printed in the four color mode (Stripe Mode), as shown in the print sample of upper right corner.

Main Causes

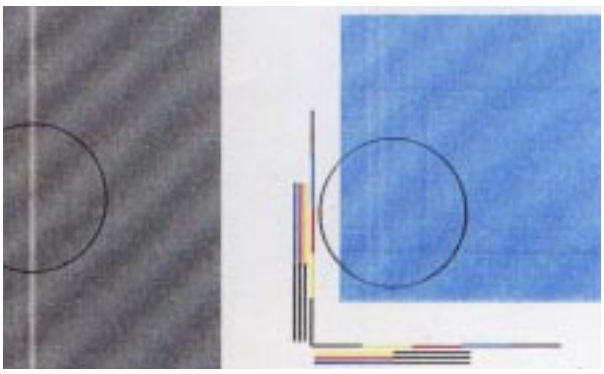
1). Foreign particles adhere to Developer Roller of specific color in question.
2). Developer Roller's surface is dameged.



Countermeasures

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

No.7	White Line Ⅱ

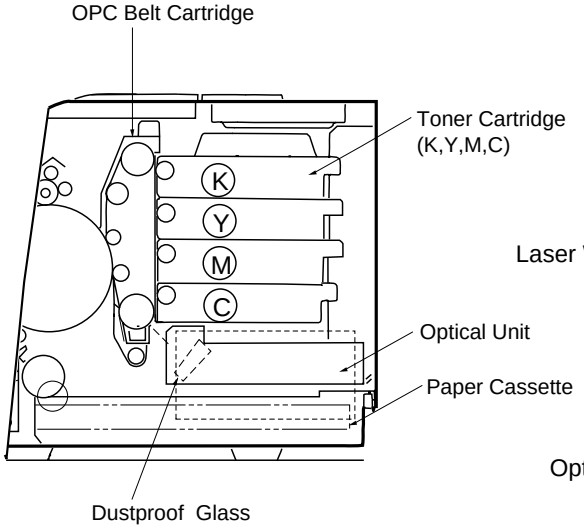


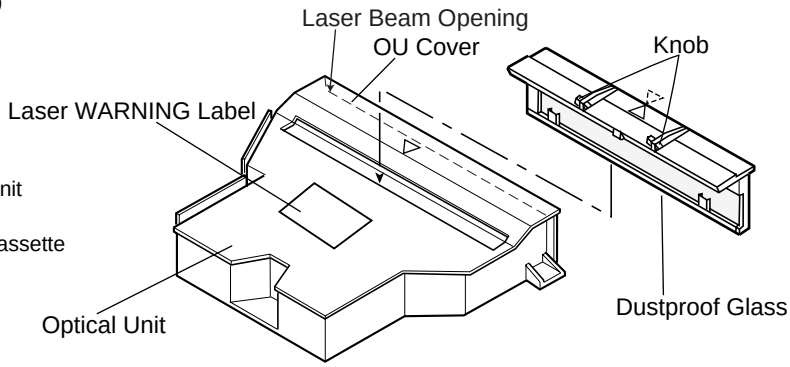
Phenomenon

Vertical white line appears from the leading edge to the trailing edge of printed image as shown in the print sample of upper right corner.

Main Causes

1). Dustproof Glass of Optical Unit is smeared with toner or foreign particles.
2). Hairy foreign particles adhere to the laser beam opening of optical unit.
3). There are foreign particles mixed in the toner cartridge.

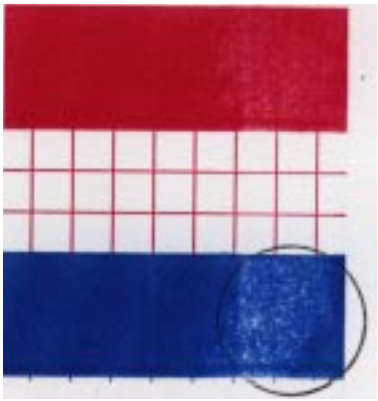




Countermeasures

1). Clean the dustproof glass.
  1-1). Remove the belt cartridge and toner cartridge. (See Section 5.2.1.)
  1-2). Remove the dustproof glass from the optical unit.
  1-3). Clean the dustproof glass. (See section 5.1.2(5))
2). Clean the laser beam opening of optical unit.
3). If White Line II failure is attributed to toner cartridge, replace it with a new cartridge.

No.8	Vertical White Band

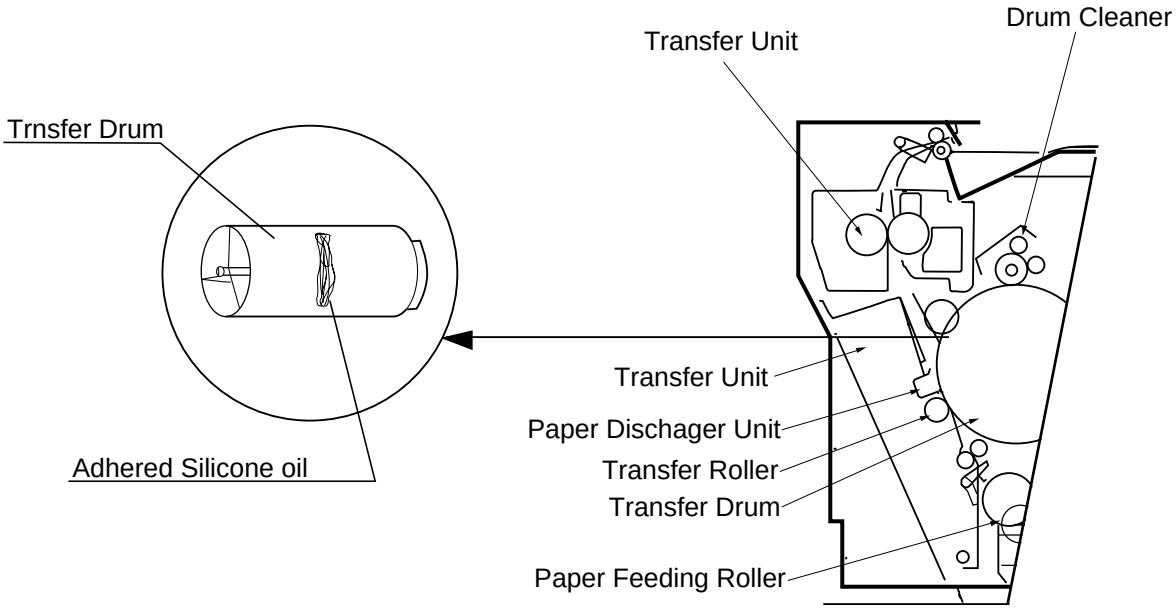


Phenomenon

White band appears in the vertical direction of printed image as shown in the print sample of upper right corner.

Main Causes

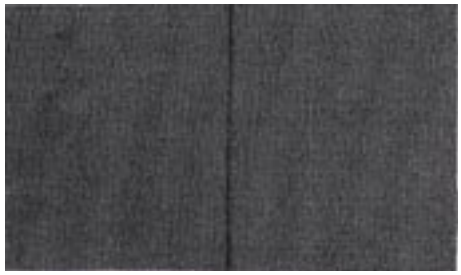
1). Silicone oil adheres to the transfer drum.



Countermeasures

1). Wipe off the oil adhering to the transfer unit and its perimeter.
2). Replace the transfer drum with a new drum. (See Section 7.6.2.)
3). If the oil adhesion is excessive, replace the belt cartridge, cleaning brush and toner cartridge with a new cartridge and brush. (See Section 5.2.1 or 5.2.5.)

No.9	Black Line

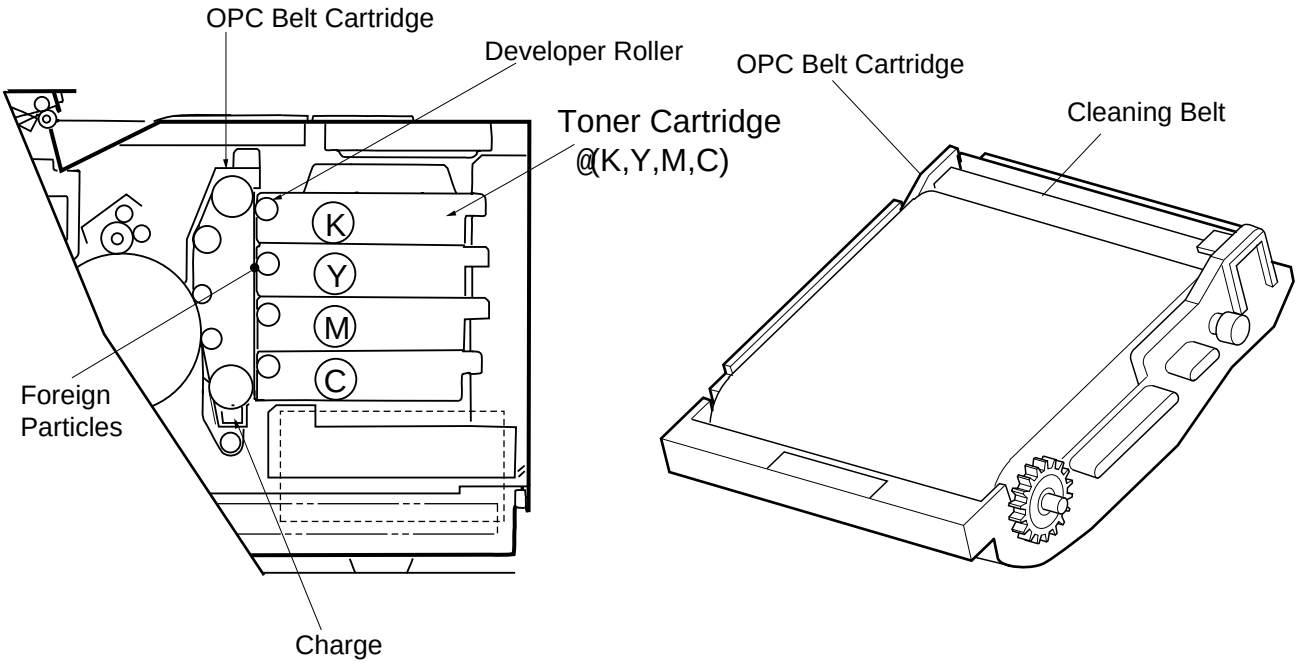


Phenomenon

Fine black line appears in the printed image as shown in the print sample of upper right corner.

Main Causes

1). Wire grid of the charger unit is smeared.
2). OPC belt's surface is damaged.
3). Foreign particles (paper dust, etc.) are stuck in between the cleaning blade and OPC belt.
4). Debris adhering to the base of toner cartridge's developer roller contacts to OPC belt.

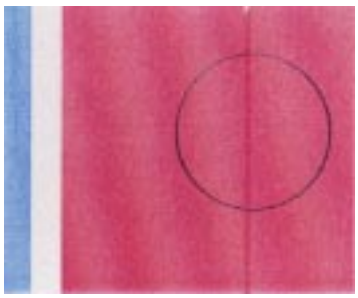


Countermeasures

1). Remove the belt cartridge.
  1-1). Clean the charger unit. (See Section 5.1.2(4).)
  1-2). Replace the belt cartridge to a new cartridge. (See Section 5.2.1.)

2). Remove foreign particles adhering to the surface of developer roller.

No.10	Vertical Line

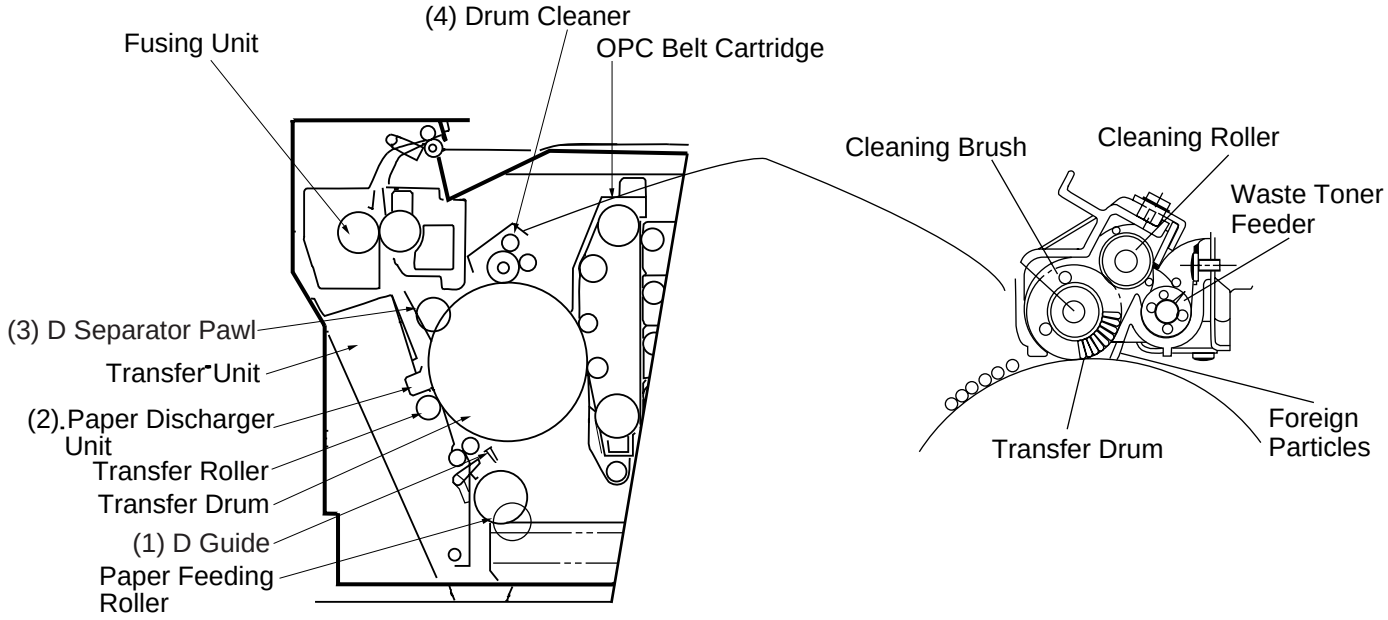


Phenomenon

Vertical line appears in the printed image as shown in the print sample of upper right corner.

Main Causes

1). Foreign particles (dust, etc.) adhere to the parts located around the transfer drum, and consequently contact the toner image on the transfer drum.



Countermeasures

1). Clean the paper discharger unit. (See Section 5.1.2(3).)
2). Clean the D guide and D separator pawl.
3). Remove the drum cleaner, and then, clean the inside and outside of waste toner feeder

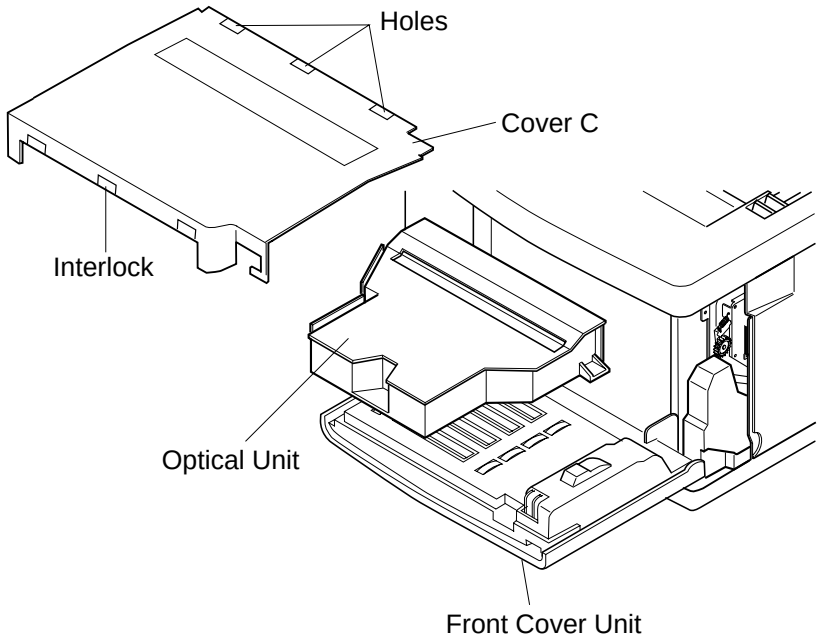
No.11	Vertical Staggering Image

Phenomenon

Printed image staggers in the vertical direction as shown in the print sample of upper right corner.

Main Causes

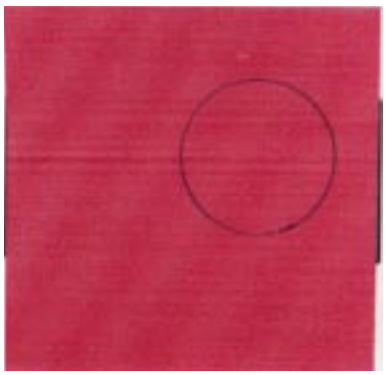
1). Shock or vibration is applied to the printer.
2). Failure of the optical unit: Vibration from the rotation of scanner motor.



Countermeasures

1). Do not apply shock or vibration to the printer body.
2). Installation location should be appropriate: No concern about shock or vibration.
3). Replace the optical unit with a new unit. (See Section 7.3.3.)

No.12	Banding

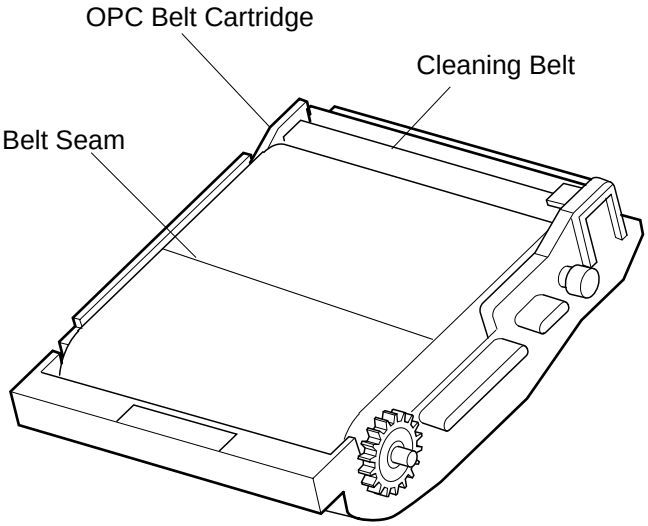


Phenomenon

Banding line appears in the horizontal direction as shown in the print sample of upper right corner.

Main Causes

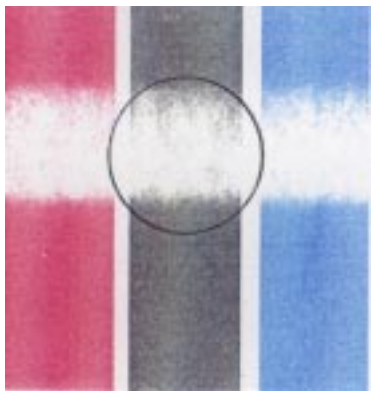
1). This is a transfer failure due to the uneven rotational speed caused by the shock which occurs when the seam of OPC belt passes over the cleaning blade.



Countermeasures

1). Replace the belt cartridge with a new cartridge. (See Section 5.2.1.)

No.13	White Band

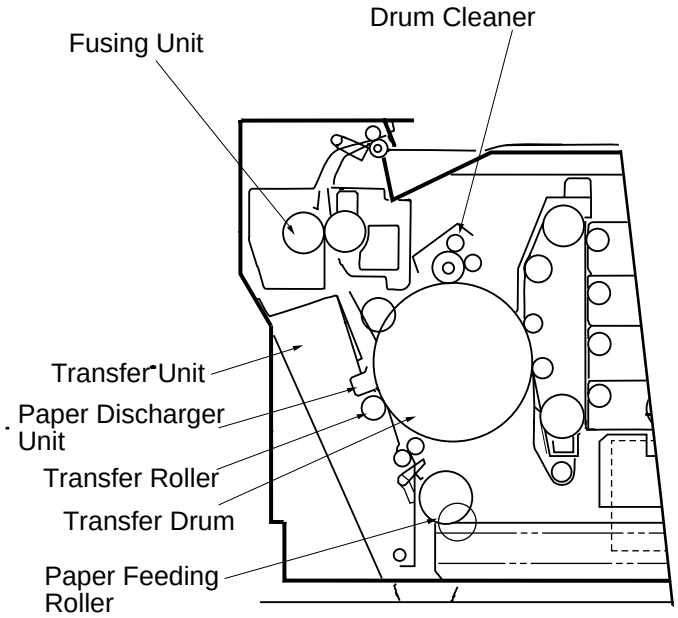


Phenomenon

White banding line appears in the horizontal direction, and consequently causes a missing image as shown in the print sample of upper right corner.

Main Causes

1). Installation failure of the transfer unit, and deformation of the transfer roller.
2). Contact failure of the transfer roller's bias pole.
3). TR Cam Clutch failure.



Countermeasures

1). Confirm if the transfer unit is properly locked or not; Both side faces of the transfer unit are fixed by the hook.
2). Confirm if the transfer unit is properly installed or not.
3). Replace the TR cam clutch with a new clutch. (See Section 7.4.6.)
4). Replace the transfer unit with a new unit. (See Section 7.6.1.)

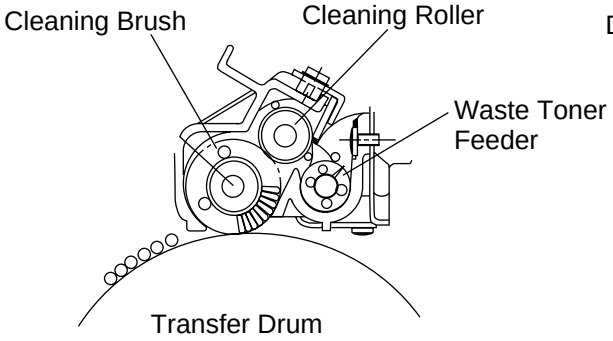
No.14	Toner Drop

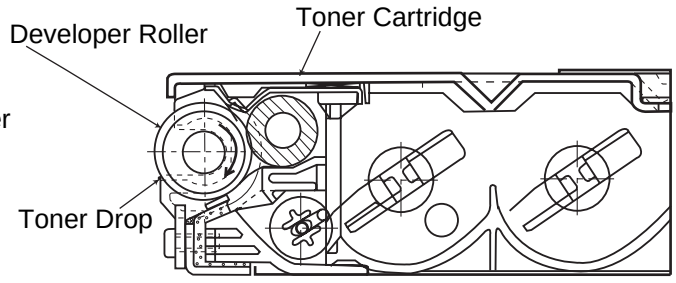
Phenomenon

Toner spot stain is caused on the print by the toner dropping within the printer engine as shown in the print sample of upper right corner.

Main Causes

1). Toner drops on the transfer drum due to the breakdown of the waste toner feeder's drum cleaner.
  1-1). Mylar of the waste toner feeder is deformed.
  1-2). Waste toner is not properly collected by the waste toner feeder.
2). Toner adhering to the developer roller drops on the OPC belt.

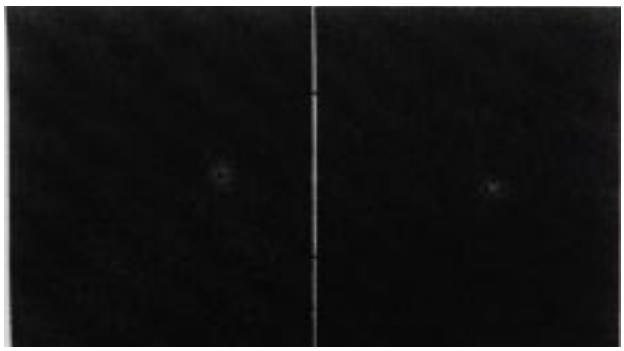




Countermeasures

1). Check up the cleaning brush and waste toner feeder.
  1-1). Clean the perimeter of the cleaning brush installation location.
  1-2). Check if the seal is deformed or damaged. If any deformation or damage, replace the waste toner feeder with a new feeder.
  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.
  2-1). Clean the toner cartridge.
  2-2). Replace the toner cartridge with a new cartridge.

No.15	White Spot / Black Spot

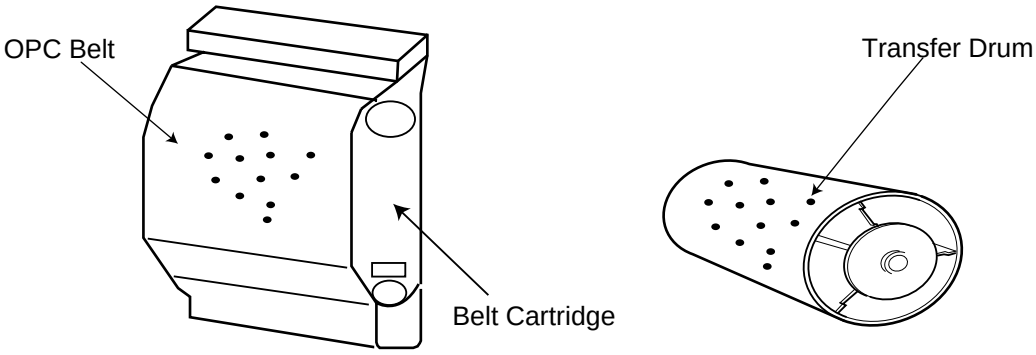


Phenomenon

White spot and black spot appear on the print as shown in the print sample of upper right corner.

Main Causes

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



Countermeasures

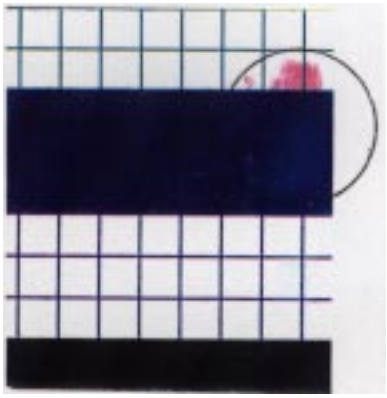
1). Remove the belt cartridge.
  1-1). Lightly wipe off the foreign particles adhering to OPC belt, using cotton cloth.
  1-2). Replace the damaged belt cartridge with a new cartridge.

2). Open the transfer unit, and check the transfer drum.
  2-1). Lightly wipe off the foreign particles adhering to transfer drum, using cotton cloth.
  2-2). Replace the damaged transfer drum with a new drum. (See Section 7.6.3.)

3). Remove the toner cartridge.
  3-1). Replace the toner cartridge with a new cartridge. (See Section 3.3)

4). Replace the transfer unit with a new unit. (See Section 7.6.1)

No.16	Mixed Color Image

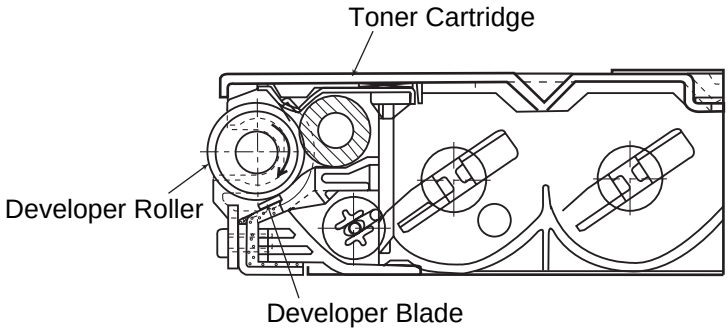


Phenomenon

Mixed color image appears in the print as shown in the print sample of upper right corner.

Main Causes

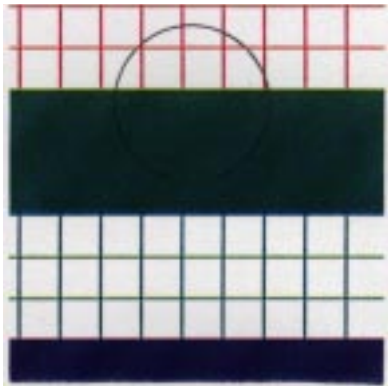
1). Failure of toner cartridge: Blade pressure of the developer roller is inappropriate or the blade is deformed.
2). Restitution error of toner cartridge.



Countermeasures

1). Confirm that the toner cartridge can be inserted smoothly.
2). Replace the toner cartridge with a new cartridge.
3). Reconfirm that the front cover unit is locked.

No.17	Color Misregistration

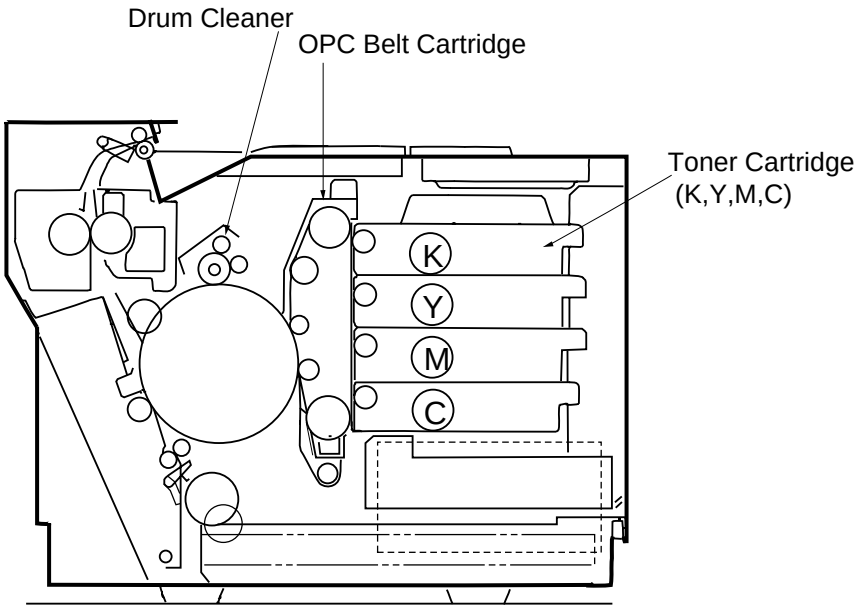


Phenomenon

Color misregistration is caused between the two colors as shown in the print sample of upper right corner.

Main Causes

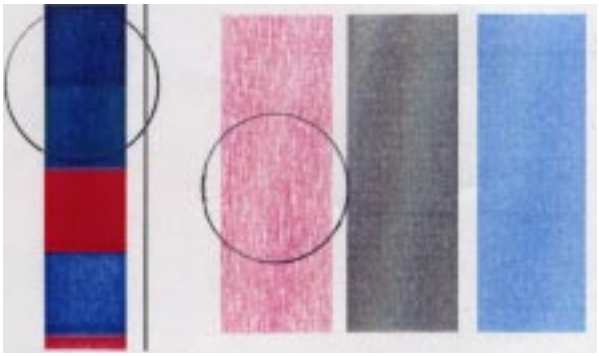
1). OPC belt cartridge is not properly installed.
2). OPC belt cartridge is deformed.
3). Cleaning brush is unstable in the operation.
4). Rotational load to the OPC belt cartridge is excessive.



Countermeasures

1). Reset the OPC belt cartridge properly.
2). Replace the OPC belt cartridge with a new cartridge.
3). Replace the cleaning brush with a new brush.
4). Replace the Drum cleaner solenoid.

No.19	Mottle

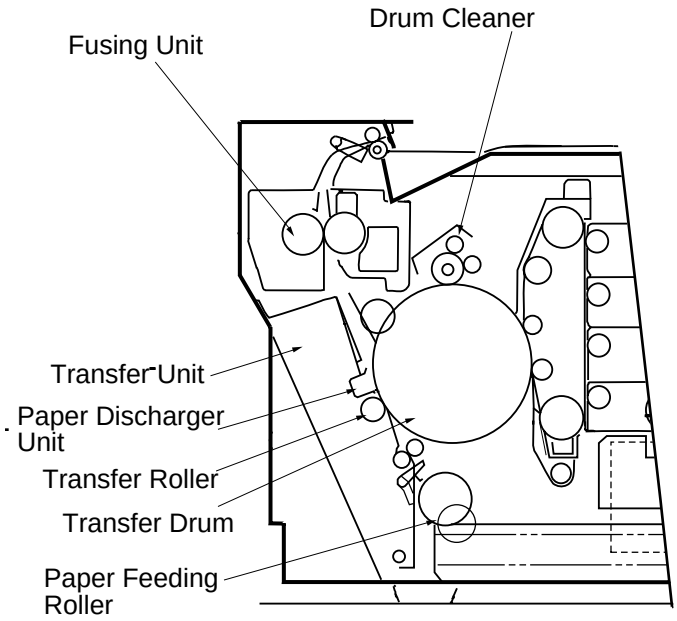


Phenomenon

Variation of the optical density is found in the image as shown in the print sample of upper right corner.

Main Causes

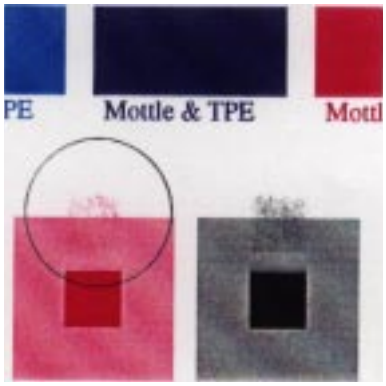
1). Transfer unit is not fixed in place.
2). Assembly of the transfer roller is inaccurate.
3). THV output of DC high voltage unit is not normal.
4). Failure of the toner cartridge.
5). Deformation of the print paper.



Countermeasures

1). Confirm if the transfer unit is firmly locked or not.
2). Confirm if the transfer roller is properly installed or not.
3). Replace the DC high voltage unit with a new unit. (See Section 7.2.6.)
4). Replace the toner cartridge with a new cartridge.
5). Replace the papers with new papers.

No.20	Residual Image

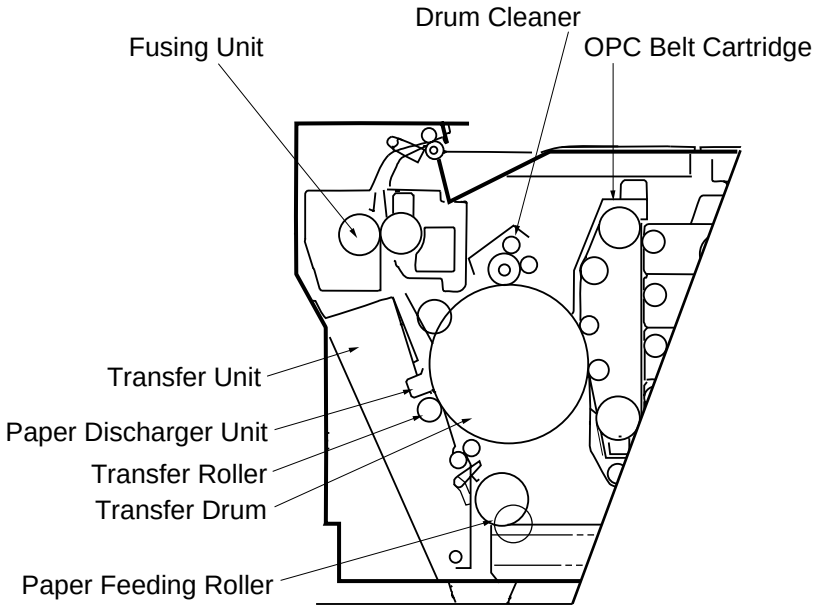


Phenomenon

Image of the preceding page appears every other page as shown in the print sample of upper right corner.

Main Causes

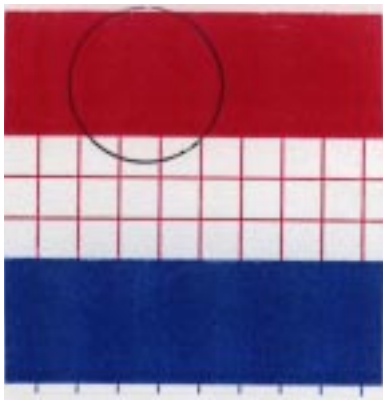
1). Cleaning failure due to the lifted cleaning brush of drum cleaner.
2). Contact failure of the drum cleaner's bias pole.
3). Failure of DC high voltage unit.



Countermeasures

1). Check if the drum cleaner is properly installed or not.
2). Replace the failed DC high voltage unit with a new unit. (See Section 7.2.6.)

No.21	Insufficient Gloss

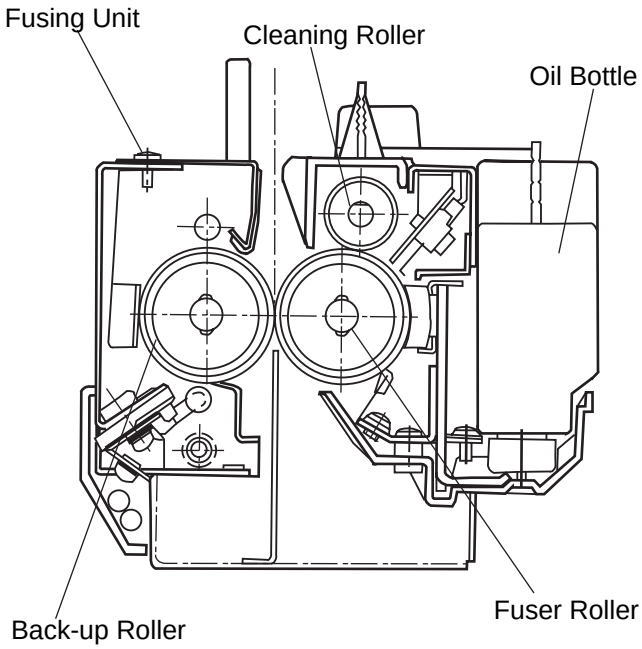


Phenomenon

Gloss of the print is not sufficient as shown in the print sample of upper right corner.

Main Causes

1). Cleaning roller is stained.
2). Fuser roller is deteriorated.



Countermeasures

1). Replace the cleaning roller with a new roller. (See Section 3.3.3.)
2). Replace the fuser unit with a new unit. (See Section 5.2.2.)

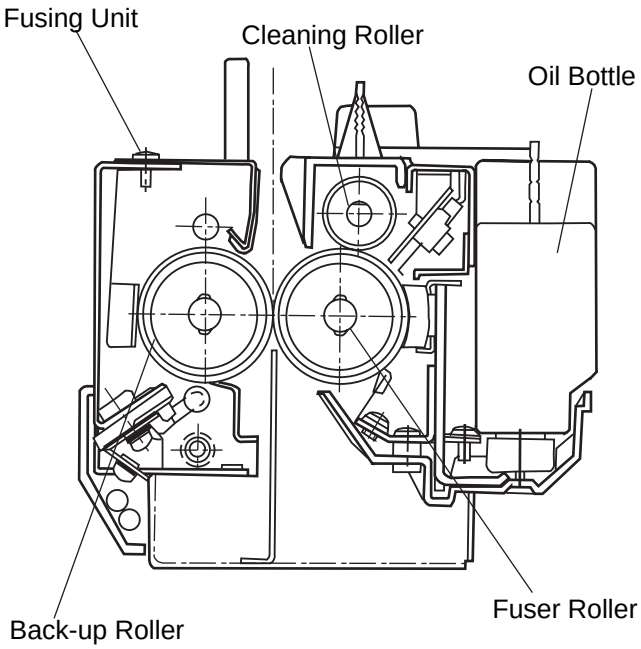
No.22	Back Stain

Phenomenon

Back side of the print paper is stained as shown in the print sample of upper right corner.

Main Causes

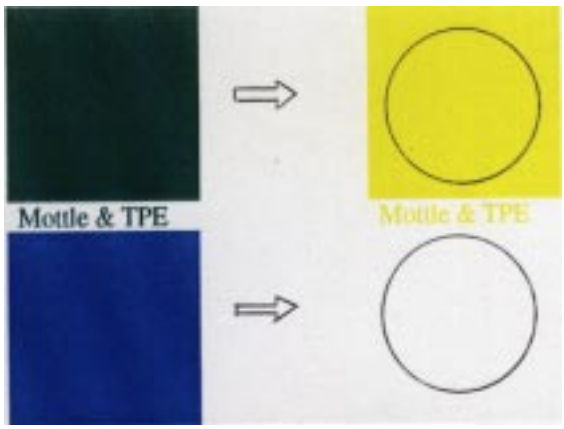
1). Fuser Unit:
  1-1). Cleaning pad is stained.
  1-2). Silicone oil is short.
  1-3). Fuser roller and back-up roller is stained.



Countermeasures

1). Replace the cleaning roller with a new roller. (See Section 3.3.3.)
2). Clean the fuser roller and back-up roller.
3). Replace the fuser unit with a new unit. (See Section 5.2.2.)

No.23	White Print

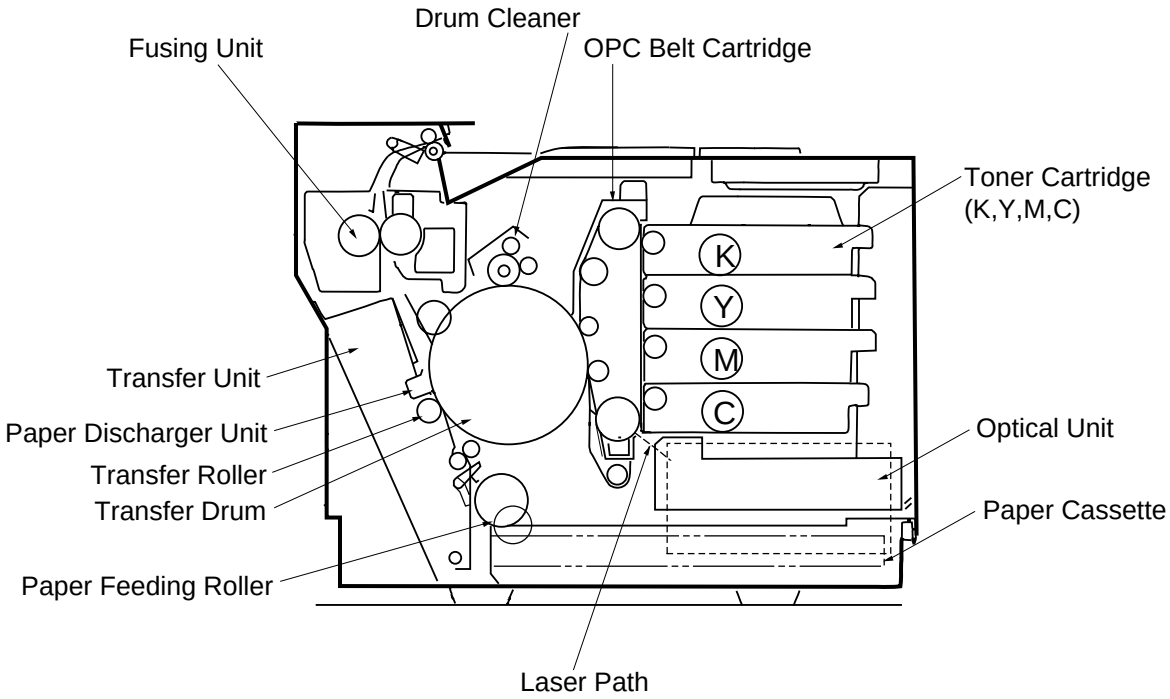


Phenomenon

Blank page (no print at all) is outputted or specific color is missing (not printed) as shown in the print sample of upper right corner.

Main Causes

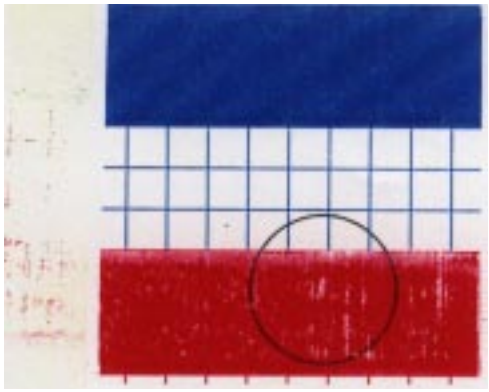
1). Laser light path is blocked by paper or other material stuck at opening of optical unit.
2). Transfer Solenoid is broken (not functioning).
3). There is no belt bias voltage (CBV) injected.
4). There is no output from the high voltage unit (HVU) due to break-down.



Countermeasures

1). Confirm that there is no foreign particles is stuck at the opening of optical unit.
2). Replace the transfer solenoid with a new solenoid. (See Section 7.4.6.)
3). Replace the belt cartridge with a new belt cartridge. (See Section 7.2.1.)
4). Replace the high voltage unit (HVU) with a new unit. (See Section 7.2.6.)

No.24	Insufficient Fusing

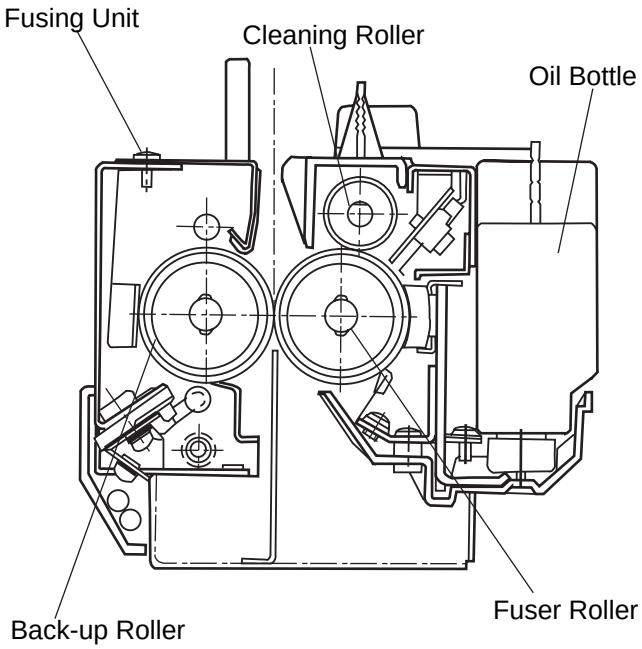


Phenomenon

Printed image is partially missing as shown in the print sample of upper right corner. This proves that the fusing is insufficient.

Main Causes

1). Wrong selection of print media (label or envelope, etc.) at the Host side.
2). Recommended paper is not used.
3). Failure of the fuser unit.



Countermeasures

1). Adjust the mode of Host side to suit to the print media in use.
2). Use the recommended paper.
3). Replace the failed fuser unit with a new unit.

9. Parts List

1) Replaceable Unit Parts 9-1

2) Covers and Power Cord 9-2

3) Layout of Right side and Front Parts 9-3

4) Layout of Left side Parts 9-4

5) Layout of Top and Rear side Parts 9-5

6) Fuser Unit Parts 9-6

SPARE PARTS LIST for SL1 COLOR LASER PRINTER

1. Replaceable Unit Parts

ILLUST. Number	CLASS	Name of Parts	Parts Code	Q'ty/Unit	Lead Time	Remarks
1- 1	A	Toner Cartridge (Y)	30129001	1		6,000 images
1- 2	A	Toner Cartridge (M)	30129002	1		6,000 images
1- 3	A	Toner Cartridge (C)	30129003	1		6,000 images
1- 4	A	Toner Cartridge (K)	30129004	1		10,000 images
1- 5	A	OPC Belt Cartridge	30129005	1		50,000 images
1- 6	A	Cleaner / Oil Bottle	30129006	1		12,000 pages
1-6-1/3-6-2	A	Cleaner / Oil Bottle		1		
1- 7	A	Waste Toner Pack	30129007	1		24,000 images
1-27	A	Fusing Unit (US)	126126	1		Every 60K pages
1-28	A	Fusing Unit (EC)	126127	1		Every 60K pages
1-29	A	Fusing Unit (JP)	126128	1		Every 60K pages
1-37	A	Transfer Roller	126137	1		Every 120K pages
1-38	A	Paper Discharger	126138	1		Every 120K pages
1-40	A	* Drum Cleaner	123875	1		Every 120K pages
1-6-1	A	Oil Bottle		1		24,000 images
3-6-2	A	Fuser Cleaner	30129008	1		Every
1-64	A	Ozone Filter	126164	1		Every 1 Year

SPARE PARTS LIST for SL1 COLOR LASER PRINTER

2. Covers and Power Cord

ILLUST. Number	CLASS	Name of Parts	Parts Code	Q'ty/Unit	Lead Time	Remarks
1-48	D	Power Cord (US)	126148	1	4	
1-49	D	Power Cord (JP)	126149	1	4	
1-51	B	Paper Casette	126151	1	4	
2- 8	D	Top Cover	126107	1	4	
2- 9	D	Side Cover (R)	126108	1	4	
2-10	D	Side Cover (L)	126109	1	4	
2-11	D	Upper Side Cover	126110	1	4	
2-15	D	Front Cover	126114	1	4	
2-17	D	Paper Exit Unit Cover	126116	1	4	
2-18	D	Paper Exit Front Cover	126117	1	4	
2-21	D	Base Cover (R)	126120	1	4	
2-22	D	Base Cover (L)	126121	1	4	
2-23	D	Rear Cover	126122	1	4	
2-24	D	Rear Cover (U)	126123	1	4	
1-25	D	Rear Cover (L)	126124	1	4	

SPARE PARTS LIST for SL1 COLOR LASER PRINTER

3. Layout of Right Side and Front

ILLUST. Number	CLASS	Name of Parts	Parts Code	Q'ty/Unit	Lead Time	Remarks
2-14	C	Front Cover Unit	126113	1	4	
3-52	C	Paper Feeding Clutch	126152	1	4	
3-53	C	Registration Clutch	126153	1	4	
3-54	C	Fuser Clutch	126154	1	4	
3-55	C	Developer Clutch	126155	5	4	DCLK, DCLY, DCLM, DCLC
3-57	C	Transfer Solenoid	126157	1	4	
3-58	C	Drum Cleaner Solenoid	126158	1	4	
3-59	C	Main Motor	126159	1	5	
3-60	C	Main Gear Unit	126160	1	4	
3-61	C	Developer Drive Motor	126161	1	5	
3-62	C	Developer Drive Unit	126162	1	4	
3-66	C	Paper Size Sensor	126166	1	4	
3-67	C	Paper Sensor	126167	8	4	PT1,PT2,HPS,PEU,GHP1, GHP2,TBFL,FC

SPARE PARTS LIST for SL1 COLOR LASER PRINTER

4. Layout of Left Side

ILLUST. Number	CLASS	Name of Parts	Parts Code	Q'ty/Unit	Lead Time	Remarks
2-71	B	MCTL P.W.B.	126171	1	5	
2-74	B	High Voltage Unit (HVU)	126174	1	5	
3-46	B	Power Supply Unit (EC)	126146	1	5	
3-47	B	Power Supply Unit (US)	126147	1	5	
3-50	C	Fuser Connector	126150	1	4	
3-63	C	Cooling Fan Motor	126163	3	4	Fuser,Controller,Ozone
3-65	C	* Interlock Switch	126817	3	4	Front,Back,Top
3-69	C	Toner Sensor Ass'y (P.W.B.)	126169	1	4	
3-73	B	IOD2 P.W.B.	126173	1	5	

SPARE PARTS LIST for SL1 COLOR LASER PRINTER

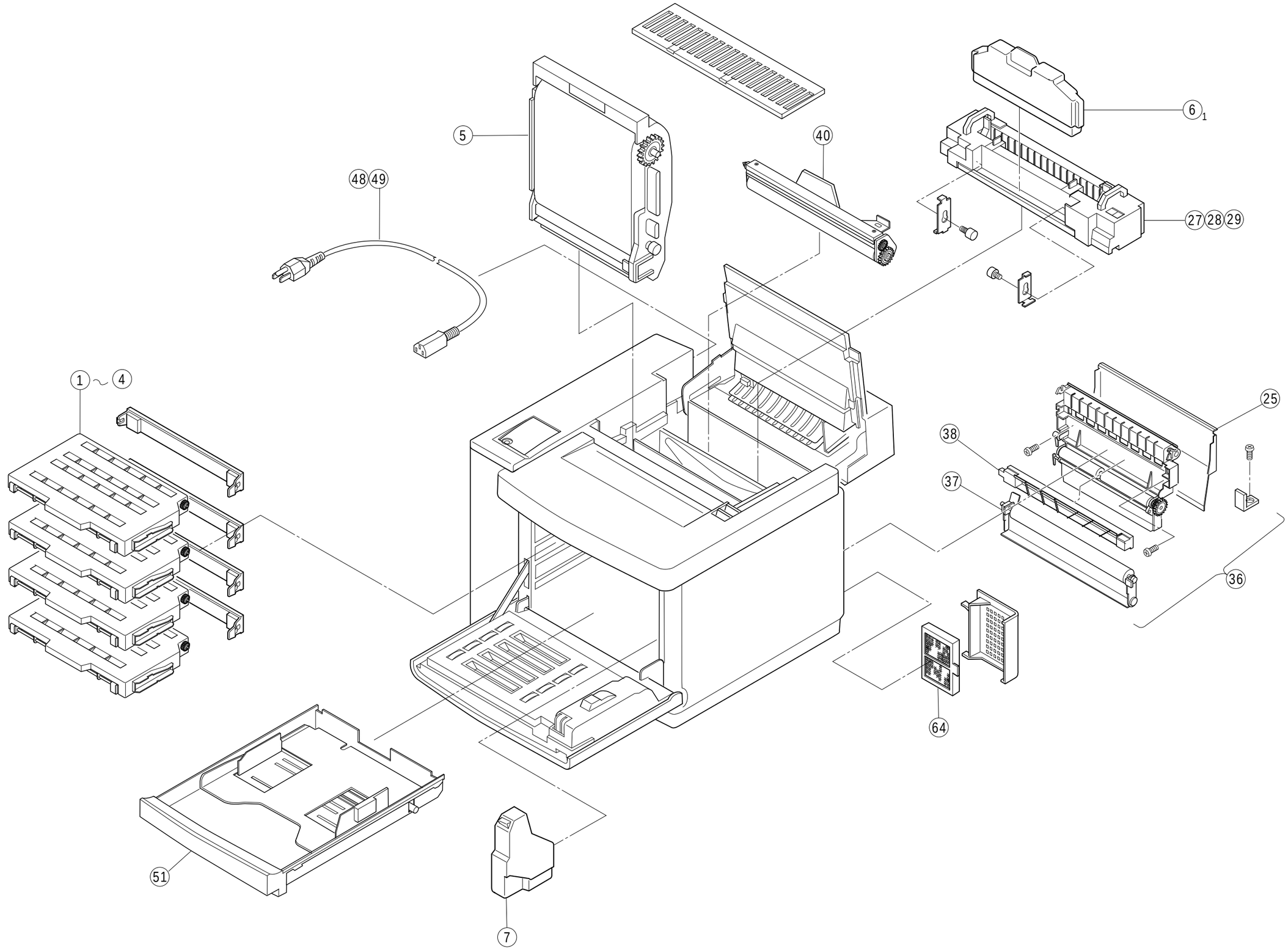
5. Layout of Top Side and Rear Side

ILLUST. Number	CLASS	Name of Parts	Parts Code	Q'ty/Unit	Lead Time	Remarks
2-12	D	Panel Button	126111	1	4	
2-13	B	Panel P.W.B.	126112	1	5	
3-26	C	Waste Toner Feeder (U)	126125	1	4	
3-39	C	Optical Unit	126139	1	5	
3-41	A	Transfer Drum	126141	1	4	300,000 images
3-44	B	Erase Lamp	126144	1	4	
3-45	C	Oil Sensor	126145	1	4	
3-68	C	Belt Sensor	126168	2	4	PBS,E4SEN
3-70	C	OHP Sensor	126170	1	4	
3-72	B	IOD1 P.W.B.	126172	1	5	
2-19	C	Paper Exit Roller	126118	1	4	
2-20	B	Discharge Brush	123842	1	4	
1-36	C	Transfer Unit	126135	1	4	
3-42	B	Paper Feeding Roller	126142	1	4	
3-43	B	* Separator Pad	123825	1	4	Every 120K pages
3-16	C	Paper Exit Unit	126115	1	4	Every 120K pages

SPARE PARTS LIST for SL1 CORROR LASER PRINTER

6. Fuser Unit Parts

ILLUST. Number	CLASS	Name of Parts	Parts Code	Q'ty/Unit	Lead Time	Remarks
3-30	C	* Fusing Heater(US)	123857	1	5	Lamp and Holder Set
3-31	C	* Fusing Heater(EC)	123858	1	5	Lamp and Holder Set
3-32	C	* Fusing Heater(JP)	123856	1	5	Lamp and Holder Set
3-33	C	* Fusing Roller	123828	1	4	
3-34	C	* Back-up Roller	123832	1	4	
3-35	C	Thermistor Ass'y	126134	1	4	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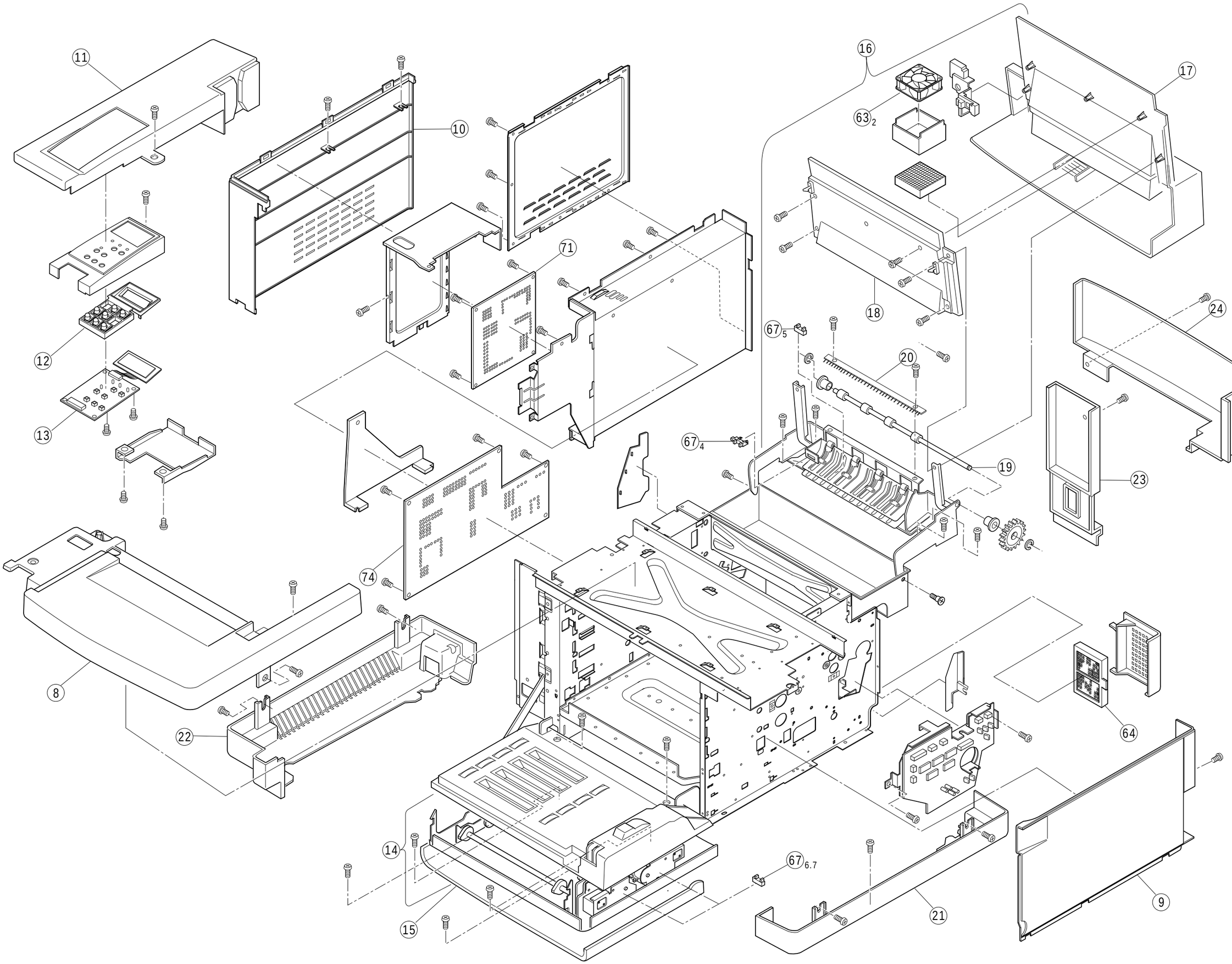
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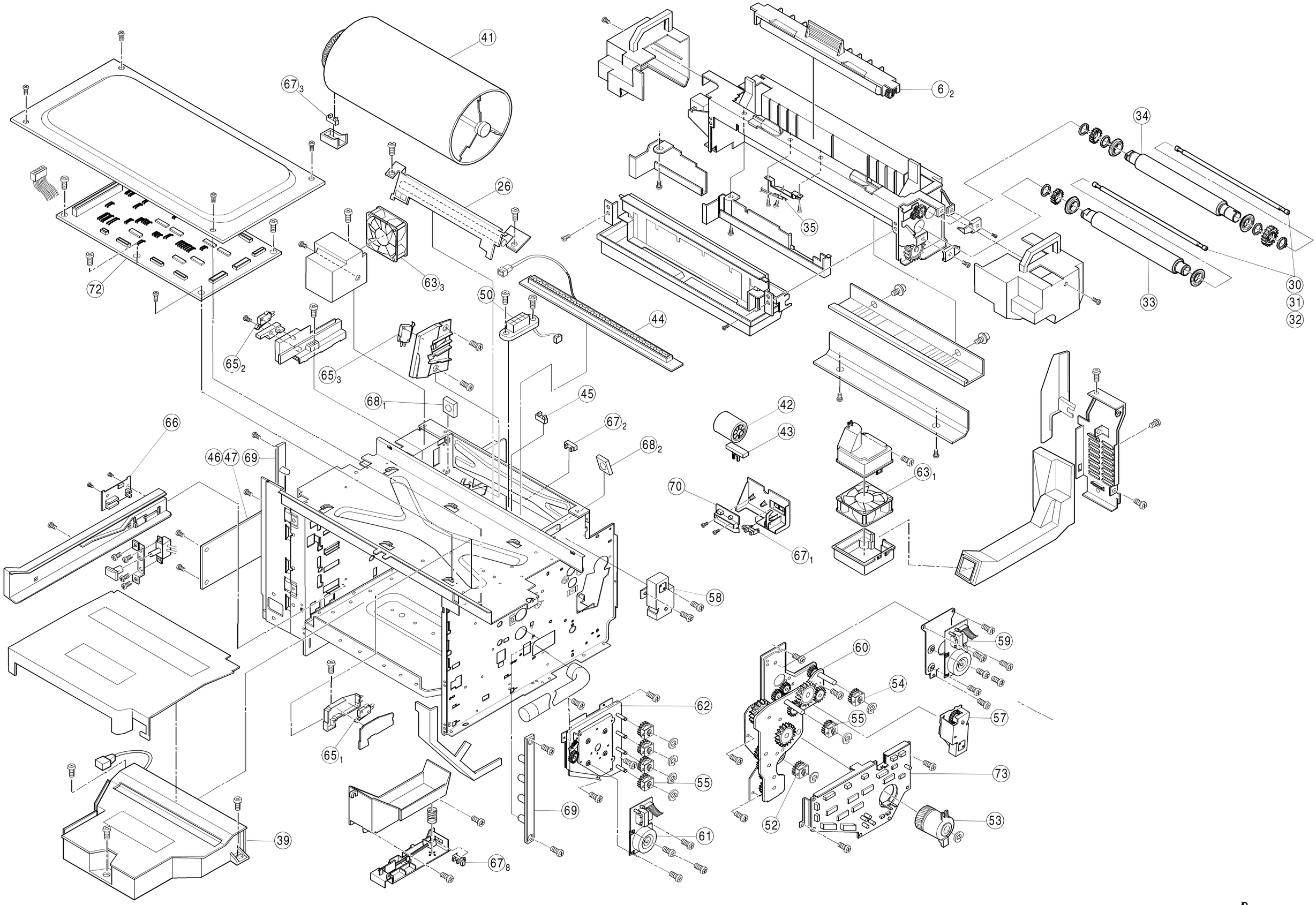
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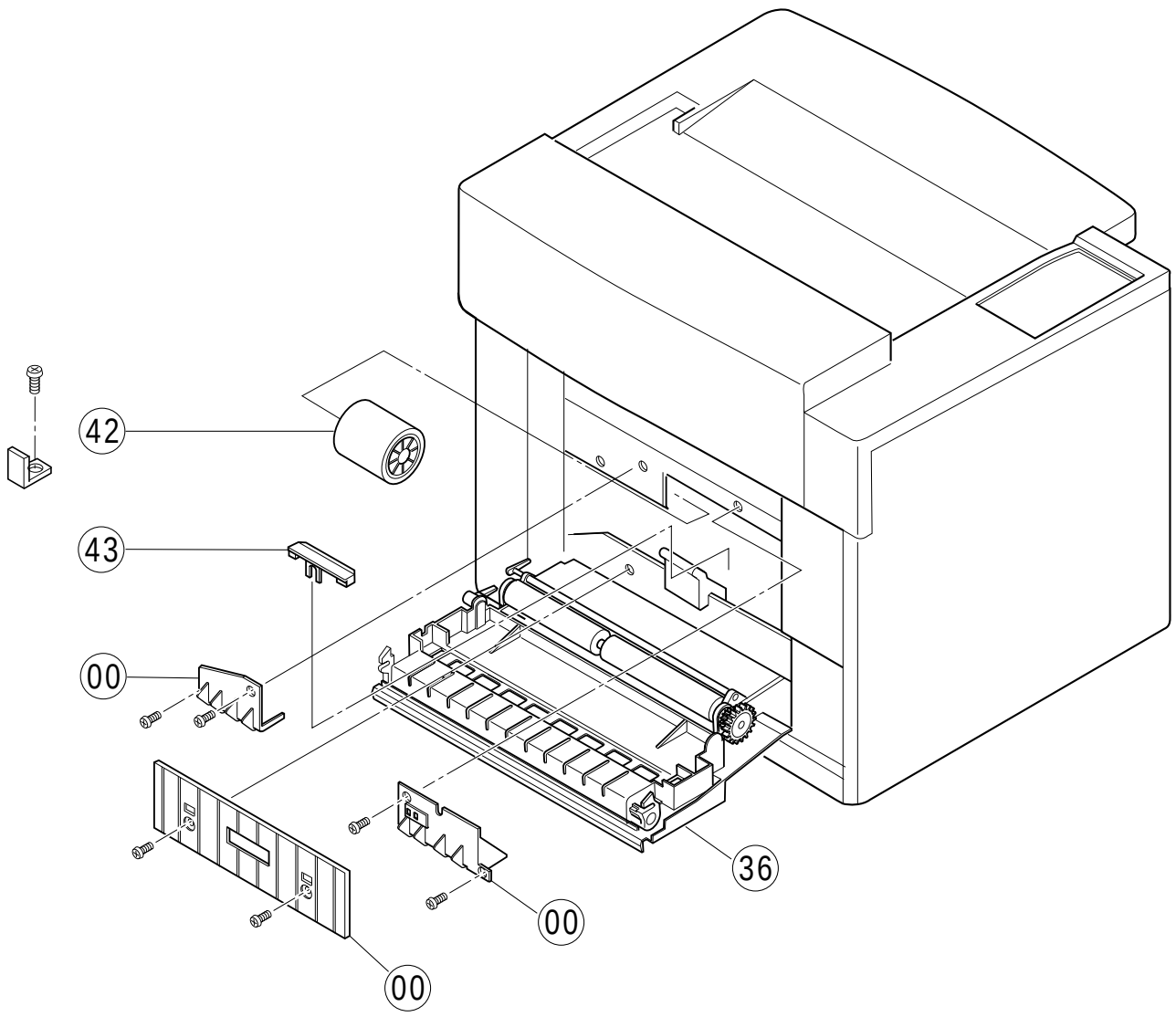
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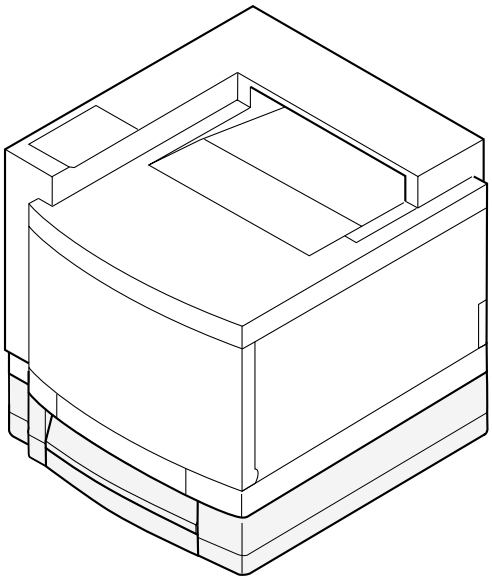
Assembly Manual of Lower Feeder Unit

Model: LFU-1

Applicable Printer: Hitachi Color Laser Printer
Model SL1 Series



Hitachi, Ltd.

Important Note

Read this Manual thoroughly before assembling the lower feeder unit to Hitachi color laser printer, and understand well the procedures and safety precautions set out in this document.

This Manual is recommended to be kept at handy for use.

FCC Notice

⚠ WARNING

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of FCC Rules. These limits are specified to provide the reasonable protection against harmful interference in a residential installation.

Since this equipment generates, uses, and radiates the radio frequency, it may cause harmful interference to the radio communications if not installed or used in accordance with the instructions set out hereunder. However, there is no guarantee that such interference will not occur in a particular installation.

If this equipment causes harmful interference to the radio or television reception, which can be checked and confirmed by powering the equipment off and on, the users are encouraged to correct the interference by taking one or more of the following counter-measures:

①. Reorient or relocate the receiving antenna.
②. Give more clearance between the equipment and receiver.
③. Connect the equipment into the outlet of other circuit which is different from the one being used for the receiver.
④. Consult the dealer or experienced radio/television technician for help.

Canadian Compliance

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

"Le presnt appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques (de la Class B) prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada."

Product Safety

Laser Product

SL1 is certified as a Class 1 laser product and complies with DHHS Laser-Radiation Standards, 21 CFR Chapter 1, Subchapter J.

⚠ Caution

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

Ozone Gas

⚠ Caution

SL1 is provided with the ozone filter in order to reduce exhausted ozone in compliance with Product Safety Standards. Ozone filter must be replaced with new filter yearly, otherwise, it may cause strong odor which will likely have ill effects to bronchial tubes. Therefore, this periodical replacement with new filter must be strictly respected.

Documentation Disclaimer

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SAFETY INSTRUCTIONS

1. Safety Instructions

1.1 Safety Principle

(1). Before starting your operation, read this Manual thoroughly. Especially, read the safety instructions of this section carefully and 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 in safety labels affixed on the machine. Failure to do so may result in the human injuries or equipment damages.

(3). Perform only the procedures explained in this Manual. Refrain from opening or touching any portions that are not related with your operation.

(4). Repair and replacement of parts should be performed by trained and qualified persons only. Operator should not attempt to do such repair or replacement works.

(5). It must be appreciated that above-mentioned cautions and warnings do not cover everything, because it is impossible to guess or evaluate all the circumstances beforehand.

1.2 Special Safety Information

(1). Introductory Information

The cautions and warnings are made clear by following the "Safety Alert Symbol" or "Signal Words" such as DANGER, WARNING and CAUTION.

①. Safety Alert Symbol

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

(1). Introductory Information (..... continue)

② . Understanding Signal Words

DANGER is used to indicate the presence of a hazard which will cause severe human injuries or 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 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 attention to safety messages in this Manual.

③ . Follow Safety Instructions

Carefully read all the safety messages set out in this Manual and also in the safety signs placed on your equipments. In this Manual, the safety instructions (safety alert symbols and signal words) are bracketed by rectangular enclosure to call for attention. Keep the safety signs in good condition without missing or damage. Replace the safety signs if smeared or damaged. Learn how to operate the equipment and how to use the control properly. Do not let anyone operate without acknowledging the instructions. Keep the equipments in proper working condition. Unauthorized modification to equipments may impair the function & safety, and affect the life of equipments.

Listed below is the various kind of "WARNING" contained in this Manual.

⚠ WARNING

HAZARDOUS VOLTAGE

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

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

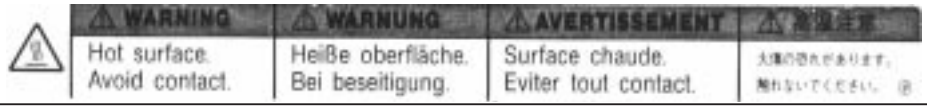
⚠ WARNING

HARMFUL OZONE GAS

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

Ozone Filter is provided to this printer to reduce the exhausted ozone. This filter must be replaced with new filter periodically in accordance with the Manual attached to this printer.

Listed below are the various kinds of "CAUTION" contained in this Manual.



HOT SURFACE

Can cause a burn.

Fusing Unit is approx.160°C hot , so that perimeter is also very hot.

When you need to change the cleaning pad or remove jammed papers, wait about 20 minutes after opening up the paper exit unit and confirm the unit to be well cooled down.

⚠ CAUTION

ROTATING PARTS

Be cautioned about the potential danger of various rollers to get your fingers or hand caught into the machine and cause serious injuries. Note that the exit roller ejecting printed papers is rotating while printing.

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

⚠ CAUTION

HAZARDOUS POWDER

Toner is fine powder to cause powder explosion if dumped into the fire. Strictly refrain from dumping toner into the fire for disposal.

⚠ CAUTION

HAZARDOUS POWDER

Toner is fine powder to cause troubles to eyes and respiratory organs if inhaled.

Handle carefully toner cartridge, waste toner pack and developing unit not to spread the toner.

⚠ CAUTION

POWER CORDS & PLUGS

This printer is equipped with 3-wire power cords and 3-pronged plugs (bi-polar plug with grounding) for the user's safety.

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

⚠ CAUTION

SAFETY INTERLOCK

Cover and Paper Delivery 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.

Preface

We thank you very much for your purchasing Hitachi color laser printer SL1 and lower feeder unit (LFU-1).

This assembly manual provides the assembly procedures how to install your lower feeder unit to Hitachi color laser printer SL1 series, as well as the handling precautions.

- Please peruse this assembly manual prior to starting the installation of lower feeder unit, and understand well the proper installation procedures.

- Please also peruse the operation manual (separate brochure) of Hitachi color laser printer SL1 prior to starting the installation of lower feeder unit and understand the proper installation procedures of your lower feeder unit as well as the handling precautions.

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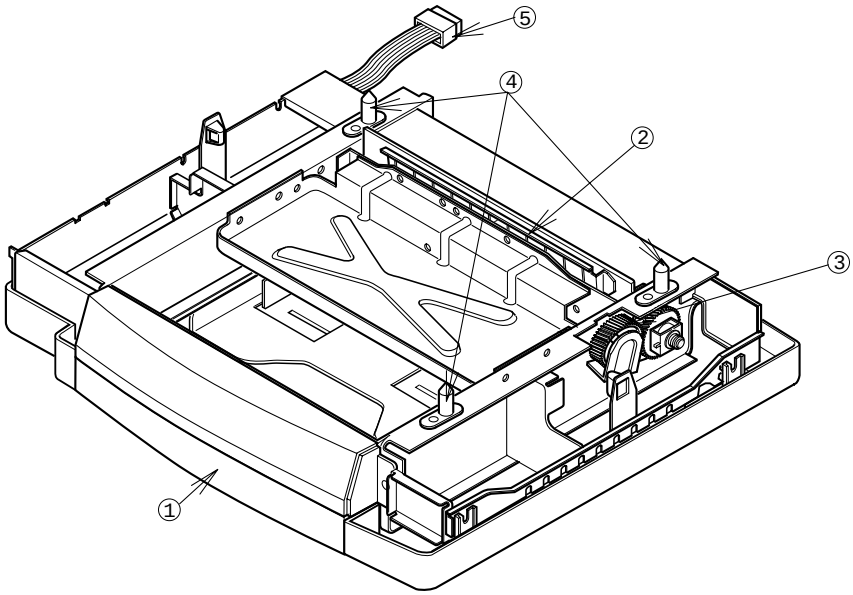
1. Outline of Product

1.1 Name & Function of Each Component



No.	Name	Function
1	Paper Cassette	Cassette to feed paper automatically.
2	Paper Guide	Cassette to guide paper from paper cassette to printer.
3	Paper Feeding Clutch	Clutch to transport paper from paper cassette.
4	Connector Pin	Guide pin to connect printer engine with lower feeder unit.
5	Signal Connector	Electric signal connector to activate lower feeder unit.

2. Specification of Product

2.1 Rating

No.	Item	Specification
1.	Applicable Printer	Hitachi Color Laser Printer SL1 Series
2.	Cassette Capacity	Paper : 250 sheets OHP : 50 sheets
3.	Printable Media	Letter, Legal, A4, Executive, B5, OHP, Label.
4.	Appearance	500(W)×484(D)×116(H) (mm) 139(W)×134.5(D)×32.2(H) (inch)
5.	Weight	Approximately 8kg [17.6lb]

3. Assembly Procedures

3.1 Installation Conditions

Installation conditions of lower feeder unit is the same as printer engine. Laser beam printer is susceptible to the environment of installation location. Printer may not be able to perform the expected function and operation if installed in an inappropriate location. Therefore, the following elements should be considered prior to deciding the installation location.

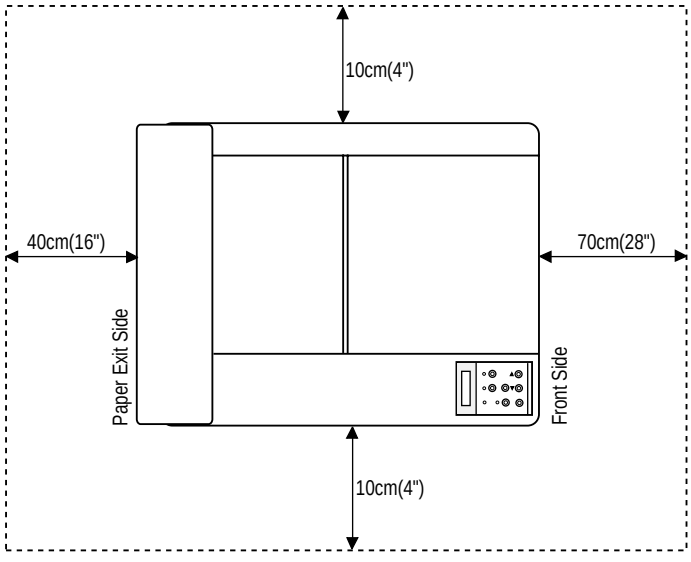
(1). Environmental Conditions

The following items [a] through [d] are all negative elements for installation of printer, and therefore, any location falling under those elements should be avoided for the installation.

[a]. Likely to receive direct sun beam or similar light; Window side for example.
[b]. Likely to vary so much in terms of the temperature and humidity; Normal operational condition to be within 10℃~32.5℃, 20~80%RH and without condensation.
[c]. Likely to directly receive cold wind from the air-conditioner or warm wind or radiated heat from the heater.
[d]. Likely to receive dust or corrosive gas like ammonia.
[e]. Likely to have poor ventilation, or set-up surface not flat.
[f]. Smoothness of set-up surface greater than± 1 degree.

(2). Basic Layout of Installation Location

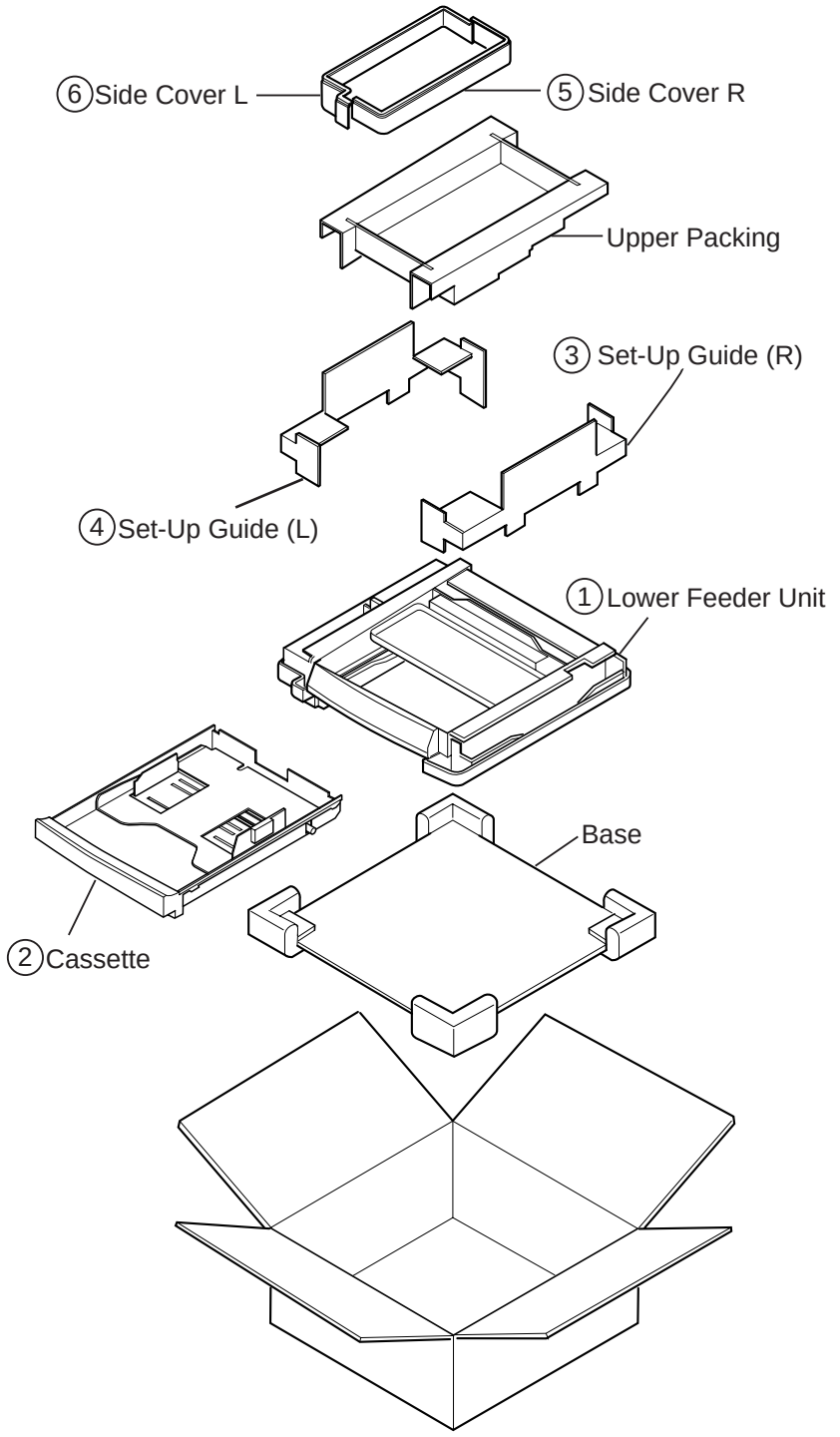
Fig.3-1 shows an appropriate layout of installation location for smooth operation and maintenance of printer.



[fig3-1]

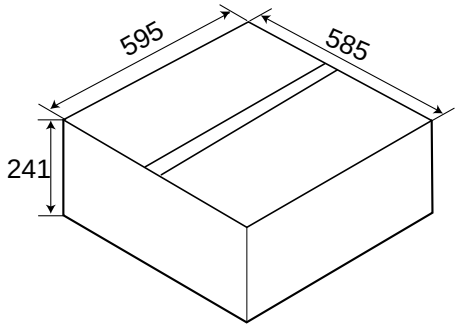
3.2 Unpacking Procedures

①. Remove the tape of upper face.
②. Take out the side cover R/L.
③. Remove the upper packing.
④. Take out the lower feeder unit (cassette and guide R/L inclusive).



Packing List

No.	Name of Parts	Quantity
1	Lower Feeder Unit	1
2	Cassette	1
3	Set-Up Guide (R)	1
4	Set-Up Guide (L)	1
5	Side Cover R	1
6	Side Cover L	1



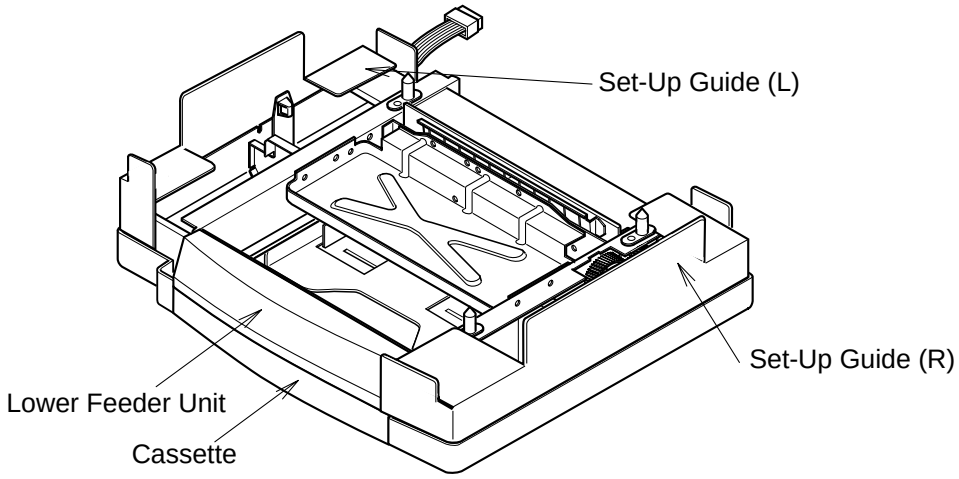
3.3 Assembly Procedures

(1). Installation of Lower Feeder Unit to Printer (LFU)

Precautions

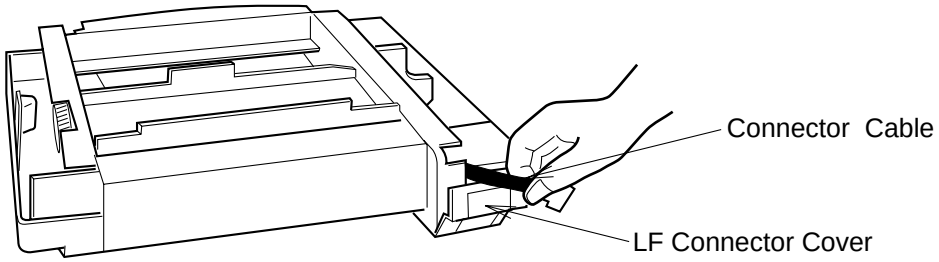
①. Lay the lower feeder unit on the solid and flat surface of set-up table.

i). Leave the set-up guide as fixed to the lower feeder unit (LFU).



②. Pull out the connector cable accommodated in the right corner as viewed from rear side of lower feeder unit.

i). Remove the LF connector cover of LFU (Lower Feeder Unit) side.

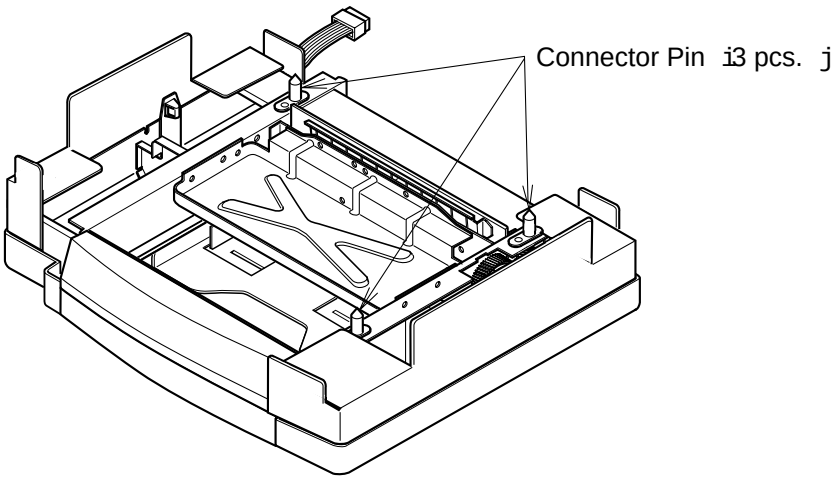


3.3 Assembly Procedures

(1). Installation of Lower Feeder Unit (LFU) to Printer (... continue)

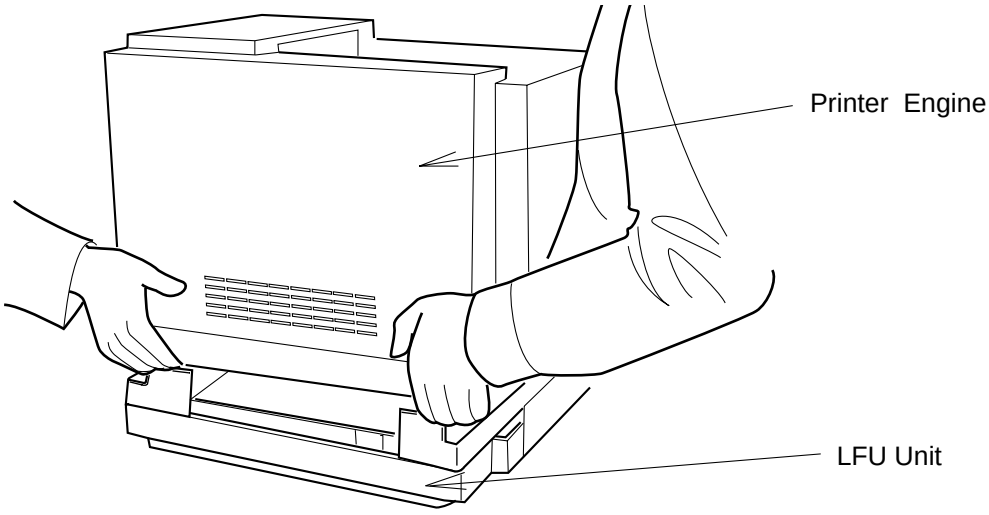
> **⚠ Caution**
>
> Printer engine weighs approximately 32kg. Do not attempt to carry the printer engine by yourself, because it is dangerous for one person to move. It may require two adults or more to move this printer. Since this printer is a precision equipment, move it slowly without giving any shock whenever relocated.

③. Confirm the position of connector pins (3 pieces) for the printer engine.



④. Lift up the printer engine (by two persons), and put it on top of the LFU.

i). Slowly let down the printer engine along the set-up guide provided at both sides of LFU so that the holes of printer engine's rear face meet the connector pins.



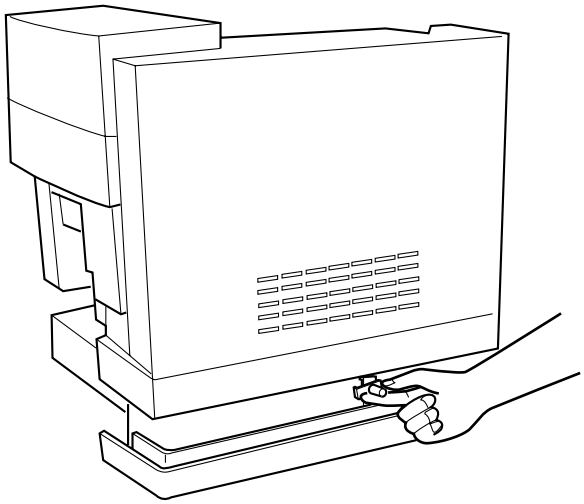
ii). After having placed the printer engine on LFU, confirm the joint with the connector pins at three locations.

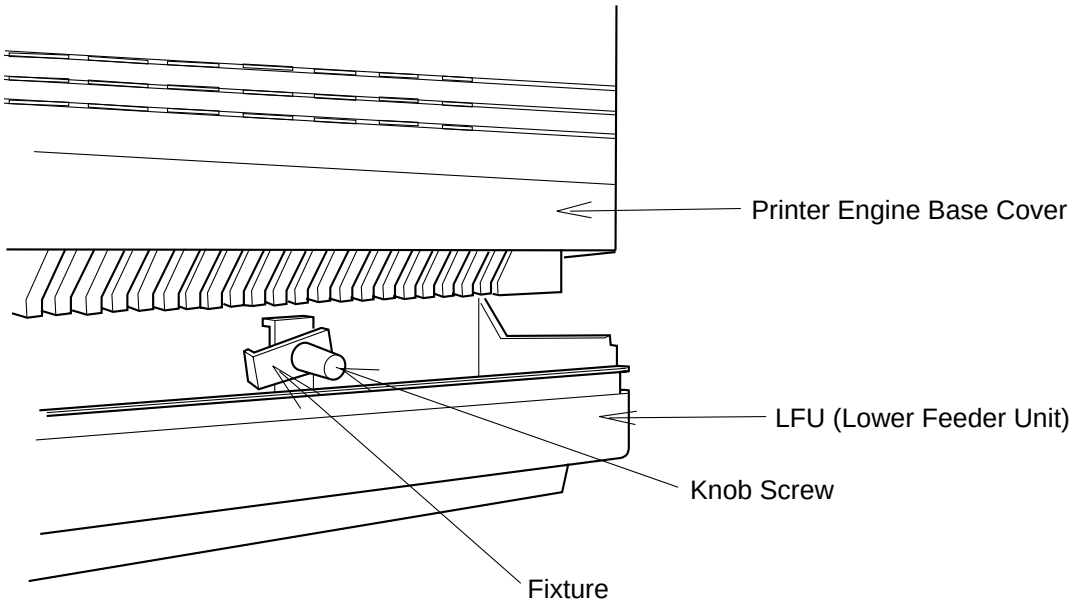
3.3 Assembly Procedures

(1). Installation of Lower Feeder Unit (LFU) to Printer (... continue)

⑤. Install a metal fixture of the left side as viewed from the front side of printer engine.

i). Confirm that there are metal fixtures (2 pcs.) and knob screws (2 pcs) in the bag packaged in the same box of LFU.
ii). Hook the leading edge of fixture to the printer engine base.
iii). Tighten the knob screw to fix the fixture.

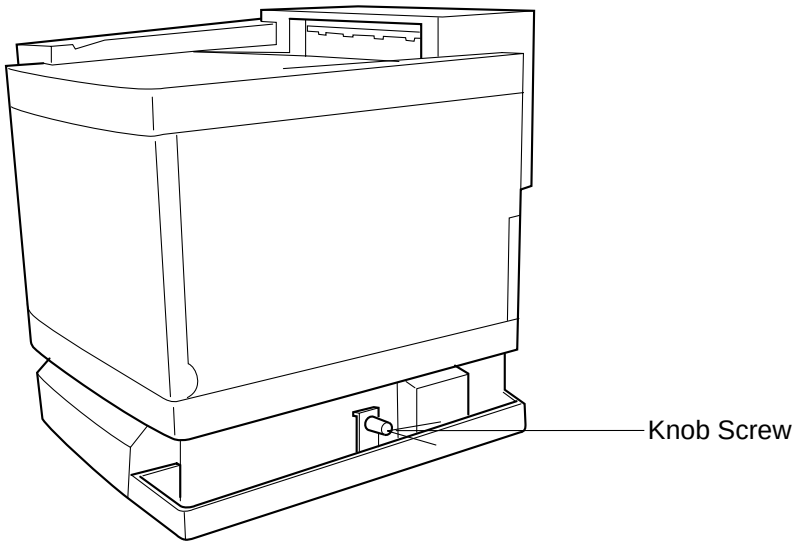




3.3 Assembly Procedures

(1). Installation of Lower Feeder Unit (LFU) to Printer (... continue)

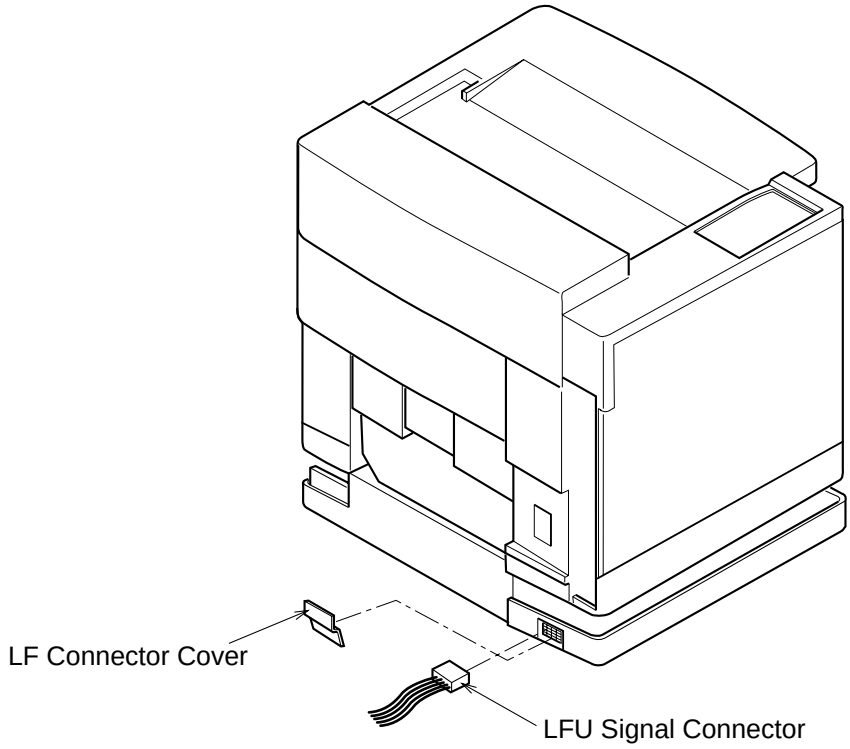
⑥. Following above procedures implemented for the left side, Install the metal fixture of the right side as viewed from the front side of printer engine.



3.3 Assembly Procedures

(2). Installation of Connector Cable to Printer Engine

①. Remove LF connector cover U from the rear side of printer engine.



②. Connect the LFU signal connector to the connector of printer engine side.

> **⚠ Caution**
>
> - Push the LFU signal connector into the connector of printer engine side until it clicks (locked).

②. Install the LFU connector cover as a connector cover of printer engine side.

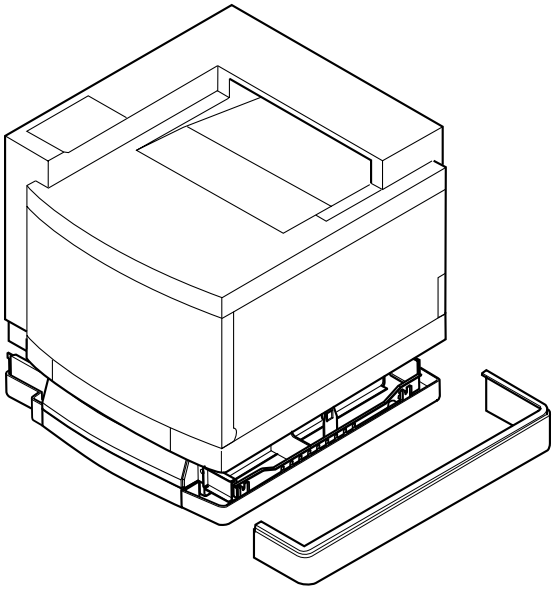
③. Install the LF connector cover U of printer engine as a connector cover of the LFU.

3.3 Assembly Procedures

(3). Installation of Cover

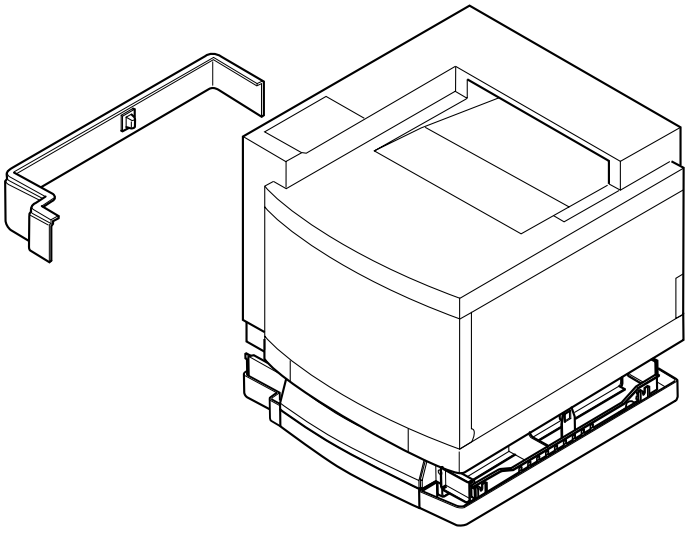
①. Install the side cover R.

i). Let the lock (projection) of side cover R (inside) meet the another lock (recess) of engine side.



②. Install the side cover L.

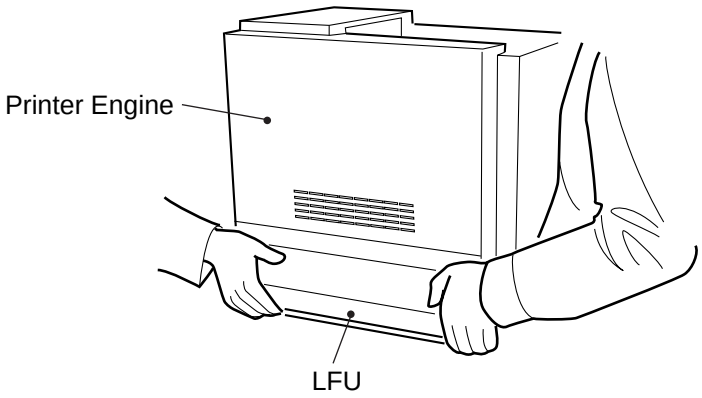
ii). Let the lock (projection) of side cover L (inside) meet the another lock (recess) of engine side.



3.3 Assembly Procedures

(4). Relocation of Printer

①. Whenever the printer is relocated, it requires more than two adults to move the printer as shown below:



⚠ Caution

- Since the printer with the LFU installed weighs approximately 40kg, do not attempt to move the printer by yourself.
- In case the printer and the LFU is relocated individually (separately), make sure to disconnect the connection of LFU signal connector prior to lifting the printer engine from the LFU.

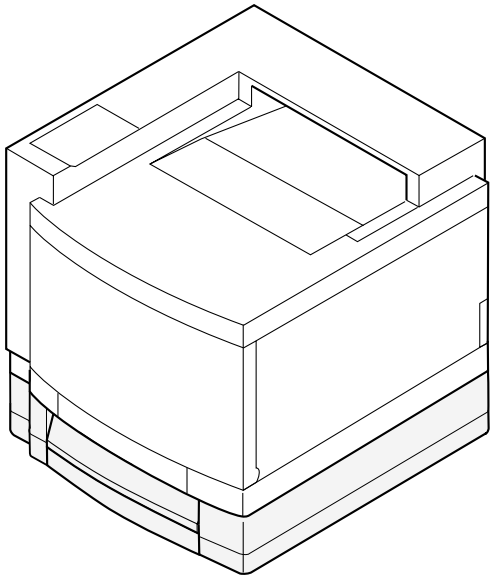
4. Test Drive and Test Print

For the details of test drive and test print, see the chapter 4 of Operation Manual.

Paper Feeding From Lower Cassette

1). Load papers only to the paper cassette of LFU.

2). Implement the test print.



5. Clearance of Paper Jam

5.1 Paper Feeding Jam

①. Pull out the paper cassette (L).
②. Remove the paper remaining inside of engine.
③. Open up the transfer unit, and confirm no remaining paper.
④. Press the clear key.

5.2 Inner Jam & Outer Jam

Both inner jam and out jam is a jam occurring inside the printer engine.

For details of the inner jam and outer jam, see the chapter 6.2 and 6.3 of Operation Manual.

6. Periodic Maintenance

6.1 Daily Maintenance

There is no part in the LFU to require daily maintenance such as cleaning etc.

6.2 Periodic Maintenance

There is no part in the LFU to require periodic replacement. However, it is recommended for good performance of paper feeding that the following parts will be replaced in accordance with the periodic replacement cycle of counter parts of engine side.

Name of Parts	Parts Code	Replacement Cycle
Paper Feeding Roller	126142	Every 120k prints
Separator Pad	123825	

7. Replacement Procedures of Main Parts

7.1 Paper Sensor (PEL) / OHP Sensor (OHPL)

Necessary Tool

①. Phillips Screwdriver #1 and #2.

Disassembly Procedures

①. Remove a side cover (R). [No tool is necessary]
②. Remove a back cover (LFU). [Remove screw BT4×8 (1 pc.)]
③. Remove a paper guide (L). [Remove screws ST4×6 (2 pcs.)]
④. Remove a paper guide (UL) assembly. [Remove screws ST4×6 (2 pcs.)]
⑤. Remove a paper sensor connector.
⑥. Remove a paper sensor from a paper guide (UL).
⑦. Remove a OHP sensor from a paper guide (UL) by removing screws BT3×6 (2 pcs.).
⑧. Remove OHP sensor harness connector.

Assembly Procedures

①. Install a new paper sensor to a paper guide (UR).
②. Connect a connector to a paper sensor.
③. Install the new OHP sensor to the paper guide (UR).
④. Assemble other pieces according to the reverse sequence of disassembling.

7.2 Paper Size Sensor (PSL)

Necessary Tool

①. Phillips Screwdriver.

Disassembly Procedures

①. Remove a side cover (L). [No tool is necessary]
②. Remove a base cover (L). [Remove screws BT4×8 (2 pcs.)]
③. Remove the front cover (LFU). [Remove screws ST3×6 (2 pcs.)]
④. Remove a set screw [BT3×8] of cassette guide (L) assembly.
⑤. Pull a cassette guide (L) toward you from the cassette side, and unhook it.
⑥. Take out a cassette guide (L) assembly from a frame.
⑦. Remove a paper size sensor from a cassette guide (L) assembly by removing screws BT3× 8 (2 pcs.).
⑧. Remove a connector for a paper size sensor.

Assembly Procedures

①. Install a new paper size sensor to a paper guide (L) assembly.
②. Assemble other pieces according to the reverse sequence of disassembling.

7.3 Paper Feeding Clutch (PKCLL)

Necessary Tool

①. Phillips Screwdriver #1 and #2.

Disassembly Procedures

①. Remove a side cover (R). [No tool is necessary]
②. Remove a base cover (R). [Remove screws BT4×8 (2 pcs.)]
③. Remove a back cover (LFU). [Remove screw BT4×8 (1 pc.)]
④. Remove a harness connector of paper feeding clutch.
⑤. Remove a clutch cover. [Remove screws ST3× 6 (1 pc.)]
In this instance, care not to let the spring (installed to clutch cover) come off.
⑥. Remove a stopper ring (nylon) from a paper feeding clutch shaft.
⑦. Remove a paper feeding clutch from a shaft.

Assembly Procedures

①. Incorporate a new paper feeding clutch to a shaft.
②. Fix a new paper feeding clutch with a stopper ring.
③. Assemble other pieces according to the reverse sequence of disassembling.

7.4 Paper Feeding Roller (LFU) / Separator Pad

Necessary Tool

①. Phillips Screwdriver #1 and #2.

Disassembly Procedures

①. Remove a side cover (R). [No tool is necessary]
②. Remove a back cover (LFU). [Remove screw BT4×8 (1 pc.)]
③. Remove a paper guide (L). [Remove screws ST3×6 (2 pcs.)]
④. Remove a paper guide (UL). [Remove screws ST3×6 (2 pcs.)]
⑤. Remove a harness (OHP sensor, paper sensor) connected to a paper guide (UL).
⑥. Sliding a paper feeding roller to the right side, remove it from a shaft.
⑦. Pull up a separator pad, and tale it out.

Assembly Procedures

①. Assemble a new separator pad.
②. Assemble a new paper feeding roller.
③. Assemble other pieces according to the reverse sequence of disassembling.

Caution

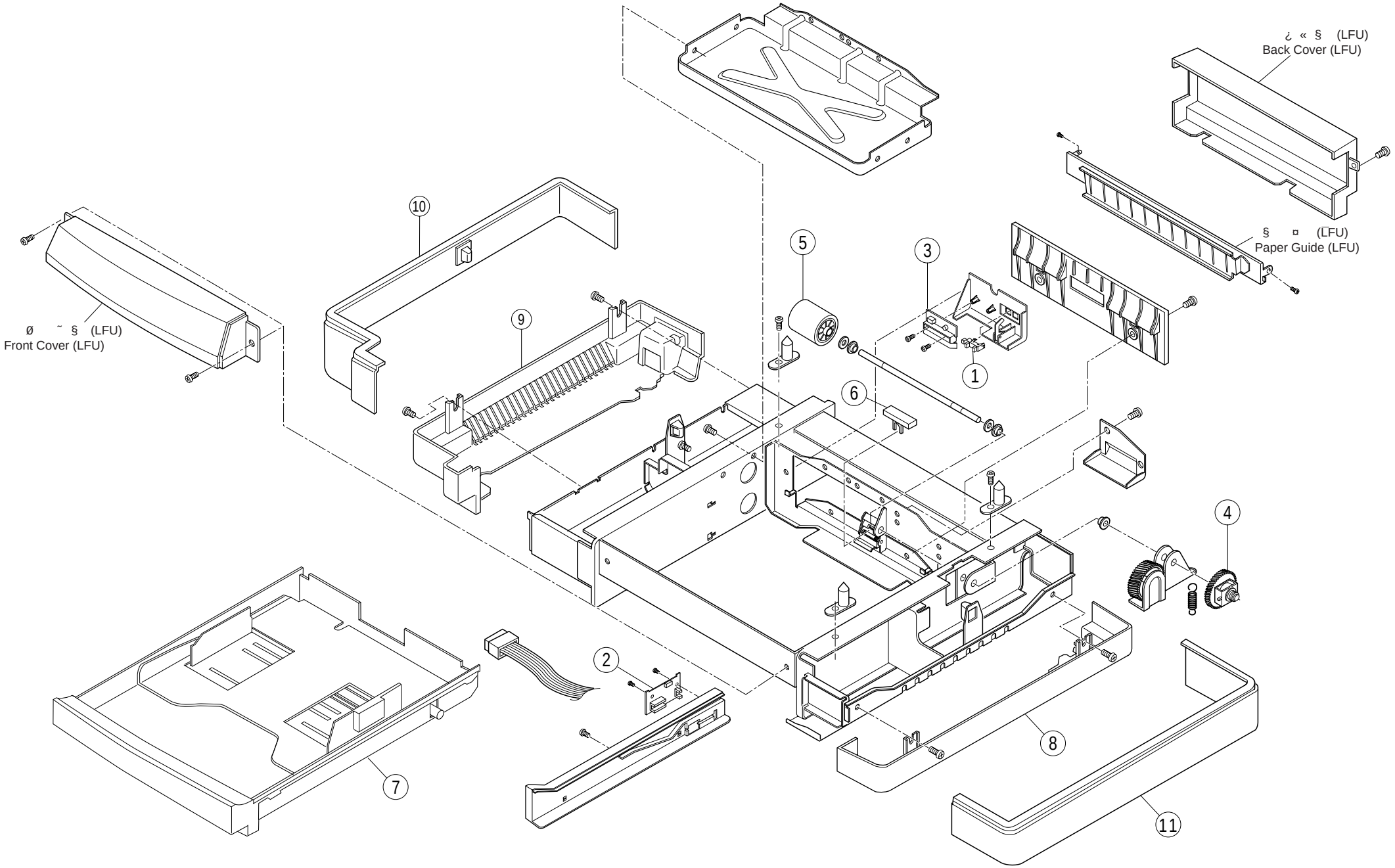
Do not touch surface of paper feeding roller and separator pad.

8. Main Parts of Lower Feeder Unit

See attached drawing 5 for the details of structure.

Main Parts List

No.	Name of Parts	Illust. No.	Parts Code	Function
1.	Paper Sensor	5-1	126167	To sense the availability of paper.
2.	Paper Size Sensor	5-2	126166	To sense the size of paper in the paper cassette.
3.	OHP Sensor	5-3	126170	To sense the availability of OHP sheet.
4.	Paper Feeding Clutch	5-4	126152	To drive a paper feeding roller.
5.	Paper Feeding Roller	5-5	126142	To automatically feed papers from cassette.
6.	Separator Pad	5-6	123825	To separate papers for the automatic feeding of each one paper.
7.	Paper Cassette	5-7	126151	To accommodate papers.
8.	LFU Base Cover R	5-8		Right base cover.
9.	LFU Base Cover L	5-9		Left base cover.
10.	Side Cover R	5-10		Right side cover.
11.	Side Cover L	5-11		Left side cover.


¿ « § (LFU)
Back Cover (LFU)
§ ¤ (LFU)
Paper Guide (LFU)
Ø ~ § (LFU)
Front Cover (LFU)
10
9
5
3
1
6
4
2
7
8
11