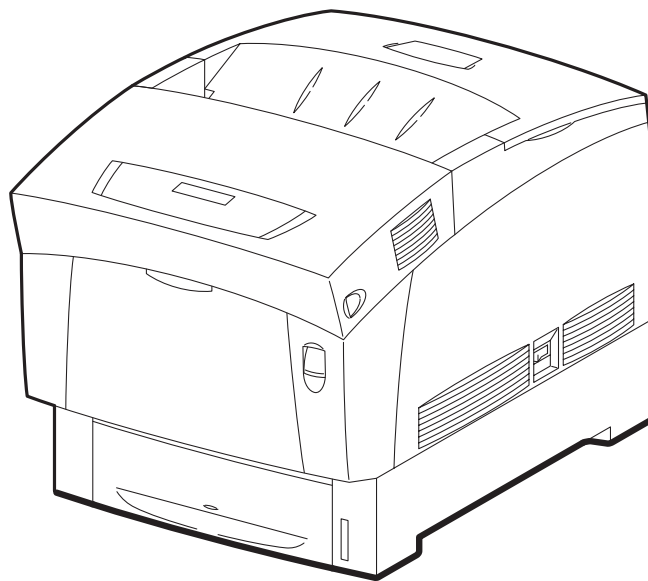




# Brother Color Laser Printer **SERVICE MANUAL**

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**MODEL: HL-4000CN**



Read this manual thoroughly before maintenance work.

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

January 2002  
SM-PRN027

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# PREFACE

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

This service manual covers the HL-4000CN color laser printer.

This manual consists of the following chapters:

**CHAPTER I : SPECIFICATIONS**

Specifications, etc.

**CHAPTER II : INSTALLATION**

Installation conditions and installation procedures.

**CHAPTER III : STRUCTURE OF SYSTEM COMPONENTS**

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

**CHAPTER IV : ASSEMBLY / DISASSEMBLY**

Procedures for replacement of the mechanical system parts.

**CHAPTER V : TROUBLESHOOTING**

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

**CHAPTER VI : DIAGRAMS**

**CHAPTER VII : PLUG / JACK (P/J) CONNECTOR LOCATIONS**

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

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

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## REGULATIONS

### LASER SAFETY (FOR 120 V MODEL ONLY)

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

Since radiation emitted inside the printer is completely confined within protective housings and external covers, the laser beam cannot escape from the machine during any phase of user operation. However, the machine contains 5-milliwatt, 700-800 nanometer wavelength, GaAlAs laser diodes. Direct (or indirect reflected) eye contact with the laser beam might cause serious eye damage. Safety precautions and interlock mechanisms have been designed to prevent any possible laser beam exposure to the operator.

### FDA REGULATIONS (FOR 120 V MODEL ONLY)

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

<p>MANUFACTURED: BROTHER INDUSTRIES, LTD. 15-1 Naeshiro-cho, Mizuho-ku, Nagoya, 467-8561 Japan This product complies with FDA radiation performance standards, 21 CFR Subchapter J.</p>
---

**Caution:**

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


## IEC 60825 SPECIFICATION (FOR 220-240 V MODEL ONLY)

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



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

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

 CLASS 3B 780nm 5mWmax	注意	開いセリインターロックを無効にすると不可視のレーザー放射を受けます。直射放射や散乱放射に、目や皮膚が、さらされないこと。
	CAUTION	INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED. AVOID EXPOSURE TO BEAM.
	PRECAUCIÓN	RADIACION LASERICA INVISIBLE CUANDO SE ABRA Y ANULE EL INTERBLOQUEO. EVITE LA EXPOSICION DIRECTA AL HAZ
	VARNING	OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. STRÅLEN ÄR FARLIG.
ADVARSEL	USYNLIG LASERSTRÅLNING NÄR DEKSEL APNES OG SIKKERHEDSLAS BRYTES. ØNNGA EKSPONERING FOR STRÅLEN.	
ADVARSEL	USYNLIG LASERSTRÅLNING VED ÅBNING NÄR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.	
VARO!	NÄKYMÄTÖN, AVATTAESSA JA SUOJALUKITUS OHJETTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.	
VORSICHT!	UNSICHTBARE LASERSTRÄHLUNG, WENN ABDECKUNG GEÖFFNET UND SICHERHEITSVERRIEGELUNG ÜBERBRÜCKT. NICHT IN DER STRAHL BLICKEN.	
ATTENTION	EMISSION DE RADIATION LASER INVISIBLE QUAND L'APPAREIL EST OUVERT ET LORSQUE LA SECURITE EST NEUTRALISEE. EVITER DE S'EXPOSER AU RAYON LASER	

### For Finland and Sweden

#### LUOKAN 1 LASERLAITE

#### KLASS 1 LASER APPARAT

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

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

### Internal laser radiation

Max. Radiation Power	10 mW
Wave Length	770 nm-808 nm
Laser Class	Class IIIb (Accordance with 21 CFR Part 1040.10) Class 3B (Accordance with IEC60825)

## **SAFETY**

To prevent possible accidents during maintenance operation, you should observe strictly the "Warning" and "Caution" information in this manual.

Dangerous operations and operations out of range of this manual should be absolutely avoided.

Generally various processes not covered by this manual may be required in actual operation, which should be performed carefully always giving attention to safety.

### **Caution**

Use of controls or adjustment or performance of procedures other than those specified in this manual might result in hazardous radiation exposure.

### **Disconnect device**

This printer must be installed near a power outlet that is easily accessible. In case of emergencies, you must disconnect the power cord from the power outlet to shut off the power completely.

### **Caution for batteries**

Do not replace the battery. There is a danger of explosion if the battery is incorrectly replaced. Do not disassemble, recharge or dispose of in by fire. Used batteries should be disposed of according to local regulations.

## Power Source

Keep the power supply off during maintenance operation to prevent electric shock, burns and other damages. Keep the power plug disconnected during the maintenance operation. If the power supply should be kept connected for measurement of voltage or other similar reasons, sufficient care should be given to prevent electric shock, by following the procedures of this manual.

### **WARNING**

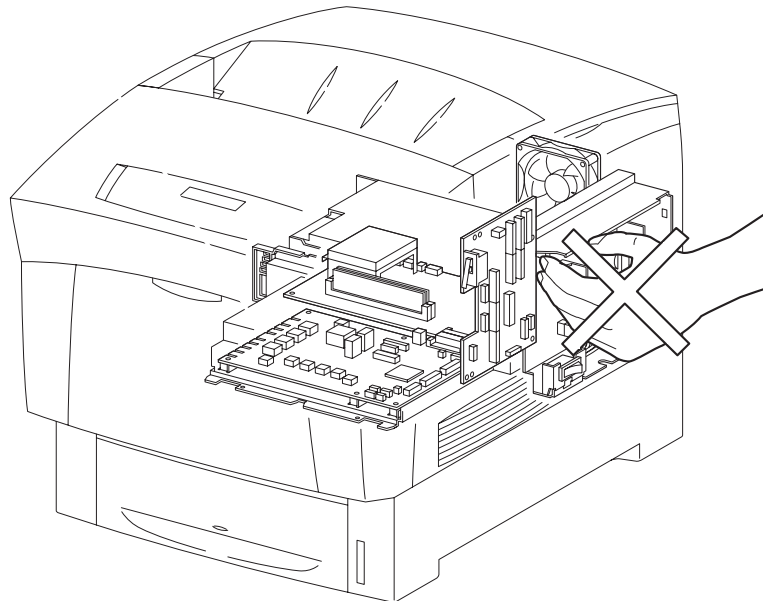
*While the printer is ON, never touch live parts if not required absolutely.*

### **WARNING**

*Power is supplied to the power switch / inlet (LVPS ASSY) even while the printer is off. Never touch its live components.*

### **WARNING**

*Do not touch live parts unless otherwise specified.*



## Driving Units

When servicing gears or other driving units, be sure to turn them OFF and plug off. Drive them manually when required.

### **WARNING**

*Never touch the gears or other driving units while the printer is running.*

## High-temperature Units

When servicing high-temperature units (securing unit, etc.), be sure to turn them OFF to prevent burns, injuries and other troubles, remove the power plug and start service processes after they have cooled down enough.

### **WARNING**

*Immediately after completion of operation, they are still hot. Start services after more than 40 minutes.*

## Laser Beams

### **WARNING**

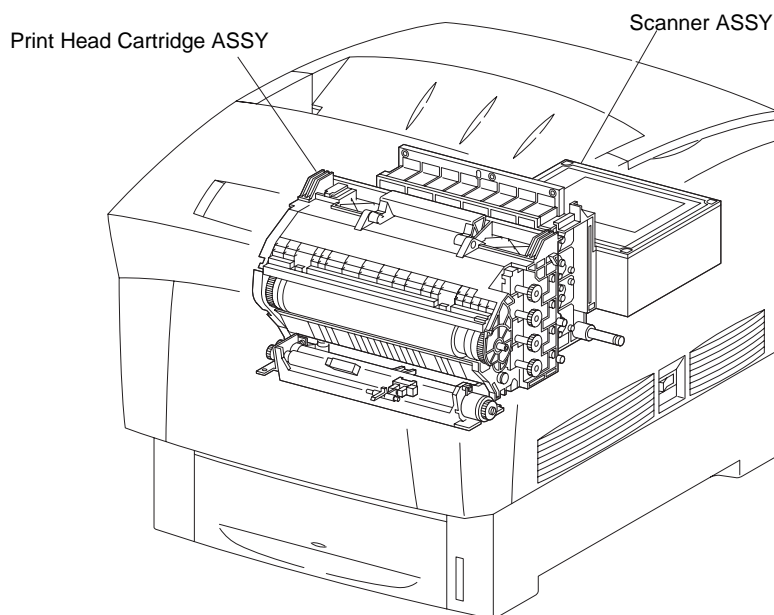
- *If your eyes are exposed to laser beams, you may lose your eyesight.*
- *Never open the cover if warning label for laser beams is attached there.*
- *Before disassembling and reassembling this laser printer, be sure to turn it OFF.*
- *When servicing this laser printer while it is running, be sure to follow the procedures specified in this manual.*
- *You should understand the features of the laser beams which are capable of having an injurious action on the human body, not to extend the danger over the workers as well as other people around the printer.*

*Note:*

*I Laser beams have features as follows:*

- *Frequencies are smaller in width than other beams (sun and electric bulbs) and phases are uniform so that high monochromatic and convergence performance can be obtained and thin beams of light can reach places at a long distance.*
- *Due to the high convergence, beams are concentrated in high density and high temperature, which is dangerous to human body.*

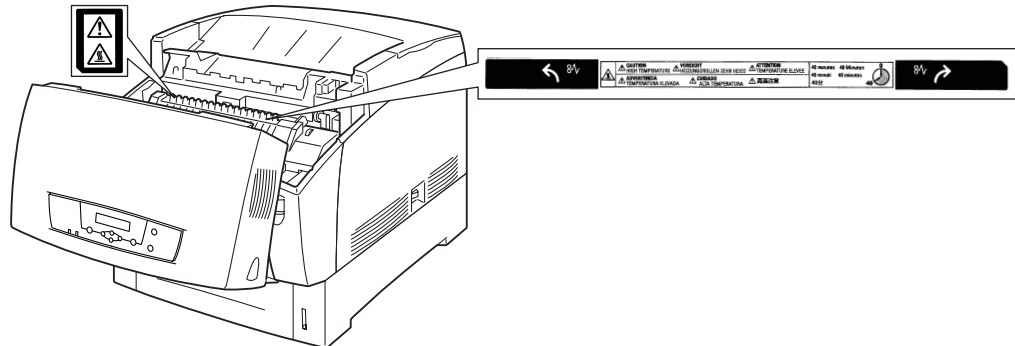
Reference: Laser beams of this laser printer is invisible rays which you cannot see.



## Warning/Caution Labels

Warning labels and caution labels are attached to this laser printer to prevent accidents. Check those labels for their peeling or stain when servicing the printer.

< Caution label for high-temperature units >



## Unpacking the Printer

### **WARNING**

*The printer must be carried horizontally with two or more persons.*

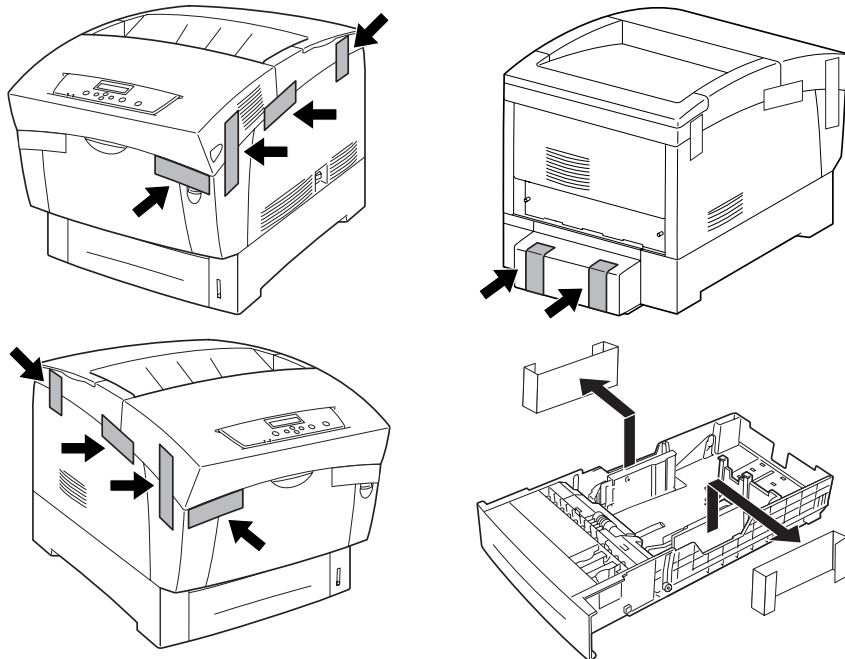
### **CAUTION**

*Extreme care must be taken to avoid personal injuries.*

Check visually the printer for evidence of any damages.

Peel all tapes off the printer.

Remove protection parts (2 pieces) from the paper tray.



## ACRONYMS

In this manual, the manual specific acronyms are used in addition to the generally used ones. The table below contains typical acronyms that are used throughout this manual.

ADC	Automatic Density Control	AG	Analog Ground
AUX.	Auxiliary	B/W	Black and White
BCR	Bias Charge Roll	CART.	Cartridge
BUR	Back Up Roll	CL.	Clutch
CCW	Counter Clock Wise	CLK	Clock
CLN	Cleaning (or Cleaner)	CRU	Customer Replaceable Unit
CR	Charge Roll	CW	Clock Wise
CRUM	CRU Monitor	DTS	Detack Saw
DB	Developing Bias	FDR	Feeder
FG	Frame Ground	FRU	Field Replaceable Unit
Hex	Hexadecimal	I/F	Interface
IDT	Intermediate Drum Transfer	ID	Image Density (or Identification)
L/H	Left Hand	L/P	Low Paper
LD	Laser Diode	LEF	Long Edge Feed
MSI	Multi Sheet Inserter	N/F	Normal Force
N/P	No Paper	NVM	Non Volatile Memory
OPC	Organic Photo Conductor	P/H	Paper Handling
PCDC	Pixel Count Dispense Control	PPM	Prints Per Minute
Pixel	Picture Cell	PWB	Printed Wiring Board
PV	Print Volume	REGI.	Registration
R/H	Right Hand	RTN	Return
SEF	Short Edge Feed	SG	Signal Ground
SNR	Sensor	SOL.	Solenoid
SOS	Start Of Scan	SPI	Scans Per Inch
SYNC.	Synchronous	T/A	Take Away
TC	Toner Concentration	TEMP.	Temperature
TR	Transfer	TRANS.	Transport
WDD	Wide Range Dynamic Damper	YMCBk	Yellow, Magenta, Cyan, Black
XERO.	Xerographic		



## **Service call procedures**

### **1. Notes Before Work**

#### **1.1 Safety notes**

To prevent an accident during maintenance, follow warnings and precautions strictly. Avoid dangerous work.

##### **1. Power supply**

To prevent an electric shock, burn, or injury, turn off the power and unplug the power cable before maintenance work. If it is inevitable to keep the power on for voltage measurement, take the greatest care not to receive an electric shock.

##### **2. Drive**

Never inspect or lubricate drive components such as gears when the machine is in operation.

##### **3. Heavy parts**

The machine weighs 35.3 kg. When lifting the machine, get a firm footing and bend your knees to avoid possible injuries to your back.

##### **4. Safety devices**

Ensure the safety functions of safety devices for preventing mechanical accidents (fuses, circuit breakers, and interlock switches) and for safe user operations (panels and covers). Do not make mechanical alterations that may impair the safety functions.

##### **5. Parts mounting and removal**

Parts and covers may have sharp edges. Do not touch the edges readily. If your fingers or hands become greasy, wipe off the grease well. Do not pull out a part cable forcibly but gradually.

##### **6. Specified tool**

Follow instructions if a tool is specified.

##### **7. Organic solvents**

Use the drum cleaner and other organic solvents carefully with the following notes in mind:

- Keep the room well ventilated not to breathe in vapor a lot or continuously.
- The solvents are inflammable liquids. Do not put them close to or into a fire or do not heat their containers.
- Avoid storing the solvents near a naked fire or sparks because they may catch fire.

##### **8. Irregular use of machine**

When altering the machine, submit an application for irregular use in advance.

## 1.2 Other notes

Do maintenance work correctly and efficiently with the following notes in mind:

1. Reference materials

Read the related technical information (SB, FTI, FTO and so on) well and do maintenance work systematically.

2. Disassembling

Before removing parts for disassembling, check the normal mounting status in advance.

3. Mounting and adjustment

Do not start up the machine immediately after finishing part mountings and adjustments. Check that there are no tools or parts left inside the machine or on assy.

4. Handling of replaced parts and consumables

Do not discard of replaced parts and consumables at the customer site.

After replacing the following consumables, be sure to attach the U tag to the replaced one and recover.

Drum cartridge

Color toner cartridges

As to parts to be recycled, enter necessary data into the U tag and recover the parts.

5. General Notes

Be careful not to disturb the customer's daily work.

Color toner dropped on the floor is hardly cleaned. Place the drop cloth on the floor when maintaining the inside of the machine to protect carpets and floors.

Put wastes, consumables, and replaced parts into a plastic or paper bag and obtain the permission of the customer to throw them away.

Be sure to enter the field work contents and the replaced consumables and parts into the Machine Log Book.

HL-4000CN weighs 35.3 kg.

When moving the equipment, make sure that there are two or more persons carrying it.

For details, see the installation procedure on page II-1.

## 2. Workflow in the Field

### < Initial Actions >

1. Question the Customer for details about the system malfunction.
2. Note down the meter count.
3. Inspect the rejected print and determine the machine condition.
4. Check the Machine Log Book.

### < For UM visit >

1. Perform the Level 1 troubleshooting.
2. Perform the troubleshooting.
3. Print any Internal Test Pattern to check the print quality. (See page V-51)
4. Feed paper from each tray, and clean or replace the feed role as required.
5. Repair any secondary problems that would prevent the machine from running.
6. Perform the trim activities.

### < For SM visit >

1. Print any Internal Test Pattern to check the print quality. (See page V-51)
2. Feed paper from each tray, and clean or replace the feed role as required.
3. Repair any secondary problems that would prevent the machine from running.
4. Perform the trim activities.

### < Final Actions >

1. Check the machine overall operation and function.
2. Check the machine appearance and consumables.
3. Perform the operator training as required.
4. Record the performed action in the Machine Log Book and Service Report.
5. Store the sample printouts in the Machine Log Book.

### 3. Trim Activity

Trim activities for HL-4000CN should be made within every SM/UM, mainly for maintaining the machine performance. There is no service call performed only for the trim activity.

#### 3.1 Trim activity procedure

1. Check the overall operation before performing the trim activity.  
Print any Internal Test Pattern to output three patterns: all colors of 20 % each, halftone and grid.  
All colors of 20 % each: IBT belt, scratches on the drum surface, and fusing problem are checked.  
Halftone pattern: Low density area reproduction problem, color balance and fusing problem are checked.  
Grid pattern: Color registration problem and fusing problem are checked.  
\* See page V-51 for test pattern output method.
2. Clean the interior of the machine.  
Clean toner contamination and paper dust in the paper path area.  
(Operator area should be cleaned carefully.)
3. Check the periodic replacement parts(consumable parts). Replace as required.
4. Safety check.  
Check the Power Cord for damage or loose connection.
5. After 1 to 4 above completes, do the following overall operation checks.  
Machine operation  
Print quality  
Meter reading

#### 3.2 Mechanical consumables and periodic replacement parts

A mechanical consumable should be replaced after checking the printed sheets count during trim action.

<Mechanical consumables>

Consumable	Product Code	Number of sheets that can be printed*1
Black Toner Cartridge	TN-11BK	8.5K
Cyan Toner Cartridge	TN-11C	6K
Magenta Toner Cartridge	TN-11M	6K
Yellow Toner Cartridge	TN-11Y	6K
Print Head Cartridge	PH-11CL	30K
Transfer Roll Cartridge (with Toner Collector Bottle)	TR-11CL	25K

\*1: Condition

Paper size: A4 or LETTER

Toner coverage: 5%

Ratio of B/W to color: 1: 1

Average number of sheets printed at onetime: 4 sheets

<Parts for periodic replacement>

Consumable	Replacement interval	Remarks
Fuser Unit	100K prints	
Retard Roll	100K prints	

### 3.3 Trim checklist

C: Check and if necessary clean, replace, or replenish.

A: Always check and clean.

R: Replace at specified intervals.

\* See page V-51 for the test pattern output method.

No.	Work item	Each time	100K	Rep & Adj No.	Description
1.1	Check before work (Mechanical noise check)	C			- Start up the machine to see that no abnormal noise occurs
1.2	Check before work (Test pattern output)	C			- Output the internal test patterns to check the print quality. (Check uneven darkness, deletion, and drum of belt damage with each 20% pattern and reproducibility of low darkness with the document reproducibility pattern.)
2	Cleaning inside the machine (Paper transport system cleaning) Retard Roll	C	R		- Clean any loose toner and paper dust from the paper transport path and jam sensors. - Clean especially the operator area. - Check and clean the MSI field roll.
3.1	Fuser ASSY	A	R		- Check that the H. Roll and P. Roll are not scratched. Replace them when necessary.
3.2	Print Head Cartridge	A	30K		- Visual check only. Do not touch.
3.3	Transfer Roll Cartridge Unit ASSY	C	18K		- Visual check only. Do not touch.
4	Safety check	A			- Check the power plug for loose connection. - Check the power cable for crack or explosion of its conductor. - Check that the extension cable of an insufficient capacity or a nonstandard power cable (ex. table tap) is not used. - Check that the power cable is not connected to the same outlet as some other cables.
5.1	Check after work (Print quality check)	C			- Output the internal test patterns to see that the print quality satisfies the standards.
5.2	Check after work (Machine operation check)	C			- Check paper feed and noise.
5.3	Check after work	C			- Create Machine Log Book and a service report.



### **CAUTION**

*Do not touch the print head cartridge or transfer roll cartridge unit directly by hand.*

*Do not use a drum cleaner or other solvents. (It will take time for the machine to recover.)*

# **CHAPTER I**

## **SPECIFICATIONS**

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# CHAPTER I SPECIFICATIONS

## 1. PRODUCT NAME

Product Name	Product Code	Model

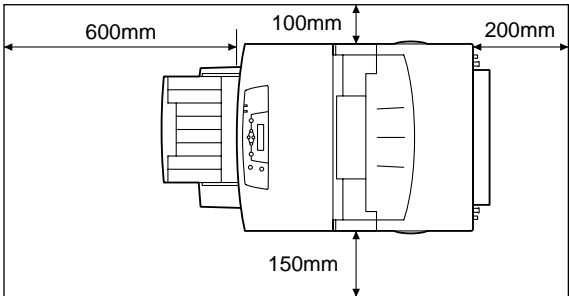
## 2. DIMENSIONS / WEIGHT (MAIN UNIT)

Width (mm)	Depth (mm)	Height (mm)	Weight (kg)
439	590*	445	35.5kg or less (with CRU)

\*: with the manual tray folded

## 3. SPACE REQUIREMENTS

The printer has vents on the sides and the rear. Install the printer with clearances of 150 cm on the right, 100 cm on the left, and 200 cm on the rear.



## 4. PRINTER SYSTEM CONFIGURATION

### 4.1 Outline of the Printer

1) Host computer

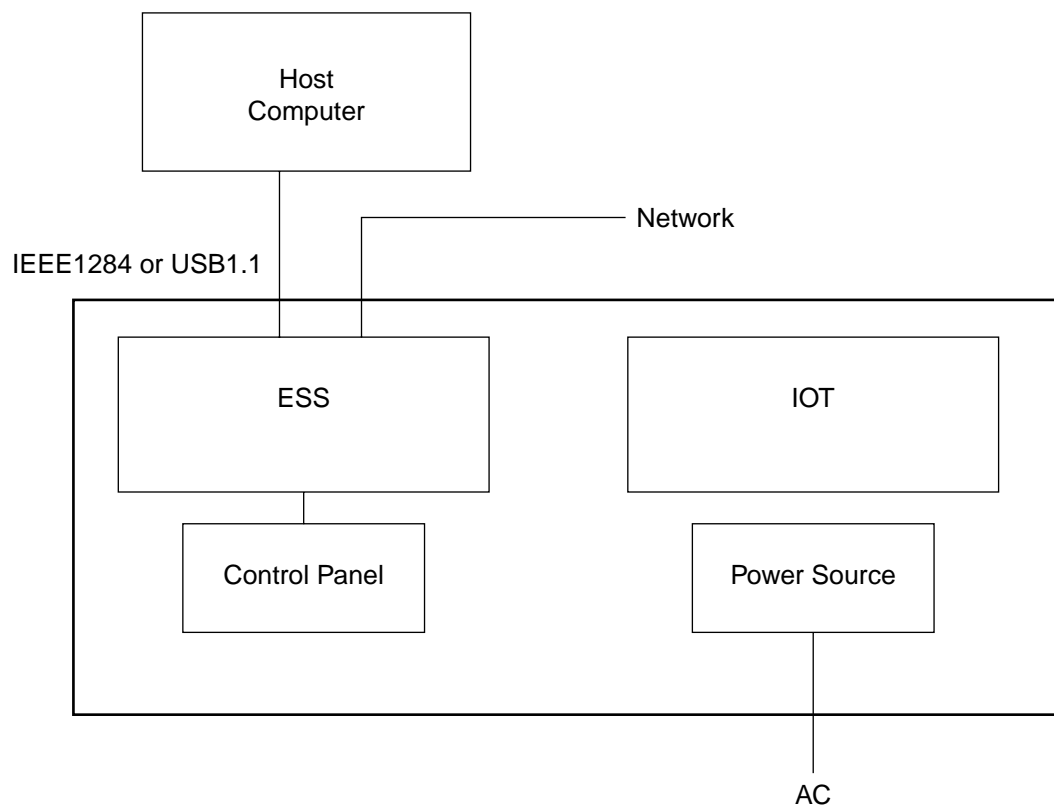
The target host is a personal computer (PC98, IBM PC-AT compatible, or Macintosh) connected directly and also through a network.

2) ESS

The ESS interprets print information (control code data, character code data, graphics data, and image data) sent from the host computer into video data and sends it to the IOT.

3) IOT

The ESS prints received video data for viewing. This unit uses the A4-size 600/1200 dpi laser xerography system.



#### 4.2 IOT Function Outline

Configuration	Contents
Recording section	- Color 16PPM, Monochrome 16PPM - 600dpi (standard speed), 1200dpi (half speed)
Recording System	- OPC drum, 4-tandem cartridges , electro-photographic system using intermediate transfer rolls
Developer	- 2-component
Toner	- Chemical toner (black, yellow, magenta, cyan)
Exposure System	- Semiconductor laser, simultaneous scanning by 4 beams
Fusing System	- Heat fusing of the free belt nip system
CRU (consumables)	- Black toner cartridge - Yellow toner cartridge - Magenta toner cartridge - Cyan toner cartridge - Drum cartridge - Transfer roll cartridge
Paper Source	- Internal 500 sheets feeder unit - MSI unit (100 sheets) - 500 sheets x 2 feeder unit (optional)
Paper Exit	- Face down output tray (250 sheets)
Duplex	- Internal Duplex
Control Panel	- LCD: 16 digits x two rows - Button: 8 - LED: 5 - MIMIC: supported
LVPS	- 100/120/220 VAC, 50/60Hz power source

### 4.3 ESS Standard Configuration

Item	Contents
CPU	QED RM5261A 350MHz
Memory	RAM: Standard 64MB, 320MB max One 144pin SO-DIMM slot installed ROM: 4MB Flash ROM (On Board) (for program) 8MB Mask ROM (On Board) (for fonts) HDD: For electronial sorting: 10GB or more IDE HDD (optional)
External Interface	<ul style="list-style-type: none"> <li>- Parallel connection interface               <ul style="list-style-type: none"> <li>: IEEE1284-compliant (compatible, nibble, ECP)</li> </ul> </li> <li>- USB1.1</li> <li>- Network connection interface               <ul style="list-style-type: none"> <li>: 100BASE-TX supported (10BASE-T compatible)</li> </ul> </li> </ul>
Network Protocol	<ul style="list-style-type: none"> <li>- LPD</li> <li>- Port9100</li> <li>- IPP</li> <li>- FTP (only for firmware update)</li> <li>- NetWare (SPX/IPX)                (with optional network expansion card installed)</li> <li>- Apple Talk (Ether Talk)                (with optional network expansion card installed)</li> <li>- SMB over TCP/IP                (with optional network expansion card installed)</li> <li>- SMB over NetBEUI                (with optional network expansion card installed)</li> <li>- DHCP</li> <li>- HTTP (EWS)</li> <li>- SNMP</li> </ul>

**5. OPTIONAL PRODUCTS**

No.	Product Name	Product Code	Remarks
1	2 Tray Module	LT-40CL	
2	Hard Disk	HD-40CL	
3			
4			
5			
6			
7			
8			
9			

## 6. SYSTEM CHARACTERISTICS

### 6.1 Operation Modes

The printer has the following modes:

1) Running Mode: The printer is running and recording.

- Fusing system Held at the operating temperature
- Exposure system Rotating at the running speed
- Recording system Operating
- Fuser fan Rotating at high speed
- Rear fan Rotating at high speed
- LVPS Normal mode

2) Ready Mode: The printer is ready to print.

- Fusing system Held at the standby temperature
- Exposure system Paused
- Recording system Paused
- Fuser fan Rotating at half speed
- Rear fan Rotating at half speed
- LVPS Normal mode

3) Low Power Mode (Light Sleep Mode):

If no print data is received for a specified time, the printer changes to this mode to save power.

- Fusing system Paused
- Exposure system Paused
- Recording system Paused
- Fuser fan Paused
- Rear fan Paused
- LVPS Normal mode

4) Power Save Mode (Deep Sleep Mode):

If no print data is received for a specified time in Low Power Mode, the printer changes to this mode to save more power. As to the power supply to IOT, the VPS output is totally blocked and only the power to the ESS network function section is supplied.

- Fusing system Paused
- Exposure system Paused
- Recording system Paused
- Fuser fan Paused
- Rear fan Paused
- LVPS Power save mode

## 6.2 Throughput

Throughput is the time from when a print instruction is issued from the printer driver until when the last print is output to the output tray, excluding the process control time.  
(OS: Win98, Measuring chart: JEIDA J11, Paper source: Tray 1)

PDL	Paper	Paper Type	Color	Throughput
PCL6	A4	Plain Paper 1	Color	63 sec. max
	A4	Plain Paper 1	Black & White	63 sec. max
PS3	A4	Plain Paper 1	Color	120 sec. max
	A4	Plain Paper 1	Black & White	120 sec. max

## 6.3 FPOT

FPOT is the time from when a print instruction is issued from the printer driver until when the first print is output to the output tray, excluding the process control time.  
(OS: Win98, Measuring chart: JEIDA J11, Paper source: Tray 1)

PDL	Paper	Paper Type	Color	Throughput
PCL6	A4	Plain Paper 1	Color	20 sec. max
	A4	Plain Paper 1	Black & White	20 sec. max
PS3	A4	Plain Paper 1	Color	20 sec. max
	A4	Plain Paper 1	Black & White	20 sec. max

## 6.4 Continuous Printing Speed

Printing speed in the same document mode  
(OS: Win98, Measuring chart: Not prescribed, Paper: A4 SEF)

<PCL6>

Paper Type	Paper Source	Color	Duplex/Simplex	Ave. print speed
Plain Paper 1	Not prescribed	Color	Simplex	16 ppm or more
Plain Paper 1	Not prescribed	Black & White	Simplex	16 ppm or more
Plain Paper 1	Not prescribed	Color	Duplex	10 ppm or more
Plain Paper 1	Not prescribed	Black & White	Duplex	10 ppm or more
Thick Paper 1	MP tray	Color	Simplex	8 ppm or more
Thick Paper 1	MP tray	Black & White	Simplex	8 ppm or more
Transparency	MP tray	Color	Simplex	8 ppm or more

<PS3>

Paper Type	Paper Source	Color	Duplex/Simplex	Ave. print speed
Plain Paper 1	Not prescribed	Color	Simplex	16 ppm or more
Plain Paper 1	Not prescribed	Black & White	Simplex	16 ppm or more
Plain Paper 1	Not prescribed	Color	Duplex	10 ppm or more
Plain Paper 1	Not prescribed	Black & White	Duplex	10 ppm or more
Thick Paper 1	MP tray	Color	Simplex	8 ppm or more
Thick Paper 1	MP tray	Black & White	Simplex	8 ppm or more
Transparency	MP tray	Color	Simplex	8 ppm or more



## 6.5 Warm-up Time

Even/state	Time before Ready state	Condition
At power on	30 sec. max	Temperature: 22°C Humidity: 55% Input power: 100/120/220 VAC
When work up from Lower Power mode	30 sec. max	

## 7. PRINT FUNCTION

### 7.1 Image Area

Size	Guaranteed image area
500-sheet universal tray	Area excluding a 4-mm margin each from the right, left, top, and bottom sides of paper (maximum area of guaranteed drawing quality: 207.9 x 347.6 mm = 8.2 x 13.7 inches)
Paper (900 mm) longer than manual feed tray	The image quality guarantee does not apply to long paper.

### 7.2 Internal Fonts

<PCL6> 80 Fonts

Type	Font
MicroType	Albertus Md, Albertus Extrabold
MicroType	Antique Olive, Antique Olive Italic, Antique Olive Bd
MicroType	Arial, Arial Italic, Arial Bd, Arial Bd It
MicroType	Clarendon Cond
MicroType	Coronet
MicroType	Courier, Courier It, Courier Bd, Courier Bold It
MicroType	Garamond Antiqua, Garamond Kursiv, Garamond Halbfett, Garamond Kurs Halb
MicroType	Letter Gothic, Letter Gothic It, Letter Gothic Bd
MicroType	Marigold
MicroType	CG Omega, CG Omega It, CG Omega Bd, CG Omega Bd It
MicroType	CG Times, CG Times It, CG Times Bd, CG Times Bd It
MicroType	Times New Roman, Times New Roman It, Times New Roman Bd, Times New Roman Bd It
MicroType	Univers Md, Univers Md It, Univers Bd, Univers Bd It, Univers Md Cd, Univers Md Cd It, Univers Bd Cd, Univers Bd Cd It
MicroType	Avant Garde Book, Avant Garde Bk Obl, Avant Garde Gothic Demi, Avant Garde Gothic Demi Obl
MicroType	Bookman Light, Bookman Light It, Bookman Demi, Bookman Demi It
MicroType	Courier*, Courier* Obl, Courier* Bd, Courier* Bd It
MicroType	Helvetica, Helvetica Obl, Helvetica Bd, Helvetica Bd Obl, Helvetica Narrow, Helvetica Narrow Obl, Helvetica Narrow Bd, Helvetica Narrow Bd Obl

Type	Font
MicroType	New Century Schoolbook Rm, New Century Schoolbook It, New Century Schoolbook Bd, New Century Schoolbook Bd It
MicroType	Palatino, Palatino It, Palatino Bd, Palatino Bd It
MicroType	Time Roman, Time Italic, Time Bold, Time Bold Italic
MicroType	Zapf Chancery Medium IT, Zapf Dingbats
MicroType	Symbol, SymbolPS

<PS3> 136 Fonts

AlbertusMT	AlbertusMT-Italic	AlbertusMT-Light
AntiqueOlive-Bold	AntiqueOlive-Compact	AntiqueOlive-Italic
AntiqueOlive-Roman	AntiqueOliveCE-Bold	AntiqueOliveCE-Compact
AntiqueOliveCE-Italic	AntiqueOliveCE-Roman	Apple-Chancery
Apple-ChanceryCE	Arial-BoldItalicMT	Arial-BoldMT
Arial-ItalicMT	ArialCE	ArialCE-Bold
ArialCE-BoldItalic	ArialCE-Italic	ArialMT
AvantGarde-Book	AvantGarde-BookOblique	AvantGarde-Demi
AvantGarde-DemiOblique	AvantGardeCE-Book	AvantGardeCE-BookOblique
AvantGardeCE-Demi	AvantGardeCE-DemiOblique	Bodoni
Bodoni-Bold	Bodoni-BoldItalic	Bodoni-Italic
Bodoni-Poster	Bodoni-PosterCompressed	BodoniCE
BodoniCE-Bold	BodoniCE-BoldItalic	BodoniCE-Italic
BodoniCE-Poster	BodoniCE-PosterCompressed	Bookman-Demi
Bookman-DemItalic	Bookman-Light	Bookman-LightItalic
BookmanCE-Demi	BookmanCE-DemItalic	BookmanCE-Light
BookmanCE-LightItalic	Carta	Chicago
ChicagoCE	Clarendon	Clarendon-Bold
Clarendon-Light	ClarendonCE	ClarendonCE-Bold
ClarendonCE-Light	CooperBlack	CooperBlack-Italic
Copperplate-ThirtyThreeBC	Copperplate-ThirtyTwoBC	Coronet-Regular
CoronetCE-Regular	Courier	Courier-Bold
Courier-BoldOblique	Courier-Oblique	CourierCE
CourierCE-Bold	CourierCE-BoldOblique	CourierCE-Oblique
Eurostile	Eurostile-Bold	Eurostile-BoldExtendedTwo
Eurostile-ExtendedTwo	EurostileCE	EurostileCE-Bold
EurostileCE-BoldExtendedTwo	EurostileCE-ExtendedTwo	Geneva
GenevaCE	GillSans	GillSans-Bold
GillSans-BoldCondensed	GillSans-BoldItalic	GillSans-Condensed
GillSans-ExtraBold	GillSans-Italic	GillSans-Light

GillSans-LightItalic	GillSansCE-Bold	GillSansCE-BoldCondensed
GillSansCE-BoldItalic	GillSansCE-Condensed	GillSansCE-ExtraBold
GillSansCE-Italic	GillSansCE-Light	GillSansCE-LightItalic
GillSansCE-Roman	Goudy	Goudy-Bold
Goudy-BoldItalic	Goudy-ExtraBold	Goudy-Italic
Helvetica	Helvetica-Bold	Helvetica-BoldOblique
Helvetica-Condensed	Helvetica-Condensed-Bold	Helvetica-Condensed-BoldObl
Helvetica-Condensed-Oblique	Helvetica-Narrow	Helvetica-Narrow-Bold
Helvetica-Narrow-BoldOblique	Helvetica-Narrow-Oblique	Helvetica-Oblique
HelveticaCE	HelveticaCE-Bold	HelveticaCE-BoldOblique
HelveticaCE-Cond	HelveticaCE-CondBold	HelveticaCE-CondBoldObl
HelveticaCE-CondObl	HelveticaCE-Narrow	HelveticaCE-NarrowBold
HelveticaCE-NarrowBoldOblique	HelveticaCE-NarrowOblique	HelveticaCE-Oblique
HoeflerText-Black	HoeflerText-BlackItalic	HoeflerText-Italic
HoeflerText-Ornaments	HoeflerText-Regular	HoeflerTextCE-Black
HoeflerTextCE-BlackItalic	HoeflerTextCE-Italic	HoeflerTextCE-Regular
JoannaMT	JoannaMT-Bold	JoannaMT-BoldItalic
JoannaMT-Italic	JoannaMTCE	JoannaMTCE-Bold
JoannaMTCE-BoldItalic	JoannaMTCE-Italic	LetterGothic
LetterGothic-Bold	LetterGothic-BoldSlanted	LetterGothic-Slanted
LetterGothicCE	LetterGothicCE-Bold	LetterGothicCE-BoldSlanted
LetterGothicCE-Slanted	LubalinGraph-Book	LubalinGraph-BookOblique
LubalinGraph-Demi	LubalinGraph-DemiOblique	LubalinGraphCE-Bookjim
NewCenturySchlbk-Roman	NewCenturySchlbkCE-Bold	NewCenturySchlbkCE-BoldItalic
NewCenturySchlbkCE-Italic	NewCenturySchlbkCE-Roman	NewYork
NewYorkCE	Optima	Optima-Bold
Optima-BoldItalic	Optima-Italic	OptimaCE-Bold
OptimaCE-BoldItalic	OptimaCE-Italic	OptimaCE-Roman
Oxford	Palatino-Bold	Palatino-BoldItalic
Palatino-Italic	Palatino-Roman	PalatinoCE-Bold
PalatinoCE-BoldItalic	PalatinoCE-Italic	PalatinoCE-Roman
StempleGaramond-Bold	StempleGaramond-BoldItalic	StempleGaramond-Italic
StempleGaramond-Roman	StempleGaramondCE-Bold	StempleGaramondCE-BoldItalic
StempleGaramondCE-Italic	StempleGaramondCE-Roman	Symbol

Tekton	Times-Bold	Times-BoldItalic
Times-Italic	Times-Roman	TimesCE-Bold
TimesCE-BoldItalic	TimesCE-Italic	TimesCE-Roman
TimesNewRomanCE	TimesNewRomanCE-Bold	TimesNewRomanCE-BoldItalic
TimesNewRomanCE-Italic	TimesNewRomanPS-BoldItalicMT	TimesNewRomanPS-BoldMT
TimesNewRomanPS-ItalicMT	TimesNewRomanPSMT	Univers
Univers-Bold	Univers-BoldExt	Univers-BoldExtObl
Univers-BoldOblique	Univers-Condensed	Univers-CondensedBold
Univers-CondensedBoldOblique	Univers-CondensedOblique	Univers-Extended
Univers-ExtendedObl	Univers-Light	Univers-LightOblique
Univers-Oblique	UniversCE-Bold	UniversCE-BoldExt
UniversCE-BoldExtObl	UniversCE-BoldOblique	UniversCE-Condensed
UniversCE-CondensedBold	UniversCE-CondensedBoldOblique	UniversCE-CondensedOblique
UniversCE-Extended	UniversCE-ExtendedObl	UniversCE-Light
UniversCE-LightOblique	UniversCE-Medium	UniversCE-Oblique
Wingdings-Regular	ZapfChancery-MediumItalic	ZapfChanceryCE-MediumItalic
ZapfDingbats		

### 7.3 True Type Fonts

Driver display	Name
Always use True Type fonts (Default)	Fonts are always downloaded from the PC for printing.
Substitute with the internal font	Fonts are substituted with internal ones according to the font substitution table. The font substitution table can be edited to set freely which fonts should be substituted with internal ones.

## 8. IMAGE PROCESSING FUNCTIONS

### 8.1 Color/Monochrome Specification

The user can select Color, Monochrome, or Auto. If Auto is selected, the printer automatically distinguishes each page and prints the page data in colors and monochrome.

### 8.2 Paper Type Selection

The user can select Plain paper 1/Plain paper 2, Transparency, Thick paper 1/Thick paper 2, Labels paper, Glossy paper, Postcard, Envelope, Thick paper (Back), Glossy paper (Back), Postcard (Back), or Envelope (Back). However, FX full-color OHP (V556) transparency is not available.

### 8.3 Toner Save

The toner consumption can be reduced to 70% (reference).

### 8.4 Color Matching

This function conforms to Windows ICM 2/Apple Color Sync 2.

### 8.5 Image Adjustment

The brightness, contrast, and saturation can be adjusted.

### 8.6 Color Adjustment

The RGB intensities can be adjusted individually.

### 8.7 Automatic Image Quality Correction

The automatic image quality correction function can be turned ON or OFF. The default is OFF.

### 8.8 Recommended Image Quality Modes

1) Default display

Mode	Resolution	Use and processing
Standard	600dpi	General standard quality This mode is suitable for printing ordinary business documents. Photos, texts, and graphics are processed in optimum ways. The printing speed is the highest in this mode. (Default)
High quality	600dpi	General high quality This mode is suitable for printing high-quality business documents. Photos, texts, and graphics are processed in optimum ways.
High definition	1200dpi	This mode is suitable for printing documents of mainly fine lines. Fine characters, lines, or photo portions are reproduced clearly.

2) All display

Mode	Resolution	Use and processing
For transparency	600dpi	This mode is suitable for printing OHP transparencies. The screen and color conversion for a small number of lines reduce IOT defects and make this mode suitable for printing on transparencies.
ICM readjusted (Colorsync for Macintosh)	600dpi	This mode is suitable for color matching with the display using ICM.
Toner save	600dpi	The toner save function is used in this mode. The hue generally goes down but the toner consumption is reduced.
Presentation	600dpi	This mode is suitable for printing presentation materials by clear color reproduction. In this coherency mode, the output hue is the same as those of other models.
Standard (High gloss)	600dpi	Glossy prints are output in this standard mode. (Plain paper 1/Plain paper 2)
High quality (High gloss)	600dpi	Glossy prints are output in this high quality mode. (Plain paper 1/Plain paper 2)

		Engine resolution/Speed			
		600dpi		1200dpi	
Paper type	Image quality mode	Simplex	Duplex	Simplex	Duplex
Plain paper 1/ Plain paper 2	Standard (High gloss)/ High quality (High gloss)	Half speed	Half speed	—	—
	High definition	—	—	Half speed	Half speed
	Other modes (Standard, High quality, etc)	Full speed	Full speed	—	—
Other paper	High definition	—	—	Half speed	—
	Other modes (Standard, High quality, etc)	Half speed	—	—	—

**8.9 Profile Specification**

The user can select "Color Temperature/Gamma Specification," "ICC Profile Specification," or "No Specification" as a color conversion profile.

## **9. IMAGE ADDITION FUNCTION**

### **9.1 Watermark**

A user-specified or routine character string can be printed as a watermark.

## **10. PAGE LAYOUT FUNCTIONS**

### **10.1 Reverse Print**

The generation of a 180-degree rotated image can be selected. This function is used if a desired result cannot be obtained without rotating a generated image because the direction of transport is determined (ex. envelope).

### **10.2 Zoom**

This printer supports routing printing or printing of a size enlarged or reduced from a routine one. The magnification can be set arbitrarily in a range from 25 to 400%.

### **10.3 Multiple Page**

The user can specify 2up, 4up, 8up, 16up, or 32up to print a specified number of pages together.

### **10.4 Margin Shift**

The user can specify the top, bottom, right, and left margins in millimeters.

### **10.5 Poster**

A single-page image of up to 6 x 6 in size can be printed 36 times repeatedly on a single page.

### **10.6 Booklet Printing**

A job consisting of several pages can be printed and stapled at the center of paper to form a booklet.

## **11. PAGE OUTPUT SEQUENCE CONTROL FUNCTIONS**

### **11.1 Stacking**

Theoretically this function can print up to 999 copies.

### **11.2 Collating**

Theoretically this function can print up to 999 copies.

When a HDD is mounted, high-speed collating is possible. Although varying with the data compression rate, the number of pages in a copy never exceeds 1,000.

## 12. SEPARATOR

### 12.1 Banner Sheet

A banner sheet can be inserted at the beginning or end of a job. The document name, port name, or other is printed in monochrome. However, the MAC driver does not support the banner at the end.

## 13. JOB CONTROL

### 13.1 Print Abortion

From the control panel, the current job can be aborted (discarded).

### 13.2 Forced Ejection

This function forcibly prints and ejects received data if data reception from the host is awaited in the middle of job processing.

### 13.3 Job Timeout

If job transfer is interrupted for a specified time (changeable or settable to infinite from the control panel), the data is discarded as an error.

### 13.4 Job Recovery

A job may fail due to a paper jam. In this case, the job is automatically executed once released.

## 14. OTHER FUNCTIONS

### 14.1 User Job Registration Function

Various print settings can be registered in a printer driver with arbitrary names for calling.

### 14.2 Billing Count Function

This function counts normally printed pages. If enabled in the C/E diag. setting, the user can check the count from the control panel. This is disabled at shipping from the factory.

Counters	Count contents
Color print counter	Counts color prints. (7 digits)
Monochrome print counter	Counts monochrome prints. (7 digits)
Total print counter	Counts both color and monochrome prints. (7 digits)

### 14.3 Toner Level Display

The short-of-toner status can be displayed by CentreWare Internet Services.



#### **14.4 Job Log Function**

This function can hold and print up to 22 job logs. Log data can also be printed immediately from the panel or automatically when the log count has reached the maximum limit.

The log contents are as follows:

- Job submission date and time
- Input interface (Centronics, lpd, etc)
- Data type (XPL)
- Document name (file name)
- User name/host name
- Number of pages used (color/monochrome)
- Number of sides used (color/monochrome)
- Size of paper used (color/monochrome)
- Result (normal termination, error, etc)
- Other (title, total print count, rights, etc)

#### **14.5 Reception Limit (IP Filter Function)**

LPD, Port9100, and IPP can permit or prohibit job acceptance to a set IP.

### **15. UTILITY PRINT**

#### **15.1 Printer Setting List**

A printer setting list can be printed from the panel. The list is printed on A4 paper in monochrome by automatic tray selection.

#### **15.2 Panel Setting List**

A panel setting list can be printed from the panel. The list is printed on A4 paper in monochrome by automatic tray selection.

#### **15.3 Font List**

A font list can be printed from the panel. The list is printed on A4 paper in monochrome by automatic tray selection. YMCK color patterns are printed on the list.

#### **15.4 Job Log Print**

Job log data can be printed immediately from the panel or automatically. The data is printed on A4 paper in monochrome by automatic tray selection.

#### **15.5 Color Registration Correction Chart**

Two kinds of color registration correction charts can be printed. One is the main scan correction chart and the other is the subscan correction chart. The user can print the main scan correction chart but the subscan correction chart is for a customer engineer.

## 16. HOST INTERFACE

### 16.1 Client Hardware

Hardware	Conditions of guarantee
PC-AT compatible (DOS/V)	A model where Windows 95/98/ME, 2000/XP, or NT4.0 is guaranteed to run
PC98 Series	A model sold in November 1993 or later with a two-way parallel interface where Windows 95/98/ME, 2000/XP, or NT4.0 is guaranteed to run
Macintosh	A model where MAC OS 8.1 to 9.1,OSX 10.1 is guaranteed to run

### 16.2 Client OS

Client OS	Driver	Direct print utility	Network utility	SNN
Windows 95/98/98ME	Supported	Supported	Supported	Supported
Windows NT4.0	Supported	—	Supported	Supported
Windows 2000/XP	Supported	—	Supported	Supported
MAC OS 8.1 to 9.1	Supported	—	—	—

### 16.3 Server OS

- Windows NT 4.0 Server
- Windows 2000 Server
- NetWare 3.12J/3.2J/4.1J/4.11J/4.2J/5J
- Windows 95/98/ME (Printer shared)

## 17. IEEE1284

### 17.1 Connector

Amphenol 36-pin

### 17.2 IEEE1284 Support

The printer supports IEEE1284 (compatible, nibble, ECP mode). If the host computer does not support IEEE1284, the two-way function cannot be used.

## 18. ETHERNET

The printer can be connected to either 100BASE-TX or 10BASE-T by automatic or manual switching. The physical specifications conform to the IEEE802.3 standards.

### 18.1 Connector

RJ-45

## 18.2 Printing Protocols

The standard printing protocols are LPD, Port9100, IPP, FTP and the optional ones are SMB, NetWare, and EtherTalk.

### 1) Standard

Supported Protocol	Transport	Max Session	Supported OS
LPD	TCP/IP	1	Win95/98/Me WinNT4.0 Win2000 (usually lprand Sizeless lpr)
Port9100	TCP/IP	1	Win95/98/Me Win2000/XP
IPP	TCP/IP	3	Windows Me, Win2000
FTP (only for firmware update)	TCP/IP	1	[Client] Win95/98/Me, WinNT4.0, Win2000/XP

### 2) Option

Supported Protocol	Transport	Max Session	Supported OS
SMB	TCP/IP	5	Win95/98/Me, WinNT4.0 Win2000
	NetBEUI		
NetWare	NCP/IPX (PServer mode)	1	NetWare 3.12J/3.2J/4.1J/4.11J/4.2J/5J (NDS support)
	SPX/IPX (Nprint mode)		
EtherTalk (PAP)	ATP/DDP	1	MAC OS 8.1 to 9.1, OpenTransport1.1.2 or later

### 18.3 Management Protocols

The printer supports SNMP and http (Web base management) as the management protocols. DHCP is also supported as automatic IP address setting.

#### 1) Standard

Supported Protocol	Transport	Support
SNMP	UDP/IP	[Supported MIB] MIB-II (RFC1213) Host Resources MIB (RFC1514) Printer MIB (RFC1759) XCMI Communication Config MIB (V2.4) XCMI Job Monitoring MIB (V2.4)  [Manager] Network utility, DocuHouse, PrintXchange
	IPX (option)	
http (Web base management)	TCP/IP	[Client] (Windows 95/98/Me/NT4.0/2000/XP) Netscape Communicator 4.06 or later Internet Explorer 4.01 or later (MacOS OS8.1 - 9.1,OpenTransport1.1.2 or later) Netscape Communicator 4.06 or later Internet Explorer 4.01 or later
DHCP	UDP/IP	[Supported OS] Windows NT 4.0 Server Windows 2000 Server
IPP	TCP/IP (Number of session: 5)	Windows2000/XP

#### 2) Option

Supported Protocol	Transport	Max Session	Supported OS
SMB	TCP/IP	5	Win95/98/Me, WinNT4.0 Win2000
	NetBEUI		
NetWare	NCP/IPX (PServer mode)	1	NetWare 3.12J/3.2J/4.1J/4.11J/4.2J/5J (NDS support)
	SPX/IPX (Nprint mode)		
EtherTalk (PAP)	ATP/DDP	1	MAC OS 8.1 to 9.1, OpenTransport1.1.2 or later

## **18.4 USB**

The printer conforms to USB Ver.1.1.

- 1) Connector  
4-pin, B connector
  
- 2) Supported OS  
Windows 98/ME, Windows 2000/XP  
Mac OS 8.6 to 9.1  
Preinstalled version  
\* Windows version: Post Launch

## **19. UTILITY SOFTWARE**

### **19.1 Printer Drivers/Installers**

Printer drivers for Windows 95/98/ME, Windows NT4.0, Windows 2000, and Mac OS 8.1 to 9.1 are prepared.

### **19.2 BLP (LPR)**

Utilities for Windows 95/98/ME are prepared for peer-to-peer network printing.

### **19.3 BNT (NetBIOS)**

Utilities for Windows 95/98/ME, NT4.0, 2000, XP are prepared for peer-to-peer network printing.

### **19.4 BRAdmin Pro**

Various network settings are permitted.

## 20. PAPER HANDLING

### 20.1 Paper Feed

1) Tray 1

The 500-sheet universal tray can be mounted.

2) Trays 2 and 3 (Option)

The 500-sheet universal tray can be mounted each.

3) Manual feed tray (MSI)

Supported size	A4, B5, A5, Letter, Legal 14, Postcard and User-defined
Paper capacity	100 sheets or 10 mm thick or less for standard paper
Paper type	Plain paper 1/Plain paper 2, Transparency, Thick paper 1/Thick paper 2, Labels paper, Glossy paper, Postcard, and Envelope Paper weight: 60 to 216 gsm (16 to 80 lb)
Paper size	Minimum: 90 mm (3.5 inches) wide x 139.7 mm (5.5 inches) long Maximum: 216 mm (8.5 inches) wide x 356 mm (14 inches) long * * The printer can handle paper up to 900 mm (35.4 inches) in long-size mode. For longer paper, however, the operator support is necessary. The paper weight in long-size mode shall be 157 gsm or less.

4) 500-sheet universal tray

Supported size	A4, B5, A5, Letter, and Legal 14
Paper capacity	500 sheets or 56 mm thick or less for standard paper
Paper type	Plain paper 1/Plain paper 2 Paper weight: 60 to 99 gsm

5) Paper feed control

1. Automatic tray feed (including the manual feed tray)

From the trays including the manual feed tray, the printer automatically selects a tray where specified paper is loaded.

The priority order of automatic selection is as follows:

Tray 1, Tray 2, Tray 3, Manual feed tray

A combination with unsupported paper is prohibited on the printer driver.

2. Specified tray feed

Select a tray from Tray 1, Tray 2, Tray 3, and Manual feed tray.

For the manual feed tray, vertical or horizontal feed is selected.

A combination with unsupported paper is excluded on the printer driver.

3. Paper level display

The short-of-paper status can be displayed by CentreWare Internet Services.

## 20.2 Output Tray

The printer has a face-down tray at the upper part.

Supported paper size	All paper sizes that can be handled by the printer
Paper capacity	250 sheets or more for standard paper

## 20.3 Duplex

### 1) Duplex path

Supported size	A4, B5, A5, Letter, Legal 14, and User-defined
Paper type	Plain paper 1/Plain paper 2 Paper weight: 64 to 99 gsm
Paper size	Minimum: 149 mm (3.5 inches) wide x 210 mm long (A5) Maximum: 216 mm (8.5 inches) wide x 356 mm (14 inches) long (Legal 14-inch)

### 2) Duplex control

Select duplex or simplex.

A combination with unsupported paper is prohibited on the printer driver.

For duplex printing, " Long Edge Binding " or " Short Edge Binding " can be selected.

## 20.4 Handling of Other Paper

### 1) Transparency dividers

The printer has a divider insertion function for transparencies. Before a transparency, a blank sheet or a print index of the same contents as the transparency is inserted. For the paper tray, user can select automatic paper feed from a tray where paper of the same size is loaded (default) or unconditional paper feed from a tray specified only for dividers.

## 20.5 Summary of Prohibited Conditions

### 1) Paper size limitation

Selected paper size	500 Universal	Manual Tray	Duplex
A5	y	y	y
B5	y	y	y
A4	y	y	y
Letter	y	y	y
Legal 14	y	y	y
Envelope	n	y	n
Postcard	n	y	n
User-defined	n	y	y

y: possible n: impossible

2) Paper type limitation

Selected paper type	500 Universal	Manual Tray	Duplex
Plain paper 1	y	y	y
Plain paper 2	y	y	y
Transparency	n	y	n
Thick paper 1	n	y	n
Thick paper 2	n	y	n
Labels paper	n	y	n
Glossy paper	n	y	n
Postcard	n	y	n
Envelope	n	y	n
Back (thick, glossy, postcard, envelop)	n	y	n

y: possible n: impossible

## 21. OPERATING SUPPLY VOLTAGE

<115/120V>

Phase	Single (two phases)
Input voltage	100-127 VAC $\pm$ 10%
Frequency	50/60 Hz $\pm$ 3Hz

<220/240V>

Phase	Single (two phases)
Input voltage	220-240 VAC $\pm$ 10%
Frequency	50/60 Hz $\pm$ 3Hz

## 22. RATED POWER CONSUMPTION

Mode	Power consumption
Running Mode	850 W max (Maximum: Fuser ON) 450 W max (Average) *1
Ready Mode	850 W max (Maximum: Fuser ON) 180 W max (Average) *2
Low Power Mode	45 W max Conforming to the International Energy Star Program

\*1: Average in continuous printing

\*2: Average when the fuser is at the standby temperature



## 23. NOISE

Standby: 35 dB (A) max

Printing:

	Base engine		Optional feeder
	Cassette run	MSI run	Cassette run
Standard ( 600dpi )	52.0 dB(A)	54.0 dB(A)	54.0 dB(A)
High definition/gloss (Half speed)	54.0 dB(A)	55.0 dB(A)	55.0 dB(A)

## 24. FIRMWARE UPDATE FUNCTION

The user can rewrite (update) the ESS firmware and Net extension card formware.

Update item	Via IEEE1284	Via network (ftp)	Via network (web)
ESS	y	y	n
Net extension card	y	y	n
MCU	n	n	n

## 25. TOOLS AND SERVICE CONSUMABLES

### 25.1 Tools

604K2540 (Tester Adapter)

### 25.2 Service Consumables

The printer has no service consumables unique to the machine.

## 26. CONSUMABLES

Consumables	Product Code	Life (No. of sheets printable)*1
Black Toner Cartridge	TN-11BK	8.5K
Cyan Toner Cartridge	TN-11C	6K
Magenta Toner Cartridge	TN-11M	6K
Yellow Toner Cartridge	TN-11Y	6K
Drum Cartridge	PH-11CL	30K
Transfer Roll Cartridge ( with the Waste Toner Bottle )	TR-11CL	25K

\*1: Conditions of use

Paper size: A4 or LETTER

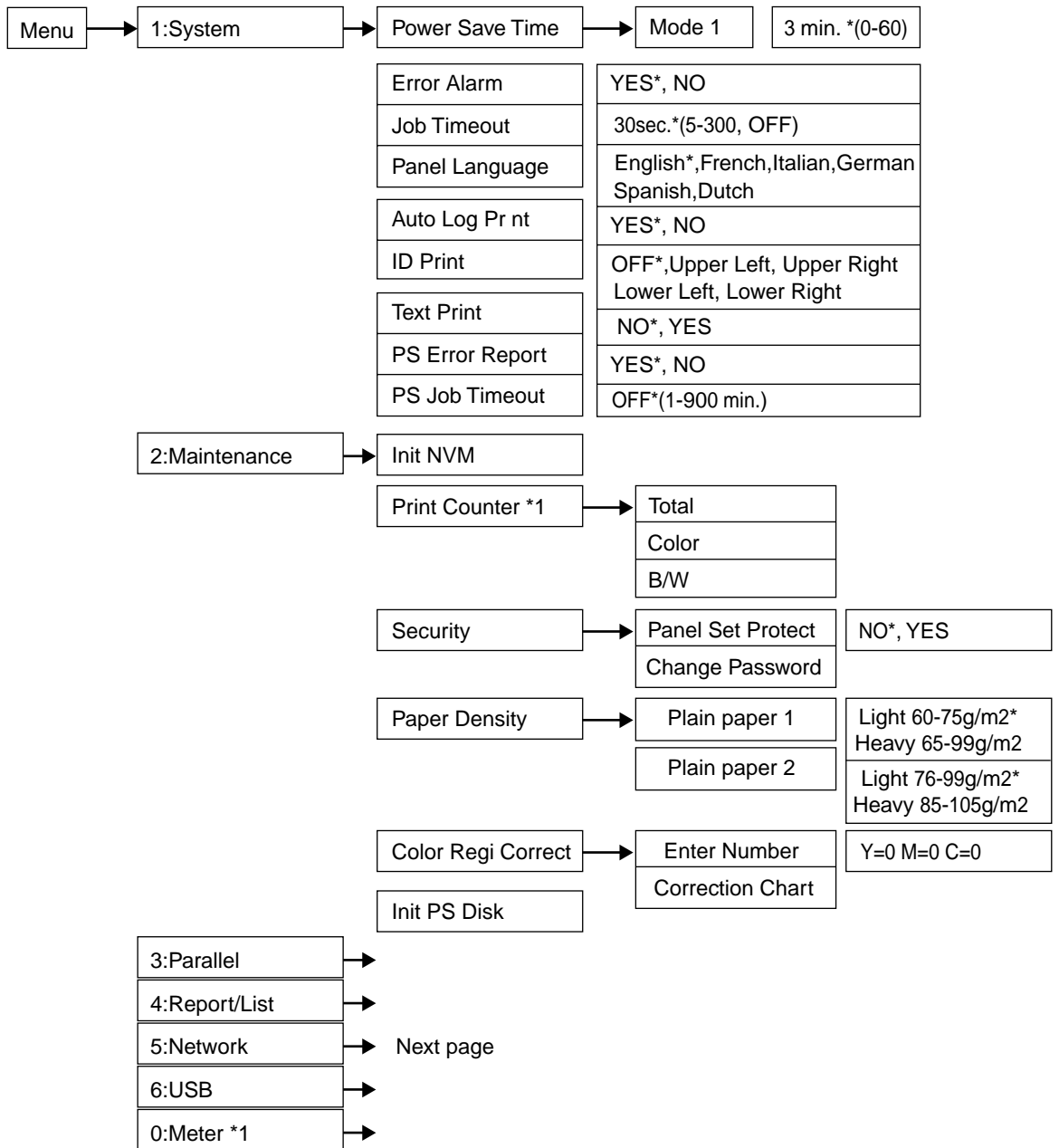
Black-and-white/color ratio: 1:1

Toner coverage: 5%

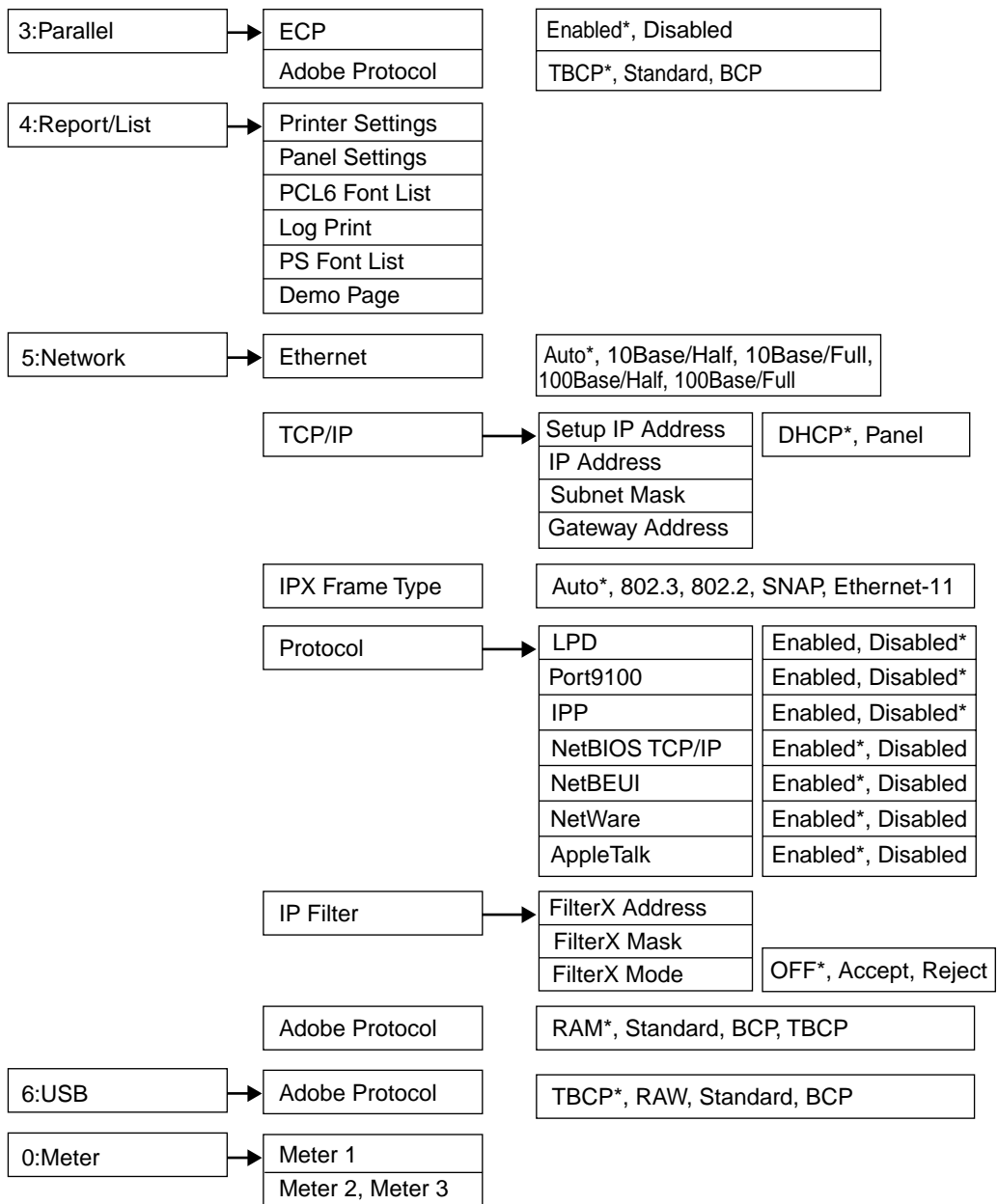
Number of sheets printed at a time: 4 ave.

## 27. SOFTWARE RELATED INFORMATION

### 27.1 Menu Tree (User Mode)



: Optional  
 \* : Default  
 \*1 : Disaplayed when installation Set >Count Display is ON in C/E Diag.



# **CHAPTER II**

## **INSTALLATION**

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## CHAPTER II      INSTALLATION

### 1.      INSTALLATION PROCEDURE

Install the printer as follows:

- 1.1    Checking the Packaged Items
- 1.2    Removing the Tapes from the Printer
- 1.3    Removing the Paper Tray Protective Materials
- 1.4    Mounting the Print Head Cartridge
- 1.5    Mounting the Toner Cartridges
- 1.6    Mounting the Transfer Roll Cartridges
- 1.7    Loading Paper
- 1.8    Connecting the Power Cable
- 1.9    Correcting the Color Registrations

*Note:*

*The printer has various protective materials for protection from vibrations and shocks during move. Remove all the protective materials first.*

*If you purchased a two-tray module, attach the module to the printer first. For the attachment method, refer to the attached document.*

*The cardboard box, carrying handle, styrofoam, and protective materials of the printer package are necessary for the long-distance move of the printer. Be sure not to lose the packaging materials.*

## 1.1 Checking the Packaged Items

The printer package contains the items shown below. Before starting installation, make sure that no items are missing.

*Note:*

*Keep the packaging materials if a future long-distance move of the printer is anticipated.*

Printer (base engine)

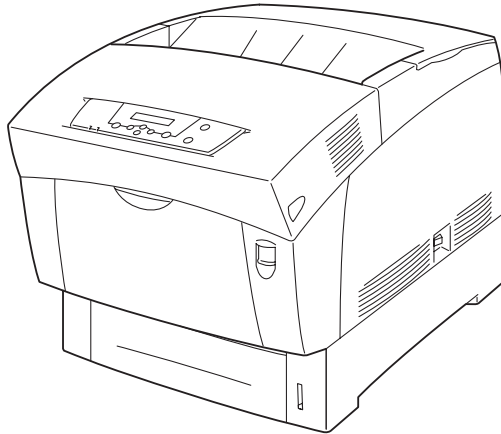


Fig.2-1

Print head cartridge

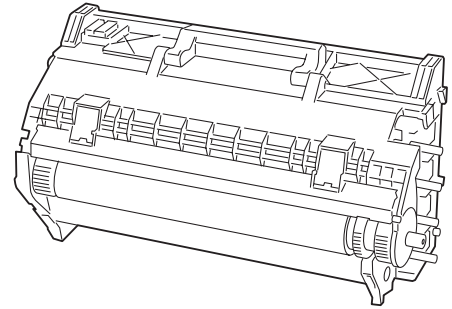


Fig.2-2

Toner cartridges  
(black, yellow, magenta, and cyan)

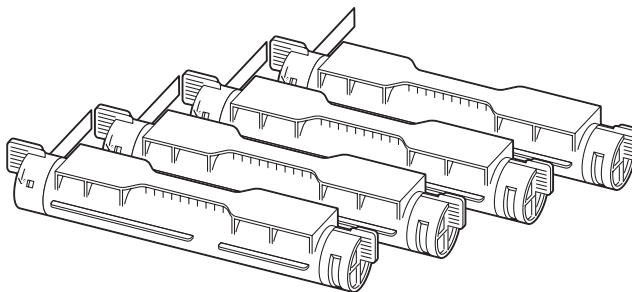


Fig.2-3

Power cable

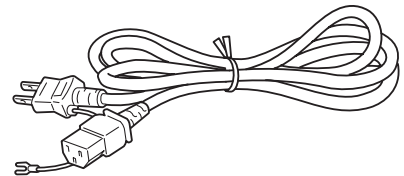


Fig.2-4

## 1.2 Removing the Tapes from the Printer

The printer taken out of the box is taped at eight positions. Remove all the tapes by referencing the figure below.

< Right side >

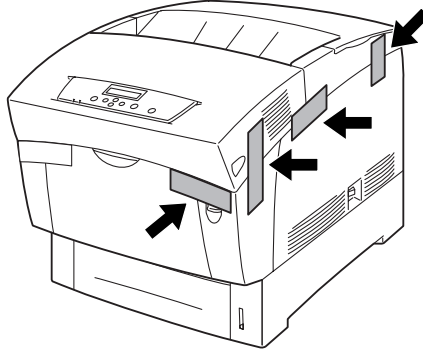


Fig.2-5

< Left side >

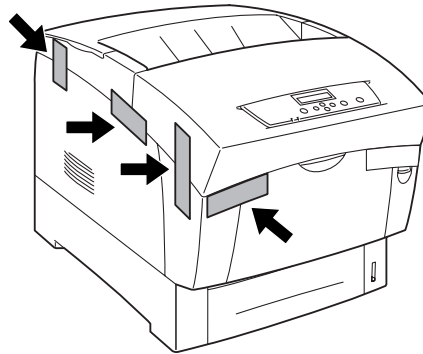


Fig.2-6

< Rear side >

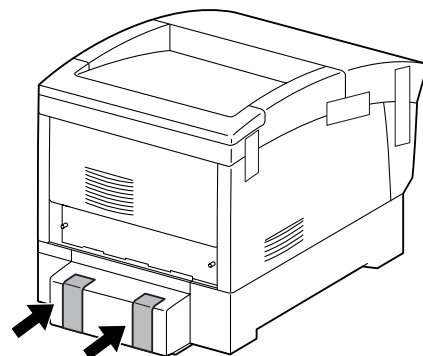


Fig.2-7



### 1.3 Removing the Paper Tray Protective Materials

Each tray of this printer has two protective materials to suppress the influences of vibrations and shocks during move.

Remove the protective materials as explained next.

*Note:*

*The protective materials are necessary for the long-distance move of the printer. Be sure not to lose them.*

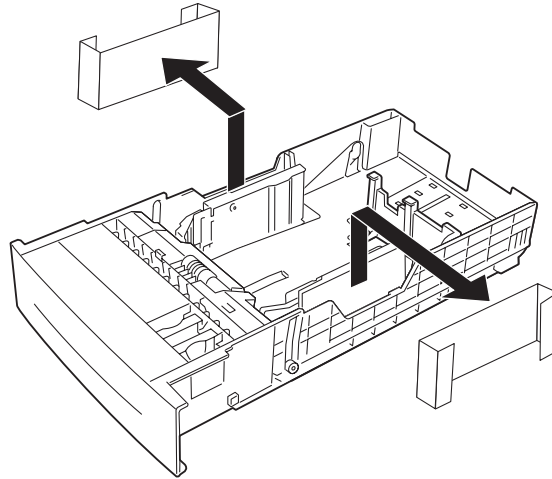


Fig.2-8

- 1) Pull out the paper tray until it stops.

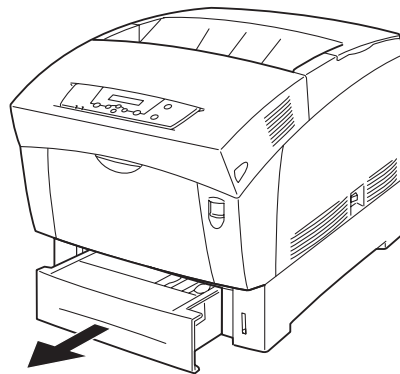


Fig.2-9

- 2) Hold the paper tray by both hands and extract it by lifting this side up.

*Note:*

*Put the removed paper tray at a flat place.*

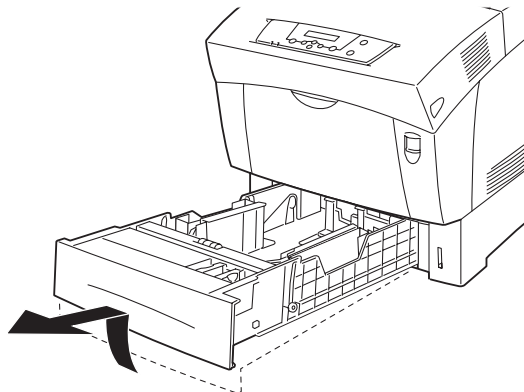
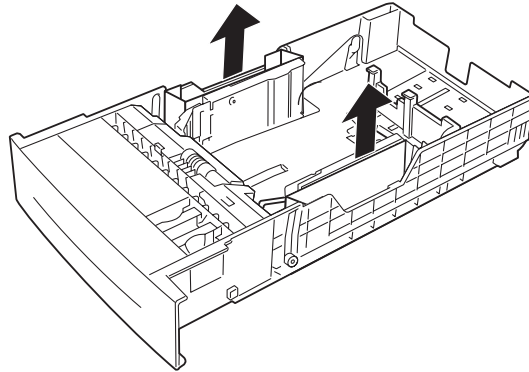


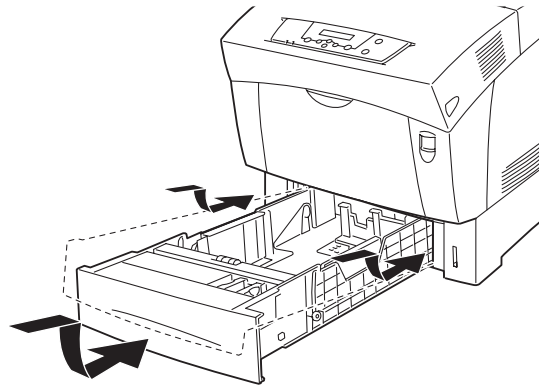
Fig.2-10

- 3) Take the protective material (made of cardboard) out of the paper tray.  
*Note:*  
*Keep the protective material if a future move of the printer is anticipated.*



**Fig.2-11**

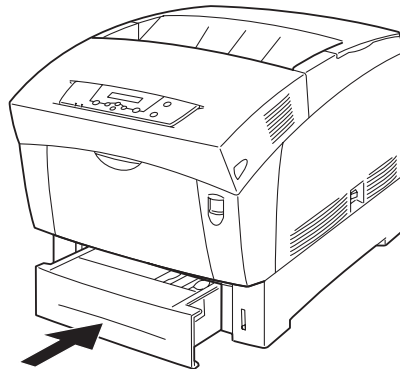
- 4) Hold the paper tray by both hands and slide it into the printer along the slot.



**Fig.2-12**

- 5) Push the tray deep into to the printer.

*Note:*  
*Be careful not to push in the tray too hard. Otherwise, the printer or tray itself may be damaged.*



**Fig.2-13**

## 1.4 Mounting the Print Head Cartridge

Mount the print head cartridge as explained next.

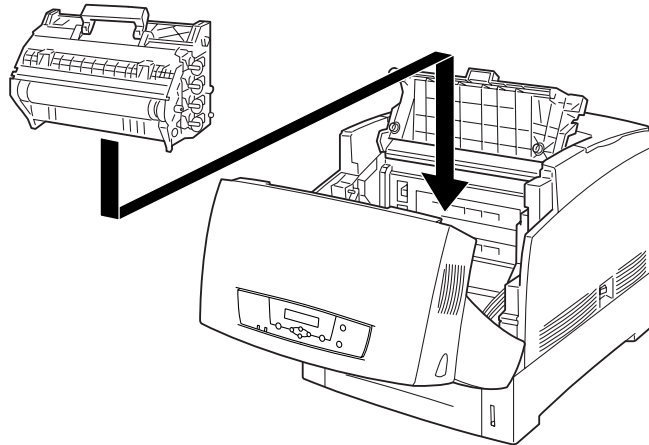


Fig.2-14

- 1) Lift the A button ((1)) and open the front cover ((2)).

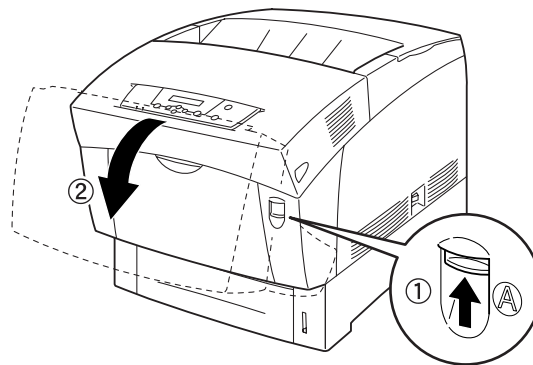


Fig.2-15

- 2) Open the delivery section cover.

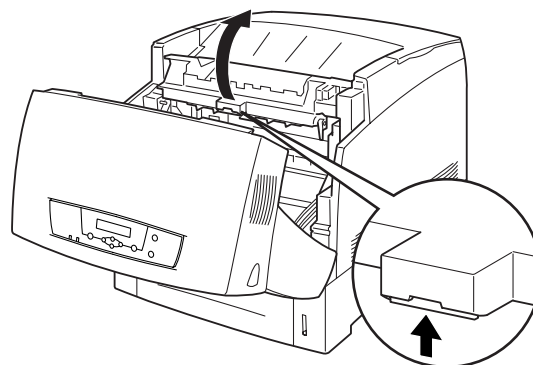


Fig.2-16

- 3) Take the print head cartridge out of the package and extract the eight seals hard in the horizontal direction.

*Note:*

*Keep the aluminum bag of the print head cartridge if a future move of the printer is anticipated.*

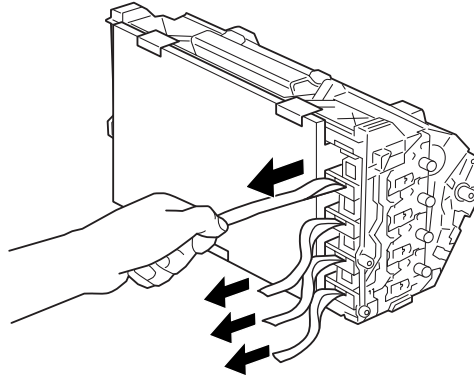


Fig.2-17

- 4) Extract the protective material of the print head cartridge by holding the right and left ends.

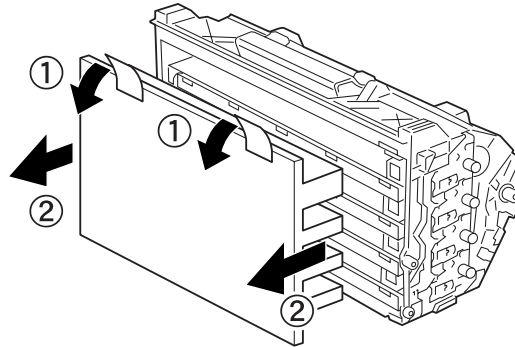


Fig.2-18

- 5) Peel the protective sheet covering the cartridge as shown in the figure.

*Note:*

*Do not touch the intermediate transfer roll (black). Do not hit or scratch the roll surface with a thing. If the roll surface is damaged or stained by hand or other, the print quality will go low.*

*Do not leave the print head cartridge with the protective sheet off. The print quality will go low.*

*When removing the protective sheet, keep the print head cartridge horizontal.*

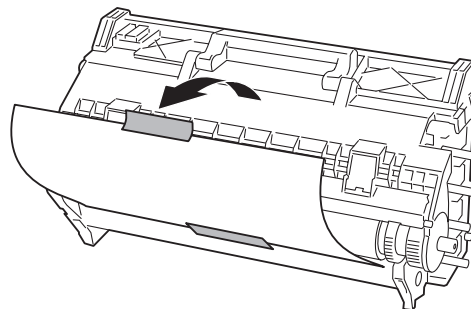


Fig.2-19

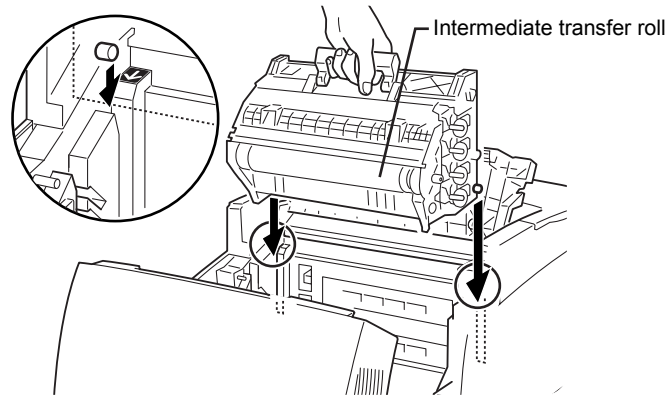
- 6) Hold the print head cartridge by the handle and align the bottom roll at the other side of the cartridge with the front groove of the printer indicated by the arrow. Then lower the cartridge slowly.

*Note:*

*Do not touch the intermediate transfer roll.*

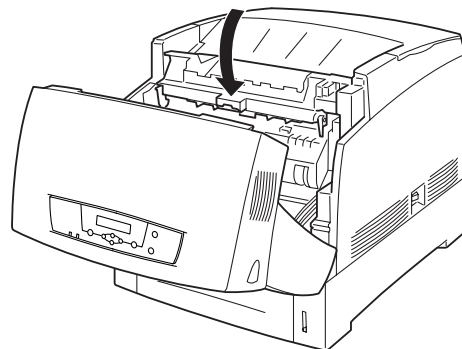
*The cartridge may be damaged if lowered when the groove and shaft are not aligned well.*

*Make sure that the surface of the intermediate transfer roll does not contact other parts.*



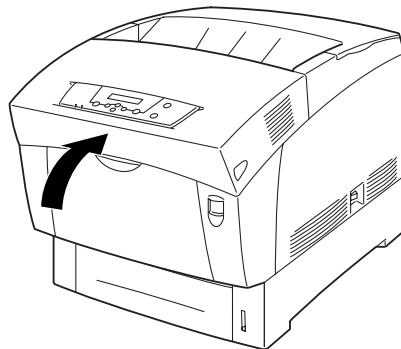
**Fig.2-20**

- 7) Close the delivery section cover.



**Fig.2-21**

- 8) Close the front cover.



**Fig.2-22**

## 1.5 Mounting the Toner Cartridges

Mount the toner cartridges as explained next.

*Note:*

*The toner is not harmful to the human body. If the toner gets on your skin or clothes, wash it away immediately.*

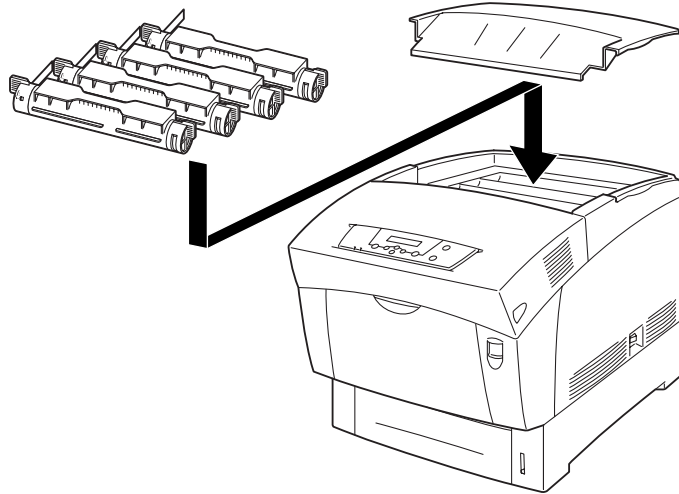


Fig.2-23

- 1) Detach the top cover.

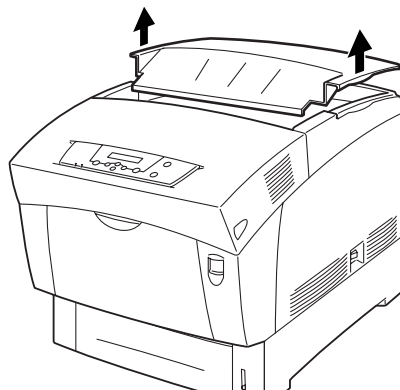


Fig.2-24

- 2) Take a new toner cartridge of the same color as the label at the mounting position out of the package.

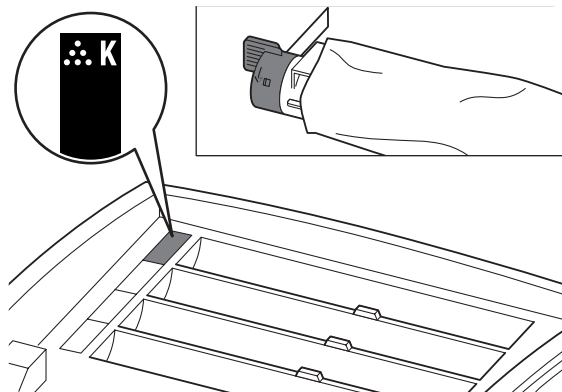


Fig.2-25

- 3) Shake the cartridge several times (7 or 8) to make the toner even inside.

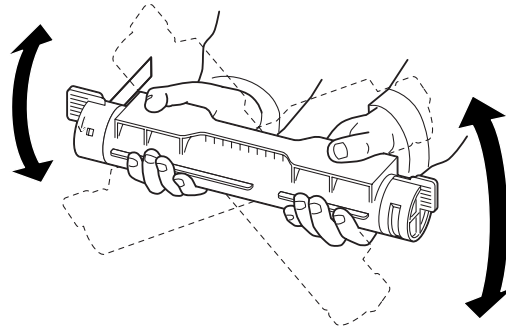


Fig.2-26

- 4) By aligning with the groove of the printer, place the cartridge in the direction shown in the figure.

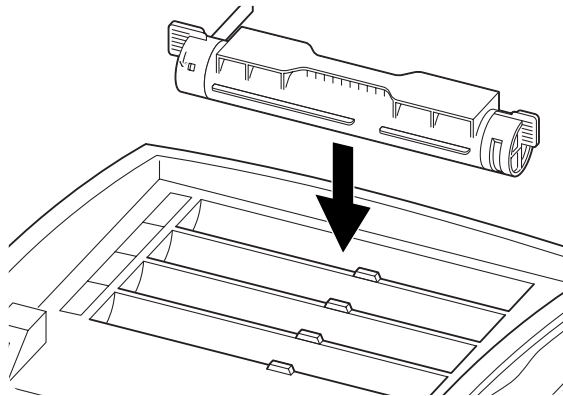


Fig.2-27

- 5) Hold the knobs at both ends of the toner cartridge. While pressing down gently, turn the knobs to this side.

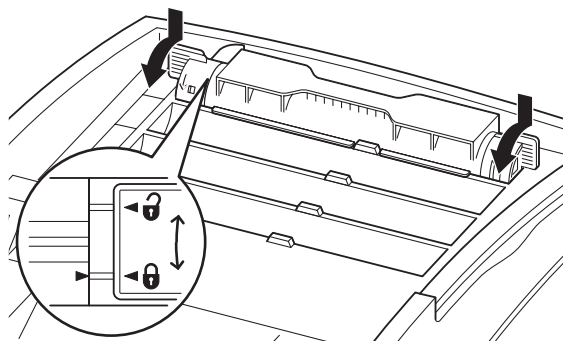
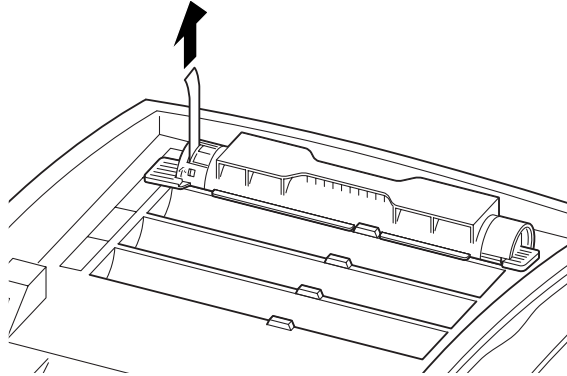


Fig.2-28

- 6) Extract the toner seal upward.

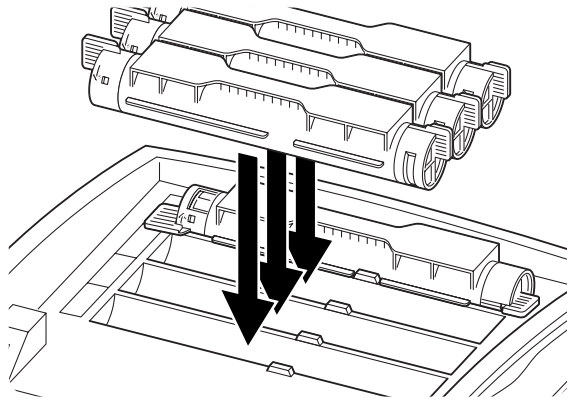
*Note:*

*For extraction, pull the toner seal straight up. The tap may be cut if pulled askew.*



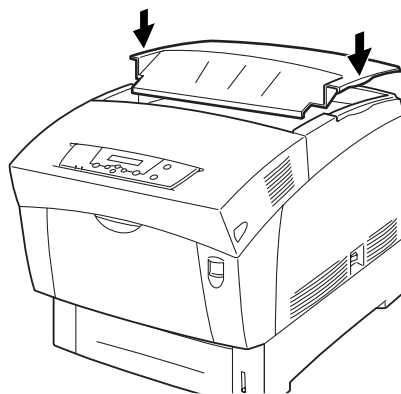
**Fig.2-29**

- 7) Mount the remaining three toner cartridges in the same way.



**Fig.2-30**

- 8) Attach the top cover.



**Fig.2-31**



## 1.6 Mounting the Transfer Roll Cartridge

Follow the procedure below to replace the transfer roll cartridge.

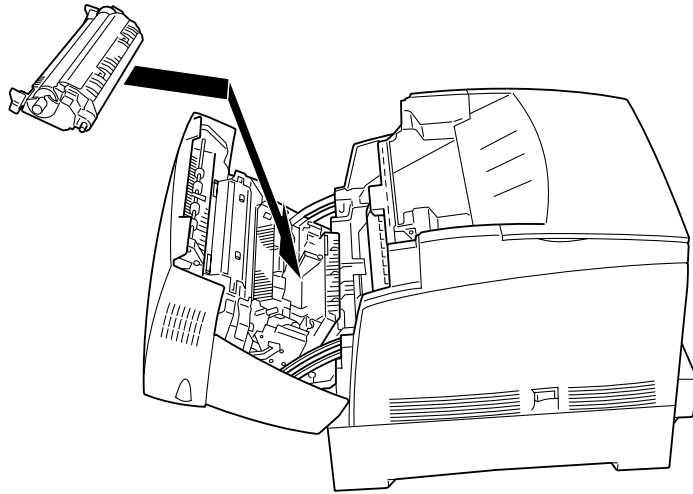


Fig.2-32

- 1) Push up button 'A' (1) and fully open the front cover (2).

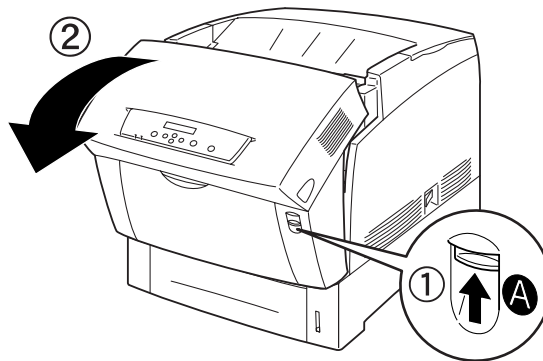


Fig.2-33

- 2) Grip the orange tabs at both ends of the transfer roll (1) and gently lift it out of the printer (2).

*Note:*

*Lift the transfer roll carefully to prevent waste toner from spilling out.*

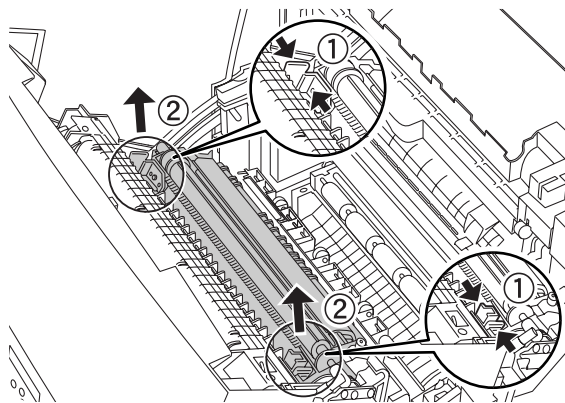
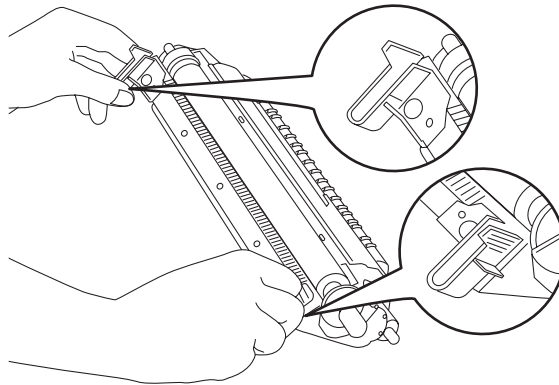


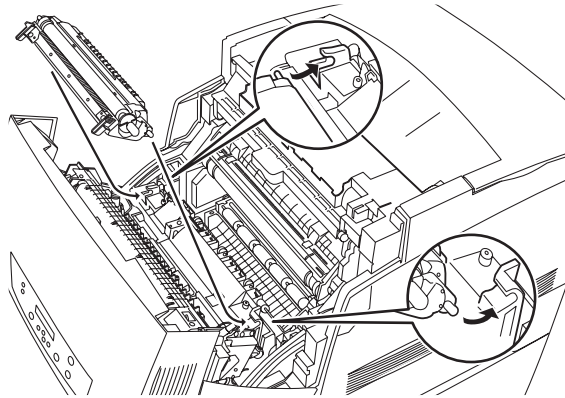
Fig.2-34

- 3) Unpack a new transfer roll cartridge and grip the orange tabs as shown.



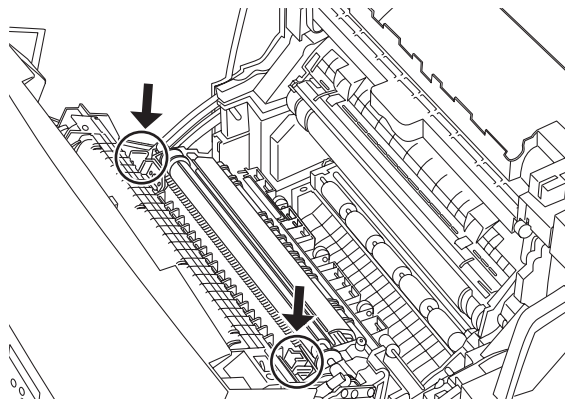
**Fig.2-35**

- 4) Insert the pins at both ends of the transfer roll cartridge into the bearings inside the printer, and gently push the roll into the printer.



**Fig.2-36**

- 5) To lock the transfer roll cartridge into the printer, push down on the tabs until you hear a click.



**Fig.2-37**

- 6) Close the front cover.

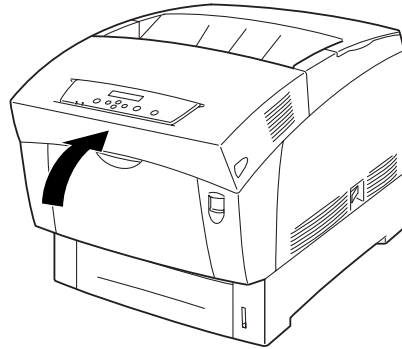


Fig.2-38

## 1.7 Loading Paper

Load paper on the tray as explained next.

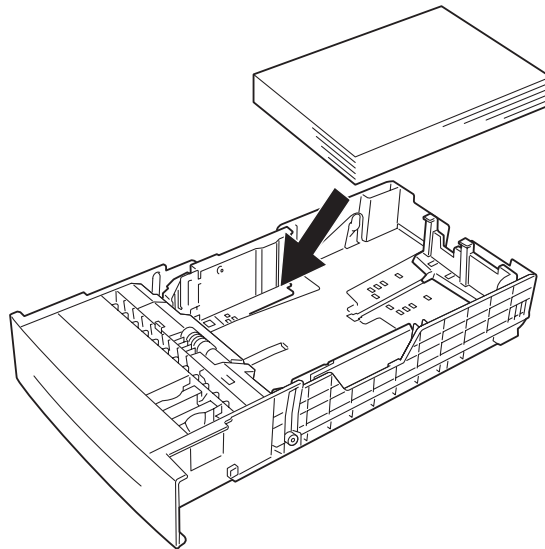


Fig.2-39

- 1) Pull out the paper tray until it stops.

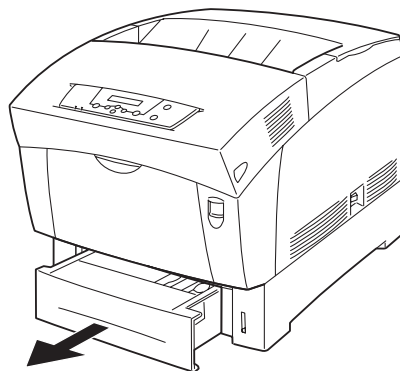
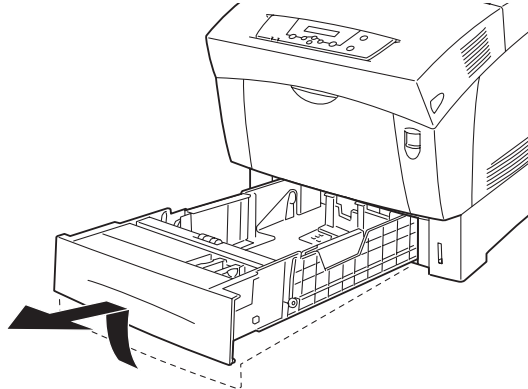


Fig.2-40

- 2) Hold the paper tray by both hands and extract it by lifting this side up.

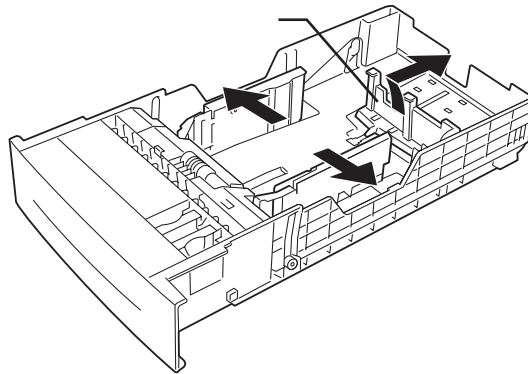
*Note:*

*Put the removed paper tray at a flat place.*




**Fig.2-41**

- 3) Shift the vertical and horizontal paper guides outward. The vertical paper guide should be lifted a little and shifted to positions greater than the paper size.



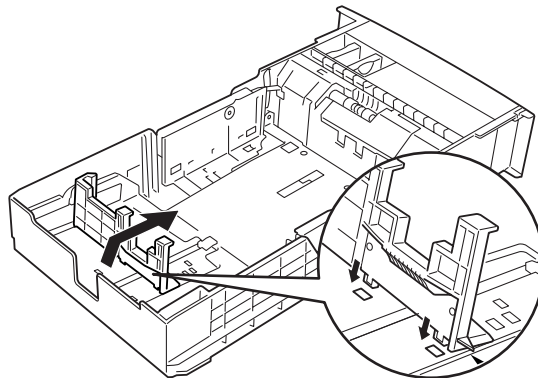
**Fig.2-42**

- 4) Pinch and lift the vertical paper guide slightly and align the projection of the guide with the  on the paper size scale.

*Note:*

*Check that the stopper of the vertical paper guide is fit in the groove on the scale.*

*If the vertical paper guide is moved slightly, the printer may not be able to detect the paper size automatically. In this case, shift the vertical paper guide to the most outward position and align with the scale again.*



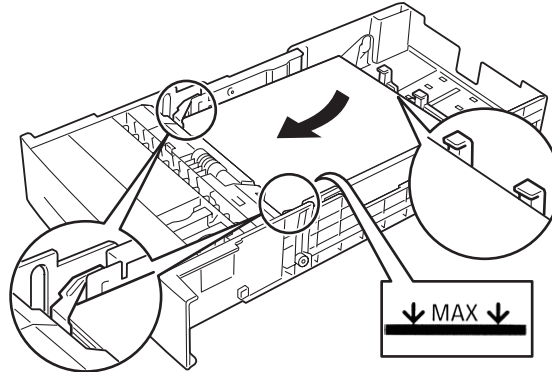
**Fig.2-43**

- 5) By aligning the four corners, load the paper under the tabs with the printing side up.

*Note:*

*Do not use folded, wrinkled, or greatly curled paper.*

*Make sure that the paper is not on the tabs.*

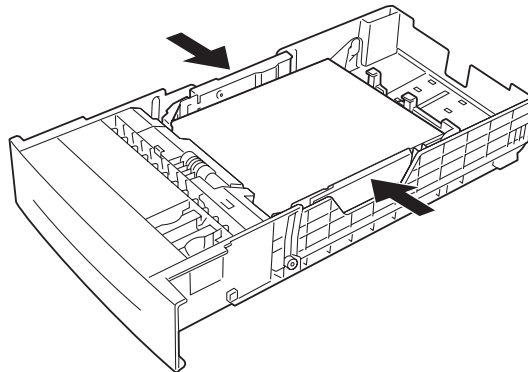


**Fig.2-44**

- 6) Align the horizontal paper guide with the paper width.

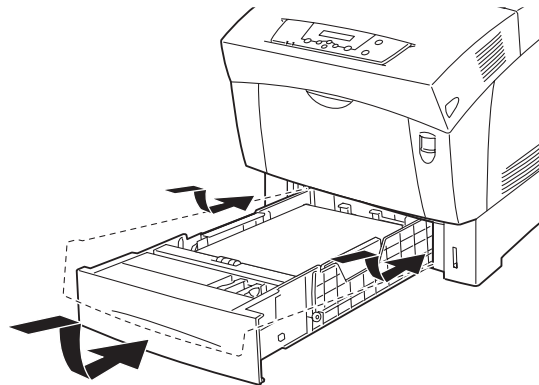
*Note:*

*If the paper guides are pressed too hard against the paper, a paper jam may occur. If the paper guides are too loose, askew paper feed may occur.*



**Fig.2-45**

- 7) Hold the paper tray by both hands and slide it into the printer along the slot.

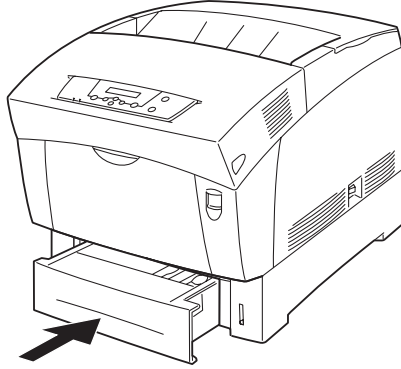


**Fig.2-46**

- 8) Push the tray deep into to the printer.

*Note:*

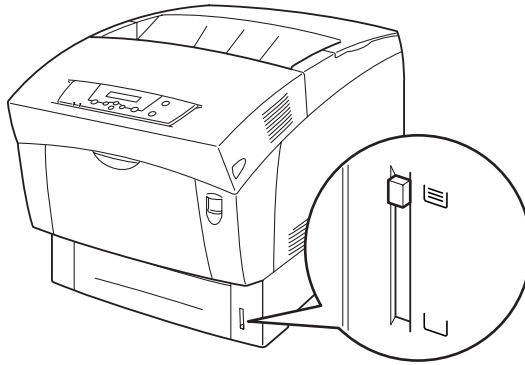
*Be careful not to push in the tray too hard. Otherwise, the printer or tray itself may be damaged.*



**Fig.2-47**

*Note:*

*A paper try has a paper level indicator on its side. Check this indicator when loading paper.*



**Fig.2-48**

## 1.8 Connecting the Power Cable

Connect the power cable as explained below.



### WARNING

Power specifications are listed below. The specifications that apply to your machine depend on your machine configuration. Connect the power plug only to a properly rated power outlet. Otherwise, it can cause fire or electric shocks. If in doubt, contact your Customer Support Centre.

- Rated voltage 100V - Rated voltage 110V - Rated voltage 220-240 V

- Rated frequency 50/60Hz - Rated frequency 60Hz - Rated frequency 50/60Hz

Never use multi-plug adaptors to plug multiple power plugs in the same outlet. Be sure to operate the machine on a sole-use receptacle. Multiple connectors can cause the outlet to overheat and cause fire.

To prevent fire or electric shocks, follow the instruction below based on your machine configuration. If in doubt, contact your dealer or authorized Brother service representative.

- If your machine is a 220-240 V model, there is no need to attach a separate earth line since the earth connection is incorporated in the power line. Plug it into a properly rated outlet.

- If your machine is a 100 or 110 V model, use the green earth wire bundled with the power cord, located at the rear of the machine.

The earth wire must be connected to one of the following conductors:

- Earth terminal of the specified power outlet
- A piece of copper buried in the earth 650 mm or deeper
- Earth terminal with Class D\* earthing.

\* Class D is the regulation for Japan only.

- 1) Connect the power cable to the power cable connector on the rear of the printer. If the power outlet has a ground terminal, connect the ground wire as well.

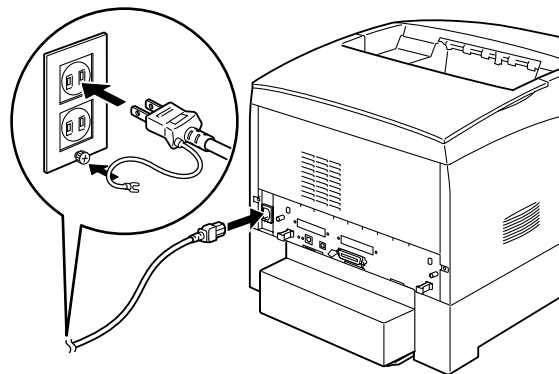
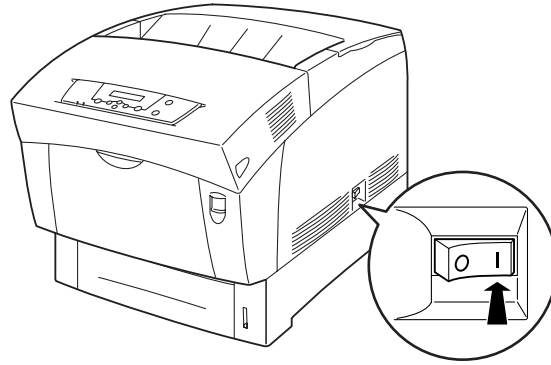


Fig.2-49

- 2) Press the [I] side of the power switch on the right side of the printer to turn the power on.

*Note:*

*When the power is turned on for the first time after installation, the motor in the printer rotates for one or two minutes.*



**Fig.2-50**

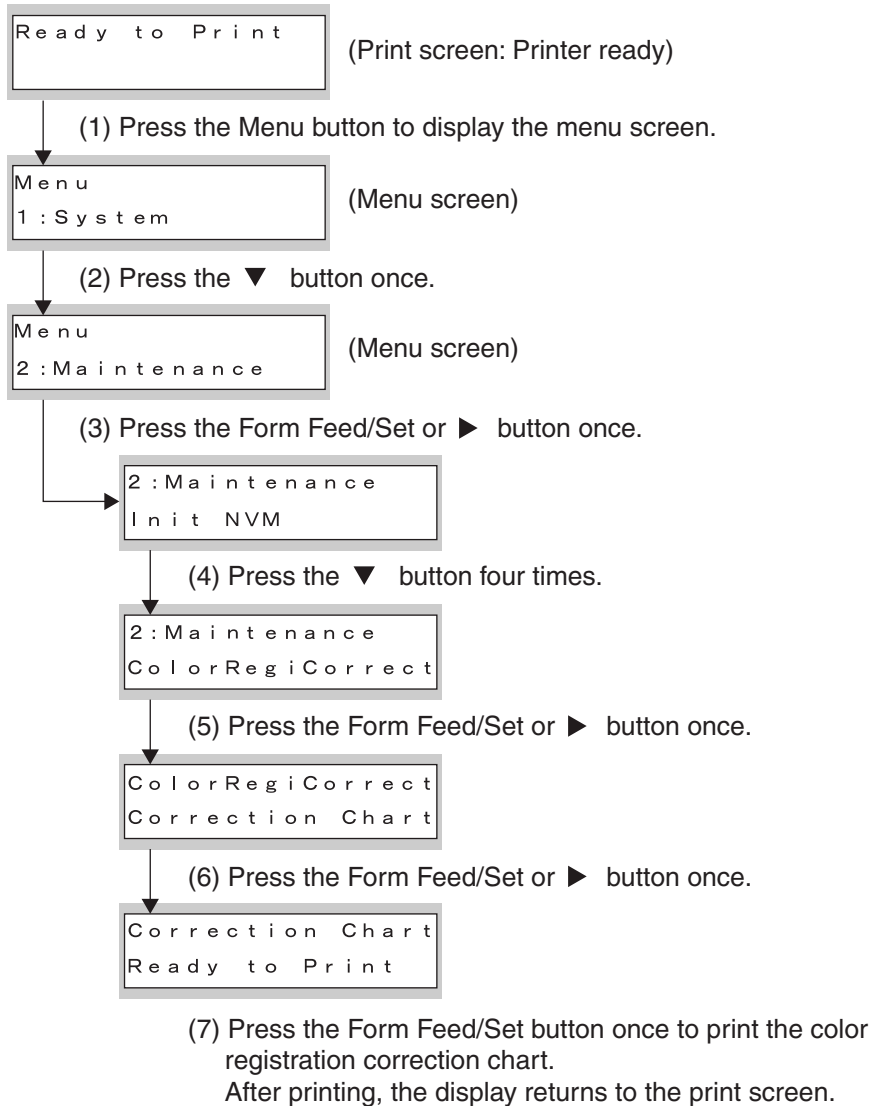


## 1.9 Correcting the Color Registrations

When the printer is installed for the first time or reinstalled after a move, correct the color registrations as explained next.

< Chart Printing >

Print the color registration correction chart from the operator panel.



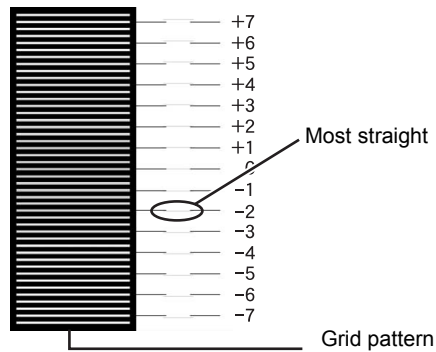
< Determining Set Values >

From the lines at right of each grid pattern Y (yellow), M (magenta), or C (cyan) on the printed color registration correction chart, the numeric value of a line most straight is read.

*Note:*

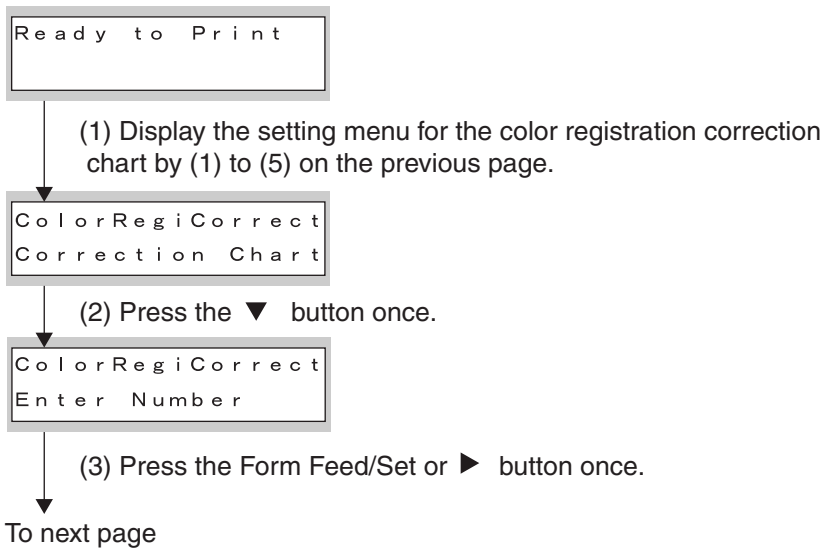
*The color density of each grid pattern is also helpful. The highest density indicates a line most straight.*

*If the value of the most straight line is 0, no correction is necessary. Otherwise, make a necessary correction according to the set value input procedure given next.*



< Entering Set Values >

By using the control panel, enter numeric values read from the color registration correction chart for corrections.



From previous page

```
Enter Number
Y= 0 M= 0 C=0
```

(4) Press the ▲ or ▼ button several times until the set value is displayed (example: +3).

```
Enter Number
Y=+3 M= 0 C=0
```

(5) Press the ► button once to move the cursor ( ) to the next value.

```
Enter Number
Y=+3 M=  C=0
```

(6) Set the color registration values by repeating (4) and (5).

```
Enter Number
Y=+3 M=+1 C=+2
```

(7) Press the Form Feed/Set button once.

```
Correction Chart
Ready to Print
```

(8) Press the Form Feed/Set button once. A new color registration correction chart reflecting the set values is printed.

After printing, the display returns to the print screen.

(9) Check that the numeric value of a line most straight is 0 for Y (yellow), M (magenta), or C (cyan) on the color registration correction chart. This completes the corrections of color registrations.

*Note: After printing, the display returns to the print screen.*

# **CHAPTER III**

## **STRUCTURE OF SYSTEM COMPONENTS**

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## CHAPTER III STRUCTURE OF SYSTEM COMPONENTS

### 1. PRINTING PROCESS

#### 1.1 Summary of Printing Process

This printer is a "Full-color laser printer" which applies the principal of an electrophotographic recording system. The tandem system comprising a drum and developing unit respectively for each color of yellow, magenta, cyan and black (Y, M, C and K) places toner image of each color on paper producing full-color prints finally through 3 intermediate transfer units (IDT 1: 2, IDT 2: 1).

Printing processes of this printer is composed of the basic steps as follows.

- 1) Charging with electricity: Drum surface is charged with electricity.
- 2) Exposure: Image unit is exposed to laser beams.
- 3) Development: Image is developed with toner.
- 4) Primary transfer: Toner image is transferred to the intermediate transfer unit (IDT 1).
- 5) Secondary transfer: Toner image on the intermediate transfer (IDT 1) is transferred to the intermediate transfer unit (IDT 2).
- 6) Cleaning: The intermediate transfer (IDT 1) is cleaned.
- 7) Tertiary transfer: Four-color finished toner image on the intermediate transfer unit (IDT 2) is transferred onto the paper.
- 8) Cleaning: Intermediate transfer unit (IDT 2) is cleaned.
- 9) Static elimination: Electric charge of the paper is eliminated.
- 10) Fixing: Toner on the paper is fixed by heat and pressure.
- 11) Cleaning: Remaining toner on the drum and intermediate transfer units are collected.

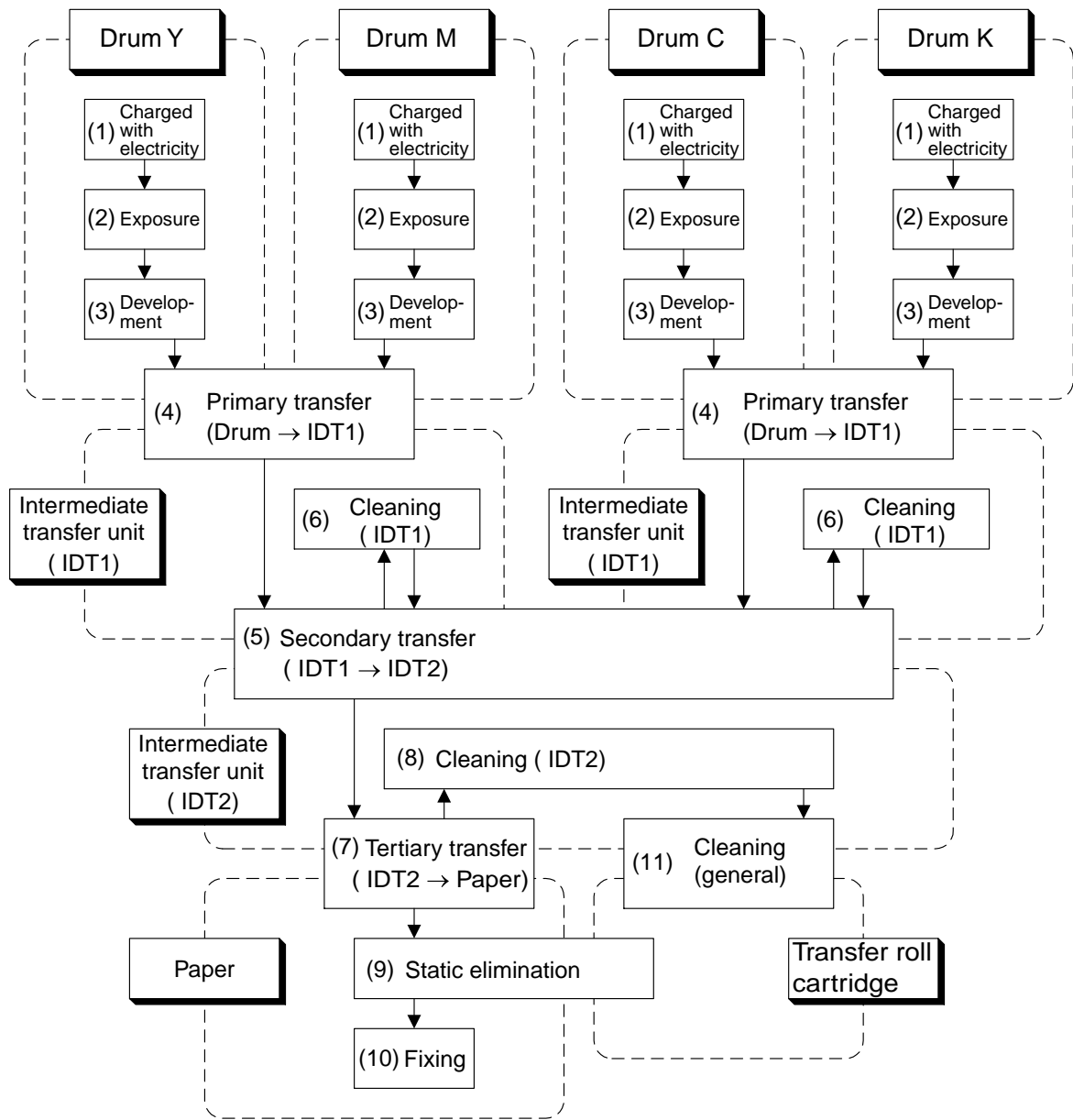


Fig.3-1



## 1.2 Schematic Diagram for Printing Processes

Outline of printing processes is shown in the figures below.

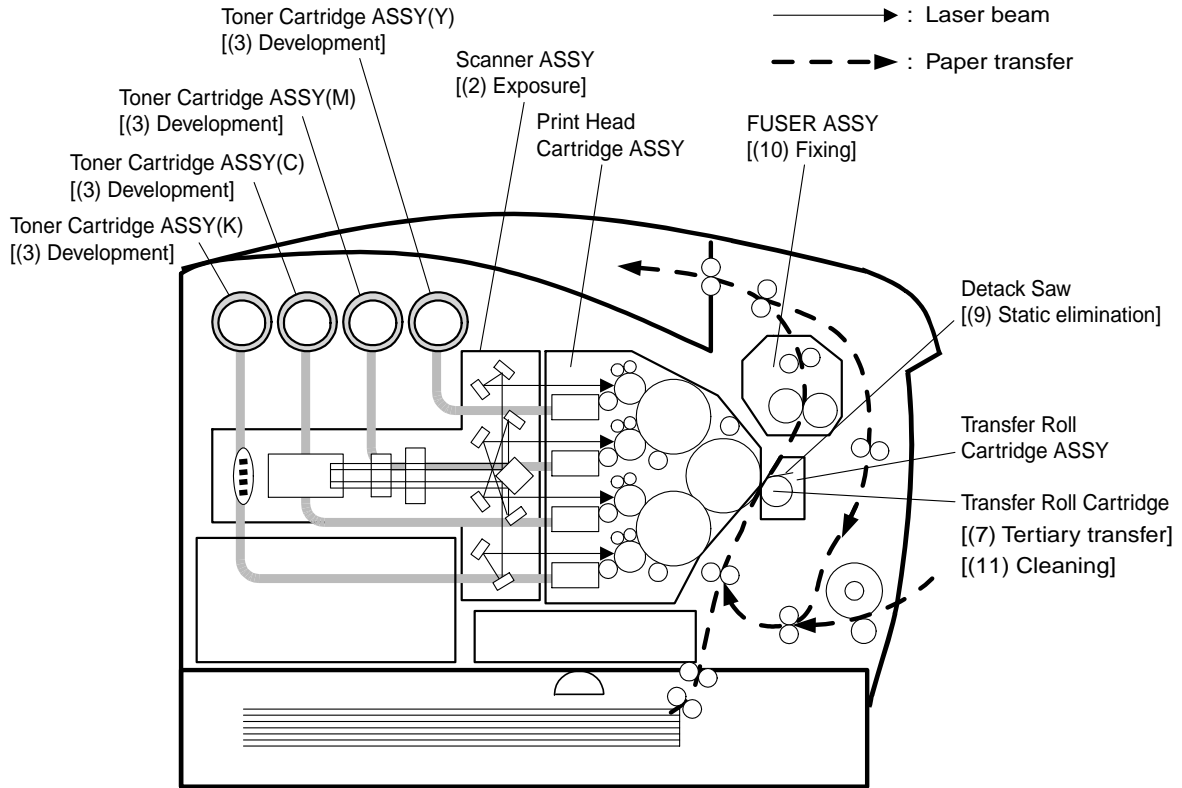


Fig.3-2

Print head cartridge ASSY is integrated major units of printing processes. It is composed as follows.

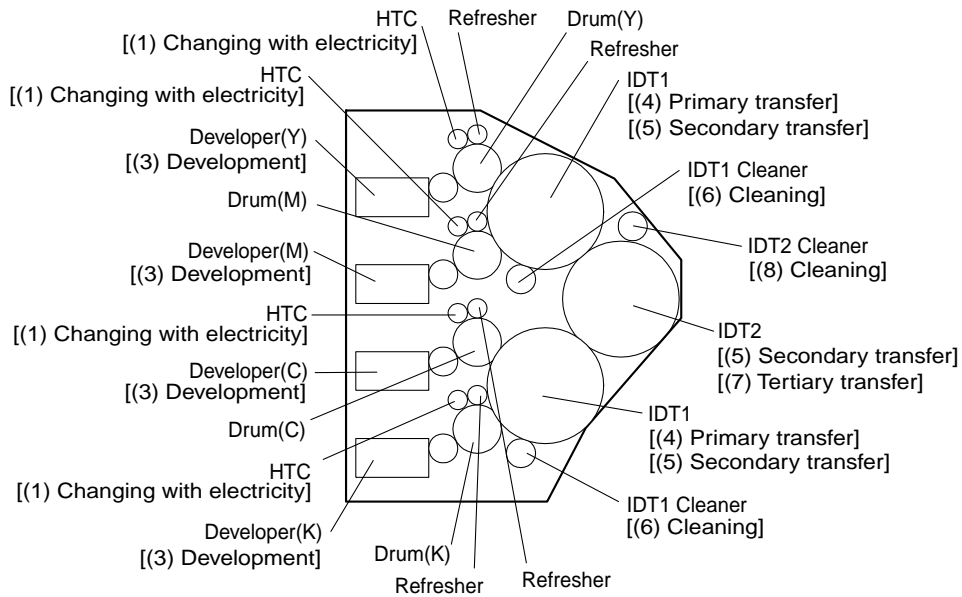


Fig.3-3

### 1.3 Description of Printing Process Techniques

#### 1.3.1 Charging with electricity

In the charging process, the drum surface rotating at a constant speed is charged uniformly with negative electricity by discharging of HTC (Hechima Tube Charge: Charged film).

This process is performed in parallel for yellow, magenta, cyan and black colors.

- The HTC is kept in contact with the drum and rotates following the rotations of the drum.  
HTC is a conductive roll, receives discharge voltage from HVPS (High Volume Power Supply) and discharges at minus DC voltage.
- The drum surface is uniformly and negatively charged with DC bias voltage.  
The drum surface is optical conductor (which is insulator in a dark place and conductor when receiving light) and the drum inside is composed of conductor.
- The Refresher is a conductive brush, and it receives negative DC voltage from the HVPS to catch the toner of reverse polarity returned to the drum via IDT. Also, it removes discharge products.

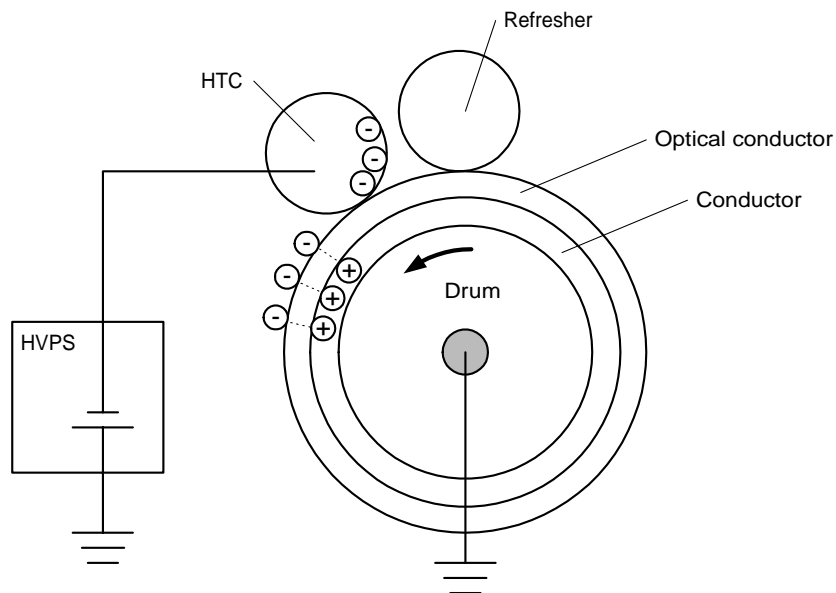


Fig.3-4

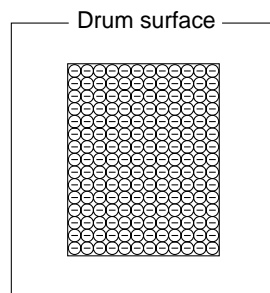


Fig.3-5

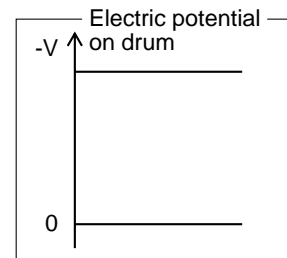


Fig.3-6

### 1.3.2 Exposure

In the exposure process, the drum surface charged negatively is scanned by laser beams to form invisible electrostatic latent image on the drum surface.

This process is performed in parallel for yellow, magenta, cyan and black colors.

- Laser beams are emitted from the laser diode in the scanner ASSY. By the rotating polygon mirror, fixed mirror and lens attached to the scanner ASSY of the scanner ASSY, each color of drum surface is scanned from end to end in the axial direction.

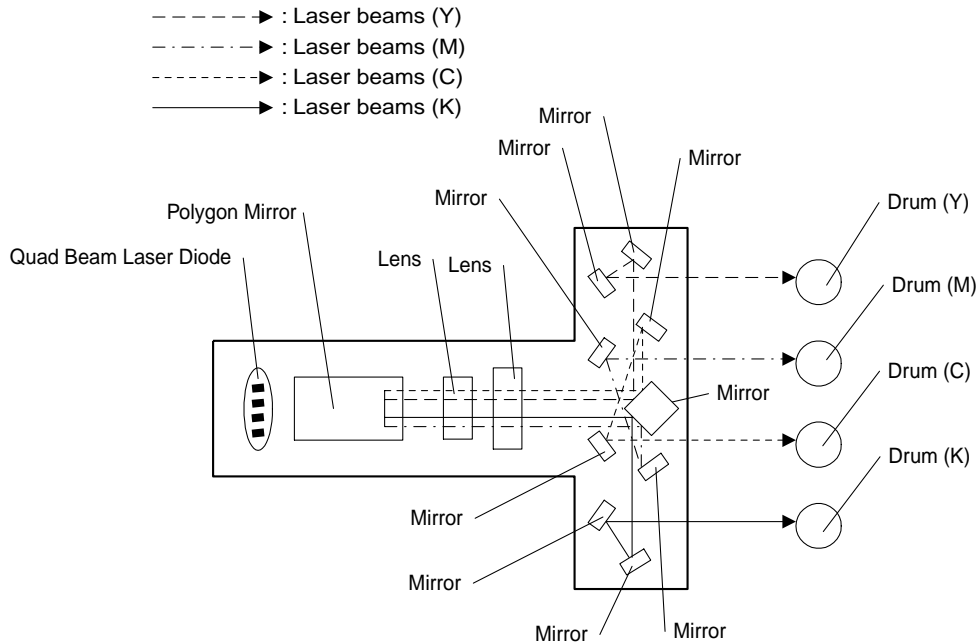


Fig.3-7

- The laser beams are emitted based on the print data (image data) from the printer controller.  
When the print data instructs to print pixel points, laser beams are generated and when the print data instructs not to print, no laser beams are generated. (On the areas which are developed by toner, the laser beams light up and areas which are not developed by toner, laser beams go out.) The laser beams emitted on the drum surface generate a pair (electron  $\Leftrightarrow$  hole) in the optical conductive layer. [Electrons are excited on the conductive zone, causing holes at the valence band.] Electrons are induced by the electric field, moved toward the inside metallic part and flow into it. The holes move toward the outer surface of the optical conductive layer, are combined with the minus charge (electron) on the outer surface again and decrease negative charge. As a result, on the drum surface where the electric potential increases, invisible static latent image (print image) is generated.

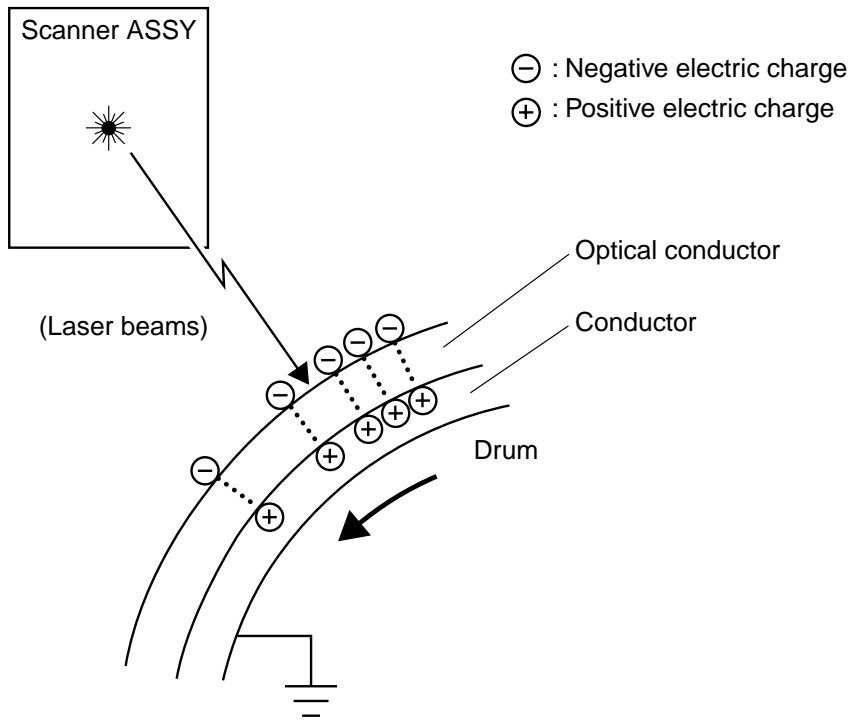


Fig.3-8

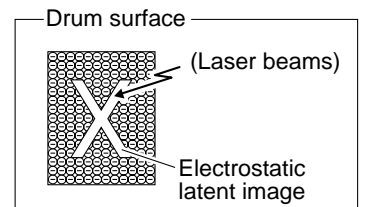


Fig.3-9

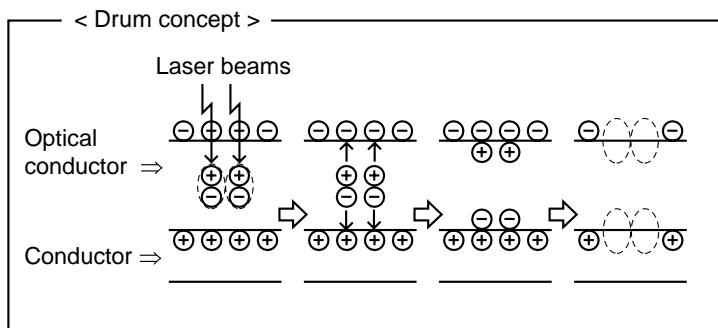


Fig.3-11

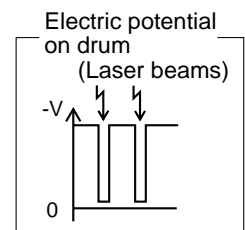


Fig.3-10

### 1.3.3 Development

In the development process, toner is electrically attached to the invisible static latent image on the drum surface to form visible toner image on the drum.

This process is performed in parallel for yellow, magenta, cyan and black color respectively.

- The toner in the toner cartridge is agitated by the agitator in the toner cartridge and fed into the toner holder. Further, the toner is fed to the developer by the auger in the toner holder and the auger in the tube that connects the toner holder and the developer. The agitator and auger are spiral agitating components and they are driven by the toner motor provided on the rear of toner cartridge. The toner to be consumed according to the print count is calculated and fed into the developer. This is called "toner dispensation", which is controlled by two types of control, "PCDC" and "ADC". For the PCDC and ADC, see 7.4 Process Control in this chapter.
- The toner fed into the developer and the carrier in the developer are agitated by the auger, and supplied to the magnet roll arranged in the vicinity of the drum surface. The toner and carrier are charged by friction due to the agitation (toner in negative, carrier in positive), and they are absorbed each other electrically. As the carrier is a magnetic substance, it is attracted to the magnet roll having a magnetic force and a homogeneous layer is formed by the trimmer rod and the paddle.
- The magnet roll is covered by a thin semi-conductive sleeve over the surface. DB (Developing Bias) voltage is supplied to this semiconductor sleeve from HVPS. DB voltage is negative DC voltage combined with AC voltage. The magnet roll is kept at constant negative voltage against the optical conducting layer of the drum by DC voltage. Therefore, at the area on the drum surface where the negative electric charge does not decrease, potential is lower than the magnet roll, while the potential is higher than the magnet roll at the area where the negative charge on the drum surface decreases. The AC voltage shakes the developer on the magnet roll surface pressing the toner to fly to the drum. Thus, the toner charged negatively is attracted only by the area where the minus charge has decreased on the drum surface from the magnet roll (static latent image) and the toner image is formed on the drum. When the toner is attached, minus charge at that portion increases, potential decreases, and force to attract the toner decreases.

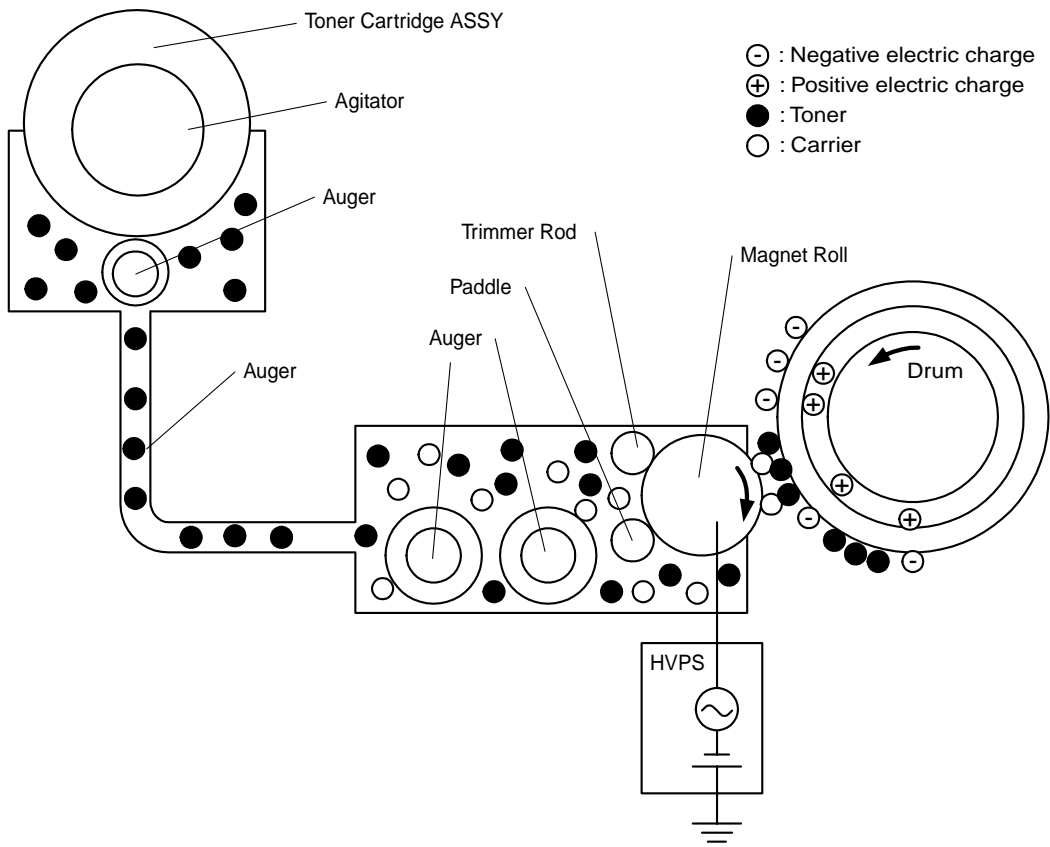


Fig.3-12

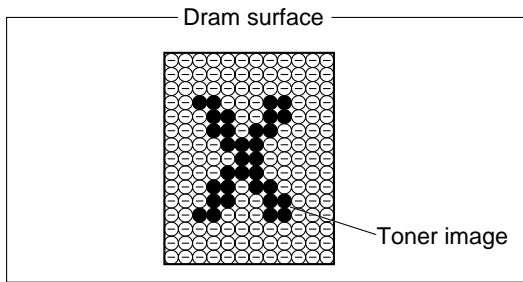


Fig.3-13

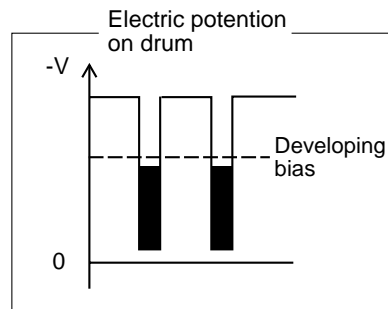


Fig.3-14

### 1.3.4 Primary transfer (drum -> IDT 1)

In the primary transfer process, toner image formed on the drum surface is transferred onto the surface of the IDT 1 (Intermediate Drum Transfer 1: intermediate transfer roll 1). Two IDT 1 are provided: yellow and magenta, and cyan and black are respectively transferred to their IDT 1.

- IDT 1 is a conductive roll and receives supply of high positive voltage from HVPS. The toner image (negatively charged) on the drum is attracted to the IDT1 positively charged, and transferred from the drum to the IDT1 surface. At this time, electric charge of the drum surface is neutralized by the IDT1.

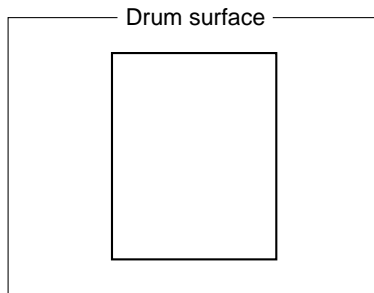


Fig.3-16

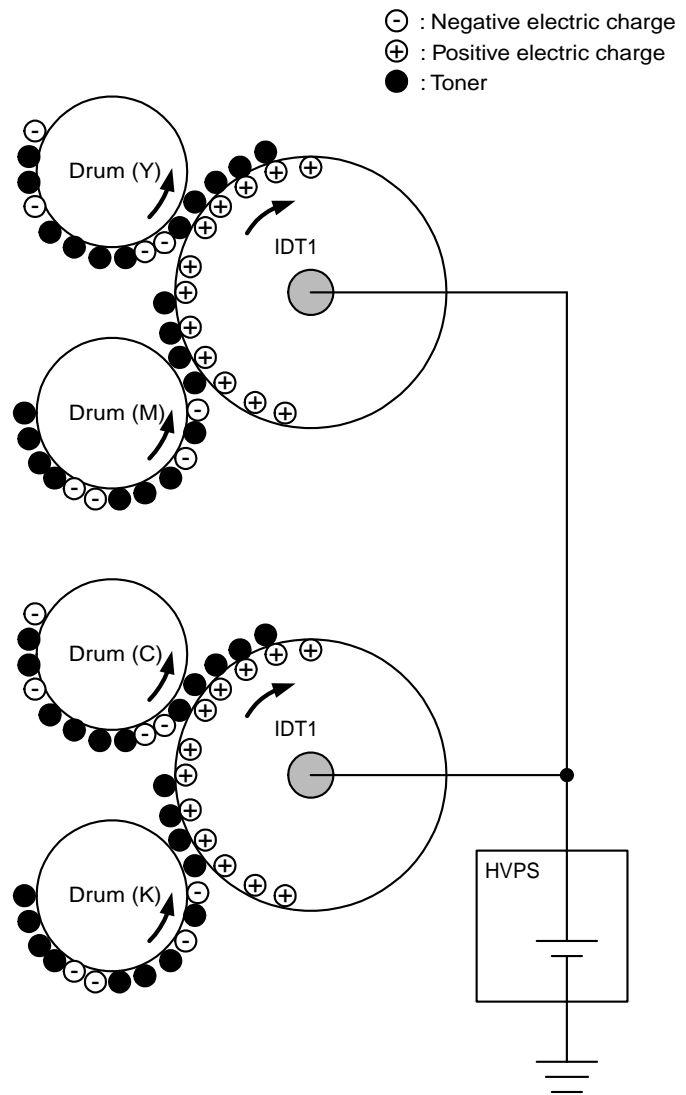


Fig.3-15

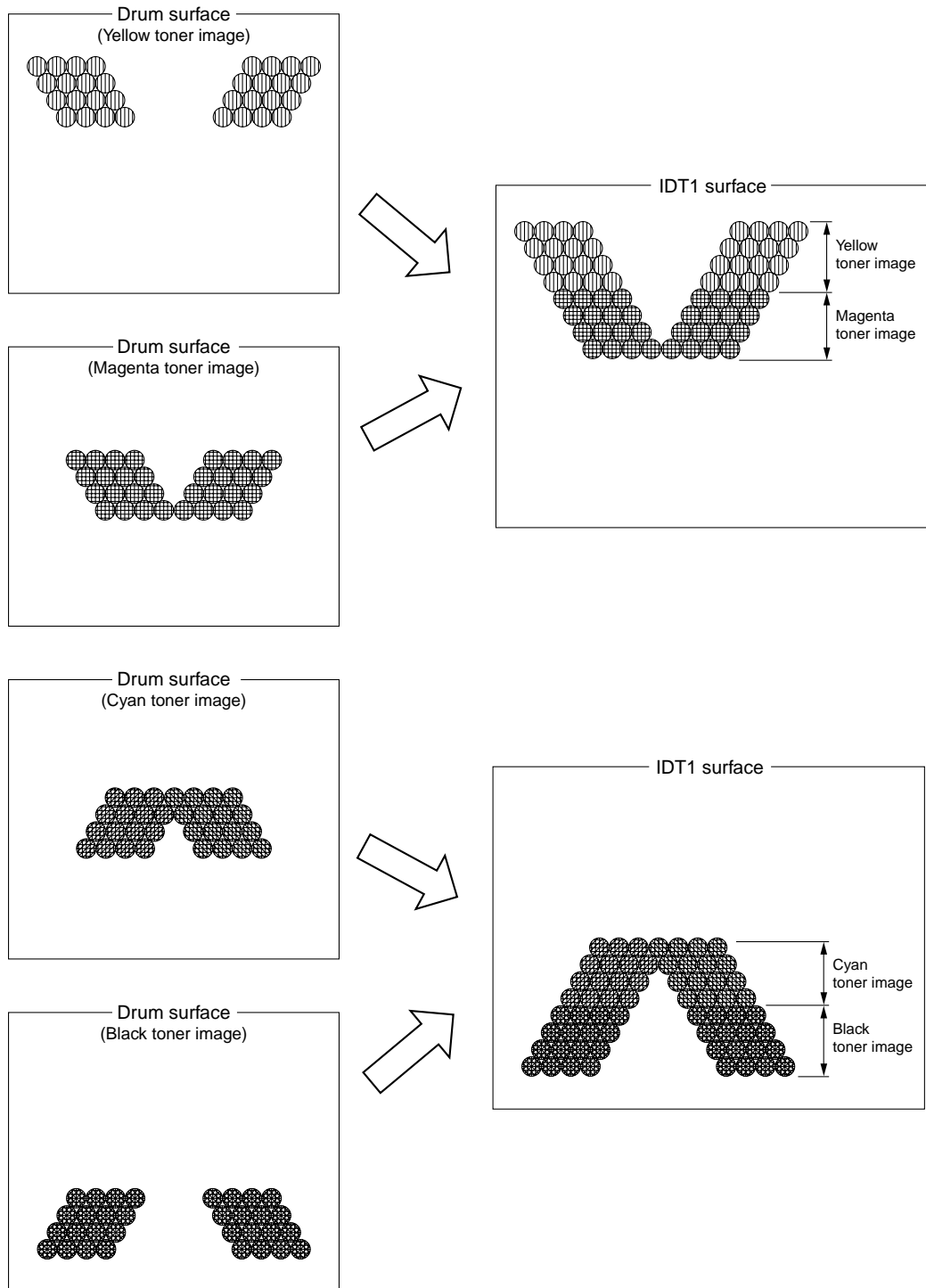


Fig.3-17



### 1.3.5 Secondary transfer (IDT 1 -> IDT 2)

In the secondary transfer process, the toner image formed on the IDT 1 surface is transferred onto the surface of the IDT 2 (Intermediate Drum Transfer 1: intermediate transfer roll 2).

Two color toner image transferred onto the 2 IDT 1 is transferred to the IDT 2. Thus, 4 color toner image are compiled on the IDT 2 as finished toner image.

- IDT 2 is a conductive roll and receives supply of positive high voltage from HVPS. Both the IDT 1 and IDT 2 are positively charged. Voltage is higher on the IDT 2 and toner image is attracted to the IDT 2 surface and transferred onto the IDT 2.

### 1.3.6 Cleaning (IDT 1)

In the cleaning process (IDT 1), toner remaining on the IDT 1 after the toner image is transferred to the IDT 2 is temporarily stored in the IDT 1 cleaner.

- The IDT 1 cleaner receives positive high voltage from the HVPS with a conductive roll brush. The IDT 1 cleaner is placed in contact with the IDT 1 at the position through which it passes after the toner image having been transferred from the drum is transferred to the IDT 2. Toner remaining on the IDT 1 is electrically scraped and stored. The toner stored is collected upon completion of printing or at the time of cleaning cycle. (Refer to 1.3.11 Cleaning (general).)

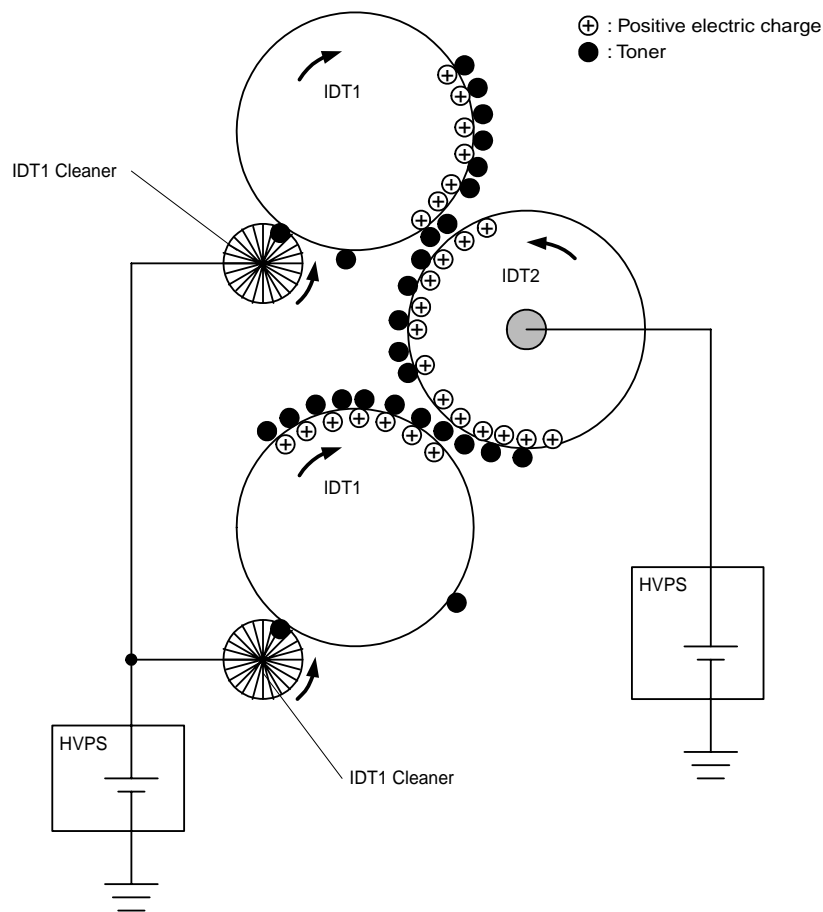


Fig.3-18

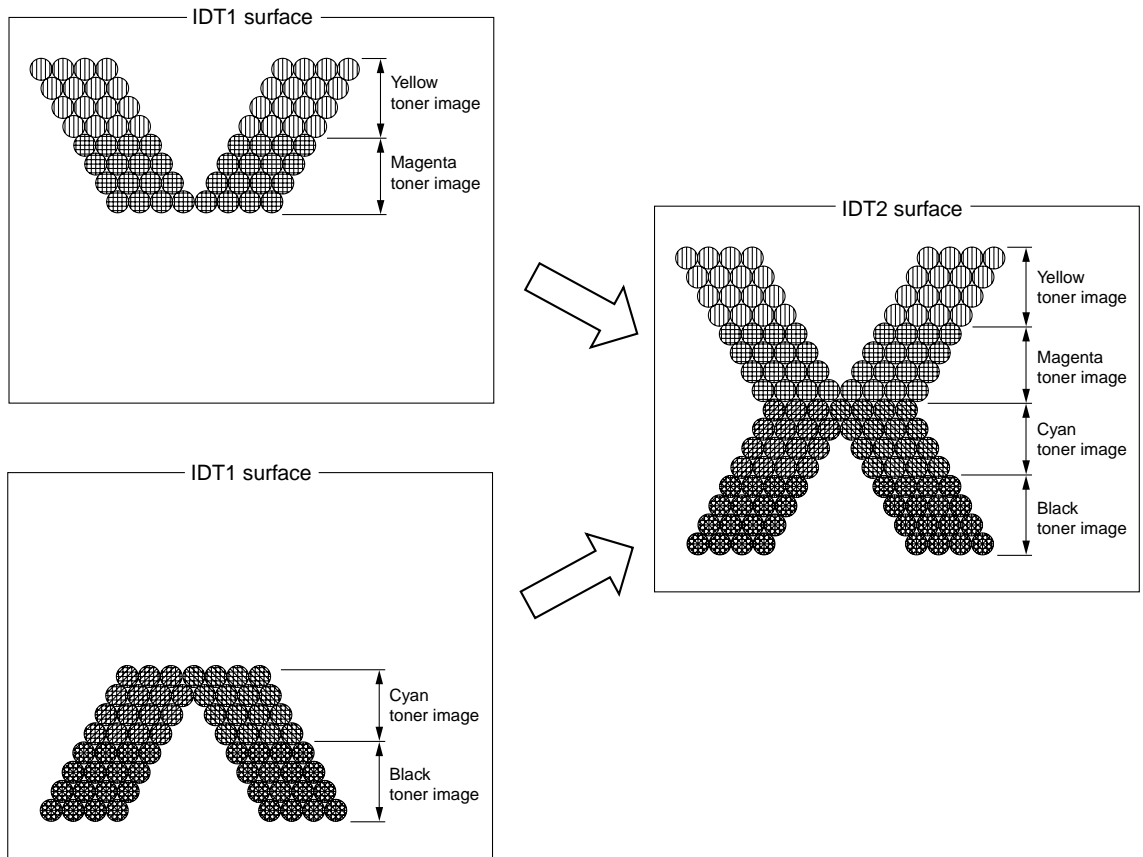


Fig.3-19

### 1.3.7 Tertiary transfer (IDT 2 - paper)

In the tertiary transfer process, finished toner image formed on the IDT 2 surface is transferred onto the paper under the voltage supplied to the transfer roll cartridge.

- Transfer roll cartridge is composed in the transfer roll cartridge ASSY. Transfer roll cartridge is a conductive roll and receives positive high current from HVPS. When paper passes through between IDT2 and transfer roll cartridge, plus potential is given to the back side of the paper so that the toner on the IDT 2 is transferred onto the paper. At this time, potential on the transfer roll cartridge is higher than that on the IDT 2.

### 1.3.8 Cleaning (IDT 2)

In the cleaning process, toner remaining on the IDT 2 after the toner image is transferred onto the paper is temporarily held at the IDT 2 cleaner.

- The IDT 2 cleaner is a conductive roll brush and receives positive high voltage from HVPS.  
The IDT 2 cleaner is placed in contact with the IDT 2 at a position through which it passes after the toner image having been transferred from IDT 1 is transferred onto the paper. Remaining toner on the IDT 2 is electrically scraped and held at the IDT 2 cleaner.  
The toner held is collected upon completion of printing or at the cleaning cycle.  
(Refer to 1.3.11 Cleaning (general).)

### 1.3.9 Static elimination

In the static elimination process, negative DC voltage is given to the back side of the paper from the detack saw (static elimination board) to neutralize and eliminate the charge of paper.

- The detack saw receives high voltage from HVPS.  
The positive charge caused in the tertiary transfer process generates image quality troubles by scattering toner. Static electricity of the paper is eliminated by discharge of the detack saw preventing those image quality troubles.

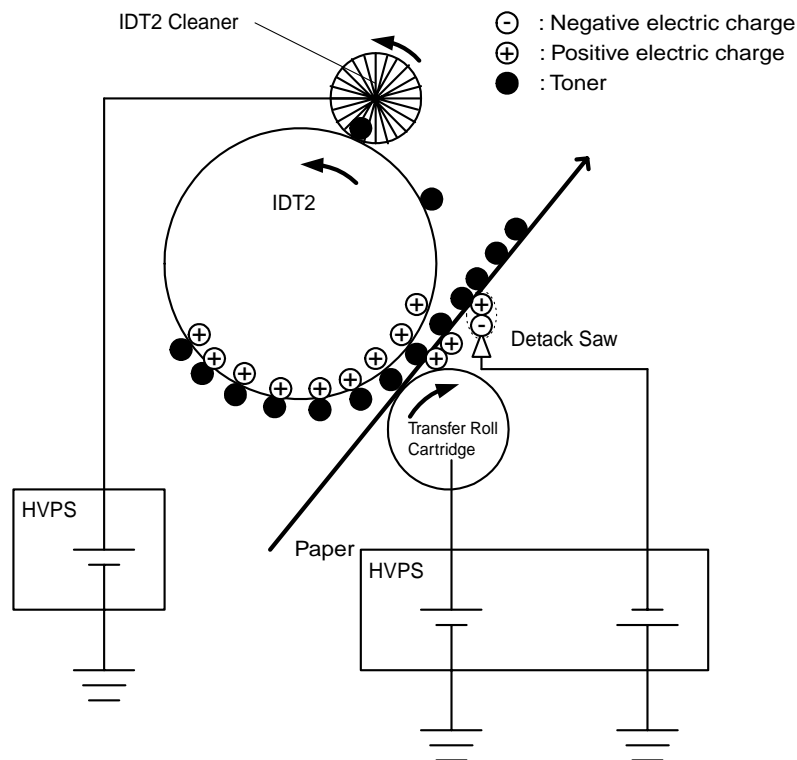


Fig.3-20

### 1.3.10 Fixing

In the fixing process, toner is fixed on the paper by heat and pressure.

- Finished toner image transferred from the belt is easily broken only by touching it with fingers. The toner image is fixed on the paper with the fuser ASSY (fixing unit). The toner melts by heat of the heat roll with the heater lamp as the heat source and is deposited on the paper under pressure given by the belt opposed against the heat roll.

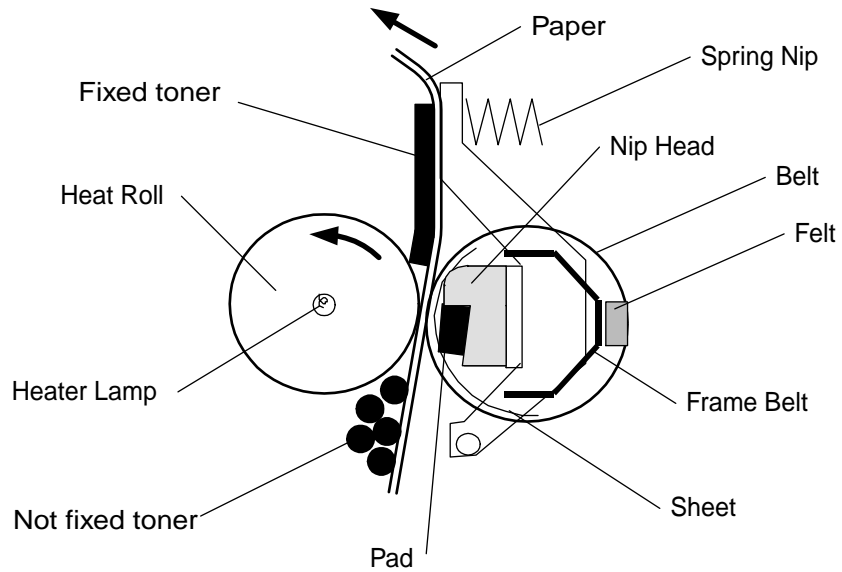


Fig.3-21

### 1.3.11 Cleaning (general)

In the cleaning (general) process, toner stored in the IDT 1 cleaner and IDT 2 cleaner after the finished toner image is transferred onto the paper and the toner remaining on the transfer roll cartridge are removed.

- The toner not completely transferred in the "secondary transfer" and "tertiary transfer" processes is held temporarily in the IDT1 cleaner and IDT2 cleaner. Also, the toner of which polarity is reversed and returned to the drum is held in the refresher. Further, the toner that passes the refresher may stick to the HTC. These toners are cleaned at the completion of the printing. The recovery method is different between the toner held in the IDT1 cleaner and IDT2 cleaner and the toner held in the refresher and HTC.

#### 1) IDT1 cleaner and IDT2 cleaner

High voltage equivalent to the voltage at the printing transfer is applied to the IDT1, IDT2, and transfer roll cartridge. The toner (negative polarity) remaining in the IDT1 cleaner and IDT2 cleaner are moved to the IDT1 and IDT2 electrically by transforming the IDT1 cleaner and IDT2 cleaner to 0V. Then, in the same manner as in the printing transfer, the residual toner is collected to the transfer roll cartridge surface by potential difference between IDT1, IDT2, and transfer roll cartridge.

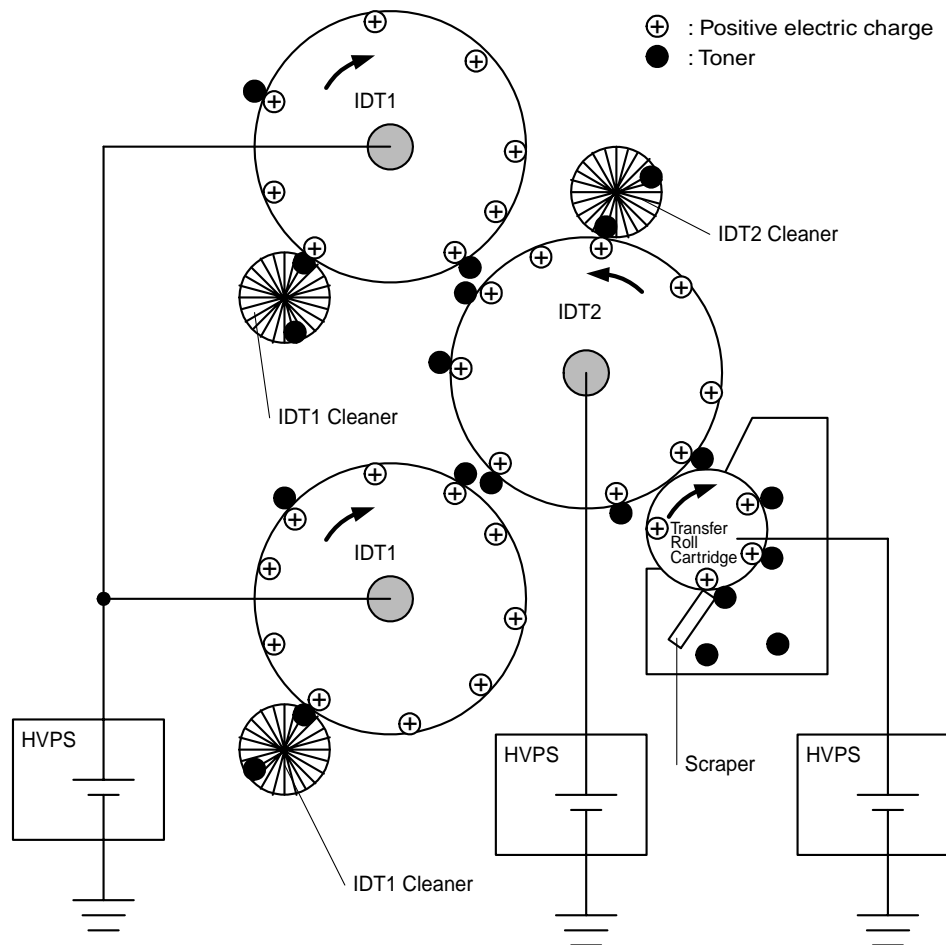


Fig.3-22

2) Refresher and HTC

High voltage of the polarity (negative) reverse to that at the printing transfer is applied to the IDT1, IDT2, and transfer roll cartridge. At this time, the drum surface is charged negatively by negative voltage of the IDT1. The toner (positive polarity) remaining in the Refresher and HTC are move to the drum electrically by transforming the Refresher and HTC to 0V. Then, in the same manner as in the printing transfer, the residual toner is collected to the transfer roll cartridge surface by potential difference between IDT1, IDT2, and transfer roll cartridge.

- Toner attached to the surface of transfer roll cartridge is scraper off with the transfer roll cartridge cleaner which is in contact with the transfer roll cartridge and collected into the collection space in the transfer roll cartridge unit ASSY.

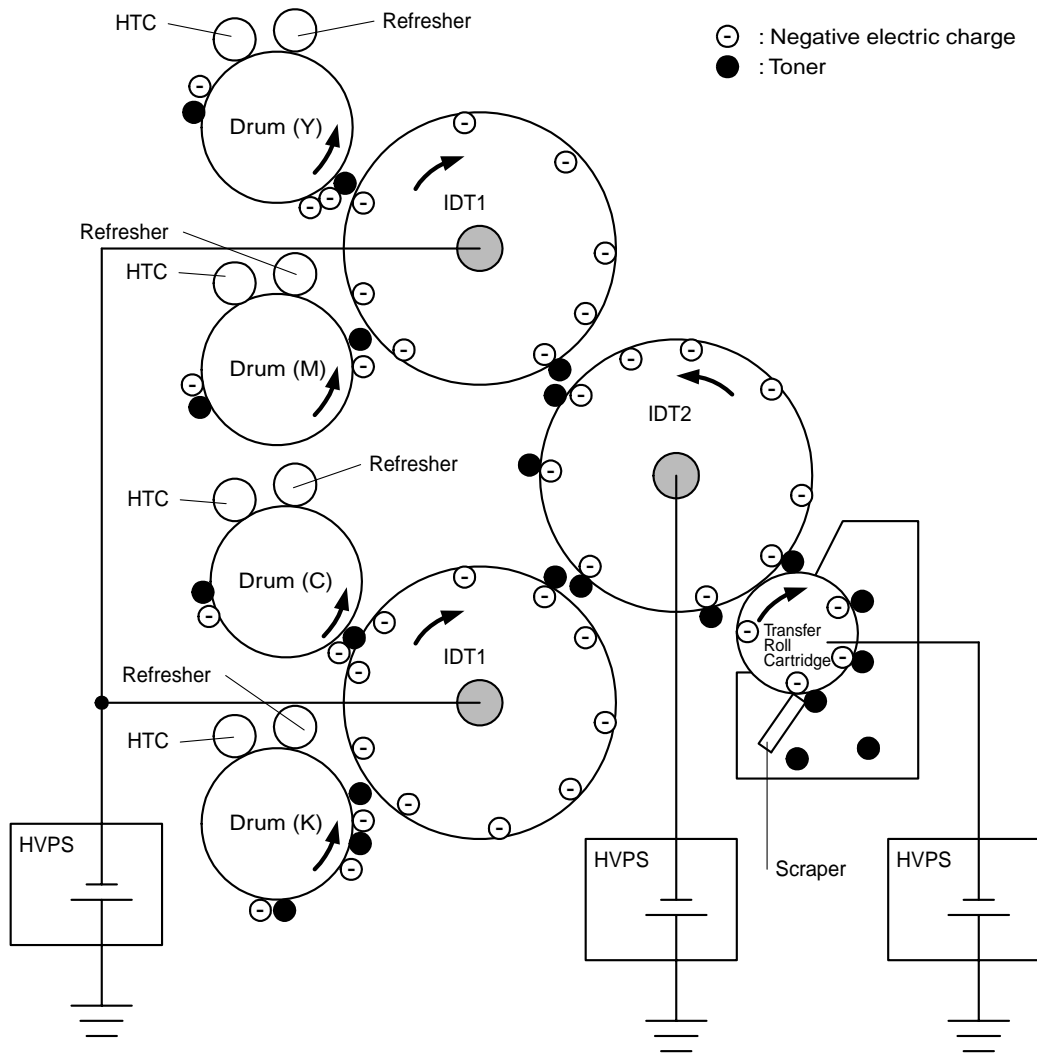


Fig.3-23

## 2. FLOW OF PRINT DATA

### 2.1 Data Flow

Print data (electric signal) from the printer controller flows as shown below to turn to the print image finally.

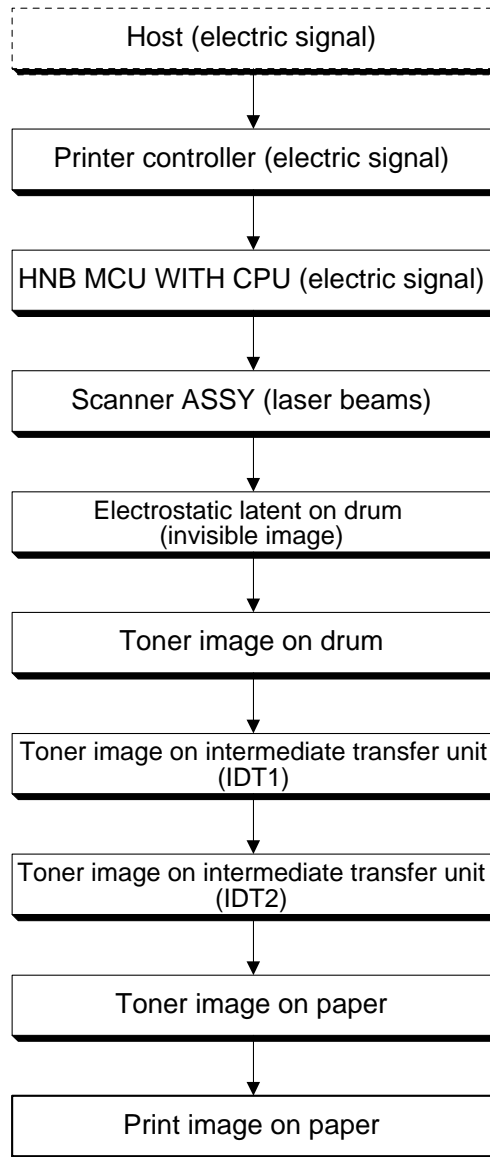


Fig.3-24

### 3. DRIVE TRANSMISSION ROUTE

#### 3.1 Main Drive ASSY

Rotary power of the main drive ASSY is transmitted through the route below.

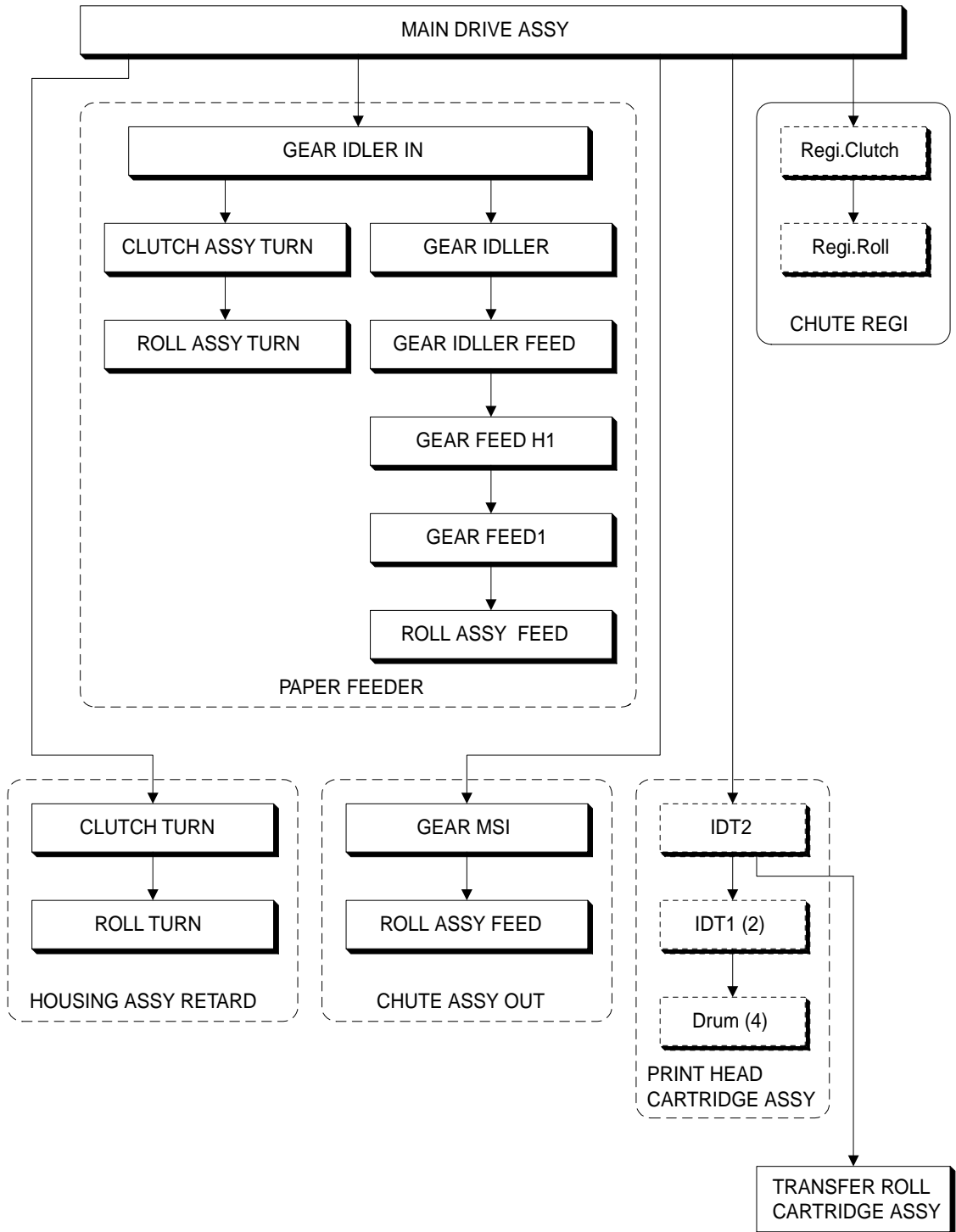


Fig.3-25



### 3.2 DEVE Drive ASSY

The rotary power of the DEVE drive ASSY drives the developers of 4 colors in the print head cartridge ASSY.

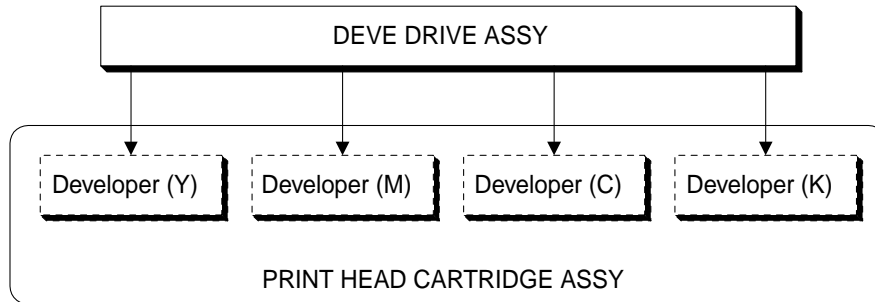


Fig.3-26

### 3.3 Holder Toner Cartridge ASSY (Y, M, C, K)

Rotary power of the toner motor in the holder toner cartridge ASSY drives the agitator in the toner cartridge ASSY (to supply toner from the toner cartridge ASSY to holder toner cartridge ASSY) and auger in the holder toner cartridge ASSY (to supply toner to developer in the print head cartridge ASSY).

Four holder toner cartridge ASSY, Y, M, C and K, operate respectively in the same way.

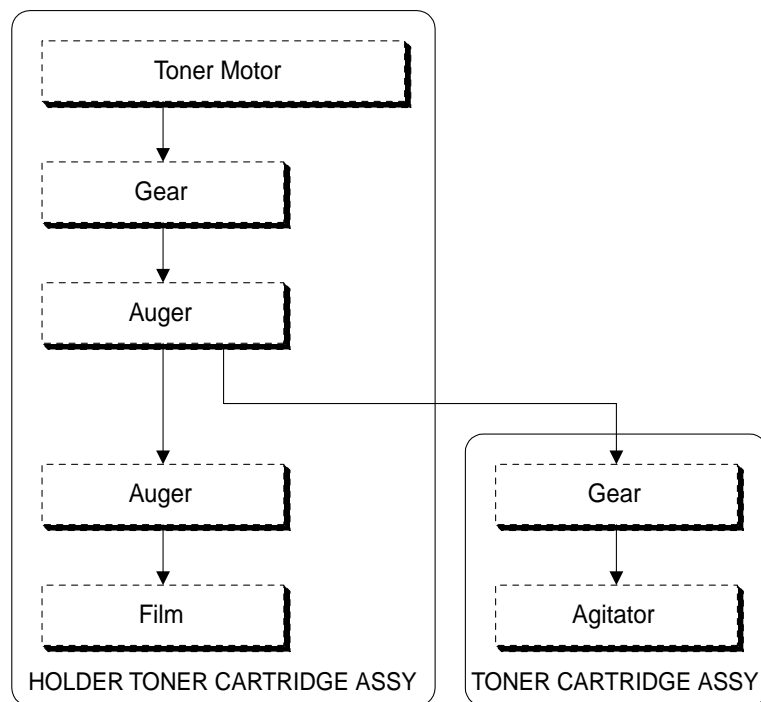


Fig.3-27

### 3.4 Fuser Drive ASSY

Rotary power of the fuser drive ASSY drives the fuser ASSY.

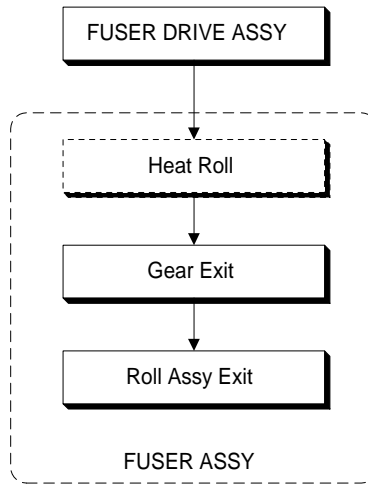


Fig.3-28

### 3.5 Motor ASSY DUP

Rotary power of the motor ASSY DUP is transmitted through the route below.

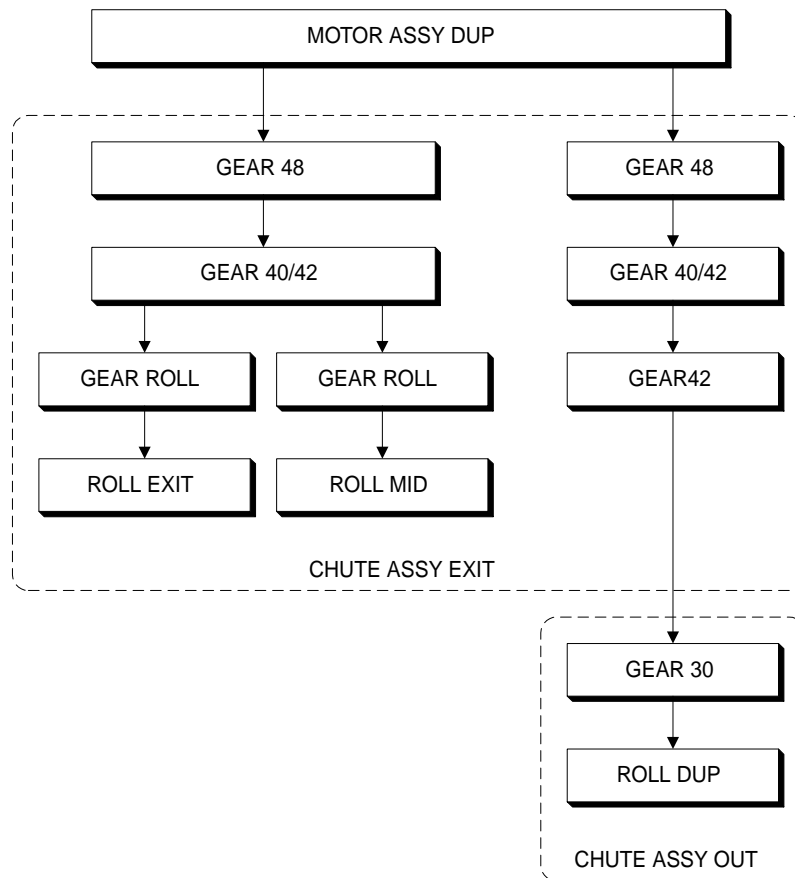
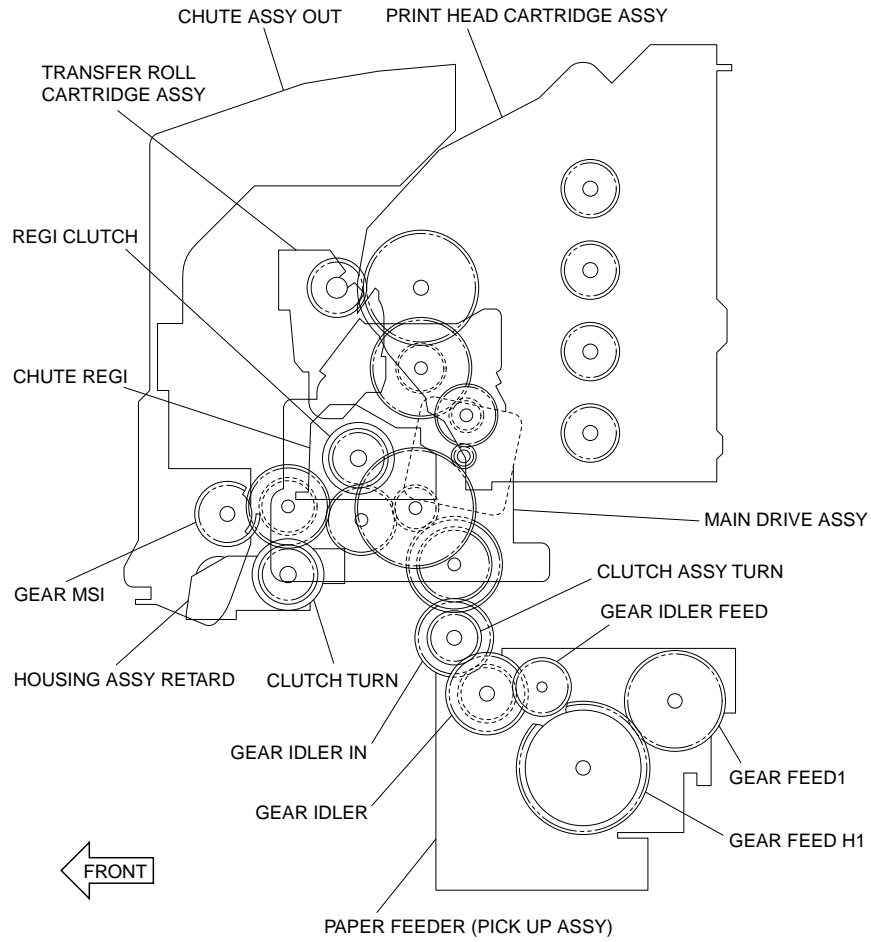
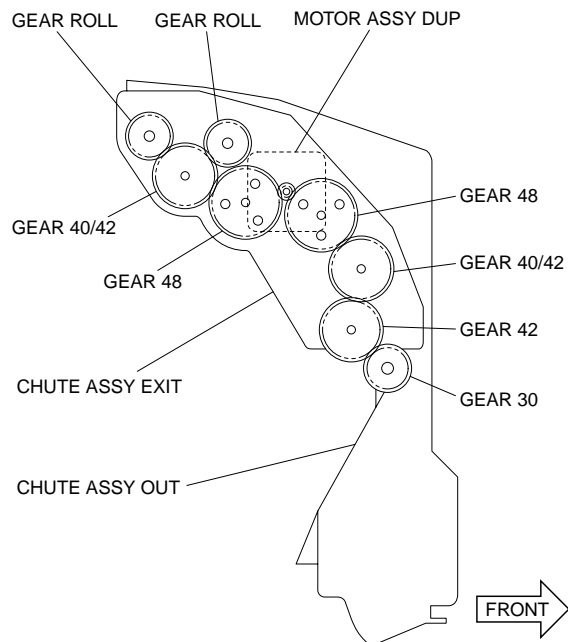


Fig.3-29

### 3.6 Gear Layout



**Fig.3-30**



**Fig.3-31**

## 4. PAPER TRANSFER

### 4.1 Paper Transfer Route (without option)

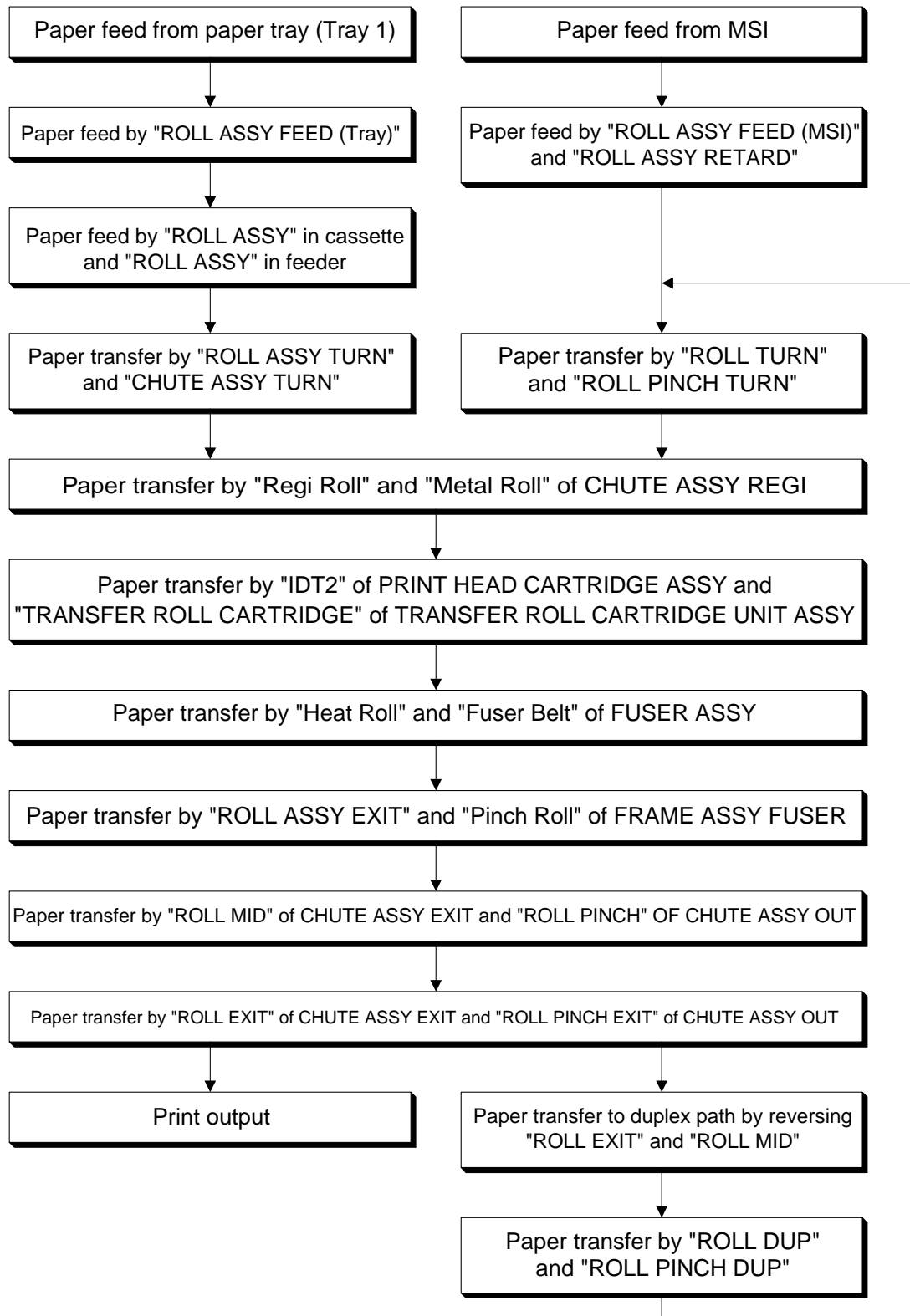


Fig.3-32

## 4.2 Layout of Paper Transfer Route

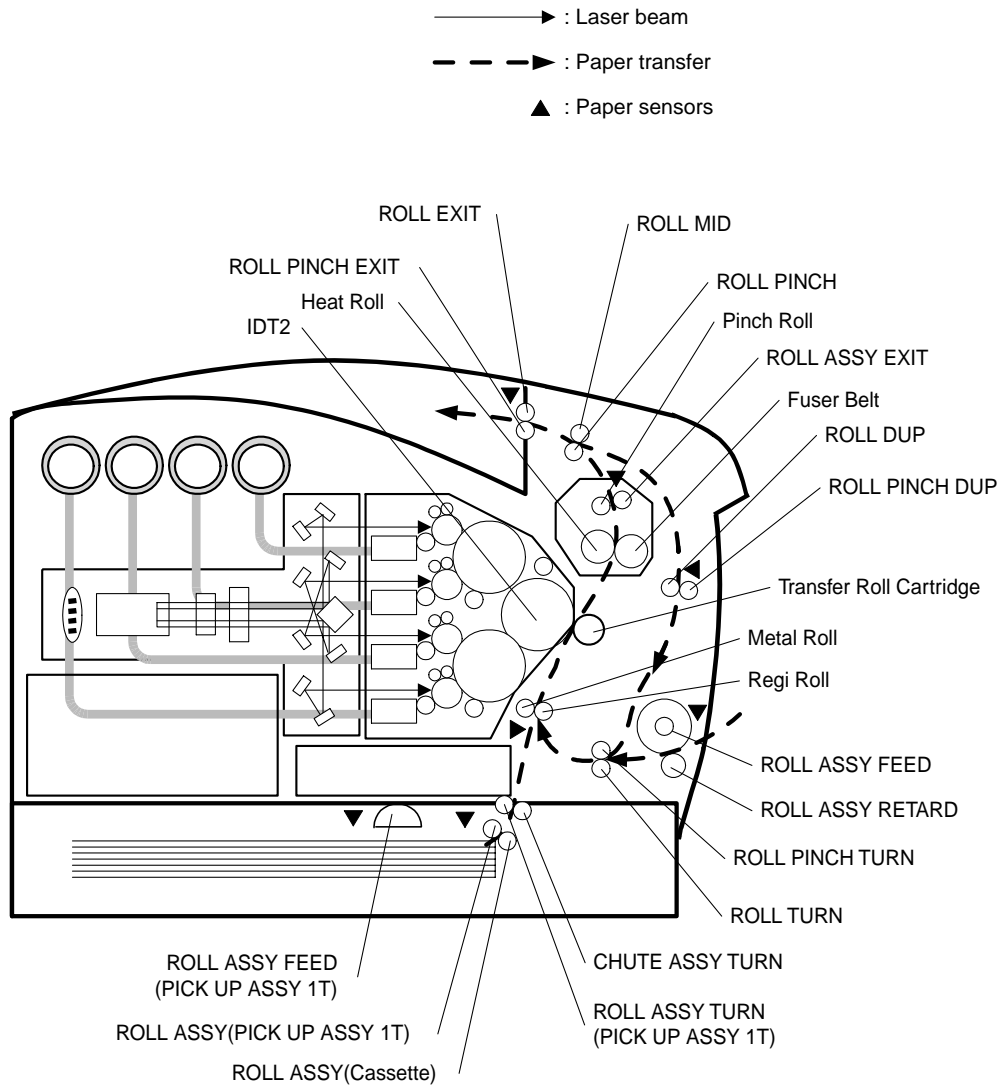


Fig.3-33

## **5. FUNCTIONS OF MAJOR FUNCTIONAL COMPONENTS**

Major functional components comprising the printer are described below referring to their illustrations.

Those components are classified into the following blocks based on the configuration of the printer.

- Paper Cassette
- Paper Feeder
- Housing ASSY Retard
- Front ASSY In
- Chute ASSY Out
- Chute ASSY Exit
- Transfer Roll Cartridge ASSY & Fuser
- Xerographics
- Toner Cartridge ASSY
- Frame & Drive
- Electrical

## 5.1 Paper Cassette

### 5.1.1 Major functions

- Side Guide  
The side guide can move at right angle to the paper transfer direction to align the paper width.
- End Guide  
The end guide can move in the paper transfer direction to determine the paper size. The ON/OFF of switch ASSY size (see 5.2 Paper Feeder) varies according to the end guide position to detect the paper size.
- Roll ASSY (Cassette)  
The roll ASSY (Cassette) and the roll ASSY (pick up ASSY T1) (see 5.2 Paper Feeder) pinch the paper to feed.

### 5.1.2 Reference diagram

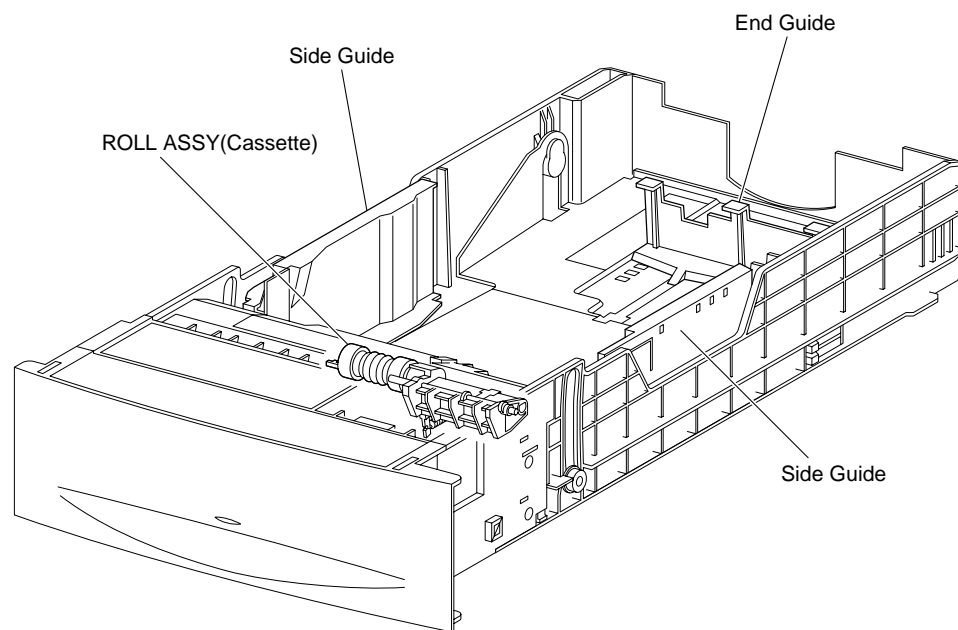


Fig.3-34

## 5.2 Paper Feeder

### 5.2.1 Major functions

- Switch ASSY size  
Switch ASSY size detects paper size and existence or non existence of the paper tray.
- Sensor photo (No paper sensor)  
Detects existence or non existence of paper in the paper tray based on the position of actuator no paper. (No paper: Sensor beam is intercepted)
- Sensor photo (Low paper sensor)  
The actuator lowers according to how much paper remains in the paper tray. When the actuator lowers to certain extent, it intercepts the sensor beam to detect low paper quantity.  
As the actuator position can be seen from the front side of paper tray, you can confirm approximate residual paper quantity.
- Solenoid feed  
Controls operation (rotation/stop) of roll ASSY feed by controlling the rotations of the gear feed.
- Clutch ASSY turn  
Transmits the drive from the main drive ASSY to roll ASSY turn.
- Roll ASSY feed  
When the solenoid feed operates, the gear feed and gear idler feed are engaged by the force of the spring feed. Under the drive from the main drive ASSY, the roll ASSY feed starts rotating and the roll ASSY (pickup ASSY T1) sends paper.  
After having rotated one turn, the gear feed and gear idler feed are disengaged at the notch of the gear feed, no drive is transmitted any more, and the roll ASSY feed stops rotating. Thus sheets of paper is sent out one by one.
- Roll ASSY turn  
The roll ASSY turn rotates by the drive from the main drive ASSY through the clutch ASSY turn to feed the paper from the paper tray to chute REGI (REGI roll) ("refer to 5.8 Xerographics").
- Sensor HUM TEMP  
Detects temperature and humidity in the printer.  
The printer corrects the charging voltage, the voltage supplied to the transfer rolls, and the developing bias based on the detected temperature and humidity.



## 5.2.2 Reference diagram

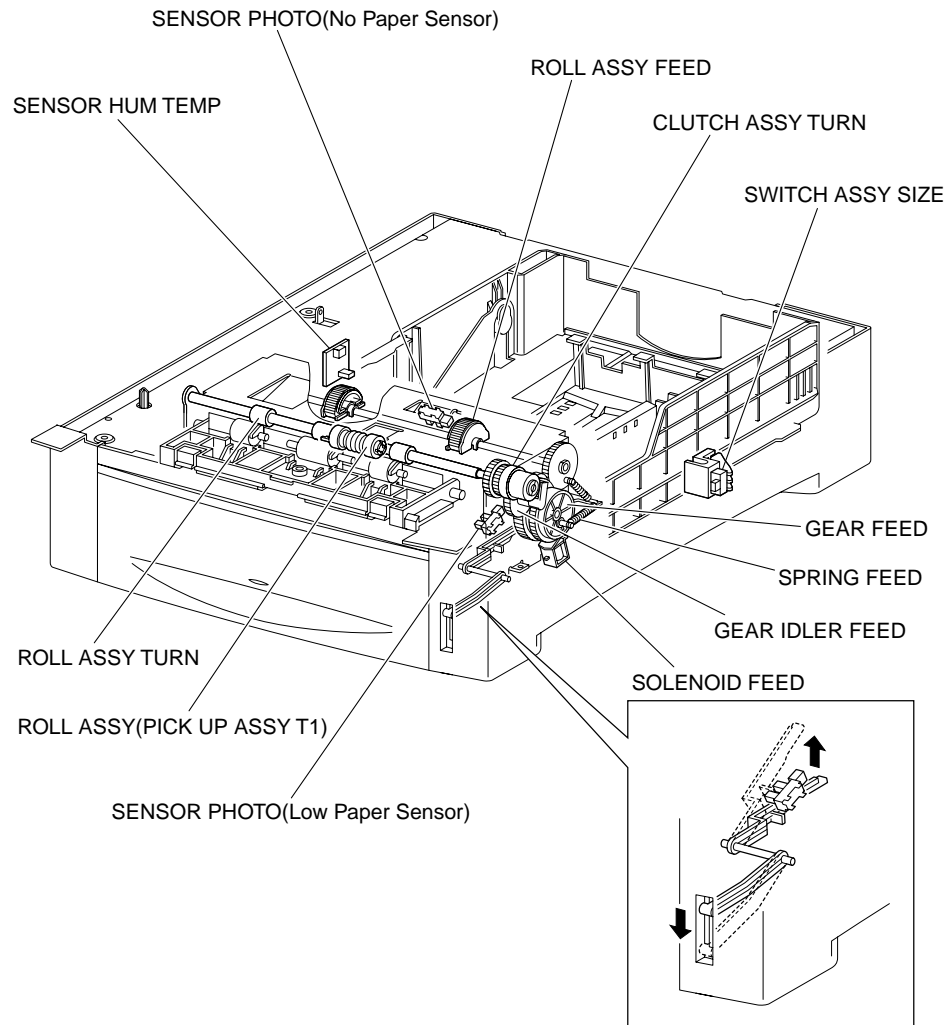


Fig.3-35

### 5.3 Housing ASSY Retard

#### 5.3.1 Major functions

- Clutch turn (MSI turn clutch)  
Transmits the drive from the main drive ASSY to the roll turn.
- Roll turn  
The roll turn is rotated by the drive from the main drive ASSY through the clutch turn (MSI turn clutch) to feed the paper from the manual feed tray to the chute REGI (REGI roll) (refer to "5.8 Xerographics").

#### 5.3.2 Reference diagram

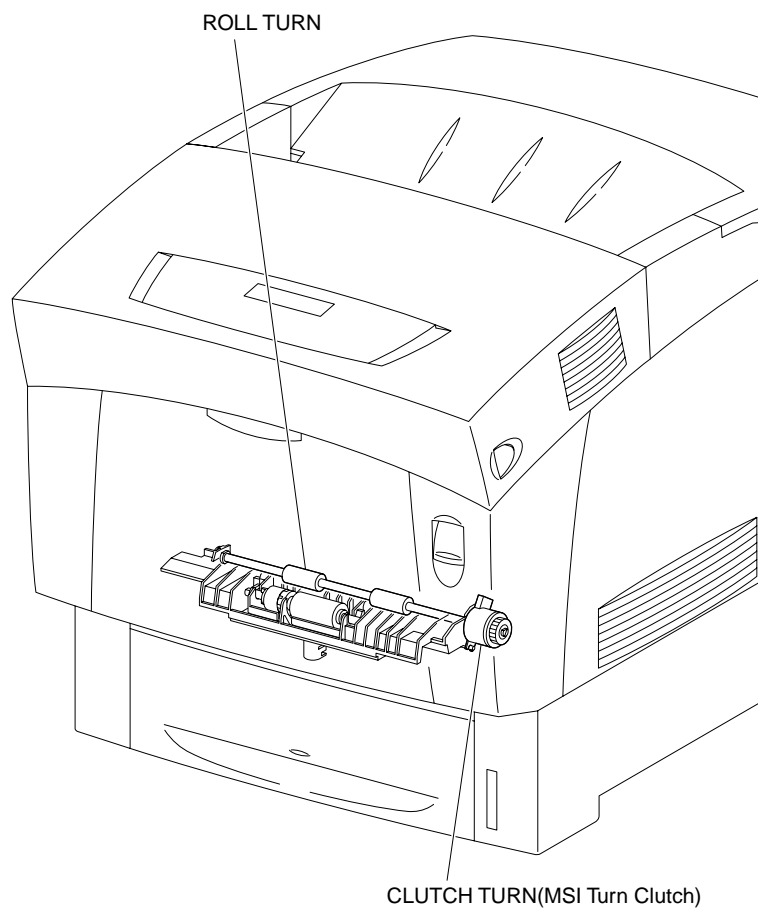


Fig.3-36

## 5.4 Front ASSY In

### 5.4.1 Major functions

- Holder ASSY CTD  
Reads the density of the toner image prepared on the surface of transfer roll cartridge in the transfer roll cartridge unit ASSY (refer to "5.7 Transfer Roll Cartridge ASSY & Fuser") and feeds it back to the process control (refer to "7.4 Process Control").
- Sensor TNR full  
Detects that the toner collect space in the transfer roll cartridge unit ASSY (refer to "5.7 Transfer Roll Cartridge ASSY & Fuser") has become full of waste toner to be collected.
- Fuser drive ASSY  
Supplies the drive to the fuser ASSY (refer to "5.7 Transfer Roll Cartridge ASSY & Fuser").

### 5.4.2 Reference diagram

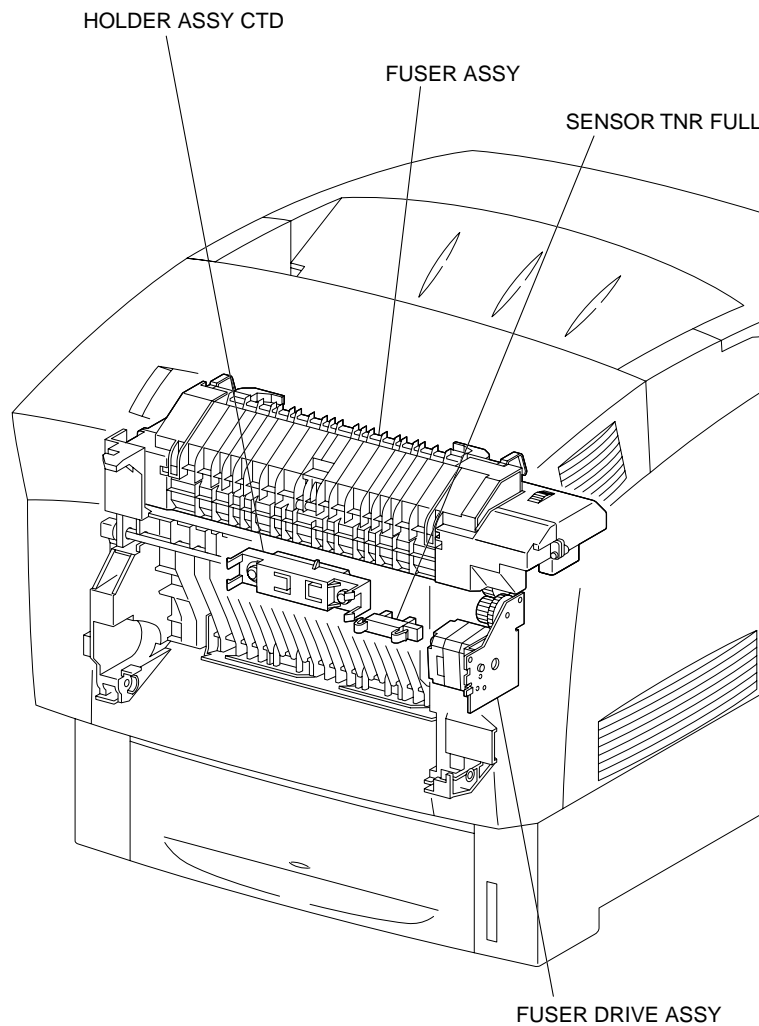


Fig.3-37

## 5.5 Chute ASSY Out

### 5.5.1 Major functions

- **Sensor photo (Full stack sensor)**  
Detects that the prints discharged onto the top cover have accumulated more than specified number of sheets based on the change of position of the actuator.  
(Full stack: Sensor beam is received)
- **Sensor photo (Dug jam sensor)**  
Detects that paper has reached and passed through the roll DUP based on the change of position of the actuator.  
(Paper present: Sensor beam is received)
- **Sensor photo (MSI no paper sensor)**  
Detects existence or non existence of paper on the manual feed tray based on the change of position of the actuator.  
(No paper: Sensor beam is intercepted)
- **Solenoid feed MSI**  
Controls the operation (rotation/stop) of roll ASSY feed by controlling the rotations of the gear MSI.
- **Roll ASSY feed**  
When the solenoid feed MSI operates, the gear MSI and gear idler are engaged by the force of the spring SOL, the roll ASSY feed starts rotating under the drive from the main drive ASSY, and feeds paper from the manual feed tray.  
After having rotated one turn, the gear MSI and gear idler are disengaged at the notch of the gear MSI, drive is not transmitted any more, and the roll ASSY feed stops rotating. Thus sheets of paper are fed one by one.
- **Roll DUP**  
The roll DUP rotates under the drive from the motor ASSY DUP and feeds paper printed on simplex returned from the chute ASSY exit to the roll turn (refer to "5.3 Housing ASSY Retard").

### 5.5.2 Reference diagram

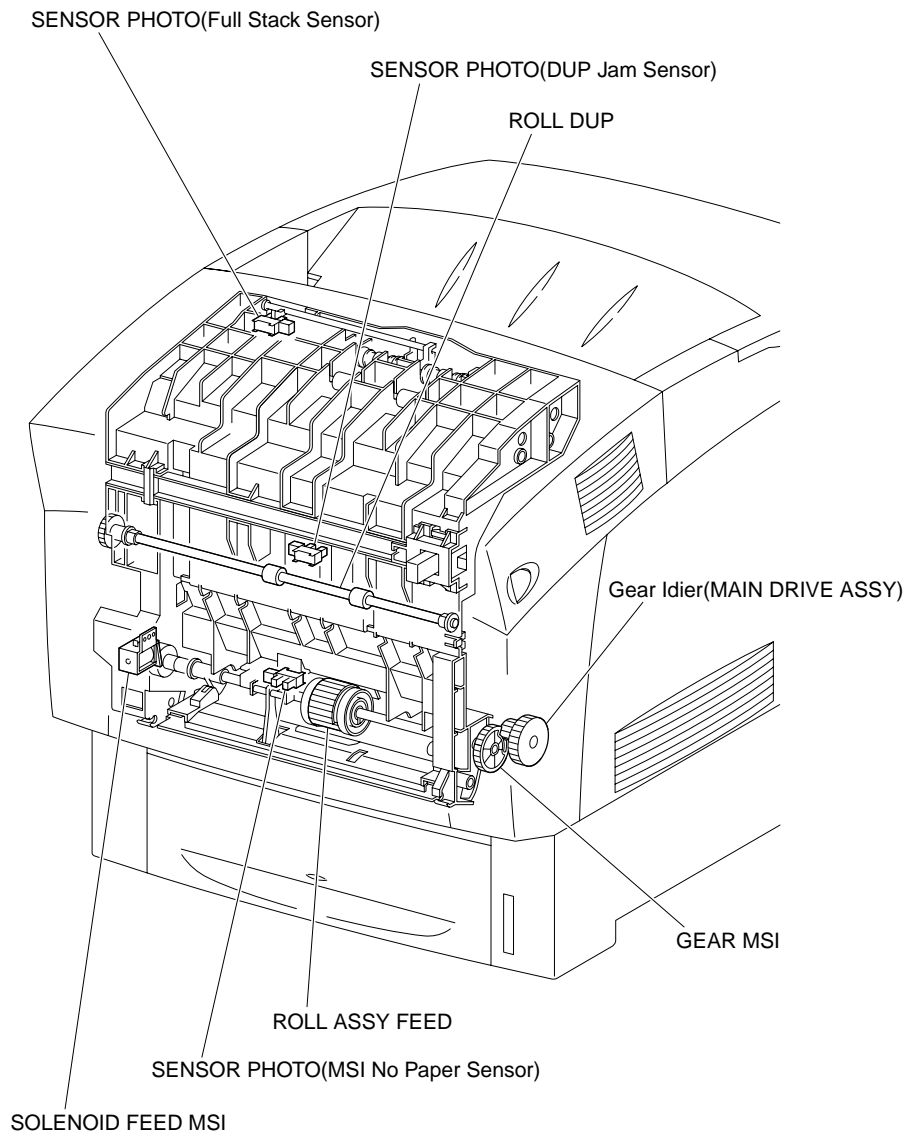


Fig.3-38

## 5.6 Chute ASSY Exit

### 5.6.1 Major functions

- Motor ASSY DUP  
Supplies drive to the roll exist, roll MID, and roll DUP.
- Roll exit  
The roll exit rotates under the drive from the motor ASSY DUP, and feeds fixed prints onto the top cover. It reverses in the duplex document mode and feeds the prints after fixed on simplex in the REGI direction.
- Roll MID  
The roll MID rotates under the drive from the motor ASSY DUP, and feeds fixed prints onto the top cover. It reverses in the duplex document mode and feeds the prints after fixed on simplex in the REGI direction.

### 5.6.2 Reference diagram

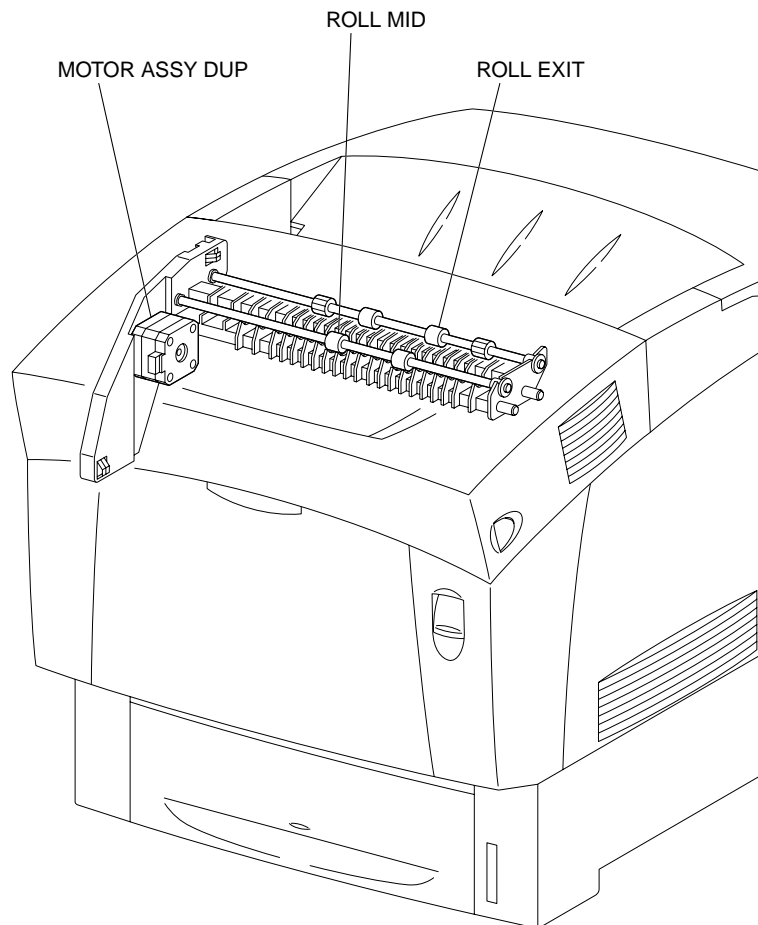


Fig.3-39

## 5.7 Transfer Roll Cartridge ASSY & Fuser

### 5.7.1 Major functions

- Fuser ASSY

The fuser ASSY fixes toner which was transferred onto the paper but not fixed by the heat and pressure and feeds paper before and after being fixed.

The fuser ASSY mainly consists of the following parts:

- Heat roll
- Heater lamp
- Thermostat
- Temp sensor
- Belt unit
- Roll ASSY exit
- Exit sensor

- Exit sensor

Detects passage of print after fixed based on the change of position of the actuator.

- Transfer roll cartridge unit ASSY

The transfer roll cartridge unit ASSY consists of a transfer roll cartridge and a waste toner recovery system.

The transfer roll cartridge is opposed to the IDT 2 in the print head cartridge ASSY and transfer the toner image on the IDT 2 onto the paper.

- Fan fuser

The fan fuser exhausts the heat of fuser ASSY to prevent inside temperature from overheating.

### 5.7.2 Reference diagram

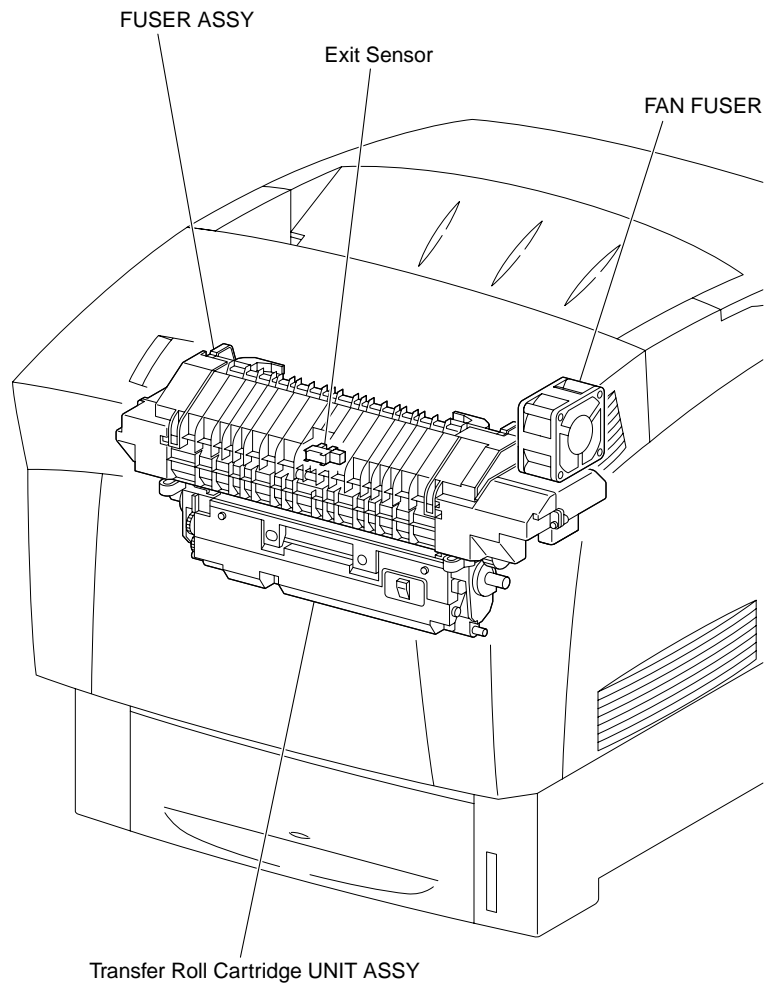


Fig.3-40



## 5.8 Xerographics

### 5.8.1 Major functions

- Scanner ASSY

Scanner ASSY (raster output scanner assembly) is an exposure unit to generate laser beams to form electrostatic latent image on the drum surface.

In this manual, the scanner ASSY is referred to as scanner ASSY.

The scanner ASSY mainly consists of the following parts:

- LD ASSY
- Scanner ASSY
- SOS PWB
- Lens
- Mirror
- Window

- Print head cartridge ASSY

Print head cartridge ASSY carries out a series of operation in the print process such as charging, developing and transfer.

Print head cartridge ASSY mainly consists of the following parts.

- Drum (Y)
- Drum (M)
- Drum (C)
- Drum (K)
- HTC (Y)
- HTC (M)
- HTC (C)
- HTC (K)
- IDT 1 (2)
- IDT 1 cleaner (2)
- Developer (Y)
- Developer (M)
- Developer (C)
- Developer (K)
- Refresher (Y)
- Refresher (M)
- Refresher (C)
- Refresher (K)
- IDT 2
- IDT 2 Cleaner

- Chute REGI (REGI clutch)

The chute REGI is composed of the REGI clutch, REGI roll and metal roll.

Drive from the main drive ASSY is transmitted to the REGI roll through the REGI clutch. Feeds paper from the tray, MSI and duplex path in the print head cartridge ASSY direction. When the paper tip reaches the chute REGI, the chute REGI has the paper make a loop until the REGI roll starts rotating and correct the skew (feeding the paper in inclined condition) of the tip of the paper.

- Sensor photo (REGI sensor)

Detects that the paper tip has reached the chute REGI.

(Paper present: Beam is received)

- OHP sensor ASSY

As plain paper scatters the radiated light, the OHP sensor ASSY can capture the reflected light to detect the paper. The OHP paper scarcely scatters the radiated light, and therefore the OHP sensor ASSY cannot capture the reflected light. Thus, whether the paper fed from MSI is plain paper or OHP paper is judged.

## 5.8.2 Reference diagram

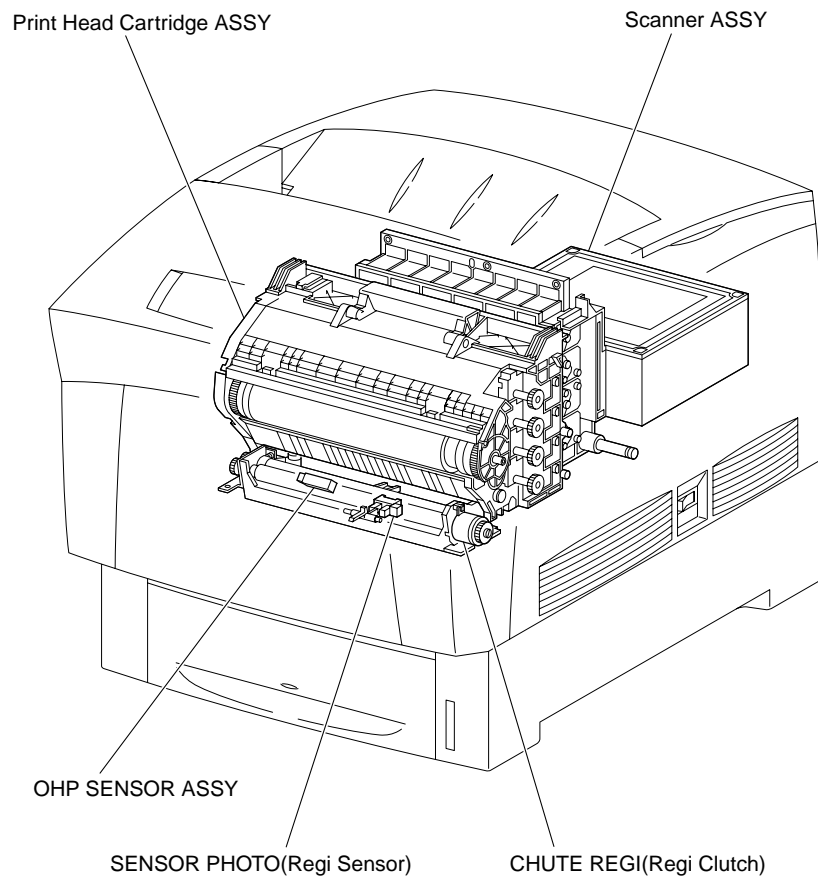


Fig.3-41

## 5.9 Toner Cartridge ASSY

### 5.9.1 Major functions

- Switch Toner Cartridge ASSY (Y)
- Switch Toner Cartridge ASSY (M)
- Switch Toner Cartridge ASSY (C)
- Switch Toner Cartridge ASSY (K)

Detects whether Toner Cartridge ASSY of each color is installed or not.

- Sensor toner low (Y)
- Sensor toner low (M)
- Sensor toner low (C)
- Sensor toner low (K)

Detects residual toner of each color.

- Holder Toner Cartridge ASSY (1) (Toner motor: Y)
- Holder Toner Cartridge ASSY (2) (Toner motor: M)
- Holder Toner Cartridge ASSY (3) (Toner motor: C)
- Holder Toner Cartridge ASSY (4) (Toner motor: K)

The toner motor incorporated in the holder toner cartridge ASSY of each color supplies the drive to the agitator in the toner cartridge ASSY of each color and to auger in the holder toner cartridge ASSY and supplies toner to the developer incorporated in the print head cartridge ASSY.

- Toner Cartridge ASSY (Y)
- Toner Cartridge ASSY (M)
- Toner Cartridge ASSY (C)
- Toner Cartridge ASSY (K)

Toner bottle containing tone of each color.

- PWBA EEPROM STD

Printer specific information is stored.

- S-HVPS

Supplies high voltage to perform the “tertiary transfer” and “static elimination” of the print process to the following components.

- Transfer Roll Cartridge in the Transfer Roll Cartridge unit ASSY.
- Detack saw in the Transfer Roll Cartridge unit ASSY.

### 5.9.2 Reference diagram

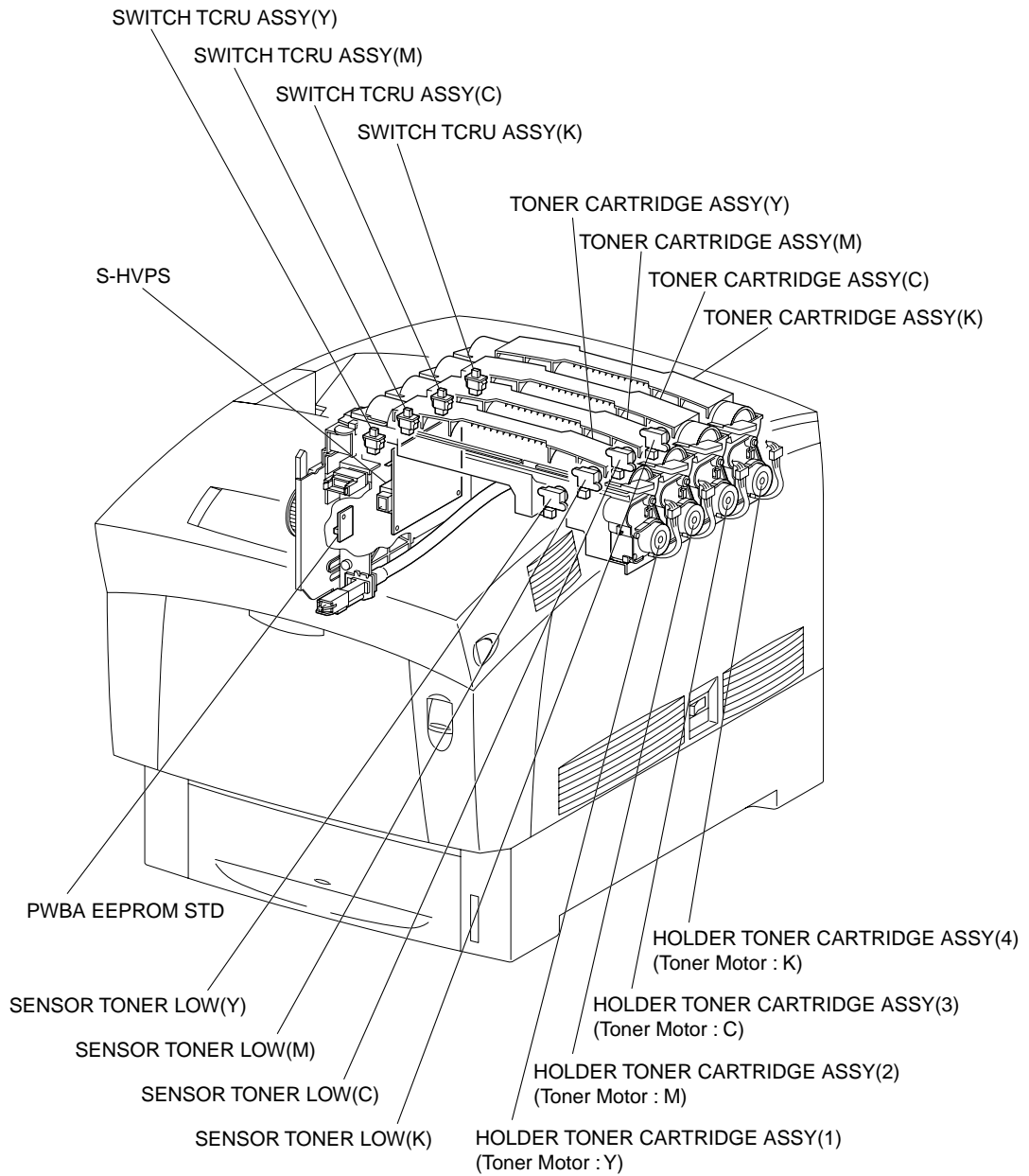


Fig.3-42

## 5.10 Frame & Drive

### 5.10.1 Major functions

- Main drive ASSY

Supplies the drive to parts as follows.

- Paper feeder
- Housing ASSY retard
- Chute ASSY out (MSI position)
- Chute REGI
- Print Head Cartridge ASSY (IDT 2, IDT 1, Drum)
- Transfer Roll Cartridge unit ASSY

- DEVE drive ASSY

Supplies the drive to parts as follows.

- Print Head Cartridge ASSY (Developer)

### 5.10.2 Reference diagram

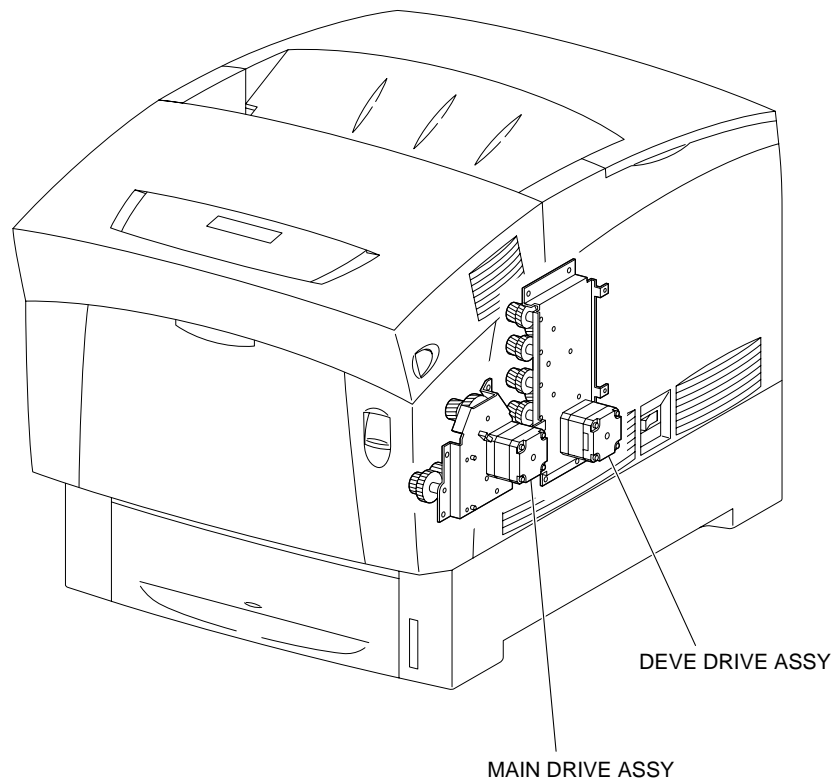


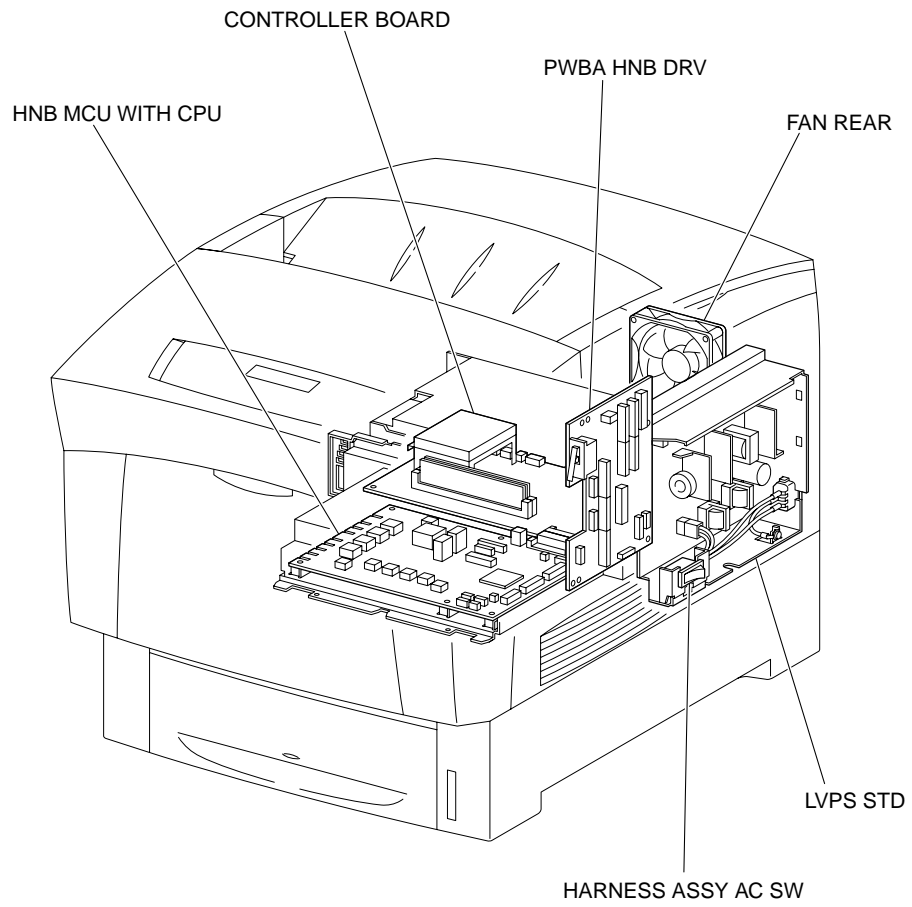
Fig.3-43

## 5.11 Electrical

### 5.11.1 Major functions

- Fan  
Discharges heat out of the printer to prevent too high temperature in the printer.
  
- Harness ASSY AC SW  
Composed of the main switch and inlet and controls supply of AC power from the power source to LVPS.
  
- LVPS STD  
The LVP STD is provided with two types, 100/200V and 230V.  
Supplies AC power from the power source to the fuser ASSY heater and generates and supplies stable low voltage DC power used for the logic circuit, etc.  
LVPS contains control circuit for the heater of the fuser ASSY, in addition to the power circuit.
  
- HNB MCU with CPU  
Controls printing operation based on the communication with the print controller and information from the sensor/switch. Incorporates functions of HVPS.  
Major functions are as follows:
  - Communication with the printer controller.
  - Receive of information from the sensors or switches.
  - Control of Scanner ASSYSupplies high voltage to parts in the print head cartridge ASSY to perform charging, development, primary transfer and secondary transfer of the print process to the following parts in the ASSY.
  - HTC
  - Refresher
  - Developer
  - IDT 1
  - IDT 2
  - IDT 1 Cleaner
  - IDT 2 Cleaner
  
- PWBA HNB DRV  
Controls parts of motor and so on by the signal from the HNB MCU with CUP and sends information from the sensors and switches to HNB MCU with CUP. The power from the LVPS STD is supplied to the HNB MCU with CPU through this PWB. Also, the interlock switch is mounted on this PWB.  
Major functions are as follows:
  - Recive of information from the sensors or switches.
  - Control of toner motor in main drive ASSY, DEVE drive ASSY, fuser drive ASSY, motor ASSY DUP, and holder TDRU ASSY.
  - Distributing low voltage DC power outputted from LVPS to each component.
  - Cutting off the 24VDC circuit by the interlock switch
  
- Controller board  
Receives data from high-order unit (host), prints and controls the whole printer.

### 5.11.2 Reference diagram



**Fig.3-44**

## 6. MODES

### 6.1 Print Mode

There are three types of print modes, standard mode, fine mode, and high gloss mode. These are discriminated by the resolution (600dpi/1200dpi) and process speed (full speed/half speed).

Setting the process speed to half speed and the video data transfer speed to SCANNER to twice the speed at 600dpi attains the resolution of 1200dpi.

1. Standard mode      Used for printing with the resolution 600dpi.
2. Fine mode            Used for printing on plain paper with the resolution 1200dpi.
3. High Gloss mode    Gloss is raised by setting half speed with plain paper 600dpi.

The relation between resolution, process speed, paper, and print mode is shown below.

Paper	Print mode	Resolution/Process speed			
		600dpi		1200dpi	
		Simplex	Duplex	Simplex	Duplex
Plain paper	Standard	Full speed	Full speed	—	—
	Fine	—	—	Half speed	Half speed
	High Gloss	Half speed	Half speed	—	—
Special paper *1	Standard	Half speed	—	—	—
	Fine	—	—	Half speed	—

\*1: Thick paper, Label, OHP, Envelope, Postcard

### 6.2 Operation Modes

For the operation of the printer, the following five modes are provided.

- DIAG test mode  
The printer is ready for receiving diagnostic commands, or the printer diagnostic function is operating.
- Wait mode  
The printer is under the adjustment of print quality.
- Ready mode  
The printer is ready for printing.
- Printing mode  
The printer is under printing.
- Error mode  
Any error was detected in the printer.



## 7. CONTROL

### 7.1 Control of Paper Size

"ON/OFF of paper size switch of switch ASSY size " and "Diag tool indication data" are shown in the table below.

*Note:*

*Paper size switches are indicated as SW1, SW2, and SW3 from the above one.*

Paper size	Paper size switch			Diag indication data
	SW1	SW2	SW3	
LEGAL14"	ON	ON	ON	00
LEGAL13"	ON	ON	OFF	01
EXECUTIVE	ON	OFF	ON	02
B5	ON	OFF	OFF	03
A4	OFF	ON	ON	04
LETTER	OFF	OFF	ON	06
A5	OFF	ON	ON	
No cassette	OFF	OFF	OFF	07

### 7.2 Selective Control on Paper Pick-up Unit

When not controlled by the printer controller, paper pick-up unit selected at the time of turning ON are as follows.

*Note:*

*The paper feeder by the paper tray under the printer is called "Tray 1", and the first tray and the second tray in optional tray unit are called "Tray 2" and "Tray 3" respectively.*

### 7.3 Scanner Light Quantity Control

The image data are entered to the laser diodes in the scanner ASSY as electric signals (data are expressed with high and low voltage values), and the laser diodes convert the image data from electric signals to optical signals (data are expressed with blinking laser beams).

Variations in light quantity of laser beams or variations in optical system (such as lenses) or drum sensitivity cannot attain proper electrostatic image, and accordingly the laser diodes monitor the light quantity of laser beams to control the light quantity so as to attain stable and proper electrostatic image.

The scanner in this printer has four laser diodes for yellow, magenta, cyan, and black respectively, and the light quantity is automatically adjusted for each color.

### 7.4 Process Control

For a stable printing, the parameters related to the image forming must be corrected as necessary. The control of entire printing process including parameter correction control is called "process control".

Mainly, the following two controls are made:

- Potential control
- Toner density control

To supplement these two controls, the following controls are provided:

- High area coverage mode
- Admix mode
- Holder ASSY CTD LED light quantity setting

### 7.4.1 Potential control

To attain stable printing image density, the drum charging voltage and the developing DC voltage are adjusted according to the developing capability of each color carrier that varies momentarily. The adjusted drum charging voltage and the developing DC voltage are fed back to keep the printing image density constant.

The potential control is made immediately before the start of printing, if either of the following conditions is satisfied:

- At the first printing after the power on
- When cumulative print count after the power on exceeds 16
- When a cleaning cycle is executed during continuous printing

The outline of control is as follows.

- 1) The sensor HUM TEMP (temperature and humidity sensor) detects the temperature and humidity, and sets target values of drum charging voltage and developing DC voltage.
- 2) The patches of respective colors (yellow, magenta, cyan, and black) for the potential control are generated and transferred on the transfer roll cartridge. (For the shape of patches, see the following figure.)

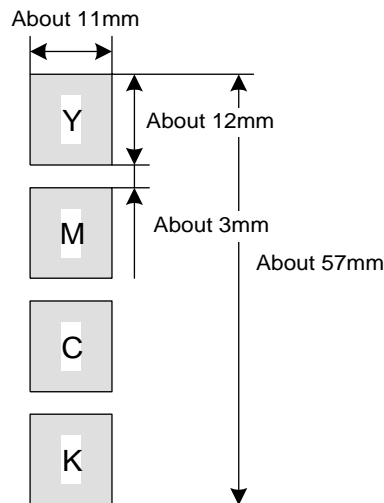


Fig.3-45

- 3) The holder ASSY CTD (density sensor) detects the density of the area on transfer roll cartridge where no toner is present and the density of patches.
- 4) The density measured in step 3) is compared with target value set in step 1) to change the drum charging voltage and the developing DC voltage for each color according to a difference.

## 7.4.2 Toner density control

The toner density must be kept constant to attain stable printing image. To keep the toner density constant, the toner should be dispensed exactly by the quantity consumed for the printing. This system is the PCDC. However, the system with only the PCDC generates a difference from target toner density, thus requiring the system to correct this error. This is the toner density control by the holder ASSY CTD. These two control systems are altogether called the toner density control.

### 1) PCDC (Pixel count dispense control)

The toner quantity consumed in the developing process is calculated by counting the video signals entered to the scanner ASSY. The video signal counting is made by the charging and discharging of the capacitor in the CR circuit arranged in parallel to the video signal line. The consumed toner quantity is calculated by the toner dispense time. The Toner Motor in the holder toner cartridge ASSY is driven by the amount of calculated toner dispense time to supply the toner into the developer.

### 2) ADC (Auto density control)

The patches of respective colors (yellow, magenta, cyan, and black) for the toner density control are generated under specified potential condition, and transferred on the transfer roll cartridge. The holder ASSY CTD measures this density. The measured value is compared with reference value, and if the toner density is low, the toner dispense quantity is increased at the next printing, or if the toner density is high, the toner dispense quantity is reduced at the next printing. The toner dispense quantity is calculated by the toner dispense time. This calculation is made for each color.

ADC is made after the completion of printing, if either of the following conditions is satisfied:

- When cumulative print count after the power on exceeds 16
- When a cleaning cycle is executed during continuous printing

### 3) Example of toner dispensation

The toner motor revolves for the duration of the specified time per 1-time dispensation. The toner dispense time in 1) and 2) above is calculated with the number of revolutions of toner motor. In the following description, this is called the dispense count.

The dispense count calculated by the ADC is cancelled in the subsequent 8 prints.

If 16 dispense counts were calculated as a lack of toner by the ADC, the toner is dispensed additionally to the dispense count calculated by the PCDC by 2 counts ( $16(8=2)$ ) in the subsequent 8 prints.

Or, if 16 dispense counts were calculated as an excess of toner by the ADC, the toner is dispensed by subtracting from the dispense count calculated by the PCDC in the subsequent 8 prints. If the excess amount cannot be subtracted in 8 prints, the remainder is subtracted in 9 and subsequent prints.

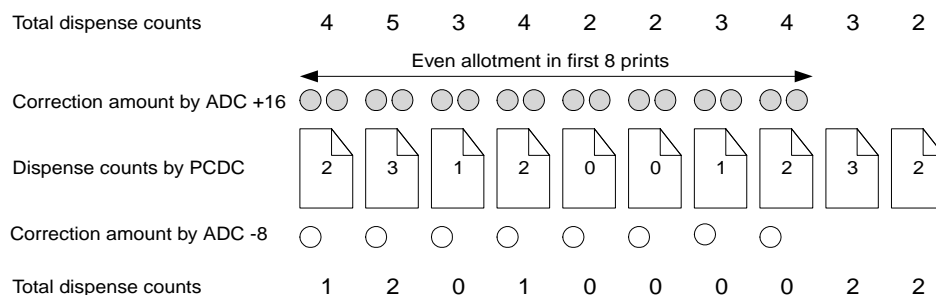


Fig.3-46

#### **7.4.3 High area coverage mode**

A continuous printing of the image of area coverage exceeding the toner dispense capability causes the toner density in the developer to be lowered.

The high area coverage mode extends the next page feed and dispenses the toner during this time, if the toner dispense time reached the specified value during a continuous printing.

#### **7.4.4 Admix mode**

Even the high area coverage mode may not be able to cope with the reduction of toner density in the developer. Also, if the machine used in high humidity environment is relocated to the place in low humidity environment, the reference value of toner density is different in respective environments, thus causing large discrepancy between measured value by holder ASSY CTD and reference value of toner density.

The admix mode dispenses the toner immediately to prevent the reduction of toner density, if the patch density result measured by the holder ASSY CTD is far lower than the reference value when the patches for toner density control are generated.

#### **7.4.5 LED light quantity control of holder ASSY CTD**

The holder ASSY CTD is a reflection type density sensor that radiates the light to an objective from the LED in the sensor and detects the reflected light from the objective to output electric signal according to the light quantity. For exact density measurement, the sensor output value (reflected light quantity) must be the specified value when no toner is put on the transfer roll cartridge as an objective. The reflected light quantity varies depending on the transfer roll cartridge surface condition or dirty condition of holder ASSY CTD surface. The light quantity emitted from the LED is controlled so that the reflected light quantity satisfies the specified value.

This control is made in two ways; one to set the light quantity so that the reflected light quantity satisfies the specified value, and one to adjust the subsequent light quantity to be within the tolerance.

##### **1) Light quantity setting**

The reflected light quantity may vary largely, if the transfer roll cartridge unit ASSY was replaced or the holder ASSY CTD was cleaned. Assuming this fact, the light quantity is set when the power is turned on, or the front cover is opened and closed.

The light quantity of LED is increased gradually, and the set value is fixed when the output of holder ASSY CTD exceeds the specified value. At this time, if the output of holder ASSY CTD does not reach the specified value even though the light quantity is increased to the upper limit, the controller judges the sensor as dirty. Also, the controller judges the sensor as faulty in the event of extremely high output.

##### **2) Light quantity adjustment**

At the execution of ADC, the light quantity adjustment is made immediately before the patches for toner density control are generated.

The light is emitted from the LED with current setting of light quantity to check if the output value of the holder ASSY CTD is within the specified range. If the output value is low, the light quantity is increased by the specified amount at the next ADC, or if high, the light quantity is reduced at the next ADC.

At this time, if the output value is less than the first lower limit, the controller judges the sensor as dirty and outputs the warning. Further, if less than the second lower limit, the controller judges the sensor as faulty and stops the printing.

## 7.5 Color Registration Control

The printer uses a tandem system where the drums and developers exclusively for yellow, magenta, cyan, and black are arranged respectively. The images are formed on the drums of respective colors cyan, and black are arranged respectively. The images are formed on the drums of respective colors registration control calculates how much the registration is shifted, and adjusts the scanner write timing.

The color registration control is made from a change in inside temperature and the print count at the execution of the process control.

The control is outlined below:

- 1) With no toner put on the transfer roll cartridge, the output value of holder ASSY CTD is measured to determine the threshold value.
- 2) The patches for color registration control are generated on the transfer roll cartridge. These patches are composed of 10mm lines of K, C, K, M, K, and Y in this order by the amount of four dispense counts, led by a black trigger.

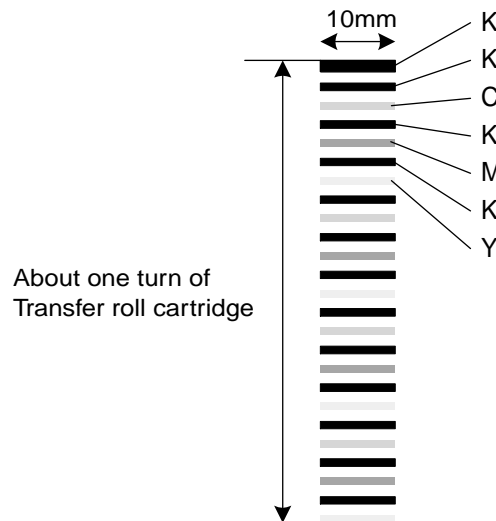


Fig.3-47

- 3) The density of patches generated by the holder ASSY CTD is read.
- 4) The adjusting amount of registration shift is calculated from the threshold value determined in 1) and the patch density measured in 3).
- 5) The scanner write timing is changed from the adjusting amount of registration shift.

## **7.6 Transfer Roll Cartridge Unit ASSY Control**

### **7.6.1 Detecting the installation of transfer roll cartridge unit ASSY**

Whether the transfer roll cartridge unit ASSY is installed is detected when the power is turned on, or the front cover is opened and closed. The sensor for detecting the installation is not provided, but judgment is made from the output of the holder ASSY CTD.

The light is emitted from the LED of holder ASSY CTD with the specified light quantity, and if the output of the holder ASSY CTD is larger than the specified value, the controller judges as installation. If the operation stops by a jam, the toner image could be put on the transfer roll cartridge and in such a case, the sensor output is reduced, causing the controller to judge as uninstallation. To prevent this wrong detection, the transfer roll cartridge is rotated by a half turn if the output is less than the specified value. Then, when the output of the holder ASSY CTD is larger than the specified value, the controller judges as installation, or if less than the specified value, the controller judges as uninstallation.

### **7.6.2 Detecting the life of transfer roll cartridge unit ASSY**

The transfer roll cartridge unit ASSY consists of a transfer roll cartridge and a waste toner recovery system. The life of the transfer roll cartridge unit ASSY is detected when the toner recovery space has become full.

The full toner recovery space is detected by the sensor TNR full.

- 1) Check timing of full waste toner recovery space
  - When the power is turned on, or the front cover is opened and closed
  - When paper is outputted
- 2) Output of " Transfer Roll Cartridge Life Warning"  
The " Transfer Roll Cartridge Life Warning" is outputted when the sensor TNR full detects the full toner recovery space.
- 3) Output of " Transfer Roll Cartridge Life Error"  
After the output of " Transfer Roll Cartridge Life Warning", the print count and the toner dispense time are counted up, and if total counts exceed the specified value, the " Transfer Roll Cartridge Life Error" is outputted.
- 4) Reset of " Transfer Roll Cartridge Life Warning"/" Transfer Roll Cartridge Life Error"  
The " Transfer Roll Cartridge Life Warning" and " Transfer Roll Cartridge Life Error" are reset, if the sensor TNR full does not detect the full toner recovery space when the power is turned on, or the front cover is opened and closed.

## 7.7 Toner Control

Whether the toner bottle is installed is detected by the switch toner cartridge ASSY, and the presence of toner in the toner bottle is detected by the sensor toner low. These switches and sensors are provided for respective colors, and detection is made for each color.

### 7.7.1 Sensor toner low

The sensor toner low is provided for each color, but the printer cannot detect all colors at a time, but detects one color each. It detects one color per 3.5 seconds, thus requiring 14 seconds for detecting four colors. Accordingly, the presence of toner is detected once per 14 seconds for each color.

The sensor toner low is attached to the holder toner cartridge ASSY, and it detects the presence of toner dispensed by the toner motor from the toner bottle into the holder toner cartridge ASSY.

Also, the sensor toner low could make a wrong detection if the toner sticks to the sensor surface. To prevent this, the film attached in the vicinity of the auger in the holder toner cartridge ASSY cleans the sensor surface when the toner is dispensed. This film rotates together with the auger at the toner dispensation to scrape the toner off the sensor toner low surface. However, the sensor may detect the toner even if the toner is not present or may not detect the toner even if the toner is present, depending on the film position when the toner motor stopped. This is avoided by the printer internal control.

### 7.7.2 Toner presence control

The control is outlined below.

- 1) Check timing
  - When the power is turned on, or the front cover is opened and closed
  - Every 14 seconds
- 2) Output of "Toner Empty Warning"

The "Toner Empty Warning" is outputted, if the sensor toner low detects toner empty two or more times continuously and also the toner is dispensed during the time of 2-time detection. This is taken place to prevent a wrong detection depending on the film position as described in "7.7.1 Sensor toner low".
- 3) Output of "Toner Empty Error"

After the output of "Toner Empty Warning", the toner dispense time is counted up, and if it exceeds the specified value, the "Toner Empty Error" is outputted.
- 4) Reset of "Toner Empty Warning"/"Toner Empty Error"

After the output of "Toner Empty Error", the toner is dispensed for 1.5 seconds when the toner bottle installation is detected. At the subsequent toner presence control timing, if the sensor toner low detects the toner presence, the "Toner Empty Warning" and "Toner Empty Error" are reset.

However, in such a case, the controller regards this status as "toner empty". When the toner is dispensed and the sensor toner low detects the toner presence three or more times continuously, the controller regards this status as "toner presence".

## **7.8 Fuser Control**

### **7.8.1 Fuser temperature control**

As for the fuser temperature control, the target temperature is set, then the heat roll surface temperature is controlled so as to be the target temperature by turning on/off the heater lamp.

The heat roll surface temperature is detected by the temp sensor. The temp sensor detects the temperature and the resistance value for disconnection sensing alternately at 40ms cycles. That is, the temperature is detected at 80ms cycles, and if the detection result is higher than target value, the heater lamp is turned off, or if lower, the heater lamp is turned on.

For the target temperature, different temperature is set respectively at the time of standby, printing, and process control. Also, target temperature is changed according to the inside temperature detected with the sensor HUM TEMP, print count, print mode, and input power supply voltage.

### **7.8.2 Cool down**

As the printing continues, the temperature distribution of the heat roll becomes uneven between paper path and non-paper path. To make the heat roll temperature as even as possible, the waiting time is provided, during which the heater lamp is not turned on. This is called the cool down.

The cool down is executed for the duration of certain time according to the number of sheets continuously printed, when the set printing with certain type and size of paper completed.

Also, when the paper type or size was changed, the cool down is inserted even in the midway of several hundred sheets of printing.

As a simple cool down, the PPM down is provided. This function idles the fuser without feeding the sheets during the printing to improve uneven temperature distribution of the heat roll.

In printing certain type/size of paper continuously, the page interval is increased from the specified print counts and the prints per minute are reduced, and thus it is called PPM down.

The PPM execution timing is determined depending on the paper size and type.



# **CHAPTER IV**

## **ASSEMBLY / DISASSEMBLY**

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## CHAPTER IV ASSEMBLY / DISASSEMBLY

### 1. BEFORE STARTING DISASSEMBLY

#### 1.1 Precautions

*Note:*

*Parts are controlled as spare parts. When servicing for parts for which no procedures are described, observe their assembling condition before starting the service.*

*Note:*

*For optional parts, refer to the manual for them.*

*Note:*

*Though the optional parts are assumed to be removed, they may not be removed if not required for the purpose of service operation.*



#### **WARNING**

*When performing service operation for parts around the fuser ASSY, start the service after the fuser ASSY and parts around it have cooled down.*



#### **WARNING**

*Do not use force to prevent damage to parts.*



#### **WARNING**

*Since a wide variety of screws are used, be careful not to mistake their positions, to prevent the screw holes.*



#### **WARNING**

*Wear a wrist band or the like as far as possible to remove static electricity of the human body.*

- ◆ Turn the power OFF and remove the power cord from the electric outlet.
- ◆ Remove the drum unit before starting the disassembling process.
- ◆ Remove the transfer unit as necessary, and perform disassembly process.
- ◆ Remove the fuser unit.
- ◆ Remove the toner cartridges.
- ◆ Remove the paper cassette from the printer.
- ◆ Remove the controller board from the printer.

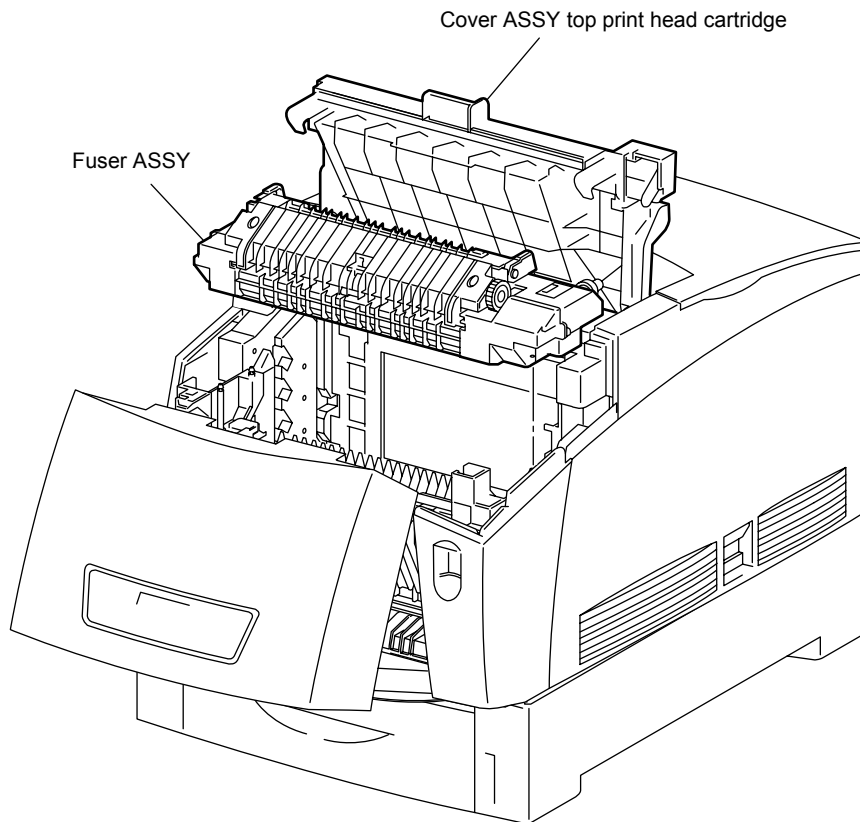
## 1.2 Fuser ASSY Removal



### **WARNING**

*Fuser is high temperature after operation. Be careful when working it not to get burning.*

- 1) Release latch B and open the chute ASSY out.
- 2) Open the cover ASSY top print head cartridge.
- 3) Release the 2 catches on top of the fuser ASSY.
- 4) Remove the fuser ASSY from the printer.



**Fig.4-1**

### 1.3 Transfer ASSY Removal

- 1) Release latch A and open the front ASSY in.
- 2) Holding the right and left knobs securing the transfer roll cartridge unit ASSY to the front ASSY in, unlock and rotate the transfer roll cartridge unit ASSY rearwards.
- 3) Extract the transfer roll cartridge unit ASSY forwards from the front ASSY in and remove.

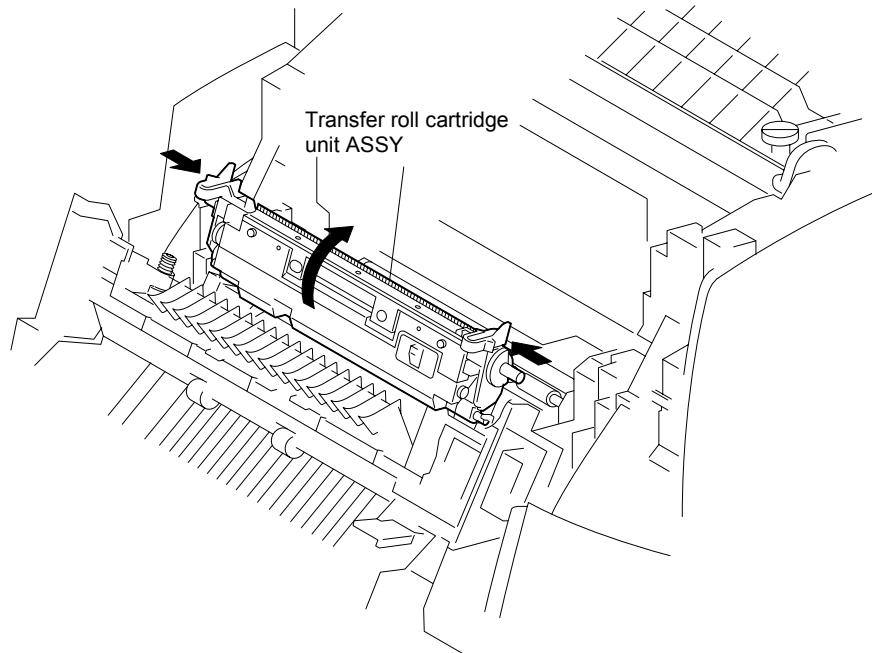


Fig.4-2

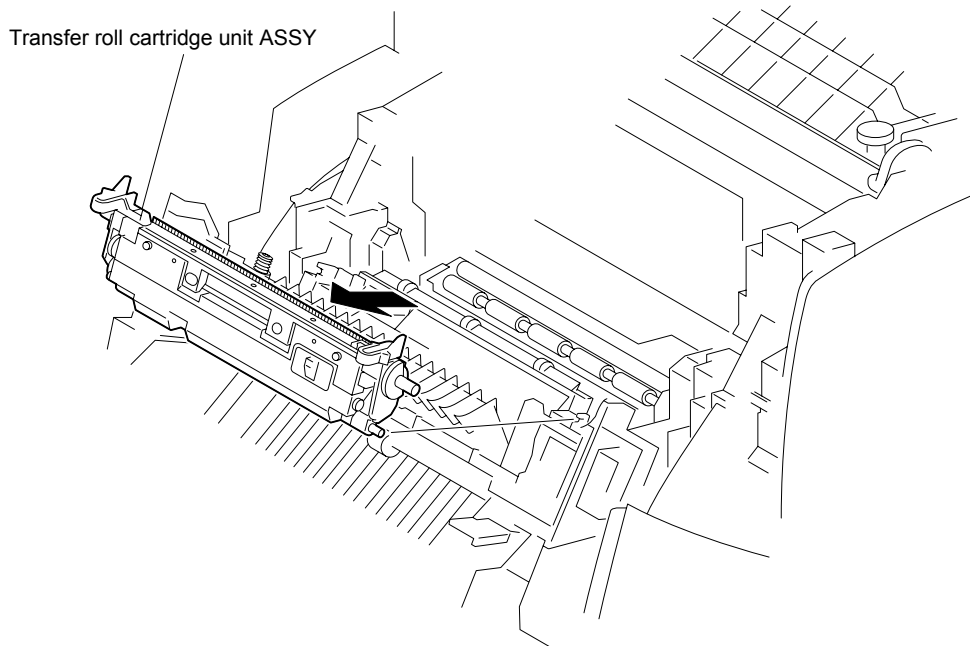


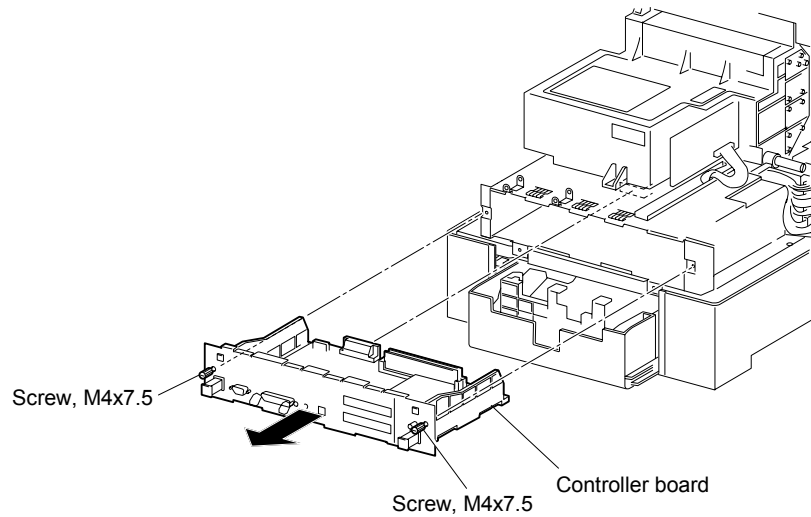
Fig.4-3

## 1.4 Controller Board Removal

- 1) Remove the cover cassette rear.
- 2) From the rear side of the printer, loosen the screws that secure the controller board.
- 3) Holding the left and right knobs on the controller board, pull out the controller board of the printer.

*Note:*

*In replacing the controller board on the printer, connect the connector at the leading end of controller board to the connector of the PKG SERVICE MCU HANABI .*



**Fig.4-4**

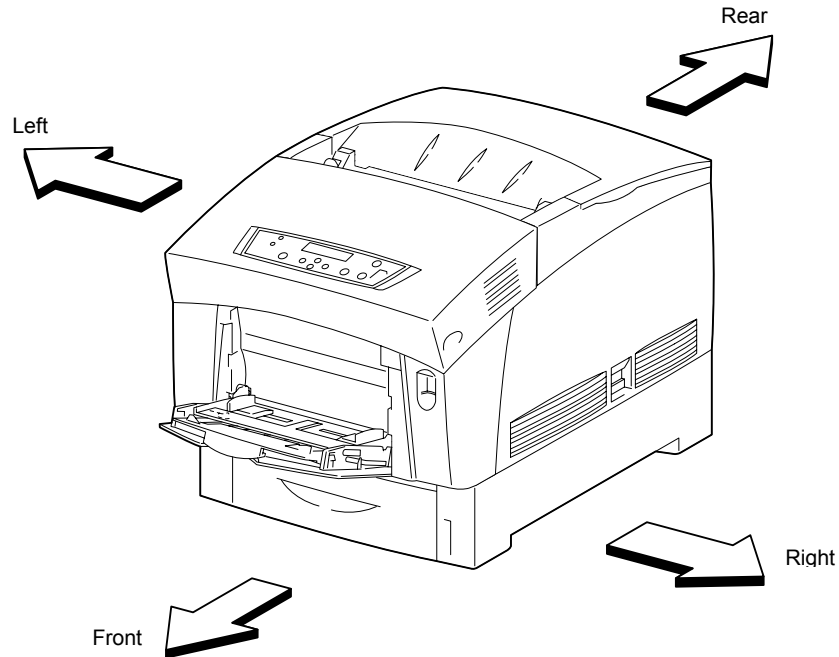


## 1.5 Description of Procedures

*Note:*

*In the procedures, directions are represented as follows.*

- *Front: Front when you are facing the front of this laser printer.*
- *Rear: Inner direction when you are facing the front of this laser printer.*
- *Left: Left hand when you are facing the front of this laser printer.*
- *Right: Right hand when you are facing the front of this laser printer.*



**Fig.4-5**

*Note:*

*The screws in the illustrations should be removed using a cross head screwdriver unless otherwise specified.*

*Note:*

*A black arrow in the illustrations indicate movement in the direction of the arrow. Numbered black arrows indicate the order of the movement.*

*Note:*

*For the positions of the connectors (P/J), refer to Chapter 7, Plug/Jack(P/J) Connector Locations.*

*Note:*

*Assembly is the harness of disassembly unless otherwise stated.*

## 2. DISASSEMBLY PROCEDURE

### 2.1 Cover of the Printer

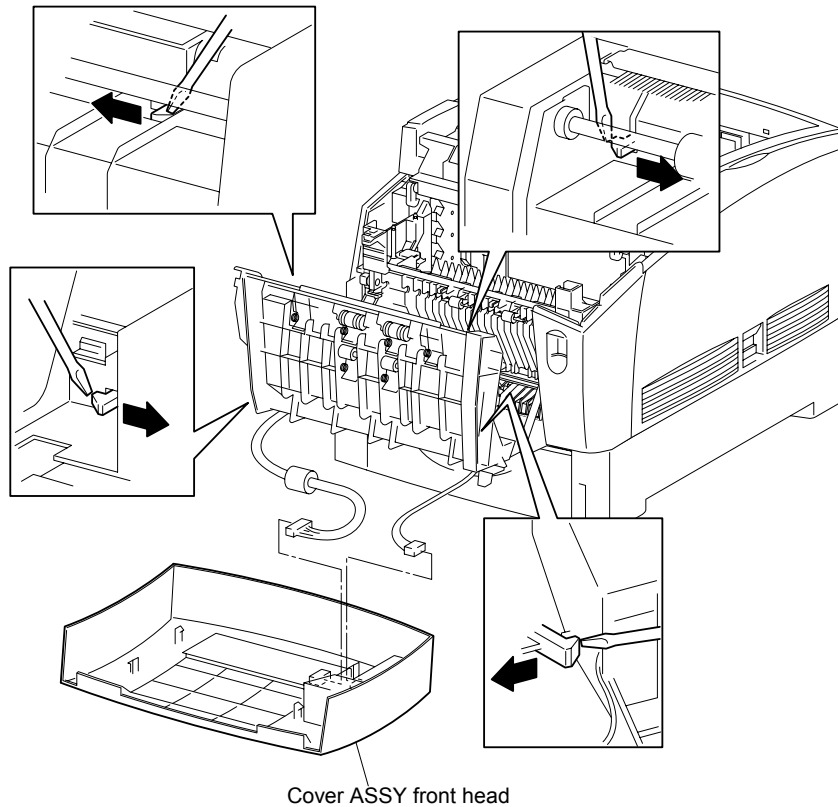
#### 2.1.1 Cover ASSY front head

- 1) Release latch B of the printer and open the front cover.

*Note:*

*Do not separate the front cover and cover ASSY front head too far in the following process.*

- 2) Release the 4 hooks securing the cover ASSY front head to the front cover.
- 3) Separate the cover ASSY front head a little from the front cover.
- 4) Remove the connector from the console panel.
- 5) Remove the connector from the fan assembly.
- 6) Remove the cover ASSY front head from the front cover.



**Fig.4-6**

### 2.1.2 Console panel

- 1) Release the 3 hooks securing the console panel to the cover ASSY front head.
- 2) Remove the console panel from the cover ASSY front head.

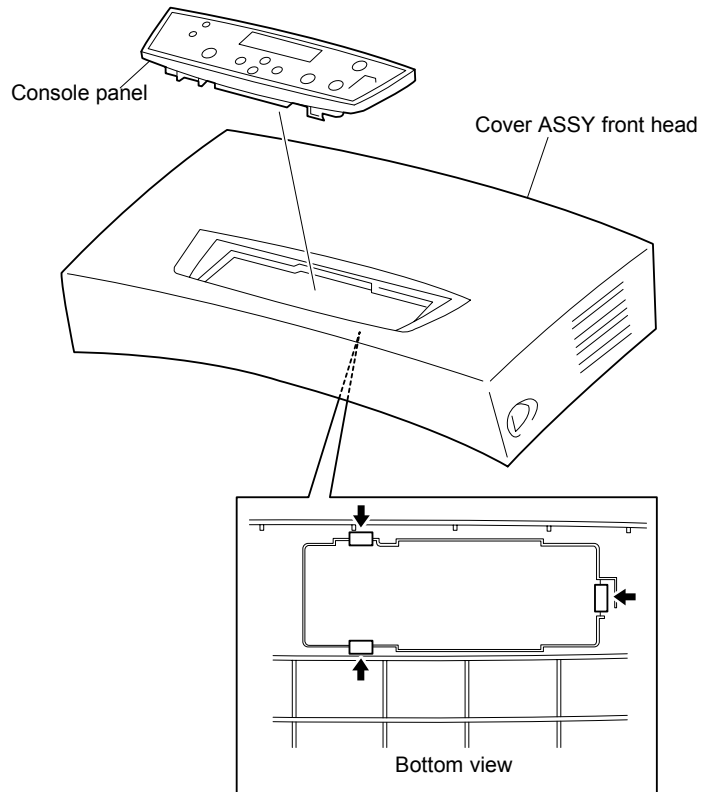


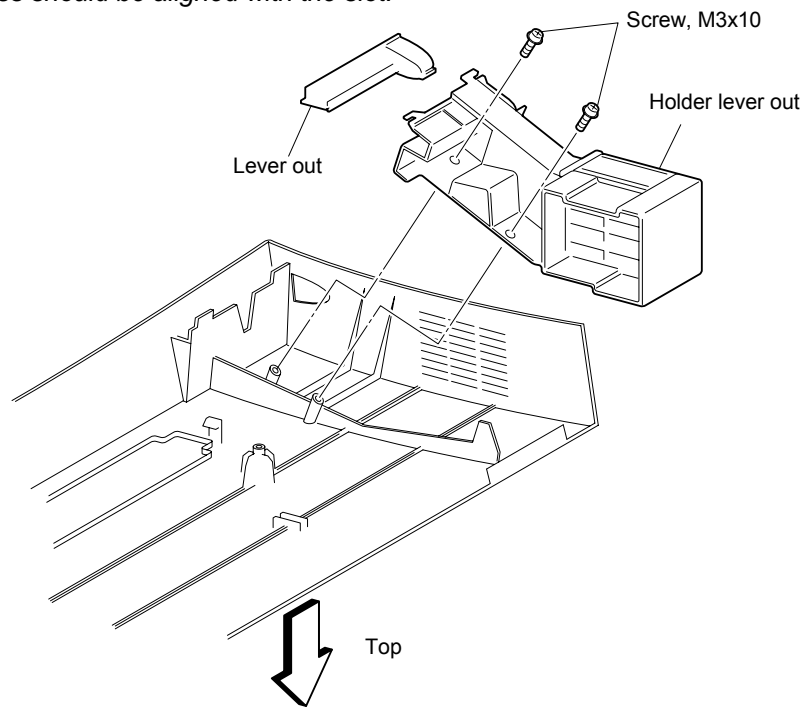
Fig.4-7

### 2.1.3 Fan fuser

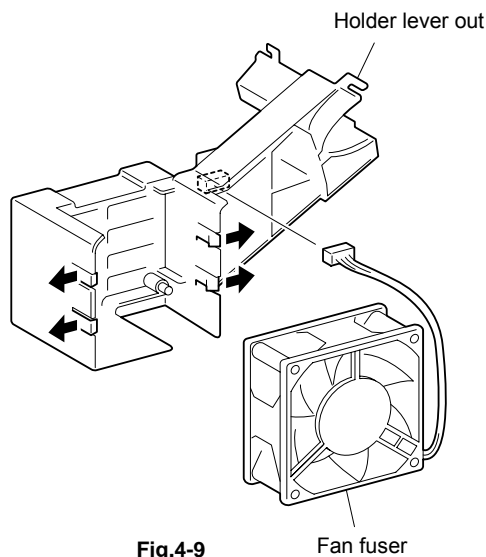
- 1) Remove 2 screws securing the holder lever out from the rear of the cover ASSY front head.
- 2) Remove the fan assembly from the cover ASSY front head.
- 3) Remove the lever out from the holder lever out.
- 4) Disconnect of the fan fuser.
- 5) Release the 4 hooks securing the fan fuser the holder lever out.
- 6) Remove the fan fuser from the holder lever out.

*Note:*

*When replacing the fan fuser into the holder lever out, the fan level should be face out and the harness should be aligned with the slot.*



**Fig.4-8**



**Fig.4-9**

#### 2.1.4 Cover MSI

- 1) Close the front cover.
- 2) Open the cover MSI.
- 3) While pulling the left hand side of the cover MSI, release the boss of the tray ASSY base from the slot in the cover MSI.
- 4) Repeat for the right hand side.
- 5) Lower the front of the cover MSI until the cover MSI releases from the printer.

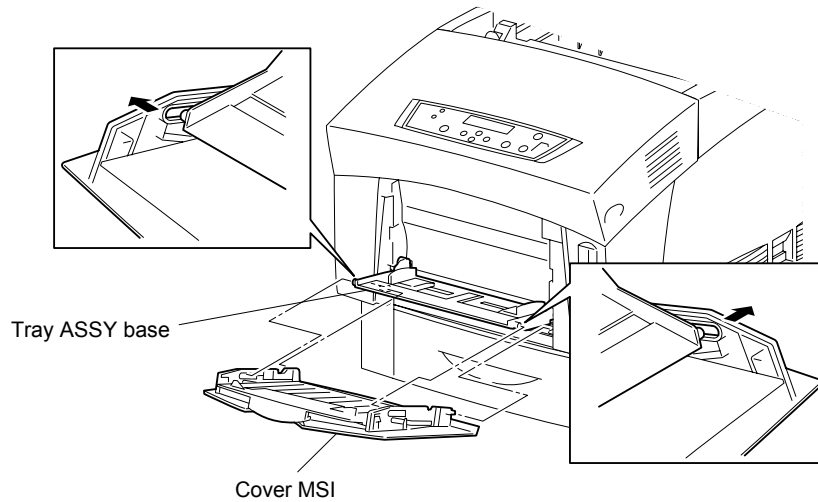


Fig.4-10

#### 2.1.5 Tray ASSY base

- 1) Check that the plate ASSY bottom MSI is shifted down.
- 2) Remove the tray ASSY base, by pushing inward, lifting it upwards, and pull it out forwards.

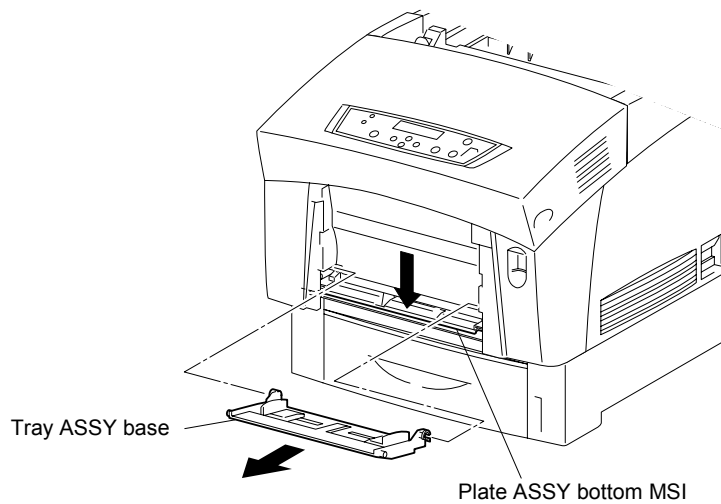


Fig.4-11

### 2.1.6 Cover ASSY front L

- 1) Release latch B and open the chute ASSY out.
- 2) Remove the top of the link: L from the leaf spring at the back of the cover ASSY front L.
- 3) Remove 2 screws securing the cover ASSY front L to the chute ASSY out.
- 4) Release the 2 hooks securing the cover ASSY front L to the chute ASSY out.
- 5) Remove the cover ASSY front L from the chute ASSY out.

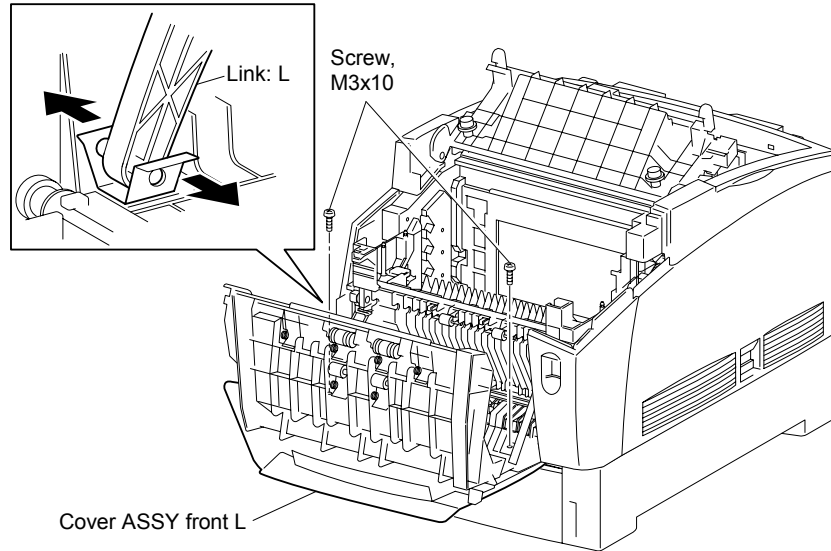


Fig.4-12

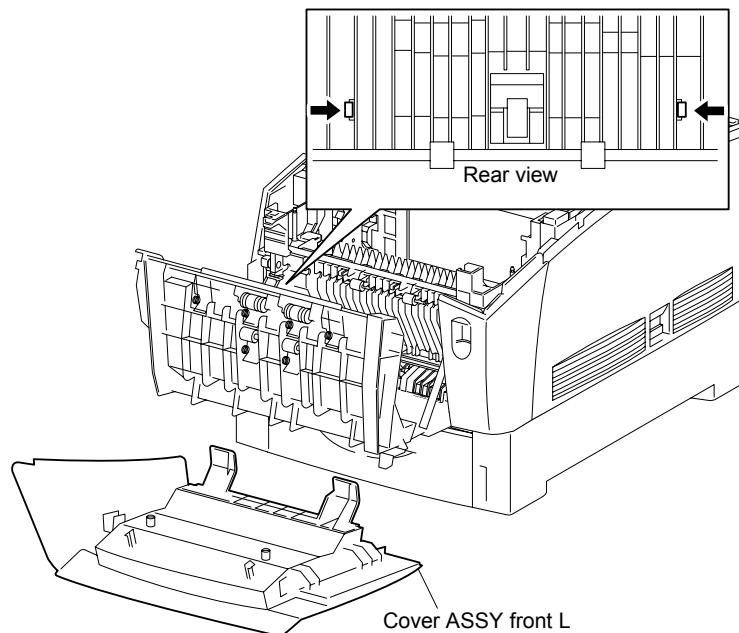


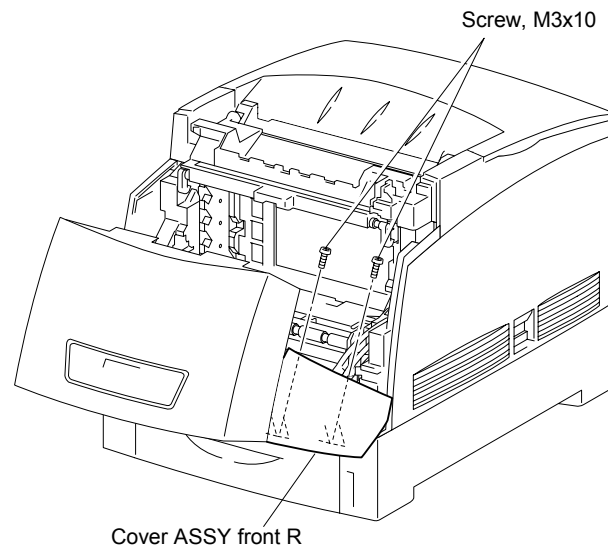
Fig.4-13

## 2.1.7 Cover ASSY front R

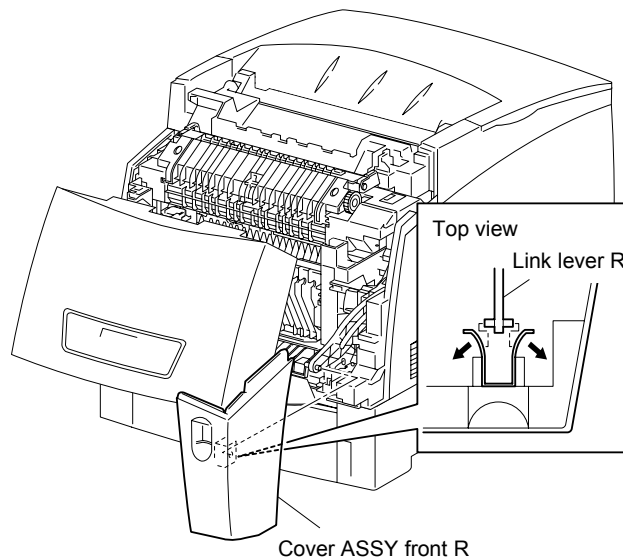
*Note:*

*In the following process, do not separate the cover ASSY front R and link: R too far.*

- 1) Release latch A and open the front ASSY in together with the chute ASSY out.
- 2) Remove 2 screws securing the cover ASSY front R to the front ASSY in.
- 3) Pull out the cover ASSY front R slightly from the front ASSY in.
- 4) Remove the top link: R from the leaf spring at the back of the cover ASSY front R and remove the cover ASSY front R.



**Fig.4-14**



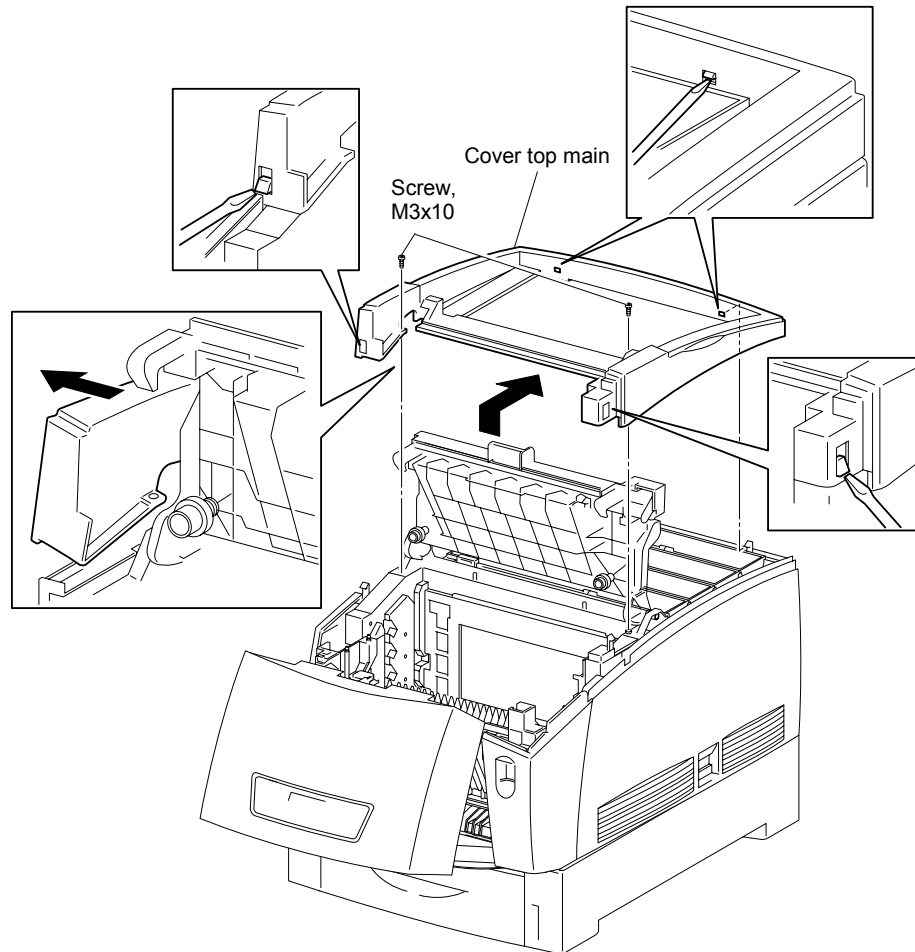
**Fig.4-15**

## 2.1.8 Cover top main

*Note:*

*Before removing the cover top main, remove the toner cartridges.*

- 1) Open the cover ASSY top print head cartridge.
- 2) Remove 2 screws securing the cover top main to the printer.
- 3) Release the 4 hooks securing the cover top main to the printer.
- 4) Raise the cover top main slightly from the printer and extract the left front edge of the cover top main deflecting it leftward.
- 5) Remove the cover top main from the printer.



**Fig.4-16**



### 2.1.9 Cover side L

- 1) Remove 1 screw securing the rear of cover side L to the printer.
- 2) Release the hook securing the cover side L at the front edge of the printer.
- 3) Remove the cover side L from the printer.

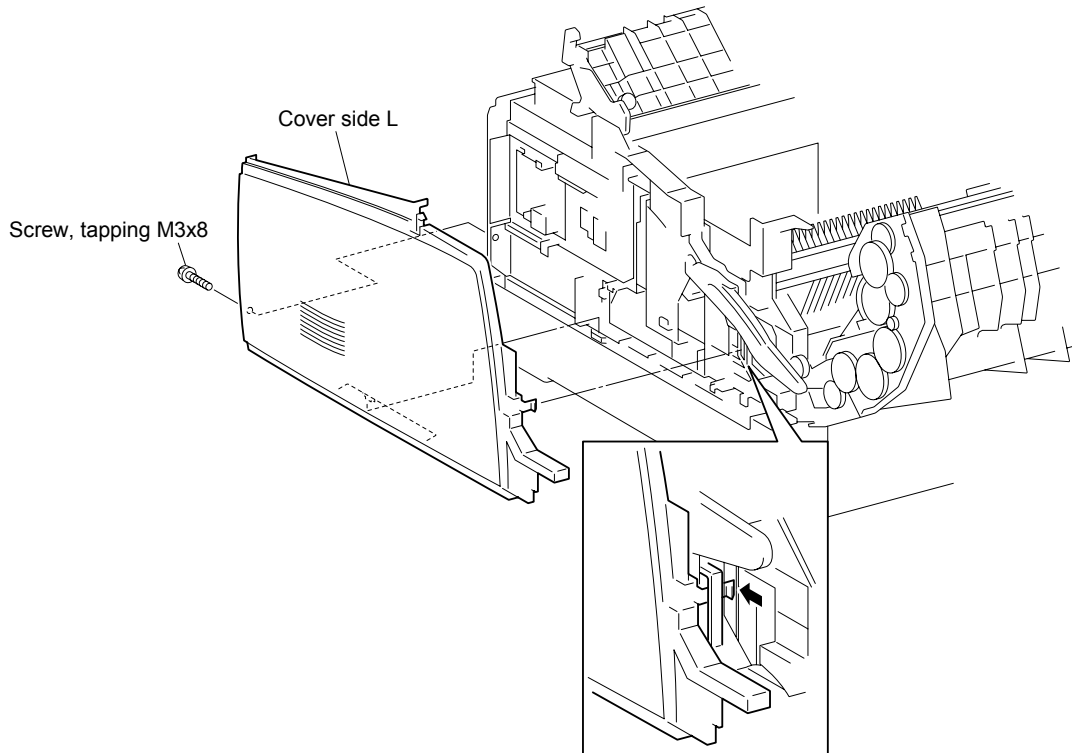


Fig.4-17

### 2.1.10 Cover ASSY top print head cartridge

- 1) Open the cover ASSY top print head cartridge.
- 2) Extract the right and left stud top securing the cover ASSY top print head cartridge to the printer.
- 3) Remove the cover ASSY top print head cartridge from the printer.

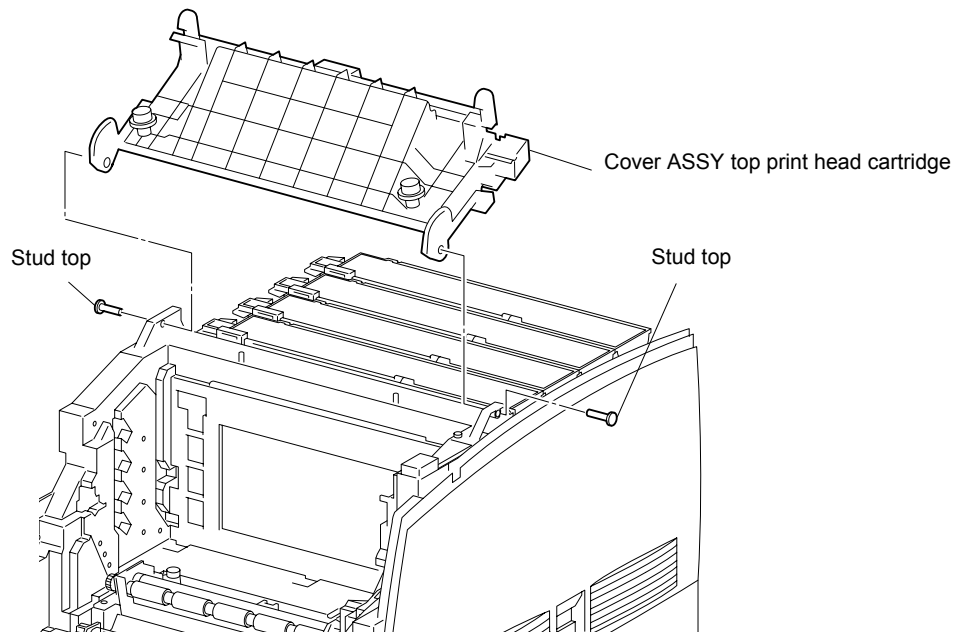


Fig.4-18

### 2.1.11 Cover side R

- 1) Remove 1 screw securing the rear of cover side R to the printer.
- 2) Release the hook securing the cover side R at the front of the printer.
- 3) Remove the cover side R from the printer.

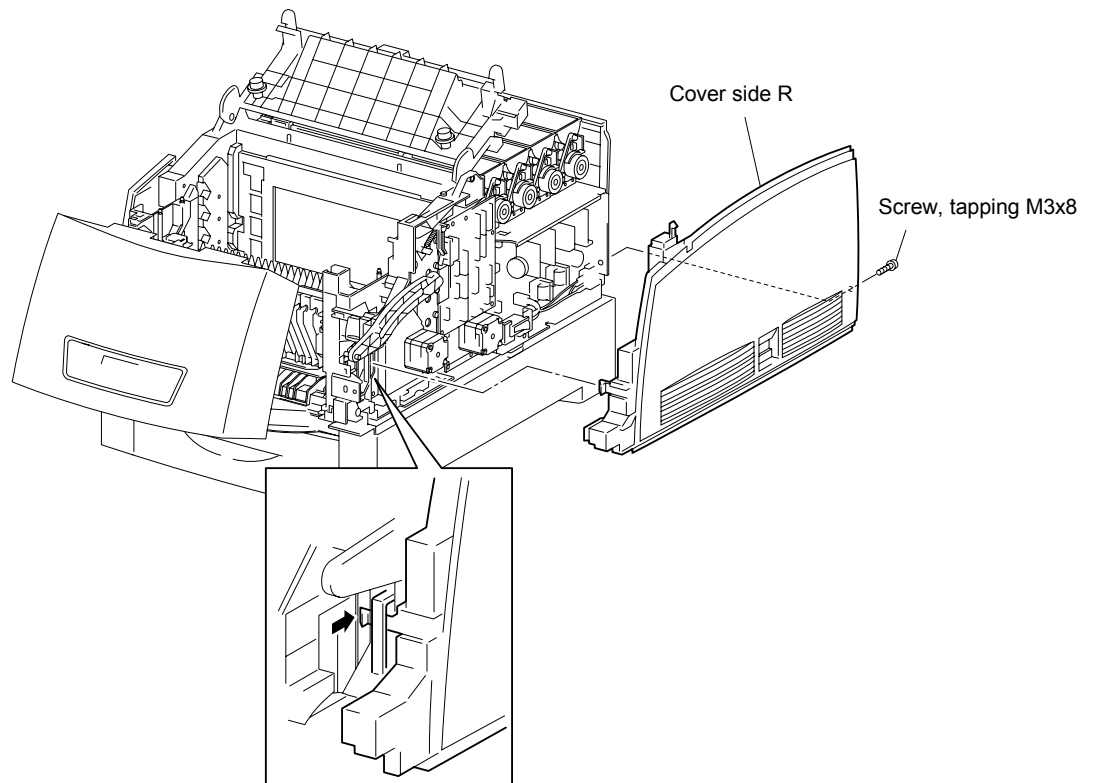


Fig.4-19

### 2.1.12 Cover rear

- 1) Lift the cover rear slightly, put it backwards and remove.

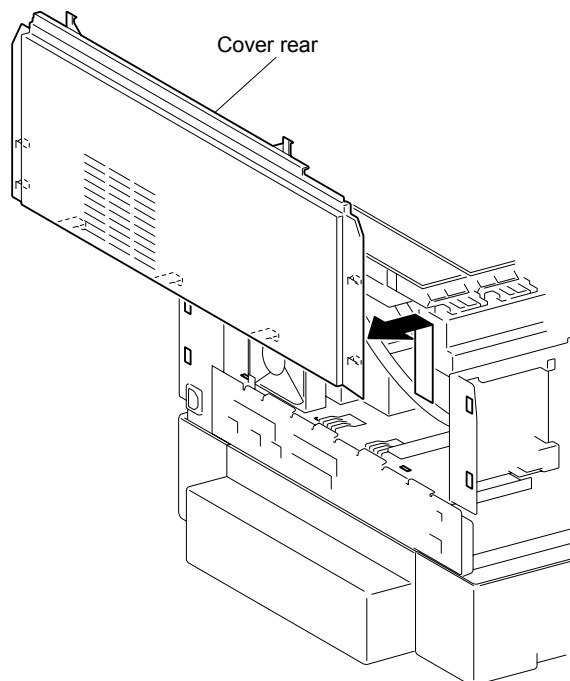


Fig.4-20

### 2.1.13 Link: L

- 1) Remove the top of spring link: L from the projection on the left side of the printer.
- 2) Slide the link: L rearward and align the shaft of the printer and hole of the link: L.
- 3) Remove the link: L from the printer together with the spring link: L.
- 4) Remove the spring link: L from the link: L.

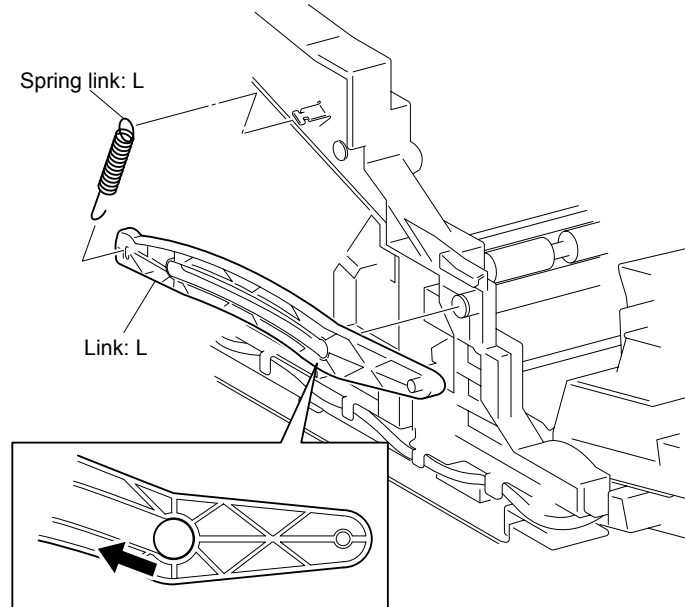


Fig.4-21

### 2.1.14 Link: R

- 1) Remove the top of spring link: R from the projection on the right side of the printer.
- 2) Slide the link: R rearward from the printer and align the shaft of the printer and the hole of the link: R.
- 3) Remove the link: R from the printer together with the spring link: R.
- 4) Remove the spring link: R from the link: R.

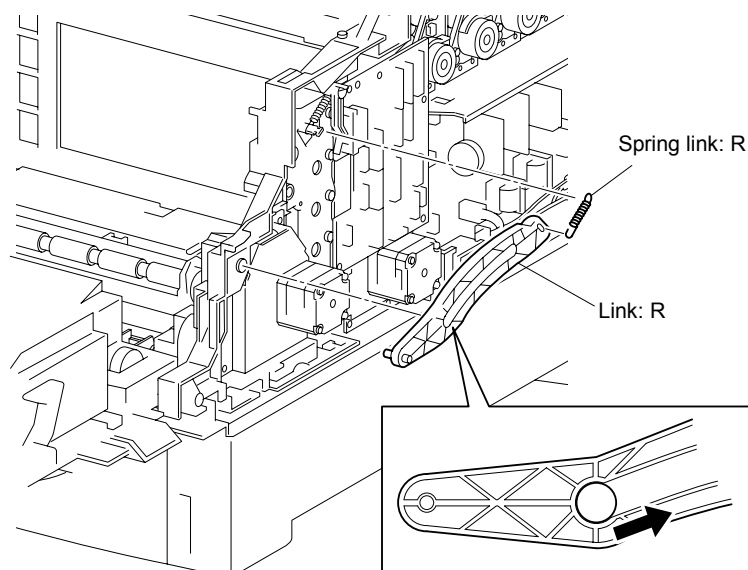


Fig.4-22

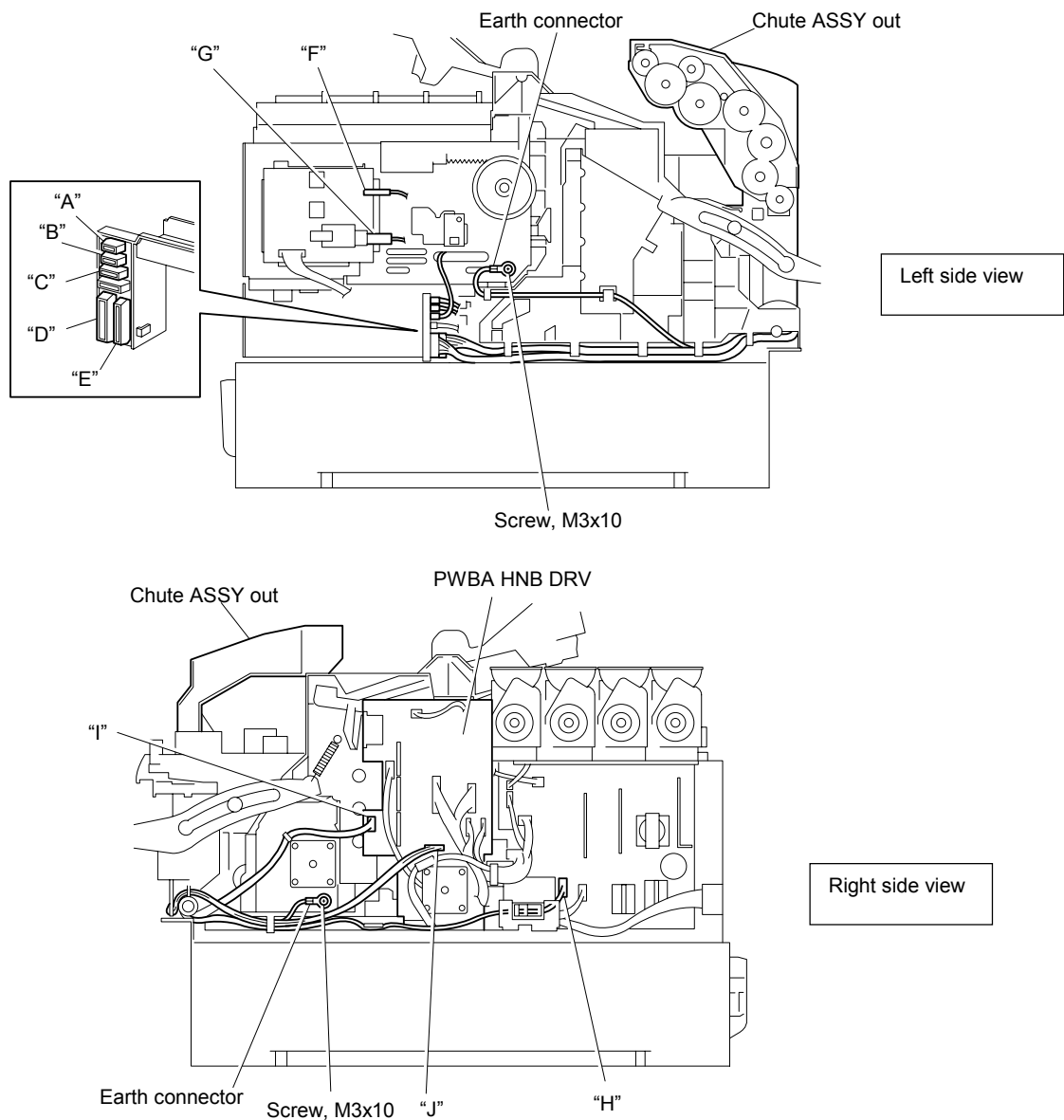
## 2.2 Front of the Printer

### 2.2.1 Chute ASSY out

*Note:*

*In the following step, lock the chute ASSY out and front ASSY in to the printer with latches A and B.*

- 1) Remove 5 connectors (A-E) from left hand side of printer that connect to the chute ASSY out.
- 2) Remove 2 lower connectors (F, G) and 1 earth connector from left hand side of printer that connect to the chute ASSY out.
- 3) Remove 3 connectors (H-J) and 1 earth connector from the right hand side of the printer that connect to the chute ASSY out.
- 4) Carefully remove the cables from the cable quickly taking note of the cable routing.
- 5) Retake the paper feed roller to raise plate ASSY bottom MSI.



**Fig.4-23**

- 6) Remove the ring E on the right and left shaft pivot securing the bottom portion of the chute ASSY out and front ASSY in.



*In the following steps, take care not to hurt your hand with burrs of the plate ASSY bottom MSI.*

- 7) Pull out the left shaft pivot from the chute ASSY out inward with radio pliers.
- 8) Pull out the right shaft pivot from the chute ASSY out inward with radio pliers.
- 9) Release latch A and pull the chute ASSY out complete with front ASSY in forwards to remove them from the printer.
- 10) Remove the strap connecting chute ASSY out to front ASSY in.

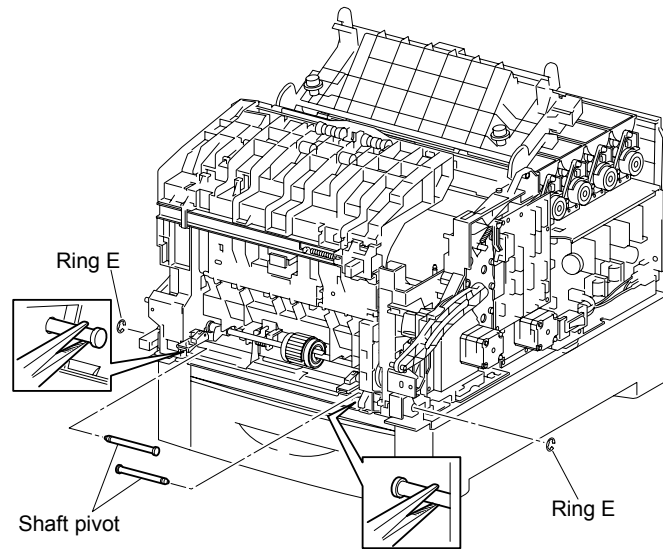


Fig.4-24

- 11) Release latch B to separate the front ASSY in from the chute ASSY out.

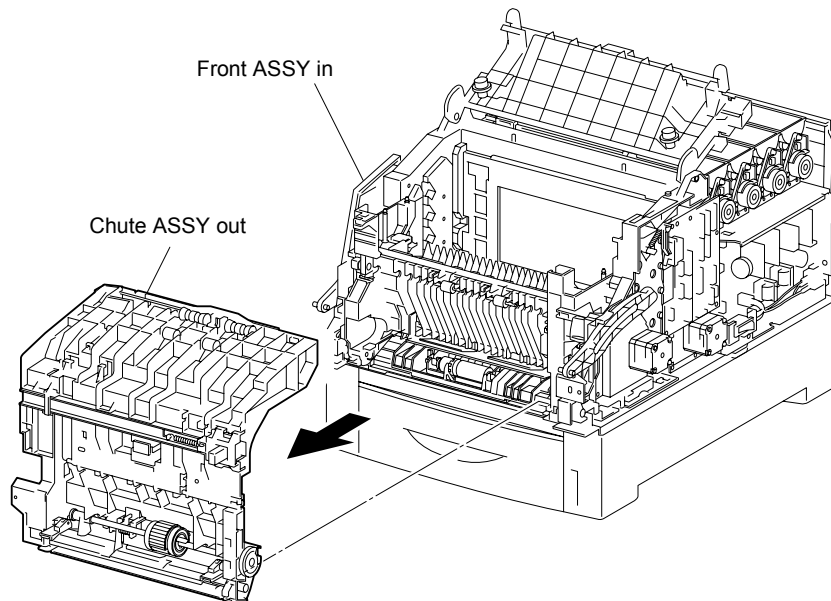


Fig.4-25

### 2.2.2 Actuator full

- 1) While pulling the center of the actuator full shaft upwards, pull the right hand end of the shaft forwards to clear the sensor and release the right end of the shaft.
- 2) Move the shaft to the right to release the left end of the shaft and remove it.

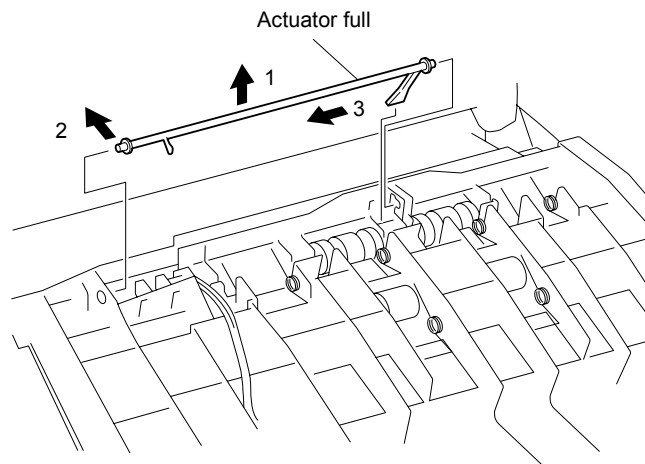


Fig.4-26

### 2.2.3 Sensor photo: full stack

- 1) Remove the connector on the sensor photo: full stack.
- 2) Release the 3 hooks securing the sensor photo: full stack to the chute ASSY out.
- 3) Remove the sensor photo: full stack from the chute ASSY out.

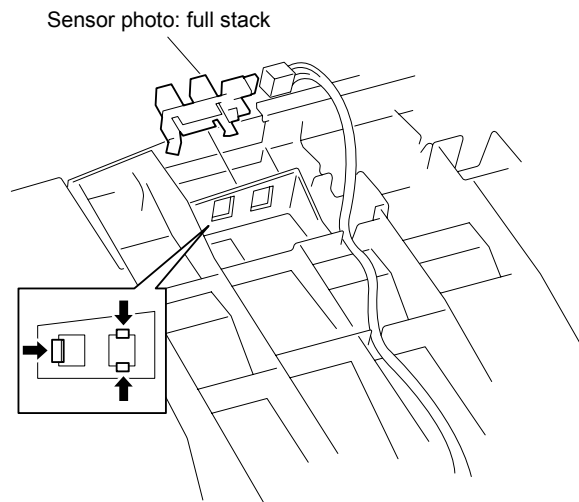


Fig.4-27

## 2.2.4 Actuator DUP

- 1) Release the 2 hooks securing the cover actuator to the chute ASSY out.
- 2) Remove the cover actuator from the chute ASSY out.
- 3) Pushing the front arm of the actuator DUP down, slide the actuator DUP to the right and extract the left side shaft of the actuator DUP from the left side bush.
- 4) Extract the actuator DUP from the chute ASSY out together with the spring SNR DUP.
- 5) Remove the spring SNR DUP from the actuator DUP.

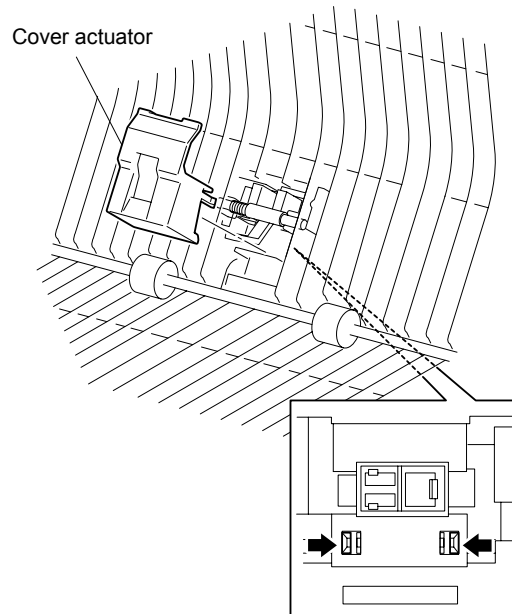


Fig.4-28

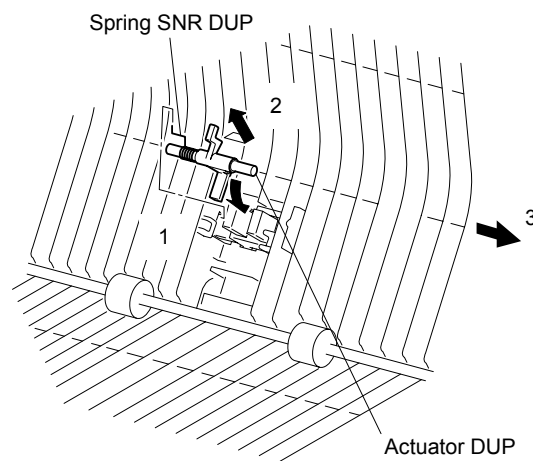


Fig.4-29

### 2.2.5 Sensor photo: DUP

- 1) Remove the sensor photo: DUP cable.
- 2) Release the 3 hooks securing the sensor photo: DUP to the chute ASSY out.
- 3) Remove the sensor photo: DUP from the chute ASSY out.

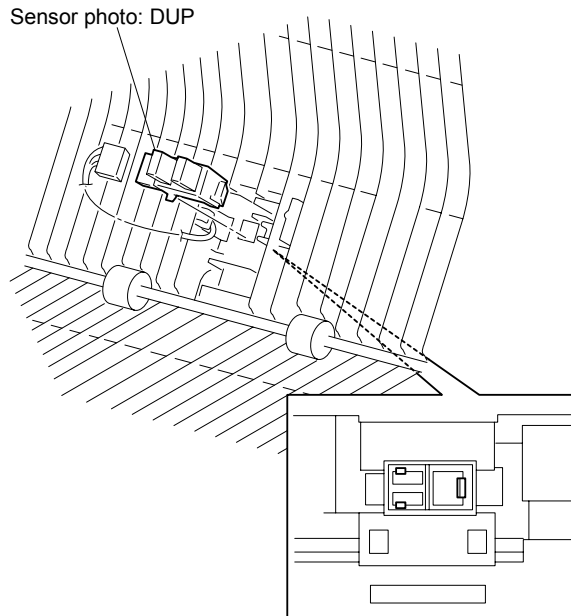


Fig.4-30

### 2.2.6 Actuator MSI

- 1) Pushing down the plate bottom MSI on the chute ASSY out push the actuator MSI inward.
- 2) Slide the actuator MSI leftward and remove the shaft from the right side of the actuator MSI.
- 3) Remove the actuator MSI together with the spring sensor MSI.
- 4) Remove the spring sensor MSI from the actuator MSI.

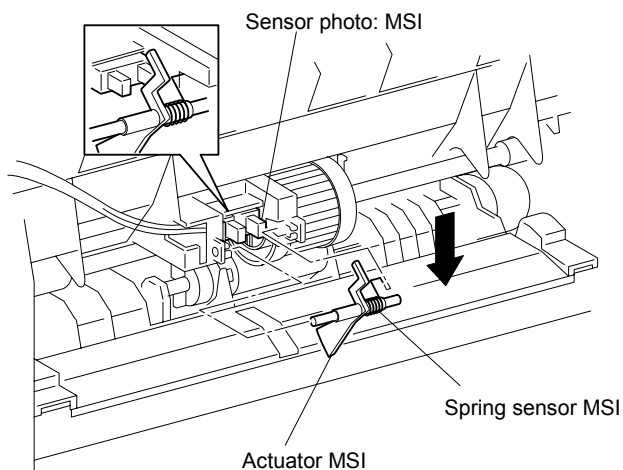


Fig.4-31



### 2.2.7 Sensor photo: MSI

- 1) Remove the connector on the sensor photo: MSI from the chute ASSY out.
- 2) Release the 3 hooks securing the sensor photo: MSI to the chute ASSY out.
- 3) Remove the sensor photo: MSI from the chute ASSY out.

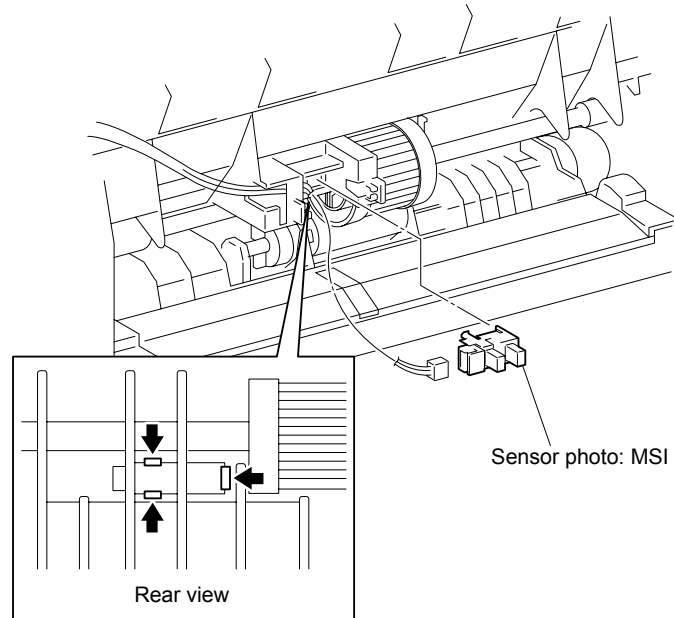


Fig.4-32

### 2.2.8 Bracket ASSY eliminator

- 1) Remove 1 screw securing the bracket ASSY eliminator to the chute ASSY out.
- 2) Raising the left end of the bracket ASSY eliminator upward, pull out the bracket ASSY eliminator toward the left to remove from the chute ASSY out.

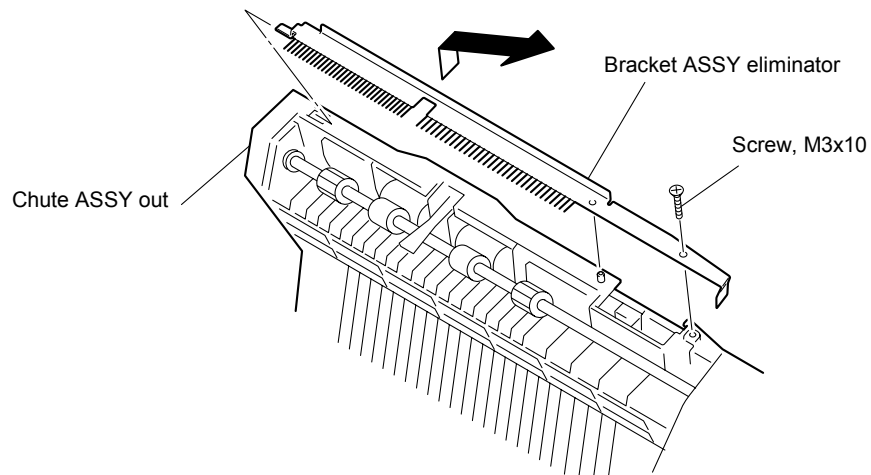


Fig.4-33

### 2.2.9 Roll DUP

- 1) Release the hook remove the gear 30 from the shaft of the roll DUP.
- 2) Extract the bush earth securing the left end of the shaft to the chute ASSY out.
- 3) Remove the E-ring securing the right end of the shaft to the chute ASSY out.
- 4) Extract the bush securing the right end of the shaft to the chute ASSY out.
- 5) Remove the roll DUP.

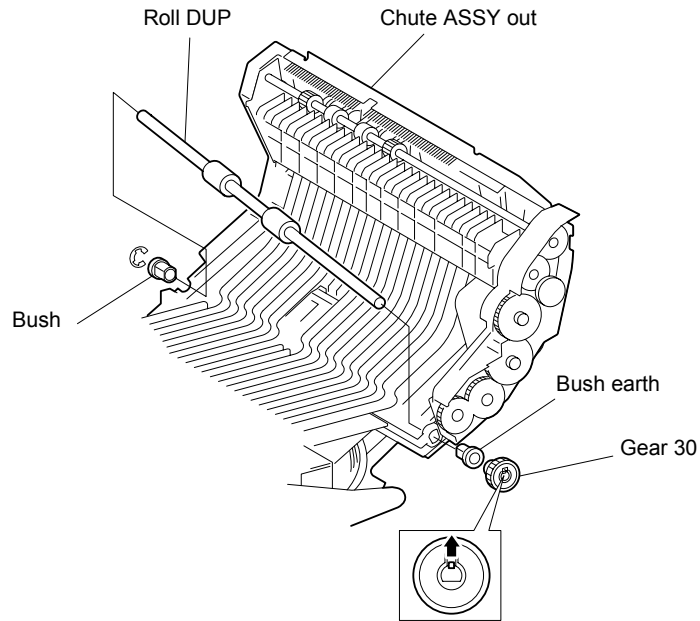


Fig.4-34

### 2.2.10 Latch out

- 1) Remove the spring latch out from the chute ASSY out.
- 2) Release the 2 hooks securing the holder latch to the chute ASSY out.
- 3) Slide the holder latch to the right to remove it from the chute ASSY out together with the latch out.
- 4) Remove the latch out from the holder.

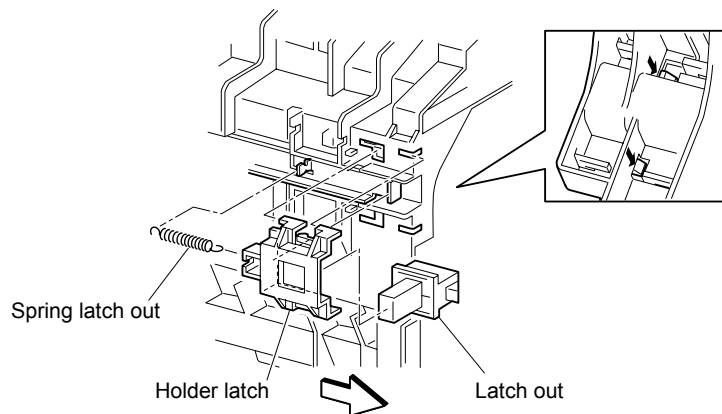


Fig.4-35

### 2.2.11 Roll ASSY feed

- 1) Release the hook securing the roll core MSI: right to the shaft MSI on the chute ASSY out and push down the plate bottom MSI slightly to release the nip with the roll ASSY feed.
- 2) Slide the roll ASSY feed to the right on the shaft MSI and lift out the roll ASSY feed forwards.

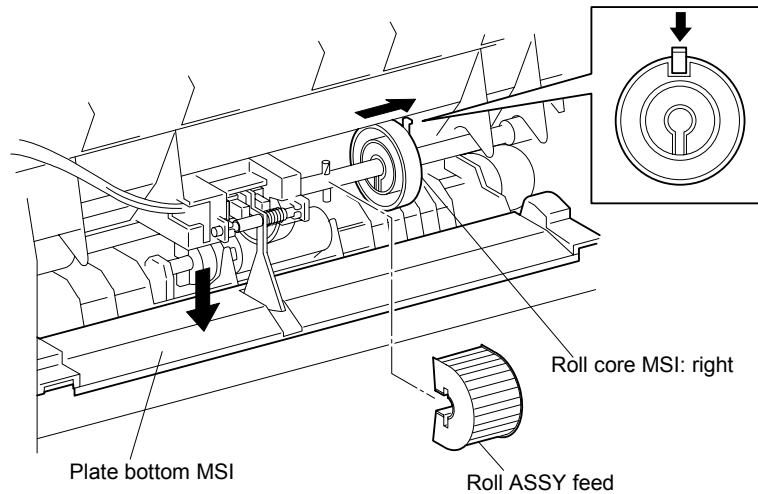


Fig.4-36

### 2.2.12 Solenoid feed MSI

- 1) Release the hook of the spring sol from the convex portion on the stopper sol from the left side of the chute ASSY out.
- 2) Remove the connector of the solenoid feed MSI from the chute ASSY out.
- 3) Remove 1 screw securing the solenoid feed MSI to the chute ASSY out.
- 4) Remove the solenoid feed MSI from the chute ASSY out.

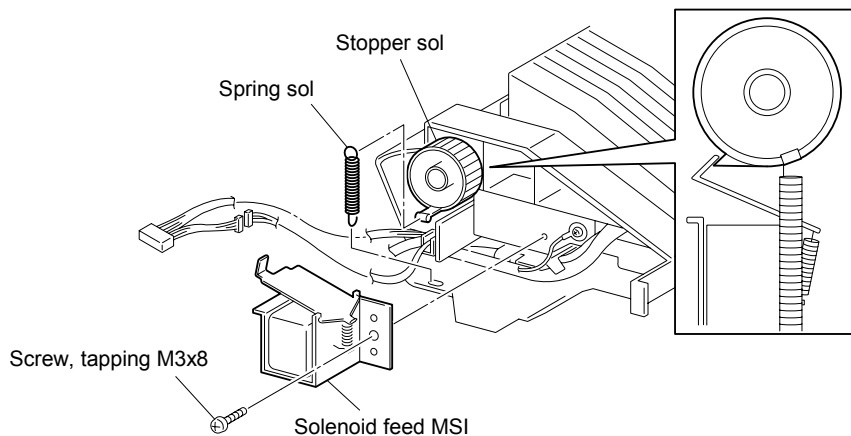


Fig.4-37

### 2.2.13 Shaft ASSY roll feed

- 1) Release the hook of the spring sol from a convex portion on the stopper sol cam from the chute ASSY out.
- 2) Release the hook securing the stopper sol cam to the left of shaft MSI, and remove the stopper sol cam from the shaft from the chute ASSY out.
- 3) Release the hook securing the gear MSI to the right of shaft MSI, and remove the gear MSI from the chute ASSY out.
- 4) Release the hooks of spring N/F MSI from the left and right ends of shaft ASSY roll feed.
- 5) Release the hook securing the cam MSI to the shaft MSI, and move the cam MSI to the center.

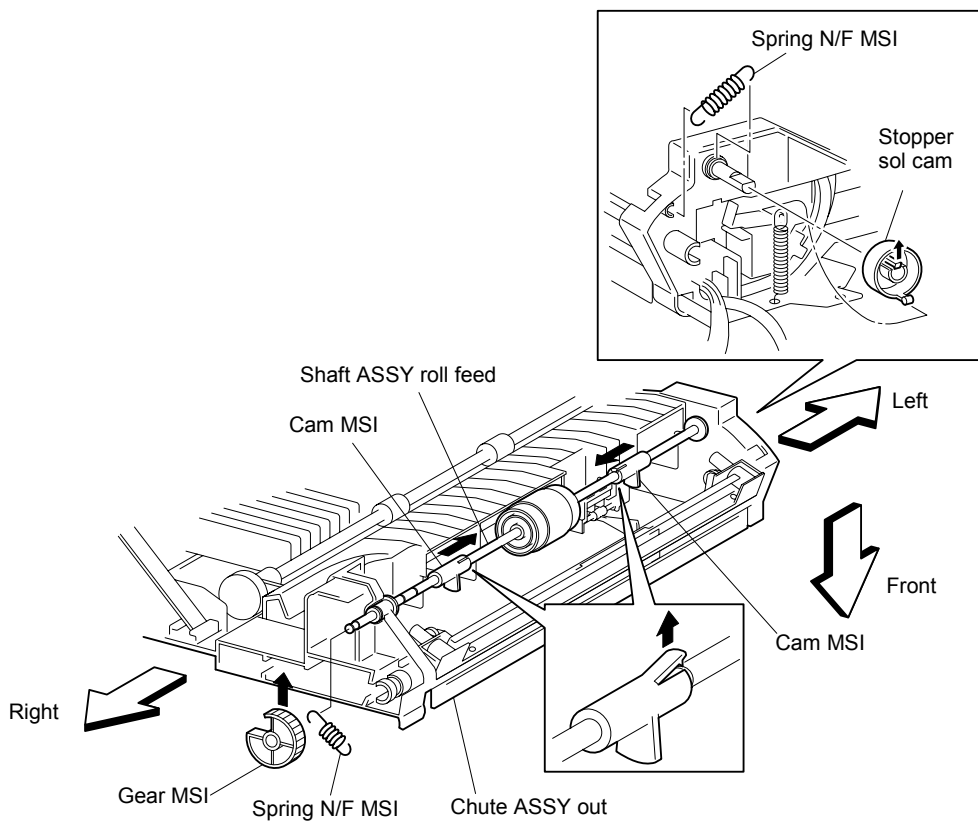


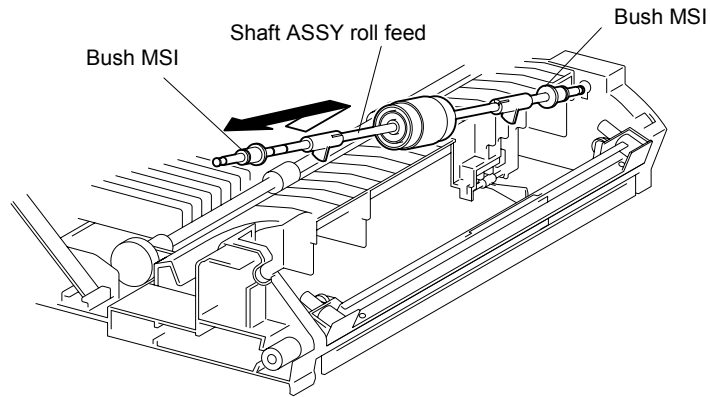
Fig.4-38

- 6) Pull off the bush MSI on the shaft MSI toward the inside.
- 7) Raising the right end of the shaft ASSY roll feed, pull out the shaft ASSY feed from the chute ASSY out.

*Note:*

*When refitting the cam MSI ensure that it is located connecting on the shaft.*

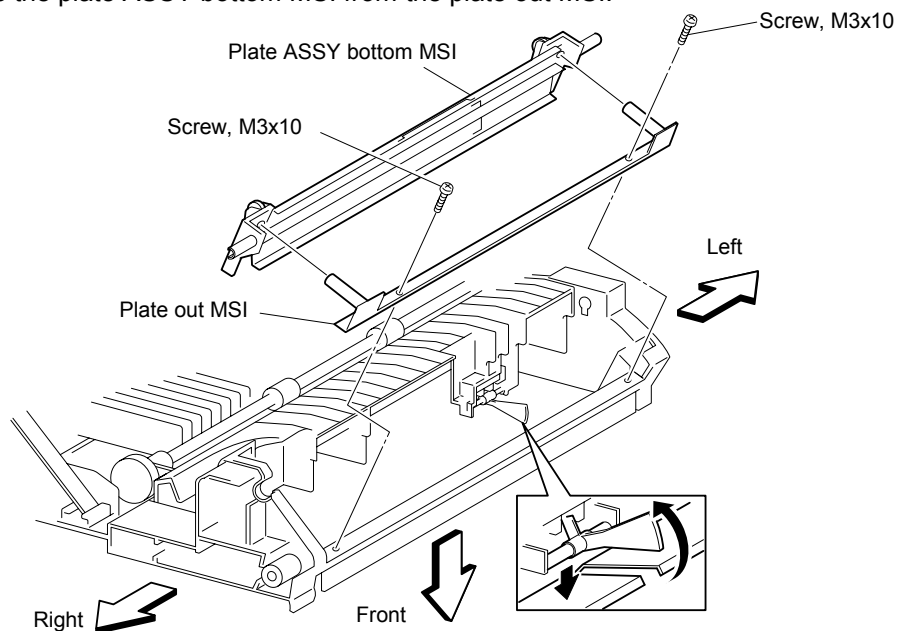
*When refitting the stopper sol cam, ensure it is in the home position.*



**Fig.4-39**

#### **2.2.14 Plate ASSY bottom MSI**

- 1) Remove 2 screws securing the plate out MSI to the chute ASSY out.
- 2) Remove the plate out MSI from the chute ASSY out together with the plate ASSY bottom MSI.
- 3) Remove the plate ASSY bottom MSI from the plate out MSI.



**Fig.4-40**

### 2.2.15 Chute ASSY exit

- 1) Disconnect the connector of the motor ASSY DUP on the chute ASSY out and release the cable from the clips.
- 2) Remove 2 screws securing the chute ASSY exit to the chute ASSY out.
- 3) Pull out the chute ASSY exit from the left side surface of the chute ASSY out.

*Note:*

*When replacing the chute ASSY exit, be careful to avoid the actuator full on the chute ASSY out.*

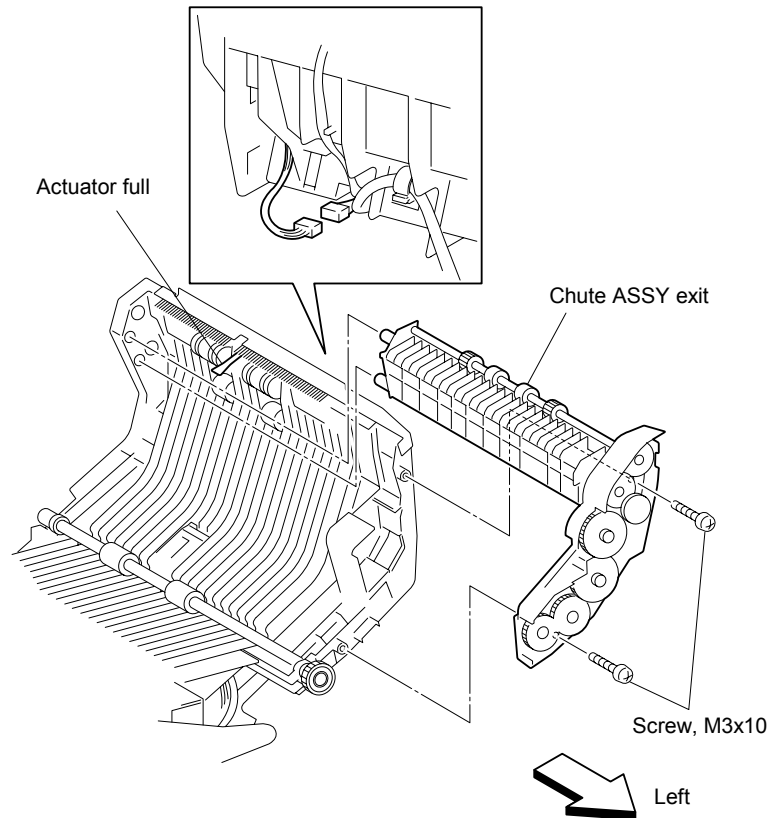


Fig.4-41

### 2.2.16 Roll exit

- 1) Release the hook securing the gear roll to the shaft of the roll exit.
- 2) Remove the gear roll from the shaft of the roll exit.
- 3) Remove the E-ring from the shaft of the roll exit.
- 4) Extract the bush earth from the shaft of the roll exit.
- 5) Raise the right hand end of the shaft from the chute ASSY exit and pull out the roll exit upwards.

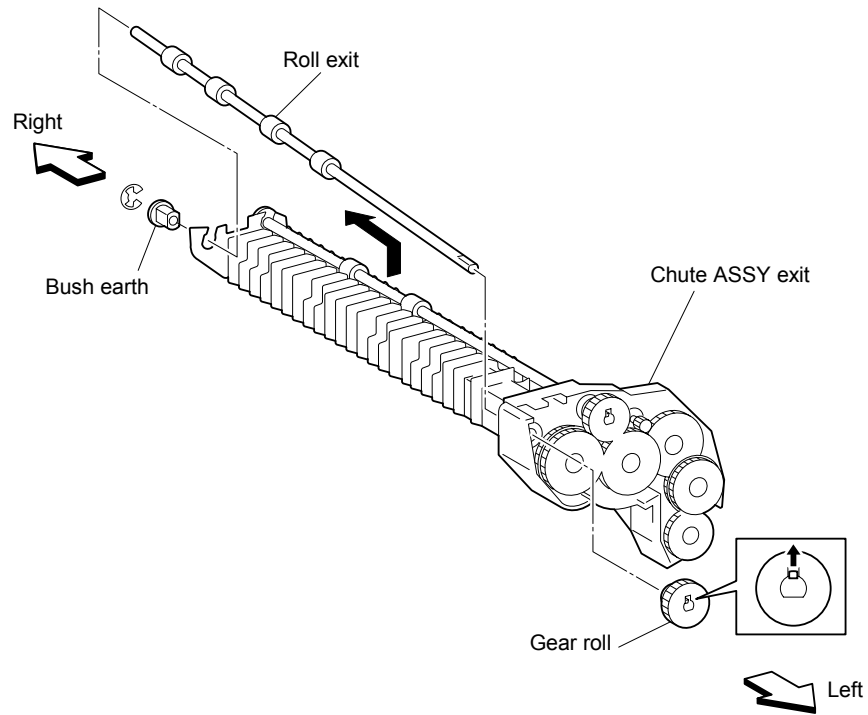


Fig.4-42

### 2.2.17 Roll MID

- 1) Release the hook securing the gear roll to the shaft of the roll MID.
- 2) Remove the gear roll from the shaft.
- 3) Remove the E-ring from the shaft of the roll MID.
- 4) Extract the bush earth from the shaft of the roll MID.
- 5) Remove the shaft of the roll MID from the chute ASSY exit and pull out the roll exit upwards.

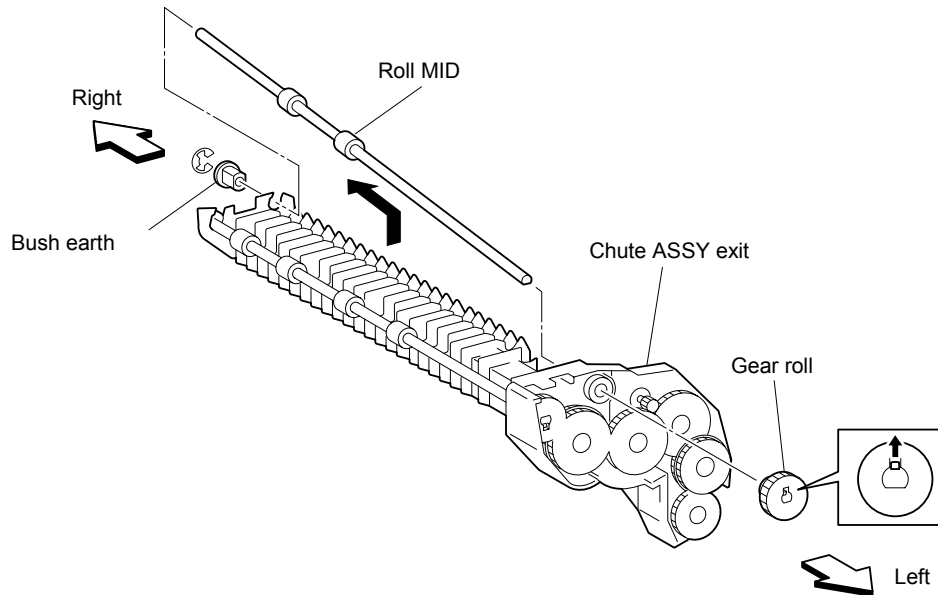


Fig.4-43



### 2.2.18 Motor ASSY DUP

- 1) Release the hook securing the gear roll to the shaft of the roll exit.
- 2) Remove the gear roll from the shaft of the roll exit.
- 3) Release the hook securing the gear roll to the shaft of the roll MID from the chute ASSY exit.
- 4) Remove the gear roll from the shaft of the roll exit.
- 5) Remove the gear 40/42 from the left side of the chute ASSY exit.
- 6) Remove the gear 48 from the left side of the chute ASSY exit.
- 7) Remove 2 screws securing the motor ASSY DUP to the chute ASSY exit.
- 8) Remove the motor ASSY DUP from the chute ASSY exit.

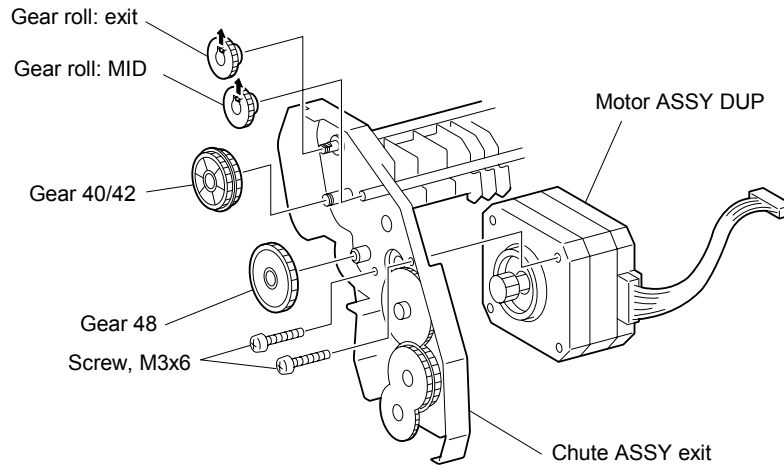


Fig.4-44

### 2.2.19 Holder ASSY CTD

- 1) Release the 4 hooks securing the holder ASSY CTD to the front ASSY in.
- 2) Raise the holder ASSY CTD slightly from the front ASSY in and pull out the connector.
- 3) Remove the holder ASSY CTD from the front ASSY in together with the spring CTD.
- 4) Remove the spring CTD from holder ASSY CTD.

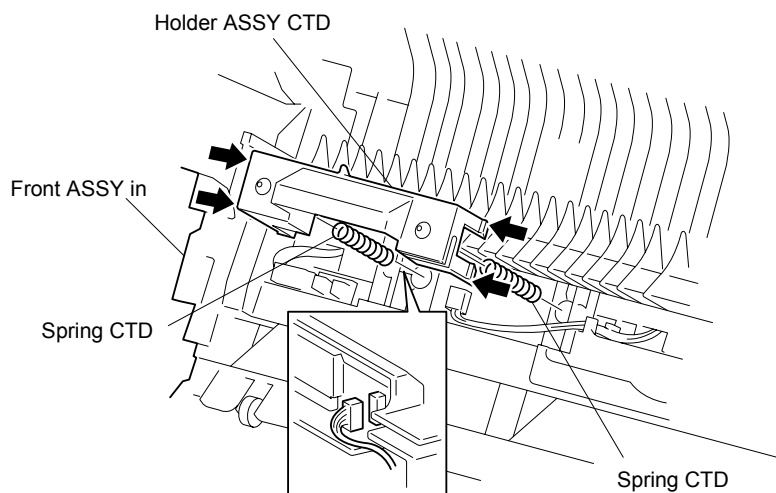


Fig.4-45

### 2.2.20 Sensor TNR full

- 1) Release the 2 hooks securing the sensor TNR full to the front ASSY in.
- 2) Remove the connector on the sensor TNR full.
- 3) Remove the sensor TNR full from the front ASSY in.

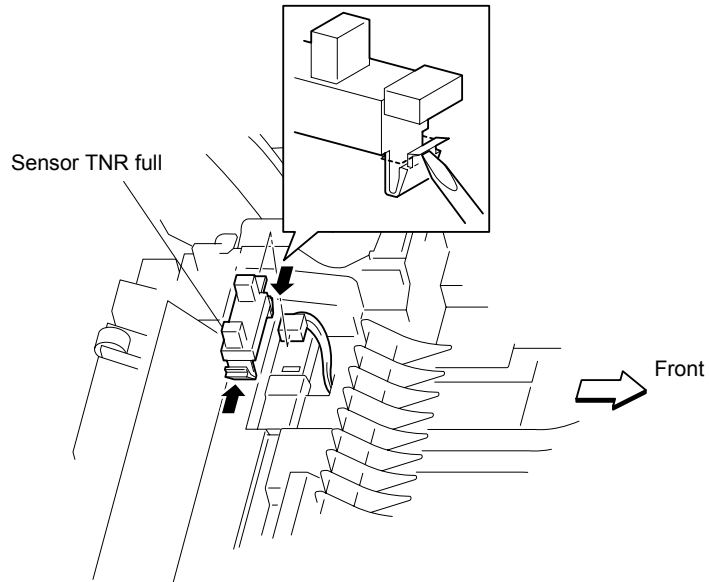


Fig.4-46

### 2.2.21 Latch R

- 1) Release the hook at the lower part of the spring latch securing it to the hole on the right side of the front ASSY in.
- 2) Release the hook securing the latch R to the front ASSY in.
- 3) Pull out the latch R from the front ASSY in together with the shaft latch and the spring latch.
- 4) Remove the spring latch from the latch R.
- 5) Pull out the shaft latch from the latch R.

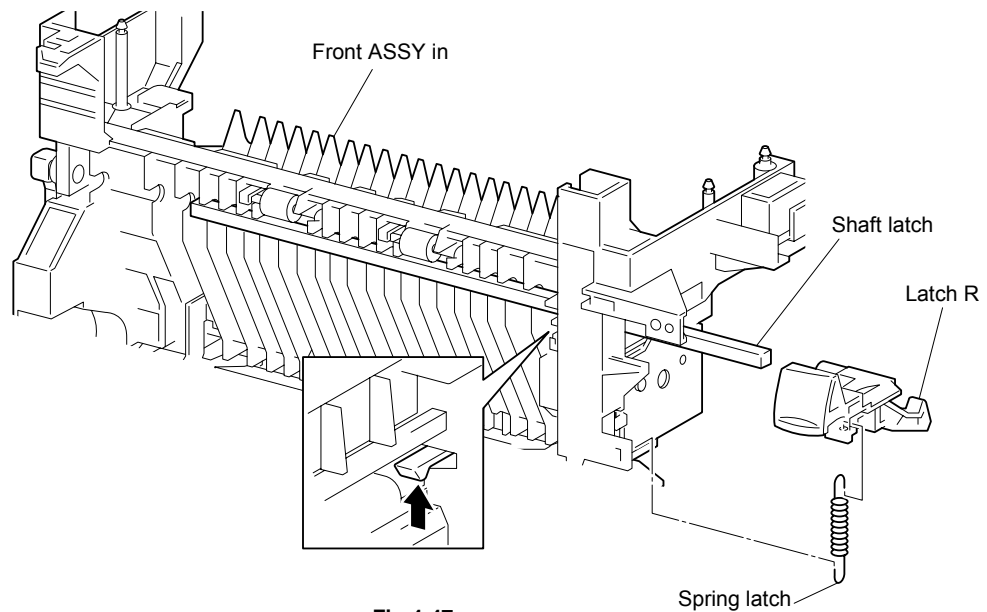


Fig.4-47

### 2.2.22 Latch L

- 1) Release the hook securing the latch L to the left side of the front ASSY in.
- 2) Remove the latch L from the front ASSY in.

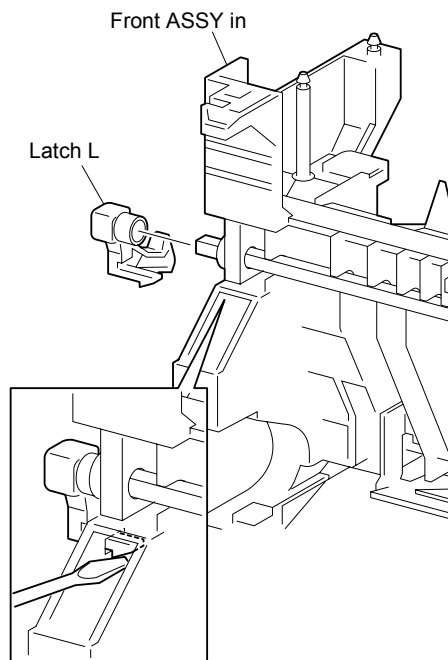


Fig.4-48

### 2.2.23 Fuser drive ASSY

- 1) Remove the screw securing the earth of the harness ASSY FSR to the fuser drive ASSY.
- 2) Release the harnesses from the harness guides.
- 3) Remove 3 screws securing the fuser drive ASSY to the front ASSY in.
- 4) Remove the fuser drive ASSY from the front ASSY in.

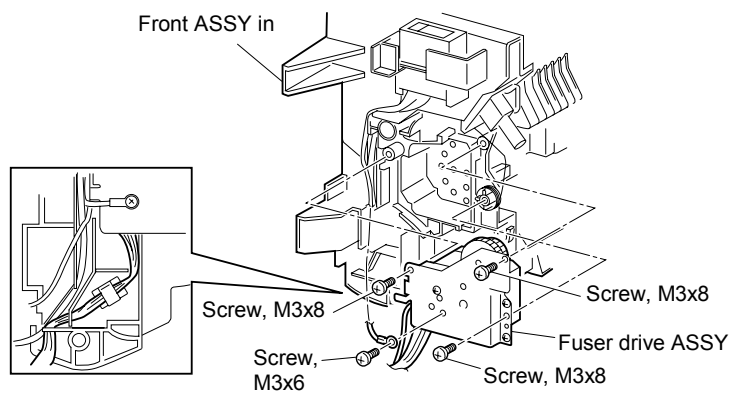


Fig.4-49

## 2.2.24 Chute ASSY REGI

- 1) Release the 2 hooks securing the housing ASSY ELEC to the printer and remove the housing ASSY ELEC upward.

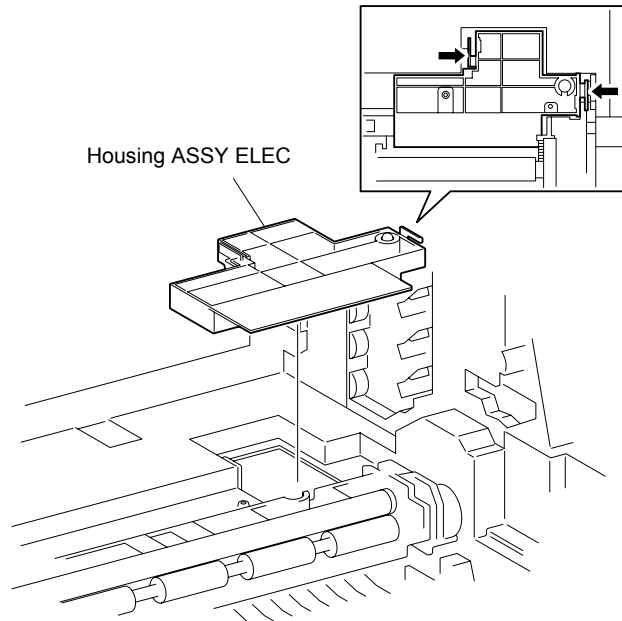


Fig.4-50

- 2) Disconnect the 2 connectors of the chute ASSY REGI from the printer.
- 3) Remove 4 screws securing the chute ASSY REGI to the printer.
- 4) Lift the left end of the chute ASSY REGI and pull out the chute ASSY REGI leftwards from the printer.

*Note:*

*Take care not to damage the plastic film when refitting the chute ASSY REGI.*

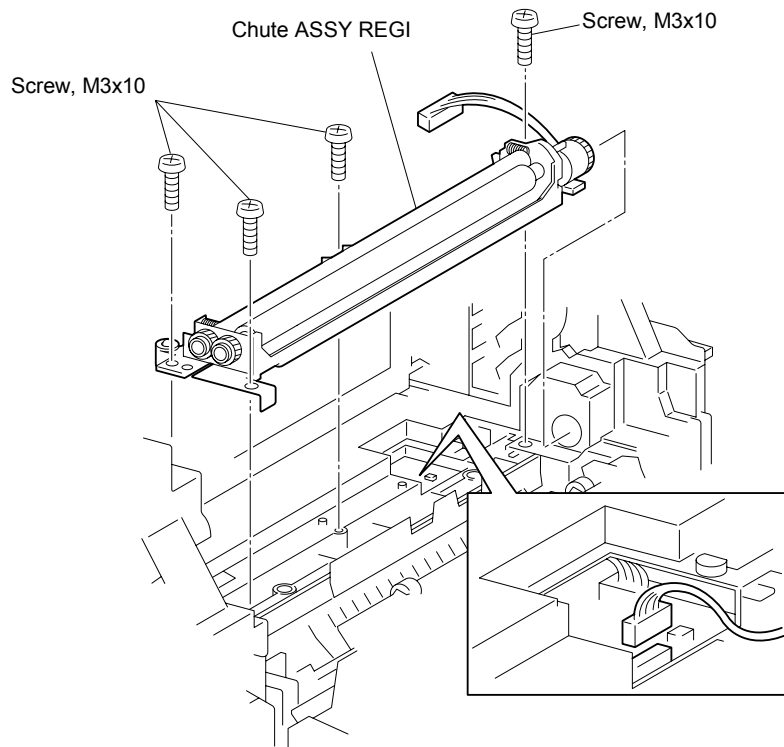


Fig.4-51

### 2.2.25 Actuator REGI

- 1) Holding the shielding portion of the actuator REGI move the actuator REGI left and extract the right hand end of the shaft of the actuator REGI from the bush of the chute ASSY REGI.
- 2) Pull out the actuator REGI from the chute ASSY REGI together with the spring sensor REGI.
- 3) Remove the spring sensor REGI from the actuator REGI.

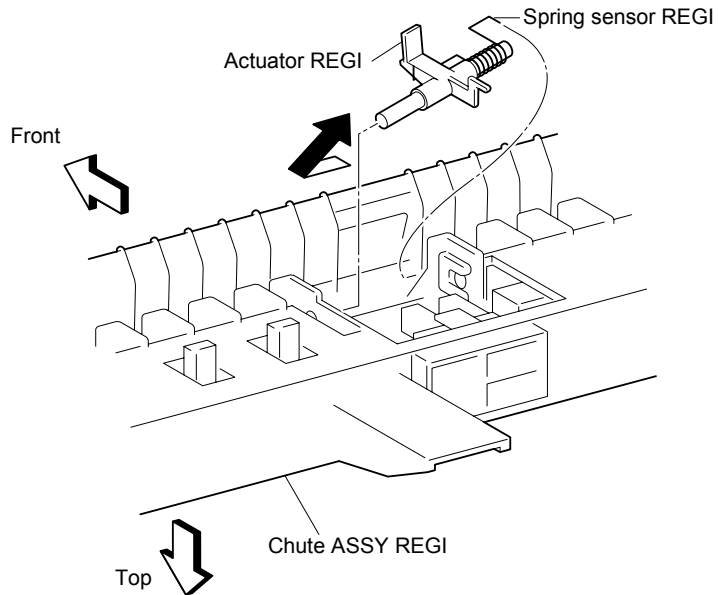


Fig.4-52

### 2.2.26 Sensor photo: REGI

- 1) Release the 3 hooks securing the sensor photo: REGI to the chute ASSY REGI.
- 2) Remove the sensor photo: REGI from the chute ASSY REGI.
- 3) Remove the connector from the sensor photo: REGI.

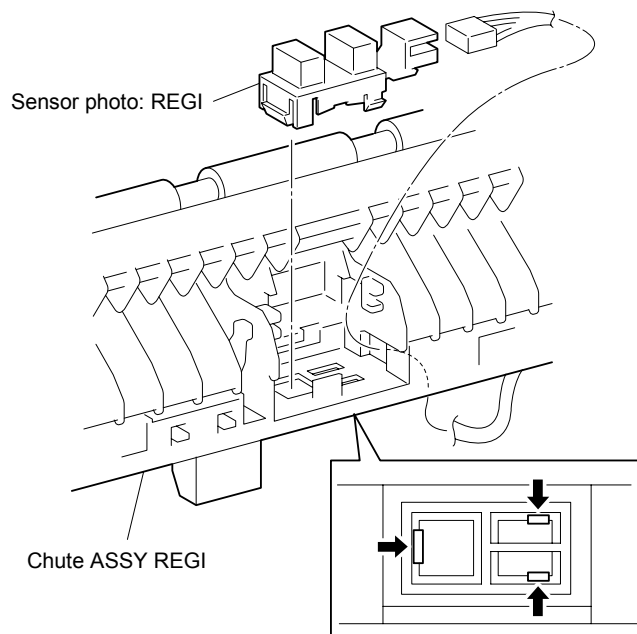


Fig.4-53

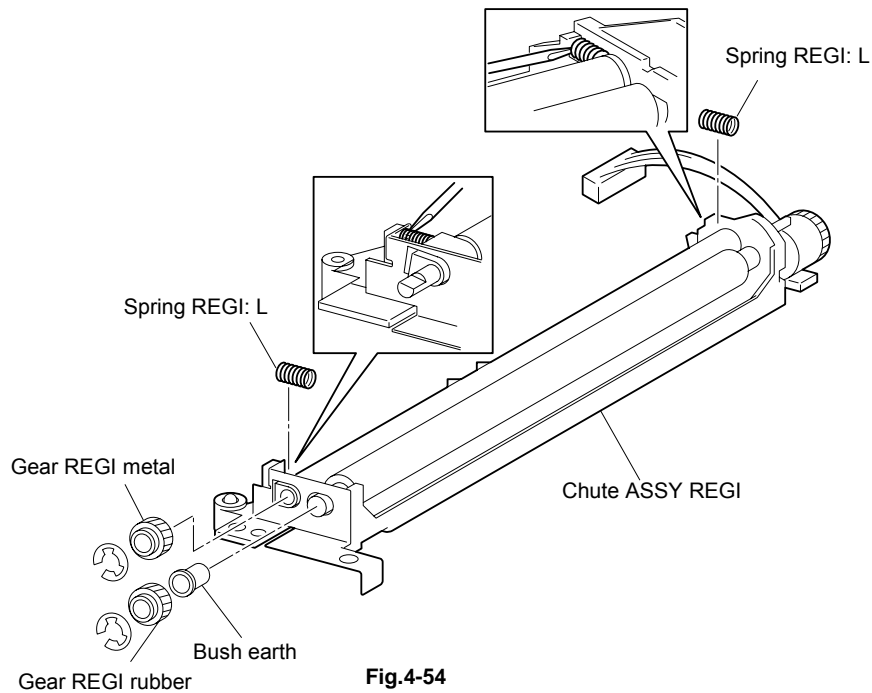
### 2.2.27 OHP sensor ASSY

- 1) Remove the E-ring that secures the gear REGI metal to the chute ASSY REGI, and remove the gear REGI metal.
- 2) Remove the E-ring that secures the gear REGI rubber to the chute ASSY REGI, and remove the gear REGI rubber.
- 3) Pull out the bush earth that secures the shaft of the roll REGI rubber.

*Note:*

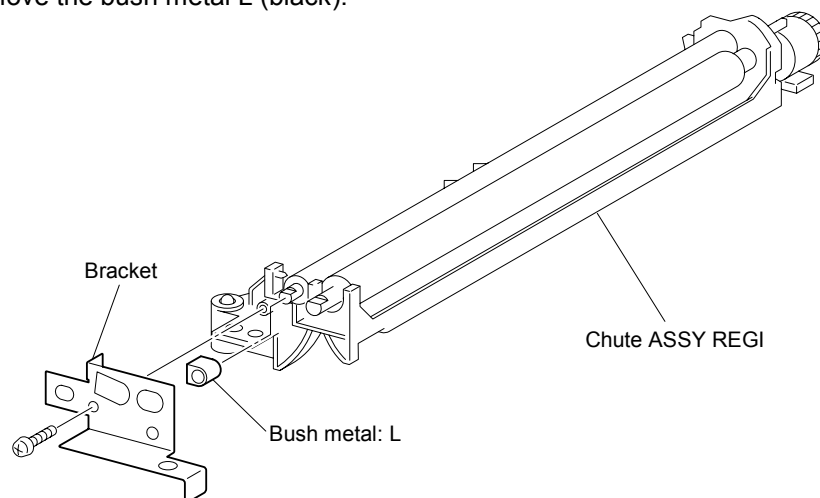
*In the following steps, take care not to lose the spring REGI: R and spring REGI: L as they will spring.*

- 4) Remove the spring REGI: L from the right side of chute ASSY REGI using a mini screwdriver. Remove the spring REGI: R from the left side of the chute ASSY REGI.



**Fig.4-54**

- 5) From the left side of chute ASSY REGI, remove the screw that secures the bracket ASSY.
- 6) Remove the bush metal L (black).



**Fig.4-55**

- 7) Lift the shaft of roll REGI metal, pull out the roll REGI metal together with the bush metal R (white).

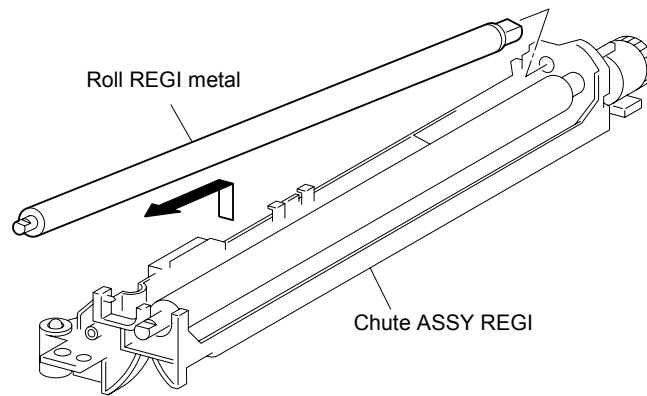


Fig.4-56

- 8) Release the 2 hooks on the bottom of chute ASSY REGI that secure the OHP sensor ASSY.
- 9) Remove the OHP sensor ASSY from the chute ASSY REGI.

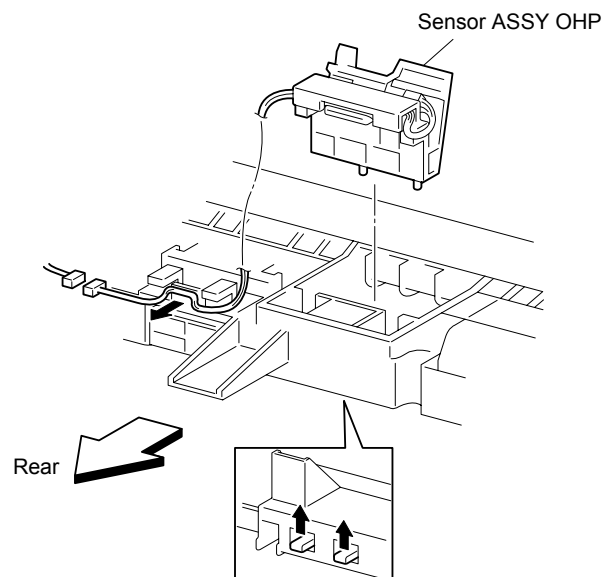


Fig.4-57

### 2.2.28 Housing ASSY retard

- 1) Remove the connector of the clutch turn from on the PWBA HB MCU.
- 2) Remove 3 screws securing the housing ASSY retard to the printer.
- 3) Remove the housing ASSY retard from the printer.

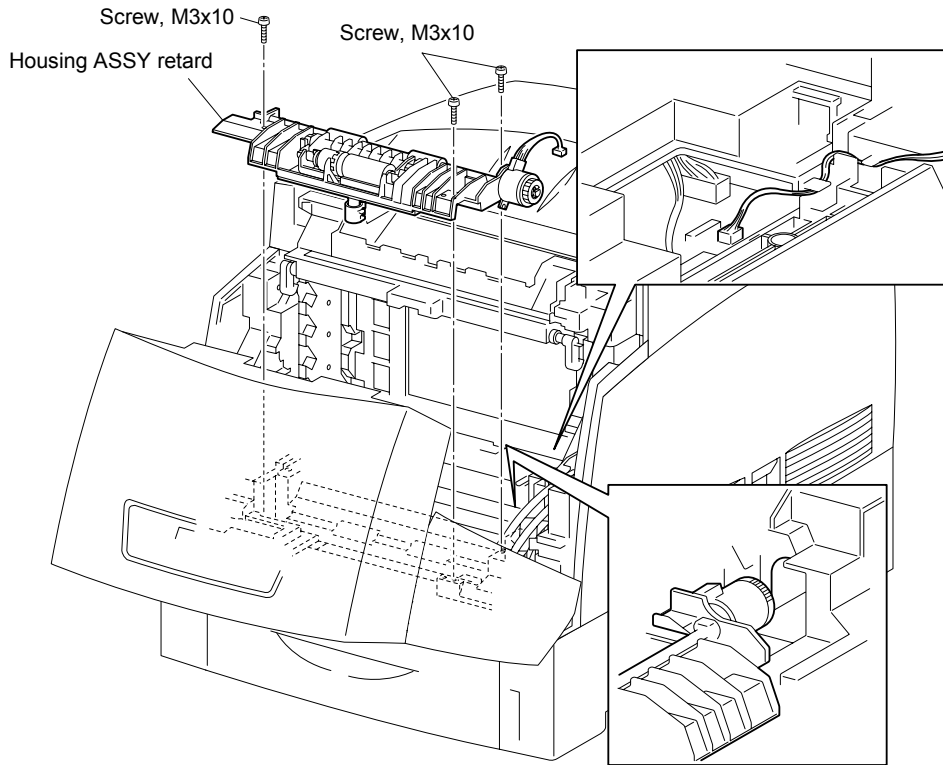


Fig.4-58

### 2.2.29 Clutch turn

- 1) Remove the E-ring securing the clutch turn to the shaft of the housing ASSY retard.
- 2) Remove the clutch turn from the shaft of the housing ASSY retard.

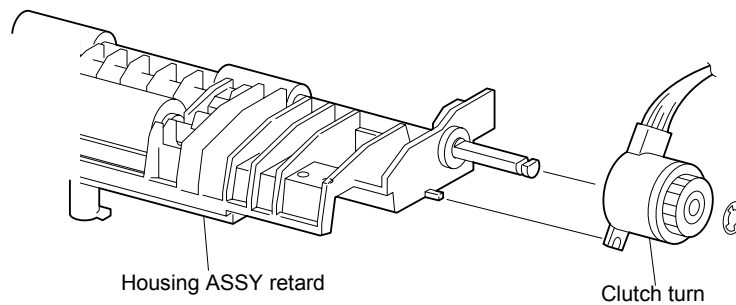


Fig.4-59



### 2.2.30 Roll turn

- 1) Remove the E-ring securing the roll turn to the housing ASSY retard.
- 2) Pull out the bush earth securing the left side of the roll turn from the housing ASSY retard.
- 3) Pull out the bush securing the right side of the roll turn from the housing ASSY retard.
- 4) Slide the roll turn from the housing ASSY retard rightward, and pull out the roll turn left and upward.

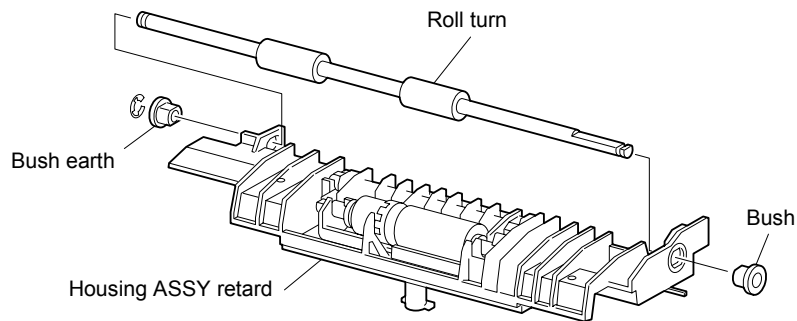


Fig.4-60

### 2.2.31 Roll ASSY retard

- 1) Push back the rear edge of the holder ASSY retard from the housing ASSY retard, and turn the holder ASSY retard to the rear.
- 2) Sliding the holder ASSY retard rightward, pull the left shaft of holder ASSY retard out of the bush bore in the housing ASSY retard.

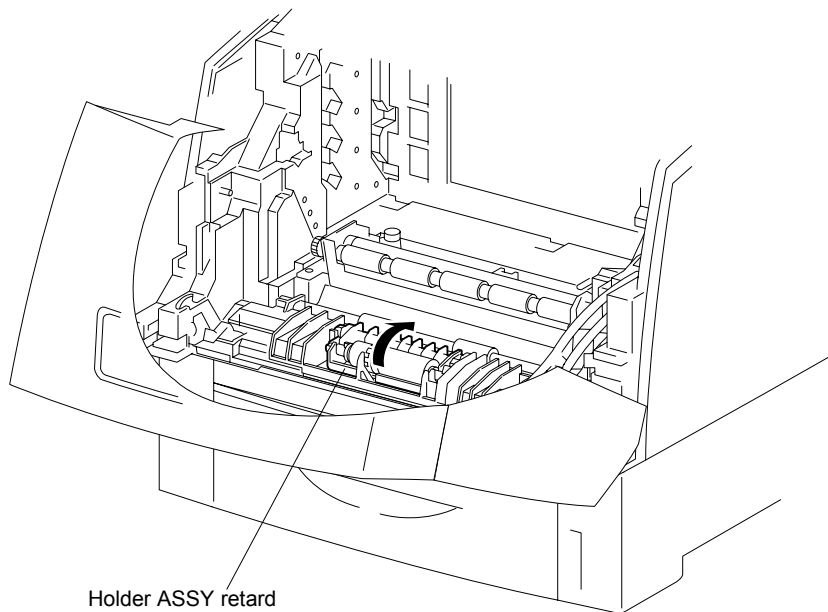
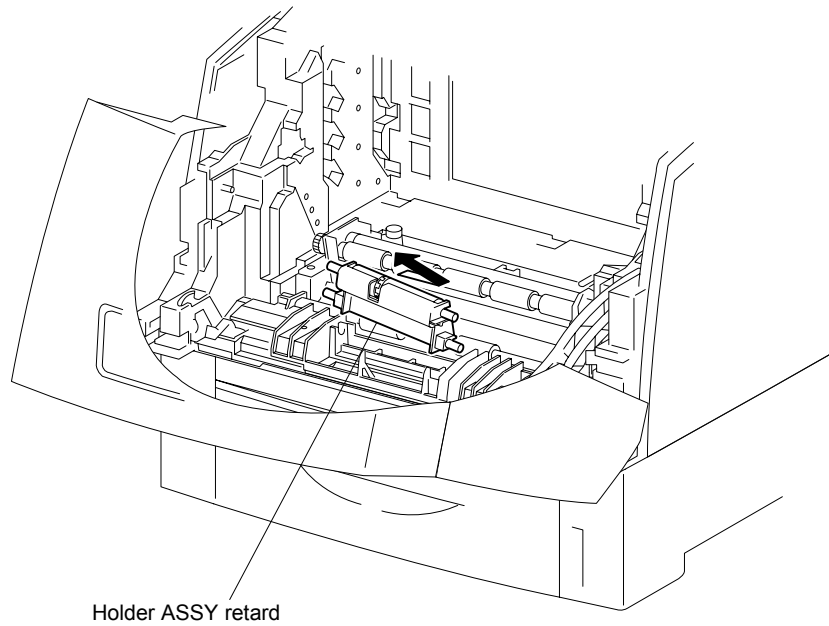


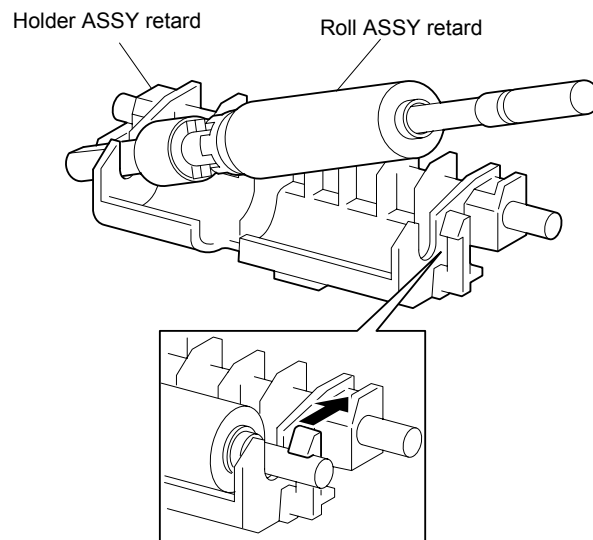
Fig.4-61

- 3) Pull out the holder ASSY retard to left upward from the housing ASSY retard.
- 4) Release the hook securing the shaft RTD to the holder ASSY retard of the printer.



**Fig.4-62**

- 5) Raise the shaft RTD to right upward, and pull out the roll ASSY retard.



**Fig.4-63**

### 2.2.32 Stud retard

- 1) Release the 2 hooks securing the cap retard to the housing ASSY retard.
- 2) Remove the cap retard from the housing ASSY retard together with the stud retard and spring retard 370.
- 3) Remove the stud retard from the cap retard.

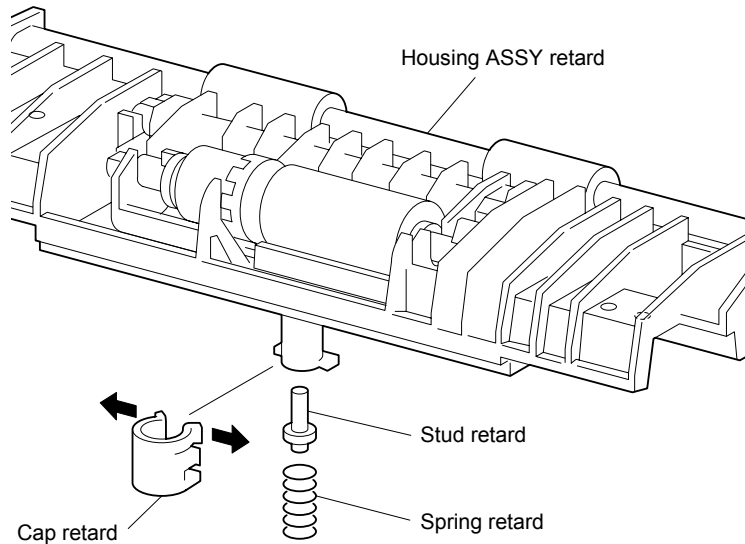


Fig.4-64

### 2.2.33 PWBA ASSY earth

- 1) Remove 2 screws securing the PWBA ASSY earth to the printer.
- 2) Remove the PWBA ASSY earth from the printer.

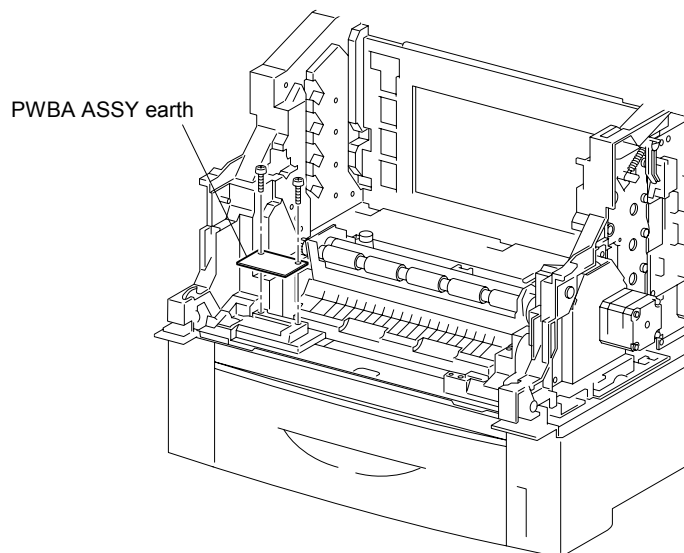


Fig.4-65

## 2.3 Top of the Printer

### 2.3.1 Holder toner cartridge ASSY unit

*Note:*

*When removing the holder toner cartridge ASSY unit, remove the toner deposit on the holder toner cartridge ASSY with a vacuum cleaner before starting the removal process.*

*Note:*

*When removing the toner deposit on the holder toner cartridge ASSY with a vacuum cleaner, attach an earth cord to the end of the cleaner to avoid the static electricity.*

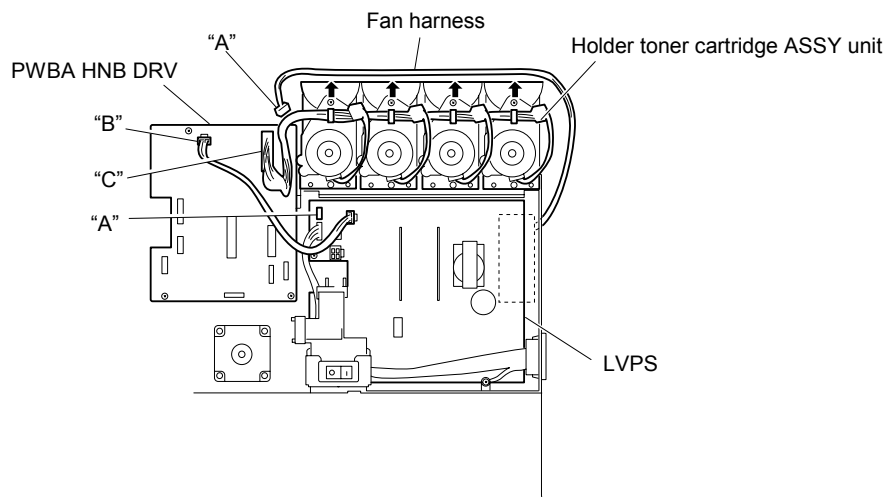
*Note:*

*When removing the toner deposit on the holder toner cartridge ASSY, be careful not to allow the toner to fly to the sensors on the holder toner cartridge ASSY by the static electricity.*

*Note:*

*Do not touch the sensor face.*

- 1) Remove the connector (A) of fan rear on the LVPS STD from the right side of the printer and release the cable assembly.
- 2) Remove the 2 connectors (B, C) on the PWBA HNB DRV from the right side of the printer.



**Fig.4-66**

- 3) Remove the connector (D) on the PWBA EFEPROM STD on the left side of the printer.
- 4) Remove the connector (E) on the S-HVPS on the left side of the printer.
- 5) From the printer, release the fan harness from the clamps.
- 6) Remove the connector (F) from the connector block.
- 7) Release the 2 hooks securing the gear slide to the shaft on the left side of the printer.
- 8) Remove the gear slide from the printer.
- 9) Remove the rack V from the printer.

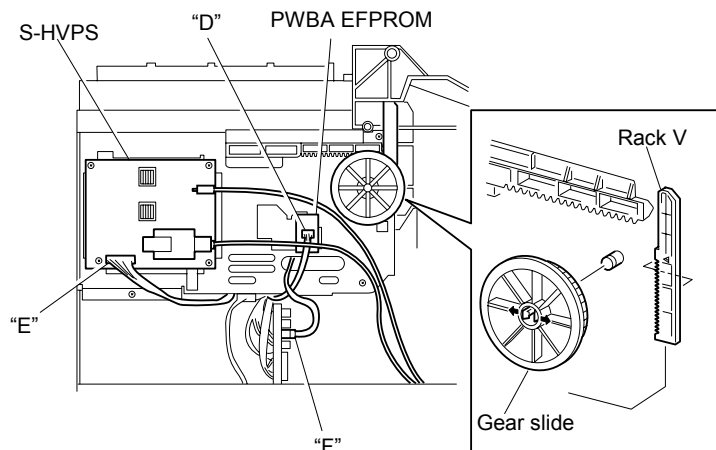


Fig.4-67

- 10) Remove 7 screws securing the holder toner cartridge ASSY unit to the printer.
- 11) Remove the holder toner cartridge ASSY unit from the printer.

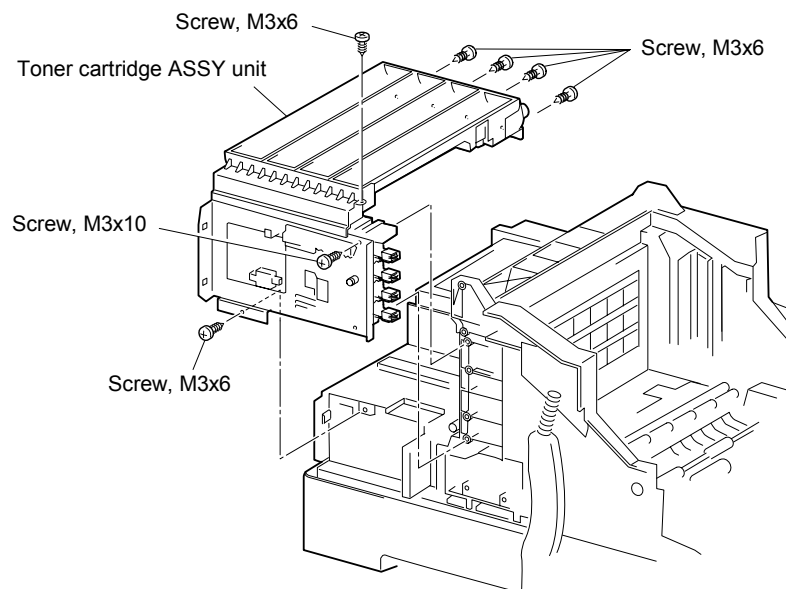


Fig.4-68

Note:

When replacing the gear slide, meet the leading edge of gear rail on the left side. with the vertex of a triangle mark on the rack V.

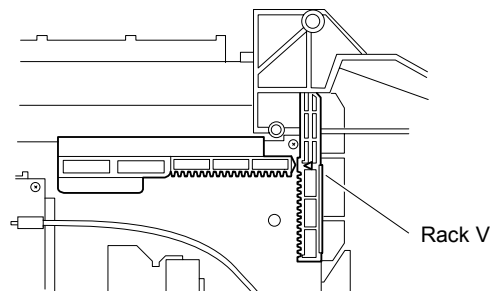


Fig.4-69

### 2.3.2 Holder toner cartridge ASSY

- 1) On the holder toner cartridge ASSY unit, release the hook securing the toner discharging unit of the holder toner cartridge ASSY (1) on the plate ASSY dispenser L with a mini screwdriver.
- 2) From the plate ASSY dispenser, pull out the toner discharging unit rightwards.
- 3) Disconnect the connector of the motor from the right hand side of the holder toner cartridge ASSY (1).
- 4) Extract the toner empty and toner cartridge connectors from the holder toner cartridge ASSY (1).
- 5) Release the harness from the hook at the bottom of the holder toner cartridge ASSY (1).
- 6) Slide the holder toner cartridge ASSY (1) rightward from the holder toner cartridge ASSY unit and remove the holder toner cartridge ASSY (1) while releasing the 2 hooks.

<Black>

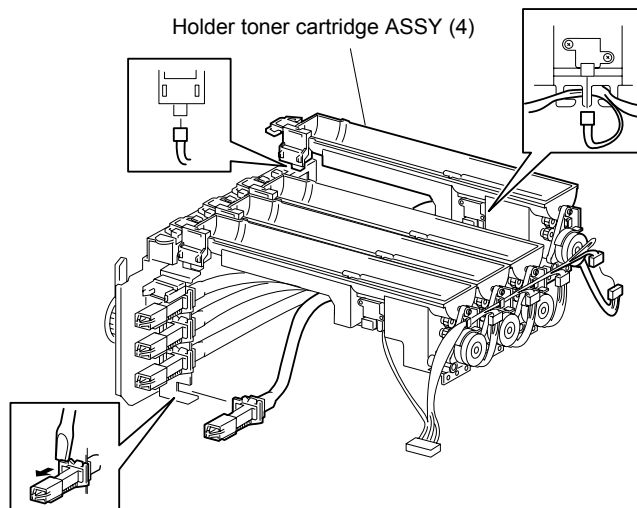


Fig.4-70

<Cyan>

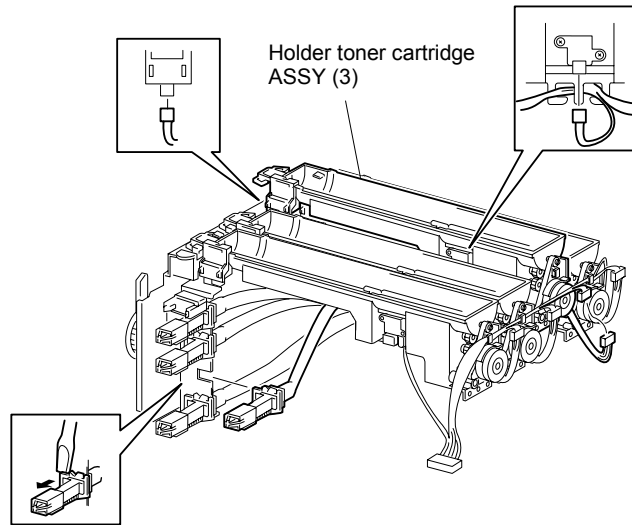


Fig.4-71

<Magenta>

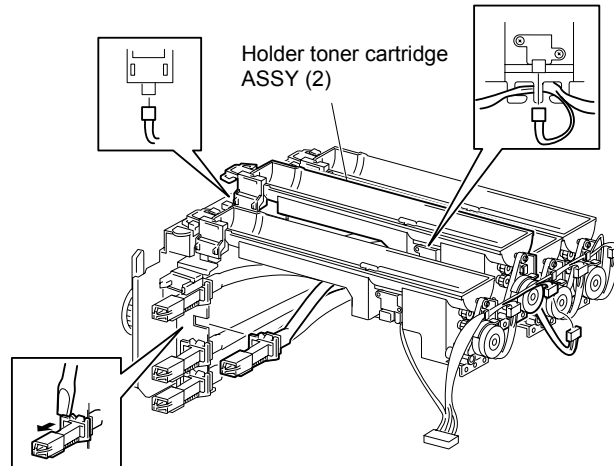


Fig.4-72

<Yellow>

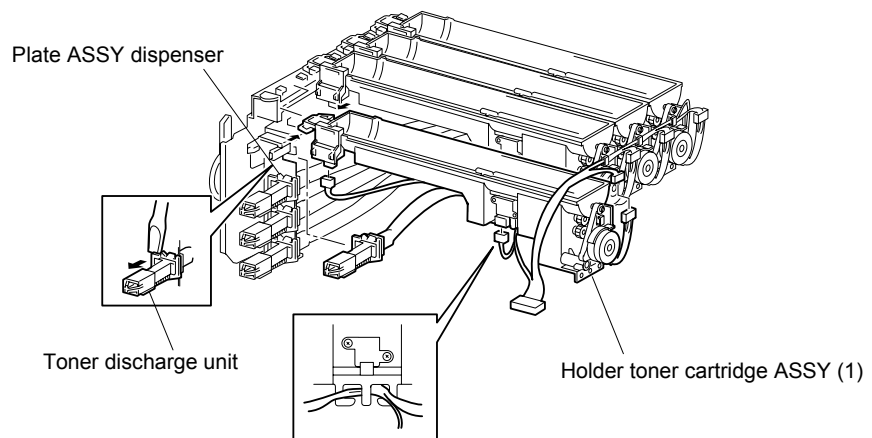


Fig.4-73

### 2.3.3 Switch toner cartridge ASSY

- 1) Release the 2 hooks securing the switch toner cartridge ASSY to the holder toner cartridge ASSY with a mini screwdriver.
- 2) Remove the switch toner cartridge ASSY from the holder toner cartridge ASSY.

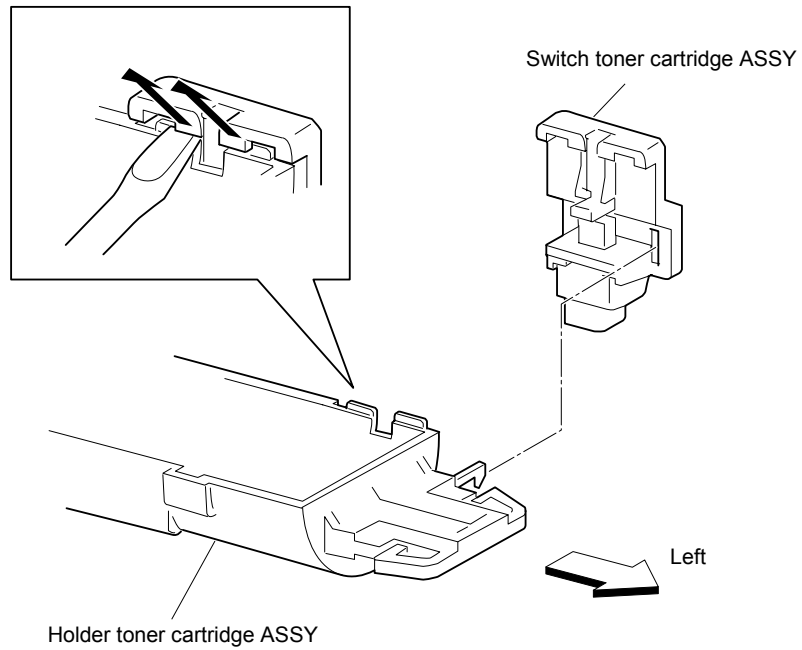


Fig.4-74

### 2.3.4 Sensor toner low

- 1) Remove 2 screws securing the sensor toner low to the holder toner cartridge ASSY.
- 2) Remove the sensor toner low from the holder toner cartridge ASSY.

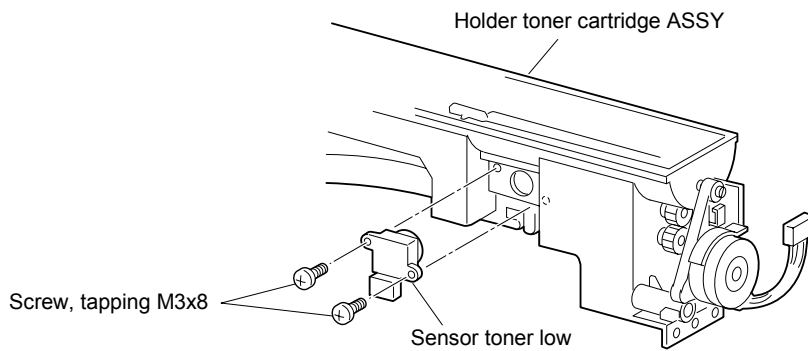


Fig.4-75



### 2.3.5 PWBA EEPROM STD

- 1) Remove 1 screw securing the PWBA EEPROM.
- 2) Remove the PWBA EEPROM from the printer.

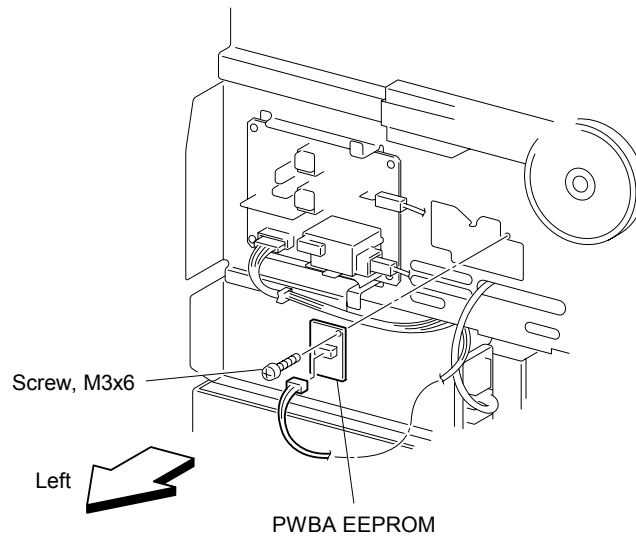


Fig.4-76

### 2.3.6 S-HVPS

- 1) Remove 4 screws securing the S-HVPS.
- 2) Remove the S-HVPS from the printer.

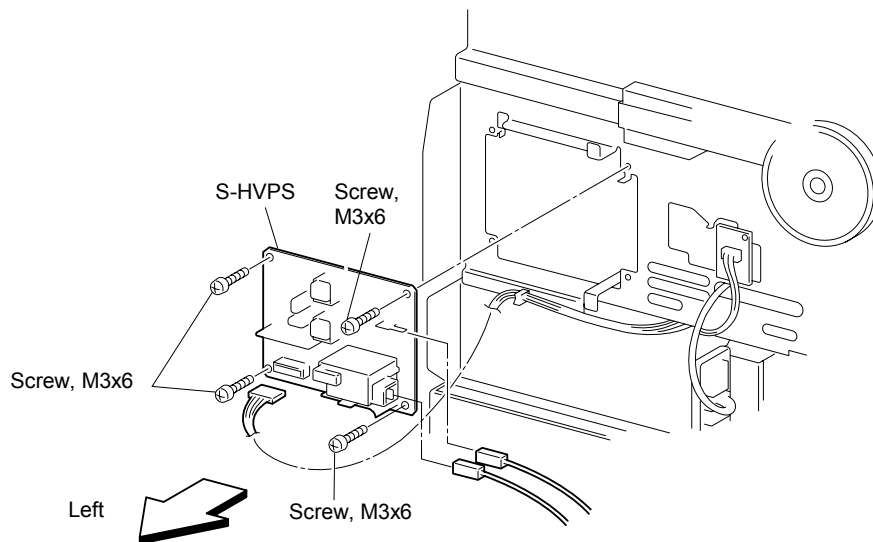


Fig.4-77

### 2.3.7 Scanner ASSY

- 1) Remove the connector on the scanner ASSY.
- 2) Release the hook of the spring scanner securing the right and left shafts of the scanner ASSY from the printer.
- 3) Remove 1 screw securing the scanner ASSY to the printer.
- 4) Remove the scanner ASSY from the printer.

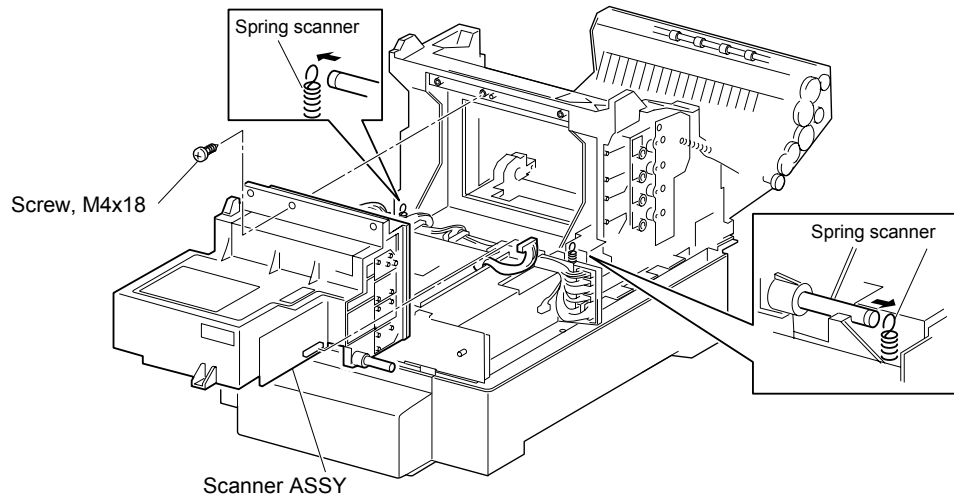


Fig.4-78

## 2.4 Right / Left / PCBs of the Printer

### 2.4.1 HSG ASSY BIAS

- 1) Remove 5 screws securing the HSG ASSY BIAS to the left side surface of the printer.
- 2) Remove the HSG ASSY BIAS from the printer.
- 3) Remove 8 contact pads from the printer.

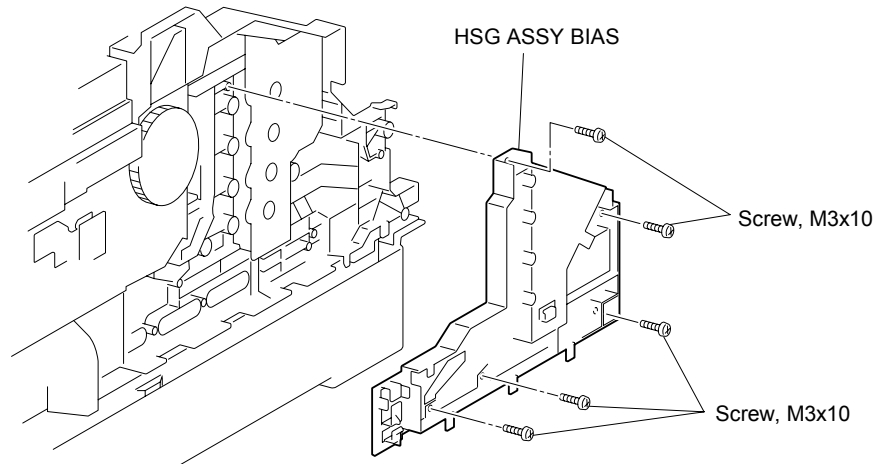


Fig.4-79

### 2.4.2 Lever drum: L

- 1) Remove 4 screws securing the plate ASSY lever L from the left side of the printer.
- 2) Remove the plate ASSY lever L from the printer.
- 3) Release the hook of the spring lever 30N hitched over the convex portion of the 4 lever drum: L from the right side of the printer.

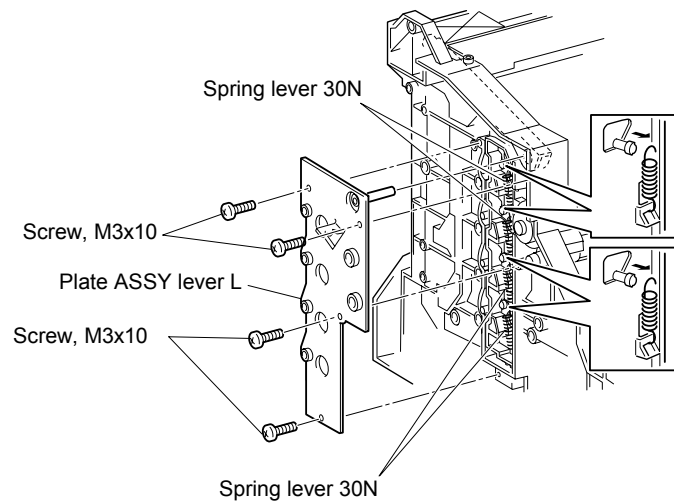
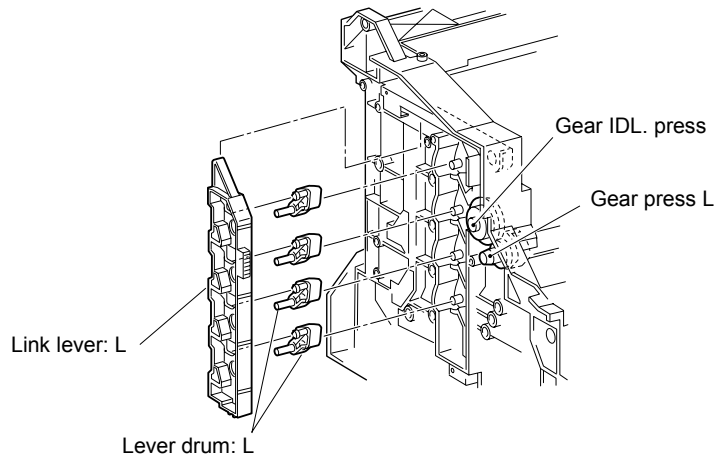


Fig.4-80

- 4) Remove the link lever: L from the printer together with the spring lever: 30N and lever drum: L.
- 5) Remove 4 springs from link lever: L and remove 4 lever drum: L.

*Note:*

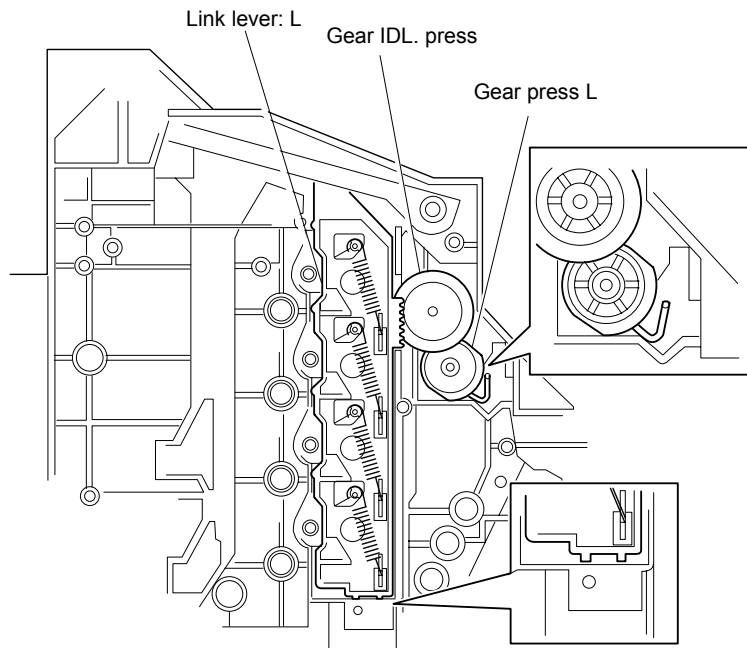
*When replacing the link lever, align the spring IDT L and the bottom of link lever: L with the positions shown in the figure (lever drum: L replacement).*



**Fig.4-81**

*Note:*

*The lever drum: L and link lever: L must be fitted and aligned before refitting spring lever 30N.*



**Fig.4-82**

### 2.4.3 Drive ASSY main

- 1) Remove the connector on the PWBA HNB DRV from the right side of the printer.
- 2) Remove 4 screws securing the drive ASSY main to the printer.
- 3) Remove the drive ASSY main from the printer.

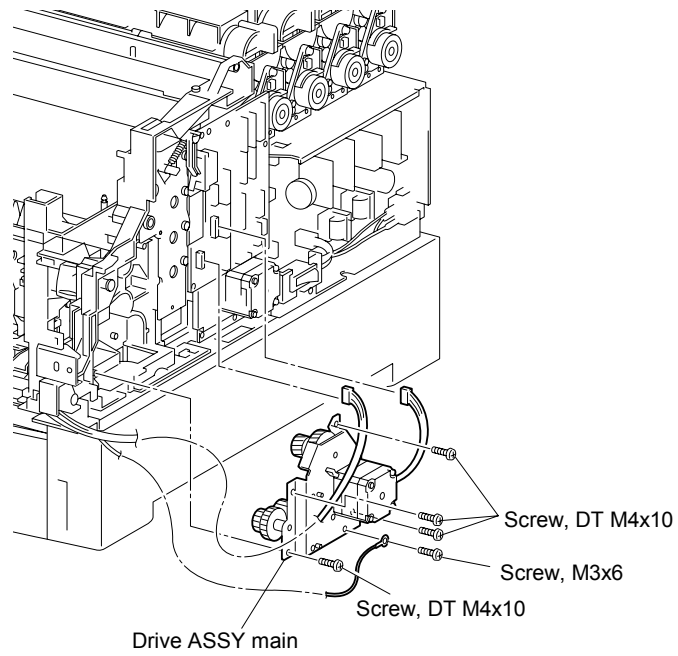


Fig.4-83

#### 2.4.4 PWBA HNB DRV

- 1) Remove the all connectors on the PWBA HNB DRV from the right side of the printer.
- 2) Remove 4 screws securing the PWBA HNB DRV to the printer.
- 3) Remove the PWBA HNB DRV from the printer.

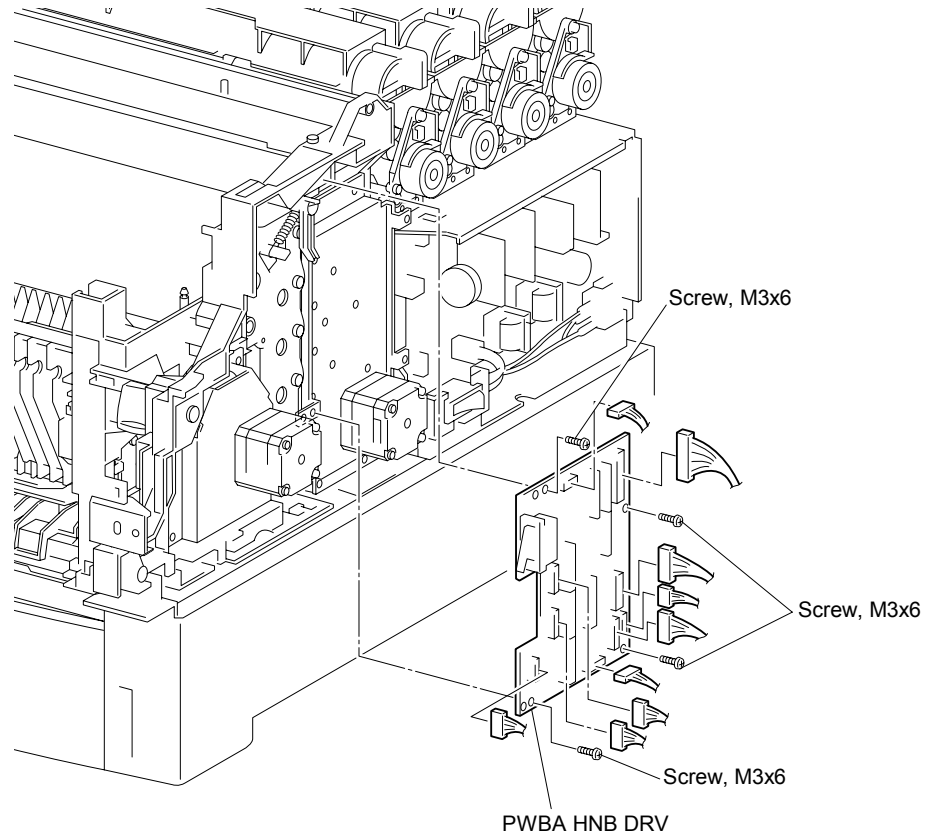


Fig.4-84

#### 2.4.5 Drive ASSY DEVE

- 1) Remove 5 screws securing the Drive ASSY DEVE from the right side of the printer.
- 2) Remove the Drive ASSY DEVE from the printer.

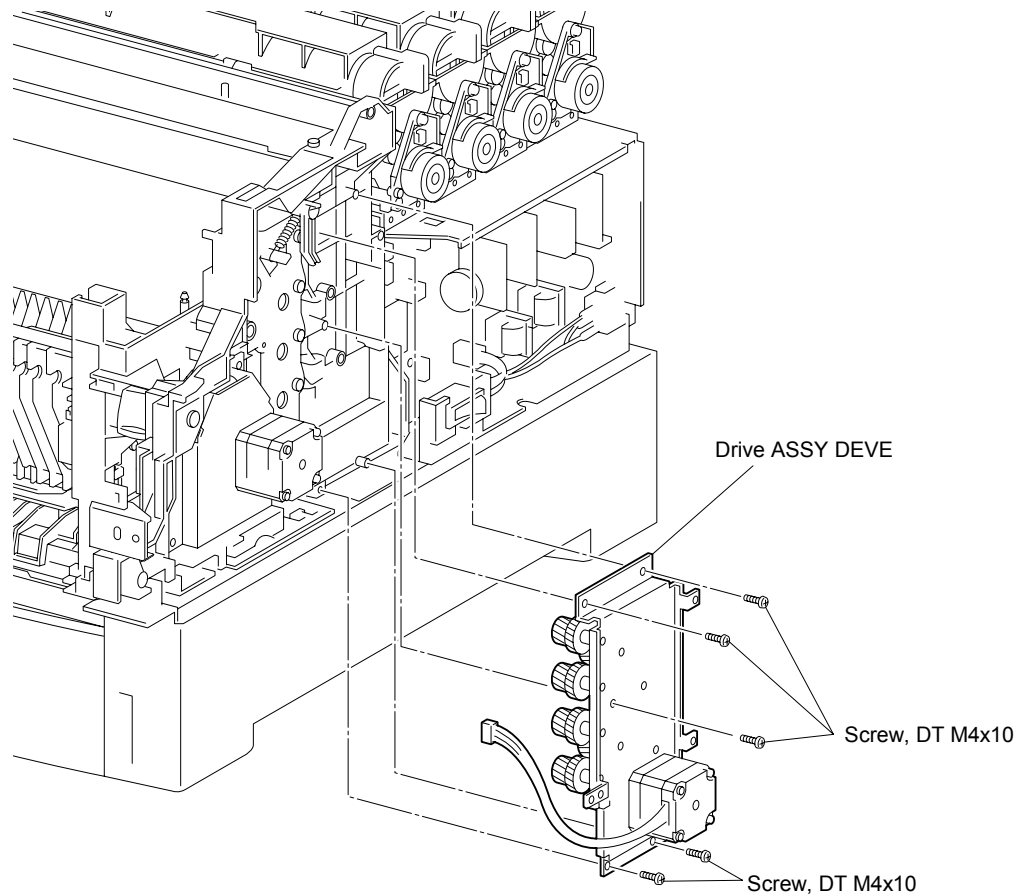


Fig.4-85

#### 2.4.6 Actuator I/R

- 1) From the right side of the printer, release the hook of the spring I/R from the convex portion of the plate ASSY lever R.
- 2) Release the hook securing the actuator I/R to the shaft on the plate ASSY lever R.
- 3) Remove the actuator I/R from the plate ASSY lever R together with the spring I/R.
- 4) Remove the spring I/R from the actuator I/R.

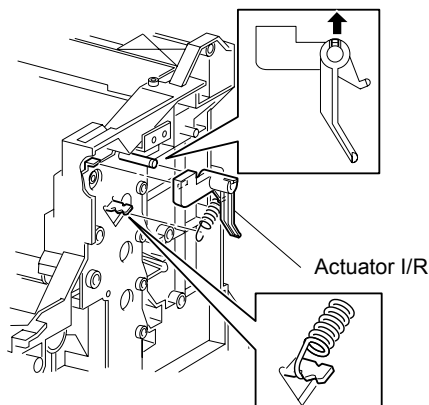


Fig.4-86

### 2.4.7 Lever drum: R

- 1) Remove 4 screws securing the plate ASSY lever R from the right side of the printer.
- 2) Remove the plate ASSY lever R from the printer.
- 3) Release the hook of the spring lever 30N hitched over the convex portion of the 4 lever drum: R from the right side of the printer.

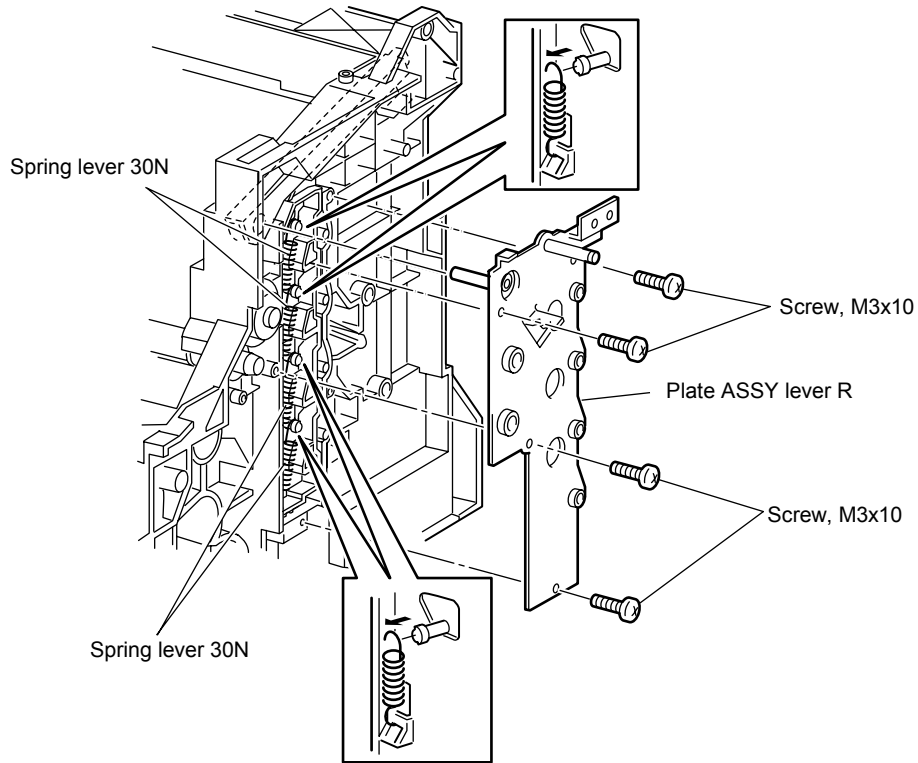


Fig.4-87

- 4) Remove the link lever: R from the printer together with the spring lever 30N.
- 5) Remove the lever drum: R from the printer.

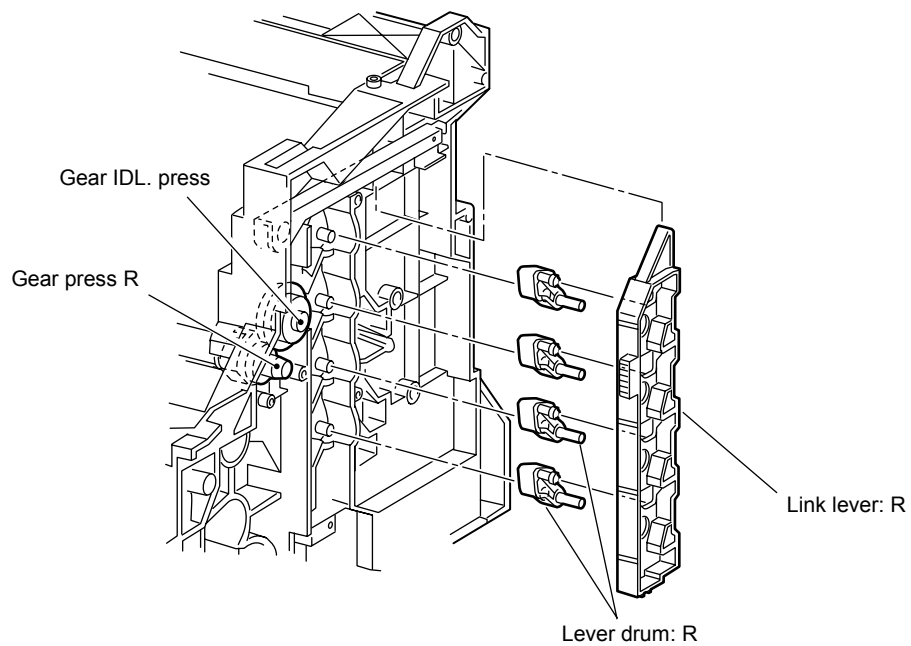
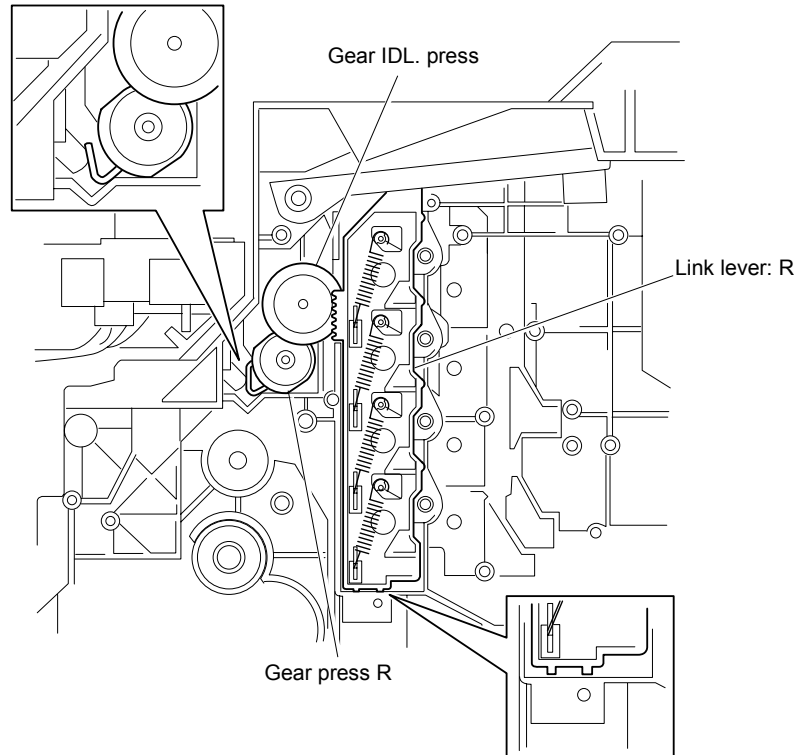


Fig.4-88



*Note:*

*When replacing the link lever: R, align the spring IDT R and the bottom of link lever: L with the positions shown in the figure (lever drum: L replacement).*



**Fig.4-89**

## 2.4.8 LVPS

- 1) Remove 2 connectors from the LVPS (164/167).
- 2) Remove the clamp guide harness at 2 positions secured on the guide harness SW of the LVPS STD.
- 3) Shift the harness from the guide harness SW.
- 4) Release the 2 hooks securing the guide harness SW to the switch bracket on the LVPS STD.
- 5) Remove the guide harness ASSY from the LVPS STD.

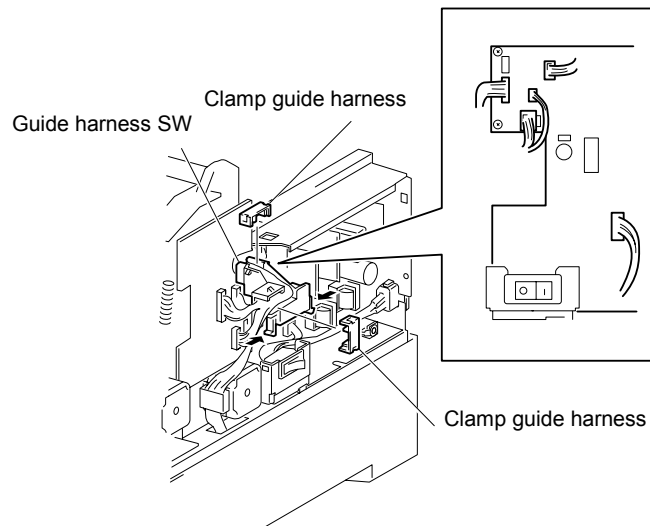


Fig.4-90

- 6) Remove 3 screws securing the LVPS STD to the printer.
- 7) Remove the LVPS STD from the printer.

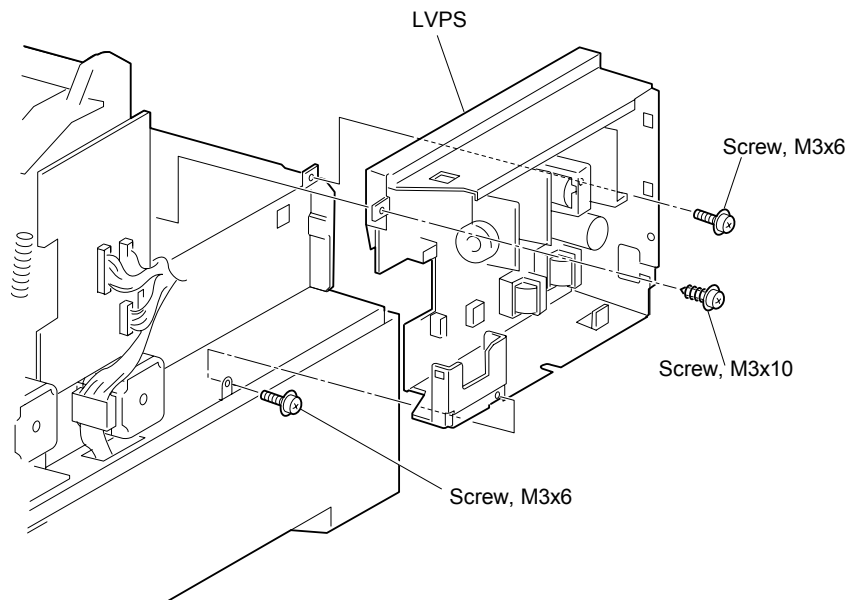


Fig.4-91

### 2.4.9 Box ASSY MCU/ESS

- 1) Remove the connector from the right side of the printer.
- 2) Remove the connector on the scanner ASSY from the right side of the printer.
- 3) Remove the connector from the left side of the printer.

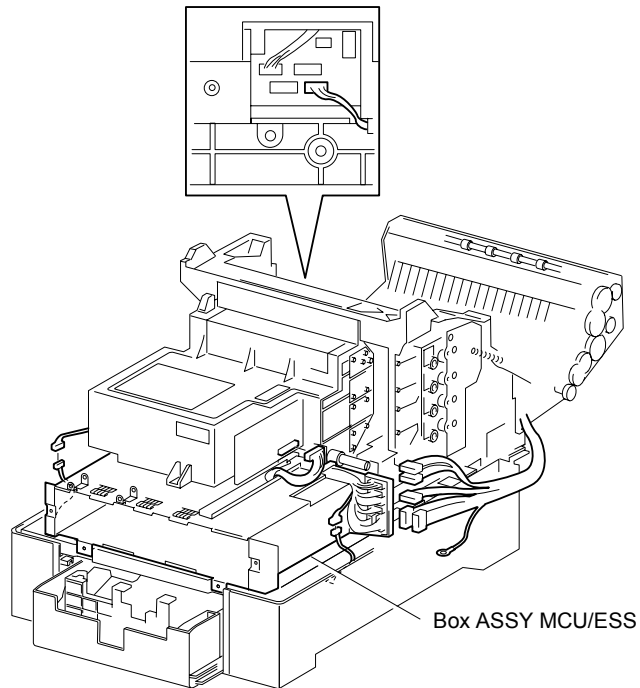


Fig.4-92

- 4) Remove 4 screws securing the box ASSY MCU/ESS to the printer.
- 5) Pull out the box ASSY MCU/ESS rearward from the printer and remove.

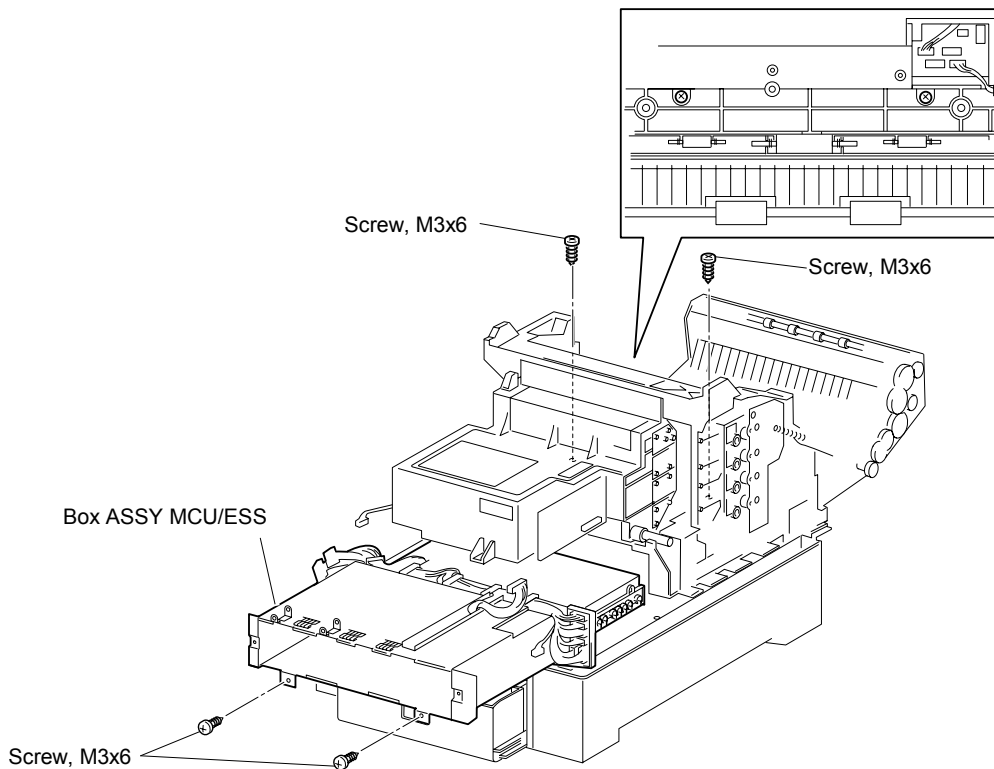
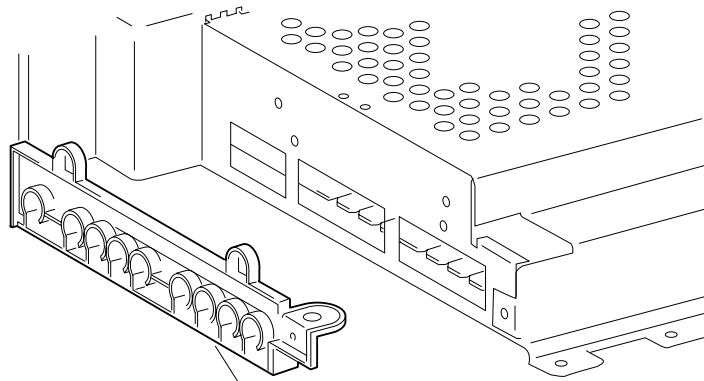


Fig.4-93

#### 2.4.10 Housing ASSY contact

- 1) Remove the housing ASSY contact from the box ASSY MCU/ESS.
- 2) Pull out the housing ASSY contact from the box ASSY MCU/ESS and remove it.



Housing ASSY contact

**Fig.4-94**

### 2.4.11 PKG service MCU HANABI

- 1) Remove 4 screws securing the cover MCU to the box ASSY MCU/ESS.
- 2) Remove the cover MCU from the box ASSY MCU/ESS.
- 3) Remove the connectors on the PKG service MCU HANABI from the box ASSY MCU/ESS.

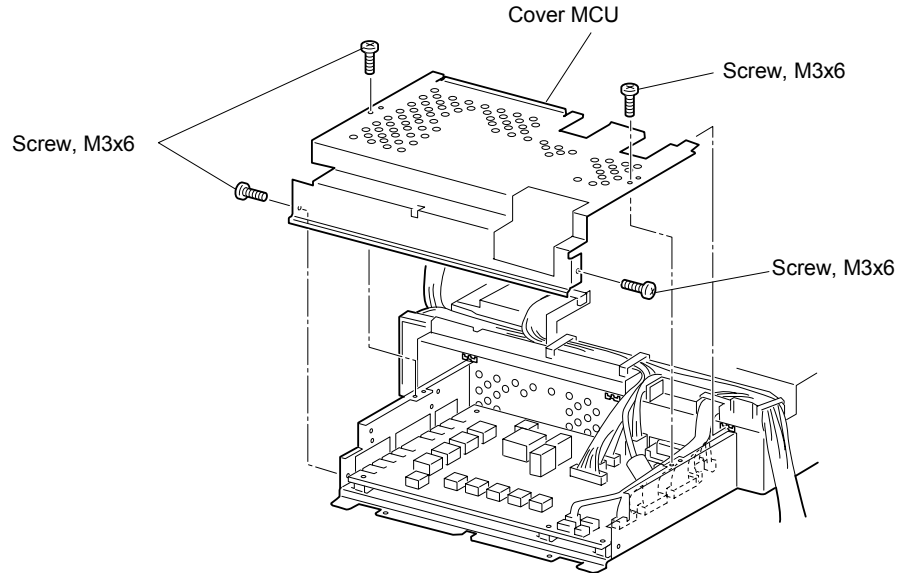


Fig.4-95

- 4) Remove 6 screws securing the PKG service MCU HANABI to the box ASSY MCU/ESS.
- 5) Remove the PKG service MCU HANABI from the box ASSY MCU/ESS.

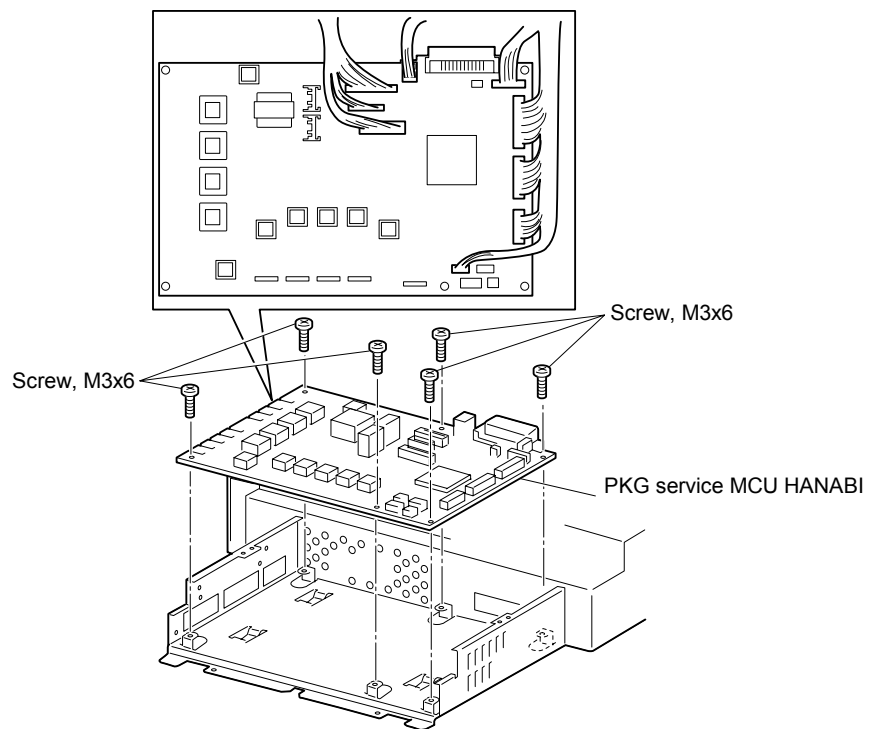


Fig.4-96

## 2.5 Paper Feed of the Printer

### 2.5.1 Chute ASSY turn

- 1) Release the 2 hooks at the front securing the chute ASSY turn to the printer feeder.
- 2) The chute ASSY will hang vertically.

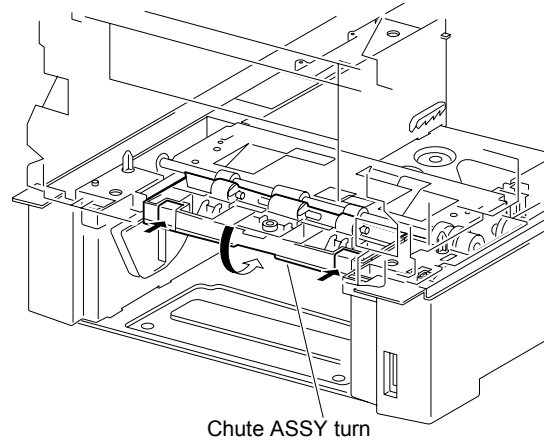


Fig.4-97

- 3) Release the hook securing the right and left shaft of the chute ASSY turn to the printer feeder.
- 4) Pull out the chute ASSY turn from the printer feeder and remove.

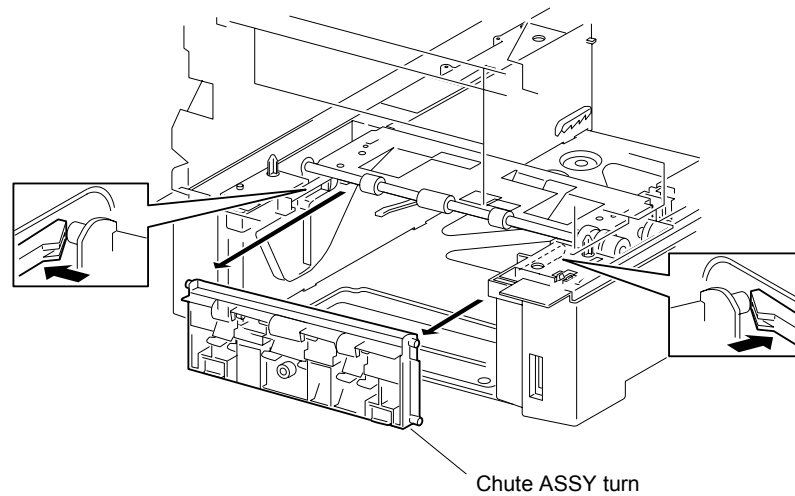


Fig.4-98

## 2.5.2 Cover cassette

- 1) Turning the cover cassette upward from the rear of the printer, pull out the cover cassette upwards to remove it.

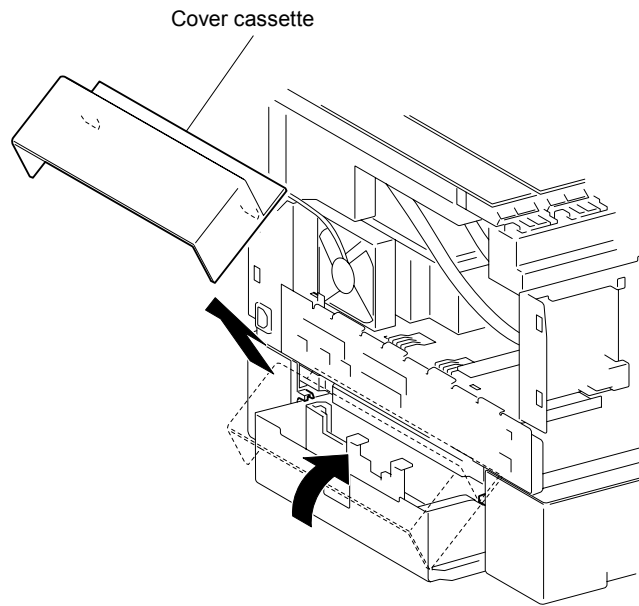


Fig.4-99

### 2.5.3 Feeder ASSY unit

- 1) Push the shaft of the link actuator secured to the actuator no paper from the printer feeder and disconnect the actuator no paper from the shaft.
- 2) Pull the link actuator from the hole in the printer feeder and remove.
- 3) Remove the connector connecting the printer and feeder ASSY unit from the left side of the printer.
- 4) Remove the 2 connectors connecting the printer and feeder ASSY unit from the right side of the printer.
- 5) Remove 8 screws securing the feeder ASSY unit to the printer.
- 6) Remove 4 long screws securing the feeder ASSY unit to the printer.



*The top unit of the printer should be raised up by more than two people.*

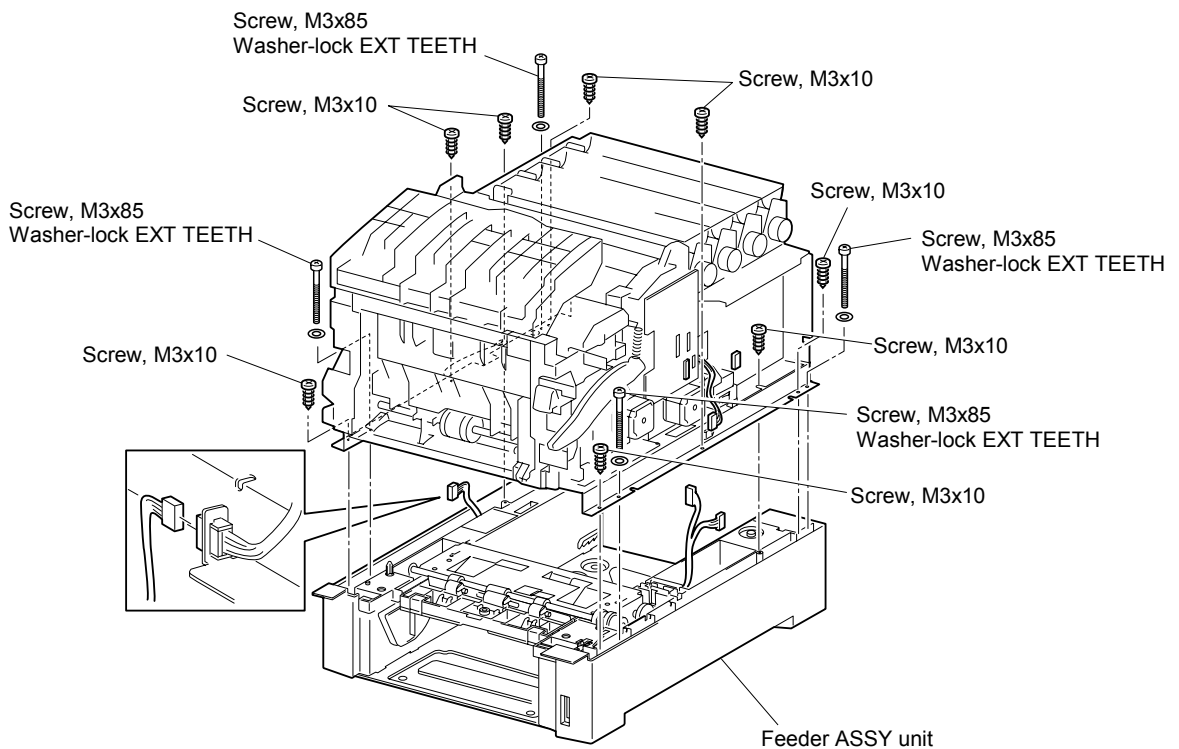
*Note:*

*When removing the top unit of the printer from the feeder ASSY unit, be careful not to drop or damage the upper part of the printer.*

- 7) Raise the printer and separate it from the feeder ASSY unit, taking care not to damage the cables.

*Note:*

*Take care not to trap the harness on the feeder ASSY unit, when replacing the printer top unit on the feeder ASSY unit.*



**Fig.4-100**



## 2.5.4 Pickup ASSY

- 1) Remove the harness of the pickup ASSY from the right hook of the feeder ASSY unit.
- 2) Disconnect the harness from the size switch.
- 3) Remove 2 screws securing the pickup ASSY to the feeder ASSY unit.
- 4) Lift the pickup ASSY from the feeder ASSY unit.

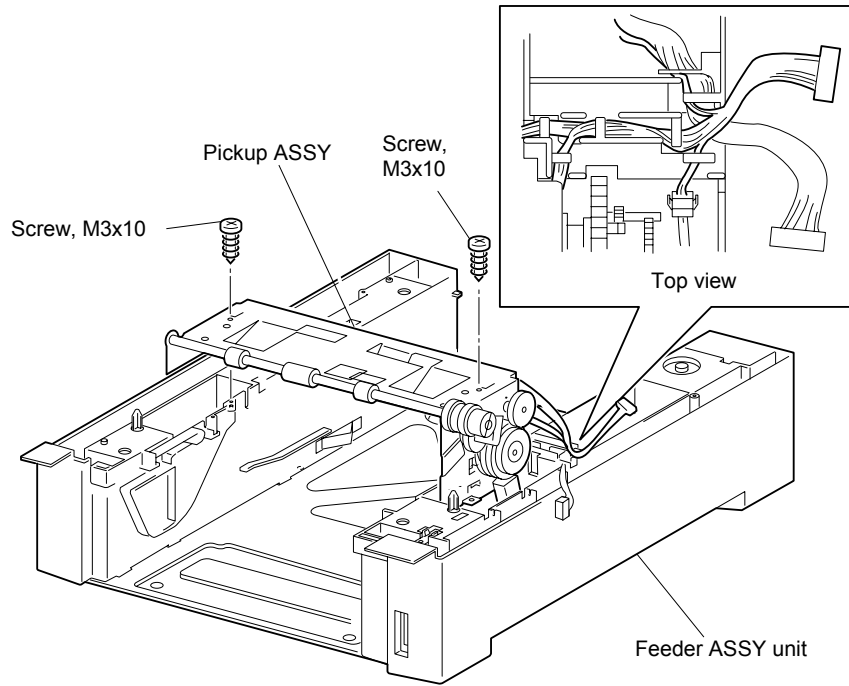


Fig.4-101

### 2.5.5 Roll ASSY feed

- 1) Rotate the shaft feed 1 (180°) so that the rubber of the roll ASSY feed L and R faces downward from the printer feeder.
- 2) Release the hook securing the roll ASSY feed L and R to the shaft feed 1 and remove the roll ASSY feeds.

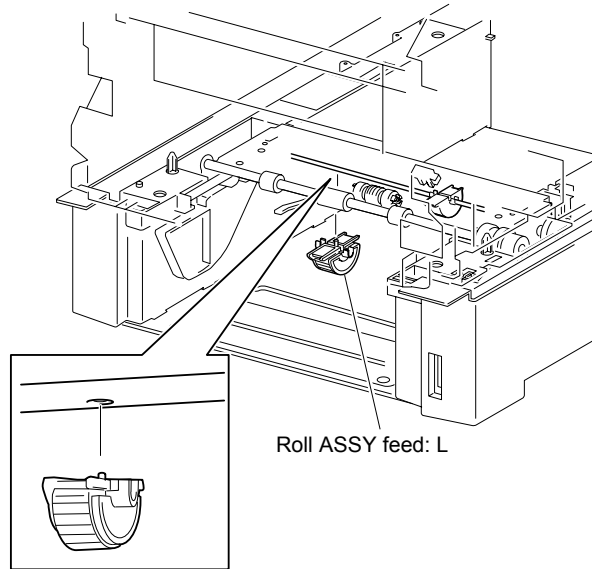


Fig.4-102

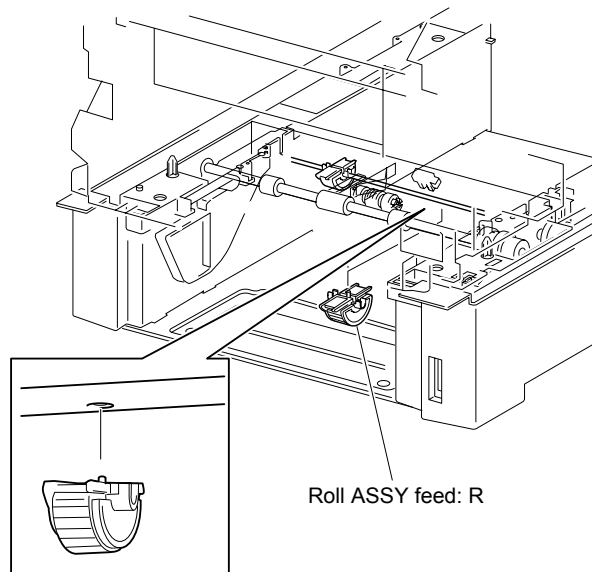


Fig.4-103

### 2.5.6 Actuator no paper

- 1) Release the hook securing the actuator no paper to the pickup ASSY and extract the left side shaft of the actuator no paper.
- 2) Pull out the actuator no paper left and upward from the pickup ASSY.

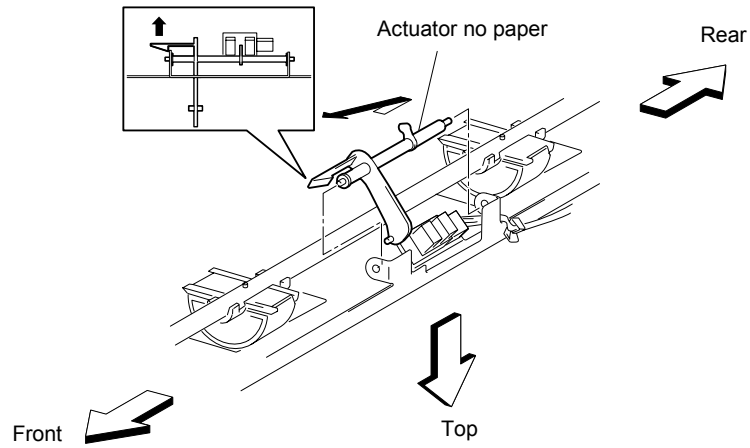


Fig.4-104

### 2.5.7 Sensor photo: No paper

- 1) Release the hooks at 3 positions securing the sensor photo: no paper to the pickup ASSY.
- 2) Remove the connector on the sensor photo: no paper.
- 3) Remove the sensor photo: no paper from the pickup ASSY.

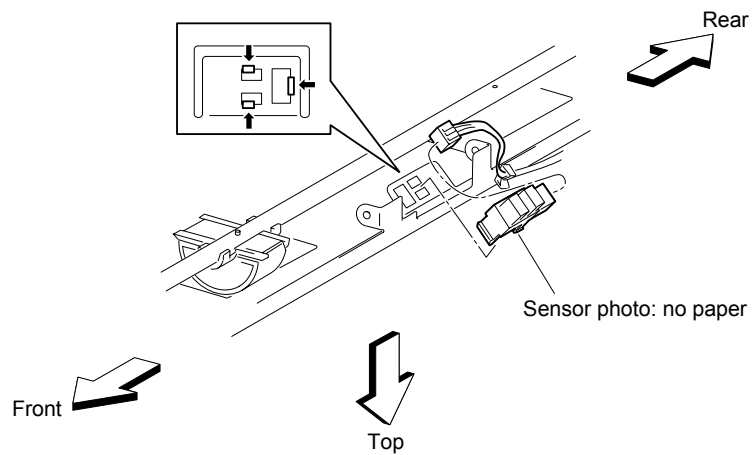


Fig.4-105

### 2.5.8 Sensor photo: Low paper

- 1) Release the hooks at 3 positions securing the sensor photo: low paper to the pickup ASSY.
- 2) Remove the connector on the sensor photo: low paper.
- 3) Remove the sensor photo: low paper from the pickup ASSY.

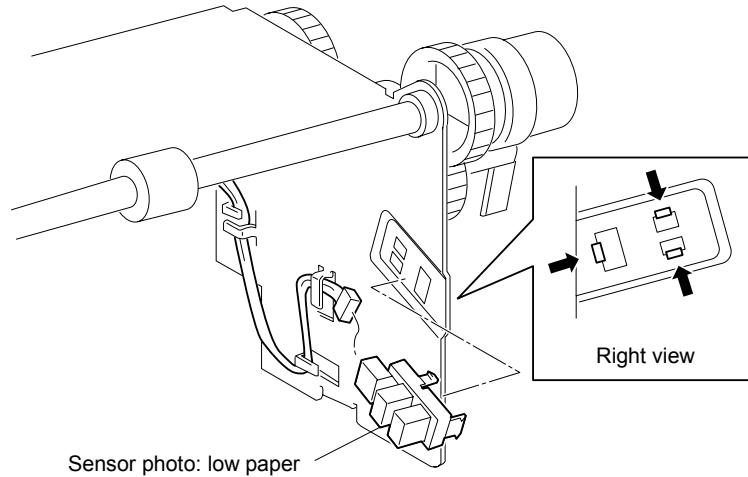


Fig.4-106

### 2.5.9 Solenoid feed

- 1) Remove 1 screw securing the solenoid feed from the pickup ASSY.
- 2) Separate the solenoid feed a little from the pickup ASSY and shift the harness of the solenoid feed.
- 3) Remove the connector of the solenoid feed from the pickup ASSY.

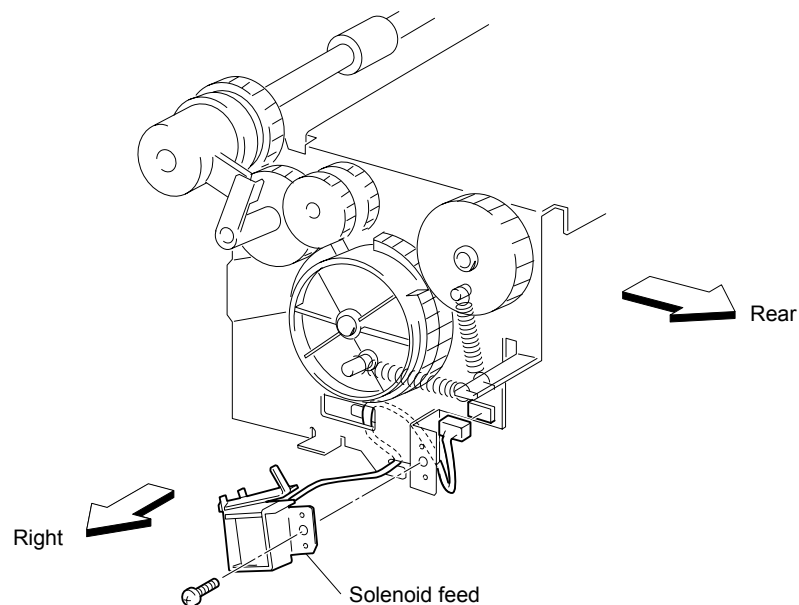


Fig.4-107

### 2.5.10 Clutch ASSY turn

- 1) Release the hook securing the stopper clutch to the shaft on the right side shaft of the pickup ASSY.
- 2) Pull out the stopper clutch from the shaft of pickup ASSY.
- 3) Remove the connector of the clutch ASSY turn from the pickup ASSY.
- 4) Pull out the clutch ASSY turn from the shaft.

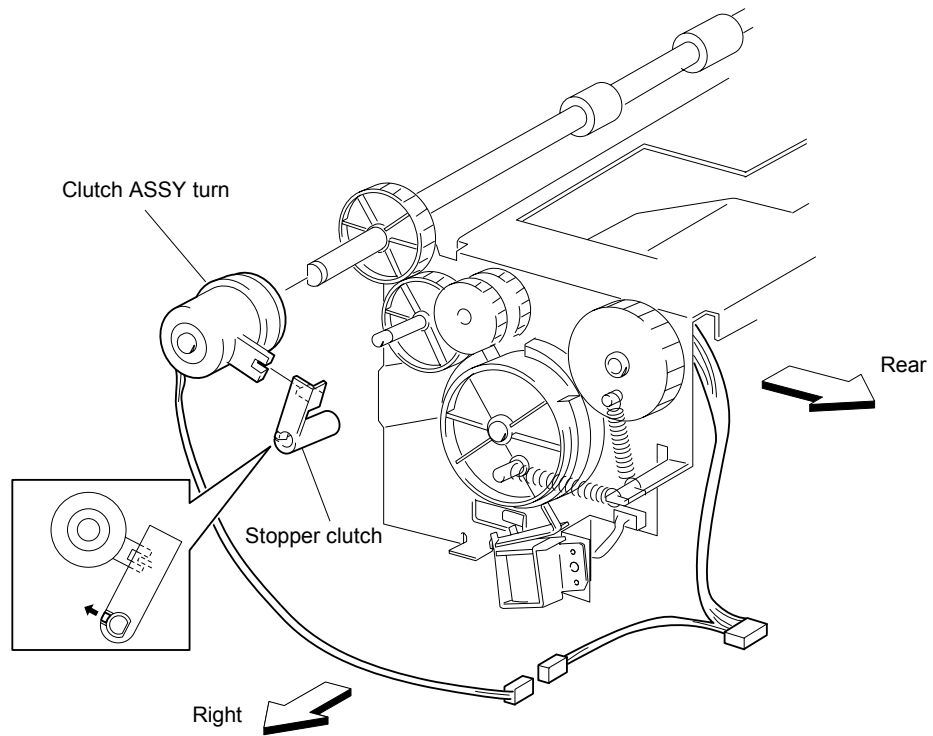


Fig.4-108

### 2.5.11 Roll ASSY turn

- 1) Release the hook securing the gear feed 2 to the shaft of the pickup ASSY and pull out gear feed 2.
- 2) Pull out the gear idler from the shaft of pickup ASSY.
- 3) Pull out the gear idler in from the shaft of the pickup ASSY.
- 4) Remove the right and left E rings securing the shaft of the roll ASSY turn to the pickup ASSY.
- 5) Remove the bush/metal securing the right shaft of the roll ASSY turn from the pickup ASSY.
- 6) Remove the bush/black securing the left shaft of the roll ASSY turn from the pickup ASSY.
- 7) Slide the roll ASSY turn from the pickup ASSY.

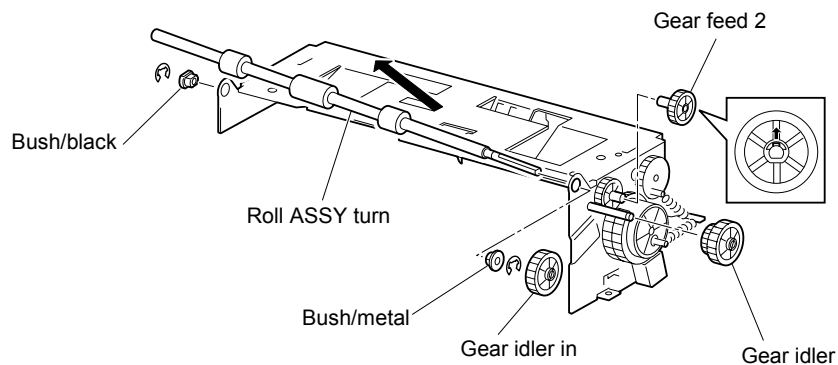


Fig.4-109

### 2.5.12 Roll ASSY

- 1) Release the hook securing the roll ASSY to the shaft feed 2.
- 2) Pull out the roll ASSY leftwards from shaft feed 2.

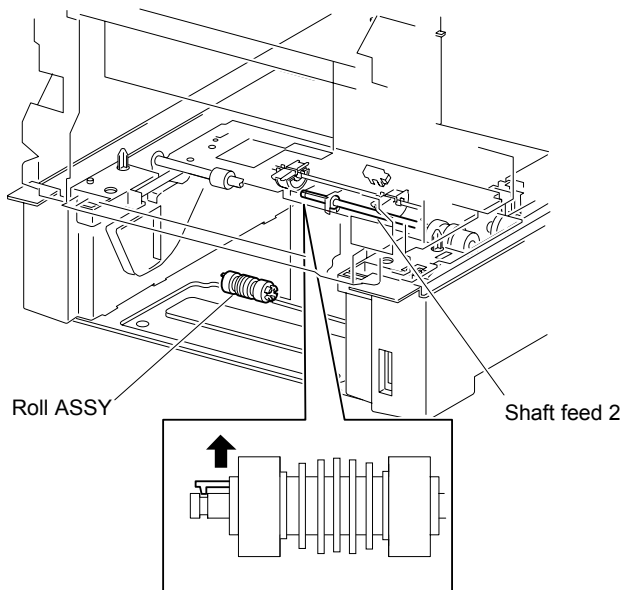


Fig.4-110

### 2.5.13 Housing ASSY feeder L

- 1) Remove 4 screws securing the housing ASSY feeder L to the plate bottom.

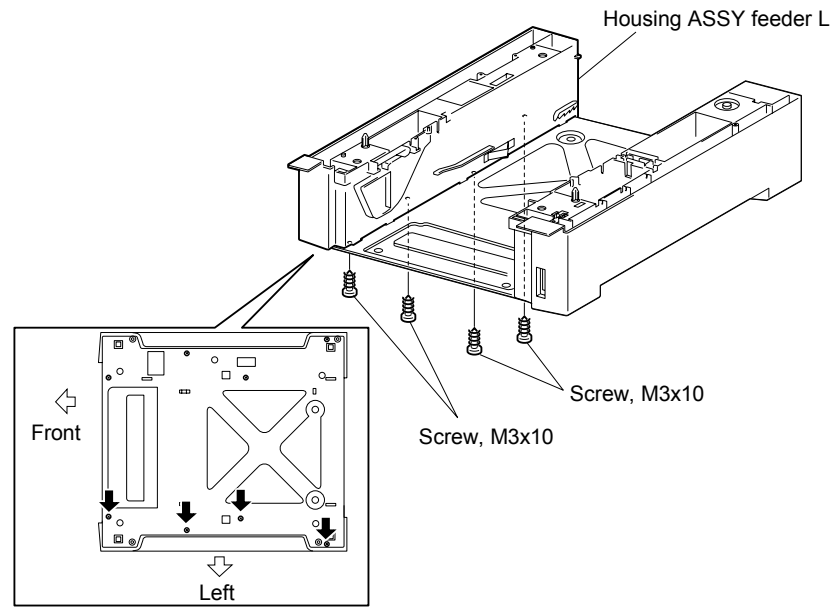


Fig.4-111

- 2) Pull down the housing ASSY feeder L inward and extract the 3 hooks out of the hole at the plate bottom.
- 3) Remove the housing ASSY feeder L upward from the plate bottom.

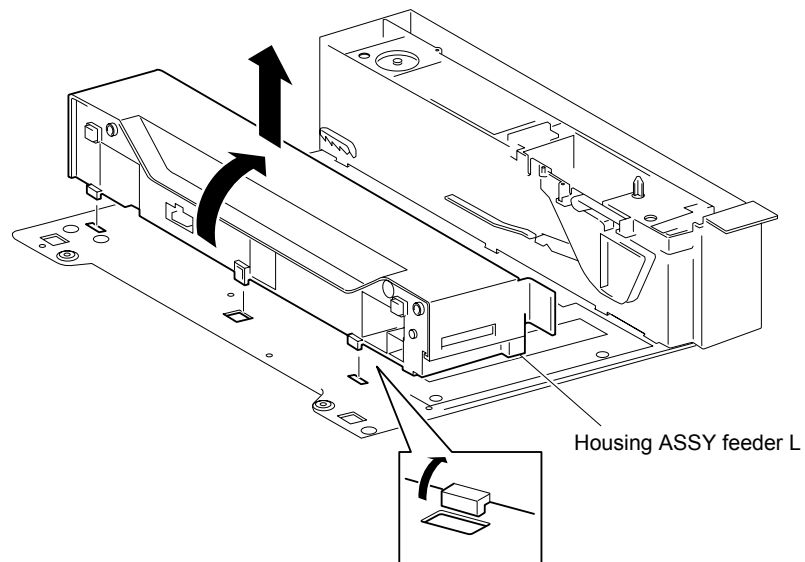


Fig.4-112

### 2.5.14 Sensor HUM temp

- 1) Remove the screw securing the sensor HUM temp.
- 2) Remove the harness ASSY TMPA.

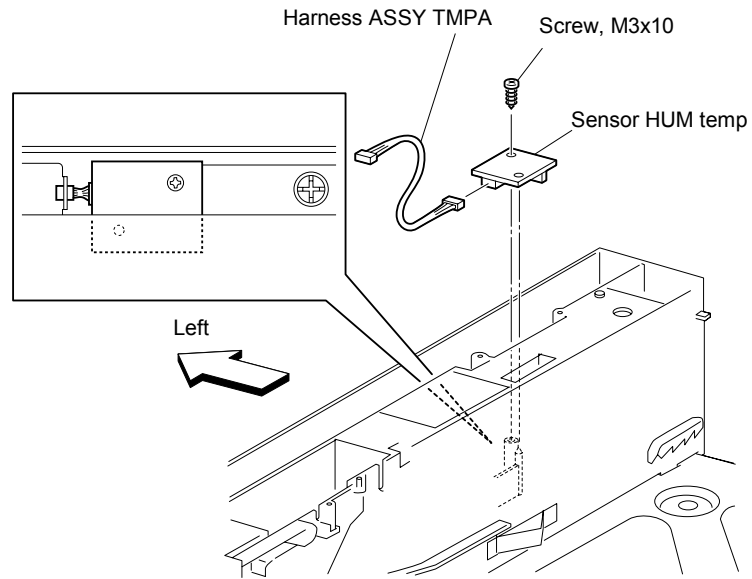


Fig.4-113



### 2.5.15 Housing ASSY feeder R

- 1) Remove 4 screws securing the support feeder left to the plate bottom.

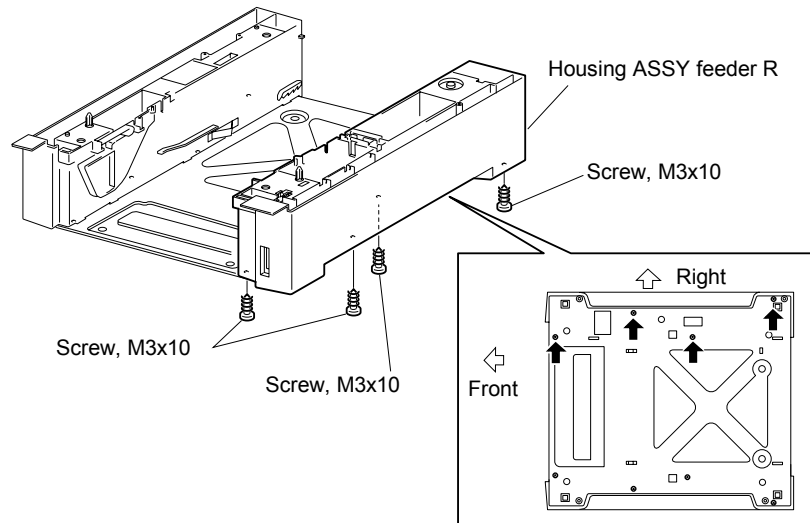


Fig.4-114

- 2) Pull down the housing ASSY feeder R inward and extract the 3 hooks out of the hole at the plate bottom.
- 3) Remove the housing ASSY feeder R upward from the plate bottom.

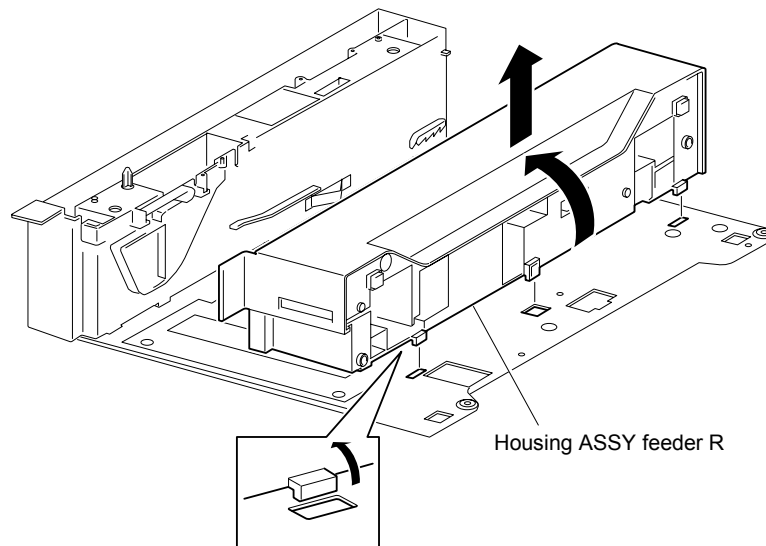


Fig.4-115

### 2.5.16 Harness ASSY OPFREC

- 1) Release the harness ASSY OPFREC from the housing ASSY feeder R of the feeder ASSY unit.
- 2) Release the 2 hooks securing the harness ASSY OPFREC to the housing ASSY feeder R.
- 3) Pull out the harness ASSY OPFREC downward from the housing ASSY feeder R.

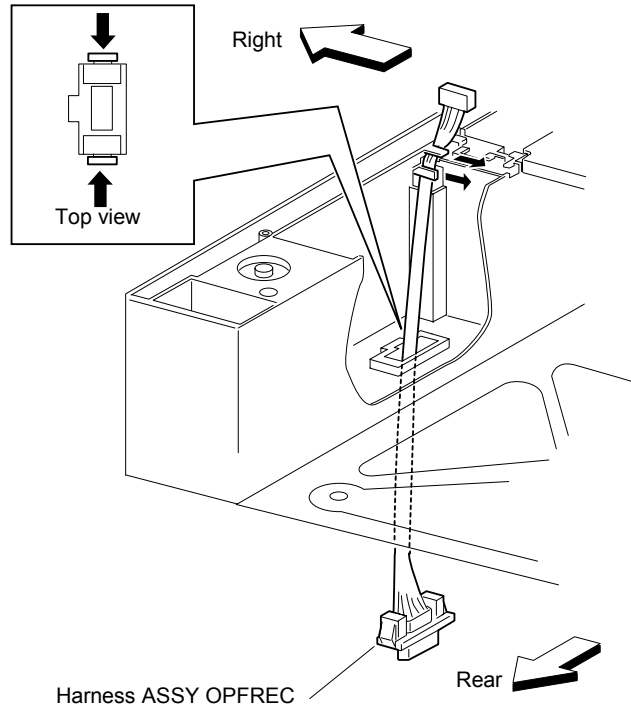


Fig.4-116

### 2.5.17 Switch ASSY size

- 1) Remove 1 screw securing the switch ASSY size to the housing ASSY feeder R.
- 2) Remove the switch ASSY size from the housing ASSY feeder R.

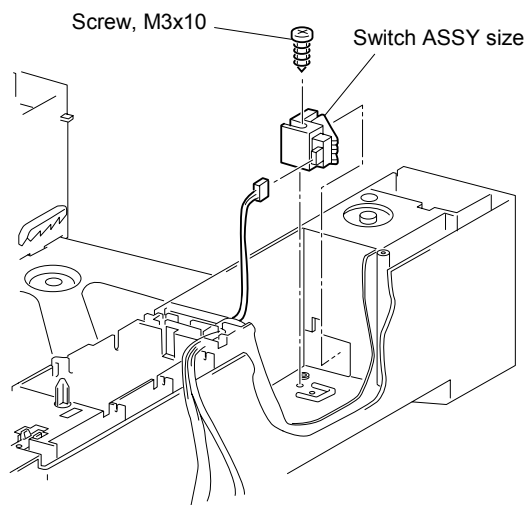


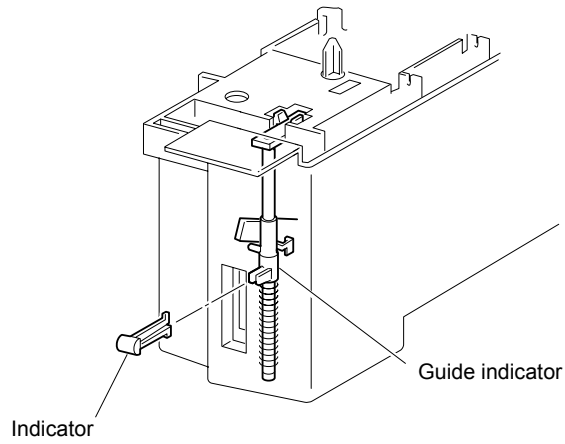
Fig.4-117

### 2.5.18 Indicator

- 1) Hold the tip of the indicator with radio pliers and pull the indicator forward and remove from the housing ASSY feeder R of the feeder ASSY unit.

*Note:*

*Hold the guide indicator, when replacing the indicator.*



**Fig.4-118**

### 2.5.19 Guide indicator

- 1) Release the 2 hooks securing the holder shaft to the housing ASSY feeder R.

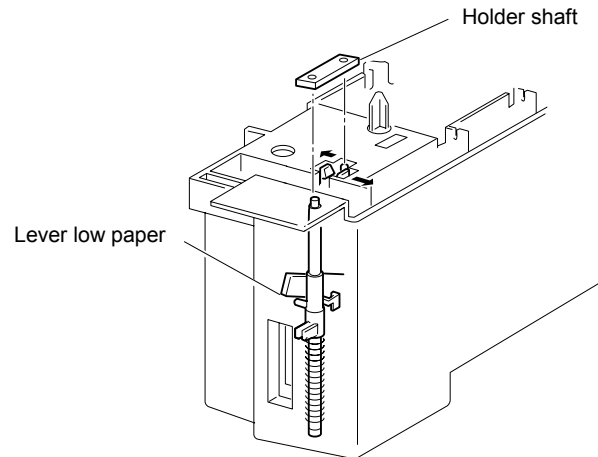


Fig.4-119

- 2) Pull out the guide indicator from the housing ASSY feeder R together with the spring indicator and shaft indicator.
- 3) Pull out the guide indicator from the shaft indicator.

*Note:*

*Put the leading end of lever low paper on a left convex portion of the guide indicator, when replacing the guide indicator.*

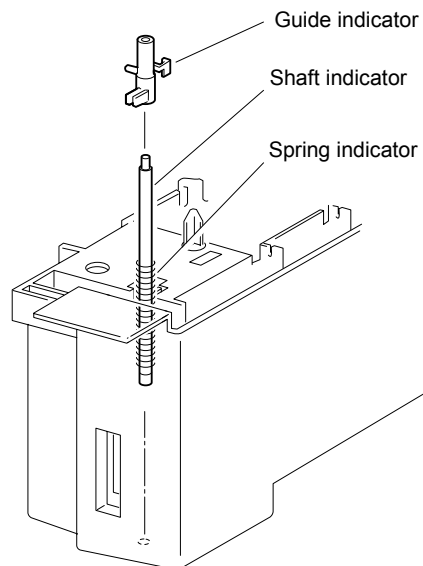


Fig.4-120

### 2.5.20 Lever low paper

- 1) Turn the housing ASSY feeder R upside down.
- 2) Push the support pillow to the left and release the lever low paper shaft.

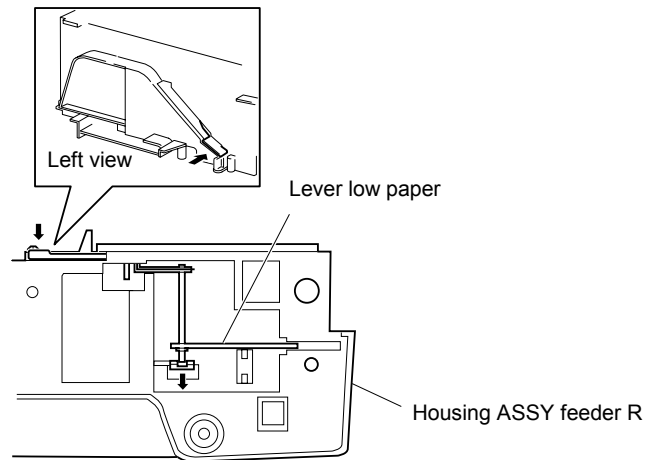


Fig.4-121

- 3) Remove the lever low paper from the housing ASSY feeder R.

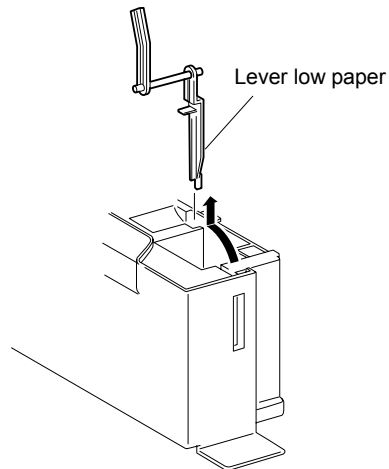


Fig.4-122

### 2.5.21 Roll ASSY

- 1) Release the cover feed secured to the cassette at one point and open the cover feed.
- 2) Release the hook securing the roll ASSY to the shaft retard from the cassette.
- 3) Pull out the roll ASSY from the shaft retard.

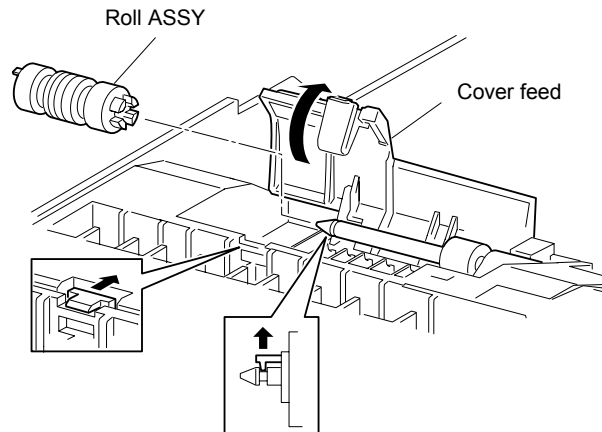


Fig.4-123

### 2.5.22 Cassette ASSY front

- 1) Release the bottom and top hook securing the cassette ASSY front from the right side of the cassette using a mini screwdriver or the like.
- 2) Release the bottom and top hook securing the cassette ASSY front from the left side of the cassette using a mini screwdriver or the like.
- 3) Pull out the cassette ASSY front from the cassette.

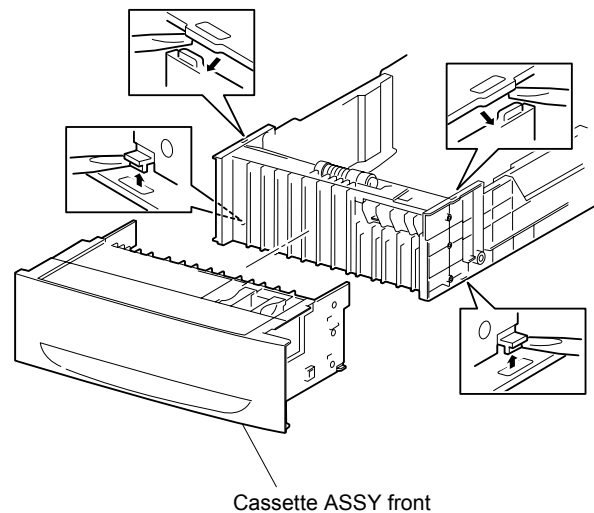


Fig.4-124

### 2.5.23 Holder retard

- 1) Remove the clutch ASSY friction on the shaft retard from the cassette.
- 2) Release the hook of the spring retard hitched to the bottom groove of the holder retard from the cassette.
- 3) Release the hook securing the top portion of the holder retard from the cassette and move the holder retard leftward.

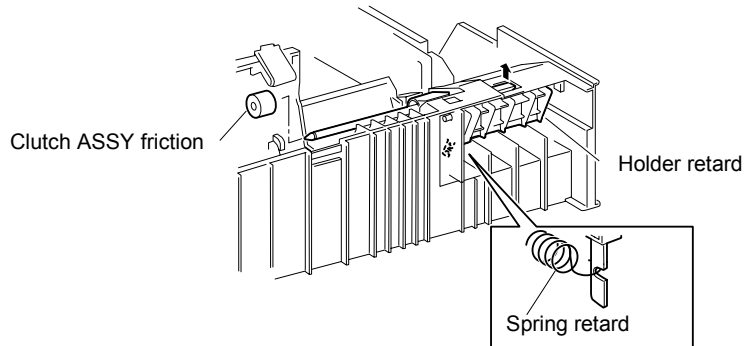


Fig.4-125

- 4) Pull out the right end of the holder retard slightly from the cassette and extract the holder retard and remove.

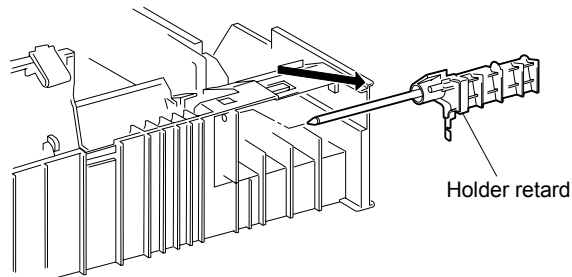


Fig.4-126

# **CHAPTER V**

## **TROUBLESHOOTING**



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# CHAPTER V TROUBLESHOOTING

## 1. PREFACE

### 1.1 Troubleshooting Procedure

The troubleshooting procedure can roughly be divided into two:

#### Level 1 troubleshooting

The level 1 FIP isolates the presence of various troubles including fail codes.

#### Level 2 Troubleshooting

Level 2 troubleshooting is a procedure in which troubles are classified by FIP, BSD or fail codes list.

### 1.2 Notes on Troubleshooting

- When replacing parts, check in advance that the connectors are connected securely.
- When replacing parts, turn the power off.
- If there are several troubles, you may refer to the same FIP again. Note that the judgment may differ in the middle even when the FIP is identical.

### **WARNING**

*When the power is on, do not touch the parts listed below. You may receive an electrical shock.*

- HVPS
- LVPS

### **WARNING**

*When the power is on, do not remove drum cartridge. An invisible laser beam may damage your eye.*

### **WARNING**

*Heat roll and pressure roll, and their peripheries become very hot. Do not touch when they are still hot. You may get burnt.*

<Terms of glossary>

Fail code: Control panel displays this code in case of a trouble.

Power off: Main power switch is off and power cord is disconnected from the outlet.



*If power off is specified in the work procedure, turn the Main power switch to off and unplug power cord from the outlet. Otherwise, you may receive an electric shock or get injured.*

Power on: Main power switch is on.

Power on/off: Turn the main power switch off and on again immediately.

Execute [DO-10]: Enter diagnostic code DO-10.

Exit [DO-10]: Exit diagnostic code DO-10.

+5VDC

H level: +4.1 to +5.6VDC

L level: -0.3 to +1.2VDC

+24VDC

H level: +21.8 to +25.8VDC

L level: -0.4 to +3.3VDC

## 2. LEVEL 1 TROUBLESHOOTING

### 2.1 Level 1 FIP

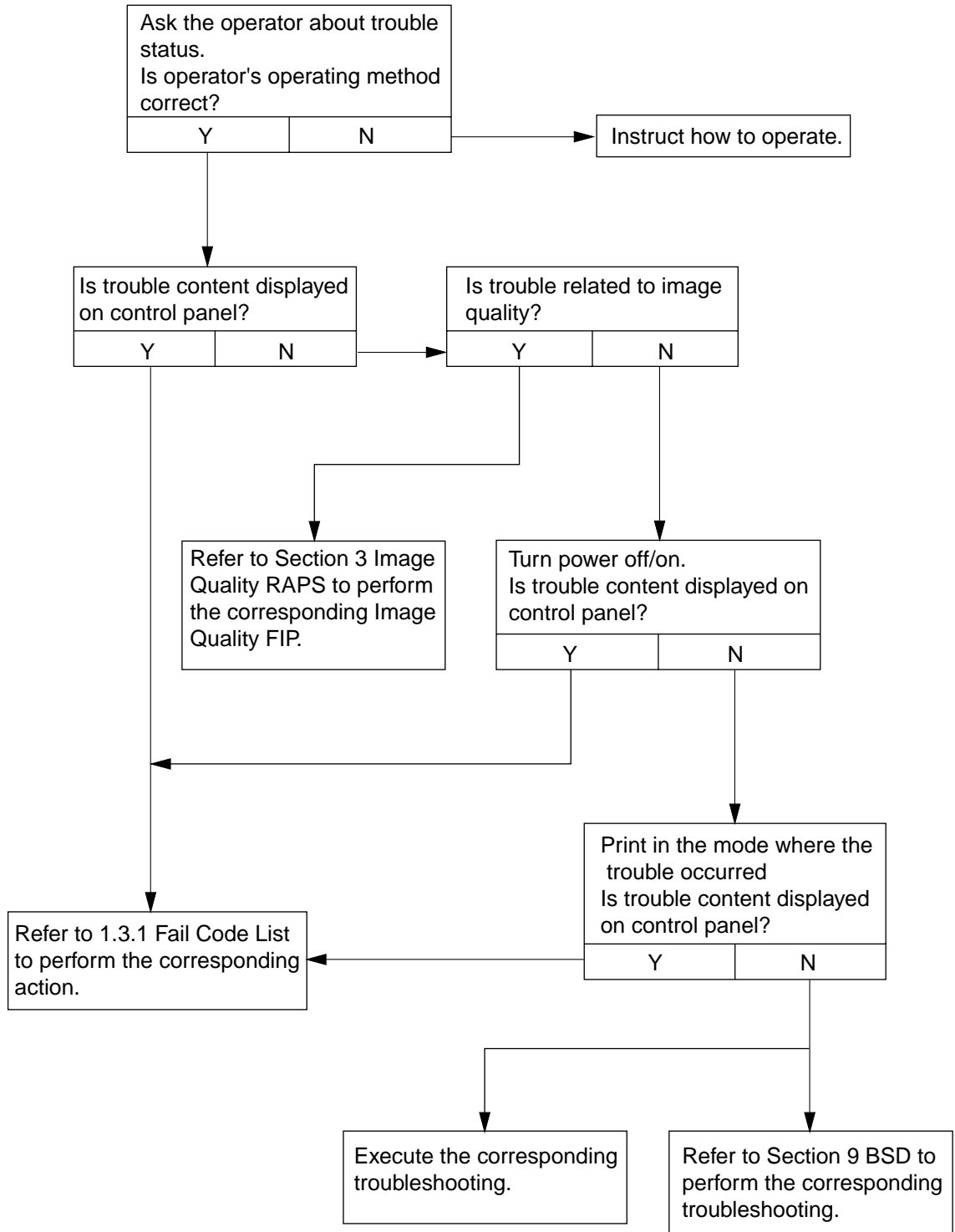


Fig.5-1

### 3. LEVEL 2 TROUBLESHOOTING

#### 3.1 Fail Code List

LCD Display	< Name of Fail > Contents of Trouble	Action	Reference BSD
001-360 Turn OFF the Power.	<IOT Fan Motor Failure> Fuser fan or rear fan fail signal detected.	Power off/on See fan motor failure FIP	2.9.3 2.9.6
003-340 Turn OFF the Power.	<IOT Firmware Error> IOT firmware error	Power off/on See firmware error FIP	2.3.1 2.3.3
003-356 Turn OFF the Power.	<IOT NVRAM Error> NVRAM error	Power off/on See NV-RAM error FIP	2.3.1 2.3.3
006-370 Turn OFF the Power.	<IOT SCANNER Failure> 1. Laser power down. 2. SOS signal not detected.	Power off/on See SCANNER failure FIP	2.5.1 2.5.2
009-340 Turn OFF the Power.	<IOT CTD Sensor Error> ADC sensor ASSY power down.	Power off/on See CTD sensor error FIP	2.8.7 2.8.8
009-342 Turn OFF the Power.	<IOT Low Density Error> Toner density is low.	Power off/on See low density error FIP	2.8.7 2.8.8
010-317 Turn OFF the Power.	<IOT Fuser Detached> Detected that the fuser ASSY is not mounted.	Power off/on See fuser detached FIP	2.9.1 2.9.6
010-350 Turn OFF the Power.	<IOT Fuser Failure> 1. Temperature exceeding 235°C detected consecutively 4 times. 2. Temperature below 120°C detected consecutively 4 times. 3. Resistance value of STS sensor over 2437KΩ detected consecutively 4 times. 4. Target temperature is not reached more than 60 seconds after the fuser lamp lighted up. 5. After the target temperature is reached, the fuser lamp was kept on for more than specified time. 6. Value of the STS sensor does not change after the lamp lights up. 7. Temperature exceeding 230°C detected during printing process consecutively twice.	Power off/on See fuser failure FIP	2.9.1 2.9.6

LCD Display	< Name of Fail > Contents of Trouble	Action	Reference BSD
010-351 Turn OFF the Power.	<IOT Fuser Life Over> Fuser ASSY life expired.	Power off/on See fuser life over FIP	2.3.1 2.3.3
010-354 Turn OFF the Power.	<IOT Environment Sensor Error> 1. The temperature over +100°C or below -20°C was detected. 2. The humidity over 100% was detected.	Power off/on See environment sensor error FIP	2.8.7 2.8.8
016-300 Turn OFF the Power.	<ESS Data Cache Error> CPU data cache error	Power off/on	2.3.1 2.3.3
016-301 Turn OFF the Power.	<ESS Instruction Cache Error> CPU instruction cache error	Power off/on	2.3.1 2.3.3
016-302 Turn OFF the Power.	<ESS Illegal Exception> CPU illegal exception	Power off/on	2.3.1 2.3.3
016-317 Turn OFF the Power.	<ESS ROM Check (Main) Fail> Main program ROM checksum error	Power off/on	2.3.1 2.3.3
016-310 Turn OFF the Power.	<ESS Font ROM Error (Main)> Internal font ROM checksum error	Power off/on	2.3.1 2.3.3
016-315 Turn OFF the Power.	<ESS On-Board RAM W/R Check Fail > Detected by RAM W/R check at initialize	Power off/on	2.3.1 2.3.3
016-316 Turn OFF the Power.	<ESS RAM DIMM W/R Check Fail > Detected by standard RAM W/R check at initialize.	Power off/on	2.3.1 2.3.3
016-323 Turn OFF the Power.	<ESS NVRAM1 W/R Check Fail > Detected by Master NVRAM W/R check.	Power off/on	2.3.1 2.3.3
016-324 Turn OFF the Power.	<ESS NVRAM2 W/R Check Fail > Detected by backup NVRAM W/R check.	Power off/on	2.3.1 2.3.3
016-325 Turn OFF the Power.	<ESS NVRAM3 W/R Check Fail > Detected by NVRAM W/R check for print log.	Power off/on	2.3.1 2.3.3
016-326 Turn OFF the Power.	<ESS NVRAM4 W/R Check Fail > Detected by NVRAM W/R check for print log	Power off/on	2.3.1 2.3.3

LCD Display	< Name of Fail > Contents of Trouble	Action	Reference BSD
016-327 Turn OFF the Power.	<ESS NVRAM1 ID Check Fail > This error occurs if the backup device is inserted in master socket.	Replace with the correct device.	2.3.1 2.3.3
016-328 Turn OFF the Power.	<ESS NVRAM2 ID Check Fail > This error occurs if the master device is inserted in backup socket.	Replace with the correct device.	2.3.1 2.3.3
016-330 Turn OFF the Power.	<NIC-ESS Communication Fail > Communication fail between NIC and ESS	Power off/on	2.3.1 2.3.3
016-331 Turn OFF the Power.	<NIC Flash ROM Boot Module Checksum Error>	Power off/on	2.3.1 2.3.3
016-332 Turn OFF the Power.	<NIC RAM R/W Test Error>	Power off/on	2.3.1 2.3.3
016-333 Turn OFF the Power.	<NIC Flash ROM Application Module Checksum Error>	Power off/on	2.3.1 2.3.3
016-334 Turn OFF the Power.	<NIC MAC Address Checksum Error>	Power off/on	2.3.1 2.3.3
016-335 Turn OFF the Power.	<NIC Ethernet BIST parity/RAM R/W Error>	Power off/on	2.3.1 2.3.3
016-336 Turn OFF the Power.	<NIC Internal Loopback Error>	Power off/on	2.3.1 2.3.3
016-340 Turn OFF the Power.	<On Board Network Communication Fail > Communication fail between CPU network and ESS F/W	Power off/on	2.3.1 2.3.3
016-344 Turn OFF the Power.	<On Board Network MAC Address Checksum Error>	Power off/on	2.3.1 2.3.3
016-345 Turn OFF the Power.	<On Board Network Ethernet BIST parity/RAM R/W Error>	Power off/on	2.3.1 2.3.3
016-346 Turn OFF the Power.	<On Board Network Internal Loopback Error>	Power off/on	2.3.1 2.3.3
016-312 Turn OFF the Power.	<ESS HD Fail > Detected by a HDD error.	Power off/on	2.3.1 2.3.3



LCD Display	< Name of Fail > Contents of Trouble	Action	Reference BSD
016-313 Turn OFF the Power.	<ASIC Fail > TBD	Power off/on	2.3.1 2.3.3
016-360 Turn OFF the Power.	<PCI Option#0 Fail> PCI option 0 detection error	Power off/on	2.3.1 2.3.3
016-361 Turn OFF the Power.	<PCI Option#1 Fail> PCI option 1 detection error	Power off/on	2.3.1 2.3.3
016-314 Turn OFF the Power.	<Video Sync Fail> Detected by an incorrect synchronous signal input.	Power off/on	2.3.1 2.3.3
016-350 Turn OFF the Power.	<IEEE1284 Data Error> Detected by IEEE1284 controller.	Power off/on	2.3.1 2.3.3
016-370 Turn OFF the Power.	<IOT-ESS Communication Fail > Communication fail between IOT and ESS	Power off/on	2.3.1 2.3.3
Initialising Press set	<NVM Fail > Checking that values wrote at NVM Initializing have been retained in the specified area on NVM.	Perform usual startup by Key On to initialize NVM.	2.3.1 2.3.3
Duplex Jam Open B-Cover	<IOT Duplex JAM> Duplex jam sensor cannot detect passage of paper within specified time.	Remove the jammed paper. See duplex JAM FIP	2.9.4 2.9.6
Fuser Jam Open A/B-Cover	<IOT Fuser JAM> Exit sensor cannot detect passage of paper within specified time.	Remove the jammed paper. See fuser JAM FIP	2.9.1 2.9.6
Regi. Jam Open A-Cover	<IOT Regi JAM> Regi sensor cannot detect passage of paper within specified time.	Remove the jammed paper. See Regi JAM FIP	2.7.6 2.7.7
Feed Jam Check Tray	<IOT Feed JAM> Regi sensor cannot detect passage of paper within specified time.	Remove the jammed paper. See feed JAM FIP	2.7.6 2.7.7
Transp. Error Open A-Cover	<IOT Media Type Mismatch> 1. Plain paper detected for a job that is specified transparency, 2. Transparency detected for a job that is specified plain paper.	Remove the jammed paper. Change paper stock. See media type mismatch FIP	2.8.3 2.8.8

LCD Display	< Name of Fail > Contents of Trouble	Action	Reference BSD
Reinsert Xxxxx Toner (X)	<IOT X Toner Detached> Toner cartridge switch ASSY detected that the toner cartridge is not mounted.	Insert toner cartridge. See toner cartridge detached FIP.  Xxxxx indicates Yellow toner (Y), Cyan toner (C), Magenta toner (M) or Black toner (K).	2.8.7 2.8.8
Reinsert Transfer Roll	<IOT transfer roll cartridge Detached> Detected that the transfer roll cartridge unit ASSY is not mounted.	Insert transfer roll cartridge unit ASSY. See transfer roll cartridge detached FIP	2.8.7 2.8.8
Set Print Head Cartridge	<IOT print head cartridge E Detached> Detected that the print head cartridge ASSY is not mounted.	Insert print head cartridge ASSY. See print head cartridge detached FIP	2.3.2 2.3.3
Replace Xxxxx Toner (X)	<IOT X Toner Empty> Toner empty detected.	Replace toner cartridge. See Yellow toner empty FIP, Magenta toner empty FIP, Cyan toner empty FIP or Black toner empty FIP  Xxxxx indicates Yellow toner (Y), Cyan toner (C), Magenta toner (M) or Black toner (K).	2.8.5 2.8.8

LCD Display	< Name of Fail> Contents of Trouble	Action	Reference BSD
Replace Transfer Roll	<IOT transfer roll cartridge Life Over> Transfer roll cartridge ASSY life expired.	Replace transfer roll cartridge ASSY. See transfer roll cartridge life over FIP	2.8.7 2.8.8
Replace Print Head Cartridge	<IOT print head cartridge Life Over> Print head cartridge ASSY life expired.	Replace print head cartridge ASSY. See print head cartridge life over FIP	2.3.2 2.3.3
Print Head Cart ID Error	<IOT CRUM ID Error> ID is different from one that is recorded in print head cartridge ASSY ID.	Replace print head cartridge ASSY. See CRUM ID error FIP	2.3.2 2.3.3
Clean Up CTD Sensor	<IOT CTD Sensor Dustiness> ADC sensor ASSY signal level below the specified value.	Clean ADC sensor ASSY. See CTD sensor dustiness FIP	2.8.7 2.8.8
Close Front Cover	<IOT Front Cover Open> Font cover is open.	Close the front cover. See front cover FIP	2.1.1 2.1.2
Empty Exit Tray	<IOT Standard Stacker Full> Exit tray is full.	Remove output paper stack. See full stack FIP	2.9.4 2.9.6
(During job waiting or auto paper feeding) Push in a Tray (When a tray is specified) Push in Tray N	<Tray Detached> <ul style="list-style-type: none"> <li>• All existing trays are open during job waiting or auto paper feeding. (All Tray Detached)</li> <li>• The specified tray is open when a tray is specified. (Specified Tray Detached)</li> </ul>	Push in the tray. N indicates the tray no.	2.6.1 2.6.2 2.6.3 2.6.4

LCD Display	< Name of Fail > Contents of Trouble	Action	Reference BSD
(When paper is being fed from a tray) Check Paper in Tray N (When paper is being fed from manual tray) Check Paper in MP Tray	<IOT Paper Size Mismatch> Paper Size Mismatch detected.	Open/close the tray. Or, reload the manual feed paper. N indicates the tray no.	2.6.1 2.6.2 2.6.3 2.6.4
(When auto select is specified) Load XX in a Tray (When a tray is specified) Load XX in Tray X (When manual feed is specified) Load XX in Manual Tray (During job waiting) One step tray configuration: No Paper in Tray N N steps tray configuration: No Paper in All Trays	<No Suitable Paper> <ul style="list-style-type: none"> <li>• All existing trays are open during job waiting or auto paper feeding. (All tray empty)</li> <li>• All existing trays are different in size when auto paper feeding is selected. (All tray size mismatch)</li> <li>• The specified tray is empty when a paper tray is specified (Specified tray empty)</li> <li>• Paper loaded in the specified tray is different from the size specified in the job when a paper tray is specified. (Specified tray size mismatch)</li> </ul>	Load the specified paper in the tray.  N indicates the tray no. XX indicates paper size.	2.6.1 2.6.2 2.6.3 2.6.4 2.7.2 2.7.7
(When auto select is specified) Push in the Tray (When a tray is specified) Push in All Trays	Upper Cassette Detached> <ul style="list-style-type: none"> <li>• Any one of trays upper than the feedable tray is open when auto tray select is specified.</li> <li>• Any one of trays upper than the specified tray is open when a tray is specified.</li> </ul>	Set the tray See upper cassette detached FIP N indicates the tray No. immediately above the specified tray.	2.6.1 2.6.2 2.6.3 2.6.4
Out of Memory Please Press Set	<Memory Overflow>	Press the set key. The processing will continue. (Job is cleared.)	

LCD Display	< Name of Fail> Contents of Trouble	Action	Reference BSD
Overrun Error Please Press Set	<Overrun>	Press the set key. The processing will continue. (Job is printed from the next page)	
Disk Full Please Press Set	<Harddisk Full>	Press the set key. The processing will continue. (Job is cleared.)	
PCL6 Error %u Please Press Set	<PDL Error>	Press the set key. The processing will continue. (Job is cleared.)	
PDF Error %u Please Press Set	<PDF Error>	Press the set key. The processing will continue. (Job is cleared.)	
PDF Extract Error Please Press Set	<PDF Compression Error >	Press the set key. The processing will continue. (Job is cleared.)	
PDF Wrong Passwd Please Press Set	<PDL Password Error>	Press the set key. The processing will continue. (Job is cleared.)	
Operation Error Please Press Set	<Job Environment Violation> A violation in the print condition founded.	Press the set key. The processing will continue. (Job is cleared.)	

LCD Display	< Name of Fail > Contents of Trouble	Action	Reference BSD
Ready to Print Need Replacement	<IOT X Toner Near Empty> The X toner is low	No action required. See Yellow toner empty FIP See Magenta toner empty FIP See Cyan toner empty FIP See Black toner empty FIP CRU Warning: Xxxxx indicates Yellow toner (Y), Cyan toner (C), Magenta toner (M) or Black toner (K).	
Ready to Print Need Replacement Transfer Roll	<Transfer roll cartridge Life Warning> Transfer roll cartridge unit ASSY is near the end of its life.	No action required. See transfer roll cartridge life over FIP CRU Warning:	
Ready to Print Need Replacement Print Head Cart	<Print head cartridge Life Warning> Print head cartridge ASSY is near the end of its life.	No action required. See print head cartridge life over FIP CRU Warning:	
Ready to Print Need Maintenance CTD Sensor	<ERU Warning> ADC sensor ASSY signal level below the specified value.	No action required. See CTD sensor dustiness FIP	

LCD Display	< Name of Fail > Contents of Trouble	Action	Reference BSD
No display	<IOT X Cassette Near Empty> Paper level is low in the X cassette.	No action required. Tray1 paper near empty FIP, Tray2 paper near empty FIP See Tray3 paper near empty FIP	
Ready to Print ServiceCallJJXXXXXXX	<ERU Warning> Fuser ASSY is near the end of its life.	No action required. See fuser life over FIP  ERU Warning: XXXXXXXX indicates ERU No. 1:Fuser unit	

### 3.2 Fail FIP

#### Base Engine

#### 001-360 Fan Motor Failure FIP(PL)

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Fuser fan replacing condition Rear fan replacing condition	Replace the parts concerned	Go to step [2]
2	Isolating faulty fan Does the fan rear rotate when printing 1 sheet?	Go to step [3]	Go to step [15]
3	Checking fan rear Does fan rear function normally? Using rear fan diagnostic tool, check by digital output test.	Replace MCU and HVPS PWB	Go to step [4]
4	Checking LVPS for signal Print 1 sheet. Is P/J166-1PIN<=>P/J166-3PIN 24VDC?	Replace MCU PWB	Replace harness
5	Checking LVPS for signal Print 1 sheet. Is P/J165-6PIN<=>P/J165-2PIN 0VDC?	Go to step [6]	Replace LVPS
6	Checking drive PWB for signal Print 1 sheet. Is P/J61-3PIN<=>P/J61-7PIN 0VDC?	Go to step [7]	Replace harness ASSY LVNC
7	Checking DRIVE PWB for signal Print 1 sheet. Is P/J42-12PIN<=>P/J42-14PIN 0VDC?	Go to step [8]	Replace drive PWB
8	Checking MCU and HVPS PWB for signal Print 1 sheet. Is P/J12-19PIN<=>P/J12-17PIN 0VDC?	Replace MCU and HVPS PWB	Replace harness ASSY DRV2
9	Checking rear fan Check if an error occurs though the rear fan was replaced with a new one.	Go to step [10]	End of work
10	Checking LVPS for signal Print 1 sheet. Is P/J166-2PIN<=>P/J166-3PIN +3.3VDC?	Replace rear fan	Go to step [11]
11	Checking LVPS for signal Print 1 sheet. Is P/J165-7PIN<=>P/J165-2PIN +3.3VDC?	Replace LVPS	Go to step [12]
12	Checking drive PWB for signal Print 1 sheet. Is P/J61-2PIN<=>P/J61-7PIN +3.3VDC?	Replace harness ASSY LVNC	Go to step [13]



Step	Check	Remedy	
		Yes	No
13	Checking drive PWB for signal Print 1 sheet. Is P/J42-29PIN<=>P/J42-14PIN +3.3VDC?	Replace drive PWB	Go to step [14]
14	Checking MCU and HVPS PWB for signal Print 1 sheet. Is P/J12-2PIN<=>P/J12-17PIN +3.3VDC?	Replace harness ASSY DRV2	Replace MCU and HVPS PWB
15	Checking fuser fan Does fuser fan function normally? Using fuser fan diagnostic tool, check by digital output test.	Replace MCU and HVPS PWB	Go to step [16]
16	Checking drive PWB for signal Print 1 sheet. Is P/J50-7PIN<=>P/J50-9PIN +24VDC?	Go to step [19]	Go to step [17]
17	Checking drive PWB for signal Print 1 sheet. Is P/J42-30PIN<=>P/J42-14PIN 0VDC?	Go to step [18]	Replace drive PWB
18	Checking MCU and HVPS PWB for signal Print 1 sheet. Is P/J12-1PIN<=>P/J12-17PIN 0VDC?	Replace MCU and HVPS PWB	Replace harness ASSY DRV2
19	Checking harness ASSY DUP for continuity Is J50<=>J137 continuous normally?	Go to step [20]	Replace harness ASSY DUP
20	Checking fuser fan Check if an error occurs though the fuser fan was replaced with a new one.	Replace Go to step [21]	End of work
21	Checking drive PWB for signal Print 1 sheet. Is P/J50-8PIN<=>P/J50-9PIN +3.3VDC?	Fuser fan	Go to step [22]
22	Checking drive PWB for signal Print 1 sheet. Is P/J42-27PIN<=>P/J42-14PIN +3.3VDC?	Replace drive PWB	Go to step [23]
23	Checking MCU and HVPS PWB for signal Print 1 sheet. Is P/J12-4PIN<=>P/J12-17PIN +3.3VDC?	Replace harness ASSY DRV2	Replace MCU and HVPS PWB

**003-340 Firmware Error FIP**

Step	Check	Remedy	
		Yes	No
1	Does an error occur even if the power is turned off and on?	Replace MCU and HVPS PWB	If the error recurs, replace MCU and HVPS PWB

**003-356 NV-RAM Error FIP**

Step	Check	Remedy	
		Yes	No
1	Does an error occur even if the power is turned off and on?	Replace MCU and HVPS PWB	If the error recurs, replace MCU and HVPS PWB

**006-370 Scanner Failure FIP**

Step	Check	Remedy	
		Yes	No
1	Checking harness ASSY scanner KA for continuity Is J15<=>P151 continuous normally?	Replace scanner ASSY	Replace harness ASSY scanner KA

**009-340 CTD Sensor Error FIP**

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. ADC sensor ASSY replacing condition	Replace the parts concerned	Go to step [2]
2	Checking harness ASSY CTD for continuity Is J136<=>J1361 continuous normally?	Go to step [3]	Replace harness ASSY CTD
3	Checking harness ASSY front 1A for continuity Is J13<=>P1361 continuous normally?	Go to step [4]	Replace harness ASSY front 1A
4	Checking ADC sensor ASSY Check if an error occurs though the ADC sensor ASSY was replaced with a new one.	Replace MCU and HVPS PWB	End of work

**009-342 LOW Density Error FIP**

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Transfer roll cartridge ASSY replacing condition ADC sensor ASSY replacing condition Print head cartridge ASSY replacing condition Residual toner	Replace the parts concerned	Go to step [2]
2	Checking harness ASSY CTD for connection Is the harness ASSY CTD connected to the ADC sensor ASSY normally?	Go to step [3]	Replace the parts concerned
3	Checking harness ASSY CTD for continuity Is J136<=>J1361 continuous normally?	Go to step [4]	Replace harness ASSY CTD
4	Checking harness ASSY front 1A for Continuity Is P1361<=>J13 continuous normally?	Go to step [5]	Replace harness ASSY front 1A
5	Checking transfer roll cartridge ASSY Check if an error occurs though the transfer roll cartridge ASSY was replaced with a new one.	Go to step [6]	End of work
6	Checking print head cartridge ASSY Check if an error occurs though the print head cartridge ASSY was replaced with a new one.	Go to step [7]	End of work
7	Checking ADC sensor ASSY Check if an error occurs though the ADC sensor ASSY was replaced with a new one.	Replace MCU and HVPS PWB	End of work

**010-317 Fuser Detached FIP**

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Fuser ASSY replacing condition	Replace the parts concerned	Go to step [2]
2	Checking fuser ASSY Remove the fuser and measure resistance value Is P232-A4PIN<=>P232-A5PIN less than 400KΩ?	Go to step [3]	Replace fuser ASSY
3	Checking harness ASSY FSR2 for continuity Is J232<=>J138 continuous normally?	Go to step [4]	Replace harness ASSY FSR2
4	Checking harness ASSY front 1A for continuity Is P138<=>J13 continuous normally?	Replace MCU and HVPS PWB	Replace harness ASSY front 1A

### 010-350 Fuser Failure FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Fuser ASSY replacing condition	Replace the parts concerned	Go to step [2]
2	Checking fuser ASSY connector Disconnect the fuser ASSY connector, and check for broken or curved pins.	Go to step [3]	Replace the parts concerned
3	Checking fuser ASSY Check if an error occurs though the fuser ASSY was replaced with a new one.	Replace MCU and HVPS PWB	End of work

### 010-351 Fuser Life Over FIP

Step	Check	Remedy	
		Yes	No
1	Checking NVM Does the error occur even if the fuser counter is cleared?	Replace MCU and HVPS PWB	End of work

### 010-354 Environment Sensor Error FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. HUM TEMP sensor replacing condition	Replace the parts concerned	Go to step [2]
2	Checking harness ASSY TMPA for signal Is P/J2361-1PIN $\leftrightarrow$ P/J2361-2PIN +3VDC or less than +0.1VDC?	Go to step [4]	Go to step [3]
3	Checking harness ASSY TMPA for signal Is P/J2361-3PIN $\leftrightarrow$ P/J2361-2PIN more than +2.5VDC?	Go to step [4]	Replace MCU and HVPS PWB
4	Checking harness ASSY TMPA for signal Is P/J2361-4PIN $\leftrightarrow$ P/J2361-2PIN +5VDC?	Replace sensor HUM TEMP	Replace MCU and HVPS PWB

### Duplex JAM FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Chute ASSY exit replacing condition DUP motor replacing condition DUP JAM sensor actuator replacing condition Chute ASSY out replacing condition	Replace the parts concerned	Go to step [2]
2	Checking DUP JAM sensor Does DUP JAM sensor function normally? Using DUP JAM sensor diagnostic tool, check by digital input test.	Go to step [7]	Go to step [3]
3	Checking harness ASSY front 2 for signal Push the DUP JAM sensor actuator by finger Is J319-3PIN<=>J319-2PIN 0VDC?	Go to step [5]	Go to step [4]
4	Checking harness ASSY front 2 for continuity Is J133<=>J139 continuous normally?	Go to step [5]	Replace harness ASSY front 2
5	Checking harness ASSY front 1A for continuity Is P139<=>J13 continuous normally?	Go to step [6]	Replace harness ASSY front 1A
6	Checking DUP JAM sensor Check if an error occurs though the sensor was replaced with a new one.	Go to step [7]	End of work
7	Checking DUP motor for operation Check if the sheet is reversed when printing 1 sheet in the duplex mode.	Go to step [13]	Go to step [8]
8	Checking DUP motor Does DUP motor function normally? Using DUP motor diagnostic tool, check by digital output test. In the test, close the interlock SW.	Go to step [13]	Go to step [9]
9	Checking drive PWB for signal Is P/J50-1PIN<=>P/J60-2PIN +24VDC?	Go to step [10]	Replace drive PWB
10	Checking harness ASSY DUP for continuity Is J131<=>J50 continuous normally?	Go to step [11]	Replace harness ASSY DUP
11	Checking harness ASSY DRV 2 for continuity Check the following for continuity. J12-5PIN<=>J42-26PIN J12-6PIN<=>J42-25PIN J12-7PIN<=>J42-24PIN J12-8PIN<=>J42-23PIN J12-29PIN<=>J42-2PIN	Go to step [12]	Replace harness ASSY DRV2
12	Checking DUP motor Check if an error occurs though the motor was replaced with a new one.	Replace MCU and HVPS PWB	End of work
13	Dose the exit roll rotate smoothly by hand?	Check the sheets for gear or skew	Check the gears for foreign substances

### Fuser JAM FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Sensor exit actuator replacing condition Fuser ASSY replacing condition Front cover replacing condition Chute DUP in replacing condition Transfer roll cartridge ASSY replacing condition Print head cartridge ASSY replacing condition	Replace the parts concerned	Go to step [2]
2	Checking fuser ASSY connector Remove the fuser ASSY connector, and check for broken or curved pins.	Go to step [3]	Replace the parts concerned
3	Checking sensor exit Does sensor exit function normally? Using sensor exit diagnostic tool, check by digital input test.	Go to step [9]	Go to step [4]
4	Checking harness FSR2 for signal Push the paper in the fuser ASSY Is P/J138-3PIN<=>P/J138-2PIN 0VDC?	Go to step [6]	Go to step [5]
5	Checking harness FSR2 for continuity Is J232<=>J138 continuous normally?	Go to step [6]	Replace harness ASSY FSR2
6	Checking harness ASSY front 1A for continuity Is P138<=>J13 continuous normally?	Go to step [7]	Replace harness ASSY Front 1A
7	Checking fuser ASSY Check if an error occurs though the fuser ASSY was replaced with a new one.	Go to step [9]	End of work
8	Checking fuser motor for operation Does the fuser motor run when printing 1 sheet?	Check the gears for meshing	Go to step [9]
9	Checking fuser motor Does fuser motor function normally? Using fuser motor diagnostic tool, check by digital output test.	Replace MCU and HVPS PWB	Go to step [10]
10	Checking drive PWB for signal Is P/J52-1PIN<=>P/J60-2PIN +24VDC?	Go to step [11]	Replace drive PWB
11	Checking harness ASSY DRV 1 for continuity Check the following for continuity. J11-12PIN<=>J41-29PIN J11-13PIN<=>J41-28PIN J11-14PIN<=>J41-27PIN J11-15PIN<=>J41-26PIN J11-16PIN<=>J41-25PIN	Go to step [12]	Replace harness ASSY DRV 1
12	Checking fuser motor Replace a new fuser motor, and check if the fuser motor rotates when printing 1 sheet.	End of work	Replace MCU and HVPS PWB

### REGI JAM FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. REGI sensor actuator replacing condition chute ASSY REGI replacing condition	Replace the parts concerned	Go to step [2]
2	Checking REGI sensor Does REGI sensor function normally? Using REGI sensor diagnostic tool, check by Digital Input Test.	Go to step [6]	Go to step [3]
3	Checking REGI clutch harness for connection Is it connected normally to the REGI sensor?	Go to step [4]	Replace the parts concerned
4	Checking REGI clutch harness for continuity Is J181<=>J18 continuous normally?	Go to step [5]	Replace chute REGI
5	Checking MCU and HVPS PWB for signal Is P/J18-3<=>P/J18-2 0VDC?	Go to step [6]	Replace REGI sensor
6	Checking clutch REGI Does clutch REGI function normally? Using clutch REGI diagnostic tool, check by digital output test. In the test, close the interlock SW.	Go to step [9]	Go to step [7]
7	Checking clutch REGI for resistance value Remove the clutch connector J18. Is J18-4PIN<=>J18-5PIN less than 200Ω?	Go to step [8]	Replace chute REGI
8	Checking MCU and HVPS PWB for signal Close the interlock SW Is P18-4PIN<=>P18-2PIN +24VDC?	Go to step [9]	Replace MCU and HVPS PWB
9	Checking chute REGI Does the roll rotate smoothly by hand?	Replace the chute REGI on the machine, and check the gears for meshing.	Replace chute REGI

### Feed JAM FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Paper cassette replacing condition Paper condition in cassette Wear or damage of rolls and gears in feeder Paper dust or foreign substances in paper path REGI sensor replacing condition Main drive ASSY replacing condition	Replace the parts concerned	Go to step [2]
2	Checking REGI sensor Does REGI sensor function normally? Using diagnostic tool, check by digital input test.	Go to step [6]	Go to step [3]

Step	Check	Remedy	
		Yes	No
3	Checking REGI clutch harness for connection Is it connected normally to the REGI SENSOR?	Go to step [4]	Replace the parts concerned
4	Checking REGI clutch harness for continuity Is J181<=>J18 continuous normally?	Go to step [5]	Replace chute REGI
5	Checking MCU and HVPS PWB for signal Is P/J18-3<=>P/J18-2 0VDC?	Replace REGI sensor	Go to step [6]
6	Checking main drive motor for operation Does the main drive motor run when printing 1 sheet?	Tray go to step [16] MSI go to step [28]	Go to step [7]
7	Checking main drive motor Does main drive motor function normally? Using diagnostic tool, check by digital output test. In the test, close the interlock SW.	Replace MCU and HVPS PWB	Go to step [8]
8	Checking drive PWB for signal Is P/J48-1PIN<=>P/J60-2PIN +24VDC?	Go to step [12]	Go to step [9]
9	Checking interlock SW Is the interlock SW pressed normally?	Go to step [10]	Replace the parts concerned
10	Checking interlock SW for signal Check the following if +24VDC is present. SW-1PIN<=>P/J60-2PIN SW-2PIN<=>P/J60-2PIN	Replace drive PWB	Go to step [11]
11	Checking drive PWB for power supply Is P/J60-1PIN<=>P/J60-2PIN +24VDC?	Replace drive PWB	Go to FIP-DC
12	Checking drive PWB for power supply Is P/J61-8PIN<=>P/J61-7PIN +5VDC?	Go to step [13]	Go to step [14]
13	Checking drive PWB for power supply Is P/J61-6PIN<=>P/J61-5PIN +3.3VDC?	Go to step [15]	Go to step [14]
14	Checking harness ASSY LVNC for continuity Is J61<=>J165 continuous normally?	Go to FIP-DC	Replace harness ASSY LVNC
15	Checking harness ASSY DRV1 for continuity Check the following for continuity. J41-30PIN<=>J11-11PIN J41-31PIN<=>J11-10PIN J41-33PIN<=>J11-8PIN	Replace MCU and HVPS PWB	Replace harness ASSY DRV1
16	Checking tray1 turn clutch ASSY for operation Does the turn roll in the feeder run when printing 1 sheet?	Go to step [22]	Go to step [17]
17	Checking tray1 turn clutch ASSY Does tray1 turn clutch ASSY function normally? Using tray1 turn clutch ASSY diagnostic tool, check by digital output test. In the test, close the interlock SW.	Check the clutch for slip, or the gear for damage.	Go to step [18]
18	Checking drive PWB for signal Is P/J47-13PIN<=>P/J60-2PIN +24VDC?	Go to step [19]	Replace drive PWB



Step	Check	Remedy	
		Yes	No
19	Checking harness ASSY FDR for continuity Check the following for continuity. J47-13PIN<=>P475-2PIN J47-14PIN<=>P475-1PIN	Go to step [20]	Replace harness ASSY FDR
20	Checking tray1 turn clutch ASSY for resistance value Remove the clutch connector J475. Is J475-1PIN<=>J475-2PIN less than 200Ω?	Go to step [21]	Replace tray1 turn clutch ASSY
21	Checking harness ASSY DRV2 for continuity Is J12-9PIN<=>J42-22PIN continuous normally?	Replace MCU and HVPS PWB	Replace harness ASSY DRV2
22	Checking tray1 feed solenoid for operation Does the feed gear in the feeder run when printing 1 sheet?	Check parts for missing and change paper, if no problem	Go to step [23]
23	Checking tray1 feed solenoid Does tray1 feed solenoid function normally? Using tray1 feed solenoid diagnostic tool, check by digital output test. In the test, close the interlock SW.	Check the spring and stopper of tray1 feed solenoid for disengagement	Go to step [24]
24	Checking drive PWB for signal Is P/J47-11PIN<=>P/J60-2PIN +24VDC?	Go to step [25]	Replace drive PWB
25	Checking harness ASSY FDR for continuity Check the following for continuity. J47-11PIN<=>P474-2PIN J47-12PIN<=>P474-1PIN	Go to step [26]	Replace harness ASSY FDR
26	Checking tray1 feed solenoid for resistance value Remove the solenoid connector J474. Is J474-1PIN<=>J474-2PIN less than 100Ω?	Go to step [27]	Replace tray1 feed solenoid
27	Checking harness ASSY DRV2 for continuity Is J12-10PIN<=>J42-21PIN continuous normally?	Replace MCU and HVPS PWB	Replace harness ASSY DRV2
28	Checking MSI turn clutch for operation Does the turn roll in the MSI run when printing 1 sheet?	Go to step [31]	Go to step [29]
29	Checking MSI turn clutch Does MSI turn clutch function normally? Using MSI turn clutch diagnostic tool, check by digital output test In the test, close the interlock SW.	Check the clutch for slip, or the gear for damage.	Go to step [30]

Step	Check	Remedy	
		Yes	No
30	Checking clutch ASSY MSI turn for resistance value Remove the clutch connector J19. Is J19-1PIN<=>J19-2PIN less than 200Ω?	Replace MCU and HVPS PWB	Replace MSI turn clutch
31	Checking solenoid feed MSI for operation Does the feed gear in the MSI run when printing 1 sheet?	Check parts for missing and change paper, if no problem	Go to step [32]
32	Checking MSI feed solenoid Does MSI feed solenoid function normally? Using MSI feed solenoid diagnostic tool, check by digital output test. In the test, close the interlock SW.	Check the spring and stopper of MSI feed solenoid for disengagement	Go to step [33]
33	Checking MSI feed solenoid for resistance value Remove J132 from MSI feed solenoid Is J132-1PIN<=>J132-2PIN less than 100Ω?	Go to step [34]	Replace MSI feed solenoid
34	Checking harness ASSY front 2 for continuity Check the following for continuity. P132-1PIN<=>J139-11PIN P132-2PIN<=>J139-10PIN	Go to step [35]	Replace harness ASSY front 2
35	Checking harness ASSY front 1A for continuity Check the following for continuity. P139-1PIN<=>J13-11PIN P139-2PIN<=>J13-10PIN	Replace MCU and HVPS PWB	Replace harness ASSY front 1A

### Media Type Mismatch FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. OHP sensor replacing condition Chute ASSY REG1 replacing condition	Replace the parts concerned	Go to step [2]
2	Checking OHP sensor Does OHP sensor function normally? Using diagnostic tool, check by digital input test.	Replace MCU and HVPS PWB	Go to step [3]
3	Checking MCU and HVPS PWB for signal Is P/J32-2PIN<=>P/J32-1PIN 0VDC?	Go to step [4]	Go to step [5]
4	Checking MCU and HVPS PWB for signal Make the paper approach to the sensor. Does P/J32-2PIN<=>P/J32-1PIN change from 0VDC to +3.3VDC?	Replace MCU and HVPS PWB	Go to step [5]
5	Checking MCU and HVPS PWB for signal Is P/J32-3PIN<=>P/J32-1PIN +5VDC?	Replace OHP sensor	Replace MCU and HVPS PWB

### Yellow Toner Cartridge Detached FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Cartridge replacing condition Toner cartridge switch ASSY (Y) replacing condition Toner cartridge switch ASSY (Y) actuator Replacing condition Toner cartridge switch ASSY (Y) connector replacing condition	Replace the parts concerned	Go to step [2]
2	Checking toner cartridge switch ASSY Does toner cartridge switch ASSY function normally? Using diagnostic tool, check by digital input test.	Replace MCU and HVPS PWB	Go to step [3]
3	Checking drive PWB for signal Is P/J51-11PIN<=>P/J51-12PIN 0VDC?	Go to step [7]	Go to step [4]
4	Checking toner cartridge switch ASSY (Y) for signal Is P/J431-2PIN<=>P/J431-1PIN 0VDC?	Go to step [6]	Go to step [5]
5	Checking toner cartridge switch ASSY (Y) for continuity Is P431-2PIN<=>P431-1PIN of toner Cartridge switch ASSY (Y) continuous normally?	Go to step [6]	Replace toner cartridge switch ASSY (Y)
6	Checking harness ASSY TNR for continuity Is J51<=>J431 continuous normally?	Go to step [7]	Replace harness ASSY TNR
7	Checking drive PWB for signal Is P/J42-4PIN<=>P/J42-14PIN 0VDC?	Go to step [8]	Replace drive PWB

Step	Check	Remedy	
		Yes	No
8	Checking MCU and HVPS PWB for signal Is P/J12-27PIN<=>P/12-17PIN of MCU and HVPS PWB 0VDC?	Replace MCU and HVPS PWB	Go to step [9]
9	Checking harness ASSY DRV2 for continuity Is J12<=>J42 continuous normally?	Replace MCU and HVPS PWB	Replace harness ASSY DRV2

#### **Magenta Toner Cartridge Detached FIP**

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Cartridge replacing condition Toner cartridge switch ASSY (M) replacing condition Toner cartridge switch ASSY (M) actuator replacing condition Toner cartridge switch ASSY (M) connector replacing condition	Replace the parts concerned	Go to step [2]
2	Checking toner cartridge switch ASSY Does toner cartridge switch ASSY function normally? Using diagnostic tool, check by digital input test.	Replace MCU and HVPS PWB	Go to step [3]
3	Checking drive PWB for signal Is P/J51-13PIN<=>P/J51-14PIN 0VDC?	Go to step [7]	Go to step [4]
4	Checking toner cartridge switch ASSY (M) for signal Is P/J432-2PIN<=>P/J432-1PIN 0VDC?	Go to step [6]	Go to step [5]
5	Checking toner cartridge switch ASSY (M) for continuity Is P432-2PIN<=>P432-1PIN of toner cartridge switch ASSY(M) continuous normally?	Go to step [6]	Replace toner cartridge switch ASSY (M)
6	Checking harness ASSY TNR for continuity Is J51<=>J432 continuous normally?	Go to step [7]	Replace harness ASSY TNR
7	Checking drive PWB for signal Is P/J42-5PIN<=>P/J42-14PIN 0VDC?	Go to step [8]	Replace drive PWB
8	Checking MCU and HVPS PWB for signal Is P/J11-26PIN<=>P/11-17PIN of MCU and HVPS PWB 0VDC?	Replace MCU and HVPS PWB	Go to step [9]
9	Checking harness ASSY DRV2 for continuity Is J12<=>J42 continuous normally?	Replace MCU and HVPS PWB	Replace harness ASSY DRV2

### Cyan Toner Cartridge Detached FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Cartridge replacing condition Toner cartridge switch ASSY (C) replacing condition Toner cartridge switch ASSY (C) actuator replacing condition Toner cartridge switch ASSY (C) connector replacing condition	Replace the parts concerned	Go to step [2]
2	Checking toner cartridge switch ASSY Does toner cartridge switch ASSY function normally? Using diagnostic tool, check by digital input test.	Replace MCU and HVPS PWB	Go to step [3]
3	Checking drive PWB for signal Is P/J51-29PIN<=>P/J51-30PIN 0VDC?	Go to step [7]	Go to step [4]
4	Checking toner cartridge switch ASSY (C) for signal Is P/J433-2PIN<=>P/J433-1PIN 0VDC?	Go to step [6]	Go to step [5]
5	Checking toner cartridge switch ASSY (C) for continuity Is P433-2PIN<=>P433-1PIN of toner cartridge switch ASSY (C) continuous normally?	Go to step [6]	Replace toner cartridge switch ASSY (C)
6	Checking harness ASSY TNR for continuity Is J51<=>J433 continuous normally?	Go to step [7]	Replace harness ASSY TNR
7	Checking drive PWB for signal Is P/J42-6PIN<=>P/J42-14PIN 0VDC?	Go to step [8]	Replace drive PWB
8		Checking MCU and HVPS PWB for signal Is P/J12-25PIN<=>P/J12-17PIN of MCU and HVPS PWB 0VDC?	Replace MCU and HVPS PWB go to step [9]
9	Checking harness ASSY DRV2 for continuity Is J12<=>J42 continuous normally?	Replace MCU and HVPS PWB	Replace harness ASSY DRV2

### Black Toner Cartridge Detached FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Cartridge replacing condition Toner cartridge switch ASSY (K) replacing condition Toner cartridge switch ASSY (K) actuator replacing condition Toner cartridge switch ASSY (K) connector replacing condition	Replace the parts concerned	Go to step [2]
2	Checking toner cartridge switch ASSY Does toner cartridge switch ASSY function normally? Using diagnostic tool, check by digital input test.	Replace MCU and HVPS PWB	Go to step [3]
3	Checking drive PWB for signal Is P/J51-31PIN<=>P/J51-32PIN 0VDC?	Go to step [7]	Go to step [4]
4	Checking toner cartridge switch ASSY (K) for signal Is P/J434-2PIN<=>P/J434-1PIN 0VDC?	Go to step [6]	Go to step [5]
5	Checking toner cartridge switch ASSY (K) for continuity Is P434-2PIN<=>P434-1PIN of toner cartridge switch ASSY (K) continuous normally?	Go to step [6]	Replace toner cartridge switch ASSY (K)
6	Checking harness ASSY TNR for continuity Is J51<=>J434 continuous normally?	Go to step [7]	Replace harness ASSY TNR
7	Checking drive PWB for signal Is P/J42-3PIN<=>P/J42-14PIN 0VDC?	Go to step [8]	Replace drive PWB
8	Checking MCU and HVPS PWB for signal Is P/J12-28PIN<=>P/12-17PIN of MCU and HVPS PWB 0VDC?	Replace MCU and HVPS PWB	Go to step [9]
9	Checking harness ASSY DRV2 for continuity Is J12<=>J42 continuous normally?	Replace MCU and HVPS PWB	Replace harness ASSY DRV2

### Transfer Roll Cartridge Detached FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Transfer roll cartridge ASSY replacing condition ADC sensor ASSY replacing condition	Replace the parts concerned	Go to step [2]
2	Checking harness ASSY CTD for connection Is the harness ASSY CTD connected to the ADC sensor ASSY normally?	Go to step [3]	Replace the parts concerned
3	Checking harness ASSY CTD for continuity Is J136<=>J1361 continuous normally?	Go to step [4]	Replace harness ASSY CTD
4	Checking harness ASSY front 1A for continuity Is P1361<=>J13 continuous normally?	Go to step [5]	Replace harness ASSY front 1A
5	Checking harness ASSY front 1A for signal Is P/J136-5PIN<=>P/J136-3PIN 0VDC?	Replace ADC sensor ASSY	Go to step [6]
6	Checking transfer roll cartridge ASSY Check if an error occurs though the transfer roll cartridge ASSY was replaced with a new one.	Replace MCU and HVPS PWB	End of work

### Print Head Cartridge Detached FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Print head cartridge ASSY replacing condition PWBA CRUM in print head cartridge ASSY replacing condition	Replace the parts concerned	Go to step [2]
2	Checking PWBA CRUM for connection Is PWBA CRUM connector connected to the harness connector normally?	Go to step [3]	Replace harness ASSY CRUM
3	Checking harness ASSY CRUM for continuity Is J170<=>J71 continuous normally?	Go to step [4]	Replace harness ASSY CRUM
4	Checking harness ASSY EEPROM for continuity Is P71<=>J140 continuous normally?	Go to step [5]	Replace harness ASSY EEPROM
5	Checking print head cartridge ASSY Check if an error occurs though the print head cartridge ASSY was replaced with a new one.	Replace MCU and HVPS PWB	End of work

### Yellow Toner Empty FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Low toner sensor replacing condition Toner cartridge replacing condition Toner motor replacing condition	Replace the parts concerned	Go to step [2]
2	Checking toner cartridge Check if an error occurs though the cartridge was replaced with a new one.	Go to step [3]	End of work
3	Checking drive PWB for signal Is P/J51-16<=>P/J51-15 less than +0.2VDC?	Go to step [6]	Go to step [4]
4	Checking harness ASSY TNR for continuity Is J441<=>J51 continuous normally?	Go to step [5]	Replace harness ASSY TNR
5	Checking low toner sensor Check if an error occurs though the low toner sensor was replaced with a new one.	Go to step [6]	End of work
6	Checking harness ASSY DRV2 for continuity Is J12-23<=>J42-8 continuous normally?	Go to step [7]	Replace harness ASSY DRV2
7	Checking toner motor Does toner motor function normally? Using toner motor, check by digital output test. In the test, close the interlock SW.	Check the toner stirring auger or gear for damage	Go to step [8]
8	Checking drive PWB for signal Is P/J51-1<=>P/J60-2 +24VDC?	Go to step [9]	Replace drive PWB
9	Checking harness ASSY TNR for continuity Is J511<=>J51 continuous normally?	Go to step [10]	Replace harness ASSY TNR
10	Checking toner motor Check if an error occurs though the toner motor was replaced with a new one.	Go to step [11]	End of work
11	Checking harness ASSY DRV1 for continuity Check the following for continuity. J11-25<=>J41-16 J11-26<=>J41-15 J11-27<=>J41-14 J11-28<=>J41-13	Replace drive PWB, and if still faulty, replace MCU and HVPS PWB	Replace harness ASSY DRV1



### Magenta Toner Empty FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Low toner sensor replacing condition Toner cartridge replacing condition Toner motor replacing condition	Replace the parts concerned	Go to step [2]
2	Checking toner cartridge Check if an error occurs though the cartridge was replaced with a new one.	Go to step [3]	End of work
3	Checking drive PWB for signal Is P/J51-18<=>P/J51-17 less than +0.2VDC?	Go to step [6]	Go to step [4]
4	Checking harness ASSY TNR for continuity Is J442<=>J51 continuous normally?	Go to step [5]	Replace harness ASSY TNR
5	Checking low toner sensor Check if an error occurs though the low toner sensor was replaced with a new one.	Go to step [6]	End of work
6	Checking harness ASSY DRV2 for continuity Is J12-22<=>J42-9 continuous normally?	Go to step [7]	Replace harness ASSY DRV2
7	Checking toner motor Does toner motor function normally? Using toner motor, check by digital output test. In the test, close the interlock SW.	Check the toner stirring auger or gear for damage	Go to step [8]
8	Checking drive PWB for signal Is P/J51-6<=>P/J60-2 +24VDC?	Go to step [9]	Replace drive PWB
9	Checking harness ASSY TNR for continuity Is J512<=>J51 continuous normally?	Go to step [10]	Replace harness ASSY TNR
10	Checking toner motor Check if an error occurs though the toner motor was replaced with a new one.	Go to step [11]	End of work
11	Checking harness ASSY DRV1 for continuity Check the following for continuity. J11-29<=>J41-12 J11-30<=>J41-11 J11-31<=>J41-10 J11-32<=>J41-9	Replace drive PWB, and if still faulty, replace MCU and HVPS PWB	Replace harness ASSY DRV1

### Cyan Toner Empty FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Low toner sensor replacing condition Toner cartridge replacing condition Toner motor replacing condition	Replace the parts concerned	Go to step [2]
2	Checking toner cartridge Check if an error occurs though the cartridge was replaced with a new one.	Go to step [3]	End of work
3	Checking drive PWB for signal Is P/J51-34<=>P/J51-33 less than +0.2VDC?	Go to step [6]	Go to step [4]
4	Checking harness ASSY TNR for continuity Is J443<=>J51 continuous normally?	Go to step [5]	Replace harness ASSY TNR
5	Checking low toner sensor Check if an error occurs though the low toner sensor was replaced with a new one.	Go to step [6]	End of work
6	Checking harness ASSY DRV2 for continuity Is J12-21<=>J42-10 continuous normally?	Go to step [7]	Replace harness ASSY DRV2
7	Checking toner motor Does toner motor function normally? Using toner motor, check by digital output test. In the test, close the interlock SW.	Check the toner stirring auger or gear for damage	Go to step [8]
8	Checking drive PWB for signal Is P/J51-19<=>P/J60-2 +24VDC?	Go to step [9]	Replace drive PWB
9	Checking harness ASSY TNR for continuity Is J513<=>J51 continuous normally?	Go to step [10]	Replace harness ASSY TNR
10	Checking toner motor Check if an error occurs though the toner motor was replaced with a new one.	Go to step [11]	End of work
11	Checking harness ASSY DRV1 for continuity Check the following for continuity. J11-33<=>J41-8 J11-34<=>J41-7 J11-35<=>J41-6 J11-36<=>J41-5	Replace drive PWB, and if still faulty, replace MCU and HVPS PWB	Replace harness ASSY DRV1

### Black Toner Empty FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Low toner sensor replacing condition Toner cartridge replacing condition Toner motor replacing condition	Replace the parts concerned	Go to step [2]
2	Checking toner cartridge Check if an error occurs though the cartridge was replaced with a new one.	Go to step [3]	End of work
3	Checking drive PWB for signal Is P/J51-36<=>P/J51-35 less than +0.2VDC?	Go to step [6]	Go to step [4]
4	Checking harness ASSY TNR for continuity Is J441<=>J51 continuous normally?	Go to step [5]	Replace harness ASSY TNR
5	Checking low toner sensor Check if an error occurs though the low toner sensor was replaced with a new one.	Go to step [6]	End of work
6	Checking harness ASSY DRV2 for continuity Is J12-24<=>J42-7 continuous normally?	With tool go to step [7] Without tool go to step [8]	Replace harness ASSY DRV2
7	Checking toner motor Does toner motor function normally? Using toner motor, check by digital output test. In the test, close the interlock SW.	Check the toner stirring auger or gear for damage	Go to step [8]
8	Checking PWBA DRV3 for signal Is P/J51-24<=>P/J60-2 +24VDC?	Go to step [9]	Replace drive PWB
9	Checking harness ASSY TNR for continuity Is J514<=>J51 continuous normally?	Go to step [10]	Replace harness ASSY TNR
10	Checking toner motor Check if an error occurs though the toner motor was replaced with a new one.	Go to step [11]	End of work
11	Checking harness ASSY DRV1 for continuity Check the following for continuity. J11-37<=>J41-4 J11-38<=>J41-3 J11-39<=>J41-2 J11-40<=>J41-1	Replace drive PWB, and if still faulty, replace MCU and HVPS PWB	Replace harness ASSY DRV1

### Transfer Roll Cartridge Life Over FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Transfer roll cartridge ASSY replacing condition Waste toner sensor replacing condition	Replace the parts concerned	Go to step [2]
2	Checking waste toner sensor Does waste toner sensor function normally? Waste toner sensor using diagnostic tool, check by Digital Input Test.	Go to step [6]	Go to step [3]
3	Checking harness ASSY TFLSNS for signal Remove the transfer roll cartridge ASSY Is P/J141-2PIN<=>P/J141-1PIN 0VDC?	Go to step [6]	Go to step [4]
4	Checking harness ASSY TFLSNS for signal Is P/J141-3PIN<=>P/J141-1PIN +5VDC?	Go to step [5]	Replace harness ASSY EEPROM
5	Checking harness ASSY TFLSNS for continuity Is J142<=>J142 continuous normally?	Replace waste toner sensor	Replace harness ASSY TFLSNS
6	Checking transfer roll cartridge ASSY Check if an error occurs though the transfer roll cartridge ASSY was replaced with a new one.	Replace MCU and HVPS PWB	End of work

### Print Head Cartridge Life Over FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Print head cartridge ASSY replacing condition PWBA CRUM in print head cartridge ASSY replacing condition	Replace the parts concerned	Go to step [2]
2	Checking PWBA CRUM for connection Is PWBA CRUM connector connected to the harness connector normally?	Go to step [3]	Replace harness ASSY CRUM
3	Checking harness ASSY CRUM for continuity Is J170<=>J71 continuous normally?	Go to step [4]	Replace harness ASSY FSR2
4	Checking harness ASSY EEPROM for continuity Is P71<=>J140 continuous normally?	Go to step [5]	Replace harness ASSY EEPROM
5	Checking print head cartridge ASSY Check if an error occurs though the print head cartridge ASSY was replaced with a new one.	Replace MCU and HVPS PWB	End of work

### CRUM ID Error FIP

Step	Check	Remedy	
		Yes	No
1	Check the following for evidence of fault. Print head cartridge ASSY replacing condition PWBA CRUM in print head cartridge ASSY replacing condition	Replace the parts concerned	Go to step [2]
2	Checking PWBA CRUM for connection Is PWBA CRUM connector connected to the harness connector normally?	Go to step [3]	Replace harness ASSY CRUM
3	Checking harness ASSY CRUM for continuity Is J170<=>J71 continuous normally?	Go to step [4]	Replace harness ASSY CRUM
4	Checking harness ASSY EEPROM for continuity Is P71<=>J140 continuous normally?	Go to step [5]	Replace harness ASSY EEPROM
5	Checking print head cartridge ASSY Check if an error occurs though the print head cartridge ASSY was replaced with a new one.	Replace MCU and HVPS PWB	End of work

### CTD Sensor Dustiness FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Transfer roll cartridge ASSY replacing condition ADC sensor ASSY replacing condition	Replace the parts concerned	Go to step [2]
2	Checking harness ASSY CTD for connection Is the harness ASSY CTD connected to the ADC sensor ASSY normally?	Go to step [3]	Replace the parts concerned
3	Checking harness ASSY CTD for continuity Is J136<=>J1361 continuous normally?	Go to step [4]	Replace harness ASSY CTD
4	Checking harness ASSY front 1A for continuity Is P1361<=>J13 continuous normally?	Go to step [5]	Replace harness ASSY front 1A
5	Checking harness ASSY CTD for signal Is P/J1361-1PIN<=>P/J1361-3PIN 0VDC?	Replace ADC sensor ASSY	Replace MCU and HVPS PWB

### Front Cover FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Drive PWB replacing condition Front cover replacing condition Interlock SW actuator replacing condition	Replace the parts concerned	Go to step [2]
2	Checking interlock SW Does interlock SW function normally? Using interlock SW, check by digital output test.	Replace MCU and HVPS PWB	Go to step [3]
3	Checking drive PWB for signal Close front cover Is P/J41-35PIN<=>P/J41-22 0VDC?	Replace MCU and HVPS PWB	Replace drive PWB

### Full Stack FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Full stack sensor replacing condition actuator replacing condition	Replace the parts concerned	Go to step [2]
2	Checking full stack sensor Does full stack sensor function normally? Full stack sensor using diagnostic tool, check by Digital Input Test.	Replace MCU and HVPS PWB	Go to step [3]
3	Checking harness ASSY front 2 for signal Is P/J139-6PIN<=>P/J139-5PIN +3.3VDC?	Replace MCU and HVPS PWB	Go to step [4]
4	Checking harness ASSY front 2 for signal Is P/J139-4PIN<=>P/J139-5PIN +3.3VDC?	Replace full stack sensor	Replace harness ASSY front 1A Replace MCU and HVPS PWB

### Upper Cassette Detached FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Size switch ASSY replacing condition actuator replacing condition Paper cassette replacing condition	Replace the parts concerned	Go to step [2]
2	Checking size switch ASSY Does size switch ASSY function normally? Size switch ASSY using diagnostic tool, check by digital input test.	Replace MCU and HVPS PWB	Go to step [3]
3	Checking drive PWB for signal Check the following, and does the result meet the combination table? P/J47-1PIN<=>P/J47-3PIN P/J47-2PIN<=>P/J47-3PIN P/J47-4PIN<=>P/J47-3PIN Refer to paper size control of operation principle	Go to step [4]	Replace size switch ASSY
4	Checking drive PWB for signal Check the following, and does the result meet the combination table? P/J42-16PIN<=>P/J42-15PIN P/J42-17PIN<=>P/J42-15PIN P/J42-18PIN<=>P/J42-15PIN	Replace MCU and HVPS PWB	Replace drive PWB

### Tray1 Paper Near Empty FIP

Step	Check	Remedy	
		Yes	No
v	Initial setting Check the following for evidence of fault. Tray1 low paper sensor replacing condition Sensor actuator replacing condition	Replace the parts concerned	Go to step [2]
2	Does the error occur even if the paper is added?	Go to step [3]	End of work
3	Checking tray1 low paper sensor Does tray1 low paper sensor function normally? Tray1 low paper sensor using diagnostic tool, check by digital input test.	Replace MCU and HVPS PWB	Go to step [4]
4	Checking drive PWB for signal Is P/J47-10<=>P/J47-9 +3.3VDC?	Go to step [6]	Go to step [5]
5	Checking drive PWB for signal Is P/J42-20<=>P/J42-15 +3.3VDC?	Replace drive PWB	Replace MCU and HVPS PWB
6	Checking drive PWB for signal Is P/J47-8<=>P/J47-9 +3.3VDC?	Replace tray1 low paper sensor	Replace drive PWB

### Tray2 Paper Near Empty FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Tray2 low paper sensor replacing condition Sensor actuator replacing condition	Replace the parts concerned	Go to step [2]
2	Does the error occur even if the paper is added?	Go to step [3]	End of work
3	Checking tray2 low paper sensor Does tray2 low paper sensor function normally? Tray2 low paper sensor using diagnostic tool, check by digital input test.	Replace MCU and HVPS PWB	Go to step [4]
4	Checking feeder PWB for signal Is P/J82-10 PIN <=>P/J82-9 +3.3VDC?	Go to step [7]	Go to step [5]
5	Checking feeder PWB for signal Is P/J81-18 PIN <=>P/J81-23 +3.3VDC?	Replace feeder PWB	Go to step [6]
6	Harness ASSY OPFPLG/ harness ASSY Checking OPFREC/ harness ASSY OPFMAIN for continuity Check the following for continuity. J81-18PIN<=>J810-A9PIN<=>J210-B9PIN<=>J21-9PIN	Replace MCU and HVPS PWB Replace feeder PWB	Replace harness ASSY which is not continuous
7	Checking feeder PWB for signal Is P/J82-8PIN<=>P/J82-9 +5VDC?	Replace tray2 low paper sensor	Replace feeder PWB

### Tray3 Paper Near Empty FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. Tray3 low paper sensor replacing condition Sensor actuator replacing condition	Replace the parts concerned	Go to step [2]
2	Does the error occur even if the paper is added?	Go to step [3]	End of work
3	Checking tray3 low paper sensor Does tray3 low paper sensor function normally? Tray3 low paper sensor using diagnostic tool, check by digital input test.	Replace MCU and HVPS PWB	Go to step [4]
4	Checking feeder PWB for signal Is P/J83-10 PIN <=>P/J83-9 +3.3VDC?	Go to step [7]	Go to step [5]
5	Checking feeder PWB for signal Is P/J81-17 PIN <=>P/J81-23 +3.3VDC?	Replace feeder PWB	Go to step [6]
6	Harness ASSY OPFPLG/ harness ASSY Checking OPFREC/ harness ASSY OPFMAIN for continuity Check the following for continuity. J81-17PIN<=>J810-A10PIN<=>J210-B10PIN<=>J21-10PIN	Replace MCU and HVPS PWB Replace feeder PWB	Replace harness ASSY which is not continuous
7	Checking feeder PWB for signal Is P/J83-8PIN<=>P/J83-9 +5VDC?	Replace tray3 low paper sensor	Replace feeder PWB



## 4. HOW TO USE DIAG. (C/E) MODE

### 4.1 Roles of the Control Panel in Diag. (C/E) Mode

(Note: Control panel display may differ depending upon the machine configuration.)

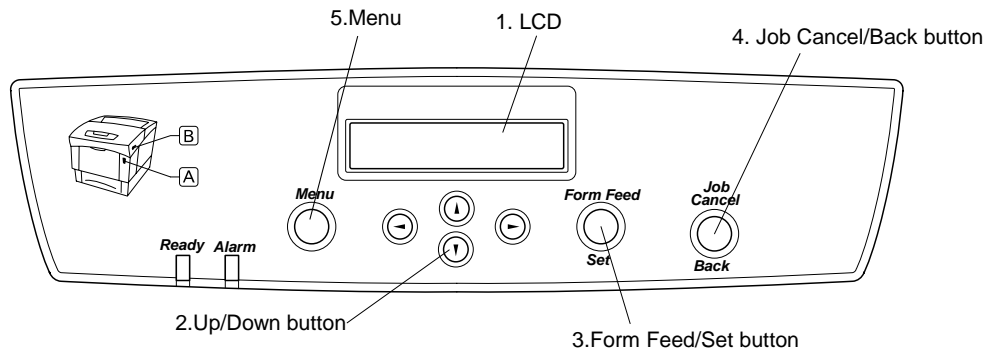


Fig.5-2

1. LCD panel: Displaying a diagnostic item and its result.
2. Up/Down buttons: Selecting a diagnostic item.  
Selecting data at parameter setting.
3. Form Feed/Set button: Determining a diagnostic item.  
Executing a diagnosis.  
Determining a parameter at parameter setting.
4. Job Cancel/Back button: Resetting a diagnostic item.  
(Returning to the menu one level higher)  
Terminating each digital input/output test.
5. Menu button: Exiting digital input/output test mode.
6. Right button: Printing registration adjustment data at parameter setting for determination.

### 4.2 Entering Diag. (C/E) Mode

1. Turn the power on while pressing the ▲ and ▼ buttons together.
2. Enter the password.  
(Password: Press the ▼ button twice and the Form Feed/Set button.)

### 4.3 Exiting Diag. (C/E) Mode

1. Stop the current diagnosis.
2. Press the Job Cancel/Back button to return to the top of the diagnostic menu.
3. Select [CE Maintenance Complete] with the ▲ and ▼ buttons.
4. Press the Form Feed/Set button to determine the selection.
5. Select [Complete] with the ▲ and ▼ buttons.
6. Press the Form Feed/Set button to determine the selection.
7. Exit Diag. (C/E) mode. (Reboot in Normal mode.)

### 4.4 Diag. (C/E) Mode Functions

In Diag. (C/E) mode, the printer provides the following six functions:

1. ESS diagnosis
2. Test print
3. IOT diagnosis
4. Parameter setting
5. Installation setting
6. Information print

## 4.5 Operation Procedure

After entering Diag. (C/E) mode, select a diagnostic item with the ▲ or ▼ button and press the Form Feed/Set button to determine the selection. If there is a lower menu, select a diagnostic item with the ▲ or ▼ button and press the Form Feed/Set button to determine the selection. Once a diagnostic item has been selected, press the Form Feed/Set button to execute the processing. To exit the diagnosis and return to the upper menu, press the Job Cancel/Back button.

### ■ Example of operation for Digital Input Test (DI-31 REGI. SENSOR)

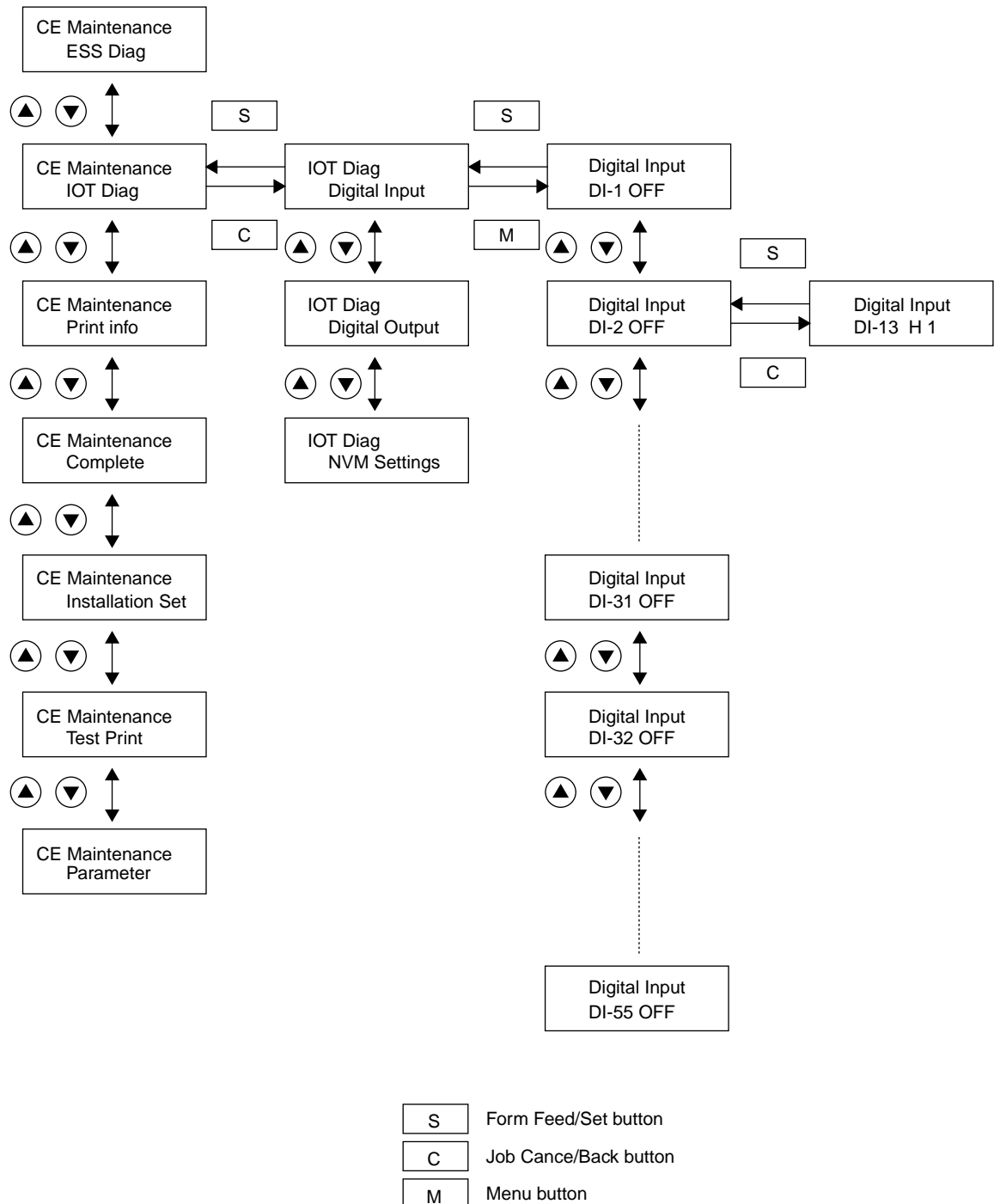
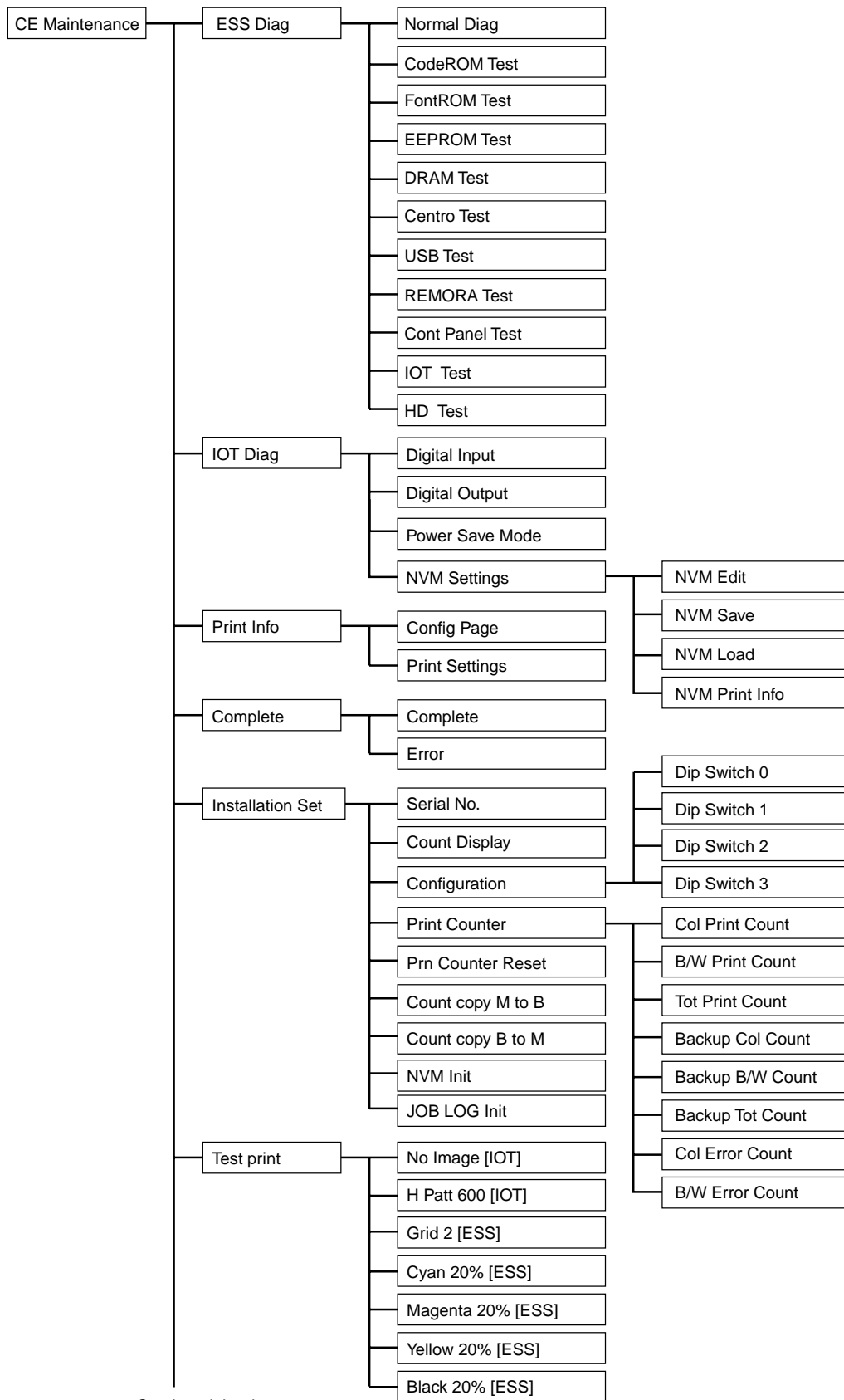


Fig.5-3

## 4.6 Diag. Mode Menu Tree



Continued the down page

Fig.5-4

Continued from the up page



Fig.5-5

## 4.7 ESS Diagnosis

Function: Executing an ESS related diagnosis.

Operation procedure:

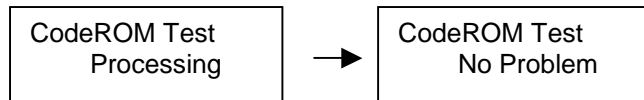
1. Enter the Diag. (C/E) mode.
2. Select [CE Maintenance ESS Diag] with the ▲ and ▼ buttons.
3. Press the Form Feed/Set button to advance to diagnostic menu selection in [CE Maintenance ESS Diag].
4. Select a diagnostic item with the ▲ or ▼ button. (For the contents of the diagnostic items, refer to the table below.)
5. Press the Form Feed/Set button to determine the selection.

Example: Code ROM test display screen

CodeROM Test  
Start

6. Press the Form Feed/Set button again to execute the diagnosis. The LCD panel displays the result ([No Problem]/[Error]).

Example: Code ROM test



7. Press the Job Cancel/Back button to return to the previous screen.

Diagnostic items

Item	Description
Normal Diag	Executes a diagnosis in Normal mode.
CodeROM Test	Calculates the ROM checksum and compares it with the stored value.
FontROM Test	Calculates the font ROM checksum and compares it with the stored value.
EEPROM Test	Writes, reads, and verifies the EEPROM diagnostic area.
DRAM Test	Performs a OPEN/SHORT test on the DRAM address line. Writes, reads, and verifies the DRAM front.
Centro Test	Performs a register check test.
USB Test	Performs a register check test.
REMORA Test	Performs a register check test.
Cont Panel Test	Tests the LED, LCD, and buttons on the control panel.
IOT Test	Tests IOT communications.
HD Test	Tests the hard disk.

- Details of the control panel test  
 For a control panel check, each button is pressed to see whether the three LED indicator lights go on or off and how the LCD panel display changes. The table below lists the relationships between the buttons and the LED indicator lights and LCD panel display.

Button	LED	LCD
▲	■ Ready ■ Error	"UP" display
▼	■ Ready □ Error	"DOWN" display
◀	□ Ready ■ Error	"LEFT" display
▶	□ Ready □ Error	"RIGHT" display
Form Feed/Set	■ Ready □ Error	"SET" display
Menu	□ Ready ■ Error	"MENU" display
Job Cancel/Back	□ Ready □ Error	"STOP" display
▲ and ▼ (together)	— (End of test)	— (End of test)

□ : Not lit ■ : Lit

#### 4.8 IOT Diagnosis

Function: Executing an IOT-related diagnosis

Diagnostic items

Item	Description
Digital Input test	Performs a digital input component test.
Digital Output test	Performs a digital output component test.
Power save mode	Performs Power save mode
NVM setting NVM Edit	Reads or writes NVM values.
NVM setting NVM Save	Saves IOT NVM information into ESS.
NVM setting NVM Load	Loads IOT NVM information into ESS.
NVM setting NVM Print Info	Prints IOT NVM information.

#### 4.8.1 Digital input test

Function: Displaying a sensor or switch signal level on the LCD panel as "H" or "L" and also the number of changes from "H" to "L" or "L" to "H"

Operation procedure:

1. Enter the Diag. (C/E) mode.
2. Select [CE Maintenance IOT Diag] with the ▲ and ▼ buttons.
3. Press the Form Feed/Set button to advance to diagnostic menu selection in [CE Maintenance IOT Diag].
4. Select [IOT Diag Digital Input] with the ▲ and ▼ buttons.
5. Press the Form Feed/Set button to advance to diagnostic menu selection in [IOT Diag Digital Input].
6. Select the menu No. of a digital input test with the ▲ and ▼ buttons.  
(For the contents of the diagnostic items, refer to the table at right.)
7. Press the Form Feed/Set button to execute the diagnosis.
8. The LCD panel displays the sensor status (H: Sensor OFF, L: Sensor ON) and the number of sensor ON/OFF changes.
9. Press the Job Cancel/Back button to terminate the diagnosis.
10. Press the Menu button to terminate the diagnosis if in progress and return to the [IOT Diag Digital Input] display.

**Digital input test code table**

Menu No.	Part/signal name	Test method	Reference BSD
DI-0	FULL STACK SENSOR	Block and unblock the sensor with an actuator.	2.9.4
DI-1	DUP JAM SENSOR	Block and unblock the sensor with an actuator.	2.9.4
DI-2	Exit Sensor (FUSER ASSY)	Block and unblock the sensor with an actuator.	2.9.1
DI-3	REGI. SENSOR	Block and unblock the sensor with an actuator.	2.7.6
DI-4	SCANNER RDY		2.5.1
DI-5	FUSER RDY		2.9.1
DI-6	CTD RDY		2.8.7
DI-7	INTERLOCK OPEN	Open and close the front cover.	2.1.1
DI-8	TONER CARTRIDGE SWITCH ASSY (Y)	Replace and remove the toner cartridge.	2.8.3
DI-9	TONER CARTRIDGE SWITCH ASSY (M)	Replace and remove the toner cartridge.	2.8.3
DI-a	TONER CARTRIDGE SWITCH ASSY (C)	Replace and remove the toner cartridge.	2.8.3
DI-b	TONER CARTRIDGE SWITCH ASSY (K)	Replace and remove the toner cartridge.	2.8.3
DI-c	LOW TONER SENSOR (Y)		2.8.5
DI-d	LOW TONER SENSOR (M)		2.8.5
DI-e	LOW TONER SENSOR (C)		2.8.5
DI-f	LOW TONER SENSOR (K)		2.8.5
DI-10	MSI NO PAPER SENSOR	Block and unblock the sensor with an actuator.	2.7.2
DI-11	TRAY1 NO PAPER SENSOR	Block and unblock the sensor with an actuator.	2.6.1

Menu No.	Part/signal name	Test method	Reference BSD
DI-12	TRAY2 NO PAPER SENSOR	Block and unblock the sensor with an actuator.	2.6.2
DI-13	TRAY3 NO PAPER SENSOR	Block and unblock the sensor with an actuator.	2.6.3
DI-15	TRAY1 LOW PAPER SENSOR	Increase and decrease paper on Tray1 for sensor detection and no detection.	2.6.1
DI-16	TRAY2 LOW PAPER SENSOR	Increase and decrease paper on Tray2 for sensor detection and no detection.	2.6.2
DI-17	TRAY3 LOW PAPER SENSOR	Increase and decrease paper on Tray3 for sensor detection and no detection.	2.6.3
DI-18	TRAY1 SIZE SWITCH ASSY	—	2.6.1
DI-20	TRAY2 SIZE SWITCH ASSY	—	2.6.2
DI-28	TRAY3 SIZE SWITCH ASSY	—	2.6.3
DI-30	FUSER FAN ALARM	Hold and release fuser fan.	2.9.3
DI-31	REAR FAN ALARM	Hold and release rear fan.	2.9.3
DI-32	NO PRINT HEAD CARTRIDGE ASSY	Mount and remove print head cartridge ASSY.	2.3.2
DI-33	WASTE TONER SENSOR	Block and unblock the sensor with paper.	2.8.6
DI-34	NO Tray Module	Connect and disconnect the tray module.	2.7

#### 4.8.2 Digital output test

Function: Activating a solenoid, clutch, motor, or other parts.

Capable of activating two or more parts simultaneously. (Parallel execution)

Operation procedure:

1. Enter the Diag. (C/E) mode.
2. Select [CE Maintenance IOT Diag] with the ▲ and ▼ buttons.
3. Press the Form Feed/Set button to advance to diagnostic menu selection in [CE Maintenance IOT Diag].
4. Select [IOT Diag Digital Output] with the ▲ and ▼ buttons.
5. Press the Form Feed/Set button to advance to diagnostic menu selection in [IOT Diag Digital Output].
6. Select the menu No. of a digital output test with the ▲ and ▼ buttons.
7. (For the contents of the diagnostic items, refer to the table below.)
8. Press the Form Feed/Set button to execute the diagnosis.
9. The part is activated and the LCD panel displays [EXEC].  
(The display is [READY] when the part is not in operation.)
10. Press the Job Cancel/Back button to terminate the diagnosis.
11. Press the Menu button to terminate all parts in operation and return to the [IOT Diag Digital Output] display.



**Digital output test code table**

Menu No.	Part/signal name	Test method	Reference BSD
DO-0	MAIN DRIVE ASSY (NORMAL SPEED)	< WARNING! > <CAUTION!> Check by hearing and visually that the motor rotates in normal mode.	2.4.1
DO-1	MAIN DRIVE ASSY (HALF SPEED)	< WARNING! > <CAUTION!> Check by hearing and visually that the motor rotates in half-speed mode.	2.4.1
DO-3	DUP MOTOR ASSY (FORWARD NORMAL SPEED)	< WARNING! > <CAUTION!> Check by hearing and visually that the motor rotates in normal mode.	2.9.5
DO-4	DUP MOTOR ASSY (FORWARD HALF SPEED)	< WARNING! > <CAUTION!> Check by hearing and visually that the motor rotates clockwise in half-speed mode.	2.9.5
DO-5	DUP MOTOR ASSY (FORWARD DOUBLE SPEED)	< WARNING! > <CAUTION!> Check by hearing and visually that the motor rotates clockwise in double-speed mode.	2.9.5
DO-6	DUP MOTOR ASSY (REVERSE NORMAL SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates counterclockwise in normal mode.	2.9.5
DO-7	DUP MOTOR ASSY (REVERSE HALF SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates counterclockwise in half-speed mode.	2.9.5
DO-8	DUP MOTOR ASSY (REVERSE DOUBLE SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates counterclockwise in double-speed mode.	2.9.5
DO-a	DEVE DRIVE ASSY (NORMAL SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates in normal mode.	2.8.2
DO-b	DEVE DRIVE ASSY (HALF SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates in half-speed mode.	2.8.2
DO-d	FUSER DRIVE ASSY (NORMAL SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates in normal mode.	2.9.2
DO-e	FUSER DRIVE ASSY (HALF SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates in half-speed mode.	2.9.2
DO-10	FEEDER DRIVE ASSY (NORMAL SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates in normal mode.	2.7.5
DO-11	FEEDER DRIVE ASSY (HALF SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates in half-speed mode.	2.7.5

Menu No.	Part/signal name	Test method	Reference BSD
DO-13	FAN (HIGH SPEED)	Check by hearing and visually that the fan rotates in high-speed mode.	2.9.3
DO-14	FAN (LOW SPEED)	Check by hearing and visually that the fan rotates in low-speed mode.	2.9.3
DO-18	TONER MOTOR (Y)	Check by hearing and visually that the motor rotates.	2.8.4
DO-1a	TONER MOTOR (M)	Check by hearing and visually that the motor rotates.	2.8.4
DO-1c	TONER MOTOR (C)	Check by hearing and visually that the motor rotates.	2.8.4
DO-1e	TONER MOTOR (K)	Check by hearing and visually that the motor rotates.	2.8.4
DO-20	REGI CLUTCH	Check by hearing that the clutch operates.	2.7.6
DO-22	MSI TURN CLUTCH	Check by hearing that the clutch operates.	2.7.2
DO-24	MSI FEED SOLENOID	Check by hearing that the solenoid operates.	2.7.2
DO-26	TRAY1 TURN CLUTCH ASSY	Check by hearing that the clutch operates.	2.7.1
DO-28	TRAY1 FEED SOLENOID	Check by hearing that the solenoid operates.	2.7.1
DO-30	HTC ON	<WARNING!> <CAUTION!>	2.8.1
DO-32	DEVE BIAS AC ON	<WARNING!> <CAUTION!>	2.8.2
DO-34	DEVE BIAS DC Y ON	<WARNING!> <CAUTION!>	2.8.2
DO-36	DEVE BIAS DC M ON	<WARNING!> <CAUTION!>	2.8.2
DO-38	DEVE BIAS DC C ON	<WARNING!> <CAUTION!>	2.8.2
DO-3a	DEVE BIAS DC K ON	<WARNING!> <CAUTION!>	2.8.2
DO-3c	IDT1 PLUS ON	<WARNING!> <CAUTION!>	2.8.6
DO-3e	IDT1 MINUS ON	<WARNING!> <CAUTION!>	2.8.6
DO-40	IDT2 PLUS ON	<WARNING!> <CAUTION!>	2.8.6
DO-42	IDT2 MINUS ON	<WARNING!> <CAUTION!>	2.8.6
DO-44	IDT1 CLEANER ON	<WARNING!> <CAUTION!>	2.8.6
DO-46	IDT2 CLEANER ON	<WARNING!> <CAUTION!>	2.8.6
DO-48	TRANSFER ROLL CARTRIDGE PLUS ON	<WARNING!> <CAUTION!>	2.8.6
DO-4a	TRANSFER ROLL CARTRIDGE MINUS ON	<WARNING!> <CAUTION!>	2.8.6
DO-4c	DTS ON	<WARNING!> <CAUTION!>	2.8.6
DO-50	TRAY2 TURN CLUTCH ASSY	Check by hearing that the clutch operates.	2.7.3
DO-52	TRAY2 FEED SOLENOID	Check by hearing that the solenoid operates.	2.7.3
DO-54	TRAY3 TURN CLUTCH ASSY	Check by hearing that the clutch operates.	2.7.4
DO-56	TRAY3 FEED SOLENOID	Check by hearing that the solenoid operates.	2.7.4

 **WARNING**

Never touch a high-voltage or live section during high-voltage output.  
Never touch a drive section during driving.  
Output a laser beam with all the covers attached.

 **CAUTION**







To avoid damage, do not keep the laser ON for a long time.  
(Turn it to OFF within several seconds.)

### 4.8.3 NVM Edit

Refer to Section 6. NVM LIST.

Function: Reading or writing NVM



Operation procedure:

1. Enter the Diag. (C/E) mode.
2. Select [IOT Diag] with the  and  buttons and press the Form Feed/Set button.
3. Go advance to [NVM Edit] with  and  buttons and press the Form Feed/Set button.
4. Select a necessary item for the address section (Ad) with the  and  buttons. The NVM data is read and two to four items are displayed from the input address.

```
Edit NVM
Ad0001=00000000*
```

↑  
Cursor

Press the  or  button to moves the cursor to the left or right.

5. Change the numeric value at the desired data section with the   buttons.

```
Edit NVM
Ad0001=c6d0d6d0
```

If the data section is changed, the \* mark disappears to indicate that the current NVM value has changed.

6. Press the Form Feed/Set button to write the NVM value.

Reference:

Display example of address 01fa

```
Edit NVM
Ad01fa 14 1e fc 21
```

#### 4.8.4 NVM Save

Function: Saving information from the MCU NVM evacuate list into ESS NVM

Operation procedure:

1. Enter the Diag. (C/E) mode.
2. Select [IOT Diag] with the ▲ and ▼ buttons and press the Form Feed/Set button.

Go advance to [NVM Save] with the ▲ and ▼ buttons and press the Feed/Set button to display the Confirm Initialize screen.

NVM Save  
OK?

Press the Job Cancel/Back button to cancel.

3. When the Form Feed/Set button is pressed, the NVM information is saved and the following screen is displayed:

NVM Save  
Saved

#### 4.8.5 NVM Load

Function: Loading ESS-saved MCU NVM information into MCU

Operation procedure:

1. Enter the Diag. (C/E) mode.
2. Select [IOT Diag] with the ▲ and ▼ buttons and press the Form Feed/Set button.

Go advance to [NVM Load] with the ▲ and ▼ buttons and press the Form Feed/Set button to display the Confirm Initialize screen.

NVM Load  
OK?

Press the Job Cancel/Back button to cancel.

3. When the Form Feed/Set button is pressed, the NVM information is loaded and the following screen is displayed:

NVM Load  
Loaded

#### 4.8.6 NVM Print Info

Function: Printing MCU NVM information saved in ESS

Operation procedure:

1. Enter the Diag. (C/E) mode.
2. Select [IOT Diag] with the ▲ and ▼ buttons and press the Form Feed/Set button.
3. Go advance to [NVM Print Info] with the ▲ and ▼ buttons and press the Form Feed/Set button.

## 4.9 Installation Setting

Function: Setting parameters at printer installation and displaying various counter values

Operation procedure:

1. Enter the Diag. (C/E) mode.
2. Select [CE Maintenance Installation Set] with the ▲ and ▼ buttons.
3. Press the Form Feed/Set button to advance to setting/display item selection in [CE Maintenance Installation Set].
4. Select a setting/display item with the ▲ and ▼ buttons. (For the setting/display items, refer to the table below.)
5. Press the Form Feed/Set button to display the setting/display item.

Setting/display items

Item	Range	Description
Serial No.	10 digits	Sets a serial number.
Count Display	ON, OFF	Sets whether to display the billing counter.
Configuration (*1)	—	Change the Dip Switch setting on NVM.
Col print Count	—	Displays the current value of the color print counter.
B/W Print Count	—	Displays the current value of the monochrome print counter.
Tot Print Count	—	Displays the current value of the total print counter.
Backup Col Count	—	Displays the current value of the backup color counter.
Backup B/W Count	—	Displays the current value of the backup monochrome counter.
Backup Tot Count	—	Displays the current value of the backup total counter.
Col Error Count	—	Displays the current value of the color print error counter.
B/W Error Count	—	Displays the current value of the monochrome print error counter.
PrnCounter Reset	—	Initializes three counter values (clears to zero).
Count copy M to B	—	Copies from a normal meter to a backup file.
NVM Init	—	Initializes NVM
Job Log Init	—	Initializes Job Log

\*1 Dip Switch 0

For service engineer

Bit	Function	Description
0	Hex Dump mode	0=OFF 1=ON
1	EEPROM Clear	0=OFF 1=ON Clear all history except Network.
2->7	Not Used	

Dip Switch 1: For debug

Dip Switch 2: For debug

Dip Switch 3: Not Used

\*Electronic billing meter (count) function and backup

The monochrome and color meters have backup meters.

The printer compares the main and backup meters when the power is turned ON.

If there is a discrepancy between the main and backup meters, the hardware of both meters is diagnosed by read/write tests.

1. If either or both meters are abnormal, a fatal error (C/E call) is assumed.  
The C/E replaces ESS-PWB.
2. If both diagnostic results are correct, the main meter is believed.  
The main meter is copied to the backup meter for matching.  
Then the mismatching is counted as an abnormality recovered automatically as a non-critical error.

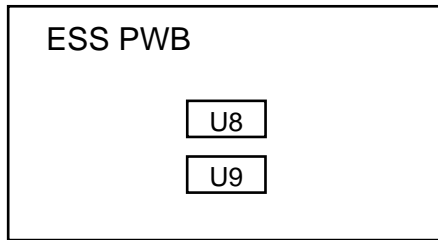


Fig.5-6

#### 4.10 Test Print

Function: Printing an internal test pattern of the printer

Operation procedure:

1. Enter the Diag. (C/E) mode.
2. Select [CE Maintenance Test Print] with the ▲ and ▼ buttons.
3. Press the Form Feed/Set button to advance to diagnostic item selection in [CE Maintenance Test Print].
4. Select a test print pattern with the ▲ and ▼ buttons.  
(For the test print patterns, refer to the table below.)
5. Press the Form Feed/Set button to determine the test print pattern.
6. Press the Form Feed/Set button again to execute test printing.  
(The LCD panel displays [Processing].)
7. After outputting the test print, the printer becomes Ready to Print state.  
(The LCD panel displays [Ready].)

Test print patterns

Item	Description
No Image [IOT]	Feeds and outputs paper with no image.
Grid2 [ESS]	Outputs an ESS internal grid pattern.
H Patt 600 [IOT]	Outputs an IOT internal 600-dpi pattern.
H Patt 1200 [IOT]	Blank paper (MCU: No Support)
Cyan 20% [ESS]	Outputs an A4 solid pattern of 20% cyan.
Magenta20% [ESS]	Outputs an A4 solid pattern of 20% magenta.
Yellow 20% [ESS]	Outputs an A4 solid pattern of 20% yellow.
Black 20% [ESS]	Outputs an A4 solid pattern of 20% black.
CMY 20% [ESS]	Outputs an A4 solid pattern of 20% C.M.Y each.
Gradation [ESS]	Outputs 100% to 2% gradation patterns to A4 sheets in four colors.
NIP adjust [ESS]	Outputs the NIP adjustment pattern to A4LEF.
PF REGI Adj	Outputs the Paper feed registration correction chart to A4 sheets.

## 4.11 Parameter Setting

### 4.11.1 Parameter setting/display

Function: Setting and displaying parameters held by IOT in NVM

Operation procedure:

1. Enter the Diag. (C/E) mode.
2. Select [CE Maintenance Parameter] with the ▲ and ▼ buttons.
3. Press the Form Feed/Set button to advance to setting/display parameter selection in [CE Maintenance Parameter].
4. Select a setting/display parameter with the ▲ and ▼ buttons.  
(For the setting/display parameters, refer to the table below.)
5. Press the Form Feed/Set button to display the setting/display parameter.

Example: Scan Regi Tray1 display screen

Scan Regi Tray1	4*
-----------------	----

6. Select setting data from the setting range with the ▲ and ▼ buttons.
7. Press the Form Feed/Set button to write the setting data into NVM.

Example: Post-change screen

Scan Regi Tray1	6
-----------------	---

8. When displaying and setting each life, have the life item displayed and press the Form Feed/Set button.

Example: Life Fuser display screen

Life Fuser Reading
-----------------------

9. Press the Form Feed/Set button to display data (decimal).

Life Fuser 6666
--------------------

Setting/display parameters

Item	Range	Description
Paper feed direction registration adjustment	-128 ~ 127	Sets the paper feed direction registration
Scan direction registration adjustment	-128 ~ 127	Sets the scan direction registration of Main, Aux 1, Aux 2, MSI, and Dup.
Life counter	—	Reads and initializes the fuser and printer life counters.

#### 4.11.2 Parameter list print

Function: Outputting a list of setting and displaying parameters held by IOT in NVM

Operation procedure:

1. Enter the Diag. (C/E) mode.
2. Select [CE Maintenance Parameter] with the ▲ and ▼ buttons.
3. Press the Form Feed/Set button to advance to setting/display parameter selection in [CE Maintenance Parameter].
4. Select [Parameter Print] with the ▲ and ▼ buttons.
5. Press the Form Feed/Set button to determine the selection.
6. Press the Form Feed/Set button again to print the parameters.

HL-4000CN	MCU Parameter List	Serial No. 00000
	Registration Adjust Slow Scan Paper from Black	: 0
	Registration Adjust Slow Scan, 600dpi,	Magenta from Black
	:	6
		Yellow from Black : 4
		Cyan from Black : 1
	Registration Adjust Slow Scan, 1200dpi,	Magenta from Black
	:	11
		Yellow from Black : 9
		Cyan from Black : 1
	Registration Adjust Fast Scan,	Magenta from Black
	:	1
		Yellow from Black : 3
		Cyan from Black : 3
Life Counters	Yellow Toner Dispense Time	: 645
	Magenta Toner Dispense Time	: 700
	Cyan Toner Dispense Time	: 802
	Black Toner Dispense Time	: 648
	TRANSFER ROLL CARTRIDGE1 Sheets	:
373		
	TRANSFER ROLL CARTRIDGE2 Dispense Time	
:	3041	
	Printer Sheets	: 373
	Printer Head Sheets	: 369
	Printer Head Time	: 8183
	Printer Head Yellow Dispense	: 645
	Printer Head Magenta Dispense	: 782



#### 4.12 Information Print

Function: Printing printer information

Operation procedure:

1. Enter the Diag. (C/E) mode.
2. Select [CE Maintenance Print info] with the ▲ and ▼ buttons.
3. Press the Form Feed/Set button to advance to print item selection in [CE Maintenance Print info].
4. Select a print item with the ▲ and ▼ buttons.
5. Press the Form Feed/Set button to determine the selection.
6. Press the Form Feed/Set button again to print the parameters.

Print items

Item	Description
Config page	Outputs printer configuration information.
Print Settings	Outputs setting information from the control panel.

HL-4000CN	MCU Config page	Serial No. 00000
	Optional Products Status	: Auxiliary Cassette
	ROM Revision NO	: V 0.75.0
	Machine Revision	: V 0.75.19

<Setting print sample>

HL-4000CN	DIAG Settings Page	Serial No. 00000
	Serial No.	: 000000
	Counter Display Switch	: OFF
	Color Print Counter	: 246
	B/W Print Counter	: 111
	Total Print Counter	: 357
	Backup Color Print Counter	: 246
	Backup B/W Print Counter	: 111
	Backup Total Print Counter	: 357
	Color Print Error Counter	: 0
	B/W Print Error Counter	: 0

## 5. DIAGNOSIS FOR STANDALONE PRINTER

### 5.1 General

The test print can be taken place on the standalone printer for operation check.  
For this purpose, the test print pattern stored in the printer is printed continuously at the continuous printing speed.

### 5.2 Printing Method

1. Load paper, and turn the power ON.



### WARNING

*In the following steps, never touch the live parts and driving parts.*

2. Short two pins of the test print connector (P31) on the MCU AND HVPS PWB.

*Reference:*

*To short two pins, make the screwdriver tip touch the two pins.*

3. The printer transits to the READY mode, and starts the printing. (Printing is carried out continuously in the Duplex mode).
4. To stop the printing, remove the screwdriver to release the short of two pins.

*Note:*

*The paper is fed from the tray 1, and if no paper is loaded in the tray 1, printing is not carried out.*

*Reference:*

*Printing will not start, if the printer is in an error status.*

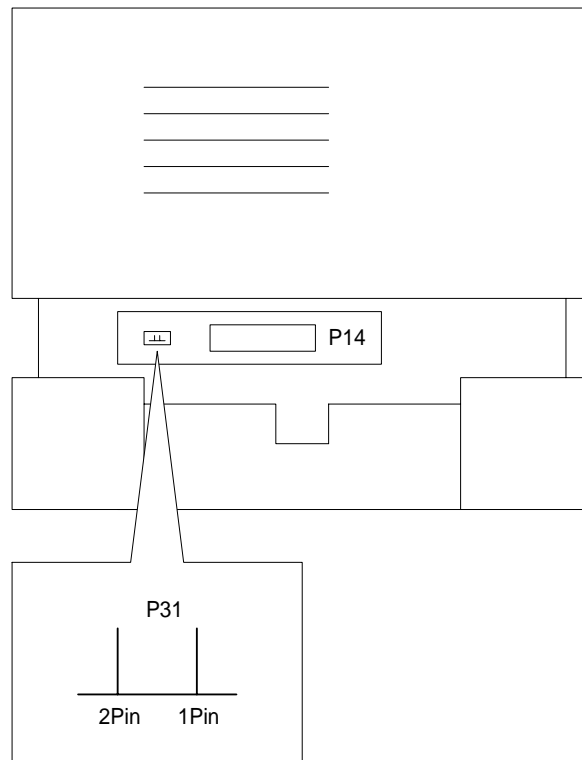


Fig.5-7

### 5.3 Test Print Pattern

The test print pattern is lattice patterns composed of black (K), cyan (C), magenta (M), and yellow (Y) patterns in this order every 128 dots in vertical and horizontal directions.

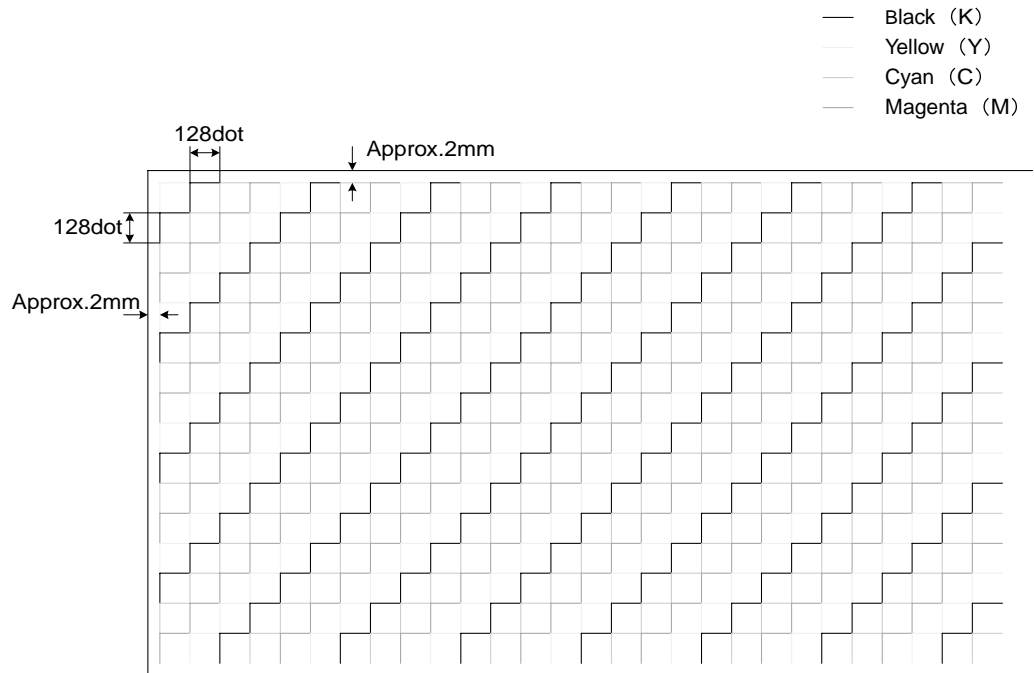


Fig.5-8

## 6. NVM LIST



*Never write the data to the NVM numbers not listed below, as they are for the system areas of the printer.*



*Never write the data to the items which address field is hatched, as they are read only.*

### 12. System, Paper

Address		Set value			Description
Higher	Lower	Hex	Dec	Word/Long	
12	0	00	0		Lead regi. between paper and K(0.17mm)
12	1	00	0		Lead regi. 600dpi between M and K (line)
12	2	00	0		Lead regi. 600dpi between Y and K (line)
12	3	00	0		Lead regi. 600dpi between C and K (line)
12	4	00	0		Lead regi. 1200dpi between M and K (line)
12	5	00	0		Lead regi. 1200dpi between Y and K (line)
12	6	00	0		Lead regi. 1200dpi between C and K (line)
12	7	00	0		Side regi. between M and K
12	8	00	0		Side regi. between Y and K
12	9	00	0		Side regi. between C and K
12	A	00	0		Side regi. between paper and K MSI (0.17mm)
12	B	FB	251		Side regi. between paper and K TRAY1 (0.17mm)
12	C	FB	251		Side regi. between paper and K TRAY2 (0.17mm)
12	D	FB	251		Side regi. between paper and K TRAY3 (0.17mm)
12	E	00	0		Side regi. between paper and K Duplex (0.17mm)
12	10	00	0	0	Dispensed time Y (L)
12	11	00	0		Dispensed time Y (H)
12	12	00	0	0	Dispensed time M (L)
12	13	00	0		Dispensed time M (H)
12	14	00	0	0	Dispensed time C (L)
12	15	00	0		Dispensed time C (H)
12	16	00	0	0	Dispensed time K (L)
12	17	00	0		Dispensed time K (H)
12	18	00	0	0	Transfer roll cartridge PV (L)
12	19	00	0		Transfer roll cartridge PV (M)
12	1A	00	0		Transfer roll cartridge PV (H)
12	1B	00	0	0	Transfer roll cartridge rotate time (L)
12	1C	00	0		Transfer roll cartridge rotate time (M)
12	1D	00	0		Transfer roll cartridge rotate time (H)

Address		Set value			Description
Higher	Lower	Hex	Dec	Word/Long	
12	1E	00	0	0	Fuser PV (L)
12	1F	00	0		Fuser PV (M)
12	20	00	0		Fuser PV (H)
12	21	00	0	0	M/C PV (L)
12	22	00	0		M/C PV (M)
12	23	00	0		M/C PV (H)
12	24	00	0		Environmental temperature at the previous regi. control
12	2A	00	0		Number of impressions after regi. control
12	2D	00	0		Total impressions (for pro. control)
12	2E	00	0		Counter for long cleaning (L)
12	2F	00	0		Counter for long cleaning (H)
12	30	00	0		Transfer roll cartridge full detected PV1 (L)
12	31	00	0		Transfer roll cartridge full detected PV1 (H)
12	32	00	0		Transfer roll cartridge full detected PV2 (L)
12	33	00	0		Transfer roll cartridge full detected PV2 (H)
12	34	00	0		Transfer roll cartridge full detected DISP (L)
12	35	00	0		Transfer roll cartridge full detected DISP (H)
12	36	00	0		FUSER final print temperature
12	37	80	128	80000	Fuser PV WARNING (L)
12	38	38	56		Fuser PV WARNING (M)
12	39	01	1		Fuser PV WARNING (H)
12	3A	D4	212	6100	Dispensed time Y LIMIT (L)
12	3B	17	23		Dispensed time Y LIMIT (H)
12	3C	D4	212	6100	Dispensed time M LIMIT (L)
12	3D	17	23		Dispensed time M LIMIT (H)
12	3E	D4	212	6100	Dispensed time C LIMIT (L)
12	3F	17	23		Dispensed time C LIMIT (H)
12	40	C2	194	6850	Dispensed time K LIMIT (L)
12	41	1A	26		Dispensed time K LIMIT (H)
12	42	50	80	18000	Transfer roll cartridge PV LIMIT (L)
12	43	46	70		Transfer roll cartridge PV LIMIT (M)
12	44	00	0		Transfer roll cartridge PV LIMIT (H)
12	45	FF	255	16777215	Transfer roll cartridge rotate time LIMIT (L)
12	46	FF	255		Transfer roll cartridge rotate time LIMIT (M)
12	47	FF	255		Transfer roll cartridge rotate time LIMIT (H)
12	48	A0	160	100000	Fuser PV LIMIT (L)
12	49	86	134		Fuser PV LIMIT (M)
12	4A	01	1		Fuser PV LIMIT (H)
12	4C	30	48	30000	PV CRUM LIMIT (L)
12	4D	75	117		PV CRUM LIMIT (M)
12	4E	00	0		PV CRUM LIMIT (H)
12	4F	5D	93	361821	Motor rotate time CRUM LIMIT (L)

Address		Set value			Description
Higher	Lower	Hex	Dec	Word/Long	
12	50	85	133		Motor rotate time CRUM LIMIT (M)
12	51	05	5		Motor rotate time CRUM LIMIT (H)
12	52	50	80	82000	Dispensed time Y CRUM LIMIT (L)
12	53	40	64		Dispensed time Y CRUM LIMIT (M)
12	54	01	1		Dispensed time Y CRUM LIMIT (H)
12	55	50	80	82000	Dispensed time M CRUM LIMIT (L)
12	56	40	64		Dispensed time M CRUM LIMIT (M)
12	57	01	1		Dispensed time M CRUM LIMIT (H)
12	58	50	80	82000	Dispensed time C CRUM LIMIT (L)
12	59	40	64		Dispensed time C CRUM LIMIT (M)
12	5A	01	1		Dispensed time C CRUM LIMIT (H)
12	5B	40	64	97600	Dispensed time K CRUM LIMIT (L)
12	5C	7D	125		Dispensed time K CRUM LIMIT (M)
12	5D	01	1		Dispensed time K CRUM LIMIT (H)
12	5E	C0	192	24000	PV CRUM WARNING (L)
12	5F	5D	93		PV CRUM WARNING (M)
12	60	00	0		PV CRUM WARNING (H)
12	61	B1	177	289457	Motor rotate time CRUM WARNING (L)
12	62	6A	106		Motor rotate time CRUM WARNING (M)
12	63	04	4		Motor rotate time CRUM WARNING (H)
12	64	40	64	65600	Dispensed time Y CRUM WARNING (L)
12	65	00	0		Dispensed time Y CRUM WARNING (M)
12	66	01	1		Dispensed time Y CRUM WARNING (H)
12	67	40	64	65600	Dispensed time M CRUM WARNING (L)
12	68	00	0		Dispensed time M CRUM WARNING (M)
12	69	01	1		Dispensed time M CRUM WARNING (H)
12	6A	40	64	65600	Dispensed time C CRUM WARNING (L)
12	6B	00	0		Dispensed time C CRUM WARNING (M)
12	6C	01	1		Dispensed time C CRUM WARNING (H)
12	6D	00	0	78080	Dispensed time K CRUM WARNING (L)
12	6E	31	49		Dispensed time K CRUM WARNING (M)
12	6F	01	1		Dispensed time K CRUM WARNING (H)
12	FA	00	0		U2 details
12	FB	00	0		U6 details

#### 14. Marking Adjust

Address		Set value		Description	
Higher	Lower	Hex	Dec		
14	0	00	0	Plain paper-L	
14	1	00	0	Thick paper-L	
14	4	00	0	Heavier paper-L	
14	5	00	0	Heavier paper-H	
14	6	00	0	Envelope	
14	7	00	0	Postcard	
14	8	00	0	Transparency	
14	9	00	0	Label-H	
14	A	00	0	Plain paper-L High Gloss	
14	B	00	0	Thick paper-L High Gloss	
14	C	00	0	Label-L	
14	E	00	0	Heavier paper-L BackFace	
14	F	00	0	Heavier paper-H BackFace	
14	10	00	0	Envelope BackFace	
14	11	00	0	Postcard BackFace	
14	12	00	0	Plain paper-H	
14	13	00	0	Thick paper-H	
14	14	00	0	Plain paper-H High Gloss	
14	15	00	0	Thick paper-H High Gloss	
14	1B	05	5	Color balance adjustment	Y
14	1C	05	5	Color balance adjustment	M
14	1D	05	5	Color balance adjustment	C
14	1E	05	5	Color balance adjustment	K
14	1F	05	5	Density adjustment	YMCK
14	20	F9	249	Color balance adjustment	0
14	21	FA	250	Color balance adjustment	1
14	22	FB	251	Color balance adjustment	2
14	23	FC	252	Color balance adjustment	3
14	24	FE	254	Color balance adjustment	4
14	25	00	0	Color balance adjustment	5
14	26	02	2	Color balance adjustment	6
14	27	04	4	Color balance adjustment	7
14	28	05	5	Color balance adjustment	8
14	29	06	6	Color balance adjustment	9
14	2A	07	7	Color balance adjustment	10
14	2B	F1	241	Density adjustment (Vdc)	0
14	2C	F4	244	Density adjustment (Vdc)	1

Address		Set value		Description	
Higher	Lower	Hex	Dec		
14	2D	F7	247	Density adjustment (Vdc)	2
14	2E	FA	250	Density adjustment (Vdc)	3
14	2F	FD	253	Density adjustment (Vdc)	4
14	30	00	0	Density adjustment (Vdc)	5
14	31	03	3	Density adjustment (Vdc)	6
14	32	06	6	Density adjustment (Vdc)	7
14	33	09	9	Density adjustment (Vdc)	8
14	34	0C	12	Density adjustment (Vdc)	9
14	35	0F	15	Density adjustment (Vdc)	10
14	36	FB	251	Density adjustment (Vcf)	0
14	37	FC	252	Density adjustment (Vcf)	1
14	38	FD	253	Density adjustment (Vcf)	2
14	39	FE	254	Density adjustment (Vcf)	3
14	3A	FF	255	Density adjustment (Vcf)	4
14	3B	00	0	Density adjustment (Vcf)	5
14	3C	01	1	Density adjustment (Vcf)	6
14	3D	02	2	Density adjustment (Vcf)	7
14	3E	03	3	Density adjustment (Vcf)	8
14	3F	04	4	Density adjustment (Vcf)	9
14	40	05	5	Density adjustment (Vcf)	10
14	41	00	0	Density adjustment (PCDC_Th Y)	0
14	42	00	0	Density adjustment (PCDC_Th Y)	1
14	43	00	0	Density adjustment (PCDC_Th Y)	2
14	44	00	0	Density adjustment (PCDC_Th Y)	3
14	45	00	0	Density adjustment (PCDC_Th Y)	4
14	46	00	0	Density adjustment (PCDC_Th Y)	5
14	47	00	0	Density adjustment (PCDC_Th Y)	6
14	48	00	0	Density adjustment (PCDC_Th Y)	7
14	49	00	0	Density adjustment (PCDC_Th Y)	8
14	4A	00	0	Density adjustment (PCDC_Th Y)	9
14	4B	00	0	Density adjustment (PCDC_Th Y)	10
14	4C	00	0	Density adjustment (PCDC_Th M)	0
14	4D	00	0	Density adjustment (PCDC_Th M)	1
14	4E	00	0	Density adjustment (PCDC_Th M)	2
14	4F	00	0	Density adjustment (PCDC_Th M)	3
14	50	00	0	Density adjustment (PCDC_Th M)	4
14	51	00	0	Density adjustment (PCDC_Th M)	5



Address		Set value		Description	
Higher	Lower	Hex	Dec		
14	52	00	0	Density adjustment (PCDC_Th M)	6
14	53	00	0	Density adjustment (PCDC_Th M)	7
14	54	00	0	Density adjustment (PCDC_Th M)	8
14	55	00	0	Density adjustment (PCDC_Th M)	9
14	56	00	0	Density adjustment (PCDC_Th M)	10
14	57	00	0	Density adjustment (PCDC_Th C)	0
14	58	00	0	Density adjustment (PCDC_Th C)	1
14	59	00	0	Density adjustment (PCDC_Th C)	2
14	5A	00	0	Density adjustment (PCDC_Th C)	3
14	5B	00	0	Density adjustment (PCDC_Th C)	4
14	5C	00	0	Density adjustment (PCDC_Th C)	5
14	5D	00	0	Density adjustment (PCDC_Th C)	6
14	5E	00	0	Density adjustment (PCDC_Th C)	7
14	5F	00	0	Density adjustment (PCDC_Th C)	8
14	60	00	0	Density adjustment (PCDC_Th C)	9
14	61	00	0	Density adjustment (PCDC_Th C)	10
14	62	00	0	Density adjustment (PCDC_Th K)	0
14	63	00	0	Density adjustment (PCDC_Th K)	1
14	64	00	0	Density adjustment (PCDC_Th K)	2
14	65	00	0	Density adjustment (PCDC_Th K)	3
14	66	00	0	Density adjustment (PCDC_Th K)	4
14	67	00	0	Density adjustment (PCDC_Th K)	5
14	68	00	0	Density adjustment (PCDC_Th K)	6
14	69	00	0	Density adjustment (PCDC_Th K)	7
14	6A	00	0	Density adjustment (PCDC_Th K)	8
14	6B	00	0	Density adjustment (PCDC_Th K)	9
14	6C	00	0	Density adjustment (PCDC_Th K)	10
14	80	00	0	Plain paper-L	Coated
14	81	00	0	Thick paper-L	Coated
14	84	00	0	Heavier paper-L	Coated
14	85	00	0	Heavier paper-H	Coated
14	86	00	0	Envelope	Coated
14	87	00	0	Postcard	Coated
14	88	00	0	Transparency	Coated
14	89	00	0	Label-H	Coated
14	8A	00	0	Plain paper-L High Gloss	Coated
14	8B	00	0	Thick paper-L High Gloss	Coated

Address		Set value		Description		
Higher	Lower	Hex	Dec			
14	8C	00	0	Label-L	Coated	
14	8E	00	0	Heavier paper-L BackFace	Coated	
14	8F	00	0	Heavier paper-H BackFace	Coated	
14	90	00	0	Envelope BackFace	Coated	
14	91	00	0	Postcard BackFace	Coated	
14	92	00	0	Plain paper-H	Coated	
14	93	00	0	Thick paper-H	Coated	
14	94	00	0	Plain paper-H High Gloss	Coated	
14	95	00	0	Thick paper-H High Gloss	Coated	

#### 15. User

Address		Set value		Description		
Higher	Lower	Hex	Dec			
15	0	00	0	UserData1		
15	1	00	0	UserData2		
15	2	00	0	UserData3		
15	3	00	0	UserData4		
15	4	00	0	UserData5		
15	5	00	0	UserData6		
15	6	00	0	UserData7		
15	7	00	0	UserData8		
15	8	00	0	UserData9		
15	9	00	0	UserData10		
15	A	00	0	UserData11		
15	B	00	0	UserData12		
15	C	00	0	UserData13		
15	D	00	0	UserData14		

#### 18. Cleaner (1)

Address		Set value		Description		
Higher	Lower	Hex	Dec			
18	50	30	48	Cleaning interval 0	0	4095
18	51	20	32	Cleaning interval 1	4096	8191
18	52	20	32	Cleaning interval 2	8192	12287
18	53	20	32	Cleaning interval 3	12288	16383
18	54	14	20	Cleaning interval 4	16384	20479
18	55	10	16	Cleaning interval 5	20480	24575
18	56	10	16	Cleaning interval 6	24576	

## 25. Fuser (1)

Address		Set value		Description			
Higher	Lower	Hex	Dec				
25	2A	16	22	Temperature table	Plain Paper Low	Large (00)	Full speed
25	2B	1E	30	Temperature table	Plain Paper Low	Middle (01)	Full speed
25	2C	26	38	Temperature table	Plain Paper Low	Small (10)	Full speed
25	2D	18	24	Temperature table	Plain Paper High	Large (00)	Full speed
25	2E	20	32	Temperature table	Plain Paper High	Middle (01)	Full speed
25	2F	28	40	Temperature table	Plain Paper High	Small (10)	Full speed
25	30	1A	26	Temperature table	Bond Paper Low	Large (00)	Full speed
25	31	22	34	Temperature table	Bond Paper Low	Middle (01)	Full speed
25	32	2A	42	Temperature table	Bond Paper Low	Small (10)	Full speed
25	33	1C	28	Temperature table	Bond Paper High	Large (00)	Full speed
25	34	24	36	Temperature table	Bond Paper High	Middle (01)	Full speed
25	35	2C	44	Temperature table	Bond Paper High	Small (10)	Full speed
25	36	2E	46	Temperature table	Plain Paper Low	Large (00)	Half speed
25	37	36	54	Temperature table	Plain Paper Low	Middle (01)	Half speed
25	38	3E	62	Temperature table	Plain Paper Low	Small (10)	Half speed
25	39	30	48	Temperature table	Plain Paper High	Large (00)	Half speed
25	3A	38	56	Temperature table	Plain Paper High	Middle (01)	Half speed
25	3B	40	64	Temperature table	Plain Paper High	Small (10)	Half speed
25	3C	32	50	Temperature table	Bond Paper Low	Large (00)	Half speed
25	3D	3A	58	Temperature table	Bond Paper Low	Middle (01)	Half speed
25	3E	42	66	Temperature table	Bond Paper Low	Small (10)	Half speed
25	3F	34	52	Temperature table	Bond Paper High	Large (00)	Half speed
25	40	3C	60	Temperature table	Bond Paper High	Middle (01)	Half speed
25	41	44	68	Temperature table	Bond Paper High	Small (10)	Half speed
25	42	46	70	Temperature table	Labels 1 (domestic)	Large (00)	Half speed
25	43	5C	92	Temperature table	Labels 1 (domestic)	Middle (01)	Half speed
25	44	5E	94	Temperature table	Labels 1 (domestic)	Small (10)	Half speed
25	45	48	72	Temperature table	Labels 2 (foreign)	Large (00)	Half speed
25	46	3A	58	Temperature table	Labels 2 (foreign)	Middle (01)	Half speed
25	47	42	66	Temperature table	Labels 2 (foreign)	Small (10)	Half speed
25	48	4A	74	Temperature table	Thick paper 1 (Low weight)	Large (00)	Half speed
25	49	4C	76	Temperature table	Thick paper 1 (Low weight)	Middle (01)	Half speed

Address		Set value		Description			
Higher	Lower	Hex	Dec				
25	4A	4E	78	Temperature table	Thick paper 1 (Low weight)	Small (10)	Half speed
25	4B	50	80	Temperature table	Thick paper 2 (Heavy weight)	Large (00)	Half speed
25	4C	52	82	Temperature table	Thick paper 2 (Heavy weight)	Middle (01)	Half speed
25	4D	54	84	Temperature table	Thick paper 2 (Heavy weight)	Small (10)	Half speed
25	4E	56	86	Temperature table	Transparencies	00	Half speed
25	4F	58	88	Temperature table	Envelope	00	Half speed
25	50	5A	90	Temperature table	Postcards	00	Half speed

25. Fuser (3)

Address		Set value		Description			
Higher	Lower	Hex	Dec				
27	49	00	0	U4 previous U4	0	0	0
27	4A	00	0	U4 one more previous U4	0	0	0

## 7. HEX/DEC CONVERSION TABLE

Decimal	HEX	Decimal	HEX	Decimal	HEX	Decimal	HEX	Decimal	HEX
1	01	53	35	105	69	157	9D	209	D1
2	02	54	36	106	6A	158	9E	210	D2
3	03	55	37	107	6B	159	9F	211	D3
4	04	56	38	108	6C	160	A0	212	D4
5	05	57	39	109	6D	161	A1	213	D5
6	06	58	3A	110	6E	162	A2	214	D6
7	07	59	3B	111	6F	163	A3	215	D7
8	08	60	3C	112	70	164	A4	216	D8
9	09	61	3D	113	71	165	A5	217	D9
10	0A	62	3E	114	72	166	A6	218	DA
11	0B	63	3F	115	73	167	A7	219	DB
12	0C	64	40	116	74	168	A8	220	DC
13	0D	65	41	117	75	169	A9	221	DD
14	0E	66	42	118	76	170	AA	222	DE
15	0F	67	43	119	77	171	AB	223	DF
16	10	68	44	120	78	172	AC	224	E0
17	11	69	45	121	79	173	AD	225	E1
18	12	70	46	122	7A	174	AE	226	E2
19	13	71	47	123	7B	175	AF	227	E3
20	14	72	48	124	7C	176	B0	228	E4
21	15	73	49	125	7D	177	B1	229	E5
22	16	74	4A	126	7E	178	B2	230	E6
23	17	75	4B	127	7F	179	B3	231	E7
24	18	76	4C	128	80	180	B4	232	E8
25	19	77	4D	129	81	181	B5	233	E9
26	1A	78	4E	130	82	182	B6	234	EA
27	1B	79	4F	131	83	183	B7	235	EB
28	1C	80	50	132	84	184	B8	236	EC
29	1D	81	51	133	85	185	B9	237	ED
30	1E	82	52	134	86	186	BA	238	EE
31	1F	83	53	135	87	187	BB	239	EF
32	20	84	54	136	88	188	BC	240	F0
33	21	85	55	137	89	189	BD	241	F1
34	22	86	56	138	8A	190	BE	242	F2
35	23	87	57	139	8B	191	BF	243	F3
36	24	88	58	140	8C	192	C0	244	F4
37	25	89	59	141	8D	193	C1	245	F5
38	26	90	5A	142	8E	194	C2	246	F6
39	27	91	5B	143	8F	195	C3	247	F7
40	28	92	5C	144	90	196	C4	248	F8
41	29	93	5D	145	91	197	C5	249	F9
42	2A	94	5E	146	92	198	C6	250	FA
43	2B	95	5F	147	93	199	C7	251	FB
44	2C	96	60	148	94	200	C8	252	FC
45	2D	97	61	149	95	201	C9	253	FD
46	2E	98	62	150	96	202	CA	254	FE
47	2F	99	63	151	97	203	CB	255	FF
48	30	100	64	152	98	204	CC	256	0100
49	31	101	65	153	99	205	CD	257	0101
50	32	102	66	154	9A	206	CE	258	0102
51	33	103	67	155	9B	207	CF	259	0103
52	34	104	68	156	9C	208	D0	260	0104

Decimal	HEX	Decimal	HEX	Decimal	HEX	Decimal	HEX	Decimal	HEX
261	0105	297	0129	333	014D	369	0171	405	0195
262	0106	298	012A	334	014E	370	0172	406	0196
263	0107	299	012B	335	014F	371	0173	407	0197
264	0108	300	012C	336	0150	372	0174	408	0198
265	0109	301	012D	337	0151	373	0175	409	0199
266	010A	302	012E	338	0152	374	0176	410	019A
267	010B	303	012F	339	0153	375	0177	411	019B
268	010C	304	0130	340	0154	376	0178	412	019C
269	010D	305	0131	341	0155	377	0179	413	019D
270	010E	306	0132	342	0156	378	017A	414	019E
271	010F	307	0133	343	0157	379	017B	415	019F
272	0110	308	0134	344	0158	380	017C	416	01A0
273	0111	309	0135	345	0159	381	017D	417	01A1
274	0112	310	0136	346	015A	382	017E	418	01A2
275	0113	311	0137	347	015B	383	017F	419	01A3
276	0114	312	0138	348	015C	384	0180	420	01A4
277	0115	313	0139	349	015D	385	0181	421	01A5
278	0116	314	013A	350	015E	386	0182	422	01A6
279	0117	315	013B	351	015F	387	0183	423	01A7
280	0118	316	013C	352	0160	388	0184	424	01A8
281	0119	317	013D	353	0161	389	0185	425	01A9
282	011A	318	013E	354	0162	390	0186	426	01AA
283	011B	319	013F	355	0163	391	0187	427	01AB
284	011C	320	0140	356	0164	392	0188	428	01AC
285	011D	321	0141	357	0165	393	0189	429	01AD
286	011E	322	0142	358	0166	394	018A	430	01AE
287	011F	323	0143	359	0167	395	018B	431	01AF
288	0120	324	0144	360	0168	396	018C	432	01B0
289	0121	325	0145	361	0169	397	018D	433	01B1
290	0122	326	0146	362	016A	398	018E	434	01B2
291	0123	327	0147	363	016B	399	018F	435	01B3
292	0124	328	0148	364	016C	400	0190	436	01B4
293	0125	329	0149	365	016D	401	0191	437	01B5
294	0126	330	014A	366	016E	402	0192	438	01B6
295	0127	331	014B	367	016F	403	0193	439	01B7
296	0128	332	014C	368	0170	404	0194	440	01B8

## 8. IMAGE QUALITY TROUBLE ENTRY CHART

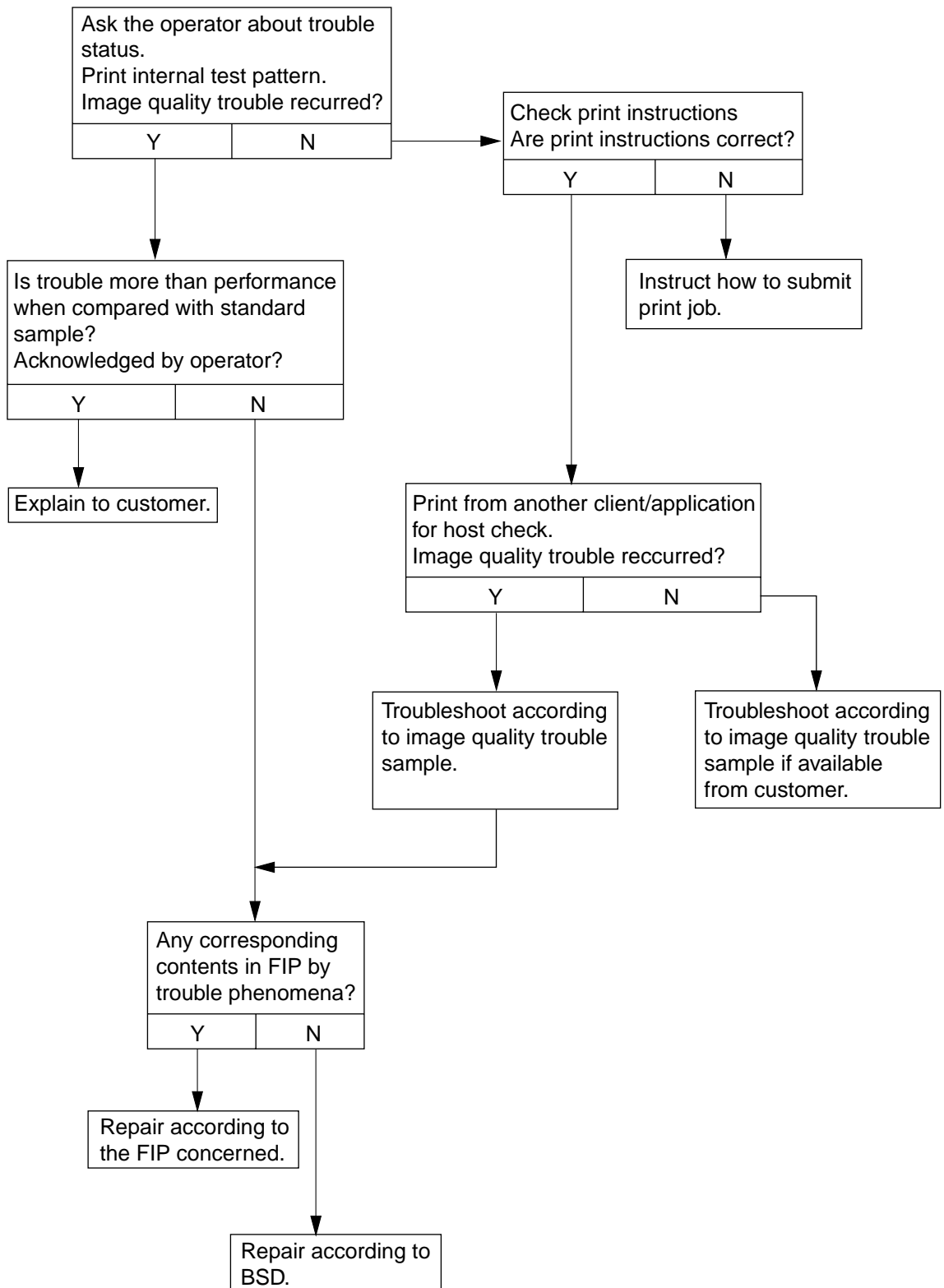


Fig.5-9

## 9. IMAGE QUALITY SPECIFICATIONS

### 9.1 Parallelism

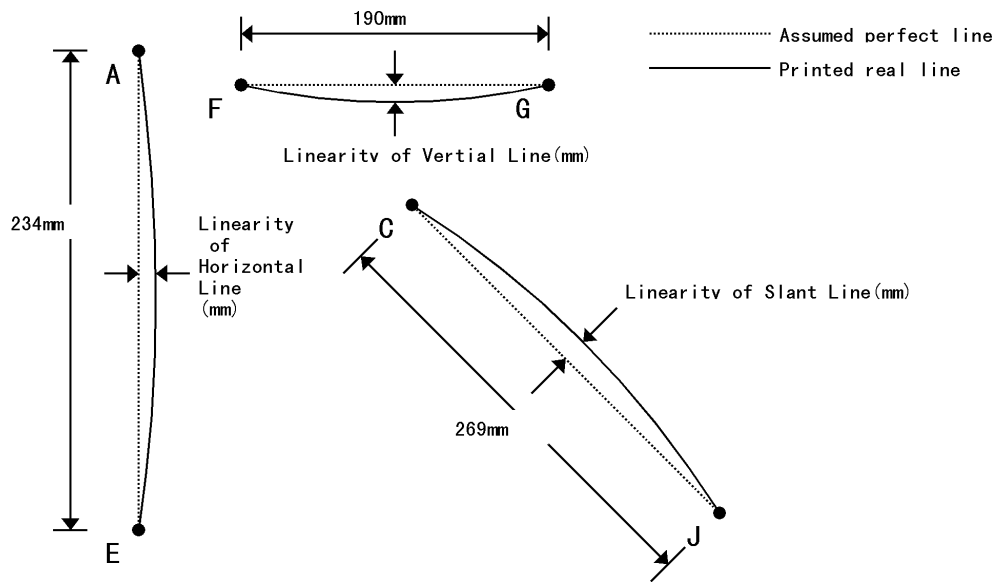


Fig.5-10

### 9.2 Diagonal

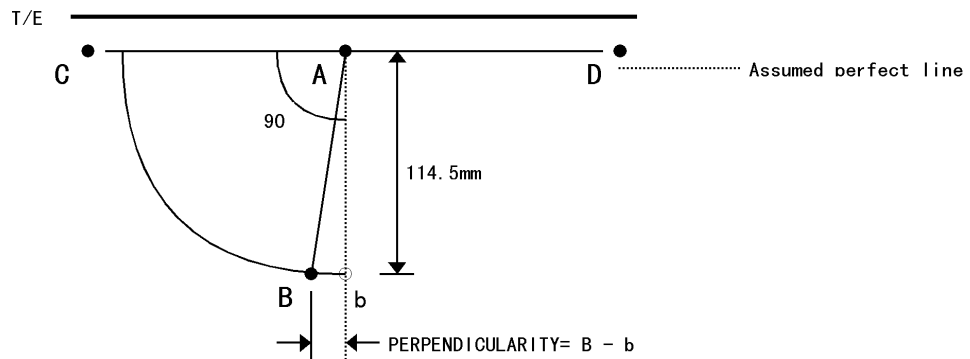


Fig.5-11

### 9.3 Skew

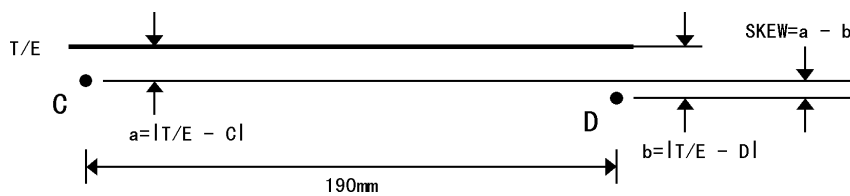


Fig.5-12



### 9.4 Straightness

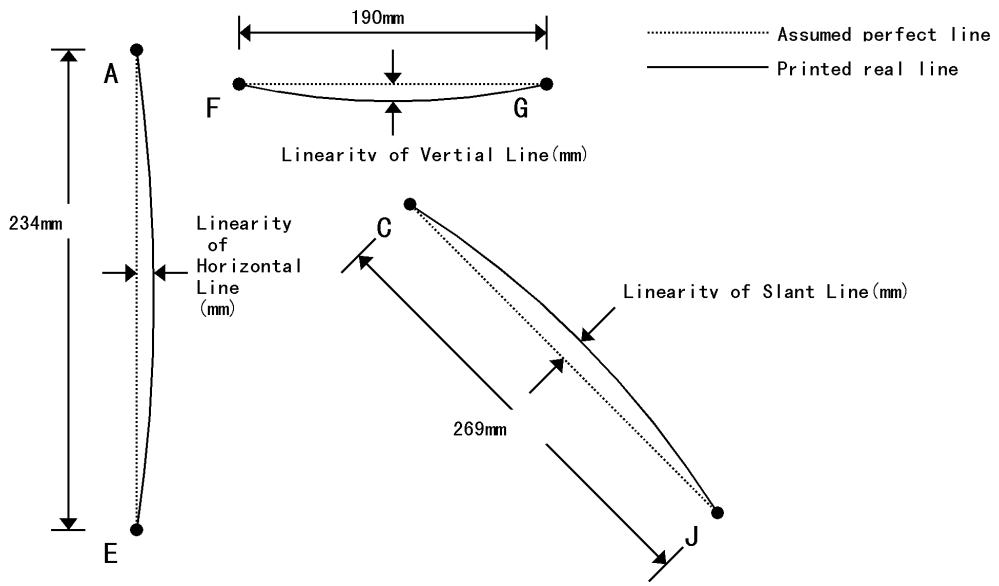


Fig.5-13

### 9.5 Magnification Error

$$\text{Magnification} = \text{measured length} \div \text{Nominal}$$

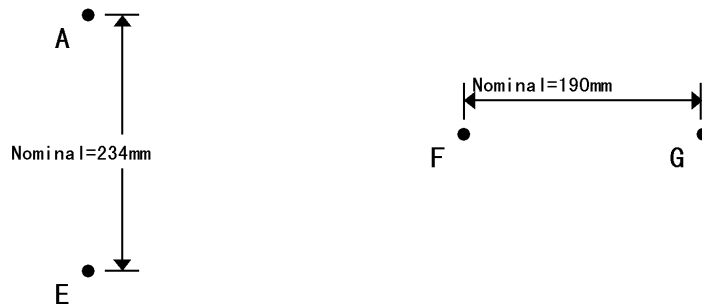


Fig.5-14

### 9.6 Registration

$$\text{Registration} = \text{measured length} - \text{Nominal}$$



Fig.5-15

## 9.7 Guaranteed Printing Area

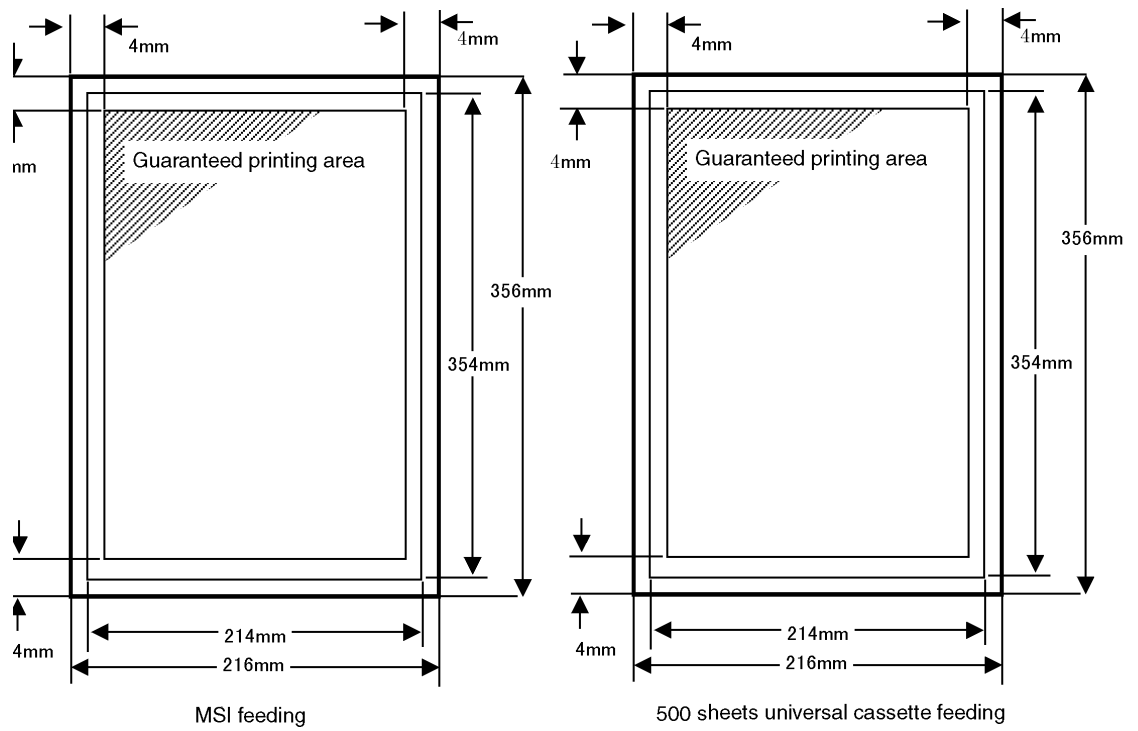









Fig.5-16

## 10. TEST PRINT

### 10.1 Test Print

Function: Printing an internal test pattern of the printer

Operation procedure:

1. While pressing the  and  buttons together, turn the power on to enter the Diag. mode.
2. Enter the password.  
(Password: Press the  button twice and the Form Feed/Set button.)
3. Go advance to [Test Print] with the  and  buttons.
4. Press the Form Feed/Set button to advance to diagnostic menu selection in [Test Print].
5. Select a test pattern with the  and  buttons.  
(For the contents of the test print patterns, refer to the table below.)
6. Press the Form Feed/Set button to determine the selection.
7. Press the Form Feed/Set button again to execute test printing.  
(The LCD panel displays [Processing].)
8. After outputting the test print, the printer becomes Ready to Print state.  
(The LCD panel displays [Ready to Print].)

Test Print

No.	Pattern	Description
1	No Image [IOT]	Feeds and outputs paper with no image.
2	Grid	Blank paper (MCU: No Support)
3	Grid2 [ESS]	Outputs an ESS internal grid pattern.
4	H Patt 600[IOT]	Outputs an IOT internal 600-dpi pattern.
5	H Patt 1200[IOT]	Blank paper (MCU: No Support)
6	Cyan 20% [ESS]	Outputs an A4 solid pattern of 20% cyan.
7	Magenta20% [ESS]	Outputs an A4 solid pattern of 20% magenta.
8	Yellow 20% [ESS]	Outputs an A4 solid pattern of 20% yellow.
9	Black 20% [ESS]	Outputs an A4 solid pattern of 20% black.
10	CMY 20% [ESS]	Outputs an A4 solid pattern of 20% C.M.Y each.
11	Gradation [ESS]	Outputs 100% to 2% gradation patterns to A4 sheets in four colors.
12	NIP adjust [A4L]	Outputs the NIP adjustment pattern to A4LEF.
13	P Regi Adj Chart [ESS]	Outputs the Paper feed registration correction chart to A4 sheets.

## 11. IMAGE QUALITY FIP

### 11.1 Notes on Image Quality Trouble Check

Image quality troubles are checked and processed according to the troubleshooting table by trouble phenomena. In case of a continuous or abnormal image defect, check the installation environment at the customer, the document, and the consumables.

1. Installation environment
  - Prepare a power supply of 100/120/220±10 VAC.
  - Do not install the printer at a place of high temperature or humidity (near a water tap, water heater, humidifier, heater, air conditioner, or fire) or at a very dusty place.
  - Do not install the printer where an ammonia gas is generated.
  - Do not install the printer under direct sunlight.
  - Install the printer at a well-ventilated place.
  - Keep the printer horizontal.
2. Host check for an image quality trouble
  - Check whether the trouble depends on the application.
    - 1) Printing from another client
    - 2) Printing from another application
    - 3) Printing from another file
    - 4) Changing the driver
    - 5) Changing the application
    - 6) Checking the client system
3. Consumables check
  - Check the lives of the following consumables:

1) Print head cartridge	30K print
2) Transfer roll cartridge	25K print
3) Y toner cartridge	6K print
4) M toner cartridge	6K print
5) C toner cartridge	6K print
6) K toner cartridge	8.5K print

### 11.2 Basic Rule of Image Quality Adjustment

The basic rule of image quality adjustment is to clean each mechanical section.

Clean the ADC sensor ASSY, paper path, fuser, and transfer roll. Remarkable or quick fouling of a mechanical section is often attributable to the installation environment. An appropriate remedy is necessary.

### 11.3 Troubleshooting Table by Trouble Phenomena

#### <Fogging>



Fig.5-17

Condition:  
Fogging over print. Toner attaches to margin of print.

Initial check:  
Parts of different specifications, improper installation, damage, deformation, dirt, foreign substance attached, etc.

Major parts to be checked:  
Print head cartridge ASSY, Fuser ASSY, Transfer roll cartridge ASSY, Scanner ASSY, MCU and HVPS PWB, SUB HVPS

Item	Check	Remedy
1	Faulty print head cartridge ASSY Is the image quality improved if print head cartridge ASSY is replaced?	Replace the print head cartridge ASSY
2	Faulty scanner ASSY Is the image quality improved if scanner ASSY is replaced?	Replace the scanner ASSY
3	Faulty fuser ASSY Check the heat roll and NIP belt for evidence of damage, dirt, or foreign substances.	Replace the fuser ASSY
4	Faulty transfer roll cartridge ASSY Is the image quality improved if transfer roll cartridge ASSY is replaced?	Replace the transfer roll cartridge ASSY

<Streak in the process direction>



Fig.5-18

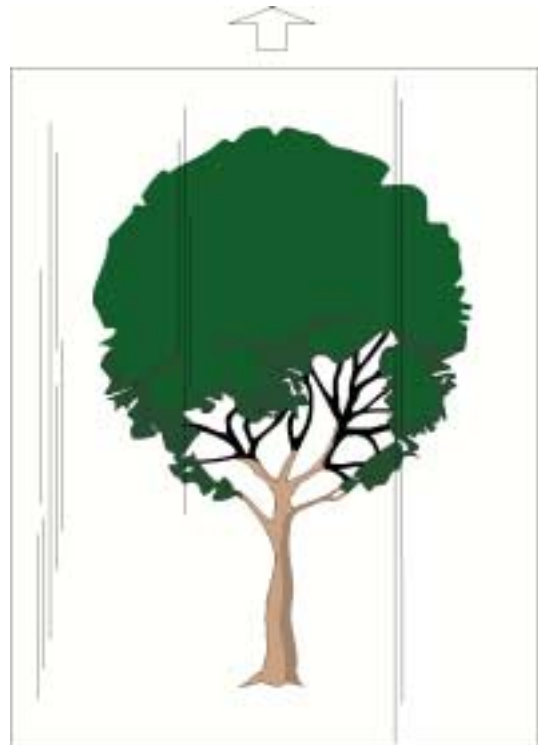


Fig.5-19

Condition:  
Black or white streaks in the process direction.

Initial check:  
Parts of different specifications, improper installation, damage, deformation, dirt, foreign substance attached, etc.

Major parts to be checked:  
Print head cartridge ASSY, Fuser ASSY, Transfer roll cartridge ASSY, Scanner ASSY, MCU and HVPS PWB, SUB HVPS

Item	Check	Remedy
1	Faulty print head cartridge ASSY Is the image quality improved if print head cartridge ASSY is replaced?	Replace the print head cartridge ASSY
2	Faulty scanner ASSY Is the image quality improved if scanner ASSY is replaced?	Replace the scanner ASSY
3	Faulty fuser ASSY Check the heat roll and NIP belt for evidence of damage, dirt, or foreign substances.	Replace the fuser ASSY
4	Faulty transfer roll cartridge ASSY Is the image quality improved if transfer roll cartridge ASSY is replaced?	Replace the transfer roll cartridge ASSY

<Streak in the shaft direction>



Fig.5-20

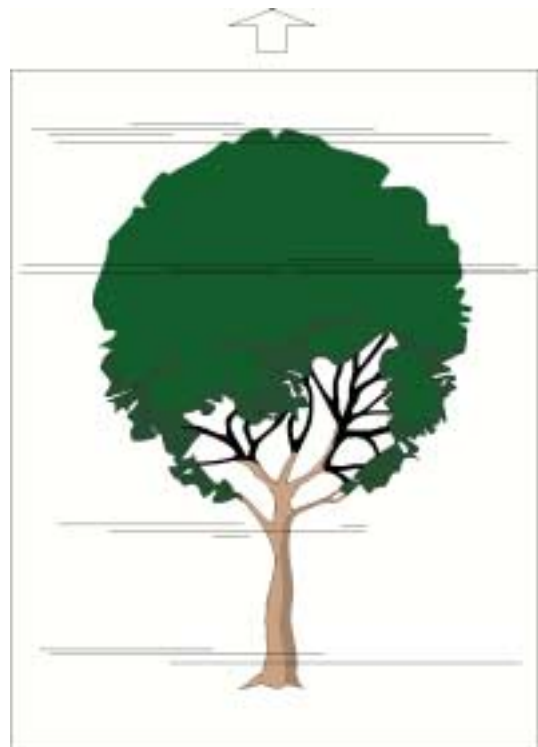


Fig.5-21

Condition:  
Black or white streaks in the shaft direction.

Initial check:  
Parts of different specifications, improper installation, damage, deformation, dirt, foreign substance attached, etc.

Major parts to be checked:  
Print head cartridge ASSY, Fuser ASSY, Transfer roll cartridge ASSY, Scanner ASSY, MCU and HVPS PWB, SUB HVPS

Item	Check	Remedy
1	Faulty print head cartridge ASSY Is the image quality improved if print head cartridge ASSY is replaced?	Replace the print head cartridge ASSY
2	Faulty scanner ASSY Is the image quality improved if scanner ASSY is replaced?	Replace the scanner ASSY
3	Faulty fuser ASSY Check the heat roll and NIP belt for evidence of damage, dirt, or foreign substances.	Replace the fuser ASSY
4	Faulty transfer roll cartridge ASSY Is the image quality improved if transfer roll cartridge ASSY is replaced?	Replace the transfer roll cartridge ASSY
5	Check periodicity Periodicity found ?	Replace the parts concerned. ( See the table below )
6	Faulty ESS PWB Is the image quality improved if ESS PWB is replaced?	Replace the ESS PWB

Rolls related with image quality troubles and interval appearing on prints are shown in the table below.

Roll	Parts	Cycle
Magnet roll	Print head cartridge ASSY	29 mm
Padolle		7.5 mm
Drum		63 mm
HTC		23 mm
IDT 1		132 mm
IDT 2		132 mm
Transfer roll cartridge	Transfer roll cartridge ASSY	65 mm
Heat roll	Fuser ASSY	82 mm



<All black>

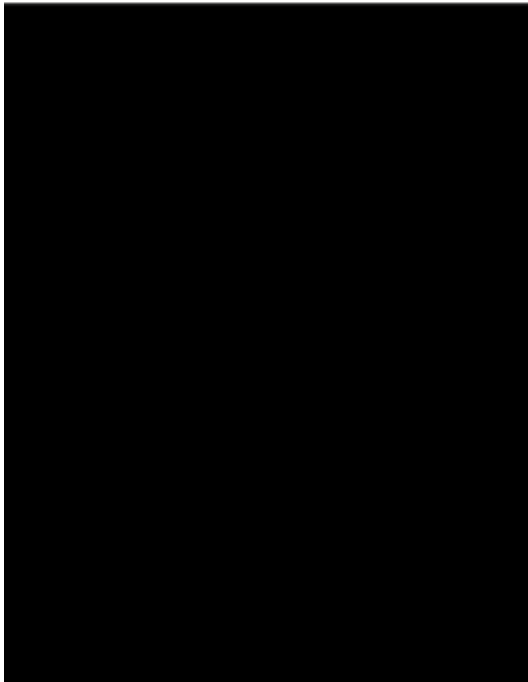


Fig.5-22

Condition:  
Print is wholly black.

Initial check:  
Parts of different specifications, improper installation, damage, deformation, dirt, foreign substance attached, etc.

Major parts to be checked:  
Print head cartridge ASSY, Fuser ASSY, Transfer roll cartridge ASSY, Scanner ASSY, MCU and HVPS PWB

Item	Check	Remedy
1	Faulty transfer Is the image quality improved if the laser beam exit window of scanner ASSY is shielded with a sheet?	Replace the MCU and HVPS PWB
2	Faulty scanner ASSY Is the image quality improved if scanner ASSY is replaced?	Replace the scanner ASSY
3	Faulty print head cartridge ASSY Is the image quality improved if print head cartridge ASSY is replaced?	Replace the print head cartridge ASSY

<All blank>

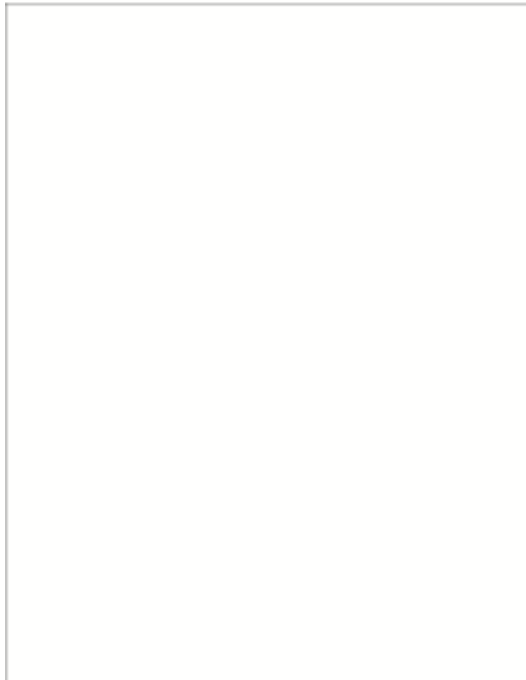


Fig.5-23

Condition:  
Print is wholly white.

Initial check:  
Parts of different specifications, improper installation, damage, deformation, dirt, foreign substance attached, etc.

Major parts to be checked:  
Print head cartridge ASSY, Fuser ASSY, Transfer roll cartridge ASSY, Scanner ASSY, MCU and HVPS PWB, Toner cartridge

Item	Check	Remedy
1	Toner empty Check if the toner cartridge is full with toner.	Replace the toner cartridge
2	Laser beam path interrupted Check the laser beam path between scanner ASSY and the drum in print head cartridge ASSY for evidence of dirt or foreign substances.	Clean dirt or foreign substances
3	Faulty scanner ASSY Is the image quality improved if scanner ASSY is replaced?	Replace the scanner ASSY
4	Faulty charging or developing Is the image quality improved if print head cartridge ASSY is replaced?	Replace the print head cartridge ASSY
5	Faulty transfer Is the image quality improved if transfer roll cartridge is replaced?	Replace the transfer roll cartridge ASSY
6	Faulty MCU and HVPS PWB Is the image quality improved if MCU and HVPS PW is replaced?	Replace the MCU and HVPS PWB

**<Too light image>**



**Fig.5-24**

Condition:  
Print is wholly light.

Initial check:  
Parts of different specifications, improper installation, damage, deformation, dirt, foreign substance attached, etc.

Major parts to be checked:  
Print head cartridge ASSY, Fuser ASSY, Transfer roll cartridge ASSY, Scanner ASSY, MCU and HVPS PWB, SUB HVPS

Item	Check	Remedy
1	Faulty print head cartridge ASSY Is the image quality improved if print head cartridge ASSY is replaced?	Replace the print head cartridge ASSY
2	Faulty scanner ASSY Is the image quality improved if scanner ASSY is replaced?	Replace the scanner ASSY
3	Faulty fuser ASSY Check the heat roll and NIP belt for evidence of damage, dirt, or foreign substances.	Replace the fuser ASSY
4	Faulty transfer roll cartridge ASSY Is the image quality improved if transfer roll cartridge ASSY is replaced?	Replace the transfer roll cartridge ASSY

<Black (color) points>

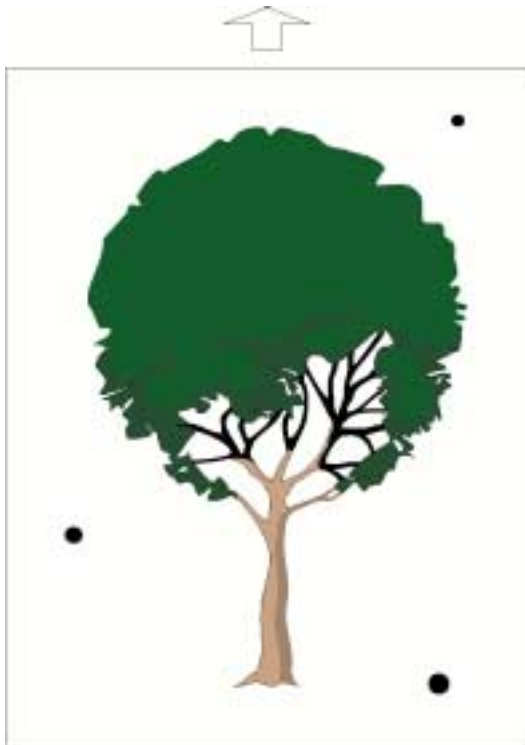


Fig.5-25

Condition:

Black (color) circles remain on the print.

Initial check:

Parts of different specifications, improper installation, damage, deformation, dirt, foreign substance attached, etc.

Major parts to be checked:

Print head cartridge ASSY, Fuser ASSY, Transfer roll cartridge ASSY, Scanner ASSY, MCU and HVPS PWB, SUB HVPS

Item	Check	Remedy
1	Faulty print head cartridge ASSY Is the image quality improved if print head cartridge ASSY is replaced?	Replace the print head cartridge ASSY
2	Faulty scanner ASSY Is the image quality improved if scanner ASSY is replaced?	Replace the scanner ASSY
3	Faulty fuser ASSY Check the heat roll and NIP belt for evidence of damage, dirt, or foreign substances.	Replace the fuser ASSY
4	Faulty transfer roll cartridge ASSY Is the image quality improved if transfer roll cartridge ASSY is replaced?	Replace the transfer roll cartridge ASSY

<Paper skew>



Fig.5-26

Condition:  
Image is printed in skewed position.

Initial check:  
Parts of different specifications, improper installation, damage, deformation, dirt, foreign substance attached, etc.

Major parts to be checked:  
Paper feeder, Chute ASSY REGI, Chute ASSY out, Transfer roll cartridge ASSY, Print head cartridge ASSY, Fuser ASSY, Scanner ASSY

Item	Check	Remedy
1	Faulty paper loading Check if paper is loaded or paper cassette is set correctly.	Load paper/Set paper cassette correctly.
2	Faulty paper transfer path Check the paper transfer path for presence of burrs, foreign substances or dirt.	Clean or replace the parts concerned.
3	Faulty paper feed rolls Check if the paper feed rolls feed the paper normally.	Clean or replace the parts concerned.
4	Faulty paper transfer rolls Check the paper transfer rolls for evidence of foreign substances, dirt, deformation, or malfunction.	Clean or replace the parts concerned.
5	Checking scanner ASSY for mounting Check if scanner ASSY for mounting	Replace the scanner ASSY
6	Faulty print head cartridge ASSY Is the image quality improved if print head cartridge ASSY is replaced?	Replace the print head cartridge ASSY

### <Crease>

Condition:

Print on creased paper.

Initial check:

Parts of different specifications, improper installation, damage, deformation, dirt, foreign substance attached, etc.

Major parts to be checked:

Paper feeder, Chute ASSY REGI, Chute ASSY out, Transfer roll cartridge ASSY, Print head cartridge ASSY, Fuser ASSY

Item	Check	Remedy
1	Wet paper Do the wrinkles disappear if the paper is replaced with newly unpacked paper?	Replace paper (Ask the customer for storing the paper in a dry place)
2	Faulty fuser ASSY Check the heat roll and NIP belt for evidence of damage, dirt, or foreign substances.	Replace the fuser ASSY
3	Paper skew feed Check if the paper is fed on the skew	Go to Paper skew.
4	Faulty paper transfer path Check the paper transfer path for presence of burrs, foreign substances or dirt.	Clean or replace the parts concerned.
5	Faulty paper transfer rolls Check the paper transfer rolls for evidence of foreign substances, dirt, deformation, or malfunction.	Clean or replace the parts concerned.

### <Poor fusing>

Condition:

Image is easily peeled off when scrubbed by hand.

Initial check:

Parts of different specifications, improper installation, damage, deformation, dirt, foreign substance attached, etc.

Major parts to be checked:

Fuser ASSY

Item	Check	Remedy
1	Wet paper Do the wrinkles disappear if the paper is replaced with newly unpacked paper?	Replace paper (Ask the customer for storing the paper in a dry place)
2	Faulty fuser ASSY Is the image quality improved if print head cartridge ASSY is replaced?	Replace the fuser ASSY

# **CHAPTER VI**

## **DIAGRAMS**

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# CHAPTER VI DIAGRAMS

## 1. PREFACE

### 1.1 How to Use the BSD

1. Enter the chain specified in the chapter of troubleshooting.
2. Or enter the corresponding chain by referencing the table of contents.
3. Analyze the fault in the chain.
4. Once the fault has been located, advance to the parts index or corresponding adjustment by referencing the Parts List number or adjustment number.



### **WARNING**

*Be sure to main power switch off and unplug the machine before replacing and removing parts. Access to a live machine's interior can cause electric shocks.*

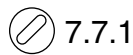
### 1.2 Explanations of Symbols



This symbol references a note usually on the same page.

PL7.7

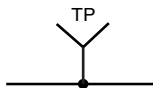
This symbol references the parts list. PL represents Parts List and "7.7" indicates a plate where the corresponding part is described. Every replaceable part on the BSD has this symbol.



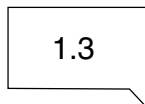
References an adjustment in the chapter of Repairs and Adjustments. In this example, 7.7.1 means that the adjustment method is described in 7.7.1 in the chapter of adjustment.



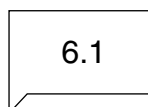
Indicates the variable resistor that can be adjusted in field.



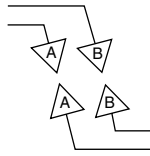
Represents a signal test point.



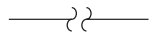
Represents the source of input to the function. In This example, the input source is the group function of chain 1-3.



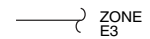
Represents the destination of output from the function. In this example, the output destination is the group function of chain 6-1.



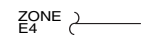
Represents a signal line connected vertically.



Represents a signal line connected horizontally.



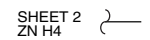
Indicates that the signal line is connected in the same function. In this example, the destination of the signal line is described in the zone of E-3.



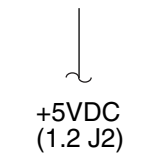
Indicates that the signal line is connected in the same function. In this example, the source of the signal line is described in the zone of A-4



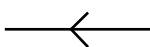
Indicates that the signal line is connected in another sheet (described at the lower right of BSD). In this example, the destination of the signal line is described in the CH8.5 zone of A-2.



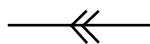
Indicates that the signal line is connected in another sheet (described at the lower right of BSD). In this example, the source of the signal line is described in the CH8.5 zone of H-4.



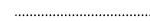
Represents the output power line of chain 1.



Indicates that the signal flow is from right to left, opposite to the ordinary direction.



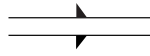
Represents a feedback signal.



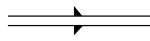
Represents a mechanical link to a part.



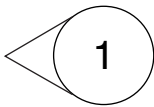
Represents a mechanical drive signal and its flow direction.



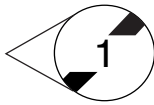
Represents a document or paper and its flow direction.



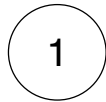
Represents a thermal, optical, or pneumatic signal and its flow direction.



Means that the information indicated by the arrow is after 1V.



Means that the information indicated by the arrow is before 1V.



Means that the information in the entire figure or frame is after 1V.



Means that the information in the entire figure or frame is before 1V.

### 1.3 Signal Name

Signal Name

Signal name configuration

<u>REGI SENSOR</u>	<u>SENSED</u>	<u>(L)</u>	<u>+5VDC</u>
Part name	Status	Logical value	Voltage at signal level H

This signal is L when paper is detected at the registration sensor but H (+5 VDC) when not.

### 1.4 DC Voltage

Unless otherwise specified in a note or other, the DC voltage is measured between each test point and the frame and its value is within the following ranges:

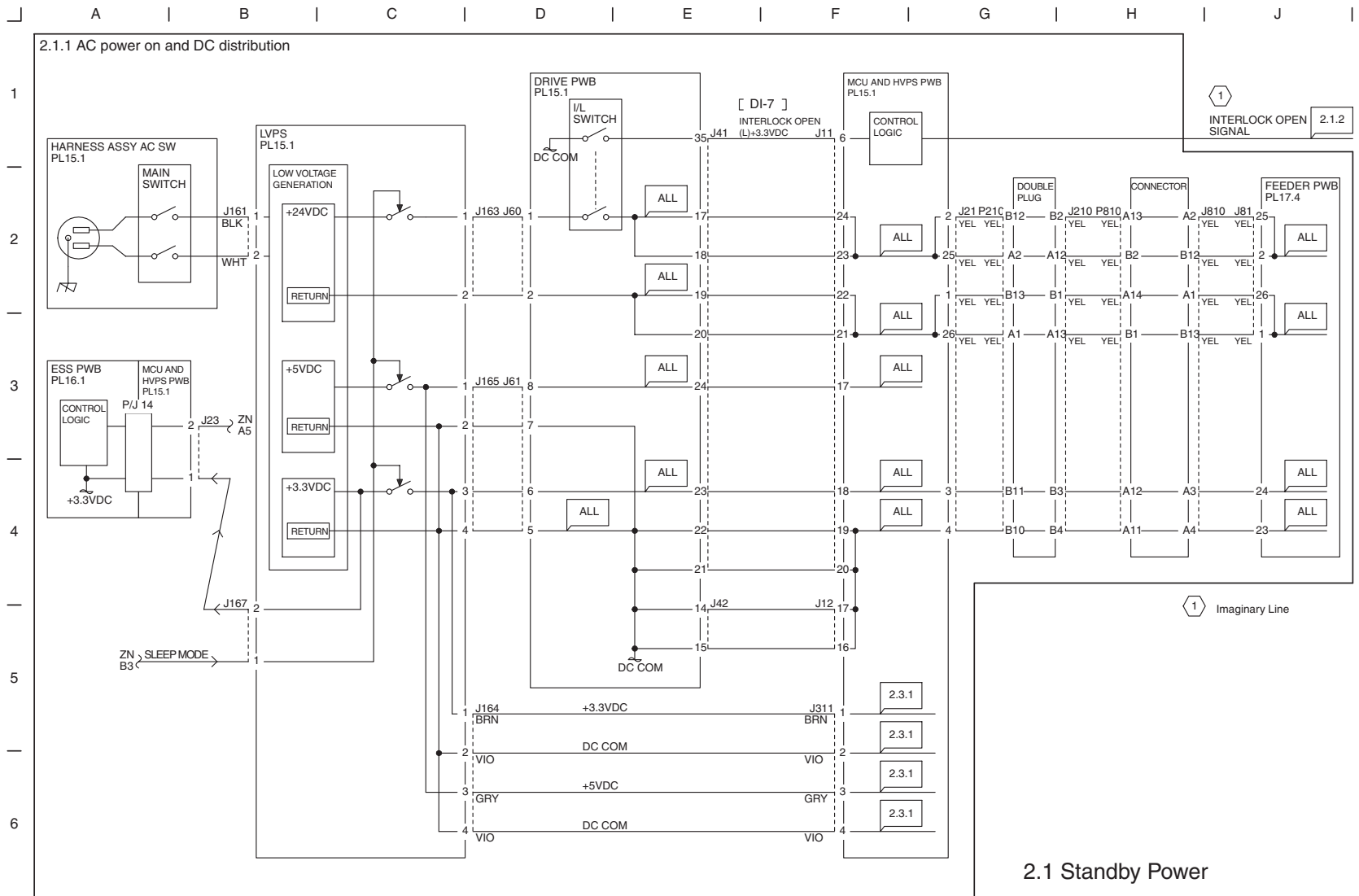
+5VDC	(H)	+4.5 to +5.3VDC
	(L)	0.0 to +1.0VDC
+12VDC	(H)	+10.0 to +13.2VDC
	(L)	0.0 to +1.5VDC
+24VDC	(H)	+22.0 to +25.7VDC
	(L)	0.0 to +3.0VDC

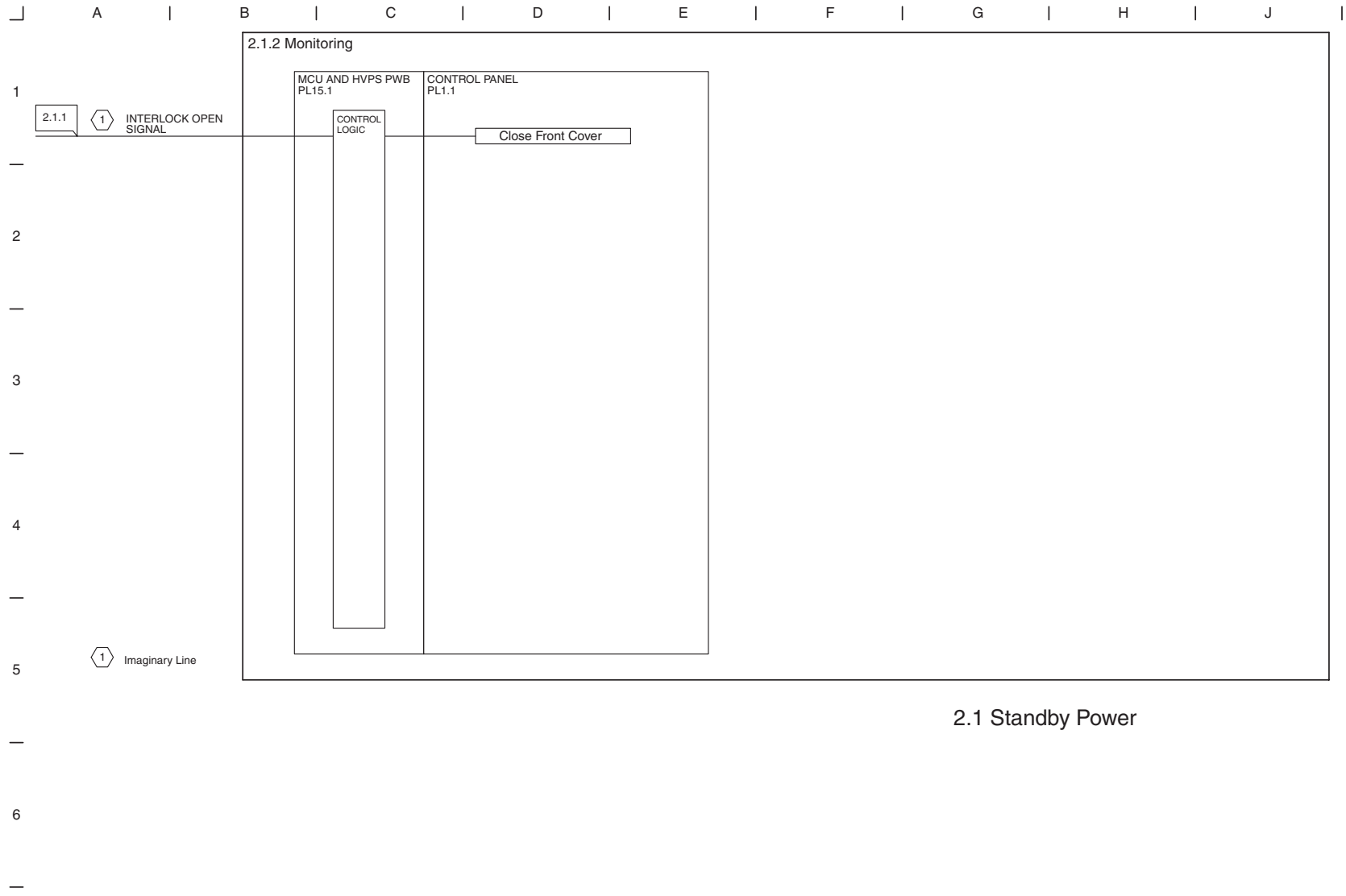
### 1.5 Input/Output Test

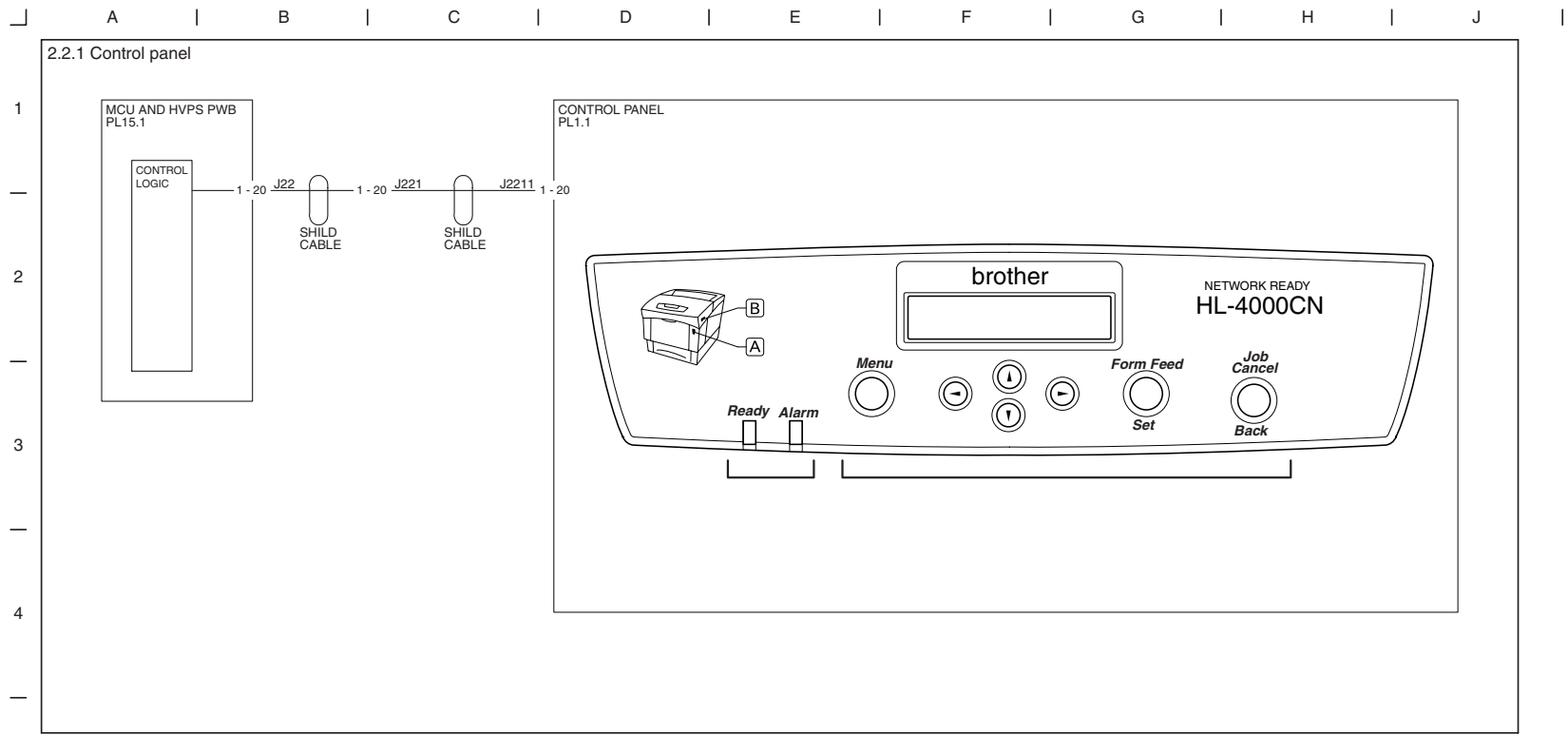
DI: Digital input test

DO: Digital output test

The DI/DO diagnosis can be executed from the control panel.

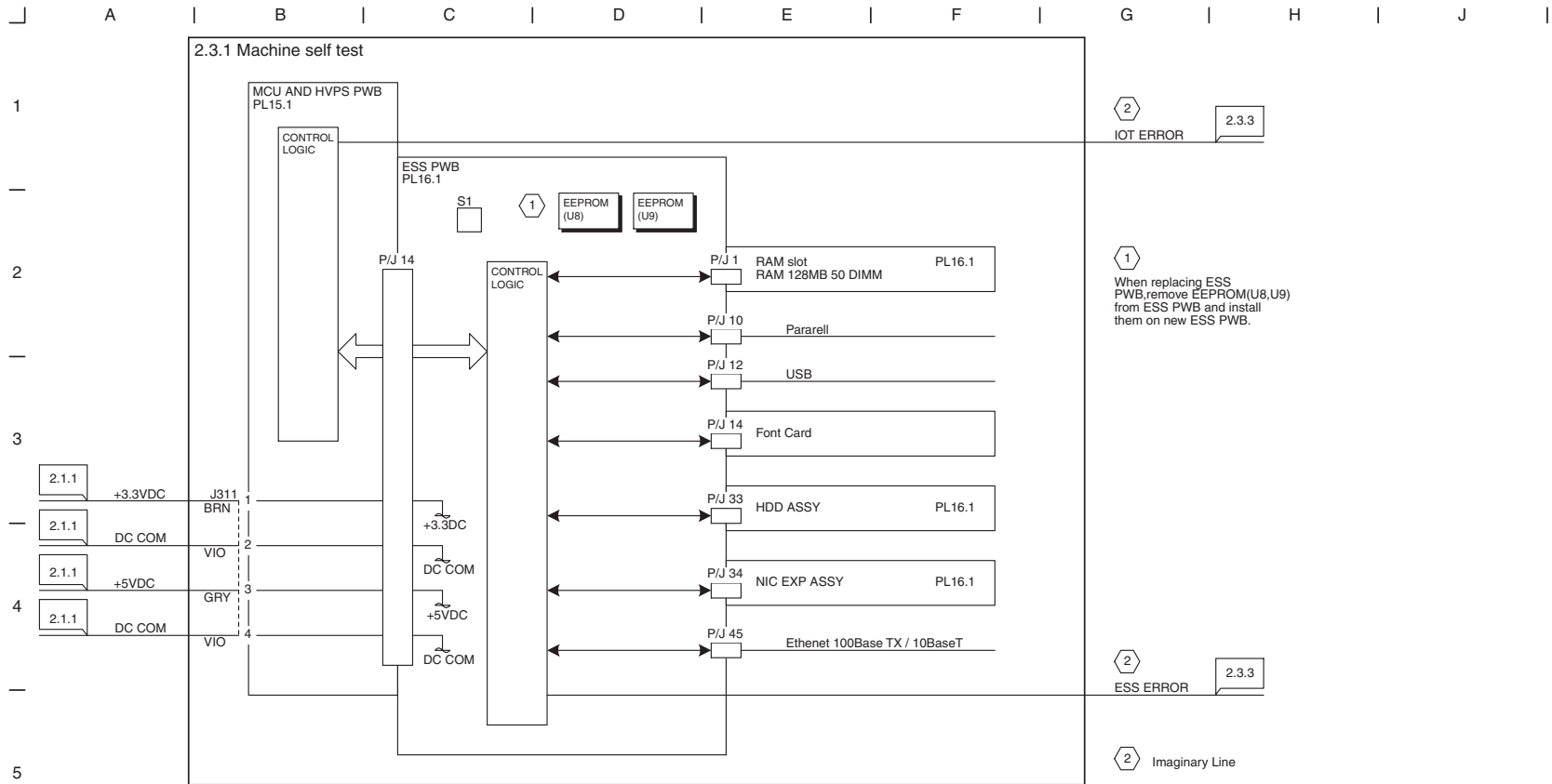




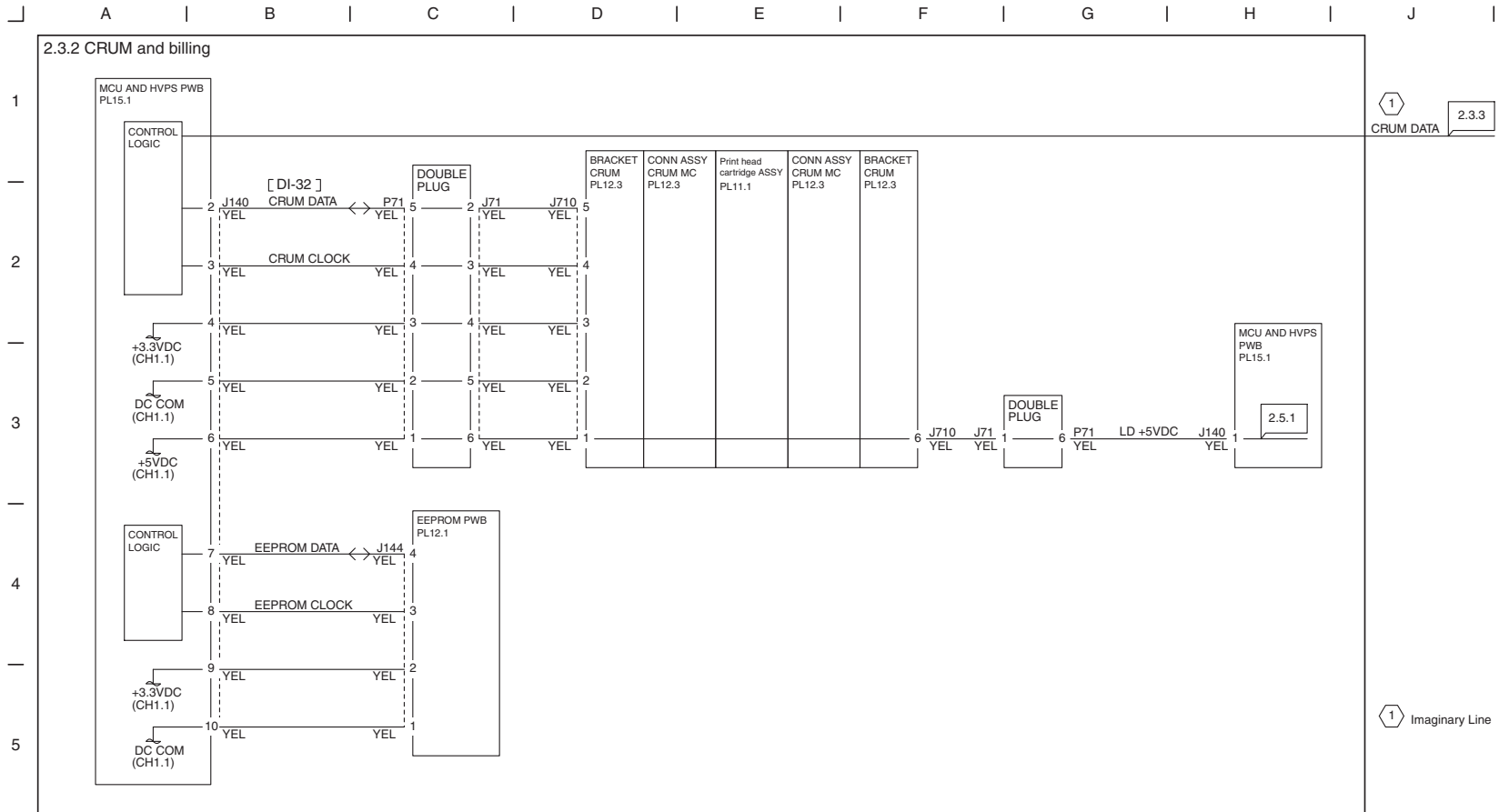


2.2 Mode Selection

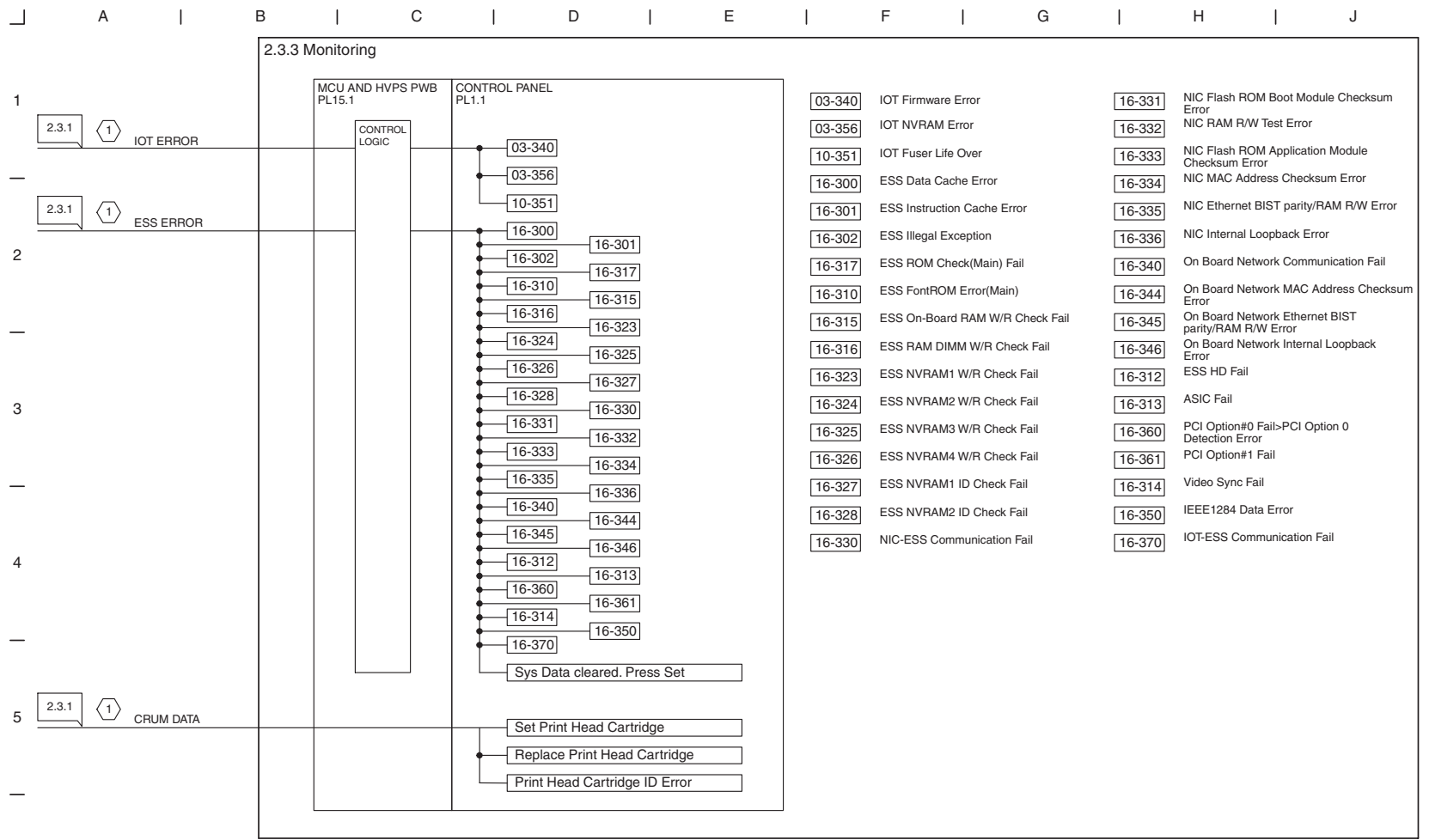




2.3 Machine Run Control

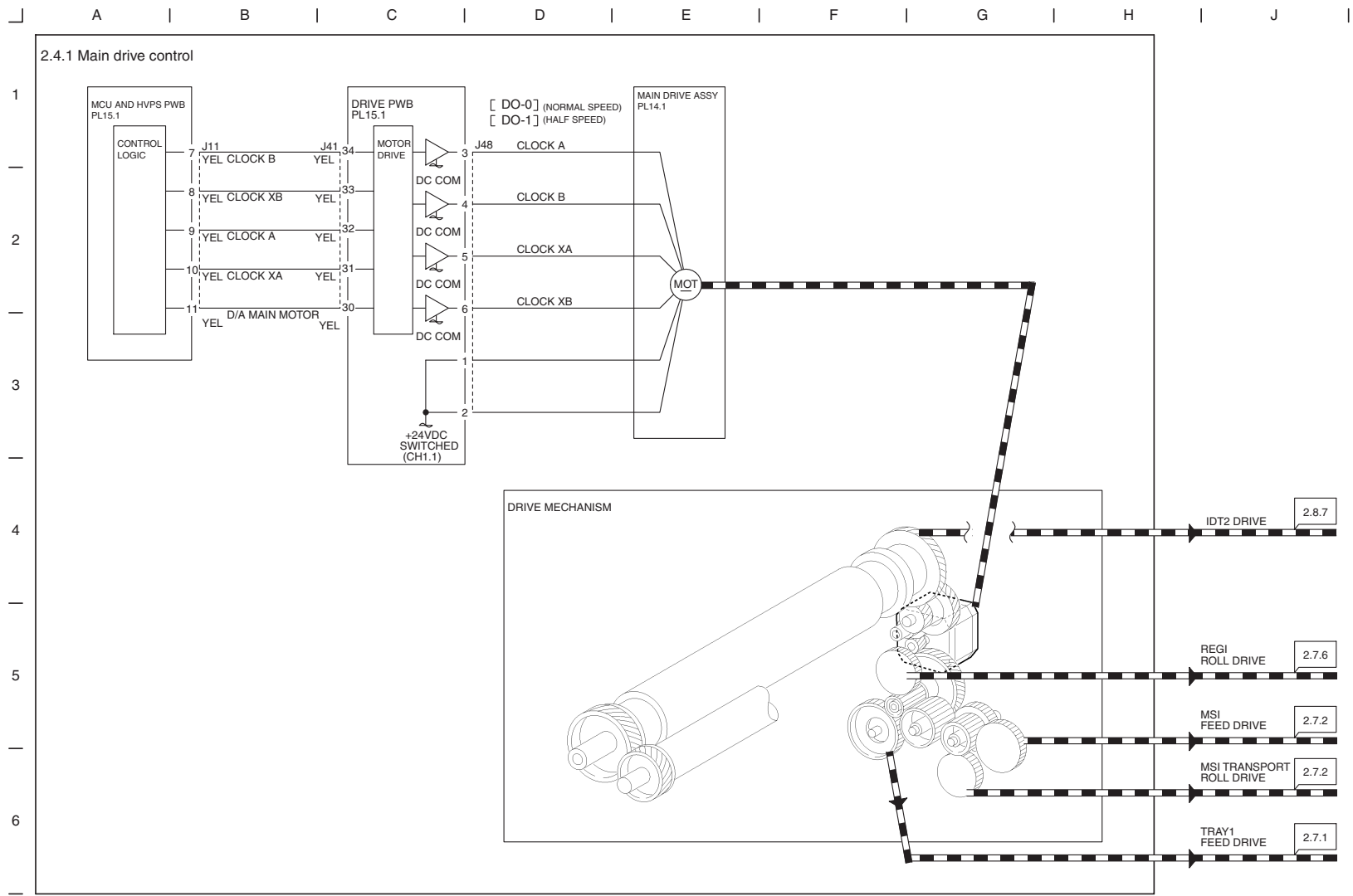


2.3 Machine Run Control



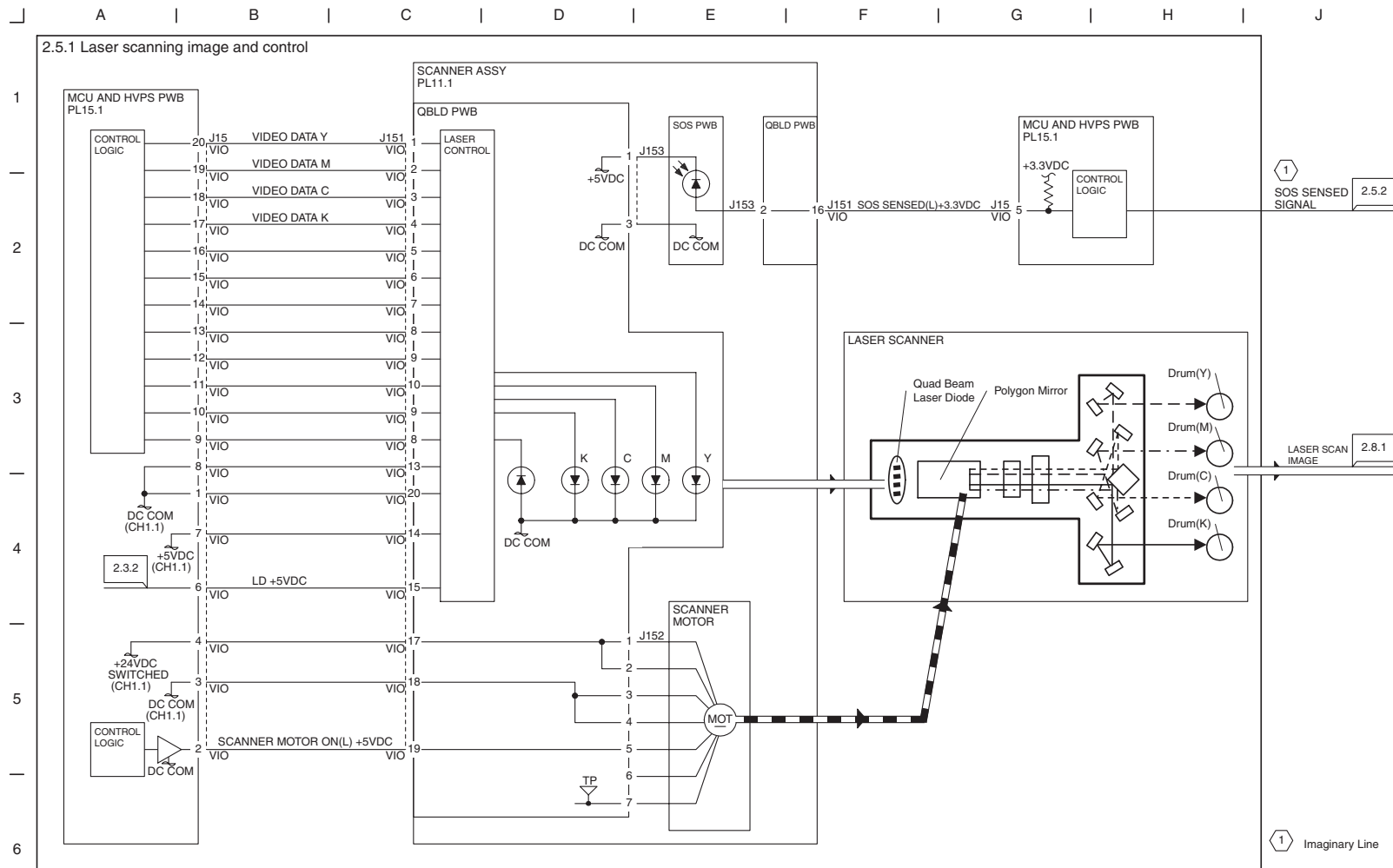
6 Imaginary Line

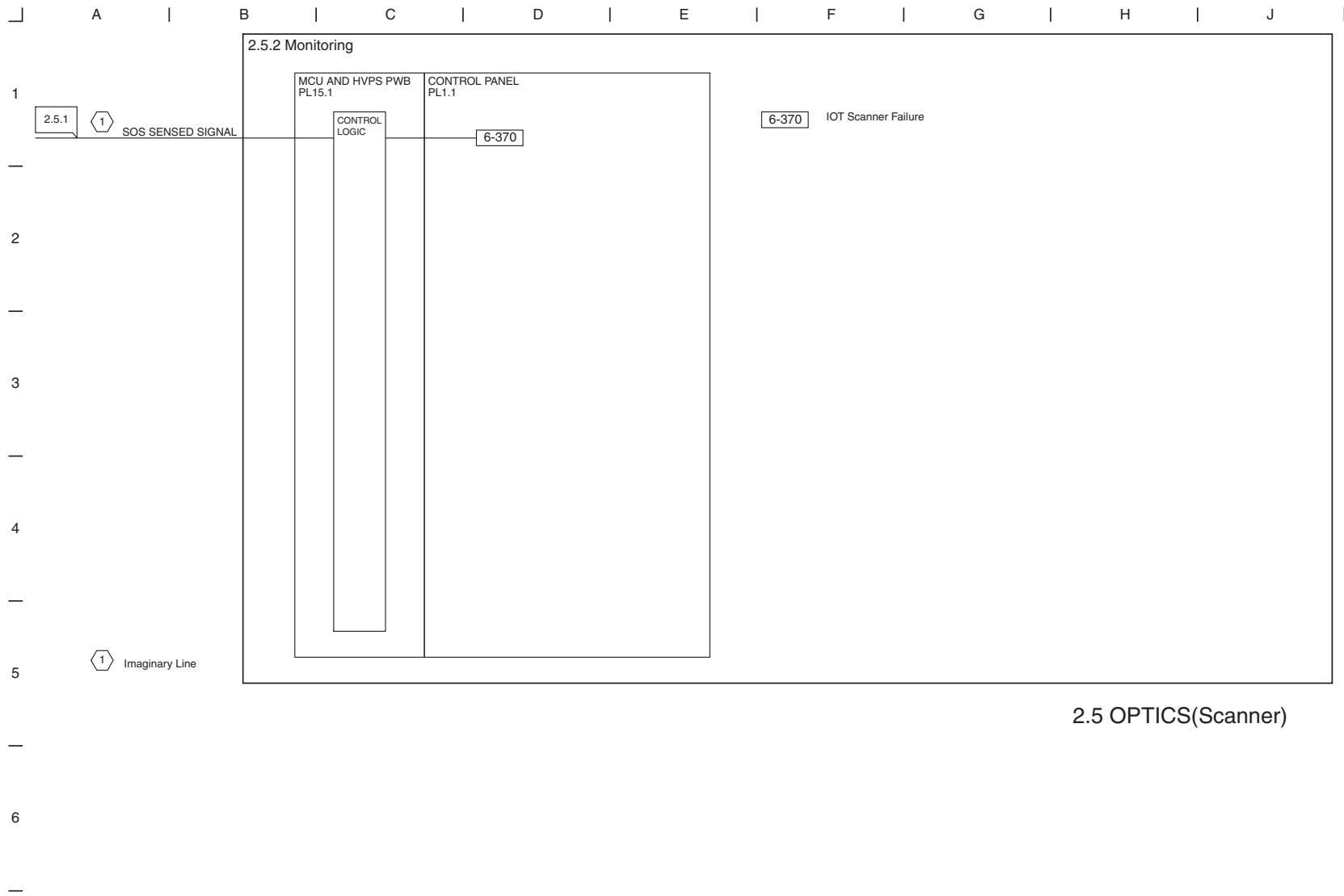
2.3 Machine Run Control



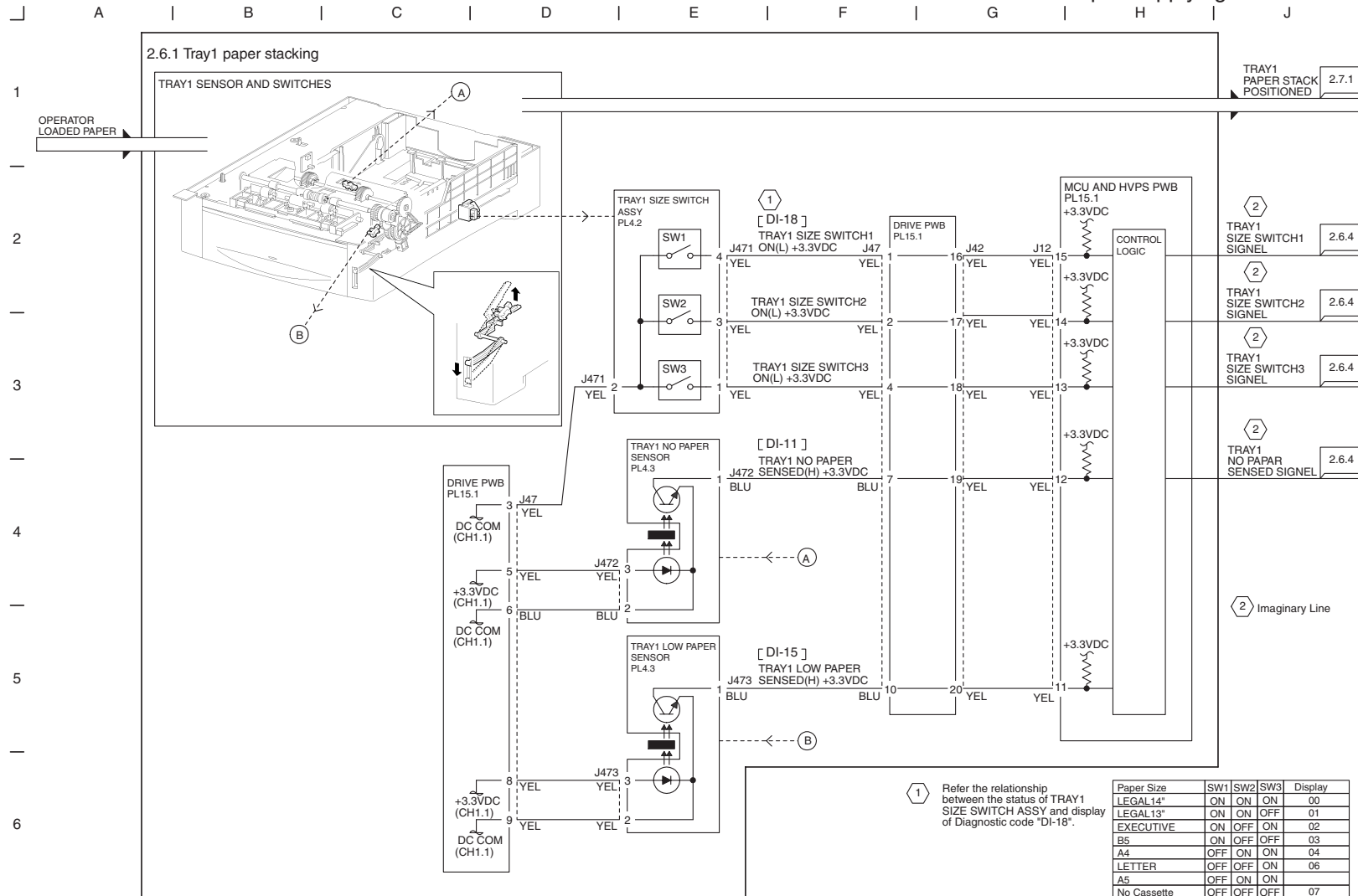
2.4 Start Print Power

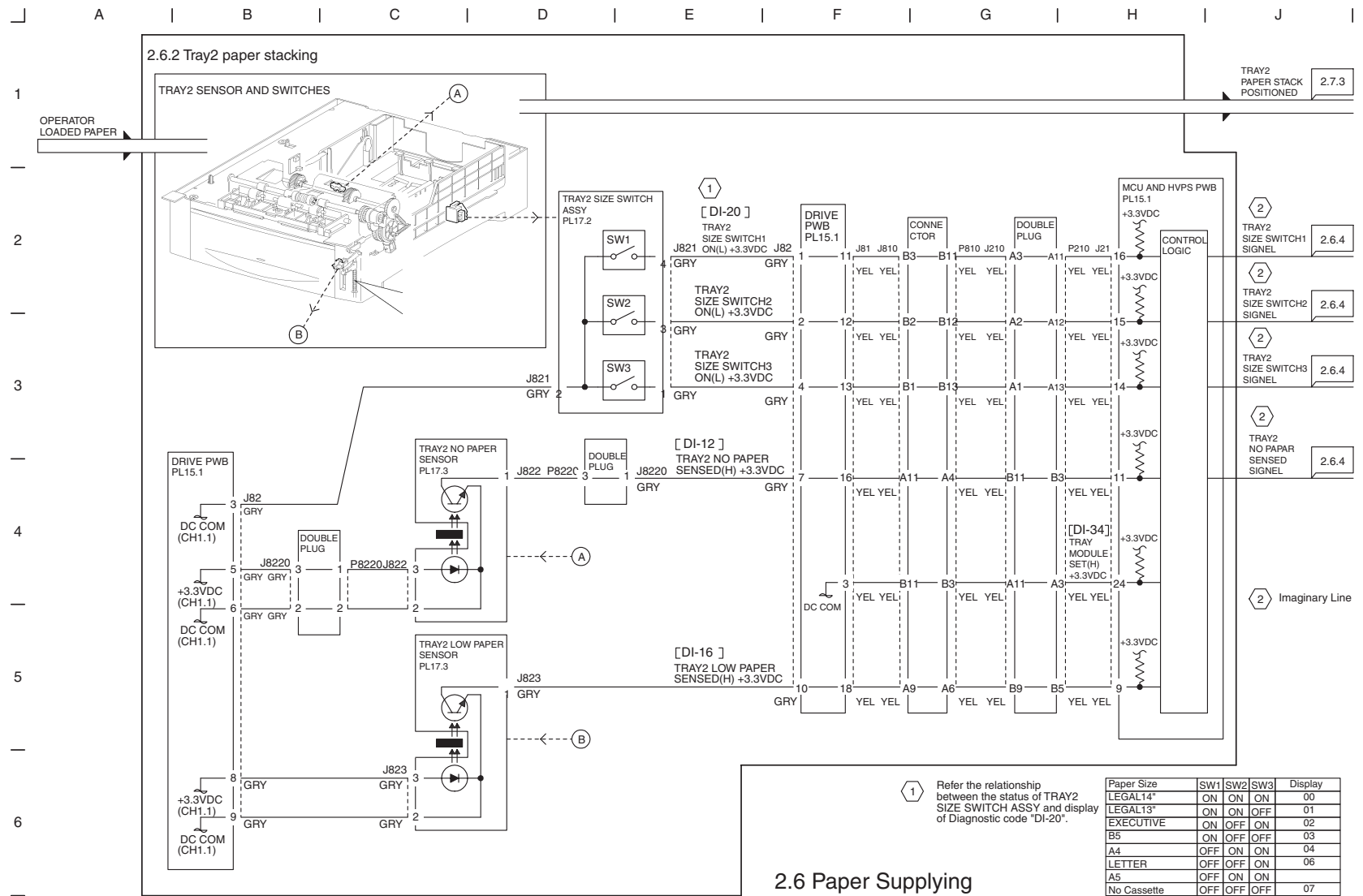
## 2.5 OPTICS(Scanner)



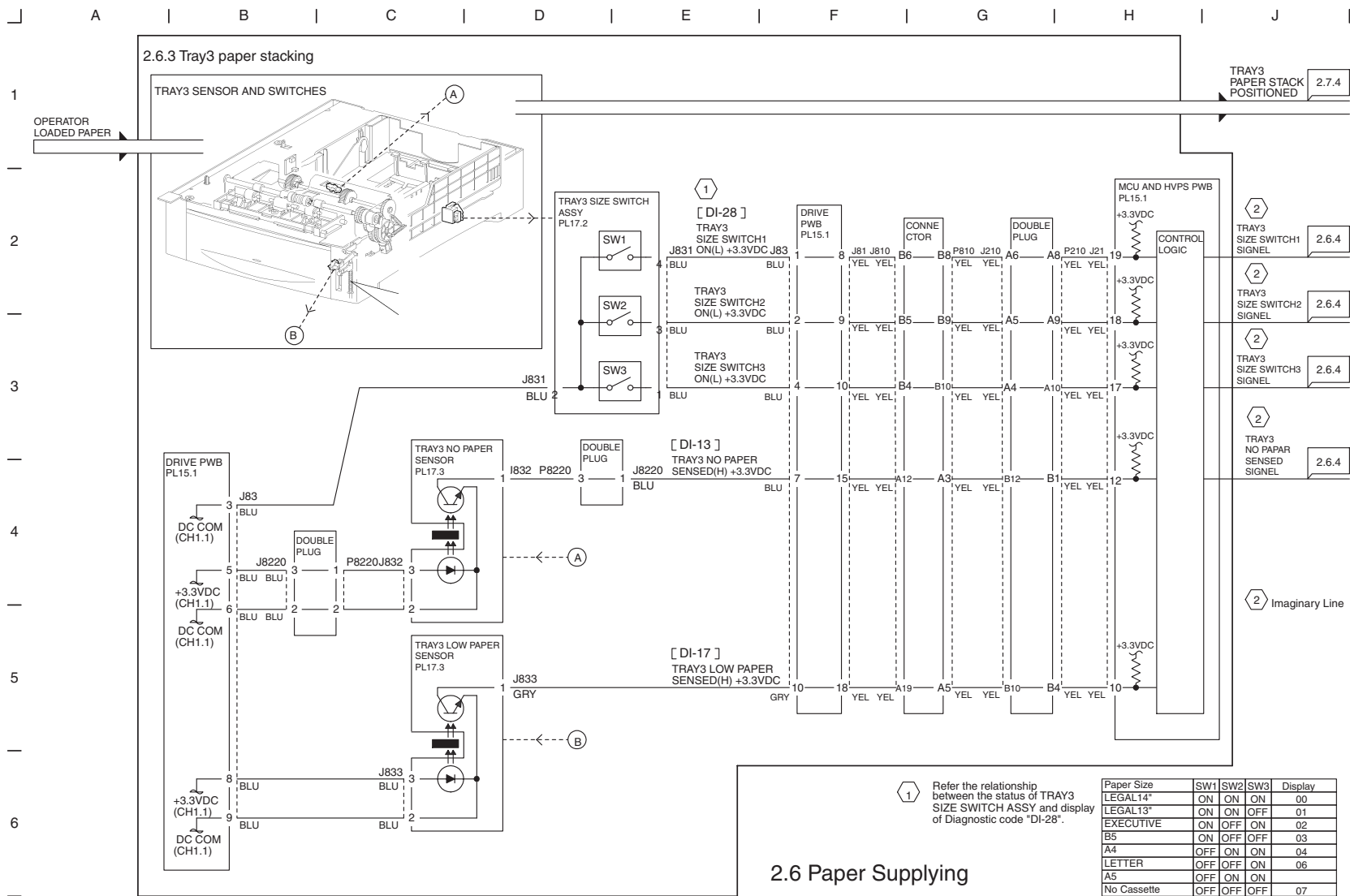


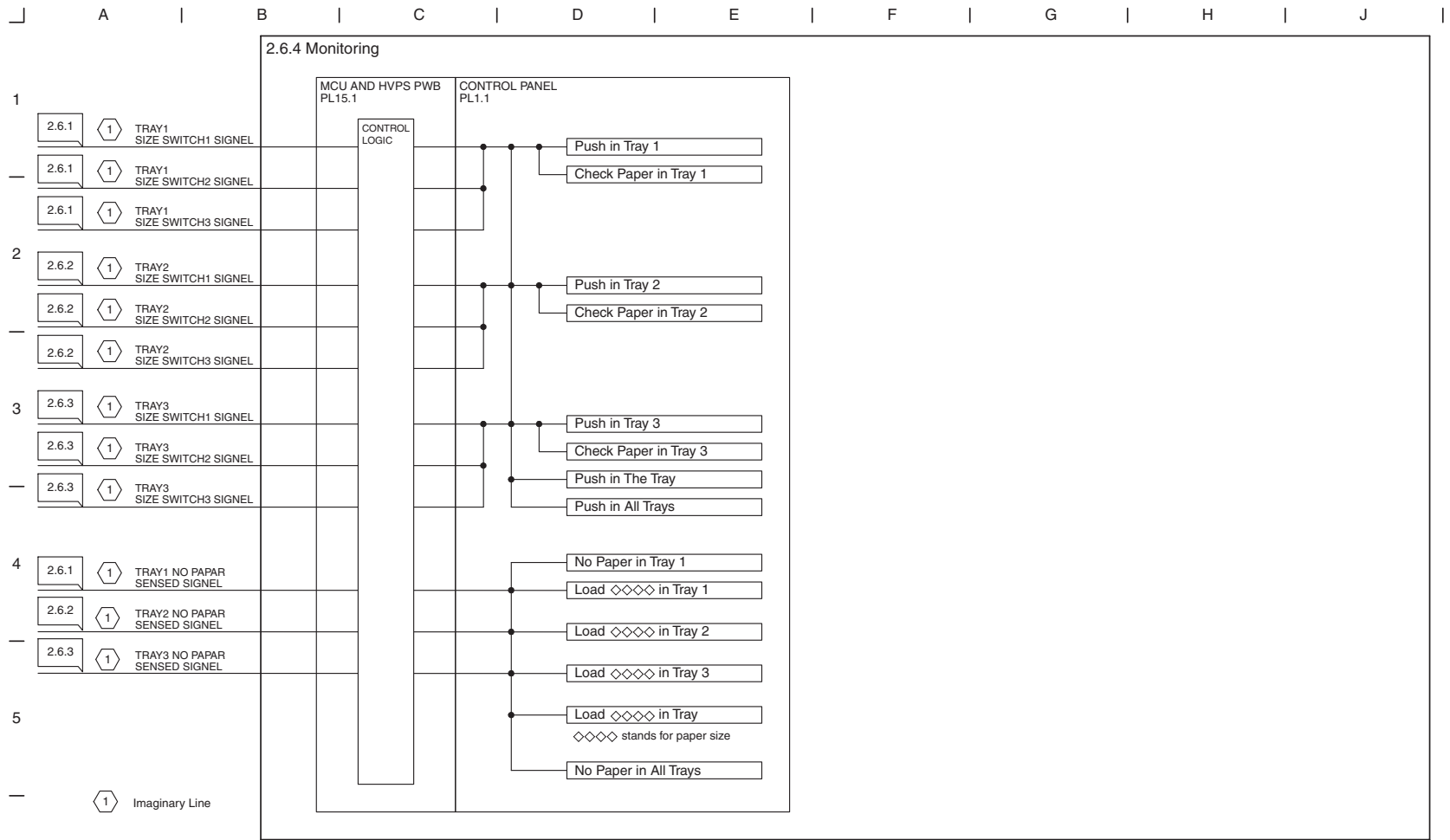
## 2.6 Paper Supplying



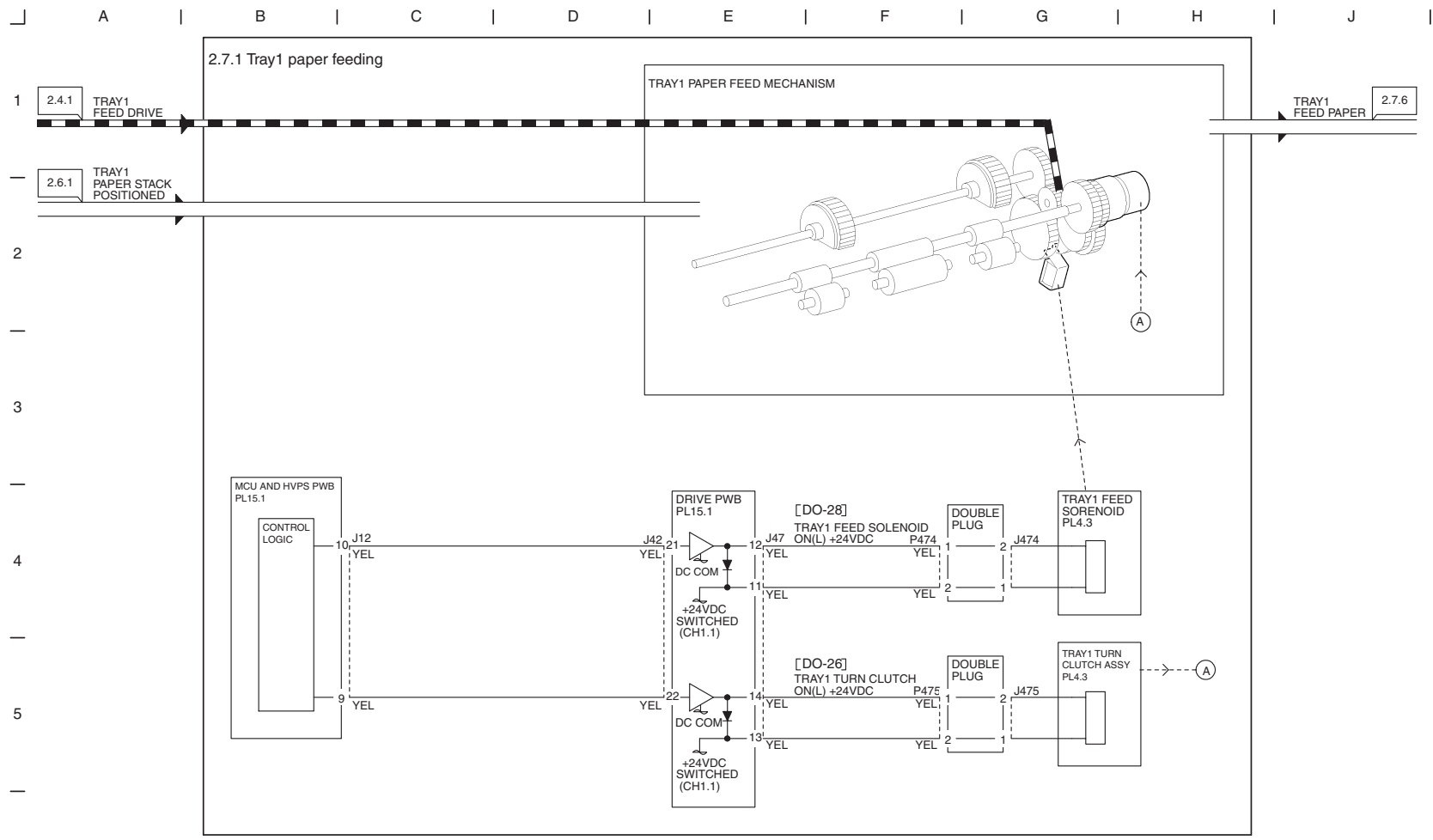




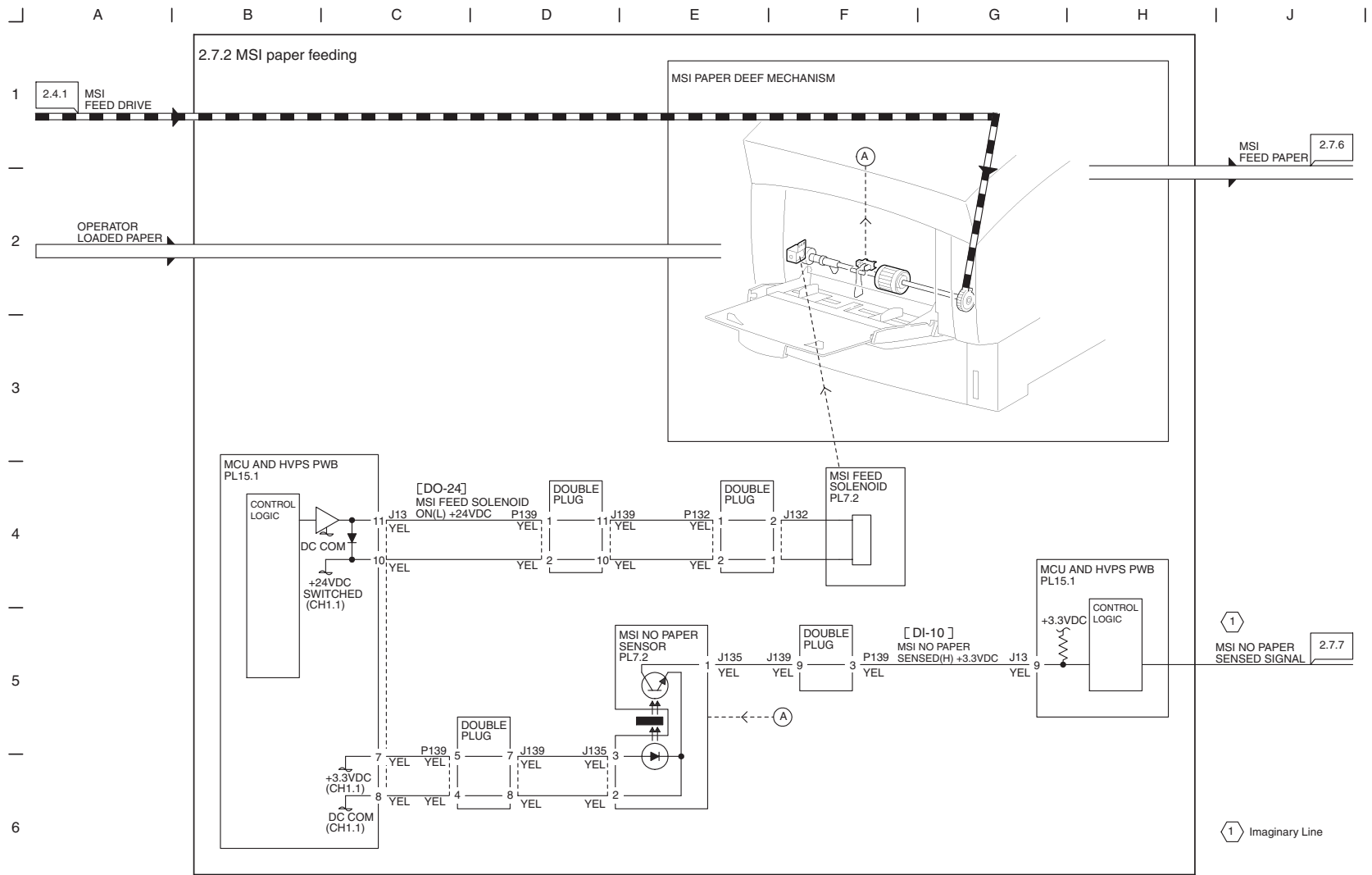


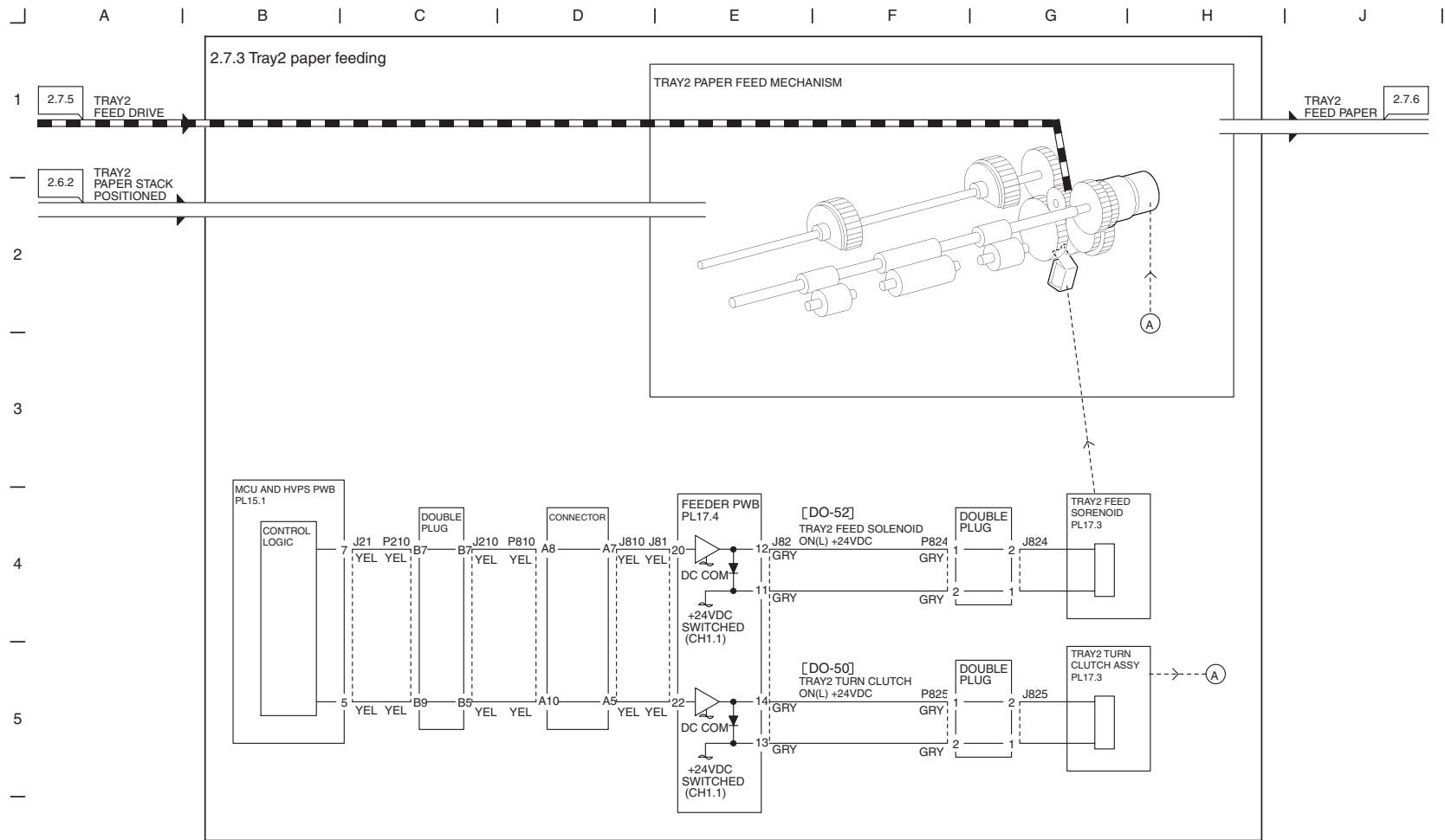


2.6 Paper Supplying

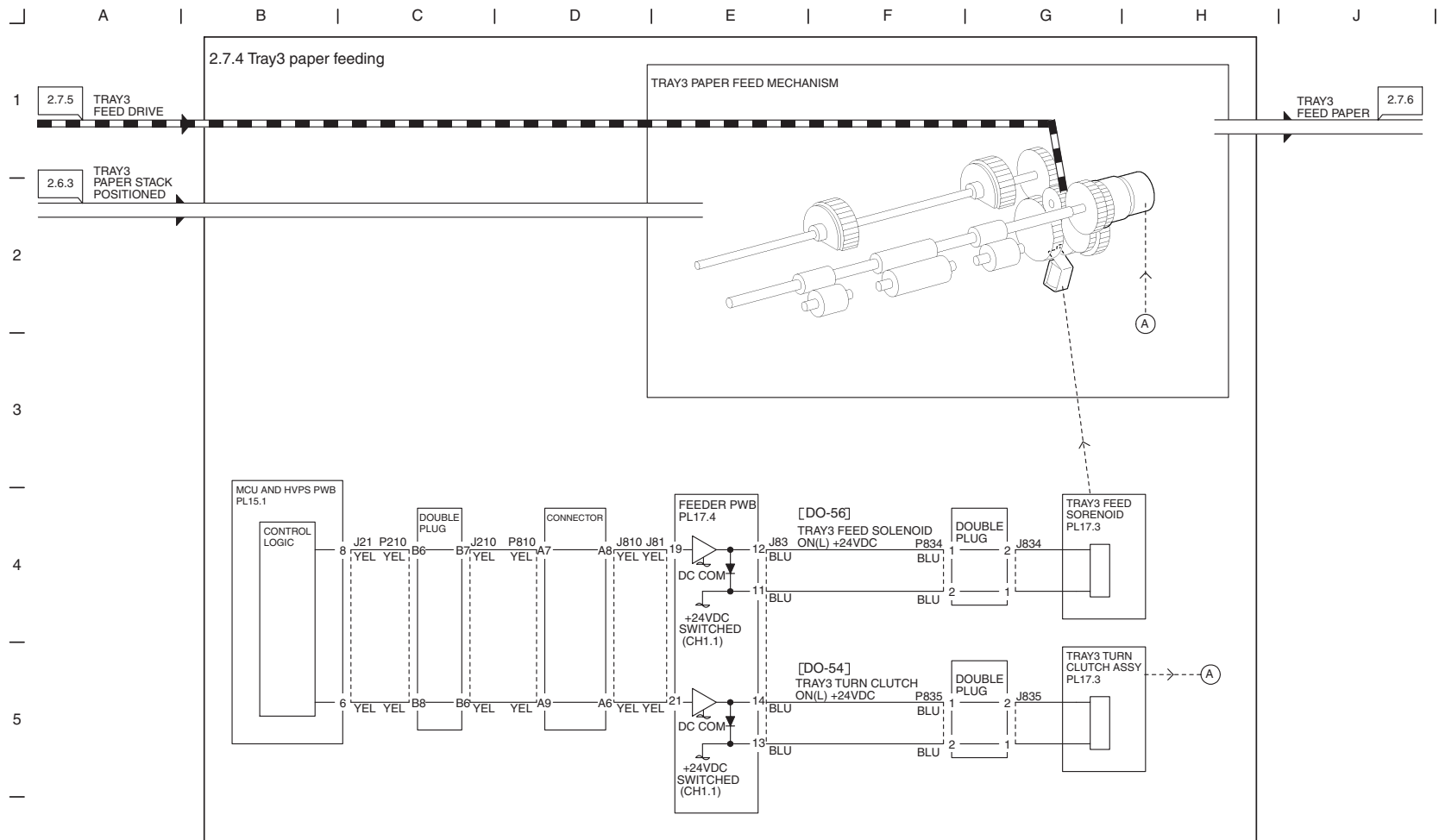


2.7 Paper Transportation

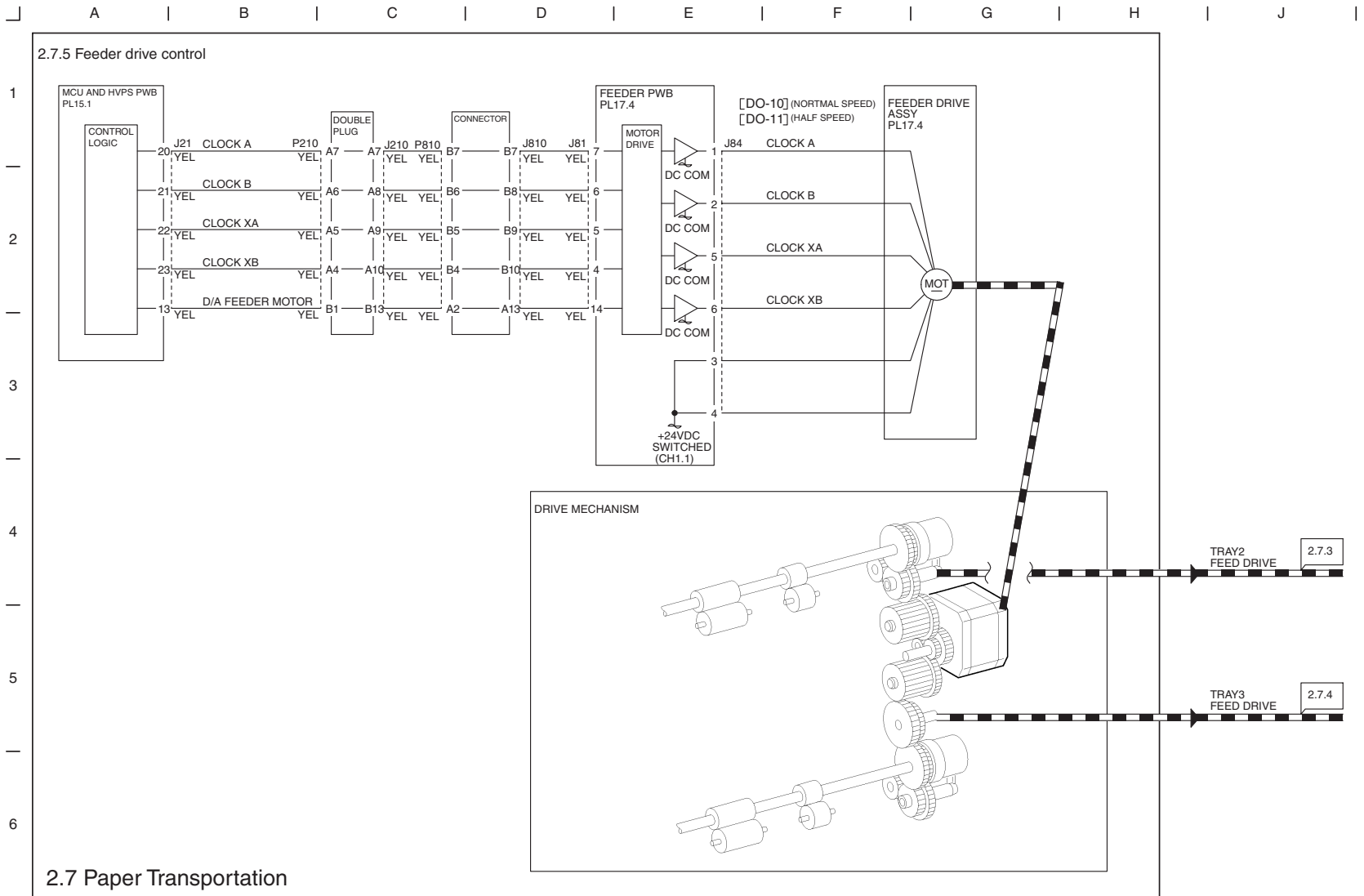


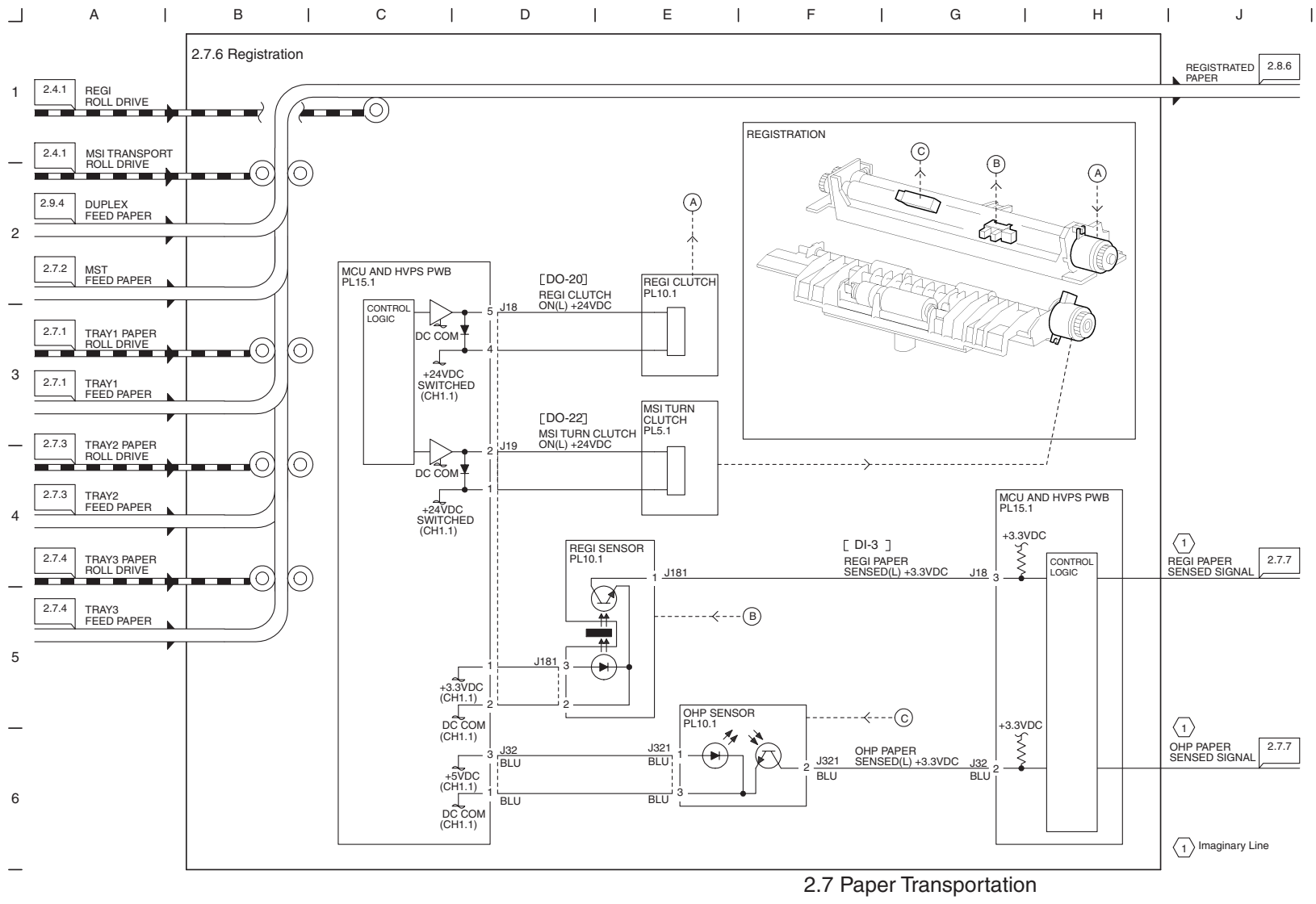


2.7 Paper Transportation

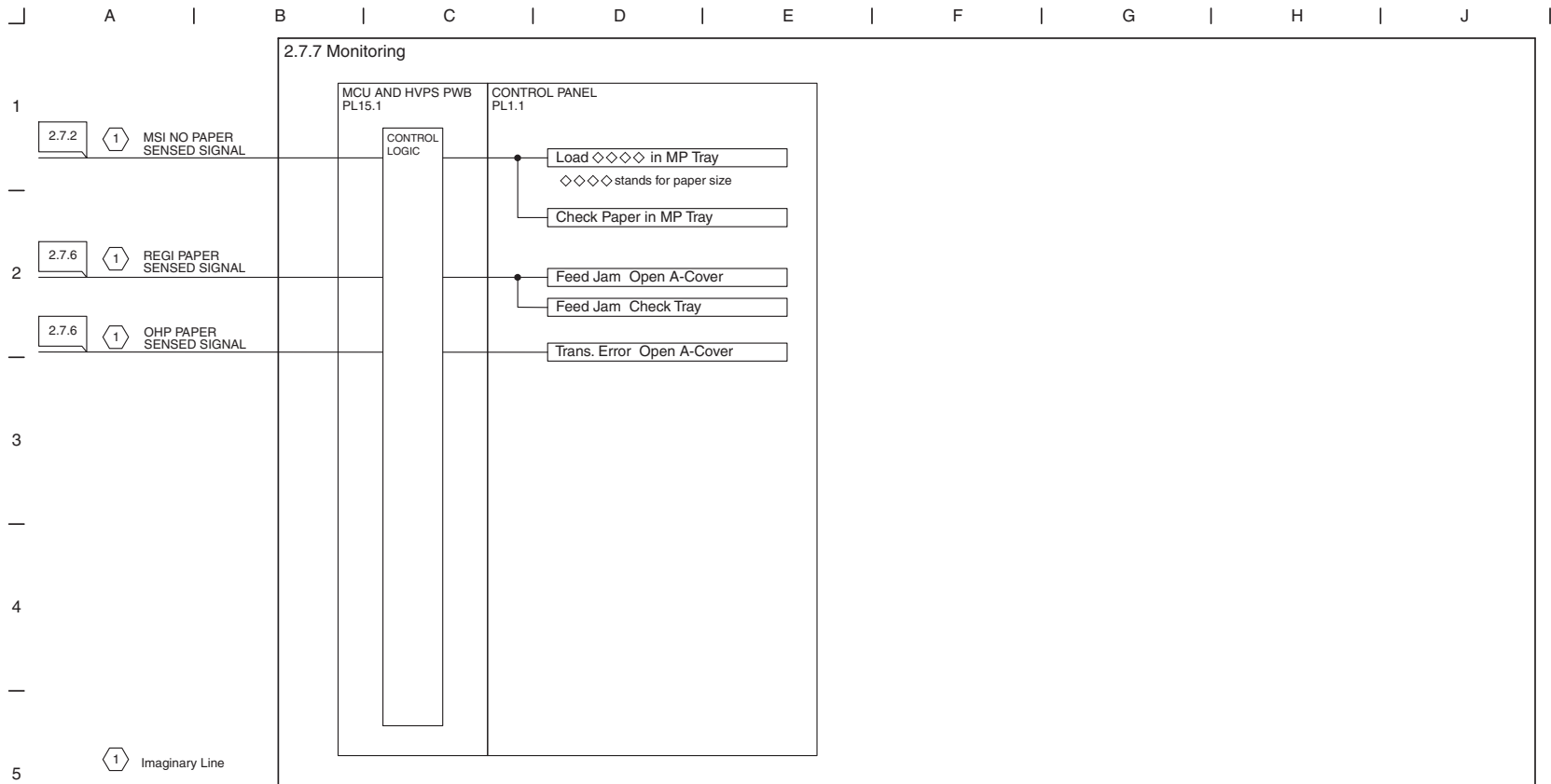


2.7 Paper Transportation

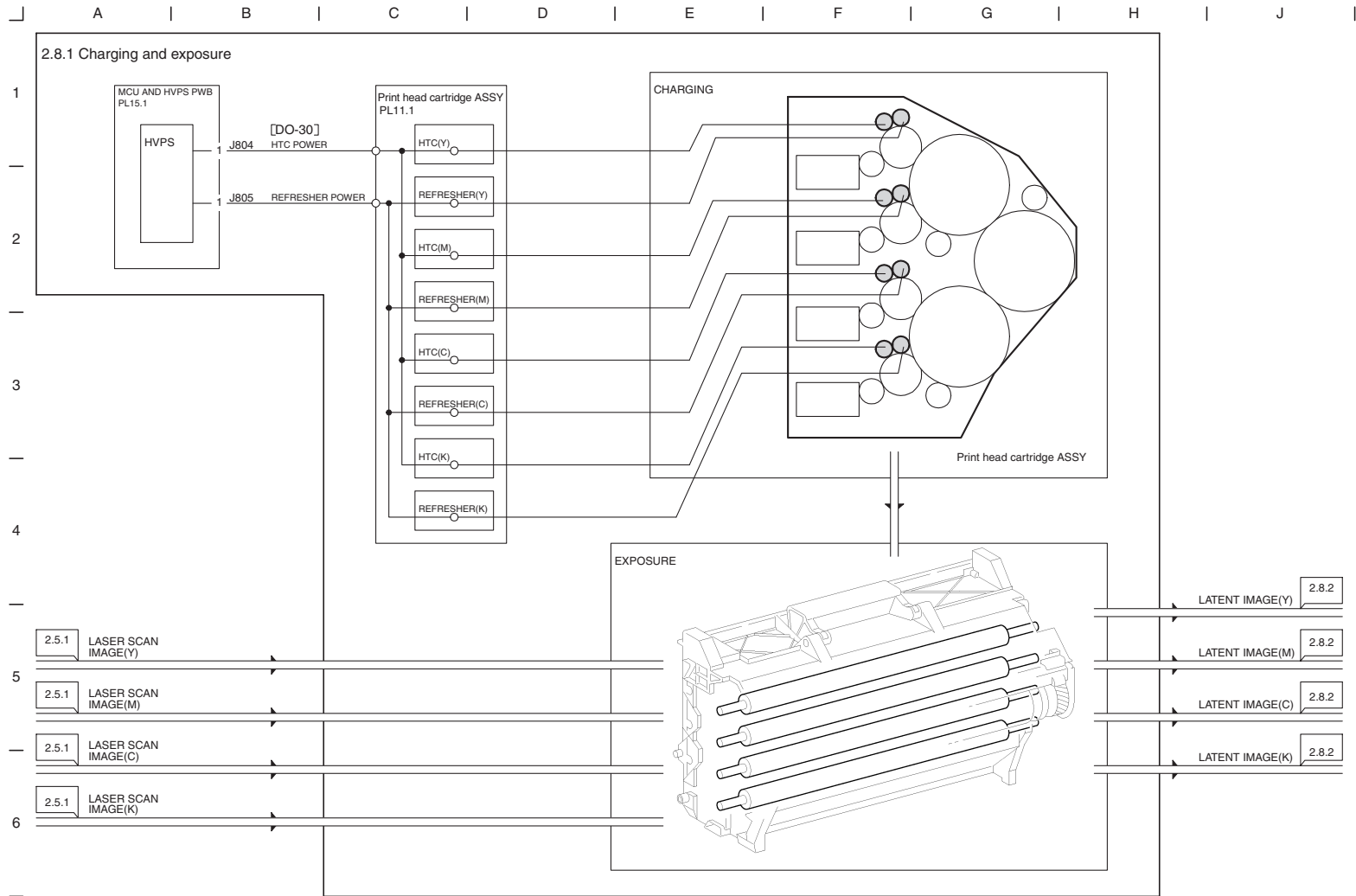




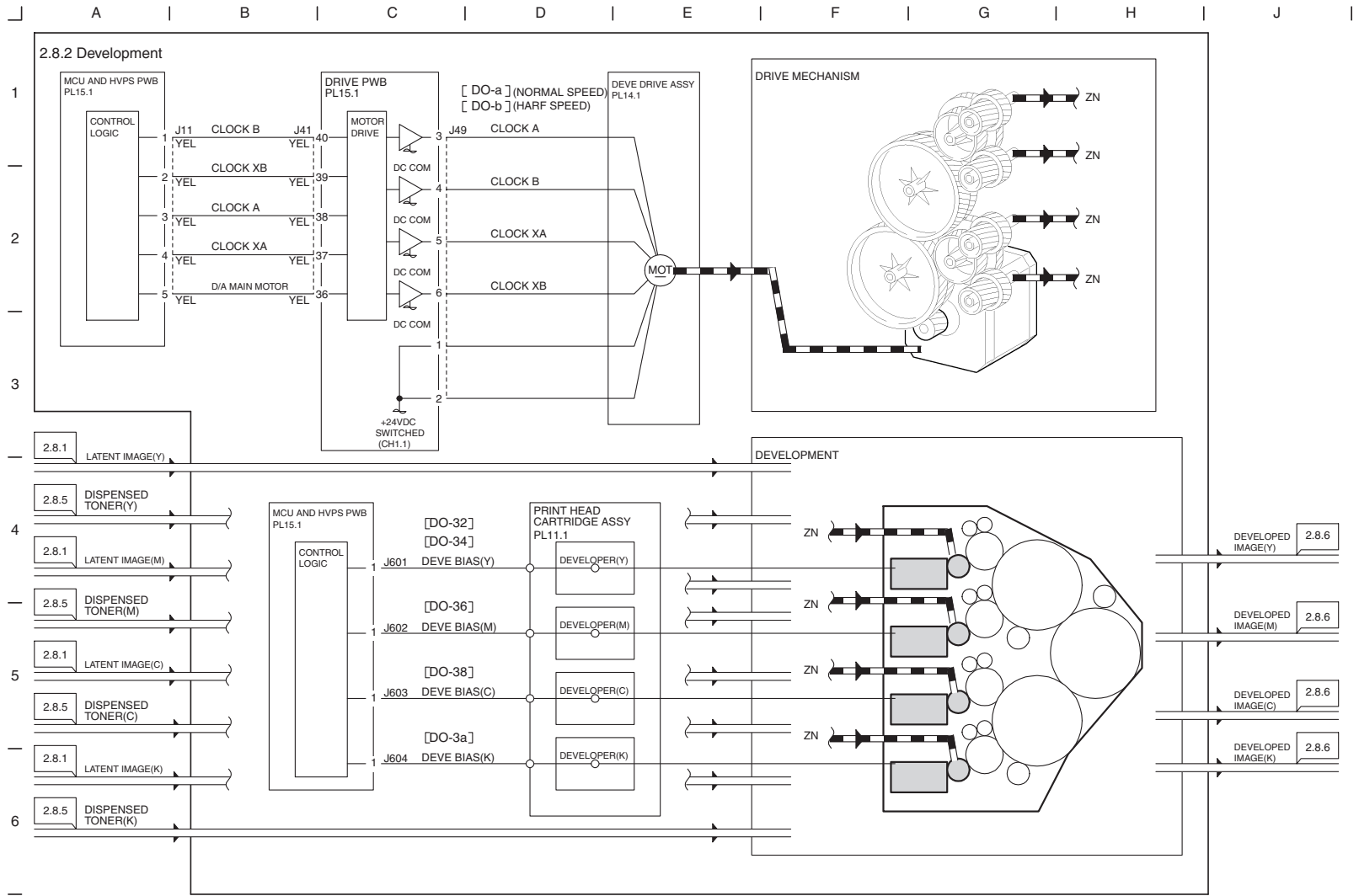


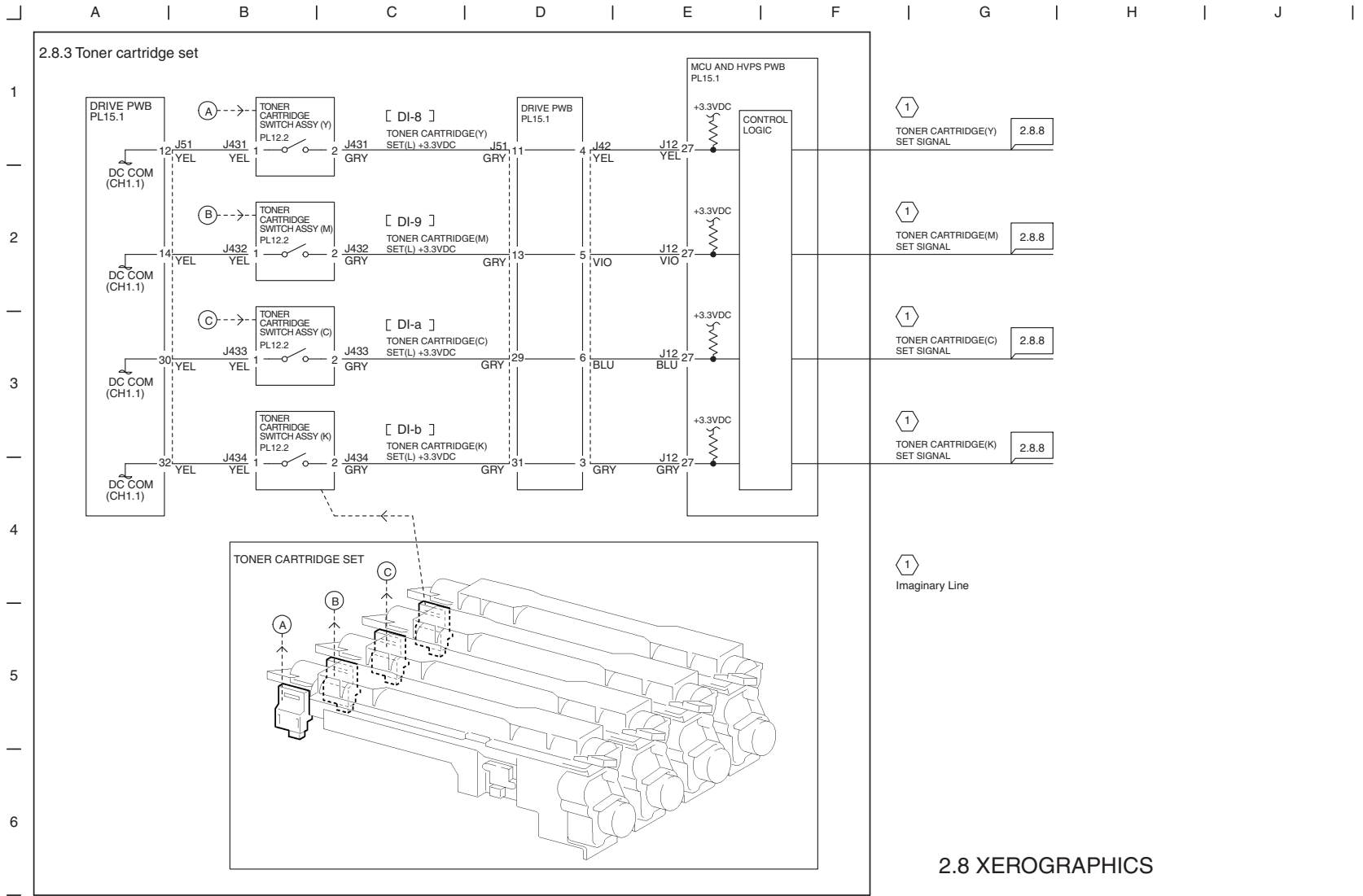


2.7 Paper Transportation

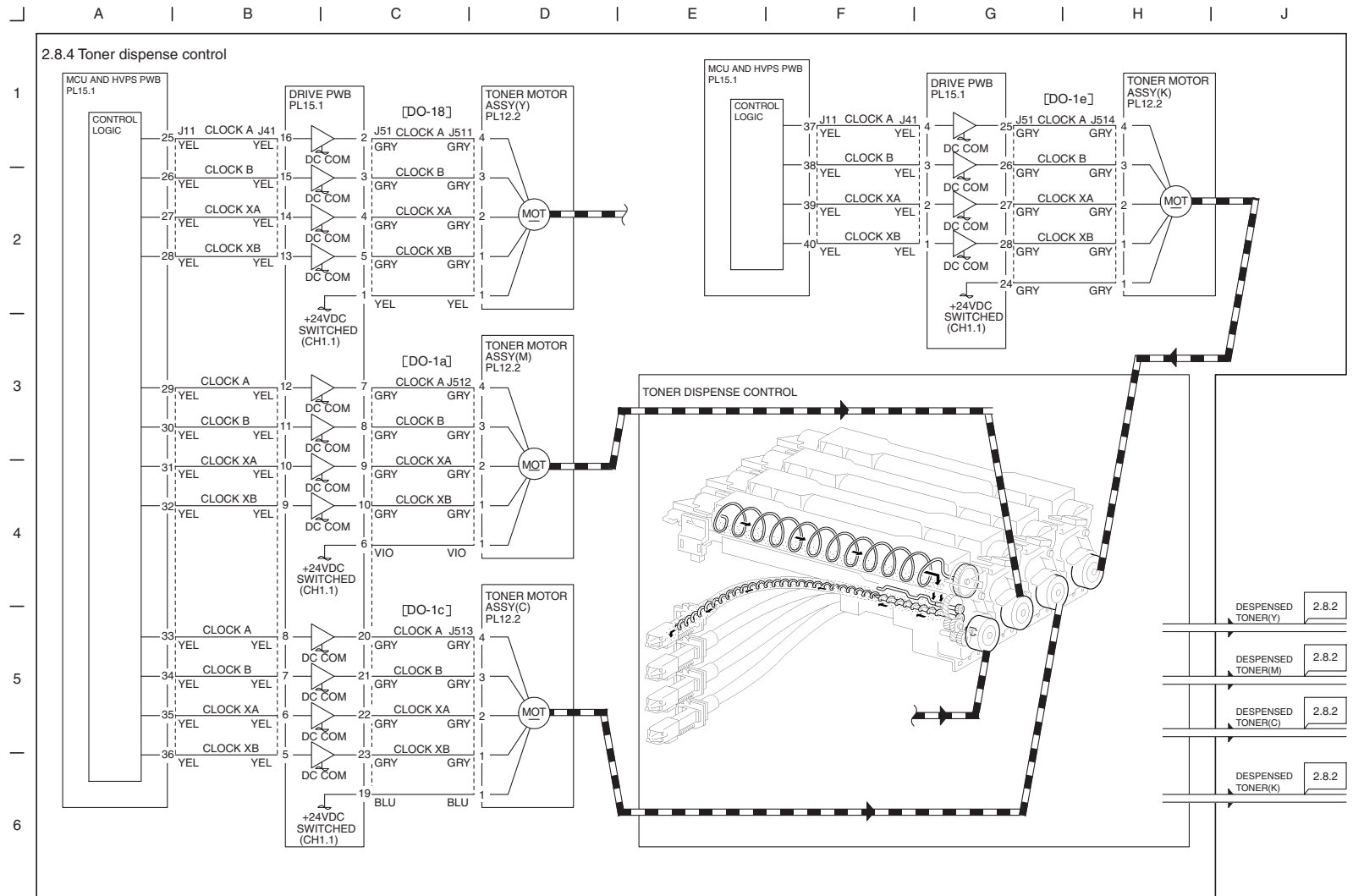


2.8 XEROGRAPHICS



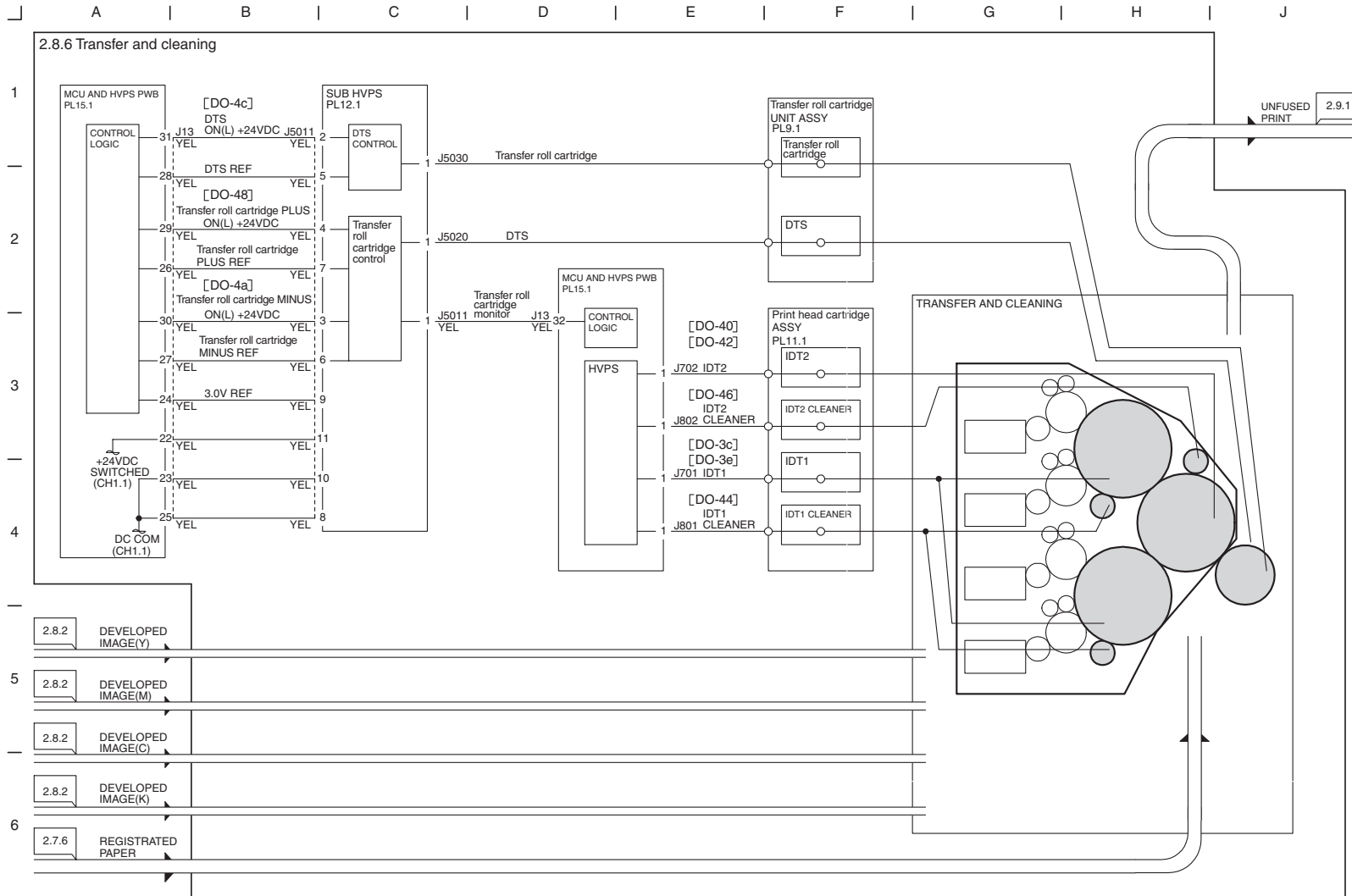


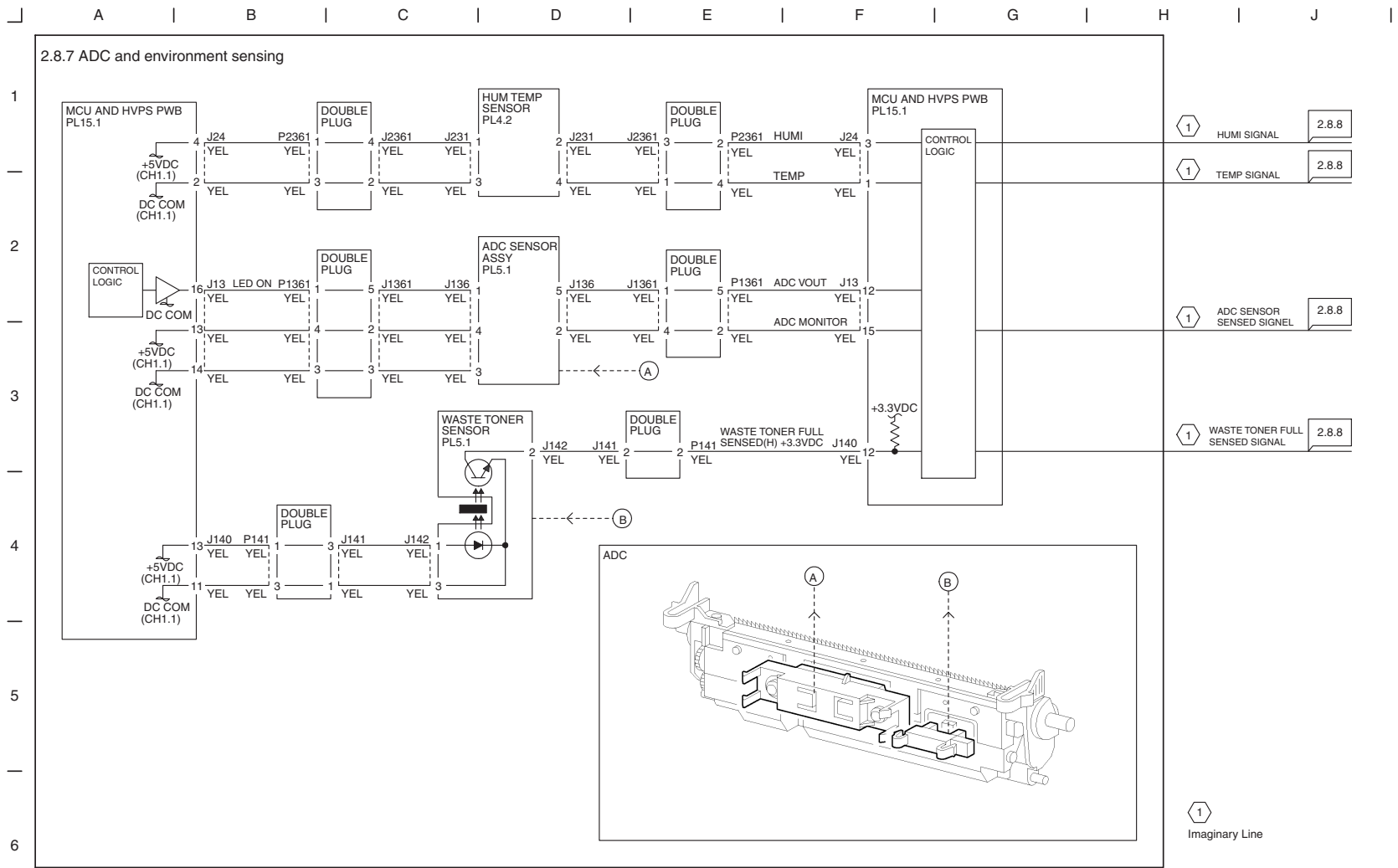
## 2.8 XEROGRAPHICS





## 2.8 XEROGRAPHICS

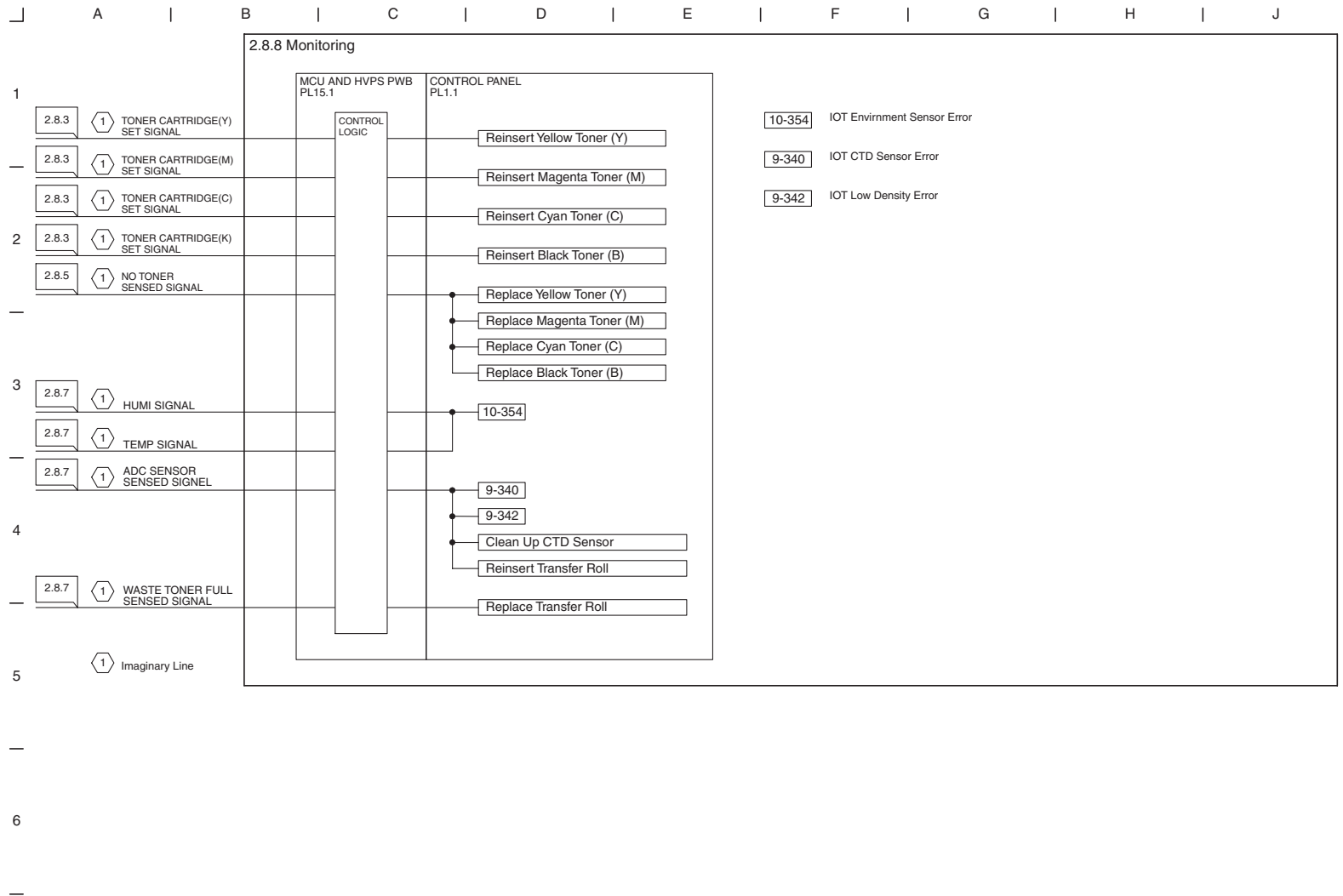


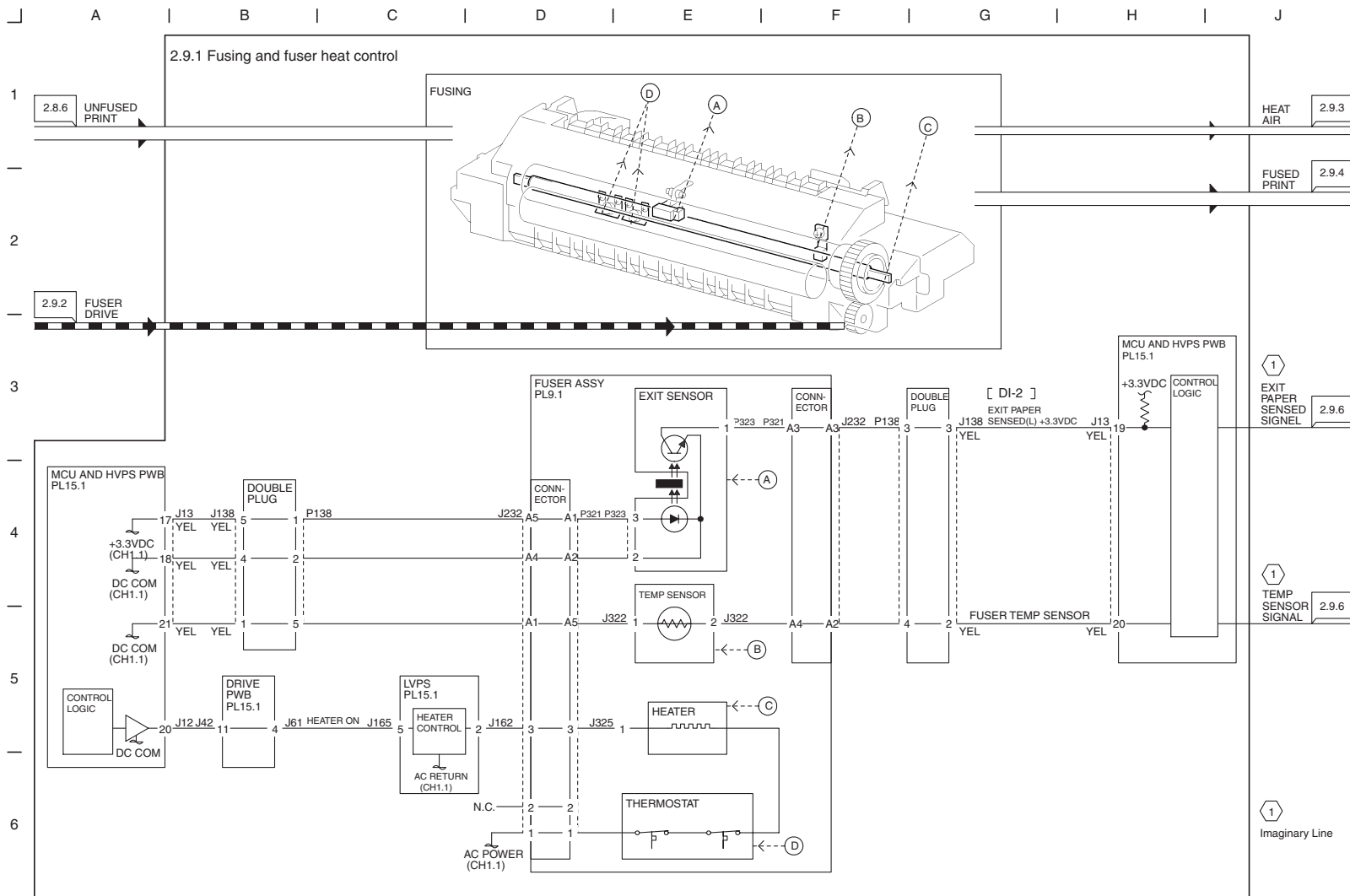


2.8 XEROGRAPHICS



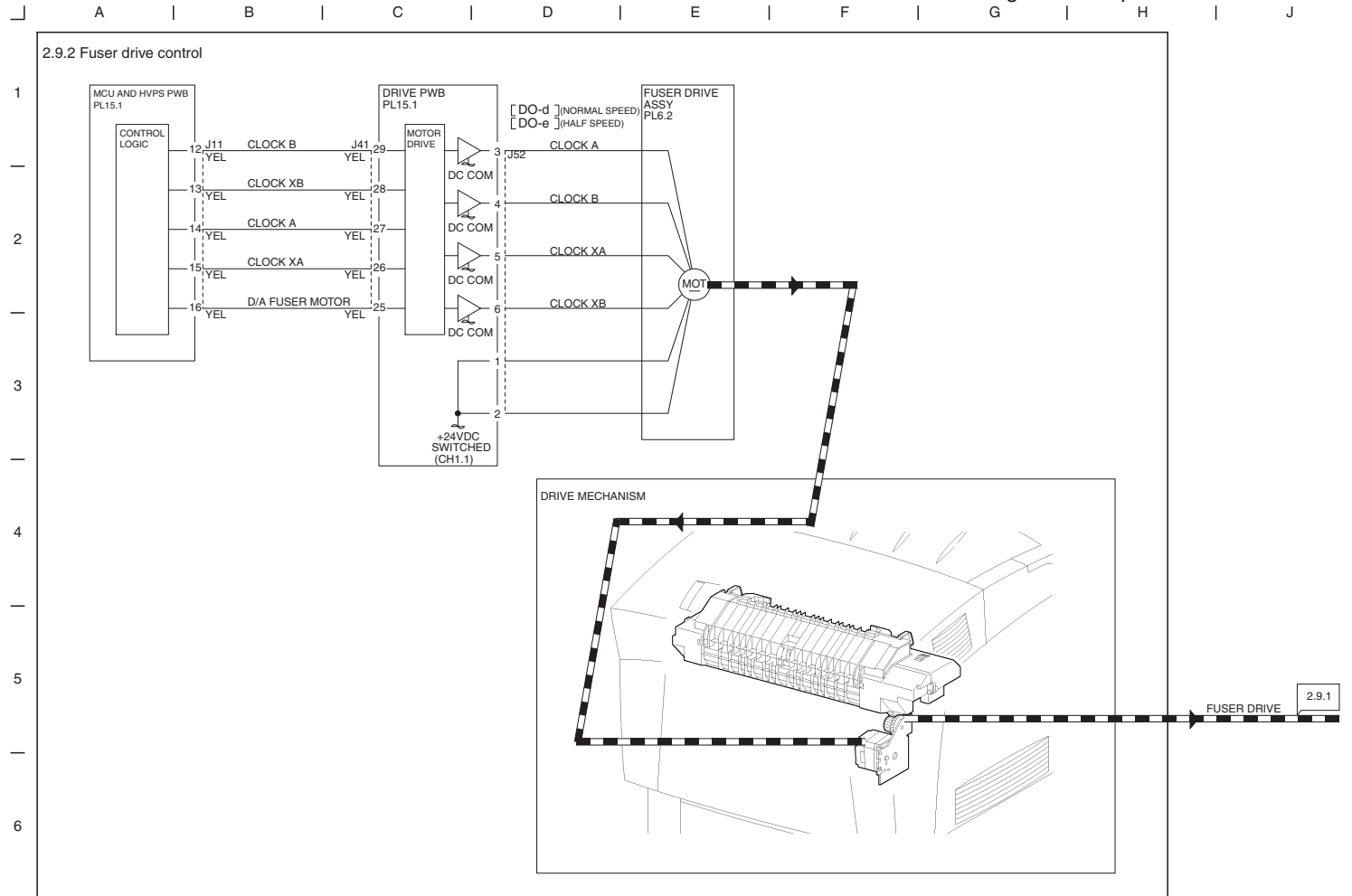
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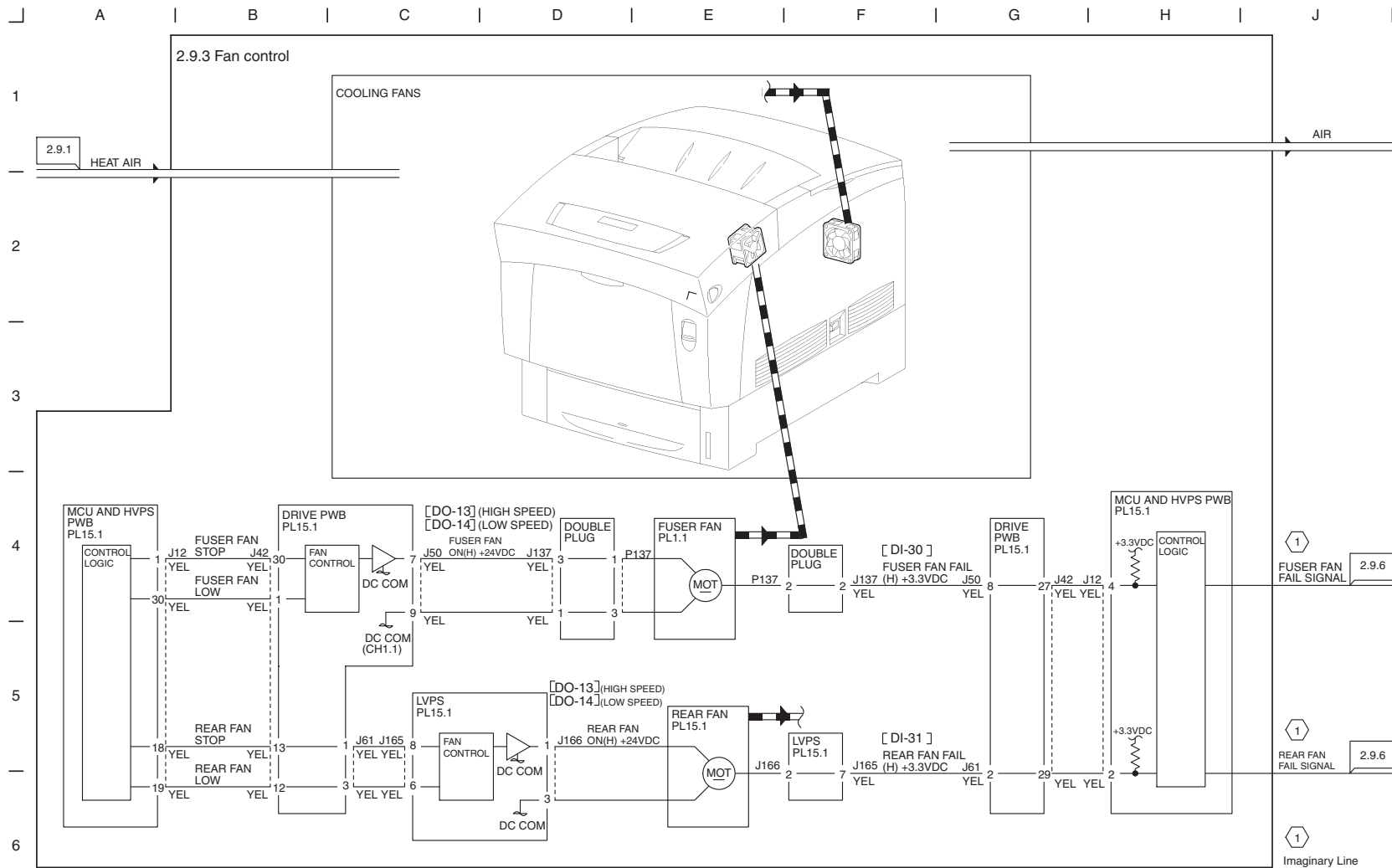




2.9 Fusing and Transportation

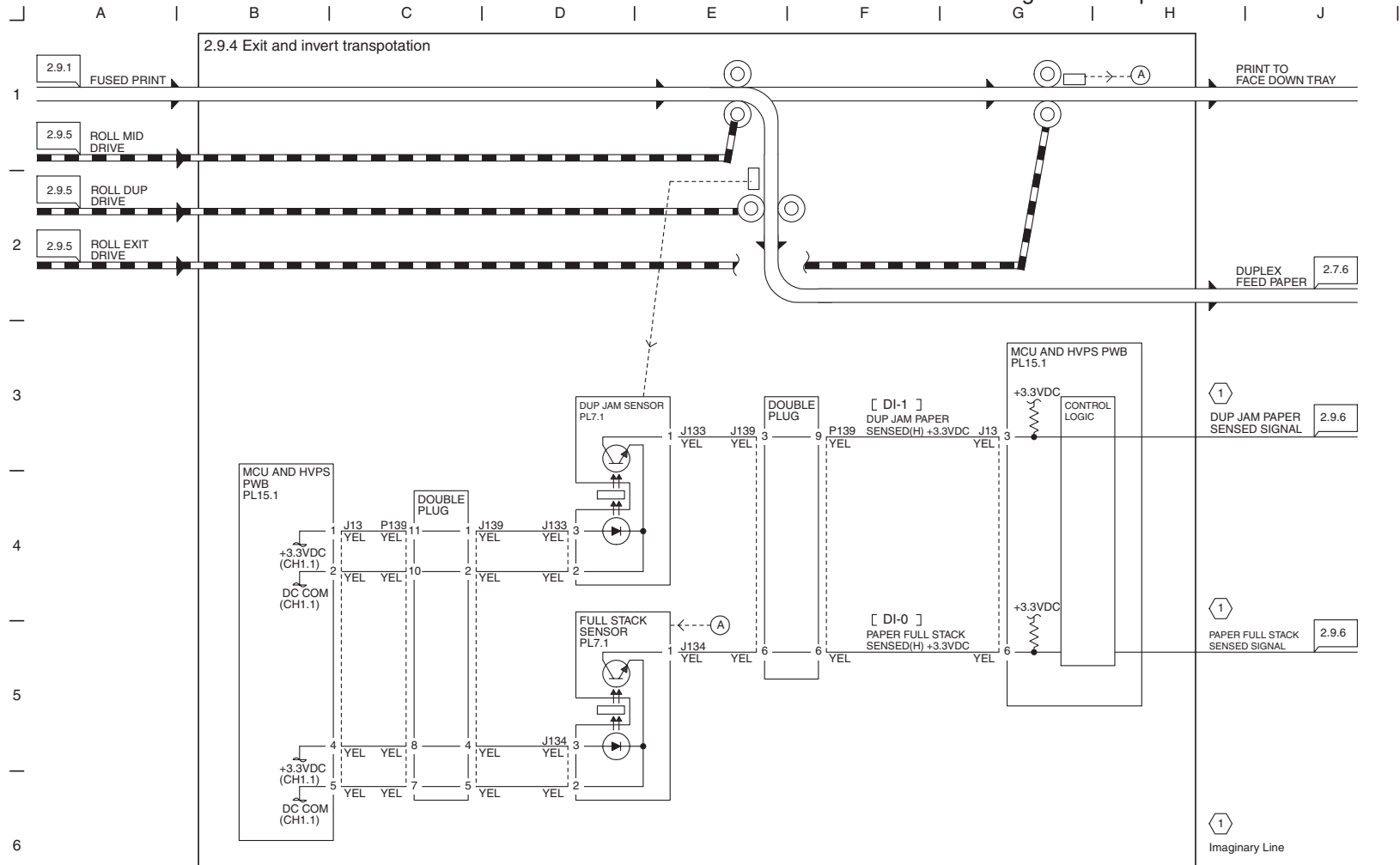
## 2.9 Fusing and Transportation

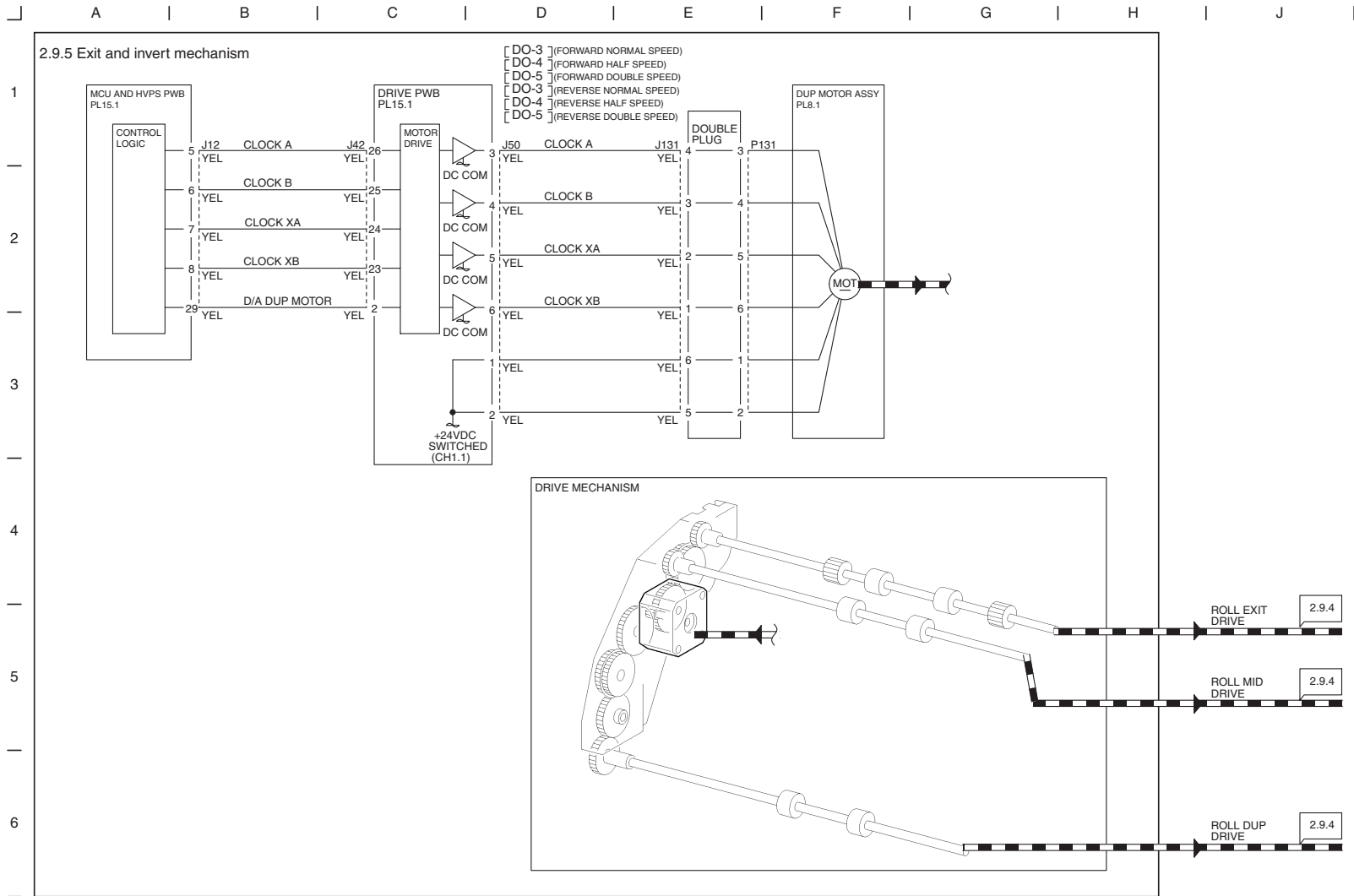




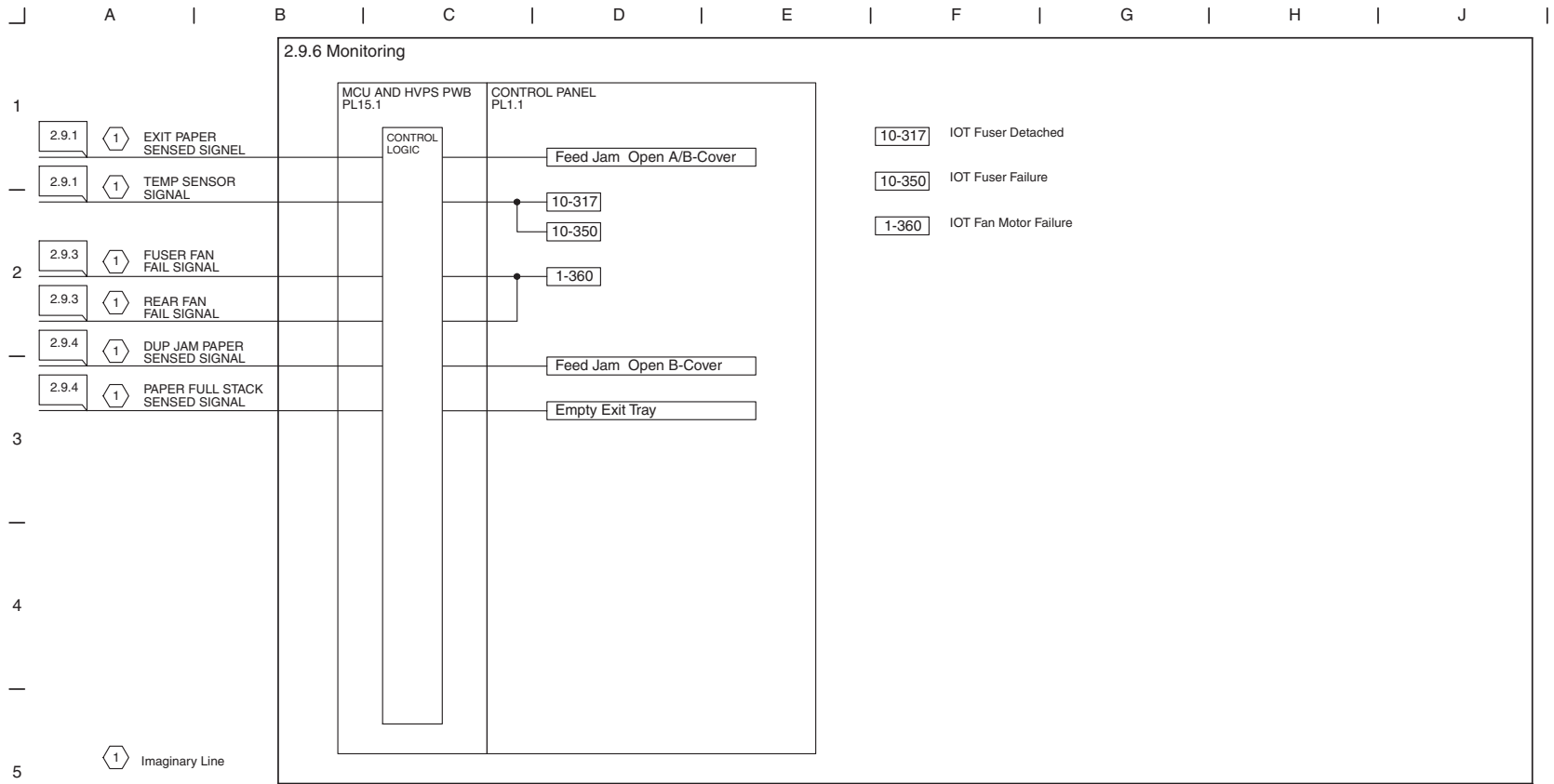
2.9 Fusing and Transportation

## 2.9 Fusing and Transportation





2.9 Fusing and Transportation



2.9 Fusing and Transportation

**CHAPTER VII**  
**PLUG/JACK (P/J)**  
**CONNECTOR LOCATIONS**



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# CHAPTER VII PLUG/JACK (P/J) CONNECTOR LOCATIONS

## 1. LIST OF P/J

The following tables list the connector (P/J) coordinates corresponding to 7.2 P/J Layout Diagram.

### 1.1 Base Engine

P/J	Coordinates	Remarks
1	H-32	Connector for ESS PWB memory
10	J-32	Connector for ESS PWB parallel interface
11	J-43	Connects MCU and HVPS PWB and harness ASSY DRV1
12	I-43	Connects MCU and HVPS PWB and harness ASSY DRV2
12	J-32	Connector for USB interface on ESS PWB
13	H-43	Connects MCU and HVPS PWB and harness ASSY front 1A
14	J-43	Connects MCU and HVPS PWB and ESS PWB
14	J-32	Connector for font card on ESS PWB
15	H-43	Connects MCU and HVPS PWB and harness ASSY scanner KA
18	H-44	Connects MCU and HVPS PWB and REGI clutch
19	H-44	Connects MCU and HVPS PWB and MSI turn clutch
21	I-43	Connects MCU and HVPS PWB and harness ASSY OPF main
22	J-43	Connects MCU and HVPS PWB and harness ASSY OPEPANE AS
23	I-43	Connects MCU and HVPS PWB and harness ASSY LVRMT
24	H-43	Connects MCU and HVPS PWB and harness ASSY TMPB
26	H-43	--
27	I-33	Connects ESS PWB and MCU and HVPS PWB
30	H-43	Flash-write
31	J-43	For test print
32	H-43	Connects MCU and HVPS PWB and harness ASSY OHP
32	J-33	-- (ESS PWB)
33	I-32	Connector for connecting to ESS PWB hard disk
34	J-32	Connector for connecting to ESS PWB network card
41	I-18	Connects drive PWB and harness ASSY DRV1
42	J-18	Connects drive PWB and harness ASSY DRV2
45	K-32	Connector for ESS PWB Ethernet
47	J-18	Connects drive PWB and harness ASSY feeder
48	I-18	Connects drive PWB and main motor ASSY
49	I-17	Connects drive PWB and DEVE motor ASSY
50	J-18	Connects drive PWB and harness ASSY DUP
50	I-32	-- (ESS PWB)
51	J-16	Connects drive PWB and harness ASSY TNR
52	I-18	Connects drive PWB and fuser motor ASSY
60	I-17	Connects drive PWB and harness ASSY 24V
61	J-18	Connects drive PWB and harness ASSY LVNC
64	I-32	-- (ESS PWB)

P/J	Coordiates	Remarks
66	I-32	Connector for connecting to EEPROM on ESS PWB
71	B-32	Connects harness ASSY EEPROM and harness ASSY CRUM
80	J-32	-- (ESS PWB)
120	H-32	Jumper pin on ESS PWB
131	B-7	Connects harness ASSY DUP and DUP motor ASSY
132	B-9	Connects harness ASSY front 2 and MSI feed solenoid
133	D-8	Connects harness ASSY front 2 and DUP JAM sensor
134	D-6	Connects harness ASSY front 2 and full stack sensor
135	C-9	Connects harness ASSY front 2 and MSI no paper sensor
136	C-23	Connects harness ASSY CTD and ADC sensor ASSY
137	F-8	Connects harness ASSY DUP and fuser fan
138	B-32	Connects harness ASSY front 1A and harness ASSY FSR2
139	B-33	Connects harness ASSY front 1A and harness ASSY front 2
140	H-43	Connects MCU and HVPS PWB and harness ASSY EEPROM
141	B-32	Connects harness ASSY EEPROM and harness ASSY TFLSNR
142	D-23	Connects harness ASSY TFLSNR and waste toner sensor
144	E-35	Connects harness ASSY EEPROM and EEPRON PWB
151	F-22	Connects harness ASSY scanner KA and scanner ASSY
161	H-29	Connects LVPS and harness ASSY AC SW
162	H-29	Connects LVPS and harness ASSY FSR2
163	H-27	Connects LVPS and harness ASSY 24V
164	H-28	Connects LVPS and harness ASSY LVRPG
165	H-28	Connects LVPS and harness ASSY LVNC
166	H-27	Connects LVPS and rear fan
167	H-28	Connects LVPS and harness ASSY LVRMT
181	E-38	Connects REGI sensor and REGI clutch (harness section)
210	H-23	Connects harness ASSY OPF main and harness ASSY OPFREC
220	E-7	Connects harness ASSY OPEPANE B and control panel HANABI
221	B-33	Connects harness ASSY OPEPANE A and harness ASSY OPEPANE B
231	C-49	Connects harness ASSY TMPA and HUM TEMP sensor
232	F-23	Connects harness ASSY FSR2 and furser ASSY
311	I-42	Connects MCU and HVPS PWB and harness ASSY LVRPG
321		Connects harness ASSY OHP and OHP sensor
431	E-6	Connects harness ASSY OHP and OHP sensor (Y)
432	E-6	Connects harness ASSY OHP and OHP sensor (M)
433	E-5	Connects harness ASSY OHP and OHP sensor (C)
434	F-5	Connects harness ASSY OHP and OHP sensor (K)
441	G-7	Connects harness ASSY TNR and low toner sensor (Y)
442	G-6	Connects harness ASSY TNR and low toner sensor (M)
443	H-6	Connects harness ASSY TNR and low toner sensor (C)
444	H-6	Connects harness ASSY TNR and low toner sensor (K)

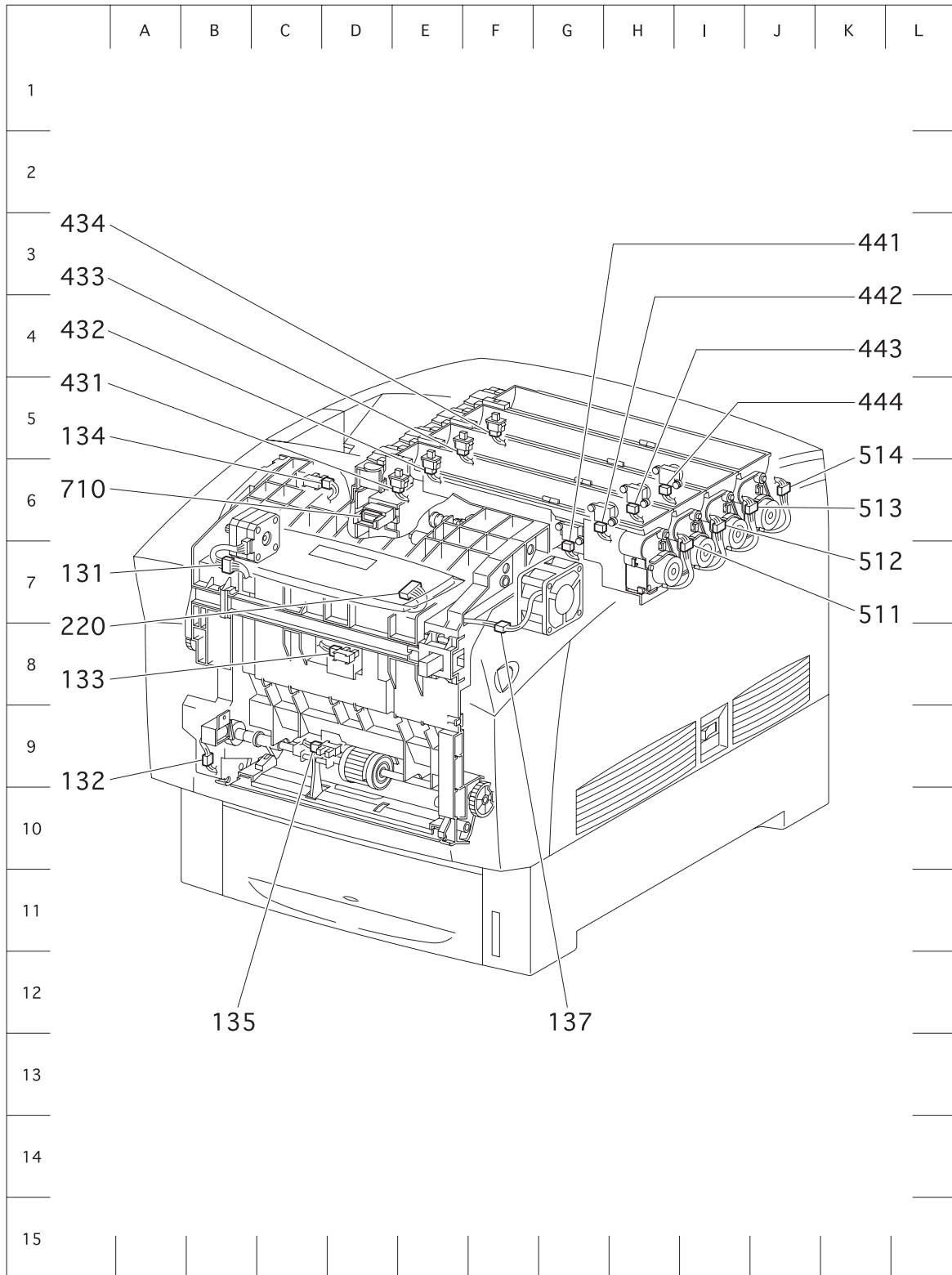
P/J	Coordiates	Remarks
471	J-49	Connects harness ASSY feeder and tray1 size switch ASSY
472	E-4	Connects harness ASSY feeder and tray 1 no paper sensor
473	H-57	Connects harness ASSY feeder and tray 1 low paper sensor
474	G-49	Connects harness ASSY feeder and tray1 feed clutch
475	H-49	Connects harness ASSY feeder and tray 1 turn clutch ASSY
511	I-7	Connects harness ASSY TNR and toner motor ASSY (Y)
512	I-6	Connects harness ASSY TNR and toner motor ASSY (M)
513	J-6	Connects harness ASSY TNR and toner motor ASSY (C)
514	J-6	Connects harness ASSY TNR and toner motor ASSY (K)
710	D-6	Connects harness ASSY CRUM and bracket CRUM
810	J-57	Connects harness ASSY OPFREC and harness ASSY PLG
960	I-33	Connector for connecting to EEPROM on ESS PWB
1361	B-32	Connects harness ASSY front 1A and harness ASSY CTD
2361	E-36	Connects harness ASSY TMPB and harness ASSY TMPA
5011	F-35	Connects harness ASSY front 1A and SUB HVPS
5020	E-35	Connects SUB HVPS and wire ASSY transfer roll cartridge
5030	E-35	Connects SUB HVPS and wire ASSY DTS

## 1.2 2 Tray Module

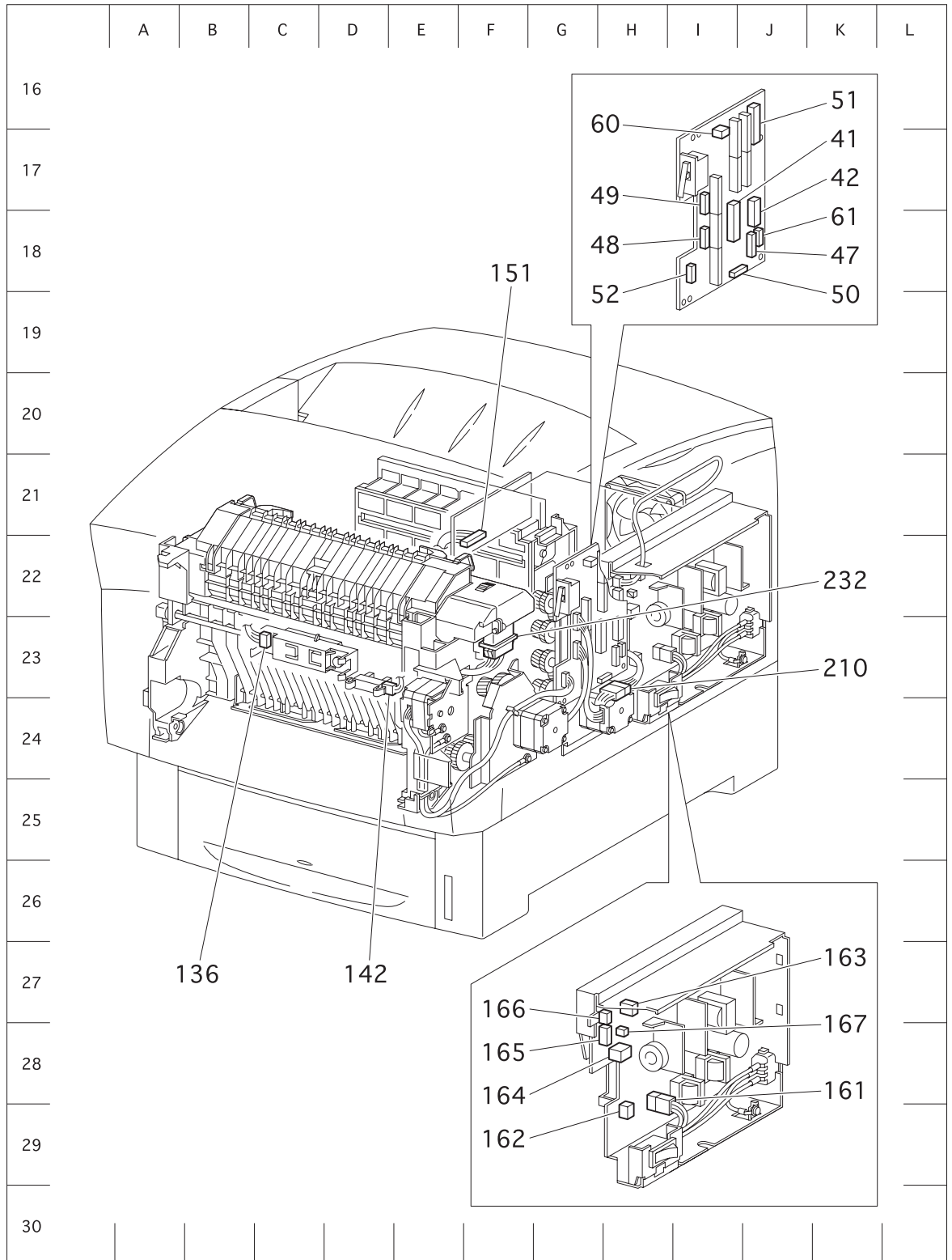
P/J	Coordiates	Remarks
832	C-3	Connects tray3 no paper sensor and harness ASSY NPRSJ
822	E-3	Connects tray2 no paper sensor and harness ASSY NPRSJ
824	F-3	Connects tray2 feed solenoid and harness ASSY FDR2T
834	K-12	Connects tray3 feed solenoid and harness ASSY FDR3T
825	I-13	Connects tray2 turn clutch ASSY and harness ASSY FDR2T
835	H-13	Connects tray3 turn clutch ASSY and harness ASSY FDR3T
8220	G-3	Connects harness ASSY NPRSJ and harness ASSY FDR2T
8220	K-11	Connects harness ASSY NPRSJ and harness ASSY FDR3T
810	H-3	Connects harness ASSY OPFREC and harness ASSY PLG
81	J-3	Connects feeder PWB and harness ASSY PLG
83	K-6	Connects feeder PWB and harness ASSY FDR3T
82	K-8	Connects feeder PWB and harness ASSY FDR2T
84	K-9	Connects feeder PWB and feeder motor ASSY
821	K-7	Connects harness ASSY FDR2T and tray2 size switch ASSY
831	K-10	Connects harness ASSY FDR3T and tray3 size switch ASSY
823	F-13	Connects harness ASSY FDR2T and tray2 low paper sensor
833	E-13	Connects harness ASSY FDR3T and tray3 low paper sensor

## 2. P/J LAYOUT DIAGRAM

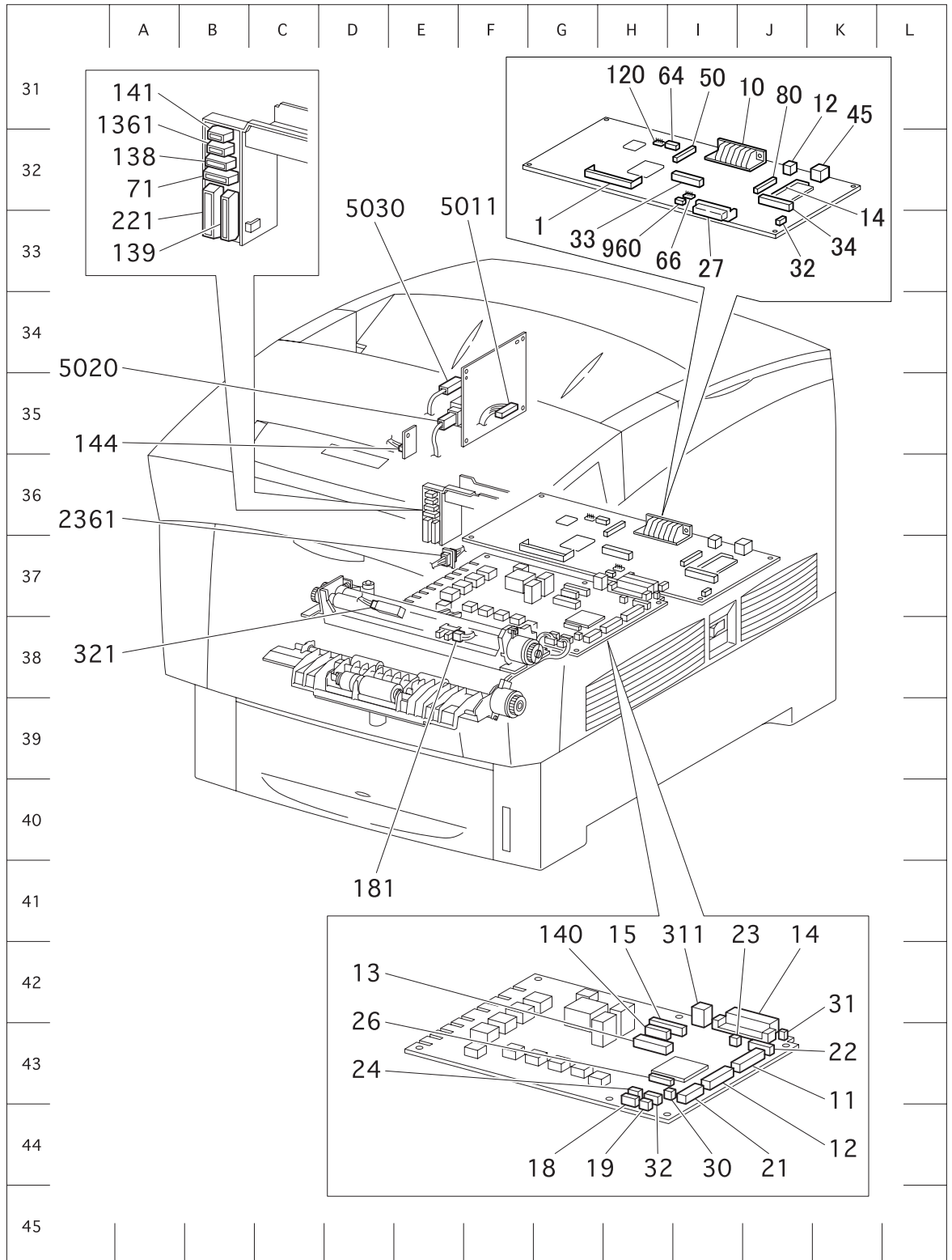
### 2.1 IOT Top



## 2.2 IOT Front/RH



### 2.3 MCU and HVPS PWB/ESS PWB



## 2.4 Tray1

