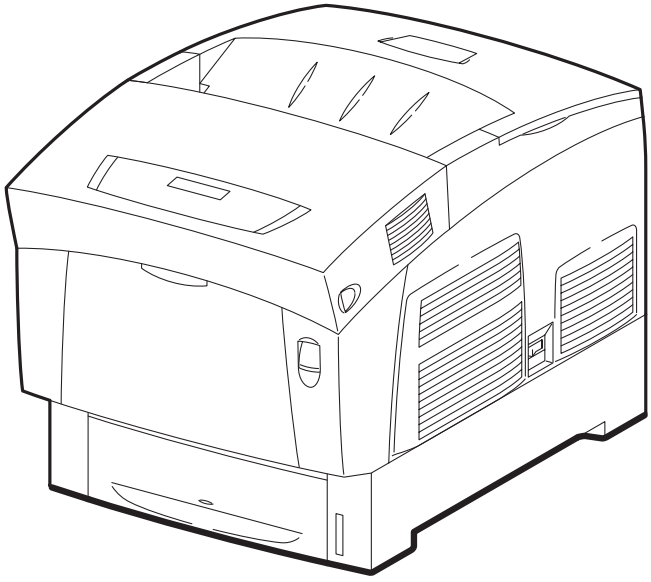
Brother Color Laser Printer

SERVICE MANUAL

MODEL: HL-4200CN



Read this manual thoroughly before maintenance work.

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

November 7, 2004
SM-PRN038

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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-4200CN 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

APPENDIX

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

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

CONTENTS

REGULATIONS

LASER SAFETY (FOR 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-milliwat, 700-800 nanometer wavelength, GaAIAs 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.

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.

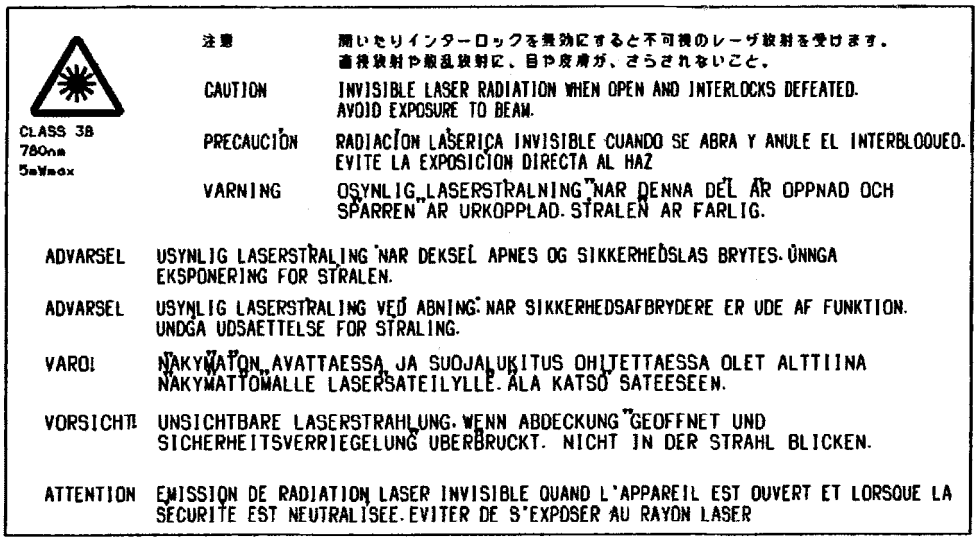
Caution:
Use of controls, adjustments or the performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

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.



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 inby 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*

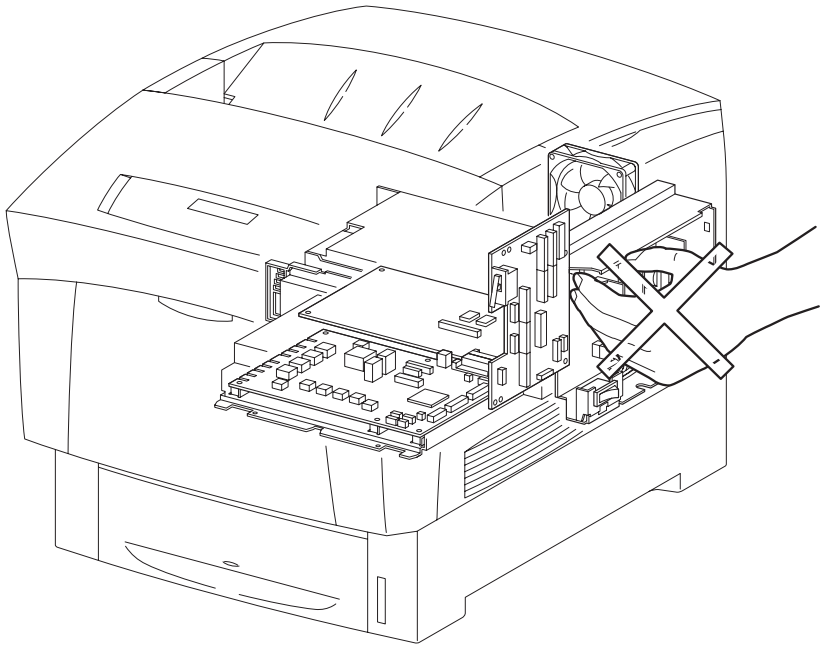
While the printer is ON, never touch live parts if not required absolutely.

⚠ *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*

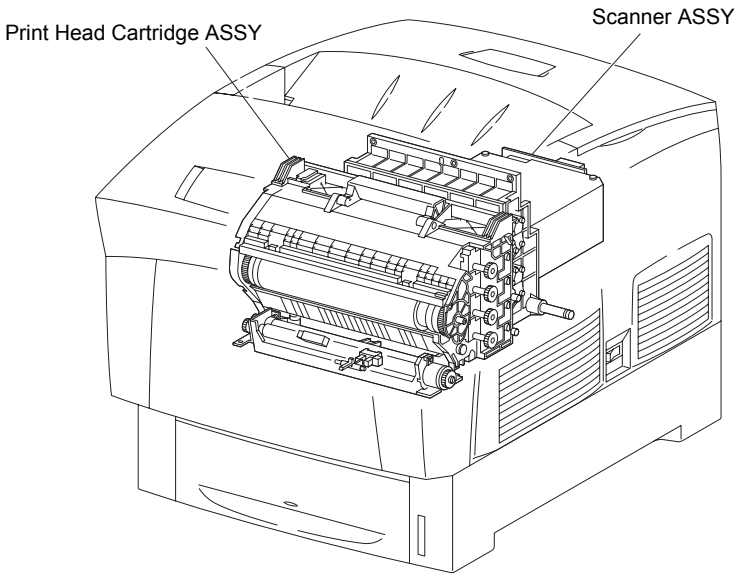
- *If your eyes are exposed to laser beams, you may lose your eyesight.*
- *Never open the cover if warning label for laser beams is attached there.*
- *Before disassembling and reassembling this laser printer, be sure to turn it OFF.*
- *When servicing this laser printer while it is running, be sure 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:

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.*

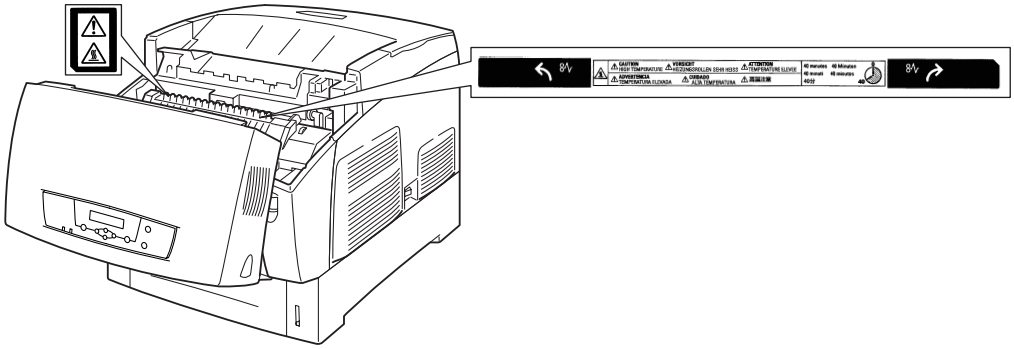
Reference: Laser beams of this laser printer is invisible rays which you cannot see.



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

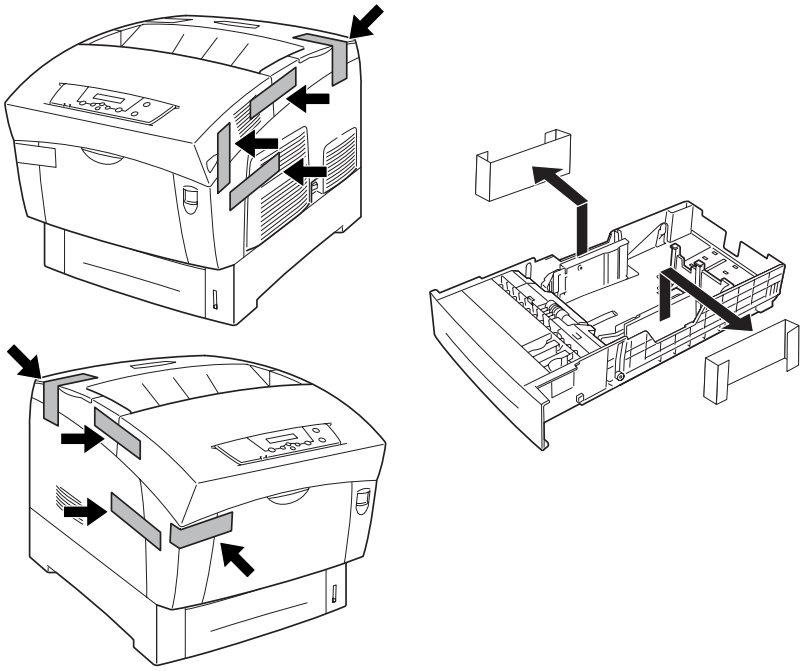
⚠ *WARNING*

The printer must be carried horizontally by 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 34.9 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 pullout 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-4200CN weighs 34.9 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-54)
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-54)
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-4200CN 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-54 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-12CL	9K
Cyan Toner Cartridge	TN-12CL	6K
Magenta Toner Cartridge	TN-12CL	6K
Yellow Toner Cartridge	TN-12CL	6K
Print Head Cartridge	PH-12CL	30K
Transfer Roll Cartridge (with Waste Toner Pack)	TR-11CL	25K
Fixing Parts	FP-12CL	100K

*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-54 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

CONTENTS

CHAPTER I SPECIFICATIONS

1. PRODUCT NAME

Product Name	Product Code
HL-4200CN	54S602

2. OPTIONAL PRODUCTS

No.	Product Name	Product Code	Remarks
1	1 x 500 – sheet tray	LT-41CL	
2	2 x 500 – sheet tray	LT-42CL	
3	Hard Disk	HD-41CL	20GB

3. DIMENSIONS / WEIGHT (MAIN UNIT)

Width (mm)	Depth (mm)	Height (mm)	Weight (kg)
439	590*	445	34.9kg or less (incl. Print Head)

*: with the manual tray folded

4. BASIC CONFIGURATION

4.1 Engine

This printer basically consists of the print engine main unit, consumables (CRU), and standard universal paper tray (500 sheets).

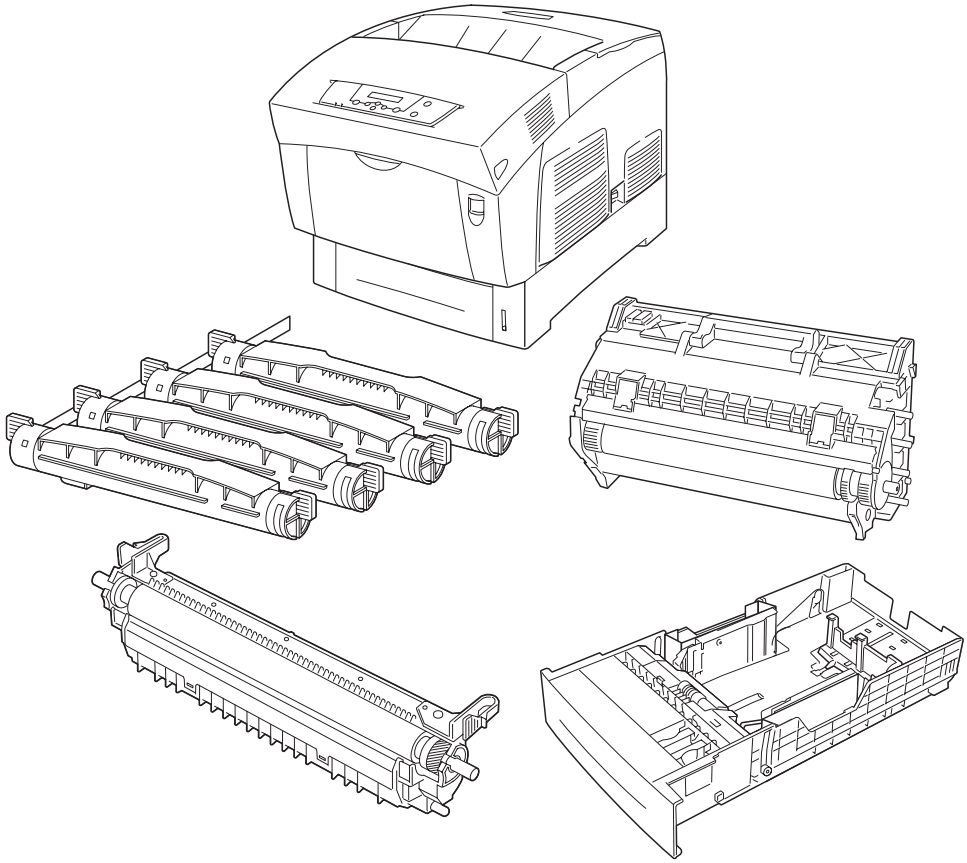


Fig.1-1

4.2 Feeder Unit

Option Feeder installed under the printer.

This printer basically consists of an option feeder and two universal paper tray (500 sheets each).

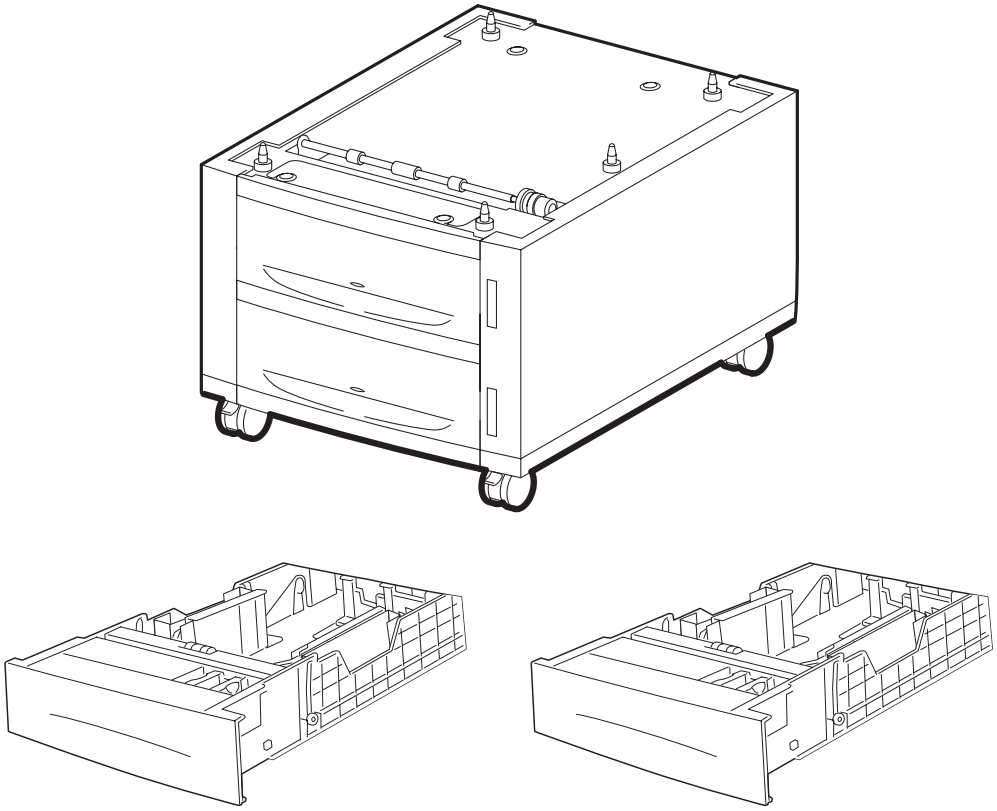


Fig.1-2

4.3 Tray Feeder Unit

Option Feeder installed under the printer.

This printer basically consists of an option feeder and a universal paper tray (500 sheets).

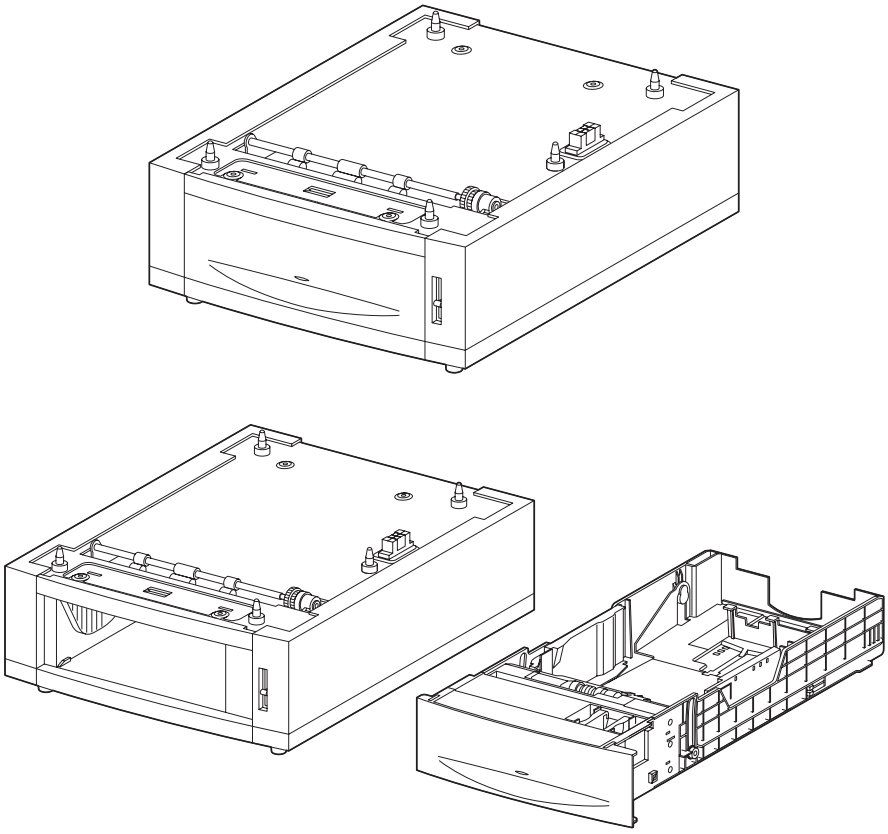


Fig.1-3

5. FUNCTIONAL CONFIGURATION

Functional configuration of this printer is shown below.

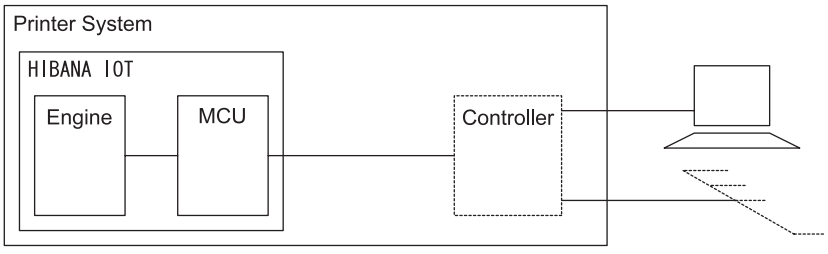


Fig.1-4

6. ELECTRICAL PROPERTIES

6.1 Power Source

Two types of power source as follows are available for this printer, which are selected according to the specifications.

* 100V/120V printer: Voltage: 100-127VAC ±10% (90 to 140V), frequency: 50/60Hz ± 3Hz

* 220/240V printer: Voltage: 220-240VAC ±10% (198 to 264V), frequency: 50/60Hz ± 3Hz

6.2 Power Consumption

Power consumption in each operation mode at rated voltage input

Operation mode	Average (Wh/h) *1	Max. power consumption
Printing mode (Running mode)	≦600W	≦900W (Fuser is on)
READY mode (Ready mode)	≦180W	≦900W (Fuser is on)
ENAGISTAR mode *2	--	≦45W (Controller is included)

*1 At running mode : wattage per hour at printing continuously.
At ready mode : wattage per hour at the temperature of fuser ready.

*2 Fuser is in stop status.

7. MECHANICAL PROPERTIES

7.1 Dimensions / Mass of Printer

Width: 439mm ± 1%

Depth: 590mm ± 1% (with no cassette installed), 638mm ± 1% (with cassette installed)

Height: 445mm ± 1%

Mass

(No cassette installed + (No CRU): 26.8 kg ± 1%

(No cassette installed + (CRU): 32.5 kg ± 1%

(Cassette installed + (No CRU): 29.2 kg ± 1%

(Cassette installed + CRU): 34.9kg ± 1%

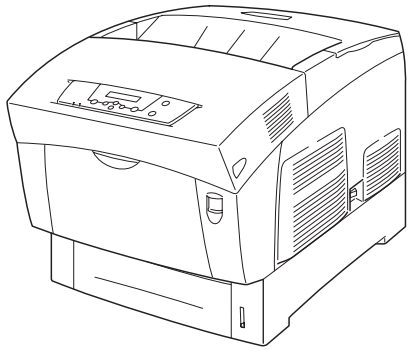


Fig.1-5

Width: 439mm ± 1%
Depth: 509mm ± 1% (with no cassette installed), 563mm ± 1% (with cassette installed)
Height: 172mm ± 1%
Mass
(No cassette installed + (No CRU): 9.3kg ± 1%
(No cassette installed + (CRU): 11.8 kg ± 1%

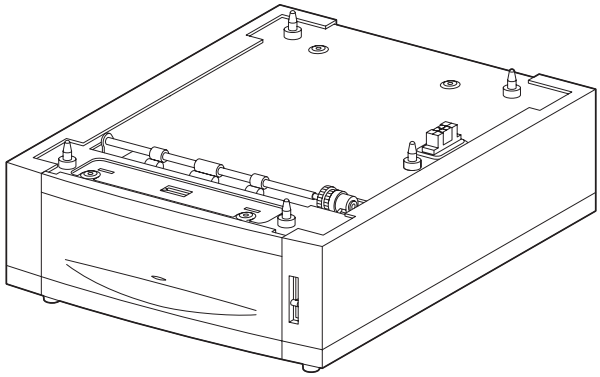


Fig.1-6

Width: 439mm ± 1%
Depth: 509mm ± 1% (with no cassette installed),
563mm ± 1% (with cassette installed)
Height: 336mm ± 1%
Mass
(No cassette installed + (No CRU): 14.2 kg ± 1%
(No cassette installed + (CRU): 19.2 kg ± 1%

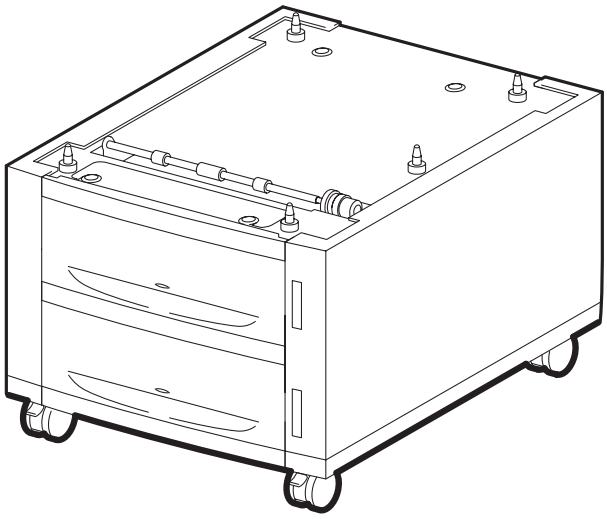


Fig.1-7

7.2 Dimensions / Mass of Universal Paper Tray (standard paper supply – 500sheets)

Width: 321mm ± 1%
Depth: 558mm ± 1%
Height: 97mm ± 1%
Mass: 2.5kg ± 1%

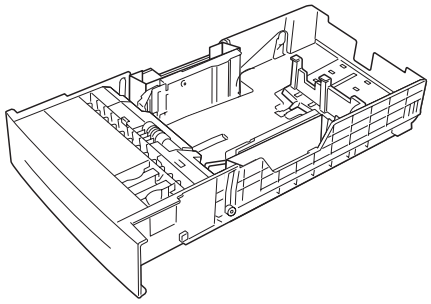


Fig.1-8

7.3 Dimensions / Mass of Consumables

7.3.1 Print head cartridge

Width: 339mm ± 3mm
Depth: 146mm ± 3mm
Height: 179mm ± 3mm
Mass: 4.5kg ± 0.1kg
Reference: The print head cartridge has CRUM (CRU memory) to record information.

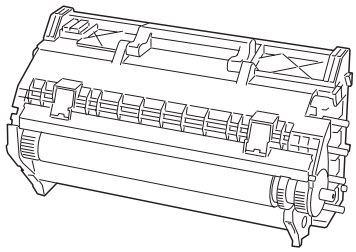


Fig.1-9

7.3.2 Transfer roll cartridge

Width:309mm ± 3mm
Depth:85mm ± 3mm
Height:60mm ± 3mm
Mass:500g ± 10g

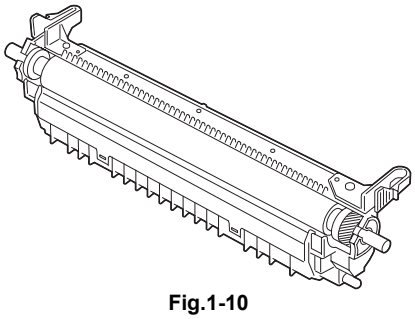


Fig.1-10

7.3.3 Toner cartridge

	Width	Depth	Height	Mass
Black toner cartridge	355mm ± 3mm	51mm ± 3mm	55mm ± 3mm	360g ± 10g
Yellow toner cartridge	355mm ± 3mm	51mm ± 3mm	55mm ± 3mm	315g ± 10g
Magenta toner cartridge	355mm ± 3mm	51mm ± 3mm	55mm ± 3mm	325g ± 10g
Cyan toner cartridge	355mm ± 3mm	51mm ± 3mm	55mm ± 3mm	315g ± 10g

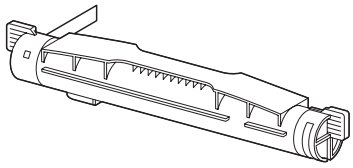


Fig.1-11

7.4 Installation Space (min. installation space)

Minimum space as shown below is required to install the printer when it is used for normal objects.
(Space occupied by the operator is not included.)

<Top view**>**

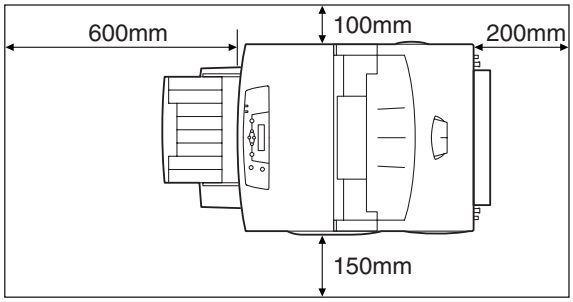


Fig.1-12

<Front view**>**

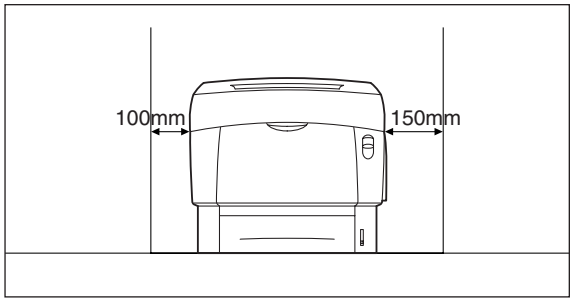


Fig.1-13

<Side view**>**

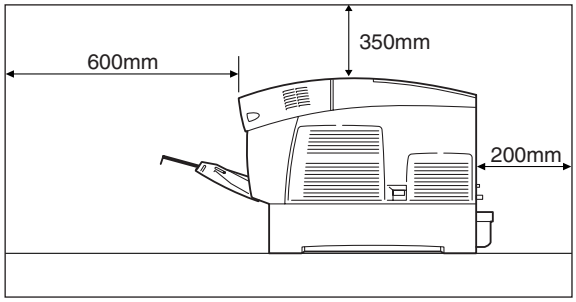


Fig.1-14

8. FUNCTIONS

8.1 Recording System

OPC drum, 4-tandem cartridges, electro-photographic system using intermediate transfer rolls

8.2 Exposure System

Semiconductor laser, simultaneous scanning by 4 beams

8.3 Development System

Development with dry type 2-component developer

8.4 Fixing System

Heat fusing of the free belt nip system

8.5 Resolution

Two types of resolutions can be switched. Printing speed is halved at 1200dpi

* Main scanning direction: 600 dots/25.4mm (by video signal from controller)
  1200 dots/25.4mm (by video signal from controller) (Half speed)
* Sub scanning direction: 600 dots/25.4mm (fixed)
  1200 dots/25.4mm (fixed) (Half speed)

8.6 Operation Mode

The printer can be operated in either of 2 operation modes. The modes are switched over by command from the printer controller or change of printer operation, etc.

* Running mode

  State in running or recording operation

Fixing system:	Held at operating temperature.
Exposure system:	Operating status
Recording system:	Operating status
Fuser fan:	Operating at high speed
Rear fan:	Operating at high speed

* Ready mode

  Ready state

Fixing system:	Stop status *1
Exposure system:	Stop status *2
Recording system:	Stop status
Fuser fan:	Stop status *3 (Half speed running)
Rear fan:	Stop status *3 (Half speed running)

*1: It can be changed to ready temperature status by a command from a controller. (However, it needs to be back in a stop status within 2 hours.)

*2: It can be changed to operating status by a command from a controller.

*3: Fan status is changed depending on the state (temperature, etc.) of the fixing system.

8.7 Process Speed

The printer prints by switching two levels, Full speed (printing with the highest process speed of the printer) and Half speed (printing with the half of process speed). The controller cannot instruct to change the process speed.

8.8 Print Mode

The printer has four modes, Standard mode, Fine mode, High gloss mode, and Super high gloss mode. Modes are switched over under the instruction from the controller.

(1) Standard mode: used for printing with resolution 600dpi

(2) Fine mode: process direction resolution 1200dpi mode

(3) High gloss mode: thick paper, special paper, and high glossed plain paper

(4) Super high gloss mode: thick paper, special paper, and super high glossed plain paper

8.9 Paper Mode

8 paper modes are available for this printer. Modes are switched over under the instruction from the controller.

<Classification of paper mode>

(1) Plain paper: Japanese plain paper such as FX-P, L, R, J/JD, and plain paper such as XC-4200 20lb, 24ibs RX-80, 90.

(2) Label-L mode: It is mainly selected to run on Japanese labels (V860 etc.).

(3) Label-H mode: It is mainly selected to run on labels (3R4469 etc.).

(4) Thick paper-L mode: it is selected to run on the papers whose thickness is 106-162gsm.

(5) Thick paper-H mode: It is selected to run on the papers whose thickness is 163-216gsm.

(6) OHP mode: It is selected to run on OHPs (JE-001 etc).

(7) Envelope mode: It is selected to run on envelopes.

(8) Postcard mode: It is selected to run on postcards.

Relation between the resolution, process speed, print mode and paper mode is shown in the table below.

Paper mode			Resolution/Process speed			
			600dpi		1200dpi	
		Print mode	Simplex	Duplex	Simplex	Duplex
Plain paper (1)		Standard mode	Full speed	Full speed	--	--
	Thick paper (4)-(5)	Fine mode	--	--	Half speed	Half speed
		High gloss mode	Half speed	Half speed	--	--
Special paper (2)-(3) (6)-(8)		Fine mode	--	--	Half speed	Half speed
		High gloss mode	Half speed	Half speed	--	--

8.10 Warm-up Time

When nominal voltage (115/230V) is applied, ready temperature (Fuser Stand-by) is reached within 30 seconds after command is given by the controller.

Reference: Measured at 22°C, 55% RH, nominal voltage.

8.11 FPOT (First Print Output Time)

FPOT time of the printer is shown in the table below.

The time required for the first sheet of paper to be delivered after the START command is given is calculated on the following conditions (rounded to one decimal place).

- IOT performance that the controller does not have IOT wait.
- This value is indicated by either of two described below depending on the status of Motor On and Fuser.
    1. Scanner RDY t_{on} : Scanner Motor Ready (steady-status rotation) and Fuser Ready
    2. Scanner OFF t_{off} : Scanner Motor Off (at stopping) and Fuser Ready temperature
- Paper is A4 SEF
- Except when process control is operating*1 / when Fuser Cool down*2
- Paper mode is plain paper mode.
- Paper feeding is Tray1 (paper tray which locates at the bottom of the printer)
- Measurement environment is at 22 °C / 55%RH rated voltage.

*1: Process controller operation is process controls such as TC control, electric potential control, cleaning cycle, registration control, and so on. Sometimes, the engine stops feeding papers for a certain period of time while continuous printing for these operations.

*2: The print may not start for a certain time after receiving the start command due to prior job running conditions.

Process speed	FPOT(sec)			
	In Simplex mode		In Duplex mode	
	Scanner RDY t_{on}	Scanner OFF t_{off}	Scanner RDY t_{on}	Scanner OFF t_{off}
Full speed	$\leq$ 8.0	$\leq$ 14.0	$\leq$ 13.5	$\leq$ 19.5
Half speed	$\leq$ 14.5	$\leq$ 20.5	$\leq$ 24.5	$\leq$ 30.5

FPOT of paper fed from trays other than is added following values to above Scanner RDY t_{on} and Scanner OFF t_{off} .

Process speed	MSI	Option Feeder Unit (Tray2) *3	Option Feeder Unit(Tray3) *4
Full speed	-0.3 sec	+0.9 sec	+1.8 sec
Half speed	-0.6 sec	+1.8 sec	+3.5 sec

*3: Tray2 : First tray of option Feeder

*4: Tray3 : Second tray of option Feeder

8.12 Continuous Printing Speed

Assuming the time until the trailing end of the 11th sheet is discharged after the trail end of the 1st sheet is discharged as t seconds, number of printed sheets for a minute given by the equation [60/t ×10] is shown in the table below, excluding, however, the time for which the process control is working and during the Fuse Cool Down are not contained.

Note:
This function specifies the IOT performance when the controller did not have the ×2 feeders satisfy the following performance.
Refer to Chart 6 Principles Of Operation, for details of Process control.

Reference:
Unit "PPM" stands for "prints per minute" indicating number of prints per minute.
"ipm" is abbreviation of "Impression Per Min", and indicates "number of printed sides per minute" for Duplex.

Paper mode	Continuous printing speed			
	Full speed (600dpi)		Half speed (600/1200dpi)	
	Simplex (ppm)	Duplex (ipm)	Simplex (ppm)	Duplex (ipm)
Plain paper (A4/LET SEF)	24/26	15.1/15.4	12/13	7.7/7.9
Thick paper (-162gsm)*1 (A4/LET SEF)	--	--	12/13	7.7/7.9
Thick paper (163-216gsm) /Label/OHP *1 (A4/LET SEF)	--	--	12/13	--
Envelop/Postcard	--	--	13	--

*1:In case of small size paper, printing speed is sometimes slowed down.

8.13 Printing Area

8.13.1 Usable paper size

Minimum and maximum paper size usable for this printer are as follows:

Minimum usable paper size:Width 88.9mm (3.5inch) × length 139.7mm (5.5 inch) (when using MSI).

Maximum usable paper size:Width 215.9mm (8.5 inch) × length 355.6mm (14 inch) (when using MSI).

8.13.2 Maximum printable area

For each printable size of paper, this printer masks 2.5mm within the left edge and right edge, 2.0mm from within edge and back edge as unprintable area, in order to prevent from that images exceed the size of printable area.

Maximum area where image can be printed is as follows:

Width: 210.9mm (8.3 inch) × length: 351.6mm (13.8 inch)

8.13.3 Guaranteed printing area

Area for which the image quality is guaranteed as follows:
Area except for 4mm (0.1575 inch) from edges of the paper.
Maximum area for which the image quantity is guaranteed as follows:
Width: 207.9mm (8.2 inch) × length: 347.6mm (13.7 inch)

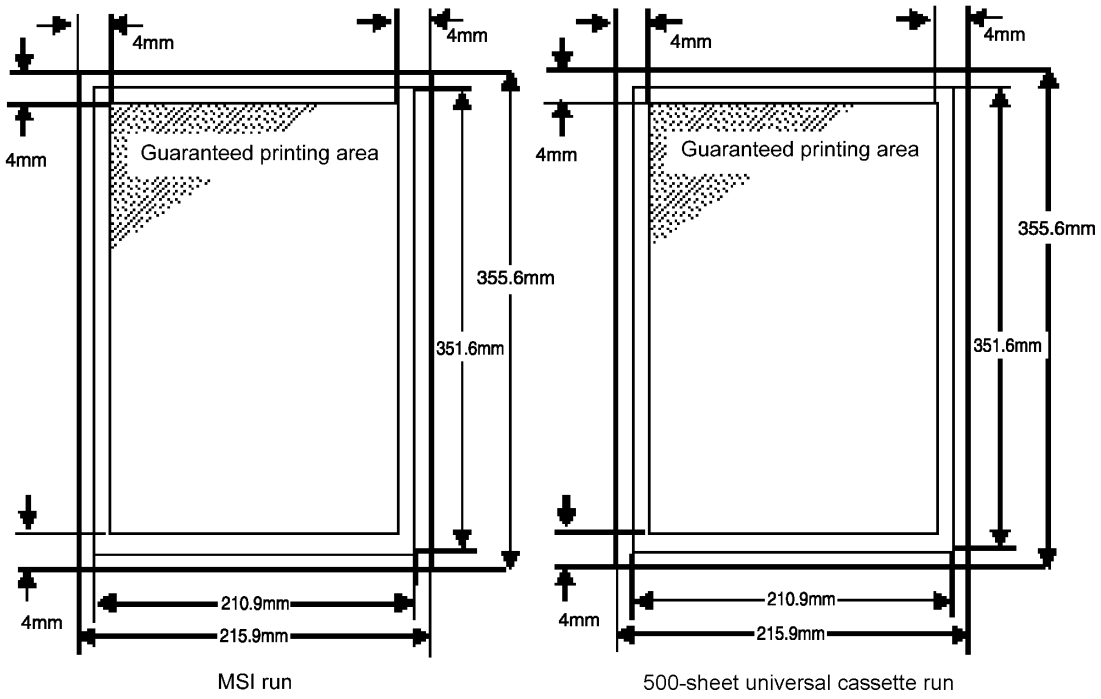


Fig.1-15

8.14 Input Properties

8.14.1 Paper pick-up system

- Paper pick-up with paper tray

  Feeding method of this printer is ARRF method.

- MSI paper pick-up

  The MSI (Multi Sheet Inserter) is equipped as standard. Selection of MSI is designated from the controller.

- Duplex paper feeder unit

  This unit is equipped as standard to enable the printing on duplex of paper. Selection of Duplex Feeder Unit is designated from the controller.

8.14.2 Paper pick-up capacity

- Paper pick-up with paper tray

  500 sheets or below 56mm of standard paper

- MSI paper pick-up

  100 sheets or below 10mm of standard paper

8.15 Output Properties

8.15.1 Paper delivery system

- FACE DOWN delivery

  Paper can be delivered by the following method.

8.15.2 Paper delivery capacity

- FACE DOWN delivery

  250 sheets (Letter/A4 standard paper)

8.15.3 Delivery paper size/mass

- FACE DOWN delivery

  All paper sizes applicable to this printer

8.15.4 Full stack detection

- Height of paper to be fed

  Detect when the height reached about 36mm.

8.16 Paper

8.16.1 Paper type

Paper which can be used with this printer is classified into standard paper, general paper and special paper.

- Standard paper

  Using this type of paper is recommended. Reliability, operability and print image quality are the application range of the specifications.

  Following paper is the standard paper.

  * Xerox 4200 DP 20lb
  * Xerox premier 80g/m²

- General paper

  General paper is plain paper except standard paper and special paper, and its reliability and running performance are within the specification, but the print image quality is out of the specification.

- Special paper

  Special paper except for plain paper. Reliability and operability are the applicable range of specifications but the print image quality is out of the applicable range of specifications.

8.16.2 Paper mass

- Paper feed from paper tray

  "60 to 105 g/m²" (16 - 28 lb)

- Paper feed from MSI

  "64 to 216 g/m²" (17 - 57 lb)

8.16.3 Paper size

Paper size which can be set to each paper pick-up unit is shown in the table below.

Cassette	Paper size
500 Sheet Paper Universal Tray	A4 –SEF B5(JIS) –SEF A5 -SEF *1 EXECUTIVE –SEF LETTER –SEF LEGAL(13")-SEF LEGAL(14")-SEF
MSI Tray	Minimum size Width 88.9mm(3.5inch)×Length139.7mm(5.5inch) Maximum size Width 215.9mm(8.5inch)×Length 355.6mm(14inch)

*1:The end guide which is attached as standard needs to be installed when running on A5 size paper. The capacity of paper is 350 sheets, or 40mm or less.

9. CONSUMABLES

Consumables are usually replaced by costumers. In the event of recovery of failure attributable to consumables or isolation of failure, you may replace them.

9.1 Items of Consumables

- Print head cartridge

  Composed of photosensitive medium, development machine, intermediate transfer roll, etc.
- Transfer roll cartridge

  Composed of transfer roll cartridge , waste toner collection box, etc.
- Black toner cartridge

  Cartridge to supply black toner to the development unit.
- Yellow toner cartridge

  Cartridge to supply yellow toner to the development unit.
- Magenta toner cartridge

  Cartridge to supply magenta toner to the development unit.
- Cyan toner cartridge

  Cartridge to supply cyan toner to the development unit.

9.2 Consumable Life

- Print head cartridge: Equivalent to about 30,000 prints
- Transfer roll cartridge: Equivalent to about 25,000 prints
- Black toner cartridge: Equivalent to about 9,000 prints
- Yellow toner cartridge: Equivalent to about 6,000 prints
- Magenta toner cartridge: Equivalent to about 6,000 prints
- Cyan toner cartridge: Equivalent to about 6,000 prints

9.3 Parts Requiring Periodical Replacement

Following parts are replaced when a certain number of sheets are printed (life over) to prevent troubles.

♦ Fuser ASSY:	Equivalent to about 100,000 prints
♦ Roll ASSY retard:	Equivalent to about 100,000 prints
♦ Roll ASSY feed MSI :	Equivalent to about 45,000 prints *1
♦ Roll ASSY retard MSI :	Equivalent to about 45,000 prints *1
♦ Chute REGI ASSY:	Equivalent to about 300,000 prints
♦ Roll ASSY feed:	Equivalent to about 300,000 prints
♦ Turn roll bearing metal:	Equivalent to about 300,000 prints *2
♦ Chute ASSY turn:	Equivalent to about 300,000 prints

*1 Replacement life when converting with utilization ratio CST 85% and MSI 15%.

*2 Bearing (ø6×L8)/metal is the same shape as turn roll bearing metal, but it is not periodical replacement parts.

10. OPERATING ENVIRONMENT

10.1 Installation Temperature / Humidity

Installation temperature and humidity on the condition without condensation is as follows.
At operating: 5-32 °C, 15-85%RH
At stopping: minus 20-40 °C, 5-85%RH

10.2 Installation Altitude

0 to 3,100m

10.3 Installation Horizontality

Within inclination of 5 degrees

10.4 Ambient Lighting

3000 Lux or less (without no direct sun beams)

11. SAFETY / ENVIRONMENT CONDITIONS

11.1 Safety Standard

- ♦ 100V / 120V system
  UL1950 3rd Edition
  CSA C22.2 No.950-M95
- ♦ 220V / 240V system
  IEC60950 2nd Edition

11.2 Laser Safety Standard

- ♦ 100V / 120V system
  FDA21CFR Chapter 1, Subchapter J, Section 1010, 1040
- ♦ 220V / 240V system
  IEC60825 Class 1 Laser Product

11.3 EMI

- ♦ 100V system (JPN)
  VCCI Class B
- ♦ 120V system (US)
  FCC Part 15, Subpart B, Class B (ANSI C63.4)
- ♦ 220V / 240V system (EC)
  EN55022 (CISPR Publication 22), Class B

11.4 Noise

Noise of printing (including simplex, duplex, with option) is as follows.

Process speed	Printer (simplex / duplex)		Option 1 Tray Feeder Unit (simplex / duplex)		Option Feeder Unit (simplex / duplex)	
	Sound pressure level (By Standar)	Sound powerlevel	Sound pressure level (By Standar)	Sound powerlevel	Sound pressure level (By Standar)	Sound powerlevel
Full speed	55dBA	6.7B	55dBA	6.8B	55dBA	6.9B
Half speed	52dBA	6.45B	53dBA	6.7B	53dBA	6.7B

Noise of ready mode is as follows.

Sound pressure level (By Standar) 36.5 dBA or less *1

Sound power level 4.95 B or less *1

*1 Both fuser fan and rear fan are on the status of half speed rotation. FAN stops depending on the status of fuser, and the noise level at this time is the same as background noise.

12. PRINT IMAGE QUALITY

12.1 Image Quality Guarantee Conditions

The image quality is specified and guaranteed under the following conditions.

12.1.1 Environmental conditions

Environment condition for general office

Temperature: 15-28 °C

Humidity: 20-70%RH

Environment condition for evaluating image quality

Temperature: 10-32 °C

Humidity: 15-85%RH

12.1.2 Guaranteed paper

The print image quality specified here is guaranteed with standard paper fed from the paper tray.

The evaluation is performed with A4 or letter size of paper.

- FX P paper A4
- Xerox 4200 DP Letter
- Xerox Premier 80gsm A4

12.1.3 Paper condition

The paper used is fresh paper immediately after unpacked, which has been left in the operating environment for 12 hours before unpacking.

12.1.4 Printer condition

The print image quality specified in this section is guaranteed with the printer in normal condition.

12.1.5 Image quality guaranteed area

The print image quality specified in this section is guaranteed in the guaranteed image quality area specified in this manual.

12.1.6 Criterion

The print image quality is guaranteed with the Spec. In rate = 95% (γ =90%).

CHAPTER II
INSTALLATION

CONTENTS

CHAPTER II INSTALLATION

1. TRANSPORTING THE PRINTER

Note the following points when transporting the printer into position.

At least two people should carry the printer.

Note:

Because the printer weighs 34.9kg with the tray and consumables installed, at least two people should carry it.

To lift the printer, face the front and back of the printer and grip the recessed areas at the bottom left and right with both hands. Never try to lift the printer by gripping any other areas. Lifting the printer by gripping other areas can cause the printer to fall, resulting in injury.

Bend your knees when lifting the printer to avoid back injury.

Never try to lift the printer by gripping the tray cover which protrudes at the lower back of the printer. It may cause the tray cover to be damaged.

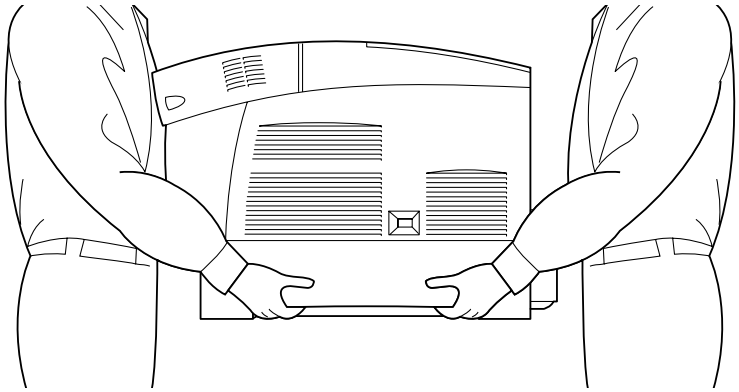


Fig.2-1

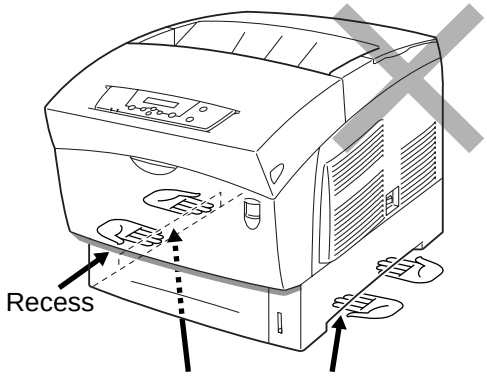


Fig.2-2

Keep the printer level.

Note:

When carrying the printer, keep it level to prevent trays and consumables from falling out.

Do not tilt it more than 10 degrees in any direction.

2. INSTALLATION PROCEDURE

Install the printer as follows:

2.1 Checking the Packaged Items
2.2 Removing the Tapes from the Printer
2.3 Removing the Paper Tray Protective Materials
2.4 Mounting the Print Head Cartridge
2.5 Preparing the Toner Cartridges
2.6 Loading Paper
2.7 Connecting the Power Code
2.8 Adjusting 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.

2.1 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 >

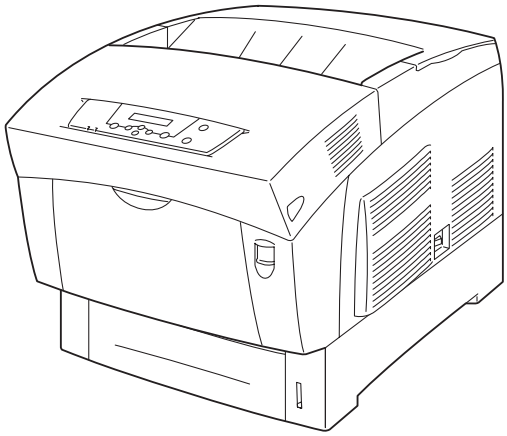


Fig.2-3

< Print head cartridge >

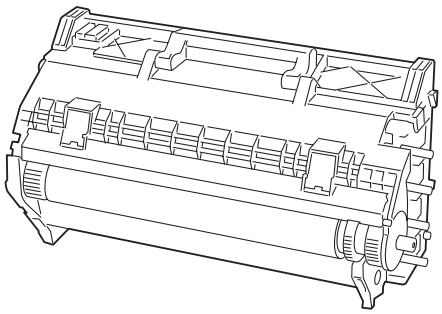


Fig.2-4

< Power code >

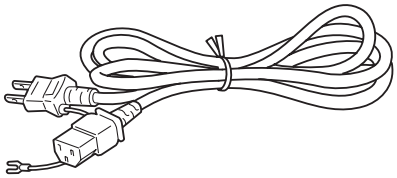


Fig.2-5

Note:
The illustration above shows the 100V power cord.

2.2 Removing the Tapes from the Printer

When you first remove the printer from its box, there is packing tape to secure the covers during shipping. Refer to the illustrations below and remove all the packing tape from the printer.

< Right side >

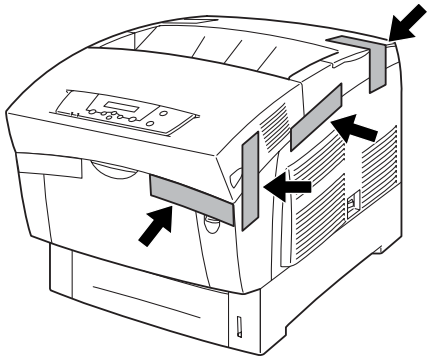


Fig.2-6

< Left side >

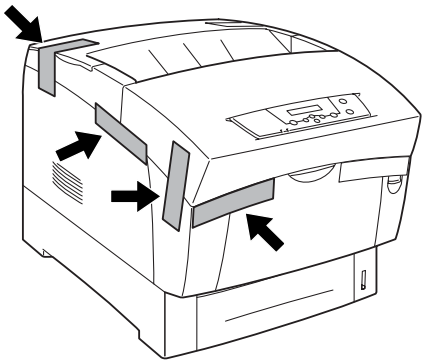


Fig.2-7

< Rear side >

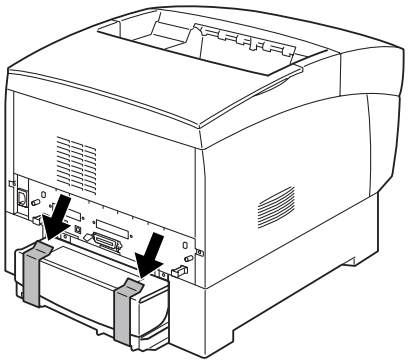


Fig.2-8

2.3 Removing the Paper Tray Protective Materials

Two spacers are installed in the paper tray to protect it from shock and vibrations during shipping. Remove the spacers before using the printer. Follow the procedure below to remove the spacers from the paper tray.

Note:

Keep the spacers in case you need to transport the printer over long distances in the future.

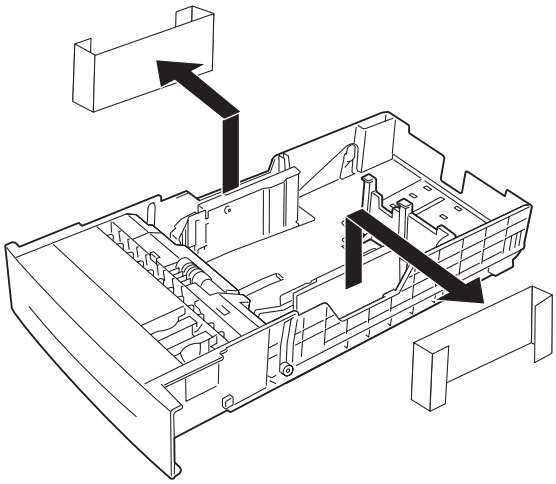


Fig.2-9

1) Gently pull out the paper tray until it stops.

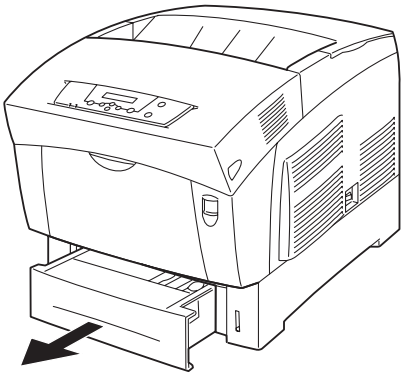


Fig.2-10

2) Hold the tray with both hands, lift the front up slightly and pull it completely out of the printer.

Note:

Place the tray on a flat surface.

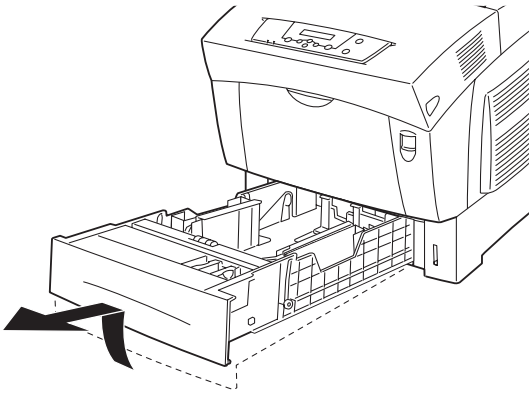


Fig.2-11

3) Remove the cardboard spacers from the paper tray.

Note:

Keep the spacers in case you need to transport the printer over long distances in the future.

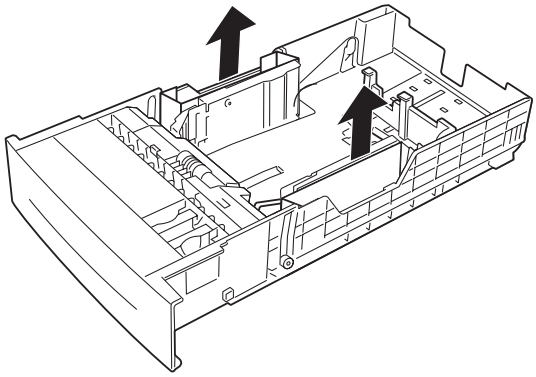


Fig.2-12

4) Holding the paper tray with both hands, align it with the opening in the printer and gently insert it.

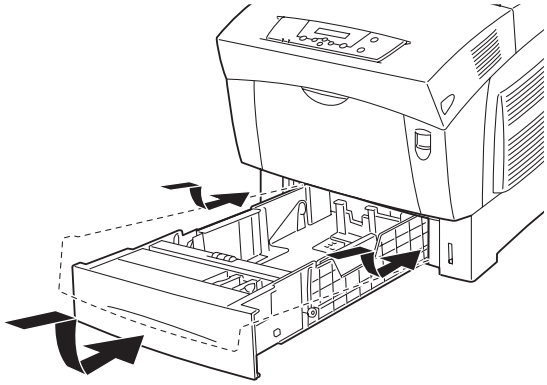


Fig.2-13

5) Push the paper tray completely back into the printer.

Note:

Do use excessive force on the paper tray. Doing so could damage the paper tray or the inside of the printer.

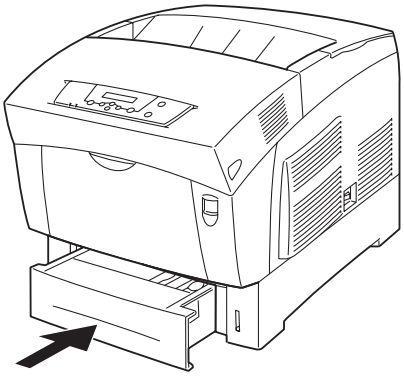


Fig.2-14

2.4 Mounting the Print Head Cartridge

Follow the procedure below to install the print head cartridge.

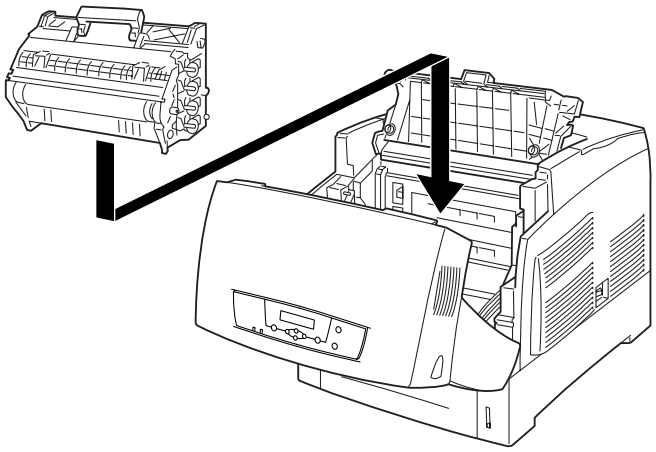


Fig.2-15

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

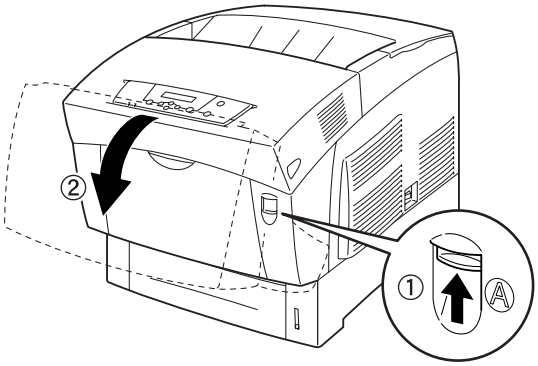


Fig.2-16

2) Open the paper outlet cover.

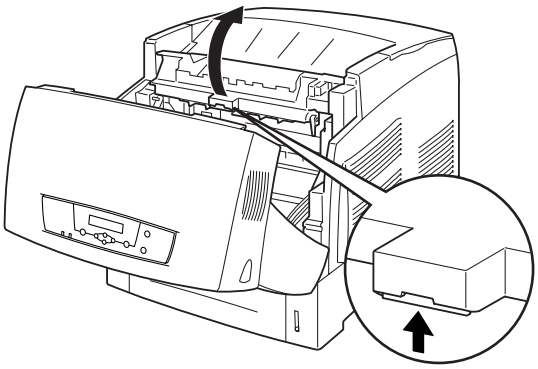


Fig.2-17

3) Open the top of the new print head cartridge box and pull of the top part of the aluminum package.

Note:
Remove the sheet by working inward from the two notches.

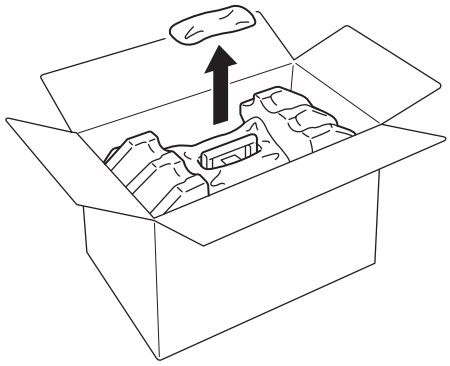


Fig.2-18

4) Grip the handle on top of the print head cartridge and gently lift it. Place the cartridge on a flat surface.

Note:
Lift the print head cartridge by the handle. Do not allow the cartridge to touch anything when removing it from the box.
When setting the print head cartridge, do not shake or tilt them.

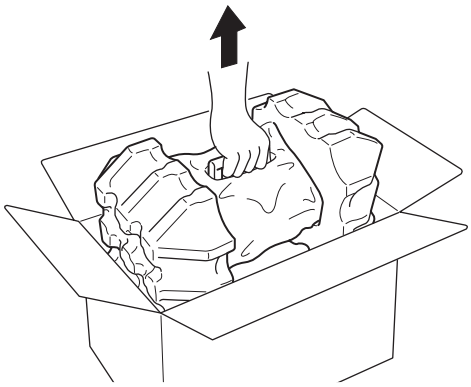


Fig.2-19

5) Remove the polystyrene packing and open the top of the aluminum package from the left and right.

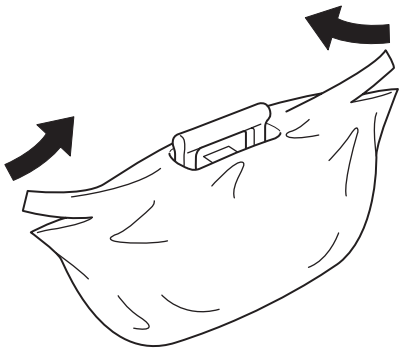


Fig.2-20

6) Take the new print head cartridge out of its package and pull on the longer of the paired seals horizontally toward you. Verify that there is a circle on the leading edge of the tape that you pull out. Do this for another three.

Note:

If there is no circle on the leading edge of the tape, you cannot use this print head cartridge.

Keep the polystyrene packing, aluminum bag and box of the print head cartridge if a future move of the printer is anticipated.

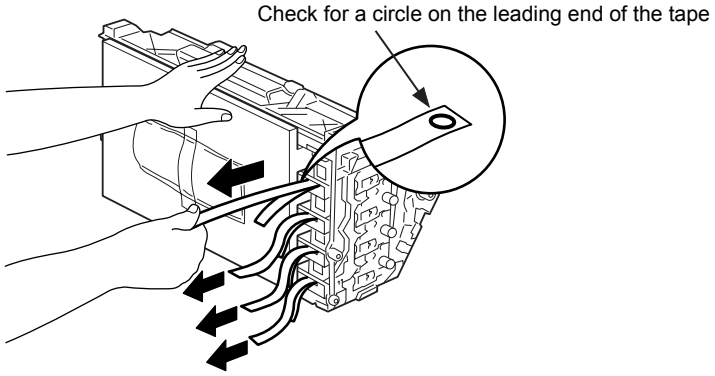


Fig.2-21

7) Remove the tape from the top of the cartridge (1), hold the protective cover on both sides and remove it from the print head cartridge (2).

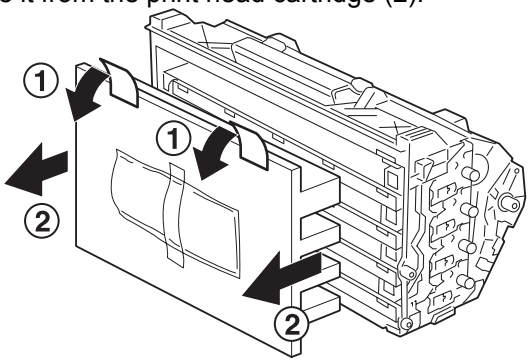


Fig.2-22

8) Grip the handle on top of the print head cartridge and face the flat part towards the back of the printer.

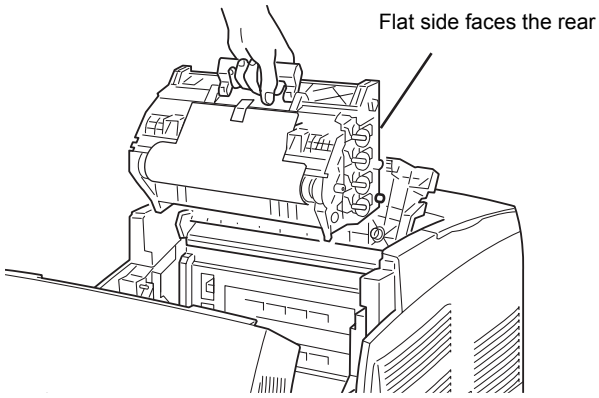


Fig.2-23

9) With the flat part of the cartridge facing the rear, align the orange rollers on both sides of the print head cartridge with the slots in front of the arrows on the printer, and gently lower the cartridge into the printer.

Note:

Lowering the cartridge into the printer without correctly aligning the rollers with the slots can damage the cartridge.
Do not allow the surface covered with a protective sheet to come into contact with anything.

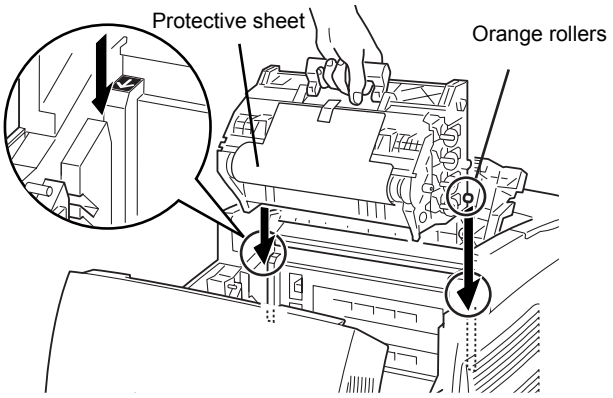


Fig.2-24

10) Pull the protective sheet on the cartridge straight up to remove it, as illustrated.

Note:

Do not touch the transfer roller (black part). Make sure that nothing touches or scratches the roller surface. Scratches or oil from your hands on the roller deteriorates print quality.

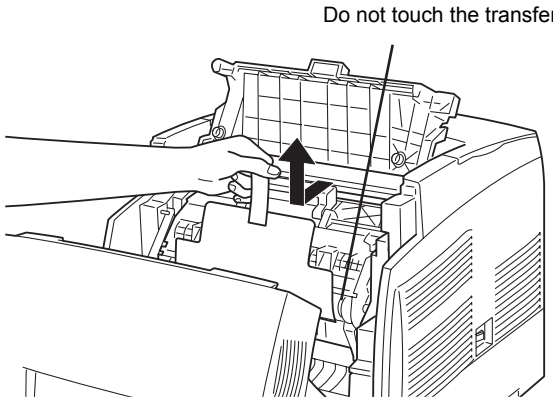


Fig.2-25

11) Close the paper outlet cover.

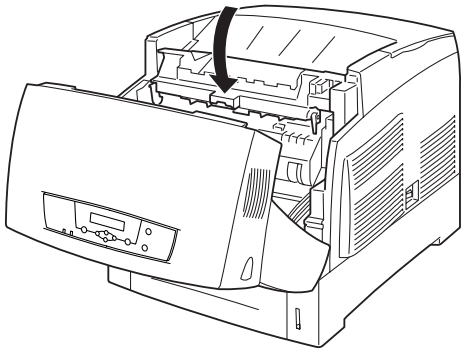


Fig.2-26

12) Close the front cover.

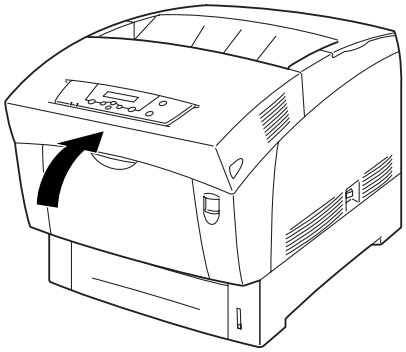


Fig.2-27

2.5 Preparing the Toner Cartridges

Follow the procedure below to prepare the toner cartridges for use.

Note:
The toner is harmless but should still be washed off immediately if it comes into contact with hands or clothing.

1) Remove the top cover, and then remove the packing sheet covering the toner cartridges.

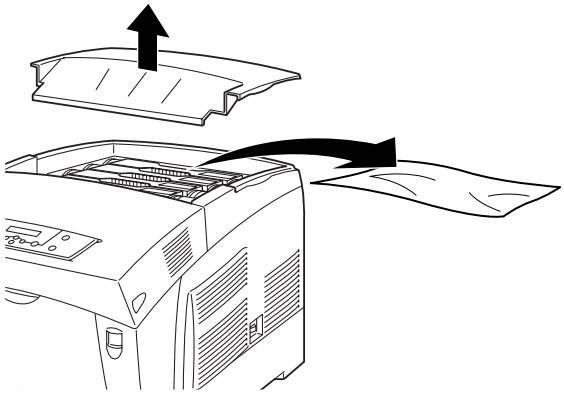


Fig.2-28

2) Pull the toner seal straight up to remove it.
Note:
Pull the toner seal straight up. Pulling the toner seal diagonally may tear the seal.

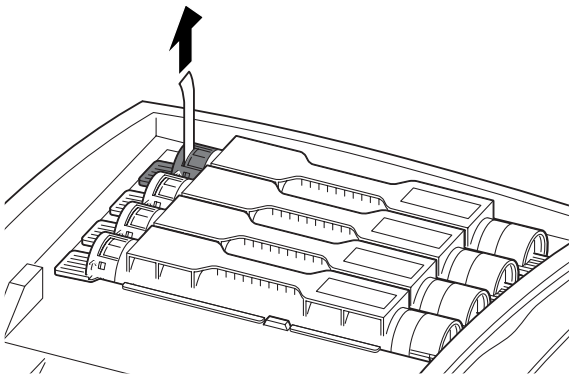


Fig.2-29

3) Replace the top cover.

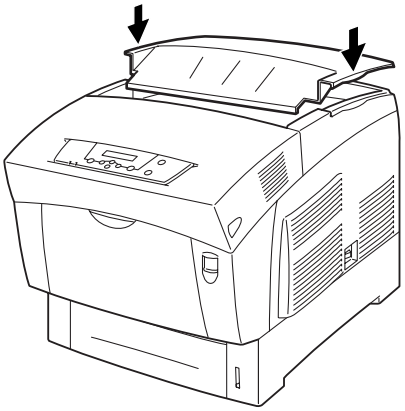


Fig.2-30

2.6 Loading Paper

Follow the procedure below to load paper into the paper tray.

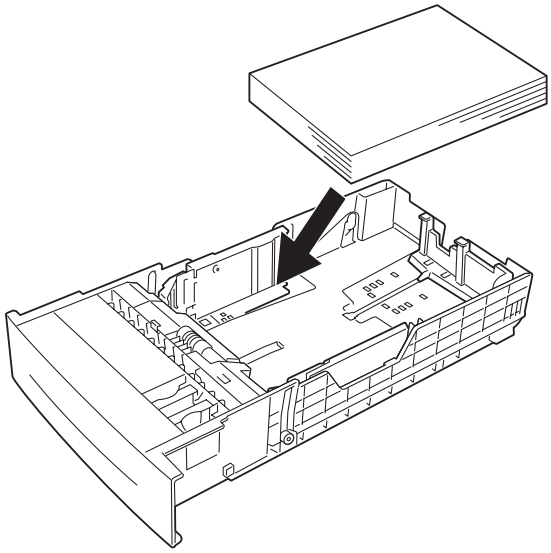


Fig.2-31

1) Pull out the paper tray until it stops.

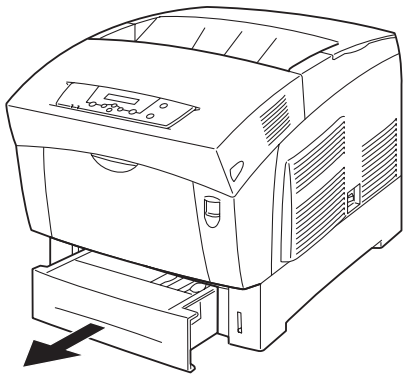


Fig.2-32

2) Hold the tray with both hands, lift up the front slightly and remove it from the printer.

Note:

Place the tray on a flat surface.

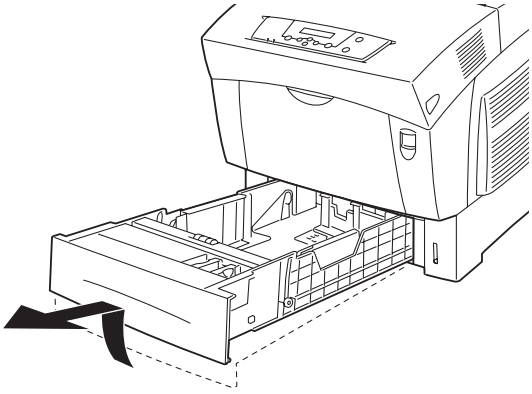


Fig.2-33

3) Move the side paper guide out so as to align it with the appropriate paper size mark (A4 in this example).

Note:

Proper guide position differs between A4 and Letter. Align the side guide to the size mark corresponding to the paper size that you want to load.

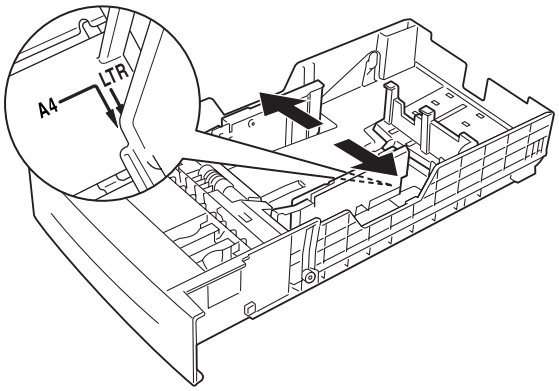


Fig.2-34

4) Grip the end paper guide with your fingers and gently lift it up. Insert the pins at the bottom of the guide in the holes corresponding to the paper size that you want to load (A4 in this example).

Note:

Make sure that the end guide is properly inserted into the holes corresponding to the appropriate paper size.

Only a small amount of movement of the end paper guide can make automatic paper size detection impossible. If this occurs, move the end paper guide all the way to its outermost position again, then realign it with the appropriate paper size mark.

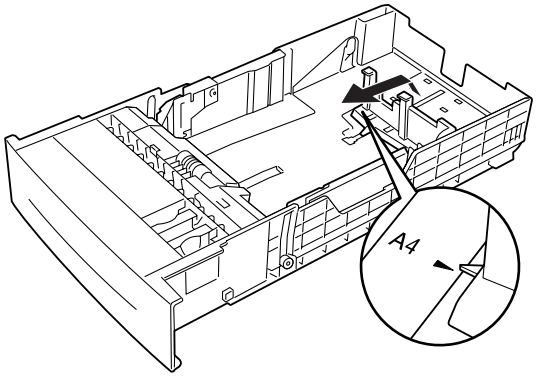


Fig.2-35

5) Align the four corners of the paper stack and insert the paper (print side up) under the tab.

Note:

Do not use paper that is folded, creased, or heavily warped.

Do not overload the paper tray.

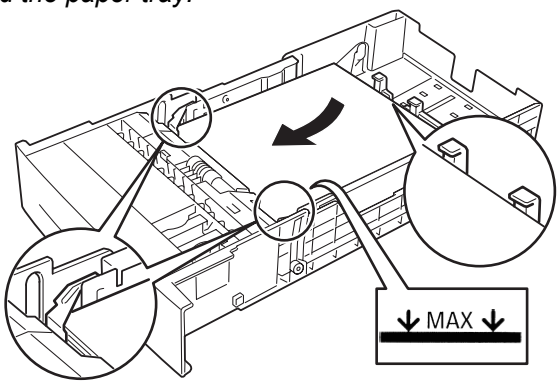


Fig.2-36

6) Make sure that the side guides are aligned with the edges of the paper.

Note:

Pushing the paper guides too hard against the edges of the paper stack can cause a paper jam. However, if the paper guide is too loose, the paper may twist as it feeds through the printer.

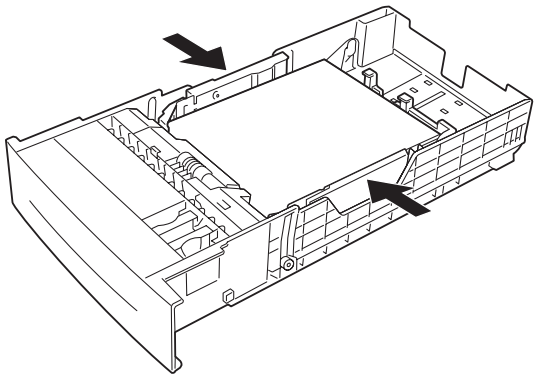


Fig.2-37

7) Hold the paper tray with both hands, align it with the opening in the printer and gently insert it.

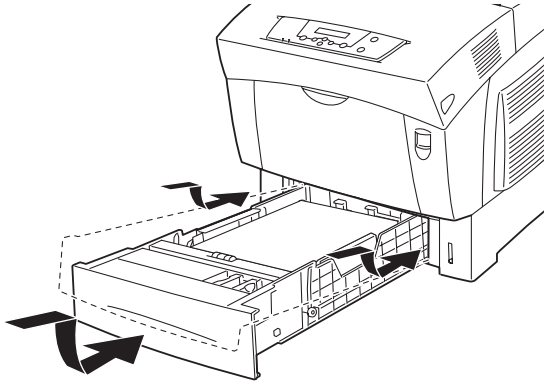


Fig.2-38

8) Push the paper tray completely back into the printer.

Note:

Do use excessive force on the paper tray. Doing so could damage the paper tray or the inside of the printer.

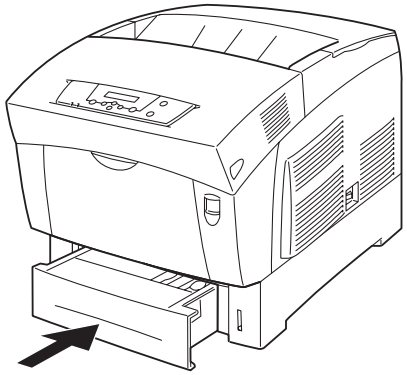


Fig.2-39

Note:

There is an indicator next to the paper tray that tells you how much paper remains in the tray. Use the meter as a guide to refill the paper tray.

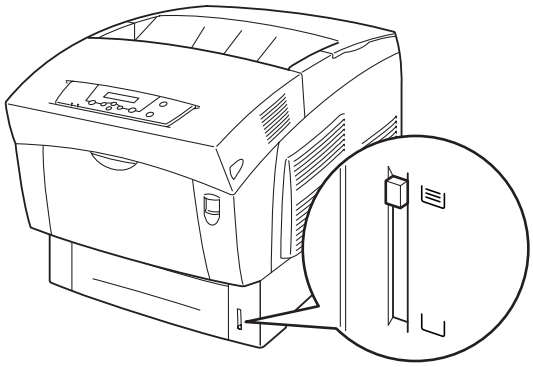


Fig.2-40

2.7 Connecting the Power Code

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 Center.

- 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.

1) Plug the power cord into the power inlet at the back of the printer. Plug the other end of the cord into the AC outlet. Connect the earth connection to the ground, if possible.

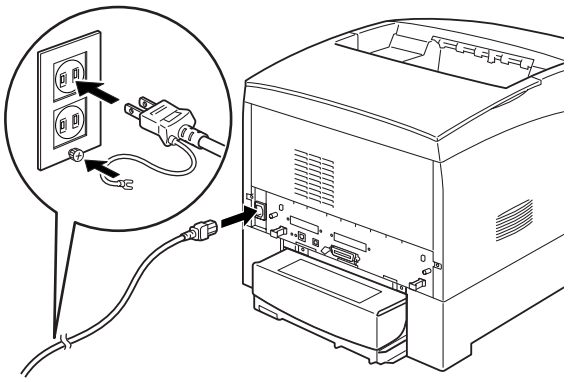


Fig.2-41

2) On the printer's right side, press the side of the power switch marked [I] to turn the printer on.

Note:

The printer motors run for 2 or 3 minutes when you first turn the power on.

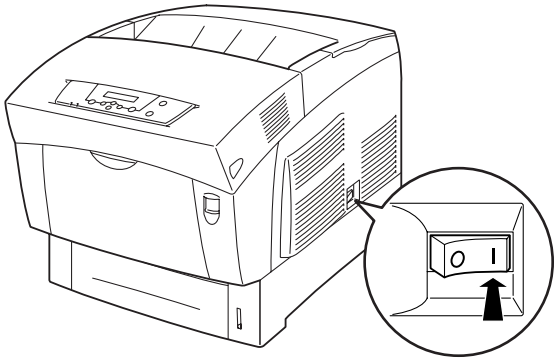


Fig.2-42

2.8 Adjusting Color Registrations

Follow the procedure below to adjust the color registration when first installing the printer or after moving it to a new location.

1) Use the control panel to print the color registration adjustment chart.

2) From the lines to the right of the Y (yellow), M (magenta), and C (cyan) pattern, find the values of the straightest lines.

Note:
You can also use the densest colors of the grid to find the straightest lines. The colors printed at the highest density are those next to the straightest lines.

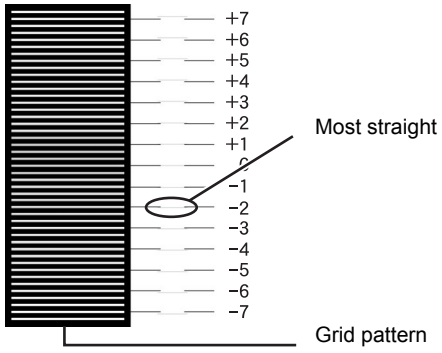


Fig.2-43

3) Input the values that you found in step 2 into the Y=?, M=? and C=? fields of the Color registration adjustment.

4) Press the Set button.
"*" appears and the new color balance chart is printed.

5) Color registration adjustment is complete when the straightest Y (yellow), M (magenta) and C (Cyan) lines is next to the '0' line. Close the menu on the control panel.

Note:
If 0 is not next to the straightest lines, repeat steps 2-5.

CHAPTER III

STRUCTURE OF SYSTEM COMPONENTS

CONTENTS

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:	Intermediate transfer unit (IDT 2) 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.

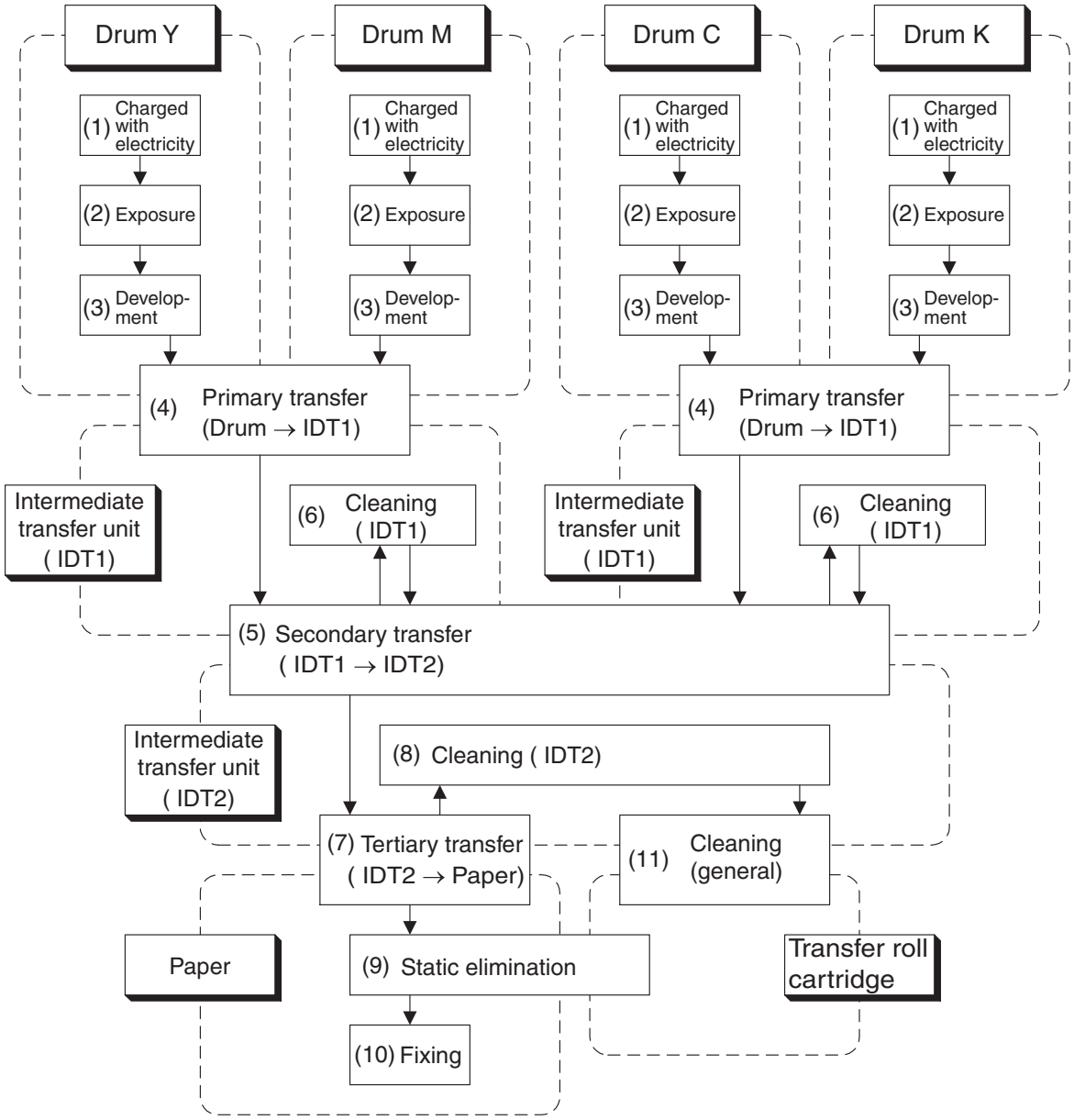

Drum Y
Drum M
Drum C
Drum K
(1) Charged with electricity
(2) Exposure
(3) Develop-ment
(4) Primary transfer (Drum → IDT1)
Intermediate transfer unit (IDT1)
(6) Cleaning (IDT1)
(5) Secondary transfer (IDT1 → IDT2)
Intermediate transfer unit (IDT2)
(8) Cleaning (IDT2)
(7) Tertiary transfer (IDT2 → Paper)
(11) Cleaning (general)
Paper
(9) Static elimination
Transfer roll cartridge
(10) Fixing

Fig.3-1

1.2 Schematic Diagram for Printing Processes

Outline of printing processes is shown in the figures below.

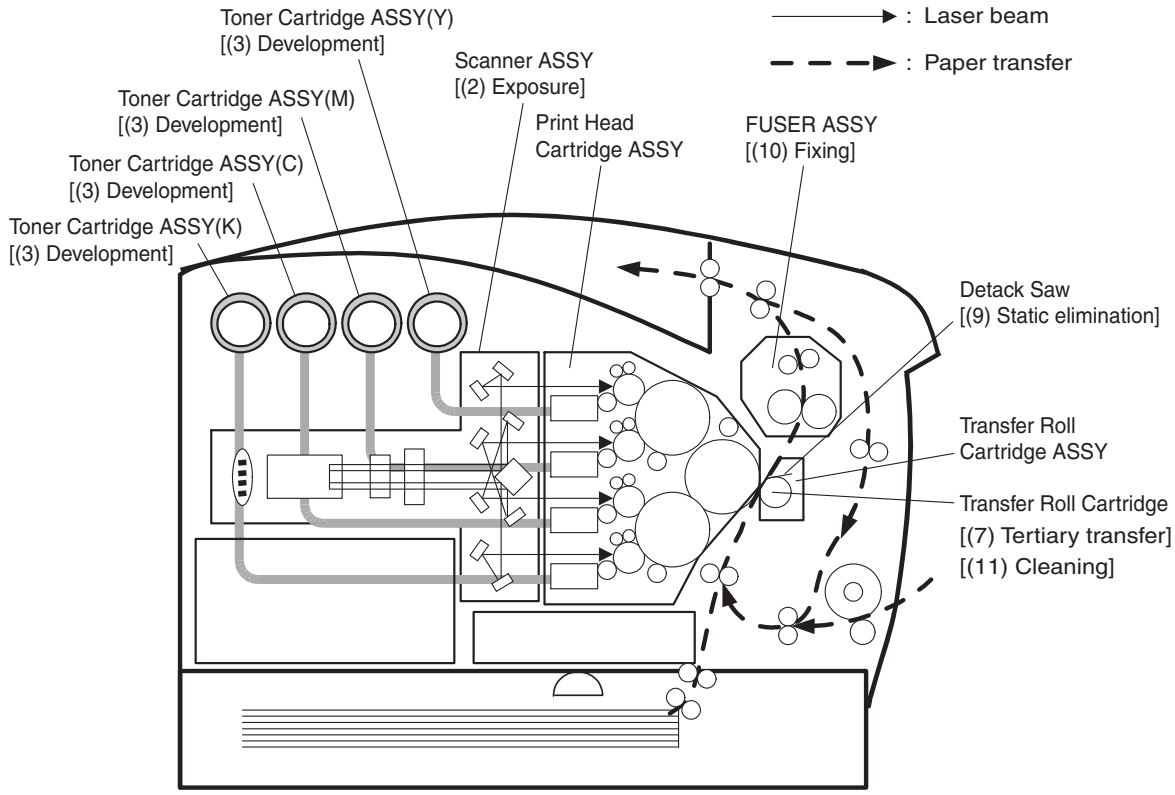


Fig.3-2

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

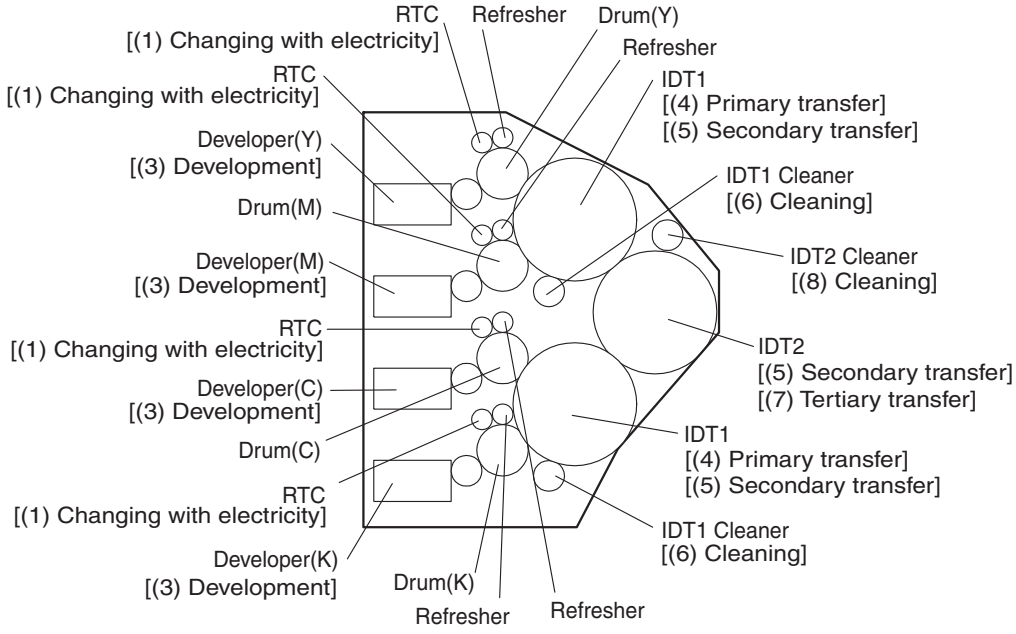


Fig.3-3

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 RTC (Rubber Tube Charge: Charged film).
This process is performed in parallel for yellow, magenta, cyan and black colors.

- The RTC is kept in contact with the drum and rotates following the rotations of the drum.
  RTC 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.

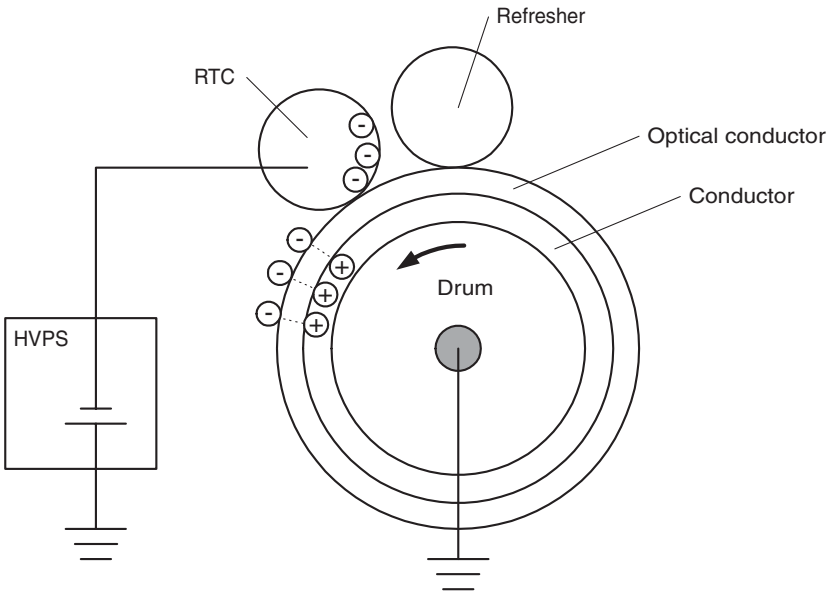


Fig.3-4

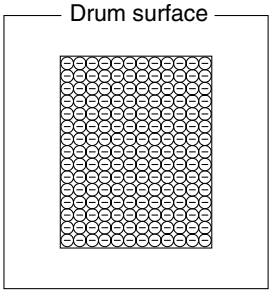


Fig.3-5

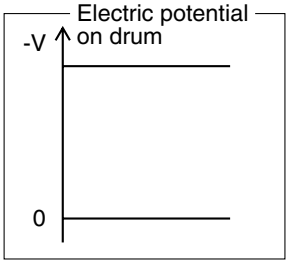


Fig.3-6

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.

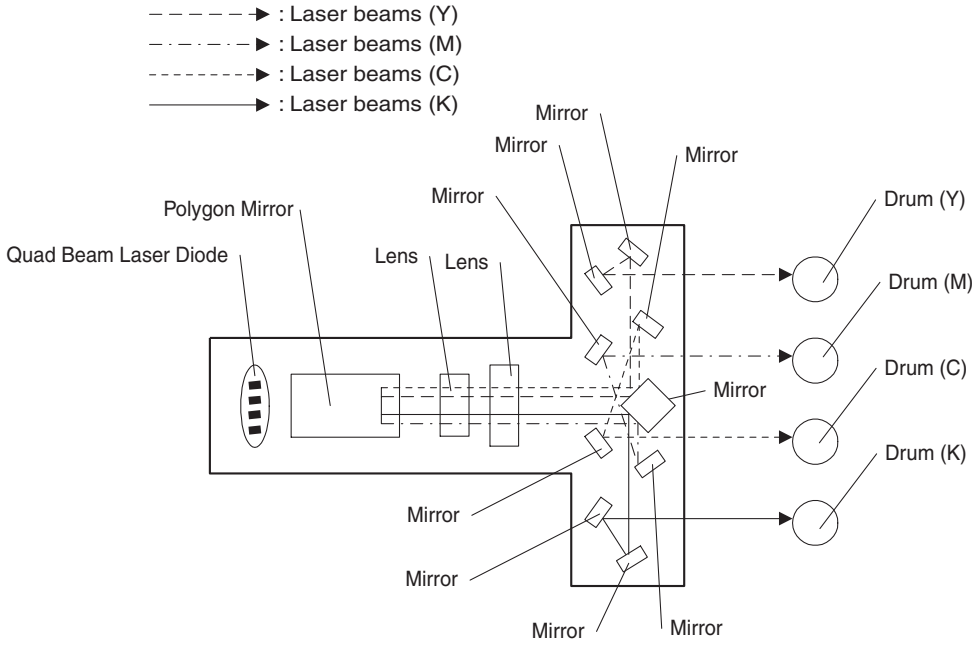


Fig.3-7

- 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 <=> 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.

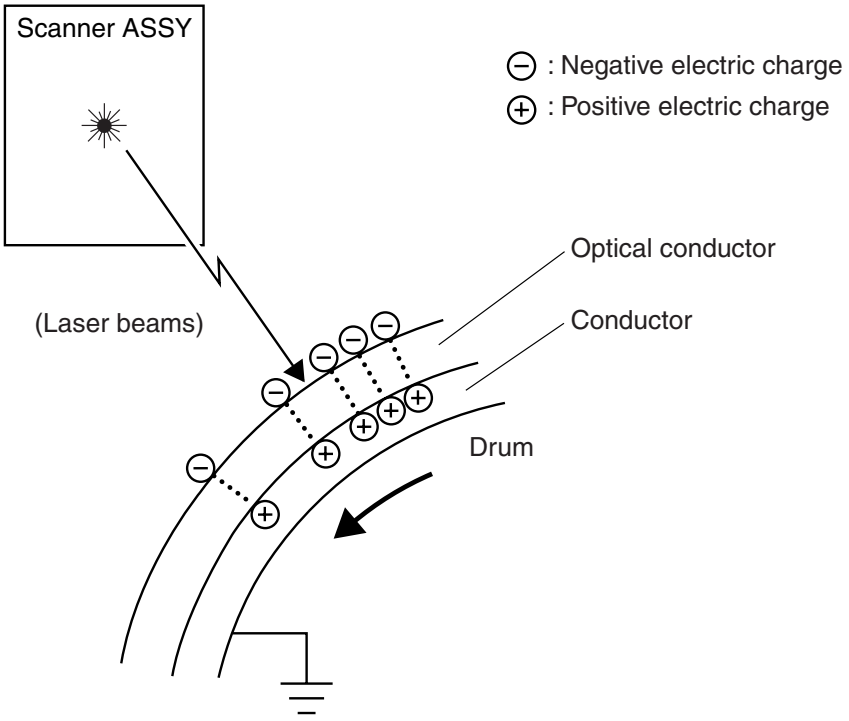


Fig.3-8

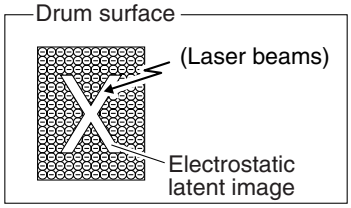


Fig.3-9

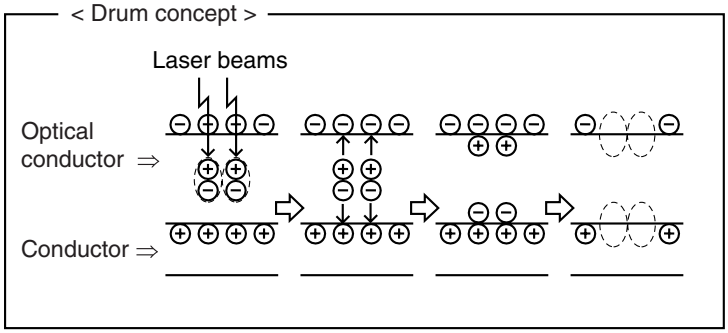


Fig.3-11

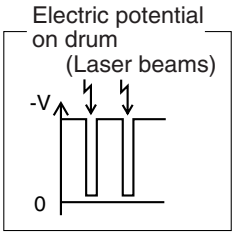


Fig.3-10

1.3.3 Development

In the development process, toner is electrically attached to the invisible statistic 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.

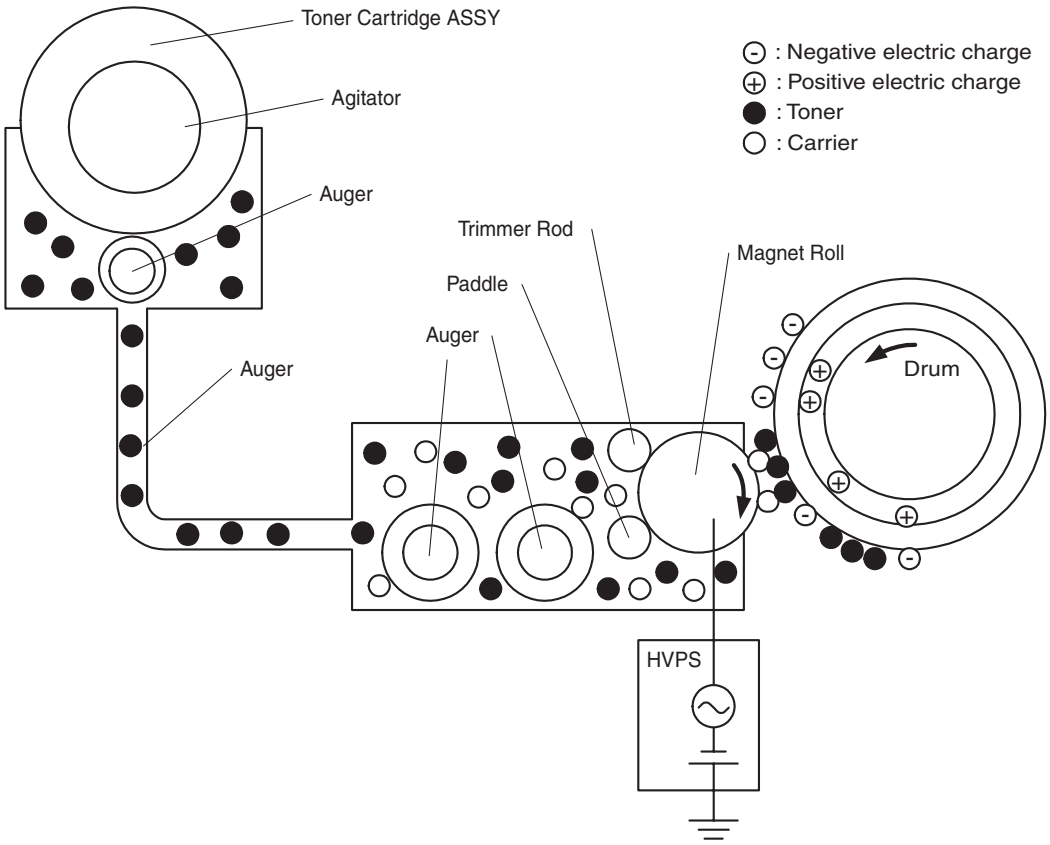


Fig.3-12

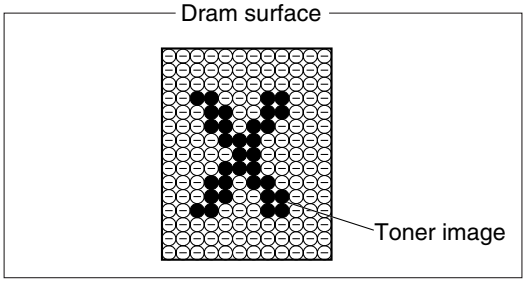


Fig.3-13

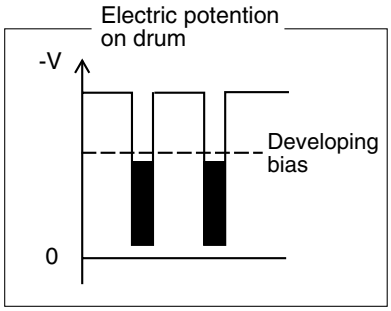


Fig.3-14

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.

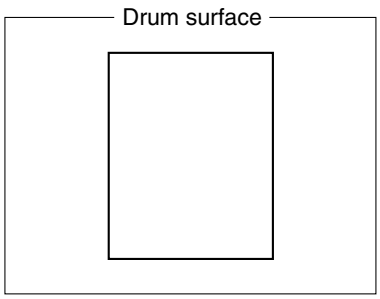


Fig.3-16

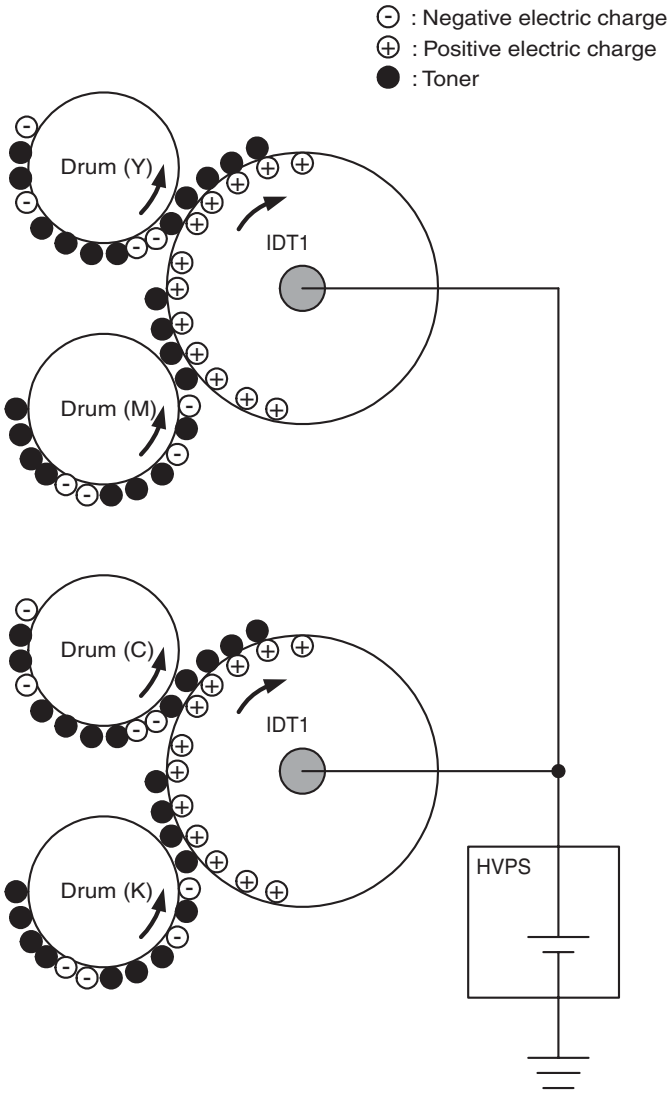


Fig.3-15

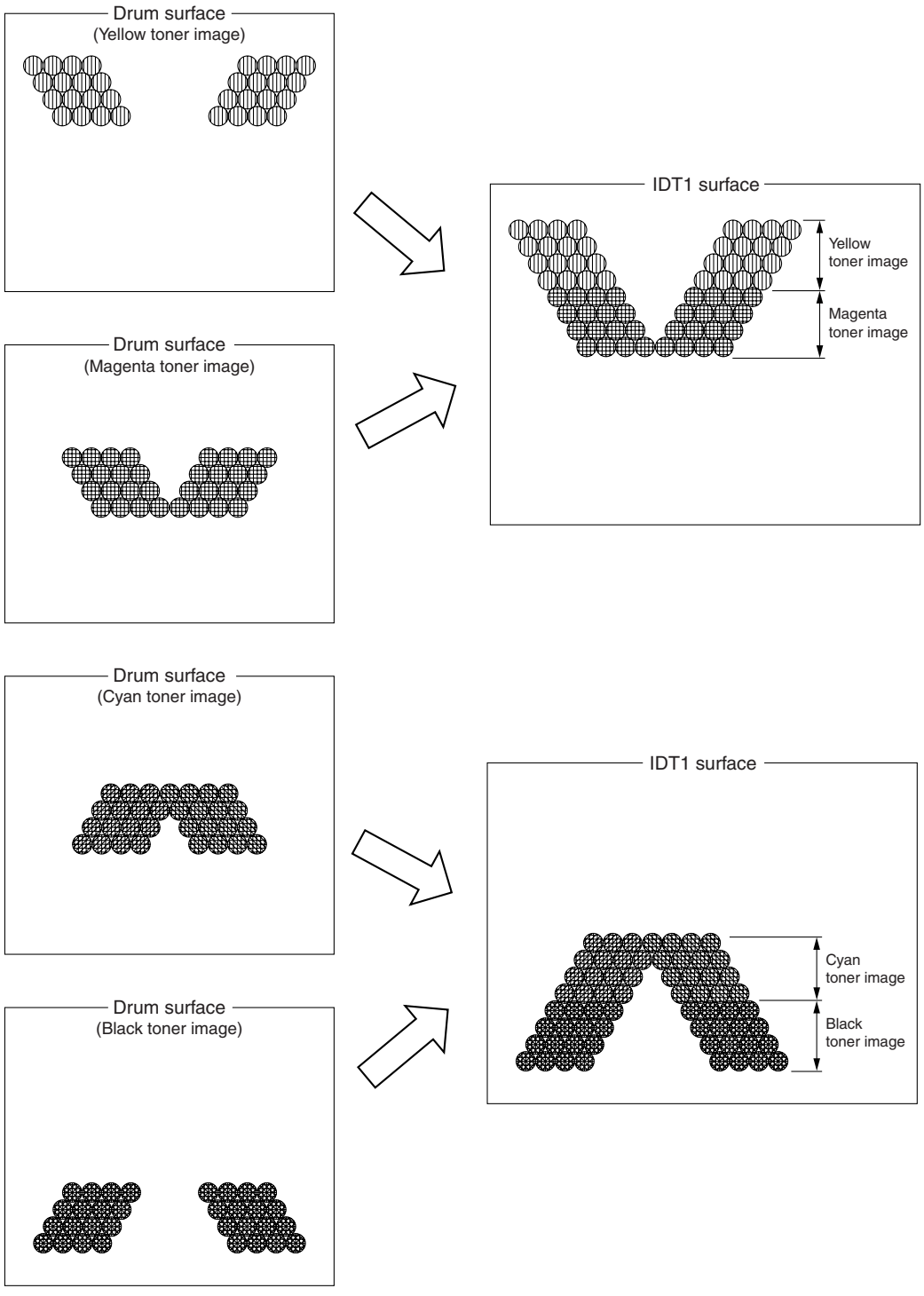

Drum surface
(Yellow toner image)
Drum surface
(Magenta toner image)
IDT1 surface
Yellow
toner image
Magenta
toner image
Drum surface
(Cyan toner image)
Drum surface
(Black toner image)
IDT1 surface
Cyan
toner image
Black
toner image

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 to1.3.11 Cleaning (general).)

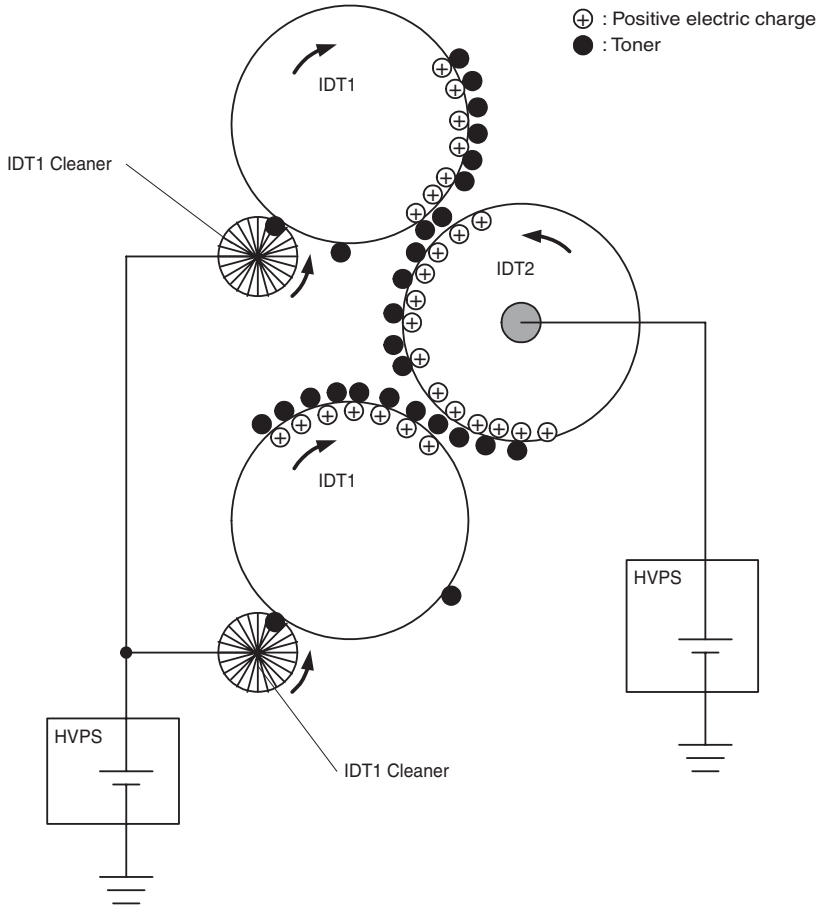


Fig.3-18

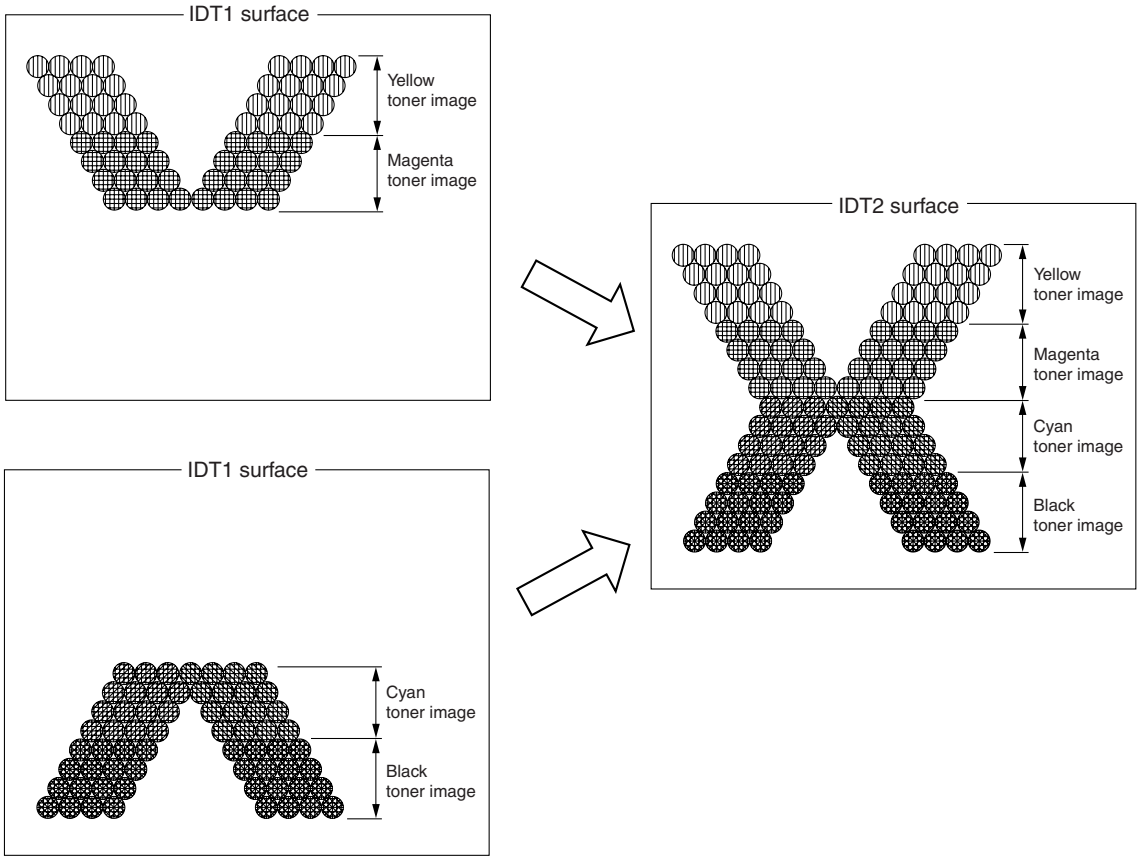


Fig.3-19

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.

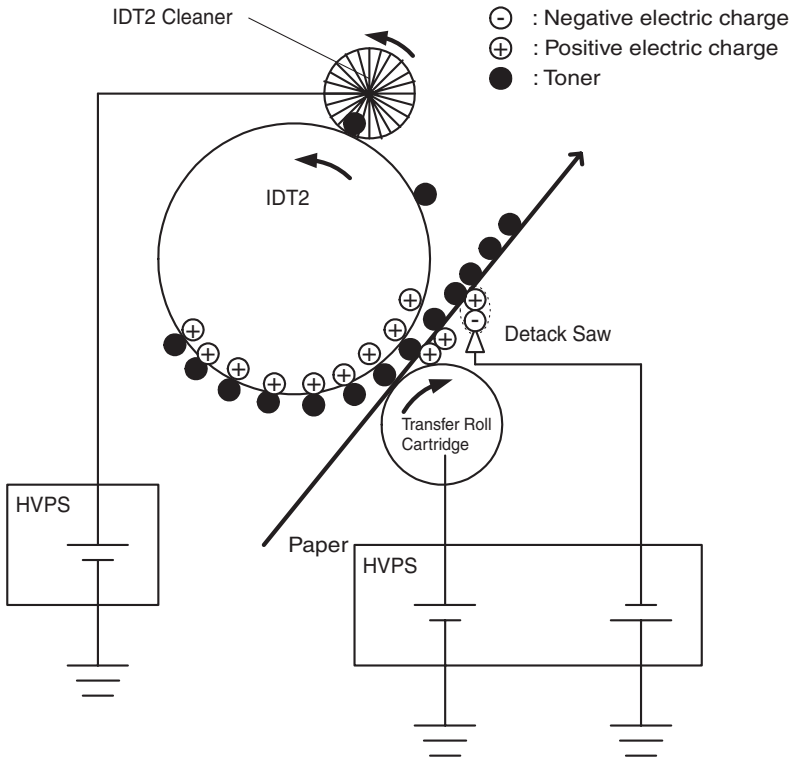


Fig.3-20

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.

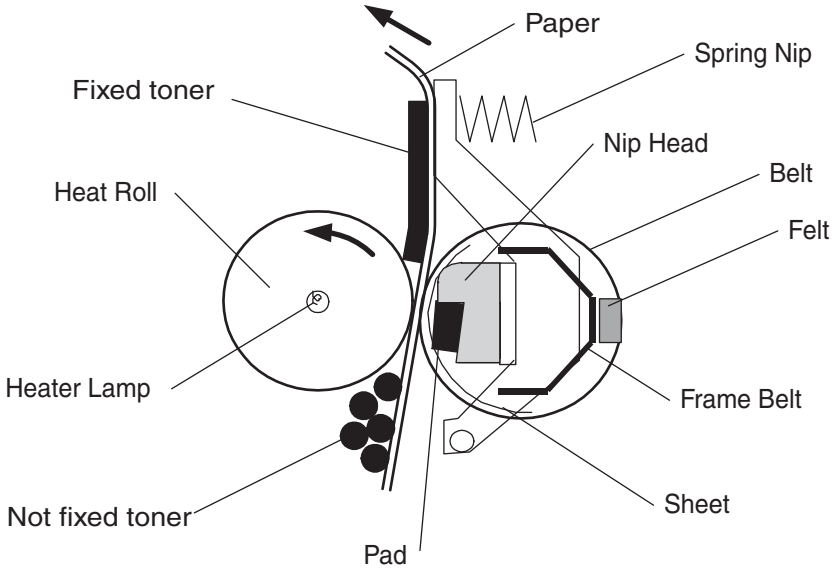


Fig.3-21

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 RTC. 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 RTC.

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.

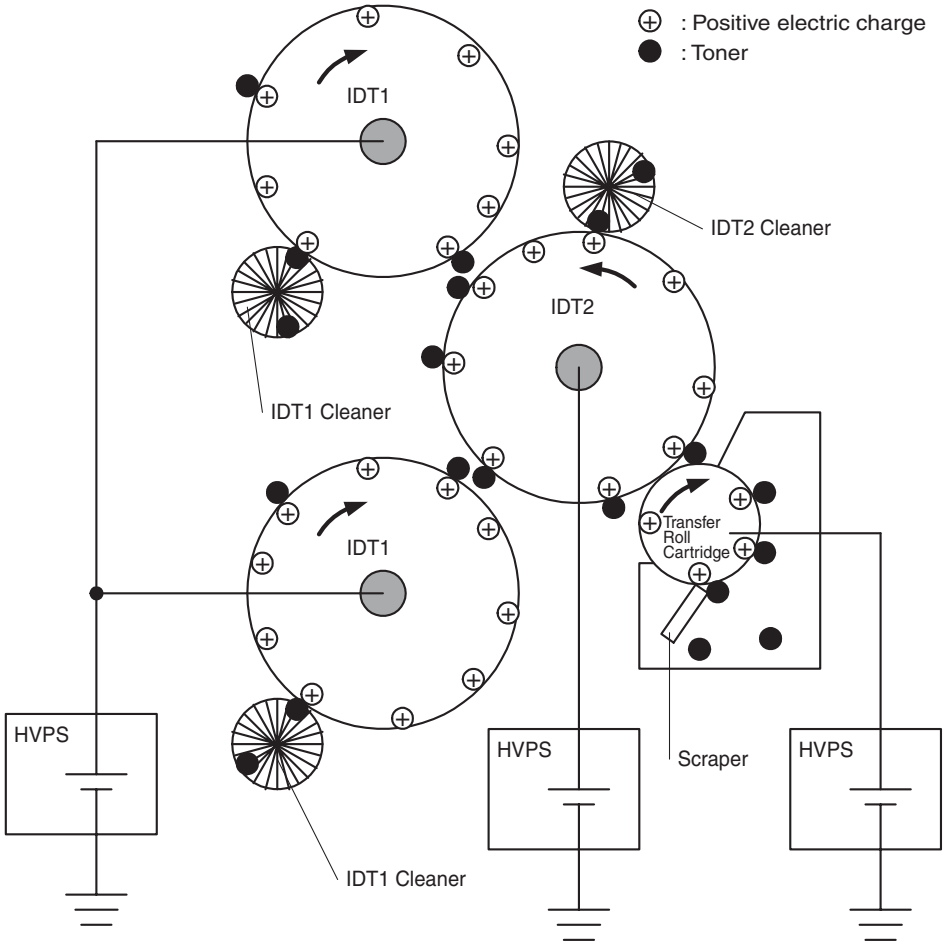


Fig.3-22

2) Refresher and RTC

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 RTC are move to the drum electrically by transforming the Refresher and RTC 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 scraped 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.

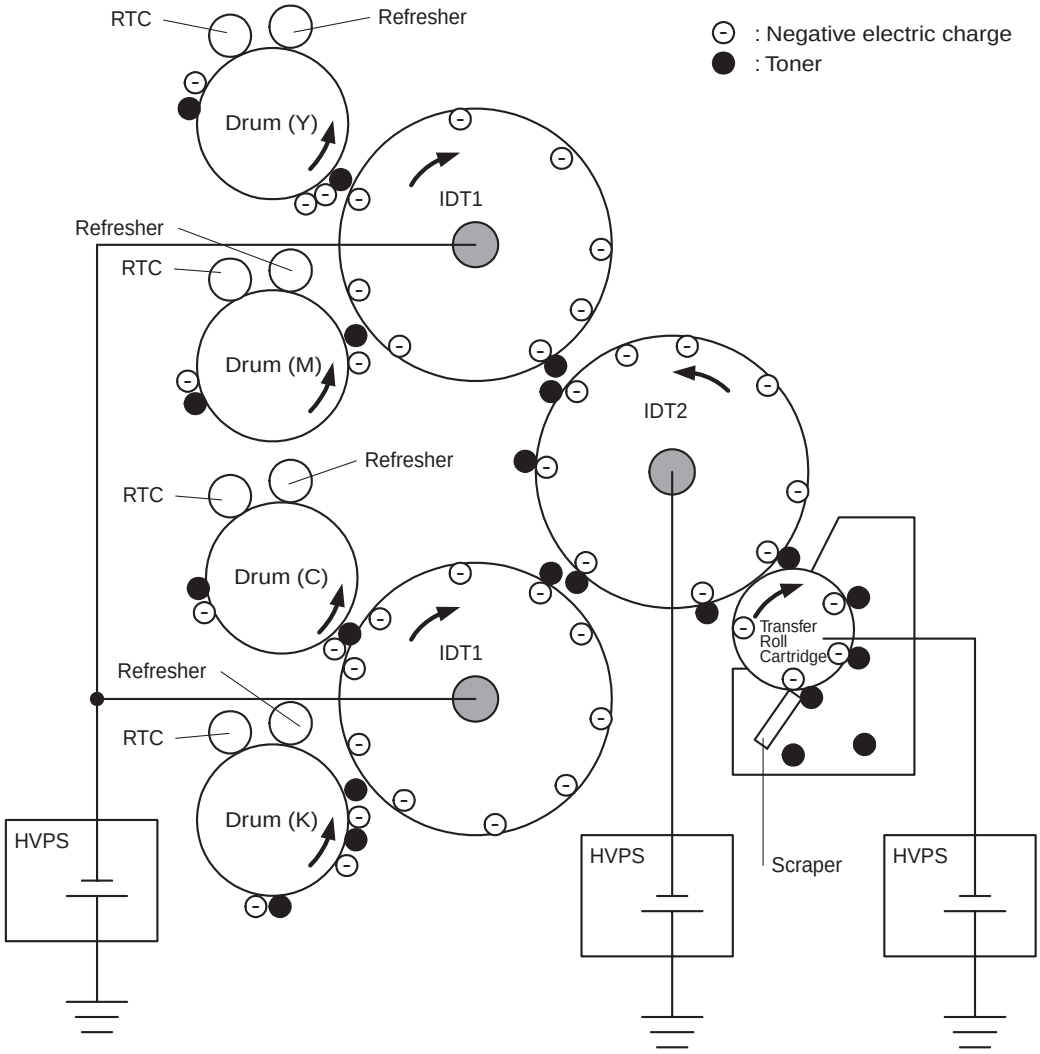


Fig.3-23

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.

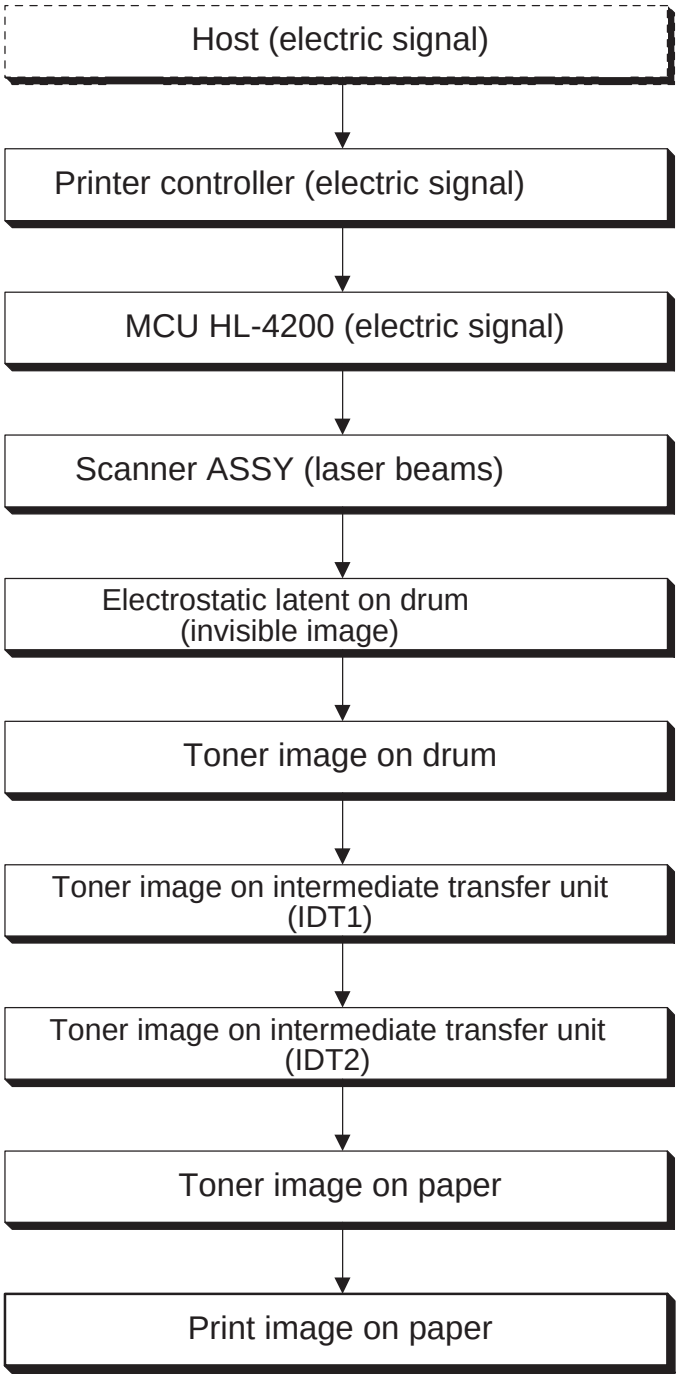


Fig.3-24

3. DRIVE TRANSMISSION ROUTE

3.1 Drive ASSY main

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

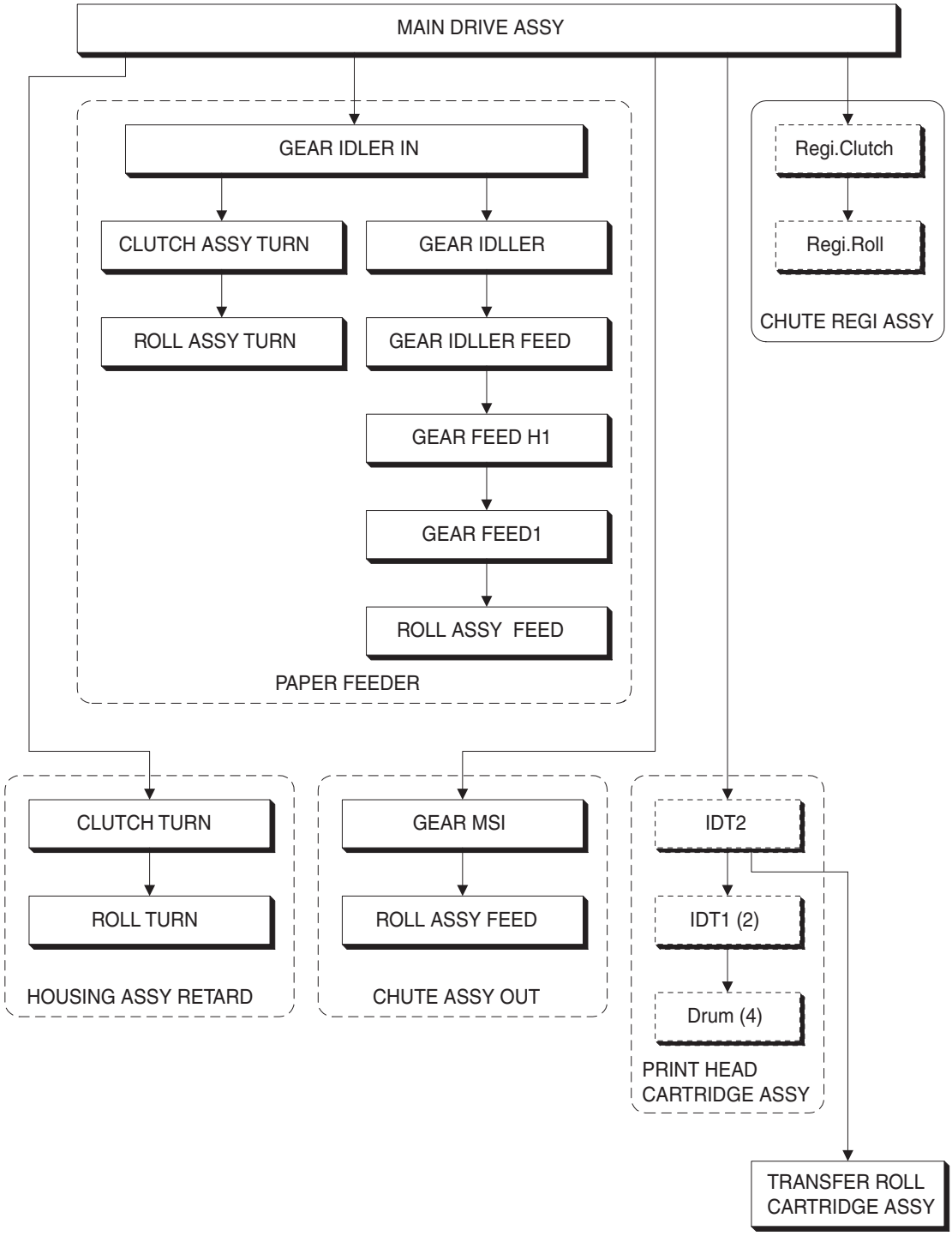


Fig.3-25

3.2 Drive ASSY DEVE

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

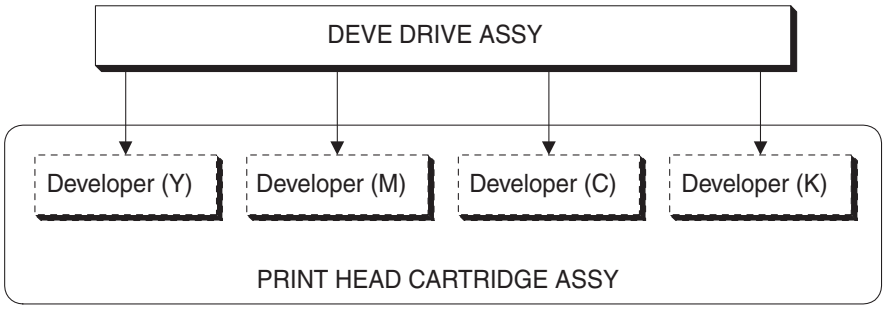


Fig.3-26

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.

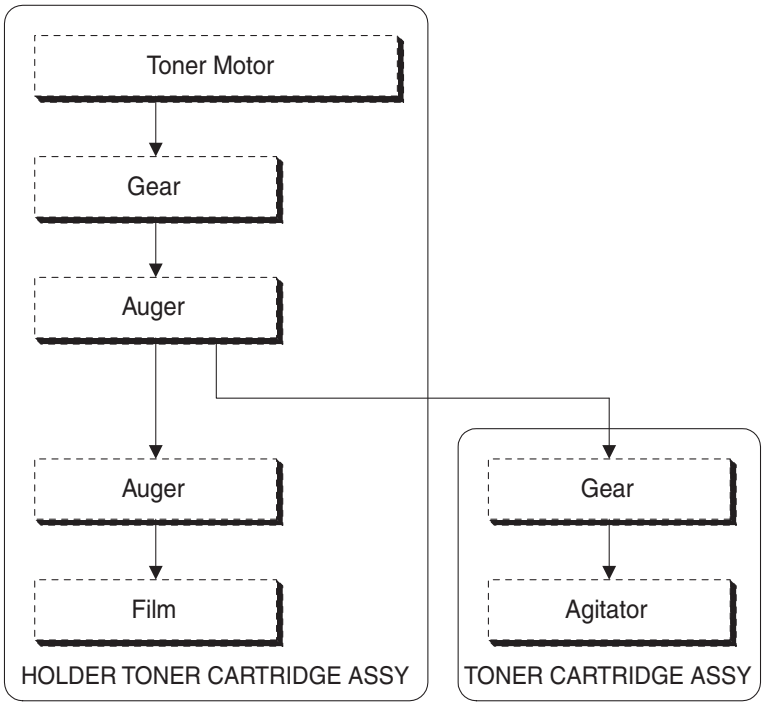


Fig.3-27

3.4 Fuser Drive ASSY

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

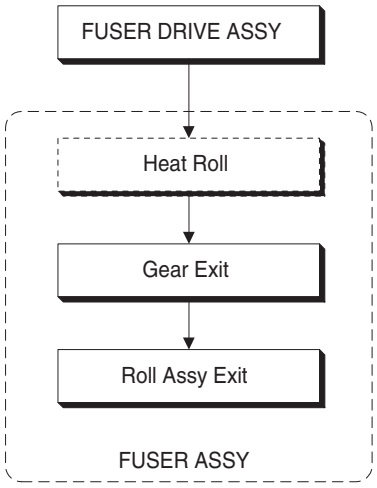


Fig.3-28

3.5 Motor ASSY DUP

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

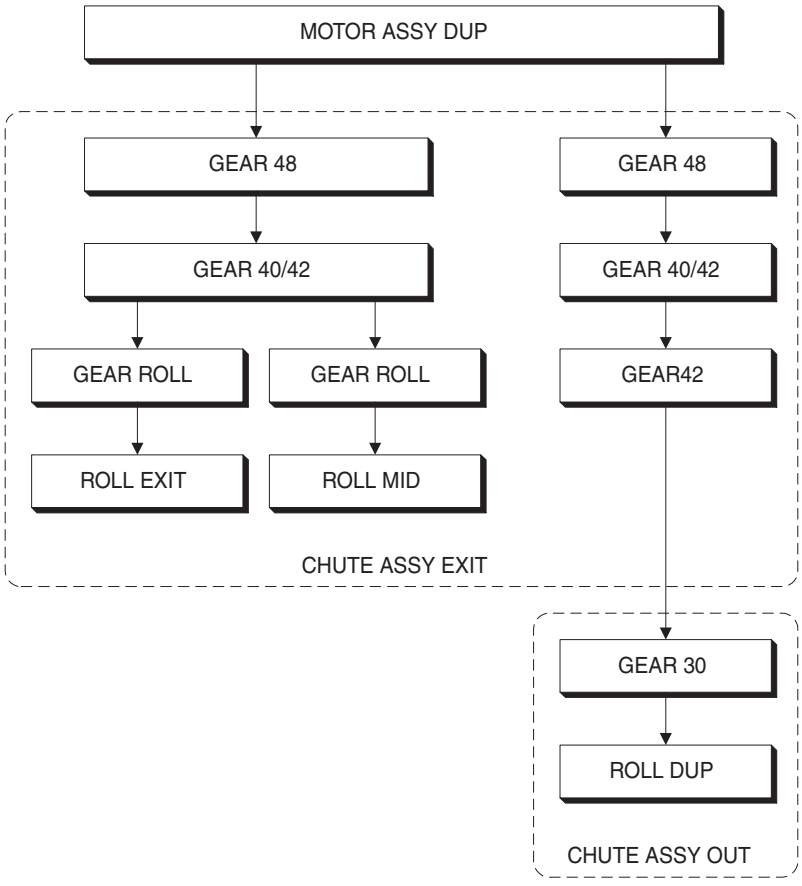


Fig.3-29

3.6 Gear Layout

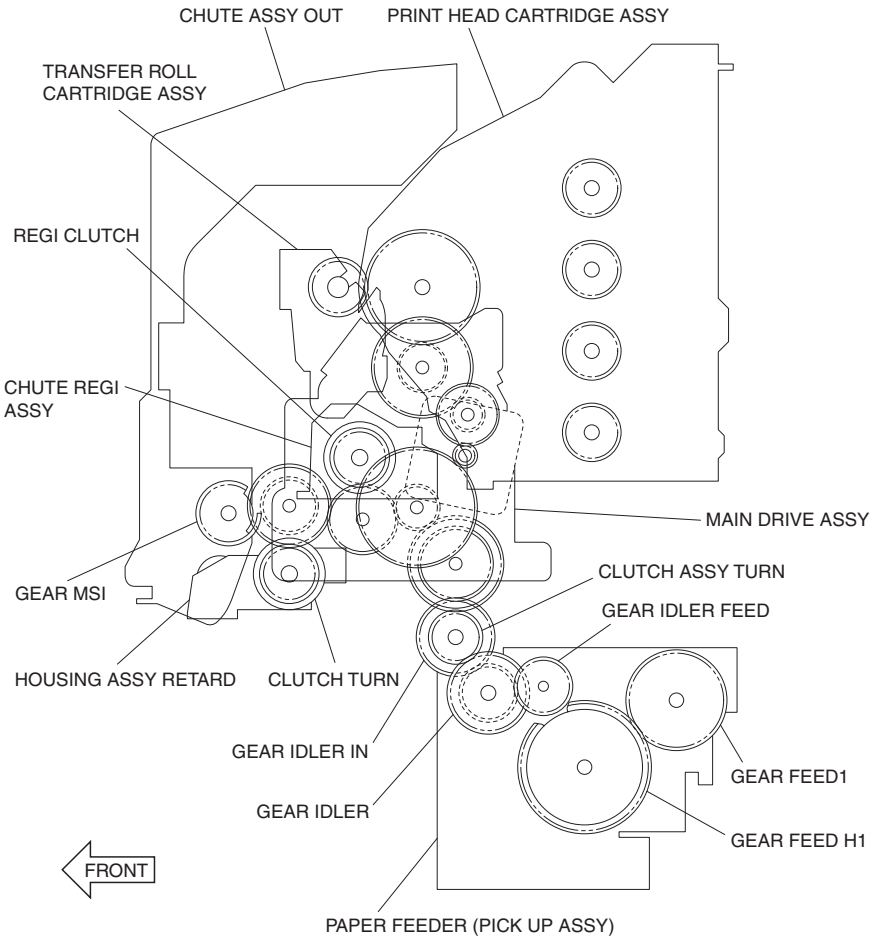


Fig.3-30

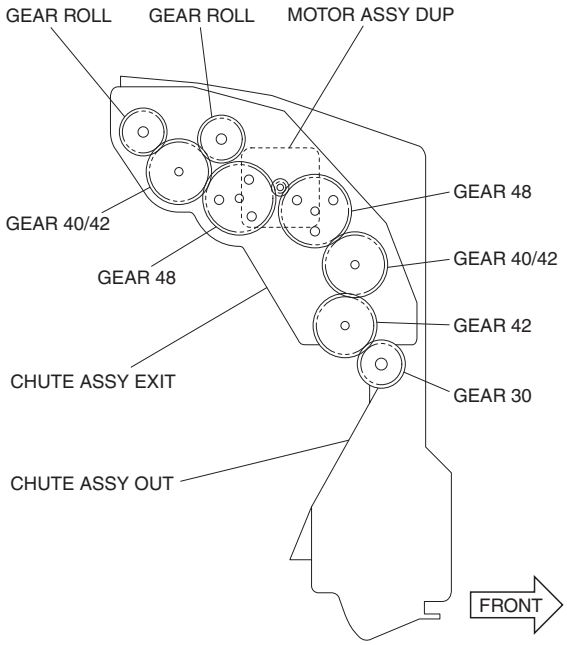


Fig.3-31

4. PAPER TRANSFER

4.1 Paper Transfer Route (without option)

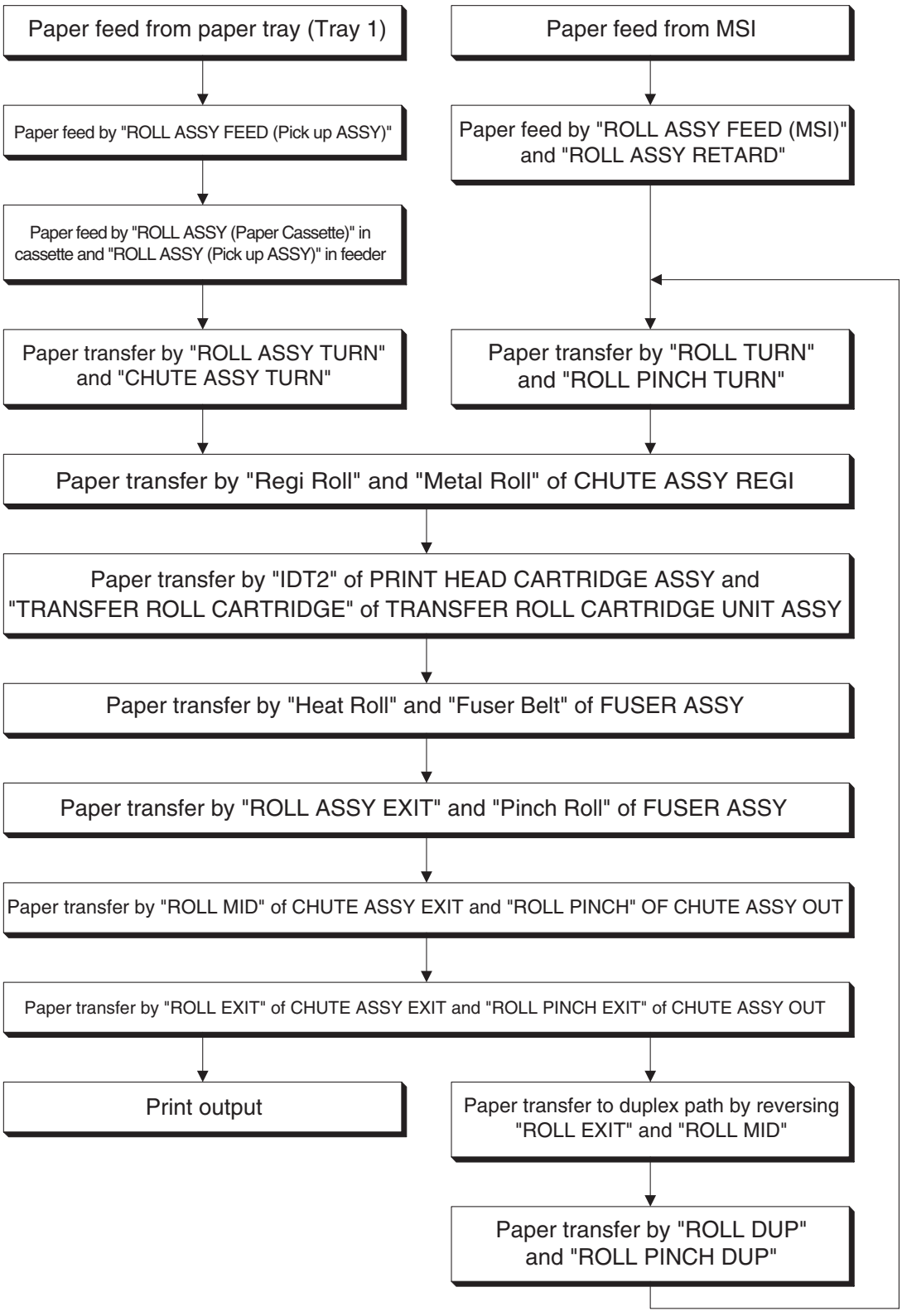


Fig.3-32

4.2 Layout of Paper Transfer Route

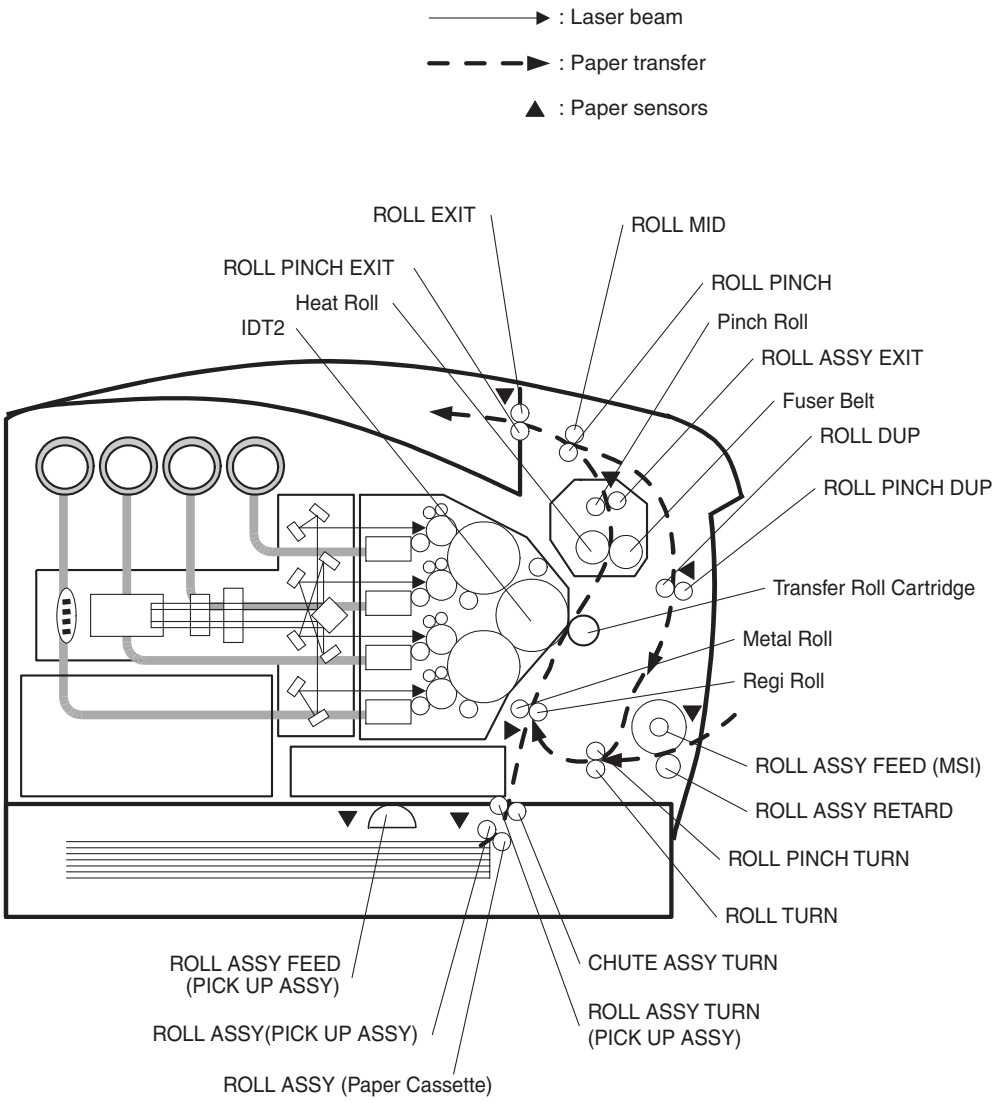


Fig.3-33

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

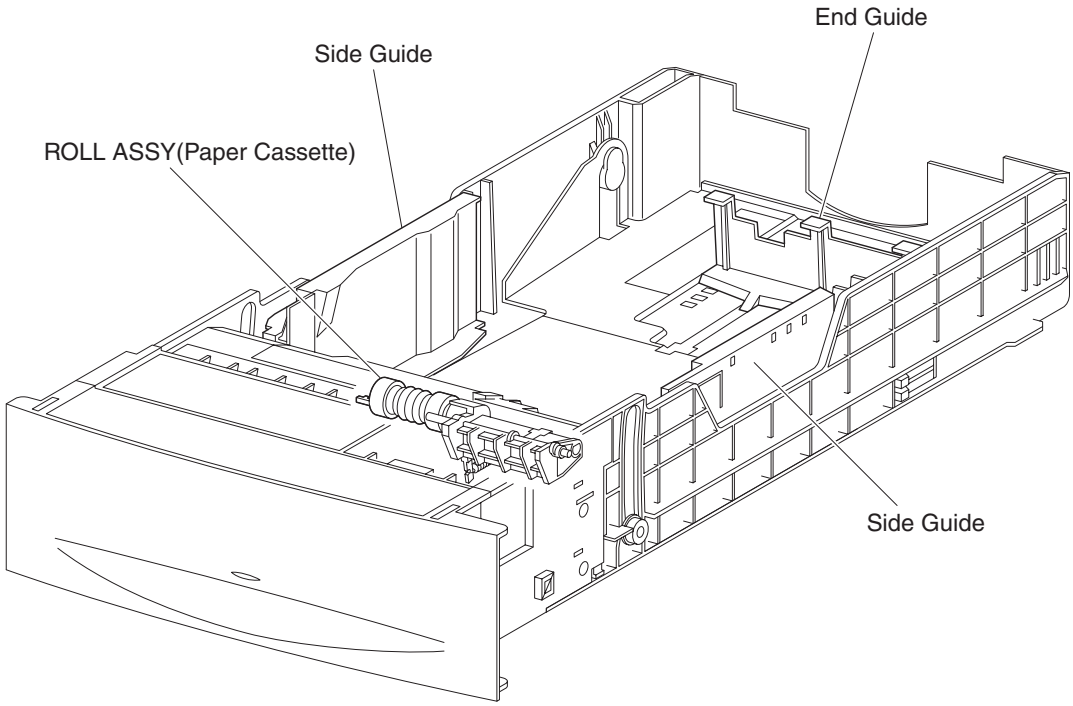


Fig.3-34

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 drive ASSY main to roll ASSY turn.

- Roll ASSY feed (Pick up ASSY)

  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 drive ASSY main, 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 drive ASSY main 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

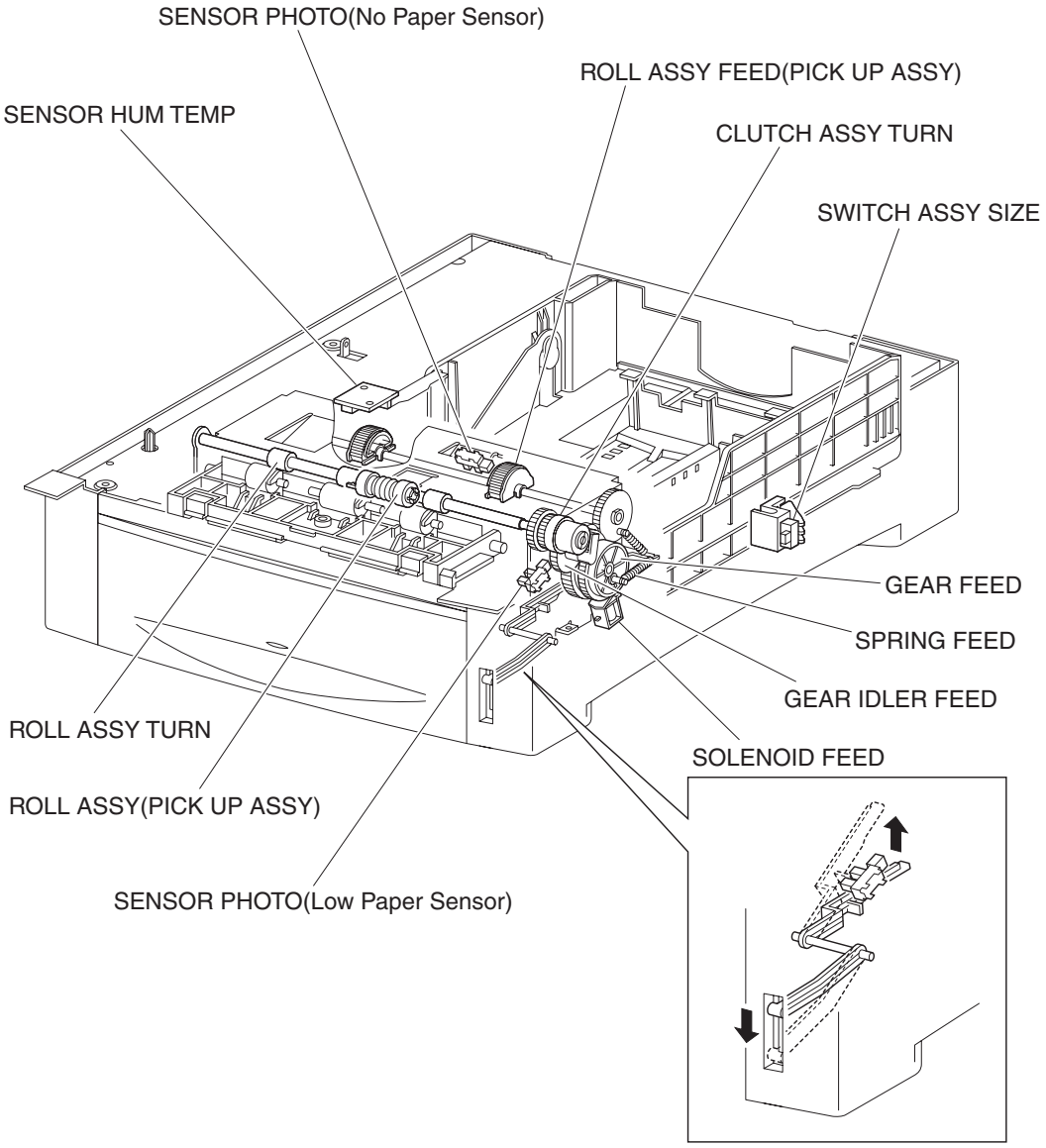


Fig.3-35

5.3 Housing ASSY Retard

5.3.1 Major functions

- Clutch turn (MSI)
  Transmits the drive from the drive ASSY main to the roll turn.

- Roll turn
  The roll turn is rotated by the drive from the drive ASSY main through the clutch turn (MSI) 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

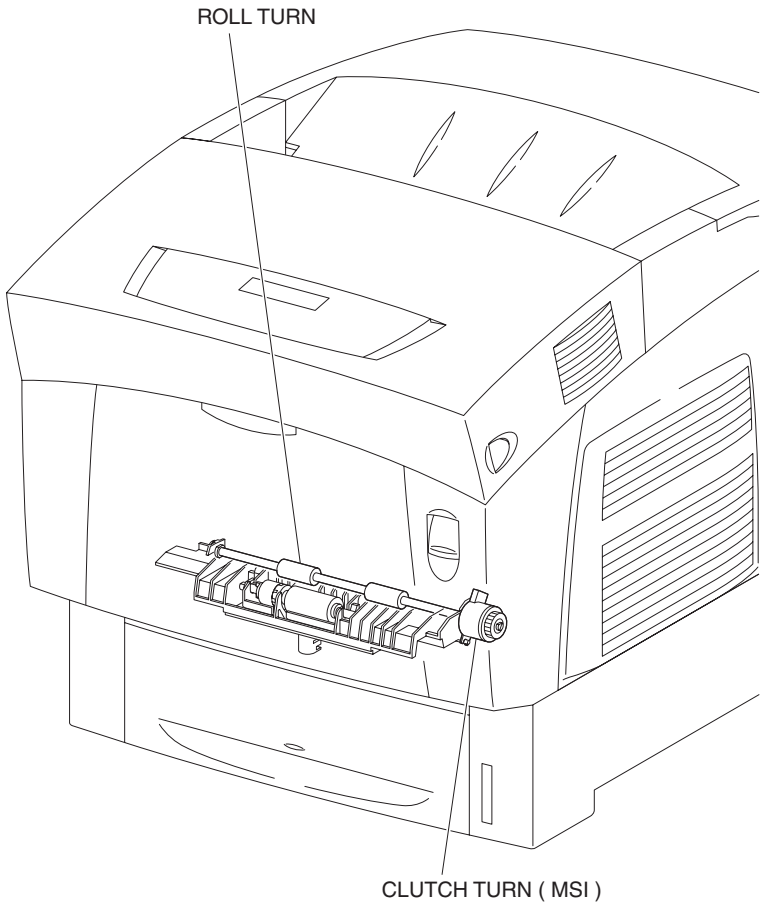


Fig.3-36

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

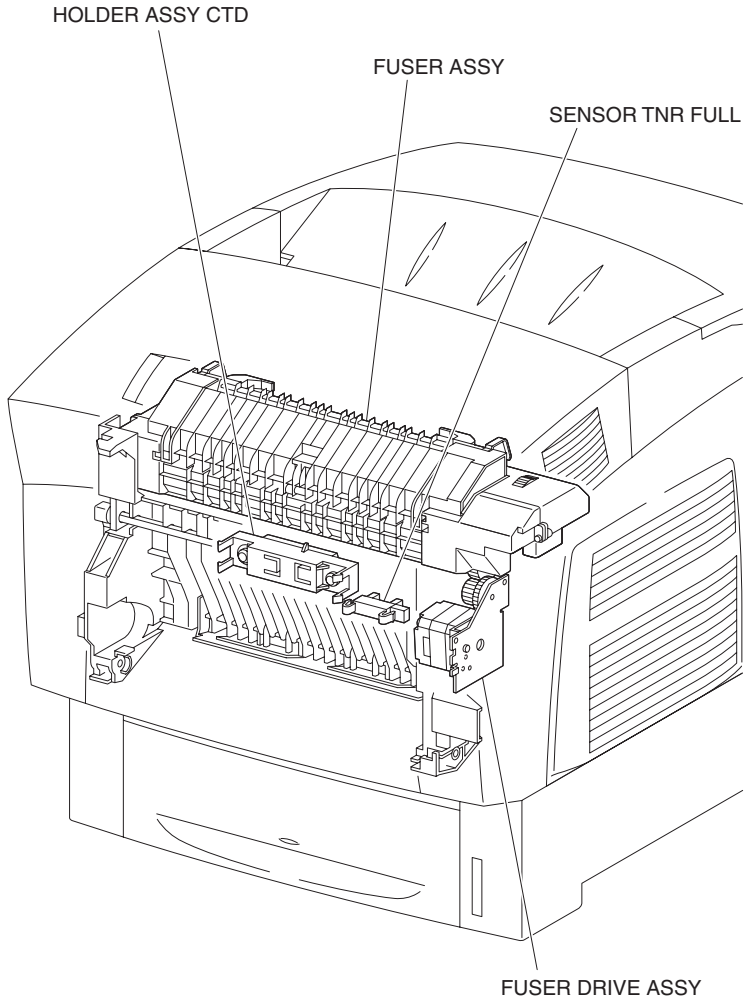


Fig.3-37

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 (DUP 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 drive ASSY main, 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

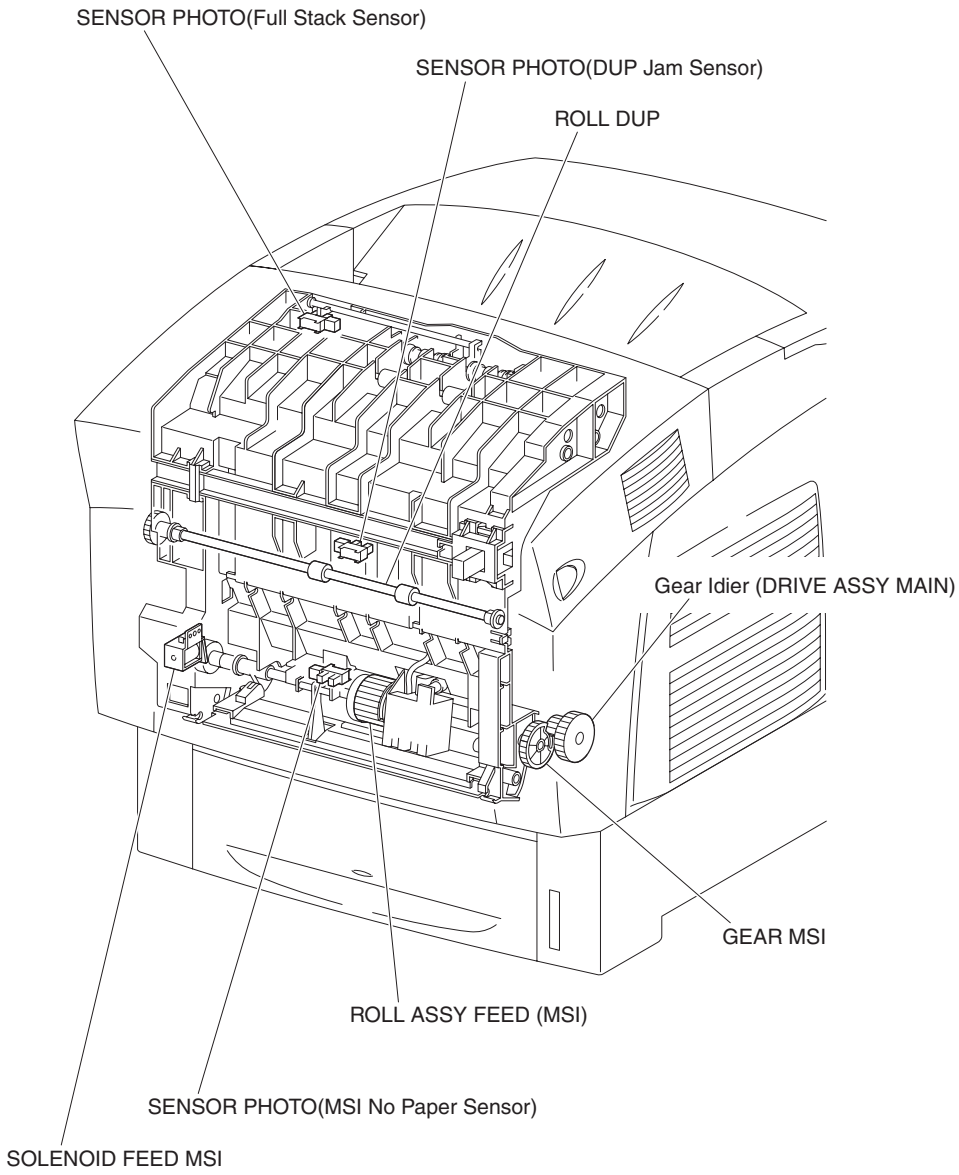


Fig.3-38

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

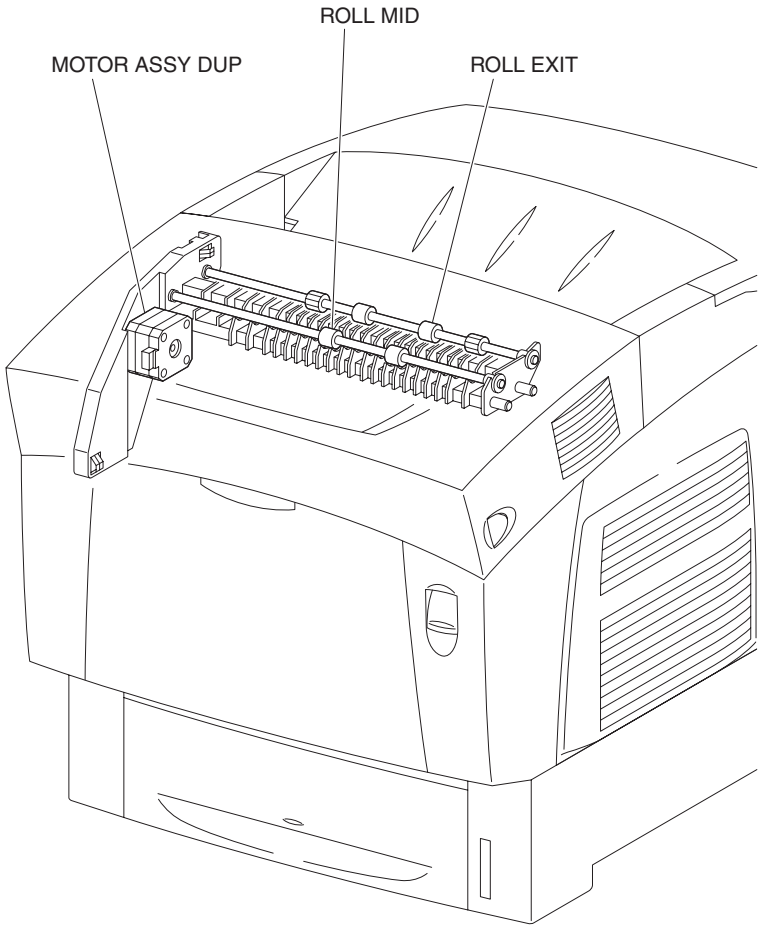


Fig.3-39

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
  - Fuser NCS
  - Belt unit
  - Roll ASSY exit
  - Exit sensor
  - Fuser EEPROM

  - 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

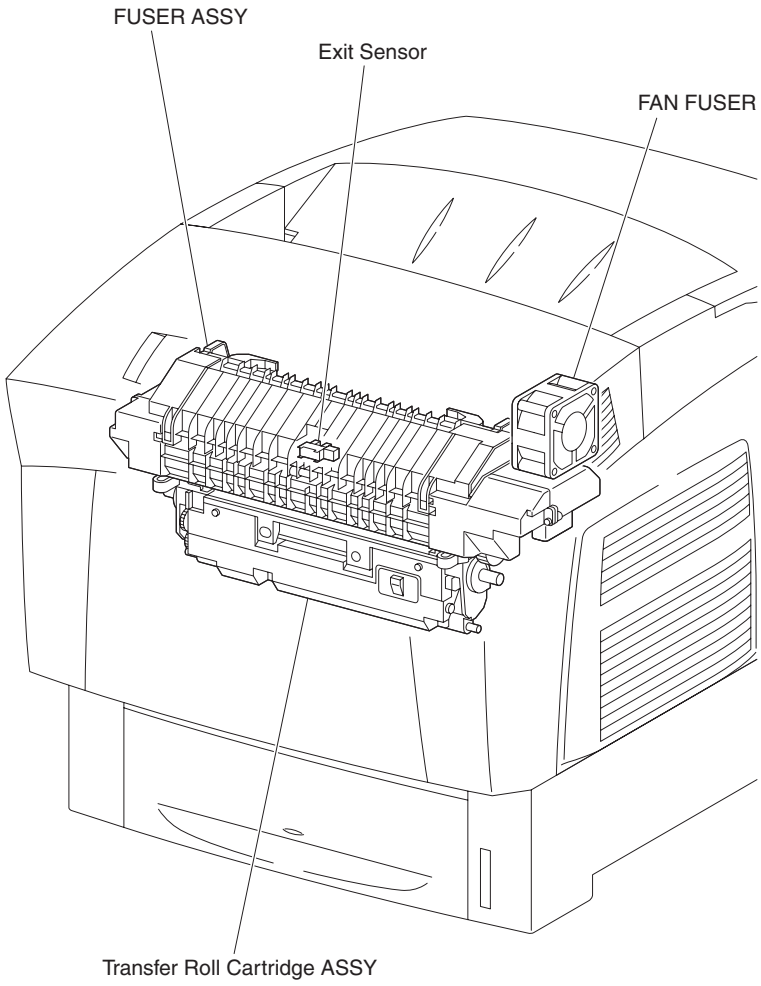


Fig.3-40

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)
  - RTC (Y)
  - RTC (M)
  - RTC (C)
  - RTC (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 drive ASSY main 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

  As plain paper scatters the radiated light, the OHP sensor can capture the reflected light to detect the paper. The OHP paper scarcely scatters the radiated light, and therefore the OHP sensor 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

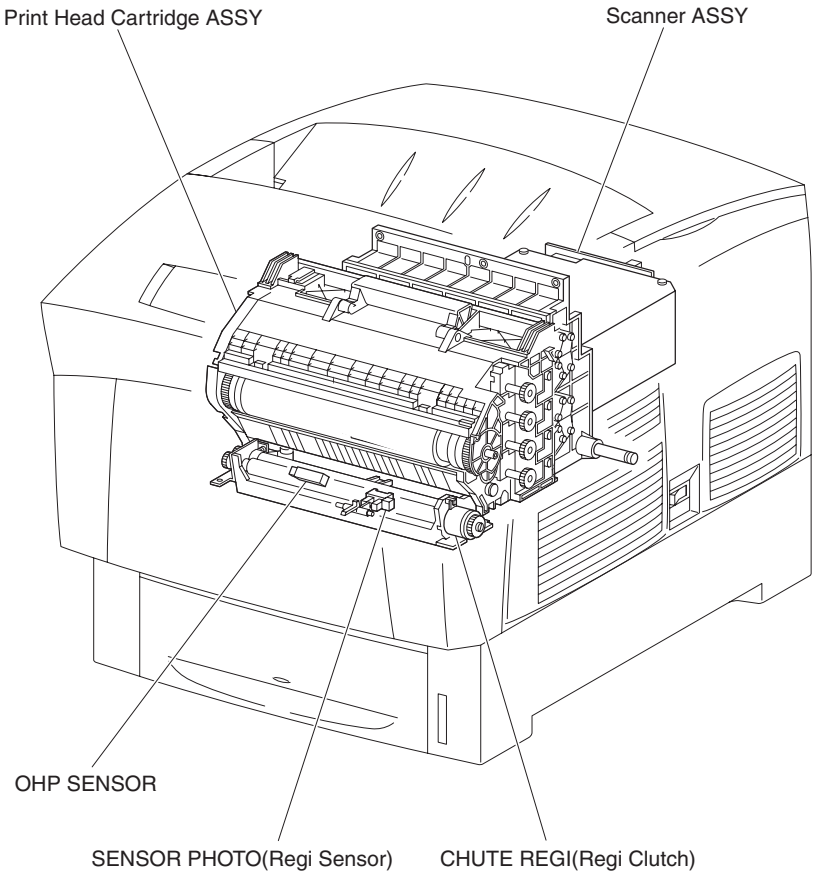


Fig.3-41

5.9 Toner Cartridge ASSY

5.9.1 Major functions

- PWBA CRUM READER

The PWB consists of each color toner bottle switch and CRUM.

Toner bottle switch:

Detects whether toner cartridge (toner bottle) of each color is installed or not.

CRUM:

Printer specific information is stored.

- Sensor no toner (Y)
- Sensor no toner (M)
- Sensor no toner (C)
- Sensor no toner (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

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

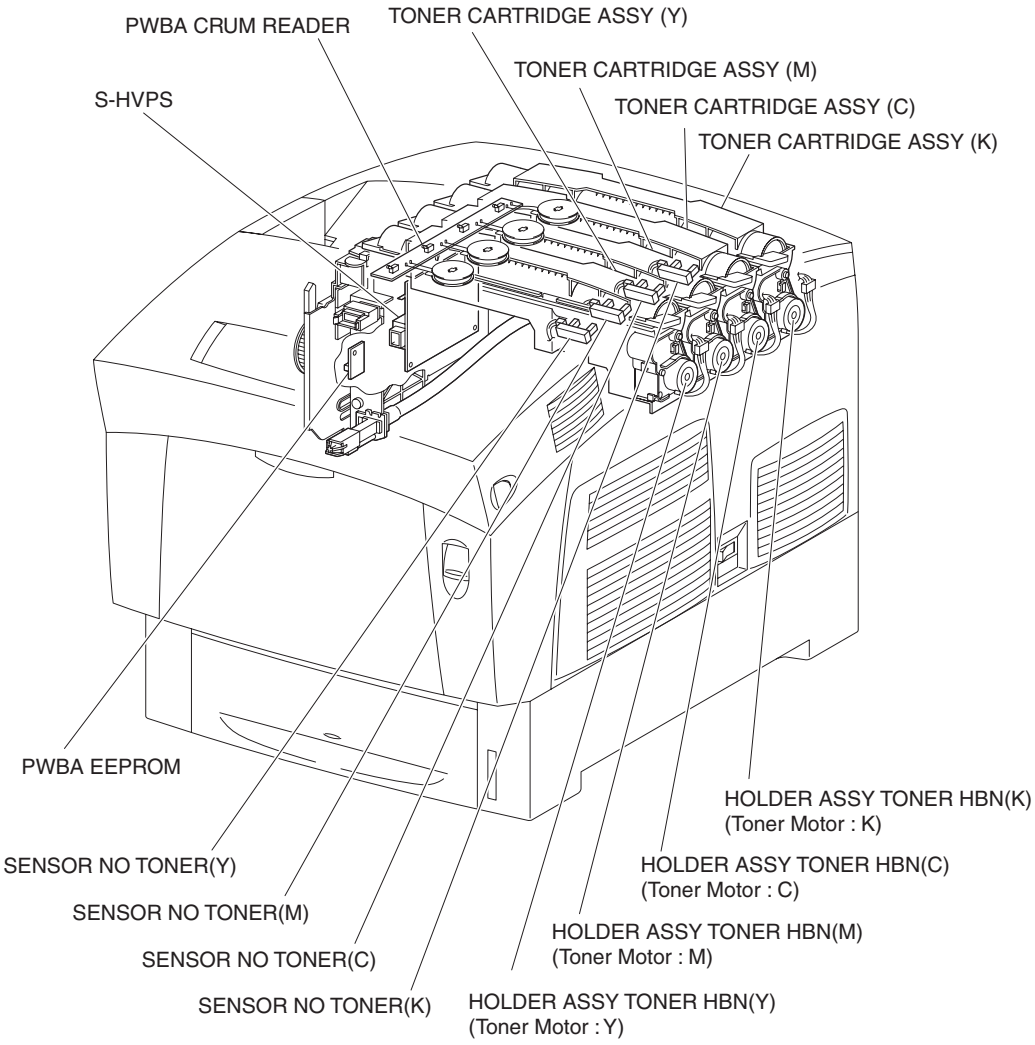


Fig.3-42

5.10 Frame & Drive

5.10.1 Major functions

- Drive ASSY main

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

- Drive ASSY DEVE

Supplies the drive to parts as follows.

- Print Head Cartridge ASSY (Developer)

5.10.2 Reference diagram

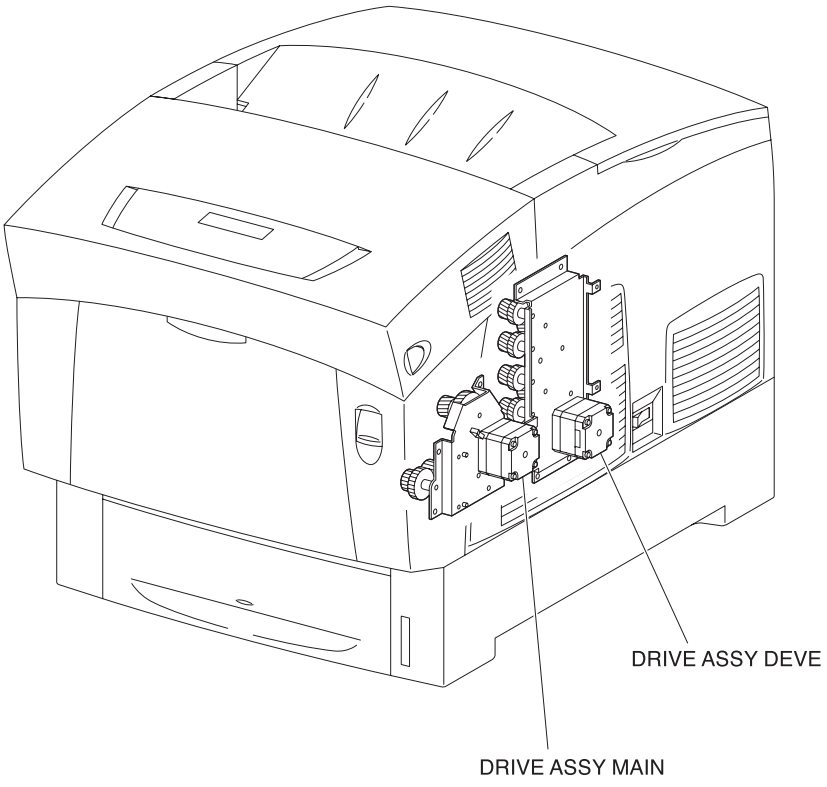


Fig.3-43

5.11 Electrical

5.11.1 Major functions

- Fan Rear

  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

  The LVPS is provided with two types, 100/120V 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.

- MCU HL-4200

  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 ASSY

  Supplies 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.

  - RTC
  - Refresher
  - Developer
  - IDT 1
  - IDT 2
  - IDT 1 Cleaner
  - IDT 2 Cleaner

- PWBA HBN DRV

  Controls parts of motor and so on by the signal from the MCU HL-4200 and sends information from the sensors and switches to the MCU HL-4200. The power from the LVPS is supplied to the MCU HL-4200 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 drive ASSY main, drive ASSY DEVE, fuser drive ASSY, motor ASSY DUP, and holder toner cartridge 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 the host, prints and controls the whole printer.

- Font Card

  Records font information of printer.

- HDD

Optional HDD is used for two uses described below.
The space used for each function is divided into partitions by the fixed ratio. The space doesn't have relation each other.
The ratio cannot be changed.

*Breakdown:
(1) Job Log: 2MB
(2) PostScript file system: 512MB
(It would be the half of the whole HDD if the capacity of HDD is less than 1GB.)
(3) Memory sort on HDD: rest of capacity
* It can be confirmed on the printer setting list.

1. Memory sort on HDD
Printing is executed by copying pages per job.
(For example, in case of 5 pages document, it prints in order as 1,2,3,4,5, 1,2,3,4,5...)
Characteristic:
It starts to print the first set and store the job to spool area simultaneously when only the printed data of the first set was received from a printer driver. The printing speed of second set and later can be faster by using the stored data.
Therefore, the burden of a driver and communication traffic between a host and a printer can be reduced, and the entire throughput can be enhanced.
High speed electron sort implemented HDD causes a printer error and cancels the rest of printing if the data which spools to the HDD exceeds the capacity of the HDD.

2. PostScript file system
The file system function of PostScript can be used.
Generally, it is used to memorize initialization job and Type1 font.

5.11.2 Reference diagram

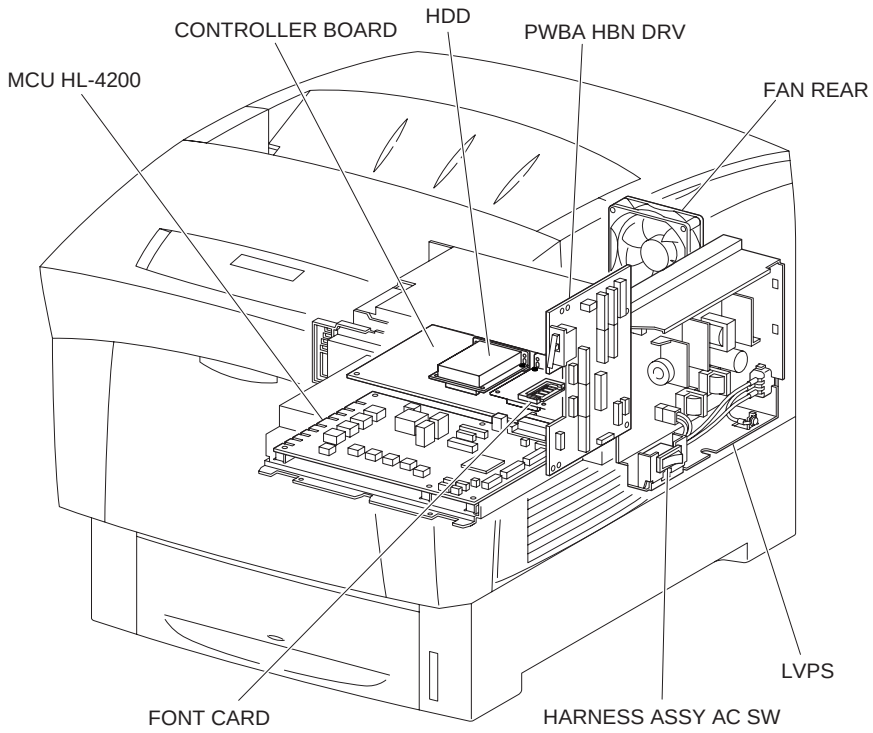


Fig.3-44

6. MODES

6.1 Print Mode

The printer has four modes, Standard mode, Fine mode, High gloss mode, and Super high gloss mode. Modes are switched over under the instruction from the controller.

1. Standard mode: Used for printing with resolution 600dpi
2. Fine mode: Process direction resolution 1200dpi mode
3. High gloss mode: Thick paper, special paper, and high glossed plain paper

Relation between the resolution, process speed, print mode and paper mode is shown in the table below.

Paper mode			Resolution/Process speed			
			600dpi		1200dpi	
		Print mode	Simplex	Duplex	Simplex	Duplex
Plain paper		Standard mode	Full speed	Full speed	--	--
	Thick paper *1	Fine mode	--	--	Half speed	Half speed
		High gloss mode	Half speed	Half speed	--	--
Special paper *2		Fine mode	--	--	Half speed	Half speed
		High gloss mode	Half speed	Half speed	--	--

*1: Thick paper-L,Thick paper-H
*2: Label-L , Label-H, OHP, Envelope, Postcard

6.2 Operation Modes

For the operation of the printer, the following seven 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.

- Initiglizing mode

  New parts have been just set to the printer (initializing with a new PHD).

- Checking Unit mode

  Printer is under checking consumable units.

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	OFF	05
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.)

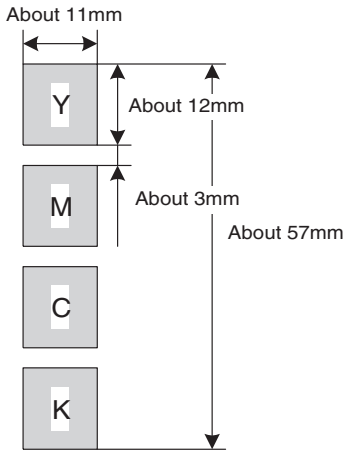


Fig.3-45

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.

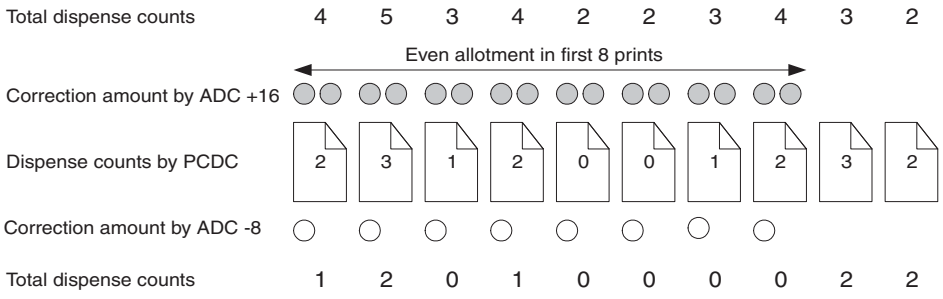


Fig.3-46

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.

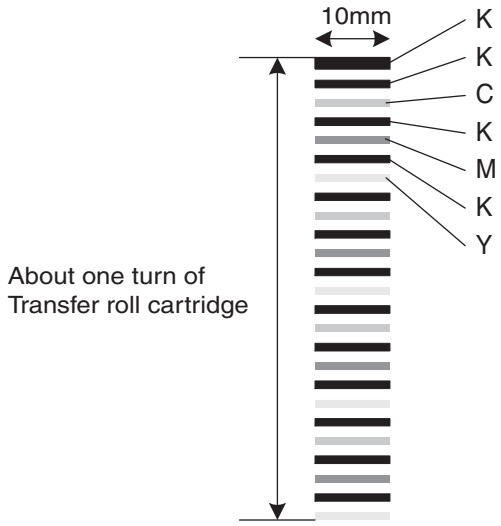


Fig.3-47

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 no toner . These switches and sensors are provided for respective colors, and detection is made for each color.

7.7.1 Sensor no toner

The sensor no toner is provided for each color.

The sensor no toner 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 no toner 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 no toner 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
   - Printing

2) Output of "Toner Empty Warning"
   Output "Toner Empty Warning" based on the counter on the toner cartridge.

3) Output of "Toner Empty Error"
   Output "Toner Empty Error" when the sensor no toner properly detects toner empty.

4) Reset of "Toner Empty Warning"/"Toner Empty Error"
   When a new toner bottle is installed ("Toner Empty Error" not being generated), the machine executes toner dispense for 1.7 seconds to detect toner. If sensor no toner detects toner full on checking "Toner Full"/"Uncontrolled Execution", "Toner Empty Warning/Toner Empty Error" will be disabled.
   However, the unit inside still recognizes "Toner Empty" at this stage. The unit recognizes "Toner Full" when the sensor no toner has detected "Toner Full" more than three times consecutively by executing toner dispense.

5) Outputting "Toner Tape not Removed Error"
   When the new toner bottle is installed ("Toner Empty Error" not being generated), the machine executes toner dispense for 1.7 seconds to detect toner. If toner full is not detected, toner dispense will be executed for 1.7 sec again 5 seconds later. If toner full is not detected after executing toner dispense three times, and if toner bottle dispense time shows 0, "Tape not Removed Error" will be output.

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.

Temperature of individual area of the heat roll is detected by the fuser non-contact sensor (NCS) in the middle of the heat roll and the temp sensor at the edge of it. The temp sensor checks for open wire by detecting the temperature every 60ms and resistance every 20ms alternately. When the temperature detected every 80ms shows the figure higher than the target, the heater lamp will be turned off. When the result shows a lower figure, the heater lamp will be turned on.

The target temperature set up varies depending on the time of warm-up, printing, or process control. The target temperature will be changed based on the interior temperature detected by the sensor hum temp, the difference of temperature between the center and edge areas of the heat roll, printing mode, or the input power voltage.

7.8.2 Cool down

As the printing continues, the distribution of temperature in the heat roll becomes uneven both in the paper feed and non-paper feed areas. Cooling down is to provide a certain period of time without feeding paper so that the heat roll temperature can be distributed evenly.
Cooling down is performed for certain period of time after printing was completed.

7.8.3 Sensor Warm-up

The fuser NCS (Non Contact Sensor) at the center of the heat roll does not detect temperature when the temperature of the sensor itself is below -5°C. Therefore, the sensor will be warmed up when the temperature is below -5°C. This action is called sensor warm-up.

CHAPTER IV
ASSEMBLY / DISASSEMBLY

CONTENTS

CHAPTER IV ASSEMBLY / DISASSEMBLY

1. REPLACING PROCEDURE OF PERIODICAL REPLACEMENT PARTS

Periodical replacement parts are the parts to be replaced periodically to maintain product quality. Refer to APPENDIX5. "PERIODICAL REPLACEMENT PARTS" in detail.

1.1 Replacing the Fuser ASSY

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

1) Push up latch B and fully open the chute ASSY out.

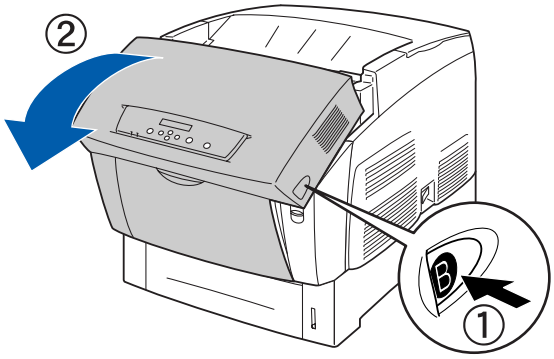


Fig.4-1

2) Push the lever on left side of the cover ASSY and open the cover ASSY.

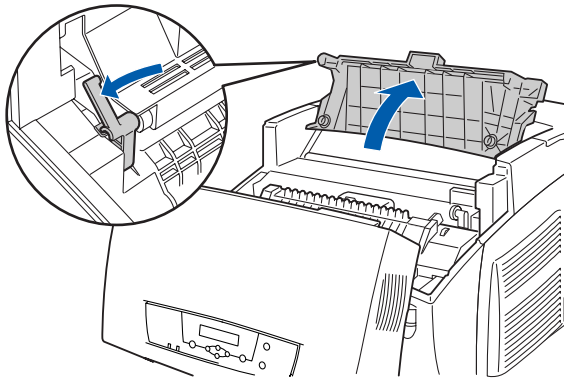


Fig.4-2

3) Push and slide forward the switches on both sides of the fuser ASSY.

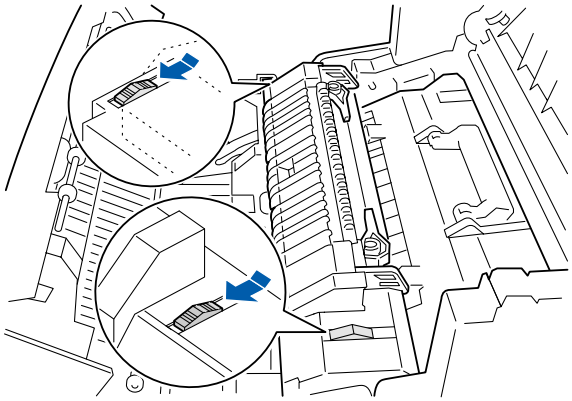


Fig.4-3

4) Lift the levers on both sides of the fuser ASSY.

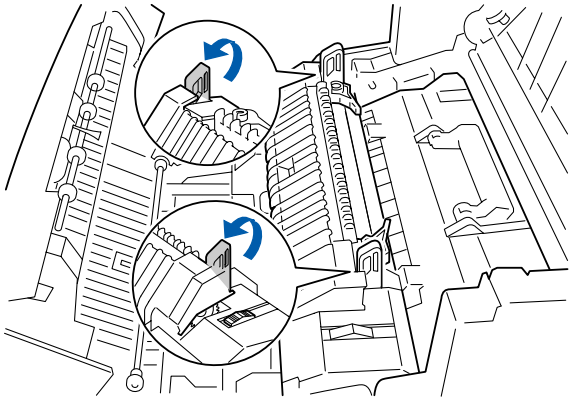


Fig.4-4

5) Hold the levers on both sides as you remove the fuser ASSY from the printer carefully.

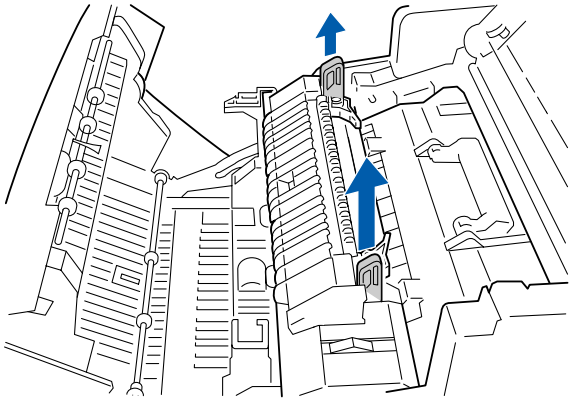


Fig.4-5

6) Unpack a new fuser ASSY and lift the levers on both sides. Grip the lever and install the fuser ASSY into the printer gently placing pin into the guides.

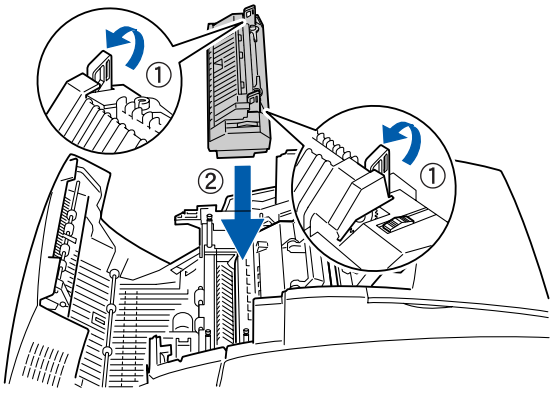


Fig.4-6

7) Push down the levers on both sides of the fuser ASSY.

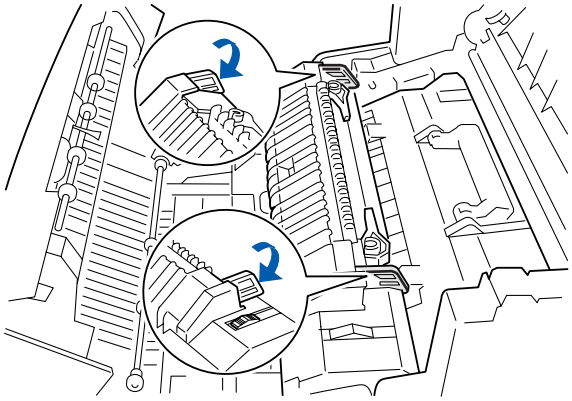


Fig.4-7

8) Push and slide backward the switches on both sides of the fuser ASSY.

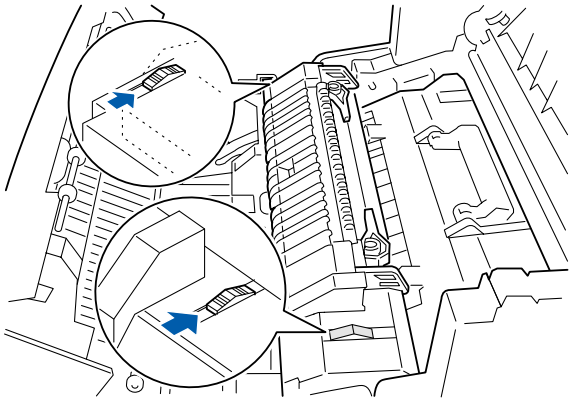


Fig.4-8

9) Close the Paper outlet cover.

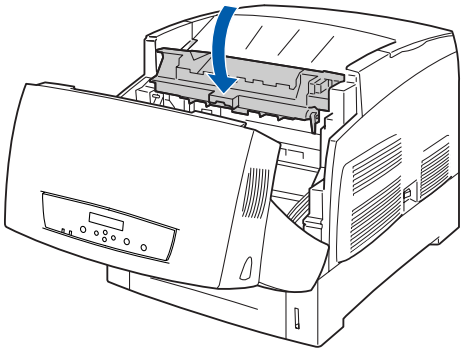


Fig.4-9

10) Close the chute ASSY.

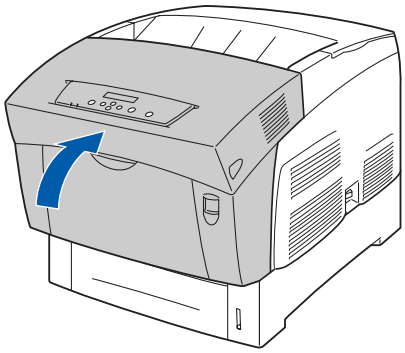


Fig.4-10

1.2 Replacing the Transfer ASSY

1) Push up latch A and fully open the chute ASSY.

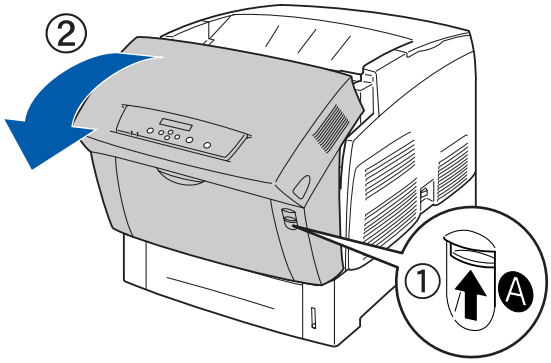


Fig.4-11

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

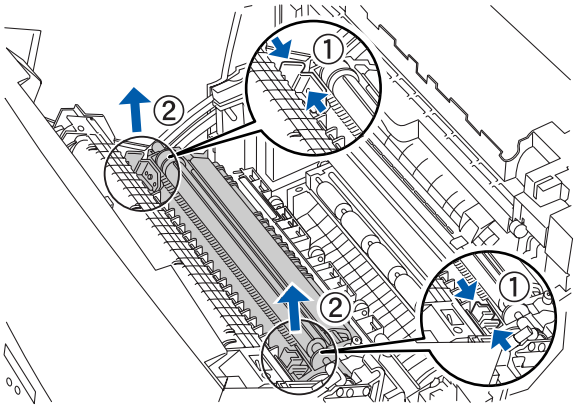


Fig.4-12

3) Unpack a new transfer roll cartridge unit ASSY and grip the orange tabs.

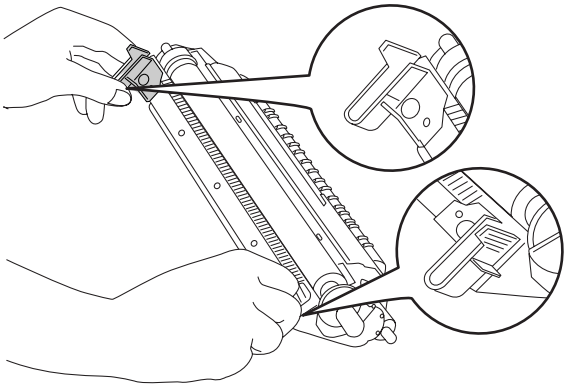


Fig.4-13

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

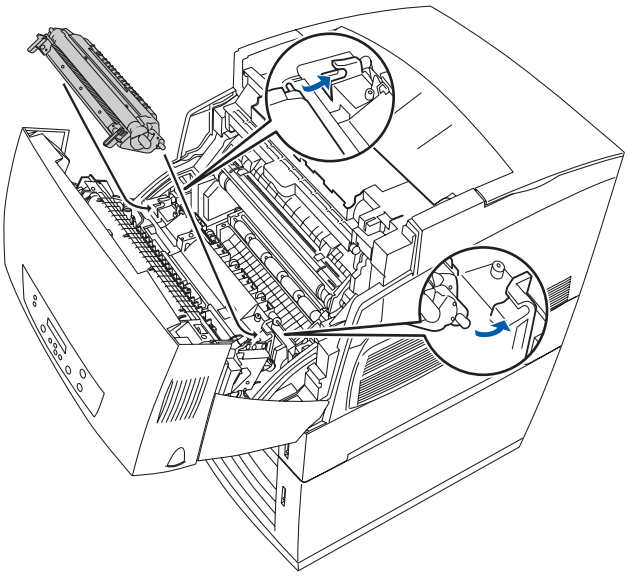


Fig.4-14

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

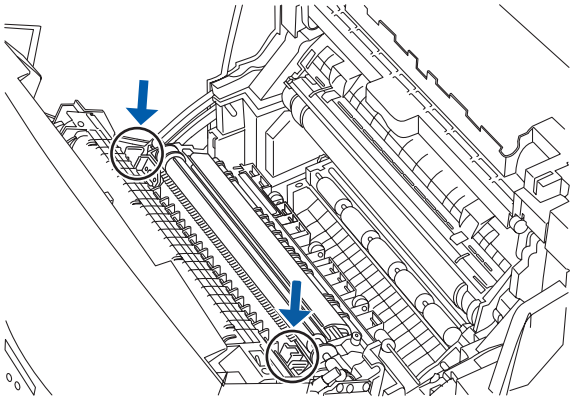


Fig.4-15a

6) Close the chute ASSY.

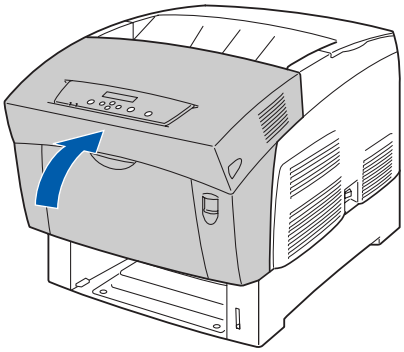


Fig.4-15b

1.3 Replacing the Roll ASSY

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

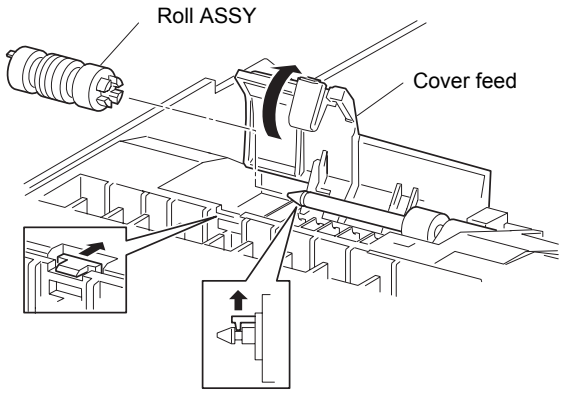


Fig.4-16

4) Push the new roll ASSY into the shaft on the paper tray.

1.4 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.*

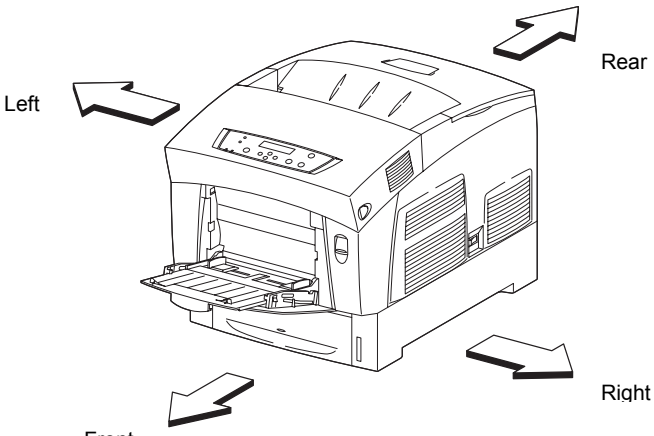


Fig.4-17

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 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.

2.2 Cover of the Printer

2.2.1 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 HIBANA.
5) Remove the connector from the fan assembly.
6) Remove the cover ASSY front head from the front cover.

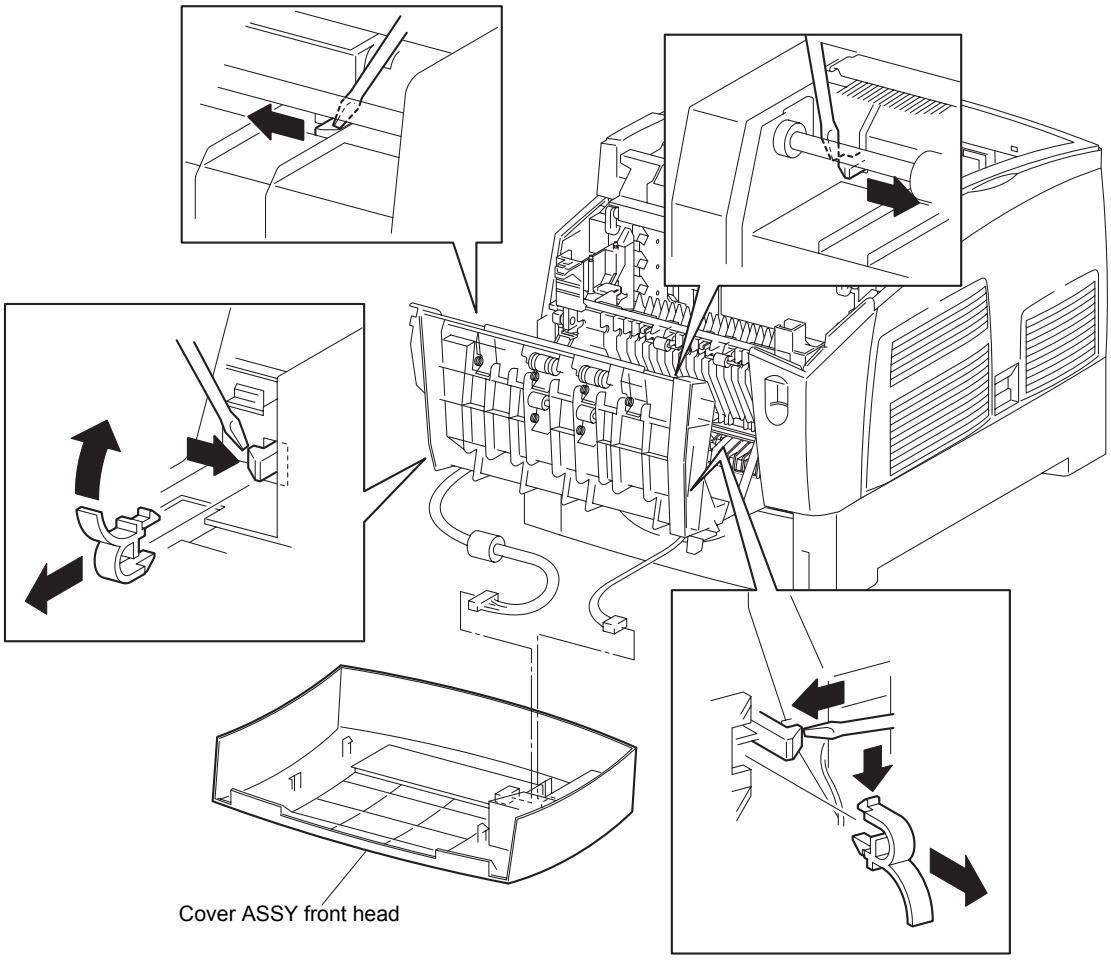


Fig.4-18

2.2.2 Console panel HL-4200

1) Release the 3 hooks securing the console panel HL-4200 to the cover ASSY front head.
2) Remove the console panel HL-4200 from the cover ASSY front head.

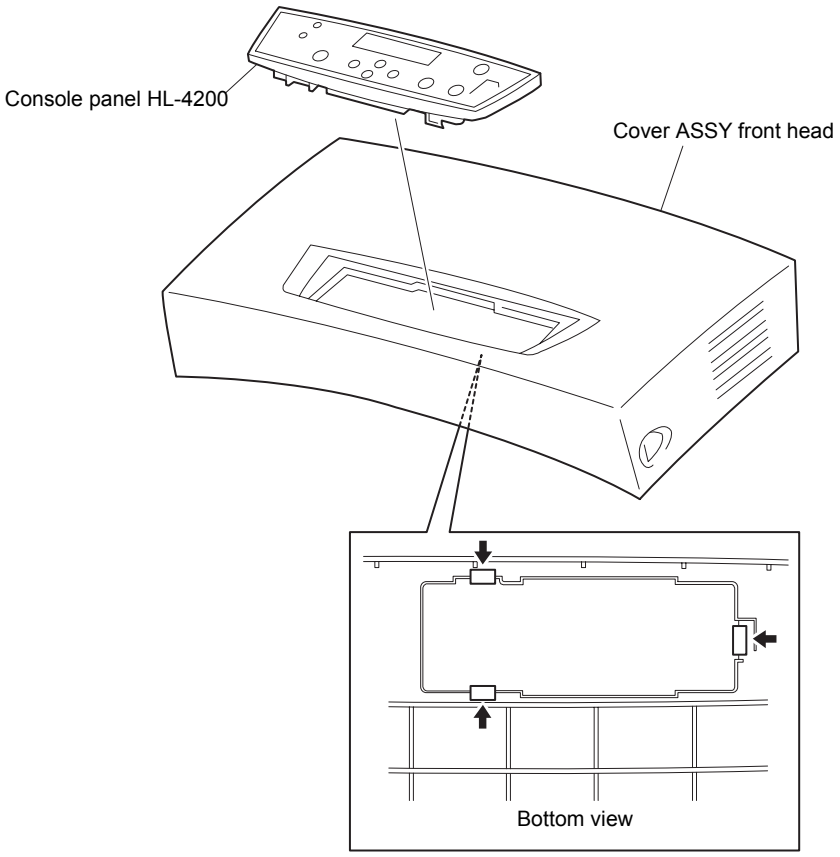


Fig.4-19

2.2.3 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.

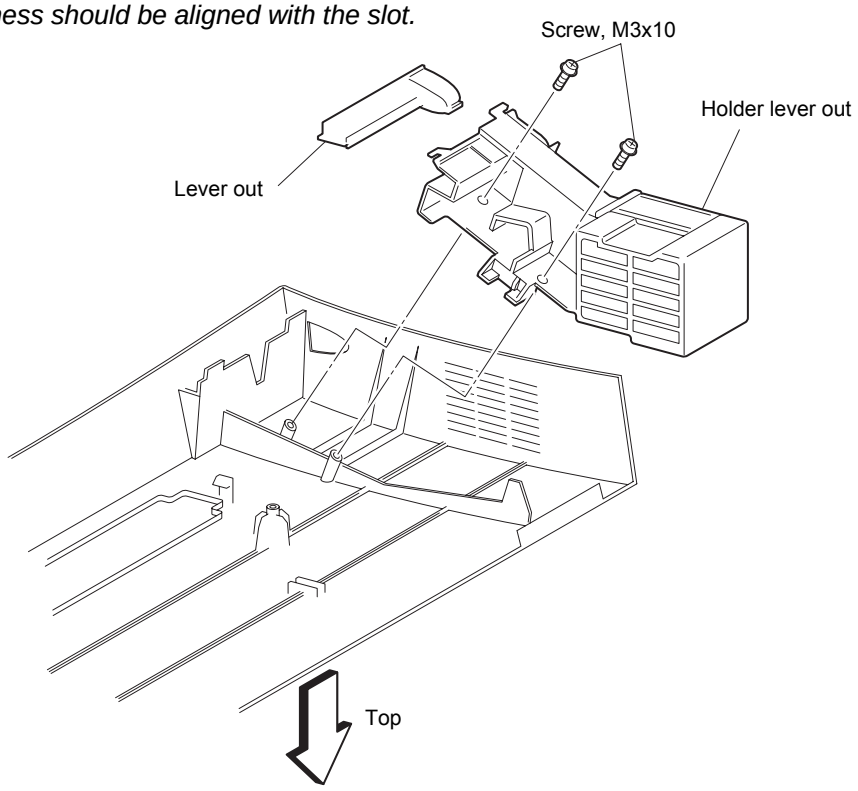


Fig.4-20

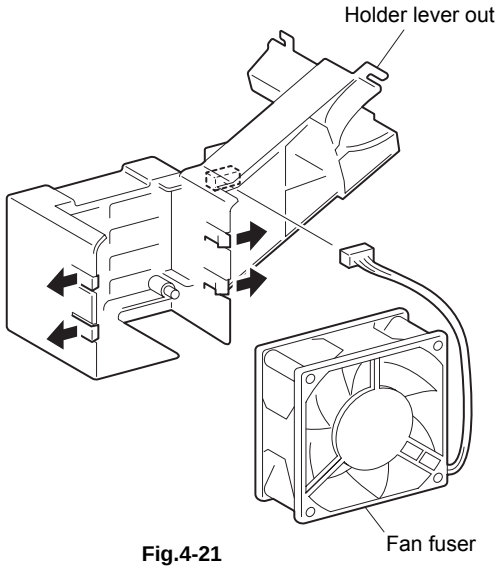


Fig.4-21

2.2.4 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 unit the cover MSI releases from the printer.

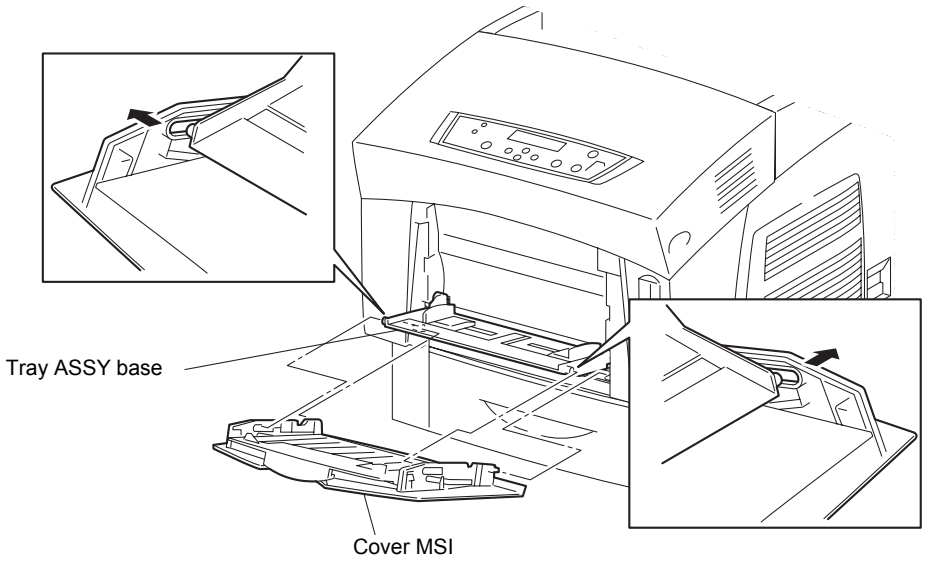


Fig.4-22

2.2.5 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.

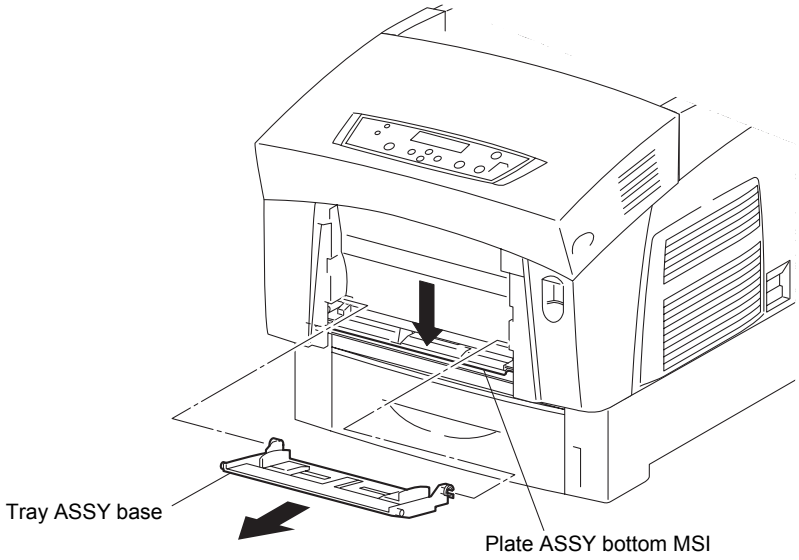


Fig.4-23

2.2.6 STRAP

1) Release hooks that secure the bottom portion of STRAP, and slide the bottom portion of STRAP toward the right to remove from the chute ASSY out.
2) Turning the top of STRAP secured to the upper right of the chute ASSY IN, meet a convex portion with the key hole in the chute ASSY IN and pull out the top of STRAP to remove the STRAP.

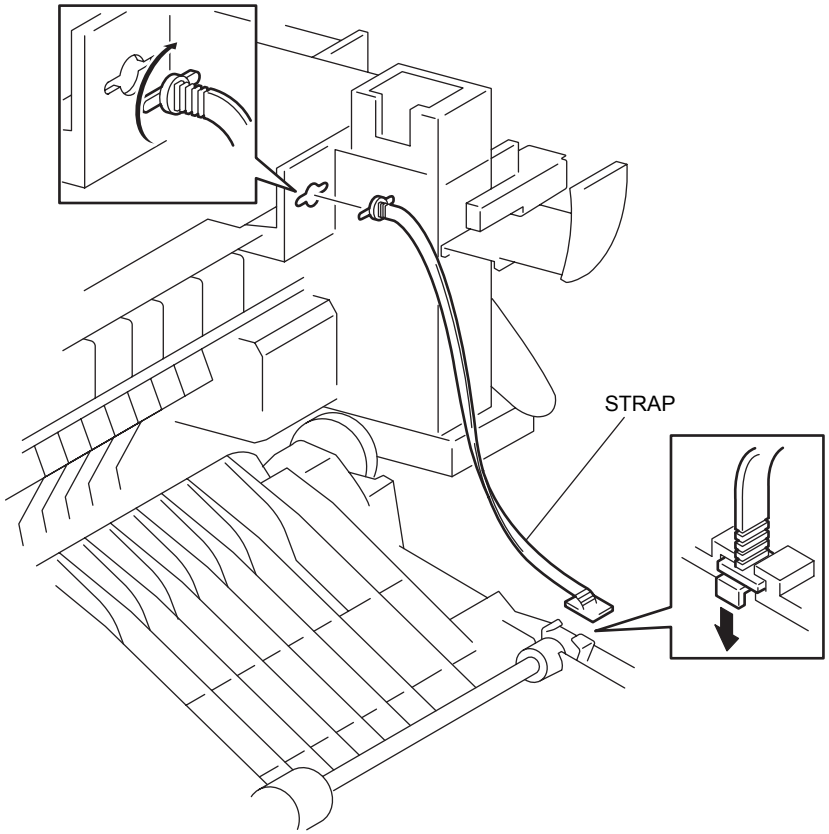


Fig.4-24

2.2.7 Cover ASSY front

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.
3) Remove 2 screws securing the cover ASSY front to the chute ASSY out.
4) Release the 2 hooks securing the cover ASSY front to the chute ASSY out.
5) Remove the cover ASSY front from the chute ASSY out.

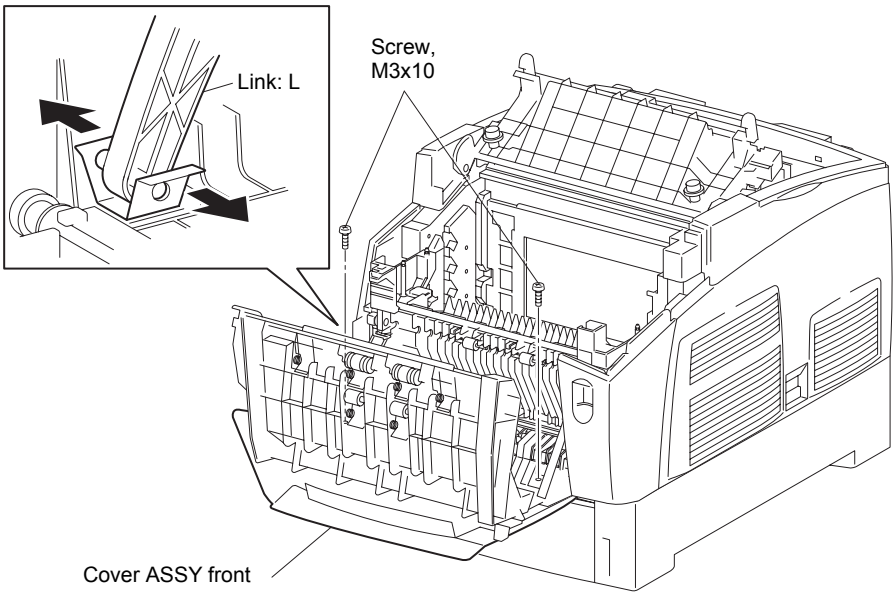


Fig.4-25

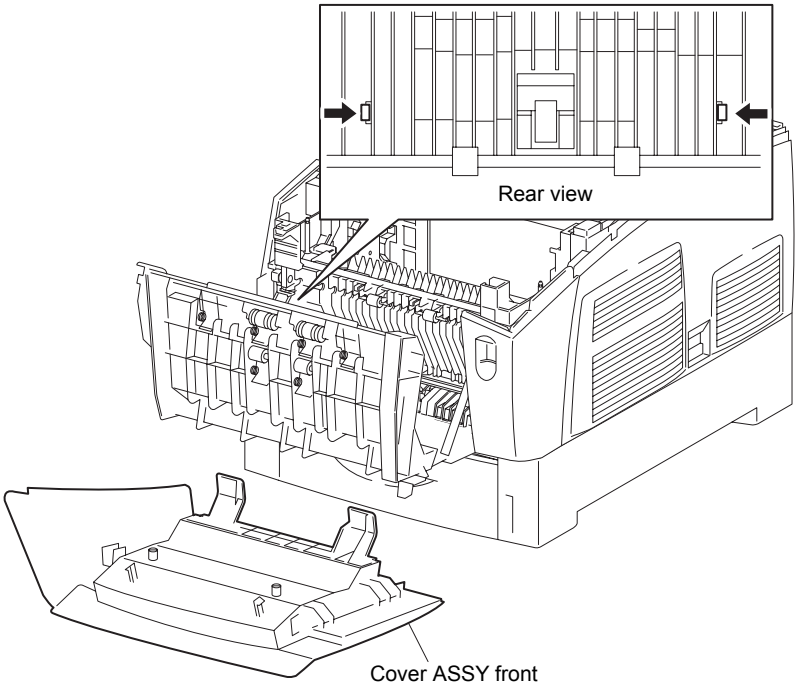


Fig.4-26

2.2.8 Cover ASSY front IN

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

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

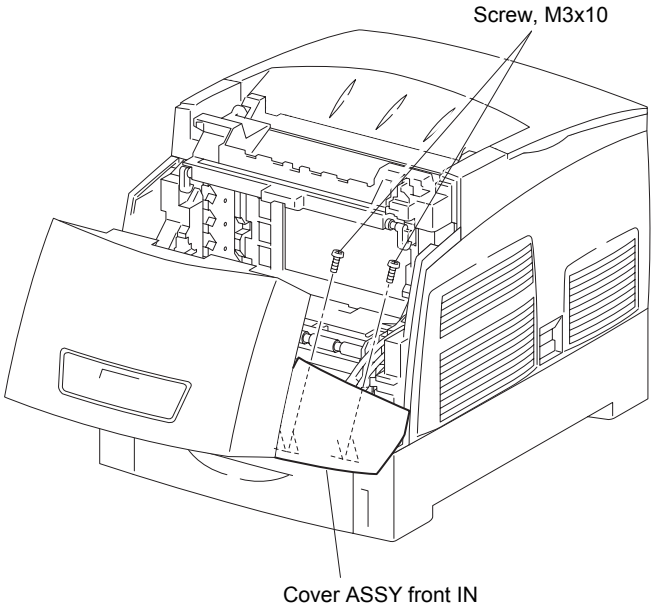


Fig.4-27

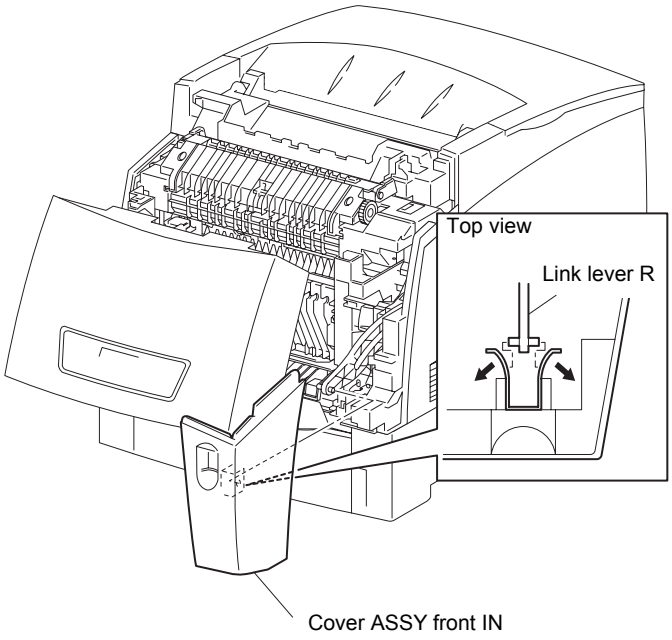


Fig.4-28

2.2.9 Cover top main

Note:
Before removing the cover top main, remove the toner cartridges.

1) Open the Paper outlet cover.
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.

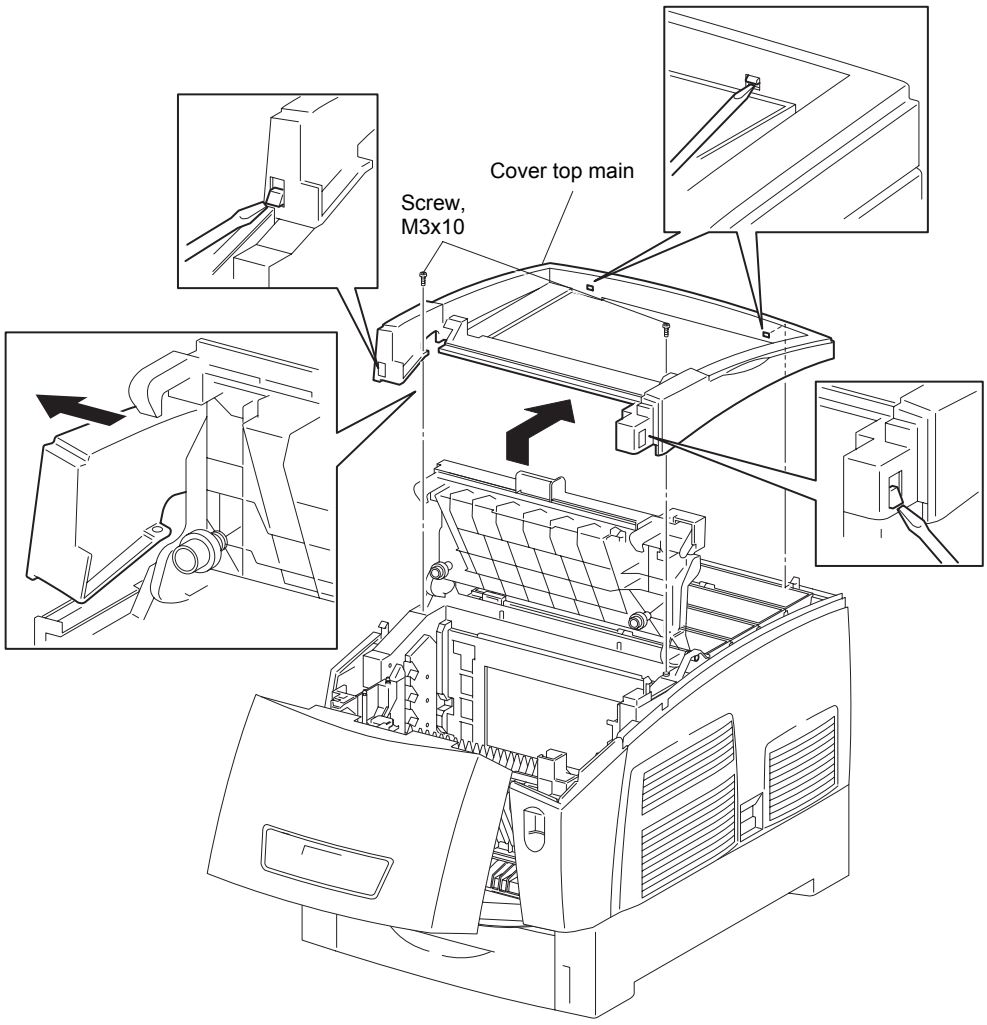


Fig.4-29

2.2.10 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.

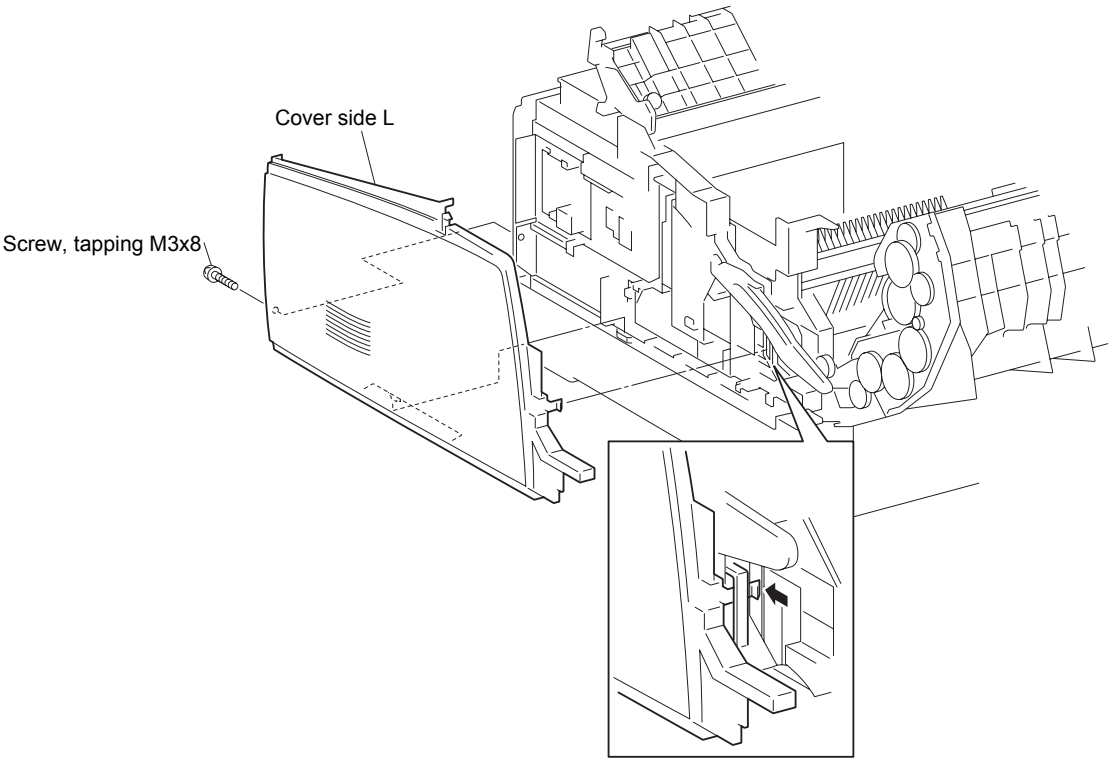


Fig.4-30

2.2.11 Paper outlet cover

1) Open the Paper outlet cover.
2) Extract the right and left stud top securing the Paper outlet cover to the printer.
3) Remove the Paper outlet cover from the printer.

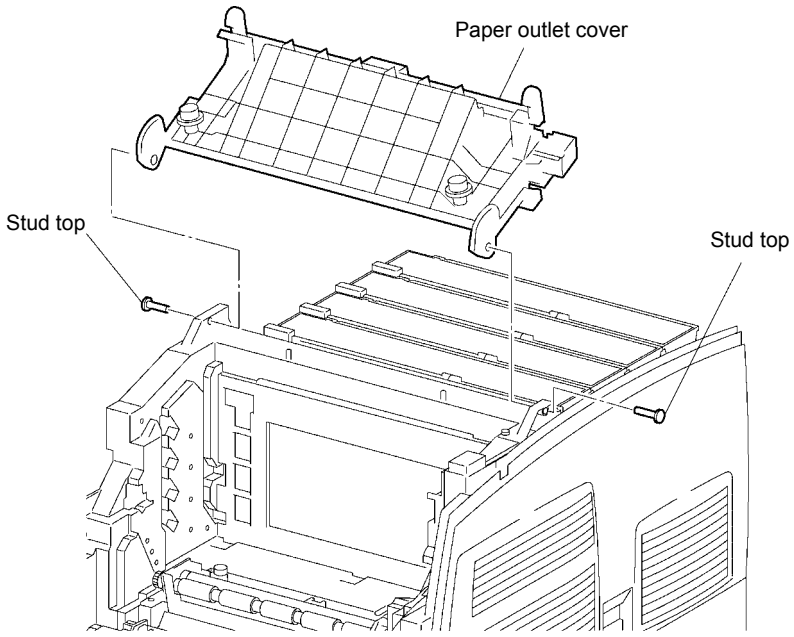


Fig.4-31

2.2.12 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.

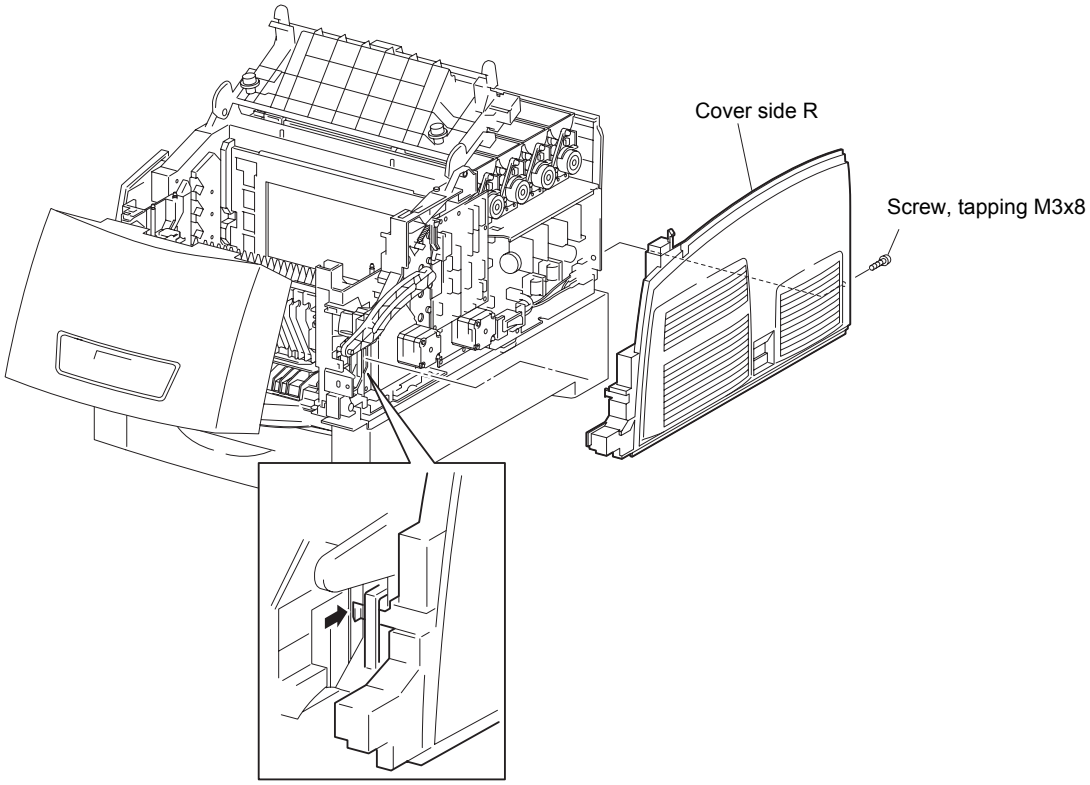


Fig.4-32

2.2.13 Cover rear

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

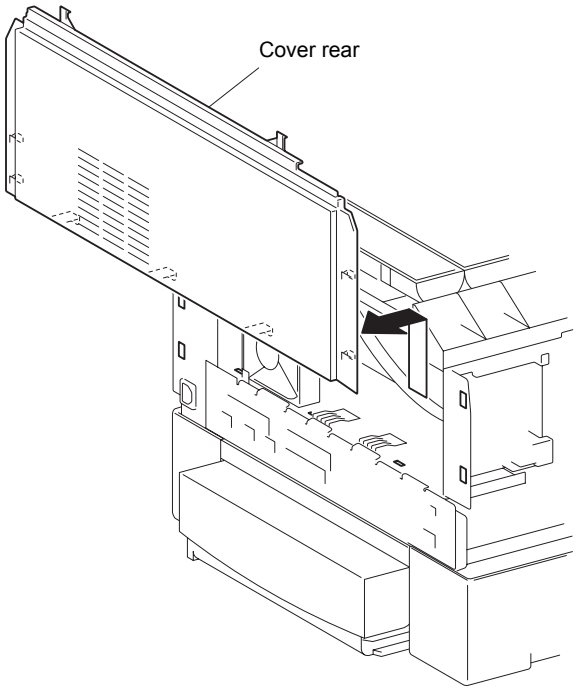


Fig.4-33

2.2.14 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.

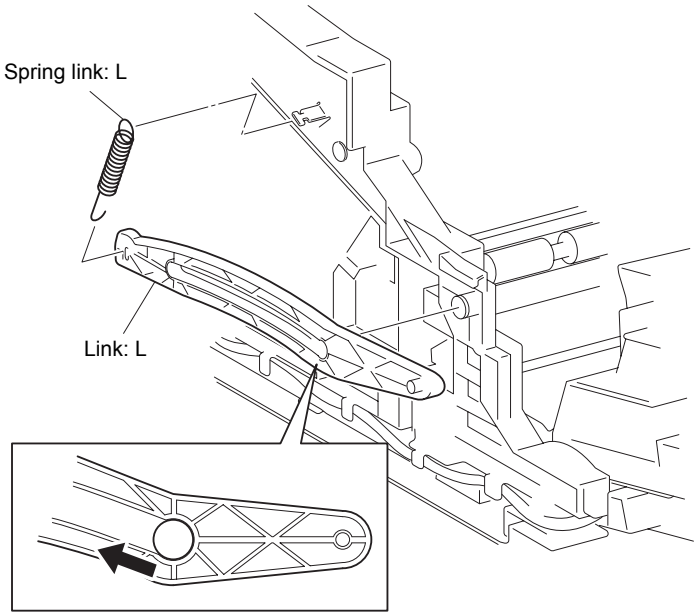


Fig.4-34

2.2.15 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.

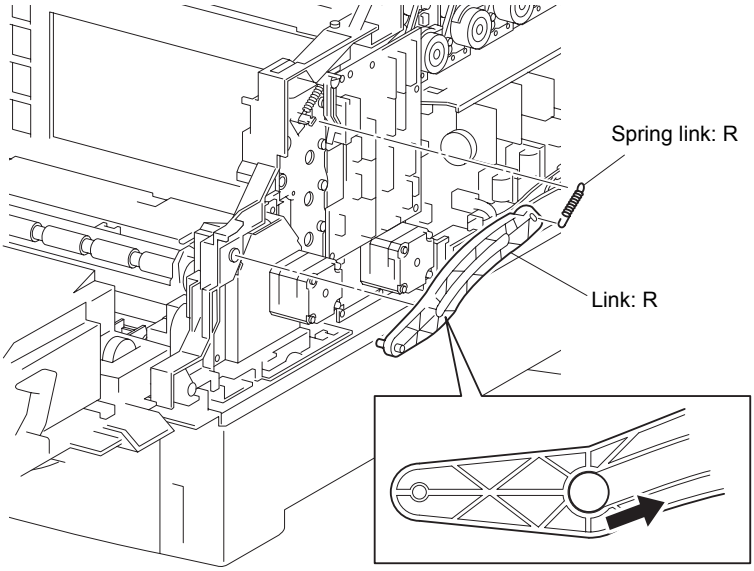


Fig.4-35

2.3 Front of the Printer

2.3.1 Chute ASSY out

Note:

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

1) Remove the connectors from the connector bracket on the left side surface of the printer.
2) Remove 1 screw which is fixing the earth from the left hand side of printer.
3) Shift the harness of the connector removed above from the bottom portion of the HSG ASSY BIAS on the left side surface of the printer.
4) Remove the connector on the PWBA DRV HBN on the right side surface of the printer.
5) Remove the harness of harness ASSY DUP from the clamp on drive ASSY main.
6) Carefully remove the cables from the cable quickly taking note of the cable routing.
7) Retake the paper feed roller to raise plate ASSY bottom MSI.

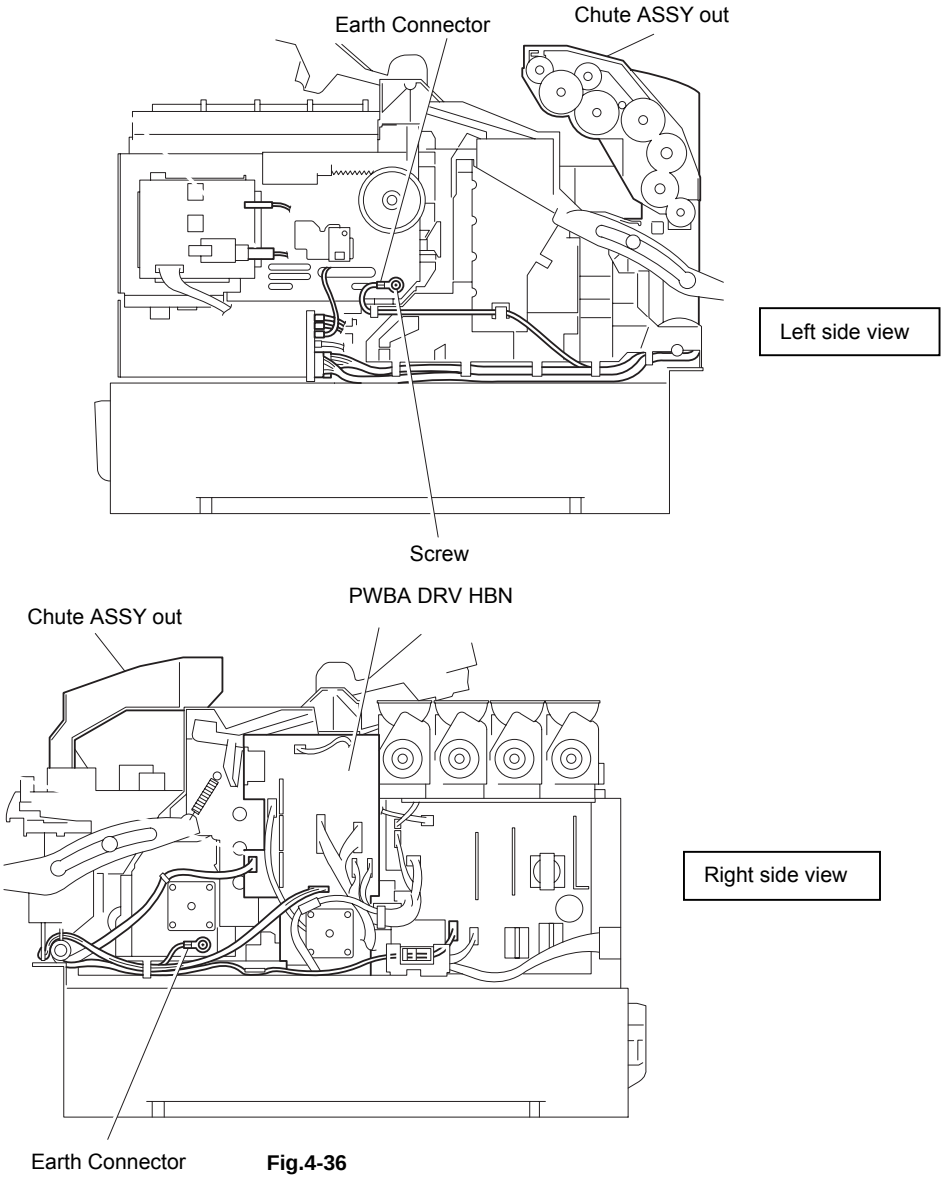


Fig.4-36

8) Remove the ring E on the right and left shaft pivot securing the bottom portion of the chute ASSY out and chute ASSY IN.

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

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

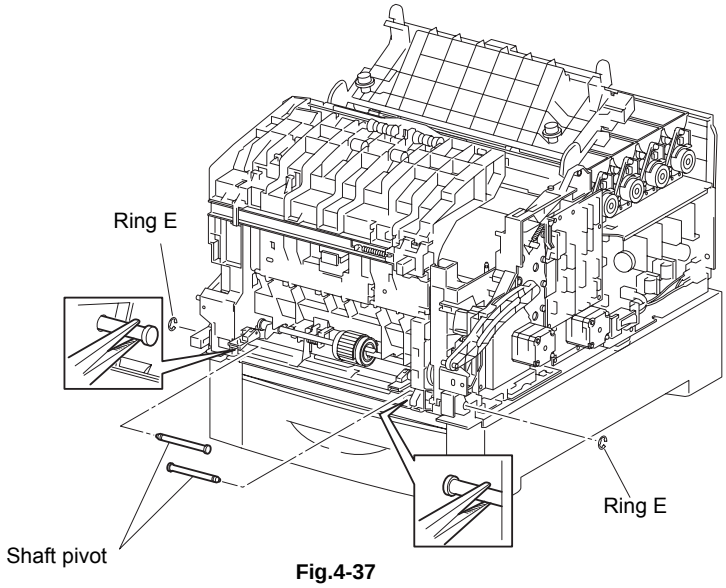


Fig.4-37

13) Release latch B to separate the chute ASSY IN from the chute ASSY out.

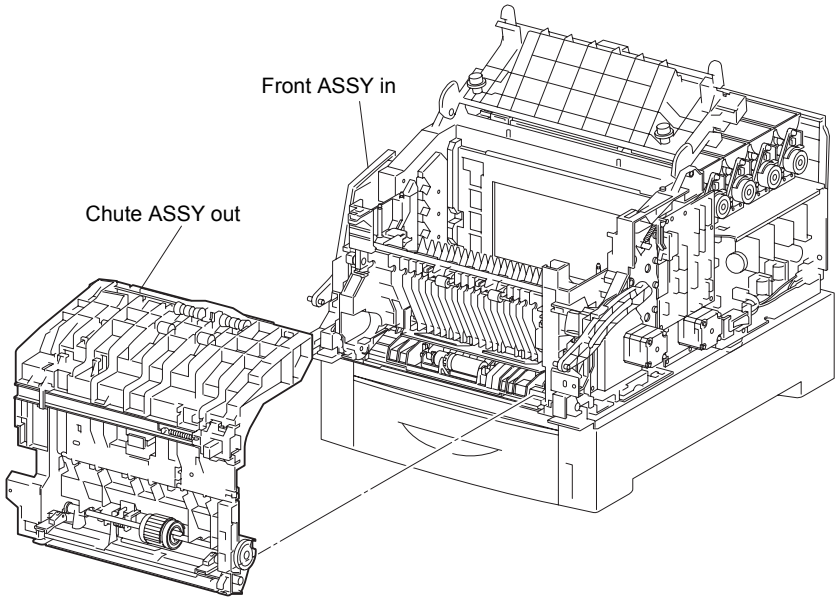


Fig.4-38

2.3.2 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.

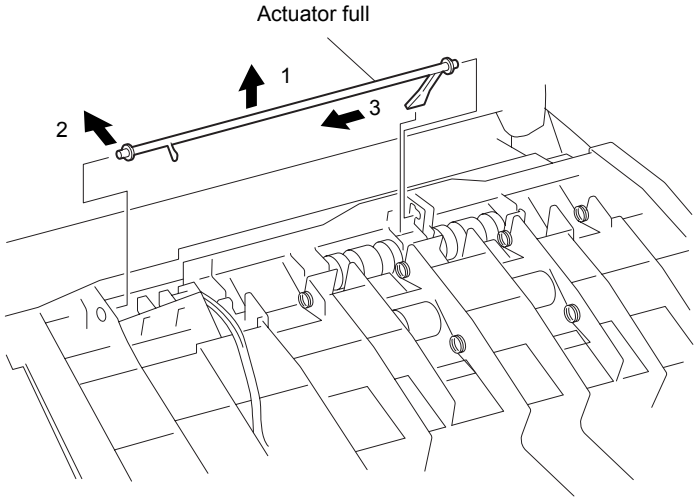


Fig.4-39

2.3.3 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.

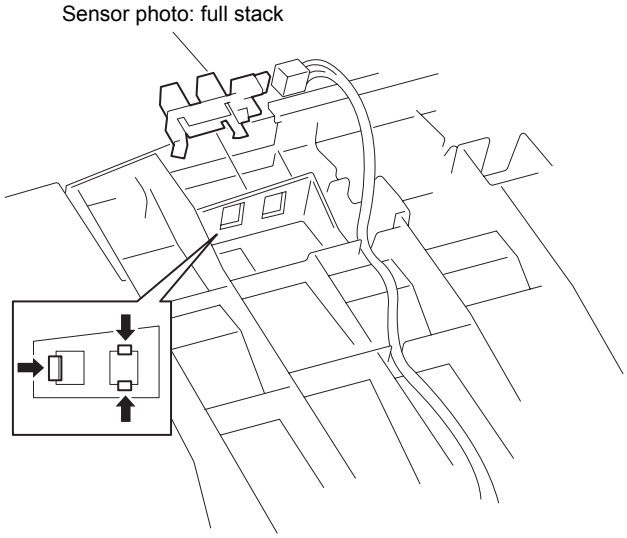


Fig.4-40

2.3.4 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.

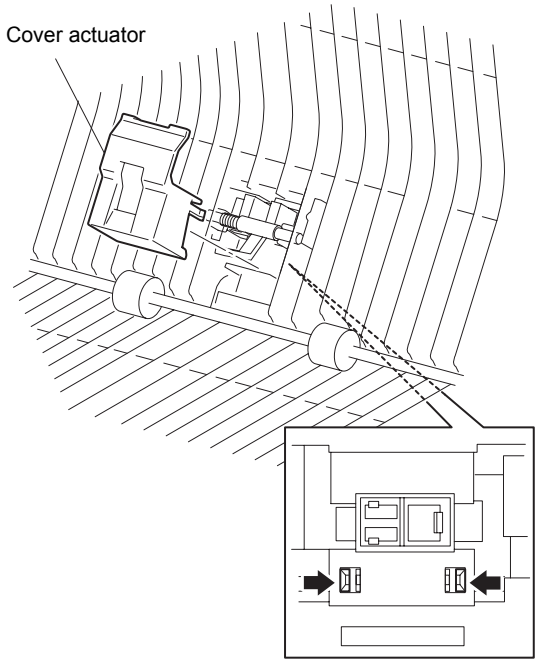


Fig.4-41

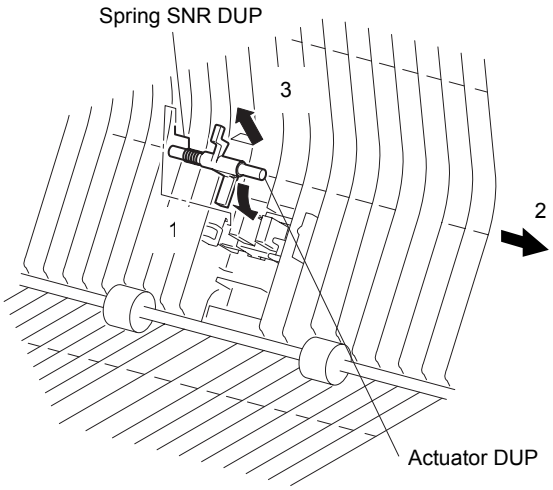


Fig.4-42

2.3.5 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.

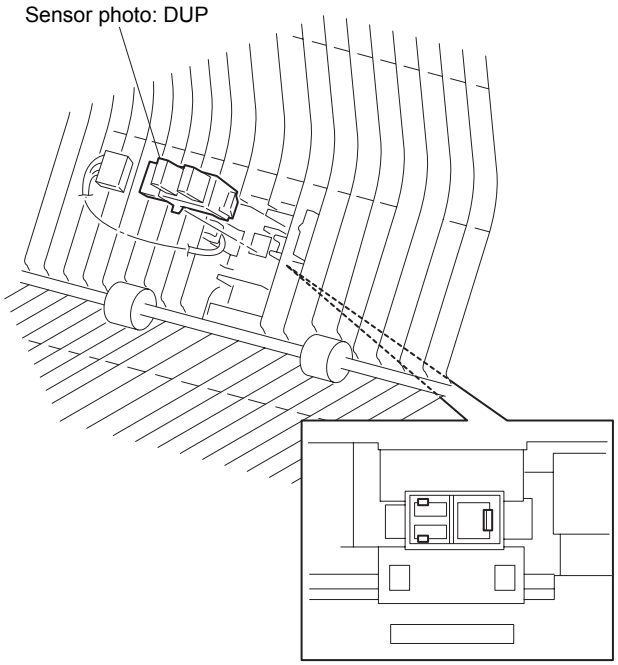


Fig.4-43

2.3.6 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.

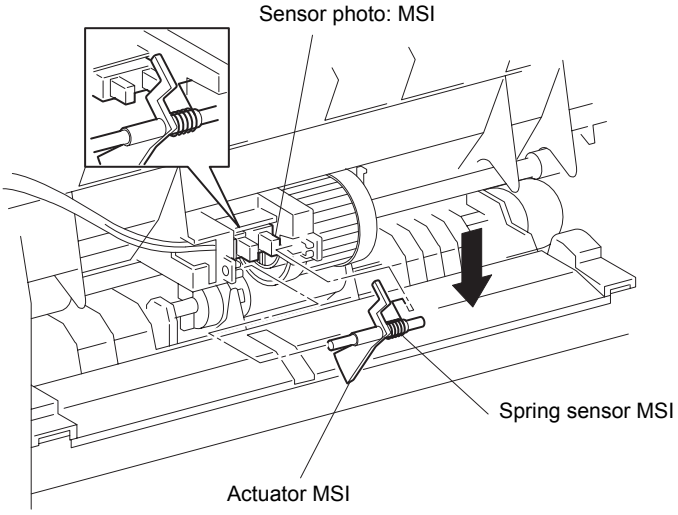


Fig.4-44

2.3.7 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.

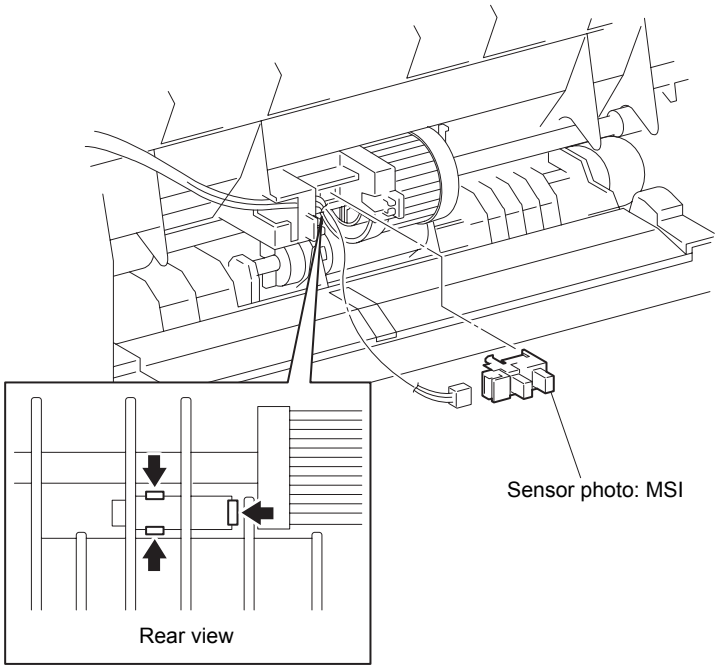


Fig.4-45

2.3.8 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.

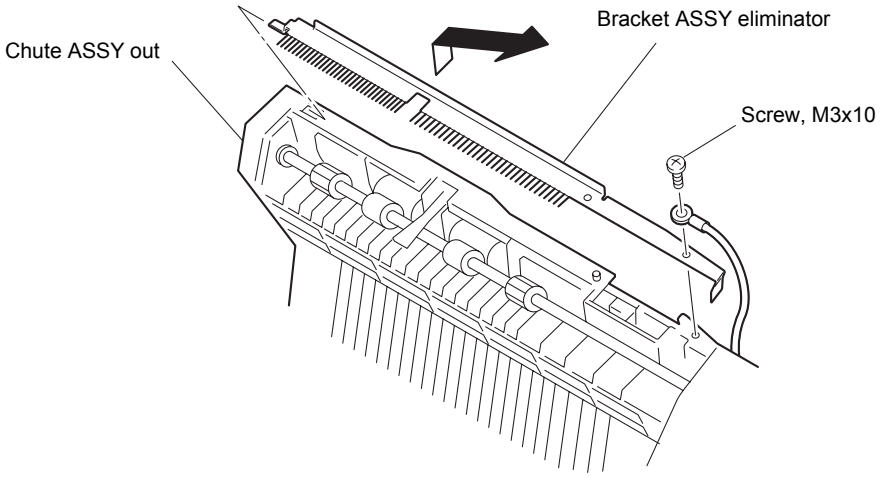


Fig.4-46

2.3.9 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.

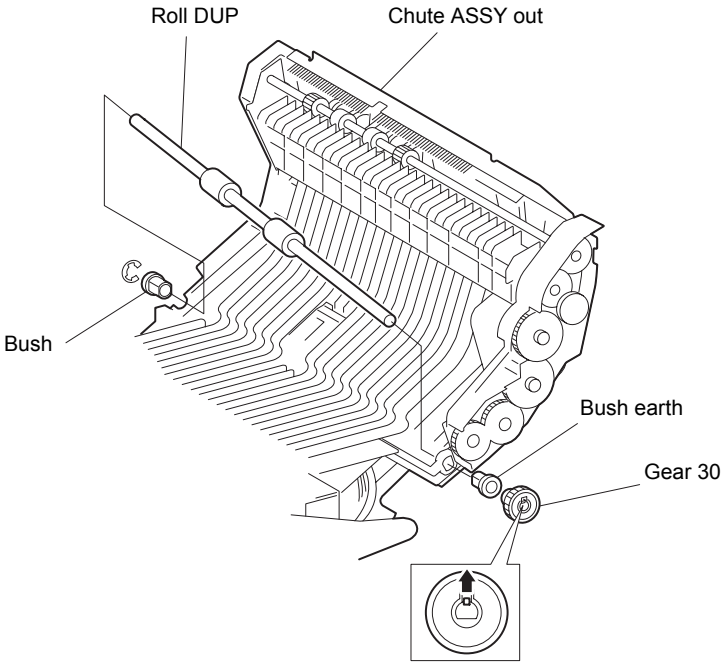


Fig.4-47

2.3.10 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.

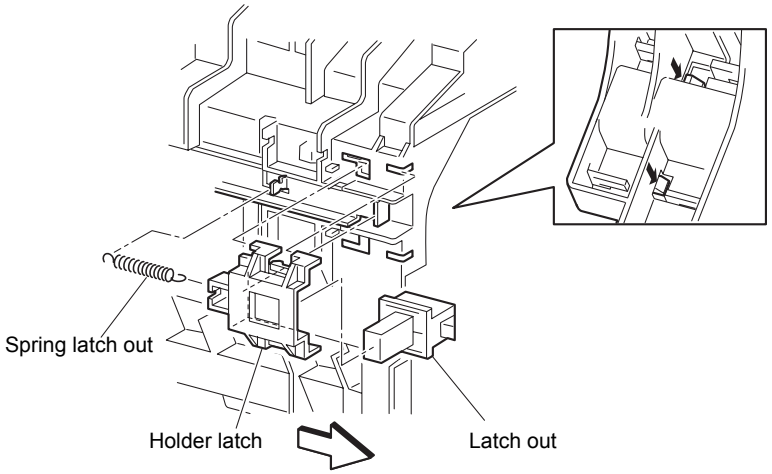


Fig.4-48

2.3.11 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.

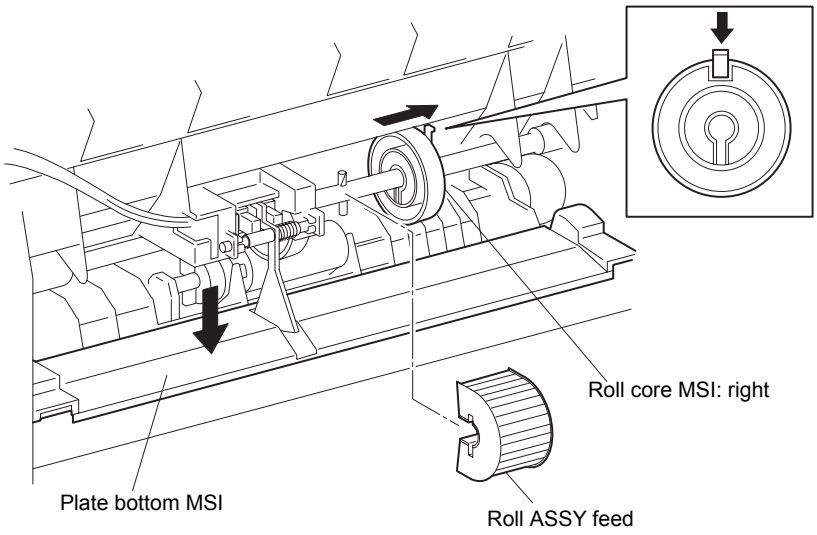


Fig.4-49

2.3.12 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.

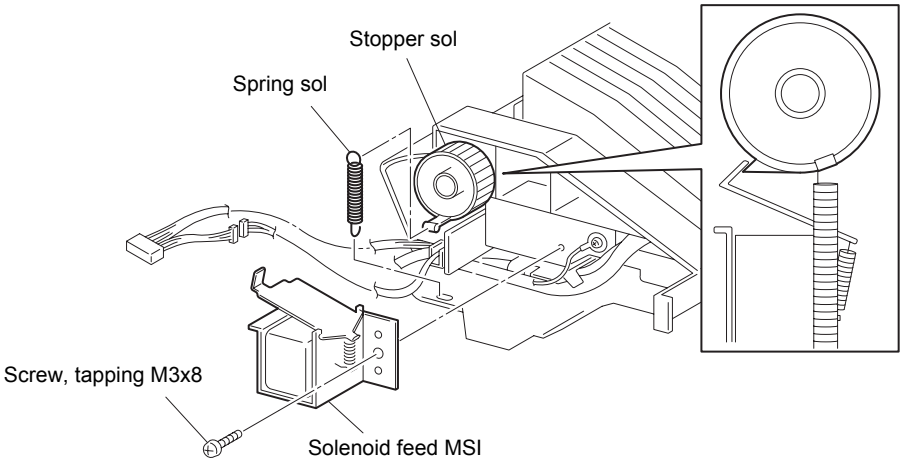


Fig.4-50

2.3.13 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 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.

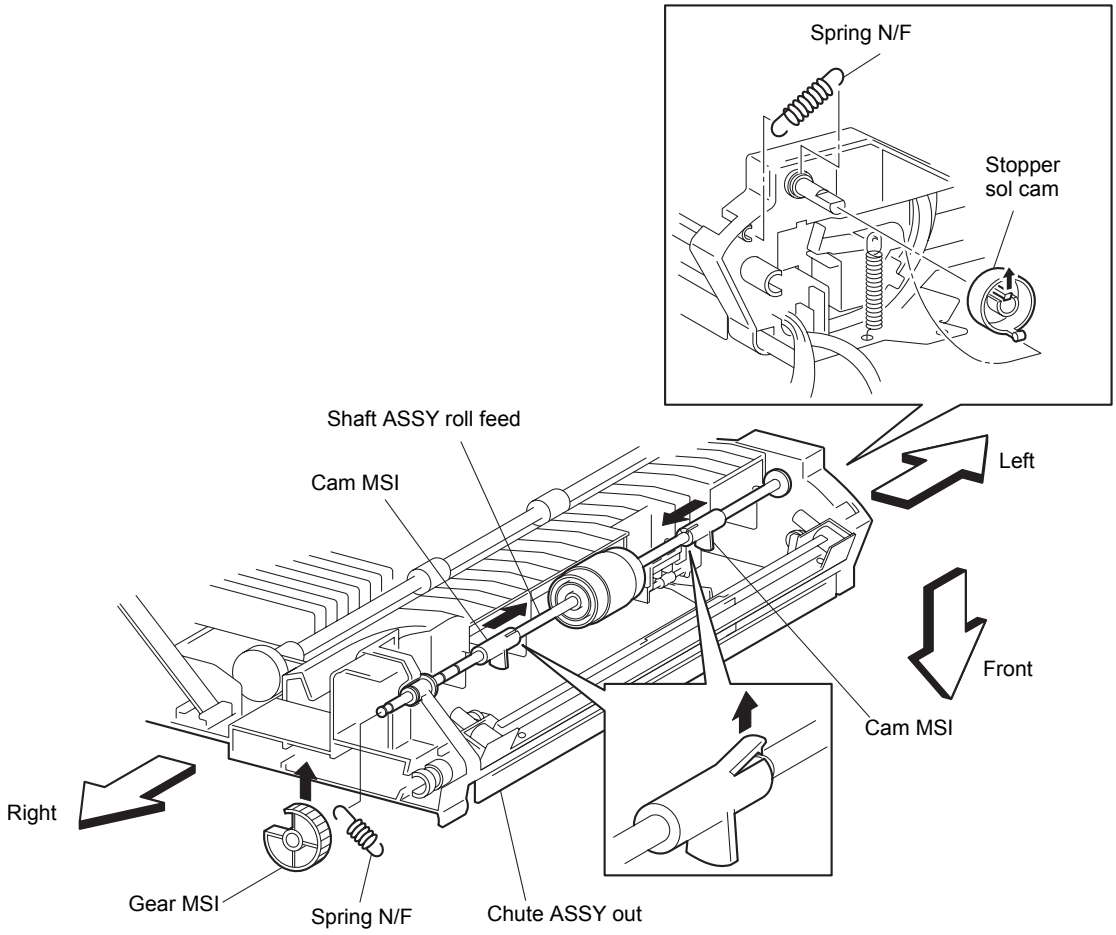


Fig.4-51

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.

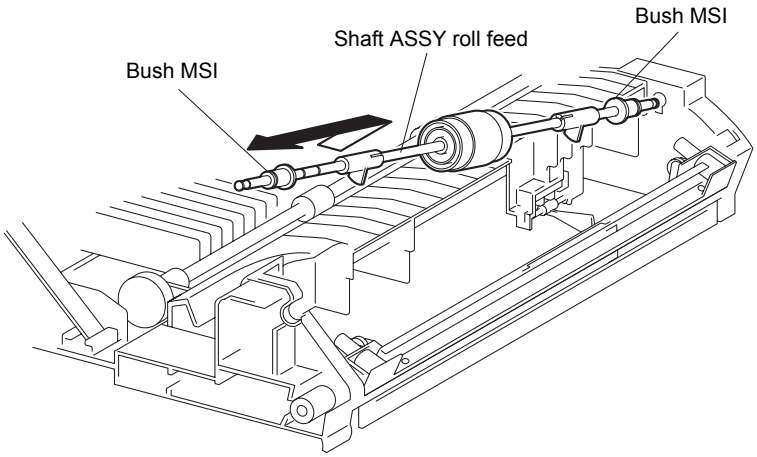


Fig.4-52

2.3.14 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.

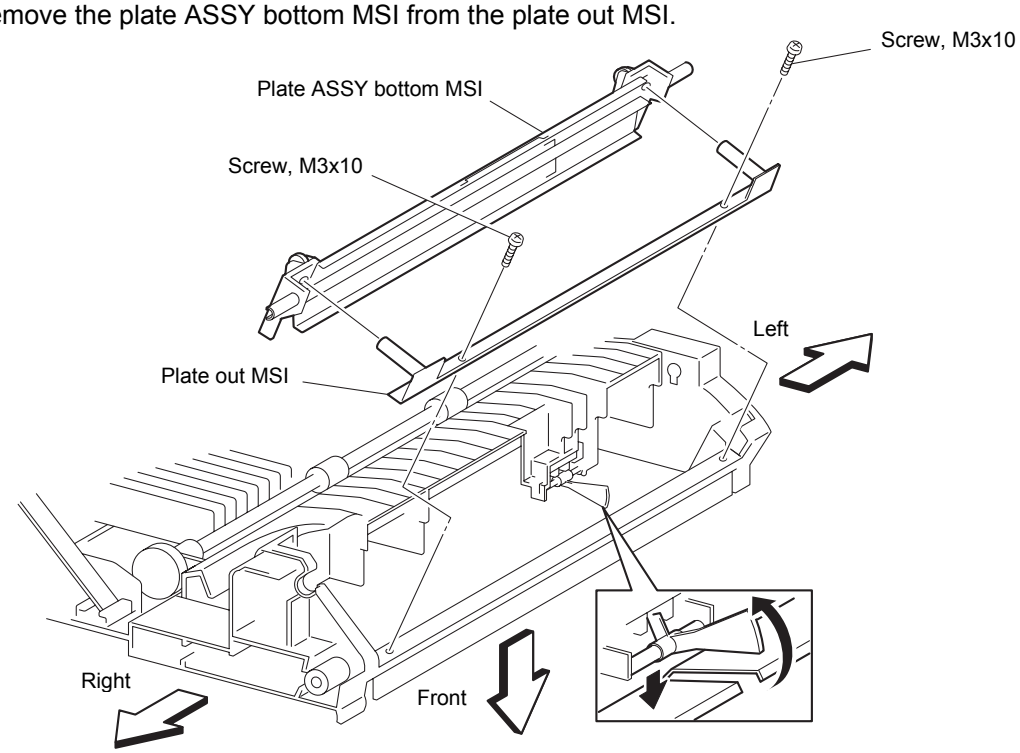


Fig.4-53

2.3.15 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.

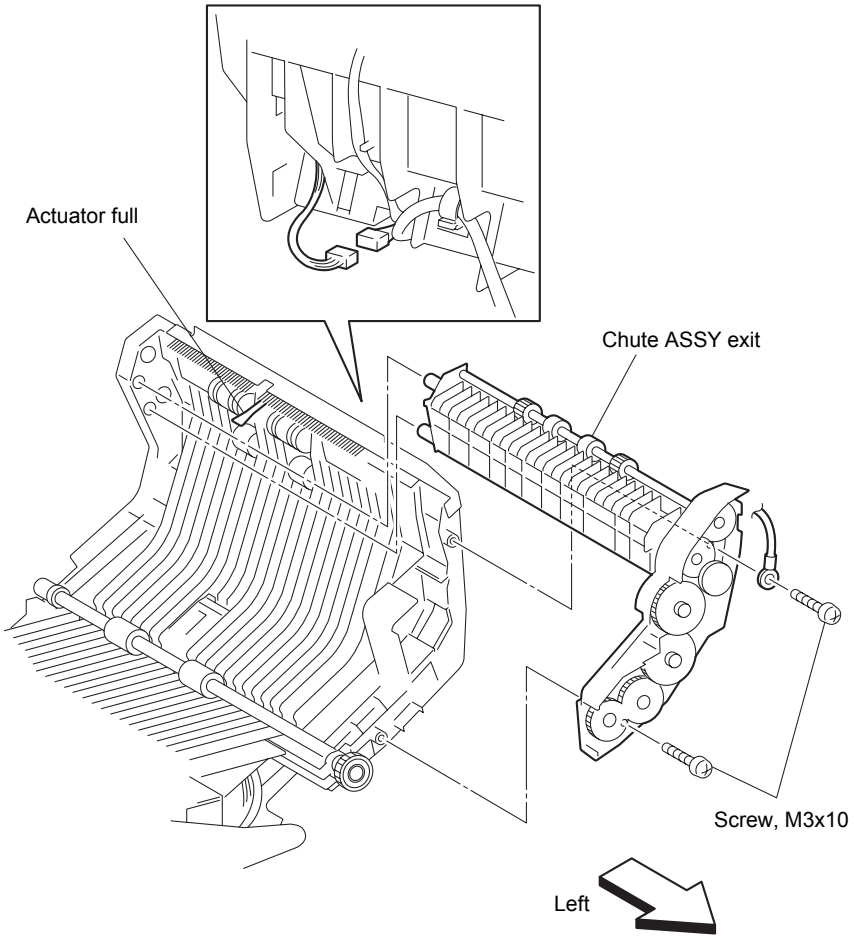


Fig.4-54

2.3.16 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.

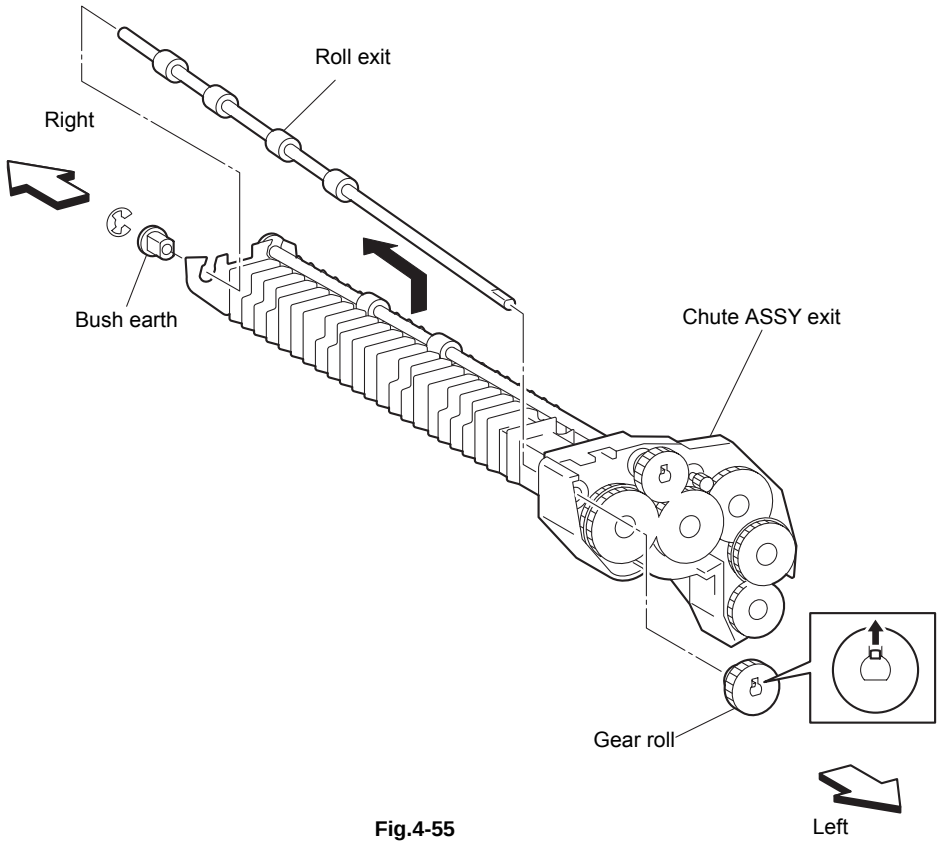


Fig.4-55

2.3.17 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.

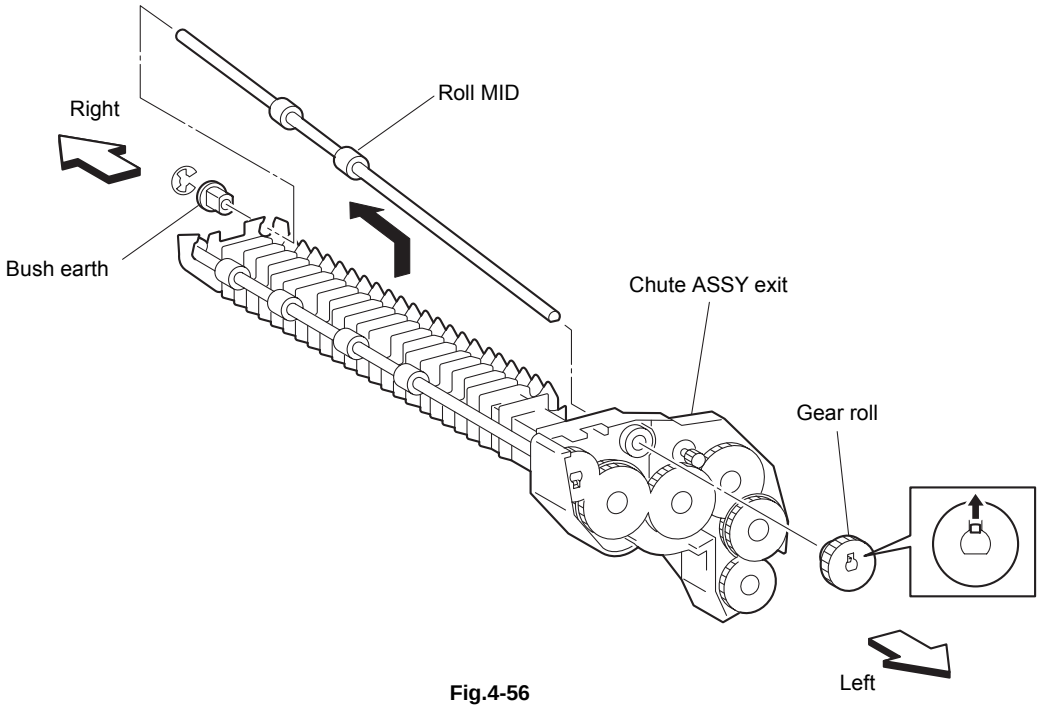


Fig.4-56

2.3.18 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) Remove the gear 40/42 from the left side of the chute ASSY exit.
4) Remove the gear 48 from the left side of the chute ASSY exit.
5) Remove 3 screws securing the motor ASSY DUP to the chute ASSY exit.
6) Remove the motor ASSY DUP from the chute ASSY exit.

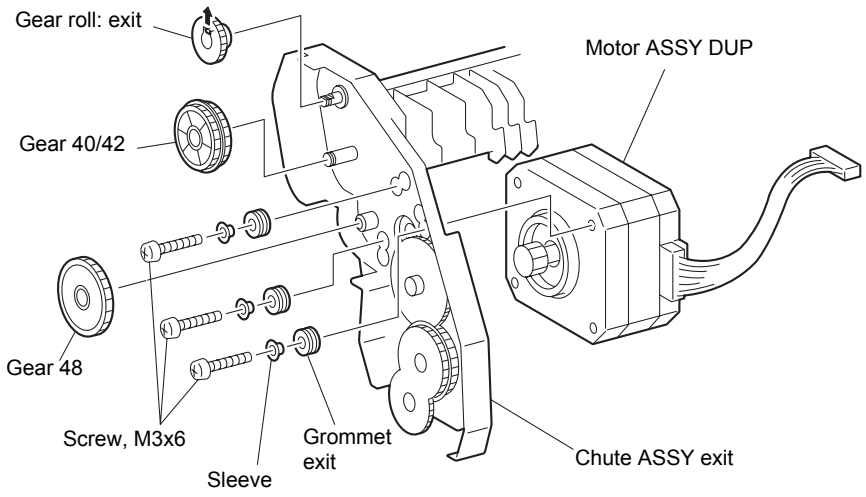


Fig.4-57

2.3.19 Chute ASSY IN

Note:
In the following step, lock the chute ASSY IN to the printer with latch at A to prevent the chute ASSY IN from drop off.

1) Remove the connectors on the S-HVPS from the left side of the printer.
2) Remove the connectors from the connector bracket on the left side of the printer.
3) Disconnect the connector of harness ASSY FSR3 (FSR32) from the left hand side of a printer.
4) Shift the harness of the connectors removed above from the bottom portion of the HSG ASSY BIAS on the left side of the printer.
5) Remove the connector on the PWBA DRV HBN on the right side of the printer.
6) Remove the connector on the LVPS on the right side of the printer.

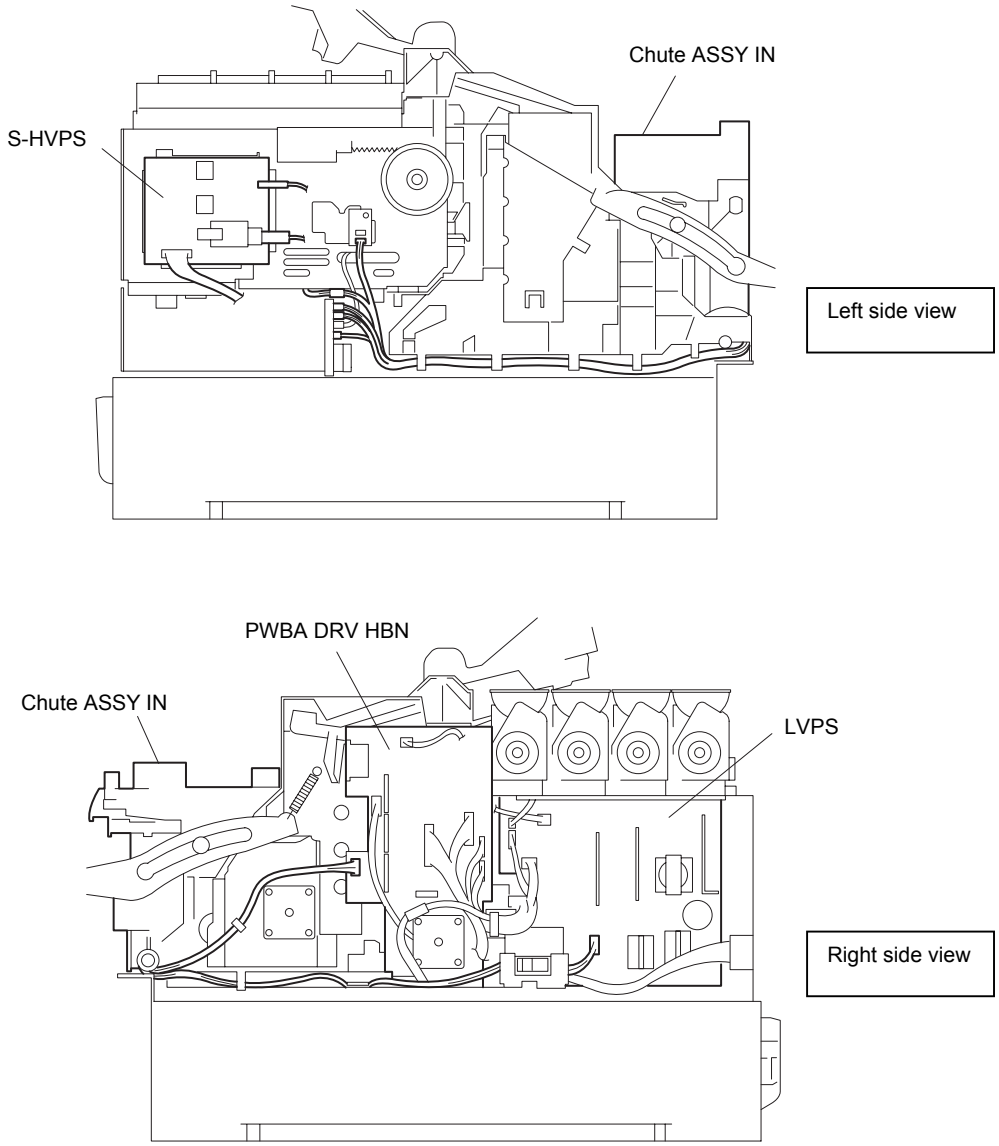


Fig.4-58

7) Remove 1 screw securing the wire ASSY FSR earth on the right side of the printer.
8) Release the harness of the fuser drive ASSY from the clamp on the drive ASSY main.
9) Shift the harness of the harness ASSY FSR3 (FSR32,FSR4) from the hook of the housing on the right side of the printer.
10) Release the latch at A from the printer, and pull out the chute ASSY IN frontward and remove.

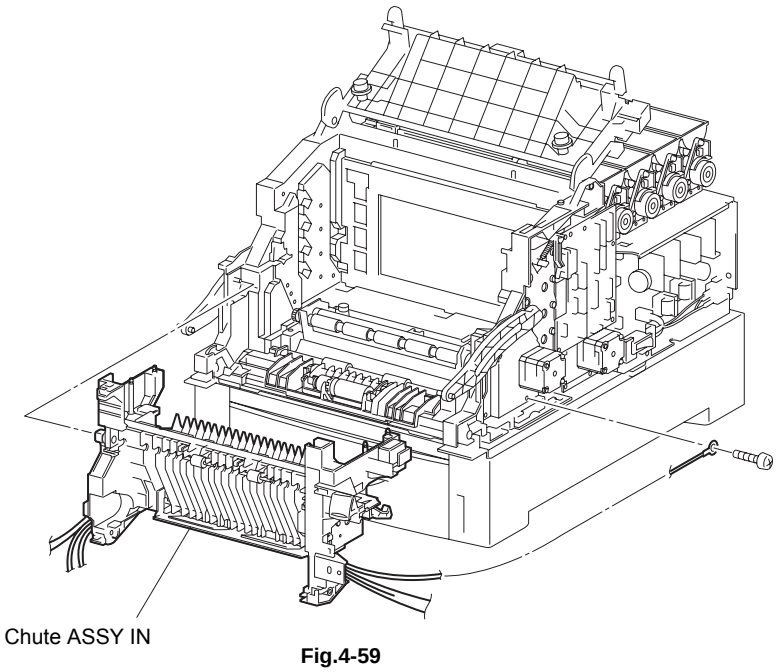


Fig.4-59

2.3.20 Holder ASSY CTD

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

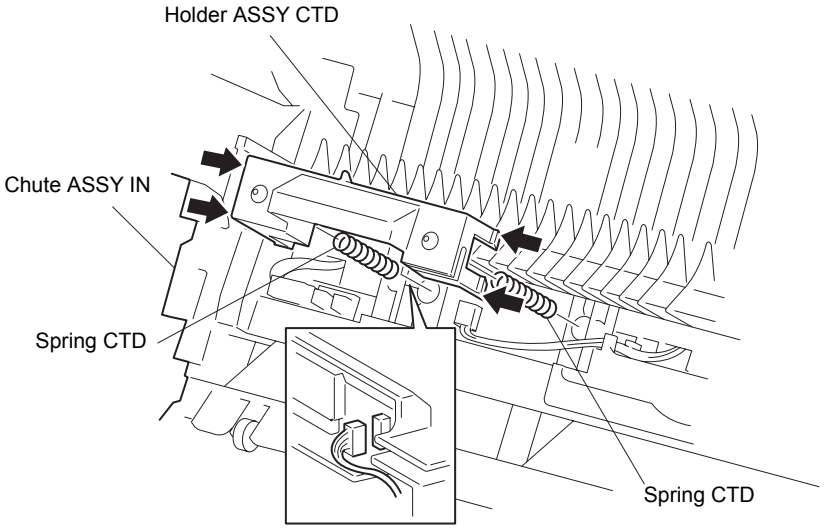


Fig.4-60

2.3.21 Sensor TNR full

1) Release the 2 hooks securing the sensor TNR full to the chute ASSY IN.
2) Remove the connector on the sensor TNR full.
3) Remove the sensor TNR full from the chute ASSY IN.

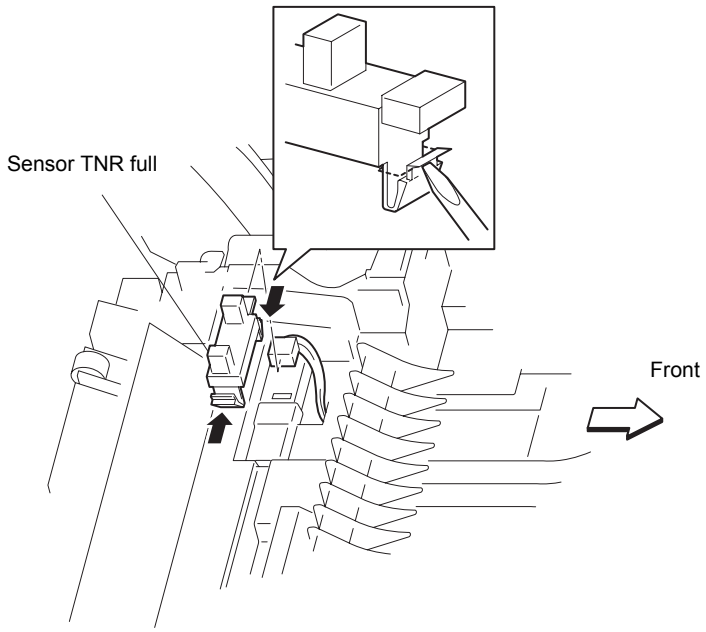


Fig.4-61

2.3.22 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 chute ASSY IN.
2) Release the hook securing the latch R to the chute ASSY IN.
3) Pull out the latch R from the chute 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.

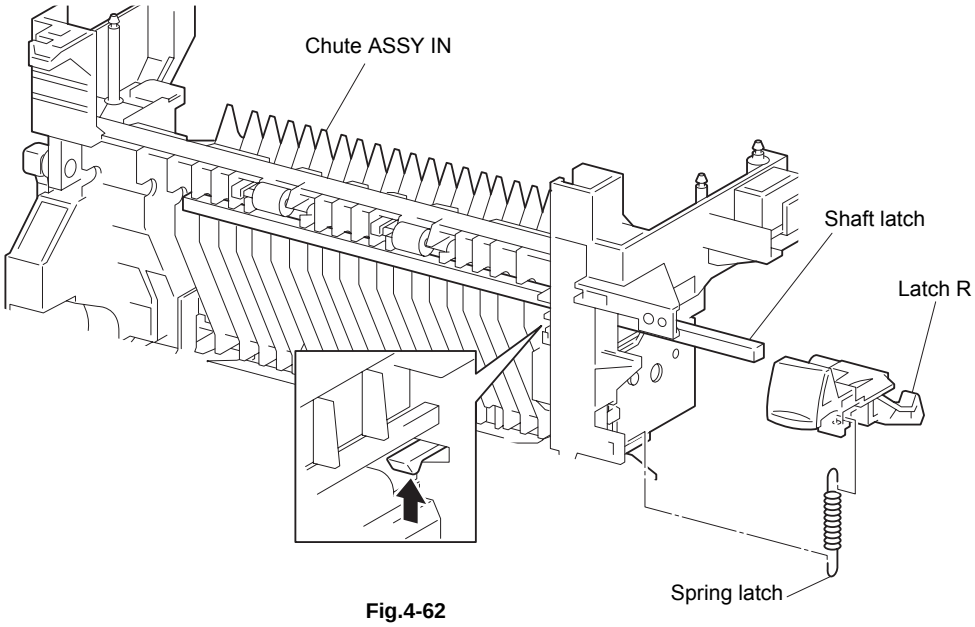


Fig.4-62

2.3.23 Latch L

1) Release the hook securing the latch L to the left side of the chute ASSY IN.
2) Remove the latch L from the chute ASSY IN.

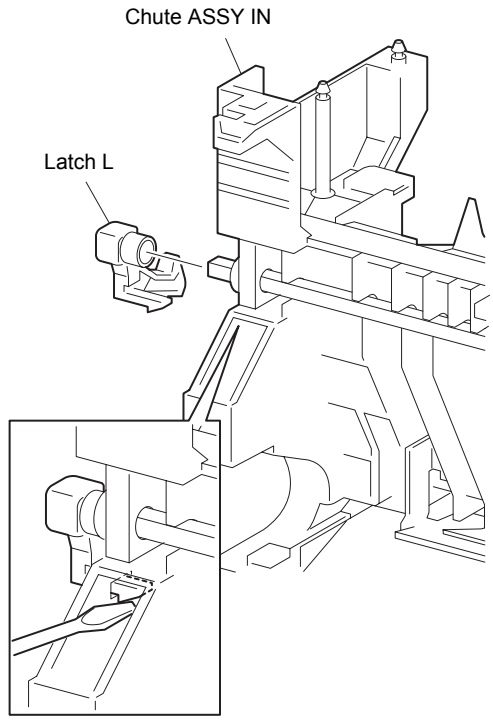


Fig.4-63

2.3.24 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 chute ASSY IN.
4) Remove the fuser drive ASSY from the chute ASSY IN.

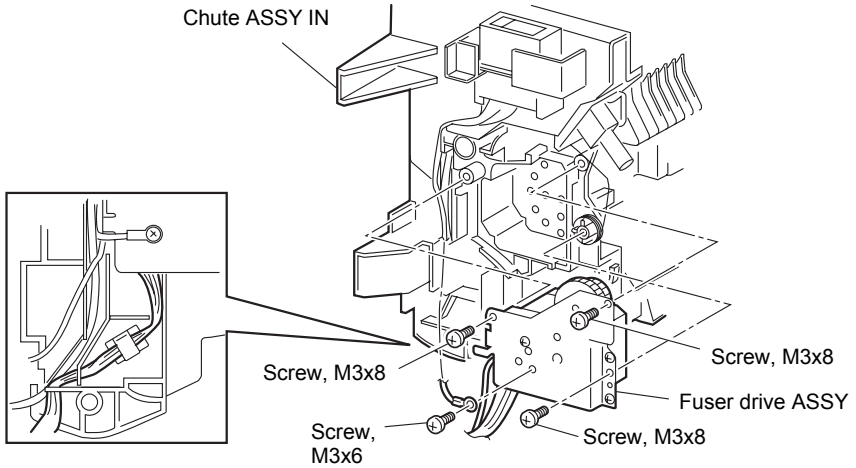


Fig.4-64

2.3.25 Chute ASSY REGI

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

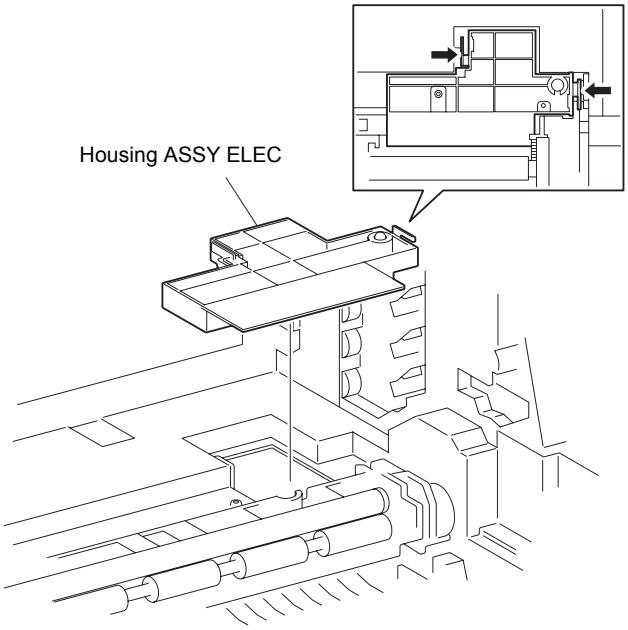


Fig.4-65

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.

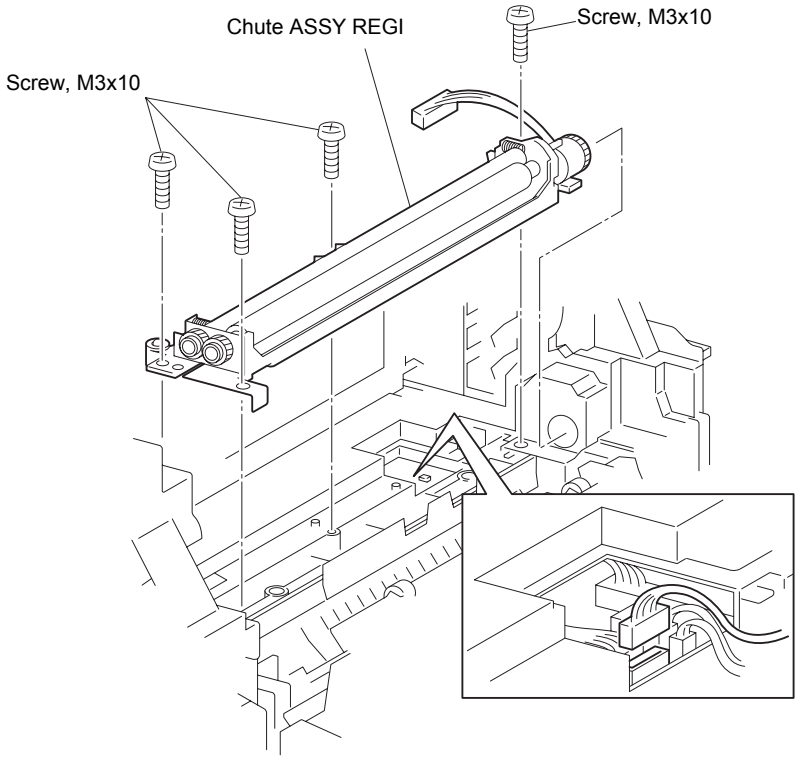


Fig.4-66

2.3.26 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.

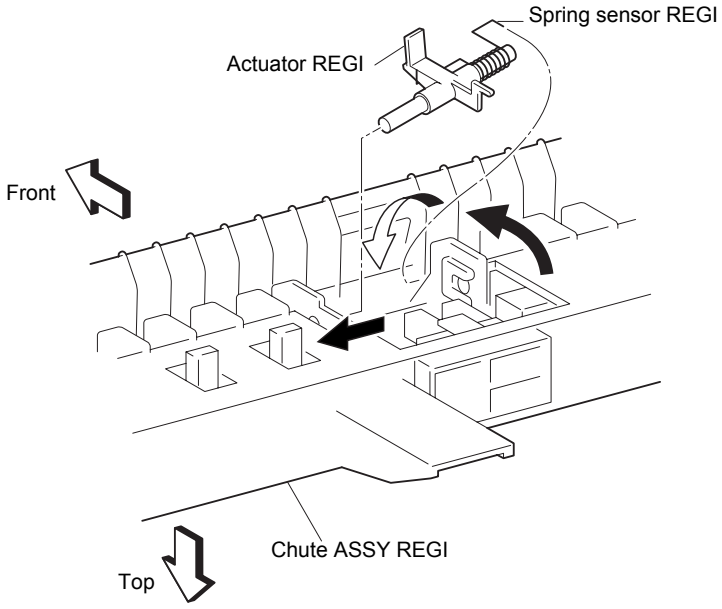


Fig.4-67

2.3.27 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.

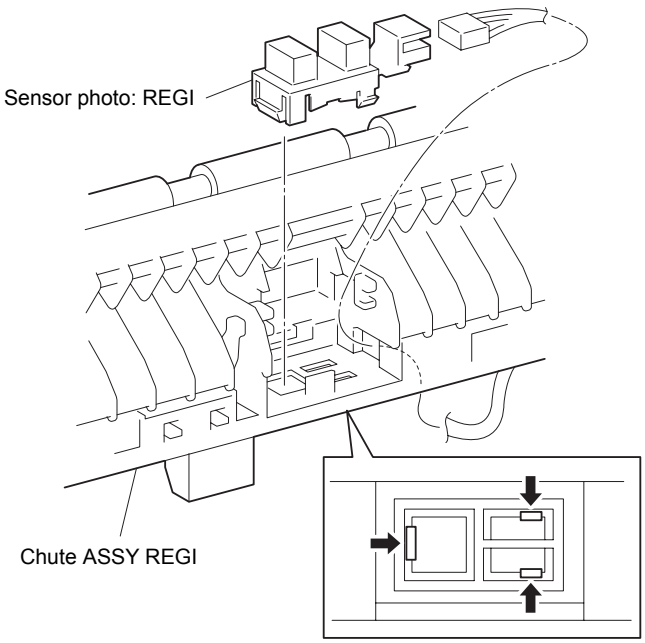


Fig.4-68

2.3.28 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.

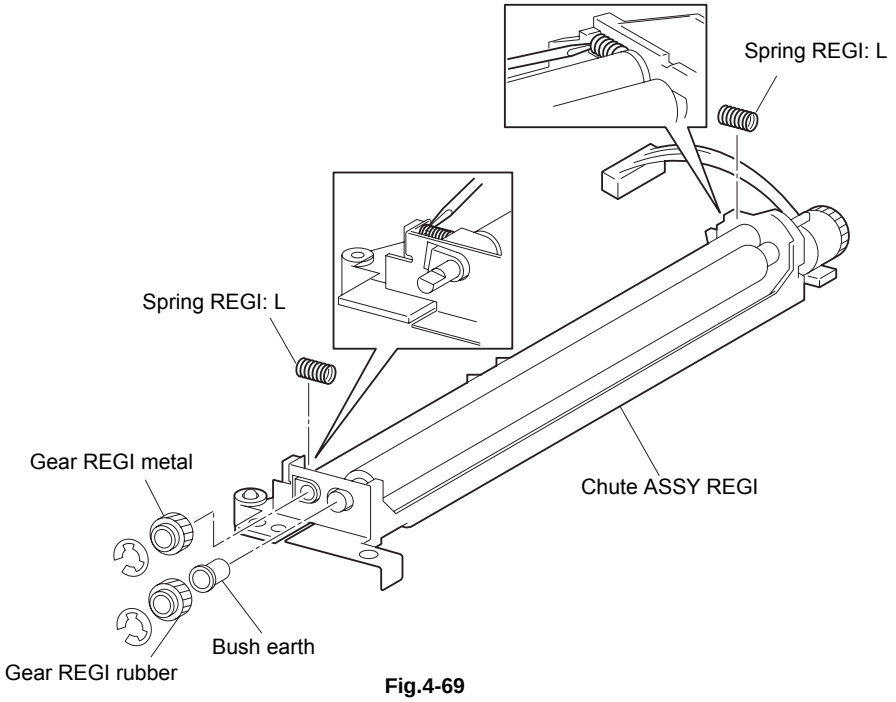


Fig.4-69

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

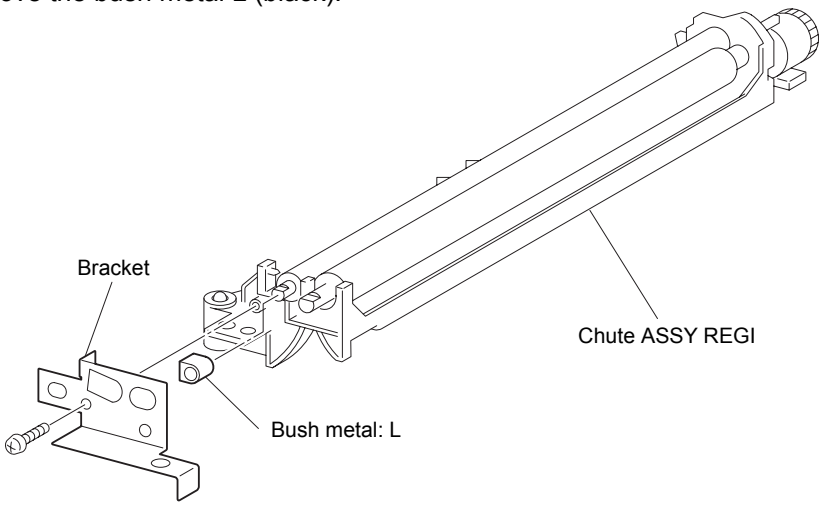


Fig.4-70

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

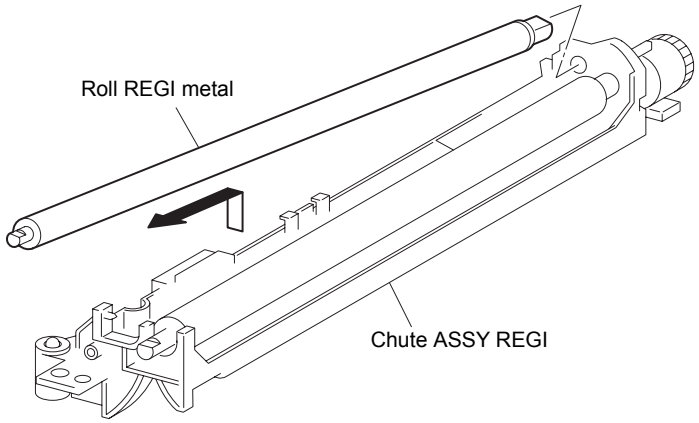


Fig.4-71

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.

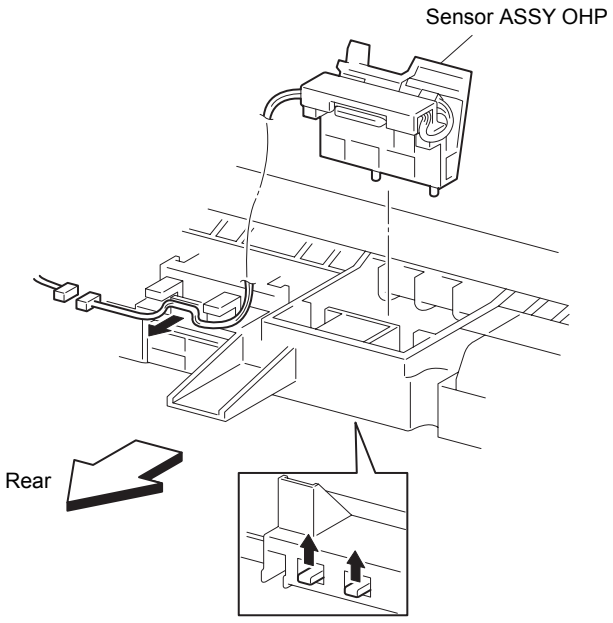


Fig.4-72

2.3.29 Housing ASSY retard

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

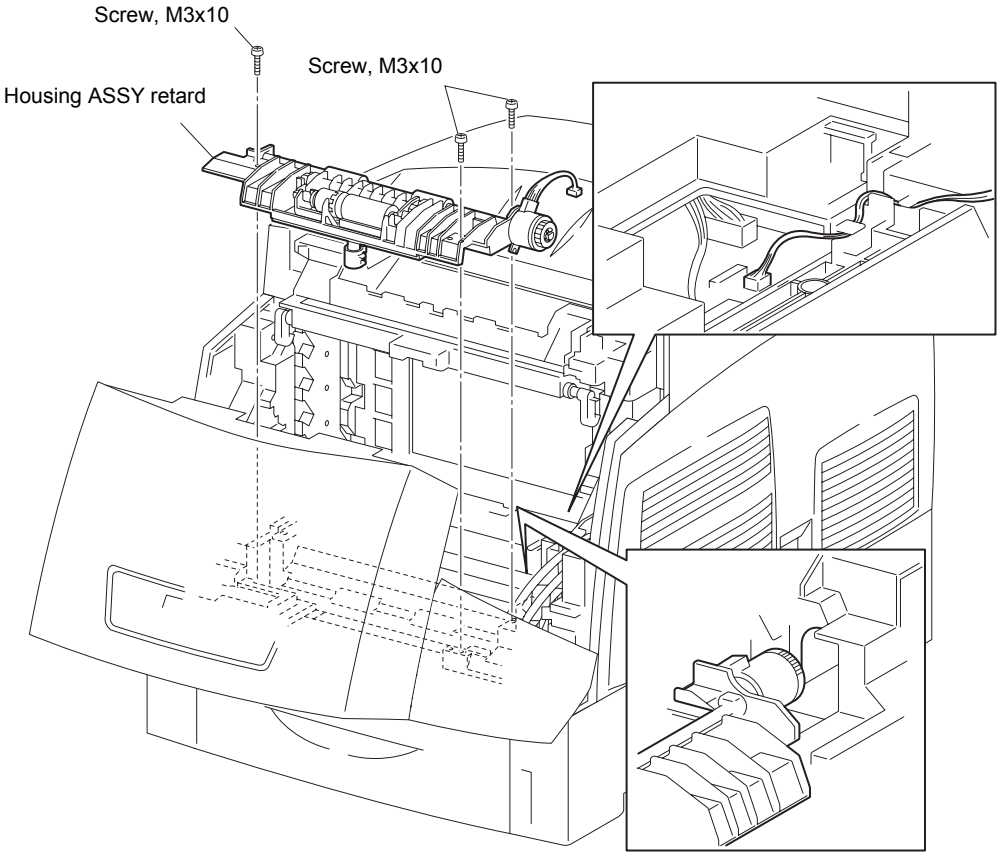


Fig.4-73

2.3.30 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.

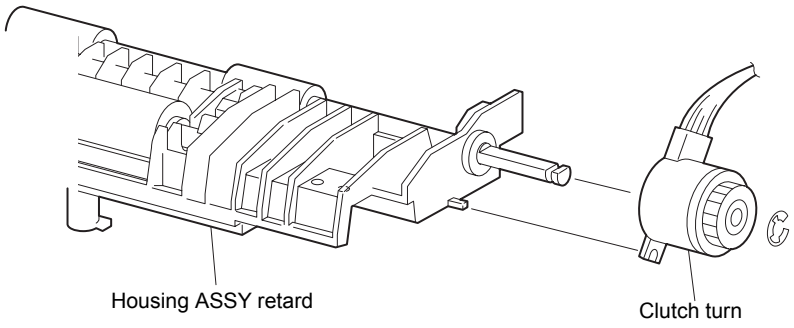


Fig.4-74

2.3.31 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.

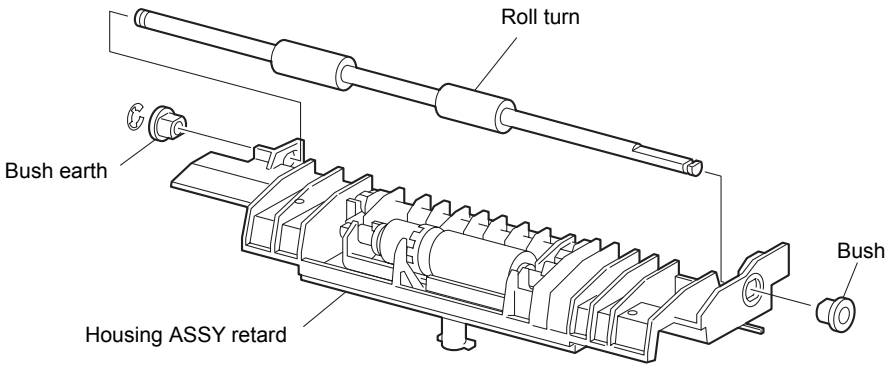


Fig.4-75

2.3.32 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.

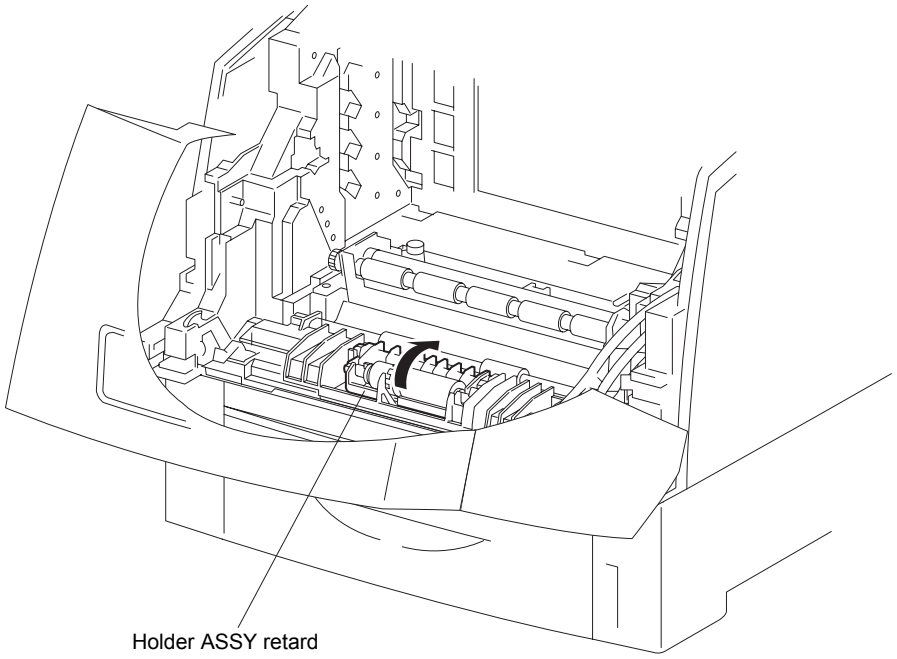


Fig.4-76

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.

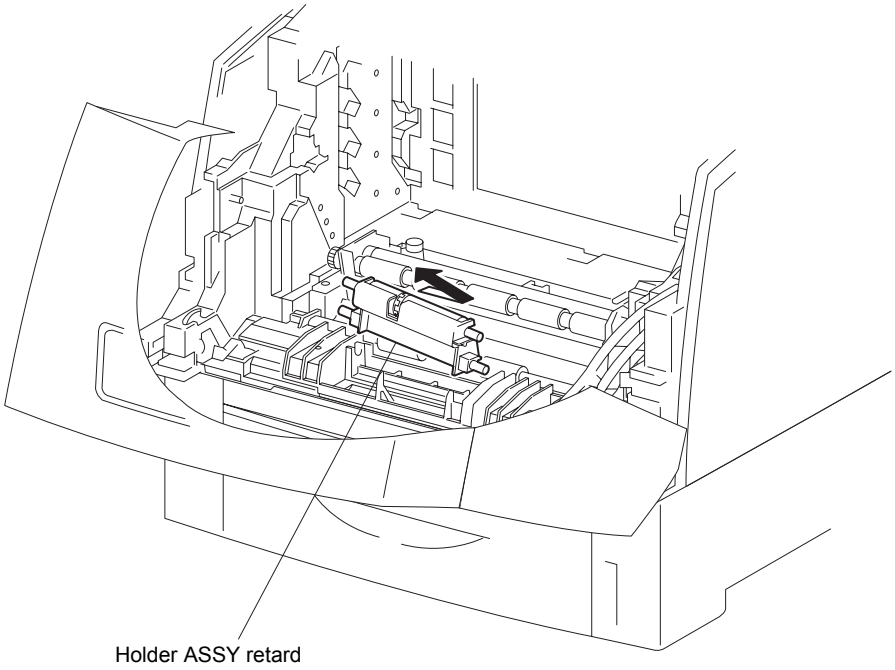


Fig.4-77

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

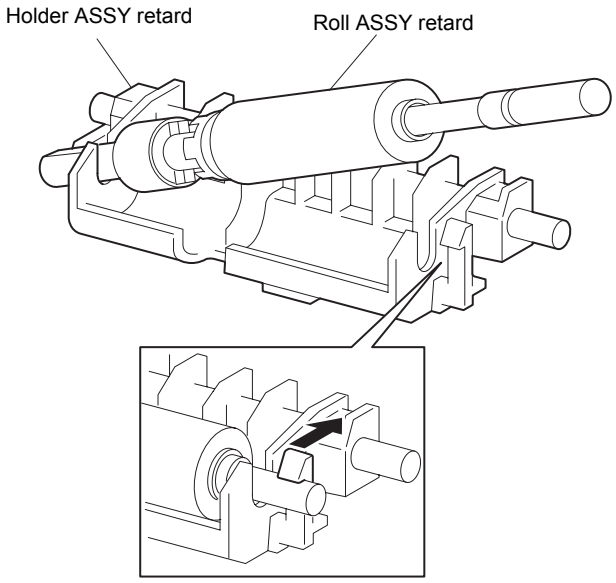


Fig.4-78

2.3.33 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.

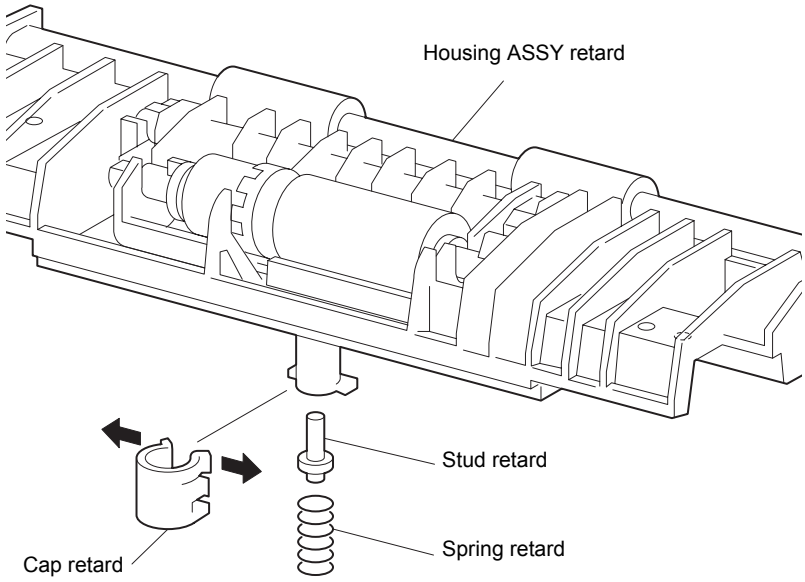


Fig.4-79

2.3.34 PWBA ASSY earth

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

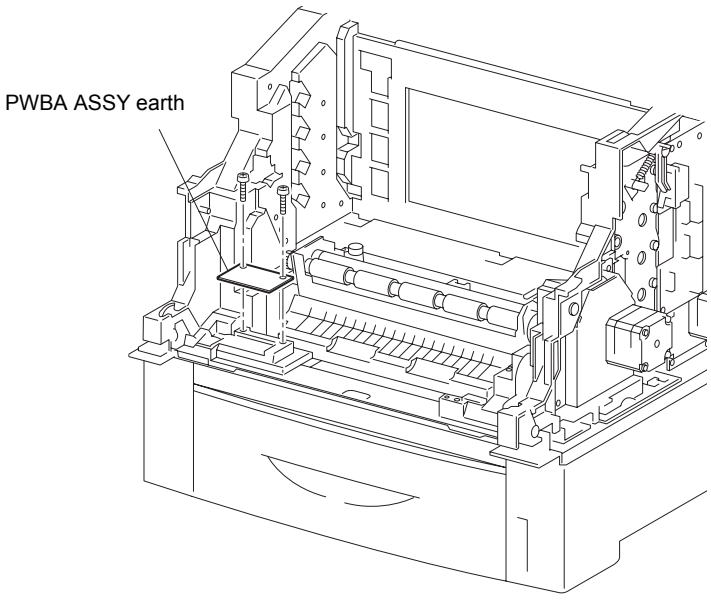


Fig.4-80

2.4 Top of the Printer

2.4.1 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 DRV HBN from the right side of the printer.

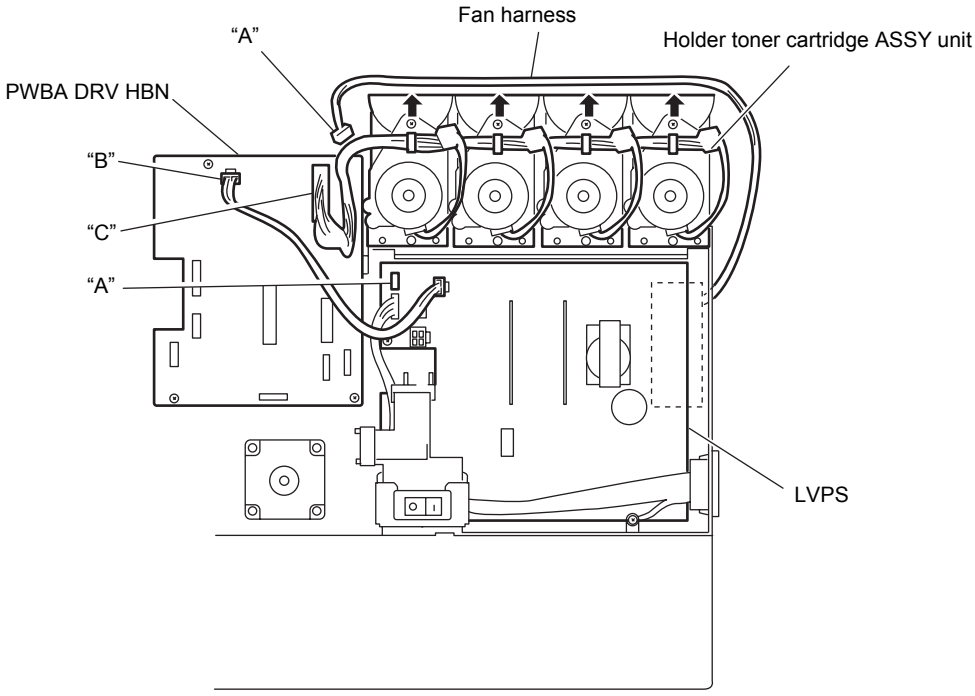


Fig.4-81

3) Remove the connector (D) on the PWBA EEPROM 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.

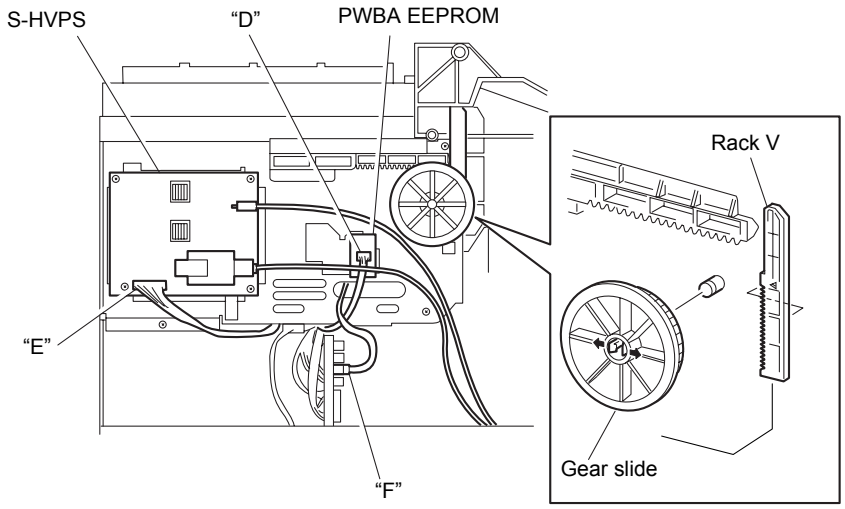


Fig.4-82

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.

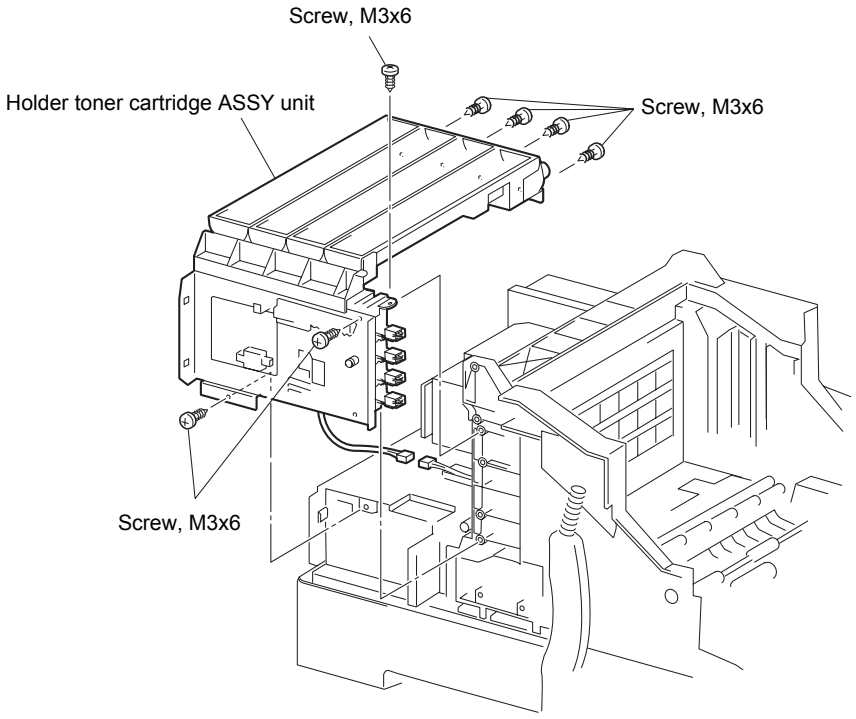


Fig.4-83

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.

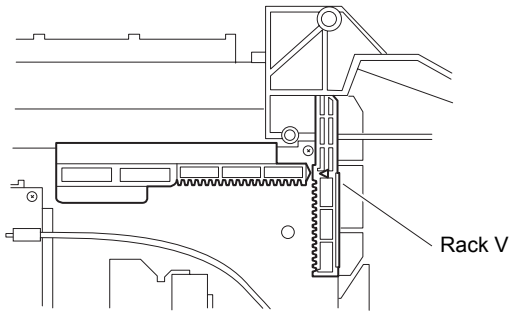


Fig.4-84

2.4.2 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) Remove the screws securing the holder toner cartridge ASSY (1) on the plate ASSY dispenser.
7) 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.

<Yellow>

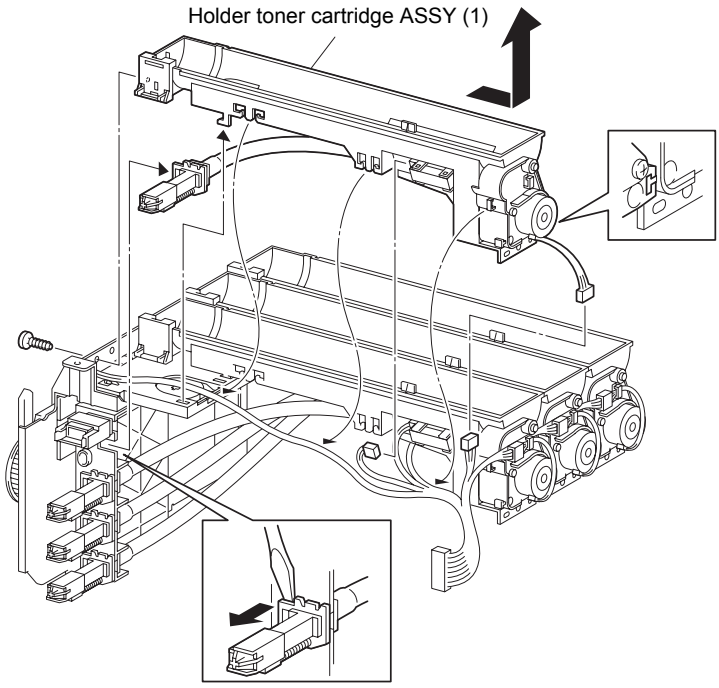


Fig.4-85

<Magenta>

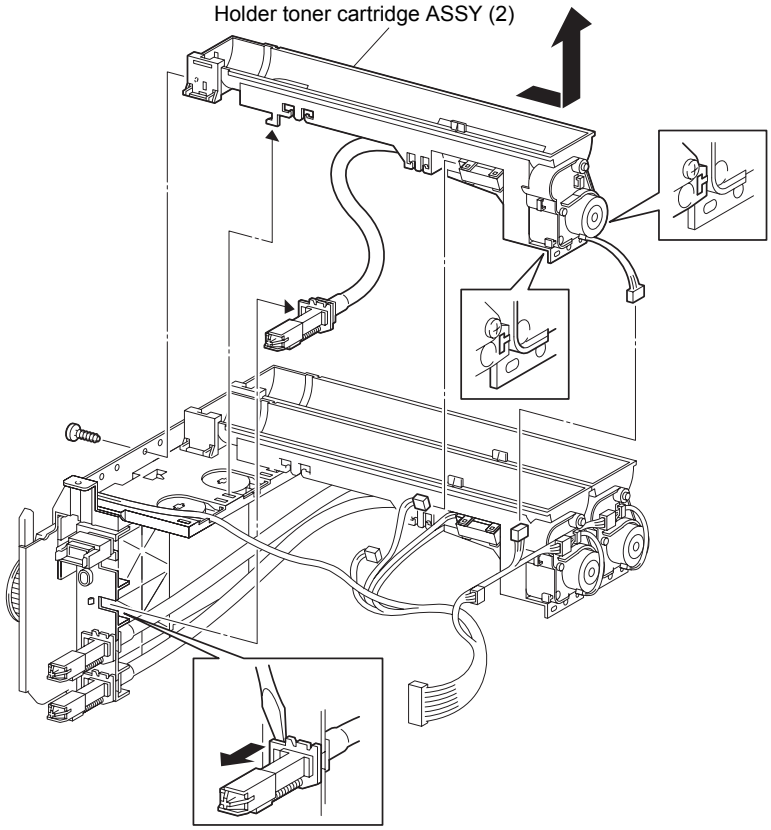


Fig.4-86

<Cyan>

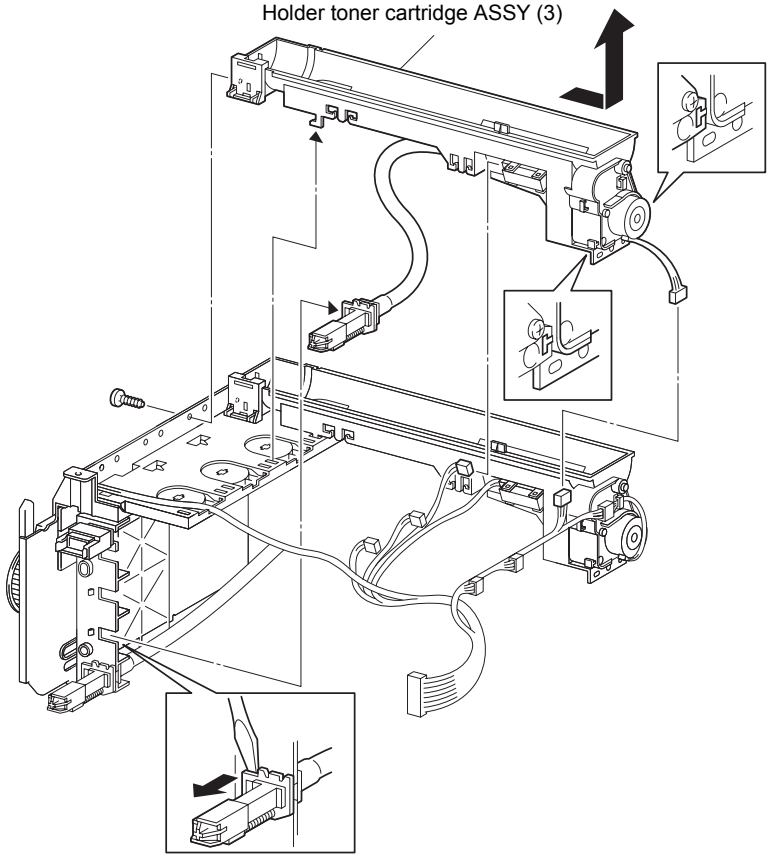


Fig.4-87

<Black>

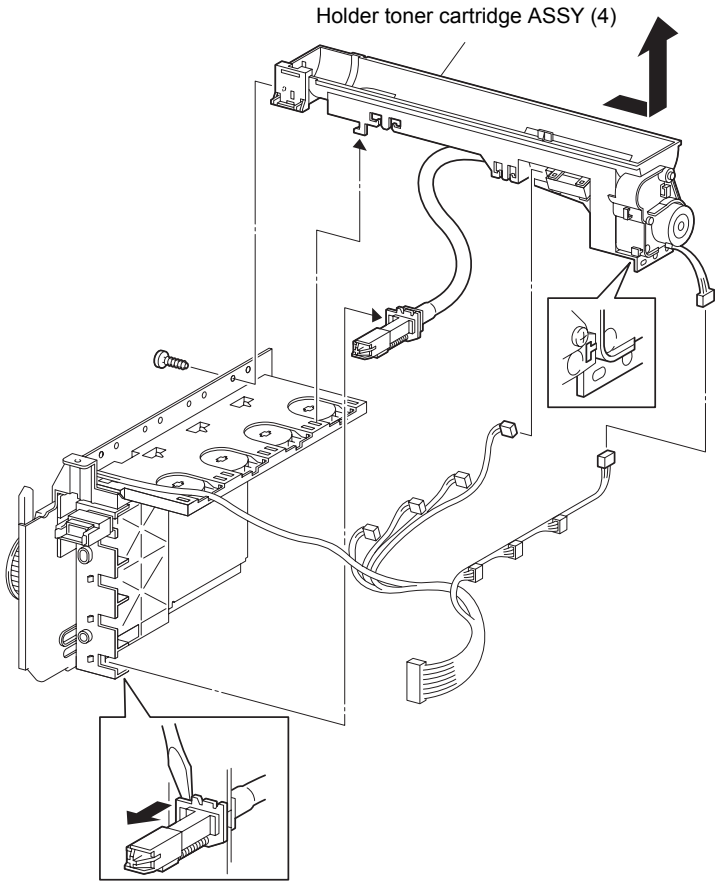


Fig.4-88

2.4.3 Actuator toner cartridge ASSY

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

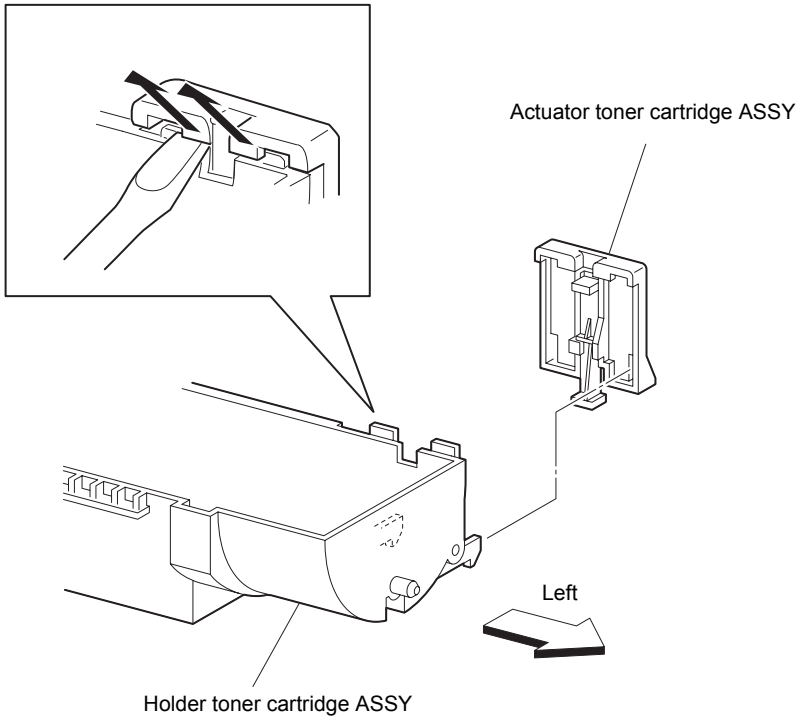


Fig.4-89

2.4.4 Bracket sensor 2 and actuator sensor 2

1) Remove the actuator sensor 2 from the actuator toner cartridge ASSY.

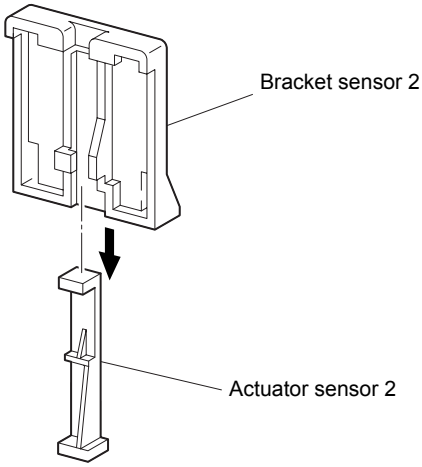


Fig.4-90

2.4.5 Sensor no toner

1) Remove the 4 hooks securing the sensor no toner to the holder toner cartridge ASSY.
2) Remove the sensor no toner from the holder toner cartridge ASSY.

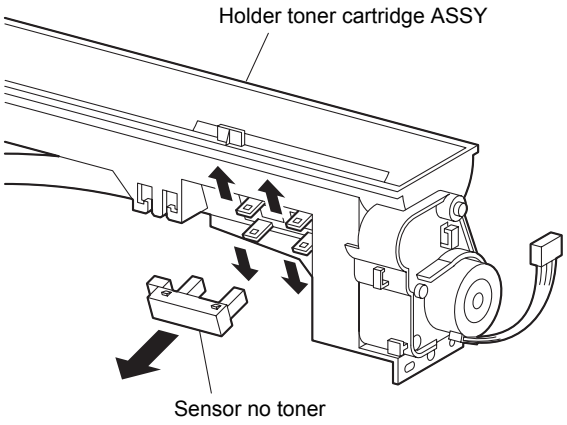


Fig.4-91

2.4.6 Box ASSY CRUM reader

1) Remove the connector on PWBA CRUM reader. Remove harness ASSY toner 4 from the slit part of HSG base CRUM.
2) Remove two screws which are fixing box ASSY CRUM reader to plate ASSY dispenser HBN.
3) Remove box ASSY CRUM reader from plate ASSY dispenser HBN.

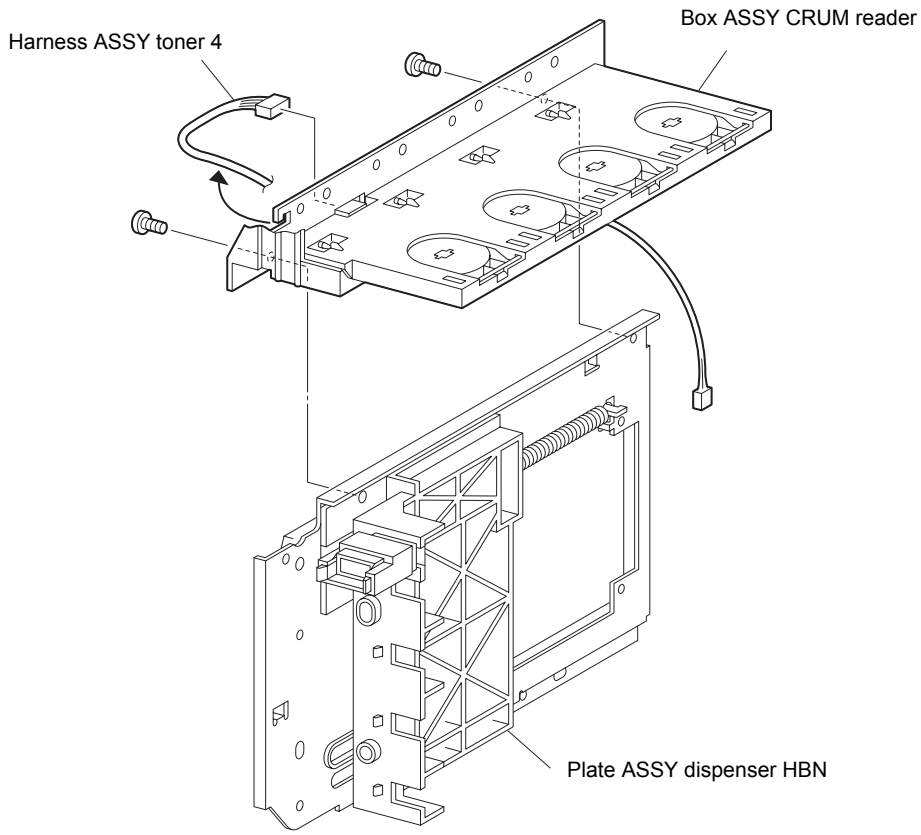


Fig.4-92

2.4.7 PWBA EEPROM

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

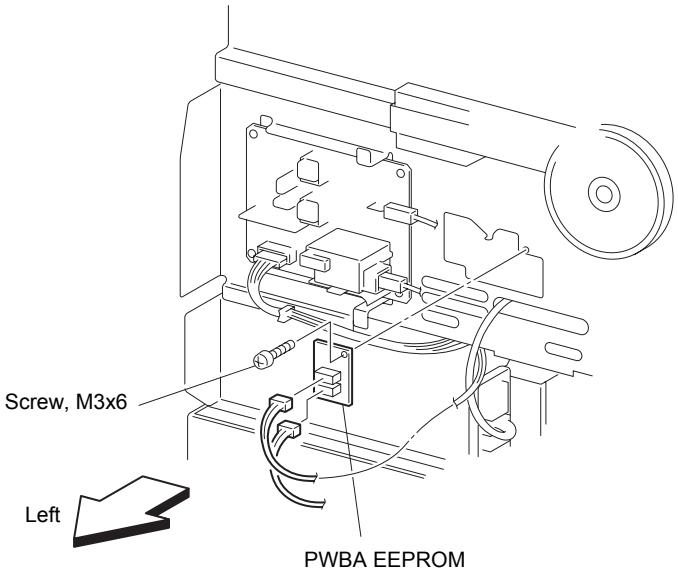


Fig.4-93

2.4.8 S-HVPS

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

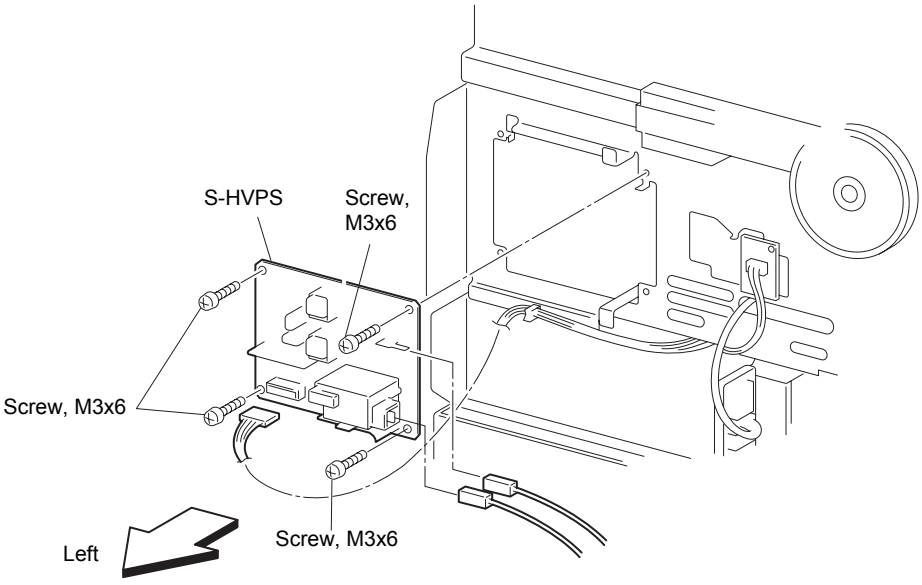


Fig.4-94

2.4.9 Fan rear

1) Remove the connector on the LVPS from the right side surface of the printer.
2) Shift the harness of the fan rear from 3 hooks of the holder toner cartridge ASSY of the printer.
3) Remove 2 screws securing the fan rear from the printer.
4) Remove the fan rear from the printer.

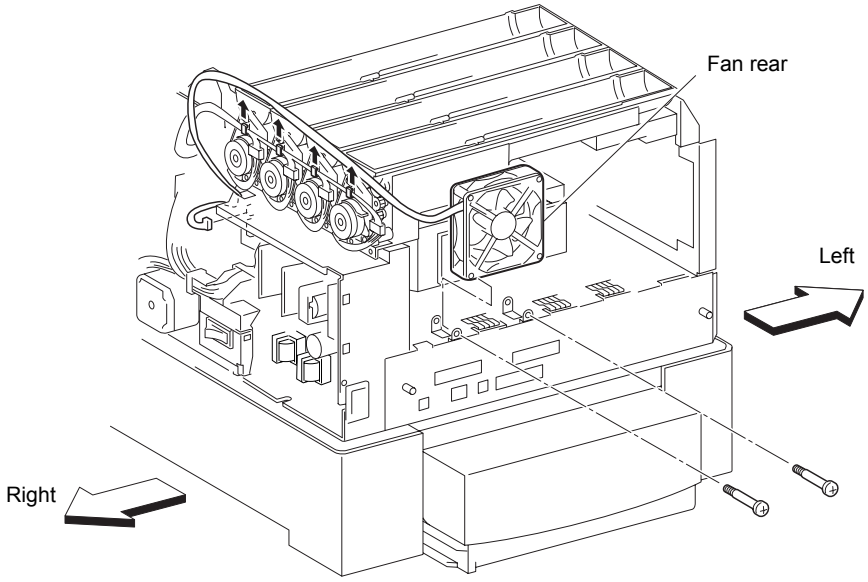


Fig.4-95

2.4.10 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 3 screws securing the scanner ASSY to the printer.
4) Remove the scanner ASSY from the printer.

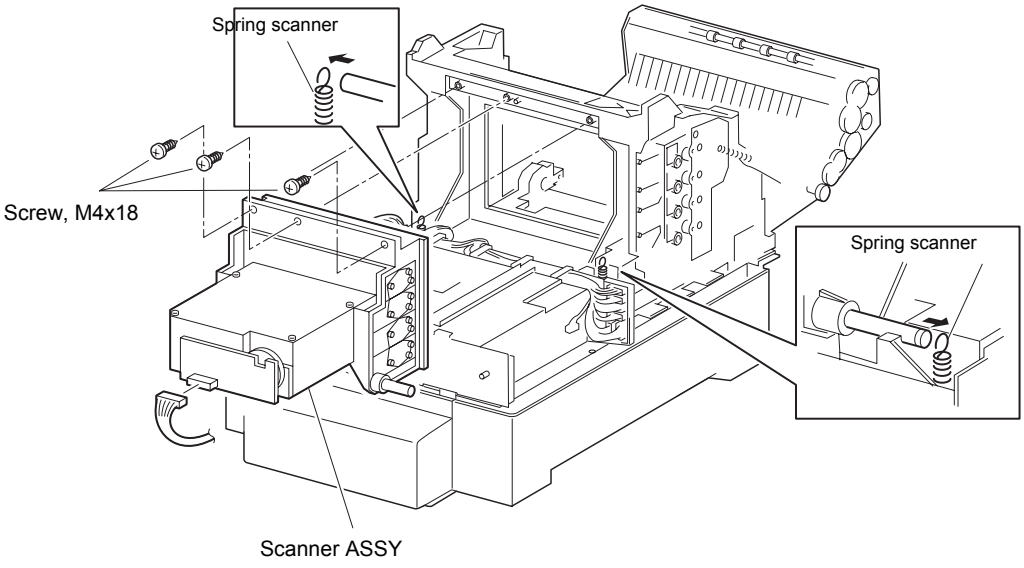


Fig.4-96

2.5 Right / Left / PCBs of the Printer

2.5.1 Controller Board

1) Loosen the two screws, and then remove the controller board.

Note:

In replacing the controller board on the printer, connect the connector at the leading end of controller board to the connector of the MCU HL-4200.

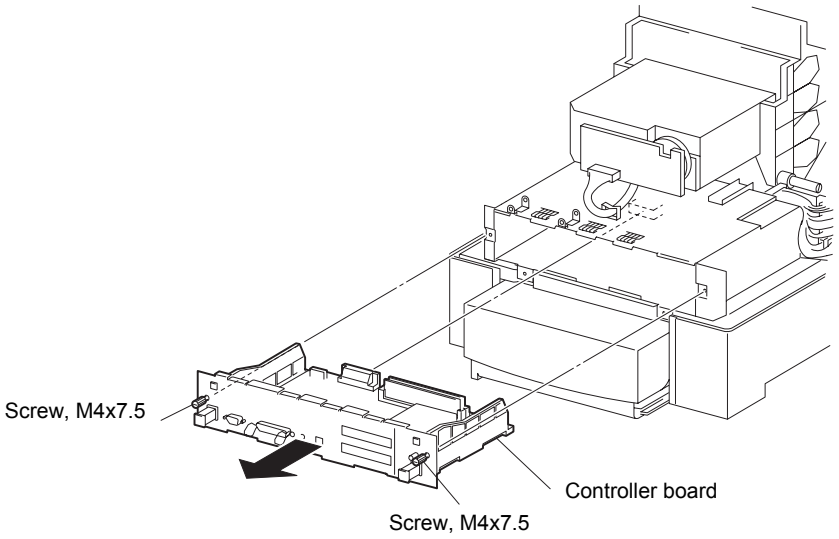


Fig.4-97

2) Remove the two screws from the plate rear ess.
3) Remove the NIC excord ASSY BR.
4) Remove the four screws, and then remove the plate rear ess.
5) Remove the Guide L ess.
6) Remove the Guide R ess.
7) Remove the font card.

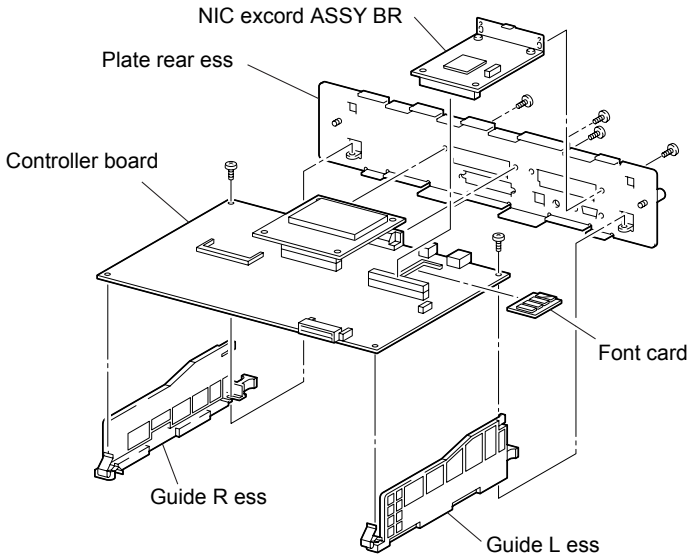


Fig.4-98

2.5.2 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.

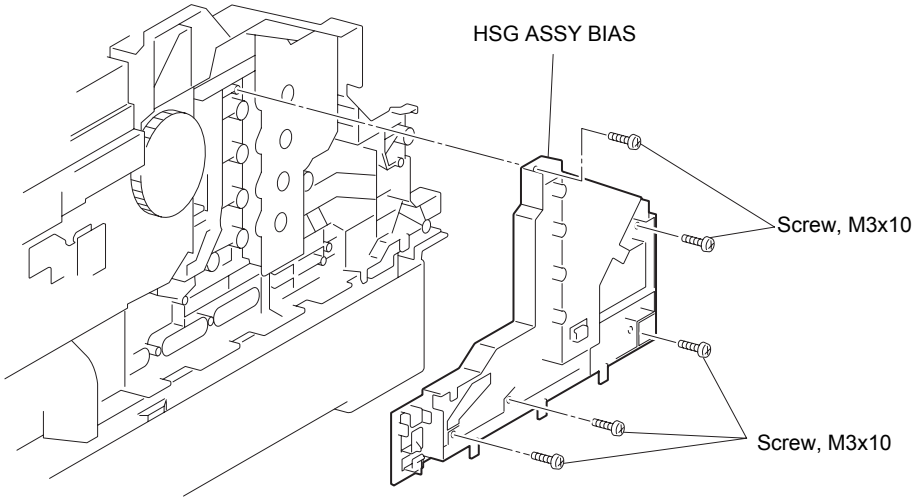


Fig.4-99

2.5.3 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.

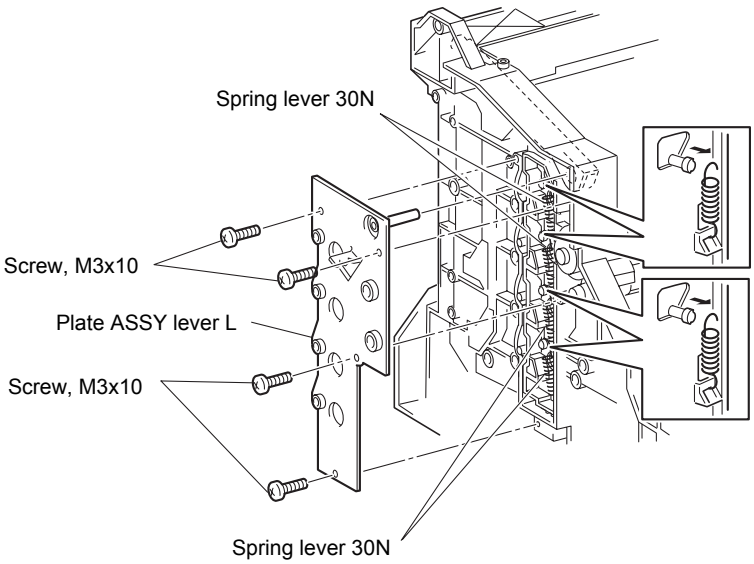


Fig.4-100

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).

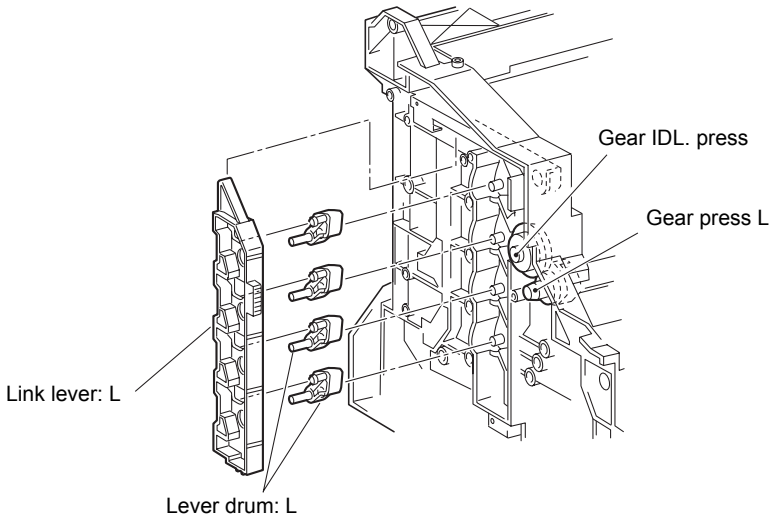


Fig.4-101

Note:

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

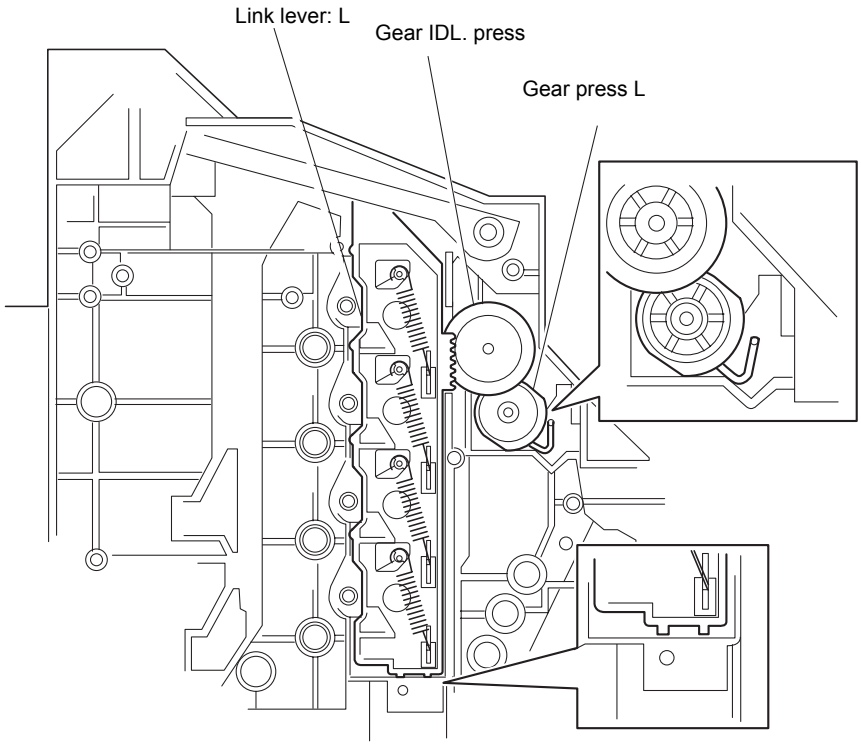


Fig.4-102

2.5.4 Drive ASSY main

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

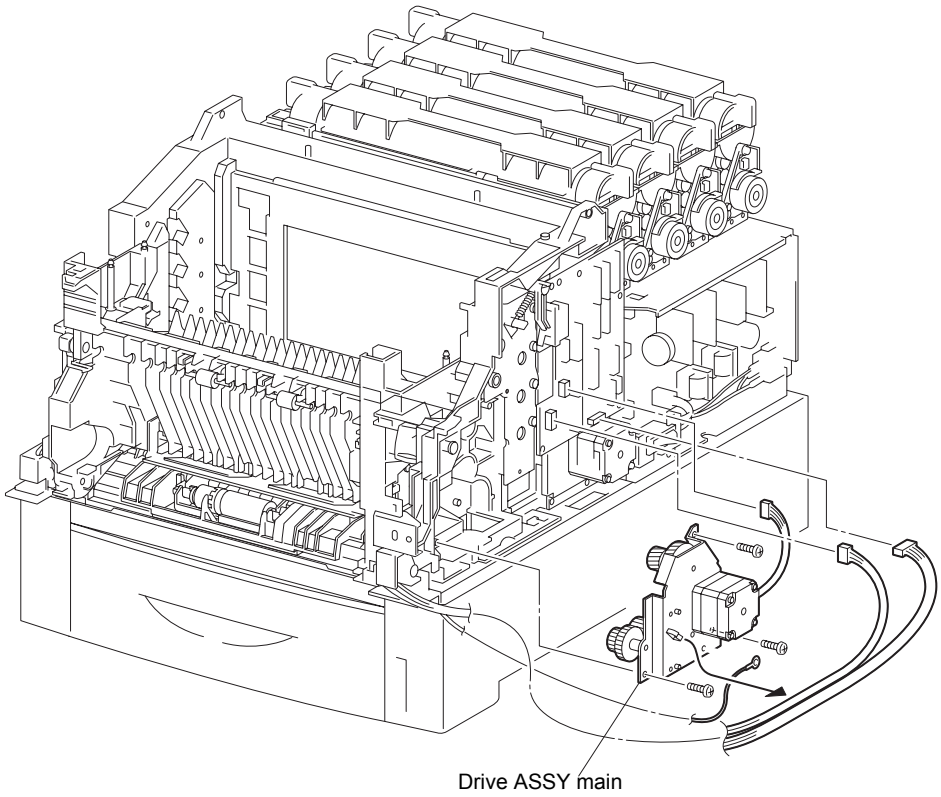


Fig.4-103

2.5.5 PWBA DRV HBN

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

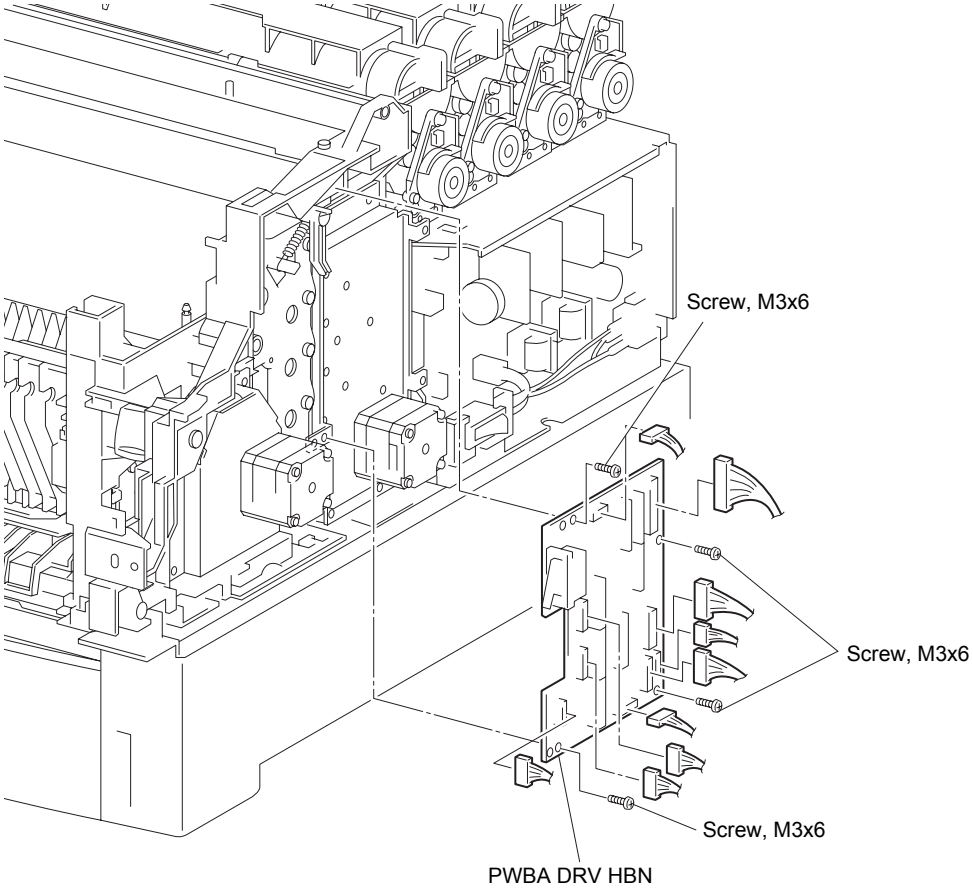


Fig.4-104

2.5.6 Drive ASSY DEVE

1) Remove 4 screws securing the Drive ASSY DEVE from the right side of the printer.
2) Remove the Drive ASSY DEVE from the printer.

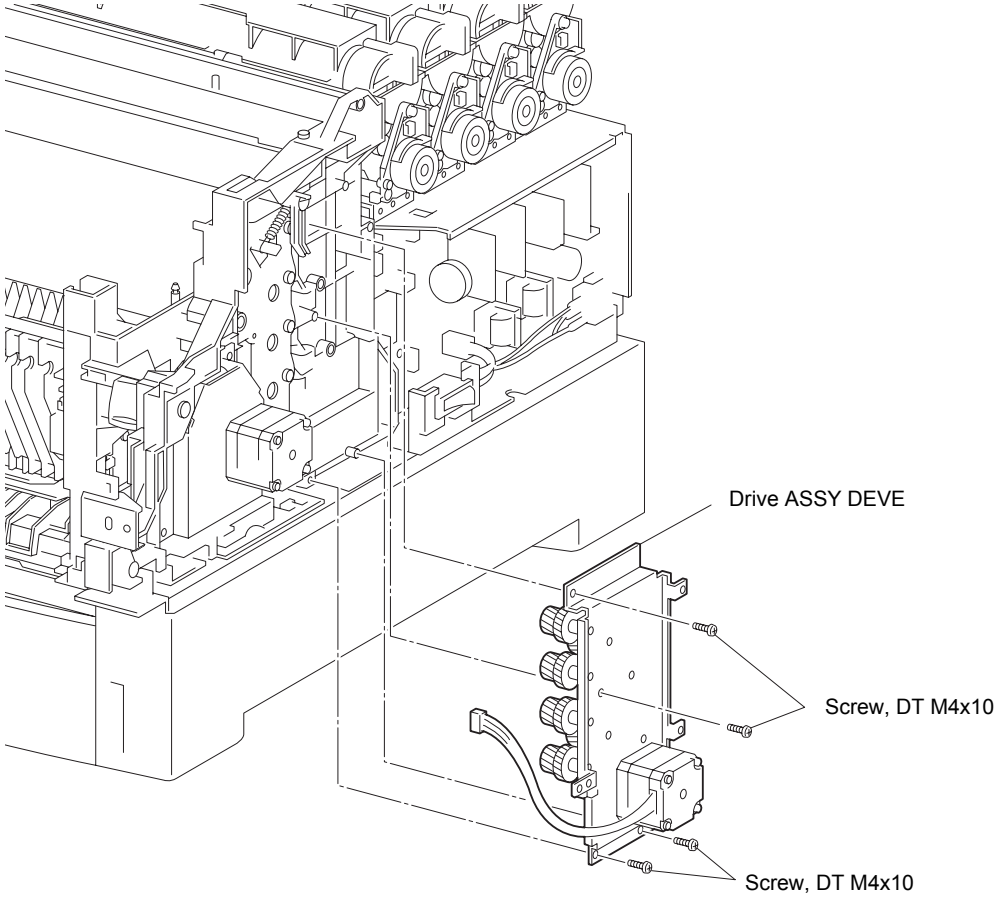


Fig.4-105

2.5.7 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.

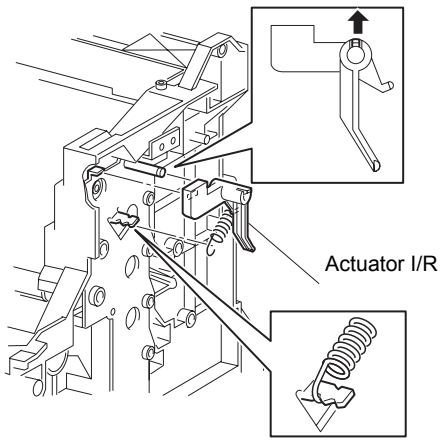


Fig.4-106

2.5.8 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.

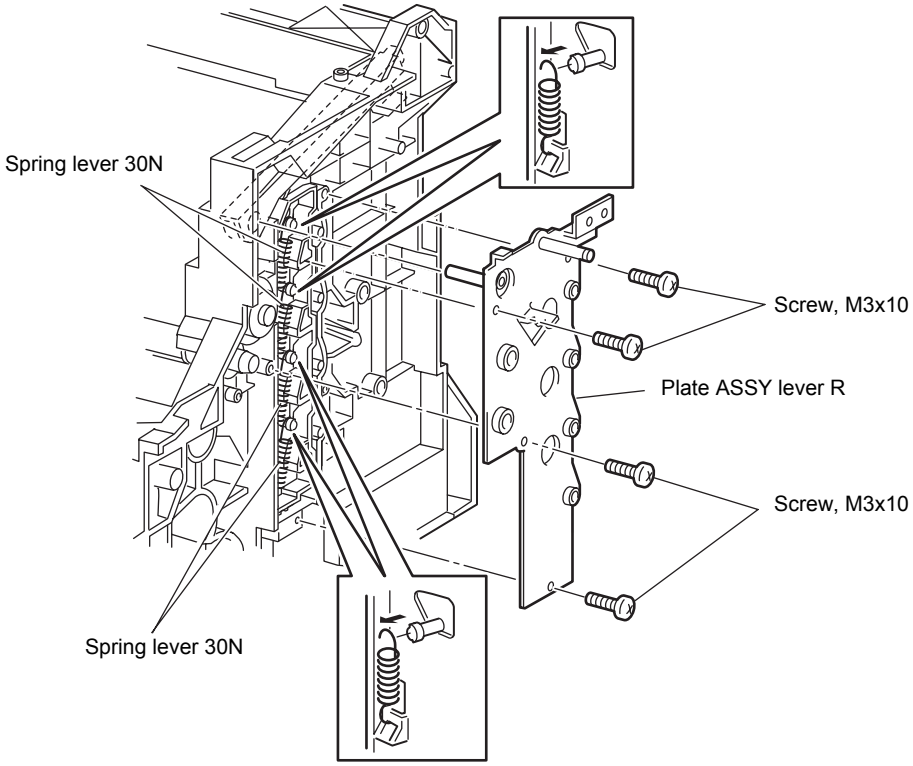


Fig.4-107

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

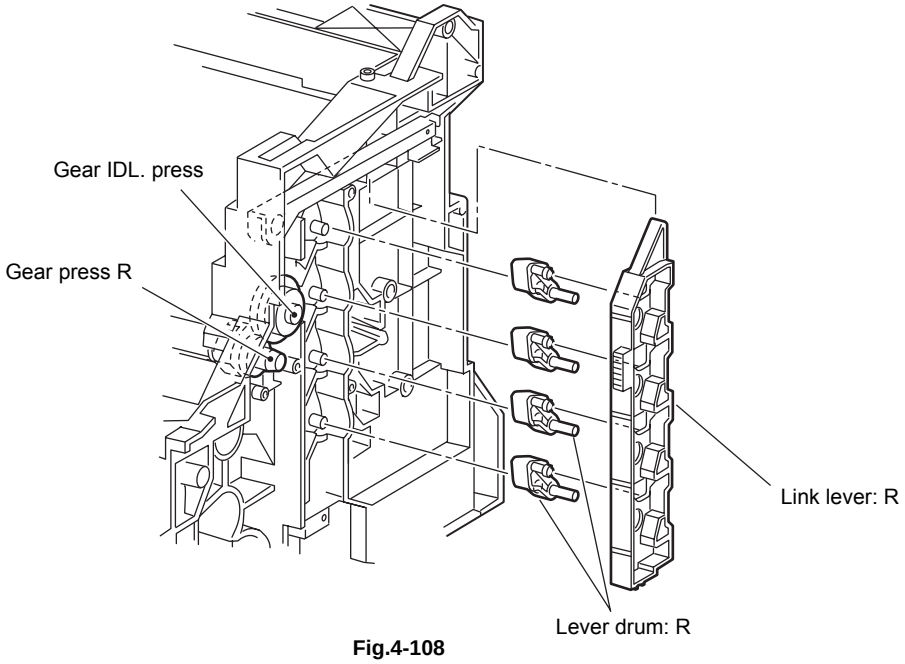


Fig.4-108

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).

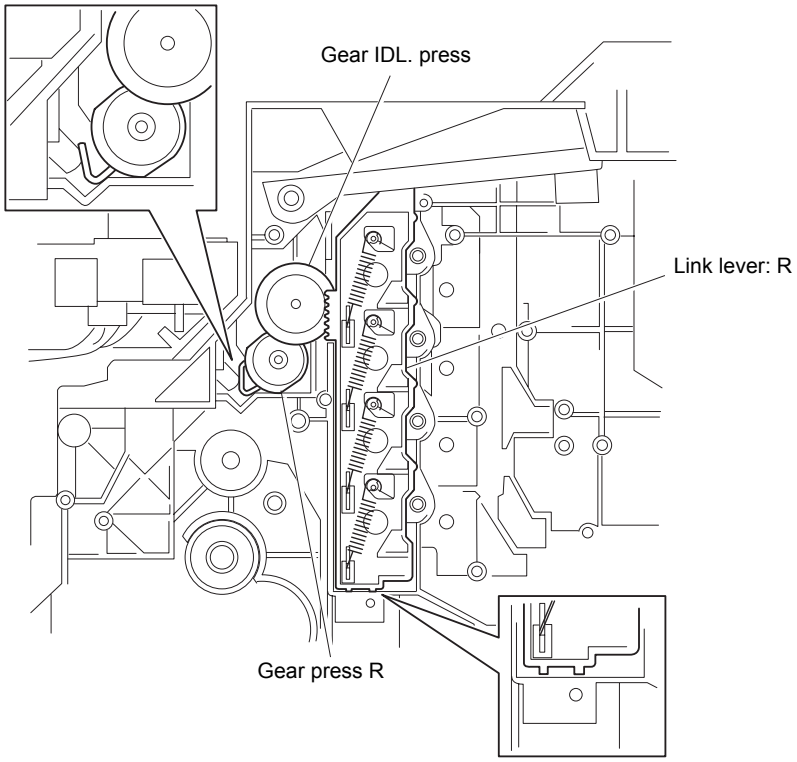


Fig.4-109

2.5.9 LVPS

1) Remove the three connectors from the LVPS.
2) Remove the clamp guide harness.
3) Remove the harness from the guide harness SW.

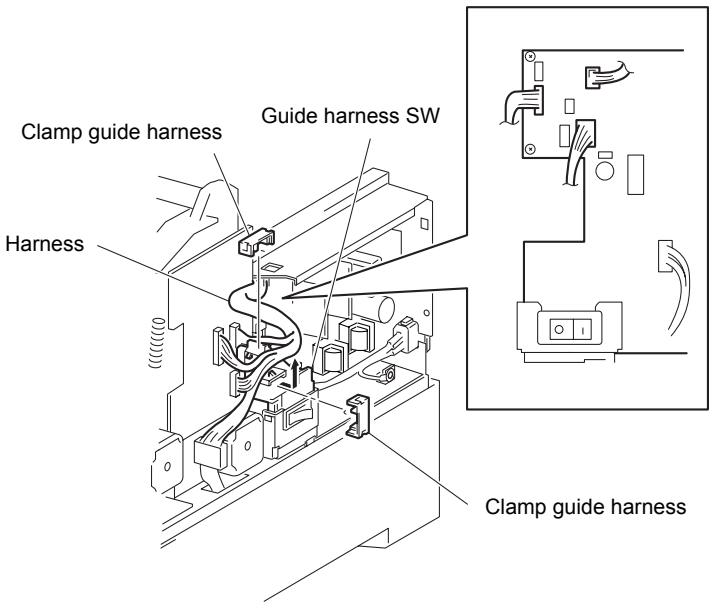


Fig.4-110

4) Releasing the hooks at 2 positions, and then remove the guide harness SW.
5) Remove the screw, and then release the ground wire.
6) Disconnect the connector on the guide harness SW.
7) Remove the switch part of the guide harness SW.
8) Releasing the hooks at 2 positions, and then remove the inlet part of the guide harness SW.
9) Remove the guide harness SW.

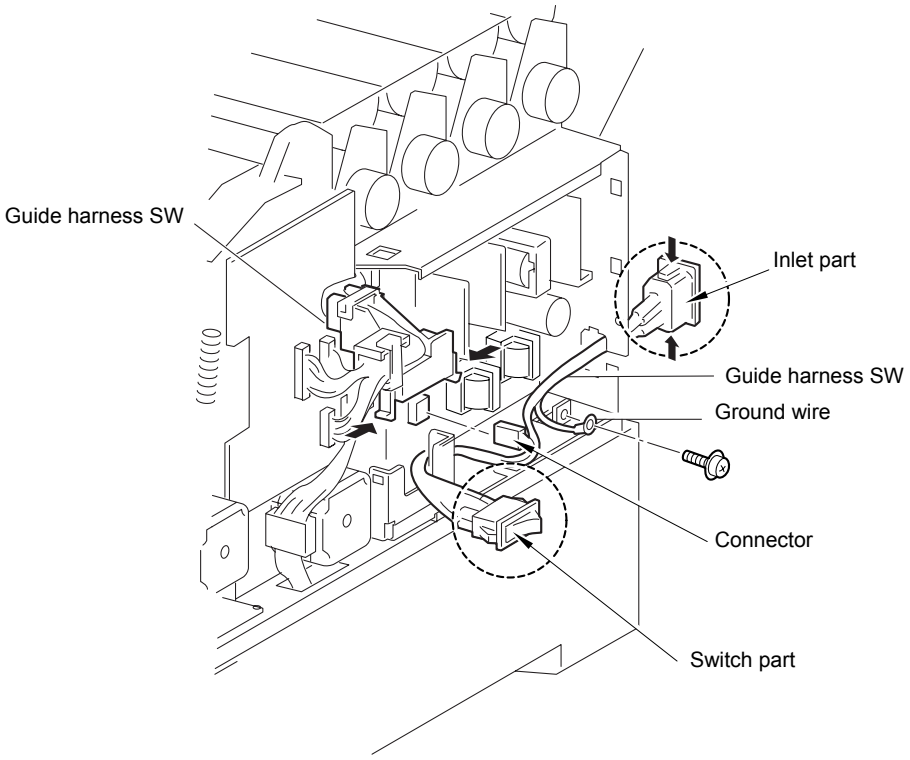


Fig.4-111

10) Remove 3 screws securing the LVPS STD to the printer.
11) Remove the LVPS STD from the printer.

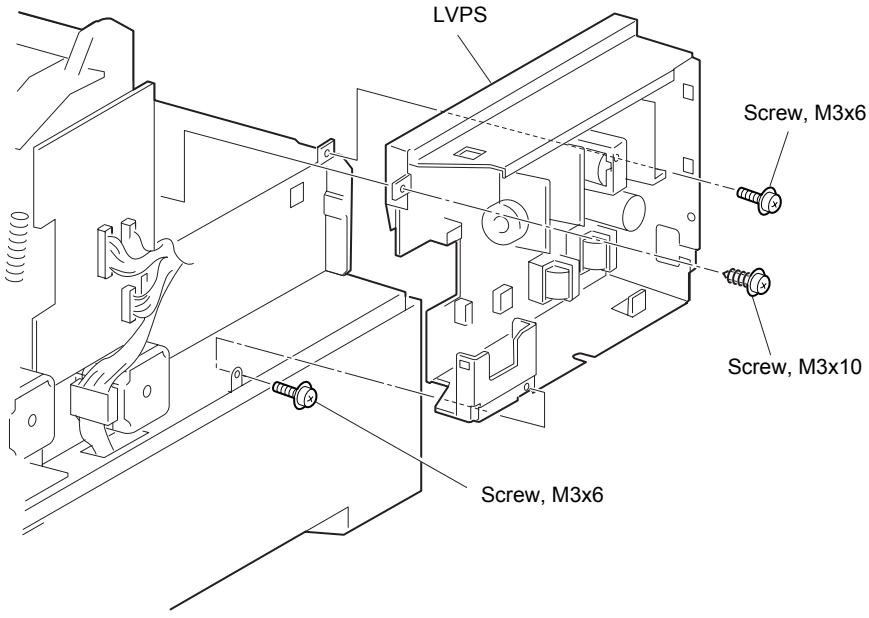


Fig.4-112

2.5.10 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.

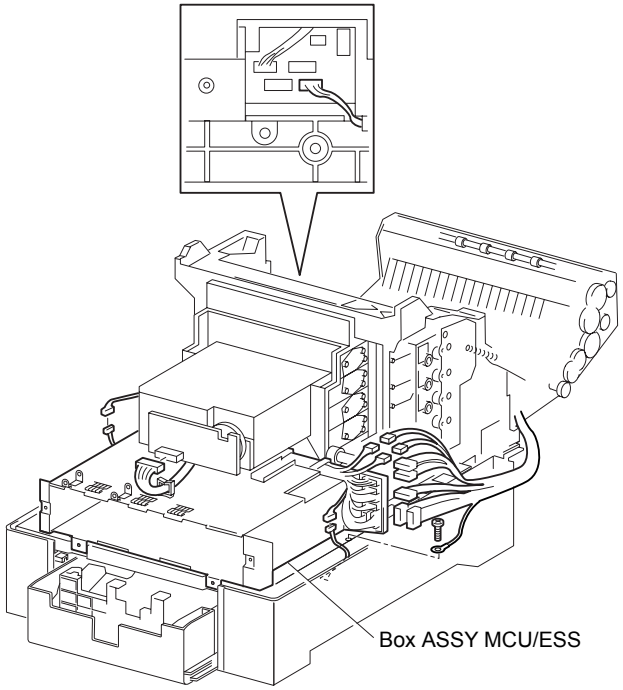


Fig.4-113

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.

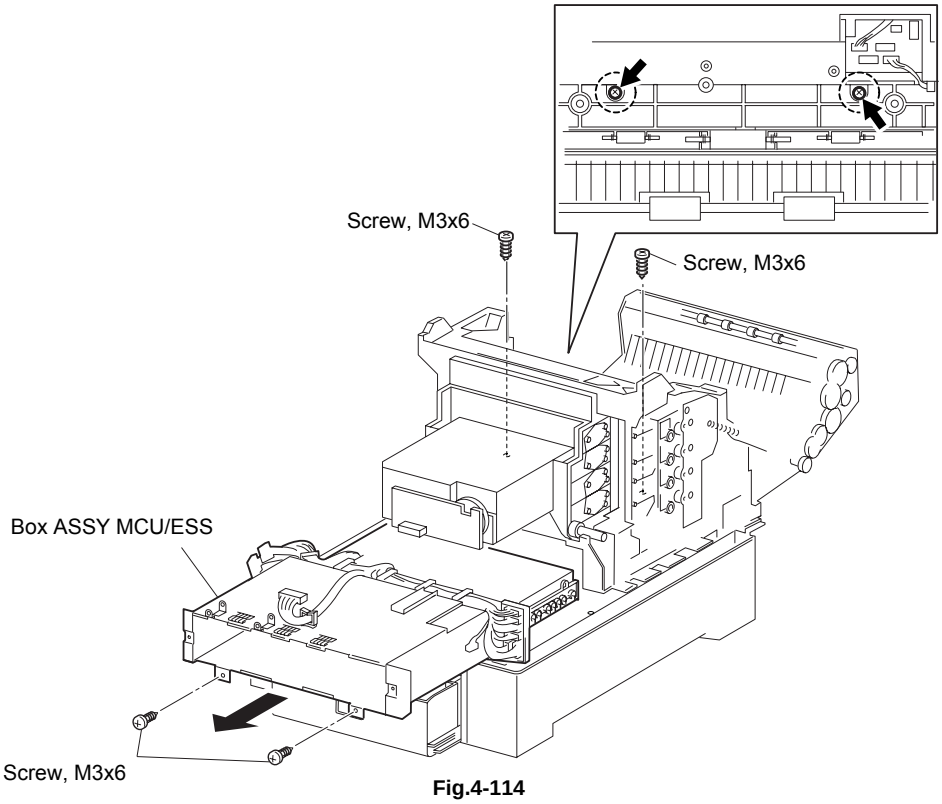


Fig.4-114

2.5.11 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.

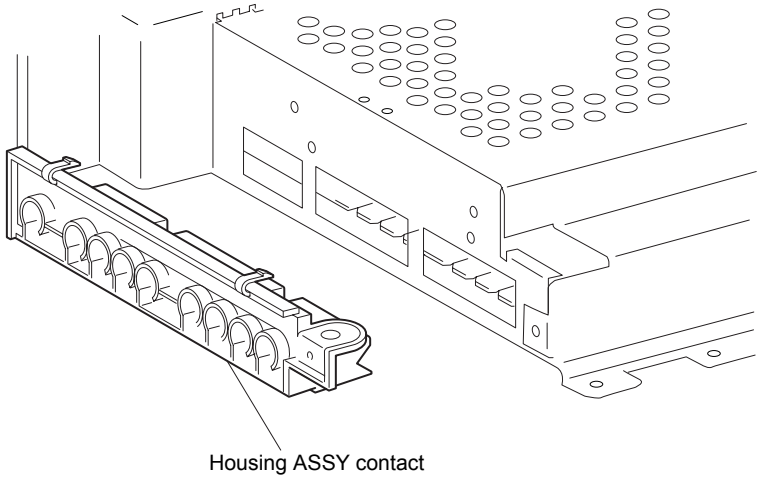


Fig.4-115

2.5.12 MCU HL-4200

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 MCU HL-4200 from the box ASSY MCU/ESS.

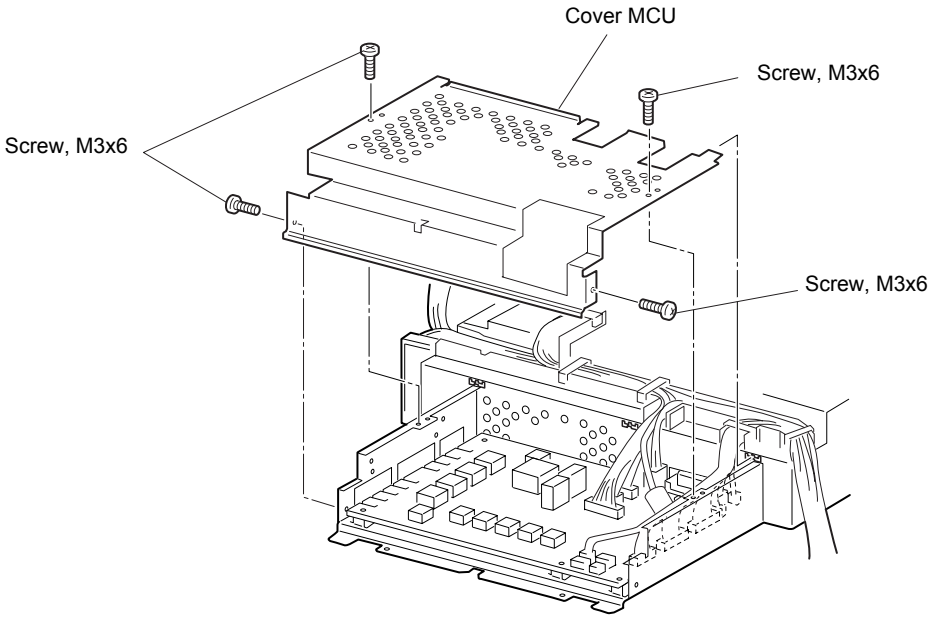


Fig.4-116

4) Remove 6 screws securing the MCU HL-4200 to the box ASSY MCU/ESS.
5) Remove the MCU HL-4200 from the box ASSY MCU/ESS.

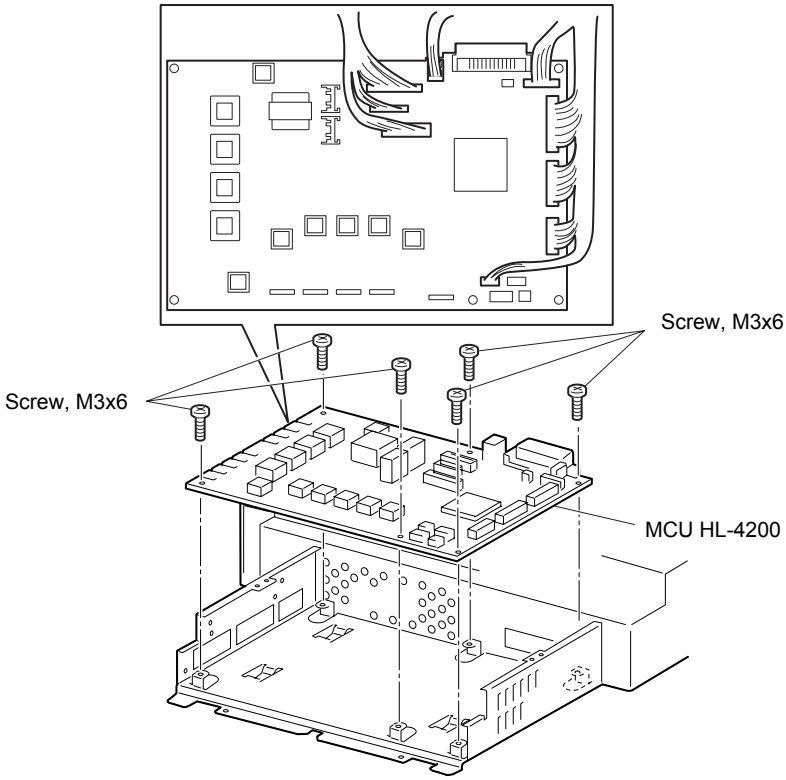


Fig.4-117

2.6 Paper Feed of the Printer

2.6.1 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 ertically.

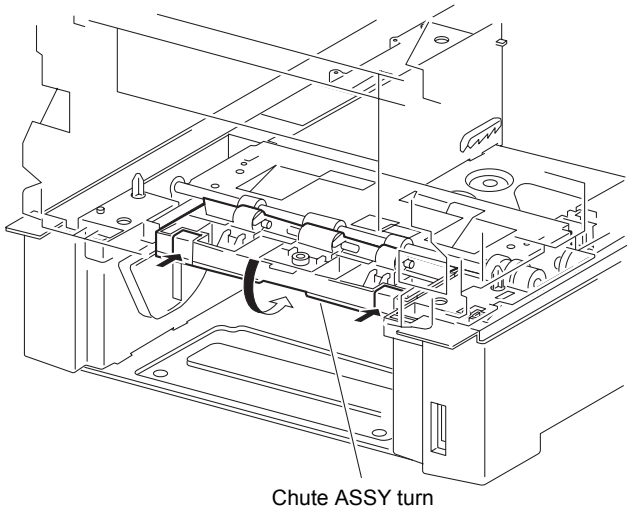


Fig.4-118

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.

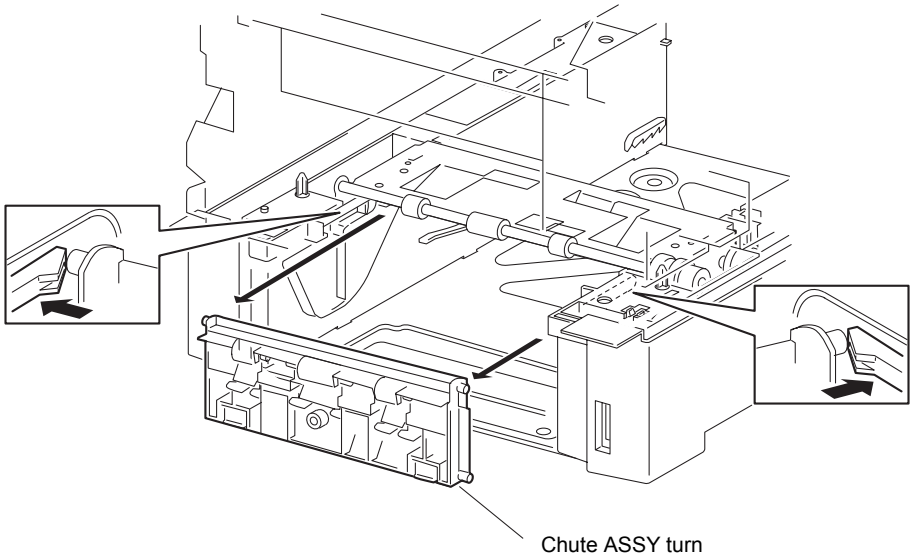


Fig.4-119

2.6.2 Cover cassette slide

1) Right and left of cover cassette slide are pushed, a claw on either side is removed from the projection of housing feeder L and housing feeder R, and cover cassette slide is removed.

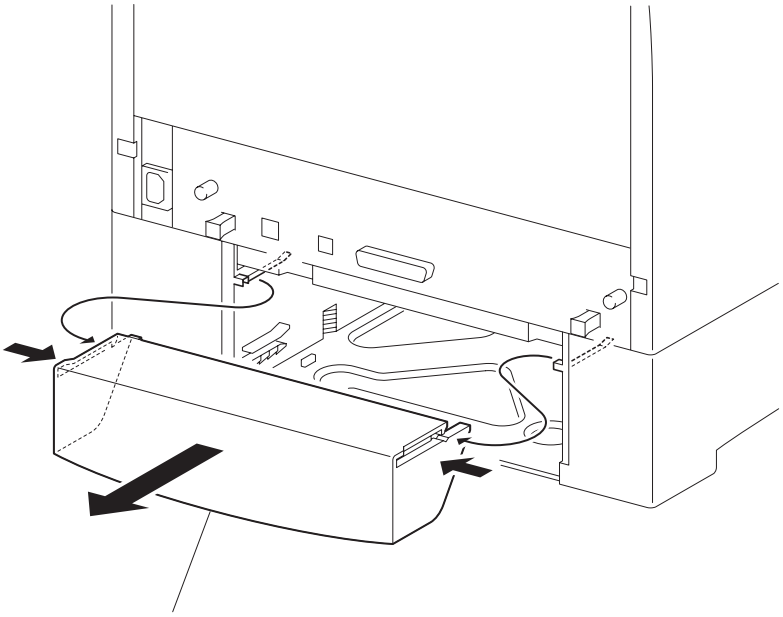


Fig.4-120

2.6.3 Link actuator

1) Shift the bracket of the link actuator from the shaft of the actuator no paper of the printer.
2) Extract the actuator of the link actuator from the hole on the printer and remove the link actuator.

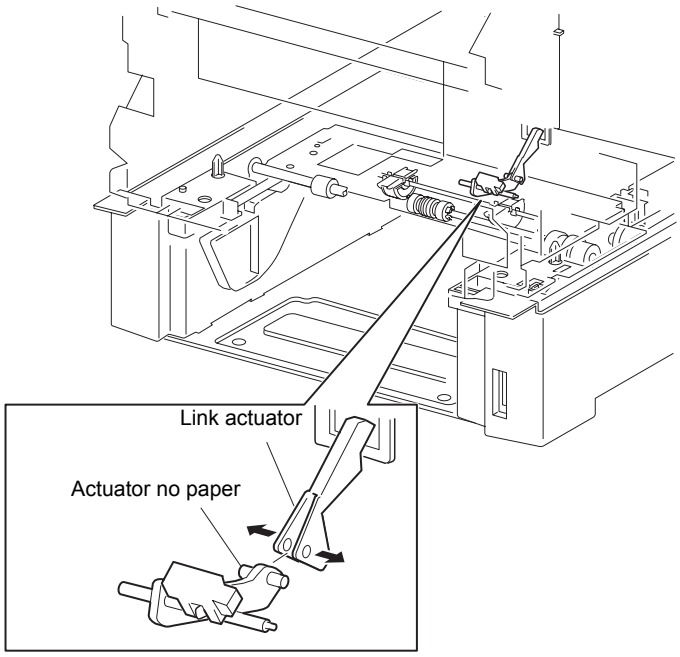


Fig.4-121

2.6.4 Feeder ASSY unit

1) Remove the connector connecting the printer and feeder ASSY unit from the left side of the printer.
2) Remove the 2 connectors connecting the printer and feeder ASSY unit from the right side of the printer.
3) Remove 8 screws securing the feeder ASSY unit to the printer.
4) Remove 4 long screws securing the feeder ASSY unit to the printer.

> **⚠ CAUTION**
> *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.

5) 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.

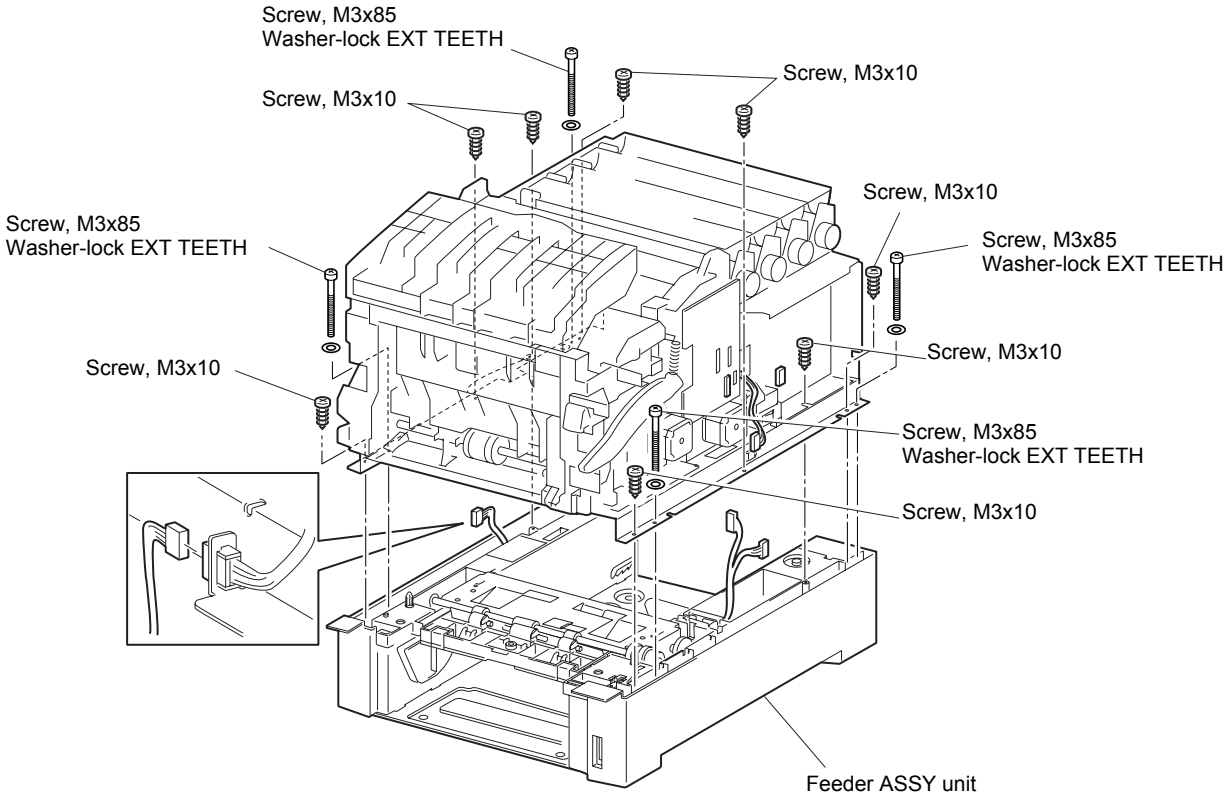


Fig.4-122

2.6.5 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.

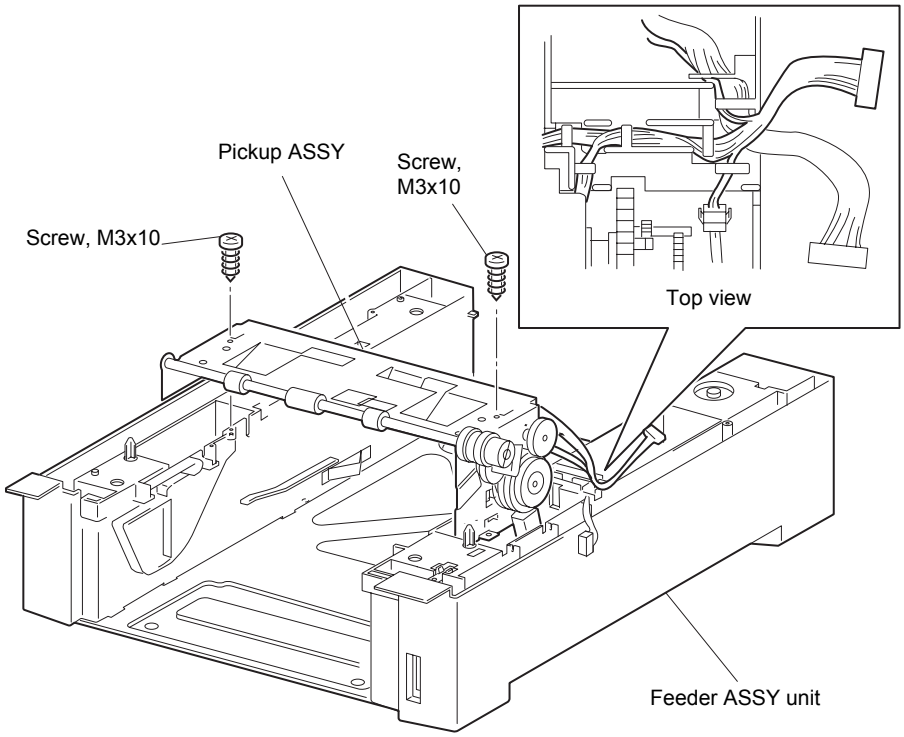


Fig.4-123

2.6.6 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.

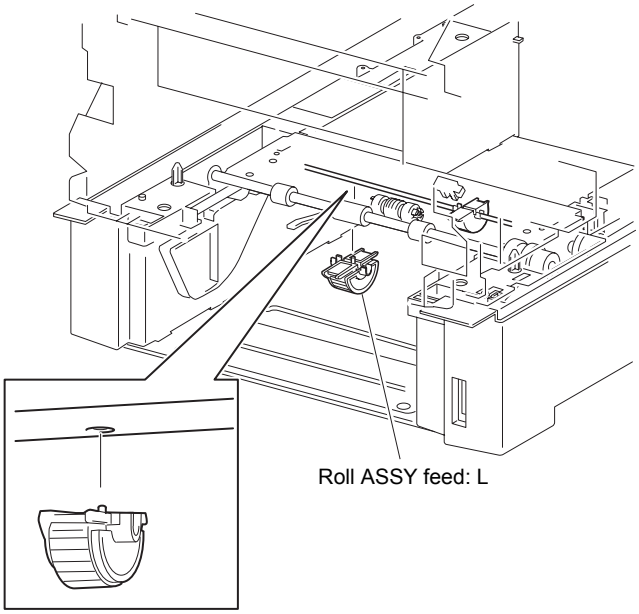


Fig.4-124

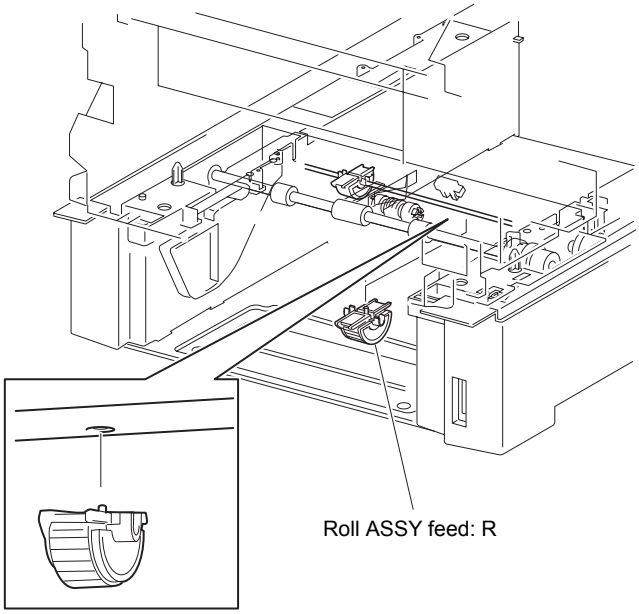


Fig.4-125

2.6.7 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.

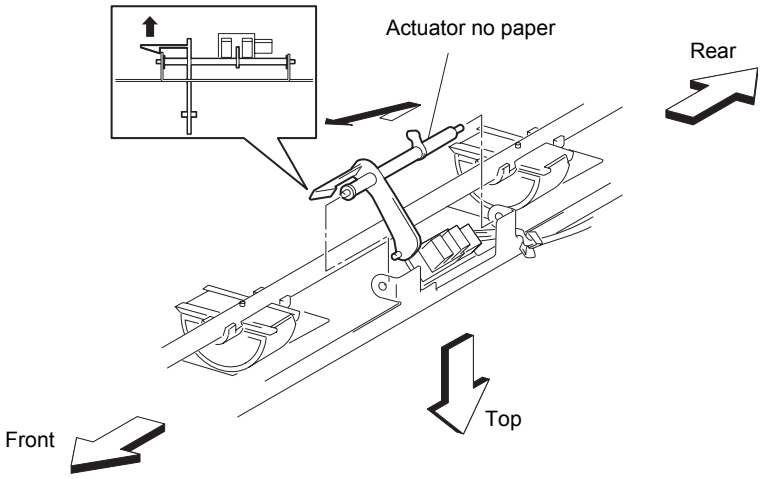


Fig.4-126

2.6.8 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.

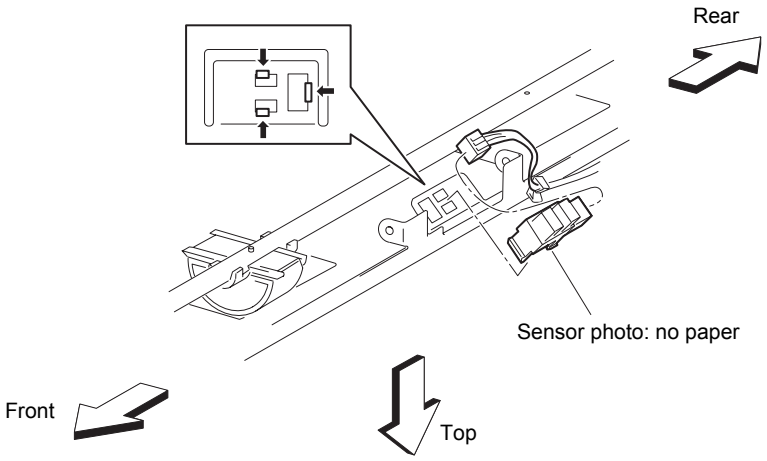


Fig.4-127

2.6.9 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.

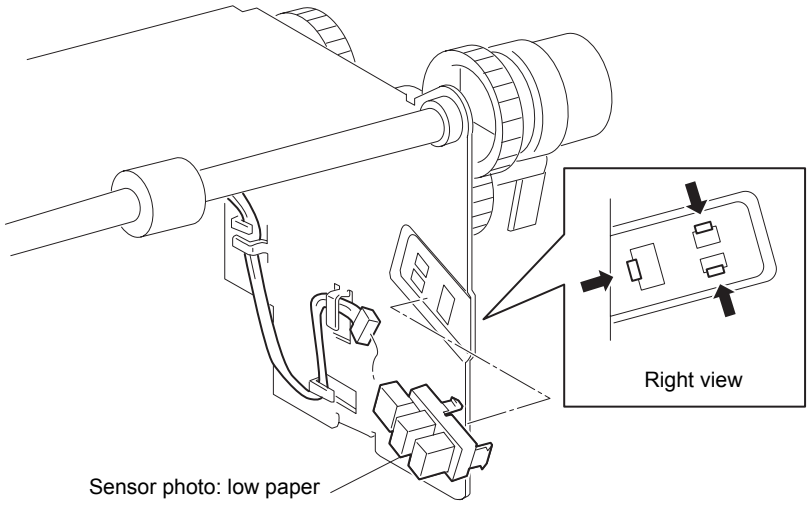


Fig.4-128

2.6.10 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.

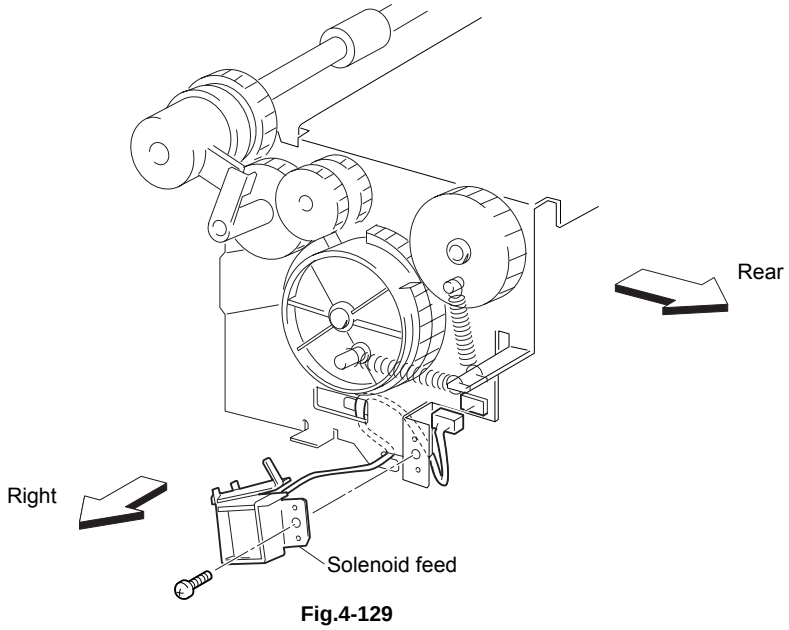


Fig.4-129

2.6.11 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.

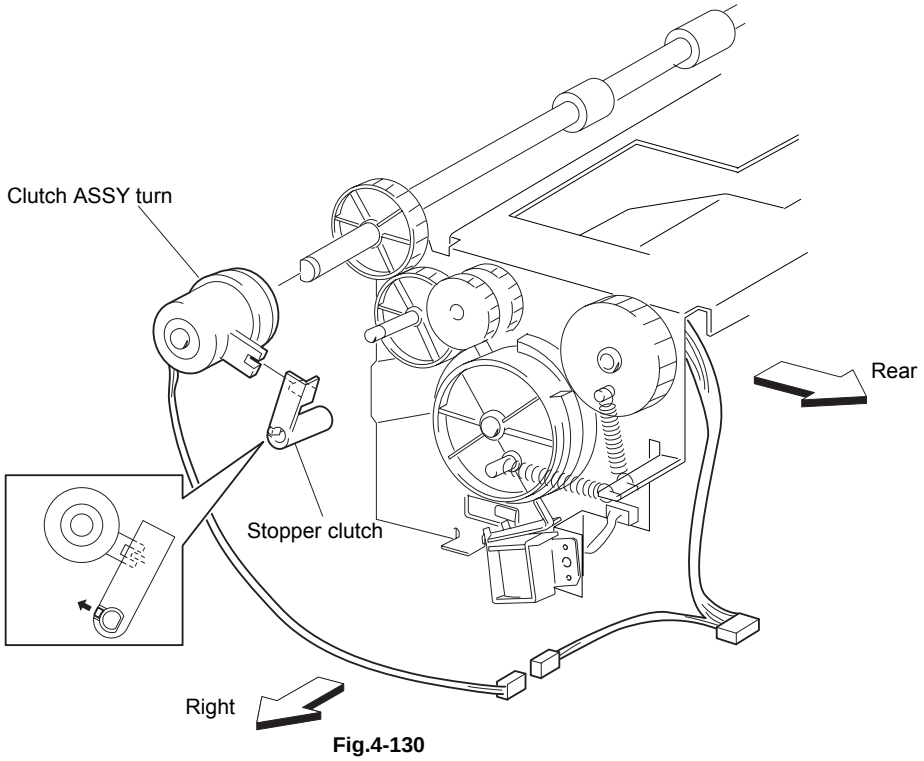


Fig.4-130

2.6.12 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.

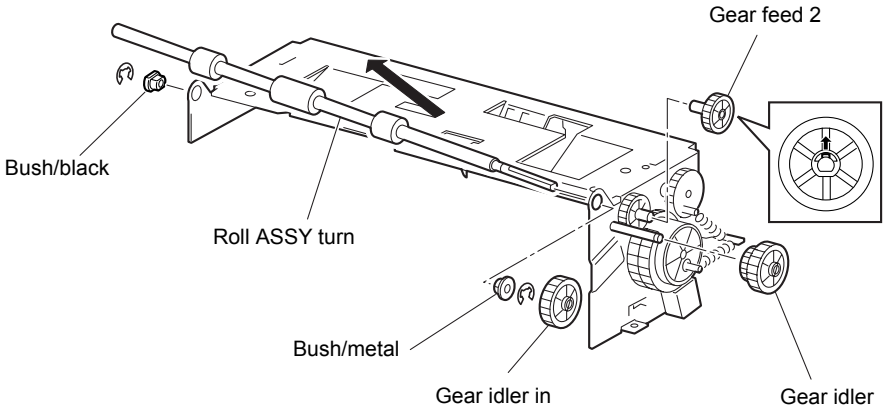


Fig.4-131

2.6.13 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.

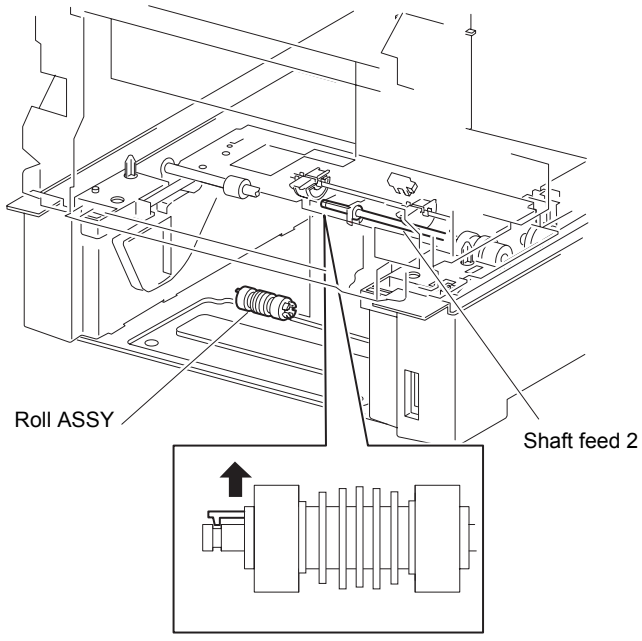


Fig.4-132

2.6.14 Housing ASSY feeder L

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

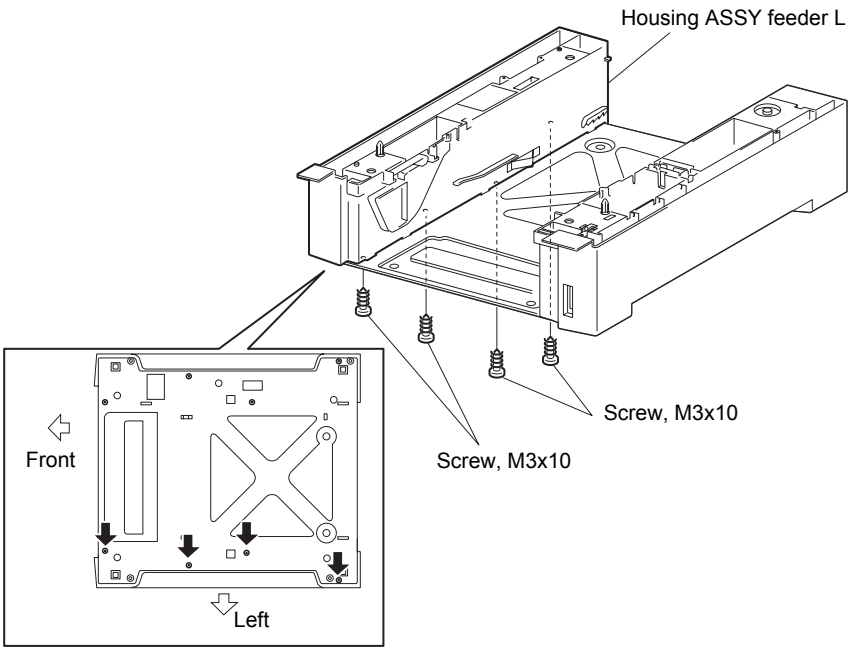


Fig.4-133

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.

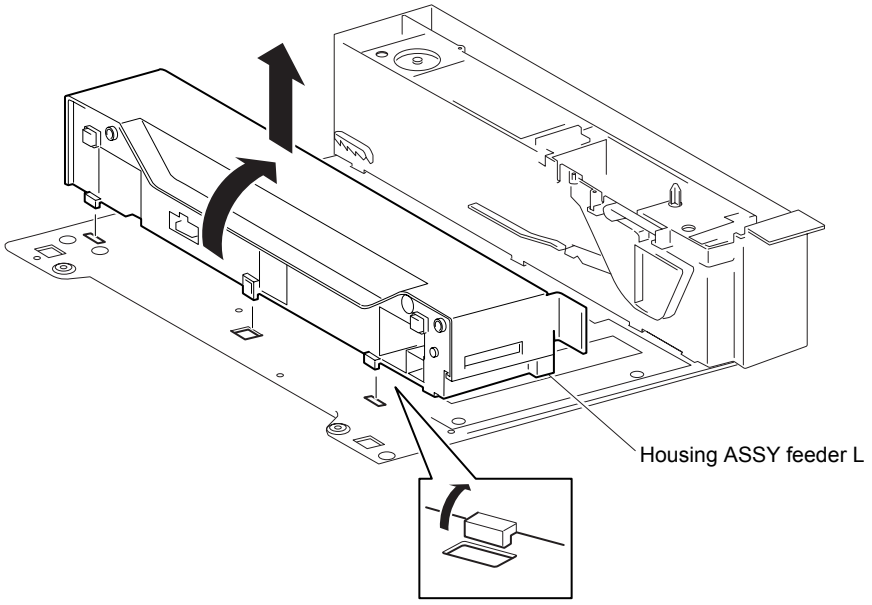


Fig.4-134

2.6.15 Sensor HUM temp

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

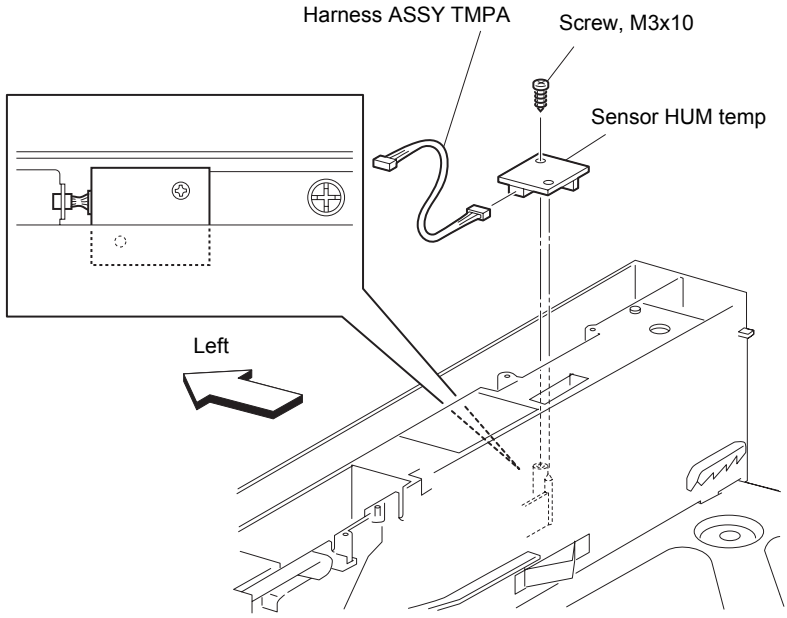


Fig.4-135

2.6.16 Housing ASSY feeder R

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

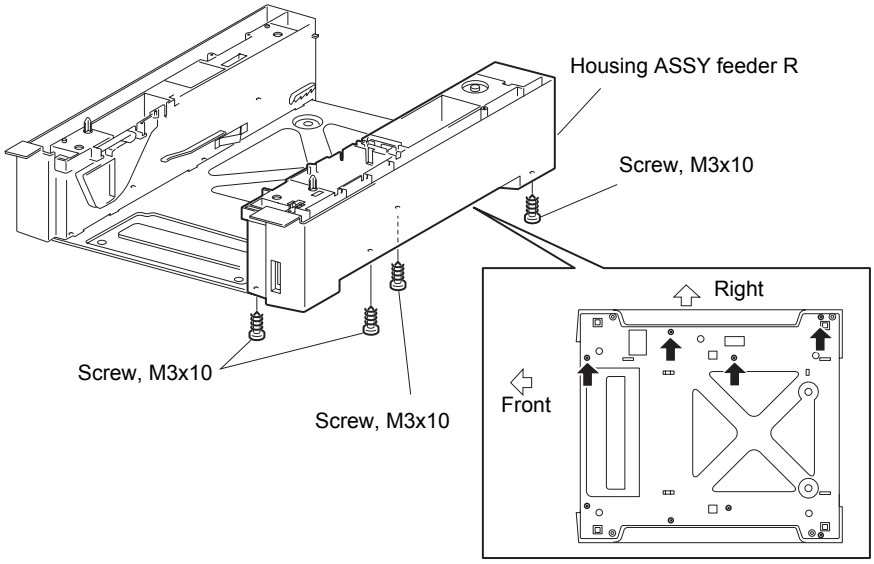


Fig.4-136

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.

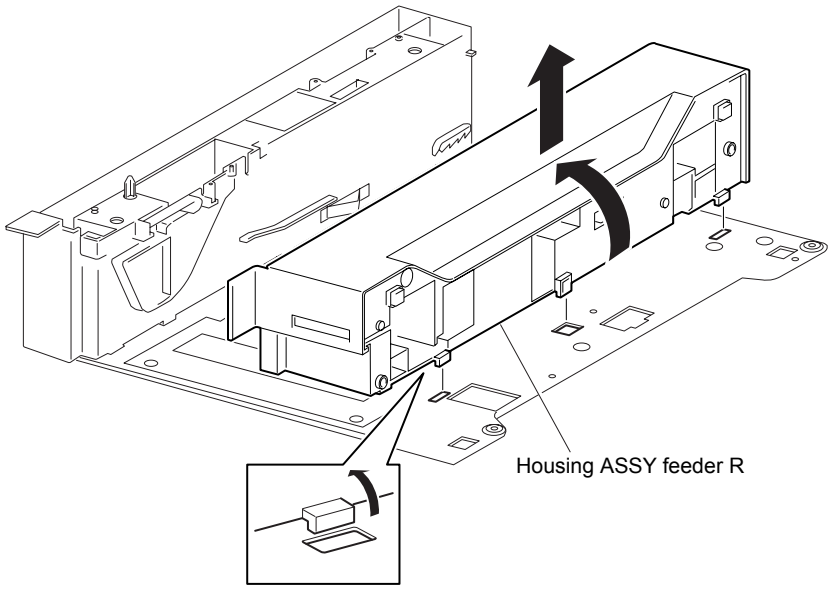


Fig.4-137

2.6.17 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.

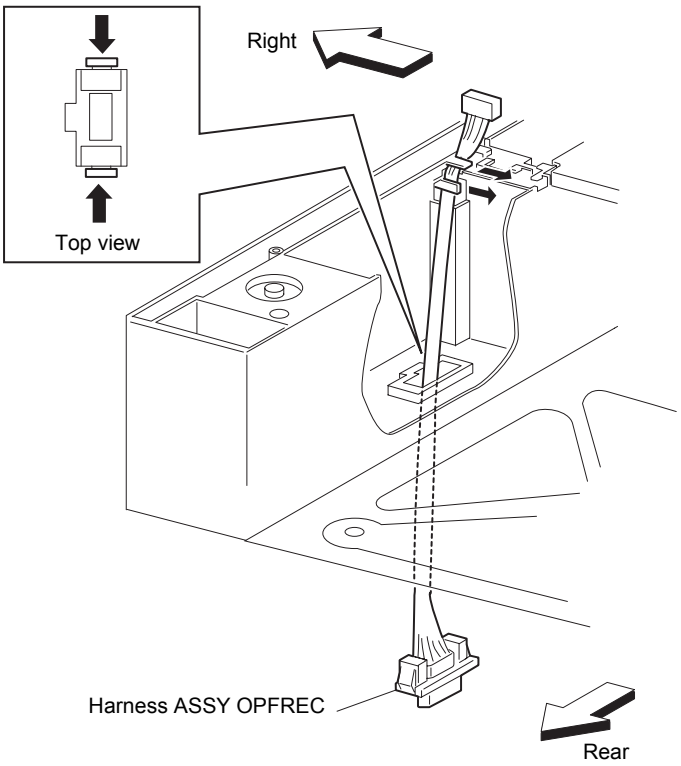


Fig.4-138

2.6.18 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.

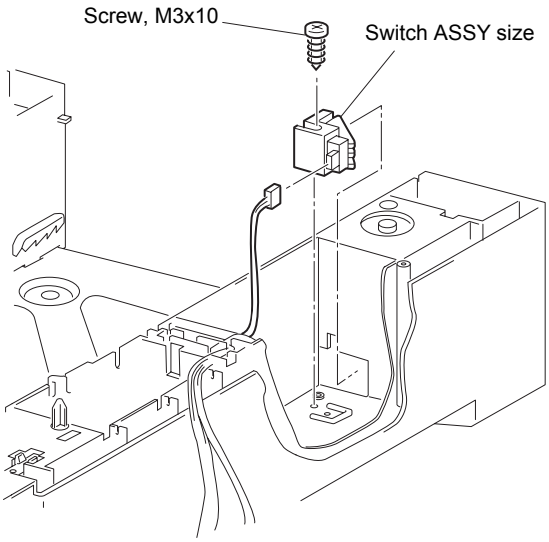


Fig.4-139

2.6.19 Indicator

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

Note:
Hold the guide indicator, when replacing the indicator.

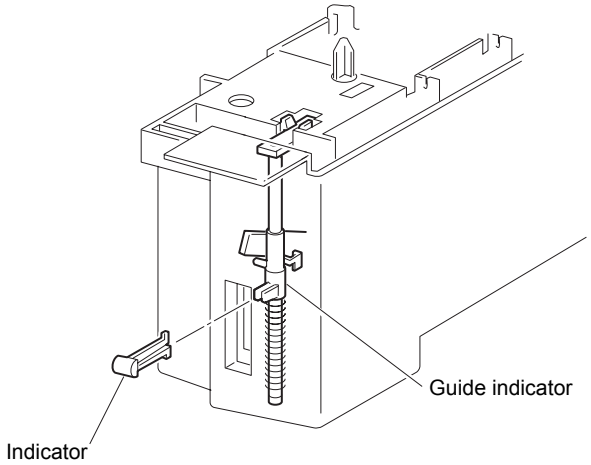


Fig.4-140

2.6.20 Guide indicator

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

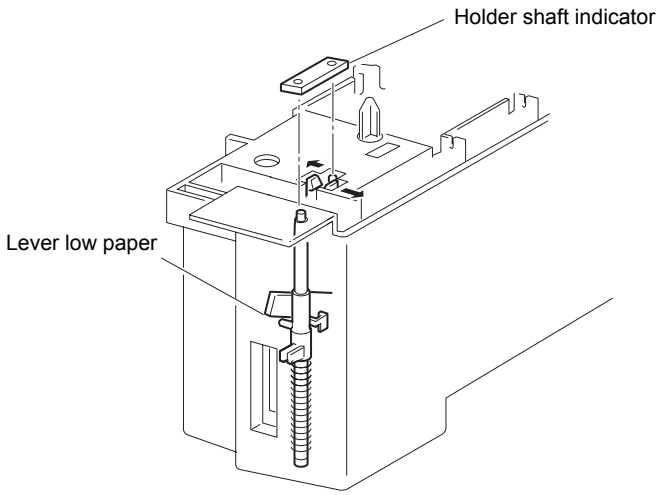


Fig.4-141

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.

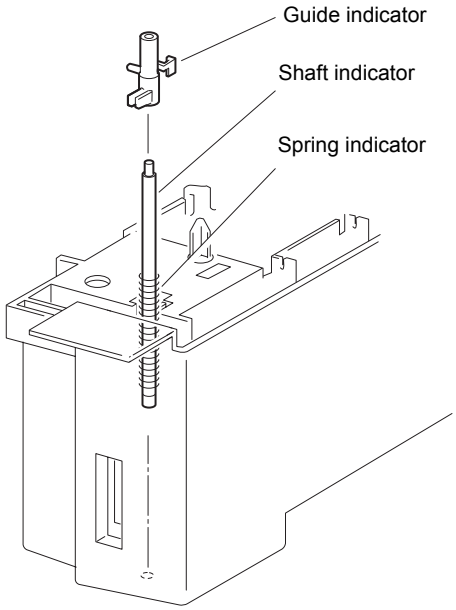


Fig.4-142

2.6.21 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.

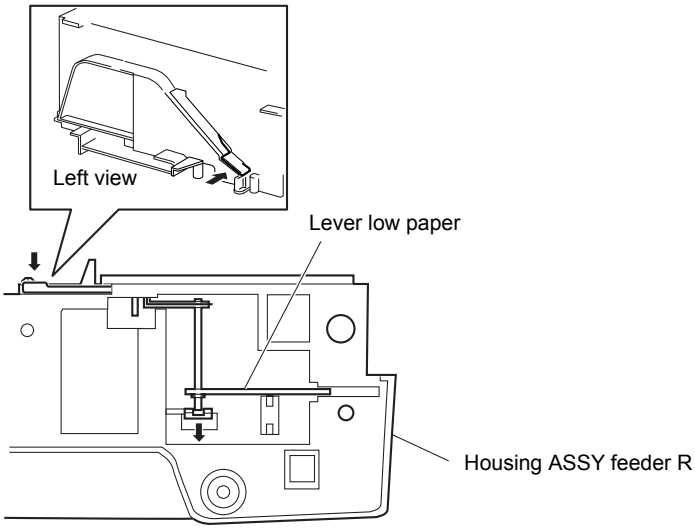


Fig.4-143

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

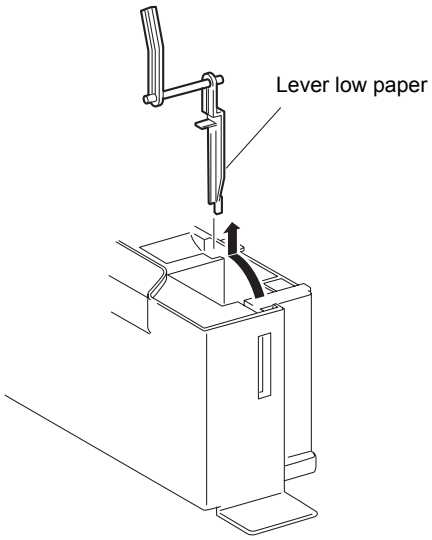


Fig.4-144

2.6.22 Roll ASSY

5) Release the cover feed secured to the cassette at one point and open the cover feed.
6) Release the hook securing the roll ASSY to the shaft retard from the cassette.
7) Pull out the roll ASSY from the shaft retard.

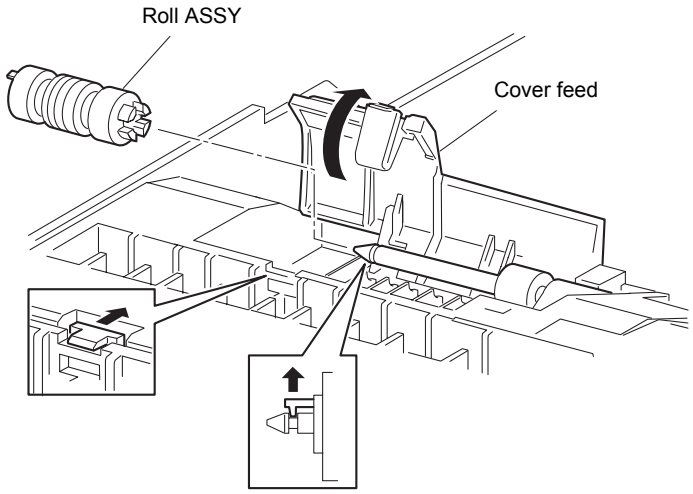


Fig.4-145

2.6.23 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.

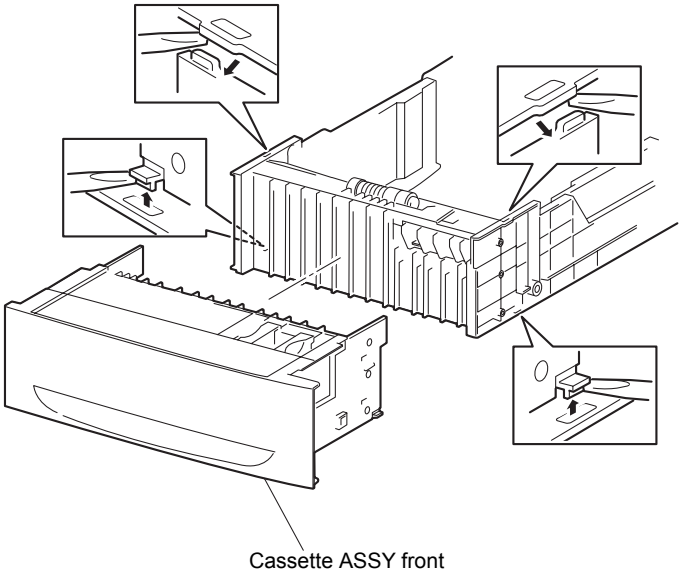


Fig.4-146

2.6.24 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.

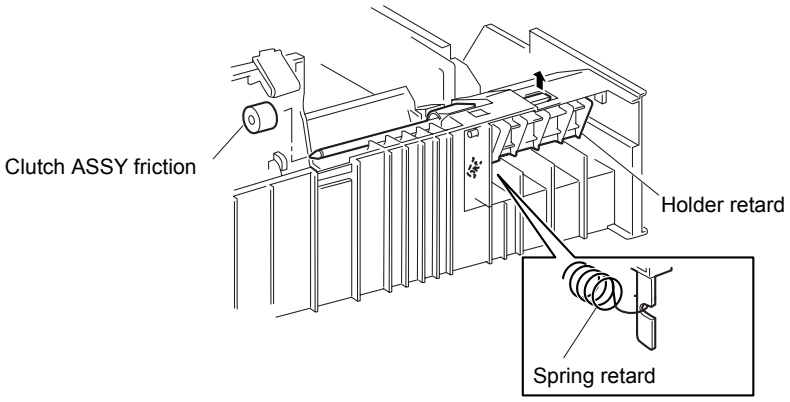


Fig.4-147

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

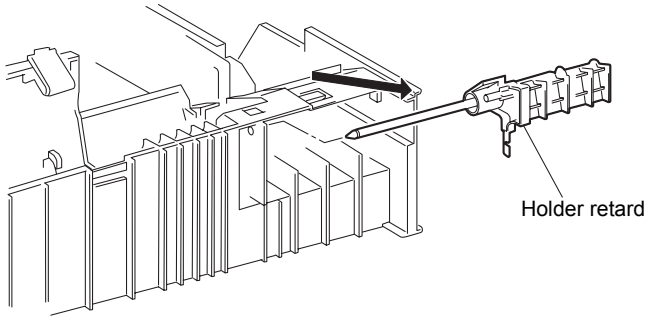


Fig.4-148

2.6.25 Actuator exit

1) Holding the actuator of the actuator exit from fuser ASSY, pull down the actuator exit rightward an extract the left shaft of the actuator exit.
2) Pull out the actuator exit from the fuser ASSY rightward together with the spring actuator.
3) Remove the spring actuator from the actuator exit.

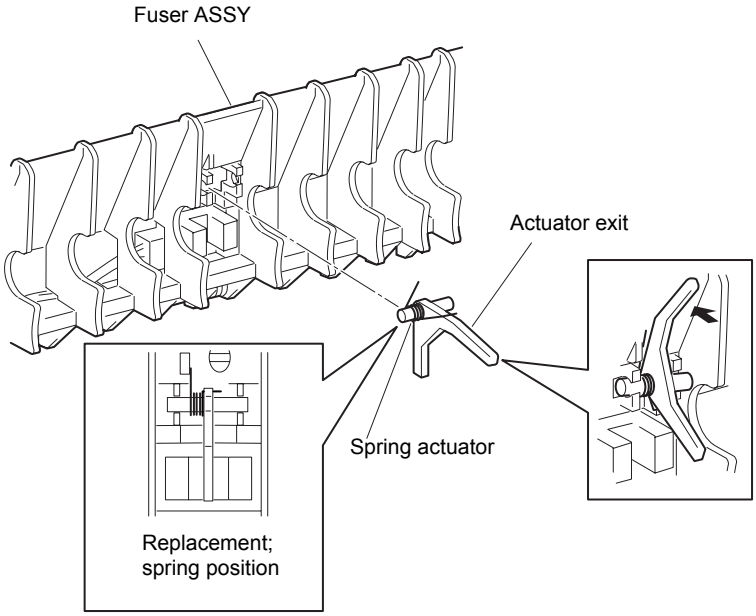


Fig.4-149

CHAPTER V
TROUBLESHOOTING

CONTENTS

CHAPTER V TROUBLESHOOTING

1. PROGRESSING WITH THE TROUBLESHOOTING

After making sure of actual condition of a trouble, proceed with the troubleshooting process efficiently making use of the Fault Isolation Procedure (FIP), Operation of Diag., Principles of operation, and BSD (Block Schematic Diagram).

1.1 Flow of Troubleshooting

Flow of the troubleshooting is as follows:

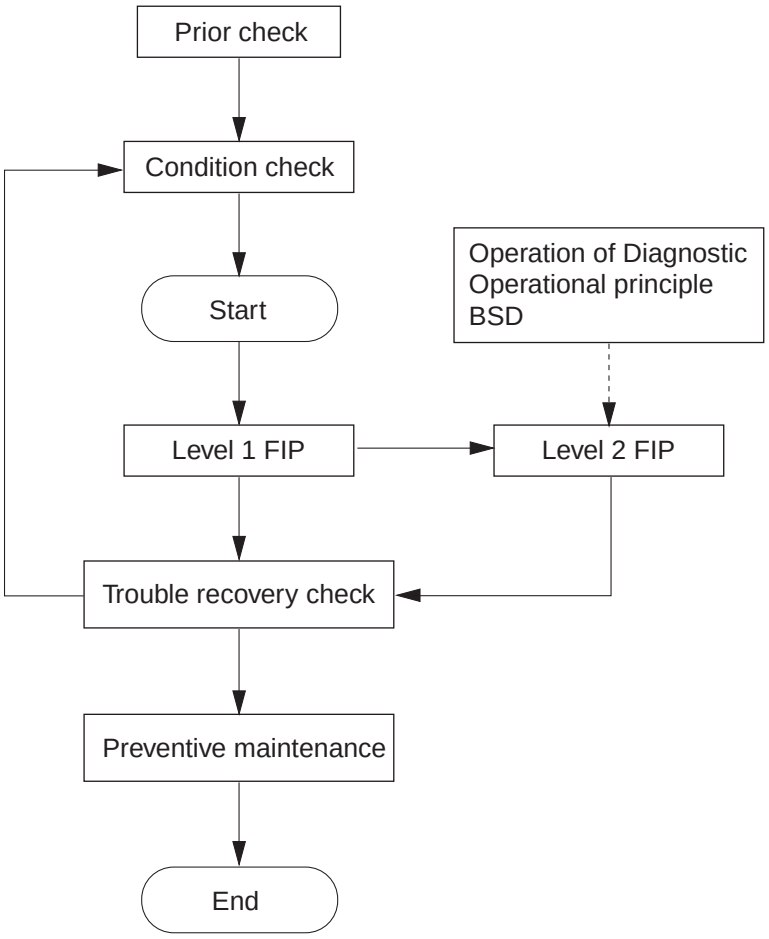


Fig.5-1

2. LEVEL 1 FIP

2.1 Level 1 FIP

The level 1 FIP is the first step for trouble diagnosis. The level 1 FIP isolates the presence of various troubles including error codes, and the level 2 FIP provides a guide for proceeding of the troubleshooting.

2.2 Flow of Level 1 FIP

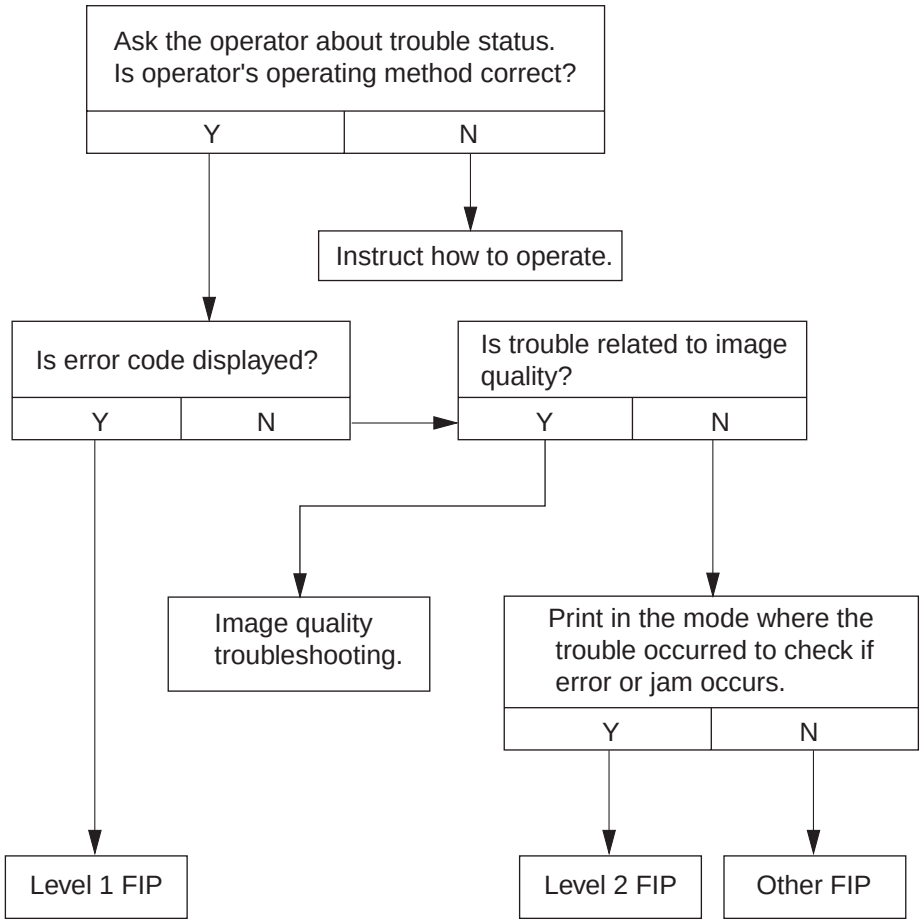


Fig.5-2

3. LEVEL 2 TROUBLESHOOTING

3.1 Level 2 FIP

The Level 2 FIP is the trouble diagnostic procedure to sort various troubles in addition to the error codes. In the troubleshooting, executing the steps given in the FIP or checking procedure allows you to find out a cause of trouble in a short time.

3.2 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
009-360 Turn OFF the Power	<IOT (Y) Toner CRUM Error>	Power off/on	2.8.3 2.8.8
009-361 Turn OFF the Power	<IOT (M) Toner CRUM Error>	Power off/on	2.8.3 2.8.8
009-362 Turn OFF the Power	<IOT (C) Toner CRUM Error>	Power off/on	2.8.3 2.8.8
009-363 Turn OFF the Power	<IOT (K) Toner CRUM Error>	Power off/on	2.8.3 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

LCD Display	< Name of Fail> Contents of Trouble	Action	Reference BSD
010-350 Turn OFF the Power.	<IOT Fuser Failure> 1. Temperature exceeding 235 C detected consecutively 4 times. 2. Temperature below 235 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
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
016-310 Turn OFF the Power.	<ESS Font ROM Error (Main)> Internal font ROM checksum error	Power off/on	2.3.1 2.3.3
016-311 Turn OFF the Power.	<ESS FontROM Error(Opt)> Option Font ROM checksum 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 > The controller's ASIC chip detected this 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
016-315 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
016-317 Turn OFF the Power.	<ESS ROM Check (Main) Fail> Main program ROM checksum error	Power off/on	2.3.1 2.3.3
016-323 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
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

LCD Display	< Name of Fail> Contents of Trouble	Action	Reference BSD
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
016-350 Turn OFF the Power.	<IEEE1284 Data Error> Detected by IEEE1284 controller.	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
016-370 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

LCD Display	< Name of Fail> Contents of Trouble	Action	Reference BSD
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	2.7.6 2.7.7
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).	2.8.3 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
Pull out the (X) toner seal	<IOT X Toner Tape Staying> Toner seal staying detected.	Remove the seal. Xxxxx indicates Yellow toner(Y), Cyan toenr(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 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
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
ID error for (X) toner cart	<IOT X Toner CRUM ID Error> CRUM ID error detedted for toner cartridge.	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 toenr(C), Magenta toner(M) or Black toner(K).	2.8.3 2.8.8
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

LCD Display	< Name of Fail> Contents of Trouble	Action	Reference BSD
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> *All existing trays are open during job waiting or auto paper feeding. (All Tray Detached) *The specified tray is open when a tray is specified. (Specified Tray Detached)	Push in the tray. N indicates the tray no.	2.6.1 2.6.2A 2.6.2B 2.6.3 2.6.4
(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 2.6.2A 2.6.2B 2.6.3 2.6.4 2.7.2 2.7.7
(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> *All existing trays are open during job waiting or auto paper feeding. (All tray empty) *All existing trays are different in size when auto paper feeding is selected. (All tray size mismatch) *The specified tray is empty when a paper tray is specified (Specified tray empty) *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)	Load the specified paper in the tray. N indicates the tray no. XX indicates paper size.	2.6.1 2.6.2A 2.6.2B 2.6.3 2.6.4 2.7.2 2.7.7

LCD Display	< Name of Fail> Contents of Trouble	Action	Reference BSD
(When auto select is specified) Push in the Tray (When a tray is specified) Push in All Trays	Upper Cassette Detached> *Any one of trays upper than the feedable tray is open when auto tray select is specified. *Any one of trays upper than the specified tray is open when a tray is specified.	Set the tray N indicates the tray No. immediately above the specified tray.	2.6.1 2.6.2A 2.6.2B 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.)	
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.)	
ID error Please Press Set	<F/W Download ID Error>	Press the Set key. The processing will continue. (Job is cleared.)	
Address error Please Press Set	<F/W Download Range Error>	Press the Set key. The processing will continue. (Job is cleared.)	
Timeout error Please Press Set	<F/W Download Timeout Error>	Press the Set key. The processing will continue. (Job is cleared.)	
Header error Please Press Set	<F/W Download Header Error>	Press the Set key. The processing will continue. (Job is cleared.)	
Checksum error Please Press Set	<F/W Download Checksum Error>	Press the Set key. The processing will continue. (Job is cleared.)	

LCD Display	< Name of Fail> Contents of Trouble	Action	Reference BSD
Download N/A error Please Press Set	<F/W Download Protect Error>	Press the Set key. The processing will continue. (Job is cleared.)	
Erase error Please Press Set	<F/W Download erase Error>	Press the Set key. The processing will continue. (Job is cleared.)	
Write error Please Press Set	<F/W Download Write Error>	Press the Set key. The processing will continue. (Job is cleared.)	
Verify error Please Press Set	<F/W Download Verify 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.)	
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 CRU Warning: Xxxxx indicates Yellow toner (Y), Cyan toner (C), Magenta toner (M) or Black toner (K).	2.8.5
Ready to Print Need Replacement Fuser Cartridge.	<Fuser Life Warning> Fuser cartridge is near the end of its life.	No action required. See Fuser Life Over FIP.	2.3.1
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 Warining:	2.8.7

LCD Display	< Name of Fail> Contents of Trouble	Action	Reference BSD
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:	2.3.2
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	2.8.7
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	2.6.1 2.6.2A 2.6.2B 2.6.3

3.3 Error Code FIP

001-360 Fan Motor Failure FIP

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?	With tool Go to step [3] Without tool Go to step [4]	With tool Go to step [15] Without tool Go to step [16]
3	Checking fan rear Does fan rear function normally? Using rear fan diagnostic tool, check by digital output test.	Replace MCU HL-4200	Go to step [4]
4	Checking LVPS for signal Print 1 sheet. Is P/J166-1PIN<=>P/J166-3PIN 24VDC?	Go to step [9]	Go to step [5]
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 PWBA HBN DRV for signal Print 1 sheet. Is P/J61-3PIN<=>P/J61-7PIN 0VDC?	Go to step [7]	Replace harness ASSY LVNC3
7	Checking PWBA HBN DRV for signal Print 1 sheet. Is P/J42-12PIN<=>P/J42-14PIN 0VDC?	Go to step [8]	Replace drive PWBA HBN DRV
8	Checking MCU HL-4200 for signal Print 1 sheet. Is P/J12-19PIN<=>P/J12-17PIN 0VDC?	Replace MCU HL-4200	Replace harness ASSY DRV2-2
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 PWBA HBN DRV for signal Print 1 sheet. Is P/J61-2PIN<=>P/J61-7PIN +3.3VDC?	Replace harness ASSY LVNC3	Go to step [13]

Step	Check	Remedy	
		Yes	No
13	Checking drive PWBA HBN DRV for signal Print 1 sheet. Is P/J42-29PIN<=>P/J42-14PIN +3.3VDC?	Replace PWBA HBN DRV	Go to step [14]
14	Checking MCU HL-4200 for signal Print 1 sheet. Is P/J12-2PIN<=>P/J12-17PIN +3.3VDC?	Replace harness ASSY DRV2-2	Replace MCU HL-4200
15	Checking fuser fan Does fuser fan function normally? Using fuser fan diagnostic tool, check by digital output test.	Replace MCU HL-4200	Go to step [16]
16	Checking drive PWBA HBN DRV for signal Print 1 sheet. Is P/J50-7PIN<=>P/J50-9PIN +24VDC?	Go to step [19]	Go to step [17]
17	Checking drive PWBA HBN DRV for signal Print 1 sheet. Is P/J42-30PIN<=>P/J42-14PIN 0VDC?	Go to step [18]	Replace PWBA HBN DRV
18	Checking MCU HL-4200 for signal Print 1 sheet. Is P/J12-1PIN<=>P/J12-17PIN 0VDC?	Replace MCU HL-4200	Replace harness ASSY DRV2-2
19	Checking harness ASSY DUP2 for continuity Is J50<=>J137 continuous normally?	Go to step [20]	Replace harness ASSY DUP2
20	Checking fuser fan Check if an error occurs though the fuser fan was replaced with a new one.	Go to step [21]	End of work
21	Checking drive PWBA HBN DRV for signal Print 1 sheet. Is P/J50-8PIN<=>P/J50-9PIN +3.3VDC?	Replace Fuser fan	Go to step [22]
22	Checking drive PWBA HBN DRV for signal Print 1 sheet. Is P/J42-27PIN<=>P/J42-14PIN +3.3VDC?	Replace PWBA HBN DRV	Go to step [23]
23	Checking MCU HL-4200 for signal Print 1 sheet. Is P/J12-4PIN<=>P/J12-17PIN +3.3VDC?	Replace harness ASSY DRV2-2	Replace MCU HL-4200

003-340 Firmware Error FIP

Step	Check	Remedy	
		Yes	No
1	Does the error still happen even after powering Off and On was done?	Go to step [2]	End of work
2	Check whether the value of NVM is correct. Is the value of NVM correct?	Replace MCU HL-4200	Correct the value of NVM.

003-356 NV-RAM Error FIP

Step	Check	Remedy	
		Yes	No
1	Does the error still happen even after powering Off and On was done?	Go to step [2]	End of work
2	Remove following components once, and reinstall them correctly. Print head cartridge ASSY FUSER ASSY PWBA EEPROM MCU HL-4200 Does the error still happen even after powering Off and On was done?	Go to step [3]	End of work
3	Replace print head cartridge ASSY. Does the error still happen even after powering Off and On was done?	Go to step [4]	End of work
4	Replace FUSER ASSY. Does the error still happen even after powering Off and On was done?	Go to step [5]	End of work
5	Replace PWBA EEPROM. Does the error still happen even after powering Off and On was done?	Replace MCU HL-4200	End of work

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 HL-4200	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 400K□?	Go to step [3]	Replace fuser ASSY
3	Checking harness ASSY FSR3 for continuity Is J232<=>J138 continuous normally?	Go to step [4]	Replace harness ASSY FSR3
4	Checking harness ASSY front 1A for continuity Is P138<=>J13 continuous normally?	Replace MCU HL-4200	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 <*Warning*> *Do not power On and Off while FUSER ASSY is removed.* *It will be in danger of getting a shock.*	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 HL-4200	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<=>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<=>P/J2361-2PIN more than +2.5VDC?	Go to step [4]	Replace MCU HL-4200
4	Checking harness ASSY TMPA for signal Is P/J2361-4PIN<=>P/J2361-2PIN +5VDC?	Replace sensor HUM TEMP	Replace MCU HL-4200

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	With tool Go to step [2] Without tool Go to step [3]
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]	With tool Go to step [8] Without tool Go to step [9]
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 PWBA HBN DRV for signal Is P/J50-1PIN<=>P/J60-2PIN +24VDC?	Go to step [10]	Replace PWBA HBN DRV
10	Checking harness ASSY DUP 2 for continuity Is J131<=>J50 continuous normally?	Go to step [11]	Replace harness ASSY DUP 2

Step	Check	Remedy	
		Yes	No
11	Checking harness ASSY DRV 2-2 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 DRV2-2
12	Checking DUP motor Check if an error occurs though the motor was replaced with a new one.	Replace MCU HL-4200	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.	With tool Go to step [3] Without tool Go to step [4]	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 FSR3 for continuity Is J232<=>J138 continuous normally?	Go to step [6]	Replace harness ASSY FSR3
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	With tool Go to step [9] Without tool Go to step [10]

Step	Check	Remedy	Step
9	Checking fuser motor Does fuser motor function normally? Using fuser motor diagnostic tool, check by digital output test.	Replace MCU HL-4200	Go to step [10]
10	Checking PWBA HBN DRV for signal Is P/J52-1PIN<=>P/J60-2PIN +24VDC?	Go to step [11]	Replace PWBA HBN DRV
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 HL-4200

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	With tool Go to step [2] Without tool Go to step [3]
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 HL-4200 for signal Is P/J18-3<=>P/J18-2 0VDC?	With tool Go to step [6] Without tool Go to step [7]	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 200□?	Go to step [8]	Replace chute REGI
8	Checking MCU HL-4200 for signal Close the interlock SW Is P18-4PIN<=>P18-2PIN +24VDC?	Go to step [9]	Replace MCU HL-4200
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	With tool Go to step [2] Without tool Go to step [3]
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]
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 HL-4200 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]	With tool Go to step [7] Without tool Go to step [8]
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 HL-4200	Go to step [8]
8	Checking PWBA HBN DRV 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 deive PWBA HBN DRV	Go to step [11]
11	Checking drive PWBA HBN DRV for power supply Is P/J60-1PIN<=>P/J60-2PIN +24VDC?	Replace PWBA HBN DRV	Go to FIP-DC
12	Checking PWBA HBN DRV for power supply Is P/J61-8PIN<=>P/J61-7PIN +5VDC?	Go to step [13]	Go to step [14]
13	Checking PWBA HBN DRV for power supply Is P/J61-6PIN<=>P/J61-5PIN +3.3VDC?	Go to step [15]	Go to step [14]
14	Checking harness ASSY LVNC3 for continuity Is J61<=>J165 continuous normally?	Go to FIP-DC	Replace harness ASSY LVNC3

Step	Check	Remedy	
		Yes	No
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 HL-4200	Replace harness ASSY DRV1
16	Checking clutch ASSY turn for operation Does the turn roll in the feeder run when printing 1 sheet?	Go to step [22]	With tool Go to step [17] Without tool Go to step [18]
17	Checking clutch ASSY turn Does clutch ASSY turn function normally? Using clutch ASSY turn 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 PWBA HBN DRV for signal Is P/J47-13PIN<=>P/J60-2PIN +24VDC?	Go to step [19]	Replace PWBA HBN DRV
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 clutch ASSY turn for resistance value Remove the clutch connector J475. Is J475-1PIN<=>J475-2PIN less than 200□?	Go to step [21]	Replace clutch ASSY turn
21	Checking harness ASSY DRV2-2 for continuity Is J12-9PIN<=>J42-22PIN continuous normally?	Replace MCU HL-4200	Replace harness ASSY DRV2-2
22	Checking solenoid feed for operation Does the feed gear in the feeder run when printing 1 sheet?	Check parts for missing and change paper, if no problem	With tool Go to step [23] Without tool Go to step [24]
23	Checking solenoid feed Does solenoid feed function normally? Using solenoid feed 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 PWBA HBN DRV for signal Is P/J47-11PIN<=>P/J60-2PIN +24VDC?	Go to step [25]	Replace PWBA HBN DRV
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 solenoid feed for resistance value Remove the solenoid connector J474. Is J474-1PIN<=>J474-2PIN less than 100□?	Go to step [27]	Replace solenoid feed

Step	Check	Remedy	
		Yes	No
27	Checking harness ASSY DRV2-2 for continuity Is J12-10PIN<=>J42-21PIN continuous normally?	Replace MCU HL-4200	Replace harness ASSY DRV2-2
28	Checking clutch ASSY turn MSI for operation Does the turn roll in the MSI run when printing 1 sheet?	Go to step [31]	With tool Go to step [29] Without tool Go to step [30]
29	Checking clutch ASSY turn MSI Does clutch ASSY turn MSI function normally? Using clutch ASSY turn MSI 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]
30	Checking clutch ASSY MSI turn for resistance value Remove the clutch connector J19. Is J19-1PIN<=>J19-2PIN less than 200□?	Replace MCU HL-4200	Replace clutch ASSY turn MSI
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	With tool Go to step [32] Without tool Go to step [33]
32	Checking solenoid feed MSI Does solenoid feed MSI function normally? Using solenoid feed MSI diagnostic tool, check by digital output test. In the test, close the interlock SW.	Check the spring and stopper of solenoid feed MSI for disengagement	Go to step [33]
33	Checking solenoid feed MSI for resistance value Remove J132 from MSI feed solenoid Is J132-1PIN<=>J132-2PIN less than 100□?	Go to step [34]	Replace solenoid feed MSI
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 HL-4200	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 REGI replacing condition	Replace the parts concerned	With tool Go to step [2] Without tool Go to step [3]
2	Checking OHP sensor Does OHP sensor function normally? Using diagnostic tool, check by digital input test.	Replace MCU HL-4200	Go to step [3]
3	Checking MCU HL-4200 for signal Is P/J32-2PIN<=>P/J32-1PIN 0VDC?	Go to step [4]	Go to step [5]
4	Checking MCU HL-4200 for signal Make the paper approach to the sensor. Does P/J32-2PIN<=>P/J32-1PIN change from 0VDC to +3.3VDC?	Replace MCU HL-4200	Go to step [5]
5	Checking MCU HL-4200 for signal Is P/J32-3PIN<=>P/J32-1PIN +5VDC?	Replace OHP sensor	Replace MCU HL-4200

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	With tool Go to step [2] Without tool Go to step [3]
2	Checking toner cartridge switch ASSY Does toner cartridge switch ASSY function normally? Using diagnostic tool, check by digital input test.	Replace MCU HL-4200	Go to step [3]
3	Checking PWBA HBN DRV 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 TNR4 for continuity Is J51<=>J431 continuous normally?	Go to step [7]	Replace harness ASSY TNR4
7	Checking PWBA HBN DRV for signal Is P/J42-4PIN<=>P/J42-14PIN 0VDC?	Go to step [8]	Replace PWBA HBN DRV

Step	Check	Remedy	
		Yes	No
8	Checking MCU HL-4200 for signal Is P/J12-27PIN<=>P/12-17PIN of MCU and HVPS PWBA HBN DRV 0VDC?	Replace MCU HL-4200	Go to step [9]
9	Checking harness ASSY DRV2-2 for continuity Is J12<=>J42 continuous normally?	Replace MCU HL-4200	Replace harness ASSY DRV2-2

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	With tool Go to step [2] Without tool Go to step [3]
2	Checking toner cartridge switch ASSY Does toner cartridge switch ASSY function normally? Using diagnostic tool, check by digital input test.	Replace MCU HL-4200	Go to step [3]
3	Checking PWBA HBN DRV 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 TNR4 for continuity Is J51<=>J432 continuous normally?	Go to step [7]	Replace harness ASSY TNR4
7	Checking PWBA HBN DRV for signal Is P/J42-5PIN<=>P/J42-14PIN 0VDC?	Go to step [8]	Replace PWBA HBN DRV
8	Checking MCU HL-4200 for signal Is P/J11-26PIN<=>P/11-17PIN of MCU and HVPS PWBA HBN DRV 0VDC?	Replace MCU HL-4200	Go to step [9]
9	Checking harness ASSY DRV2-2 for continuity Is J12<=>J42 continuous normally?	Replace MCU HL-4200	Replace harness ASSY DRV2-2

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	With tool Go to step [2] Without tool Go to step [3]
2	Checking toner cartridge switch ASSY Does toner cartridge switch ASSY function normally? Using diagnostic tool, check by digital input test.	Replace MCU HL-4200	Go to step [3]
3	Checking PWBA HBN DRV 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 TNR4 for continuity Is J51<=>J433 continuous normally?	Go to step [7]	Replace harness ASSY TNR4
7	Checking PWBA HBN DRV for signal Is P/J42-6PIN<=>P/J42-14PIN 0VDC?	Go to step [8]	Replace PWBA HBN DRV
8	Checking MCU HL-4200 for signal Is P/J12-25PIN<=>P/12-17PIN of MCU and HVPS PWBA HBN DRV 0VDC?	Replace MCU HL-4200	Go to step [9]
9	Checking harness ASSY DRV2-2 for continuity Is J12<=>J42 continuous normally?	Replace MCU HL-4200	Replace harness ASSY DRV2-2

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	With tool Go to step [2] Without tool Go to step [3]
2	Checking toner cartridge switch ASSY Does toner cartridge switch ASSY function normally? Using diagnostic tool, check by digital input test.	Replace MCU HL-4200	Go to step [3]
3	Checking PWBA HBN DRV 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 TNR4 for continuity Is J51<=>J434 continuous normally?	Go to step [7]	Replace harness ASSY TNR4
7	Checking PWBA HBN DRV for signal Is P/J42-3PIN<=>P/J42-14PIN 0VDC?	Go to step [8]	Replace PWBA HBN DRV
8	Checking MCU HL-4200 for signal Is P/J12-28PIN<=>P/12-17PIN of MCU and HVPS PWBA HBN DRV 0VDC?	Replace MCU HL-4200	Go to step [9]
9	Checking harness ASSY DRV2-2 for continuity Is J12<=>J42 continuous normally?	Replace MCU HL-4200	Replace harness ASSY DRV2-2

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 Replace new transfer roll cartridge ASSY, and check if an error occurs.	Replace MCU HL-4200	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 HBN DRVA CRUM in print head cartridge ASSY replacing condition	Replace the parts concerned	Go to step [2]
2	Checking PWBA HBN DRVA CRUM for connection Is PWBA HBN DRVA 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 Replace new print head cartridge ASSY, and check if an error occurs.	Replace MCU HL-4200	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 toner cartridge was replaced with a new one.	Go to step [3]	End of work
3	Checking PWBA HBN DRV 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 TNR4 for continuity Is J441<=>J51 continuous normally?	Go to step [5]	Replace harness ASSY TNR4
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 DRV2-2 for continuity Is J12-23<=>J42-8 continuous normally?	With tool Go to step [7] Without tool Go to step [8]	Replace harness ASSY DRV2-2
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 HBN DRV for signal Is P/J51-1<=>P/J60-2 +24VDC?	Go to step [9]	Replace drive PWBA HBN DRV
9	Checking harness ASSY TNR4 for continuity Is J511<=>J51 continuous normally?	Go to step [10]	Replace harness ASSY TNR4
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 PWBA HBN DRV, and if still faulty, replace MCU HL-4200	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 toner cartridge was replaced with a new one.	Go to step [3]	End of work
3	Checking PWBA HBN DRV 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 TNR4 for continuity Is J442<=>J51 continuous normally?	Go to step [5]	Replace harness ASSY TNR4
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 DRV2-2 for continuity Is J12-22<=>J42-9 continuous normally?	With tool Go to step [7] Without tool Go to step [8]	Replace harness ASSY DRV2-2
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 HBN DRV for signal Is P/J51-6<=>P/J60-2 +24VDC?	Go to step [9]	Replace PWBA HBN DRV
9	Checking harness ASSY TNR4 for continuity Is J512<=>J51 continuous normally?	Go to step [10]	Replace harness ASSY TNR4
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 PWBA HBN DRV, and if still faulty, replace MCU HL-4200	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 toner cartridge was replaced with a new one.	Go to step [3]	End of work
3	Checking drive PWBA HBN DRV 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 TNR4 for continuity Is J443<=>J51 continuous normally?	Go to step [5]	Replace harness ASSY TNR4
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 DRV2-2 for continuity Is J12-21<=>J42-10 continuous normally?	With tool Go to step [7] Without tool Go to step [8]	Replace harness ASSY DRV2-2
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 HBN DRV for signal Is P/J51-19<=>P/J60-2 +24VDC?	Go to step [9]	Replace PWBA HBN DRV
9	Checking harness ASSY TNR4 for continuity Is J513<=>J51 continuous normally?	Go to step [10]	Replace harness ASSY TNR4
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 PWBA HBN DRV, and if still faulty, replace MCU HL-4200	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 toner cartridge was replaced with a new one.	Go to step [3]	End of work
3	Checking PWBA HBN DRV 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 TNR4 for continuity Is J441<=>J51 continuous normally?	Go to step [5]	Replace harness ASSY TNR4
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 DRV2-2 for continuity Is J12-24<=>J42-7 continuous normally?	With tool go to step [7] Without tool go to step [8]	Replace harness ASSY DRV2-2
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 HBN DRV for signal Is P/J51-24<=>P/J60-2 +24VDC?	Go to step [9]	Replace PWBA HBN DRV
9	Checking harness ASSY TNR4 for continuity Is J514<=>J51 continuous normally?	Go to step [10]	Replace harness ASSY TNR4
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 PWBA HBN DRV, and if still faulty, replace MCU HL-4200	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 Sensor TNR full replacing condition	Replace the parts concerned	With tool Go to step [2] Without tool Go to step [3]
2	Checking sensor TNR full Does sensor TNR full function normally? Sensor TNR full 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 sensor TNR full	Replace harness ASSY TFLSNS
6	Checking transfer roll cartridge ASSY Replace new transfer roll cartridge ASSY, and check if an error occurs.	Replace MCU HL-4200	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 HBN DRVA CRUM in print head cartridge ASSY replacing condition	Replace the parts concerned	Go to step [2]
2	Checking PWBA HBN DRVA CRUM for connection Is PWBA HBN DRVA 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 Replace new print head cartridge ASSY, and check if an error occurs.	Replace MCU HL-4200	End of work

CRUM ID Error FIP (Print Head Cartridge)

Step	Check	Remedy	
		Yes	No
1	Check the following for failure: Installation of toner cartridge Installation of PWB CRUM reader	Reinstall the appropriate part	Go to step [2]
2	Check connection of PWB CRUM reader. Is the PWB CRUM reader connector properly connected to the harness connector?	Go to step [3]	Replace harness ASSY
3	Check continuity of harness ASSY RFID2 (J341-3411). Is continuity proper between J341<=>J3411?	Go to step [4]	Replace harness ASSY
4	Check continuity of harness ASSY RFID (J34-3411). Is continuity proper between P3411<=>J34?	Go to step [5]	Replace harness ASSY
5	Check Toner Cartridge. Has error occurred after installing the new toner cartridge?	Replace MCU HL-4200	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 HL-4200

Front Cover FIP

Step	Check	Remedy	
		Yes	No
1	Initial setting Check the following for evidence of fault. PWBA HBN DRV replacing condition Front cover replacing condition Interlock SW actuator replacing condition	Replace the parts concerned	With tool Go to step [2] Without tool Go to step [3]
2	Checking interlock SW Does interlock SW function normally? Using interlock SW, check by digital output test.	Replace MCU HL-4200	Go to step [3]
3	Checking PWBA HBN DRV for signal Close the front cover Is P/J41-35PIN<=>P/J41-22 0VDC?	Replace MCU HL-4200	Replace MCU HL-4200

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	With tool Go to step [2] Without tool Go to step [3]
2	Checking full stack sensor Does full stack sensor function normally? Full stack sensor using diagnostic tool, check by Digital Input Test.	Replace MCU HL-4200	Go to step [3]
3	Checking harness ASSY front 2 for signal Is P/J139-6PIN<=>P/J139-5PIN +3.3VDC?	Replace MCU HL-4200	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 HL-4200

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	With tool Go to step [2] Without tool Go to step [3]
2	Checking size switch ASSY Does size switch ASSY function normally? Size switch ASSY using diagnostic tool, check by digital input test.	Replace MCU HL-4200	Go to step [3]
3	Checking PWBA HBN DRV 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 PWBA HBN DRV 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 HL-4200	Replace PWBA HBN DRV

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?	With tool Go to step [3] Without tool Go to step [4]	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 HL-4200	Go to step [4]
4	Checking PWBA HBN DRV for signal Is P/J47-10<=>P/J47-9 +3.3VDC?	Go to step [6]	Go to step [5]
5	Checking PWBA HBN DRV for signal Is P/J42-20<=>P/J42-15 +3.3VDC?	Replace PWBA HBN DRV	Replace MCU HL-4200
6	Checking PWBA HBN DRV for signal Is P/J47-8<=>P/J47-9 +3.3VDC?	Replace tray1 low paper sensor	Replace PWBA HBN DRV

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?	With tool Go to step [3] Without tool Go to step [4]	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 HL-4200	Go to step [4]
4	Checking PWBA OPTFDR for signal Is P/J82-10 PIN <=>P/J82-9 +3.3VDC?	Go to step [7]	Go to step [5]
5	Checking PWBA OPTFDR for signal Is P/J81-18 PIN <=>P/J81-23 +3.3VDC?	Replace PWBA OPTFDR	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 HL-4200 Replace PWBA OPTFDR	Replace harness ASSY which is not continuous
7	Checking PWBA OPTFDR for signal Is P/J82-8PIN<=>P/J82-9 +5VDC?	Replace tray2 low paper sensor	Replace PWBA OPTFDR

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?	With tool Go to step [3] Without tool Go to step [4]	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 HL-4200	Go to step [4]
4	Checking PWBA OPTFDR for signal Is P/J83-10 PIN <=>P/J83-9 +3.3VDC?	Go to step [7]	Go to step [5]
5	Checking PWBA OPTFDR for signal Is P/J81-17 PIN <=>P/J81-23 +3.3VDC?	Replace feeder PWBA HBN DRV	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 HL-4200 Replace PWBA OPTFDR	Replace harness ASSY which is not continuous
7	Checking PWBA OPTFDR for signal Is P/J83-8PIN<=>P/J83-9 +5VDC?	Replace tray3 low paper sensor	Replace PWBA OPTFDR

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.)

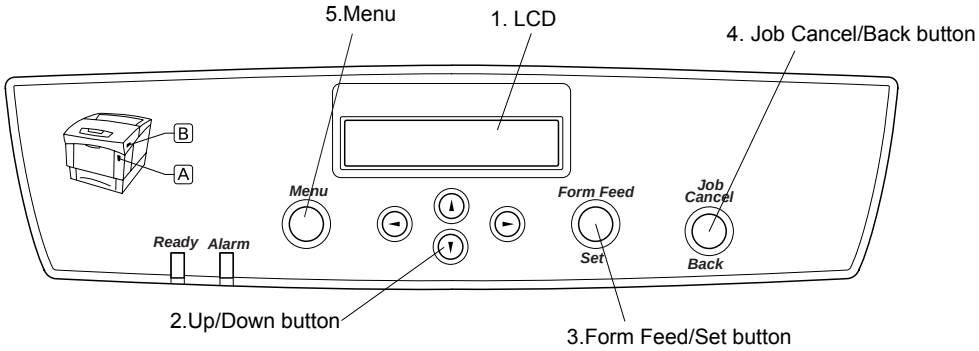


Fig.5-3

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. IOT diagnosis
3. Print Info
4. Complete
5. Installation set
6. Test print
7. Parameter

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)

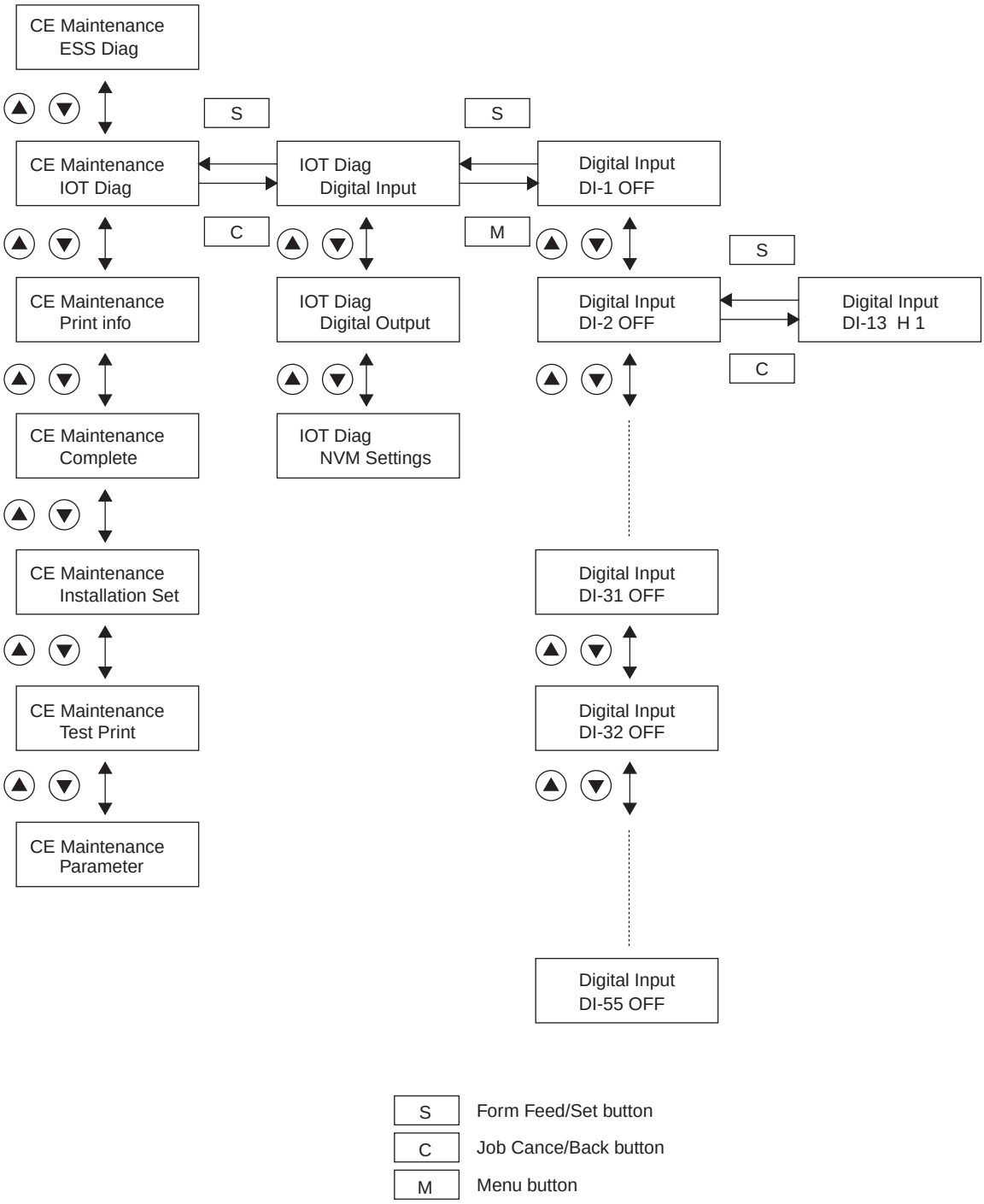


Fig.5-4

4.6 Diag. Mode Menu Tree

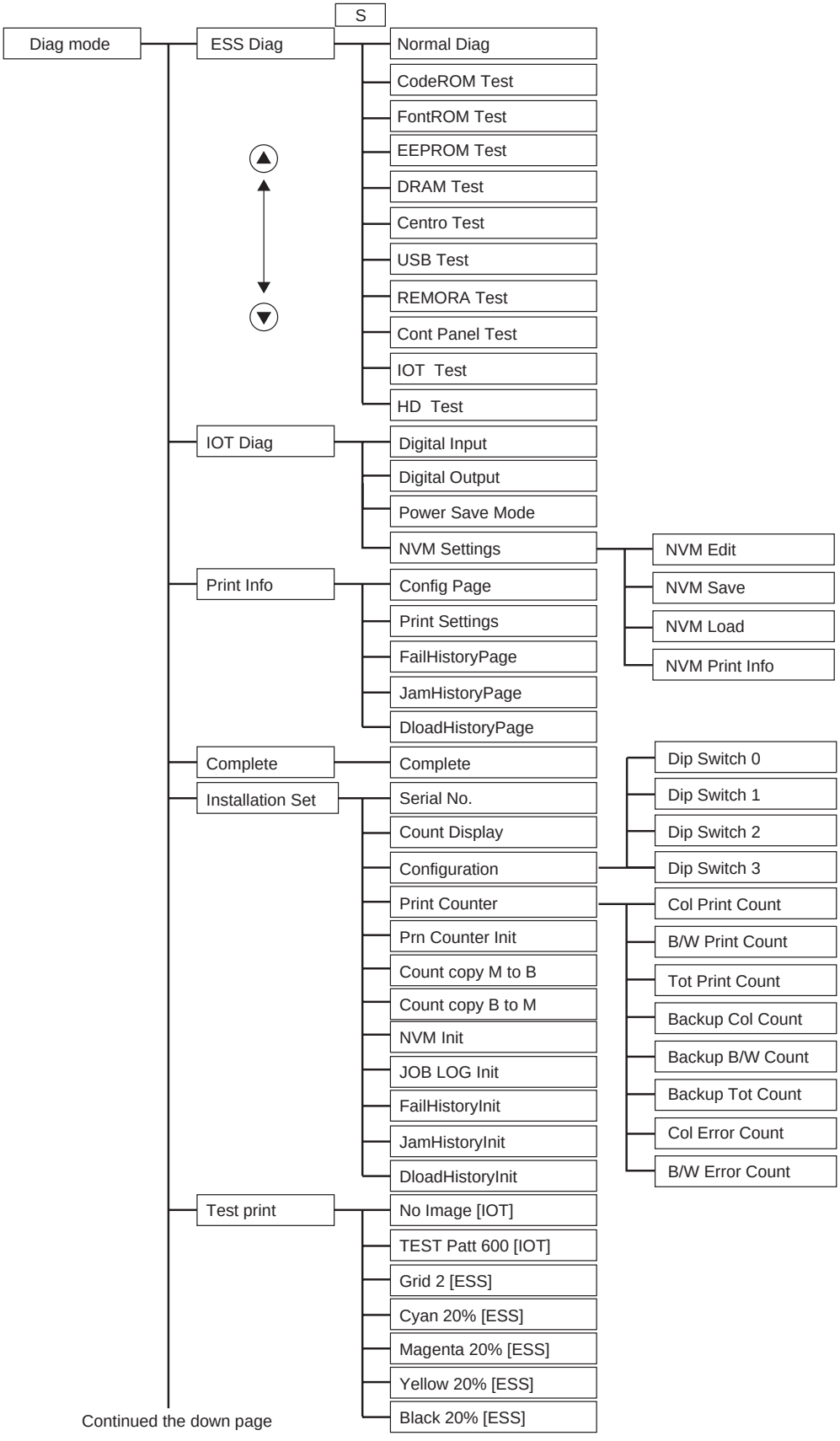


Fig.5-5

Continued from the up page

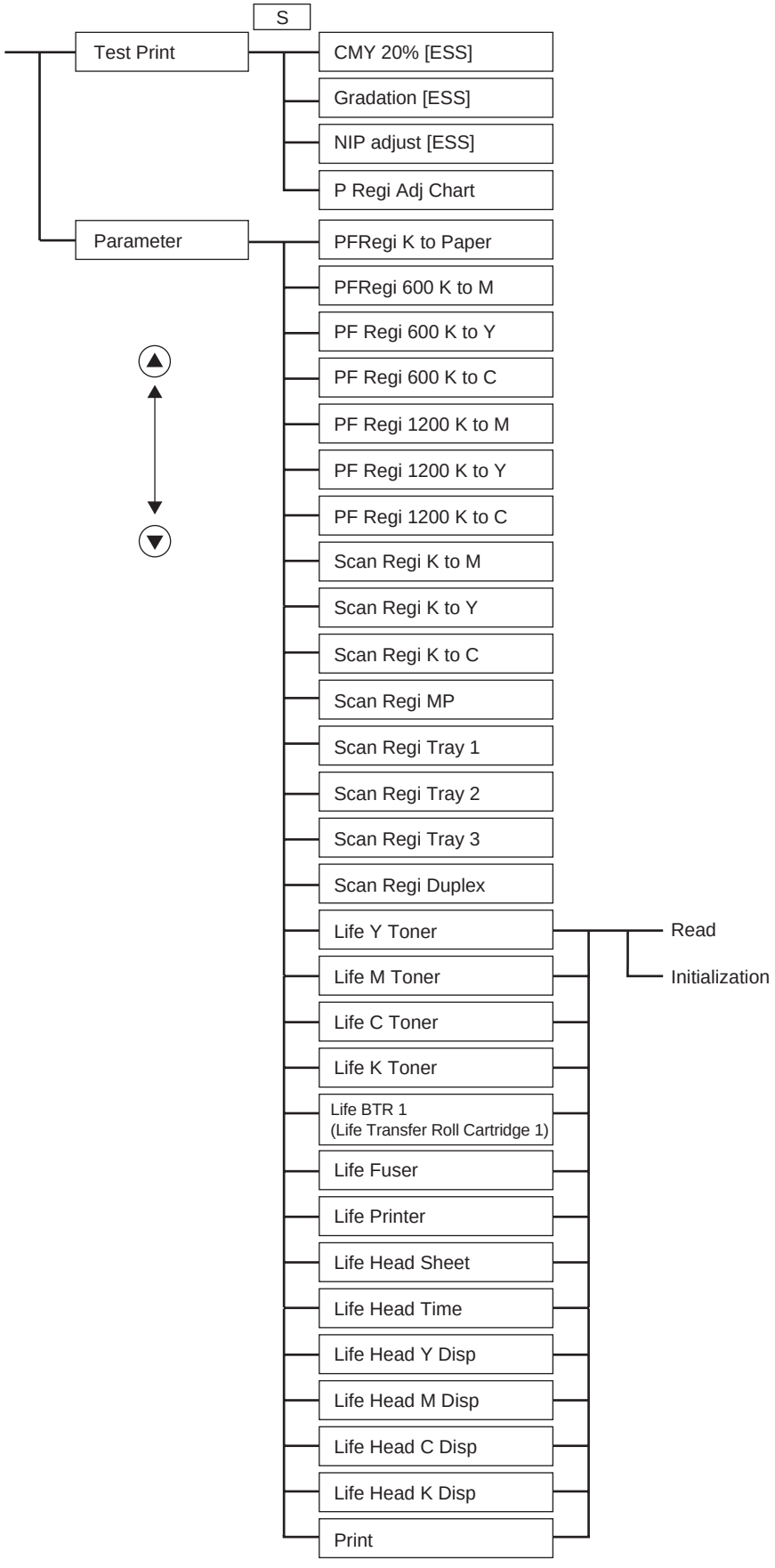


Fig.5-6

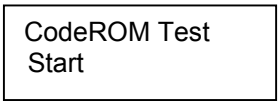
4.7 ESS Diagnosis

Function: Executing an ESS related diagnosis.

Operation procedure:

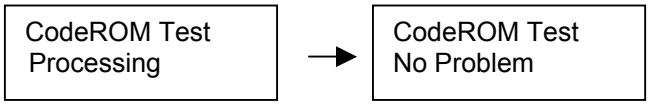
1. Enter the Diag. (C/E) mode.
2. Select [CE Maintenance ESS Diag] with the ▲ and ▼ buttons.
3. Press the Form Feed/Set button to advance to diagnostic menu selection in [CE Maintenance ESS Diag].
4. Select a diagnostic item with the ▲ or ▼ button. (For the contents of the diagnostic items, refer to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

   Example: Code ROM test display screen

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 ■ Alarm	"UP" display
▼	■ Ready □ Alarm	"DOWN" display
◀	□ Ready ■ Alarm	"LEFT" display
▶	□ Ready □ Alarm	"RIGHT" display
Form Feed/Set	■ Ready □ Alarm	"SET" display
Menu	□ Ready ■ Alarm	"MENU" display
Job Cancel/Back	□ Ready □ Alarm	"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
MCU nationality change	Switches the MCU nationality to JP or US.
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 READY	The component of scanner is turned ON and checked in Diag Mode(C/E).	2.5.1
DI-5	FUSER READY	The component of scanner is turned ON and checked in Diag Mode(C/E).	2.9.1
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	SENSOR NO TONER (Y)	Replace and remove the toner cartridge.	2.8.5
DI-d	SENSOR NO TONER (M)	Replace and remove the toner cartridge.	2.8.5
DI-e	SENSOR NO TONER (C)	Replace and remove the toner cartridge.	2.8.5
DI-f	SENSOR NO TONER (K)	Replace and remove the toner cartridge.	2.8.5
DI-10	MSI NO PAPER SENSOR	Block and unblock the sensor with an actuator.	2.7.2

Menu No.	Part/signal name	Test method	Reference BSD
DI-11	TRAY1 NO PAPER SENSOR	Block and unblock the sensor with an actuator.	2.6.1
DI-12	TRAY2 NO PAPER SENSOR	Block and unblock the sensor with an actuator.	2.6.2A 2.6.2B
DI-13	TRAY3 NO PAPER SENSOR	Block and unblock the sensor with an actuator.	2.6.3
DI-14	KIT SENSOR OHP	Plain paper is checked.	2.7.6
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.	2.6.2A 2.6.2B
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 (DISPLAY)	Set the side guide and end guide of tray1 to the paper size. Check the sensors signal. The value (from 00 to 07) is displayed that corresponded with the size of paper. Refer to the BSD.	2.6.1
DI-19	TRAY1 SIZE SWITCH (SW1)	Set the side guide and end guide of tray1 to the paper size. Check the sensors signal. When the SW1 is switched on, displays L (low). Refer to the BSD.	2.6.1
DI-1a	TRAY1 SIZE SWITCH (SW2)	Set the side guide and end guide of tray1 to the paper size. Check the sensors signal. When the SW2 is switched on, displays L (low). Refer to the BSD.	2.6.1
DI-1b	TRAY1 SIZE SWITCH (SW3)	Set the side guide and end guide of tray1 to the paper size. Check the sensors signal. When the SW3 is switched on, displays L (low). Refer to the BSD.	2.6.1
DI-20	TRAY2 SIZE SWITCH (DISPLAY)	Set the side guide and end guide of tray2 to the paper size. Check the sensors signal. The value (from 00 to 07) is displayed that corresponded with the size of paper. Refer to the BSD.	2.6.2A 2.6.2B
DI-21	TRAY2 SIZE SWITCH (SW1)	Set the side guide and end guide of tray2 to the paper size. Check the sensors signal. When the SW1 is switched on, displays L (low). Refer to the BSD. 7.2B	2.6.2A 2.6.2B

Menu No.	Part/signal name	Test method	Reference BSD
DI-22	TRAY2 SIZE SWITCH (SW2)	Set the side guide and end guide of tray2 to the paper size. Check the sensors signal. When the SW2 is switched on, displays L (low). Refer to the BSD.	2.6.2A 2.6.2B
DI-23	TRAY2 SIZE SWITCH (SW3)	Set the side guide and end guide of tray2 to the paper size. Check the sensors signal. When the SW3 is switched on, displays L (low). Refer to the BSD.	2.6.2A 2.6.2B
DI-28	TRAY3 SIZE SWITCH (DISPLAY)	Set the side guide and end guide of tray3 to the paper size. Check the sensors signal. The value (from 00 to 07) is displayed that corresponded with the size of paper. Refer to the BSD.	2.6.3
DI-29	TRAY3 SIZE SWITCH (SW1)	Set the side guide and end guide of tray3 to the paper size. Check the sensors signal. When the SW1 is switched on, displays L (low). Refer to the BSD.	2.6.3
DI-2a	TRAY3 SIZE SWITCH (SW2)	Set the side guide and end guide of tray3 to the paper size. Check the sensors signal. When the SW2 is switched on, displays L (low). Refer to the BSD.	2.6.3
DI-2b	TRAY3 SIZE SWITCH (SW3)	Set the side guide and end guide of tray3 to the paper size. Check the sensors signal. When the SW3 is switched on, displays L (low). Refer to the BSD.	2.6.3
DI-30	FUSER FAN FAIL	Hold and release fuser fan.	2.9.3
DI-31	REAR FAN FAIL	Hold and release rear fan.	2.9.3
DI-32	NO PRINT HEAD CARTRIDGE ASSY PKG	Mount and remove print head cartridge ASSY.	2.3.2
DI-33	WASTE TONER FULL	Block and unblock the sensor with paper.	2.9.7
DI-34	TRAY MODULE DETECTED	Connect and disconnect the tray module.	2.6.2A 2.6.2B
DI-38	NO TONER SENSOR (Y)	Replace and remove the toner cartridge.	2.8.5
DI-39	NO TONER SENSOR (M)	Replace and remove the toner cartridge.	2.8.5
DI-3a	NO TONER SENSOR (C)	Replace and remove the toner cartridge.	2.8.5
DI-3b	NO TONER SENSOR (K)	Replace and remove the toner cartridge.	2.8.5

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.
   (For the contents of the diagnostic items, refer to the table below.)
7. Press the Form Feed/Set button to execute the diagnosis.
8. The part is activated and the LCD panel displays [EXEC].
   (The display is [READY] when the part is not in operation.)
9. Press the Job Cancel/Back button to terminate the diagnosis.
10. 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	DRIVE ASSY MAIN ON (NORMAL SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates in normal mode.	2.4.1
DO-1	DRIVE ASSY MAIN ON (HALF SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates in half-speed mode.	2.4.1
DO-2	DRIVE ASSY MAIN OFF	<WARNING!> <CAUTION!> Check by hearing and visually that stop the motor rotates.	2.4.1
DO-3	DUP MOTOR ASSY ON (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 ON (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 ON (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 ON (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 ON (REVERSE HALF SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates counterclockwise in half-speed mode.	2.9.5

Menu No.	Part/signal name	Test method	Reference BSD
DO-8	DUP MOTOR ASSY ON (REVERSE DOUBLE SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates counterclockwise in double-speed mode.	2.9.5
DO-a	DRIVE ASSY DEVE ON (NORMAL SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates in normal mode.	2.8.2
DO-b	DRIVE ASSY DEVE ON (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 ON (NORMAL SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates in normal mode.	2.9.2
DO-e	FUSER DRIVE ASSY ON (HALF SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates in half-speed mode.	2.9.2
DO-10	OPTION MOTOR ON (NORMAL SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates in normal mode.	2.7.5A 2.7.5B
DO-11	OPTION MOTOR ON (HALF SPEED)	<WARNING!> <CAUTION!> Check by hearing and visually that the motor rotates in half-speed mode.	2.7.5A 2.7.5B
DO-13	REAR FAN ON (HIGH SPEED)	Check by hearing and visually that the fan rotates in high-speed mode.	2.9.3
DO-14	REAR FAN ON (LOW SPEED)	Check by hearing and visually that the fan rotates in low-speed mode.	2.9.3
DO-16	FUSER FAN ON (HIGH SPEED)	Check by hearing and visually that the fan rotates in High-speed mode.	2.9.3
DO-17	FUSER FAN ON (LOW SPEED)	Check by hearing and visually that the fan rotates in Low-speed mode.	2.9.3
DO-19	DRIVE ASSY MAIN ON (LOW SPEED)	<WARNING> <CAUTION> Check by hearing and visually that the motor rotates in Low-speed mode.	2.4.1

Menu No.	Part/signal name	Test method	Reference BSD
DO-1a	DUP MOTOR ASSY ON (FORWARD LOW SPEED)	<WARNING> <CAUTION> Check by hearing and visually that the motor rotates in Low-speed mode.	2.9.5
DO-1b	DUP MOTOR ASSY ON (REVERSE LOW SPEED)	<WARNING> <CAUTION> Check by hearing and visually that the motor rotates counterclockwise in Low-speed mode.	2.9.5
DO-1c	DRIVE ASSY DEVE ON (LOW SPEED)	<WARNING> <CAUTION> Check by hearing and visually that the motor rotates in Low-speed mode.	2.8.2
DO-1d	FUSER DRIVE ASSY ON (LOW SPEED)	<WARNING> <CAUTION> Check by hearing and visually that the motor rotates in Low-speed mode.	2.9.2
DO-1e	OPTION MOTOR ON (LOW SPEED)	<WARNING><CAUTION> Check by hearing and visually that the motor rotates in Low-speed mode.	2.7.5A 2.7.5B
DO-28	TONER MOTOR (Y) ON	Check by hearing and visually that the motor rotates.	2.8.4
DO-2a	TONER MOTOR (M) ON	Check by hearing and visually that the motor rotates.	2.8.4
DO-2c	TONER MOTOR (C) ON	Check by hearing and visually that the motor rotates.	2.8.4
DO-2e	TONER MOTOR (K) ON	Check by hearing and visually that the motor rotates.	2.8.4
DO-30	REGI CLUTCH ON	Check by hearing that the clutch operates.	2.7.6
DO-32	MSI TURN CLUTCH ON	Check by hearing that the clutch operates.	2.7.6
DO-34	MSI FEED SOLENOID ON	Check by hearing that the solenoid operates.	2.7.2

Menu No.	Part/signal name	Test method	Reference BSD
DO-36	TRAY1 TURN CLUTCH ON	Check by hearing that the clutch operates.	2.7.1
DO-38	TRAY1 FEED SOLENOID ON	Check by hearing that the clutch operates.	2.7.1
DO-40	CHARGI FILM ON	<WARNING><CAUTION>	2.8.1
DO-42	DEVE BIAS AC ON	<WARNING><CAUTION>	2.8.2
DO-44	DEVE BIAS DC Y ON	<WARNING><CAUTION>	2.8.2
DO-46	DEVE BIAS DC M ON	<WARNING><CAUTION>	2.8.2
DO-48	DEVE BIAS DC C ON	<WARNING><CAUTION>	2.8.2
DO-4a	DEVE BIAS DC K ON	<WARNING><CAUTION>	2.8.2
DO-4c	IDT1 PLUS ON	<WARNING><CAUTION>	2.8.6
DO-4e	IDT1 MINUS ON	<WARNING><CAUTION>	2.8.6
DO-50	IDT2 PLUS ON	<WARNING><CAUTION>	2.8.6
DO-52	IDT2 MINUS ON	<WARNING><CAUTION>	2.8.6
DO-54	IDT1 CLEANER ON	<WARNING><CAUTION>	2.8.6
DO-56	IDT2 CLEANER ON	<WARNING><CAUTION>	2.8.6
DO-58	TRANSFER ROLL CARTRIDGE PLUS ON	<WARNING><CAUTION>	2.8.6
DO-5a	TRANSFER ROLL CARTRIDGE MINUS ON	<WARNING><CAUTION>	2.8.6
DO-5c	DTS ON	<WARNING><CAUTION>	2.8.6
DO-60	TRAY2 TURN CLUTCH ON	Check by hearing that the clutch operates.	2.7.3A 2.7.3B
DO-62	TRAY2 FEED SOLENOID ON	Check by hearing that the solenoid operates.	2.7.3A 2.7.3B
DO-64	TRAY3 TURN CLUTCH ON	Check by hearing that the clutch operates.	2.7.4
DO-66	TRAY3 FEED SOLENOID ON	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.)

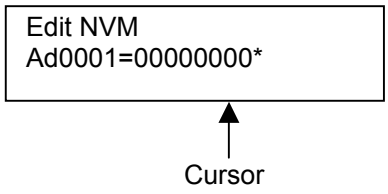
4.8.3 NVM Edit Read/Write

Refer to Section 7. NVM LIST.

Function: Reading or writing NVM

Operation procedure:

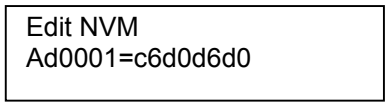
1. Enter the Diag. (C/E) mode.
2. Select [IOT Diag] with the ▲ and ▼ buttons and press the Form Feed/Set button.
3. Select [NVM Settings] with ▲ and ▼ buttons and press the Form Feed/Set button.
4. Advance to [NVM Edit] with ▲ and ▼ buttons and press the Form Feed/Set button.
5. Select a necessary item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



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

Press the ▲ or ▼ button to change value on cursor.

6. Change the numeric value at the desired data section with the ▲ ▼ buttons.



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

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

4.8.4 NVM Information Print

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. Select [NVM Settings] with ▲ and ▼ buttons and press the Form Feed/Set button.
4. Advance to [NVM Print Info] with the ▲ and ▼ buttons and press the Form Feed/Set button.

4.8.5 NVM Information 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.
3. Select [NVM Settings] with ▲ and ▼ buttons and press the Form Feed/Set button.
4. Advance to [NVM Save] with the ▲ and ▼ buttons and press the Feed/Set button to display the Confirm Initialize screen.

   NVM Save MCU -> ESS
   OK?

   Press the Job Cancel/Back button to cancel.
5. When the Form Feed/Set button is pressed, the NVM information is saved and the following screen is displayed:

   NVM Save MCU -> ESS
   Saved

4.8.6 NVM Information 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.
3. Select [NVM Settings] with ▲ and ▼ buttons and press the Form Feed/Set button.
4. Advance to [NVM Load] with the ▲ and ▼ buttons and press the Form Feed/Set button to display the Confirm Initialize screen.

   NVM Load ESS -> MCU
   OK?

   Press the Job Cancel/Back button to cancel.
5. When the Form Feed/Set button is pressed, the NVM information is loaded and the following screen is displayed:

   NVM Load ESS -> MCU
   Loaded

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	--	Sets a dip switch.
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.
Count copy B to M	--	Copies from a backup file to a normal meter.
NVM Init	--	All clear of NVM
Job Log Init	--	Clear of Job Log
FailHistoryInit	--	Clear of fail history
JamHistoryInit	--	Clear of jam history
DloadHistoryInit	--	Clear of download history

*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-PWBA HBN DRV.
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.

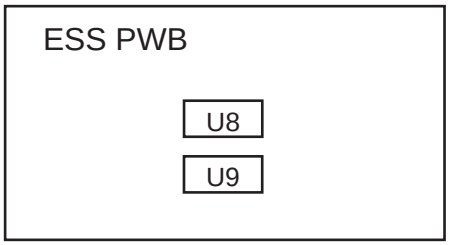


Fig.5-7

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 Cyan 20% [ESS] 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.
Test Patt 600 [IOT]	Outputs an IOT internal 600-dpi pattern.
Grid2 [ESS]	Outputs an ESS internal grid pattern.
Cyan 20% [ESS]	Outputs a solid pattern of 20% cyan.
Magenta20% [ESS]	Outputs a solid pattern of 20% magenta.
Yellow 20% [ESS]	Outputs a solid pattern of 20% yellow.
Black 20% [ESS]	Outputs a solid pattern of 20% black.
CMY 20% [ESS]	Outputs a solid pattern of 20% C.M.Y each.
Gradation [ESS]	Outputs 100% to 2% gradation patterns in four colors.
NIP adjust [ESS]	Outputs the NIP adjustment pattern.
P REGI Adj Chart	Outputs the Paper feed registration correction chart.

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
   0*

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 to 127	Sets the paper feed direction registration
Scan direction registration adjustment	-128 to 127	Sets the scan direction registration of Main, Aux 1, Aux 2, MSI, and Dup.
Life counter	--	Reads 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-4200CN          MCU Parameter List      Serial No. 000000

  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

  Registration Adjust Fast Scan, Paper from Black : MP Tray       : 0
                                Paper from Black : Tray1          : 0
                                Paper from Black : Tray2          : 0
                                Paper from Black : Tray3          : 0
                                Paper from Black : Duplex         : 0

  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
                Printer Sheets                                    : 373
                Printer Head Sheets                               : 369
                Printer Head Time                                 : 8183
                Printer Head Yellow Dispense                      : 645
                Printer Head Magenta Dispense                     : 782
                Printer Head Cyan Dispense                        : 883
                Printer Head Black Dispense                       : 730
```

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.
FailHistoryPage	Outputs setting fail history information from the control panel.
JamHistoryPage	Outputs setting jam history information from the control panel.
DloadHistoryPage	Outputs setting download history information from the control panel.

<Config page sample>

HL-4200CN MCU Config page Serial No. 000000

Optional Products Status :
Auxiliary Cassette 1&2&3

ROM Revision NO :V 1.0.1
MVM Revision NO : V 1.0.1

<Setting print sample>

HL-4200CN DIAG Settings Page Serial No. 000000

Serial No.	: 000000
Counter Display Switch	: OFF
Color Print Counter	: 4553
B/W Print Counter	: 2384
Total Print Counter	: 6937
Backup Color Print Counter	: 4553
Backup B/W Print Counter	: 2384
Backup Total Print Counter	: 6937
Color Print Error Counter	: 1
B/W Print Error Counter	: 1

<Fail history sample>

HL-4200CN System Fail History Serial No. 000000

Total Number of Prints = 6938

No.	Print Cnt.	Chain-Link
1	6910	016-370
2	6872	016-330
3	6851	016-350
4	6791	016-314
5	6656	016-302 0x00000008 0x00000000 200305120950
6	6647	016-370
7	6624	016-314
8	6228	016-370

<Jam history sample>

HL-4200CN Paper Jam History Serial No. 000000

Total Number of Prints = 6939

No.	Print Cnt.	Kind of JAM
1	6911	Fuser JAM
2	6880	Regi. JAM
3	6846	Feed JAM
4	6823	Media Type Mismatch
5	6791	Regi. JAM
6	6777	Feed JAM
7	6734	Fuser JAM
8	6624	Regi. JAM

<Download history sample>

HL-4200CN F/W System Download History Serial No. 000000

Total Number of Prints = 6940

No.	Print Cnt.	S/W Type	Result	Port	Version
1	6866	IOT NVM	Complete	Parallel	1.0.1
2	6866	IOT F/W	Complete	Parallel	1.0.1
3	6851	IOT NVM	Complete	Parallel	1.0.0
4	6816	ESS F/W	Main Complete	Parallel	2003052111321
5	6815	ESS F/W	Main Complete	Parallel	200305161510
6	6811	ESS F/W	Main Complete	Parallel	200305161510
7	6804	IOT NVM	Complete	Parallel	1.0.0
8	6804	IOT F/W	Complete	Parallel	1.0.1

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. Remove the ESS PWB.
2. Load paper, and turn the power ON.

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

3. Short two pins of the test print connector (P31) on the MCU HL-4200.

   Reference:
   To short two pins, make the screwdriver tip touch the two pins.
4. The printer transits to the READY mode, and starts the printing. (Printing is carried out continuously in the Duplex mode).
5. 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.

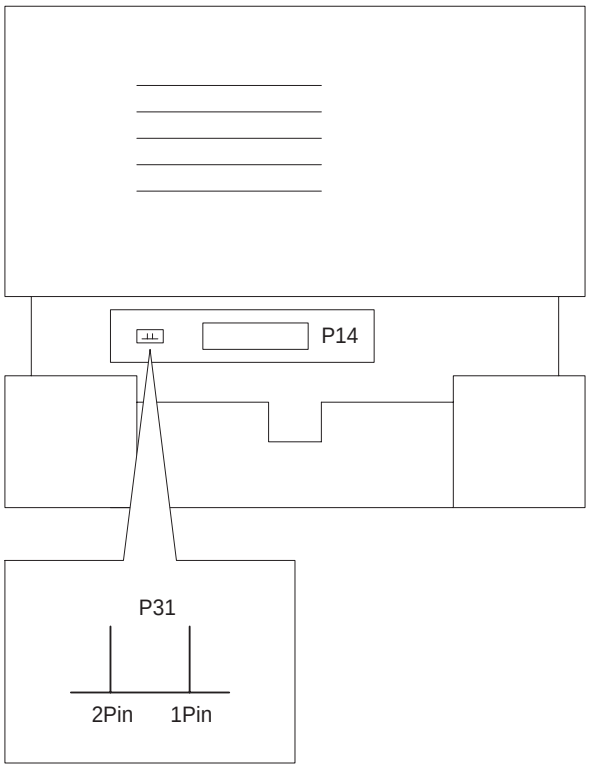


Fig.5-8

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.

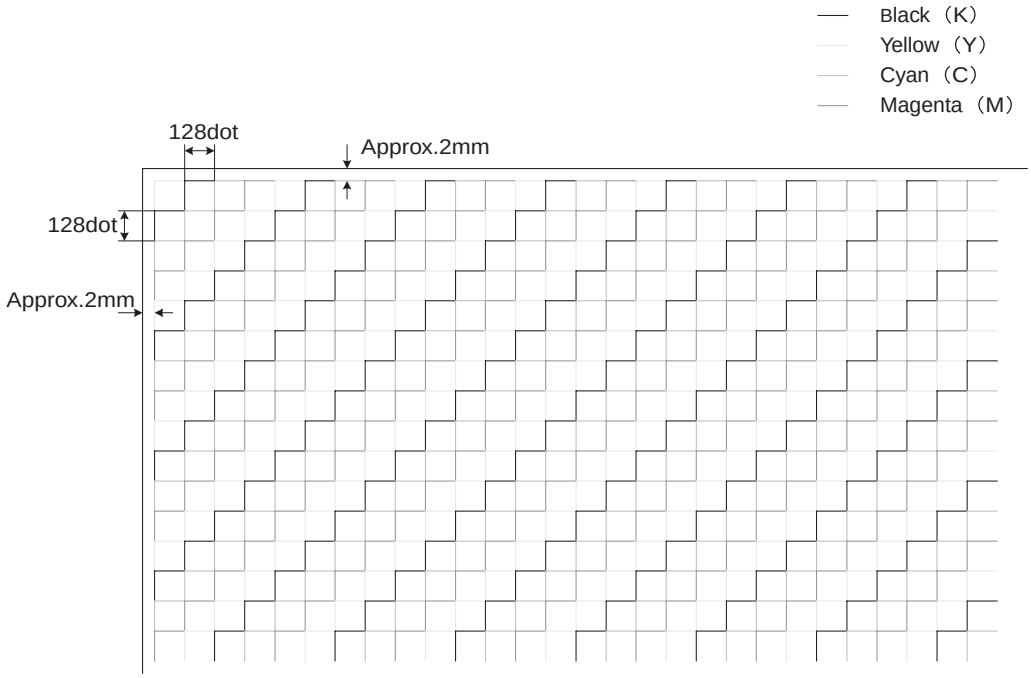


Fig.5-9

6. TRANSFER ROLL CARTRIDGE ADJUSTING THIRD TRANSFER CURRENT VALUE

The transfer current value of the toner image is set so that the image quality can get for each type of paper. This set value is selected by assuming the average characteristic per paper type, therefore, the best image quality may not appear if the paper to be used has the different characteristic from the one which Brother assumes.
In this case, the image quality can be improved by changing the transfer current value to the one which corresponding to the paper used actually.

<Image troubles which may be caused when the transfer current value is not appropriate>

1) In case that the transfer current is "not enough":
   Toner splash at the edge of image and unbalanced color (Whole image has bluish tinge) are caused.
   -> Increase the transfer current

2) In case that the transfer current is "excess":
   1mm flakes appear on the entire image.
   -> Reduce the transfer current

Note:
There is high possibility to cause these image errors to the second side especially when executing duplex printing.

6.1 Procedure of Changing the Transfer Current Value Setup

The transfer current value setup is changed on the control panel.

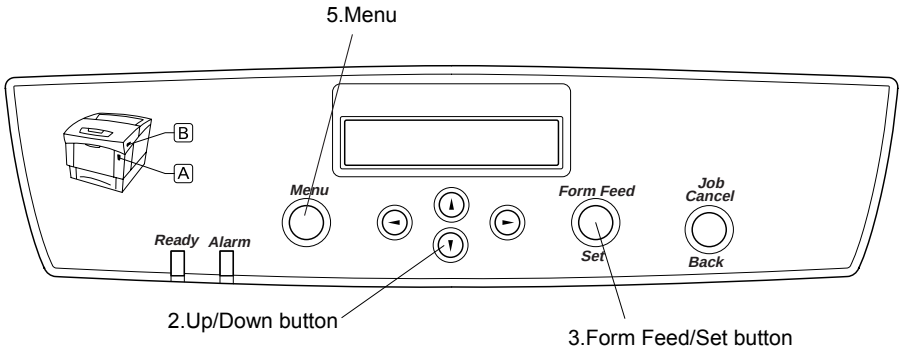


Fig.5-10

<Operation procedure>

1. With the status of Ready to Print (Printer screen (printable)), press [Menu] button.

Ready to Print

2. After Menu screen (1:System) is displayed, press ▼ button.

Menu 1:System

3. After Menu screen (2:Maintenace) is displayed, press [Form Feed/Set] button.

Menu 2:Maintenance

4. After 2:Maintenace screen (Init NVM) is displayed, press ▼ button three times.

2:Maintenance Init NVM

5. After 2:Maintenace screen (Media CurrentAdi) is displayed, press [Form Feed/Set] button.

2:Maintenance BTR CurrentAdj

6. After BTR CurrentAdi screen (Plain paper) is displayed, press ▼ button and select the used paper mode (includes front and back sides).

BTR CurrentAdj Plain Paper

Note:
Refer to 6.2 User mode Menu tree.

Example in case of selecting board 1 back side:

BTR CurrentAdj ThinkPaper 1 BK

7. Press [Form Feed/Set] button.

ThinkPaper 1 BK 0 *

8. After the current value is displayed, change the value (increase and reduce the transfer current value) by ▲ and ▼ buttons.
Example in the case of pressing ▲ button once and increasing the value 1 step:

ThinkPaper 1 BK 1

9. Press [Form Feed/Set] button to save the value.

ThinkPaper 1 BK 1*

Note:
Usually, it is increase 1 or 2 steps.
"" indicates that the changed value is now valid.*

10. Press [Menu] button and back to Ready to Print (Printer screen (printable)) screen.

Ready to Print

Check the image error was improved by printing the image caused an error after setting. If it is not improved, repeat 1 to 10.

Note:
Be careful not to cause other image error by changing the current value to the adjusting value too much.
The changed adjusting value is maintained for the same paper mode until it is adjust again.

6.2 User Mode Menu Tree

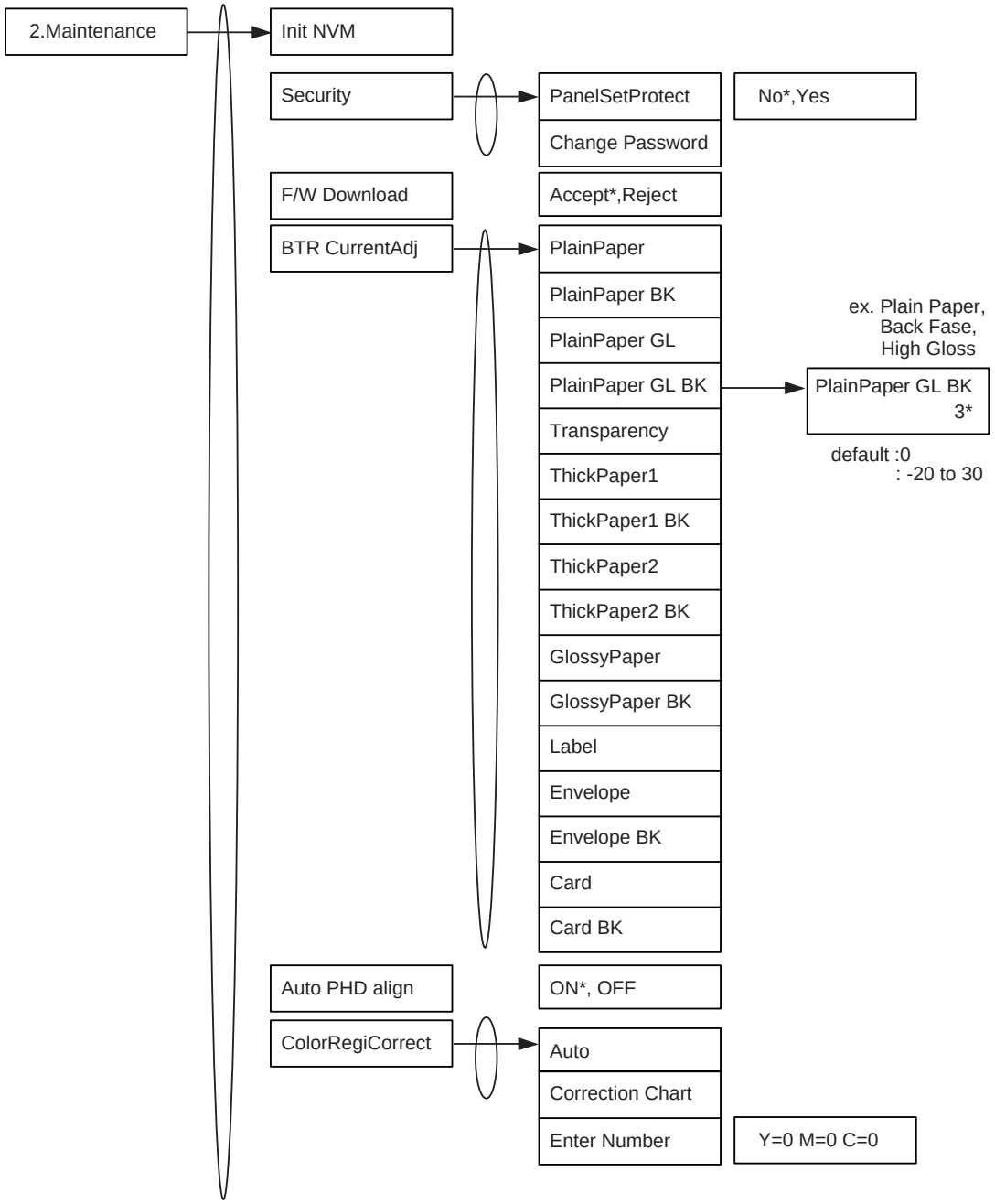


Fig.5-11

7. NVM LIST

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

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

Address	Set value			Description	
	Hex	Dec	Word/ Long		
1200	00	0		Lead regi. between paper and K(0.17mm)	
1201	00	0		Lead regi. 600dpi between M and K (line)	
1202	00	0		Lead regi. 600dpi between Y and K (line)	
1203	00	0		Lead regi. 600dpi between C and K (line)	
1204	00	0		Lead regi. 1200dpi between M and K (line)	
1205	00	0		Lead regi. 1200dpi between Y and K (line)	
1206	00	0		Lead regi. 1200dpi between C and K (line)	
1207	00	0		Lead regi. 1800dpi between M and K (line)	
1208	00	0		Lead regi. 1800dpi between Y and K (line)	
1209	00	0		Lead regi. 1800dpi between C and K (line)	
120A	00	0		Side regi. between M and K	
120B	00	0		Side regi. between Y and K	
120C	00	0		Side regi. between C and K	
120D	00	0		Side regi. between paper and K Duplex (0.17mm)	
120E	00	0		Side regi. between paper and K MSI (0.17mm)	
120F	00	0		Side regi. between paper and K Tray1 (0.17mm)	
1210	00	0		Side regi. between paper and K Tray2 (0.17mm)	
1211	00	0		Side regi. between paper and K Tray3 (0.17mm)	
121A	00	0	0	Transfer roll cartridge PV (L)	
121B	00	0		Transfer roll cartridge PV (M)	
121C	00	0		Transfer roll cartridge PV (H)	
1220	00	0	0	Fuser PV (L)	

Address	Set value			Description	
	Hex	Dec	Word/ Long		
1221	00	0		Fuser PV (M)	
1222	00	0		Fuser PV (H)	
1223	00	0	0	M/C PV (L)	
1224	00	0		M/C PV (M)	
1225	00	0		M/C PV (H)	
122E	00	0		Counter for long cleaning (L)	
122F	00	0		Counter for long cleaning (H)	
1230	00	0	0	Transfer roll cartridge full detected PV1 (L)	
1231	00	0		Transfer roll cartridge full detected PV1 (H)	
1232	00	0	0	Transfer roll cartridge full detected PV2 (L)	
1233	00	0		Transfer roll cartridge full detected PV2 (H)	
1234	00	0	0	Transfer roll cartridge full detected DISP (L)	
1235	00	0		Transfer roll cartridge full detected DISP (H)	
1236	80	128	80000	Fuser PV WARNING (L)	
1237	38	56		Fuser PV WARNING (M)	
1238	01	1		Fuser PV WARNING (H)	
1242	A8	168	25000	Transfer roll cartridge PV LIMIT (L)	
1243	61	97		Transfer roll cartridge PV LIMIT (M)	
1244	00	0		Transfer roll cartridge PV LIMIT (H)	
1248	A0	160	100000	Fuser PV LIMIT (L)	
1249	86	134		Fuser PV LIMIT (M)	
124A	01	1		Fuser PV LIMIT (H)	
146D	05	5		Color balance adjustment	Y
146E	05	5		Color balance adjustment	M
146F	05	5		Color balance adjustment	C
1470	05	5		Color balance adjustment	K
1471	05	5		Density adjustment	YMCK
14ED	05	5		(Low-speed) Color balance adjustment	Y
14EE	05	5		(Low-speed) Color balance adjustment	M
14EF	05	5		(Low-speed) Color balance adjustment	C
14F0	05	5		(Low-speed) Color balance adjustment	K
14F1	05	5		(Low-speed) Density adjustment	YMCK
1610	00	0		Scanner Failure 1	
1611	00	0		Scanner Failure 2	
1612	00	0		Scanner Failure 3	
1613	00	0		Fuser Failure(CPU) 1	

Address	Set value			Description	
	Hex	Dec	Word/ Long		
1614	00	0		Fuser Failure(CPU) 2	
1615	00	0		Fuser Failure(CPU) 3	
1616	00	0		Firmware Error 1	
1617	00	0		Firmware Error 2	
1618	00	0		Firmware Error 3	
1619	00	0		Fuser Failure(ASIC) 1	
161A	00	0		Fuser Failure(ASIC) 2	
161B	00	0		Fuser Failure(ASIC) 3	
1680	00	0		0000KCMY:Dispense init	1: Not complete 0: Complete
16B8	FF	255	16777215	FUSER LIMIT2 PV(L)	
16B9	FF	255		FUSER LIMIT2 PV(M)	
16BA	FF	255		FUSER LIMIT2 PV(H)	
184F	30	48		Cleaning interval 0 Full-speed	0 1024
1850	30	48		Cleaning interval 1 Full-speed	1024 5120
1851	20	32		Cleaning interval 2 Full-speed	5120 10240
1852	20	32		Cleaning interval 3 Full-speed	10240 15360
1853	20	32		Cleaning interval 4 Full-speed	15360 20480
1854	1A	26		Cleaning interval 5 Full-speed	20480 25600
1855	1A	26		Cleaning interval 6 Full-speed	25600 30720
1856	1A	26		Cleaning interval 7 Full-speed	30720
186C	1C	28		Cleaning interval 0 Half-speed	
186D	1C	28		Cleaning interval 1 Half-speed	
186E	18	24		Cleaning interval 2 Half-speed	
186F	18	24		Cleaning interval 3 Half-speed	
1870	18	24		Cleaning interval 4 Half-speed	
1871	14	20		Cleaning interval 5 Half-speed	
1872	14	20		Cleaning interval 6 Half-speed	
1873	14	20		Cleaning interval 7 Half-speed	
1874	14	20		Cleaning interval 0 Low-speed	
1875	14	20		Cleaning interval 1 Low-speed	
1876	10	16		Cleaning interval 2 Low-speed	
1877	10	16		Cleaning interval 3 Low-speed	
1878	10	16		Cleaning interval 4 Low-speed	
1879	0C	12		Cleaning interval 5 Low-speed	
187A	0C	12		Cleaning interval 6 Low-speed	
187B	0C	12		Cleaning interval 7 Low-speed	
1C80	00	0		Plain paper-L	
1C81	00	0			
1C82	00	0			
1C83	00	0			
1C84	00	0		Heavier paper-L	
1C85	00	0		Heavier paper-H	
1C86	00	0		Envelope	
1C87	00	0		Postcard	

Address	Set value			Description	
	Hex	Dec	Word/ Long		
1C88	00	0		Transparency (=OHP)	
1C89	00	0		Label-H	
1C8A	00	0		Plain paper-L High Gloss	
1C8B	00	0			
1C8C	00	0		Label-L	
1C8D	00	0			
1C8E	00	0		Heavier paper-L Back Face	
1C8F	00	0		Heavier paper-H Back Face	
1C90	00	0		Envelope Back Face	
1C91	00	0		Postcard Back Face	
1C92	00	0		Plain paper-H	
1C93	00	0			
1C94	00	0		Plain paper-H High Gloss	
1C95	00	0			
1C96	00	0		Plain Paper-L Super High Gloss	
1C97	00	0		Plain Paper-H Super High Gloss	
1C98	00	0		Heavier paper-L Super High Gloss	
1C99	00	0		Heavier paper-H Super High Gloss	
1C9A	00	0		Envelope Super High Gloss	
1C9B	00	0		Postcard Super High Gloss	
1C9C	00	0		Transparency (=OHP) Super High Gloss	
1C9D	00	0		Label-H Super High Gloss	
1C9E	00	0		Label-L Super High Gloss	
1C9F	00	0		Heavier paper-L Super High Gloss Back Face	
1CA0	00	0		Heavier paper-H Super High Gloss Back Face	
1CA1	00	0		Envelope Super High Gloss Back Face	
1CA2	00	0		Postcard Super High Gloss Back Face	
1CC0	00	0		Plain paper-L Super High Gloss	Coated
1CC1	00	0			
1CC2	00	0			
1CC3	00	0			
1CC4	00	0		Heavier paper-L	Coated
1CC5	00	0		Heavier paper-H	Coated
1CC6	00	0		Envelope	Coated
1CC7	00	0		Postcard	Coated
1CC8	00	0		Transparency (=OHP)	Coated
1CC9	00	0		Label-H	Coated
1CCA	00	0		Plain paper-L High Gloss	Coated
1CCB	00	0			
1CCC	00	0		Label-L	Coated
1CCD	00	0			
1CCE	00	0		Heavier paper-L Back Face	Coated

Address	Set value			Description	
	Hex	Dec	Word/ Long		
1CCF	00	0		Heavier paper-H Back Face	Coated
1CD0	00	0		Envelope Back Face	Coated
1CD1	00	0		Postcard Back Face	Coated
1CD2	00	0		Plain paper-H	Coated
1CD3	00	0			
1CD4	00	0		Plain paper-H High Gloss	Coated
1CD5	00	0			
1CD6	00	0		Plain Paper-L Super High Gloss	Coated
1CD7	00	0		Plain Paper-H Super High Gloss	Coated
1CD8	00	0		Heavier paper-L Super High Gloss	Coated
1CD9	00	0		Heavier paper-H Super High Gloss	Coated
1CDA	00	0		Envelope Super High Gloss	Coated
1CDB	00	0		Postcard Super High Gloss	Coated
1CDC	00	0		Transparency (=OHP) Super High Gloss	Coated
1CDD	00	0		Label-H Super High Gloss	Coated
1CDE	00	0		Label-L Super High Gloss	Coated
1CDF	00	0		Heavier paper-L Super High Gloss Back Face	Coated
1CE0	00	0		Heavier paper-H Super High Gloss Back Face	Coated
1CE1	00	0		Envelope Super High Gloss Back Face	Coated
1CE2	00	0		Postcard Super High Gloss Back Face	Coated
2502	00	0		User temperature correction Full-speed Plain-1 (0 deg.C)	setting range: -6 to 6
2505	00	0		User temperature correction Full-speed Plain-2 (0 deg.C)	setting range: -6 to 6
2508	00	0		User temperature correction Full-speed Plain-3 (0 deg.C)	setting range: -6 to 6
250B	00	0		User temperature correction Full-speed Plain-4 (0 deg.C)	setting range: -6 to 6
2532	00	0		User temperature correction Half-speed Plain-1 (0 deg.C)	setting range: -6 to 6
2535	00	0		User temperature correction Half-speed Plain-2 (0 deg.C)	setting range: -6 to 6
2538	00	0		User temperature correction Half-speed Plain-3 (0 deg.C)	setting range: -6 to 6
253B	00	0		User temperature correction Half-speed Plain-4 (0 deg.C)	setting range: -6 to 6
254D	00	0		User temperature correction Half-speed Label-1 (0 deg.C)	setting range: -6 to 6
2550	00	0		User temperature correction Half-speed Label-2 (0 deg.C)	setting range: -6 to 6
2553	00	0		User temperature correction Half-speed Heavier-1 (0 deg.C)	setting range: -6 to 6

Address	Set value			Description	
	Hex	Dec	Word/ Long		
2556	00	0		User temperature correction Half-speed Heavier-2 (0 deg.C)	setting range: -6 to 6
2559	00	0		User temperature correction Half-speed Transparency (0 deg.C)	setting range: -6 to 6
255C	00	0		User temperature correction Half-speed Envelope (0 deg.C)	setting range: -6 to 6
255F	00	0		User temperature correction Half-speed Postcard (0 deg.C)	setting range: -6 to 6
2562	00	0		User temperature correction Low-speed Plain1 (0 deg.C)	setting range: -6 to 6
2565	00	0		User temperature correction Low-speed Plain-2 (0 deg.C)	setting range: -6 to 6
2568	00	0		User temperature correction Low-speed Plain-3 (0 deg.C)	setting range: -6 to 6
256B	00	0		User temperature correction Low-speed Plain-4 (0 deg.C)	setting range: -6 to 6
257D	00	0		User temperature correction Low-speed Label-1 (0 deg.C)	setting range: -6 to 6
2580	00	0		User temperature correction Low-speed Label-2 (0 deg.C)	setting range: -6 to 6
2583	00	0		Userï, temperature correction Low-speed Heavier-1 (0 deg.C)	setting range: -6 to 6
2586	00	0		User temperature correction Low-speed Heavier-2 (0 deg.C)	setting range: -6 to 6
2589	00	0		Userï, temperature correction Low-speed Transparency (0 deg.C)	setting range: -6 to 6
258C	00	0		User temperature correction Low-speed Enve-lope (0 deg.C)	setting range: -6 to 6
258F	00	0		User temperature correction Low-speed Post-card (0 deg.C)	setting range: -6 to 6

8. 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**

9. IMAGE QUALITY TROUBLE ENTRY CHART

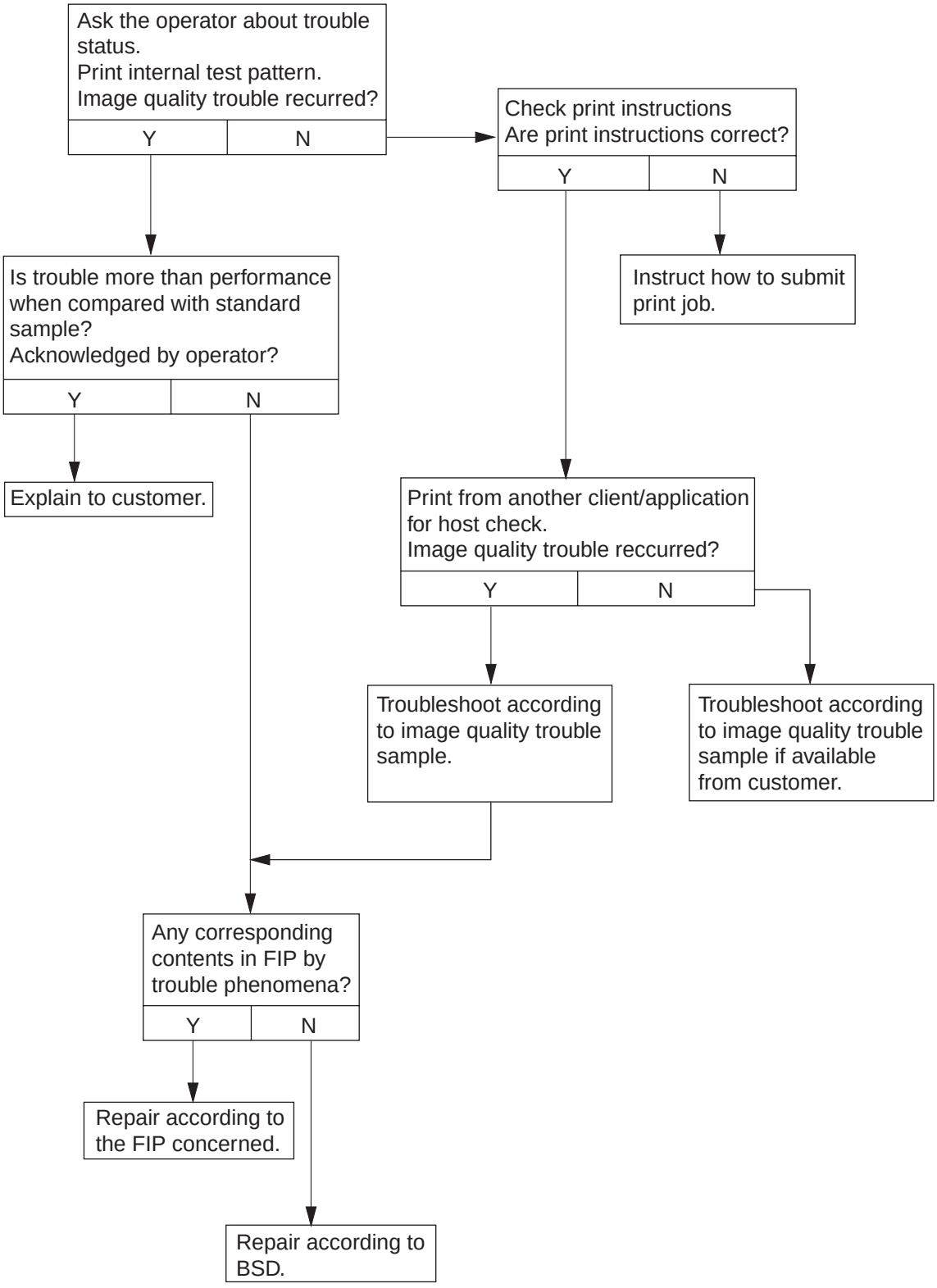


Fig.5-12

10. IMAGE QUALITY SPECIFICATIONS

10.1 Parallelism

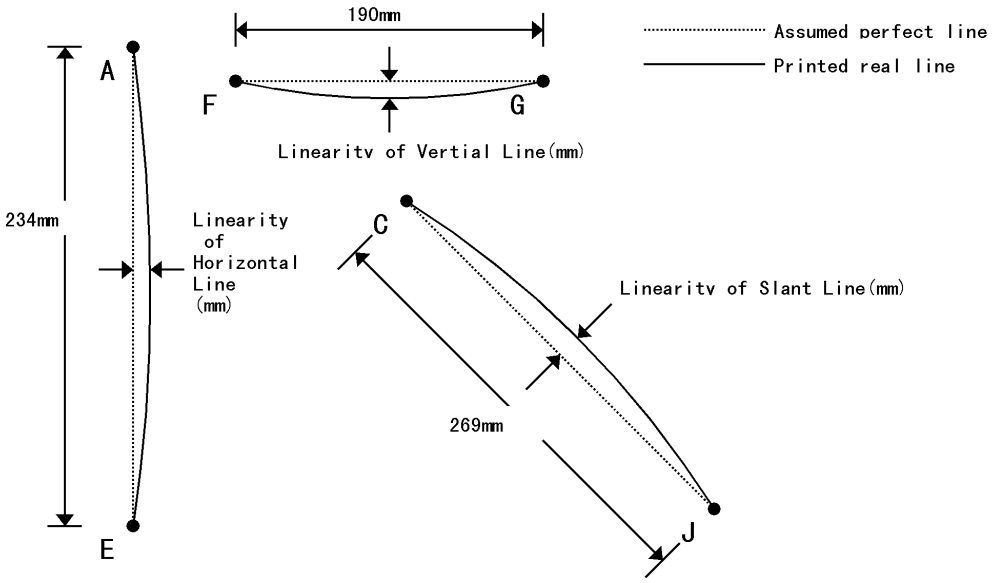


Fig.5-13

10.2 Diagonal

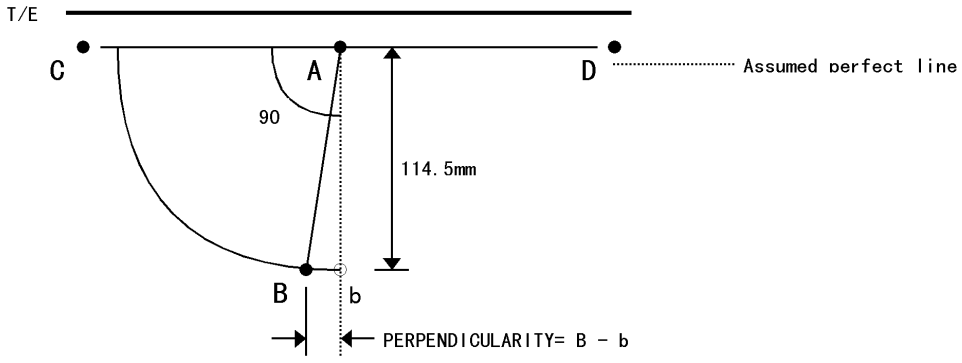


Fig.5-14

10.3 Skew

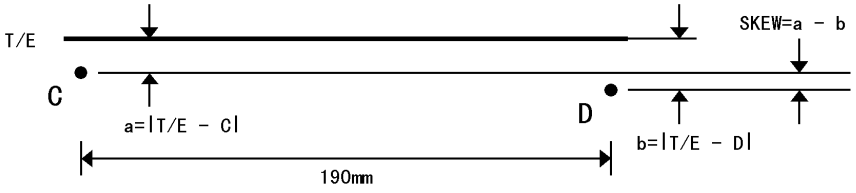


Fig.5-15

10.4 Straightness

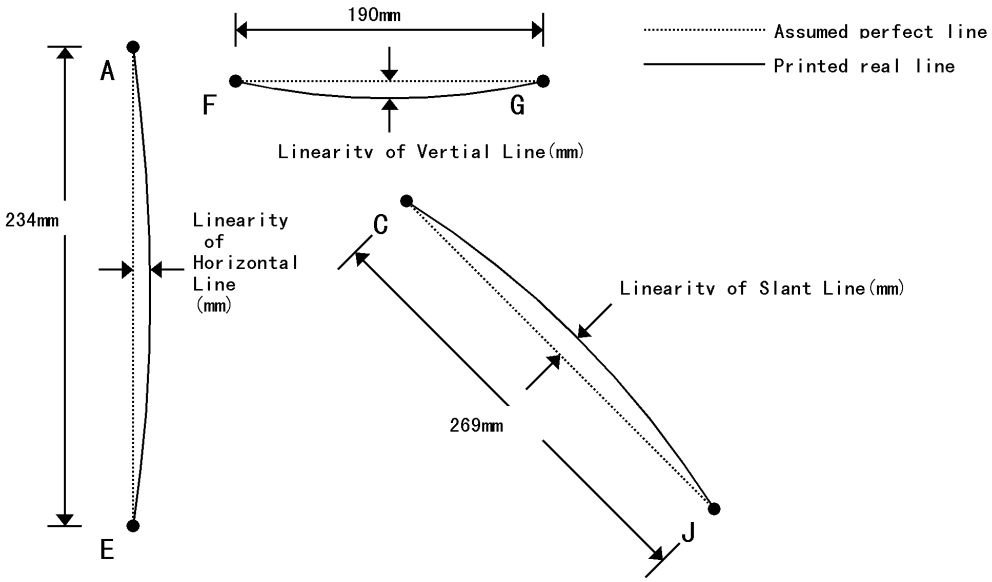


Fig.5-16

10.5 Magnification Error

Magnification=measured length ÷ Nominal

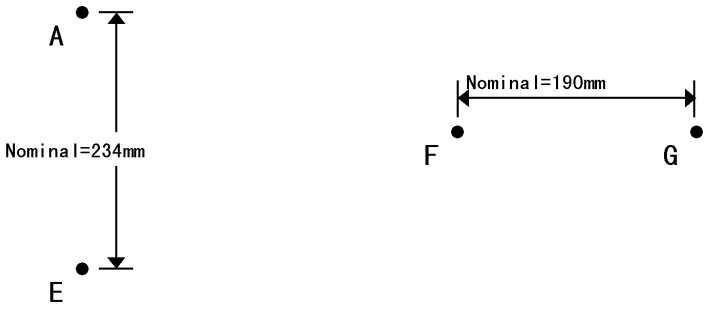


Fig.5-17

10.6 Registration

Registaration=measured length - Nominal

Fig.5-18

10.7 Guaranteed Printing Area

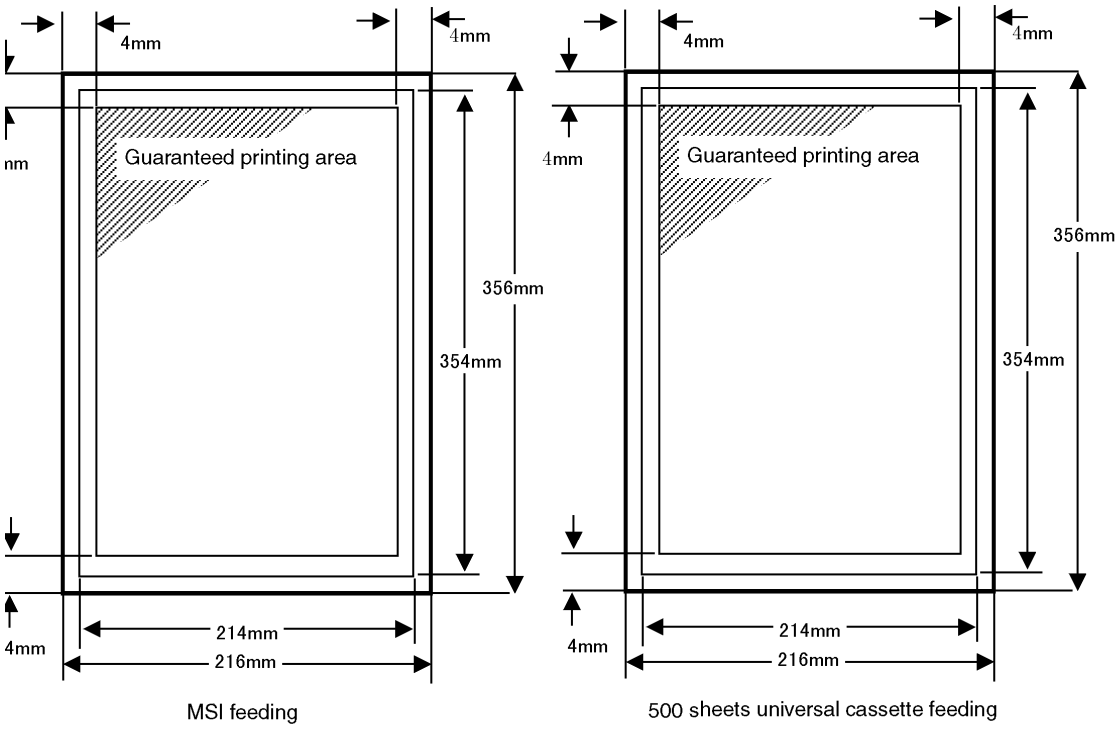


Fig.5-19

11. TEST PRINT

11.1 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

			Paper size	
No.	Pattern	Description	US	EU
1	No Image [IOT]	Feeds and outputs paper with no image.	Letter/A4	Letter/A4
2	Test Patt 600[IOT]	Outputs an IOT internal 600-dpi pattern.	A4	A4
3	Grid2 [ESS]	Outputs an ESS internal grid pattern.	Letter	A4
4	Cyan 20% [ESS]	Outputs a solid pattern of 20% cyan.	Letter	A4
5	Magenta20% [ESS]	Outputs a solid pattern of 20% magenta.	Letter	A4
6	Yellow 20% [ESS]	Outputs a solid pattern of 20% yellow.	Letter	A4
7	Black 20% [ESS]	Outputs a solid pattern of 20% black.	Letter	A4
8	CMY 20% [ESS]	Outputs a solid pattern of 20% C.M.Y each.	Letter	A4
9	Gradation [ESS]	Outputs 100% to 2% gradation patterns in four colors.	Letter	A4
10	NIP adjust [ESS]	Outputs the NIP adjustment pattern.	Letter	A4
11	P Regi Adj Chart [ESS]	Outputs the Paper feed registration correction chart.	Letter	A4

12. IMAGE QUALITY FIP

12.1 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) Drum 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	9K print

12.2 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.

12.3 Toubleshooting Table by Trouble Phenomena

<Fogging>

Fig.5-20

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 HL-4200, 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.5-21

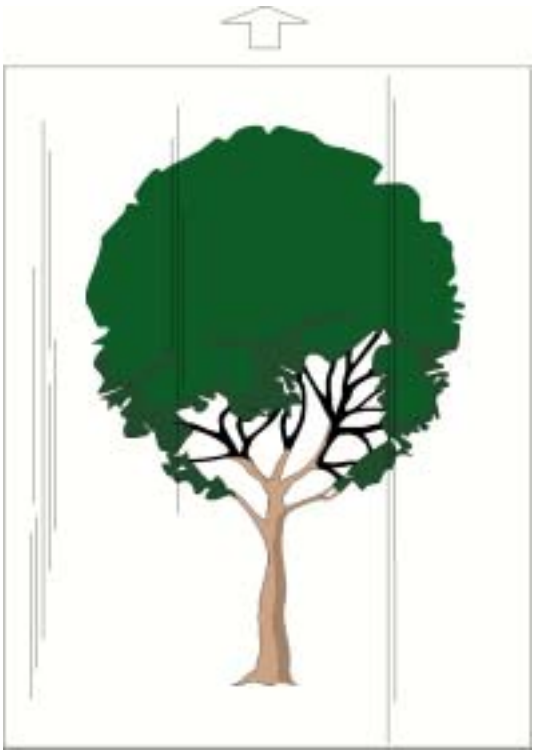


Fig.5-22

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 HL-4200, 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.5-23

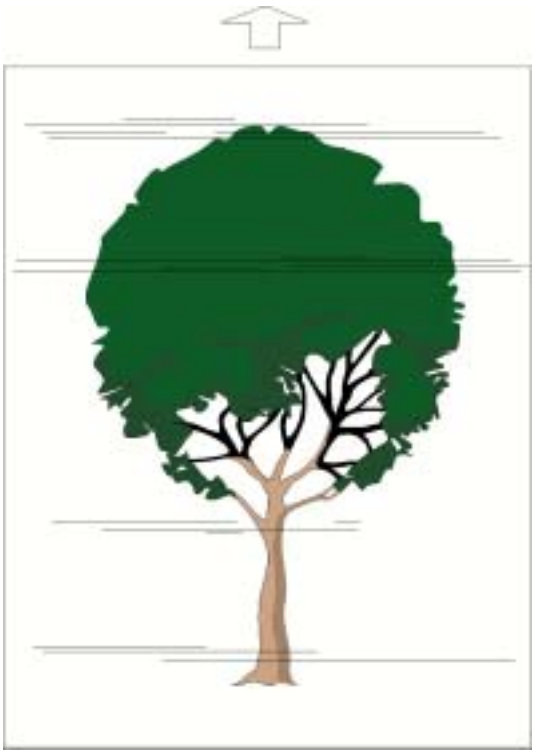


Fig.5-24

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 HL-4200, 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 PWBA HBN DRV Is the image quality improved if ESS PWBA HBN DRV is replaced?	Replace the ESS PWBA HBN DRV

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>

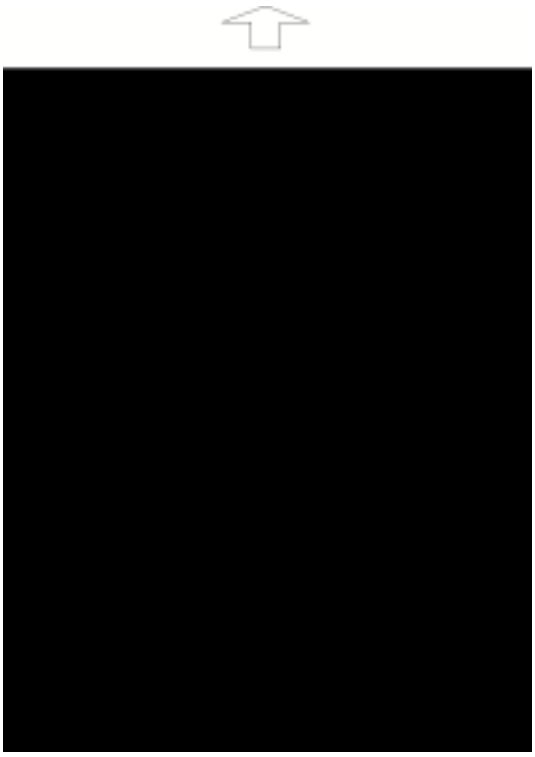


Fig.5-25

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 HL-4200

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 HL-4200
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.5-26

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 HL-4200, 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 HL-4200 Is the image quality improved if MCU and HVPS PW is replaced?	Replace the MCU HL-4200

<Too light image>

Fig.5-27

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 HL-4200, 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.5-28

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 HL-4200, 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.5-29

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	Faulty scanner ASSY Is the image quality improved if scanner ASSY is replaced?	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

<Flake>

Fig.5-30

Condition:
Some parts of image are missing and they become flakes.

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

Major parts to be checked:
Transfer roll cartridge ASSY

Item	Check	Remedy
1	Paper check The recommended size/type of paper is used?	Change paper. Use the recommended size/type of paper. Check the printer driver.
2	The flakes appear on the recommended size/type of paper. Or the flakes appear on the paper other than recommended size/type of paper.	Adjust transfer roll cartridge tertiary transfer current value (Refer to Trouble shooting 6. adjusting transfer roll cartridge tertiary transfer current value in Chapter 5).

<Toner splash>

Fig.5-31

Condition:
Toner around image splashes.

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

Major parts to be checked:
Transfer roll cartridge ASSY

Item	Check	Remedy
1	Paper check The recommended size/type of paper is used?	Change paper. Use the recommended size/type of paper. Check the printer driver.
2	The flakes appear on the recommended size/type of paper. Or the flakes appear on the paper other than recommended size/type of paper.	Adjust transfer roll cartridge tertiary transfer current value (Refer to Trouble shooting 6. adjusting transfer roll cartridge tertiary transfer current value in Chapter 5).

<Whole image has bluish tinge>

Fig.5-32

Condition:
Whole image has bluish tinge.

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

Major parts to be checked:
Transfer roll cartridge ASSY

Item	Check	Remedy
1	Paper check The recommended size/type of paper is used?	Change paper. Use the recommended size/type of paper. Check the printer driver.
2	The flakes appear on the recommended size/type of paper. Or the flakes appear on the paper other than recommended size/type of paper.	Adjust transfer roll cartridge tertiary transfer current value (Refer to Trouble shooting 6. adjusting transfer roll cartridge tertiary transfer current value in Chapter 5).

CHAPTER VI
DIAGRAMS

CONTENTS

CHAPTER VI DIAGRAMS

1. PREFACE

1.1 How to Use the BSD

1. Enter the chain specified in the chapter of troubleshooting.
2. See the contents to enter the appropriate Chain.
3. Diagnose the failure in the appropriate Chain.
4. If the failure can be isolated, refer to the Parts List No or Adjustment No go to the index of parts or the appropriate adjustment.

> ***WARNING***
>
> *Perform installation and removal of parts with the main power switch turned off and the power cord unplugged to avoid electric shock and injury.*

1.2 Explanations of Symbols

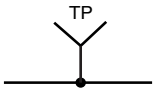
This symbol is used to refer to Notes usually described in the same page.

PL7.7

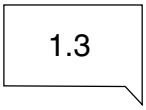
This symbol is used to refer to the Parts List. PL stands for Parts List; 7.7 denote Plate No. It shows that the appropriate part is described in the designated plate. This symbol is added to all the exchangeable parts on BSD.

Reference to adjustments in the Service Manual Section4 will be indicated by this symbol. In this case, the number 7.7.1 indicate that the Adjustment Procedure is found in ADJ 7.7.1 of the Service Manual.

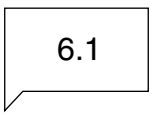
This symbol identifies a variable resistor, which can be adjusted in the field.



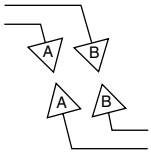
This symbol identifies a test point of a signal.



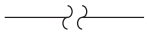
This symbol is used to show the location from where the input to the Function comes. It shows that the input comes from the Group Functions in Chain1-3.



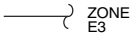
This symbol is used to show the location where the output from the Functions goes. It shows that the output goes to the Group functions in Chain6-1.



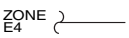
This symbol identifies a signal line is connected in the meet direction.



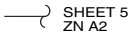
This symbol identifies a signal line is connected in the arrow direction.



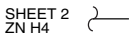
This symbol indicates that a signal line is connected within the same Function. It shows that the location to which signal line is connected is marked in Zone (E-3).



This symbol indicates that a signal line is connected within the same Function. It shows that the location from which signal line is connected is in Zone (E-4).

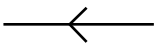


This symbol indicates that a signal line is connected to other sheet (described in the lower right side of BSD). It shows that the location to which a signal line is connected is in Zone A2 in Sheet5.

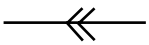


This symbol represents that a signal line is connected to other sheet (described in the lower right side of BSD). It shows that the location from which a signal line is connected is in Zone H4 in Sheet2.

This symbol identifies power line generating Chain1.



This symbol represents that a signal runs in the opposite direction of the usual left-to-right direction.

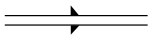


This symbol identifies a feedback signal.

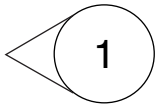
This symbol identifies a mechanical linkage with a part.

This symbol identifies a mechanically driven signal and its direction.

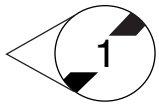
This symbol represents a document or paper as well as its direction.



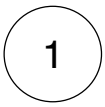
This symbol represents a heat, light or air signal as well as its direction.



This symbol represents that the part indicated by an arrow is the information on the duplicator with Tag/Mod.



This symbol represents that the part indicated by an arrow is the information on the duplicator without Tag/Mod.



This symbol represents that the part indicated by an arrow is the information on the duplicator without Tag/Mod. This symbol represents that the entire illustration or the part in the outlined box is the information on the duplicator with Tag/Mod.

This symbol represents that the entire illustration or the part in the outlined box is the information on the duplicator without Tag/Mod.

1.3 Signal Name/Other description

Signal Name

Signal name configuration

REGI SENSOR	SENSED	(L)	+5VDC
Part name	Active status	Logical value	Highest level expected

The above example indicates that the signal will be (L) when the registration sensor detected a sheet of paper and that it will be (H) when the sensor has not detected a sheet of paper and that the voltage is +5VDC.

1.4 DC Voltage

DC voltage is measured between each test point and the frame unless otherwise instructed in Notes. The measured voltages are within the following ranges:

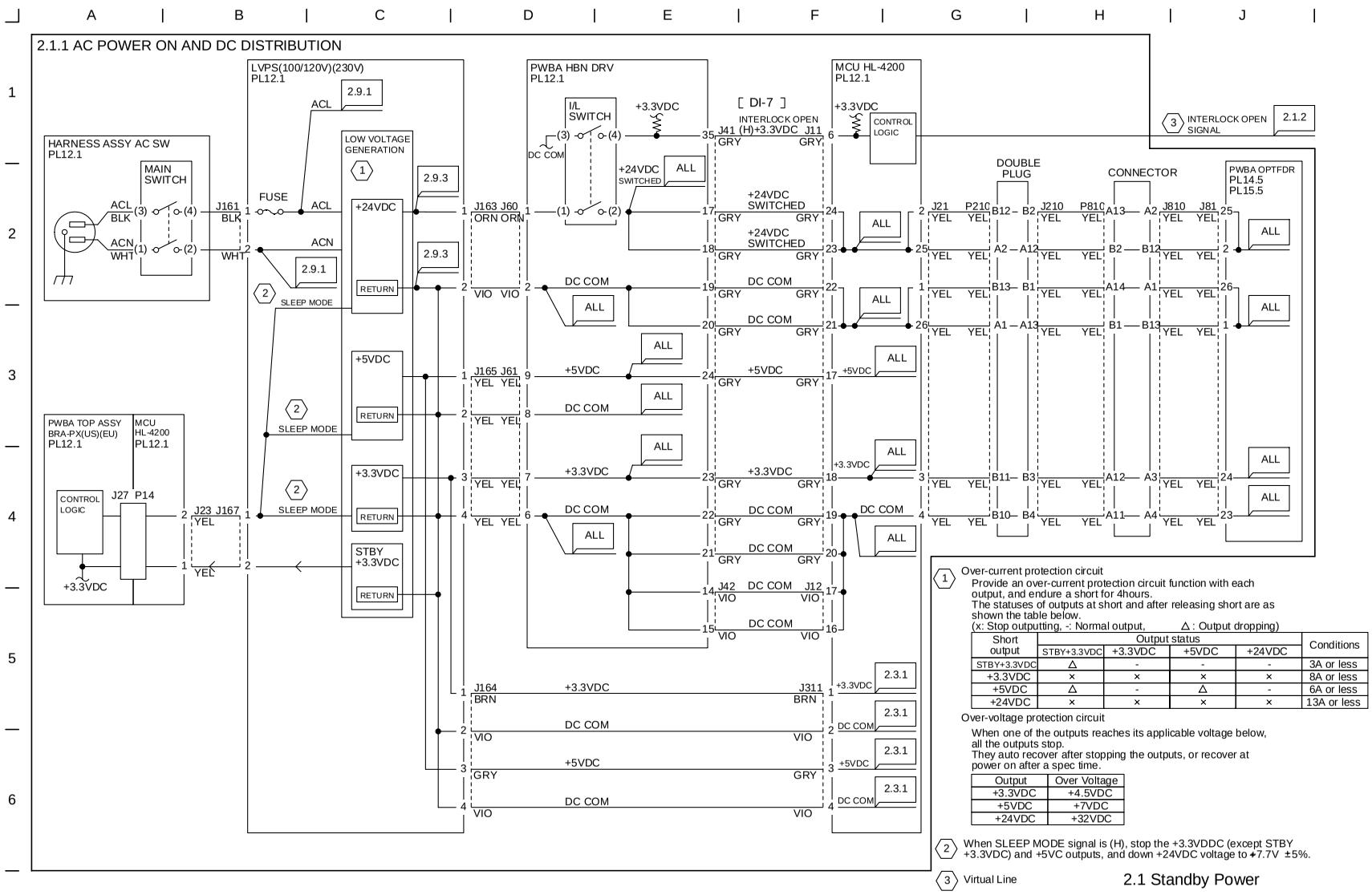
+3.3VDC	(H)	+3.1 to +3.5VDC
	(L)	0.0 to +1.0VDC
+5VDC	(H)	+4.8 to +5.3VDC
	(L)	0.0 to +1.0VDC
+24VDC	(H)	+23.0 to +25.2VDC
	(L)	0.0 to +3.0VDC

1.5 Input/Output Test

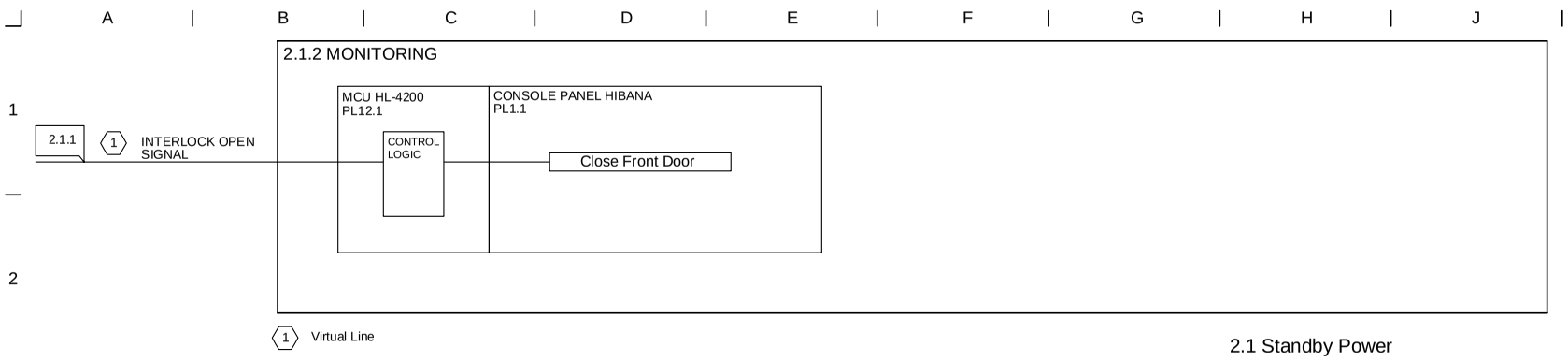
DI: Digital input test

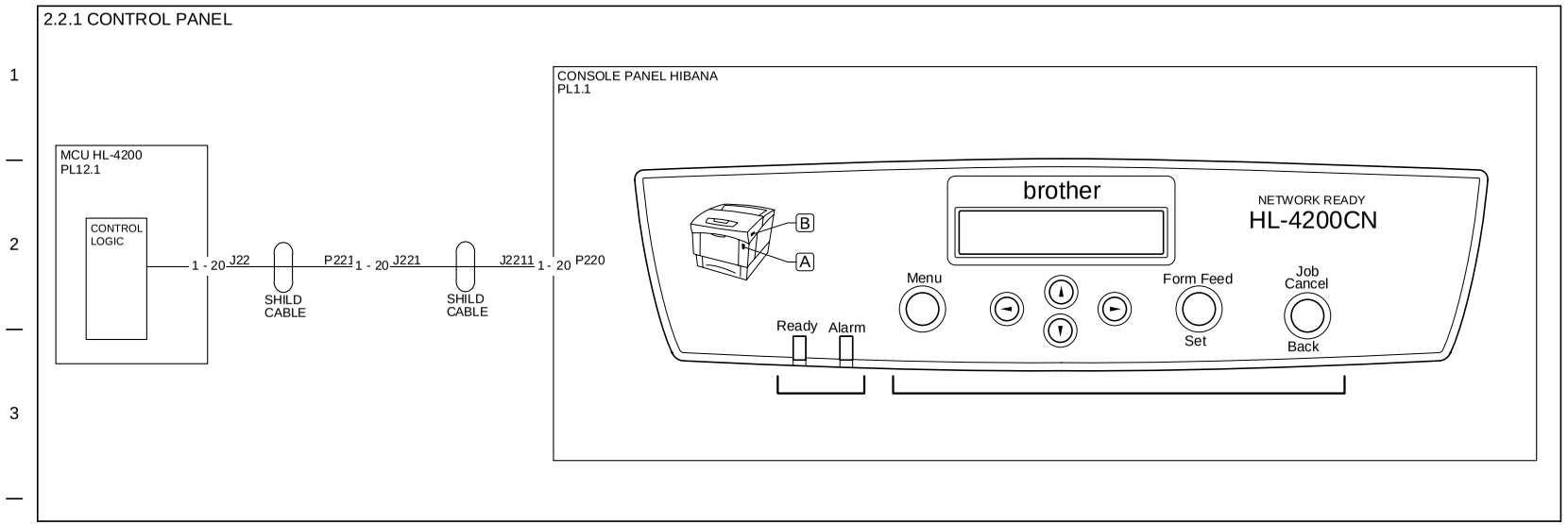
DO: Digital output test

Diagnostics on DI/DO can be executed on the Control Panel.

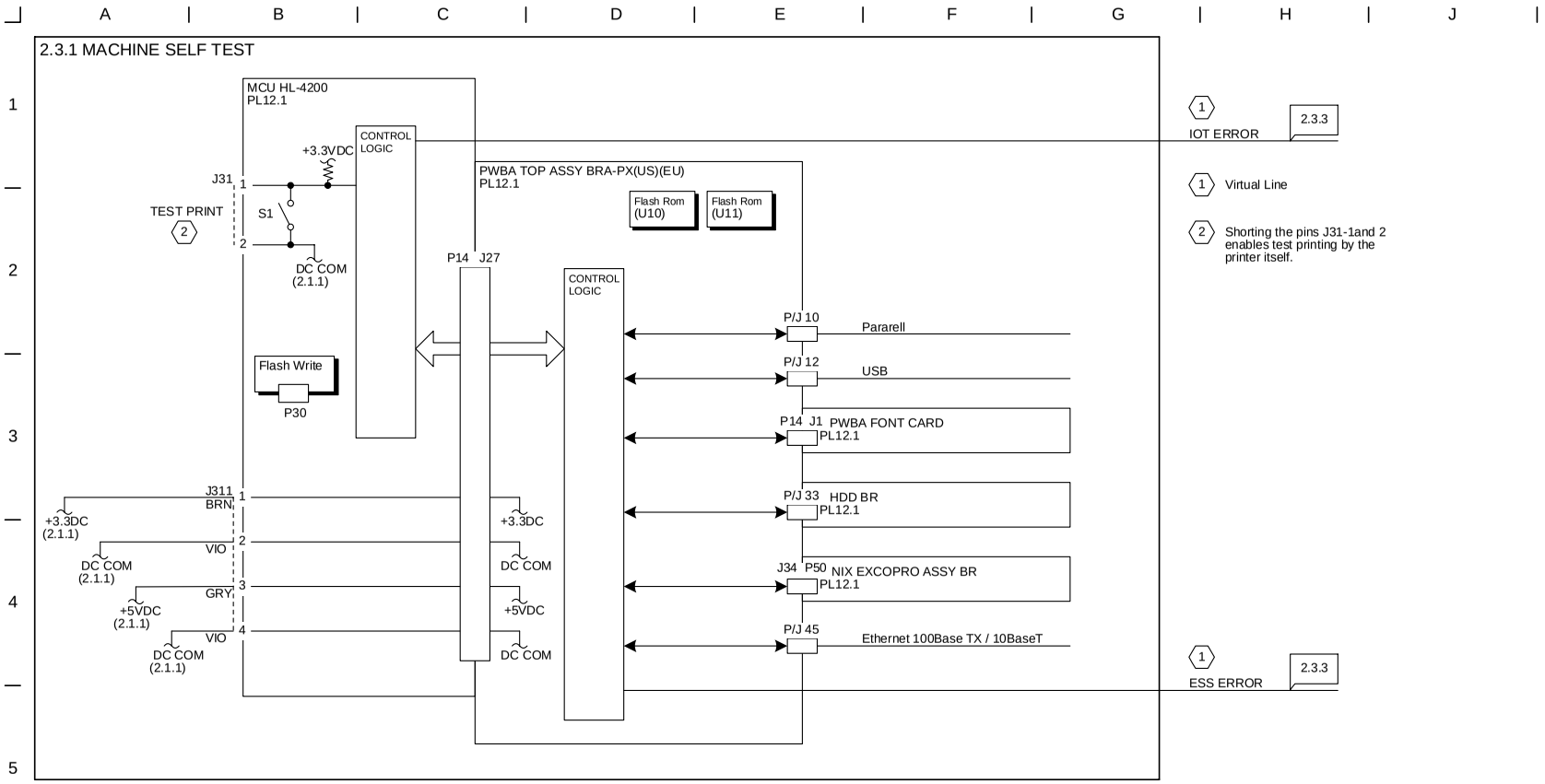


2.1 Standby Power

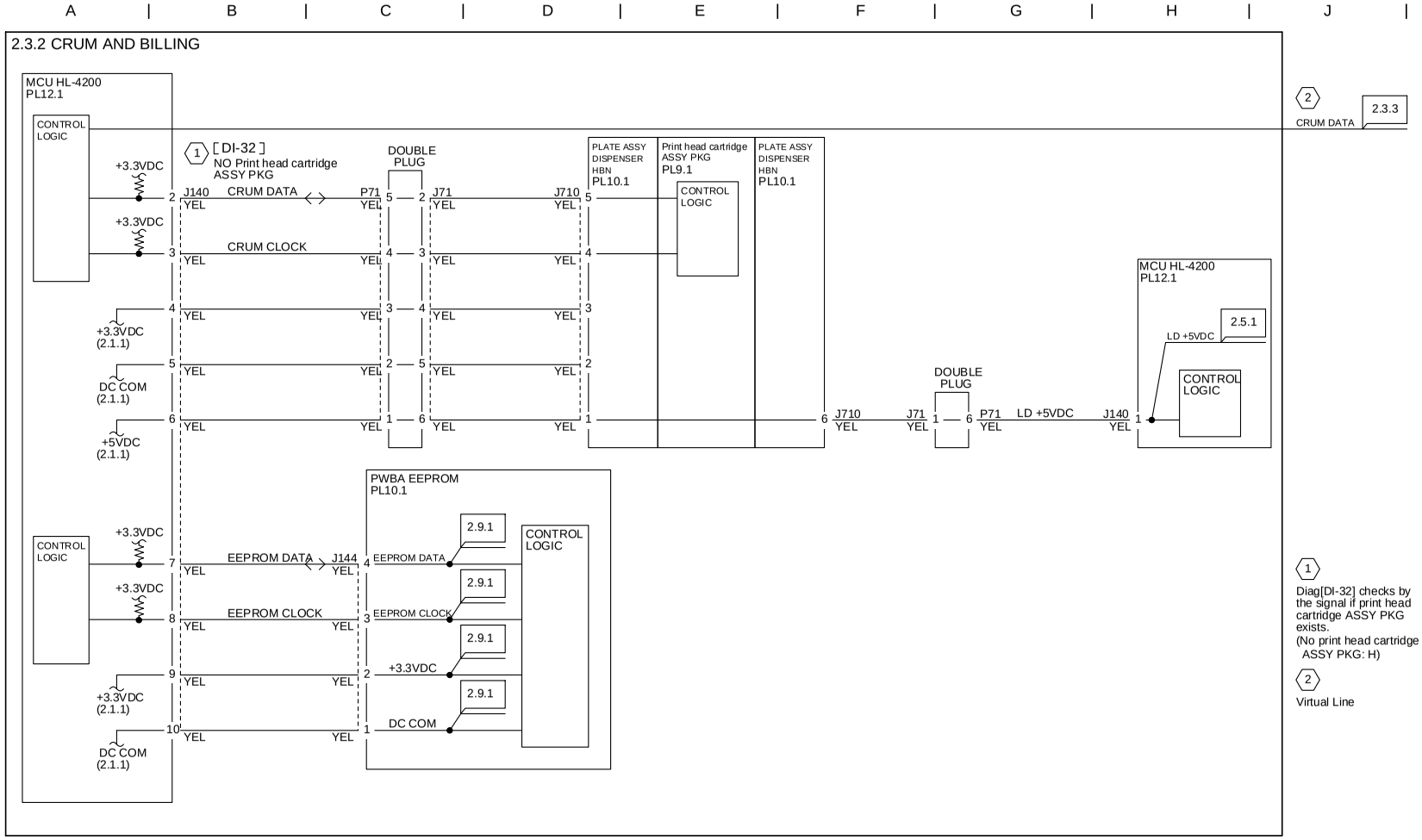

A
B
C
D
E
F
G
H
J
1
2
3
4
5
6
2.1.2 MONITORING
MCU HL-4200
PL12.1
CONTROL
LOGIC
CONSOLE PANEL HIBANA
PL1.1
Close Front Door
2.1.1
1
INTERLOCK OPEN
SIGNAL
1
Virtual Line
2.1 Standby Power

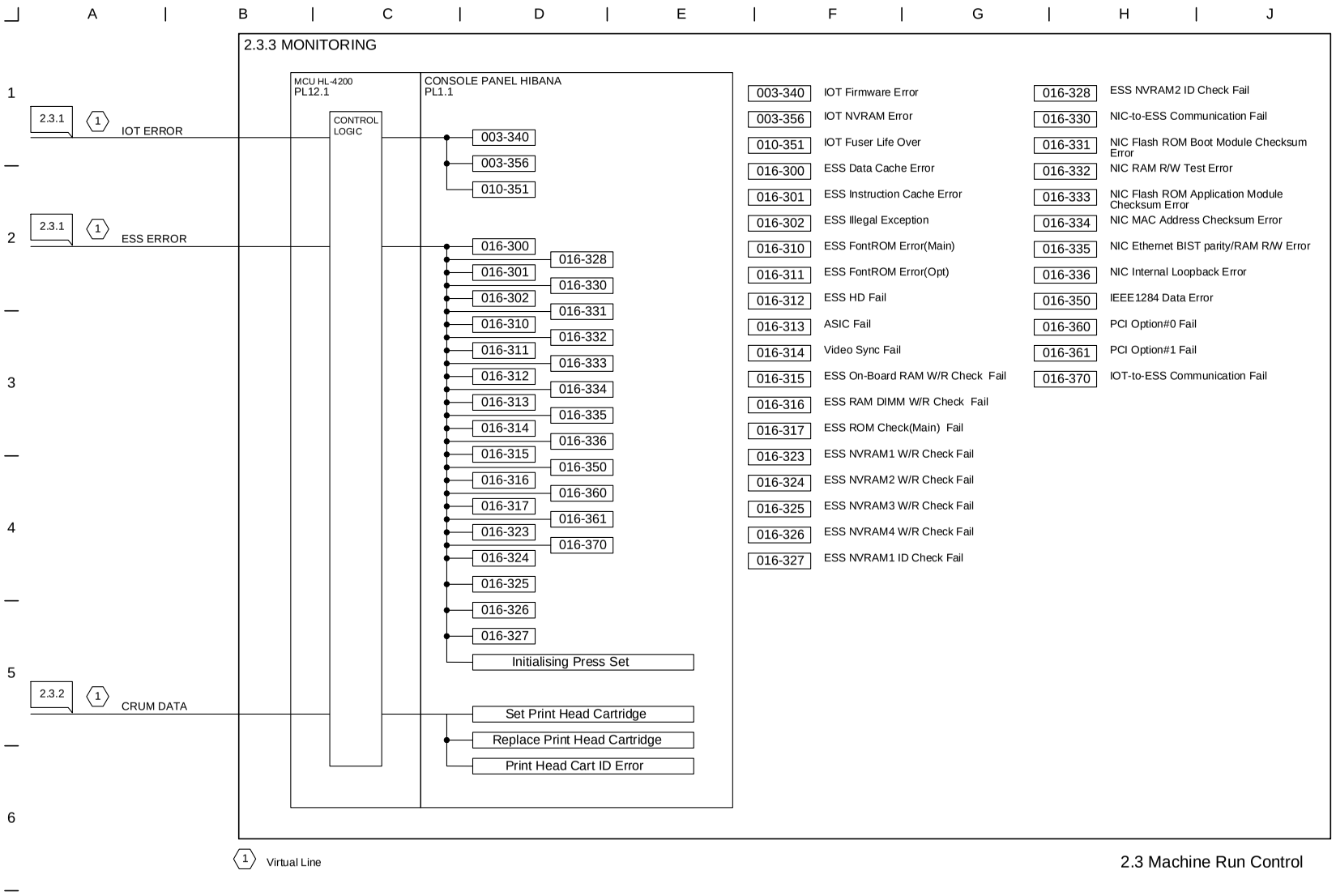


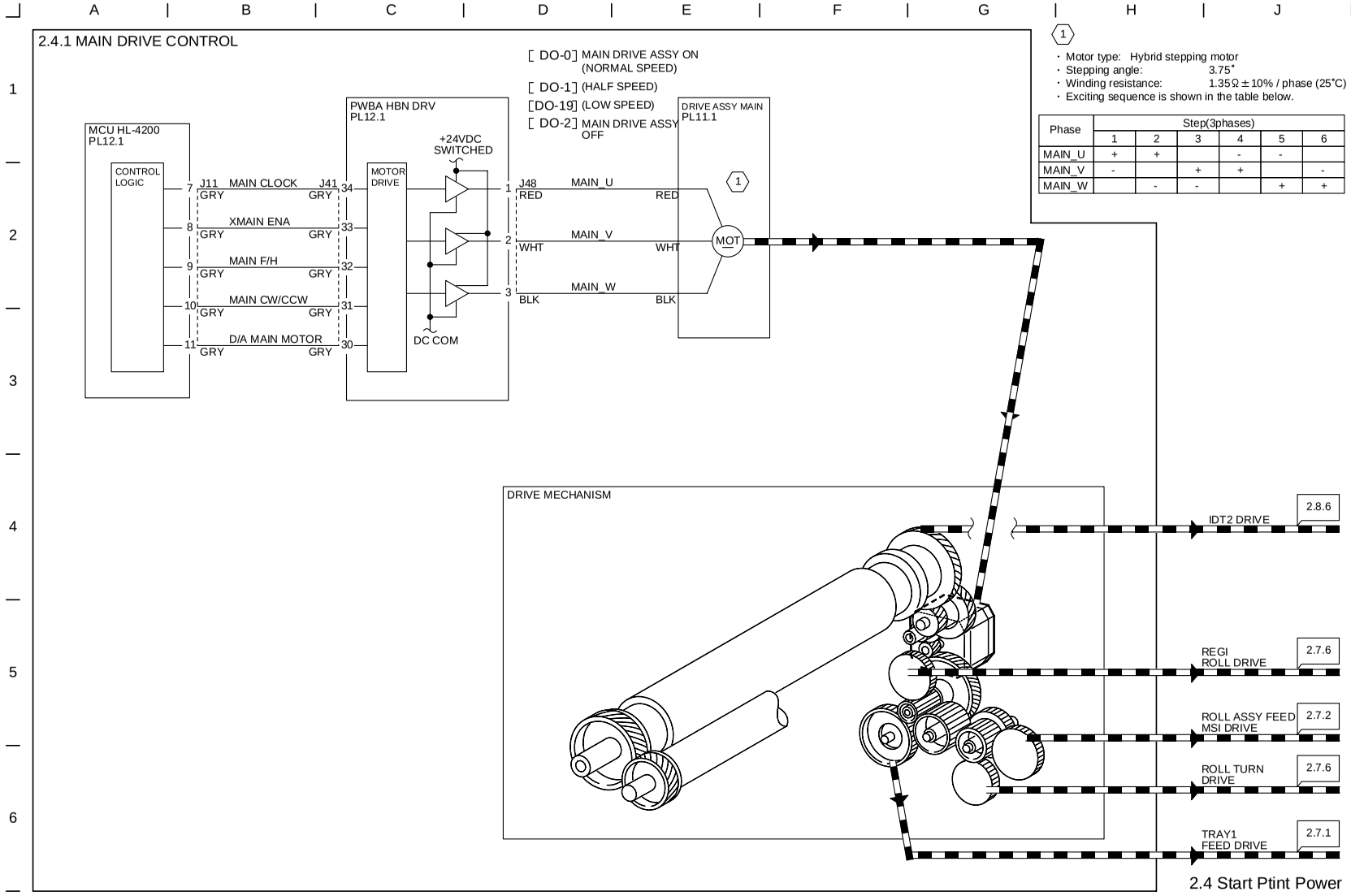
2.2 Mode Selection

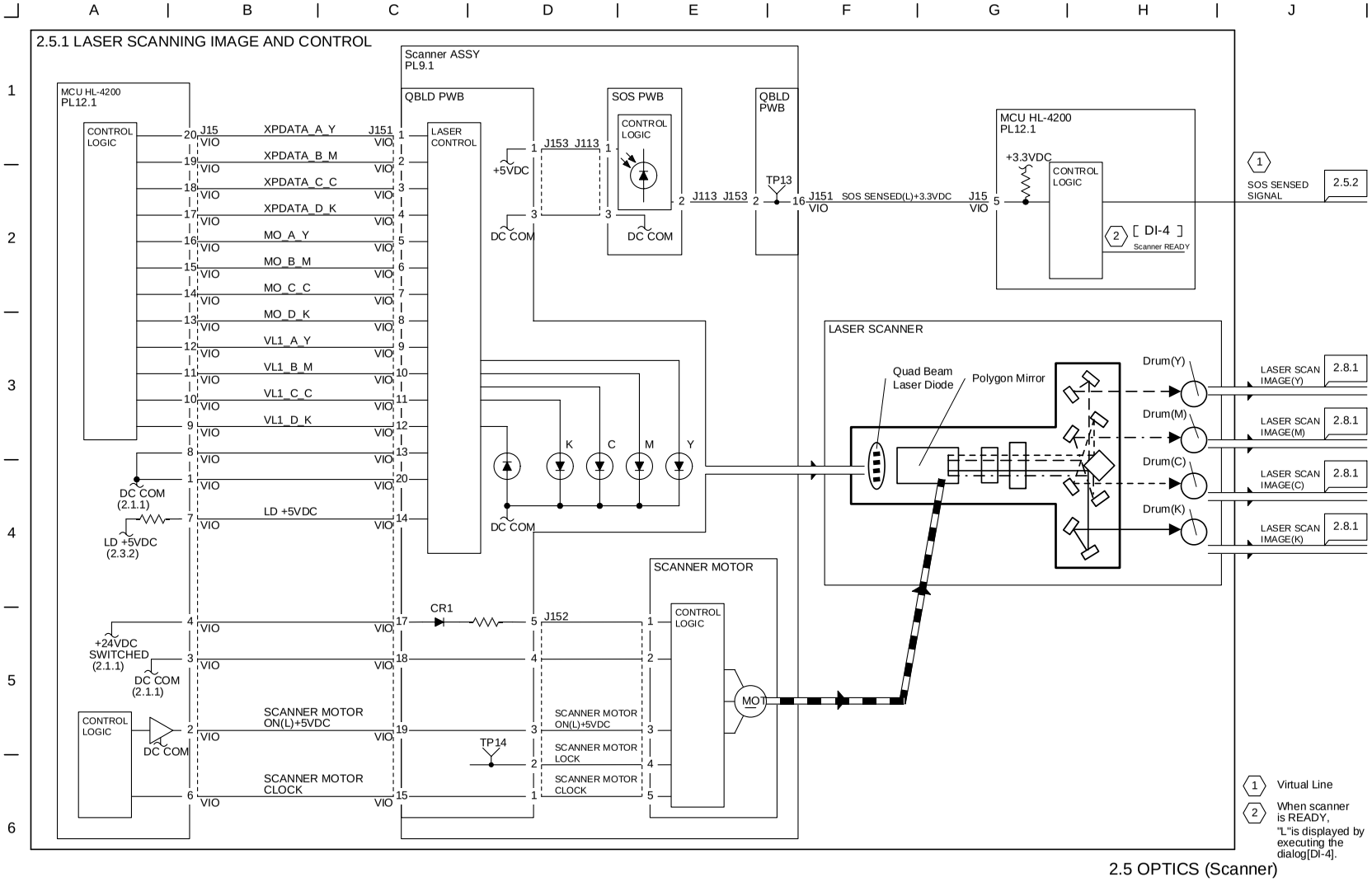


2.3 Machine Run Control

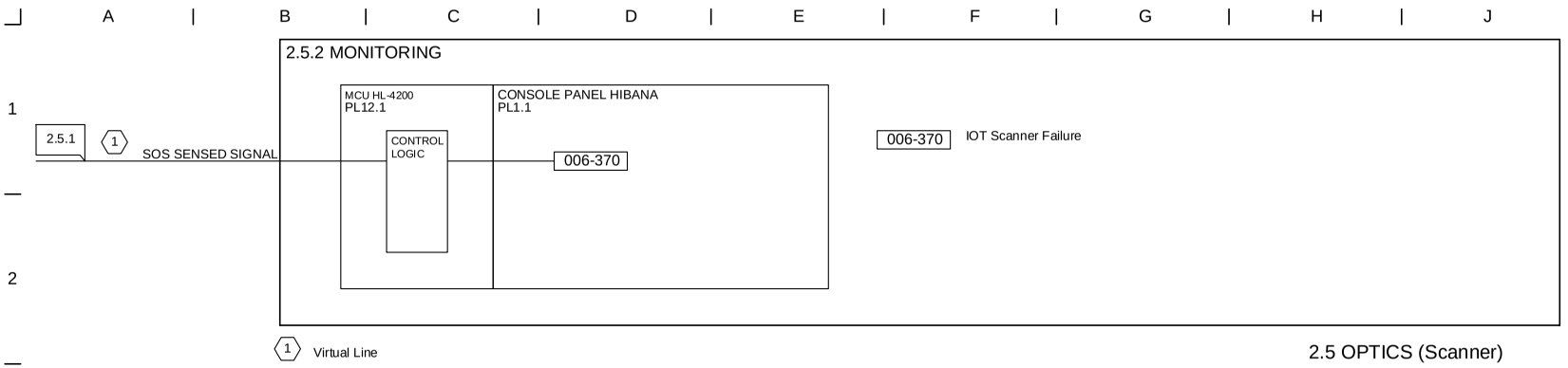

2.3.2 CRUM AND BILLING
MCU HL-4200
PL12.1
CONTROL LOGIC
+3.3VDC
CRUM DATA
CRUM CLOCK
+3.3VDC (2.1.1)
DC COM (2.1.1)
+5VDC (2.1.1)
[DI-32]
NO Print head cartridge ASSY PKG
DOUBLE PLUG
PLATE ASSY DISPENSER HBN PL10.1
Print head cartridge ASSY PKG PL9.1
PLATE ASSY DISPENSER HBN PL10.1
J140
P71
J71
J710
YEL
MCU HL-4200
PL12.1
2.5.1
LD +5VDC
CONTROL LOGIC
DOUBLE PLUG
J710
J71
P71
LD +5VDC
J140
PWBA EEPROM
PL10.1
2.9.1
CONTROL LOGIC
EEPROM DATA
EEPROM CLOCK
J144
+3.3VDC
DC COM
2
CRUM DATA
2.3.3
1
Diag[DI-32] checks by the signal if print head cartridge ASSY PKG exists.
(No print head cartridge ASSY PKG: H)
2
Virtual Line

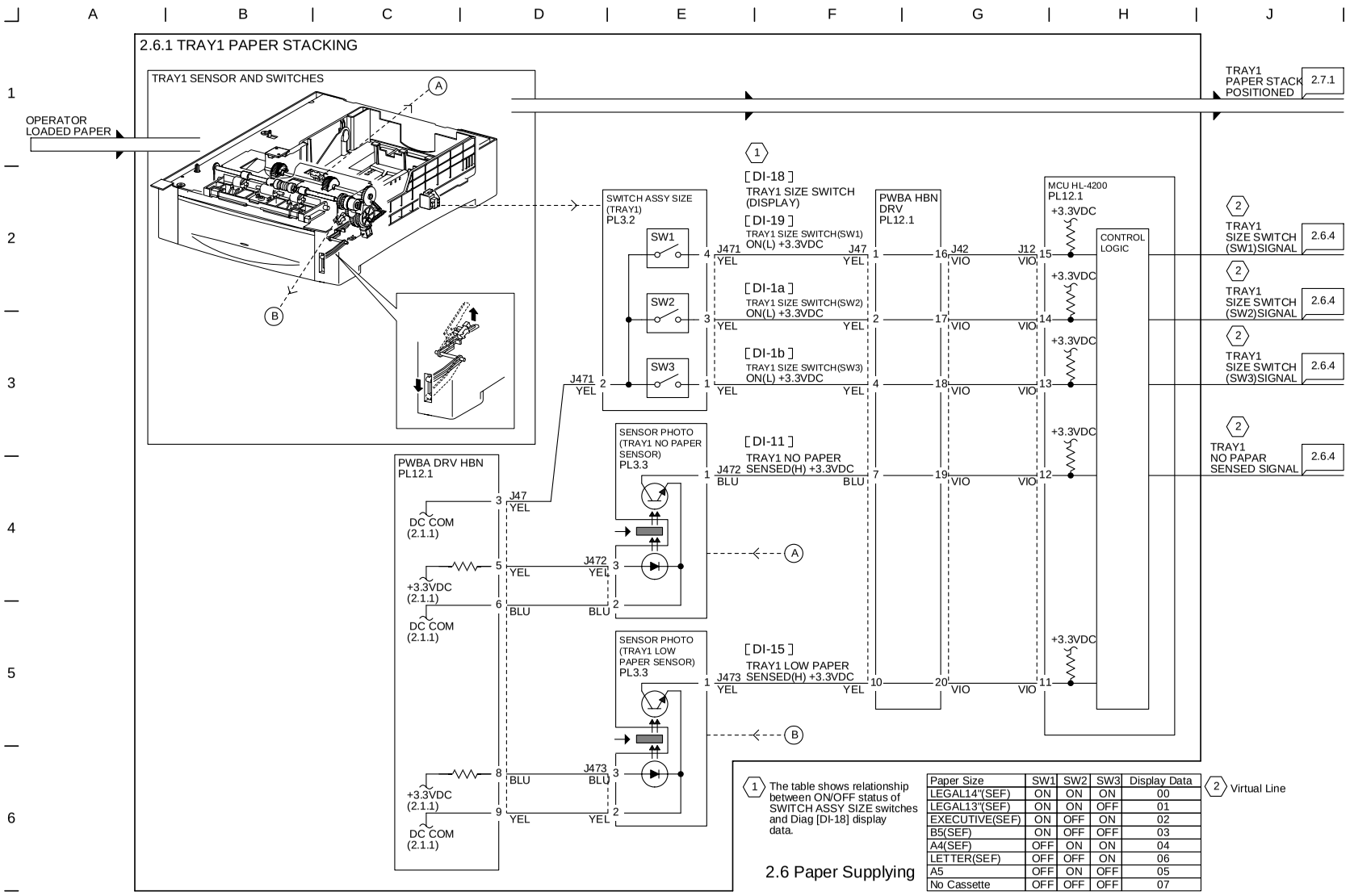

2.3.3 MONITORING
MCU HL-4200
PL12.1
CONSOLE PANEL HIBANA
PL1.1
CONTROL LOGIC
2.3.1
1
IOT ERROR
2.3.1
1
ESS ERROR
2.3.2
1
CRUM DATA
003-340
003-356
010-351
016-300
016-301
016-302
016-310
016-311
016-312
016-313
016-314
016-315
016-316
016-317
016-323
016-324
016-325
016-326
016-327
016-328
016-330
016-331
016-332
016-333
016-334
016-335
016-336
016-350
016-360
016-361
016-370
Initialising Press Set
Set Print Head Cartridge
Replace Print Head Cartridge
Print Head Cart ID Error
003-340 IOT Firmware Error
003-356 IOT NVRAM Error
010-351 IOT Fuser Life Over
016-300 ESS Data Cache Error
016-301 ESS Instruction Cache Error
016-302 ESS Illegal Exception
016-310 ESS FontROM Error(Main)
016-311 ESS FontROM Error(Opt)
016-312 ESS HD Fail
016-313 ASIC Fail
016-314 Video Sync Fail
016-315 ESS On-Board RAM W/R Check Fail
016-316 ESS RAM DIMM W/R Check Fail
016-317 ESS ROM Check(Main) Fail
016-323 ESS NVRAM1 W/R Check Fail
016-324 ESS NVRAM2 W/R Check Fail
016-325 ESS NVRAM3 W/R Check Fail
016-326 ESS NVRAM4 W/R Check Fail
016-327 ESS NVRAM1 ID Check Fail
016-328 ESS NVRAM2 ID Check Fail
016-330 NIC-to-ESS Communication Fail
016-331 NIC Flash ROM Boot Module Checksum Error
016-332 NIC RAM R/W Test Error
016-333 NIC Flash ROM Application Module Checksum Error
016-334 NIC MAC Address Checksum Error
016-335 NIC Ethernet BIST parity/RAM R/W Error
016-336 NIC Internal Loopback Error
016-350 IEEE1284 Data Error
016-360 PCI Option#0 Fail
016-361 PCI Option#1 Fail
016-370 IOT-to-ESS Communication Fail
1 Virtual Line


2.4.1 MAIN DRIVE CONTROL
[DO-0] MAIN DRIVE ASSY ON
(NORMAL SPEED)
[DO-1] (HALF SPEED)
[DO-19] (LOW SPEED)
[DO-2] MAIN DRIVE ASSY
OFF
MCU HL-4200
PL12.1
CONTROL
LOGIC
PWBA HBN DRV
PL12.1
MOTOR
DRIVE
+24VDC
SWITCHED
DC COM
DRIVE ASSY MAIN
PL11.1
J11
J41
J48
MAIN CLOCK
XMAIN ENA
MAIN F/H
MAIN CW/CCW
D/A MAIN MOTOR
MAIN_U
MAIN_V
MAIN_W
GRY
RED
WHT
BLK
MOT
1
・ Motor type: Hybrid stepping motor
・ Stepping angle: 3.75˚
・ Winding resistance: 1.35Ω ± 10% / phase (25˚C)
・ Exciting sequence is shown in the table below.
Phase
Step(3phases)
1
2
3
4
5
6
MAIN_U
MAIN_V
MAIN_W
DRIVE MECHANISM
IDT2 DRIVE
2.8.6
REGI
ROLL DRIVE
2.7.6
ROLL ASSY FEED
MSI DRIVE
2.7.2
ROLL TURN
DRIVE
2.7.6
TRAY1
FEED DRIVE
2.7.1
2.4 Start Ptint Power

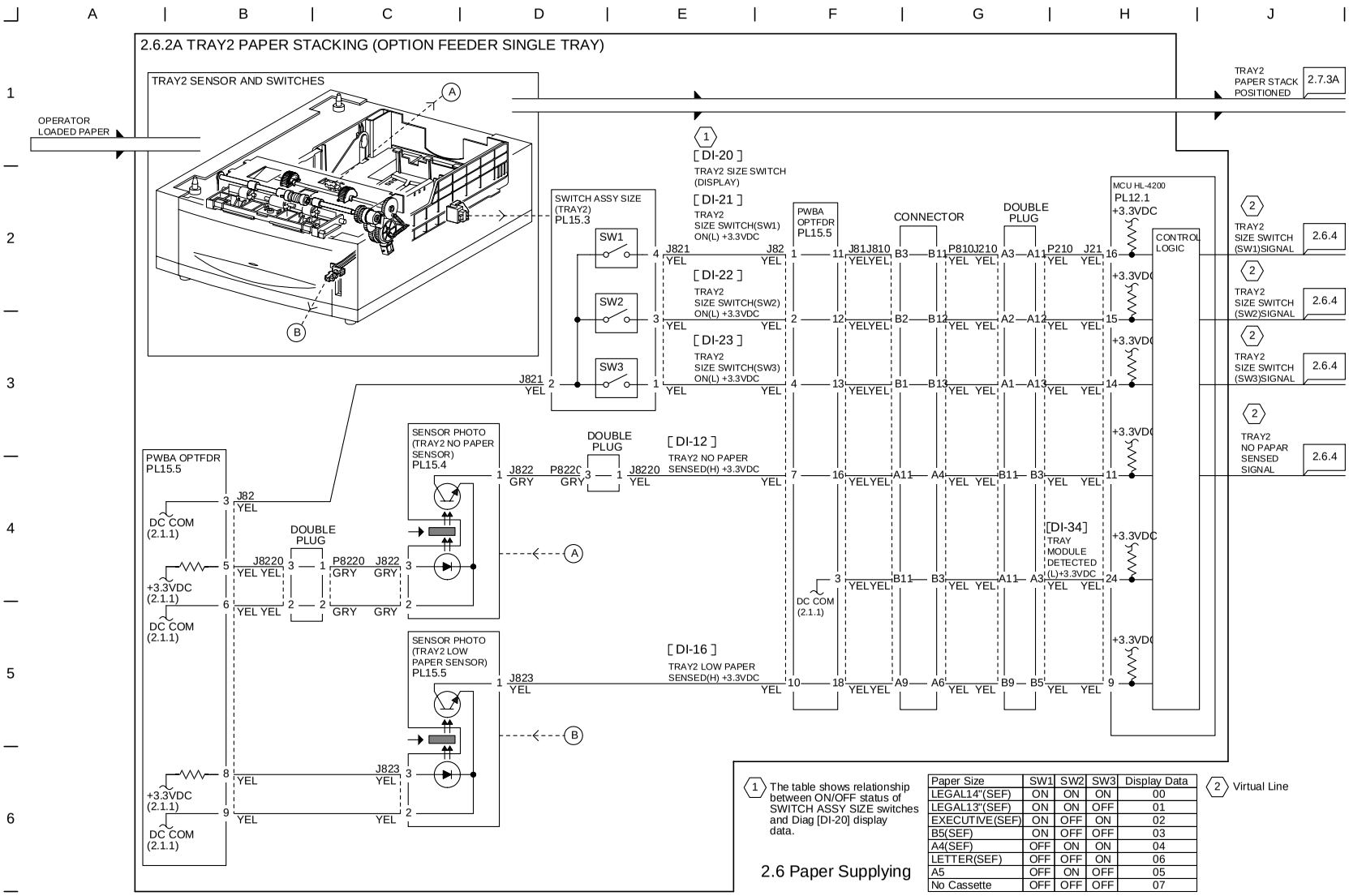


2.5 OPTICS (Scanner)

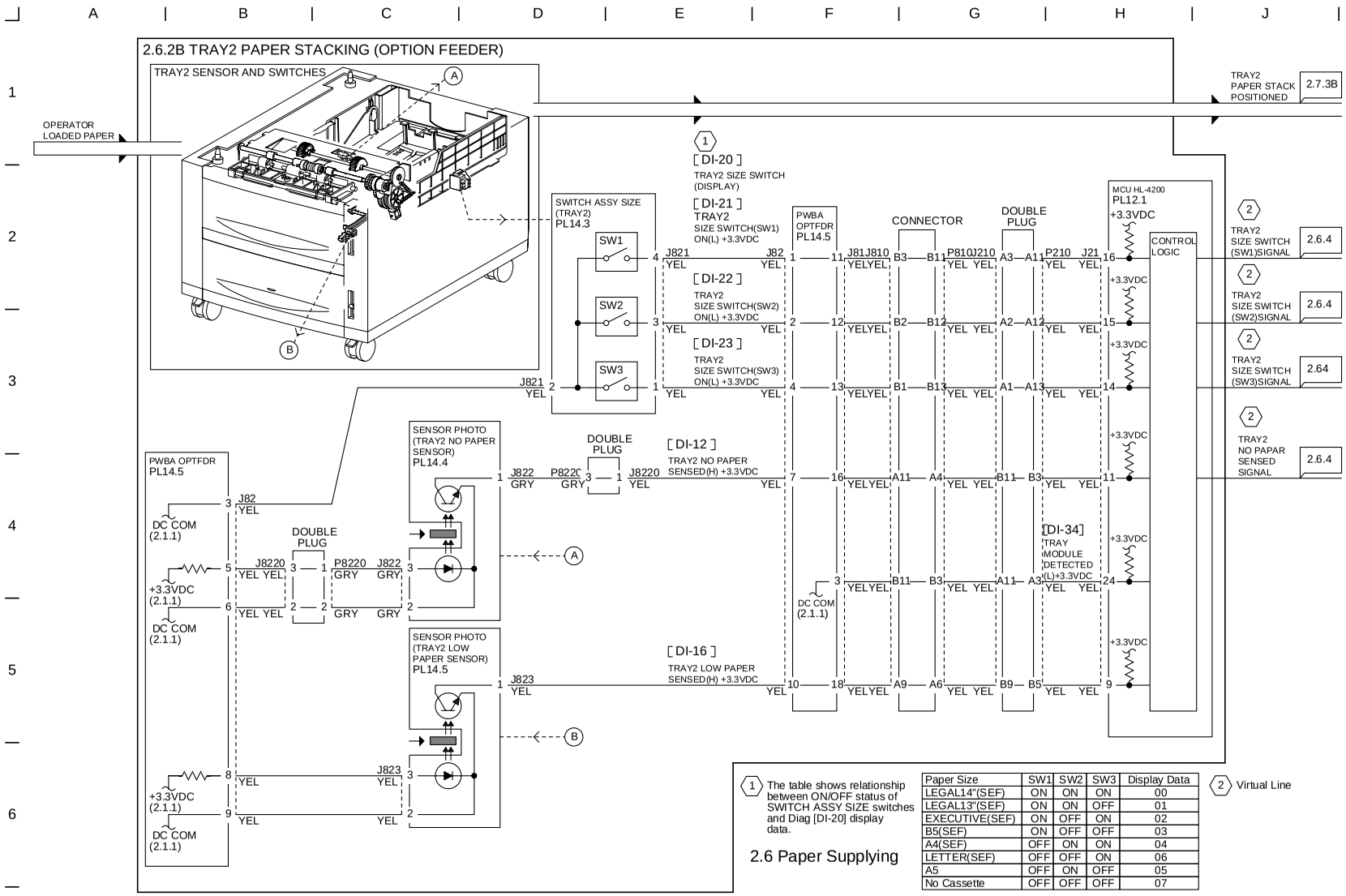

A
B
C
D
E
F
G
H
J
1
2
3
4
5
6
2.5.2 MONITORING
MCU HL-4200
PL12.1
CONTROL
LOGIC
CONSOLE PANEL HIBANA
PL1.1
006-370
2.5.1
1
SOS SENSED SIGNAL
006-370
IOT Scanner Failure
1
Virtual Line
2.5 OPTICS (Scanner)



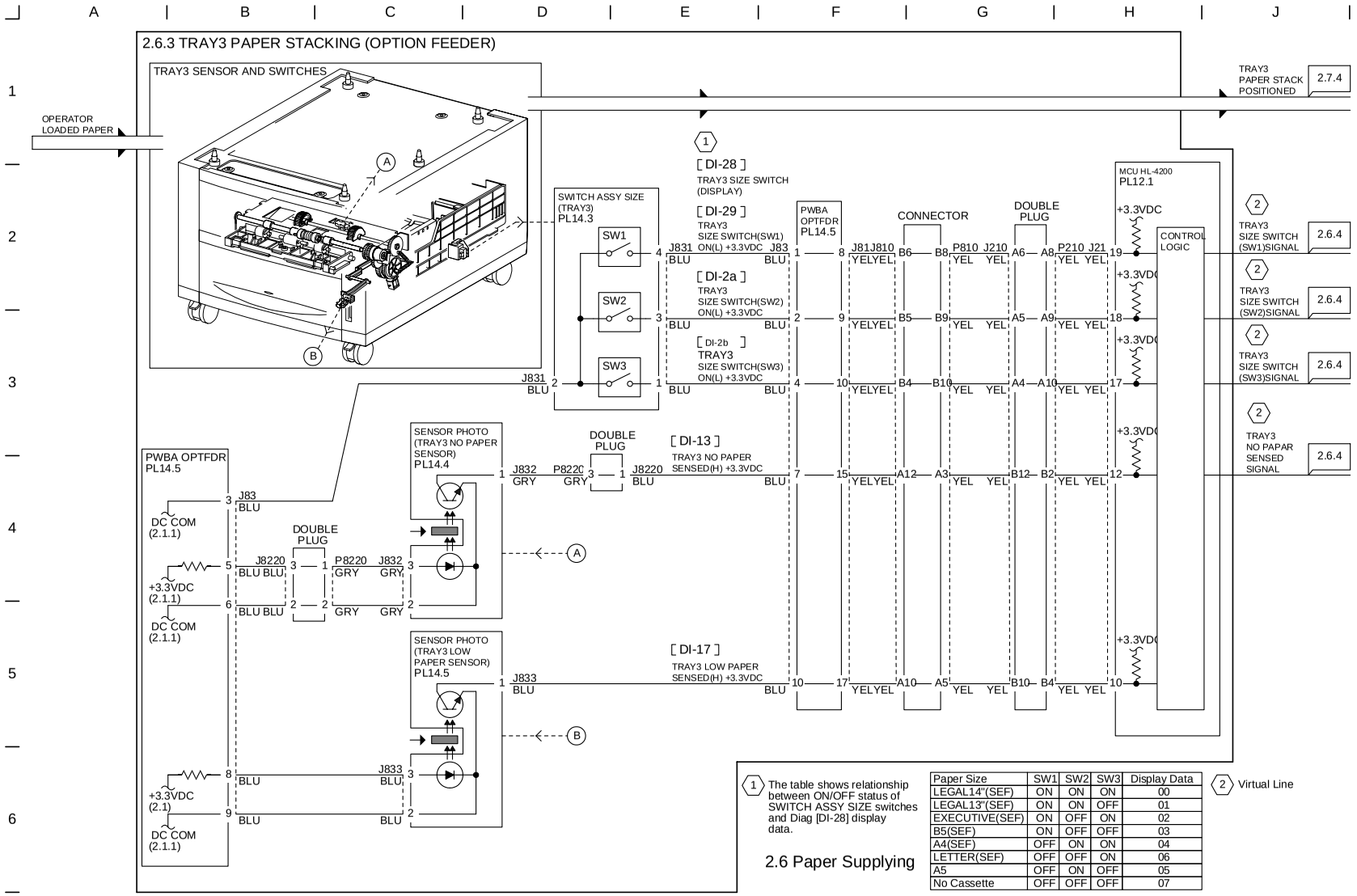
Paper Size	SW1	SW2	SW3	Display Data
LEGAL14"(SEF)	ON	ON	ON	00
LEGAL13"(SEF)	ON	ON	OFF	01
EXECUTIVE(SEF)	ON	OFF	ON	02
B5(SEF)	ON	OFF	OFF	03
A4(SEF)	OFF	ON	ON	04
LETTER(SEF)	OFF	OFF	ON	06
A5	OFF	ON	OFF	05
No Cassette	OFF	OFF	OFF	07



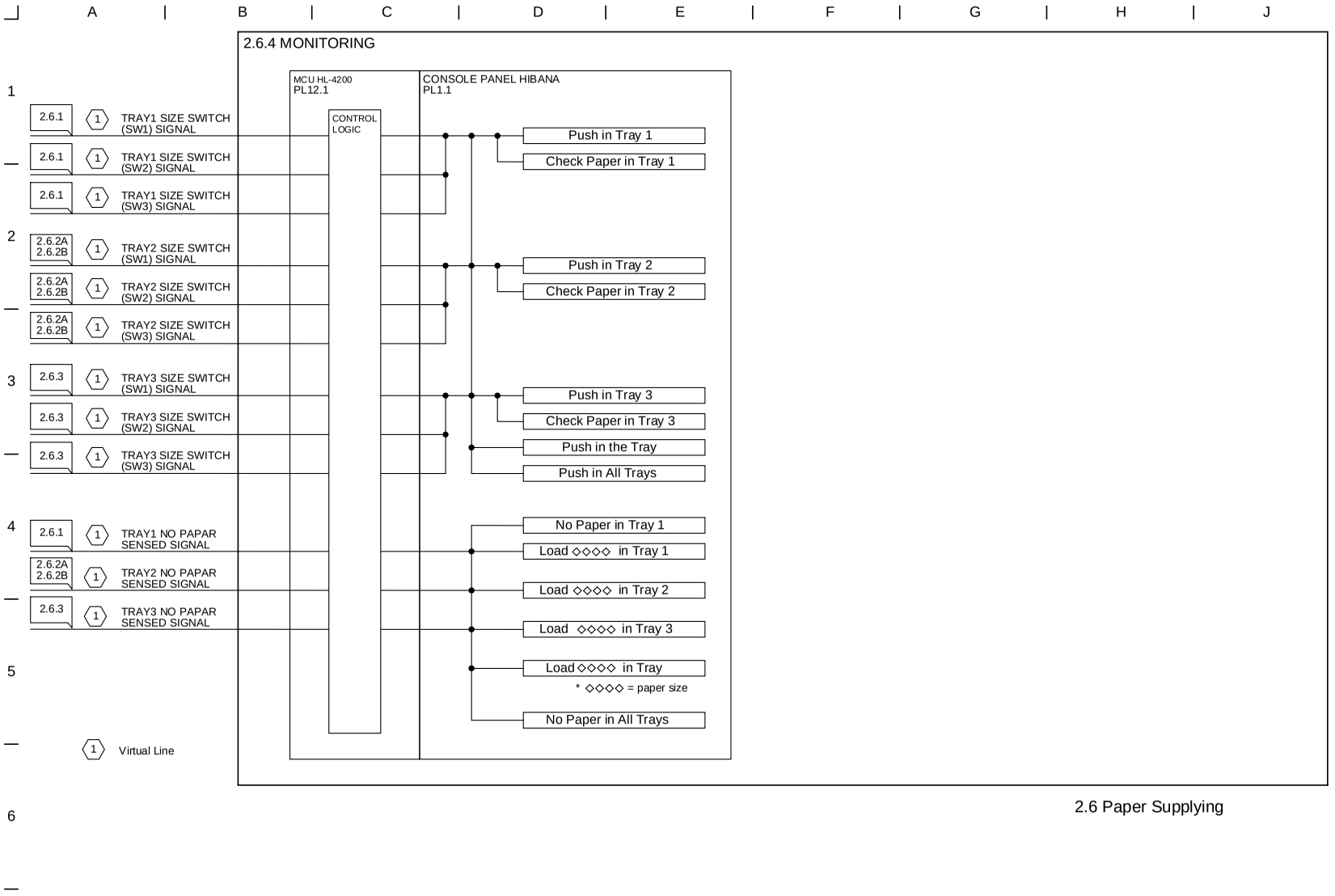
Paper Size	SW1	SW2	SW3	Display Data
LEGAL14"(SEF)	ON	ON	ON	00
LEGAL13"(SEF)	ON	ON	OFF	01
EXECUTIVE(SEF)	ON	OFF	ON	02
B5(SEF)	ON	OFF	OFF	03
A4(SEF)	OFF	ON	ON	04
LETTER(SEF)	OFF	OFF	ON	06
A5	OFF	ON	OFF	05
No Cassette	OFF	OFF	OFF	07



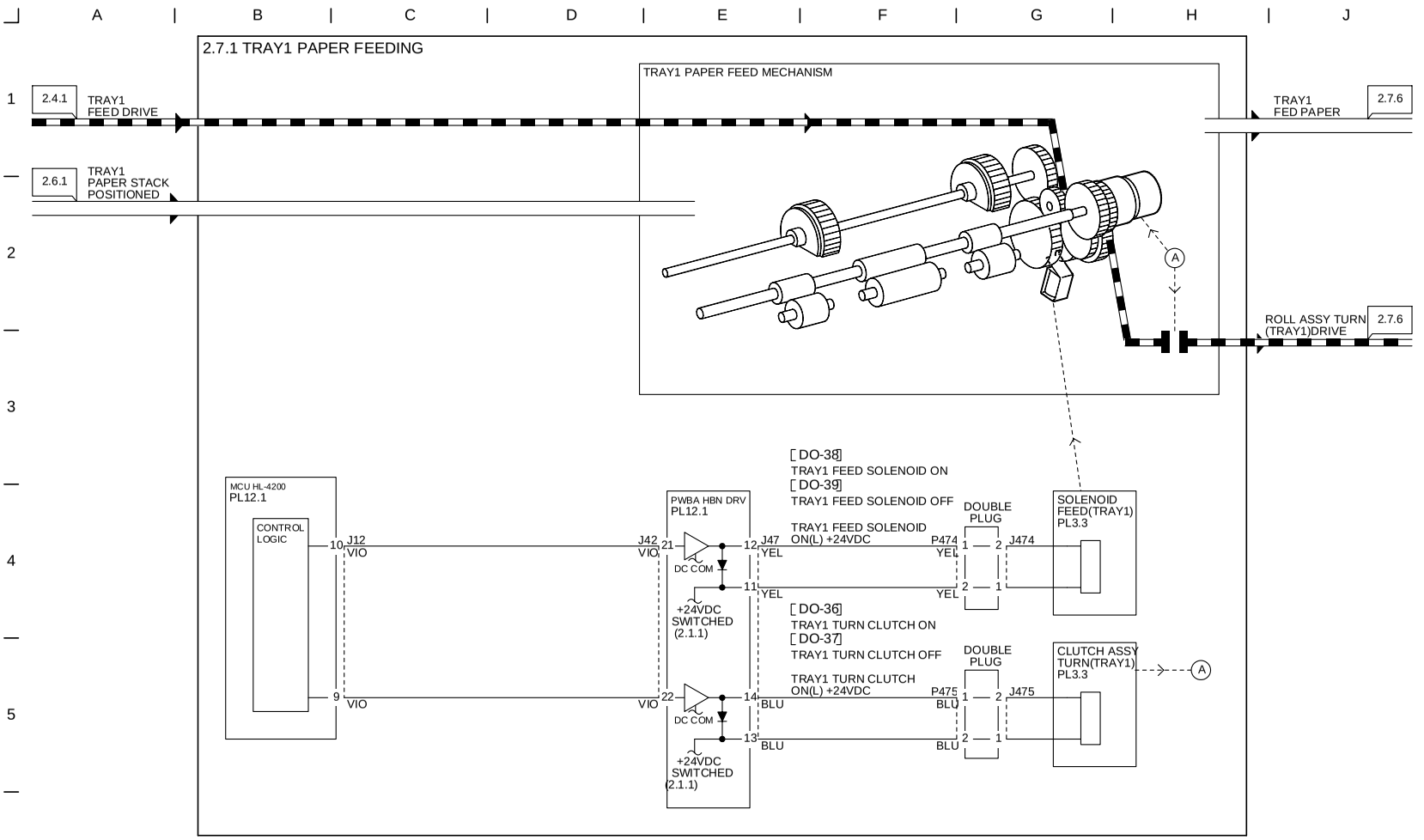
Paper Size	SW1	SW2	SW3	Display Data
LEGAL14"(SEF)	ON	ON	ON	00
LEGAL13"(SEF)	ON	ON	OFF	01
EXECUTIVE(SEF)	ON	OFF	ON	02
B5(SEF)	ON	OFF	OFF	03
A4(SEF)	OFF	ON	ON	04
LETTER(SEF)	OFF	OFF	ON	06
A5	OFF	ON	OFF	05
No Cassette	OFF	OFF	OFF	07



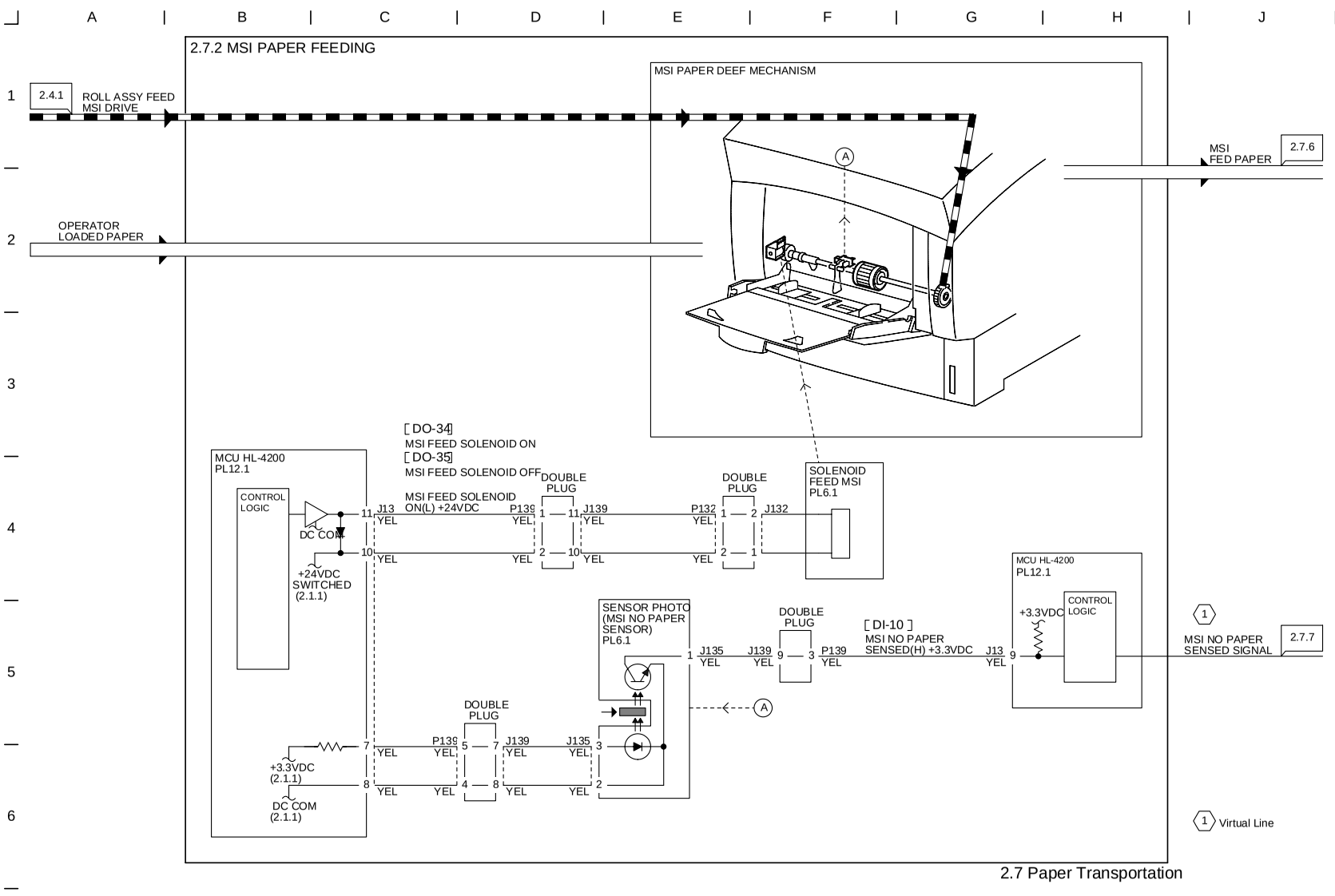
Paper Size	SW1	SW2	SW3	Display Data
LEGAL14"(SEF)	ON	ON	ON	00
LEGAL13"(SEF)	ON	ON	OFF	01
EXECUTIVE(SEF)	ON	OFF	ON	02
B5(SEF)	ON	OFF	OFF	03
A4(SEF)	OFF	ON	ON	04
LETTER(SEF)	OFF	OFF	ON	06
A5	OFF	ON	OFF	05
No Cassette	OFF	OFF	OFF	07



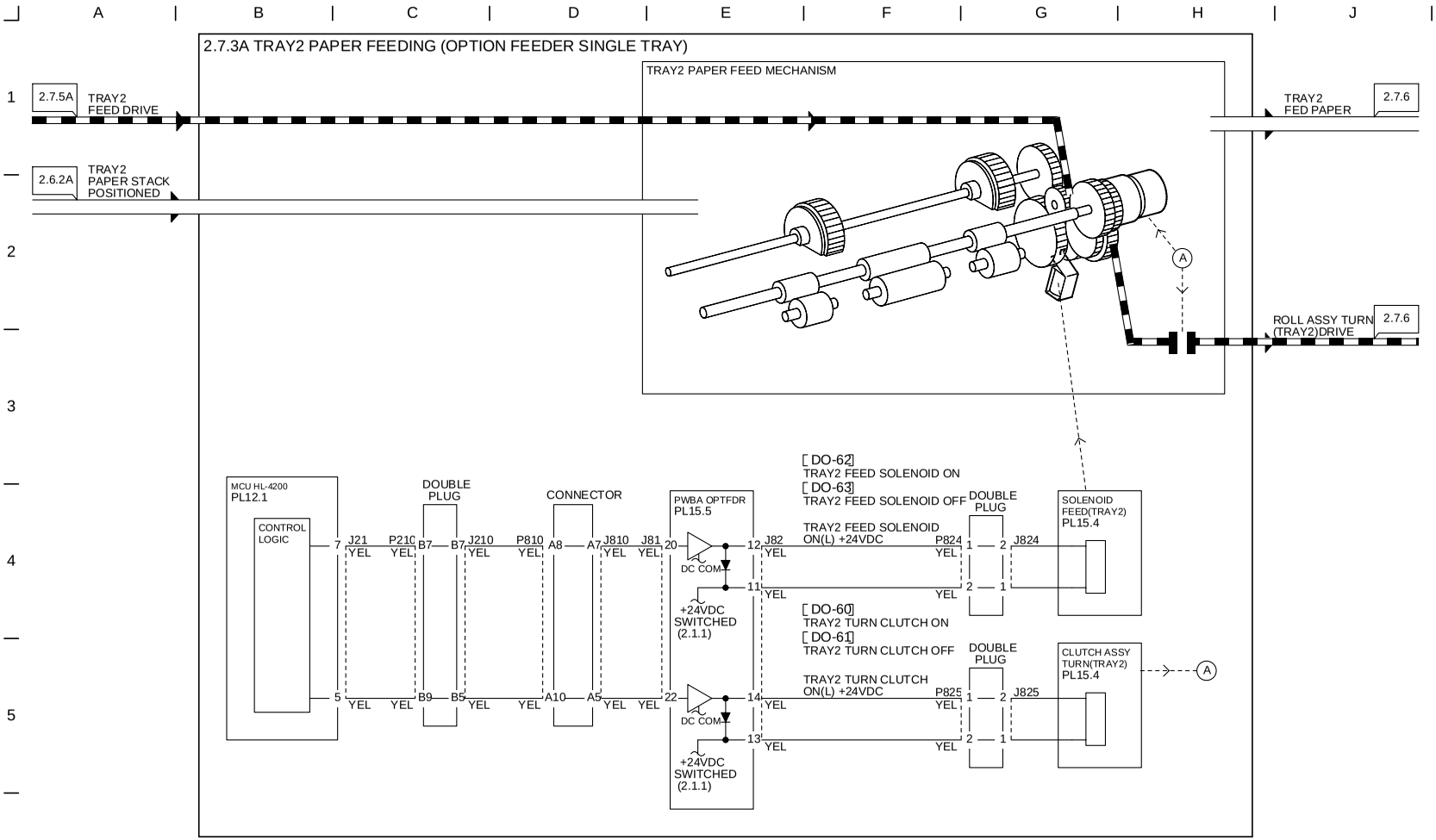
2.6 Paper Supplying



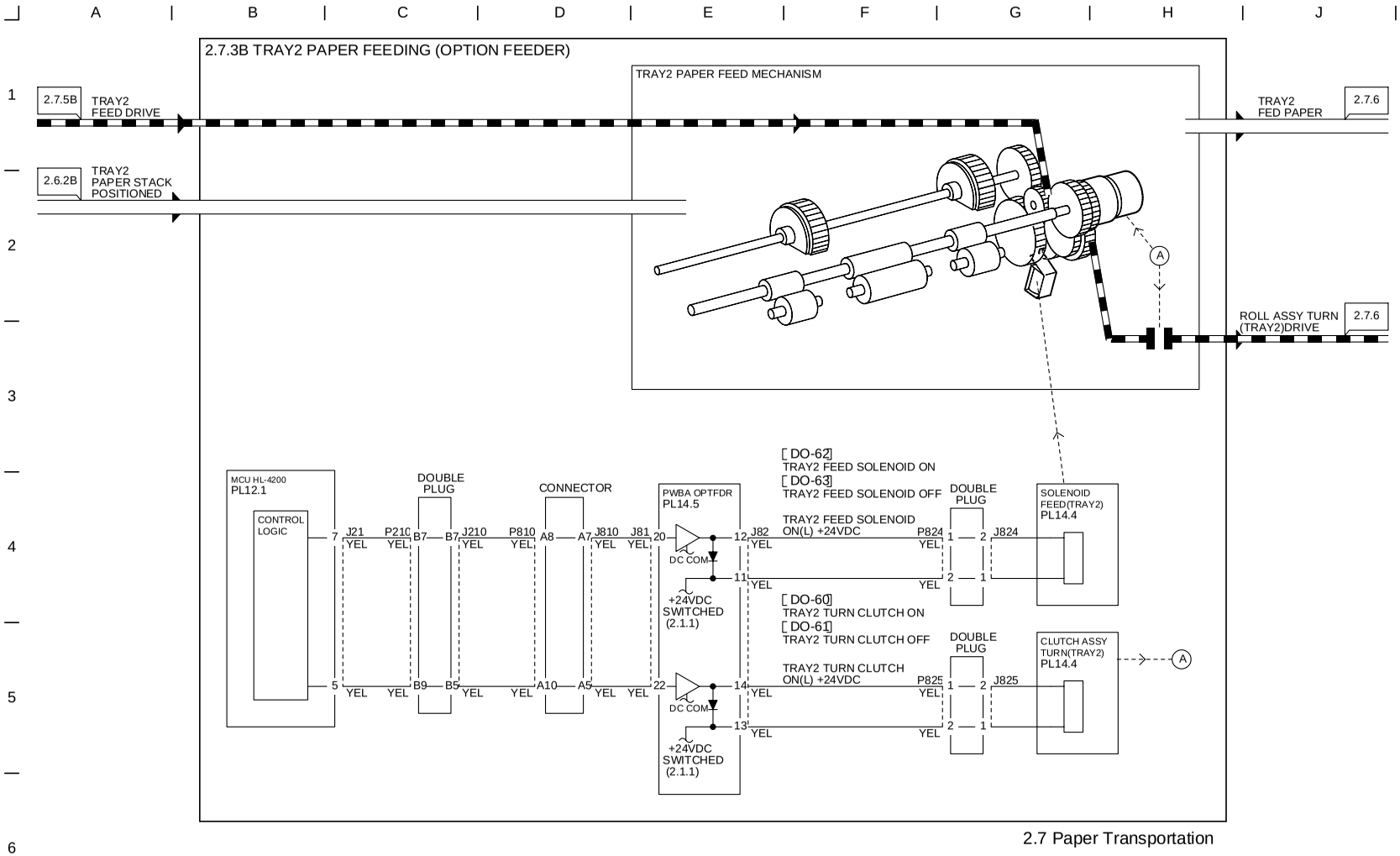
2.7 Paper Transportation



2.7 Paper Transportation



2.7 Paper Transportation



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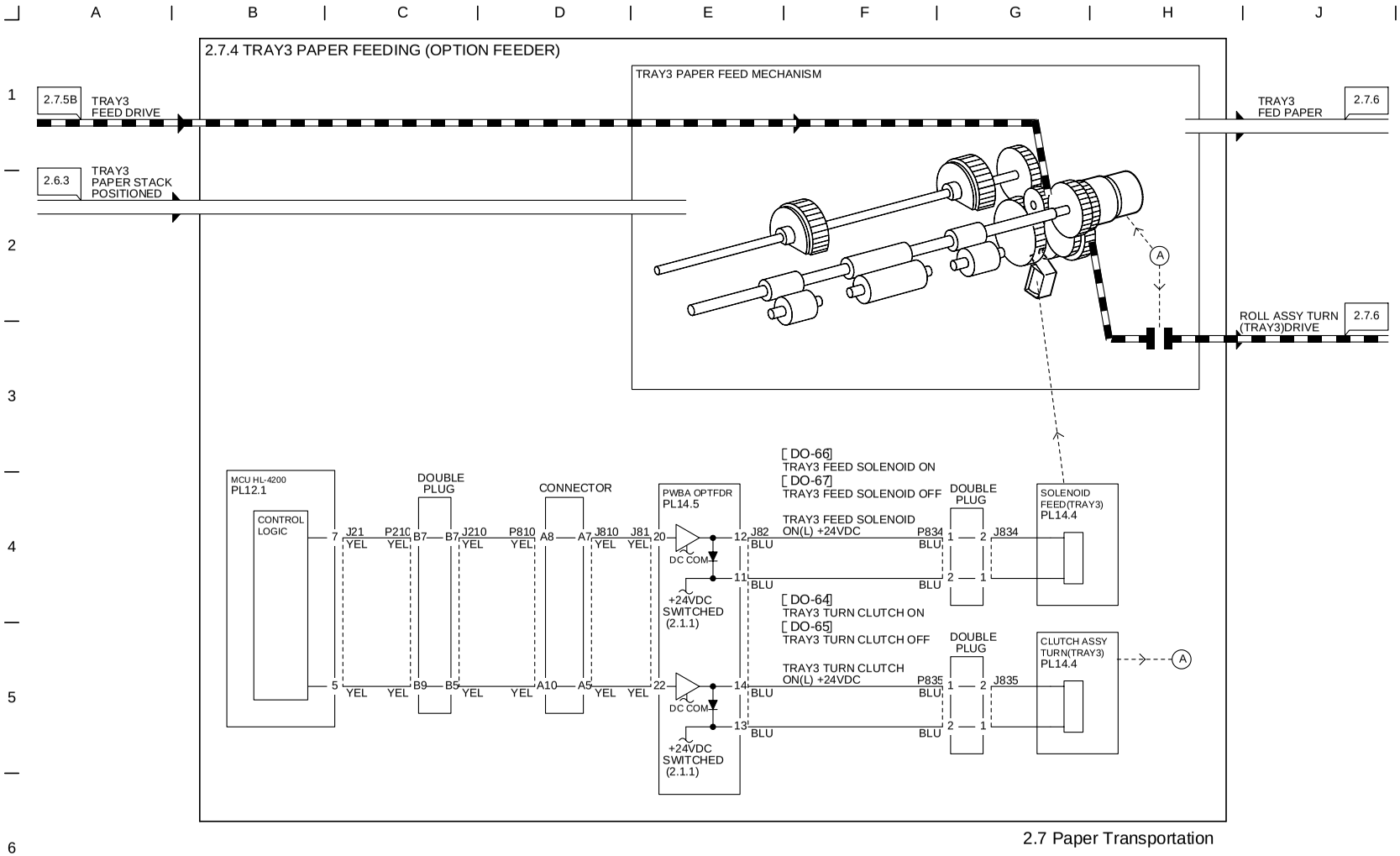
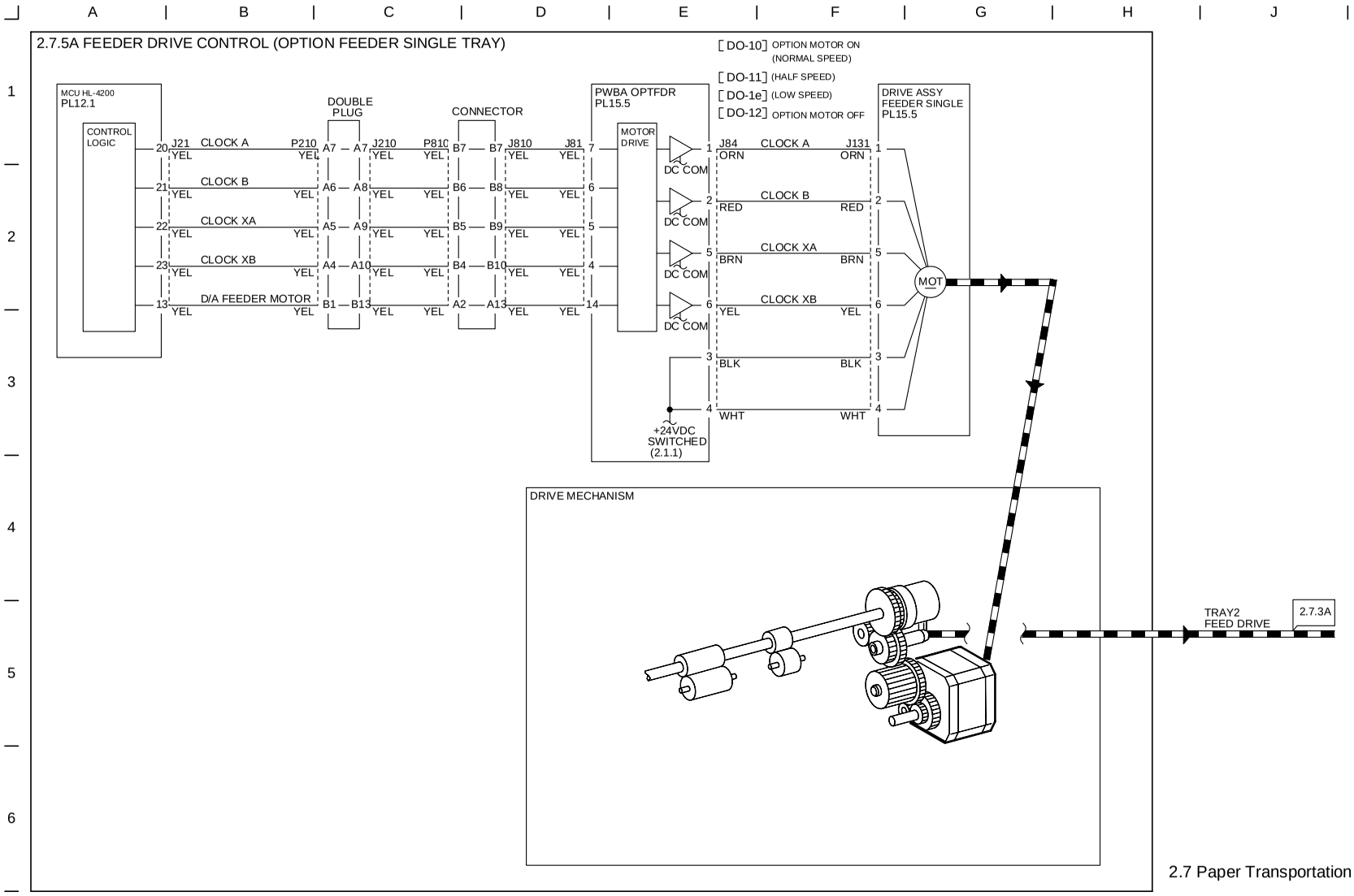
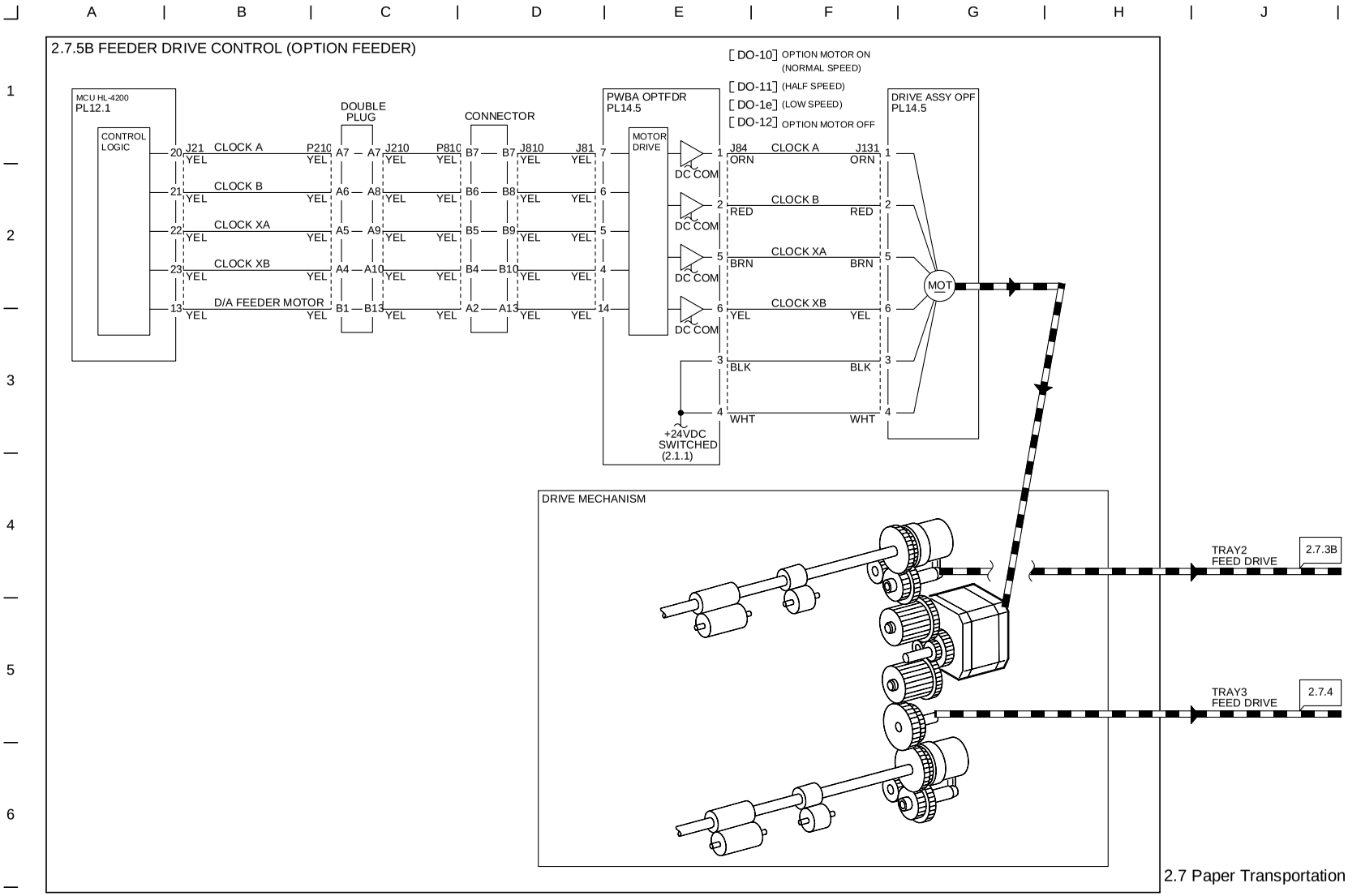


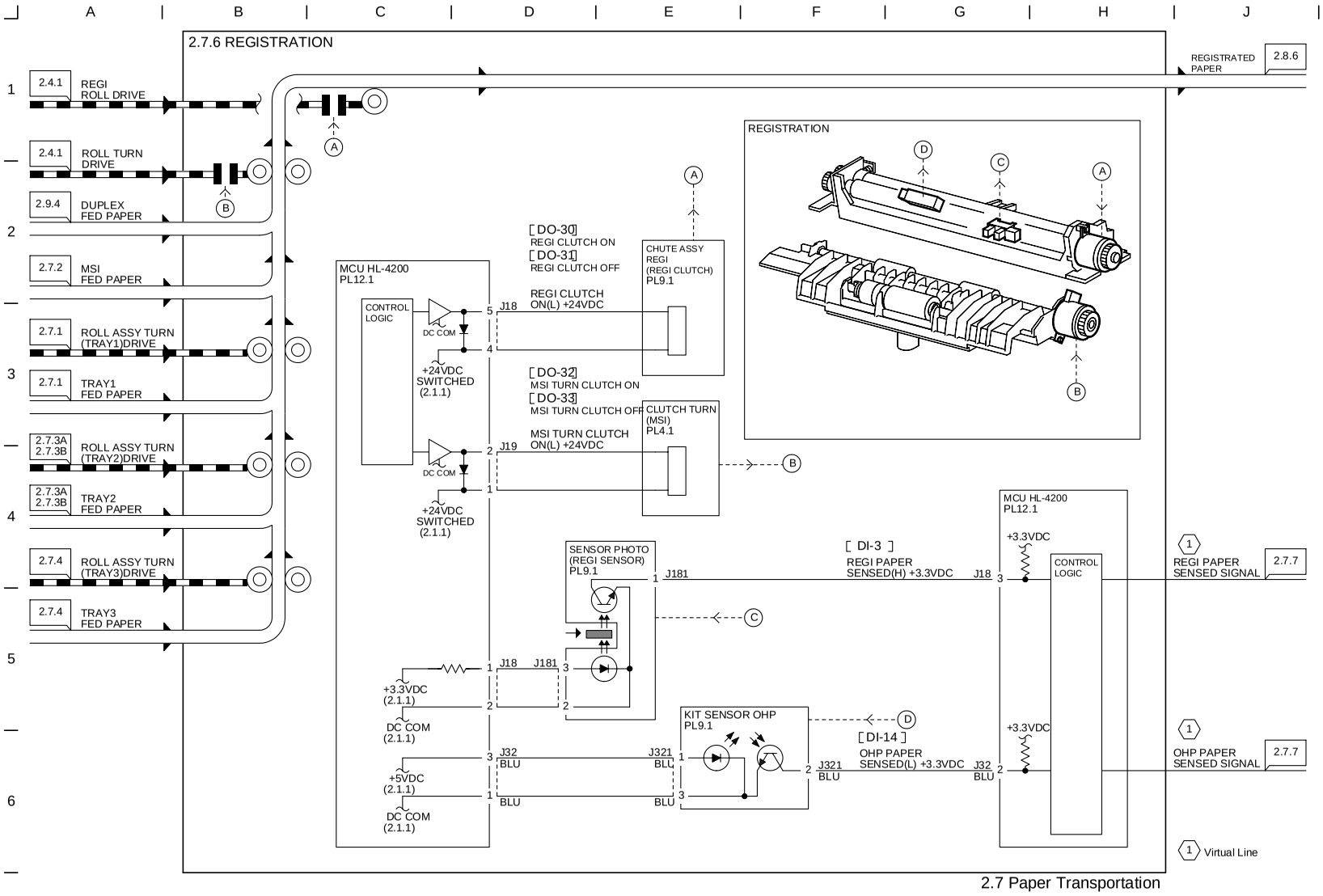
2.7 Paper Transportation



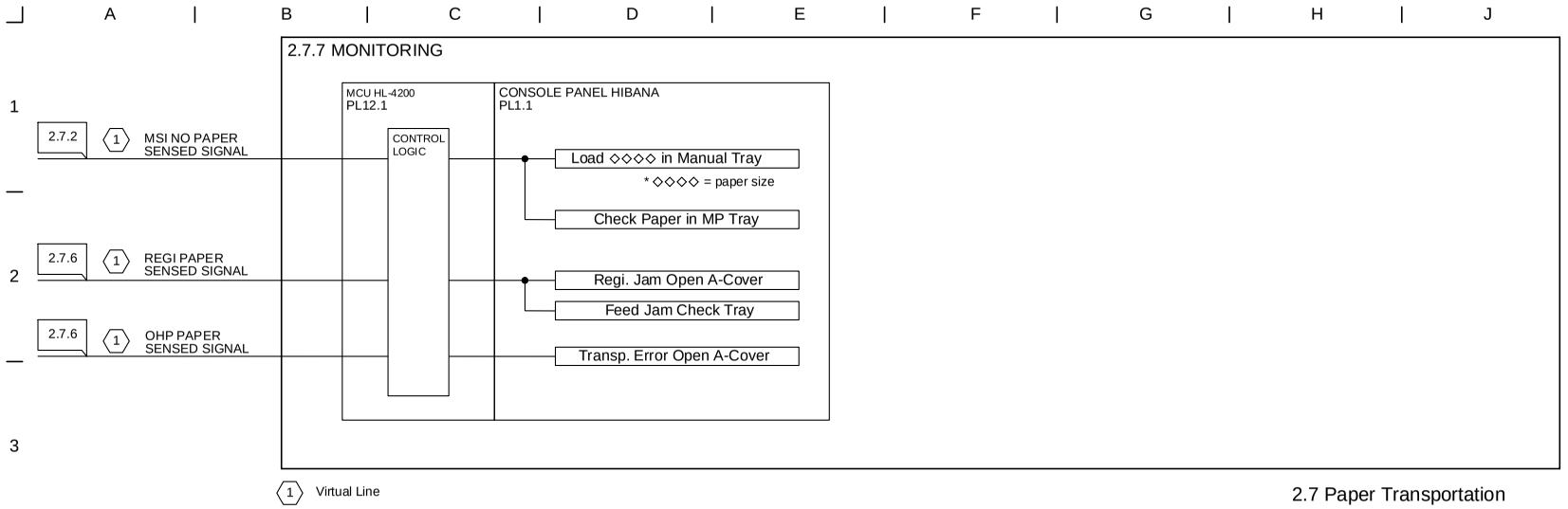
2.7 Paper Transportation



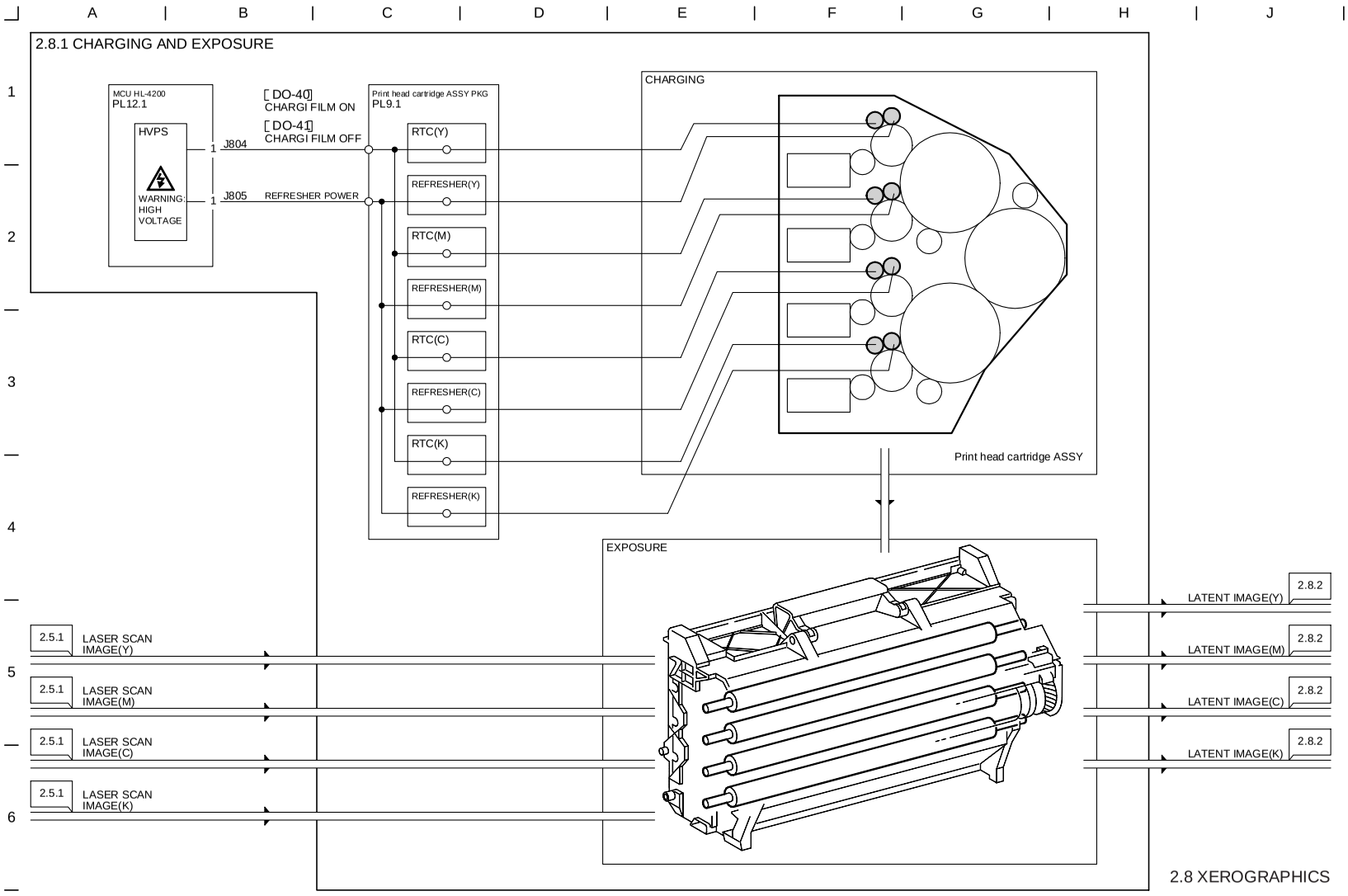
2.7 Paper Transportation

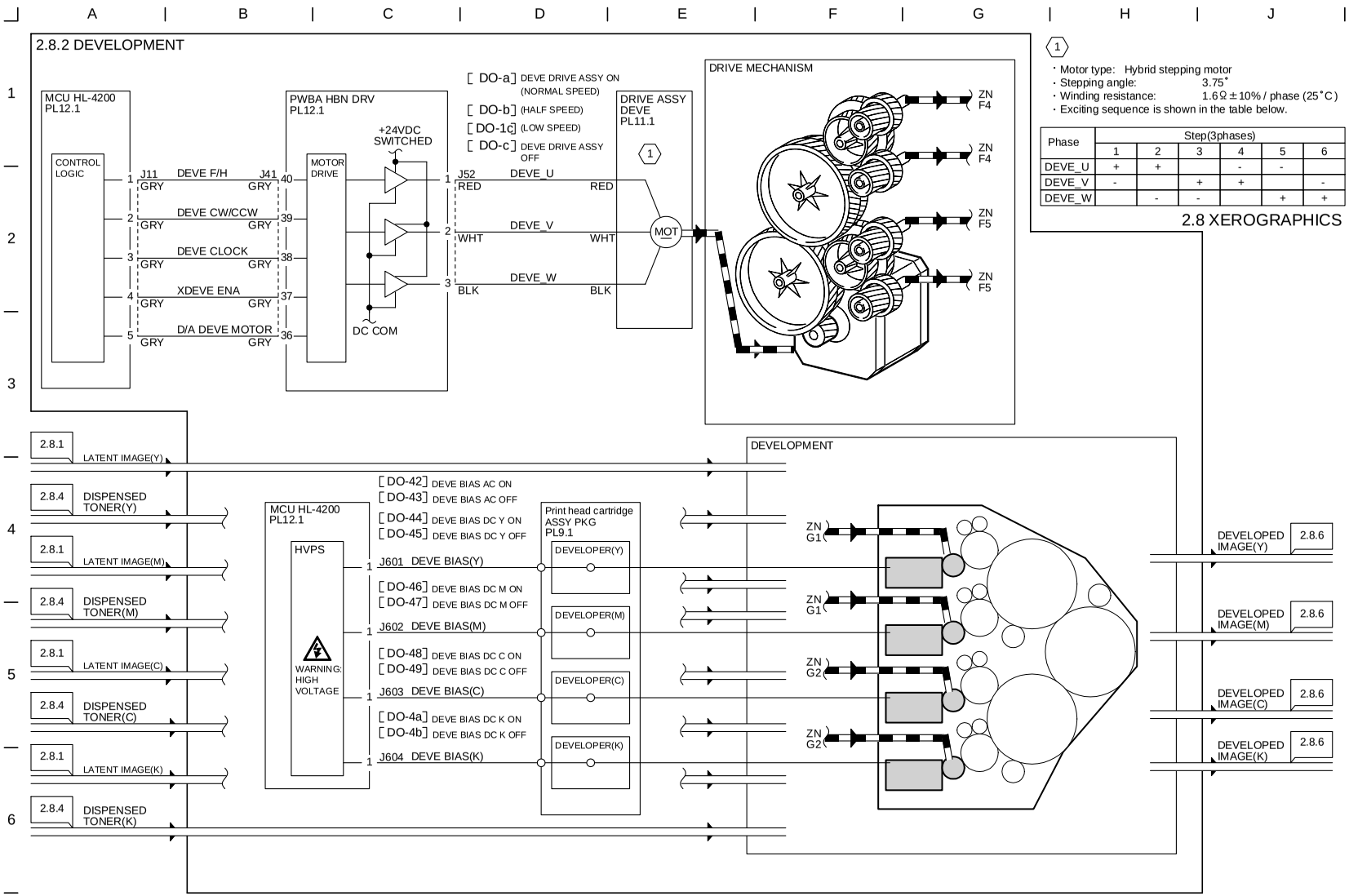


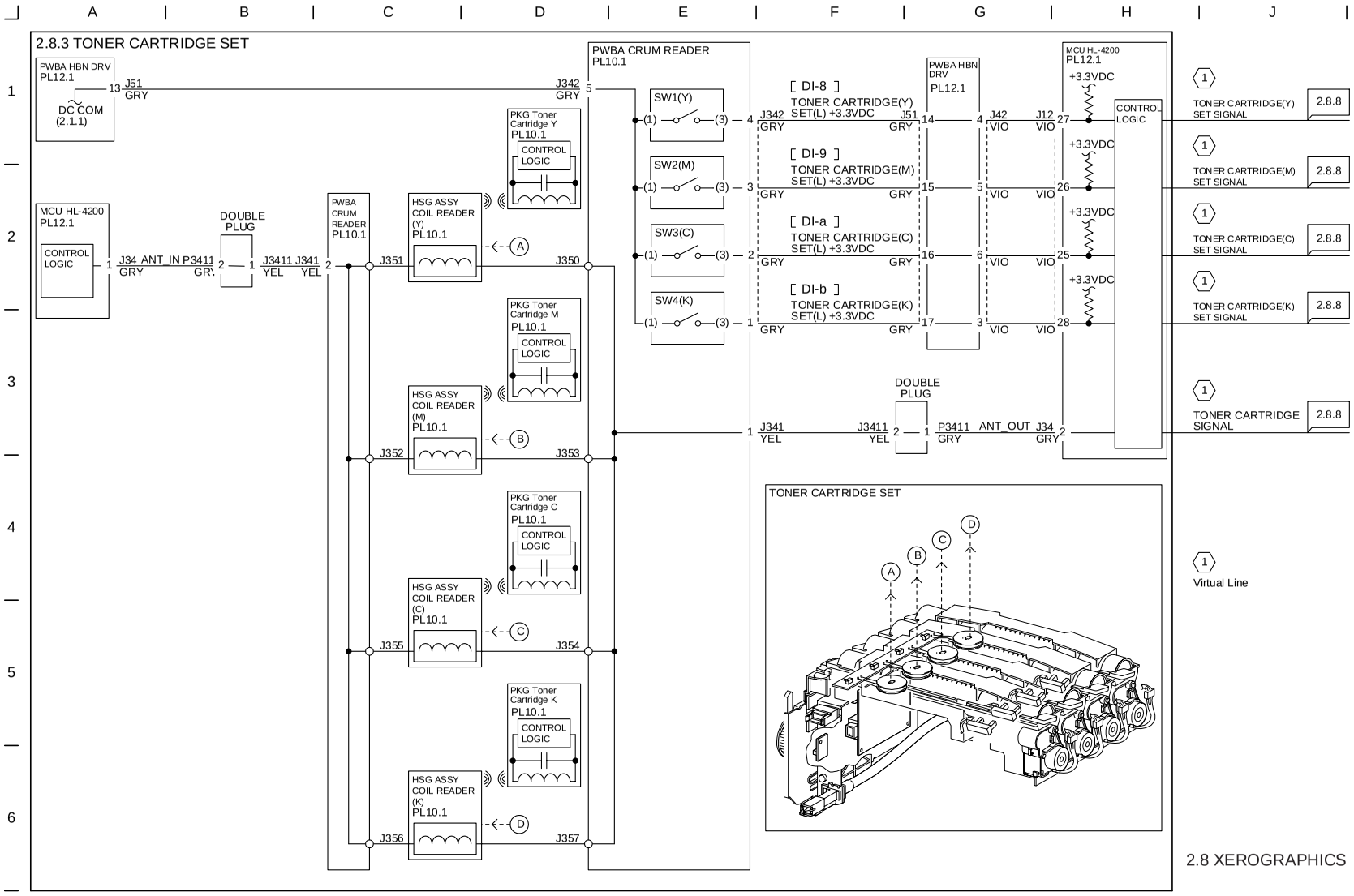
2.7 Paper Transportation

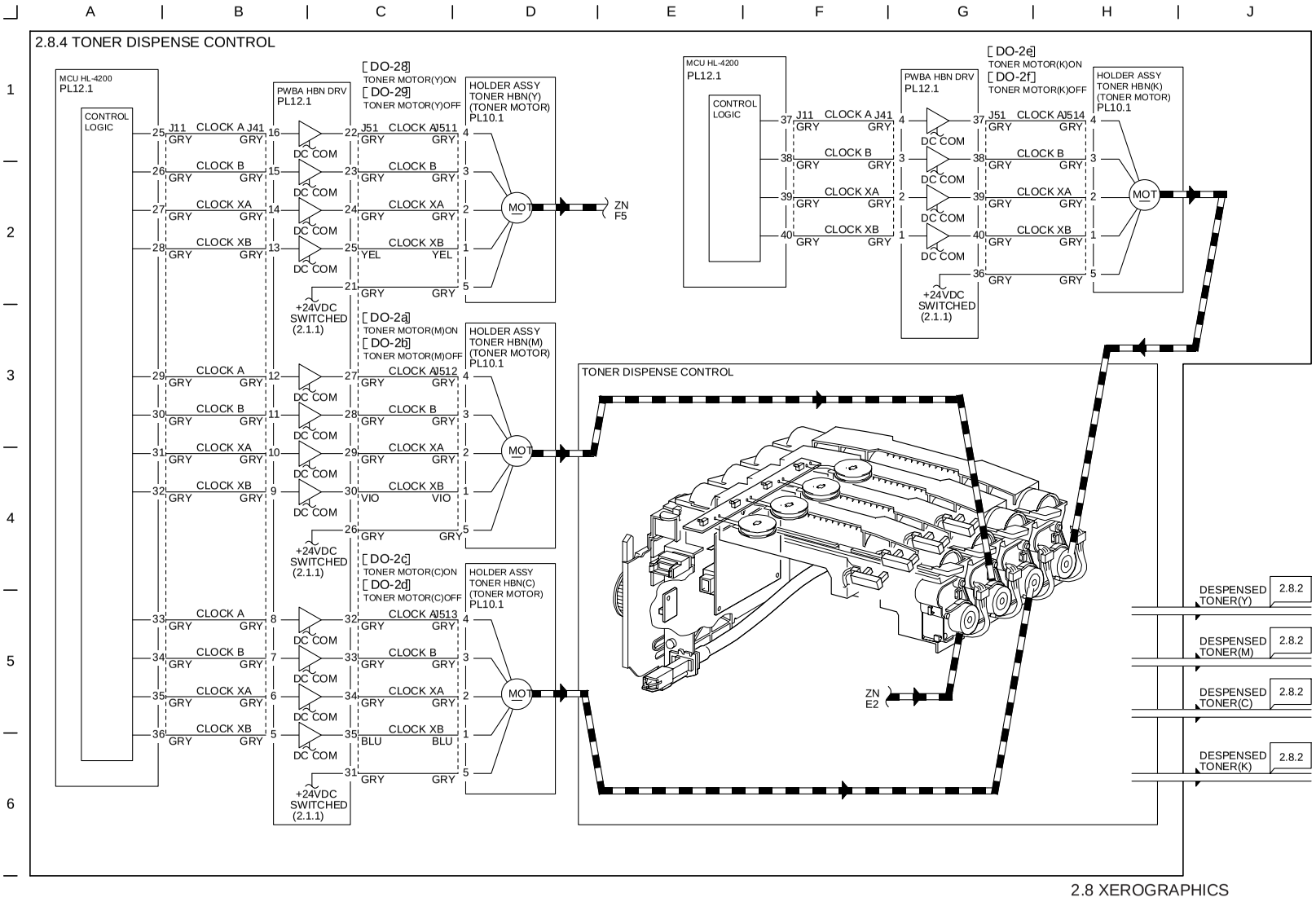


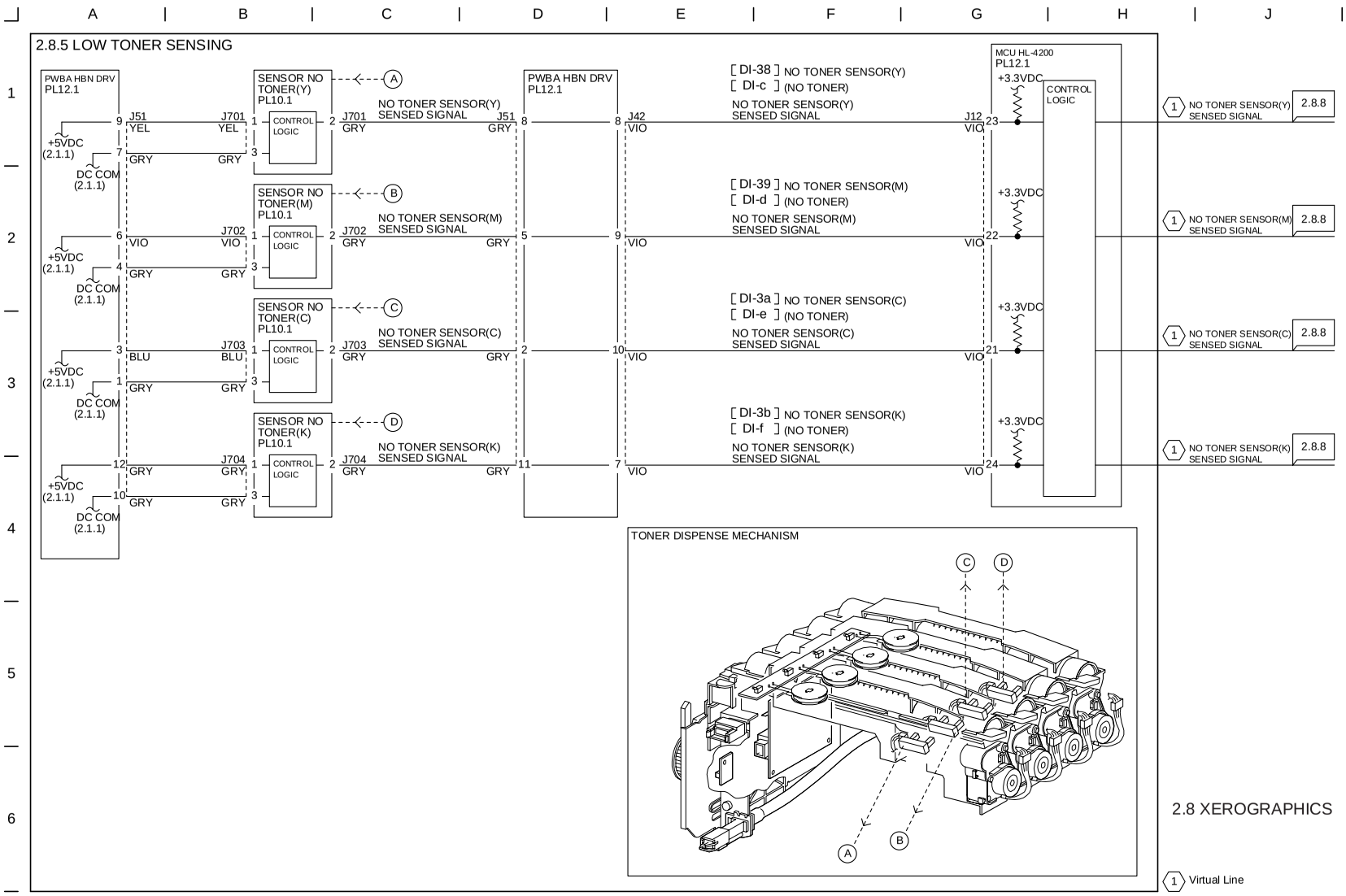
2.7 Paper Transportation

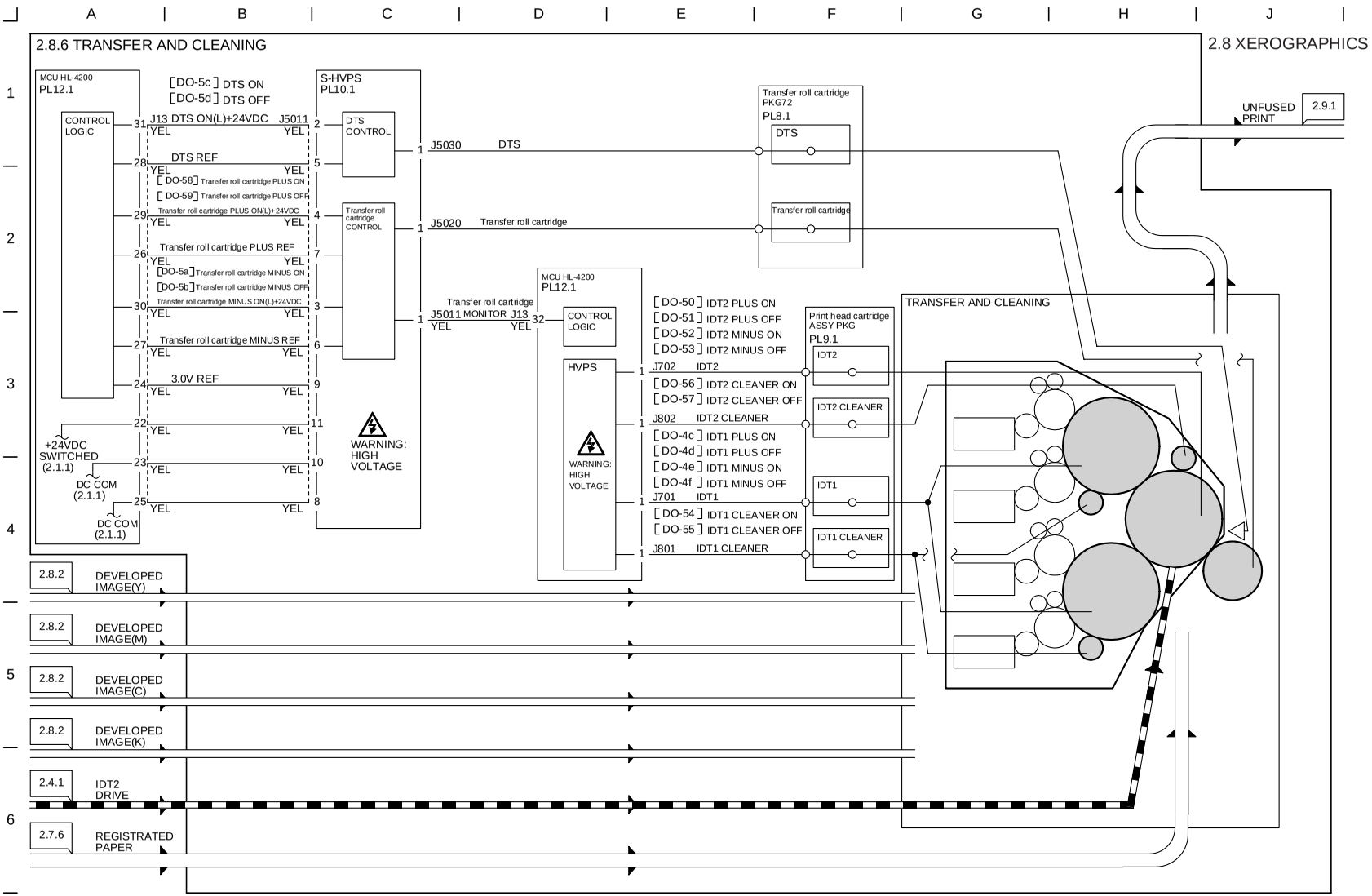

2.8.1 CHARGING AND EXPOSURE
MCU HL-4200
PL12.1
HVPS
WARNING: HIGH VOLTAGE
J804
J805
[DO-40] CHARGI FILM ON
[DO-41] CHARGI FILM OFF
REFRESHER POWER
Print head cartridge ASSY PKG
PL9.1
RTC(Y)
REFRESHER(Y)
RTC(M)
REFRESHER(M)
RTC(C)
REFRESHER(C)
RTC(K)
REFRESHER(K)
CHARGING
Print head cartridge ASSY
EXPOSURE
2.5.1 LASER SCAN IMAGE(Y)
2.5.1 LASER SCAN IMAGE(M)
2.5.1 LASER SCAN IMAGE(C)
2.5.1 LASER SCAN IMAGE(K)
LATENT IMAGE(Y) 2.8.2
LATENT IMAGE(M) 2.8.2
LATENT IMAGE(C) 2.8.2
LATENT IMAGE(K) 2.8.2
2.8 XEROGRAPHICS

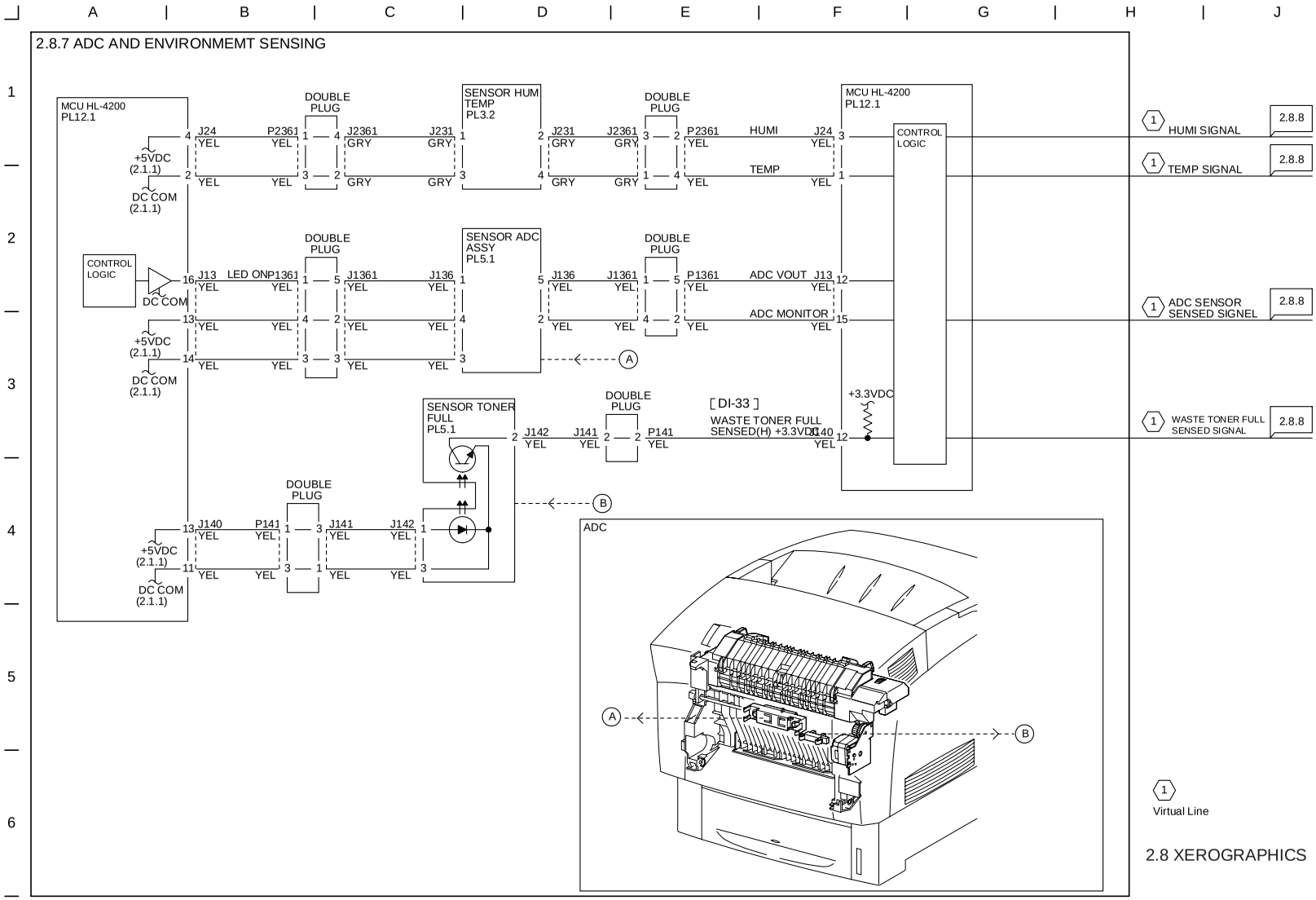

2.8.2 DEVELOPMENT
MCU HL-4200
PL12.1
CONTROL LOGIC
PWBA HBN DRV
PL12.1
MOTOR DRIVE
+24VDC SWITCHED
DC COM
[DO-a] DEVE DRIVE ASSY ON (NORMAL SPEED)
[DO-b] (HALF SPEED)
[DO-1c] (LOW SPEED)
[DO-c] DEVE DRIVE ASSY OFF
DRIVE ASSY DEVE
PL11.1
MOT
DRIVE MECHANISM
J11 DEVE F/H J41
DEVE CW/CCW
DEVE CLOCK
XDEVE ENA
D/A DEVE MOTOR
J52 DEVE_U
DEVE_V
DEVE_W
GRY
RED
WHT
BLK
ZN F4
ZN F4
ZN F5
ZN F5
・Motor type: Hybrid stepping motor
・Stepping angle: 3.75˚
・Winding resistance: 1.6Ω±10% / phase (25˚C)
・Exciting sequence is shown in the table below.
Phase
Step(3phases)
DEVE_U + + - - -
DEVE_V - + + - -
DEVE_W - - + + +
2.8 XEROGRAPHICS
2.8.1 LATENT IMAGE(Y)
2.8.4 DISPENSED TONER(Y)
2.8.1 LATENT IMAGE(M)
2.8.4 DISPENSED TONER(M)
2.8.1 LATENT IMAGE(C)
2.8.4 DISPENSED TONER(C)
2.8.1 LATENT IMAGE(K)
2.8.4 DISPENSED TONER(K)
MCU HL-4200
PL12.1
HVPS
WARNING: HIGH VOLTAGE
[DO-42] DEVE BIAS AC ON
[DO-43] DEVE BIAS AC OFF
[DO-44] DEVE BIAS DC Y ON
[DO-45] DEVE BIAS DC Y OFF
J601 DEVE BIAS(Y)
[DO-46] DEVE BIAS DC M ON
[DO-47] DEVE BIAS DC M OFF
J602 DEVE BIAS(M)
[DO-48] DEVE BIAS DC C ON
[DO-49] DEVE BIAS DC C OFF
J603 DEVE BIAS(C)
[DO-4a] DEVE BIAS DC K ON
[DO-4b] DEVE BIAS DC K OFF
J604 DEVE BIAS(K)
Print head cartridge ASSY PKG
PL9.1
DEVELOPER(Y)
DEVELOPER(M)
DEVELOPER(C)
DEVELOPER(K)
DEVELOPMENT
ZN G1
ZN G1
ZN G2
ZN G2
DEVELOPED IMAGE(Y) 2.8.6
DEVELOPED IMAGE(M) 2.8.6
DEVELOPED IMAGE(C) 2.8.6
DEVELOPED IMAGE(K) 2.8.6

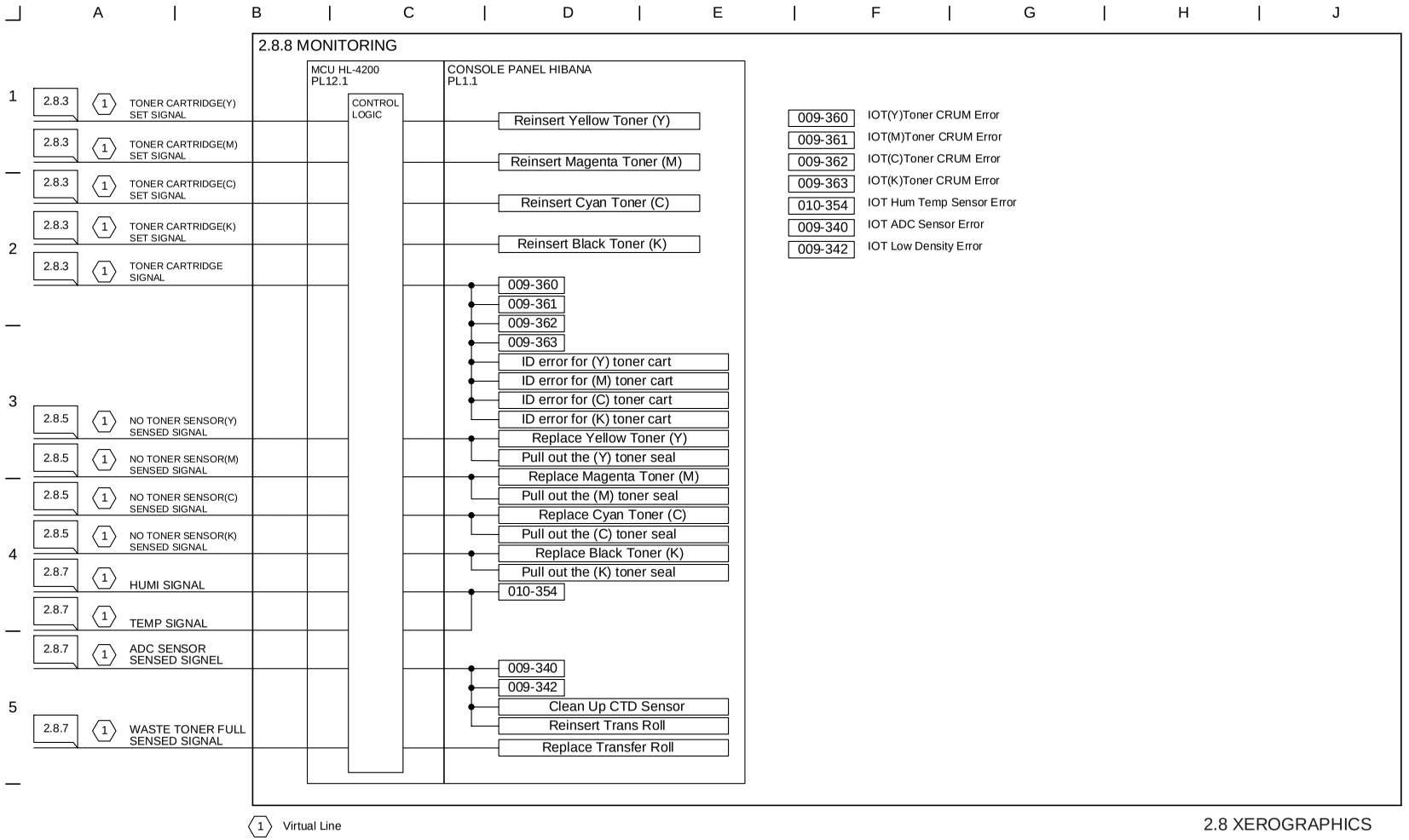

2.8.3 TONER CARTRIDGE SET
PWBA HBN DRV
PL12.1
DC COM
(2.1.1)
13 J51 GRY
J342 GRY 5
PWBA CRUM READER
PL10.1
SW1(Y)
SW2(M)
SW3(C)
SW4(K)
[DI-8]
TONER CARTRIDGE(Y)
SET(L) +3.3VDC
[DI-9]
TONER CARTRIDGE(M)
SET(L) +3.3VDC
[DI-a]
TONER CARTRIDGE(C)
SET(L) +3.3VDC
[DI-b]
TONER CARTRIDGE(K)
SET(L) +3.3VDC
PWBA HBN DRV
PL12.1
MCU HL-4200
PL12.1
+3.3VDC
CONTROL LOGIC
TONER CARTRIDGE(Y) SET SIGNAL
TONER CARTRIDGE(M) SET SIGNAL
TONER CARTRIDGE(C) SET SIGNAL
TONER CARTRIDGE(K) SET SIGNAL
2.8.8
MCU HL-4200
PL12.1
CONTROL LOGIC
J34 ANT_IN P3411
DOUBLE PLUG
J3411 J341
PWBA CRUM READER
PL10.1
HSG ASSY COIL READER (Y)
PL10.1
HSG ASSY COIL READER (M)
PL10.1
HSG ASSY COIL READER (C)
PL10.1
HSG ASSY COIL READER (K)
PL10.1
PKG Toner Cartridge Y
PL10.1
PKG Toner Cartridge M
PL10.1
PKG Toner Cartridge C
PL10.1
PKG Toner Cartridge K
PL10.1
CONTROL LOGIC
J351
J350
J352
J353
J355
J354
J356
J357
DOUBLE PLUG
J341 YEL
J3411 YEL
P3411 GRY
ANT_OUT J34 GRY
TONER CARTRIDGE SET
A
B
C
D
TONER CARTRIDGE SIGNAL
Virtual Line
2.8 XEROGRAPHICS

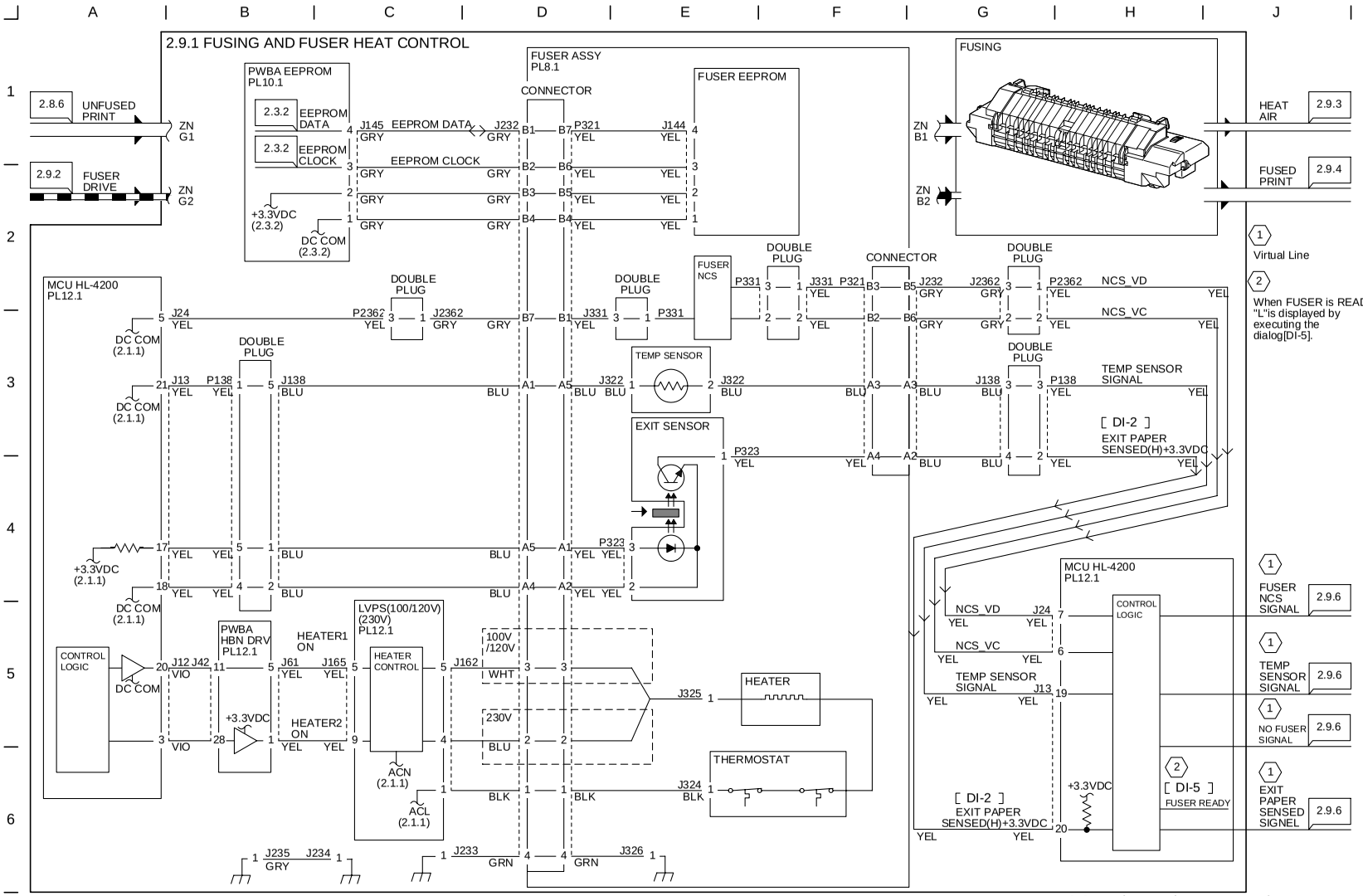

2.8.4 TONER DISPENSE CONTROL
MCU HL-4200
PL12.1
CONTROL LOGIC
PWBA HBN DRV
PL12.1
[DO-2a] TONER MOTOR(M)ON
[DO-2b] TONER MOTOR(M)OFF
[DO-2c] TONER MOTOR(C)ON
[DO-2d] TONER MOTOR(C)OFF
[DO-2e] TONER MOTOR(K)ON
[DO-2f] TONER MOTOR(K)OFF
[DO-2g] TONER MOTOR(Y)ON
[DO-2h] TONER MOTOR(Y)OFF
HOLDER ASSY TONER HBN(Y) (TONER MOTOR) PL10.1
HOLDER ASSY TONER HBN(M) (TONER MOTOR) PL10.1
HOLDER ASSY TONER HBN(C) (TONER MOTOR) PL10.1
HOLDER ASSY TONER HBN(K) (TONER MOTOR) PL10.1
CLOCK A
CLOCK B
CLOCK XA
CLOCK XB
DC COM
+24VDC SWITCHED (2.1.1)
MOT
ZN F5
ZN E2
TONER DISPENSE CONTROL
DESPENSED TONER(Y) 2.8.2
DESPENSED TONER(M) 2.8.2
DESPENSED TONER(C) 2.8.2
DESPENSED TONER(K) 2.8.2

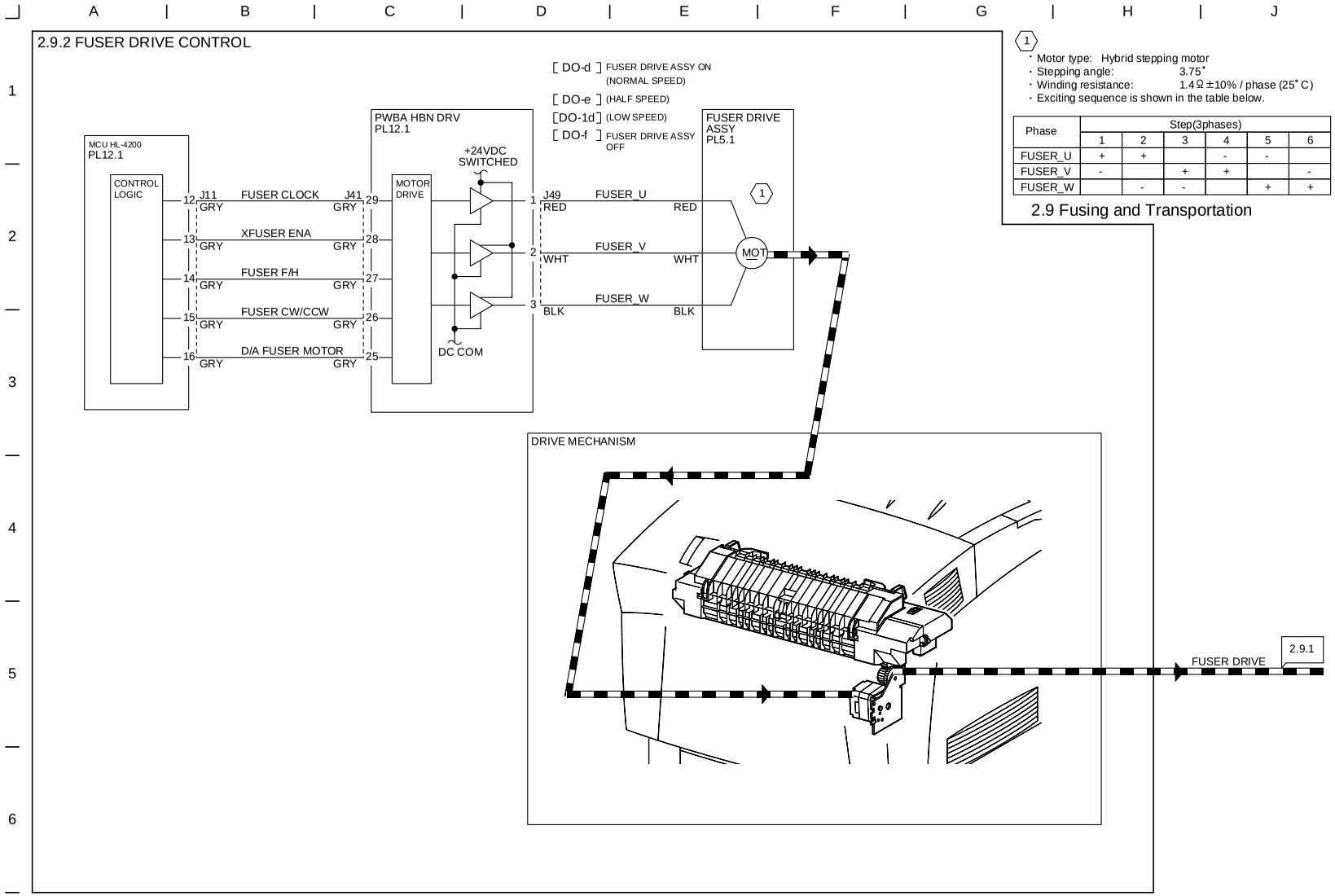

2.8.5 LOW TONER SENSING
PWBA HBN DRV
PL12.1
SENSOR NO TONER(Y)
PL10.1
SENSOR NO TONER(M)
PL10.1
SENSOR NO TONER(C)
PL10.1
SENSOR NO TONER(K)
PL10.1
CONTROL LOGIC
+5VDC (2.1.1)
DC COM (2.1.1)
NO TONER SENSOR(Y) SENSED SIGNAL
NO TONER SENSOR(M) SENSED SIGNAL
NO TONER SENSOR(C) SENSED SIGNAL
NO TONER SENSOR(K) SENSED SIGNAL
PWBA HBN DRV
PL12.1
[DI-38] NO TONER SENSOR(Y)
[DI-c] (NO TONER)
[DI-39] NO TONER SENSOR(M)
[DI-d] (NO TONER)
[DI-3a] NO TONER SENSOR(C)
[DI-e] (NO TONER)
[DI-3b] NO TONER SENSOR(K)
[DI-f] (NO TONER)
MCU HL-4200
PL12.1
+3.3VDC
CONTROL LOGIC
2.8.8
TONER DISPENSE MECHANISM
2.8 XEROGRAPHICS
Virtual Line


2.8.6 TRANSFER AND CLEANING
2.8 XEROGRAPHICS
MCU HL-4200
PL12.1
CONTROL LOGIC
[DO-5c] DTS ON
[DO-5d] DTS OFF
J13 DTS ON(L)+24VDC
DTS REF
[DO-58] Transfer roll cartridge PLUS ON
[DO-59] Transfer roll cartridge PLUS OFF
Transfer roll cartridge PLUS ON(L)+24VDC
Transfer roll cartridge PLUS REF
[DO-5a] Transfer roll cartridge MINUS ON
[DO-5b] Transfer roll cartridge MINUS OFF
Transfer roll cartridge MINUS ON(L)+24VDC
Transfer roll cartridge MINUS REF
3.0V REF
+24VDC SWITCHED (2.1.1)
DC COM (2.1.1)
DC COM (2.1.1)
S-HVPS
PL10.1
DTS CONTROL
Transfer roll cartridge CONTROL
J5011
WARNING: HIGH VOLTAGE
J5030 DTS
J5020 Transfer roll cartridge
Transfer roll cartridge
J5011 MONITOR J13
MCU HL-4200
PL12.1
CONTROL LOGIC
HVPS
WARNING: HIGH VOLTAGE
Transfer roll cartridge PKG72
PL8.1
DTS
Transfer roll cartridge
[DO-50] IDT2 PLUS ON
[DO-51] IDT2 PLUS OFF
[DO-52] IDT2 MINUS ON
[DO-53] IDT2 MINUS OFF
J702 IDT2
[DO-56] IDT2 CLEANER ON
[DO-57] IDT2 CLEANER OFF
J802 IDT2 CLEANER
[DO-4c] IDT1 PLUS ON
[DO-4d] IDT1 PLUS OFF
[DO-4e] IDT1 MINUS ON
[DO-4f] IDT1 MINUS OFF
J701 IDT1
[DO-54] IDT1 CLEANER ON
[DO-55] IDT1 CLEANER OFF
J801 IDT1 CLEANER
Print head cartridge ASSY PKG
PL9.1
IDT2
IDT2 CLEANER
IDT1
IDT1 CLEANER
TRANSFER AND CLEANING
UNFUSED PRINT
2.9.1
2.8.2 DEVELOPED IMAGE(Y)
2.8.2 DEVELOPED IMAGE(M)
2.8.2 DEVELOPED IMAGE(C)
2.8.2 DEVELOPED IMAGE(K)
2.4.1 IDT2 DRIVE
2.7.6 REGISTRATED PAPER

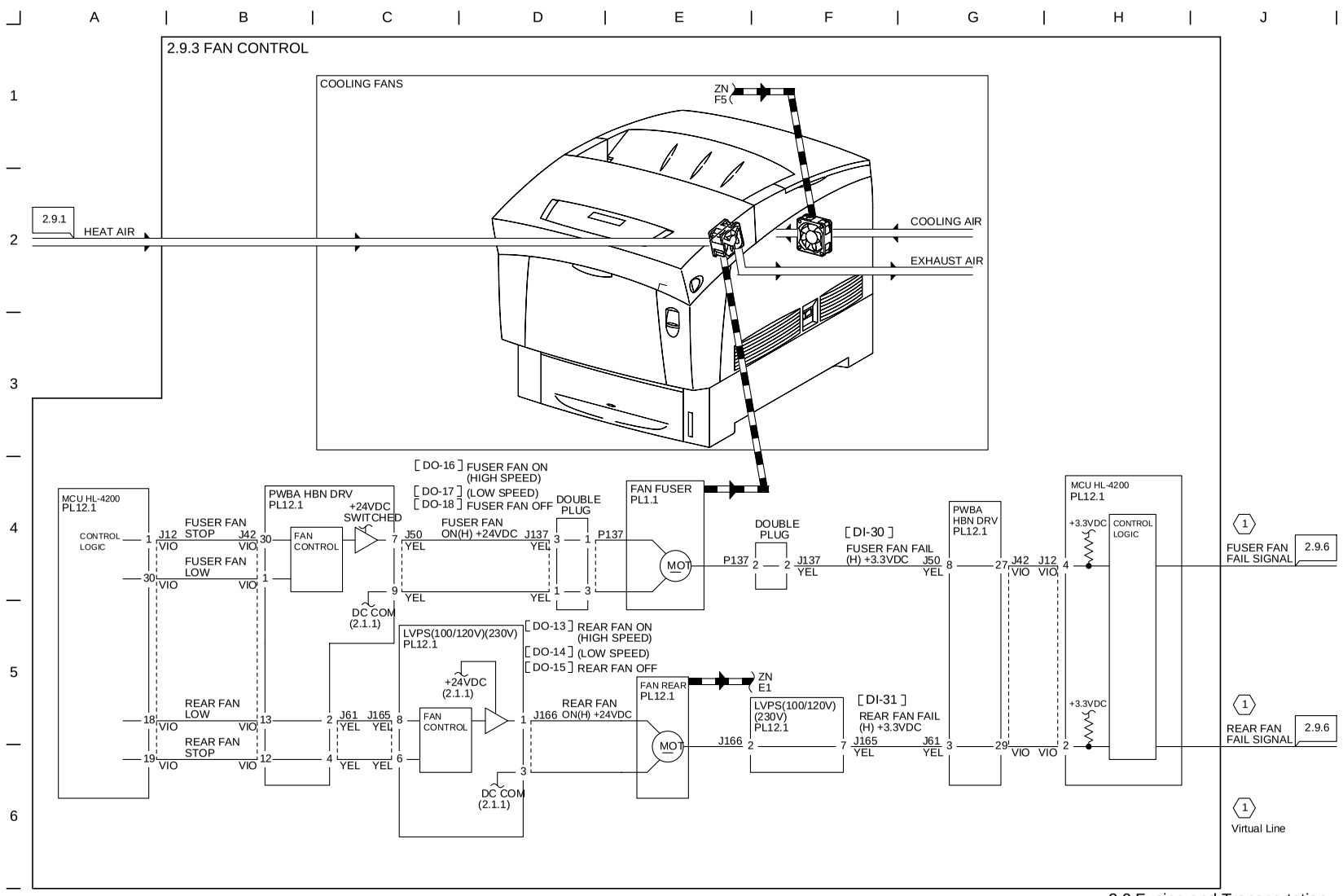

2.8.7 ADC AND ENVIRONMEMT SENSING
MCU HL-4200
PL12.1
+5VDC
(2.1.1)
DC COM
(2.1.1)
DOUBLE
PLUG
SENSOR HUM
TEMP
PL3.2
J24
P2361
J2361
J231
J1361
HUMI
TEMP
CONTROL
LOGIC
SENSOR ADC
ASSY
PL5.1
J13
LED ON
J136
ADC VOUT
ADC MONITOR
SENSOR TONER
FULL
PL5.1
J142
J141
P141
J140
[DI-33]
WASTE TONER FULL
SENSED(H) +3.3VDC
+3.3VDC
HUMI SIGNAL
TEMP SIGNAL
ADC SENSOR
SENSED SIGNEL
WASTE TONER FULL
SENSED SIGNAL
2.8.8
ADC
Virtual Line
2.8 XEROGRAPHICS


2.8.8 MONITORING
MCU HL-4200
PL12.1
CONTROL
LOGIC
CONSOLE PANEL HIBANA
PL1.1
2.8.3 1 TONER CARTRIDGE(Y) SET SIGNAL
2.8.3 1 TONER CARTRIDGE(M) SET SIGNAL
2.8.3 1 TONER CARTRIDGE(C) SET SIGNAL
2.8.3 1 TONER CARTRIDGE(K) SET SIGNAL
2.8.3 1 TONER CARTRIDGE SIGNAL
2.8.5 1 NO TONER SENSOR(Y) SENSED SIGNAL
2.8.5 1 NO TONER SENSOR(M) SENSED SIGNAL
2.8.5 1 NO TONER SENSOR(C) SENSED SIGNAL
2.8.5 1 NO TONER SENSOR(K) SENSED SIGNAL
2.8.7 1 HUMI SIGNAL
2.8.7 1 TEMP SIGNAL
2.8.7 1 ADC SENSOR SENSED SIGNEL
2.8.7 1 WASTE TONER FULL SENSED SIGNAL
Reinsert Yellow Toner (Y)
Reinsert Magenta Toner (M)
Reinsert Cyan Toner (C)
Reinsert Black Toner (K)
009-360
009-361
009-362
009-363
ID error for (Y) toner cart
ID error for (M) toner cart
ID error for (C) toner cart
ID error for (K) toner cart
Replace Yellow Toner (Y)
Pull out the (Y) toner seal
Replace Magenta Toner (M)
Pull out the (M) toner seal
Replace Cyan Toner (C)
Pull out the (C) toner seal
Replace Black Toner (K)
Pull out the (K) toner seal
010-354
009-340
009-342
Clean Up CTD Sensor
Reinsert Trans Roll
Replace Transfer Roll
009-360 IOT(Y)Toner CRUM Error
009-361 IOT(M)Toner CRUM Error
009-362 IOT(C)Toner CRUM Error
009-363 IOT(K)Toner CRUM Error
010-354 IOT Hum Temp Sensor Error
009-340 IOT ADC Sensor Error
009-342 IOT Low Density Error
1 Virtual Line
2.8 XEROGRAPHICS

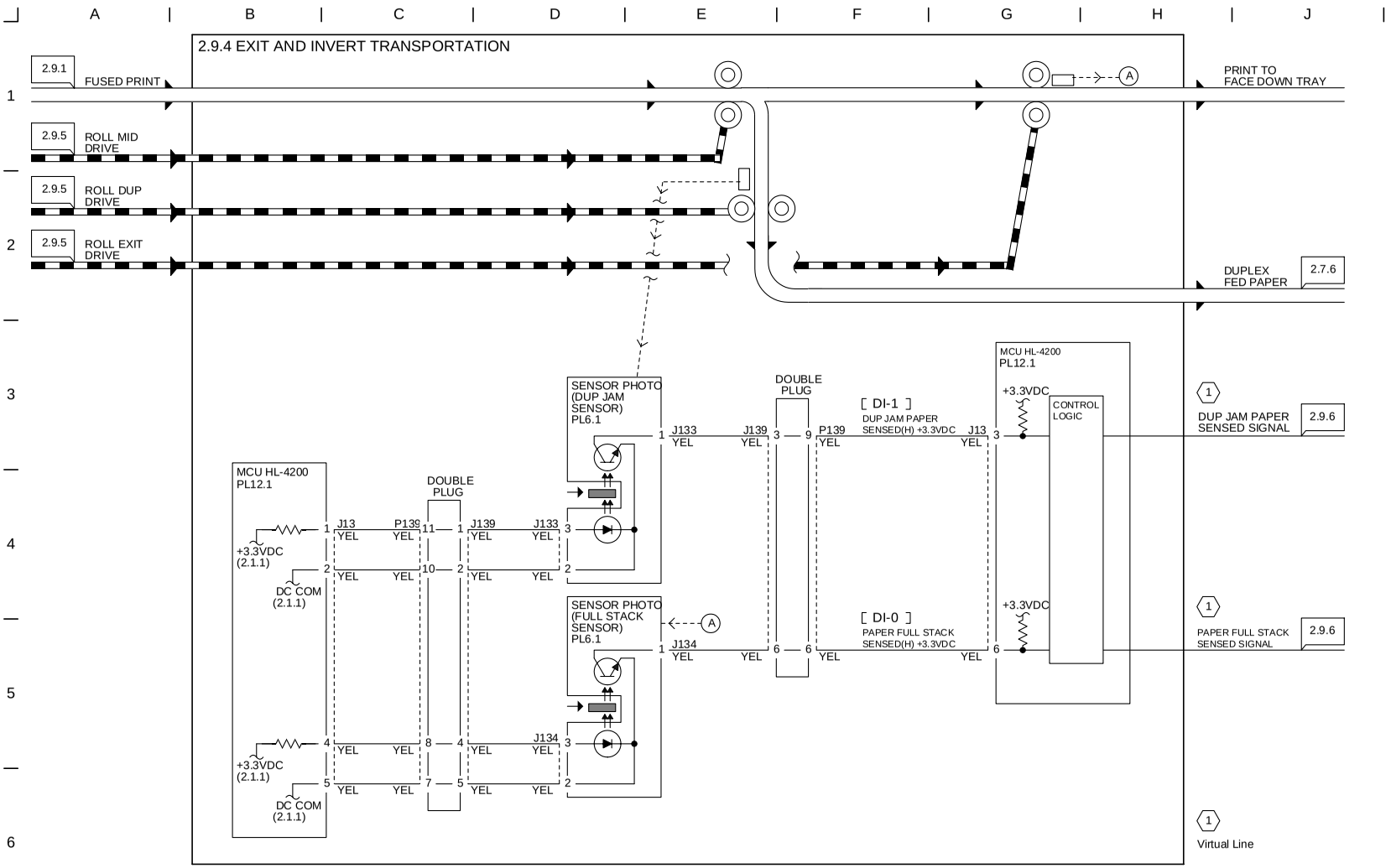

2.9.1 FUSING AND FUSER HEAT CONTROL
FUSER ASSY PL8.1
PWBA EEPROM PL10.1
FUSER EEPROM
CONNECTOR
FUSING
2.8.6 UNFUSED PRINT
2.9.2 FUSER DRIVE
ZN G1
ZN G2
ZN B1
ZN B2
HEAT AIR 2.9.3
FUSED PRINT 2.9.4
2.3.2 EEPROM DATA
2.3.2 EEPROM CLOCK
EEPROM DATA
EEPROM CLOCK
+3.3VDC (2.3.2)
DC COM (2.3.2)
MCU HL-4200 PL12.1
DOUBLE PLUG
FUSER NCS
TEMP SENSOR
EXIT SENSOR
DC COM (2.1.1)
+3.3VDC (2.1.1)
TEMP SENSOR SIGNAL
NCS_VD
NCS_VC
[DI-2]
EXIT PAPER SENSED(H)+3.3VDC
PWBA HBN DRV PL12.1
HEATER1 ON
HEATER2 ON
LVPS(100/120V) (230V) PL12.1
HEATER CONTROL
CONTROL LOGIC
100V /120V
230V
HEATER
THERMOSTAT
ACN (2.1.1)
ACL (2.1.1)
[DI-5]
FUSER READY
1 Virtual Line
2 When FUSER is READY, "L"is displayed by executing the dialog[DI-5].
FUSER NCS SIGNAL 2.9.6
TEMP SENSOR SIGNAL 2.9.6
NO FUSER SIGNAL 2.9.6
EXIT PAPER SENSED SIGNEL 2.9.6



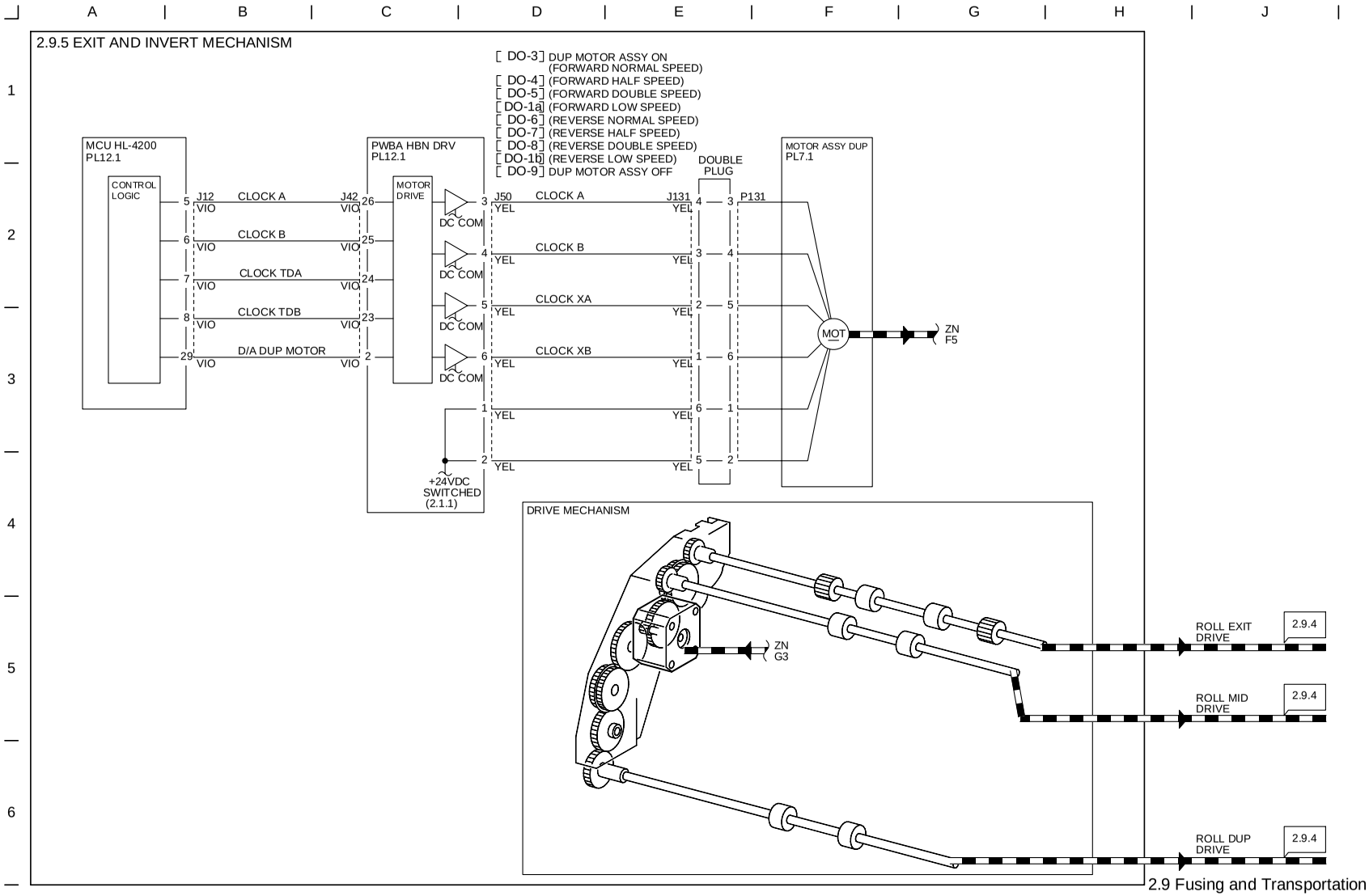
Phase	Step(3phases)					
	1	2	3	4	5	6
FUSER_U	+	+		-	-	
FUSER_V	-		+	+		-
FUSER_W		-	-		+	+

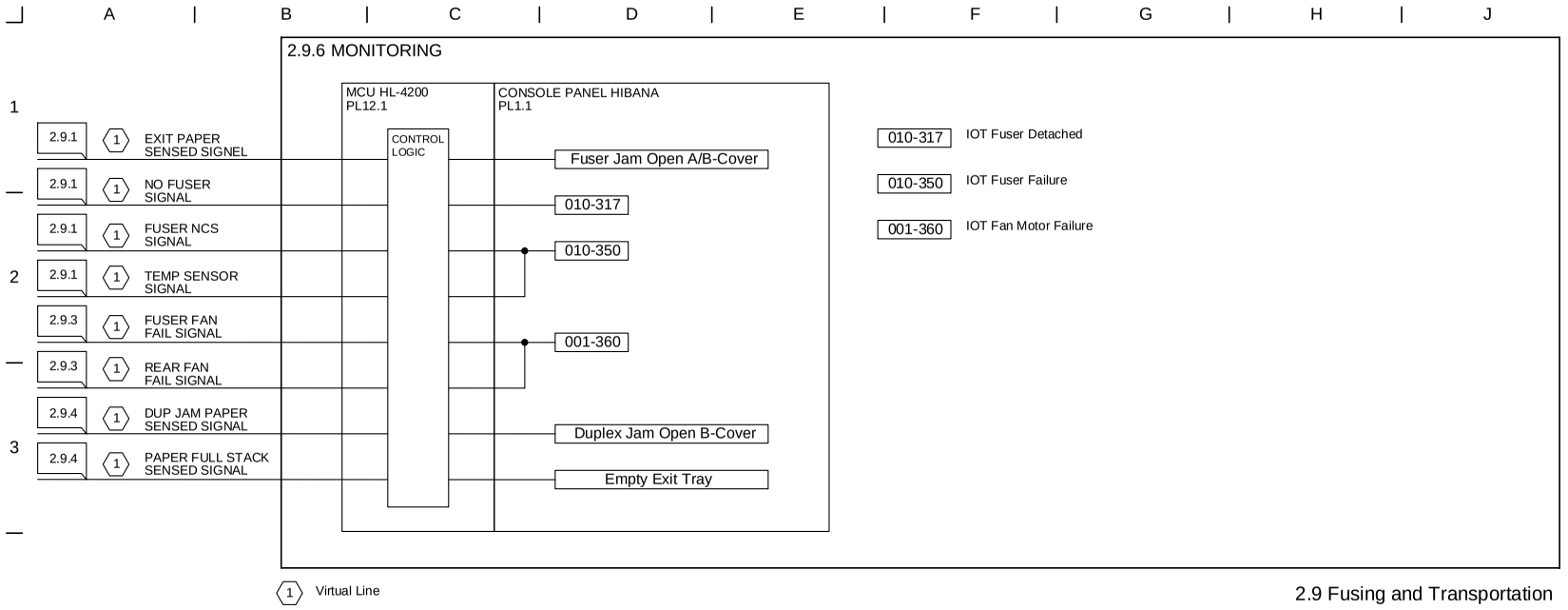


2.9 Fusing and Transportation



2.9 Fusing and Transportation


2.9.5 EXIT AND INVERT MECHANISM
[DO-3] DUP MOTOR ASSY ON (FORWARD NORMAL SPEED)
[DO-4] (FORWARD HALF SPEED)
[DO-5] (FORWARD DOUBLE SPEED)
[DO-1a] (FORWARD LOW SPEED)
[DO-6] (REVERSE NORMAL SPEED)
[DO-7] (REVERSE HALF SPEED)
[DO-8] (REVERSE DOUBLE SPEED)
[DO-1b] (REVERSE LOW SPEED)
[DO-9] DUP MOTOR ASSY OFF
MCU HL-4200
PL12.1
CONTROL LOGIC
PWBA HBN DRV
PL12.1
MOTOR DRIVE
DOUBLE PLUG
MOTOR ASSY DUP
PL7.1
CLOCK A
CLOCK B
CLOCK TDA
CLOCK TDB
D/A DUP MOTOR
CLOCK A
CLOCK B
CLOCK XA
CLOCK XB
DC COM
+24VDC SWITCHED (2.1.1)
MOT
ZN F5
DRIVE MECHANISM
ZN G3
ROLL EXIT DRIVE
ROLL MID DRIVE
ROLL DUP DRIVE
2.9.4



2.9 Fusing and Transportation

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

CONTENTS

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

1. LIST OF P/J

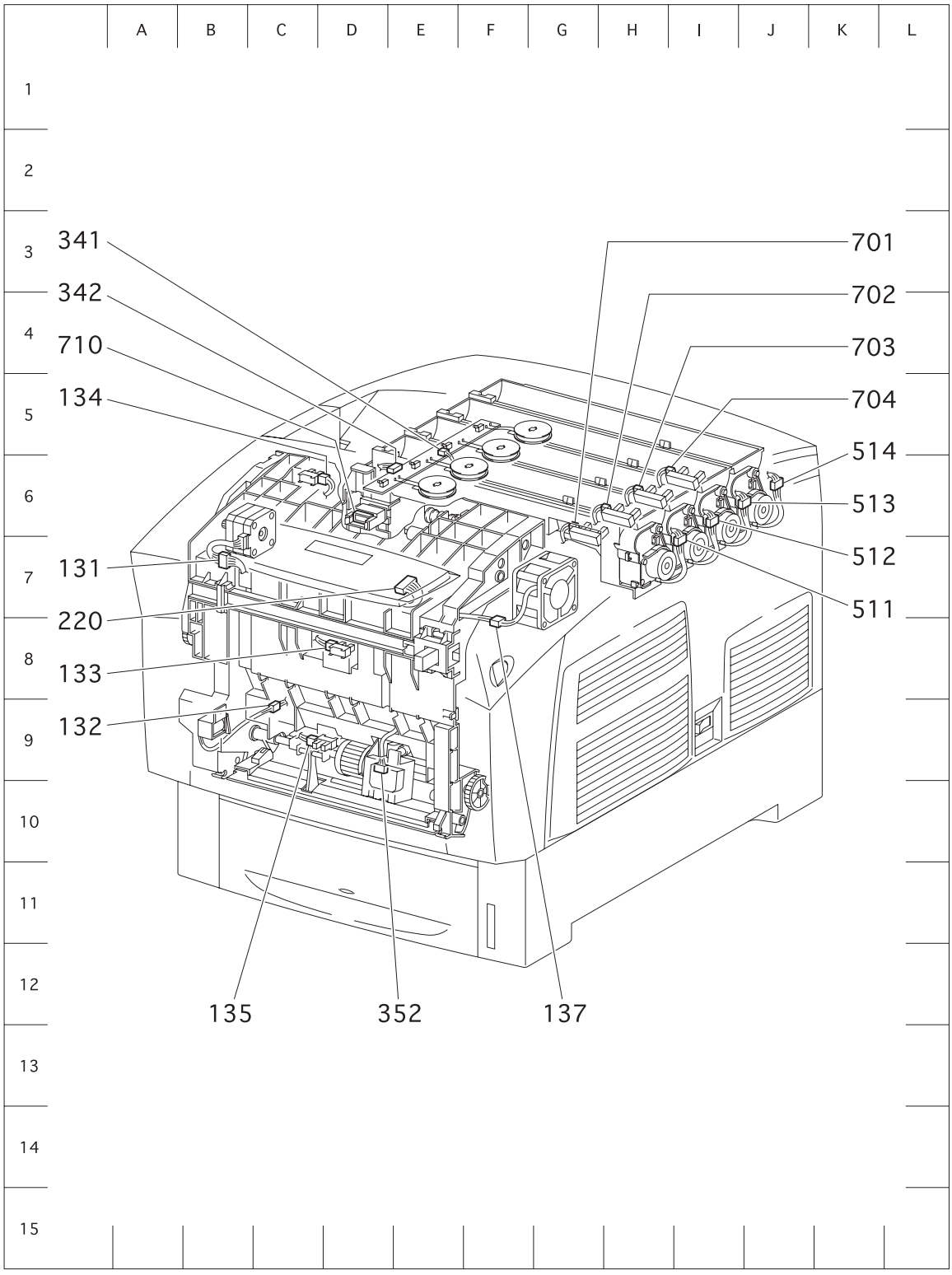
The following tables list the connector (P/J) coordiates corresponding to 2. P/J Layout Diagram.

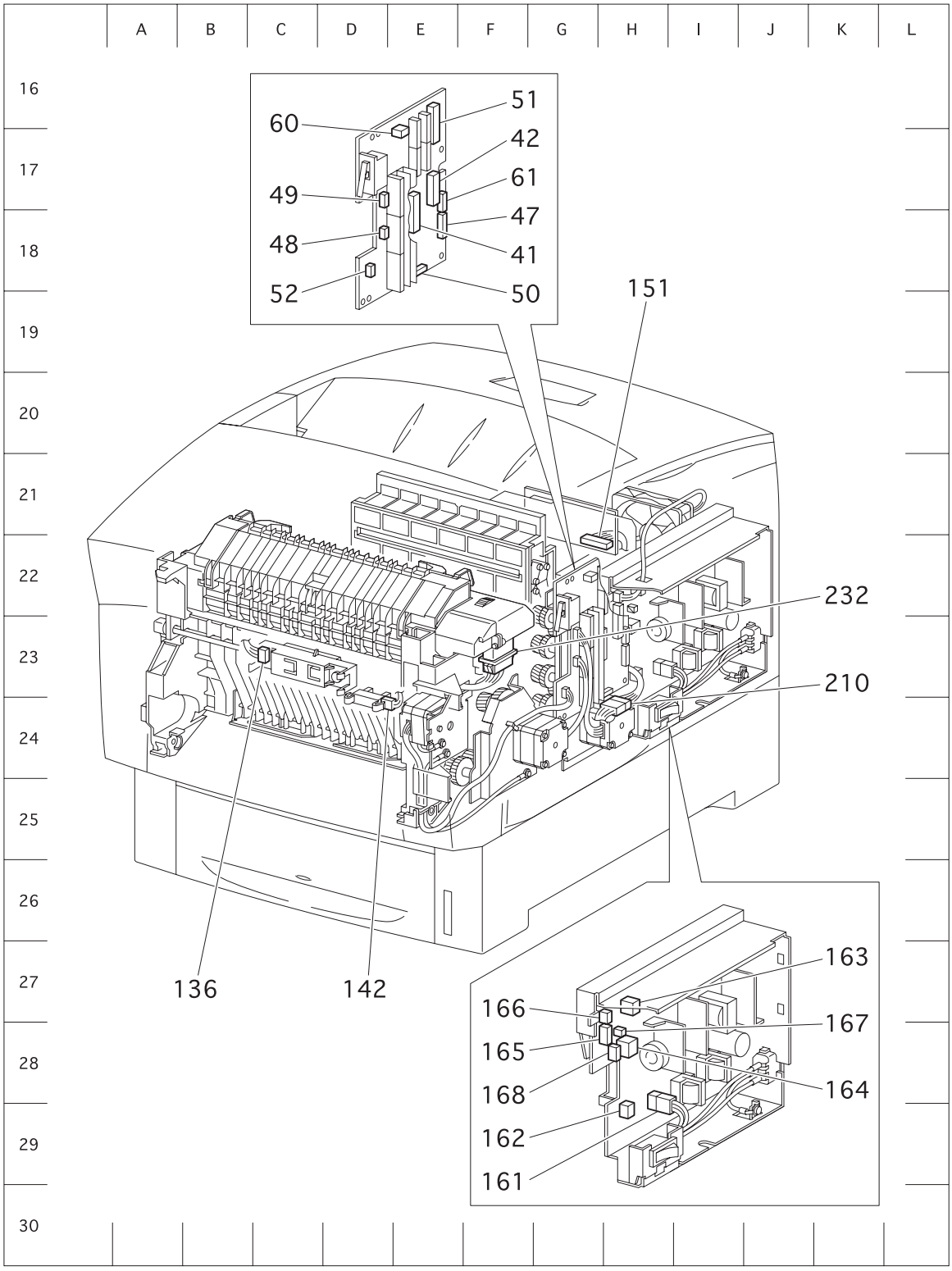
P/J	Coordiates	Remarks
1	I-37	Connects PWBA Font Card and Controller Board
11	E-43	Connects MCU HL-4200 and PWBA HBN DRV
12	E-43	Connects MCU HL-4200 and PWBA HBN DRV
13	D-43	Connects MCU HL-4200, S-HVPS, Harness ASSY FSR3C(FSR32C), Harness ASSY Front 2 and Harness ASSY CTD
14	H-37	Connects MCU HL-4200 and Controller Board
14	I-37	Connects Controller Board and PWBA Font Card
15	D-43	Connects MCU HL-4200 and Scanner ASSY
18	C-43	Connects MCU HL-4200 and REGI Chute ASSY (REGI Clutch, REGI Sensor)
19	D-44	Connects MCU HL-4200 and Housing ASSY Retard (TURN Clutch)
21	D-43	Connects MCU HL-4200 and Harness ASSY OPFREC
22	E-43	Connects MCU HL-4200 and Harness ASSY OPEPANE BS
23	E-43	Connects MCU HL-4200 and LVPS STD ASSY
24	D-43	Connects MCU HL-4200, Harness ASSY FSR3C(FSR32C) and Harness ASSY TMPA
27	H-37	Connects Controller Board and MCU HL-4200
30	D-43	Flash-write
31	F-43	Test-print
32	D-43	Connects MCU HL-4200 and OHP Sensor
33	I-43	Connects HDD BR and Controller Board
34	D-42	Connects MCU HL-4200 and Harness ASSY RFID2
34	J-43	Connects NIC EXCOPRO ASSY BR and Controller Board
35	D-43	Not Connects
41	E-18	Connects PWBA HBN DRV and MCU HL-4200
42	E-17	Connects PWBA HBN DRV and MCU HL-4200
47	E-18	Connects PWBA HBN DRV, Pick Up ASSY (No Paper Sensor, Low Paper Sensor, Solenoid Feed, Clutch ASSY Turn) and Switch ASSY Size
48	D-18	Connects PWBA HBN DRV and Drive ASSY Main
49	D-17	Connects PWBA HBN DRV and Drive ASSY DEVE
50	E-18	Connects PWBA HBN DRV, Chute ASSY Exit (Motor ASSY DUP) and Cover ASSY Front Head (Fan Fuser)
51	E-16	Connects PWBA HBN DRV, Holder Toner Cartridge ASSY (Sensor No Toner, TNR Motor) and PWBA CRUM Reader
52	D-18	Connects PWBA HBN DRV and Chute ASSY IN (Fuser Drive ASSY)
60	E-17	Connects PWBA HBN DRV and LVPS STD ASSY
61	E-17	Connects PWBA HBN DRV and LVPS STD ASSY
71	B-32	Connects Harness ASSY EEPROM and Plate ASSY Dispenser L (CONN ASSY CRUM MC)
131	B-7	Connects Chute ASSY Exit (Motor ASSY DUP) and PWBA HBN DRV

P/J	Coordiates	Remarks
132	C-9	Connects Chute ASSY Out (Solenoid Feed MSI) and Harness ASSY Front 1A
133	D-8	Connects Chute ASSY Out (DUP JAM Sensor) and Harness ASSY Front 1A
134	D-6	Connects Chute ASSY Out (Full Stack Sensor) and Harness ASSY Front 1A
135	C-9	Connects Chute ASSY Out (MSI No Paper Sensor) and Harness ASSY Front 1A
136	C-23	Connects Front ASSY In (ADC Sensor ASSY) and Front 1A Harness ASSY
137	F-8	Connects Cover ASSY Front Head (Fan Fuser) and PWBA HBN DRV
138	B-32	Connects Harness ASSY Front 1A and Fuser ASSY
139	B-33	Connects Harness ASSY Front 1A and Chute ASSY Out (Solenoid Feed MSI, DUP JAM Sensor, Full Stack Sensor, MSI No Paper Sensor)
140	D-43	Connects MCU HL-4200, Harness ASSY CRUM, Harness ASSY TFLSNS and PWBA EEPROM STD
141	B-32	Connects Harness ASSY EEPROM and Chute ASSY In (Sensor TNR Full)
142	E-24	Connects Chute ASSY In (Sensor TNR Full) and Harness ASSY EEPROM
144	E-35	Connects PWBA EEPROM STD and MCU HL-4200
145	E-35	Not Connects
151	H-22	Connects Scanner ASSY and MCU HL-4200
161	H-29	Connects LVPS STD ASSY and Power Cord
162	H-29	Connects LVPS STD ASSY and Fuser ASSY
163	H-27	Connects LVPS STD ASSY and PWBA HBN DRV
164	H-28	Connects LVPS STD ASSY and MCU HL-4200
165	H-28	Connects LVPS STD ASSY and PWBA HBN DRV
166	H-27	Connects LVPS STD ASSY and Fan
167	H-28	Connects LVPS STD ASSY and MCU HL-4200
168	H-28	Not Connects
181	E-38	Connects REGI Chute ASSY (REGI Sensor) and MCU HL-4200
210	H-24	Connects Harness ASSY OPF Main and Option Feeder
220	E-7	Connects Console Panel HIBANA and Harness ASSY OPEPANE AS
221	B-33	Connects Harness ASSY OPEPANE AS and Console Panel HIBANA
231	D-52	Connects Sensor HUM Temp and Harness ASSY TMPNCS
232	F-23	Connects Fuser ASSY, LVPS STD ASSY, Harness ASSY Front 1A and Harness ASSY TMPNCS
311	D-42	Connects MCU HL-4200 and LVPS STD ASSY
341	E-5	Connects PWBA CRUM Reader and Harness ASSY RFID
342	E-6	Connects PWBA CRUM Reader and PWBA HBN DRV
351	E-36	Not Connects
352	D-9	Not Connects
471	I-53	Connects Switch ASSY Size and PWBA HBN DRV
472	F-53	Connects No Paper Sensor and PWBA HBN DRV
473	F-54	Connects Low Paper Sensor and PWBA HBN DRV

P/J	Coordiates	Remarks
474	G-54	Connects Solenoid Feed and PWBA HBN DRV
475	H-53	Connects Clutch ASSY Turn and PWBA HBN DRV
511	I-7	Connects Holder ASSY MQ-Y (TNR Motor) and PWBA HBN DRV
512	I-6	Connects Holder ASSY MQ-M (TNR Motor) and PWBA HBN DRV
513	J-6	Connects Holder ASSY MQ-C (TNR Motor) and PWBA HBN DRV
514	J-6	Connects Holder ASSY MQ-K (TNR Motor) and PWBA HBN DRV
701	G-6	Connects Holder ASSY MQ-Y (Sensor No Toner) and PWBA HBN DRV
702	H-6	Connects Holder ASSY MQ-M (Sensor No Toner) and PWBA HBN DRV
703	H-6	Connects Holder ASSY MQ-C (Sensor No Toner) and PWBA HBN DRV
704	H-6	Connects Holder ASSY MQ-K (Sensor No Toner) and PWBA HBN DRV
710	D-6	Connects Plate ASSY Dispenser L (CONN ASSY CRUM MC) and Harness ASSY EEPROM
810	H-54	Connects Option Feeder and MCU HL-4200
1361	B-32	Connects Harness ASSY Front 1A and Chute ASSY In (ADC Sensor ASSY)
2361	E-37	Connects Harness ASSY TMPNCS and Sensor HUM Temp
2362	E-36	Connects Harness ASSY TMPNCS and Fuser ASSY
3411	G-36	Connects Harness ASSY RFID and PWBA CRUM Reader
5011	F-35	Connects S-HVPS and MCU HL-4200
5020	E-35	Connects S-HVPS and Chute ASSY In
5030	E-35	Connects S-HVPS and Chute ASSY In

2. P/J LAYOUT DIAGRAM

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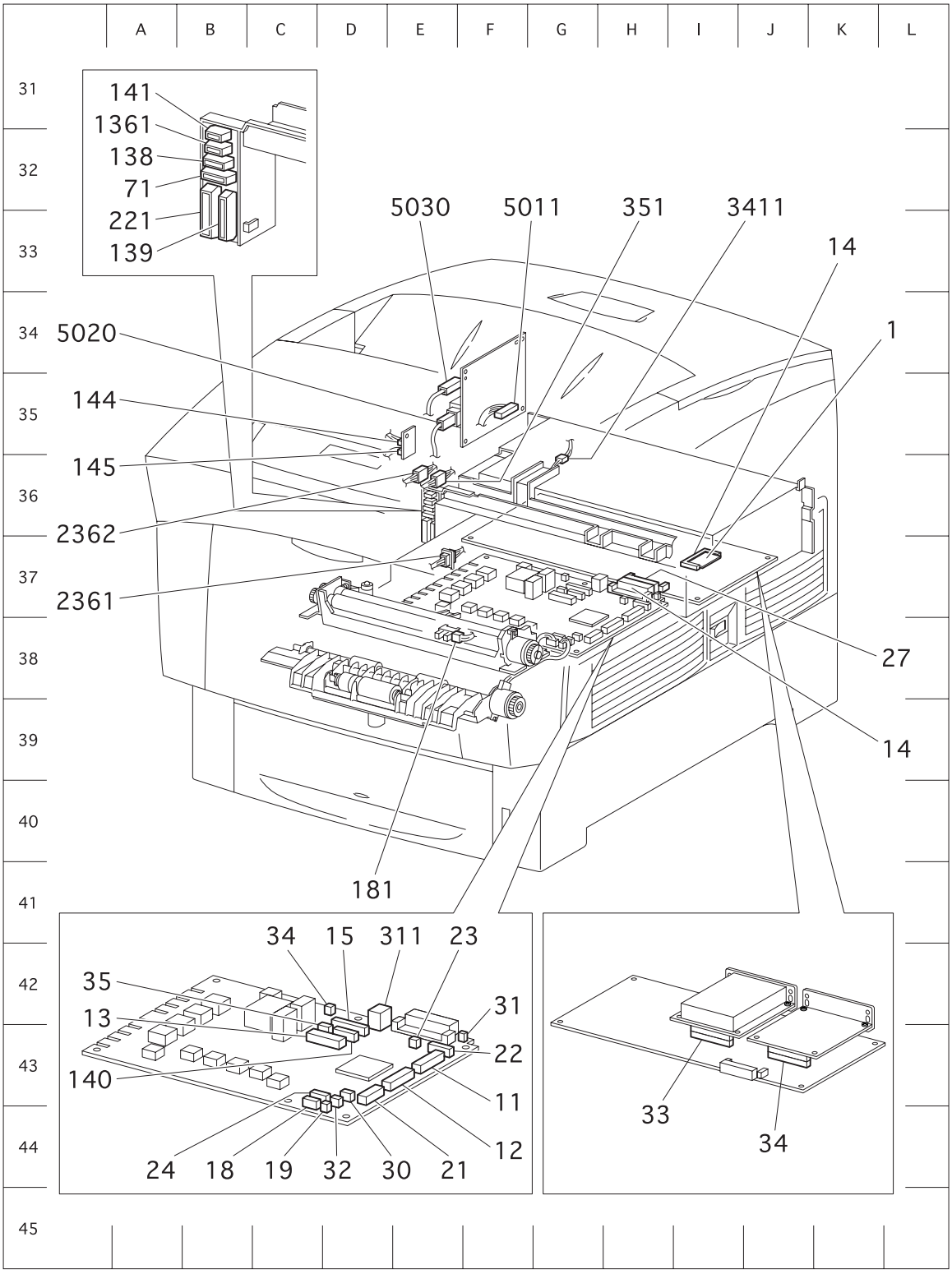
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141
1361
138
71
221
139
5030
5011
351
3411
14
1
5020
144
145
2362
2361
27
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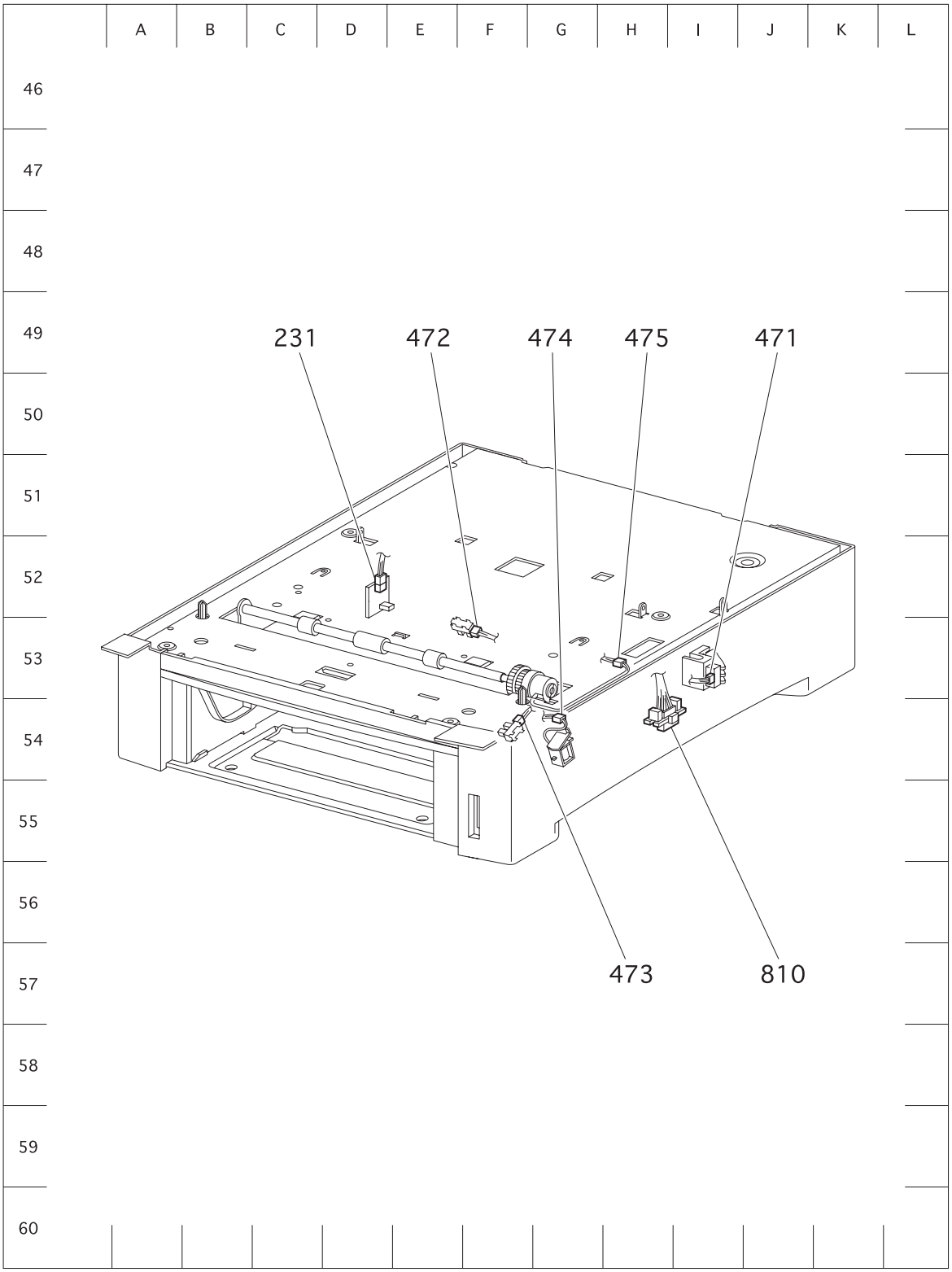
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472
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473
810

APPENDIX

CONTENTS

APPENDIX 1

1.1 When PCB is replaced

The information below is stored in NV-RAM (EEPROM) on ESS.

If necessary, transfer the data to a new PCB.

- U8 (Part number)
  1. Data set with Control Panel
  2. NV-RAM data on MCU that is saved manually
  3. Error Log
  4. Jam Log
  5. Billing Counter
- U9 (Part number)

  The information stored is specific to the Controller Board, therefore, the information cannot be used for the new PCB.
- U7/U38 (Part number)

  Job Log is stored, however, the Job Log cannot be transferred to the new PCB because it is surface-mounted.

- The Network setting data is stored in EEPROM on NIC EXCORD ASSY. Use the same NIC EXCORD ASSY if you want to keep the same Network setting.

1.1.1 When Controller Board (ESS) is replaced

- Take the EEPROM (U8) out of the Controller Board, then put it in the new U8 on Controller Board.
- Take out the NIC EXCORD ASSY, then put it on the new Controller Board.

1.1.2 When MCU PWBA is replaced

When you replace MCU PWBA, you must temporary save NV-RAM data in EEPROM of Controller Board.

1. Turn the power on while pressing the [↑] and [↓] buttons together.
2. Enter the password.
   (Password; Press the [↓] button twice and Form Feed/Set button).
3. Select [CE Maintenance / IOT Diag] with the [↑] and [↓] button, and press the [Set] button.
4. Select [IOT Diag / Digital Input] with the [↑] or [↓] button and press the [Set] button.
5. Select [NVM Settings / NVM Save] and press the [Set] button.
6. Press the [Set] button to copy the MCU NV-RAM data to ESS NV-RAM.
7. Replace the MCU PWBA.
8. Turn the power on while pressing [↑] and [↓] buttons together.
9. Enter the password.
   (Password; Press the [↓] button twice and the [Form Feed/Set] button).
10. Select [CE Maintenance / IOT Diag] with the [↑] or [↓] button, and press the [Set] button.
11. Select [IOT Diag / Digital Input] with [↑] or [↓] button and press the [Set] button.
12. Select [NVM Settings / NVM Load] and press the [Set] button.
13. Press the [Set] button to copy the original MCU NV-RAM data to the new MCU NV-RAM.

1.2 Controller Firmware upgrade

- All PCBs are supplied with Firmware written in, however, if there is a problem, you can upgrade PCBs with the following procedures:
- The following Firmware can be upgraded with the On-demand Downloader

- Controller firmware
- NIC Boot program (DIP SW (JP2) of NIC card must be ON.)
- NIC Firmware

- The following Firmware must be written in Download mode

- Controller Boot program
- MCU NVM / Firmware

- Setting up PC

1. Install the printer driver.
2. Install Filedg32 and Firmware (e.g.: hibana.dlb, Hbn1_01_01.dlb) in C:¥HL4200.

1.2.1 Controller Firmware / NIC Boot program / NIC Firmware upgrade

- Setting up On-demand Downloader
  1. Use the [Menu] button to put the machine off line mode.
  2. Select [Menu / 2:Maintenance] by pressing the [↓] button, then press the [Set] button.
  3. Select [2:Maintenance / F/W Download] by pressing the [↓] button.
  4. Press the [Set] button. [F/W Download / Reject*] is displayed.
  5. Press the [↓] button to change it to [F/W Download / Accept], then press the [Set] button.
- Upgrading Firmware
  1. Connect the PC and printer with a parallel cable.
  2. Turn on the printer, then turn on the PC.
  3. Execute Fildg32.
  4. Drag and drop firmware file from C:\HL4200 folder to HL4200 printer icon.
  5. Turn off the printer.

1.2.2 Controller Boot program / MCU NVM / MCU Firmware upgrade

- Upgrading Firmware
  1. Connect the PC and printer with a parallel cable.
  2. Turn on the printer while pressing the [Menu] and [Job Cancel] buttons. (For Controller Boot program, press [Menu], [Job Cancel], and [↑] buttons.)
  3. Turn on the PC.
  4. Execute Fildg32.
  5. Drag and drop firmware file from C:\HL4200 folder to HL4200 printer icon.
  6. The printer is automatically rebooted when the writing procedure is finished.

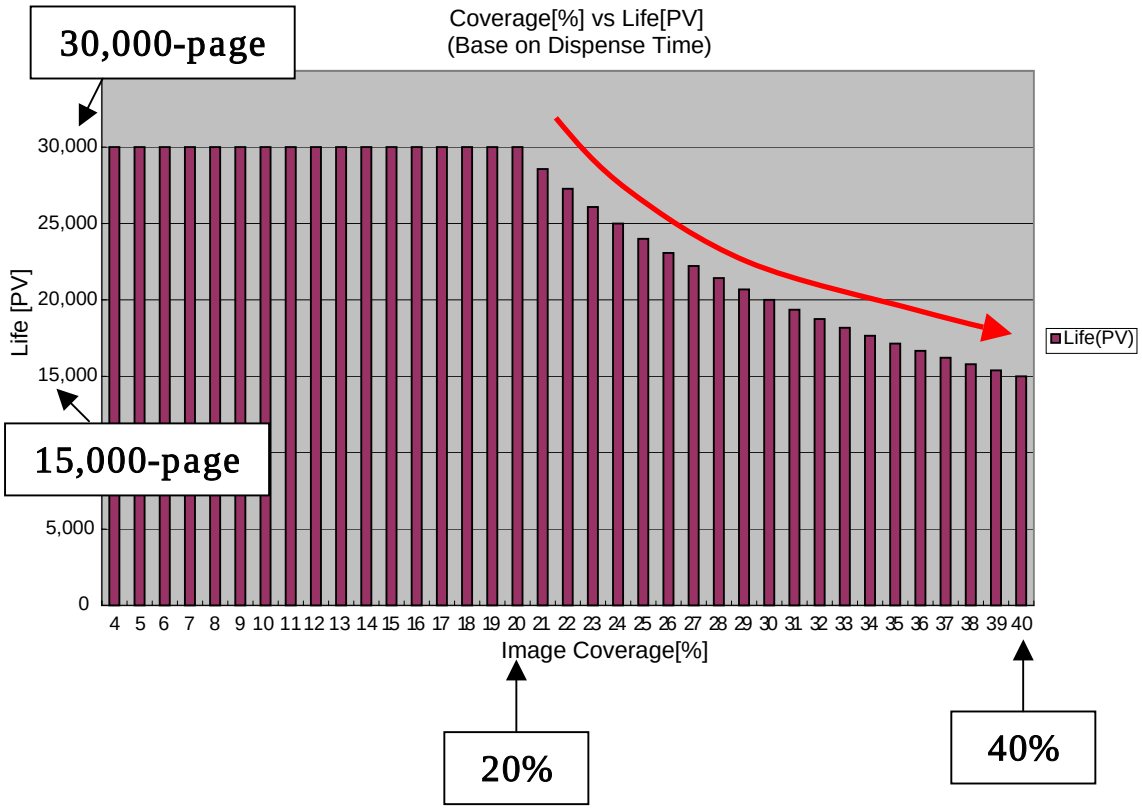
APPENDIX 2 CONSUMABLES REPLACEMENT

Printhead Unit

The life is 30,000-page (@ C:5%, M:5%,Y:5% , K:5%). The life will change by “Coverage” and “Job”.

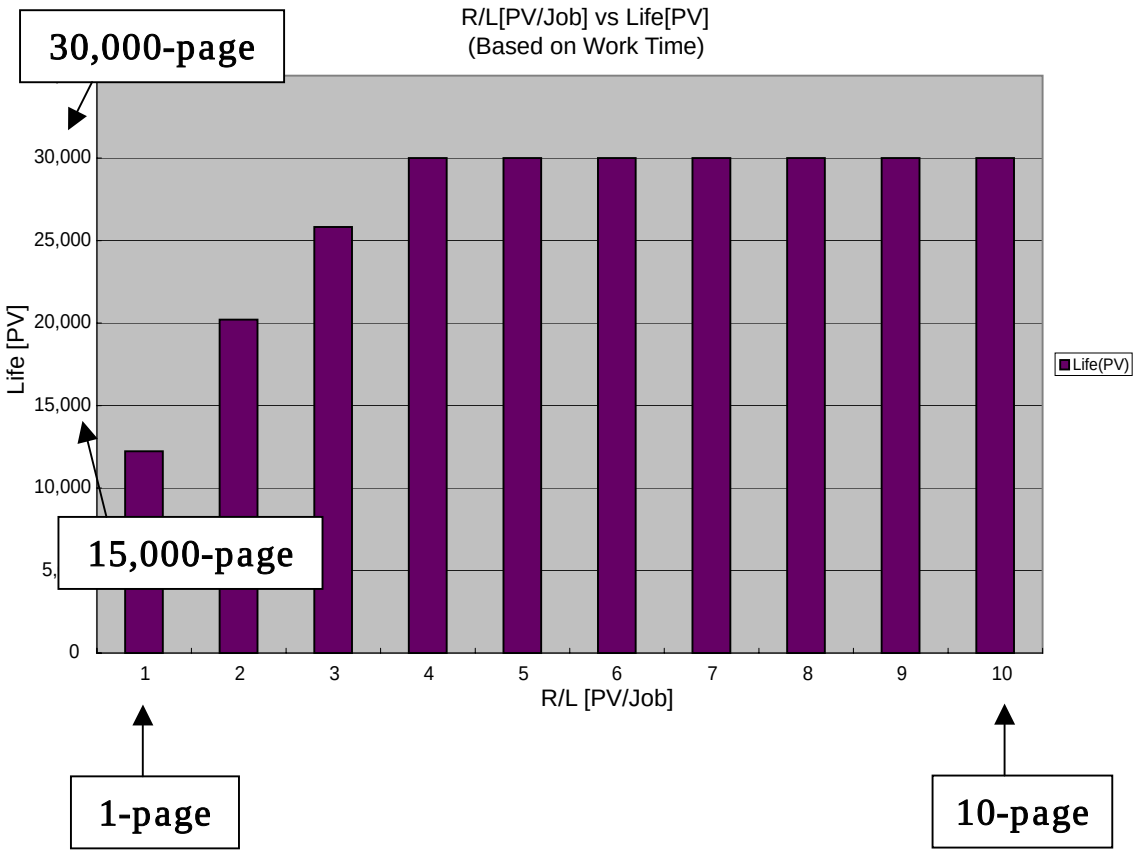
1.Coverage

If the print coverage increased, the life decreases as below.



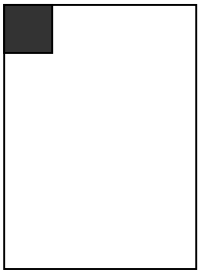
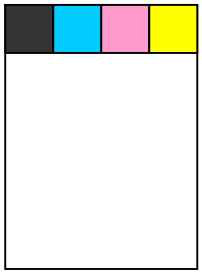
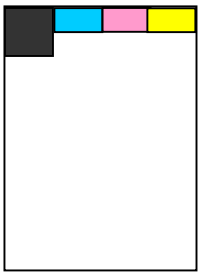
2.Job

If each print job increased, the life increases as below.



TR-11CL

The life is 25,000-page (by printing BW document and Full color document 50%:50%.). The detail is as follows.

The life will be 25,000-page when Printing 5% coverage BW document for 12,500-page Printing 20% coverage (C:5%, M:5%, Y:5%, BK:5%) for 12,500-page	 Mono: 5% bk  Full color: 20% 5% each
Above situation is same as the situation below. Printing 12.5% (C:2.5%, M:2.5%, Y:2.5%, BK: 5%) for 25,000-page	 Full color: 12.5% C:2.5%, M:2.5%, Y:2.5%, BK: 5%

The life will change when the coverage becomes high

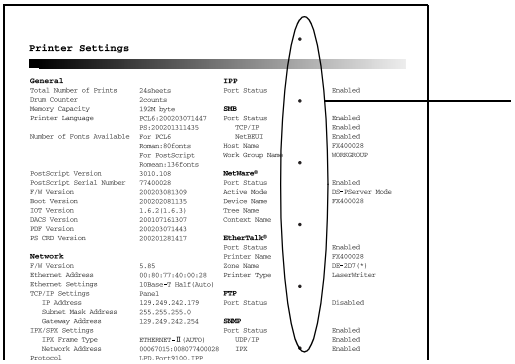
Total Coverage	BW (%)	Full Color each (%)	Life k(p/v)
12.5	**5**	**5**	**29.4**
15	6	6	**28.4**
17.5	7	7	**27.6**
20	8	8	**26.8**
22.5	9	9	**26.0**
25	10	10	**25.3**
27.5	11	11	**24.6**
30	12	12	**24.0**
32.5	13	13	**23.4**
35	14	14	**22.8**
37.5	15	15	**22.2**
40	16	16	**21.7**

We say this value as 25,000-page by taking some margin

The actual life is over than catalog specification. But as you may know, we are including some margin.

Print Head Cartridge Cleaning Kit User Guide

Thank you for choosing this product.
If your printer is printing colored dots at regular intervals like in the diagram below, use the cleaning kit to clean the print head cartridge.



Handling Precautions

■Attention during cleaning

- Do not use this cleaning kit except for cleaning.
- No printing during the cleaning. Errors may occur if you print while the cleaning kit is attached.

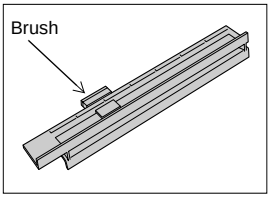
■Handling the print head cartridge

- Handle the print head cartridge with care; it weighs 4.5 kg.
- Do not expose the print head cartridge to light for a prolonged time. The print head cartridge may be deteriorated.

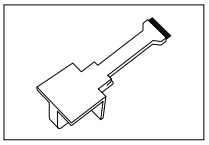
■Handling the cleaning kit

- Make sure the cleaning brush is not directly touching an object during storage.
- Avoid dust / grime on the cleaning kit (esp. the brush) as much as possible. Clean the tip of the brush with the cleaner provided if it gets dusty or dirty.

Cleaning Kit



Brush cleaner

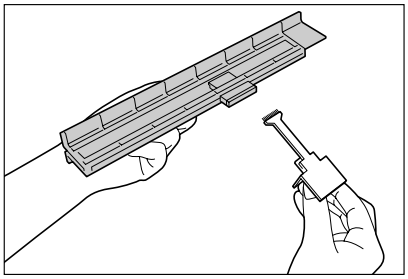


How to clean the print head cartridge

Attach this cleaning kit to the printer so the brush directly brushes the dirty parts of the print head cartridge. Follow the following procedures.

Lining up the brush with the dirty part of the print head cartridge

1 Remove the dust and dirt from the brush part of the cleaning kit with the brush cleaner provided.

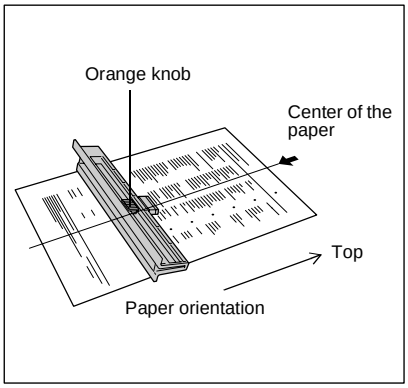


2 Place the print sample (single sided print samples) on which colored dots were printed face up on a desk.

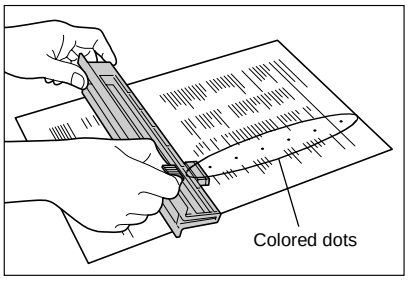
Note

If you don't have a sample, print out the printer settings list. Refer to the last page of the " Printing the printer settings list".

3 Put the cleaning kit on the print sample, matching the center of the cleaning kit to the center of the print sample.

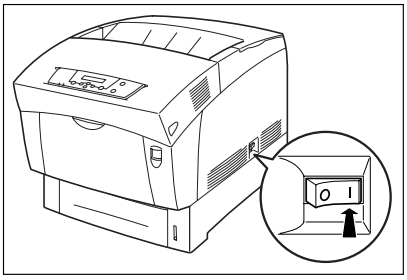


4 While lightly holding the cleaning kit with one hand, move the orange knob, and then align the brush with the colored dot.

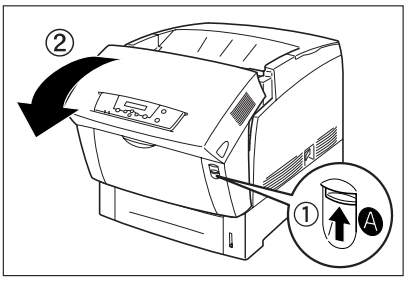


Attaching the cleaning kit to clean the print head cartridge

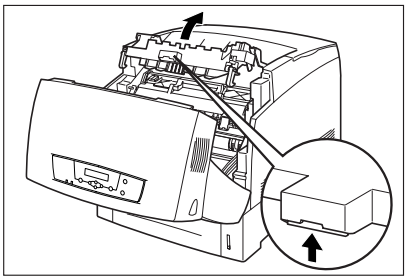
1 Turn on the printer.



2 Push up button A (1) and fully open the front door (2).

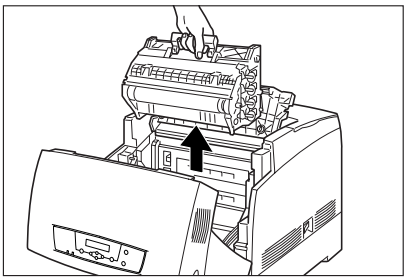


3 Push the button as shown and open the paper outlet cover.



4 Grip the handle on top of the print head cartridge and gently lift it out of the printer.

Place the print head cartridge on a level surface with its back facing you.



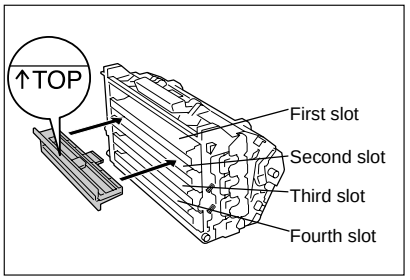
5 Holding the cleaning kit with the "↑TOP" facing up, slowly insert it into the print head cartridge.

Note that you need to insert the cleaning kit into different slots depending on the color of the dots.

Magenta: Second slot (shown in the diagram at right)

Cyan: Third slot

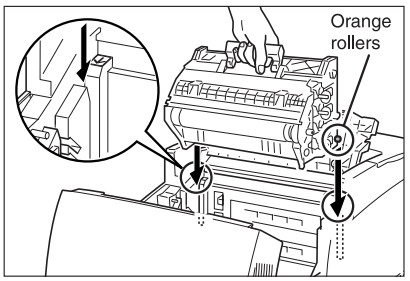
Black: Fourth slot



6 Align the orange rollers on the inner side of the print head cartridge with the slots in front of the arrows inside the printer, and slowly lower it into the printer.

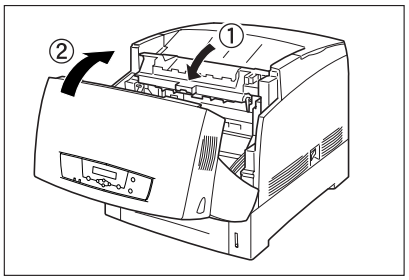
LOOK

If the slot and the rollers are not completely aligned then the print head cartridge may be damaged when it is lowered into the printer.



7 Close the paper outlet cover (1), and then close the front door (2).

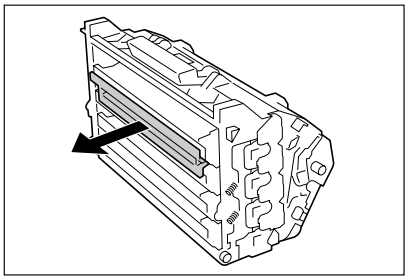
Display will show "Please Wait." The printer will automatically operate to clean the print head cartridge. It'll take about 20 sec. to 2 min.



8 The message changes to "Ready to Print," and the sound of the printer motor stops, go to steps 2 through 4 to remove the print head cartridge. And then carefully remove the cleaning kit.

LOOK

Printing while the cleaning kit is attached may result in poor print quality or may damage the printer.



9 Following instructions in step 6 through 7, replace the print head cartridge into the printer.

10 When the message changes to "Ready to Print," print the printer settings list to check whether the colored dots still appear.

If the dots still appear after the cleaning, please replace the print head cartridge.

Printing the printer settings list

Use the operation panel to print the printer settings list.

1 Press the <Menu> button while "Ready to print" is displayed (in the print screen).

The menu screen is displayed.

2 Press the <▼> button three times to display "4 Report/List".

3 Press the <Set/Eject> button or the <►> button.

4 Check that "Printer Settings" is displayed, and then press the <Set/Eject> button.

5 Press the <Set/Eject> button again.

The printer settings list is printed. When printing is finished, the print screen is displayed again.

APPENDIX 4 MEASURE OF TONER CARTRIDGE WEIGHT

Toner Cartridge Weight (approximate weight)

	Yellow	Magenta	Cyan	Black
Brand new Toner Cartridge Weight	315g ± 1 0g	325g ± 1 0g	315g ± 1 0g	360g ± 1 0g
Toner Weight at Brand new Toner Cartridge	110g	120g	110g	155g
Toner Cartridge Weight at Toner Empty	217g	217g	217g	217g
Remain Toner Weight at Toner Empty	10g	10g	10g	10g
You can print 500 to 600 pages with 10g Toner.				

NOTE: Toner Cartridge Weight and Remain Toner Weight while may vary depending on the printing condition when the printer displays "Toner Empty".

APPENDIX 5 PERIODICAL REPLACEMENT PARTS

Periodical replacement parts are the parts to be replaced periodically to maintain product quality. These parts would affect the product quality greatly if they lost their function even if they do not appear to be damaged or there is no change in their appearance.

Part number	Description	LCD Message	Approximate Life *1	Replacement Procedure
TN-12BK	Black toner cartridge	Replace Black Toner	Up to 9,000 pages	---
TN-12Y	Yellow toner cartridge	Replace Yellow Toner	Up to 6,000 pages	---
TN-12M	Magenta toner cartridge	Replace Magenta Toner	Up to 6,000 pages	---
TN-12C	Cyan toner cartridge	Replace Cyan Toner	Up to 6,000 pages	---
PH-12CL	Print head <PHD> cartridge	Replace Print Head Cartridge	Up to 30,000 pages	---
TR-12CL	Transfer roll <BTR> cartridge	Replace Transfer Roll	Up to 25,000 pages	See subsection 1.2 in Chapter 4
FP-12CL	FUSER ASSY	Replace Fuser Cartridge	Up to 100,000 pages	See subsection 1.1 in Chapter 4
LJ3998001	ROLL ASSY RETARD	---	Up to 100,000 pages	See subsection 2.3.32 in Chapter 4
LM0234001	FEED ROLL ASSY FEED MSI	---	Up to 45,000 pages	See subsection 2.3.11 in Chapter 4
LM0018001	ROLL ASSY RETARD MSI	---	Up to 45,000 pages	See subsection 2.3.32 in Chapter 4
LM0258001	CHUTE REGI ASSY	---	Up to 300,000 pages	See subsection 2.3.25 in Chapter 4
LM0009001	ROLL ASSY FEED	---	Up to 300,000 pages	See subsection 2.6.6 in Chapter 4
LM0165001	TURN ROLL BEARING METAL	---	Up to 300,000 pages	See subsection 2.6.12 in Chapter 4
LM0001001	CHUTE ASSY TURN	---	Up to 300,000 pages	See subsection 2.6.1 in Chapter 4

Note:

** A4 or Letter-size single-sided pages at about 5% coverage. The actual number of printed pages may vary depending on the print jobs and paper you use.*

** Replacement life when converting with utilization ratio CST (Paper Cassette) 85% and MSI (Multi Sheet Inserter) 15%.*