PagePro 4100E/GN/W

Service Manual

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MINOLTA QMS

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Safety Precautions for Inspection and Service

When performing inspection and service procedures, observe the following precautions to prevent accidents and ensure the utmost safety.

*Depending on the model, some of the precautions given on the following pages do not apply.

Different markings are used to denote specific meanings as detailed below.

WARNING Indicates a potentially hazardous situation, which if not avoided could result in death or serious injury.

CAUTION Indicates a potentially hazardous situation, which if not avoided may result in minor or moderate injury. It is also used to alert against unsafe practices.

The following graphic symbols are used to give instructions that need to be observed.

Used to call the service engineer attention to what is graphically represented inside the marking (including a warning).

Used to prohibit the service engineer from doing what is graphically represented inside the marking.

Used to instruct the service engineer to do what is graphically represented inside the marking.

WARNING

1.Always observe precautions.

- Parts requiring special attention in this product will include a label containing the mark shown on the left plus precautionary notes. Be sure to observe the precautions.
- Be sure to observe the “Safety Information” given in Operator’s Manual.

2.Before starting the procedures, be sure to unplug the power cord.

- This product contains a high-voltage unit and a circuit with a large current capacity that can cause an electric shock or burn.
- The product also contains parts that can jerk suddenly and cause injure.
- This product uses a laser. Laser beam leakage may cause eye damage or blindness.

3.Use the specified parts.

- For replacement parts, always use the genuine parts specified in the manufacturer's Parts Manual. Installing a wrong or unauthorized part could cause dielectric breakdown, overload, or undermine safety devices resulting in possible electric shock or fire.
- Replace a blown electrical fuse or thermal fuse with its corresponding genuine part specified in the manufacturer's Parts Manual. Installing a fuse of a different make or rating could lead to a possible fire. If a thermal fuse blows frequently, the temperature control system is probably the cause, and action must be taken to eliminate the problem.

4.Handle the power cord with care and never use a multiple socket.

- Do not break, crush or otherwise damage the power cord. Placing a heavy object on the power cord, or pulling or bending it may damage it, resulting in a possible fire or electric shock.
- Do not use a multiple outlet to which any other appliances or machines are connected.
- Be sure the power outlet meets or exceeds the specified capacity.

5.Be careful about the high-voltage parts.

- A part marked with the symbol shown on the left carries a high voltage. Touching it could result in an electric shock or burn. Be sure to unplug the power cord before servicing this part or the parts near it.

6.Do not keep your hands wet when performing the procedures.

- Do not unplug or plug in the power cord, or perform any kind of service or inspection with wet hands. Doing so could result in an electric shock.

7.Do not touch a high-temperature part.

- A part marked with the symbol shown on the left and other parts such as the exposure lamp and fusing roller can be very hot while the machine is energized. Touching them may result in a burn.
- Wait until these parts have cooled down before replacing them or any surrounding parts.

8.Make a ground connection at all times (This item may not be effected in the USA).

- Be sure to connect a ground wire to the ground terminal even when performing an inspection or repair. Without proper grounding, electrical leakage could result in an electric shock or fire.
- Never connect the ground wire to a gas pipe, water pipe, telephone ground wire, or a lightning conductor.

9.Do not modify the product.

- Modifying this product in a manner not authorized by the manufacturer may result in a fire or electric shock. If this product uses a laser, laser beam leakage may cause eye damage or blindness.

10.Restore all parts and harnesses to their original positions.

- To ensure safety and prevent product damage, make sure the harnesses are returned to their original positions and properly secured in their clamps and saddles in order to avoid hot parts, high-voltage parts, and sharp edges, or being crushed.
- To ensure safety, make sure that all tubing and other insulating materials are returned to their original positions. Make sure that floating components mounted on the circuit boards are at their correct distance and position off the boards.

 CAUTION

1.Precautions for Service Jobs

- A toothed washer and spring washer were originally used, they must be reinstalled. Omitting them may result in contact failure which could cause an electric shock or fire.
- When reassembling parts, make sure that the correct screws (size, type) are used in the correct places. Using the wrong screw could lead to stripped threads, poorly secured parts, poor insulating or grounding, and result in a malfunction, electric shock or injury.

- Take great care to avoid personal injury from possible burrs and sharp edges on the parts, frames and chassis of this product.
- When moving the product or removing an option, use care not to injure your back or allow your hands to be caught in mechanisms.

2.Precautions for Servicing with Covers and Parts Removed

- Wherever possible keep all parts and covers mounted when energizing the product.
- If energizing the product with a cover removed is absolutely unavoidable, do not touch any exposed live parts and use care not to allow your clothing to be caught in the moving parts. Never leave a product in this condition unattended.
- Never place disassembled parts or a container of liquid near opened areas of the product. Product parts falling into, or the liquid spilling inside the mechanism could result in an electric shock or fire.
- Never use a flammable spray near the product. This could result in a fire.

- Make sure the power cord is unplugged before removing or installing circuit boards or plugging in or unplugging connectors.
- Always use the interlock switch actuating jig to actuate an interlock switch when a cover is opened or removed. The use of folded paper or some other object may damage the interlock switch mechanism, possibly resulting in an electric shock, injury or blindness.

3.Precautions for Working Environment

- The product must be placed on a flat, level surface that is stable and secure.
- Never place this product or its parts on an unsteady or tilting workbench when servicing.
- Provide good ventilation at regular intervals if a service job must be done in a confined space for a long period time.
- Avoid dusty locations and places exposed to oil mist or steam.
- Avoid working positions that may block the ventilation port of the product.

4.Precautions for Handling Batteries

- Replace a rundown battery with the same type as specified in the manufacturer's parts manual.
- Before installing a new battery, make sure of the correct polarity of the installation or the battery could burst.
- Dispose of used batteries according to the local regulations. Never dispose of them at the user's premises or attempt to try to discharge one.

5.Precautions for Laser Beam (Products Employing Laser Only)

- Removing the cover marked with the following caution label could lead to possible exposure to the laser beam, resulting in eye damage or blindness. Be sure to unplug the power cord before removing this cover.
- If removing this cover while the power is ON is unavoidable, be sure to wear protective laser goggles that meet specifications.
- Make sure that no one enters the room when the machine is in this condition.
- When handling the laser unit, observe the "Precautions for Handling Laser Equipment."

注意–	ここを開くと不可視レーザ光が出ます。ビームを直接見たり、触れたりしないでください。
CAUTION–	INVISIBLE LASER RADIATION WHEN OPEN AVOID EXPOSURE TO BEAM
VORSICHT–	UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET NICHT DEM STRAHL AUSSETZEN
ADVARSEL–	USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGÅ EKSPONERING FOR STRÅLEN
VARO !	AVATTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE ÄLÄ KATSO SÄTEESEEN
ADVARSEL–	USYNLIG LASERSTRÅLING VED ÅBNING UNDGÅ UDSÆTTELSE FOR STRÅLING
VARNING–	OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD STRÅLEN ÄR FARLIG
注意：	当您打开这里时，会出现肉眼看不见的激光射线，请不要直视或接触光线。

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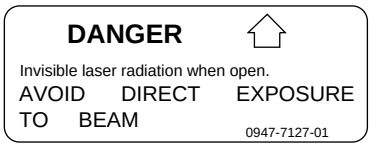

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Other Precautions

- To reassemble the product, reverse the order of disassembly unless otherwise specified.
- While the product is energized, do not unplug or plug connectors into the circuit boards or harnesses.
- The magnet roller generates a strong magnetic field, therefore it should not come in close contact with a watch, floppy disk, magnetic card, or CRT tube.
- An air gun and vacuum cleaner generates a strong electrostatic charge that can destroy the ATDC sensor and other sensors. Before cleaning a component with one of these devices, be sure to remove all the sensors. Otherwise, use a blower brush and cloth when cleaning parts.
- When handling circuit boards with MOS ICs, observe the "INSTRUCTIONS FOR HANDLING THE PWBs WITH MOS ICs" (applicable only to the products using MOS ICs).
- The PC Drum is a very delicate component. Observe the precautions given in "HANDLING OF THE PC DRUM" because mishandling may result in serious image problems.
- Note that replacement of a circuit board may call for readjustments or resetting of
- particular items, or software installation.
- After completing a service job, perform a safety check. Make sure that all parts, wiring and screws are returned to their original positions.
- Check the area surrounding the service site for any signs of damage, wear or need of repair.
- Do not pull out the toner hopper while the toner bottle is turning. This could result in a damaged hopper motor or locking mechanism.
- If the product is to be run with the front door open, make sure that the toner hopper is in the locked position.

Used Batteries Precautions

(ALL Areas)

CAUTION

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions.

(Germany only)

VORSICHT!

Explosinsgefahr bei unsachgemäßen austausch der batterie.
Ersatz nur durch denselben oder einen vom hersteller empfohlenen ähnlichen typ.
Entsorgung gebrauchter batterien nach angaben des herstellers.

(France)

ATTENTION

Ily a danger d'explosion s'ily a remplacement incorrec de la batterie.
Remplacer uniquement avec une batterie du meme type ou d'un type équivalent recommande par le constructueur.
Mettre au rebut les batteries usageés conformément aux instructions du fabricant.

(Denmark only)

ADVARSEL!

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

(Norway only)

ADVARSEL

Eksplosjonsfare ved feilaktig skifte av batteri.
Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten.
Brukte batterier kasseres i henhold til fabrikantens instruksjoner.

(Sweden only)

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt fabrikantens instruktion.

(Finland only)

VAROlTUS

Paristo voi räjähtää, los se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä Käytetty paristo valmistajan ohjeiden mukaisesti.

SAFETY INFORMATION

This printer is a page printer which operates by means of a laser. There is no possibility of danger from the laser, provided the printer is operated according to the instructions in this manual.

Since radiation emitted by the laser is completely confined within protective housing, the laser beam cannot escape from the machine during any phase of user operation.

Laser Safety

This printer is certified as a Class 1 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.

CDRH Regulations

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. Compliance is mandatory for products marketed in the United States. The label shown below indicates compliance with the CDRH regulations and must be attached to laser products marketed in the United States.

Internal Laser Radiation

Maximum Radiation Power: 1.03 (mW) at laser aperture of the print head unit
Wave Length: 770-810 (nm)

This product employs Class IIIb Laser Diode.
Laser Diode and Scanning Polygon Mirror are incorporated in the print head unit.
The print head unit is NOT A FIELD SERVICE ITEM.
Therefore, the print head unit should not be opened under any circumstances.

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

This is a semiconductor laser. The maximum power of the laser diode is 5 mW and the wavelength is 770-810 nm.

For Denmark Users;

ADVARSEL
Usynlig laserstråling ved åbning, når sikkerhedsafbrydere er ude af funktion.
Undgå udsættelse for stråling.

Klasse 1 laser produkt der opfylder IEC825 sikkerheds kravene.

For Finland, Sweden Users;

VARNING!
Osynlig laserstråining när denna del är öppnad och spärren är urkopplad. Betrakta ej stråien.

VARO!
Avattaessa ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle.
Äjä katso säteeseen.

VARNNING
Om apparaten används på annat sätt än i denna bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning som överskrider gränsen för laser klass 1.

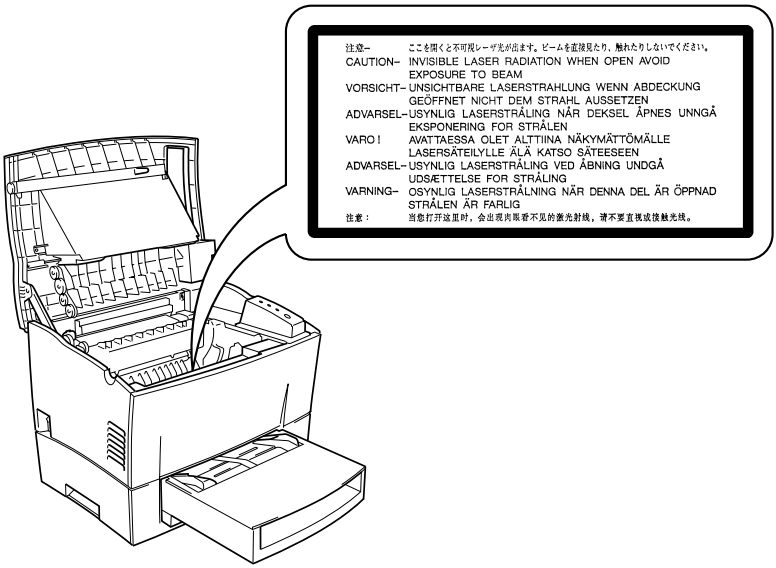
VAROITUS
Laitteen käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteiylle.

For Norway Users;

ADVARSEL
Dersom apparatet brukes på annen måte enn spesifisert i denne bruksanvisning, kan brukeren utsettes for unsynlig laserstråling som overskrider grensen for laser klasse 1.

Dette er en halvleder laser. Maksimal effeckt til laserdiode er 5mW og bølgelengde er 770-810 nm.

WARNING LABEL



CONTENTS

1. INSTALLATION

1-1. Installation Environment

When installing the printer, avoid the types of locations listed below, both for safety considerations and to avoid breakdowns.

•Areas with high temperatures or humidity, or with low temperatures and humidity
•Areas where the temperature and/or humidity fluctuate sharply
•Areas where the printer will be in direct sunlight
•Areas near a cooler, heater, or ventilation opening or in the direct path of wind
•Areas near oil stoves or other heat-generating equipment
•Areas with poor ventilation
•Areas where water is likely to fall on the equipment or electrical leakage is likely
•Areas where corrosive gases (ammonia gases, etc.) are present
•Areas where there is a high volume of dust, dirt and vibration
•Areas where the floor is not sufficiently strong or is not level
•Areas containing volatile and flammable materials and curtains

1-2. Usage Environment

In order to make sure the printer functions properly, make sure the ambient environment satisfies the following requirements:

•Temperature: 10-35°C, or 50-95°F	Temperature fluctuation: ±10°C, or ±50°F per hour or less
•Humidity: 30-70% RH	Humidity fluctuation: ±20% RH per hour or less

1-3. Installing the Power Supply

Do not plug the Power Cord into a power outlet via an extension cord supplying electricity to more than one unit. Do not connect the printer to a power outlet used for other equipment or appliances.
More than one appliance connected to a single outlet could cause a drop or surge in the electrical supply, resulting in operational problems for the printer.

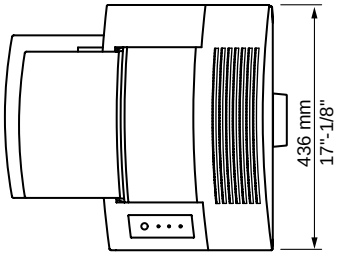
•Voltage fluctuation:	Specified voltage: ±10%
•Frequency fluctuation:	Specified frequency: ±3Hz

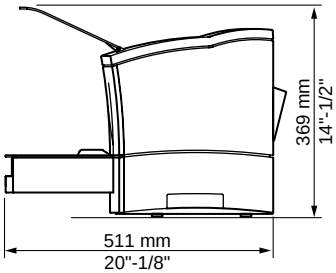
The following items should be checked periodically:

•Make sure the power supply plugs do not feel warm.
•Power supply cords should be free of cracks and scratches.
•Power supply plugs should be firmly plugged into outlets.

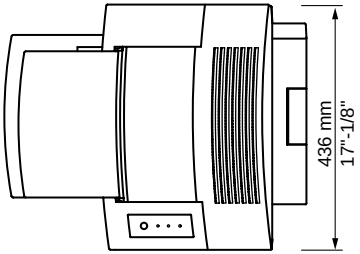
1-4. Installation Space

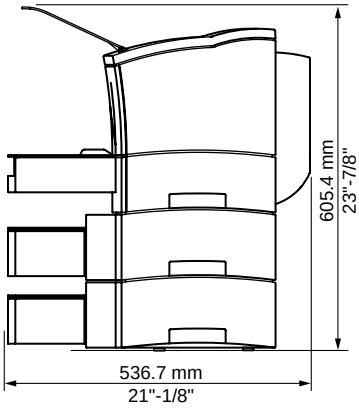
1-4-1. Standard





1-4-2. With 2nd and 3rd Paper Cassette Units and Duplex Unit (Options)





2. GENERAL INFORMATION

2-1. Specifications

2-1-1. Printer

Type	Desktop Laser Beam Printer
Printing System	Electrophotographic
Exposure System	Laser diode + Polygon Mirror scanning
Resolution	600 x 600 dpi, 1200 x 600 dpi
Media Size	Custom (Width: 86 to 216 mm x Length: 148 to 356 mm) (Width: 3-1/3" to 8-1/2" x Length: 5-13/16" to 14-1/16") A4 (210mm x 297 mm), A5 (148mm x 210 mm), JIS B5 (182mm x 257 mm), 8-1/2"x11" (Letter), 8-1/2"x14" (Legal), 7-1/4"x10-1/2" (Executive), 5-1/2"x8-1/2" (Invoice) Envelope (DL, C5, B5, Com10, Monarch) *All paper sizes are lengthwise only.
Media Type	Ordinary plain paper (60-90 g/m^2; 16 to 24 lbs), Recycled paper (60-90 g/m^2; 16 to 24 lbs), Thick paper (90-163 g/m^2; 24 to 43 lbs), Transparencies, Envelopes, Letterhead, Postcards, Labels
First printing time	Simplex: within 18 sec. (A4 or Letter) Duplex: within 28.5 sec. (A4 or Letter)
Multi-print speed	Simplex: 18 prints/min. or more (A4 or Letter/Face down) Duplex: 9 prints/min. or more (A4 or Letter/Face down)
Warm-up time	Within 23 sec. *When power is supplied at 23°C/73.4°F
Paper feeding	Multipurpose Tray (Ordinary plain paper: 250 sheets) Manual feeding (1 sheet at a time) 2nd/3rd Paper Cassette Unit (500 sheets) Feeding system can be extended to a 4-way system by installing options (maximum: 1250 sheets)
Paper exit system	Face down (maximum: 250 sheets)
Drum charging system	Rotation brush charging

Developing system	Single element developing system FMT (Fine Micro Toning) system
Density control	Bias adjusting system
Image transfer system	Transfer Roller system
PC Drum	OPC (Organic Photo conductor)
PC Drum cleaning system	Blade system
Paper separating system	Curvature separating system and charge neutralizing pin
Fusing system	Heated roller system
Dimensions	436mm (width) x 511 mm (depth) x 332 mm (height) or 17"-1/8" (width) x 20"-1/8" (depth) x 13"-3/4" (height)
Weight	Approx. 13kg (29 lbs) (without Imaging Cartridges)
	Imaging Cartridge: approx 1.5 kg (3 lbs)
Power supply voltage	AC120-127 V, AC 220-240 V
Frequency	50/60 Hz
Power consumption	820 W or less
	During stand-by: 60 W or less (average)
	Power save mode: 30 W or less (average)
Acoustic noise	67 dB or less (during printing) 39 dB or less (power saving mode)
Operating environment	10-35°C or 50-95°F
Imaging Cartridge life (separately sold)	9,000 prints or more (in continuous printing) 7,200 prints or more (in single printing) *Black/White ratio=5%
Imaging Cartridge life (provided with printer)	5,000 prints or more (in continuous printing) 4,000 prints or more (in single printing) *Black/White ratio=5%
Standard Accessories	Power Cord, Starter Imaging Cartridge

2-1-2. Options

Item	Model		
	PagePro 4100GN	PagePro 4100E	PagePro 4100W
2nd Paper Cassette Unit	Standard	Option	Option
3rd Paper Cassette Unit	Option	Option	Option
Duplex Unit	Option	Option	Option
PS-ROM SIMM	Option	Option	Not Available
Jogging Function	Standard	Not Available	Not Available
Network Interface Card (Standard)	10/100 Base T	None	None
Network Interface Card (Option)	10 Base T/2	10/100 Base T 10 Base T/2	10/100 Base T

2-1-3. 2nd and 3rd Paper Cassette Unit

Media Type	Ordinary plain paper (60-90 g/m^2; 16 to 24 lbs), Recycled paper (60-90 g/m^2; 16 to 24 lbs)
Media Size	A4, B5, Legal, Letter, Executive (identified by cassette type)
Cassette capacity	500 sheets
Paper feeding system	With paper claw separation mechanism
Power source	Supply from main unit (DC24V, DC5V)
Drive source	Supply from main unit
Dimensions	436 (width) x 351 (depth) x 120 (height) mm or 17"-1/4" (width) x 13"-3/4" (depth) x 4"-3/4" (height) (without Paper Cassette)
Weight	Approx 4.5 kg (10 lbs)
Standard accessory	Paper cassette (A4 or Letter)
Option	Paper cassette (A4, B5, Legal, Letter, Executive)

2-1-4. Duplex Unit

Media Type	Ordinary plain paper (64-90 g/m^2; 17 to 24 lbs), Recycled paper (64-90 g/m^2; 17 to 24 lbs)
Media Size	A5, A4, B5, Legal, Letter, Executive
Power source	Supply from main unit (DC24V, DC5V)
Dimensions	322 (width) x 151 (depth) x 274 (height) mm or 12”-3/4” (width) x 6” (depth) x 10”-3/4”(height)
Weight	Approx 2.3 kg (5 lbs)

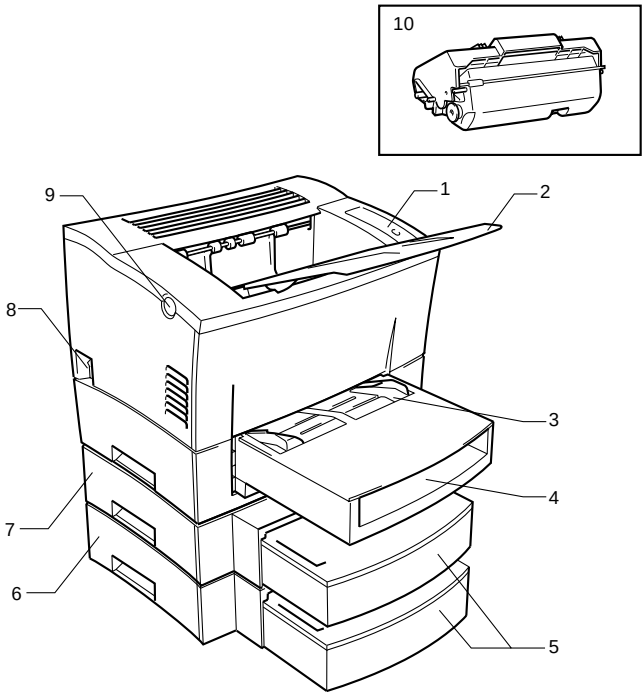
2-1-5. Controller (for 4100E, 4100GN)

CPU	PowerPC and QuickPrint, 66 MHz
Imaging Method	Band Buffer method (bitmap method)
Memory configuration	Standard ROM: 4 MB Standard RAM: 8 MB DRAM SIMM slot: 2 slots (for optional DRAM: up to max. 104 MB RAM There is necessity to be faster than 60 nsec on the speed of DRAM SIMM PS SIMM slot: 1 slot (for optional PS-ROM)
Interface	Standard: Centronics IEEE1284/ ECP
Network Interface	Standard: Ethernet 10/100 BaseT (4100GN) Option: Ethernet 10/100 BaseT (for 4100E) Option: Ethernet 10 BaseT/2 (for 4100E)
Fine-ART Mode	Edge smoothing technology that delivers sharp, crisp and clear defined text and images.
Toner Saver Mode	Function to regulate the toner consumption
Emulation	Compatible with PCL5e (HP LaserJet5) Compatible with PCL6 (HP LaserJet6P) Adobe PostScript3 (Option on for 4100E)
Printer Driver	PCL Driver: For Windows95/ NT4.0/3.1 PS Driver (Option): For Windows95/NT4.0/3.1

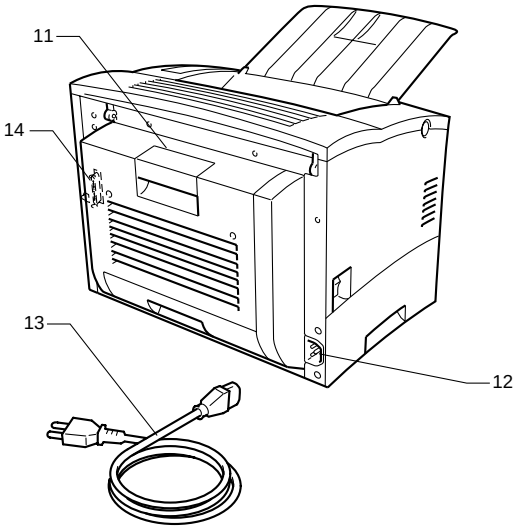
2-1-6. Controller (for 4100W)

CPU	Hitachi Zenographics, 20MHz
Imaging Method	Band Buffer method (bitmap method)
Memory configuration	Standard: ROM 64KB Standard: RAM 2MB Option: up to max. 18MB RAM There is necessity to be faster than 60 nsec on the speed of DRAM.SIMM
Interface	Standard: Centronics IEEE1284/ ECP/EPP Compatible Option: Ethernet 10/100 Base T
Resolution Enhancement	Resolution Enhancement function by software
Toner Saver Mode	Not Supported
Interpreters	GDI (Graphic Device Interface) PostScript Level 2 (Z-script, Software RIP: Standard)
Printer Driver	For Windows95/98/NT4.0/2000

2-2. Parts Identification

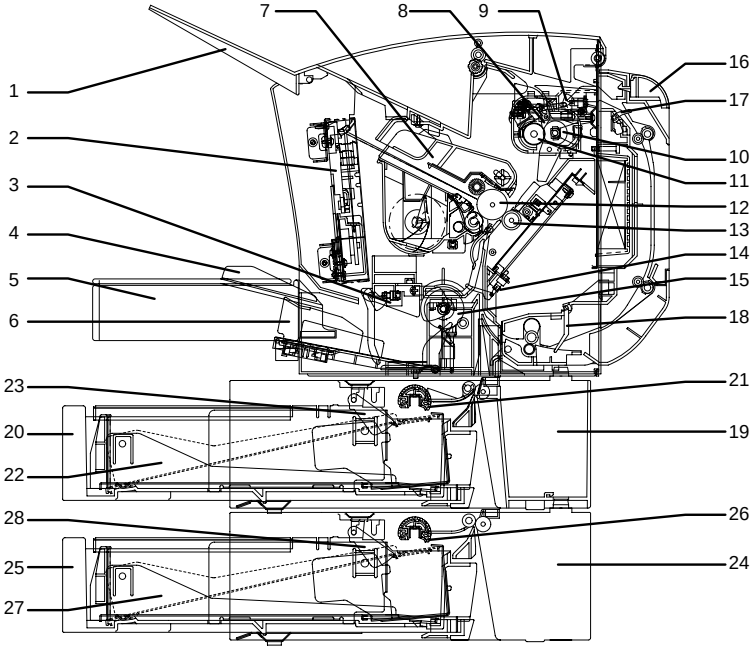


1. Control Panel
2. Face-down Tray
3. Manual Feed Guide
4. Multi-purpose Tray
5. Paper Cassette
6. 3rd Paper Cassette Unit (Option)
7. 2nd Paper Cassette Unit (Option for 4100E and 4100W, Standard for 4100GN)
8. Power Switch
9. Top Cover Release Button
10. Imaging Cartridge



11. Duplex Unit (Option)
12. Power Cord Socket
13. Power Cord
14. Parallel Interface Connector

2-3. Component Layout



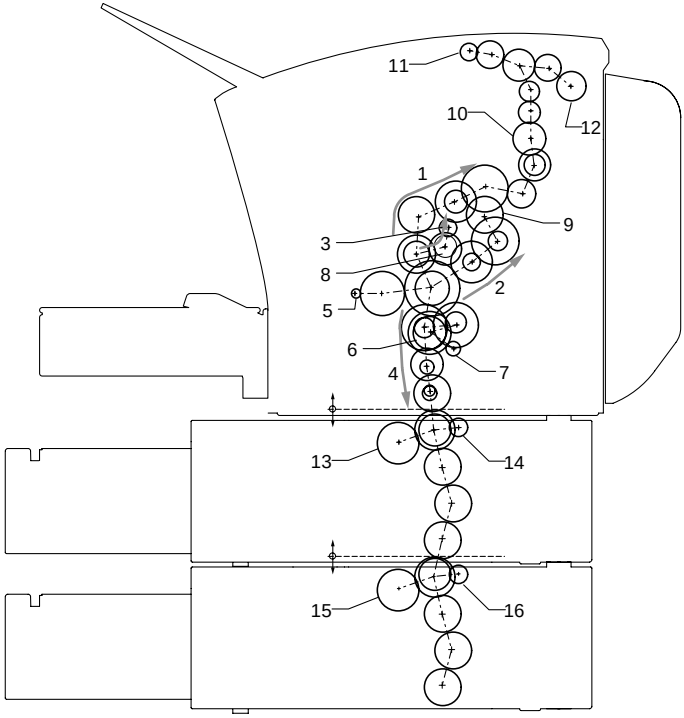
1. Face-down Tray
2. Print Head Unit (PH)
3. Paper Empty Sensor (P_EMP1)
4. Manual Feed Tray
5. Multipurpose Tray
6. Paper Size Guide
7. Imaging Cartridge Guide
8. Fusing Separator
9. Paper Exit Sensor (PS3)
10. Backup Roller
11. Heat Roller
12. PC Drum
13. Image Transfer Roller
14. Paper Take-up Sensor (PS1)
15. Paper Take-up Roller
16. Duplex Unit
17. Duplex Entrance Sensor (DUP_PSR)
18. Duplex Exit Sensor (DUP_PS1)
19. 2nd Paper Cassette Unit
20. 2nd Paper Cassette
21. 2nd Paper Take-up Roller
22. 2nd Paper Lift-up Plate
23. 2nd Paper Empty Detecting Lever
24. 3rd Paper Cassette Unit
25. 3rd Paper Cassette
26. 3rd Paper Take-up Roller
27. 3rd Paper Lift-up Plate
28. 3rd Paper Empty Detecting Lever

16-28: Option for 4100E, 4100W
16, 17, 24-28: Option for 4100GN

2-4. Drive Section

2-4-1. Overview

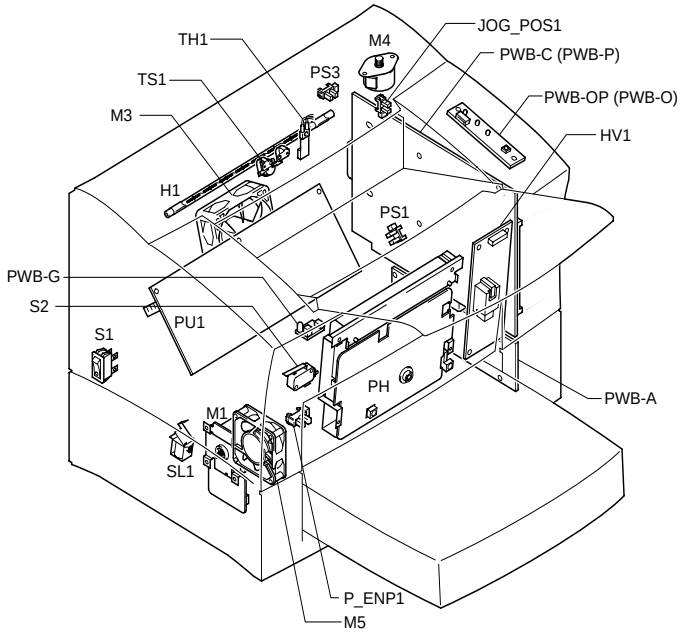
The Main Motor (M1) transmits the drive to the rollers of the printer, the 2nd/3rd Paper Cassette Units, and the Duplex Unit via each gear as shown below.



1. Drive flow (fusing)
2. Drive flow (PC Drum)
3. Drive flow (developing)
4. Drive flow (paper take-up)
5. Main Motor (M1)
6. Paper Take-up Roller
7. Paper Transfer Roller
8. Imaging Cartridge Connection Gear
9. PC Drum
10. Fusing Roller
11. Paper Exit Roller
12. Duplex Unit Connection Gear
13. 2nd Paper Take-up Roller
14. 2nd Paper Transfer Roller
15. 3rd Paper Take-up Roller
16. 3rd Paper Transfer Roller

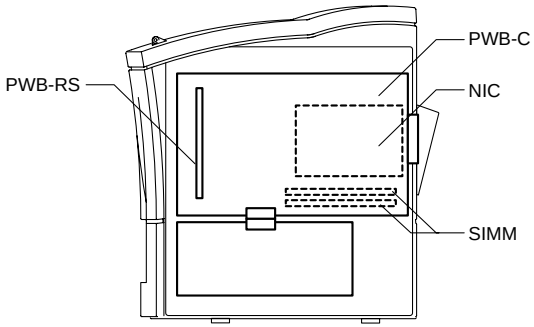
2-5. Electrical Components Layout

2-5-1. Printer



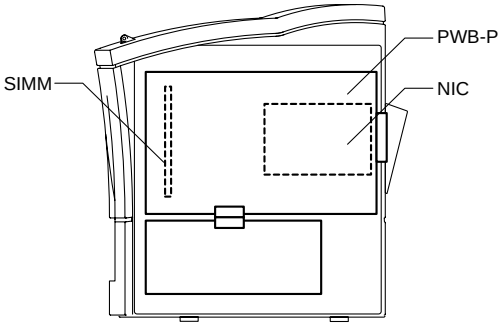
H1	Heater Lamp	PWB-A	Mechanical Control Board
HV1	High Voltage Board	PWB-C	Controller Board (4100E, 4100GN)
JOG_POS1	Jog Position Sensor (4100GN only)	PWB-A	Mechanical Control Board
M1	Main Motor	PWB-G	Toner Empty Sensor
M3	Fusing Unit Cooling Fan Motor	PWB-O	Control Panel Board (4100W only)
M4	Jog Motor (4100GN only)	PWB-OP	Control Panel Board (4100E, 4100GN)
M5	Print Head Cooling Fan Motor	PWB-P	Controller Board (4100W only)
P_ENP1	Paper Empty Sensor	S1	Power Switch
PH	Print Head Unit	S2	Interlock Switch
PS1	Paper Take-up Sensor	SL1	Paper Take-up Solenoid
PS3	Paper Exit Sensor	TH1	Thermistor
PU1	Power Unit	TS1	Thermostat

2-5-2. Controller (for 4100E, 4100GN)



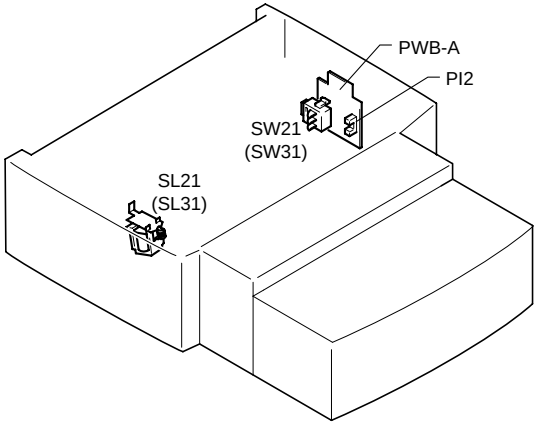
NIC	Network Interface Card (4100GN: Standard, 4100E: Option)
PWB-C	Controller Board
PWB-RS	PS-ROM Board (Option)
SIMM	SIMM (Option)

2-5-3. Controller (for 4100W)



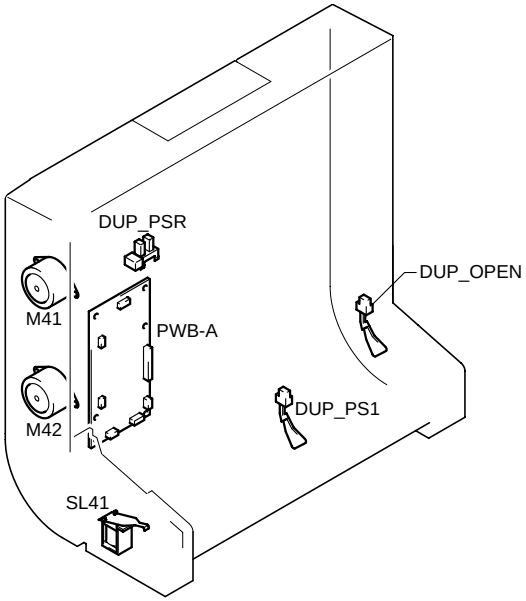
NIC	Network Interface (Option)
PWB-P	Controller Board
SIMM	SIMM (Option)

2-5-4. 2nd Paper Cassette Unit (Option for 4100E, 4100W), 3rd Paper Cassette Unit (Option for 4100E, 4100GN, 4100W)



PI2	Paper Empty Sensor
PWB-A	Connecting Board
SL21 (SL31)	Paper Take-up Solenoid
SW21 (SW31)	Cassette Detecting Switch

2-5-5. Duplex Unit (Option)



DUP_OPEN	Duplex Cover Sensor
DUP_PS1	Duplex Exit Sensor
DUP_PSR	Duplex Entrance Sensor
M41	Switchback Motor
M42	Transfer Motor
PWB-A	Control Board for Duplex Unit
SL41	Skew Correction Solenoid

2-6. Electrical Parts Function

2-6-1. Printer

Symbol	Name	Function
H1	Heater Lamp	Heats the Heat Roller (650 W).
HV1	High Voltage Unit	Supplies power to the following sections: •Rotating Charge Brush: Charged voltage • Sleeve Roller: Developing bias voltage •Toner Regulation Plate: Developing blade voltage •Toner Collecting Plate: Collection blade voltage •Image Transfer Roller: Image transfer voltage
JOG_POS1	Jog Position Sensor (4100GN only)	Detects the reset position of the Paper Exit Roller. The signal is "low" when the reset position is detected.
M1	Main Motor	The drive source of the printer.
M2	Polygon Motor (Inside of the Print Head Unit)	A regular hexahedron polygon mirror rotates at high speed, making the laser scan in the scanning direction.
M3	Fusing Unit Cooling Fan Motor	The Cooling Fan Motor for the Fusing Unit.
M4	Jog Motor (4100GN only)	Motor for jogging function. Slides the Paper Exit Roller to right and left and sorts paper.
M5	Print Head Cooling Fan Motor	Cooling Fan Motor for the Print Head Unit.
NIC	Network Interface Card	Communicates with the Personal Computer on the Network and controls all printer operation. 4100E, 4100W: option, 4100GN: standard
P_ENP1	Paper Empty Sensor	Detects the presence of paper. The signal is "low" when the paper is detected.
PS1	Paper Take-up Sensor	Detects when paper is taken up and the paper length. The signal is "low" when the paper is detected.
PS3	Paper Exit Sensor	Detects when the paper is fed out. The signal is H when the paper is detected.
PU1	Power Unit	Converts the power voltage from AC voltage into DC voltage and supplies that to H1.
PWB-A	Mechanical Control Board	Communicates with the Controller Board and controls all printer operation.
PWB-C	Controller Board (for 4100E, 4100GN)	Communicates with the Personal Computer and the Mechanical Control Board, and controls all printer operation.

Symbol	Name	Function
PWB-D	Laser Diode Drive Board (inside of the Print Head Unit)	Detects the starting point of printing via the laser diode and SOS sensor, and exposes the PC Drum with the laser beam according to the image signals.
PWB-G	Toner Empty Sensor	Detects when the toner is empty. The signal is "low" when empty is detected.
PWB-O	Control Panel Board (for 4100W)	Contains with the display and key to enable the operation of the machine.
PWB-OP	Control Panel Board (for 4100E, 4100GN)	Contains with the display and key to enable the operation of the machine.
PWB-P	Controller Board (for 4100W)	Communicates with the Personal Computer and the Mechanical Control Board, and controls all printer operation.
PWB-RS	PS_ROM Board (option for 4100E, 4100GN)	PS Font ROM Board of Adobe PostScript3 correspondence.
S1	Power Switch	Turns ON or OFF the printer.
S2	Interlock switch	Detects the opening or closing of the top cover. Cuts output voltage (except 5 VDC) when the Top Cover is open.
SL1	Paper Take-up Solenoid	Transmits the drive of the Main Motor to the Paper Take-Up Roller.
TH1	Thermistor	Detects the temperature of the Heat Roller, measures the temperature on the surface of the Heat Roller, and sends the data to the main control board.
TS1	Thermostat	Cuts power to the Heater Lamp (H1) when overheating (205°C or 401°F) is detected at the Fusing Section.

2-6-2. 2nd Paper Cassette Unit (Option for 4100E, 4100GN), 3rd Paper Cassette Unit (Option for 4100E, 4100GN, 4100W)

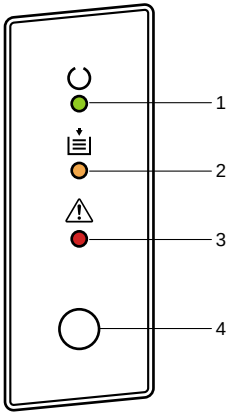
Symbol	Name	Function
PI2	Paper Empty Sensor (on the PWB-A)	Detects the presence of paper. The signal is "low" when the paper is detected.
PWB-A	Connecting Board	Sends and receives power and control signals from PWB-A in the printer to components in the Second/Third Paper Cassette Units.
SL21 (SL31)	Paper Take-up Solenoid	Controls gears and clutches to transmit the drive from the Main Motor to Paper Take-up Rollers. The drive is transmitted when the solenoid is turned on.
SW21 (SW31)	Cassette Detecting Switch	Triple push switches for detecting the cassette type according to the paper size

2-6-3. Duplex Unit (Option)

Symbol	Name	Function
DUP_OPEN	Duplex Cover Sensor	Checks the status of the cover and stops operation of the Duplex Unit when the cover is open.
DUP_PS1	Duplex Exit Sensor	Detects that paper is discharged from the Duplex Unit. The signal is "low" when paper is detected.
DUP_PSR	Duplex Entrance Sensor	Detects that paper is fed into the Duplex Unit. The signal is "low" when paper is detected.
M41	Switchback Motor	Reverses the rotation of the Paper Exit Roller and feeds paper into the Duplex Unit.
M42	Paper Transfer Motor	Transports paper within the Duplex Unit.
PWB-A	Duplex Unit Control Board	Sends and receives power and control signals from PWB-A in the printer to components in the Duplex Unit.
SL41	Skew Correction Solenoid	Controls gears and clutches for transmitting the drive of the transfer motor to rollers. The drive is transmitted when the solenoid is turned on.

2-7. Explanation of the Control Panel for 4100E, 4100GN

The Control Panel has three indicator lights and one button.



1	Ready (Green)	3	Error (Red)
2	Paper (Amber)	4	Panel Button

2-7-1. Indicator Lights

Different combinations of the three indicator lights indicate the current printer status and let the user know what the printer is doing. The details of the current printer status appear on the host computer.

2-7-2. Indicator Status

Ready (green)	Paper (amber)	Error (red)	Printer Status
On	Off	Off	Printer is ready.
Off	Off	Off	Power is off.
Blinking	Off	Off	Receiving data via parallel interface; printing in progress.
Blinking	Off	On	Receiving data via network interface.
Blinking	Blinking	Blinking	Canceling job.
Blinking	Blinking	Off	Warming up.
On	On	On	"Power on" initial setting.
Slow Blinking	Off	Off	Power save mode.
Off	On	Off	Out of paper.
On	Off	On	The imaging cartridge is low on toner.
On	Blinking	On	The imaging cartridge is out of toner.
Off	Blinking	On	Data is currently being compressed because more data is being processed than can be managed by the amount of memory installed in your printer. You may notice a difference in image quality when compressed data is printed.
Off	Off	Blinking	Memory overflow/data received cannot be processed because it is too complex.
Off	Blinking	Blinking	The wrong size or multiple sheets of paper are loaded.
On	Blinking	Off	The printer is waiting for paper to be loaded manually.
On	On	Off	The printer is waiting for paper to be loaded manually.
Off	Off	On	Cover is open.
Off	Blinking	Off	Paper misfeed.
On	Blinking	Blinking	The second or third paper cassette unit is not installed. The NIC is not ready.
Off	On	Blinking	Controller-memory error.
Off	On	On	Engine error (jogging function). 4100GN only.
On	Off	Blinking	Engine error (fusing unit).
On	On	Blinking	Engine error (laser or main motor).
Blinking	Off	Blinking	Engine error (polygon scanner).
Blinking	On	Blinking	Engine error (cooling fan).
Blinking	Blinking	On	Engine error (HSYNC).

2-7-3. Control Panel Button Function

Depending on the status of the printer, the control panel button performs any one of the following operations.

•Job cancel

•Print configuration page

•Form feed

Job Cancel

Use the following procedure whenever you want to the cancel the current job.

1. Hold down the control panel button for about five seconds.
2. After all the indicator lights are lit, release the control panel button to cancel the print job.

Print Configuration

Use the following procedure whenever you want to print a sheet that shows the current printer settings.

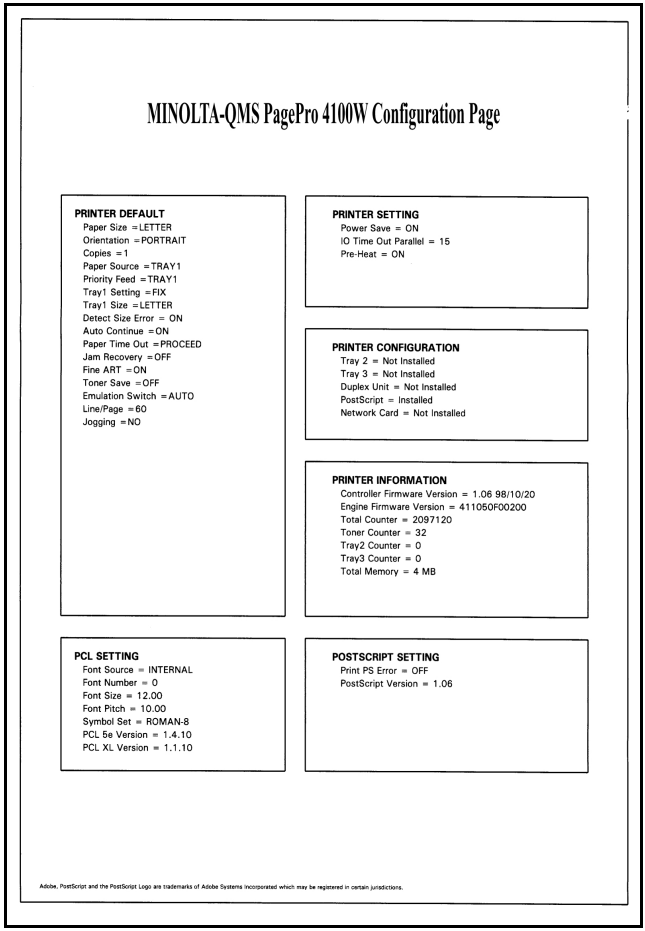
•Briefly press the control panel button to start printing the configuration page.

Form Feed

When a memory overflow occurs, press the control panel button to perform a form feed.

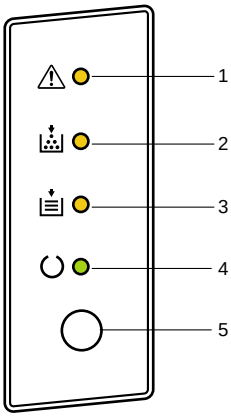
2-7-4. Test Print Function

Perform the following operation to print a test page showing the current printer settings.

Operation	Briefly press the control panel button.
Configuration Page Sample	

2-8. Explanation of the Control Panel for 4100W

The Control Panel has four indicator lights and one button.



1 Error (Amber)
2 Toner (Amber)
3 Paper (Amber)
4 Ready (Green)
5 Panel Button

2-8-1. Indicator Lights

Different combinations of the four indicator lights indicate the current printer status and let the user know what the printer is doing. The details of the current printer status appears on the host computer.

2-8-2. Panel Button

Press this key if an error should occur in order to have the current condition of the printer displayed through the indicator lights.

2-8-3. Indicator Status

Error ⚠	Toner	Paper	Ready ↻	Printer Status
On	On	On	On	Printer Initializing.
On	On	Off	Off	Toner Empty. The imaging cartridge is out of toner. Press the Panel Button in the event of a toner empty.
On	Off	Off	Off	Fatal Error. Press the Panel Button in the event of a Fatal Error.
Off	Off	Off	On	Printer is ready and able to print.
Off	Off	Off	Off	Power is off.
Off	Off	Off	Blinking	Warming up.
Off	Off	Off	Slow Blinking	Printer has entered the Power Save Mode.
Off	Off	Blinking	On	No Paper Cassette in Tray 2 or Tray 3. Press the Panel Button in the event of a No Paper Cassette.
Off	Off	Blinking	Blinking	Wait Action Press the Panel Button in the event of a paper size error or when operating in the manual mode.
Blinking	Off	On	On	Paper Empty. Press the Panel Button in the event of a paper empty.
Blinking	Off	Off	Off	Operator Error. Press the Panel Button in the event of an Operator Error.
Blinking	Off	Blinking	Blinking	Paper Size Mismatch. The wrong size of paper has been detected in Tray 1, Tray 2 or Tray 3.
Blinking	Blinking	Off	On	Toner Low. The imaging cartridge is low on toner but printing is still possible.

When a Paper Empty occurs:

Indicate cause of Fatal Error	Error ⚠	Toner	Paper	Ready ○	Printer Status
	Blinking	Off	On	On	
Press the Panel Button	On	Off	On	On	Tray 1 Paper Empty The paper supply of Multipurpose Tray is empty.
	Off	On	On	On	Tray 2 Paper Empty The paper supply of 2nd paper cassette is empty.
	On	On	On	On	Tray 3 Paper Empty The paper supply of 3rd paper cassette is empty.

When a No Cassette occurs:

Indicate cause of Fatal Error	Error ⚠	Toner	Paper	Ready ○	Printer Status
	Off	Off	Blinking	On	
Press the Panel Button	Off	On	On	On	No Cassette on Tray 2. The 2nd Paper Cassette is not present.
	On	On	On	On	No Cassette on Tray 3. The 3rd Paper Cassette is not present.

When a Toner Empty occurs:

Indicate cause of Fatal Error	Error ⚠	Toner	Paper	Ready ○	Printer Status
	On	On	Off	Off	
Press the Panel Button	Off	Off	On	Off	Toner Empty Replace the Imaging Cartridge.

When the Operator Error occurred

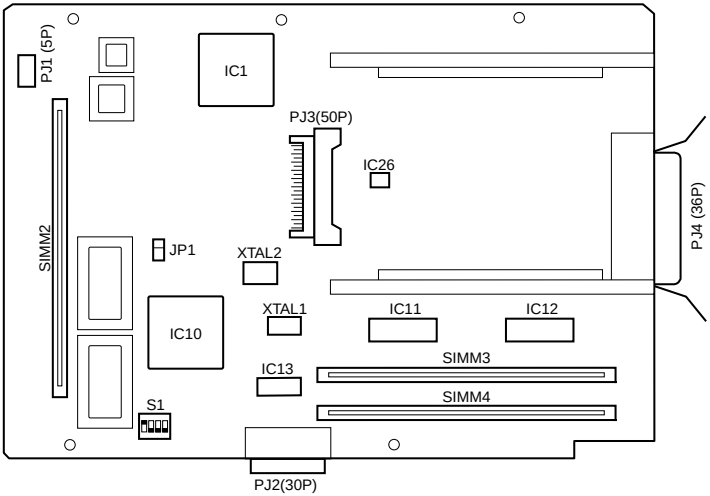
Indicate cause of Fatal Error	Error ⚠	Toner	Paper	Ready ↻	Printer Status
	Blinking	Off	Off	Off	
Press the Panel Button	Off	Off	Off	On	Paper Misfeed at Paper Take-up Section. (2nd Paper Cassette)
	Off	Off	On	On	Cover Open The top cover is open.
	Off	On	Off	Off	Paper Size Error The paper-size setting of the printer driver does not match the size of paper that has been detected in the tray.
	Off	On	Off	On	Paper Misfeed at Paper Exit Section. (Fusing Unit)
	Off	On	On	Off	Paper Misfeed at Paper Take-up Section. (Manual feed)
	Off	On	On	On	Wrong Media of Duplex Unit The wrong size of paper has been loaded into the duplex unit.
	On	Off	Off	Off	Paper Misfeed at Paper Take-up Section (Multipurpose Tray).
	On	Off	Off	On	Paper Misfeed at Paper Transport Section. (PC Drum)
	On	Off	On	On	Paper Misfeed at Duplex Unit. (Paper switchback section)
	On	Off	On	Off	Paper Misfeed at Paper Take-up Section. (3rd Paper Cassette)
	On	On	Off	Off	Duplex Unit Cover Open The cover of the duplex unit is open.
	On	On	Off	On	Buffer Overflow The buffer cannot handle the volume of data being sent.
	On	On	On	Off	Paper Misfeed at Duplex Unit.
	On	On	On	On	Video Under Run The buffer cannot handle the volume of data being sent.

When the Fatal Error occurred

Indicate cause of Fatal Error	Error ⚠	Toner	Paper	Ready ○	Printer Status
	On	Off	Off	Off	
Press the Panel Button	Blinking	Blinking	Blinking	On	Engine error (P/H cooling fan error).
	Blinking	Blinking	Off	On	Engine error (Fusing Unit low temperature error).
	Blinking	Off	Blinking	On	Engine error (Fusing Unit warm up error).
	Blinking	Off	Off	On	Engine error (polygon scanner).
	Off	Blinking	Blinking	On	Engine error (Fusing Unit cooling fan error).
	Off	Blinking	Off	On	Engine error (main motor).
	Off	Off	Blinking	On	Engine error (Fusing Unit overheat).
	Off	Off	Off	On	Engine error (HSYNC).
	Off	On	Off	On	Engine error (Controller, I/F).
	Off	On	On	Off	I/O Error (Network). A Network port error occurred.
	On	On	Off	Off	I/O Error (Parallel). A controller error occurred at the parallel port.

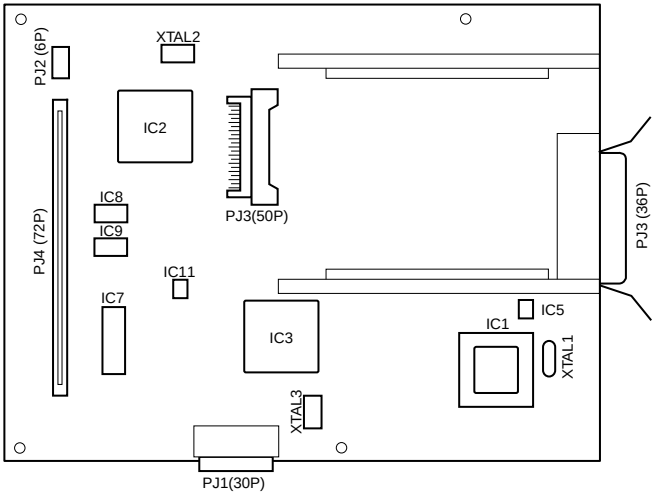
2-9. Electrical Service Parts on P.W.Boards

2-9-1. PWB-C (Controller Board for 4100E, 4100GN)



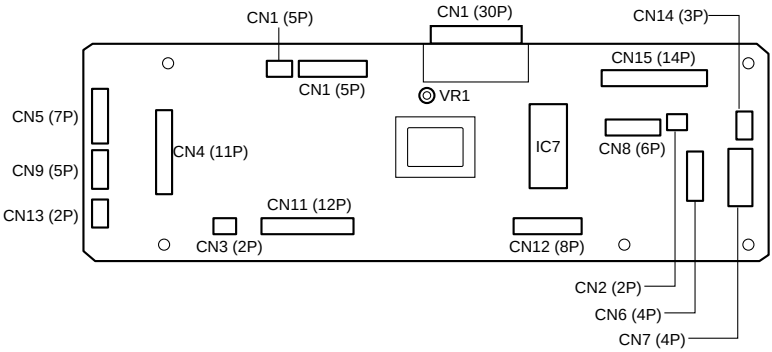
Symbol	Item	Explanation
IC1	CPU	PowerPC and QuickPrint, 66 MHz
IC10	ASIC	Peerless QP1700
IC11	DRAM	2 MB (60nsec. First Page mode Type)
IC12	DRAM	2 MB (60nsec. First Page mode Type)
IC13	EET	DESTINY D9001MF-H
IC26	EEPROM	512 Byte
JP1	Jumper post	Factory Use Only (Normally 1-2 position)
PJ3	Connector	Connector for Network Interface Card
PJ4	Connector	Parallel Connector (Centronics IEEE1284/Nibble compatible mode Type B Connector)
S1	Dip switch	1. ON: Inch (PageWorks), OFF: Metric (PagePro) 2. ON: OEM, OFF: OWN 3. Factory Use Only (Normally OFF) 4. Not used (Normally OFF)
SIMM2	SIMM slot	Slot for optional PostScript-ROM
SIMM3 SIMM4	SIMM slot	Slot for optional DRAM SIMM (up to max. 104 MB RAM)
XTAL1	Video Oscillator	96.59242 MHz
XTAL2	Oscillator	66 MHz

2-9-2. PWB-P (Controller Board for 4100W)



Symbol	Item	Explanation
IC1	CPU	Hitachi Zenographics, 20MHz
IC2	Image Compression ASIC	Pixel Magic PM2MJ-33MHz (JBIG Compression)
IC3	ASIC	ALTERA FLEX EPF6016QC208-2
IC5	EEPROM	1,024bit
IC7	DRAM	2 MB (60nsec. First Page mode Type)
IC8, 9	SRAM	64KB (for mode setting and counters)
IC11	EPROM	64KB
PJ3	Connector	Parallel Connector (Centronics IEEE1284/ECP/EPP compatible mode Type B Connector)
PJ4	SIMM slot	Slot for optional DRAM SIMM (up to max. 18 MB RAM)
PJ5	Connector	Connector for Network Interface Card (Option)
XTAL1	Oscillator	20 MHz
XTAL2	Oscillator	33 MHz
XTAL3	Oscillator	96.59242 MHz

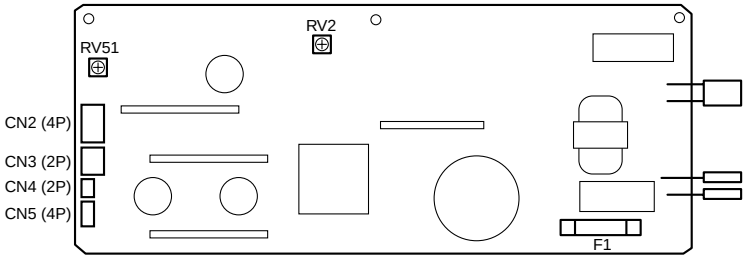
2-9-3. PWB-A (Mechanical Control)



IC7 Jog Motor Drive IC (4100GN only)

VR1 Adjusts the Image Registration margin. (Refer to chapter 5.)

2-9-4. PU1 (Power unit)

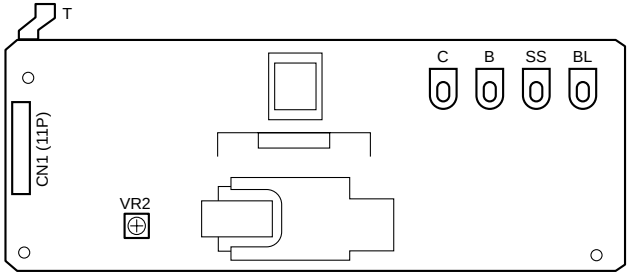


F1 Fuse (Rating: 8A, 125V)

RV2 Dial for factory adjustment (Available only at factory)

RV51 Dial for factory adjustment (Available only at factory)

2-9-5. HV1 (High Voltage Unit)

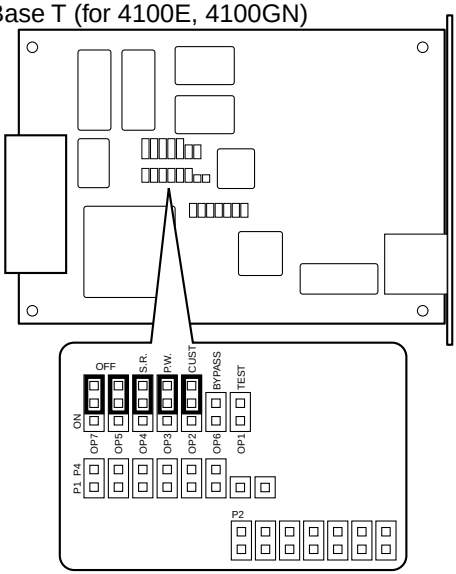


C	Drum Charging Bias terminal (DC-1286V/DC-800V)
B	Developing Bias terminal (DC-300V)
SS	Toner Blade Bias terminal (DC-550V)
BL	Toner Blade Bias terminal (DC-550V)
T	Image Transfer Bias terminal (DC3000V/DC-1000V max)
VR2	Dial for factory adjustment (Available only at factory)

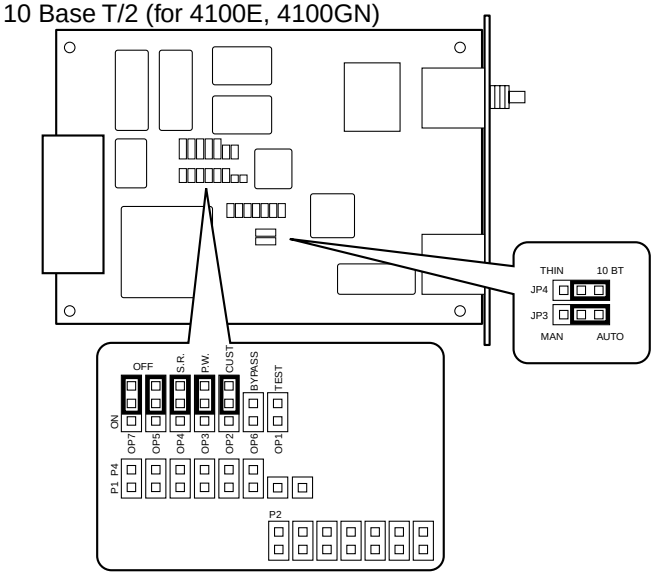
2-9-6. NIC (Network Interface Card)

Jumper Post Default Position Settings

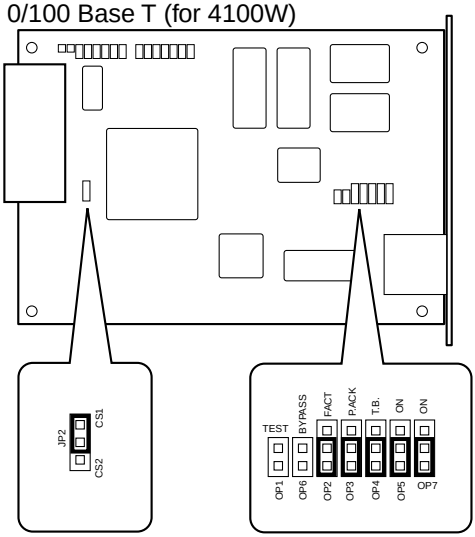
10/100 Base T (for 4100E, 4100GN)



10 Base T/2 (for 4100E, 4100GN)



0/100 Base T (for 4100W)



2-10. Video Interface (Engine I/F)

This section explains the video interface between the Engine and Controller.

2-10-1. Overview of Video Interface

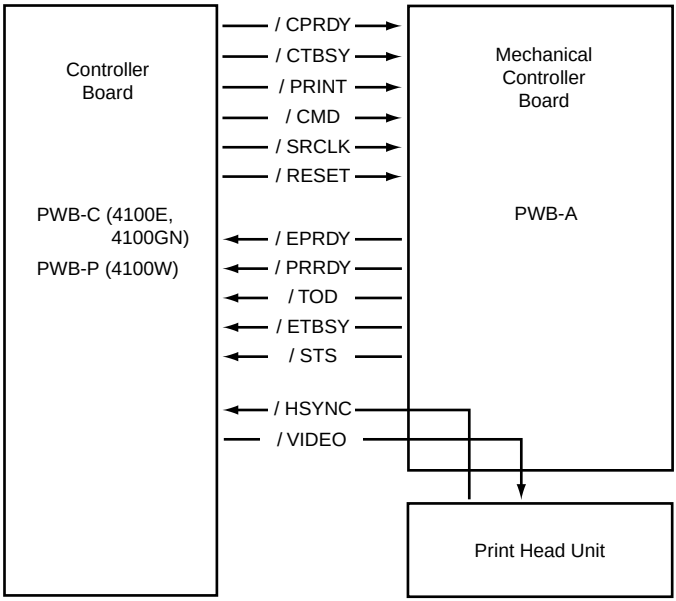
The Engine and Controller use a video interface to carry out the following functions.

•The transfer of image data.

•Mutual exchange (and confirmation) of data on the progress of the printing sequence.

•Data about the Engine is given to the Controller.

•Engine operation commands are sent.

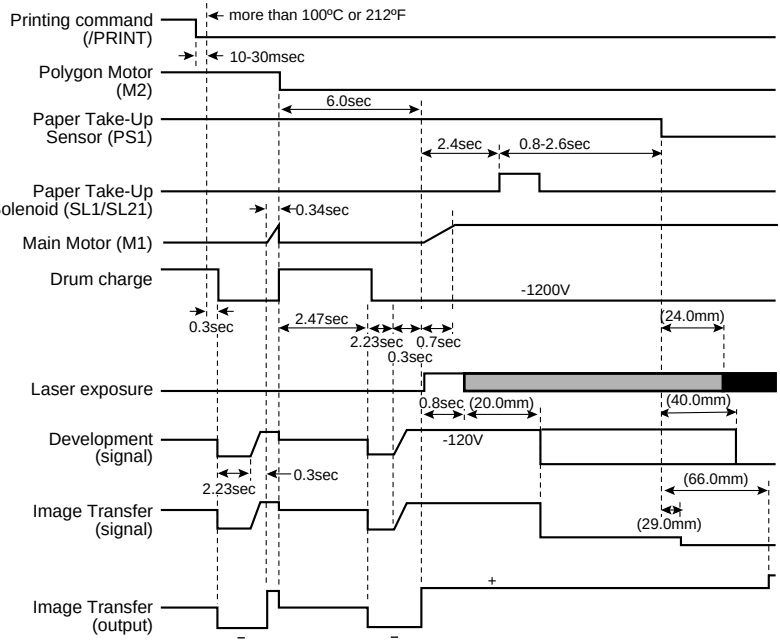


2-10-2. Description of Signals

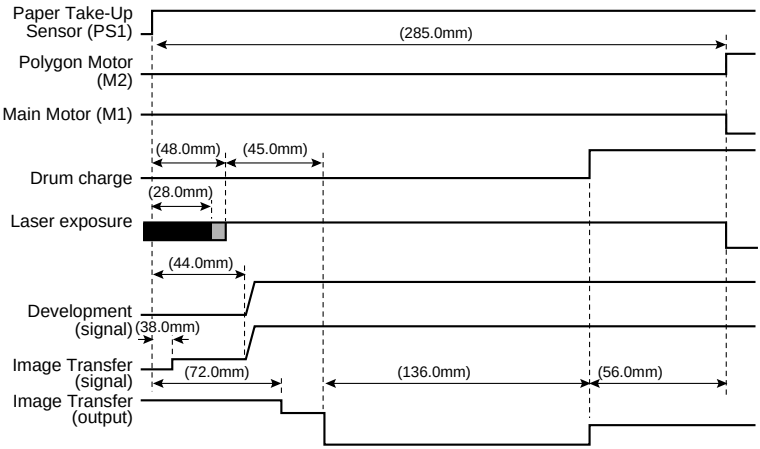
Signals	Meaning of Signals
/CPRDY	This signal indicates that the Controller is ready for communication with the Engine following initialization of the CPU in the Controller after the main power is turned on. The signal becomes active when communication is enabled.
/CTBSY	This signal indicates that the Video Controller is currently transmitting the -CMD signal to the Mechanical Controller.
/PRINT	This signal is the request by the Controller to the Engine, to start or continue printing. The signal becomes active when the Controller completes preparation of the image output.
/CMD	This is an 8 bit signal used by the Controller to control Engine operation. The type of operation is defined by the combination of 8 bits.
/STS	This is an 8 bit signal used by the Engine to inform the Controller of the current status of the Engine.
/SRCLK	This signal is a serial synchronization clock for transmitting the -CMD and -STS signals.
/RESET	This signal is sent from the Controller to the Engine and initializes the Engine (resets the CPU).
/EPRDY	This signal indicates that the Engine is ready for communication with the Controller following initialization of the CPU in the Engine after the main power is turned on. The signal becomes active when communication is enabled.
/PRRDY	This signal tells the Controller whether or not printing is possible. The signal is inactive when there is a jam, the Fusing Roller is still warming up, etc.
/ETBSY	This signal indicates that the Engine is currently transmitting the -STS signal to the Controller.
/HSYNC	This is the horizontal (main scanning direction) synchronization signal which obtains the print start timing of each line during laser scanning. The signal is active during the period that the laser beam strikes the SOS sensor for each scan of the laser beam.
/VIDEO	This signal is an image data signal and is transmitted from the Controller to the Engine.

2-11. Timing Chart

2-11-1. Print Starting



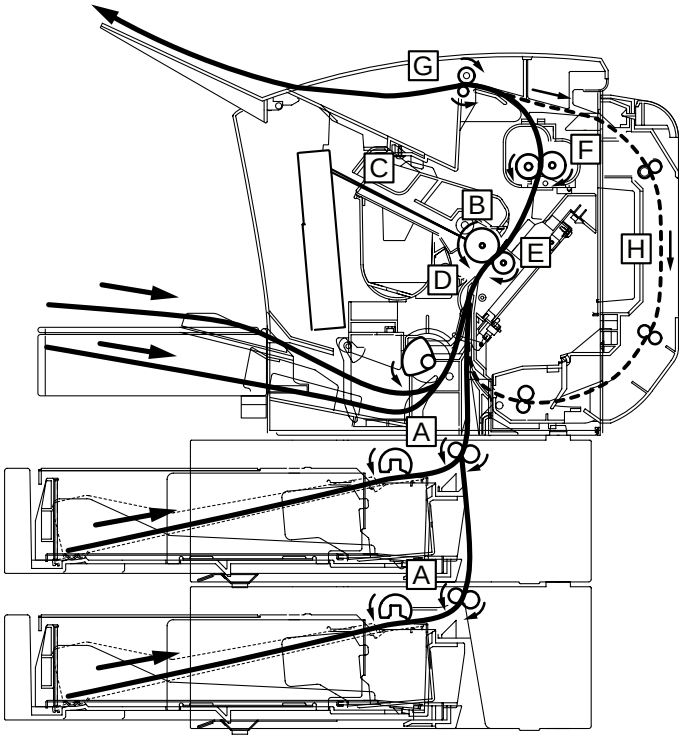
2-11-2. Print Ending



3. MECHANICAL/ELECTRICAL

3-1. Paper Path

Paper can be fed into the printer either from the Multipurpose Tray (250 sheets) or the Manual Feed Port (1 sheet). The paper feed system can be extended to a 4-way system by installing the optional Second Paper Cassette Unit (500 sheets) and 3rd Paper Cassette Unit (500 sheets). In addition, duplex printing is possible when the Duplex Unit is installed. Paper fed by the Paper Take-up Roller is transported to the Image Transfer Roller, Fusing Roller, and Paper Exit Roller, then discharged onto the printer tray.
When duplex printing, the printer pulls the paper into the Duplex Unit, and printing is performed on the back side of the paper.



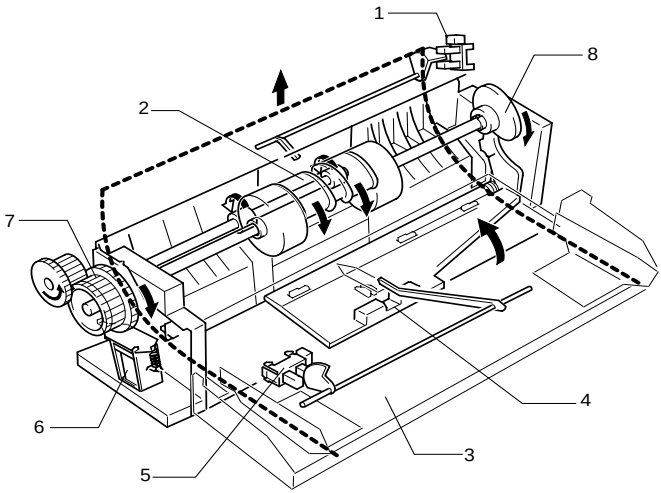
A	Paper Take-up	E	Image Transfer
B	Drum Charge	F	Fusing
C	Laser Exposure	G	Paper Exit
D	Development	H	Duplex

3-2. Paper Take-up Section

3-2-1. Multipurpose Tray

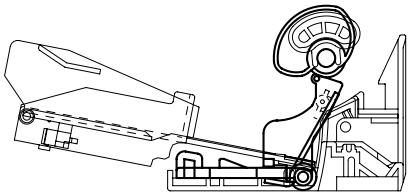
Mechanism

- When the Paper Take-Up Solenoid (SL1) is energized, the drive of the Main Motor (M1) is transmitted to the Paper Take-Up Roller via the Paper Take-Up Clutch (one-way clutch) to turn the Paper Take-Up Roller one revolution.
- At the same time, the Depressing Cam turns and lifts the Tray Lifting Plate, and the first (top) sheet of paper on the tray is fed into the printer.
- The Fixed Separating Pad is used for the paper separation system. It prevents the second or later sheets of paper from being fed together with the top sheet.
- As the Multipurpose Tray has no paper size detecting mechanism, it recognizes the paper size by the paper length, which is calculated from the time the paper passes over and activates the Paper Take-up Sensor (PS1). Therefore, sheets of paper having different widths are recognized as the same paper size if they have the same length.

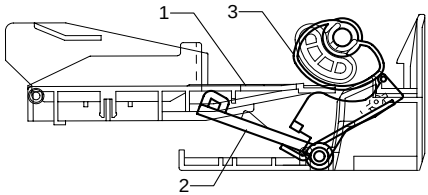


1	Paper Take-up Sensor (PS1)	5	Paper Empty Sensor (P_ENP1)
2	Paper Empty Sensor (P_EMP1)	6	Paper Take-up Solenoid (SL1)
3	Tray	7	Paper Take-up Clutch
4	Tray Lifting Plate	8	Depressing Cam

Standing by



Taking up the paper



1 Tray
2 Tray Lifting Plate
3 Depressing Cam

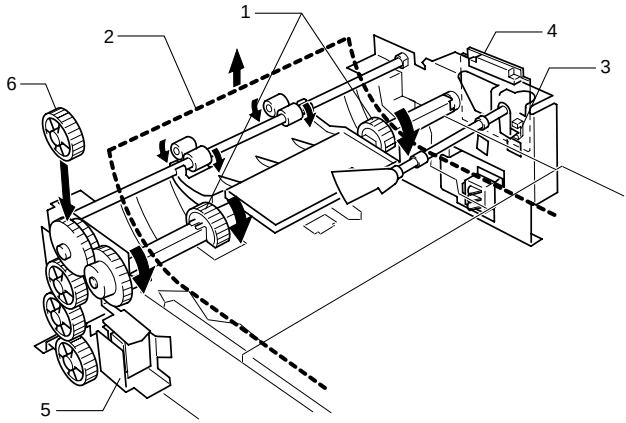
Paper Empty Detection

The Paper Empty Sensor (PE1) on the upper section of the Multipurpose Tray determines whether paper is loaded in the tray. When paper is present, the actuator is lifted and the sensor is deactivated. When the tray has run out of paper, the actuator falls into the cutout in the tray and the sensor is activated.

3-2-2. Second and Third Paper Cassette Unit

Mechanism

- The Second and Third Paper Cassette Units have the same configuration.
- As drive motors are not installed in these units, the drive for feeding and transporting paper (power from M1) is transmitted from the printer via the Drive Transmission Gear.
- Although the feeding method is the same as the Multipurpose Tray in the printer, the corner separation system is applied as the paper separating method.
- Paper is separated at the corner by the paper separation claw in the paper cassette and the strength of paper itself (corner separation system). One sheet of paper is fed for each paper feed cycle.
- The Paper Take-up Solenoid (SL21) is controlled by the printer via PWB-A in the Second Paper Cassette Unit.



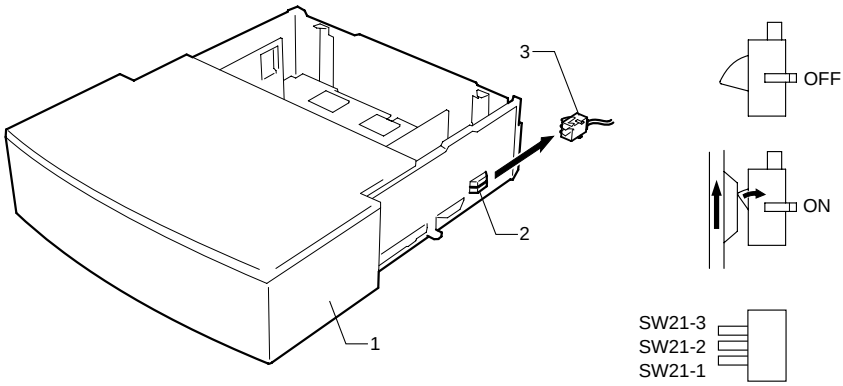
1	Paper Take-up Roller	4	Connecting Board (PWB-A)
2	Paper	5	Paper Take-up Solenoid (SL21)
3	Paper Empty Sensor (PE21)	6	Drive Transmission Gear

Paper Empty Detection

The Paper Empty Sensor (PE21) on the Connecting Board (PWB-A) determines whether paper is loaded in the tray. When paper is present, the actuator is lifted and the sensor is deactivated. When the tray has run out of paper, the actuator falls into the cutout in the tray and the sensor is activated.

Cassette Type Detection

Cassette Detection Switch (SW21) with sector levers are provided in the Second Paper Cassette Unit. When the paper cassette is inserted, the projections on the side of the cassette push and turn on the switches corresponding to each paper size. These three switches are provided as a set, and the printer recognizes the cassette type (paper size) by the combination of ON/OFF states of the switches. The printer determines the cassette type (paper size) by the combination of ON/OFF states of the switches.



1 Paper Cassette
2 Projection
3 Cassette Detecting Switch (SW21)

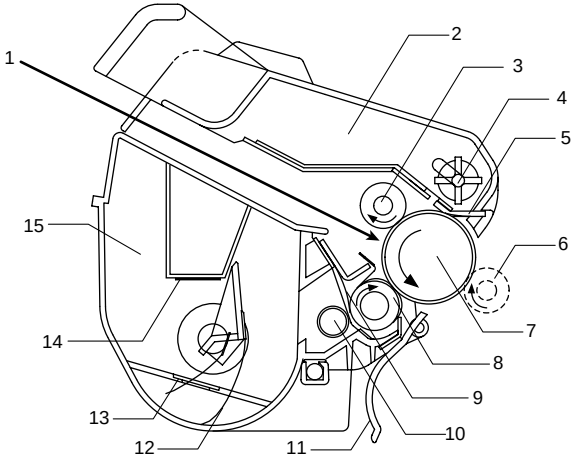
The state of SW21 for each cassette type

Cassette Type	SW21-1	SW21-2	SW21-3
A4	OFF	OFF	ON
B5	ON	ON	OFF
Letter	OFF	ON	OFF
Legal	ON	OFF	OFF
Executive	OFF	ON	ON
No Cassette (or undefined)	OFF	OFF	OFF
	ON	ON	ON
	ON	OFF	ON

3-3. Imaging Cartridge

3-3-1. Overview

The imaging cartridge is a unit that integrates functions for charging, developing, cleaning, supplying toner, and storing waste toner.



Section names and Functions

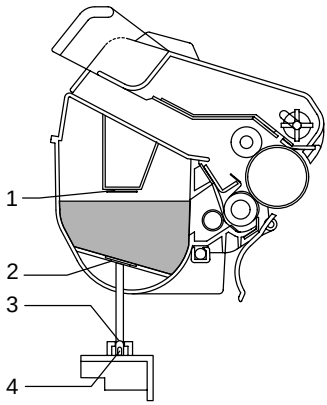
	Name	Function
1	Laser Exposure	Emits a laser beam from the laser exposure section
2	Waste toner section	Removes and collects excess toner.
3	Rotating Charge Brush	Charges the PC Drum.
4	Waste toner collection blade	Collects the waste toner removed by the cleaning blade.
5	Cleaning blade	Removes excess toner (waste toner) on the PC Drum after transferring the image to the paper.
6	Image Transfer Roller	Transfers the toner image on the PC Drum to the paper.
7	PC Drum	An invisible image is created on the surface by laser, developing is performed by the resin sleeve, and the developed image is transferred to the paper.
8	Sleeve Roller	Transfers toner to the surface of the PC Drum by rotating the resin sleeve for development.
9	Toner control plate	Distributes the appropriate amount of toner evenly on the resin sleeve. The toner is negatively charged when fed between the toner control plate and resin sleeve.

	Name	Function
10	Toner Transport Roller	Transfers toner to the sleeve roller section.
11	PC Drum protection cover	Covers and protects the PC Drum when taking the imaging cartridge out of the printer.
12	Toner Agitating blade	Agitates the toner in the Toner Hopper and sends the toner to the Toner Transport Roller.
13	LED penetration window	Light from the Toner Empty Sensor LED penetrates this section.
14	Mirror	Light from the Toner Empty Sensor LED is reflected when only a small amount of toner remains.
15	Toner Hopper	Contains toner.

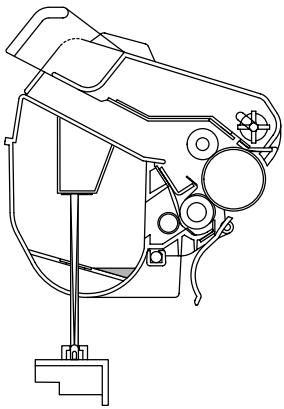
3-3-2. Toner Empty Detection

The amount of toner remaining is detected by the Toner Empty Sensor LED and photo sensor. When the amount of toner is sufficient, light from the Toner Empty Sensor LED is not reflected by the mirror. However, when only a small amount of toner remains, the light from the Toner Empty Sensor LED is reflected by the mirror, the photo sensor receives the light, and it detects that the toner hopper is empty. At this time, the toner empty command is sent to the controller. When the Top Cover is opened and then closed, the printer recognizes that the imaging cartridge is replaced and resets the toner empty command.

When the amount of toner is sufficient



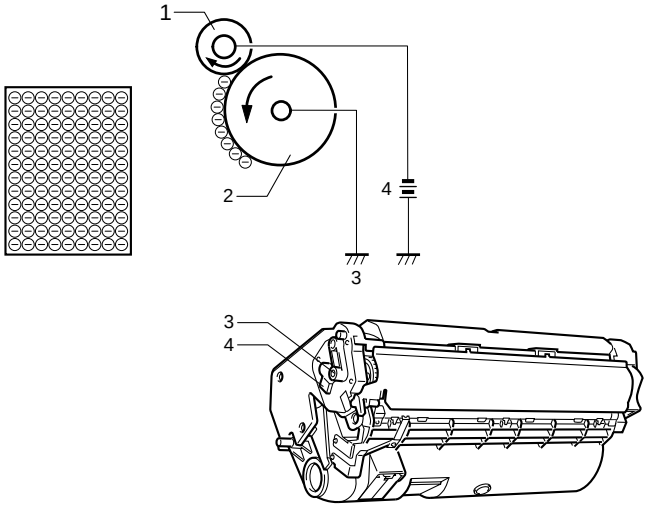
When the toner hopper is empty



1 Mirror
2 LED penetration window
3 Toner Empty Sensor LED
4 Photo Sensor

3-4. Drum Charge

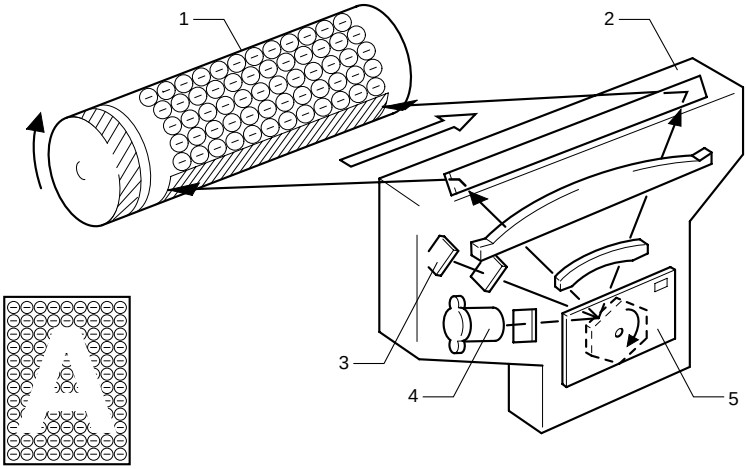
- The PC Drum is charged with static electricity before laser exposure.
- The Rotating Charge Brush and the Precharge-film are used for the charging method.
- The Rotating Brush charging and Precharge-film charging generate little ozone in the printer. Because the charge is directly applied to the PC Drum, the PC Drum can be charged by low voltage. The PC Drum is charged evenlyacross it's entire surface.
- The Pre-charge Film supplies the charge to the PC Drum before being charged by the Rotating Charge Brush to improve charging efficiency.
- The electric potential on the surface of the charged PC Drum is approximately -800 V.



1	Rotating Charge Brush	3	Ground (PC Drum)
2	PC Drum	4	Charge Bias (Rotating Charge Brush)

3-5. Laser Exposure

Laser exposure is the process of creating an invisible static charge image on the PC Drum by the laser beam emitted from the Print Head Unit. This process is controlled as follows in order to appropriately time image printing.



1 PC Drum
2 Print Head Unit (PH1)
3 SOS Sensor (PWB-D)
4 Laser Diode
5 Polygon Motor (M2)

In the sub-scanning direction (vertical direction)

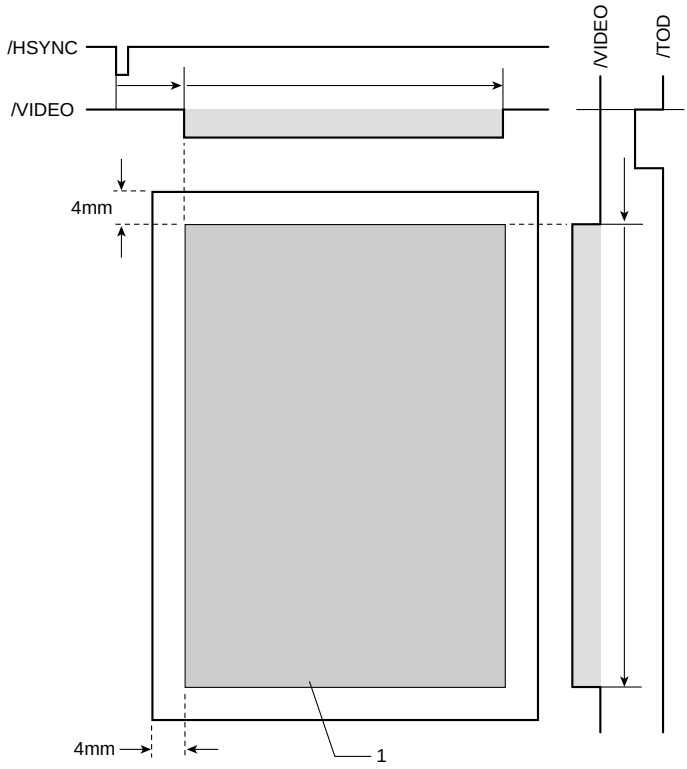
- When the printer receives the PRINT signal, the Polygon Motor and the Main Motor rotate and the paper is fed into the printer.
- The printing in the sub-scanning direction is started when PWB-A sends the VIDEO signal to the Print Head a certain time after the leading edge of the paper activates the Paper Sensor (TOD signal).
- This process is controlled as follows in order to appropriately time image printing.

In the scanning direction (horizontal direction)

- The SOS sensor is installed on the laser diode control board (PWB-D) to standardize the laser emission timing for each line of scanning.

Printing Area

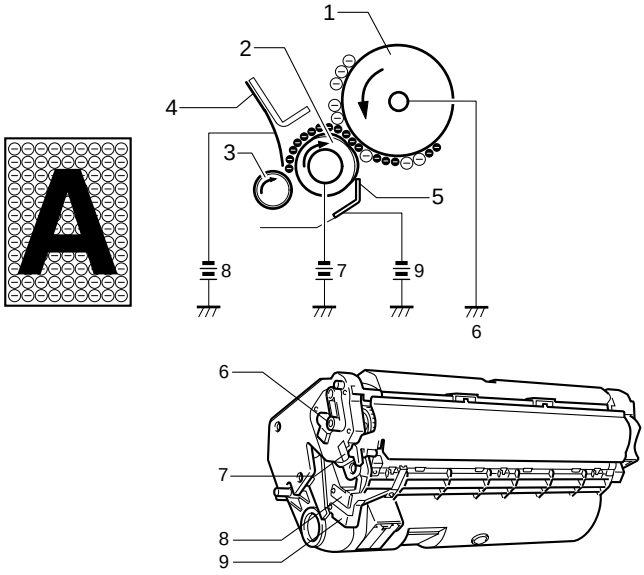
- The controller sends the VIDEO signal of the appropriate paper size to the engine.
- The controller determines the starting point of printing according to the TOD signal (sub-scanning direction) sent from the engine (PWB-A) and the HSYNC signal.
- Laser exposure is started when the print head receives the VIDEO signal.



1 Printing Area

3-6. Development

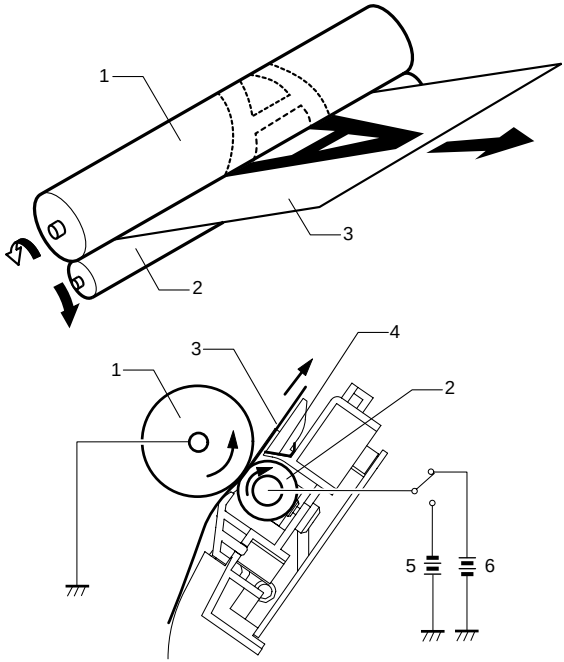
Toner is applied to the invisible static image on the PC Drum and a toner image is created on the drum surface.



1 PC Drum
2 Sleeve Roller
3 Toner Transport Roller
4 Toner Blade
5 Lower Seal
6 Ground (PC Drum)
7 Developing Bias
8 Toner Blade Bias Terminal
9 Lower Seal Bias

3-7. Image Transfer

- Image transfer is the process of transferring the toner image created on the PC Drum in the developing process to paper.
- Roller Image Transfer is used instead of Corona Image Transfer as the image transfer method. In Roller Image Transfer, there is little generation of ozone due to corona discharge. Also, there is no blur of toner because the paper is always pressed by the PC Drum and the Image Transfer Roller.
- When cleaning the Image Transfer Roller and before printing, reverse bias is applied.
- The residual electric potential on the paper is dissipated via a discharge needle.

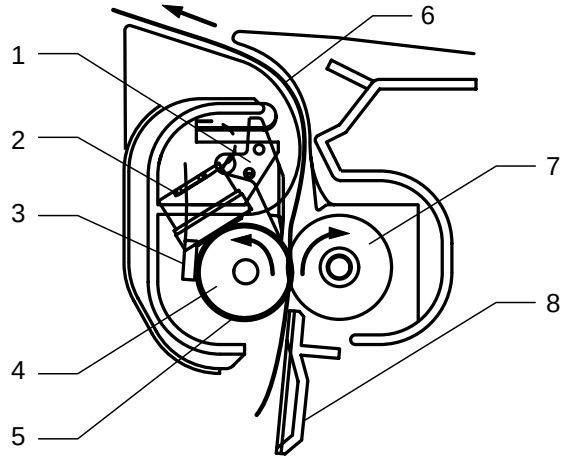


1	PC Drum	4	Discharge Needle
2	Imaging Transfer Roller	5	Reverse Bias
3	Paper	6	Image Transfer Roller

3-8. Fusing

3-8-1. An Overview

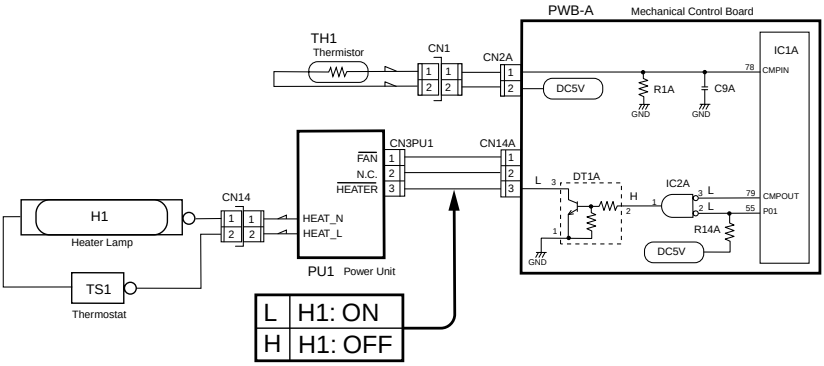
- The toner image transferred to the paper is fused to the paper in the Fusing Section.
- A heat roller system is used as the fusing system. The toner is fused on the paper as it is pressed between the Backup Roller and Heat Roller heated by the Heater Lamp.



1 Paper Separator
2 Thermostat (TS1)
3 Thermistor (TH1)
4 Heater Lamp (H1)
5 Heat Roller
6 Paper
7 Backup Roller
8 Fusing Entrance Guide Plate

3-8-2. Fusing Temperature Control Circuit

- The Thermistor (TH1) detects the surface temperature of the Fusing Heat Roller and inputs that analog voltage into IC1A-78. Corresponding to this data, the Heater Lamp ON/OFF signal is output from IC1A-55, causing the Heater Lamp (H1) to turn ON or OFF to control the fusing temperature.
- When the Heater Lamp is not turned OFF even if the Thermistor detects a high temperature malfunction (if the surface temperature of the Fusing Heat Roller exceeds 245°C/473ºF), the signal from IC1A-79 changes from “low” to “high” to turn OFF the Heater Lamp forcibly.



The printer is initialized upon power being supplied. The printer then starts warming-up and the Heater Lamp lights. This lamp is lit until the temperature of the Heat Roller reaches approximately 200°C/392ºF. The temperature is controlled as follows.

Mode 1

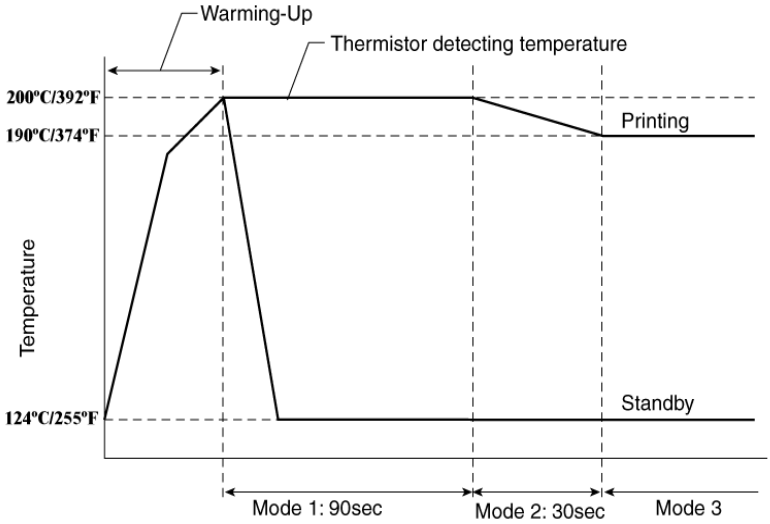
The temperature is controlled to maintain about 124°C/255ºF during standby and 200°C/392ºF during printing. If this mode continues for 90 seconds, it will shift to mode 2.

Mode 2

The temperature of the Heat Roller falls gradually to about 190°C/374ºF from about 200°C/392ºF. If this mode continues for 308 seconds, it will shift to mode 3.

Mode 3

The temperature is controlled to maintain about 124°C/255ºF during standby and about 190°C/374ºF during printing. Unless an error occurs or the top cover is opened, this mode is maintained.



	Temperature immediately after temperature control starts		
The state before discontinuation of temperature control	less than 45°C/113ºF	45°C/113ºF or more, less than 100°C/212ºF	100°C/212ºF or more
Mode 1	Mode 1		
Mode 2, 3 or Power OFF	Mode 1	Mode 2	Mode 3

3-9. Paper Exit

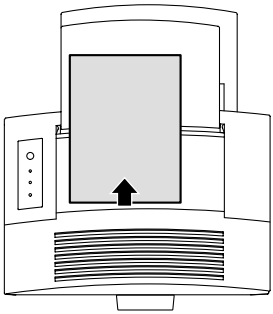
3-9-1. Overview

- The Main Motor (M1) transmits drive to the Paper Exit Roller via the gears. The paper is discharged onto the tray with the printed side facing down.

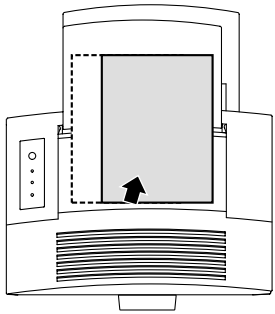
3-9-2. Jog Tray Function (4100GN only)

- The jog tray function enables the Paper Exit Roller to slide to the left and right so that paper is sorted and discharged at different positions on the tray while printing.
- The original discharging position when not using the jog tray function is regarded as jog position 1.
- The position where paper is discharged with the Paper Exit Roller changed by the jog tray function is regarded as jog position 2.

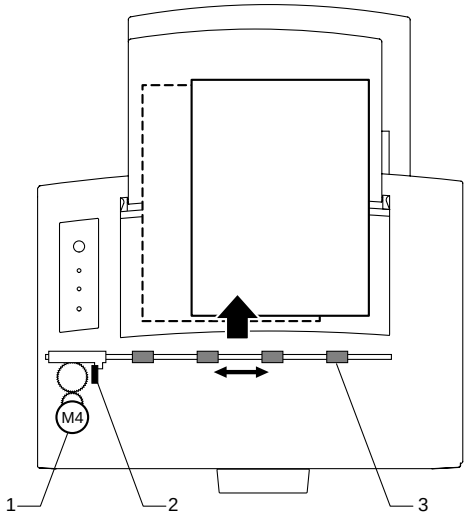
Jog position 1



Jog position 2



- The jog tray function is activated when paper exits the fusing section and the Paper Exit Sensor (PS3) is turned off.
- The Jog Motor (M4) rotates forward when the Paper Exit Sensor (PS3) is turned off. The paper is discharged, sliding to the side (jog position 2), while the Paper Exit Roller is sliding.
- When the paper is discharged, the Jog Motor (M4) rotates backward. The roller stops sliding when the Jog Position Sensor (JOG_POS1) is turned on.



1 Jog Motor (M4)
2 Jog Position Sensor (JOG_POS1)
3 Paper Exit Roller

3-10. Duplex Unit (Option)

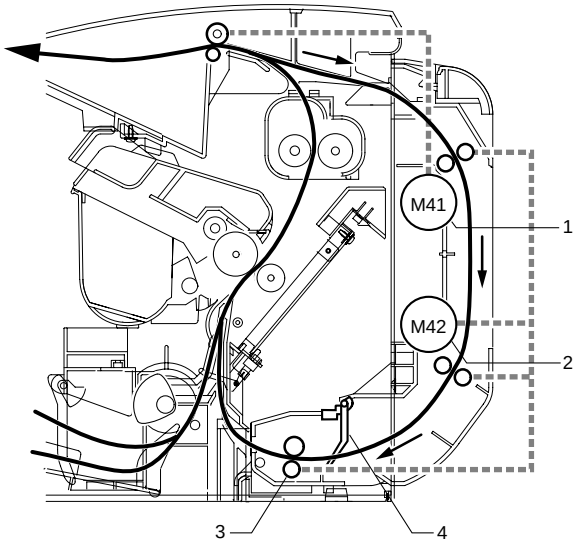
The Paper Exit Roller is connected to the Switchback Motor (M41) by the connection lever and gear when the Duplex Unit is installed to the printer.

For simplex printing

The printed paper passes the Paper Exit Sensor and is discharged by the Paper Exit Roller.

For duplex printing

Paper with an image printed on one side is transferred by the Paper Exit Roller until the paper passes the Paper Exit Sensor. The Switch Back Motor (M41) then rotates backward to feed the paper to the Duplex Unit. The paper is transferred to the Register Roller by the Transfer Motor (M42). Paper tilt is checked and corrected by the Paper Exit Sensor (DUP_PS1) and the paper is fed to the Transfer Section by the Register Roller. Printing is performed on the rear side and the paper is discharged by the Paper Exit Roller.



1 Switchback Motor (M41)
2 Transfer Motor (M42)
3 Resister Roller
4 Paper Exit Sensor (DUP_PS1)

4. MAINTENANCE/DISASSEMBLY

4-1. Precautions for Maintenance/Disassembly

4-1-1. Precautions for Disassembly

Observe the following precautions whenever servicing the printer.

- Be sure to unplug the printer from the outlet before attempting to service the printer.
- To reassemble the printer, reverse the order of disassembly unless otherwise specified.
- The printer should not be operated anytime during disassembly. If it is absolutely necessary to run the printer with its covers removed, use care not to allow your clothing to be caught in moving parts such as the gears, rollers, and motor.
- Never touch the terminals of electrical parts or high-voltage parts such as the High Voltage Unit with the power cord connected.
- As the Fusing Section is extremely hot immediately after power is turned off, be careful when handling it. Be sure to wait until it cools down before disassembling the printer.
- Be sure to check that power is turned off before plugging in or unplugging the power cord. Always hold the connector housing when plugging in or unplugging the power cord. Faulty contact may result if the wire is held when unplugging the power cord.
- Be sure to use the fuse of the specified rating.
- Do not forget to reinstall the ground wire or ground plate to ensure positive conduction. Reinstall the screw with a toothed washer in the right position at reassembly.

4-1-2. Precautions for Handling the Laser Equipment

- When a service job needs to be performed in the laser beam path, such as when working around the Print Head Unit and the Imaging Cartridge, be sure to turn the printer OFF first.
- Do not place any reflective objects in the laser beam path.
- If it is necessary to leave the printer on, remove your watch and any rings, and wear laser protective goggles that meet the following laser specifications:

Max. power	1.03 mW
Output wavelength	770-810 nm

4-1-3. Parts not to be touched

The following parts should not be removed, disassembled, or adjusted.

- Print Head Unit
- The parts where the mounting screws are painted red.

4-1-4. Instructions for Handling the PWBs with MOS ICs

The following precautions must be observed when handling circuit boards with MOS (Metal Oxide Semiconductor) ICs.

During Transportation/Storage:

- During transportation or in storage, circuit boards must not be indiscriminately removed from their conductive cases or bags. Never wrap boards with plastic bags or paper.
- Do not store or place circuit boards in a location exposed to direct sunlight.
- If circuit boards need to be removed from their conductive cases or bags, never put them in a place easily charged with static electricity (carpet etc.) or on objects such as plastic and vinyl bags.

During Replacement:

- The entire unit or assembly must be replaced, as a rule.
- Be sure to unplug the power cord from the power source before unplugging the connectors from the circuit boards.
- Never touch the terminals of the IC or the printed pattern when removing the circuit board from its conductive bag or case, or when replacing the board,. Always hold the edge of the board.

During Inspection:

- Avoid checking the IC directly with a multi-meter; use connectors on the board.
- Never short terminals on the IC with metal tools, etc.
- When it is absolutely necessary to touch the ICs and other electrical components on the board, be sure to ground your body.

4-1-5. Precautions for Handling the Imaging Cartridge

During Transportation/Storage:

- Use the specified carton whenever moving or storing the Imaging Cartridge.
- The storage temperature is in the range between -20°C/68ºF and +40°C/104ºF.

Handling:

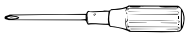
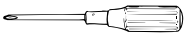
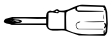
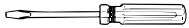
- As the PC Drum is extremely sensitive to light fatigue and takes along time to recover sensitivity, never open the protective cover or expose the PC Drum to direct sunlight.
- Use care not to contaminate the surface of the PC Drum with oil-base solvent, fingerprints, and other foreign matter.
- Do not scratch the surface of the PC Drum.

4-2. Maintenance Schedule List

Parts (Unit)	Cleaning Cycle	Replacement Cycle (Continuous Printing)	Replacement Cycle (Single Printing)
Imaging Cartridge (separately sold)	none	approximately 9,000 simplex prints	approximately 7,200 simplex prints
Imaging Cartridge (provided with printer)	none	approximately 5,000 simplex prints	approximately 4,000 simplex prints
Imaging Transfer Roller	none	approximately 50,000 simplex prints	
Fusing Unit	none	approximately 50,000 simplex prints	
Paper Take-up Roller	at the time of trouble	approximately 150,000 simplex prints	
2nd and 3rd Cassette Unit Paper Take-up Roller	at the time of trouble	approximately 150,000 simplex prints	
Transfer Roller	at the time of trouble	approximately 150,000 simplex prints	

The Imaging Cartridge is a user-replaceable item.

4-3. Required Service Tools

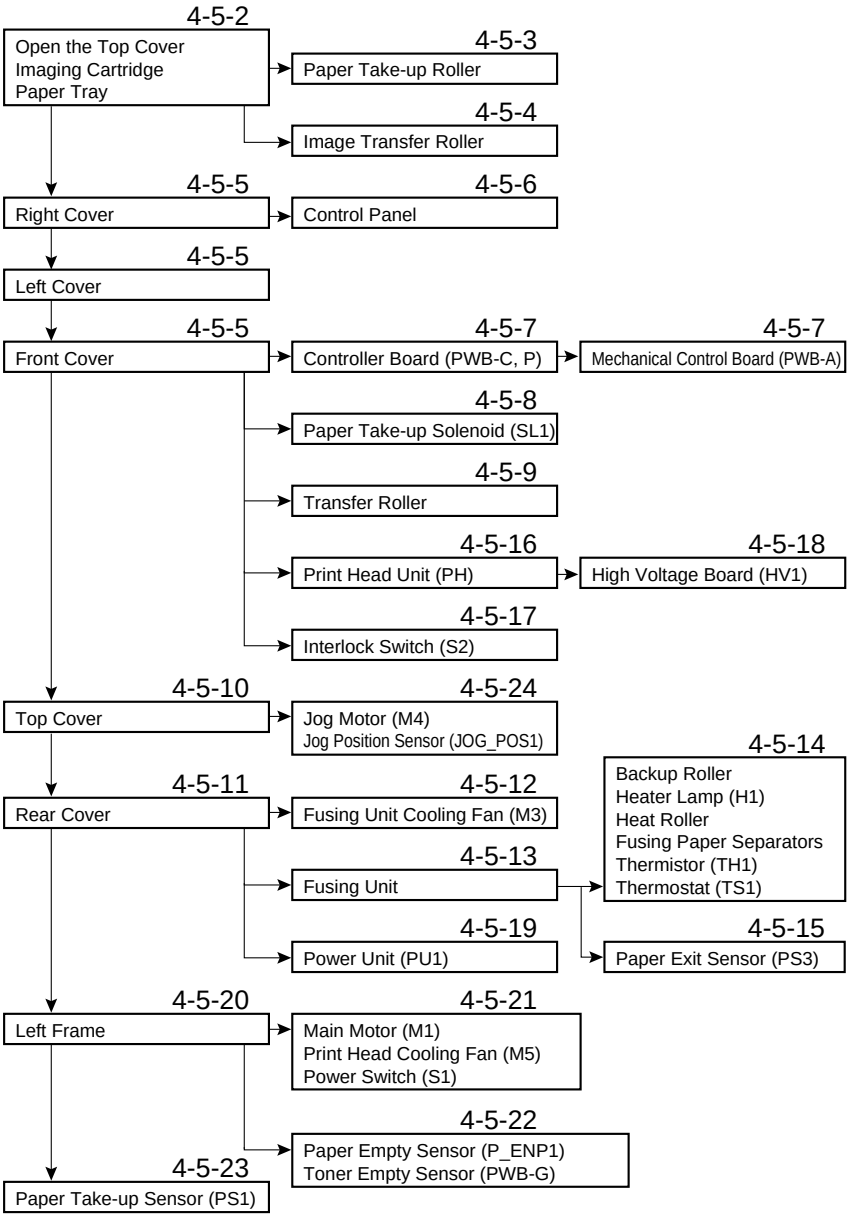
Tools			
Phillips screwdriver (No. 1)	Phillips screwdriver (No. 2)	Stubby screwdriver (Phillips)	Flat screwdriver
 tool1	 tool1	 tool3	 tool9

4-4. Screws

Illust.	No.	D x L (mm)	Illust.	No.	D x L (mm)	Illust.	No.	D x L (mm)
	1308	3x8		3501 3541 3541	3x6 3x8 3x6		3907 3923	3x8 3x10
	1112	3x6		3704 3727	3x8 3x8		4012	3x6
	3435	3x30						

4-5. Disassembly Procedures

4-5-1. Disassembly Procedure Chart



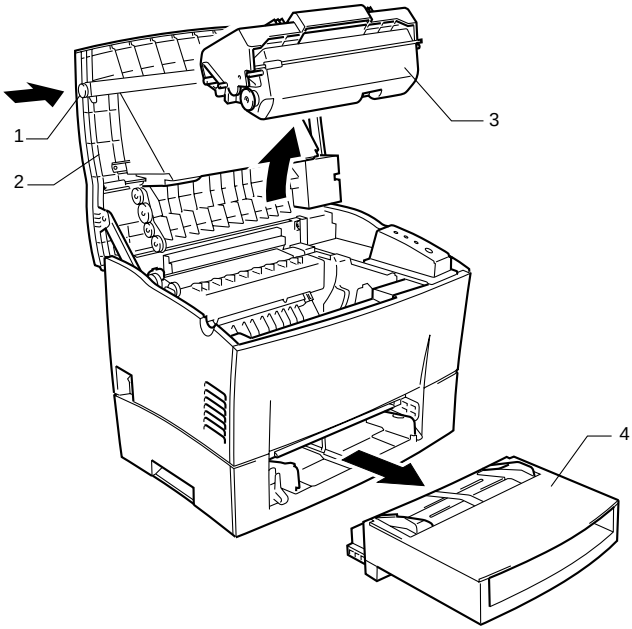
4-5-2. Before Disassembly Preparation

Before disassembling the machine, the following units need to be removed.

1 Push the Top Cover Release Button and fully open the Top Cover.

2 Remove the Imaging Cartridge.

3 Remove the Paper Tray.



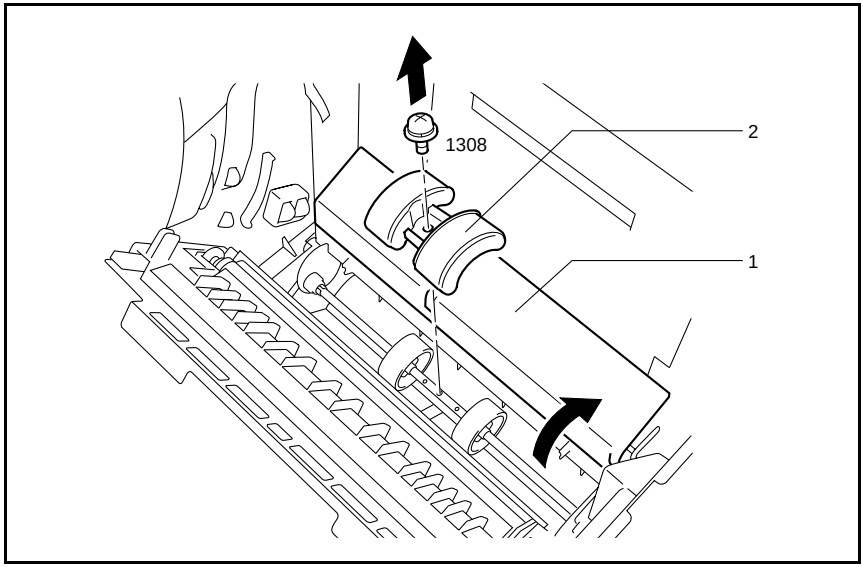
1	Top Cover Release Button	3	Imaging Cartridge
2	Top Cover	4	Paper Tray

4-5-3. Replacing the Paper Take-up Roller

Replace the Paper Take-up Roller approximately every 150,000 simplex prints.

1 Open the Paper Take-up Roller Cover and remove the Paper Take-up Roller. (1 screw)

NOTE:
When installing the roller, fit the positioning pin on the back side of the roller into the hole of the shaft.



1 Paper Take-up Roller Cover

2 Paper Take-up Roller

4-5-4. Replacing the Image Transfer Roller

Replace the Image Transfer Roller approximately every 150,000 simplex prints.
Never touch the surface of the Image Transfer Roller or contaminate it with chemicals or toner. Any depression or contamination on the roller will affect the printing quality.

• Carefully hold the roller by the shaft or bushings.

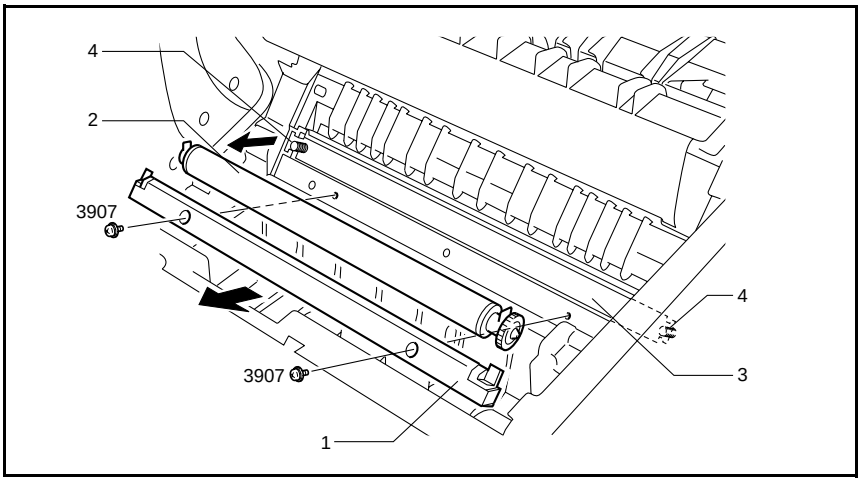
---

1 Remove the Image Transfer Roller cover by using a Stubby Screwdriver. (2 screws)

2 Push down the lever of the bushings (white) of the Image Transfer Roller and remove the roller from the Image Transfer Roller holder.

NOTE:

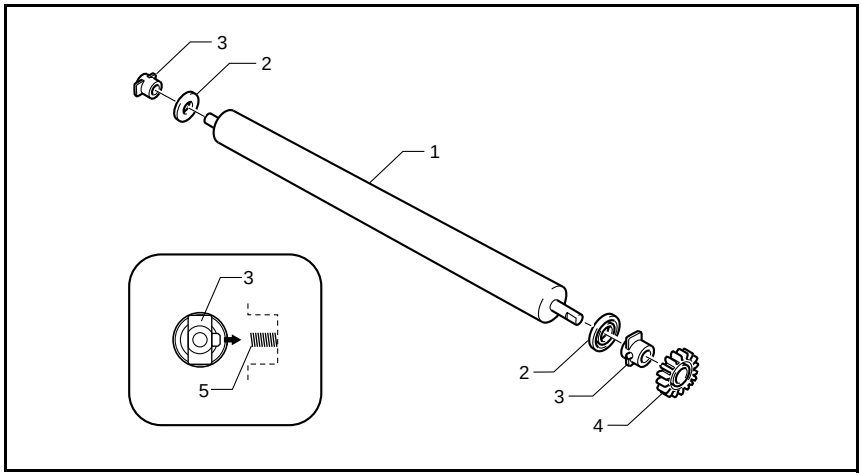
• Do not lose the holding springs for the Image Transfer Roller Holder.



1 Image Transfer Roller Cover
2 Image Transfer Roller
3 Image Transfer Roller Holder
4 Holding Springs

3 Remove the left and right roller holders, bushings, and gear from the original Image Transfer Roller and attach them to the new one.

4 Insert the new roller into the Transfer Roller holder and raise the lever of the bushings.



1 Imaging Transfer Roller
2 Bushing
3 Roller Holder
4 Gear
5 Holding Screw

5 Replace the Image Transfer Roller cover. (2 screws)

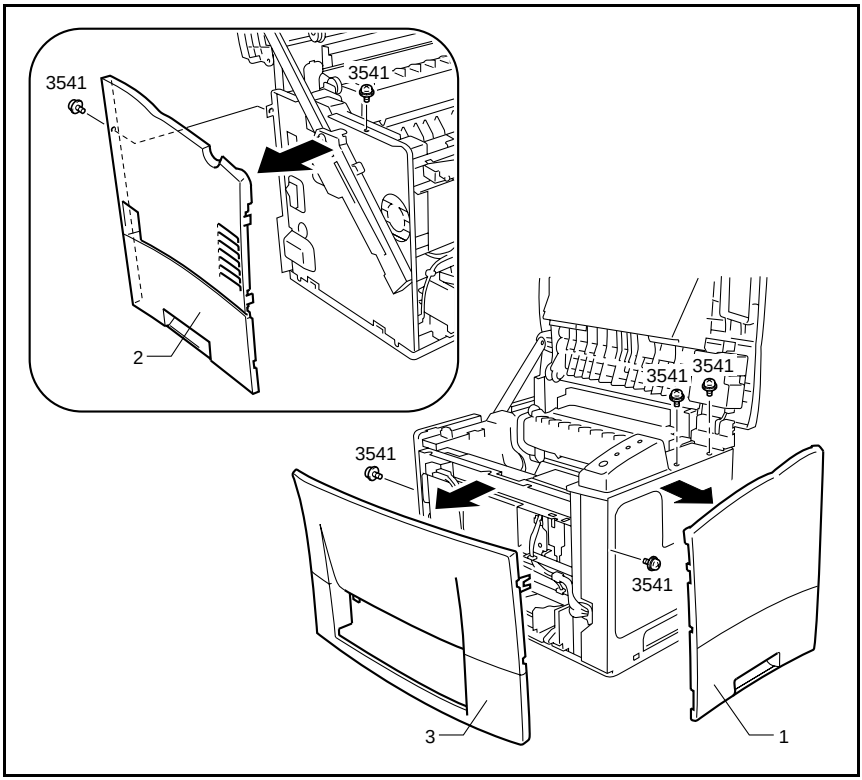
4-5-5. Removal of the Right Cover, the Left Cover and the Front Cover

1 Remove the Right Cover. (2 screws)

2 Remove the Left Cover. (2 screws)

3 Remove the Front Cover. (2 screws)

NOTE:
When reinstalling each cover, securely insert the projections of the cover into the cutouts in the printer frame.

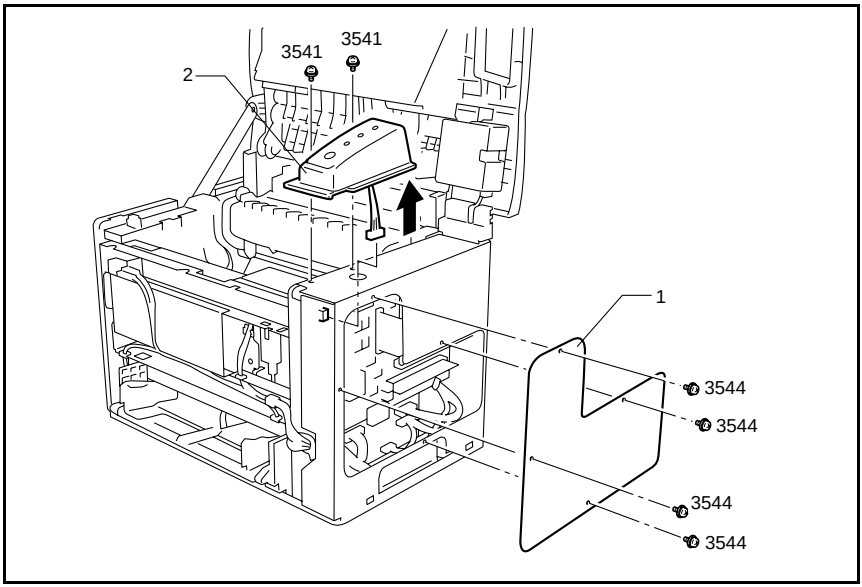


1 Right Cover
2 Left Cover
3 Front Cover

4-5-6. Removal of the Control Panel

1 Remove the Controller Cover. (4 screws)

2 Remove the Control Panel. (2 screws, 1 connector)



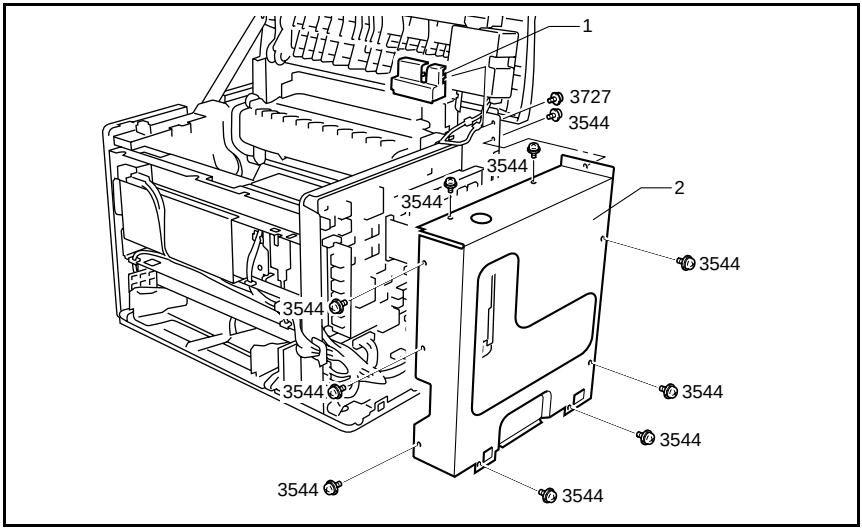
1 Controller Cover

2 Control Panel

4-5-7. Removal of the Controller Board (PWB-C, P) and the Mechanical Control Board (PWB-A)

1 Remove the Harness Cover. (1 screw)

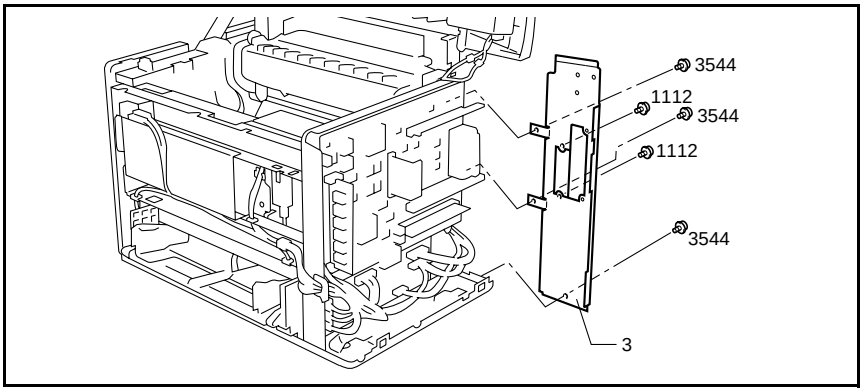
2 Remove the Board Cover A. (10 screws)



1 Harness Cover

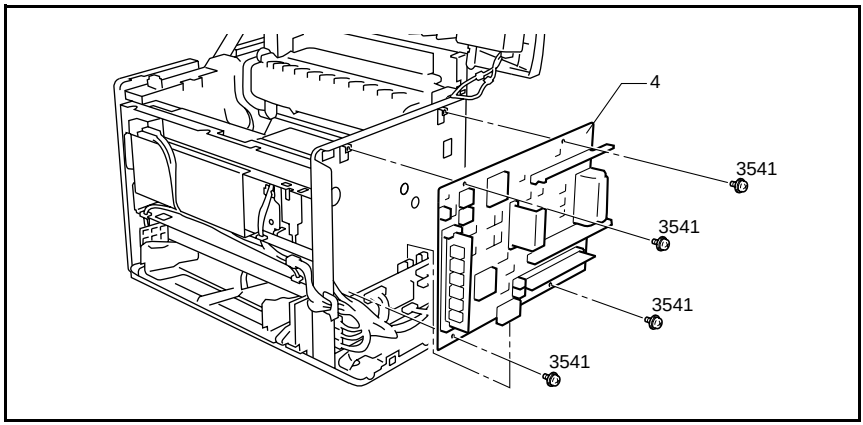
2 Board Cover A

3 Remove Board Cover B. (5 screws)



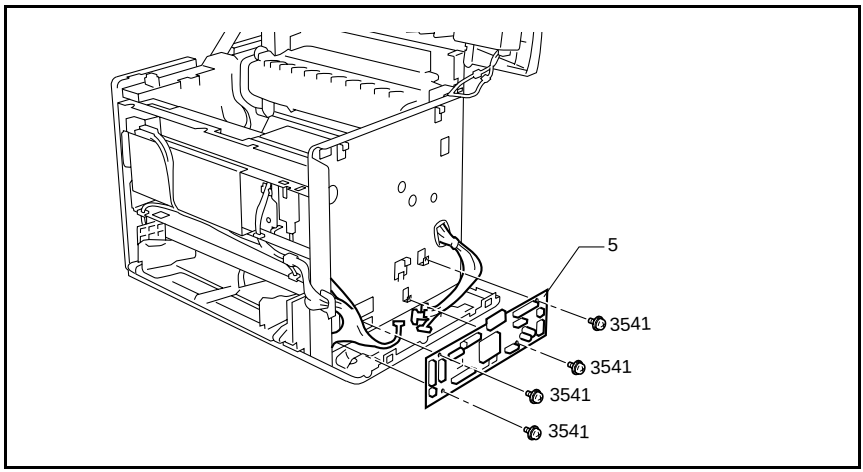
3 Board Cover B

4 Remove the Controller Board (PWB-C or PWB-P). (4 screws, 1 connector)



4 Controller Board (4100E, 4100GN: PWB-C, 4100W: PWB-P)

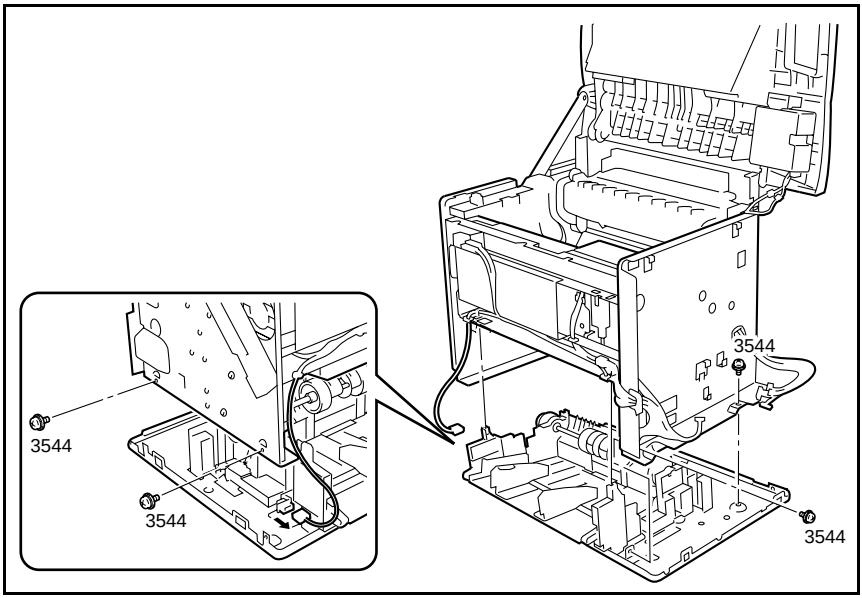
5 After unplugging all connectors on the Mechanical Control Board (PWB-A), remove the Mechanical Control Board (PWB-A). (4 screws)



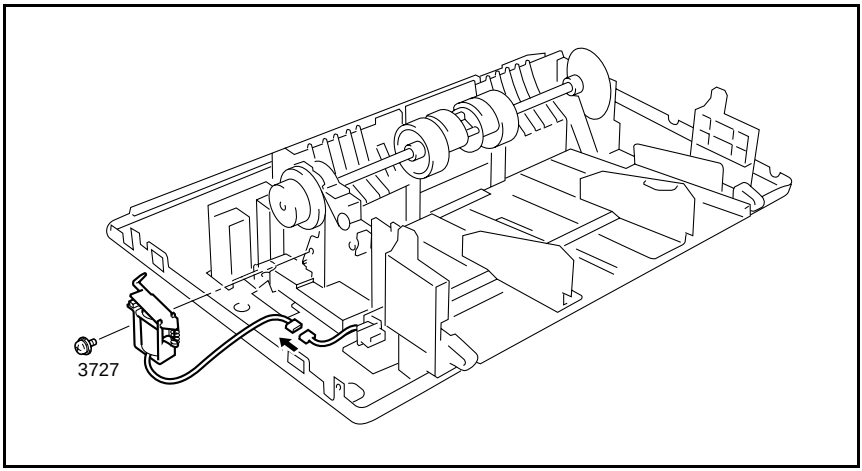
5 Mechanical Control Board (PWB-A)

4-5-8. Removal of the Paper Take-up Solenoid (SL1)

1 Remove the upper section of the printer. (4 screws, 1 connector)



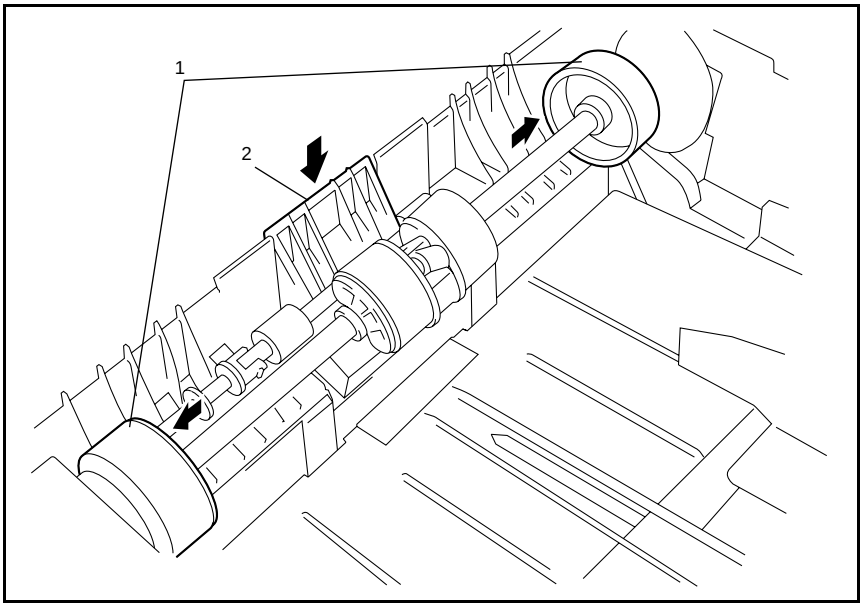
2 Remove the Paper Take-up Solenoid (SL1). (1 screw, 1 connector)



4-5-9. Replacing the Transfer Roller

Replace the Transfer Roller approximately every 150,000 sheets of print.

1 Holding the Transfer Roller Holder, move the Transfer Rolls apart to both sides.



1 Transfer Rolls

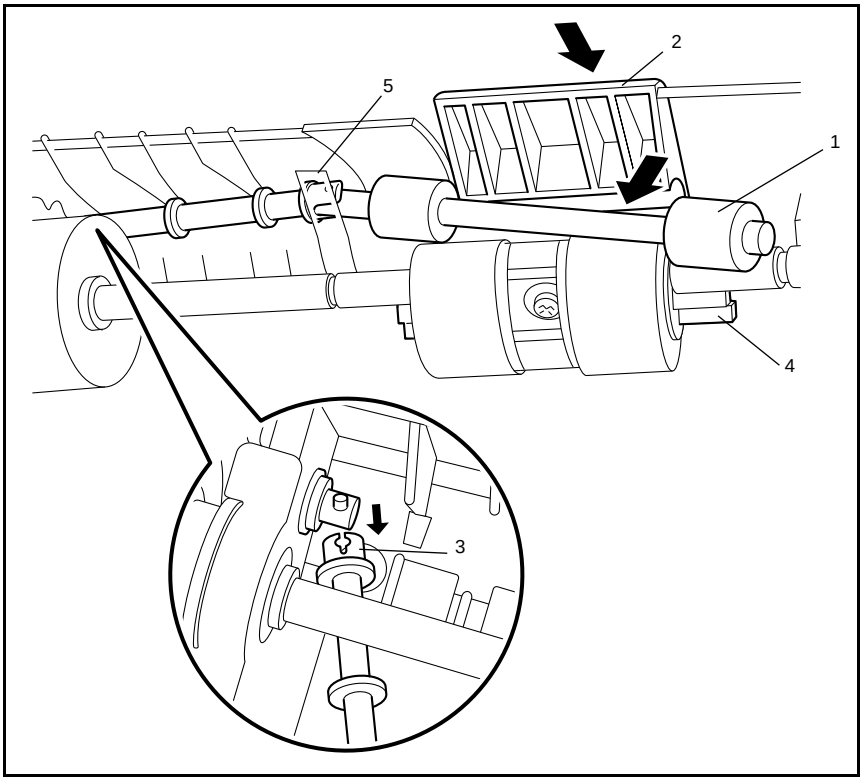
2 Transfer Roller Holder

2 Hold the Transfer Roller Holder tightly and pull the Transfer Roller out from the right side.

3 Disconnect the transfer roller at the joint and remove it.

NOTE:

- Attach the New Transfer Roller so that the guide film is placed upward.
- Press the Transfer Roller Holder and the Paper Separator down when attaching the Transfer Rolls to the original positions.



1 Transfer Roller
2 Transfer Roller Holder
3 Joint
4 Paper Separator
5 Guide Film

4-5-10. Removal of the Top Cover

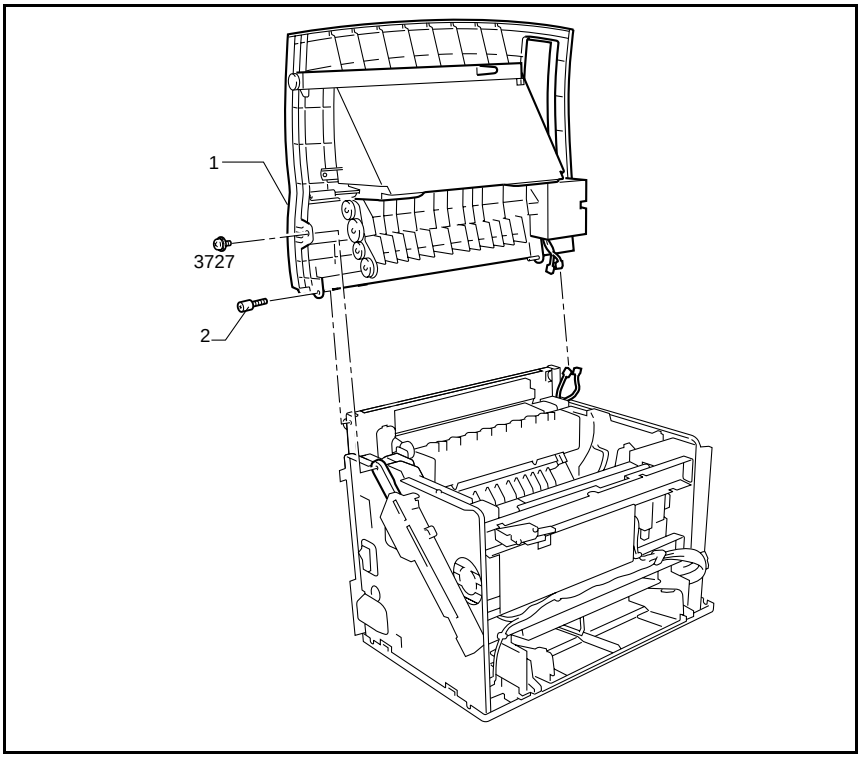
1 Remove the connectors (2 pieces) between the Top Cover and the printer.

2 Remove the Shoulder Screw and washer from the Stopper Guide.

NOTE:
Hold the upper cover with your hand, or the cover may fall when the screw is removed.

3 Remove the screw between the Top Cover and Rear Cover.

4 Remove the Top Cover.



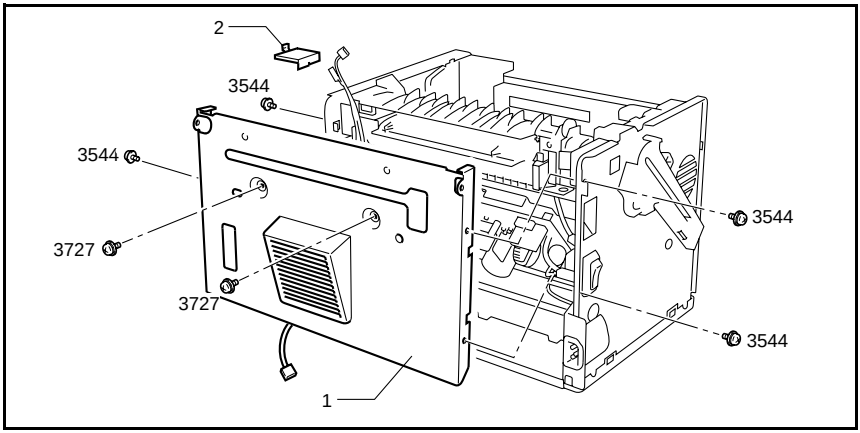
1 Top Cover

2 Shoulder Screw

4-5-11. Removal of the Rear Cover

1 Remove the Rear Cover. (6 screws, 1 connector)

NOTE:
Do not lose the connector cover.

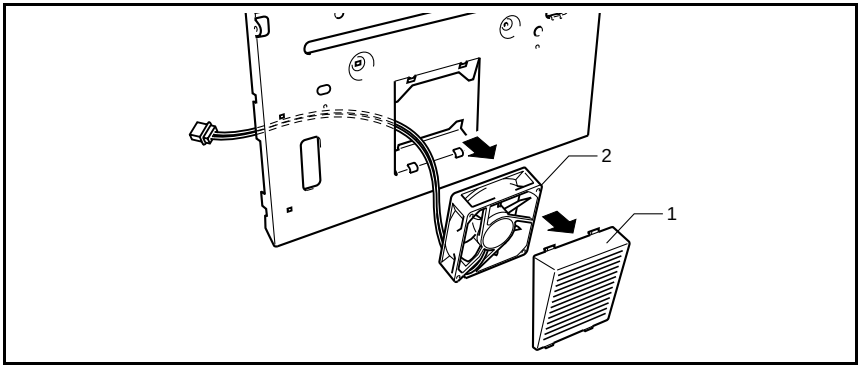


1 Rear Cover 2 Connector Cover

4-5-12. Removal of the Fusing Unit Cooling Fan (M3)

1 Remove the Cooling Fan Cover.

2 Remove the Fusing Unit Cooling Fan (M3).

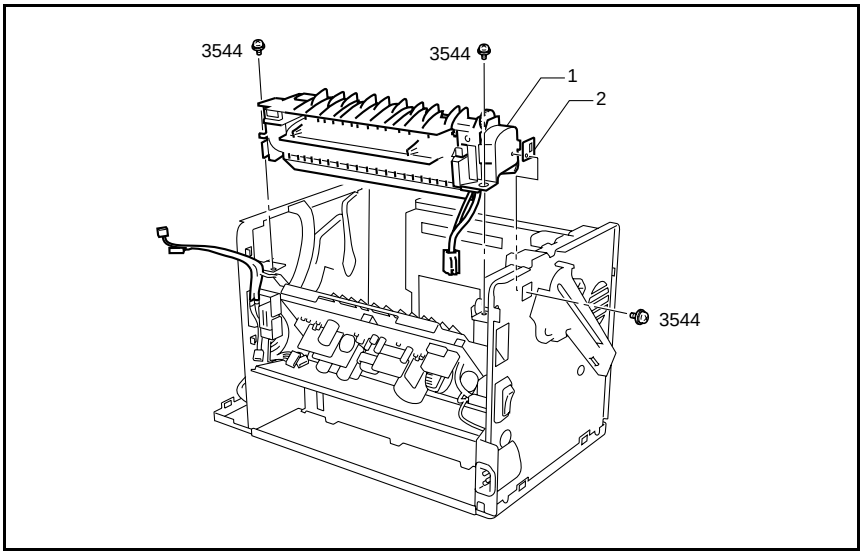


1 Cooling Fan Cover 2 Fusing Unit Cooling Fan (M3)

4-5-13. Removal of the Fusing Unit

Replace the Fusing Unit about every 50,000 sheets of print.

1 Remove the Fusing Unit. (3 screws, Fixing Plate, 3 connectors)



1 Fusing Unit 2 Fixing Plate

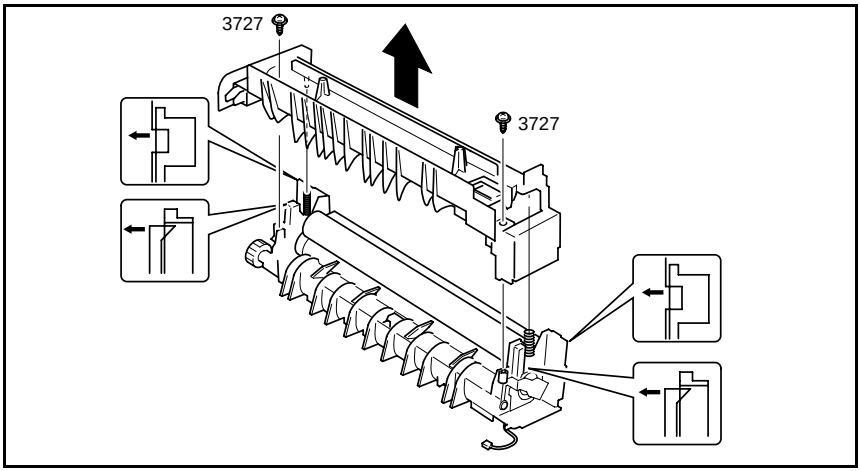
NOTE:

Once the Fusing Unit is removed, use the following instructions to make repairs when image quality problems or parts failure occur.

4-5-14. Disassembly of the Fusing Unit

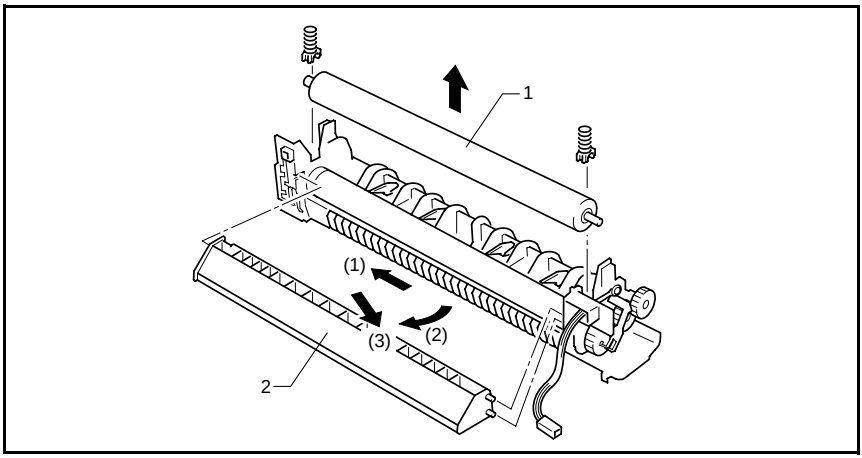
1 Remove two screws.

2 Press the left and right claws (4 in total) and separate the upper and lower fusing units.



3 Remove the Backup roller.

4 Slide the Front Fusing Guide Plate in direction (1) and pull it in direction (2) to remove one side of the plate. Then pull the plate in direction (3) to remove it completely.



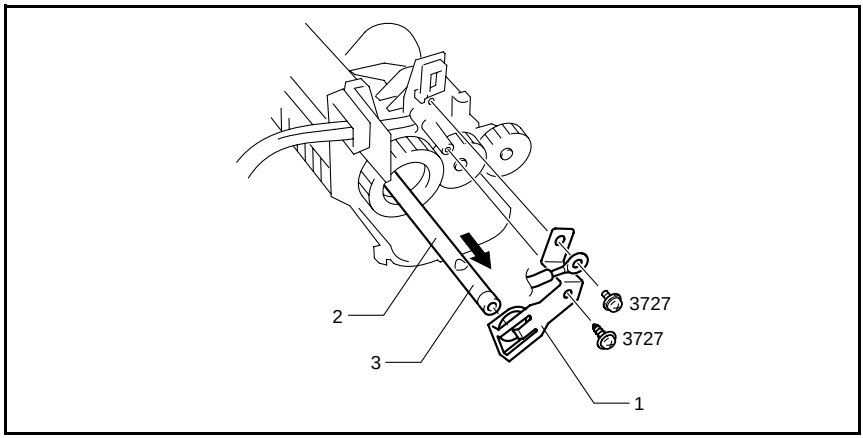
1 Backup Roller

2 Fusing Entrance Guide Plate

5 Remove the Terminal Plate. (2 screws)

6 Pull out the Heater Lamp (H1).

NOTE:
- When reinstalling the lamp, position the voltage mark on the fusing drive gear side.
- Be sure not to touch the lamp surface with bare hands.

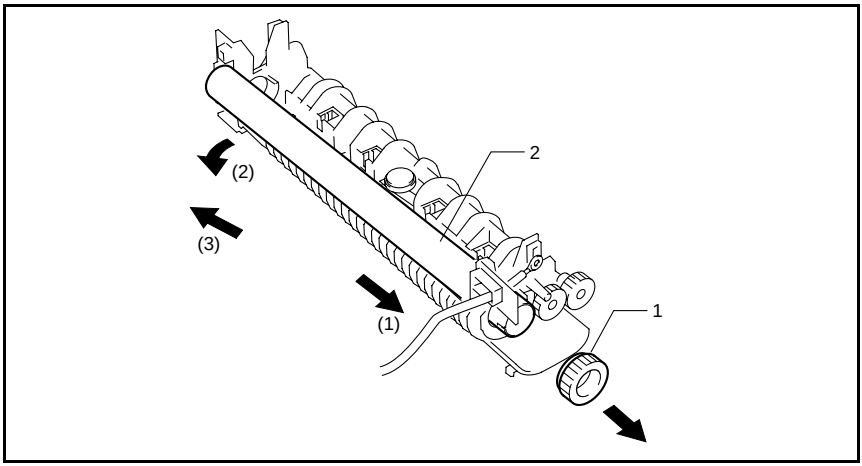


1 Terminal Plate
2 Heater Lamp (H1)
3 Voltage Mark

7 Remove the four Fusing Paper Separators.

8 Slide the Heat Roller in direction (1) and pull it in direction (2) to remove one side of the roller. Then pull the roller in direction (3) to remove it completely.

NOTE:
In order not to scratch the surface of the Heat Roller with the Fusing Separators, lift the Separators as much as possible when removing or installing the roller.



1 Drive Gear

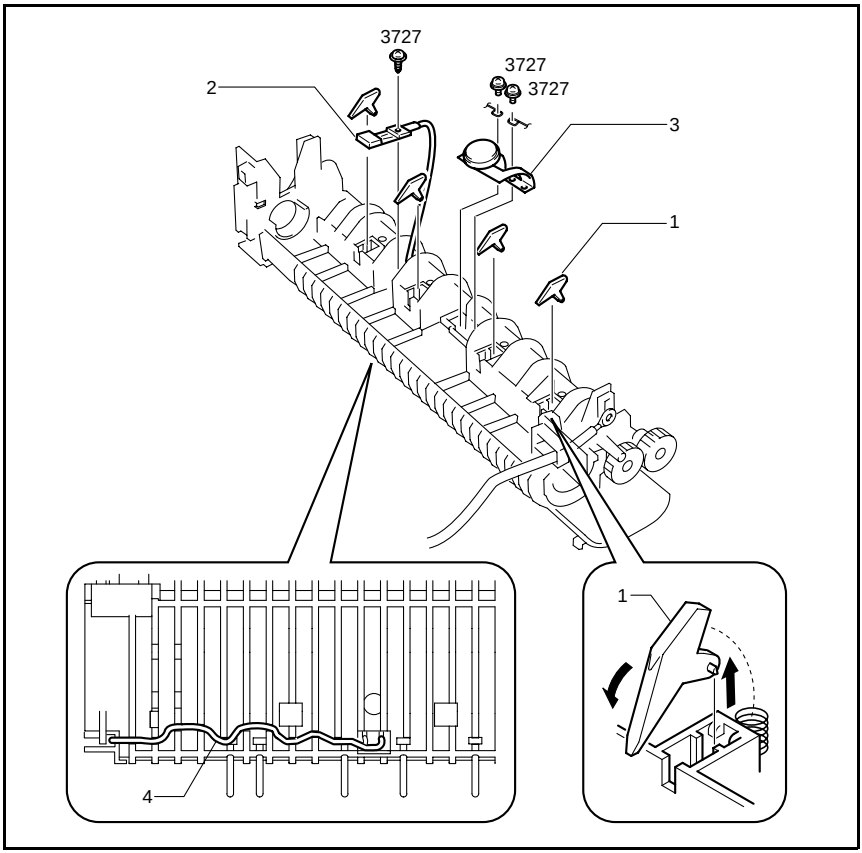
2 Heat Roller

9 Remove the four Fusing Paper Separators.

10 Remove the Thermistor (TH1). (1 screw)

NOTE:
Route the harness along the bottom of the Fusing unit when attaching the Thermistor, as shown in the following figure.

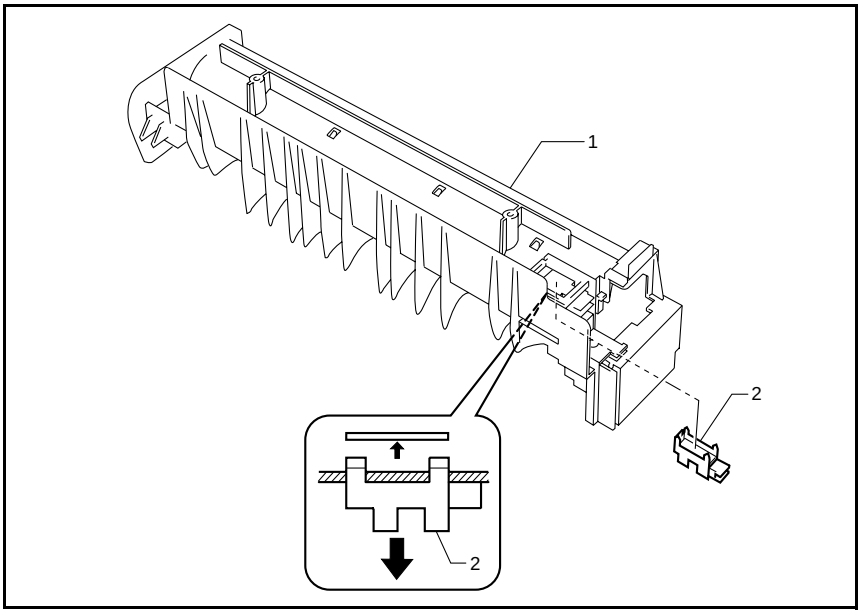
11 Remove the Thermostat (TS1). (2 screw)



1 Fusing Paper Separators
2 Thermistor (TH1)
3 Thermostat (TS1)
4 Harness

4-5-15. Removal of the Paper Exit Sensor (PS3)

1 Remove the Paper Exit Sensor (PS3) from the Fusing Unit.



1 Fusing Unit

2 Paper Exit Sensor (PS3)

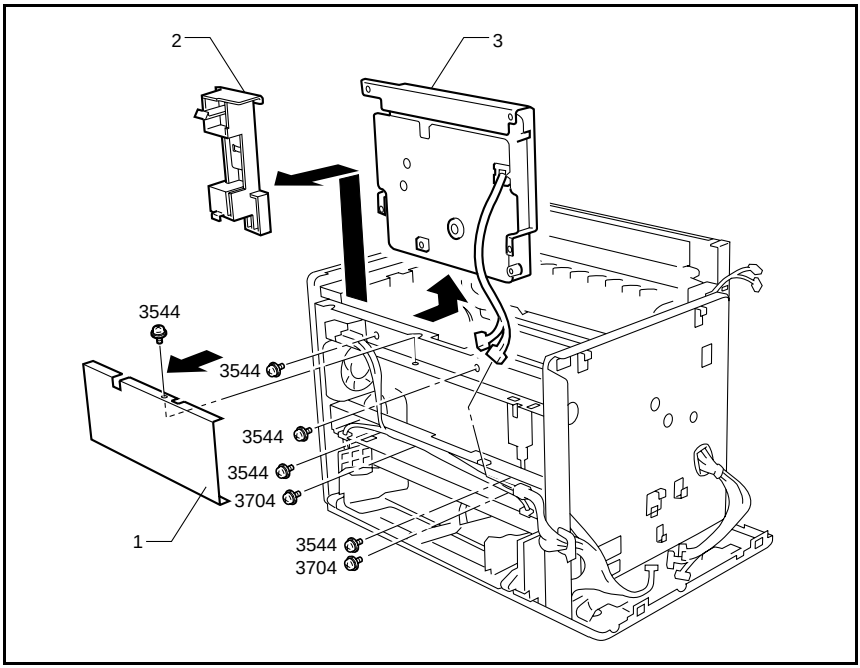
4-5-16. Removal of the Print Head Unit (PH)

1 Remove the Duct. (1 screw)

2 Remove the Cover.

3 Unplug the two connectors from PWB-A and remove the harness from the cord holders.

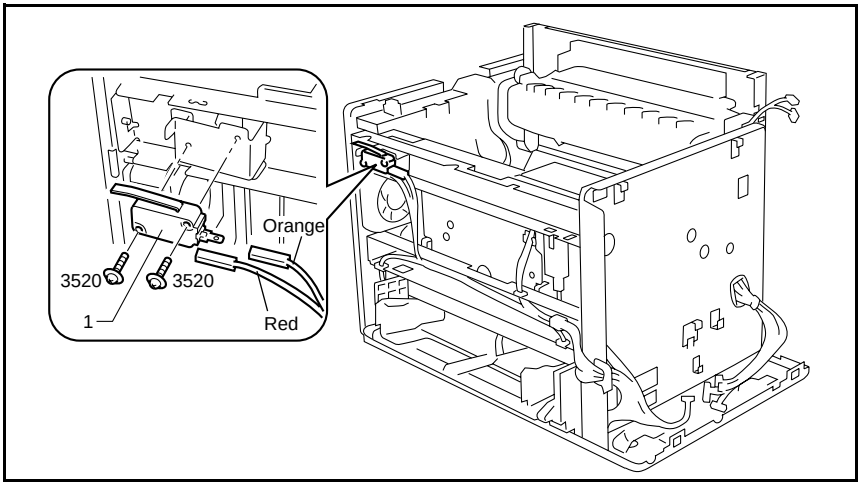
4 Remove the Print Head Unit (PH). (6 screws)



1 Duct
2 Cover
3 Print Head Unit (PH)

4-5-17. Removal of the Interlock Switch (S2)

1 Remove the Interlock Switch (S2) and unplug two connectors.

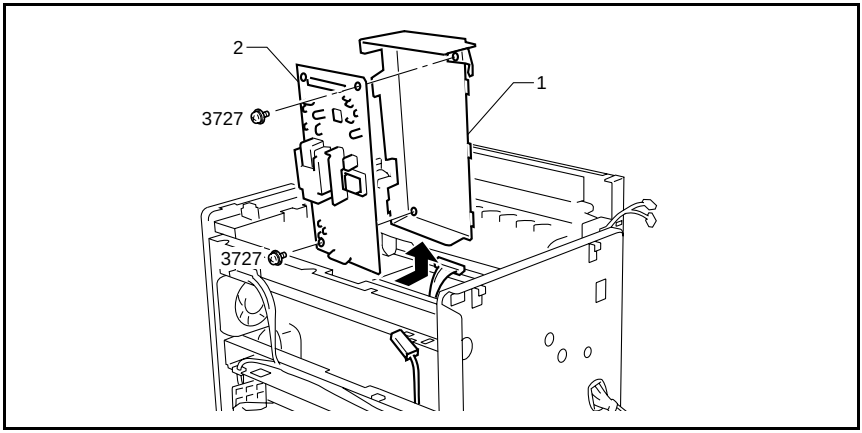


1 Interlock Switch (S2)

4-5-18. Removal of the High Voltage Board (HV1)

1 Remove the High Voltage Board Cover with High Voltage Board. (2 connectors)

2 Remove the High Voltage Board (HV1) from the Cover. (2 screws)

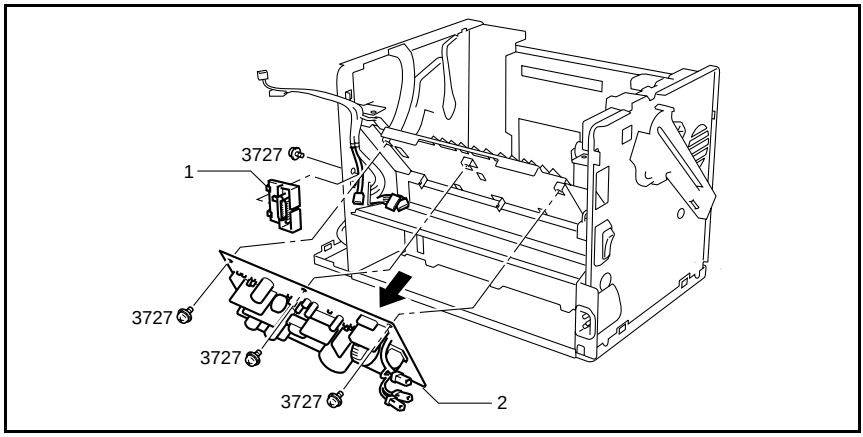


1 High Voltage Board Cover 2 High Voltage Board (HV1)

4-5-19. Removal of the Power Unit (PU1)

1 Remove the Duplex Connector Holder. (1 screw)

2 Remove the Power Unit (PU1). (3 screws, 6 connectors)

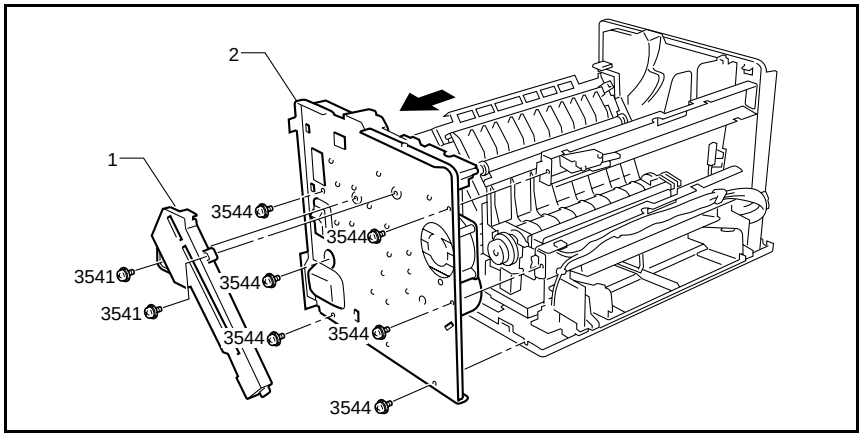


1 Duplex Connector Holder 2 Power Unit (PU1)

4-5-20. Removal of the Left Frame

1 Remove the Cover Stay Guide. (2 screws)

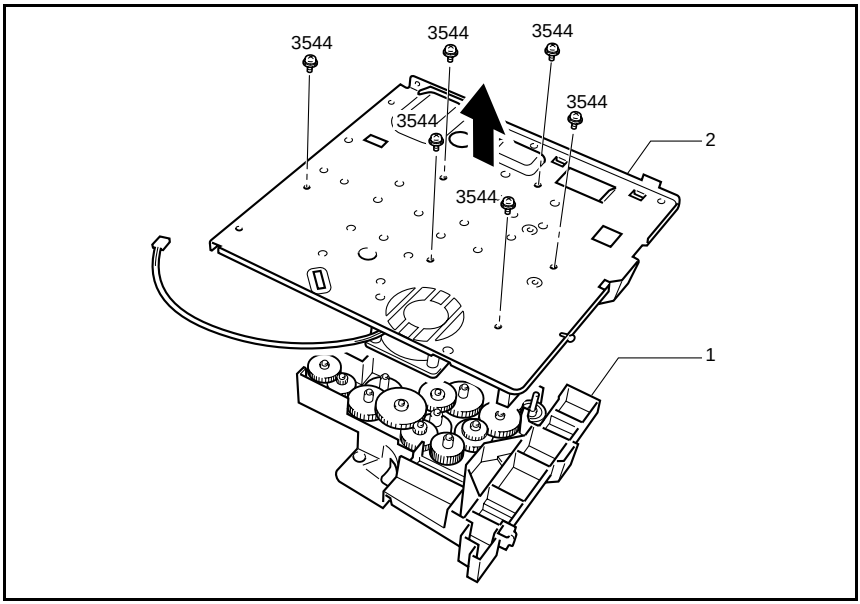
2 Remove the Left Frame. (6 screws, 5 connectors)



1 Cover Stay Guide 2 Left Frame

4-5-21. Removal of the Main Motor (M1), the Print Head Cooling Fan (M5) and the Power Switch (S1)

1 Separate the Drive Unit Cover and the Left Frame. (6 screws)



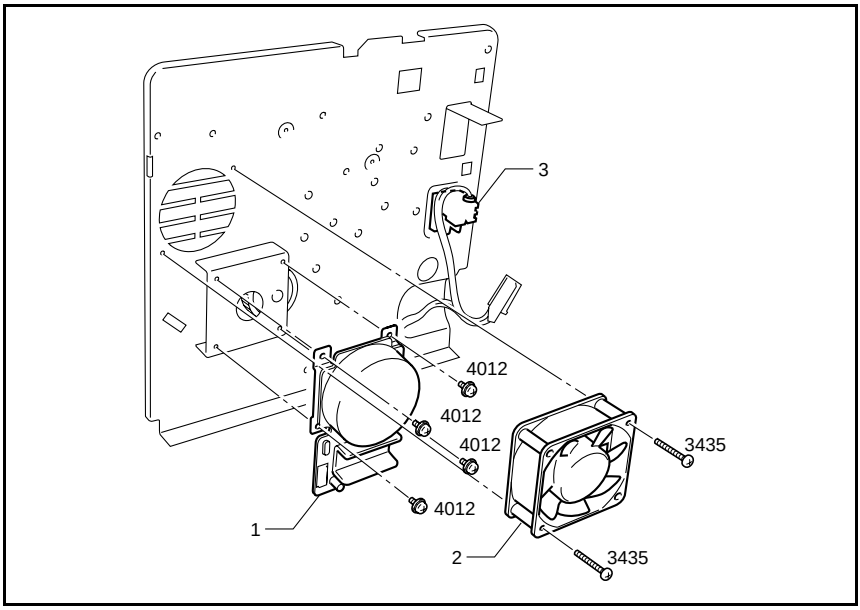
1 Drive Unit Cover

2 Left Frame

2 Remove the Main Motor (M1). (4 screws)

3 Remove the Print Head Cooling Fan (M5). (2 screws)

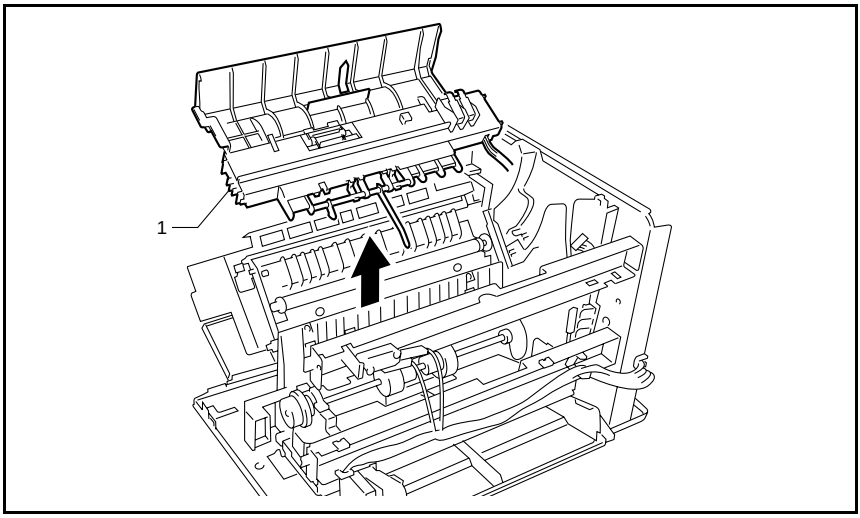
4 Remove the Power Switch (S1). (2 connectors)



1 Main Motor (M1)
2 Print Head Cooling Fan (M5)
3 Power Switch (S1)

4-5-22. Removal of the Paper Empty Sensor (P_ENP1) and Toner Empty Sensor (PWB-G)

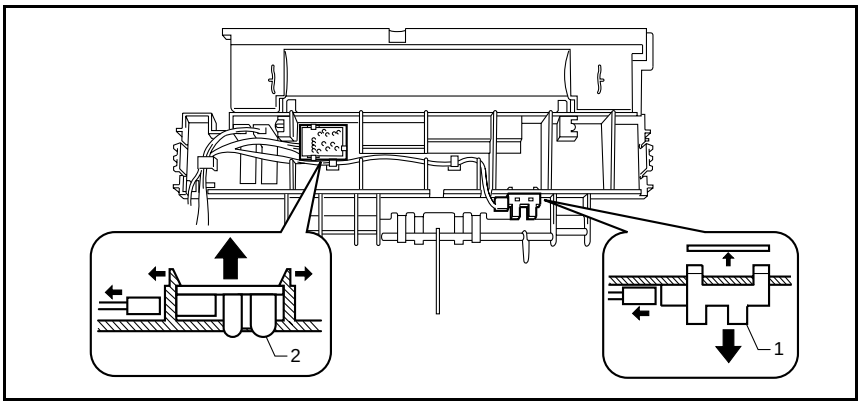
1 Remove the Imaging Cartridge Cover.



1 Imaging Cartridge Cover

2 Remove the Paper Empty Sensor (P_ENP1) and unplug the connector.

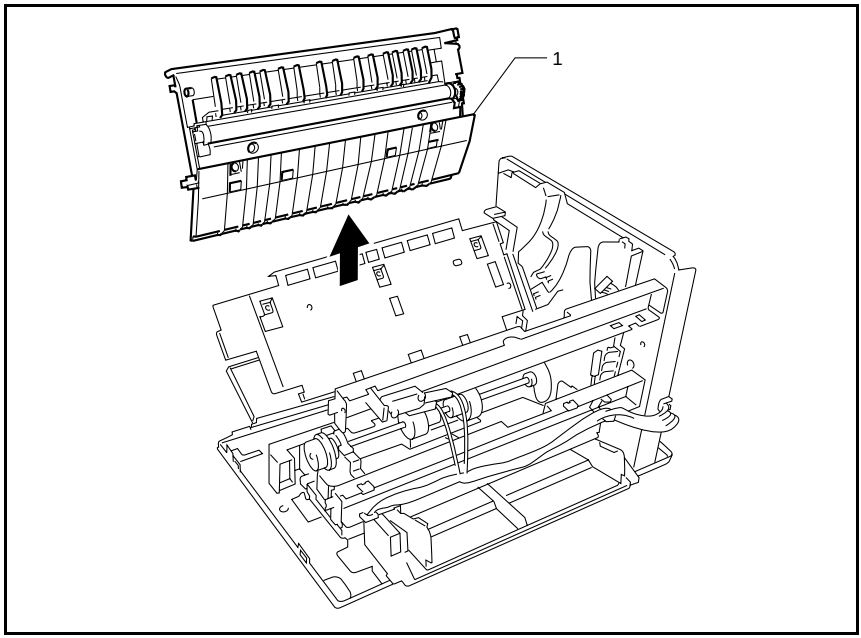
3 Remove the Toner Empty Sensor (PWB-G) and unplug the connector.



1 Paper Empty Sensor (P_ENP1) 2 Toner Empty Sensor (PWB-G)

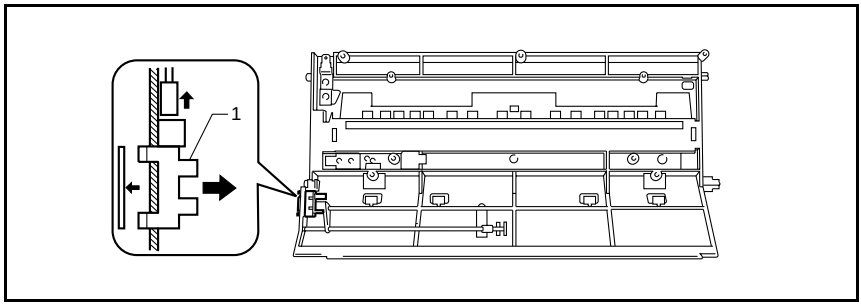
4-5-23. Removal of the Paper Take-up Sensor (PS1)

1 Remove the Image Transfer Guide Assembly.



1 Image Transfer Guide Assembly.

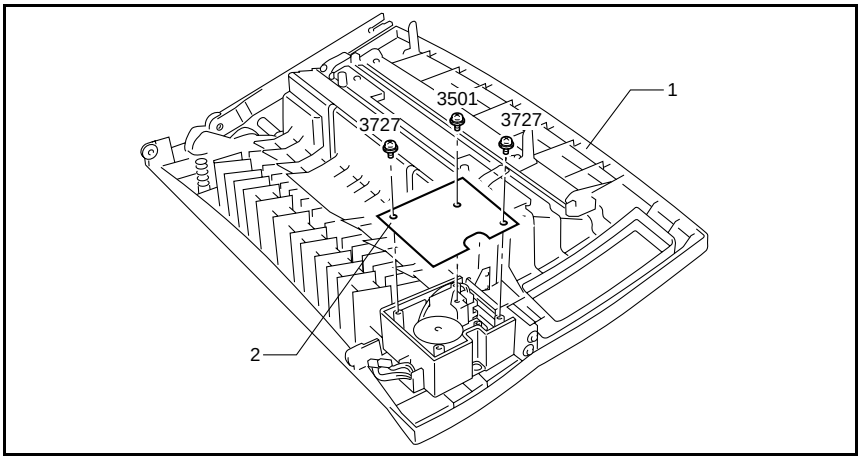
2 Remove the Paper Take-up Sensor (PS1), and unplug a connector.



1 Paper Take-up Sensor(PS1)

4-5-24. Removal of the Jog Motor (M4) and the Jog Position Sensor (JOG_POS1): 4100GN only

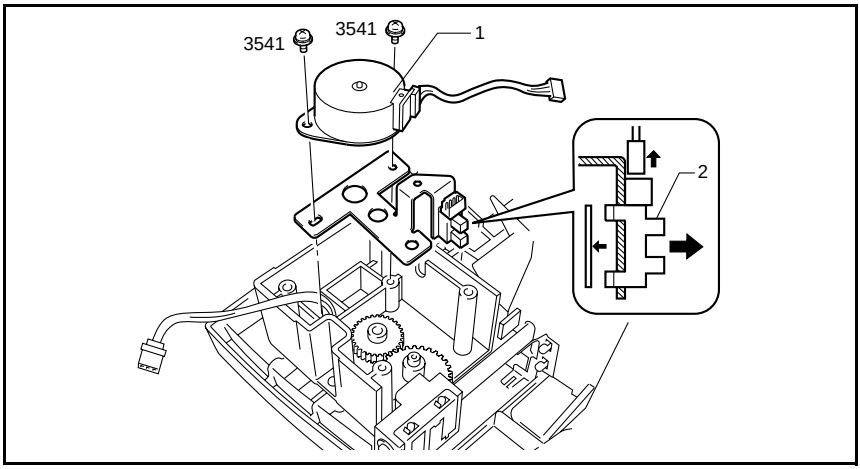
1 Remove the Jog Motor Cover from the Top Cover. (3 screws)



1 Top Cover 2 Jog Motor Cover

2 Remove the Jog Motor (M4). (2 screws)

3 Remove the Jog Position Sensor (JOG_POS1) and unplug the connector.



1 Jog Motor (M4) 2 Jog Position Sensor (JOG_POS1)

4-5-25. Replacement of the 2nd and 3rd Paper Take-up Roller

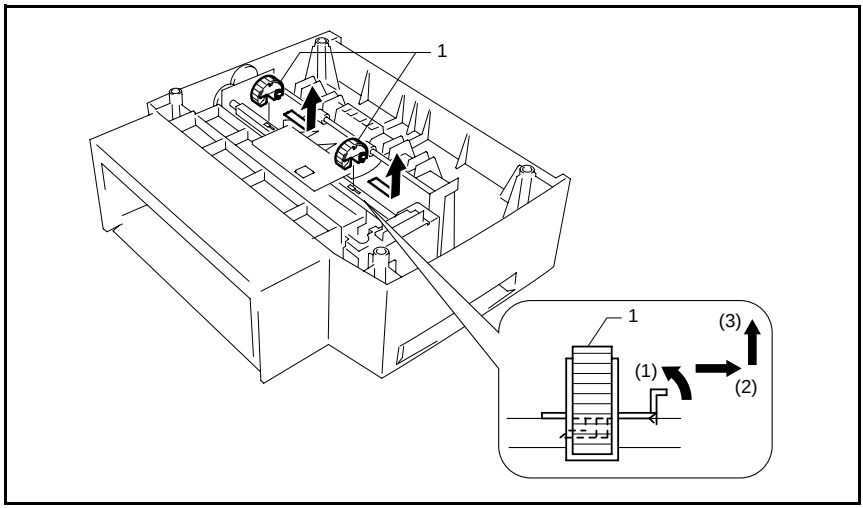
Replace the Paper Take-up Roller approximately every 150,000 sheets of print.

1 Separate the printer and 2nd/3rd Paper Casette Unit.

2 As shown in the figure, remove the Paper Take-up Rollers.

(1) Pull up on the lever of the roller.
(2) Pull it to the right.
(3) Lift out the roller.

3 Install a new Paper Take-up Rollers in the opposite way.



1 Paper Take-up Roller

4-5-26. Removal of the Switchback Motor (M41), the Transfer Motor (M42), the Skew Correction Solenoid (SL41) and the Duplex Entrance Sensor (DUP_PSR)

1 Remove the Left Cover of the Duplex Unit. (1 screw)

2 Remove the Board Cover. (2 screw)

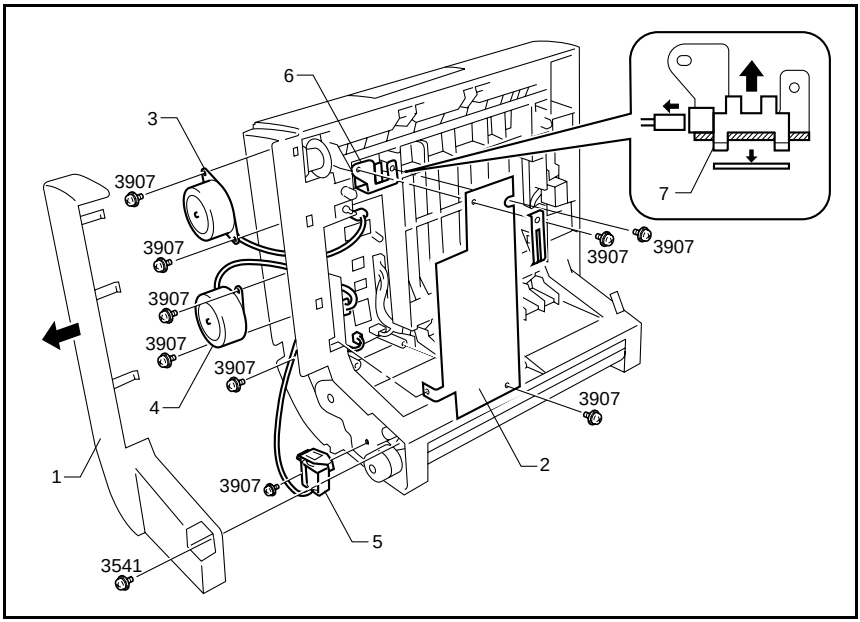
3 Remove the Switchback Motor (M41). (2 screws, 1 connector)

4 Remove the Transfer Motor (M42). (2 screws, 1 connector)

5 Remove the Skew Correction Solenoid. (1 screw, 1 connector)

6 Remove the Sensor Bracket. (1 screw)

7 Remove the Duplex Entrance Sensor (DUP_PSR) and unplug the connector.

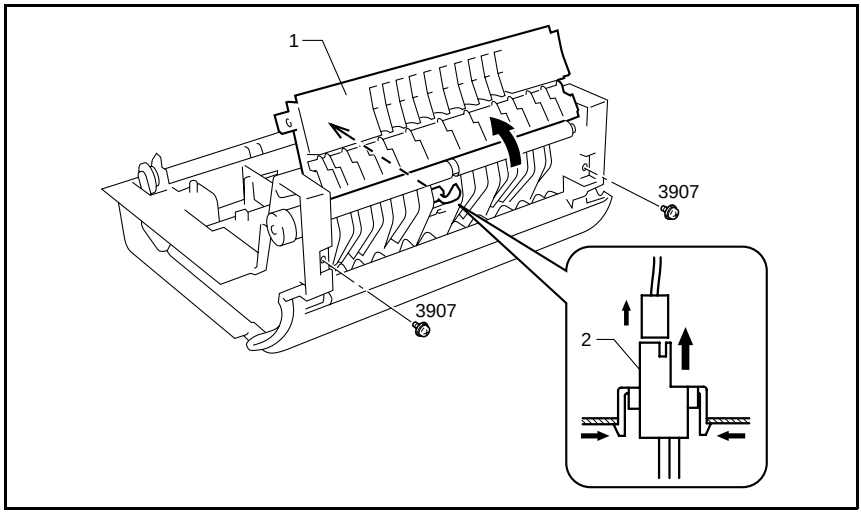


1 Left Cover
2 Board Cover
3 Switchback Motor (M41)
4 Transfer Motor (M42)
5 Skew Correction Solenoid (SL41)
6 Sensor Bracket
7 Duplex Entrance Sensor (DUP_PSR)

4-5-27. Removal of the Duplex Exit Sensor (DUP_PS1)

1 Open the Bottom Cover of the Duplex Unit. (2 screws)

2 Remove the Duplex Exit Sensor (DUP_PS1) and unplug the connector.



1 Bottom Cover

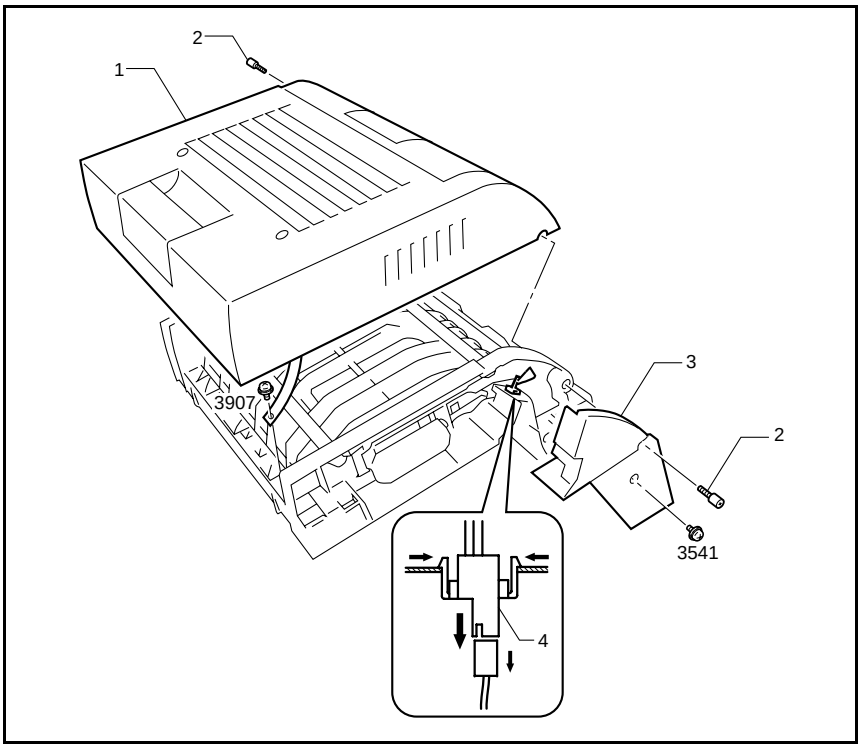
2 Duplex Exit Sensor (DUP_PS1)

4-5-28. Removal of the Duplex Cover Sensor (DUP_OPEN)

1 Remove the Rear Cover of the Duplex Unit. (2 shoulder screws, and 1 screw)

2 Remove the Right Cover. (1 screw)

3 Remove the Duplex Cover Sensor (DUP_OPEN) and unplug the connector.



1	Rear Cover	3	Right Cover
2	Shoulder Screw	4	Duplex Cover Sensor (DUP_OPEN)

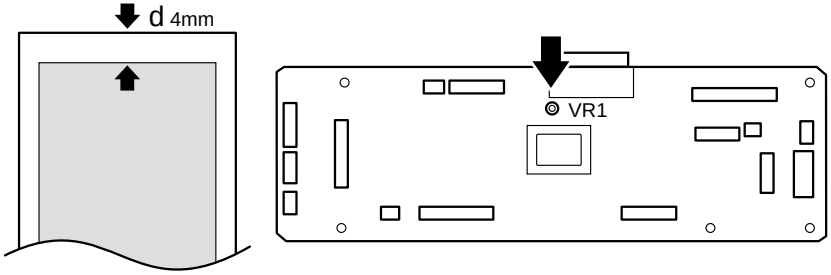
5. ADJUSTMENT

5-1. Adjustment of Image Registration

After the Mechanical Control Board (PWB-A) is replaced, print an image sample. If the starting position of the image (registration gap (d)=4mm) in the sub-scanning direction is not suitable, adjust the gap by following one of the procedures described below.

1 Remove the right cover so that VR1 of PWB-A can be adjusted.

2 Turning VR1 on PWB-A in the clockwise direction makes the gap (d) greater and turning it in the counter-clockwise direction makes the gap (d) smaller.



Adjustment by Voltage

1 Touch the positive and negative terminals of the tester to VR1 and frame GND respectively with power turned on.

2 Adjust VR1 until the tester reads between 2.4 to 2.54 VDC.

5-2. Adjustment of Interlock Switch Position

When the Top cover is closed and the power supply does not come back on even though the Power Switch (S1) is turned ON, check and adjust the position of the Interlock Switch (S2) following the procedure below.

1 Remove the left cover, right cover and front cover.

2 After loosening the screw of the interlock switch (S2), close the top cover carefully.

3 Move the interlock switch (S2) up and down and tighten the screw at the position where the switch turns on.

6. TROUBLESHOOTING

6-1. Paper Misfeed Detection

6-1-1. Overview

The printer recognizes if paper remains inside the printer by detecting the status of the Paper Take-Up Sensor (PS1) and the Paper Exit Sensor (PS3). A paper misfeed is detected by the timing that PS1 and PS3 become activated or deactivated.

When a paper misfeed is detected, the drive for all elements is stopped, excluding the two following cases.

During multi printing
When condition (1) listed below is detected and paper remains in the printer, all elements will be stopped after the paper is fed out of the printer.

During single printing
When condition (1) listed below is detected and paper does not remain in the printer, all elements except the Heater Lamp (H1) will be stopped.

6-1-2. Paper Misfeed Detecting Conditions

(1) The Paper Take-Up Sensor (PS1) does not activate within 2.8 sec. after the Paper Take-Up Roller in the printer or optional 2nd Cassette Unit or 3rd Cassette Unit starts turning.
(2) The Paper Take-Up Sensor (PS1) does not deactivate within 8.21 sec. after the paper leading edge reaches the Paper Take-Up Sensor (PS1).
(3) The Paper Exit Sensor (PS3) does not activate within 2.84 to 3.79 sec. after the paper leading edge reaches the Paper Take-Up Sensor (PS1).
(4) The Paper Exit Sensor (PS3) does not deactivate within 2.6 to 3.63 sec. after the paper trailing edge passes the Paper Take-Up Sensor (PS1).
(5) The Duplex Entrance Sensor (DUP_PSR) does not activate within 1.65 sec. after the Switchback Motor (M4) is energized.
(6) The Paper Take-Up Sensor (PS1) activates when the Power Switch (S1) is turned ON, or when the Top Cover is closed.
(7) The Paper Exit Sensor (PS3) activates when the Power Switch (S1) is turned ON, or when the Top Cover is closed.
(8) The Duplex Entrance Sensor (DUP_PSR) activates when the Power Switch (S1) is turned ON, or when the Top Cover is closed or when the Duplex Cover is closed.

6-1-3. How to Reset a Paper Misfeed

Close the Top Cover or Duplex Cover after removing the misfed paper.

6-2. Malfunction Detection

When any of the following problems are detected, all driving units are turned off with the corresponding hardware error issued to the control panel.

6-2-1. Fusing Malfunction

(1) The Thermistor detecting temperature has exceeded 240°C/464ºF for 50 msec. during temperature control.

(2) The temperature detected by the Thermistor has not reached the reference temperature for 50 msec. within 12 to 30 sec. after warming up. (This detection applies only when the Thermistor detecting temperature is 160°C/320ºF or less.)

(3) The Thermistor detecting temperature has not reached the reference temperature within 120 sec. after warming up.

(4) The Thermistor detecting temperature during the idle state has fallen to 70°C/158ºF or lower for 50 msec., or the temperature during printing has fallen to 160°C/320ºF or lower.

6-2-2. Laser malfunction

The Laser Diode is forcibly activated for 0.8 sec. after the Polygon Motor (M2) turns ON. At this time, laser emission power is adjusted. The LD_APC1 signal or LD_APC2 signal deviates from the specified value while the laser emission power is adjusted. LD_APC1/ LD_APC2: These signals are to adjust the laser drive current.

6-2-3. Main Motor Malfunction

(1) The motor lock signal has not been ON within 1.0 sec. after the Main Motor (M1) is energized.

(2) When motor lock signal is continuously turned OFF for 0.1 seconds during main motor rotation.

6-2-4. Polygon Motor Malfunction

(1) The -SSCAN signal has not been entered once within 0.8 sec. after the Polygon Motor is energized.

(2) The number of Polygon Motor rotations has not stabilized within ±0.5% by 5.5 sec. after the Motor is energized.

(3) The number of Polygon Motor rotations has exceeded ±3% for more than 0.5 sec. after the Motor is energized and the rotation number stabilizes within ±0.5%.

6-2-5. Cooling Fan Motor Malfunction

(1) When lock detection voltage (0.35V) is continuously detected between 0.5sec. at the time of Fusing Unit Cooling Fan Motor (M3) rotation.

(2) When lock detection voltage (0.35V) is continuously detected between 0.5sec. at the time of P/H Cooling Fan Motor (M3) rotation.

6-2-6. Jog Motor Malfunction (4100GN only)

(1) The Jog Position Sensor (JOG_POS) does not deactivate within 0.5 sec. after the Jog Motor (M4) rotates. (Home Position to Jog Position)

(2) The Jog Position Sensor (JOG_POS) does not activate within 0.5 sec. after the Jog Motor (M4) rotates. (Jog Position to Home Position)

6-3. Troubleshooting for Paper Misfeed

6-3-1. Paper misfeed occurred when the Power Switch (S1) is turned ON

Check		Remedy
Paper left in machine. ↓No	→ Yes	Remove the paper.
Do the Paper Take-up Sensor (PS1), the Paper Exit Sensor (PS3), Duplex Duplex Entrance Sensor (DUP_PSR) and Duplex Paper Exit Sensor lever move correctly?	→ No	Correct the Sensor lever movement.
	→ Yes	Replace PS1. Replace PS3. Replace DUP_PSR. Replace PWB-A. Replace PWB-C. (4100E, 4100GN) Replace PWB-P. (4100W)

6-3-2. Paper misfeed occurred at the paper take-up section

Check		Remedy
Does the Paper Take-up roller of the 2nd Cassette unit and 3rd Cassette unit turn? ↓Yes	→ No	Replace SL1. Replace SL21. (Replace SL31)
Does the paper being used conform to the product specifications? ↓Yes	→ No	Instruct the user to use the paper that conforms to the product specifications.
Is the paper curled, waved, or damp? ↓No	→ Yes	Change the paper. Instruct the user to store the paper properly.
Are the Paper take-up roller, 2nd and 3rd Paper Take-up Roller deformed, worn, or dirty with paper dust? ↓No	→ Yes	Replace the Paper Take-up Roller. Replace the 2nd Paper Take-up Roller. Replace the 3rd Paper Take-up Roller.
Does the Paper Take-up Sensor (PS1) lever move correctly?	→ No	Correct the Sensor lever movement.
	→ Yes	Replace PS1. Replace PWB-A. Replace PWB-C. (4100E, 4100GN) Replace PWB-P. (4100W)

6-3-3. Paper misfeed occurred at the paper exit section

Check		Remedy
Is the Image Transfer Roller deformed, worn, or dirty with paper dust?	→ Yes	Replace the Image Transfer Roller.
↓No		
Is the Fusing roller deformed, worn, or dirty with paper dust?	→ Yes	Replace the Fusing Unit.
↓No		
Does the Paper exit roller rotate?	→ No	Replace the Top Cover Assy.
↓Yes		
Does the Paper Exit Sensor (PS3) lever move correctly?	→ No	Correct the Sensor lever movement.
	→ Yes	Replace the Fusing Unit or PS3. Replace PWB-A. Replace PWB-C. (4100E, 4100GN) Replace PWB-P. (4100W)

6-3-4. Paper misfeed occurred at the Duplex Unit

Check		Remedy
Switchback Motor (M4) rotates and the paper is sent into Duplex Unit.	→ No	Replace M4. Replace PWB-A of Duplex Unit. Replace PWB-A of Printer.
↓Yes		
Does the Duplex Entrance Sensor (DUP_PSR) lever move correctly?	→ No	Correct the Sensor lever movement.
↓Yes		
Is the Paper Transfer Roller deformed, worn, or dirty with paper dust?	→ Yes	Clean the Paper Transfer Roller.
↓No		
Does the Paper Transfer Roller rotate?	→ No	Replace the Transfer Motor (M42). Replace PWB-A of Duplex Unit. Replace PWB-A of Printer.
↓Yes		
Does the Duplex Exit Sensor (DUP_PS1) lever move correctly?	→ No	Correct the Sensor lever movement.
	→ Yes	Replace DUP_PS1. Replace PWB-A of Duplex Unit. Replace PWB-A of Printer.

6-4. Troubleshooting for Malfunctions (4100E, 4100GN)

6-4-1. No power

Check		Remedy
Has the Power Switch (S1) been turned ON?	→ No	Turn on the Power Switch (S1).
↓Yes		
Has the Power Cord been securely connected to the printer?	→ No	Plug in the power cord.
↓Yes		
Has the Power Cord been securely plugged into the outlet?	→ No	Plug the power cord into the power outlet.
↓Yes		
Has the Interlock Switch (S2) been turned ON?	→ No	Adjust the Interlock Switch (S2) position.
↓Yes		
Has the fuse in the Power Unit (PU1) blown?	→ No	Replace PU1. Replace PWB-A. Replace PWB-C.
	→ Yes	Replace the fuse (F1).

6-4-2. Engine error (fusing unit)

Check		Remedy
Is an error shown after the printer has completed warming up?	→ Yes	Replace the Thermistor (TH1) or Fusing Unit. Replace PWB-A.
↓No		
Is the Fusing Unit warm?	→ Yes	Replace the Thermistor (TH1) or Fusing Unit. Replace PWB-A.
↓No		
Is there electrical conduction between CN14-1 and CN14-2 of the Fusing Unit?	→ No	Replace the Heater Lamp (H1), Thermostat (TS1) or Fusing Unit
	→ Yes	Replace the Power Unit (PU1). Replace PWB-A. Replace PWB-C.

6-4-3. Engine error (laser or main motor)

Check		Remedy
The Main Motor (M1) rotates when the Power Switch (S1) is turned ON.	→ No	Replace M1. Replace PWB-A.
↓Yes		
Laser Malfunction	→	Replace the Print Head Unit. Replace PWB-A. Replace PWB-C.

6-4-4. Engine error (polygon scanner)

Check	Remedy
Polygon Malfunction	Replace the Print Head Unit. Replace PWB-A. Replace PWB-C.

6-4-5. Engine error (fan motor)

Check		Remedy
Fusing Unit Cooling Fan Motor (M3) rotates simultaneously with power-supply ON.	→ No	Replace M3. Replace PU1. Replace PWB-A.
↓Yes		
P/H Cooling Fan Motor (M5) rotates simultaneously with power-supply ON.	→ No	Replace M5. Replace PWB-A.
	→ Yes	Replace PWB-A. Replace PWB-C.

6-4-6. Engine error (jogging function) 4100GN only

Check		Remedy
The Jog Motor (M4) rotates and Paper Exit roller moves, when the Power Switch is turned ON.	→ Yes	Replace the Jog Position Sensor (JOG_POS). Replace PWB-A.
	→ No	Replace the M4. Replace PWB-A. Replace PWB-C.

6-5. Troubleshooting for Malfunctions (4100W)

6-5-1. No power

Check		Remedy
Has the Power Switch (S1) been turned ON?	→ No	Turn on the Power Switch (S1).
↓Yes		
Has the Power Cord been securely connected to the printer?	→ No	Plug in the power cord.
↓Yes		
Has the Power Cord been securely plugged into the outlet?	→ No	Plug the power cord into the power outlet.
↓Yes		
Has the Interlock Switch (S2) been turned ON?	→ No	Adjust the Interlock Switch (S2) position.
↓Yes		
Has the fuse in the Power Unit (PU1) blown?	→ No	Replace PU1. Replace PWB-A. Replace PWB-P.
	→ Yes	Replace the fuse (F1).

6-5-2. Engine error (Fusing Unit low temperature error)

Check		Remedy
Is an error shown after the printer has completed warming up?	→ Yes	Replace the Thermistor (TH1) or Fusing Unit. Replace PWB-A.
↓No		
Is the Fusing Unit warm?	→ Yes	Replace the Thermistor (TH1) or Fusing Unit. Replace PWB-A.
↓No		
Is there electrical conduction between CN14-1 and CN14-2 of the Fusing Unit?	→ No	Replace the Heater Lamp (H1), Thermostat (TS1) or Fusing Unit
	→ Yes	Replace the Power Unit (PU1). Replace PWB-A. Replace PWB-P.

6-5-3. Engine error (Fusing Unit warm-up error)

Check		Remedy
Is an error shown after the printer has completed warming up?	→ Yes	Replace the Thermistor (TH1) or Fusing Unit. Replace PWB-A.
↓No		
Is the Fusing Unit warm?	→ Yes	Replace the Thermistor (TH1) or Fusing Unit. Replace PWB-A.
↓No		
Is there electrical conduction between CN14-1 and CN14-2 of the Fusing Unit?	→ No	Replace the Heater Lamp (H1), Thermostat (TS1) or Fusing Unit
	→ Yes	Replace the Power Unit (PU1). Replace PWB-A. Replace PWB-P.

6-5-4. Engine error (Fusing Unit overheat)

Check		Remedy
Is an error shown after the printer has completed warming up?	→ Yes	Replace the Thermistor (TH1) or Fusing Unit. Replace PWB-A.
↓No		
Is the Fusing Unit warm?	→ Yes	Replace the Thermistor (TH1) or Fusing Unit. Replace PWB-A.
↓No		
Is there electrical conduction between CN14-1 and CN14-2 of the Fusing Unit?	→ No	Replace the Heater Lamp (H1), Thermostat (TS1) or Fusing Unit
	→ Yes	Replace the Power Unit (PU1). Replace PWB-A. Replace PWB-P.

6-5-5. Engine error (laser)

Check	Remedy
Laser Malfunction	Replace the Print Head Unit. Replace PWB-A. Replace PWB-P.

6-5-6. Engine error (HSYNC)

Check	Remedy
HSYNC Signal Malfunction	Replace the Print Head Unit. Replace PWB-A. Replace PWB-P.

6-5-7. Engine error (main motor)

Check		Remedy
The Main Motor (M1) rotates when the Power Switch (S1) is turned ON.	→ No	Replace M1. Replace PWB-A.
	→ Yes	Replace PWB-A. Replace PWB-P.

6-5-8. Engine error (polygon scanner)

Check	Remedy
Polygon Malfunction	Replace the Print Head Unit. Replace PWB-A. Replace PWB-P.

6-5-9. Engine error (Fusing Unit cooling fan)

Check		Remedy
Fusing Unit Cooling Fan Motor (M3) rotates simultaneously with power-supply ON.	→ No	Replace M3. Replace PWB-A.
	→ Yes	Replace PWB-A. Replace PWB-P.

6-5-10. Engine error (P/H cooling fan)

Check		Remedy
P/H Cooling Fan Motor (M5) rotates simultaneously with power-supply ON.	→ No	Replace M5.
	→ Yes	Replace PWB-A. Replace PWB-P.

6-5-11. Engine error (Controller)

Fatal Error	Remedy
Controller Malfunction	Replace optional SIMM. Replace PWB-A. Replace PWB-P.

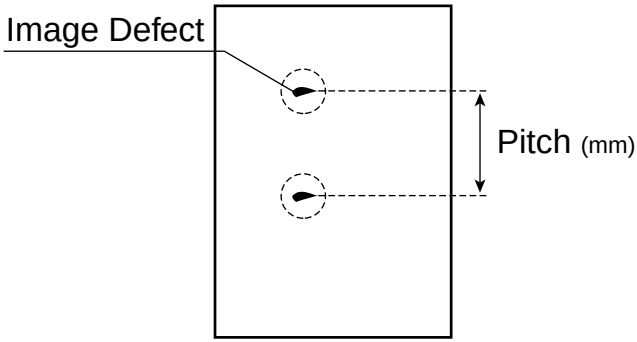
6-5-12. I/O error (Parallel, Network)

Fatal Error	Remedy
Parallel Port Malfunction	Replace Interface Cable. Replace PWB-P.
Network Port Malfunction	Replace Network Cable. Replace NIC. Replace PWB-P.

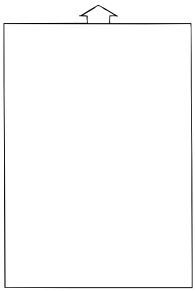
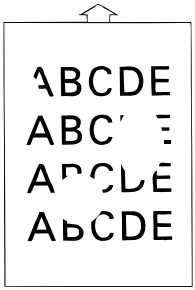
6-6. Image Quality Troubleshooting

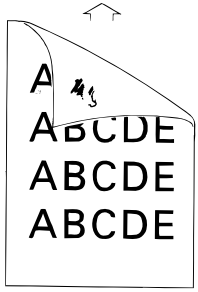
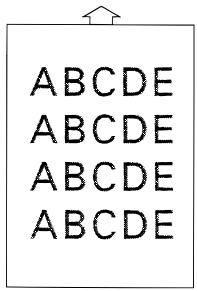
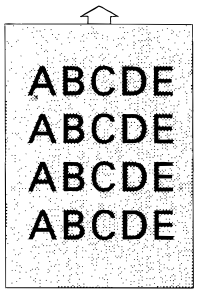
When an image problem occurs, exchange the Imaging Cartridge for a new one and determine whether the cause of the problem is due to one of the cartridges or something else in the printer.

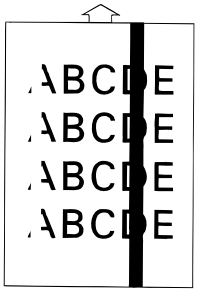
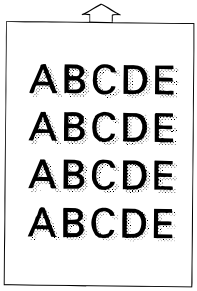
If an image quality problem occurs with the printer, please refer to the following chart to help determine the defective unit.

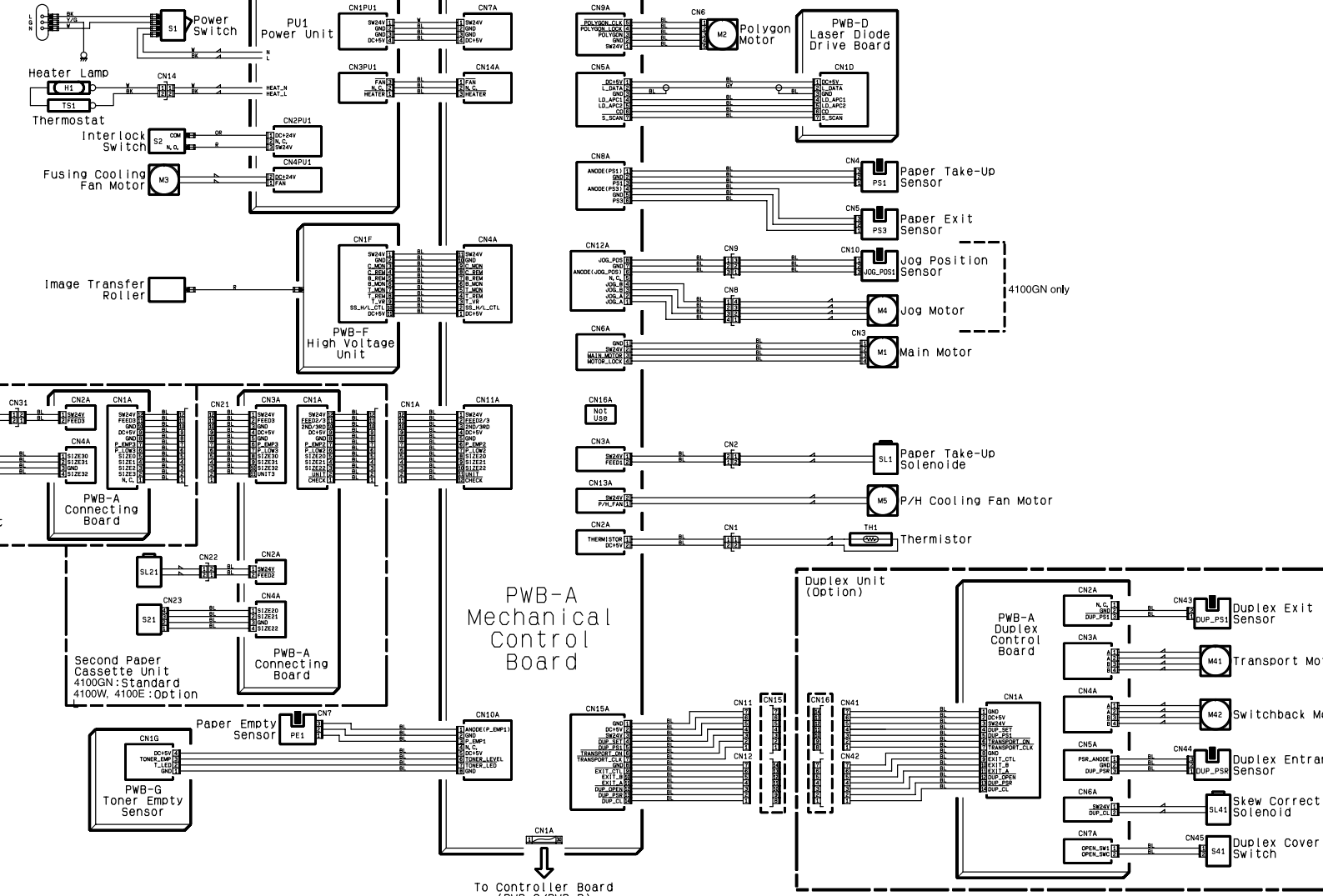


Pitch	Defective Part (diameter)	Defective Unit
26.0 mm or 1 1/32"	Sleeve Roller (ϕ 15.8 mm or 7/12")	Imaging Cartridge
94.2 mm or 3 5/8"	PC Drum (ϕ 30 mm or 1 1/8")	
50.6 mm or 2"	Imaging Transfer Roller (ϕ 16.1 mm or 11/16")	Image Transfer Roller
62.8 mm or 2 7/16"	Heat Roller (ϕ 20 mm or 13/16")	Fusing Unit
67.8 mm or 2 9/16"	Backup Roller (ϕ 21.6 mm or 7/8")	

Symptom	Possible Cause	Remedy
Blank print 	Toner Empty in Imaging Cartridge	Replace the Imaging Cartridge.
	Defective PC Drum (end of life)	Replace the Imaging Cartridge.
	Improper laser exposure	Replace Print Head. Replace PWB-A. Replace PWB-C. (4100E, 4100GN) Replace PWB-P. (4100W)
	Poor image transfer	Replace the Image Transfer Roller. Replace HV1. Replace PWB-A. Replace PWB-C. (4100E, 4100GN) Replace PWB-P. (4100W)
Black print 	Improper laser exposure.	Replace Print Head Unit. Replace PWB-A. Replace PWB-C. (4100E, 4100GN) Replace PWB-P. (4100W)
	Improper charging.	Replace HV1. Replace PWB-A. Replace PWB-C. (4100E, 4100GN) Replace PWB-P. (4100W)
White spots 	The paper may have absorbed moisture due to high humidity.	Replace the paper.
	Poor image transfer.	Replace the Image Transfer Roller. Replace HV1. Replace PWB-A. Replace PWB-C. (4100E, 4100GN) Replace PWB-P. (4100W)

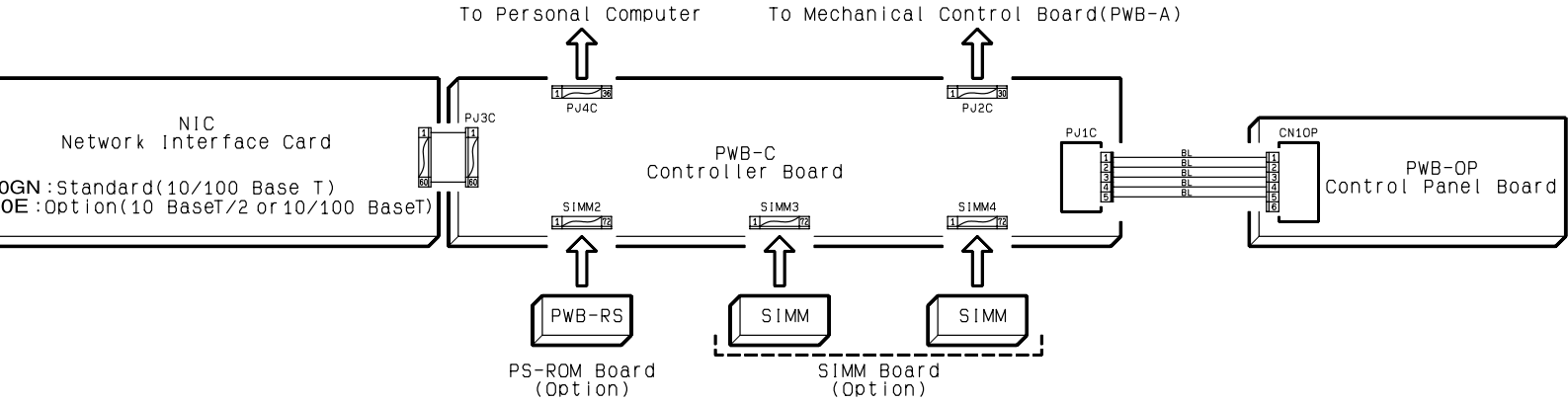
Symptom	Possible Cause	Remedy
Toner smudges on backside 	Dust or damage on the Fusing Roller.	Replace the Fusing Unit or Fusing Roller.
	Dust or damage on the Imaging Transfer Roller.	Replace the Image Transfer Roller.
	Toner on paper path.	Clean the paper path inside of the printer.
Low Image density 	Toner empty in the Imaging Cartridge.	Replace the Imaging Cartridge.
	Defective PC Drum (end of life).	Replace the Imaging Cartridge.
	Poor development	Replace HV1. Replace PWB-A. Replace PWB-C. (4100E, 4100GN) Replace PWB-P. (4100W)
Foggy background 	Poor development.	Replace HV1. Replace PWB-A. Replace PWB-C. (4100E, 4100GN) Replace PWB-P. (4100W)
	Defective PC Drum (end of life).	Replace the Imaging Cartridge.

Symptom	Possible Cause	Remedy
White/Black lines and bands 	Scratch on the PC Drum.	Replace the Imaging Cartridge.
	Defective Print Head Unit.	Replace the Print Head Unit. Replace PWB-A. Replace PWB-C. (4100E, 4100GN) Replace PWB-P. (4100W)
Offset image 	Defective Fusing Roller.	Replace the Fusing Unit or Fusing Roller.
	Defective Image Transfer Roller.	Replace the Image Transfer Roller.

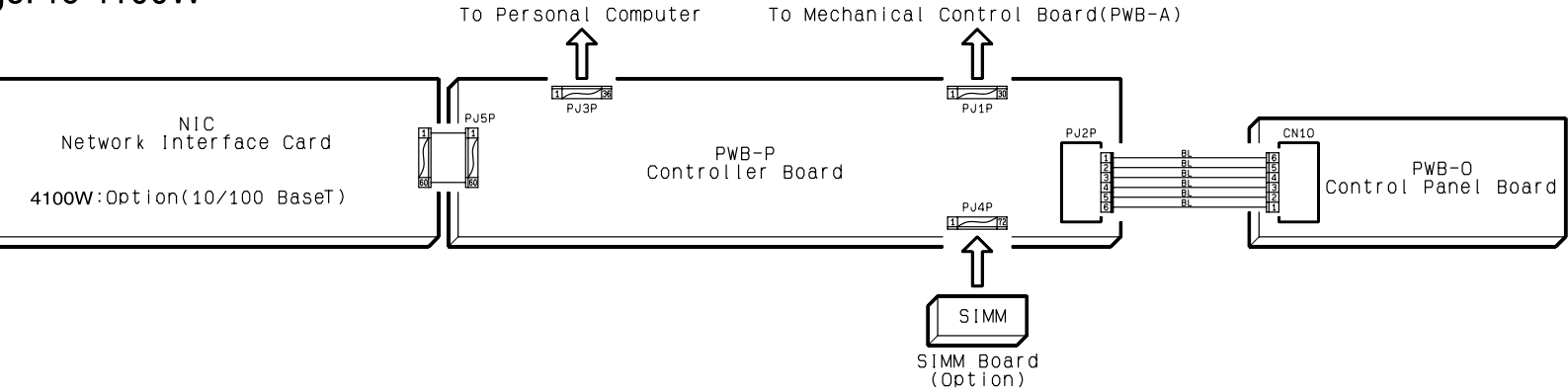


DWG. NO.	4110-B001-0
TITLE	WIRING DIAG

gePro 4100E / 4100GN



gePro 4100W



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