Service Manual

LBP6000/6018/3010/3100/3150 Series

Canon

Sep 8 2010

Application

This manual has been issued by Canon Inc. for qualified persons to learn technical theory, installation, maintenance, and repair of products. This manual covers all localities where the products are sold. For this reason, there may be information in this manual that does not apply to your locality.

Corrections

This manual may contain technical inaccuracies or typographical errors due to improvements or changes in products. When changes occur in applicable products or in the contents of this manual, Canon will release technical information as the need arises. In the event of major changes in the contents of this manual over a long or short period, Canon will issue a new edition of this manual.

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Caution

Use of this manual should be strictly supervised to avoid disclosure of confidential information.

Symbols Used

This documentation uses the following symbols to indicate special information:

Symbol	Description
	Indicates an item of a non-specific nature, possibly classified as Note, Caution, or Warning.
	Indicates an item requiring care to avoid electric shocks.
	Indicates an item requiring care to avoid combustion (fire).
	Indicates an item prohibiting disassembly to avoid electric shocks or problems.
	Indicates an item requiring disconnection of the power plug from the electric outlet.
 Memo	Indicates an item intended to provide notes assisting the understanding of the topic in question.
 REF.	Indicates an item of reference assisting the understanding of the topic in question.
	Provides a description of a service mode.
	Provides a description of the nature of an error indication.

The following rules apply throughout this Service Manual:

1. Each chapter contains sections explaining the purpose of specific functions and the relationship between electrical and mechanical systems with reference to the timing of operation.
   In the diagrams, ▭▮▮▮▭ represents the path of mechanical drive; where a signal name accompanies the symbol , the arrow ⟶ indicates the direction of the electric signal.
   The expression "turn on the power" means flipping on the power switch, closing the front door, and closing the delivery unit door, which results in supplying the machine with power.
2. In the digital circuits, '1'is used to indicate that the voltage level of a given signal is "High", while '0' is used to indicate "Low".(The voltage value, however, differs from circuit to circuit.) In addition, the asterisk (*) as in "DRMD*" indicates that the DRMD signal goes on when '0'.
   In practically all cases, the internal mechanisms of a microprocessor cannot be checked in the field. Therefore, the operations of the microprocessors used in the machines are not discussed: they are explained in terms of from sensors to the input of the DC controller PCB and from the output of the DC controller PCB to the loads.

The descriptions in this Service Manual are subject to change without notice for product improvement or other purposes, and major changes will be communicated in the form of Service Information bulletins.
All service persons are expected to have a good understanding of the contents of this Service Manual and all relevant Service Information bulletins and be able to identify and isolate faults in the machine."

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Chapter 1 PRODUCT DESCRIPTION

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1.1 Features

1.1.1 Features

LBP3010B / LBP3010

1. Small-size, high-speed monochrome printer
This equipment has a compact body that realizes high-speed print of 16 prints/min (A4) or 14 prints/min (A4). (See MEMO.1.)

2. Reduction in standby time and energy consumption
This equipment employs on-demand fixing where the heater activates only during printing, resulting in a reduction in standby time and energy consumption on this mode.
3. Realization of noise reduction and stable image quality
This equipment employs a belt drive method for transmitting the drive of the main motor. This enables lower noise and more stable image quality compared to the conventional gear drive method. (See MEMO.2.)

4.Improved Usability
In this equipment, the power switch is situated at the front of the host machine, and maintenance (jam removal, replacing the cartridge) can be performed by accessing one point of the delivery tray.

MEMO
1.For this equipment, the 16 ppm model and 14 ppm model are available according to the sales area. The only difference between these models is the processing speed.
The following is the brand name for each product.
The letter 'B' at the end of brand name in the following table indicates that the external color of the product is black.
The external color of the base model (without the letter 'B' at the end of brand name) is white.
MEMO
1. We have two types of machine; for 16ppm (prints/min) and 14ppm (prints/min).
The only difference between these two types of machine is process speed.
The following are the commodity names of products in each product type.

T-1-1

Area	Product type	
	16ppm model	14ppm model
Europe	3100	3010/3010B
China	3108	3018
Asia	3150	3050

2. Changing the drive method from gear to belt reduces uneven pitch due to varied rotation speed of the photosensitive drum, which realizes stable image quality.

1.1.2 Features

LBP6000 / LBP6000B

1. Small-size, high-speed monochrome printer
This equipment has a compact body that realizes high-speed print of 18 ppm. (See MEMO.1.)

2. Reduction in standby time and energy consumption
This equipment employs on-demand fixing where the heater activates only during printing, resulting in a reduction in standby time and energy consumption on this mode.
3. Realization of noise reduction and stable image quality
This equipment employs a belt drive method for transmitting the drive of the main motor. This enables lower noise and more stable image quality compared to the conventional gear drive method. (See MEMO.2.)

4.Improved Usability
In this equipment, the power switch is situated at the front of the host machine, and maintenance (jam removal, replacing the cartridge) can be performed by accessing one point of the delivery tray.

MEMO
1.The following is the brand name for each product.
The letter 'B' at the end of brand name in the following table indicates that the external color of the product is black.
The external color of the base model (without the letter 'B' at the end of brand name) is white.

T-1-2

Area	**External color**	
	White	**Black**
Europe	6000	6000B
Latin America	6000	----
Asia	6000	6018B
China	6018	----
Korea	6000	----
Australia	6000	---- ----

2. Changing the drive method from gear to belt reduces uneven pitch due to varied rotation speed of the photosensitive drum, which realizes stable image quality.

1.2 Product Specifications

1.2.1 Specifications

LBP3100 / LBP3010B / LBP3010

Body installation method	desktop page printer
Photosensitive medium	OPC drum
Exposure method	semiconductor laser
Development method	Toner projection development
Transfer method	by roller
Separation method	Curvature
Pickup-tray pickup method	by pad
Multifeeder pickup method	by pad
Drum cleaning method	by blade
Fixing method	on-demand
Delivery method	face-down
Toner supply type	By toner cartridge
Warm-up time	in standby: 0 sec (at power-on: 10 sec or less)
Print area	top: 5 mm; bottom: 5 mm; left/right: 5 mm (if envelope, top, bottom, left, right: 10 mm)
Printing resolution	600dpix 600dpi(Output adjustment mode), 600x 400dpi(Initial mode)
First print time	approx. 8.5 sec or less (A4)
Print speed (A4)	LBP3100: 16 ppm (Initial mode), 10.6 ppm (Output adjustment mode) LBP3010/3010B: 14 ppm (Initial mode), 8.8 ppm (Output adjustment mode)
Pickup-tray paper size	A4, B5, A5, LGL, LTR, Executive, Envelope(DL,COM10,C5, Monarch), user-defined paper (76.2 to 215.9 mm in width, 127 to 355.6 mm in length)
Multi-purpose paper size	A4, B5, A5, LGL, LTR, Executive, Envelope(DL,COM10,C5, Monarch), user-defined paper (76.2 to 215.9 mm in width, 127 to 355.6 mm in length)
Pickup-tray paper type	plain paper (60 to 105 g/m2), heavy paper (106 to 163 g/m2), transparency, label sheet, postcard,
Multi-purpose paper type	plain paper (60 to 105 g/m2), heavy paper (106 to 163 g/m2), transparency, label sheet, postcard,
Pickup-tray paper capacity	Approx. 150 sheets (plain paper 64 g/m2)
Multi-purpose capacity	1 sheet (64 g/m2 to 163g/m2)
Delivery tray stack	Approx. 100 sheets (plain paper 64 g/m2)
Duplex method	None
Hard disk	Standard: none, Option: none
Interface	USB 2.0, Option: none
Memory	Standard: 2MB, Option: none
Operating environment (Temperature range)	7.5 deg C to 32.5 deg C
Operating environment (Humidity range)	10 to 80%RH
Noise	64.6 dB or less (during printing; based on ISO9296; announced noise emission)
Power supply rating	AC220 V to AC240 V, +/-10% (50/60 Hz, +/-2 Hz)
Power consumption (Maximum)	Approx.880W more less (The value of the reference room temperature at 20 deg C)
Dimensions	372 (W) x 250 (D) x 197 (H) mm
Weight	Printer:Approx. 5.4kg, Toner cartridge:Approx. 0.5kg

1.2.2 Specifications

LBP6000 / LBP6000B

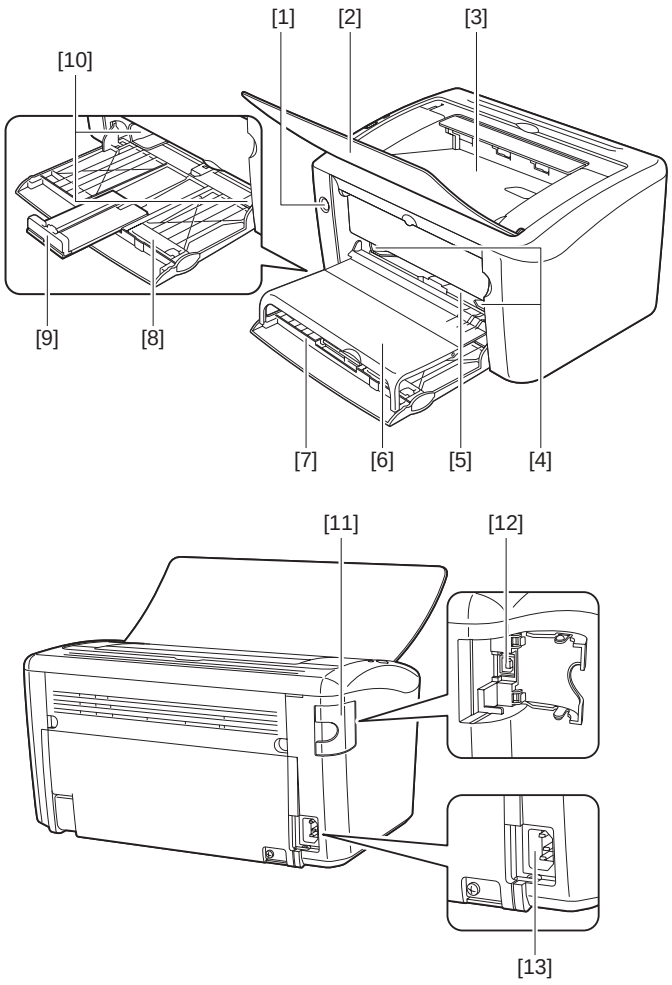
Body installation method	desktop page printer
Photosensitive medium	OPC drum
Exposure method	semiconductor laser

Development method	Toner projection development
Transfer method	by roller
Separation method	Curvature
Pickup-tray pickup method	by pad
Drum cleaning method	by blade
Fixing method	on-demand
Delivery method	face-down
Toner supply type	By toner cartridge
Warm-up time	in standby: 0 sec (at power-on: 10 sec or less)
Print area	top: 5 mm; bottom: 5 mm; left/right: 5 mm (if envelope, top, bottom, left, right: 10 mm)
Printing resolution	600dpix 600dpi(Output adjustment mode), 600x 400dpi(Initial mode)
First print time	approx. 7.8 sec or less (A4)
Print speed (A4)	18 ppm (Initial mode), 12 ppm (Output adjustment mode)
Pickup-tray paper size	A4, B5, A5, LGL, LTR, Executive, 16K, Envelope(DL,COM10,C5, Monarch), user-defined paper (76.2 to 215.9 mm in width, 188 to 355.6 mm in length)
Pickup-tray paper type	plain paper (60 to 105 g/m2), heavy paper (106 to 163 g/m2), transparency, label sheet, postcard, envelope
Pickup-tray paper capacity	Approx. 150 sheets (plain paper 64 g/m2)
Delivery tray stack	Approx. 100 sheets (plain paper 64 g/m2)
Duplex method	None
Hard disk	Standard: none, Option: none
Interface	USB 2.0, Option:none
Memory	Standard: 2MB, Option: none
Operating environment (Temperature range)	10 deg C to 30 deg C
Operating environment (Humidity range)	20 to 80%RH
Noise	49.2 dB or less (during printing; based on ISO9296; announced noise emission)
Power supply rating	AC 120-127V(±10%) 50/60Hz(±2HzÅj AC 220-240V(±10%) 50/60Hz(±2HzÅj
Power consumption (Maximum)	120V : Approx.850W more less (The value of the reference room temperature at 20 deg C) 230V : Approx.910W more less (The value of the reference room temperature at 20 deg C)
Dimensions	359 (W) x 249 (D) x 198 (H) mm
Weight	Printer:Approx. 5.0kg ,Toner cartridge:Approx. 0.5kg

1.3 Name of Parts

1.3.1 External View

LBP3100 / LBP3010B

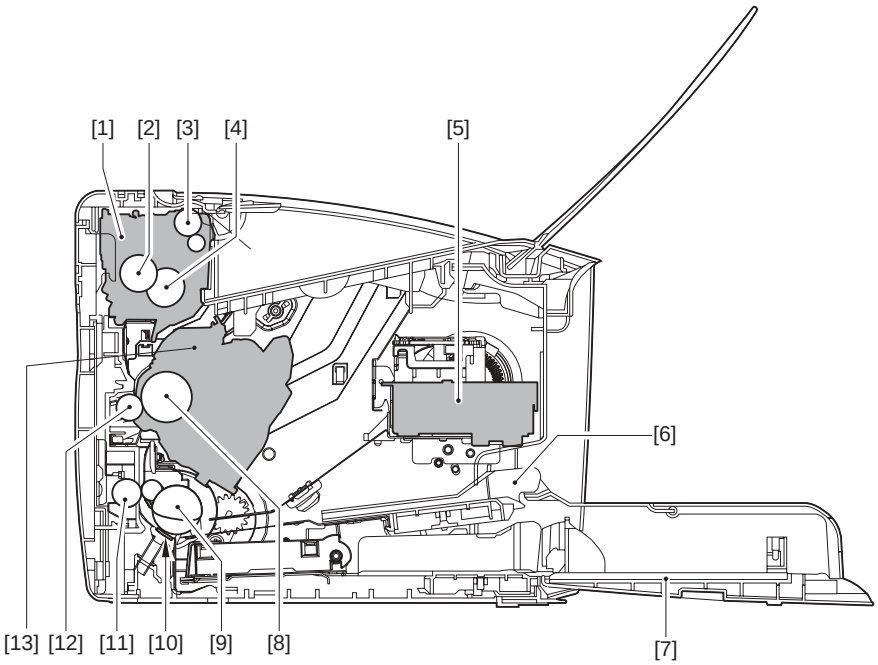


F-1-1

[1] Poewr switch
[2] Delivery auxiliary tray
[3] Delivery tray
[4] Manual feed tray paper guide
[5] Manual feed tray
[6] Tray cover
[7] Pickup tray
[8] Small size paper guide
[9] Rear paper guide
[10] Manual feed tray Paper guide
[11] USB cover
[12] USB connector
[13] Power receptacle

1.3.2 Cross Section

LBP3100 / LBP3010B

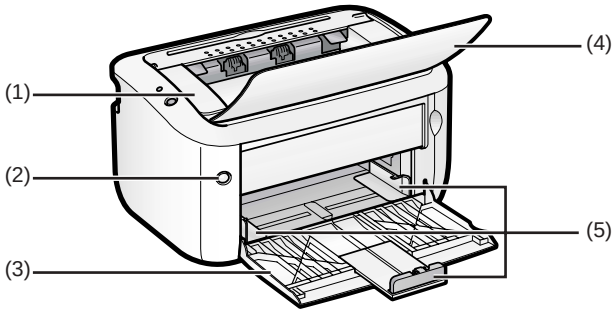


F-1-2

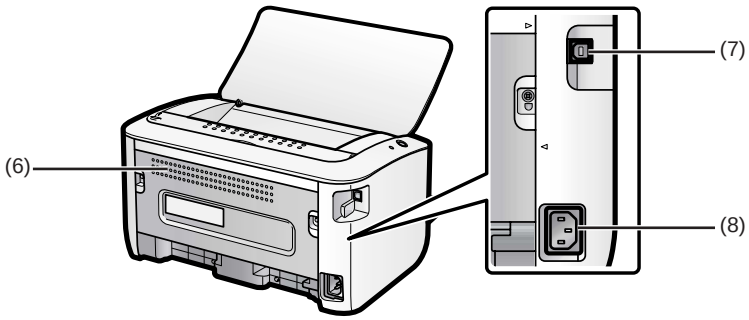
[1] Fixing unit
[2] Pressure roller
[3] Delivery roller
[4] Fixing film unit
[5] Laser scanner unit
[6] Manual feed tray
[7] Pickup tray
[8] Photosensitive drum
[9] Pickup roller
[10] separation pad
[11] Feed roller
[12] Transfer roller
[13] Toner cartridge

1.3.3 External View

LBP6000 / LBP6000B



F-1-3

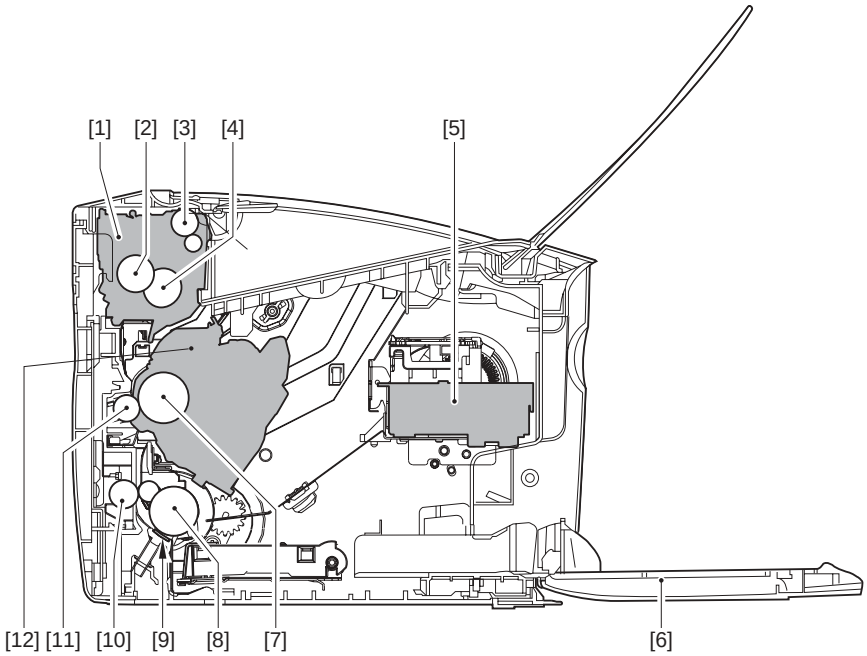


F-1-4

[1]Top Cover
[2]Power Switch
[3]Multi-purpose Tray
[4]Output Tray
[5]Paper Guide
[6]Rear Cover
[7]USB Connector
[8]Power Socket

1.3.4 Cross Section

LBP6000 / LBP6000B



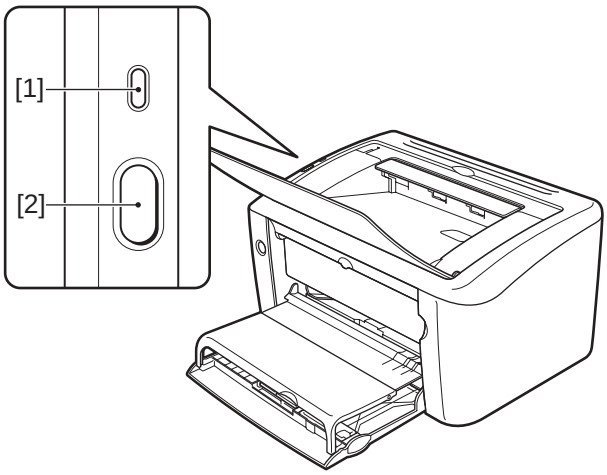
F-1-5

[1] Fixing unit
[2] Pressure roller
[3] Delivery roller
[4] Fixing film unit
[5] Laser scanner unit
[6] Pickup tray
[7] Photosensitive drum
[8] Pickup roller
[9] separation pad
[10] Feed roller
[11] Transfer roller
[12] Toner cartridge

1.4 Using the Machine

1.4.1 Control Panel

LBP3100 / LBP3010B



F-1-6

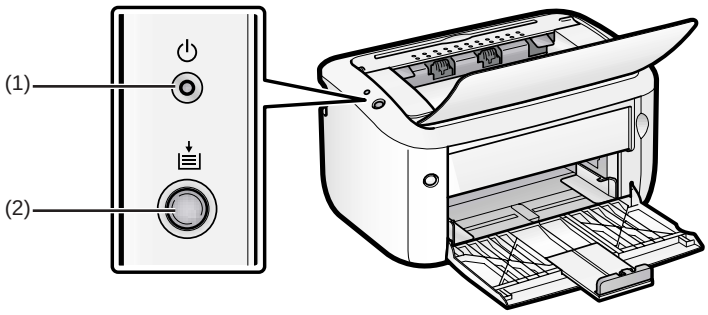
[1] Power lamp (green)
Lighting:
Indicates that the power of the host machine is turned on.
Not lighting:
Indicates that the power of the host machine is not turned on.

[2] Paper lamp/paper key (red)
<Lamp>
Flashing:
Indicates that there is no paper in the pickup source and print cannot be executed, or papers cannot be fed correctly.
Not lighting:
Indicates that the machine can make prints.

<Key>
Pressing this key after executing pickup of paper or jam removal restarts printing.

1.4.2 Control Panel

LBP6000 / LBP6000B



F-1-7

[1] Power lamp (green)
Lighting:
Indicates that the power of the host machine is turned on.
Not lighting:
Indicates that the power of the host machine is not turned on.

[2] Paper lamp/paper key (red)
<Lamp>
Flashing:
Indicates that there is no paper in the pickup source and print cannot be executed, or papers cannot be fed correctly.
Not lighting:
Indicates that the machine can make prints.

<Key>
Pressing this key after executing pickup of paper or jam removal restarts printing.

1.5 Safety

1.5.1 Safety of Laser Light

LBP3100 / LBP3010B

Laser light can be extremely hazardous to the human body.

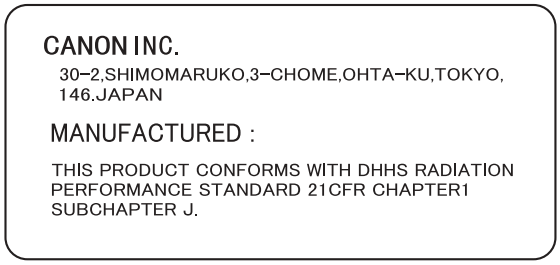
The machines laser scanning system is contained in a protective housing and external covers to prevent escape of laser light outside the machine. In other words, the user is free of laser-related hazards as long as the machine is being used for its intended purposes.

The following warnings are given to comply with Safety Principles (EN60950).
Laserstrahlen können für den menschlichen Körper gefährlich sein. Aus diesem Grund ist das optische Lasersystem mit einem Schutzgehäuse und einer Außenabdeckung dicht verschlossen und hat eine Struktur, die keine Laserstrahlen nach außen dringen lässt. Unter der Voraussetzung, dass der Benutzer dieses Gerät normal bedient, ist ein Austritt von Laserstrahlen daher ausgeschlossen.

1.5.2 CDRH Regulations

LBP3100 / LBP3010B

The Center for Devices and Radiological Health of the US Food and Drug Administration put into effect regulations concerning laser products on August 2, 1976. These regulations apply to products produced on and after August 1, 1976, and prohibit the sale of laser products without certification. The following is a label used to certify compliance with the CDRH regulations, and all laser products to be sold in the US must bear this label.



F-1-8

1.5.3 Safety of Toner

LBP3100 / LBP3010B

The machines toner is a non-toxic material made up of plastic, iron, and small amounts of dye.

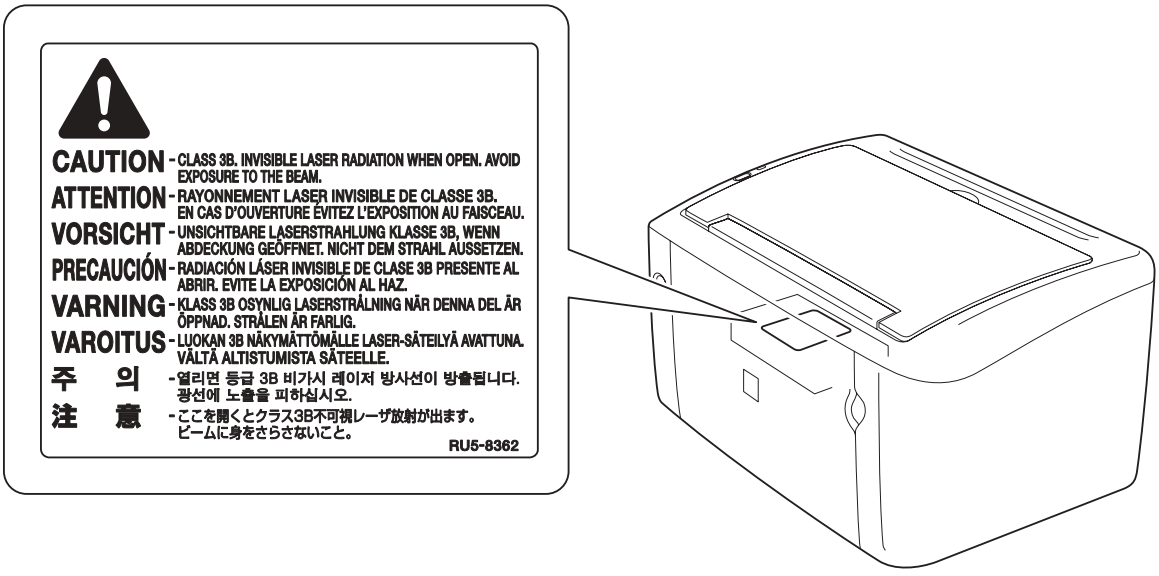
⚠
Do not throw toner into fire. Doing so can lead to explosion.

Toner on Clothing or Skin
1.Remove toner from clothing or skin, and wash with water.
2.Do not use warm or hot water, which will cause the toner to turn jelly-like and fuse permanently with the fibers of clothing.
3.Toner tends to react readily with vinyl. Do not bring it in contact.
Be sure to avoid using a transparent case made from vinyl chloride.
If it is in contact with a copy surface, the toner on it may melt, causing the case and the paper to stick to each other.

1.5.4 Handling the Laser Unit

LBP3100 / LBP3010B

The laser/scanner unit emits invisible laser beam. DO NOT disassemble the unit as the laser beam can possibly damage your eyes. The unit cannot be adjusted in the field. The following label is attached to the cover of the unit:



F-1-9

Handhabung des Laserteils

Bei Servicearbeiten am oder in der Nähe des Laserteils zuerst das Hauptgerät abschalten.

Bei Servicearbeiten, die unbedingt bei eingeschaltetem Gerät durchgeführt werden müssen, auf jeden Fall die folgenden Vorsichtsmaßnahmen beachten.

• Keine stark reflektierenden Schraubenzieher oder ähnliche Werkzeuge direkt in den Lichtpfad des Laserstrahls bringen.

• Vor Beginn der Arbeit Uhren, Ringe und ähnliche Gegenstände abnehmen. (Reflektierte Laserstrahlen könnten sonst in die Augen geraten.)

Abdeckungen, die möglicherweise Laserstrahlen reflektieren, haben in der auf dem Bild gezeigten Position einen Aufkleber. Bei Servicearbeiten auf der Innenseite von Abdeckungen mit Aufkleber ist besondere Vorsicht erforderlich.

F-1-10

1.5.5 Points to Note at Disassembly/Assembly Work

LBP3100 / LBP3010B

Be sure to ensure the following notes when performing disassembly/assembly work.
1. Be sure to disconnect the power plug for safety when performing disassembly/assembly work.
2. As for assembly procedure, perform the reverse procedure of disassembly unless otherwise instructed.
3. Avoid making mistakes in the type of screws (length/diameter) and usage locations for assembly.
4. Screws w/washer are used as mounting screws for grounding wires and varistors with the aim of checking electric continuity. Be sure to use this screw for assembly.
5. Basically, do not activate the machine with their parts being removed.
6. Do not remove paintlock screws at the time of disassembly.

1.5.6 Safety of Laser Light

LBP6000 / LBP6000B

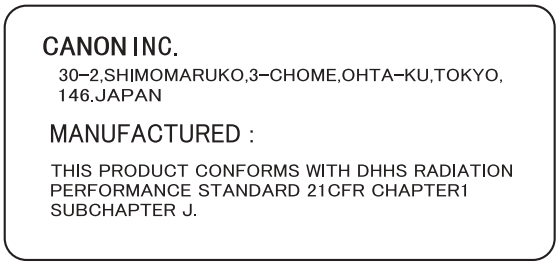
Laser light can be extremely hazardous to the human body.
The machines laser scanning system is contained in a protective housing and external covers to prevent escape of laser light outside the machine. In other words, the user is free of laser-related hazards as long as the machine is being used for its intended purposes.

The following warnings are given to comply with Safety Principles (EN60950).
Laserstrahlen können für den menschlichen Körper gefährlich sein. Aus diesem Grund ist das optische Lasersystem mit einem Schutzgehäuse und einer Außenabdeckung dicht verschlossen und hat eine Struktur, die keine Laserstrahlen nach außen dringen lässt. Unter der Voraussetzung, dass der Benutzer dieses Gerät normal bedient, ist ein Austritt von Laserstrahlen daher ausgeschlossen.

1.5.7 CDRH Regulations

LBP6000 / LBP6000B

The Center for Devices and Radiological Health of the US Food and Drug Administration put into effect regulations concerning laser products on August 2, 1976. These regulations apply to products produced on and after August 1, 1976, and prohibit the sale of laser products without certification. The following is a label used to certify compliance with the CDRH regulations, and all laser products to be sold in the US must bear this label.



F-1-11

1.5.8 Safety of Toner

LBP6000 / LBP6000B

The machines toner is a non-toxic material made up of plastic, iron, and small amounts of dye.

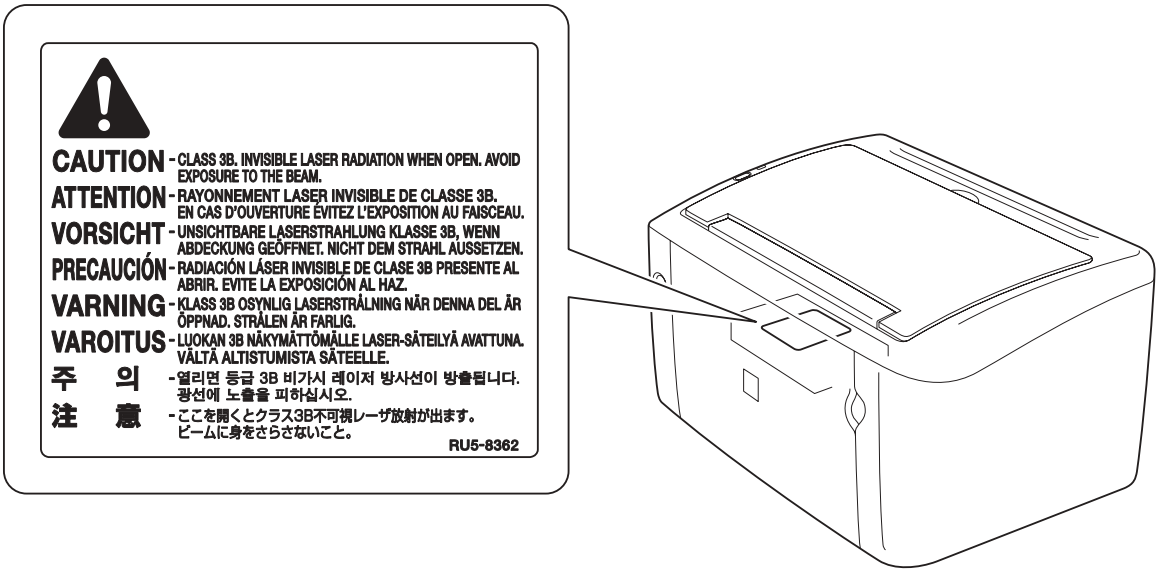
⚠
Do not throw toner into fire. Doing so can lead to explosion.

Toner on Clothing or Skin
1.Remove toner from clothing or skin, and wash with water.
2.Do not use warm or hot water, which will cause the toner to turn jelly-like and fuse permanently with the fibers of clothing.
3.Toner tends to react readily with vinyl. Do not bring it in contact.
Be sure to avoid using a transparent case made from vinyl chloride.
If it is in contact with a copy surface, the toner on it may melt, causing the case and the paper to stick to each other.

1.5.9 Handling the Laser Unit

LBP6000 / LBP6000B

The laser/scanner unit emits invisible laser beam. DO NOT disassemble the unit as the laser beam can possibly damage your eyes. The unit cannot be adjusted in the field. The following label is attached to the cover of the unit:



F-1-12

Handhabung des Laserteils

Bei Servicearbeiten am oder in der Nähe des Laserteils zuerst das Hauptgerät abschalten.

Bei Servicearbeiten, die unbedingt bei eingeschaltetem Gerät durchgeführt werden müssen, auf jeden Fall die folgenden Vorsichtsmaßnahmen beachten.

• Keine stark reflektierenden Schraubenzieher oder ähnliche Werkzeuge direkt in den Lichtpfad des Laserstrahls bringen.

• Vor Beginn der Arbeit Uhren, Ringe und ähnliche Gegenstände abnehmen. (Reflektierte Laserstrahlen könnten sonst in die Augen geraten.)

Abdeckungen, die möglicherweise Laserstrahlen reflektieren, haben in der auf dem Bild gezeigten Position einen Aufkleber. Bei Servicearbeiten auf der Innenseite von Abdeckungen mit Aufkleber ist besondere Vorsicht erforderlich.

F-1-13

1.5.10 Points to Note at Disassembly/Assembly Work

LBP6000 / LBP6000B

Be sure to ensure the following notes when performing disassembly/assembly work.
1. Be sure to disconnect the power plug for safety when performing disassembly/assembly work.
2. As for assembly procedure, perform the reverse procedure of disassembly unless otherwise instructed.
3. Avoid making mistakes in the type of screws (length/diameter) and usage locations for assembly.
4. Screws w/washer are used as mounting screws for grounding wires and varistors with the aim of checking electric continuity. Be sure to use this screw for assembly.
5. Basically, do not activate the machine with their parts being removed.
6. Do not remove paintlock screws at the time of disassembly.

Chapter 2 TECHNICAL REFERENCE

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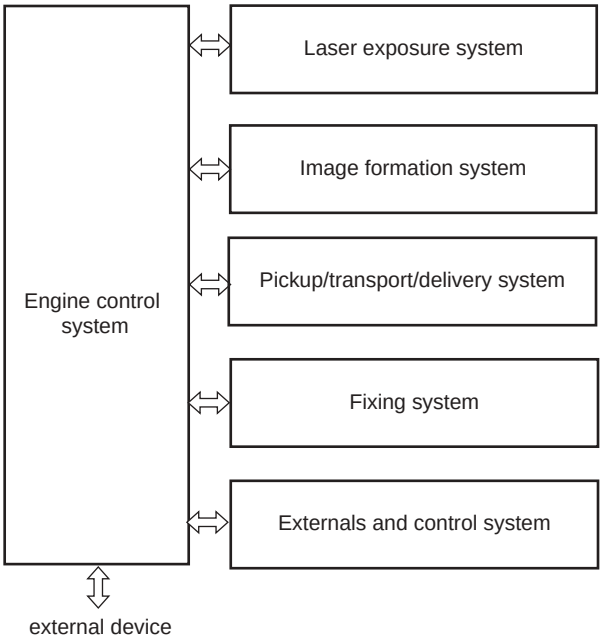
2.1 Functional Configuration

2.1.1 Outline

LBP3100 / LBP3010B

The machine may be broadly divided into the following 6 functional blocks: engine control system, laser exposure system, image formation system, pickup/transport/delivery system, fixing system, and externals/auxiliary control system.

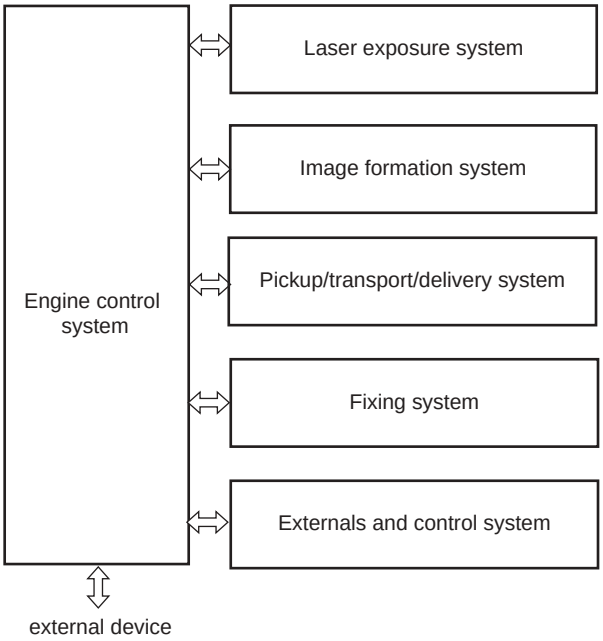


F-2-1

2.1.2 Outline

LBP6000 / LBP6000B

The machine may be broadly divided into the following 6 functional blocks: engine control system, laser exposure system, image formation system, pickup/transport/delivery system, fixing system, and externals/auxiliary control system.



F-2-2

2.2 Basic Sequence

2.2.1 Basic Sequence of Operation

LBP3100 / LBP3010B

The engine controller controls the operation sequence.The following table provides an outline of machine operation occurring from when the power switch is turned on to when printing ends and motors stop, indicating the purposes of intervals and engine operation. For details of various loads, see the timing chart.

T-2-1

Interval		Purpose	Remarks
WAIT (Wait)	From power-ON until initial drive for main motor is completed.	To clear potential from the drum surface and to clean the transfer roller. Also to bring the heater temperature up to the targeted temperature.	Detect whether the Toner cartridge is installed or not.
STBY (Standby)	From the end of the WAIT period or the LSTR period until the print command is sent from the main controller. Or, from the end of the LSTR period until power switch is turned OFF.	To keep the printer ready to print.	
INTR (initial rotation)	From the input of the print command from the main controller until the pick-up solenoid is turned ON.	To stabilize the photosensitive drum sensitivity in preparation for printing. Also to clean the transfer roller.	
PRINT (print)	From the end of the INTR period until the top of page sensor detects the trailing edge of paper.	To form image on the photosensitive drum based on the VIDEO (/VD0, VD0) signals input from the main controller, and to transfer the toner image onto paper.	
LSTR (last rotation)	From the end of PRINT period until the Main motor stops.	To deliver the last paper completely out of the printer.	Return to the INTR period as soon as another print command is sent from the main controller.

2.2.2 Power-On Sequence

LBP3100 / LBP3010B

The sequences from the power-ON to the STBY period are described below.
1) Power-ON
2) CPU initialization
3) Video interface communication start
4) Residual paper check
   Detecting paper presence by each sensor signaling.

5) Initial drive for main motor
6) Initial drive for fixing heater
   Controlling fixing temperature targeting for 120 deg C.
7) Initial drive of the scanner motor.
8) High-voltage control
   Detect cartridge presence after primary charging AC bias is applied.
   Cleaning transfer roller.
9) Failure/Abnormality check
   Detecting fixing unit failure and door open during above periods.

2.2.3 Basic Sequence of Operation

LBP6000 / LBP6000B

The engine controller controls the operation sequence.The following table provides an outline of machine operation occurring from when the power switch is turned on to when printing ends and motors stop, indicating the purposes of intervals and engine operation. For details of various loads, see the timing chart.

T-2-2

Interval		Purpose	Remarks
WAIT (Wait)	From power-ON until initial drive for main motor is completed.	To clear potential from the drum surface and to clean the transfer roller. Also to bring the heater temperature up to the targeted temperature.	Detect whether the Toner cartridge is installed or not.
STBY (Standby)	From the end of the WAIT period or the LSTR period until the print command is sent from the main controller. Or, from the end of the LSTR period until power switch is turned OFF.	To keep the printer ready to print.	
INTR (initial rotation)	From the input of the print command from the main controller until the pick-up solenoid is turned ON.	To stabilize the photosensitive drum sensitivity in preparation for printing. Also to clean the transfer roller.	
PRINT (print)	From the end of the INTR period until the top of page sensor detects the trailing edge of paper.	To form image on the photosensitive drum based on the VIDEO (/VD0, VD0) signals input from the main controller, and to transfer the toner image onto paper.	
LSTR (last rotation)	From the end of PRINT period until the Main motor stops.	To deliver the last paper completely out of the printer.	Return to the INTR period as soon as another print command is sent from the main controller.

2.2.4 Power-On Sequence

LBP6000 / LBP6000B

The sequences from the power-ON to the STBY period are described below.
1) Power-ON
2) CPU initialization
3) Video interface communication start
4) Residual paper check
   Detecting paper presence by each sensor signaling.

5) Initial drive for main motor
6) Initial drive for fixing heater
Controlling fixing temperature targeting for 120 deg C.
7) Initial drive of the scanner motor.
8) High-voltage control
Detect cartridge presence after primary charging AC bias is applied.
Cleaning transfer roller.
9) Failure/Abnormality check
Detecting fixing unit failure and door open during above periods.

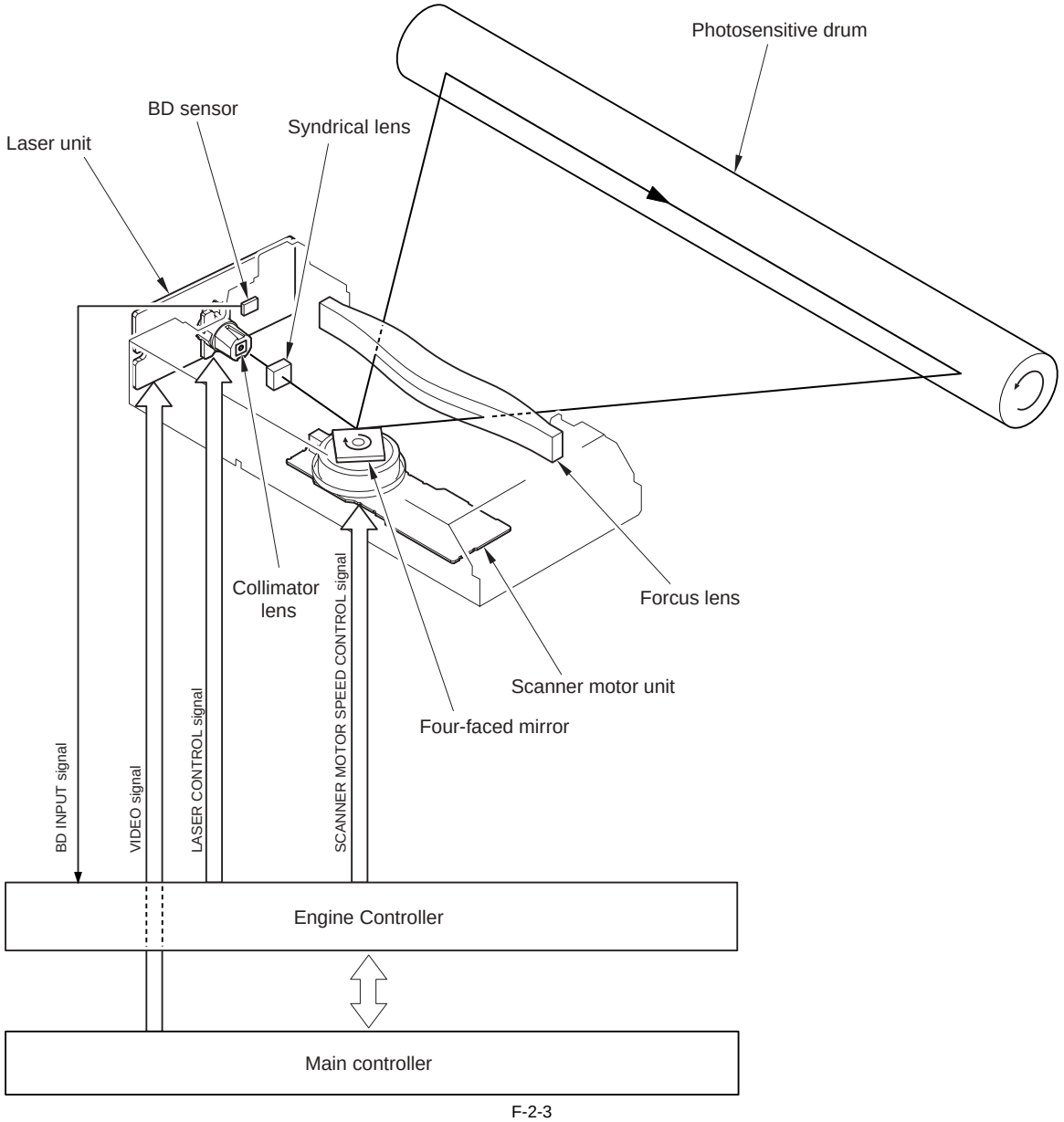
2.3 LASER EXPOSURE SYSTEM

2.3.1 Overview/Configuration

2.3.1.1 Overview

LBP3100 / LBP3010B

The laser Exposure system forms static latent images on the photosensitive drum according to the VIDEO signals sent from the main controller, and is comprised of the laser driver and scanner motor, etc. There are controlled by the engine controller. The following is the outline of the laser Exposure system.



F-2-3

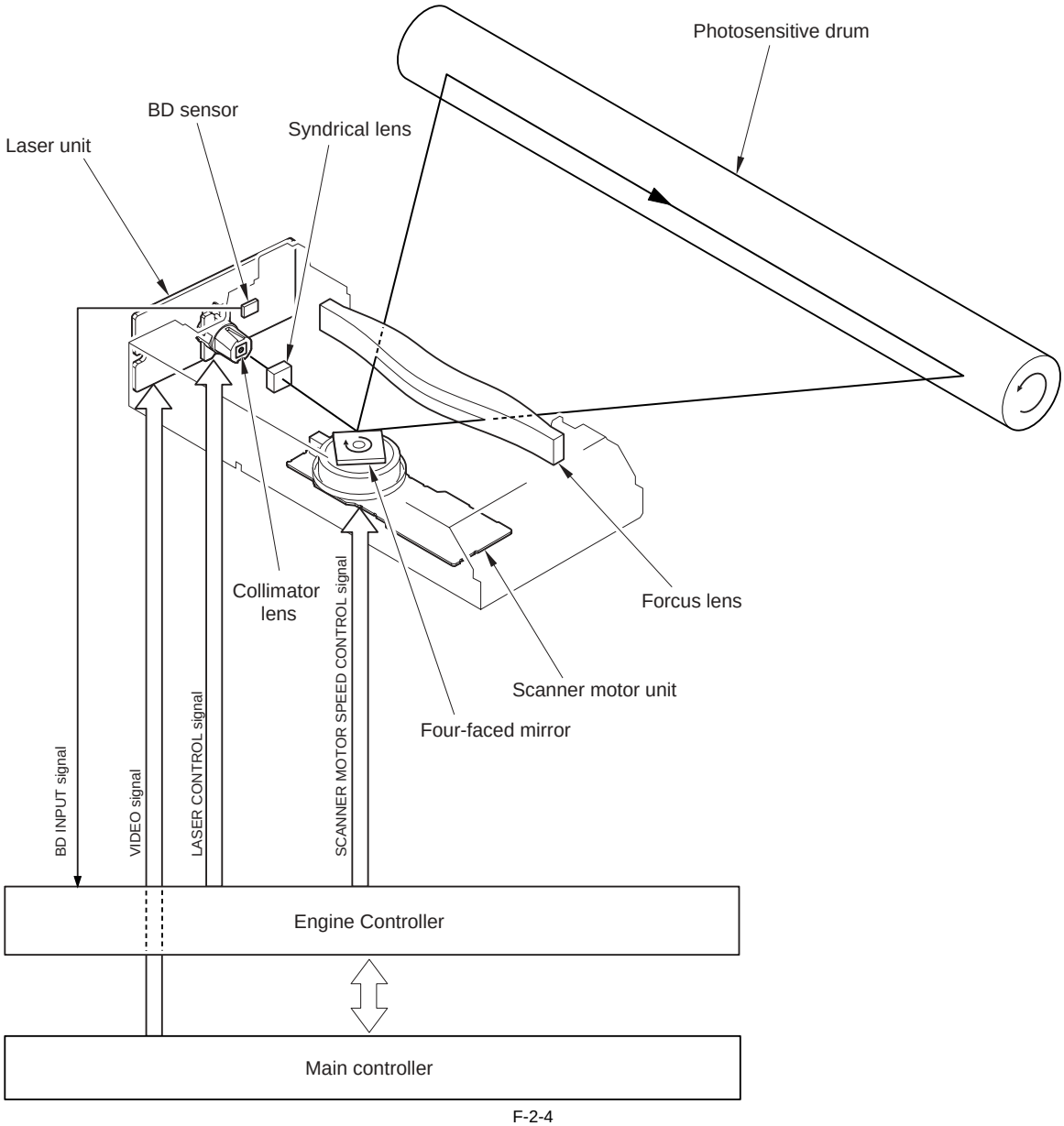
The operational sequence of the laser scanner unit is described below.
1) When the Main controller sends print instruction command, the Engine controller rotates the Four-faced mirror, causing the Scanner motor to rotate.
2) When the Scanner motor starts to rotate, the Engine controller emits the laser forcibly using the Laser control signal, causing the Engine controller to start rotation control for the Scanner motor.
3) The Engine controller controls to keep a constant speed of rotation of the Scanner motor using the Scanner motor speed control signal.
4) After the rotation speed of the Scanner motor reaches its target, the Main controller sends VIDEO signals to the Laser driver PCB.
5) The Laser driver emits laser diode according to these signals.
6) The laser beam passes through the collimator lens and the cylindrical lens and enters the Four-faced mirror rotating at a constant speed.
7) The laser beam reflected by the Four-faced mirror is focused on the Photosensitive drum via the image-forming lens at the front of the Four-faced mirror.

8) When the Four-faced mirror rotates at a constant speed, the laser beam on the Photosensitive drum is scanned on the Photosensitive drum at a constant speed.
9) When the Photosensitive drum rotates at a constant speed and the laser beam is scanned on the Photosensitive drum at a constant speed, latent images are formed on the Photosensitive drum.

2.3.1.2 Overview

LBP6000 / LBP6000B

The laser Exposure system forms static latent images on the photosensitive drum according to the VIDEO signals sent from the main controller, and is comprised of the laser driver and scanner motor, etc. There are controlled by the engine controller. The following is the outline of the laser Exposure system.



F-2-4

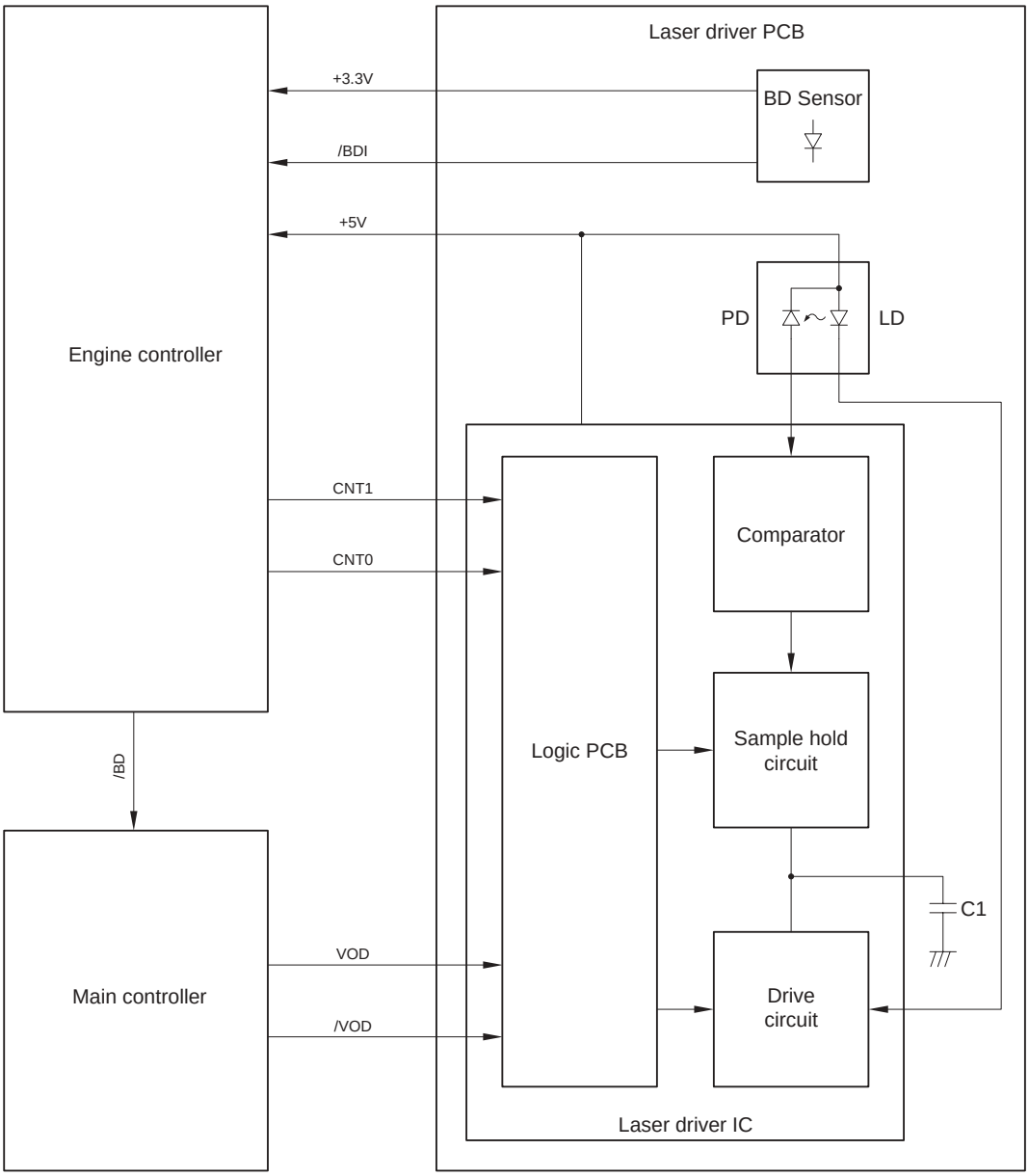
The operational sequence of the laser scanner unit is described below.
1) When the Main controller sends print instruction command, the Engine controller rotates the Four-faced mirror, causing the Scanner motor to rotate.
2) When the Scanner motor starts to rotate, the Engine controller emits the laser forcibly using the Laser control signal, causing the Engine controller to start rotation control for the Scanner motor.
3) The Engine controller controls to keep a constant speed of rotation of the Scanner motor using the Scanner motor speed control signal.
4) After the rotation speed of the Scanner motor reaches its target, the Main controller sends VIDEO signals to the Laser driver PCB.
5) The Laser driver emits laser diode according to these signals.
6) The laser beam passes through the collimator lens and the cylindrical lens and enters the Four-faced mirror rotating at a constant speed.
7) The laser beam reflected by the Four-faced mirror is focused on the Photosensitive drum via the image-forming lens at the front of the Four-faced mirror.
8) When the Four-faced mirror rotates at a constant speed, the laser beam on the Photosensitive drum is scanned on the Photosensitive drum at a constant speed.
9) When the Photosensitive drum rotates at a constant speed and the laser beam is scanned on the Photosensitive drum at a constant speed, latent images are formed on the Photosensitive drum.

2.3.2 Controlling the Laser Activation Timing

2.3.2.1 Laser ON/OFF Control

LBP3100 / LBP3010B

In this control, the laser driver turns on/off the laser diode (LD) according to the laser control signal sent from the engine controller.
The following is the circuit diagram of the laser control.



F-2-5

The engine controller sends the laser control signal (CNT0, CNT1) for changing the operation mode of the laser to the logic circuit in the laser driver IC, as well as the video signal (VD0, /VD0) for image formation. The laser driver IC executes laser control according to the combination of the CNT0, CNT1 signals.
The following is the combination of the laser control signal (CNT0, CNT1).

T-2-3

Operation mode	CNT0	CNT1	Remarks
Discharge	L	L	The capacitor (C1) is discharged.
Data output	H	H	At normal print
APC	H	L	At using APC
Forced OFF	L	H	At using image mask

2.3.2.2 Horizontal Sync Control

LBP3100 / LBP3010B

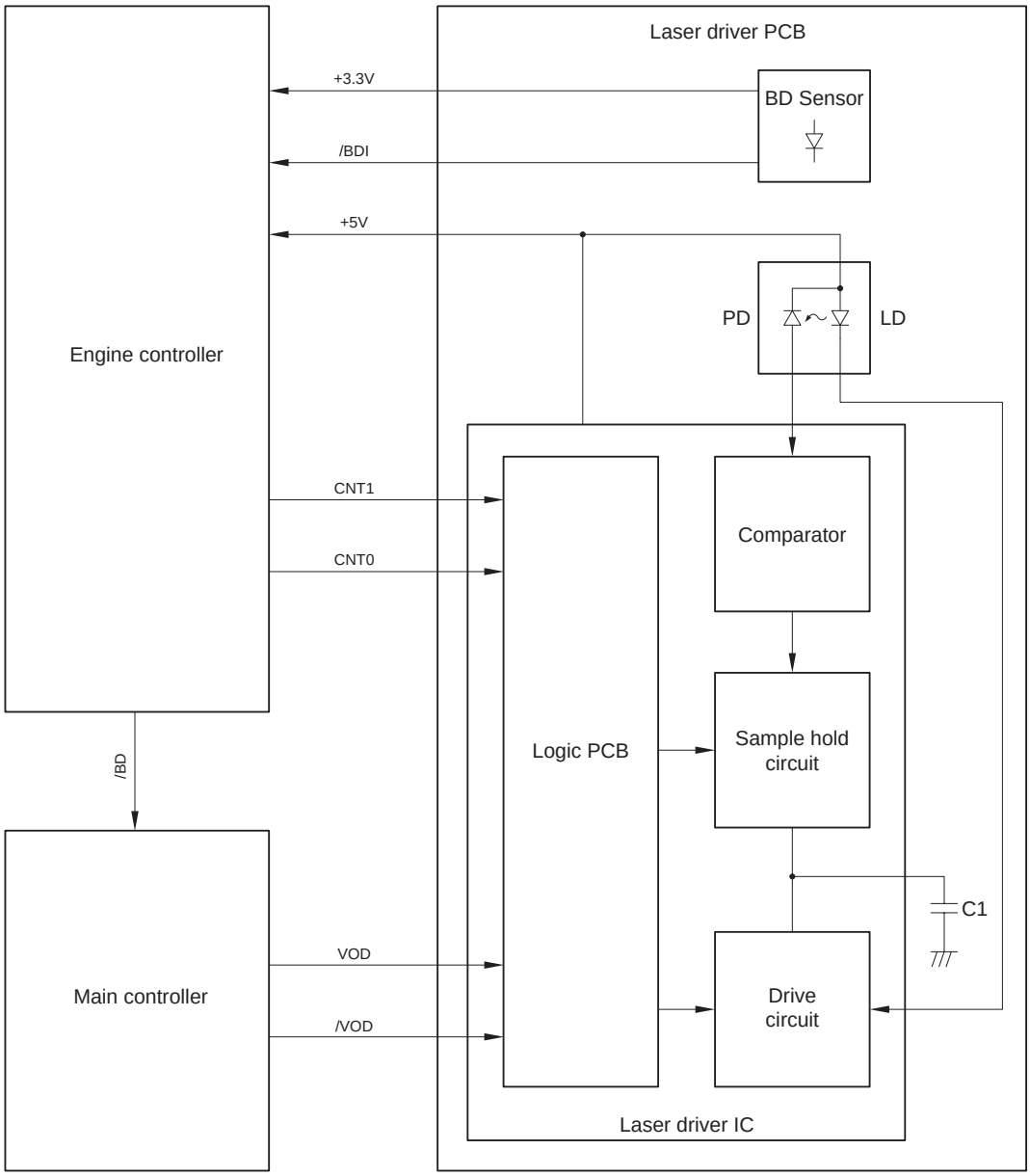
This is the control to adjust the writing position in the image horizontal direction.
The following is the details of control procedure.
1) The engine controller controls the laser control signal during unblanking (*) to emit the laser diode (LD) forcibly.
2) The BD PCB exists on the scanning route of the laser beam, which is sent to the BD PCB.
3) The BD PCB detects this laser beam, creates BD input signal (/BDI) and sends it to the engine controller.
4) The engine controller creates horizontal sync signals (/BD) based on /BDI signal and sends the /BD signal to the main controller.
5) When /BD signal is input, the main controller outputs the video signal (VD0, /VD0) to the engine controller to adjust the writing position in image horizontal direction.

***: Unblanking period**
The period during which the laser diode is emitted in non-image area.

2.3.2.3 Laser ON/OFF Control

LBP6000 / LBP6000B

In this control, the laser driver turns on/off the laser diode (LD) according to the laser control signal sent from the engine controller.
The following is the circuit diagram of the laser control.



F-2-6

The engine controller sends the laser control signal (CNT0, CNT1) for changing the operation mode of the laser to the logic circuit in the laser driver IC, as well as the video signal (VD0, /VD0) for image formation. The laser driver IC executes laser control according to the combination of the CNT0, CNT1 signals.
The following is the combination of the laser control signal (CNT0, CNT1).

T-2-4

Operation mode	CNT0	CNT1	Remarks
Discharge	L	L	The capacitor (C1) is discharged.
Data output	H	H	At normal print
APC	H	L	At using APC
Forced OFF	L	H	At using image mask

2.3.2.4 Horizontal Sync Control

LBP6000 / LBP6000B

This is the control to adjust the writing position in the image horizontal direction.

The following is the details of control procedure.
1) The engine controller controls the laser control signal during unblanking (*) to emit the laser diode (LD) forcibly.
2) The BD PCB exists on the scanning route of the laser beam, which is sent to the BD PCB.
3) The BD PCB detects this laser beam, creates BD input signal (/BDI) and sends it to the engine controller.
4) The engine controller creates horizontal sync signals (/BD) based on /BDI signal and sends the /BD signal to the main controller.
5) When /BD signal is input, the main controller outputs the video signal (VD0, /VD0) to the engine controller to adjust the writing position in image horizontal direction.

***: Unblanking period**
The period during which the laser diode is emitted in non-image area.

2.3.3 Laser Control

2.3.3.1 Auto Power Control (APC)

LBP3100 / LBP3010B

This is the control to emit a constant level of laser diode.
There are two types of APC; initial APC (note 1), and line space APC (note 2). The laser driver executes the same procedure for both controls. The following is the details of the control procedure.

1) When the laser control signal enters APC mode (CNT0=H, CNT1=L), the laser driver emits LD in APC mode.
2) The emission level of LD is detected with photo diode (PD), converted from current output to voltage, and compared with the standard voltage (voltage equivalent to the target laser level).
3) The laser driver controls the laser current to achieve the voltage of LD target level.
4) When the laser control signal enters LD forced OFF mode, the LD is forcibly turned off. The laser driver saves the adjusted laser intensity to the capacitor (C1).

1. Initial APC
APC that is executed during initial rotation. APC adjusts laser intensity.
2. Line space APC
APC that is executed during printing. Laser intensity for one line is adjusted before writing one line.

2.3.3.2 Auto Power Control (APC)

LBP6000 / LBP6000B

This is the control to emit a constant level of laser diode.
There are two types of APC; initial APC (note 1), and line space APC (note 2). The laser driver executes the same procedure for both controls. The following is the details of the control procedure.

1) When the laser control signal enters APC mode (CNT0=H, CNT1=L), the laser driver emits LD in APC mode.
2) The emission level of LD is detected with photo diode (PD), converted from current output to voltage, and compared with the standard voltage (voltage equivalent to the target laser level).
3) The laser driver controls the laser current to achieve the voltage of LD target level.
4) When the laser control signal enters LD forced OFF mode, the LD is forcibly turned off. The laser driver saves the adjusted laser intensity to the capacitor (C1).

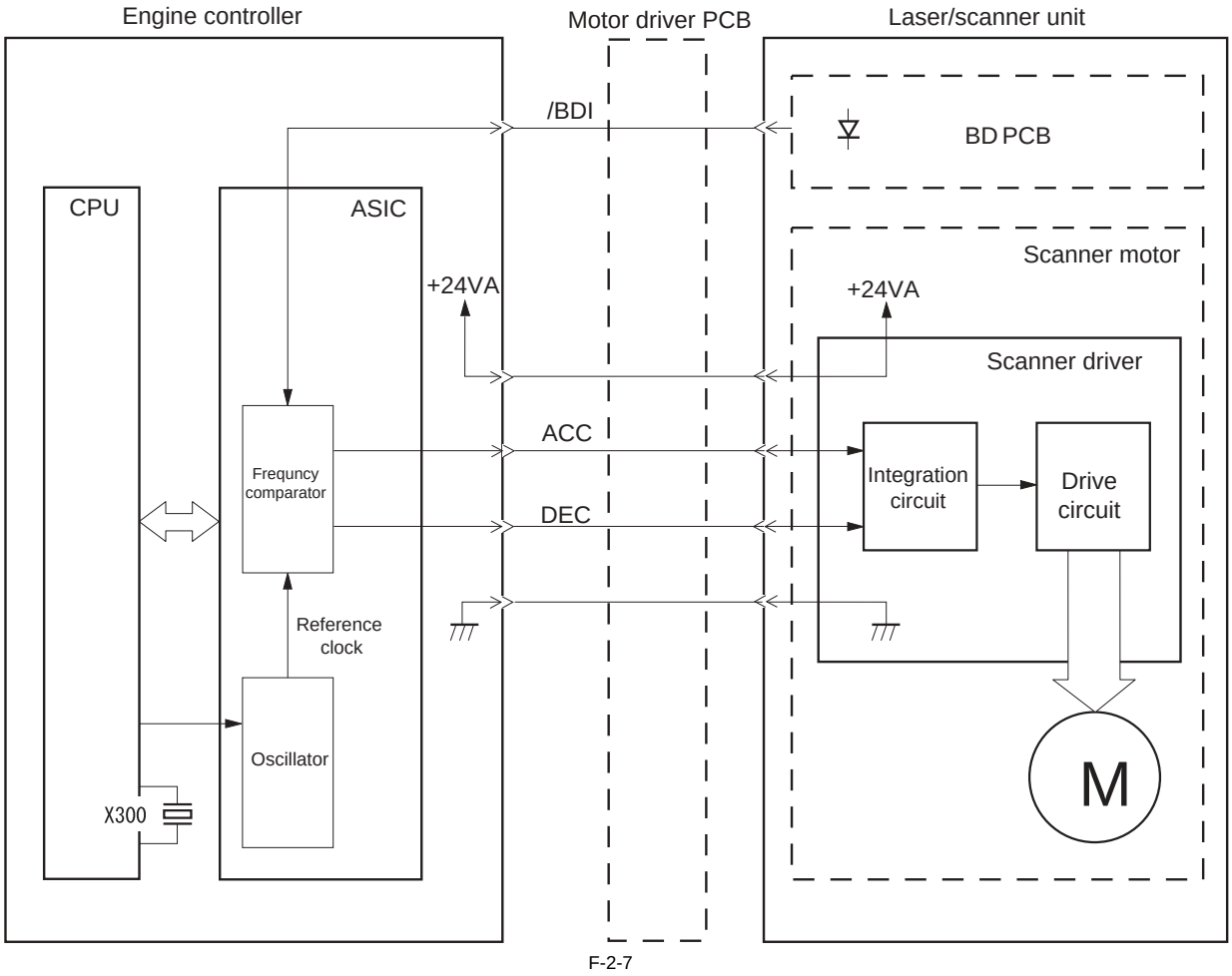
1. Initial APC
APC that is executed during initial rotation. APC adjusts laser intensity.
2. Line space APC
APC that is executed during printing. Laser intensity for one line is adjusted before writing one line.

2.3.4 Laser Scanner Motor Control

2.3.4.1 Overview

LBP3100 / LBP3010B

This is the control to rotate the scanner motor at a constant speed to emit the laser beam on the correct position on the photosensitive drum.
The following is the control circuit of the scanner motor.



F-2-7

The engine controller creates standard clock based on oscillation frequency of the oscillator (X300); the cycles of the standard clock is compared with that of BD input signal (/BDI) with a frequency comparator and the rotations of the scanner motor is monitored.
The engine controller sends the scanner motor acceleration signal (ACC) and scanner motor deceleration signal (DEC) to the scanner motor driver according to the detected rotation speed to control the rotation speed.

2.3.4.2 Scanner Motor Fault Detection

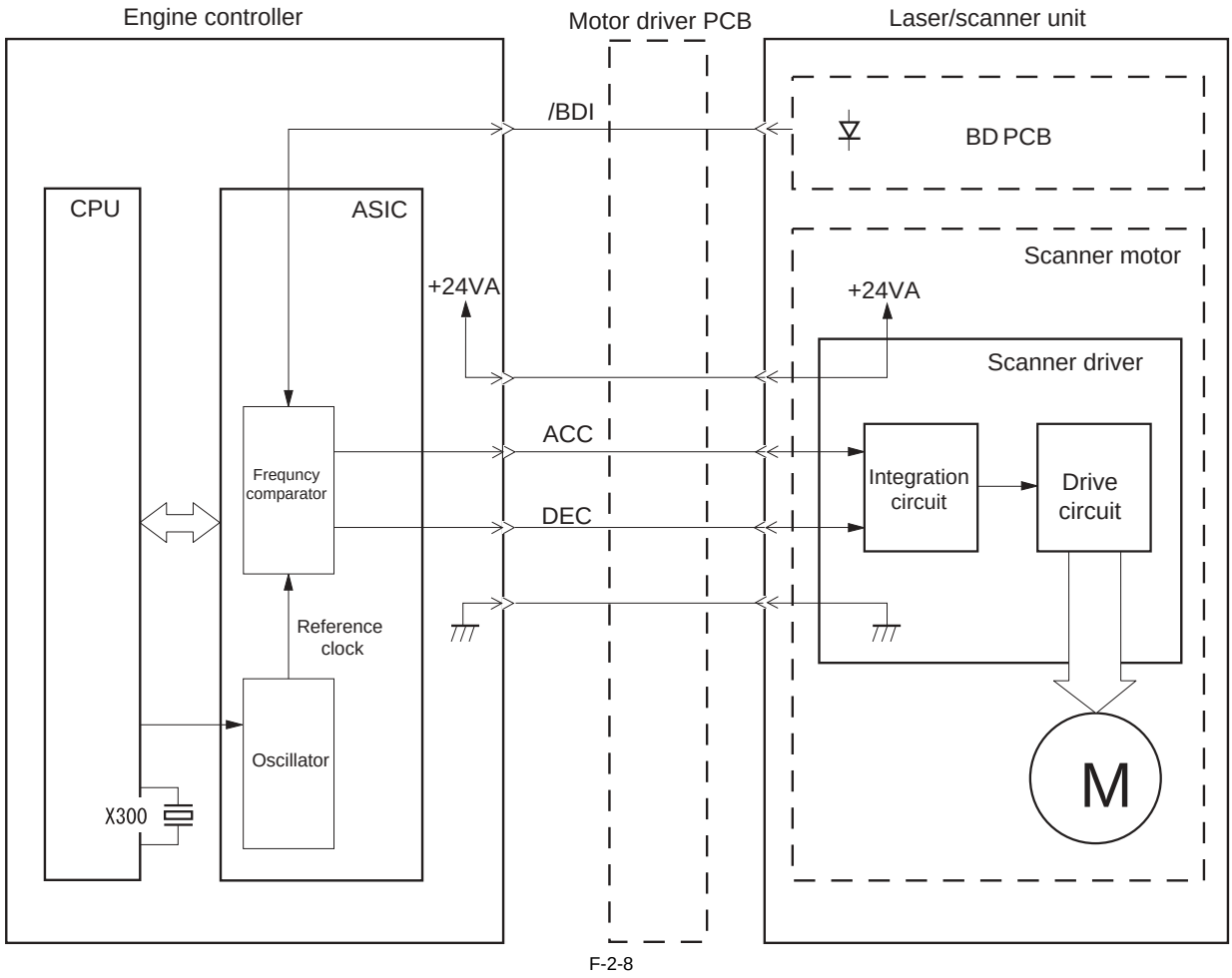
LBP3100 / LBP3010B

This is the detection of faults in the laser scanner unit.
When the laser unit scanner unit falls into either of the following status, the engine controller judges it as a fault in the laser/ scanner unit system and notices the status of fault to the main controller.
The operations of the host machine are stopped.
1) Fault in BD input
At startup of the scanner, /BDI signal cannot be detected within 0.1 sec from the completion of forced acceleration of the scanner motor.
2) Fault in startup
During activating the scanner motor at startup of the scanner, the motor rotation exceeds the specified range (98.3 to 102.1%).
3) Fault in control
After startup of the scanner completes correctly, /BDI signal exceeds the specified value of cycle 10 consecutive times.

2.3.4.3 Overview

LBP6000 / LBP6000B

This is the control to rotate the scanner motor at a constant speed to emit the laser beam on the correct position on the photosensitive drum.
The following is the control circuit of the scanner motor.



F-2-8

The engine controller creates standard clock based on oscillation frequency of the oscillator (X300); the cycles of the standard clock is compared with that of BD input signal (/BDI) with a frequency comparator and the rotations of the scanner motor is monitored.
The engine controller sends the scanner motor acceleration signal (ACC) and scanner motor deceleration signal (DEC) to the scanner motor driver according to the detected rotation speed to control the rotation speed.

2.3.4.4 Scanner Motor Fault Detection

LBP6000 / LBP6000B

This is the detection of faults in the laser scanner unit.
When the laser unit scanner unit falls into either of the following status, the engine controller judges it as a fault in the laser/ scanner unit system and notices the status of fault to the main controller.
The operations of the host machine are stopped.
1) Fault in BD input
   At startup of the scanner, /BDI signal cannot be detected within 0.1 sec from the completion of forced acceleration of the scanner motor.
2) Fault in startup
   During activating the scanner motor at startup of the scanner, the motor rotation exceeds the specified range (98.3 to 102.1%).
3) Fault in control
   After startup of the scanner completes correctly, /BDI signal exceeds the specified value of cycle 10 consecutive times.

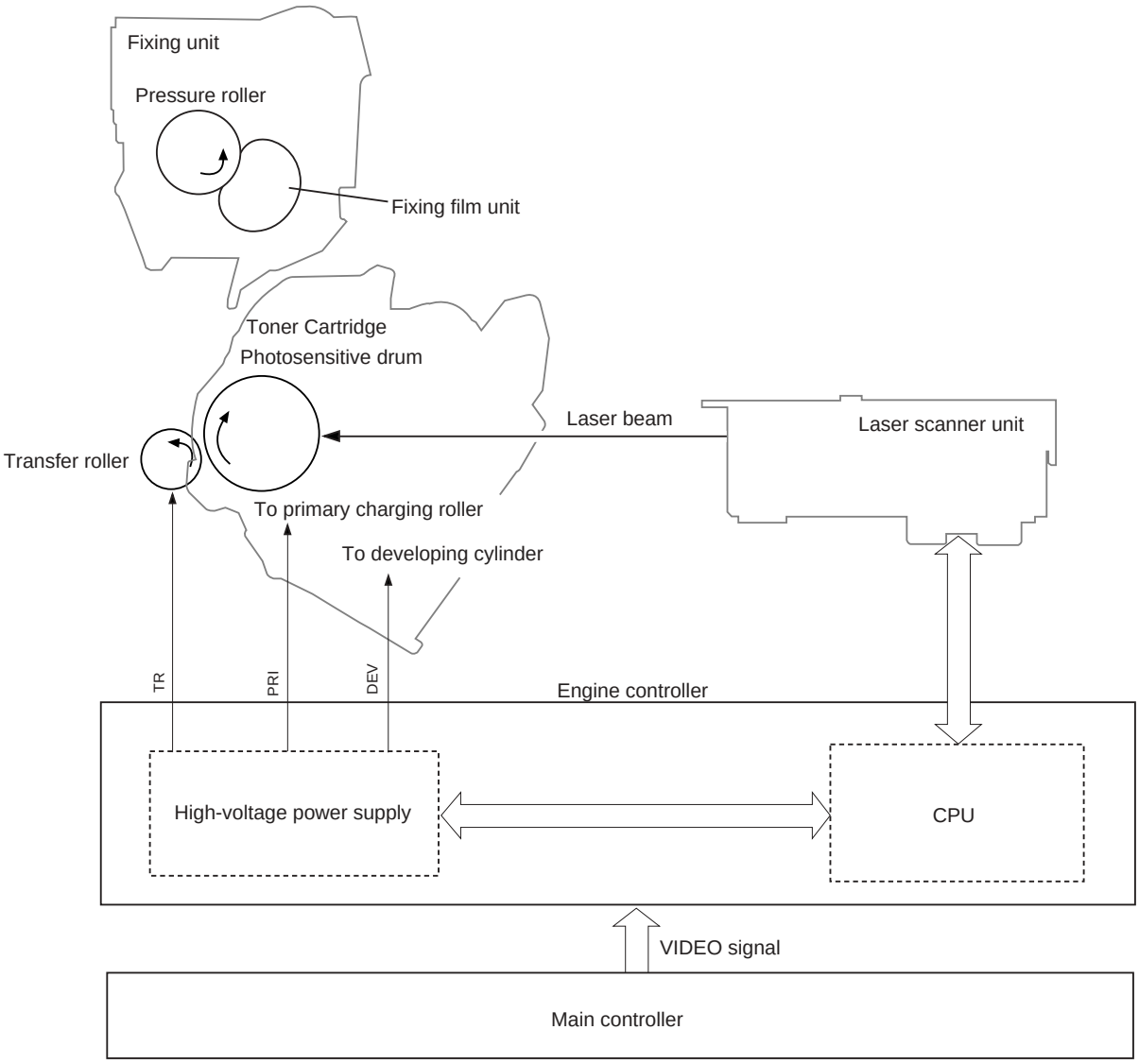
2.4 IMAGE FORMATION SYSTEM

2.4.1 Overview/Configuration

2.4.1.1 Overview

LBP3100 / LBP3010B

The image formation system is the core of this equipment; it forms toner images on papers.
The image formation system is comprised of the following components.
The engine controller controls the laser scanner unit and high-voltage power supply circuit and forms images based on the video signals on papers.
The following are the details of print process for this equipment and the functions of image formation.



F-2-9

2.4.1.2 Print Process

LBP3100 / LBP3010B

This explains the basic process of the operations that a printer executes for image formation.
The print process of this equipment is divided largely into 5 blocks, 7 steps.
Toner images are formed on papers by executing the steps of each block in order.
The following are the blocks of print process and the steps.

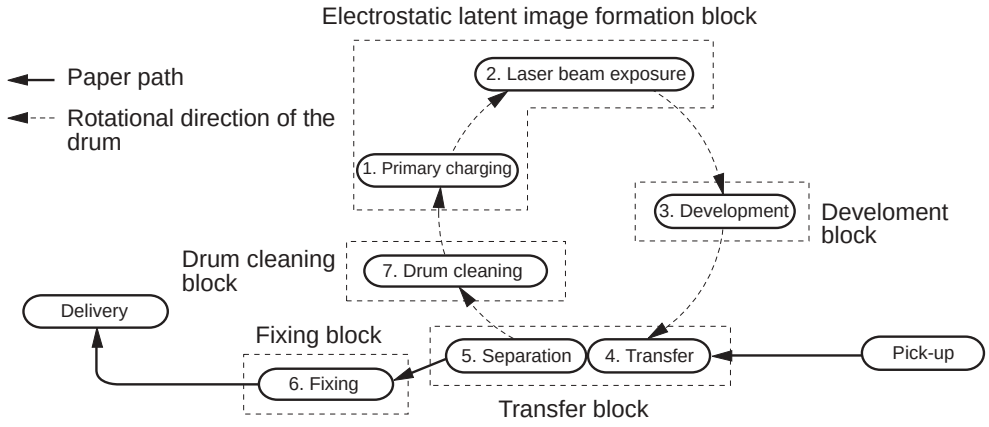
1. Static latent image formation block
   Step 1: Primary charging
   Step2: Laser beam exposure

2. Development block
   Step 3: Development

3. Transfer block
   Step 4: Transfer
   Step 5: Separation

4. Fixing block
Step 6: Fixing

5. Drum cleaning block
Step 7: Drum cleaning

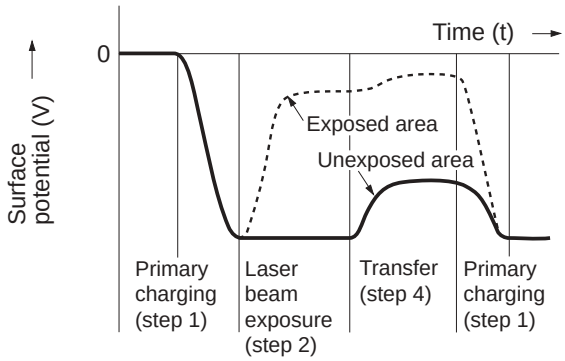


F-2-10

2.4.1.3 Static Latent Image Formation Block

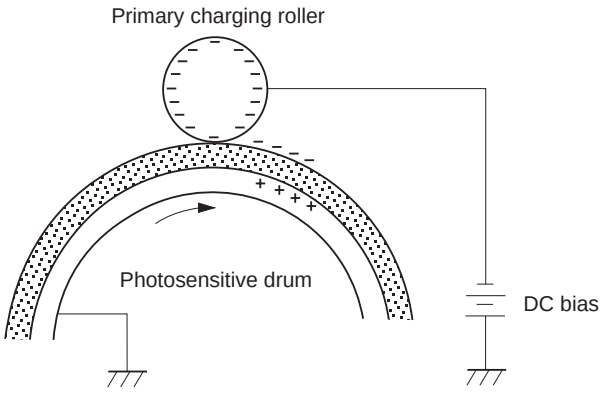
LBP3100 / LBP3010B

This block is comprised of two steps and forms static latent images on the photosensitive drum.
When the final step of this block completes, negative charge remains at dark areas on the drum surface where laser beam has not been exposed, and negative charge is eliminated from bright areas on the drum surface with laser beam exposed. The images on the drum with negative charge are called static latent images because human eyes cannot detect them.



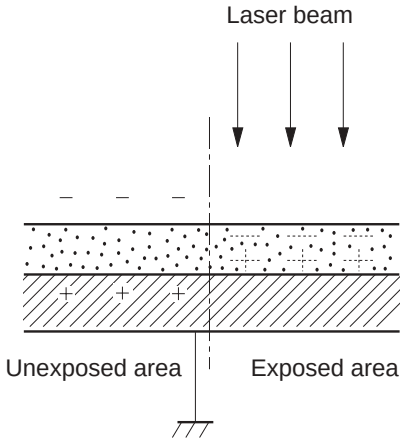
F-2-11

Step 1: Primary charging
For preparation of latent image formation, the surface of photosensitive drum is charged with even negative potential. In this primary charging, the charge is applied from the primary charging roller directly to the photosensitive drum.
DC bias is applied to the primary charging roller to maintain an even potential on the surface of the photosensitive drum.



F-2-12

Step 2: Laser beam exposure
In this step, static latent images are formed on the photosensitive drum with laser beam.
When laser beams are scanned on the photosensitive drum negatively charged, bright areas lose their charges, eliminating negative potential on the surface of the photosensitive drum; on those portions, static latent images are formed.



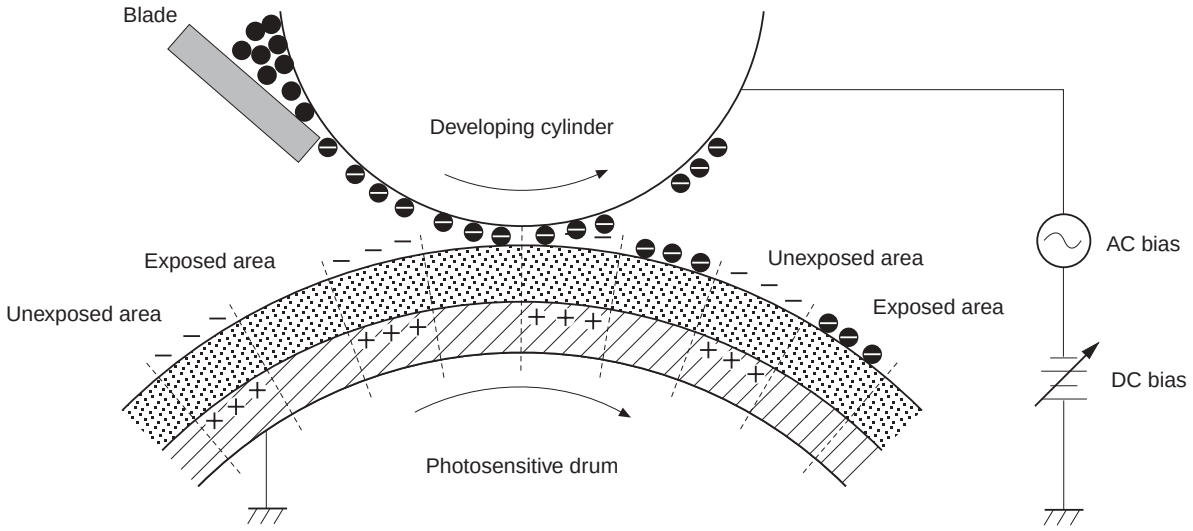
F-2-13

2.4.1.4 Development Block

LBP3100 / LBP3010B

This block is comprised of one step; it puts toners to the static latent images on the surface of the photosensitive drum and visualizes the images using toner projection development. The toner projection development makes the toner jump on the surface of the photosensitive drum and develops the images.
The toner (developer) used for this equipment is a one-component toner that comprises magnetic body and resin, etc.

Step 3: Development
Toner is affixed to static latent images on the surface of the photosensitive drum.
The toner is charged negatively by friction between the developing cylinder and the surface of the developing blade.
An area on the photosensitive drum exposed with laser beam has higher potential than the developing cylinder; the potential difference between the drum surface and the cylinder enables the toner to jump on the drum surface and makes them visible images.
AC bias superimposed with the development DC negative bias is applied to the developing cylinder.



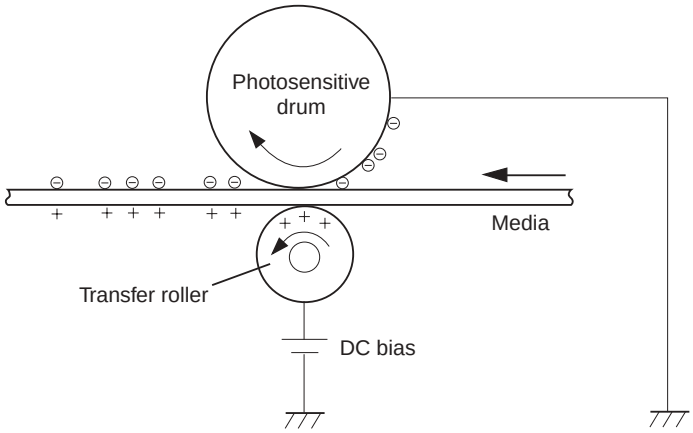
F-2-14

2.4.1.5 Transfer Block

LBP3100 / LBP3010B

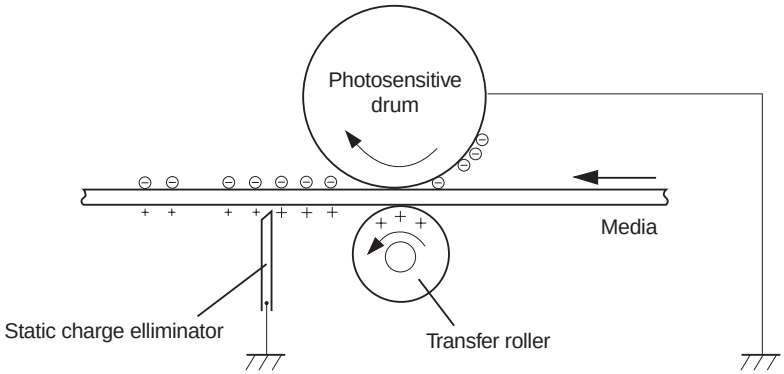
This block is comprised of two steps; it transfers toner images on the surface of the photosensitive drum to papers.

Step 4: Transfer
In this step, toner images on the photosensitive drum are transferred to papers.
This equipment applies DC positive bias to the transfer roller facing the photosensitive drum and charges papers positively. This enables toner negatively charged on the surface of the photosensitive drum to be transferred to papers.



F-2-15

Step 5: Separation
In this step, DC negative bias is applied to the static eliminator according to the elasticity of papers to separate the papers from the photosensitive drum. The static eliminator is used to stabilize the paper feed system (prevention of toner stray that appears as polka-dots on print images in a low-temperature, low-humidity environment), and neutralizes the electric charge at the back of papers.



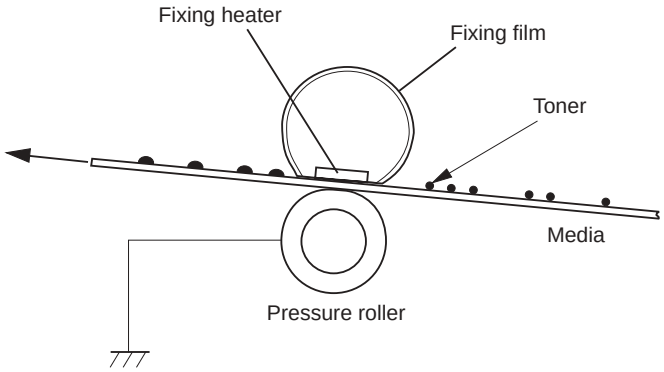
F-2-16

2.4.1.6 Fixing Block

LBP3100 / LBP3010B

This block applies pressure and heat to papers and the toner on them to fix toner images to the papers.

Step 6: Fixing
This step employs on-demand fixing that fixes toner images transferred to papers on the papers.

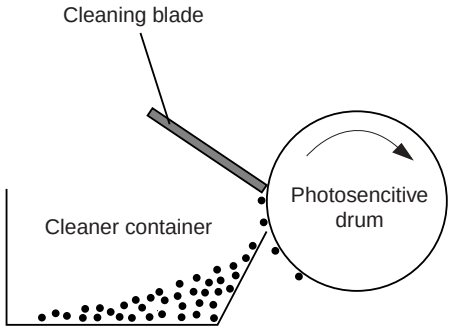


F-2-17

2.4.1.7 Drum Cleaning Block

LBP3100 / LBP3010B

The drum cleaning block removes the toner remained on the photosensitive drum.
Step 7: Drum cleaning
In this step, toner remained on the photosensitive drum is removed.
The cleaning blade scrapes the leftover toner on the surface of the photosensitive drum; the toner is collected into the cleaner container.
By implementing the above step, the surface of the photosensitive drum is cleaned.

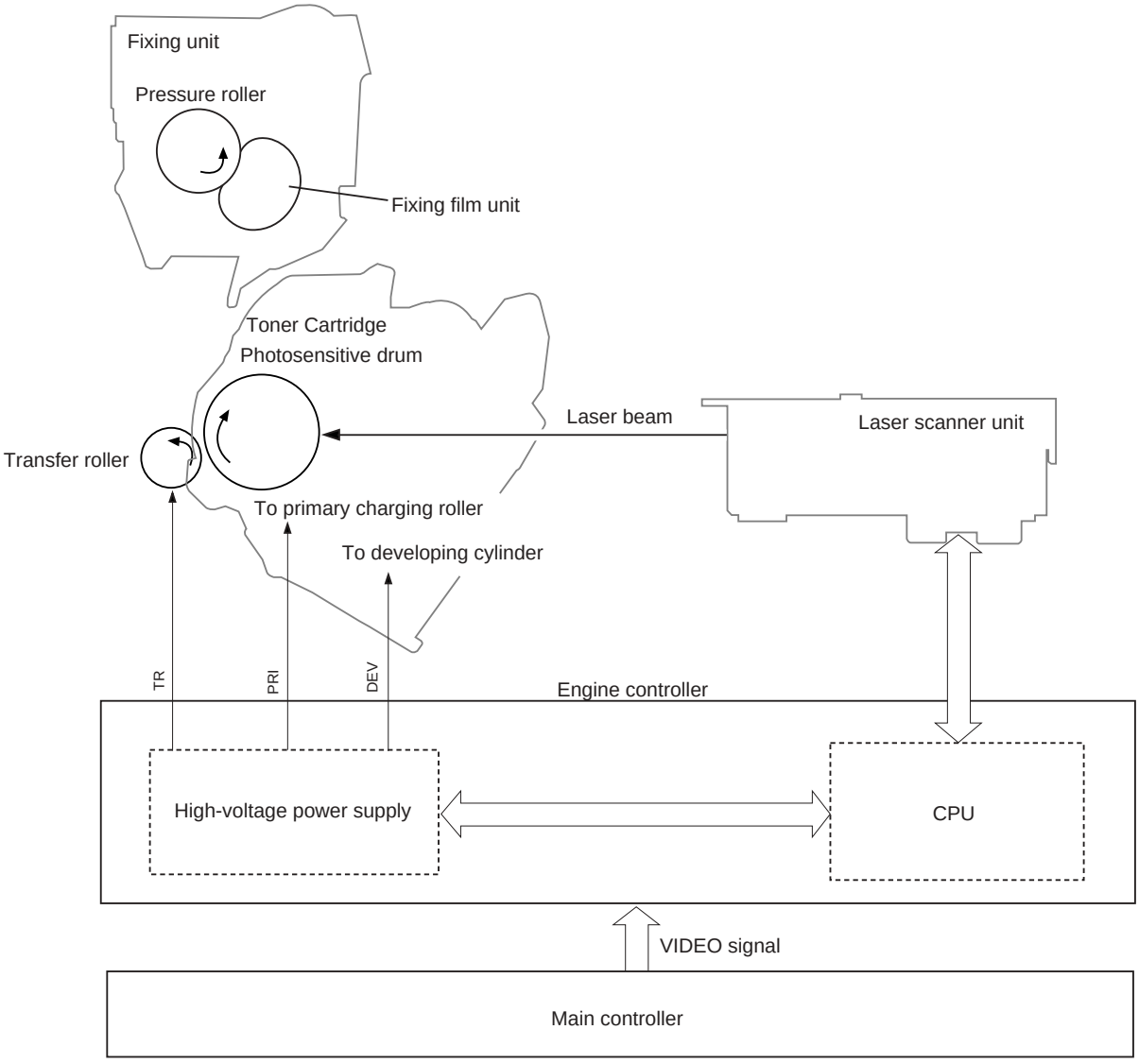


F-2-18

2.4.1.8 Overview

LBP6000 / LBP6000B

The image formation system is the core of this equipment; it forms toner images on papers.
The image formation system is comprised of the following components.
The engine controller controls the laser scanner unit and high-voltage power supply circuit and forms images based on the video signals on papers.
The following are the details of print process for this equipment and the functions of image formation.



F-2-19

2.4.1.9 Print Process

LBP6000 / LBP6000B

This explains the basic process of the operations that a printer executes for image formation.
The print process of this equipment is divided largely into 5 blocks, 7 steps.
Toner images are formed on papers by executing the steps of each block in order.

The following are the blocks of print process and the steps.

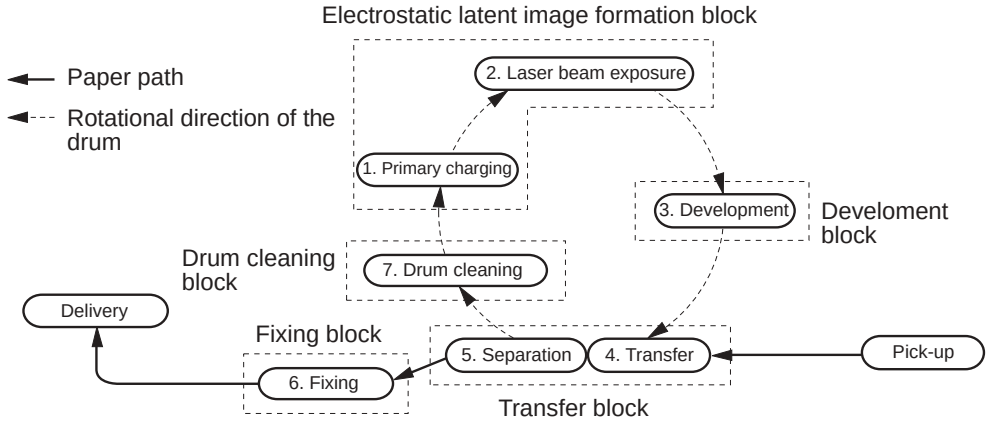
1. Static latent image formation block
   Step 1: Primary charging
   Step2: Laser beam exposure

2. Development block
   Step 3: Development

3. Transfer block
   Step 4: Transfer
   Step 5: Separation

4. Fixing block
   Step 6: Fixing

5. Drum cleaning block
   Step 7: Drum cleaning

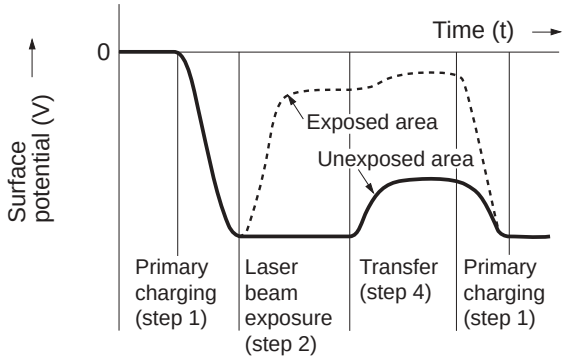


F-2-20

2.4.1.10 Static Latent Image Formation Block

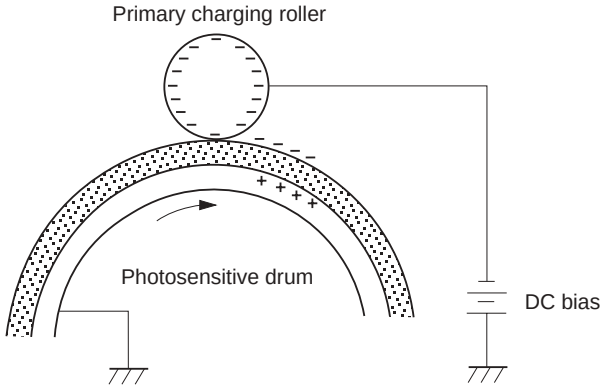
LBP6000 / LBP6000B

This block is comprised of two steps and forms static latent images on the photosensitive drum.
When the final step of this block completes, negative charge remains at dark areas on the drum surface where laser beam has not been exposed, and negative charge is eliminated from bright areas on the drum surface with laser beam exposed. The images on the drum with negative charge are called static latent images because human eyes cannot detect them.



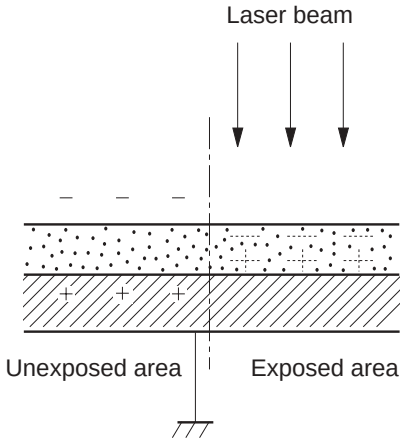
F-2-21

Step 1: Primary charging
For preparation of latent image formation, the surface of photosensitive drum is charged with even negative potential. In this primary charging, the charge is applied from the primary charging roller directly to the photosensitive drum.
DC bias is applied to the primary charging roller to maintain an even potential on the surface of the photosensitive drum.



F-2-22

Step 2: Laser beam exposure
In this step, static latent images are formed on the photosensitive drum with laser beam.
When laser beams are scanned on the photosensitive drum negatively charged, bright areas lose their charges, eliminating negative potential on the surface of the photosensitive drum; on those portions, static latent images are formed.



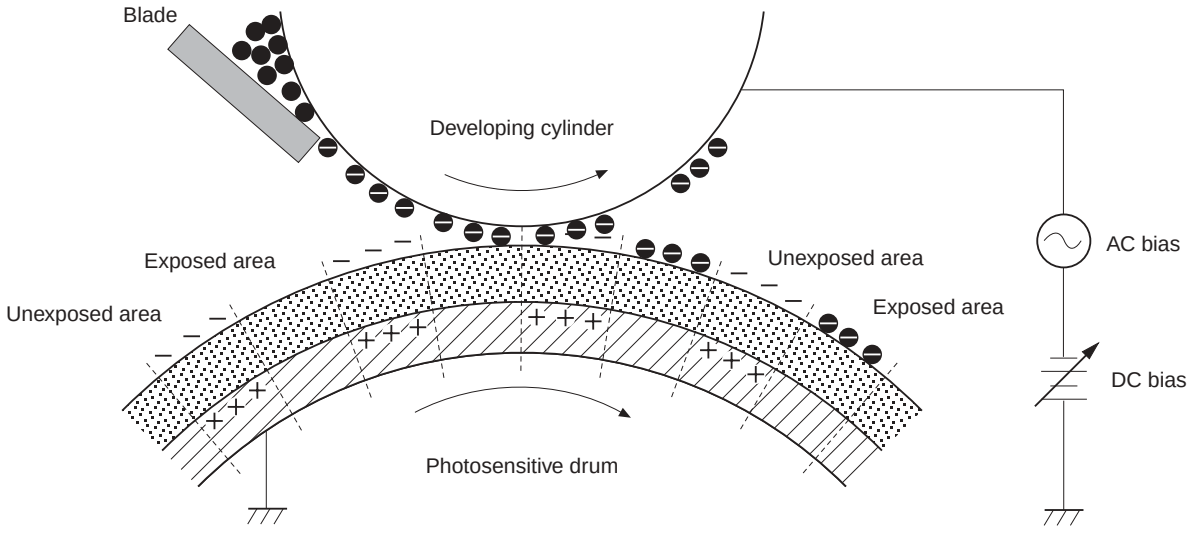
F-2-23

2.4.1.11 Development Block

LBP6000 / LBP6000B

This block is comprised of one step; it puts toners to the static latent images on the surface of the photosensitive drum and visualizes the images using toner projection development. The toner projection development makes the toner jump on the surface of the photosensitive drum and develops the images.
The toner (developer) used for this equipment is a one-component toner that comprises magnetic body and resin, etc.

Step 3: Development
Toner is affixed to static latent images on the surface of the photosensitive drum.
The toner is charged negatively by friction between the developing cylinder and the surface of the developing blade.
An area on the photosensitive drum exposed with laser beam has higher potential than the developing cylinder; the potential difference between the drum surface and the cylinder enables the toner to jump on the drum surface and makes them visible images.
AC bias superimposed with the development DC negative bias is applied to the developing cylinder.



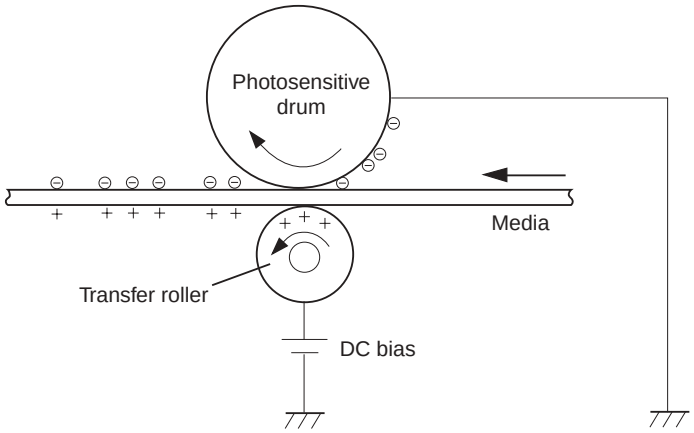
F-2-24

2.4.1.12 Transfer Block

LBP6000 / LBP6000B

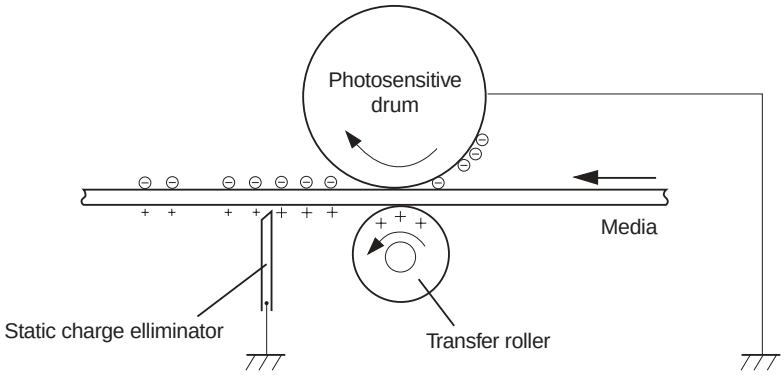
This block is comprised of two steps; it transfers toner images on the surface of the photosensitive drum to papers.

Step 4: Transfer
In this step, toner images on the photosensitive drum are transferred to papers.
This equipment applies DC positive bias to the transfer roller facing the photosensitive drum and charges papers positively. This enables toner negatively charged on the surface of the photosensitive drum to be transferred to papers.



F-2-25

Step 5: Separation
In this step, DC negative bias is applied to the static eliminator according to the elasticity of papers to separate the papers from the photosensitive drum. The static eliminator is used to stabilize the paper feed system (prevention of toner stray that appears as polka-dots on print images in a low-temperature, low-humidity environment), and neutralizes the electric charge at the back of papers.



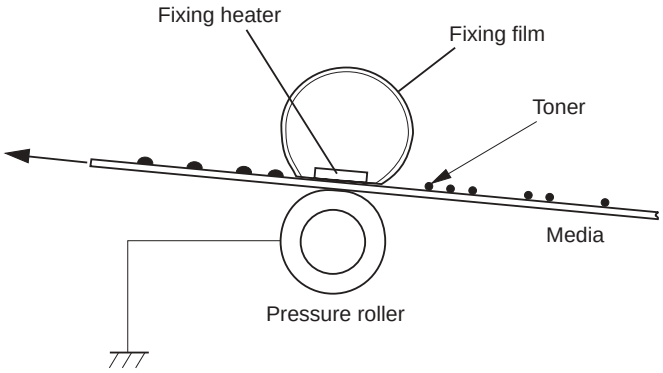
F-2-26

2.4.1.13 Fixing Block

LBP6000 / LBP6000B

This block applies pressure and heat to papers and the toner on them to fix toner images to the papers.

Step 6: Fixing
This step employs on-demand fixing that fixes toner images transferred to papers on the papers.

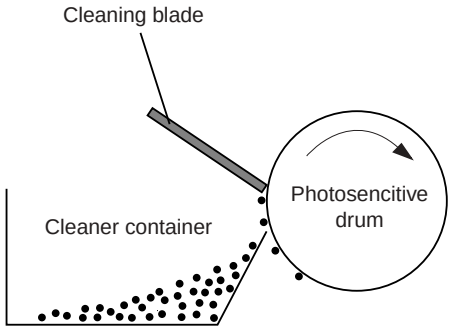


F-2-27

2.4.1.14 Drum Cleaning Block

LBP6000 / LBP6000B

The drum cleaning block removes the toner remained on the photosensitive drum.
Step 7: Drum cleaning
In this step, toner remained on the photosensitive drum is removed.
The cleaning blade scrapes the leftover toner on the surface of the photosensitive drum; the toner is collected into the cleaner container.
By implementing the above step, the surface of the photosensitive drum is cleaned.



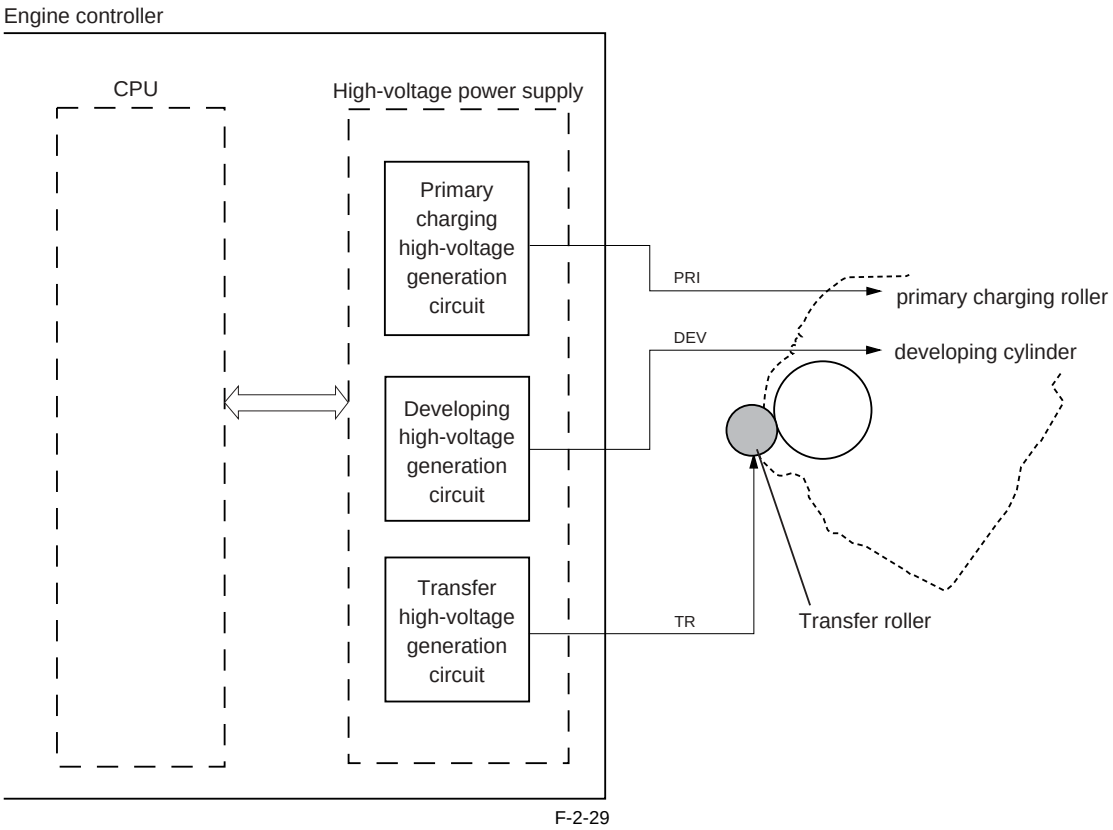
F-2-28

2.4.2 High-Voltage Control

2.4.2.1 Overview

LBP3100 / LBP3010B

This circuit is comprised of the circuits that apply biases to the primary charging roller, developing cylinder, transfer roller, and the fixing control circuit. The CPU of the engine controller controls the high-voltage power supply circuit to generate these biases. The fixing control circuit executes heater control of the fixing assembly according to the instruction by the CPU of the engine controller.
The following is the block diagram of this circuit.



F-2-29

2.4.2.2 Generating Primary Charging Bias

LBP3100 / LBP3010B

The primary charging bias (PRI) is a DC negative bias that is output to apply an even negative potential to the surface of the photosensitive drum. The primary charging high-voltage generating circuit in the high-voltage power supply circuit generates this bias.
The high-voltage power supply circuit applies the generated primary charging bias to the primary charging roller at a specified timing.
The primary charging bias varies in conjunction with the developing bias according to the information of image density sent from the main controller.

2.4.2.3 Generating Developing Bias

LBP3100 / LBP3010B

The developing bias is a DC negative bias that is output to affix toner to the static latent images formed on the photosensitive drum. This bias is a development DC and AC superimposed bias and generated by the development high-voltage generating circuit in the high-voltage power supply circuit.
The high-voltage power supply circuit applies the generated developing bias to the developing cylinder at a specified timing.
The developing bias varies in conjunction with the primary charging bias according to the information of image density sent from the main controller.

2.4.2.4 Generating Transfer Bias

LBP3100 / LBP3010B

Transfer bias (TR) is a bias that is output to transfer toner to papers. There are two types of bias; DC positive bias and DC negative bias, and generated by the transfer high-voltage generating circuit in the high-voltage power supply circuit. The DC positive bias is output at the time of toner transfer, and the DC negative bias at the time of cleaning the photosensitive drum.
The high-voltage power supply circuit applies the generated transfer bias to the transfer roller according to each print sequence.
Each print sequence is described below.
- Cleaning bias:
  The bias to move (clean) the toner attached to the transfer roller to the photosensitive drum at the time of warming up or last rotation sequence.
  The transfer negative bias is applied to the transfer roller.

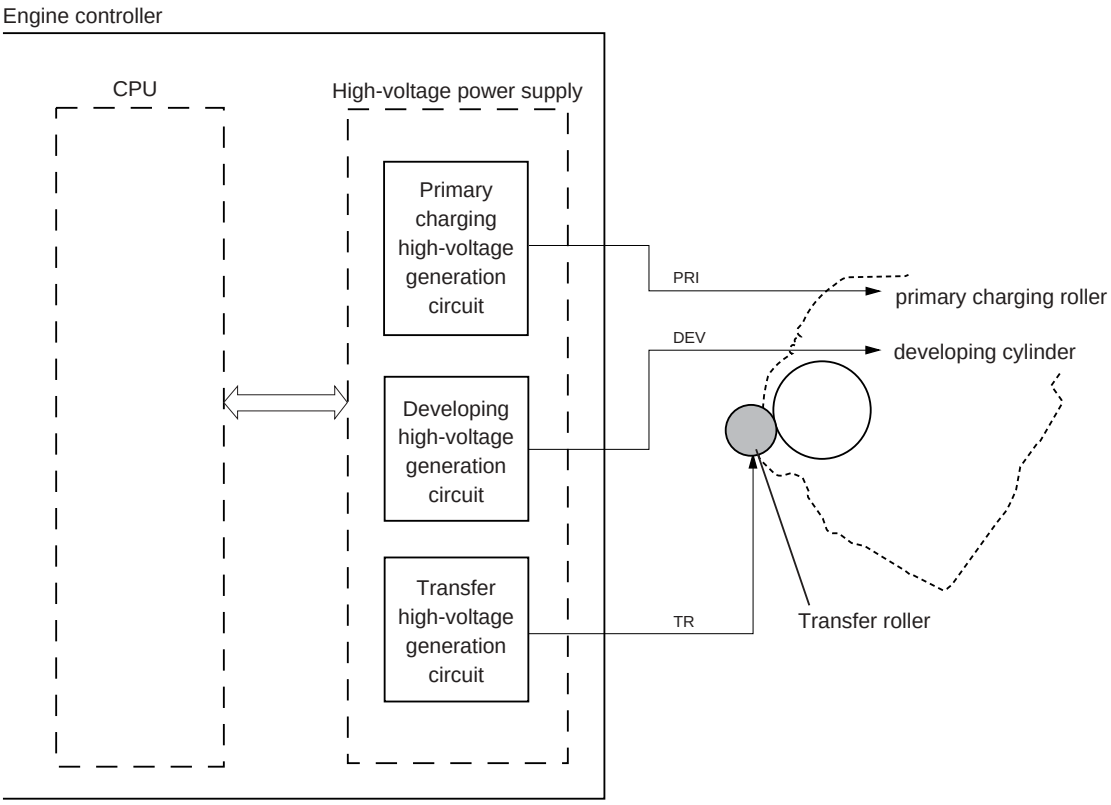
- Paper intervals bias:
  The bias to prevent the toner remained on the photosensitive drum from attaching to the transfer roller at paper intervals during continuous printing. A minor transfer positive bias is applied to the transfer roller.

- Print bias:
  The bias to transfer the toner on the surface of the photosensitive drum to papers at the time of print sequence. The transfer positive bias is applied to the transfer roller.

2.4.2.5 Overview

LBP6000 / LBP6000B

This circuit is comprised of the circuits that apply biases to the primary charging roller, developing cylinder, transfer roller, and the fixing control circuit. The CPU of the engine controller controls the high-voltage power supply circuit to generate these biases. The fixing control circuit executes heater control of the fixing assembly according to the instruction by the CPU of the engine controller.
The following is the block diagram of this circuit.



F-2-30

2.4.2.6 Generating Primary Charging Bias

LBP6000 / LBP6000B

The primary charging bias (PRI) is a DC negative bias that is output to apply an even negative potential to the surface of the photosensitive drum. The primary charging high-voltage generating circuit in the high-voltage power supply circuit generates this bias.
The high-voltage power supply circuit applies the generated primary charging bias to the primary charging roller at a specified timing.
The primary charging bias varies in conjunction with the developing bias according to the information of image density sent from the main controller.

2.4.2.7 Generating Developing Bias

LBP6000 / LBP6000B

The developing bias is a DC negative bias that is output to affix toner to the static latent images formed on the photosensitive drum. This bias is a development DC and AC superimposed bias and generated by the development high-voltage generating circuit in the high-voltage power supply circuit.
The high-voltage power supply circuit applies the generated developing bias to the developing cylinder at a specified timing.
The developing bias varies in conjunction with the primary charging bias according to the information of image density sent from the main controller.

2.4.2.8 Generating Transfer Bias

LBP6000 / LBP6000B

Transfer bias (TR) is a bias that is output to transfer toner to papers. There are two types of bias; DC positive bias and DC negative bias, and generated by the transfer high-voltage generating circuit in the high-voltage power supply circuit. The DC positive bias is output at the time of toner transfer, and the DC negative bias at the time of cleaning the photosensitive drum.
The high-voltage power supply circuit applies the generated transfer bias to the transfer roller according to each print sequence.
Each print sequence is described below.
- Cleaning bias:
  The bias to move (clean) the toner attached to the transfer roller to the photosensitive drum at the time of warming up or last rotation sequence.
  The transfer negative bias is applied to the transfer roller.

- Paper intervals bias:
  The bias to prevent the toner remained on the photosensitive drum from attaching to the transfer roller at paper intervals during continuous printing. A minor transfer positive bias is applied to the transfer roller.

- Print bias:
  The bias to transfer the toner on the surface of the photosensitive drum to papers at the time of print sequence. The transfer positive bias is applied to the transfer roller.

2.4.3 Toner Cartridge

2.4.3.1 Toner Level Detection

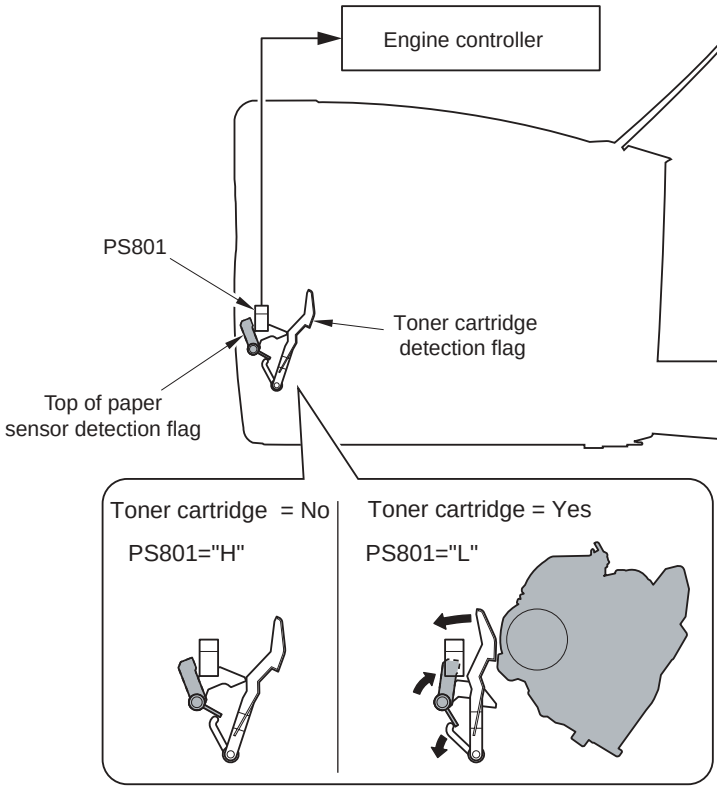
LBP3100 / LBP3010B

This equipment has no function of toner level detection.

2.4.3.2 Toner Cartridge Absence/Presence Detection

LBP3100 / LBP3010B

The engine controller detects the position of the Toner cartridge detection flag to judge the absence/presence of the Toner cartridge.
At the time of turning on the power or closing the upper cover, the engine controller judges the position of the Toner cartridge flag based on the output result of the leading edge sensor (PS801).
When the output result of PS801 is L, it is judged that the Toner cartridge is absent; If being H, it is judged that the Toner cartridge is present.



F-2-31

The leading edge sensor performs both this detection and paper feed detection. Therefore, the engine controller cannot make a judgment of ‘Toner cartridge absent’ or ‘jam occurrence’ when jam occurs.
The engine controller judges this case as ‘Toner cartridge absent’ and notices it to the main controller.
If jam occurs when ‘Toner cartridge absent’ is detected, check if there is a fault in the leading edge sensor and the detection flag.

2.4.3.3 Toner Level Detection

LBP6000 / LBP6000B

This equipment has no function of toner level detection.

2.4.3.4 Toner Cartridge Absence/Presence Detection

LBP6000 / LBP6000B

The engine controller detects the position of the Toner cartridge detection flag to judge the absence/presence of the Toner cartridge.
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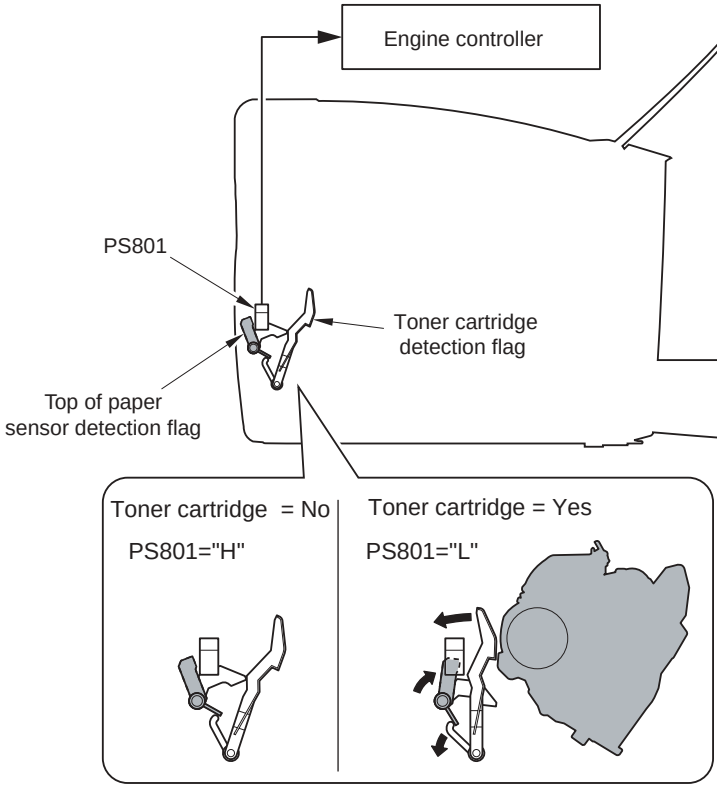


F-2-32

The leading edge sensor performs both this detection and paper feed detection. Therefore, the engine controller cannot make a judgment of ‘Toner cartridge absent’ or ‘jam occurrence’ when jam occurs.
The engine controller judges this case as ‘Toner cartridge absent’ and notices it to the main controller.
If jam occurs when ‘Toner cartridge absent’ is detected, check if there is a fault in the leading edge sensor and the detection flag.

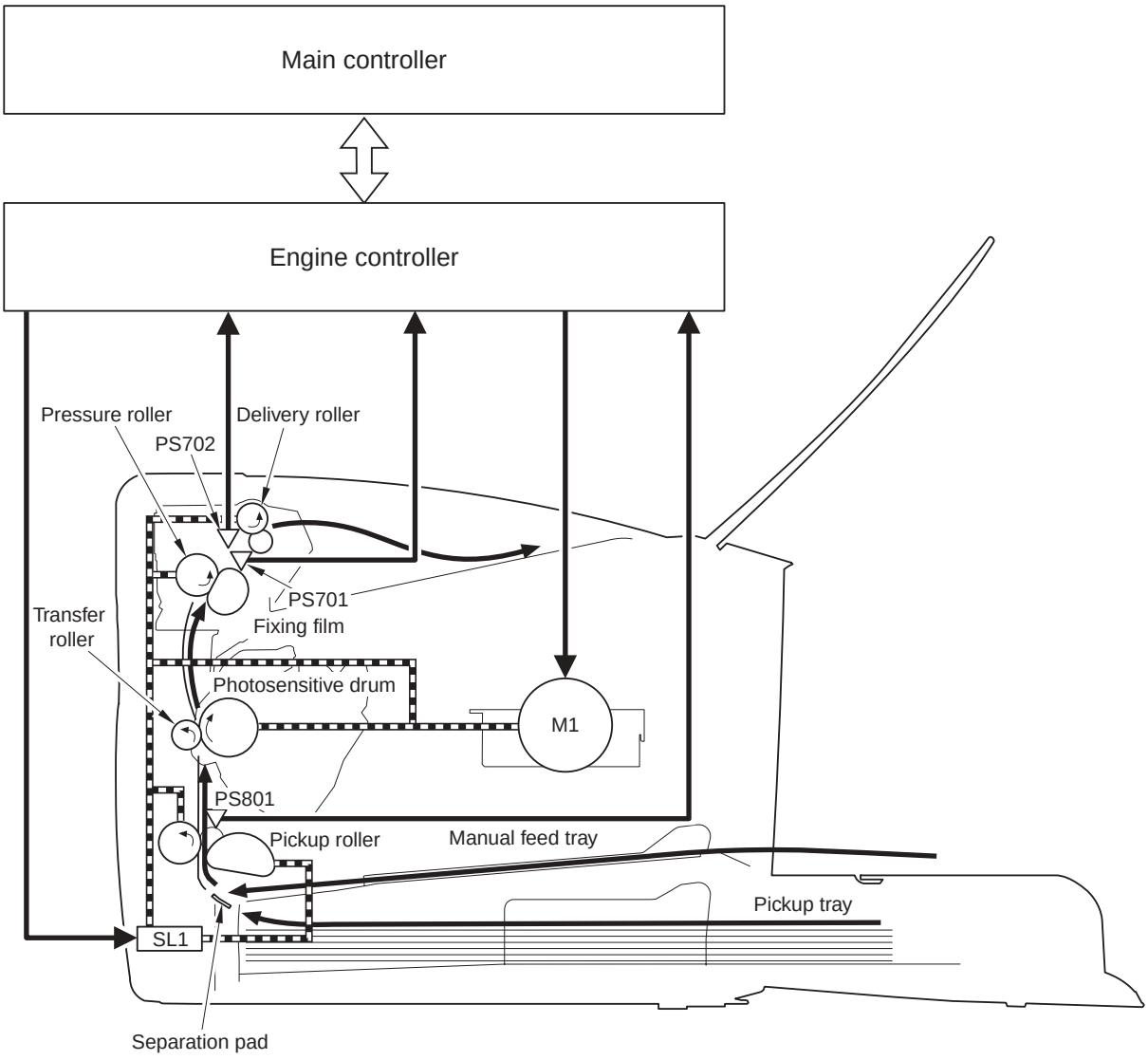
2.5 PICKUP AND FEEDING SYSTEM

2.5.1 Overview/Configuration

2.5.1.1 Overview

LBP3100 / LBP3010B

The pickup/feeding system executes pickup and feeding of papers and is composed of the main motor, solenoid, and rollers.
In this equipment, pickup from the pickup tray and manual feed tray is available. There is only a face-down delivery.
Papers set on the pickup tray and manual feed tray are fed by the same pickup roller. The papers are fed to the photosensitive drum, the transfer charging roller, the fixing film unit, the pressure roller and then to delivery roller in this order; and then they are delivered to the delivery tray.
The feeding route of papers has three photointerrupters; the paper leading edge sensor (PS801), the fixing delivery sensor (PS701), the paper width sensor (PS702). They detect arrival and passing of papers.
If a paper does not reach or pass through each sensor within a specified time, the engine controller judges this status as jam and notices the jam occurrence to the main controller.



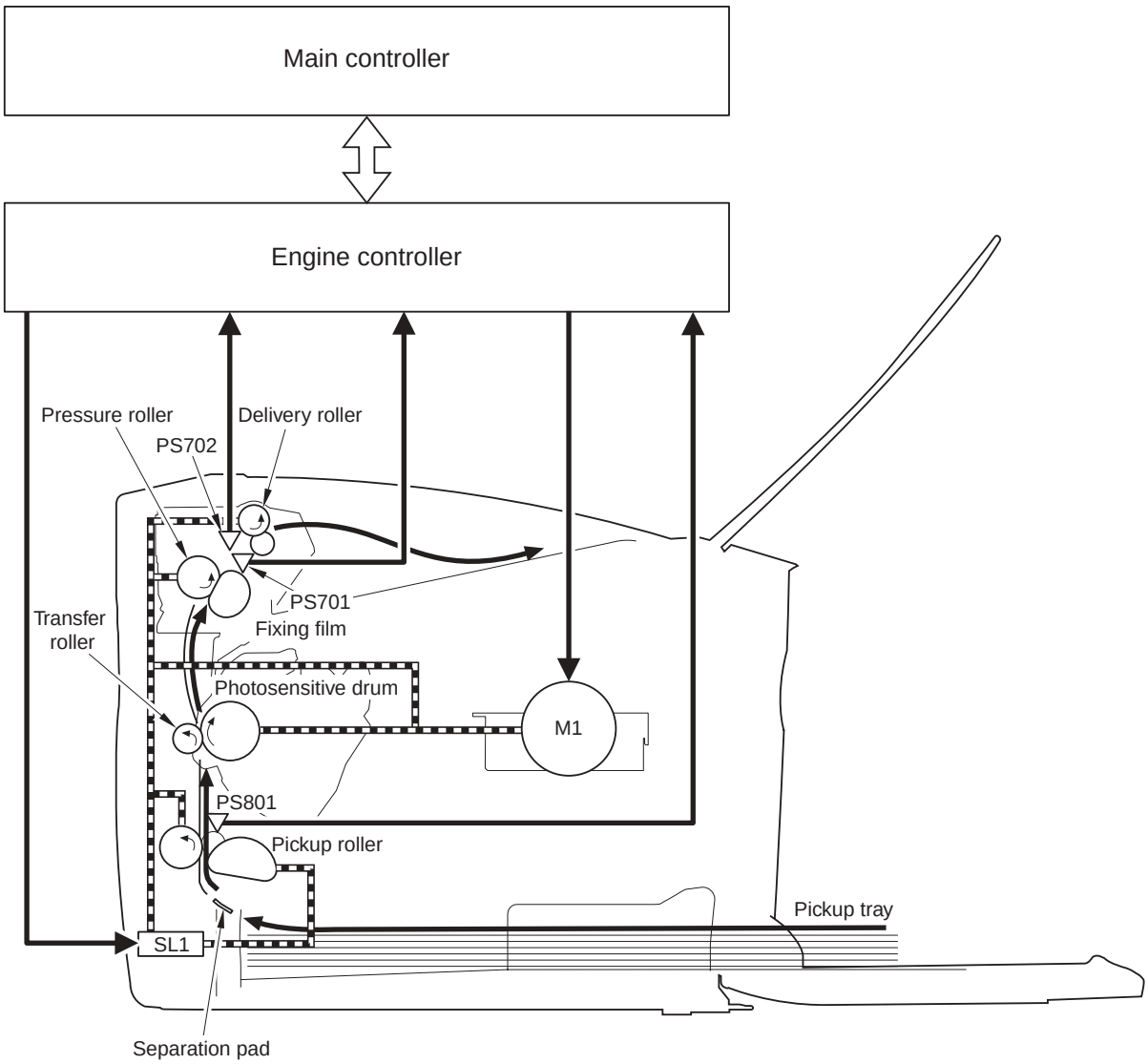
F-2-33

PS701: Paper width sensor
PS702: Fixing delivery sensor
PS801: Paper leading edge sensor
M1: Main motor
SL1: Pickup solenoid

2.5.1.2 Overview

LBP6000 / LBP6000B

The pickup/feeding system executes pickup and feeding of papers and is composed of the main motor, solenoid, and rollers.
In this equipment, pickup from the pickup tray and manual feed tray is available. There is only a face-down delivery.
Papers set on the pickup tray and manual feed tray are fed by the same pickup roller. The papers are fed to the photosensitive drum, the transfer charging roller, the fixing film unit, the pressure roller and then to delivery roller in this order; and then they are delivered to the delivery tray.
The feeding route of papers has three photointerrupters; the paper leading edge sensor (PS801), the fixing delivery sensor (PS701), the paper width sensor (PS702). They detect arrival and passing of papers.
If a paper does not reach or pass through each sensor within a specified time, the engine controller judges this status as jam and notices the jam occurrence to the main controller.



F-2-34

PS701: Paper width sensor
PS702: Fixing delivery sensor
PS801: Paper leading edge sensor
M1: Main motor
SL1: Pickup solenoid

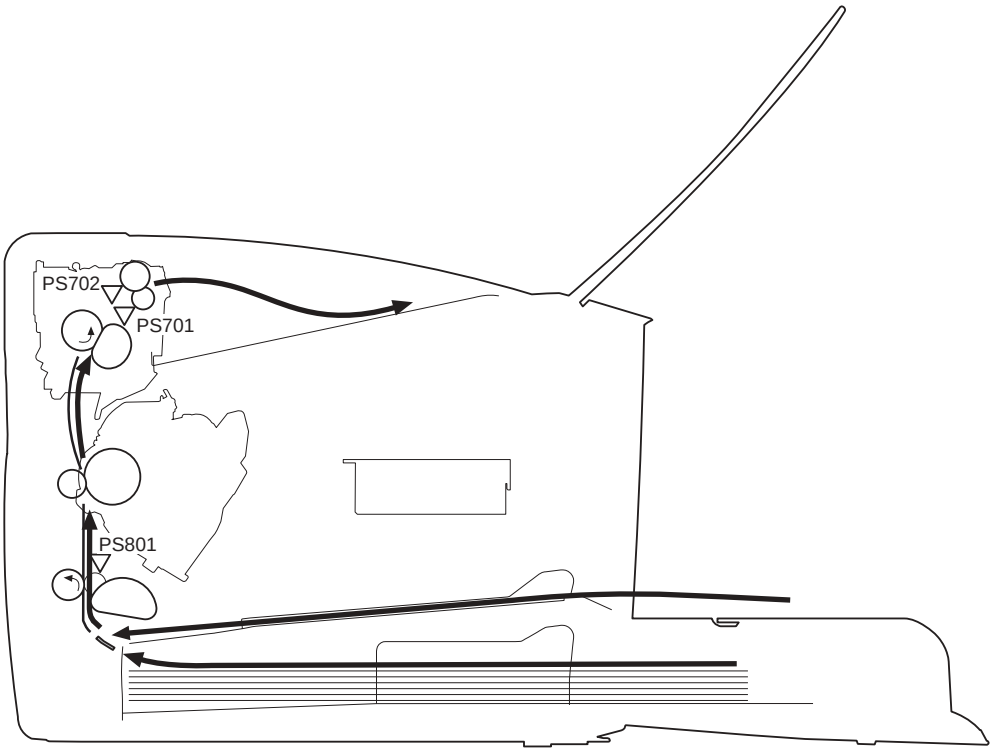
2.5.2 Detecting Jams

2.5.2.1 Jam Detection Outline

2.5.2.1.1 Overview

LBP3100 / LBP3010B

The following sensors are installed to detect absence/presence of papers and whether papers are correctly fed.
- Paper width sensor (PS701)
- Fixing delivery sensor (PS702)
- Paper leading edge sensor (PS801)



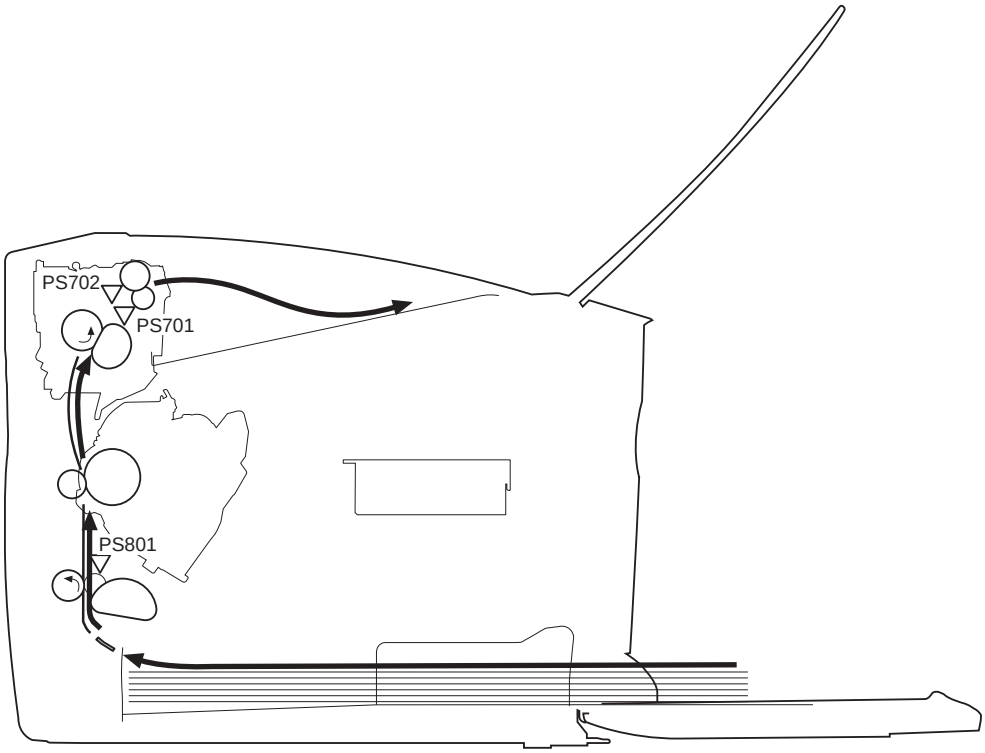
F-2-35

Whether jam occurs or not is judged according to whether a paper is absent/present on the sensor at the check timing that has been stored in the CPU of the engine controller.
When the engine controller judged that jam has occurred, print operation is stopped and jam occurrence is noticed to the main controller.

2.5.2.1.2 Overview

LBP6000 / LBP6000B

The following sensors are installed to detect absence/presence of papers and whether papers are correctly fed.
- Paper width sensor (PS701)
- Fixing delivery sensor (PS702)
- Paper leading edge sensor (PS801)



F-2-36

Whether jam occurs or not is judged according to whether a paper is absent/present on the sensor at the check timing that has been stored in the CPU of the engine controller.
When the engine controller judged that jam has occurred, print operation is stopped and jam occurrence is noticed to the main controller.

2.5.2.2 Delay Jams

2.5.2.2.1 Delivery Delay Jam

LBP3100 / LBP3010B

- If there is no paper ahead on paper path:
CPU detects delivery delay jam in the case that the sheet (to print) does not reach the fixing delivery sensor (PS702) within 1.5 sec (approximately) after it reaches the paper lead edge sensor (PS801).
- If there is paper ahead on paper path:
CPU detects delivery delay jam in the case that 1st sheet (to print) is detected by the fixing delivery sensor (PS702) 1.5 sec (approximately) after the 2nd sheet (to print) reaches the paper lead edge sensor (PS801).

2.5.2.2.2 Delivery Delay Jam

LBP6000 / LBP6000B

- If there is no paper ahead on paper path:
CPU detects delivery delay jam in the case that the sheet (to print) does not reach the fixing delivery sensor (PS702) within 1.5 sec (approximately) after it reaches the paper lead edge sensor (PS801).
- If there is paper ahead on paper path:
CPU detects delivery delay jam in the case that 1st sheet (to print) is detected by the fixing delivery sensor (PS702) 1.5 sec (approximately) after the 2nd sheet (to print) reaches the paper lead edge sensor (PS801).

2.5.2.3 Stationary Jams

2.5.2.3.1 Pickup Stationary Jam

LBP3100 / LBP3010B

CPU detects pickup stationary jam in the case that the sheet (to print) is detected 5.6 sec (approximately) after it reaches the paper lead edge sensor (PS801).

2.5.2.3.2 Delivery Stationary Jam

LBP3100 / LBP3010B

If 0.9 sec passes after the paper leading edge sensor (PS801) detects the paper absent and, in addition, the fixing delivery sensor (PS702) cannot detect the paper within approx 0.4 sec after that, CPU determines the delivery stationary JAM.

2.5.2.3.3 Pickup Stationary Jam

LBP6000 / LBP6000B

CPU detects pickup stationary jam in the case that the sheet (to print) is detected 5.6 sec (approximately) after it reaches the paper lead edge sensor (PS801).

2.5.2.3.4 Delivery Stationary Jam

LBP6000 / LBP6000B

If 0.9 sec passes after the paper leading edge sensor (PS801) detects the paper absent and, in addition, the fixing delivery sensor (PS702) cannot detect the paper within approx 0.4 sec after that, CPU determines the delivery stationary JAM.

2.5.2.4 Other Jams

2.5.2.4.1 Fixing Take-up Jam

LBP3100 / LBP3010B

CPU detects fixing take-up jam in the case that the fixing delivery sensor (PS702) detects absence of paper (no paper) for 0.9 sec (approximately) after the sheet (to print) reaches the fixing delivery sensor (PS702) and the paper lead edge sensor (PS801) detects absence of paper (no sheet).

2.5.2.4.2 Remaining Jam at Start-up

LBP3100 / LBP3010B

CPU detects residual jam when meeting the following conditions:
- If either of the paper width sensor (PS701), the fixing delivery sensor (PS702) or the paper lead edge sensor (PS801) detects a sheet (to print) when the power is turned ON or the door is open.

- If either of the paper width sensor (PS701), the fixing delivery sensor (PS702) or the paper lead edge sensor (PS801) detects a sheet (to print) after Auto Delivery* is completed.

***Auto Delivery function**
This function is to deliver the residual paper automatically when the delivery tray is opened at power-on or at a start of print operation.
During initial operation, if the paper leading edge sensor (PS801) detects the paper, CPU determines that there is the residual paper at startup and informs it to the main controller, then stops a printer. After that, when the auto delivery is instructed by the main controller, CPU drives the motor and delivers the residual paper to the outside of the machine.

2.5.2.4.3 Fixing Take-up Jam

LBP6000 / LBP6000B

CPU detects fixing take-up jam in the case that the fixing delivery sensor (PS702) detects absence of paper (no paper) for 0.9 sec (approximately) after the sheet (to print) reaches the fixing delivery sensor (PS702) and the paper lead edge sensor (PS801) detects absence of paper (no sheet).

2.5.2.4.4 Remaining Jam at Start-up

LBP6000 / LBP6000B

CPU detects residual jam when meeting the following conditions:
- If either of the paper width sensor (PS701), the fixing delivery sensor (PS702) or the paper lead edge sensor (PS801) detects a sheet (to print) when the power is turned ON or the door is open.

- If either of the paper width sensor (PS701), the fixing delivery sensor (PS702) or the paper lead edge sensor (PS801) detects a sheet (to print) after Auto Delivery* is completed.

***Auto Delivery function**
This function is to deliver the residual paper automatically when the delivery tray is opened at power-on or at a start of print operation.
During initial operation, if the paper leading edge sensor (PS801) detects the paper, CPU determines that there is the residual paper at startup and informs it to the main controller, then stops a printer. After that, when the auto delivery is instructed by the main controller, CPU drives the motor and delivers the residual paper to the outside of the machine.

2.6 EXTERNAL AND CONTROLS SYSTEM

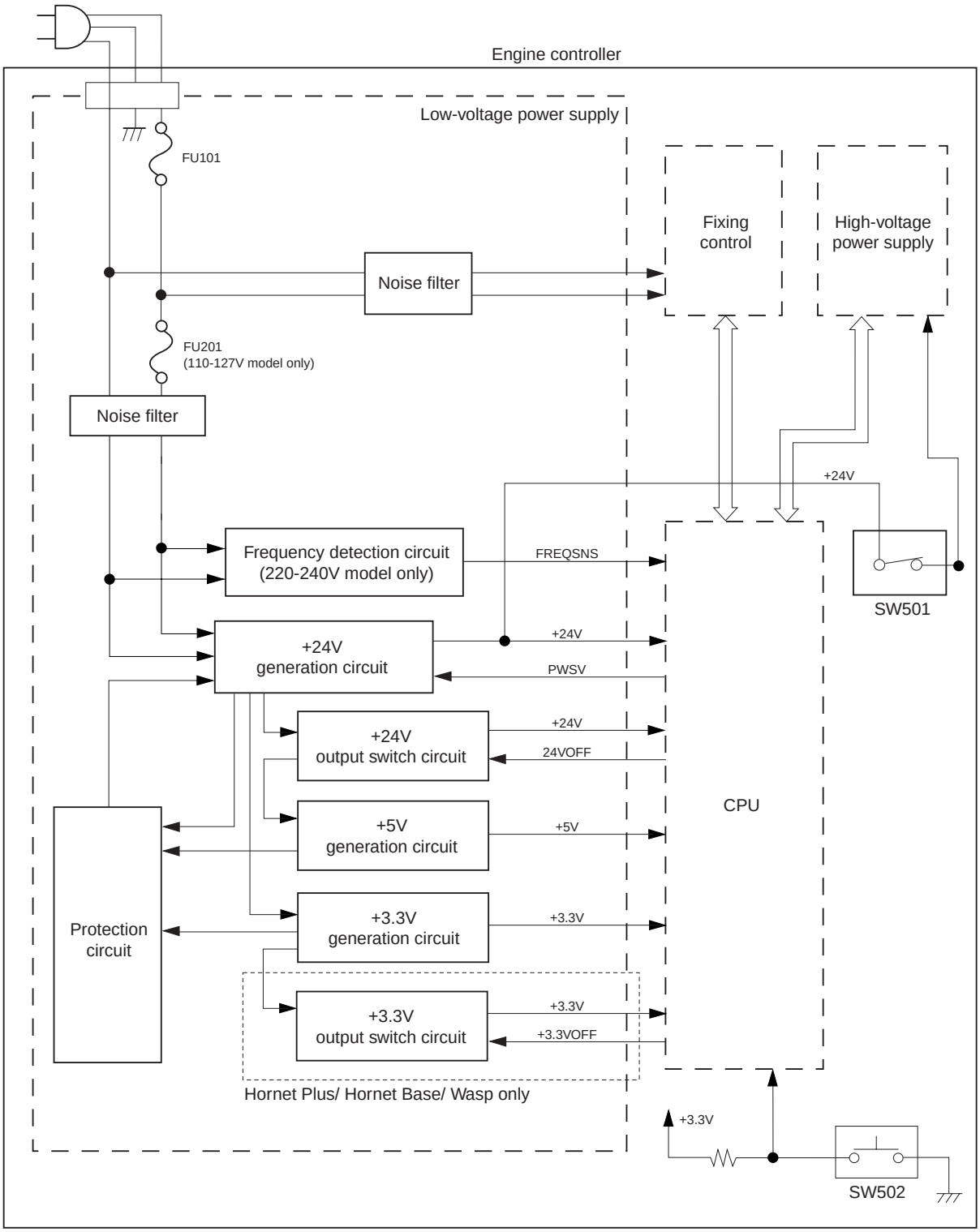
2.6.1 Power Supply

2.6.1.1 Power Supply

2.6.1.1.1 Low voltage power circuit

LBP3100 / LBP3010B

This circuit is to convert the AC power that is input by the power receptacle to the DC power and supply it to each load.
AC power is supplied to the low voltage circuit when the power switch (SW1) is turned ON. Then, AC power is converted to the DC power; +24V, +5V or +3.3V that is required for the host machine in this circuit.
The following is the block diagram of low voltage circuit and the DC power supply route.



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2.6.1.1.2 Low voltage power circuit

LBP6000 / LBP6000B

This circuit is to convert the AC power that is input by the power receptacle to the DC power and supply it to each load.
AC power is supplied to the low voltage circuit when the power switch (SW1) is turned ON. Then, AC power is converted to the DC power; +24V, +5V or +3.3V that is required for the host machine in this circuit.
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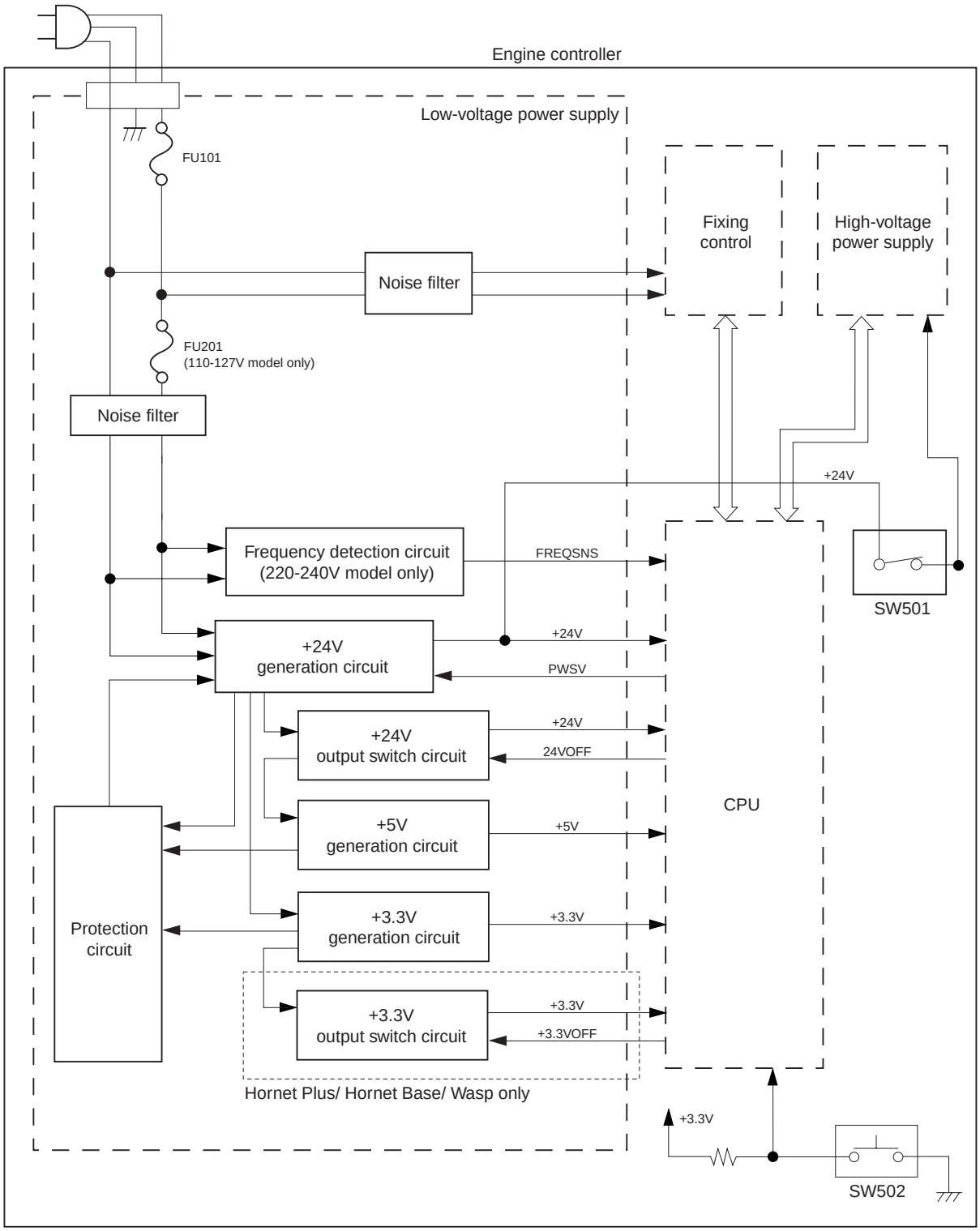

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2.6.1.2 Protective Functions

2.6.1.2.1 Power protective function

LBP3100 / LBP3010B

Low voltage power circuit carries the overcurrent preventive function against and overvoltage preventive function that block the voltage output automatically to prevent the power circuit brokerage when the overcurrent or overvoltage occur due to load errors such as short circuit etc.
Thus, when the DC power cannot be output from the low voltage circuit, the protective function against overcurrent or overvoltage may be working. Turn OFF the power switch (SW1) to fix load errors and turn ON the switch again (see note 1).
Also the circuit carries the 2 fuses (FU101, FU102) as a preventive function (see note 2). The fuses blow to block the power supply when overcurrent occurs in AC line.

⚠
1. When restoring the low voltage power after protective function is activated, leave it for 2 minutes or more from turning off the switch or plugging out before turning ON.

2. 200V series products carry FU101 fuse only.

2.6.1.2.2 Safety function

LBP3100 / LBP3010B

The host machine equips the function of stopping 24V of fixing assembly and the high voltage power unit to avoid users and engineers from getting burned or electric shock.
When the cartridge door is opened, the interlock switch (SW501) is turned off and 24V supplied to fixing assembly and the high voltage power unit is shut.
Engine controller CPU determines the door open when each interlock switch is turned OFF.

2.6.1.2.3 Power protective function

LBP6000 / LBP6000B

Low voltage power circuit carries the overcurrent preventive function against and overvoltage preventive function that block the voltage output automatically to prevent the power circuit brokerage when the overcurrent or overvoltage occur due to load errors such as short circuit etc.
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Also the circuit carries the 2 fuses (FU101, FU102) as a preventive function (see note 2). The fuses blow to block the power supply when overcurrent occurs in AC line.

1. When restoring the low voltage power after protective function is activated, leave it for 2 minutes or more from turning off the switch or plugging out before turning ON.

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When the cartridge door is opened, the interlock switch (SW501) is turned off and 24V supplied to fixing assembly and the high voltage power unit is shut.
Engine controller CPU determines the door open when each interlock switch is turned OFF.

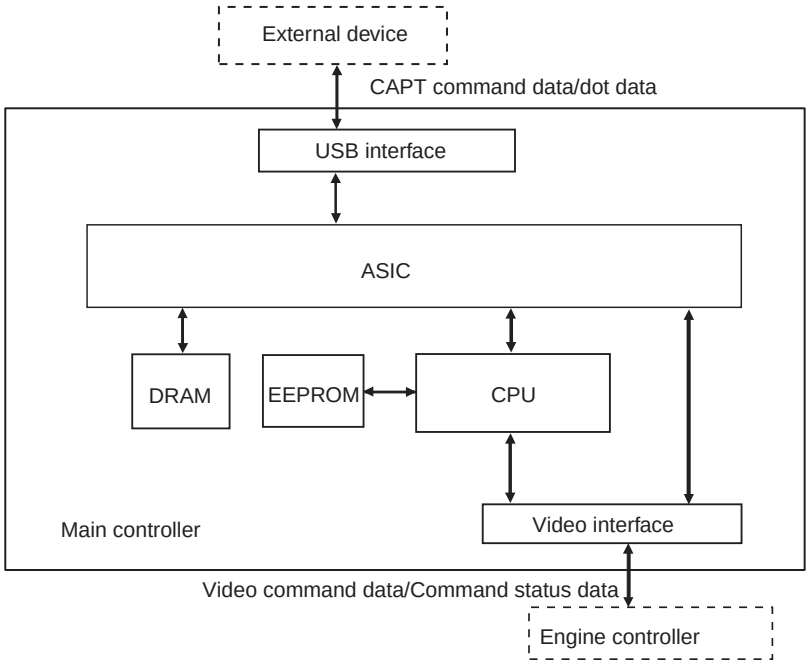
2.7 ENGINE CONTROL SYSTEM

2.7.1 Main Controller

2.7.1.1 General description

LBP3100 / LBP3010B

Main controller receives the print information from the external devices (computer etc.) through the interface cable.
Print information is divided into 2 types such as CAPT command data to handle the printer status or specific data and the dot data to printout.
After the main controller receives the dot data, it creates the video data and send it to the engine controller.
CAPT command data is the data to monitor the printer status from the external device using interface.
When this data arrives, the main controller communicates with the engine controller and sends the printer status to the external devices.



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2.7.1.2 General description

LBP6000 / LBP6000B

Main controller receives the print information from the external devices (computer etc.) through the interface cable.
Print information is divided into 2 types such as CAPT command data to handle the printer status or specific data and the dot data to printout.
After the main controller receives the dot data, it creates the video data and send it to the engine controller.
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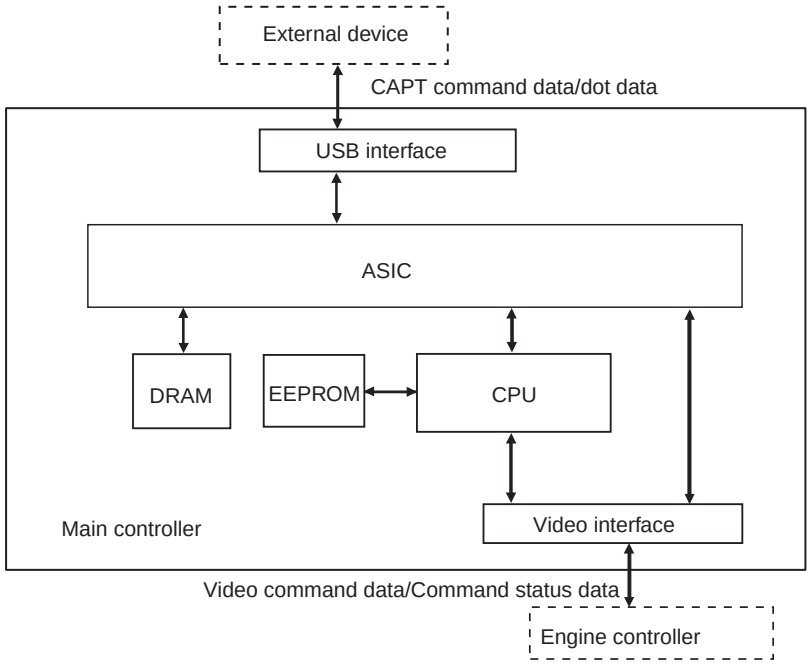
When this data arrives, the main controller communicates with the engine controller and sends the printer status to the external devices.



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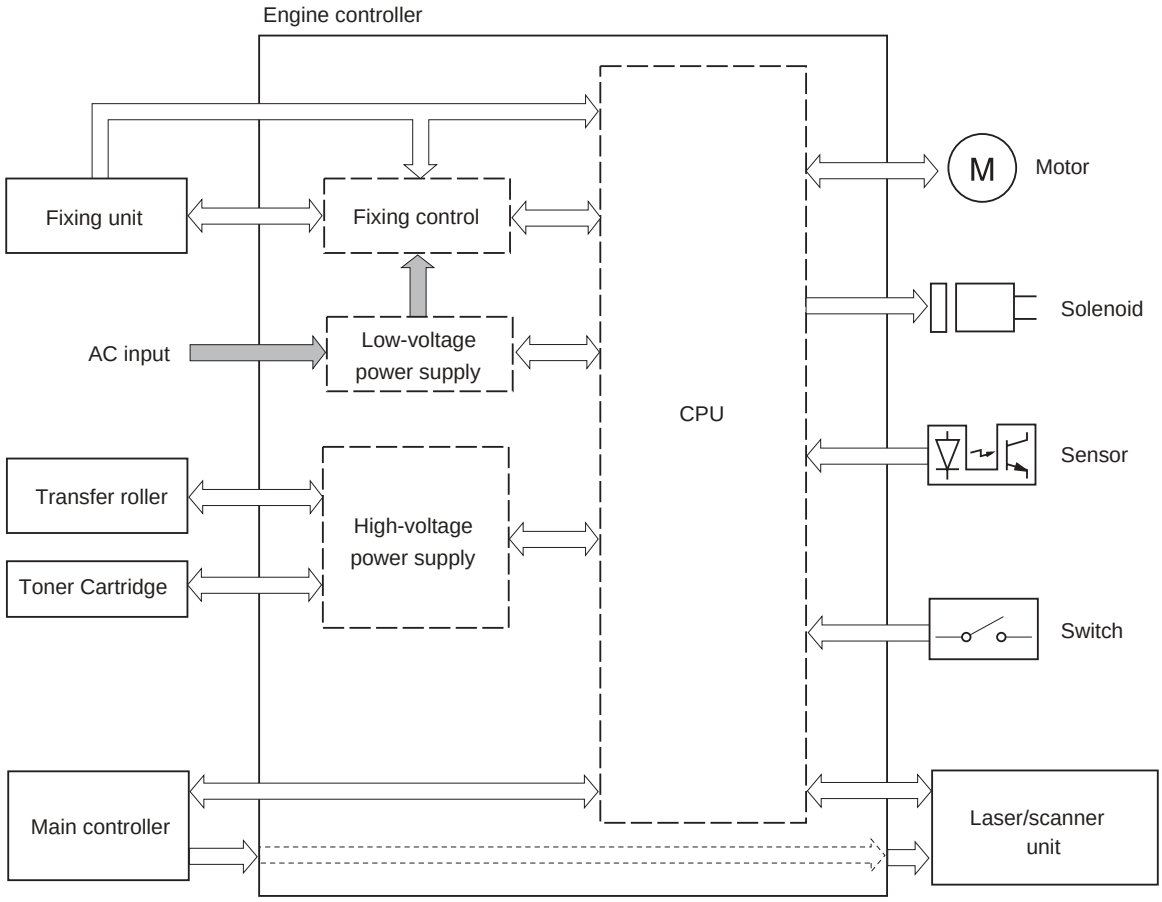
2.7.2 Engine Controller

2.7.2.1 General description

LBP3100 / LBP3010B

Engine controller is the circuit to control the operation sequence of the host machine and it is controlled by the CPU inside the engine controller.
When the power is turned ON and DC power is supplied through the low voltage power inside engine controller, CPU starts the printer operation control.
Then, CPU drives the loads such as laser diode, motors and solenoids etc. according to the image data that is input by the main controller when status becomes stand-by mode.
The following is the block diagram of this circuit.


Engine controller
Fixing unit
Fixing control
AC input
Low-voltage
power supply
CPU
Transfer roller
High-voltage
power supply
Toner Cartridge
Main controller
M
Motor
Solenoid
Sensor
Switch
Laser/scanner
unit

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2.7.2.2 General description

LBP6000 / LBP6000B

Engine controller is the circuit to control the operation sequence of the host machine and it is controlled by the CPU inside the engine controller.
When the power is turned ON and DC power is supplied through the low voltage power inside engine controller, CPU starts the printer operation control.
Then, CPU drives the loads such as laser diode, motors and solenoids etc. according to the image data that is input by the main controller when status becomes stand-by mode.
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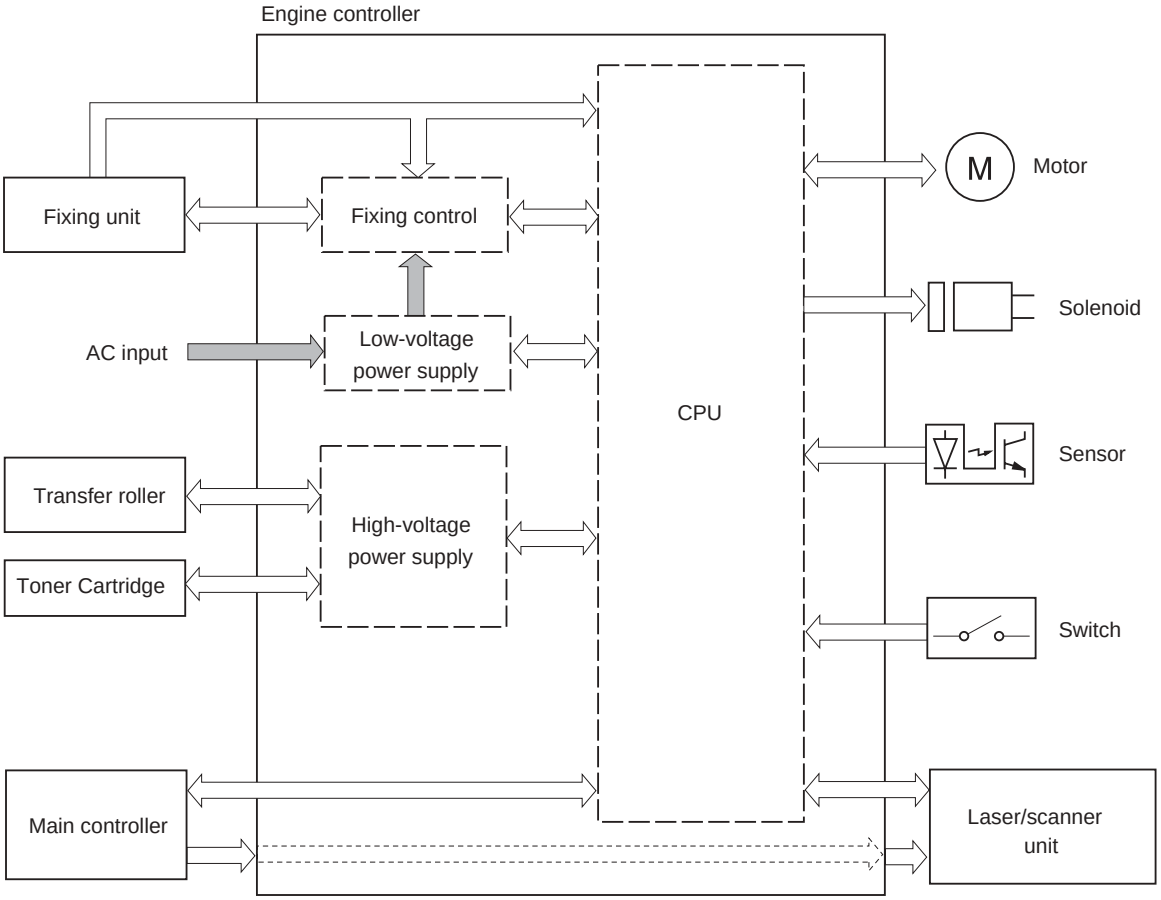

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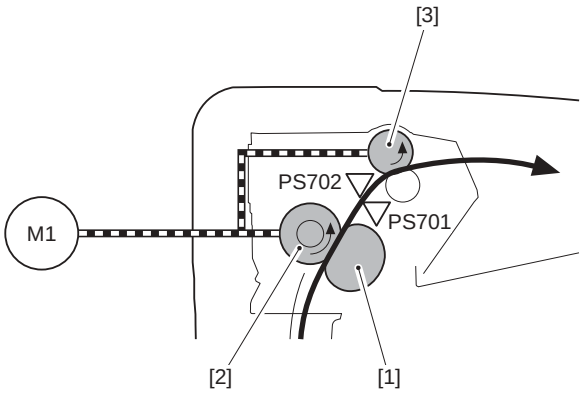
2.8 FIXING UNIT/DELIVERY SYSTEM

2.8.1 Overview/Configuration

2.8.1.1 Overview

LBP3100 / LBP3010B

Fixing/delivery system consists of the fixing film unit, pressure roller and delivery roller etc.
These rollers are driven by the main motor (M1).
Toner is transferred on the paper and fused by the heat of the fixing heater on the fixing assembly and by the pressure from the pressure roller, then the paper is delivered from the fixing assembly.
The paper is detected by the delivery sensor (PS701) and the paper width sensor (PS702), and then delivered to the delivery tray by the delivery roller.



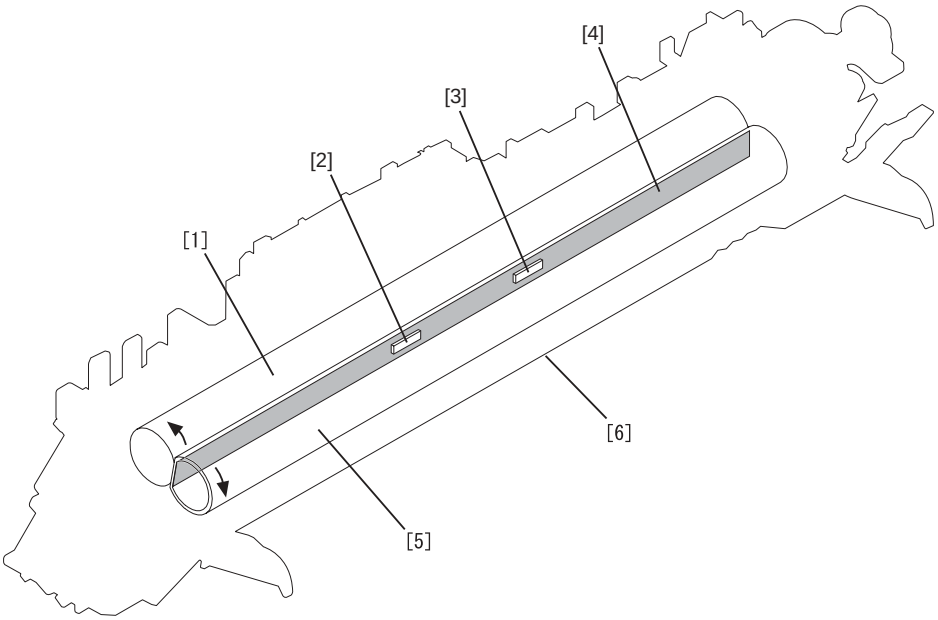
F-2-43
T-2-5

Name	
[1] Fixing film unit	PS701 delivery sensor
[2] Pressure roller	PS702 paper width sensor
[3] Delivery roller	M1 main motor

2.8.1.2 Main Parts of Fixing Unit

LBP3100 / LBP3010B

Main parts configuration and its purposes inside the fixing assembly are described below.



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T-2-6

Name	
[1] Pressure roller	[2] Temperature fuse
[3] Thermistor	[4] Fixing heater

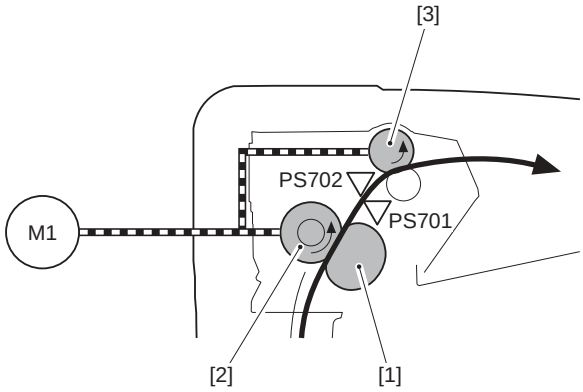
Name	
[5] Fixing film unit	[6] Fixing assembly

- Fixing heater:	This fixing assembly is equipped with 1 heater.
	Fixing heater (H1): For heating the fixing film (ceramic heater)
- Thermistor:	This fixing assembly is equipped with 1 thermistor.
	Main thermistor (TH1): For controlling the fixing heater temperature (contact type thermistor)
- Temperature fuse:	This fixing assembly is equipped with 1 temperature fuse.
	Temperature fuse (TP1): For detecting the fixing heater overheat (non-contact type fuse)
	When the heater overheats, the fuse melts to cut the power supply to the heater.

2.8.1.3 Overview

LBP6000 / LBP6000B

Fixing/delivery system consists of the fixing film unit, pressure roller and delivery roller etc.
These rollers are driven by the main motor (M1).
Toner is transferred on the paper and fused by the heat of the fixing heater on the fixing assembly and by the pressure from the pressure roller, then the paper is delivered from the fixing assembly.
The paper is detected by the delivery sensor (PS701) and the paper width sensor (PS702), and then delivered to the delivery tray by the delivery roller.



F-2-45

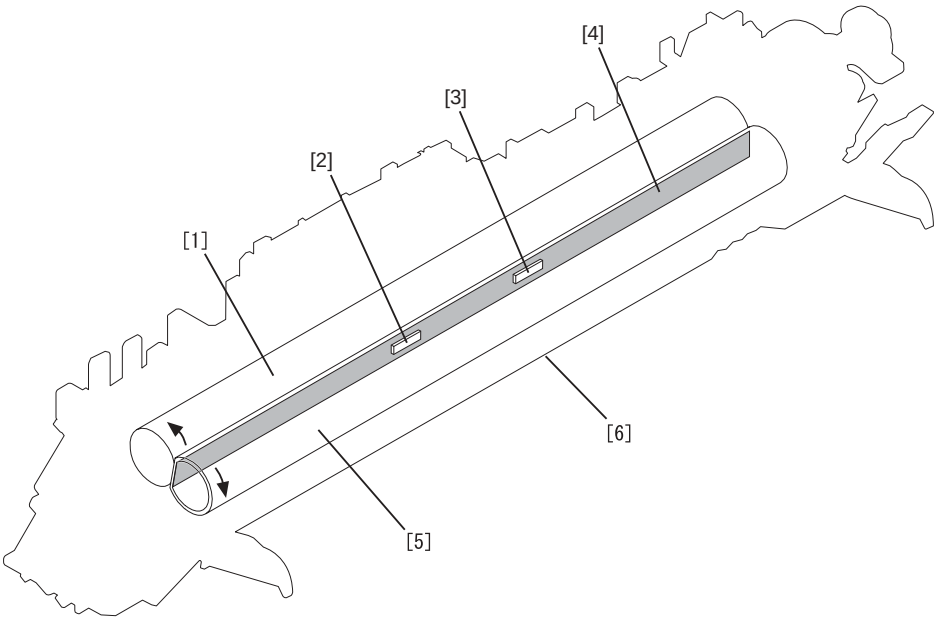
T-2-7

Name	
[1] Fixing film unit	PS701 delivery sensor
[2] Pressure roller	PS702 paper width sensor
[3] Delivery roller	M1 main motor

2.8.1.4 Main Parts of Fixing Unit

LBP6000 / LBP6000B

Main parts configuration and its purposes inside the fixing assembly are described below.



F-2-46

T-2-8

Name	
[1] Pressure roller	[2] Temperature fuse
[3] Thermistor	[4] Fixing heater
[5] Fixing film unit	[6] Fixing assembly

- Fixing heater: This fixing assembly is equipped with 1 heater.
  Fixing heater (H1): For heating the fixing film (ceramic heater)
- Thermistor: This fixing assembly is equipped with 1 thermistor.
  Main thermistor (TH1): For controlling the fixing heater temperature (contact type thermistor)
- Temperature fuse: This fixing assembly is equipped with 1 temperature fuse.
  Temperature fuse (TP1): For detecting the fixing heater overheat (non-contact type fuse)
  When the heater overheats, the fuse melts to cut the power supply to the heater.

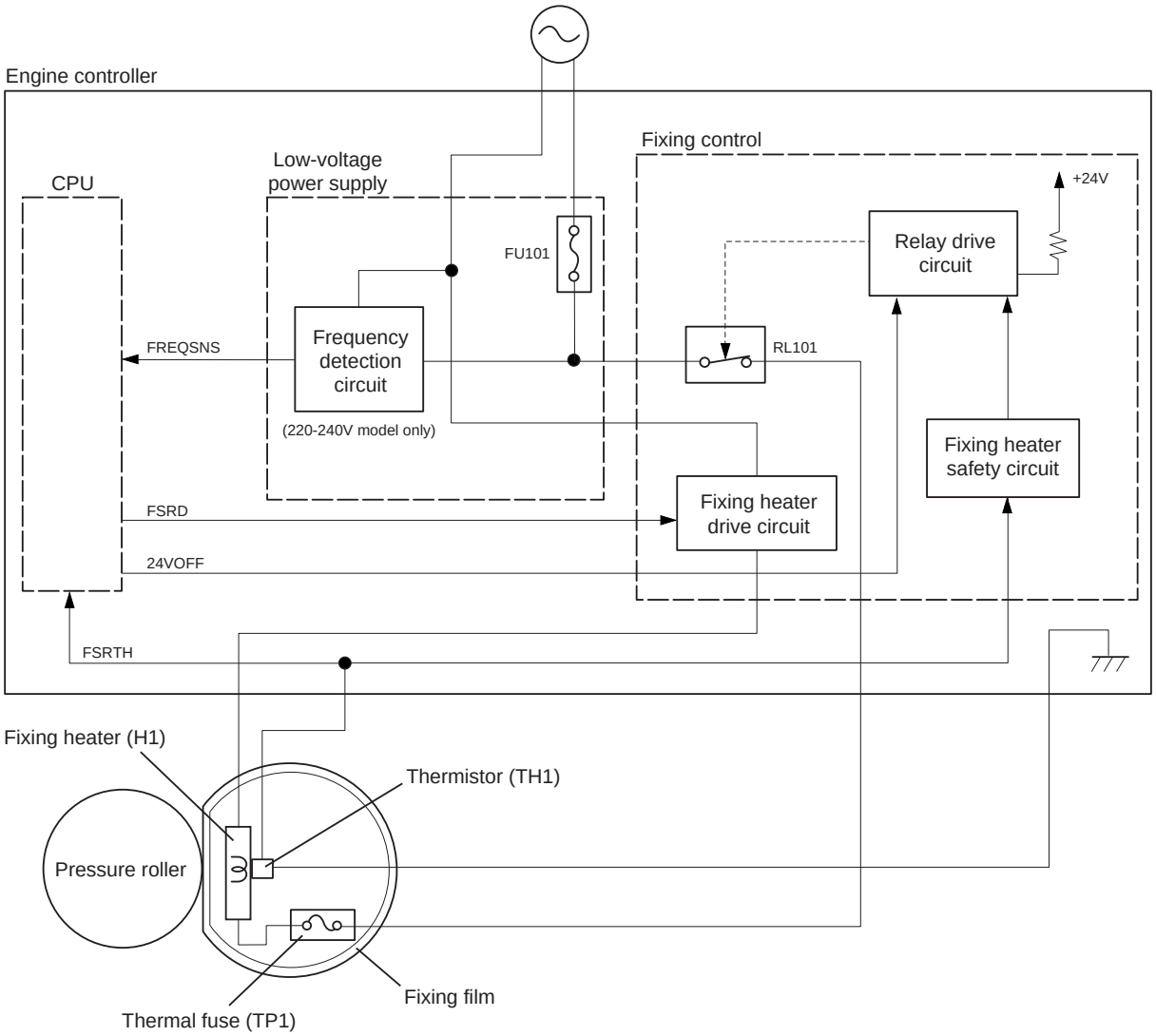
2.8.2 Various Control Mechanisms

2.8.2.1 Fixing Temperature Control

2.8.2.1.1 Fixing Temperature Control

LBP3100 / LBP3010B

This control is to keep the heater in the fixing film unit to the specified temperature.
The engine controller monitors the fixing heater temperature detection signal (FSRTH) and outputs the fixing heater drive signal (FSRD) according to the detected temperature. The fixing heater drive PCB controls the fixing heater according to this signal to keep the fixing heater temperature within the target values.
The following is the block diagram of this control.



F-2-47

There are 8 types of target fixing temperature depending on the fixing mode.
These types are according to the paper type settings and resolution settings (see the note below) etc. on a driver.
The following is the relation list of the fixing target temperature and the driver settings.

T-2-9

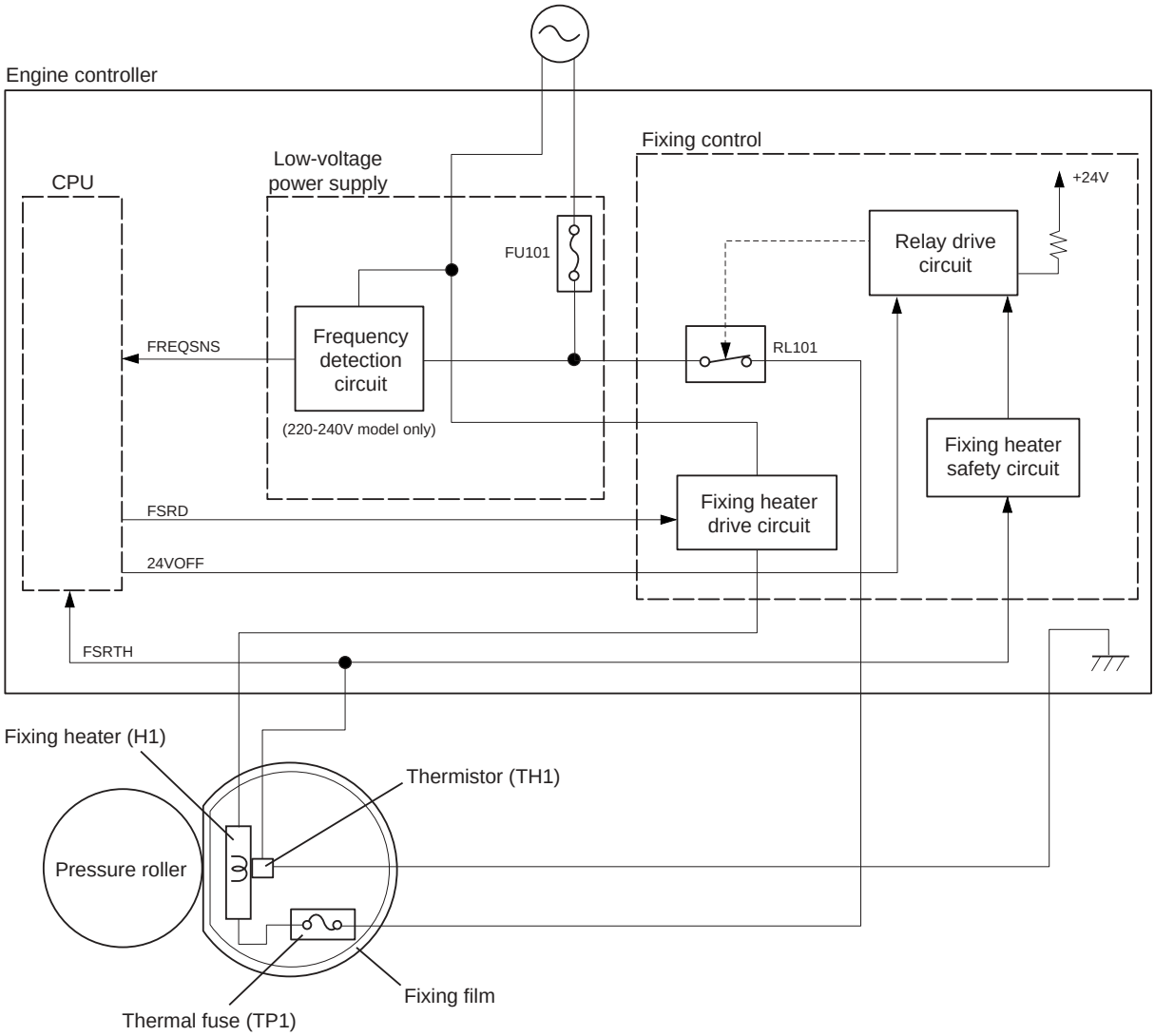
Settings on Printer Driver		**Target fixing temperature**
Paper type settings	**Sub scanning direction**	
Plain paper	600dpi	155 to 170 deg C
	400dpi	170 to 190 deg C
Plain paper L	600dpi	145 to 160 deg C
	400dpi	160 to 180 deg C
Thick paper	600dpi	180 deg C
Thick paper H	600dpi	185 deg C
Transparency	600dpi	150 to 160 deg C
	400dpi	165 to 180 deg C
Postcard/postcard H	600dpi	188 deg C
	400dpi	188 deg C
Envelope	600dpi	130 to 150 deg C
Labels	600dpi	130 to 150 deg C

Resolution Settings
This machine has 2 types of resolution settings (600 x 600 dpi, 600 x 400dpi).
This setting can be changed by whether or not ticking the item on finish settings (Finishing > Process Option > Use output adjustment mode).
600 x 400dpi is specified as factory settings. Ticking this box changes it to 600 x 600dpi.

2.8.2.1.2 Fixing Temperature Control

LBP6000 / LBP6000B

This control is to keep the heater in the fixing film unit to the specified temperature.
The engine controller monitors the fixing heater temperature detection signal (FSRTH) and outputs the fixing heater drive signal (FSRD) according to the detected temperature. The fixing heater drive PCB controls the fixing heater according to this signal to keep the fixing heater temperature within the target values.
The following is the block diagram of this control.



F-2-48

There are 8 types of target fixing temperature depending on the fixing mode.
These types are according to the paper type settings and resolution settings (see the note below) etc. on a driver.
The following is the relation list of the fixing target temperature and the driver settings.

T-2-10

Settings on Printer Driver		**Target fixing temperature**
Paper type settings	**Sub scanning direction**	
Plain paper	600dpi	150 to 165 deg C
	400dpi	170 to 190 deg C
Plain paper L	600dpi	140 to 155 deg C
	400dpi	160 to 180 deg C
Thick paper	600dpi	170 deg C
Thick paper H	600dpi	185 deg C
Transparency	600dpi	150 to 160 deg C
	400dpi	165 to 180 deg C
Postcard/postcard H	600dpi	188 deg C
	400dpi	188 deg C
Envelope	600dpi	160 to 165 deg C
Labels	600dpi	170 deg C

Resolution Settings
This machine has 2 types of resolution settings (600 x 600 dpi, 600 x 400dpi).
This setting can be changed by whether or not ticking the item on finish settings (Finishing > Process Option > Use output adjustment mode).
600 x 400dpi is specified as factory settings. Ticking this box changes it to 600 x 600dpi.

2.8.2.2 Protective Functions

2.8.2.2.1 Protective Function of Fixing Unit

LBP3100 / LBP3010B

Host machine carries the following 3 functions to prevent the fixing heater from overheating.
- Protective function by CPU
- Protection function by fixing heater safety circuit
- Protection function by temperature fuse

Each function is described as below.

1) Protective function by CPU
CPU of engine controller monitors the thermistor (TH1) temperature consistently.
When TH1 reaches approx 230 deg C, CPU determines that the fixing heater is overheating and stops the fixing heater drive signal(FSRD) output and also turns OFF relays to shut the power supply to fixing heater.

2) Protection function by fixing heater safety circuit
Fixing heater safety circuit monitors the thermistor (TH1) temperature consistently.
When TH1 reaches approx 235 deg C, it determines that the fixing heater is overheating and the fixing heater safety circuit turns OFF the relay drive circuit to shut the power supply to the fixing heater.

3) Protection function by temperature fuse (TP1)
When the fixing heater temperature rises abnormally and temperature fuse (TP1) temperature reaches approx 226 deg C, TP1 opens to shut the power supply to the fixing heater.

2.8.2.2.2 Error detection

LBP3100 / LBP3010B

CPU of engine controller determines the fixing assembly error and shuts the fixing heater drive signal (FSRD) and also turns OFF relays to shut the power supply to the fixing heater in the following cases. Also, it notifies the error status to the main controller simultaneously.

1) Startup error detection
- When thermistor temperature does not reach 35 deg C within 1.5 sec from heater ON.
- When the thermistor detects the temperature of 100 deg C or below during stand-by.

2) Abnormal low temperature error
- After heater ON, when the thermistor detects the temperature of 100 deg C or below at printing after the thermistor temperature reaches 50 deg C.
- After heater ON, when the thermistor detects the temperature of 55 deg C or below at sheet interval or in cleaning mode after thermistor temperature reaches 50 deg C.

3) Overheat error
When the thermistor detects the temperature of 220 deg C or over 30 times consecutively.

4) Frequency detection circuit error (200-240V series only)
When it cannot detect the frequency detection signal at fixing drive circuit even once within 3.3 sec after power ON.

2.8.2.2.3 Protective Function of Fixing Unit

LBP6000 / LBP6000B

Host machine carries the following 3 functions to prevent the fixing heater from overheating.
- Protective function by CPU
- Protection function by fixing heater safety circuit
- Protection function by temperature fuse

Each function is described as below.

1) Protective function by CPU
CPU of engine controller monitors the thermistor (TH1) temperature consistently.
When TH1 reaches approx 220 deg C, CPU determines that the fixing heater is overheating and stops the fixing heater drive signal(FSRD) output and also turns OFF relays to shut the power supply to fixing heater.

2) Protection function by fixing heater safety circuit
Fixing heater safety circuit monitors the thermistor (TH1) temperature consistently.
When TH1 reaches approx 235 deg C, it determines that the fixing heater is overheating and the fixing heater safety circuit turns OFF the relay drive circuit to shut the power supply to the fixing heater.

3) Protection function by temperature fuse (TP1)
When the fixing heater temperature rises abnormally and temperature fuse (TP1) temperature reaches approx 226 deg C, TP1 opens to shut the power supply to the fixing heater.

2.8.2.2.4 Error detection

LBP6000 / LBP6000B

CPU of engine controller determines the fixing assembly error and shuts the fixing heater drive signal (FSRD) and also turns OFF relays to shut the power supply to the fixing heater in the following cases. Also, it notifies the error status to the main controller simultaneously.

1) Startup error detection
- When thermistor temperature does not reach 35 deg C within 1.5 sec from heater ON.
- When the thermistor detects the temperature of 100 deg C or below during stand-by.

2) Abnormal low temperature error
- After heater ON, when the thermistor detects the temperature of 100 deg C or below at printing after the thermistor temperature reaches 50 deg C.
- After heater ON, when the thermistor detects the temperature of 55 deg C or below at sheet interval or in cleaning mode after thermistor temperature reaches 50 deg C.

3) Overheat error
When the thermistor detects the temperature of 220 deg C or over 30 times consecutively.

4) Frequency detection circuit error (200-240V series only)
When it cannot detect the frequency detection signal at fixing drive circuit even once within 3.3 sec after power ON.

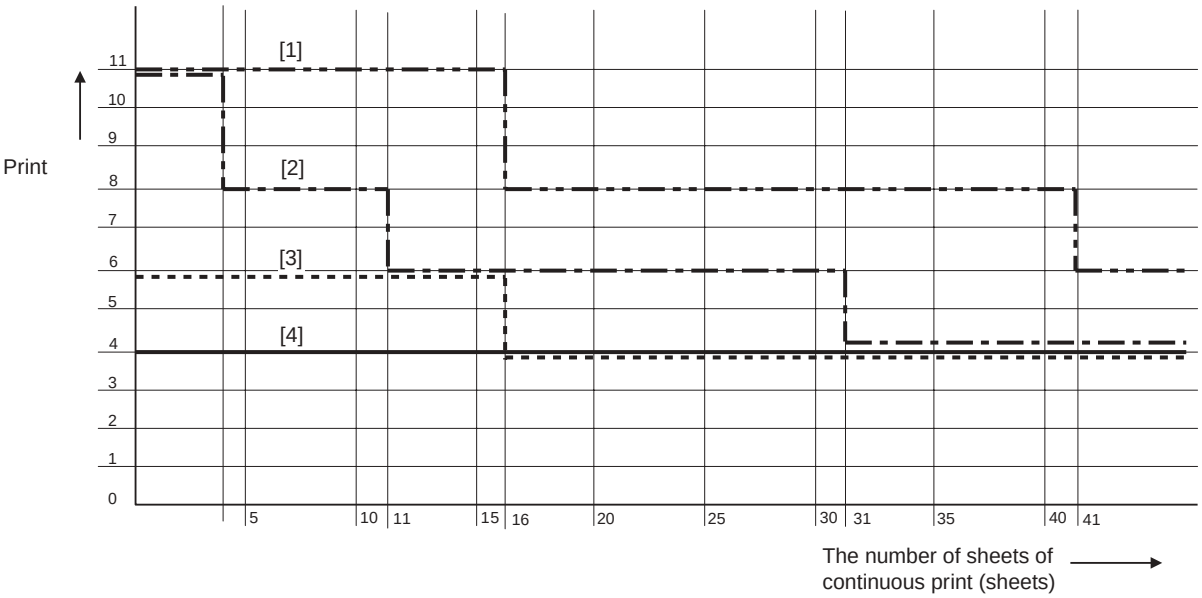
2.8.3 Other Functions

2.8.3.1 Throughput Down Control

LBP3100 / LBP3010B

This machine performs the throughput down control that extends the paper interval and lower the printing speed to prevent the edge of the fixing heater from overheating at continuous printing of small paper (the paper with narrow width) and to prevent the fixing heater unit from overheating at high-volume continuous printing.
This control extends the interval between heater on and prevents the edge of the roller of fixing assembly and the delivery unit from overheating.
This control has the following 3 modes and the operation sequence differs depending on each modes.

Mode 1: sequence (For prevention of temperature increase in the edge)
Condition: paper length is 264mm or shorter
Operation: print speed drops according to the setting item (paper type) on the printer driver. Simultaneously, control the target temperature of the fixing assembly according to the temperature in the following table.



F-2-49

T-2-11

No.	**Paper type**
[1]	Plain paper/plain paper L
[2]	Heavy paper/heavy paper L
[3]	Postcard
[4]	Postcard H

Mode 2: sequence (For prevention of temperature increase in the edge)
Condition: paper length is 264mm or longer while paper width is 190mm or shorter
Operation: print speed drops to 3ppm from the 2nd sheet of continuous print. Simultaneously, control the target temperature of the fixing assembly within the range of approx. 155 deg C to 170 deg C.

Mode 3: sequence (For prevention of temperature increase in the delivery unit)
Condition: paper width is 190mm or longer
Operation: print speed drops to 5ppm from the 251st sheet of continuous. Simultaneously, control the target temperature of the fixing assembly within the range of approx. 132 deg C to 134 deg C.

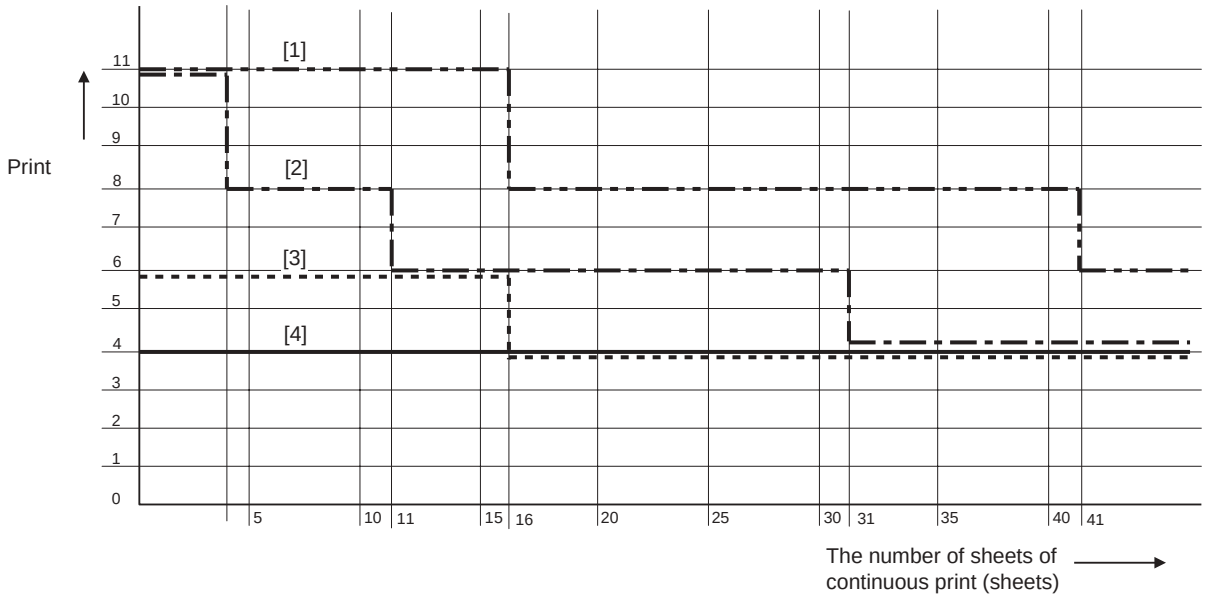
2.8.3.2 Throughput Down Control

LBP6000 / LBP6000B

This machine performs the throughput down control that extends the paper interval and lower the printing speed to prevent the edge of the fixing heater from overheating at continuous printing of small paper (the paper with narrow width) and to prevent the fixing heater unit from overheating at high-volume continuous printing.
This control extends the interval between heater on and prevents the edge of the roller of fixing assembly and the delivery unit from overheating.
This control has the following 3 modes and the operation sequence differs depending on each modes.

Mode 1: sequence (For prevention of temperature increase in the edge)

Condition: paper length is 264mm or shorter
Operation: print speed drops according to the setting item (paper type) on the printer driver. Simultaneously, control the target temperature of the fixing assembly according to the temperature in the following table.



F-2-50
T-2-12

No.	**Paper type**
[1]	Plain paper/plain paper L
[2]	Heavy paper/heavy paper L
[3]	Postcard
[4]	Postcard H

Mode 2: sequence (For prevention of temperature increase in the edge)

Condition: paper length is 264mm or longer while paper width is 190mm or shorter
Operation: print speed drops to 3ppm from the 2nd sheet of continuous print. Simultaneously, control the target temperature of the fixing assembly within the range of approx. 155 deg C to 170 deg C.

Mode 3: sequence (For prevention of temperature increase in the delivery unit)

Condition: paper width is 190mm or longer
Operation: print speed drops to 5ppm from the 251st sheet of continuous. Simultaneously, control the target temperature of the fixing assembly within the range of approx. 132 deg C to 134 deg C.

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3.1 EXTERNAL AND CONTROLS SYSTEM

3.1.1 Rear Cover

3.1.1.1 Preparation for Removing the Rear Cover

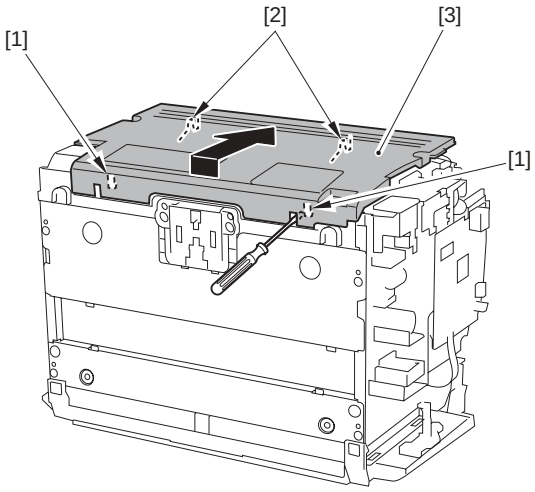
LBP3100 / LBP3010B

1) Removing the Upper Cover (page 3-3)Reference[Removing the Upper Cover]
2) Removing the Left Cover (page 3-2)Reference[Removing the Left Cover]
3) Removing the Right Cover (page 3-2)Reference[Removing the Right Cover]

3.1.1.2 Removing the Rear Cover

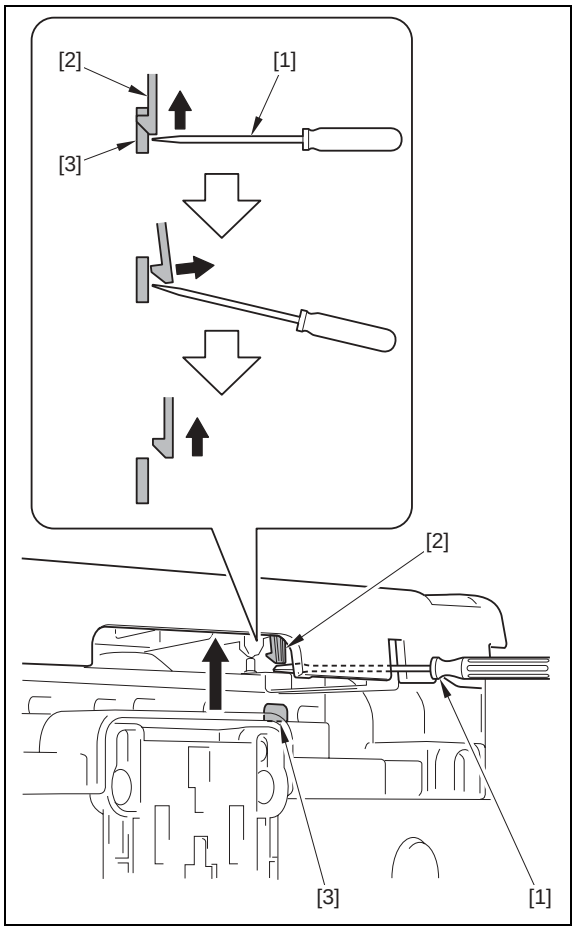
LBP3100 / LBP3010B

1) Release the 2 claws [1].
2) While releasing the 2 hooks [2], remove the rear cover [3].



F-3-1

MEMO:
When Releasing the right and left claws, lift the claw [2] with a flat-blade screwdriver [1] as shown to release the claws from holes [3].



3.1.1.3 Before Remove the Rear Cover

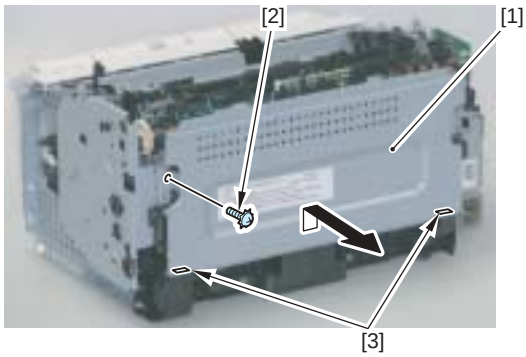
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]
2) Remove the Left Cover. (page 3-3)Reference[Removing the Left Cover]
3) Remove the Right Cover. (page 3-2)Reference[Removing the Right Cover]

3.1.1.4 Removing the Rear Cover

LBP6000 / LBP6000B

1) Remove the Rear Cover [1].
   - 1 Screw [2]
   - 2 Hooks [3]



F-3-2

3.1.2 Right Cover

3.1.2.1 Preparation for Removing the Right Cover

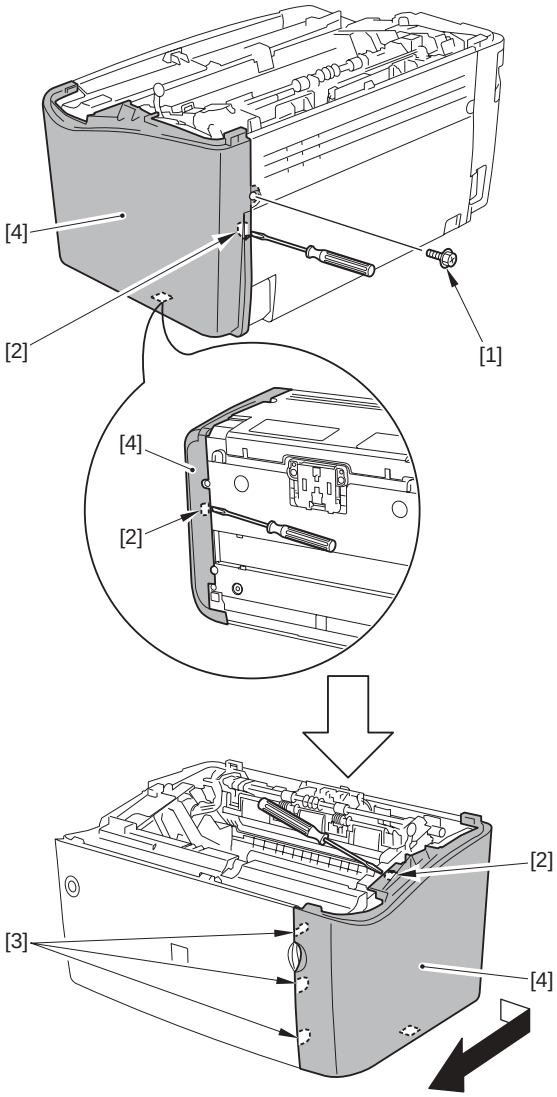
LBP3100 / LBP3010B

1) Removing the Upper Cover (page 3-3)Reference[Removing the Upper Cover]

3.1.2.2 Removing the Right Cover

LBP3100 / LBP3010B

1) Remove the 1 screw [1] and release the 3 claws [2].
2) While releasing the 3 claws [3], remove the right cover [4] in the direction of the arrow.



F-3-3

3.1.2.3 Before Remove the Right Cover

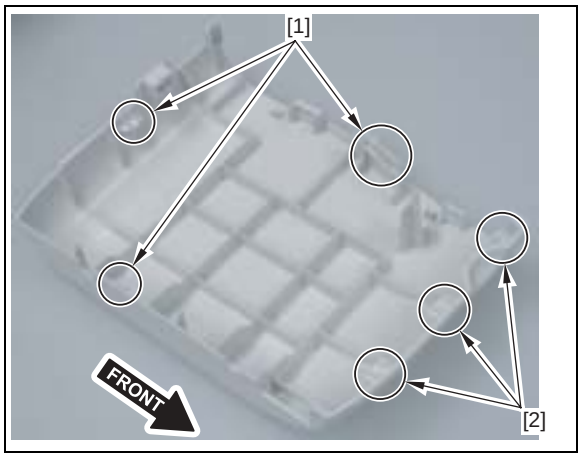
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]

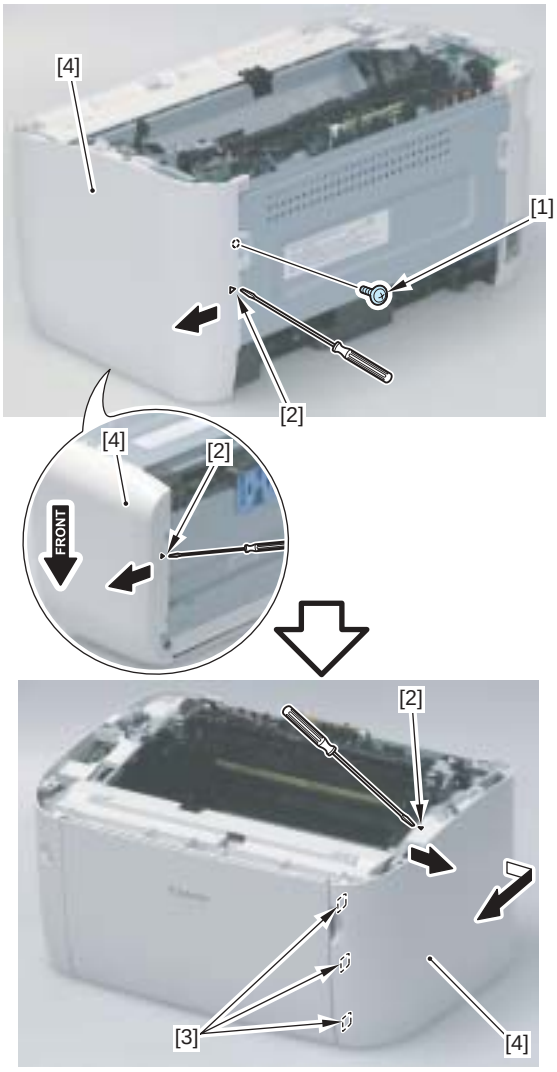
3.1.2.4 Removing the Right Cover

LBP6000 / LBP6000B

MEMO:
The following shows the 3 claws [1] and 3 hooks [2] of the Right Cover.



1) Remove the screw [1] and release the 3 claws [2].
2) While releasing the 3 hooks [3], remove the Right Cover [4] in the direction of the arrow.



F-3-4

3.1.3 Left Cover

3.1.3.1 Preparation for Removing the Left Cover

LBP3100 / LBP3010B

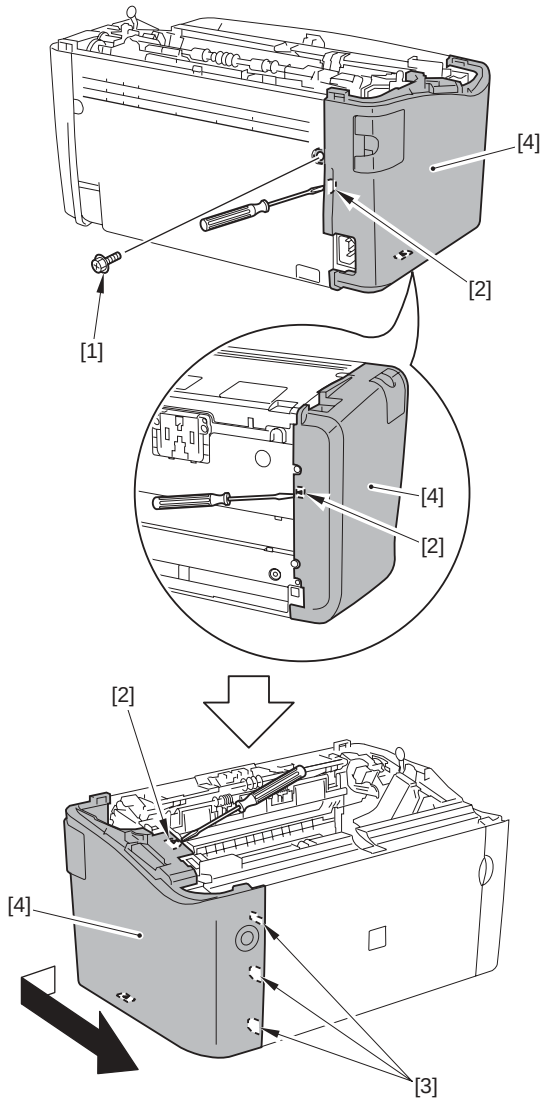
1) Removing the Upper Cover (page 3-3)Reference[Removing the Upper Cover]

3.1.3.2 Removing the Left Cover

LBP3100 / LBP3010B

1) Remove the 1 screw [1] and release the 3 claws [2].

2) While releasing the 3 claws [3], remove the left cover [4] in the direction of the arrow.



F-3-5

3.1.3.3 Before Remove the Left Cover

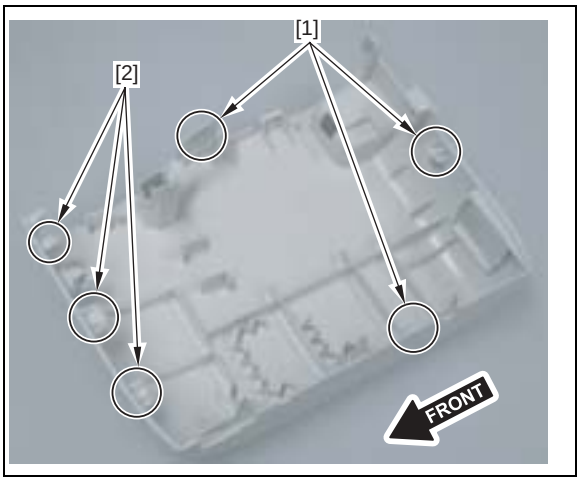
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]

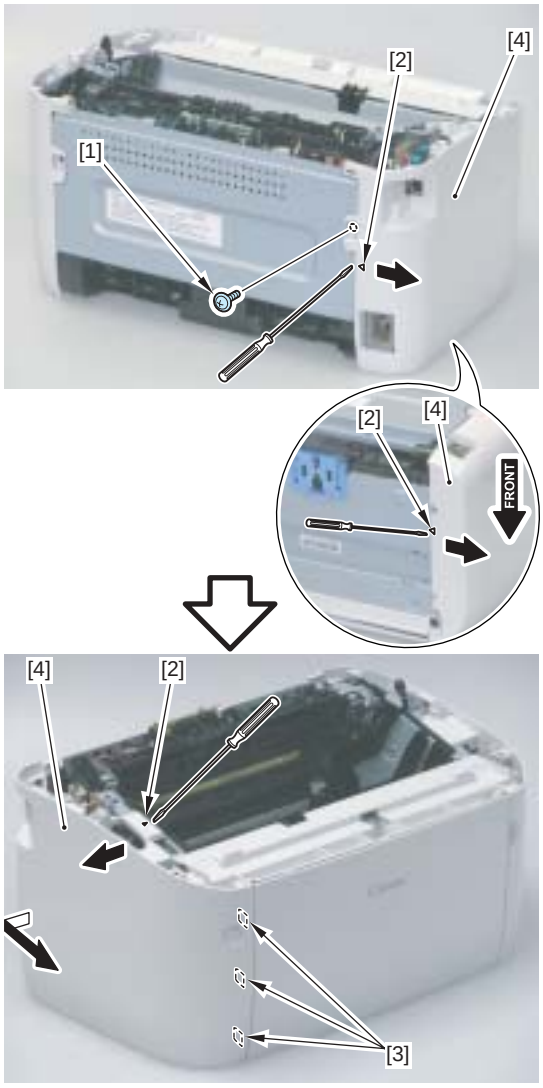
3.1.3.4 Removing the Left Cover

LBP6000 / LBP6000B

MEMO:
The following shows the 3 claws [1] and 3 hooks [2] of the Left Cover.



1) Remove the screw [1] and release the 3 claws [2].
2) While releasing the 3 hooks [3], remove the Left Cover [4] in the direction of the arrow.



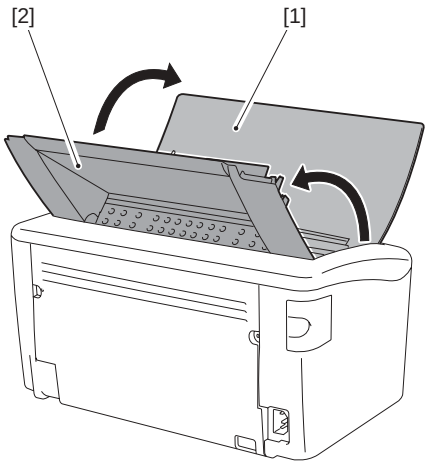
F-3-6

3.1.4 Upper Cover

3.1.4.1 Removing the Upper Cover

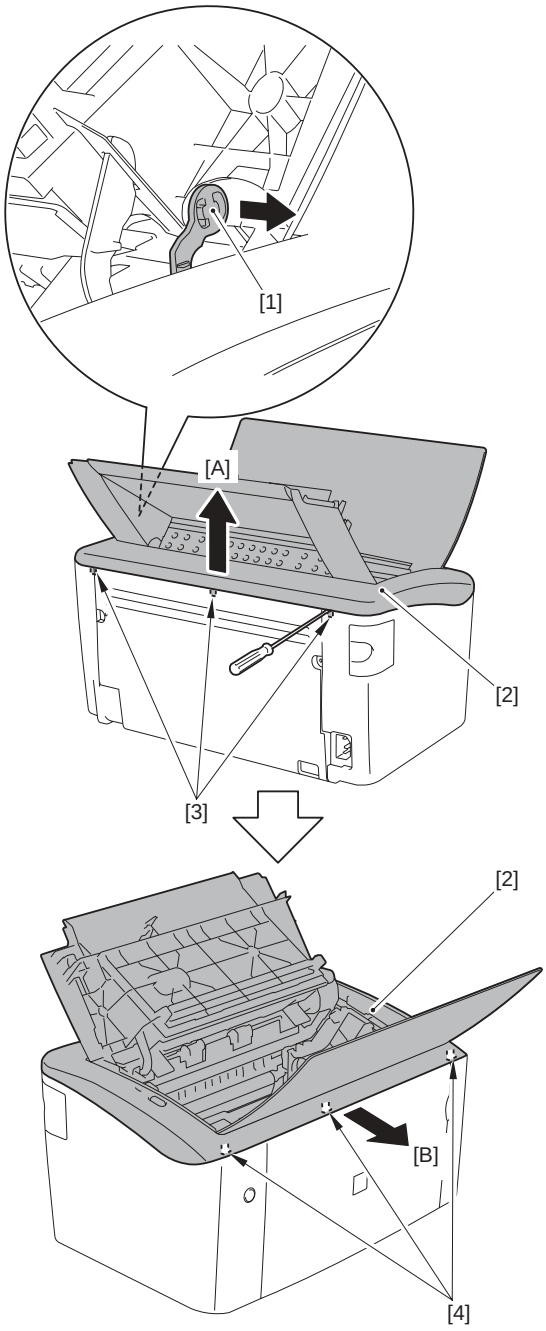
LBP3100 / LBP3010B

1) Open the delivery auxiliary tray [1] and delivery tray [2].



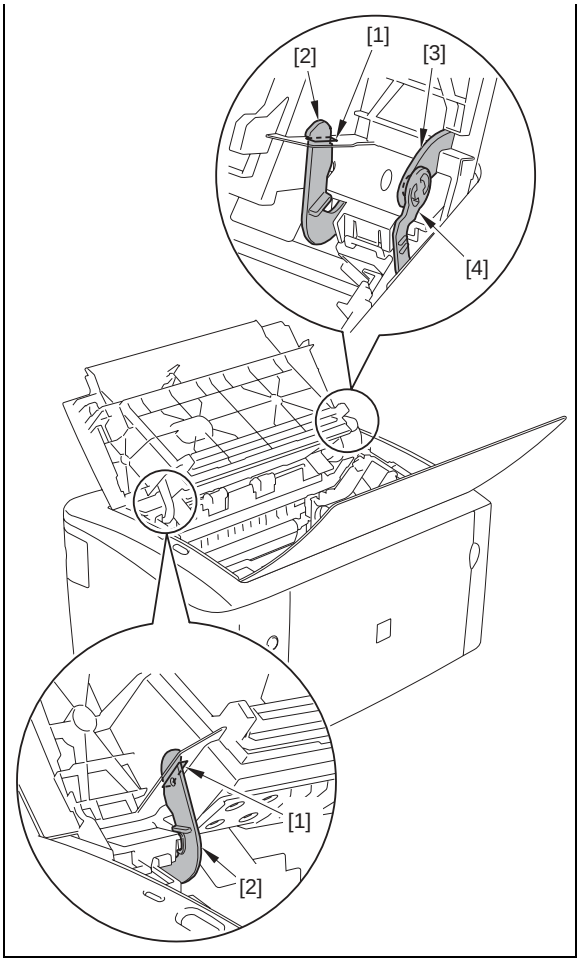
F-3-7

2) Remove the cartridge arm [1].
3) Release the 3 claws [3] on the upper cover [2] in the arrow [A] direction.
4) While releasing the 3 claws [4], remove the upper cover in the arrow [B] direction.



F-3-8

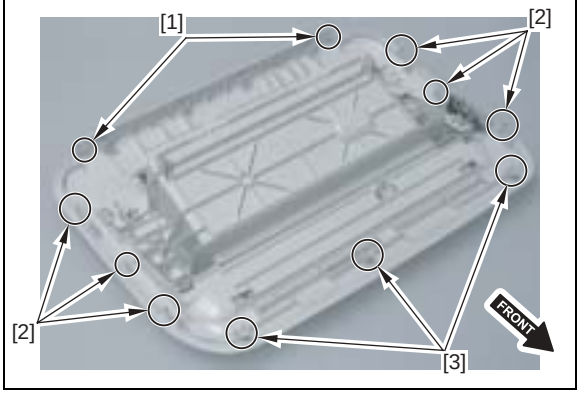
Points to note at installation
- Attach the left and right fixing pressure arms [2] to the left and right holes [1] of the delivery tray.
- Attach the cartridge lock arm [4] to the arm unit [3] on the delivery tray.



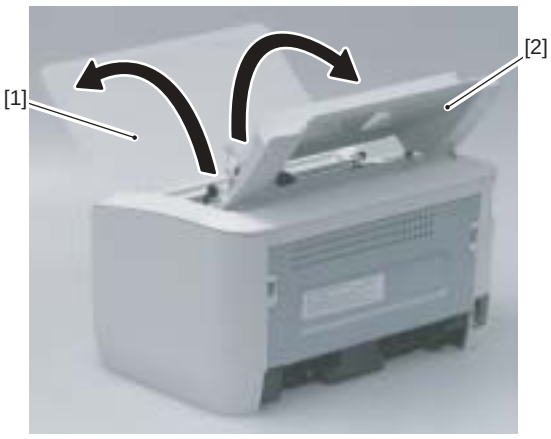
3.1.4.2 Removing the Upper Cover

LBP6000 / LBP6000B

MEMO:
The following shows the 2 claws [1] at rear side of the Upper Cover Unit, 6 claws [2] at the sides, and 3 hooks [3].

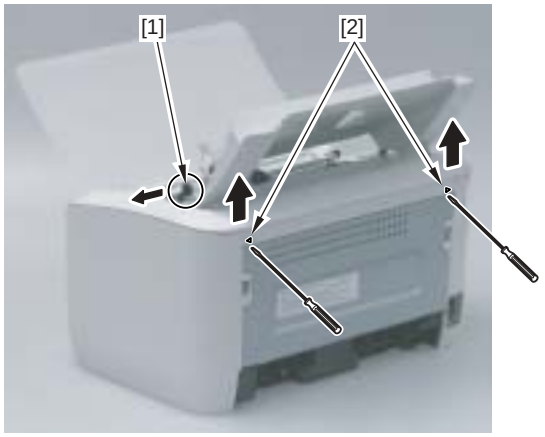


1) Open the Delivery Auxiliary Tray [1] and the Delivery Tray [2].



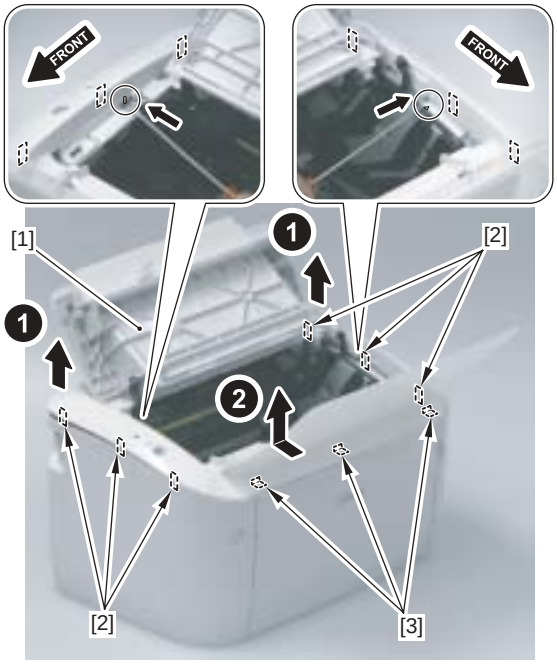
F-3-9

2) Remove the Cartridge Arm [1].
3) Release the 2 claws [2] of the Upper Cover.



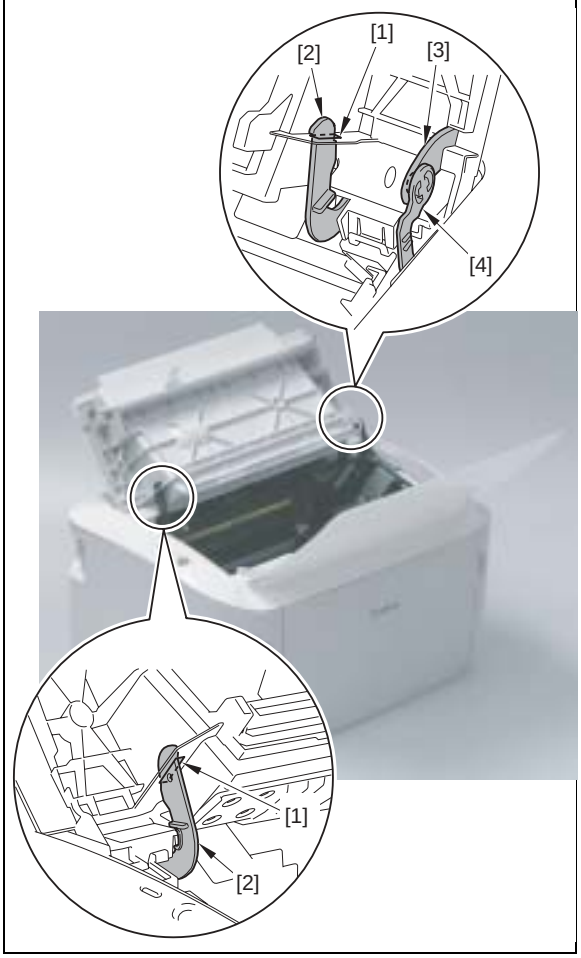
F-3-10

4) Remove the Upper Cover [1].
- 6 Claws [2]
- 3 Hooks [3]



F-3-11

Points to Note at Installation
- Be sure to fit the 2 Fixing Pressure Arms (Right and Left) [2] into the 2 holes (right and left) [1] of the Delivery Tray.
- Be sure to set the Cartridge Lock Arm [4] to the arm unit [3] on the Delivery Tray.



3.1.5 Front Cover

3.1.5.1 Preparation for Removing the Front Cover

LBP3100 / LBP3010B

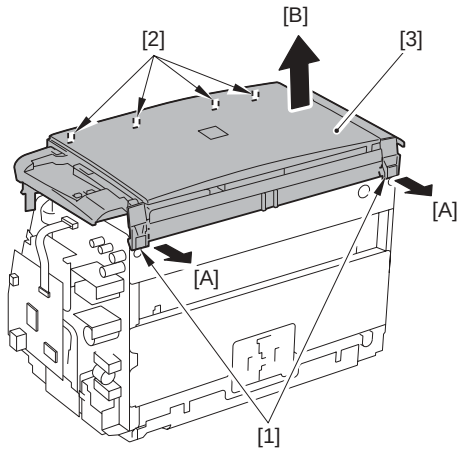
1) Removing the Upper Cover (page 3-3)Reference[Removing the Upper Cover]

2) Removing the Left Cover (page 3-2)Reference[Removing the Left Cover]
3) Removing the Right Cover (page 3-2)Reference[Removing the Right Cover]

3.1.5.2 Removing the Front Cover

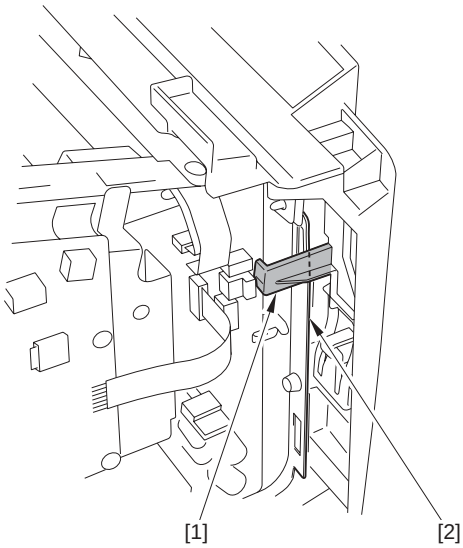
LBP3100 / LBP3010B

1) Release the 2 hooks in the arrow [A] direction.
2) While releasing the 4 hooks [2] in the arrow [B] direction, remove the front cover [3].



F-3-12

Points to note at installation
Make sure that the switch arm [1] does not contact with the edge of the plate [2] when attaching the cover.



3.1.5.3 Before Remove the Front Cover

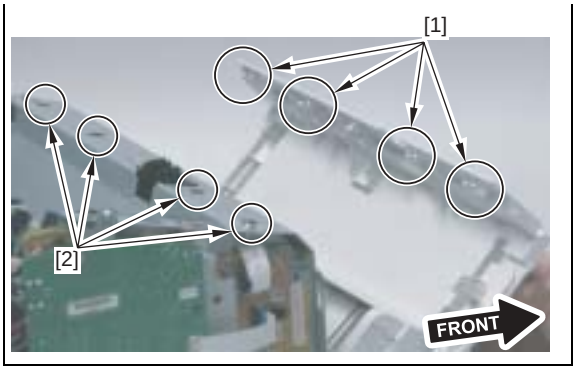
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]
2) Remove the Left Cover. (page 3-3)Reference[Removing the Left Cover]
3) Remove the Right Cover. (page 3-2)Reference[Removing the Right Cover]

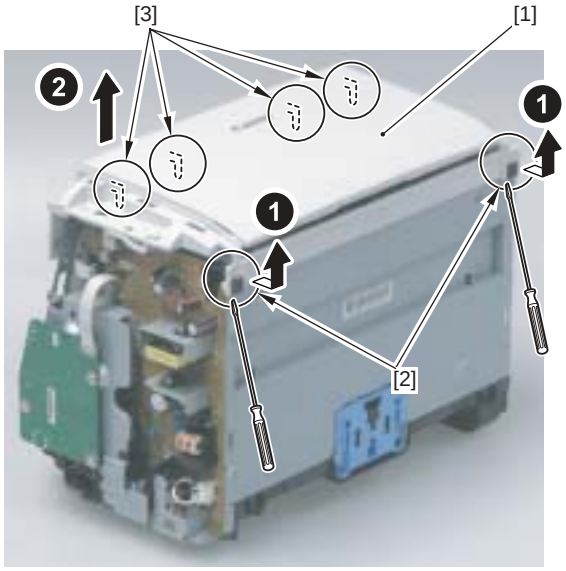
3.1.5.4 Removing the Front Cover

LBP6000 / LBP6000B

MEMO:
The following shows the 4 hooks [1] and 4 hook holes [2] of the Front Cover.



1) Remove the Front Cover [1].
   - 2 Claws [2]
   - 4 Hooks [3]



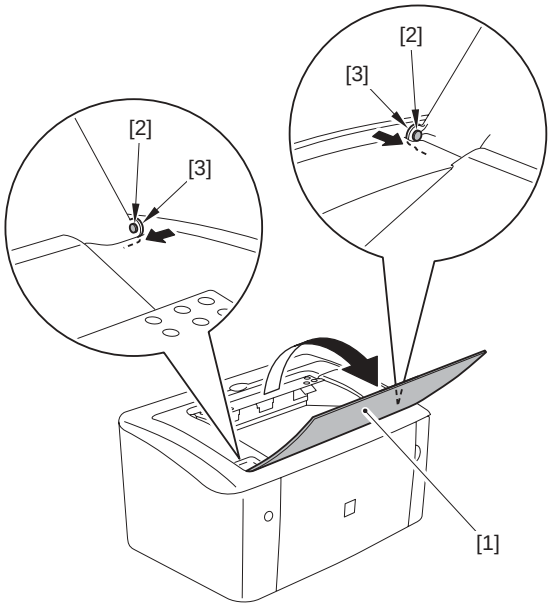
F-3-13

3.1.6 Delivery Tray

3.1.6.1 Removing the Delivery Auxiliary Tray

LBP3100 / LBP3010B

1) Remove the delivery auxiliary tray [1].
   - 2 shafts [2]
   - 2 shaft supports [3]



F-3-14

3.1.7 Pickup Tray

3.1.7.1 Preparation for Removing the Pickup Tray Unit

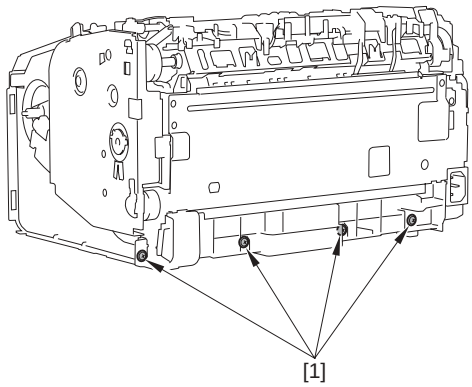
LBP3100 / LBP3010B

1) Removing the Upper Cover (page 3-3)Reference[Removing the Upper Cover]
2) Removing the Left Cover (page 3-2)Reference[Removing the Left Cover]
3) Removing the Right Cover (page 3-2)Reference[Removing the Right Cover]
4) Removing the Front Cover (page 3-6)Reference[Removing the Front Cover]
5) Removing the Rear Cover (page 3-1)Reference[Removing the Rear Cover]
6) Removing the Separation Pad (page 3-34)Reference[Removing the Separation Pad]

3.1.7.2 Removing the Pickup Tray Unit

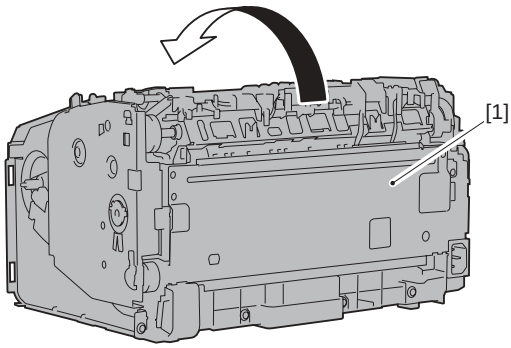
LBP3100 / LBP3010B

1) Remove the 4 screws [1].



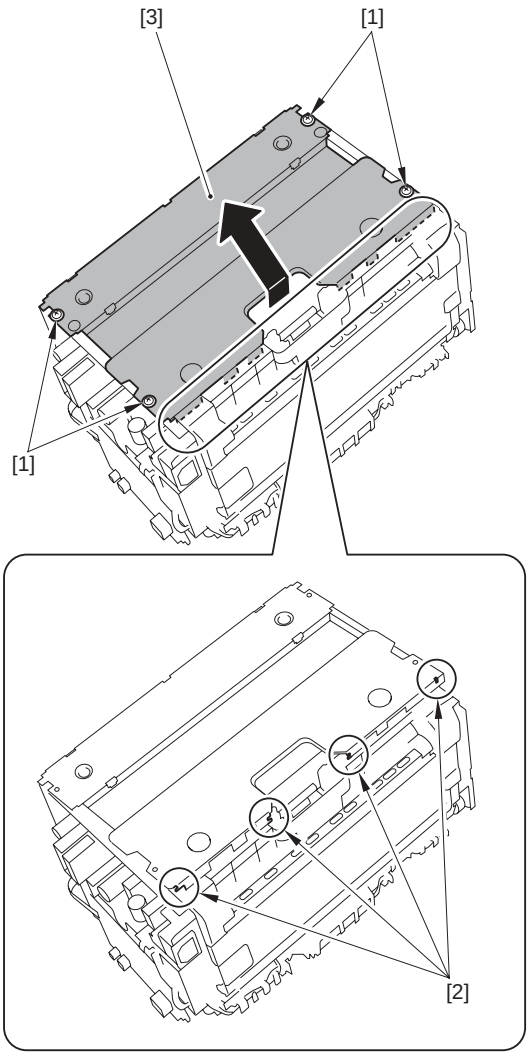
F-3-15

2) Turn the host machine [1] in the direction of the arrow.



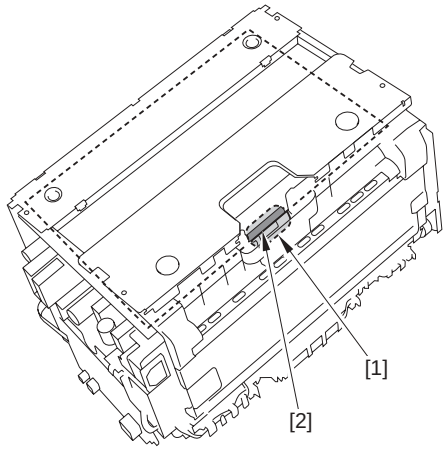
F-3-16

3) Remove the pickup tray unit [3].
   - 4 screws [1]
   - 4 hooks [2]



F-3-17

When attaching the pickup tray to the host machine, put the pickup tray [2] onto the pickup roller [1].



3.1.7.3 Before Removing the Pickup Tray Unit

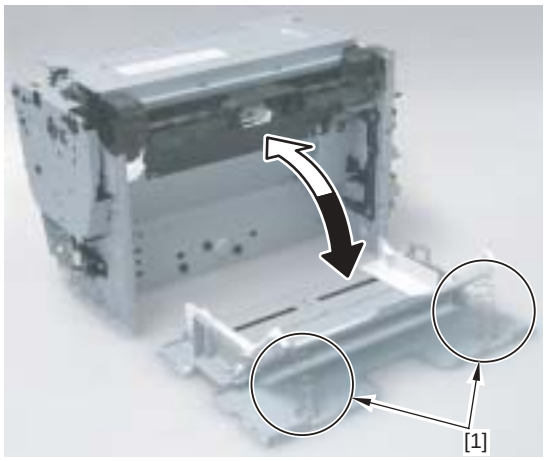
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]
2) Remove the Left Cover. (page 3-3)Reference[Removing the Left Cover]
3) Remove the Right Cover. (page 3-2)Reference[Removing the Right Cover]
4) Remove the Front Cover. (page 3-6)Reference[Removing the Front Cover]
5) Remove the Separation Pad. (page 3-34)Reference[Removing the Separation Pad]

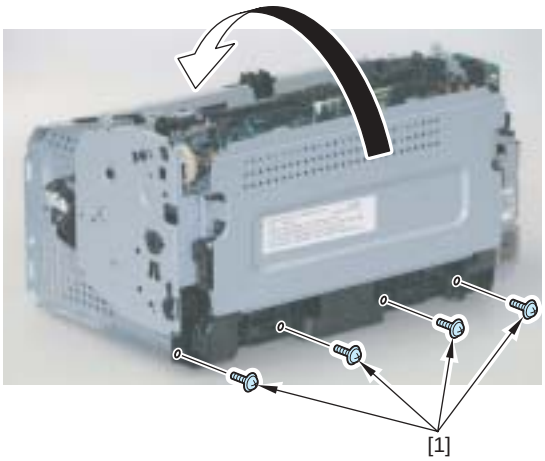
3.1.7.4 Removing the Pickup Tray Unit

LBP6000 / LBP6000B

CAUTION:
When disassembling and assembling, be careful not to loose the 2 springs [1] of the Pickup Tray Unit.

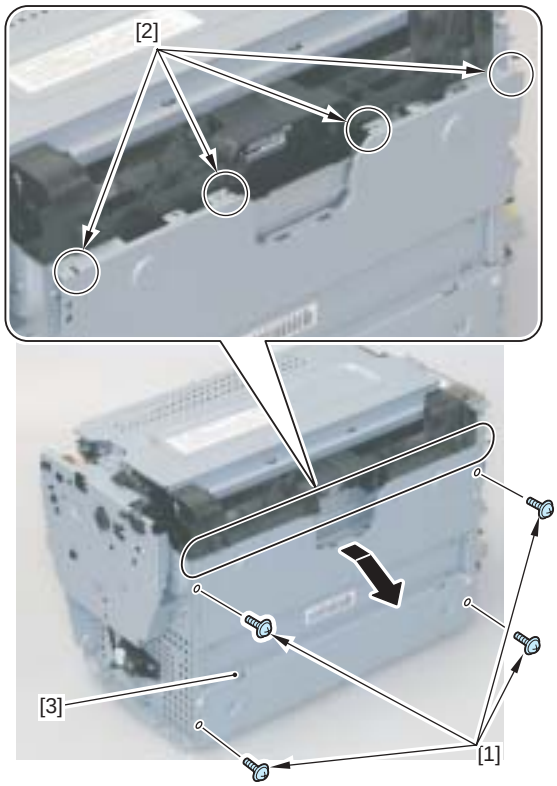


1) Remove the 4 screws [1], and turn the machine in the direction of the arrow.



F-3-18

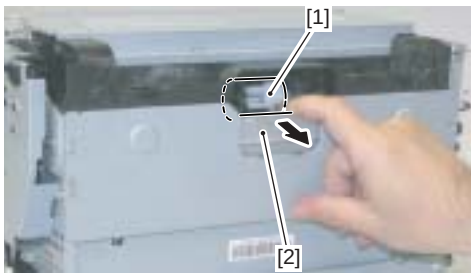
2) Remove the Pickup Tray Unit [3].
- 4 Screws [1]
- 4 Hooks [2]



F-3-19

Be sure to place the springs [1] between [A] and [B] parts of the Pickup Tray Unit when assembling.

When installing the Pickup Tray Unit to the machine, be sure to put the Pickup Tray [2] onto the Pickup Roller [1].



3.1.8 Drive Unit

3.1.8.1 Preparation for Removing the Drive Belt

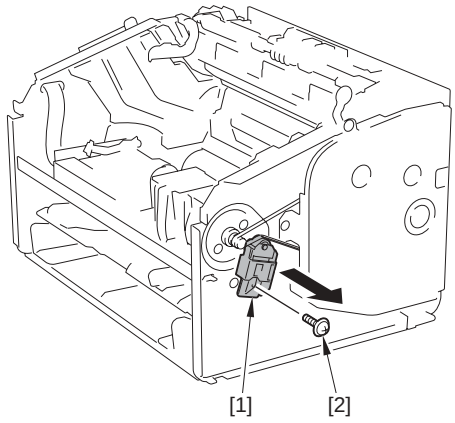
LBP3100 / LBP3010B

1) Removing the Upper Cover (page 3-3)Reference[Removing the Upper Cover]
2) Removing the Left Cover (page 3-2)Reference[Removing the Left Cover]
3) Removing the Right Cover (page 3-2)Reference[Removing the Right Cover]
4) Removing the Front Cover (page 3-6)Reference[Removing the Front Cover]

3.1.8.2 Removing the Drive Belt

LBP3100 / LBP3010B

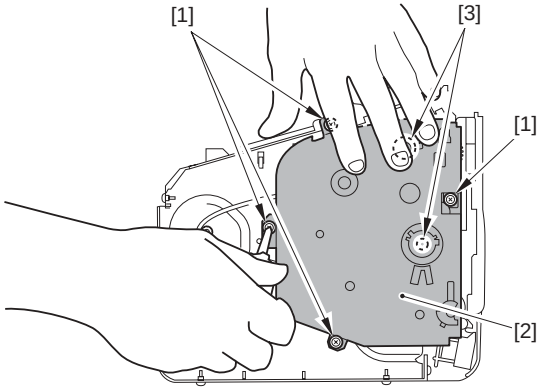
1) Remove the tension unit [1].
- 1 screw [2]

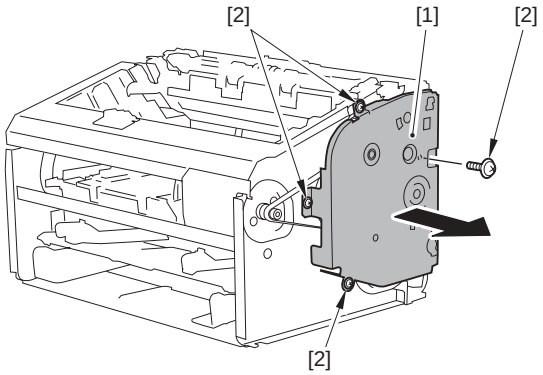


F-3-20

2) Remove the drive cover [1].
- 4 screws [2]

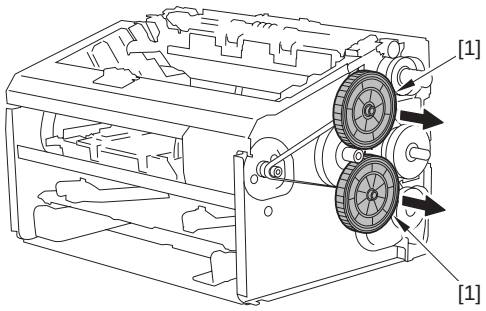
Points to note at disassembly
When removing the 4 screws [1], hold the driver cover [2] by hand. (Otherwise, the spring [3] inside the drive cover may be lost.)





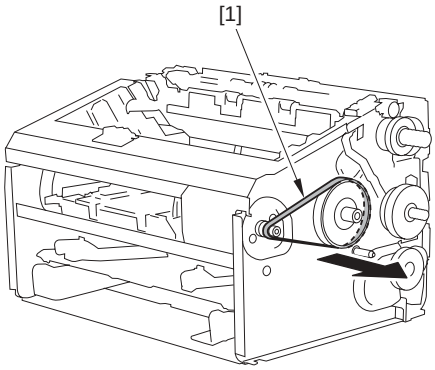
F-3-21

3) Remove the 2 gears [1].



F-3-22

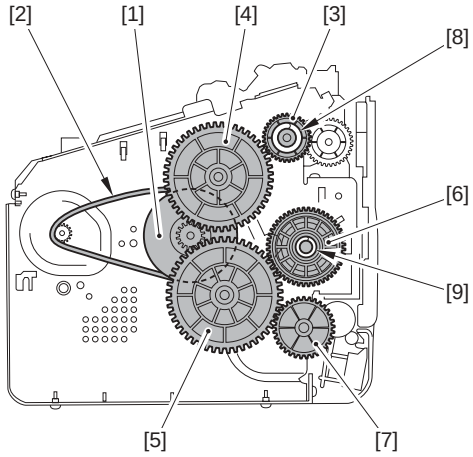
4) Remove the drive belt [1].



F-3-23

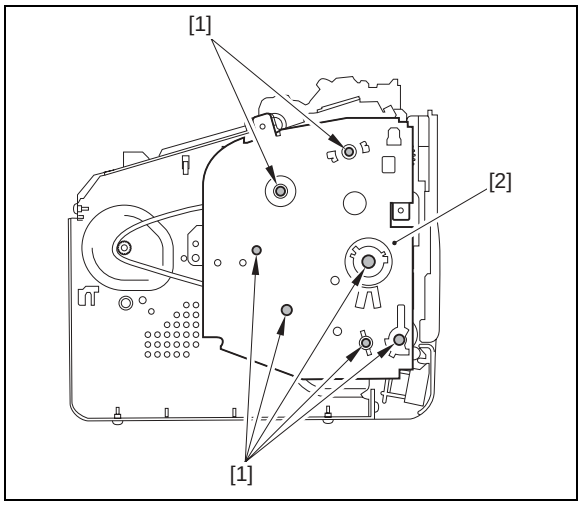
Points to note at installation

- When assembling the drive gears, follow the order as below.



[1] Primary speed down pulley
[2] Timing belt
[3] Fixing ratchet gear
[4] Fixing gear
[5] Cartridge gear
[6] Coupling gear
[7] Delivery speed down W gear
[8] Compression spring
[9] Compression spring

- When attaching the drive gear, align the 7 shaft holes [1] with the drive cover [2].



3.1.8.3 Before Removing the Drive Belt

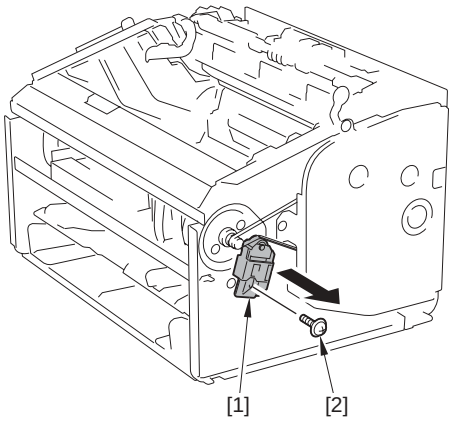
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]
2) Remove the Left Cover. (page 3-3)Reference[Removing the Left Cover]
3) Remove the Right Cover. (page 3-2)Reference[Removing the Right Cover]
4) Remove the Front Cover. (page 3-6)Reference[Removing the Front Cover]

3.1.8.4 Removing the Drive Belt

LBP6000 / LBP6000B

1) Remove the Tension Unit [1].
   - 1 Screw [2]

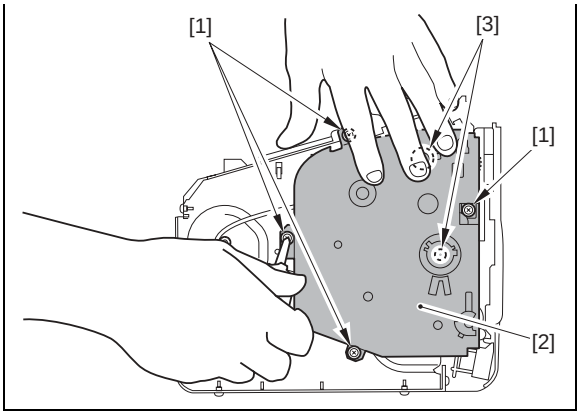


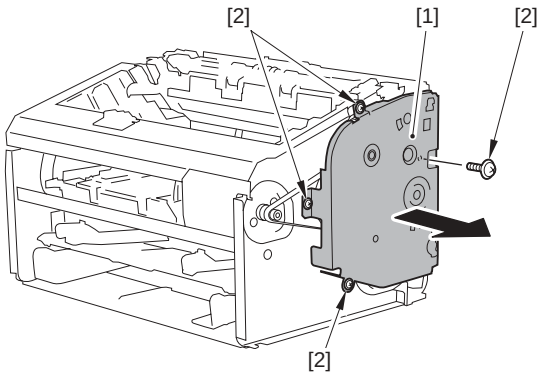
F-3-24

2) Remove the Drive Cover [1].
   - 4 Screws [2]

Points to Note at Removing

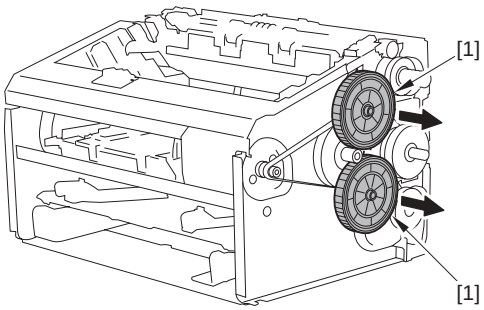
When removing the 4 screws [1], be sure to hold the Drive Cover [2] by hand.(Otherwise, the 2 springs [3] inside the Drive Cover may be lost.)





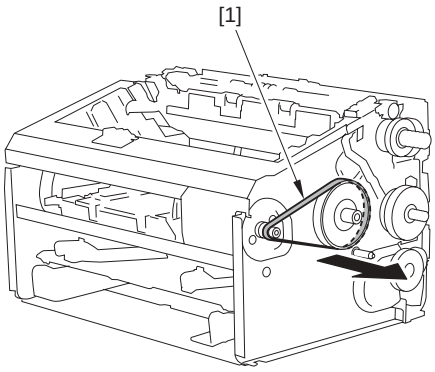
F-3-25

3) Remove the 2 gears [1].



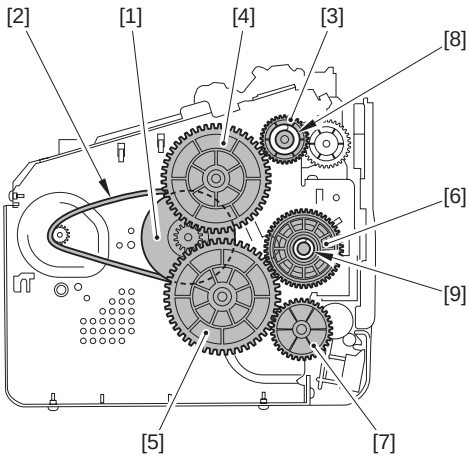
F-3-26

4) Remove the Drive Belt [1].



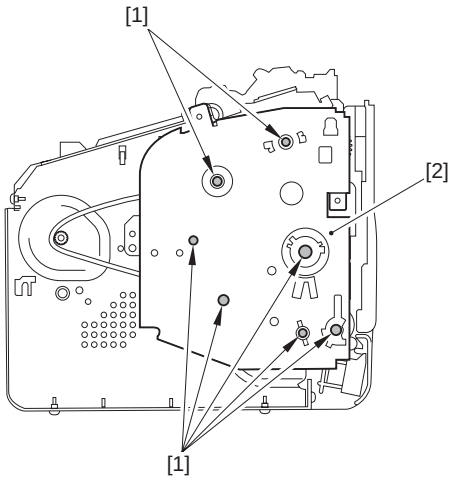
F-3-27

Points to Note at Installation
- When assembling the Drive Gear, be sure to follow the order shown below.



[1] Primary Deceleration Pully
[2] Timing Belt
[3] Fixing Ratchet Gear
[4] Fixing Transmission Gear
[5] Cartridge Transmission Gear
[6] Coupling Gear
[7] Feed Deceleration Gear
[8] Compression Spring
[9] Compression Spring

- When installing the Drive Cover, be sure to align the 7 Shaft Holes [1] with the Drive Cover [2].



3.1.9 Main Drive Unit

3.1.9.1 Preparation for Removing the Main Motor

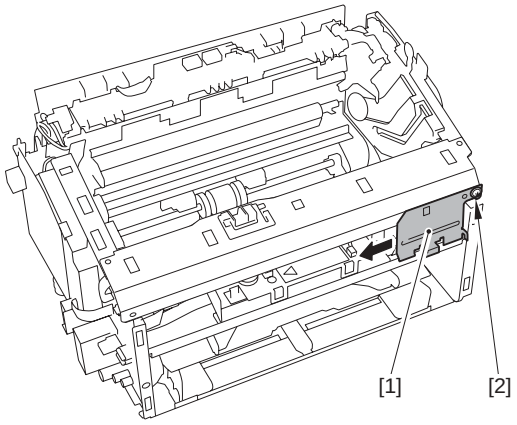
LBP3100 / LBP3010B

1) Removing the Upper Cover (page 3-3)Reference[Removing the Upper Cover]
2) Removing the Left Cover (page 3-2)Referense[Removing the Left Cover]
3) Removing the Right Cover (page 3-2)Referense[Removing the Right Cover]
4) Removing the Front Cover (page 3-6)Referense[Removing the Front Cover]

3.1.9.2 Removing the Main Motor

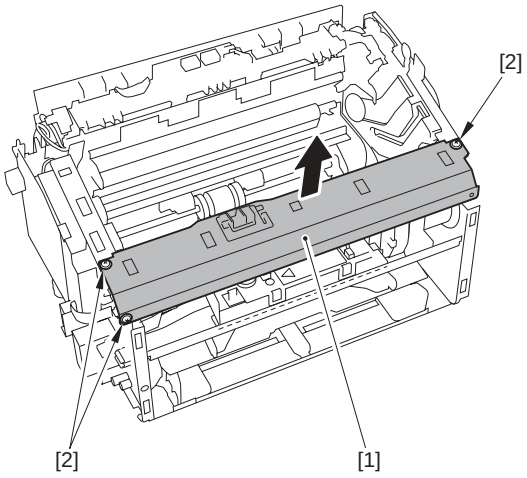
LBP3100 / LBP3010B

1) Remove the scanner sub cover [1].
- 1 screw [2]



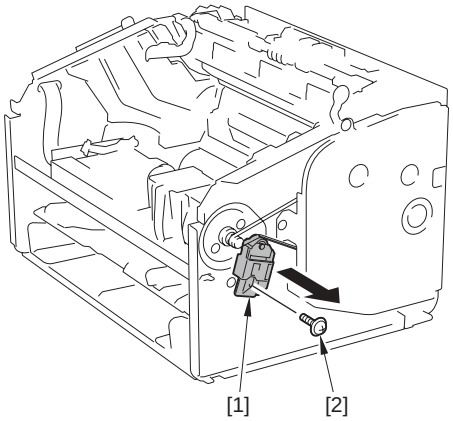
F-3-28

2) Remove the scanner cover [1].
- 3 screws [2]



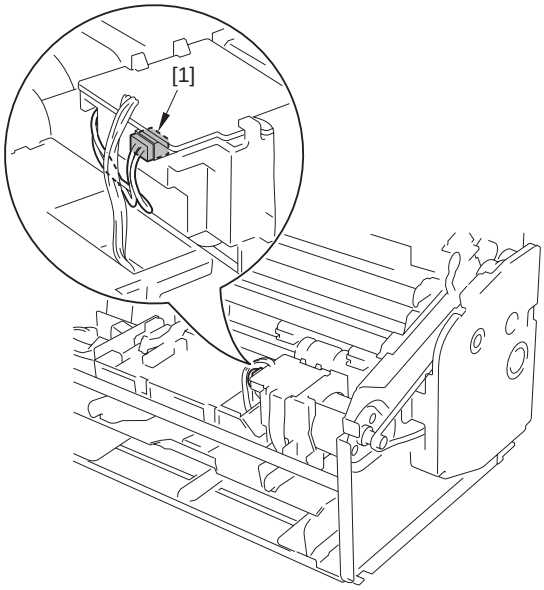
F-3-29

3) Remove the tension unit [1].
- 1 screw [2]



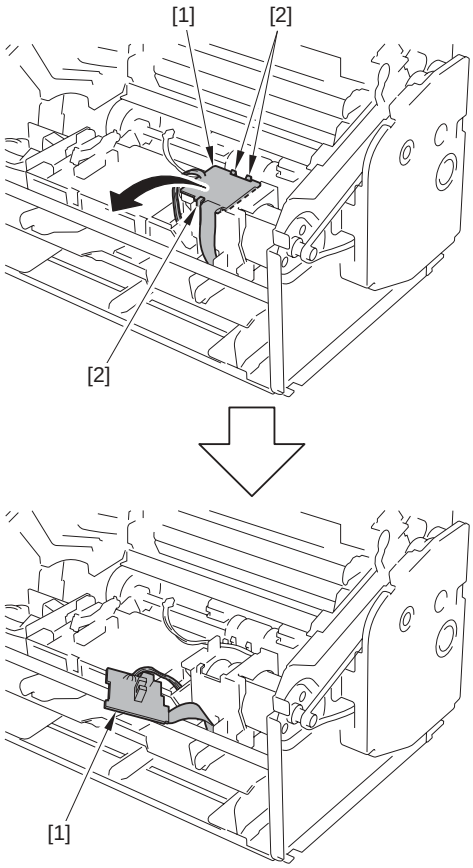
F-3-30

4) Disconnect the connecter [1].



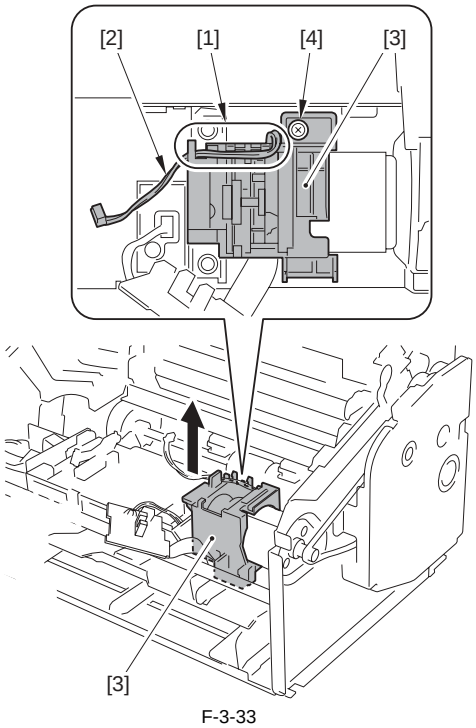
F-3-31

5) Remove the motor driver PCB [1].
- 3 claws [2]



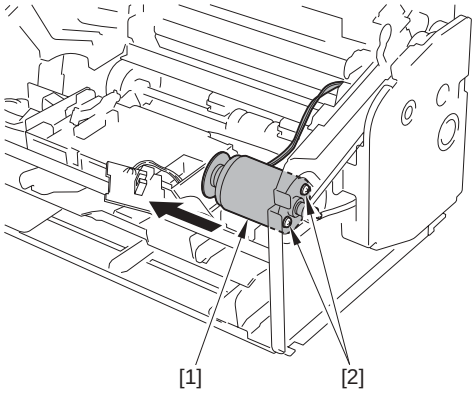
F-3-32

6) Free the motor harness [2] from the harness guide [1].
7) Remove the motor guide [3].
- 1 screw [4]



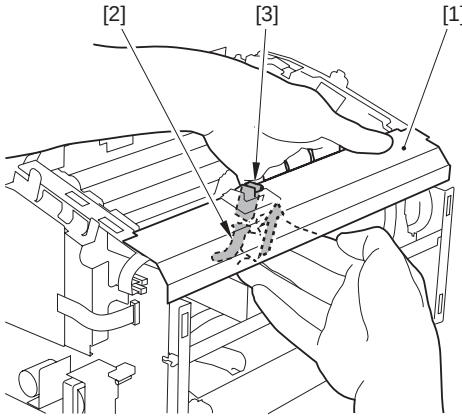
F-3-33

8) Remove the main motor [1].
- 2 screws [2]



F-3-34

Points to note at installation
When attaching the laser scanner cover [1], put the shutter lever [2] through the hole [3] on the scanner cover.



3.1.9.3 Before Removing the Main Motor

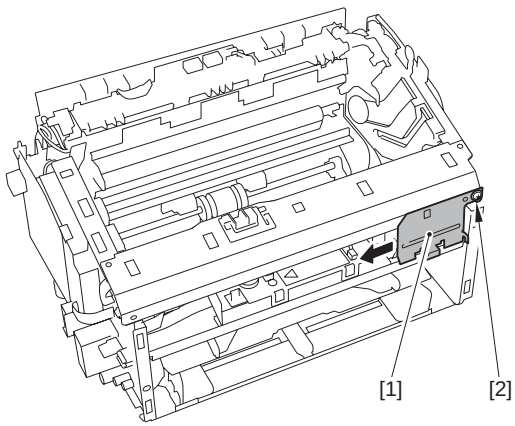
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]
2) Remove the Left Cover. (page 3-3)Reference[Removing the Left Cover]
3) Remove the Right Cover. (page 3-2)Reference[Removing the Right Cover]
4) Remove the Front Cover. (page 3-6)Reference[Removing the Front Cover]

3.1.9.4 Removing the Main Motor

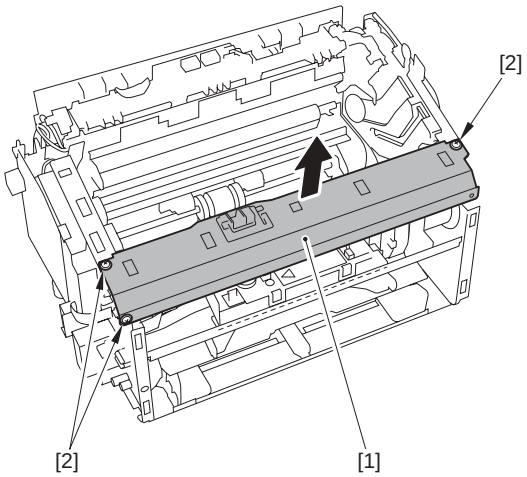
LBP6000 / LBP6000B

1) Remove the Scanner Sub Cover [1].
- 1 Screw [2]



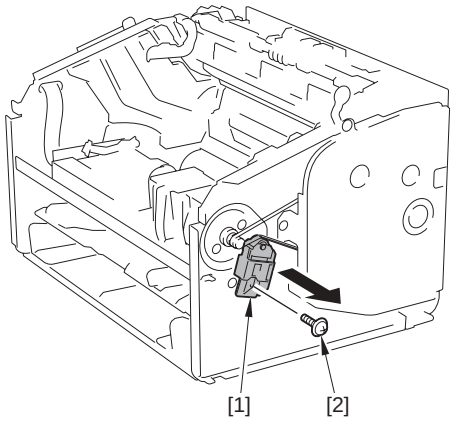
F-3-35

2) Remove the Scanner Cover [1].
- 3 Screws [2]



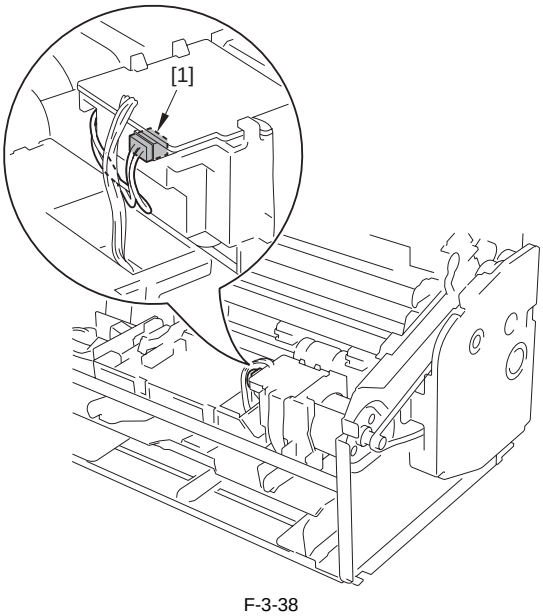
F-3-36

3) Remove the Tension Unit [1].
- 1 Screw [2]



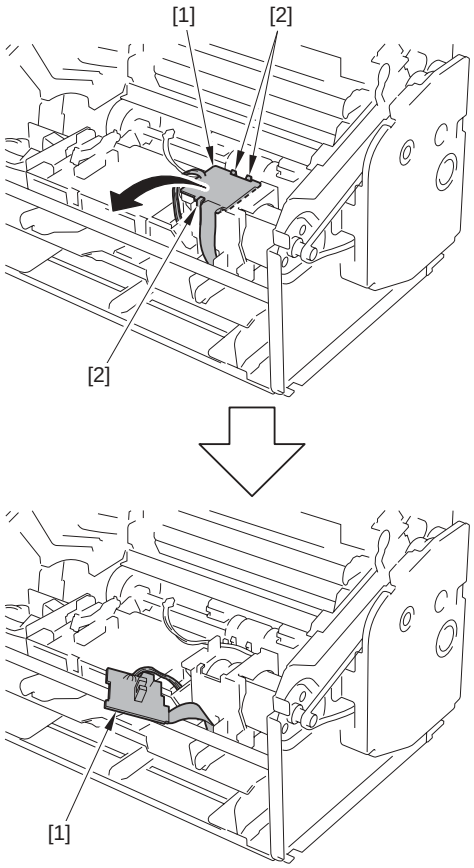
F-3-37

4) Disconnect the connector [1].



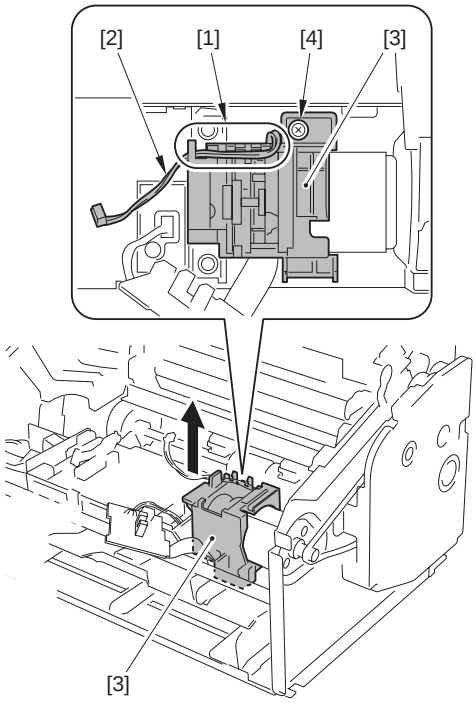
F-3-38

5) Remove the Motor Driver PCB [1].
- 3 Claws [2]



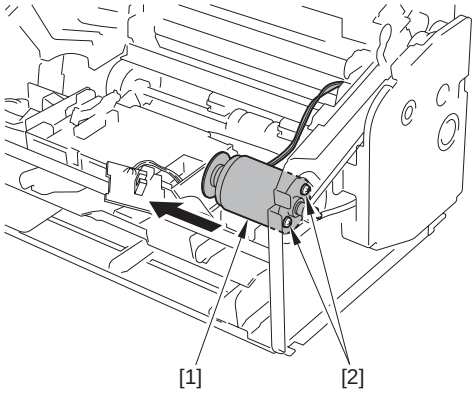
F-3-39

6) Free the Motor Harness [2] from the Harness Guide [1].
7) Remove the Motor Guide [3].
- 1 Screw [4]



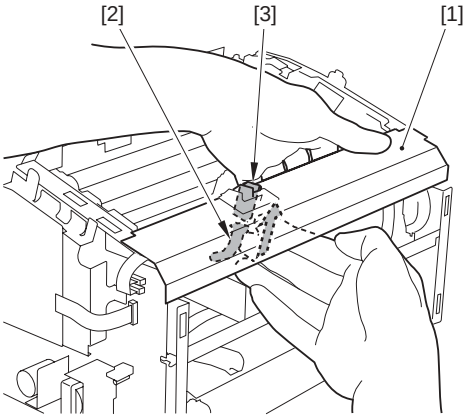
F-3-40

8) Remove the Main Motor [1].
- 2 Screws [2]



F-3-41

Points to Note at Installation
When installing the Laser Scanner Cover [1], be sure to put the Shutter Open/Close Lever [2] through the hole [3] on the Scanner Cover.



3.1.10 Engine controller board

3.1.10.1 Preparation for Removing the Engine Controller PCB

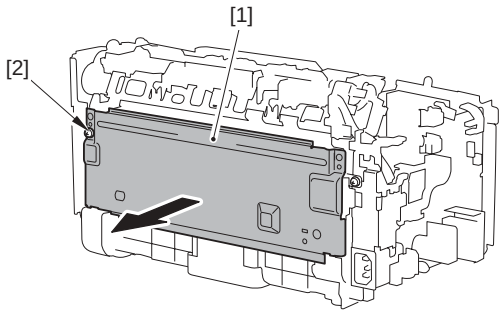
LBP3100 / LBP3010B

1) Removing the Upper Cover (page 3-3)Referense[Removing the Upper Cover]
2) Removing the Left Cover (page 3-2)Referense[Removing the Left Cover]
3) Removing the Right Cover (page 3-2)Referense[Removing the Right Cover]
4) Removing the Front Cover (page 3-6)Referense[Removing the Front Cover]
5) Removing the Rear Cover (page 3-1)Referense[Removing the Rear Cover]
6) Removing the Main Controller PCB (page 3-17)Referense[Removing the Main Controller PCB]

3.1.10.2 Removing the Engine Controller PCB

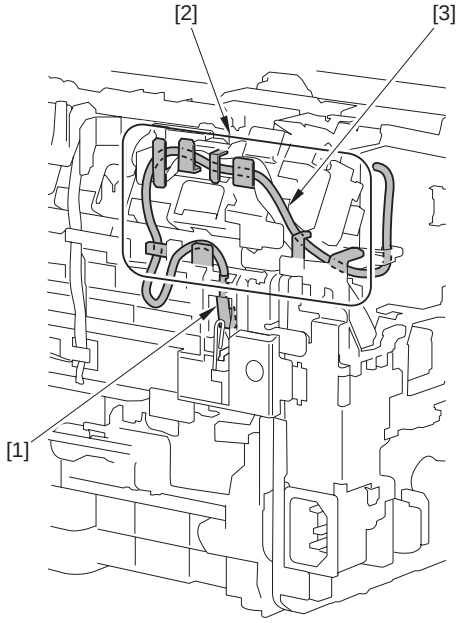
LBP3100 / LBP3010B

1) Remove the inner rear cover [1].
 - 1 screw [2]



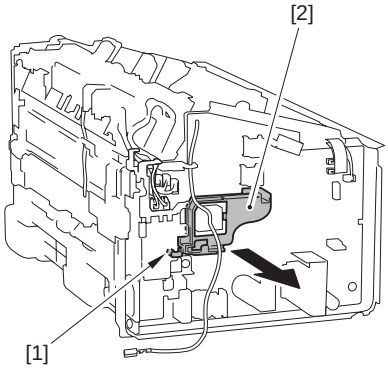
F-3-42

2) Remove the terminal [1] and free the harness [3] from the harness guide [2].



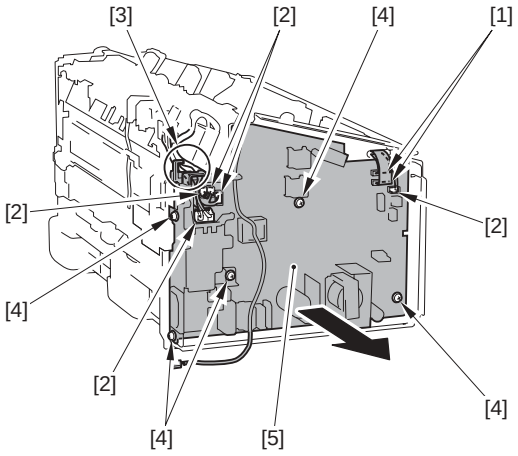
F-3-43

3) Remove the boss [1] and remove the protective cover [2].



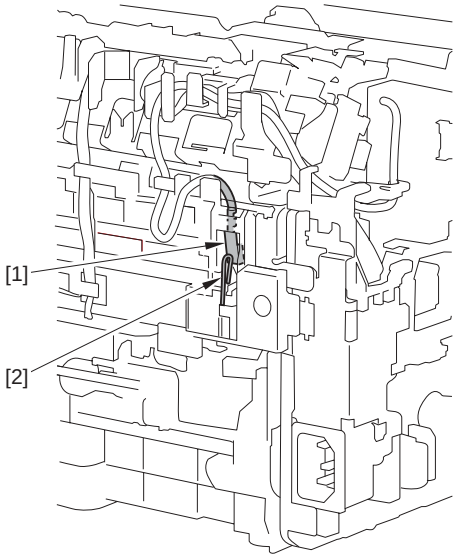
F-3-44

4) Disconnect the 2 flat cables [1] and the 5 connecters [2] and then, free the harness from the guide [3].
5) Remove the 5 screws [4] and the engine controller PCB [5].



F-3-45

Points to note at installation
When attaching the terminal [1], make sure that the contact spring [2] contacts as shown.



3.1.10.3 Before Remove the Engine Controller PCB

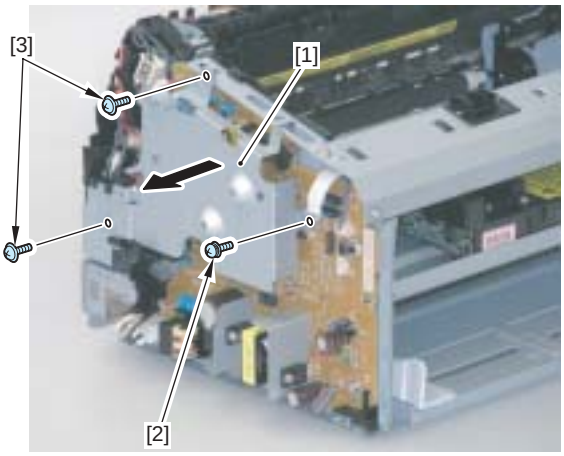
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]
2) Remove the Left Cover. (page 3-3)Reference[Removing the Left Cover]
3) Remove the Right Cover. (page 3-2)Reference[Removing the Right Cover]
4) Remove the Front Cover. (page 3-6)Reference[Removing the Front Cover]
5) Remove the Rear Cover. (page 3-1)Reference[Removing the Rear Cover]
6) Remove the Main Controller PCB. (page 3-17)Reference[Removing the Main Controller PCB]

3.1.10.4 Removing the Engine Controller PCB

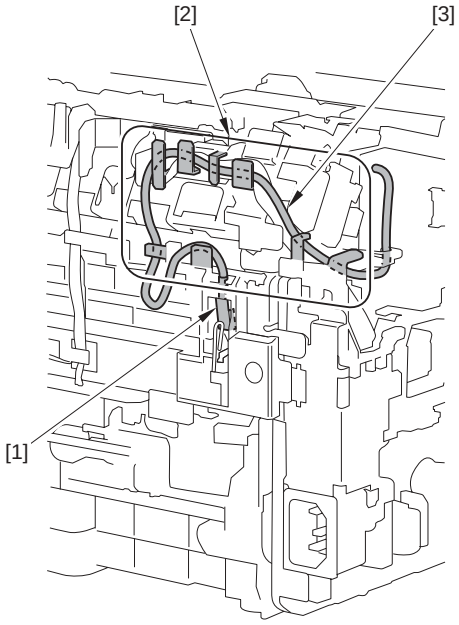
LBP6000 / LBP6000B

1) Remove the Main Controller PCB Installation Plate [1].
- 1 Screw (with washer) [2]
- 2 Screws (TP) [3]



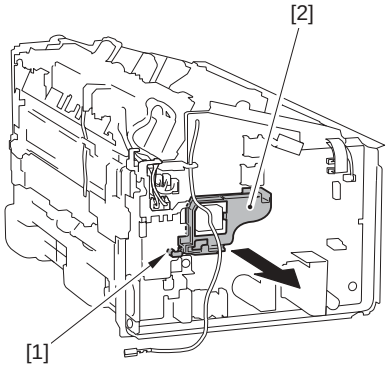
F-3-46

2) Remove the terminal [1], and free the harness [3] from the Harness Guide [2].



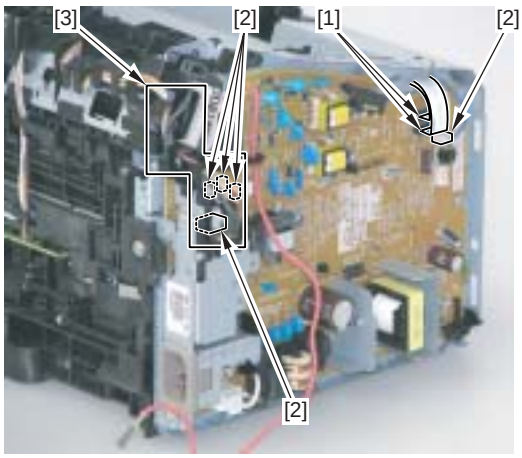
F-3-47

3) Remove the boss [1], and remove the Protection Cover [2].



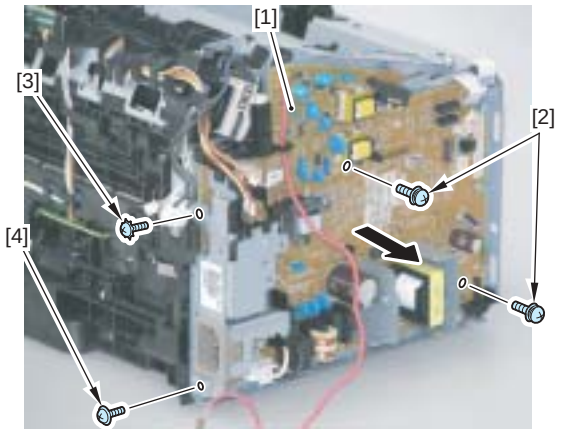
F-3-48

4) Disconnect the 2 Flat Cables [1] and 5 connectors [2], and free the harness from the guide [3].



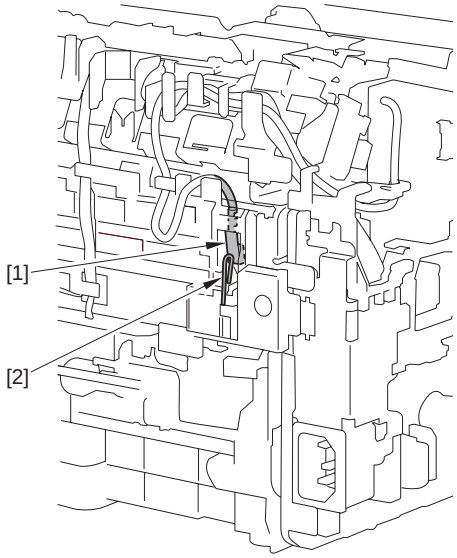
F-3-49

5) Remove the Engine Controller PCB [1].
- 2 Screws (with washer) [2]
- 1 Screw (with toothed lock washer) [3]
- 1 Screw (TP) [4]



F-3-50

Points to Note at Installation
When installing the terminal [1], be sure that the Contact Spring [2] is in contact with it as shown below.



3.1.11 Main Controller PCB

3.1.11.1 Preparation for Removing the Main Controller PCB

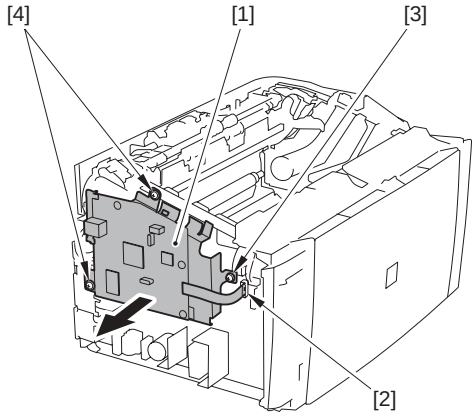
LBP3100 / LBP3010B

1) Removing the Upper Cover (page 3-3)Referense[Removing the Upper Cover]
2) Removing the Left Cover (page 3-2)Referense[Removing the Left Cover]

3.1.11.2 Removing the Main Controller PCB

LBP3100 / LBP3010B

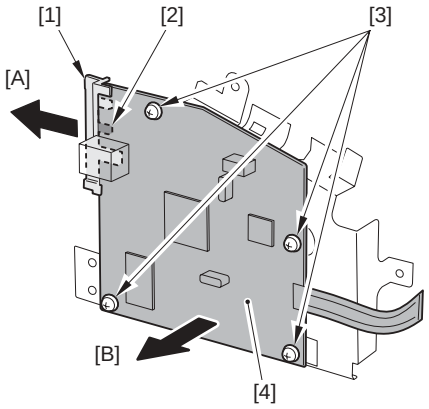
1) Remove the main controller unit [1].
- 1 flat cable [2]
- 1 screw (w/washer)[3]
- 2 screws (TP) [4]



F-3-51

2) Remove the guide [1] in the arrow [A] direction.
- 1 claw [2]

3) Remove the 4 screws [3] and remove the main controller PCB [4] in the arrow [B] direction.



F-3-52

3.1.11.3 Before Remove the Main Controller PCB

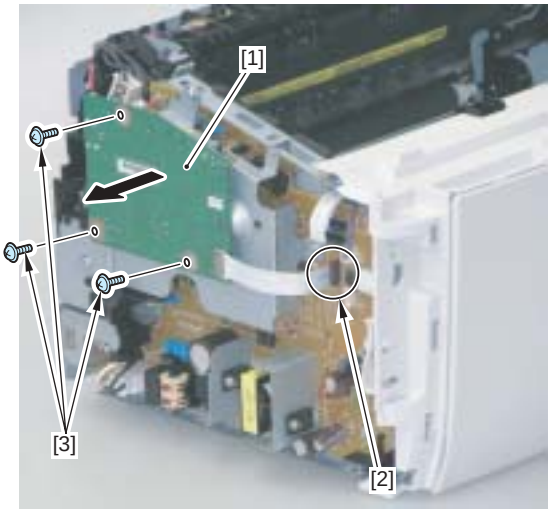
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]
2) Remove the Left Cover. (page 3-3)Reference[Removing the Left Cover]

3.1.11.4 Removing the Main Controller PCB

LBP6000 / LBP6000B

1) Remove the Main Controller Unit [1].
- 1 Flat Cable [2]
- 3 Screws [3]



F-3-53

3.1.12 Relay Board

3.1.12.1 Preparation for Removing the Memory Contact Unit

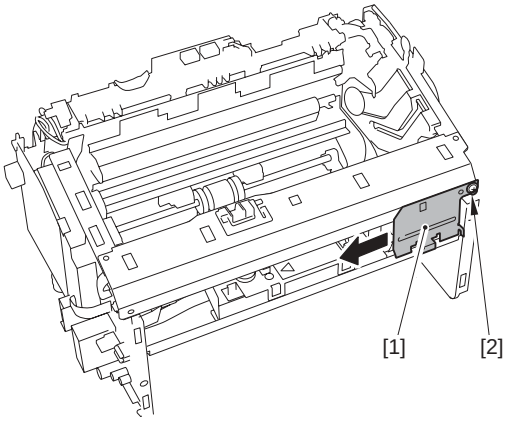
LBP3100 / LBP3010B

1) Removing the Upper Cover (page 3-3)Reference[Removing the Upper Cover]
2) Removing the Left Cover (page 3-2)Reference[Removing the Left Cover]
3) Removing the Right Cover (page 3-2)Reference[Removing the Right Cover]
4) Removing the Front Cover (page 3-6)Reference[Removing the Front Cover]
5) Removing the Rear Cover (page 3-1)Reference[Removing the Rear Cover]
6) Removing the Separation Pad (page 3-34)Reference[Removing the Separation Pad]
7) Removing the Pickup Tray Unit (page 3-7)Reference[Removing the Pickup Tray Unit]

3.1.12.2 Removing the Memory Contact Unit

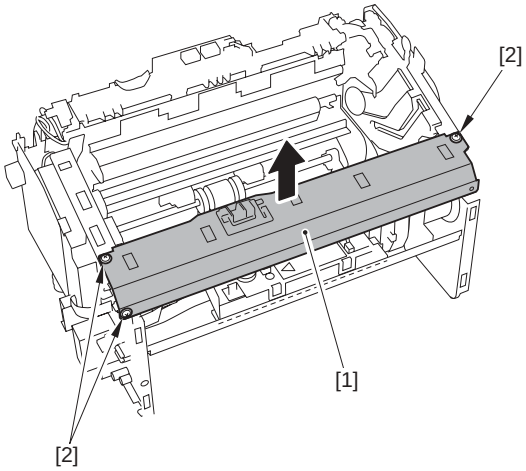
LBP3100 / LBP3010B

1) Remove the scanner sub cover [1].
- 1 screw [2]



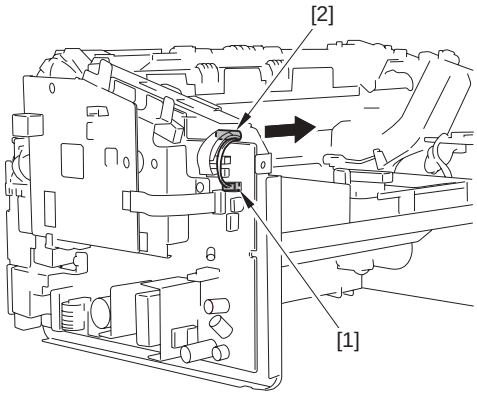
F-3-54

2) Remove the scanner cover [1].
- 3 screws [2]



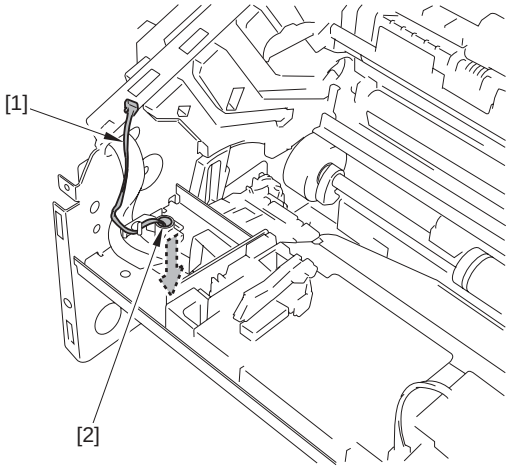
F-3-55

3) Disconnect the connecter [1] and put the connecter [1] through the hole [2] on the side plate [2].



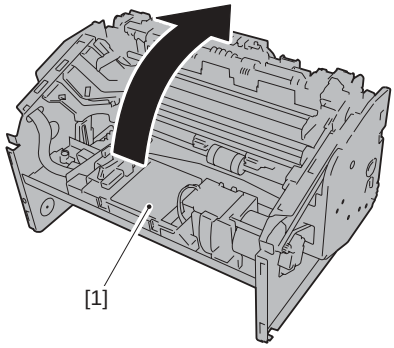
F-3-56

4) Remove the harness [1] and take the harness [1] out from the guide hole [2].



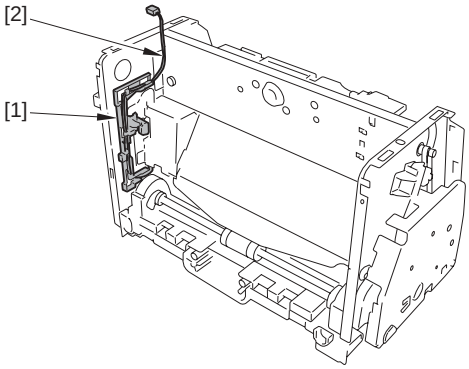
F-3-57

5) Turn the host machine [1] in the direction of the arrow.



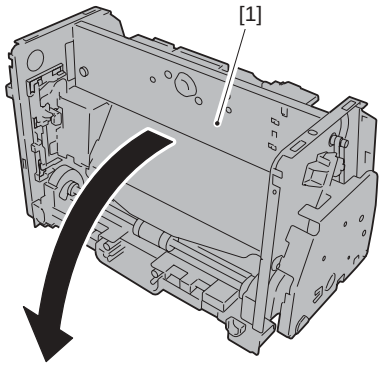
F-3-58

6) Free the harness [2] from the harness guide [1].



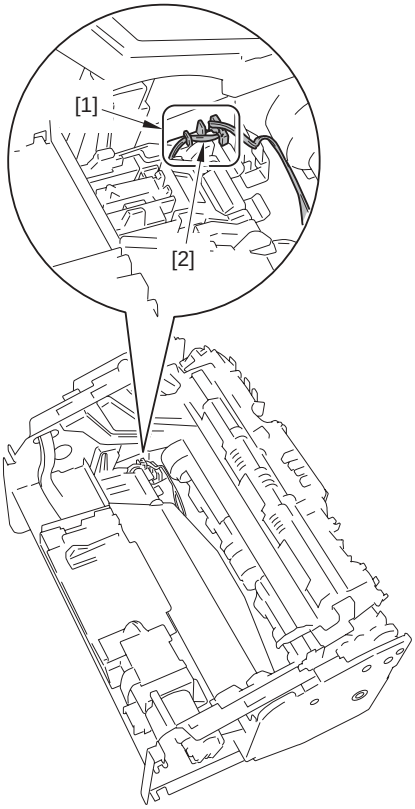
F-3-59

7) Turn the host machine [1] in the direction of the arrow.



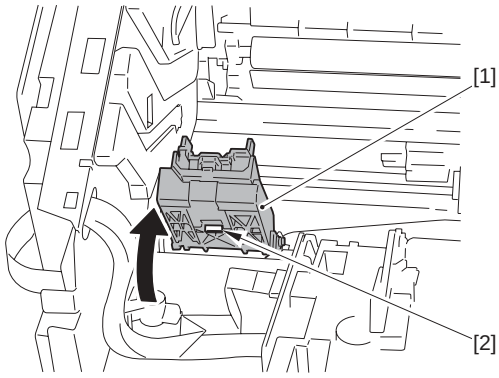
F-3-60

8) Free the harness [2] from the harness guide [1].



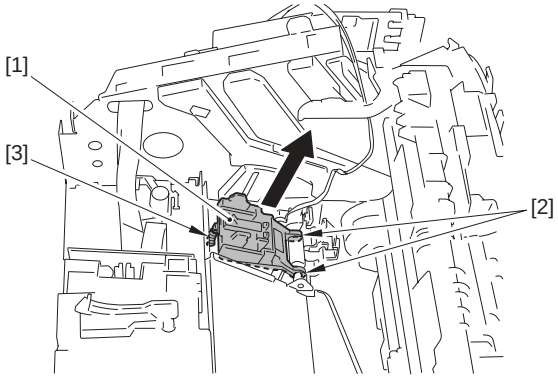
F-3-61

9) Lift the memory contact unit [1] in the direction of the arrow and release the lower claw [2].



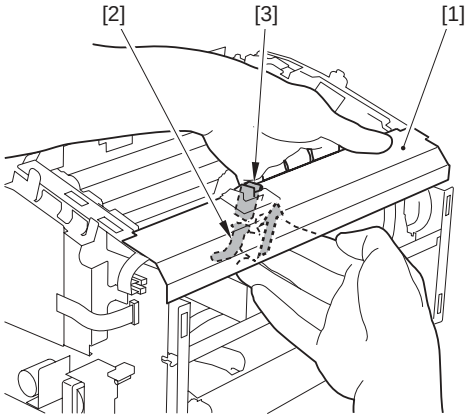
F-3-62

10) Remove the memory contact unit [1].
- 2 hooks [2]
- 1 screw [3]



F-3-63

Points to note at installation
When attaching the laser scanner cover [1], put the shutter lever [2] through the hole [3] on the scanner cover.



3.1.12.3 Before Removing the Memory Contact Unit

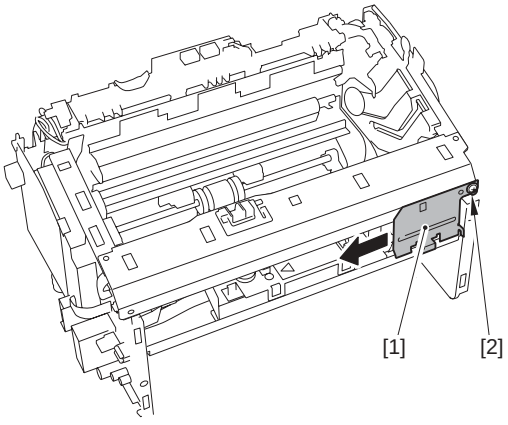
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]
2) Remove the Left Cover. (page 3-3)Reference[Removing the Left Cover]
3) Remove the Right Cover. (page 3-2)Reference[Removing the Right Cover]
4) Remove the Front Cover. (page 3-6)Reference[Removing the Front Cover]
5) Remove the Rear Cover. (page 3-1)Reference[Removing the Rear Cover]
6) Remove the Separation Pad. (page 3-34)Reference[Removing the Separation Pad]
7) Remove the Pickup Tray Unit. (page 3-8)Reference[Removing the Pickup Tray Unit]

3.1.12.4 Removing the Memory Contact Unit

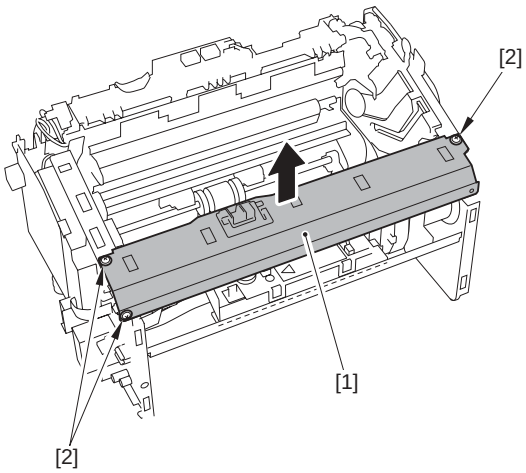
LBP6000 / LBP6000B

1) Remove the Scanner Sub Cover [1].
- 1 Screw [2]



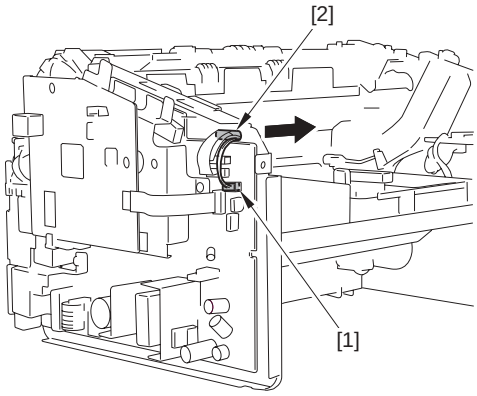
F-3-64

2) Remove the Scanner Cover [1].
- 3 Screws [2]



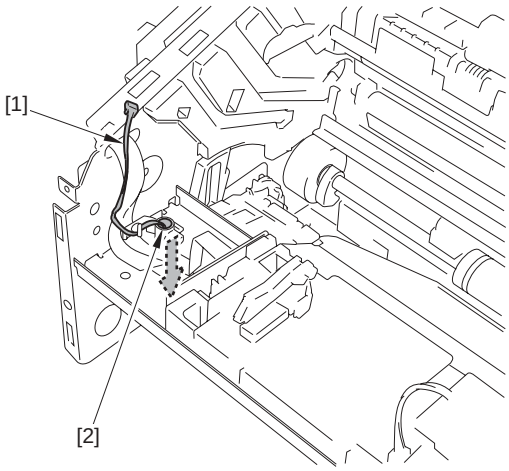
F-3-65

3) Disconnect the connector [1] and take it out from the hole [2] on the Side Plate.



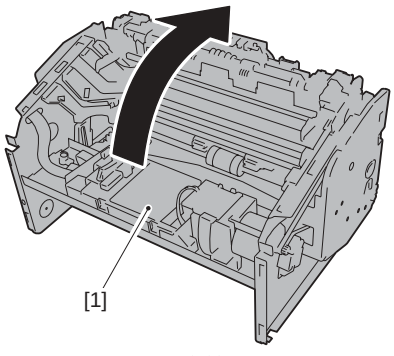
F-3-66

4) Disconnect the harness [1] and take it out from the hole [2] on the guide.



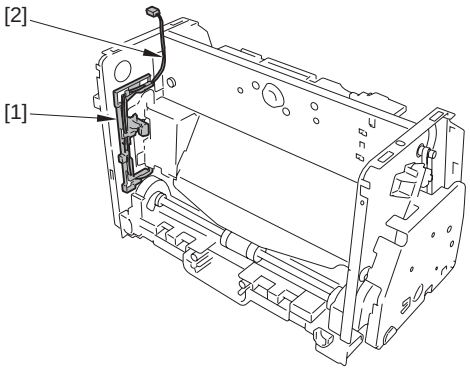
F-3-67

5) Turn the machine [1] in the direction of the arrow.



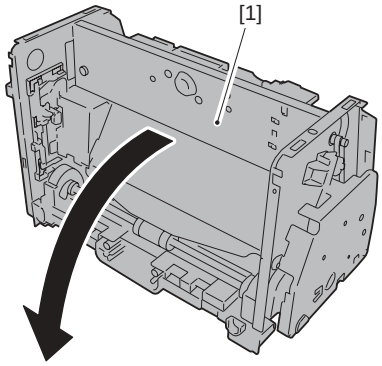
F-3-68

6) Free the harness [2] from the Harness Guide [1].



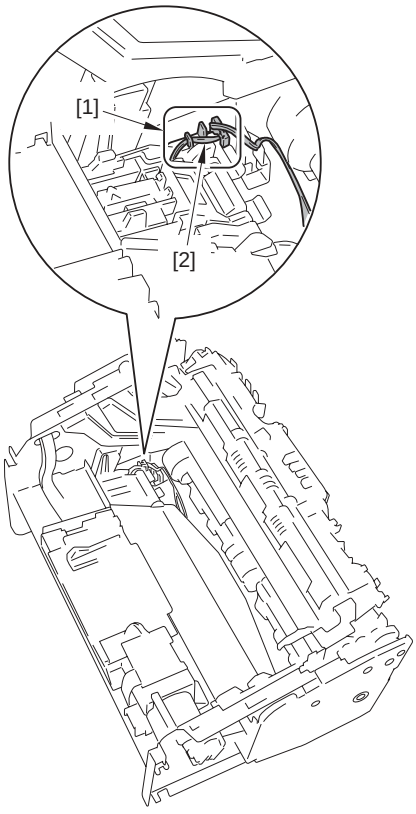
F-3-69

7) Turn the machine [1] in the direction of the arrow.



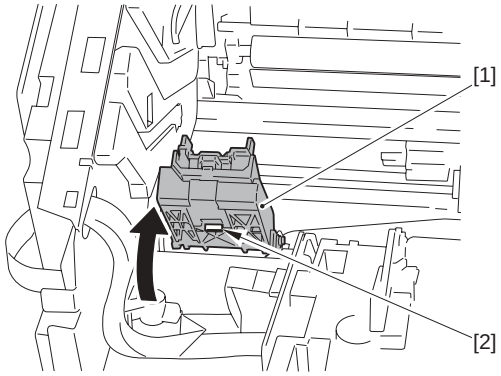
F-3-70

8) Free the harness [2] from the Harness Guide [1].



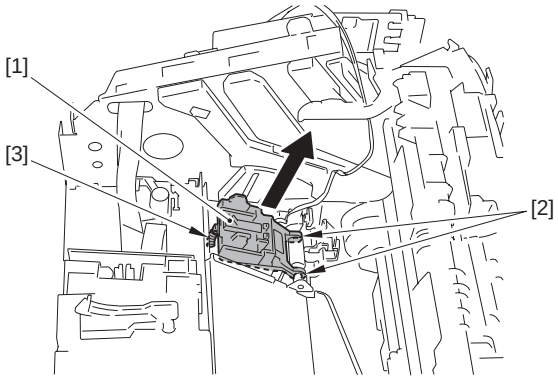
F-3-71

9) Lift the Memory Contact Unit [1] in the direction of the arrow, and release the claw [2] at lower side.



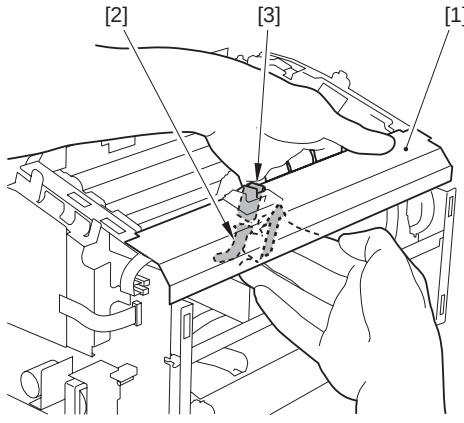
F-3-72

10) Remove the Memory Contact Unit [1].
- 2 Hooks [2]
- 1 Spring [3]



F-3-73

Points to Note at Installation
When installing the Laser Scanner Cover [1], be sure to put the Shutter Open/Close Lever [2] through the hole [3] on the Scanner Cover.



3.1.13 Top sensor

3.1.13.1 Preparation for Removing the Paper Leading Edge Sensor

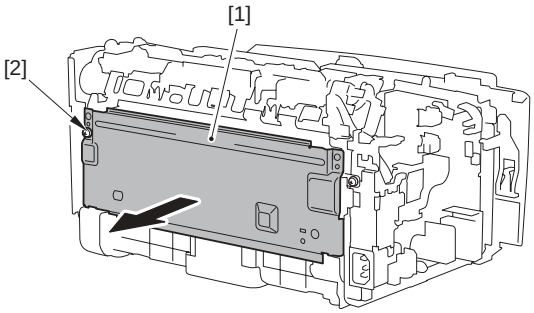
LBP3100 / LBP3010B

1) Removing the Upper Cover (page 3-3)Reference[Removing the Upper Cover]
2) Removing the Left Cover (page 3-2)Reference[Removing the Left Cover]
3) Removing the Right Cover (page 3-2)Reference[Removing the Right Cover]
4) Removing the Rear Cover (page 3-1)Reference[Removing the Rear Cover]
5) Removing the Main Controller PCB (page 3-17)Reference[Removing the Main Controller PCB]

3.1.13.2 Removing the Paper Leading Edge Sensor

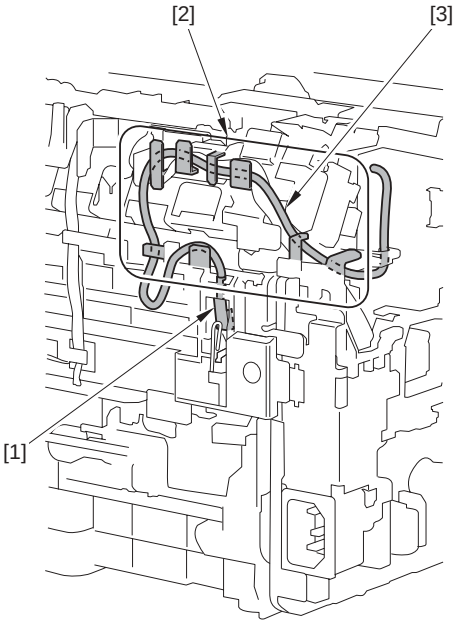
LBP3100 / LBP3010B

1) Remove the inner rear cover [1].
   - 1 screw [2]



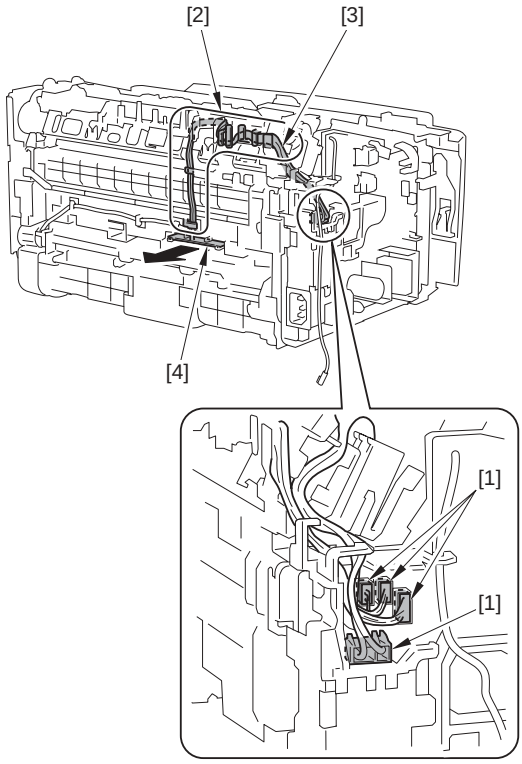
F-3-74

2) Remove the terminal [1] and free the harness [3] from the harness guide [2].



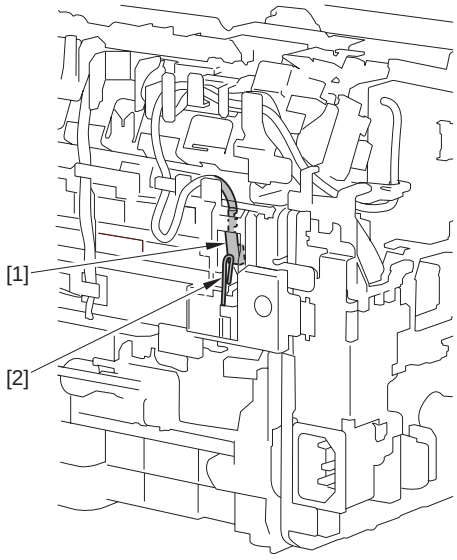
F-3-75

3) Disconnect the 4 connecters [1] and free the harness [3] from the harness guide [2].
4) Remove the paper leading edge sensor [4].



F-3-76

Points to note at installation
When attaching the terminal [1], make sure that the contact spring [2] contacts as shown.



3.1.13.3 Before Removing the Paper Leading Edge Sensor

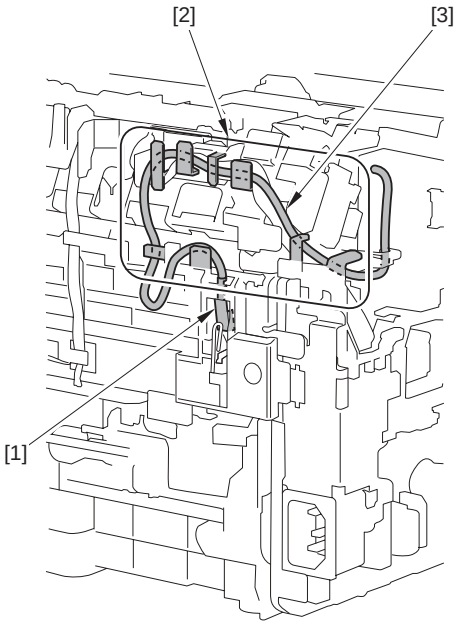
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]
2) Remove the Left Cover. (page 3-3)Reference[Removing the Left Cover]
3) Remove the Right Cover. (page 3-2)Reference[Removing the Right Cover]
4) Remove the Rear Cover. (page 3-1)Reference[Removing the Rear Cover]
5) Remove the Main Controller PCB. (page 3-17)Reference[Removing the Main Controller PCB]

3.1.13.4 Removing the Paper Leading Edge Sensor

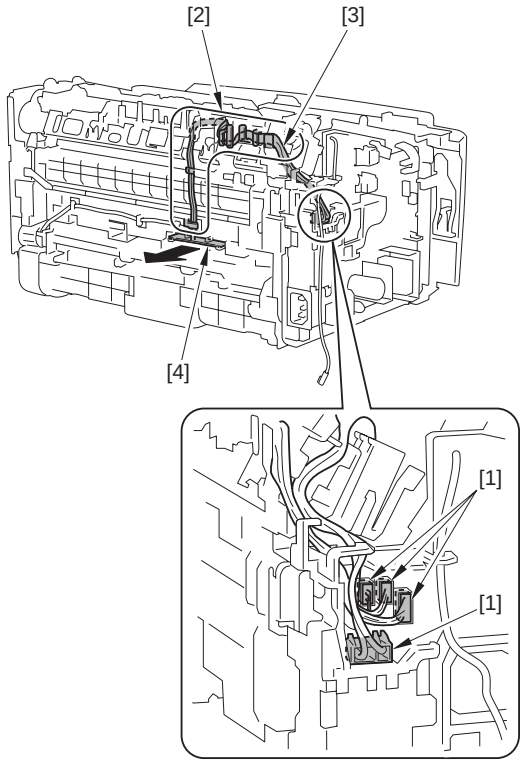
LBP6000 / LBP6000B

1) Remove the terminal [1], and free the harness [3] from the Harness Guide [2].



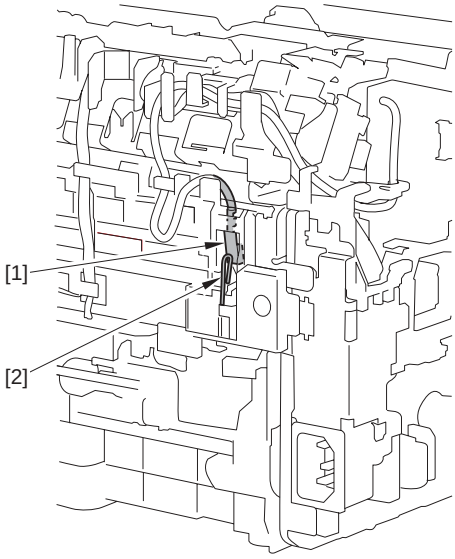
F-3-77

2) Disconnect the 4 connectors [1], and free the harness [3] from the Harness Guide [2].
3) Remove the Paper Leading Edge Sensor [4].



F-3-78

Points to Note at Installation
When installing the terminal [1], be sure that the Contact Spring [2] is in contact with it as shown below.



3.1.14 Sensor Boade

3.1.14.1 Preparation for Removing the Sensor PCB

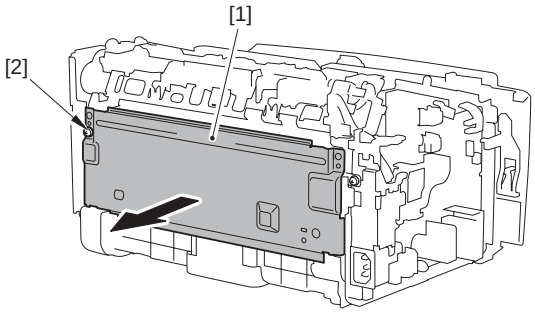
LBP3100 / LBP3010B

1) Removing the Upper Cover (page 3-3)Reference[Removing the Upper Cover]
2) Removing the Left Cover (page 3-2)Reference[Removing the Left Cover]
3) Removing the Right Cover (page 3-2)Reference[Removing the Right Cover]
4) Removing the Rear Cover (page 3-1)Reference[Removing the Rear Cover]
5) Removing the Main Controller PCB (page 3-17)Reference[Removing the Main Controller PCB]

3.1.14.2 Removing the Sensor PCB

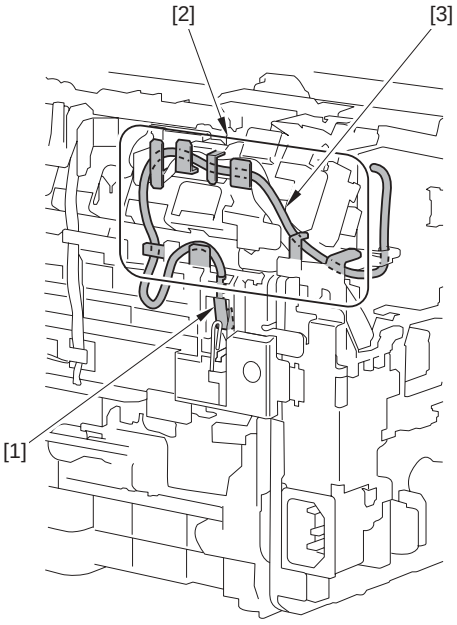
LBP3100 / LBP3010B

1) Remove the inner rear cover [1].
- 1 screw [2]



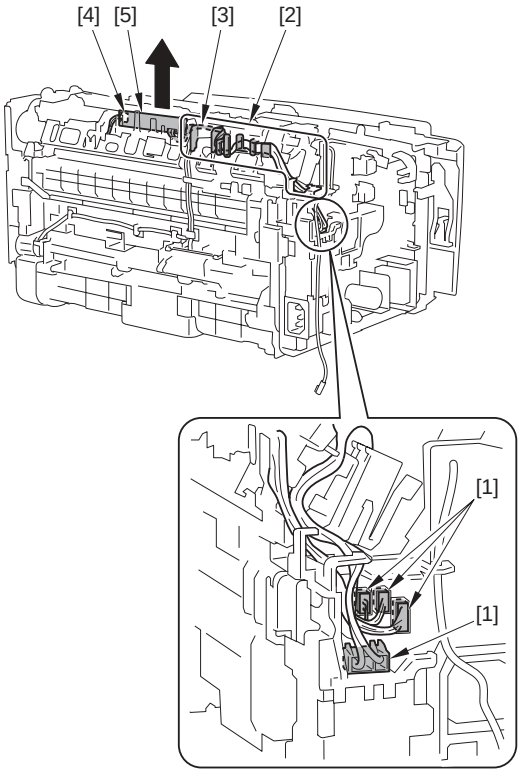
F-3-79

2) Remove the terminal [1] and free the harness [3] from the harness guide [2].



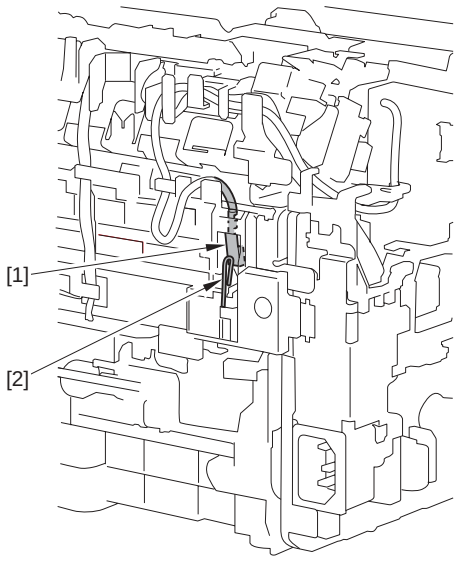
F-3-80

3) Remove the 4 connecters [1] and free the harness [3] from the harness guide [2].
4) Disconnect the connecter [4] and remove the sensor PCB [5].



F-3-81

Points to note at installation
When attaching the terminal [1], make sure that the contact spring [2] contacts as shown.



3.1.14.3 Before Removing the Sensor PCB

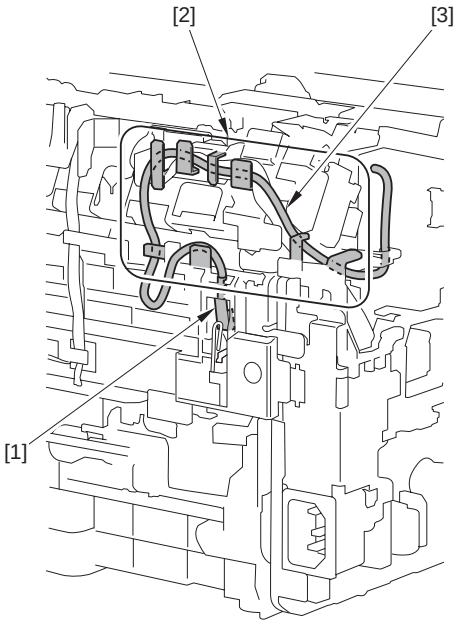
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]
2) Remove the Left Cover. (page 3-3)Reference[Removing the Left Cover]
3) Remove the Right Cover. (page 3-2)Reference[Removing the Right Cover]
4) Remove the Rear Cover. (page 3-1)Reference[Removing the Rear Cover]
5) Remove the Main Controller PCB. (page 3-17)Reference[Removing the Main Controller PCB]

3.1.14.4 Removing the Sensor PCB

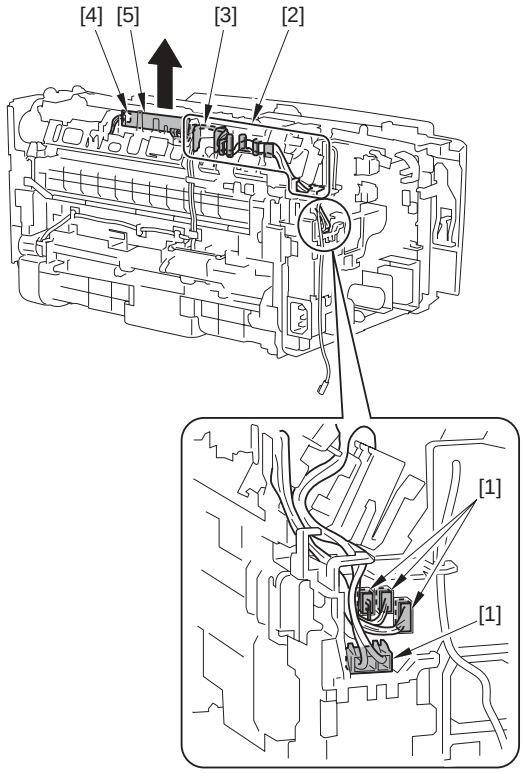
LBP6000 / LBP6000B

1) Remove the terminal [1], and free the harness [3] from the Harness Guide [2].



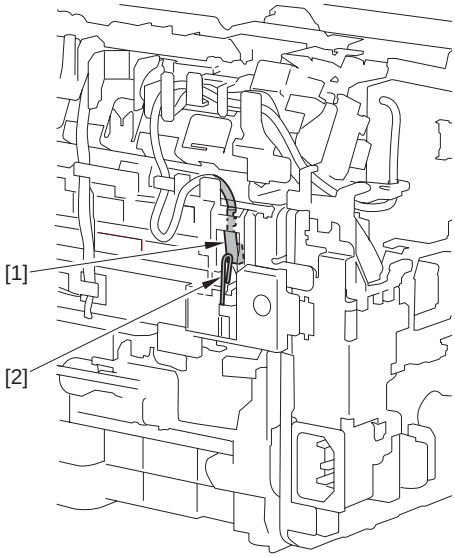
F-3-82

2) Disconnect the 4 connectors [1], and free the harness [3] from the Harness Guide [2].
3) Disconnect the connector [4], and remove the Sensor PCB [5].



F-3-83

Points to Note at Installation
When installing the terminal [1], be sure that the Contact Spring [2] is in contact with it as shown below.



3.2 LASER EXPOSURE SYSTEM

3.2.1 Laser Scanner Unit

3.2.1.1 Preparation for Removing the Laser Scanner Unit

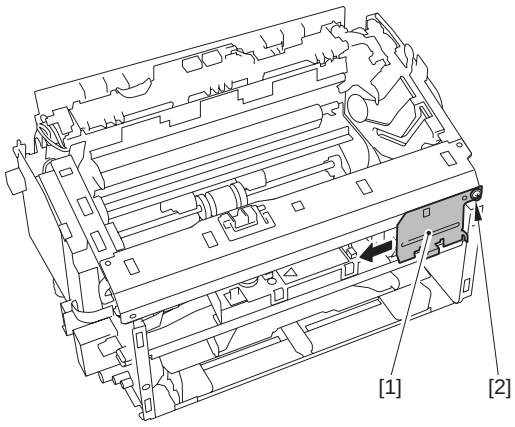
LBP3100 / LBP3010B

1) Removing the Upper Cover (page 3-3)Reference[Removing the Upper Cover]
2) Removing the Left Cover (page 3-2)Reference[Removing the Left Cover]
3) Removing the Right Cover (page 3-2)Reference[Removing the Right Cover]
4) Removing the Front Cover (page 3-6)Reference[Removing the Front Cover]

3.2.1.2 Removing the Laser Scanner Unit

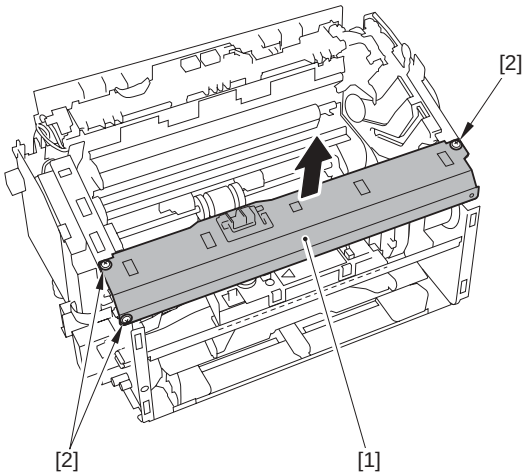
LBP3100 / LBP3010B

1) Remove the scanner sub cover [1].
   - 1 screw [2]



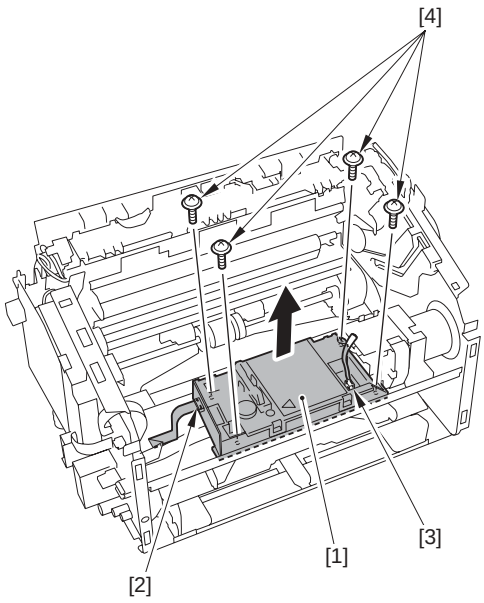
F-3-84

2) Remove the scanner cover [1].
   - 3 screws [2]



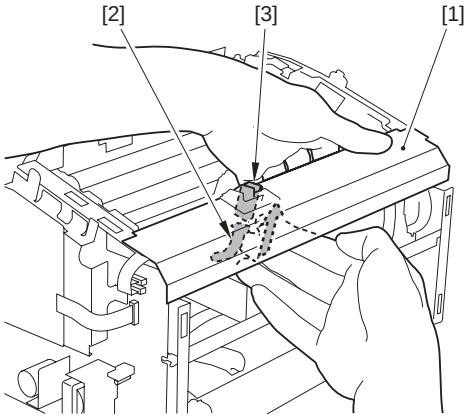
F-3-85

3) Remove the laser scanner unit [1].
   - 1 flat cable [2]
   - 1 connecter [3]
   - 4 screws [4]



F-3-86

Points to note at installation
When attaching the laser scanner cover [1], put the shutter lever [2] through the hole [3] on the scanner cover.



- Do not disassemble the laser scanner unit because it needs adjustment.

3.2.1.3 Before Remove the Laser Scanner Unit

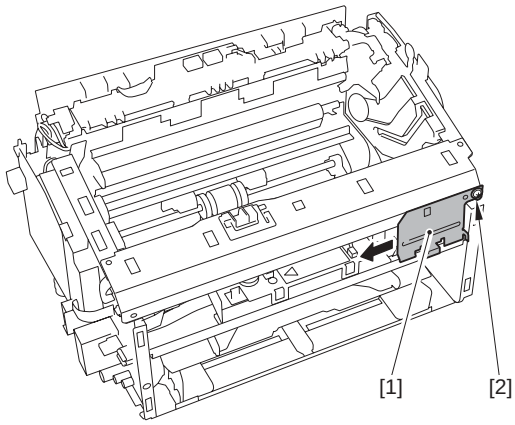
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]
2) Remove the Left Cover. (page 3-3)Reference[Removing the Left Cover]
3) Remove the Right Cover. (page 3-2)Reference[Removing the Right Cover]
4) Remove the Front Cover. (page 3-6)Reference[Removing the Front Cover]

3.2.1.4 Removing the Laser Scanner Unit

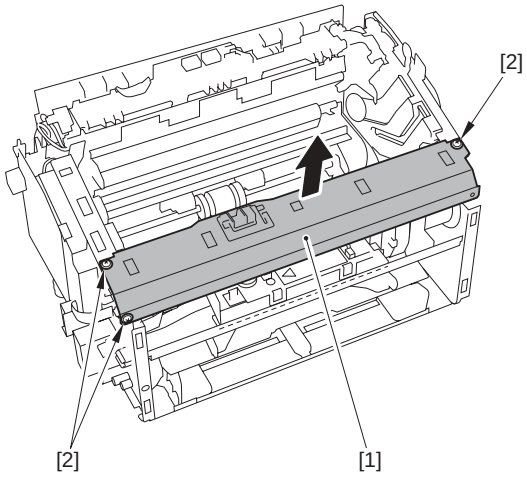
LBP6000 / LBP6000B

1) Remove the Scanner Sub Cover [1].
   - 1 Screw [2]



F-3-87

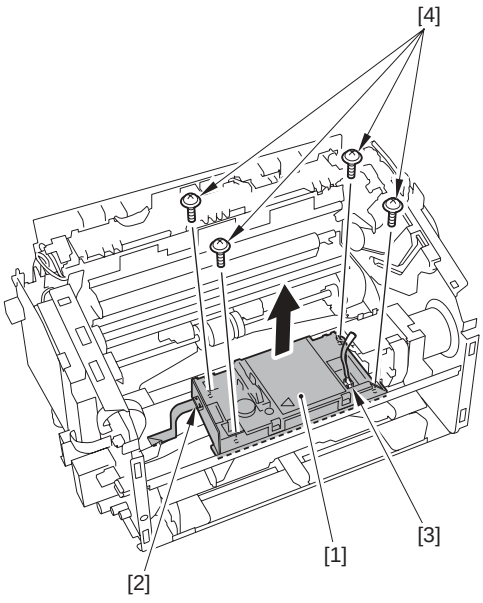
2) Remove the Scanner Cover [1].
- 3 Screws [2]



F-3-88

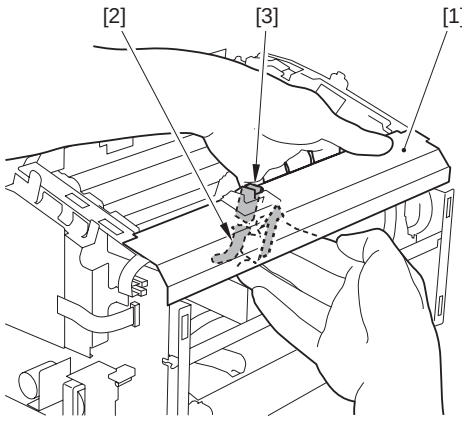
3) Remove the Laser Scanner Unit [1].
- 1 Flat Cable [2]
- 1 Connector [3]
- 4 Screws [4]

⚠
- Be sure not to disassemble the Laser Scanner Unit because it requires adjustment.



F-3-89

⚠ **Points to Note at Installation**
When installing the Laser Scanner Cover [1], be sure to put the Shutter Open/Close Lever [2] through the hole [3] on the Scanner Cover.



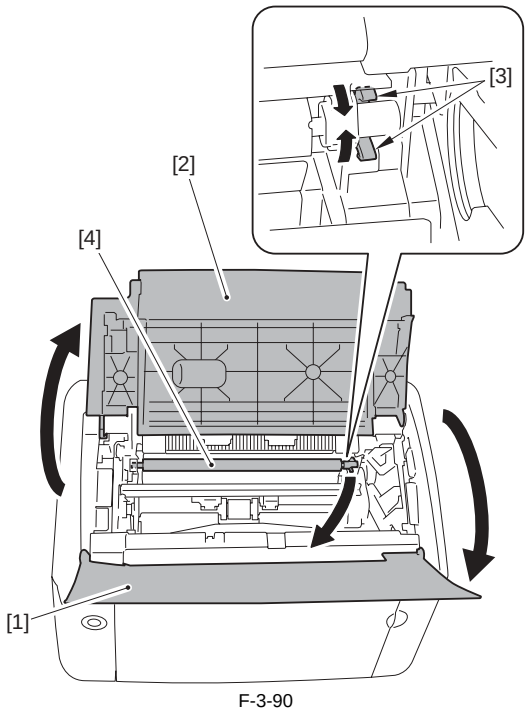
3.3 IMAGE FORMATION SYSTEM

3.3.1 Transfer Charging Roller

3.3.1.1 Removing the Transfer Roller

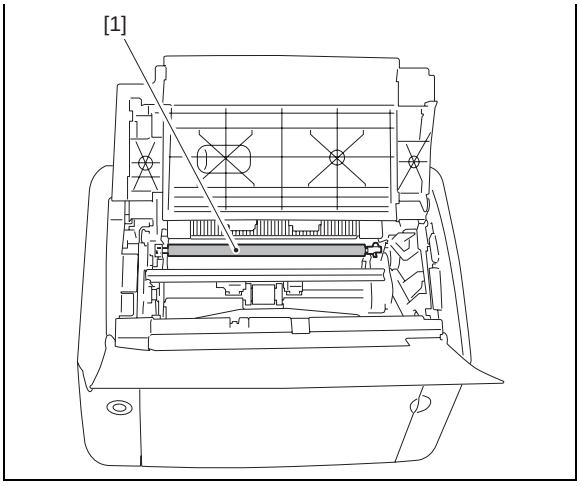
LBP3100 / LBP3010B

1) Open the delivery auxiliary tray [1] and the delivery tray [2].
2) While pushing the 2 claws [3], remove the transfer roller [4].



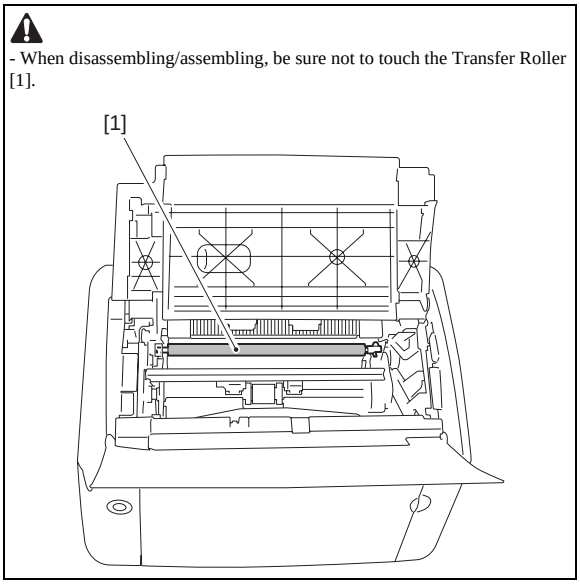
F-3-90

⚠
Avoid contact with the transfer roller when removing the pickup roller.

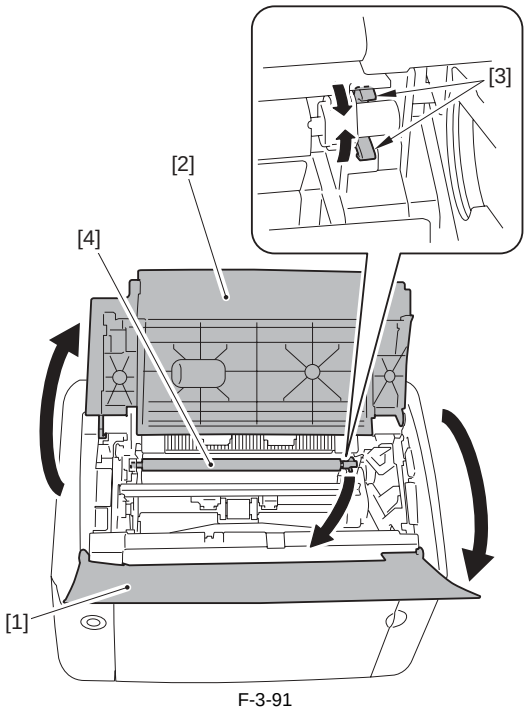


3.3.1.2 Removing the Transfer Roller

LBP6000 / LBP6000B



1) Open the Delivery Auxiliary Tray [1] and the Delivery Tray [2].
2) While pushing the 2 claws [3], remove the Transfer Roller [4].



F-3-91

3.4 PICKUP AND FEEDING SYSTEM

3.4.1 Pickup Unit

3.4.1.1 Preparation for Removing the Pickup Unit

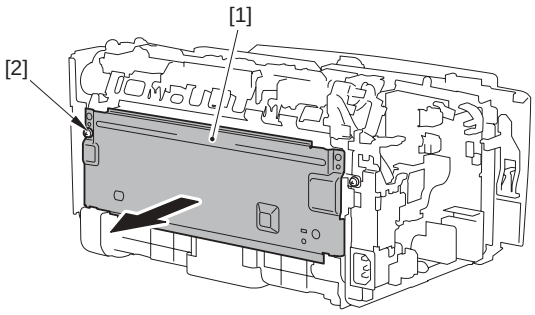
LBP3100 / LBP3010B

1) Removing the Upper Cover (page 3-3)Reference[Removing the Upper Cover]
2) Removing the Left Cover (page 3-2)Reference[Removing the Left Cover]
3) Removing the Right Cover (page 3-2)Reference[Removing the Right Cover]
4) Removing the Rear Cover (page 3-1)Reference[Removing the Rear Cover]
5) Removing the Main Controller PCB (page 3-17)Reference[Removing the Main Controller PCB]

3.4.1.2 Removing the Pickup Unit

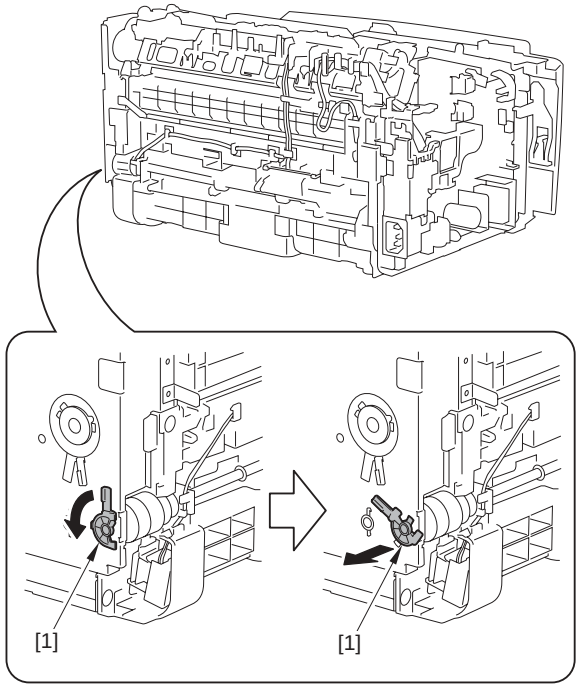
LBP3100 / LBP3010B

1) Remove the inner rear cover [1].
- 1 screw [2]



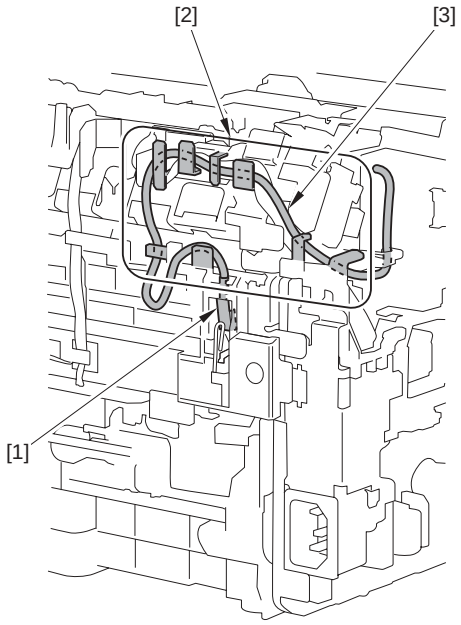
F-3-92

2) Remove the shaft support [1].



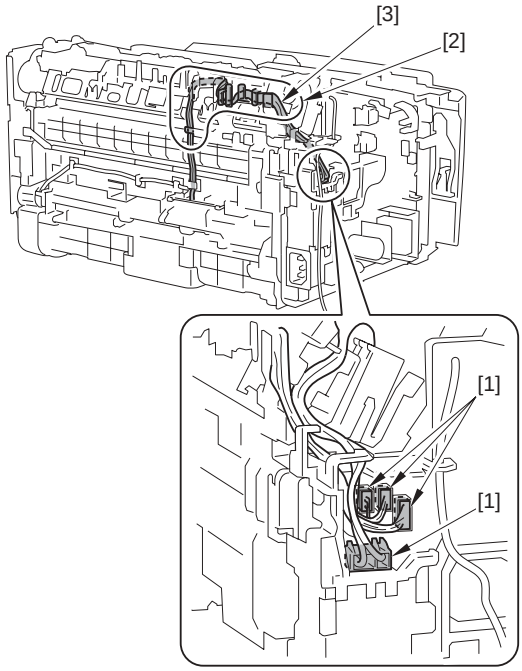
F-3-93

3) Remove the terminal [1] and free the harness [3] from the harness guide [2].



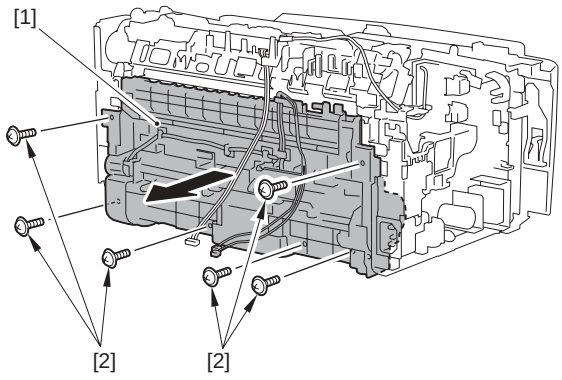
F-3-94

4) Disconnect the 4 connecters [1].
5) Free the harness [3] from the harness guide [2].



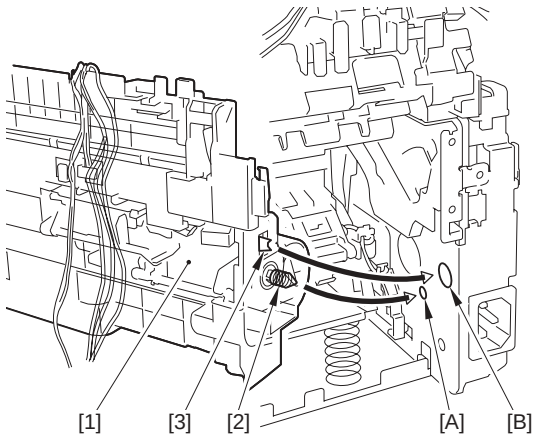
F-3-95

6) Remove the pickup unit [1].
- 6 screws [2]

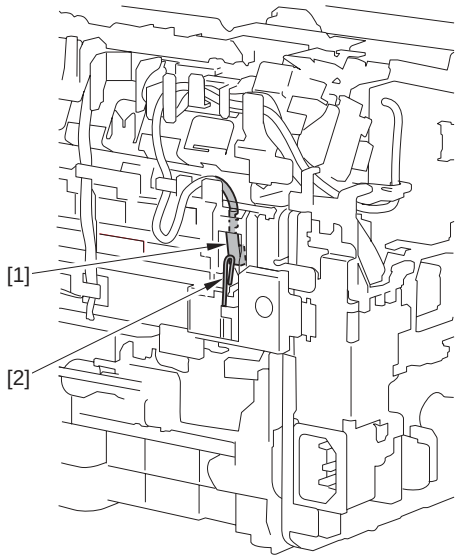


F-3-96

Points to note at installation
When installing the pickup unit [1], make sure that the contact spring [2] contacts with [A] part.
Also, make sure that the grounding contact point [3] contacts with [B] part.



Points to note at installation
When attaching the terminal [1], make sure that the spring contact point [2] contacts as shown.



3.4.1.3 Before Removing the Pickup Unit

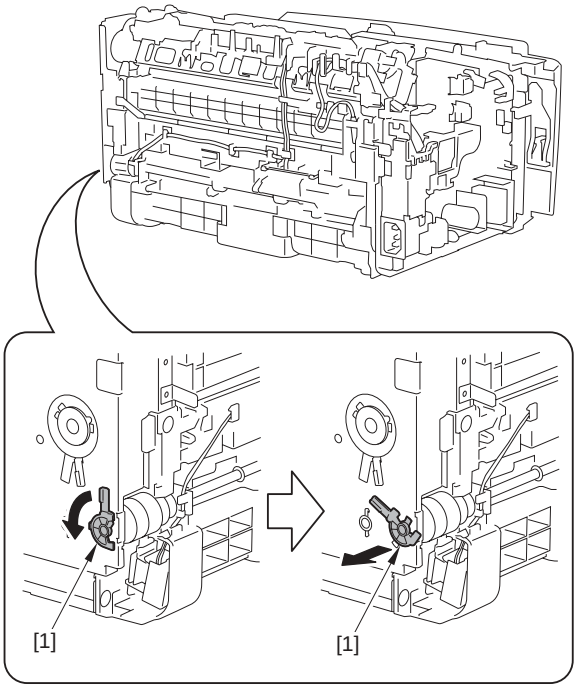
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]
2) Remove the Left Cover. (page 3-3)Reference[Removing the Left Cover]
3) Remove the Right Cover. (page 3-2)Reference[Removing the Right Cover]
4) Remove the Rear Cover. (page 3-1)Reference[Removing the Rear Cover]
5) Remove the Main Controller PCB. (page 3-17)Reference[Removing the Main Controller PCB]

3.4.1.4 Removing the Pickup Unit

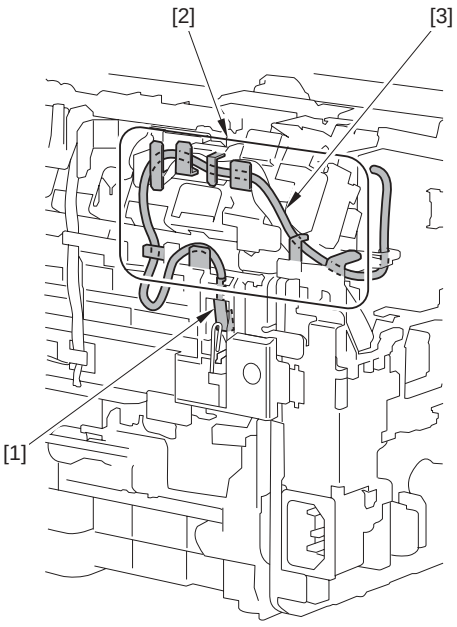
LBP6000 / LBP6000B

1) Remove the Shaft Retainer [1].



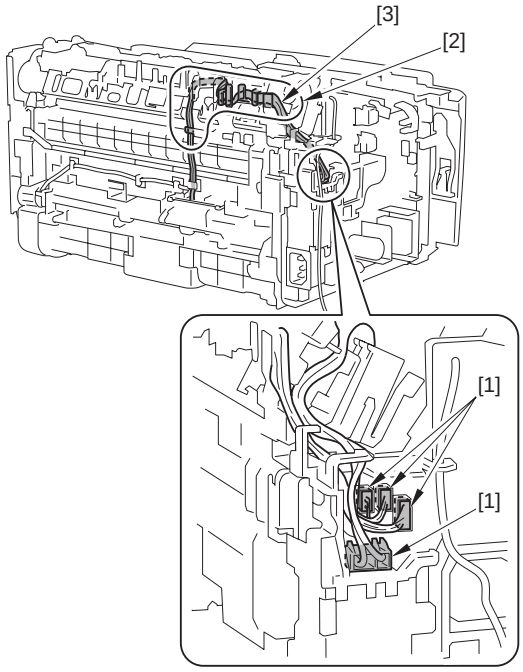
F-3-97

2) Remove the terminal [1], and free the harness [3] from the Harness Guide [2].



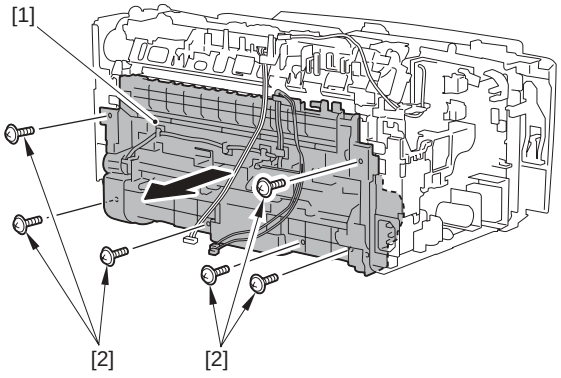
F-3-98

3) Disconnect the 4 connectors [1].
4) Free the harness [3] from the Harness Guide [2].



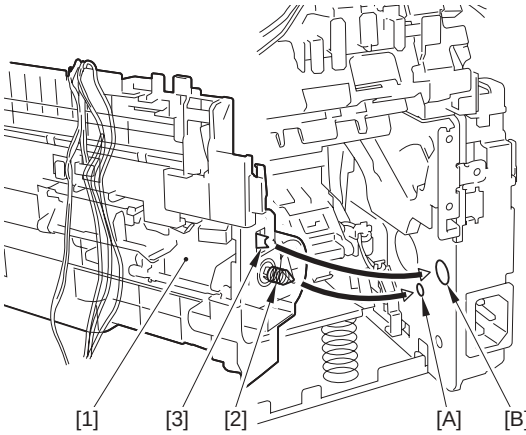
F-3-99

5) Remove the Pickup Unit [1].
- 6 Screws [2]

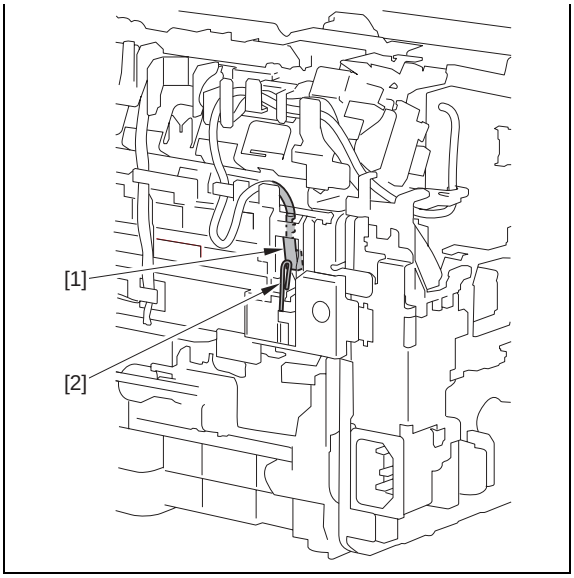


F-3-100

Points to Note at Installation
When installing the Pickup Unit [1], be sure to make the Contact Spring [2] comes in contact with [A] part. Be sure to make the grounding contact point [3] comes in contact with [B] part.



Points to Note at Installation
When installing the terminal [1], be sure that the Contact Spring [2] is in contact with it as shown below.



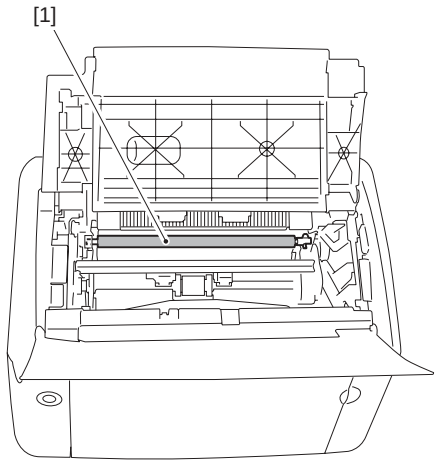
3.4.2 Cassette Pickup Roller

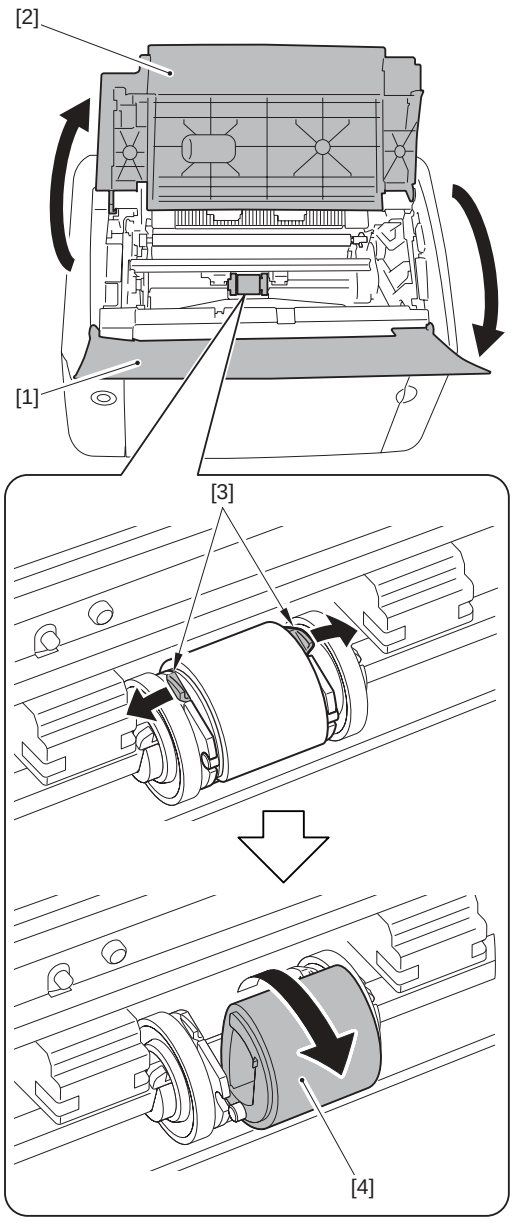
3.4.2.1 Removing the Pickup Roller

LBP3100 / LBP3010B

1) Open the delivery auxiliary tray [1] and the delivery tray [2].
2) Open the right and left claws [3] and remove the pickup roller [4].

Avoid contact with the transfer roller when removing the pickup roller.



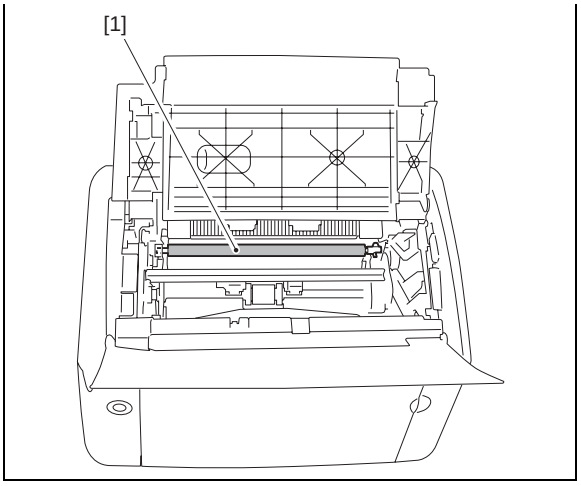


F-3-101

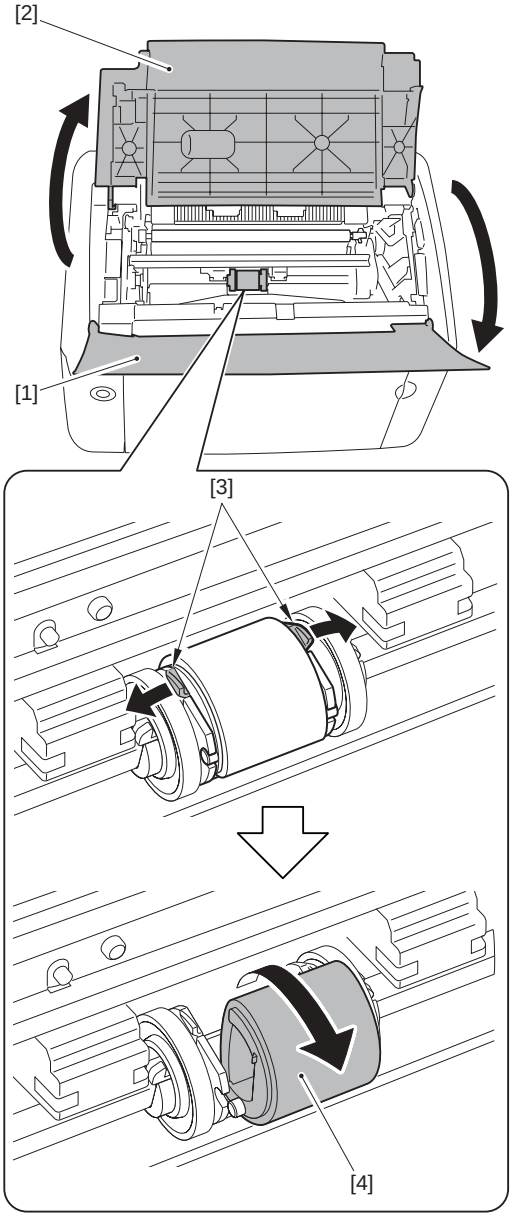
3.4.2.2 Removing the Pickup Roller

LBP6000 / LBP6000B

- When disassembling/assembling, be sure not to touch the surface of the Pickup Roller.
- When disassembling/assembling the Pickup Roller, be sure not to touch the Transfer Roller [1].



1) Open the Delivery Auxiliary Tray [1] and the Delivery Tray [2].
2) Open the 2 right and left claws [3], and remove the Pickup Roller [4].



F-3-102

3.4.3 Cassette Pickup solenoid

3.4.3.1 Preparation for Removing the Pickup Solenoid

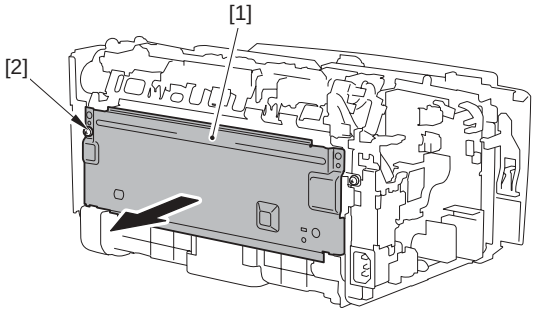
LBP3100 / LBP3010B

1) Removing the Upper Cover (page 3-3)Reference[Removing the Upper Cover]
2) Removing the Left Cover (page 3-2)Reference[Removing the Left Cover]
3) Removing the Right Cover (page 3-2)Reference[Removing the Right Cover]
4) Removing the Rear Cover (page 3-1)Reference[Removing the Rear Cover]
5) Removing the Main Controller PCB (page 3-17)Reference[Removing the Main Controller PCB]

3.4.3.2 Removing the Pickup Solenoid

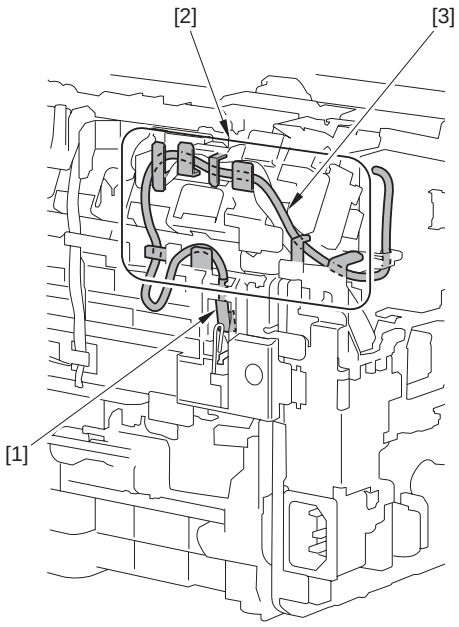
LBP3100 / LBP3010B

1) Remove the inner rear cover [1].
- 1 screw [2]



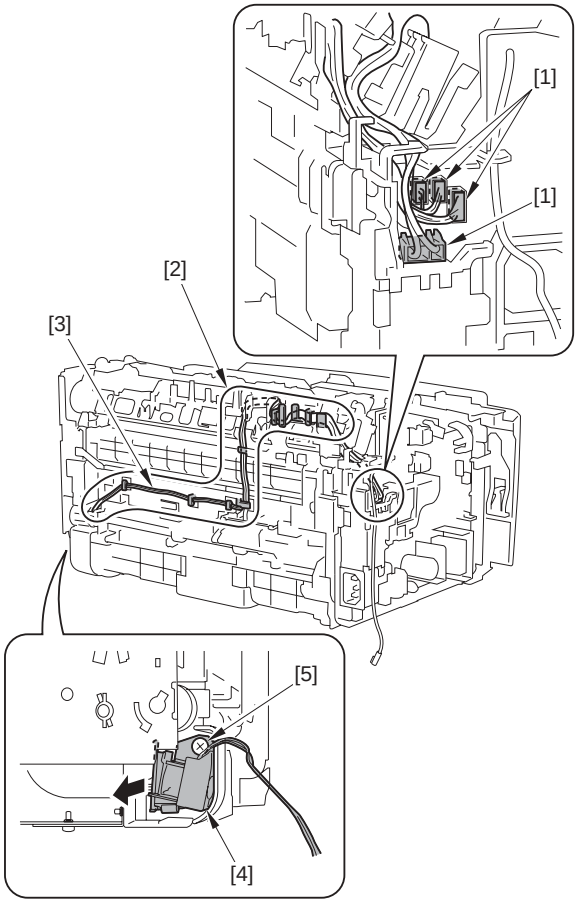
F-3-103

2) Remove the terminal [1] and free the harness [3] from the harness guide [2].



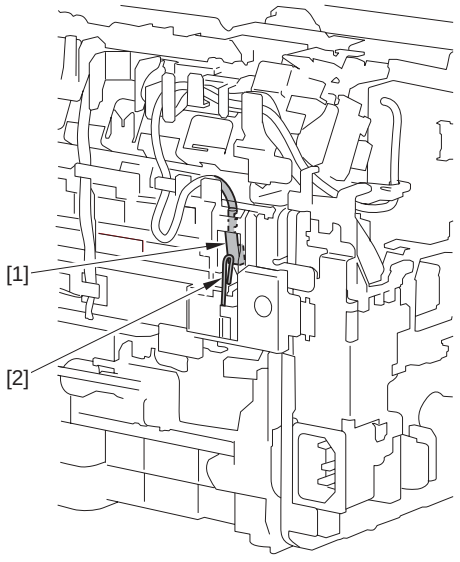
F-3-104

3) Disconnect the 4 connecters [1].
4) Free the harness [3] from the harness guide [2].
5) Remove the screw [5] to remove the pickup solenoid [4].



F-3-105

Points to note at installation
When attaching the terminal [1], make sure that the contact spring [2] contacts as shown.



3.4.3.3 Before Removing the Pickup Solenoid

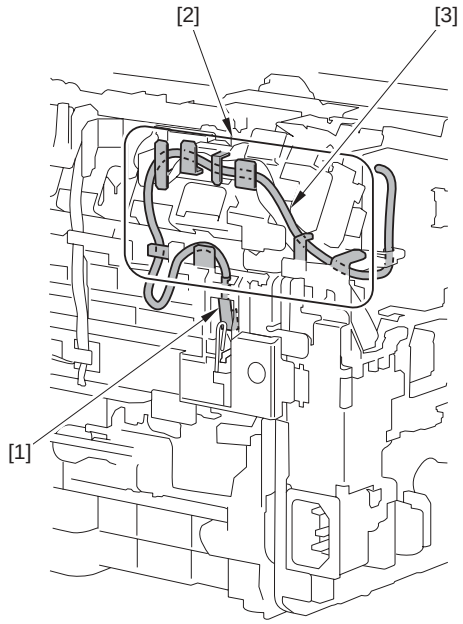
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]
2) Remove the Left Cover. (page 3-3)Reference[Removing the Left Cover]
3) Remove the Right Cover. (page 3-2)Reference[Removing the Right Cover]
4) Remove the Rear Cover. (page 3-1)Reference[Removing the Rear Cover]
5) Remove the Main Controller PCB. (page 3-17)Reference[Removing the Main Controller PCB]

3.4.3.4 Removing the Pickup Solenoid

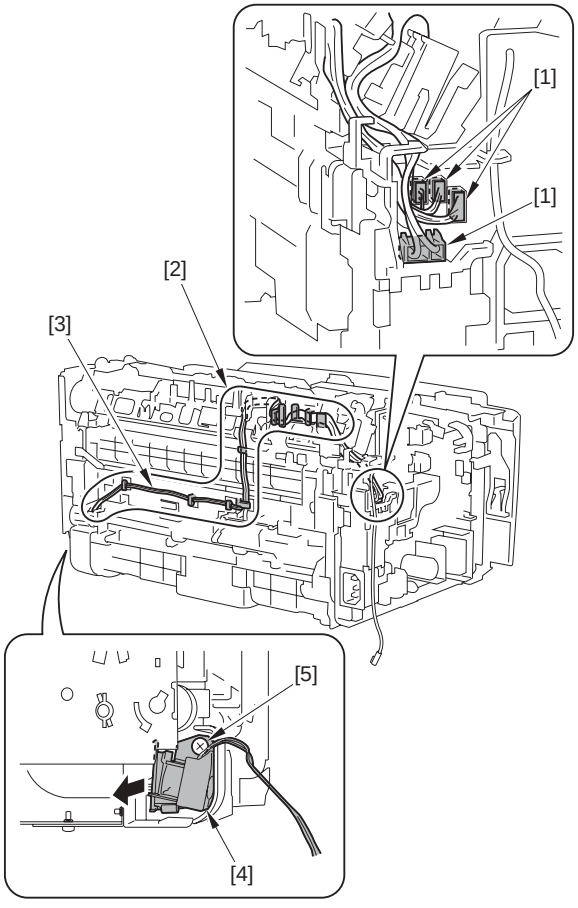
LBP6000 / LBP6000B

1) Remove the terminal [1], and free the harness [3] from the Harness Guide [2].



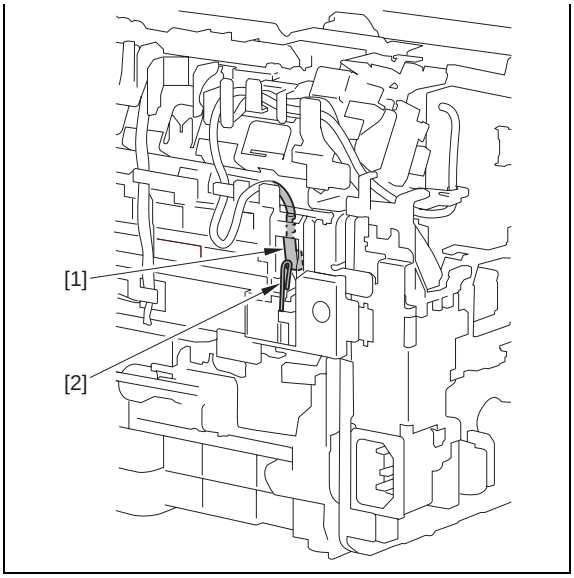
F-3-106

2) Disconnect the 4 connectors [1].
3) Free the harness [3] from the Harness Guide [2].
4) Remove the screw [5] to remove the Pickup Solenoid [4].



F-3-107

Points to Note at Installation
When installing the terminal [1], be sure that the Contact Spring [2] is in contact with it as shown below.

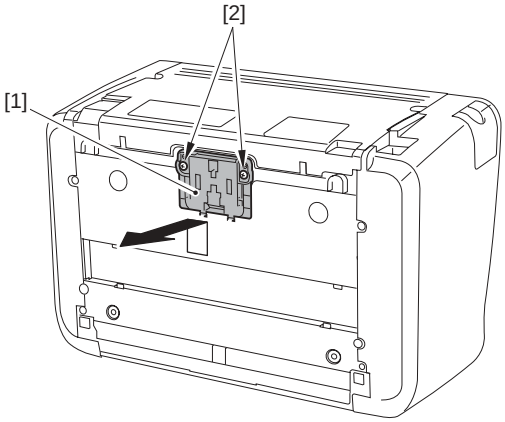


3.4.4 Cassette Separation Pad

3.4.4.1 Removing the Separation Pad

LBP3100 / LBP3010B

1) Remove the separation pad [1].
- 2 screws [2]

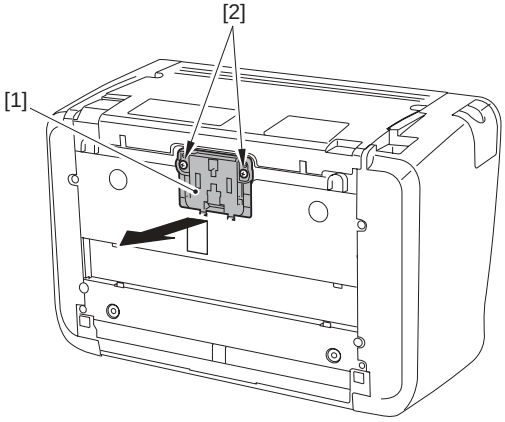


F-3-108

3.4.4.2 Removing the Separation Pad

LBP6000 / LBP6000B

1) Remove the Separation Pad [1].
- 2 Screws [2]



F-3-109

3.5 FIXING SYSTEM

3.5.1 Fixing Unit

3.5.1.1 Preparation for Removing the Fixing Unit

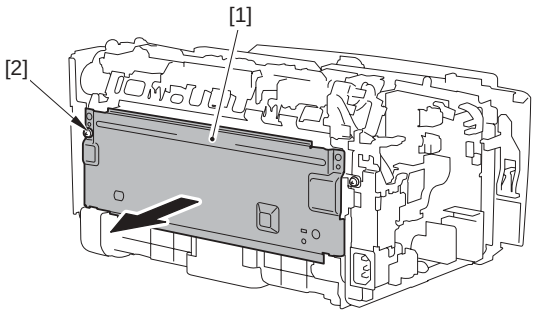
LBP3100 / LBP3010B

1) Removing the Upper Cover (page 3-3)Reference[Removing the Upper Cover]
2) Removing the Left Cover (page 3-2)Reference[Removing the Left Cover]
3) Removing the Right Cover (page 3-2)Reference[Removing the Right Cover]
4) Removing the Rear Cover (page 3-1)Reference[Removing the Rear Cover]
5) Removing the Main Controller PCB (page 3-17)Reference[Removing the Main Controller PCB]

3.5.1.2 Removing the Fixing Unit

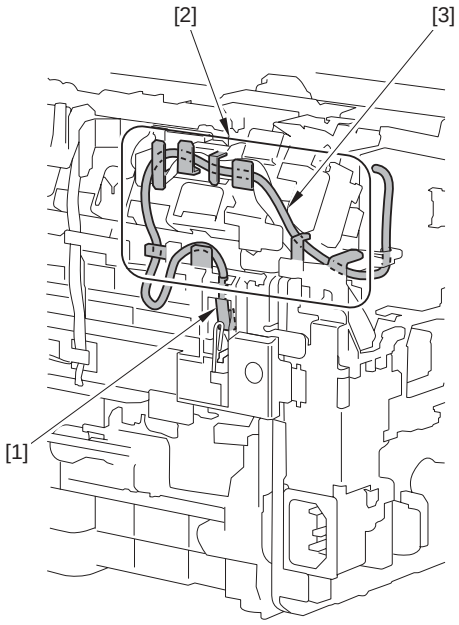
LBP3100 / LBP3010B

1) Remove the inner rear cover [1].
- 1 screw [2]



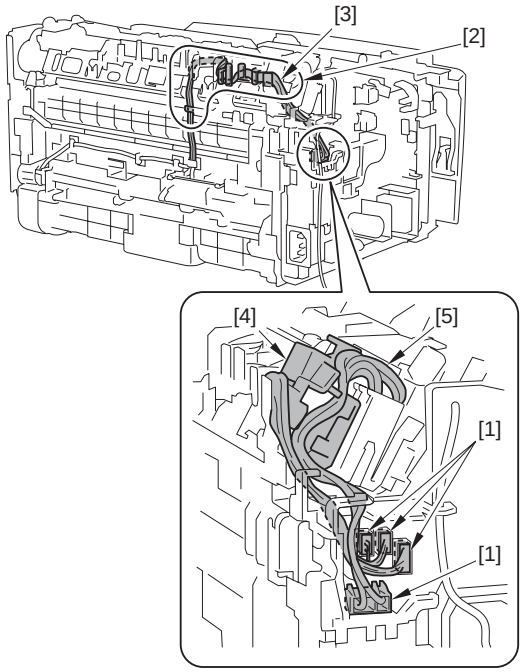
F-3-110

2) Remove the terminal [1] and free the harness [3] from the harness guide [2].



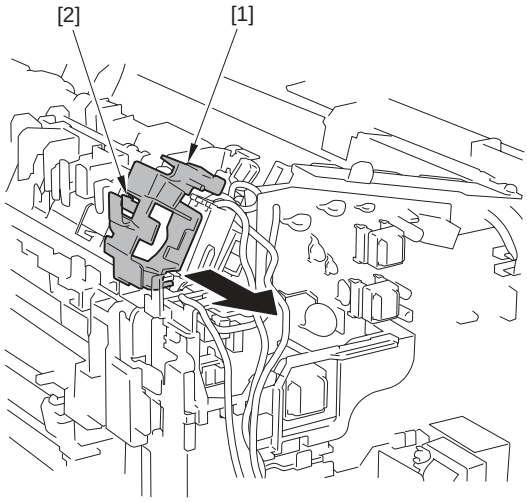
F-3-111

3) Disconnect the 4 connecters [1].
4) Free the harness [3] from the harness guide [2].
5) Free the fixing harness [5] from the harness holder [4].



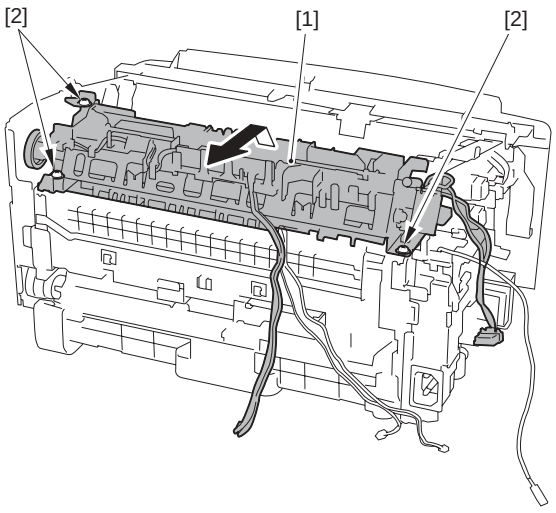
F-3-112

6) Remove the harness holder [1].
- 1 screw [2]



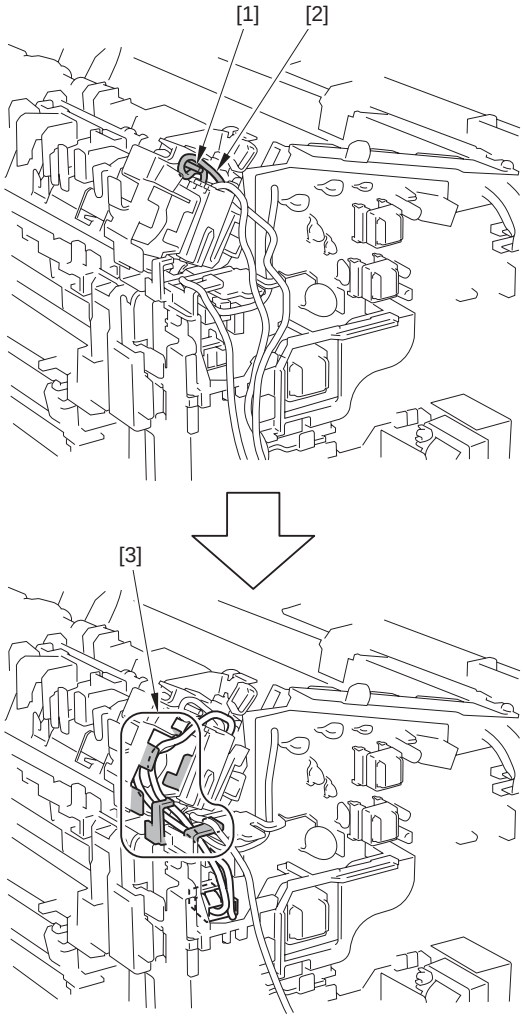
F-3-113

7) Remove the fixing unit [1].
- 3 screws [2]

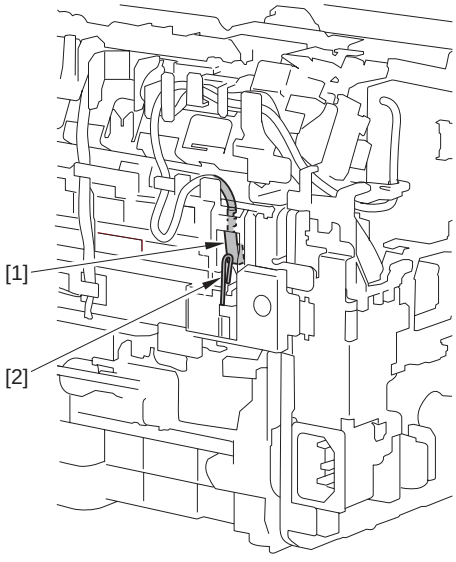


F-3-114

Points to note at installation
When attaching the fixing harness, wind the fixing harness [2] around the protrusion [1] of the harness holder and secure it with the harness guide [3].



Points to note at installation
When attaching the terminal [1], make sure that the contact spring [2] contacts as shown.



3.5.1.3 Before Removing the Fixing Assembly

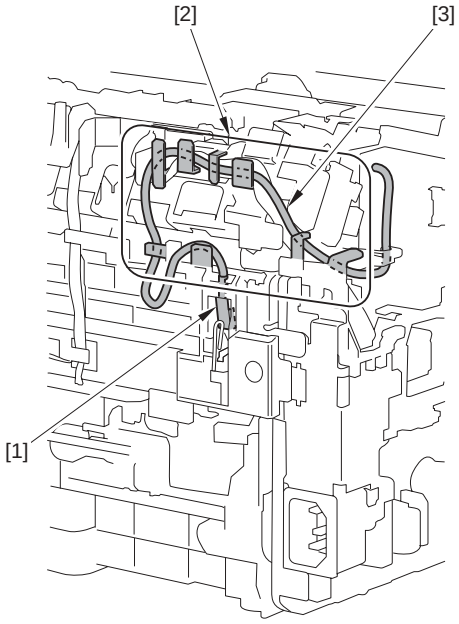
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]
2) Remove the Left Cover. (page 3-3)Reference[Removing the Left Cover]
3) Remove the Right Cover. (page 3-2)Reference[Removing the Right Cover]
4) Remove the Rear Cover. (page 3-1)Reference[Removing the Rear Cover]
5) Remove the Main Controller PCB. (page 3-17)Reference[Removing the Main Controller PCB]

3.5.1.4 Removing the Fixing Assembly

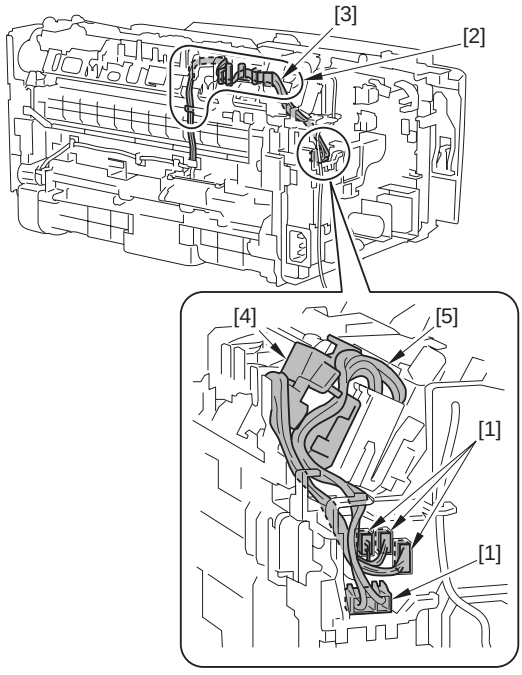
LBP6000 / LBP6000B

1) Remove the terminal [1], and free the harness [3] from the Harness Guide [2].



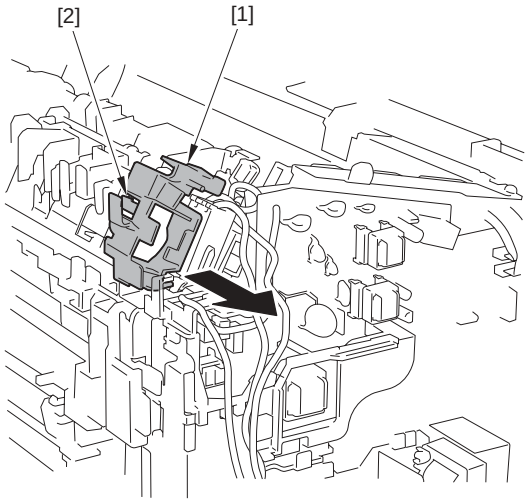
F-3-115

2) Disconnect the 4 connectors [1].
3) Free the harness [3] from the Harness Guide [2].
4) Free the Fixing Harness [5] from the Harness Holder [4].



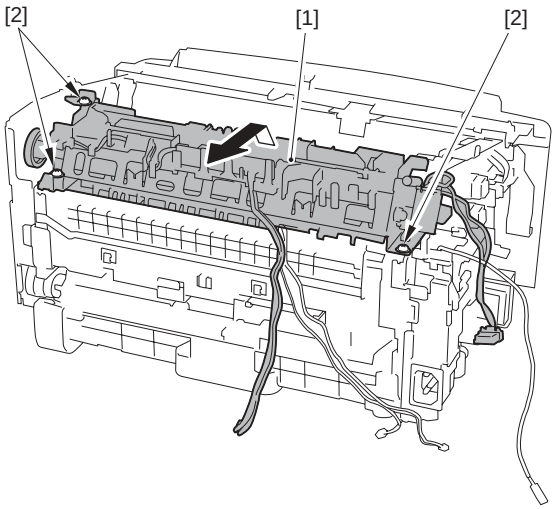
F-3-116

5) Remove the Harness Holder [1].
- 1 Claw [2]



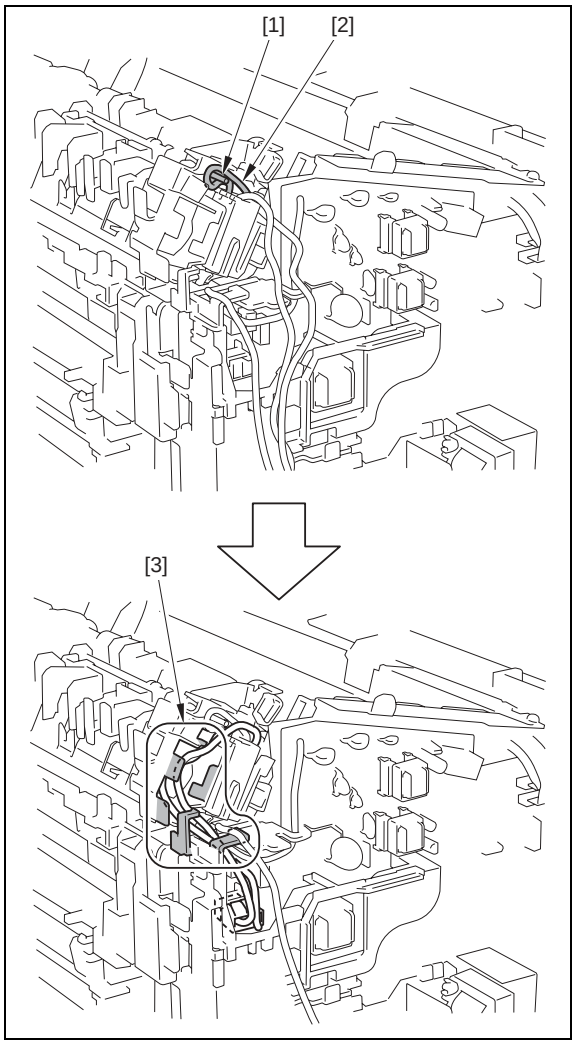
F-3-117

6) Remove the Fixing Assembly [1].
- 3 Screws [2]

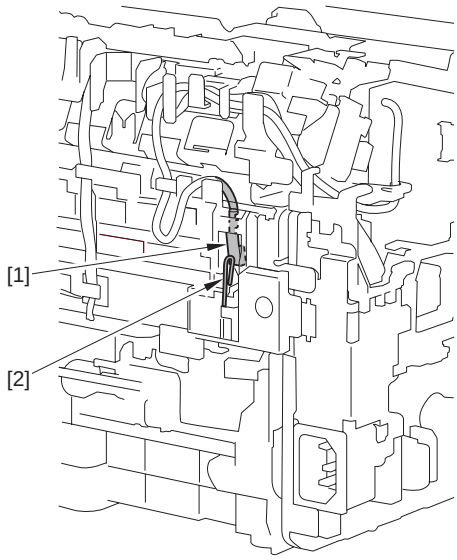


F-3-118

Points to Note at Installation
When attaching the Fixing Harness in place, be sure to wind the Fixing Harness [2] around the protrusion [1] of the Harness Holder and secure it with the Harness Guide [3].



Points to Note at Installation
When installing the terminal [1], be sure that the Contact Spring [2] is in contact with it as shown below.



3.5.2 Fixing Film Unit

3.5.2.1 Preparation for Removing the Fixing Film Unit

LBP3100 / LBP3010B

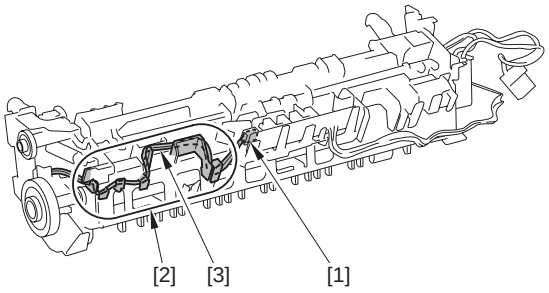
1) Removing the Upper Cover (page 3-3)Reference[Removing the Upper Cover]
2) Removing the Left Cover (page 3-2)Reference[Removing the Left Cover]

3) Removing the Right Cover (page 3-2)Reference[Removing the Right Cover]
4) Removing the Rear Cover (page 3-1)Reference[Removing the Rear Cover]
5) Removing the Main Controller PCB (page 3-17)Reference[Removing the Main Controller PCB]
6) Removing the Fixing Assembly (page 3-34)Reference[Removing the Fixing Assembly]

3.5.2.2 Removing the Fixing Film Unit

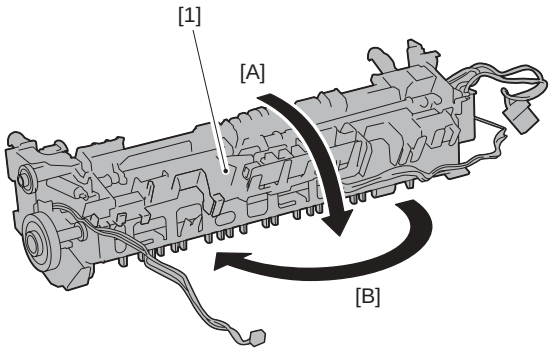
LBP3100 / LBP3010B

1) Disconnect the connecter [1] and free the harness [3] from the harness guide [2].



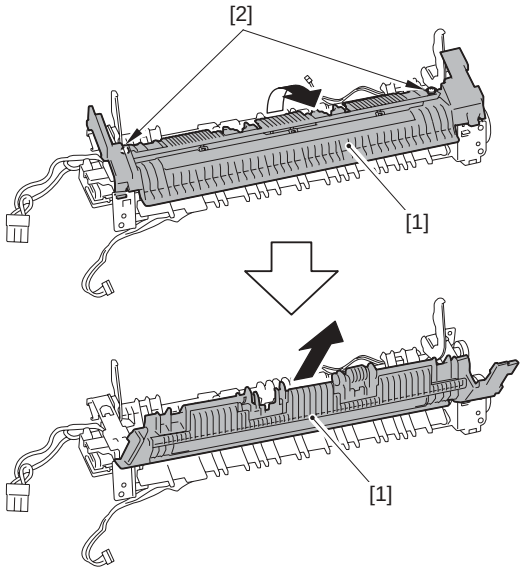
F-3-119

2) Turn the fixing unit [1] in the arrow [A] and arrow [B] direction in order.



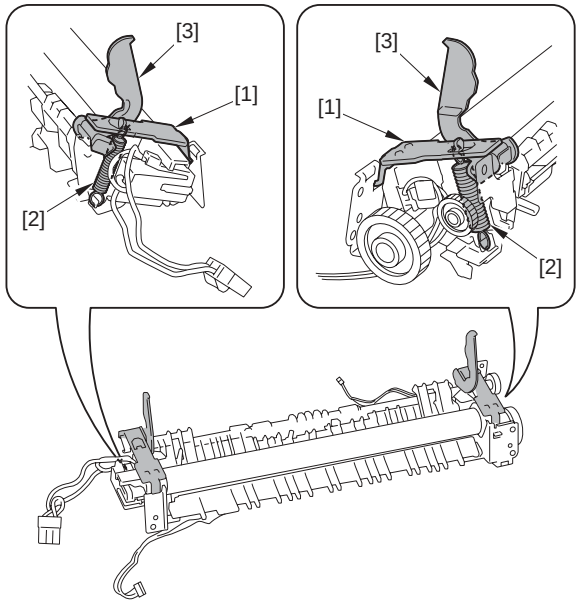
F-3-120

3) Remove the fixing upper guide [1].
- 2 screws [2]



F-3-121

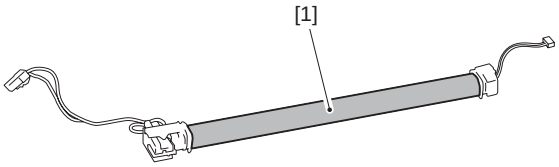
4) Remove the right and left pressure plates [1].
- 2 springs [2]
- 2 pressure arms [3]

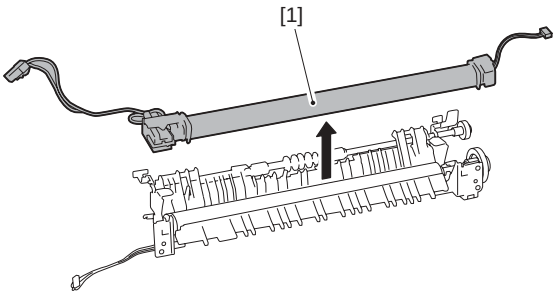


F-3-122

5) Remove the fixing film unit [1].

- Do not touch the surface [1] of the fixing film unit.
- Do not disassemble fixing film unit because it causes its functionality failure.





F-3-123

3.5.2.3 Before Removing the Fixing Film Unit

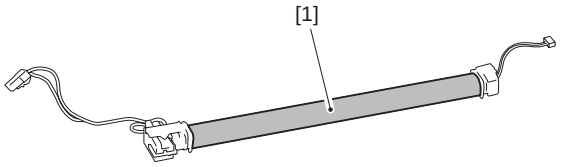
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]
2) Remove the Left Cover. (page 3-3)Reference[Removing the Left Cover]
3) Remove the Right Cover. (page 3-2)Reference[Removing the Right Cover]
4) Remove the Rear Cover. (page 3-1)Reference[Removing the Rear Cover]
5) Remove the Main Controller PCB. (page 3-17)Reference[Removing the Main Controller PCB]
6) Remove the Fixing Assembly. (page 3-36)Reference[Removing the Fixing Assembly]

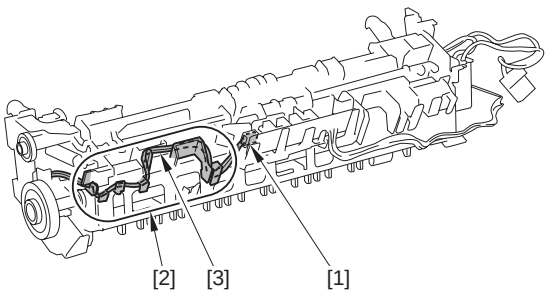
3.5.2.4 Removing the Fixing Film Unit

LBP6000 / LBP6000B

- Be sure not to touch the surface [1] of the Fixing Film Unit.
- Do not disassemble the Fixing Film Unit to prevent occurrence of functionality failure.

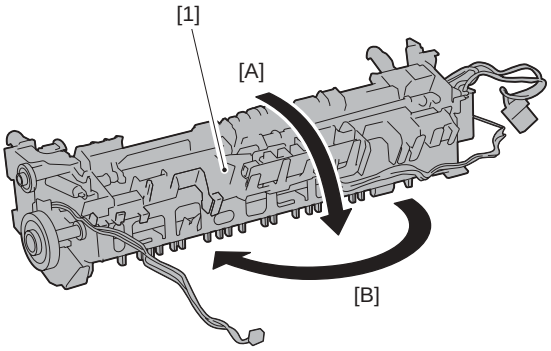


1) Disconnect the connector [1], and free the harness [3] from the Harness Guide [2].



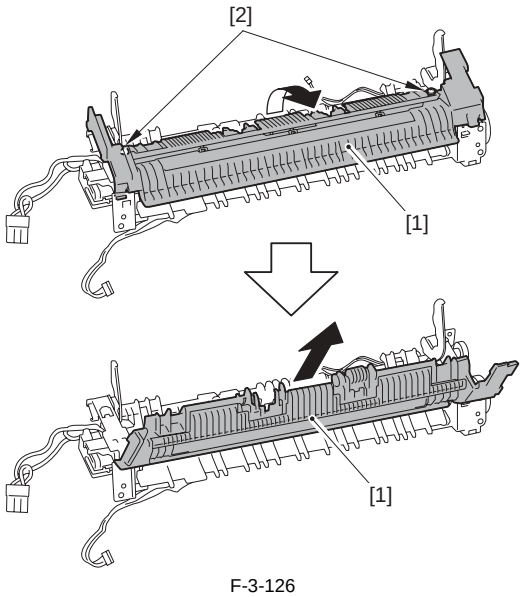
F-3-124

2) Turn the Fixing Assembly [1] in the direction of the arrow [A] followed by the arrow [B].



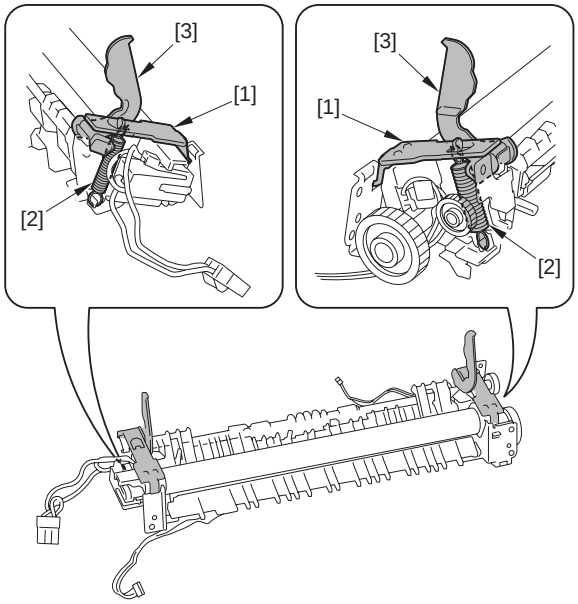
F-3-125

3) Remove the Fixing Upper Guide [1].
- 2 Screws [2]



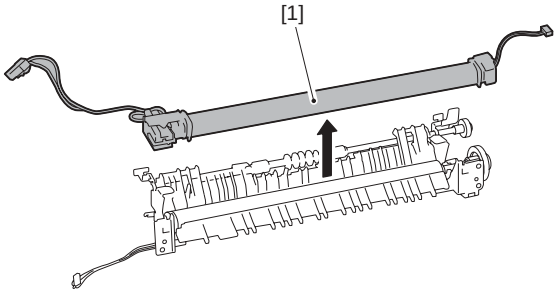
F-3-126

4) Remove the 2 Pressure Plates [1] (right and left).
- 2 Springs [2]
- 2 Pressure Arms [3]



F-3-127

5) Remove the Fixing Film Unit [1].



F-3-128

3.5.3 Fixing Pressure Roller

3.5.3.1 Preparation for Removing the Fixing Pressure Roller

LBP3100 / LBP3010B

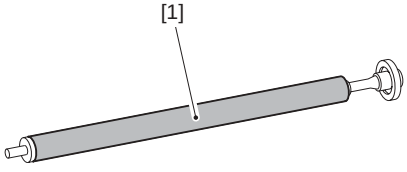
1) Removing the Upper Cover (page 3-3)Reference[Removing the Upper Cover]
2) Removing the Left Cover (page 3-2)Reference[Removing the Left Cover]
3) Removing the Right Cover (page 3-2)Reference[Removing the Right Cover]
4) Removing the Rear Cover (page 3-1)Reference[Removing the Rear Cover]
5) Removing the Main Controller PCB (page 3-17)Reference[Removing the Main Controller PCB]
6) Removing the Fixing Assembly (page 3-34)Reference[Removing the Fixing Assembly]
7) Removing the Fixing Film Unit (page 3-38)Reference[Removing the Fixing Film Unit]

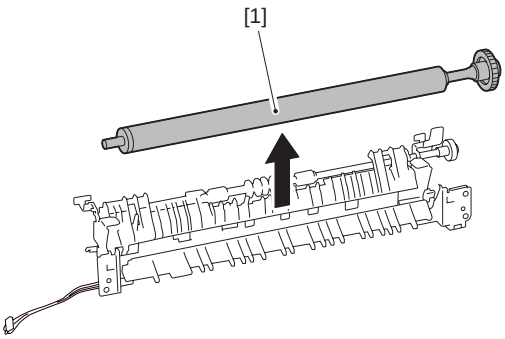
3.5.3.2 Removing the Fixing Pressure Roller

LBP3100 / LBP3010B

1) Remove the fixing pressure roller [1].

Do not touch the surface [1] of the fixing pressure roller.





F-3-129

3.5.3.3 Before Removing the Fixing Pressure Roller

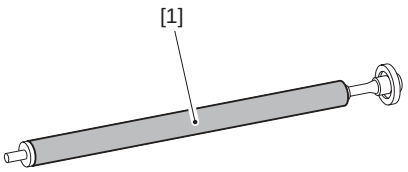
LBP6000 / LBP6000B

1) Remove the Upper Cover. (page 3-5)Reference[Removing the Upper Cover]
2) Remove the Left Cover. (page 3-3)Reference[Removing the Left Cover]
3) Remove the Right Cover. (page 3-2)Reference[Removing the Right Cover]
4) Remove the Rear Cover. (page 3-1)Reference[Removing the Rear Cover]
5) Remove the Main Controller PCB. (page 3-17)Reference[Removing the Main Controller PCB]
6) Remove the Fixing Assembly. (page 3-36)Reference[Removing the Fixing Assembly]
7) Remove the Fixing Film Unit. (page 3-38)Reference[Removing the Fixing Film Unit]

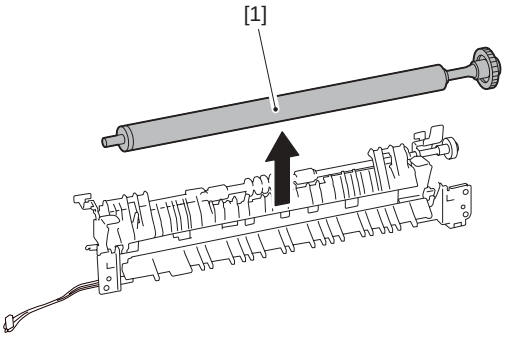
3.5.3.4 Removing the Fixing Pressure Roller

LBP6000 / LBP6000B

Be sure not to touch the surface [1] of the Fixing Pressure Roller.



1) Remove the Fixing Pressure Roller [1].



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Chapter 4 MAINTENANCE AND INSPECTION

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4.1 Periodically Replaced Parts

4.1.1 Periodically Replaced Parts

LBP3100 / LBP3010B

There is no periodically replaced part with this machine.

4.1.2 Periodically Replaced Parts

LBP6000 / LBP6000B

There is no periodically replaced part with this machine.

4.2 Consumables

4.2.1 Consumables

LBP3100 / LBP3010B

There is no consumable with this machine.

4.2.2 Consumables

LBP6000 / LBP6000B

There is no consumable with this machine.

4.3 Periodical Service

4.3.1 Scheduled Servicing

LBP3100 / LBP3010B

There is no portion that requires schedule servicing in this equipment.

4.3.2 Scheduled Servicing

LBP6000 / LBP6000B

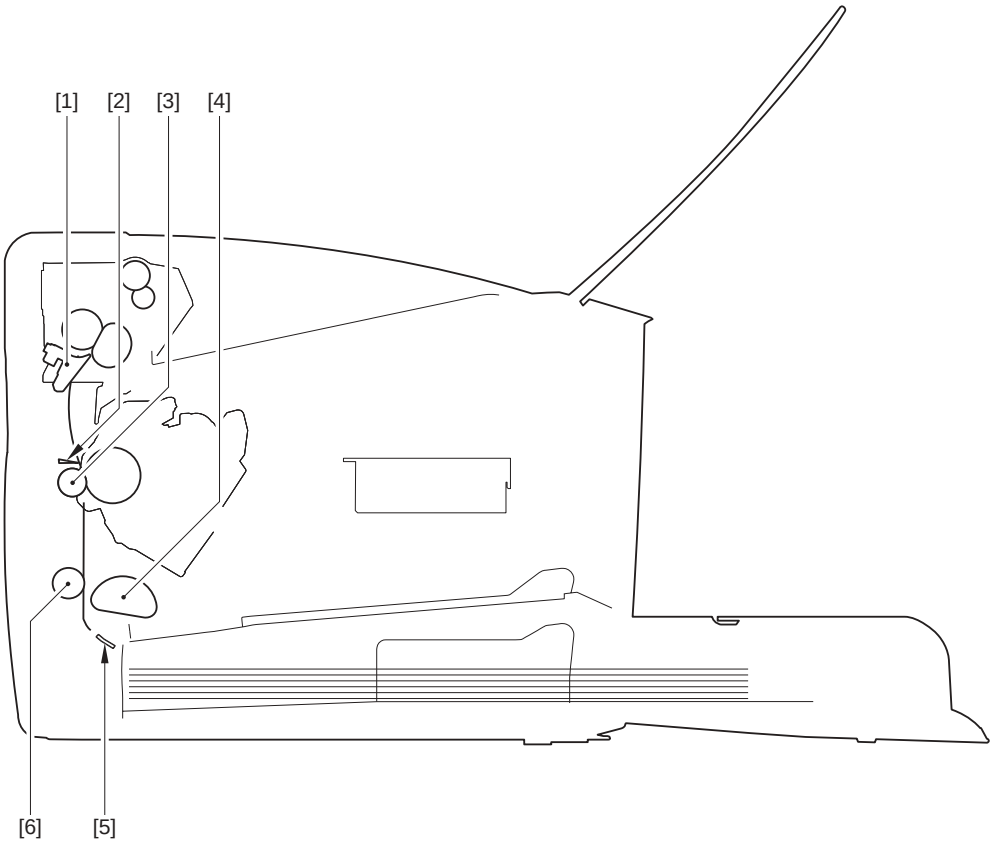
There is no portion that requires schedule servicing in this equipment.

4.4 Cleaning

4.4.1 Cleaning Method

LBP3100 / LBP3010B

Cleaning at servicing



F-4-1

T-4-1

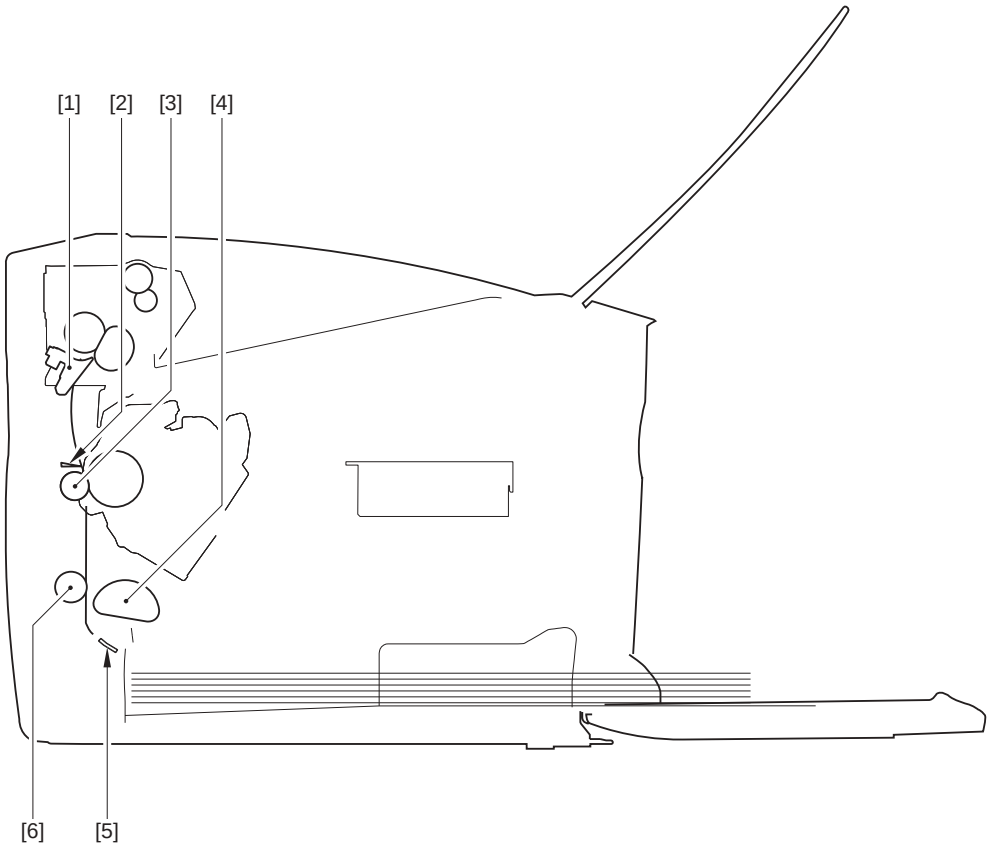
[1]	Fixing inlet guide	[2]	Static eliminator
[3]	Transfer roller	[4]	Pickup roller
[5]	Separation pad	[6]	Feeding roller

Follow the procedure below for cleaning during servicing.
1) Fixing inlet guide
Clean it with a dry lint-free paper.
2) Static eliminator
Clean it with a dry lint-free paper.
3) Transfer roller
Basically, do not touch it with your hands or clean it. When cleaning is absolutely necessary, clean with a dry lint-free paper.
Take care not to touch the roller and let solvents or oils be removed.
4) Pickup roller
Clean it with a dry lint-free paper.
5) Separation pad
Clean the rubber part with a lint-free paper
6) Feeding roller
Clean it with a dry lint-free paper.

4.4.2 Cleaning Method

LBP6000 / LBP6000B

Cleaning at servicing



F-4-2

T-4-2

[1]	Fixing inlet guide	[2]	Static eliminator
[3]	Transfer roller	[4]	Pickup roller
[5]	Separation pad	[6]	Feeding roller

Follow the procedure below for cleaning during servicing.

1) Fixing inlet guide
   Clean it with a dry lint-free paper.
2) Static eliminator
   Clean it with a dry lint-free paper.
3) Transfer roller
   Basically, do not touch it with your hands or clean it. When cleaning is absolutely necessary, clean with a dry lint-free paper.
   Take care not to touch the roller and let solvents or oils be removed.
4) Pickup roller
   Clean it with a dry lint-free paper.
5) Separation pad
   Clean the rubber part with a lint-free paper
6) Feeding roller
   Clean it with a dry lint-free paper.

Chapter 5 TROUBLESHOOTING

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5.1 Countermeasures

5.1.1 Image Faults

5.1.1.1 Smudged/Streaked

5.1.1.1.1 Bleeding (smear) occurs immediately after the power is turned on for the first time for the day

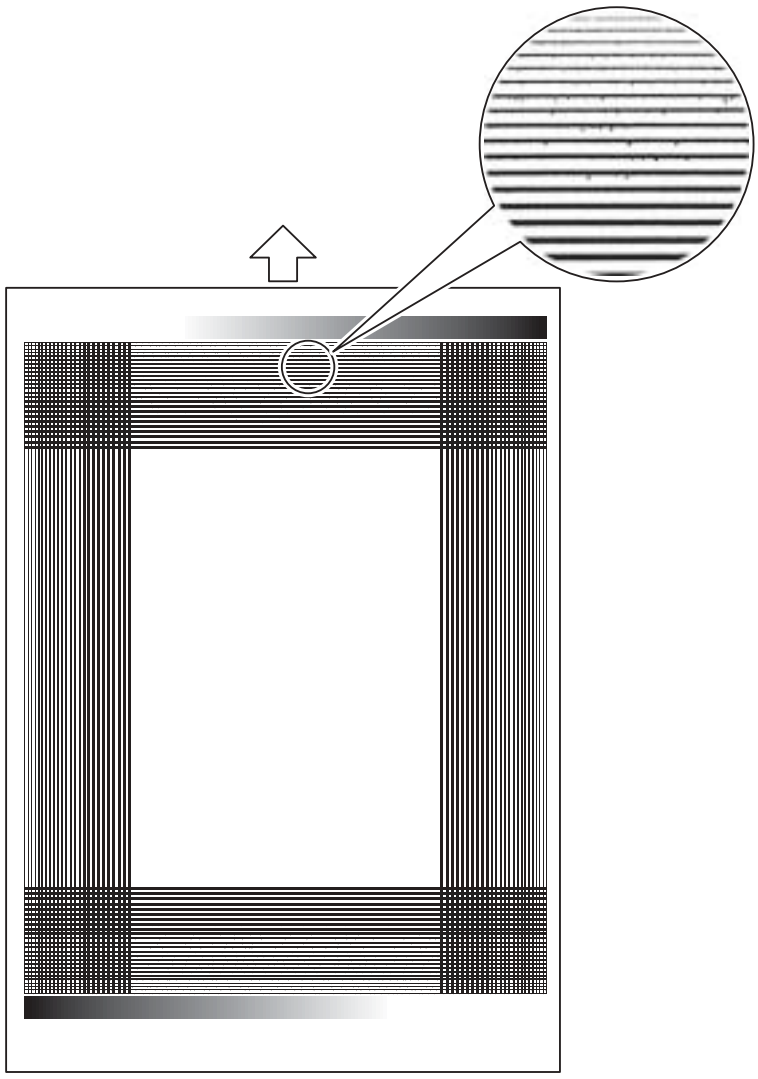
LBP3100 / LBP3010B

Description
There is sometimes a case where the difference of temperature between air and inside of the machine causes moisture to occur on the toner immediately after the power is turned on for the first time for the day.
As a result, when the toner transferred on a sheet at the time of initial printing passes through the fixing assembly, moisture on the toner is vaporized into steam, causing breading (smear) to occur.
Field Remedy
Prevent bleeding using the following user mode items.

T-5-1

Setting item	Setting value	Description	Additional information
Finishing > Processing Option > Special Print Mode A	) Mode 1 through 4 (Factory setting: Not used)	Make a setting to perform thinning of printed image data by processing of the controller. When the value set for the mode increases, the amount of thinning increases. (The image density decreases.)	Printing time does not increase because the method of image processing performed by the controller is changed.This mode is less effective than Mode B.
) Finishing > Processing Option > Special Print Mode B	) Mode 1 through 3 (Factory setting: Not used)	Extend the initial rotation period by processing of the engine. When the value set for the mode increases, the initial rotation period is extended.	The initial rotation period in engine operation is extended, and printing time increases. The initial rotation period for each mode is shown below.Mode 1: 13 sec, Mode 2: 30 sec, Mode 3: 60 sec

Image sample



F-5-1

5.2 MEASUREMENT AND ADJUSTMENT

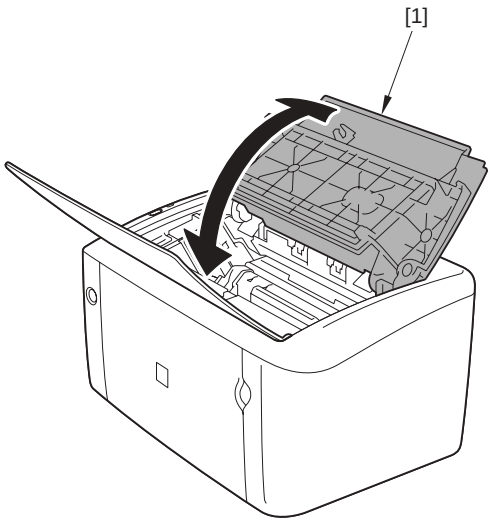
5.2.1 Test Print

5.2.1.1 Test Print Function

LBP3100 / LBP3010B / LBP6000 / LBP6000B

This equipment has a test print function to check if the printer engine normally operates.
Test patterns (horizontal lines) are output when executing this test print.

The following is the operation procedure;
1) Set A4/LTR papers on the pickup tray.
2ÅjOpen and close the delivery tray [1] five times continuously with the power switch on. (The time of opening and closing the delivery tray is approx. 2 sec or less.)
3) Test print is executed.



F-5-2

5.2.2 Mechanical Adjustment

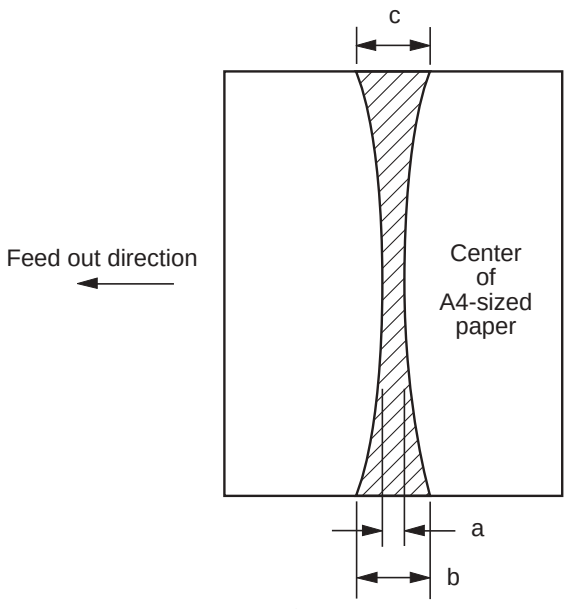
5.2.2.1 Nip-width (pressure from the pressure roller) specifications

LBP3100 / LBP3010B / LBP6000 / LBP6000B

> ⚠ Be sure to follow the procedures below, otherwise the fixing film or the fixing sleeve may be damaged.

The nip width of the fixing unit is not adjustable in this printer, however, the improper nip-width may cause the faulty fixing.
Follow the procedures below to check the nip width.

1) Prepare an all-black print of A4 size that is printed with the same type of cartridge for the printer before visiting the user.
2) Load the printed sheet facing DOWN on the pickup tray.
3) Print a test-page.
4) Turn off the printer when the leading edge of the paper appears in the face-down delivery slot.
   Wait for 60 seconds and open the cartridge door to remove the paper from the printer.
5) Measure the width of the glossy band across the paper and check if it is meeting the requirements below.
   - Center (a): 5.6mm to 8.0mm
   - Right and left (b, c): 5.6mm to 8.0mm



F-5-3

5.3 SERVICE TOOLS

5.3.1 Standard tools

LBP3100 / LBP3010B / LBP6000 / LBP6000B

The followings are the required tools to perform the service operation.

T-5-2

No.	Tool name	Tool number	Usage/remarks
1	Tool case	TKN-0001	
2	Jumper wire	TKN-0069	With clip
3	Gap gauge	CK-0057	0.02 to 0.03mm
4	Spring scale	CK-0058	To check cassette spring pressure
5	Philips screwdriver	CK-0101	M4, M5 Length: 363mm
6	Philips screwdriver	CK-0104	M3, M4 Length: 155mm
7	Philips screwdriver	CK-0105	M4, M5 Length: 191mm
8	Philips screwdriver	CK-0106	M4, M5 Length: 85mm
9	Flat-blade screwdriver	CK-0111	
10	Precision slot head screwdriver	CK-0114	6 pieces set
11	Hex-key wrench set	CK-0151	5 pieces set
12	Smooth file	CK-0161	
13	Hex screwdriver	CK-0170	M4, Length: 107mm
14	Nipper	CK-0201	
15	Long-nose pliers	CK-0202	
16	Pliers	CK-0203	
17	Stop-ring pliers	CK-0205	For shaft ring
18	Crimping tool	CK-0218	
19	Tweezers	CK-0302	
20	Scale	CK-0303	150mm For measurement
21	Plastic hummer	CK-0314	
22	Brush	CK-0315	
23	Penlight	CK-0327	
24	Plastic bottle	CK-0328	
25	Lint-free paper	CK-0336	500SH/PKG
26	Oiler	CK-0349	30cc
27	Plastic bottle	CK-0351	30cc
28	Digital multi-meter	FY9-2032	

5.3.2 Special Tool

LBP3100 / LBP3010B / LBP6000 / LBP6000B

There is no special tool required.

5.3.3 List of solvent/ lubricant

LBP3100 / LBP3010B / LBP6000 / LBP6000B

T-5-3

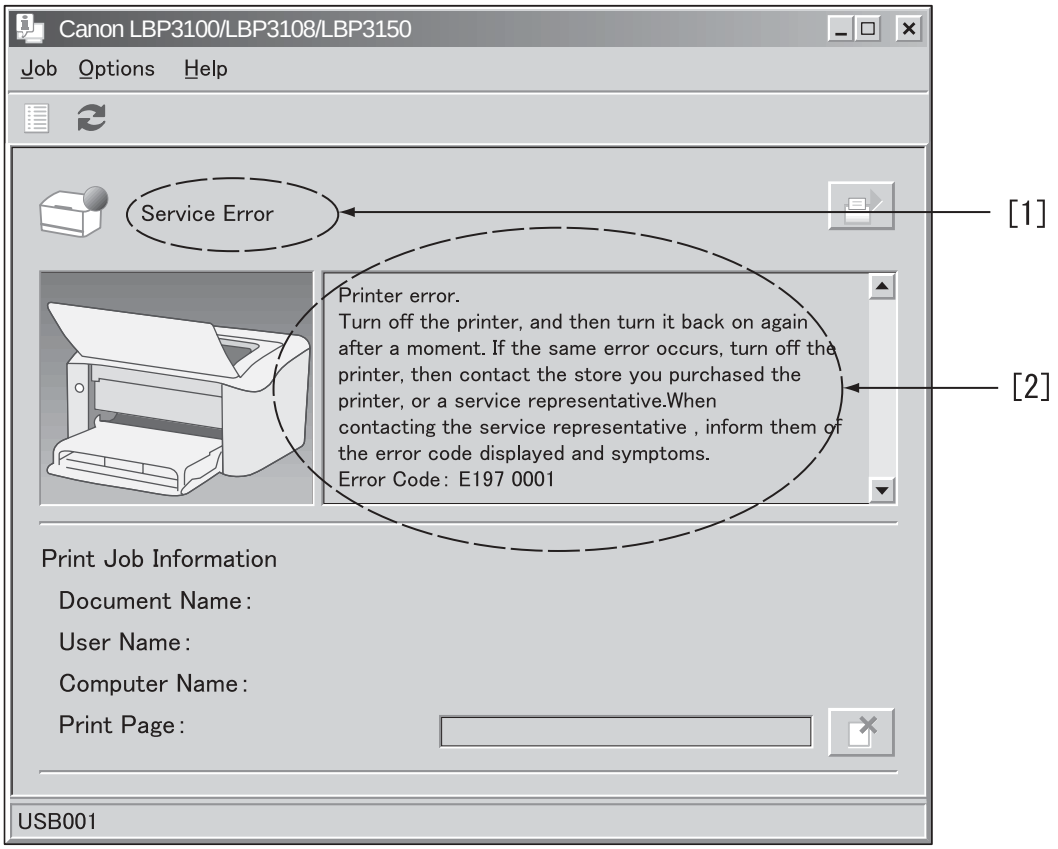
~~Name~~	Usage	Remarks
Ethel alcohol	Cleaning e.g.) Metal parts Grease Toner contamination	- Local procurement - Keep fire away
Lubricant	- Apply it on gears etc. - Apply it on shafts and shaft supports etc.	- tool number: HY9-0007(Dow Corning made Molykote EM-50L)

5.4 ERROR CODE TABLE

5.4.1 Overview

LBP3100 / LBP3010B

This printer does not have a status panel (LCD panel), and the messages for statuses and errors that would have been displayed on the status panel during a printer's operations are displayed on the computer display. The screen displayed is called Status Window (see the following figure).
The status window informs users of the printer status with messages or animations.
Messages are displayed on the message area [1] and message area (auxiliary) [2]. There are two types of messages; user message and service message. The user message prompts users to take some actions, and the service message prompts service engineers to do so.



F-5-4

The following are the details of the service message. For the user message, please refer to the users guide packaged with the printer.

5.4.2 Service Message

LBP3100 / LBP3010B

The service message is displayed when a fault in the printer occurs and called error code.
The error code is displayed on the message area of the status window screen, and its details on the message area (auxiliary) with the error code; 'Exxx' (a three-digit number is assigned to XXX).
The following is the list of service messages.

T-5-4

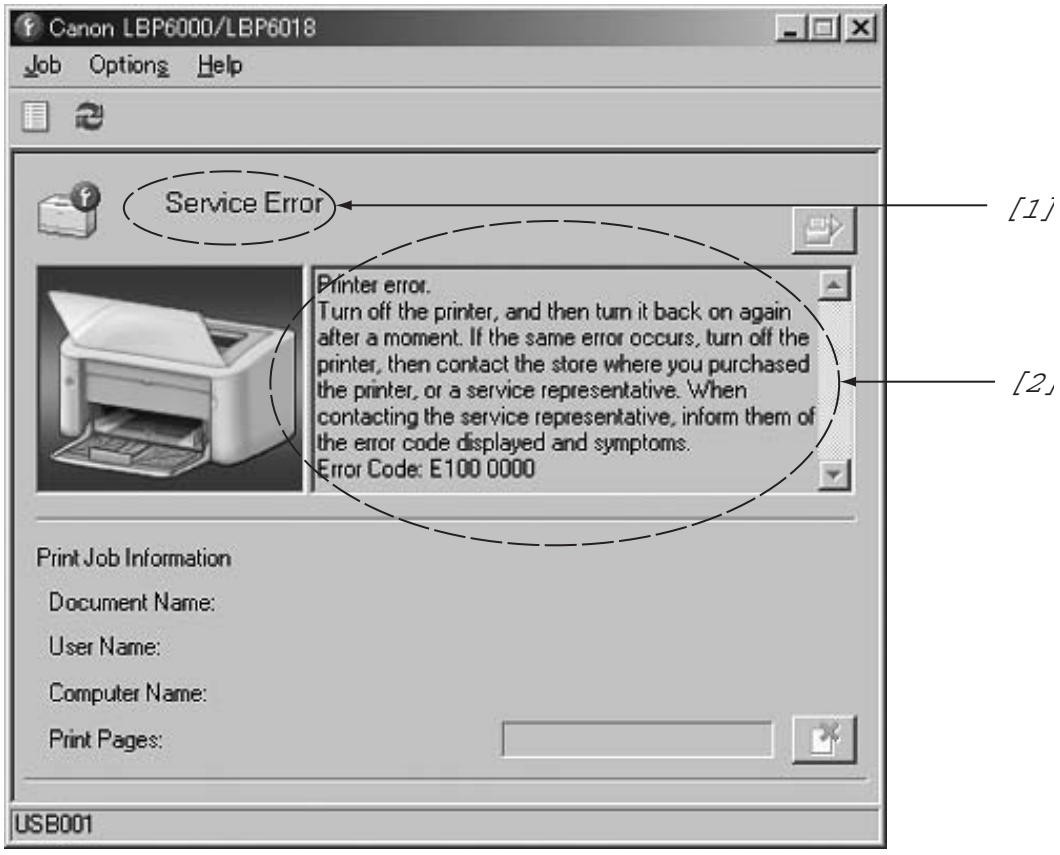
Error Code	Details	Measures
E000	Error in startup	
	- The detected temperature of the thermistor does not reach 35 deg C within approx. 1.5 sec of the heater being turned on. - The detected temperature of the thermistor is 100 deg C or lower in standby mode.	- Check connectors on the fixing film unit. - Replace the fixing film unit. - Replace the engine controller PCB.
E001	Error in abnormally high temperature	
	The detected temperature of the thermistor is 220 deg C or higher 30 times consecutively.	- Check connectors on the fixing film unit. - Replace the fixing film unit. - Replace the engine controller PCB.
E003	Error in abnormally low temperature	
	- After the heater is turned on, the detected temperature of the thermistor is 100 deg C or lower at the time of printing after reaching 50 deg C. - After the heater is turned on, the detected temperature of the thermistor is 55 deg C or lower at paper intervals or in cleaning mode after reaching 50 deg C.	- Check connectors on the fixing film unit. - Replace the fixing film unit. - Replace the engine controller PCB.

Error Code	Details	Measures
E004	Error in fixing heater drive circuitry (For 200V machines only)	
	An abnormal frequency is detected on the fixing drive circuit within approx. 3.3 sec of the power being turned on.	- Check connectors on the fixing film unit. - Replace the fixing film unit. - Replace the engine controller PCB.
E100	Error in Scanner Unit	- Check connectors on the scanner unit - Replace the scanner unit - Replace the engine controller PCB
	- At startup of the scanner, /BDI signal cannot be detected within 0.1 sec after forced acceleration of the scanner motor. - At startup of the scanner during activation of the scanner motor, the motor rotation exceeds the range of specified value (98.3 to 102.1%). - After startup of the scanner is correctly completed, /BDI signal exceeds the specified cycle 10 times consecutively.	
E197	Error in engine communication	- Replace the engine controller PCB
	An error in data communication occurs in the engine controller.	
E747	Error in main controller memory	- Replace the main controller PCB
	Data of EEPROM on the main controller cannot be read/written.	

5.4.3 Overview

LBP6000 / LBP6000B

This printer does not have a status panel (LCD panel), and the messages for statuses and errors that would have been displayed on the status panel during a printer's operations are displayed on the computer display. The screen displayed is called Status Window (see the following figure).
The status window informs users of the printer status with messages or animations.
Messages are displayed on the message area [1] and message area (auxiliary) [2]. There are two types of messages; user message and service message. The user message prompts users to take some actions, and the service message prompts service engineers to do so.



F-5-5

The following are the details of the service message. For the user message, please refer to the users guide packaged with the printer.

5.4.4 Service Message

LBP6000 / LBP6000B

The service message is displayed when a fault in the printer occurs and called error code.
The error code is displayed on the message area of the status window screen, and its details on the message area (auxiliary) with the error code; 'Exxx' (a three-digit number is assigned to XXX).
The following is the list of service messages.

T-5-5

Error Code	Details	Measures
E000	Error in startup	
	- The detected temperature of the thermistor does not reach 35 deg C within approx. 1.5 sec of the heater being turned on. - The detected temperature of the thermistor is 100 deg C or lower in standby mode.	- Check connectors on the fixing film unit. - Replace the fixing film unit. - Replace the engine controller PCB.
E001	Error in abnormally high temperature	
	The detected temperature of the thermistor is 220 deg C or higher 30 times consecutively.	- Check connectors on the fixing film unit. - Replace the fixing film unit. - Replace the engine controller PCB.
E003	Error in abnormally low temperature	
	- After the heater is turned on, the detected temperature of the thermistor is 100 deg C or lower at the time of printing after reaching 50 deg C. - After the heater is turned on, the detected temperature of the thermistor is 55 deg C or lower at paper intervals or in cleaning mode after reaching 50 deg C.	- Check connectors on the fixing film unit. - Replace the fixing film unit. - Replace the engine controller PCB.
E004	Error in fixing heater drive circuitry (For 200V machines only)	
	An abnormal frequency is detected on the fixing drive circuit within approx. 3.3 sec of the power being turned on.	- Check connectors on the fixing film unit. - Replace the fixing film unit. - Replace the engine controller PCB.
E100	Error in Scanner Unit	- Check connectors on the scanner unit - Replace the scanner unit - Replace the engine controller PCB
	- At startup of the scanner, /BDI signal cannot be detected within 0.1 sec after forced acceleration of the scanner motor. - At startup of the scanner during activation of the scanner motor, the motor rotation exceeds the range of specified value (98.3 to 102.1%). - After startup of the scanner is correctly completed, /BDI signal exceeds the specified cycle 10 times consecutively.	
E196	Error in DCON communication	- Replace the engine controller PCB
	An error in data communication occurs in the Main controller.	
E733	error in Engine communication	- Turn OFF and then ON the power. - Replace the Engine Controller PCB.
	An error in data communication occurs in the Engine controller.	
E747	Error in main controller memory	- Replace the main controller PCB
	Data of EEPROM on the main controller cannot be read/written.	

5.5 Version Up

5.5.1 Upgrade

LBP3100 / LBP3010B / LBP6000 / LBP6000B

The host machine does not support SST (Service Support Tool)
Thus, when upgrading the main controller or engine controller, replace the PCB to the one in new version.

Chapter 6 APPENDIX

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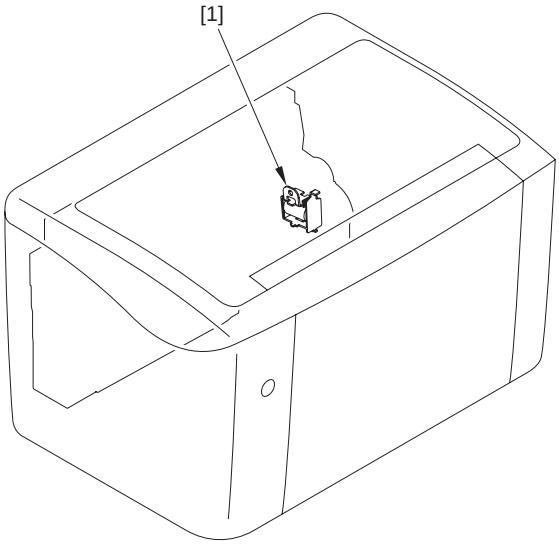
6.1 OUTLINE OF ELECTRICAL COMPONENTS

6.1.1 Clutch/Solenoid

6.1.1.1 Solenoid

LBP3100 / LBP3010B / LBP6000 / LBP6000B



F-6-1

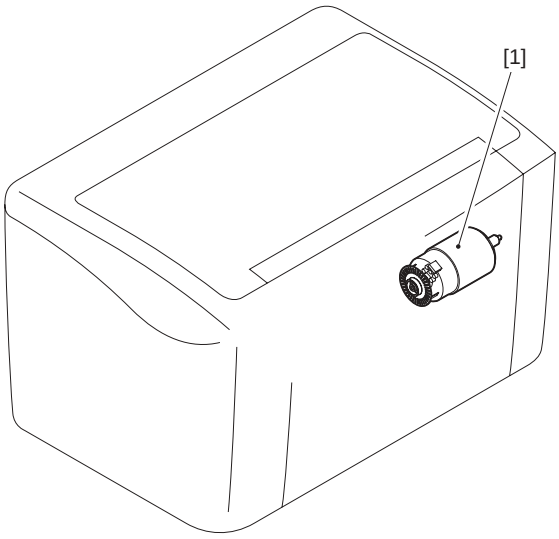
T-6-1

Code	Name
[1]	Pickup solenoid

6.1.2 Motor

6.1.2.1 Motor

LBP3100 / LBP3010B / LBP6000 / LBP6000B



F-6-2

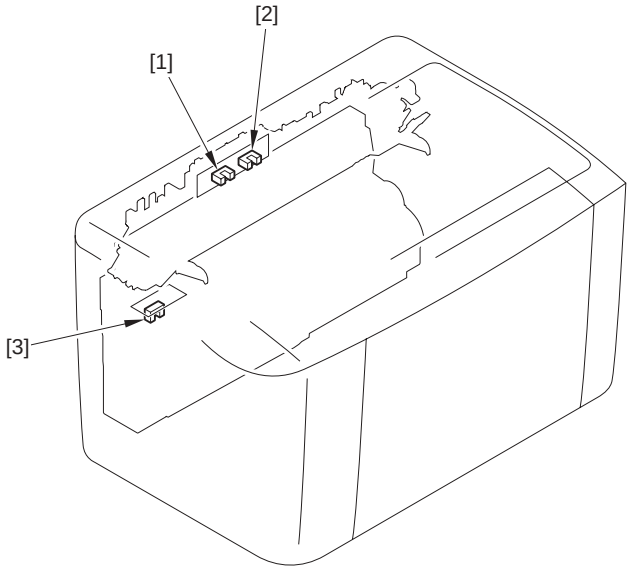
T-6-2

Code	Name
[1]	Main motor

6.1.3 Sensor

6.1.3.1 Sensor

LBP3100 / LBP3010B / LBP6000 / LBP6000B



F-6-3

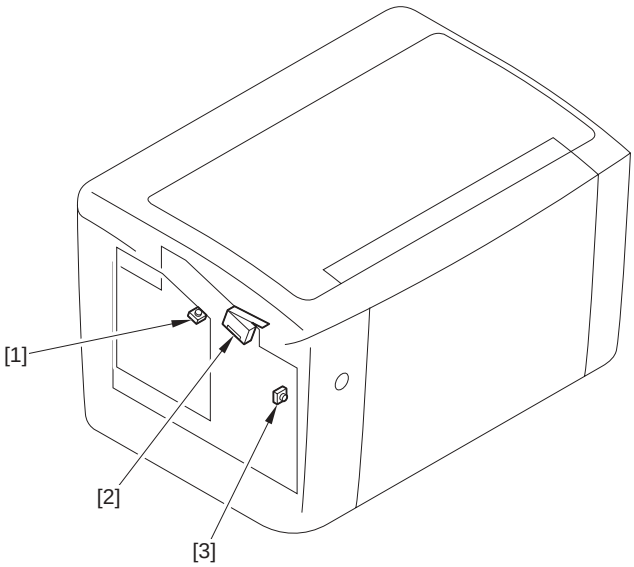
T-6-3

Code	Name
[1]	Fixing delivery sensor
[2]	Paper width sensor
[3]	Paper leading edge sensor

6.1.4 Switch

6.1.4.1 Switch

LBP3100 / LBP3010B / LBP6000 / LBP6000B



F-6-4

T-6-4

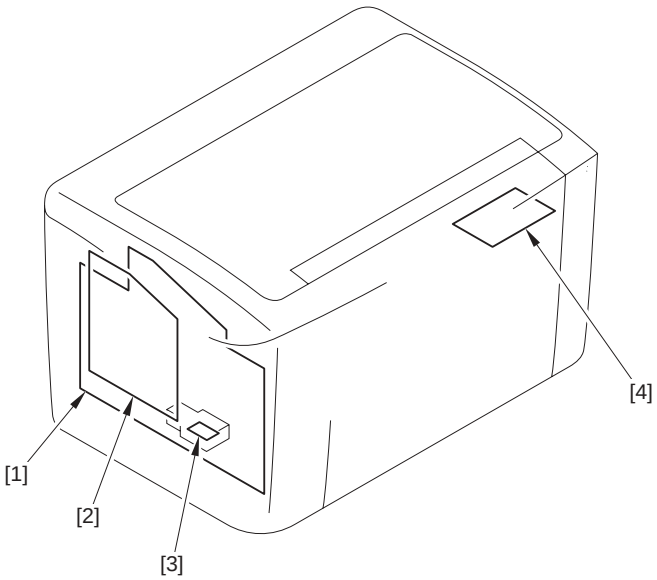
Code	Name
[1]	Control key switch
[2]	Power switch

Code	Name
[3]	Door switch

6.1.5 PCBs

6.1.5.1 PCB

LBP3100 / LBP3010B / LBP6000 / LBP6000B



F-6-5

T-6-5

Code	Name
[1]	Engine controller PCB
[2]	Main controller PCB
[3]	Memory PCB
[4]	Motor drive PCB

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