LBP-1760

SERVICE MANUAL

REVISION 0

Canon

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Prepared by

PERIPHERAL PRODUCTS QUALITY ADVANCEMENT DIV.
PERIPHERAL PRODUCTS TECHNICAL DOCUMENTATION DEPT.

CANON INC.

5-1, Hakusan 7-chome, Toride-City, Ibaraki-Pref. 302-8501, Japan

PREFACE

This Service Manual contains basic information required for after-sales service of the laser beam printer LBP-1760 (here after referred to as the "printer"). This information is vital to the service technician in maintaining the high print quality and performance of the printer.

The paper feeder, envelope feeder and duplexing unit, which are prepared for the printer as options, are described in this manual.

This manual consists of the following chapters:

Chapter 1: Product information
Features, specifications and installation

Chapter 2: Operation and Timing
A description of the operating principles and timing sequences of the electrical and mechanical systems

Chapter 3: The Mechanical System
Explanation of mechanical operation, disassembly, reassembly and adjustment procedures

Chapter 4: Troubleshooting
Troubleshooting procedures, reference values and adjustments, maintenance and servicing, etc.

Appendix: General timing chart, general circuit diagram, etc.

Information in this manual is subject to change as the product is improved or redesigned. All relevant information in such cases will be supplied in the Service Information Bulletins.

A thorough understanding of this printer, based on information in this Manual and Service Information bulletins, is required for maintaining its performance and for locating and repairing the causes of malfunctions.

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CHAPTER 4 TROUBLESHOOTING

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CHAPTER 1

PRODUCT INFORMATION

I. FEATURES

1. High speed printing
Equipped with the Intel 960HD-50 processor, this printer is compact in size and capable of printing a maximum of 17 pages/min. (LTR).

2. Excellent image quality
Resolution of 1200/600DPI, super fine particle toner, and automatic image refinement provide excellent image.

3. Various paper source in option
The three kinds of optional paper source, paper feeder, envelope feeder, and duplexing unit, will meet various requirements for a user.
In addition to the standard equipped multi-purpose tray and built-in cassette, installation of the optional paper feeder and envelope feeder provide a user the four-way paper pick-up sources. Installation of the duplexing unit enables duplex printing.

4. Memory saving techology
Memory Reduction Technology enables A4/LTR size single-side printing (1200×1200DPI resolution) with only 4MB of memory.

5. Energy saving
Employment of on-demand fixing method and energy saving function that automatically reduces power consumption when the printer is idle for the specified period of time offers lower power consumption.

6. Reduction in toner consumption
Toner consumption can be reduced by selecting the economy mode and printing rough image with lesser toner.

7. Automatic PDL switch
This printer supports the Hewlett-Packard PCL6 printer language. It can also support the Adobe PostScript 3 by installing the optional Canon Adobe PostScript 3 Module A5. It automatically switches PDL between PCL and PostScript according to the received data.

8. Features of interface
This printer supports automatic interface switch between all active ports. The printer is equipped with the IEEE 1284 compliant parallel interface that supports bi-directional communication between the printer and the computer. The network board is available as an option, and the printer is equipped with the I/O slots that allow the printer to be connected to the Ethernet network and the Token Ring network environments. As a result, the printer can be connected to multiple computers simultaneously.

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II. SPECIFICATIONS

A. Printer

1. Printer Engine

1) Type   Desk-top page printer
2) Printing method   Electrophotography
3) Printing speed **(Note 1)**   About 17.1 pages/min. (Letter, 600 DPI), about 8.5 pages/min. (Letter, 1200 DPI)
About 16.2 pages/min. (A4, 600 DPI), about 8.1 pages/min. (A4, 1200 DPI)
4) First print time **(Note 2)**   15.2 sec. or less (A4, 600 DPI, face-down)
14.1 sec. or less (A4, 600 DPI, face-up)
5) Wait time   25 sec. or less
6) Scanning pitch
     Horizontal   600/1200 DPI
     Vertical   600/1200 DPI
7) Image formation system
     Laser   Semiconductor laser
     Scanning system   Rotating six-faced prism mirror (Scanning mirror)
     Photosensitive drum   OPC
     Charging   Roller charging
     Exposure   Laser scanning
     Toner   Magnetic single-component dry toner
     Development   Toner projection development
     Toner supply   By EP-52 cartridge replacement (about 10,000 A4-sized prints: with image density set in the middle, and 4% dot density ratio)
     Transfer   Roller transfer
     Separation   Curvature
     Cleaning   Blade
     Fixing   On-demand method
8) Feeding   Multi-purpose tray
     Cassette
     Paper feeder (option)
     Envelope feeder (option)
     Print paper   Plain paper, recycled paper, colored paper, labels, OHT, envelopes
     Paper sizes
     Multi-purpose tray   W. 98.4mm $\times$ L. 190mm (min.) ~ W. 216mm $\times$ L. 356mm (max.) size plain paper ($60g/m^2$ ~ $128g/m^2$ recommended paper), above-mentioned paper
     Cassette   Letter, Legal, and A4-sized plain paper ($60g/m^2$ ~ $105g/m^2$ recommended paper), recycled paper, colored paper
     Multi-purpose tray capacity   10mm stack (about 100 sheets of $80g/m^2$ paper)
     Cassette capacity   56mm stack (about 500 sheets of $80g/m^2$ paper)
     Cassette types   Universal (Letter, Legal, A4 sizes)
9) Print delivery   Face-down/face-up
     Face-down tray capacity   About 250 sheets ($80g/m^2$ paper)
     Face-up tray capacity   About 50 sheets ($80g/m^2$ paper)
10) Duplexing
     Auto-duplexing   When duplexing unit (option) is installed, Letter, Legal, Executive, A4, and B5 size plain paper only ($60g/m^2$ ~ $105g/m^2$ recommend-

	ed paper).
Manual duplexing **(Note 3)**	Plain paper (60g/m² ~ 105g/m² recommended paper) on multi-purpose tray only
11) Environment	
Temperature	7.5 ~ 32.5°C
Humidity	5 ~ 90%RH
Air pressure	747 ~ 1013hPa (560 ~ 760mmHg/equivalent to 0 ~ 2,600m above the sea level)
12) Power consumption	1100W or less (20°C room temperature, with rated voltage input)
13) Noise level (Officially announced level based on ISO 9296)	

Sound power level (1B=10dB)	6.6B or less (600dpi, printing)
	4.4B or less (standby)
Sound pressure level	53dB or less (600dpi, printing)
(Bystander position)	33dB or less (standby)

The above figures are the values measured when all the options are installed.

14) Dimensions	400 (W) × 507 (D) × 346 (H) mm
15) Weight	About 18kg (printer with cassette)
	About 1.5kg (EP-52 cartridge)
16) Line voltage requirements	
	100-127V (-10%, +6%) 50-60Hz (±2Hz)
	200-240V (-10%, +6%) 50-60Hz (±2Hz)
17) Options	Paper feeder, duplexing unit, envelope feeder

Notes: 1. At the room temperature of 20°C with rated voltage input.
2. When the printer is in READY state at a room temperature of 20°C, the time from reception of the PRINT signal from the video controller until an A4-sized print is delivered to the face-down or face-up tray.
3. When manual duplexing, correct the curl of the print delivered in the face-down tray before setting it in the multi-purpose tray.

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2. Video Controller

1) CPU	RISC processor: Intel 960HD-50
2) RAM	Standard: 4MB
	Maximum: 36MB
3) ROM	4MB
4) ROM DIMM socket	3
5) RAM DIMM socket	2
6) Host interface	Standard: IEEE 1284 parallel interface
	Option: expansion interface (Ethernet, Token Ring)
7) Language	Standard: PCL 6, PCL 5e plus PCL-XL
	Option: Adobe PostScript Level 3
8) Resident fonts	45 Scalable fonts (MicroType fonts), 8 Bitmap font
9) Optional fonts	136 fonts
10) Scalar	UFST

Specifications are subject to change with product modification.

B. Options

1. Paper feeder

1)	Paper source	Letter, Legal, Executive, A4, B5-JIS, B5-ISO, and Custom-sized plain paper ($60g/m^2$ ~ $105g/m^2$ recommended paper), recycled paper, colored paper
2)	Capacity	56mm stack (about 500 sheets of $80g/m^2$ paper)
3)	Dimensions	390 (W) × 493 (D) × 129 (H) mm
4)	Weight	About 7kg
5)	Power supply	DC24V (supplied from printer)

2. Duplexing unit

1)	Feed paper	Letter, Legal, Executive, A4, and B5-JIS-sized plain paper ($60g/m^2$ ~ $105g/m^2$ recommended paper)
2)	Dimensions	319 (W) × 360 (D) × 141 (H) mm
3)	Weight	About 3.5kg
4)	Power supply	DC24V (supplied from printer)

3. Envelope feeder

1)	Feeding speed	12 prints/min., 9 prints/min., 6 prints/min. (variable according to the number of envelopes to be printed or the initial temperature of the fixing unit)
2)	Envelope types	Monarch, COM-10, DL, B5, C5 recommended envelopes
3)	Envelope sizes	W. 98.4mm × L. 190mm (min.) ~ W. 216mm × L. 356mm (max.) size
4)	Capacity	55mm stack or 75 envelopes, whichever is less.
5)	Dimensions	326 (W) × 242 (D) × 115 (H) mm
6)	Weight	About 1.5kg
7)	Power supply	DC24V (supplied from printer)

Specifications are subject to change with product modification.

III. ⚠ SAFETY INFORMATION

A. Laser Safety

An invisible laser beam is irradiated within the laser/scanner unit.

Since the laser beam can injure your eye, be sure not to disassemble the laser/scanner unit. Also, it cannot be adjusted in the field.

The label shown below is attached to the laser/scanner unit cover.

Figure 1-3-1

B. Toner Safety

Composed of minute, plastic, colored components, toner is a non-poisonous substance.

If toner adheres to your skin or clothes, remove as much of it as possible with dry tissue paper, then wash with cold water. If you use hot water, the toner will gel and become difficult to remove.

As toner easily breaks down vinyl materials, avoid letting toner come into contact with vinyl.

C. Ozone safety

An infinitesimal amount of ozone gas (O_3) is generated during corona discharge from the charging roller used in this printer. The ozone gas is emitted only when the printer is operating.

This printer meets the ozone emission reference value set by Underwriters Laboratory (UL) at the time it is shipped from the factory.
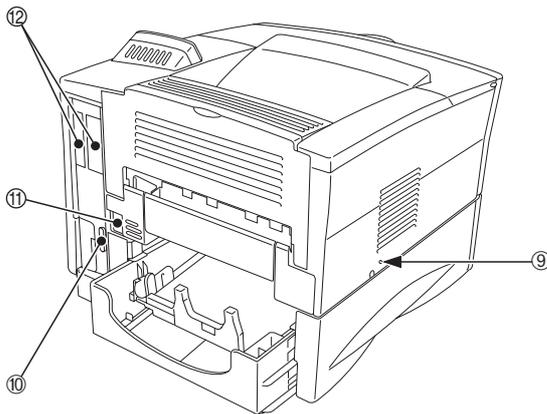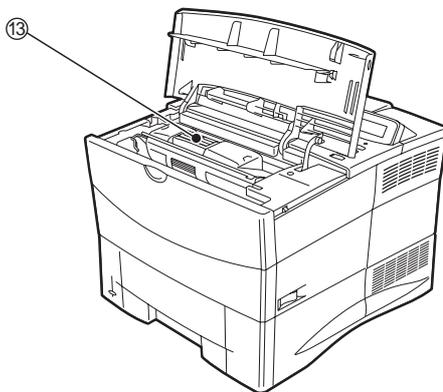
IV. PARTS OF THE PRINTER

A. External Views

1. Printer
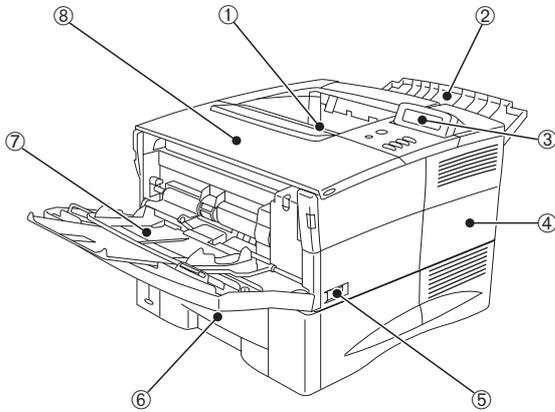
1: Face-down tray
2: Face-up tray
3: Operation panel
4: Right rear cover
5: Power switch
6: Cassette
7: Multi-purpose tray
8: Top cover

Figure 1-4-1

9: Test print switch
10: Parallel interface connector
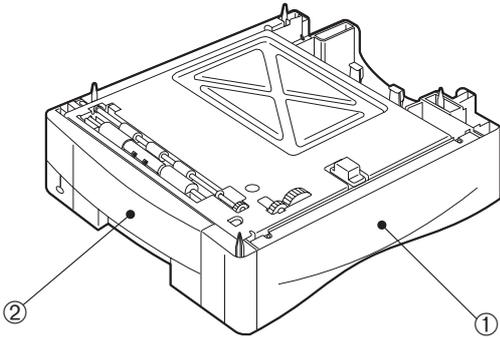11: Power receptacle
12: Expansion I/O slots
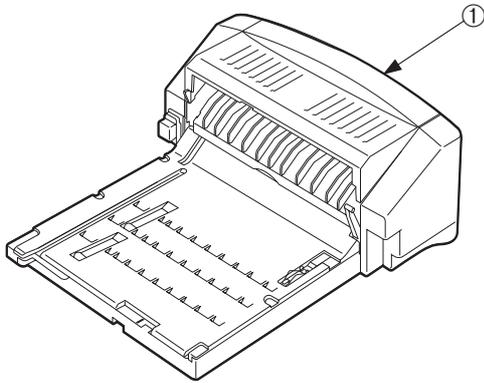
Figure 1-4-2

13: EP-52 cartridge

Figure 1-4-3

2. Paper feeder

1: Paper feeder
2: 500-sheet cassette
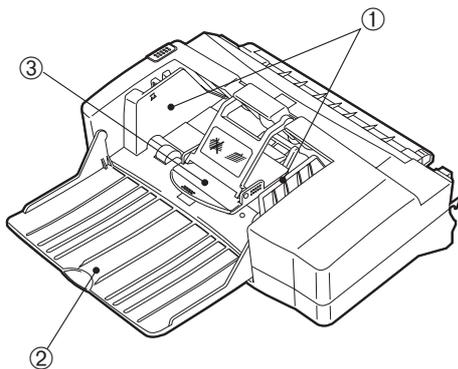
Figure 1-4-4

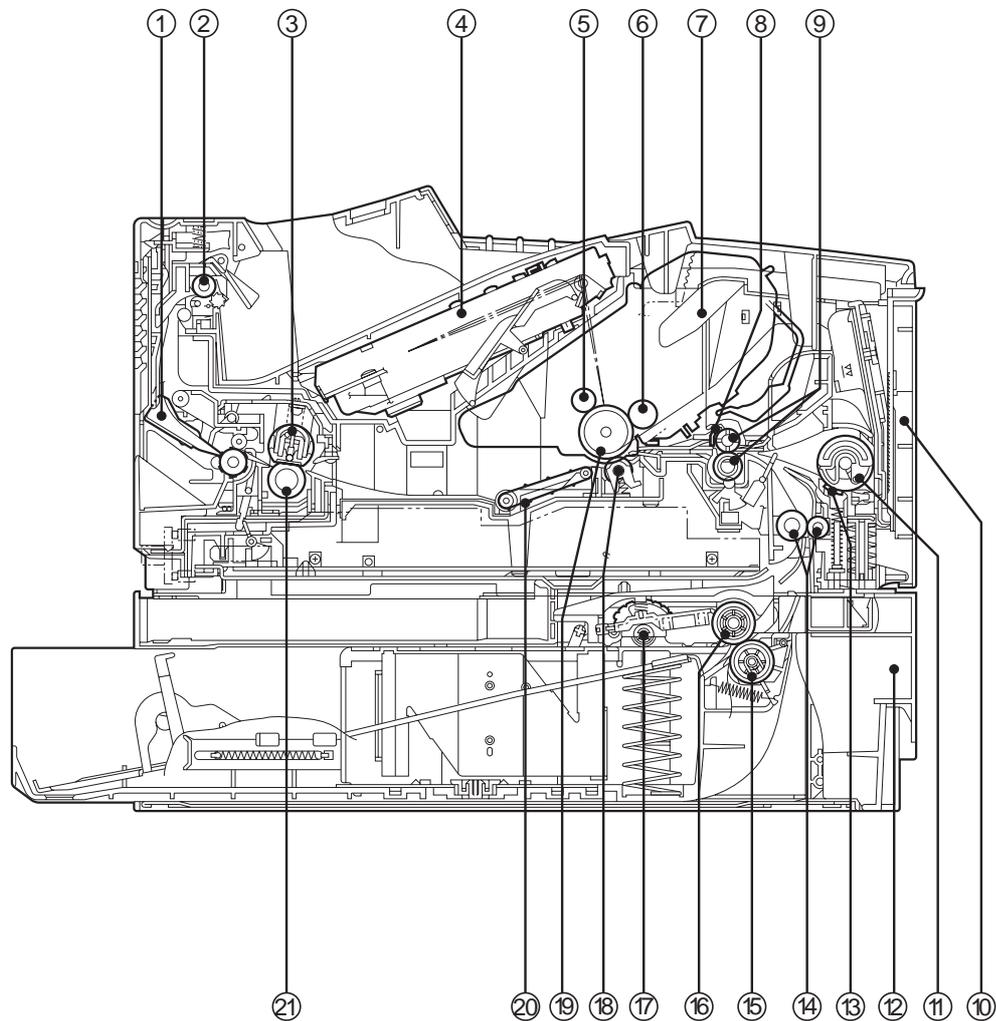## 3. Duplexing unit

1: Duplexing unit jam release cover

Figure 1-4-5

4. Envelope feeder

1: Envelope guide
2: Extension tray
3: Weight

Figure 1-4-6

B. Cross-sectional Views
1. Printer

Figure 1-4-7

1: Face-up deflector
2: Face-down delivery roller
3: Fixing film unit
4: Laser/scanner unit
5: Primary charging roller
6: Developing cylinder
7: EP-52 cartridge
8: Registration arm
9: Pre-transfer rollers
10: Multi-purpose tray
11: Multi-purpose tray pick-up roller

12: Cassette
13: Separation pad
14: Feed rollers
15: Cassette separation roller
16: Cassette feed roller
17: Cassette pick-up rollers
18: Transfer charging roller
19: Photosensitive drum
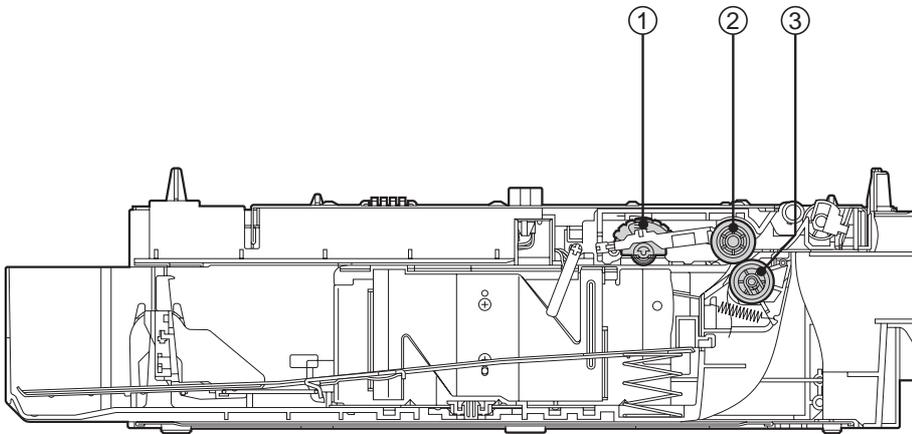20: Feed belt
21: Pressure roller

2. Paper feeder

Figure 1-4-8

1: Pick-up roller
2: Feed roller
3: Separation roller

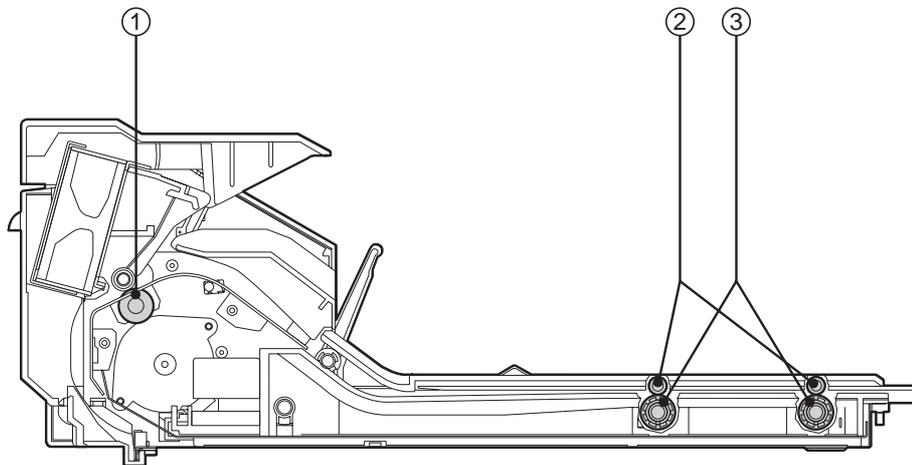## 3. Duplexing unit

Figure 1-4-9

1: Reversing roller
2: Oblique rollers
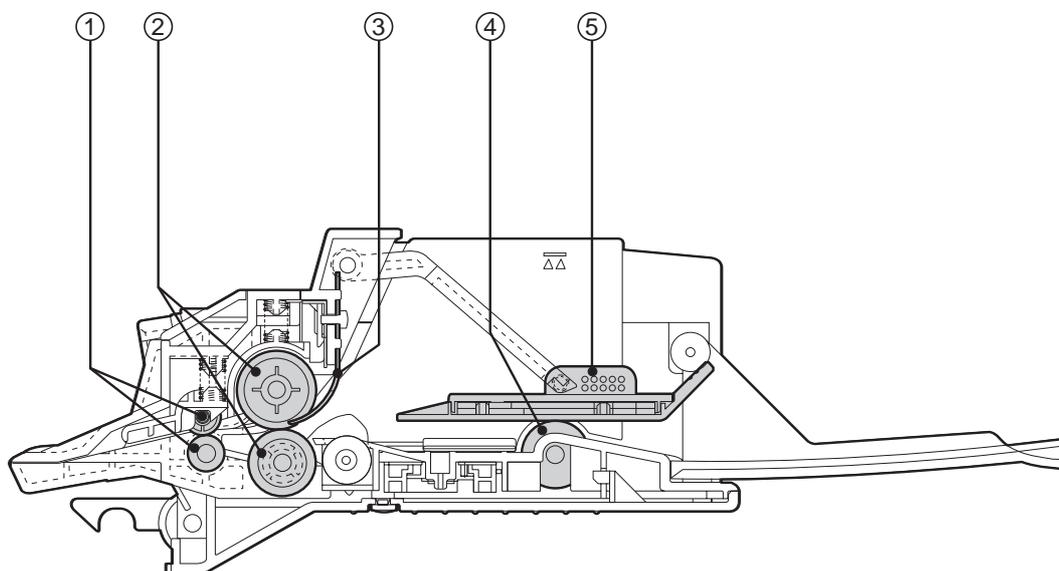3: Duplexing unit pick-up rollers

4. Envelope feeder

Figure 1-4-10

1: Feed rollers
2: Separation rollers
3: Separation guide
4: Pick-up rollers
5: Weight

V. INSTALLATION

A. Outline

This printer is packaged and shipped from the factory after careful adjustments and rigorous inspections.

When installing the printer, it is important to demonstrate its performance in the same way as when it passed the factory inspection.

The service engineer must sufficiently understand the performance of the printer, install it correctly in a location with an appropriate environment, and conduct sufficient checks of the unit.

B. Location Selection

Before taking the printer to the customer's premises, you should confirm the following installation conditions.

1. Power supply

Use the following power supplies:
• Line voltage (AC): -10%, +6% rated voltage
• Power frequency: 50/60 Hz±2 Hz

2. Operating environment

Install in a location that meets the following conditions:
• Level, flat surface
• Temperature, humidity within the following ranges:
   Surrounding temperature: 7.5 ~ 32.5°C
   Surrounding humidity: 5 ~ 90%RH (relative humidity)
• Cool, well-ventilated space

Do not install in the following locations:
• Exposed to direct sunlight
   If you cannot avoid such a location, hang heavy curtains, etc. to shut out the direct sunlight.
• Near magnets and devices that emit a magnetic field
• Areas with vibration
• Dusty places
• Near fire or water

3. Installation space

Install the printer at a suitable distance from the walls, leaving enough room to operate it (see Figure 1-5-1).

When installing the printer on a desk, be sure that it is large enough to accommodate the printer's feet (rubber pads) and strong enough to stand its weight.
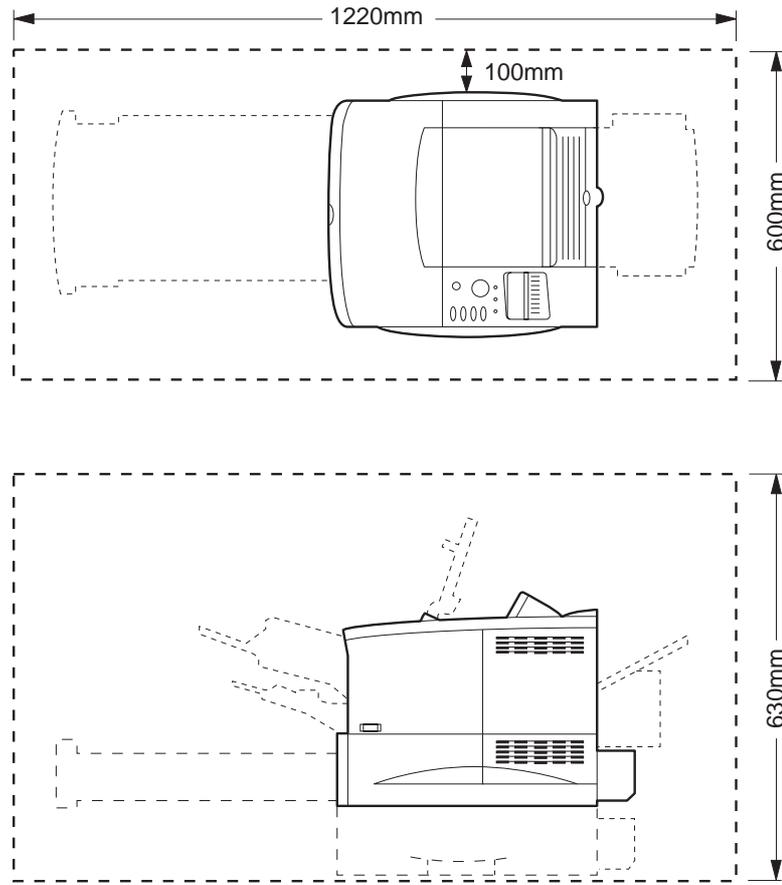
Figure 1-5-1

C. Unpacking and Installation

Condensation appear on metal surfaces in the printer when brought from a cold area into a warm area. Also, since the condensation can cause various troubles including print defects, in such a case, leave it in the carton at room temperature for at least an hour so that it is acclimatized to room temperature.

When installing the options, be sure that the printer is powered OFF.

1. Printer
1) Open the printer packaging.
2) Take out the accessories. Confirm that the power cord, cartridge, CD-ROM, and manuals are included.
3) Take the plastic bag off the printer and peel the tape off each part. Confirm that none of the covers were scratched or deformed during shipment.
4) Open the top cover and remove the tape and packing materials from inside the printer.
5) Remove the tape and spacer from the face-down tray.
6) Take out the cassette from the printer, and remove the packing materials from the cassette.

2. Cartridge
1) Open the bag holding the cartridge and take out the cartridge.
2) Hold the cartridge as shown in figure 1-5-2 and slowly rock it to right and left 5 to 6 times so that the toner is evenly distributed.
3) Place the cartridge on a flat surface. While holding down on the top of the cartridge with one hand, grasp the tab with the other hand and gently pull out the sealing tape.
4) Open the top cover of the printer and load the cartridge in the printer. Make sure to insert the cartridge until it firmly contacts with the back of the slot.

3. Paper feeder
1) Open the paper feeder packaging.
2) Take out the paper feeder with the front and rear pads from the package.
3) Take the plastic bag off the paper feeder and peel the tape off each part. Confirm that none of the covers were scratched or deformed during shipment.
4) Remove the packing materials from the paper feeder.
5) Place the paper feeder on a flat surface.
6) Lift the printer, and align the positioning pins of the paper feeder with the positioning holes of the printer.

4. Envelope feeder
1) Open the envelope feeder packaging.
2) Take off the plastic bag and peel the tape off. Confirm that none of the covers were scratched or deformed during shipment.
3) Remove the packing materials from the envelope feeder.
4) Open the multi-purpose tray of the printer, remove the envelope entrance cover, and open the envelope feeder gear cover.
5) Holding the envelope feeder with both hands, install it into the printer.

5. Duplexing unit
1) Open the duplexing unit packaging.
2) Take off the plastic bag and peel the tape off. Confirm that none of the covers were scratched or deformed during shipment.
3) Remove the packing materials from the duplexing unit.
4) Remove the 2 duplexing unit slot covers from the printer.
5) Holding the duplexing unit with both hands, install in into the printer.

6. Operation confirmation

1) Load paper in the cassette.
2) Plug the power cord into the printer and outlet, and turn the power switch ON. Be sure to use the enclosed power cord.
3) After the printer enters the STANDBY mode, press the test print switch to make a test print. Check if the density of the output image is correct.
4) Keep clean around the printer and ensure that it is ready for use at anytime.

D. Storing, Handling the EP-52 Cartridge

Whether the cartridge is still sealed in its box or installed in the printer, the effect of the natural environment will change it over time regardless of the number of prints. As the progression of this natural change depends on the storage or installation environment, take sufficient care in storing and handling the cartridges.

a. Before unsealing the box

When the cartridge is stored in a warehouse, workshop, etc., be sure to keep it within the ranges shown in Table 1-5-1. Note the following points:
1) Avoid locations in direct sunlight.
2) Do not leave in areas exposed to strong vibration.
3) Do not bump or drop.

Table 1-5-1 Environmental conditions

Temperature	Normal (total storage time × 9/10)		0 to 35°C
	Severe (total storage time × 1/10)	High	35 to 40°C
		Low	−20 to 0°C
	Temperature change (within 3 minutes or so)		40°C→15°C
			−20°C→25°C
Relative humidity	Normal (total storage time × 9/10)		35 to 85% RH
	Severe (total storage time 1/10)	High	85 to 95% RH
		Low	10 to 35% RH
Air pressure			345 to 1013 hPa (460 to 760 mmHg)

Note: Total storage time is the valid time span following the manufacture date displayed on the cartridge box.

b. Storing unsealed parts

As an organic photoconductor (OPC) is used in the photosensitive drum, it will deteriorate if exposed to strong light. As there is also toner in the cartridge, be sure to explain to the customer the need to be careful in handling and storing unsealed cartridges.

1. Storage environment
1) Be sure to store in the protective bag.
2) Avoid locations exposed to direct sunlight, near windows, etc. Do not leave the cartridge in cars for any extended period of time as heat can damage it.
3) Avoid high, low, and changeable temperature/humidity locations.
4) Avoid sites with corrosive gases (pesticides) or salt in the air.
5) Store the cartridge within a range of 0 to 35°C.
6) Do not place the cartridge near CRT displays, disk drives, or floppy disks.
7) Store the cartridges out of reach of children.

2. Effective life

Cartridges are effective for 2.5 years following the date of manufacture, which is displayed in an abbreviated form on the cartridge. The cartridge life span is also displayed (month and year) on the cartridge box as 2.5 years from the date of manufacture. Cartridges should be used within their life spans, as image quality will deteriorate after the expiry date.

c. Handling

1) When loading a new cartridge into the printer, or when blank spots appear on output images due to uneven distribution of the toner during use, hold the cartridge at each end as shown in the figure below. Slowly rock it 5 to 6 times at a 45-degree angle to evenly distribute the toner, and reload it into the printer. Do not shake the cartridge in any other ways, as toner may leak from the developing cylinder or the cleaning unit.
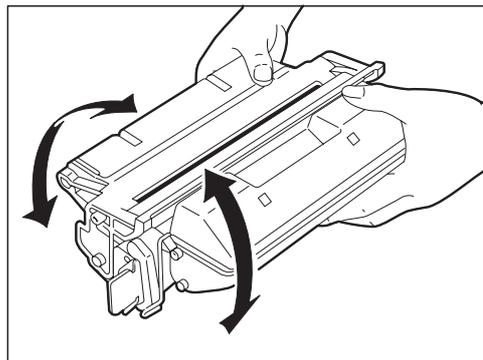

Figure 1-5-2

 After loading the cartridge in the printer, print 3 to 5 sheets of test patterns and check for toner leakage to prevent output image from dirt.

2) Remove the cartridge from the printer before transporting it. During transportation, the cartridge must be kept in the protective bag or thick cloth to prevent direct exposure to light.

3) Avoid placing the cartridge near CRT displays, disk drives or floppy disks, as the magnetism generated by the cartridge may destroy the data.

4) As the photosensitive drum is sensitive to strong light, do not expose the cartridge to direct sunlight or strong light. If it is exposed to strong light, blank spots or black lines may appear on images. In such cases, stop the printer for a while. However, these problems may still remain if the drum has been exposed to strong light for an extended period of time.

5) Do not open the photosensitive drum protective shutter by hand nor touch the drum surface. Do not clean the drum.

6) Do not stand the cartridge nor upside down. Always place it so that the label side faces upward.
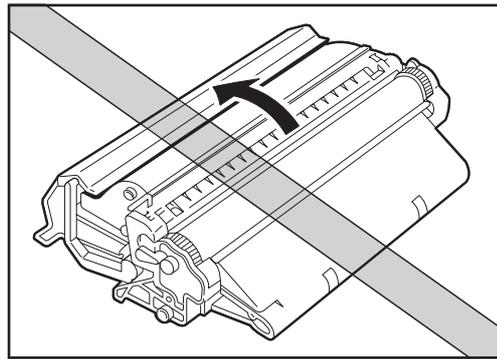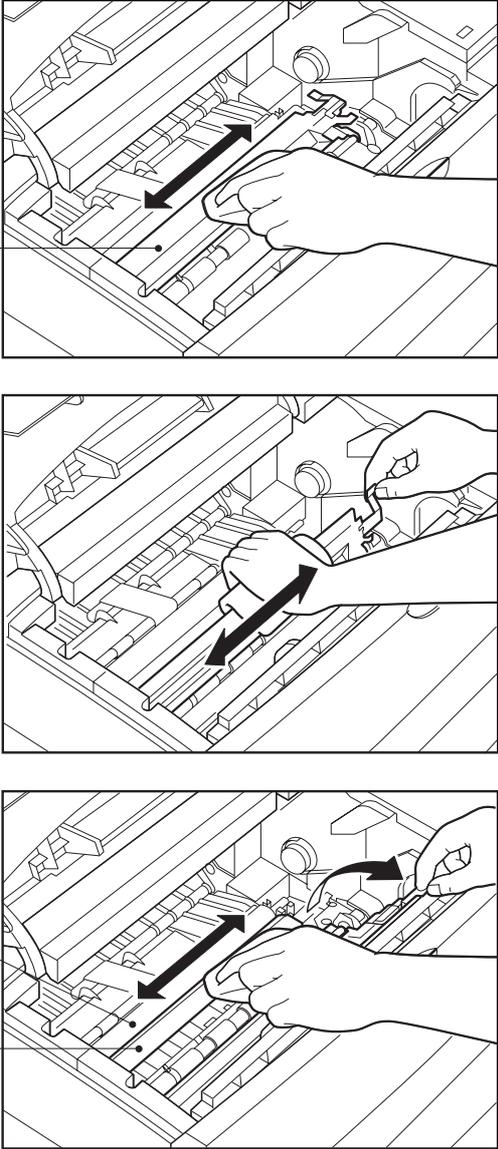
7) Do not disassemble the cartridge.

Figure 1-5-3

VI. MAINTENANCE AND SERVICING BY THE CUSTOMER

Table 1-6-1 shows the maintenance the customer should conduct to ensure optimum machine performance at all times.

Table 1-6-1

Item	Customer maintenance
Cartridge	Rock the cartridge or replace it, if necessary.
Transfer guide	Clean the transfer guide when replacing the cartridge. Upper transfer guide Transfer charging roller Lower transfer guide

VII. OPERATION

A. The Operation Panel

The operation panel is used to perform basic printer operations, make printer configuration changes that software applications cannot control, identify available typefaces, and check the status of the printer.

The operation panel consists of the status indication display, three indicator lights, and six menu and operation keys.
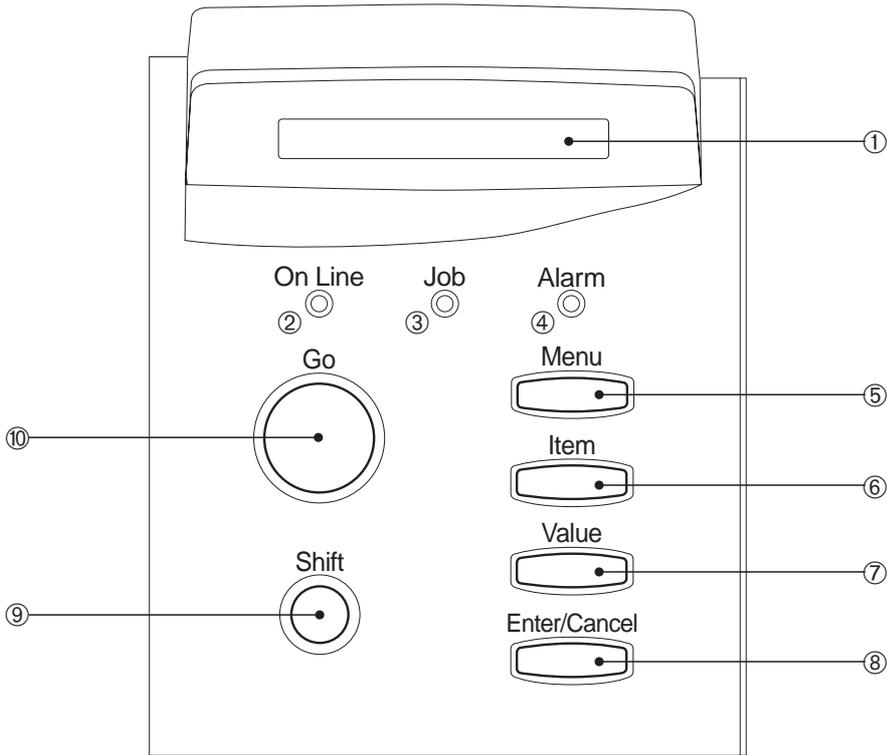

Figure 1-7-1

• **Status indication display (2-line, 16-segment LCD): 1**
 Indicates the printer status and menu setting, and displays messages.
• **On Line indicator: 2**
ON:
The printer is on-line.
Blinking:
The printer is processing or printing.
OFF:
The printer is off-line.

• **Job indicator: 3**
ON:
A page buffer has been composed and is currently stored in printer memory.
Blinking:

1 - 20