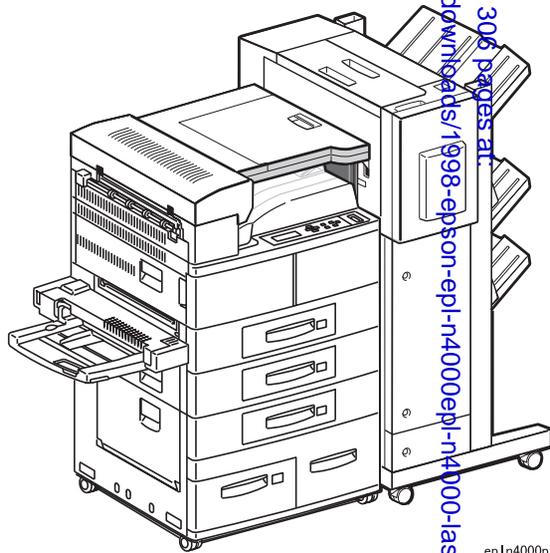


SERVICE MANUAL



ep1n4000p



EPSON®

Laser Printer
EPSON EPL-N4000 / EPL-N4000+

Product: 1998 EPSON EPL-N4000/EPL-N4000+ Laser Printer Service Repair Workshop Manual
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PRECAUTIONS

Precautionary notations throughout the text are categorized relative to 1) Personal injury and 2) damage to equipment.

DANGER Signals a precaution which, if ignored, could result in serious or fatal personal injury. Great caution should be exercised in performing procedures preceded by DANGER Headings.

WARNING Signals a precaution which, if ignored, could result in damage to equipment.

The precautionary measures itemized below should always be observed when performing repair/maintenance procedures.

DANGER

1. ALWAYS DISCONNECT THE PRODUCT FROM THE POWER SOURCE AND PERIPHERAL DEVICES PERFORMING ANY MAINTENANCE OR REPAIR PROCEDURES.
2. NO WORK SHOULD BE PERFORMED ON THE UNIT BY PERSONS UNFAMILIAR WITH BASIC SAFETY MEASURES AS DICTATED FOR ALL ELECTRONICS TECHNICIANS IN THEIR LINE OF WORK.
3. WHEN PERFORMING TESTING AS DICTATED WITHIN THIS MANUAL, DO NOT CONNECT THE UNIT TO A POWER SOURCE UNTIL INSTRUCTED TO DO SO. WHEN THE POWER SUPPLY CABLE MUST BE CONNECTED, USE EXTREME CAUTION IN WORKING ON POWER SUPPLY AND OTHER ELECTRONIC COMPONENTS.

WARNING

1. REPAIRS ON EPSON PRODUCT SHOULD BE PERFORMED ONLY BY AN EPSON CERTIFIED REPAIR TECHNICIAN.
2. MAKE CERTAIN THAT THE SOURCE VOLTAGES IS THE SAME AS THE RATED VOLTAGE, LISTED ON THE SERIAL NUMBER/ RATING PLATE. IF THE EPSON PRODUCT HAS A PRIMARY AC RATING DIFFERENT FROM AVAILABLE POWER SOURCE, DO NOT CONNECT IT TO THE POWER SOURCE.
3. ALWAYS VERIFY THAT THE EPSON PRODUCT HAS BEEN DISCONNECTED FROM THE POWER SOURCE BEFORE REMOVING OR REPLACING PRINTED CIRCUIT BOARDS AND/OR INDIVIDUAL CHIPS.
4. IN ORDER TO PROTECT SENSITIVE MICROPROCESSORS AND CIRCUITRY, USE STATIC DISCHARGE EQUIPMENT, SUCH AS ANTI-STATIC WRIST STRAPS, WHEN ACCESSING INTERNAL COMPONENTS.
5. REPLACE MALFUNCTIONING COMPONENTS ONLY WITH THOSE COMPONENTS BY THE MANUFACTURE; INTRODUCTION OF SECOND-SOURCE ICs OR OTHER NONAPPROVED COMPONENTS MAY DAMAGE THE PRODUCT AND VOID ANY APPLICABLE EPSON WARRANTY.

About This Manual

This manual describes basic functions, theory of electrical and mechanical operations, maintenance and repair procedures of EPL-N4000/N4000+. The instructions and procedures included herein are intended for the experienced repair technicians, and attention should be given to the precautions on the preceding page.

Contents

This manual consists of six chapters and Appendix.

CHAPTER 1. PRODUCT DESCRIPTIONS

Provides a general overview and specifications of the product.

CHAPTER 2. OPERATING PRINCIPLES

Describes the theory of electrical and mechanical operations of the product.

CHAPTER 3. TROUBLESHOOTING

Provides the step-by-step procedures for the troubleshooting.

CHAPTER 4. DISASSEMBLY AND ASSEMBLY

Describes the step-by-step procedures for disassembling and assembling the product.

CHAPTER 5. ADJUSTMENTS

Provides Epson-approved methods for adjustment.

CHAPTER 6. MAINTENANCE

Provides preventive maintenance procedures and the lists of Epson-approved lubricants and adhesives required for servicing the product.

APPENDIX Provides the following additional information for reference:

- Connector pin assignments
- Electric circuit boards components layout
- Exploded diagram
- Electrical circuit boards schematics

Symbols Used in This Manual

Various symbols are used throughout this manual either to provide additional information on a specific topic or to warn of possible danger present during a procedure or an action. Be aware of all symbols when they are used, and always read WARNING, CAUTION or NOTE messages.



Indicates an operating or maintenance procedure, practice or condition that, if not strictly observed, could result in injury or loss of life.



Indicates an operating or maintenance procedure, practice, or condition that, if not strictly observed, could result in damage to, or destruction of, equipment.



May indicate an operating or maintenance procedure, practice or condition that is necessary to accomplish a task efficiently. It may also provide additional information that is related to a specific subject, or comment on the results achieved through a previous action.

Safety Information

To prevent accidents during a maintenance procedure, strictly observe the Warnings and Cautions. Do not do anything that is dangerous or not within the scope of this document.

Do not do anything that is dangerous even if not specifically described in this manual. In addition to the descriptions below and those given in this manual, there are many situations and circumstances that are dangerous. Be aware of these when you are working with the printer.

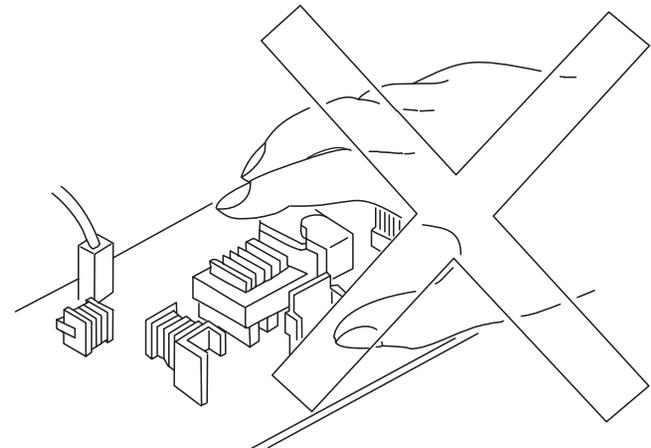
Safety Precautions

POWER SUPPLY AND ELECTRICAL COMPONENTS

Before starting any service procedure, turn off the printer and unplug the power cord from the wall outlet. If you must service the printer with the power applied, be aware of the potential for electrical shock and do all tasks by following the procedures in this manual.



Do not touch any electrified component unless you are instructed to do so by service procedure.

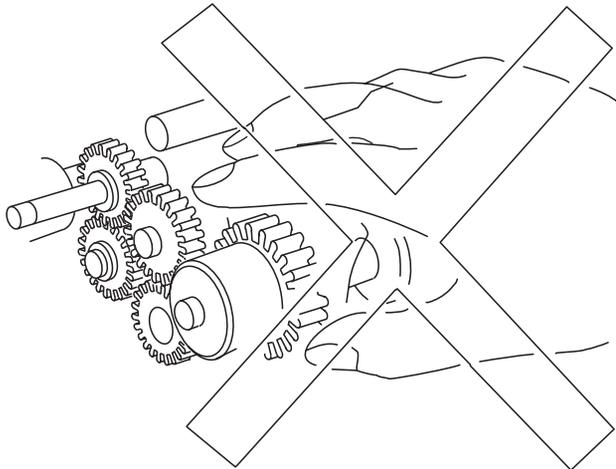


MECHANICAL COMPONENTS

If you service a driving assembly (e.g., gears), first turn off the power and unplug the power cord. Then manually rotate the assembly.



Do not try to manually rotate or stop the drive assemblies while the Main Motor is running.



LASER ASSEMBLY



This printer uses a laser as part of the printing process. The laser beam is a very powerful, straight, narrow beam of light that produces extreme heat at its focal point. The laser beam in this printer is invisible. Although you cannot see the beam, it can still cause severe damage. Direct eye exposure to the laser beam may cause eye injury or blindness. Never place a mirror or a reflective tool or object in the laser beam path.

To avoid permanent eye damage, follow these directions;

- Before starting any service procedure, switch off the printer power and unplug the power cord from the wall outlet.
- Do not disassemble the ROS Assembly or any laser component that displays a Laser Warning Sticker.
- Use caution when you are working around the ROS Assembly or when you are performing laser related repair procedures.
- Do not disassemble the printer in such a way that the laser beam can exit the printer engine during a print cycle.

Safety Components

Make sure fuses, interlock switches, covers and panels are all functioning properly after you have reinstalled or replaced them.

Warning/Caution Labels

WARNING and CAUTION labels are stuck on dangerous parts in the printer to make you aware of the potential dangers that are present when you are working with those parts.

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CHAPTER

1

PRODUCT DESCRIPTION

1.1 Features

EPL-N4000/N4000+ is non-impact page printer applied with laser xerographic method.

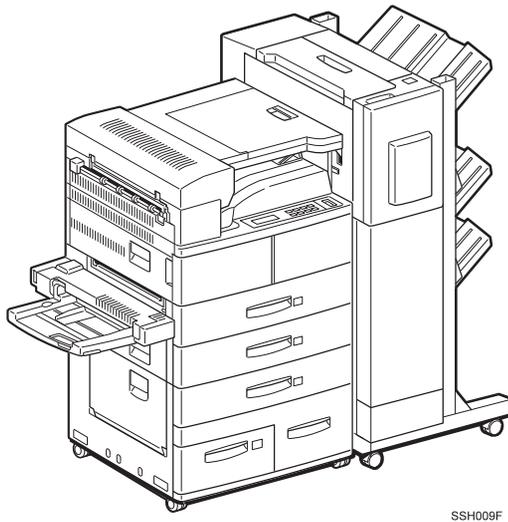


Figure 1-1. Exterior View of EPL-N4000+

ENGINE FEATURES

- High speed & high reliability A3 engine.
- Resolution:600 dpi
- Printing speed:40 ppm (A4) / 40ppm (Letter)
- Standard paper feeders are two universal cassettes (500 sheets x2) and manual feed tray (50 sheets)

- Options: large-capacity paper unit (500 sheets(A4 to A3) on MP tray + 1000 sheets on cassette 1 + 1000 sheets (A4, Letter, and Executive sizes) on cassette 2)
Refer to Table 1-6, "Feeding Method," on page 10 for details.
- Offset stacking equipped as standard
- Wide range of options (Duplex Module, Face-up tray, Envelope Feeder, Multibin Unit, Finisher Stapler*, HDD*)

NOTE: Finisher Stapler and HDD are only supported from EPL-N4000+. Refer to Table 1-2 on page 4 for support range.

CONTROLLER FEATURES

- High speed controller, employing new CPU
64-bit RISC CPU VR4700 133MHz
- SDRAM DIMMs adopted
64MB RAM equipped as standard
Expandable up to 256 MB (using commercially available SDRAM DIMMs) However, 256MB SDRAM DIMMs cannot be used.
- Two standard interfaces
IEEE 1284 parallel interface
Ethernet interface (100Base-TX)
- 1 slot for Type B interface
Type B Level 3 is supported from EPL-N4000+.
- Enhanced Micro Gray loaded

SOFTWARE FEATURES

- Supported emulation
 - PCL5e Enhanced Micro Gray support, paper handling support
 - PostScript Level3*1 Refer to the Adobe PS 3 kit specification
 - ESC/Page Enhanced Micro Gray support, paper handling support
 - EPL-N4000+ ESC/Page language has upward compatibility compared to EPL-N4000.
 - FX, ESC/P2,1239X Paper handling support
 - PJL, EJL
 - RCC Firmware updating function
 - DIAG Adjusts engine. Not open to users.
 - EpsonNet WebAssist Enables to set printer configuration and network configuration using a web browser. Only English version is available and Internet Explorer 4.01 or above is necessary.

NOTE: *1 PostScript Level3 is optional. To be installed in slot A or B. Dedicated to EPL-N4000. Adobe PS 3 kit needs to be updated to EPL-N4000+, too.

Firmware	Adobe PS 3 kit module	Print	Finisher, HDD
EPL-N4000	EPL-N400	enable	disable
EPL-N4000	EPL-N4000+	enable	disable
EPL-N4000+	EPL-N4000	disable (invalid Adobe PS 3 kit error)	disable
EPL-N4000+	EPL-N4000+	enable	enable

- Rewriting flash ROM DIMMs

Flash ROM DIMMs in slot A and the program slot can be rewritten from any I/F. (Not open to users except slot A.)
 Downloading of NLSP is written through slot A and inserted in slot C when used. When rewriting the firmware of Adobe PS 3 kit for EPL-N4000 to Adobe PS 3 kit for EPL-N4000+, insert in slot A.
- Panel Setting
 - EPL-N4000:

Available to set the printer mode, print menu and device menu individually by each language's environment interface
 - EPL-N4000+:

All modes except the printer mode are changed to the common environment with interface.
 Environment setting not by the panel operation is added

Table 1-1. Printer environment setting not by the panel setting

	EPL-N4000	EPL-N4000+
Panel setting by Web	---	○
Network setting by Web	○	○
Network setting by ENPC	---	○

NOTE: "○" = Available
 "--" = Not available

- Support range of EPL-N4000 and EPL-N4000+

For this product, firmware will be developed in two stages, EPL-N4000 and EPL-N4000+. Firmware is stored in the flash ROM DIMM, and therefore it can be modified from EPL-N4000 to EPL-N4000+. Each support range is as follows: The hardware is common.

Table 1-2. Support Range

Option	EPL-N4000	EPL-N4000+
Large capacity Paper Unit	○	○
Duplex Module	○	○
Multibin Unit; Mailbox Sorter Multiple Sorter Stacker	○ ○ ○ ○	○ ○ ○ ○
Finisher Stapler; Stacker + Stapler	--	○
Face-up Tray	○	○
Envelope Feeder	○	○
Collate printing (electronic sorter) RAM HDD	○ --	○ ○ (The RAM sorter is not used when HDD is installed)

Utilities for Printer Setting

Table 1-3. Utilities for Printer Setting

Option	EPL-N4000	EPL-N4000+
EPSON Remote Control Panel	○	-- (panel setting utility)
EPSON Net!2 for Intranet	○	--(Network Setting)
EpsonNet WebAssist (built-in)	--	○ (panel, network setting)
EpsonNet Web Manager	--	○ (network control utility)
EpsonNet WinAssist, MacAssist	--	○ (network setting utility)
EPSON Status Monitor 2	○	--(included in the driver function with EPL-N4000+)
EPSON Status Monitor 3	--	○ (installed with the printer driver)
EPSON Net Direct Print	--	○

NOTE: Error will occur if the Finisher and HDD options are installed to EPL-N4000. The Multibin unit and Finisher Stapler cannot be installed at the same time. For installing the Multibin Unit of Finisher Stapler, the Large Capacity Paper Unit is required.

HDD option

HDD is used up to 1 GB for spooling print data which are received via network. And the Adobe PS 3 kit Option used up to 1GB.
Data spooling: When Network Menu/Buffer Size=Max is selected, received data is spooled in the HDD after the network receiving buffer becomes full.

1.2 Changes from EPL-N4000 to EPL-N4000+

Here explains the changes from EPL-N4000 to EPL-N4000+.

DIFFERENCE OF PANEL SETTING

- “Printing Menu”, “Device Menu” “ESC/PS Environment Menu” and “ESC/Page Environment Menu”
 - “Start ,menu”, “Initialization Menu” are erased
 - “Setting Initialization = All setting” in the “Initialization Menu” is added as “Setting Initialization” of “Common Menu”.
 - “One-touch” is added to “Printer Mode Menu”

DESIGNED FOR FINISHER AND STAPLE

- The following are added to the panel settings.
 - Setup Menu/Stacker
 - Printing Menu/Staple
 - Printing Menu/Staple position
 - Support Menu/HDD Format
 - Support Menu/Adobe PS 3 kit HDD Init
- The following are added to the printer message.
 - Finisher Error yyy
 - Can'tAdjustFnshrTray
 - Finisher N Full
 - Install Staple Crtg
 - Cover E Open

- Cover F Open
- Cover G Open
- Cover H Open
- Staple Cover Open
- Finisher Not Connect
- Stapler Supply
- Can't Staple (Warning)
- Staple Align (Warning)
- Check Stapler (Warning)
- Adobe PS 3 kit Hard Disk full
- Maintenance Req 0001-0013

- Following message is erased from the printer message
 - Optional device error

DESIGNED FOR ADOBE PS 3 KIT

- The following is added to the printer messages.
 - Invalid Adobe PS 3 kit

MODIFIED ESC/PAGE

- The following were added to the panel setting items.
 - PGI was added to ESC/Page Menu.
 - ESC/Page was added to IES.
- The following commands were added.
 - Job clear (GS pcO)

- graphics relative position coordinate mode 2 (GS 2 sarG)
- GS command encode (GS n1; n2ecE, GS n1; n2ec{E)
- stretch raster image compression 5 (GS n1; to; n6 srl)
- noPGI mode in gray color space

MODIFIED ESCP2,FX

- The emulation target was designed for Euro.

RECEIVE DATA SPOOLING, ELECTRONIC SORTING AND PS FONT DOWNLOADING WERE ADDED FOR USE OF HDD

- The following were added to the panel setting items.
 - Support Menu/HDD Format
 - Support Menu/Adobe PS 3 kit HDD Init
- The following were added to the printer messages.
 - Invalid HDD
 - Adobe PS 3 kit Hard Disk full

DESIGNED FOR TYPE B OPTION LEVEL3

- "D4" was added to MAIN System Type of Type-B I/F
- The following were added to the Panel Setting items.
 - AUX Status Sheet to Test Menu
 - AUX Config to Aux Menu
 - Get IP address to Aux Menu
 - IP Byte to Aux Menu
 - SM Byte to Aux Menu

- GW Byte to Aux Menu
- NetWare to Aux Menu
- Apple Talk to Aux Menu
- NetBEUI to Aux Menu
- AUX Init to Aux Menu

ADDED NETWORK PROTOCOL

- ENPC(EPSON Network Peripheral Control Protocol) protocol was added to the built-in network.
- Epson Net Web Manager, WinAssist and MacAssist were added to the utilities packed with the product.

DESIGNED FOR PANEL SETTING BY WEB

- All panel setting items were designed for setting from Web (EPSONNet WebAssist)
- EPSON Remote Control Panel was deleted from the utilities packed with the product.

MODIFIED PANEL SETTING

- The following panel setting items other than the above were modified.
- The order of Test Menu was changed.
 - It was designed that Binding would also appear in the Printing Menu when the finisher was installed.
 - MP Mode was added to the Tray Menu
 - Setup Menu/Auto Eject Page
 - LANG=SUOMI in the Setup Menu was changed to KIELI=SUOMI.

- Setup Menu/Stacker
- Page Count in the Setup Menu was changed to Total Pages.
- Network Config was added to the Network Menu
- "DHCP", a choice of Get IP Address in the Network Menu, was changed to "Auto".
- Default values of IP Address, Subnet Mask and Default Gateway in the Network Menu were changed.
- The Support Menu was added.
- "Total Counter Clear" was moved after "Fuser Counter Clear" in the Maintenance Menu.

MODIFIED APPLE TALK ENTITY TYPE

If Emulation is fixed for a certain language, the language's Entity Type and EPSONPAGE4 are returned.

1.3 Basic Specification

1.3.1 Controller Specification

CPU

- CPU: 64-bit RISC CPU VR4700 133MHz

RAM

- RAM: SDRAM DIMMs adopted
 - 64 MB RAM fitted as standard (SDRAM DIMM type. However, 8MB is used as a system area)
- DIMM option: 8MB*, 16MB, 32MB, 64MB, 128MB (SDRAM type, 2 slots) Maximum

NOTE: * 8 MB is rarely distributed and therefore, this is not stated in the catalog and specification.

ROM

- Fonts: 2M bytes (mounted on main board)
- Program: 4M bytes (mounted on flash ROM DIMM board)
- Expansion ROM: 3 ROM DIMM slots (Can be mounted and removed only when power is off)
 - Slot A: Adobe PS 3 kit or option fonts
 - Slot B: Adobe PS 3 kit or option fonts
 - Slot C: NLSP fonts
 - Only one Adobe PS 3 kit can be mounted

HOST INTERFACES

- Host Interfaces:
 - Standard: Parallel IEEE 1284 compliant, bidirectional, B-type connector. Compatibility, Nibble, ECP Ethernet 10 BaseT/100BaseTX
 - Option: Type B I/F slot (1 slot)

PRINTER SETTING

- By EJL, PJJ, HTTP, SNMP and ENPC (EPL-N4000+)
- Memory element EEPROM serial type 16KB

CONTROL PANEL

- Control Panel:
 - Switch: 8 switches
 - LED: 6 LEDs
 - LCD: 20-character LCD

MOUNTING

Fixed on main unit

HDD OPTION

- HDD option: IDE type. 4GB or 6GB (TBD). Dedicated format for EPL-N4000. Required when finisher option is used. Can be used only with software of EPL-N4000+. Already formatted; no initialization required.

MISCELLANEOUS

Mechanical control function is not built in.

1.3.2 Engine Specification

- Printing Method: Electro-photographic printing, utilizing semiconductor laser beam scan and single-component magnetic toner.
- Resolution: 600 dpi
- Printing Speed:

Table 1-4. Printing Speed (PPM)

Size	One-Side Printing						Duplex Printing					
	C1	C2	MP Tray ^a	High Capacity Feeder ^d			C1	C2	MP Tray	High Capacity Feeder		
				C3	C4	C5				C3	C4	C5
A4 ~ L ^c	40	38	32 (16)	38	37	35	28	28	27	26	24	25
A3 ~ P ^d	20	20	19 (12)	20	--	--	14	14	13	13	--	--
LT ~ L	40	37	31 (16)	37	36	35	28	28	27	26	24	22

- Note):*
- a:* () is for custom size(unfixed form).
 - b:* High(large) Capacity Feeder is optional.
 - c:* L means long edge first setting.
 - d:* P means short edge first setting.

- Time to print first sheet

Table 1-5. Time to print first sheet(sec.)

One-Side Printing						Duplex Printing						
Size	C1	C2	MP Tray ^a	High Capacity Feeder ^d			C1	C2	MP Tray	High Capacity Feeder		
				C3	C4	C5				C3	C4	C5
A4 ~ L ^a	10.0	10.8	TBD	11.1	12.0	13.2	14.6	15.4	TBD	15.7	16.6	17.8
LT ~ L	10.0	10.8	TBD	11.1	12.0	13.2	14.6	15.4	TBD	15.7	16.6	17.8

Note): a: () is for custom size(unfixed form).
 b. High(large) Capacity Feeder is optional.

- Warm-Up Time: Within 60 seconds (at 23 °C/rated voltage)

1.3.3 Paper Specification

- Paper Feeding
 Maximum 6 ways:
 MP (Multi purpose tray), Cassette1, Casset 2, Cassette 3, Casset 4, Cassette 5.
- Paper Feed volume
 - Standard (No optional parts)
 1050 sheets (50 + 500 x 2)
 - When using optional parts
 3550 sheets (Standard + 500 + 1000 x 2)

- Feeding Method

Table 1-6. Feeding Method

Paper Feeding Method		Volume (sheet)	Paper Size	Paper thickness (g/m ²)
Standard	MP(Multi purpose tray)	50 ^a	<ul style="list-style-type: none"> • Standard size paper (A3, B4, F4, Ledger, Legal, Government Legal, Executive) • Custom size paper 	Normal Paper 60-90
		5mm high	A4, B5, A5, Labels, OHP, Thick Paper, Letter, Government Letter, Half-Letter	Normal Paper 60-90 Thick Paper 90-190
	Cassette 1	500	A3-L, B4-P, A4-L, B5-L, A5-L	Normal Paper 60-90
		TBD	Labels, OHP-sheet, thick paper, Letter	Normal Paper 60-90
	Cassette 2	500	A3-P, B4-P, A4-L, B5-L, A5-L	Normal Paper 60-90
		TBD	Labels, OHP-sheet, thick paper, Letter	Normal Paper 60-90
High Capacity Feeder (Optional)	Cassette 3	Same as Cassette 2		
	Cassette 4&5	Each 1000	A3-L, B4-P, A4-L, B5-L, A5-L	Normal Paper 60-90
		TBD	Labels, OHP-sheet, thick paper, Letter	Normal Paper 60-90 Thick Paper 90-190

Note): a.:With 75g/m² paper.

Table 1-7. Paper Size and Mounting Direction

Paper Type	Paper	Paper Size	Mounting Direction					Duplex printing
			MP Tray	C1	C2	C3	C4,5	
Normal Paper	A3	297 x 420	P ^a	P ^b	P	P	-- ^c	O ^d
	A4	210 x 297	L	L	L	L	L	O
	A5	148 x 210	L	L	--	--	--	--
	B4	257 x 364	P	P	P	P	--	O
	B5	182 x 257	L	L	L	L	L	O
	B(LD)	279.4 x 431.8	P	P	P	P	--	O
	LG	215.9 x 355.6	P	P	P	P	--	O
	GLG	215.9 x 330.2	P	P	P	P	--	O
Normal Paper	LT	215.9 x 279.4	L	L	L	L	L	O
	GLT	215.9 x 266.7	L	--	--	--	--	O
	EXE	184.1 x 266.7	L	L	L	L	L	O
	HLT	139.7 x 215.9	L	L	--	--	--	--
Special Paper	F4	210 x 330	P	--	--	--	--	O
	OHP	A4/LT	L	L	L	L	L	--
	Label	A4/LT	L	L	L	L	L	--

Note): a.L: Long edge first setting.
 b.P: Short edge first setting.
 c.--: Not available.
 d.O: Available.

- Supported paper size: Width=100 to 297 mm
Length=139.7 to 431.8 mm
- Paper Feed Standard: Only one side for each size and each paper feeding
- Paper Eject

Table 1-8. Paper Eject Volume

Paper Eject Type	Volume (sheet)	Paper size/Type	Thickness (g/m ²)
Face down	500	All size, type and Custom size.	Normal Paper 60-90
Face down (Offset) ^a	--	Normal Paper (Refer to Table1-7 "Paper Size and Mounting Direction")	Normal Paper 60-90 Thick Paper 90-190
Face up	200	Same as Face-up	
Mailbox	100 sheet x each 10 mail box	Normal Paper (Refer to Table1-7 "Paper Size and Mounting Direction")	Normal Paper 60-90

Note): a.Standard function for the face down.
 Offset volume: Approx.20mm

- Guaranteed print area
 - Printable area
297 mm (width) x 431.8 mm (length)
 - Guaranteed print area
Entire paper area, excluding 4.0 mm from each edge of the paper.

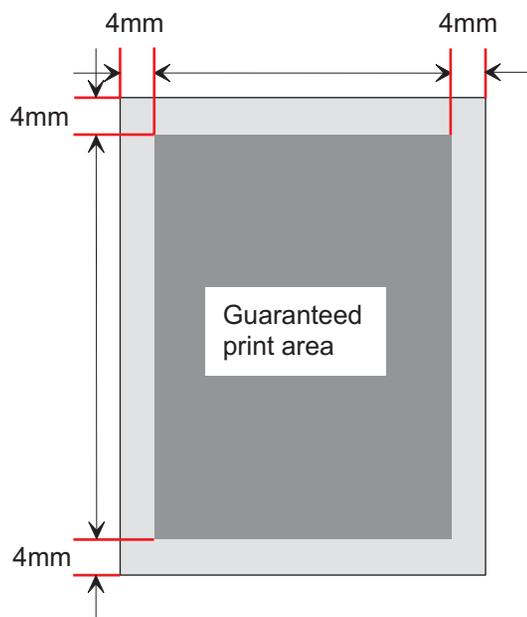


Figure 1-2. Printable Area

1.3.4 Electrical Specification

- Power Consumption (printer body)

Table 1-9. Power Consumption

		120V	200V
Input Voltage		108 ~ 127V	198 ~ 254V
Rated Frequency		50-60Hz±3Hz	50-60Hz±3Hz
Maximum Currency		Less than 9.6A	Less than 5.2A
Power Consumption	Maximum	Less than 1180W	Less than 1243W
	Continuous printing (Average)	TBD	TBD
	Power Saving (Stand-by) (Heater Off)	Less than 45W	Less than 45W

- High Capacity Feeder (Optional)
Average consumption electricity: Less than 0.6 A (24V)
Less than 0.2A (5V)
- Mailbox (Optional)
Average consumption electricity: Less than 0.6 A (24V)
Maximum: Less than 2.0 A (24V)
Average consumption electricity: Less than 0.2 A (5V)
- Duplex (Optional)
Average consumption electricity: Less than 0.5 A (24 V)
Less than 0.1 A (5V)

- AC Line Noise:
 - Pulse width = 50 to 1000 ns
 - Pulse polarity = +/-
 - Repetition = Asynchronous
 - Modes = Common / Normal
 - Voltage = 1KV (parts must be able to withstand 2KV without damage)

- Transient Outage: DIP 100% (at rated voltage-100%) 1 cycle
- Electrostatic Tolerance: Less than ± 8KV
No damage to image
- Surge Current: 1/2-cycle / Not above 100A
- Insulation Resistance(TBD): Less than 10 MΩ
- Dielectric Strength: Insulation shall not break down when the following voltage is applied between primary circuit and chassis for 1 minute.

Table 1-10. Dielectric strength

	Primary-Chassis	Primary- Secondary
100/120V	AC1000V	AC2000V
200 V Series	AC1500V	AC3000V

- Leakage Current: 120V 3.5 mA or less
200V series 3.5 mA or less

1.3.5 Reliability, Durability and Maintainability

- MPBF: 400,000 pages (one-side printing)
- Print Volume: Maximum 150,000 pages/month
Average 25,000 pages/month

Table 1-11. Paper Feed Reliability

	Paper Jam Rate ^a		Double Feed Rate	
	Standard Environment	Average of all environment	Standard Environment	Average of all environment
MP Tray	1/200	1/100	1/100	TBD
Cassette1, 2	1/5000	1/2500	1/5000	1/2500
High capacity feeder, Cassette	1/5000	1/2500	1/5000	1/2500

NOTE: a. These figures are measured, assuming normal paper is used. This measurement does not apply when boundary face is generated. Boundary face is generated when the additional paper is added to paper already set.

- Printing position reliability

Table 1-12. Printing position

	One-side printing	duplex printing	MP Tray*
Main Scan direction	±2.0mm	±2.4mm	±2.9mm
Sub scan direction	±1.5mm	±1.9mm	±2.1mm

- Skew (See the figure on next page)

Table 1-13. Skew

	One-side printing	duplex printing	MP Tray*
Main scan direction (c-d)	±2.0mm	±2.4mm	±2.9mm
Sub scan direction (a-b)	±1.5mm	±1.9mm	±2.1mm

NOTE: The measurements for MP Tray are based on one-side printing.

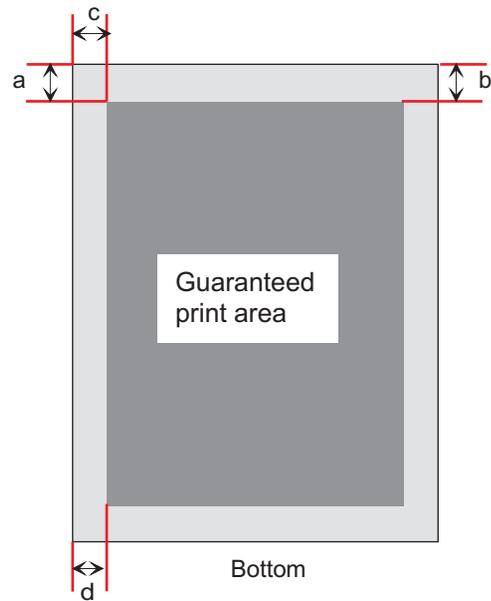


Figure 1-3. Skew

- Product Life: 1500,000 sheets or 5 years in use, whichever comes first.
- Maintenance: MTTR: Average less than 40 minutes.

1.3.6 Safety Approval

Safety Regulation

Table 1-14. Safety Regulation

Model	Applicable Standard
120V	<ul style="list-style-type: none"> • UL1950 2nd Edition • CSA 22.2 No.950-M95 by UL(=cUL)
200V series	<ul style="list-style-type: none"> • IEC950 2nd Edition with amendment 1(1995) • CE Directive

Safety Regulation(Laser Radiation)

Table 1-15. Laser Radiation

Model	Applicable Standard
120V	<ul style="list-style-type: none"> • FDA21 CFR Chapter1. Subchapter j, Section 1010, 1040.
200V series	<ul style="list-style-type: none"> • IEC 825 Class1 Laser Product

EMC

Table 1-16. EMC

Model	Applicable Standard
120V	<ul style="list-style-type: none"> • FCC Parts15 Subpart B, Class B • CISPR Publication 22, ClassB(Taiwan)
200V series	<ul style="list-style-type: none"> • EN55022 ClassB • EN61000-3-2 • EN50082-1 • AS 3548 (Australia) (TBD)

Power consumption: In compliance with International Energy Star program.

Others:

- Toner: No effect on human health. (In compliance with OSHA, TSCA, EINECS, worker safety laws and CSCL)

- OPC: No effect on human health. (In compliance with OSHA)

- Ozone:In compliance with UL478 5th Edition

- Materials: In compliance with Swiss environment protection law (no CdS content)

1.3.7 Environmental Specification

1.3.7.1 Operating Environment(including optional parts)

Table 1-17. Operating Condition

Item	Condition
Temperature	0 to 32 °C
Humidity	15 to 85%RH (without condensation)
Air Pressure(Altitude)	Less than 760 hPa(Less than 2500m)

1.3.7.2 Storage Environment(including optional parts)

Table 1-18. Storage Condition

Item	Normal	Extreme
Temperature	0 to 35 °C	Low Temp.: -10 to 0 °C High Temp.:35 to 40 °C
Humidity	15 to 85%RH	Low Humidity: 5 to 15%RH High Humidity:85 to 90% RH
Storage	12 months	Max. 48 hours

1.3.7.3 Altitude

- Storage
0 to 3000m (10000ft)
- Transportation
0 to 15000m (49200ft)

1.3.7.4 Vibration Tolerance

- Vibration
5 to 100 Hz
- Acceleration
0.7G

- Direction
Three directions(X,Y,Z)
- Time
50 minutes in each direction