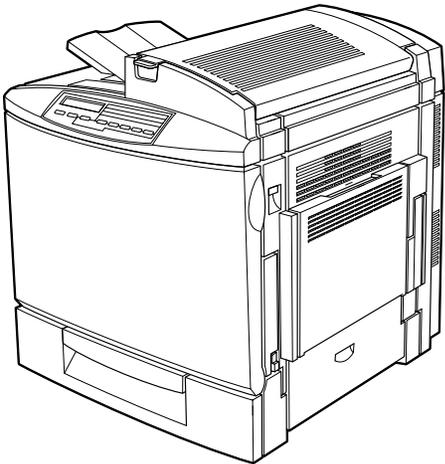


SERVICE MANUAL

Product: 2000 EPSON AcuLaser Color 2000 A4 Color Laser Printer Service Repair Workshop Manual
Full Download: <https://www.arepairmanual.com/downloads/2000-epson-aculaser-color-2000-a4-color-laser-printer-service-repair-workshop-manual/>

A4 Color Laser Printer **EPSON AcuLaser Color 2000**



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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 NON-APPROVED COMPONENTS MAY DAMAGE THE PRODUCT AND VOID ANY APPLICABLE EPSON WARRANTY.

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.

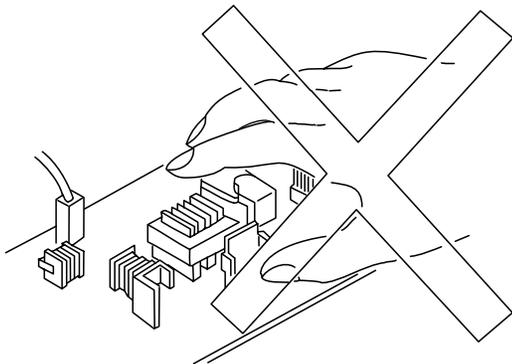
Do not do anything that is dangerous even if not specifically described in this manual. In addition to the descriptions below and those given in this manual, there are many situations and circumstances that are dangerous. Be aware of these when you are working with the printer.

Power Supply and Other Electrical Devices

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

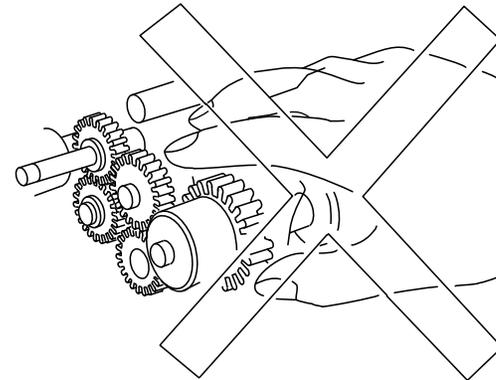


Do not touch any live part unless you are instructed to do so by a service procedure.



Mechanical Components

If you service gear or roller, manually rotate a drive assembly. Never hand-rotate or stop the drive assembly while the main motor is rotating.



Laser Beam



The laser beam used for exposing process during printing 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 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 Component

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

Warning/Caution Label

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.

PREFACE

This manual describes basic functions, theory of electrical and mechanical operations, maintenance and repair procedures of EPSON AcuLaser Color 2000. 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. The chapters are organized as follows:

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 troubleshooting.

CHAPTER 4. DISASSEMBLY AND ASSEMBLY

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

CHAPTER 5. ADJUSTMENTS

No adjustment is required for this product..

CHAPTER 6. MAINTENANCE

Provides preventive maintenance procedures for servicing the product.

APPENDIX

Provides the following additional information for reference:

- MCU Internal Connection Diagram*
- Component Layout*
- Exploded Diagram*
- Circuit Diagram*

Revision Status

Revision	Issued Date	Description
A	June 8, 2000	First Release
B	July 26, 2000	Chap. 3:On page 97, Figure 3-1 "Print Pattern" has been changed. Chap. 4:On page 126, 4.2.3.6 "Rear Controller Cover Removal" has been changed. On page 129, 4.2.4 "C314MAIN Board" has been changed.
C	Septembre 19, 2000	1.4.6 Engine Program Update is deleted. 4.3 MCU Firmware Update is deleted. This function is not supported for mass-production.

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CHAPTER

1

PRODUCT DESCRIPTIONS

1.1 Overview

This printer is a non-impact color page printer driven by a laser and electrophotographic technologies. It has a resolution of 600/300 dpi and print speed is 5 ppm (A4/LT color)/20 ppm (A4/LT B/W). It is also equipped with AcuLaser Color Halftoning as its full color technology.

Engine Features

1. High speed print engine at a print speed of 5 PPM for color, and 20 PPM for B/W (when printing A4/LT). The engine is capable of printing true 600 dpi high resolution in full color.
2. Duplex printing supported (A4/LT). Cannot print duplex for thick paper, transparency and labels.
3. Higher quality printing is possible with high quality plain paper.
4. Capable of printing thick paper and OHP (exclusive OHP sheets is recommended).
5. Features easy maintenance as a color laser printer. The user can replace all consumables.
 - Toner cartridges (C, M, Y, K)
 - Photoconductor Kit
 - Photoconductor unit, Waste Toner Collector and Print Head Filter included.
 - Fuser Oil Roll
 - Fuser Kit
 - Fuser unit, 2nd Transfer Roll included
 - Transfer Belt Unit
 - Waste Toner Collector (Can be applied separately.)
6. Standard paper feed includes 2 bins; MP tray (up to 150 sheets) and Lower cassette (up to 500 sheets, A4/LT). Including the optional single Lower cassette (up to 500 sheets, A4/LT),

paper feeding of up to 1150 sheets from 3 bins is possible. MP Tray can hold up to 50 sheets of thick paper, transparency or label sheet.

7. Standard paper output can output 500 sheets Face-down.

Controller Features

1. High Speed Controller employing new CPU
 - A new 64-bit RISC CPU R5000 - 266 MHz
 - 64-bit high speed memory SDRAM DIMM
 - Standard RAM is 32 MB (TBD). By installing additional RAM, it is possible to expand the memory to 288 MB (32MB + 256MB). (Furthermore, it is expandable up to 512 MB if remove the standard 32MB RAM then install 256 MB RAM to the slot.)
2. Equipped with Enhanced ASIC (VIP1a). Color management technology has been incorporated into the hardware to achieve high speed processing.
 - AcuLaser Color Halftoning drawing area
 - CCNV (Color conversion)
 - CCMP (Color compression/expansion)
 - CRIT (Character smoothing).
3. Equipped with 2 standard interfaces.
 - IEEE 1284 compatible and ECP compatible parallel Interface
 - Ethernet interface (100Base-TX/10Base-T)
4. By expanding memory with RAM DIMMs, the following functions can be enhanced and speeded up.
 - CPGI drawing area
 - Print Speed
 - Resolution
5. ROM update function (RCC compatible) when a Flash DIMM is installed.

6. Euro symbol supported
7. HDD (optional) can be installed

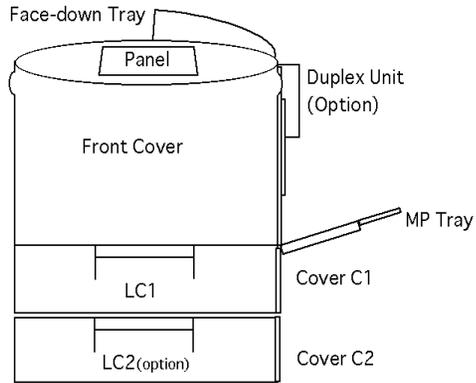
Software Features

1. Color technologies
 - ESC/Page-Color supports B/W printing. (Speeded up in automatic discrimination of color and B/W.) (TBD)
 - Smooth expanding of color images by ESC/Page-Color. (TBD)
 - Automatic color adjustment. (at powering on / when cover is closed (excludes paper jam) / at a time after 24hours passed or 100 pages printed since color adjustment have been done previously and returning from standby)
2. Job management (TBD)
Printing status confirmation and job cancel are enabled for job printed from built-in network by EPSON Direct Print and internal network.
3. Through bi-directional EPL and MIB, the printer status and printer environment are monitored.
4. Remote panel function through a Web browser (compatible with Java JDK1.1).
5. When a HDD (option) is installed, electronic sorting, I/F reception buffer expansion (only for Ethernet I/F) and font registration when PostScript3 mode can be equipped.
6. Additional built-in fonts
Euro Symbol supported. NLSP Bitmap3 Plus is installed in the main unit font ROM. PCLit771 is added.
7. Installed emulations
 - Standard: ESC/Page-Color, PCL5e(B/W), GL-Like(B/W), FX(B/W), ESCP2(B/W), I239X(B/W), ESC/Page(B/W)
 - Options: Adobe Postscript Level3(Kent-Color)

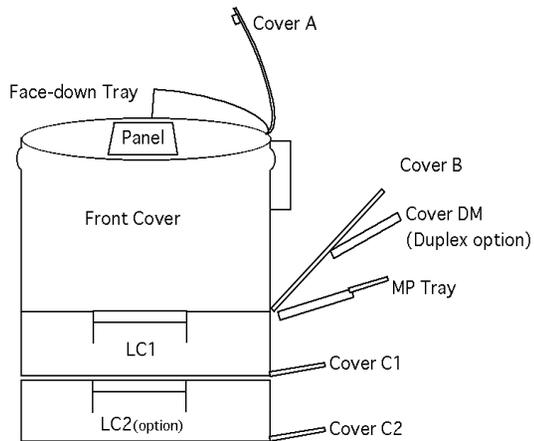
- Other:
 - EPL, PPL mode
 - RCC mode (firmware update)
 - MCU update mode (mechanical-controller firmware update)
 - DIAG Mode (engine configuration)
- Auxiliary softwares
 - Status Sheet
 - Network Status Sheet
 - AUX Status Sheet (only when Type-B Level3 installed)
 - PS3 Status Sheet (only when PostScript3 module installed)
 - Font Sample (for each mode)
 - Hex dump
 - Support Mode
 - Maintenance Mode (Engine Status Sheet, for printer engine)

Exterior View and Names

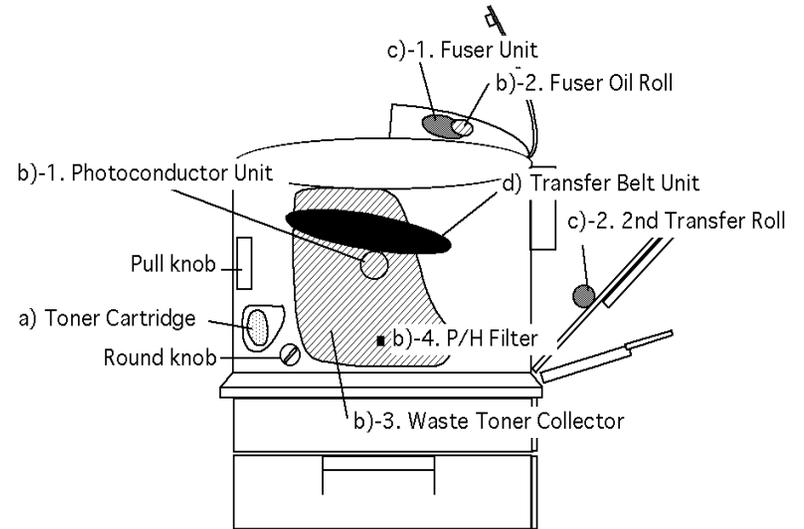
1. External view



2. When open all covers except Front cover



3. When open the Front cover



1.2 Controller Unit Specifications

1.2.1 Controller Basic Specifications

CPU

64bit RISC CPU R5000 (266MHz)

ASIC

VIP1a (AcuLaser Color Halftoning, CCNV, CCMP, CRIT, Enhanced MicroGray)

RAM

- SDRAM 64bit width DIMM (168pins, 3.3V)
- 2 slots (install the standard RAM to one slot and SDRAM DIMM must be installed to slot-0)
 - Standard: 32MB (TBD)
 - Optional RAM: 32MB, 64MB 128MB and 256MB (Can be expanded to up to 512MB by installing 256MB to both slots.)

ROM

32bit width

- Program: 4MB (Flash ROM DIMM)
- Fonts: 4MB
- Expansion ROM: 2 slots (ROM DIMM slots) (can be installed and removed only with power off)
- A, B slot: PS3, font ROM module, Overlay ROM module

Host Interface

- Standard
 - Parallel 1ch Bi-directional based on IEEE 1284 standard, B-type connector Compatibility, Nibble, ECP
 - Ethernet 100Base TX / 10Base-T
- Optional
 - Type B 1 slot (Level3 compatible)

Printer Settings

Panel settings, EJP, PJP, HTTP, SNMP and ENPC.

- Storage cell EEPROM 16Kbytes

Control Panel

20-digit LCD, 8-switches, 6-LEDs,

HDD

1 (optional) IDE type

Installation Method

Fixed to main unit

1.2.2 Engine Specifications

Printing Method

Electrophotographic method using scanning semiconductor laser beam and dry one- component toner.

Resolution

600 dpi (switching with engine)

Print Mode

- B/W mode: Monochrome mode. Offering maximum printing speed of this printer.
- Color mode: Color mode, printing in Y, M, C, K toners.

Speed Mode

- Standard mode: Paper feed at the maximum speed of this printer.
- Half-speed mode: Reduced paper feed rate to ensure fixing on thick paper (exceeding 90 g/m² 24 lb), envelopes, and transparencies.

Printing Speed*1

Table 1-1. Printing Speed

Printing mode	Speed mode	Single-sided printing A4/LT/A5/B	Duplex printing
B/W	Standard mode	20 PPM	13 PPM
	Half-speed mode	3.8 PPM	
Color	Standard mode	5 PPM	5 PPM
	Half-speed mode	2.4 PPM	

*1: Excluding limits on printing speed described in "Restriction on Printing Speed" on page 54.

First Printing Time

Table 1-2. First Printing Time

Printing mode	Speed mode	Single-sided printing A4/LT/A5/B			Duplex printing
		A4	LT/B	A5	A4/LT
B/W	Standard mode	16 sec.	16 sec.	16 sec.	25 sec.
	Half-speed mode	29 sec.	28 sec.	28 sec.	
Color	Standard mode	25 sec.	25 sec.	25 sec.	37 sec.
	Half-speed mode	38 sec.	38 sec.	37 sec.	

Warm-Up Time (TBD)

- 120 V: 150 sec. (Max.) (at 22°C, 55%RH, rated voltage)
- 220 - 240 V: 160 sec. (Max.) (at 22°C, 55%RH, rated voltage)

Paper Supply

Table 1-3. Paper Supply

Paper feed method		Capacity	Paper size	Paper thickness
Standard tray* ¹	Standard universal tray	150 sheets	Paper Width: 92 to 216 mm Paper Length: 210 to 297 mm	60 to 90 g/m ² (recommended paper, plain paper)
		10 sheets	Envelope (TBD)* ²	---
		50 sheets	92 x 148 to 216 x 297 mm transparencies/labels/thick paper	91 to 163 g/m ² (thick paper, special paper)
Cassette unit* ³ * ⁴	Standard cassette	500 sheets	A4/LT	60 to 90 g/m ² (recommended paper, plain paper), transparencies
		50 sheets	Transparencies (TBD)	
	Optional Cassette	500 sheets	A4/LT	60 to 90 g/m ² (recommended paper, plain paper), transparencies
		50 sheets	Transparencies (TBD)	

*1: Paper size detection and near empty detection are not installed, paper out sensor installed. Paper existence is detected when one sheet of paper (post card or a paper larger than A5T) is set.

*2: - Flap is on the short edge and is folded :

Set the envelope with flap toward the paper feed roller side.

- Flap is on the long edge and is folded :

Set the envelope in portrait direction and with flap toward right side of paper feed direction.

- Flap is on the short edge and is opened :

Set the envelope with flap opened and toward the opposite side of paper feed roller.

- Flap is opened and sticky with paste : Not supported.

*3: Each cassette unit has independent Side guide and End guide (combined with paper size detectors) and can be adjusted by user. Maximum 2 cassette units can be installed and the maximum paper capacity is 1150 sheets.

*4: Each cassette is equipped with paper-out sensor and near-empty sensor.

* Near-empty is detected when paper remaining is 50 ± 30 sheets. (when using plain paper of 80g/m.)

Duplex Printing (optional)

- Supported size: A4, LT
- Paper type: Plain paper (60 to 90 g/m²)
- Paper size/Paper set direction/Duplex availability

Table 1-4. Paper Size

Paper Type		Paper Size	Paper Set Direction			Duplex Availability
			Standard tray	Standard cassette	Optional cassette	
Standard Paper	A4	210.0 x 297.0mm (8.27 x 11.69")	SEF*1	SEF	SEF	A*2
	A5	148.0 x 210.0mm (5.83 x 8.27")	SEF	---	---	UA*3
	B5	182.0 x 257.0mm (7.16 x 10.12")	SEF	---	---	UA
	ISO-B5	176.0 x 250.0mm (6.93 x 9.84")	SEF	---	---	UA
	Letter (LT)	215.9 x 279.4mm (8.5 x 11.0")	SEF	SEF	SEF	A
	Half Letter (HLT)	139.7 x 215.9mm (5.5 x 8.5")	SEF	---	---	UA
	Legal 13"	215.9 x 330.2mm (8.5 x 13.0")	SEF	---	---	UA
	Legal 14"	215.9 x 355.6mm (8.5 x 14.0")	SEF	---	---	UA
	EXE	184.2 x 266.7mm	SEF	---	---	UA
	F4	210.0 x 330mm (8.27 x 13")	SEF	---	---	UA
Special Paper (Envelopes)	COM10	104.8 x 241.3mm (4.13 x 9.5")	SEF*4	---	---	UA
	Monarch	98.4 x 190.5mm (3.88 x 7.5")	SEF*4	---	---	UA
	C5	162.0 x 229.0mm (6.38 x 9.02")	SEF*4	---	---	UA
	DL	110.0 x 220.0mm	SEF*4	---	---	UA
	C6	114.0 x 162 mm	SEF*4	---	---	UA

*1: SEF (Short Edge Feed) = Set paper in portrait direction toward paper feed direction.

*2: A = Available

*3: UA = Unavailable

*4: See "Paper Supply" on page 17 for details.

Paper Feed Reference

Center line reference for each paper size and each paper feeder (standard tray/each cassette)

Consumables

- Developer cartridge (black/cyan/magenta/yellow)
- Photoconductor kit (including Photoconductor unit, Fuser oil roll, Waste toner collector, Printhead filter)
- Fuser kit (including Fuser unit, Second transfer roll), Transfer belt unit, Waste toner collector (separately).

NOTE: These consumable can be replaced by the user.

Output Paper Capacity

Face-down(FD) only. 500 sheets (using A4/LT, 80g/m² or 20 lb paper)

Dimensions

- Main unit only : 463*¹ (W) x 548 (D) x 511 (H) mm
- With Duplex unit installed : 496*¹ (W) x 548 (D) x 511 (H) mm
- With optional cassette installed : 463*¹ (W) x 548 (D) x 625 (H) mm
- With both of optional cassette and Duplex unit installed:
496*¹ (W) x 548 (D) x 625 (H)

Weight

- Main unit only: 44.5kg (includes consumables)
- Duplex unit: 3.0kg

*1: With standard tray and output tray closed.

Power Supply

- 100/120V version: 100/120V±10%, 50-60Hz ±3Hz
- 200V version: 220V/240V±10%, 50-60Hz ±3Hz

Power Consumption

Table 1-5. Power Consumption

Description		Specifications
Maximum rated current		1000W max. (100V / 120V)
		1100W max. (220 to 240 V)
During printing, average* ¹	B/W printing	700 Wh max.
	Color printing	550 Wh max.
During standby, average		250 Wh max.
During the heater-off state, average* ²		45 Wh max.

*1: Includes optional cassette unit and Duplex unit

*2: Completely suspended. Conformed to the Energy Star program.

Current Consumption

- 120V version: 10.0 A max. (at rated voltage)
- 220 to 240 V version: 6.0 A max. (at rated voltage)

Life

- Main unit : 500,000 pages*1 or 5 years whichever comes earlier. (Including standard tray)
- Optional cassette unit :500,000sheets or 5 years whichever comes earlier.
- Duplex unit : 500,000 pages (250,000sheets) or 5 years whichever comes earlier.

Noise

- During operation: 55 dB(A) max. (TBD)
- During standby: 41 dB(A) max.

Ozone Concentration

0.1 ppm max. (based on UL standards)

Particles Discharge

Particles concentration 0.25 mg/m³ max. (based on Blue Angel standards)

Toxicity

Photoconductor kit (OPC), toner, and plastic materials are all non-toxic.

**1: Life of 500,000 pages is calculated assuming a B/W : color job ratio of 1:1, and equivalent to 1,250,000images (4imagesx250,000pages + 250,000images). 500,000sheets or 1,250,000images whichever comes earlier is the life of the main unit, also.*

1.2.3 Process Specification

- Method: Electrophotographic method using dry one-component developing and Belt transfer
- Light source: Semiconductor Laser
- Photoconductor unit: OPC (Organic Photo Conductor) Drum
- Charging: Needle electrode charger
- Developing: Exposed area development
- Toner: Non-magnetic toner
- Primary transfer: Roller Transfer
- Fixing: Heated belt fixing method (with oil coated mechanism)
- Density adjustment: Automatic (non-user adjustable)

1.2.4 Paper Specification

Paper Type

- Recommended paper: 4024 paper (20 lb) (B/W), FX J paper (TBD)
- Plain paper: Ordinary copy paper, recycled
60g/m² to 90g/m² (16 lb to 24 lb)
- Special paper: Transparencies, Colored paper, Thick paper
(91g/m² to 163g/m², Envelope (TBD))

NOTE 1: lb: Ream weight = lb/500 sheets/17"x22" (431.8 x 558.8mm) g/
m²: 1 g/m² = 0.2659763 lb

NOTE 2: Before buying large quantities of paper, verify that your printer will print properly with the paper.

NOTE 3: Do not use any of the paper types listed below with this printer. They may cause defective printing, paper blockages, or damage to the printer.

- Carbon paper, non-carbon paper, thermal paper, pressure-sensitive paper, acidic paper
- Paper previously printed in a thermal printer or ink jet printer.
- Extra thick or extra thin paper.
- Damp paper.
- Surface-coated paper or surface-treated color paper.
- Extra smooth or glossy paper. Extra rough paper.
- Paper with significantly different roughness on each surface.
- Paper with punched holes or perforations.
- Folded, curled, or torn paper.
- Irregularly shaped paper or paper with non-perpendicular corners.
- Sheets of labels that peel off easily.
- Paper with glue, staples, or clips attached.
- Special ink jet paper superfine paper, glossy film, etc.
- Transparencies for other color/monochrome laser printers or photocopiers.
- Sheets already printed on other color/monochrome laser printers or photocopiers.
- Sheets of paper stuck together.

Paper Feeding

Table 1-6. Paper Feeding

Paper source	Recommended paper	Plain Paper	Special applications			
			Transparencies	Labels	Thick paper (90 to 163g/m ²)	Envelopes
Standard tray	PA	A	A	A	A	A
Standard cassette	PA	A	NA	NA	NA	NA
Lower cassette unit (Option)	PA	A	NA	NA	NA	NA

PA: Paper feed and image quality assured.

P: Paper feed and image quality assured, but only for the use of ordinary types of paper.

NA: Not available

Printing Area

- Maximum printable area:Width 208mm/Length 289mm
- Guaranteed printing area

Maximum guaranteed printing area:Width 208mm/Length 289mm
Entire paper area except for a 4mm margin at each edge of the paper up to the above size. (See the figure below.)

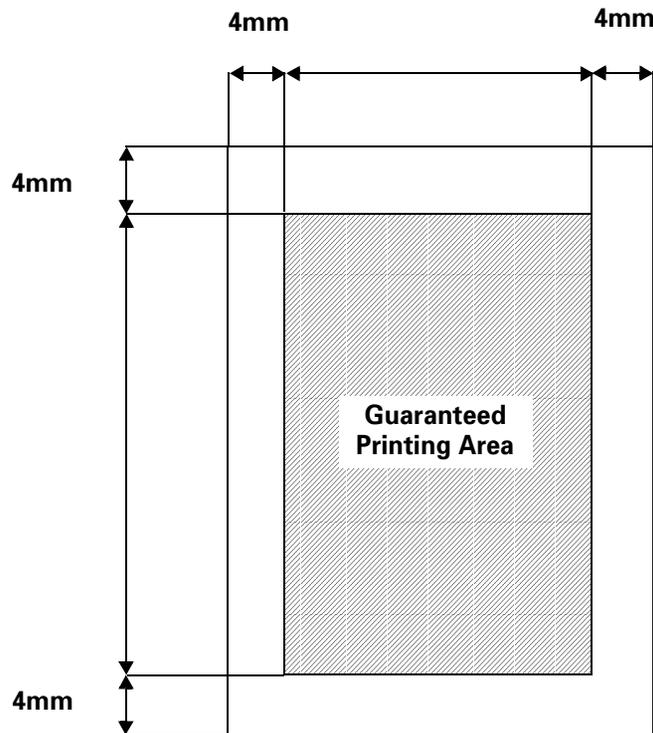


Figure 1-1. Printing Area

1.2.5 Sensors

Photoconductor Unit

Table 1-7. Sensor Specifications - Photoconductor Unit

Detected Conditions	Detection Method	Comments
Mounted/unmounted	Electrical contact detection method	---
New product	Fuse method (Cut fuse in new product)	---
Mounted/unmounted detection at powering on	Electrical contact detection method	<ul style="list-style-type: none"> • Can be mounted/unmounted while power is on • No damage on mechanism • Status is updated when the cover is closed
Consumption	Calculate operating time (motor rotation time)	Added up in 30 sec. unit
Near end	The total operating time of the main motor	2640counts x 30sec. = 1320min.
End of life	The total operating time of the main motor.	3300counts x 30sec. = 1650min. Printing is forbidden in the following timing <ul style="list-style-type: none"> • While printing of up to 100 images(300sec.) is performed after the End of life detection • After printing completed.
Genuine SEC product	Un-compatible rib	---

Fuser Oil Roll

Table 1-8. Sensor Specifications - Fuser Oil Roll

Detected Conditions	Detection Method	Comments
Mounted/unmounted	Actuator	---
Mounted/unmounted detection at powering on	Actuator	<ul style="list-style-type: none"> • Can be mounted/unmounted while power is on • No damage on mechanism • Status is updated when the cover is closed

Waste Toner Collector

Table 1-9. Sensor Specifications - Waste Toner Collector

Detected Conditions	Detection Method	Comments
Mounted/unmounted	Actuator	---
Mounted/unmounted detection at powering on	Actuator	<ul style="list-style-type: none"> • Can be mounted/unmounted while power is on • No damage on mechanism • Status is updated when the
Waste toner collector full	Photo sensor	cover is closed

Printhead Filter

Table 1-10. Sensor Specifications - Printhead Filter

Detected Conditions	Detection Method	Comments
Mounted/unmounted	Waste toner collector cannot be installed if the printhead filter is not installed.	---

Fuser unit

Table 1-11. Sensor Specifications - Fuser Unit

Detected Conditions	Detection Method	Comments
Mounted/ unmounted	Electrical contact detection method (detected by voltage of speed detection trimmer inside the unit)	---
New product	Fuse method (Cut fuse in new product)	---
Mounted/ unmounted detection at powering on	Electrical contact detection method	<ul style="list-style-type: none"> • Can be mounted/ unmounted while power is on • No damage on mechanism • Status is updated when the cover is closed
Consumption	Total operating time of the fuser motor	Added up in 30 sec. unit
Near end	The total operating time of the fuser motor	28,880 counts
End of life	The total operating time of the main motor.	36,000 counts Printing is forbidden in the following timing <ul style="list-style-type: none"> • While printing of up to 100 images (300sec.) is performed after the End of life detection • After printing completed.

Developer Cartridge

Table 1-12. Sensor Specifications - Developer Cartridge

Detected Conditions	Detection Method	Comments
Mounted/ unmounted	Electrical contact detection method (detected by voltage of speed detection trimmer inside the unit)	---
New product	Fuse method (Cut fuse in new product)	---
Mounted/ unmounted detection at powering on	Electrical contact detection method	<ul style="list-style-type: none"> • Can be mounted/ unmounted while power is on • No damage on mechanism • Status is updated when the cover is closed and the rotary rotates once.
Residual toner	Counts images by the mechanical controller.	---
Near end	Counts images by the mechanical controller Counts the luminescent period of the LD.	4,800 images or 3,200 counts of the LD luminescence period , whichever reaches earlier.
End of life	Counts images by the mechanical controller. Reflective photo sensor	6,000 images Detected by the counter whichever reaches 6,000 earlier. Printing is not forbidden.
Genuine SEC product	Un-compatible rib	---

Transfer Belt Unit

Table 1-13. Sensor Specifications - Transfer Belt Unit

Detected Conditions	Detection Method	Comments
Mounted/ unmounted	Returns GND from AIDC sensor for the detection.	---
New product	Fuse method (Cut fuse in new product)	---
Mounted/ unmounted detection at powering on	Returns GND from AIDC sensor for the detection.	<ul style="list-style-type: none"> • Can be mounted/ unmounted while power is on • No damage on mechanism • Status is updated when the cover is closed
Consumption	Total operating time of the main motor	Added up in 30 sec. unit
Near end	The total operating time of the main motor	12,000 counts
End of life	The total operating time of the main motor.	15,000 counts Printing is forbidden in the following timing <ul style="list-style-type: none"> • While printing of up to 100 images (300sec.) is performed after the End of life detection • After printing completed.

Standard tray/Optional Feeder/Duplex Unit

**Table 1-14. Sensor Specifications
Standard Tray / Optional Feeder / Duplex Unit**

Unit	Detected Conditions	Detection Method	Comments
Standard tray	Out of paper	Actuator	---
Optional feeder	Mounted/ unmounted	Communication check with the main unit	It is not guaranteed to be unmounted/ mounted while power is on. Detection is performed only at powering on.
Duplex unit	Mounted/ unmounted	Detects the short pin.	

Standard/Optional Cassette

Table 1-15. Sensor Specifications - Standard/Optional Cassette

Detected Conditions	Detection Method	Comments
Mounted/ unmounted	Returns GND from AIDC sensor for the detection.	
Paper size	Actuator (operates together with the end guide)	A4 or LT
Paper near end	Photo sensor	50 +/- 30 sheets (with 80g/m ² paper)
Paper out	Actuator	

1.2.6 Reliability, Durability, Serviceability

MPBF

80,000 pages (200,000 images) min.*1

MTBF

3,000 hours min.*2

Paper Feeding Reliability

Table 1-16. Paper Feeding Reliability*1

	Single-sided printing	Duplex printing
Paper jam rate	1/2000 sheets (max.)	1/1000 sheets (max.)
Paper misfeed	1/2000 sheets (max.)	---
Multiple sheet feed rate*2	1/500 sheets (max.)	---
Paper creasing	1/1000 sheets (max.)	1/500 sheets (max.)
Leading edge folded (for 1C or more)*3	1/1000 sheets (max.)	1/500 sheets (max.)

*1: Using recommended paper in standard environment (15 to 25°C , 35 to 70%RH)

*2: The values for multiple-sheet feed rate do not include effects at the boundary between original paper and replenished paper, occurring after paper is replenished.

*3: 1C indicates 1mm corner fold.

*1: In color mode, 4 images (YMCK) are printed per sheet. MPBF is calculated assuming a B/W: color job ratio of 1:1.
e.g. : 200,000 = 80,000/2 + (80,000/2 x 4)

*2: PV (page volume) per month : 8,000pages(average)
calculated assuming the Operating time per month as 300 hours (average).

Printing Start Position Accuracy / Paper Skew

Table 1-17. Printing Start Position Accuracy/Paper Skew*1

	Directions	Single-sided printing	Duplex printing
Print start position accuracy	Main Scanning Direction (c)	±2.0 mm	±3.2 mm
	Sub Scanning Direction (a)	±2.5mm	±2.0 mm
Paper skew	Main Scanning Direction (c-a)	±1.5 mm	±2.5 mm (TBD)
	Sub Scanning Direction (a-b)	±2.0mm	±3.5 mm (TBD)

*1: With A4/LT

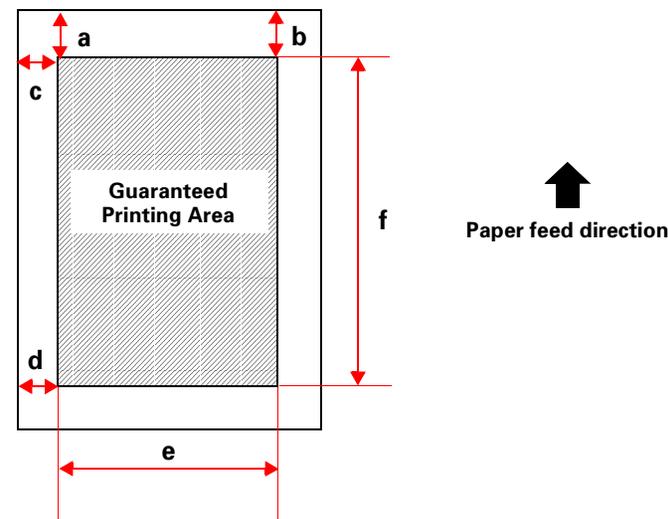


Figure 1-2. Printing Start Position Accuracy/Paper Skew Descriptions

Serviceability

MTTR 30 minutes max. (average)
(Time for service technician to locate and repair a failure.)

Output Paper Curl Height (with A4/LT)

- Plain paper: ± 30mm max. (same as for duplex printing)
- Transparencies: ± 15mm max.

(For non-aligned B/W printing with 5% image occupation rate or color printing with 5% image occupation)

1.2.7 Operating Conditions (Including Consumables)

Temperature and Humidity

- Temperature: 10 to 35°C
- Humidity: 15 to 85% RH no condensation

Barometric Pressure (Altitude)

760 hPa min. (2,500 m max.)

Levelness

Max. 1° tilt (front-rear or left-right)

Illumination

3,000 lux max. (no direct sunlight)

Printer Peripheral Space (TBD)

Maintain the space shown in the diagram below around the printer to ensure normal printer operation. (Units: mm)

1.2.8 Storage and Transport Environments (Including Consumables)

Temperature and Humidity

Table 1-18. Temperature and Humidity

Conditions	Temperature	Humidity* ¹	Guaranteed period
Normal conditions	0 to 35°C	30 to 85%RH	18 months from manufacture
Severe conditions	High: 35 to 40°C* ² Low : -20 to 0°C	High: 85 to 95% RH Low: 10 to 30% RH	1/30 of 18months

*1: With no condensation.

*2: 35 to 55°C when excludes Developer cartridge and Photoconductor unit.

Storage Barometric Pressure (Altitude)

740 to 1013 hPa*¹

Dropping (TBD)

- For European model: No abnormalities according to JIS Z0200-1994 Level 1.
- For North America : No abnormalities according to ISTA 2A.

Also, no abnormalities by the dropping with one side supported.*²

*1: 613 to 1013 hPa when excludes Developer cartridge and Photoconductor unit.

*2: Drop the short edge of the bottom from a height of 52cm, twice for both edge (total 4 times).

Vibration

- Frequency: 5 to 100 Hz (Sweep time : 10 min.)
- Acceleration: 1.0 G (on the vibrator)
- Direction of application: 3 dimensional (along X, Y and Z axes)
- Time of application: 60 min. along each axis

1.2.9 Electrical Characteristics

The following items do not apply to the Optional Units.

AC Line Noise

- Pulse Width: 50-1000ns
- Pulse Polarity: +/-
- Repeating: Asynchronous
- Mode: Common / Normal
- Voltage: 1kv No component damage to 2kv.

Instantaneous Power Failure

- DIP 100% (at rated voltage - 10%) 1 cycle. No abnormality to quality in print cycle.
- Satisfies the following conditions under the evaluation conformed to "IEC61000-4-11"
 - Falls by 95%, 0.5 cycle : No print error except for slight dot error.
 - Falls by 30%, 25 cycle : No component damage
 - Falls by 95%, 250 cycle : No component damage

Static Electricity Resistance

- Satisfies the following conditions under the 50% Flash over method.
 - Up to ± 7 kv: No hardware error at all.
 - Up to ± 10 kv: No print error except for slight dot error.
 - Up to ± 15 kv: No component damage.
- Satisfies the following conditions under the evaluation conformed to "IEC61000-4-2"
 - Contact discharge 8kV : No device error at all
 - internal discharge 15kV : No device error at all

Inrush Current

1/2 cycle 50A max. (in an environment of 23°C min.)

Insulation Resistance

10MΩ max.

Dielectric Strength

No breakdown when the following voltage is applied for one minute.

Table 1-19. Dielectric Strength

	Across Primary and Chassis
100/120V Model	AC1000V
200V Model	AC1500V

Leak Current*1

- 100V model 0.25 mA max.
- 120V model 3.5 mA max.
- 200V model 3.5 mA max.

*1: Measured according to [The Guideline for Leak current of Personal computers]

1.2.10 Applicable Standards and Regulations

The engine specification meets the following standards and regulations. Depending on the destination, some standards and regulations apply to the product only when including controller.

Safety Standards

- 100Vmodels
 - US : UL1950 3rd Edition
 - Canada : CSA C22.2 No.950-09 3rd
- 200Vmodels
 - Europe : IEC60950 2nd Edition + Amd 1, 2, 3, 4
EN60950 : 1992 + Amd 1, 2, 3, 4
EMKO-TSE (74-SC) 207/94

Safety Regulations (laser radiation)

- 120V FDA21CFR Chapter 1, Subchapter J, Section 1010,1040
- 200V EN60825-1 + All

NOTE: Laser power: 1.16 mW Max.
Wavelength: 785 nm ± 10nm

EMI Standards

- 120V
 - US : 47CFR Part15 SubpartB, ClassB
 - Canada : ICES-003 Issue3 ClassB (C108.8-M1983)
 - Taiwan : CNS13483 ClassB
- 200V
 - EN55022 (CISPR Publication22), ClassB

Power Supply High Frequencies

Comply with high-frequency restriction guidelines.

Power Consumption

Comply with International Energy Star Program standards (45W max. in Standby mode)

Others

- Toner: No effects on the human body (conforming to OSHA, TSCA, EINECS).
- OPC: No effects on the human body (conforming to OSHA).
- Ozone generation: Conforming to UL478, Edition 5.
- Materials: Conforming to Swiss environmental-protection laws (not including CdS).

Product: 2000 EPSON AcuLaser Color 2000 A4 Color Laser Printer Service Repair Workshop Manual
 Full Download: <https://www.arepairmanual.com/downloads/2000-epson-aculaser-color-2000-a4-color-laser-printer-service-repair-workshop-manual/>