Product: EPSON EPL-N2000 Terminal Printer Service Repair Workshop Manual
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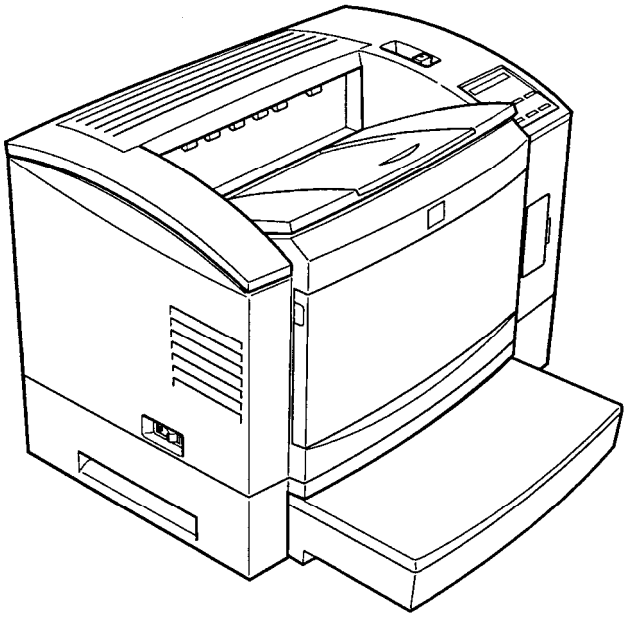
EPL-N2000

SERVICE MANUAL



EPSON

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NOTICE

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PRECAUTIONS

÷5T™ÞÆ‡¨›Þ5‡Þ‡¨›¹ throughout the tect are categorized relative to 1) personal injury, and 2) damage to equipment:

DANGER	Singnals a precaution which, if ignored, could ressult in serious or fatal personal injury, Great caution should be exercised in performing procedures preceded by a DANGER headings.
WARNING	Singnals 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 BOTH THE POWER SOURCE AND THE HOST COMPUTER BEFORE PERFORMING ANY MAINTENANCE OR REPAIR PROCEDURE.
2. NO WORK SHOULD BE PERFORMED ON THE UNIT BY PERSONS UNFAMIAR WITH BASIC SAFETY MEASURES AS DICTATED FOR ALL ELECTRONICS TECHNICIANS IN THEIR LINE OF WORK
3. WHEN PERFORMING TESTING AS DISCATED WITHIN THIS MANUL, DO NOT CONNECT THE UNIT TO A POWER SOURCE UNIT 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 VOLTAGE IS THE SAME AS THE RATED VOLTAGE, LISTED ON THE SERIAL NUMBER/RATIG PLATE. IF THE EPSON PRODUCT HAS A PRIMARY-AC RATING DIFERENT FORM THE AVAILABLE POWER SOURCE, DO NOT CONNECTE 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 INDDMDUAL CHIPS.
4. IN ORDER TO PROTECT SENSITIVE m P CHIPS AND CIRCUITRY, USE STATIC DISCHARGE EQUIPMENT, SUCH AS ANTI-STATIC WRIST STRAPS, WHEN ACCESSING INTERNAL COMPONENTS.
5. REPLACE MALFUNCTIONING COMPONENTS ONLY WITH THOSE COMPONENTS RECOMMENTED BY THE MAANUFACTURE; INTRODUCTION OF SECOND-SOURCE ICs OR OTHER NONAPPROVED COMPONENTS MAY DAMAGE THE PRODUCT AND VOID ANY APPLICABLE EPSON WARRANTY.

SAFETY INFORMATION

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

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

For United States Users;

[Laser Safety1

This printer is certified as a Class 1 Laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. This means that the printer does not produce hazardous laser radiation.

[CDRH Regulations]

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

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

[Internal Laser Radiation]

Maximum Radiation Power:	5.0 x 1o-4 (W)
Wave Length:	790 ± 20 nm

This is a Class IIIb Laser Diode Assay that has an invisible laser beam. The print head unit is NOT A FIELD SERVICE ITEM. Therefore, the print head unit should not be opened under any circumstances.

For Other Countries Users;

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

This is a semiconductor laser. The maximum power of the laser diode is 5.0 x 10^{-4} W and the wavelength is 790 ± 20 nm.

For Denmark Users;

ADVARS EL
Usynlig laserstrdling ved abning, nar sikkerhedsafbrydere er ude af funktion.
Undna udszttelse for strbling.

Klasse 1 laser nrodukt der onfvlder IEC825 sikkerheds kravene.

For Finland. Sweden Users:

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

VARNING
Om apparaten används på annat sätt än i denna bruksanvisning specificerats, kan användaren utsättas for osynlig laserstrhlning, som over&rider gränsen för laser klass 1.

For Finland. Sweden Service People

VAROITUS
Avattaessa ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Ala katso sateeseen.

VARNING
Osynlig laserstrålning när denna del är öppnad och spärren är urkopplad. Betrakta ei strålen.

For Norway Users;

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

Dette er en halvleder laser. Maksimal effeckt til laserdiode er 5.0 x 10^{-4} W og bølgelengde er 790 ± 20 nm.

Laser Safety Labels

[Label on rear printer case]

A laser safety labels is attached on the outside of the printer shown below.

For United State

0‹´¹ 4Þ¹T5w5¨uÆ¨™‡¨›3¨5×¹ ‡¨ ‡‹TÞww4´™Þ¤4T
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¦‹Þw‡T5ˆÐKˆ¹Æ¤™‹Þw‡T5ˆ',
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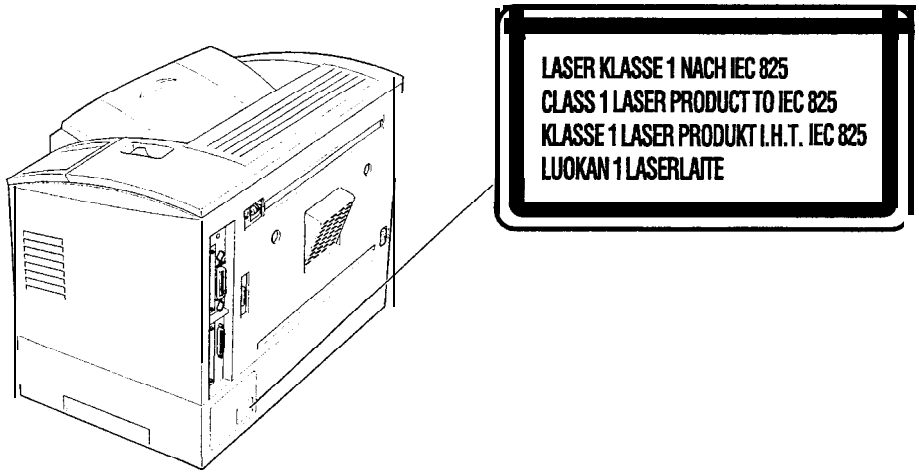
PN/ÝpN¦0Ýr•'n

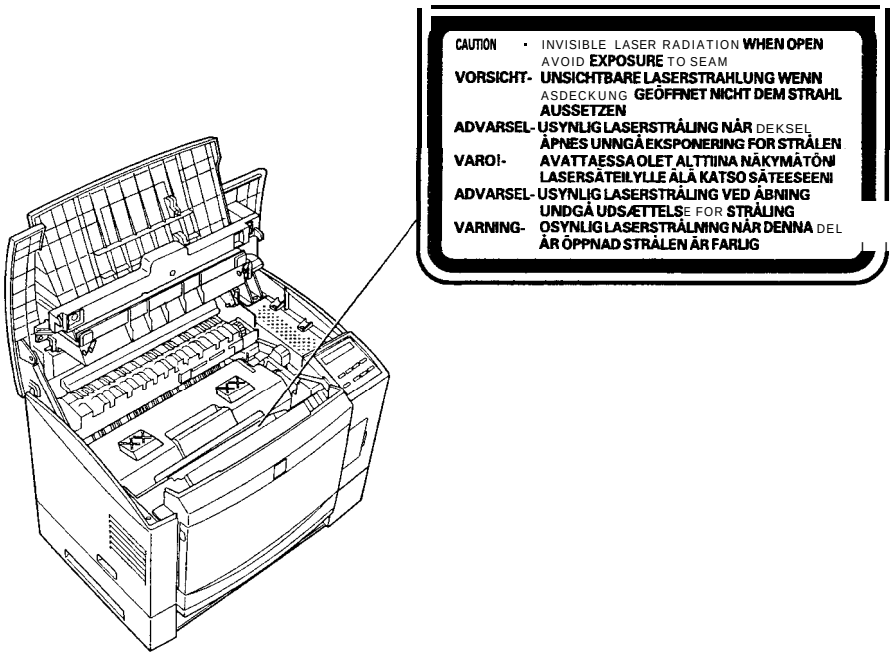
For Europe



[Label inside printer]

The following laser safety label will be attached inside the printer as shown below.

For Denmark, Finland, Sweden, and Norway



For Finland. Sweden Users:

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

VARNING
Om apparaten används på annat sätt än i denna bruksanvisning specificerats, kan användaren utsättas for osynlig laserstrhlning, som over&rider gränsen för laser klass 1.

For Finland. Sweden Service People

VAROITUS
Avattaessa ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Ala katso sateeseen.

VARNING
Osynlig laserstrålning när denna del är öppnad och spärren är urkopplad. Betrakta ei strålen.

For Norway Users;

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

Dette er en halvleder laser. Maksimal effeckt til laserdiode er 5.0 x 10^{-4} W og bølgelengde er 790 ± 20 nm.

Laser Safety Labels

[Label on rear printer case]

A laser safety labels is attached on the outside of the printer shown below.

For United State

0‹´¹ 4Þ¹T5w5¨uÆ¨™¶¨›3¨5×¹ ‡¨ ‡‹TÞww4´™Þ¤4T
5TVÆ´5T×T›ß mèCFR
¦‹Þw‡T5ˆÐKˆ¹Æ¤™‹Þw‡T5ˆ¸
Q•Ð¶ð •÷Qð/ ¦ðr÷¸
.´5¨¨UÞˆ ð33´™T
à¢ˆ .´5¨¨UÞKˆ Q‹¨¨v´5´*¹‹´Kˆ /ÞþÞ›¨*UT›K
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REVISION SHEET

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Chapter 1 Product Description

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1.1 FEATURES

The EPSON® EPL-N2000 is a non-impact page printer that combines a semi-conductor laser with electrophotographic technology. The main features are:

❑ Paper feed up to 1150 sheets (for A4 or letter-size paper):	Standard: 150 sheets for MP (multipurpose) tray 500 sheets for standard lower paper cassette Optional: 500 sheets for 500-sheet lower paper cassette unit
❑ High print speed:	20 ppm in single-sided print mode for A4 or letter-size paper
❑ Integrated imaging cartridge:	Provides long cartridge life (10,000 sheets) and easy user maintenance.
❑ Optional duplex print	
❑ Ozone	Printing process creates no ozone gas
❑ High capacity output tray:	Face-down exit tray holds up to 500 sheets
❑ 2 optional paper cassettes for the lower paper cassettes unit:	500-sheet cassette for A4 or letter-size paper 250-sheet universal cassette (available for up to A3-size paper)
❑ Power saving mode:	Conforms to Energy Star program

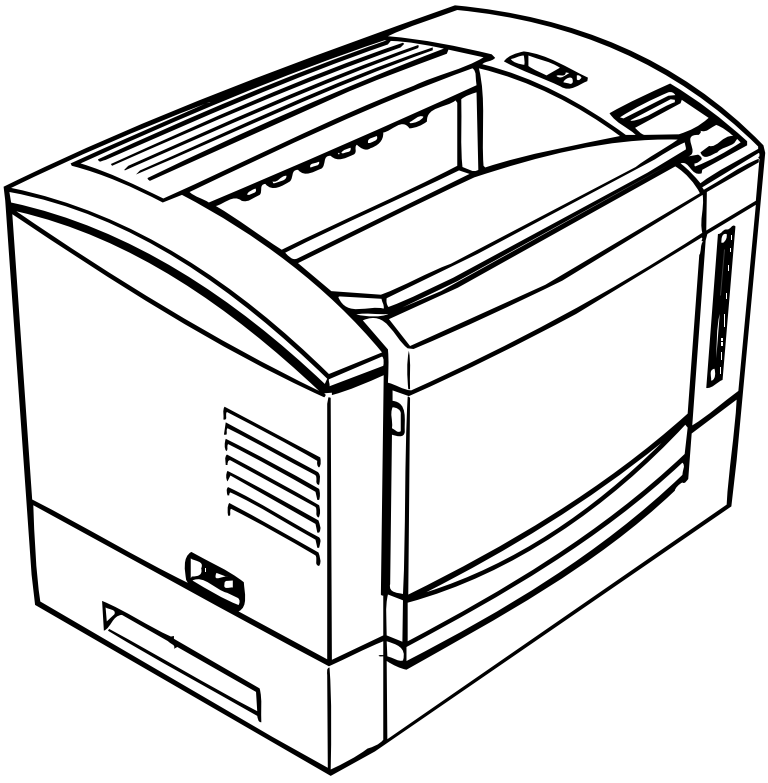


Figure 1-1. Exterior View of the EPL-N2000

Table 1-1 lists the consumables and optional units available for the EPL-N2000.

Table 1-1. Options and Consumables for EPL-N2000

Option	Part #	Requirements
ROM SIMM (EpsonScript Level 2 PostScript ROM SIMM)	C83226*	Minimum RAM size: 2MB
1MB RAM SIMM	---	
2MB RAM SIMM	---	
4MB RAM SIMM	---	
8MB RAM SIMM	---	
16MB RAM SIMM	---	
32MB RAM SIMM	---	
NLSP Bitmap 2 Font ROM for LGC*[1]	---	Available only in Europe
NLSP Bitmap 2 Font ROM for HA	---	
NLSP Bitmap 2 Font ROM for OCR	---	
LocalTalk / Serial Module	C82334*	Cannot be used with AppleTalk I/F of Type B I/F Board
Interface Cable (2 m, 6.6')	C83602*	
	C836031	(See Note 2)
	C836041	See Notes 2 and 3)
	C836051	(See Note 2)
	C836061	(See Notes 2 and 3)
	C83615*	(See Note 4)
Interface Cable (0.4 m, 1.3')	C836141	(See Note 5)

Notes:

1. Can be used in HP (GL/2) and ESC/P 2 modes.
2. Can be used only when 32KB serial interface is used.
3. Can be used in combination with interface cable C836141 with the serial interface mode for the LocalTalk /Serial Module.
4. Can be used when RS-232C I/F is selected for serial interface mode and LocalTalk/Serial Module.
5. Can be used with the serial interface mode for LocalTalk/Serial Module.
6. The asterisk is a substitution for the last digit of the product number, which varies by country:
   1: For EAI
   2: For areas other than EAI

Table 1-1. Options and Consumables for EPL-N2000 (Continued)

Option	Part #	Description
Type B Interface Board	C82307*	32KB Serial I/F (RS-422)
	C82310*	32KB Parallel Interface
	C82312*	AppleTalk Interface
	C82314*	Coax Interface
	C82315*	Twinax Interface
	C82313*	GPIB Interface or IEEE-1284
	C82324*	NetWare
	C82328*	Fax
Imaging Cartridge	S051035	
250 Sheet Paper Cassette A3 Universal	C81269*	
500 Sheet Paper Cassette A4	C81264*	
500 Sheet Paper Tray LT	C81265*	
250 Sheet Paper Tray A3 Universal	C81270*	
500 Sheet Paper Tray A4	C81266*	
500 sheet Paper Tray LT	C81267*	
duplex Unit	C81268*	

*The asterisk is a substitution for the last digit of the product number, which varies by country:

1: for EAI

2: for the areas other than EAI

1.2 SPECIFICATIONS

This section provides statistical data for the EPL-N2000.

1.2.1 Basic Specifications

- ❑ Type — Desktop page printer
- ❑ Printing method — Laser beam scanning and dry electrophotographic process
- ❑ Resolution — 600 dpi
- ❑ Printing speed — Single-sided print: 20.0 ppm*1, 11.0 ppm*2; Duplex print: 12.0 ppm*1, 6 .0 ppm*2
- ❑ First print time — Single-sided print: 16.0 seconds*1, 18.0 seconds*2; Duplex print: 26.0 seconds*1, 36.0 seconds*2
- ❑ Warm-up time — 100 V, 200 V: Less than 70 seconds (at rated current and 23° C (68° F) temperature)
- ❑ Paper supplies — See Table 1-2.

*1: Using A4 or letter-size paper in landscape orientation in the direction of the paper path.

*2: Using A3 paper in portrait orientation in the direction paper of the paper path.

Table 1-2. Paper Feed Sources

Paper Supply		Paper Size*1	Capacity	Usage Thickness (Ream Weight)
MP Tray	Universal	A3+, A3, B4, F4, A4 (L) B5 (L), l-B5 (L), A5 (L), Ledger, Legal, GLG, Letter (L), GLT (L), Executive (L), HLT (L)	200 *2	Standard: 60 to 135 g / m² (16 to 36 lb) Thick paper: 90 to 157 g / m² (24 to 42 lb) Special papers: Labels, transparencies
		Envelopes Monarch, C10, DL, C5, C6 *1	10	Standard paper 60 to 105 g / m² (16 to 28 lb)
Standard lower cassette unit	A4/letter cassette	GLG, LGL, B A3, B4, LTR (L) A4 (L), B5 (L), A5 (L) *1	250 *2	Standard paper 60 to 90 g / m² (16 to 24 lb)
Optional lower cassette unit*3	A4/letter cassette	A4 (L), LTR (L), *1	500 *2	Standard paper 60 to 90 g / m² (16 to 24 lb)
	A3 universal cassette	A3, B4, F4, A4 (L) B5 (L), l-B5 (L), A5 (L), Ledger, Legal, GLG, Letter (L), GLT (L), Executive (L), HLT (L)	250	

*1: (L) indicates landscape orientation; all others are portrait orientation

*2: With 75 g/m² (20 lb) paper.

*3: The A4/letter cassette and A3 universal cassette are available for both the standard and optional cassette units.

❑ Paper sizes See Table 1-3.

Front tray Width: 92 mm to 330.2 mm (3.26" to 13")

Length: 140 mm to 483 mm (5.5" to 19")

Table 1-3. Available Paper Sizes

Paper Type	Size Width X Length	MP Tray	Cassette		Duplex*2
		Universal	Universal	A4/Letter	
A3+	328 X 453 mm	P*1	—	—	P
A3	297 X 420 mm	P	P	—	P
B4	257 X 364 mm	P	P	—	P
F4	210 x 330 mm	P	P	—	P
A4	210 X 297 mm	L*1	L	L	L
B5*3	182 x 257 mm	L	L	—	L
l-B5*3	176 X 250 mm	L	L	—	L
A5	148 x 210 mm	L	L	—	L
Ledger	11" X 17"	P	P	—	P
Legal	8.5 X 14"	P	P	—	P
GLG	8.5" X 13"	P	P	—	P
Letter	8.5" X 11"	L	L	L	L
GLT	8" X 10.5"	L	L	—	L
Executive	7.25" X 10.5"	L	L	—	L
HLT	5.5" X 8.5"	L	L	—	L
Monarch	3 7/8" X7 1/2"	P	—	—	—
C-10	4 1/8"x9 1/2"	P	—	—	—
DL	110 X 220 mm	P	—	—	—
C5	162 X 229 mm	P	—	—	—
C6	114 X 162 mm	P	—	—	—

*1: P: Portrait orientation
L: Landscape orientation

*2: Only standard-size paper can be used for duplex printing.

*3: The printer identifies B5 with l-B5 paper.

❑ Paper types
Normal paper: 60 to 90 g / m^2 (16 to 24 lb)
Recycled paper: 60 to 90 g / m^2 (16 to 24 lb)
Special paper: Transparencies (OHP), letterhead, envelopes, labels, thick paper (91 to 157 g / m^2, 24 to 42 lb)
Specific paper: A3+ 328 mm × 453 mm, 75 to 80 g / m^2 (20 to 21 lb)

Table 1-4. Paper Types

		U.S.	Europe
Normal Paper	Recommended Paper	Minolta Bond 20 lb. (Nekoosa)	Copy paper 70 Copy paper 80 (Neusiedler)
	Standard Paper	Xerox 4024 DP 20 lb	—
Recycled Paper		Ardor Recycled Xerox / Bond 20 lb (Nekoosa)	RCC80 (Steinbeis)
Special Paper	Letterhead	Four Star 403C 20 lb, Parchment Deed 13C 20 lb Neenah Bond 20 lb, Gilbert 20 lb	
	Transparency (OHP)	3M PP2500	

Table 1-5. Usability of Special Papers

Feeding Source	Standard Paper	Normal Paper	Special Papers — OHP, Envelopes, Labels
MP tray	RF	R	P
Lower paper cassette	RF	R	N
Universal cassette (250 sheets)	RF	R	N
A4, letter cassette (500 sheets)	RF	R	N
Duplex unit	RF	R	N

RF: Reliable feeding and good image quality.
R: Reliable feeding and good image quality, but limited to paper generally available.
P: Possible, but limited to paper generally available.
N: Not supported.

❑ Paper feed alignment direction: Center alignment for all sizes

❑ Paper ejection: Face-down only

❑ Output tray capacity: 500 sheets (75 g / m^2, 20 lb paper)

❑ Printable area: See Figure 1-2.

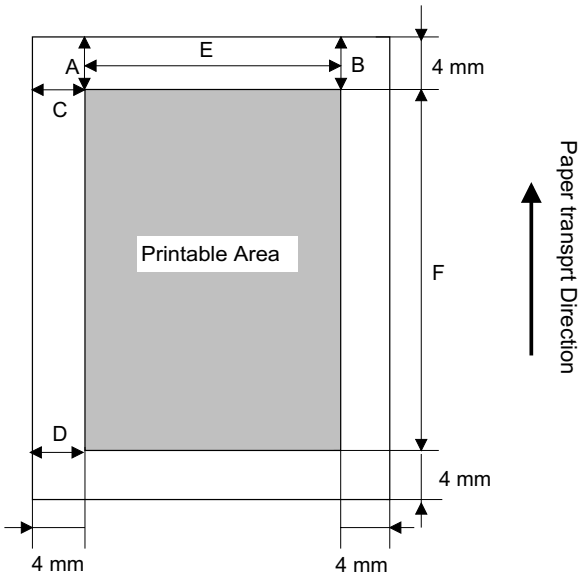


Figure 1-2. Printable Area

Note: For A3+ paper (E X F) : 297 × 420 mm (12.12 X 17.14 ")
The maximum printable area with good image quality (E X F) :
323 × 443 mm (12.72 × 17.44").
Printable area can vary, depending on the emulation.

1.2.2 Electrical Specifications

Table 1-6. Electrical Specifications

Printer Version	100 V Version	120 V Version	200 V Series
Rated Voltage	90 V to 110 V (100 V ± 10 %)	108 V to 132 V (120 V ± 10 %)	207 V to 253 (230 V ± 10 %)
Rated Frequency Range	50 /60 Hz ± 3 Hz		
Power Consumption	Less than 790 W Less than 45 W (in energy-saver mode)		
Current Consumption	Less than 8 A (at rated voltage)	Less than 7 A (at rated voltage)	Less than 5 A (at rated voltage)

1.2.3 Specifications for Reliability, Durability, and Maintenance

- MPBF* (mean prints between failures): over 60,000 sheets or 3,000 hours

  * MPBF indicates an average number of pages printed before occurrence of problem requiring replacement or service.

Table 1-7. Paper Feed Reliability

	MP tray	Cassette*1	Duplex
Jam rate *2	1/ 2000 or less	1/ 2000 or less	1/ 1000 or less
Feed failure	1/ 2000 or less	1/ 2000 or less	1/2000 or less
Multiple paper feeds	1/ 500 or less	1/ 500 or less	1/500
Leading edge bent	1/ 1000 for 1C or more *3	1/ 1000 for 1C or more *3	1/500 or less
Paper wrinkle	1/ 1000 or less	1/ 1000 or less	1/500 or less

*1: A4/letter cassette and universal cassette from the lower paper cassette units.

*2: Multiple paper feeds excluded.

*3: Disregarding a sheet bent less than 1C. (1C = 1 corner bent by 1 mm or less)

Note: Statistics above only apply to newly unpacked paper.

- Print Position (Refer to Figure 1-2.)

  Single-sided print:
  Main scan direction: Standard position (C) ± 2.0 mm
  Sub scan direction: Standard position (A) ± 2.5 mm

  Duplex print:
  Main scan direction: Standard position (C) ± 3.0 mm
  Sub scan direction: Standard position (A) ± 2.5 mm

- Paper curl height: ± 30 mm or less
- MTTR (mean time to repair): 30 minutes or less
- Printer operating life: 5 years or 360,000 sheets, whichever comes first.
- Acoustic noise: 38 db(A), standby
53 db(A), operation
- Ozone density: Less than 0.02 ppm (Blue Angel standard conformance)
- Toxicity: No toxicity exists in OPC, toner, or plastic materials
- Skew See Table 1-8.

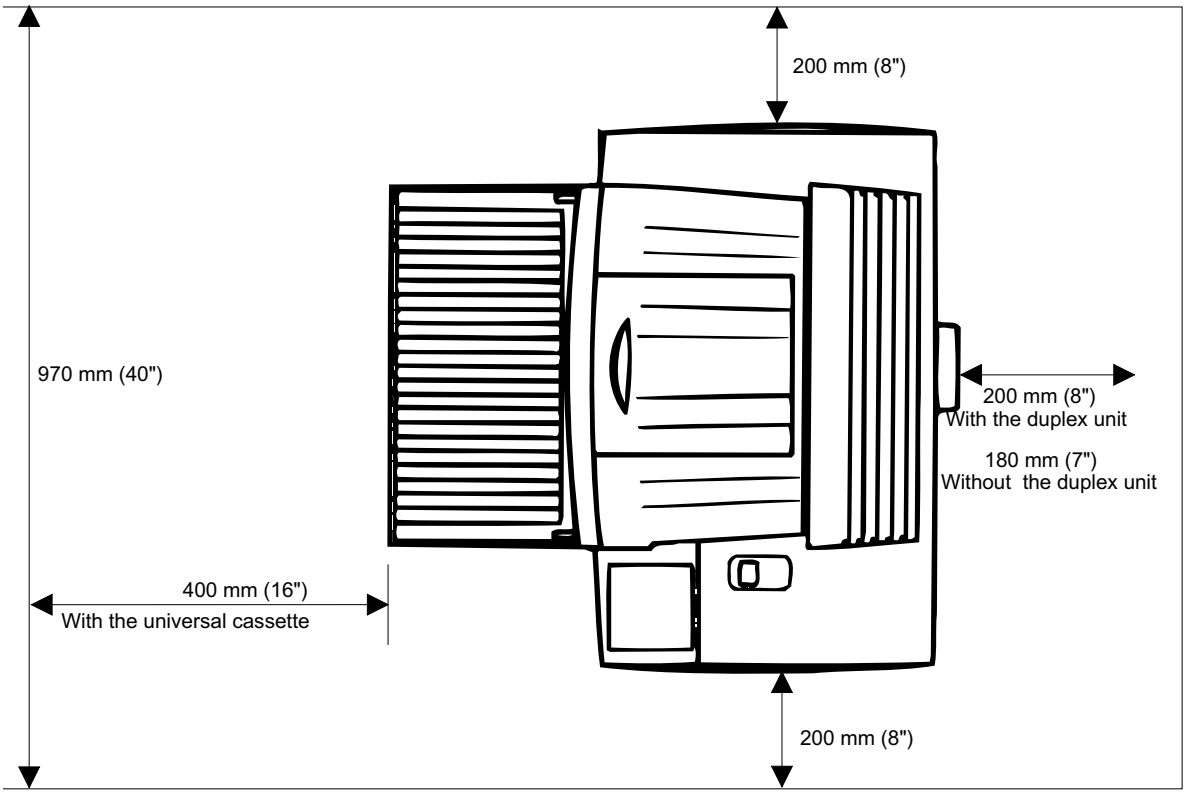
Table 1-8. Paper Skew

	Direction	A4 (Landscape)	A3
Single-sided print	|C-D|*1 |A-B|*2	± 1.5 mm ± 2.0 mm	± 3.0 mm ± 2.0 mm
Duplex print	|C-D| |A-B|	æ 2.5 mm ± 3.0 mm	± 4.5 mm ± 3.0 mm

*1: Main scan direction *2: Sub scan direction (See Figure 1-2.)

1.2.4 Environmental Conditions for Operation (Including Consumables)

- ❑ Temperature: 10 to 35^{o} C (50 to 90^{o} F)
- ❑ Humidity: 15 to 85% RH (withour condensation)
- ❑ Altitude: 2500 m (8202') or less
- ❑ Atmospheric pressure: 760 hpa or more
- ❑ Levelness: 1^{o} or less
- ❑ Illuminance: 3,000 lux or less (must not be exposed to direct sunlight.)
- ❑ Surrounding space required: See Figure 1-3.



Leave 880 mm in height including 400 mm for opening the top cover.
An additional 94 mm in height is needed when installing the optional cassette unit.

Figure 1-3. Space Requirements

1.2.5 Environmental Conditions for Storage and Transportation

Table 1-9. Environmental Conditions for Storage

Storage life	18 months after production, packed.		
Temperature	Normal (over full storage life)		0 to 35° C (32 to 95 F)
	Extremes ($^1/_3$ of full storage life)	High	35 to 55° C (95 to 131 F)* [1]
		Low	–20 to 0° C (–4 to 32 F)
	Change range per hour		Less than 10° C (18 F)
Humidity	Normal (over full storage life)		30 to 85 RH
	Extremes ($^1/_3$ of the full storage life)	High	85 to 95% RH
		Low	10 to 30% RH
Atmospheric Pressure	61.3 to 101.3K Pa (460 to 760 mm Hg)		

*1 Without Imaging cartridge

- Resistance to vibration (including consumables):

  Vibration frequency: 5 to 100 Hz , 100 to 5 Hz
  Acceleration: 1 G
  Transportation time: 10 minutes (1 way)
  Accelaration directions: 3 directions
  Acceleration duration: 60 minutes for each direction — X, Y and Z (180 minutes total)

- Drop test: No damage at JIS Z0200-1987 level 1

1.2.6 Specifications for the Imaging Cartridge

❑ Cartridge life: 10,000 sheets *

* This number is printable pages in continuous print mode using A4 or letter size paper at a 5% image ratio (black / white ratio). Life varies, depending on the image ratio and printing mode, such as continuous / intermittent, density and toner saver.

Table 1-10. Environmental Conditions for Storage and Transportation

Storage life	18 months after production, packed.		
Temperature	Normal (over full storage life)		0 to 35° C (32 to 95 F)
	Extremes (1/3 of the full storage life)	High	35 to 40°C (95 to 104 F)* 1
		Low	–20 to 0°C (–4 to 32 F)
	Change range per hour		Less than 10°C (18 F)
Humidity	Normal (over full storage life)		30 to 85 RH
	Extremes (1/3 of the full storage life)	High	85 to 95% RH
		Low	10 to 30% RH
Atmospheric Pressure	74.0 to 101.3K Pa (555 to 760 mm Hg)		

* 1: Without condensation

❑ Drop test: Height : 76 cm

❑ Resistance to vibration: Same as the printer

1.2.7 Applicable Standards

Safety Standards

❑ USA	UL1950
❑ Canada	CSA950
❑ Europe	EN60950:1992 Annex ZB, ZC

Safety Regulations (Laser Radiation)

❑ USA	21 CFR Chapter 1 Subchapter J Part 1040
❑ Europe	IEC825

EMI

❑ USA	47 CFR Part 15 Subpart B Class A
❑ Canada	ICES-003:Issue 2 Class A
❑ Europe	EN 55022 (Class A)

Others

❑ Toner	No effect on human health (OSHA-TSCA, EINEX)
❑ OPC	No effect on human health (under OSHA regulations)
❑ Ozone	UL478 (5th edition)
❑ Materials	SWISS environmental law (must contain no CdS)

1.2.8 Physical Specifications

❑ Dimensions (Width X Depth X Height):	561 × 402 × 408 mm (22 × 16 × 16") (Without optional lower cassette unit) 561 × 402 × 508.3 mm (22 × 16 × 20") (With optional lower cassette unit)
❑ Weight:	Approximately 24 kg (53 lb.) (Consumables and options excluded)

1.2.9 Process Specifications

❑ Printing system	Electrostatic and dry electrophotographic process
❑ Exposing source	Semi-conductor laser beam scanning system
❑ Exposed object	OPC drum (Organic Photo Conductor)
❑ Charging system	Rotating charge brush system
❑ Developing system	Fine Micro Toning system
❑ Toner	Nonmagnetic toner
❑ Image transfer system	Roller transfer system
❑ Drum cleaning system	Cleaning blade
❑ Fixing system	Heat roller
❑ Image density control	Variable developer bias (can be set by user)

1.2.10 Controller Specifications

❑ CPU:	RISC type CPU:	MB86935-50
	Clock speed:	47.6 MHz
❑ RAM:	Standard:	4MB
	Max.*1:	68MB
❑ ROM:	4MB	
❑ EEPROM:	16Kbits	
❑ Host interface:	Standard:	Bidirectional parallel B type / C type Ethernet*2
	Optional:	Type B *3 LocalTalk / Serial Module
❑ Optional slots:	RAM SIMMs:	2 slots
	ROM SIMM:	1 slot
	PCMCIA:	1 slot
	NLSP socket:	1 slot
	Type B:	1 slot

⚠CAUTION

*1: Expanded with up to 2 SIMMs
2: Type-B I/F Board (C82331) (standard) is instsalled in Type-B slot.
3: Remove Type-B I/F Board (C82331) (Standard) before inserting Type-B I/F card.

Make sure power is off when installing and removing options.

1 .2.11 Software Specifications

❑ Built-in emulation modes:
PCL5e *1
GL/2 *1
EPSON GL/2 *2
FX
ESC/P 2
I239X

*1: Included in HP LaserJet 4 emulation.

*2: EPSON GL/2 mode, which emulates the GL/2 mode in the HP LaserJet 4 emulation, has 2 modes; LJ4-GL2 mode and GL-like mode.

❑ LJ4-GL2 mode: Used to print with software that supports the HP 7600 series electrostatic plotter. It emulates GL/2 mode in the HP LaserJet 4 emulation. In EPSON GL/2 mode, however, the operator can reach some parameters with SelecType, without sending commands.

❑ GL-like mode: Used to print with software that supports the HP7475A series pen plotter. GL-like mode features all the commands for LJ4-GL/2 mode, except some instructions such as plotter unit and picture frame, that are the same as in EPSON GL/2 mode. However, since GL-like mode doesn't support some commands used in the HP GL mode, print cannot be assured with application software that specifies those commands.

See Table 1-11 for differences between LJ4-GL/2 mode and the GL-like mode.

Table 1-11. Differences between LJ4-GL/2 Mode and GL-like Mode

	LJ4-GL/2 Mode	GL-like Mode
Orientation	Can be set in printing menu	Always landscape
Plotter Unit	1/1016 inch	1/1021 inch
Picture Frame	Same as in GL/2 mode in HP LaserJet mode	Hard clip limit for EPSON GL mode
Default Value for P1 and P2	Left and right bottom edge of the picture frame	Inside the picture frame
Undefined Command	The first character discarded	Both of 2 characters discarded
CS, CA Command	Unsupported	Supported (Not fully compatible with the HP-GL mode)
Procedure for omission of 2nd parameter of the DT command	No terminator plotted	Terminator plotted
Default value for number of pens	2	8 (can be set by sending a command)

1.2.12 Fonts Specifications

- Built-in fonts: Scalable: 45 fonts
  Bitmap: 1 font

See Table 1-12 on the next page for the list of the built-in fonts.

Table 1-12. Built-in Fonts

Resident Fonts	Applicable Modes		
	PCL 5e GL/2	ESC/P 2	FX
Bitmap font			
Line Printer	S	NS	NS
Scalable fonts			
Dutch 801 Roman SWC	S	NS	NS
Dutch 801 Bold SWC	S	NS	NS
Dutch 801 Italic SWC	S	NS	NS
Dutch 801 Bold Italic SWC	S	NS	NS
ZapfHumanist 601 Demi SWC	S	NS	NS
ZapfHumanist 601 Bold SWC	S	NS	NS
ZapfHumanist 601 Demi Italic SWC	S	NS	NS
ZapfHumanist 601 Bold Italic SWC	S	NS	NS
Ribbon 131 SWC	S	NS	NS
Clarendon Condensed SWC	S	NS	NS
Swiss 742 SWC	S	NS	NS
Swiss 742 Bold SWC	S	NS	NS
Swiss 742 Italic SWC	S	NS	NS
Swiss 742 Bold Italic SWC	S	NS	NS
Swiss 742 Condensed SWC	S	NS	NS
Swiss 742 Bold Condensed SWC	S	NS	NS
Swiss 742 Condensed italilc SWC	S	NS	NS
Swiss 742 Bold Condensed italilc SWC	S	NS	NS
Incised 901 SWC	S	NS	NS
Incised 901 Black SWC	S	NS	NS
Incised 901 SWC Italic	S	NS	NS
Original Garamond SWC	S	NS	NS
Original Garamond Bold SWC	S	NS	NS
Original Garamond Italic SWC	S	NS	NS
Original Garamond Bold Italic SWC	S	NS	NS
Audrey Two SWC	S	NS	NS
Flareserif 821 SWC	S	NS	NS
Flareserif 821 Extra Bold SWC	S	NS	NS
Swiss 721 Roman SWM	S	S	NS
Swiss 721 Bold SWM	S	S	NS
Swiss 721 Oblique SWM	S	NS	NS
Swiss 721 Bold Oblique SWM	S	NS	NS
Dutch 801 Roman SWM	S	S	S
Dutch 801 Bold SWM	S	S	S
Dutch 801 Italic SWM	S	NS	NS
Dutch 801 Bold Italic SWM	S	NS	NS
Symbol Set SWA	S	NS	NS
More WingBats SWM	S	NS	NS
Courier SWC	S	S	S
Courier Bold SWC	S	S	S
Courier Italic SWC	S	NS	NS
Courier Bold Italic SWC	S	NS	NS
Letter Gothic Roman SWC	S	S	S
Letter Gothic Bold SWC	S	S	S
Letter Gothic Italic SWC	S	NS	NS

S: Supported , NS: Not supported

❑ Font Symbol Sets

In LJ4 Emulation Mode (Bitmap Fonts): 28 Symbol Sets

Roman-8 *[1]	ECM94-1	Norwege 2	Spanish
Roman Extension	8859-9 ISO	Italian	Swedish
Legal	8859-2 ISO	UK	Portuguese
IBM-US	IBM-DN	Norwege 1	IBM Portuguese
ANCI ASCII	Swedish 2	IBM Spanish	
JIS ASCII	HP German	HP Spanish	
IRV	German	French 2	
French	PcMultilingual	Chines	

In LJ4 Emulation Mode (Scalable Fonts): 27 Symbol Sets

Roman-8 *[1]	Roman Extension	Veinterrnational
ECM94-1	Legal	VeUS
8859-2 ISO	PsMath	PiFont
8859-9 ISO	WiTurkish	PcE.Europe
MsPublishing	VeMath	Symbol
Desktop	Math-8	WiAnsi
WiE.Europe	PcTk437	Wingdings
Windows	PsTest	McText
IBM-US	IBN-DN	PcMultilingual

*1: Includes other 19 sets (partial variations of the Roman-8 set):
Norweg 1, Italian, Swedish, ANSI ASCII, UK, French, German, Spanish, Norweg2, French2, 29HP German, JIS ASCII, HP Spanish, Chinese, IRV, Swedish2, Portuguese, IBM Portuguese, IBM Spanish

In ESC/P 2 or FX Modes: 9 Symbol Sets and 15 International Character Sets

PC437 (USA / standard Europe)	PC850 (Multilingual)
PC860 (Portuguese)	PC863 (Canadian-French)
PC865 (Norwegian)	PC857 (PcTurk2)
PC852 (East Europe)	BRASCII
Abicomp	

USA	France
Germany	UK
Denmark	Sweden
Italy	Spain
Japan	Norway
Denmark2	Spain2
Latin America	Korea*
Legal*	

* Available for ESC / P 2 emulation only

In i239X Emulation Mode: 5 Symbol Sets and 7 Fonts

PC437 (USA / standard Europe)	PC850 (Multilingual)
PC860 (Portuguese)	PC863 (Canadian-French)
PC865 (Norwegian)	

EPSON Sans-Serif	Courier SWC	EPSON Prestige
EPSON Gothic	EPSON Presentor	
EPSON Orator	EPSON Script	

1.3 INTERFACE SPECIFICATIONS

The following interfaces are available for EPL-N2000 printer.

- ❑ Standard: Parallel B type I/F
  Parallel C type I/F
  Network I/F
- ❑ Optional: LocalTalk / Serial Module *
  Type-B I/F
  * Connector for LocalTalk is built in on the I/F bracket, along with connectors for standard I/F.

NOTE: Type-B I/F Board (C82331*) (standard) is inserted in the Type-B interface slot. Note the following when Type-B I/F Board (C82331*) is installed:

- ❑ Remove Type-B I/F Board (C82331*) when installing Type-B interface.
- ❑ Remove Type-B I/F Board (C82331*) when using LocalTalk/Serial Module in LocalTalk mode.

* Type-B I/F Board: C82331* (The asterisk is a substitution for the last digit which varies by the country.
  1 : For EAI 2 : For the areas other than EAI

1.3.1 Parallel Interface Specifications

1.3.1.1 Parallel Interface B Type Specifications

- ❑ Type: Bidirectional Parallel I/F (IEEE-1284)
- ❑ Operation modes: Compatibility mode
  Nibble mode
  ECP mode
  (Byte mode and EPP mode are not supported.)
- ❑ Data transmission system: $\overline{\text{STROBE}}$ synchronization, 8-bit parallel data transfer
- ❑ Handshaking: BUSY and $\overline{\text{ACKNLG}}$ signals
- ❑ Connector type: 57RE-4060-730B (D5)
  Receptacle: (DDK)
- ❑ Applicable plug: Amphenol or equivalent
- ❑ Cable length: 3 meters (10") or less

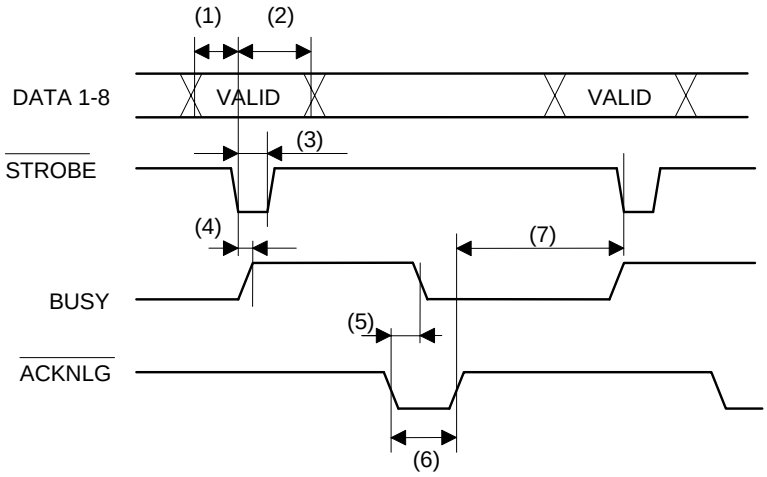


Figure 1-4. Timing Chart

- ❑ Signal timing: See the figure below and Table 1-13.

Product: EPSON EPL-N2000 Terminal Printer Service Repair Workshop Manual
Full Download: https://www.arepairmanual.com/downloads/epson-epl-n2000-terminal-printer-service-repair-workshop-manual/

Table 1-13. Timing in Compatibility Mode

Description *1	Minimum	Typical	Maximum
(1) DATA setup	0.5 µs		
(2) DATA hold	0.5 µs		
(3) $\overline{\text{STROBE}}$↑ pulse width↓	0.5 µs		
(4) BUSY↓ to $\overline{\text{STROBEX}}$↓	0 s		
(5) $\overline{\text{STROBEX}}$↓ to BUSY↑			0.5 ms
(6) BUSY↓ to $\overline{\text{STROBEX}}$↓	0 s		
(7) $\overline{\text{ACKX}}$ pulse width	0.5 µs	1 µs*2	
(8) $\overline{\text{ACKX}}$↑ to BUSY↓	0 s		
(9) BUSY↑ to PE↑ or $\overline{\text{ERRX}}$↓	2 ms*		
(10) PE↓ or $\overline{\text{ERRX}}$↑ to BUSY↓	2 ms*		
(11) Power on to signal output valid			0.5 µs
(12) PE↓ or $\overline{\text{ERRX}}$↑ to $\overline{\text{ACKX}}$↓	2 ms*		
(13) $\overline{\text{STROBEX}}$↑ to $\overline{\text{ACKX}}$↓	0 s*		

*1: Signals ending in "X" are Active LOW.
*2: SE specification

Table 1-14. Pin Assignments for Parallel B Type I/F

Pin	Compatibility Mode	Nibble Mode	ECP Mode	I/O
1	nStrobe	HostClk		I
2 to 9	DATA 1 to DATA 8			I/O
10	nAcknlg	PtrCLK	PeriphClk	O
11	Busy	PtrBusy	PeriphAck	O
12	PError	AckDataReq	nAckReverse	O
13	Select	Xflag		O
14	nAutofeed	HostBusy	HostAck	I
15	NC			—
16	GND			—
17	FG			—
18	PeripheralLogicHigh			O
19 to 30	GND			—

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