EPSON TERMINAL PRINTER

LQ-2070

SERVICE   MANUAL
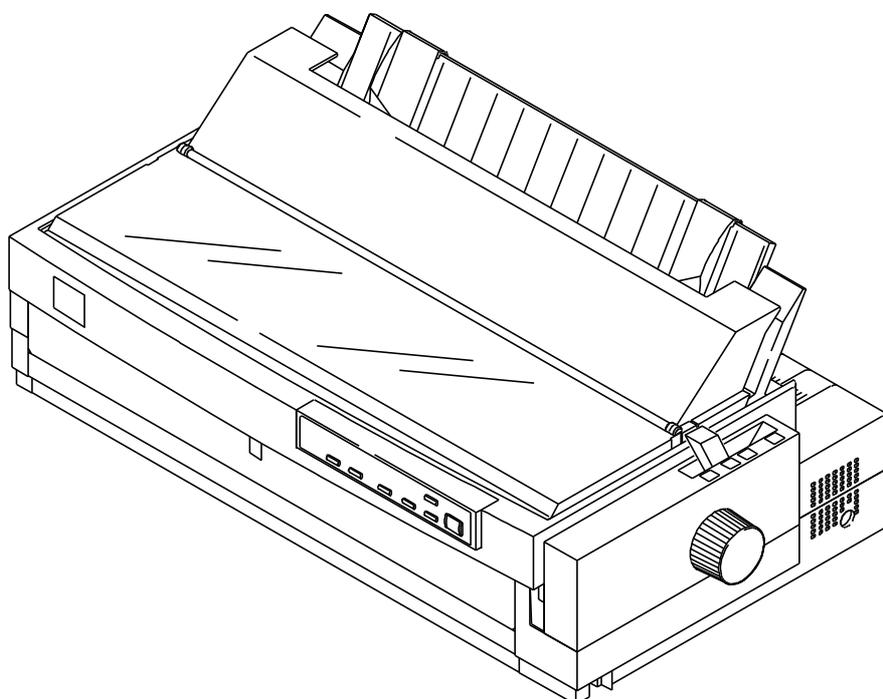
EPSON

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PRECAUTIONS

Precautionary notations 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 INDDIVIDUAL 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.

PREFACE

This manual describes functions, theory of electrical and mechanical operations, maintenance, and repair of the FX-2170. The instructions and procedures included herein are intended for the experienced repair technician, and attention should be given to the precautions on the preceding page. The chapters are organized as follows:

Chapter 1   -   Provides a general product overview, Lists specifications, and illustrates the main components of the printer.

Chapter 2   -   Describes the theory of printer operation.

Chapter 3   -   Includes a step-by-step guide for product disassembly and assembly.

Chapter 4   -   Includes a step-by step guide for addjustement.

Chapter 5   -   Provides Epson-approved techniques for troubleshooting.

Chapter 6   -   Describes prevetive maintenance techniques.

❋ The contents of this manual are subject to change without notice.

REVISION SHEET

Revision	Issued Date	Revision Page
Rev. A	April 8,1996	1st issued

TABLE OF CONTENTS

CHAPTER 1 Product Description

Table of Contents

List of Figures

List of Tables

1.1 Specifications

These specifications provide statistical information for the LQ-2070 serial impact dot matrix printer.

1.1.1. Features

The LQ-2070 is a 24pin serial impact dot-matrix printer suitable for the VAR (value addedreseller) market. The major features of this printer are:

. Print speed	High speed draft	300 characters per second (cps)
	Draft	275 cps
	LQ	92 cps at 10 characters per inch (cPi)
•Feeding method	Friction feed	(front, rear)
	Push tractor feed	(front, rear)
	Push and pull tractor feed	(front, rear)
	Pull tractor feed	(front, rear, bottom)
•Feeder	Front push tractor(option), rear push tractor, CSF bin 1 / bin 2 (option) Pull tractor (option), roll paper holder (option)	
•Paper/media	Single sheet, continuous paper, multipart paper, envelopes, card labels, roll paper	
. Fonts	9 LQ and 1 draft bitmap typefaces, 4 Scarable typefaces, 8 barcode fonts	
•Character tables	Standard version	11 tables
	NLSP version	20 tables
•Input buffer	64KB	
•Acoustic noise	51 dB (A), 1S0 7779 pattern	
•Reliability	Total print volume 6 million lines, except printhead	
	MTBF	6000 power on hours (POH)
	Printhead life	200 million strokes/wire
	Ribbon life	8 million characters
•Interfaces	Bidirectional parallel interface (IEEE-P1284 nibble mode supported) Type B I/F Level 2 (option)	
. Control codes	ESC/P2 and IBM 2390/2391 plus emulation	
. Copy capability	1 original+ 3 copies	
•Control panel functions	Font, Pause, Condensed Pause, Tear off, Bin, LF/FF, Load/Eject, Micro Adjust, Default Setting	

Refer to Figure 1-1 on the next page for an exterior view of the LQ-2070.

Note: Roll paper is not available on all models and not available in the U.S.
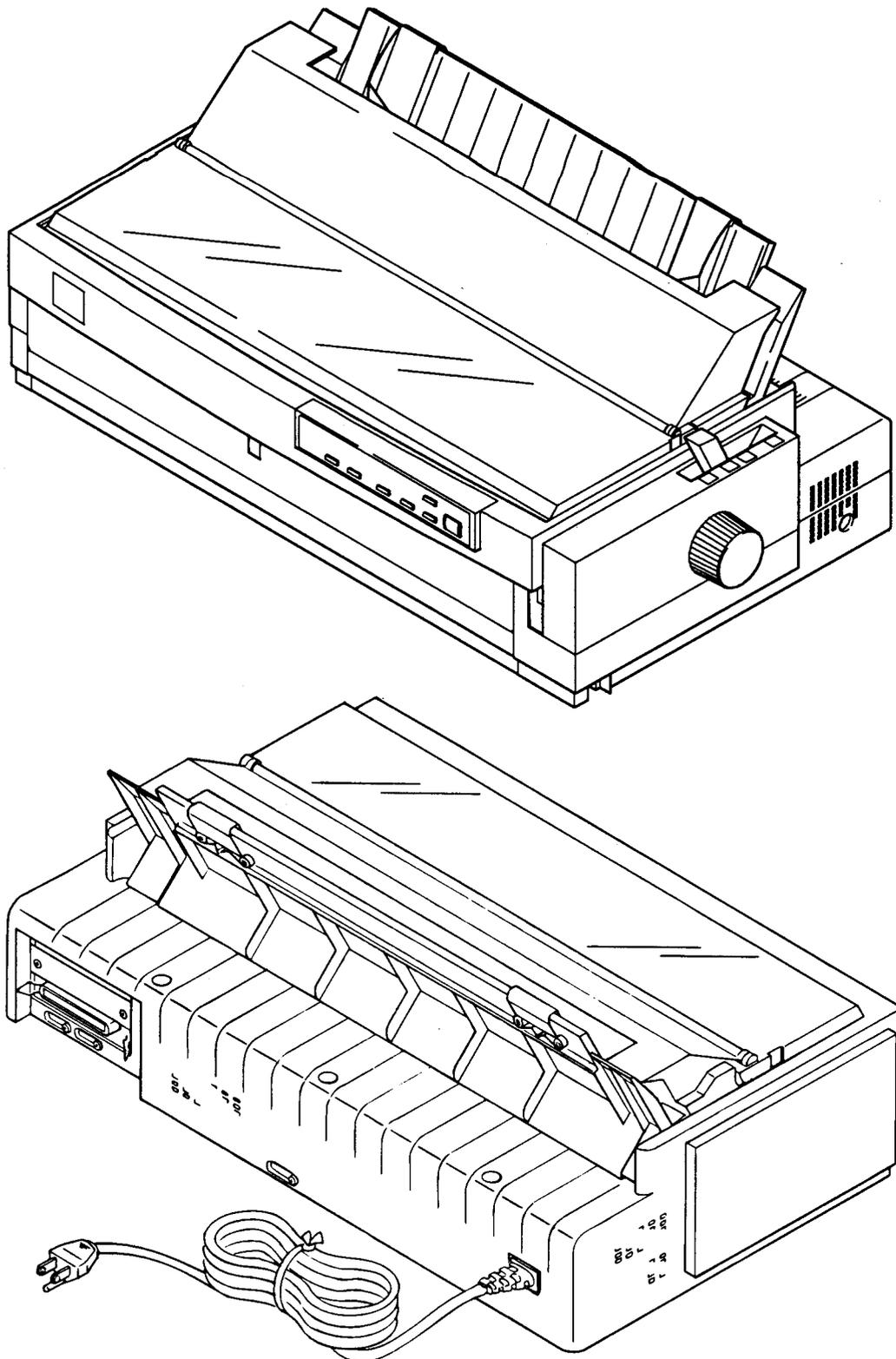
Figure 1-1 Exterior View of the LQ-2070

1.1.2. Accessories

• Items included in the printer **carton**

Table 1-1 Items Included with the Printer

Enclosed Items	Quantity
User's guide	1
Driver diskette	1
Ribbon cartridge	1
Power cord	1

. Consumables

Table 1-2 Consumables

Consumable Item	Part Number
Ribbon cartridge	S015083/S01 5086
Ribbon pack	S010031/S01 **0033**

. Options

Table 1-3 Optional Units

Unit	Description
High-capacity cut sheet feeder 1 (bin 1)	C80673*
Second bin cut sheet feeder 2 (bin 2)	C80674*
Pull tractor unit	C80032*
Roll paper holder	#831 O
Serial I/F card	C82305* / C82306*
32KB intelligent serial I/F card	C82307* / C82308*
32KB intelligent parallel I/F card	C8231O*/C82311•
Local Talk I/F card	C82312*
32KB IEEE-488 I/F card	C82313*
Coax I/F card	C82314*
Twinax I/F card	C82315*
Ethernet I/F card	C82331•

* The number represented by an asterisk varies, depending on the country.

Note: Roll paper is not available on all models and not available in the U.S.

1.2 Hardware Specifications

This section provides detailed hardware specifications for the LQ-2070.

1.2.1 Printing Method

. Printing method   Impact dot matrix

. Color   Black

. Number of pins   24 pins

. Pin arrangement   12x 2 staggered

•Print Pin diameter   **0.2 mm (0.0079 inch)**
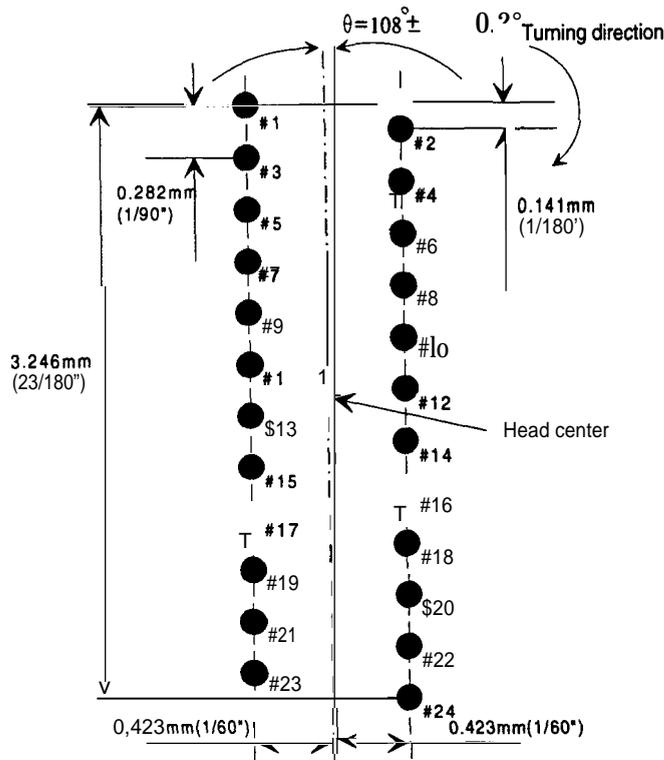
Figure 1-2. Pin Configuration

✳ The figure above shows the configuration of pins on the paper .

. **Print** direction   Bidirectional, with logic seeking for text, and unidirectional for graphics. (Bidirectional printing of graphics can be selected with a printer setting or software command.)

1.2.2 Printing Specifications

● Copy capability   1 original+ 3copies

● **Print** speed **and printable** columns

Table 1-4 Print Speed and Printable Columns

Print Mode	Character Pitch	Printable Columns	Print Speed (cps)	
			Normal	**copy**
High-speed draft	10 cpi	136	**300**	**244**
Draft	10 cpi	136	275	183
	12 cpi	163	330	220
	15 cpi	204	413	275
Draft condensed	17 cpi	**233**	**236**	**157**
	20 cpi	272	275	183
LQ	10 cpi	136	92	61
	12 cpi	163	**110**	73
	15 cpi	204	138	92
LQ Condensed	17 cpi	233	157	105
	20 cpi	2 7 2	183	122

. Resolution

Table 1-5 Print Resolution

Print Mode	Horizontal Density	Vertical Density	Adjacent Dot Printed?
High-speed draft	90 dpi	180 dpi	No
Draft	120 dpi	180 dpi	No
Draft condensed	240 dpi	180 dpi	No
LQ	360 dpi	180 dpi	No
8 pin bit image	60,80, 90, or 120 dpi	60 dpi	Yes
	120 or 240 dpi	60 dpi	No
24 pin bit image	60,90, 120, or 180 dpi	180 dpi	Yes
	360 dpi	180 dpi	No
Raster graphics	180 or 360 dpi	180 or 360 dpi	Yes

● Acoustic noise   51 dB (A), 1S0 7779 pattern

1.2.3 Paper Handling Specifications

•Feeding method	Friction feed	(front, rear)
	Push tractor feed	(front, rear)
	Push and pull tractor feed	(front, rear, bottom)
. Feeder	Front push tractor(Option), mar push tractor, CSF bin 1 /bin 2 (Option)
	Pull tractor (Option) and roll paper holder (Option)
. Paper path	Manual insertion	Front or rear in, top out
	CSF	Rear in, top out
	Tractor	Front, rear, or bottom in, top out
•Line spacing	1/6 inch or programmable in increments of 1/360 inch.
•Feed speed	1/6 inch feed	45 msec
	Continuous feed	0.127 m /see (5.0 inches/see)
. Release lever	Set the release lever, using the following table.

Table 1-6 Paper Path and Paper Types

Lever Position	Paper Entrance	Paper Types				
		Single Sheet	Labels	Card Stock / Envelopes	Multipart	Roll Paper
Friction	Front insertion	OK	NO	OK%	OK	NO
	Rear insertion	OK	NO	OK	OK	NO
	CSF bin 1	OK	NO	OK	OK	NO
	CSF bin 2	OK	NO	NO	NO	NO
	Roll paper holder	NO	NO	NO	NO	OK
Rear tractor	Push	OK	OK%	NO	OK	NO
	Push-pull	OK	OK%	NO	OK	NO
Front tractor	Push	OK	OK%	NO	OK	NO
	Push-pull	OK	OK%	NO	OK	NO
Full release	Pull (front bottom)	OK	OK	NO	OK	NO
	Pull (rear)	OK	OK ✳	NO	OK	NO

✳ This symbol after "OK" means you need to check the paper type before using it with this paper path.

. Paper thickness lever   Set the paper thickness lever to the appropriate position, as
                                             indicated in the following table.

Table 1-7 Paper Thickness Lever Positions

Lever Position	Paper Thickness (inches)		Paper Thickness (mm)	
	Minimum	Maximum	Minimum	Maximum
0	0.0024	0.0047	0.065	0.12
1	0.0047	0.0075	0.12	0.19
2	0.0075	0.0102	0.19	0.26
3	0.0102	0.0126	0.26	0.32
4	0.0126	0.0142	0.32	0.36
5	0.0142	0.0157	0.36	0.40
6	0.0157	0.0205	0.40	0.52

————— Precautions for Handling Paper —————

1. Friction feed

. Set the release lever to the FRICTION position and install the paper eject assembly
• Load paper from the front or top entrance.
• Do not use continuous paper.
. Do not perform any reverse paper feeds within the top 8.5 mm (0.33 inch) and bottom 22 mm
    (0.87 inch) area.
. Do not perform reverse feeds greater than 1/6 inch after the paper end has been detected.
• Use the paper-tension unit.
• Insert the multipart cut sheet forms only from the front.

2. Push tractor feed

. Set the release lever to the REAR PUSH/FRONT PUSH position and install the paper eject
    assembly.
• Load paper from the rear or front entrance.
• Release the friction feed mechanism.
. Multipart paper must be carbonless.
• Use the paper-tension unit.
. Do not perform reverse feeds greater than 1/6 inch.
. Do not perform reverse feeds after the paper end has been detected, because accuracy of
    paper feeding cannot be assured.

3. Pull tractor feed

. Set the release lever to the PULL position.
• Load paper from the front, rear, or bottom entrance.
    (The front or bottom entrance is recommended for thick paper or labels.)
• Remove the paper eject assembly and attach the pull tractor unit.
. Insert paper from either from the front or bottom.
. Multipart paper must be carbonless.
. Do not perform reverse feeds.

4. Push-pull tractor feed

● Set the release lever to the REAR PUSH/FRONT PUSH position.
● Load paper from the front or rear entrance.
● Remove the paper eject assembly and attach the pull tractor unit.
● Remove any slack in the paper between the platen and pull tractor.
. Precisely adjust the horizontal position of the pull tractor and push tractor.
. Multipart paper mustbe carbonless.
. Do not perform reverse feeds greater than 1/6 inch.
. Do not perform reverse feeds after the paper end has been detected.

1.2.4 Paper Specifications

This section describes the printable area and types of paper that can be used in this printer.

Cut Sheets

● Paper/ media specifications   The following table shows specifications for cut sheets.

Table 1-8 Specifications for Cut Sheets (Single Sheet, Not Multipart)

	Front Entry		Rear Entry	
	Minimum	**Maximum**	**Minimum**	**Maximum**
Width	101 mm (4.0")	420 mm (1 6.5")	101 mm (4.0")	420 mm (16.5")
Length	147 mm (5.8")	420 mm (16.5")	101 mm (4.0")	420 mm (16.5")
Thickness	0.065 mm(0.0025")	0.14 mm (0.0055")	0.065 mm(0.0025")	0.14 mm (0.0055")
Weight	52.3 g/m^2 (14 lb)	90 g/m^2 (24 lb)	52.3 g/m^2 (14 lb)	90 g/m^2 (24 lb)
Quality	Plain paper, recycled paper. Not curled, not folded, or not crumpled.		Plain paper, recycled paper. Not curled, not folded, or not crumpled.	

Table 1-9 Specifications for Cut Sheets (Multipart)

	Front Entry		Rear Entry	
	Minimum	Maximum	Minimum	Maximum
Width	101 mm (4.0")	420 mm (1 6.5")	101 mm (4.0")	420 mm (16.5")
Length	147 mm (5.8")	420 mm (16.5")	101 mm(4.0")	420 mm (16.5")
Copies	1 original+ 3 copies		1 original+ 3 copies	
Total thickness	0.12 mm (0.0047")	0.32 mm (0.013")	0.12 mm (0.0047")	0.32 mm (0.013")
W e i g h t %	40 g/m^2 (12 lb)	58 g/m^2 (15 lb)	40 g/m^2 (12 lb)	58 g/m^2 (15 lb)
Quality	Plain paper, recycled paper. Not curled, not folded, or not crumpled.		Plain paper, recycled paper. Not curled, not folded, or not crumpled.	
Binding	A line of glue at the top or one side of the form.		A line of glue at the top of the form.	

＊ This weight is for one sheet of the multipart form.

• Printable area   Figure 1-3 shows the printable area for cut sheets. The table
                                    below defines the abbreviations used in the figure.

Table 1-10 Printable Area for Cut Sheets

Abbreviations	Single Sheet	Multipart
PW (width)	Refer to Table 1-8.	Refer to Table 1-9.
PL (length)	Refer to Table 1-8.	Refer to Table 1-9.
LM (left margin)	3 mm (0.12") or more **(PW ≤ 364** mm (14.33")) 25 mm **(0.98")** or more (PW = 420 mm (16.5"))	3 mm (0.1 **2")** or more (PW ≤ **364** mm (14.33")) 25 mm (0.98") or more (PW = 420 mm (16.5"))
RM (right margin)	3 mm or more (PW ≤ 364 mm (14.33")) 25 mm (0.98") or more (PW = 420 mm (16.5"))	3 mm or more (PW ≤ 364 mm (14.33")) 25 mm (0.98") or more (PW = 420 mm (16.5"))
TM (top margin)	4.2 mm (0.17") or more	4.2 mm (0.17") or more
BM (bottom margin)	4.2 mm (0.17") or more	4.2 mm (0.1 7") or more
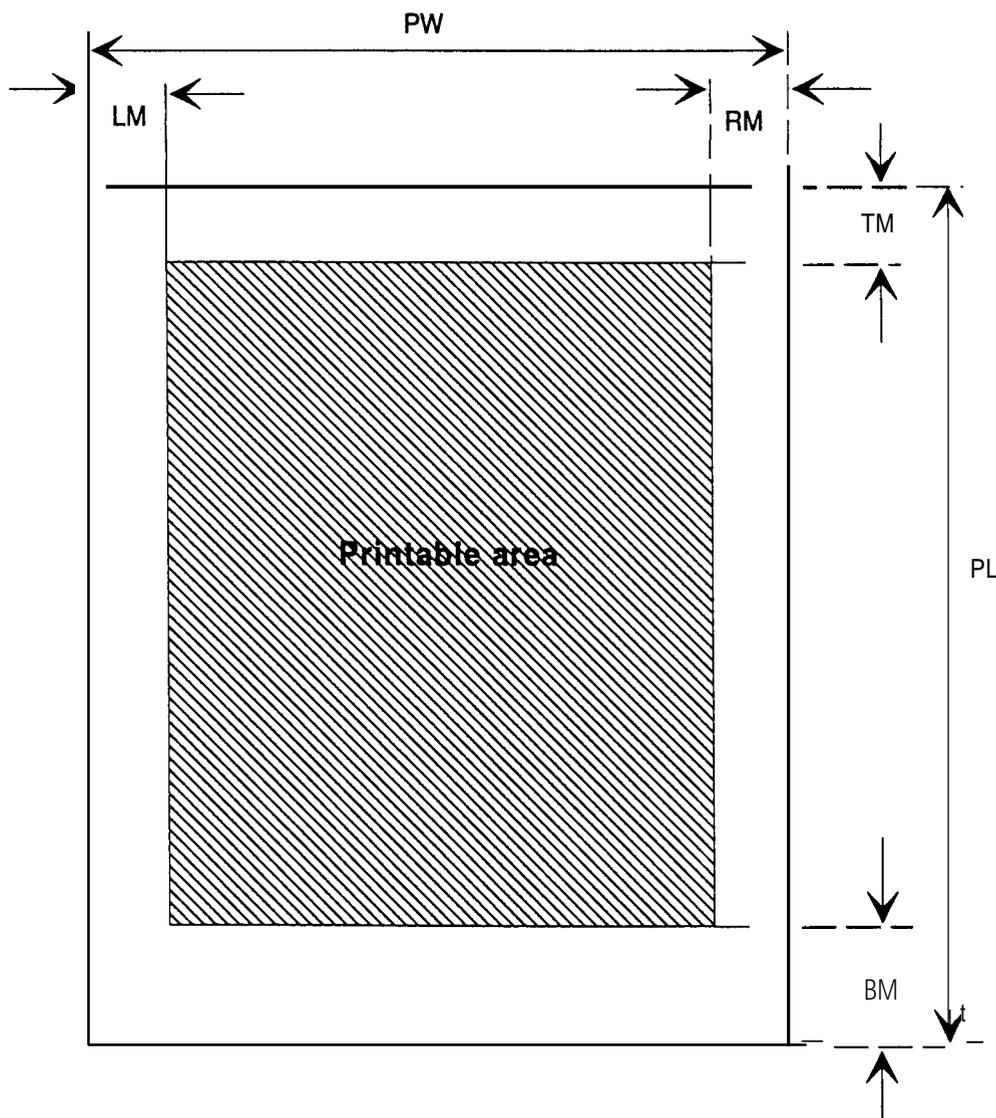
Figure 1-3 Printable Area for Cut Sheets '

Envelopes and Card Stock

• Paper/media specifications   The following tables gives specifications for envelopes and card stock.

Table 1-11 Specifications for Envelopes

		Front Entry		Rear Entry	
		Minimum	Maximum	Minimum	Maximum
No. 6 envelopes	Width	---		166 mm (6.5″)	
	Length	---		92 mm (3.6")	
No. 10 envelopes	Width	---		240 mm (9.5")	
	Length	..-		104 mm (4.1")	
Total thickness		----	----	0.16 mm (0.0063")	0.52 mm (0.020")
			.-.	Differences in thickness in the printable area must be within 0.25 mm (0.0098").	
Weight		----	----	45g/m2(12 lb)	91 g/m^2 (24 lb)
Quality			....	Bond paper, plain paper, or airmail. No glue at the flap. Not curled. not folded. or not crumpled.	

❋ Printing on envelopes is available only at normal temperatures and humidity.
❋ Insert envelopes from the rear entrance only.
❋ Insert the longer side of the envelope horizontally.

Table 1-12 Specifications for Card Stock

	Front Entry		Rear Entry	
	Minimum	Maximum	Minimum	Maximum
Width	105 mm (4.13")	148 mm (5.83")	105 mm (4.1 3")	148 mm (5.83")
Length	148 mm (5.83")	148 mm (5.83")	105 mm (4.13")	148 mm (5.83")
Thickness	0.22 mm (0.0087")		0.22 mm (0.0087")	
Weight	192 g/m^2 (51 lb)		192 g/m^2 (51 lb)	
Quality	Plain paper, recycled paper. Not curled, not folded, or not crumpled.		Plain paper, recycled paper. Not curled, not folded, or not crumpled.	

❋ Printing on card stock is available only at normal temperatures and humidity.
❋ When the longer side of an A6 card is to be inserted horizontally, insert it from the rear entrance.

● Printable area   The figure below shows the printable area for envelopes and card stock.
                                     Each abbreviation is defined-in the following table.

Table 1-13 Printable Area for Envelopes and Card Stock

Abbreviations	Envelopes	Card Stock
PW (width)	Refer to Table 1-11.	Refer to Table 1-12.
PL (length)	Refer to Table 1-11.	Refer to Table 1-12.
LM (left margin)	3 mm (0.1 2") or more	3 mm (0.12") or more
RM (right margin)	3 mm (0.12") or more	3 mm (0.12") or more
TM (top margin)	4.2 mm (0.17") or more	4.2 mm (0.17") or more
BM (bottom **margin**) .	**4.2** mm (0.17") or more	4.2 mm (0.1 **7")** or more
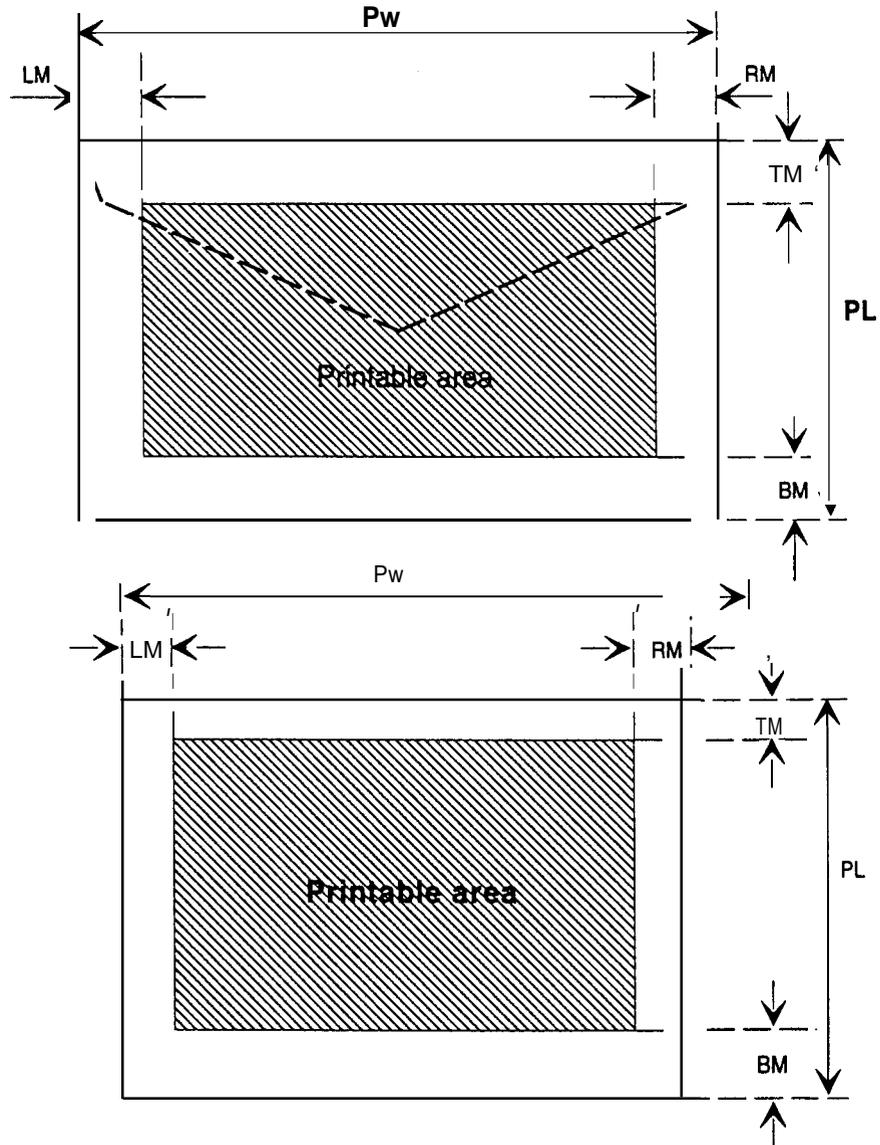
Figure 1-4 Printable Area for Envelopes and Card Stock

Continuous Paper

●Paper/media specifications   The following table gives specifications continuous paper.

Table 1-14 Specifications for Continuous Paper (Single Sheet and Multipart)

	Front Entry		Rear Entry		Bottom Entry	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Width	101 mm (4.0")	406 mm (16")	101 mm (4.0")	406 mm (16")	101 mm (4.0")	406 mm (16")
Length	101 mm (4.0")	559 mm (22")	101 mm (4.0")	559 mm (22")	101 mm (4.0")	559 mm (22")
Copies	1 original + 3 copies		1 original+ 3 copies		1 original + 3 copies	
Total thickness	0.065 mm (0.0025")	0.32 mm (0.013")	0.065 mm (0.0025")	0.32 mm (0.013")	0.065 mm (0.0025")	0.32 mm (0.013")
Weight (not multipart)	52.3 g/m^2 (14 lb)	82 g/m^2 (22 lb)	52.3 g/m^2 (14 lb)	82 g/m2 (22 lb)	52.3 g/m^2 (14 lb)	82 g/m2 (22 lb)
Weight (one sheet of a multipart form)	40 g/m^2 (12 lb)	58 g/m^2 (15 lb)	40 g/m^2 (12 lb)	58 g/m^2 (15 lb)	40 g/m^2 (12 lb)	58 g/m^2 (15 lb)
Types of paper	Plain paper. Recycled paper. Carbonless multipart.		Plain paper. Recycled paper. Carbonless multipart.		Plain paper. Recycled paper. Carbonless multipart.	
Binding	Dots of glue or paper staples (both sides).		Dots of glue or paper staples (both sides).		Dots of glue or paper staples (both sides).	

●Printable area   The figure below shows the printable area for continuous paper.
                                 Each abbreviation is defined in the following table.

Table 1-15 Printable Area for Continuous Paper

Abbreviations	Continuous Paper
PW (width)	Refer to Table 1-14.
PL (length)	Refer to Table 1-14.
LM (left margin)	13 mm (0.51") or more
RM (right margin)	13 mm (0.51") or more
TM (top margin)	4.2 mm (0.17") or more
BM (bottom margin)	4.2 mm (0.1 *7")* or more
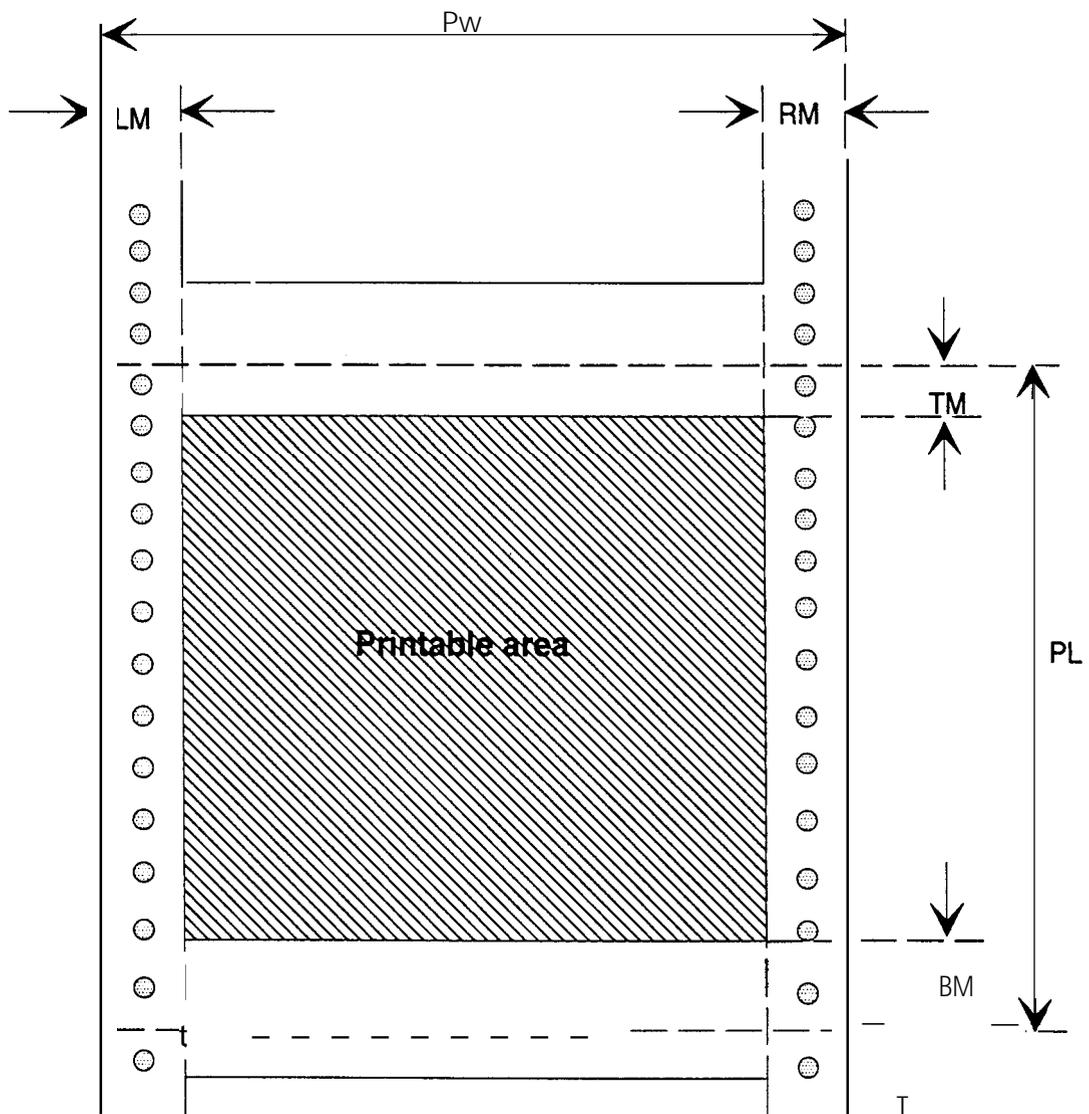
Figure 1-5 Printable Area for Continuous Paper

Continuous Paper with Labels

●Paper/media specifications   The following table gives the specifications for continuous paper with labels.

Table 1-16 Specifications for Continuous Paper with Labels

	Front Entry		Rear Entry		Bottom Entry	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Label size	See the figure below		---		See the figure below	
Base sheet width	101 mm (4.0")	406 mm (16")	- -	…	101 mm (4.0")	406 mm (16")
Base sheet length (one page)	101 mm (4.0")	559 mm (22")	---	'--	101 mm (4.0")	559 mm (22")
Base sheet thickness	0.07 mm (0,0028")	0.09 mm (0.0035)	---	'--	0.07 mm (0.0028")	0.09 mm (0.0035")
Total thickness	0.16 mm (0.0063")	0.19 mm (0.0075")	---	'--	0.16 mm (0.0063")	0.19 mm (0.0075")
Label weight	68 g/m^2 (17 lb)		---		68 g/m^2 (17 lb)	
Quality	. A very continuous form labels . A very mini-line or equivalent quality labels		---		. Avery continuous form labels . Avery mini-line or equivalent quality labels	

✳ Printing on labels is available only at normal temperatures and humidity.
✳ The base sheet for the labels must be continuous paper.
✳ Continuous paper with labels should be inserted from the front or bottom entrance.

2.5inch (63.5mm) min.

15/16inch (23.8mm) min.

Label

R0.1inch (2.5mm) min.
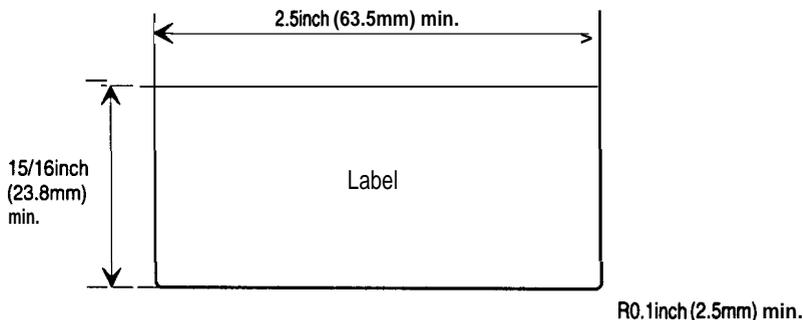
Figure 1-6 Label Size

. Printable size and area   The figure above is the printable size for the labels.
                                 The printable area for the base sheet containing the labels
                                 depends on conditions in Figure 1-5 and Table 1-15.

Roll Paper

Note: Roll paper is not available in all models, and not available in the U.S.

. Paper/media specifications   The following table shows specifications for roll paper.

Table 1-17 Specifications for Roll Paper

	Front Entry		Rear Entry	
	Minimum	**Maximum**	**Minimum**	**Maximum**
Width	**---**		**216** mm (8.5")	
Length	----		----	
Thickness	- - -	- - -	0.07 mm (0.0028")	0.09 mm (0.0035")
Weight	----	- - -	52.3 g/m^2 (14 lb)	82 g/m^2 (22 lb)
Quality	---		Plain paper, recycled paper. Not curled, not folded, or not crumpled.	

● Printable area   Figure 1-7 gives the printable area for roll paper.
Each abbreviation is defined in the following table.

Table 1-18 Printable Area for Roll Paper

Abbreviations	Roll Paper
PW (width)	See Table 1-17.
PL (length)	See Table 1-17.
LM	3 mm (0.12") or more
RM	3 **mm** (0.12") or more
TM	4.2 mm (0.17") or more
BM	4.2 mm (0.17") or more
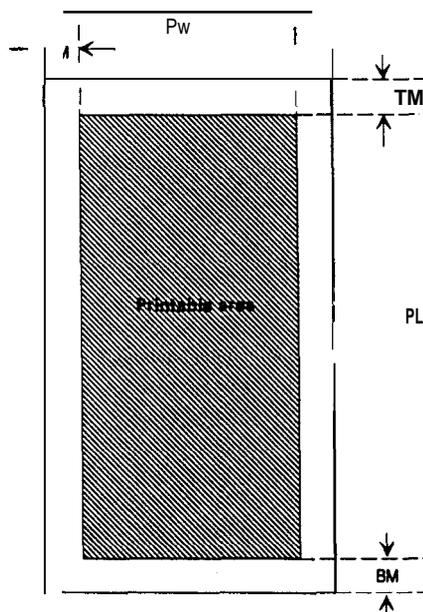
Figure 1-7 Printable Area for Roll Paper

1.2.5 Ribbon Specifications

Table 1-19 Statistics on the Ribbon

Item	Specification
Type	Fabric
Color	Black
Ribbon life	8 million characters (draft, 10 cpi, 48dots/ character)
Dimension	506.0 mm (W) x 123.5 mm (D) x 23.0 mm (H) 19.92" (W) x 4.86" (D) x .91 " (H)

1.2.6 Electrical Specifications

Tables 1-20 and 1-21 provide statistics on electrical ratings and consumption.

Table 1-20 Electrical Specifications for the 120 V Version

Item	Specifications
Rated voltage	120 VAC
Input voltage range	103.5 to 132 VAC
Rated frequency range	50 to 60 Hz
Input frequency range	49.5 to 60.5 Hz
Rated current	1.0 A (max. 2.4A)
Power consumption	Approx. 34 W (self-test in draft mode at 10 cpi)
Insulation resistance	10 MΩ min. (between AC line and chassis, 500 VDC)
Dielectric strength	1000 VAC rms. 1 min. or 1200 VAC rms. 1 sec. (between AC line and chassis)

Table 1-21 Electrical Specifications for the 220/240 V Version

Item	Specifications
Rated voltage	220 to 240 VAC
Input voltage range	198 to 264 VAC
Rated frequency range	50to 60 Hz
Input frequency range	49.5 to 60.5 Hz
Rated current	0.5 A (maximum 1.2A)
Power consumption	Approx. 34 W (self-test in draft mode at 10 cpi)
Insulation resistance	10 MΩ min. (between AC line and chassis, 500 VDC)
Dielectric strength	1500 VAC rms. 1 min. (between AC line and chassis)

1.2.7 Environmental Conditions

Table 1-22 explains the conditions the printer requires during operation and when not operating,

Table 1-22 Environmental Requirements

Item	Specifications
Temperature	5 to 35° C/41 to 95° F (operating ✳ 1) 15 to 25° C/59 to 77° F (operating ✳ 1, ✳ 2) -30 to 60° C/-22 to 140° F (non-operating)
Humidity	10 to 80 % RH (operating ✳ 1) 30 to 60 % RH (operating ✳ 1,X 2) O to 85 % RH (non-operating ✳ 1)
Resistance to shack	1 G, within 1 ms (operating) 2 G, within 2 ms (non-operating ✳ 3)
Resistance to vibration	0.25 G, 10 to 55 Hz (operating) 0.50 G, 10 to 55 Hz (non-operating ✳ 3)

✳ 1: Without condensation.
✳ 2: During printing on multipart paper, envelopes, card stock, or labels.
✳ 3: In shipment container.

1.2.8 Reliability

Table 1-23 gives maximum life and usage specifications.

Table 1-23 Reliability Statistics

Item	Specification
Total print volume	*6* million lines (except printhead)
MTBF	6000 power on hours (POH)
Printhead life	200 million strokes / wire
Ribbon life	8 million characters

1.2.9 Safety Approvals

Table 1-24 provides information about the safety approvals the printer has met.

Table 1-24 Safety Information for Printer Models

	120 V	230 V
Safety Standards	UL1950 with D3 CSA C22.2 No,950 with D3	EN60950 (TüV. SEMKO, DEMKO, NEMKO, FIMKO)
EMI	FCC part 15 subpart B class B CSA C108.8	EN55022 (CISPR pub.22) class B

1.2.10 CE Marking

The following table lists CE marking information.

Table 1-25 CE Marking

Low Voltage Directive 73/23 / **EEC**	EN60950
EMC Directive 89/336/ **EEC**	EN55022 class B EN50082-1 , IEC801-2 **IEC801-3 , IEC801-4**
Non-Automatic Weighing **Instruments Directive** 90/384/EEC	**EN45501**

1.2.11 Physical Specifications

Table 1-26 provides printer dimensions and weight.

Table 1-26 Physical Specifications

Dimensions	639 mm (W) x402 mm (D) x 257 mm (H) 25.16" **(W)** x **16.14" (D)** x **10.12" (H)**
Weight	Approx. 13 kg (28.66 lb)

1.2.12 Cut Sheet Feeder Specifications

This printer has two CSF options: a high-capacity CSF and a 2nd bin CSF. The high-capacity CSF has special a paper-feed motor to load the paper quickly. The 2nd bin CSF can be connected to the high-capacity CSF to allow them to be used as a double bin CSF. The following table provides the specifications for these CSF options.

. Hopper capacity

Table 1-27 Hopper Capacity

	CSF Bin 1	CSF Bin 2
Single sheets	150 sheets (✽1) / 110 sheets (✽2) 185 sheets (✽3) / 135 sheets (✽4)	50 sheets (✽1) / 50 sheets (✽2) 60 sheets (✽3) / 60 sheets (✽4)
Envelopes	25 sheets (✽5) 30 sheets (✽6)	---
Card stock	50 sheets (✽7)	---
Multipart paper	40 sheets (✽8)	---

✽1 : Plain paper (weight: 82 g/m^2, 22 lb) or recycled paper, except for A3-size paper.
✽2 : Plain paper (weight: 82 g/m^2, 22 lb) or recycled paper, A3 paper.
✽3 : Plain paper (weight: 64 g/m^2, 17 lb), except for A3 paper.
✽4 : Plain paper (weight: 64 g/m^2, 17 lb), A3 paper.
✽5 : Envelopes (weight: 91 g/m^2, 24 lb)
✽6: Envelopes (weight: 45 g/m^2, 12 lb)
✽7 : Card stock (weight: 192 g/m^2, 51 lb; thickness: 0.22 mm, 0.0087")
✽8 : 1 original+ 5 copies (thickness: 0.36 mm, 0.0142")

. Stacker capacity

Table 1-28 Capacity of the Stacker

	CSF Bin 1	CSF Bin 2
Single sheets	140 sheets (✳1) 100 sheets (✳2)	----
Envelopes	15 sheets (✳3) 28 sheets (✳4)	----
Card stock	30 sheets (✳5)	----
Multipart	36 sheets (3$6)	... -

✳1: Single sheets (weight: 82 g/m^2, 22 lb), except for A3 paper
✳2: Single sheets (weight: 82 g/m^2, 22 lb), A3 paper
✳3: Envelopes (weight: 91 g/m^2, 24 lb)
✳4: Envelopes (weight: 45 g/m^2, 12 lb)
✳5: Card stock (weight: 192 g/m^2, 51 lb; thickness: 0.22 mm, 0.0087")
✳6: 1 original+ 5 copies (thickness: 0.36 mm, 0.0142")

. Reliability

MCBF: 2×10^5 cycles

. Environmental conditions

Table 1-29 Environmental Conditions

	Operating	Non Operating
Temperature	5 to 35° c (41 to 95° F)	–30 to 60° C (-22 to 140° F)
Humidity	10 to 80% RH (✳1, ✳3) 30 to 60% RH (✳2, ✳3)	O to 85% RH (✳3)

✳1: Single sheets (plain, 64 g/m^2 < weight < 82 g/m^2; /17 lb < weight < 22 lb)
✳2: Single sheets (plain, weight < 64 g/m^2, 82 g/m^2 < weight/weight < 17 lb, 22 lb < weight)
    Single sheets (recycled), multipart, envelopes, and card stock
✳3: Without condensation

1.3 Firmware Specifications

This section provides detailed information about LQ-2070 firmware.

1.3.1 Control Codes and Fonts

- Control codes   ESC/P2 and IBM 2390/2391 plus emulations.

- Typefaces

  Bitmap fonts

EPSON Draft	10 cpi, 12 cpi, 15 cpi
EPSON Roman	10 cpi, 12 cpi, 15 cpi, proportional
EPSON Saris Serif	10 cpi, 12 cpi, 15 cpi, proportional
EPSON Courier	10 cpi, 12 cpi, 15 cpi,
EPSON Prestige	10 cpi, 12 cpi
EPSON Script	10 cpi
EPSON OCR-B	10 cpi
EPSON Orator	10 cpi
EPSON Orator-S	10 cpi
EPSON Script C	Proportional

  Scalable font

EPSON Roman	10.5pt., 8pt.~32pt. (every 2 pt.)
EPSON Saris Serif	10.5pt., 8pt.~32pt. (every 2pt.)
EPSON Roman T	10.5pt., 8pt.~32pt. (every 2pt.)
EPSON Saris Serif H	10.5pt., 8pt.~32pt. (every 2pt.)

  Bar code fonts

  EAN-13, EAN-8, Interleaved 2 of 5, UPC-A, UPC-E, Code 39
  Code 128, POSTNET

- International character sets

  14 countries
  U.S.A., France, Germany, U.K., Denmark 1, Sweden, Italy,
  Spain l, Japan, Norway, Denmark2, Spain2, Latin America, Korea, Legal

. Character tables   The standard version has 11 character tables and the NLSP version has 20 character tables, as shown in the following table.

Table 1-30 Character Tables

Version	Character Tables		
Standard Version	Italic	PC-437 (U.S., Standard Eur.)	PC-850 (Multilingual)
	PC-860 (Portuguese)	PC-861 (Icelandic)	PC-863 (Canadian-French)
	PC-865 (Nordic)	Abicomp	BRASCII
	Roman8	ISO Latin 1	
NLSP Version	Italic	PC-437 (US, Standard Eur.)	PC-850 (Multilingual)
	PC-437 Greek	PC-852 (East Europe)	PC-853 (Turkish)
	PC-855 (Cyrillic)	PC-857 (Turkish)	PC-866 (Russian)
	PC-869 (Greek)	MAZOWAI (Poland)	Code MJK (CSFR)
	ISO 8859-7 (Latin/Greek)	ISO Latin IT (Turkish)	Bulgaria (Bulgarian)
	Estonia (Estonia)	PC-744(LST 1283:1993)	ISO Latin 2
	PC-866 LAT (Latvia)	PC-864 (Arabic)	

1.3.2 Interface Specifications

This printer provides a bidirectional 8-bit parallel interface and a Type B optional interface slot, standard.

1.3.2.1 Parallel Interface (Forward Channel)

- Transmission mode   8-bit parallel, IEEE-P1284, compatibility mode
- Adaptable connector   57-30360 (Amphenol) or equivalent
- Synchronization   STROBE pulse
- . Handshaking   BUSY and $\overline{\text{ACKNLG}}$ signals
- Signal level   TTL compatible (IEEE-P1284 level 1 device)

Table 1-31 Pin Assignments for Forward Channel

Pin No.	Signal Name	Return GND pin	In /Out	Function Description	
1	$\overline{\text{STROBE}}$	19	In	Strobe pulse. Input data is latched at falling edge of the signal	
2	DATA1	20	In	Parallel input data to the printer	bit O: LSB
3	DATA2	21	In		bit 1
4	DATA3	22	In		bit 2
5	DATA4	23	In		bit 3
6	DATA5	24	In		bit 4
7	DATA6	25	In		bit 5
8	DATA7	26	In		bit 6
9	DATA8	27	In		bit 7: MSB
10	$\overline{\text{ACKNLG}}$	28	out	This signal (negative pulse) indicates the printer has received data and is ready to accept more data.	
11	BUSY	29	out	This signal's HIGH level means the printer is not ready to accept data.	
, 12	PE	28	out	This signal's HIGH level means the printer has a paper-out error.	
13	SLCT	28	out	Always HIGH when the printer is powered on.	
14	$\overline{\text{AFXT}}$	30	In	Not used.	
31	$\overline{\text{INIT}}$	30	In	This signal's negative pulse initializes printer.	
32	$\overline{\text{ERROR}}$	29	out	This signal's LOW level means the printer is in an error state.	
36	SLIN	30	In	Not used.	
18	Logic H	----	out	This line is pulled up to + 5 V through 3.9KΩ resistor.	
35	+5V	----	Out	This line is pulled up to +5 V through 3.3KΩ resistor.	
17	Chassis	----	–-—	Chassis GND.	
16,33, 19-30	GND	----	---	Signal GND.	
15,34	NC	----	---	Not connected.	