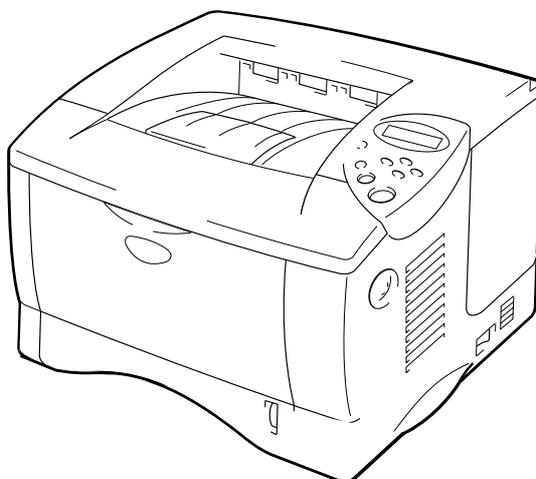




Brother Laser Printer **SERVICE MANUAL**

MODEL: HL-1850/1870N



Read this manual thoroughly before maintenance work.

Keep this manual in a convenient place for quick and easy reference at all times.

January 2002
SM-PRN031

Sample of manual. Download All 303 pages at:

<https://www.arepairmanual.com/downloads/2002-brother-hl-18501870n-laser-printer-service-repair-workshop-manual/>

Product: 2002 Brother HL-1850/1870N Laser Printer Service Repair Workshop Manual
Full Download: <https://www.arepairmanual.com/downloads/2002-brother-hl-1850-1870n-laser-printer-service-repair-workshop-manual/>

© Copyright Brother Industries, Ltd. 2002

All rights reserved.

No part of this publication may be reproduced in any form or by any means without permission in writing from the publisher.

Specifications are subject to change without notice.

Trademarks:

The brother logo is a registered trademark of Brother Industries, Ltd.

Apple, the Apple Logo, and Macintosh are trademarks, registered in the United States and other countries, and TrueType is a trademark of Apple computer, Inc.

Epson is a registered trademark and FX-80 and FX-850 are trademarks of Seiko Epson Corporation.

Hewlett Packard is a registered trademark and HP LaserJet is a trademark of Hewlett Packard Company.

IBM, IBM PC and Proprinter are registered trademarks of International Business Machines Corporation.

Microsoft and MS-DOS are registered trademarks of Microsoft Corporation.

Windows is a registered trademark of Microsoft Corporation in the U.S. and other countries.

Sample of manual. Download All 303 pages at:

<https://www.arepairmanual.com/downloads/2002-brother-hl-18501870n-laser-printer-service-repair-workshop-manual/>

PREFACE

This service manual contains basic information required for after-sales service of the laser printer (hereinafter referred to as "this machine" or "the printer"). This information is vital to the service technician to maintain the high printing quality and performance of the printer.

This service manual covers the **HL-1850/1870N** printers.

This manual consists of the following chapters:

CHAPTER 1: GENERAL

Features, specifications, etc.

CHAPTER 2: INSTALLATION AND BASIC OPERATION

Installation conditions, Installation procedures, basic operation of the printer etc.

CHAPTER 3: THEORY OF OPERATION

Basic operation of the mechanical system, the electrical system and the electrical circuits and their timing information.

CHAPTER 4: DISASSEMBLY AND RE-ASSEMBLY

Procedures for disassembling and re-assembling the mechanical system.

CHAPTER 5: PERIODIC MAINTENANCE

Periodical replacements parts, consumable parts, etc.

CHAPTER 6: TROUBLESHOOTING

Reference values and adjustments, troubleshooting image defects, troubleshooting malfunctions, etc.

CHAPTER 7: HIDDEN FUNCTIONS

Professional menu mode and Service menu mode, etc.

APPENDICES: Serial No. descriptions, Drum life & page counter, Diameter / circumference of rollers, Connection diagrams, PCB circuit diagrams, etc.

Information in this manual is subject to change due to improvement or redesign of the product. All relevant information in such cases will be supplied in service information bulletins (Technical Information).

A thorough understanding of this printer, based on information in this service manual and service information bulletins, is required for maintaining its print quality performance and for improving the practical ability to find the cause of problems.

TABLE OF CONTENTS

REGULATION.....	viii
SAFETY INFORMATION.....	x
CHAPTER 1 GENERAL	1-1
1. FEATURES	1-1
2. OVERVIEW	1-3
3. SPECIFICATIONS.....	1-4
3.1 Printing	1-4
3.2 Functions.....	1-5
3.3 Electrical and Mechanical	1-6
3.4 Network.....	1-7
3.5 Paper.....	1-8
3.5.1 Feedable paper.....	1-8
3.5.2 Paper cassette capacity.....	1-10
3.5.3 Print delivery	1-10
3.6 Printing Area.....	1-11
3.6.1 PCL5e/EPSON/IBM emulation.....	1-11
3.6.2 PCL6/BR-Script3 emulation	1-14
CHAPTER 2 INSTALLATION AND BASIC OPERATION	2-1
1. CONDITIONS REQUIRED FOR INSTALLATION.....	2-1
1.1 Power Supply	2-1
1.2 Environment	2-1
1.3 System Requirements for Brother Printer Solution for Windows®.....	2-1
2. UNPACKING	2-2
3. INSTALL THE PRINTER	2-3
3.1 For All Users	2-3
3.1.1 Install the drum unit assembly	2-4
3.1.2 Load paper into the paper cassette	2-4
3.1.3 Print a test page.....	2-5
3.2 For Windows® Users	2-6
3.3 For Macintosh Users	2-10
4. PRINTING METHODS.....	2-12
4.1 Printing from the Paper Cassette	2-12
4.2 Printing from Multi-purpose Tray.....	2-12
4.2.1 Printing on envelopes (Face up printing)	2-14
4.2.2 Printing on label, transparency, etc.	2-15
4.3 Printing to the Face up Output Tray (Face up Printing)	2-17
4.4 Printing on Both Sides of the Paper (Duplex Printing)	2-17
4.5 Manual Feed	2-18

5.	CONTROL PANEL OPERATION.....	2-19
5.1	Data LED Indications	2-19
5.2	Panel Switches Functions	2-20
5.2.1	Go switch	2-20
5.2.2	Job Cancel switch	2-20
5.2.3	Reprint switch	2-21
5.2.4	+ & - switch	2-24
5.2.5	Set switch	2-24
5.2.6	Back switch	2-24
5.3	LCD Display	2-24
5.3.1	Backlights	2-25
5.3.2	Printer status messages	2-26
5.4	How to Use the Control Panel.....	2-27
5.5	Control Panel Setting Menu	2-28
5.5.1	Information	2-29
5.5.2	Paper	2-29
5.5.3	Quality.....	2-30
5.5.4	Setup	2-30
5.5.5	Print menu.....	2-31
5.5.6	Network.....	2-34
5.5.7	Interface	2-34
5.5.8	Reset menu.....	2-35
5.5.9	Set IP address	2-35
5.5.10	About emulation modes	2-36
5.5.11	List of factory settings	2-36
5.6	Other Control Features	2-40
5.6.1	Sleep mode.....	2-40
5.6.2	Inspection mode	2-40
6.	NETWORK BOARD OPERATION.....	2-41
6.1	Installing the Network Board	2-41
6.2	Functions.....	2-43
6.2.1	LED functions	2-43
6.2.2	Factory default setting	2-43

CHAPTER 3 THEORY OF OPERATION 3-1

1.	ELECTRONICS	3-1
1.1	General Block Diagram	3-1
1.2	Main PCB Block Diagram.....	3-2
1.3	Main PCB	3-3
1.3.1	ASIC.....	3-3
1.3.2	ROM.....	3-5
1.3.3	Flash ROM.....	3-6
1.3.4	SDRAM	3-7
1.3.5	Optional RAM.....	3-9
1.3.6	PCI bus	3-10
1.3.7	EEPROM	3-11
1.3.8	Reset circuit	3-11

1.3.9	Engine I/O	3-12
1.3.10	Panel I/O	3-12
1.4	Engine PCB	3-13
1.5	BR-net PCB	3-13
1.6	Power Supply	3-14
1.6.1	Low-voltage Power Supply	3-14
1.6.2	High-voltage Power Supply	3-15
2.	MECHANICS	3-16
2.1	Overview of Printing Mechanism	3-16
2.2	Paper Transfer	3-18
2.2.1	Paper supply	3-18
2.2.2	Paper registration	3-18
2.2.3	Paper eject	3-19
2.2.4	Duplex printing	3-19
2.3	Sensors	3-20
2.3.1	Cover sensors	3-20
2.3.2	Toner sensors	3-20
2.3.3	DX tray sensor / DX paper size sensor	3-21
2.3.4	Rear cover sensor	3-21
2.3.5	Cassette sensor / Paper empty sensor	3-22
2.3.6	Paper eject sensor	3-22
2.4	Drum Unit	3-23
2.4.1	Photosensitive drum	3-23
2.4.2	Primary charger	3-23
2.4.3	Transfer roller	3-23
2.4.4	Cleaner	3-23
2.5	Toner Cartridge	3-23
2.6	Print Process	3-23
2.6.1	Charging	3-23
2.6.2	Exposure stage	3-24
2.6.3	Developing	3-25
2.6.4	Transfer	3-25
2.6.5	Fixing stage	3-26
CHAPTER 4	DISASSEMBLY AND RE-ASSEMBLY	4-1
1.	SAFETY PRECAUTIONS	4-1
2.	DISASSEMBLY FLOW	4-2
3.	DISASSEMBLY PROCEDURE	4-3
3.1	AC Cord	4-3
3.2	Drum Unit	4-3
3.3	Paper Cassette	4-4
3.4	Network Board (For HL-1870N only)	4-11
3.5	Top Cover	4-12
3.6	DX Feed ASSY	4-16
3.7	Rear Cover	4-20
3.8	Rear Cover R & L / Side Cover R & L	4-22
3.9	MP Cover ASSY	4-23

3.10	Process Unit Cover ASSY.....	4-25
3.11	Laser Unit.....	4-26
3.12	Fixing Unit	4-27
3.13	Paper Pick-up Roller ASSY.....	4-39
3.14	Feed MP Unit	4-40
3.15	Drive Unit	4-42
3.16	Low-voltage Power Supply PCB ASSY.....	4-47
3.17	Main PCB ASSY.....	4-48
3.18	Fan Motor / Fan Motor 60	4-48
3.19	Base Plate.....	4-49
3.20	Engine PCB ASSY / High-voltage Power Supply PCB ASSY.....	4-49
3.21	DX Sensor PCB ASSY	4-51
3.22	Toner Sensor PCB Unit (Light Reception)	4-52
3.23	Toner LED PCB Unit (Light Emission)	4-52
3.24	Paper Feed Roller ASSY.....	4-53
3.25	First Feed Roller ASSY	4-53
3.26	Exit Roller Unit.....	4-55
3.27	Harness Winding Form	4-57
4.	PACKING	4-58

CHAPTER 5 PERIODIC MAINTENANCE..... 5-1

1.	CONSUMABLE PARTS.....	5-1
1.1	Drum Unit.....	5-1
1.2	Toner Cartridge	5-2
2.	PERIODICAL REPLACEMENT PARTS.....	5-5
3.	PERIODICAL CLEANING.....	5-6
3.1	Cleaning the Printer Exterior	5-6
3.2	Cleaning the Drum Unit.....	5-6
3.3	Cleaning the Scanner Window	5-7
3.4	Cleaning the Electrical Terminals.....	5-8
4.	MTBF / MTTR.....	5-9

CHAPTER 6 TROUBLESHOOTING..... 6-1

1.	INTRODUCTION	6-1
1.1	Initial Check.....	6-1
1.2	Warnings for Maintenance Work.....	6-2
1.3	Identify the Problem	6-3
2.	OPERATOR CALLS & SERVICE CALLS	6-4
2.1	Operator Calls	6-4
2.2	Service Calls	6-6
3.	PAPER PROBLEMS.....	6-9
3.1	Paper Loading Problems.....	6-9
3.2	Paper Jams	6-10
3.2.1	Clearing jammed paper.....	6-11

3.2.2	Causes & countermeasures.....	6-19
3.3	Paper Feeding Problems	6-20
4.	SOFTWARE SETTING PROBLEMS	6-22
5.	MALFUNCTIONS	6-25
6.	IMAGE DEFECTS	6-31
6.1	Image Defect Examples	6-31
6.2	Troubleshooting Image Defect	6-32
6.3	Location of Grounding Contacts.....	6-50
6.3.1	Drum unit	6-50
6.3.2	Printer body & Paper cassette	6-50
7.	INCORRECT PRINTOUT	6-51
8.	NETWORK PROBLEM.....	6-54
8.1	Installation Problem.....	6-54
8.2	Intermittent Problem.....	6-55
8.3	TCP/IP Troubleshooting.....	6-56
8.4	UNIX Troubleshooting.....	6-56
8.5	Windows NT/LAN Server (TCP/IP) Troubleshooting	6-57
8.6	Windows 95/98/Me (or later) Peer to Peer Print (LPR) Troubleshooting	6-57
8.7	Windows 95/98/Me (or later) Peer to Peer (HP JetAdmin Compatible Method) Troubleshooting.....	6-58
8.8	Windows 95/98/Me/NT 4.0/2000 (or later) Peer to Peer Print (NetBIOS) Troubleshooting ...	6-58
8.9	Internet Print (TCP/IP) Troubleshooting.....	6-58
8.10	Novell Netware Troubleshooting	6-59
8.11	AppleTalk Troubleshooting	6-59
8.12	Apple TCP/IP Printing (System 8.6 or later).....	6-60
8.13	Web Browser Troubleshooting (TCP/IP).....	6-60
9.	INSPECTION MODE	6-61
9.1	Entering Inspection Mode	6-61
9.2	Sensor Check Mode.....	6-62
CHAPTER 7	HIDDEN FUNCTIONS.....	7-1
1.	ENTERING HIDDEN FUNCTION MENU MODES.....	7-1
2.	PROFESSIONAL MENU MODE.....	7-2
2.1	Enabling and Disabling Professional Menu Mode.....	7-2
2.2	Function Table	7-3
3.	SERVICE MENU MODE.....	7-7
3.1	Entering the Service Menu Mode.....	7-7
3.2	Function Table	7-7
4.	OTHER HIDDEN FUNCTION MENUS	7-9
4.1	Hidden Function Menus Enabled by Pressing Switch(es) When Turning the Machine on	7-9
4.2	Drum Life Reset Function	7-9
4.3	Parts life Reset Function	7-9

APPENDICES

1. CONNECTION DIAGRAM, HL-1850/1870N	A-1
2. MAIN PCB CIRCUIT DIAGRAM, HL-1850/1870N (1/6)	A-2
3. MAIN PCB CIRCUIT DIAGRAM, HL-1850/1870N (2/6)	A-3
4. MAIN PCB CIRCUIT DIAGRAM, HL-1850/1870N (3/6)	A-4
5. MAIN PCB CIRCUIT DIAGRAM, HL-1850/1870N (4/6)	A-5
6. MAIN PCB CIRCUIT DIAGRAM, HL-1850/1870N (5/6)	A-6
7. MAIN PCB CIRCUIT DIAGRAM, HL-1850/1870N (6/6)	A-7
8. ENGINE PCB CIRCUIT DIAGRAM, HL-1850/1870N (1/2)	A-8
9. ENGINE PCB CIRCUIT DIAGRAM, HL-1850/1870N (2/2)	A-9
10. NETWORK BOARD PCB CIRCUIT DIAGRAM, HL-1850/1870N.....	A-10
11. LOW-VOLTAGE POWER SUPPLY PCB CIRCUIT DIAGRAM (100V)	A-11
12. LOW-VOLTAGE POWER SUPPLY PCB CIRCUIT DIAGRAM (200V)	A-12
13. HIGH-VOLTAGE POWER SUPPLY PCB CIRCUIT DIAGRAM	A-13
14. SERIAL NO. DESCRIPTIONS	A-14
15. DIAMETER / CIRCUMFERENCE OF ROLLERS.....	A-16
16. PRINT SPEEDS WITH VARIOUS SETTINGS.....	A-17
17. HOW TO KNOW DRUM UNIT LIFE & PAGE COUNTER	A-18
18. HOW TO USE THE SELF-DIAGNOSTICS TOOLS	A-23
19. NVRAM DEFAULT VALUE	A-27
20. PAPER CASSETTE INFORMATION (FOR EUROPE ONLY).....	A-28
21. GUIDELINES FOR LEAD FREE SOLDER (MAIN PCB ASSY)	A-29
22. HOW TO REWRITE HL-1850/1870N FLASH ROM	A-30

INDEX

REGULATION

LASER SAFETY (110 - 120V MODEL ONLY)

This printer is certified as a Class I laser product under the US 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.

Since radiation emitted inside the printer is completely confined within the protective housing and external covers, the laser beam cannot escape from the machine during any phase of user operation.

FDA REGULATIONS (110 - 120V MODEL ONLY)

The US Food and Drug Administration (FDA) has implemented regulations for laser products manufactured on and after August 2, 1976. Compliance is mandatory for products marketed in the United States. One of the following labels on the back of the printer indicates compliance with the FDA regulations and must be attached to laser products marketed in the United States.

The label for Japanese manufactured products

MANUFACTURED: BROTHER INDUSTRIES, LTD. 15-1, Naeshiro-cho, Mizuho-ku, Nagoya 467-8561, Japan. This product complies with FDA radiation performance standards, 21 CFR Subchapter J.	K
---	---

The label for Chinese manufactured products

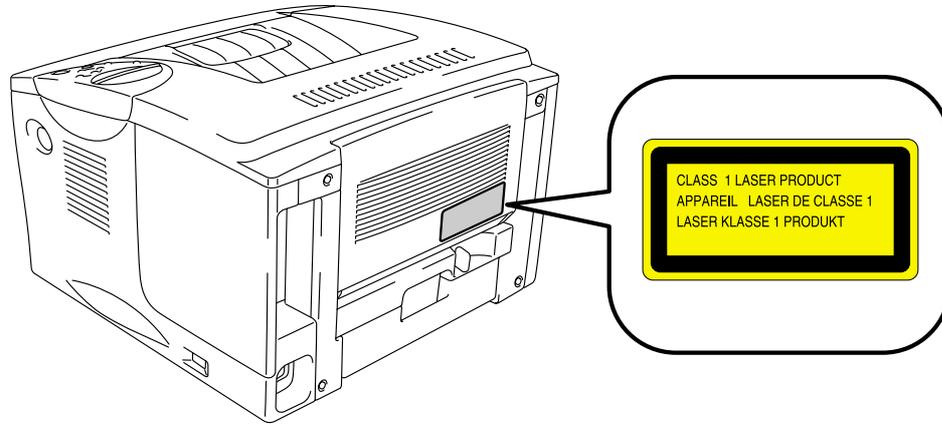
MANUFACTURED: BROTHER Corporation (Asia) Ltd. Shenzen Buji Nan Ling Factory Gold Garden Ind., Nan Ling Village, Buji, Rong Gang, Shenzen, CHINA This product complies with FDA radiation performance standards, 21 CFR Subchapter J.	C
--	---

Caution

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

IEC 825 (220-240V MODEL ONLY)

This printer is a Class I laser product as defined in IEC 825 specifications. The label shown below is attached in countries where required.



This printer has a laser diode which emits invisible laser radiation in the Laser Unit. The Laser Unit should not be opened without disconnecting the two connectors connected with the AC power supply and laser unit. Since the variable resistor in the laser unit is adjusted in accordance with the standards, never touch it.

Caution

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

For Finland and Sweden**LUOKAN 1 LASERLAITE****KLASS 1 LASER APPARAT**

Varoitus! Laitteen käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.

Varning – Om apparaten används på annat sätt än i denna Bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.

SAFETY INFORMATION

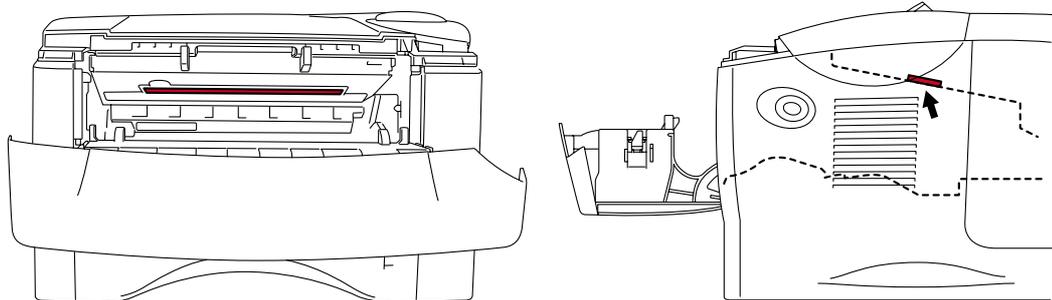
CAUTION FOR LASER PRODUCT (WARNHINWEIS FÜR LASER DRUCKER)

CAUTION: When the machine during servicing is operated with the cover open, the regulations of VBG 93 and the performance instructions for VBG 93 are valid.

CAUTION: In case of any trouble with the laser unit, replace the laser unit itself. To prevent direct exposure to the laser beam, do not try to open the enclosure of the laser unit.

ACHTUNG: Im Falle von Störungen der Lasereinheit muß diese ersetzt werden. Das Gehäuse der Lasereinheit darf nicht geöffnet werden, da sonst Laserstrahlen austreten können.

<Location of the laser beam window>



ADDITIONAL INFORMATION

When servicing the optical system of the printer, be careful not to place a screwdriver or other reflective object in the path of the laser beam. Be sure to take off any personal accessories such as watches and rings before working on the printer. A reflected beam, though invisible, can permanently damage the eyes.

Since the beam is invisible, the following caution label is attached on the laser unit.

CAUTION	INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCK DEFEATED. AVOID DIRECT EXPOSURE TO BEAM. CLASS 3B LASER PRODUCT.
ADVARSEL	USYNLIG LASER STRÅLING NÅR KABINETLÅGET STÅR ÅBENT. UNGDÅ DIREKTE UDSÆTTELSE FOR STRÅLING. KLASSE 3B LASER.
VARNING	OSYNLIG LASERSTRÅLNING NÅR DENNA DEL ÄR ÖPPNAD OCH SPÄRRAR ÄR URKOPPLADE. STRÅLEN ÄR FARLIG. KLASSE 3B LASER APPARAT.
VARO!	AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN. LUOKAN 3B LASERLAITE.
ADVARSEL	USYNLIG LASERSTRÅLING UINNÅ DIREKTE KONTAKT MED LASERENHETEN NÅR TOPPDEKSELET ER ÅPENT. KLASSE 3B LASERPRODUKT.
ATTENTION	RADIATIONS LASER INVISIBLES QUANDOUVERT ET VERROUILLAGE ENLEVÉ. ÉVITER EXPOSITIONS DIRECTES AU FAISCEAU. PRODUIT LASER CLASSE 3B.
VORSICHT	UNSICHTBARE LASERSTRÄHLUNG WENN ABDECKUNG GEÖFFNET UND SICHERHEITSVERRIEGELUNG ÜBERBRÜCKT. NICHT DEM STRAHL AUSSETZEN. SICHERHEITSKLASSE 3B.
ATENCIÓN	RADIACIÓN LASER INVISIBLE CUANDO SE ABRE LA TAPA Y EL INTERRUPTOR INTERNO ESTÁ ATASCADO. EVITE LA EXPOSICIÓN DIRECTA DE LOS OJOS. PRODUCTO LASER CLASE 3B.



DEFINITIONS OF WARNINGS, CAUTIONS AND NOTES

The following conventions are used in this service manual:



Indicates warnings that must be observed to prevent possible personal injury.



Indicates cautions that must be observed to service the printer properly or prevent damage to the printer.

NOTE:

Indicates notes and useful tips to remember when servicing the printer.

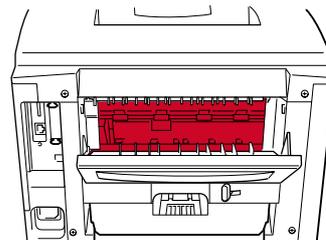
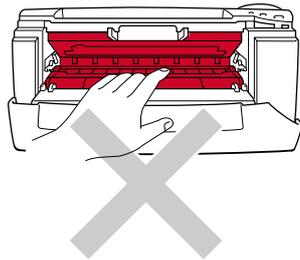
**Listed below are the various kinds of “WARNING” messages included in this manual.



Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the printer.



Some parts inside the printer are extremely hot immediately after the printer is used. When opening the front cover or rear cover to access any parts inside the printer, never touch the red colored parts shown in the following figures.



If you analyze malfunctions with the power plug inserted into the power outlet, special caution should be exercised even if the power switch is OFF because it is a single pole switch.

CHAPTER 1 GENERAL

1. FEATURES

This printer has the following features;

High Resolution and Fast Print Speed

True 600 x 600 dots / true 300 x 300 dots per inch (dpi) and 2400 x 600 dots per inch (dpi) for graphics with microfine toner and up to 18 pages per minutes (ppm) print speed for A4 and 19 pages per minutes (ppm) print speed for Letter paper.

Versatile Paper Handling

The printer loads paper automatically from the paper cassette. The paper cassette can hold A4, letter, B5 (ISO), B5 (JIS), A5, B6 (ISO), A6, Executive and Legal sizes of paper. The manual feed slot allows manual paper loading sheet by sheet so you can use a variety of types and sizes of paper.

Front Operation

Basic operation of the printer can be controlled from the control panel.

Enhanced Printing Performance and User-Friendly Operation for Windows®

The dedicated printer driver for Microsoft® Windows® 95/98/Me, Windows® NT 4.0 and Windows® 2000/XP are available on the CD-ROM supplied with your printer. You can easily install them into your Windows® system using our installer program. The driver supports our unique compression mode to enhance printing speed in Windows® applications and allows you to choose various printer settings including toner save mode, custom paper size, sleep mode, gray scale adjustment, resolution, water mark and many layout functions. You can easily setup these print options through the Printer Setup Menu.

Printer Status Monitor with Bi-directional Parallel Interface

The printer driver can monitor the status of your printer using bi-directional parallel communications. IEEE-1284 bi-directional parallel printer cable is recommended.

The printer status monitor program can show the current status of your printer. When printing, the animated dialog box appears on your computer screen to show the current printing process. If an error occurs, a dialog box will appear to let you know what to correct. If you have turned on the interactive Help (Windows® 95/98 only) you can get visual guidance on your PC screen on the actions in the event of certain printer errors.

Quick Print Setup

The Quick Print Setup is a convenient utility to allow you to make changes to frequently used driver settings easily without having to open the printer properties selection box every time. It is launched automatically when this printer driver is selected. You can change the settings by clicking on the icon with the right mouse button.

Enhanced Memory Management

The printer provides its own data compression technology in its printer hardware and the supplied printer driver software, which can automatically compress graphic data and font data efficiently into the printer's memory. You can avoid memory errors and print most full page 600 dpi graphic and text data, including large fonts, with the standard printer memory.

USB Interface (for Windows® 98 / 2000/XP, iMac and Power Macintosh)

The printer can be connected using the Universal Serial Bus (USB) interface to a PC or Mac which has a USB interface. Drivers that allow you to use the USB port are provided on the CD-ROM supplied with the printer.

Popular Printer Emulation Support

These printers support the following printer emulation modes;
HP LaserJet (PCL6), PostScript® Level 3 language emulation (Brother BR-Script Level 3),
Epson FX-850 and IBM Proprinter XL.

When you use DOS application software or Windows® version 3.0 or earlier, you can use any of these emulations to operate the HL-1850/1870N printers. The printers also support auto-emulation switching between HP, Brother BR-Script 3 and Epson or HP, BR-Script 3 and IBM. If you want to set the printer emulation, you can do it using the Remote Printer Console Program.

High Resolution Control & Advanced Photoscale Technology

High Resolution Control (HRC) technology provides clear and crisp printouts. Use this function to get smooth text print quality.

Advanced Photoscale Technology (APT) enables the printer to print graphics in 256 greyscales, producing nearly photographic quality. Use this function when you want to print photographic images.

Environment-Friendly

<Economy Printing Mode>

This feature will cut your printing cost by saving toner. It is useful for obtaining draft copies for proof-reading. You can select the 50% toner saving economy mode through the Windows® printer driver supplied with your printer.

<Sleep Mode (Power Save Mode)>

Sleep mode automatically reduces power consumption when the printer is not in use for a certain period of time. The printer consumes less than 12W when in sleep mode.

<Low Running Cost>

Since the toner cartridge is separate from the drum unit, you need to replace only the toner cartridge after printing around 6,500 pages at 5% coverage for A4 paper for the standard cartridge, which is both cost effective and ecologically friendly.

Bar Code Print

The printer can print the following 11 types of bar codes;

- Code 39
- US-PostNet
- EAN-8
- Code 128
- ISBN
- EAN-13
- Interleaved 2 of 5
- UPC-A
- EAN-128
- Codabar
- UPC-E

Network Feature (for HL-1870N only)

The Brother printer has built in multi protocol network capability as standard. This allows multiple host computers to share the printer on a 10/100Mbit Ethernet network. Any users can print their jobs as if the printer was directly connected to their computer. Users on Windows® 95/98/Me, Windows® NT, Windows® 2000/XP, UNIX, Novell, Apple Macintosh, LAN server and OS/2 Warp server computer simultaneously can access this printer. For further information, see the Network User's Guide supplied with the printer.

2. OVERVIEW

<Front View>

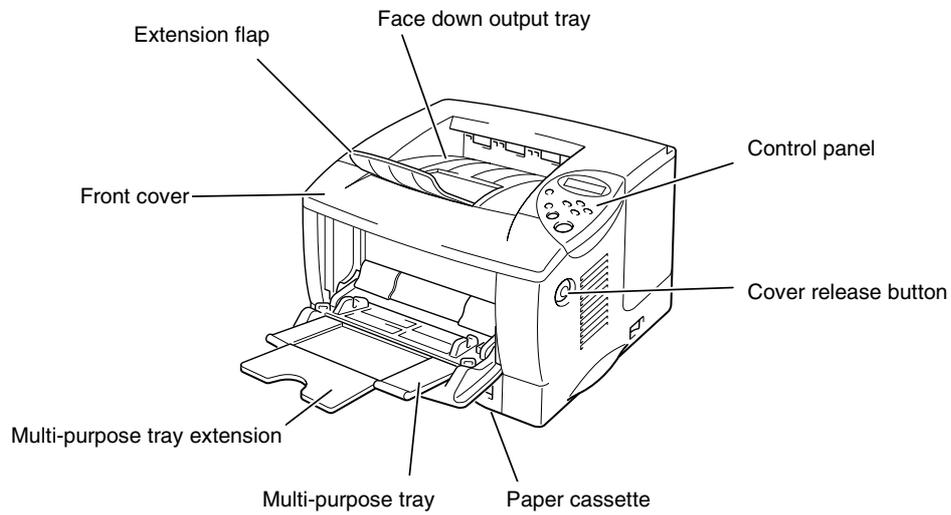


Fig. 1-1

<Rear View>

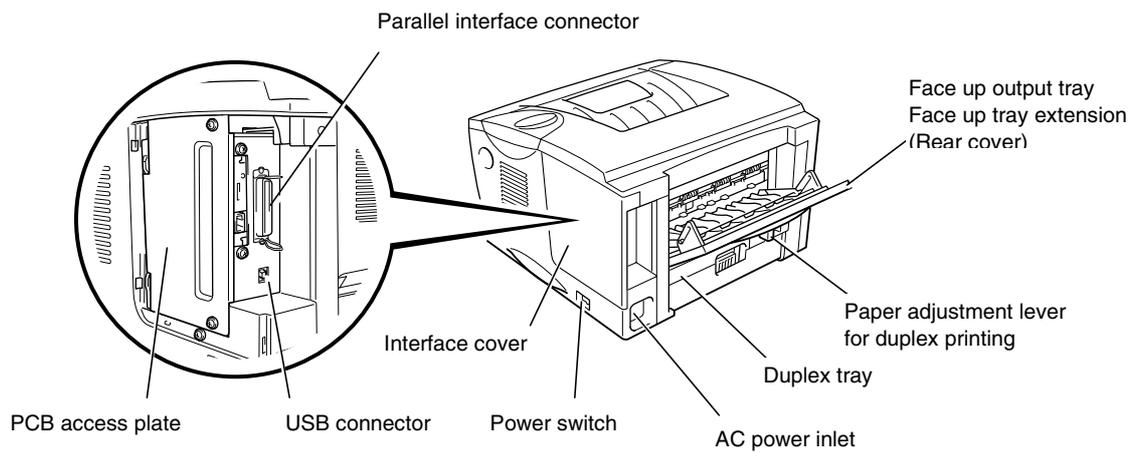


Fig. 1-2

3. SPECIFICATIONS

3.1 Printing

Print method	Electrophotography by semiconductor laser beam scanning
Laser	Wavelength: 780 nm Output: 5mW max
Resolution	HQ1200 (for Windows® 95/98/Me, WindowsNT® 4.0, Windows® 2000/XP, and Mac OS) 600 dpi (for Windows® 95/98/Me, WindowsNT® 4.0, Windows® 2000/XP, DOS and Mac OS) 300 dpi (for Windows® 95/98/Me, WindowsNT® 4.0, Windows® 2000/XP, and Mac OS)
Print quality	Normal printing mode Economy printing mode (up to 25% and 50% toner saving)
Print speed	Normal: Up to 18 pages/minute (A4) Up to 19 pages/minute (Letter-size paper) Duplex printing: Up to 8.5 pages/minute* (when loading A4 or Letter-size paper from the standard paper cassette.)
Warm-up	Max. 20 seconds at 23°C (73.4°F)
First print	Max. 12 seconds (when loading A4 or Letter-size paper from the standard paper cassette.)
Print media	Toner cartridge Life expectancy: 6,500 pages/cartridge (when printing A4 or Letter-size paper at 5% print coverage)
Developer	Drum unit Life expectancy: 20,000 pages/drum unit

***NOTE:**

*Print speed varies depending on the paper size or media type. For details, refer to **APPENDIX 16 'PRINT SPEEDS WITH VARIOUS SETTINGS'**.*

3.2 Functions

CPU	Fujitsu MB86834 100MHz
Emulation	Brother Printing Solution for Windows® Automatic emulation selection among HP LaserJet (PCL level 6), Brother BR-Script Level 3, EPSON FX-850 or IBM Proprinter XL
Printer driver	<PCL Driver> Windows® 95/98/Me, Windows® NT 4.0, Windows® 2000/XP driver, supporting Brother Native Compression mode <PS Driver> PPD file driver for Windows® 95/98/Me, Windows NT® 4.0, Windows® 2000/XP driver and Macintosh driver <Others> <ul style="list-style-type: none"> • iMac, Power Macintosh with USB printer driver • Optional Macintosh driver available for System 6.0.7 or higher
Interface	<ul style="list-style-type: none"> • Bi-directional parallel • Universal Serial Bus (USB) • 10/100 BaseTX Ethernet network interface (optional for HL-1850) • Optional IrDA
Memory	HL1850: 16 Mbytes HL1870N: 32 Mbytes Expandable up to 136 Mbytes for HL1850 and 144 Mbytes for HL1870N by installing an industry standard DIMM*
Control Panel	<ul style="list-style-type: none"> • Display LCD: 1 line, 16 digit, 3 color LED: 1 LED • Buttons 7 keys
Diagnostics	Self-diagnostic program

***NOTE:**

The DIMM must have the following specifications;

Type: 100 pin

Access time: 60 nsec - 80 nsec

Capacity: 16, 32, 64, 128 Mbyte

Height: 35.0 mm (1.38 inches) or less

Output: 32 bit or 36 bit (independent of parity)

3.3 Electrical and Mechanical

Power source	U.S.A. and Canada: AC 110 to 120V, 50 Hz/60 Hz Europe and Australia: AC 220 to 240V, 50 Hz/60 Hz
Power consumption	Printing (average): 410 W or less Standing by: 70 W or less Sleep*: 9 W or less (for HL-1850) 10 W or less (for HL-1870N)
Noise	Printing: 50dB A or less Standing by: 30dB A or less
Temperature	Operating: 10 to 32.5°C (50 to 90.5°F) Non operating: 0 to 40°C (38 to 104°F) Storage: -20 to 40°C (-4 to 104°F)
Humidity	Operating: 20 to 80% (non condensing) Storage: 10 to 85% (non condensing)
Dimensions (W x D x H)	425 x 424 x 275 mm (16.7 x 16.7 x 10.8 inches) A4 lower paper cassette installed: 425 x 424 x 384 mm (16.7 x 16.7 x 15.1 inches)
Weight	Approx. 14.5 kg (32.2 lb.) including the drum unit. Approx. 18.7 kg (41.6 lb.) including the drum unit and the optional lower tray unit.

***NOTE:**

- *The power consumption figure quoted for sleep mode is when the fan has stopped.*

3.4 Network

Type / Speed	10/100 Base TX Ethernet Automatic negotiation
Protocols	TCP/IP (RARP, BOOTP, DHCP, NetBIOS, WINS, LPR/LPD, Port9100, POP3/SMTP, SMB, User definable port, IPP, FTP, TELNET, SNMP, HTTP, TFTP), Netware IPX/SPX (Bindery and NDS), Appletalk, DLC/LLC, NetBEUI, DEC LAT, Banyan VINES
Management	<ul style="list-style-type: none"> • Web Based Management (HTTPD) • BRAdmin Professional (using TCP/IP protocol and IPX/SPX) • SNMP, MIB II as well as Brother private MIB • TELNET command console (NIC only) • HP JetAdmin compatible • BRCONFIG DOS Utility (NIC only, needs Netware network) • Front Panel Configuration (if the printer has LCD panel)
Firmware update	Flash ROM based for Network module <ul style="list-style-type: none"> • Can be upgraded using TFTP • Can be upgraded using IPX/SPX • Easy upgrade using Brother BRAdmin utility
Supplied software	<ul style="list-style-type: none"> • BRAdmin Professional management utility (for Windows® 95/98, Windows® NT 4.0/Windows® 2000/XP) • Port driver for Windows® 95/98, Windows® NT 4.0/Windows® 2000/XP <ul style="list-style-type: none"> LPR port driver (for Windows® 95/98 only) NetBIOS port driver SMTP port driver

3.5 Paper

3.5.1 Feedable paper

(1) Paper type

Paper type	Upper paper tray	Multi-purpose tray	Optional lower tray	Duplex printing	Select the paper type from the printer driver
Plain paper 60 g/m ² to 105 g/m ² (16 to 28 lbs.)					Plain paper
Recycled paper					Plain paper
Bond paper					Bond paper
Thick paper 105 g/m ² to 161 g/m ² (28 to 43 lbs.)					Thick paper or thicker paper
Transparency	Up to 10 sheets	Only A4 or Letter size			Transparencies
Label		Only A4 or Letter size			Plain paper
Envelope					Envelopes or Env.Tick or Env.Thin
Card					Thick paper or thicker paper

(2) Paper size

	Upper paper tray	Multi-purpose tray	Optional lower tray	Duplex printing
Paper size	A4, Letter, Legal, 8.5x13 in., B5 (JIS), B5 (ISO), Executive, A5, A6, B6	Width: 70 to 216 mm (2.75 to 8.5 in.) Length: 116 to 356 mm (4.57 to 14.0 in.)	A4, Letter, Legal, B5 (JIS), B5 (ISO), Executive, A5	A4, Letter, Legal

(3) Other paper specifications

<Paper cassette>

	Cut sheet
Basis weight	60 to 105 g/m ² (16 to 28 lb.)

Caliper	0.08 to 0.13 mm (0.003 to 0.005 in.)
Moisture content	4% to 6% by weight

<Multi-purpose tray>

	Cut sheet	Envelope
Basis weight	60 to 161 g/m ² (16 to 43 lb.)	75 to 90 g/m ² (20 to 24 lb.) single thickness
Caliper	0.08 to 0.2 mm (0.003 to 0.008 in.)	0.084 to 0.14 mm (0.003 to 0.005 in.) single thickness
Moisture content	4% to 6% by weight	4% to 6% by weight

(4) Recommended paper

	Europe	USA
Plain paper	Xerox Premier 80 g/m ² Xerox Business 80 g/m ² IGEPA X-Press 80 g/m ²	Xerox 4200DP 20 lb Champion Paper One 20 lb Hammermill Laser Paper 24 lb
Recycled paper	Steinbis Recycling Copy 80 g/m ²	
Transparency	3M CG3300	3M CG 3300
Label	Avery laser label L7163	Avery laser label #5160

! CAUTION:

When you are choosing print media, be sure to follow the information given below to prevent any paper jams, print quality problems or printer damage;

- *It is recommended to use long-grained paper for the best print quality. If short-grained paper is being used, it might be the cause of paper jams.*
- *Use neutral paper. Do not use acid paper to avoid any damage to the drum unit.*
- *Avoid using coated paper such as vinyl coated paper.*
- *Avoid using preprinted or highly textured paper.*
- *It is recommended to use labels or transparencies which are designed for use in laser printers.*
- *Avoid feeding labels with the carrier sheet exposed, or the printer will be damaged.*
- *Before loading paper with holes such as organizer sheets, be sure to fan the stack well.*
- *Do not use organizer sheets that are stuck together. The glue that is used might caused damaged to the printer.*
- *When printing on the back of pre-printed paper, if the paper is curled, be sure to straighten the paper as much as possible.*
- *Different types of paper should not be loaded at the same time in the paper cassette to avoid any paper jams or misfeeds.*

3.5.2 Paper cassette capacity

	Upper paper tray	Multi-purpose tray	Optional lower tray
Paper Capacity	250 sheet (80 g/m ² or 20 lbs.)	100 sheets (80 g/m ² or 20 lbs.) Legal: 30 8.5x13 in.: 30 Label stock: 10	250 sheets (80 g/m ² or 20 lbs.)

3.5.3 Print delivery

- (1) Face down output tray
capacity: Maximum 150 sheets (80 g/m²)
face down only
- (2) Face up output tray
capacity: Maximum 50 sheets (80 g/m²)
face up only

NOTE:

Face-down: Delivery with the printed face of the paper downwards.

Face-up: Delivery with the printed face of the paper upwards.

- (3) We recommend the following print methods (output tray) for each paper media type.

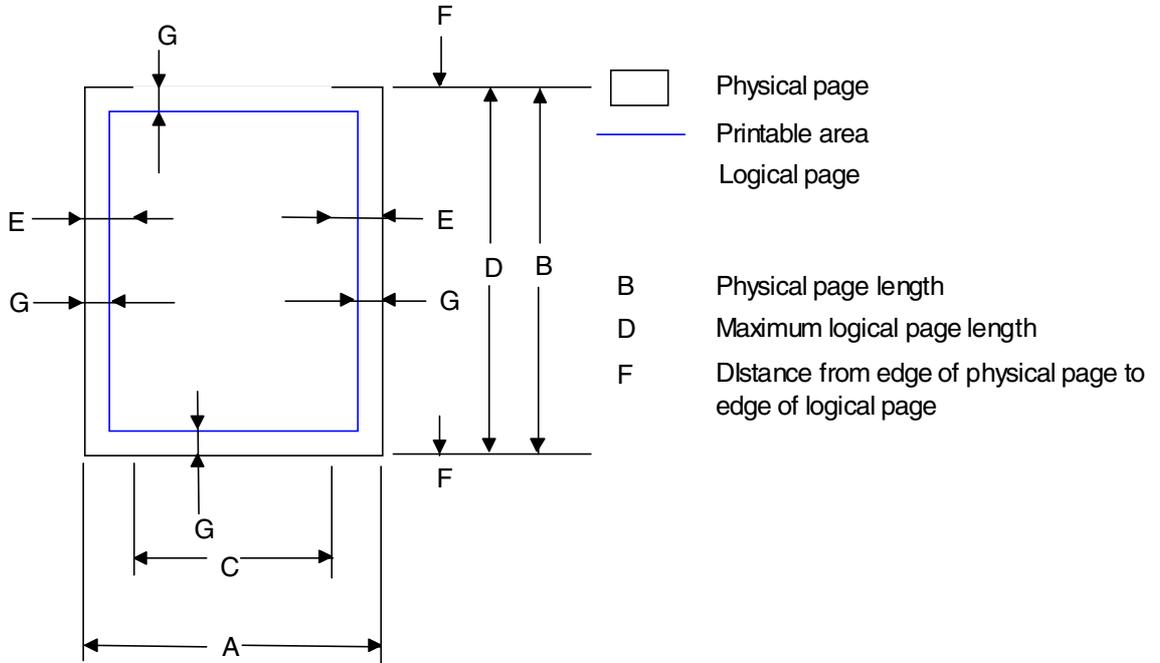
Media type	Paper output	
	Face down	Face up
Plain paper		
Thick paper		
Recycled paper		
Transparency		
Label		
Envelope		
Card		

3.6 Printable Area

3.6.1 PCL5e/EPSON/IBM emulation

The figure below shows the printable area each emulation guarantees when printing on Portrait and Landscape.

Portrait



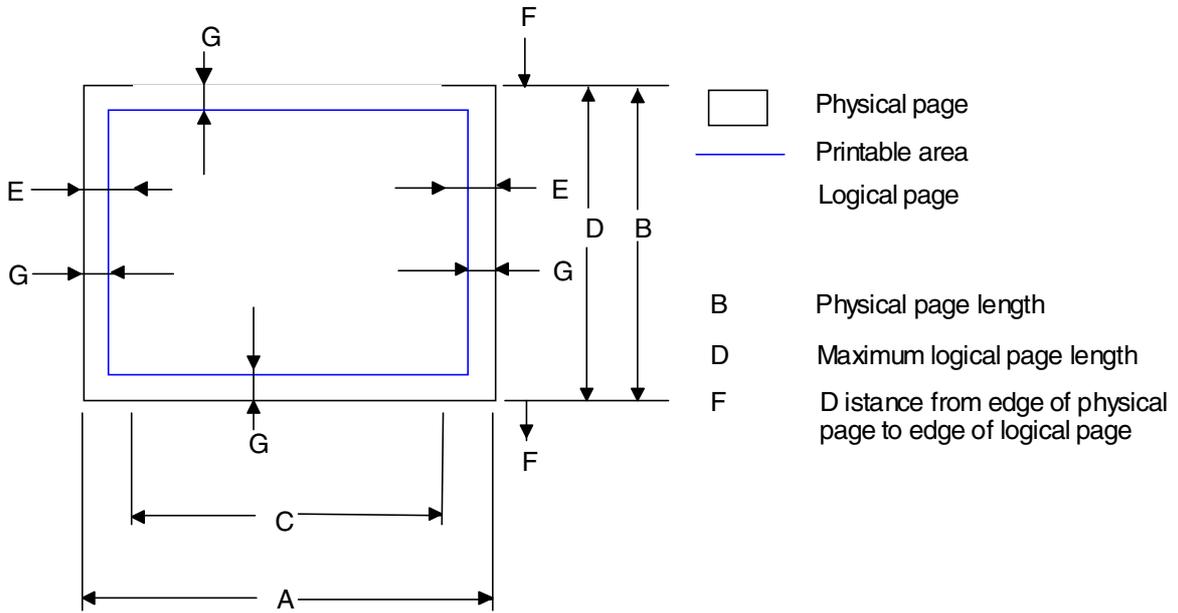
The table below shows the printable areas when printing on Portrait for each paper size.

Size	A	B	C	D	E	F	G
Letter	215.9 mm 8.5" (2,550 dots)	279.4 mm 11.0" (3,300 dots)	203.2 mm 8.0" (2,400 dots)	279.4 mm 11.0" (3,300 dots)	6.35 mm 0.25" (75 dots)	0 mm	4.2 mm 0.16" (50 dots)
Legal	215.9 mm 8.5" (2,550 dots)	355.6 mm 14.0" (4,200 dots)	203.2 mm 8.0" (2,400 dots)	355.6 mm 14.0" (4,200 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
Executive	184.15 mm 7.25" (2,175 dots)	266.7 mm 10.5" (3,150 dots)	175.7 mm 6.92" (2,025 dots)	266.7 mm 10.5" (3,150 dots)	6.35 mm 0.25" (75 dots)	0 mm	4.2 mm 0.16" (50 dots)
A 4	210.0 mm 8.27" (2,480 dots)	297.0 mm 11.69" (3,507 dots)	198.0 mm 7.79" (2,338 dots)	297.0 mm 11.69" (3,507 dots)	6.01 mm 0.24" (71 dots)	0 mm	4.2 mm 0.16" (50 dots)
A 5	148.5 mm 5.85" (1,754 dots)	210.0 mm 8.27" (2,480 dots)	136.5 mm 5.37" (1,612 dots)	210.0 mm 8.27" (2,480 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
A 6	105.0 mm 4.13" (1,240 dots)	148.5 mm 5.85" (1,754 dots)	93.0 mm 3.66" (1,098 dots)	148.5 mm 5.85" (1,754 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 5 (JIS)	182.0 mm 7.1" (2,130 dots)	257.0 mm 10.11" (3,033 dots)	170.0 mm 6.69" (2,007 dots)	257.0 mm 10.11" (3,033 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 5 (ISO)	176.0 mm 6.93" (2,078 dots)	250.0 mm 9.84" (2,952 dots)	164.0 mm 6.46" (1,936 dots)	250.0 mm 9.84" (2,952 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 6	125.0 mm 4.92" (1,476 dots)	176.0 mm 6.93" (2,078 dots)	164.0 mm 4.44" (1,334 dots)	176.0 mm 6.93" (2,078 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
COM10	104.78 mm 4.125" (1,237 dots)	241.3 mm 9.5" (2,850 dots)	92.11 mm 3.63" (1,087 dots)	241.3 mm 9.5" (2,850 dots)	6.35 mm 0.25" (75 dots)	0 mm	4.2 mm 0.16" (50 dots)
MONARCH	98.43 mm 3.875" (1,162 dots)	190.5 mm 7.5" (2,250 dots)	85.7 mm 3.37" (1,012 dots)	190.5 mm 7.5" (2,250 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
C 5	162.0 mm 6.38" (1,913 dots)	229.0 mm 9.01" (2,704 dots)	150.0 mm 5.9" (1,771 dots)	229.0 mm 9.01" (2,704 dots)	6.01 mm 0.24" (71 dots)	0 mm	4.2 mm 0.16" (50 dots)
DL	110.0 mm 4.33" (1,299 dots)	220.0 mm 8.66" (2,598 dots)	98.0 mm 3.86" (1,157 dots)	220.0 mm 8.66" (2,598 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)

NOTE:

- The paper sizes indicated here should confirm to the nominal dimensions specified by JIS except B5 (ISO).
- The dot size is based on 300 dpi resolution.

Landscape



The table below shows the printable areas when printing on Landscape for each paper size.

Size	A	B	C	D	E	F	G
Letter	279.4 mm 11.0" (3,300 dots)	215.9 mm 8.5" (2,550 dots)	269.3 mm 10.6" (3,180 dots)	215.9 mm 8.5" (2,550 dots)	5.0 mm 0.2" (60 dots)	0 mm	4.2 mm 0.16" (50 dots)
Legal	355.6 mm 14.0" (4,200 dots)	215.9 mm 8.5" (2,550 dots)	345.5 mm 13.6" (4,080 dots)	215.9 mm 8.5" (2,550 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
Executive	266.7 mm 10.5" (3,150 dots)	184.15 mm 7.25" (2,175 dots)	256.6 mm 10.1" (3,030 dots)	184.15 mm 7.25" (2,175 dots)	5.0 mm 0.2" (60 dots)	0 mm	4.2 mm 0.16" (50 dots)
A 4	297.0 mm 11.69" (3,507 dots)	210.0 mm 8.27" (2,480 dots)	287.0 mm 11.2" (3,389 dots)	210.0 mm 8.27" (2,480 dots)	4.8 mm 0.19" (59 dots)	0 mm	4.2 mm 0.16" (50 dots)
A 5	210.0 mm 8.27" (2,480 dots)	148.5 mm 5.85" (1,754 dots)	200.0mm 7.87" (2,362 dots)	148.5 mm 5.85" (1,754 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
A 6	148.5 mm 5.85" (1,754 dots)	105.0 mm 4.13" (1,240 dots)	138.5 mm 5.45" (1,636 dots)	105.0 mm 4.13" (1,240 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 5 (JIS)	257.0 mm 10.11" (3,033 dots)	182.0 mm 7.1" (2,130 dots)	247.0 mm 9.72" (2,916 dots)	182.0 mm 7.1" (2,130 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 5 (ISO)	250.0 mm 9.84" (2,952 dots)	176.0 mm 6.93" (2,078 dots)	240.0 mm 9.44" (2,834 dots)	176.0 mm 6.93" (2,078 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 6	176.0 mm 6.93" (2,078 dots)	125.0 mm 4.92" (1,476 dots)	166.4 mm 6.55" (1,960 dots)	125.0 mm 4.92" (1,476 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
COM10	241.3 mm 9.5" (2,850 dots)	104.78 mm 4.125" (1,237 dots)	231.1 mm 9.1" (2,730 dots)	104.78 mm 4.125" (1,237 dots)	5.0 mm 0.2" (60 dots)	0 mm	4.2 mm 0.16" (50 dots)
MONARCH	190.5 mm 7.5" (2,250 dots)	98.43 mm 3.875" (1,162 dots)	180.4 mm 7.1" (2,130 dots)	98.43 mm 3.875" (1,162 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
C 5	229 mm 9.01" (2,704 dots)	162 mm 6.38" (1,913 dots)	219.0 mm 8.62" (2,586 dots)	162 mm 6.38" (1,913 dots)	4.8 mm 0.19" (59 dots)	0 mm	4.2 mm 0.16" (50 dots)
DL	220 mm 8.66" (2,598 dots)	110 mm 4.33" (1,299 dots)	210.0 mm 8.26" (2,480 dots)	110 mm 4.33" (1,299 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)

NOTE:

- The paper sizes indicated here should confirm to the nominal dimensions specified by JIS except B5 (ISO).
- The dot size is based on 300 dpi resolution.

3.6.2 PCL6/BR-Script3 emulation

You can not print within 4.2 mm (50dots in 300 dpi mode) on all four sides of the paper.

CHAPTER 2 INSTALLATION AND BASIC OPERATION

1. CONDITIONS REQUIRED FOR INSTALLATION

1.1 Power Supply

- The source voltage must stay within $\pm 10\%$ of the rated voltage shown on the rating plate.
- The power cord, including extensions, should not exceed 5 meters (16.5 feet).
- Do not share the same power circuit with other high-power appliances, particularly an air conditioner, copier or shredder. If it is unavoidable that you must use the printer with these appliances, it is recommended that you use an isolation transformer or a high-frequency noise filter.
- Use a voltage regulator if the power source is not stable.

1.2 Environment

- The printer should be installed near a power outlet, which is easily accessible.
- The room temperature is maintained between 10°C and 32.5°C. The relative humidity is maintained between 20% and 80%.
- The printer should be used in a well ventilated room.
- Place the printer on a flat, horizontal surface.
- Keep the printer clean. Do not place the printer in a dusty place.
- Do not place the printer where the ventilation hole of the printer is blocked. Keep approximately 100 mm (4 inches) between the ventilation hole and the wall.
- Do not place the printer where it is exposed to direct sunlight. Use a blind or a heavy curtain to protect the printer from direct sunlight when the printer is unavoidably set up near a window.
- Do not place the printer near devices that contain magnets or generate magnetic fields.
- Do not subject the printer to strong physical shocks or vibrations.
- Do not expose the printer to open flames or salty or corrosive gasses.
- Do not place objects on top of the printer.
- Do not place the printer near an air conditioner.
- Keep the printer horizontal when carrying.
- Do not cover the slots in the side cover.

1.3 System Requirements for Brother Printer Solution for Windows®

Check the following system requirements to setup and operate the printer using Brother Printing Solution for Windows®:

Operating system	Computer / Processor	Memory
Windows® 95	486DX / 66MHz or higher processor	24MB
Windows® 98	Pentium 150MHz or higher processor	32MB
Windows® Me	Pentium 150MHz or higher processor	32MB
Windows® NT 4.0	Pentium 150MHz or higher processor	24MB
Windows® 2000/XP	Pentium 133MHz or higher processor	64MB