Alere™ Universal Printer
User Manual

PN 55115

Contents

Safety and Precautions

Before installing and using the printer, please read the following items carefully.

1. Caution

Do not touch the print head during printing and just after operation. It is a thermal element and can reach a high temperature. Contact with the print head can cause a minor burn.

Keep the printer away from water to avoid a shock hazard and equipment damage.

Keep the printer out of moist areas to avoid condensation. If condensation occurs, do not turn on the power until it has completely gone away. Condensation build up could cause minor shock.

Disconnect the power when the printer is not in use.

Do not spill water or other conductive materials into the printer (e.g. metal). If this happens, turn off the power immediately.

Do not disassemble the printer.

2. Important

- Install the printer on a flat and stable surface.
- Reserve adequate space around the printer so that the operation and maintenance can be performed properly.
- Do not use or store the printer in a place exposed to heat, moisture or serious pollution.
- Do not place the printer in a place exposed to vibration or impact.
- Do not touch the print head. It is an ESD-sensitive device.
- Do not expose the printer to direct sunlight, strong light or heat.
- Connect the printer power to an appropriate outlet. Avoid sharing one electrical outlet with large instruments or other devices that may cause the fluctuation of voltage.
- Do not attempt to print when there is no paper installed, otherwise the print head and roller will be damaged.
- To ensure quality print and normal lifetime, use the recommended paper.
- Shut down the printer when connecting or disconnecting data cables to avoid damages to control board.
- Set the print darkness to a lower grade as long as the print quality is acceptable. This will help to keep the print head durable.
- Keep this manual carefully in hand for reference.

Waste Disposal

Council Directive 2002/96/EC concerning Waste Electrical and Electronic Equipment (WEEE). Indicates a requirement not to dispose of WEEE as municipal waste. Contact your local distributor for information regarding disposal of the unit and accessories.

1. Product Description

1.1 Introduction

Alere™ Universal Printer is a high performance thermal label printer with a simple structure for easy operation. It adopts modular design and can accept up to an 80mm (maximal diameter) paper roll. Equipped with serial and USB ports, the printer provides real-time printing when connected with the testing device.

Main Features:

- Thermal printing.
- Low noise, 150mm/s high speed printing.
- Easy paper loading, convenient operation, easy to use.
- 32 bit high speed microprocessor.
- Automatically temperature controlled, and high printing quality.
- ESC/POS programming language.

1.2 Material List

Open the packaging, and check the parts according to the packing list. Please contact if there is shortage or damage.

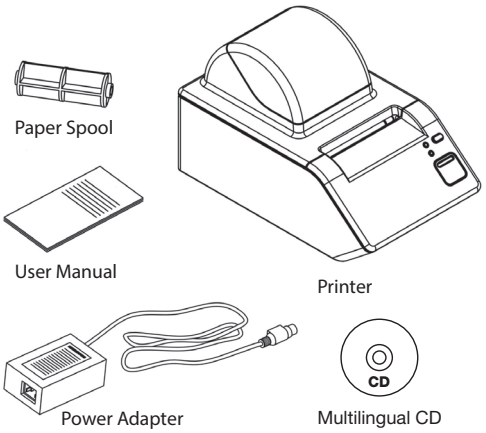


Figure 1.2.1

1.3 Printer Installation Position

Place the printer on a flat stable surface that is free of moisture, water and dust. The maximum tilt angle should not exceed ±15° during installation.

1.4 Power Adapter Connection

1. Ensure the power switch is turned off.
2. Connect the AC power cord with power adapter, and then insert the other end of the power adapter into the power adapter interface of printer.
3. Insert the other end of AC power cord into a 110V/220V wall socket.

⚠ Caution:

When the printer is not in use, disconnect the power.

1.5 Communication Cable Connection

1. Confirm the power of printer is turned off.
2. Insert the data cable to the suitable interface on the back of the printer, and fixed it with a screw or clip spring.
3. Connect other end of the communication cable to the testing device.

Important:

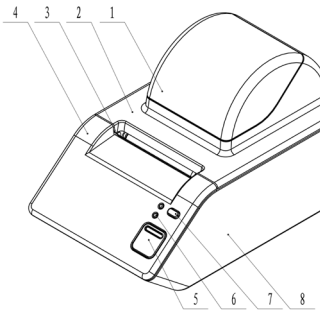
Do not connect or disconnect the serial or USB data cable when the power is on.

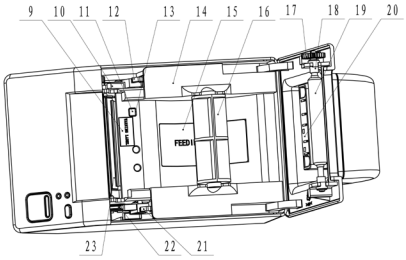
2. Printer Operation

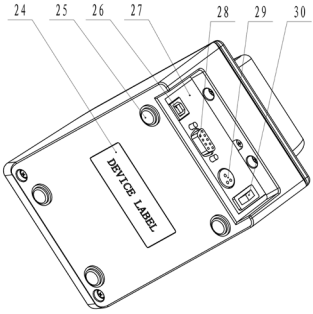
2.1 Appearance and Module

The detailed structure of printer is as follows:

1—Window
2—Top cover
3—Tear-off bar
4—Front cover
5—Cover open button
6—LED
7—Feed button
8—Bottom cover
9—Warning label
10—Micro switch
11—Sensor cover
12—Right latch
13—Paper end sensor
14—Paper housing
15—Paper loading label
16—Paper spool
17—Gear
18—Platen roller sleeve
19—Print roller
20—Upper path
21—Left latch
22—Spanner
23—Print head
24—Product label
25—Rubber foot
26—USB interface
27—Interface fixing plate
28—Serial interface
29—Power adapter interface
30—Power switch







2.2 Introduction of Main Module

1. Paper spool (16): to support paper roll.
2. Micro switch (10): to detect print head lift up/press down.
3. Paper end sensor (13): to detect and position media like label paper, etc.
4. Power switch (30): power control switch of printer.

2.3 Function of LED and Button

2.3.1 Function of LED

LED name	Status	Explanation
Power LED (green)	Always On	Printer power is on
Error LED (red)	Flashing	Printer error.

Table 2.3.1

2.3.2 Function of Button

Button	Function	Explanation
Feed button	Press down button to feed paper	For label printing: the printer only feeds one label; for continuous paper (paper without hole cut-outs), the printer does not stop feeding paper until the button is released.
	Print self-test page	If turning on the power while pressing down the feed button, the printer will print out the main menu. According to the menu's operation prompt, select "print configuration information" through the feed button. For operation steps, please refer to 2.5.1.
	Parameter configuration	Refer to appendix 3 to modify the printer parameters.
	Sensor verification	For sensor verification method, please refer to 2.5.3.

Table 2.3.2

2.3.3 LED

Error information	LED Flash Status
Out of paper	
Print head is lifted up	
Print head voltage is abnormal	
Print head temperature is abnormal	
Can not find the label cut-outs or the printer does not recognize labels	

Table 2.3.3

2.3.4 Function of Button Configuration

Parameters can be configured via long-press time or short-press time according to the printed configuration information. For the detailed configuration information, please refer to appendix 3.

2.4 Paper Loading

1. Press down the cover open button to open the top cover to the position shown in figure 2.4.1.
2. Open the top cover to the position shown in figure 2.4.2.

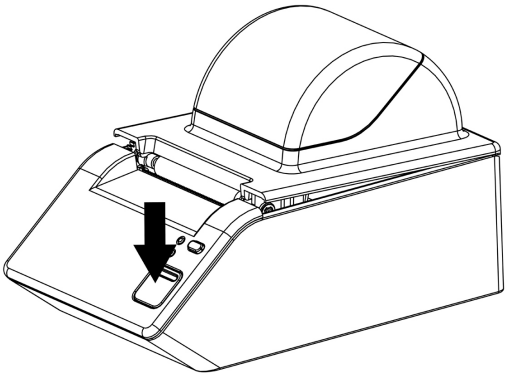


Figure 2.4.1

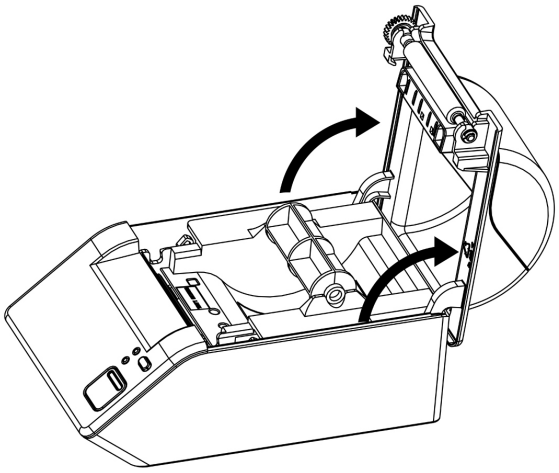


Figure 2.4.2

3. Load the paper roll onto the paper roll spool, and put the paper roll spool into the paper housing, as shown in figures 2.4.3 and 2.4.4.

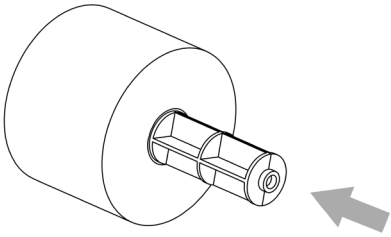


Figure 2.4.3

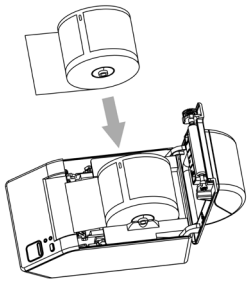


Figure 2.4.4

4. Close the top cover.

Important:

The print side of the paper should be facing down.

2.5 Start the Printer

2.5.1 Power ON and Self-Test

Ensure the power adapter and the data cables are correctly connected. When turning on the power the green LED will be on and the red LED off.

Important:

If the printer does not power on or does not work normally after powered on, please contact Alere.

2.5.2 Print Self-Test Page

1. Ensure the printer's power source is connected and the paper roll with spool is loaded into the paper housing.
2. Ensure the green LED is off and the printer is powered off.
   - Press and hold the feed button.
   - While holding the feed button, turn on the power switch.
   - When the printer starts feeding, release the feed button.

   Press the feed button twice and hold (at least 1s) and the printer will print out the configuration information (for a sample print out, refer to appendix 2) and the prompt information ("Press and Release FEED to continue SELF-TEST printing" and "Press and Hold FEED to configure the printer"), and then it will enter into pause and waiting status with the red LED flashing.
3. Pressing down the feed button for a short time, the printer will print out character test page, and the self-test page printing is completed. If the feed button is pressed and held down, the printer will print out the interface with the title of "MAIN MENU".

2.5.3 Label Verification

Manual Verification

1. Power off the printer.
2. Install the labels or print paper.
3. Press down the feed button while turning on the power switch. After the printer starts feeding the paper, release the feed button, waiting for it to finish the printing of the main menu.
4. Press down the feed button three times, and then hold the feed button down (for at least 1 second). The printer will feed the paper and start the label verification.

- After finishing the verification, the printer enters into standby status; if the mark cannot be found, the printer will distinguish it to be continuous paper.

Important:

Manual verification of the labels is needed under each of the following situations:

- Install and use of the printer for the first time.
- Re-installation of the printer after being disconnected.
- The sensor is used for the first time after cleaning.
- The label cannot be effectively recognized during print.
- The operation environment is changed.

Important:

- Once the verification of labels is completed, the printer is ready.
- After the above steps and sensor cleaning, if the printer fails the label verification, please contact Alere.

3. Printer Adjustment

3.1 Adjustment of Parameters

3.1.1 Adjustment and Adjustment Range

Adjustment object	Setting range	Remark
Print darkness	00—90	Set the print darkness to a lower grade as long as the print quality is acceptable. This will extend the print head's durability.
Darkness difference of label paper and continuous paper	20—40	Set the darkness of label paper to be higher than that of continuous paper. Default value is 30.

Table 3.1.1

4. Routine Maintenance

Clean the print head, roller and sensor according to the following steps.

4.1 Cleaning the Print Head

If the following cases occur, the print head should be cleaned:

- Printout is not clear.
- Paper feeds and retracts with excessive noise.
- Debris on the print head.

The following steps are for print head cleaning:

1. Turn off the power and open the top cover.
2. Wait for the print head to cool down completely.
3. Wipe off dust or particles on the surface of the print head with a soft cotton cloth dampened with 70% isopropyl alcohol. (It should not be dripping.)
4. Wait for 5 to 10 minutes until the alcohol evaporates completely. Press down the print head module and close the top cover.

Caution:

Do not touch the print head during printing and just after operation. It is a thermal element and can reach a high temperature. Contact with the print head can cause a minor burn.

Important:

Do not touch the print head. It is an ESD-sensitive device. Contact with the print head may cause damage.

4.2 Cleaning the Sensor Cover

The sensor cover should be cleaned when the following occur:

- During printing, the printer LED flashes the out of paper pattern, when paper is installed.
- The printer does not alarm the paper end LED pattern when there is no paper left.
- The printer does not identify labels correctly.

The following steps are for paper end sensor cover cleaning:

1. Turn off the printer power and open the top cover.
2. Wipe off dust or particles on the dustproof cover surface of the paper end sensor with soft cotton cloth damped with 70% isopropyl alcohol. (It should not be dripping.)
3. Wait for 5 to 10 minutes until the alcohol evaporates completely, press down the print head module and close the top cover.

4.3 Cleaning the Print Roller

If the following cases occur, the roller should be cleaned:

- Printout is not clear.
- Paper feeds and retracts with excessive noise.
- Debris on the print roller.

The following steps are for print roller cleaning:

1. Turn off the power and open the top cover.
2. Wait for the print roller to cool down completely.
3. Wipe off dust or particles on the surface of the print roller with a soft cotton cloth dampened with 70% isopropyl alcohol. (It should not be dripping.)
4. Wait for 5 to 10 minutes until the alcohol evaporates completely, press down the print head module and close the top cover.

⚠ Caution:

- **Before starting routine maintenance of the printer, make sure the power is turned off.**
- **Do not touch the surface of the print head with hands or metal.**

Important:

- **Do not use forceps; this will prevent the print head, print roller and sensors from being scratched.**
- **Do not use organic solvent like gasoline, acetone etc.**
- **Please wait for the alcohol to evaporate completely before printing.**

5. Troubleshooting

If the printer has an error, please refer to this chart for troubleshooting steps. If it still cannot be solved, please contact Alere.

5.1 LED Status Indication

The red LED flashes when the printer has an error. At this time, the printer will stop printing and the connection between the testing device and printer will be terminated. Please check the pattern that the LED continuously flashes and then troubleshoot per the following:

Error LED status	Reason	Solution
Flash twice	Paper end /no paper present	Load paper roll again.
	Reflection sensor error	Contact Alere.
Flash three times	Print head lifted up	Press down the print head.
	Micro switch error	Contact Alere.
Flash five times	Abnormal voltage	Check the power supply and power adapter connection to the printer and the wall socket. Visibly inspect both connections for damage as well.
	Voltage sampling module error	Contact Alere.
Flash six times	Print head temperature is abnormal	Wait until the temperature of the print head returns to normal working range.
	Temperature sampling module error	Contact Alere.

Table 5.1.1

5.2 Printing Quality Problem

Malfunction	Reason	Solution
Printout is unclear or is illegible.	Print head or print roller is dirty	Clean the print head or roller
	Paper quality problem	Use recommended paper
	Low print darkness	Increase the print darkness

Table 5.2.1

Appendix

Appendix 1. Technical Specification

Appendix 1.1 Main Technical Specifications

Item		Alere™ Universal Printer PN 55115 parameter
Printing	Resolution	203DPI
	Print mode	Thermal
	Print width (Max.)	56mm
	Print speed (Max.)	150mm/s
	CPU	32bit RISC kiosk microprocessor
	Memory	SDRAM: 2MB FLASH: 2MB
	Print head temperature detection	Thermal resistor
	Print head position detection	Micro switch
	Paper mark detection	Photoelectric sensor
	Communication interface	Standard configuration RS-232 serial, USB interface
Media	Paper type	Thermal continuous or label paper
	Paper OD (Max.)	80mm
	Paper roll width (Max.)	62mm
	Paper out mode	Tear off
Character Barcode Image	Character enlargement/ rotation	All characters can be enlarged 1–6 times horizontally and vertically.Rotation printing (0°, 90°, 180°, 270°)
	Character set	ASCII character International character set: USA, France, Germany, UK, Denmark I, Sweden, Italy, Spain, Japan, Norway, Denmark II Code page: 437, 850, 852, 860, 863, 865, 858, 866, 1252, 862, Katakana, 1253, 737
		User-defined font: User can define font and download it to FLASH or SDRAM.
	Image	Plain bitmap in binary system, which can be downloaded to FLASH or RAM.
	Barcode	**One-dimensional barcode:** UPC-A, UPC-E, EAN13, EAN8, CODE39, CODE93, ITF, CODABAR, CODA128, etc. **Two-dimensional barcode:** PDF417, MAXICODE, QRCODE,GS1 etc.
Operation interface	Button, LED	1 button, 2 LEDs
Power adapter	Input	AC 110~240V, 50/60Hz
	Output	DC 24V, 1.5A
Environmental requirements	Operation environment	+5°C - 45°C, 20%~90% (40°C)
	Storage environment	-40°C - 60°C, 20%~93% (40°C)
Physical features	Overall size	193.5mm*113mm*120.5mm (L*W*H)
	Weight	655g

Appendix table 1.1.1

Appendix 1.2 Paper Technical Specifications

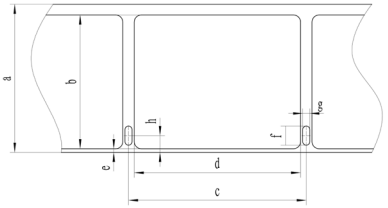
The maximum paper height is decided by the size in the printer's configured memory.

1 Continuous paper specification (unit: mm)

Type	Figure	Index
Without adhesives, continuous, strip paper		Paper width: a=62mm

Appendix table 1.3.1

2 Discontinuous paper (unit: mm)

Type	Figure	Index
With adhesives, discontinuous, punched label paper		Base Paper width: a=62 Label width: b=56 Label gap: c=74.8 Label height: d=70 Label position: e=1.5 Detection hole height: f=8 Detection hole width: g =3 Detection hole position: h=7

Appendix table 1.3.2

Appendix 2. Self-Test Page

Printer configuration information contained in the self-test page:

1. Configuration information of printer

Boot Firmware :FV1.012

Main Firmware :FV1.011

H/W Parameters

Flash Memory Size :2M Bytes

Flash Logos/Fonts :512K Bytes

Resolution :203×203 DPI

Print Width (max) :56mm

Fixed LeftMargin :0mm

Fixed RightMargin :0mm

Print Speed (max) :150mm/s

Dark Scale :80

CRCommand :Disabled

Current Codepage :PC437

Communication Interface

Interface Type1	:RS232
Rx Buffer Size	:4K Bytes
Baud Rate	:9600 bps
Data Bits	:8
Stop Bits	:1
Parity	:None
Handshaking	:DTR/DSR
Command CR	:Disabled
Data Received Error	:Print '?'
Interface Type2	:USB_ BTP-L560_1
Interface Mode	:WinDriver Mode
Rx Buffer Size	:4K Bytes

Resident Fonts

Font Type	:ELITE
Code Page	:PC437, PC850
	:PC852, PC860
	:PC863, PC865
	:PC858, PC866
	:PC1252, PC862
	:PC1253, PC737
	:KATAKANA

International Character

:U.S.A
:France
:Germany
:U.K.
:Denmark I
:Sweden
:Italy
:Spain
:Japan
:Norway
:Denmark II

Bar Code Available

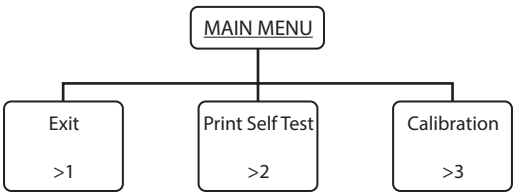
:UPC-A
:UPC-E
:EAN-8
:EAN-13
:CODE 39
:CODE 93
:ITF
:CODABAR
:CODA128
:PDF417
:QRCODE
:MAXICODE
:GS1

Appendix 3. Button Configuration

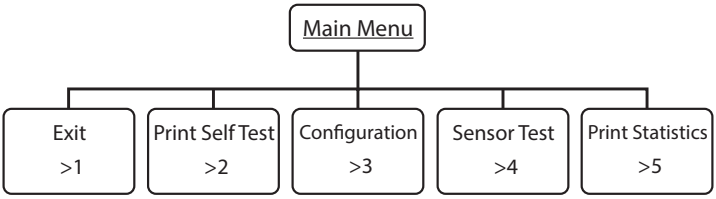
The following steps are for the printer button parameter configuration:

1. Ensure the printer is connected to its power source and paper is loaded. Press down the feed button while turning on the power, then release the feed button, the printer will print out the main menu of button configuration and button operation prompts.
2. All the numbers in the menus correspond with the times button is pressed down for a short time; the current selection is confirmed by pressing down the button for a long time (at least 1 second).
3. Pressing down the feed button twice for a short time and once for a long time (at least 1 second), the printer will print out the configuration information and prompt the information (“Press and Release FEED to continue SELF-TEST printing” and “Press and Hold FEED to configure the printer), and then will enter into pause and waiting status with the red LED flashing.
4. Pressing and holding down the feed button will print out the interface with the title of “MAIN MENU”.
5. Pressing down the feed button three times for a short time and once for a long time, the printer will print out the interface with the title of “CONFIGURATION”. Select the configuration according to the number before the menu.

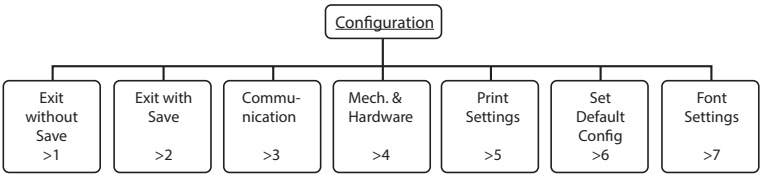
Menu Structure of Step 1:



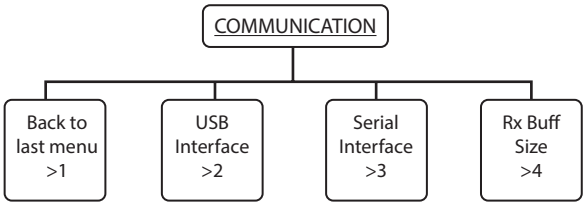
Menu Structure of Step 4:



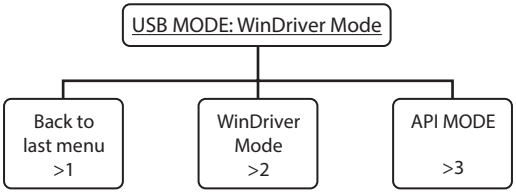
Menu Structure of Step 5:



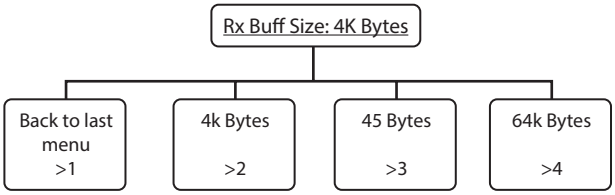
Communication >3 Menu Structure of Communication Interface.



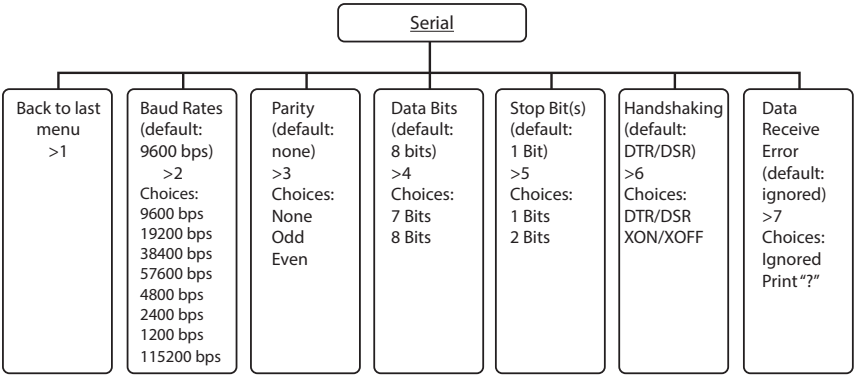
Communication USB Interface >2 Relevant Configuration Parameter of Communication Interface:



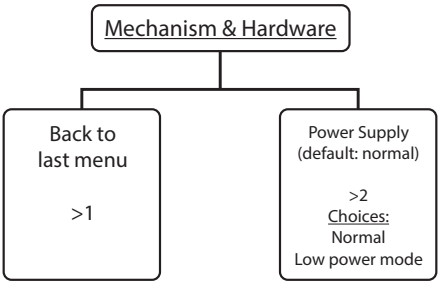
Communication Rx Buff Size >4 Relevant Configuration Parameter of Receive Buffer:



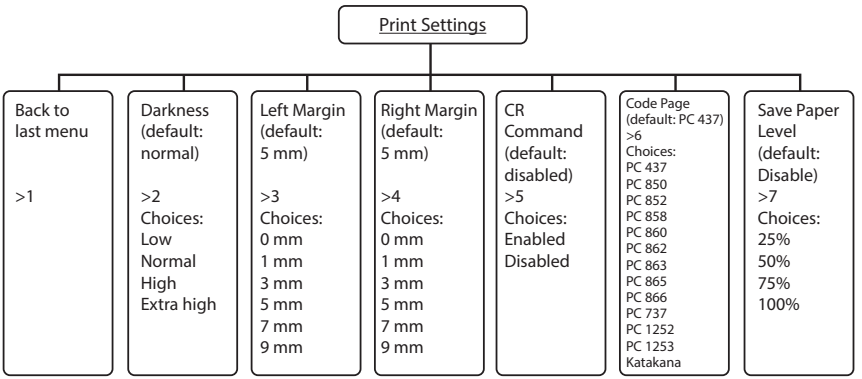
Communication Serial Interface >3 Relevant Configuration Parameter of Serial Interface:



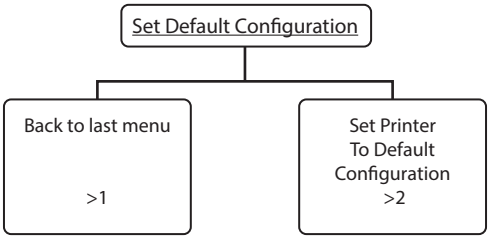
Mech. & Hardware >4 Menu Structure:



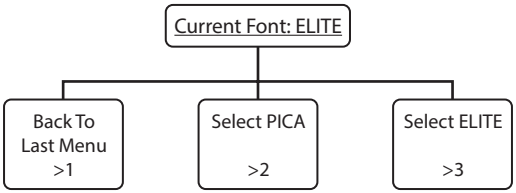
Print Settings >5 Menu structure.



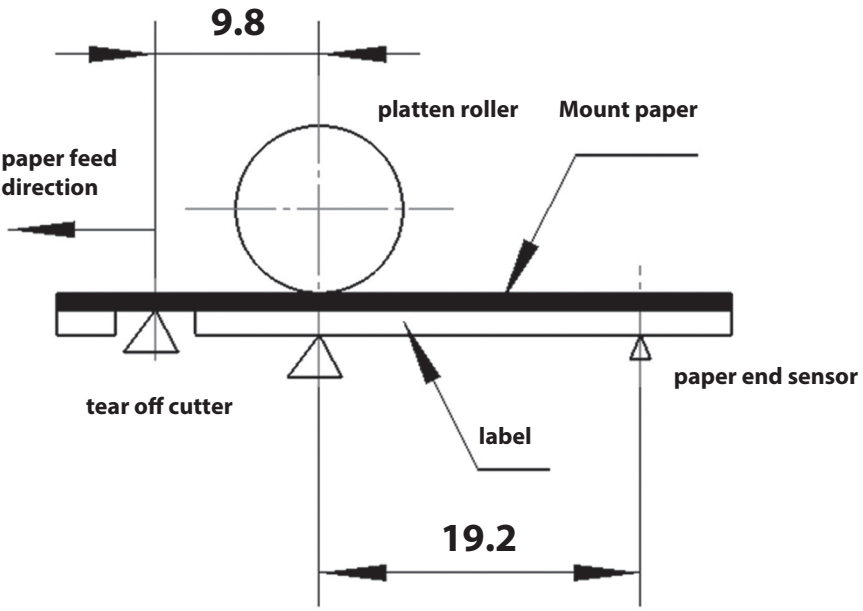
Set Default Config >6 Menu structure.



Font Settings >7 Menu structure.



Appendix 4. Printing and Paper Out Position



Appendix figure 4.1

Important:

The above figure takes label mark paper as an example to explain printing and paper out position.

Appendix 5. Communication Interface

Appendix 5.1 Serial Interface

1. Interface signal

PIN	Signal Name	Signal Direction	Function
1	None		
2	RXD	Input	Data input terminal
3	TXD	Output	Data output terminal
4	DTR	Output	Data terminal is ready
5	SG	–	Signal ground
6	DSR	Input	Data device is ready
7	RTS	Output	Request transmission
8	CTS	Input	Allow transmission
9	FG	–	Frame ground

Appendix 5.1.1 printer signal and status

2. Wiring Diagram

PC --------- Printer
TXD -------- RXD
RXD -------- TXD
CTS -------- RTS
RTS -------- CTS
SG --------- SG

Important:

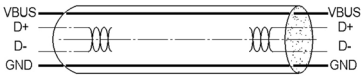
The following connection method can be used with only 3 pcs of wire. This method is suitable for small data amount or XON/XOFF flow control:

PC --------- Printer
TXD -------- RXD
RXD -------- TXD
SG --------- SG

Appendix 5.2 USB Interface

USB interface meets USB 2.0 protocol standard and the connector (at the printer terminal) is USB series B socket.

USB interface transmits signal and power via a four–wire cable, as shown in the following figure:



Appendix figure 5.2.1 USB cable

Wire D+ and D- in appendix figure 5.2.1 are used for signal transmission, the VBUS is +5V.

Appendix 6 Guidance and Manufacturer's Declaration – Electromagnetic Emissions

- The device needs special EMC precautions and must be installed and started according to the EMC information supplied in this manual.
- Portable and mobile RF communications equipment could affect the device. For example mobile phones can affect the device. Avoid placing a mobile phone in direct proximity to the device.
- Important: The use of accessories, other than those recommended by the manufacturer, may result in stronger emissions or reduce the immunity of the device.
- Important: The device should not be used beside or stacked on top of any other equipment. If you must use it side by side or on top of another system, you should check that the device works properly in the chosen configuration.
- Meeting the emissions levels shown in the first table is considered to be essential performance of the device.

GUIDANCE AND MANUFACTURER'S DECLARATION –ELECTROMAGNETIC EMISSIONS		
The device is intended for use in the electromagnetic environment specified below. The customer or user of the device should assure that it is used in such an environment		
Emissions test	**Compliance**	**Electromagnetic environment - guide**
RF emissions CISPR 11	Group 1	The device uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The device is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes. Suitable for use in all establishments, specifically in commercial, industrial settings.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ emission oscillations IEC 61000-3-3	Complies	

GUIDANCE AND MANUFACTURER'S DECLARATION –ELECTROMAGNETIC IMMUNITY			
The device is intended for use in the electromagnetic environment specified below. The customer or user of the device should assure that it is used in such an environment			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - recommendations**
Electrostatic discharge (DES) CEI 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/ output lines	±2 kV for power supply lines ±1 kV for input/ output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5 % U_T (>95 % dip in U_T) for 0.5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles <5 % U_T (>95 % dip in U_T) for 5 sec	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the device requires continued operation during power mains interruptions, it is recommended that the device be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A / m	3 A / m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE U_T is the a.c. mains voltage prior to application of the test level.			

GUIDANCE AND MANUFACTURER'S DECLARATION –ELECTROMAGNETIC IMMUNITY

The device is intended for use in the electromagnetic environment specified below. The customer or the user of the device should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - recommendations
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	Portable and mobile RF communication equipment should be used no closer to any part of the device, including cables, than recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distances** d = 1.2 $\sqrt{P}$ d = 1.2 $\sqrt{P}$ 80 MHz to 800 MHz d = 2.3 $\sqrt{P}$ 800 MHz to 2.5 GHz where *P* is the maximum output power of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey [a] should be less than the compliance level in each frequency range [b]. Interference may occur in the vicinity of equipment marked with the following symbol: 
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	

NOTE 1 At 80 MHz and at 800 MHz ,the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the device is used exceeds the applicable RF compliance level above, the device should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the device.

[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 1 V/m.

RECOMMENDED SEPARATION DISTANCES BETWEEN PORTABLE AND MOBILE RF COMMUNICATIONS EQUIPMENT AND THE STIMULATOR DEVICE

The device is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the device can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the device as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	**Separation distances according to frequency of the transmitter** m		
	150 kHz to 80 MHz $d = 1.2 \sqrt{P}$	**80 kHz to 800 MHz** $d = 1.2 \sqrt{P}$	**800 MHz to 2.5 GHz** $d = 2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.20	1.20	2.30
10	3.79	3.79	7.27
100	12.00	12.00	23.00

For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is modified by absorption and reflection from structures, objects and people.

Glossary of Terms and Symbols

ESD: Electrostatic Discharge

LED: Light Emitting Diode

USB: Universal Serial Bus

Symbol	Definition
	Authorized Representative in the European Community
	Catalog Number
	Caution
	CD of Multi-language User Guide
	CE Mark
	Consult instructions for use
	Direct Current
	FCC certification mark
	GS certification mark
	Manufacturer
	Serial Number
	Thermal element
	UL certification mark
	VCCI assurance symbol for electromagnetic disturbance emission level
	Waste Electrical & Electronic Equipment

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Revision History

B	Update part numbers and Symbols to match applicable standards Update Latin America contact information

Declaration

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