USER'S MANUAL

Embedded Printer

BK-L216II

Shandong New Beiyang Information Technology Co., Ltd.

Declaration

Information in this document is subject to change without notice. SHANDONG NEW BEIYANG INFORMATION TECHNOLOGY CO., LTD. (hereinafter referred to as "SNBC") reserves the right to improve products as new technology, components, software, and firmware become available. If users need further data about these products, please feel free to contact our market department or our local distributor.

Copyright

Version: 1.0

Trademarks

Our registered trademark is SNBC® BEIYANG®

Marks means

	Warning	Items shall be strictly followed to avoid injury or damage to body and equipment.
	Caution	Items with important information and prompts for operating the printer.
	Heating	The print head is a thermal element, please do not touch it and its peripherals for safety reasons.
	Warning	To prevent damage caused from static electricity, do not touch either its printing part or connecting parts.

The quality control system of SNBC has been approved by the following certification.

(DNV)ISO9001:2000

BK-L216II printer has been also approved by the environmental management system as below:

(DNV)ISO14001:2004

Warning !

This is class A product. In domestic environment this may cause radio interference in which case the user may be required to take adequate measures.

Contact us

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Safety Instructions

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

- Install the printer in a flat and stable place.
- Reserve adequate space around the printer so that the operation and maintenance can be performed conveniently.
- Keep the printer far away from water source.
- Do not use or store the printer in a place exposed to heat of fire, moisture and serious pollution and do not expose the printer to direct sunlight, strong light and heater.
- Do not place the printer in a place exposed to vibration and impact.
- No dew condensation is allowed to the printer. In case of such condensation, do not turn on the power until it has completely gone away.
- Connect the DC adapter to an appropriate grounding outlet. Avoid sharing one electrical outlet with large power motors and other devices that may cause the fluctuation of voltage.
- Disconnect the DC adapter when the printer is deemed to idle for a long time.
- Don't spill water or other electric materials into the printer. In case this happens, turn off the power immediately.
- Do not allow the printer to start printing when there is no recording paper installed, otherwise the print head and platen roller will be damaged.
- To ensure quality print and normal lifetime, use recommended paper or its equivalent.
- Shut down the printer when connecting or disconnecting interfaces connectors 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.
- Do not disassemble the printer without permission of a technician, even for repairing purpose.
- Keep this manual carefully in hand for usage and reference.

CONTENT

1. General description

1.1 Introduction

BK-L216II is a high performance thermal printer with cutter and presenter as optional and can accept up to 203mm (Outer diameter) paper rolls. The maximum print width is 216mm. It can be widely used in Kiosk applications like data communication terminal, test instrument terminal and information consulting terminal etc.

BK-L216II consists of the following modules.

- Thermal printing unit
- Presenter (optional or with paper out path structure)
- Paper holder (optional, or not configured)
- Control board
- Cutter

According to different paper roll installation mode, BK-L216II has models in horizontal and vertical structures for customers to select. BK-L216II can be connected with other devices by serial interface and parallel interface, or serial interface and USB interface. Drivers are available for Win95/98/NT4.0/2000/XP/LINUX. BK-L216II could be operated and maintained very easily.

1.2 Main features

- **Printing**
  - ✧ High-speed printing
  - ✧ Thermal print with low noise
  - ✧ High reliability
- **Presenter**
  - ✧ Accommodate and present printout
  - ✧ Retract printout after waiting time
  - ✧ Hold printout for user to take away
- **Applications**
  - ✧ Character processing: 1-6 times enlargement vertically and horizontally, Rotation (0^0, 90^0, 180^0, 270^0), white/black reverse, underline, inverse;
  - ✧ Barcode printing is Barcode printing is available by using a bar code command. Barcodes can be printed both in the vertical direction and in the horizontal direction.
  - ✧ Character font size (font A or font B) can be selected via a command.
- **Printer maintenance**
  - ✧ Easy paper roll loading
  - ✧ Easy Print head cleaning
  - ✧ Various features and parameters can be selected by using a software tool
  - ✧ Auto paper cutting
  - ✧ Semi-automatic paper loading
  - ✧ Mark identification and checkout
  - ✧ Updating firmware online

2. Specifications

2.1 Technical Specifications

<table>
<tr><th colspan="2" rowspan="2">Items</th><th colspan="3">Parameter</th></tr>
<tr><th colspan="2">203dpi Model</th><th>300dpi Model</th></tr>
<tr><td rowspan="13"></td><td>Print method</td><td colspan="3">Direct thermal line</td></tr>
<tr><td>Resolution</td><td colspan="2">203dpi</td><td>300dpi</td></tr>
<tr><td>Paper Length</td><td colspan="2">210mm-216mm</td><td>210mm-216mm</td></tr>
<tr><td rowspan="2">Print Width</td><td colspan="2">Max.216mm （8.5 "）</td><td>Max.216mm （8.5 "）</td></tr>
<tr><td colspan="2">Max.1728 点</td><td>Max.2560 点</td></tr>
<tr><td rowspan="2">Print height</td><td>Standard mode</td><td colspan="2">Max: 1000mm
Min: 82.5mm</td></tr>
<tr><td>Special mode</td><td colspan="2">Max: 1000mm
Min: A4/3 (82.5mm)</td></tr>
<tr><td>Print speed</td><td colspan="2">Max.125mm/s</td><td>Max.100mm/s</td></tr>
<tr><td>RAM memory</td><td colspan="3">SRAM: 8MB</td></tr>
<tr><td>Flash memory</td><td colspan="3">1MB/2MB/4MB</td></tr>
<tr><td>Print head temperature detecting</td><td colspan="3">Thermal resistor</td></tr>
<tr><td>Print head position detecting</td><td colspan="3">Micro switch</td></tr>
<tr><td>Paper / mark detecting</td><td colspan="3">Photoelectrical Sensor</td></tr>
<tr><td>Paper near end detecting</td><td colspan="3">Photoelectrical Sensor</td></tr>
<tr><td>Interface</td><td colspan="3">RS-232，Centronics（optional），USB（optional）</td></tr>
<tr><td rowspan="4">Barcodes

Fonts

Graphics</td><td>Barcode</td><td colspan="3">CODE128，ITF ，UPC-A，UPC-E，EAN13
EAN8 ，CODE39，CODE93， CODABAR, PDF417</td></tr>
<tr><td rowspan="2">Fonts</td><td>English font 0: 12×24
English font 1: 9×17
Big font: 24X24</td><td colspan="2">English font 0: 18×34
English font : 13×24
Big font: 36 X36</td></tr>
<tr><td colspan="3">Big Font（optional） （Simplified Chinese GB2312, traditional Chinese GB18030, Japanese, Korean）</td></tr>
<tr><td>Fonts Process</td><td colspan="3">All fonts can be enlarged 1 to 6 times vertically and horizontally respectively ;Rotation Print（0^0, 90^0, 180^0, 270^0）
Bold, white/black reverse, Underline.</td></tr>
<tr><td>Graphics</td><td colspan="3">Support BMP bit Image download to RAM or FLASH
Support direct BMP Print</td></tr>
<tr><td rowspan="5">Medium</td><td>Paper type</td><td colspan="3">Continuous paper / marked paper / folded Paper</td></tr>
<tr><td>Paper roll OD</td><td colspan="3">Max.203mm</td></tr>
<tr><td>Paper roll ID</td><td colspan="3">Optional: 25.4mm or ≥50mm</td></tr>
<tr><td>Thickness</td><td colspan="3">60~100 um</td></tr>
<tr><td>Thermal surface</td><td colspan="3">Outer side</td></tr>
</table>

Items		Parameter	
		203dpi Model	300dpi Model
Power	Input voltage	AC 220V±5%, 50/60Hz	
	Output voltage	DC 24V, 2.5A	
PRESENTER	Paper out speed	≥400mm/s	
	Paper retracting speed	≥400mm/s	
	Function modes	Retraction/Hold/Commands control/close	
Reliability	Print head lifetime	≥100Km	
	Cutter lifetime	≥500,000 (paper thickness:0.08mm)	
	MTBF	360,000 hours	
Environment	Operation Environment	5°C to 45°C, 20% to 90% RH (40°C)	
	Storage Environment	-40°C to 60°C, 20% to 93% RH (40°C)	
Physics Character	Dimensions	212(L) ×294(W)×97(H)	
	Weight	About 3.8Kg (without paper roll and paper holder)	

Table 2.1.1 Technical specifications

Note:

- DPI: Dots for each inch in printing (one inch equals to 25.4mm);
- Character s space can be adjusted by **ESC SP**;
- Real print speed is related to the conditions as data transmission speed, print darkness, print duty ratio, commands used and supply voltage

2.2 Paper Specifications

- Paper type : Continuous paper /marked paper
- Paper supply Method : Paper roll/ Folded paper
- Paper width : 210mm –216mm
- Paper thickness : 60μm-100μm
- Thermal layer : Outer side of the roll
- Paper roll specification
  : 50mm (inner dimension of standard core)
  : 25.4mm or ≥50mm (inner dimension of optional core)
  :203mm (maximum paper outer dimension)
- Recommended paper:

➢ **Continuous paper specification**

Paper type	Manufacturer
TF50KS-E2C,TF50KS-E	Nippon Paper Industries Co., Ltd
F70NA	FUJI PHOTO FILM Co., Ltd
F240AC/F220-VP,FV230A1,PA220AG,HP220A	Mitsubishi Paper Mill Co., Ltd.
PD150R,PD160R	OJI Paper Co.,Ltd.
F5041，F5051，P5045，P5055	Mitsubishi HitTec Paper Flensburg GmbH

Table 2.2.1 Printer recommended paper

➢ **Marked paper specification**

In marked paper mode, the printer determines cut position by referencing black mark position. Detailed paper should meet the following requirement besides that of standard paper:

Mark length L1: 20mm ≤ L1

Mark height L2: 4mm ≤ L2 ≤ 8 mm

Space between two near Marks L3: 82.5mm ≤ L3 ≤ 305mm

Mark position on paper: Right, middle or left side on non-thermal sensitive surface of paper.

Reflectivity: The reflectivity of black mark shall be less than 15% while the paper itself reflectivity shall exceeds 85%. There shall be no any patterns or add items on the area between black marks, such as advertisement, figure and so on.

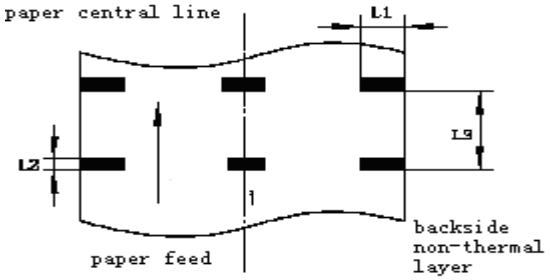


Figure 2.2.1 Mark position sketch map

Notes：

- Mark height can be set by adjusting printer configuration.
- The paper path has three positions selectable for black mark sensor installation. Only one sensor is mounted on the right side of the paper path(default) when the printer is delivered（Paper feeding direction）.
- When the printer is in motionless status, it does not detect any black marks. Therefore, if the paper is pulled away from it compulsorily, the printer gives no alarm of paper end. This feature design assures that the printer does not alarm paper end errors when a black mark stops on paper near end sensor of the printer.

➢ **Folded paper specification**

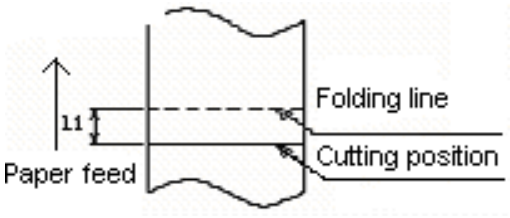


Figure 2.2.2 Relations between folding line position and cutting position

- When using folded paper, make sure to keep the folding line outside of the printing area to avoid paper jammed.
- It is recommended to set the cutting position 0.5 to 2mm below the folding line (reverse to feeding paper direction) to prevent paper jam.
- Refer to continuous and marked paper specification to decide the position relation between folding line and black mark.

Notice:

- Please use the recommended paper or its equivalents. Using other types of paper may affect print quality and reduce the print head lifetime.
- Do not paste the paper to the shaft core.
- If the paper comes in contact with chemical or oil, it may discolour or be less heat sensitive, which will greatly affect the print quality.
- Do not rub the paper surface with a nail or hard metal. Otherwise it may discolour.
- When the temperature goes up to 70 degrees, paper will discolour. So please be careful to the effect of temperature, humidity and sunlight in environment.

3. Structure and functions

3.1 Appearance

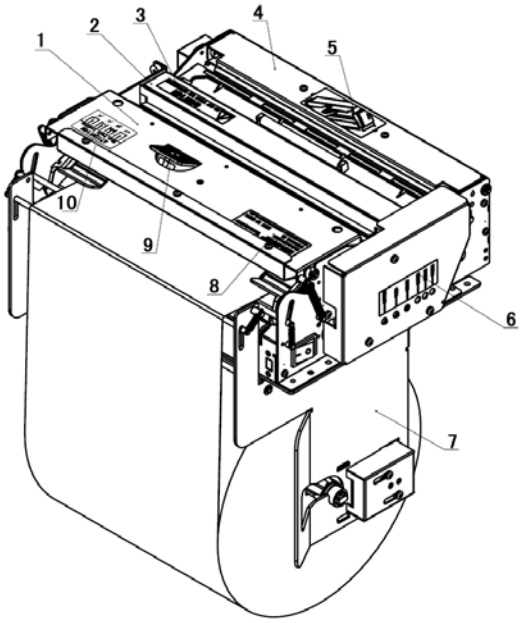


Figure 3.1.1 Vertical structure

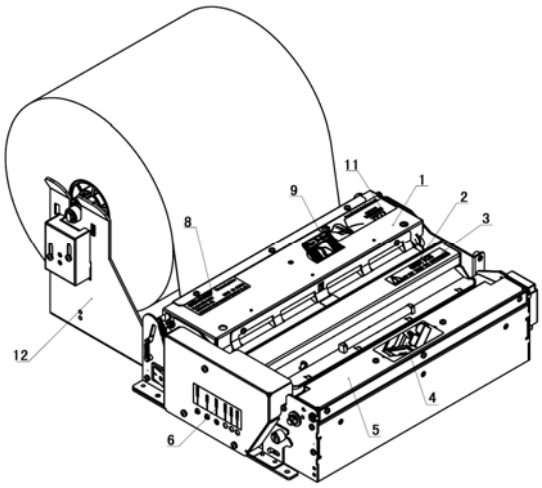


Figure 3.1.2 Horizontal structure

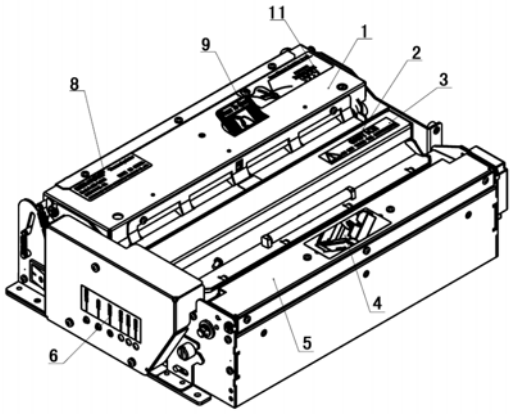


Figure 3.1.3 Structure without paper holder

1----------Print unit
2----------Cutter
3----------Cutter label
4----------Presenter upper cover open label
5----------Presenter
6----------Button
7----------Paper holder (for vertical structure only)
8----------Product Label
9----------Print head cover open label
10---------- Paper feed label (for vertical structure only)
11----------Paper feed label (for horizontal structure and without paper holder type)
12----------Paper holder (for horizontal structure only)

3.2 External Dimension

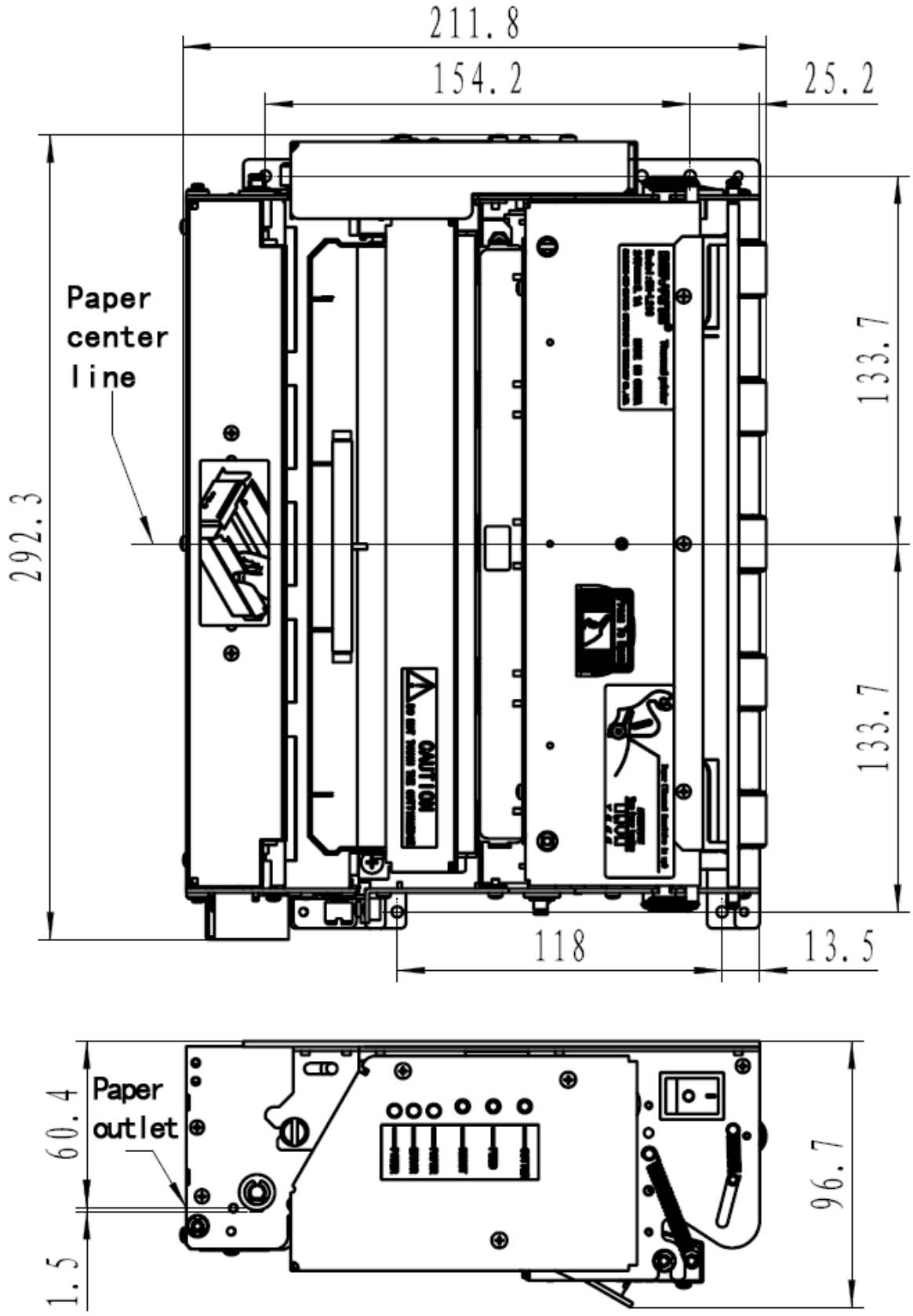


Figure3.2.1 Dimension without paper holder (212*294*96.7mm)

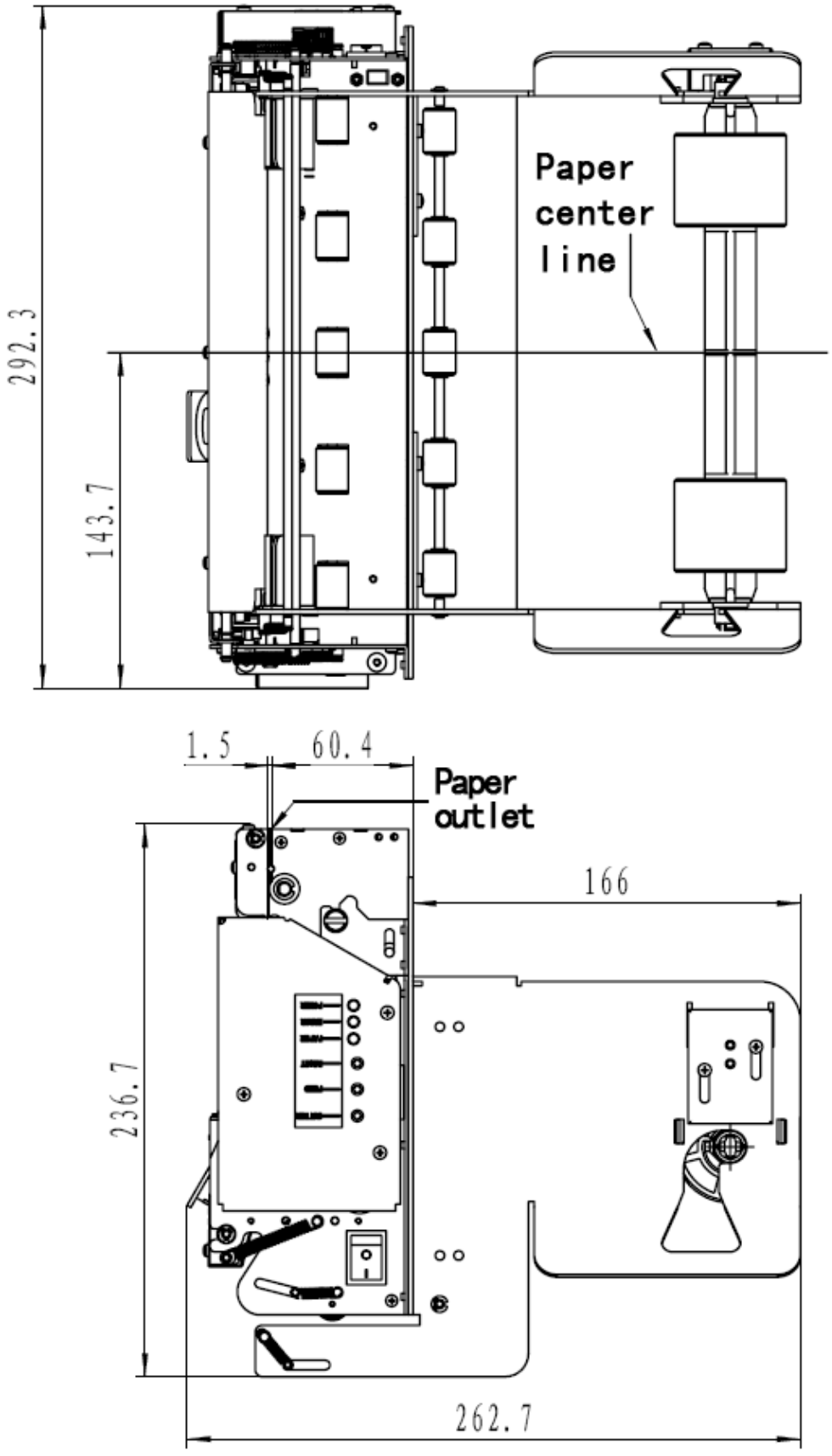


Figure 3.2.2 Dimension of vertical structure (237*293*263mm)

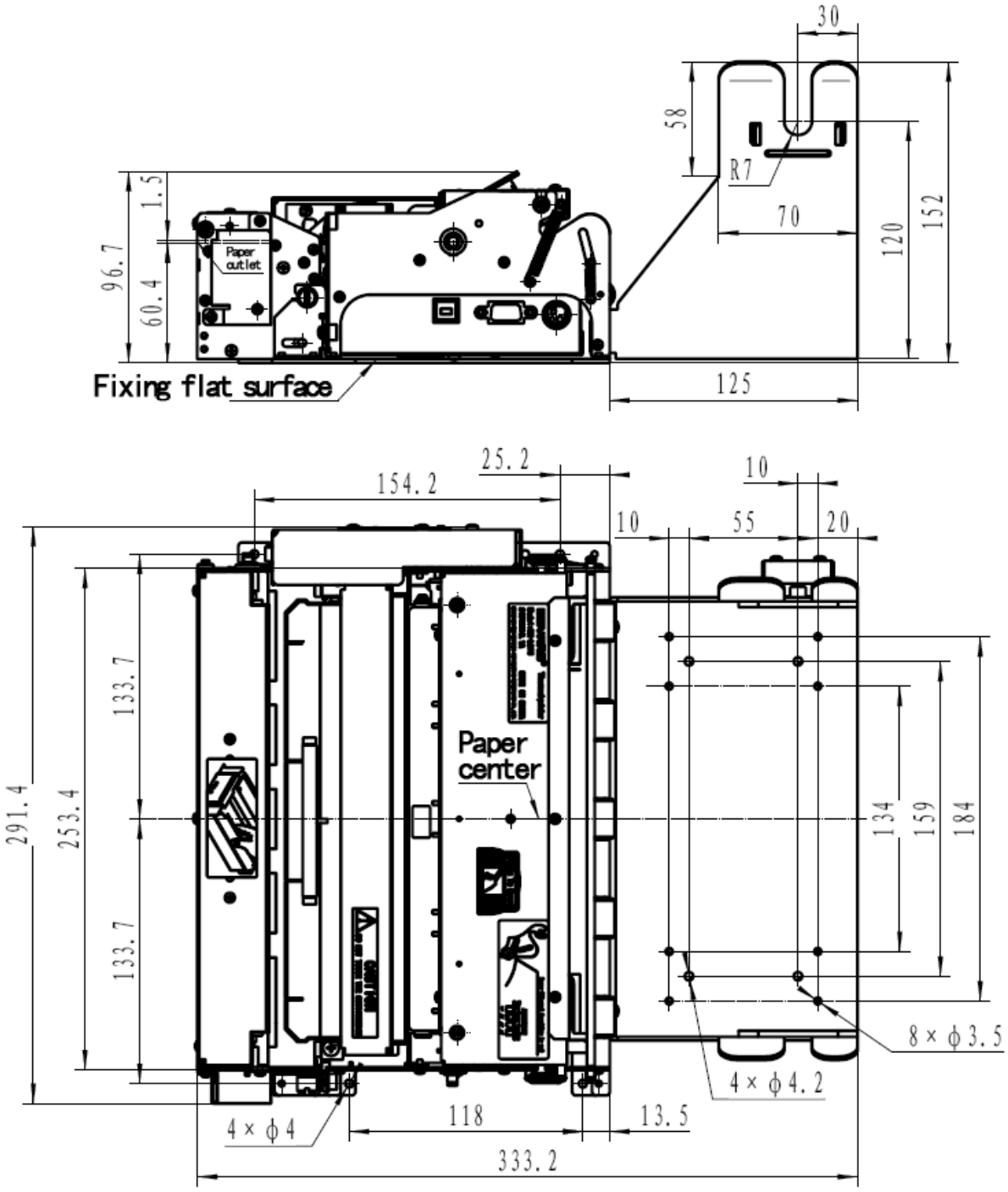


Figure 3.2.3 Dimension of horizontal paper holder (335*294*150mm)

3.3 Printer mechanism

3.3.1 Printer mechanism module appearance (without paper holder)

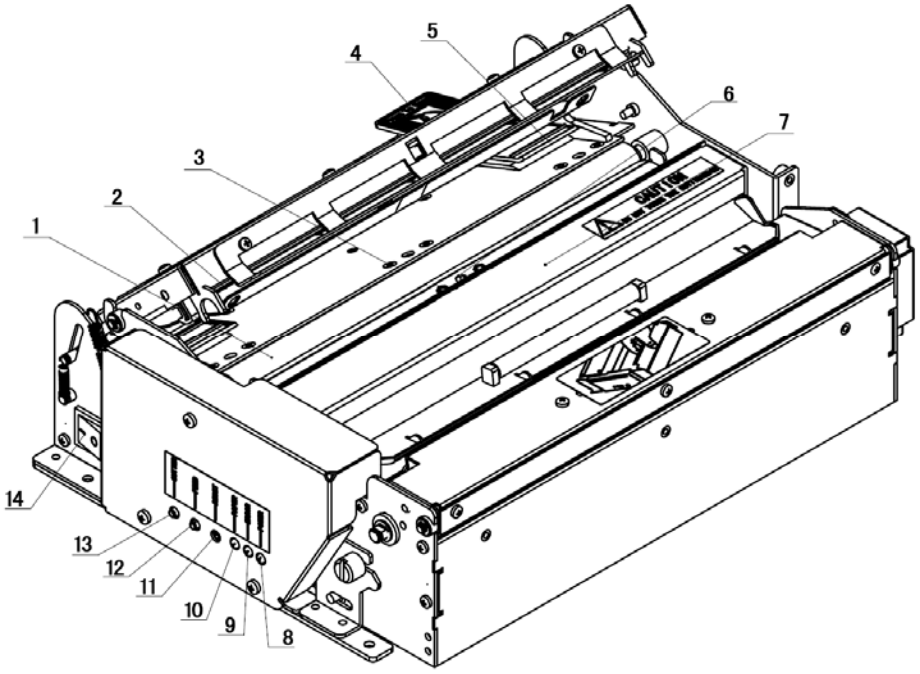


Figure 3.3.1 Printing mechanism

1 —Print platen	6 —Paper load sensor	11－Reset button
2 —Print head	7 —Cutter	12－Feed button
3 —Paper sensor	8 —Power LED（Green）	13－Cut button
4 —Pressing plate	9 —Alert LED（Red）	14－Power switch
5 —Paper guide module	10－Paper end LED（Red）	

3.3.2 Printer mechanism module explanation

1. **Paper sensor --**Detect whether there is paper.
2. **Pressing plate for opening cover –**When users press down this plate, the print head could be opened automatically;
3. **Paper guide module –**It is the path before the printing shown as Fig. 3.3.1 and Fig.3.3.2. The paper guide module has two parts which can move to right or left so that users could adjust it until the paper lies in the middle of the print head. Left and right positioning parts can support the paper width from 210 to 216mm;

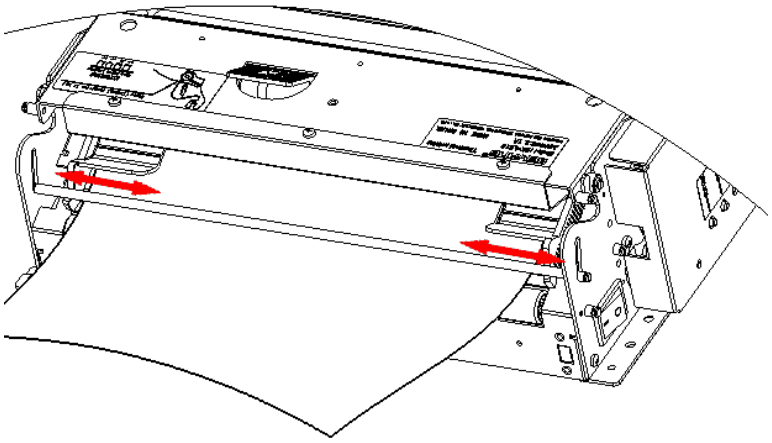


Figure 3.3.2 Paper guide module

4. **Paper loading sensor --**Detect the position of the front end of paper.
5. **Cutter –**Execute auto-cut function;
6. **Power LED (Green) --**To indicate whether the power is on and it lights all the time when the power is turned on;
7. **Alert LED –**Indicate all status of print. In normal conditions Alert LED is off; In error status (such as paper end) Alert LED blinks;
8. **Paper end LED --**When the printer is in paper end status, this LED blinks; If paper is available, Paper End LED is off;
9. **Reset button –**When pressing down this button, the printer shall execute its reset automatically and clear the print data in the printers.
10. **FEED button** --Under normal status (no error), press to feed paper. Keep pressing for continuous paper feeding. Turn on the power while pressing this button for one second to print self test page.Content in self test page changes with the configuration of the printer.

    Note: make sure that there is paper in the printer and the print head is not uplifted before starting self test page.

    （For self test page , please refer to Appendix 1 printer self test page）
11. **Error LED (Red) --**This LED is used to indicate different status of the printer. Normally, it isn't light. When errors happen (for example, paper end), it will flash to give alarms.
12. **CUT button** --Press to cut paper under any circumstances (even the printer has errors);
13. **Power LED (Green) –**To press down "O" can turn off the power; To press down "—" turn on the power;

3.4 Presenter module

3.4.1 Appearance

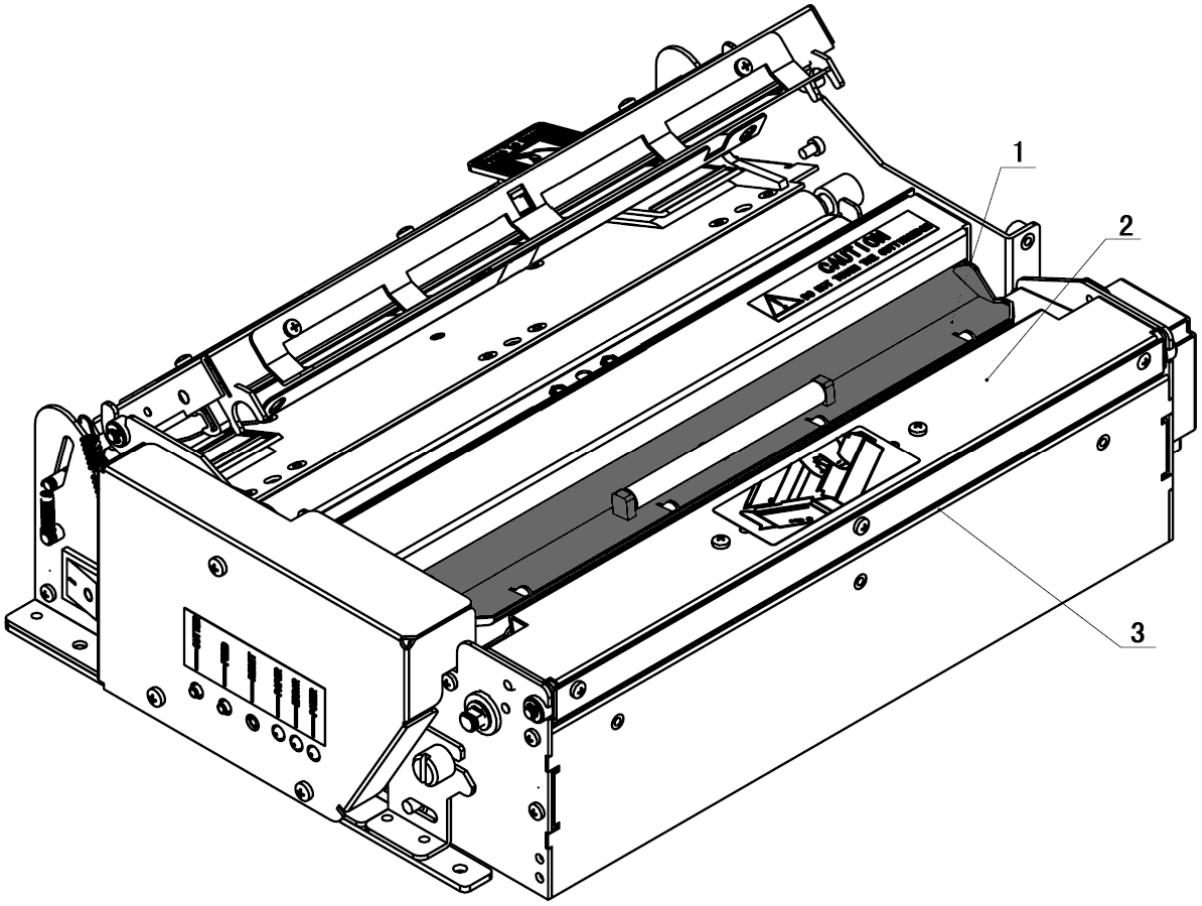


Figure 3.4.1 Presenter appearance

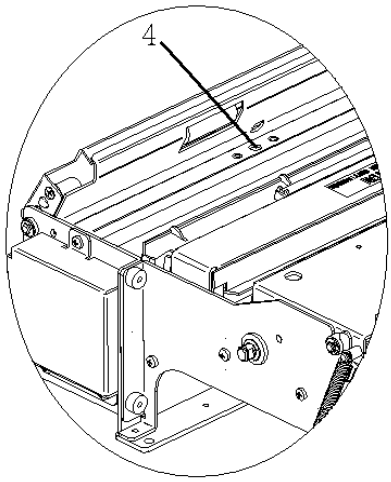


Figure 3.4.2 Paper out sensor

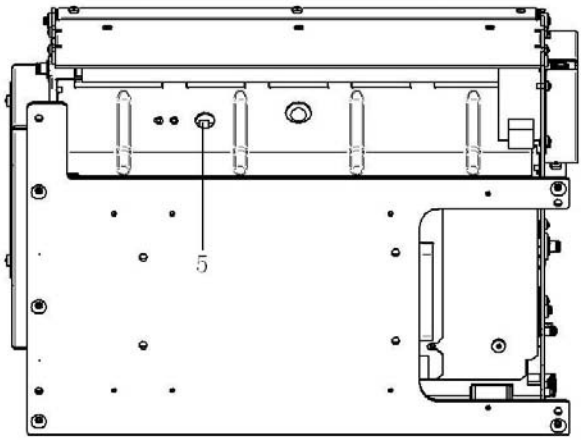


Figure 3.4.3 Retraction sensor

1.--- Presenter turning board

2.--- Presenter module

3.--- Paper path in presenter

4.--- Paper out sensor

5.--- PrstIn sensor(optional)

3.4.2 Presenter parts explanation

Paper out sensor: to detect paper status

PrstIn sensor(optional): to detect whether paper retracted.

Caution : Paper sensor may be ineffective due to the direct irradiation of sunlight, blazing light and heat source.

3.5 Paper holder

3.5.1 Paper holder appearance

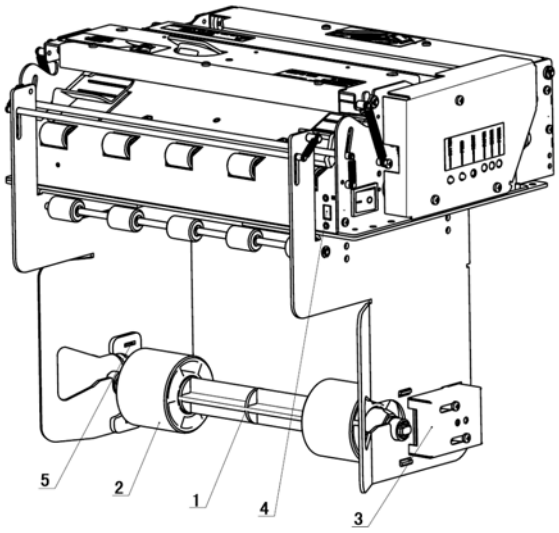


Figure 3.5.1 Vertical paper roll holder appearance

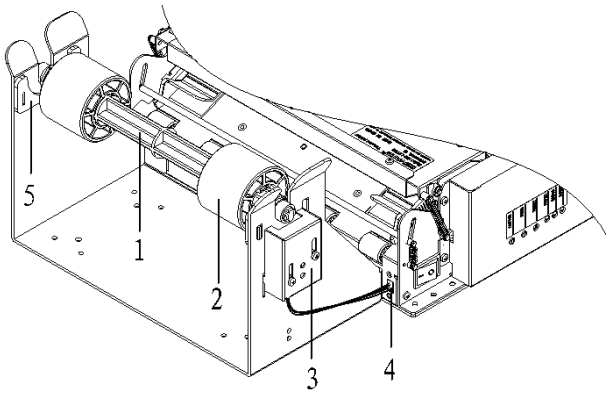


Figure 3.5.2 Horizontal paper roll holder appearance

1-Paper roll shaft

2-Paper roll support

3-Paper near end sensor

4-Paper near end sensor inter-connective socket

5-Paper roll locating block (each one on the left and right)

3.5.2 Paper holder module explanation

1) **Paper near end sensor**

① User may check paper status by sending inquiring command (refer to "command set" for details) to the printer.

② Users can adjust the position of paper near end sensor to control the amount of remaining paper according to different paper roll diameter (see figure 3.5.1 and 3.5.2). To adjust the sensor, please loose those two fixing screws and move the positioning board up or down to the right position along the slide track then tighten the screws.

2) **Paper roll shaft**

Paper roll support (2) is needed when a paper roll with a 50 mm ID is used. For paper roll with 25mm ID, use only the paper roll shaft (1).

3) **Paper roll-locating block**

Fix paper roll position fixing piece on paper holder only when using a 210mm wide paper roll. For 216mm wide paper, please remove the paper roll-locating block.

Caution

When you fix or remove paper roll-locating block, you should adjust both left and right paper guide modules (refer to 5 in 3.3.1 printer mechanism module appearance) at the same time to match with different paper width.

3.6 Interface

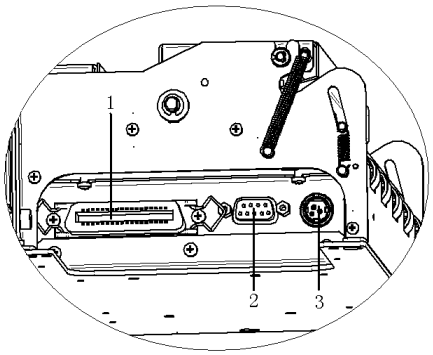


Figure 3.6.1 Parallel interface model

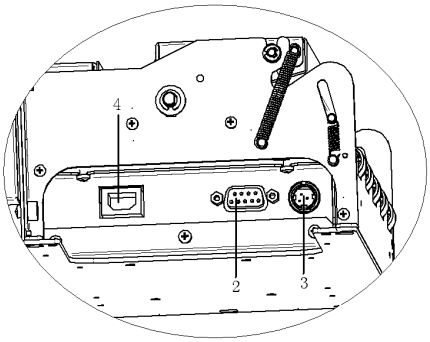


Figure 3.6.2 USB interface model

1.--- Centronics (parallel interface)

2.--- RS-232

3.--- Power socket

4.--- USB interface

Notice: Only one kind of interface between parallel and USB can be configured in one printer.

4. Installation and suggestion

4.1 Unpacking

Open the carton and all packing materials, and check whether all items in the packing list are short or damaged. In case of damages or missing items, please contact your dealer or the manufacture for assistance.

4.2 Assembling the printer（for vertical and horizontal type）

For safety purpose, print mechanism and paper holder should be packed separately in transport. Before getting the printer into use, please reassemble them according to the following figures.

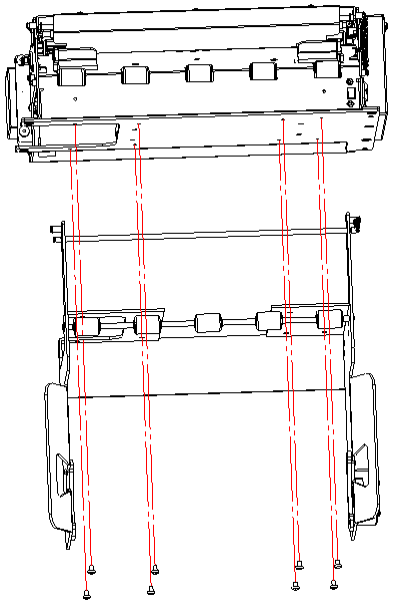


Figure 4.1 Vertical type

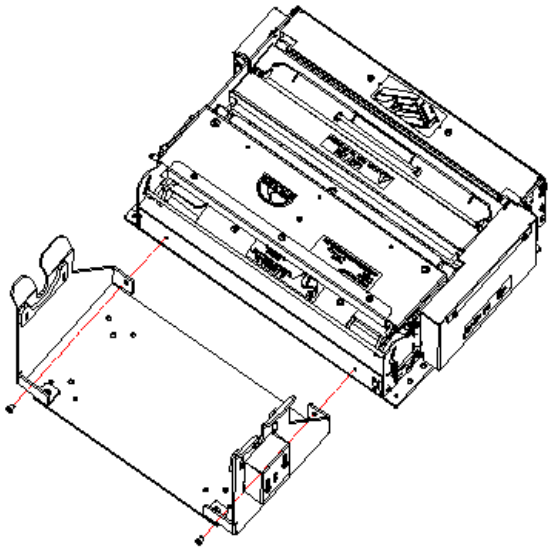


Figure 4.2 Horizontal type

Notice:

Make sure to plug paper near end sensor pin into its inter-connective socket. (For socket position, please refer to 3.5.1 paper holder appearance)

4.3 Connecting the grounding wire

To ensure that the printer has a nice grounding status, please follow figures below to connect the grounding wire.

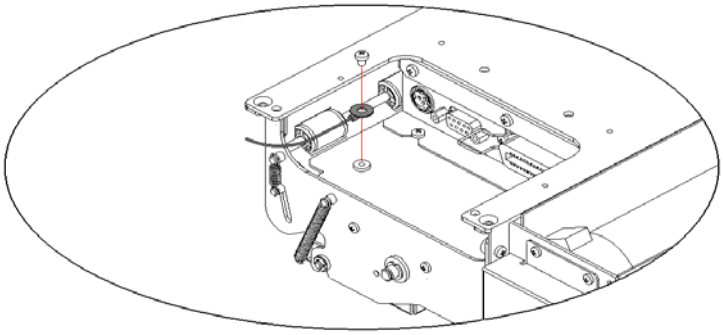


Figure 4.3 connecting the ground wire

4.4 Connecting the AC power adapter

1) Make sure the printer is turned off.
2) With the flat side of cable pin of AC adapter facing downward, plug the cable pin into the power interface on the bottom of the printer.
3) Connect the AC power cable to a nearby electrical outlet.

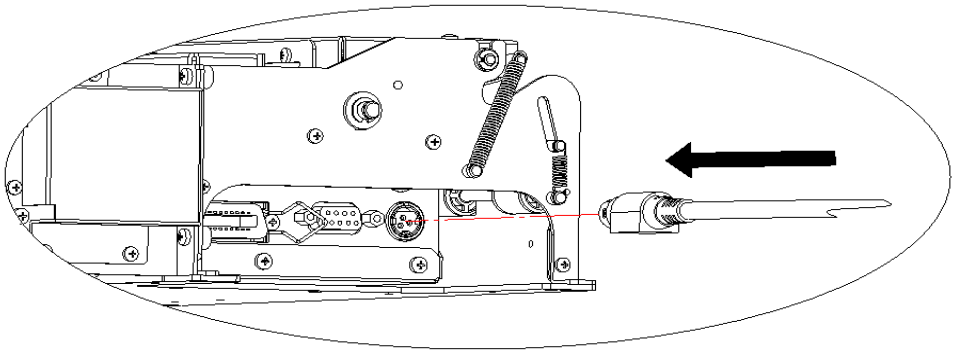


Figure4.4 Connecting AC adapter

Caution

- ✧ Use recommended power adapter or the one with the same quality.
- ✧ Connect power adapter connector at right angle between pin and socket.
- ✧ When connecting or disconnecting the cable connector of the AC adapter, always hold the connector shell and don't pull the cable forcibly.
- ✧ Avoid dragging or pulling the cable of AC adapter, otherwise the cable may be damaged or broken and a fire and electric shock may be caused accordingly.
- ✧ Avoid placing the adapter near an overheating device; otherwise the cover of the cable may melt and cause a fire or electric shock.
- ✧ If leaving the printer idle for a long time, please disconnect the power of adapter of printer.

4.5 Connecting interface cable

Make sure that the printer has been shut down, that is, sign "O" in power switch is pressed down.
Connect one end of the interface cable into a relevant interface of the printer and fix them with screws or latch springs as figure 4.5, figure 4.6 and figure 4.7.
Connect the other end of the interface cable to the computer.

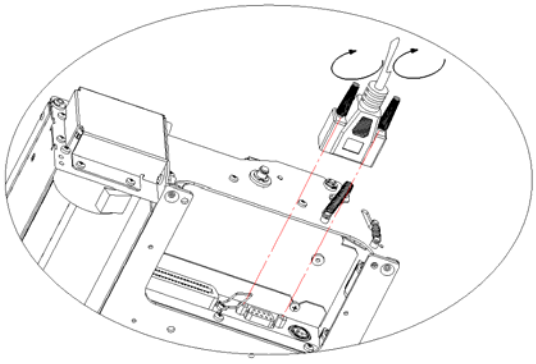


Figure 4.5.1Connecting serial interface cable

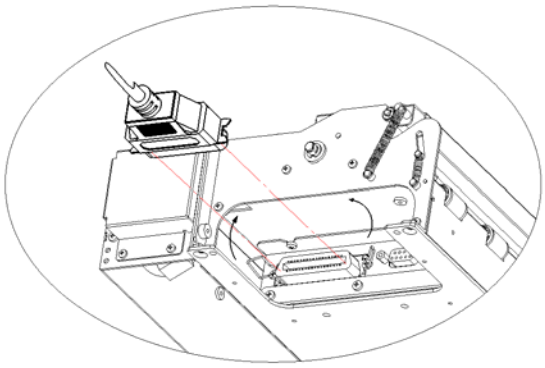


Figure 4.5.2 Connecting parallel interface cable

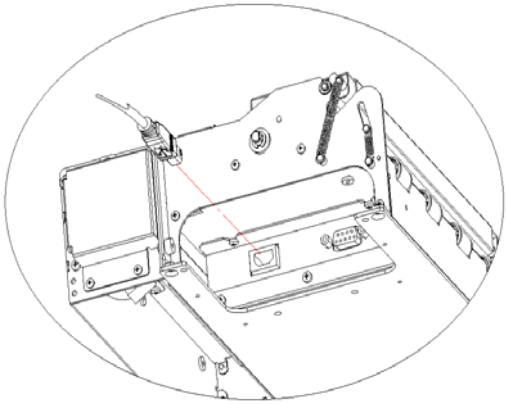


Figure 4.5.3 Connecting USB interface cable

Notice:

- Make sure the interface cable is connected in correct direction.
- When connecting serial interface cable, do not forget to tighten the fixing screws. For parallel interface cable, make sure to close the clips.
- When connect or disconnect the interface cable, make sure to hold the plug shell instead of the dragging the cable forcibly.

4.6 Loading paper roll

Before starting to load the paper roll, confirm whether the paper specifications are in conformity with printer requirements (refer to 2.2 paper specification)

4.6.1 Loading process

1) Before starting to load the paper roll, please check the paper width is 210mm to 216mm and decide whether paper roll fixing block is needed according to paper width.

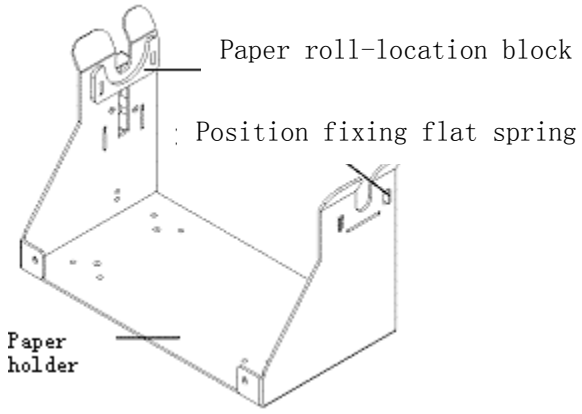
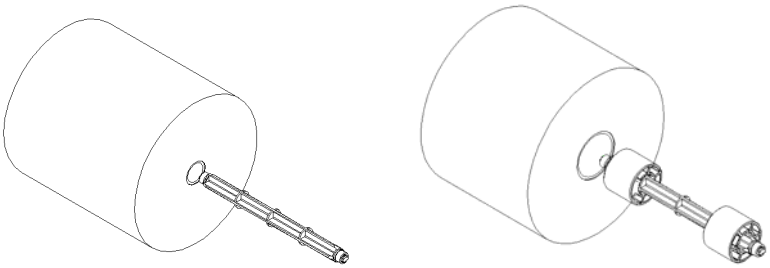


Figure 4.6.1 Paper roll location block

If the paper roll is 210mm wide, paper roll-location block is needed. To install the paper roll-location block, please latch position fixing flat spring into the holes in paper holder.

If the paper roll is 216mm wide, paper roll-location block is not needed. To remove the paper roll-location block, please move position fixing flat spring to center and get it off.

2) Insert the paper roll holding shaft into the core of the paper roll as the following figures:



Paper roll ID: 25mm Paper roll OD: 50mm

Figure 4.6.2 Explanation for installing paper roll holding shaft

3) Make sure that the paper winding direction is backward and then put the paper roll onto the paper holder.

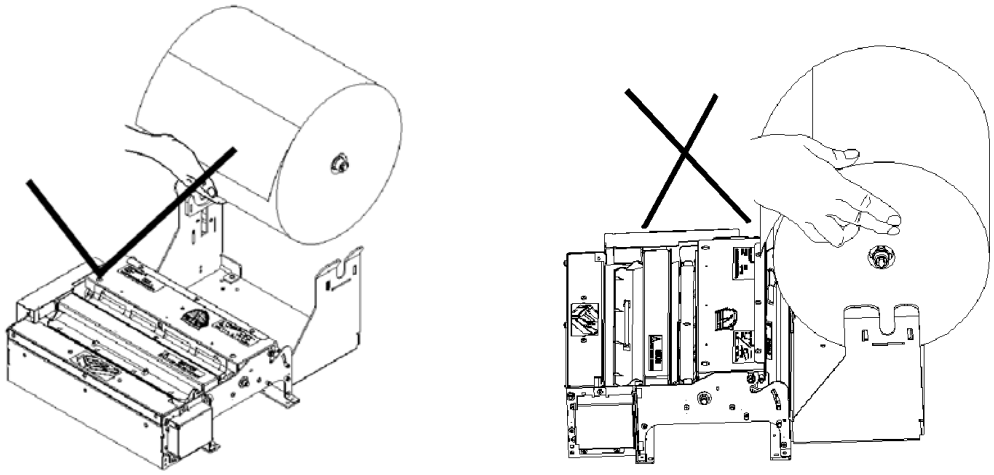


Figure 4.6.3 Explanation for loading paper roll

Note:

1) Avoid the mistaken operation not to hurt fingers.

2) Cut the paper neatly by consulting the figure below.

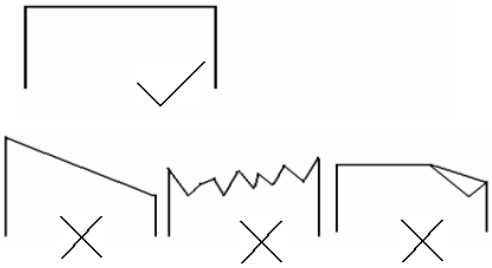


Figure 4.6.4 Paper head explanation

3) Sliding the paper guider to appropriate position (scale: 210mm or 216mm) according to paper width.

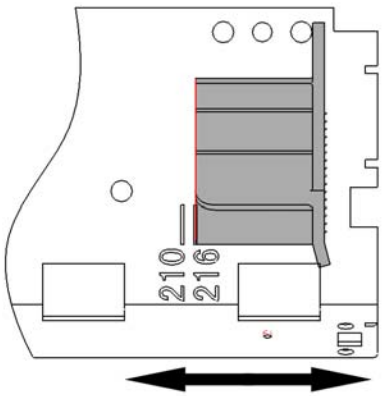


Figure 4.6.5 Adjusting paper guider explanations

4.6.2 Semi-automatic paper loading or manual paper loading

- **Semi-automatic paper loading**

  1) Turn on the power. The buzzer will beep for paper end.
  2) See the figure below, inset the front end of the paper roll smoothly through the paper feeding path and loose hands when platen roller starts running and holds the paper.
  3) The printer starts to load paper. After paper loading is finished, paper head halts at normal printing position, and then printing task can be performed.

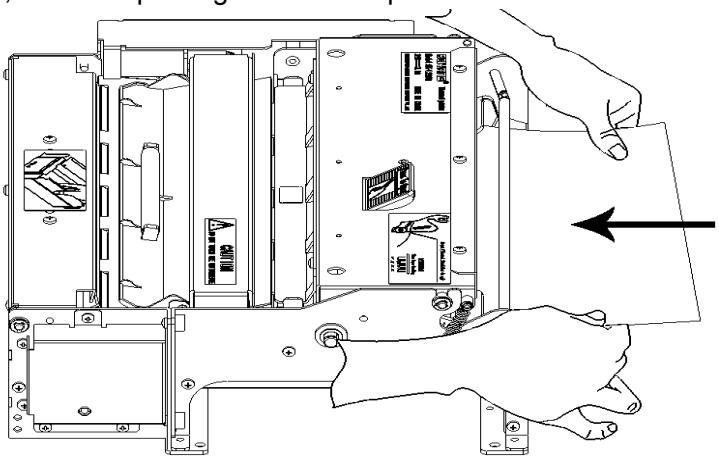


Figure 4.6.6 Semi-automatic paper loading

Notice:

- The paper head shall go through the horizontal positioning shaft (vertical structure doesn't have this shaft).
- The paper shall go through between the up and down sliding plates of paper guide.

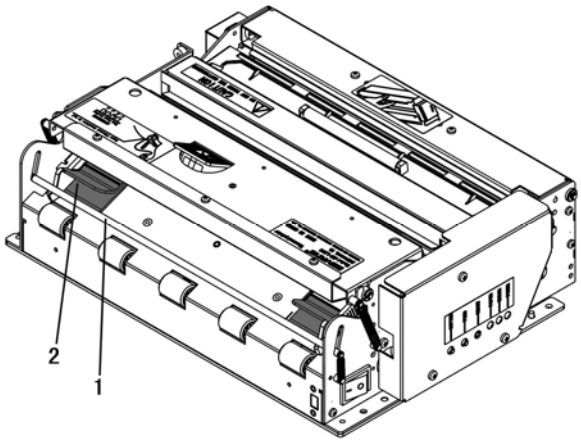


Figure 4.6.7 Paper loading explanation

1—positioning shaft (for horizontal structure only)

2—sliding plates

- **Manual paper loading**

1) Turn on the power and the buzzer will alarm paper end.

2) Press down the button on the print upper cover, and lift the print head.

3) Manually load paper as following figure, and make sure that the printing platen roller is fully covered by paper.

4) Close the print head. The printer will automatically feed paper to right position.

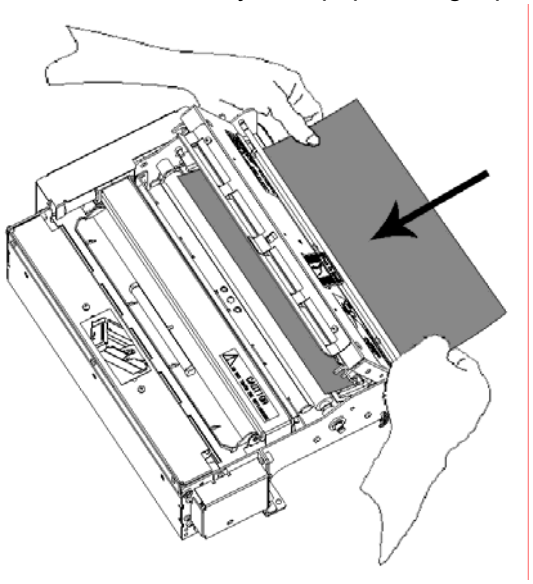


Figure 4.6.8 Manual paper loading

4.7 Installing the printer

BK-L216 printer is designed for embedded application.

1) Installation notes:

- Install the printer on a flat and stable place. Recommend to use horizontal installation. The inclination shouldn't exceed ±15°(paper feeding direction) when inclination installation is done. Inclination in other directions is strictly forbidden.
- Keep the printer far away from water source

- Do not place the printer in the place exposed to vibration and impact.
- while operating and doing routine maintenance, we suggest reserving the space as follows(figure 4.7.1, 4..7.2, 4.7.3) in order to guarantee printer working reliability and easy operation efficiently.

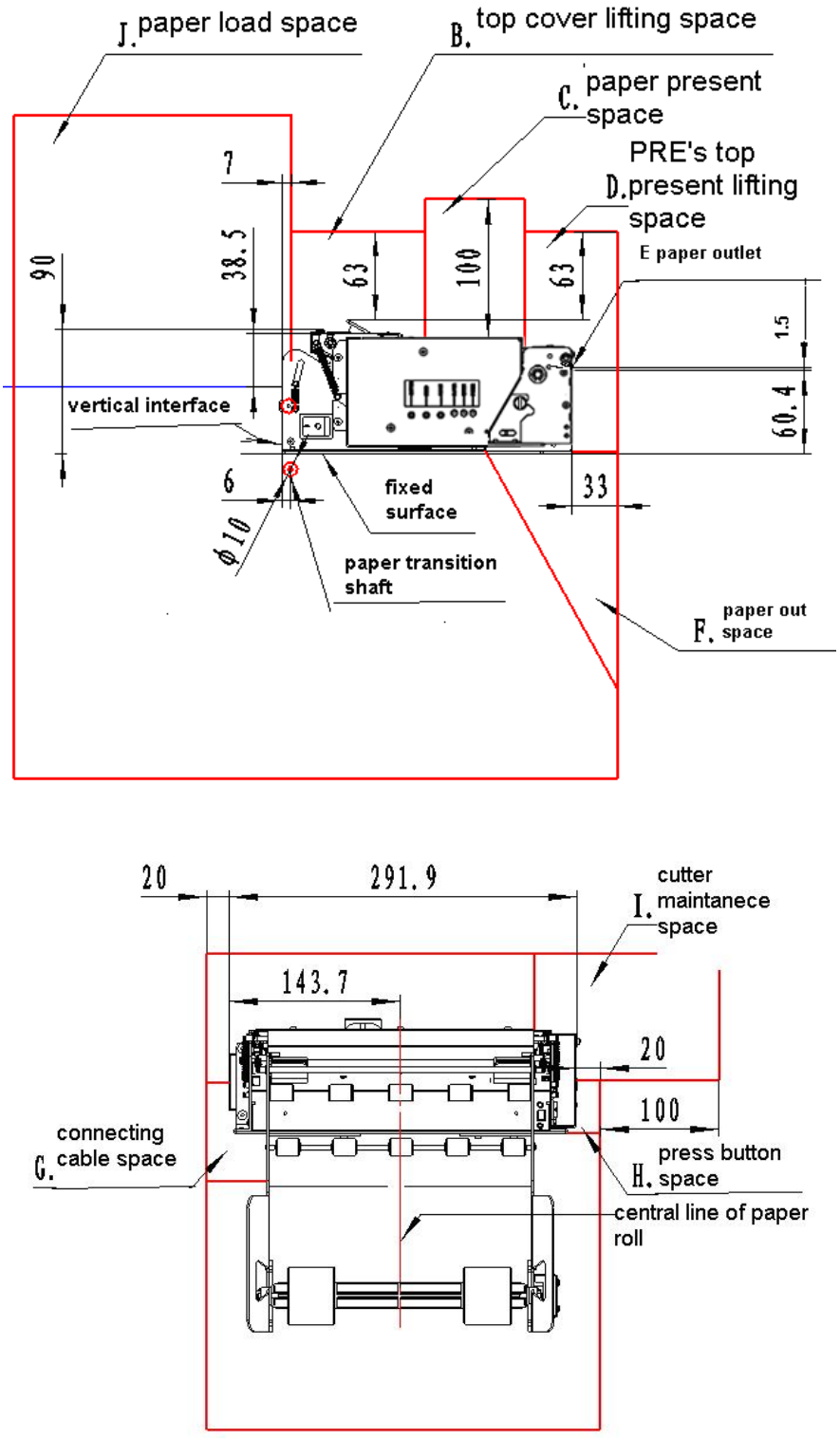


Figure 4.7.1 Vertical structure

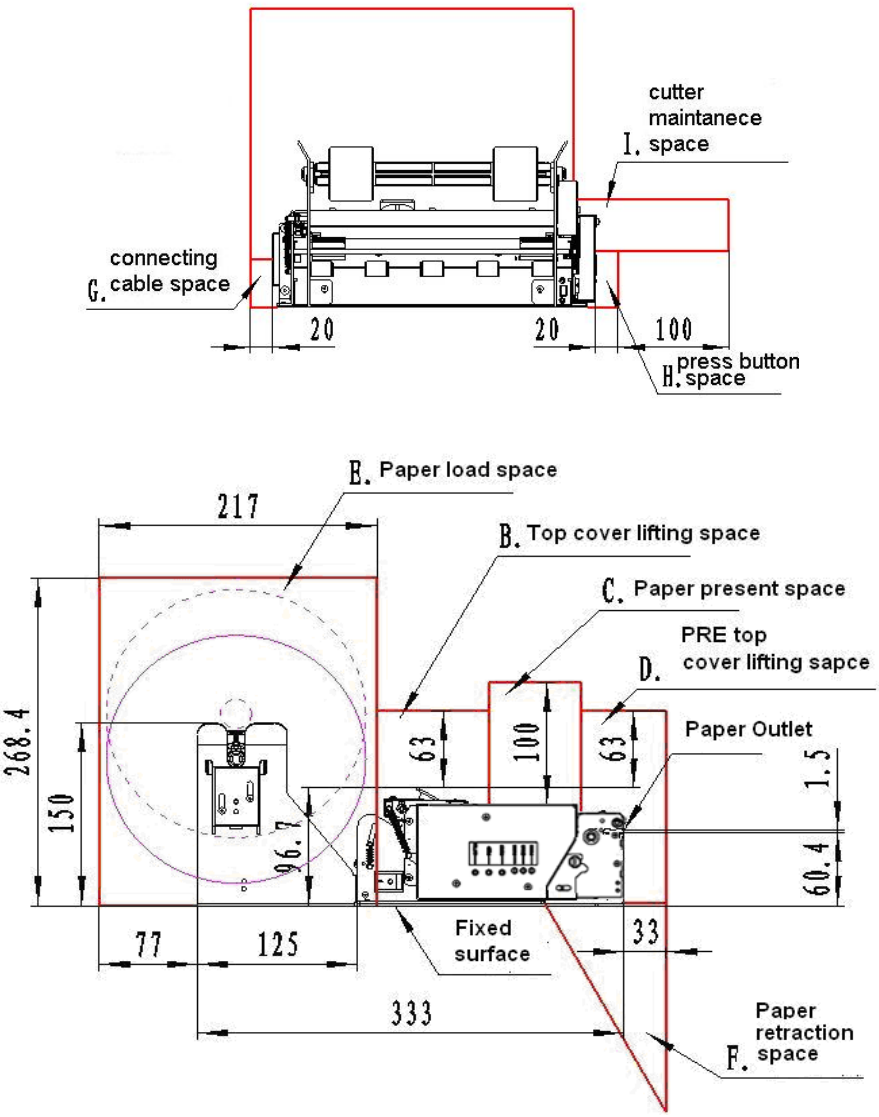


Figure 4.7.2 Horizontal structure

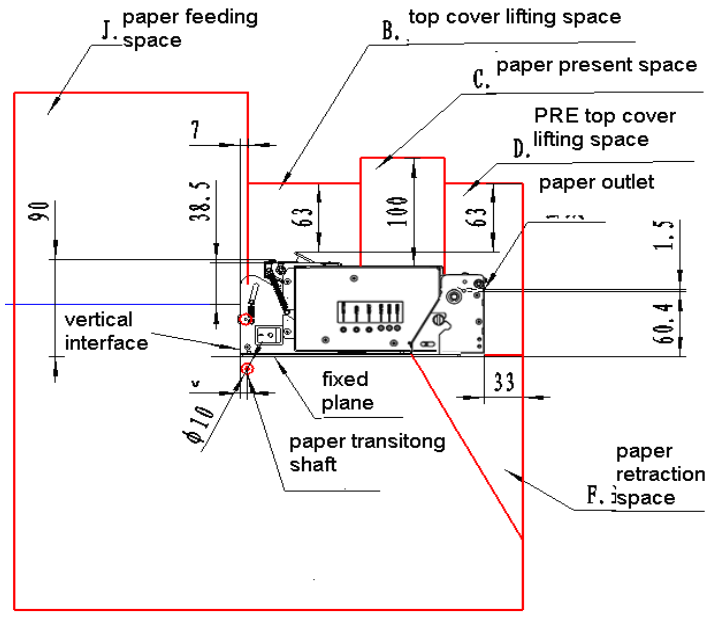


Figure 4.7.3 Structure without paper holder

Note：

- Spaces in above figure are as follows: printer work space, printer routine maintenance space and printer operating space. Printer work space include paper accommodating space and paper backing space; Printer routine maintenance space include PRE's upper cover opening space, upper cover opening space and cutter routine maintenance space; Printer operating space include paper roll loading space, paper loading space, button space and connection wire space.
- The dimension given in above figures is only for references.
- To ensure reliable paper accommodating, enough space should be left. There shall be no sharp edges, corners or edges around the space to avoid the printout damaged.

2) Spaces explanation

◆A: paper loading space; make sure to reserve enough space for semi-automatic paper loading.

◆B: upper cover uplifting space. Make sure to reserve enough space to enable the upper cover open.

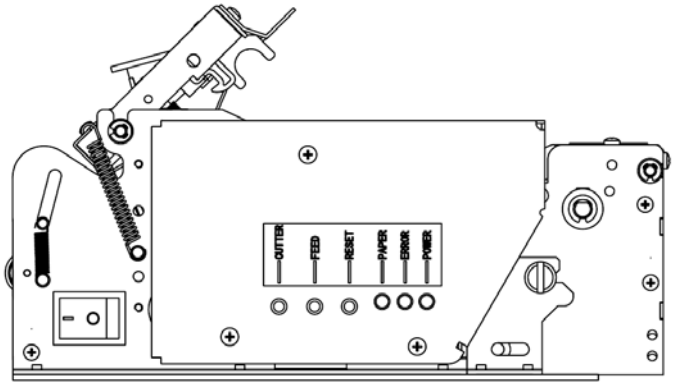


Figure 4.7.4 Upper cover opening

◆C: Paper accommodating space. Make sure to reserve enough space for the PRE turning board uplifting and paper looping height (For A4 size paper, the looping height is around 100mm)；

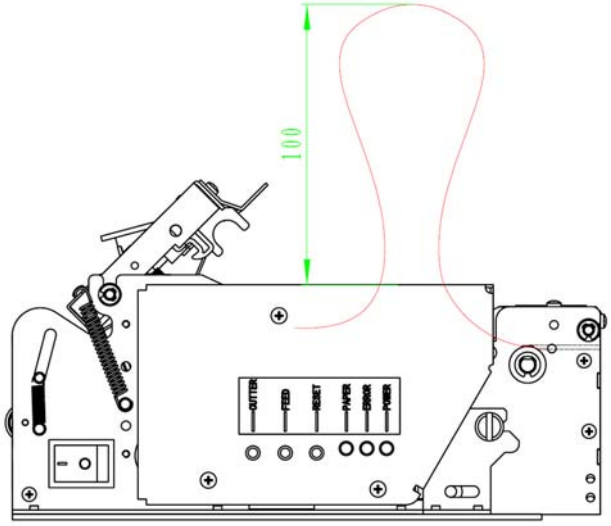


Figure 4.7.5 Paper looping

◆D：PRE upper cover uplifting space. Make sure to reserve enough space for Pre upper cover to lift up and loose.

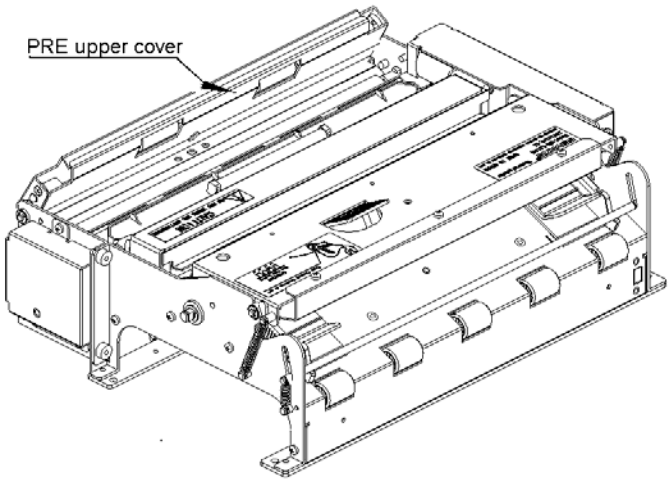


Figure 4.7.6 PRE's upper cover open

◆E：Paper rolls loading space. Make sure to reserve enough space to load paper roll.

◆F: paper retraction space. Presenter module waits for the user to take the paper away. If the user does not need the paper, the paper backs to the dustbin of the machine, Paper retraction outlet should be reserved when the machine is fixed (as figure4.22, which is positioned with fixing hole .The hole you design should be bigger than the one in the figure). If your printer doesn't have paper retraction function, just neglect this point.

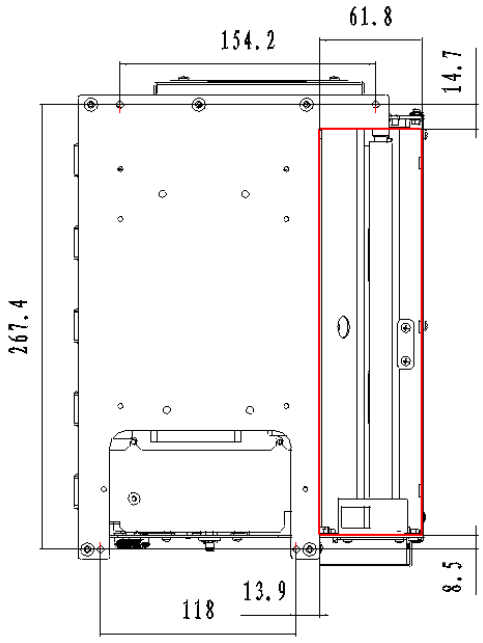


Figure 4.7.7 Paper retraction outlet

◆G: connection wire space. make sure there are enough space to connect and disconnect power cable and communication cable of print mechanism;

◆H: button space. make sure there are enough space to finish the operation of the CUT button, FEED button and power switch;

◆I: cutter maintenance space. make sure there are enough space to finish the disassembly of the protective cover and the operation of cutter manual resetting.(For maintenance method , please see section 5.4);

◆J: paper feeding space allowed by the paper roll. If your printer doesn't have paper holder or the paper holder is made yourself, please consider the space. (Figure 4.7.3) There is a blue line in the space. If paper feeding is controlled above the blue line, your printer is considered to be horizontal. Or else, it is vertical. For horizontal type, you had better control the paper roll above the space, mainly in order to use the buffer mechanism of print mechanism to avoid compression. For vertical type, Please add buffer mechanism to paper holder (as figure4.7.8). In addition, if paper feeding touches vertical critical interface （as figure4.7.3）, please add paper transition roller to the paper holder in order to avoid that paper touches metal parts directly , causing paper damaged.

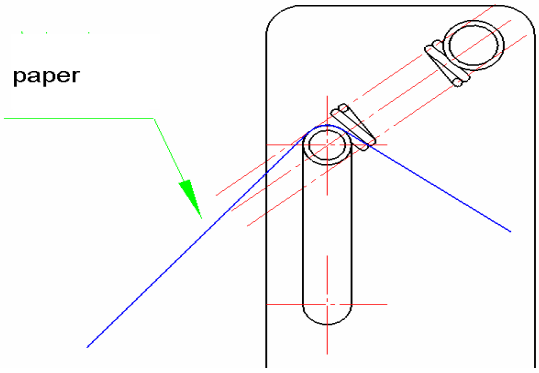


Figure 4.7.8 Buffer explanation

3) Notes for paper holder separate installation

If available, install the printer and paper holder together. If the paper holder has to be installed separately because of limited space, to ensure the reliability of paper feeding, please pay attention to following items:

◆For installation dimension, please refer to the explanation of "J" paragraph;

◆Keep paper path smooth, avoid sharp folder to cause overload;

◆Avoid that paper rubs with sharp object, in order to prevent paper thermal layer damaged;

◆Make sure that paper keeps certain pressure to printer elastic shaft to get buffer effect.

◆Make sure that paper center is in consistent with the center of the paper-feeding path, in order to prevent paper from slant during printing. (For position dimension, please see shape dimension in section 3.2)

◆The intensity of the paper holder and paper shaft should be parallel with printer head, cutter etc.

4) Notes when designing external paper out path

In your system, it may be necessary to connect paper out path to match with the printer. To keep paper feeding smoothly, we suggest design project in the place where external paper out path matches with the printer (as figure 4.7.9), and request that the paper-feeding path is smooth without burr, sharp corner and tuber.

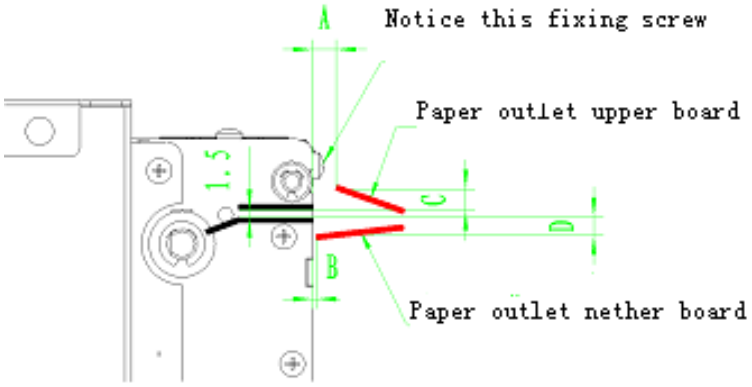


Figure 4.7.9 Paper outlet explanation

- Upper board "A" dimension of paper out path should be controlled from 4.5 to 5.5 mm and "C" dimension should be from 4 to 5mm.This is mainly to avoid the interference when the upper cover of PRE uplifts, and also to avoid interference with the fixing screw (M2.5) of the PRE upper cover.
- Lower board B dimension of paper out path is controlled to be within 1mm, and D is from 2 to 4mm.

Notice：

- The paper outlet shown in figure is just a sketch map; the paper outlet angle can be designed according to actual need. But try to avoid the paper outlet bend in order to increase the smoothness of the paper path.
- We leave fixing holes in printer mechanism for connecting paper out path for you as figure 4.25 (Notice the position of four fixing screw):

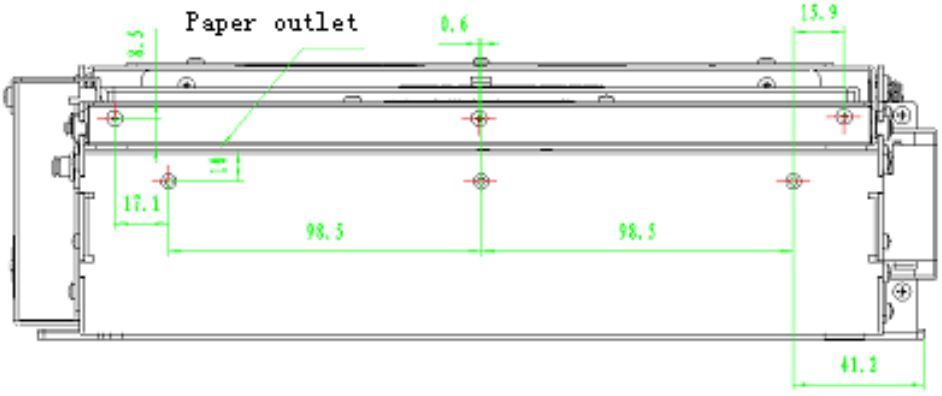


Figure 4.7.10 Fixing holes

- If you need to use our fixing holes, Please design the size of paper out path according to above request strictly. If your paper outlet is not assembled on the printer, namely, the paper outlet can be separated with printer during maintenance, "A" and "C" dimension couldn't be as the figure so strictly.
- If you design paper jam preventing mechanism in paper outlet, the paper outlet can be designed as figure 4.7.11. But as a result of the design, the paper can't fall off automatically during paper out. You can design it in other shapes, but try to keep the smoothness of the paper outlet.

Figure 4.7.11 Paper outlet preventing jammed paper

4.8 Installing printer driver

The printer supports standard WINDOWNS. Serial driver and parallel driver both support System platforms such as WINDOWS98/NT4.0/2000/XP/Server2003/Vista.USB driver supports System platforms such as WIN98/2000/XP/Server2003/Vista. The current edition of the WINDOWNS driver is V1.0. (For setup and use of the driver, please refer to the help document in the drive software package)

Figure 4.8.1 WINDOWNS driver installation interface

5 Routine maintenances

Caution：

- ✧ Before starting routine maintenance for the printer, make sure the power is turned off.
- ✧ Do not touch the surface of print head with hands or metal. Do not use forceps so as to prevent print head, platen roller and sensors being scratched.
- ✧ Do not use organic solvent like gasoline, acetone etc.
- ✧ When cleaning print head or sensors, please wait for pure alcohol to evaporate totally before starting printing.
- ✧ It is recommended to do routine maintenance per month.

5.1 Cleaning print head

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

- ➢ Printout is not clear.
- ➢ Some columns on the page are not clear.
- ➢ Paper feeds or retracts with big noises.

To clean the print head, follow steps given below:

- ➢ Turn off the power and open the upper cover.
- ➢ Lift print head module and wait for print head to cool down totally when it has just finished printing.
- ➢ Wipe off dust and stains on the surface of the print head with soft cotton cloth dipped with pure alcohol. The cotton cloth shall be wrung before using.
- ➢ Wait for 5 to 10 minutes until pure alcohol evaporates totally, press down print head module and close upper cover.

5.2 Cleaning sensors

5.2.1 Cleaning paper end sensor

When any of following cases occurs, the sensors should be cleaned:

- ➢ During printing, the printer sometimes stops printing and alarms paper end when there is paper in fact.
- ➢ The printer doesn't alarm paper end when paper is out.
- ➢ The printer doesn't identify marks correctly.

To clean paper near end sensor, follow the steps given below:

- ➢ Turn off the power, open print head upper cover.
- ➢ Lift the print head and find out paper end sensor according to the figure 3.3.1.
- ➢ With soft cotton cloth dipped with pure alcohol (should be wrung),, carefully wipe off stains on the surfaces of sensors
- ➢ Wait for 5 to 10 minutes until pure alcohol evaporates totally, press down the print head and close upper cover.

5.2.2 Cleaning paper loading sensor

When any of the following case occurs, paper loading sensor should be cleaned:

- The paper can't back to normal printing position during semi-automatic paper loading.
- Print motor reverse backward for long time during semi-automatic paper loading.
- After printing is finished, the paper can't return to normal printing position.

To clean paper-loading sensors, following the steps given below:

- Turn off the power and open print head upper cover.
- Uplift the print head and find out paper loading sensor according to the figure3.3.1.
- With soft cotton cloth dipped with pure alcohol (should be wrung), carefully wipe off stains on the surfaces of sensors.
- Wait for 5 to 10 minutes until pure alcohol evaporates totally, press down print head and close printer upper cover.

5.2.3 Cleaning paper out sensor

When any of the following case occurs, paper out sensor should be cleaned:

- PRESENTER can't hold paper normally.
- PRESENTER can't perform retracting function after holding paper.

To clean paper near end sensor, follow the steps given below:

- Turn off the power and open PRESENTER upper cover.
- Find paper out sensor according to figure 5.2.1.

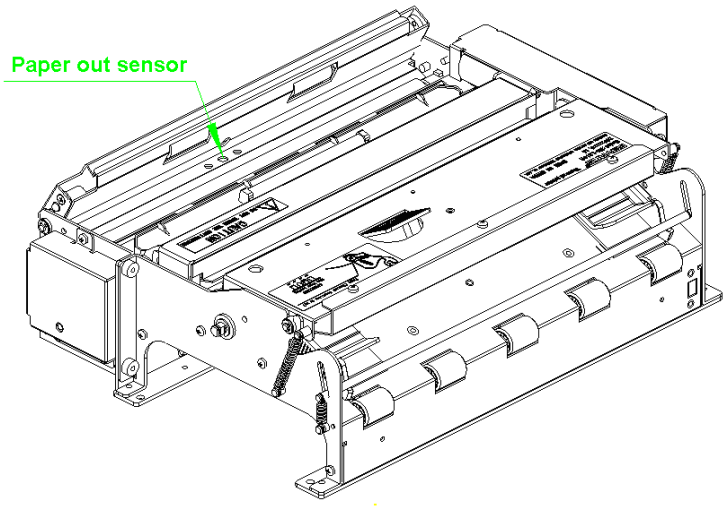


Figure 5.2.1 paper out sensor

- With soft cotton cloth dipped with pure alcohol (should be wrung), carefully wipe off stains on the surfaces of sensors.
- Wait for 5 to 10 minutes until pure alcohol evaporates totally, and close PRESENTER upper cover.

5.2.4 Paper retract sensor

When any of the following case occurs, paper retract sensor should be cleaned:

- Paper in the retract position can not out and PRESENTER doesn't alarm.
- Paper in the retract position out and PRESENTER still alarms.

To clean paper retract sensor, follow the steps given below:

- Turn off the power and reverse the printer.
- Find paper out PRESENTER paper retract sensor according to figure 5.2.2:

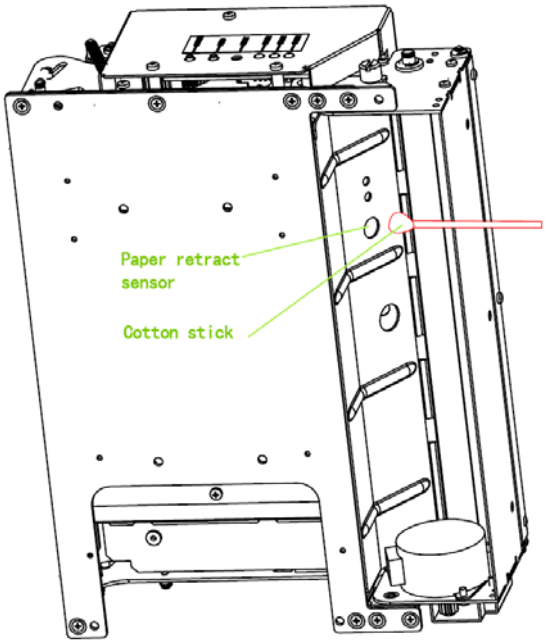


Figure 5.2.2 PRESENTER paper retract sensor

- With soft cotton stick dipped with pure alcohol (should be wrung), carefully wipe off stains on the surfaces of sensors.
- Wait for 5 to 10 minutes until pure alcohol evaporates totally.

5.3 Cleaning printing platen

When any of the following case occurs, the sensor should be cleaned:

- Print out is not clear.
- Some columns on the page are not clear.
- Paper feeds or retracts with big noises.

To clean printing platen, follow the steps given below:

- Turn off the power, open the top cover of the printer.
- Wait for a few minutes until print head cools down if the printer has just finished printing.
- With soft cotton cloth dipped with some neutral detergent (should be wrung), carefully wipe off stains on the surfaces of printing platen roller.

5.4 Manual resetting cutter

When one of the following cases occurs, manual-resetting cutter should be done:

- The cutter can't cut off the paper and fails to reset; cutter doesn't act when pressing CUT button.

1) Paper jams due to reset failure of cutter. Press CUT button, but cutter doesn't act.

Reset cutter manually in the following steps:

- Turn off printer power.
- Remove the protective board cover.

- Use cross screwdriver to rotate motor shaft, push cutter guider forward (or there is big gap between upper and lower blade) as figure 5.4.1.

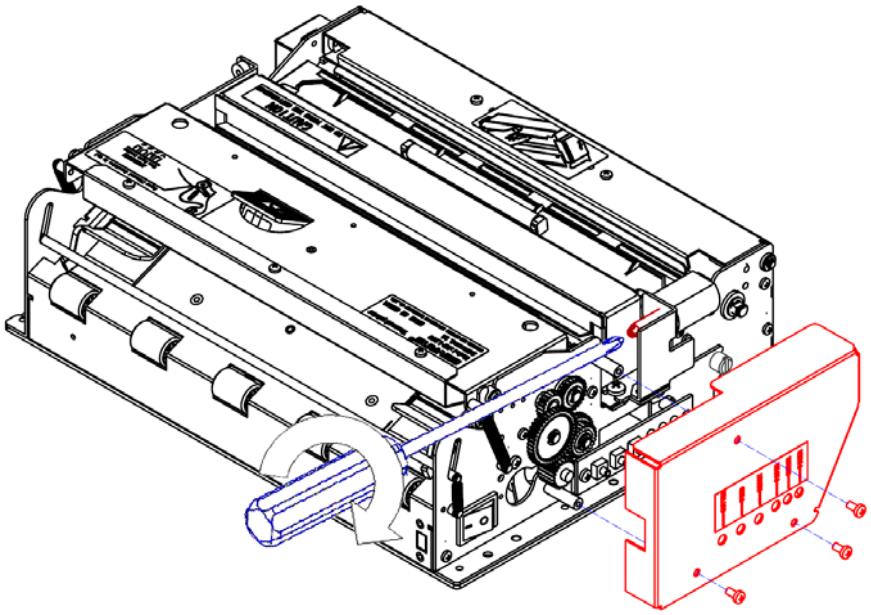


Figure 5.4.1 Manual resetting cutter

5.5 Manual removal of the jammed paper

When any of the following errors occurs, please remove jammed paper manually:

- Paper jams between platen roller and cutter holder.
- Paper accumulates at paper inlet of the cutter in the front of print head.
- The cutter can't cut off paper.

Remove jammed paper in the following steps:

- Open printer upper cover.
- Pull out the jammed part of paper; if the cutter couldn't be reset, please refer to 5.4.1 manual reset cutter to reset the cutter.
- Cut off the folded part of paper.
- Reload the paper.

6 Interface signal

6.1 RS-232 Interface

6.1.1 Parameter

- data transmission mode: asynchronous serial communication
- handshake mode: RTS/CTS， DTR / DSR
- voltage level: MARK = -3 to -15 V: Logic "1"/ OFF
  SPACE = +3 to +15 V: Logic "0"/ ON
- baud rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
- data bit: 8 bit or 7bit
- Parity bit: None, even, or odd
- Stop bit: 1bit
- connector : 9 pins serial connector(female head)

Caution：

✧ baud rate, data bit and parity bit are set by EEPROM.

6.1.2 Interface linking terminal distribution and signal function

Printer signal and status is described as the following table:

PIN NO	Signal name	Signal direction	function
1	NO		
2	RXD	input	Data input end
3	TXD	output	Data output end
4	DTR	output	Data terminal is ready
5	SG	—	Signal ground
6	DSR	input	Data device is ready
7	RTS	output	Request to send
8	CTS	input	Allow to send
9	FG	—	Frame Ground

6.2 IEEE1284 Parallel interface (optional)

RS-232 serial interface is the standard interface of the printer, and IEEE 1284 Parallel interface is the optional one, and works in compatible mode (For interface position, please refer to figure 3.6.1).

6.2.1 Parameters

Data transmission: 8 bits Parallel
Synchronization mode: nStrobe signal is provided by exterior
Handshake mode: Busy signal
Signal voltage level: TTL compatible

Connector: 36 pins inner empty type Centronics connector in accord with the IEEE1284 agreement

6.2. 2 The influence of printer status to parallel interface (/FAULT pin and PE pin)

Status	/FAULT	**PE**
Status	/FAULT	**PE**
Normal	high	low
Paper end	low	high
Print head Overheated	low	low
Other errors	low	low

Table 6.2.1 /FAULT pin and PE pin explanation

When above errors occur, information can be obtained by reading the status of correlative pins of parallel interface.

6.2.3 Parallel interface signal

Pin No.	Source	Compatible mode
1	H	nStrobe
2	H	Data 0 (Least Significant Bit)
3	H	Data 1
4	H	Data 2
5	H	Data 3
6	H	Data 4
7	H	Data 5
8	H	Data 6
9	H	Data 7 (Most Significant Bit)
10	P	nAck
11	P	Busy
12	P	Perror
13	P	Select
14	H	nAutoFd
15		Not Defined
16		Logic Ground
17		Chassis Ground
18	P	Peripheral Logic High
19		Signal Ground (nStrobe)
20		Signal Ground (Data 0)
21		Signal Ground (Data 1)
22		Signal Ground (Data 2)
23		Signal Ground (Data 3)
24		Signal Ground (Data 4)
25		Signal Ground (Data 5)
26		Signal Ground (Data 6)
27		Signal Ground (Data 7)

Pin No.	Source	Compatible mode
28		Signal Ground (PError, Select, and nAck)
29		Signal Ground (Busy and nFault)
30		Signal Ground (nAutoFd, nSelctIn, and nInit)
31	H	nInit
32	P	nFault
33		Not defined
34		Not defined
35		Not defined
36	H	nSelectIn

Table 6.2.2 Parallel interface signal definition

Note:

- ✧ H stands for host computer terminal, and P stands for printer terminal.
- ✧ Parallel Interface Signal use TTL voltage level. When it is used, please make sure both the rise and drop time of host computer terminal is no longer than 0.5us.
- ✧ When data transfers, the host computer should not ignore the busy signal, or else the print data may be lost.
- ✧ The length of parallel interface connection wire should be as short as possible if it meets use requirement.

6.2.4 Time sequence of data receiving

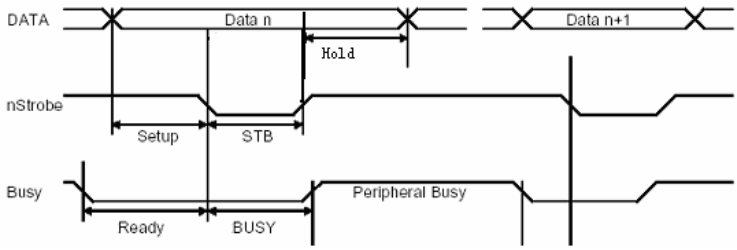


Figure 6.2.1 Time sequence of parallel interface data receiving

Signal time demands:

Signal	Min(ms)	Max(ms)
Setup	0.75	-
Ready	0	-
Stb	0.75	500
Busy	0	2.5
Hold	0.75	-

Table 6.4 Demand explanation of interface signal

6.3 USB interface (optional)

RS-232 serial interface is the standard interface of the printer, and USB interface is an optional one which accords with USB 1.1 agreement standard, and work in full speed mode(For interface position, please refer to figure 3.6.2) Data transfer bit rate is 12Mbps.USB transfers signal and power by a kind of four-line cable. D+ and D- connection wires in figure 6.3.1 are used to send signal.。

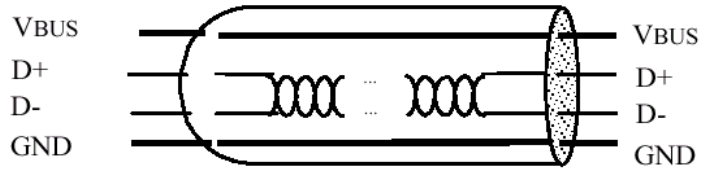


Figure 6.3.1 USB Cable

6.3.1 Power interface

This connector is used to connect the printer with external power supply

Pins distribution of power connector:

PIN	Signal name
1	+24V
2	GND
3	NC
SHELL	F.G.

Table 6.3.1 Power pin definition explanation

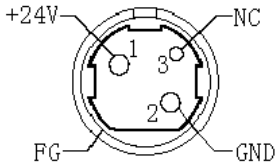


Figure 6.3.2 Power supply pins

7 Troubleshooting and maintenance

7.1 Common errors and settlement

7.1.1 Problems during paper loading

Problem	Possible reasons	How to settle
Paper roll can't be loaded into paper holder.	✧The paper roll width and diameter do not meet the requirements of the printer	✧Replace the paper
The printer can't feed paper automatically.	✧Paper head is irregular ✧Paper jams ✧The paper load sensor is not covered by paper head. ✧Dust or wastepaper covers the paper loading sensor.	✧Clear wastepaper according to requires ✧Remove jammed paper ✧Check the front end of paper to confirm that the paper-load sensor is covered fully by paper. ✧Clean the paper load sensor.
Buzzer alarms	✧Paper end ✧The printer cover is not fully closed.	✧Replace the paper roll. ✧Close printer upper cover fully.
After auto paper feeding ,the paper can't stop in the normal print position	✧Dust or wastepaper covers the paper loading sensor	✧Clean the paper loading sensor.

Table 7.1.1 Paper feeding problem index

7.1.2 Problems during printing

Problems	Possible reasons	How to deal with
The receipt can't be ejected out smoothly.	✧Paper jams	✧Open upper cover and presenter upper cover, check paper path, remove wastepaper and reload paper automatically.
Printout is not clear	✧The thermal paper is loaded in wrong direction or it's of poor quality. ✧Print head needs cleaning ✧Printing darkness is too low ✧Input voltage is too low.	✧Make sure the paper roll is loaded correctly. ✧Use recommended paper or its equivalents. ✧Adjust print darkness(*). ✧Use the power supply which meets requires.
Cutter works abnormally	✧Paper jams in cutter. ✧Cutter is broken	✧Check if there are sundries in cutter path (*) ✧Contact with the manufacturer or your local distributor.
Printing data is lost and no printing.	✧The printer cover is closed improperly. ✧Paper jams.	✧Close printer upper cover properly. ✧Remove paper jam

Table 7.1.2 Print problem index

＊To adjust print darkness, and contact with our distributors or manufacturer.

7.1.3 Problems during paper out

Problems	Possible reasons	How to deal with
The printer stops printing and warns errors during printing.	✧Paper end. ✧Paper jams in cutter. ✧Dust or wastepaper covers the paper near end sensor.	✧Install a new paper roll. ✧Check if there are sundries in cutter path. ✧Clean the paper end sensor.

Table 7.1.3 Problem of out paper index

Note: Contaminated paper may cause detection failure.

7.1.4 Other problems

Problem	Possible reasons	How to deal with
LED can not light and printer doesn't work.	✧The printer is not connected with the power supply correctly. ✧The printer isn't turned on.	✧Connect the printer with the power supply correctly. ✧Turn on the printer.
The printer doesn't work after receiving commands.	✧Printer is in error status. ✧The communication cable is not connected well. ✧Interface setting is wrong.	✧Remove all errors (*). ✧Make sure the communication cable is connected correctly. ✧Print a self-test page and set the interface again according to information on it.

Table 7.1.4 Other problems index

* Paper near end alarm acts only as a prompt for users, not error status. Therefore when this alarm is given, printing task can still be sent.
* If paper jam in the cutter, first clear up the jammed paper then press CUTTER button to reset the cutter.

Appendix

Appendix 1 Self-test page

Print self-test page in the following steps:

Turn off printer power, hold the FEED button for at least 1 second while turning on the printer. The printer will start to print a self-test page. Take 203 dpi Serial+USB interface model as an example, the self test paper is shown as follows:

BK-L216II(200) TEST FORM

Boot Firmware	:FV1.010
Main Firmware	:FV1.000
H/W Parameters	
H/W ID	:BK-L216II2(U) 1
Flash Memory Size	:1M bytes
Flash Logos Size	:64k bytes
Resolution	:203×300DPI
Print Width（Max）	:216mm
Fixed Left Margin	:0mm
Fixed Right Margin	:0mm
Print Speed（MAX）	:100mm/s
Dark Scale	:110
Cutter	:Enabled
PRSENTER	:Enabled
Bundelr Mode	:Command Control
Communication Interface	
Rx Buffer Size	:4096 bytes
Interface Type1	:RS232
Baud Rate	:38400bps
Data Bits	:8
Stop Bits	:1
Parity	:NONE
Flow Control	:DTR/DSR
Command CR	:Ignored
Data Receive Error	:Print '?'
Interface Type2	:USB_BK-L216II_1
Resident Fonts	
Font0(12X24)	:English
Font1(9X17)	:English
Code Pages	:437,850,852
:858,860,863	
:865,866,1252	

:Katakana

International Character :U.S.A
:France
:Germany
:U.K.
:Denmark I
:Italy
:Spain I
:Japan
:Norway
:Denmark II
:Spain II
:Latin America

Bar Code Available :UPC-A
:UPC-E
:EAN-8
:EAN-13
:CODE 39
:CODE 93
:ITF
:CODABAR
:CODE128
:PDF417

Explanation of self test page content:

Boot Firmware---------- Printer BOOTLOADER version

Main Firmware ---------- Printer monitor program version

H/W Parameters---------- Printer parameter setting

H/W ID ---------- Printer ID setting

Flash Memory Size ---------- Printer FLASH size

Flash Logos Size---------- Flash size for bitmap downloading

Resolution---------- Printer resolution

Valid Print Width（Max） ---------- Maximum print width

PrintSpeed（MAX）---------- Print speed

Dark Scale ---------- Print darkness

Cutter---------- Enable/ Disable cutter

PRSENTER---------- Enable/Disable PRESENTER

PRSENTER Mode ---------- PRESENTER paper out mode

Comm Interface---------- Communication interface setting

Rx Buffer Size---------- Data receiving buffer zone size

Interface Type ---------- Interface type

Baud Rate ---------- Serial communication baud rate setting

Data Bit ---------- Serial communication data bit setting

Stop Bit---------- Serial communication stop bit setting

Parity ---------- Serial communication parity bit setting

Flow Control---------- Serial communication data stream mode (handshaking type)

Command CR ---------- Enable/Disable CR command

Data Received Error-------- ---------- Serial receive error

Interface Type2 ---------- The second interface type

Resident Fonts---------- Font setting

Font 0(12×24) ---------- Font 0 setting

Font 0(9×17)---------- Font 1 setting

Code Pages---------- Code page type

International Character---------- International Character type

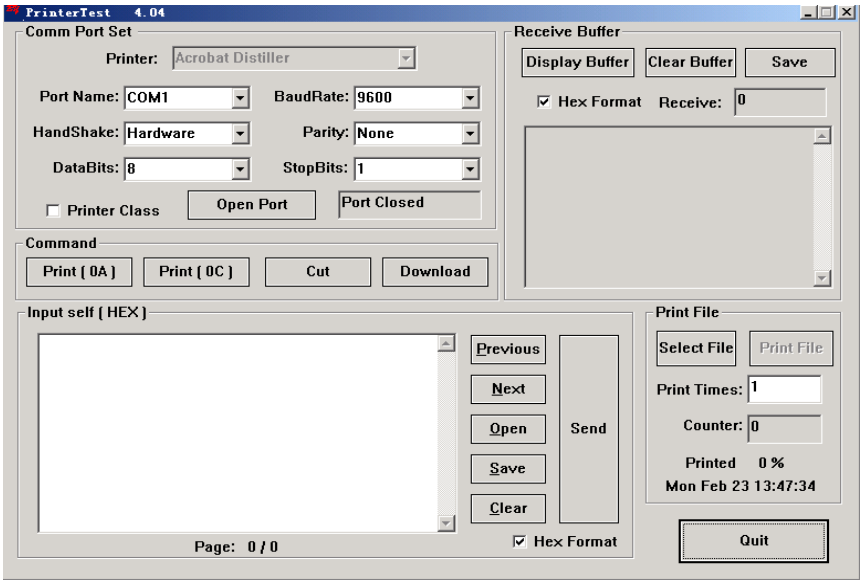
BarCode Available ---------- Printable Barcode model

Appendix 2 Tool software

For BK-L216II printer, we provide the flowing tools: configuration software, debug software, demo software, download /upgrade program and LOGOKIT tool. Brief introduction are as follows.

Appendix 2.1 Debugging Software

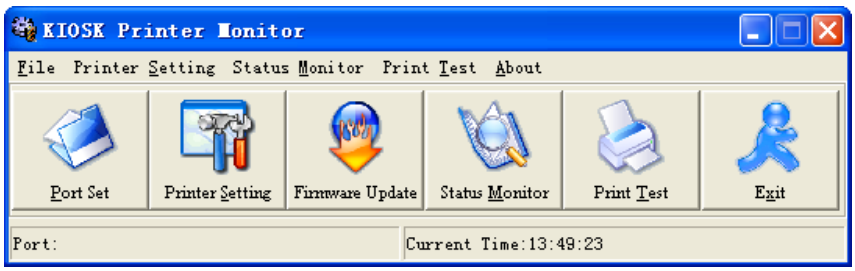
The debug software is PRINTERTEST. Its main function is to debug printers. It supports the following system platform: WINDOWS98/NT4.0/2000/XP. The flowing is the main interface figure of PRINTERTEST. (For detailed use explanation, please refer to the explain document in the tool software package)



Appendix figure 2.1 PRINTERTEST interface

Appendix 2.2 BKMonitor program

BKMonitor is monitor software; its function is mainly for on-line firmware download /upgrade, printer status monitor, print demo etc. Supported system platforms: WINDOWS2000/XP/ Server 2003. The flowing is the main interface figure of BKMonitor. (For detailed use explanation, please refer to the explain document in the tool software package)



Appendix figure 2.2 BKMonitor interface

Appendix 2.3 KIOSKUtility Tool

KIOSKUtility is a integrated software tool. The main function of KIOSKUtility are for on-line firmware download /upgrade, print demo, edit and download CodePage and other usual printing functions' demonstration etc. Supported system platforms: WINDOWS2000/XP/ Server 2003. The flowing is the main interface figure of KIOSKUtility. (For detailed use explanation, please refer to the explain document in the tool software package).

Appendix figure 2.3 KIOSKUtility interface