

USER'S MANUAL

Single Station Thermal Printer

Model: BTP-2002CP

- This printer has been manufactured and branded for ORIENT Technologies B.V. by Shandong New Beiyang Information Technology Co., Ltd.
- Design and specifications are subject to change without notice. Ask the supplier for technical specifications before purchase and/or use.
- Whenever in doubt about safety issues might arise from this product, please contact the supplier immediately for assistance.

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DECLARATION

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BEIYANG

- Warning and Caution



Warning Items shall be strictly followed to avoid damages to body and equipment.



Caution Items with important information and prompts for operating the printer.

- The quality control system of New Beiyang has been approved of the following certification.



DNV ISO9001: 2000

- The product BTP-2002CP complies with the following safety standards,



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General Safety Information

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

1. Safety instructions



Do not touch the cutter and tear bar of printer.

The print head is a thermal element and it is at high temperature during printing or just after operation, therefore please do not touch it and its peripherals for safety reasons.

The thermal head is an ESD-sensitive device. To prevent damage, do not touch either its printing part or connecting parts.

2. Precaution:

- 1) Install the printer on a flat and stable place.
- 2) Reserve adequate space around the printer so that convenient operation and maintenance can be performed.
- 3) Keep the printer away from water source.
- 4) Do not use or store the printer in a place exposed to heat of fire, moisture, serious pollution and direct sunlight.
- 5) Do not place the printer on a place exposed to vibration or impact.
- 6) 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.
- 7) Connect the DC adapter to an appropriate grounding outlet. Avoid sharing a single electrical with large power motors and other devices that may cause the fluctuation in voltage.
- 8) Disconnect the DC adapter when the printer is not used for a long time.
- 9) Don't spill water or other materials on the printer. If this happens, turn off the power immediately.
- 10) 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.
- 11) To ensure quality print and normal lifetime, use recommended or good quality paper.
- 12) Shut down the printer when connecting or disconnecting interfaces connectors to avoid damage to the control board.
- 13) 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.
- 14) The printer should only be disassembled or repaired by a technician, who is certified by the manufacturer or by ORIENT Technologies bv.
- 15) Keep this manual safe and at hand for ready reference.

1 Introduction

1.1 Outline

- The BTP-2002CP is a high performance thermal printer. It can be widely used in real-time printing applications, such as POS systems, restaurant systems, ATMs, etc.
- The BTP-2002CP can be connected with another device via Centronics interface or serial interface and is available for Windows 95/98/2000/NT4.0/XP.

1.2 Features

Low noise, high printing speed
 Easy paper loading: Drop & print
 Easy use and maintenance
 Paper with black mark ("black mark sensing")
 and continuous paper can be used

Paper with different widths can be used
 Auto cut (full or partial cut)
 Cash drawer control connector
 Communication connector optional
 ESC/POS compatible

2 Specifications

2.1 Main specification

Item	Specification	
Print method	Thermal line	
Resolution	203DPI X 180DPI	
Print speed	Max. 150mm/s	
Print width	Max. 80mm	
Paper type	Marked paper, continuous paper	
Bar code supported	Interleaved 2 of 5 UPC-A UPC-E EAN-8 EAN-13 Codabar Code39 Code128 code93	
Character set	Standard ASCII(12x24) compressed ASCII(9x17). Code page 437, 850, 852, 860, 863, 865, 858	
Character enlargement	All fonts can be enlarged vertically and horizontally up to 6x.	
Character rotation	(0°, 90°, 180°, 270°)	
Paper detect	Photo sensor (paper end), micro switch(paper near end)	
Printer top cover position	Micro switch	
Print head overheating protection	Thermal resistor	
Graphics	Download bitmap	Direct bitmap print
	6 figures maximum download to a total bitmap buffer of 8KB	Support bitmap mode and can realize fast bitmap printing
Interface	Centronics (36pins) or RS232 (25 pins)	
Cash drawer control	1-2 cash drawers	
Memory	RAM 128KB FLASH 512KB	
Power supply	24V±5%DC, Mean current 2.3A, max. 8A (with 256 heaters simultaneous operation)	
print head life time	100Km	
Operating temperature and humidity	5 45 20 ~ 80% RH (No dew condensation)	
Storage temperature and humidity	-40 55 93%RH (40)	
Dimensions	142(W)×192(D)×139(H)mm	

2.2 Cutter Specification

Item	Parameter	Remark
Cut mode	Slide cutter	
Cut time	600ms	The time that one cut takes.
Cut interval	2s	30 times/min. (Max.)
Paper type	65~100 μ m	Thermal paper or paper with the same thickness.
Operation voltage	24VDC	
Max. static current	1.2A	24V DC
Cutter lifetime	1,000,000 cuts	Full and Partial cut

2.3 Electric Parameters of Power Supply

Supply voltage: 24VDC \pm 5%

Current consumption:

Mean: approximately 2.3A (12.5% duty ratio)

Peak: Approximately 8 A

Ripple & Noise: < 200mV

2.4 Paper specification

2.4.1 Continuous paper

- Paper type: thermal paper
- Paper width: 82 \pm 0.5mm, 79.5 \pm 0.5 mm, 71.5 \pm 0.5 mm, 61.5 \pm 0.5 mm, 55.5 \pm 0.5 mm
- Paper thickness: 65 \pm 5 μ m
- Roll outer diameter: Max.80 mm
- Printing surface: Outside of roll
- Recommend paper: POS-grade paper (e.g. Mitsubishi: F24OAC/F220-VP thermal paper)
- Core diameter: Inner diameter 17.5 mm, Outer diameter 21.5mm.

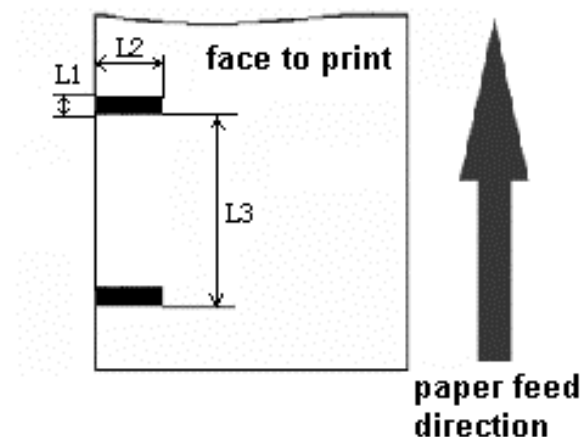
2.4.2 Marked paper

Make sure that the black marks of the marked paper are at positions where the paper end sensor can detect. The black mark's reflectivity must be less than 15% while that of the other part of the paper should be more than 85%. Should no design, for instance ads or such like, be printed on areas between marks. Sizes of the mark shall meet the following requirements.

3mm < L1 black mark width < 10mm

L2 black mark length > 20mm

20mm < L3 (black mark pitch) < 500mm



Caution:

Please use recommended paper or its equivalents. Using other paper types would affect the print quality and shorten printhead life.

Do not paste the paper to the core.

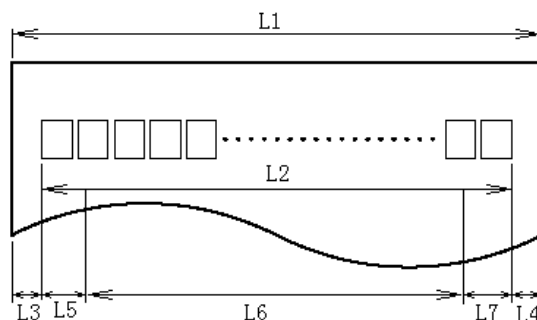
If the paper is contaminated by a chemical or oil, it may discolor or lose heat sensitivity at the polluted spot.

Do not rub the paper surface strongly with a nail or hard metal. It may discolor.

Discoloring starts when temperature is over 70°C. Be careful of effects of heat, humidity, light, and so on.

2.5 Print and cut position

2.5.1 Print position



L1: Paper holder width 83+0/-0.5mm

L2: Print width 80mm

L3: Space between the left end of printhead and the holder wall (fixed) 1.2±0.3mm

L4: Space between the right end of printhead and the holder wall (fixed) 1.2±0.3mm

L5: Left margin changeable by command (refer to command set), the default is 3mm.

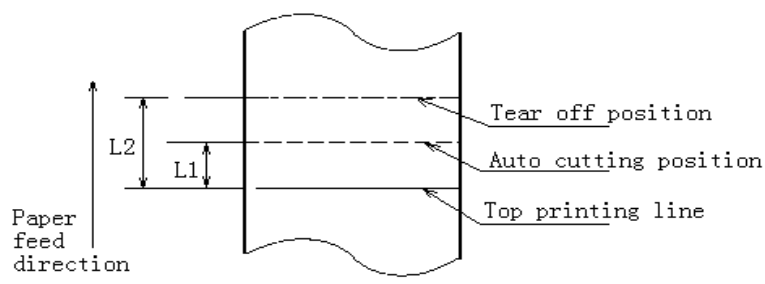
L6: Print area width changeable by command (refer to command set).

L7: Right margin The default is 3mm.

The following table is a reference for users to set the print area width and left margin when using paper with different width.

Paper width (mm)	L5 left margin (mm)	L6 Print area width (mm)
82±0.5	Defaults or values set through command.	74
79.5±0.5		74
71.5±0.5		(71.5±0.5) – L5 Left margin
61.5±0.5		(61.5±0.5) – L5 Left margin
55.5±0.5		(55.5±0.5) – L5 Left margin

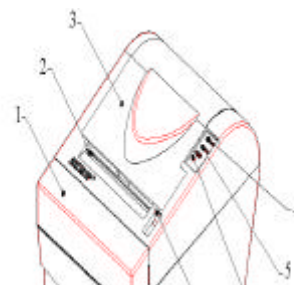
2.5.2 Cut position



3. Outline and parts

3.1 Outline and parts

1— Cutter cover



2— Tear bar**3— Printer top cover****4— Power LED**

Indicating power status (ON/OFF).

5— Error LED

The red LED indicates basic information about the status of the printer. When the LED is off, the printer is operating normally. A flashing red LED means the printer needs operator assistance (such as paper end).

6— Feed button

- ◇ Under normal status (no error), press it to feed paper. To feed long lengths of paper, press the key continuously.

7— Top cover latch**8— Power switch**

Turning on/off the power for the printer. "O"-power is turned off; "—"-power is turned on.

9— Power connector**10 Cash drawer connector****11 Communication interface****12 Cutter acting blade****13 Paper near end sensor**

Detecting the status of paper roll. If the paper is near the end, the error LED will twinkle and hint users to replace the paper roll and the printer will continue printing until the paper is end.

14 printer platen**15 Cutter fixed blade****16 Paper width adjust module**

There are 4 long slots at the base of paper holder, putting the paper width adjust module in different slot will allow the printer to use different width papers listed as follows: 79.5 ± 0.5 mm, 71.5 ± 0.5 mm, 61.5 ± 0.5 mm, 55.5 ± 0.5 mm. Removing the paper width adjust module will allow a paper width 82 ± 0.5 mm.



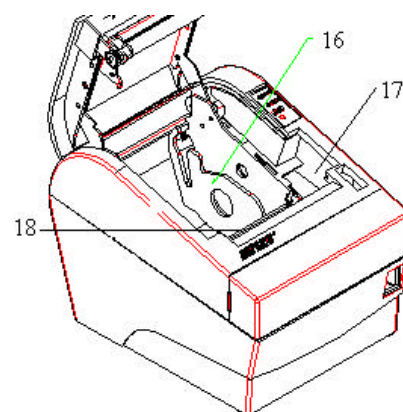
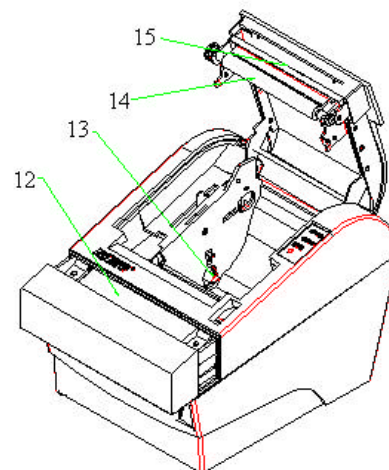
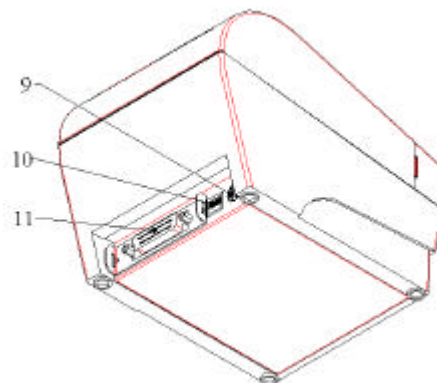
Caution: Paper width adjust module is an indispensable part of printer and should be kept safely.

17 Top cover position sensor of printer

The sensor is used to detect whether the top cover is closed or not.

18 — Paper end sensor

For continuous paper, this sensor is used to detect whether the paper roll has run out. When using marked labels, it is used to detect the marks of labels.



3.2 Error LED and Buzzers

A single beep means that the printer has successfully completed its startup routine. It should beep after being powered up.

The error LED and buzzer indicate the state of the printer, as specified in the table below:

Information of error	Voice of buzzer	LED indicator
Cutter error(paper jam)	Long-long-long	Fast
Print head is open	Short-long-short	Slow
Print head is overheated()	Long-short-long	Fast
Paper near end	No	Fastest
Paper end	Short-short-short	Very fast
Configuration table error	Long-long-short	Rather fast

The printer can detect the temperature of the printhead by using the thermistor. If it is too hot, the protection circuit will cut off the power to the print head and prevent printing. The protection temperature of printhead overheating is 65⁰ C.

4. Installation

4.1 Unpacking

Check whether all items listed on the packing list are present and in good condition. In case of damages or missing items, please contact your dealer or the manufacture for assistance.

4.2 Selecting installation position and direction

The BTP-2002CP can be installed on a wall or on a table:

To install the printer vertically on a wall, please follow instructions given below.

- 1) Fix the wall mounting plate (optional) at the base of printer with 4 screws: see figure 1.
- 2) Hang the printer vertically on the wall: see figure 2.

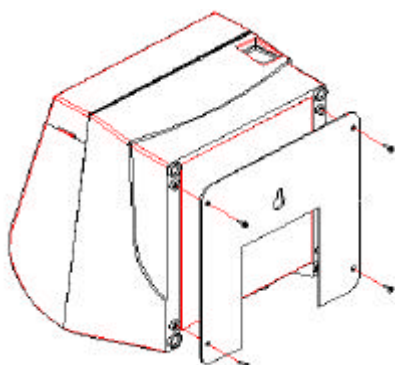


Figure 1

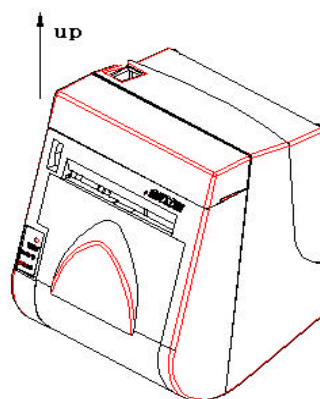


Figure 2



Caution:

- ✧ The printer should only be installed as it is instructed by above figure, the reverse is not allowed.
- ✧ Wall fixings should be adequate and sound to prevent the printer from dropping on the ground and damaging.

4.3 Grounding the printer

Be sure that the main cable of the AC adapter, that is supplied with the printer, has a ground wire and that the main wall-outlet has a ground function. If this is not the case, take precautions to ground the printer.

4.4 Connecting the AC adapter

- 1) Turn off the power of the printer.
- 2) With the flat side of the AC adapter's cable connector facing downward, insert the cable connector into the power connector on the backside of the printer. See figure 4.
- 3) Connect the AC power cord plug into a suitable wall outlet.

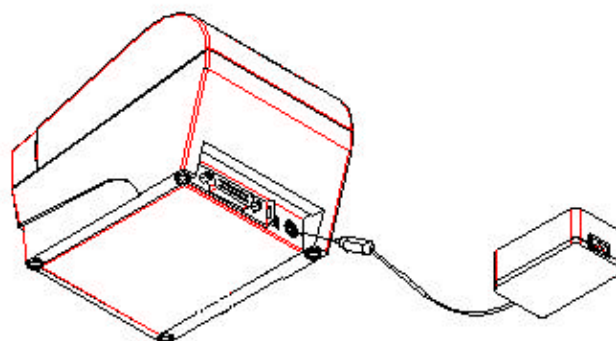


Figure 4



Caution:

Use only the manufacturers supplied power adapter or other equal model.

When connecting or disconnecting the cable connector of the AC adapter, always pull on the connector, not on the cable.

Do not pulling on the AC adapter cord or the cord may be damaged or broken, causing a risk of fire or electric shock.

Do not placing the AC adapter cord near a heating device; otherwise, the cover of the cord may melt, causing a risk of fire or electric shock.

When the printer is not used for a long period of time, disconnect the AC Adapter from the wall outlet for safety.

4.5 Connecting interface cable

- 1) Turn off the power to the printer.
- 2) Orienting the connector of the interface cable correctly, insert it into the interface connector of the printer and fasten the connectors with screws or clamps.
- 3) Connect the other end of the interface cable to the host computer.
(see figure 5)

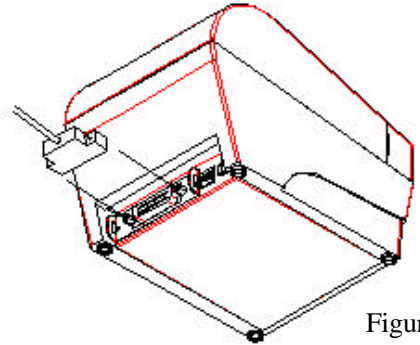


Figure 5

4.6 Connecting the cash drawer kick-out connector

- 1) Turn off the power to the printer.
- 2) Orienting the connector of the cash drawer kick-out cable correctly, insert it into the cash drawer kick-out connector on the back of the printer. (See figure 6)

**Caution:**

Do not connect any other device than the specified drawer (Solenoid) to the cash drawer kick-out connector. (Do not connect a telephone line either.).

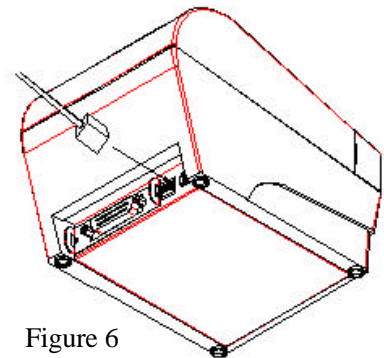


Figure 6

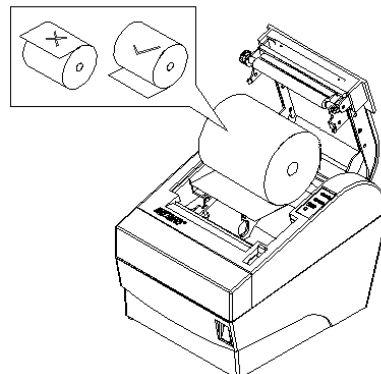
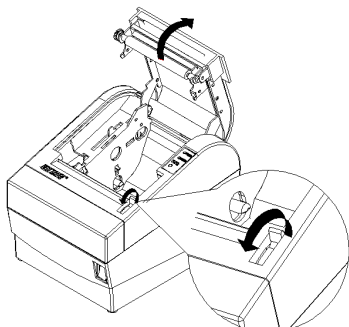
4.7 Loading paper

4.7.1 Confirm the paper type

When having finished connecting the printer, the paper roll can be installed and printing will be able to commence. Make sure to use the right paper before printing. The default paper type is continuous paper. If marked paper is to be used, set the printer settings as marked paper mode first, see instruction manual.

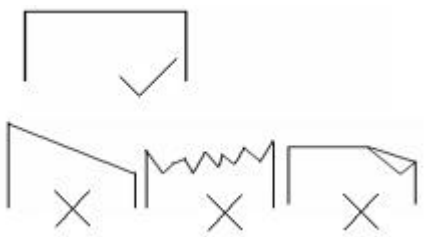
4.7.2 Setting/replacing paper roll

- 1) Turn on the printer.
- 2) Open the printer top cover, as following picture.
- 3) Put the paper roll into the paper holder. See figure below.



Caution:

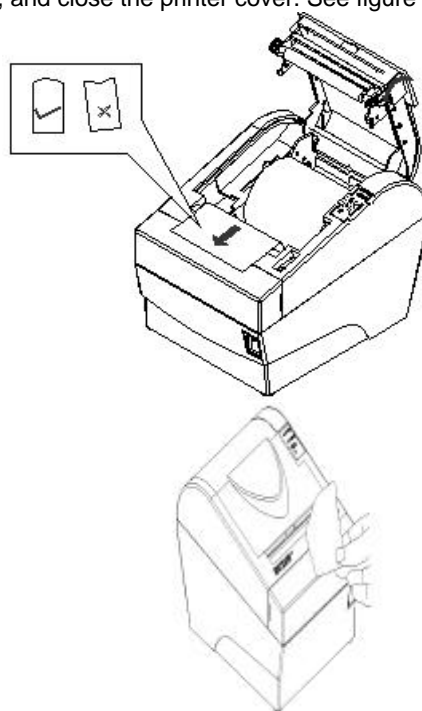
- ✧ Adjust the paper width by adjusting the module according to the paper type used.
- ✧ Make sure that the paper roll is cut according to the requirement below before loading:



- ✧ Make sure that the heat sensitive side of paper faces the printhead and the rolling direction of paper meets the requirements.
 - ✧ The paper roll should be kept from being loose. Or it may cause paper jam or other malfunction.
 - ✧ The paper roll should be balanced in the paper holder and not be inclined as it can affect paper auto loading and printing.
- 4) Pull the end of the paper roll out up to the end of the top cover, and close the printer cover. See figure below.

**Caution:**

- ✧ Both sides of the printer cover must be pressed down completely, fail to do so will influence the normal operation of the printer.
- ✧ The edge of paper should not leave the paper channel as shown in the above figure.



- 5) Tear off the surplus portion of paper by using the tear bar.

4.8 Self test

When having finished loading the paper roll, turn on the power while pressing the “FEED” button to print a self-test page.

5. Routine maintenance

5.1 Cleaning the print head

When one or more of the following phenomena occur, the printhead should be cleaned.

- Print out is light.
- Some of vertical columns on receipt are light.
- Paper advances or retraces with large noises.

To clean the printhead, follow steps given below.

- Turn off the power and open the top cover of printer.
- Allow a few minutes for printhead to cool down if it has just finished printing.
- Wipe off stains, such as dust and the like, on the heating element of print head by using a cotton swab (wrung) impregnated with ethyl alcohol.
- Close the printer top cover when ethyl alcohol has evaporated completely.

5.2 Cleaning sensor

When one or more of the following phenomena occur, please clean the paper near end sensor.

- During printing, the printer stops printing occasionally and misinforms paper end.
- The printer misidentifies label mark.
- Doesn't alarm paper end when paper is end.

To clean sensors, following steps given below,

- Turn off the power and open the top cover.
- With a soft cotton swab impregnated with ethyl alcohol, carefully wipe off stains and dusts on the surface of sensor.
- Close printer cover when ethyl alcohol has evaporated completely.

5.3 Cleaning platen roller

When one or more of the following phenomena occur, please clean the platen roller.

- Print out is light
- Some vertical columns on receipt are not clear.
- Paper advances or retraces with large noises.

To clean the platen roller, follow steps given below.

- Turn off the power, then open the top cover.
- Wipe off stains, such as dust and the like, on the platen roller by using a cotton swab (wrung) impregnated with ethyl alcohol.
- Close the top cover when ethyl alcohol has evaporated completely.



Caution:

- ✧ Before starting routine care, make sure the printer has been shut down.
- ✧ Do not touch the surface of printhead with your hands or any metallic objects. Do not use any other method to clean the printhead, platen roller and sensors.
- ✧ Do not use an organic solvent like gasoline, acetone and etc.
- ✧ Allow a few minutes for ethyl alcohol to evaporate before preparing the printer ready to use.

6. Connector signal

6.1 Centronics interface

The parallel interface is single-directional and supports BUSY/ACK handshaking protocol. Its connector is 36pin Centronics.

Pin#	Source	Compatible
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 Gnd
17		Chassis Gnd
18	P	Peripheral Logic High
19		Signal Ground (nStrobe)
20		Signal Ground (Data 1)
21		Signal Ground (Data 2)
22		Signal Ground (Data 3)
23		Signal Ground (Data 4)
24		Signal Ground (Data 5)
25		Signal Ground (Data 6)
26		Signal Ground (Data 7)
27		Signal Ground (Data 8)
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

6.2 Serial interface

The serial interface is RS-232 standard compatible and its connector is 25pin female D type.

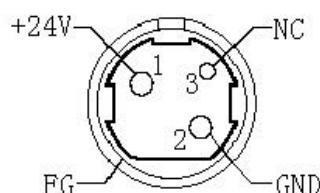
PIN No.	Signal
PIN1	Shield Ground
PIN2	TXD
PIN 3	RXD
PIN 4	RTS
PIN 5~6	NC
PIN 7	Signal Ground
PIN 8~19	NC
PIN 20	DTR
PIN 21~25	NC

User may check the current setting statues of the interface by printing a configuration table. The default setting is as follows,

Baud rate: 9600bps
 Data bit: 8
 Parity bit: None
 Stop bit: 1
 Flow control: Hardware

6.3 Signal assignment of power connector

- 1 --- Positive (+24V)
- 2 --- Negative(GND)
- 3 --- NC

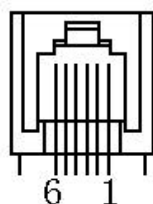


6.4 Drawer kick-out connector

1. Electrical characteristics

- Drive voltage: DC 24 V
- Drive current: 0.8 A maximum (Within 510 ms)
- SW signal: Signal level "L" = 0 to 0.5 V "H" = 3 to 5 V

2. Diagram



3. Signal assignmen

No	Signal	Function
1	FG	Frame ground
2	DRAWER 1	Drawer 1 drive signal
3	DRSW	Drawer status detecting signal
4	VDR	Drawer drive power supply
5	DRAWER 2	Drawer 2 drive signal
6	GND	Common ground on circuits

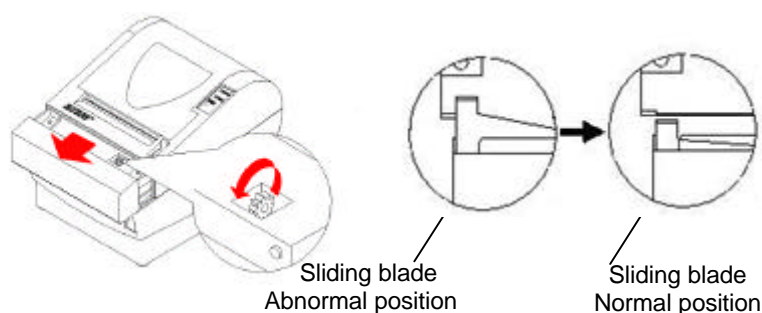
7. Troubleshooting

If the printer does not operate correctly, consult the troubleshooting table below. If there are still, problems that can not be solved, please contact your local distributor or a technician of manufacturer for assistance.

7.1 Cutter malfunction

While encountering cutter malfunction due to paper jam or unexpected power off, do not open the top cover by force since the sliding blade of the cutter installed on it might have not got back to its original position. Otherwise, the cutter will be damaged. In case of this, please follow instructions below to settle the problem.

1. Shut down the printer.
2. Remove the cutter cover as shown in figure below, a knob will be exposed.
3. Turn the knob counter-clockwise (see figure below) to retract the sliding blade of the cutter while observing its movement through the paper exit, do not stop turning until the sliding blade is completely separated from the stationary blade. Then open the top cover to clear paper jam or such the like.



Caution 1: Usually, at the beginning of the knob being turned, the sliding blade moves too slowly to be felt. However, it's moving. Therefore, keep turning while carefully observing its movement.

Caution 2: In case of being unable to turn the knob counter-clockwise as shown in figure below, turn it clockwise.

7.2 Error LED and buzzer

Problem	Possible cause	How to deal with	Referring
Error LED quick continuous flashing.	Paper near end	Replace the paper roll in time.	User's manual
Error LED flashes and buzzer beeps	Paper end	Load a new paper roll	
	Cutter error	Deal with the error according to 7.1	
	Top cover is raise	Close the top cover completely.	
	Print head is overheating	Turn off power switch to allow the print head to cool.	
A long beep of buzzer	The printer starts initialization		User's manual
Buzzer beeps and error LED on.	These indicate a serious problem.	Contact your local distributor or a technician of manufacturer for assistance.	

7.3 Problem during printing

Problem	Possible causes	How to deal with	Referring
Colored stripes on receipt.	Paper near end	Replace paper roll	User's manual
Receipt does not come out all the way.	Paper jammed	Open printer's top cover, inspect the paper path and cutter and clear any jammed paper.	

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Halt of printing	Paper jammed	Open printer's top cover, inspect the paper path and cutter and clear any jammed paper.	
Receipt is not cut	Paper jammed	Open printer's top cover, inspect the paper path and cutter and clear any jammed paper.	
Printout is light or spotty.	Paper roll is loaded incorrectly.	Make sure the paper roll has been loaded correctly	
	Paper is out of specification	Make sure to use recommended paper or its equivalent.	
	Dirty printhead or platen roller	Clean the printhead or platen roller.	Instruction
	Print darkness is too low.	Increase print darkness to 110% or 120% as needed.	
Vertical column of print is missing	Dirty printhead or platen roller	Clean printhead or platen roller	User's manual
	Damaged printhead	Contact distributor or manufacturer for assistance	

7.4 Printer does not function

Problem	Possible causes	How to deal with	Referring
Printer does not function when turned on.	Printer not plugged in	Make sure that printer cable has been connected properly on both ends. Check that the host or power supply is getting power.	User's manual

Paper near end alarm acts only as a prompt for users to pay attention to the remaining paper. The printer doesn't recognize it as an error. When this alarm is given, no effect will be applied to printing.