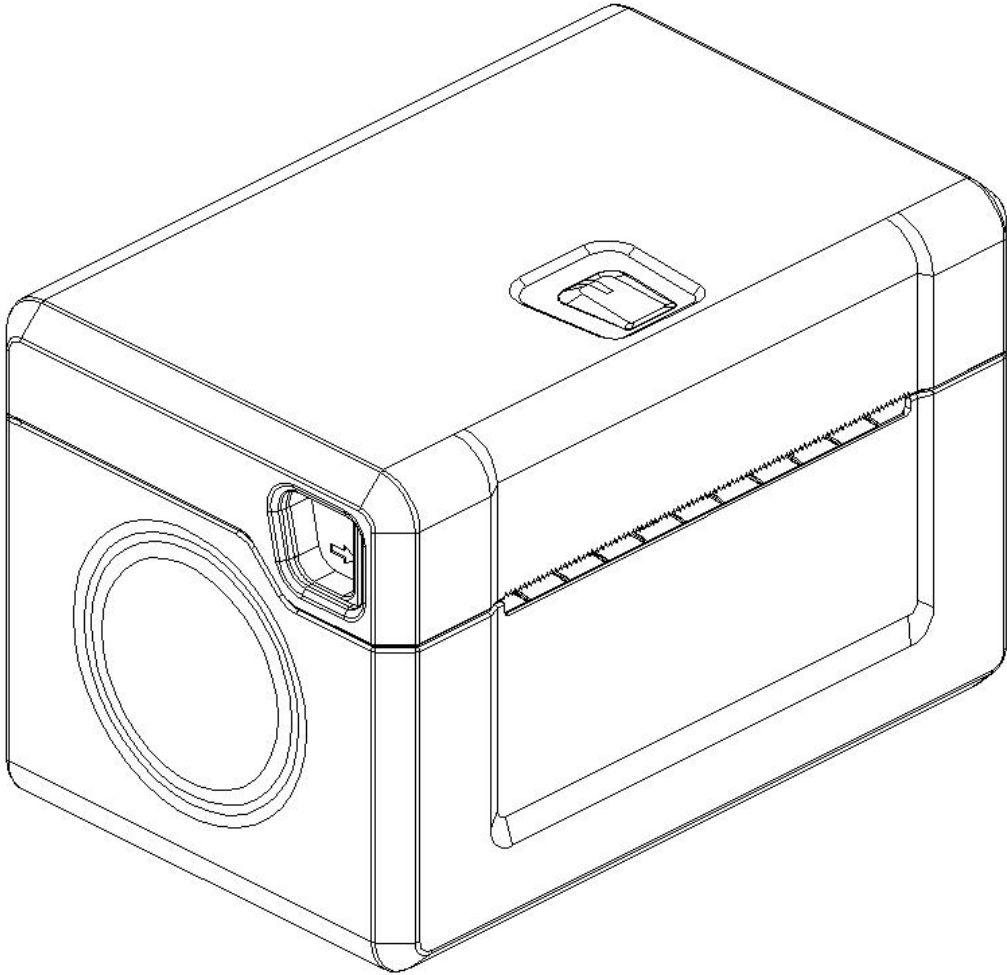# SP-TL31 Thermal Label Printer User's Manual

VER 1.00

Beijing Spirit Technology Development Co.,Ltd

www.sprt-printer.com

Content

Precautions

Before using the printer, please read this chapter carefully!

Safety Precautions

◆Do not touch the print head and its connecting parts to avoid burns or damage to the print head due to static electricity.

◆If the printer emits smoke, peculiar smell or abnormal noise, the machine must be turned off immediately. Continued use may cause fire. You should cut off the power immediately and contact the seller or Spirit Customer Service Center to inquire about the solution.

◆Do not disassemble the machine by yourself. Improper repairs are dangerous and will therefore lose the warranty provided by the supplier.

◆Please use the power adapter provided by the supplier or meet the specifications. An improper power adapter may damage the machine and cause a fire.

◆Prevent foreign objects from entering the machine to avoid damage to the machine components, which may even cause fire and accidents in serious cases.

◆If water or other liquid flows into the machine, please cut off the power immediately, and get in touch with the seller immediately to inquire about the treatment method. Continued use may cause fire.

Precautions for use

◆The printer should not be immersed in water or exposed to rain, otherwise it may cause damage to the printer.

◆Do not open the paper compartment cover during printing, otherwise the printer may not work properly.

◆When using the USB interface to print, the USB cable cannot be unplugged during the printing process, otherwise the print data may be incomplete. When using Bluetooth to print, the distance cannot exceed 10 meters during the printing process, otherwise it may cause garbled printing or printing failure.

◆Although the printer can work stably from 0°C to 50°C, too high ambient temperature (45°C) or too low ambient temperature (5°C) will cause the print quality to decrease.

◆Excessive environmental humidity (above 85% relative humidity) or low environmental humidity (below 20% relative humidity) will cause the print quality to decrease.

◆Using low-quality printing paper or printing paper that has been stored for a long time may reduce the printing quality and even damage the printer.

◆When the printer works in the black mark detection mode (when printing pre-printed receipts with black marks), the black mark pre-printed on the printing paper is required to comply with the black mark printing specifications (see 4.2 black mark detection instructions for details), otherwise it may cause The printer cannot accurately detect the black mark.

◆When the printer prints labels, the label must not exceed the maximum value designed by the printer, otherwise the printer may not work normally.

Precautions for storage

◆The printer should be stored in an environment with a temperature of -20°C to 60°C and a relative

humidity of 10% to 90%.

Statement

This is a Class A product. In the living environment, this product may cause radio interference. In this case, the user may be required to take practical measures for its interference.

Chapter One Printer Appearance and Model

1.1 Printer Appearance

Indicator LED

Upper Cover

Door-open Button

FEED

Paper-out Mouth

Lower Cover
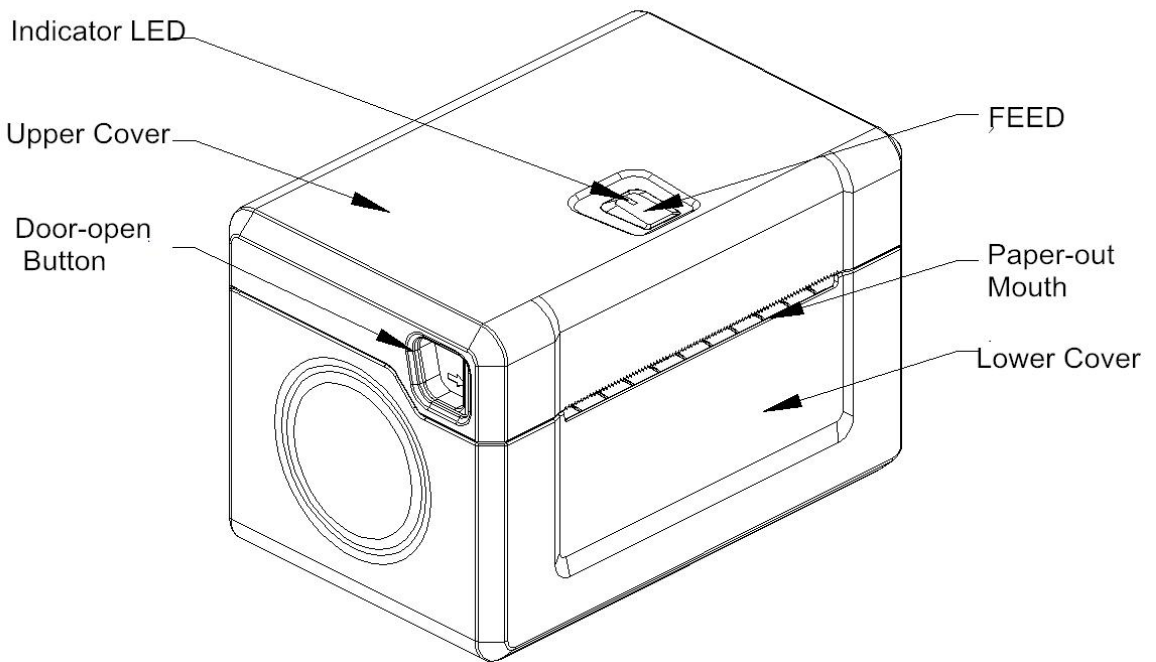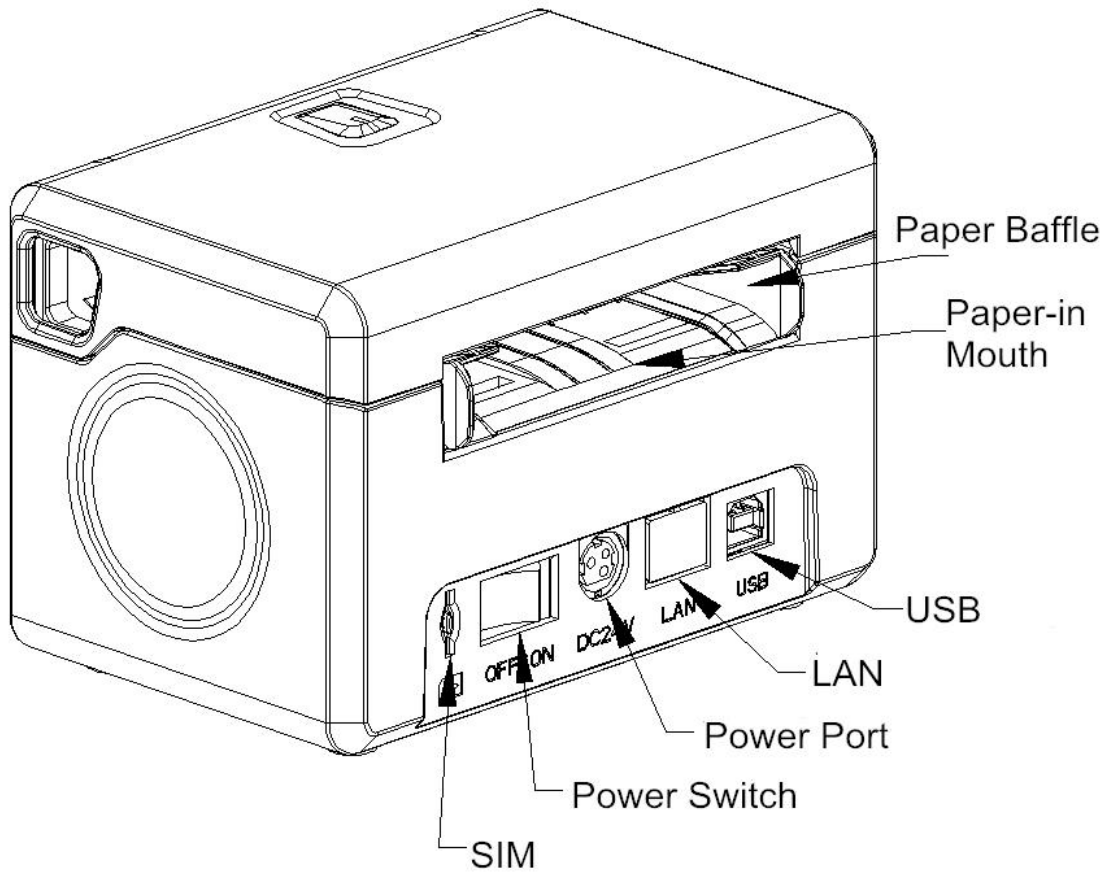
SP-TL31 Printer appearance figure

1.2 Model

Model Name	Description	Printing Density
SP-TL31	USB	8dots/mm, 576dots/line
SP-TL31BTDM	USB,Blue Tooth	

Chapter 2 Performance Features

2.1 Printing performance

Printing method: line thermal printing

Printing paper width: 40mm(Min)---80mm(Max)

Printing width: 72mm(Max)

Maximum label: 80x202mm

Minimum label: 40x30mm

Label gap: Roll paper: 2-3mm

               Folding paper: 3mm

Resolution: 8dots/mm (203dpi)

Printing speed: 150mm/s(Max)

     Reliability: (1) Print head life: 50km

            Conditions of Use:

* Print 12 × 24 Western characters, print 50 lines of characters each time, and repeat printing intermittently.

* Use designated thermal paper.

2.2 Printing paper

Paper thickness: ordinary paper: 0.06mm～0.08mm;

Label paper: 0.12～0.14mm

Paper type: Folding paper: 80x202mm(Max)

            Roll paper: 80xφ100mm (Max)

2.3 Printing characters

·GB18030 all Chinese characters and characters, BIG5 all traditional Chinese characters, GB12345 all,Shift JIS Kanji: 24x24 dots and 16x16 dots

·ASCII characters: 12x24 points, 8x16 points and 9x17 points

·International characters and code pages: 12x24 points and 9x17 points

·Customize characters and graphics.

·One-dimensional barcode: UPCA, UPCE (not supported by TSPL instruction), EAN13, EAN8, CODE39, ITF25 (not supported by TSPL instruction), CODABAR, CODE93, CODE128.

·Two-dimensional barcode: PDF417, QR CODE, DATA Matrix

2.4 Physical parameters

Appearance size: 140(L) X 95(W) X 93(H)mm;

Weight: 680g (without paper roll);

Interface mode: USB, Bluetooth;

2.5 Environmental parameters

Working temperature: 0℃～50℃;

Working humidity: 10%～80%;

Storage temperature: -20℃～60℃;

Storage humidity: 10%～90%.

2.6 Other properties

Paper loading method: see 3.1.1 Printing Paper Roll Installation for details.

Black mark positioning: yes (see 4.2 pre-printed black mark description for details).

Print control commands: ESC/POS, TSC/TSPL.

(See "SP-TL31/301 Printer Command Programming Manual" for details).

Power supply mode: DC24V±5%, 1.5A.

Chapter 3 Methods of Use

3.1 Operation Steps

3.1.1 Paper Installation

Open the cover and fill the paper:

1. Open the paper compartment cover and adjust the position of the paper limit block so that the paper can be put in smoothly.

2. Pass the paper through the limit slot of the paper limit block from the rear, and pull the paper over the paper exit position. Pay attention that the thermal surface of the paper faces the direction of the print head.

3. Adjust the paper limit block to a suitable position again according to the paper width, so that the paper slides smoothly, and the paper will not swing left and right during the printing process.

4. Close the paper compartment cover, and pay attention to minimize the amount of label paper left outside, so as to reduce the waste of paper rolls.
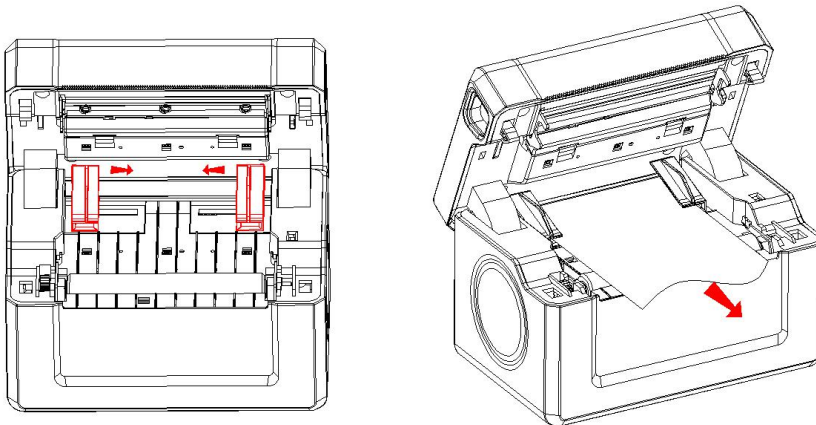
Automatic paper loading:

1. Adjust the paper limit block to a suitable position according to the paper width, so that the paper slides smoothly, and the paper will not swing left and right during the printing process.

2. Pass the paper through the limit slot of the paper limit block from the back, and continue to push the paper inward until the machine automatically sucks in the paper. Note that the thermal surface of the paper faces the direction of the print head.
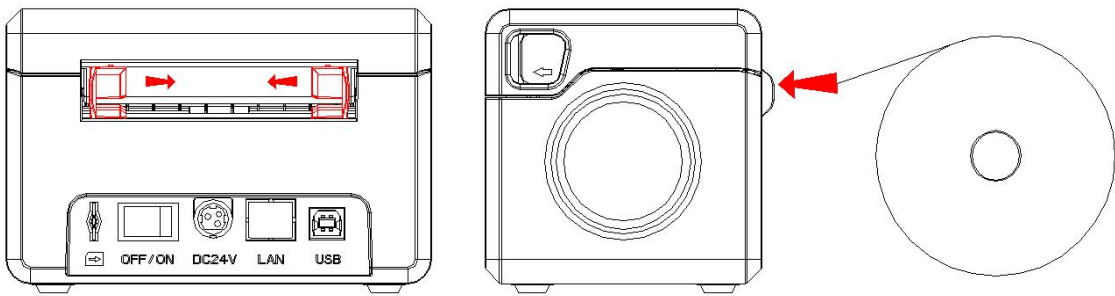
> ⚠ **Caution!**
> 1. Pay attention to the direction of loading paper, make the printing surface face to the print head.
> 2. Please don't feed or draw the paper forwards or backwards with hands.
> 3. Keep clean of the print head, avoid to influence the printing quality.

3.1.2 Paper Position Requirements

The folding paper (or paper roll) should be placed in the same straight line as the paper feeding path, to avoid skewing left and right causing the paper not to feed smoothly, which may affect the printing performance.
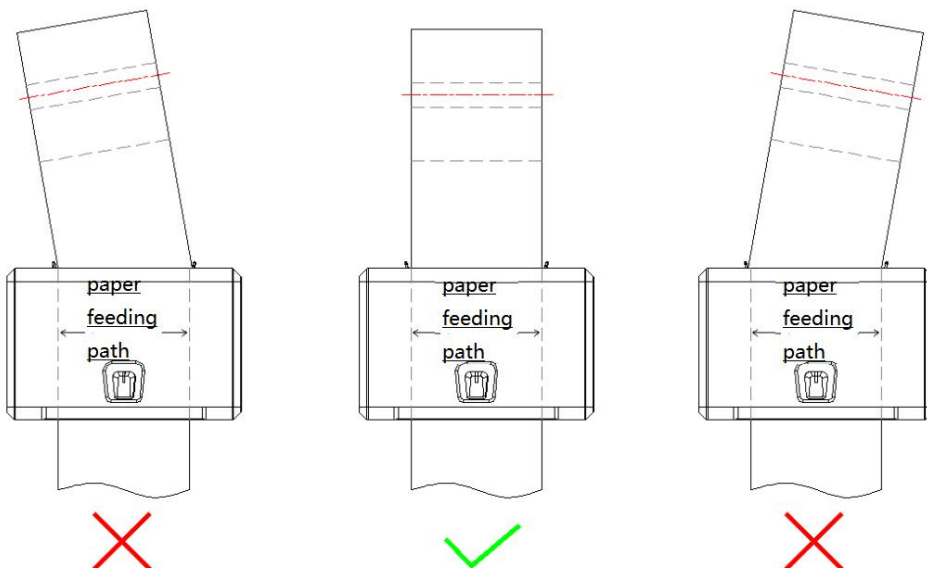
3.1.3 Print Head Replacement

1. Open the upper cover, pull the two clasps on the upper channel block, and remove the upper channel block.

2. Slide the print head assembly down to the bottom end, and take out the print head assembly

at a slight angle away from the plastic case.

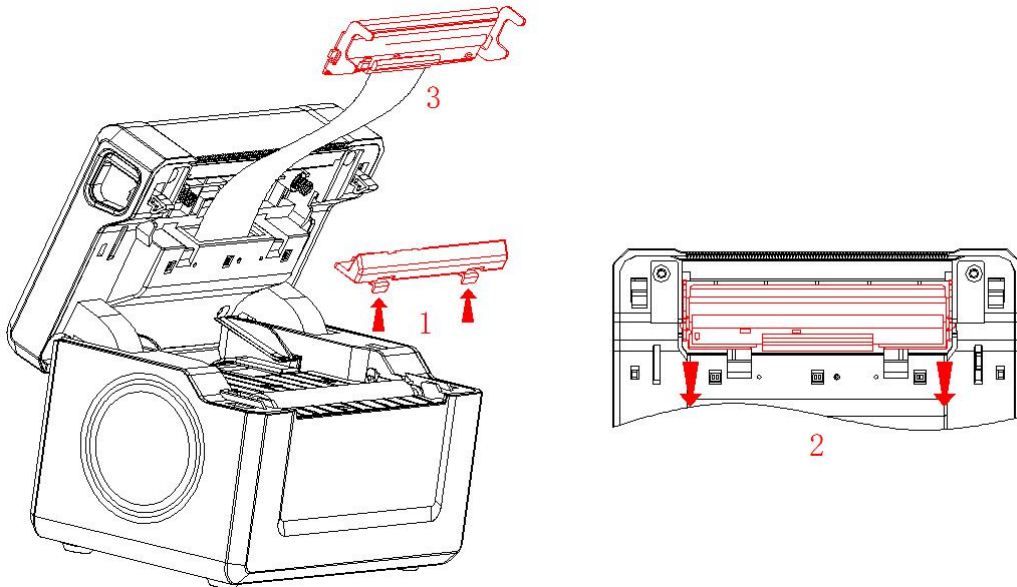3. Remove the ribbon cable, replace with a new print head assembly, keep the ribbon cable direction unchanged, and assemble it in reverse according to the above steps.

3.1.4 Rubber roller replacement

1. Open the upper cover and press the clasps of the rubber roller sleeve inward from the left and right sides. After the clasp is released, rotate in the direction shown in the figure and take out the rubber roller assembly in parallel.

2. Manually remove the gear and shaft sleeve to both sides, replace with a new rubber roller, keep the direction of the shaft sleeve unchanged, and assemble it in reverse according to the above steps.

3.2 Basic functions instructions

3.2.1 Power on

Close the paper house cover in power off status, then turn on the printer. The indicator light will flash alternately two times, then the power indicator is always on, the printer enters the normal working mode.

3.2.2 Self test

Close the paper case, press the 【FEED】 button, then turn on the power, at this time the printer will mark the gap sensor firstly, and then print self test paper after finishing the mark. The self test paper of different model may have difference. It will not mark gap sensor in receipt printing mode.

Self-test can detect whether the printer is working properly. If the self-test can be printed correctly, it means the printer works normal except for the interface of the host. Otherwise it needs to be repaired.

Self-test prints out parameters in fellow order: manufacturer name, printer model, software version, interface type, default value of printer parameters, 96 characters in ASSIC code, default code page content (language setting is English) or Chinese character library name (The language is set to Chinese) and the barcode type. Note: gap sensor related parameter included under label mode.

3.2.3 Paper feed (manual paper feed)

Receipt paper mode: In the power-on state, put in the ordinary thermal paper, press the 【FEED】 button, the printer starts to feed the paper, release the 【FEED】 button　to stop the paper feeding;

Label mode: In the power-on state, put in the thermal label paper, press the 【FEED】 key. The printer forwards the paper to find the label gap, and sends the label gap to the tear line position.

3.2.4 Paper auto feeding

Adjust the paper width limit block to a suitable position. When the printer is turned on and the paper house cover is closed, feed the paper into the printer from the paper inlet, and the printer will automatically suck the paper in.

3.2.5 The first order zero waste

In the power-on state, the printer will automatically perform the first order zero waste function after the printer is powered on, cover opened and closed, and automatically loaded paper, to ensure that the printing paper is not wasted.

3.2.6 Hexadecimal printing

Follow the steps below to turn the printer into hex print mode.

1. Open the paper cover;

2. Press the 【FEED】 button to turn on the power. Wait for the power indicator and the error indicator to flash alternately, then close the paper cover.

3. At this point, the following 3 lines of content are printed:

Hexadecimal Dump

To terminate hexadecimal dump,

Press FEED button three times.

It indicates that the printer enters hex mode. In this mode, all inputs will be printed as hexadecimal numbers. Each press of the 【FEED】key will feed a line of paper. Press 3 times in total, and it will print out "*** Completed * **",　which means exit hex print mode.

3.2.7 Printer parameter settings

There are two ways to set printer parameters:

1. Use the setting tool on PC to set.

2. Set by button, the specific operation methods are as follows:

In the power off state, open the Paper Cover firstly, press the 【FEED】 button, then turn on the power. Release the 【FEED】 button after the power indicator and error indicator flash alternately. Press the【FEED】button two times, then close the Paper Cover. The printer enters the parameter setting mode and prints out the first settable parameter and its current set value. Check Appendix A for

detailed setup methods.

To exit the parameter setting method, open the paper cover, press the 【FEED】 button simultaneously, then close the paper cover, release the【FEED】 button. The printer saves the set parameter values and exits the parameter setting mode to enter the normal working mode.

If the printer is powered off directly, the set parameter values are not saved.

3.2.8 Factory reset

In the power off state, open the Paper Cover firstly, press【FEED】button, then turn on the power. Release the 【FEED】 button after the power indicator and error indicator flash alternately. Press the 【FEED】 button three times, then close the Paper Cover. The printer will print out the currently set parameters, and at the end prompt: "Note: set the recovery system to the default values, press the 【FEED】 button to confirm. Direct power off cancel". Press 【FEED】 button to confirm recovery, power off to cancel the factory reset Settings.

3.2.9 Update Firmware

1. Open"UpdateFirmware.exe" update tool.

2. Choose the port, select the firmware file that needs to be upgraded, click "Start", and wait until the data update is completed, the printer will automatically enter the upgrade mode.

3. The green and red light flash alternately. After the upgrade is completed, the printer automatically prints out the self-test and enters the normal working mode.

3.2.10 Switch mode of operation

In the power off state, open the paper cover, press【FEED】button, turn on the power. Wait about 5 seconds, when the red error light flashes, release the 【FEED】button, close the paper cover, the printer prints out " Switch to ticket print mode" or "switch to label print mode". (Depending on the current working mode of the printer, the printed information will be different). The printer will work in the prompted mode of operation.

3.3 Interface connection and printing

3.3.1 Power interface

The rated supply voltage is 24V ± 5% DC, rated current is 1.5A. Use a desktop A-1009-3P power outlet, positive inside and negative outside. Please use the standard power adapter to supply power.
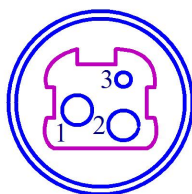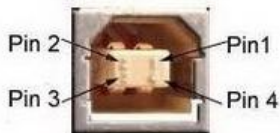

Pin No.	Signal
1	+24VDC
2	Ground
3	NC

Power socket and pin assignment

3.3.2 USB interface

The standard configuration of the SP-TL31 printer is equipped with a standard USB printer cable D-port data cable for connecting the printer to the main device. The printer's USB belongs to the slave device type (DEVICE);

The outline and pin definitions are as follows:

USB socket and pin assignment

Pin No.	Function	Remark
1	V Bus	
2	Data -	Data negative
3	Data +	Data positive
4	GND	Power ground

3.3.3 Bluetooth connection

A handheld device with Bluetooth interface, such as laptops, or other information terminals, can drive SP-TL31 printing via the Bluetooth interface. The initial device name is "TL31/301 BT Printer" and the initial password is "1234". Users can use <SP-TL31/301 Setting Tool Software> to modify the device name and password as needed. For details on how to change the device name and password, refer to the help file of <SP-TL31/301 Setting Tool Software>.

The SP-TL31 printer must be paired with the Bluetooth master device that controls the printer before it works. Pairing is initiated by the master device. The usual pairing process is as follows:

1, Turn on the printer

2. The master device searches for an external Bluetooth device.

3. If there are multiple external Bluetooth devices, select TL31/301 BT Printer

4. Enter the password "1234"

5. Complete the pairing.

For details on how to pair, please refer to the Bluetooth function description of the main device.

Description: The SP-TL31 printer supports connection with Android devices and Apple 4.0 devices.

3.4 Indicator light, buzzer and button operation

The SP-TL31 printer has one button, one built-in buzzer and one Red and green two-color indicator.

【FEED】 is the paper feed button. You can use the print command to enable or disable the button switch function. The button control mode is allowed: When in the ticket mode, press the 【FEED】button to output the paper, release the 【FEED】 button to stop the paper exiting. When in the label mode, press the 【FEED】 button, the printer advances the paper to find the label gap, and sends the label gap to the tear line position.

The buzzer is used to indicate the type of error status, which can be set to enable or disable the error alarm by parameter setting. The error status type is the same as the ERROR indicator.

When the green indicator is always on,means the printer is working normally and could print.

When the green indicator is flashing, it means the Bluetooth has been connected.

When the red indicator is always on or flashing, it means the printer has error like out of paper. Please refer to the "Error Table" for details.

Errors	Error indicator status	Specification
Without paper	Constant on	Replace the paper or use the appropriate label stock
Paper case opens	Flash five times, stop 1 second	Close the paper case
Printer head overheated	Flash one time, stop 1 second	Wait for a moment to continue printing

Chapter 4 Other Information

4.1 Commands Manual

<SP-TL31/301 Commands Manual> is a technical manual for engineer to develop printer utility, and users can ask our company for it.

4.2 Description of pre-printed Black Mark

If user use pre-printed black mark to locate the receipt, please be sure to abide by the following pre-printed black mark regulation when print the black mark paper. Otherwise, it will cause that the printer cannot identify the black mark.

The black mark pre-print regulations are as below:
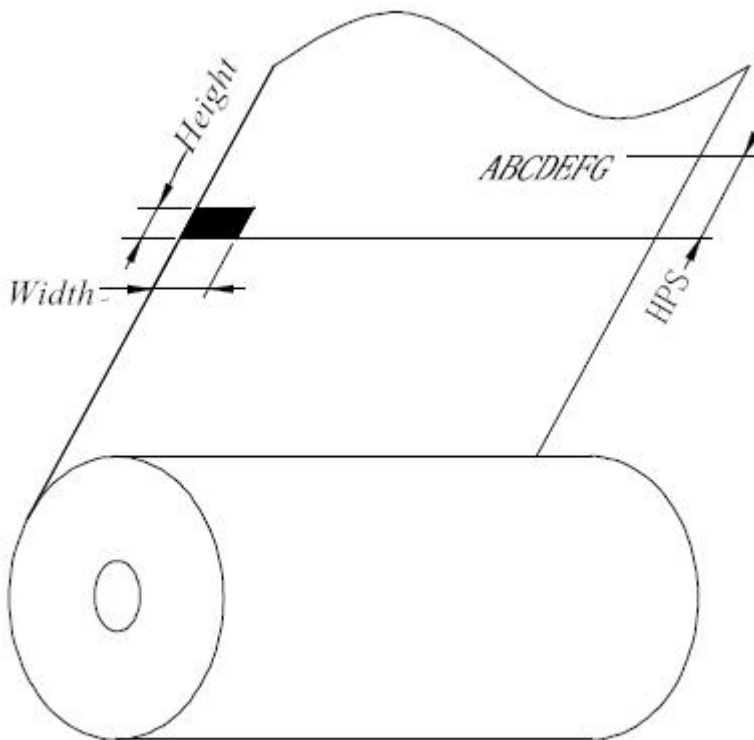
Printing Position: As the picture above, the black mark should be printed on the right edge of the side of words

Width range: width≥7mm

Height range: 4mm≤height≤6mm

Reflectivity of infrared ray : <10% (infrared ray reflectivity of other parts of the black mark paper

is>65%)

HPS: It is the distance between edges of black mark and edges of print beginning position. 4.5mm≤Hps≤6.5mm

4.3 Cleaning and maintenance

The thermal printer mechanism needs regular maintenance, the methods are as follows:

1. Use a dusting brush to clean up the scraps and dust on paper roller.

2. Dip an appropriate amount of alcohol with a cotton swab, wipe the printer core heating film, and remove impurities such as carbon deposits, dust and paper scraps. .

The above operations must be performed when the printer is powered off.
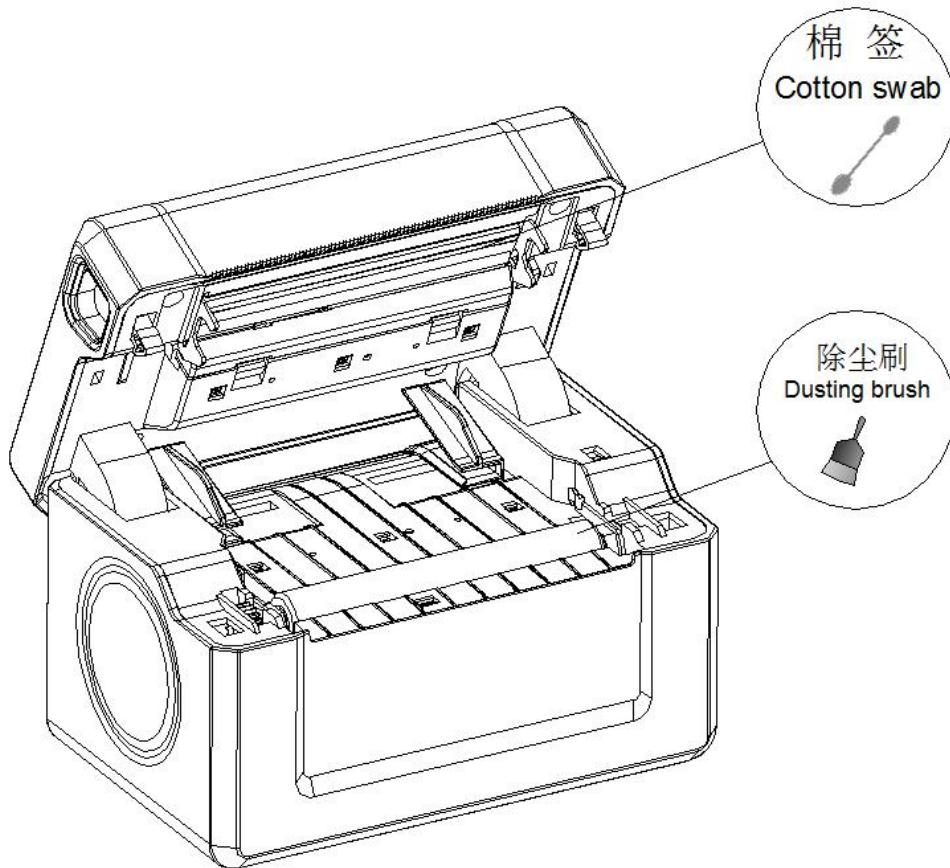
Appendix A

Setting description: Use [Paper Hatch Cover] to select the setting item. Each time you press [Paper Hatch Cover], the setting item changes to the next item, and the current setting value of the item is displayed. Use the 【FEED】 key to select the setting value of the setting item. Each time you press the【FEED】key, the setting value of the item changes to the lower value.
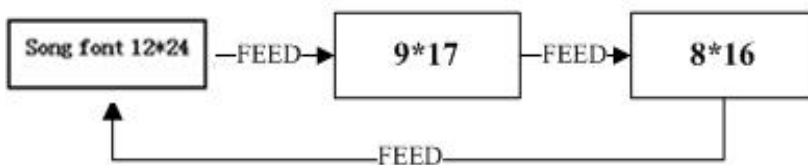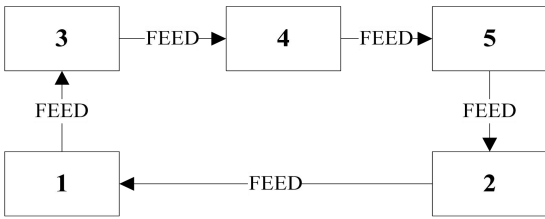
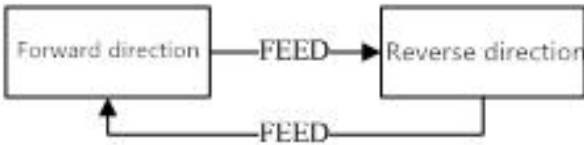## 1.General settings:
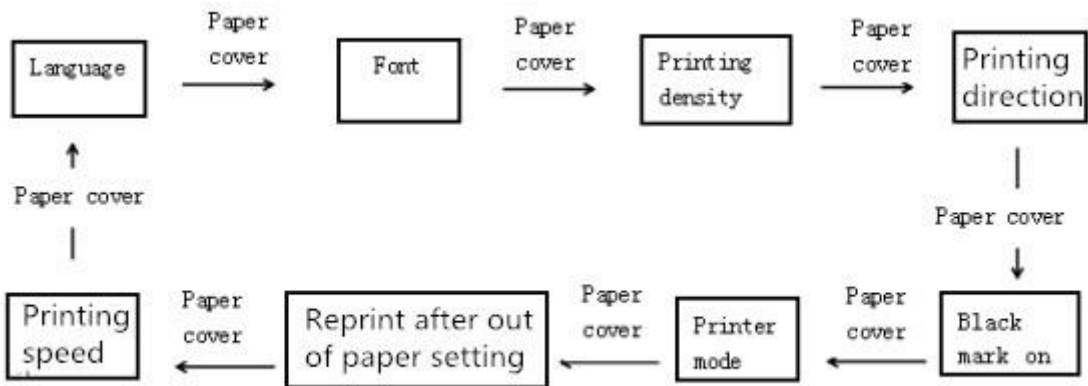
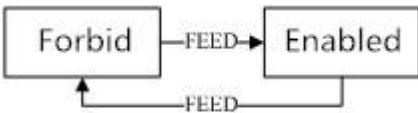## 2.Language setting:
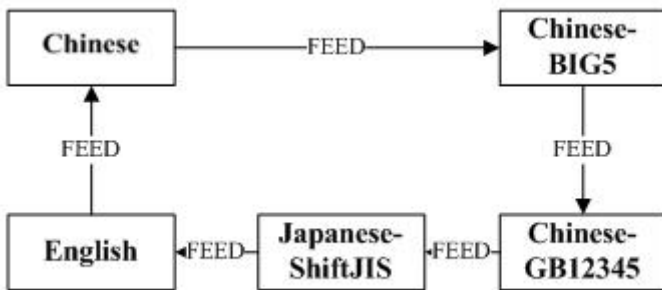
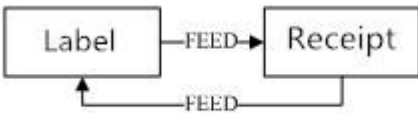## 3.Font setting:

4.Printing density setting:

```
┌─────┐        ┌─────┐        ┌─────┐
│  3  │─FEED──▶│  4  │─FEED──▶│  5  │
└─────┘        └─────┘        └─────┘
   ▲                             │
 FEED                          FEED
   │                             ▼
┌─────┐        ┌─────┐        ┌─────┐
│  1  │◀──FEED─────────────────│  2  │
└─────┘                       └─────┘
```

5.Printing direction setting:

```
┌──────────────────┐          ┌──────────────────┐
│ Forward direction│──FEED──▶ │ Reverse direction│
└──────────────────┘          └──────────────────┘
         ▲                              │
         └──────────FEED────────────────┘
```

6.Black mark on setting:

```
┌────────┐          ┌─────────┐
│ Forbid │──FEED──▶ │ Enabled │
└────────┘          └─────────┘
     ▲                   │
     └───────FEED─────────┘
```

7.Printer mode setting:

```
┌────────┐          ┌─────────┐
│ Label  │──FEED──▶ │ Receipt │
└────────┘          └─────────┘
     ▲                   │
     └───────FEED─────────┘
```

8.Reprint setting for out of paper:

Same as 【Black mark on setting】

9.Printing rapid setting:

Speed setting item:

```
┌─────────┐       ┌────────┐       ┌─────────┐       ┌─────────┐
│150mm/s  │─FEED─▶│76mm/s  │─FEED─▶│100mm/s  │─FEED─▶│127mm/s  │
└─────────┘       └────────┘       └─────────┘       └─────────┘
     ▲                                                    │
     └──────────────────FEED──────────────────────────────┘
```