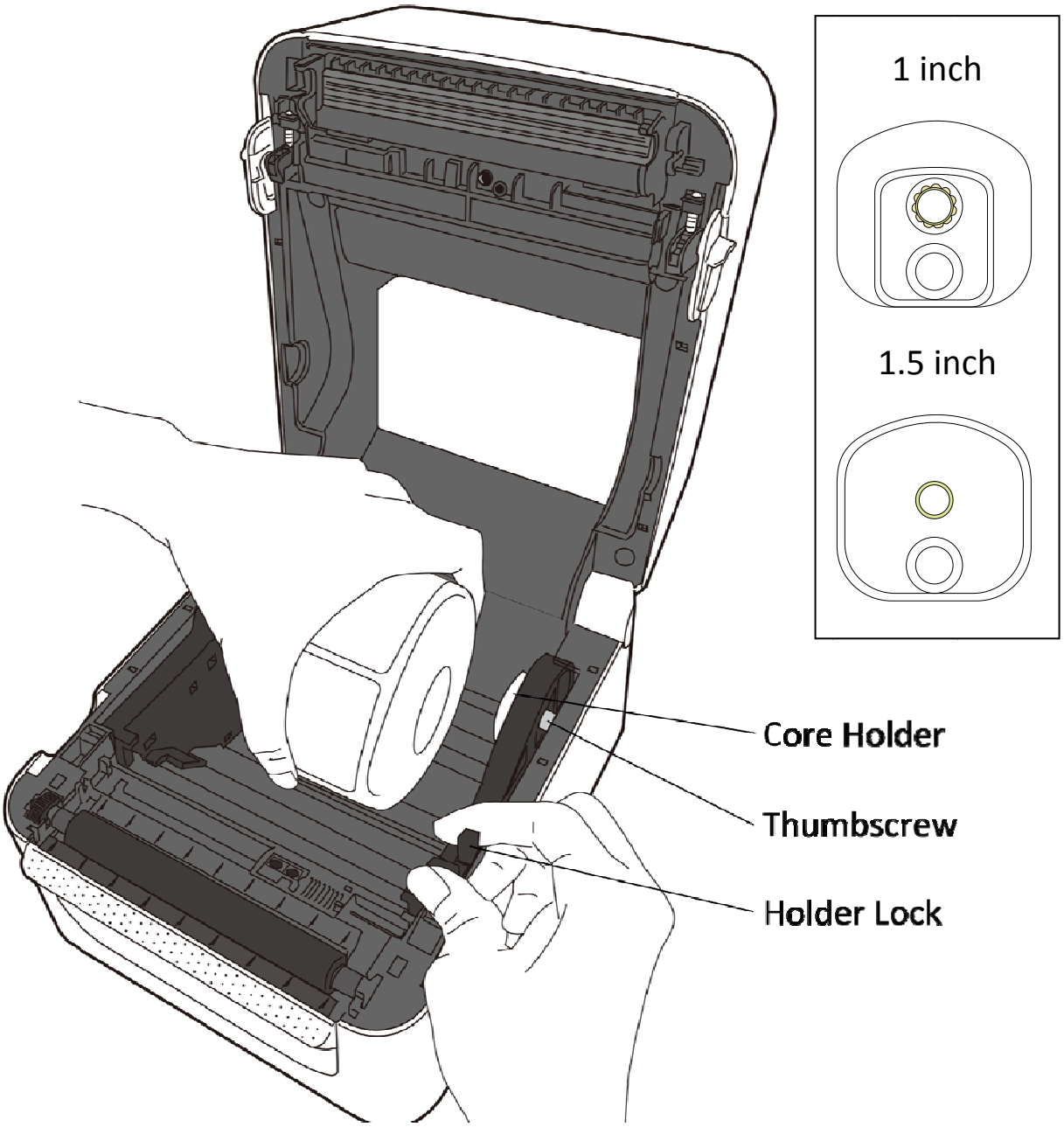
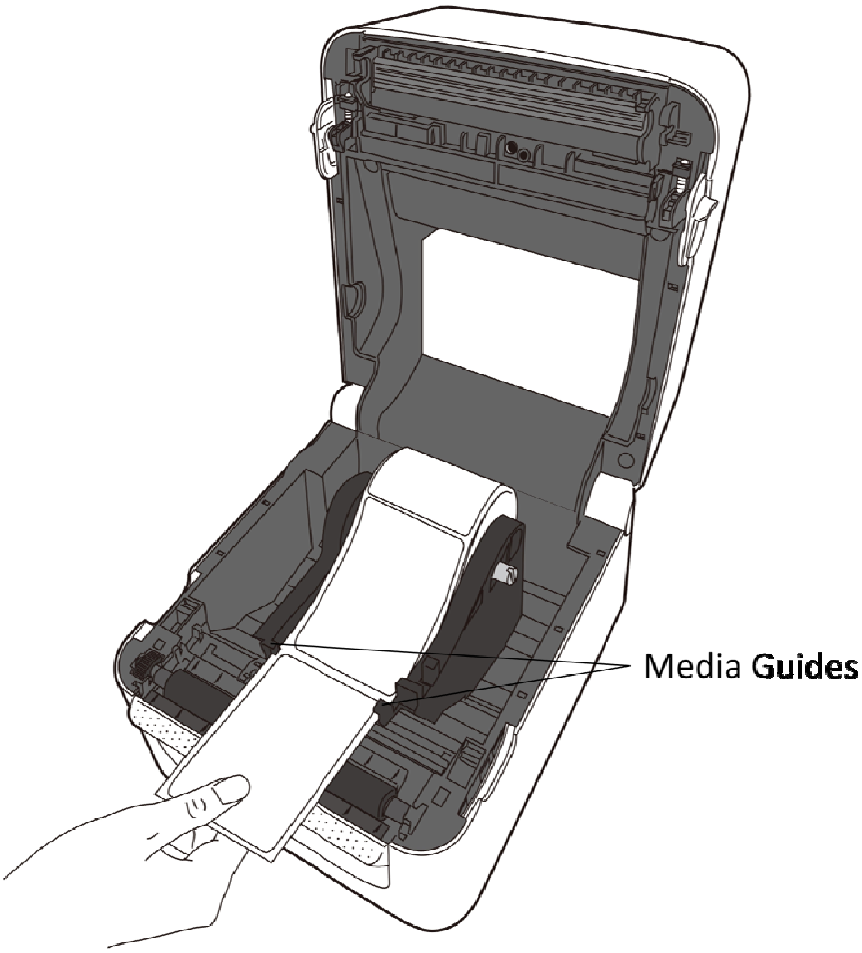
2. Press the holder lock on the **Media Roll Holders** to slide them outward, and place the media roll between the holders. Make sure the print side is up, and the media roll is clamped tightly by the holders.

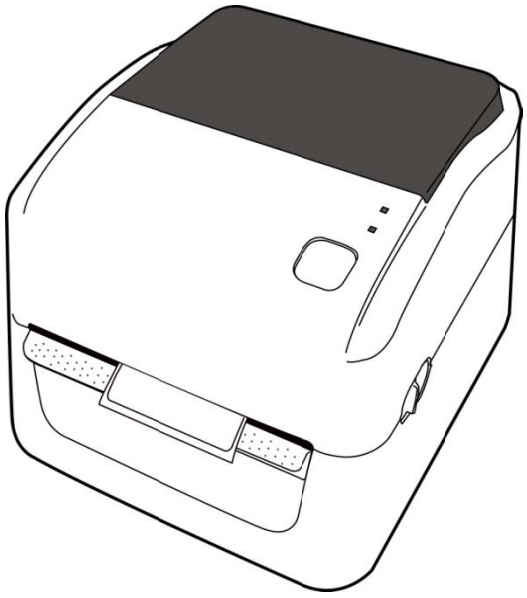
Note The default core holder is set for 1-inch inside diameter (ID). To install a 1.5-inch ID media roll, use your hand or a coin to loosen two thumbscrews on both holders, flip the core holders horizontally and secure them back.



3. Pull the media until it reaches out of the printer. Thread the media under the media guides.

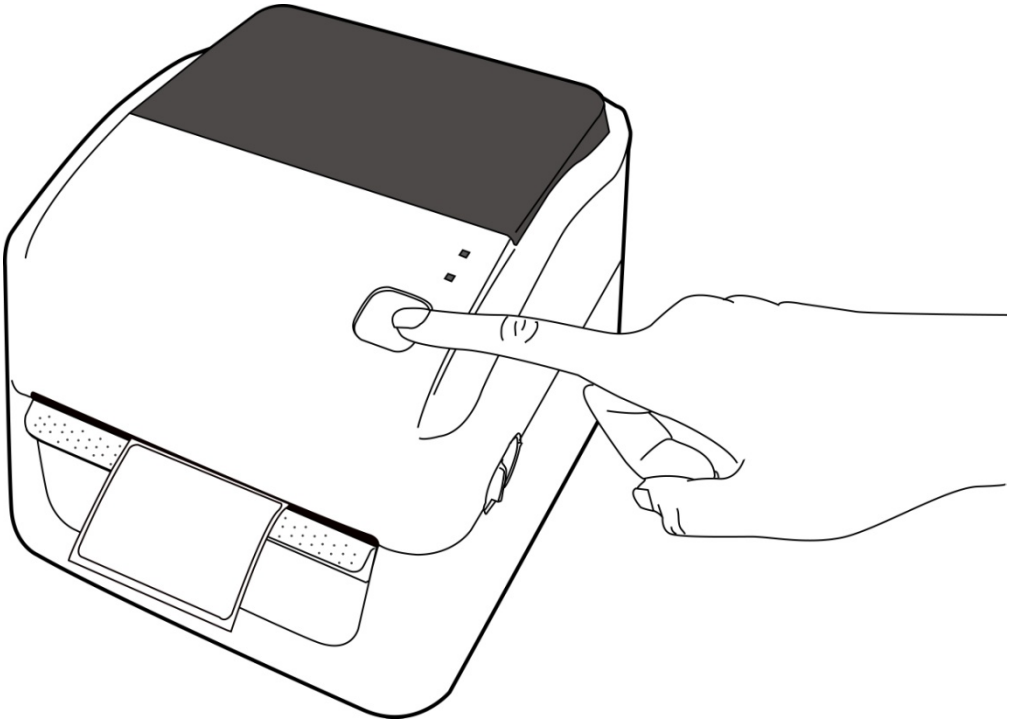


4. Close the top cover.

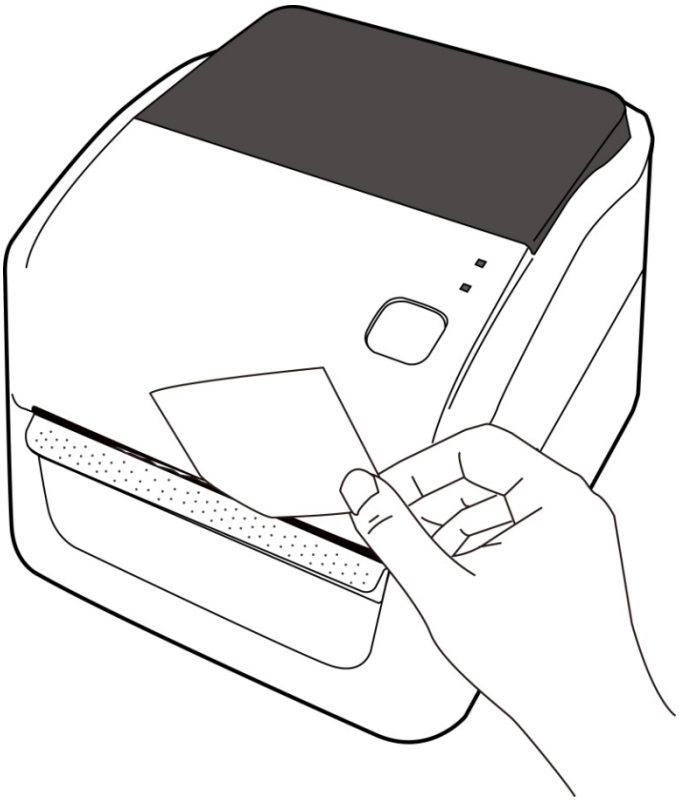


2.3.3 Test media feed

1. Turn on the printer, and press the **FEED** button to feed a label.

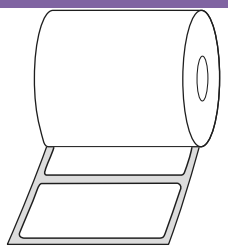
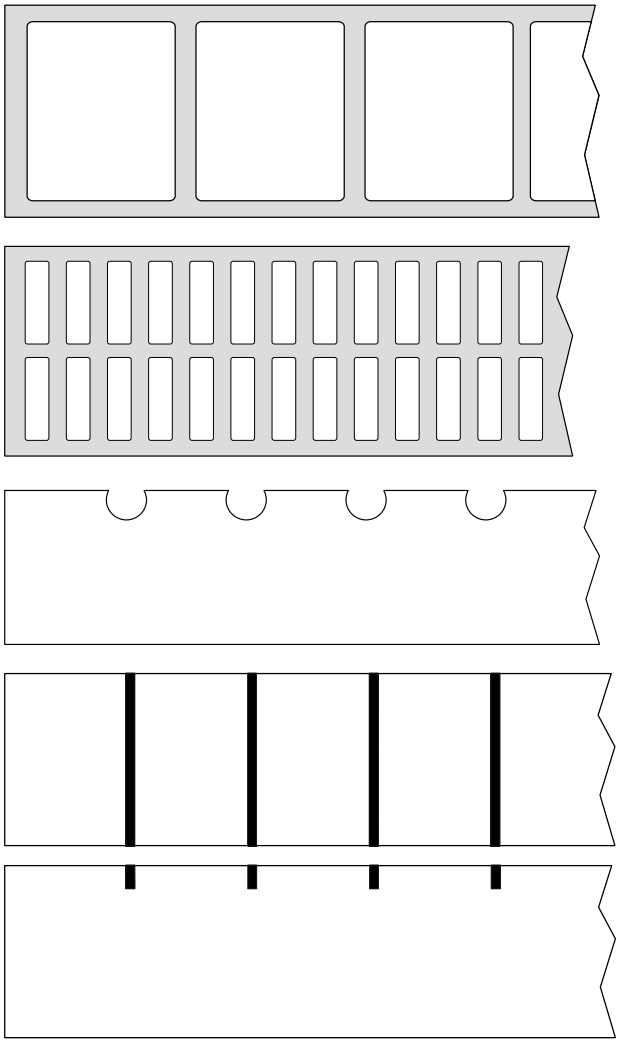


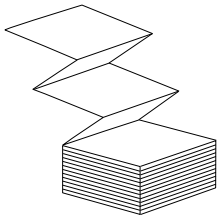
2. Flip the media and tear it along the edge of the top cover.



2.4 Media types

Your printer supports various media types, including non-continuous media, continuous media, and fanfold media. The following table provides details about them.

Media Type	Looks Like	Description
Non-Continuous Media		Non-continuous media is the typical media for bar code printing. Labels and tags are made of various materials, such as paper, fabric or cardstock, and are separated by gaps, holes, notches or black marks. Many labels are self-adhesive with liners, while some are linerless. 

Media Type	Looks Like	Description
Fanfold Media		Fanfold media is in continuous form, but it can be used as non-continuous media, because its labels are separated by folds. Some fanfold media also has black marks or liners.

3 Printer operation

This chapter provides information about printer operation.

3.1 Media sensor calibration

You will want the printer to work properly before starting your print jobs. To do this, you need to calibrate the media sensor. WS printers provide transmissive and reflective sensor calibration. Take the following steps to use them.

1. Make sure the media is properly loaded, the print module is closed, and the printer's power switch is set to the **OFF** position.
2. Press and hold the **FEED** button, and turn on the printer.
3. Both status lights glow solid orange for a few seconds. Next, they turn to green shortly, and then turn to other colors. Do one of the following to select the sensor:

- If you want to calibrate the transmissive sensor, when LED 1 turns to green and LED 2 turns to red, release the **FEED** button immediately.
- If you want to calibrate the reflective sensor, when LED 1 turns to green and LED 2 turns to orange, release the **FEED** button immediately.

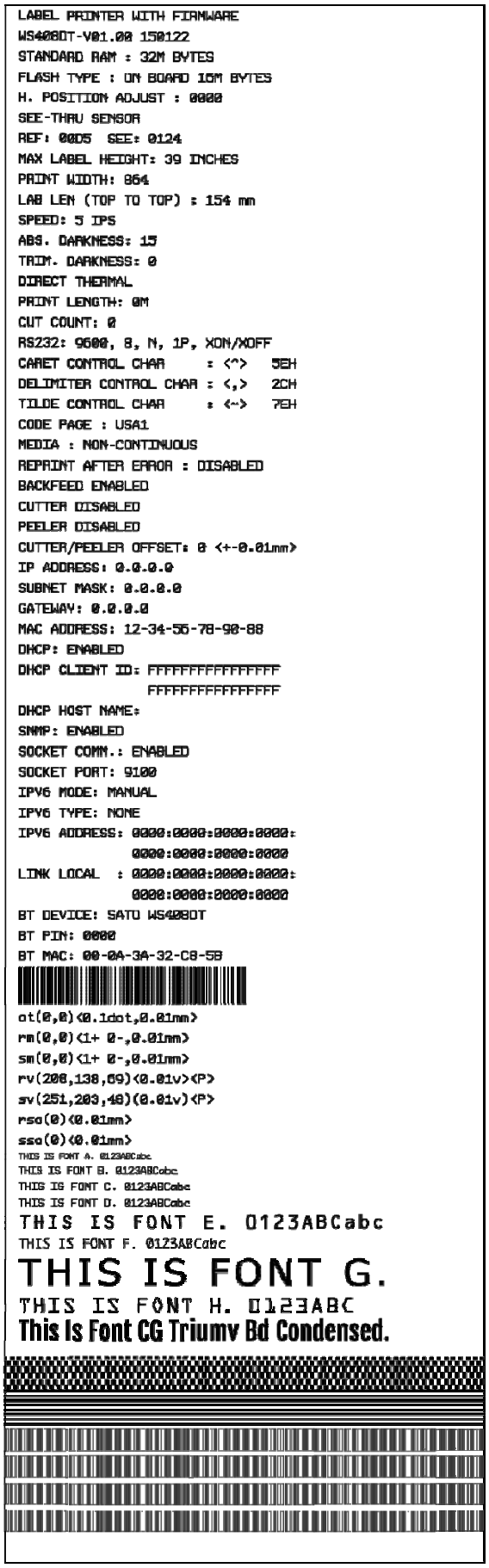
4. Press the **FEED** button. The media calibration is complete after the printer feeds 3-4 labels and stops.

3.2 Self test

The printer can run a self test to print a configuration label, which helps you understand current settings of the printer.

1. Turn off the printer.
2. Press and hold the **FEED** button, and turn on the printer.
3. Both status lights glow solid orange for a few seconds. Next, they turn to green shortly, and then turn to other colors. When LED 1 turns to orange and LED 2 turns to green, release the **FEED** button.
4. Press the **FEED** button to print a configuration label.

Your configuration label should look like this:


LABEL PRINTER WITH FIRMWARE
WS408DT-V01.00 150122
STANDARD RAM : 32M BYTES
FLASH TYPE : ON BOARD 16M BYTES
H. POSITION ADJUST : 0000
SEE-THRU SENSOR
REF: 00D5 SEE: 0124
MAX LABEL HEIGHT: 39 INCHES
PRINT WIDTH: 864
LAB LEN (TOP TO TOP) : 154 mm
SPEED: 5 IPS
ABS. DARKNESS: 15
TRIM. DARKNESS: 0
DIRECT THERMAL
PRINT LENGTH: 0M
CUT COUNT: 0
RS232: 9600, 8, N, 1P, XON/XOFF
CARET CONTROL CHAR : <^> 5EH
DELIMITER CONTROL CHAR : <,> 2CH
TILDE CONTROL CHAR : <~> 7EH
CODE PAGE : USA1
MEDIA : NON-CONTINUOUS
REPRINT AFTER ERROR : DISABLED
BACKFEED ENABLED
CUTTER DISABLED
PEELER DISABLED
CUTTER/PEELER OFFSET: 0 <+-0.01mm>
IP ADDRESS: 0.0.0.0
SUBNET MASK: 0.0.0.0
GATEWAY: 0.0.0.0
MAC ADDRESS: 12-34-56-78-90-88
DHCP: ENABLED
DHCP CLIENT ID: FFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFF
DHCP HOST NAME:
SNMP: ENABLED
SOCKET COMM.: ENABLED
SOCKET PORT: 9100
IPV6 MODE: MANUAL
IPV6 TYPE: NONE
IPV6 ADDRESS: 0000:0000:0000:0000:
0000:0000:0000:0000
LINK LOCAL : 0000:0000:0000:0000:
0000:0000:0000:0000
BT DEVICE: SATO WS408DT
BT PIN: 0000
BT MAC: 00-0A-3A-32-C8-5B
at(0,0)<0.1dot,0.01mm>
rm(0,0)<1+ 0-,0.01mm>
sm(0,0)<1+ 0-,0.01mm>
rv(208,138,69)<0.01v><P>
sv(251,203,48)(0.01v)<P>
rsa(0)<0.01mm>
ssa(0)<0.01mm>
THIS IS FONT A. 0123ABCabc
THIS IS FONT B. 0123ABCabc
THIS IS FONT C. 0123ABCabc
THIS IS FONT D. 0123ABCabc
THIS IS FONT E. 0123ABCabc
THIS IS FONT F. 0123ABCabc
THIS IS FONT G.
THIS IS FONT H. 0123ABC
This Is Font CG Triumv Bd Condensed.

3.3 Reset your printer

By resetting your printer, you can return your printer to the state it was in when you receive it. This can help you solve some problems caused by settings changed during the printing.

Do the following to reset your printer:

1. Turn off the printer.
2. Press and hold the **FEED** button, and turn on the printer.
3. Both status lights glow solid orange for a few seconds. Next, they turn to green shortly, and then turn to other colors. When both lights turn to red, release the **FEED** button immediately.
4. Press and hold the **FEED** button for 3 seconds and release it. Both status lights blink red three times, and turn to solid orange for a few seconds. After the printer is reset, LED 2 goes out while LED 1 turns to solid green.

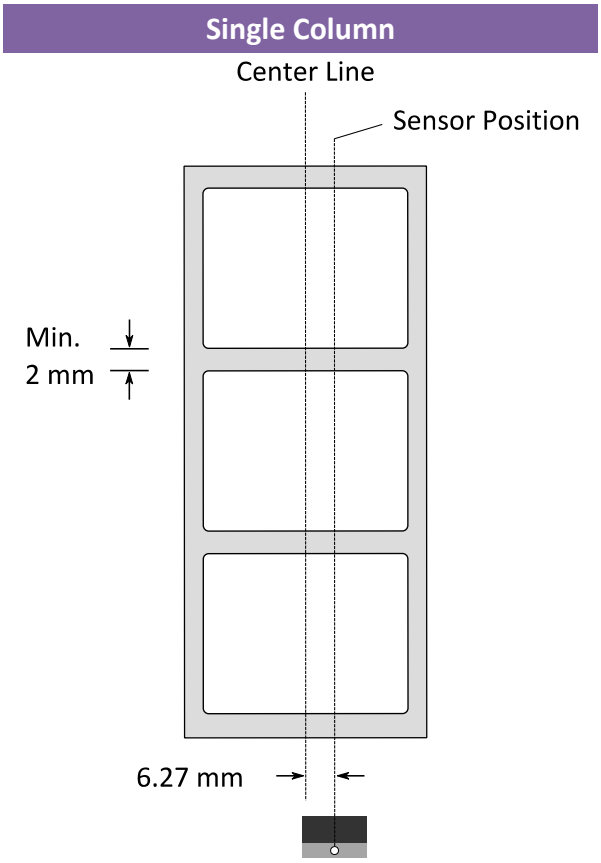
Important In step 4, if you do not hold the **FEED** button long enough, LED 2 will blink orange three times while LED 1 goes out. It means the printer is not reset.

3.4 Media sensing

WS printers offer two types of media sensor: transmissive and reflective. They are used for detecting specific media types.

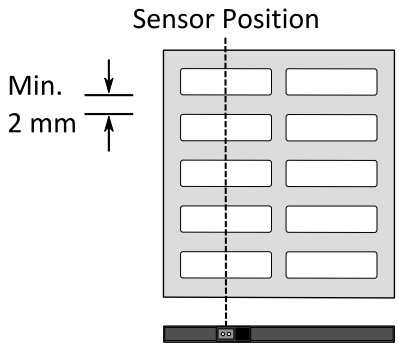
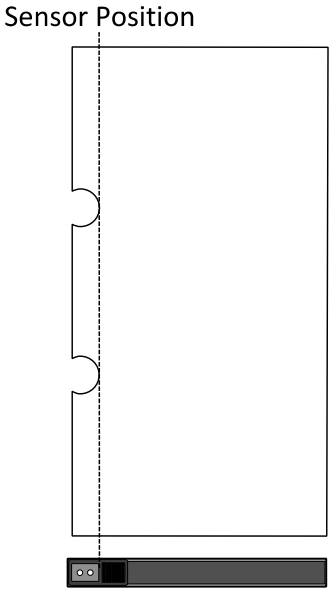
3.4.1 Transmissive sensor

The transmissive sensor is fixed and placed near the center of the printhead. It is used for detecting gaps across the entire width of the label.



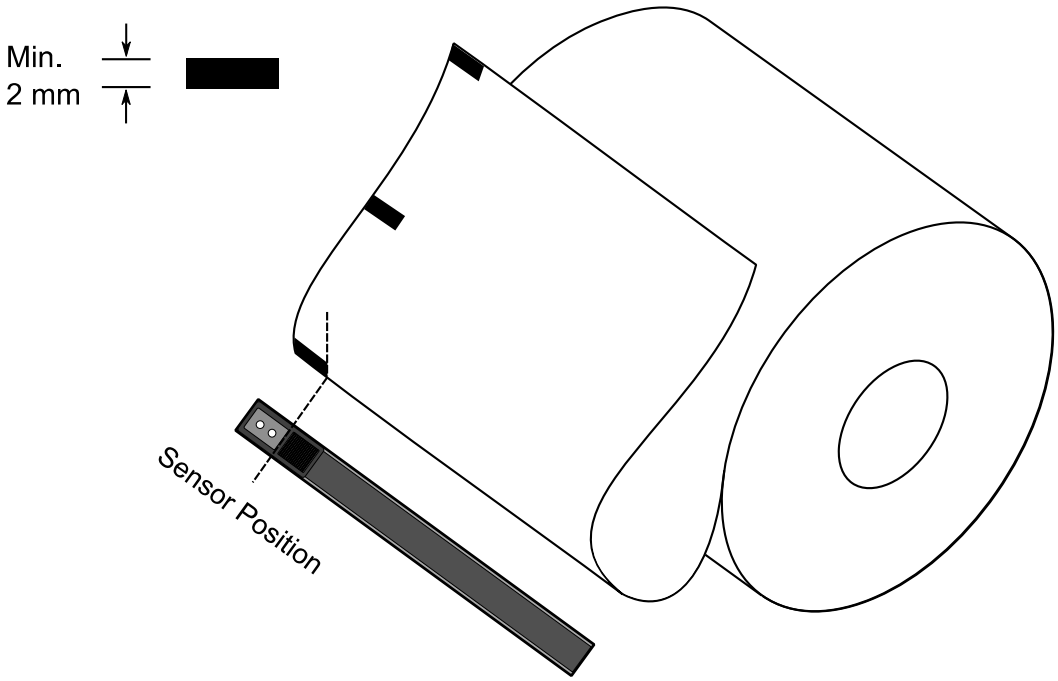
3.4.2 Reflective sensor

The reflective sensor is movable within the entire width of the media. It detects gaps, notches and black marks not located at the center of the media.

Multi Columns	Notch
	

Black Mark

Flip the media so the black-mark side is facing down to align with the sensor.



3.5 Wireless connection

Printers which have built-in Bluetooth are able to connect to the internet in a more flexible way. You can transmit data to your printer in any location within Bluetooth range.

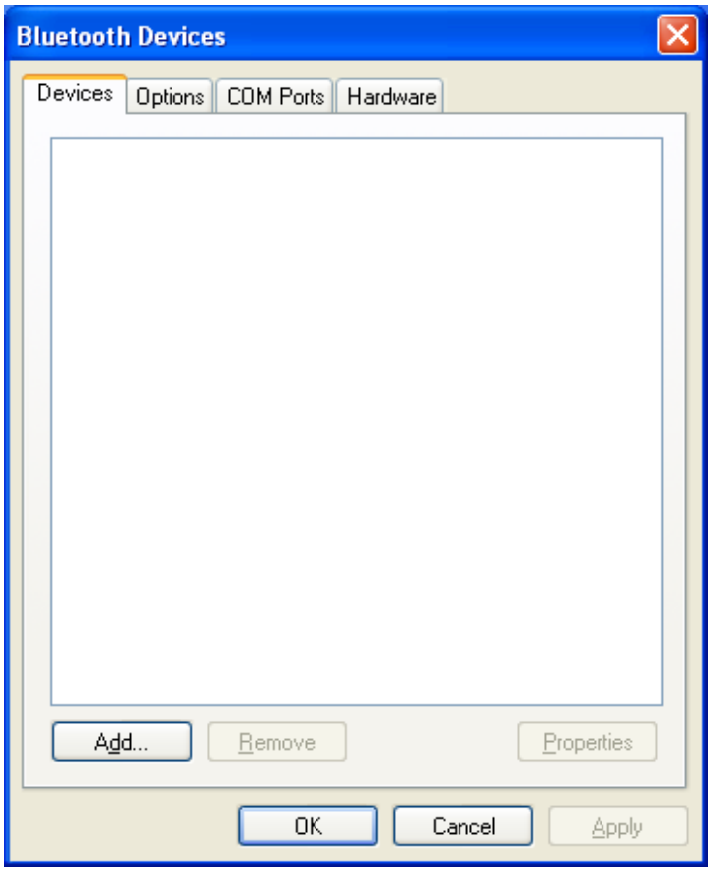
3.5.1 Bluetooth

Before you use Bluetooth to connect your printer, make sure your computer or device has a built-in Bluetooth adapter. If your computer doesn't have it, get an adapter and plug it into the USB port. The Bluetooth setup screen may vary depending on your computer or device. In this article, we use a Windows XP computer as an example.

Do the following to set up a Bluetooth connection for your printer:

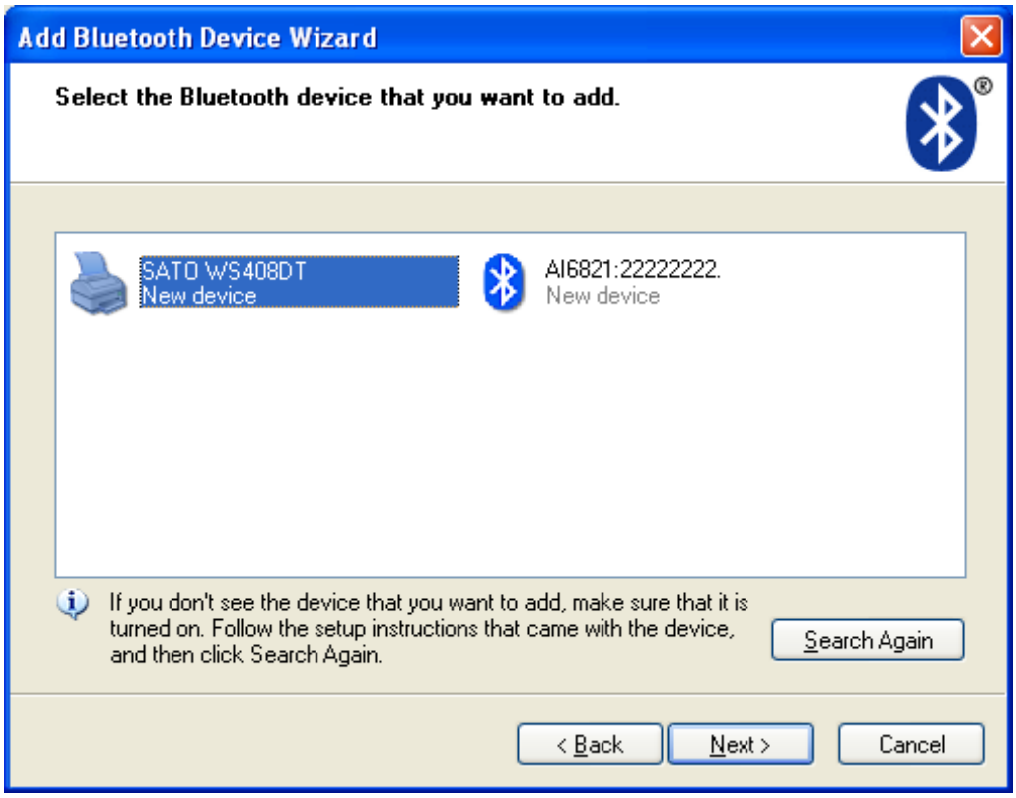
1. Click the Bluetooth icon in the notification area (system tray).

2. In the **Bluetooth Devices** dialog box, click **Add**.

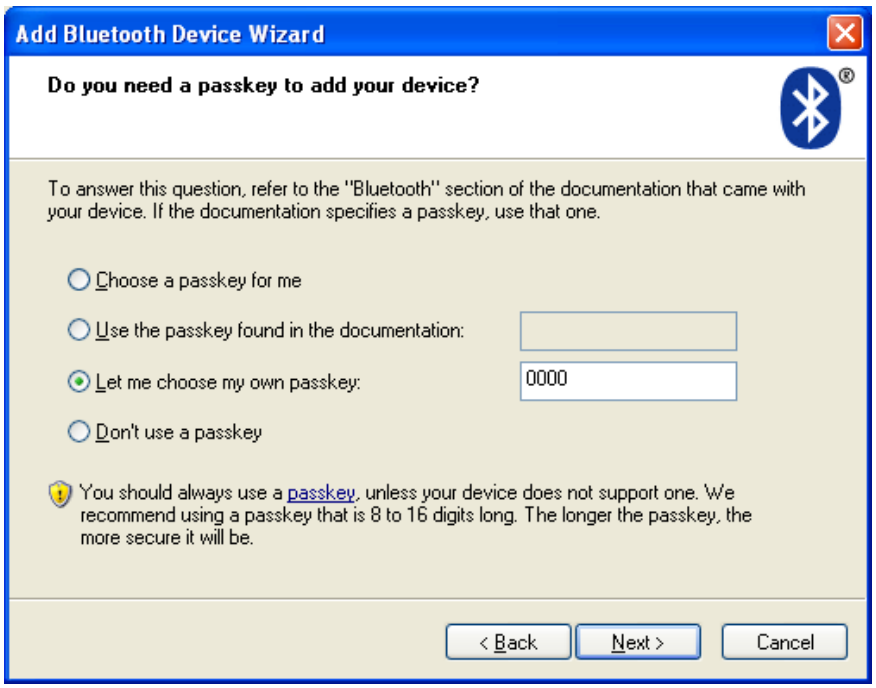


3. In the **Add Bluetooth Device Wizard** dialog box, select the **My device is set up and ready to be found** check box, and click **Next**.

4. Click **SATO WS408DT**, and click **Next**.



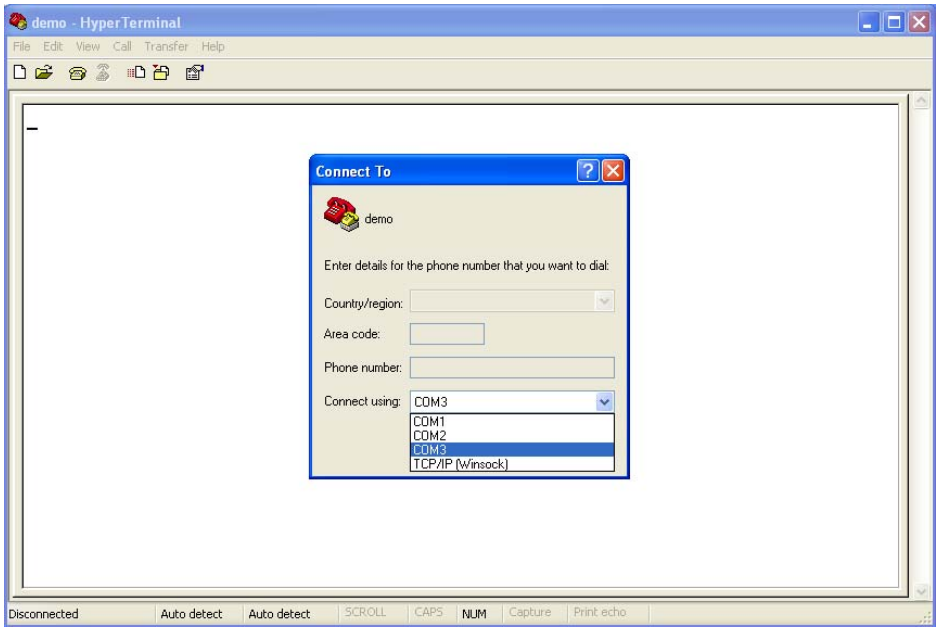
5. Click **Let me choose my own passkey**. The default key is **0000**. After entering the key, click **Next**.



6. The computer will try to connect the printer. If it succeeds, you'll see the successful message. Take a note of the outgoing COM port and click **Finish**.

   Note If you forget the port number, in the **Bluetooth Devices** dialog box, click the **COM Ports** tab to see the virtual COM port assigned to your printer.

7. Use any third-party application to transmit data to the printer, such as Hyper Terminal. When you set up a connection in Hyper Terminal, choose the COM port you obtained in the previous step, so you can use Bluetooth to communicate with your printer.



4 Maintenance

This chapter describes routine cleaning procedure.

4.1 Cleaning

To maintain print quality and prolong the printer's life, you need to perform some routine maintenance. Daily maintenance should be done for high volume printing, and weekly for low volume printing.

Caution Always turn off the printer before cleaning.

4.1.1 Printhead

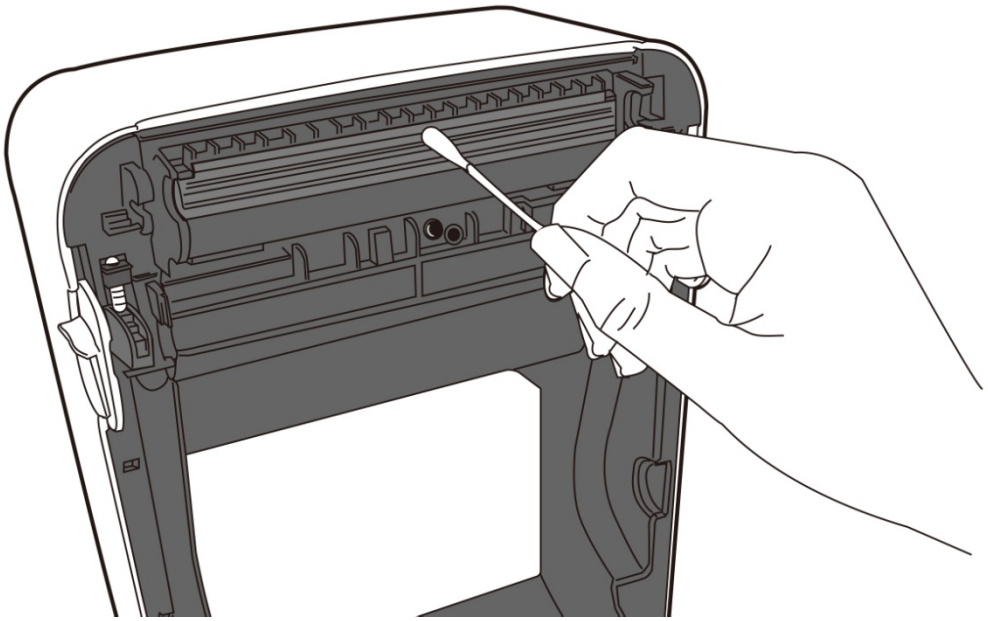
It is essential to keep printhead clean if you want the best print quality. We strongly recommend that you clean the printhead when you load a new media roll. If the printer is operated in critical environment, or the print quality declines, you need to clean the printhead more frequently.

Keep in mind these things before you clean:

- Keep the water away in case of corrosion on heating elements.
- If you just finish printing, wait until the printhead cools down.
- Do not touch the printhead with bare hands or hard objects.

Cleaning steps:

1. Moisten a soft cloth or a cotton swab with ethyl alcohol.
2. Gently wipe the printhead in one direction. That is, wipe it only from left to right or vice versa. Do not wipe back-and-forth, in case dust or dirt attaches to the printhead again.

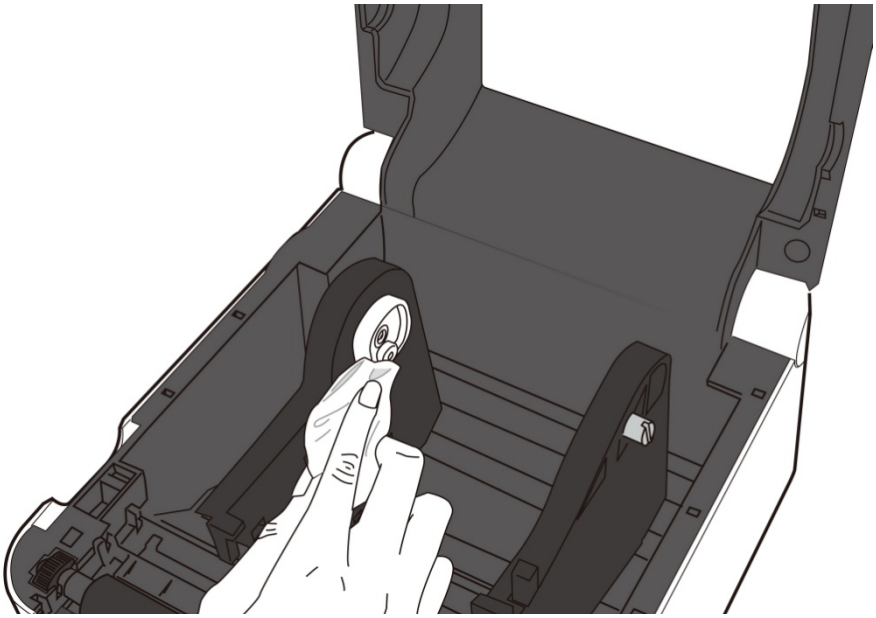


Important Printhead warranty becomes void if printhead's serial number is removed, altered, defected, or made illegible, under every circumstance.

4.1.2 Media housing

Use a soft cloth to clean the dust, dirt or debris built up on the **Media Roll Holders**, **Media Guides** and media path.

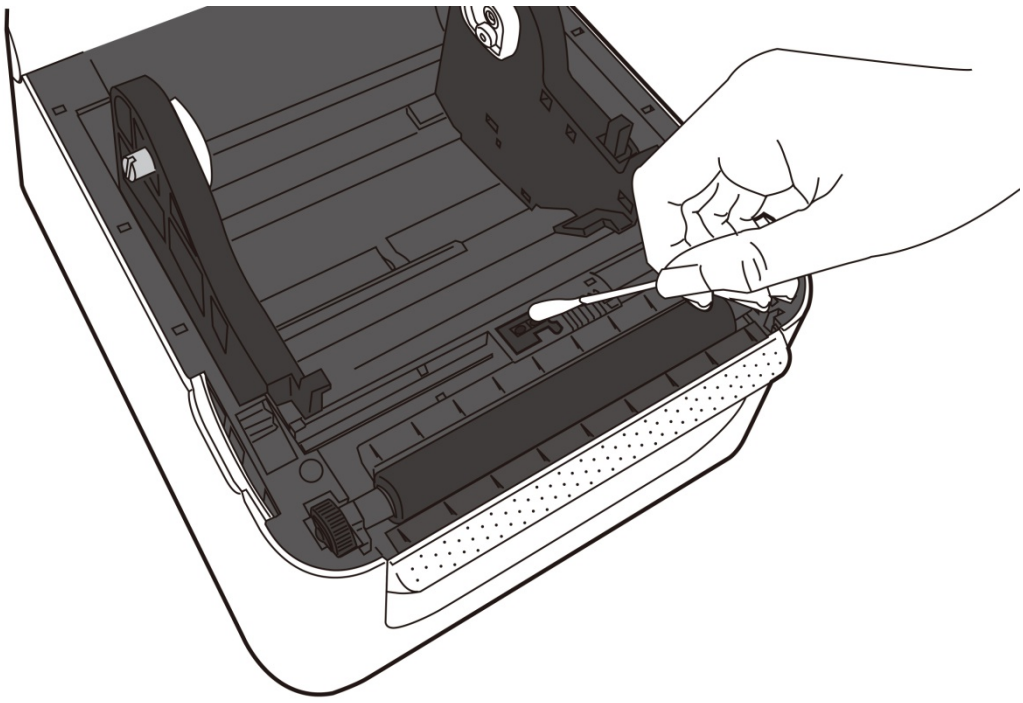
1. Moisten a soft cloth with ethyl alcohol.
2. Wipe the **Media Roll Holders** to clean dust.
3. Wipe the **Media Guides** to clean dust and dirt.
4. Wipe the media path to clean paper debris.



4.1.3 Sensor

Media sensors may not be able to detect the media correctly if it becomes dirty.

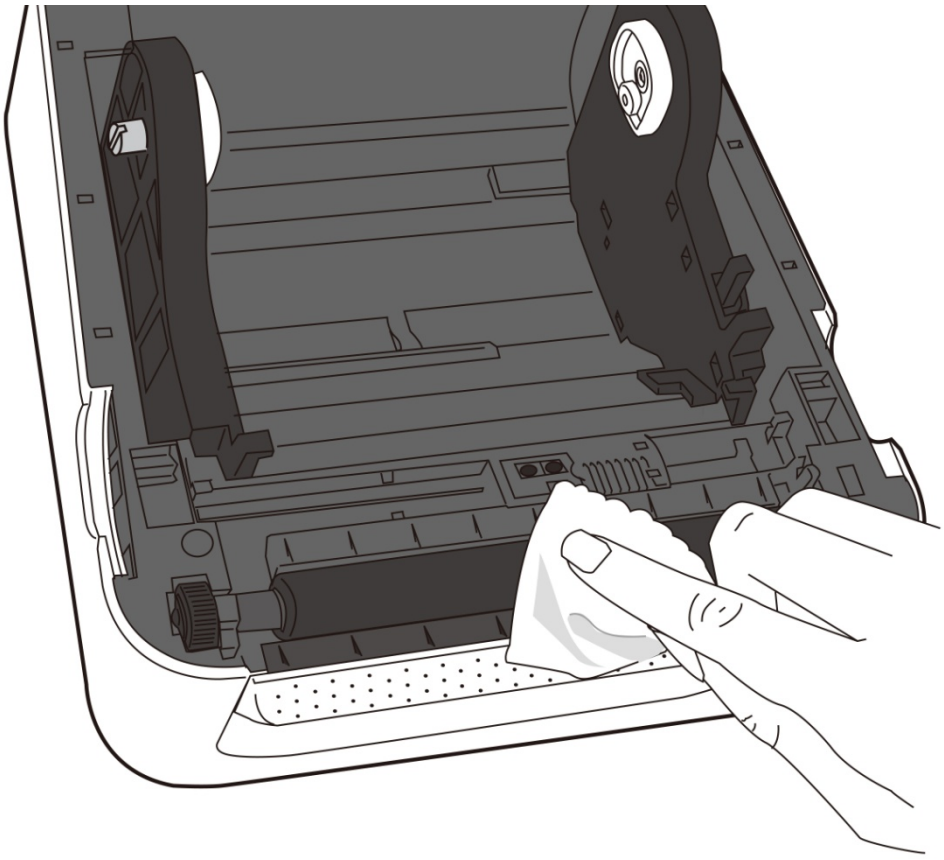
1. Moisten a soft cloth or a cotton swab with absolute ethyl alcohol.
2. Gently brush sensors to remove the dust away.
3. Use a dry cloth to clean the residue.



4.1.4 Platen roller

The platen roller is also important for print quality. Dirty platen roller may damage the printhead. Clean the platen roller right away if the adhesive, dirt or dust accumulates on it.

1. Moisten a soft cloth with absolute ethyl alcohol.
2. Gently wipe the platen roller to remove the dust and adhesive.



5 Troubleshooting

This chapter provides the information about printer problems and solutions.

5.1 Printer issues

The printer won’t turn on

- Did you attach the AC power cord?
- Make sure the power supply’s connector is inserted into the printer power jack.
- Check the power connection from the wall socket to the printer. Test the power cord and the socket with other electrical devices.
- Disconnect the printer from the wall socket, and connect it again.

The printer turns itself off

- Turn on the printer again.
- Make sure the power supply’s connector and the power cord are properly plugged.
- Make sure the power supply and the power cord are not damaged.
- Use the applicable power supply.
- If the printer keeps turning itself off, check the socket and make sure it has enough power for the printer.

The printer does not feed the media out

- The media is not loaded correctly. See Section 2.3, “Loading Media” to reload the media.
- If there is a paper jam, clear it.

5.2 Media issues

The media is out

- Load a new media roll.

The paper is jammed

- Open the printer and clear the jammed paper.
- Make sure the paper is held properly by the **Media Guides**.

The printing position is not correct

- Did you use the correct media type for printing?
- The media is not loaded correctly. See Section 2.3, “Loading Media” to reload the media.
- The media sensor needs to be calibrated. See Section 3.1, “Media Sensor Calibration” to calibrate the sensor.
- The media sensor is dirty. Clean the media sensor.

Nothing is printed

- The media is not loaded correctly. See Section 2.3, “Loading Media” to reload the media.
- The print data might not be sent successfully. Make sure the interface is set correctly in the printer driver, and send the print data again.

The print quality is poor

- The printhead is dirty. Clean the printhead.
- The platen roller is dirty. Clean the platen roller.
- Adjust the print darkness, or lower the print speed.
- The media is incompatible for the printer. Use SATO-approved media roll instead.

5.3 Other issues

There are broken lines in the printed label

- The printhead is dirty. Clean the printhead.

An error occurred when writing data to the USB memory

- Did you insert the USB drive?
- Make sure the USB drive is plugged tightly into the port.
- The USB drive might be broken. Replace it with another one.

The printer is unable to save files due to insufficient USB memory

- Delete the files on your USB drive to free some space, or replace your USB drive with an empty one.

The printhead temperature is extremely high

- The printhead temperature is controlled by the printer. If it is extremely high, the printer will stop printing automatically, until the printhead is cool down. After that, the printer will resume printing automatically, if there is any unfinished print job.

The printhead is broken

- Contact your local dealer for assistance.

6 Specifications

This chapter provides specifications for the printer.

6.1 Printer

Model	WS408DT
Print method	Direct Thermal
Resolution	203 dpi (8 dots/mm)
Media Alignment	Centered
Operation Mode	Standard: Continuous **mode**, Tear-off **mode**
Sensor	Media Sensor: Gap Sensor (Transmissive, Fixed) I-Mark Sensor (Reflective, Movable)
	Head Open Switch
Print Speed	2, 3, 4, 5, 6 inches/sec (50.8, 76.2, 101.6, 127, 152.4 mm/sec) Default: 5 onches/sec 2 &3ips for peel off mode
Print Darkness	Darkness level – SZPL: 0 ~ 30 Default –SZPL: SD15
Max Printable Area	Length 999 mm x Width 108 mm
Non-Printable Area	Pitch Direction - Top: 1 mm, Bottom: 1 mm (excluding liner) Width Direction - Left: 1 mm, Right: 1 mm (excluding liner)
Print Ratio	Average print ratio within 15 % or less (whole print layout area) Full width with 1 mm pitch is required
Interface	USB (Type A and Type B), Ethernet, Bluetooth
Onboard Memory	Standard Memory (Flash ROM): 16 MB User Memory: 3 MB Standard Memory (SDRAM): 32 MB
External Memory	USB: Max 16 GB
Panel	2 LED, 1 Button
LED	1st LED: Red and Green (Various Combinations: Orange) 2nd LED: Red and Green (Various Combinations: Orange)
Font	Standard: See the SZPL Command **Reference**

6.2 Media

Properties	Description
Media Size	**Continuous Mode** Length: 8 mm ~ 997 mm Width: 22.4 mm ~ 115 mm (including liner 25.4 ~ 118 mm) **Tear-Off Mode** Length: 30 mm ~ 997 mm Width: 22.4 mm ~ 115 mm (including liner 25.4 ~ 118 mm) Max Roll Diameter Size: 127 mm (5 inches) Max Roll Diameter Size for External Media Stand: 203.2 mm (8 inches)
Media Type	Direct Thermal Label Direct Thermal Tag Roll Paper (Inside Wound or Outside Wound) Fanfold Paper

6.3 Bar codes

Programming Language	SZPL
One Dimensional Bar Code	UPC-A
	UPC-E
	JAN/EAN
	CODE39
	CODE93
	CODE128
	GS1-128 (UCC/EAN128)
	CODABAR (NW-7)
	ITF
	Industrial 2of5
	MSI
	UPC add-on code
	POSTNET
	GS1 DataBar Omnidirectional
	GS1 DataBar Truncated
	GS1 DataBar Stacked
	GS1 DataBar Stacked Omnidirectional
	GS1 DataBar Limited
	GS1 DataBar Expanded
	GS1 DataBar Expanded Stacked
Two Dimensional Bar Code	QR Code
	PDF417 (including MicroPDF)
	DataMatrix (ECC200)
	GS1 DataMatrix
	MaxiCode
Composite Symbol	EAN-13 Composite (CC-A/CC-B)
	EAN-8 Composite (CC-A/CC-B)
	UPC-A Composite (CC-A/CC-B)
	UPC-E Composite (CC-A/CC-B)
	GS1 DataBar Composite (CC-A/CC-B)
	GS1 DataBar Truncated Composite (CC-A/CC-B)
	GS1 DataBar Stacked Composite (CC-A/CC-B)

Programming Language	SZPL
	GS1 DataBar Expanded Stacked Composite (CC-A/CC-B) GS1 DataBar Expanded Composite (CC-A/CC-B) GS1 DataBar Stacked Omnidirectional Composite (CC-A/CC-B) GS1 DataBar Limited Composite (CC-A/CC-B) GS1-128 Composite (CC-A/CC-B/CC-C)

6.4 Bluetooth

Properties	Bluetooth I/F
Standard	Bluetooth 2.1 + EDR or later
Enable Device	WS Series
Operating Temperature	41°F (5°C) ~ 104°F (40°C)
Storage Temperature	-4°F (-20°C) ~ 140°F (60°C)
Operating Humidity	25 ~ 85 % Non-condensing R.H
Storage Humidity	10 ~ 90 % Non-condensing R.H
Connection Form	Only one-to-one connection is supported.
Support Profile	Serial Port Profile (SPP) PIN code is supported.
Class of Radio Transmission	CLASS 2
Transmission Method	Bi-directional (Half-duplex)
Flow Control	Credit based flow control
Operating Mode	Slave Mode
Transmission Distance	3 m (360 degrees)
SR Mode in Page/Inquiry Scanning	R1 Scan Interval 1.28 sec. Scan Window 22.5 msec.
RF Frequency Range	2402 ~ 2480 MHz
Nominal Output Power	+4 dBm (2.51 mW) MAX

6.5 Ethernet

Properties	Description
Port	RJ-45
Speed	10Base-T/100Base-T (Auto Detecting)
Protocol	ARP, IP, ICMP, UDP, TCP, HTTP, DHCP, Socket, LPR, IPv4, SNMPv2
Mode	TCP Server/Client, UDP Client
Technology	HP Auto-MDIX, Auto-Negotiation

6.6 Electrical and operating environment

Properties	Range
Power Supply	Voltage: AC 100 V ~ 240 V ± 10 % (full range) Frequency: 50 Hz - 60 Hz ± 5 %
Power Consumption	60W
Temperature	Operating: 5 °C ~ 40 °C Storage: -40 °C ~ 60 °C
Humidity	Operating: 25 %RH ~ 85 %RH (non-condensing) Storage: 10 %RH ~ 90 %RH (non-condensing)

6.7 Physical dimension

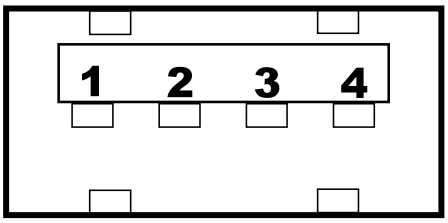
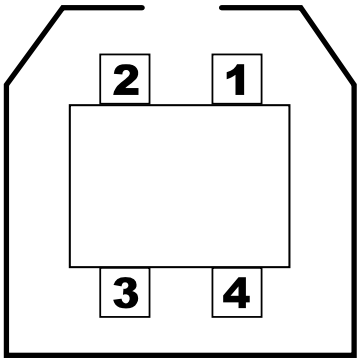
Dimension	Size and Weight
Size	W 183.8 x D 222.6m x H 166 mm
Weight	Approx. 1.76kg

6.8 Interfaces

This section provides information about IO port specifications for the printer.

6.8.1 USB

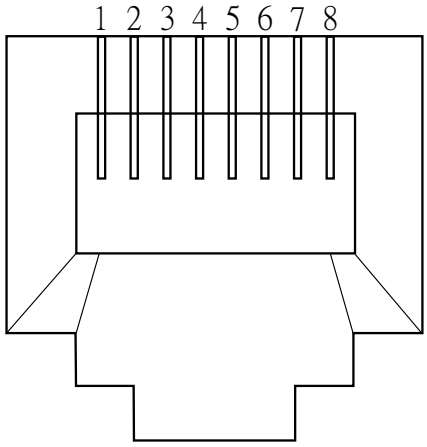
There are two common USB connectors. Typically, type A is found on hosts and hubs; type B is found on devices and hubs. The figure below shows their pinouts.

Type A	Type B
	

Pin	Signal	Description
1	VBUS	+5V
2	D-	Differential data signaling pair -
3	D+	Differential data signaling pair +
4	Ground	Ground

6.8.2 Ethernet

The Ethernet uses RJ-45 cable, which is 8P8C (8-Position 8-Contact). The figure below shows its pinout.



Pin	Signal
1	Transmit+
2	Transmit-
3	Receive+
4	Reserved
5	Reserved
6	Receive-
7	Reserved
8	Reserved