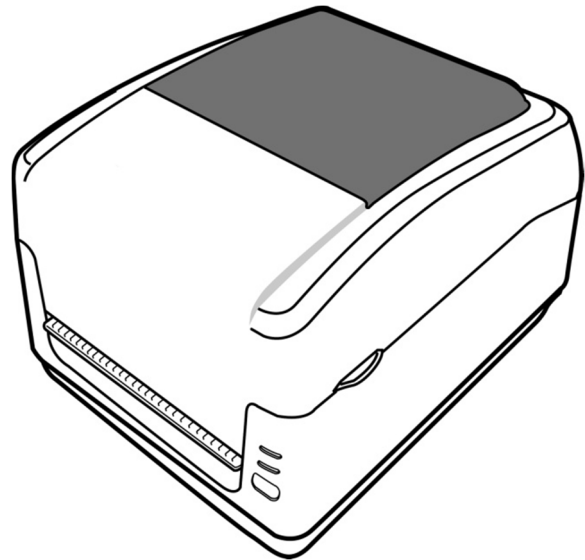**SATO**

Barcode Printer

Owner's Manual

WS408TT-STD/WS412TT-STD
WS412TT-LAN/WS412TT-LAN

FCC ID

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

FCC Warning

This equipment has been tested, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operations of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Statement for Optional RF module

This device complies with RF radiation exposure limits set forth for an uncontrolled environment.

The antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all people and must not be collocated or operating in conjunction with any other antenna or transmitter.

IC Warning

Canada, Industry Canada (IC) Notices

This device complies with Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Canada, avis d'Industry Canada (IC)

Cet appareil est conforme avec Industrie Canada exemptes de licence RSS standard(s).

Son fonctionnement est soumis aux deux conditions suivantes : (1) cet appareil ne doit pas causer d'interférence et (2) cet appareil doit accepter toute interférence, notamment les interférences qui peuvent affecter son fonctionnement.

Bluetooh/Wireless Communication

Compliance Statement
This product has been certified for compliance with the relevant radio interference regulations of your country or region. To make sure continued compliance, do not:

- Disassemble or modify this product.
- Remove the certificate label (serial number seal) affixed to this product.

Use of this product near microwave and/or other wireless LAN equipment, or where static electricity or radio interference is present, may shorten the communication distance, or even disable communication.

WARNING

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

(for USA only)

Radio Frequency (RF) Exposure Information

The radiated output power of the Wireless Device is below the Industry Canada (IC) radio frequency exposure limits. The Wireless Device should be used in such a manner such that the potential for human contact during normal operation is minimized.

This device has also been evaluated and shown compliant with the IC RF Exposure limits under mobile exposure conditions. (antennas are greater than 20cm from a person's body).

Informations concernant l'exposition aux fréquences radio (RF)

La puissance de sortie émise par l'appareil de sans fil est inférieure à la limite d'exposition aux fréquences radio d'Industry Canada (IC). Utilisez l'appareil de sans fil de façon à minimiser les contacts humains lors du fonctionnement normal.

Ce périphérique a également été évalué et démontré conforme aux limites d'exposition aux RF d'IC dans des conditions d'exposition à des appareils mobiles (antennes sont supérieures à 20 cm à partir du corps d'une personne).

Liability Disclaimer

SATO Corporation takes steps to assure that the company's published engineering specifications and manuals are correct; however, errors do occur. SATO reserves the right to correct any such errors and disclaims any resulting liability. In no event shall SATO or anyone else involved in the creation, production, or delivery of the accompanying product (including hardware and software) be liable for any damages whatsoever (including, without limitation, damages for loss of business profits, business interruption, loss of business information, or other pecuniary loss) arising out of the use of or the results of use of or inability to use such product, even if SATO has been advised of the possibility of such damages.

Caution

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Contents

1 Introduction

Thank you for purchasing a SATO WS printer. This manual provides information about how to set up and operate your printer, load the media and solve common problems.

1.1 Features

- **Various Connectivity Options**   USB, Ethernet
- **Easy Operation**   One-button design for easy control
- **Fast Print Speed**   Max 6 inches/sec for the WS408 model
- **Wireless Connection**   Build a wireless printing environment with Bluetooth
- **External Memory**   The extra USB port allows you to use a USB flash drive for storage

1.2 Unpacking

Make sure all of the following items are included in your package.
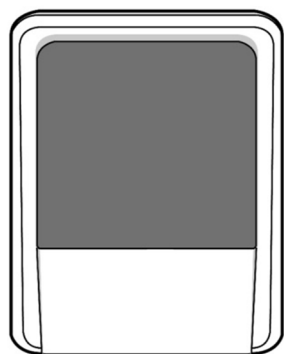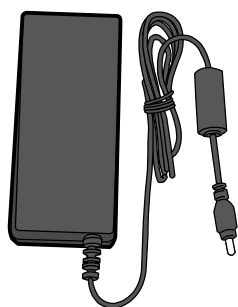
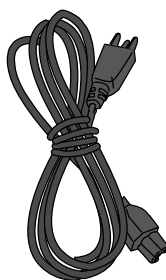SATO WS Printer   SATO WS
                                   Quick Installation Guide

Power Supply

AC Power Cord

When you receive the printer, open the package immediately and inspect for shipping damage. If you discover any damage, contact the shipping company and file a claim. SATO is not responsible for any damage incurred during shipping. Save all package materials for the shipping company to inspect.
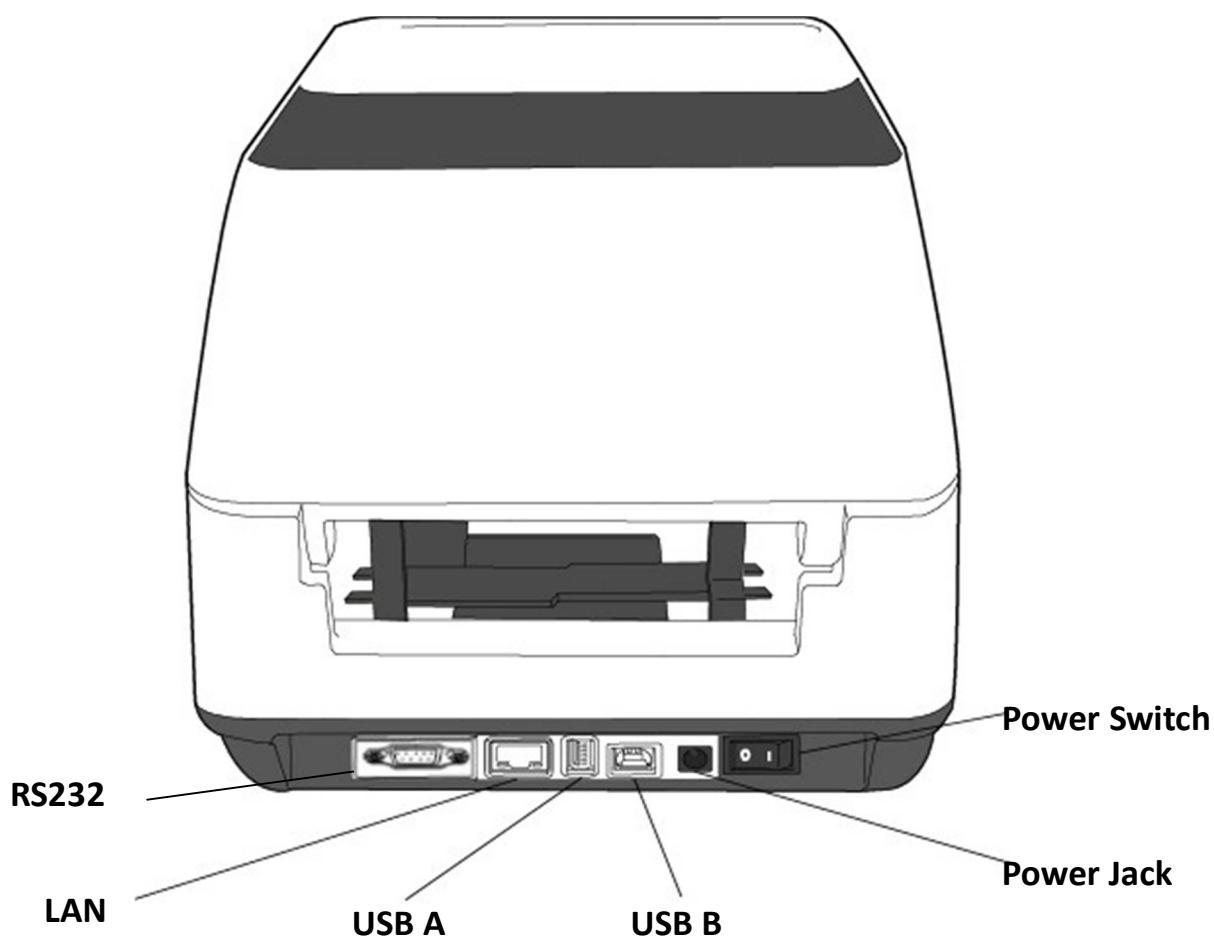
> **Note**   If any item is missing, please contact your local dealer.

1.3 Understand your printer

## 1.3.1 Perspective view
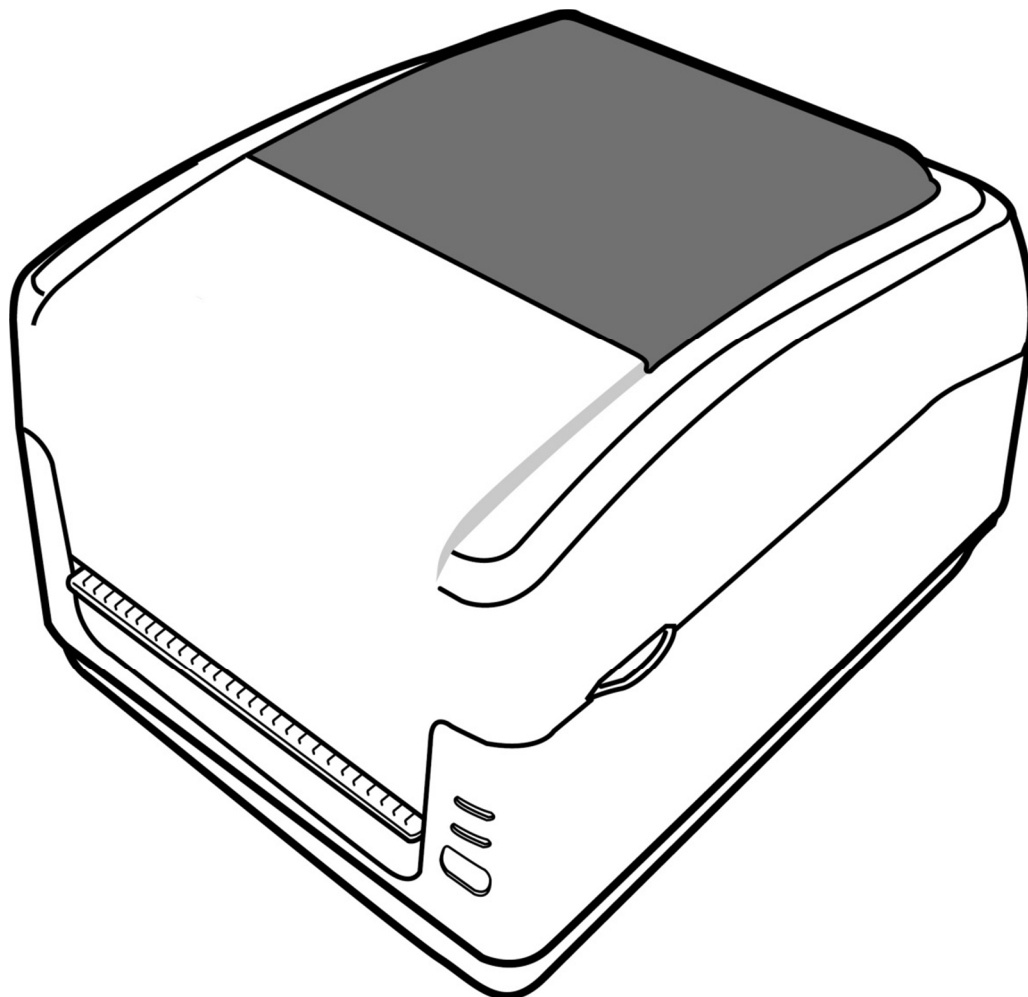
1.3.2 Back view

Caution   The areas indicated by the ellipse have sharp edges. To avoid injury, be careful not to touch them when handling the printer.
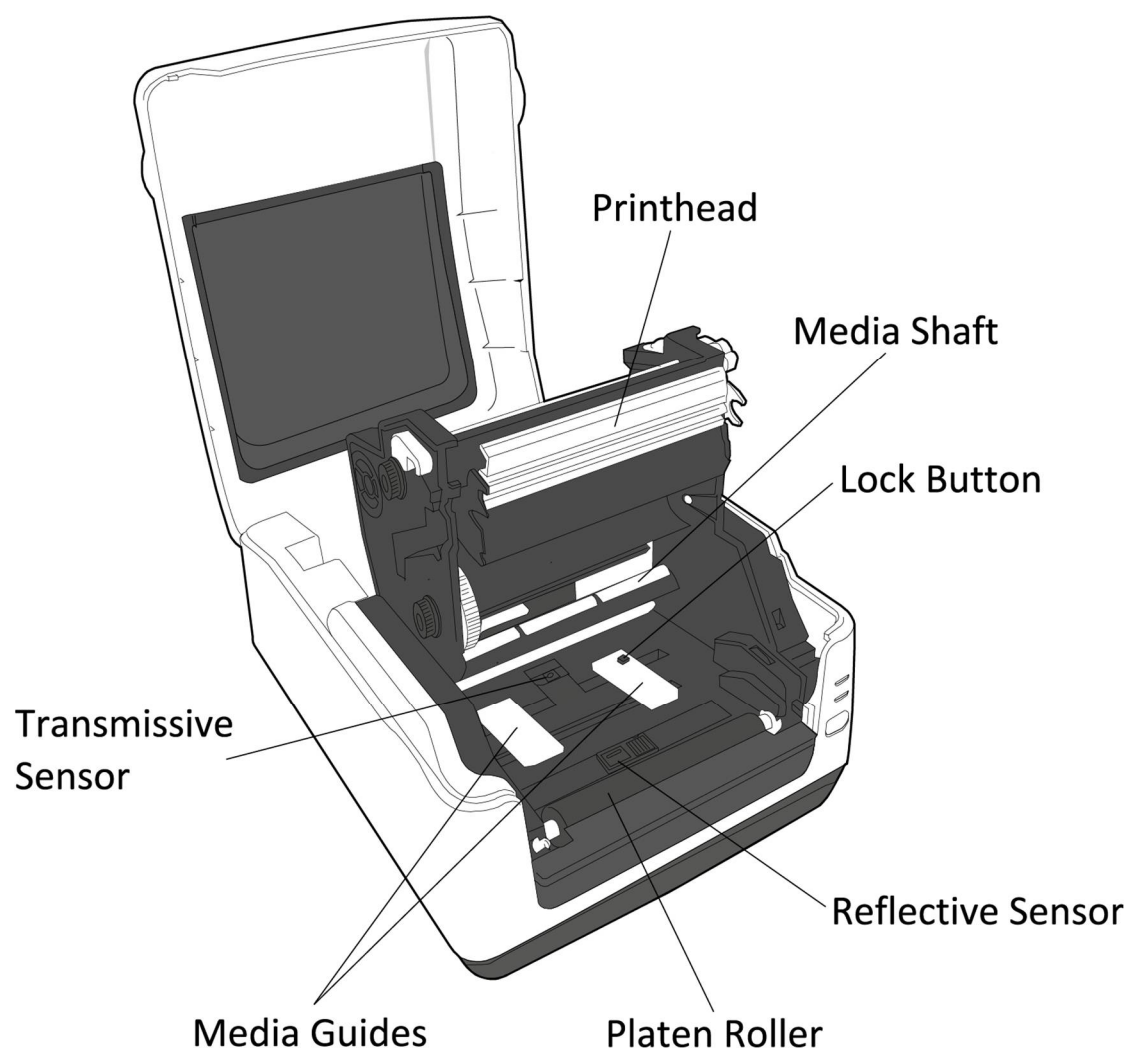
Caution   To avoid injury, be careful not to trap your fingers in the Paper Slot while opening or closing the Top Cover.

1.3.3   Interior view I

Ribbon

Supply Wheel

Take-Up Wheel

Media Roll
Holders

Module
Release Latch
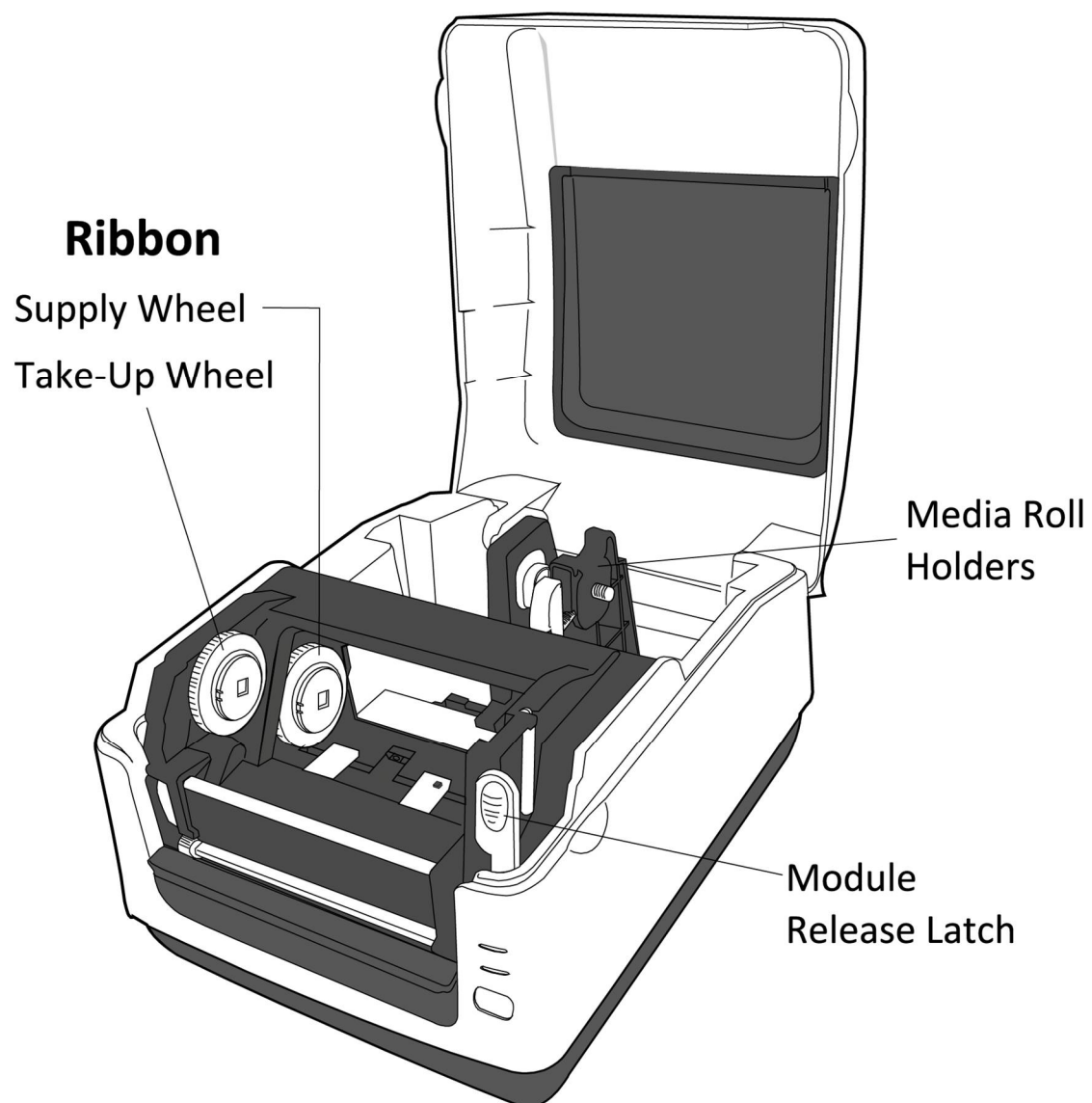
1.3.4   Interior view II

⚠️ **Warning**   The printhead becomes very hot during printing. Do not touch the printhead or touch around it directly after printing. By doing so you may get burnt.

1.4 Printer lights

There are two LED lights that show the status of your printer.

1.4.1 Status lights

Status lights help you check printer's condition. The following tables show the blinking speed of status lights and the conditions they indicate.

Symbol	Blinking Speed	Blinking Interval
**	Fast	0.5 Second
*	Slow	2 Seconds
* LED1 + *LED2	Slow	LED1 & LED2 Blinking Interval at same time
* LED1 + LED2 *	Slow	LED1 & LED2 Blinking Interval at different timing

LED 1	LED 2	Description	LED indicate Label
Green	Green	The printer is ready to print.	V
Green	** Green	The printer is transmitting data.	
* Green	* Green	In pause.	V
* Green	Green *	The printer is writing data to the flash or USB memory. The USB memory is being initialized.	
Green	Orange	Head high temperature.	V
Green	* Orange	The RTC battery is low. (If the printer has a built-in RTC)	
Green	** Orange	The print module is opened when the printer is turned on.	
Orange	Orange	Paper jam.	V
** Orange	** Orange	The media is out when the print data is sent to the printer. Paper end.	V
** Orange	Orange **	Ribbon end or ribbon error. (for thermal transfer models)	V
Red	Orange	The printhead is broken.	
Red	*Orange	Communication error (RS-232C).	

Red	**Orange	Cutter error (with optional cutter).	
Red	**Red**	Cover (Thermal Head) open error during printing.	V

1.4.2   System mode

The system mode consists of status light color combinations. It contains a list of commands for you to select and run.

To enter the system mode and run the command, do the following:

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.

4. When status lights show the color combination you need, release the **FEED** button immediately.

5. Press the **FEED** button to run the command.

The following table is the command list of the system mode.

LED 1	LED 2	Command
Green	Red	Transmissive Sensor Calibration (Section 3.1)
Green	Orange	Reflective Sensor Calibration (Section 3.1)
Red	Red	Resetting Your Printer (Section 3.3)
Red	Orange	Reserved
Red	Green	Disable Checking RTC Battery Charge
Orange	Red	Reserved
Orange	Green	Self Test and Dump Mode (Section 3.2)

2　Get started

This chapter describes how to set up your printer.

⚠️ **Caution**　Do not use your printer in areas exposed to splashing water or any other liquid.

⚠️ **Caution**　Do not drop your printer, or place it in an area subject to humidity, vibration or shock.

2.1　Attach the power cord

1. Make sure the power switch is set to the **OFF** position.
2. Insert the power supply's connector into the printer power jack.
3. Insert the AC power cord into the power supply.
4. Plug the other end of the AC power cord into the wall socket.

Important　Use only power supplies listed in the user instructions.
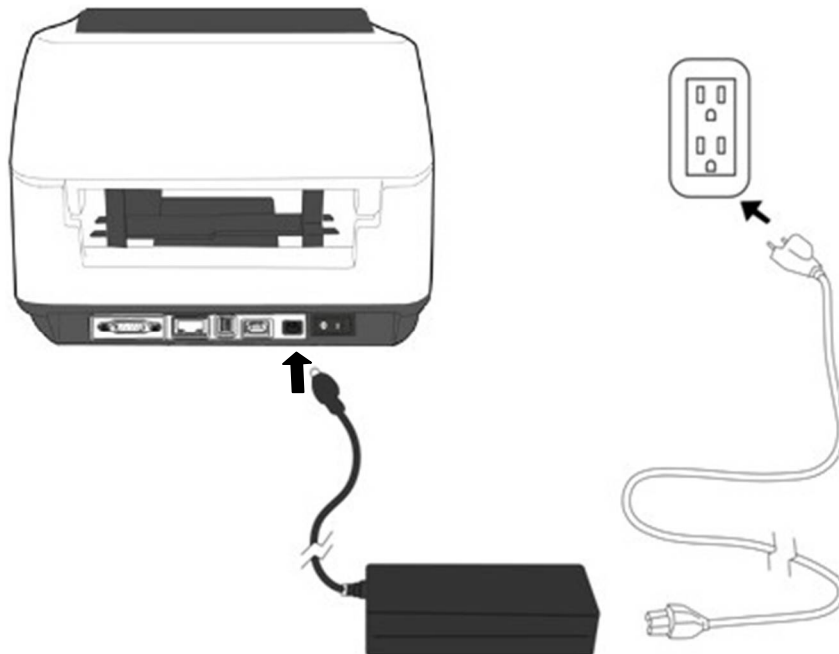
⚠️ **Warning**　Do not plug the AC power cord with wet hands, or operate the printer and the power supply in an area where they may get wet. Serious injury may result from these actions!

2.2 Turn on/off your printer

When your printer is connected to a host (a computer), it is good to turn on the printer before turning on the host, and turn off the host before turning off the printer.

2.2.1   Turn on your printer

1. To turn on your printer, turn on the **Power Switch** as below. The "I" is the **ON** position.
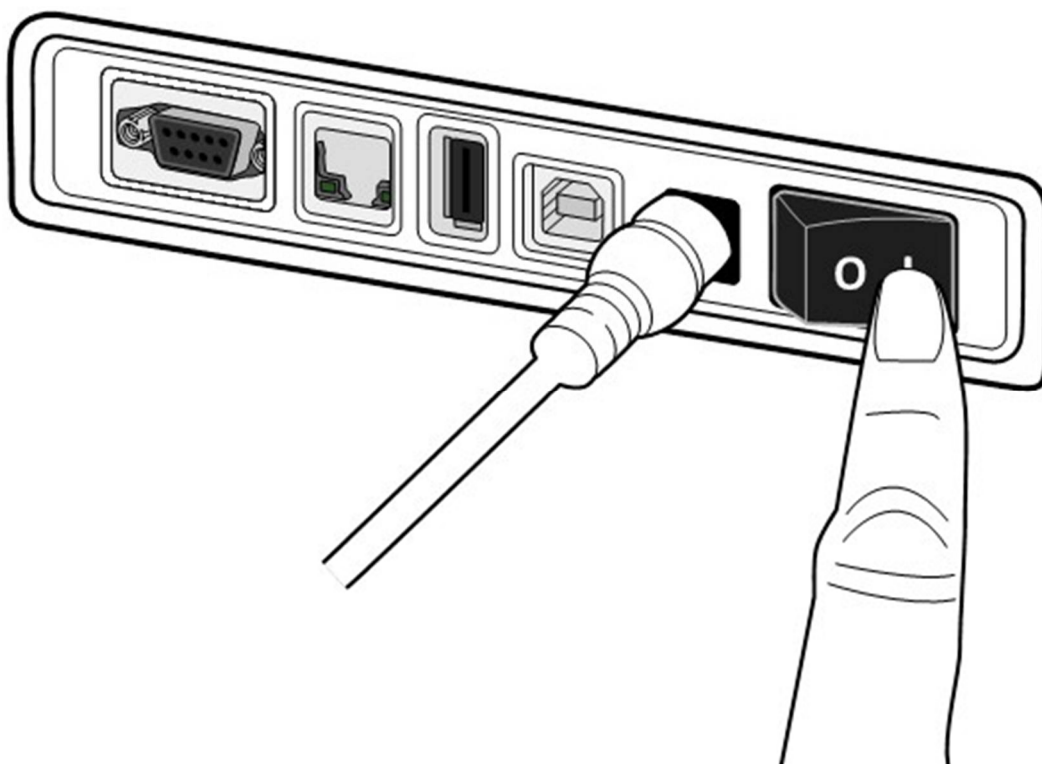
2. Both status lights glow solid orange for a few seconds, and then LED 2 goes out, while LED 1 turns to solid green.

> **Note**   If you connect the printer to the internet or insert a USB drive before turning on the printer, it will take longer for the printer to enter the online mode (LED 1 glows solid green) after you turn it on.

2.2.2   Turn off your printer

1. Make sure LED 2 is off and LED 1 is solid green before turning off the
   printer.
2. To turn off your printer, turn off the **Power Switch** as below. The "O" is
   the **OFF** position.
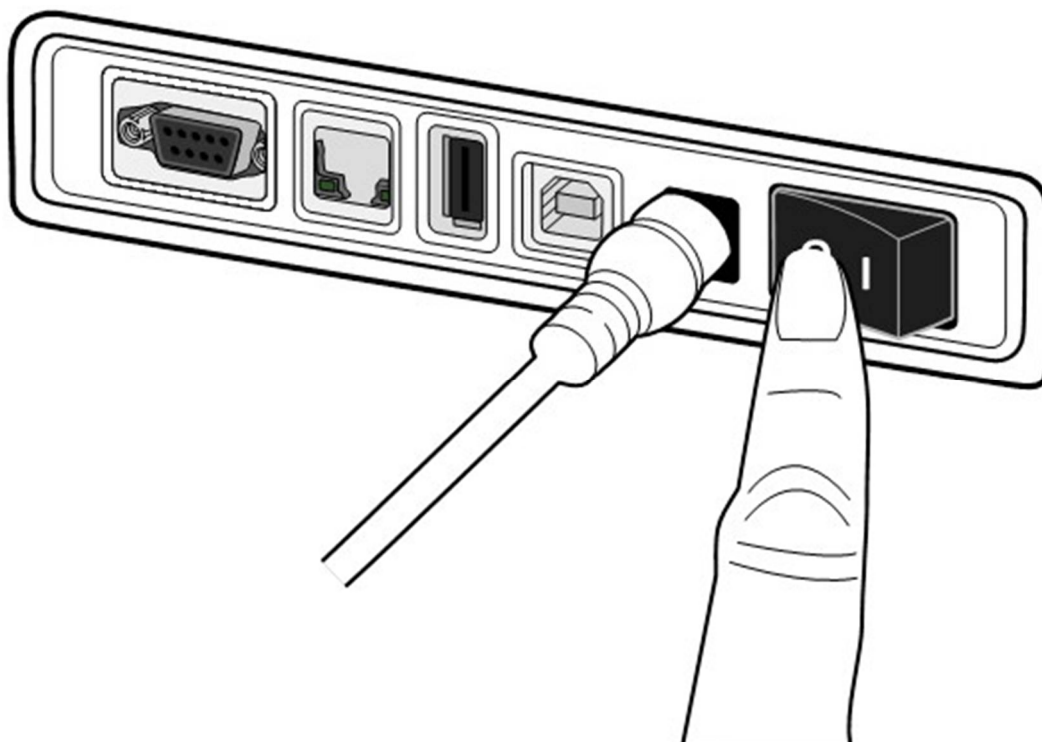
> ⚠️ **Caution**   Do not turn off your printer during data transmission.

2.3 Load media

There are various types and sizes for the media roll. Load the applicable media to satisfy your need.

2.3.1 Prepare media

The inside wound and outside wound media roll can be loaded into the printer the same way. In case the media roll is dirty during shipping, handling or storage, remove the outside length of the media. It helps avoid dragging adhesive and dirty media between the printhead and platen roller.
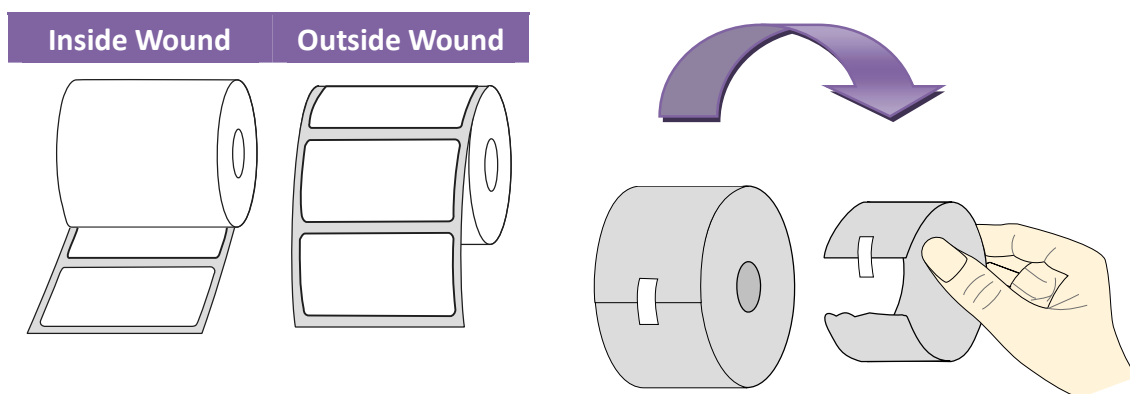
2.3.2   Place a media roll

1. Open the top cover of the printer.

2. Press the switch lock on the **Media Roll Holders** to slide them outward, and place the media roll between the holders. Adjust the media roll so its print side is facing up, and make sure it is clamped tightly by the holders.

Switch Lock
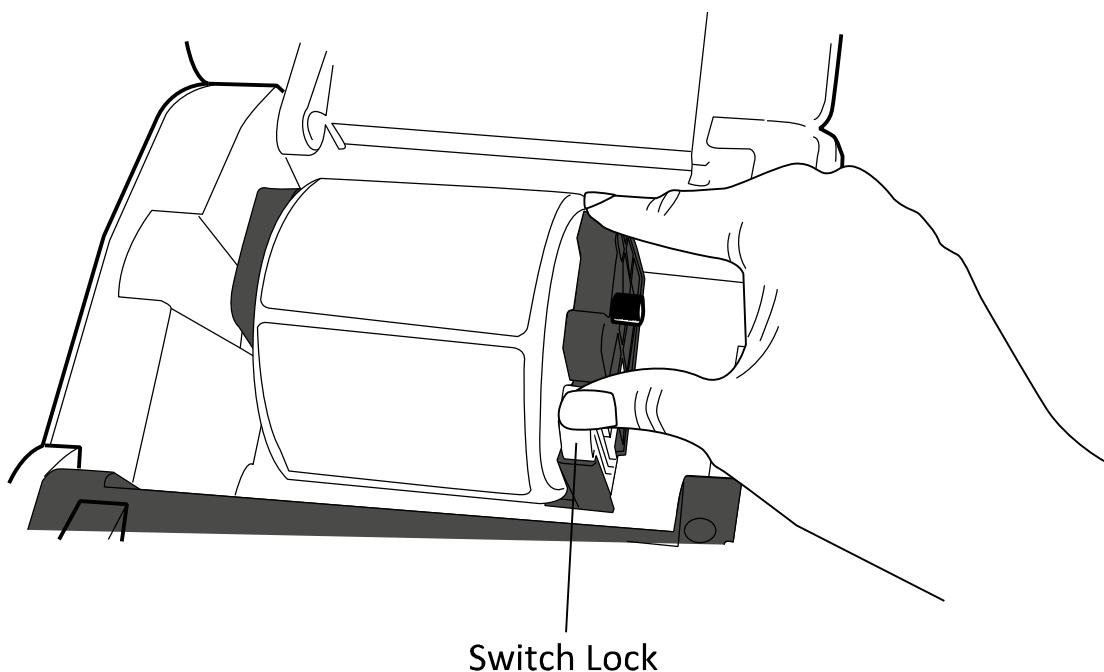
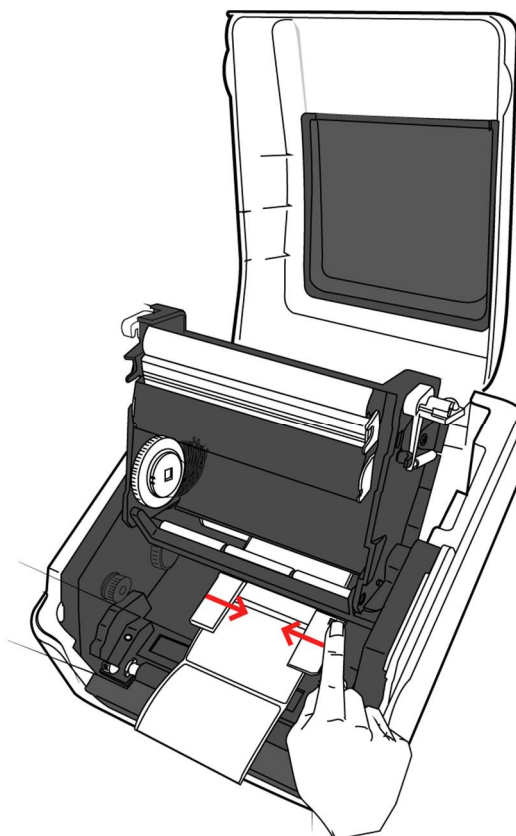3. Push the **Module Release Latch** to open the printer module.
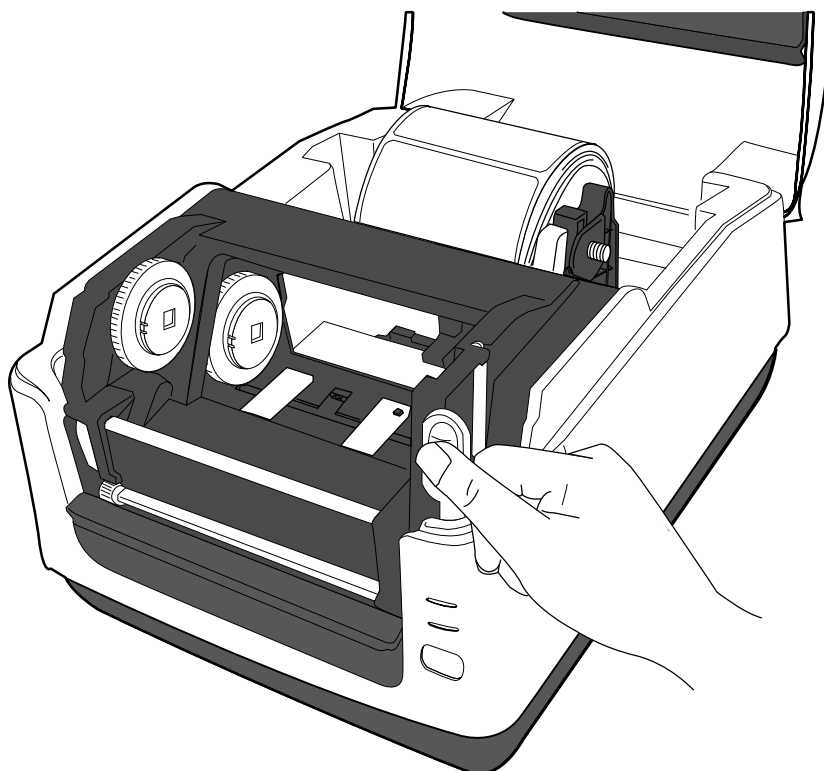
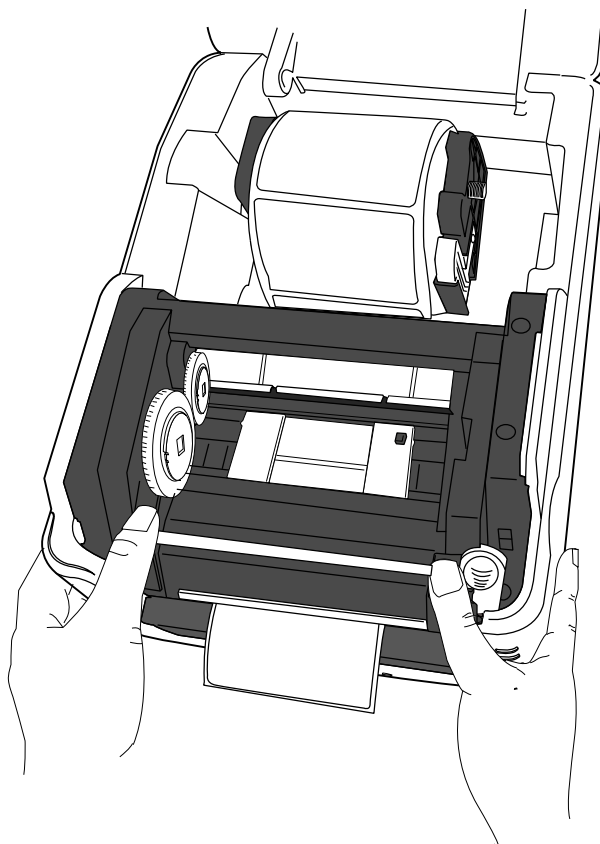4. Press the **Lock** button on the **Media Guides** to slide them outward.
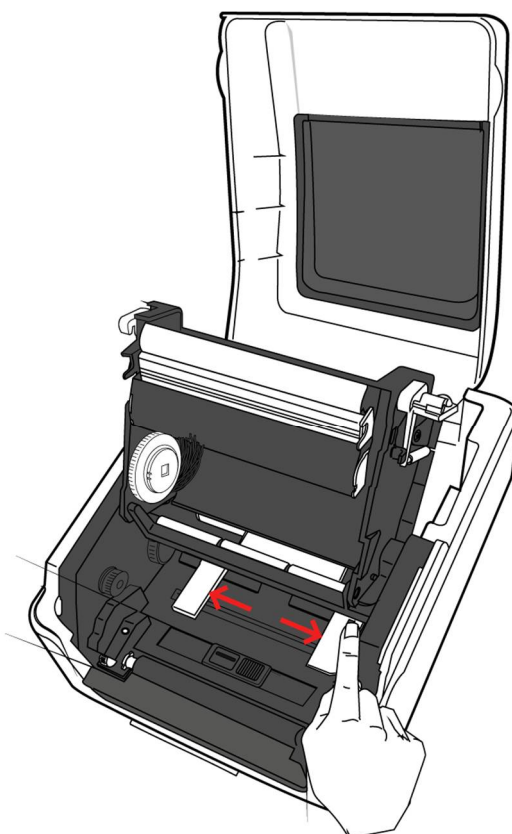
5. Pull the media until it reaches out of the printer.
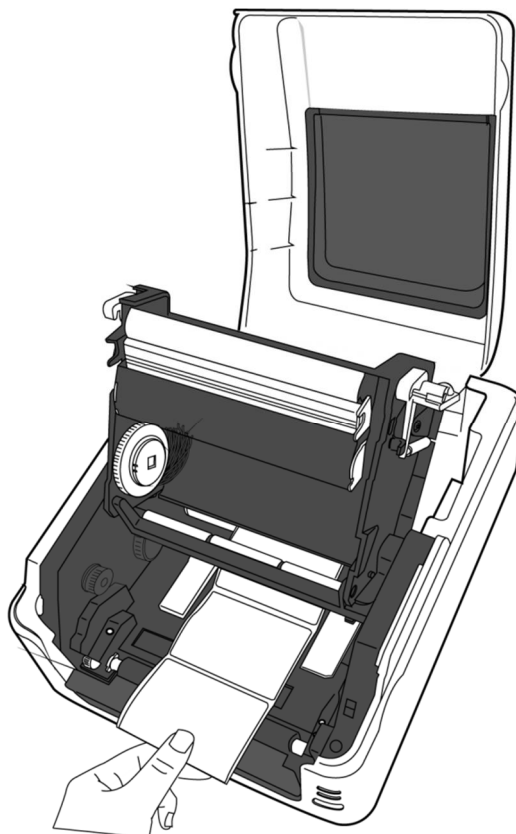
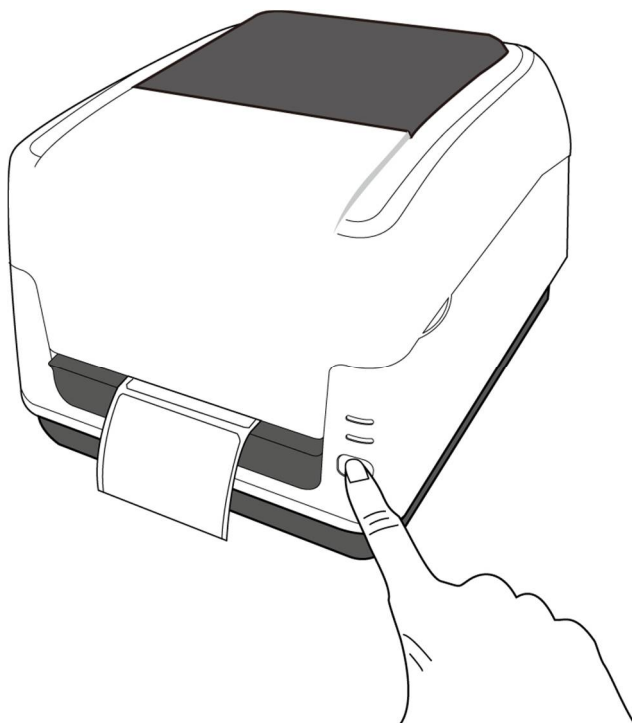6. Put the media under the **Media Shaft** and center it between the **Media Guides**.

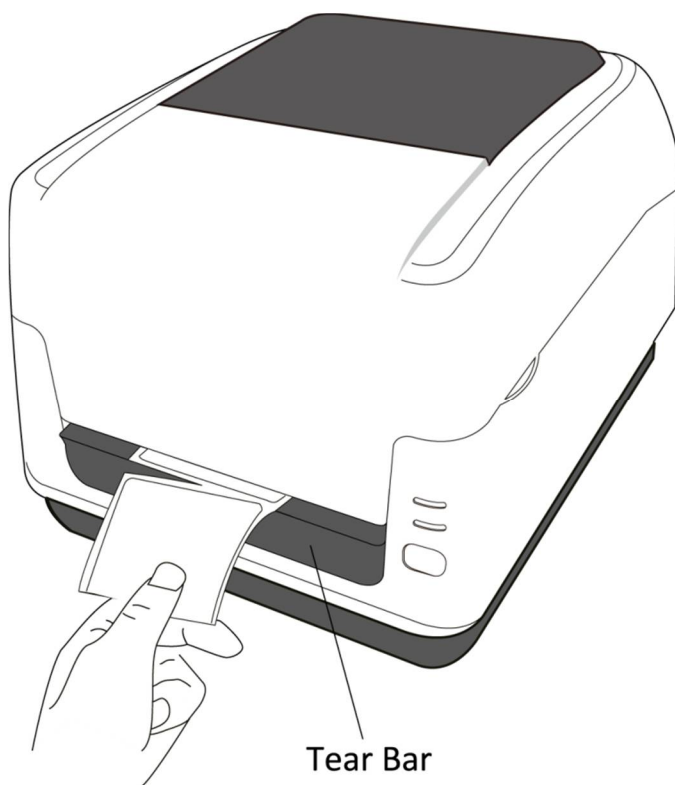7. Close the printer module and press down firmly at its both sides, until you hear a click.

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.
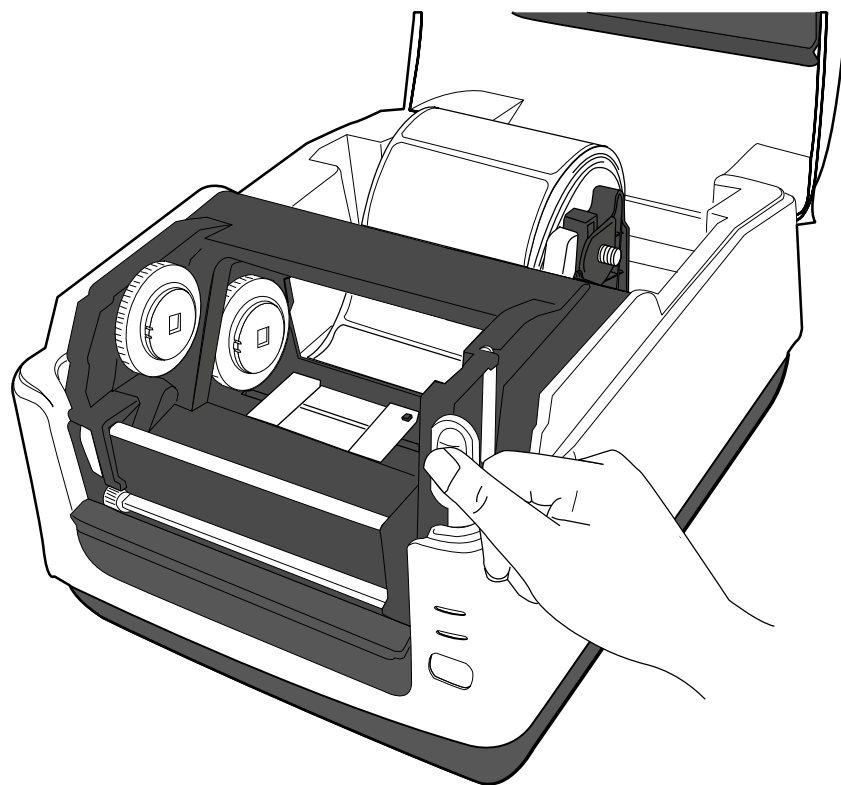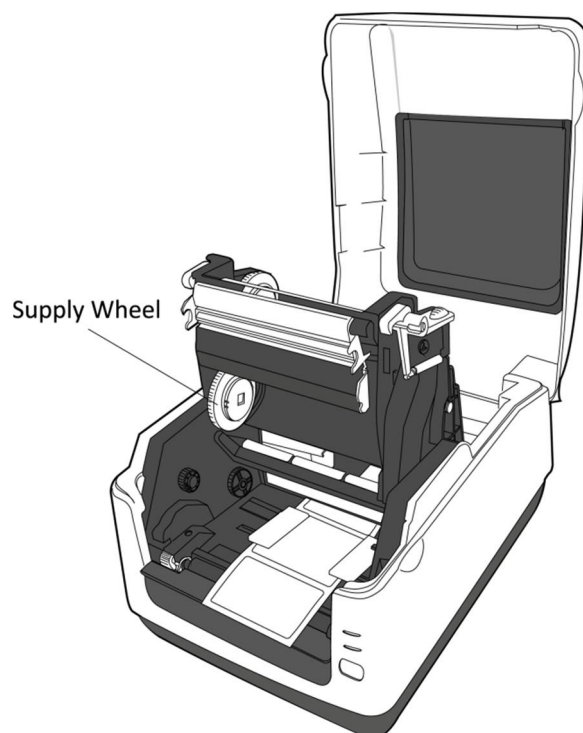

Tear Bar

2.4 Placing Ribbon Roll

1. Open the top cover of the printer.

2. Push the **Module Release Latch** to open the printer module.
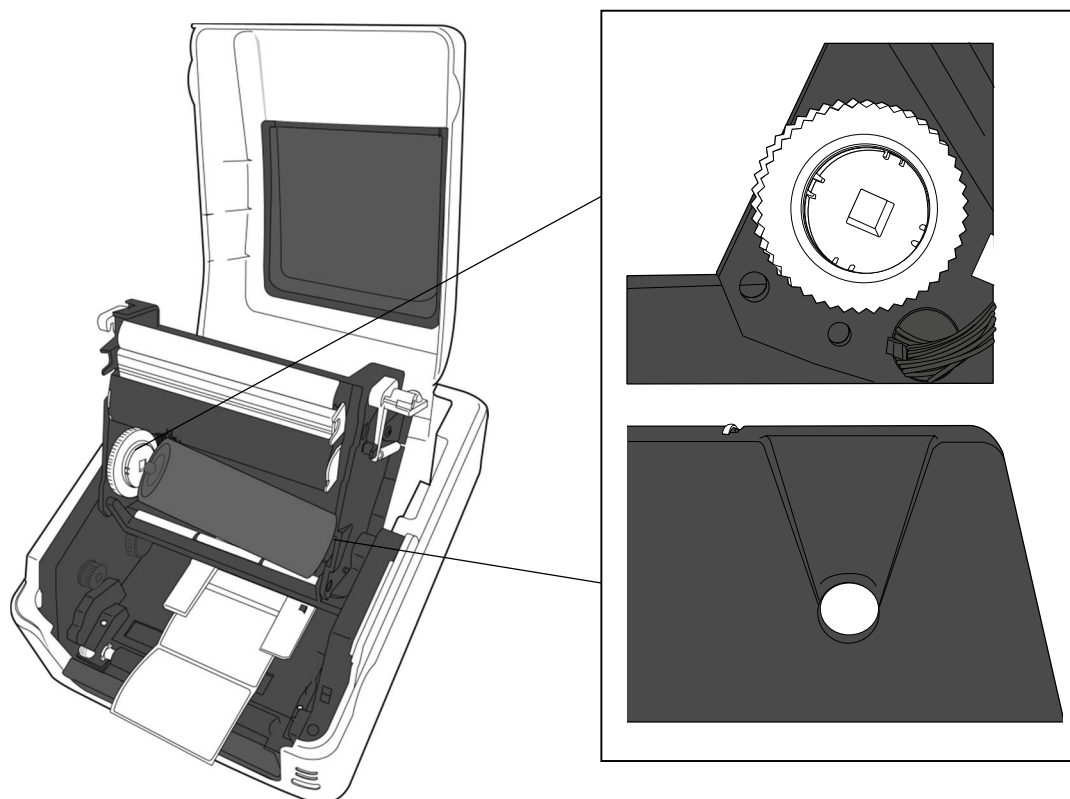
3.   Lift the printer module to reveal the **Supply Wheel**.


4.   Do the following to install both rolls:

•   To load the supply roll, align the notches on the left side and press the roll to the

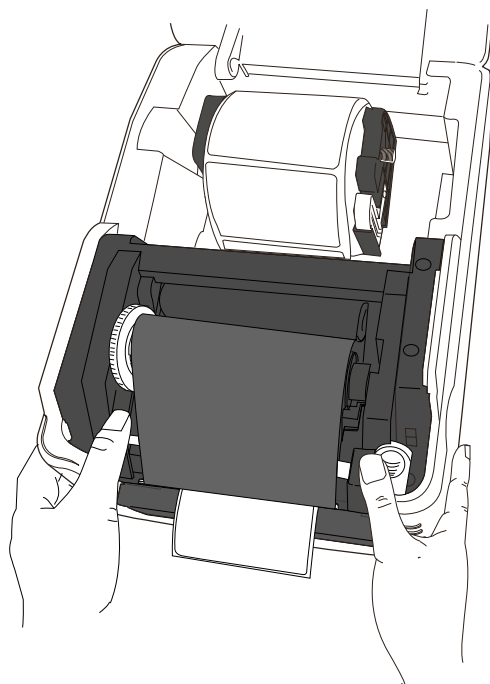   supply hub, and then press the right side of the roll to the hole.

- To load the take-up roll, align the notches on the left side and press the roll to

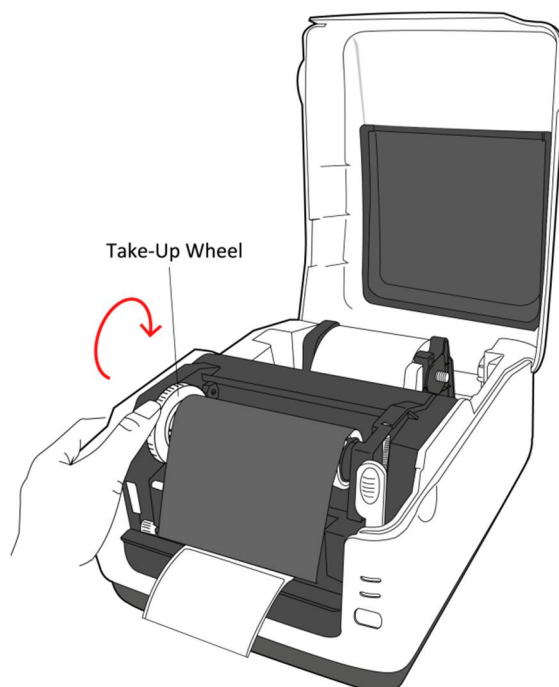 the take-up hub, and then press the right side of the roll to the hole.
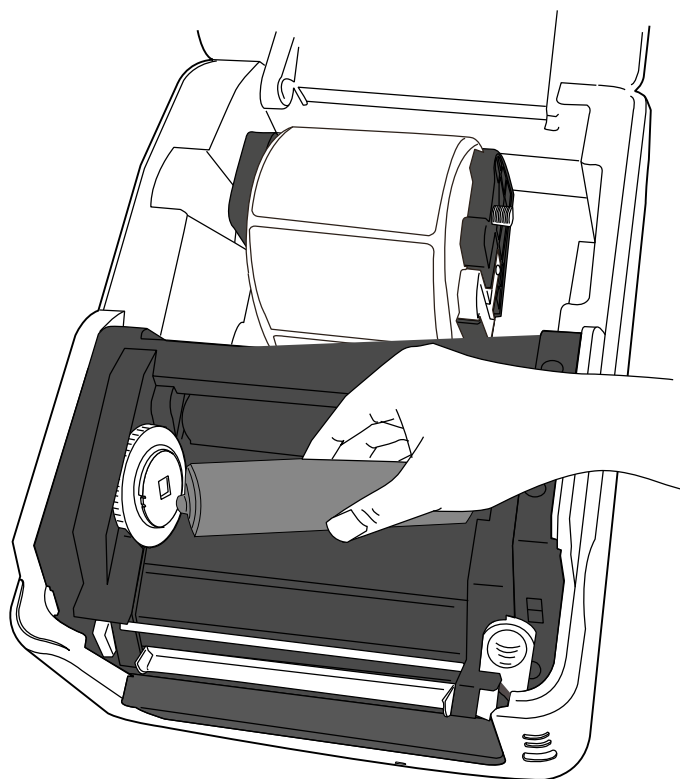
5. Pull the ribbon from the supply roll and tape it on the take-up roll.
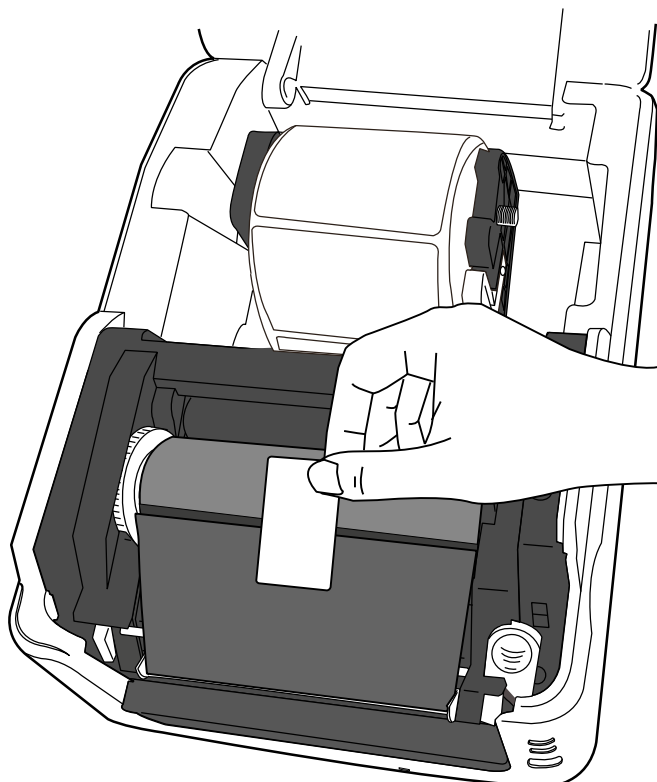
6.　Close the printer module and press down firmly at its both sides, until you hear a

click.

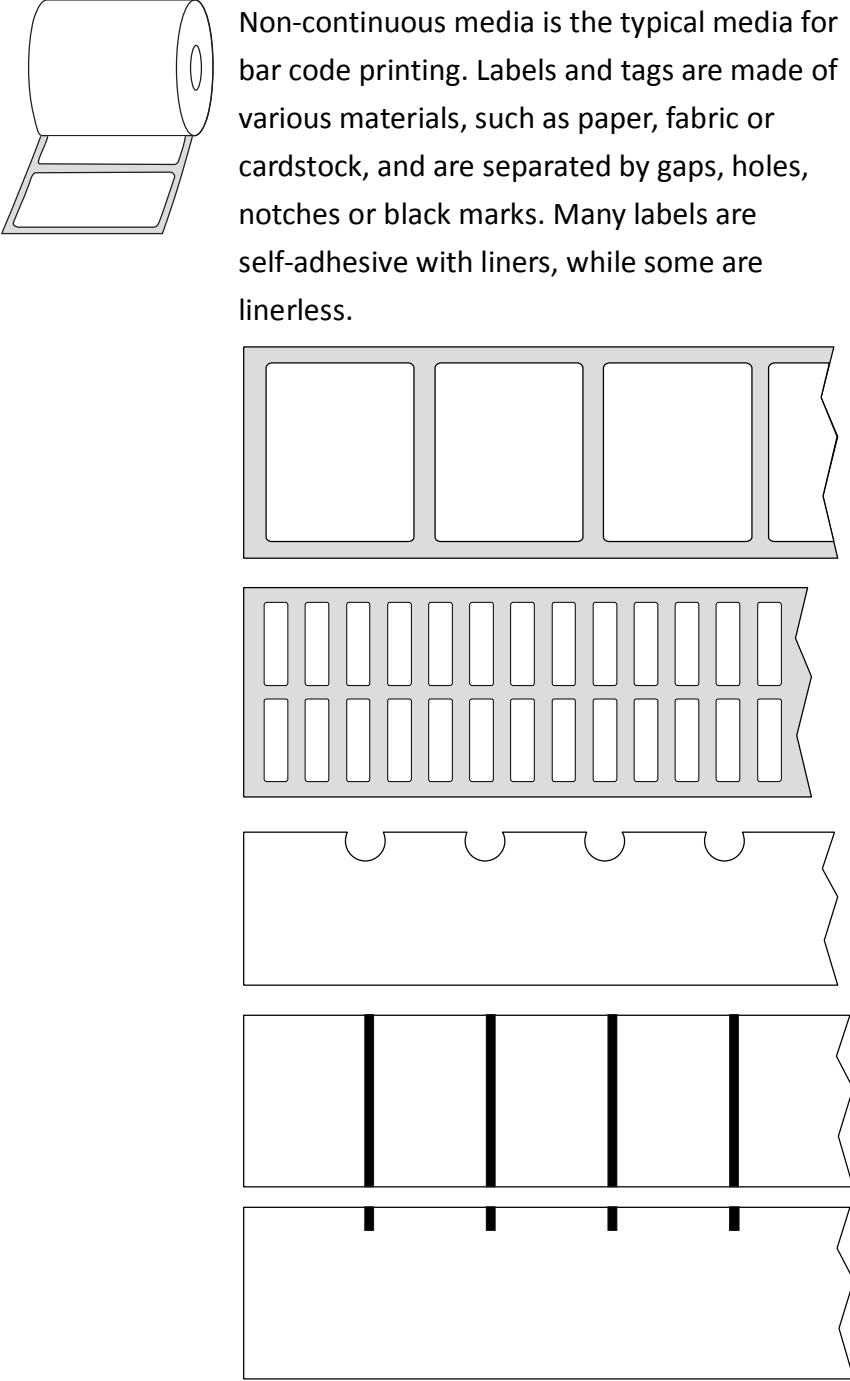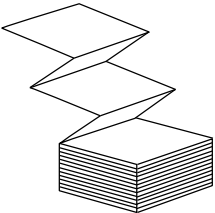7.　Rotate the **Take-Up Wheel** to straighten the ribbon and reduce its wrinkles.

> **Note**　For the supply hub, the ribbon wind direction can be coated side in (CSI) or coated side out (CSO); for the take-up hub, the wind direction must be CSO.

2.5 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
```

ot(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>
rso(0)<0.01mm>
sso(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.

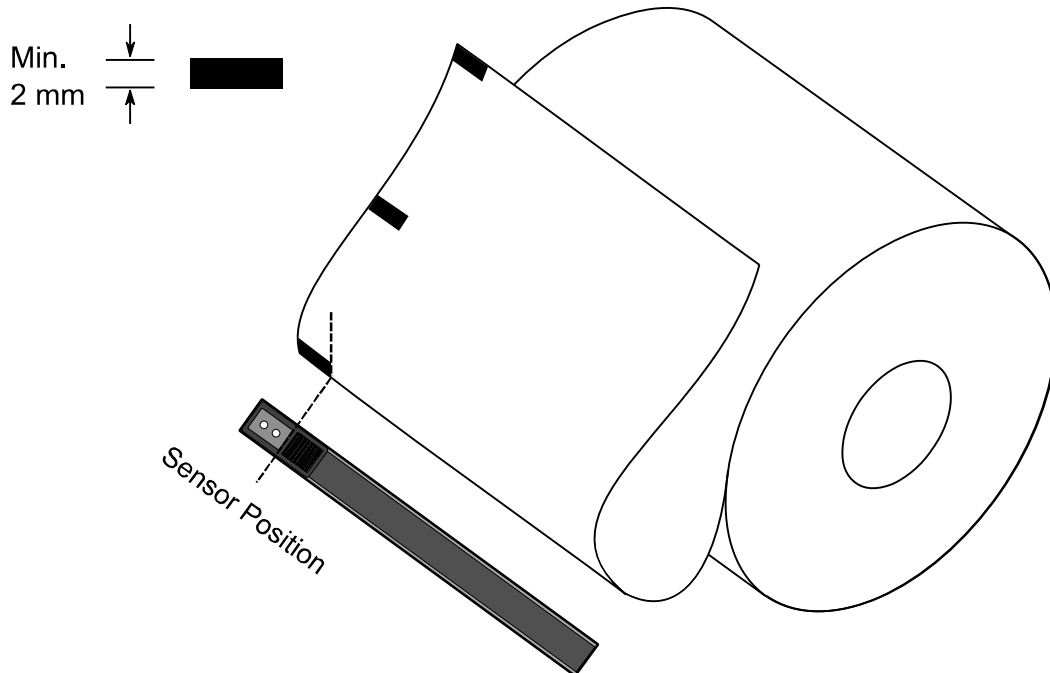It is used for detecting gaps across the entire width of the label.
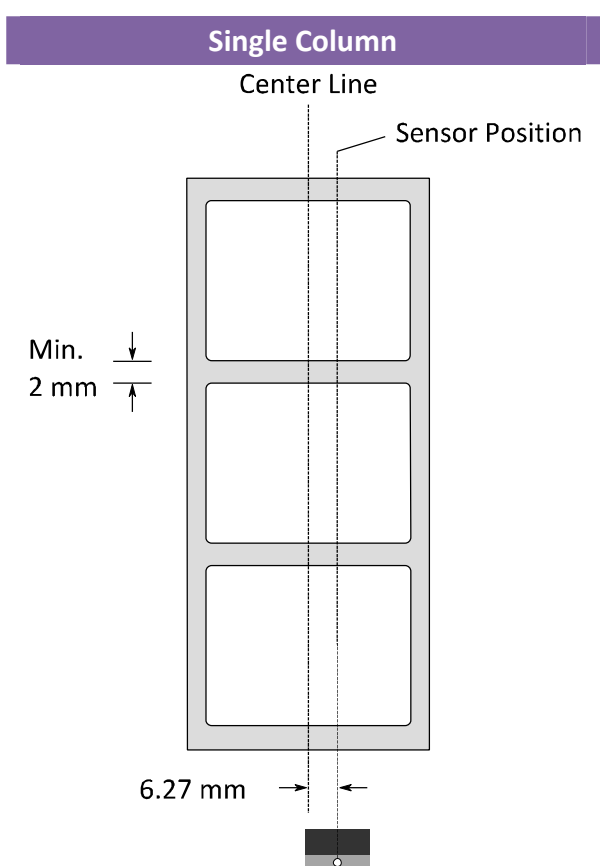
3.4.2   Reflective sensor

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
Sensor Position	Sensor Position
Min. 2 mm	
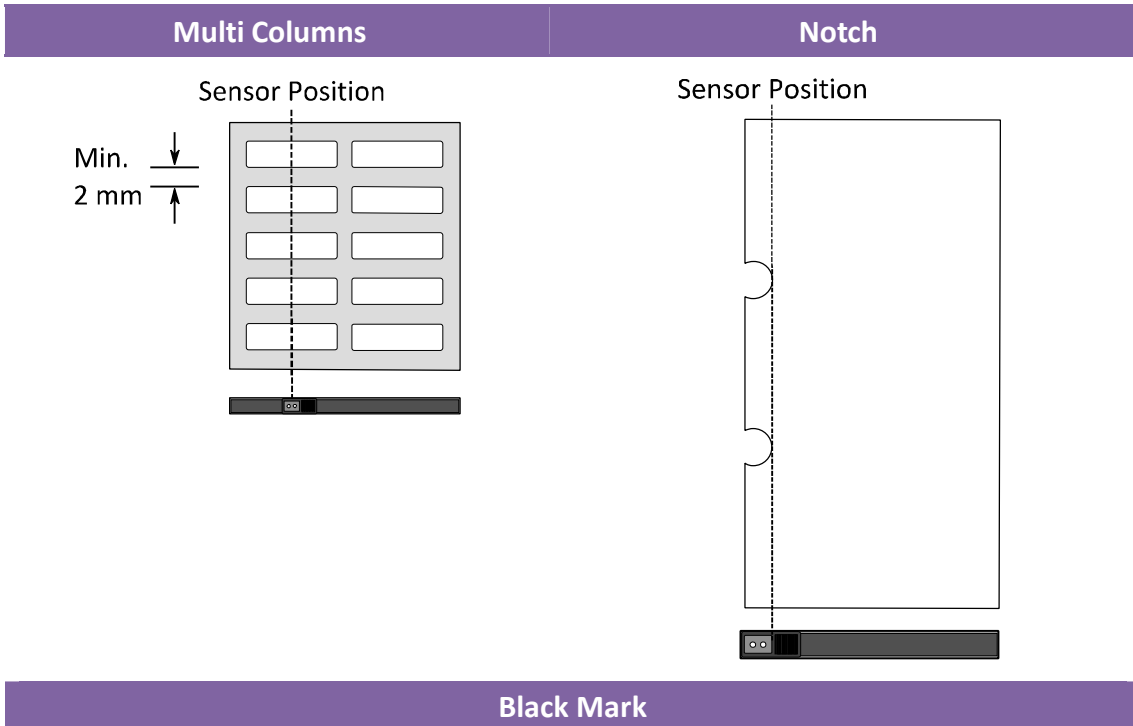
Black Mark

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

Min.
2 mm

Sensor Position

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.
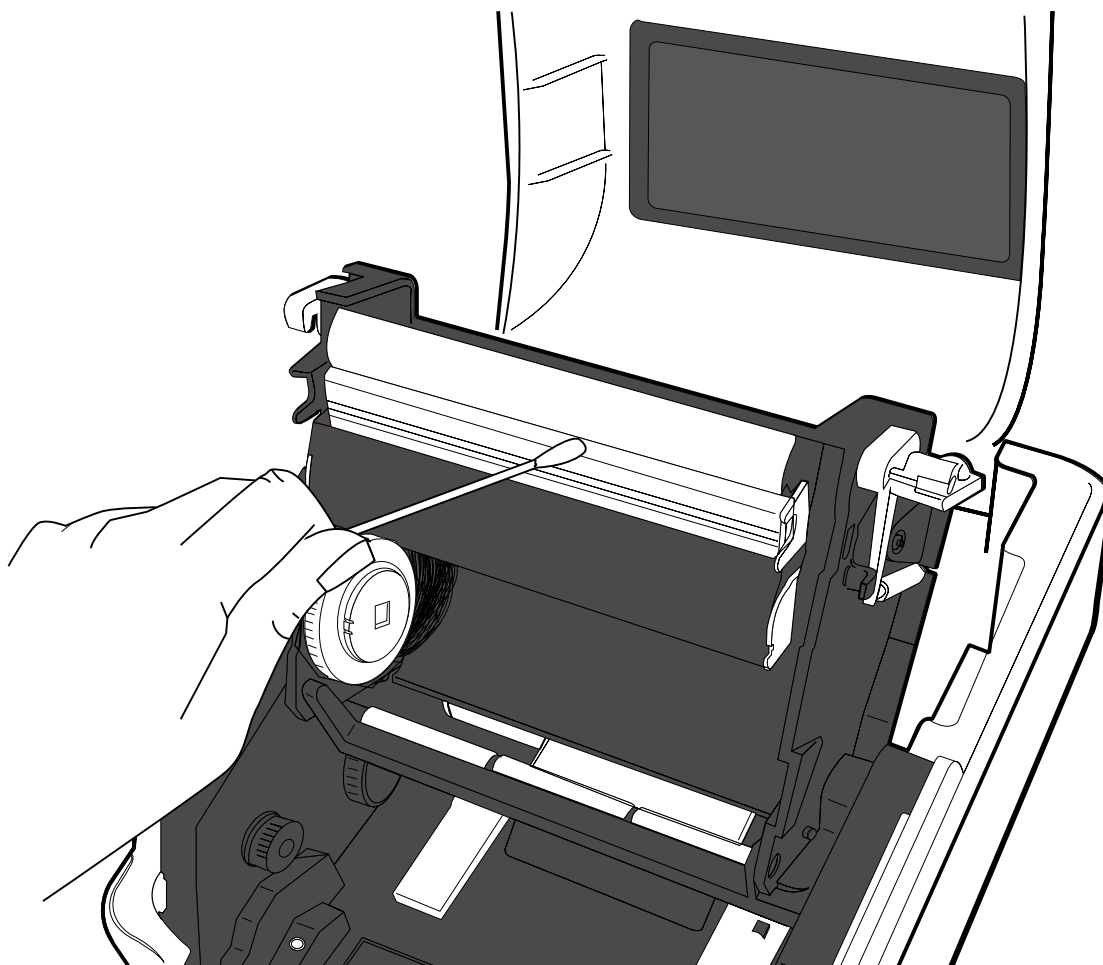
4.1.1 Printhead

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.

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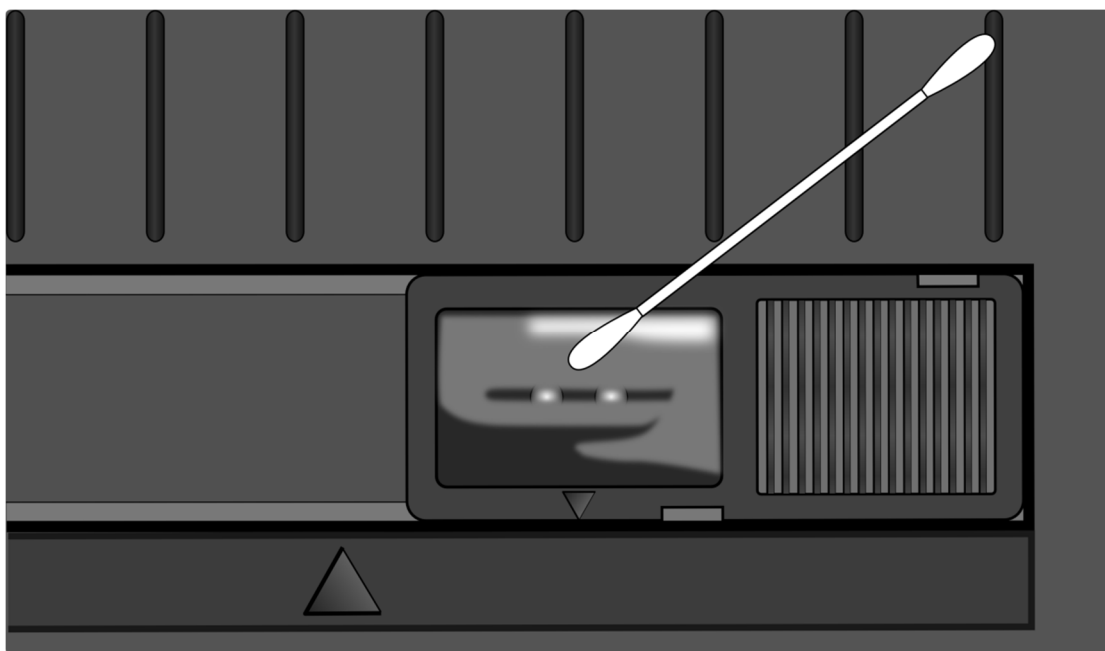
1. Moisten a soft cloth with ethyl alcohol.
2. Wipe the **Media Roll Holders** to clean dust.
3. Wipe the **Media Guides** to clean dust and dirt.
4. Wipe the media path to clean paper debris.
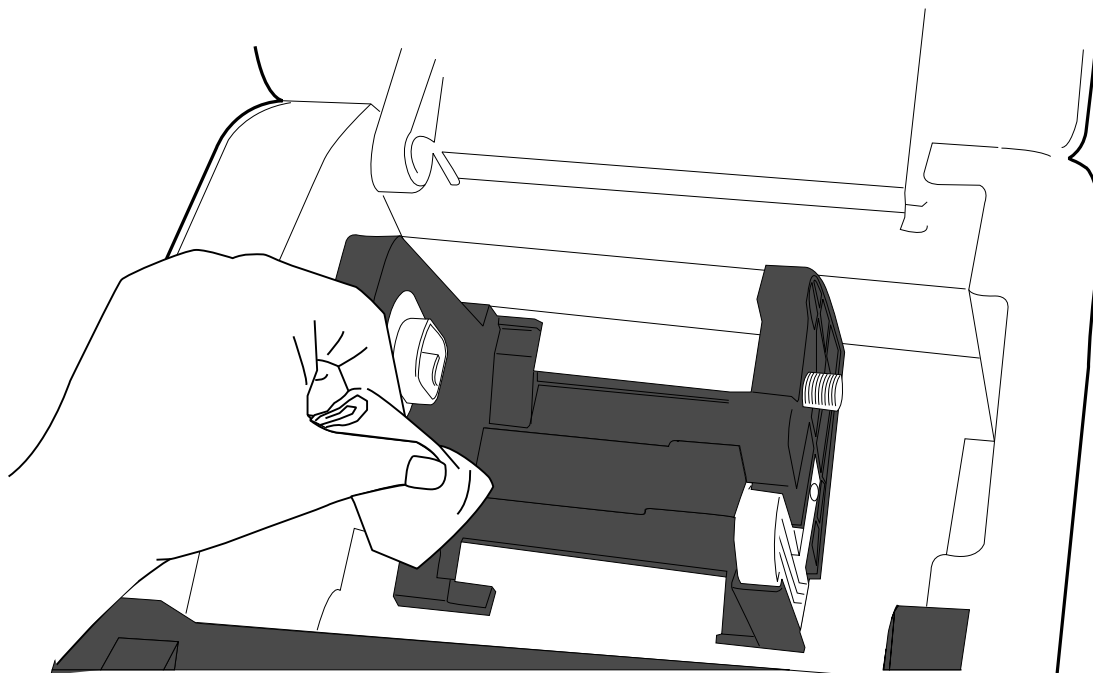
4.1.3   Sensor

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.
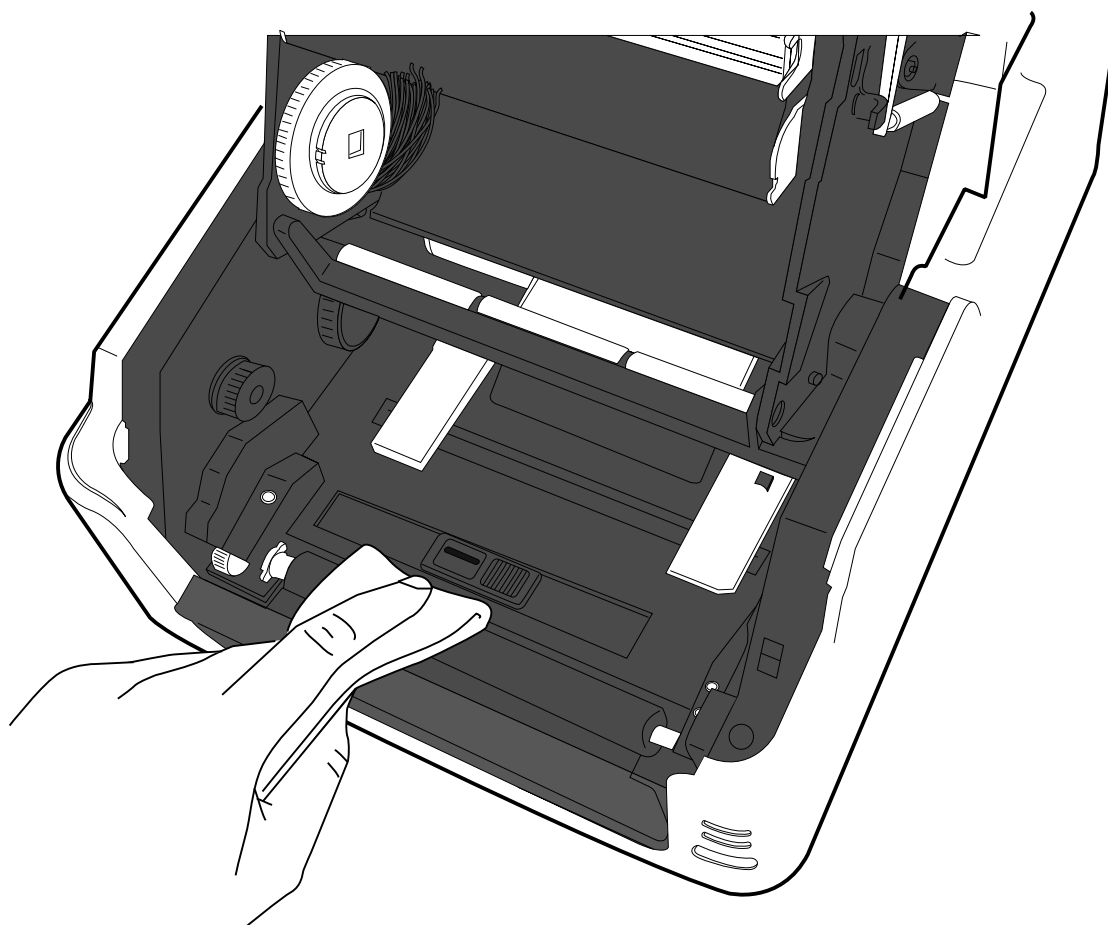
4.2   Replacing RTC Battery

If your printer has a built-in real-time clock (RTC), you will find the RTC battery on the main board. The RTC battery keeps the RTC running when the printer is turned off, so the RTC can keep track of the current time. You can check the RTC battery charge from the status lights. If the RTC battery is low or out, you need to replace it with a new one.

Take the following steps to replace your RTC battery:

1. Turn on the printer.

2. Locate the battery on the main board.

3. Remove the old coin battery and install a new one.

4. Turn off the printer.

Battery

Battery Slot
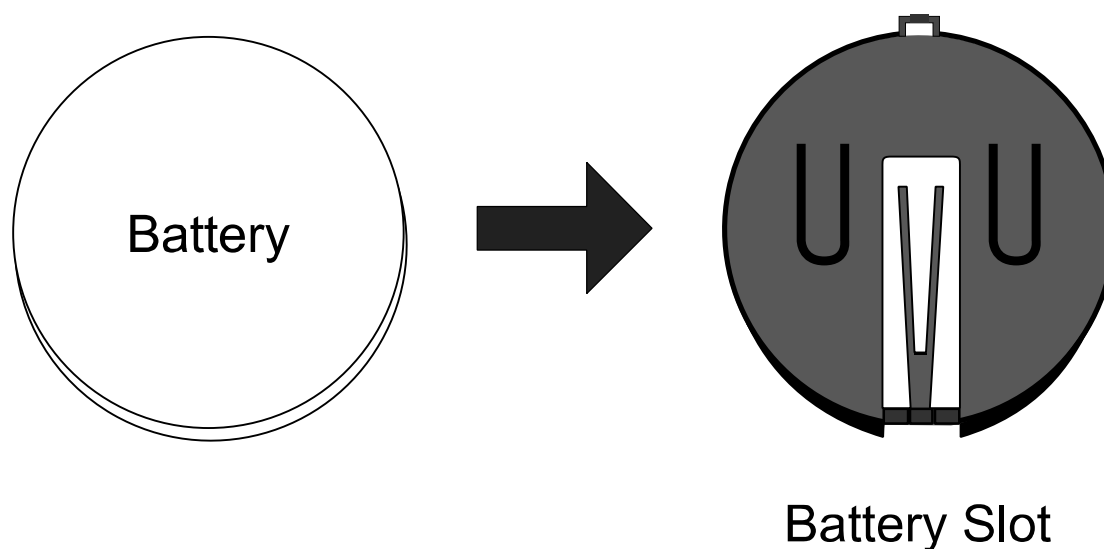
Warning   Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

5   Troubleshooting

This chapter provides the information about printer problems and solutions.

5.1   Printer issues

The printer is not turned 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 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.

I accidentally press the feed button while the printer module is opened

Close the printer module and press the **FEED** button.

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 ribbon is not loaded correctly. See Section 2.4, "Loading Ribbon" to reload the ribbon.

- 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 ribbon. Use the compatible media instead.

- The media is incompatible for the printer. Use Toshiba-approved media roll instead.

5.3 Ribbon Problems

The ribbon is out

■   Load a new ribbon roll.

The ribbon is broken

■   Check the print darkness and adjust it if it is too high, and take the following

steps to fix the broken ribbon:

1.   Unload the ribbon supply roll and take-up roll from the printer.

2.   Pull the ribbon from the supply roll so it overlaps the broken end of the

take-up roll.

3.   Tape the overlapped parts together.

4.   Reload both rolls into the printer.

The ribbon is "printed out" with the media

■   The ribbon is not loaded correctly. See Section 2.4, "Loading Ribbon" to reload

the ribbon.

■   The printhead temperature is too high. Reload the ribbon and print a

configuration label to check the settings (see Section 3.2, "Self Test and Dump

mode"). If the print darkness is very high, adjust it in printer preference, or reset

your printer (see Section 3.3, "Restore Your Printer to Factory Settings").

The ribbon is wrinkled

1. Make sure the ribbon is loaded correctly.

2. Rotate the **Take-Up Wheel** to straighten the ribbon.

5.4 Other issues

There are broken lines in the printed label

- The ribbon is wrinkled. Adjust or reload the ribbon. Or, print a few labels until the wrinkled part goes away.

- 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 cutter is experiencing issues

- If there is a paper jam, clear it.

- The cutter has become loose. Fix the cutter in position and tighten it.

- The cutter blade is not sharp anymore. Replace your cutter with a new 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	WS408TT
Print method	Direct Thermal and Thermal Transfer
Resolution	203 dpi (8 dots/mm)
Media Alignment	Center Alignment
Operation Mode	Standard: Continuous, Tear-off
Sensor	Media Sensor — Gap Sensor (Transmissive, Fixed) Offset: 6.27mm - Factory Default Sensor
	I-Mark Sensor (Reflective, Movable)
	Head Open Switch
	Ribbon Sensor
Print Speed	2, 3, 4, 5, 6 inches/sec (50.8, 76.2, 101.6, 127, 152.4 mm/sec) 2 &3 ips for peel off mode
	Do not set Print Speed to 4 ips or higher speed, when the peeler module is installed and the peeler cover is open.
Print Darkness	Darkness level – PPLZ: 0 ~ 30
	Default – PPLZ: 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 1mm pitch is required
Interface	USB (Type A and Type B), Ethernet
On-Board Memory	Standard Memory (Flash ROM): 16 MB User Memory: 2 MB Standard Memory (SDRAM): 32 MB
External Memory	USB: Max 16 GB

Model	WS408TT
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 PPLZ Command **Reference**

6.2 Media

Properties	Description
Media Size	**Batch Mode** Length (TT): 8 mm ~ 997 mm (including liner 10 ~ 999 mm) Length (DT): 8 mm ~ 997 mm Width: 22.4 mm ~ 115 mm (including liner 25.4 ~ 118 mm) **Tear-Off Mode** Length (TT): 8 mm ~ 997 mm (including liner 10 ~ 999 mm) Length (DT): 30 mm ~ 997 mm Width: 22.4 mm ~ 115 mm (including liner 25.4 ~ 118 mm)
Media Type	Thermal Transfer Label Thermal Transfer Tag Direct Thermal Label Direct Thermal Tag Roll Paper (Face-Out/Face-In) Fanfold Paper
Ribbon Size	Length: 100 m (ϕ Core Size: 0.5 inch), Max 300 m (ϕ Core Size: 1 inch) Width: 40 mm ~ 110 mm
Ribbon Type	Wax, Wax-Resin, Resin Coated Side In or Coated Side Out

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	90W
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 220.6 ± 0.5mm x D 278.5 ± 0.5mm x H 182 ± 0.5mm Height with cover open: 358.1 mm
Weight	2.4 kg ± 3% (excluding media and options) or less

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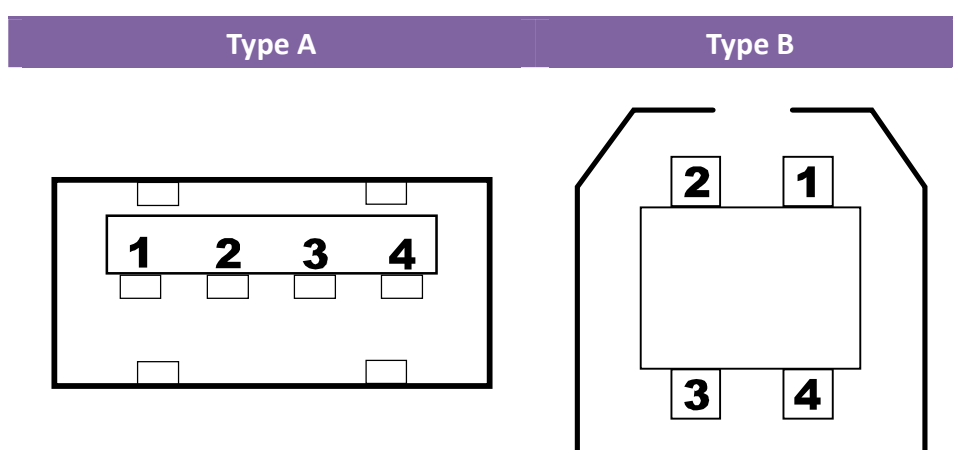
Pin	Signal	Description
1	VBUS	+5V
2	D-	Differential data signaling pair -
3	D+	Differential data signaling pair +
4	Ground	Ground

6.8.2 Ethernet

The Ethernet uses RJ-45 cable, which is 8P8C (8-Position 8-Contact). The figure below shows its pinout.
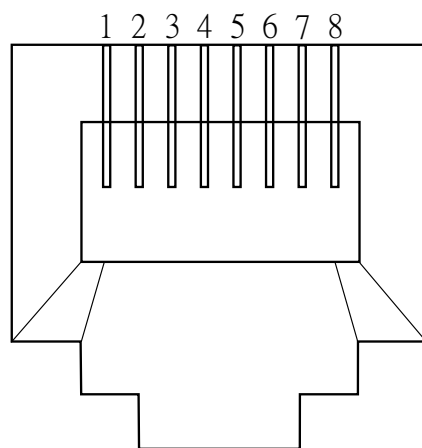
Pin	Signal
1	Transmit+
2	Transmit-
3	Receive+
4	Reserved
5	Reserved
6	Receive-
7	Reserved
8	Reserved

7 Safety precautions

This section describes how to use the printer safely. Be sure to read the following information carefully before using the printer.

Pictographic Symbols
This quick guide and the printer labels use a variety of pictographic symbols. These symbols emphasize the safe and correct use of the printer and to prevent injury to others and property damage. The explanation of the symbols is as follows. Be sure to understand these symbols well before you read the main text.

⚠ **WARNING**	Ignoring the instructions marked by this symbol and erroneously operating the printer could result in death or serious injury.
⚠ **WARNING**	Ignoring the instructions marked by this symbol and erroneously operating the printer could result in injury or property damage.

⚠	The △ pictograph means "Caution is required." A specific warning symbol is contained inside this pictograph (The symbol at left is for electric shock).
🚫	The ⊘ pictograph means "Should not be done." What is specifically prohibited is contained in or near the pictograph (The symbol at left means "Disassembly prohibited").
	The ● pictograph means "Must be done." What is specifically to be done is contained in the pictograph (The symbol at left means "Unplug the power cord from the outlet").

⚠ WARNING
Do not set on an unstable area
• Do not set on an unstable area, such as a wobbly table or slanted area or an area subject to strong vibration. If the printer falls off or topples over, it could injure someone.
Do not place containers full of water or other liquid on the printer
• Do not place flower vases, cups, or other containers holding liquids, such as water or chemicals, or small metal objects near the printer. If they are spilled and get inside the printer, immediately turn off the power switch, unplug the power cord from the outlet, and contact your SATO reseller or technical support center. Using the printer in this condition could cause a fire or electric shock.
Do not put objects inside the printer
• Do not insert or drop in metal or burnable objects inside the printer's openings (cable outlets, etc.). If foreign objects do get inside the printer, immediately turn off the power switch, unplug the power cord from the outlet, and contact your SATO reseller or technical support center. Using the printer in this condition could cause a fire or electric shock.
Do not use other than the specified voltage
• Do not use other than the specified voltage. Doing so could result in fire or electric shock.
Always ground the connections
• Always connect the printer's ground wire to a ground. Not grounding the ground wire could result in electric shock.
Handling of the power cord
• Do not damage, break, or modify the power cord. Also, do not place heavy objects on the power cord, heat it, or pull it because doing so could damage the power cord and cause a fire or electric shock. • If the power cord becomes damaged (core is exposed, wires broken, etc.), contact your SATO reseller or technical support center. Using the power cord in this condition could cause a fire or electric shock. • Do not modify, excessively bend, twist, or pull the power

	cord. Using the power cord in such a condition could cause a fire or electric shock.
When the printer has been dropped or broken	
	• If the printer is dropped or broken, immediately turn off the power switch, unplug the power cord from the outlet, and contact your SATO reseller or technical support center. Using the printer in this condition could cause a fire or electric shock.
Do not use the printer when something is abnormal about it	
	• Continuing to use the printer in the event something is abnormal about it, such as smoke or unusual smells coming from it, could result in fire or electric shock. Immediately turn off the power switch, unplug the power cord from the outlet, and contact your SATO reseller or technical support center for repairs. It is dangerous for the customer to try to repair it, so absolutely do not attempt repairs on your own.
Do not disassemble the printer	
	• Do not disassemble or modify the printer. Doing so could result in fire or electric shock. Ask your SATO reseller or technical support center to conduct internal inspections, adjustments, and repairs.
Regarding the cutter	
	• Do not touch the cutter with your hands or do not put something into the cutter. Doing so could result in an injury.
Using the head cleaning fluid	
	• Use of flame or heat around the head cleaning fluid is prohibited. Absolutely do not heat it or subject it to flames. • Keep the fluid out of reach of children to prevent them from accidentally drinking it. If the fluid is drunk, immediately consult with a physician.
Print head	
	• The print head is hot after printing. Be careful not to get burned when replacing media or cleaning immediately after printing. • Touching the edge of the print head with bare hands could result in injury. Be careful not to become injured when replacing media or cleaning.

	• The customer should not replace the print head. Doing so could result in injury, burns or electric shock.

⚠ CAUTION	
Do not place in areas with high humidity	
	• Do not place the printer in areas with high humidity or where condensation forms. If condensation forms, immediately turn off the power switch and do not use the printer until it dries. Using the printer while condensation is on it could result in electric shock.
Carrying the Printer	
	• When moving the printer, always unplug the power cord from the outlet and check to make sure all external wires are disconnected before moving it. Moving the printer with the wires still connected could damage the cords or connecting wires and result in a fire or electrical shock. • Do not carry the printer with media loaded in it. The media could fall out and cause an injury. • When setting the printer on the floor or a stand, make sure not to get your fingers or hands pinched under the printer feet.
Power supply	
	• Do not operate the power switch or plug in/ unplug the power cord with wet hands. Doing so could result in electric shock.
Power cord	
	• Keep the power cord away from hot devices. Getting the power cord close to hot devices could cause the cord's covering to melt and cause a fire or electric shock. • When unplugging the power cord from the outlet, be sure to hold it by the plug. Pulling it by the cord could expose or break the core wires and cause a fire or electric shock. • The power cord set that comes with the printer is especially made for this printer. Do not use it with any other electrical devices.

Top cover	
	• Be careful not to get your fingers pinched when opening or closing the top cover. Also be careful the top cover does not slip off and drop.
Loading media	
	• When loading media roll, be careful not to get your fingers pinched between the media roll and the supply unit.
When not using the printer for a long time	
	• When not using the printer for a long time, unplug the power cord from the outlet to maintain safety.
During maintenance and cleaning	
	• When maintaining and cleaning the printer, unplug the power cord from the outlet to maintain safety.