DESKTOP PRINTERS

ZD421 and ZD621 Series

User Guide

P1123730-07EN Rev A

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2026/07/16

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About This Guide

This guide is for integrators and operators of the Zebra ZD421 and ZD621 Desktop Printers. Use this guide to install, configure, operate, and support your printer(s).

Zebra has made the following resources available online to assist you:

- How-to videos
- Product page links to printer specifications
- Printer accessory, supplies, parts, and software links
- Setup, configuration, and programming guides
- Printer drivers (Windows, Apple, OPOS, etc.), firmware, and utilities
- Printer fonts
- Knowledge base and support contacts
- Printer warranty and repair links

The specific product pages for your printer model(s) are:

- ZD421 Direct Thermal printer — zebra.com/zd421d-info
- ZD421 Thermal Transfer printer — zebra.com/zd421t-info
- ZD421 Thermal Transfer Ribbon Cartridge printer — zebra.com/zd421c-info
- ZD621 Direct Thermal printer — zebra.com/zd621d-info
- ZD621 Thermal Transfer printer — zebra.com/zd621t-info
- ZD621R Thermal Transfer RFID printer — zebra.com/zd621r-info

Other Valuable Printer Resources

Zebra has a large suite of free and fee based software, Apps (applications), and other technical resources for your Zebra Link-OS printer.

These are just some of the extensive software and resource areas available online:

- ZebraDesigner label design software available from zebra.com/zebradesigner
- Printer management tools
- Virtual devices for legacy languages normally associated with other printer brands
- Cloud-based enterprise printer management and printing

- XML and PDF format file printing
- Oracle and SAP support
- Zebra Savanna Data Intelligence platform - turns raw data from devices (IoT) and sensors into actionable intelligence for your business
- A suite of Link-OS Mobile Apps (applications for phones, tablets, etc.)
- Link-OS software development kit (SDK)
- Additional Operating Systems (OS) and Service platforms

For more information, see ZebraLink, Zebra Link-OS, and the Zebra Savanna cloud data platform at zebra.com/software.

Zebra OneCare Printer Service and Support

For maximum productivity, we can help your business ensure its Zebra printers are online and ready for business.

For information on the Zebra OneCare service and support options available for your printer, go to zebra.com/zebraonecare.

Notational Conventions

The following conventions make the content of this document easy to navigate.

- **Bold** text is used to highlight the following:
  - Dialog box, window, and screen names
  - Dropdown list and list box names
  - Checkbox and radio button names
  - Icons on a screen
  - Key names on a keypad
  - Button names on a screen
- Bullets (•) indicate:
  - Action items
  - List of alternatives
  - Lists of required steps that are not necessarily sequential
- Sequential lists (for example, those that describe step-by-step procedures) appear as numbered lists.

Icon Conventions

The documentation set is designed to give the reader more visual clues. The following visual indicators are used throughout the documentation set.

NOTE: The text here indicates information that is supplemental for you to know and that is not required to complete a task.

IMPORTANT: The text here indicates information that is important for you to know.

CAUTION: If the precaution is not heeded, you could receive a minor or moderate injury.

WARNING: If danger is not avoided, you CAN be seriously injured or killed.

DANGER: If danger is not avoided, you WILL be seriously injured or killed.

Introduction

This section introduces the Zebra ZD421 and ZD621 desktop thermal label printers. It details your printer's features, the options available for your printer, and what ships with your printer.

This document covers the following ZD Series desktop printer models:

- ZD421 Direct Thermal printer — zebra.com/zd421d-info
- ZD421 Thermal Transfer printer — zebra.com/zd421t-info
- ZD421 Thermal Transfer Ribbon Cartridge printer — zebra.com/zd421c-info
- ZD621 Direct Thermal printer — zebra.com/zd621d-info
- ZD621 Thermal Transfer printer — zebra.com/zd621t-info
- ZD621R Thermal Transfer RFID printer — zebra.com/zd621r-info

Link-OS 4 inch Desktop Thermal Printers

The Zebra Link-OS 4 inch Desktop printers are compact label printers with a wide range of features and options.

- Both Direct Thermal and Thermal Transfer printer models are available.
- This printer series includes healthcare printer models engineered with plastics that can withstand routinely-used hospital cleaning chemicals. They ship with a medical-grade power supply.
- ZD421 printers support printing speeds* of:
  - up to 152 mm per second (6 ips) for 203 dpi printers.
  - up to 102 mm per second (4 ips) for 300 dpi printers.
- ZD621 printers support printing speeds* of:
  - up to 203 mm/s per second (8 ips or inches per second) for 203 dpi (dots per inch print density) printers
  - up to 152 mm/s (6 ips) for 300 dpi version printers.
- Used with Link-OS virtual devices, these printers support both ZPL and EPL Zebra printer programming languages and a wide variety of other printer-control languages.

NOTE: * Maximum print speeds vary by model, print resolution, and the type of media being used.

Common Desktop Printer Features

Zebra desktop printers share the features listed here.

Table 1 Common Desktop Printer Features

OpenAccess design	To simplify media loading.
Color-coded touch points (for operator controls and media guides) plus an enhanced user interface featuring three buttons and five status indicators	For ease of using the printer.
Field-installable media handling options	So you can use a variety of media with your printer.
Media roll support	Outer Diameter (O.D.): Up to 127 mm (5 in.) Inner Diameter (I.D.) roll cores: 12.7 mm (0.5 in.), 25.4 mm (1 in.), and additional core sizes when using optional media core adapters
Movable media sensor	Compatibility with a wide range of media types: • Full and partial width black mark media and notched/slotted media. • Multi-center position transmissivity sensor for use with label gap/web media
Modular connectivity slot	• On ZD421 models, the modular connectivity slot is available for field-installable 10/100 Ethernet (802.3 RJ-45) with an internal print server or serial (RS-232 DB-9) interface options. • On ZD621 models, the modular connectivity slot has a serial (RS-232 DB-9) port, and an Ethernet (LAN, RJ-45 connector) with an internal print server that supports 10Base-T, 100Base-TX, and Ethernet 10/100 auto-switching networks factory installed.
Font support	On-the-fly OpenType and TrueType font scaling and import. Unicode Resident scalable font (Swiss 721 Latin 1 font) Selection of resident bitmap fonts
Backwards-compatibility focused technology	For quick printer replacements: • Drop-in replacement of legacy Zebra desktop printers. • Support for EPL and ZPL programming language instructions. • Support for Link-OS virtual devices to interpret non-Zebra printer programming language code.
Universal Serial Bus (USB) 2.0 interface	For convenient connectivity and quick file transfers.
Universal Serial Bus (USB) host port	To speed up print operations such as printer firmware updates.

Table 1 Common Desktop Printer Features (Continued)

Factory-installed network models	Supports printer configuration using a setup utility running on mobile devices. • Use the printer's optional Bluetooth Low Energy (LE) feature for short-range communication to mobile devices. Bluetooth LE works with Zebra mobile setup utility applications to assist in printer setup, perform media calibration, and maximize print quality. • Tap to pair devices with the printer, access printer information, and use mobile applications using Zebra's Print Touch (Near Field Communication or NFC).
Zebra's Link-OS	An open platform that connects operating systems for smart Zebra devices with powerful software apps, allowing for quick integration, management, and maintenance from any location.
On-board Real Time Clock (RTC)	For internal printer timekeeping.
XML-enabled printing	For barcode label printing; lowers license fees and print server hardware requirements, reducing customization and programming costs.
Zebra global printing solution	Supports the following: • Microsoft Windows keyboard encoding (and ANSI), Unicode UTF-8 and UTF-16 (Unicode Transformation Formats) • XML • ASCII (7-bit and 8-bit used by legacy programs and systems) • Basic single- and double-byte font encoding • Hexadecimal encoding • JIS and Shift-JIS (Japanese Industrial Standards) • Custom character mapping (DAT table creation, font linking, and character remapping)
Printhead maintenance reporting	Reporting can be enabled and customized to suit your needs.
Tool-free replacement	For printheads and platen (drive) rollers.
Minimum of 64 MB of internal (E : \) printer memory	To store forms, fonts, and graphics.

Link-OS 4-inch Desktop Printer Options

Zebra Link-OS 4-inch desktop printers can be ordered with a range of factory-installed options. Other options are field upgrade kits.

- Color Touch LCD User Interface — for easy setup, print configuration, printing, and use of a variety of Link-OS features.
- ZD621R thermal transfer printer — factory-installed RFID support available with the color touch display.
- Healthcare printer models:
  - Healthcare wipe-able plastics for easy disinfecting and cleaning
  - IEC 60601-1 certified power supply.
- Wired and Wireless options — factory-installed and field-installable:
  - Wi-Fi (802.11 ac - includes a/b/g/n), Bluetooth Classic 4.1, and Bluetooth Low Energy (LE) 5.0 wireless connectivity.
  - Wi-Fi (802.11ax – includes a/b/g/n), Bluetooth 5.3, and Bluetooth Low Energy (LE) 5.3 wireless connectivity.
  - Internal Ethernet Print Server (LAN, RJ-45 connector) — supports 10Base-T, 100Base-TX, and fast Ethernet 10/100 auto-switching networks for wired connectivity. This includes Bluetooth Low Energy (LE) wireless connectivity.
  - ZD621 printers — include Internal Ethernet Print Server (LAN, RJ-45 connector) with support for 10Base-T, 100Base-TX, and Ethernet 10/100 auto-switching networks; and a Serial (RS-232 DB-9) port.
- ZD421 Field installable connectivity modules:
  - Internal Ethernet Print Server (LAN, RJ-45 connector) —supports 10Base-T, 100Base-TX, and Ethernet 10/100 auto-switching networks
  - Serial (RS-232 DB-9) Port
- Thermal transfer printing — A choice of models that support thermal transfer ribbon cartridge or dual-capacity ribbon rolls (74-meter and 300-meter)
- Field installable media handling options:
  - Label Dispenser (peels liner off the label and dispenses the label)
  - General-purpose media cutter (cuts or tears off a label after it is printed)
- Media Core Adapter kit include adapters for media rolls with Outer Diameters (O.D.) up to 127 mm (5 in.):
  - 38.1 mm (1.5 in.) I.D. media cores
  - 50.8 mm (2.0 in.) I.D. media cores
  - 76.2 (3.0 in.) I.D. media cores
- Attached power supply base with internal power supply
- Attached battery base with removable battery:
  - Attached battery base and battery are sold separately
  - Provides a regulated 24 VDC until shutdown for recharging, to maintain print quality. This keeps print from changing as the battery discharges with use.

  - Battery shutdown mode for shipping and storage
  - Built-in battery charge and status indicators
- Asian Language support with printer configuration options for the large Simplified and Traditional Chinese, Japanese, or Korean character sets. Printers sold in China have the Simplified Chinese SimSun font pre-installed.
- Zebra ZBI 2.0 (Zebra BASIC Interpreter) programming language. ZBI allows you to create custom printer operations that can automate processes, use peripherals such as scanners, scales, keyboards or the Zebra Keyboard Display Units, without being attached to a PC or a network.
- ZD621 Direct Thermal healthcare models — Locking Media Cabinet for for additional security, and Kensington Slot for Kensington locking devices to secure the printer.

What's in the Box?

After unpacking and inspecting the printer, make sure you have all the parts listed here. Familiarize yourself with the printer hardware so you can easily follow the instructions in this guide.

<table>
<tr>
<td> 
Printer</td>
<td> 
USB cable</td>
<td> 
Printer documentation</td>
</tr>
<tr>
<td colspan="3"> 
Power supply and power cord. (Power cord varies by region.)</td>
</tr>
<tr>
<td colspan="3">The items below are included with thermal transfer printer models only. Direct thermal printers do not need ribbon for printing, so they do not ship with these.</td>
</tr>
<tr>
<td> 
Empty starter ribbon cores</td>
<td colspan="2"> 
Non-Zebra 300-meter ribbon adapters</td>
</tr>
</table>

Unpacking and Inspecting the Printer

When you receive the printer, immediately unpack it and inspect for shipping damage. Also make sure the package includes all the parts.

See the Zebra support page for your printer (listed in the introductory chapter of this guide) for videos that show how to pack and unpack your printer.

1. Save all packing materials.
2. Check all exterior surfaces for damage.
3. Open the printer and inspect the media compartment for loose or damaged components.
4. If you discover shipping damage on inspecting the printer:

a) Immediately notify the shipping company and file a damage report.

NOTE: Zebra Technologies Corporation is not responsible for any damage to the printer incurred during shipment, and will not cover the repair of this damage under its warranty policy.

b) Keep all packaging material for shipping-company inspection.

c) Notify your authorized Zebra reseller promptly.

What You Will Need to Print

Your printer is one of three parts of your printing solution. To print, you will also need print media and software.

The printer can operate in standalone mode. It does not have to be connected to other devices or systems to print.

Table 2 Supplies, Drivers and Applications You Will Need to Print

Compatible media	Depending on the printer model (direct thermal or thermal transfer), you will need appropriate media to print. Direct thermal printing uses chemically-treated, heat-sensitive media that blackens when it passes under the thermal printhead. For direct thermal printing, you need direct thermal media. Ribbon is not required for direct thermal printing. Thermal transfer printing uses a heated ribbon to produce durable, long-lasting images on a wide variety of materials. For thermal transfer printing, you need thermal transfer media and thermal transfer ribbon rolls (or a ribbon cartridge for Ribbon Cartridge printer models). You can use media that is of any supported format. Depending on your printing needs, you can use things such as labels, tags, tickets, receipt paper, fanfold stacks, and tamper-proof labels. Use information from zebra.com/supplies or from your reseller to identify and procure media for your printer and for your specific needs.
Software • Printer drivers • Printer programming utilities • Applications (such as for label design)	Zebra provides a complete suite of free Link-OS software applications and drivers to configure printer settings, print labels and receipts, get printer status, import graphics and fonts, send programming commands, update firmware, and download files. Use these drivers and applications to configure and manage your printer and your print jobs from a central device such as a PC or laptop. For information on installing the drivers, see Installing the Windows Printer Drivers on page 181. You can use ZebraDesigner—a free application for Windows PC operating systems—to design simple labels and forms. ZebraDesigner is available to download from zebra.com/zebradesigner.

Modes of Printing

Depending on your printer type, model and options, it may support one or more of these modes and media configurations.

Table 3 Print Modes

Mode	Description
Direct Thermal printing	Uses heat-sensitive media to print. When setting this mode, use media that supports Direct Thermal printing. See Determining Thermal Media Types on page 331.
Thermal Transfer printing	Requires ribbon rolls or a thermal transfer ribbon cartridge to print. While printing, heat and pressure transfer ink from the ribbon to the media. When using Thermal Transfer printing, be sure to use thermal transfer media. See Determining Thermal Media Types on page 331.
Standard tear-off mode	Allows you to tear off each label or batch-print a strip of labels and tear them off after the printer has printed the label(s).
Label dispense mode	If your printer has the optional factory-installed label dispenser, the dispenser automatically peels away the backing material from a label as it is being printed before it prints the next label.
Media cutting mode	If your printer has the optional factory-installed media cutter, the printer cuts the label liner between the labels, the receipt paper, or the tag stock.
Linerless media printing	In linerless printing, the printer accommodates cut or tear-off options for the easy pick-and-place of labels.
Standalone operation (printer operates on its own without a live network connection)	The printer can print an auto-running label format or form (programming based) without being actively connected to a networked device such as a computer. • On printers with the color display or color-touch display option, you can use menus to access and print a label format or form. • You can use a Link-OS app which enables you to connect to the printer using the Bluetooth (wireless) option. • You can print using an auto-running label format or form (programming based). • Your printer supports data-input devices that can be connected to the printer's USB Host port or serial port. Data-input devices include scanners, weighing scales, or Zebra Keyboard Display Units (ZKDUs).
Shared network printing mode	Printers configured with factory-installed Ethernet (LAN) and Wi-Fi (WLAN) interface options ship with an internal print server to enable wired and wireless networking respectively.

Opening Your Printer

Use this procedure to open the media compartment, inspect and clean the interior periodically, load printing supplies, and replace those parts as necessary that are operator-replaceable.

To open the printer, pull the release latches towards you and lift the cover.

NOTE: If this is the first time you are opening the printer after receiving it, check the media compartment for loose or damaged components.



CAUTION: The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the printhead and other electronic components used in this device. You must observe static-safe procedures when working with the printhead or the electronic components under the top cover.

Closing Your Printer

Make sure printer cover is closed properly after you load media or ribbon and after you have cleaned the inside of the printer.

To close the printer cover:

1. Lower the top cover.
2. Push down firmly, either in the center or in both corners on the front of the printer, until both side latches lock.



Printer Features

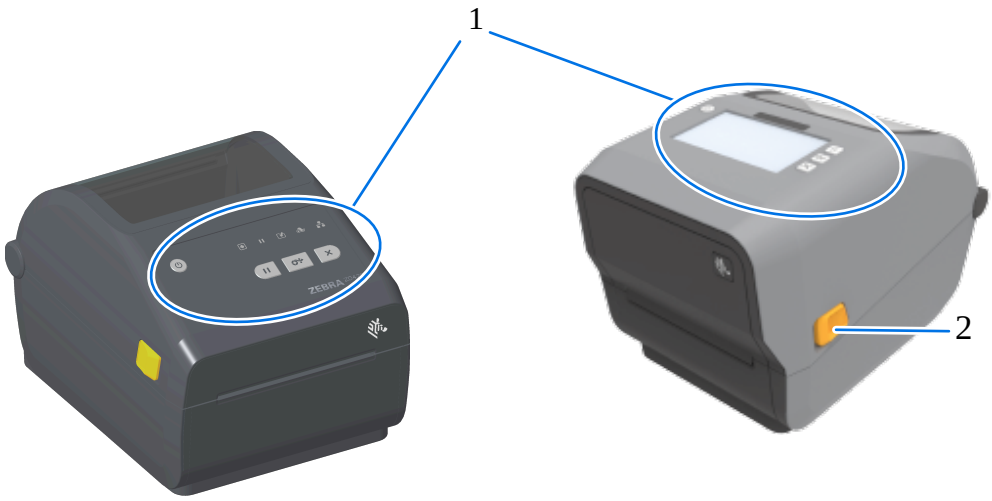
Use these support links to familiarize yourself with the internal and external physical features of your printer.

For printer features videos and other helpful information, go to:

- ZD421 Direct Thermal printer — zebra.com/zd421d-info
- ZD421 Thermal Transfer printer — zebra.com/zd421t-info
- ZD421 Thermal Transfer Ribbon Cartridge printer — zebra.com/zd421c-info
- ZD621 Direct Thermal printer — zebra.com/zd621d-info
- ZD621 Thermal Transfer printer — zebra.com/zd621t-info
- ZD621R Thermal Transfer RFID printer — zebra.com/zd621r-info

Exterior Features of Your Printer

The printer's exterior features are used to power up and power down the printer, open and close the media compartment, make power and network connections, and configure and operate your printer.



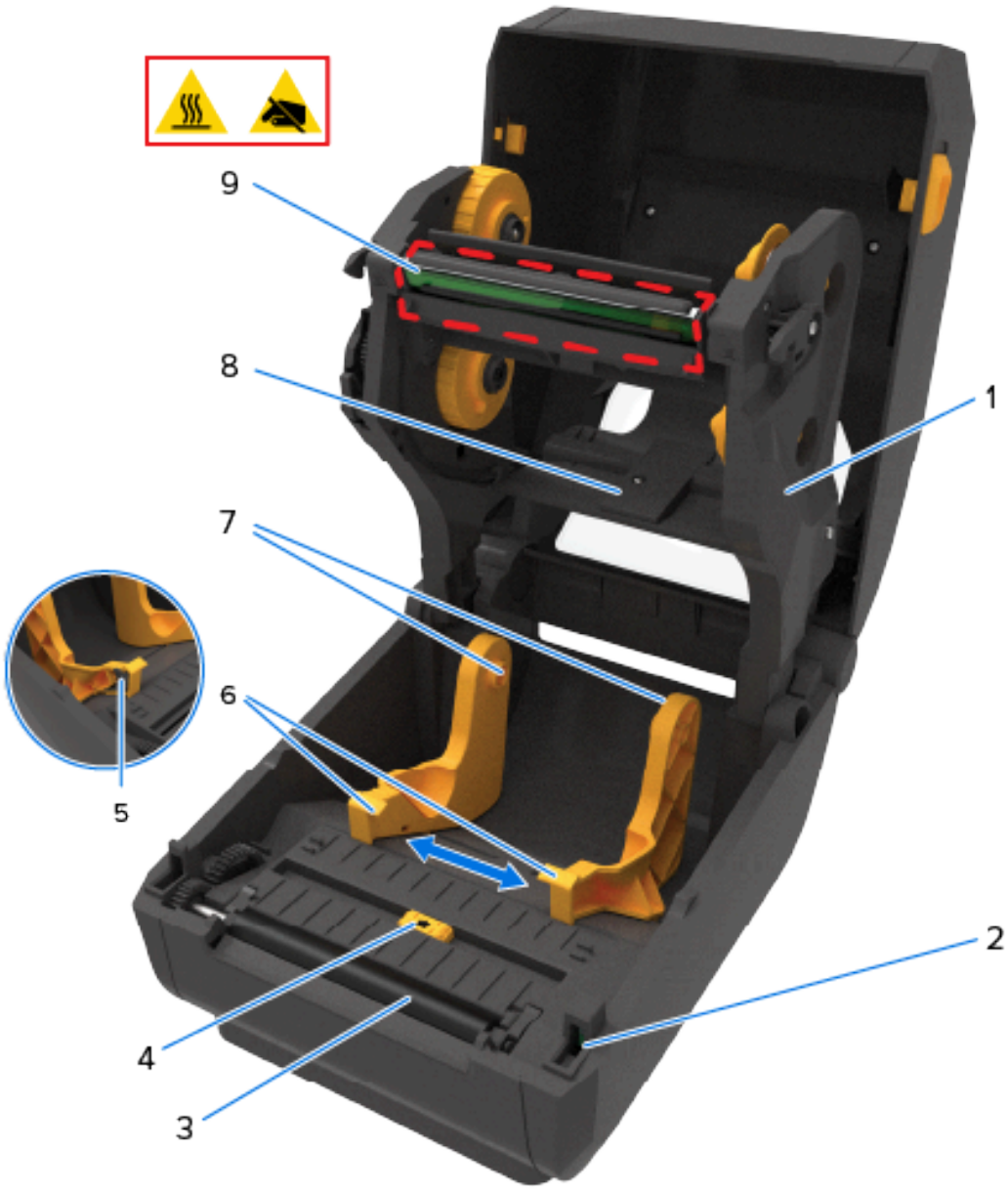
1	User interface controls and, in some models, color touch display
2	Release latch

See Controls and Indicators on page 48 for information on how to operate the printer using the interface buttons and the color touch display if your printer has one.



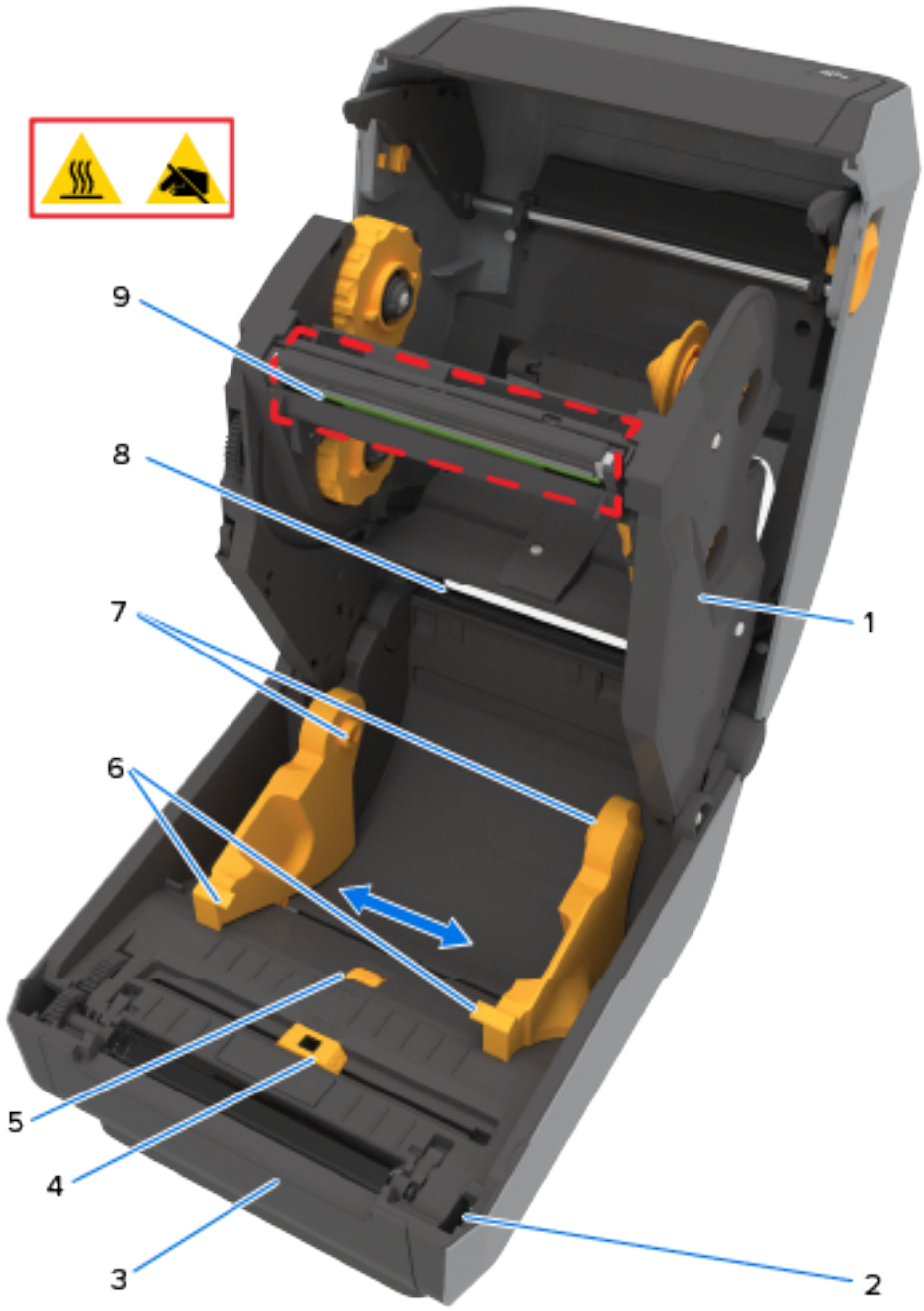
1	**POWER** button
2	Fanfold media entry slot
3	Interface and connectivity module slot access
4	DC power receptacle
5	Release latch

Inside the ZD421 Dual Capacity Ribbon Roll Printer



1	Ribbon carriage	6	Media guides
2	Head-up sensor (inside)	7	Roll holders
3	Platen (drive) roller	8	Upper web (gap) array sensor (other side)
4	Movable sensor (black mark and lower web/gap)	9	Printhead (may be hot – do NOT touch!)
5	Media guide stop		

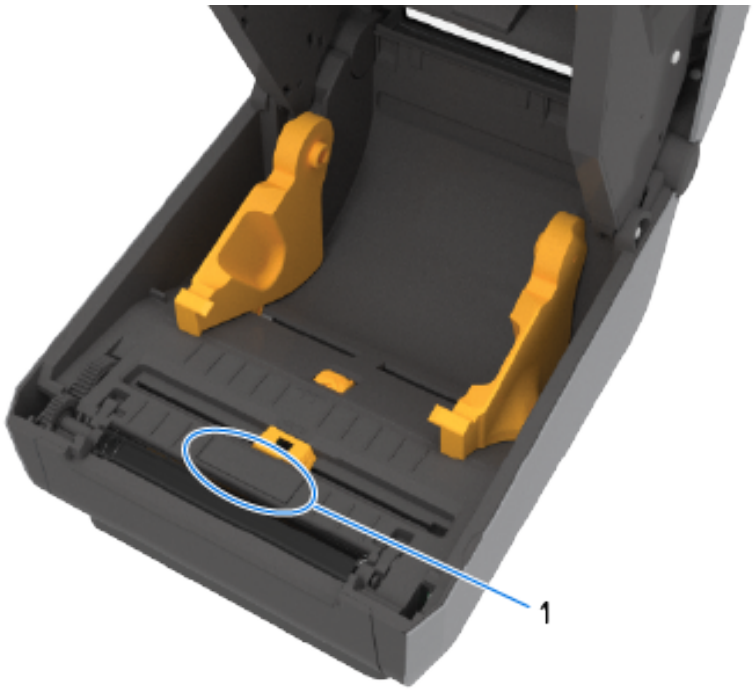
Inside the ZD621 Dual Capacity Ribbon Roll Printer



1	Ribbon carriage	6	Media guides
2	Head-up sensor (inside)	7	Roll holders
3	Platen (drive) roller	8	Upper web (gap) array sensor (other side)
4	Movable sensor (black mark and lower web/gap)	9	Printhead (may be hot – do NOT touch!)
5	Media guide stop adjustment		

RFID Antenna Location – ZD621R Printers Only

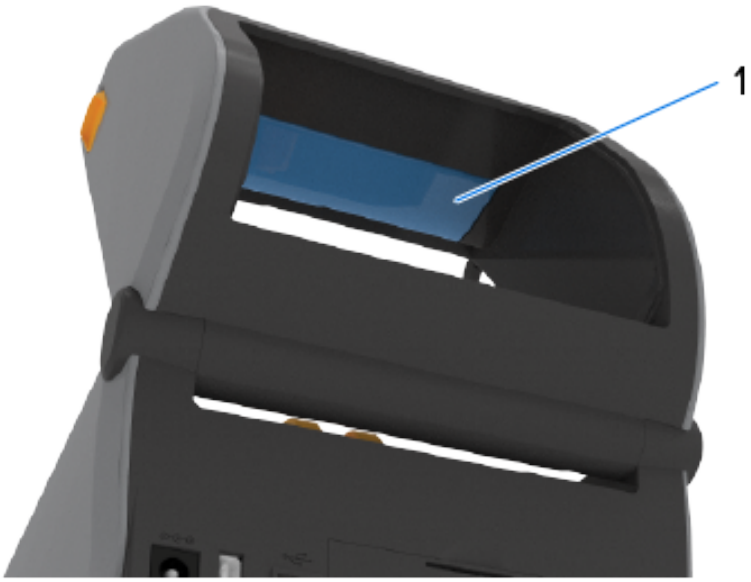
On ZD621R printers which are RFID-sensing printers, the RFID antenna is located between the platen roller and the channel of the movable media sensor. Other printer RFID indications on ZD621R printers include information displayed on the color touch display when it on, as also information on the product label.



1	RFID antenna dome

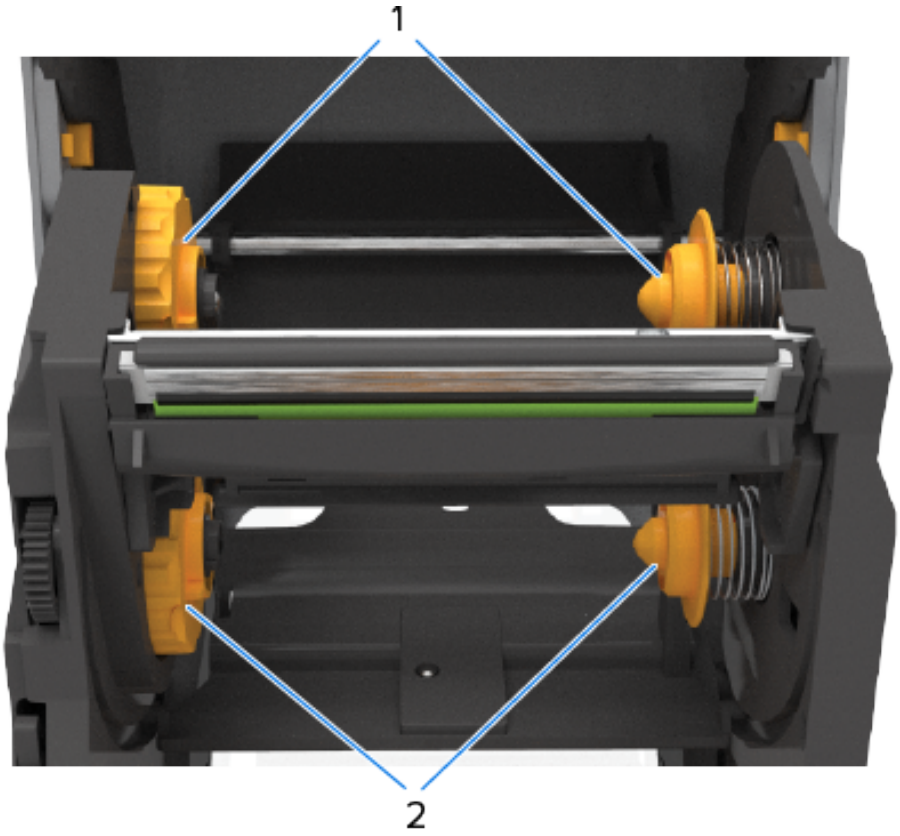
Media Dancer – ZD621 Printers Only

In this image, the printer's window is removed and the media dancer is colored for easy identification. As seen within the printer, it is of the same color as the dark gray parts adjacent to it.



1	Media dancer (ZD621 models only)

Dual-Capacity Ribbon Chassis – Ribbon Roll Holders



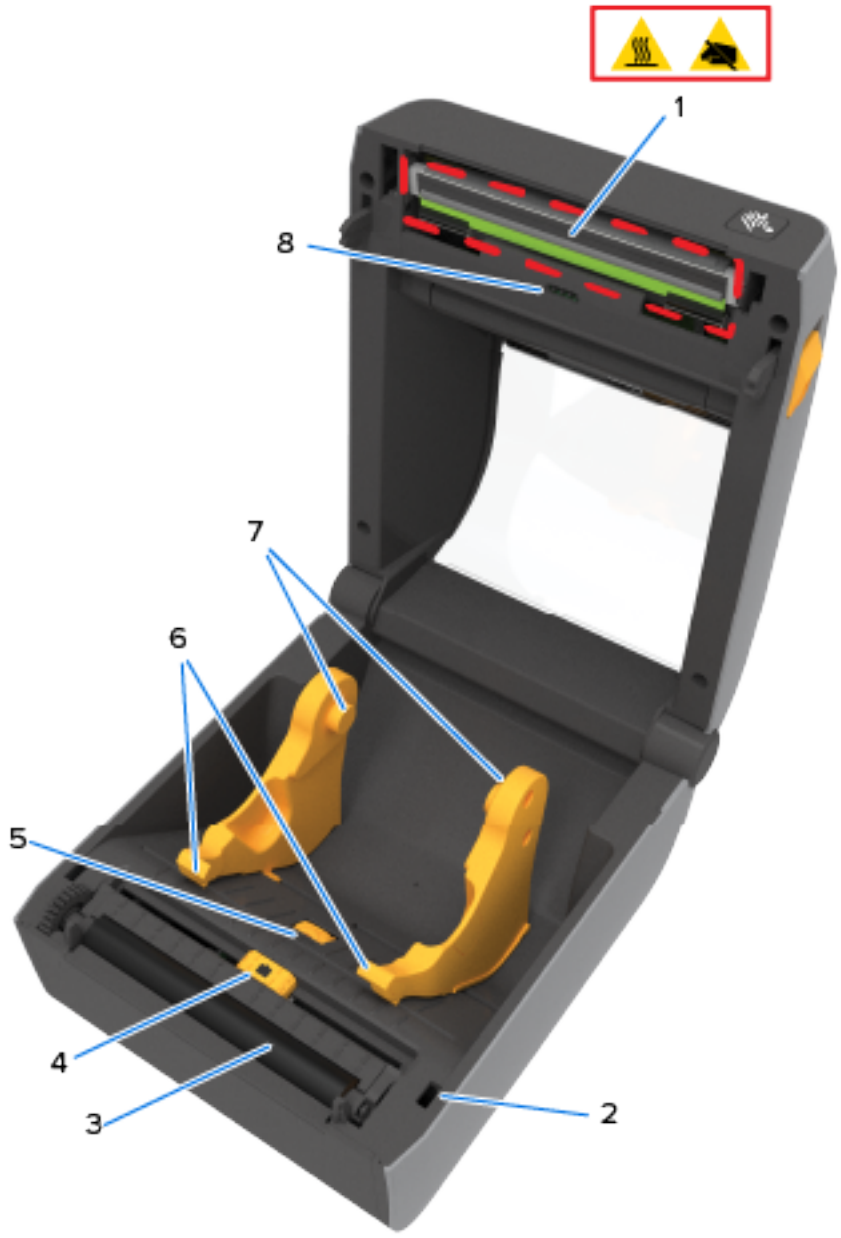
1	Take-up spindles	2	Supply spindles (full ribbon rolls)

Inside the ZD421 Direct Thermal Printer



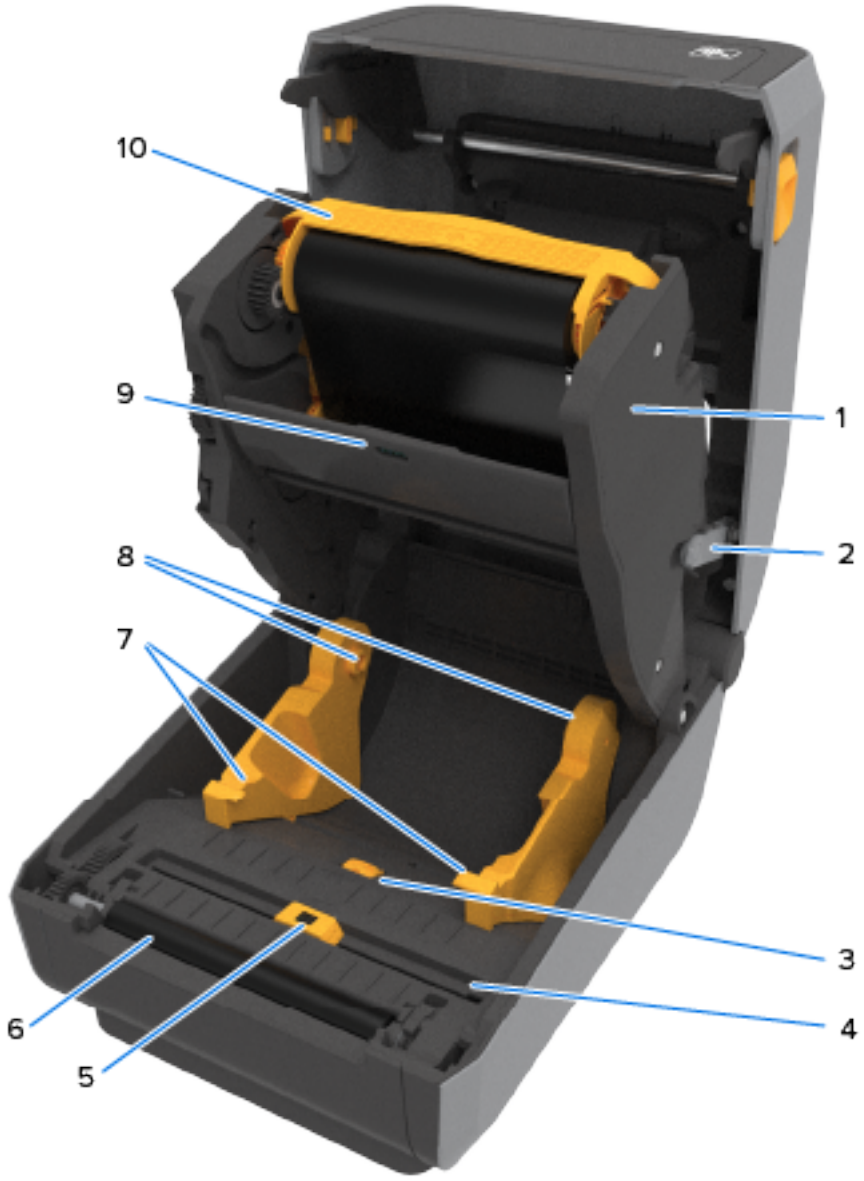
1	Printhead (may be hot – do NOT touch!)	5	Head-up sensor (inside)
2	Upper web (gap) array sensor	6	Movable sensor (black mark and lower web/gap)
3	Roll holders	7	Platen (drive) roller
4	Media guides	8	Media guide stop

Inside the ZD621 Direct Thermal Printer



1	Printhead (may be hot – do NOT touch!)	5	Media guide stop adjustment
2	Head-up sensor (inside)	6	Media guides
3	Platen (drive) roller	7	Roll holders
4	Movable sensor (black mark and lower web / gap)	8	Upper web (gap) array sensor

Inside the ZD421 Ribbon Cartridge Printer



1	Ribbon drive transport	6	Platen (drive) roller
2	Release arms (2)	7	Media guides
3	Media guide adjustment stop	8	Roll holders
4	Head-up sensor (inside)	9	Upper web (gap) array sensor
5	Movable sensor (black mark and lower web / gap)	10	Ribbon cartridge (shown installed – sold separately)

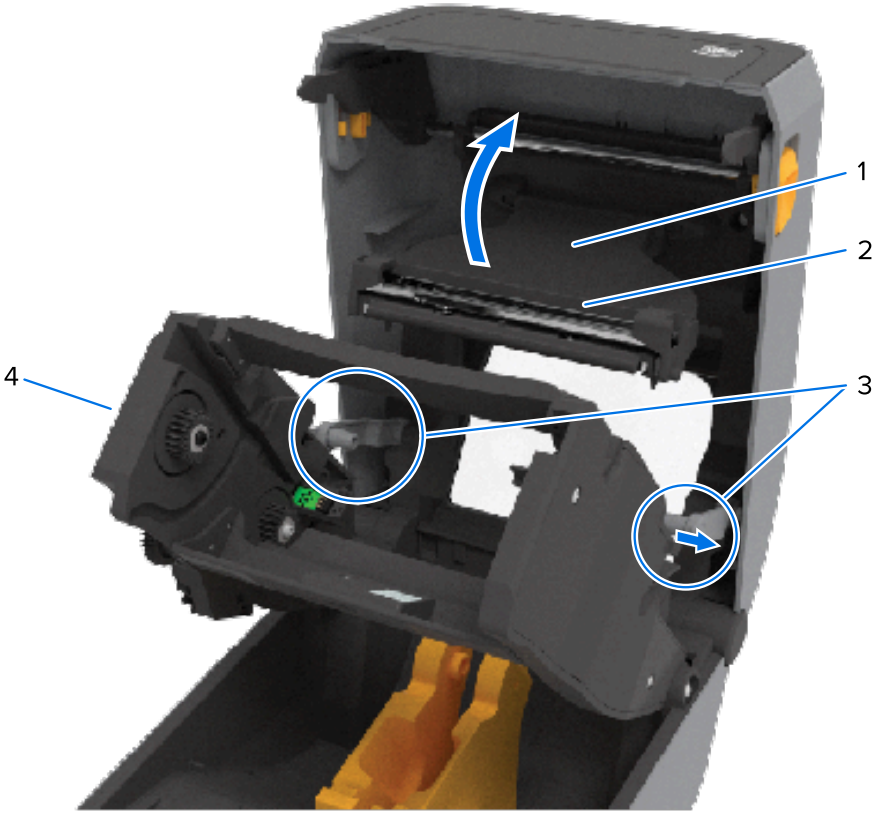
Accessing the Printhead of the ZD421 Ribbon Cartridge Printer

To access the printhead:

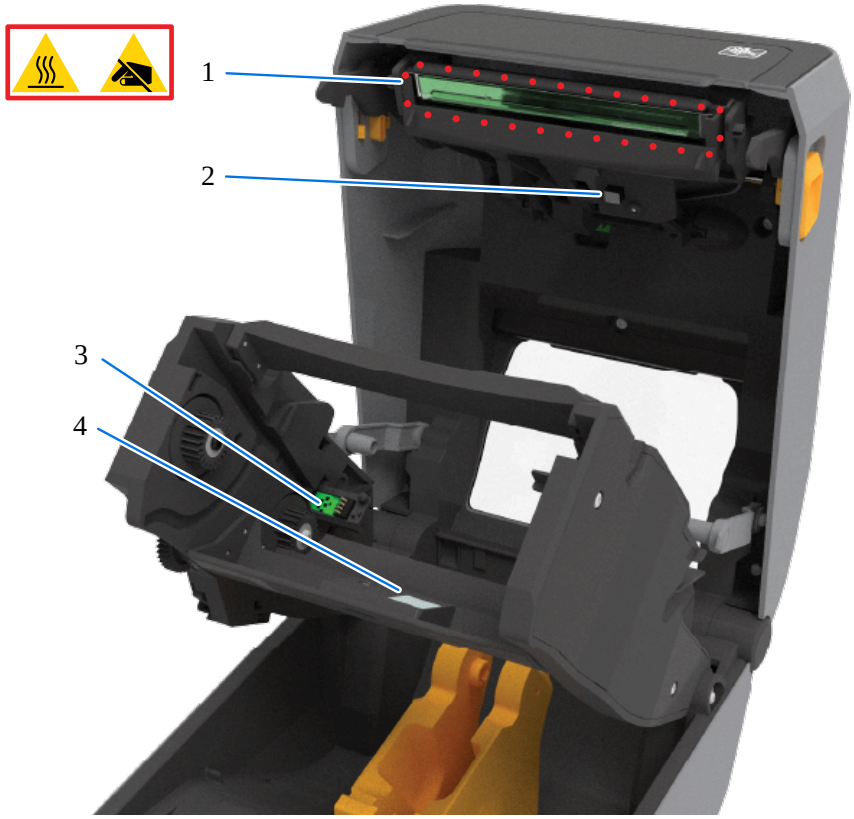
1. Pull both release arms out (lighter gray parts).

   The ribbon drive transport drops down.

2. Lift printhead actuator arm up to access the printhead.

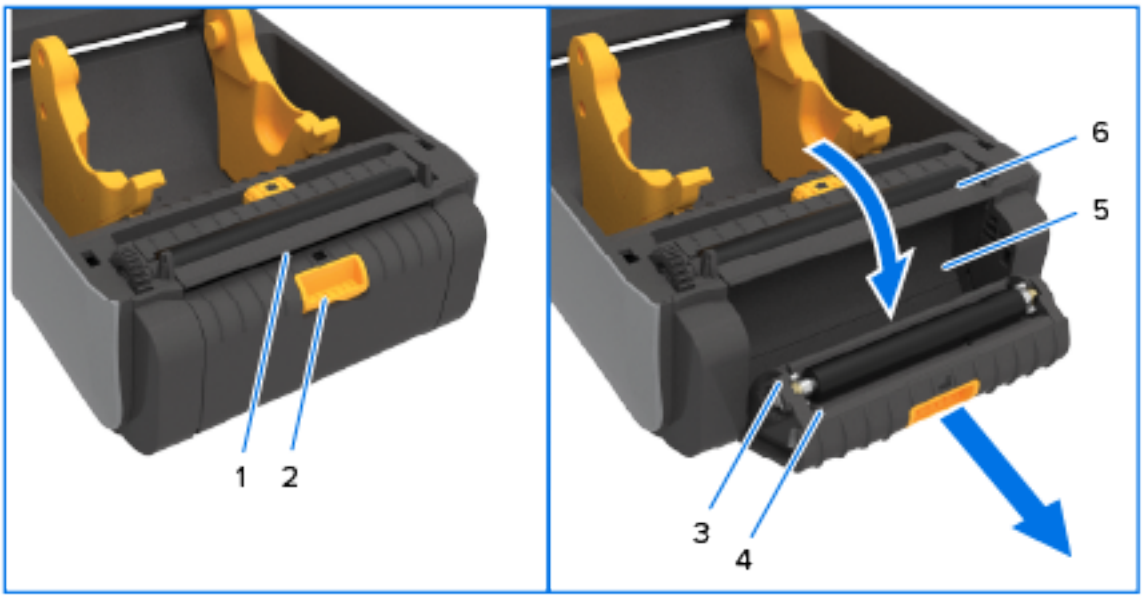


1	Printhead actuator arm	3	Release arms
2	Back of printhead	4	Ribbon transport



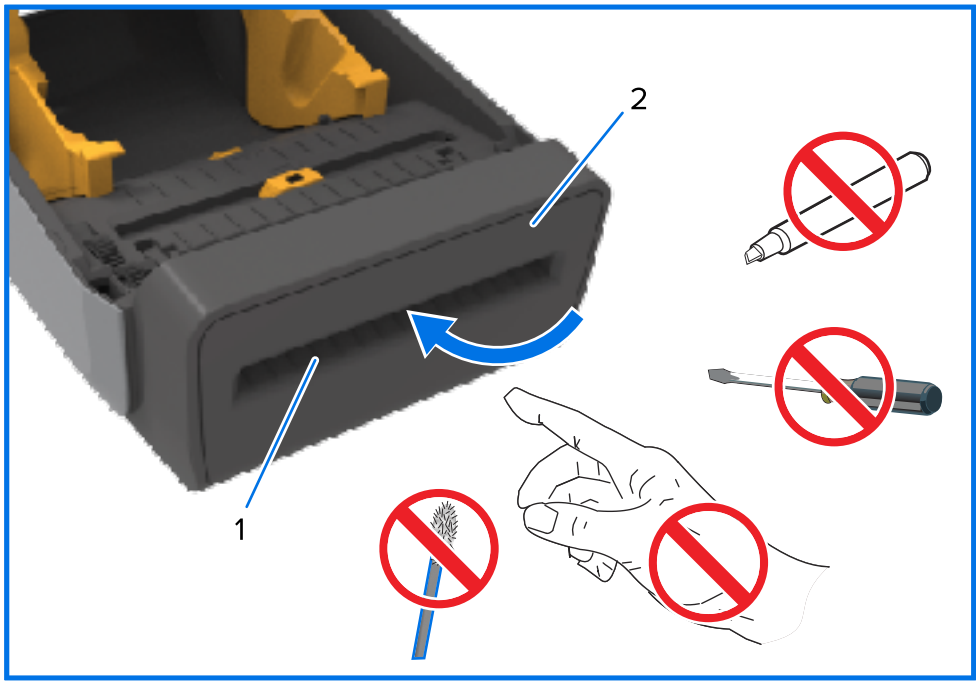
1	Printhead (may be hot – do NOT touch!)	3	Ribbon cartridge authentication and status interface
2	Ribbon sensor	4	Ribbon sensor's reflector

Label Dispenser Option (field-installable) – All Models



1	Label-taken sensor	4	Dispenser door
2	Door latch	5	Label liner exit area
3	Peel roll	6	Label peel bar

Cutter Option (field-installable) – All Models



1	Media exit slot	2	Cutter module

Linerless Media Tear-Off Option – Direct Thermal Models Only



1	Label-taken sensor

Linerless Cutter Option – Direct Thermal Models Only

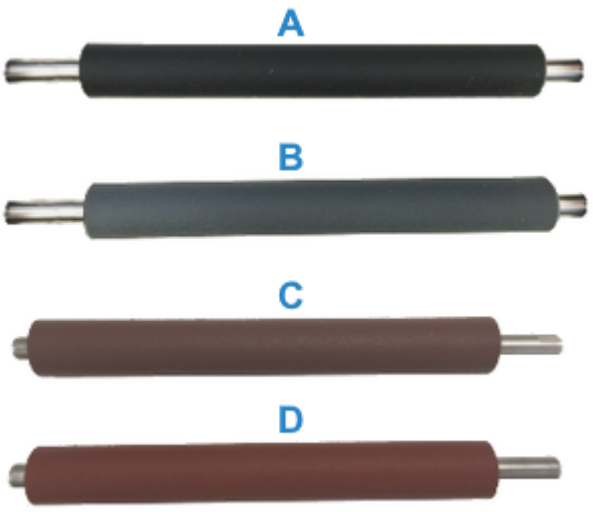


1	Label-taken sensor	2	Cut label landing area

Identifying Platen Drive Roller Types

The platen (drive) rollers are colored differently to identify the platen type and print resolution of your printer (and the platen).

NOTE: Do NOT exchange platen types unless you are specifically instructed to do so either by an upgrade procedure or by Zebra Technical Support. If incorrect platens are used, the printer will stop operating as normal and cause a variety of problems that would require resolution.



A	203 dpi standard platen (black)	C	203 dpi linerless platen (reddish-brown)
B	300 dpi standard platen (gray)	D	300 dpi linerless platen (brown)

Printer Power Supply Options

Instead of the power supply that shipped with your printer, you can use one of two field-installable attached power options—an attached power supply base or a battery power base. Both are easily attachable to your printer with screws.

Attached Power Supply Base



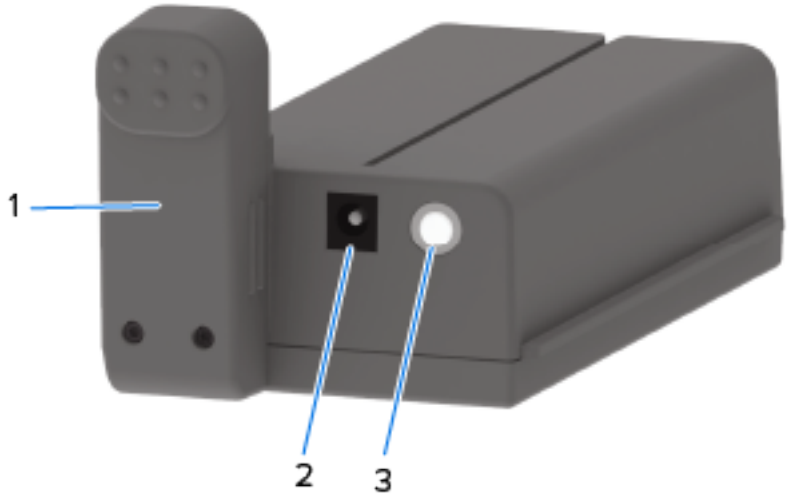
1	Rear view of attached power supply base	2	Front view of attached power supply base

Attached Battery Base and Battery

Figure 1 Printer with Battery Base Installed

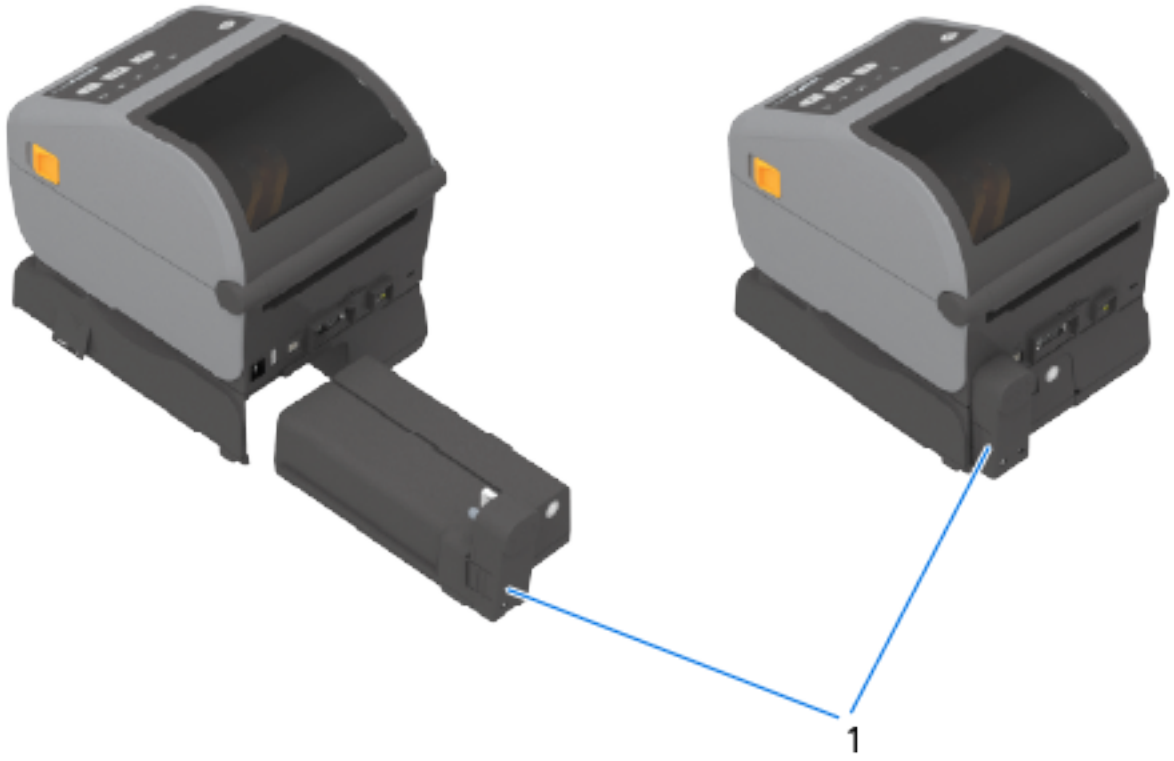


1	Battery power base	2	Battery status and charge indicators



1	Power interface	3	Battery control button
2	Power input		

Figure 2 Battery Ready to Install (left) and Printer with Battery installed (right)



1	Battery latch

NOTE: A printer power supply or other approved Zebra power source is needed to charge your battery. The battery can be charged, checked, and configured for storage without being attached to the printer.

ZD621 Direct Thermal Locking Printer Feature – Healthcare Models Only

Direct Thermal Healthcare printer models come with lock-and-key access to the printer's media compartment plus a Kensington lock slot on the printer's back panel to secure the printer.



1	Cabinet lock	2	Kensington lock slot

For more information on the Locking Printer option, see Zebra Basic Interpreter (ZBI) on page 222.

Zebra Print Touch for Near-Field Communications (NFC)

The Zebra Print Touch feature allows you to touch an Android-based, Near Field Communication (NFC)-enabled device such as a smart phone or tablet to the printer's Print Touch logo to pair the device to the printer.

Zebra Print Touch is available on Zebra printer models with factory-installed networking (Wi-Fi, wired Ethernet, Bluetooth, and Bluetooth Low Power). The Print Touch feature allows you to use your mobile device to provide information for which you are prompted and then print a label using that information.

This image shows Print Touch (passive NFC) location on your printer.



1	NFC sensor

IMPORTANT: Some mobile devices may not support NFC communication with the printer until you configure the required NFC settings in your device. If you encounter difficulties, consult your service provider or your smart device manufacturer for more information.

Data encoded into the tag includes:

- a URL for a Zebra quick-help style support web page
- the printer's unique Bluetooth Low Energy MAC address
- the printer's Bluetooth Classic MAC address (if present)
- the printer's Wi-Fi (WLAN) MAC address (if present)
- the printer's Ethernet (LAN) MAC address (if present)
- the printer SKU (ex., D6A142-301F00EZ)
- the printer's unique serial number

The NFC tag can be used to:

- pair with a compatible mobile device using Bluetooth.
- launch an application.
- launch a mobile browser to a web page.

Controls and Indicators

This section discusses the two user control panel variations and their functionality.

User Interface

The printer's primary user interface controls are on the front of the device. Two user interface options are available on these printers.

- Standard User Interface — This interface serves basic printer control and status functions. Operating status is provided by five icon indicator lights. These lights, together and in combination, provide a wide range of printer status notifications. They are visible from a farther distance than the proximity needed to read a printer display screen. See the Meaning of the Indicator Light Patterns on page 54.
  - The printer user interface supports various routine tasks such as replacing printing supplies (labels, receipt paper, transfer ribbon, or others). For example, you are notified of a media-out condition by the color and state of two indicators.
  - Each status indicator icon represent a functional area of printer operation (such as SUPPLIES or NETWORK).
  - Depending on the operational state of the printer, the printer's status indicator lights convey the printer's status and activities (data downloading, over-temperature cooling cycle, or other) using a variety of states:
    - off (not lit — does NOT require your attention)
    - lit up red, green, or amber (orange yellow)
    - blinking / flashing
    - fading (bright to off), or
    - lighting up steady in a variety of patterns
  - The color of these status indicators may be:
    - Red — indicates that your attention is needed or that the printer is not ready to print.
    - Green — indicates the printer is ready or functioning.
    - Amber (orange/yellow) — indicates a busy or active process (data downloading, over-temperature cooling cycle, etc.).
  - Control buttons—You will use these in various combinations to access internal utilities that calibrate the printer to your media and change printer settings that are modifiable.

- Color Display or Color Touch Display (available on some printer ZD printer models) — Provides the means to easily set up and configure the printer. The display is customizable by all user types, The interface includes all standard user interface controls and indicators to provide printer status information.
  - The display option on the printer provides printer status and messages. It supports 19 languages, selectable on the configuration menus or set through programming.
  - The menu system allows you to change print settings (darkness, speed, etc.), run utilities, and set the wired and wireless communication interfaces (serial, Ethernet, Wi-Fi) installed on your printer.

Standard Interface Controls

The printer's user interface is located on the top of the printer towards the front.



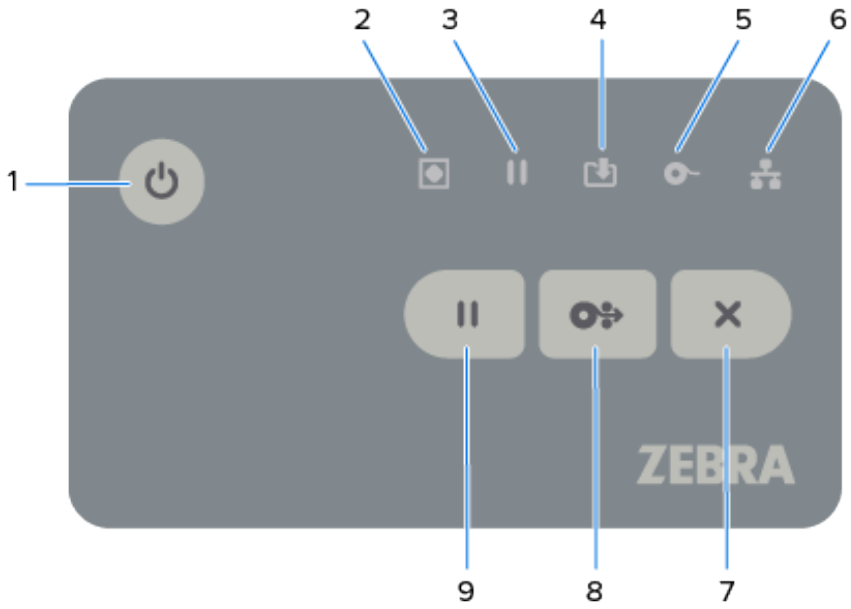

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ZEBRA

Table 4 Standard Interface Controls

Icon	Button	Descriptions
	1. **POWER** button — Pressing this button turns power to the printer ON and OFF. Also used to initiate low-power sleep and wake states.	• Initial power ON — Press **POWER** until the printer's indicator lights flash on in various combinations for several seconds. This indicates the printer is performing self-diagnostics and configuration checks, and integrating optional components. The STATUS indicator turns solid green, indicating the printer is ready for normal print operations. • Energy Star (low power mode) — To minimize power use, press and release **POWER** one time to place the printer in Energy Star low power mode. All the indicators will turn off except the STATUS Indicator which flashes to indicate the printer is in Energy Star Mode. • Power OFF with Energy Star Delayed — Press and hold **POWER** for 4–9 seconds. You can start a batch print job and put the printer into the low power consumption state of Sleep mode after the job has finished. • Power OFF / Shutdown — Press and hold **POWER** for 4–9 seconds to turn printer power OFF. • Power Failure Recovery Mode — This printer feature is activated by a hardware jumper setting on one of the optional Printer Connectivity Modules installed in the printer. You can turn this mode on and off by activating the jumper. ◦ The printer automatically powers ON when connected to an active AC power source. ◦ Supports Sleep Mode and Power OFF with Sleep Mode Delayed features. ◦ When Power Failure Recovery Mode is initiated, the printer resets and and runs the Initial Power ON sequence on the loss of power (Power OFF / Shutdown).  **NOTE:** Power Failure Recovery Mode is available ONLY on printers with a printer connectivity module installed.
	2. STATUS Indicator — Primary status indicator for overall printer health and operational status. Also known as the Power indicator.	• Green — The printer is ready to print and engage in data transfer. • Green, slowly turning on and off — The printer is in sleep mode. • Red — Media out, media detection error, head (cover/printhead) open, cut error, or printhead authentication failure. • Amber — Printhead over temp (temperature), printhead element failure, out of memory while storing content (formats, graphics, fonts, etc.), and interface power fault for USB Host or serial ports. • Blinking amber — Printhead under temp (temperature). • Blinking red — Printhead over temp (temperature). This status is coupled with blinking red PAUSE indicator. Printer requires cooling and restart.

Table 4 Standard Interface Controls (Continued)

Icon	Button	Descriptions
	3. PAUSE Indicator — The printer is in Pause mode when the Pause indicator light is on. A label (print form) or all labels (print forms) in the print buffer's queue can be canceled using the **CANCEL** button when the Pause indicator is on.	• Amber — Printer is paused. The print, label feed (advance), and other label routines are suspended until you exit the printer from Pause state by pressing **PAUSE**. • Blinking red — Printhead over temp (temperature). Coupled with blinking red STATUS indicator, indicates that the printer must be allowed to cool and then restarted.
	4. DATA Indicator — Indicates the status of data transfer activity.	• Off — Data transfer is not occurring. • Green — A data communication operation has not finished, but data is not actively being transferred. • Blinking green — Data communication in process. • Blinking amber — OUT OF MEMORY while storing content (formats, graphics, fonts, etc.).
	5. SUPPLIES Indicator — Indicates status of media loaded in the printer (label, receipt, tags, transfer ribbon, ribbon cartridge, etc.)	• Red — Media Out. • Blinking red — RIBBON OUT. Applies to printing in Thermal Transfer mode. (The printer does NOT require ribbon to print in Direct Thermal mode.) • Blinking red and amber — Ribbon Cartridge Low (ZD421 Ribbon Cartridge printers only). • Blinking amber — RIBBON IN (ZD421 Ribbon Cartridge printers only). Detected when the printer is set to print in Direct Thermal mode, a mode in which the printer does NOT require ribbon to print.
	6. NETWORK Indicator — Indicates network activity and status.	• Amber — 10 base Ethernet (LAN) connection detected. • Green — 10/100 Ethernet (LAN) connection detected or when Wi-Fi (WLAN) has a strong signal and is connected. • Red — when an Ethernet (LAN) or Wi-Fi (WLAN) fault occurs. • Blinking red — during Wi-Fi (WLAN) association. • Blinking amber — during Wi-Fi (WLAN) authentication. • Blinking green — when a Wi-Fi (WLAN) connection has been established but the signal is weak.

Table 4 Standard Interface Controls (Continued)

Icon	Button	Descriptions
	7. **CANCEL** Button — Cancels print jobs. Functional only when the printer is in Pause state.	• Cancel printing — Press **CANCEL** one time to cancel printing the next format in the print buffer. • Cancel all print jobs — Press and hold **CANCEL** for two seconds. The printer cancels printing ALL pending formats.
	8. **FEED** (Advance) Button — Advance a label (print form/ format).	• Feed one label (one blank form or format length of a label, receipt, tag, ticket, etc.) — Press and release **FEED** when the printer is not printing. • Advance multiple labels — Press and hold **FEED** when the printer is not printing. The printer advances loaded media to the beginning position of the next label (format/form) and the next until you release **FEED**. • Reprint last label (activated using a SGD command: `ezpl.reprint_mode`) — This feature allows the reprinting a failed media print. If the printer runs out of media (paper, labels, transfer ribbon, etc.), it can reprint the last label (print form or format).  **NOTE:** The print buffer which stores the print image for printing and reprint is automatically cleared when the printer is turned off or reset.
	9. **PAUSE** Button — Pauses print and media movement actions.	• Stop print activities and place the printer into Pause state — Press **PAUSE**. The printer finishes printing the current label before it pauses. The PAUSE indicator displays Amber (orange/yellow) to indicate the printer is in Pause state. • Exit the printer out of Pause state and return it to normal operation — Press **PAUSE** when the printer is in Pause state. If you are printing a multi-label (form or format) job or if one or more other prints job are in the print queue, the printer resumes printing the job(s) in queue.

On printers with a Color Touch display, the user interface controls are mapped as shown here. The functionality of the buttons is the same as described earlier.



1	Status indicators	4	**CANCEL** button
2	**PAUSE** button	5	Color Touch display and interface
3	**FEED** button	6	**POWER** button

Meaning of the Indicator Light Patterns

All Link-OS 4 inch printers include status indicators on their user interfaces.

The indicators may be off or on in a variety of lighting patterns of red, green, or amber (orange/yellow). They may flash (blink), fade (bright to off), alternate between colors, or simply remain lit. as indicated in the table below.

	Steady on
	Flashing
	Fade

	Off

For information on resolving errors identified using the status of the indicator lights, see Troubleshooting on page 273.

Status – Typical Operating Conditions

This table describes printer status under typical operating conditions.

Table 5 Typical Operating Conditions Status Indications

Status	Description
Printer Ready 	The printer is powered on and ready to print.
Pause 	The printer is paused. Press **PAUSE** to resume print operations.
Media Out 	The printer has run out of media (labels, receipts, tags, tickets, etc.). The printer needs attention and cannot continue without user intervention.
Ribbon Out 	The printer has detected the end of a ribbon roll (reflective end on ribbon rolls) or, in case of a Ribbon Cartridge printer, a missing ribbon cartridge. Alternatively, if a Ribbon Cartridge printer is set to print in Thermal Transfer mode, the ribbon cartridge must be replaced for the printer to continue printing.
Ribbon Low (Ribbon Cartridge Printers only) 	The default value for a Ribbon Low condition is 10% of ribbon remaining. The Media indicator flashes red and yellow while the Status indicator is solid yellow.
Ribbon In (Ribbon Cartridge Printers Only) 	A Thermal Transfer printer is set to print in Direct Thermal Mode while it has a ribbon cartridge installed. Remove the ribbon cartridge to continue printing in Direct Thermal mode.
Transferring Data 	Data communication is in process.

Table 5 Typical Operating Conditions Status Indications (Continued)

Status	Description
Data Transfers Paused 	While a data communication operation has not yet been complete, data is not actively being transferred at the time.
Out of Memory 	Out of memory while attempting to storing content such as formats, graphics, and fonts. Make sure the printer has enough storage for the data you are trying to transfer.
Cover Open/Printhead (PH) Open 	The cover (printhead) is open. The printer needs attention and cannot continue without user intervention.
Cut Error (Binding) 	The cutter blade is bound and is not moving properly. The cutter is not an operator-serviceable component. Call a service technician for assistance. **NOTE:** Do NOT remove the cutter cover (bezel). Never attempt to insert objects or fingers in to the cutter mechanism.
Cartridge Authentication Failed (Ribbon Cartridge printers only) 	The ribbon cartridge cannot be authenticated or it has been altered. Your printer only supports Genuine Zebra Ribbon Cartridges. It cannot use refurbished ribbon cartridges or non-Zebra ribbon cartridges to print.

Status – Printhead Operation

This table describes status indicator conditions you may see during printhead operations and what those conditions mean.

CAUTION: The printhead may be hot and could cause severe burns. Allow the printhead to cool.

Table 6 Printhead Operation Status Indications

Status	Description
Printhead Over Temp 	The printhead is over temperature and paused to allow the printhead to cool. The print operation will resume after the printhead has cooled.

Table 6 Printhead Operation Status Indications (Continued)

Status	Description
Printhead Under Temp 	The printhead is under temperature. Typically, the operating environment is below the printer's minimum operational temperature.
Printhead Shutdown 	The printhead is over temperature. Turn printer power OFF. Wait several minutes to allow the printer to completely cool. Then turn printer power ON.
Printhead Resolution Error 	The printer is unable to read the printhead resolution type (dpi). The printhead has been replaced incorrectly or replaced with a non-Zebra-branded printhead.
Unauthorized Printhead Error 	The printhead was replaced with one that is not a genuine Zebra printhead. Install a genuine Zebra printhead to continue.

Status – Bluetooth Low Energy Option

This table describes Bluetooth status indications and what they mean.

Table 7 Bluetooth Low Energy Status Indicators

Status	Description
Bluetooth LE Paired 	Bluetooth Low Energy has paired.
Bluetooth LE Failed to Pair 	Bluetooth Low Energy has failed to pair.

Status – Ethernet (LAN) Option

This table describes Ethernet (LAN) statuses.

Table 8 Ethernet (LAN) Status Indications

Status	Description
Ethernet (LAN) No Link 	No Ethernet link is available. The NETWORK status light on the back of the printer is off.
Ethernet (LAN) 100base Link 	A 100 Base link was found.
Ethernet (LAN) 10base Link 	A 10 Base link was found.
Ethernet (LAN) Link Error 	An error condition exists. The printer is not connected to your network.

Status – Wi-Fi (WLAN) Option

This table describes Wi-Fi (WLAN) statuses.

Table 9 Wi-Fi (WLAN) Status Indications

Status	Description
Wi-Fi Connecting to WLAN 	The light flashes red while the printer associates with the network. The light then flashes yellow while the printer is authenticating with the network.
Wi-Fi (WLAN) 100base Link 	The printer is connected to your network and the Wi-Fi signal is strong.

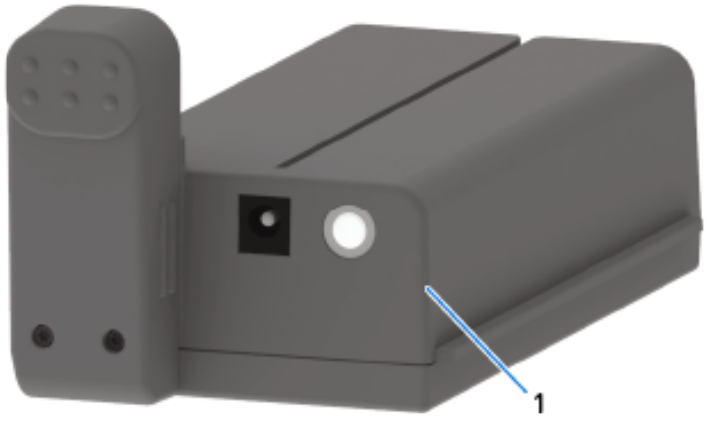
Table 9 Wi-Fi (WLAN) Status Indications (Continued)

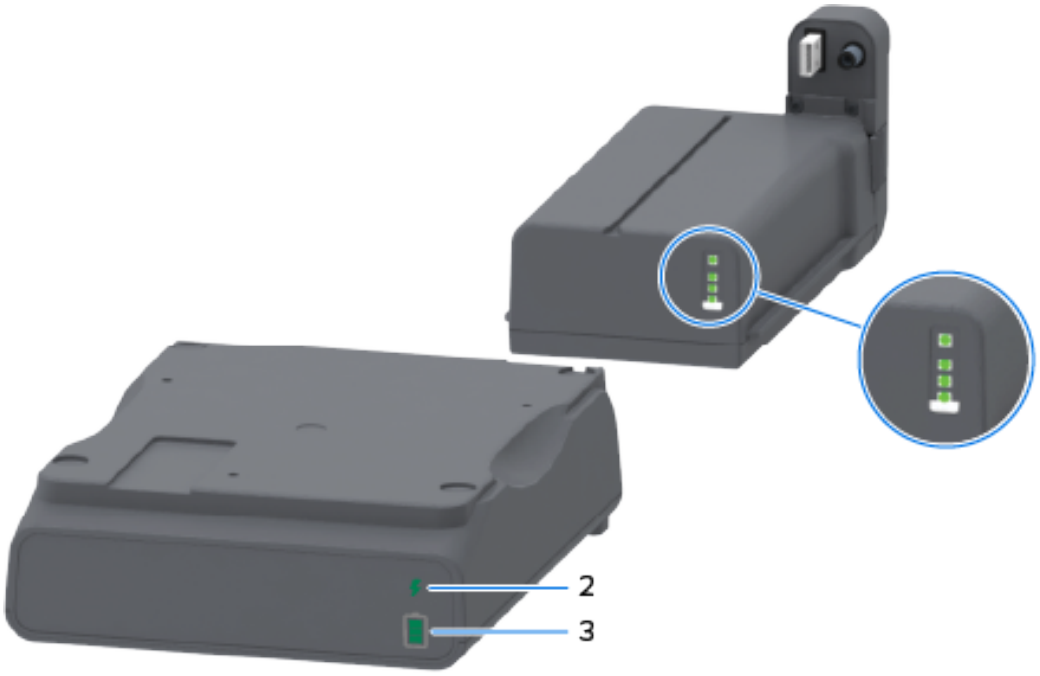
Status	Description
Wi-Fi (WLAN) 10base Link 	The printer is connected to your network and the Wi-Fi signal is weak.
Wi-Fi (WLAN) Link Error 	An error condition exists. The printer is not connected to your network.

Battery Indicators and Controls

The optional printer battery accessory has a simple, one button, four-LED indicator user interface to control and display battery status and health. The battery acts as an uninterruptible power supply (UPS) for the printer.

For more information on using the battery with your printer and power saving modes (sleep, shutdown, etc.), see Printing with the Attached Battery Base and Battery Option on page 218.





1	**Battery Control** button
2	Battery health indicator (located on the back of the battery)
3	Battery charge level indicator (located on the back of the battery)

The exploded view (the circles in the image above) show the health indicator on the top and the three charge-level indicators below it.

Table 10 Battery Indicators and Controls

Icon	Button/Indicator	Descriptions
	**Battery Control** button — Enables you to control the battery, both inside and outside of the printer.	• If you press and release this button when the battery is on , it has this effect: • Wakes up (activates power) the battery from Sleep mode or Shutdown mode. The battery health and charge status are checked. The battery indicators all flash on and off together three times. Now, you have one minute to turn printer power on before the battery reverts to a prior Sleep or Shutdown mode. • The battery displays the its charge level in the first 10 seconds after internal battery health checks are complete To place the printer in Shutdown mode, press and hold **Battery Control** for 10–11 seconds and release. The battery starts shutting down. Approximately three seconds later, all battery LEDs flash three times to let you know the battery has shut down.
	Battery Health indicator — Displays the battery's charging status and health of the battery.	• Green — Good health, charge complete, and ready to operate. • Amber — Charging (printer is OFF). • Red — Battery has an internal error. Remove the battery and see Troubleshooting on page 273. • Flashing red — Charging error (over or under temperature, internal monitoring error, or other)

Table 10 Battery Indicators and Controls (Continued)

Icon	Button/Indicator	Descriptions
	Battery Charge Level indicator — Displays the battery's charging status and health of the battery.	• Three green bars on, indicator does not flash — The battery is fully charged and does not have to continue charging. • Two green bars on with the top bar flashing — The battery is at less than full charge. • One green bar flash — It is time to charge your battery! • No bars on — The battery needs charging, but the Battery Health indicator flashes when **Battery Control** is pressed. The printer CANNOT be turned on when the battery is in this state. • Amber — The battery is charging.

Install Hardware Options

This section provides instructions for installing the commonnetwork connectivity modules and media handling options available for use with your printer.

IMPORTANT: To simplify and speed up the setup process, install all connectivity modules and media-handling options before you set up and use your printer for the first time.

IMPORTANT: We strongly recommend that you update your printer's firmware after the printer hardware options are added. Many of these options have internal firmware that require the latest firmware to be installed on your printer. For instructions, see Updating Printer Firmware on page 272.

Field-Installable Printer Accessories and Options

This section lists the accessories and options available for the printer models covered in this guide.

Printer Connectivity Modules

The connectivity module's access door must be removed prior to installing the following options. See Accessing the Connectivity Module Slot on page 64.

- Wireless Connectivity Module (Wi-Fi 802.11 ac, Bluetooth 4.2, BTLE 5, and MFi 3.0). Go to Installing the Wireless Connectivity Module on page 68
- Wireless Connectivity Module (Wi-Fi 802.11ax, Bluetooth 5.3, BTLE 5.3, and MFi 3.0). Go to Installing the Wireless Connectivity Module on page 68.
- ZD421 Serial Port — see Installing the Serial Port Module on page 65.
  - RS-232 DB-9 connector with DTE/DTC auto-switching — see Serial Port Interface on page 304.
- ZD421 Internal Ethernet (wired LAN) — see Installing the Internal Ethernet (LAN) Module on page 66.
  - RJ-45 connector
  - Fast Ethernet 10/100 auto-switching, 10Base-T, and 100Base-TX networks

Media Handling Options

The printer's standard bezel must be removed prior to installing the following options — see Removing the Standard Bezel on page 73.

- Label Dispenser (automatically peels liner off labels and dispenses the labels) — see Installing the Label Dispenser on page 74.

- General Purpose Media Cutter — see Installing the Standard Media Cutter on page 75.
- Media Roll Adapters for 38.1 mm (1.5 in.), 50.8 mm (2.0 in.), or 76.2 mm (3.0 in.) I.D. media cores — see Media Roll Core Size Adapters on page 76.
- Fanfold Media Access Cover for Thermal Transfer printers.

Power Base Options

The ZD421 and ZD621 printers support power base field upgrade kits for each of the Direct Thermal and Thermal Transfer models.

- Attached Power Supply Base (power supply included) — see Installing the Attached Power Supply Base Options on page 78.
- Battery Power Base (battery pack sold separately) — see Installing the Attached Battery Base Options on page 80.
- Battery Pack (battery power base sold separately) — see Installing the Battery into the Attached Power Base on page 81.

Printer Connectivity Modules

The connectivity modules are easily installable without the use of tools.

Power Failure Recovery Mode Jumper (OFF by Default)

CAUTION: The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the printhead or electronic components used in this device. You must observe static-safe procedures when working with the printhead or the electronic components.

All printer connectivity modules have a power failure recovery jumper that is set to the OFF position by default.

When the jumper is set to ON, the printer automatically powers on when plugged into an active AC power source. See Setting the Power Failure Recovery Mode Jumper on page 222 for instructions on activating this mode.

NOTE: Power Failure Recovery Mode is available ONLY on printers that have a Printer Connectivity Module installed.

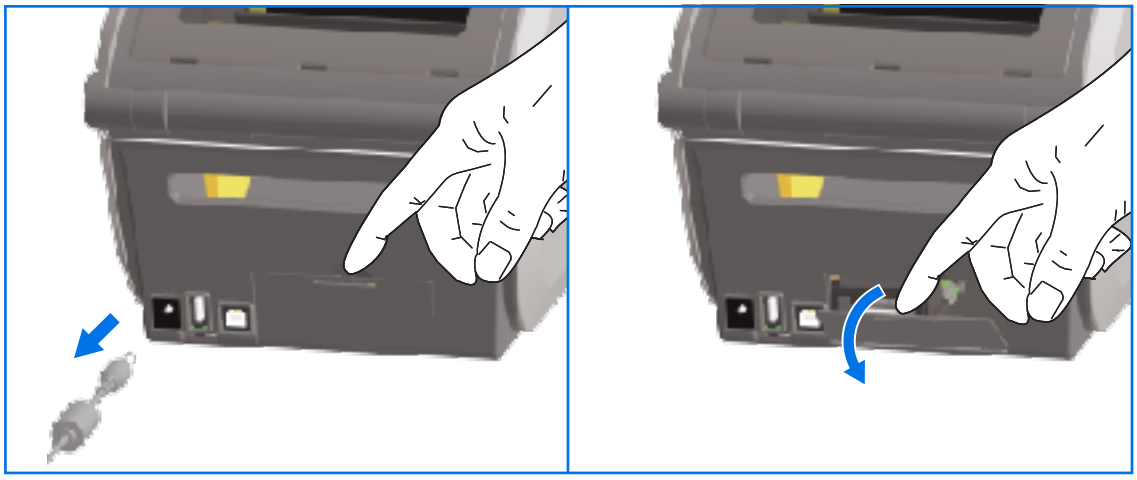
See also **POWER** Button — Power Failure Recovery Mode in Standard Interface Controls on page 49 for information on the power ON/OFF behaviors when the jumper is set to ON.

Accessing the Connectivity Module Slot

Follow these instructions to gain access to the connectivity module slot.

1. Disconnect the DC power plug from the rear of the printer.
2. Open the module access door by pushing down on the top of the door with your fingertip.

   This releases the latch.
3. Pull the door away from the printer and down to remove.



Installing the Serial Port Module

Follow these instructions to install the serial port module.

1. With the DC power plug and module's access door removed, slide the serial port module into the printer. Push the circuit card in slowly but firmly until the card is just past the inside lip of the access door.



2. Align the bottom of the serial port's door cover to the bottom lip of the module access opening. Swing the door up and snap the cover closed.



1	Serial port (RS-232)

NOTE: For best printer performance, update the printer's firmware after installing options or immediately after the printer's initial setup. See Updating Printer Firmware on page 272.

Installing the Internal Ethernet (LAN) Module

Follow these instructions to install the Ethernet (LAN) module.

1. With the DC power plug and module's access door removed, slide the Ethernet module into the printer. Push the circuit card in slowly but firmly until the card is just past the inside lip of the access door.



2. Align the bottom of the Ethernet port's door cover to the bottom lip of the module access opening, then swing the door up and snap the cover closed.



1	Ethernet port (RJ-45)

NOTE: For best printer performance, update the printer's firmware after installing options or immediately after the printer's initial setup. See Updating Printer Firmware on page 272.

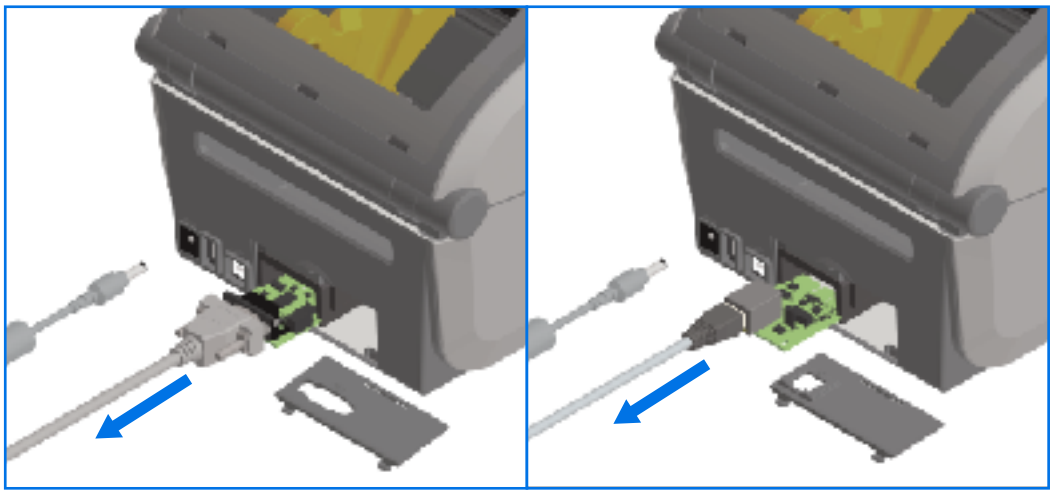
Removing Printer Connectivity Modules

Connectivity modules can easily be removed when you need to install another module or for printer repair. They should not, as a general practice, be removed and replaced routinely.

Follow these instructions to remove a connectivity module installed in your printer:

1. Remove the interface cable (Ethernet or Serial).
2. Remove the module access door. Push down on the top of the door with your fingertip.

   This releases the latch.
3. Pull the door away and down to remove.



4. Reattach the interface cable to the connectivity module and secure the cable.
5. Gently pull on the interface cable that is secured to the connectivity module, thenslowly pull the module out of the printer.
6. Install a different connectivity module or reinstall the connectivity module's access door as required. Align it to the bottom lip of the access opening and swing it up to snap and lock in place.

Installing the Wireless Connectivity Module

The wireless connectivity module provides Wi-Fi connectivity for the printer. Install it to allow your printer to connect to Wi-Fi networks.

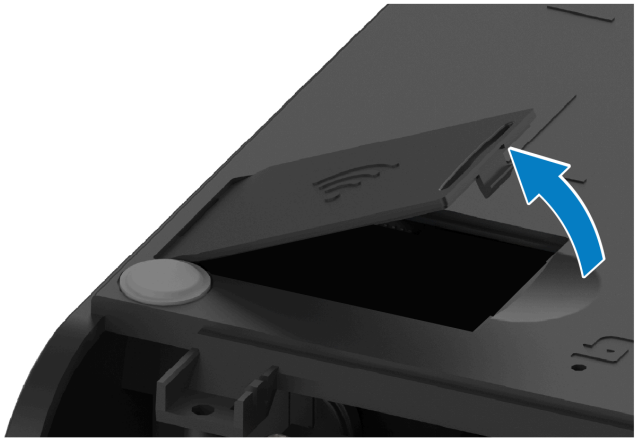
CAUTION: The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the printhead or electronic components used in this device. You must observe static-safe procedures when working with the printhead or the electronic components.

No tools are needed to perform this procedure.

To prepare for the installation, remove any loaded media, turn the printer power **OFF**, and disconnect any power or interface cables from the printer.

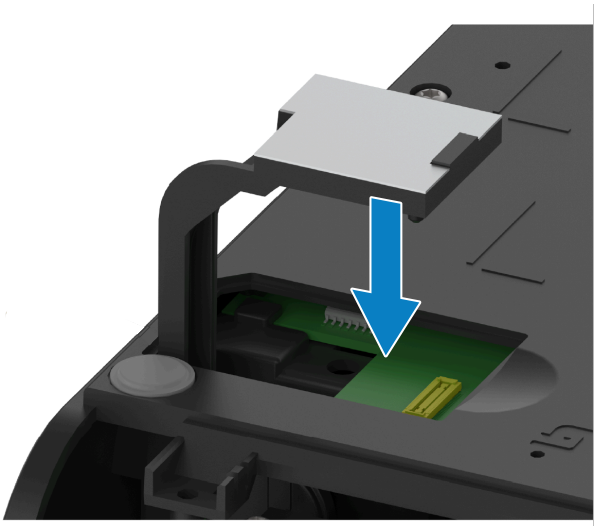
1. Turn the printer over to access the wireless connectivity door located at the bottom of the printer.
2. Push the latch at the top with your fingertip to open the module access door. The printer base has a recessed area for your fingertip.

   The latch releases.
3. Lift and swing the door up to remove it.



4. Align the antenna arm and lower the module.

NOTE: Ensure the printer's Wi-Fi connector aligns with the module's connectors.



5. Push the module in gently but firmly until fully seated.
6. Align the shortest side of the wireless connectivity door to the shortest side of the opening.
7. Swing the door closed and push down to lock the latch.



8. Place the compliance label that shipped with the module on the bottom of the printer.

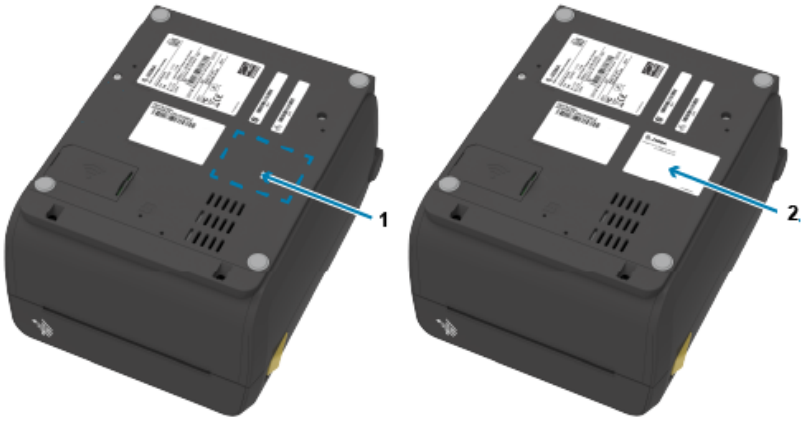
   The compliance label has the appropriate regulatory marks needed to use the printer in your country.

Figure 3 Label Locations for Thermal Transfer Printers



1	Location for the label	2	Label affixed

Figure 4 Label Locations for Direct Thermal Printers



1	Location for the label	2	Label affixed

After all hardware upgrade kits are added, reconnect the printer's power and interface cables.

NOTE: We recommend that you update the printer firmware to verify the printer and wireless module have the same, latest version. Go to Updating Printer Firmware for firmware update instructions.

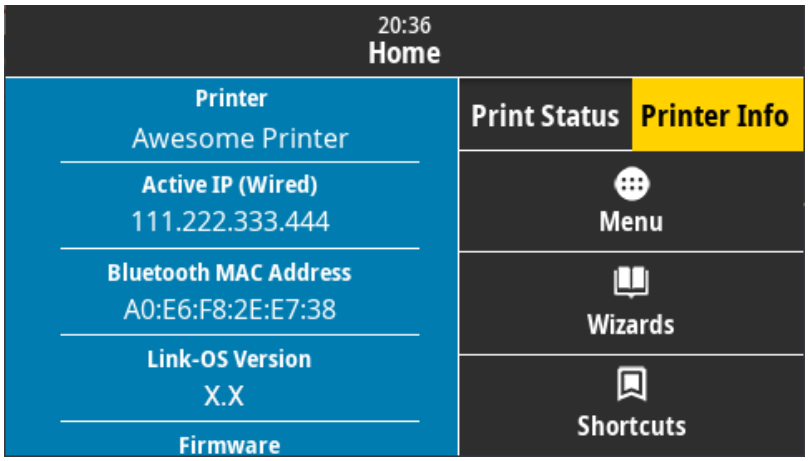
Finding Your Printer's Media Access Control (MAC) Address

Use this procedure to find your printer's MAC address.

NOTE: If your printer came with a Wi-Fi/Bluetooth module installed, the labels with the MAC address can be found the bottom of the printer.

1. If your printer has a color-touch display, use this step. (Otherwise, skip to step 2.)

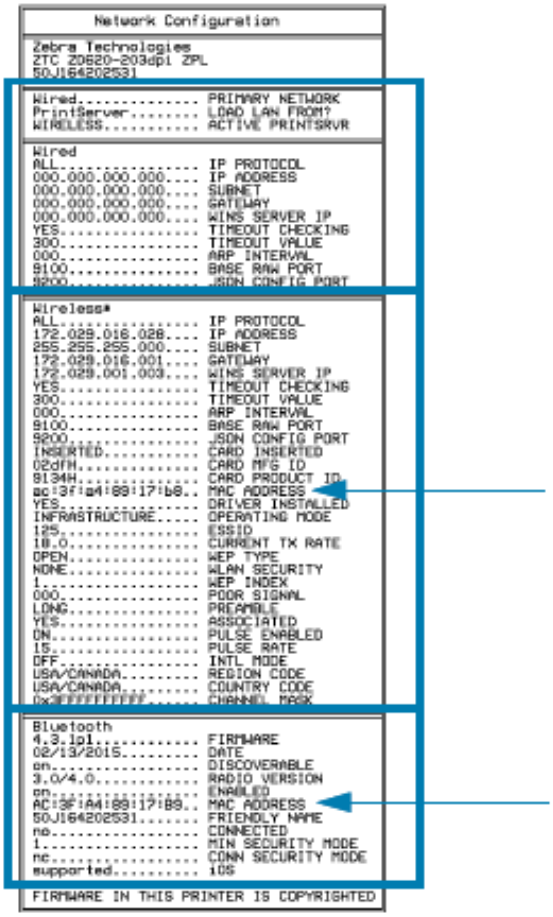
   Tap **Printer Info** on the display...



Alternatively, tap **Menu** > **Network** > **Wi-Fi**, and scroll down.



2. If your printer does NOT have a color touch display and you want to locate the printer's MAC address, press and hold **FEED** and **CANCEL** simultaneously for a few seconds while the printer is in Ready state. The printer prints a network configuration report that lists its MAC address.



Media Handling Options

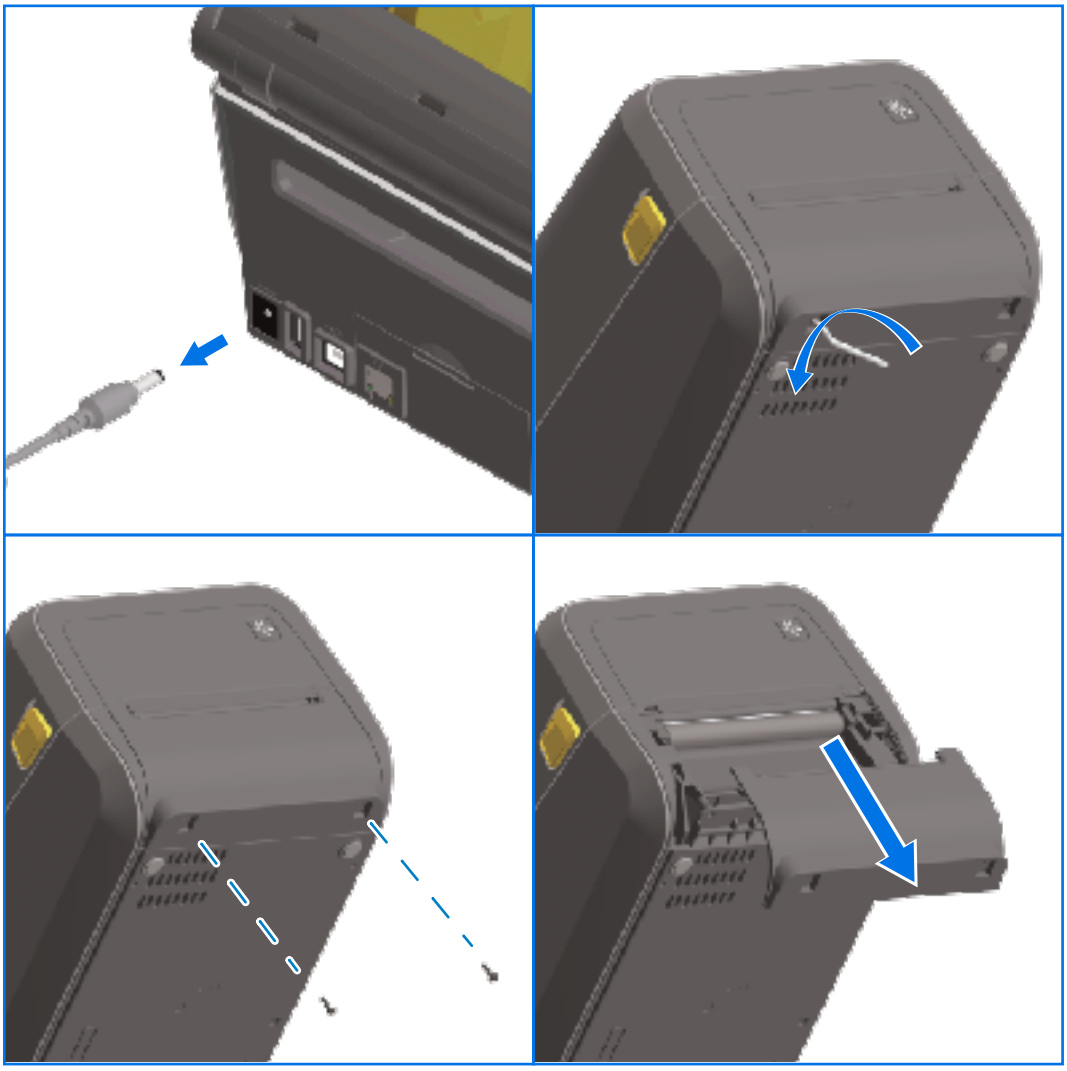
This section describes the various media handling options available with your printer.

CAUTION: The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the printhead or electronic components used in this device. You must observe static-safe procedures when working with the printhead or the electronic components.

Removing the Standard Bezel

Use this procedure to remove the standard bezel before mounting your media-handling option.

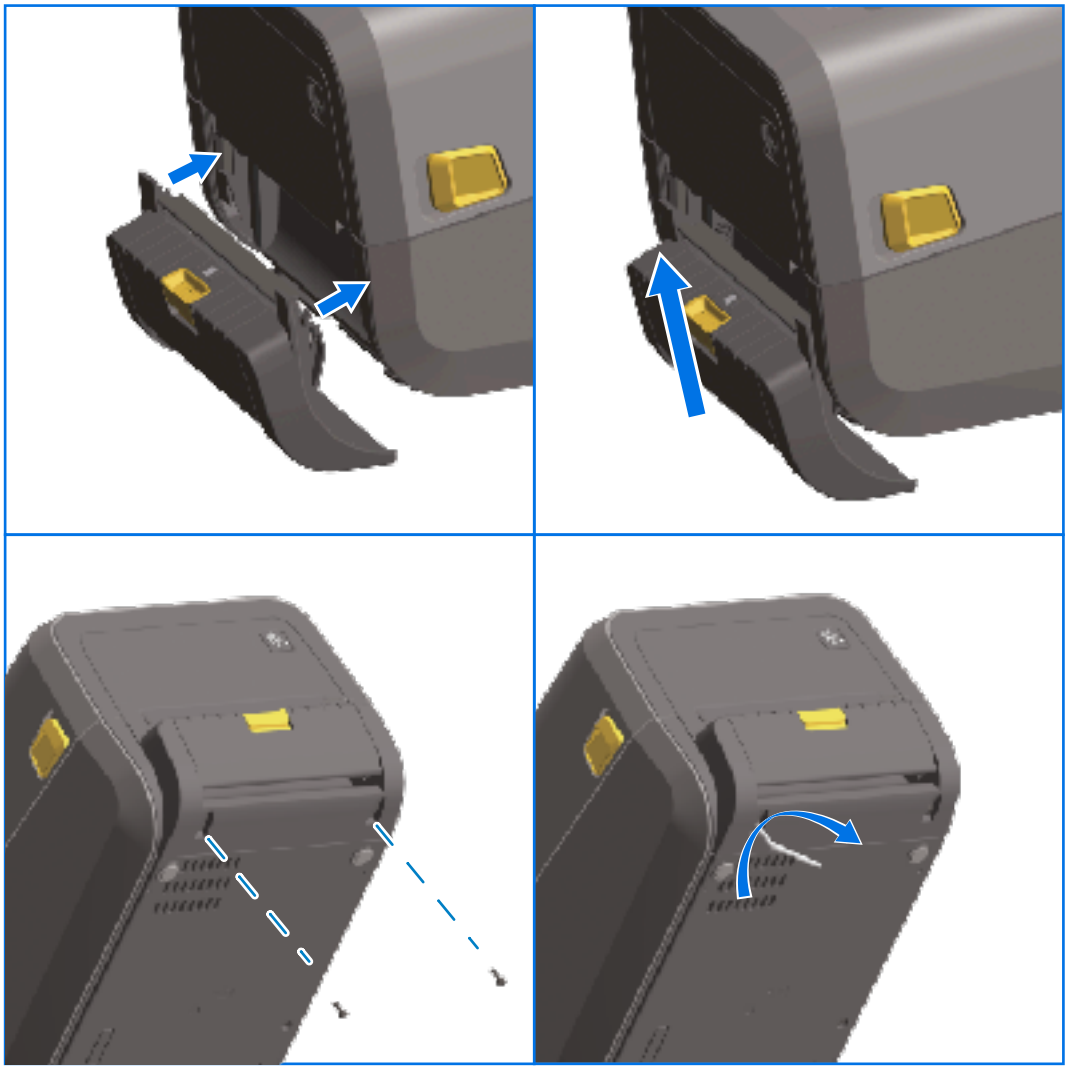
1. Disconnect the printer's DC power input plug from the rear of the printer.
2. Turn the printer upside down. Use the the supplied Torx wrench to remove the two mounting screws. Save the screws to reinstall the bezel later.
3. Slide the bezel down the front about 12.5 mm (0.5 in.) until it comes loose and pull it out.



Installing the Label Dispenser

To install the label dispenser, you must remove the standard bezel and disconnect DC input power to the printer. See Removing the Standard Bezel on page 73.

1. Place the label dispenser module and printer right side up with the top of the module 12.5 mm (0.5 in.) below the bottom of the top cover. Center and push the module into the front of the printer and slide it up until it stops.
2. Turn the printer upside down, then use the Torx wrench to attach the module to the printer with the two supplied screws.



NOTE: For optimal printer performance, update the printer's firmware after installing options or immediately after the printer's initial setup. See Updating Printer Firmware on page 272.

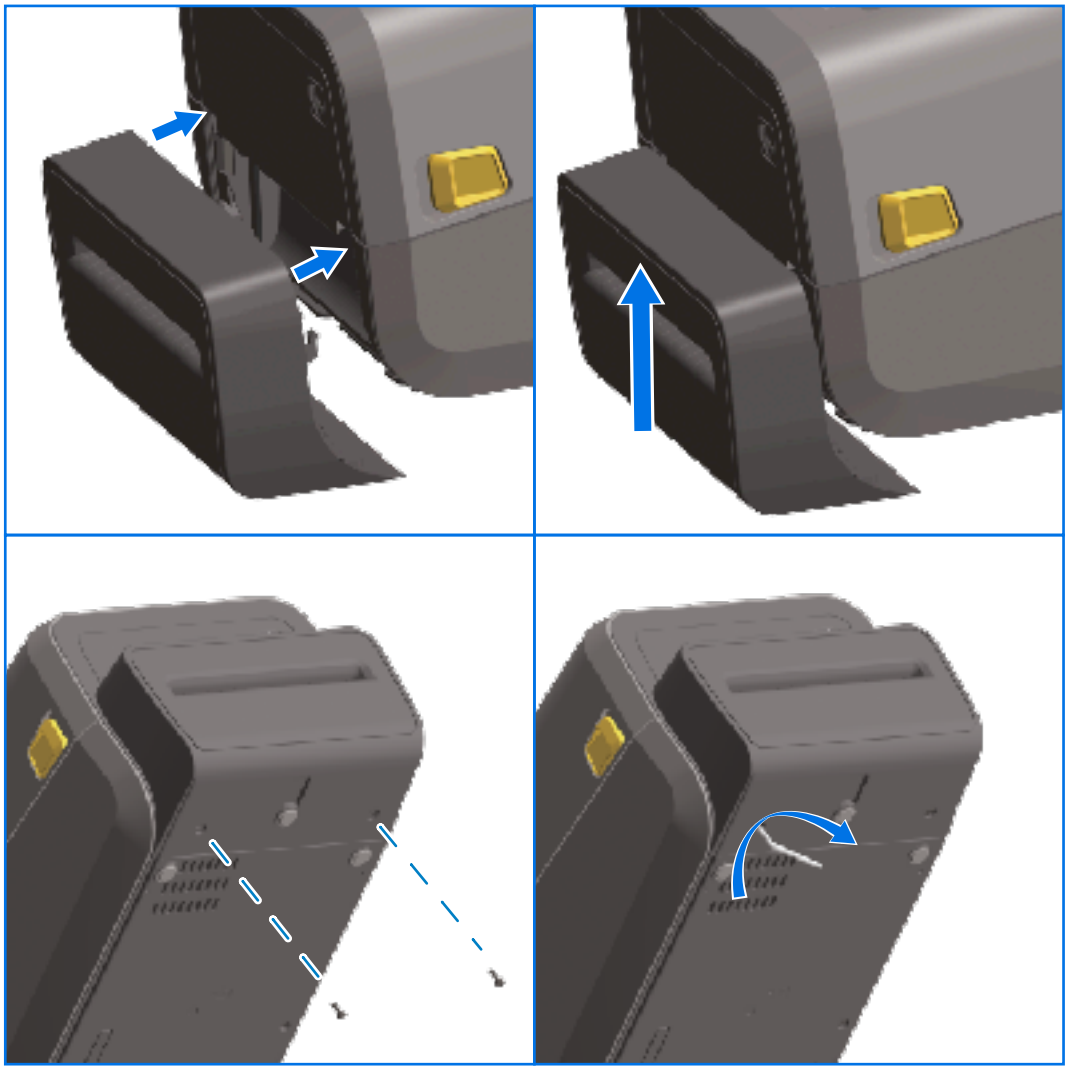
Installing the Standard Media Cutter

To install the standard media cutter, you must remove the standard bezel and disconnect DC input power to the printer. See Removing the Standard Bezel on page 73.

CAUTION: There are no operator serviceable parts in the cutter unit. Never remove the cutter cover (bezel). Never attempt to insert objects or fingers into the cutter mechanism.

IMPORTANT: Using unapproved tools, cotton swabs, solvents, etc. may damage or shorten the cutter's usable life or cause the cutter to bind.

1. Place the cutter module and printer right side up with the top of the module even with the bottom of the top cover.
2. Center and push the module into the front of the printer and slide it up until it stops.
3. Turn the printer upside down, then use the Torx wrench to attach the module to the printer with the two supplied screws.



NOTE: For optimal printer performance, update the printer's firmware after installing options or immediately after the printer's initial setup. See Updating Printer Firmware on page 272.

Media Roll Core Size Adapters

The media roll adapters kit includes three pairs of media roll adapters. The kits are for the following inner diameter (I.D.) media cores:

- 38.1 mm (1.5 in.)
- 50.8 mm (2.0 in.)
- 76.2 mm (3.0 in.)

The adapters are intended to be permanently installed in the printer. You can replace them as needed to support other media roll sizes that require one of these adapter sizes.

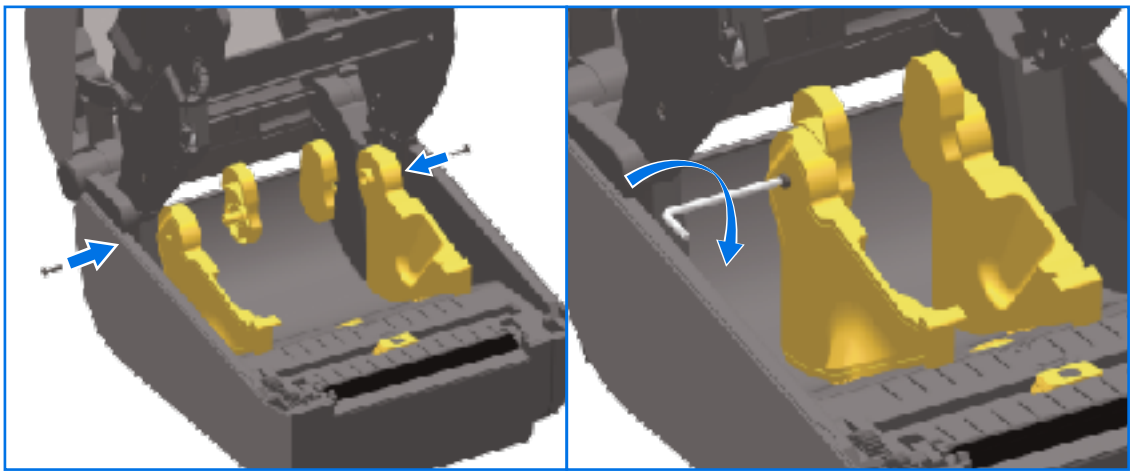
IMPORTANT: The adapters may wear out if they are changed too often.

NOTE: When you remove the media adapters to print on standard roll cores, the plastic pieces on the sides of the media roll holders may rub against the roll. If this is the case, push the attached pieces back into the side of the media roll holder.

Installing the Media Roll Adapters

1. Place one screw in the top adapter mounting hole of both of the roll holders. Turn the screws clockwise using the Torx wrench until the tip of the screw barely protrudes through the inside of the roll holder.

   NOTE: The screws are self-tapping.



2. Place the adapter on the inside of the roll holder, making sure the large side is on top and the smooth side (no ribs) face the middle of the printer.

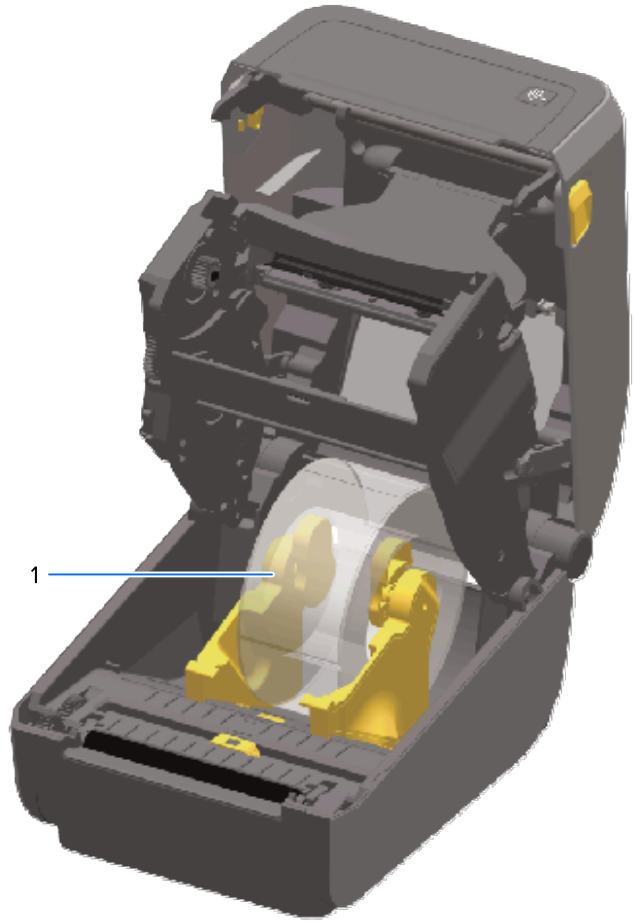
3. Align the adapter's top screw hole to the protruding screw tip and pinch it tightly to the roll holder body. Tighten the screw until there is no gap between the adapter and roll holder. Do not tighten beyond this point.

   IMPORTANT: Over-tightening will strip the thread.

4. Insert a screw in the bottom adapter mounting hole. Pinch the adapter tightly to the roll holder while tightening the screw. Tighten the screw until there is no gap between the adapter and roll holder. Do not tighten beyond this point.

   IMPORTANT: Over-tightening will strip the thread.

5. Repeat the above steps to install the other adapter and roll holder.

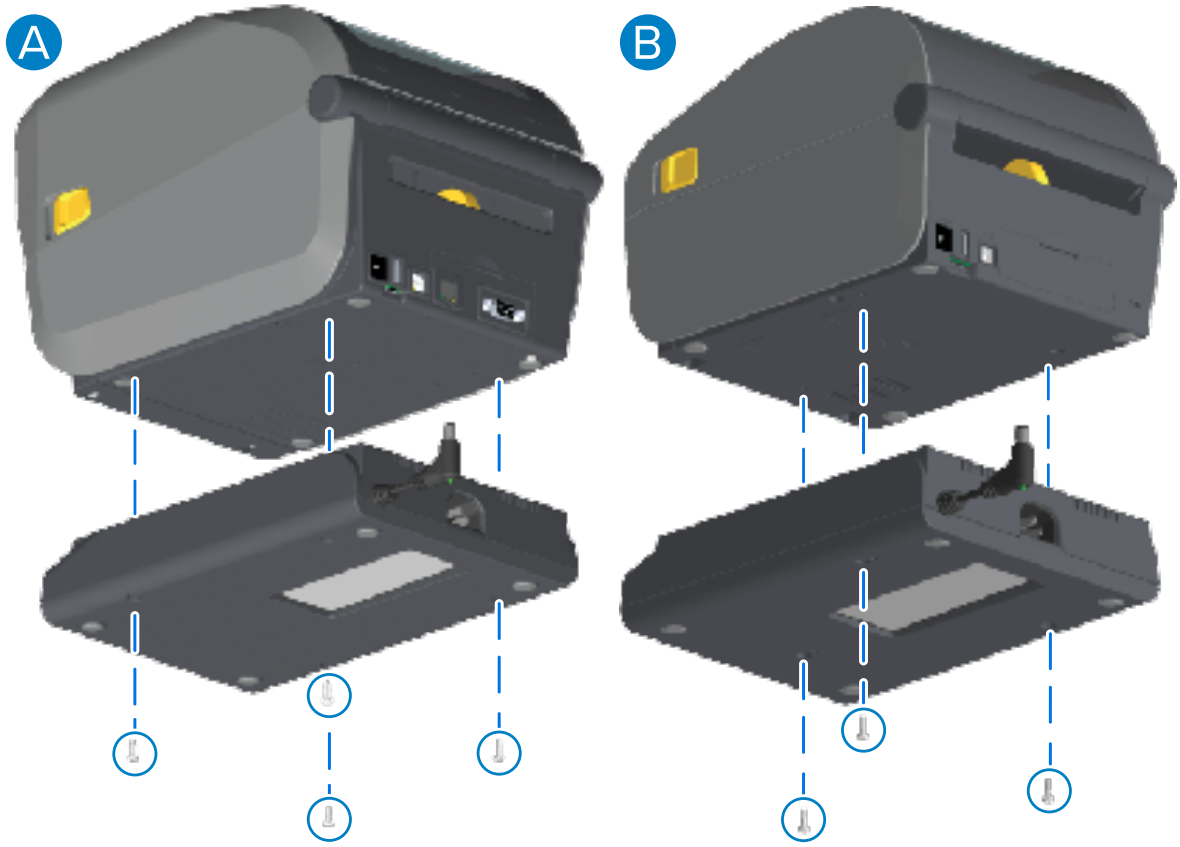


1	Label roll with 76.2 mm (3.0 in.) inner core mounted on media core adapters (shown as an example)

Installing the Attached Power Supply Base Options

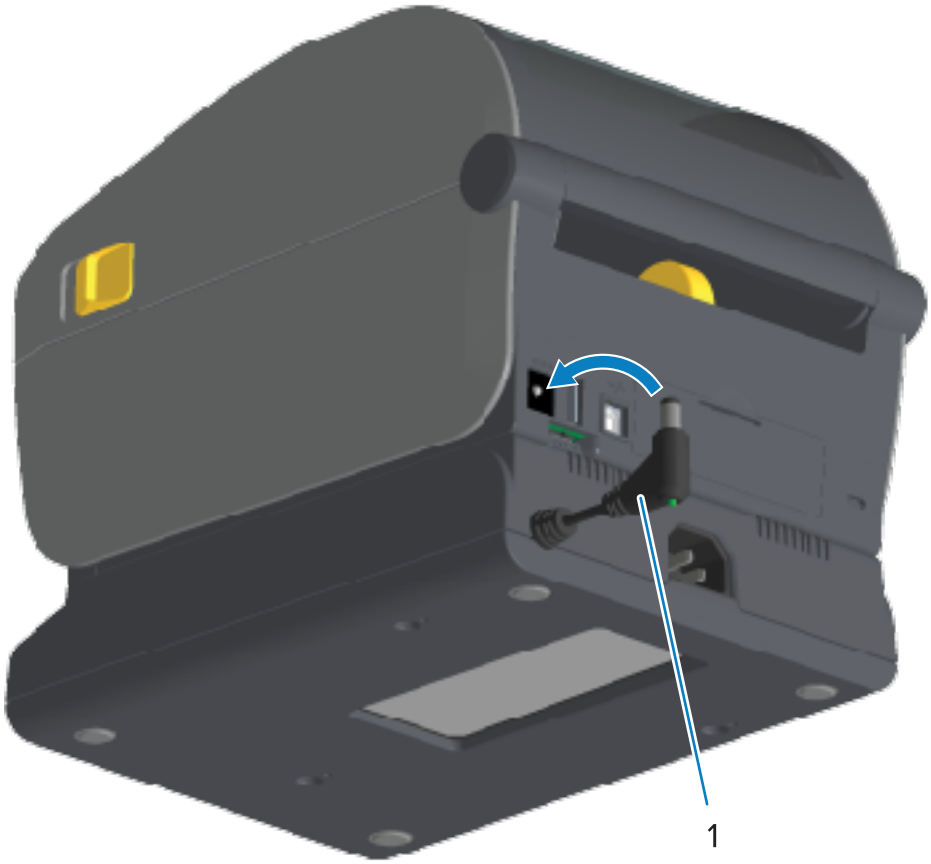
The power base is designed for quick installation using mounting screws (provided with the upgrade kit) and a Torx T10 wrench that you supply.

1. Remove media rolls (if any) from the printer.
2. Unplug the power supply cable from the back of the printer.
3. Turn the printer over and align the power base to the bottom of the printer, making sure the printer power plug is oriented toward the back of the printer. The printer's rubber feet should align with recesses on the top of the power base.
4. Use the screws provided to attach the power base to the printer. Thermal Transfer printer models use four screws (A), and Direct Thermal printer models use three screws (B). Tighten the screws using the T10 wrench provided in the kit.



A	Thermal Transfer printers	B	Direct Thermal printers

5. Insert the DC input power plug into the printer.



1	DC input power plug



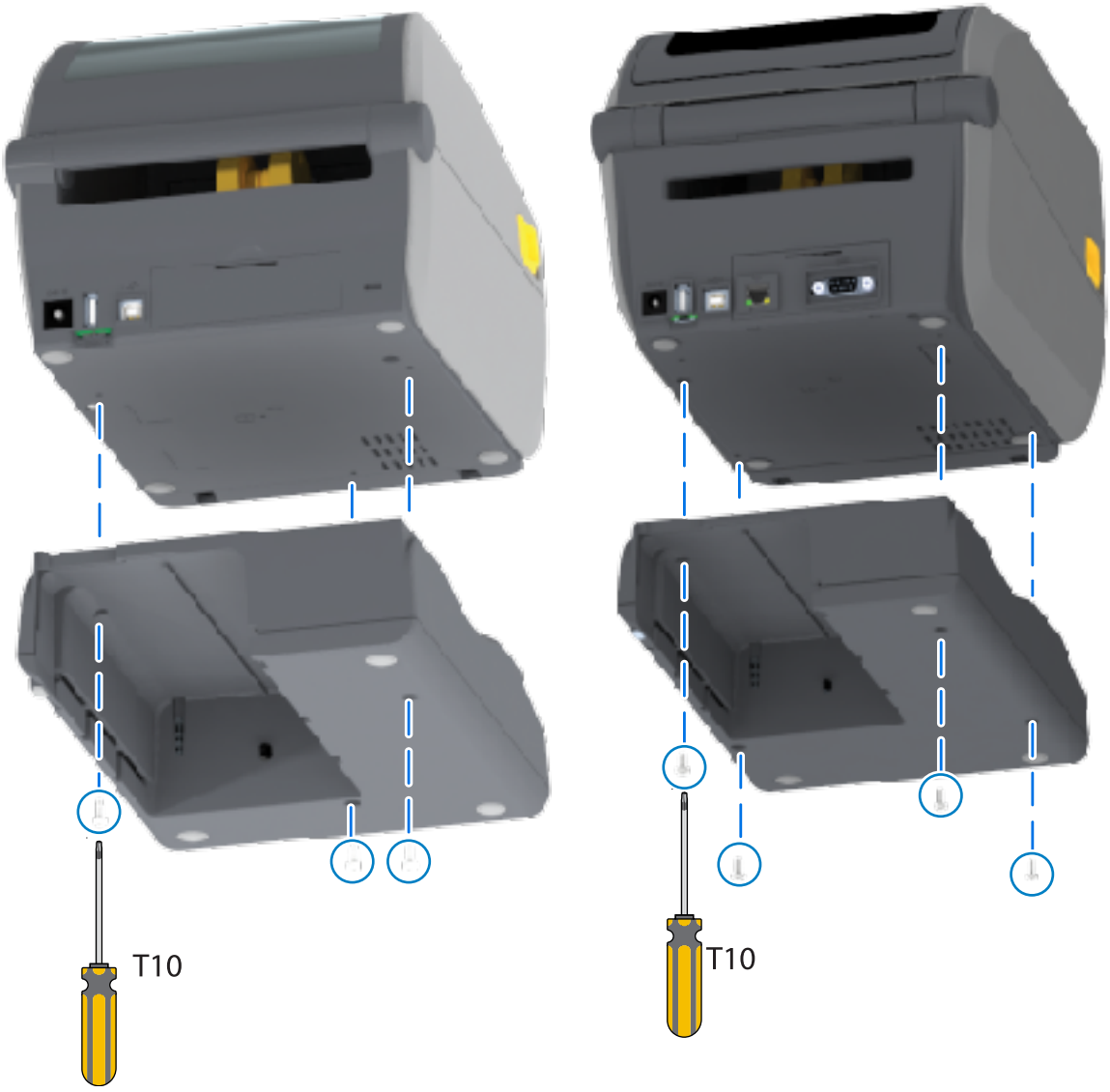
2	DC input power plug

6. Re-connect the AC power cord to the printer power base.

Installing the Attached Battery Base Options

The battery base is ready to attach to the printer. The base is installed using a Torx T10 wrench and the mounting screws provided with the upgrade kit.

1. Remove media rolls (if any) from the printer. Detach the original power supply cable from the back of the printer.
2. Turn the printer over and align the power base to the bottom of the printer with the printer power plug oriented toward the back of the printer. The printer's rubber feet should align with the recesses in the top of the power base.
3. Use the screws provided to attach the power base to the printer. Thermal Transfer printer models use four screws (image on the left below) and Direct Thermal printer models use three screws (image on the right below). Tighten the screws using the Torx wrench supplied in the kit.

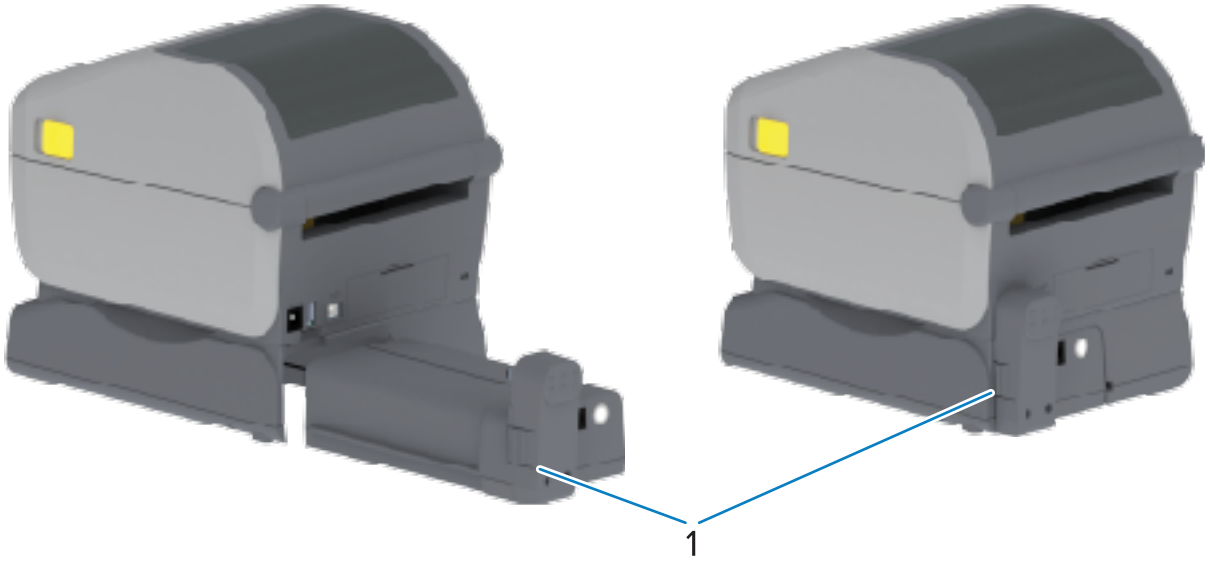


Installing the Battery into the Attached Power Base

IMPORTANT: The attached battery base must be properly installed and securely connected your printer to keep from damaging the printer or the battery.

1. Disconnect the printer's external power supply from the DC power input connector located on the rear of the printer.
2. Slide the battery into the battery slot on the battery base. Push the battery into the base until battery pack is flush to the rear of the battery base, and the connectors on the battery pack are engaged with the ports on the back of the printer.

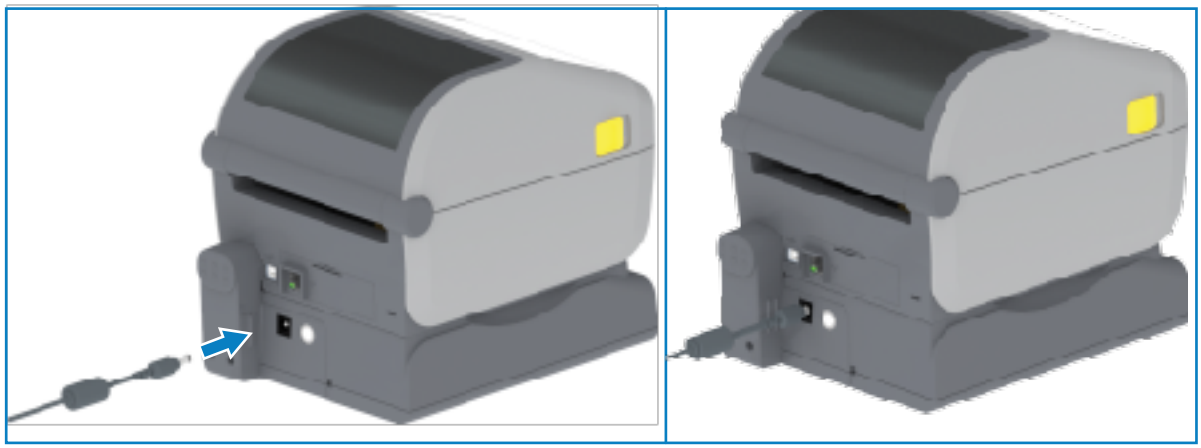
   This image shows the position of the battery when it is ready to install (left) and the battery installed in the base (right).



1	Battery latch

NOTE: Batteries are shipped in shutdown mode for safety and to keep the battery from discharging during storage and shipping. The battery requires charging prior to initial use with the printer.

3. Attach the printer's power supply to the battery to wake up the battery from shutdown mode and begin its initial charge.



4. The battery must be fully charged before first use. See Battery Indicators and Controls on page 59 to learn how to:
   - turn the battery on.
   - discover battery-charge-saving features and behaviors.
   - check the battery's charge level and health.

   The battery takes approximately two hours to reach full charge. The battery status/ health indicator (lighting bolt) turns from amber (charging) to green (charged) when the battery reaches full charge.

Color Touch Display and Controls

The optional Color Touch Display available with select printers lets you access printer features and run print jobs, use wizards for commonly-performed tasks, and troubleshoot issues if any with your printer.

Color Touch Display Printer Controls

The Color Touch Display interface option (available with some printer models) makes it easy for you to operate your printer. It is customizable for all user types and includes standard controls and indicators.



1	Status indicators	4	**CANCEL** button

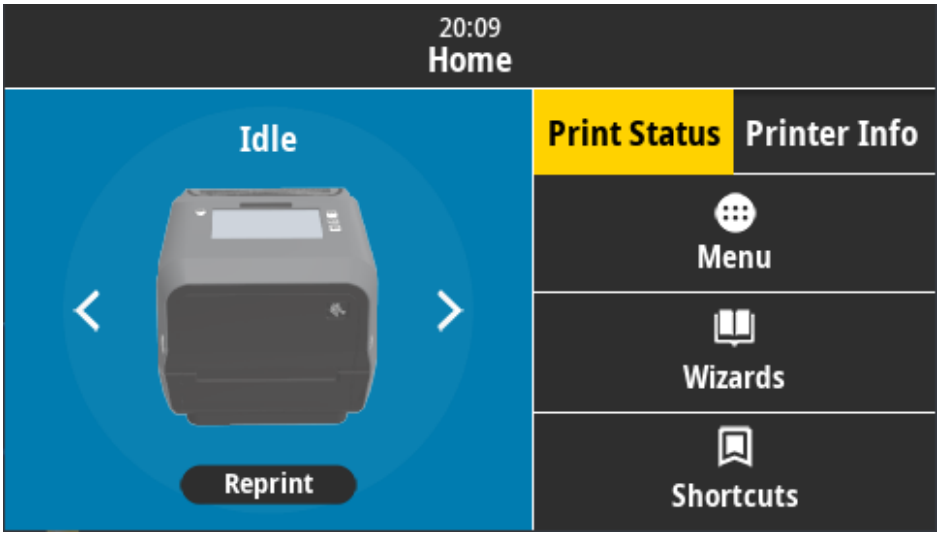
2	**PAUSE** button	5	Color Touch display and Interface
3	**FEED** button	6	**POWER** button

See Controls and Indicators on page 48 for information on the printer's Standard Interface controls (**POWER**, **PAUSE**, **FEED**, and **CANCEL** buttons) and the five printer status indicators.

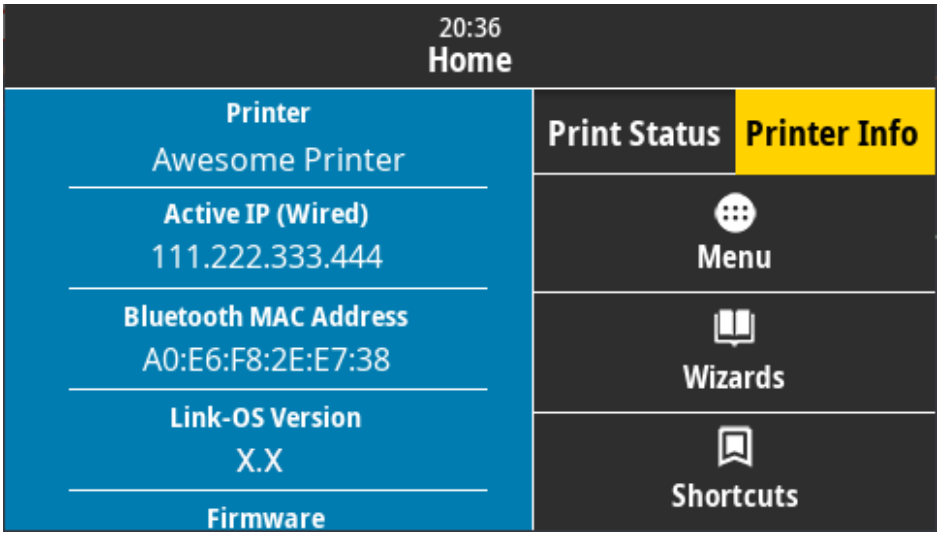
Home Screen

The Home screen on the printer's display shows you the printer's current status and provides a way for you to access the printer's menus. You can rotate the image of the printer 360 degrees to view the information on it from all angles.

Printer Status

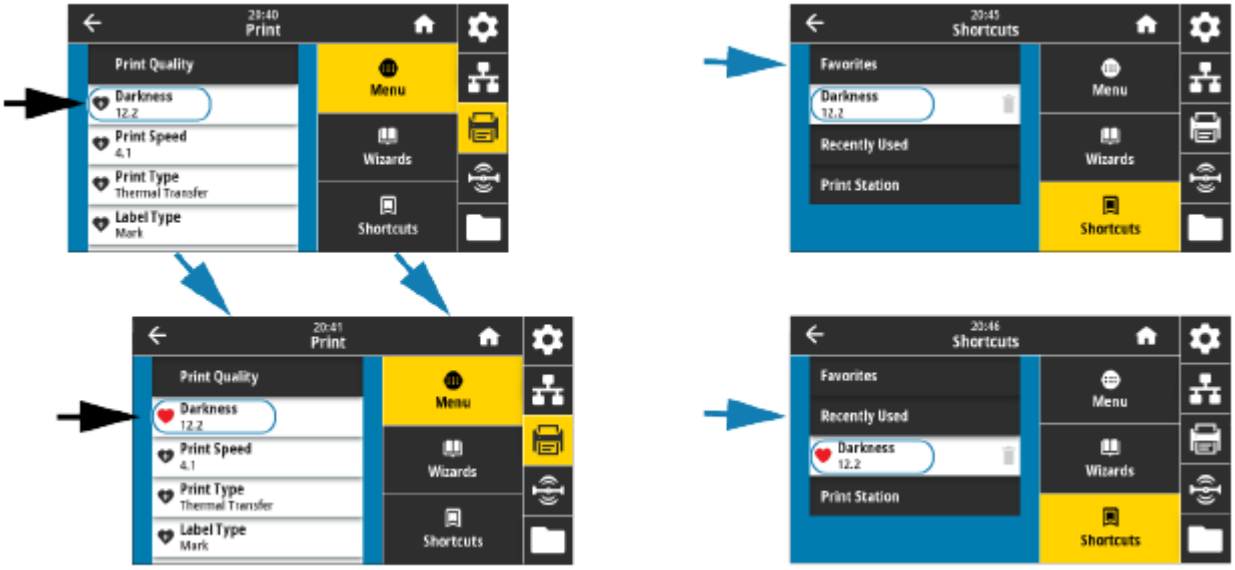


Printer Info



Printers with the optional Color Touch Display interface include the following features:

- The printer's Standard Interface controls and status indicators provide a way for you to place the printer in various modes, recognize printer status, and operate the printer.
- The interactive Color Touch Display shows the normal operation status of the home screen with access to:
  - Print Status and Printer Info — Provide information about the printer.
  - Menu — Navigate the menu to establish and change settings, and to control print operations and file transfers.
  - Wizards — Use these to change printer settings by going through prompts. See Printer Wizards on page 85.
  - Shortcuts — Use these to quickly access the most recent menu items and to save your favorites. Touch the darkened heart icon next to a menu item to save it to your list of favorites. Items in the favorites are shown in the order in which they were saved.



The Color Touch Display displays alerts and error messages. If the background color of the Home Screen is yellow or red, the printer is in an alert or error state. For more information, see Resolving Alerts and Errors on page 273.

The Color Touch Display also shows a quick link to online instructions and how-to videos that you can access using mobile devices. And it provides access to onboard help.

Printer Wizards

Printer wizards are designed to assist you by walking you through the setup process for various printer settings and features.

The following wizards are available:

- **Set All Wizard** — runs all the Wizards in sequence.
- **System Wizard** — sets up non-print related operating system settings.

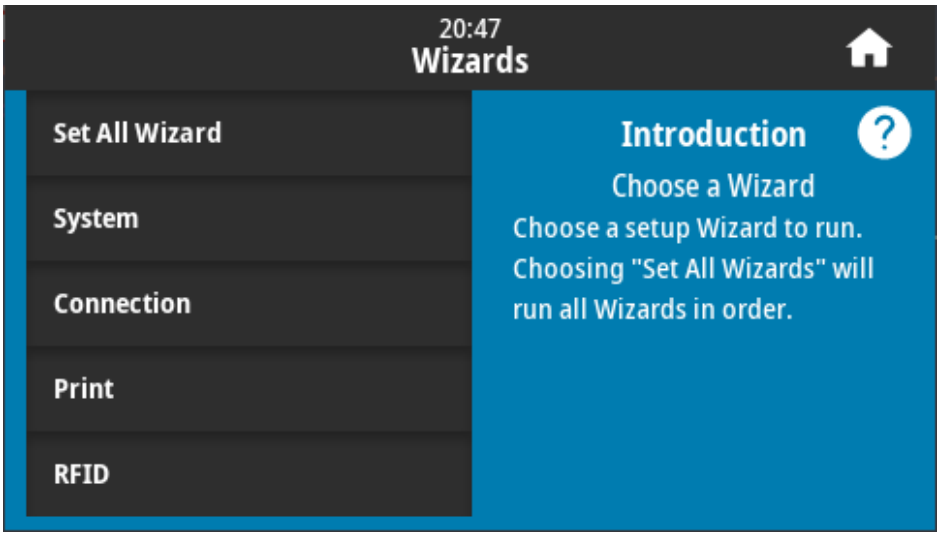
- **Connection Wizard** — configures the printer's connectivity options.
- **Print Wizard** — configures key printing parameters and features.
- **RFID Wizard** — sets up the RFID subsystem's operations.

NOTE: For printers with Protected Mode enabled, you need to provide the Protected Mode password to change certain settings, and they cannot be modified through the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

NOTE: When using the Wizards, do not send data to the printer from the host.

For optimal results, use full-width media when running the **Print Wizard** or **Set All Wizard**. If the media is shorter than an image to be printed, the image may be truncated or it may print across multiple labels.

On the Home screen, touch **Wizards** to see the available options. For more information about individual settings set by any of the wizards, see User Menus on page 86.

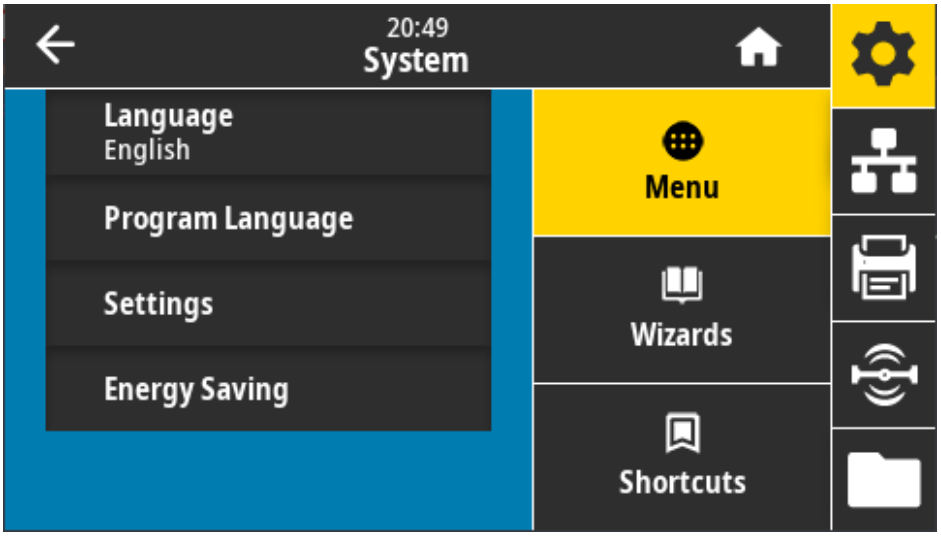


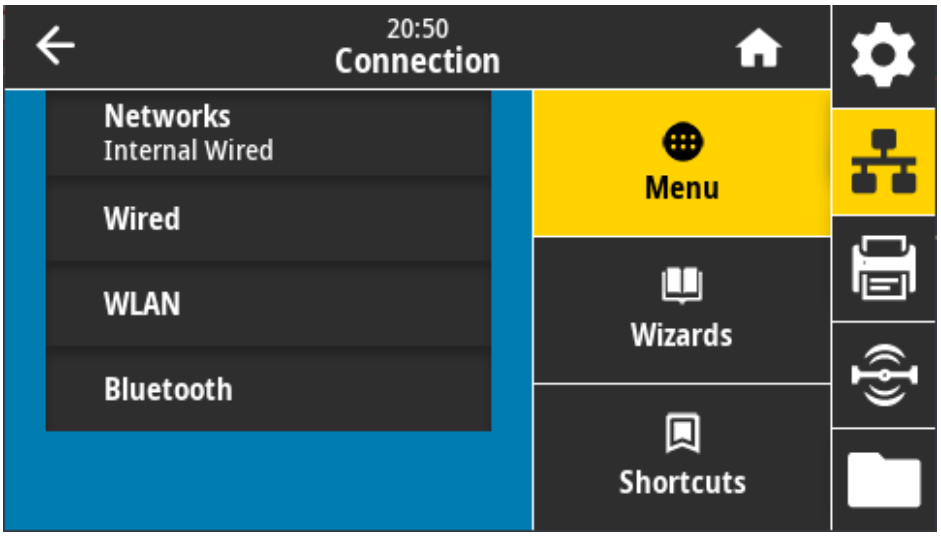
User Menus

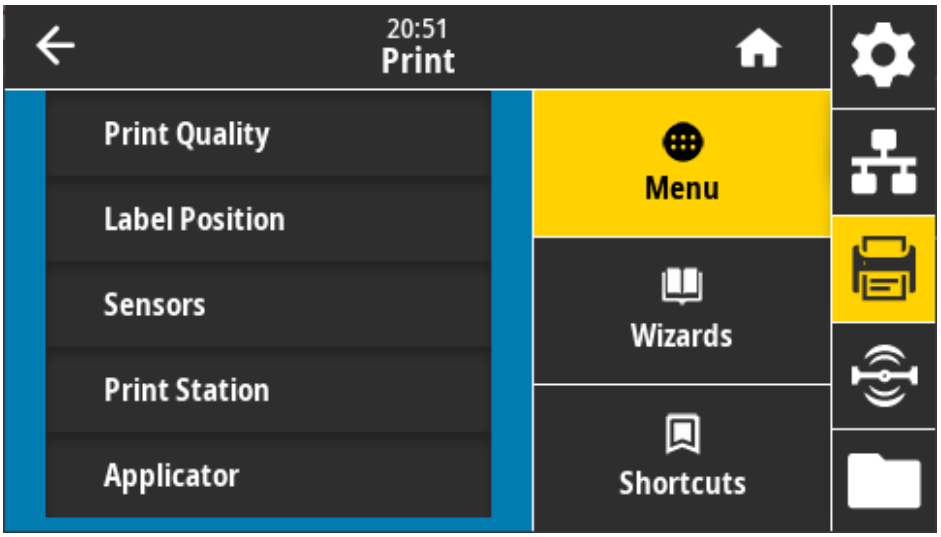
The printer's user menus enable you to configure the printer.

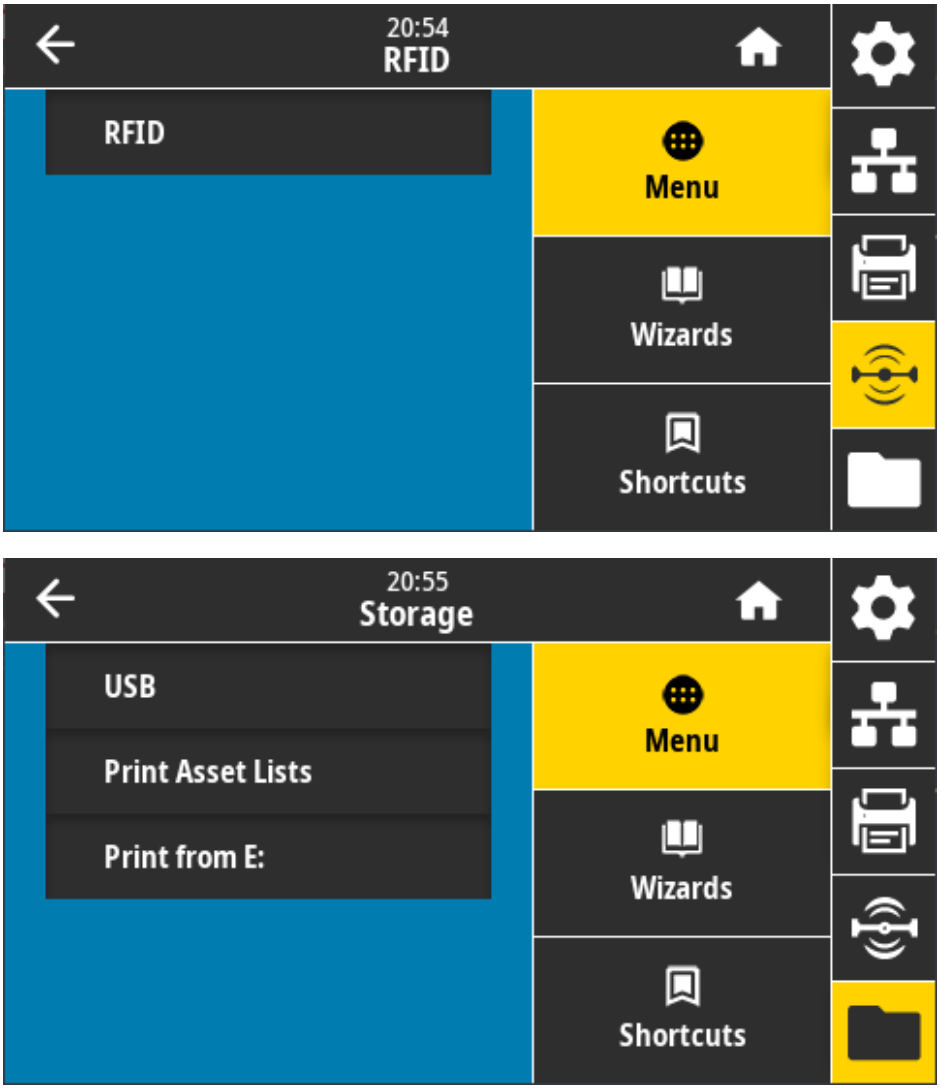
The following menus are available:

- System menu
- Connection menu
- Print menu
- RFID menu
- Storage menu


20:49
System
Language
English
Program Language
Settings
Energy Saving
Menu
Wizards
Shortcuts


20:50
Connection
Networks
Internal Wired
Wired
WLAN
Bluetooth
Menu
Wizards
Shortcuts

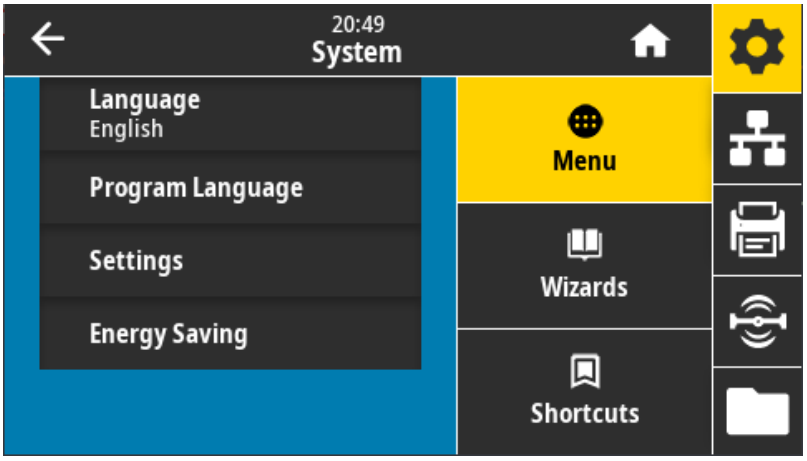

20:51
Print
Print Quality
Label Position
Sensors
Print Station
Applicator
Menu
Wizards
Shortcuts



The user menu descriptions include other ways to change the same settings when other options exist. You can also use the printer's wizards to change some of the settings. See Printer Wizards on page 85.

System Menu

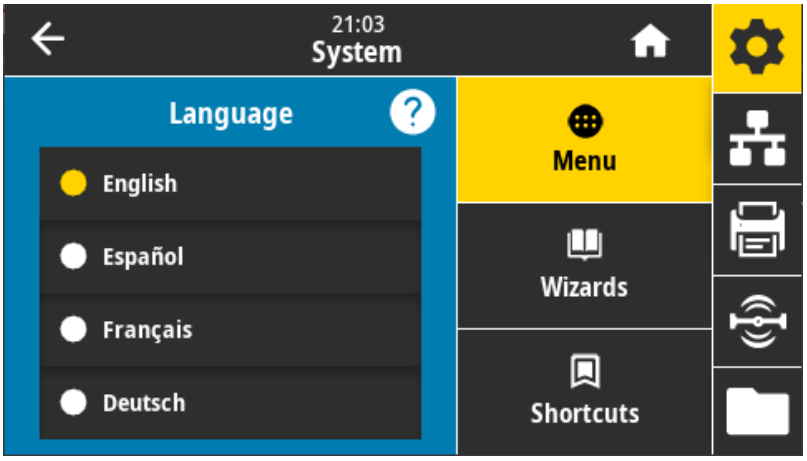
Use System menu items to specify settings for printer function and printer options, set the display language, and restore defaults.



System > Language

Use this setting to select one of 19 language choices for your printer display.

NOTE: The language selections for this parameter are displayed by language name in the language of the displayed name.



Accepted values: ENGLISH, SPANISH, FRENCH, GERMAN, ITALIAN, NORWEGIAN, PORTUGUESE, SWEDISH, DANISH, DUTCH, FINNISH, CZECH, JAPANESE, KOREAN, ROMANIAN, RUSSIAN, POLISH, SIMPLIFIED CHINESE, TRADITIONAL CHINESE

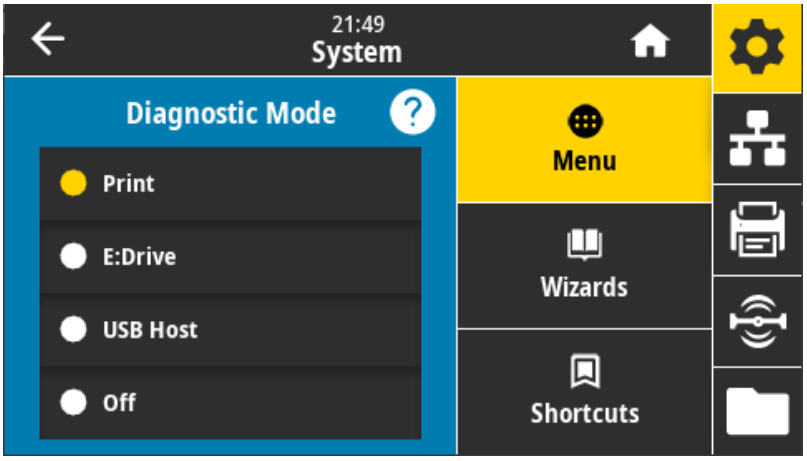
Related ZPL command(s): ^KL

SGD command used: `print.tone`

View and Modify Printer Settings > General Setup > Language

System > Program Language > Diagnostic Mode

Use Communications Diagnostics Mode to enable the printer to output all communication as printed data for advanced troubleshooting



Accepted values: Print, E: Drive, USB Host, Off

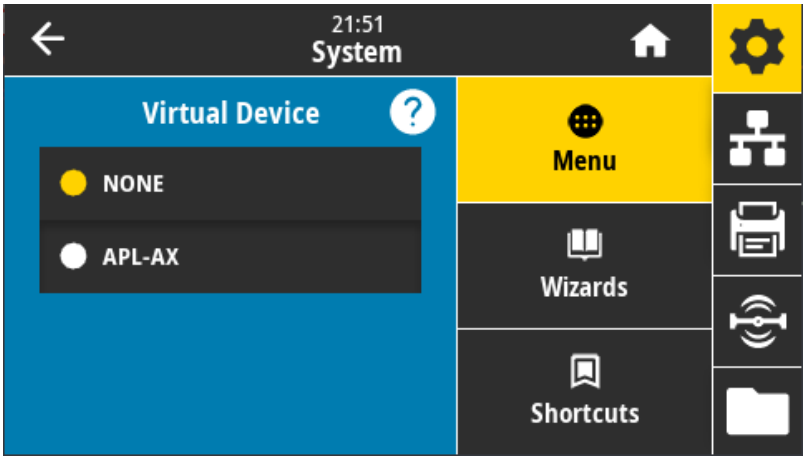
Related ZPL command(s): For Print Diagnostics only: ~JD to enable, ~JE to disable

Print Server web page: **View and Modify Printer Settings** > **General Setup** > **Language**

Control panel key(s): For print diagnostics only, with the printer in Ready state, press **PAUSE** + **FEED** simultaneously and hold for two seconds.

System > Program Language > Virtual Device

If any Virtual Device applications are installed on your printer, you may view or enable/disable them from this user menu.

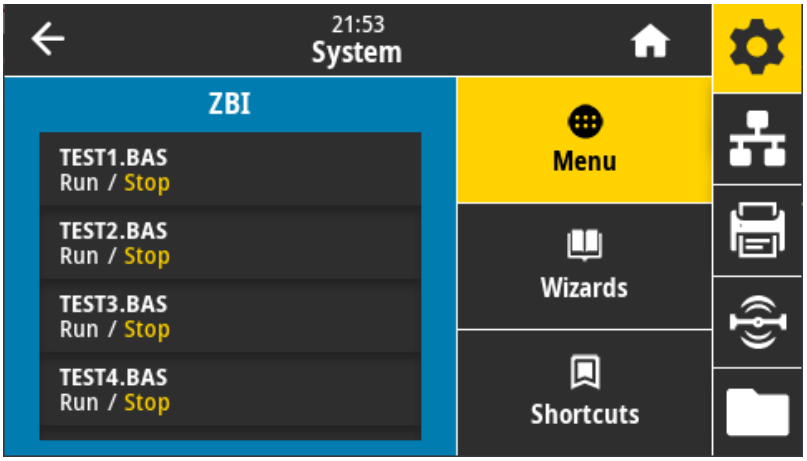


Values displayed: NONE, (followed by a list of any connected Link-OS Virtual Devices)

System > Program Language > ZBI

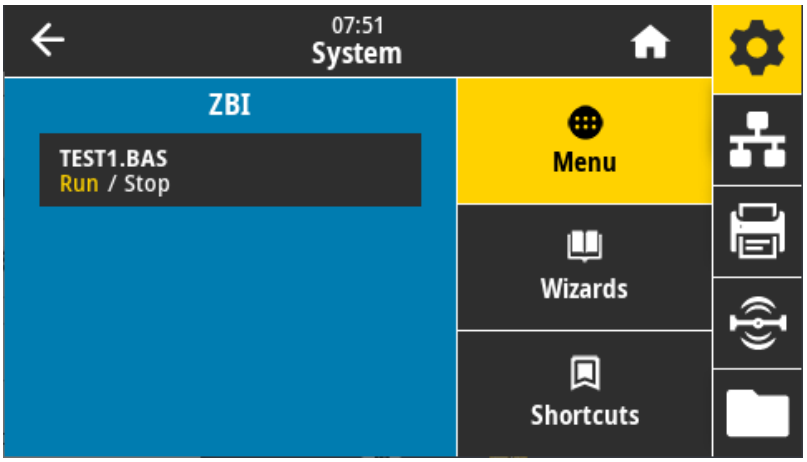
Zebra Basic Interpreter (ZBI 2.0) is a purchasable printer programming option.

If you would like to purchase this option, contact your Zebra reseller.



If ZBI programs have been downloaded to your printer, you may select one to run using this menu item. If no program exists on your printer, the display shows NONE.

When ZBI programs have been downloaded but none are running, the printer lists all available programs. To run one of them, touch **Run** under the program name.

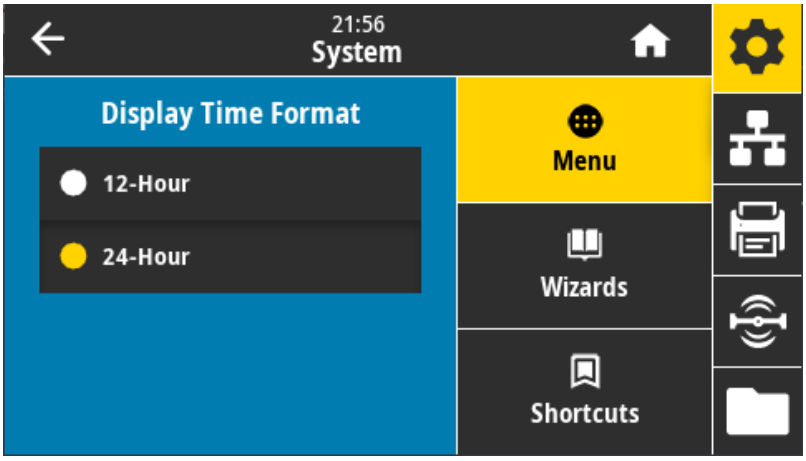


After the selected program is initiated, only that program is listed on the display. Touch **Stop** to end the program.

SGD command used: `zbi.key` (identifies if the ZBI 2.0 option is enabled or disabled on the printer)

System > Settings > Display Time Format

Use this setting to select the time format used by the printer.

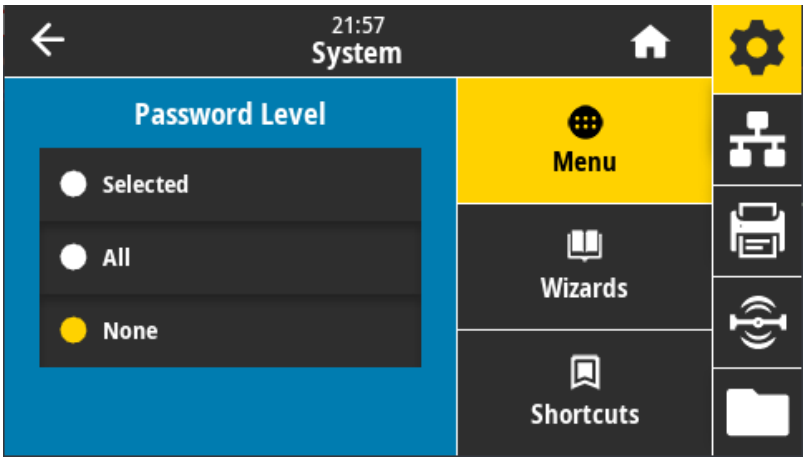


Accepted values: 12-Hour, 24-Hour

SGD command used:`device.idle_display_value`

System > Settings > Password Level

Use this setting to select the level of password protection for user menu items.



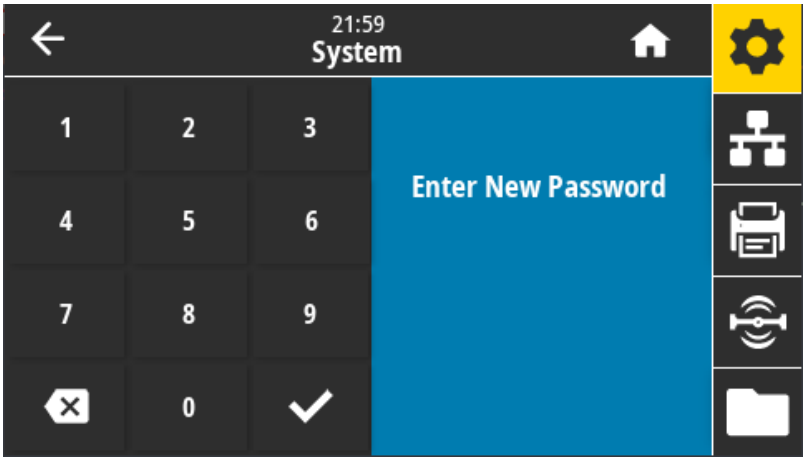
Accepted values: Selected, All, None

Related ZPL command(s): ^KP (to change the printer password)

System > Settings > Set Password

For printers purchased in the EMEA region after August 1, 2025: Out of the box, the printer requires the configuration of a front panel password/PIN before you can modify certain settings through the user menus. This front panel password is different than the Protected Mode password, which also must be configured. For additional information, go to zebra.com/asr.

For all other printers: Set a new printer password for menu items protected by the previous parameter. The default printer password is 1234.

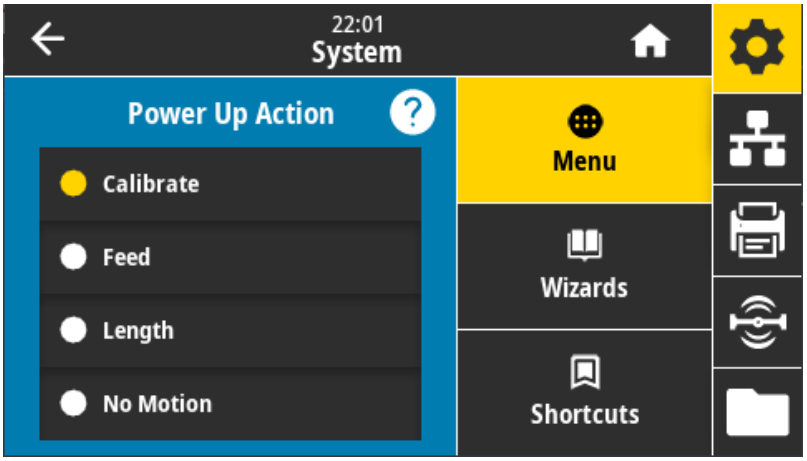


Accepted values: `0000` to `9999` (four digits)

Related ZPL command(s): `^KP`

System > Settings > Power Up Action

Set the action for the printer to take during the power-up sequence.



Accepted values:

- CALIBRATE—Adjusts sensor levels and thresholds, determines the label length, and feeds the media to the next web.
- FEED—Feeds the labels to the first registration point.
- LENGTH—Determines the label length using current sensor values, and feeds the media to the next web.
- NO MOTION—Tells the printer not to move the media. You must manually ensure that the web is positioned correctly, or press **FEED** to position the next web.
- SHORT CAL—Sets the media and web thresholds without adjusting sensor gain, determines the label length, and feeds the media to the next web.

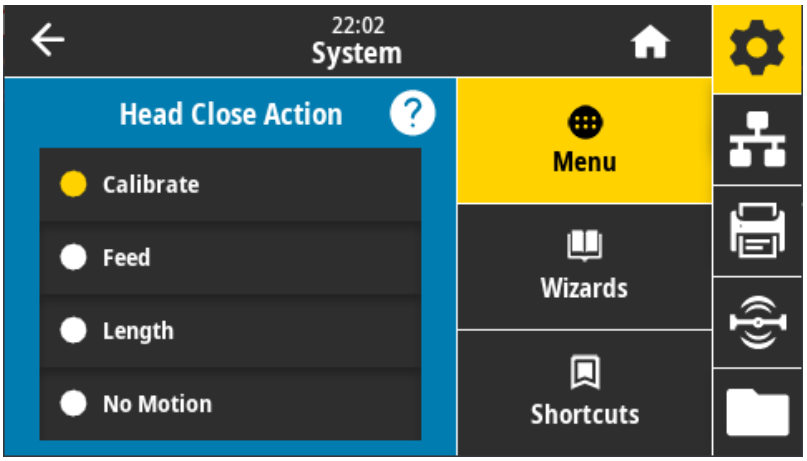
Related ZPL command(s): `^MF`

SGD command used: `ezpl.power_up_action`

Printer web page: **View and Modify Printer Settings** > **Calibration**

System > Settings > Head Close Action

Set the action for the printer to take when you close the printhead.



Accepted values:

- CALIBRATE—Adjusts sensor levels and thresholds, determines the label length, and feeds the media to the next web.
- FEED—Feeds the labels to the first registration point
- LENGTH—Determines the label length using current sensor values, and feeds the media to the next web.
- NO MOTION—Tells the printer not to move the media. You must manually ensure that the web is positioned correctly, or press feed to position the next web.
- SHORT CAL—Sets the media and web thresholds without adjusting sensor gain, determines the label length, and feeds the media to the next web.

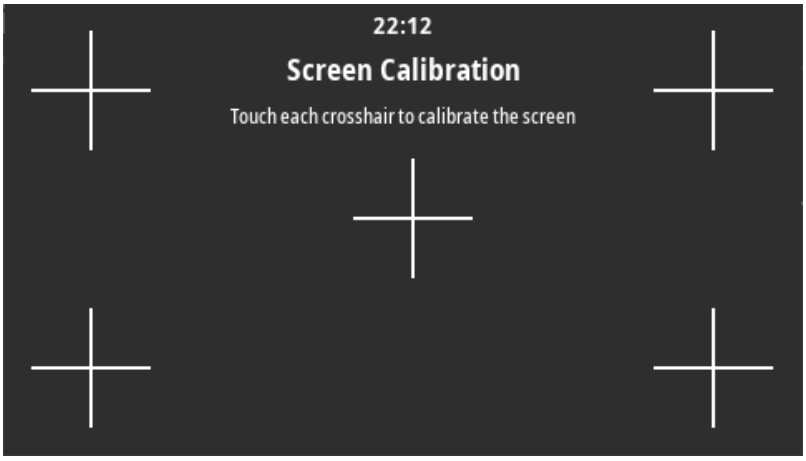
Related ZPL command(s): `^MF`

SGD command used: `ezpl.head_close_action`

Printer web page: **View and Modify Printer Settings** > **Calibration**

System > Settings > Screen Calibration

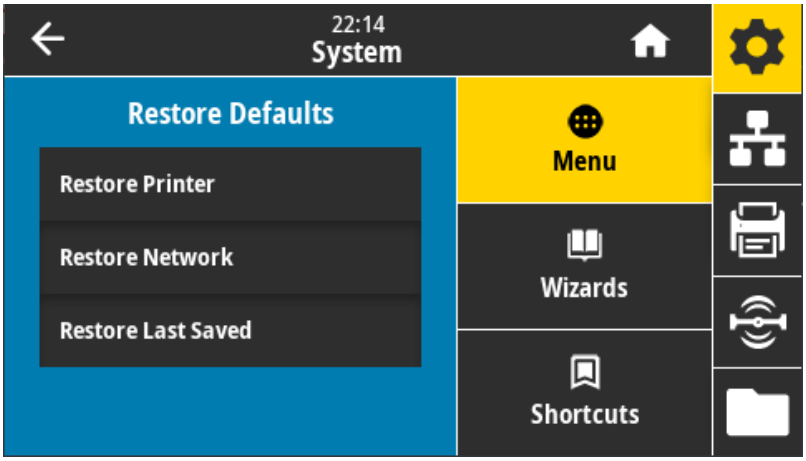
Touch each crosshair to calibrate the screen.



System > Settings > Restore Defaults

Restore specific printer, print server, and network settings back to the factory defaults.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.



Use care when loading defaults because you will need to reload all settings that you changed manually. This menu item is available through two user menus with different default values for each.

Accepted values:

- PRINTER—Restores all printer settings other than the network settings back to factory defaults. Use care when loading defaults because you will need to set all settings that you had changed manually before the reset.
- NETWORK—Reinitializes the printer's wired or wireless print server. With a wireless print server, the printer also re-associates with your wireless network.
- LAST SAVED—Loads settings from the last permanent save.

- NO MOTION—Tells the printer not to move the media. You must manually ensure that the web is positioned correctly, or press **FEED** to position the next web.
- SHORT CAL—Sets the media and web thresholds without adjusting sensor gain, determines the label length, and feeds the media to the next web.

Related ZPL command(s):

- PRINTER—^JUF
- NETWORK—^JUN
- LAST SAVED—^JUR

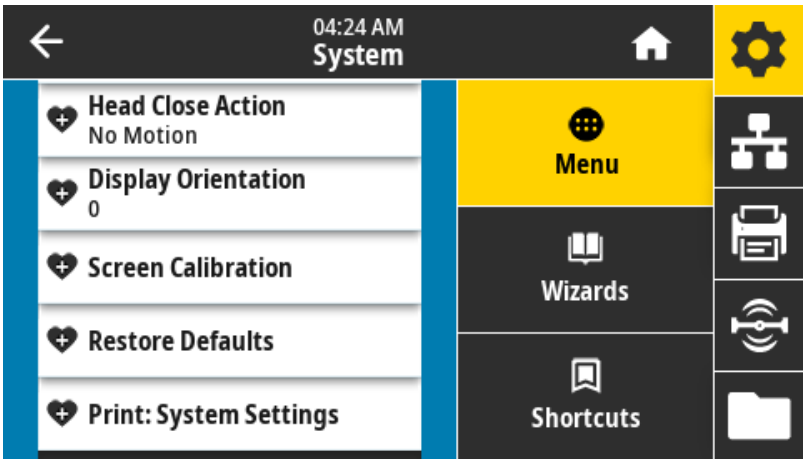
Control panel key(s): To reset the printer parameters to factory values, hold **FEED** + **PAUSE** simultaneously during printer power-up.

Printer web pages:

- PRINTER—**View and Modify Printer Settings** > **Restore Default Configuration**
- NETWORK—**Reset Print Server** > **Print Server Settings**
- LAST SAVED—**View and Modify Printer Settings** > **Restore Saved Configuration**

System > Settings > Print: System Settings

Prints a printer configuration report.



Related ZPL command(s): ~WC

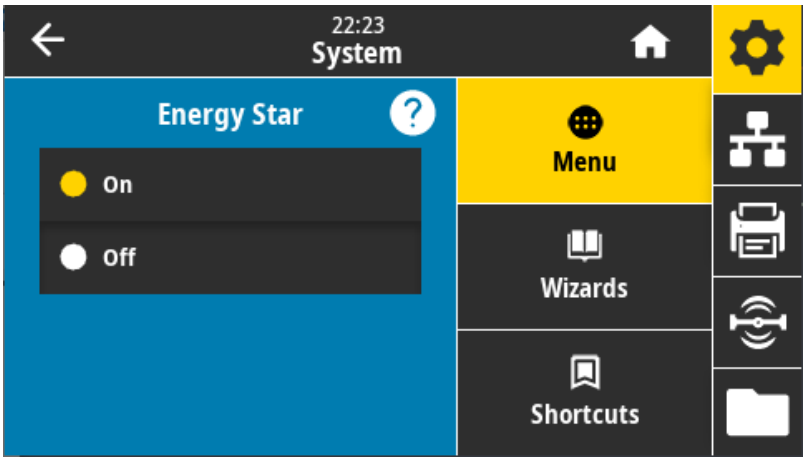
Control panel key(s):

- Hold **CANCEL** for two seconds during printer power-up.
- With the printer in Ready state, press and hold **FEED** + **CANCEL** simultaneously for two seconds.

Printer web page: **View and Modify Printer Settings** > **Print Listings on Label**

System > Energy Saving > Energy Star

When Energy Star mode is enabled, the printer goes into a “sleep” mode after a timeout period, thereby lowering power consumption. Press any button on the control panel to bring the printer back to an active state.



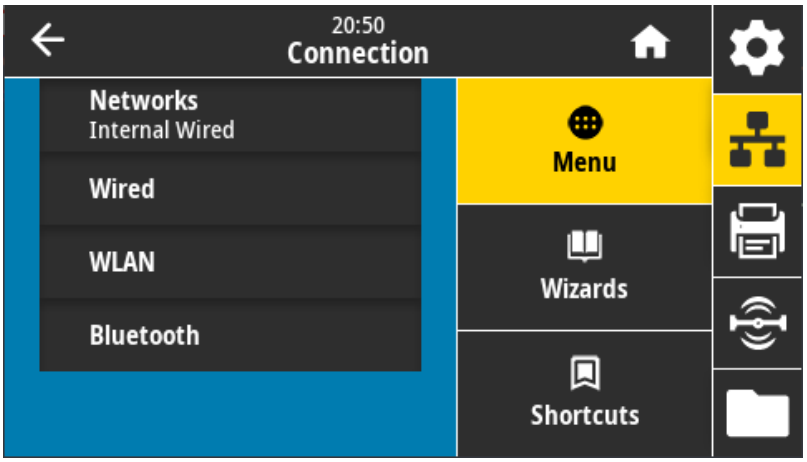
Accepted values: ON, OFF

SGD command(s) used:

- `power.energy_star.enable`
- `power.energy_star_timeout`

Connection Menu

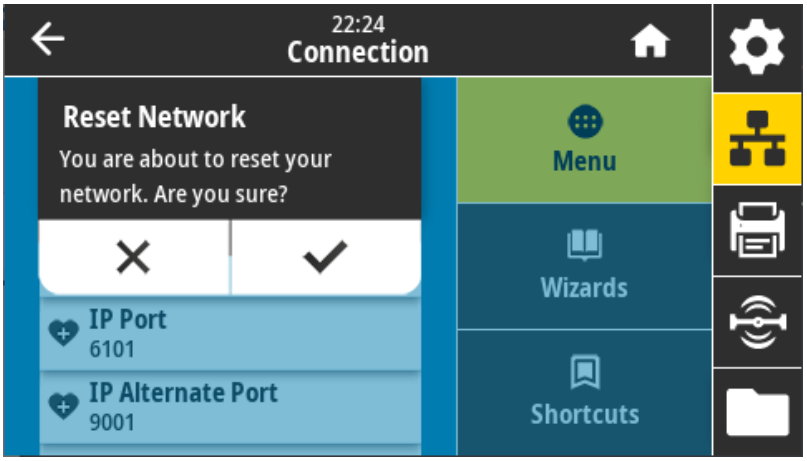
Use this menu to set connection parameters for wired and wireless (Wi-Fi and Bluetooth) printer communication.



Connection > Networks > Reset Network

This option resets the wired or wireless print server and saves any changes that you made to any network settings. You must reset the print server to allow changes to the network settings to take effect.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.



Related ZPL command(s): ~WR

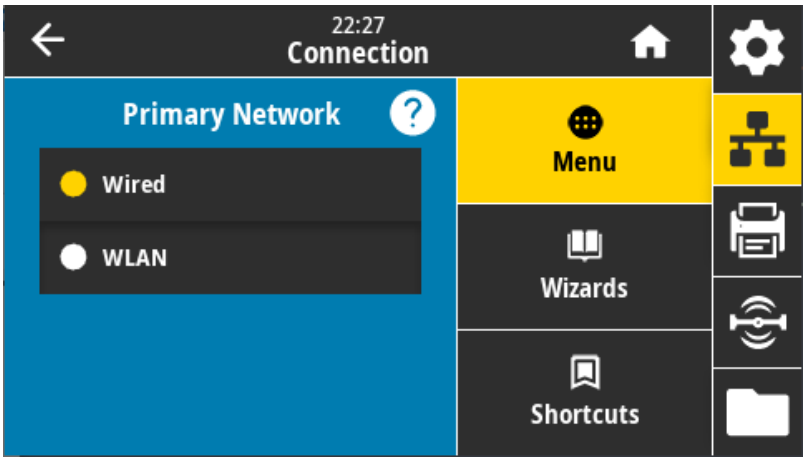
SGD command used: `device.reset`

Printer web page: **Print Server Settings** > **Reset Print Server**

Connection > Networks > Primary Network

View or modify whether the wired or wireless print server is considered primary. You have the ability to select the primary.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.



Accepted values: Wired, WLAN

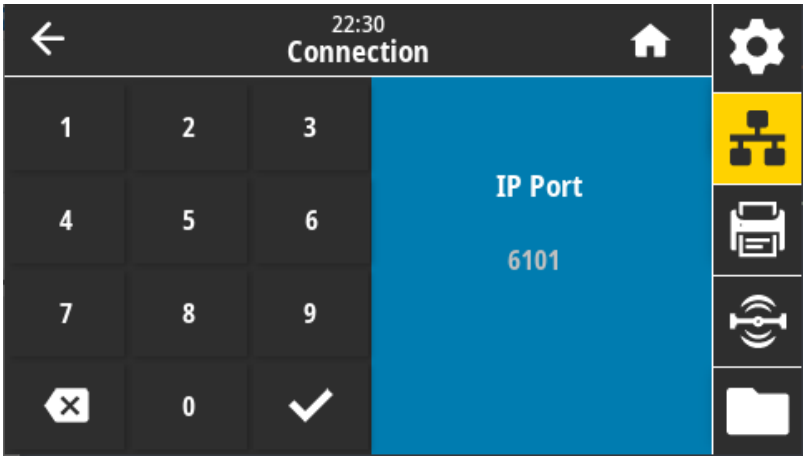
Related ZPL command(s): ^NC

SGD command used: `ip.primary_network`

Connection > Networks > IP Port

This printer setting refers to the internal wired print server's port number that the TCP print service is listening on. Normal TCP communications from the host should be directed to this port.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.



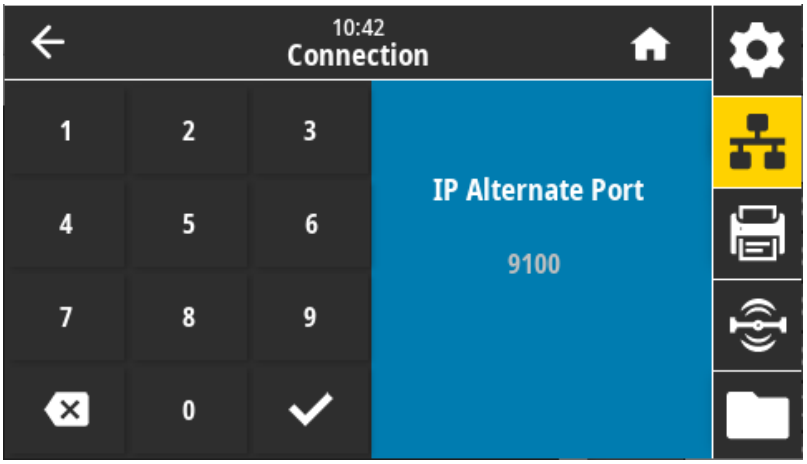
SGD command used: `internal_wired.ip.port`

Printer web page: **View and Modify Printer Settings** > **Network Communications Setup** > **TCP/IP Settings**

Connection > Networks > IP Alternate Port

This command sets the port number of the alternate TCP port. Print servers supporting this command will monitor both the primary port and the alternate port for connections at the same time.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.



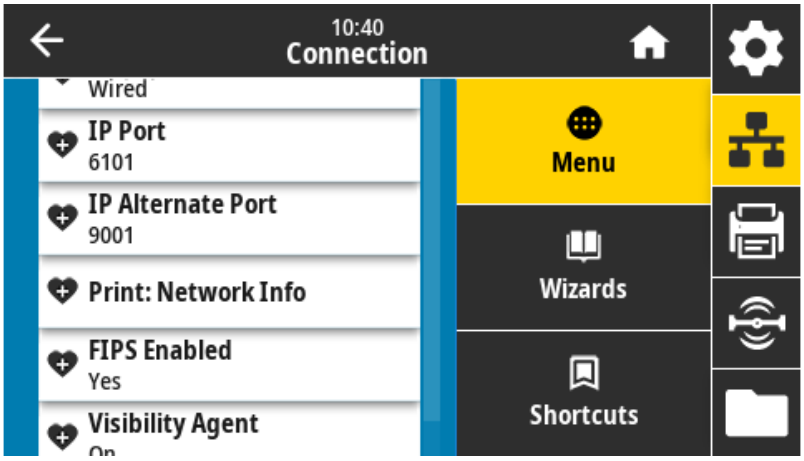
SGD command(s) used:

- `internal_wired.ip.port_alternate`
- `wlan.ip.port_alternate`

Printer web page: **View and Modify Printer Settings** > **Network Communications Setup** > **TCP/IP Settings**

Connection > Networks > Print: Network Info

Prints the settings for any print server or Bluetooth device that is installed.



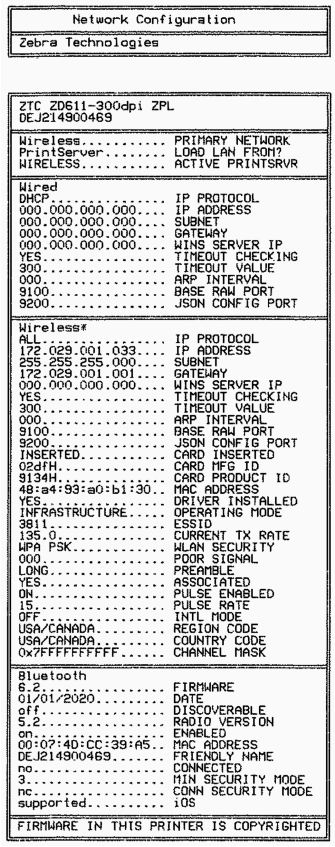
Related ZPL command(s): ~WL

Control panel key(s):

- During printer power-up, hold **CANCEL** down for two seconds.
- While the printer is in Ready state, press and hold **FEED** + **CANCEL** simultaneously for two seconds.

The printer prints the Network Configuration label.

Printer web page: **View and Modify Printer Settings** > **Print Listings on Label**



```
Network Configuration
Zebra Technologies

ZTC ZD611-300dpi ZPL
DEJ214900469

Wireless.......... PRIMARY NETWORK
PrintServer....... LOAD LAN FROM?
WIRELESS.......... ACTIVE PRINTSRVR

Wired
DHCP.............. IP PROTOCOL
000.000.000.000... IP ADDRESS
000.000.000.000... SUBNET
000.000.000.000... GATEWAY
000.000.000.000... WINS SERVER IP
YES............... TIMEOUT CHECKING
300............... TIMEOUT VALUE
000............... ARP INTERVAL
9100.............. BASE RAW PORT
9200.............. JSON CONFIG PORT

Wireless*
ALL............... IP PROTOCOL
172.029.001.033... IP ADDRESS
255.255.255.000... SUBNET
172.029.001.001... GATEWAY
000.000.000.000... WINS SERVER IP
YES............... TIMEOUT CHECKING
300............... TIMEOUT VALUE
000............... ARP INTERVAL
9100.............. BASE RAW PORT
9200.............. JSON CONFIG PORT
INSERTED.......... CARD INSERTED
02dfH............. CARD MFG ID
9134H............. CARD PRODUCT ID
48:a4:93:a0:b1:30.. MAC ADDRESS
YES............... DRIVER INSTALLED
INFRASTRUCTURE.... OPERATING MODE
3811.............. ESSID
135.0............. CURRENT TX RATE
WPA PSK........... WLAN SECURITY
000............... POOR SIGNAL
LONG.............. PREAMBLE
YES............... ASSOCIATED
ON................ PULSE ENABLED
15................ PULSE RATE
OFF............... INTL MODE
USA/CANADA........ REGION CODE
USA/CANADA........ COUNTRY CODE
0x7FFFFFFFFF...... CHANNEL MASK

Bluetooth
6.2............... FIRMWARE
01/01/2020........ DATE
off............... DISCOVERABLE
5.2............... RADIO VERSION
on................ ENABLED
00:07:4D:CC:39:A5.. MAC ADDRESS
DEJ214900469...... FRIENDLY NAME
no................ CONNECTED
3................. MIN SECURITY MODE
nc................ CONN SECURITY MODE
supported......... iOS

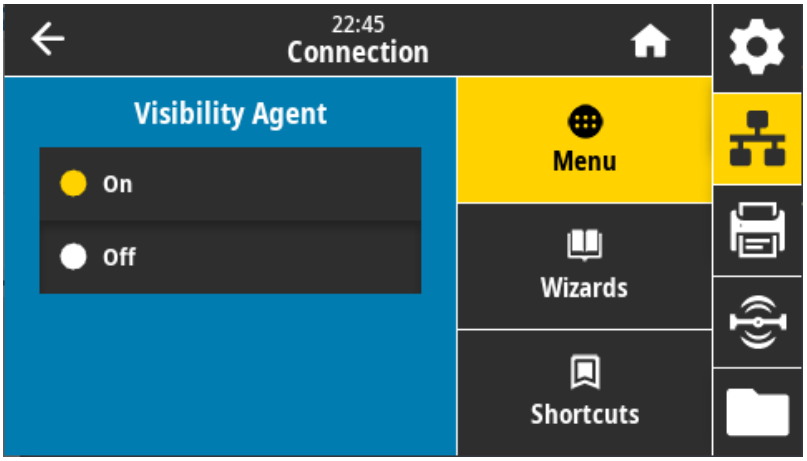
FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

Connection > Networks > Visibility Agent

When connected to a wired or wireless network, the printer will try and connect to Zebra's Asset Visibility Service, through the cloud-based Zebra printer connector. To opt out of the feature, disable this setting.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

The printer uses an encrypted, certificate-authenticated, web-socket connection to send discovery, settings, and alerts data. It does NOT transmit data printed using label formats.



Accepted values: ON, OFF

SGD command used: `weblink.zebra_connector.enable`

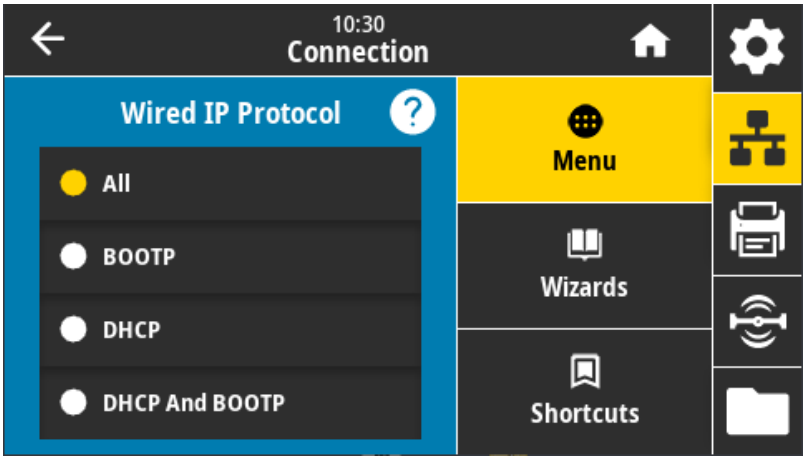
Printer web page: **View and Modify Printer Settings** > **Network Configuration** > **Cloud Connect Settings**

For more information, see the application note titled “Opting Out of the Asset Visibility Agent,” which is available through search on zebra.com/support.

Connection > Wired > Wired IP Protocol

The wired print server's IP address can be set by you ("permanent") or be selected by the server ("dynamic"). When a dynamic option is chosen, this parameter specifies the method(s) by which the print server receives the IP address from the server.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.



You must reset the print server to allow changes to the network settings to take effect. See Connection Networks Reset Network on page 98.

Accepted values: ALL, GLEANING ONLY, RARP, BOOTP, DHCP, DHCP & BOOTP, PERMANENT

Related ZPL command(s): `^ND`

SGD command used: `internal_wired.ip.protocol`

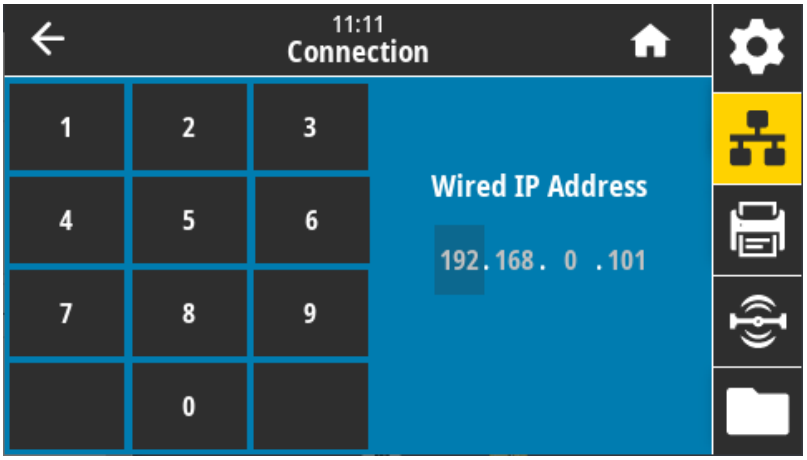
Printer web page: **View and Modify Printer Settings** > **Network Communications Setup** > **TCP/IP Settings**

Connection > Wired > Wired IP Address

View and, if necessary, change the printer's wired IP address.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

To save any changes you make to this setting, set **Connection** > **Wired** > **Wired IP Protocol** to PERMANENT. Then reset the print server (see Connection Networks Reset Network on page 98).



Accepted values: 000 to 255 (for each field)

Related ZPL command(s): ^ND

SGD command used: `internal_wired.ip.addr`

Printer web page: **View and Modify Printer Settings** > **Network Communications Setup** > **TCP/IP Settings**

Connection > Wired > Wired Subnet

View and, if necessary, change the wired subnet mask.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

To save changes to this setting, set **Connection** > **Wired** > **Wired IP Protocol** to *PERMANENT*, and then reset the print server (see **Connection** > **Networks** > **Reset Network**).

Accepted values:
000 to 255 for each field

Related ZPL command(s):
^ND

SGD command used:
`internal_wired.ip.netmask`

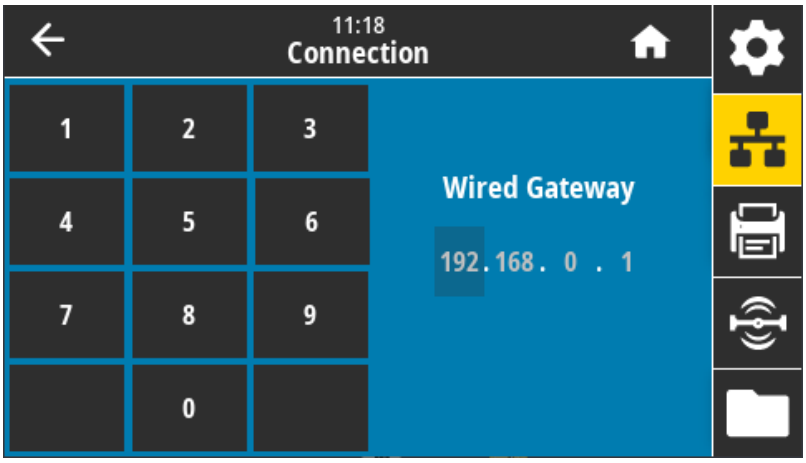
Printer web page:
View and Modify Printer Settings > **Network Communications Setup** > **TCP/IP Settings**

Connection > Wired > Wired Gateway

Use this screen to view and if necessary change the default wired gateway.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

To save any changes you make to this setting, set **Connection** > **Wired** > **Wired IP Protocol to PERMANENT**. Then reset the print server (see Connection Networks Reset Network on page 98).



Accepted values: 000 to 255 (for each field)

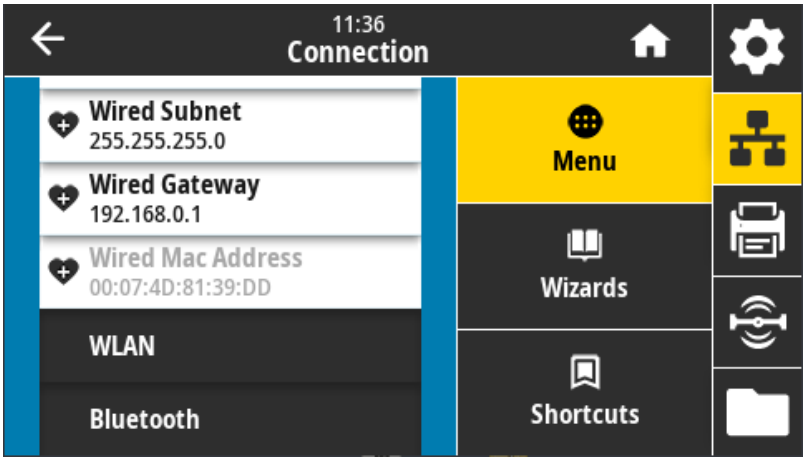
Related ZPL command(s): ^ND

SGD command used: `internal_wired.ip.gateway`

Printer web page: **View and Modify Printer Settings** > **Network Communications Setup** > **TCP/IP Settings**

Connection > Wired > Wired Mac Address

View the Media Access Control (MAC) address of the wired print server. This value cannot be modified.



SGD command used: `internal_wired.mac_addr`

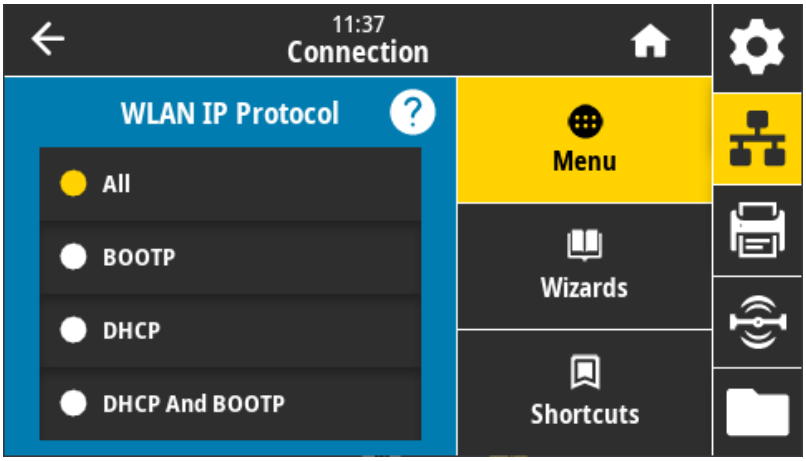
Printer web page: **View and Modify Printer Settings** > **Network Communications Setup** > **TCP/IP Settings**

Connection > WLAN > WLAN IP Protocol

You can set the wireless print server's IP address ("permanent") or the server can set it ("dynamic") . When a dynamic option is chosen, this parameter tells the method(s) by which this print server receives the IP address from the server.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

You must reset the print server to allow changes to the network settings to take effect (see Connection Networks Reset Network on page 98).



Accepted values: ALL, GLEANING ONLY, RARP, BOOTP, DHCP, DHCP & BOOTP, PERMANENT

Related ZPL command(s): ^ND

SGD command used: `wlan.ip.protocol`

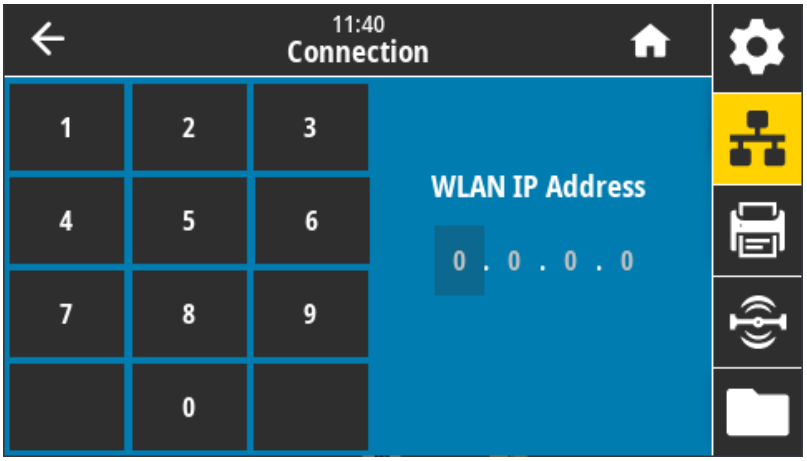
Printer web page: **View and Modify Printer Settings** > **Network Communications Setup** > **Wireless Setup**

Connection > WLAN > WLAN IP Address

Use this screen to view and if necessary change the printer's wireless IP address.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

To save changes to this setting, set **Connection** > **WLAN** > **WLAN IP Protocol** to PERMANENT. Then reset the print server. See Connection Networks Reset Network on page 98.



Accepted values: 000 to 255 (for each field)

Related ZPL command(s): ^ND

SGD command used:

- `ip.addr`
- `wlan.ip.addr`

Printer web page:

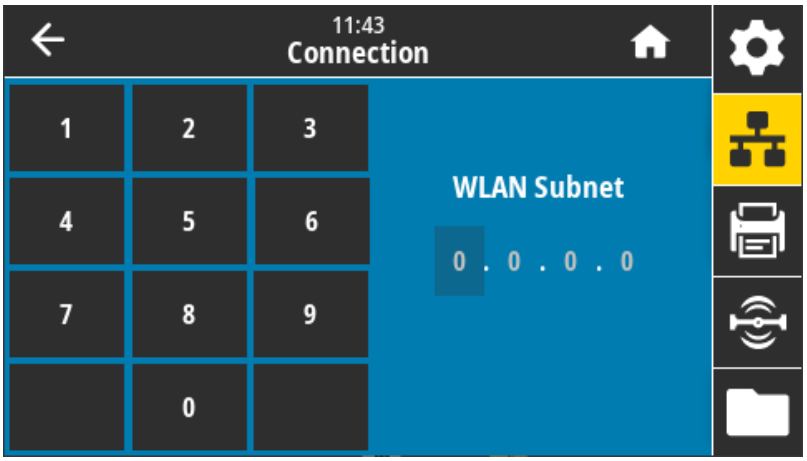
View and Modify Printer Settings > **Network Communications Setup** > **Wireless Setup**

Connection > WLAN > WLAN Subnet

Use this screen to view and if necessary change the wireless subnet mask.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

To save changes to this setting, set **Connection** > **WLAN** > **WLAN IP Protocol**. to PERMANENT. Then reset the print server. See Connection Networks Reset Network on page 98.



Accepted values: 000 to 255 (for each field)

Related ZPL command(s): ^ND

SGD command used: `wlan.ip.netmask`

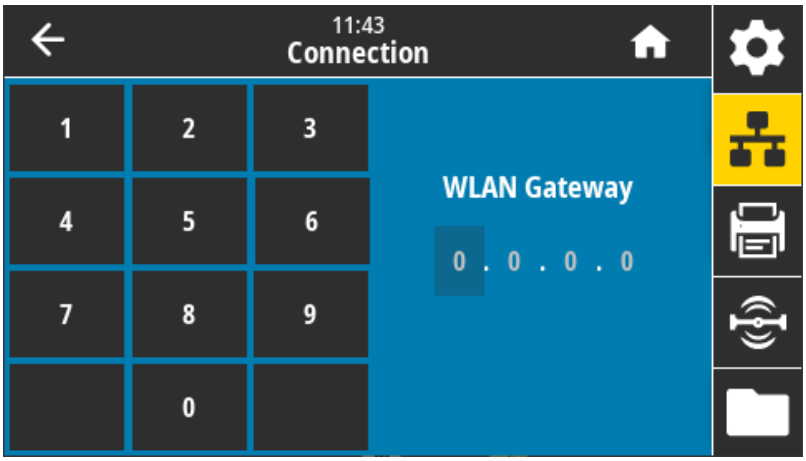
Printer web page: **View and Modify Printer Settings** > **Network Communications Setup** > **Wireless Setup**

Connection > WLAN > WLAN Gateway

View and, if necessary, change the default wireless gateway.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

To save changes you make to this setting, set **Connection** > **WLAN** > **WLAN IP Protocol** to PERMANENT. Then reset the print server. See Connection Networks Reset Network on page 98.



Accepted values: 000 to 255 (for each field)

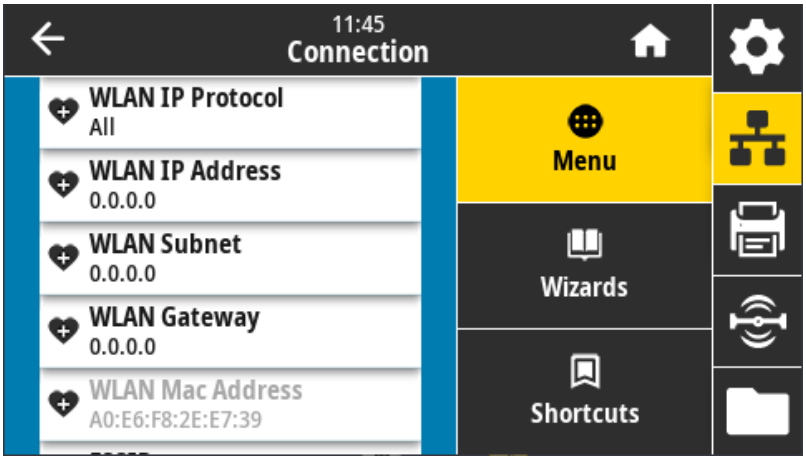
Related ZPL command(s): `^ND`

SGD command used: `wlan.ip.gateway`

Printer web page: **View and Modify Printer Settings** > **Network Communications Setup** > **Wireless Setup**

Connection > WLAN > WLAN Mac Address

View the Media Access Control (MAC) address of the wireless print server. This value cannot be modified.



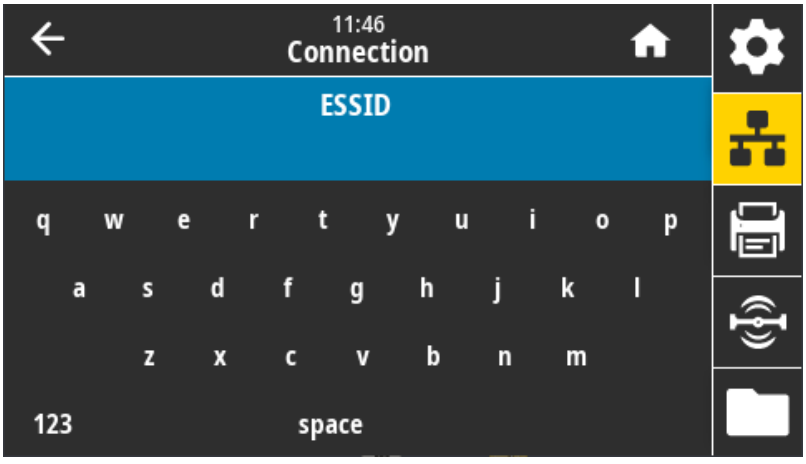
SGD command used: `wlan.mac_addr`

Printer web page: **View and Modify Printer Settings** > **Network Communications Setup** > **Wireless Setup**

Connection > WLAN > ESSID

The Extended Service Set Identification (ESSID) is an identifier for your wireless network. Specify the ESSID for the current wireless configuration.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.



Accepted values: 32-character alphanumeric string (default: 125)

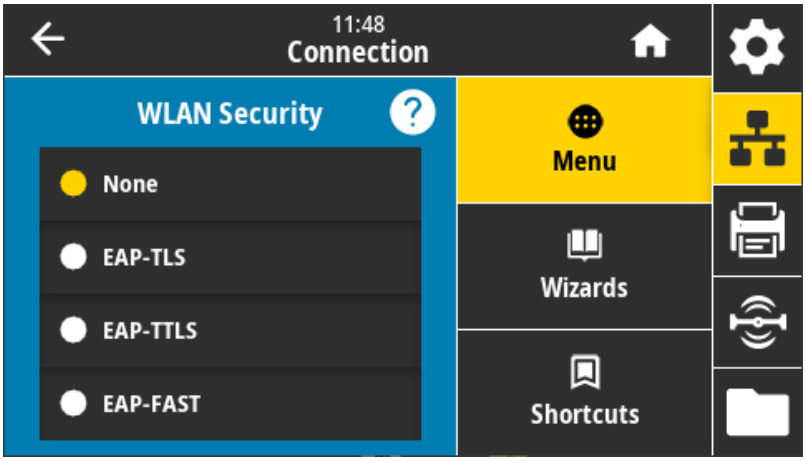
SGD command used: `wlan.essid`

Printer web page: **View and Modify Printer Settings** > **Network Communications Setup** > **Wireless Setup**

Connection > WLAN > WLAN Security

Select the security type being used on your WLAN.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.



Related ZPL command(s): ^WX

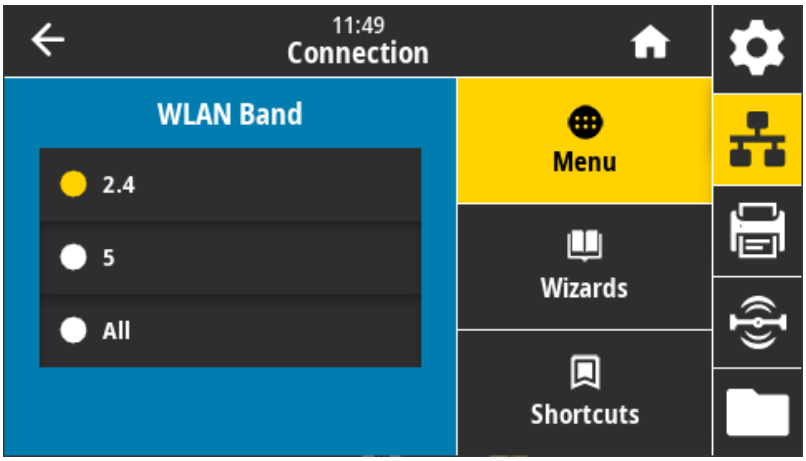
SGD command used: `wlan.security`

Printer web page: **View and Modify Printer Settings** > **Network Communications Setup** > **Wireless Encryption Setup**

Connection > WLAN > WLAN Band

Set a preferred band to connect with via Wi-Fi.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.



Accepted values: 2.4, 5, None

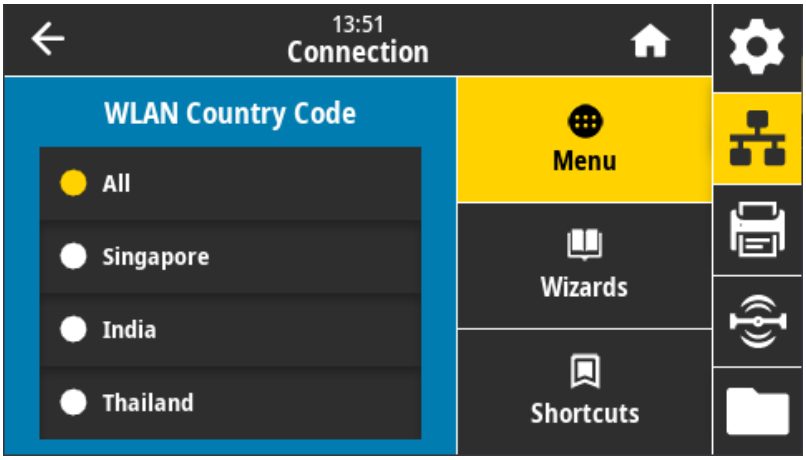
SGD command used: `wlan.band_preference`

Printer web page: **View and Modify Printer Settings** > **Network Communications Setup** > **Wireless Setup**

Connection > WLAN > WLAN Country Code

The country code defines the regulatory country for which the wireless radio is currently configured.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.



NOTE: The list of country codes is specific to each printer. It depends on the printer model and the wireless radio configuration of the printer. This list is subject to change, addition, or deletion with any firmware update, at any time, without notice.

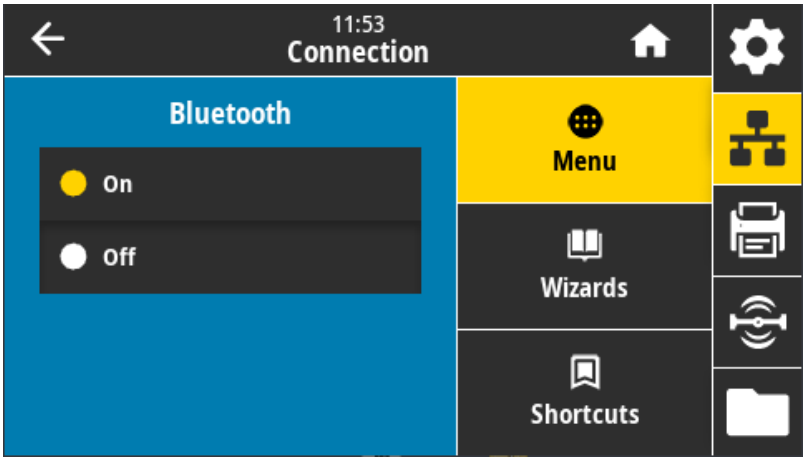
To determine the country codes available on your printer, issue the `! U1 getvar "wlan"` command to return all commands related to WLAN settings. Locate the `wlan.country.code` string in the results and view the country codes available for your printer.

SGD command used: `wlan.country_code`

Connection > Bluetooth > Bluetooth

Select if the printer is “Discoverable” for Bluetooth device pairing.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.



Accepted values:

- ON—Enables the Bluetooth radio.
- OFF—Disables the Bluetooth radio.

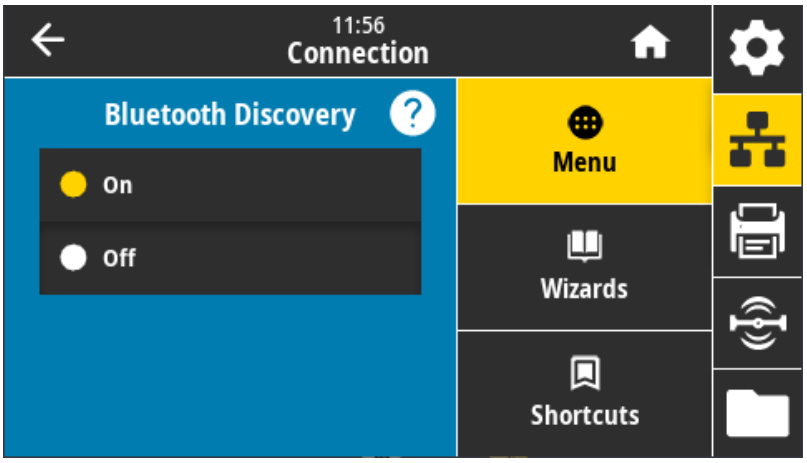
SGD command used: `bluetooth.enable`

Connection > Bluetooth > Bluetooth Discovery

Use this parameter to specify if the printer is “discoverable” for Bluetooth device pairing.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

NOTE: For security, leave this set to OFF when Bluetooth is not in use.



Accepted values:

- ON—Enables Bluetooth discoverable mode.
- OFF—Disables Bluetooth discoverable mode.

SGD command used: `bluetooth.discoverable`

Connection > Bluetooth > Friendly Name

This command sets the friendly name, which is used during service discovery.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

For changes to take effect, turn printer power OFF and then ON. Alternatively, issue the `device.reset` command.

Another way to reset the network is to use the Reset Network menu option. See Connection Networks Reset Network on page 98.

If you do not set a friendly name for the printer for easier discovery, the name defaults to the printer serial number.



Accepted value: 17-character text string

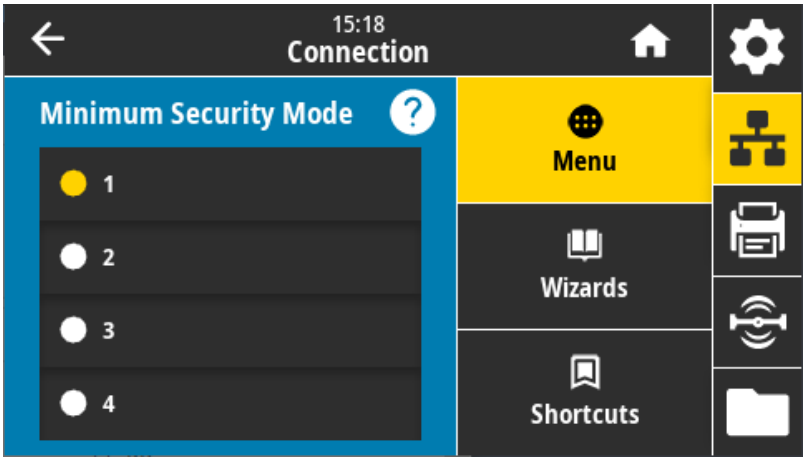
SGD command used: `bluetooth.friendly_name`

Connection > Bluetooth > Minimum Security Mode

This printer setting establishes the Minimum Security mode for Bluetooth connections.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

The Minimum Security Mode provides for various levels of security, depending on the printer radio version and printer firmware.



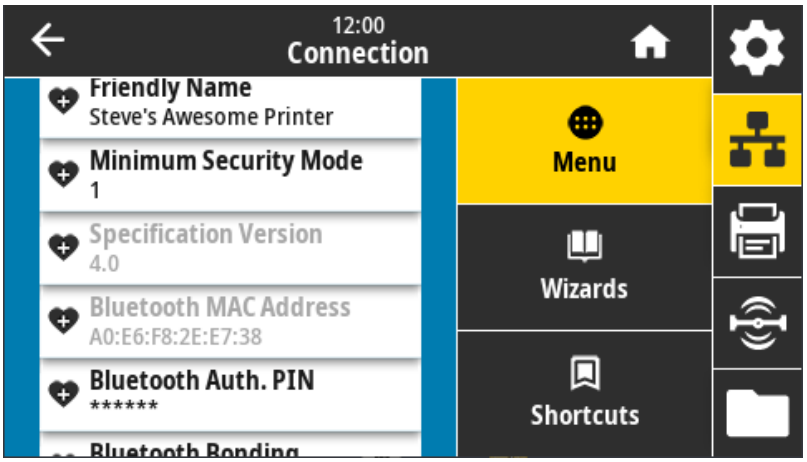
For details, refer to the Zebra Programming Guide at zebra.com/manuals.

Accepted values: 1, 2, 3, 4

SGD command used: `bluetooth.minimum_security_mode`

Connection > Bluetooth > Specification Version

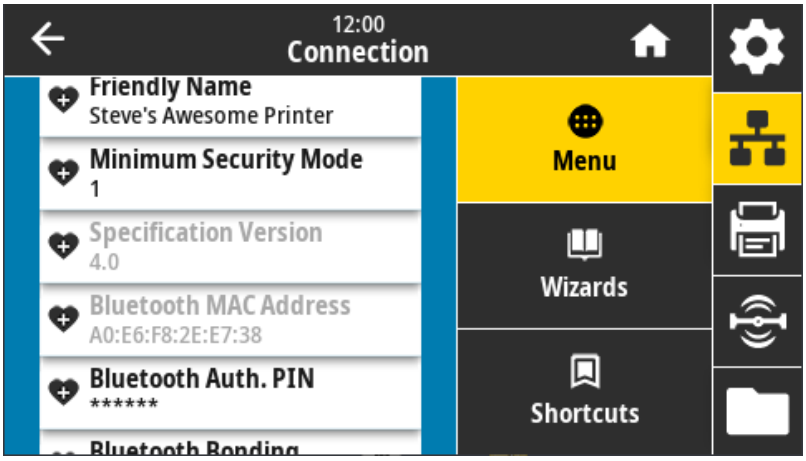
This parameter displays the Bluetooth library version number.



SGD command used: `bluetooth.version`

Connection > Bluetooth > MAC Address

This parameter displays the Bluetooth device address.

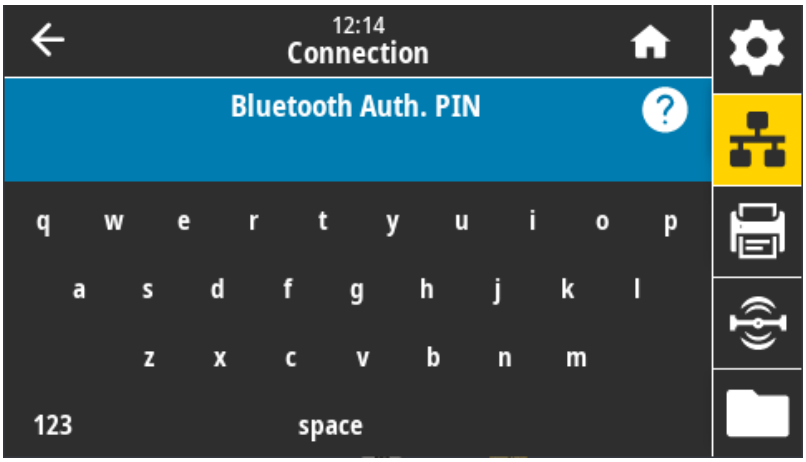


SGD command used: `bluetooth.address`

Connection > Bluetooth > Bluetooth Auth. PIN

This parameter displays the Bluetooth device address.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.



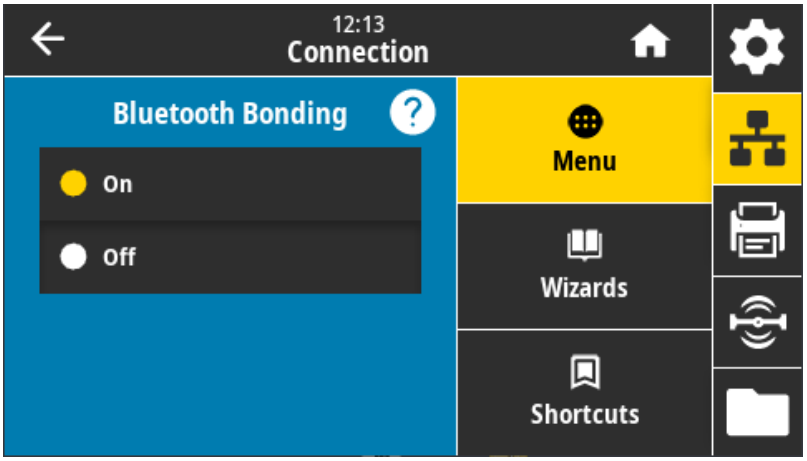
SGD command(s) used:

- To set the PIN: `bluetooth.bluetooth_pin`
- To enable authentication using the PIN: `bluetooth.authentication`

Connection > Bluetooth > Bluetooth Bonding

This setting is used to specify if the Bluetooth stack will “bond” or will save link keys for devices that successfully connect to the printer.

NOTE: For printers with Protected Mode enabled, you cannot modify this setting from the front panel. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.



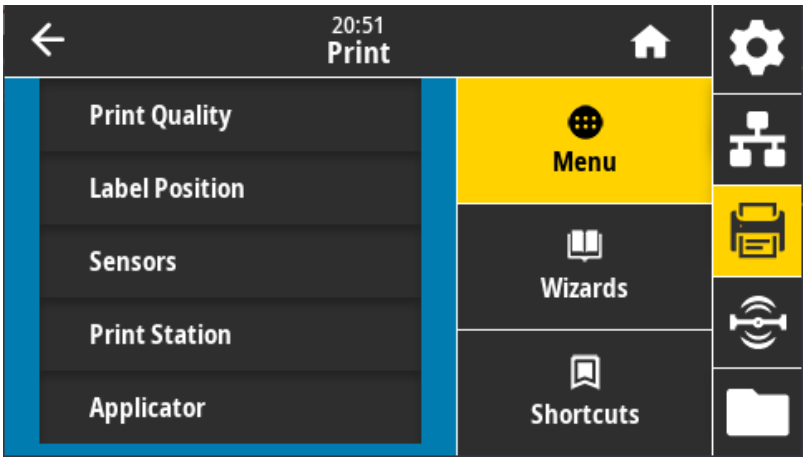
Accepted values:

- ON—Enables Bluetooth bonding.
- OFF—Disables Bluetooth bonding.

SGD command used: `bluetooth.bonding`

Print Menu

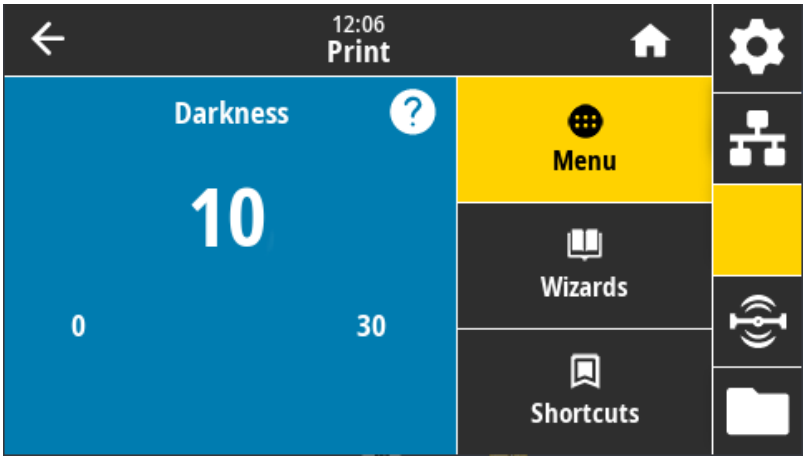
Use this menu to set and change print settings such as print darkness, speed, and size.



Print > Print Quality > Darkness

Set the print darkness to the lowest setting that provides good print quality.

If you set the darkness too high, the label image may print unclearly, barcodes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely.



Accepted values: 0.0 to 30.0

Related ZPL command(s):

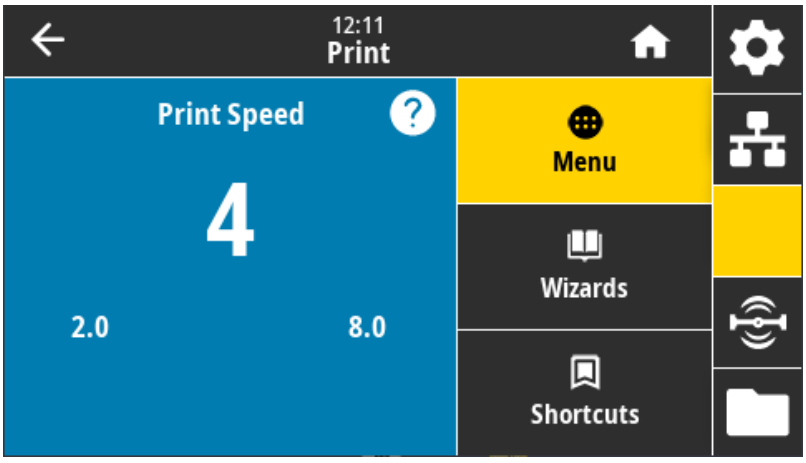
- ^MD
- ~SD

SGD command used: `print.tone`

Printer web page: **View and Modify Printer Settings** > **General Setup** > **Darkness**

Print > Print Quality > Print Speed

Select the speed in inches per second (ips), for printing a label. Slower print speeds typically yield better print quality.



Accepted values:

- ZD621 203 dpi = 2 to 8 ips

- ZD621 300 dpi = 2 to 6 ips

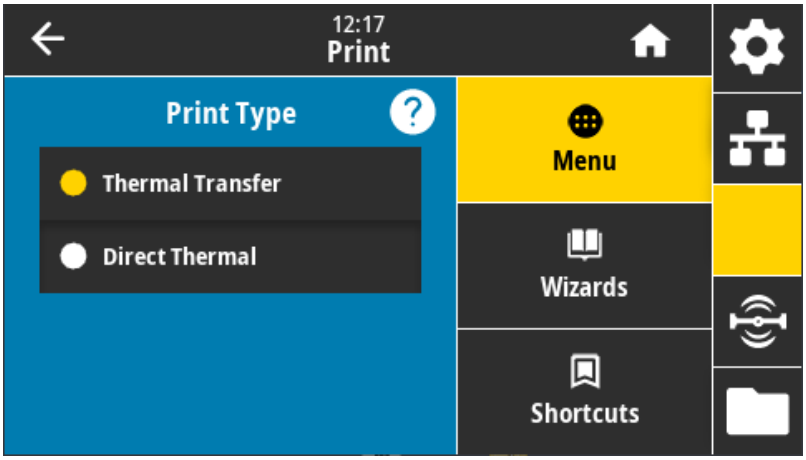
Related ZPL command(s): ^PR

SGD command used: `media.speed`

Printer web page: **View and Modify Printer Settings** > **General Setup** > **Print Speed**

Print > Print Quality > Print Type

Specify if the printer needs to use ribbon for printing.



Accepted values:

- Thermal Transfer—Uses ribbon and thermal transfer media.
- Direct Thermal—Uses direct thermal media and no ribbon.

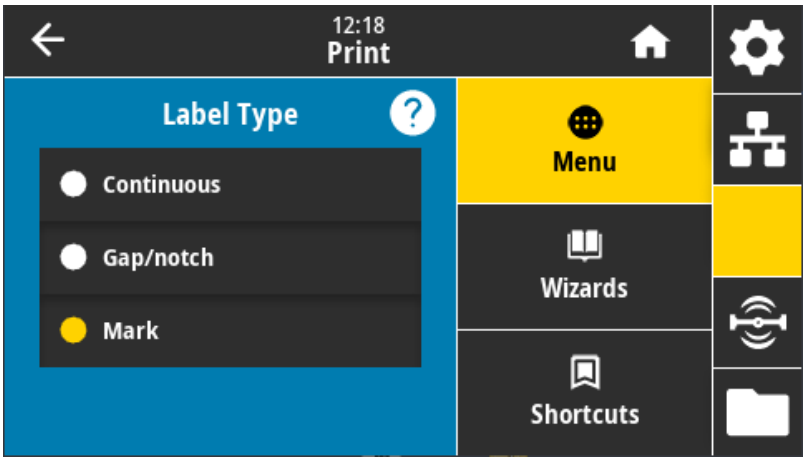
Related ZPL command(s): ^MT

SGD command used: `ezpl.print_method`

Printer web page: **View and Modify Printer Settings** > **Media Setup** > **Print Method**

Print > Print Quality > Label Type

Select the type of media that you are using.



If you select Continuous, you must include a label length (see Print Print Quality Label Length on page 118) in your label format layout (`^LL` if you are using ZPL).

If you select Gap/Notch or Mark for various non-continuous media, the printer feeds the media to calculate the label length.

Accepted values: Continuous, Gap/Notch, Mark

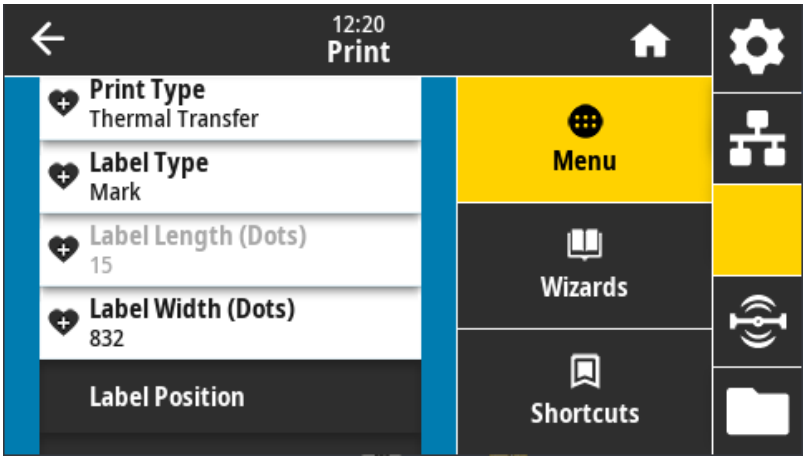
Related ZPL command: `^MN`

SGD command used: `ezpl.media_type`

Printer web page: **View and Modify Printer Settings** > **Media Setup** > **Media Type**

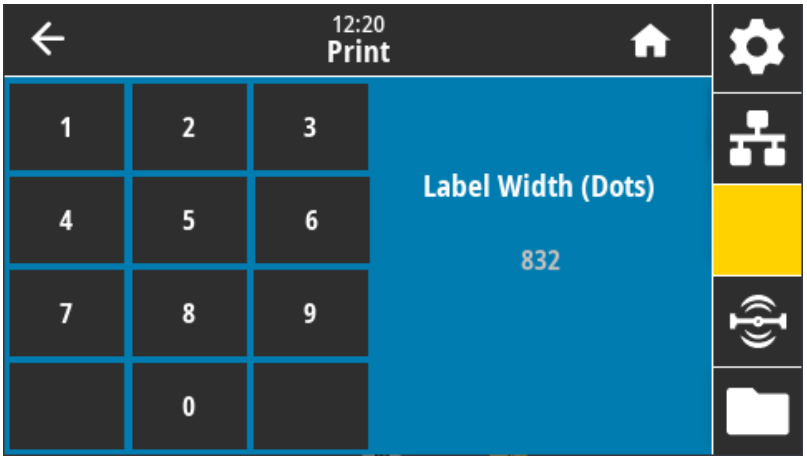
Print > Print Quality > Label Length

View the calibrated label length in dots. This value cannot be modified.



Print > Print Quality > Label Width (Dots)

Specify the width of the labels being used, in dots. The default value is the maximum width for the printer, based on the printhead's DPI value.



Setting the width too narrow can result in portions of a label format not being printed on the media.

Setting the width too wide wastes formatting memory and can cause the printer to print outside the label edges and onto the platen roller.

NOTE: This setting can affect the horizontal position of the label format if the image was inverted using the ^POI ZPL command.

Accepted values: ZD621 203 dpi = 0002 to 832 dots

ZD621 300 dpi = 0002 to 1280* dots

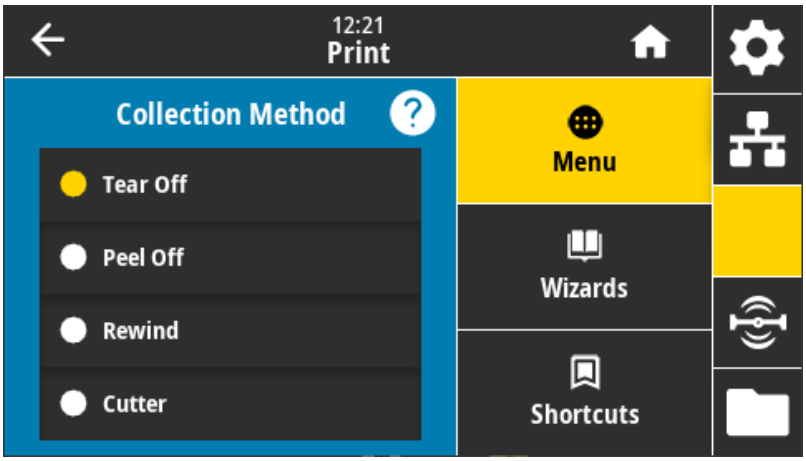
Related ZPL command(s): ^PW

SGD command used: `ezpl.print_width`

Printer web page: **View and Modify Printer Settings** > **Media Setup** > **Print Width**

Print > Label Position > Collection Method

Select a collection method that is compatible with the options available on your printer.



Accepted values: Tear Off, Peel Off, Rewind, Cutter, Delayed Cut, Linerless Peel, Linerless Rewind, Linerless Tear, Applicator, Linerless Cut, Linerless Delayed Cut

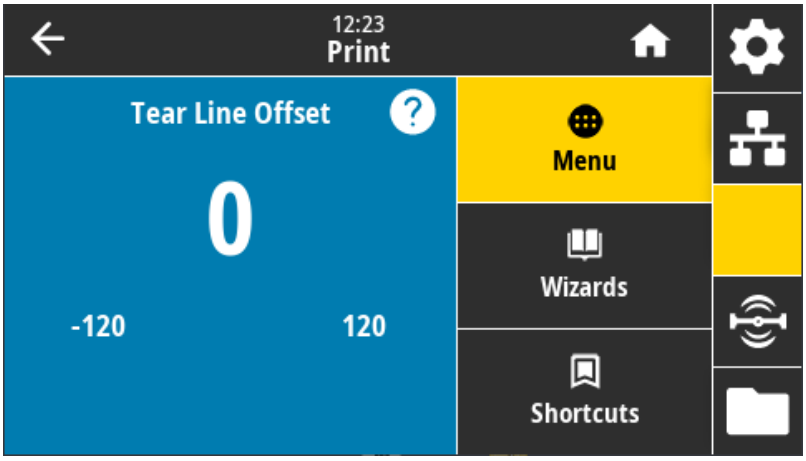
Related ZPL command(s): ^MM

SGD command used: `media.printmode`

Printer web page: **View and Modify Printer Settings** > **General Setup** > **Print Mode**

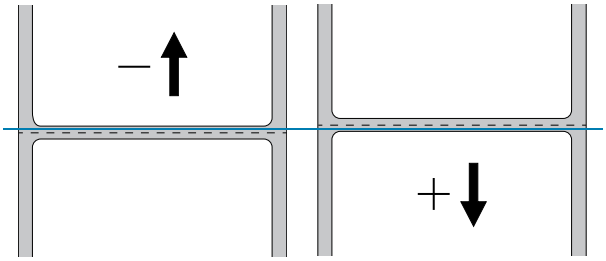
Print > Label Position > Tear Line Offset

Set the position where the printer stops for tear-off label removal.



If necessary, shift the position of the media over the tear-off feature after printing.

- Lower numbers move the media into the printer by the specified number of dots (the tear line moves closer to the edge of the label just printed)
- Higher numbers move the media out of the printer (the tear line moves closer to the leading edge of the next label).



Accepted values: –120 to +120

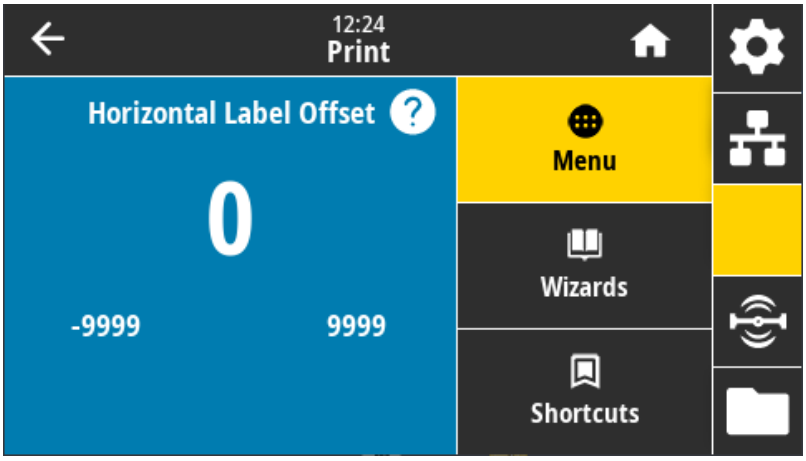
Related ZPL command(s): ~TA

SGD command used: `media.printmode`

Printer web page: **View and Modify Printer Settings** > **General Setup** > **Tear Off**

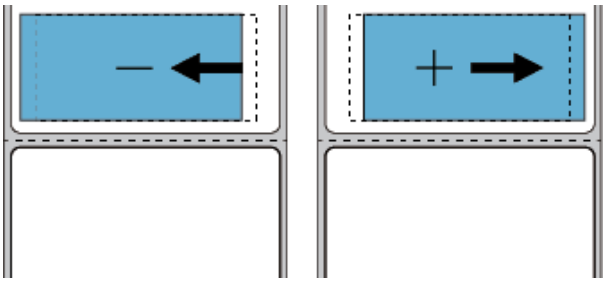
Print > Label Position > Horizontal Label Offset

If necessary, shift the position of the image horizontally on the label.



If necessary, shift the horizontal position of the print on the media.

- Negative numbers move the left edge of the image toward the left edge of the label by the number of dots selected.
- Positive numbers move the edge of the image toward the right edge of the label.



Accepted values: –9999 to 9999

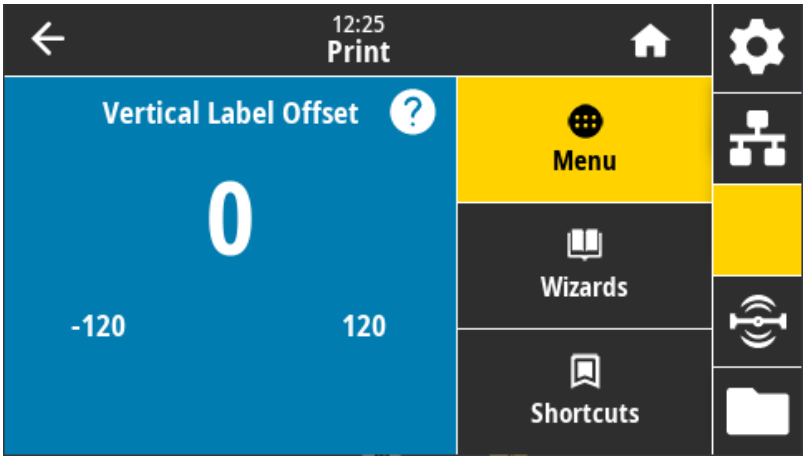
Related ZPL command(s): ^LS

SGD command used: `zpl.left_position`

Printer web page: **View and Modify Printer Settings** > **Advanced Setup** > **Left Position**

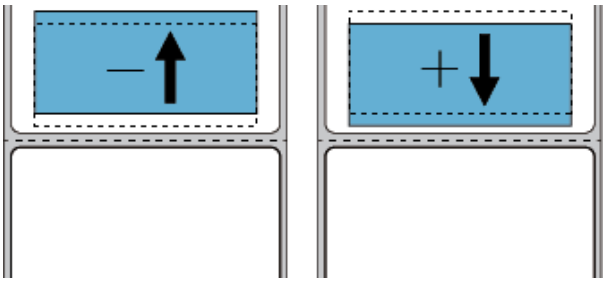
Print > Label Position > Vertical Label Offset

If necessary, use this parameter to shift the position of the image vertically on the label.



If necessary, shift the position horizontal of the print on the media.

- Lower numbers move the image higher on the label (toward the printhead).
- Higher numbers move the image farther down on the label (away from the printhead) by the specified number of dots.



Accepted values: -120 to 120

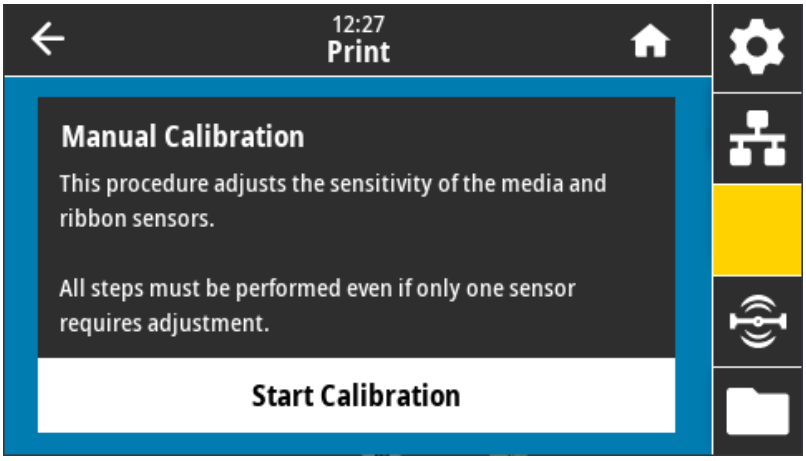
Related ZPL command(s): `^LT`

SGD command used: `zpl.top_position`

Printer web page: **View and Modify Printer Settings** > **Advanced Setup** > **Label Top**

Print > Sensors > Manual Calibration

This wizard that interactively steps you through a manual calibration of media sensor settings. Manually calibrate the printer as needed to adjust the sensitivity of the media and ribbon sensors.



For complete instructions on how to perform a calibration procedure, see Manually Calibrating Media on page 299.

Related ZPL command(s): `~JC`

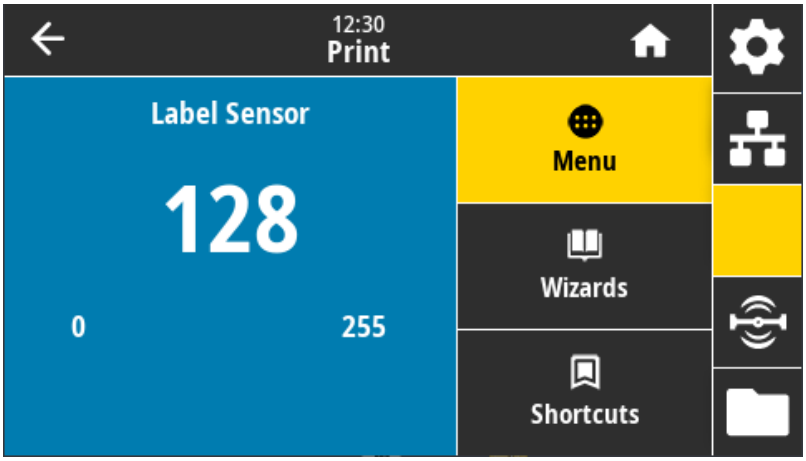
SGD command used: `ezpl.manual_calibration`

Control panel key(s): To initiate the calibration, press and hold **PAUSE** + **FEED** + **CANCEL** simultaneously for two seconds.

Print > Sensors > Label Sensor

This screen shows the sensitivity level of the label sensor which is typically set by the printer during the calibration process.

NOTE: Do NOT change these settings unless you are told to do so by Zebra Technical Support or by an authorized service technician.



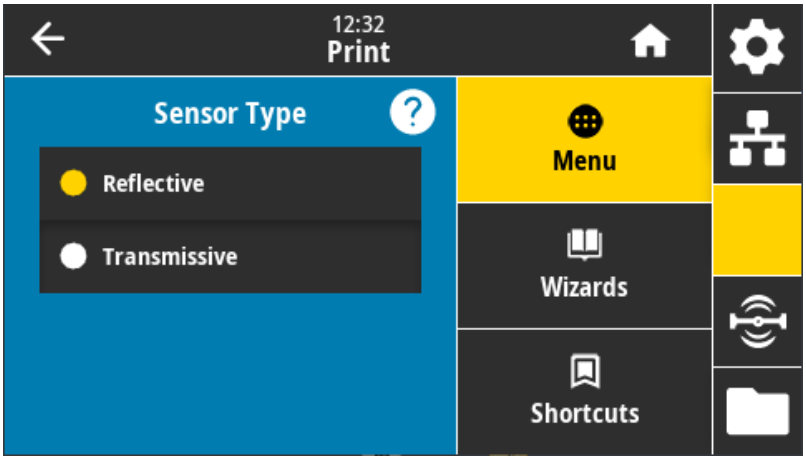
Range of values: 0 to 255

SGD command used: `ezpl.label_sensor`

Printer web page: **View and Modify Printer Settings** > **Calibration**

Print > Sensors > Sensor Type

Select between transmissive and reflective media sensing based on the media type you plan to use for printing.



Accepted values: REFLECTIVE, TRANSMISSIVE

- **Reflective** — Used when the printer needs to detect black mark/line and notches/holes on the back of media. This is because black markings and holes do not reflect like label liner or paper.
- **Transmissive** (sees-through media and liner) — Used when the printer needs to sense gaps/webs for regular labels and continuous media. These types of media do not have tracking marks or notches.

Related ZPL command(s): `^JS`

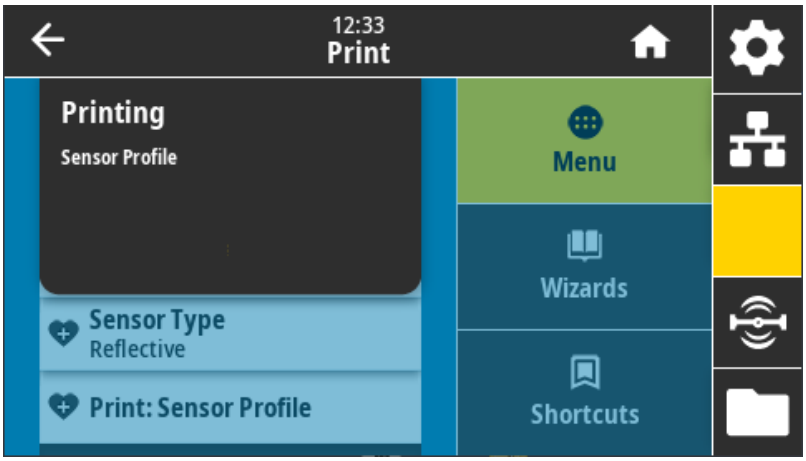
SGD command used: `device.sensor_select`

Printer web page:**View and Modify Printer Settings** > **Media Setup**

Print > Sensors > Print: Sensor Profile

Shows the sensor settings compared to actual sensor readings.

To interpret the results, see Sensor Profile on page 298.



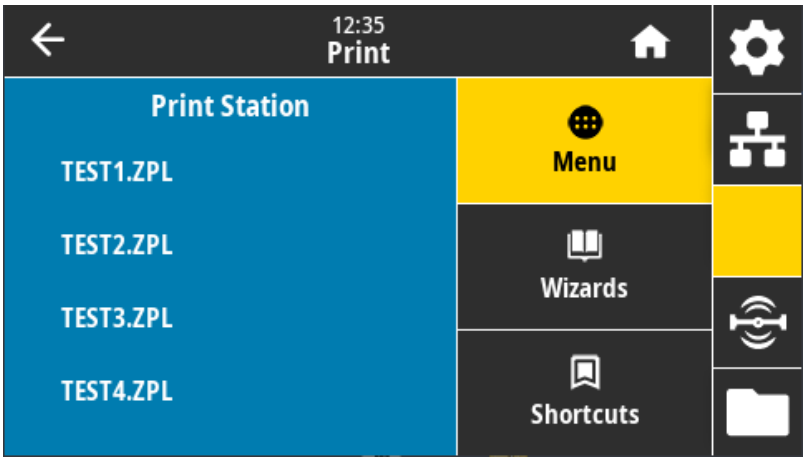
Related ZPL command(s): ~JG

Control panel key(s): During printer power-up, press and hold **FEED** + **CANCEL** simultaneously.

Printer web page: **View and Modify Printer Settings** > **Print Listings on Label**

Print > Print Station

Use this menu item to fill in variable fields in a label format and print the label using a Human Input Device (HID), such as a USB keyboard, scale, or barcode scanner.



IMPORTANT: To use this option, a suitable label format must be stored on the printer's E: drive. See Using the USB Host Port and Near Field Communication (NFC) Capabilities on page 232 and Exercise 5: Enter Data for a Stored File with a Smart Device and Print a Label on page 233 to learn how to use this feature.

When you plug an HID into one of the printer's USB host ports, use this menu to select a form on the printer's E: drive. When you are prompted to fill in each variable ^FN field on the form, you can specify the desired quantity of labels to print.

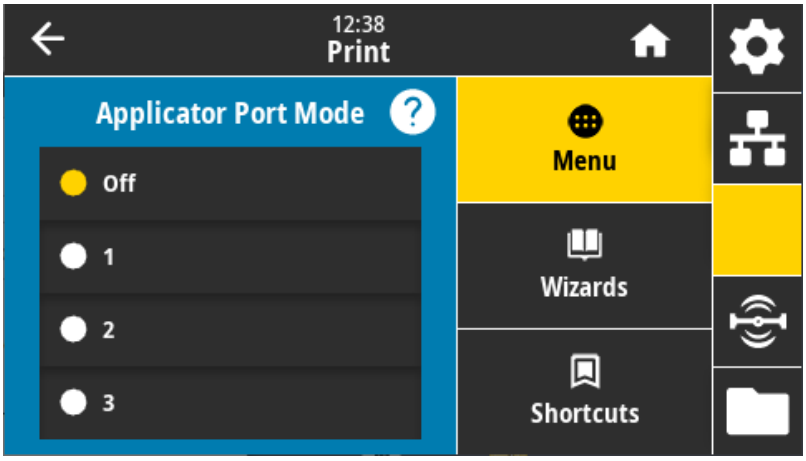
For more information about using the ^FN command or the SGD commands related to this feature, refer to the Zebra Programming Guide at zebra.com/manuals.

SGD command(s) used:

- `usb.host.keyboard_input` (must be set to ON)
- `usb.host.template_list`
- `usb.host.fn_field_list`
- `usb.host.fn_field_data`
- `usb.host.fn_last_field`
- `usb.host.template_print_amount`

Print > Applicator > Applicator Port Mode

Controls the way in which the applicator port's "End Print" signal functions.



Accepted values:

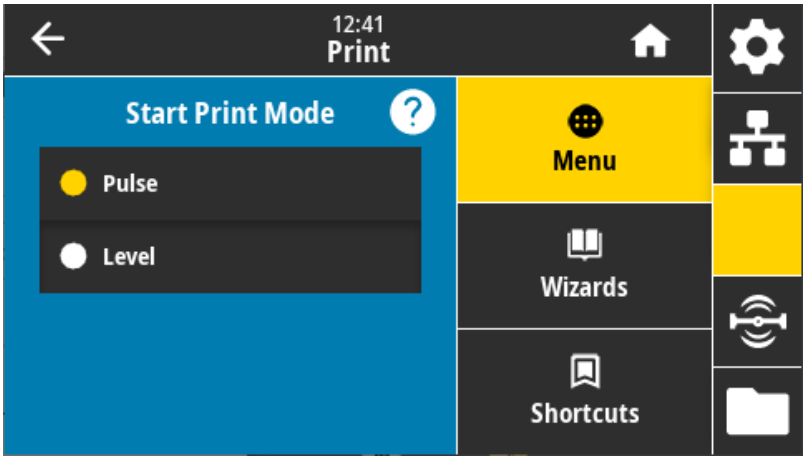
- Off 1 = End Print signal normally high, and low only when the printer is moving the label forward.
- 2 = End Print signal normally low, and high only when the printer is moving the label forward.
- 3 = End Print signal normally high, and low for 20 ms when a label has been printed and positioned.
- 4 = End Print signal normally low, and high for 20 ms when a label has been printed and positioned.

Related ZPL command(s): `^JJ`

SGD command used: `device.applicator.end_print`

Print > Applicator > Start Print Mode

Determines if the applicator port's "Start Print" signal is in level mode or pulse mode.



Accepted values:

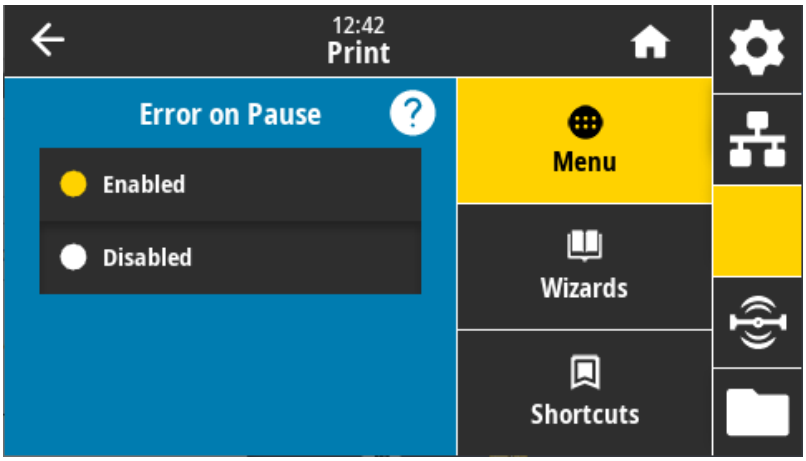
- Pulse — Start Print signal must be disabled before it can be asserted for the next label.
- Level — Start Print signal does not need to be disabled to print the next label. A label prints as long as the Start Print signal is low and a label is formatted correctly.

Related ZPL command(s): `^JJ`

SGD command used: `device.applicator.start_print`

Print > Applicator > Error on Pause

Determines how applicator port errors are treated by the printer. Enabling this feature also causes the "Service Required" pin to be asserted.



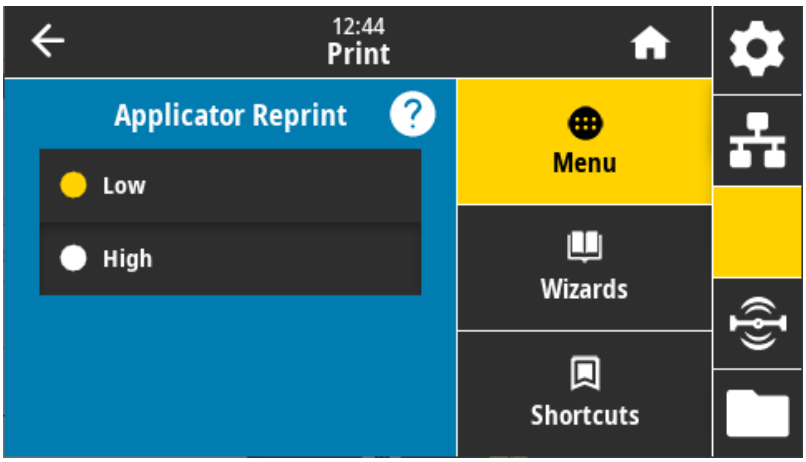
Accepted values: ENABLED, DISABLED

SGD command used: `device.applicator.error_on_pause`

Printer web page: **View and Modify Printer Settings** > **Advanced Setup** > **Error on Pause**

Print > Applicator > Applicator Reprint

This setting specifies if a high or low value is required for an applicator to reprint a label.



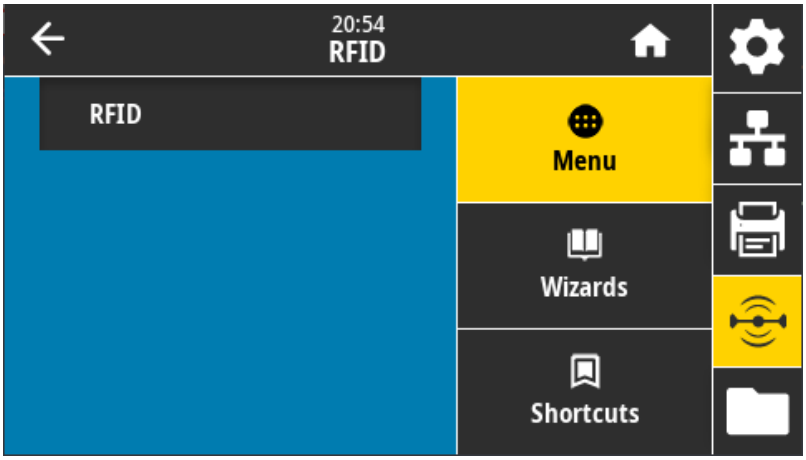
It enables or disables the ~PR command which, when enabled, reprints the last printed label. It also enables the **Reprint** on the Home screen.

Related ZPL command(s): `^JJ, ~PR`

SGD command used: `device.applicator.reprint`

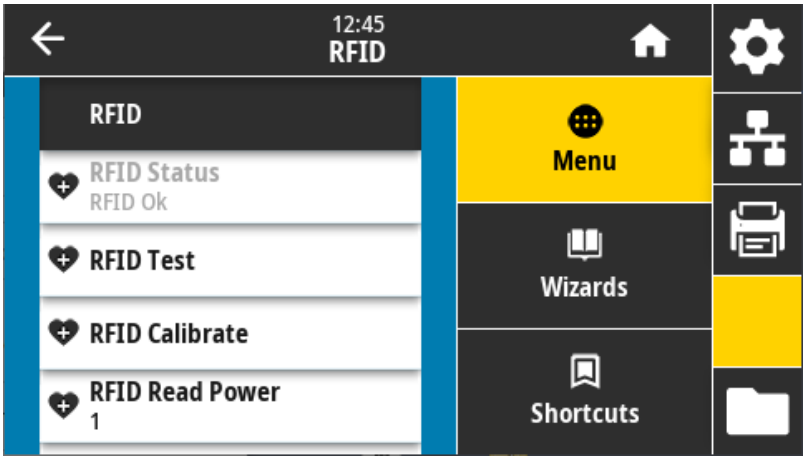
RFID Menu

Use this menu to configure, monitor, and test the RFID subsystem operation.



RFID > RFID Status

Display the status of the RFID subsystem of the printer.

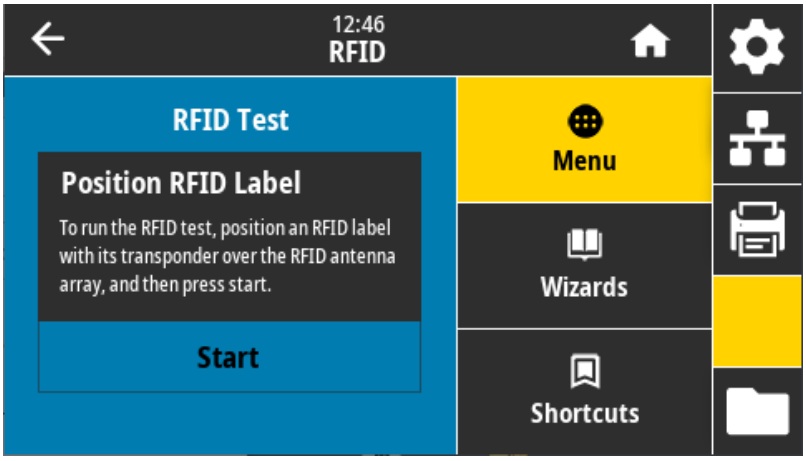


Related ZPL command(s): `^HL, ~HL`

SGD command used: `rfid.error.response`

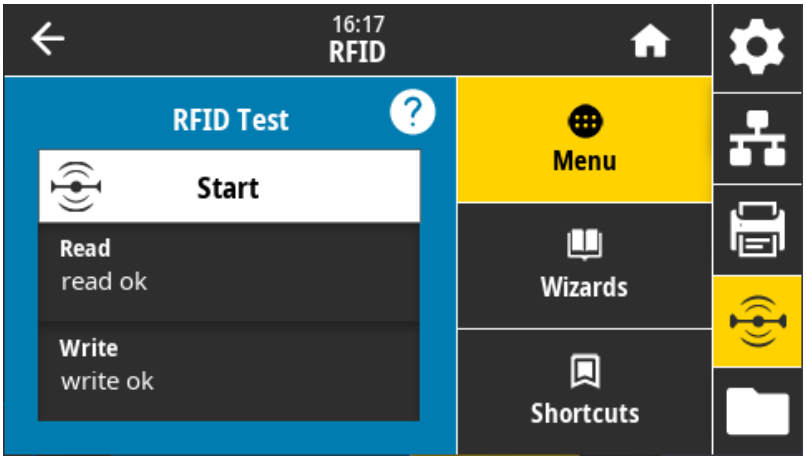
RFID > RFID Test

During the RFID test, the printer attempts to read and write to a transponder. The printer's components do not move during this test.



To test an RFID label, position an RFID label with its transponder above the RFID antenna array. Then touch **Start**.

The results of this test appear on the display when the test is complete.



SGD commands used:

- `rfid.tag.test.content`
- `fid.tag.test.execute`

RFID > RFID Calibrate

Used to initiate tag calibration for RFID media. (This is NOT the same as media and ribbon calibration.)

During the process, the printer moves the media, calibrates the RFID tag position, and determines the optimal settings for the RFID media being used. These settings include:

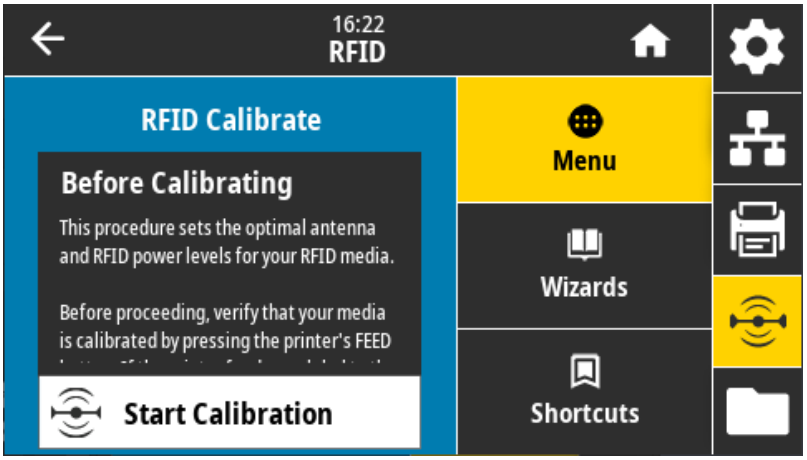
- the programming position
- the antenna element to use

- the read/write power level to use

For more information, refer to RFID Programming Guide 3 available from zebra.com/manuals.

NOTE: Before you run this command, load the printer with RFID media, calibrate your printer (see Print Sensors Manual Calibration on page 123), close the printhead, and press **FEED** to advance at least one label to make sure that tag calibration will begin at the correct position.

Leave all transponders before and after the tag that is being calibrated. This allows the printer to determine RFID settings which do not encode the adjacent tag. Allow a portion of media to extend out the front of the printer to make room for backfeed during the tag calibration procedure.

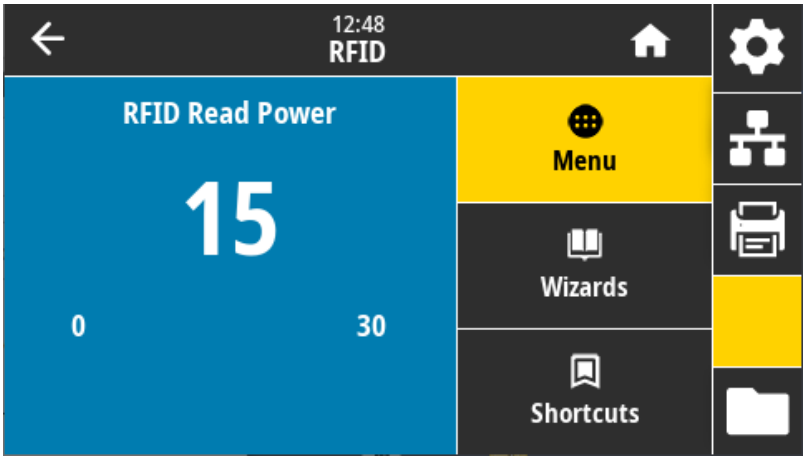


Related ZPL command: ^HR

SGD command used: `rfid.tag.calibrate`

RFID > Read Power

Specify an appropriate value here if RFID tag calibration does not determine the desired read power for the tags you plan to use.



Accepted values: 0 to 30

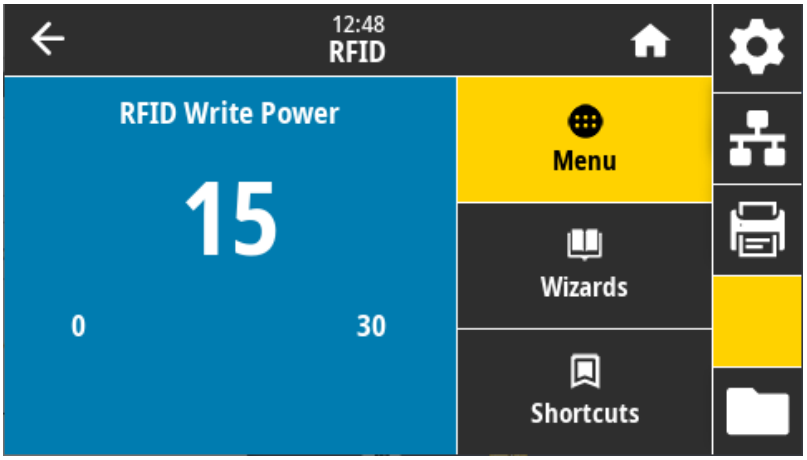
Related ZPL command(s): ^RW

SGD command used: `rfid.reader_1.power.read`

Printer web page: **View and Modify Printer Settings** > **RFID Setup** > **RFID READ PWR**

RFID > Write Power

Specify the appropriate value on this screen if RFID tag calibration does not determine the desired write power for the tags you plan to use.



Accepted values: 0 to 30

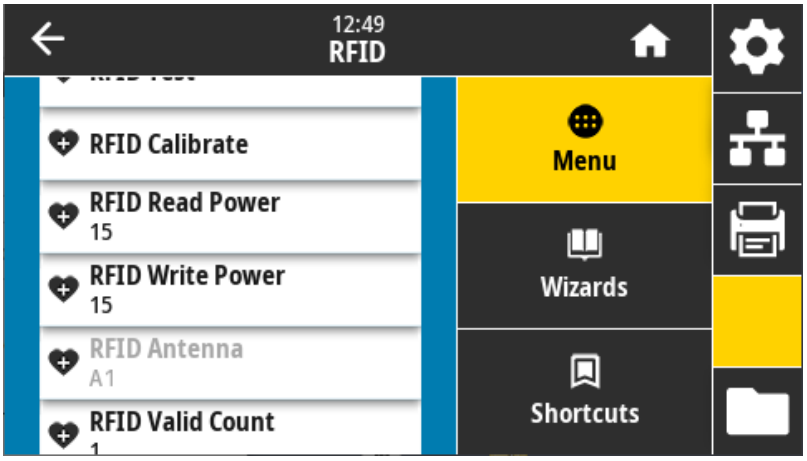
Related ZPL command(s): ^RW

SGD command used: `rfid.reader_1.power.write`

Printer web page: **View and Modify Printer Settings** > **RFID Setup** > **RFID WRITE PWR**

RFID > RFID Antenna

Specify the appropriate value here if RFID tag calibration does not determine the desired antenna selection.



Accepted values: A1 default (only valid setting for center aligned antennas used in this Zebra printer)

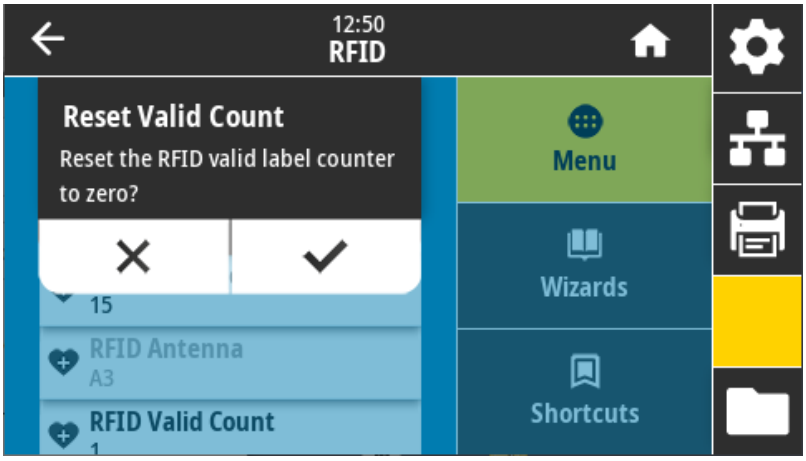
Related ZPL command(s): ^RW

SGD command used: `rfid.reader_1.antenna_port`

Printer web page: **View and Modify Printer Settings** > **RFID Setup** > **RFID ANTENNA**

RFID > RFID Valid Count

Used to reset the RFID valid label counter to zero.

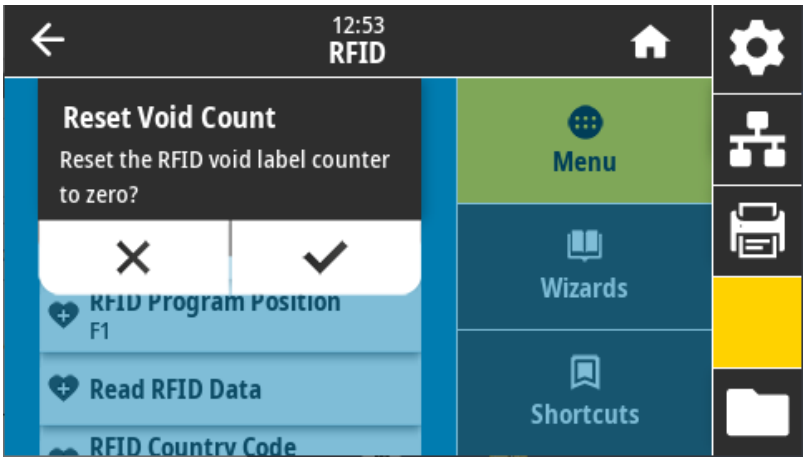


Related ZPL command(s): ~R0

SGD command used: `odometer.rfid.valid_resettable`

RFID > RFID Void Count

Used to reset the RFID void label counter to zero.

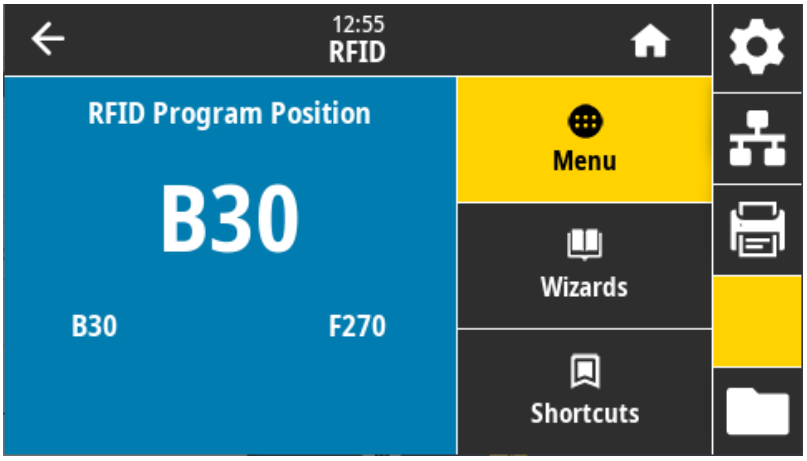


Related ZPL command(s): ~R0

SGD command used: `odometer.rfid.void_resettable`

RFID > RFID Program Position

Specify the appropriate value if the desired programming position (read/write position) is not achieved through RFID tag calibration.



Accepted values:

- F0 to Fxxx (where xxx is the label length in millimeters or 999, whichever is less) — The printer feeds the label forward for the specified distance and then begins programming.
- B0 to B30 — The printer back-feeds the label for the specified distance and then begins programming. To account for the back-feed, allow the empty media liner to extend out of the front of the printer when using a backward programming position.

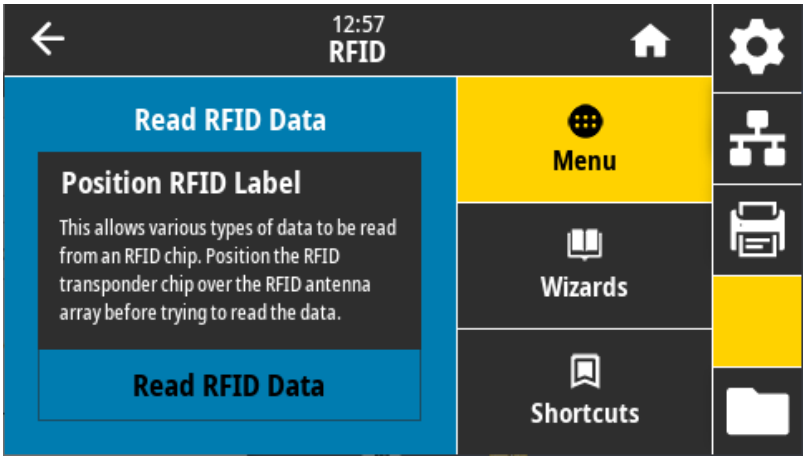
Related ZPL command(s): ^RS

SGD command used:`rfid.position.program`

Printer web page: **View and Modify Printer Settings** > **RFID Setup** > **PROGRAM POSITION**

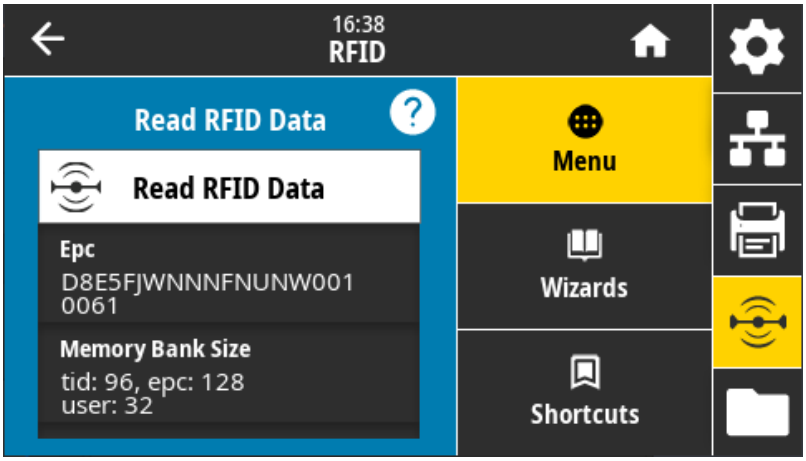
RFID > Read RFID Data

Read and return the specified tag data from the RFID tag located over the RFID antenna. No printer movement occurs while tag data is being read. The printhead can be open or closed.



To read and display the information stored on an RFID tag, position the RFID label with its transponder over the RFID antenna, then touch **Read RFID Data**.

The results of the test are shown on the display.



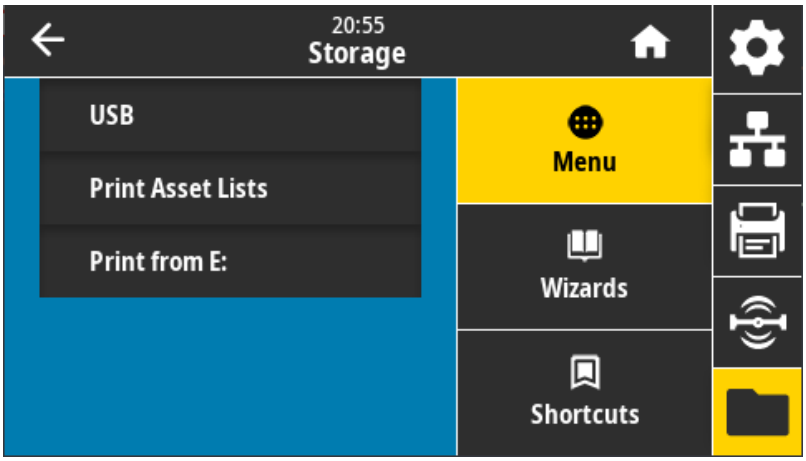
Related ZPL command(s): ^RF

SGD command used:

- `rfid.tag.read.content`
- `rfid.tag.read.execute`

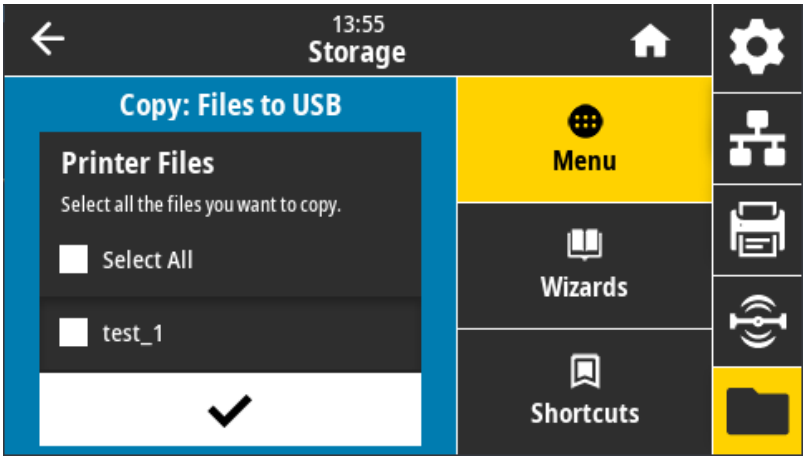
Storage Menu

Use this menu to manage file operations within the printer, accessing external files via the USB Host, and print label formats.



Storage > USB > Copy: Files to USB

Select files from the printer to store on a USB Flash drive.



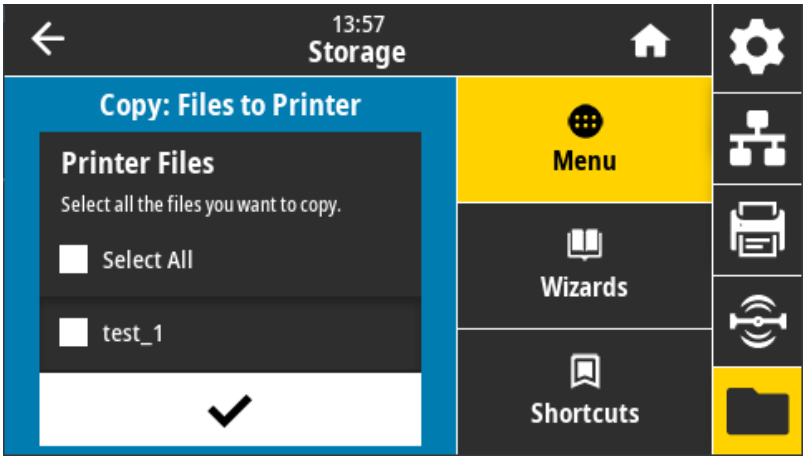
To copy files from the printer to a USB Flash drive:

1. Insert a USB flash drive into the printer's USB host port. The printer lists available files
2. Touch the box next to the desired files. You can also **Select All**.
3. Touch the checkmark to copy the selected files.

`SGD command used: usb.host.write_list`

Storage > USB > Copy: Files to Printer

Select files to copy to the printer from a USB Flash drive.



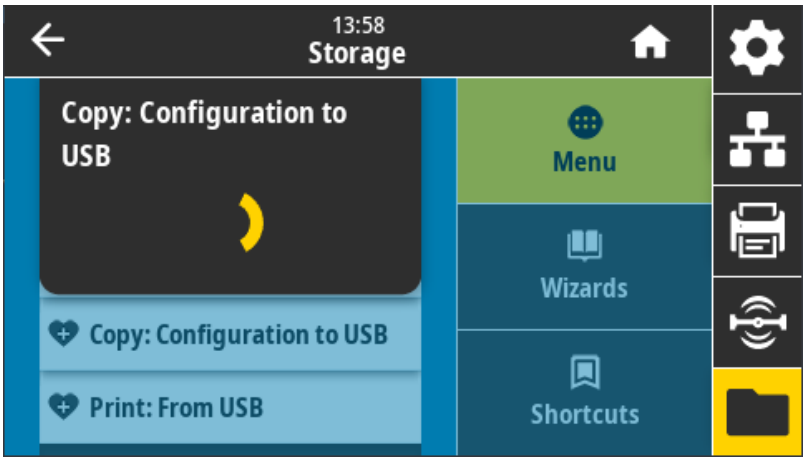
To copy files to the printer from a USB Flash drive:

1. Insert a USB flash drive into the printer's USB host port. The printer lists available files
2. Touch the box next to the desired files. Select All is also available.
3. Touch the checkmark to copy the selected files.

`SGD command used: usb.host.read_list`

Storage > USB > Copy: Configuration to USB

Use this function to copy the printer's configuration information to a USB mass storage device, such as a USB Flash drive, that is plugged into one of the printer's USB host ports. This makes the information accessible without having to print physical labels.



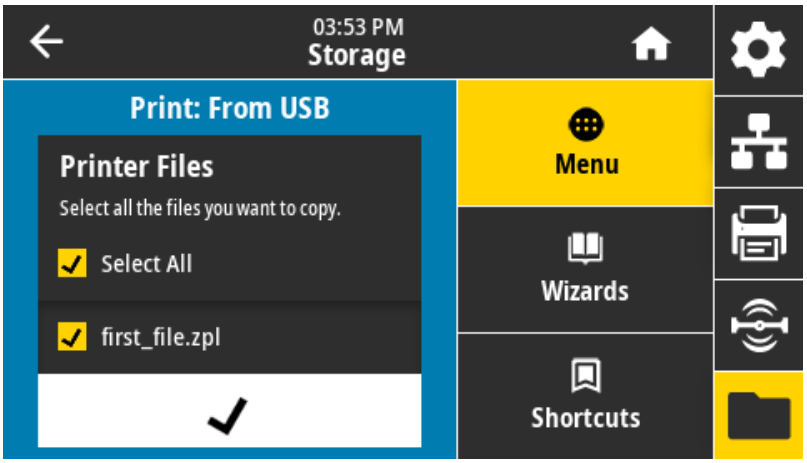
Related ZPL command(s): ^HH(returns the printer configuration information returned to the host computer)

Printer web pages:

- To view printer configuration information on your web browser: **Printer Home Page** > **View Printer Configuration**
- To print the configuration information on labels: **View and Modify Printer Settings** > **Print Listings on Label**

Storage > USB > Print: From USB

Select files to print from a USB Flash drive.



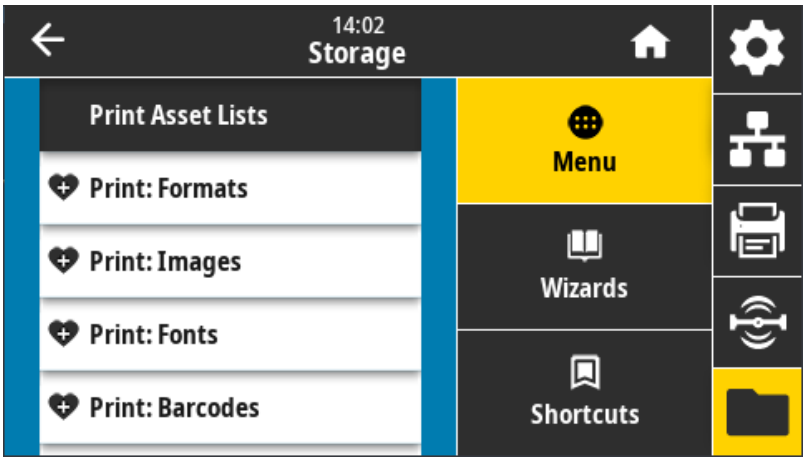
To print files from a USB Flash drive:

1. Insert a USB flash drive into the printer's USB host port. The printer lists available files
2. Touch the box next to the desired files. You can also **Select All**.
3. Touch the checkmark to copy the selected files.

SGD command used: usb.host.read_list

Storage > Print Asset Lists

Print the specified information on one or more labels.



Accepted values:

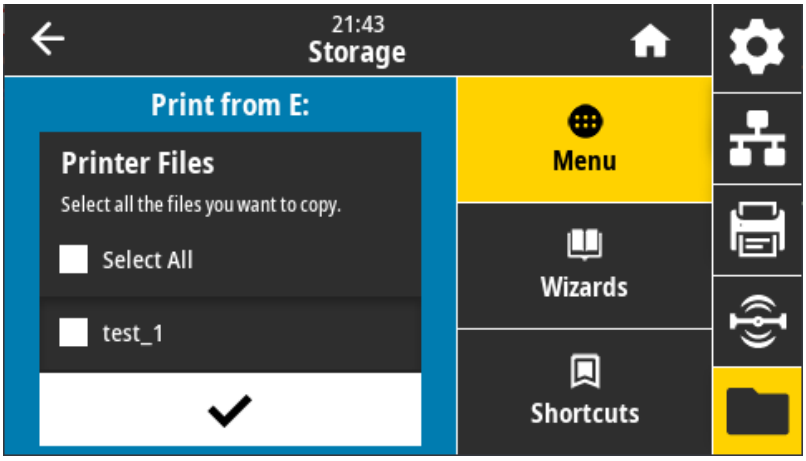
- **Formats** — Prints the available formats stored in the printer's RAM, Flash memory, or optional memory card.
- **Images** — Prints the available images stored in the printer's RAM, Flash memory, or optional memory card.
- **Fonts** — Prints the available fonts in the printer, including standard printer fonts plus any optional fonts. Fonts may be stored in RAM or Flash memory.
- **Barcodes** — Prints the available barcodes in the printer. Barcodes may be stored in RAM or Flash memory.
- **All**—Prints the previous labels plus the printer configuration label and the network configuration label

Related ZPL command(s): ^WD

Printer web page: **View and Modify Printer Settings** > **Print Listings on Label**

Storage > USB > Print from E:

Select files to print from files in printer E: memory.



To print files from printer E: memory:

1. Touch the box next to the desired files. You cal also use **Select All**.
2. Touch the checkmark to print the selected files.

SGD command used: `usb.host.write_list`

Setup

This section assists you in setting up and operating your printer. The setup process can be broken down into two phases: hardware setup and host system (software/driver) setup. This section covers the physical hardware setup needed to print your first label.

Modifying or Viewing Secured Features

Some features may be locked either by default or by choice, and you need to perform certain tasks before they can be viewed or modified.

EU RED

If you purchased your printer within European, Middle Eastern, or African (EMEA) countries on or after August 1, 2025, the printer comes with specific security features to meet the EU Radio Equipment Directive (RED) requirements. As part of the setup process, you must do the following before you can access the control panel parameters or modify certain settings using commands:

- set a Protected Mode password and configure Protected Mode
- set a front panel password/PIN to view the control panel parameters

For more information, go to zebra.com/asr or refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

Protected Mode

For printers that already have Protected Mode set up, you need to enter the Protected Mode (admin) password to change certain settings on the printer. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

Front Panel Password/PIN

The front panel display can be locked, limiting access to the control panel parameters until the front panel password is entered. This value is initially undefined and must be set before it can be used.

For more information about the front panel password, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

Printer Setup Overview

Review this overview and prepare for the setup before you begin the physical printer setup.

- Install any printer hardware options first. See Install Hardware Options on page 63.

- Place the printer in a safe location with access to power and where you can connect interface cables or wirelessly to the system.
- Attach the printer and power supply to a grounded AC power source. See Attaching the Printer to a Power Source on page 141.
- Select and prepare media for your printer. See Media on page 331.
- Load the media. See Loading Media on page 143.
- Turn printer power ON.
- Calibrate the printer for the media. See Running a SmartCal Media Calibration on page 163.
- Print a Configuration Report to verify basic printer operation. See Test Printing with a Configuration Report on page 164.
- Turn printer power OFF.
- Choose a method to communicate to and manage your printer using a wired or wireless connection. The available wired local connection types are:
  - USB port
  - Serial port (option available for your printer)
  - Ethernet (LAN) (option available for your printer)
- Attach the printer cable to the network or host system, making sure printer power is OFF.
- Begin the second phase of printer setup, typically Setup for Windows on page 181.

Select a Location for the Printer

The printer and media need a clean and safe area with moderate temperatures for optimal print operations

Select a location for the printer that meets these conditions:

Condition	Description
Surface	Must be solid, level, and of sufficient size and strength to hold the printer loaded with media (or in the case of fanfold media, stable and sturdy with the media placed on the surface)..
Space	The operating location for the printer must include enough space to open the printer (for media access and cleaning), and enable access to connectivity and power cords. Leave open space on all sides of the printer to allow for proper ventilation and cooling. **IMPORTANT:** Do not place any padding or cushioning material under or around the base of the printer because this will restrict airflow and could cause the printer to overheat.
Power	Situate the printer within easy access of a power outlet.
Data communication interfaces	Ensure that cabling and Wi-Fi or Bluetooth radios do NOT exceed the maximum distance specified by the communication protocol standard or product data sheet for this printer. Radio signal strength can be reduced by physical barriers (objects, walls, etc.).

Condition	Description
Data cables	Cables should not be routed with or near power cords or conduits, fluorescent lighting, transformers, microwave ovens, motors or other sources of electrical noise and interference. These interference sources may cause problems with communications, host system operation, and printer functionality.
Operating conditions	Your printer is designed to function in a wide range of environments. • Operational temperature: 40°F to 105°F (5°C to 41°C) • Operational humidity: 10% to 90% non-condensing • Non-operational temperature: -40°F to 140°F (-40°C to 60°C) • Non-operational humidity: 5% to 95% non-condensing

Install Printer Options and Connectivity Modules

If your printer will use any of the following printer options, you will need to install them before you proceed with the printer setup.

- Wireless (802.11 ac and Bluetooth 4.2) Module — See Installing the Wireless Connectivity Module on page 68 .
- Wireless (802.11ax and Bluetooth 5.3) Module — See Installing the Wireless Connectivity Module on page 68.
- Serial (RS-232 DB-9) Port Module — See Installing the Serial Port Module on page 65.
- Internal Ethernet (LAN) Module — See Installing the Internal Ethernet (LAN) Module on page 66.
- Label Dispenser (automatically peels the liner off the label and dispenses the label) — See Installing the Label Dispenser on page 74.
- Standard (general purpose) media cutter — See Installing the Standard Media Cutter on page 75.
- Media Roll Core Size Adapters for 38.1 mm (1.5 in.), 50.8 mm (2.0 in.), or 76.2 (3.0 in.) I.D. media cores. — For information on these adapters, see Media Roll Core Size Adapters on page 76. To install the adapters, see Installing the Media Roll Adapters on page 76.

Attaching the Printer to a Power Source

CAUTION: Never operate the printer and power supply in an area where they can get wet. Serious personal injury could result!

IMPORTANT: Ensure the appropriate power cord with a three-prong plug and an IEC 60320-C13 connector are used at all times. These power cords must bear the relevant certification mark of the country in which the product is being used.

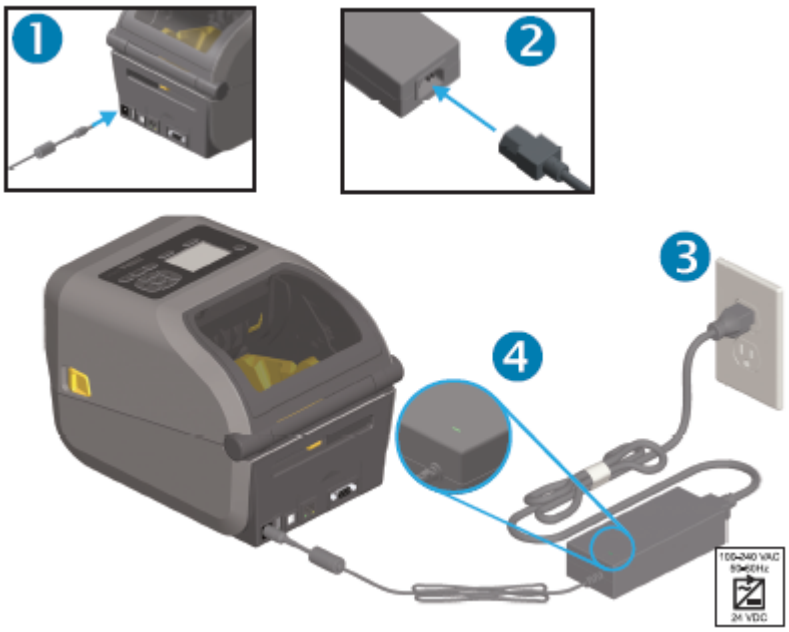
Set up your printer so that you can handle the power cord easily if needed. Some setup and troubleshooting tasks may ask you to turn printer power OFF. When the instructions call for turning printer power OFF, separate the power cord from the power supply receptacle or AC electrical outlet to ensure that the printer CANNOT carry electrical current.

1. Plug the power supply into the printer's DC power receptacle.
2. Insert the AC power cord into the power supply.

3. Plug the other end of the AC power cord into an appropriate AC electrical outlet.

NOTE: The AC outlet (plug) end of the power cord varies by region.

The active power light turns green if power is on at the AC outlet.



Media Preparation for Printing

Purchase media that will suit your printing needs. Media does not ship with the printer.

You can use labels, tags, tickets, receipt paper, fanfold stacks, tamper-proof labels or other print media formats. Use the Zebra website, or your reseller may be able to help you select the right media for your intended printing application.

To procure media that is specifically designed for use with your Zebra printer, go to zebra.com/supplies.

During setup, use the same media that you would use for normal printer operation. This will help you identify any setup or real-life application issues so you can address them right at the start.

Preparing and Handling Media

Careful handling and storage of your media are important to maximize print quality. If the media becomes contaminated or dirty, it can damage the printer and cause defects in the printed image, such as voids, streaks, discoloration, and compromised adhesive.

IMPORTANT: . To reduce the possibility of contaminants transferring from the media onto the printhead while printing, remove the outside layer of the media roll or stack.

Media Storage Guidelines

Follow these media storage guidelines for optimal print output.

- Store media in a clean, dry, cool, dark area.

NOTE: Direct thermal media is chemically treated to be heat-sensitive. Exposure to direct sunlight or heat sources may damage the media.

- Do NOT store media with chemicals or cleaning products.
- Leave media in its protective packaging and remove the packaging only before use.
- Many media types and label adhesives have a shelf life or expiration date. Always use the oldest viable (non-expired) media first.

Roll Media Types and Loading

The printers support the three basic types of media: continuous media, marked media, and label media. All three types are loaded the same way for the printer models described in this guide.

- Continuous has no marks that define print length. These are typically used for receipts.
- Marked media comes with black lines, black marks, notches, or holes that help the printer sense print length.
- Label media avails of the print sensor's ability to look through the media backing (liner) and sense the beginning and end of labels on the roll.

The printer uses two sensing methods to accommodate a wide range of media:

- Center-area transmissive sensing for continuous media and gap/web label media.
- Full-width movable (reflective) sensing for print format (length) using black marks, black lines, notches, or holes.

Setting Media Sensing by Media type

- For web/gap media, the printer senses the differences between the label and the liner to determine the print format length.
- For continuous roll media, the printer only senses the media's characteristics. The print format's length is set by programming (driver or software) or by using length of the last stored form.
- For black mark media, the printer uses its sensor to measure the print format length, from the first black mark to the start of the next black mark .
- If using a label dispenser, load the media and proceed with Using the Label Dispenser Option on page 213.
- If using fanfold media, see Printing on Fanfold Media on page 209.

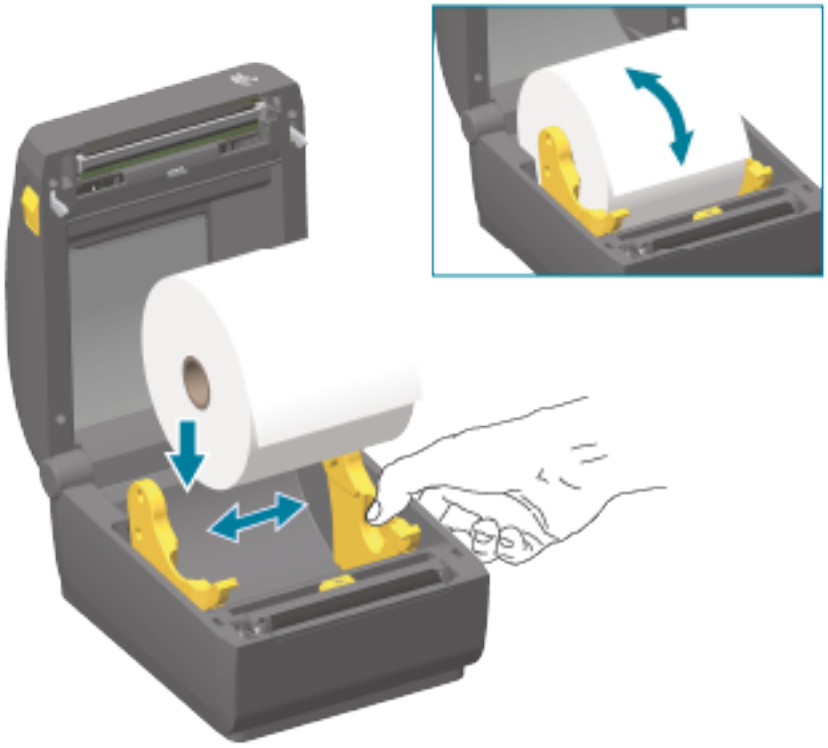
Loading Media

This procedure works for the Tear-Off (standard bezel), Label Dispense, and Media Cutting options that are available to use with your printer.

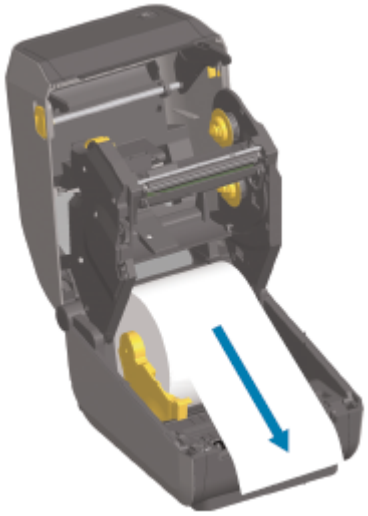
1. Open the printer. Pull the release latch levers toward the front of the printer.



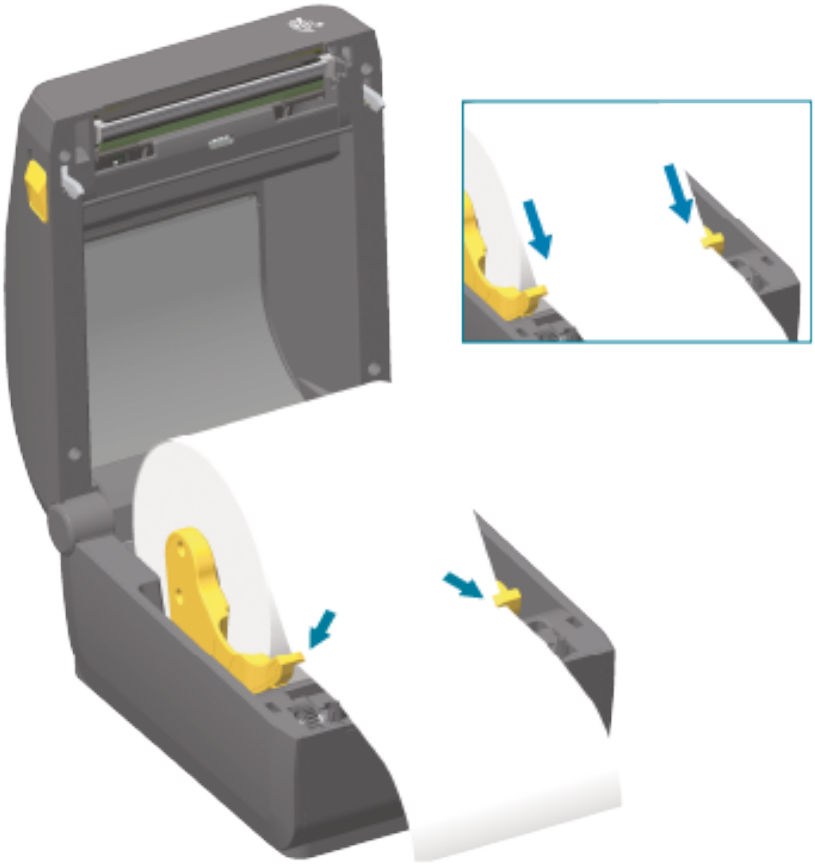
2. Open the media roll holders. Orient the media roll so that its printing surface will face up as it passes over the platen (drive) roller. Pull the media guides open with your free hand and place the media roll on the roll holders and release the guides. Verify the roll turns freely. The roll must not sit in the bottom of the media compartment.



3. Pull the media so that it extends out of the front of the printer.



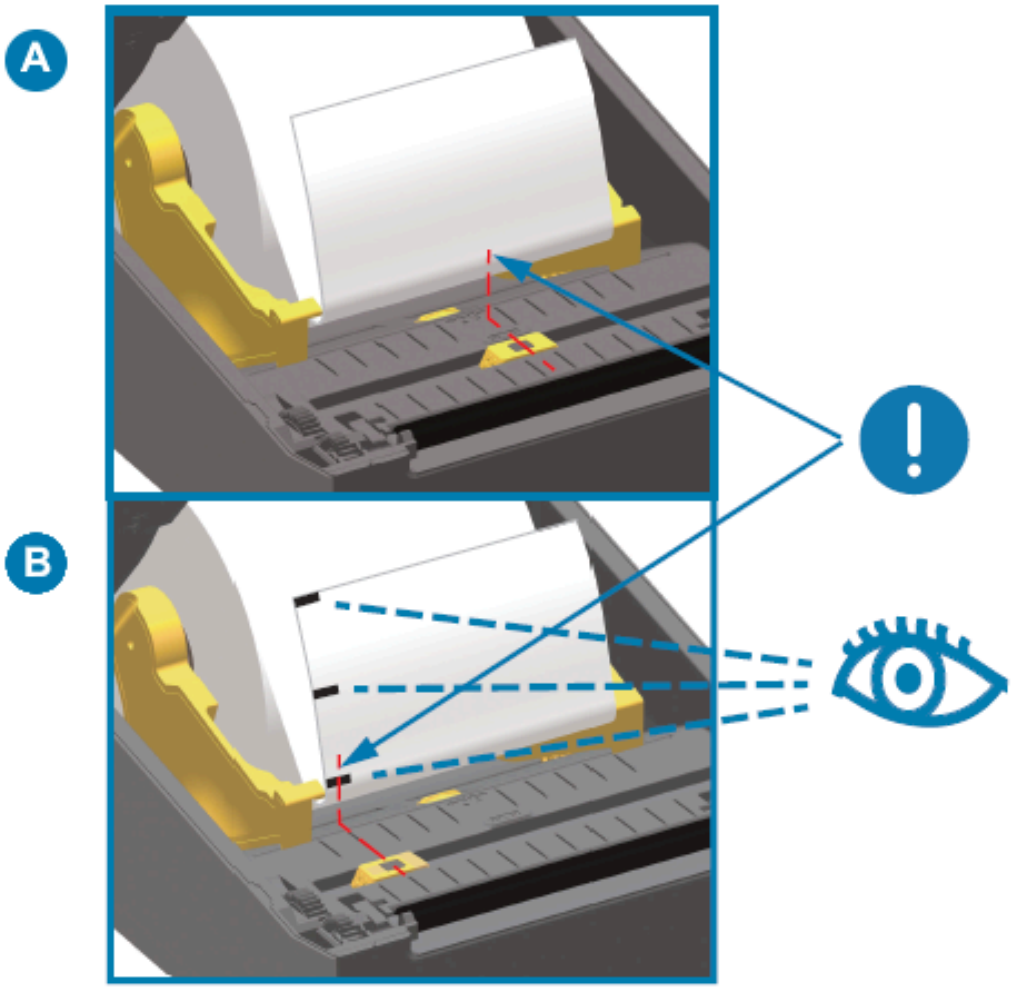
4. Push the media under both of the media guides.



5. Flip the media up and align the movable media sensor as appropriate for your media type.

For continuous roll receipt-type media and for label media without black marks or notches...	Align the media to the default center position.

For black mark (black line, notches or holes), backed media...	Adjust the sensor position in such a way that the sensor aligns to the center of the black mark. Avoid the center area of the media so you only use black-mark sensing for printing on black mark media.



A	Web (gap) sensing standard operating position for the sensor (default)
B	Off-center sensor position (use for black mark sensing only)

Movable Sensor Adjustment

The movable sensor is a dual-function sensor. It provides transmissive (sees through media) and reflective media sensing. The printer can use either sensing method, but not both simultaneously.

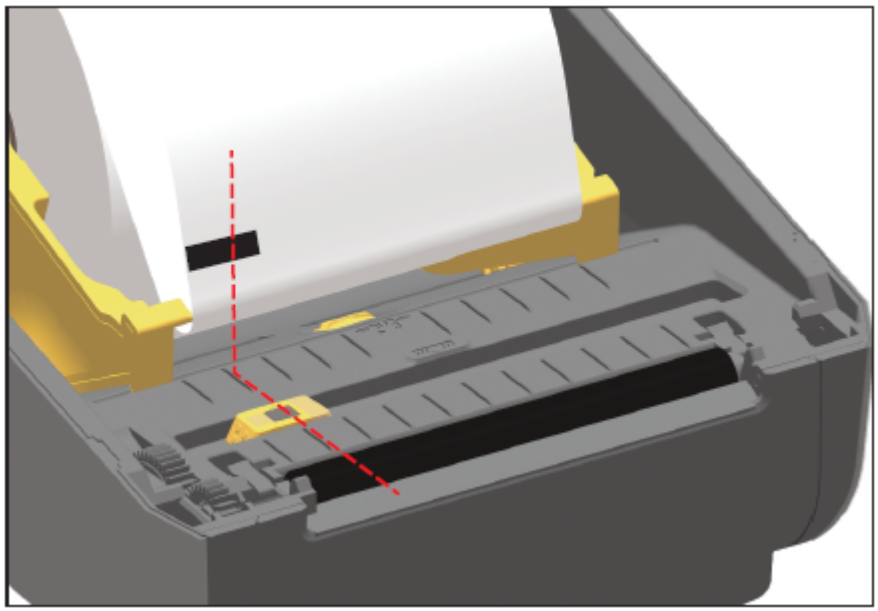
The movable sensor has a center array of sensors. This provides adjustable transmissive web (gap) sensing to positions that match legacy Zebra desktop printer sensor locations and positions in between. This also provides for use of some non-standard media variations or irregularly-shaped media.

The movable sensor allows the printer to use media with black marks or notches (holes through the media) on the back side of the media (or media liner). The sensor aligns to the middle of black marks or notches not in the center of the media roll to avoid web/gap sensing array.

Adjusting the Movable Sensor for Black Marks or Notches

Black mark sensing looks for non-reflective surfaces such as black marks, black lines, notches or holes on the back of the media which do not reflect the sensor's near infrared light beam back to the sensor's detector. The sensor light and its black mark detector are located next to each other, under the sensor cover.

1. Position the movable sensor's alignment arrow to the middle of the black mark or notch in the underside of the media.
2. Verify that you have set the sensor alignment as far as possible from the edge of the media, where 100% of the sensor window is aimed within the region of the black mark.



NOTE: When printing, the media can move from side to side ±1mm (due to media variations and edge damage due to handling). Notches cut into the side of the media can also become damaged.

Adjusting the Movable Sensor for Web (Gap) Sensing

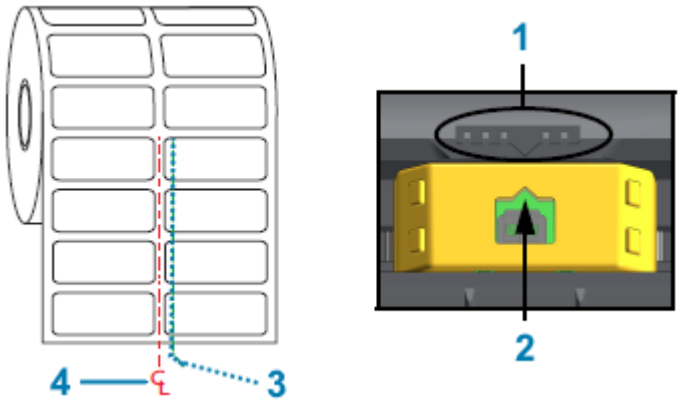
The movable sensor for web/gap sensing supports multiple positions.

The movable sensor's default position is ideal for printing on most label types.

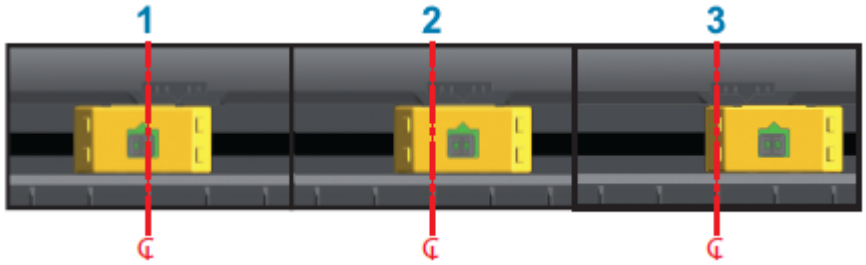
The adjustment range is from center to off-center positions. This adjustment is ideal for printing two labels side by side on a roll.

The movable sensor adjustment range covers sensor positions use by legacy Zebra printers.

Web (gap) sensing with the movable sensor only functions when the movable sensor's alignment arrow points to any position on the alignment key.



1	Alignment key
2	Alignment arrow (default position)
3	Default gap sensing position
4	Center line



1	Center-aligned sensing position
2	Default sensing position
3	Maximum right sensing position

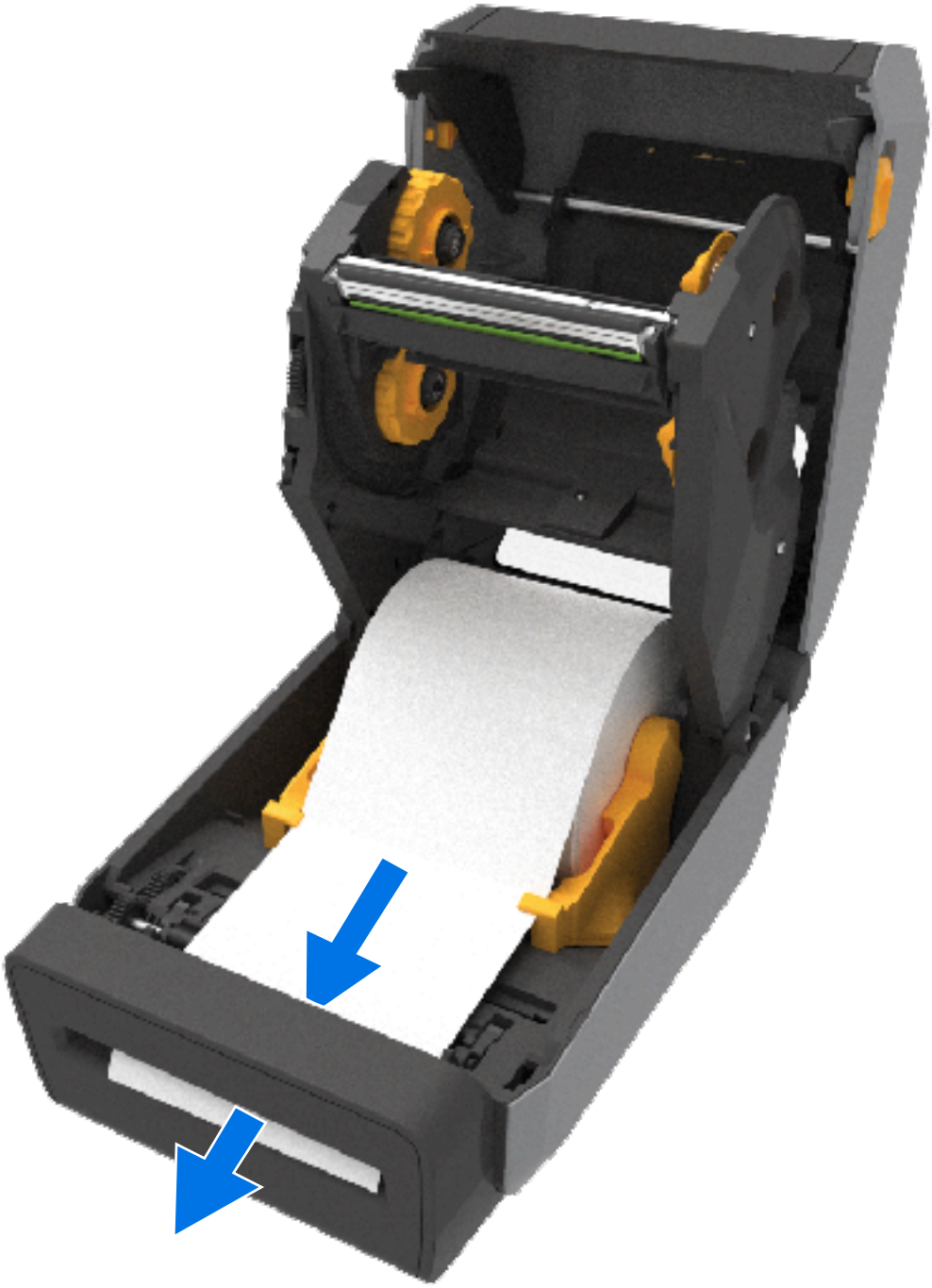
The following are Zebra printer fixed sensor position relative to a ZD Series printer:

- Default — Zebra models G-Series fixed-position sensors: LP/TLP 2842, LP/TLP 2844, and LP/TLP 2042
- Center aligned — Zebra model LP/TLP 2742

Loading Roll Media for Cutter Models

If your printer has the optional cutter module installed, use these instructions to continue loading the roll media.

1. Thread the media through cutter's media slot and pull it out the front of the printer.



2. Close the printer. Press down until the cover snaps closed.



You may need a calibrate your printer for the media. See Running a SmartCal Media Calibration on page 163. The printer's sensors must adjust to sense the label, the liner, and the distance between labels to operate properly.

However, you do not have to recalibrate the printer's media sensors when you are loading the media with the same physical specifications (size, label type) and vendor/batch. If this is the case, just press **FEED** (Advance) to ready the new media for printing.

Thermal Transfer Roll Ribbon Loading

Thermal transfer printers have a flexible ribbon system that supports 74-meter and 300-meter ribbons manufactured by Zebra. Your printer ships with 300-meter ribbon adapters to support non-Zebra ribbon rolls.

The 74-meter ribbon used with non-Zebra printers does NOT require non-Zebra ribbon adapters to operate properly.

Transfer ribbons come in several varieties—and in some cases several colors—to match your application needs. Transfer ribbons manufactured by Zebra are specifically designed for use with your Zebra printer and Zebra brand media. For transfer ribbon rolls and other printing supplies, see zebra.com/supplies.

CAUTION—PRODUCT DAMAGE: Using non-Zebra media or ribbons that are NOT approved for use with your Zebra printer may damage your printer or printhead.

Inner Diameter (I.D.) = 12.2 mm (0.5 in.)	I.D. = 25.4 mm (1.0 in.)

- To ensure optimal print results, match the media and ribbon types.
- To protect the printhead from wear, always use ribbon that is wider than the media.

- For printing on Direct Thermal media, do NOT load ribbon in the printer. See Determining Thermal Media Types on page 331.
- To avoid ribbon wrinkling and other print problems, always use an empty ribbon core that matches your transfer ribbon roll's inner diameter (I.D.).

Your printer requires ribbons manufactured by Zebra that have a ribbon-out trailer (reflector). When the printer senses this trailer, it recognizes that the transfer ribbon roll has been used up and it stops printing. In addition, ribbons and ribbon cores manufactured by Zebra include notches to help maintain ribbon-roll engagement and drive (without slipping) while printing.

Zebra-manufactured ribbons for your printer include:

- Performance Wax
- Premium Wax/Resin
- Performance Resin for synthetics (6 inches per second or ips maximum speed) and coated paper (4 ips maximum speed)
- Premium Resin for synthetics (4 ips maximum speed)

IMPORTANT: If using 74-meter ribbons, DO NOT pair them with early-model desktop printer ribbon cores! These older cores are too large. You can identify the older-style ribbon cores (and some Non-Zebra ribbons) by notches seen ONLY on one side of the ribbon core.

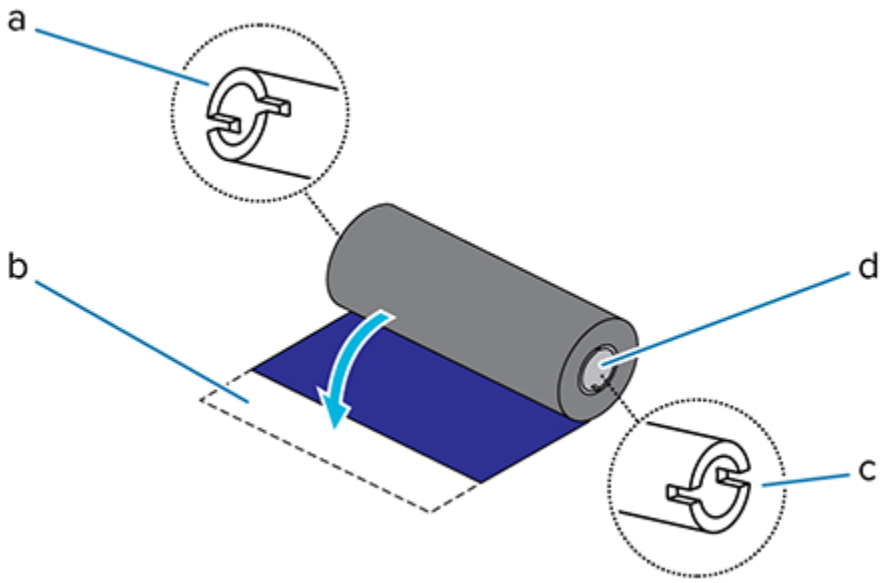
IMPORTANT: DO NOT use ribbon cores that have damaged notches (rounded, frayed, smashed, etc.) The core notches must be square to lock the core onto the spindle. Otherwise, the core may slip and cause ribbon wrinkle, poor end-of-ribbon sensing, or other intermittent failures.

Loading Zebra Transfer Roll Ribbon

Be sure to complete the preparatory steps described here before you load the ribbon.

Prepare the ribbon by removing its wrapping and pulling its adhesive strip free.

Verify that the ribbon and empty ribbon core have notches on the left side of the ribbon cores as shown here. (If they do not, see Loading Non-Zebra 300-Meter Transfer Ribbon on page 155.)

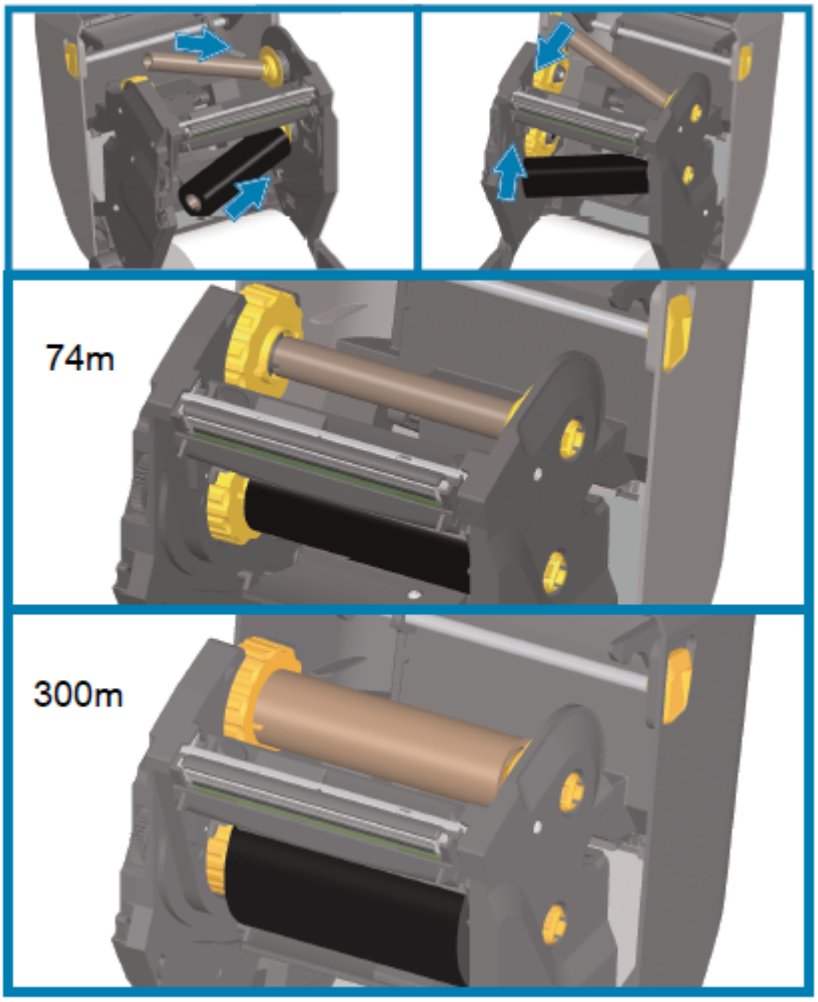


a	Notch (required on left side of ribbon)
b	Adhesive strip
c	Notches are also on the right side of the 74-meter ribbon
d	Right side (printer and roll)

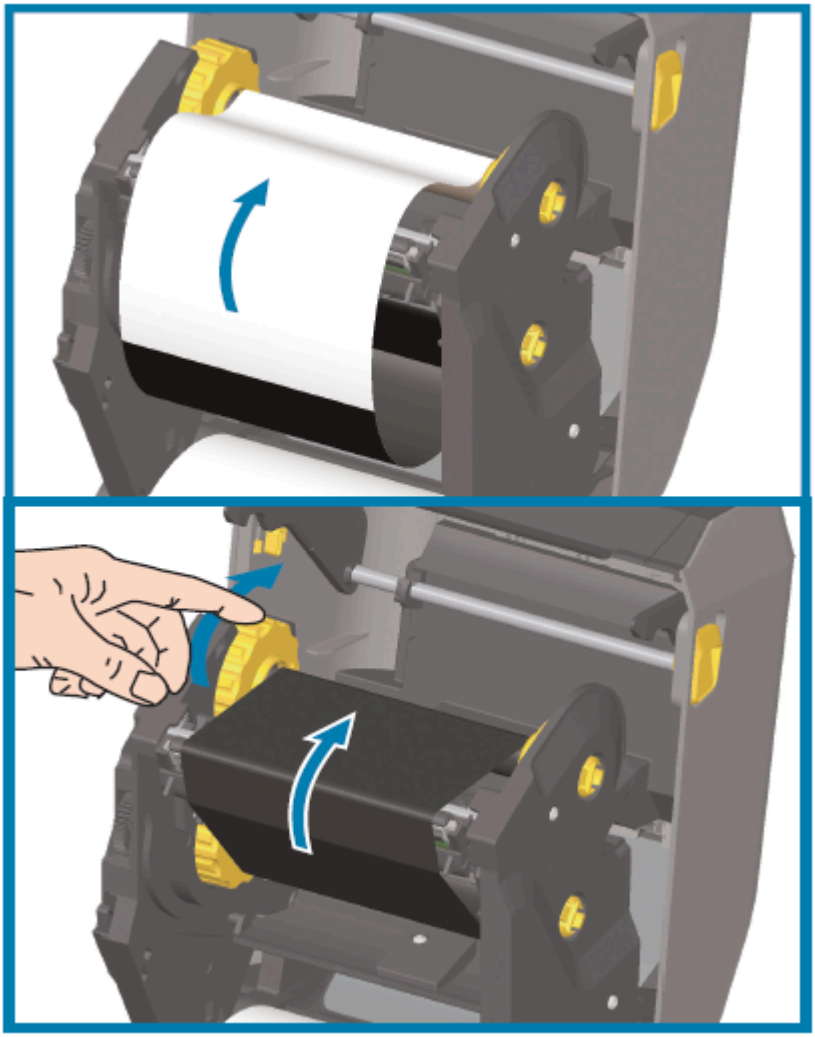
1. With the printer open, place an empty ribbon core on printer's take-up spindles.

   NOTE: You can find your first ribbon take-up core in the packing box. Subsequently, use the empty supply core from the supply spindle for the next roll of ribbon.

2. Push the right side of the empty core onto the spring-loaded spindle (right side), aligning the core with the center of the left-side spindle's hub. Then rotate the core until the notches align and lock.
3. Place a new ribbon roll on printer's lower ribbon supply spindle. Push it onto the right spindle and lock the left side on to the left supply spindle.



4. Attach the ribbon to the take-up core. Use the adhesive strip on new rolls; otherwise, use a thin strip of tape. Align the ribbon so that it will be taken straight onto the core.



5. Turn the ribbon take-up hub with the top moving toward rear to remove slack from the ribbon. Rotate the hub to finish aligning the take-up ribbon position to the ribbon supply roll. The ribbon leader should be completely covered by the ribbon.
6. Verify that media is loaded correctly and is ready for printing, then close the printer cover.
7. If printer power is ON, press **FEED** to advance the media a minimum of 20 cm (8 in.) to straighten the ribbon and remove any slack and ribbon wrinkle and align the ribbon on the spindles.
8. Change the print mode setting from DIRECT THERMAL to THERMAL TRANSFER using the printer driver, the application software, or printer programming commands.

NOTE: The printer cannot print in Direct Thermal mode and with direct thermal media loaded when ribbon is also loaded. Attempting to print in Direct Thermal mode with ribbon loaded generates a ribbon-in print error.

When controlling printer operations using ZPL programming...	Refer to the Media Type ZPL II command ^MT and, follow the instructions, in the ZPL Programming Guide.

When controlling printer operations using EPL Page Mode...	Refer to the Options EPL command 0, and follow the instructions, in the EPL Page Mode Programmer's Guide.

9. To verify the mode change from Direct Thermal printing to Thermal Transfer printing, print a configuration report. For instructions on printing this report, see Printing the Printer and Network Configuration Reports (CANCEL Self Test) on page 288.

   The `PRINT METHOD` shown on the printer configuration report should read `THERMAL-TRANS`.

Loading Non-Zebra 300-Meter Transfer Ribbon

To load non-Zebra 300-meter transfer ribbon onto your printer, you will need Zebra ribbon core adapters.

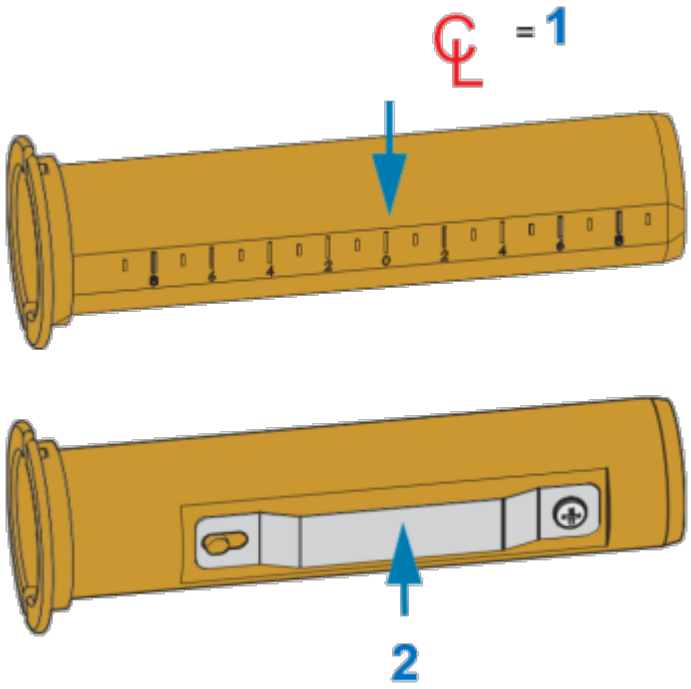
The minimum requirements to use non-Zebra 300-meter ribbons with your printer are as follows:

Inside core diameter (I.D.)	25.4 mm (1.0 in., with a range of 1.004 in. to 1.016 in.)
Inside core material	Fiberboard (hard materials such as plastic cores may NOT function correctly)
Ribbon width range	33 mm to 110 mm (1.3 in. to 4.3 in.)
Ribbon's maximum outer diameter (O.D.)	66 mm (2.6 in.)

CAUTION—PRODUCT DAMAGE: Using non-Zebra media or ribbons not approved for use in your Zebra printer may damage your printer or printhead. Image quality may also be affected by:

- poor or marginal ribbon performance (maximum print speed, ink formulation, etc.)
- core material that is too soft or too hard)
- loose or tight ribbon core fit or a ribbon core that exceeds the maximum outer diameter of 66 mm)

The adapters help you align the ribbon and core to the media (and printer's) center. They include a core-lock spring to engage the soft fiberboard inside the ribbon core. They scale, as measured from the printer's center-line, when mounted in the printer.

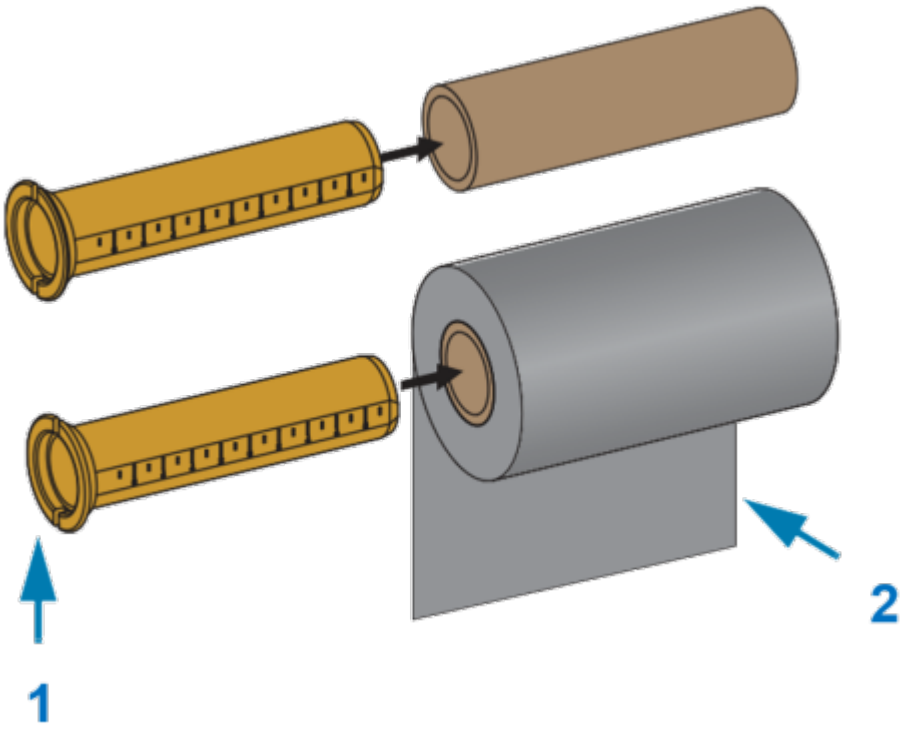


1	Center line
2	Core lock spring

1. Load an empty ribbon core onto a ribbon core adapter. The empty ribbon core should be the same width (or larger) than the ribbon roll. Roughly center the core over the adapter's center line.

   NOTE: An empty Zebra ribbon core may be used instead of the ribbon-core adapter and empty non-Zebra ribbon core. One 300-meter empty ribbon core is supplied with your printer.

2. Load the non-Zebra ribbon roll onto the ribbon-core adapter. Orient the adapter flange on the left side and verify that the ribbon unwraps on the backside of the roll as shown here. Roughly center the core over the center line (CL) of the adapter.

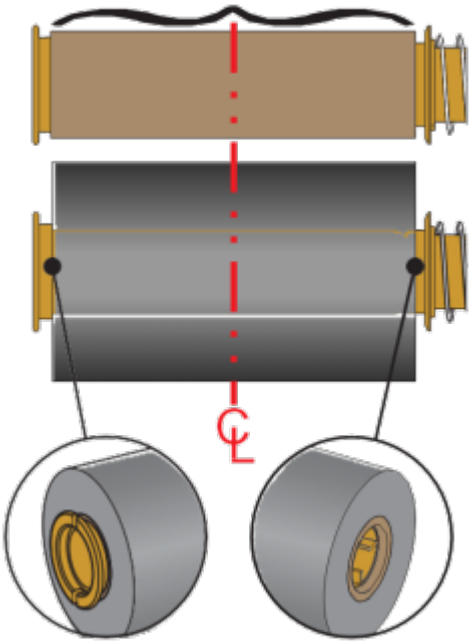


1	Flange – place on left
2	Ribbon exiting the roll in the back

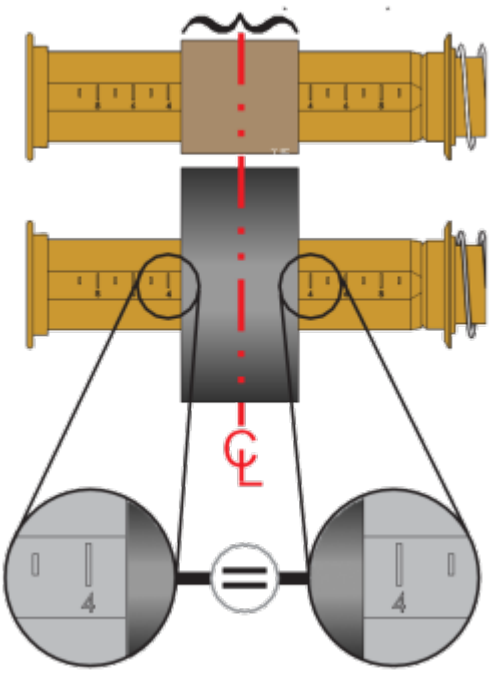
NOTE: The maximum roll width of 110 mm (4.3 in.) does NOT require centering.

For media less than maximum width down to the minimum width of 33 mm (1.3 in.), use the graduated scale on the adapter core to align the ribbon rolls to the media and printer.

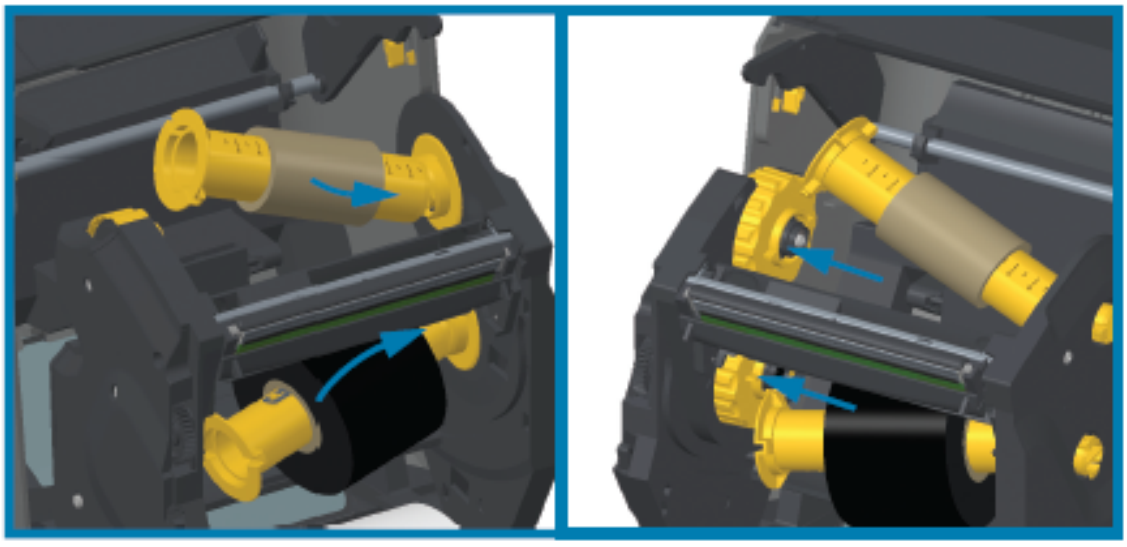
Width = 110 mm (4.3 in.)

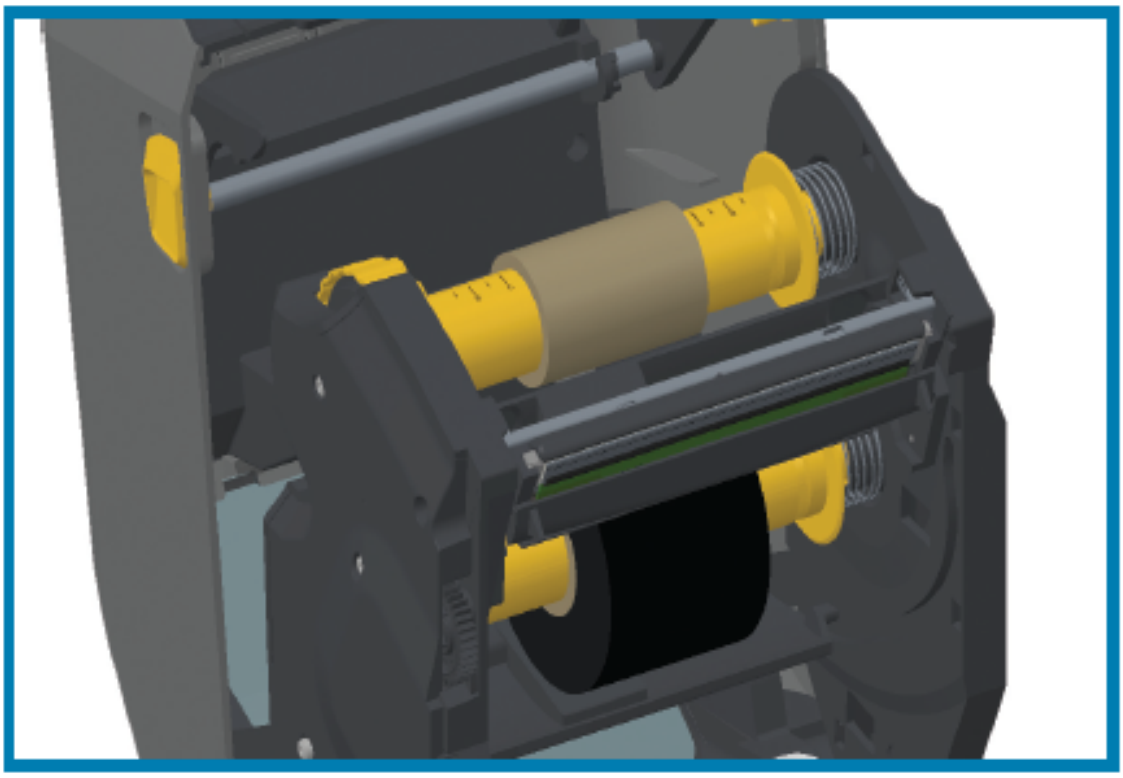


Width = 33 mm (1.3 in.)

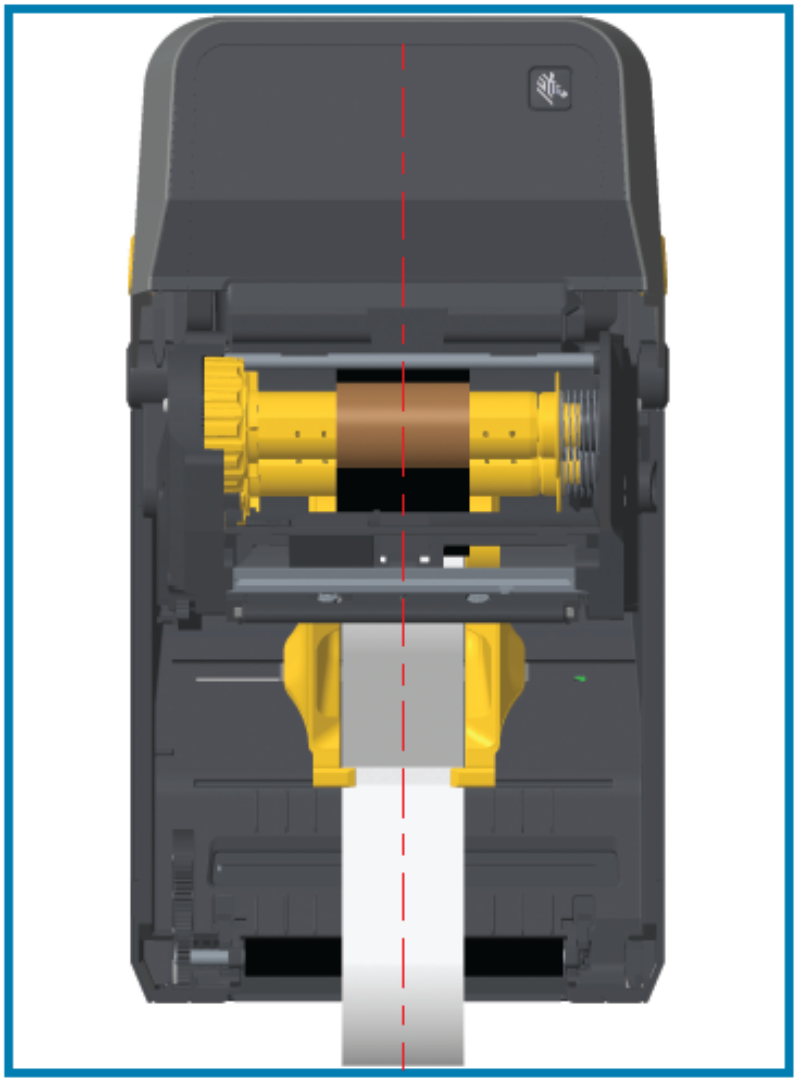


3. Place the adapter with an empty core on the take-up spindles and the adapter with the ribbon roll on the lower supply spindles. The right side of the core adapter fits on the cone-tip on each of the spring-loaded right-side spindles. Continue pushing the adapter onto right-side spindle and swing the adapter onto the left-side spindle hubs. Rotate the adapters and hubs until the notches on the adapters flange align and lock on the left spindles' hub spokes.

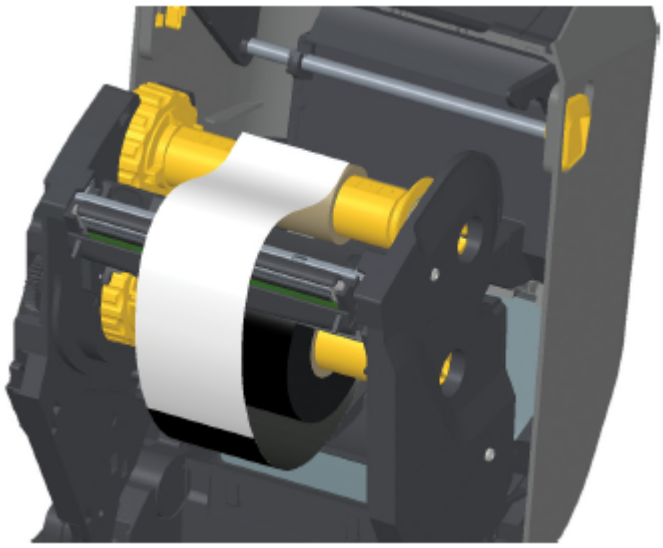




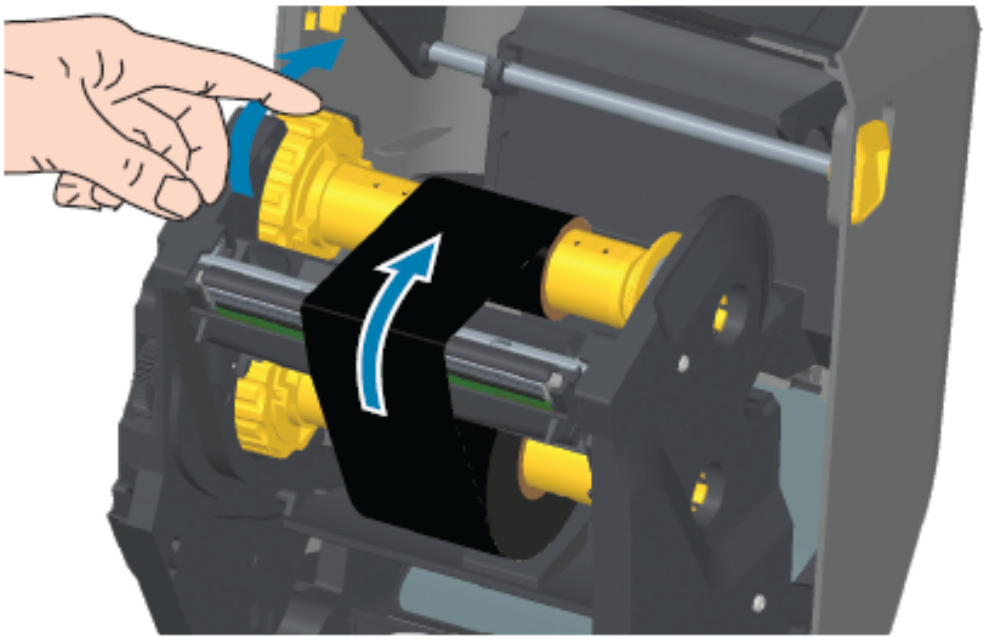
4. While the ribbon and empty cores were being installed during the previous steps, they may have been bumped off center.
   - Verify that the ribbon roll and empty core are aligned to the center of the media (labels, paper, tags, etc.). Use the center line scales on the ribbon core adapter as a guide to return them to the proper positions.
   - If you have not yet checked if the ribbon is wide enough the for the media in use, do so now. To protect the printhead, the ribbon must be wider than the media (where the width includes the label liner or backing).



5. Attach the ribbon to the take up core. If your media does NOT have an adhesive strip on the ribbon leader as Zebra-manufactured ribbon does, use a thin strip of tape to secure the ribbon to the take-up core. Align the ribbon so that it will be taken straight onto the core.



6. Turn the ribbon take-up hub with the top moving towards the rear to remove slack from the ribbon. Rotate the hub to finish aligning the take-up ribbon position with the supply-ribbon roll. The ribbon should be wound, at a minimum, one-and-a-half times around the take-up ribbon core.



7. Verify that the media is loaded properly and is ready for printing, then close the printer cover.
8. If printer power is ON, press **FEED** to advance a minimum of 20 cm (8 in.) of media to remove slack and ribbon wrinkle (straighten the ribbon), and align the ribbon on the spindles.
9. Change the print mode setting from Direct Thermal printing to Thermal Transfer using the printer driver, the application software, or printer programming commands.

NOTE: The printer cannot print in Direct Thermal mode and with direct thermal media loaded when ribbon is also loaded. Attempting to print in Direct Thermal mode with ribbon loaded generates a ribbon-in print error.

When controlling printer operations with ZPL programming...	Refer to the Media Type ZPL II command (^MT), and follow the instructions, in the ZPL Programming Guide).
When controlling printer operations with EPL Page Mode...	Refer to the Options EPL command (0), and follow the instructions, in the EPL Page Mode Programmer's Guide).

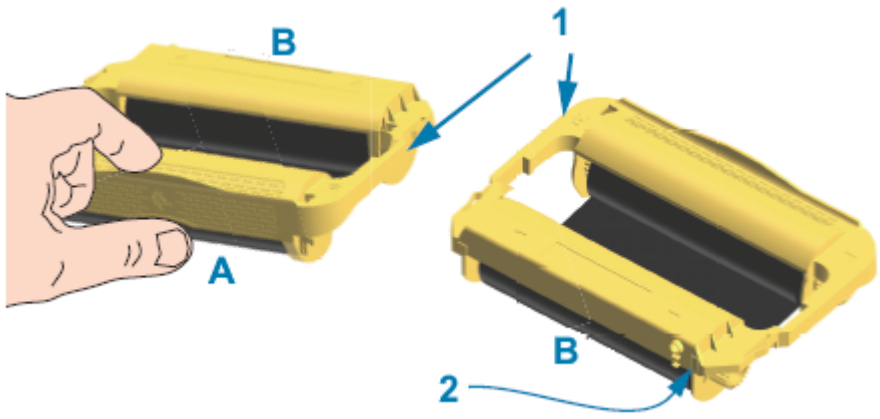
10. To verify the mode change from Direct Thermal printing to Thermal Transfer printing, print a configuration report. For instructions on printing this report, see Printing the Printer and Network Configuration Reports (CANCEL Self Test) on page 288.

    The PRINT METHOD on the printer configuration status report should read THERMAL-TRANS.

Loading the Ribbon Cartridge – ZD421 Ribbon Cartridge Printers Only

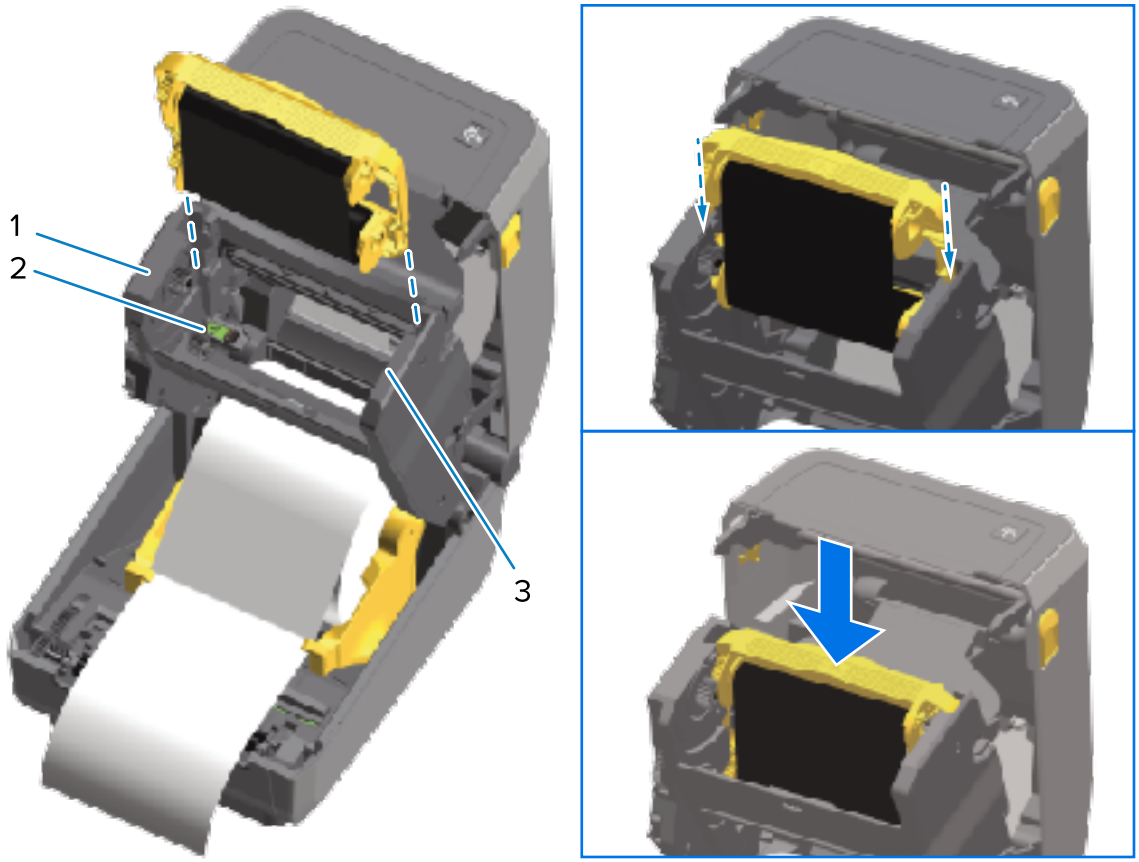
The printer uses a transfer ribbon cartridge for thermal transfer printing. This procedure involves sliding the cartridge into the ribbon transport and then closing the printer. The printer automatically reads the information about the cartridge that is stored on the cartridge.

NOTE: Only Genuine Zebra Ribbon Cartridges are supported.



1	Cartridge guide rails	A	Hold the ribbon cartridge here.
2	Cartridge information smart chip	B	Insert this end of the cartridge

1. Open the printer and insert the ribbon cartridge into the ribbon cartridge slot on the ribbon transport in your printer.



1	Front of ribbon transport
2	Smart chip reader
3	Cartridge guides

2. Push until the cartridge is nearly flush to the front of the ribbon transport.

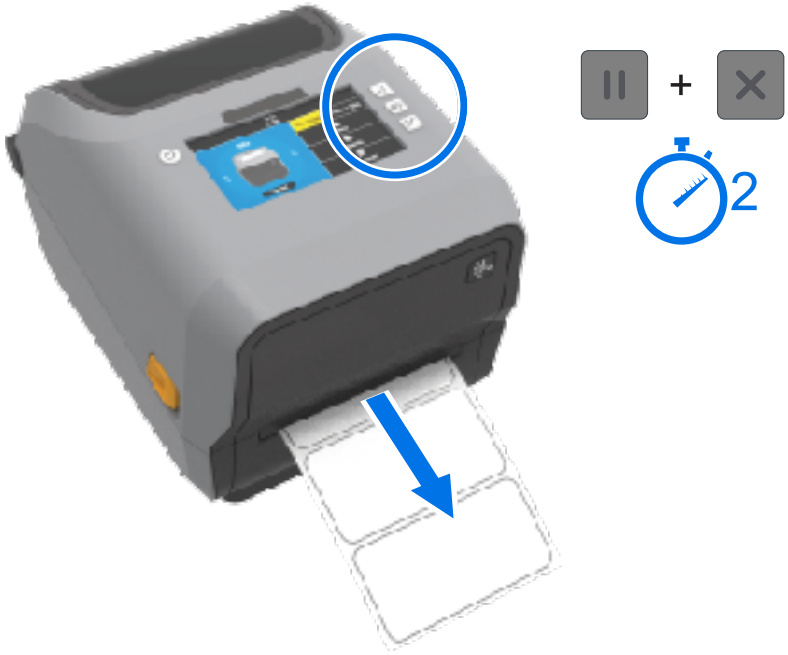
   You will hear and feel the cartridge lock into place.

Running a SmartCal Media Calibration

The printer must set media parameters for optimal operation prior to printing. To do this, it automatically determines the media type (web/gap, black mark/notch, or continuous) and the measure media characteristics for printing.

1. Make sure media is loaded (and also ribbon if you are using thermal transfer mode) properly in the printer and the top cover of the printer is closed.
2. Press **POWER** to turn printer power on and wait until the printer is in the Ready state.

   The STATUS Indicator lights solid green.
3. Press and hold **PAUSE** and **CANCEL** simultaneously for two seconds, then release.



The printer feeds and measures a few labels and adjusts media sensing levels. When it completes measuring, the STATUS indicator lights solid green.

NOTE: After initial calibration to a specific media, additional calibrations are not necessary for newly-loaded media as long as it is of the same type as the prior media used (media type, vendor, batch, size, etc.). The printer automatically measures the newly-loaded media and adjusts for any small changes in its characteristics when printing.

After you load a roll of new media from the same batch, you can synchronize the labels and get the media set for printing by simply pressing **FEED** (Advance) once or twice.

If the printer should fail to recognize and correctly calibrate to the media, see Manually Calibrating Media on page 299.

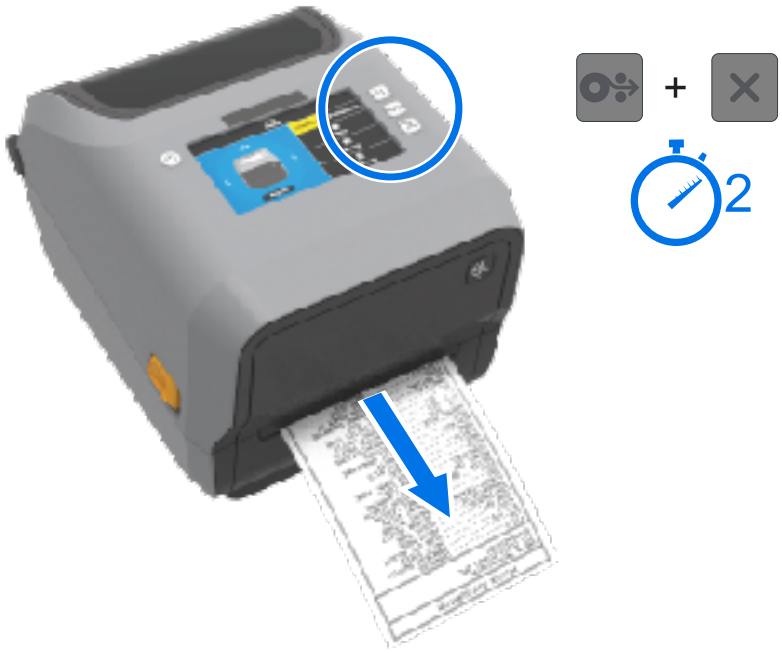
Test Printing with a Configuration Report

Before connecting the printer to a computer, make sure that the printer is in working order by printing a configuration report.

The information in the configuration reports may come in handy during printer installation and troubleshooting.

1. Make sure the media (and ribbon, if you printing on thermal transfer media) are loaded properly in the printer and the printer's top cover is closed.
2. Turn printer power ON.
3. After the printer enters ready state (the STATUS indicator lights solid green), press and hold **FEED** and **CANCEL** simultaneously for two seconds, then release.

The printer and network configuration reports print. When the printer stops printing the reports, the STATUS indicator turns solid green.



If you cannot get these reports to print, see Troubleshooting on page 273.

Detecting and Recovering from a Media-Out Condition

When you run out of media, your printer reports a media-out condition. The STATUS Indicator flashes red and the SUPPLIES indicator light up red. This is part of the normal media usage cycle.



To recovery from a media-out condition:

1. Open the printer.

   NOTE: During the media out alert, the media is usually at the end of the roll or nearly at the end of the roll, with a label missing from the liner.

2. Remove the remaining media and roll core.



3. Insert a new roll of media.

If you are installing more of the same media...	Load the new media and press **FEED** (Advance) one time to resume printing.
If the new media you have loaded is NOT the same as the prior media used with this printer (different size or length, or from a different vendor or batch)...	Load the new media and use the SmartCal procedure to calibrate the printer to the new media to ensure optimal print results.

NOTE: If you load media of a different size (length or width), you will usually need to change the programmed media dimensions or the active label format by adjusting the printer settings using the menu or through printer programming commands.

IMPORTANT: At times a label may be missing somewhere in the middle of your roll of labels instead of at the end of the media roll. This may cause the printer to issue a media-out alert. To recover from this alert condition:

1. Pull the media past the missing label until the next label is over the platen roller.
2. Close the printer.
3. Press **FEED** (Advance) once.

The printer resynchronizes the label position and readies to continue printing.

Detecting and Recovering from a Ribbon-Out Condition

When the printer runs out of ribbon, it alerts you of the condition. This is part of the normal printing cycle. Use these steps to replace the ribbon and continue printing.



1. Open the printer.

   NOTE: Typically, in the ribbon-out-condition, the reflective ribbon—which the printer uses to detect an end-of-ribbon condition—is exposed on the underside of the ribbon cartridge or ribbon roll. The front ribbon/top roll is also full.

2. Remove the used ribbon roll or ribbon cartridge from the take-up spindles and dispose of it properly. Keep the empty ribbon core (roll) so you can use it to load the new ribbon roll.
3. Load a new ribbon roll (or insert a new ribbon cartridge if your printer is a ribbon cartridge model).
4. Press **FEED** (Advance) once to resume printing.

Connecting the Printer to a Device

After you have set up the printer, you are ready to connect the printer to your device (such as a computer, phone, or tablet).

NOTE: If you purchased your printer in the EMEA region on or after August 1, 2025, go to Modifying or Viewing Secured Features on page 139.

Connect to a Phone or Tablet

Download the free Zebra Printer Setup Utility app for your device.

- Android devices
- Apple devices

The applications support the following types of connectivity:

- Bluetooth Classic
- Bluetooth Low Energy (Bluetooth LE)
- Wired/Ethernet
- Wireless
- USB On-The-Go

For the User Guides for these printer setup utilities, go to zebra.com/setup.

Connecting Your Printer to a Computer

Use these steps to connect your printer to a computer.

NOTE: If you purchased your printer in the EMEA region on or after August 1, 2025, go to Modifying or Viewing Secured Features on page 139.

1. Decide how you will connect to the printer.

   Your printer supports these interface options and configurations:

   - Universal Serial Bus (USB 2.0) interface — Standard. For cable requirements, see Interface Cable Requirements on page 169, Universal Serial Bus (USB) Interface on page 304, and Universal Serial Bus (USB) Interface on page 304.
   - RS232 Serial — Standard on ZD621 printers, and field upgrade option on ZD421 printers. See Serial Port Interface on page 304.
   - Ethernet / LAN — Standard on ZD621 printers, and field upgrade option on ZD421 printers. See Interface Cable Requirements on page 169 and Ethernet (LAN, RJ-45) on page 172 for cable requirements.
   - Internal Wi-Fi:
     - (802.11ac) and Bluetooth 4.1 (3.0 compatible).
     - 802.11ax and Bluetooth 5.3.

     See Wi-Fi and Bluetooth Classic Wireless Connectivity Option on page 173.

     NOTE: Zebra ZD Series printers, which are equipped with the Wi-Fi connectivity option, have support for Bluetooth Low Energy (low-speed connection). You can configure them using Zebra Setup Utilities, which are installed on an Android or iOS device.

   Be sure to review the cabling and unique parameters for each physical printer communication interface. This will help you set up the printer with the correct settings. For detailed instructions on configuring network (Ethernet / Wi-Fi) and Bluetooth communication, see the Wired and Wireless Print Server User Guide and the Bluetooth Wireless Guide available from the product information links listed in About this Guide.
2. Switch printer power OFF.
3. Connect the printer to the computer or device you will use to manage the printer using your selected connection method (USB, Ethernet / LAN, Wi-Fi, or Bluetooth).
4. Run Zebra Setup Utilities (ZSU) from your central device. See Running the Printer Installation Wizard on page 184.

The central device may be a Windows PC or laptop running the operating systems listed in Setup for Windows on page 181, an Android device, or an Apple device. Supported printer connection options are Wired/Ethernet, USB, and Wireless, Bluetooth Classic, and Bluetooth Low Energy (Bluetooth LE).

Zebra Setup Utilities (ZSU) are designed to assist you with installing these interfaces. To download the ZSU user guide, go to zebra.com/setup.

IMPORTANT: Wait to turn printer power ON until you are instructed to do so by the Installation Wizard. Keep the power switch in the OFF position when attaching the interface cable. The power cord must be inserted into the power supply and the power receptacle on the back of the printer BEFORE you connect or disconnect the communications cables.

The ZSU wizard installs the Zebra Windows drivers.

5. When the ZSU installation wizard prompts you do to so, turn printer power ON, then follow the on-screen instructions to complete the printer setup.

Interface Cable Requirements

Data cables must be fully shielded and fitted with metal or metalized connector shells. Shielded cables and connectors are required to prevent the radiation and reception of electrical noise.

To minimize electrical noise pickup in the cable:

- Keep data cables as short as possible (1.83 m [6 ft.] recommended).
- Do NOT tightly bundle the data cables with power cords.
- Do NOT tie the data cables to power wire conduits.

IMPORTANT: This printer complies with FCC Rules and Regulations, Part 15, for Class A Equipment, using fully-shielded data cables. Use of unshielded cables may increase radiated emissions above the Class A limits.

USB Interface

Universal Serial Bus (version 2.0 compliant) provides a fast interface that is compatible with your existing PC hardware. USB's plug-and-play design simplifies the installation. Multiple printers can share a single USB port/hub.

When using a USB cable, verify that the cable or cable packaging bears the "Certified USB™" mark (see below) to guarantee USB 2.0 compliance.


USB
CERTIFIED USB

Serial Interface

The printer uses a Null Modem (cross-over) cable for DTE communications. The required cable must have a nine-pin D-type (DB-9P) male connector on one end which plugs into the mating (DB-9S) serial port located on the back of the printer. The other end of this signal interface cable connects to a serial port on the host computer. See Interface Connector Wiring in this guide for pinout information.

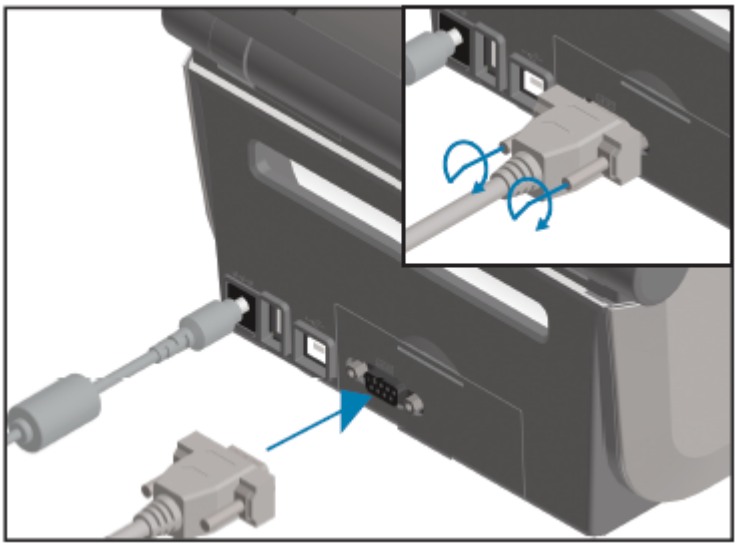
The serial port communication settings between the printer and host (typically a PC) must match for reliable communication. The Bits per second (or Baud rate) and Flow control are the most common settings that get changed.

Serial communications between the printer and the host computer can be set by:

- ZPL ^SC command.
- resetting the printer to its default printer configuration.

Factory defaults for serial communication settings are:

- 9600 baud
- 8 bit word length
- NO parity
- 1 stop bit
- XON/XOFF
- 'Software' data flow control in Windows-based host systems



IMPORTANT: Do not use RS-232 cable adapter dongles (DTE<=>DCE) with this printer. Some dongles can interfere with the operation of USB host port devices at printer power-up.

Ethernet (LAN, RJ-45)

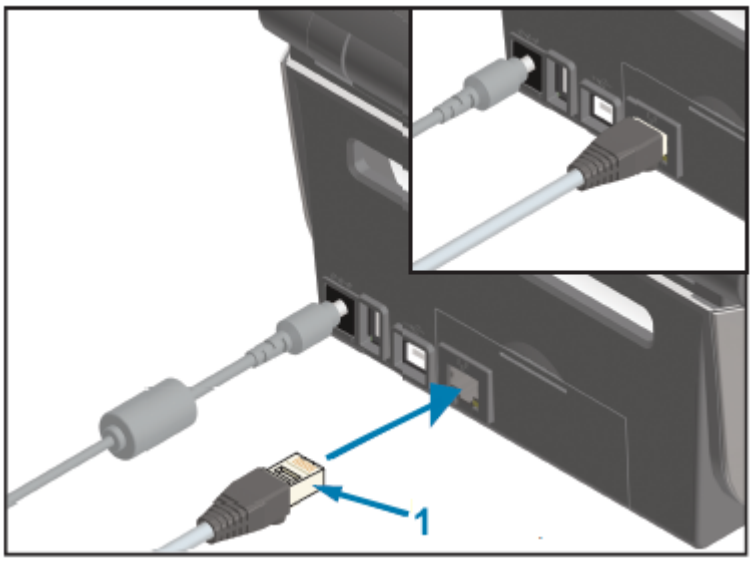
Your printer requires UTP RJ-45 Ethernet cable rated CAT-5 or better.

NOTE: For printers purchased in the EMEA region after August 1, 2025, you must configure a Protected Mode password and front panel password for the printer before you can perform wired or wireless setup. For additional information, go to zebra.com/asr or refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

For other printers with Protected Mode enabled, depending on the configuration, you may need to enter the Protected Mode password to change certain settings on the printer. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

Your printer must be physically connected to your Ethernet / LAN network using the appropriate cable and be configured properly to make a network connection and operate on your network.

The printer includes an in-built network print server which can be accessed through the printer's print server web pages.



1	Ethernet cable (RJ-45 connector)

NOTE: For information on how to configure your printer to run on a compatible Ethernet / LAN, see the Wired and Wireless Print Server User Guide.

Ethernet Status / Activity Indicators

The Ethernet connector on the printer has two status / activity indicators. These indicators are partially visible to provide interface status at the connector.

The printer has user interface also has indicator lights. These lights display printer network operation status. See Meaning of the Indicator Light Patterns on page 54 for more details.

LED Status	Description
Both OFF	No Ethernet link detected.
Green	100 Mbps link detected.
Green with the Amber flashing	100 Mbps link and Ethernet activity detected.

LED Status	Description
Amber	10 Mbps link detected.
Amber with the Green flashing	10 Mbps link and Ethernet activity detected.

Assigning an IP Address for Network Access

All devices on an Ethernet network (LAN and WLAN) including your printer require a network IP (Internet Protocol) address.

You will need the printer's IP address to access the device for printer configuration and for printing.

There are five ways to assign an IP address:

- DHCP (Dynamic Host Configuration Protocol) (default setting)
- Zebra Setup Utilities (includes the ZebraDesigner Windows printer driver)
- Telnet
- Mobile Apps
- ZebraNet Bridge.

DHCP for Personal Networks

Your printer is set to operate on an Ethernet LAN or Wi-Fi network with DHCP by default.

This setting is intended primarily for personal networks. The network automatically provides a new network IP address each time printer power is turned ON.

The Windows printer driver uses a Static IP address to connect to the printer. You must change the IP address set in the printer driver to access the printer if its assigned IP address has changed after initial printer installation.

Using Your Printer on a Managed Network

Using the printer in a structured network (LAN or Wi-Fi) requires a network administrator to assign the printer a Static IP address and establish other settings that your printer needs to operate on the network.

Print Server User ID and Password Defaults

You will need the default User ID and/or default password for the printer's in-built print server to access some printer's features and its WiFi option.

Factory default User ID: `admin`

Factory default Password: `1234`

Wi-Fi and Bluetooth Classic Wireless Connectivity Option

NOTE: For printers purchased in the EMEA region after August 1, 2025, certain connectivity options are disabled by default. To enable these options, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

This user guide covers only basic configuration of your Internal Wi-Fi Print Server and Bluetooth Classic 5.3 wireless connectivity options as described in Setting Up the Wi-Fi Print Server Option on page 188 and Configuring the Printer Using Bluetooth on page 198.

For details on your printer's Ethernet and Bluetooth operations, see the Wired/Wireless Print Server User Guide and the Bluetooth Printer Management Guide available from zebra.com.

Update Printer Firmware to Finish Option Installations

It is recommended that you always update the printer's firmware with the latest version for optimal printer performance.

For instructions on how to update printer firmware, see Updating Printer Firmware on page 272. See About This Guide on page 13 for links to printer support pages for your specific Link-OS printer model and firmware updates for your printer model(s).

What To Do If You Forget to Install the Printer Drivers First

If you plug your Zebra printer into a power source and printer power is turned ON before installing the drivers, the printer displays as an Unspecified device on your host computer. Use this procedure to make sure the printer is identifiable by name on your host device.

NOTE: The images in this section depict screens for Windows 10. The screens that display for you depend on the operating system.

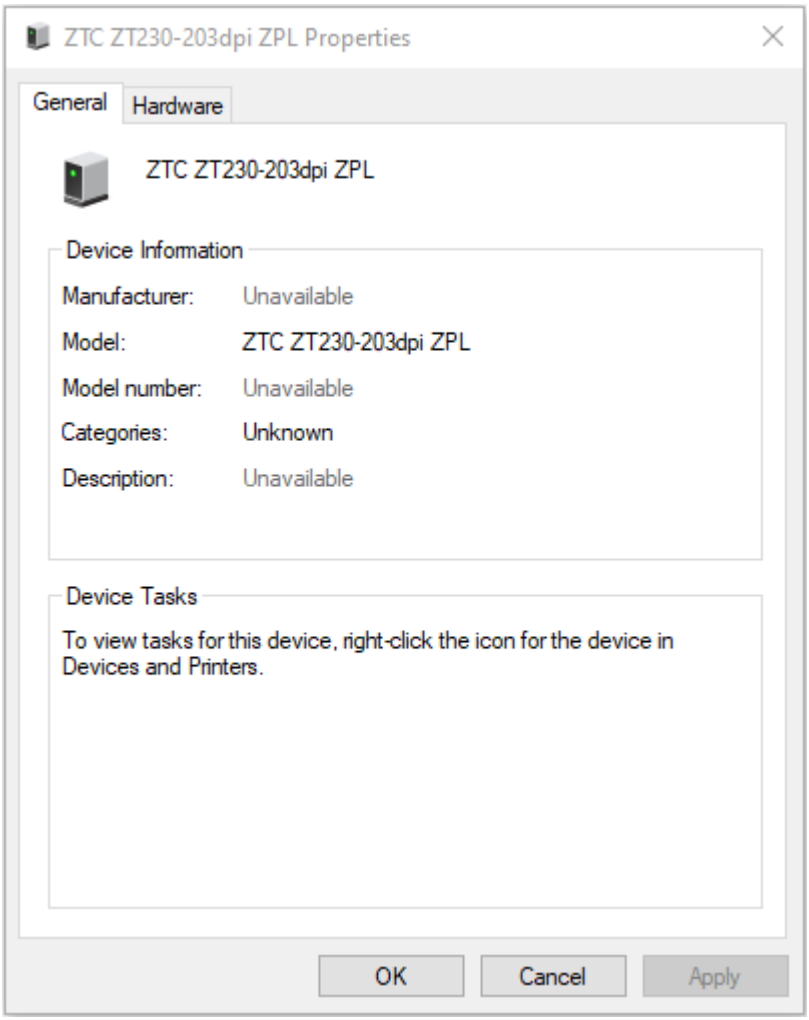
1. From the **Windows** menu, open the **Control Panel**.
2. Click **Devices and Printers**.

   In this example, the ZTC ZT320-203dpi ZPL is an incorrectly installed Zebra printer.

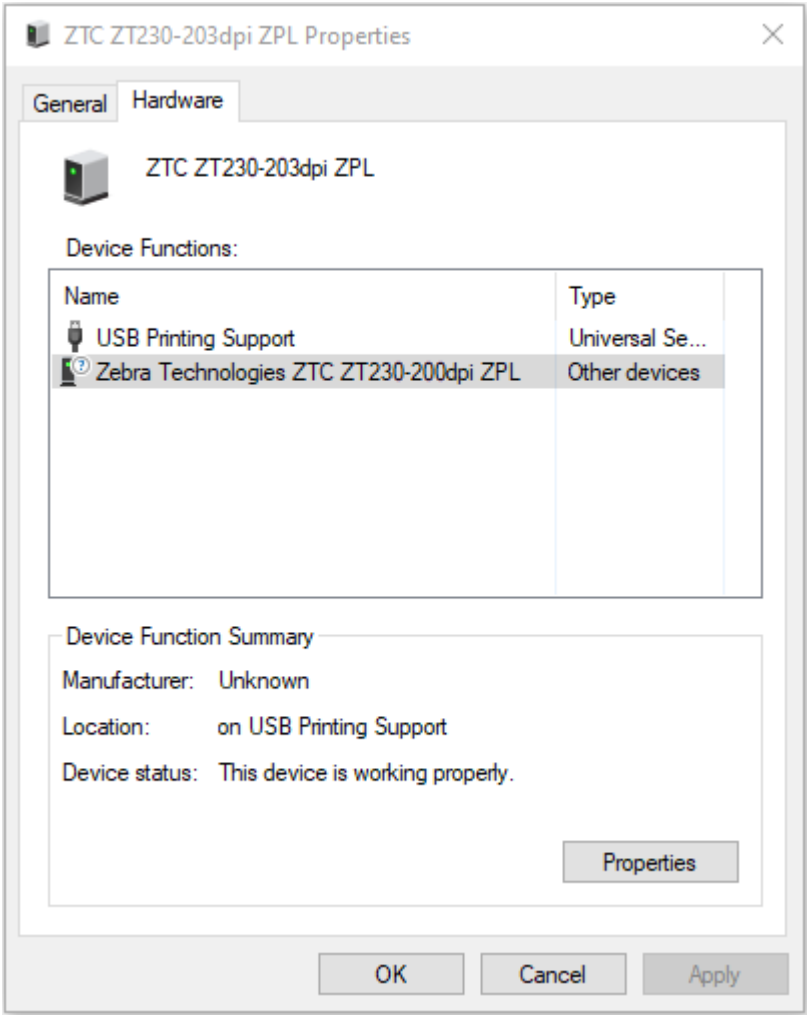


3. Right-click on the icon representing the device, then select **Properties**.

   The properties for the device display.

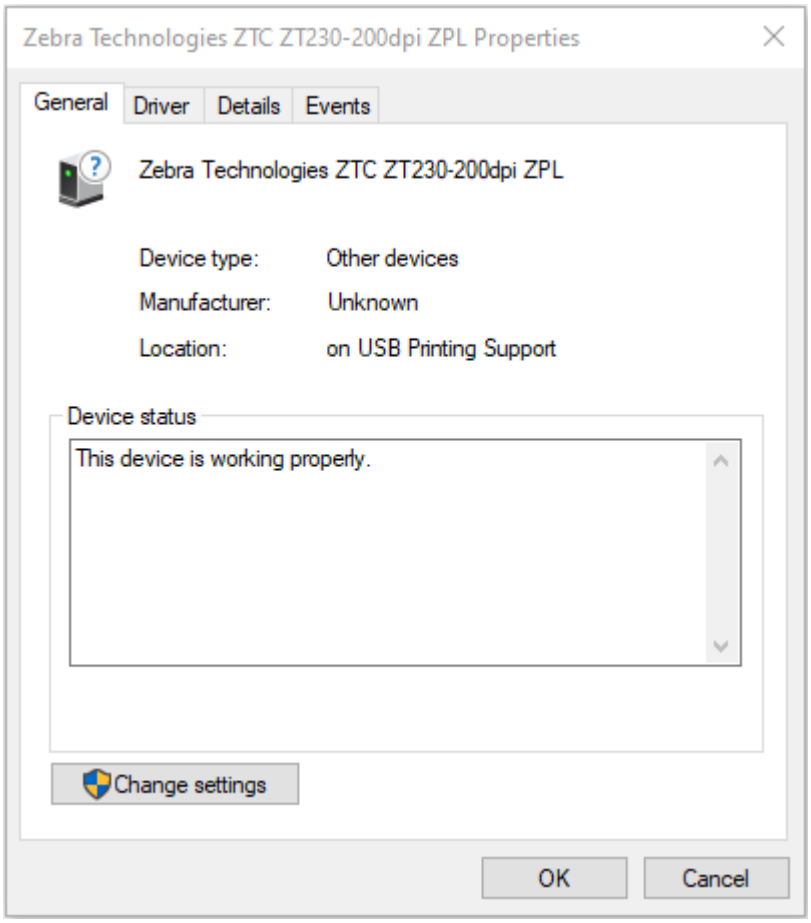


4. Click the **Hardware** tab.

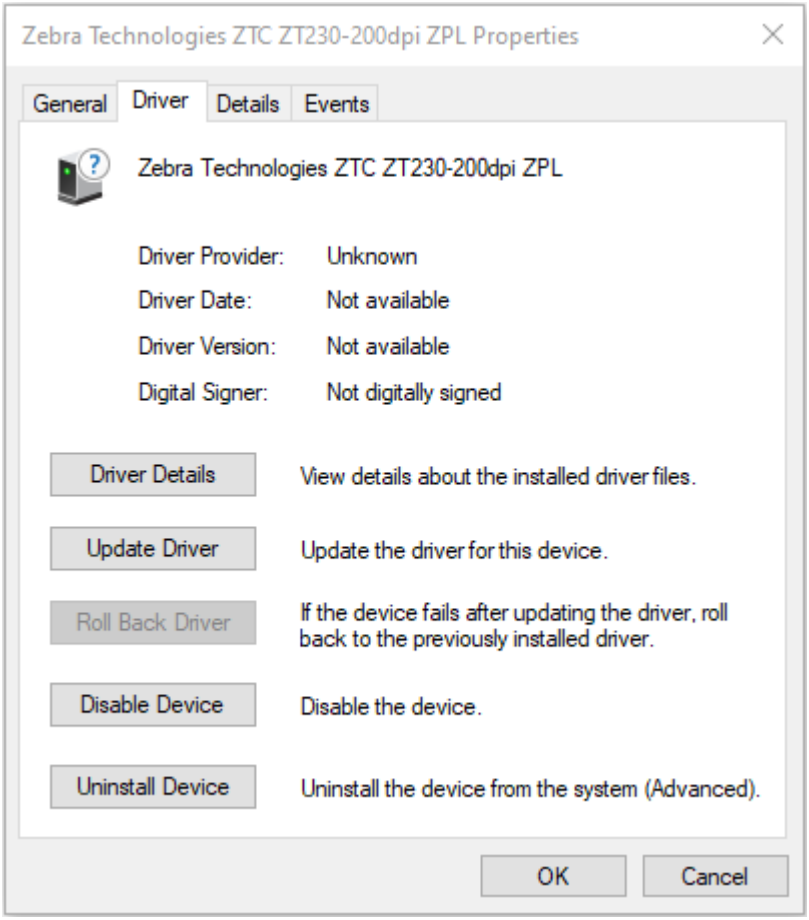


5. Select the printer in the **Device Functions** list, and then click **Properties**.

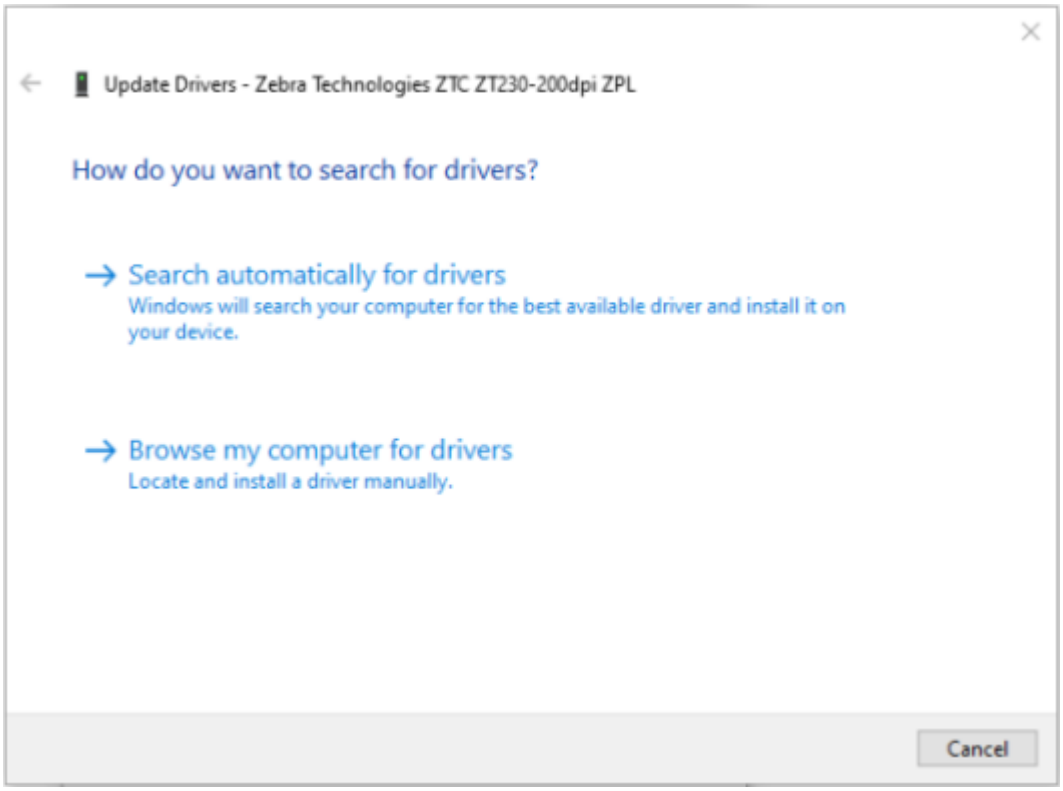
   The properties display.



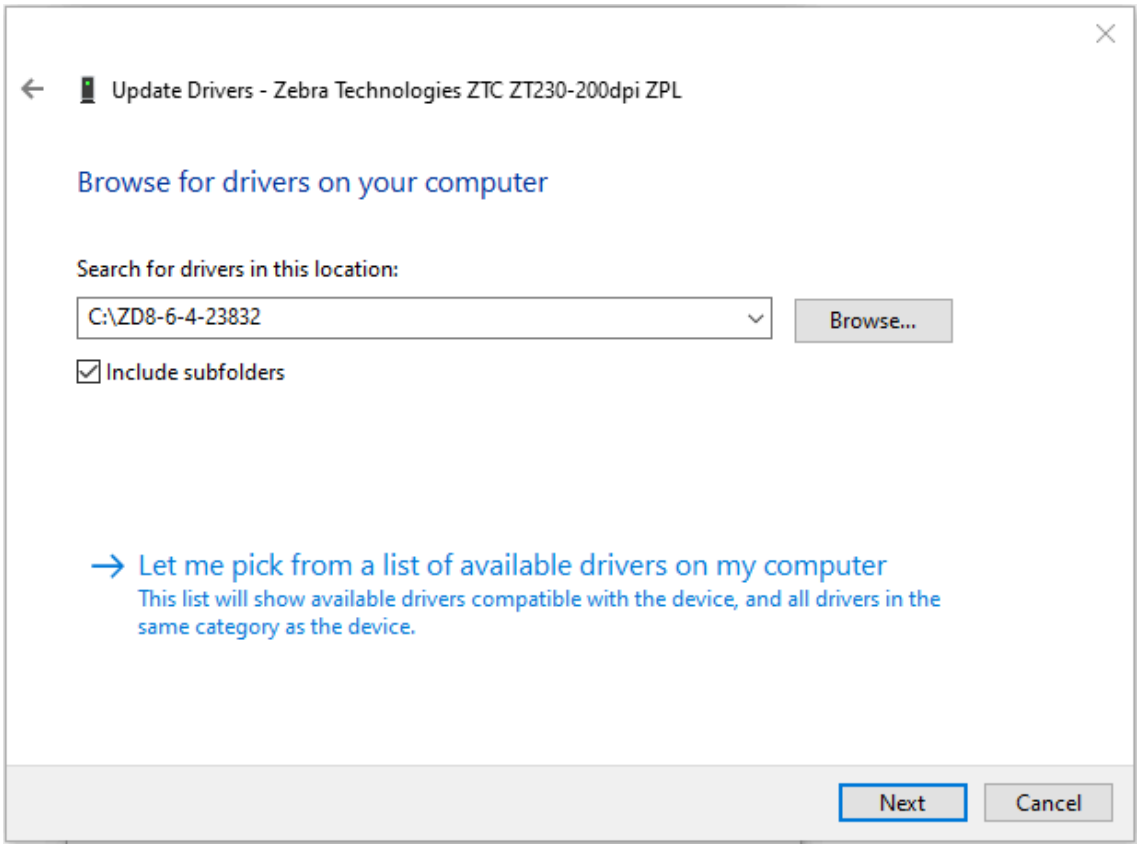
6. Click **Change settings** and then click the **Driver** tab.



7. Click **Update Driver**.



8. Click **Browse my computer for driver software**.
9. Click **Browse**... and navigate to the **Downloads** folder.
10. Click **OK** to select the folder.



11. Click **Next**.

    The device is updated with the correct drivers.

Setup for Windows

The section helps you setup communications between your printer and the Windows operating system environment.

Windows-to-Printer Communication Setup (Process Overview)

Use this overview to understand how to set up your printer using the most common (supported) Windows operating systems and a local (wired) connection.

You may also set up your printer using factory-installed Wi-Fi or Bluetooth as described in asas Setting Up the Wi-Fi Print Server Option on page 188 and Configuring the Printer Using Bluetooth on page 198.

1. Download the Zebra Setup Utilities (ZSU) from one of the printer information pages listed in About This Guide on page 13.
2. Make sure printer power is OFF.
3. Run Zebra Setup Utilities (ZSU) from your Download directory.
4. Click **Install New Printer** and run the installation wizard.
5. Click **Install Printer**, then select your printer's model number from the list of Zebra printers.
6. Select the appropriate USB port and connect to the PC.

   You can use the USB interface for a wizard-guided installation of networked devices or Bluetooth Classic (4.0) devices.
7. When the installation wizard instructs you to do so, turn printer power ON.
8. Use the wizard to configure printer communications for the selected interface type.
9. Perform a print test to verify that your printer has been set up properly. See how to output a test print in After Your Printer is Connected on page 205.

IMPORTANT: If you did not install the printer drivers before connecting to the printer when it was powered ON, see What To Do If You Forget to Install the Printer Drivers First on page 174.

Installing the Windows Printer Drivers

To use your printer with a Microsoft Windows-based computer, you must install the correct drivers first. Use the Zebra Setup Utilities to install the printer drivers on your central device and run the Utilities with power to the printer is switched OFF. These drivers enable you to set up and manage your printer from the convenience of your central device: a Windows PC, an Android device, or an Apple device.

NOTE: You may connect your printer to your computer using any of the supported connections that are available to you to use. However, do NOT connect any cables from your computer to the printer UNTIL you are instructed to do so by the installation wizards. If you connect the cables at the wrong time, your printer will not install the correct printer drivers. To recover from incorrect driver installation, see What To Do If You Forget to Install the Printer Drivers First on page 174.

NOTE: If using a PC, it must run a Zebra-driver-supported Windows OS. (See the Zebra Setup Utilities Release Notes for a list of supported Windows operating systems.)

If you are using a physical cable to connect your computer to the printer, be sure to review the cabling specifications and the parameters specific to the physical communication interface you plan to use. This information will help you make the appropriate configuration setup choices both prior to and immediately after you apply power to the printer.

- For basic interface cabling requirements, see Interface Cable Requirements on page 169.
- For USB cable requirements and information on basic USB connectivity, see USB Interface on page 169.
- For Ethernet cable specifications and information on basic Ethernet connectivity, see Ethernet (LAN, RJ-45) on page 172.
- For detailed information on installing Ethernet/LAN and Bluetooth interfaces, see the Wired/Wireless Print Server User Guide and the Bluetooth Printer Management Guide available from zebra.com.

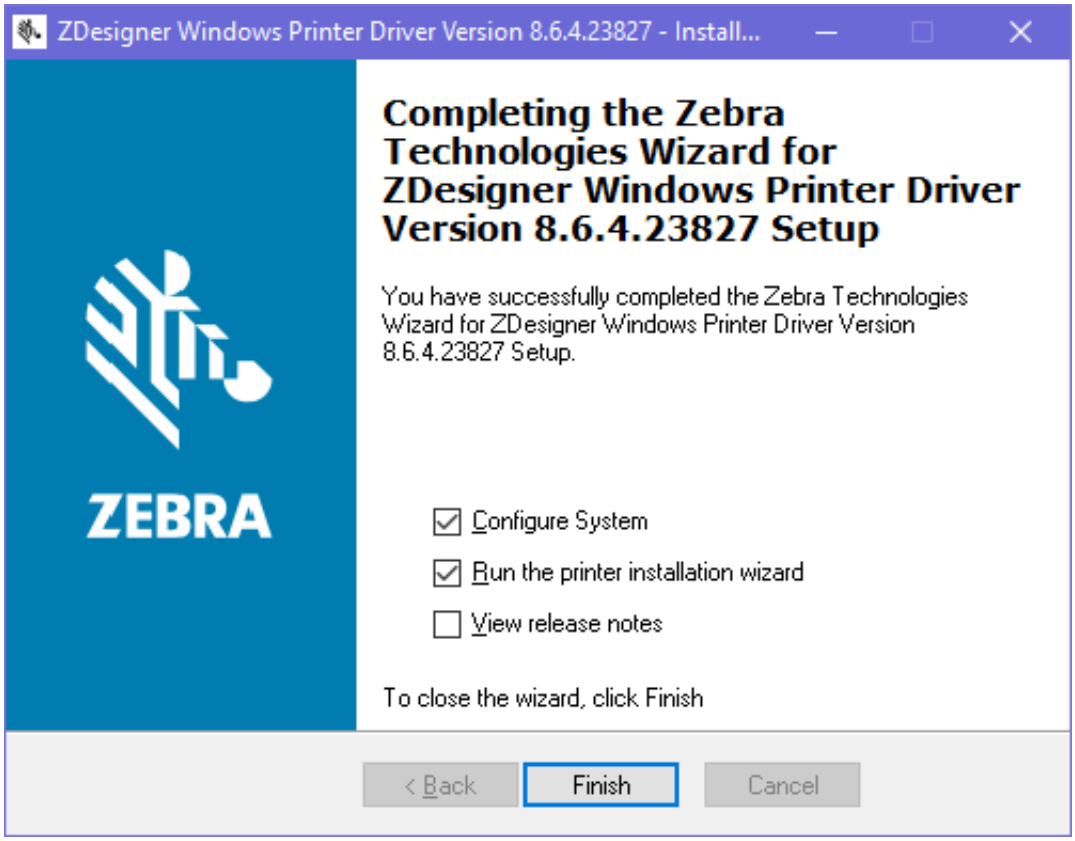
1. Navigate to zebra,com/drivers.
2. Click **Printers**.
3. Select your printer model.
4. On the product page for your printer, click **Drivers**.
5. Download the appropriate driver for Windows.

   The driver executable file (such as `zd86423827-certified.exe`) is added to your Download folder.
6. Ensure printer power is OFF.

   IMPORTANT: Do NOT turn printer power on until you are instructed to do so by the Setup Wizard.
7. From your PC, run the Zebra Setup Utilities (ZSU) executable and follow the prompts.

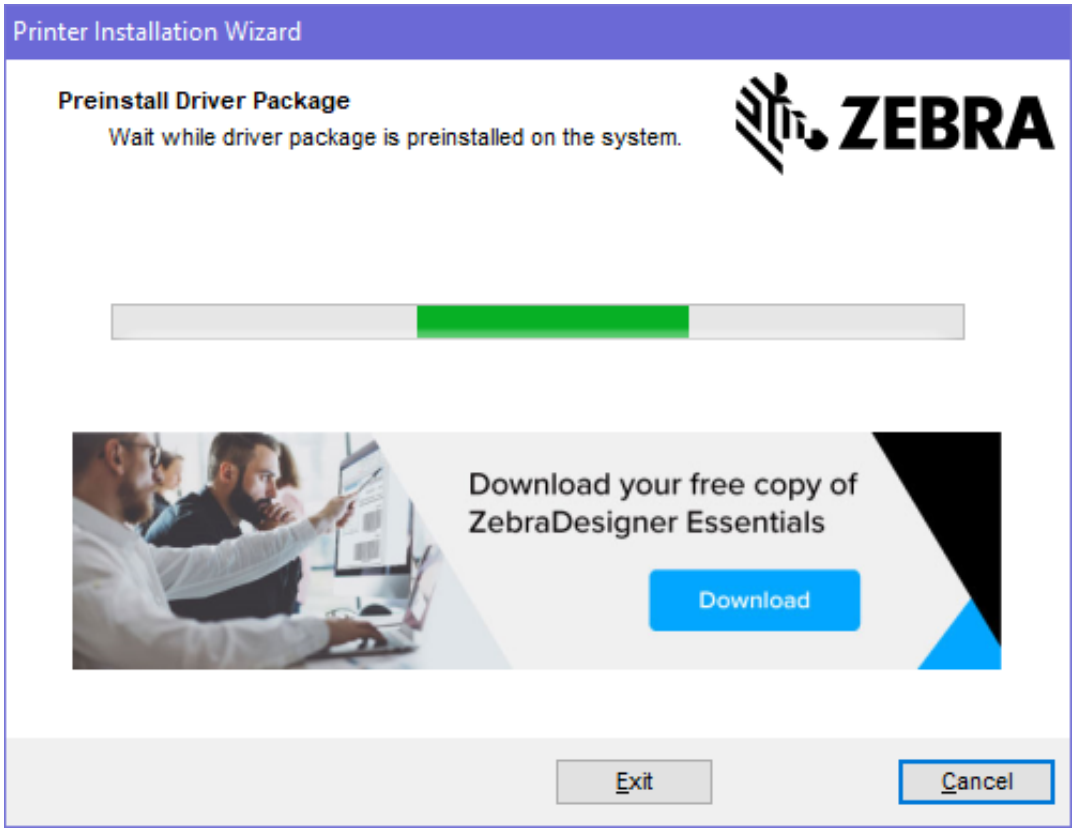
   The setup wizard installs the printer drivers and prompts you to turn printer power ON.

   NOTE: When setup is complete, you may select to add the drivers to your system (Configure System) or elect to add specific printers in a later step.



8. Select **Configure System** and click **Finish**.

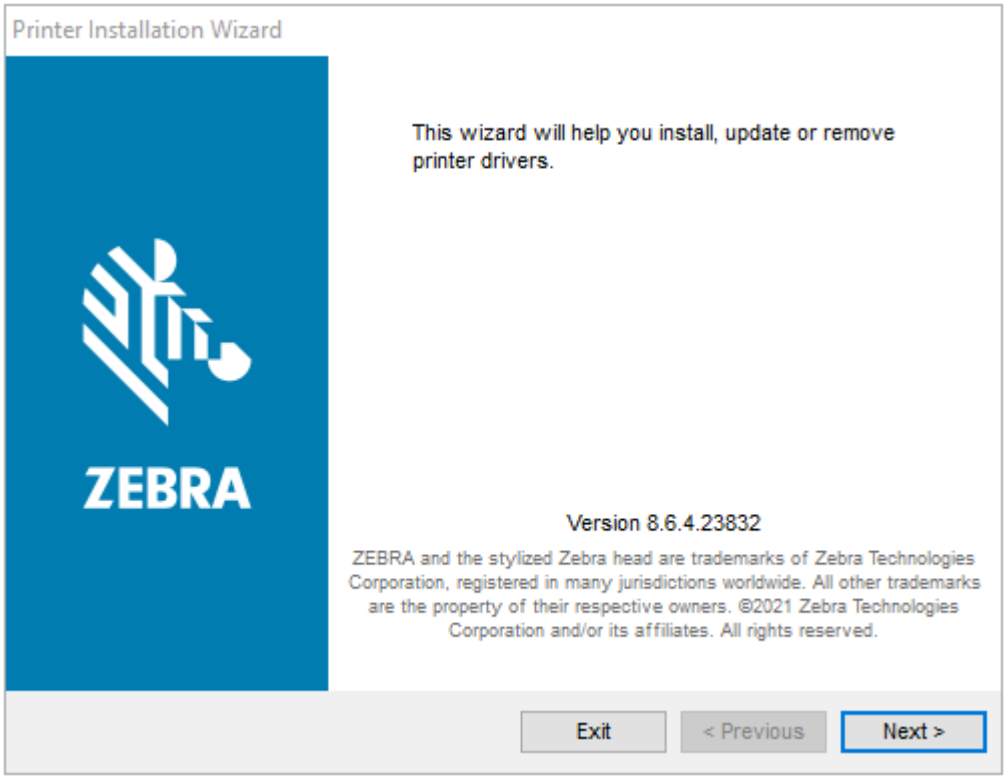
   The Printer Installation Wizard installs the drivers.



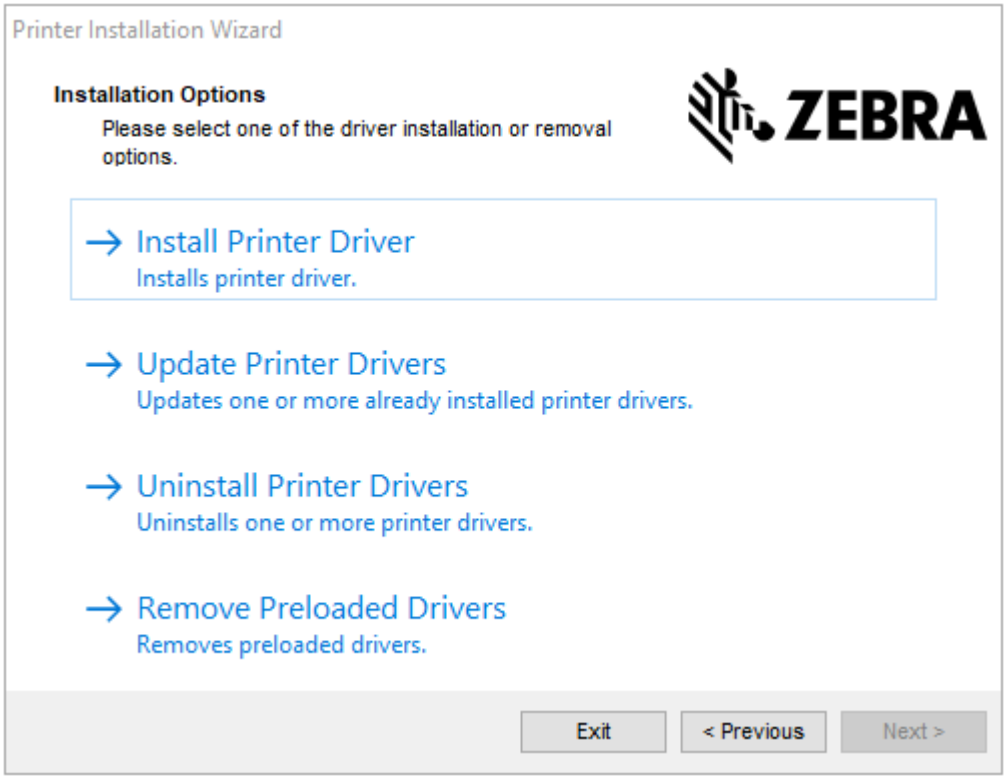
Running the Printer Installation Wizard

1. On the last screen of the driver installer, leave **Run the Printer Installation Wizard** checked, then click **Finish**.

   The Printer Driver Wizard displays.



2. Click **Next**.

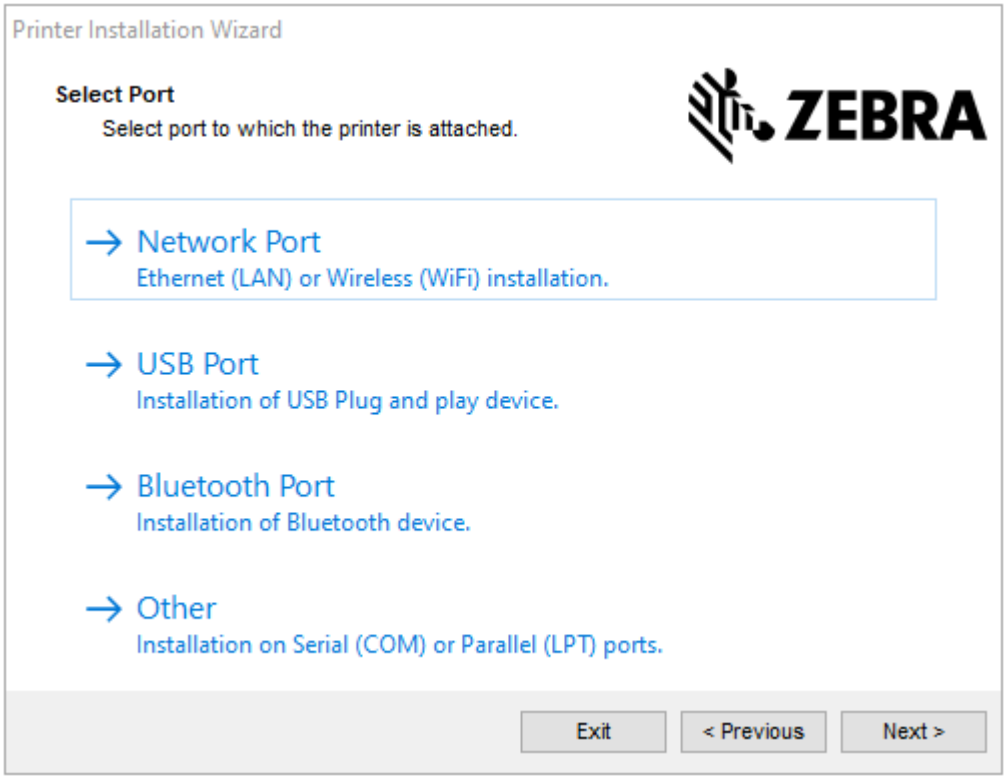


3. Click **Install Printer Driver**.

The license agreement displays.



4. Read and accept the terms of the license agreement, and then click **Next**.



5. Select the communication option that you want to configure for your printer:
   - Network Port: To install printers with an Ethernet (LAN) or wireless (Wi-Fi) network connection. Wait for the driver to scan your local network for devices and follow the prompts.
   - USB Port: To install printers connected with the USB cable. Connect the printer to the computer. If the printer is already connected and powered on, you may need to remove the USB cable and install it again. The driver will automatically search for the model of the connected printer.
   - Bluetooth Port: To install printers with a Bluetooth connection.
   - Other: For installation on another type of cable, such as Serial (COM). No additional configuration is necessary.
6. If prompted, select your printer model and resolution.

   The model and resolution are listed on the printer configuration label. For instructions on printing a label, see Printing the Printer and Network Configuration Reports (CANCEL Self Test) on page 288.

Setting Up the Wi-Fi Print Server Option

The wireless radio option (which includes Wi-Fi, Bluetooth Classic and Bluetooth Low Energy) is available ONLY as a factory-installed configuration. These instructions guide you through basic configuration of your internal Wi-Fi Print Server option using the Connectivity Wizard.

NOTE: For printers purchased in the EMEA region after August 1, 2025, you must configure a Protected Mode password and front panel password for the printer before you can perform wired or wireless setup. For additional information, go to zebra.com/asr or refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

For other printers with Protected Mode enabled, depending on the configuration, you may need to enter the Protected Mode password to change certain settings on the printer. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

You may configure your printer for wireless operation using one of these methods:

Using the Connectivity Wizard (covered in this guide)	When run, the wizard writes a ZPL script to enable your PC to communicate with your printer over Wi-Fi. Towards the end of the process, the wizard prompts you to either send the command directly to your printer, or save the ZPL script to a file. If you elect to save this ZPL file: • You can send the file to one or more printers that will use the same network settings, using any available connection (serial, parallel, USB, or wired print server). • You can resend the file to the printer at a future time if the printer's network settings were restored to their factory defaults.
Using a ZPL script that you write yourself*	Use the `^WX` command to set the basic parameters for Security Type.
Using Set/Get/Do (SGD) commands that you send to the printer	Begin with `wlan.security` to set the Wireless Security type. Then add other SGD commands (which will be necessary based on the security type you select) to specify the other required parameters.
NOTE: * Refer to the ZPL Programming Guide for more information on these options. You can send these commands through any available connection (serial, parallel, USB, or wired print server).	

The following settings must be configured correctly for your printer to connect through Wi-Fi:

- **ESSID**—specify the ESSID value that matches the value used by your wireless router. Check with your network administrator for the ESSID value to use.
- **WLAN Gateway**—Match the gateway value of your WLAN.
- **WLAN Subnet**—Match the subnet value of your WLAN.

If you make changes to any of these settings, reset the network to allow changes to the network settings to take effect. (See Connection Networks Reset Network on page 98.)

Configuring the Printer Using ZebraNet Bridge's Connectivity Wizard

While you have several options to connect to and configure your printer for cloud, WLAN and LAN operations, the recommended tool to use is Link-OS Profile Manager. Link-OS Profile Manager is provided with the ZebraNet Bridge Enterprise (for local and LAN configurations), a configuration utility that is available for download from zebra.com/software.

NOTE: For printers purchased in the EMEA region after August 1, 2025, you must configure a Protected Mode password and front panel password for the printer before you can perform wired or wireless setup. For additional information, go to zebra.com/asr or refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

For other printers with Protected Mode enabled, depending on the configuration, you may need to enter the Protected Mode password to change certain settings on the printer. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

The Connectivity Wizard (which is part of this software) allows you to easily configure your printer for wireless operation by authoring the appropriate ZPL script for your printer. Use this utility to configure your printer's wireless print server either for the first time or after you reset the printer's network options to their factory defaults.

1. If it is not already downloaded and installed, download ZebraNet Bridge Enterprise version 1.2.5 or later from zebra.com/software and install it on your computer.

   NOTE: You will need ZebraNet Bridge Enterprise version 1.2.5 or later to configure the printer.

2. Launch the ZebraNet Bridge Enterprise utility. If you are prompted for a serial number, you can choose to click **Cancel** and continue using the Connectivity Wizard.
3. From the Windows **Menu** bar, select **Tools** > **Connectivity Wizard**.

   The Connectivity Wizard opens.

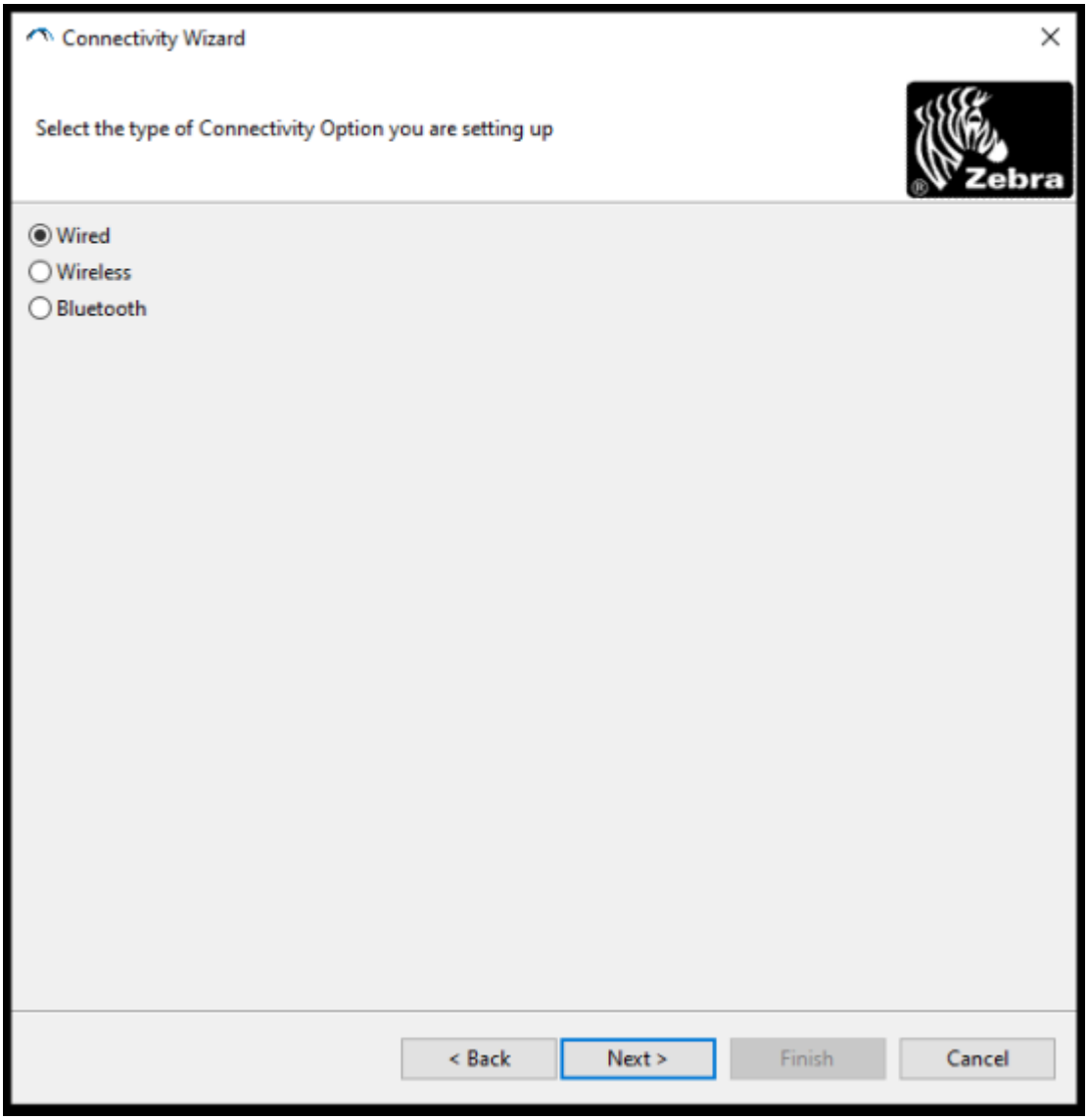


4. From the **Choose Port** list, select the port to which your printer is connected.

If you want to save the file without sending it to a printer...	Select any available port.
If you decide to select **File**...	Browse to the location of the file.
If you select a serial port...	Serial port configuration information appears below the **Choose Port** list. If necessary, change the serial communication settings to match your printer's settings. **NOTE:** If a port is in use by another device, it will NOT appear in the drop-down list.

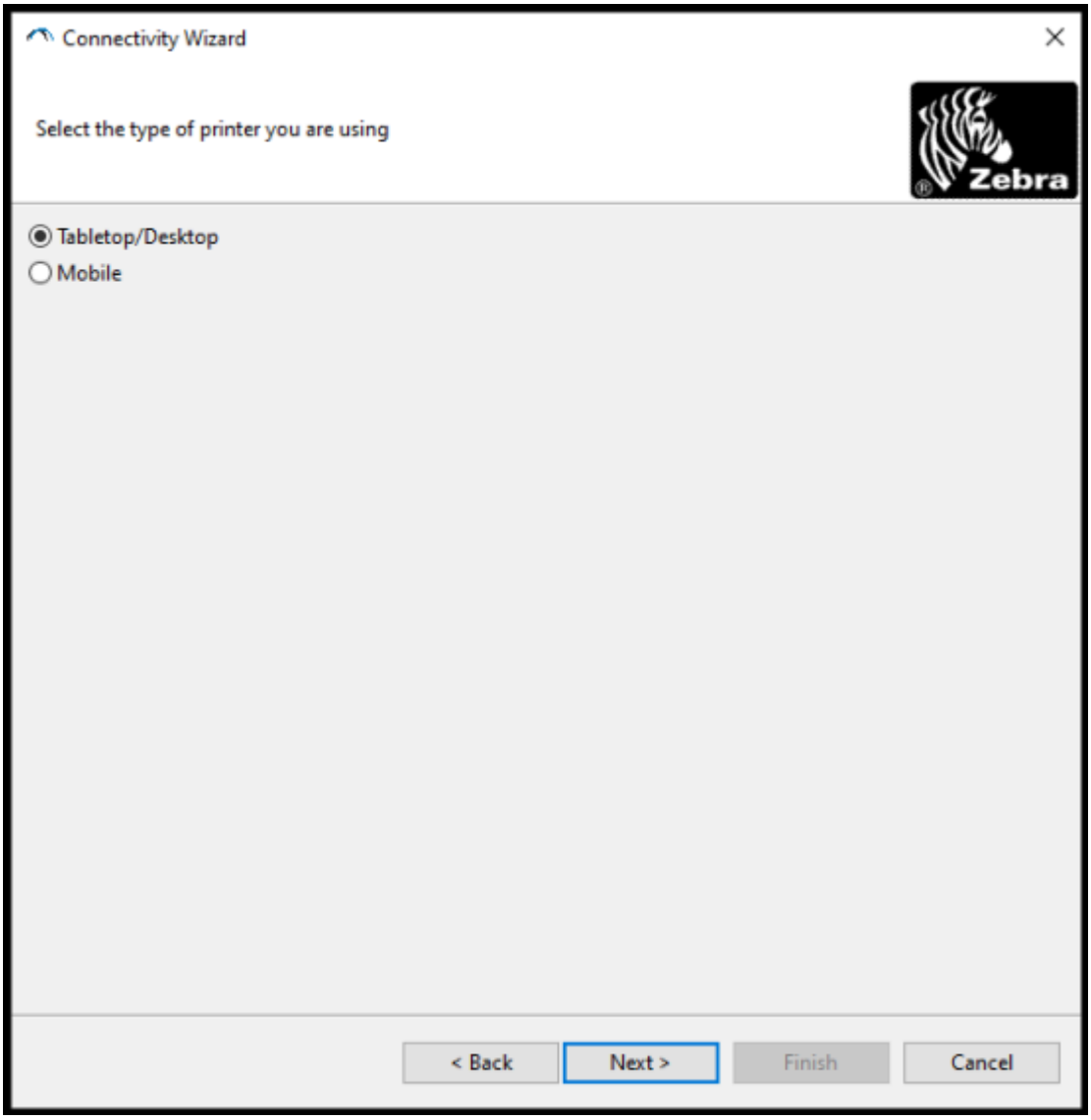
5. Click **Next**.

   The wizard prompts you to select the print server device to configure.



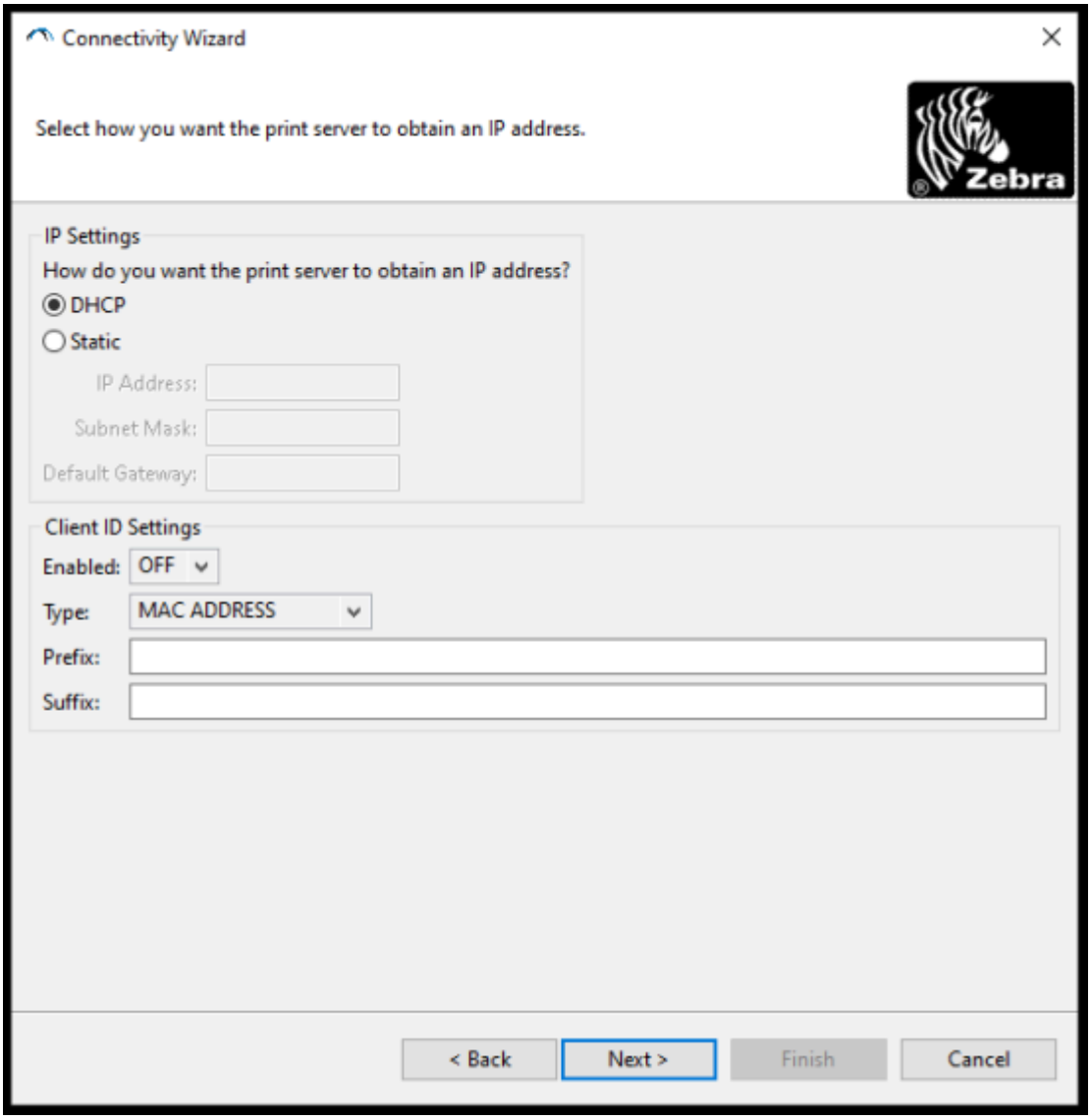
6. Select **Wireless**, then click **Next**.

   The wizard prompts you for the type of printer you are using.



7. Select the type of printer you are using, then click **Next**.

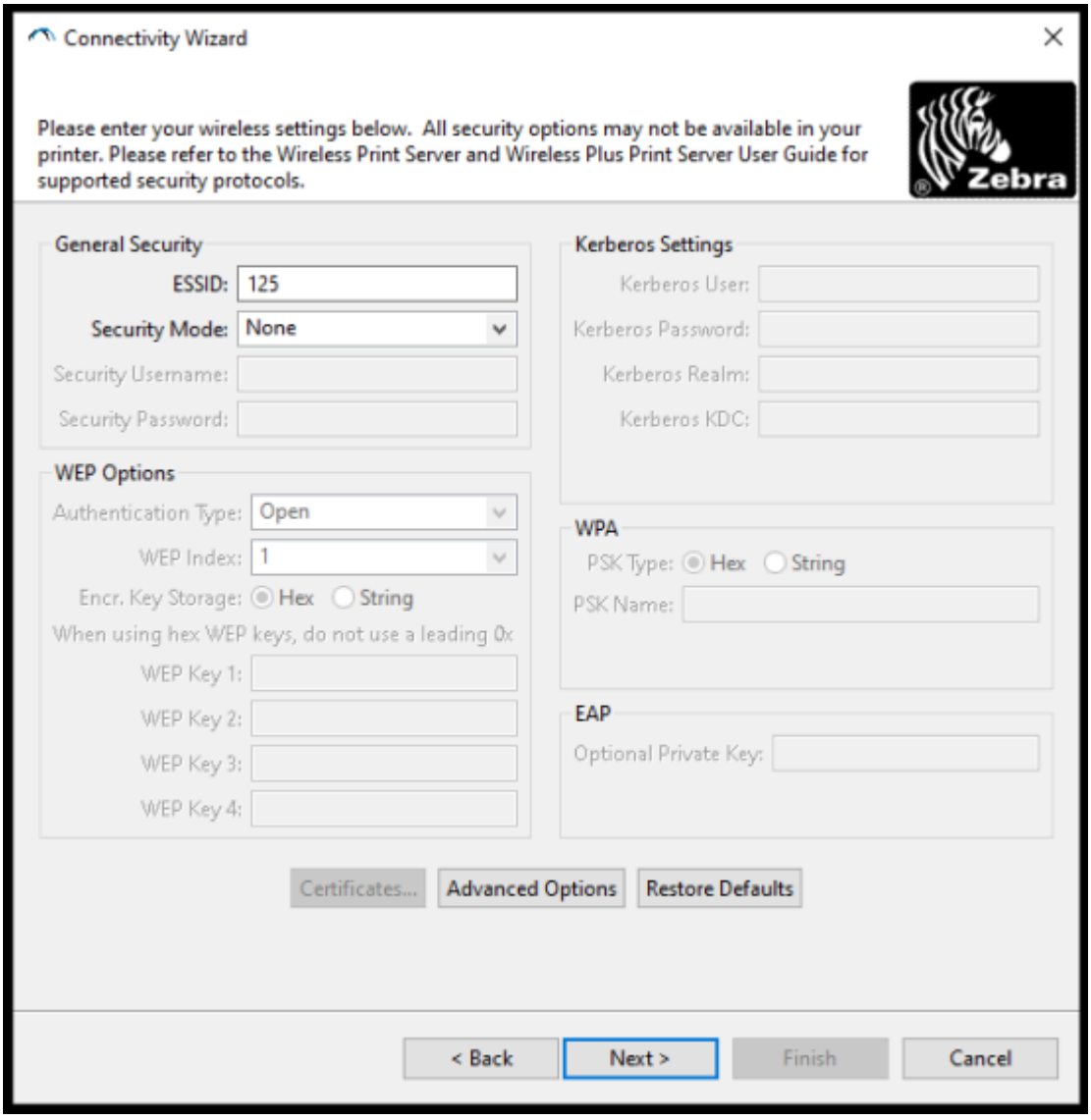
   The wizard prompts you to enter the wireless IP details.



8. Enable the **DHCP** (dynamic) option or the **Static** IP option.

If you chose **DHCP**...	Click **Next** and proceed to the next step in this procedure.
If you chose **Static**...	Enter the **IP Address**, Default Gateway, and Subnet Mask for the wireless print server and click **Next**. Contact your network administrator for the correct values to use.

The Wireless Settings window opens.



9. Enter the **ESSID**.

NOTE: You must set the **ESSID** (and passphrase, if you use one) at your access point before completing these steps.

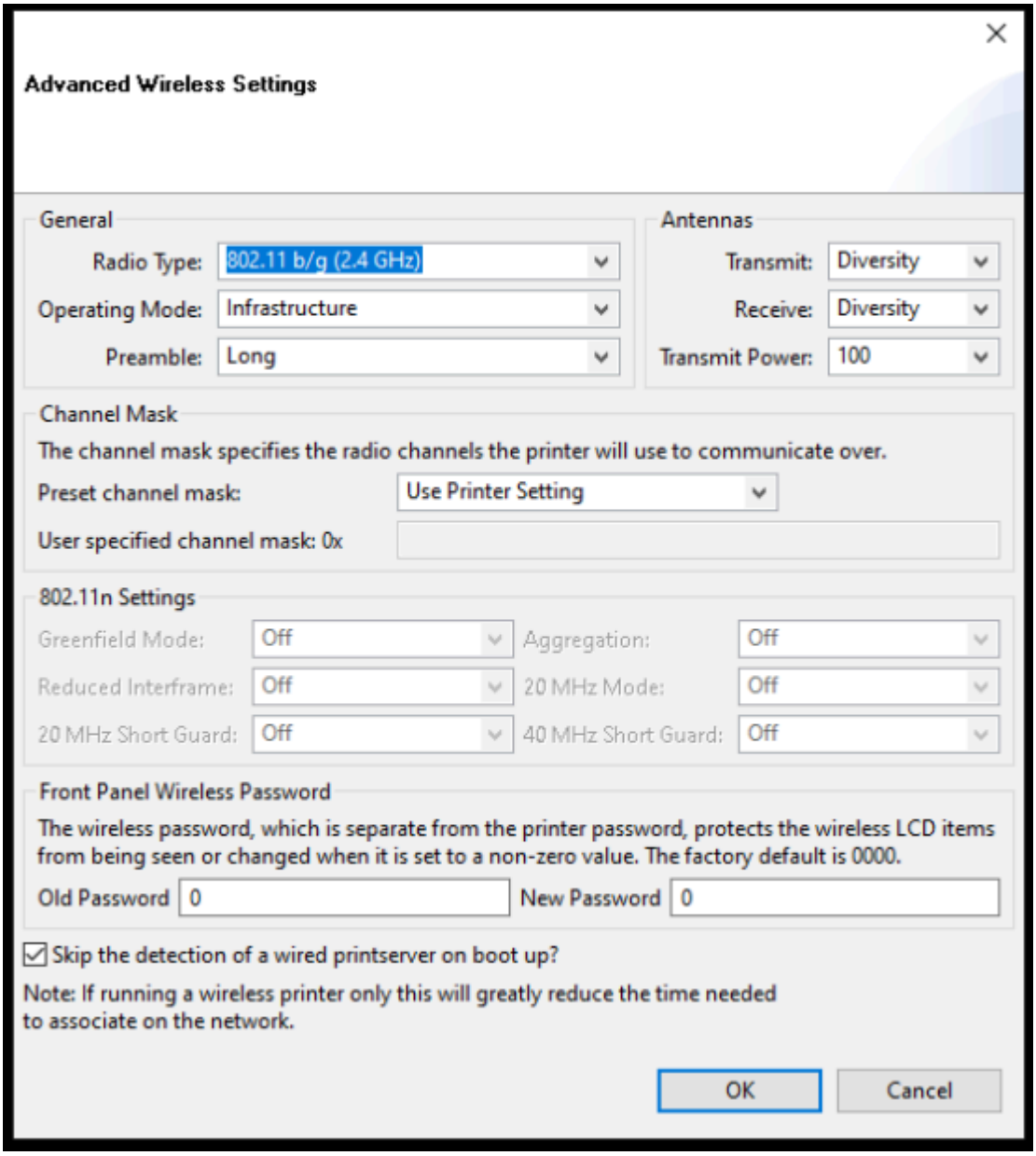
10. From the **Security Mode** dropdown, select the appropriate mode. Depending on the option you choose, complete the additional steps listed below the option you decide to use, before moving on to the next step in this procedure.

If you select...	Perform these additional steps, then proceed to the next step in this procedure.
None (no security protocol)	Skip this step.

If you select...	Perform these additional steps, then proceed to the next step in this procedure.
WEP 40-Bit or **WEP 128-Bit**	In the WEP Options section of the window, enter the following values: • Authentication Type • WEP Index • Encryption Key Storage • WEP Keys
EAP-TLS, EAP-TTLS, EAP-FAST, or WPA-EAP-TLS	In the EAP section, if necessary, enter an **Optional Private Key**.
PEAP, LEAP, WPA-EAP-TTLS, WPA-PEAP, or WPA-LEAP	In the General Security section, enter the **Security Username** and **Password**.
WPA-PSK	In the WPA section, select the **PSK Type**, and enter the **PSK Name**.
WPA-EAP-FAST	In the General Security section, enter the **Security Username** and **Password**. In the EAP section, if needed, enter an **Optional Private Key**.
KERBEROS	Under Kerberos Settings, enter values for **Kerberos User**, **Kerberos Password**, **Kerberos Realm**, and **Kerberos KDC**. **NOTE:** KERBEROS is NOT supported on Internal Wireless Plus print servers or radio cards.

11. Click **Next**.
12. In the Wireless Settings window, click **Advanced Options**.

    The Advanced Wireless Settings window opens.



13. Review and change the settings in the Advanced Wireless Settings window as needed.
14. Click **OK** to return to the Wireless Settings window.
15. Click **Next**.

    Based on the selections you made in the preceding steps, the wizard creates a script file with the appropriate ZPL commands and displays them for your review.

    If you selected **Tabletop/Desktop**, a dialog box similar to this one displays:



16. Decide if you will send the script immediately, or save it for use at a later time.

Sending a ZPL Configuration Script to the Printer

Complete printer Wi-Fi server setup by sending the ZPL script to the printer through the port you selected in Configuring the Printer Using ZebraNet Bridge's Connectivity Wizard on page 189. You may want to save the ZPL script and use it to restore the printer network configuration if the printer is reset to its factory defaults in the future. Saving the script will also allow you to quickly configure multiple printers if they need the same settings.

1. Verify that the printer is connected to the computer through the wired cable connection to the USB port.
2. If the printer is switched off, turn printer power ON.
3. In the Connectivity Wizard: Review and Send ZPL for Wireless window, click **Finish**.

   The computer sends the ZPL script to the printer through the interface port. The Wireless Setup Wizard screen closes.
4. Turn printer power OFF and then back ON.
5. Observe the wireless status on the printer's indicator lights to confirm that you have set up your printer for wireless connectivity.
6. At this point, you can save the ZPL script for later use with this printer and to configure other printers that may need the same network settings. To save the script:
   a) In the Review and Send ZPL for Wireless window, highlight the script, right-click it, and select **Copy**.
   b) Open a text editor such as Notepad and paste the script into the application.
   c) Save the script.
   d) Back in the Connectivity Wizard, you may click **Cancel** to exit the Wizard without sending the script to the printer at this time.

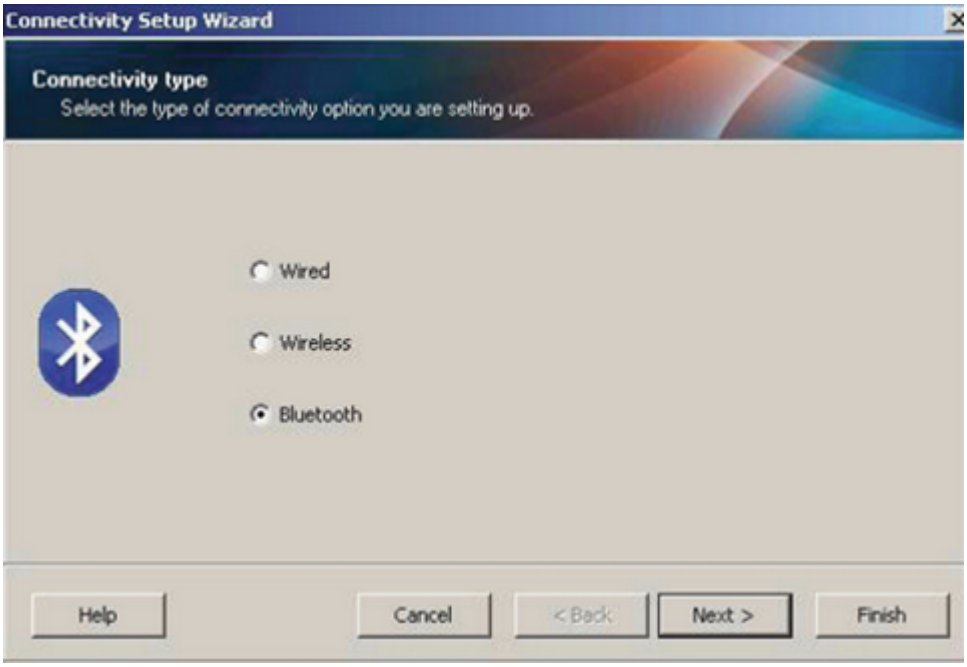
   To configure either the same printer again (in case it was reset to its factory defaults) or to configure other printers with the same settings, send the saved ZPL script file to the printer through the connection of your choice as detailed in the prior steps in this procedure.

Configuring the Printer Using Bluetooth

The Zebra Setup Utilities provides a quick and easy way to configure a Bluetooth wireless connection with your printer.

NOTE: For printers with Protected Mode enabled, you need to provide the Protected Mode password to change this setting. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

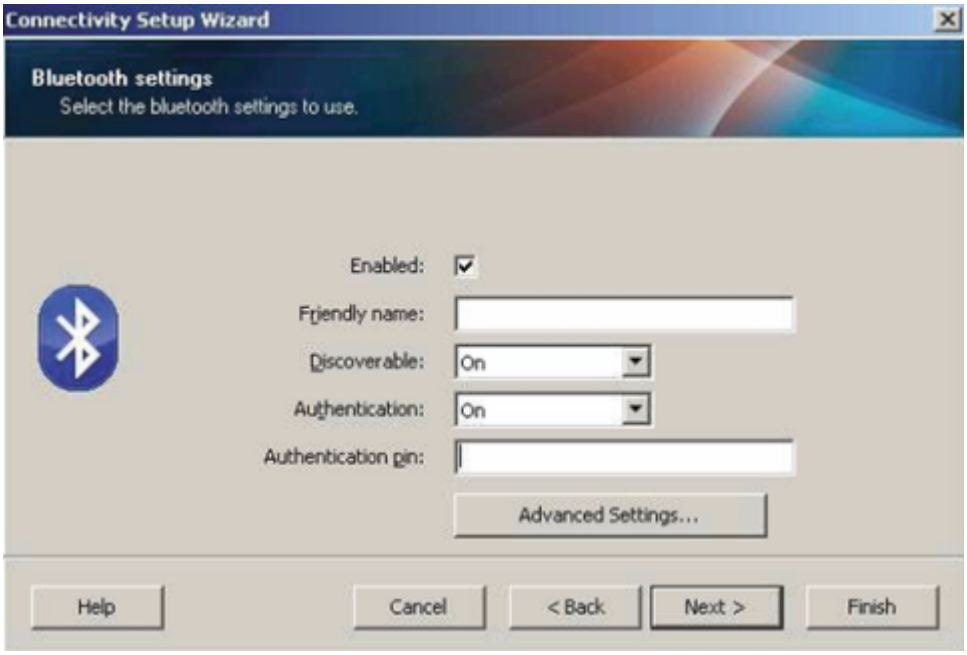
1. Double-click the **Zebra Setup Utilities** (ZSU) icon on your desktop.
2. Connect your computer and the printer with a USB cable.
3. On the first ZSU screen, highlight the printer displayed in the window and click **Configure Printer Connectivity**.
4. On the Connectivity type screen, select **Bluetooth**, then click **Next**.



5. On the Bluetooth Settings screen, check **Enabled** to enable Bluetooth functionality.
6. In the **Friendly Name** field, set the Bluetooth name of the device that you will use to discover the device on the network.

   This is the name that the central device will apply to the printer.
7. If you want the device to appear when central devices are looking for new devices to pair with, set the **Discoverable** field to **On** . If not, set it to **Off**.
8. Set **Authentication** to **On**.

   NOTE: This setting does not exist in Link-OS Profile Manager, but you must set it to **On** if you want to enter a PIN in the Zebra Setup Utilities. The actual authentication setting on the printer is set by accessing **Advanced Settings** > **Security Mode**.
9. The values required to set the **Authentication PIN** will vary based on the Bluetooth version used by the central device that you use to manage your printer. If the central device uses BT v2.0 or older, enter a numeric value in this field. You will be prompted to enter this same value on the central device to verify Bluetooth pairing. For PIN pairing, also select **Security Mode 2** or **Security Mode 3** in **Advanced Settings** .



NOTE: If the central device uses BT v2.1 or newer, this setting has no effect. BT v2.1 and newer versions use Secure Simple Paring (SSP) which does not require the use of a PIN.

10. To view Advanced Bluetooth settings, click **Advanced Settings...**.

    NOTE: For more information on Advanced Settings, refer to the Wired and Wireless Print Server Guide. This guide is available to download from zebra.com/manuals.

11. Click **Next** to continue configuring your printer.

    The specific SGD commands you need to configure your printer from your central device are displayed.

12. On the Send Data screen, click the name of the printer that you want to send the commands to. You can also click **File** to save the commands to a file for later use.

13. Send the commands to the printer you chose by clicking **Finish**.

    The printer updates and reboots with the programming settings you specified.

14. At this point, you may disconnect the USB interface from your printer.

15. To complete the Bluetooth pairing process, enable Bluetooth device discovery on your central device and follow the instructions provided by the central device to complete the pairing.

Connecting the Printer to a Windows 10 OS

Before adding (also called pairing) a Bluetooth-enabled device to your central device, make sure the device to be paired is turned on and discoverable.

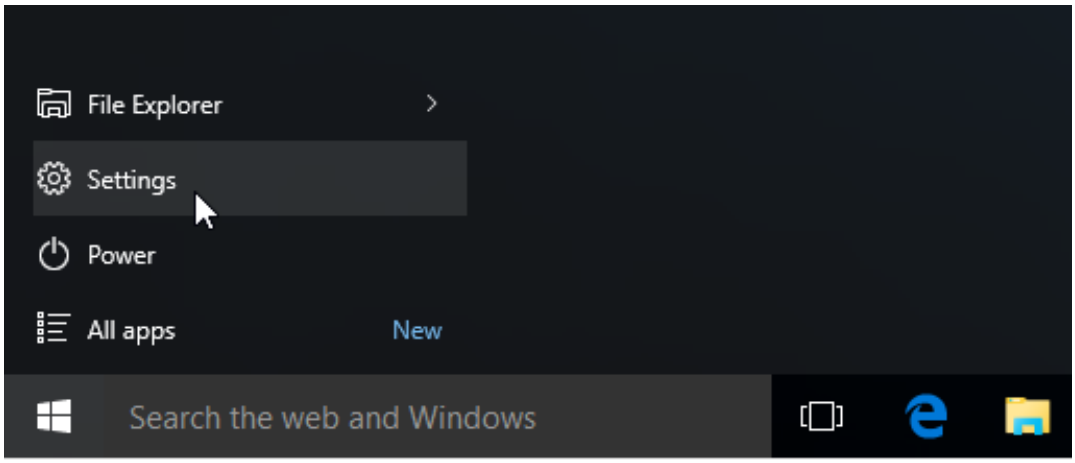
NOTE: Your Windows device may need a Bluetooth adapter to connect to a Bluetooth device. Check with your Windows device user guide for details.

Some non-Microsoft Bluetooth dongles and built-in Bluetooth devices in the host PCs have ONLY marginal driver support for Secure Simple Paring (SSP) printing and may not complete the **Add printer** wizard normally.

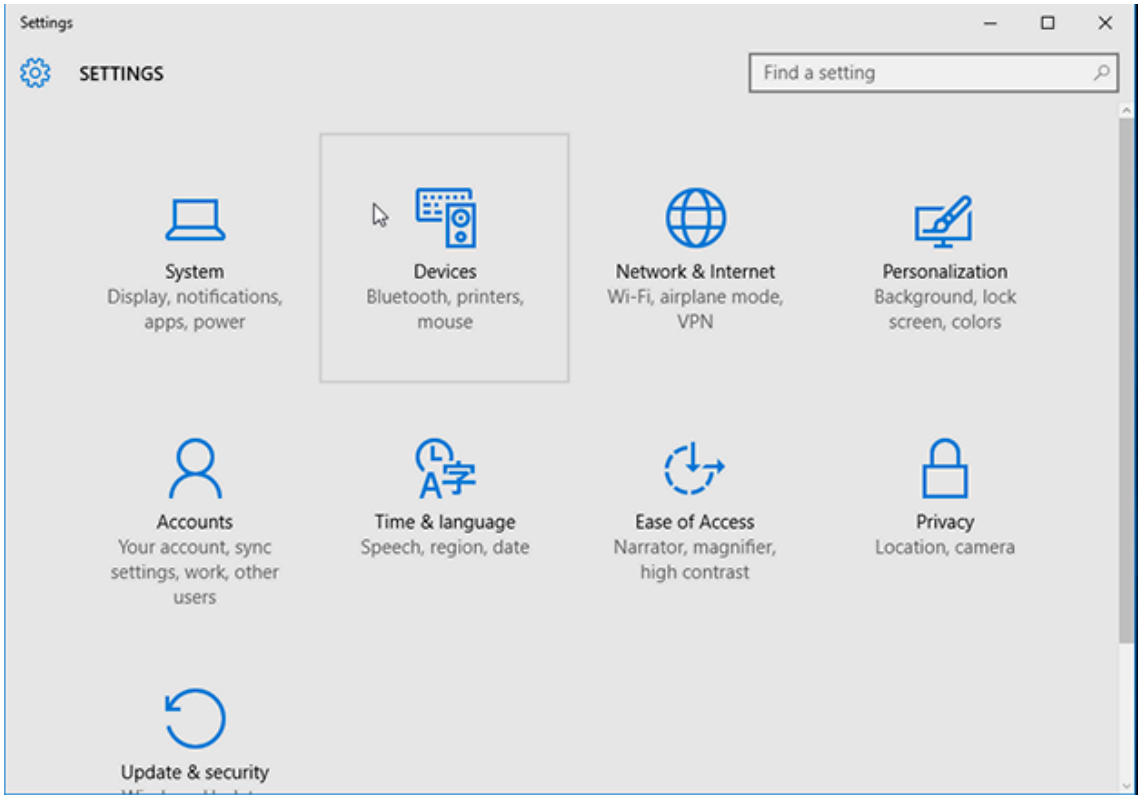
You may need to access **Bluetooth Devices** under Windows **Settings** and activate SPP for the 'device' (the Bluetooth-capable printer you are setting up).

Install the printer to a local printer (USB, for your printer), and then change the **Port** after the completing the installation to SPP (virtual serial port) COM port.

1. Click the **Windows Start** ( ) button, then select **Settings**.



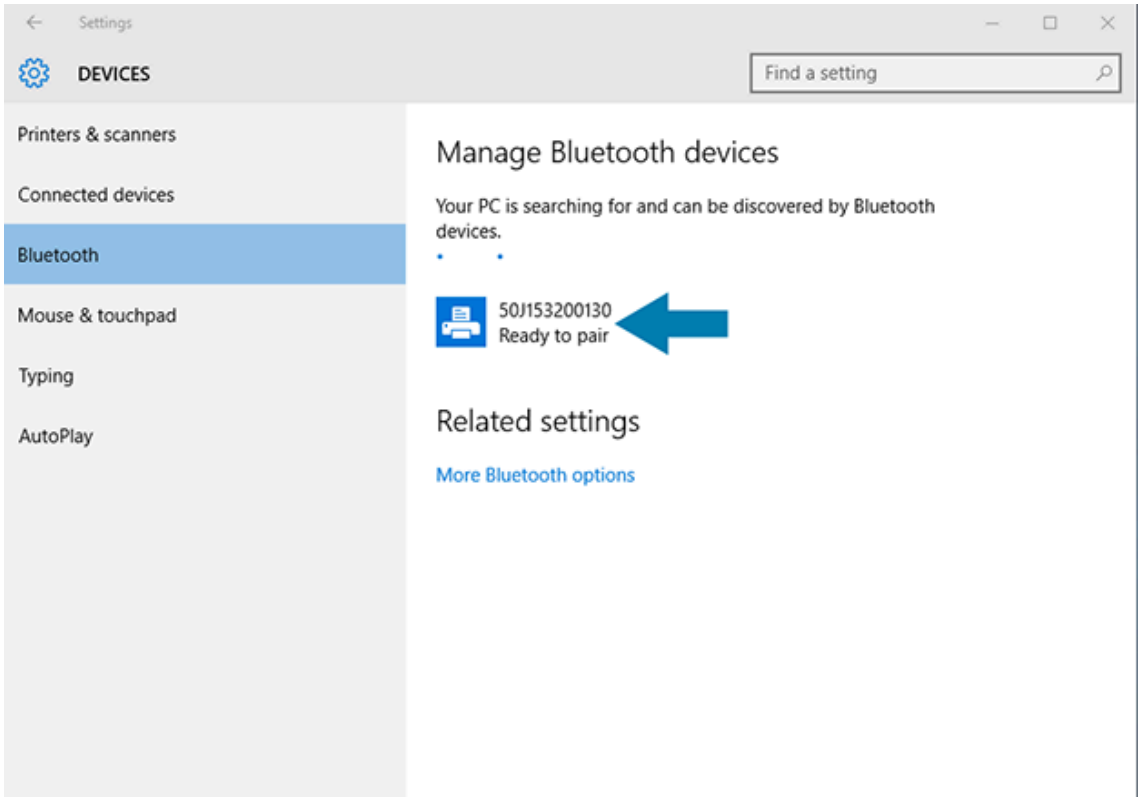
2. Click **Devices**.



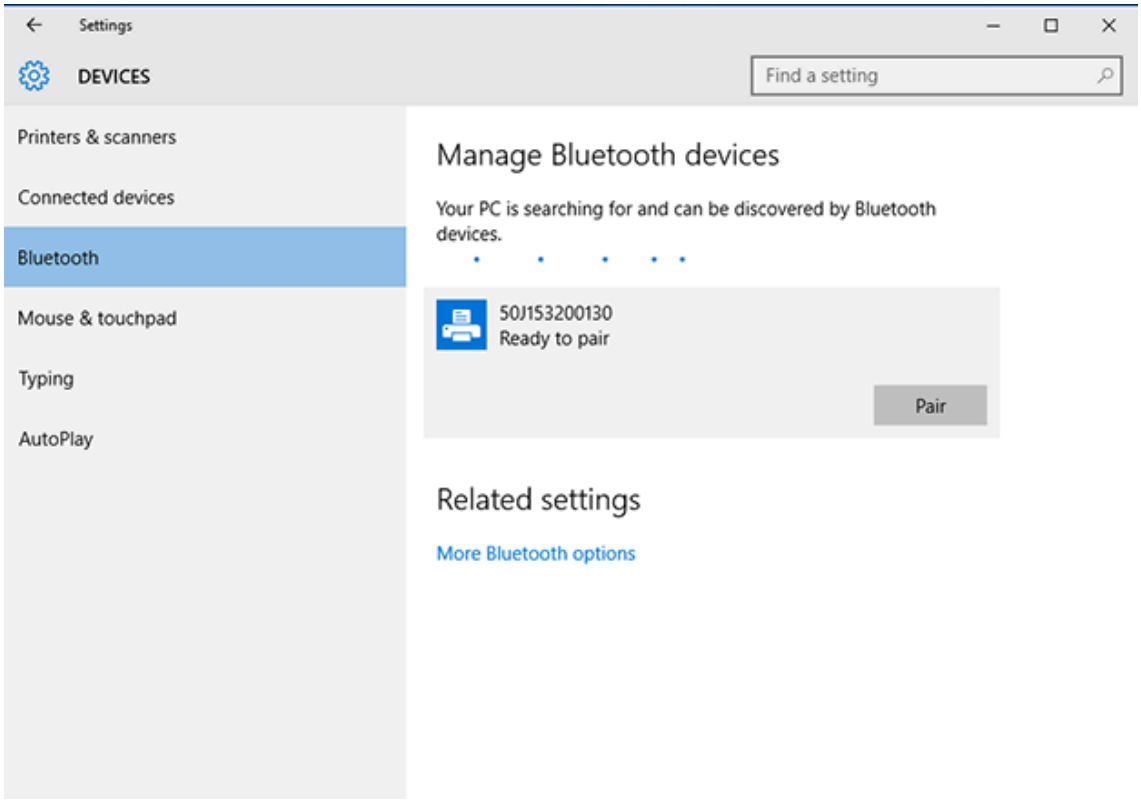
3. Click **Bluetooth**.

NOTE: If your PC does not have Bluetooth installed, the Bluetooth category is NOT displayed in the list of device categories.

The printer is identified by its serial number as shown here.

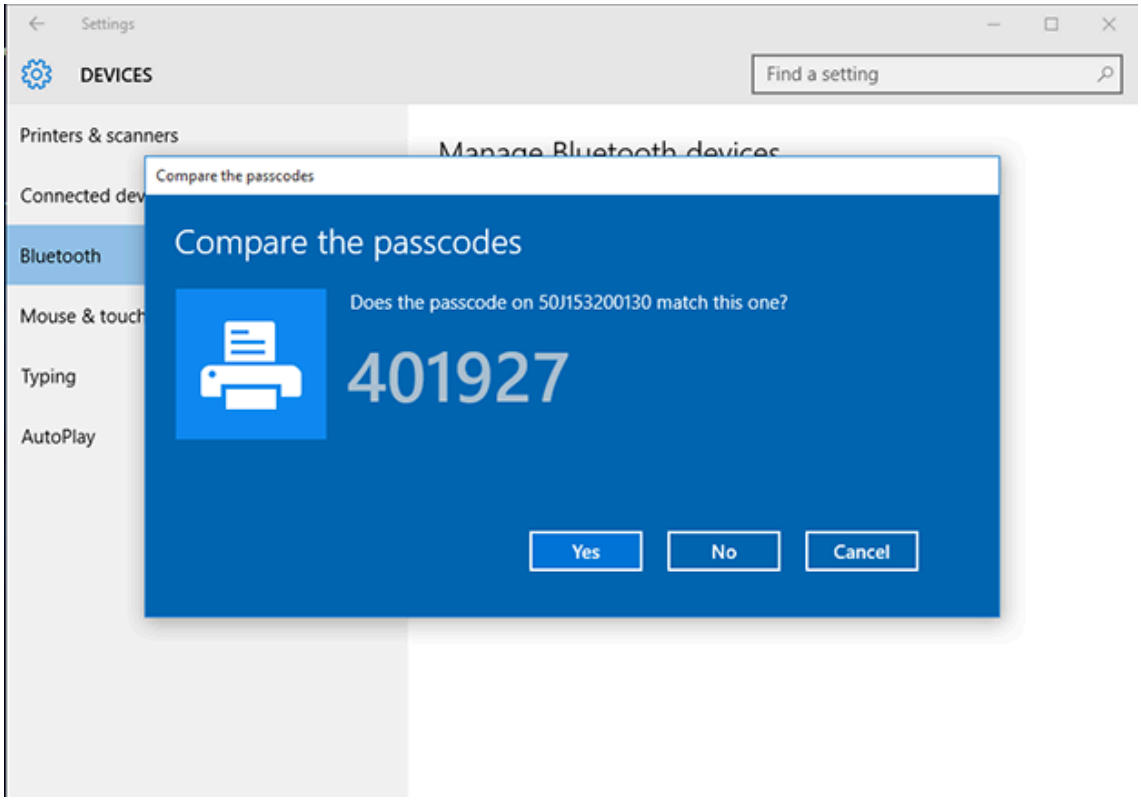


4. Click the printer icon, then click **Pair**.

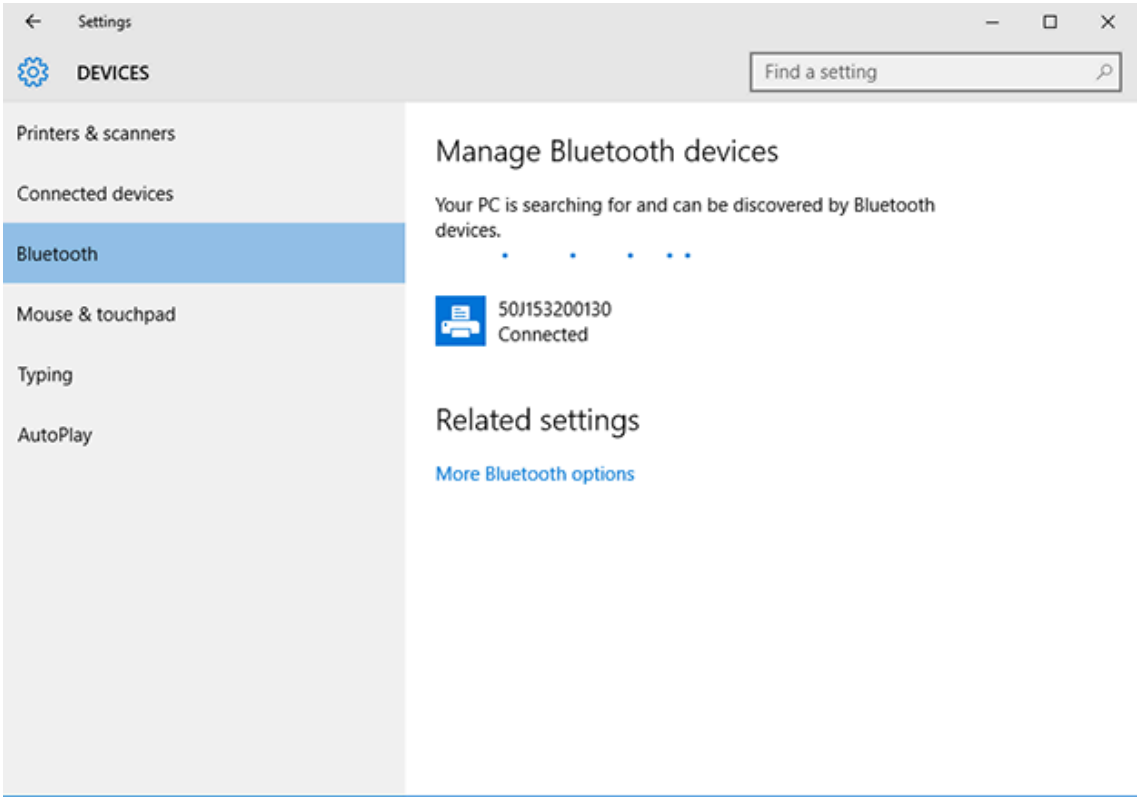


The printer prints a passcode.

5. Compare the passcode with the one on the screen. If they match, click **Yes**.



The printer status changes to Connected when pairing is complete.



After Your Printer is Connected

When you have established basic communication with your printer, you may want to test printer communications and then install other printer-related applications, drivers, or utilities.

Verifying printer operation is a relatively simple process:

- For Windows operating systems, you can use the Zebra Setup Utility or the Windows **Printers and Faxes** feature in the **Control Panel** to access and print a test label.
- For non-Windows operating systems, you can send an ASCII text file to the printer with a single command (`~WC`) instructing it to print a printer configuration report.

Test Printing with Zebra Setup Utilities

Print a configuration report to test the printer.

1. Open the Zebra Setup Utilities.
2. Click on the newly-installed printer's icon to select the printer.
3. Click **Open Printer Tools**.
4. Access the Print tab, click on **Print configuration label**, and then click **Send**.

The printer should print a configuration report. If it doesn't, make sure the printer is set up according to the instructions in this guide and use the information in the Troubleshooting section to resolve any issues.

Test-Printing with the Windows Printer and Faxes Menu

Print a test page to test the printer.

1. Click the Windows **Start** menu button or open the **Control Panel** to access the Printers and Faxes menu, then open the menu.
2. Select the newly-installed printer's icon to select the printer, and right-click to access the printer's **Properties** menu.
3. From the printer's General tab window, click **Print Test Page**.

The printer prints a Windows test page.

Test-Printing with an Ethernet Printer Connected to a Network

You can test-print on an printer connected to Ethernet (LAN or WLAN) in one of two ways: use an MS-DOS command from the command prompt, or select **Run** from the Windows **Start** menu.

1. Create a text file with this ASCII string: `~WC`
2. Save the file an arbitrary filename such as `TEST.ZPL`.
3. Find the IP address on the printer Configuration Report — Network Status printout.
4. From a central device that is connected to the same LAN or WAN as the printer, type the following in a web browser window address bar and press **Enter**: `ftp x.x.x.x` (where the `x.x.x.x` is the IP address of your printer).

   For an IP address that reads `123.45.67.01`, you would enter `ftp 123.45.67.01`
5. Type the word `put` followed by the filename and press **Enter**.

For a test print using the file TEST.ZPL, the command to use is `put TEST.ZPL`.

The printer prints a printer configuration report.

Test-Printing with a Copied ZPL Command File for Non-Windows Operating Systems

1. Create a text file with this ASCII string: `~WC`
2. Save the file using an arbitrary filename such as TEST.ZPL.
3. Copy the file to the printer. For DOS, sending this file to a printer connected to the system's serial port would be as simple as issuing this command to the printer from the central device: `COPY TEST.ZPL COM1`



NOTE: Other interface connection types and operating systems will require different command strings. See your OS documentation for detailed instructions on how to copy to the appropriate printer interface for this test.

Print Operations

This section provides general information on media and print handling, font and language support, and the setup of less common printer configurations.

Thermal Printing

Zebra ZD Series printers use heat to expose direct thermal media or use heat and pressure to melt and transfer 'ink' to the media. Extra care should be taken to avoid touching the printhead which gets hot and is sensitive to electrostatic discharge.



CAUTION—HOT SURFACE: The printhead may be hot and could cause severe burns. Allow the printhead to cool.

CAUTION: To protect from damaging the printhead and risk of personal injury, AVOID touching the printhead. Use ONLY the cleaning pen to perform printhead maintenance.



CAUTION—ESD: The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the printhead and other electronic components used in this device. You must observe static-safe procedures when working with the printhead or the electronic components under the top cover.

Determining Your Printer's Configuration Settings

The ZD Series printer is capable of printing a configuration report listing printer settings and hardware details.

Included in this report are:

- operational status (darkness, speed, media type, etc.)
- installed printer options (network, interface settings, cutter, etc.)
- printer details (serial number, model name, firmware version, etc.)

For instructions on printing this label...	See Printing the Printer and Network Configuration Reports (CANCEL Self Test) on page 288.
For information on interpreting the configuration report and the associated programming command and command states identified in the report...	For information on how to interpret the configuration report and the associated programming command and command states listed in the report, see Managing the ZPL Printer Configuration on page 335.

Select a Print Mode or Collection Method

To set the printer to use a specific print mode, see instructions on using the ^MM command in the ZPL Programming Guide. To download this manual, go to one of the printer information links listed in zebra.com/support.

Your printer supports these print modes:

Tear Off (default; available with any printer option and with most media types)	The printer prints the labels as it receives them. The labels can be torn off after they print.
Peel (if you have the Label Dispenser option installed)	The printer peels the label from the liner while printing. It pauses to print the next label until the current one is removed.
Cutter (if you have the Cutter option which is factory-installed)	The printer cuts each label after it is printed.

To set the printer to use an available print mode:

- Access the setting for Collection Method. See Print Label Position Collection Method on page 119.
- Use the ^MM command described in the ZPL Programming Guide. This guide is available for download from zebra.com/manuals.

Adjusting the Print Quality

Print quality is affected by a combination of the heat (or density) setting of the printhead, print speed, and the media loaded. Experiment with these settings to find the optimal mix for your application.

You can set print quality using the **Configure Print Quality** wizard in Zebra Setup Utilities.

Print a print quality report using FEED self-test to print a range of labels that help you identify print darkness and print speed settings to optimize general print quality and barcode quality. For instructions on printing this report, see Printing a Print Quality Report (FEED Self Test) on page 291.

Before adjusting any settings, verify the printer's media settings by printing a printer configuration report. See Printing the Printer and Network Configuration Reports (CANCEL Self Test) on page 288.

1. To adjust the print darkness (or density) setting, use one of these methods:
   - Use the Set Darkness (~SD) ZPL command. For details, see the ZPL Programming Guide which you can download from zebra.com/manuals.
   - Try a Manual Print Darkness Adjustment on page 301.
2. To adjust the print speed, use one of these methods:
   - application software such as ZebraDesigner which is available for download from zebra.com/zebradesigner.
   - The ZPL Print Rate (^PR) command. For details, see the ZPL Programming Guide which you can downloaded from zebra.com/manuals.

NOTE: Media manufacturers may recommend specific speed settings when using your printer with their media. The recommended speed may be lower than your printer's maximum speed setting.

3. To reduce the maximum distance for automatic media type detection and sensing, use the ZPL Maximum Label Length command (^ML).

   The minimum distance should be no less than twice the longest label to be printed. If the largest label being printed is 2 inches by 6 inches, the maximum label (media) length detection distance can be reduced from the default distance of 39 inches to 12 inches.

Adjusting the Print Width

You must set the print width before you use the printer for the first time. You must also set it when you load media into the printer that is of a different width than the one you loaded for the previous print job.

To set the print width, you can use one of the following:

- Windows printer driver
- application software such as ZebraDesigner which can be downloaded from zebra.com
- ZPL programming Print Width (^PW) command. See the ZPL Programming Guide available from zebra.com/manuals for details.)
- For instructions on adjusting the width, see Manual Print Width Adjustment on page 300.

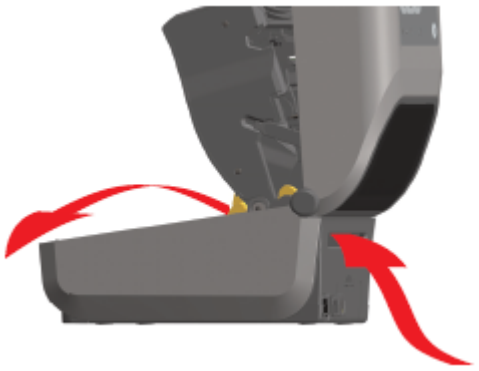
Replacing Supplies while Using the Printer

If the media supply (ribbon, labels, receipts, tags, tickets, etc.) runs out while printing, leave the printer power ON while reloading. (Data loss occurs if you turn off the printer). After loading a new roll of media or ribbon, simply press **FEED** to resume printing.

Printing on Fanfold Media

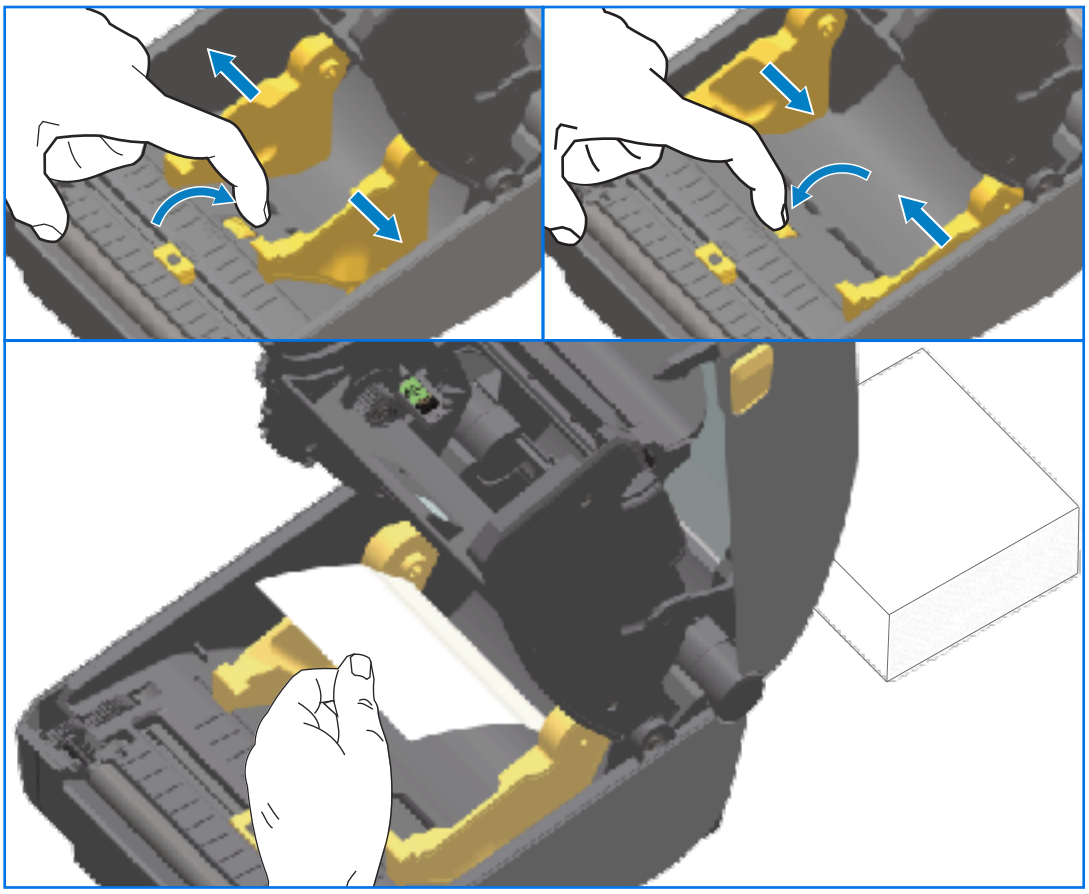
Use this procedure to print on fanfold media.

Fanfold media enters the printer from the back and exits through the front of the printer during the print job.

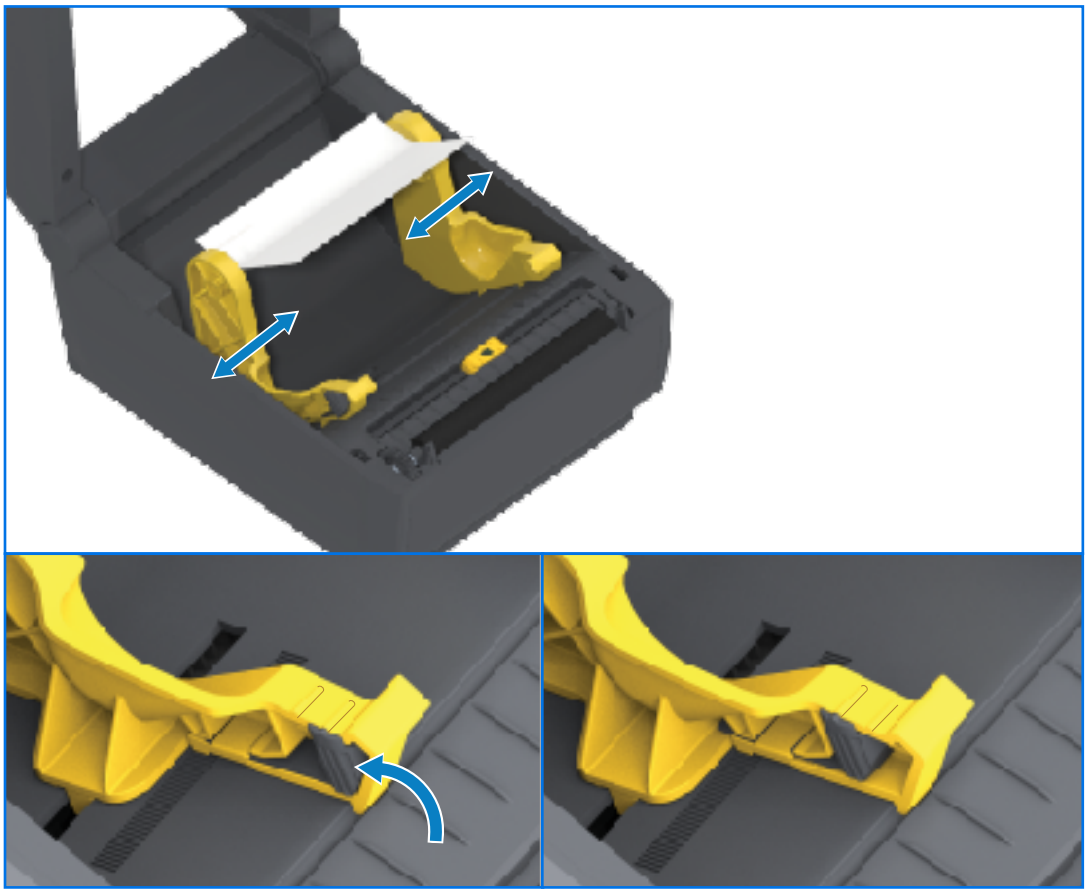


1. Remove media from the printer.
2. If you have thermal transfer printers and it has a fanfold cover installed, remove the cover.
3. Open the top cover of your printer.

4. For ZD621 printers and the ZD421 Cartridge printer, adjust the media guide stop position with the gold thumb wheel.
   a) Use a piece of the fanfold media to set the stop position.
   b) To make the space between the guides wider, rotate the wheel away from you. To make the space narrower, rotate the wheel toward you.



5. For non-cartridge ZD421 printers—Adjust the media guide stop position with the slide lock on the left side media guide.
   a) Use a piece of the fanfold media to set the stop position.
   b) Push the gray lock down towards the base of the media roll holder to secure the roll in position.
   c) Rotate the wheel toward you to make the space between the media guides narrower.



6. Insert the media through the slot at the rear of the printer, and place the media between the media guide and roll holders.



7. Close the top cover.

IMPORTANT: The media guide stop position may need further adjustment if, after printing or after pressing **FEED** to advance several labels:

- the media does not track down the center (moves from side to side), or
- the sides of the media (liner, tag, paper, etc.) are frayed or damaged when exiting the printer

If additional adjustment does not correct the problem, route the media over the two roll-holding pins on the media guide.

You can also provide additional support for thin media by placing an empty roll core (of the same width as the fanfold media stack) between the roll holders.

Printing with Externally-Mounted Roll Media

Your printer accommodates externally-mounted roll media (as it does for fanfold media). It requires a media-roll-and-stand combination to ensure low (initial) inertia when pulling the media off the roll.

Make note of these considerations when using externally-mounted roll media:

- The media should ideally enter the printer from directly behind the printer and pass through the fanfold media slot in the rear of the printer.
- The media should move smoothly and freely. It should not slip, skip, jerk, bind and then move, etc. when mounted on your media stand.

- The movement of the media roll should not be impeded by contact with any printer or other surfaces.
- The printer should be placed such that it may not slip or lift up away from its operating surface while printing.

Using the Label Dispenser Option

The label dispenser option allows you to print a label and have the backing material (liner/web) automatically removed before the label is dispensed. If you are printing multiple labels and the printer has been programmed appropriately, the printer prints and dispenses the next label after you remove an already printed and dispensed, peeled label.

To use label dispense mode, use the Windows printer driver—or the Configure Printer Settings wizard in Zebra Setup Utilities—to set the printer's Media Handling setting to Peel-Off.

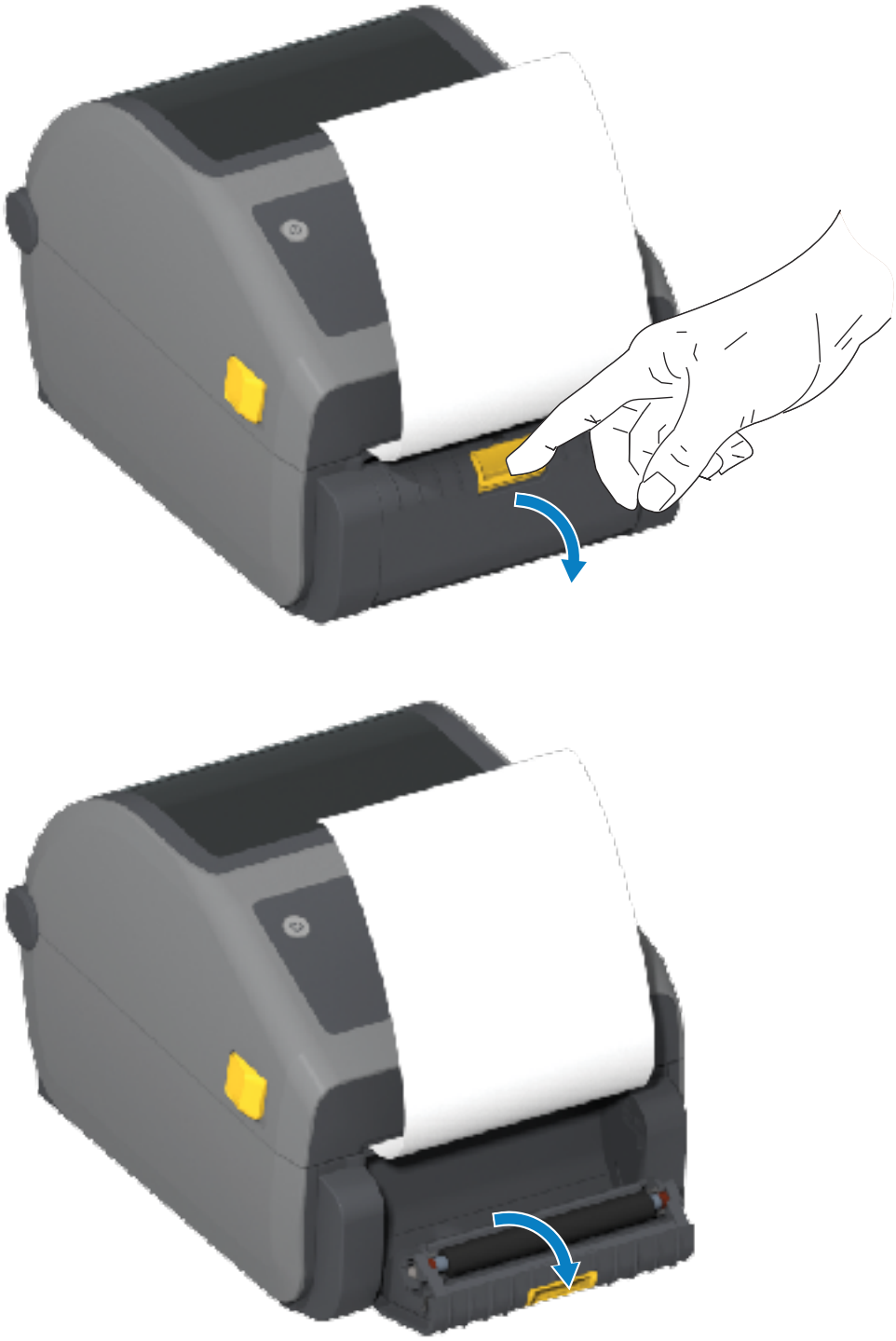
You can also configure the printer to dispense labels by sending it programming commands. If using ZPL, use these command sequences:

- `^XA ^MMP ^XZ`
- `^XA ^JUS ^XZ`

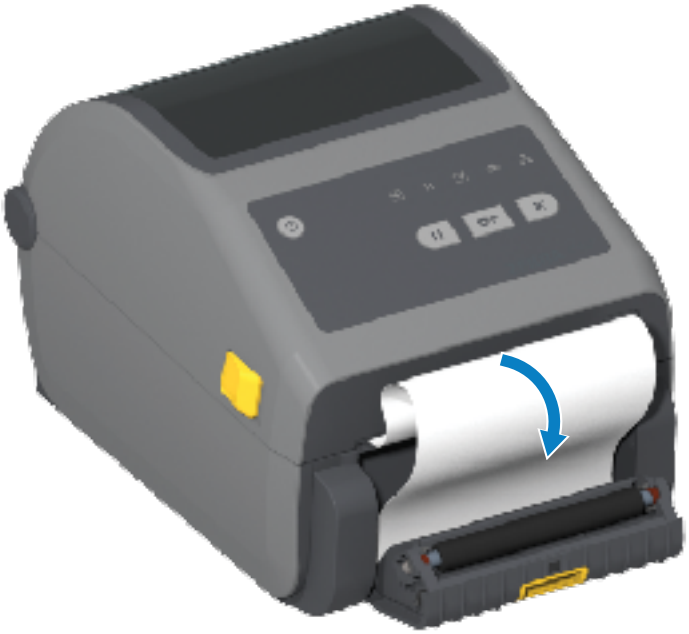
1. Load the labels into the printer. Close the printer and press **FEED** until a minimum of 100 mm (4 in.) of exposed labels exit the printer. Leave the labels on the liner.



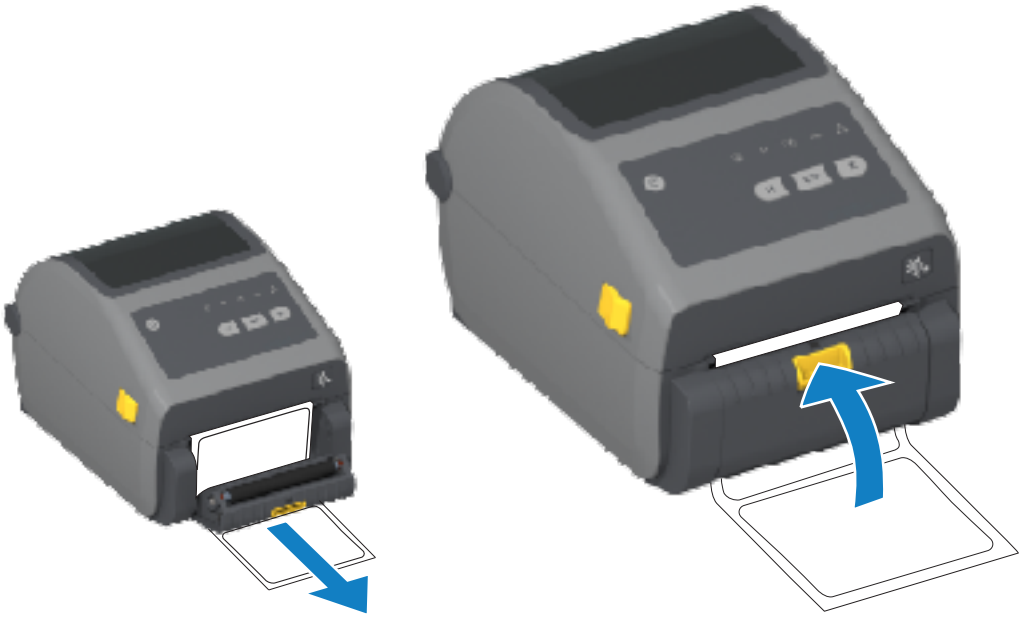
2. Lift the liner over the top of the printer, then open the door by pulling the gold latch in the center of dispenser door away from the printer.



3. Insert the label liner between the dispenser door and the printer body.



4. Close the dispenser door while pulling the end of the label liner tight.



5. Press and release **FEED** (Advance) one or more times until a label is presented for removal.



6. During the print job, the printer will peel off the backing and present a single label. Take the label from the printer to allow the printer to print the next label.

NOTE: If you did not activate the label-taken sensor—using printer programming commands—to detect the removal of the dispensed (peeled) label, the printed labels will stack and may bind the mechanism.

Using the Linerless Options

The Linerless Media Tear-Off and Cutter options operate much like the standard media printers. These options include an additional sensor to detect when a printed and presented label is taken from the printer.

Linerless printers require special cleaning processes to maximize the platen (drive) roller and special non-stick surfaces in the printer and media path areas.

The Linerless printing option allows you to print a multi-label format/form that stops between each label. Removing the dispensed (peeled) label triggers the printer to print and dispense the next label until all labels have been printed.

To use dispense mode, set MEDIA HANDLING to PEEL-OFF in the printer driver or with the Zebra Setup Utilities using the Configure Printer Settings wizard.

Alternatively, send the appropriate ZPL programming commands to the printer. When programming in ZPL, you can use the command sequences shown below to configure the printer to use the dispenser option:

- `^XA ^MMP ^XZ`

- ^XA ^JUS ^XZ

For details, see the ZPL Programming Guide available for download from zebra.com/manuals.

Linerless Printing

Linerless media loads the same as models with the standard tear-off bezel or the general factory-installed cutter options.

For information on loading the media. see Loading Media on page 143 and Loading Roll Media for Cutter Models on page 148.

- Media Reloading — Clean the printhead and inspect the media path and platen roller for build up of adhesive and debris. Remove particles with the adhesive side of your linerless media. Lightly touch the media path and platen roller with the label to lift particles off the exposed area of the platen roller and the media path areas. For more information, see the Linerless Platen (Drive) Roller entry in the Recommended Cleaning Schedule on page 236.
- Do not remove new media from it's protective wrapping until you are ready to place it in the printer. Setting the roll on its side will pick up contaminants and may stick to surfaces.

IMPORTANT: The platen roller can accumulate adhesive on the outer edges of the roller. After using many rolls of media, these rings of adhesive may dislodge as the printer is used routinely. These particle clumps can transfer to other areas. Clean the platen as needed to remove this build-up. using the instructions in the Maintenance section of this guide.

Sending Files to the Printer

Graphics, fonts and programming files can be sent to the printer from supported Microsoft Windows operating systems using Link-OS Profile Manager, Zebra Setup Utilities (and driver), ZebraNet Bridge or Zebra ZDownloader available from the Zebra website at zebra.com/software.

Ribbon Cartridge Programming Commands

The Ribbon Cartridge printer available with this Zebra printer series offers several Set-Get-Do (SGD) programming commands to support the use of the ribbon cartridge.

See the ZPL Programmer's Guide for more details on SGD commands and, in particular, SGD ribbon cartridge commands. The guide can be downloaded from zebra.com/manuals.

The following are examples of SGD ribbon cartridge commands.

```
! U1 getvar "device.feature.ribbon_cartridge"
! U1 getvar "ribbon.cartridge.part_number"
! U1 getvar "ribbon.cartridge.authenticated"
! U1 getvar "ribbon.cartridge.length_remaining"
! U1 getvar "ribbon.cartridge.serial_number"
! U1 getvar "ribbon.cartridge.width"
! U1 getvar "ribbon.cartridge.type"
! U1 getvar "ribbon.cartridge.length"
! U1 getvar "ribbon.cartridge.inserted"
```

```
ribbon.ribbon_low.warning : 50 , Choices: off,5,10,15,25,50,75,100
! U1 getvar "ribbon"
! U1 getvar "ribbon.ribbon_low.warning"
! U1 setvar "ribbon.ribbon_low.warning" "75"
! U1 setvar "ribbon.ribbon_low.warning" "off"
```

You can use Zebra Setup Utilities to send commands and receive status from the printer using the **Open Communication With Printer** feature.

Printing with the Attached Battery Base and Battery Option

Printer operating procedures change slightly when using the battery. Power connections and power loss scenarios necessitate the differences in operation. The battery is designed to maximize battery life, maintain print quality, and have simple operation.

- When you connect the printer's external power supply to the battery, it 'wakes up' and determines if it needs charging (charge level below 90%).
- The battery will not start charging until the battery's charge drops below 90% charge. This charging design extends your battery's life.
- After the battery begins charging, the battery will charge to 100% capacity and then enter Sleep Mode.
- The printer receives external power that passes through the battery circuitry to the printer. The battery does not charge when the printer is printing or moving media.
- The battery uses only a very minimal power during Sleep Mode to maximize the available charge that it stores.
- It takes about two hours to charge a fully-discharged battery.

Uninterrupted Power Supply (UPS) Mode

In UPS mode, the printer receives external power which passes through the battery circuitry to the printer.

1. Press **Battery Control** to 'wake up' the battery and check the battery has charge.

   After 60 seconds, the battery enters sleep mode. In this mode, the battery uses loss of external power as a cue to wake up and supply the printer with power.
2. Turn printer power OFF and ON as you normally would. The printer does not require the battery be manually turned on to operate when it in UPS mode.

Battery Mode

In this mode, the printer is powered solely by the battery.

1. Press **Battery Control** on the attached battery to wake up the battery and check if the battery has sufficient charge. After 60 seconds, the battery goes to sleep if the printer is OFF.
2. Turn printer power ON.
3. Use the printer as you normally would.
4. Check the battery charge status when needed by pressing **Battery Control**.
5. Change or charge your battery when the last battery charge level indicator is flashing.

NOTE: Print operation may be interrupted if the battery charge is used up and the printer turns off.

Printer Fonts

The ZD Series printer supports multiple languages and fonts.

You can take advantage of the advanced font mapping and scaling technology available with your printer using the ZPL programming language. ZPL commands support the following:

- Outline fonts (TrueType and OpenType)
- Unicode character mapping
- Basic bitmapped fonts
- Character code pages

The font capabilities of your printer are programming-language dependent.

- For descriptions and documentation of the fonts, code pages, character access, listing fonts, and limitations for their respective printer programming languages, see the ZPL and the legacy EPL programming guides downloadable from zebra.com/manuals.
- For information on text, fonts, and character support, see the printer programming guides.

Zebra has a variety of utilities and application software to enable font downloads to the printer for the ZPL and EPL printer programming languages.

IMPORTANT: Some ZPL fonts that are factory-installed in your printer are license-restricted. They CANNOT be copied, cloned, or restored to your printer by reloading or updating the firmware. If these license-restricted ZPL fonts are removed using an explicit ZPL object delete command, you will need to repurchase and reinstall them using a font activation and installation utility.

EPL fonts do not have this restriction.

Identifying Fonts in Your Printer

Fonts can be loaded into various storage locations in the printer. Fonts and memory are shared by the programming languages in the printer.

The ZPL programming language can recognize EPL and ZPL fonts. However, EPL programming can only recognize EPL fonts. See the respective programming guides for more information on fonts and printer memory.

Specific to ZPL fonts:

To manage and download fonts for ZPL print operation	Use the Zebra Setup Utility or ZebraNet Bridge Utilities.
To display all fonts loaded onto your printer	Send the `^WD` ZPL command to the printer. See the ZPL Programming Guide for details. In ZPL: • The bitmap fonts in the various printer memory areas are identifiable by the `.FNT` file extension.

	• The scalable fonts are identified with the `.TTF`, `.TTE`, or `.0TF` file extensions. (EPL does not support these fonts.)

Localizing the Printer with Code Pages

For each printer programming language, ZPL and EPL, your printer supports two sets of language, region, and character sets for the permanent fonts loaded onto the printer.

Your printer supports localization with common international character map code pages.

For ZPL code page support, including Unicode, see the `^CI` command in the ZPL Programming Guide.

Asian Fonts and Other Large Font Sets

Both of the printer's programming languages, ZPL and EPL, support the large pictographic double-byte character Asian font sets. The ZPL programming language supports Unicode.

Asian language ideographic and pictographic fonts have large character sets with thousands of characters that support single language code page. To support for these large character sets, printer manufacturers adopted a double-byte (67840 maximum) character system (instead of the single-byte, 256-maximum character system used by Latin-based language characters to address this issue).

With the invention of Unicode came the ability to support multiple languages using a single font set. A Unicode font supports one or more code points (relate these to code page character maps) accessed in a standard method that resolves character mapping conflicts.

The number of fonts that can be downloaded to your printer is dependent upon the amount of available Flash memory not already in use and the size of the font to be downloaded.

Procuring and Installing Asian Fonts

Asian bitmap font sets are typically downloaded into the printer either by the printer user or an integrator.

ZPL fonts are purchased separately from the printer.

The following EPL Asian Fonts are available as free downloads from zebra.com:

- Korean including Johab
- Thai

EPL Line Mode (Direct Thermal Printers only)

Your direct thermal printer supports Line Mode printing. EPL Line Mode printing is designed to be command compatible with EPL1 programming language.

Line Mode printing is ideal for basic retail (also referred to as point of sale or POS), shipping, inventory, work flow control, and general labeling. EPL printers with Line Mode are versatile printers than can print a wide range media and barcodes.

Line mode printing only prints single lines the height of the largest element present in the line of text and data — barcode, text, a logo or simple vertical lines. Line mode has many limitations due to the single line of print: no fine element placement, no overlapping elements, and no horizontal (ladder) barcodes.

- To enter Line Mode printer operation, send the printer the EPL `0EPL1` command. See the EPL Programming Guide (Page Mode) or the EPL Line Mode Programming Guide for details.

- Exit Line Mode printer operation by sending the printer the `esc0EPL2` line mode command. See the EPL Line Mode Programming Guide for details.
- When Line Mode is active, ZPL and EPL (EPL2) Page Mode programming is processed as Line Mode programming and data.
- When default ZPL and EPL (EPL2) Page Mode are active, Line Mode programming is processed as ZPL and/or EPL programming and data.

You can determine and verify the printer programming mode (that the printer is set to) by printing a printer configuration report.

ZD621 Locking Printer Option

The locking printer option is available only as a healthcare model.

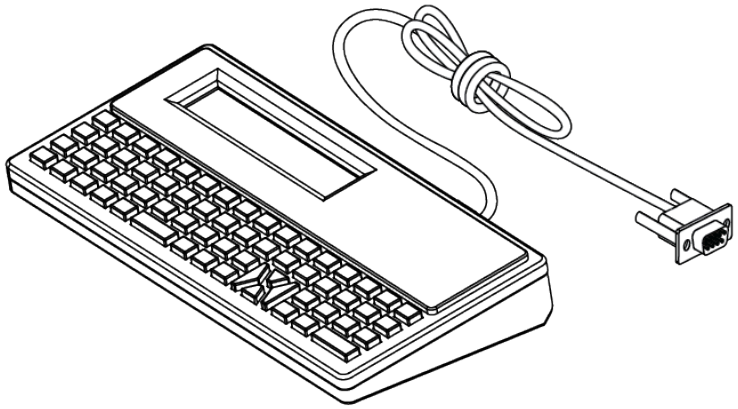
The following features are built into the locking printer:

- Lock and key access to the printer's media compartment.
  - Metal locking mechanism built into the printer.
  - Precision fabricated metal parts for repeatable movement.
  - The locking mechanism comes with two keys.
- Supports industry recognized Kensington lock slot that allows you to lock printer to any immovable object such as a desk.
- For added security, includes a permanently-sealed media window (not serviceable).
- The **FEED** button is disabled on the locking printer models. This is to prevent users from manually advancing media when the printer is locked. The **FEED** button will always boot up in **FEED** disabled mode.
- Supports only media that can be loaded within the printer. This model is not recommended if you need to you fanfold media for printing.

For an illustration of the locking printer features, see ZD621 Direct Thermal Locking Printer Feature – Healthcare Models Only on page 46.

Zebra Keyboard Display Unit (ZKDU) – Printer Accessory

The ZKDU is a small terminal unit that interfaces with the printer to enable ease of access to EPL or ZPL label forms stored in the printer.



The ZKDU is used for the following functions:

- List label forms stored in the printer
- Retrieve label forms stored in the printer
- Input variable data
- Printing labels
- Switching between EPL and ZPL to support dual-format printer language format/form types. These forms can be stored and printed in late model Zebra label printers.

NOTE: The ZKDU is strictly a terminal unit. It does not store data and cannot be used to change printer or printing parameters.

Zebra Basic Interpreter (ZBI)

Customize and enhance your printer using the ZBI 2.0 programming language. ZBI 2.0 allows Zebra printers to run applications and take input from scales, scanners and other peripherals without a PC or network connection. ZBI 2.0 works with the ZPL printer command language so that printers can understand non-ZPL data streams and convert them into labels. That means the Zebra printer can create barcodes and text from input received, non-ZPL label formats, sensors, keyboards, and peripherals. Printers can also be programmed to interact with PC-based database applications to retrieve information for use on printed labels.

- ZBI 2.0 can be activated by ordering a ZBI 2.0 Key Kit, or activated by purchasing a key from zebra.com.
- Use the ZBI Key Manager (also know as ZDownloader utility) to apply the key.
- An intuitive ZBI-Developer is used to create, test and distribute ZBI 2.0 applications. The built-in virtual printer allows you to quickly create, test and prepare programs for use.

ZBI-Developer is available on the Zebra web site at zebra.com/software. Look for Zebra Basic Interpreter 2.0.

Setting the Power Failure Recovery Mode Jumper

The printer can be configured to restart itself unattended and unaided after a power failure by setting it to this mode.

NOTE: Power Failure Recovery Mode is available ONLY on printers that have a printer connectivity module installed.

The printer connectivity modules have a power failure recovery jumper. The jumper is set to OFF by default. By setting the jumper to ON, you can make the printer automatically Power ON when it is plugged into an active AC power source (meaning printer power is ON).

NOTE: The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the printhead or electronic components used in this device. You must observe static-safe procedures when working with the printhead or the electronic components.

1. Disconnect the DC power plug and any interface connectors from the rear of the printer.
2. Remove the module access door and connectivity module. See Removing Printer Connectivity Modules on page 67 which includes instructions for ZD421 printers.

NOTE: The module removal steps for ZD621 printers is similar to that for ZD421 printers.

3. Move the AUTO (Power Failure Recovery Mode) jumper from the OFF position to the ON position.
4. Reinstall the connectivity module and module access door. See Installing the Internal Ethernet (LAN) Module on page 66 or Installing the Serial Port Module on page 65.

NOTE: The procedures for the connectivity module installation are the same for the ZD621 printers as they are for the ZD421 printers.

5. Reconnect the printer DC power plug and interface cables to the printer.

USB Host Port and Link-OS Usage Examples

This section has information on using the printer's USB Host port along with Link-OS features and apps (applications). Try these example tasks in the sequence provided, so you develop a good understanding of how to use the USB Host Port.

USB Host

The USB host port allows you to connect USB devices—such as a keyboard, scanner, or USB flash (memory) drive—to the printer.

Uses for the USB Host are as follows:

- Firmware updates
- File transfers and management
- A port for low power USB data entry devices (keyboards, scales, scanners, and other wedge devices).



1	USB host port

IMPORTANT: The USB Flash drive must be formatted using the FAT file system. Filenames can be 1 to 16 alphanumeric characters (A, a, B, b, C, c, ..., 0, 1, 2, 3, ...) only. Use only ASCII characters. Do NOT use Asian characters, Cyrillic characters, or accented characters in filenames. Some functions may not work properly if there are underscores in a filename. Use periods instead.

Using a USB Host for Firmware Updates

The USB host port allows you to connect an USB Flash drive to the printer to perform firmware updates.

Zebra "mirror" functions enable you to easily accomplish important printer management tasks.

For example, you can update the printer firmware by downloading the latest version from zebra.com, copying the files to a USB Flash drive (of up to a 1 TB storage capacity), connecting the USB drive to the printer, and uploading them to printer memory.

See the printer ZPL Programming Guide for information on the Mirror and Set-Get-Do (`usb.mirror`) SGD commands.

Files for Completing the Exercises

Most of the files you need to complete the exercises in these section are available from zebra.com as a .ZIP file located here on the Zebra website. Download this archive file and extract its contents on your central device (host computer).

Where possible, the contents of the files are shown in this section. Contents of files that include coded content—which cannot be viewed either as text or as an image—are not shown.

File 1: ZEBRA.BMP



File 2: SAMPLELABEL.TXT

```
^XA
^FO100,75^XGE:zebra.bmp^FS
^FO100,475^A0N,50,50^FDMirror from USB Completed^FS
^XZ
```

This simple label format prints the Zebra logo and a line of text at the end of the mirroring exercise.

File 3: LOGO.ZPL

Uses the Zebra logo bitmap file.

File 4: USBSTOREDFILE.ZPL

```
CT~~CD,~CC^~CT~
^XA~TA012~JSN^LT0^LH0,0^JMA^PR4,4~SD15^LRN^CI0^XZ
~DG000.GRF,07680,024,,[image data]
^XA
^LS0
^SL0
^BY3,3,91^FT35,250^BCN,,Y,N^FC%,{,#^FD%d/%m/%Y^FS
^FT608,325^XG000.GRF,1,1^FS
^FT26,75^A0N,28,28^FH\^FDThis label was printed from a format stored^FS
^FT26,125^A0N,28,28^FH\^FDon a USB Flash Memory drive. ^FS
^BY3,3,90^FT33,425^BCN,,Y,N
^FD>:Zebra Technologies^FS
^PQ1,0,1,Y^XZ
^XA^ID000.GRF^FS^XZ
```

This label format prints an image and text. This file will be stored on the USB memory device at the root level so that it can be printed.

File 5: VLS_BONKGRF.ZPL

File 6: VLS_EIFFEL.ZPL

File 7: KEYBOARDINPUT.ZPL

```
^XA
^CI28
^BY2,3,91^FT38,184^BCN,,Y,N^FC%,{,#^FD%d/%m/%Y^FS
^FO385,75^XGE:zebra.bmp^FS
^FT40,70^A0N,28,28^FH\^FDThis label was printed using a keyboard input.
^FS
^FT35,260^A0N,28,28^FH\^FDThis label was printed by:^FS
^FT33,319^A0N,28,28^FN1"Enter Name"^FS
^XZ
```

This label format, used for the USB keyboard input exercise, does the following:

- Creates a barcode with the current date, based on your Real-Time Clock (RTC) setting. (RTC may not be present in the printer version you purchased).
- Prints the Zebra logo graphic.
- Prints fixed text.
- Prints text entered with the keyboard by a user.

File 8: SMARTDEVINPUT.ZPL

```
^XA
^CI28
^BY2,3,91^FT38,184^BCN,,Y,N^FC%,{,#^FD%d/%m/%Y^FS
```

```
^FO385,75^XGE:zebra.bmp^FS
^FT40,70^A0N,28,28^FH\^FDThis label was printed using a smart device input.
 ^FS
^FT35,260^A0N,28,28^FH\^FDThis label was printed by:^FS
^FT33,319^A0N,28,28^FN1"Enter Name"^FS^XZ
```

The same label format as the previous label, only with different text printing. This format is used for the smart device input exercise.

Exercise 1: Copy Files to a USB Flash Drive and Perform USB Mirror

NOTE: For printers purchased in the EMEA region after August 1, 2025, mirroring (`usb.mirror.enable`) is disabled by default. You must enable it before you can complete this exercise. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

1. On your USB flash drive, create the following:
   - A folder called `Zebra`
   - In that folder, three subfolders:
     - `appl`
     - `commands`
     - `files`
2. In the `/appl` folder, place a copy of the latest firmware for your printer.

   NOTE: Avoid underscores in the filenames. Some functions may NOT work properly if there are underscores. Use periods instead.
3. In the `/files` folder, place the following file: `ZEBRA.BMP`
4. In the `/commands` folder, place the following files: `SAMPLELABEL.TXT` and `LOGO.ZPL`.
5. Insert the USB flash drive into a USB host port situated on the front of your printer.
6. Observe the user interface and wait for the following:
   - If the firmware on the USB flash drive is different than what is on the printer, the firmware downloads to the printer. The printer then restarts and prints a printer configuration label. (If there is no firmware on the USB flash drive or if the firmware version is the same, the printer skips this action.)
   - The printer downloads the files in the `/files` folder and briefly shows on the display and, in case of printers that have a Color Touch display, the names of the files that are downloading to the printer from the USB drive.
   - The printer executes any files you added to the `/commands` folder.
   - The printer restarts, then displays the message `MIRROR PROCESSING FINISHED.`
7. Remove the USB Flash drive from the printer.

Exercise 1: Information for Advanced Operators

See the ZPL Programming Guide for more information about these commands.

Enable/disable mirroring:

```
! U1 setvar "usb.mirror.enable" "value" — Values: "on" or "off"
```

Enable/disable automatic mirroring that occurs when a USB Flash drive is inserted into the USB host port:

```
! U1 setvar "usb.mirror.auto" "value" — Values: "on" or "off"
```

Mirror operation retry number — Specify the number of times that the mirror operation will be repeated if it fails:

```
! U1 setvar "usb.mirror.error_retry" "value" — Values: 0 to 65535
```

Change file path from USB — Reprogram the file location the printer searches to retrieve files from the USB memory during mirror operations:

```
! U1 setvar "usb.mirror.appl_path" "new_path" — Default: "zebra/appl"
```

Change file path to USB — Reprogram the file location the printer places files into USB memory during mirror operations:

```
! U1 setvar "usb.mirror.path" "path" — Default: "zebra"
```

Enable/disable the USB host port:

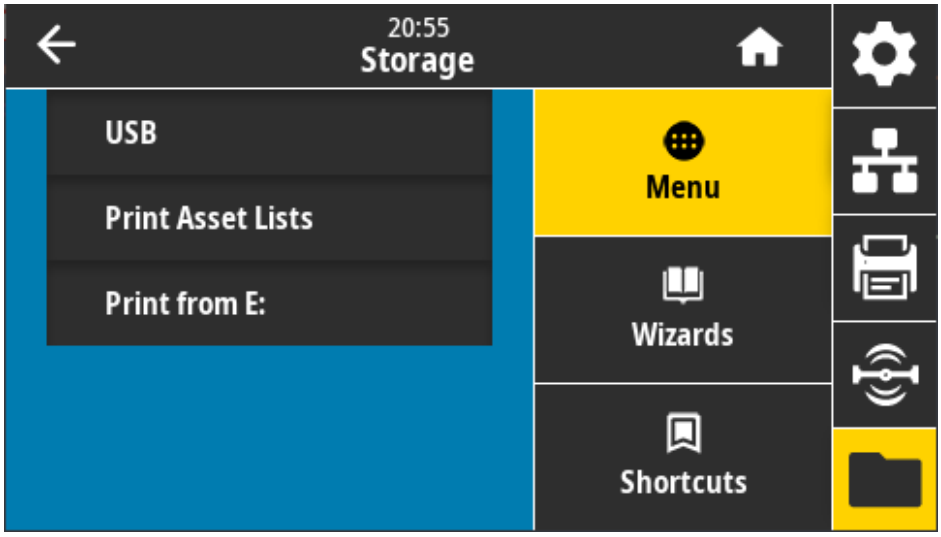
```
! U1 setvar "usb.host.lock_out" "value" — Values: "on" or "off"
```

Exercise 2: Print a Label Format from a USB Flash Drive

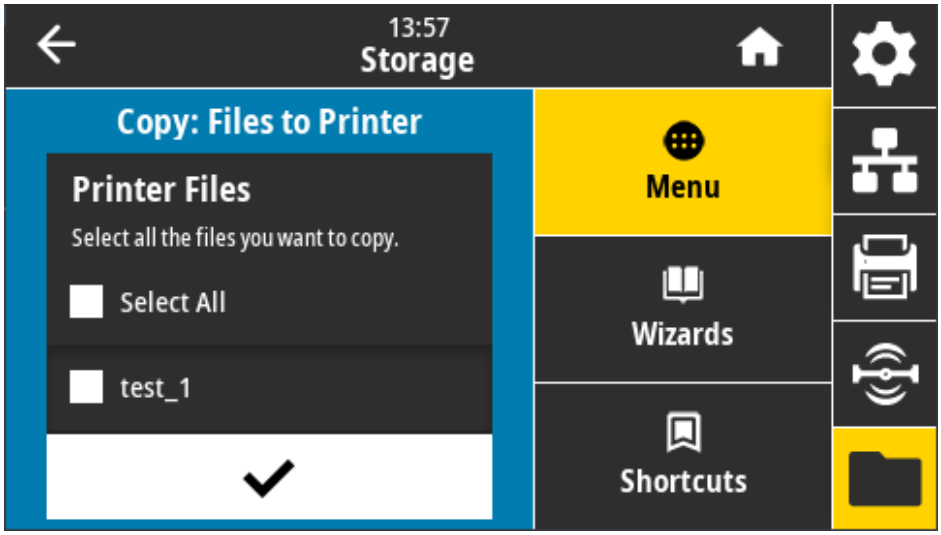
The Print USB File option allows you to print files from a USB mass storage device, such as a USB Flash drive.

The files must be printable (`.ZPL` and `.XML`) and they must be located at the root level of the USB drive, not placed within a directory.

1. Copy the following files to your USB Flash drive:
   - File 4: `USBSTOREDFILE.ZPL`
   - File 5: `VLS_BONKGRF.ZPL`
   - File 6: `VLS_EIFFEL.ZPL`
2. Insert the USB Flash drive into a USB host port on the front of your printer.
3. From the printer's display, touch **Menu** > **Storage** on the printer's Home screen.



4. Touch and select **Menu** > **Storage** > **USB** > **Print: From USB**. The printer lists the available files.
5. Touch the box next to the desired files. You also have the option to **Select All**.



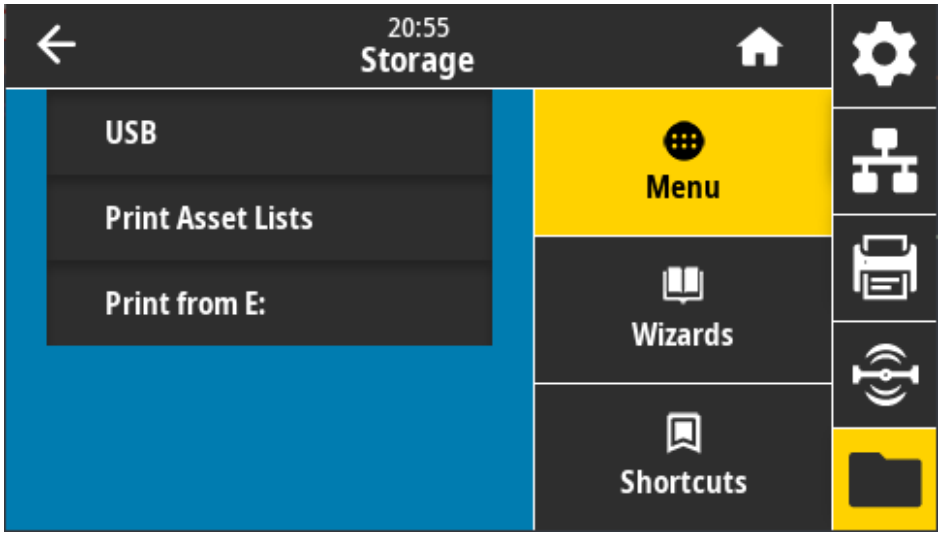
6. Touch the checkmark to print the selected files.
7. Remove the USB Flash drive from the printer.

Exercise 3: Copy Files to/from a USB Flash Drive

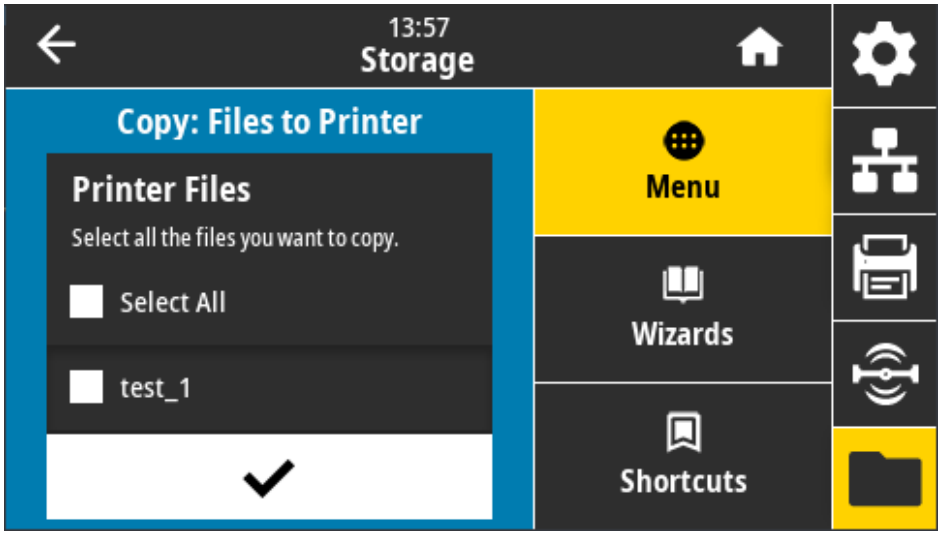
The Copy USB File option allows you to copy files from a USB mass storage device to the printer's Flash memory E: drive.

1. Copy the files listed below to the root directory of your USB Flash drive. (The files should not be placed in a subfolder.)
   - File 7: `KEYBOARDINPUT.ZPL`
   - File 8: `SMARTDEVINPUT.ZPL`
2. Insert the USB Flash drive into a USB host port on the front of your printer.

3. From the printer's display, touch **Menu** > **Storage** on the printer's Home screen.



4. Touch **USB** > **Copy: Files to Printer**.

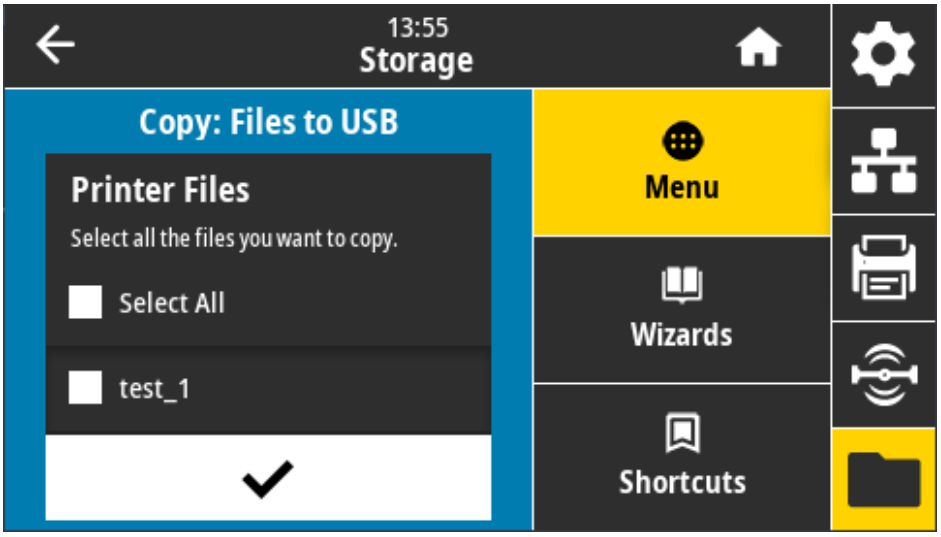


The printer lists available files.

5. Touch the box next to the files you want to copy. You can also **Select All**.
6. Touch the checkmark to copy the selected files.
7. Remove the USB Flash drive from the USB host port.

   The printer stores the file in E: memory.

8. You can now copy files from the printer to a USB Flash drive using the **Menu** > **Storage** > **USB** > **Copy: Files to USB**.

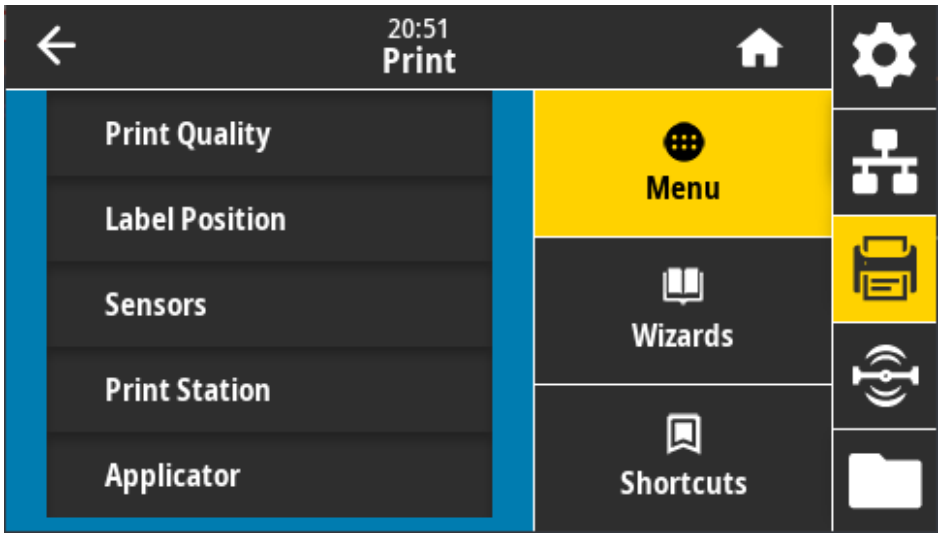


The **Select All** option is available to copy all files stored in the printer to the USB Flash drive. Any file with the .ZPL extension that is copied to the USB drive is post-processed so that its contents can be sent to a printer for normal execution.

Exercise 4: Enter Data for a Stored File with a USB Keyboard and Print a Label

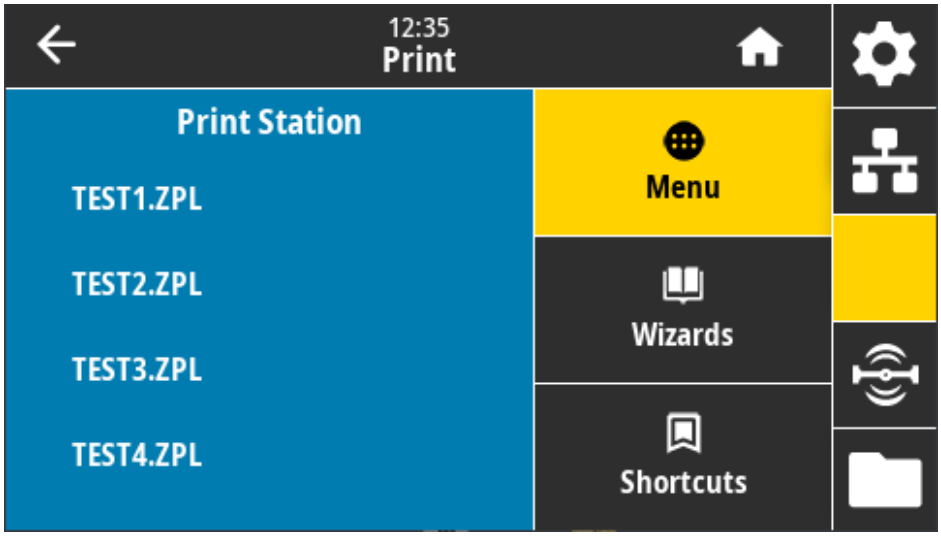
The Print Station feature allows you to use a USB Human Interface Device (HID) — such as a keyboard or a barcode scanner — to enter ^FN field data into a *.ZPL template file.

1. After performing the previous exercise, plug a USB keyboard into a USB host port located on the front of your printer.
2. Touch **Menu** > **Print**.



The Print screen displays.

3. Touch **Print Station**.



The printer loads any executable files and processes them. The available files are listed.

4. Select the file `KEYBOARDINPUT.ZPL`.

   The printer accesses the file and prompts you for the information in the `^FN` fields in the file. In this case, it prompts you for your name.

5. Using the external keyboard, type your name and press **ENTER**.

   The printer prompts you for the number of labels to print.

6. Using the external keyboard, specify the desired quantity of labels and press **ENTER**.

   The specified number of labels is printed, with your name in the appropriate fields.

Using the USB Host Port and Near Field Communication (NFC) Capabilities

The Zebra Print Touch feature allows you to touch an Android-based, NFC-enabled device (such as a smart phone or tablet) to the printer's NFC logo to pair the device to the printer. You can use this feature to supply information for which you are prompted and then print a label using that information.

IMPORTANT: Some devices may not support NFC communication with the printer until you change their settings. If you encounter difficulties, consult your service provider or your smart device manufacturer for more information.

Figure 5 Print Touch Location (Passive NFC)



Exercise 5: Enter Data for a Stored File with a Smart Device and Print a Label

NOTE: The steps in this exercise may vary somewhat based on your smart device, on your service provider, or on whether you already have the free Zebra Utilities app installed on your smart device.

Refer to the Zebra Bluetooth User Guide for specific instructions for configuring your printer to use a Bluetooth interface. A copy of this manual is available at zebra.com/manuals.

1. If you do not have the Zebra Utilities app installed on your device, go to the app store for your device, search for the Zebra Utilities app, and install it.
2. Pair your smart device with the printer by holding the smart device next to the **Zebra Print Touch** icon on your printer.
   a) If necessary, access the Bluetooth information about your printer using your smart device. For instructions, refer to the manufacturer documentation made available for your device.
   b) If necessary, select the Zebra printer's serial number to pair it with the device.
   c) After your smart device is detected by the printer, the printer may prompt you to accept or reject the pairing. If necessary, press **ACCEPT**. Some smart devices will pair with the printer without this prompt.
3. Start the Zebra Utilities app on your device.

   The Zebra Utilities main menu displays.



4. Perform these steps if you have an Apple device: If not, skip to the next step.
   a) Tap **Settings** ( ) in the lower right corner.
   b) Change the setting for **Get Labels From Printer** to **ON**.
   c) Tap **Done**.
   d) Tap **Files**.

      The smart device gets data from the printer and displays it. This retrieval process may take a minute or more to complete.
5. Scroll through the formats shown and select `E:SMARTDEVINPUT.ZPL`.

   Based on the `^FN` field in the label format, the smart device prompts you for your name.
6. Enter your name at the prompt.
7. If desired, change the quantity of labels to print.
8. Tap **Print** to print the label.

Maintenance

This section provides routine cleaning and maintenance procedures. It is recommended that you procure designed to work with your printer from zebra.com/supplies.

Cleaning

Your Zebra printer may require periodic maintenance to keep it functional and printing high-quality labels, receipts, and tags.

CAUTION—PRODUCT DAMAGE: DO NOT use an air compressor in place of the can of compressed air. Air compressors have micro-contaminants and particles that can enter the air system and damage your printer.

CAUTION—EYE INJURY: When using compressed air to clean the sensors, wear eye protection to shield your eyes from flying particles and objects.

Cleaning Supplies

The following printer cleaning supplies are recommended for use with your printer:

These and other printer supplies and cleaning accessories are available from zebra.com/supplies.

Printhead cleaning pens	For routine printhead cleaning.
99.7% min. pure isopropyl alcohol	Use a labeled alcohol dispenser. **NOTE:** Never re-moisten cleaning materials used to clean the printer. Always use clean supplies.
Fiber-free cleaning swabs	To clean the media path, guides, and sensors.
Cleaning wipes	To clean the media path and interior (for example, Kimberly-Clark Kimwipes)
Can of compressed air	**CAUTION—PRODUCT DAMAGE:** DO NOT use an air compressor in place of the can of compressed air. Air compressors have micro-contaminants and particles that can enter the air system and damage your printer.

IMPORTANT: To avoid product damage and risk of personal injury, follow the precautions included in each cleaning procedure when cleaning the printer.

Recommended Cleaning Schedule

Cleaning is a routine part of printer maintenance. Be sure to clean your printer and its components using the schedule listed here.

Component / Area	Recommendations
Printhead	Clean the printhead after printing every five rolls of media printed. See Cleaning the Printhead on page 237.
Standard platen (drive) roller	As needed to improve print quality. Platen rollers can slip causing print image distortion and in worst case scenarios not move the media (labels, receipts, tags, etc.) Use the detailed instructions in this Maintenance section to clean, and if needed, replace the platen. Standard platen rollers come in two colors, black (203 dpi) and gray (300 dpi).
Linerless Platen (Drive) Roller	The linerless platen normally does not require cleaning. The adhesive side of the media picks up particles as you print. Clean if you observe a build-up of particles on the platen roller. The platen roller can accumulate adhesive on the outer edges of the roller. After using many rolls of media, these 'rings' of adhesive can get dislodged when using the printer. These particle clumps can then get transferred to other areas in the printer, most importantly, the printhead. To remove adhesive particles, use the adhesive side of a piece of linerless media to gently press and remove the particles from the plater roller. See the instructions in this Maintenance section for information on cleaning and replacing the platen. If the linerless media is sticking and binding in the printer, the silicon non-stick coating may have been used up. In this case, the linerless platen normally needs to be replaced. Linerless platen rollers come in two colors, reddish-brown (203 dpi) and brown (300 dpi). **CAUTION:** Cleaning the roller with solutions or rubbing the delicate surface of this type of roller will permanently damage or shorten the usable life of the linerless platen.
Media path	Clean thoroughly as needed with fiber-free cleaning swabs and cloths moistened with 99.7% pure isopropyl alcohol. Let the alcohol evaporate completely. See Cleaning the Media Path on page 240.
Interior	Clean as needed using a soft cloth, brush or compressed air to wipe or blow dust and particles out of the printer. Use 99.7% pure isopropyl alcohol and a fiber-free cleaning cloth to dissolve contaminants like oils and grime.

Component / Area	Recommendations
Exterior	Clean as needed using a soft cloth, brush, or compressed air to wipe or blow dust and particles out of the printer. The exterior of the printer can be cleaned using plain soap and water solutions to moisten the cloth. Only use the minimum amount of cleaning solution to avoid getting solution in the printer or other areas. Do NOT clean connectors or interior of the printer with this method. The latest healthcare printer models now include ultraviolet (UV) and disinfectant-ready plastics for hospital and other similar environments. The printer user interface controls are sealed so they can be cleaned with the rest of the printer's exterior. See the Guide To Disinfecting and Cleaning Zebra Healthcare Printers on the Zebra website at zebra.com/support for the latest information on tested and approved cleaning materials and cleaning methods.
Label dispenser option	Clean as needed to improve label dispenser operations. For details on operating the dispenser, see Cleaning the Label Dispenser Option on page 245.
Cutter option	The cutter is not a user-serviceable component. Do NOT clean inside the cutter opening or blade mechanism. Use the exterior cleaning procedure to clean the cutter bezel (housing). For cleaning and maintenance of this option, call a service technician. **CAUTION:** There are no operator serviceable parts in the cutter unit. Never remove the cutter cover (bezel). Never attempt to insert objects or fingers in to the cutter mechanism. **IMPORTANT:** The blade has a special coating to resist adhesives and wear. Cleaning it may ruin the blade. **IMPORTANT:** Use the recommended cleaning supplies listed in this guide. Using unapproved tools, cotton swabs, solvents (including alcohol), etc. may damage or shorten the cutter's usable life or cause the cutter to bind.

Cleaning the Printhead

For optimal print operations, clean the printhead each time you load a new roll of media.

Always use a new cleaning pen on the printhead. Old, used cleaning pens carry contaminants from previous use that may damage the printhead.

CAUTION: The printhead becomes hot while printing. To protect from damaging the printhead and risk of personal injury, avoid touching the printhead. Only use the cleaning pen to perform printhead maintenance.

CAUTION—ESD: Observe static-safe procedures when working with the printhead or the electronic components under the top cover. The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the printhead and other electronic components used in this device.

Cleaning the Printhead – ZD421/ZD621 Direct Thermal Printers

Zebra recommends that you clean the printhead when you load a new roll of media.

1. Rub the cleaning pen across the dark area of the printhead. Clean from the middle to the outside, to move adhesive transferred from the edges of media out and away from the media path.

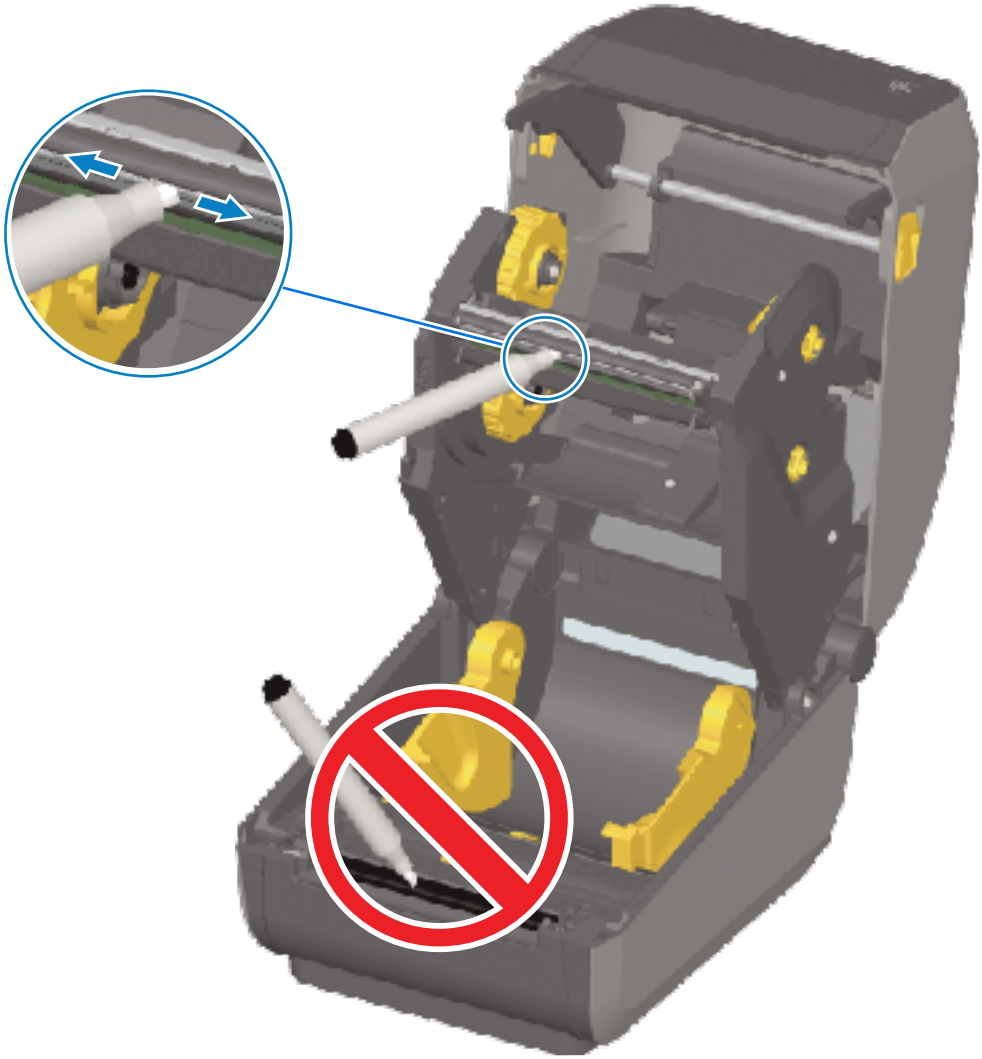


2. Wait one minute before you close the printer to allow the wet areas to dry fully.

Cleaning the Printhead – ZD421/ZD621 Thermal Transfer Printers

Clean the printhead each time you load a new roll of media.

1. If transfer ribbon is installed, remove it before proceeding.
2. Rub the cleaning pen across the dark area of the printhead. Clean from the middle to the outside, to move adhesive transferred from the edges of media to the outside of media path.

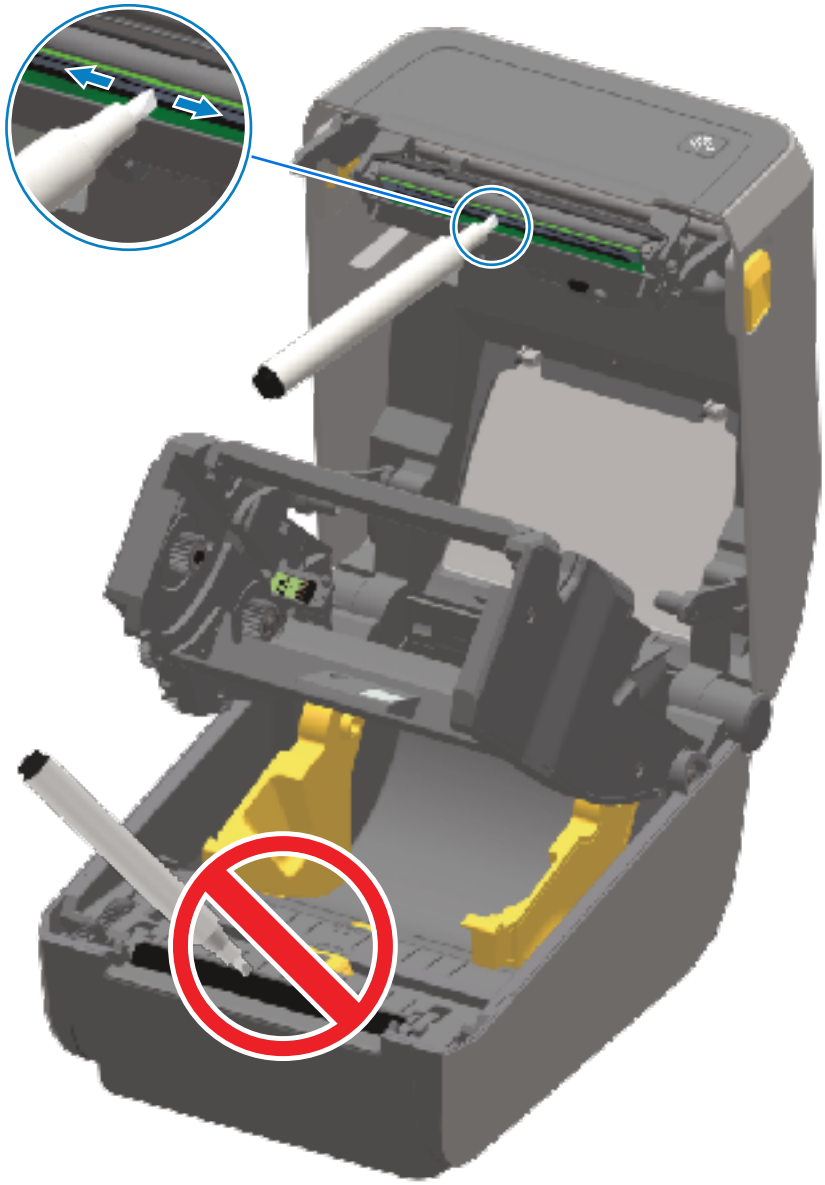


3. Wait one minute before closing the printer or loading ribbon to allow all components to dry.

Cleaning the Printhead – ZD421 Ribbon Cartridge Printers

Zebra recommends that you clean the printhead when you load a new roll of media.

1. Pull the two release arms out to release the ribbon drive transport. For instructions on how to access the printhead, see Accessing the Printhead of the ZD421 Ribbon Cartridge Printer on page 36.
2. Lift the printhead actuator arm up to access the printhead.
3. Rub the cleaning pen across the dark area of the printhead. Make sure you clean from the middle to the outside. This moves adhesive transferred from the outer edges of media away from and outside the media path.



4. Wait one minute for the surface of the printhead to dry.
5. Release the printhead actuator arm, then push the ribbon drive transport into the printhead actuator arm.

   The release arms snap into place, relinking the ribbon drive transport to the top cover and the printhead actuator arm.

Cleaning the Media Path

Use a cleaning swab and or a lint-free cloth to remove debris, dust or crust that has built-up on the holders, guides, and the media path surfaces.

Lightly moisten the swab or cloth with 99.7% pure medical-grade alcohol.

For hard-to-clean areas, use extra alcohol on a cleaning swab to soak the debris to break up any adhesive that may have accumulated on surfaces in the media compartment.

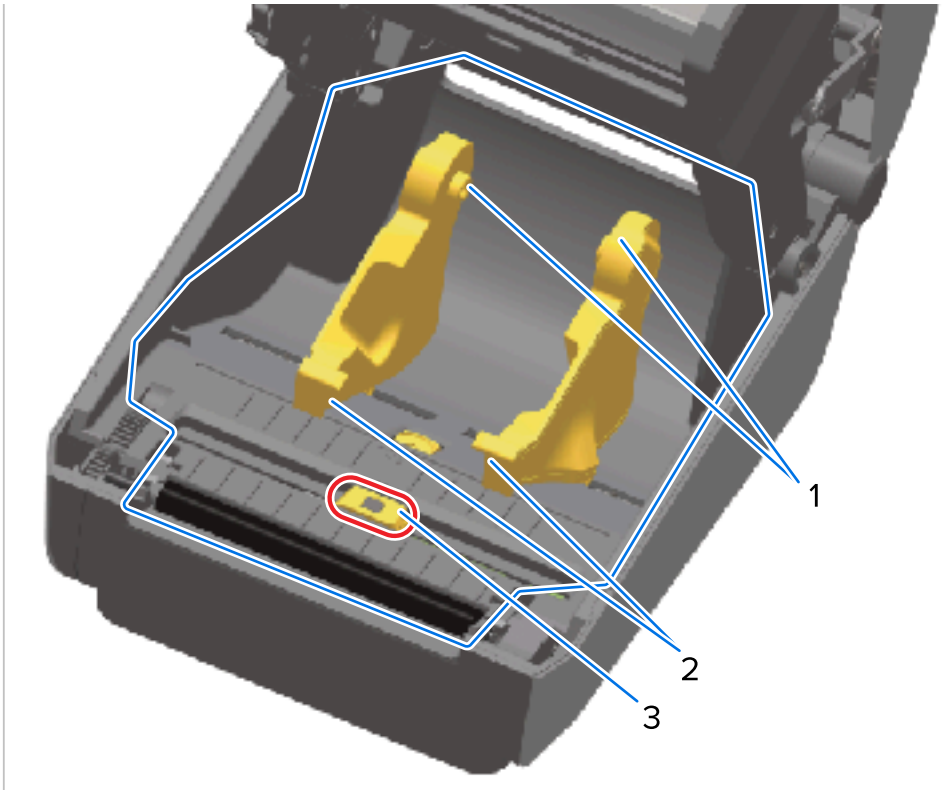
IMPORTANT: Do NOT clean the printhead, movable sensor, or platen as part of this process.

Cleaning the Media Path – Lower Half of ZD421/ZD621 Printers

The lower half of all printer models covered in this guide get cleaned the same way, as described in this procedure.

IMPORTANT: Do NOT clean the printhead, sensors, or platen as part of this process.

1. Wipe the inside surfaces of the roll holders and the underside of the media guides with either wipes or cleaning swabs lightly moistened with 99.7% pure isopropyl alcohol. Use extra alcohol if necessary to soak accumulated debris for removal.
2. Wipe the inside surfaces of the roll holders and the underside of the media guides with a swab.



1	Media roll holders
2	Media guides
3	Sensor (do NOT clean)

NOTE: Use a clean swab for each cleaning. Discard all used cleaning swabs.

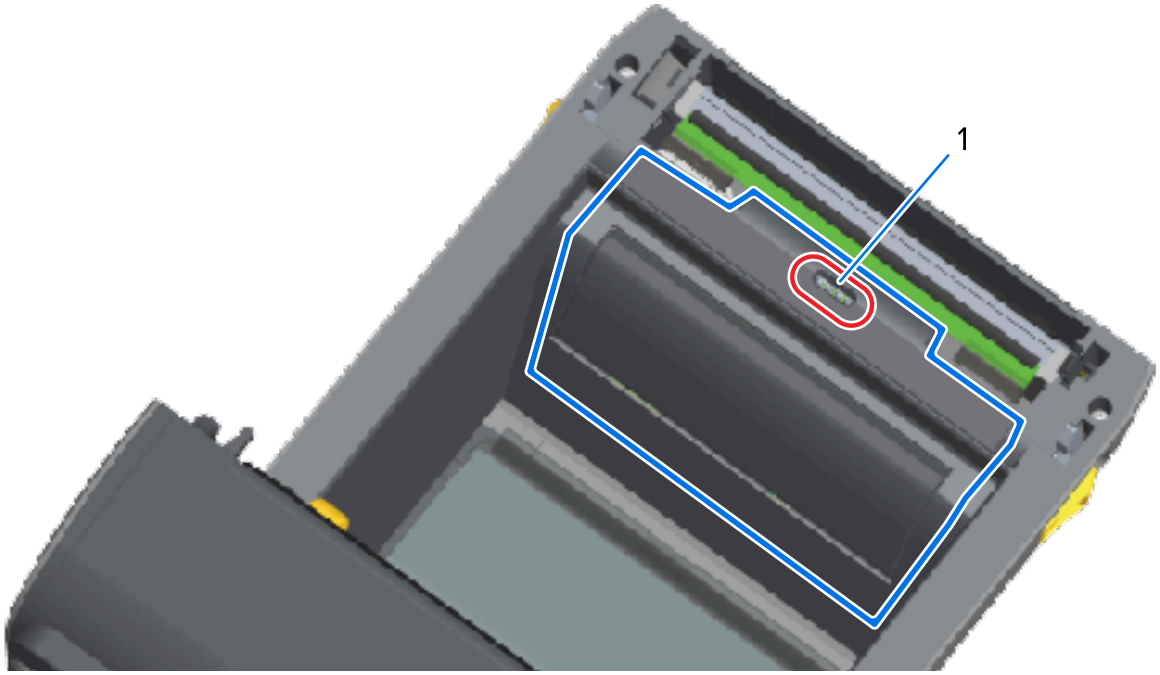
3. Wipe the movable sensor slide channel (but NOT the sensor itself). Move the sensor gently as needed to get to all areas.
4. Wait one minute before closing the printer to allow time for all cleaned areas to dry thoroughly.

Cleaning the Media Path – Upper Half of ZD421/ZD621 Direct Thermal Printers

See Cleaning the Media Path for information on the cleaning solution and swabs or cloth to use to clean the media path.

Use a clean swab or lint-free cloth lightly moistened with 99.7% pure isopropyl alcohol to wipe the areas (outlined in blue in the figure below) to remove adhesive and other contaminants.

NOTE: Do NOT clean the sensor array.

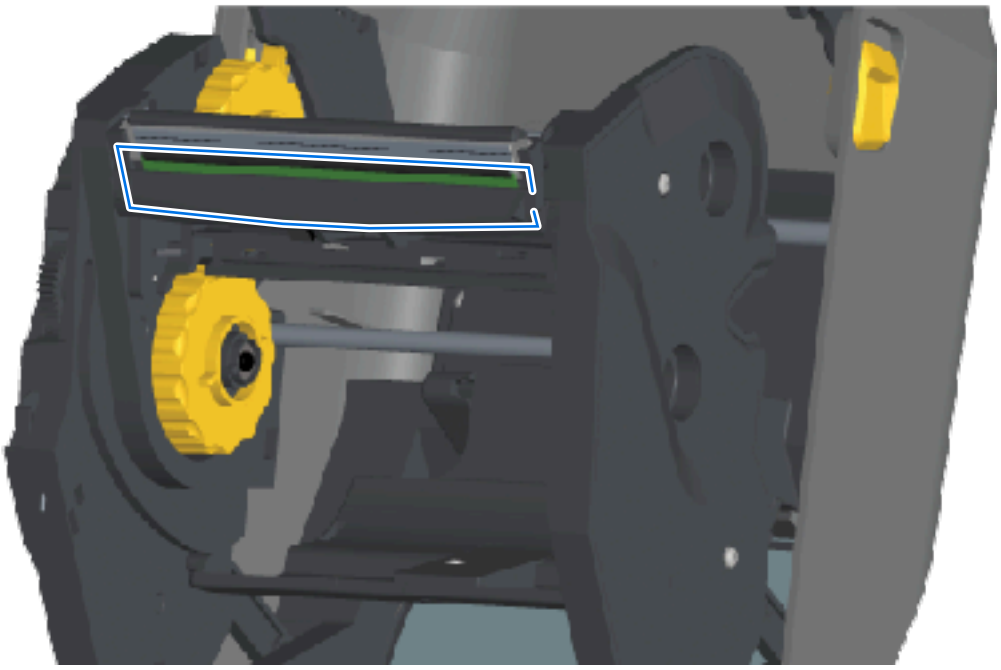


1	Sensor (do NOT clean)

Cleaning the Media Path – Upper Half of ZD421/ZD621 Thermal Transfer Printers

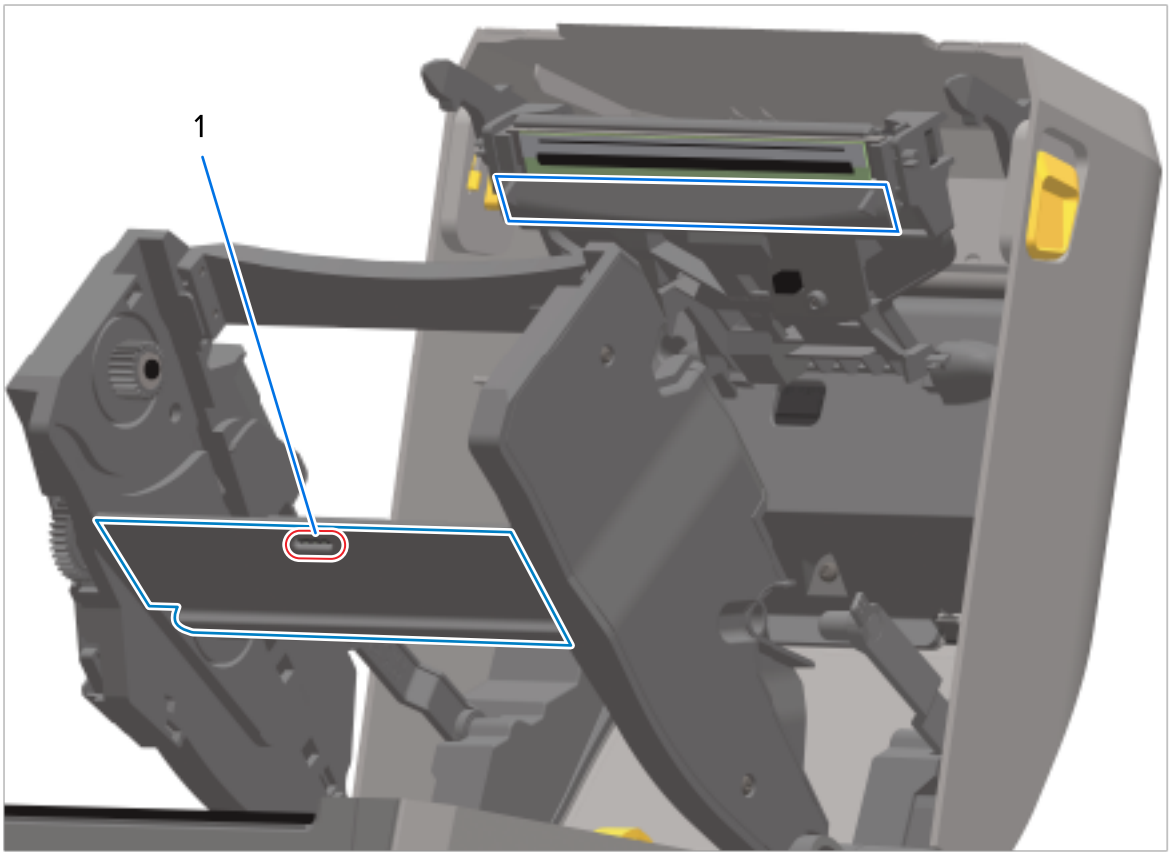
See Cleaning the Media Path for information on the cleaning solution and swabs or cloth to use to clean this path.

Use a clean swab or lint-free cloth lightly-moistened with 99.7% pure isopropyl alcohol solution to wipe the area (outlined in the figure below), near the printhead and on the front of the printer's ribbon carriage.



Cleaning the Media Path – Upper Half of ZD421 Thermal Transfer Ribbon Cartridge Printers

1. Pull the two release arms out to release the ribbon drive transport. For instructions on how to access the printhead, see Accessing the Printhead of the ZD421 Ribbon Cartridge Printer on page 36.
2. Wipe the areas (outlined in blue in the figure) which are below the printhead actuator arm and the ribbon drive transport.



1	Sensor (do NOT clean)

3. Release the printhead actuator arm, then push the ribbon drive transport into the printhead actuator arm.

   The release arms snap into place, relinking the ribbon drive transport to the top cover and the printhead actuator arm.

Cleaning the Cutter Option

This is a continuation of cleaning the media path for either option (if installed).

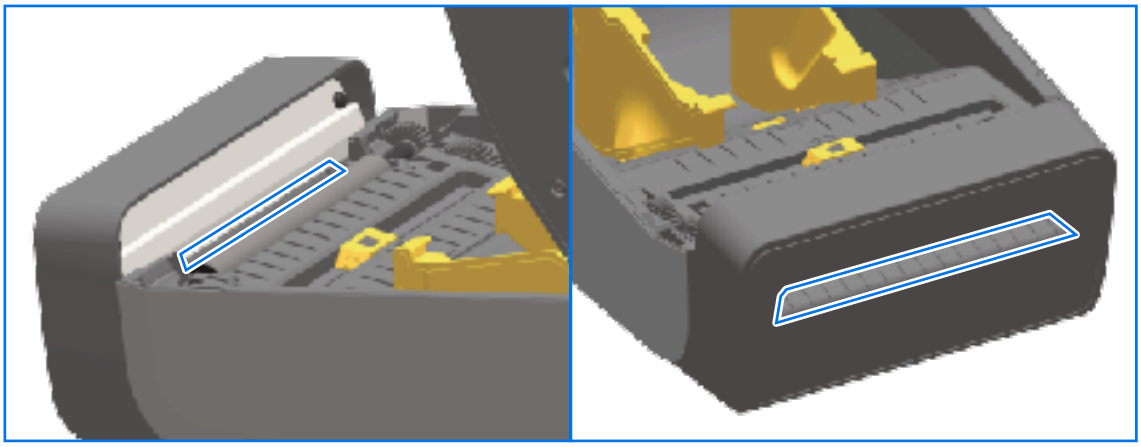
IMPORTANT: Clean only the plastic media path surfaces, and not the internal cutter blades or cutter mechanism. The cutter blade mechanism does NOT require maintenance cleaning. DO NOT clean the blade. This blade has a special coating to resist adhesives and wear which may be damaged if cleaned.

CAUTION: There are no operator serviceable parts in the cutter unit. Never remove the cutter cover (bezel), or attempt to insert objects or fingers into the cutter mechanism.

CAUTION: Using un-approved tools, cotton swabs, solvents (including alcohol), etc. all may damage or shorten the cutter's usable life or cause the cutter to jam.

1. Use a clean swab or lint-free cloth lightly-moistened with 99.7% pure isopropyl alcohol to wipe the ridges and the plastic surfaces of the media entry on the inside and the exit slot on the outside of the cutter. Clean inside the areas outlined in the figure shown.

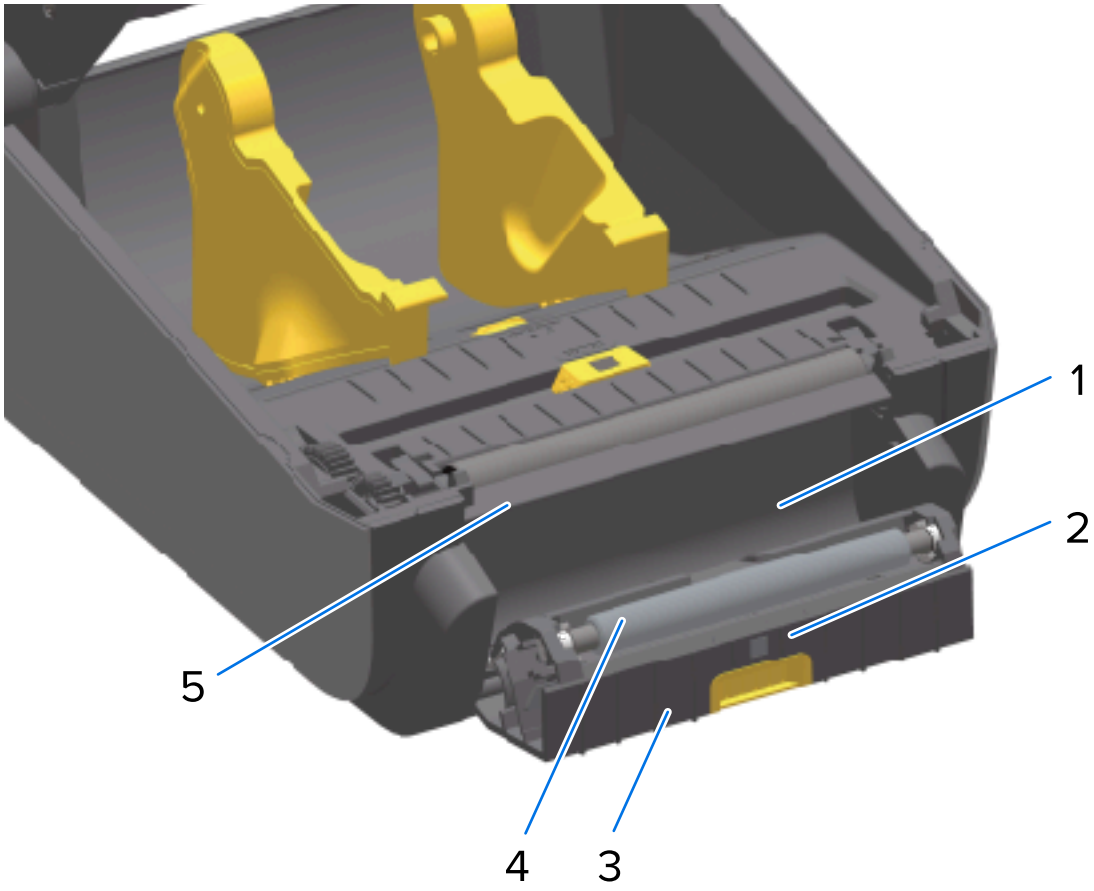
2. Repeat as necessary to remove any adhesive or contaminate residue and allow to dry.



Cleaning the Label Dispenser Option

For the cleaning supplies to use to clean the label dispenser, see Cleaning Supplies on page 235.

1. Open the door and clean the peel bar, the inner surfaces, and the ridges on the door using a clean swab or lint-free cloth lightly moistened with 99% pure isopropyl alcohol.
2. Rotate the roller and wipe its surfaces.
3. Discard the swab or cloth.
4. Use a new swab or cloth to remove any diluted residue.
5. Clean the sensor window thoroughly until it is clear of streaks and residue.



1	Inside wall
2	Label-taken sensor
3	Ridges
4	Pinch roller
5	Peel bar

Cleaning the Sensor

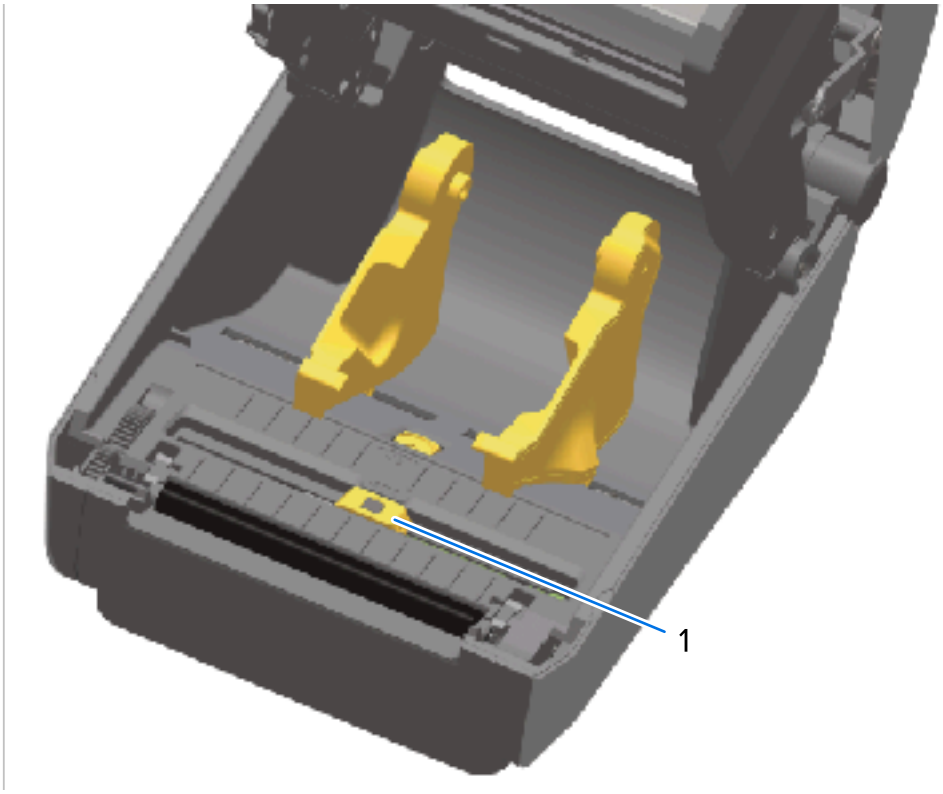
Dust can accumulate on the media sensors and must be cleaned periodically.

NOTE: Do NOT use an air compressor to remove dust. The action of air compressors tends to add moisture, fine grit, and lubricant which can contaminate your printer.

Cleaning the Sensor – Lower Half of the ZD421/ZD621 Printers

The lower half of all ZD621/ZD421 model printers are all cleaned the same way. Use this procedure to clean the sensor window.

1. Clean the window of the movable sensor by gently brushing away dust or using a can of compressed air. If necessary, use a dry swab to brush away dust.

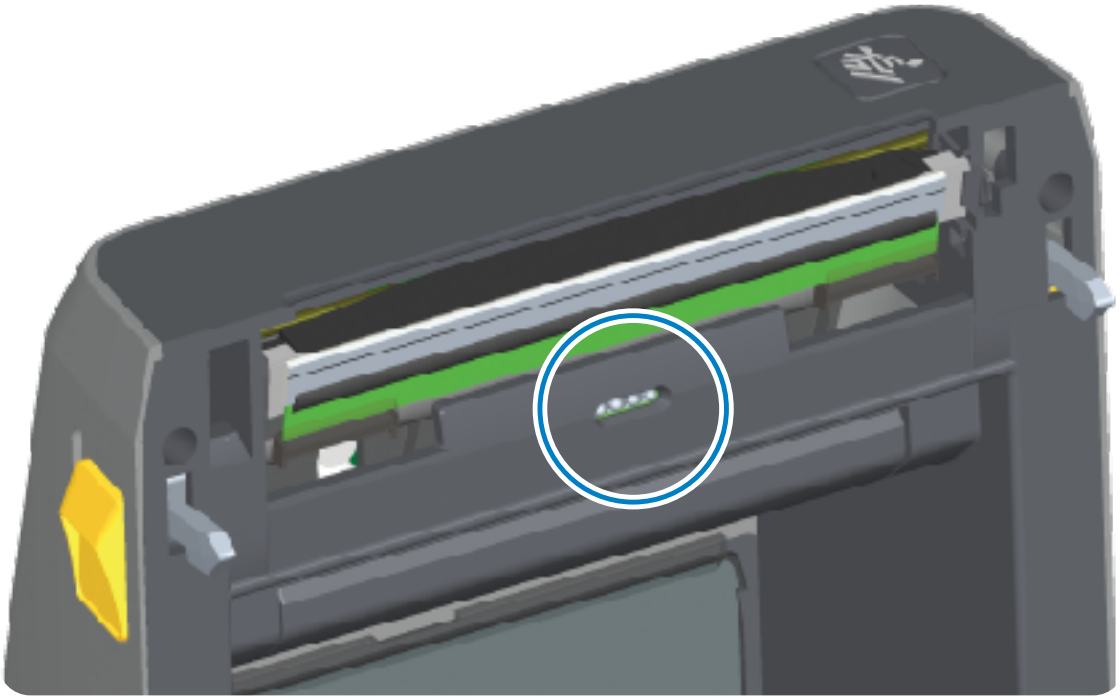


1	Movable sensor (black mark and lower web/gap)

2. If adhesives or other contaminants remain, use a swab moistened with 99.7% pure isopropyl alcohol to break them up. Discard the used swab(s).
3. Use a dry swab to remove any residue that may be left from the first cleaning.
4. Repeat the preceding steps as required until all residue and streaks are removed from the sensor.

Cleaning the Sensor – Upper Half of ZD421/ZD621 Direct Thermal Printers

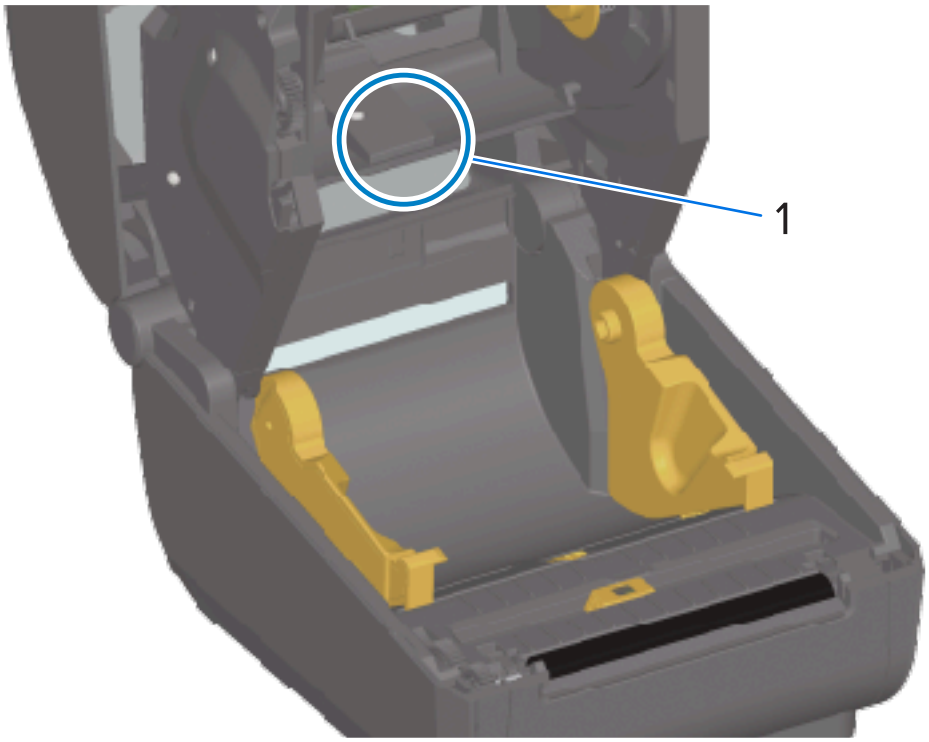
1. Spray the upper web (gap) array sensor below the printhead with a can of compressed air. If necessary, use a swab moistened with 99.7% pure isopropyl alcohol to break up adhesive or other non-dust contaminants.
2. Discard the used swab.
3. Use a clean dry swab to remove any residue that may be left from the first cleaning.



Cleaning the Sensor – Upper Half of the ZD421/ZD621 Thermal Transfer Printers

1. Use a can of compressed air to spray the upper web (gap) array sensor located below the printhead.

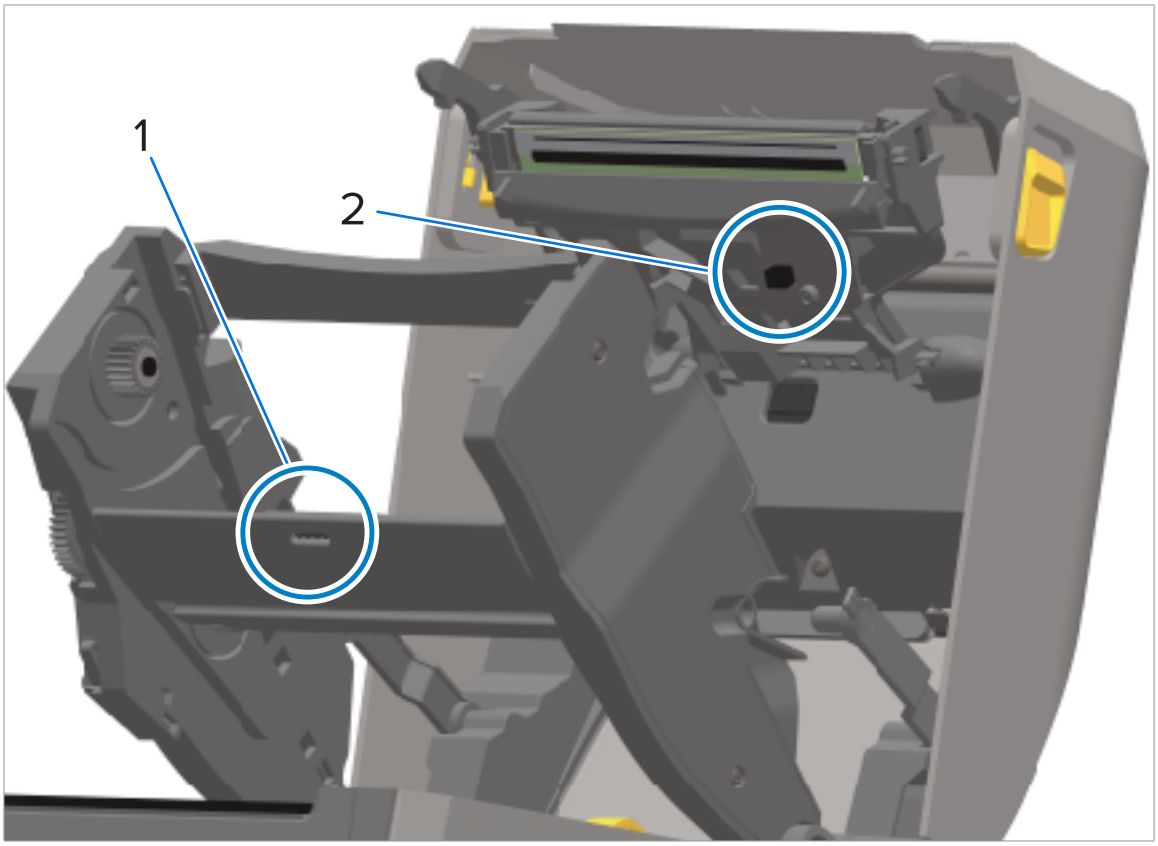
IMPORTANT: If the entire sensor needs a complete cleaning (which is a very rare occurrence), a service technician should perform the cleaning.



2. Close the printer cover when done.

Cleaning the Sensor – Upper Half of the ZD421 Ribbon Cartridge Printers

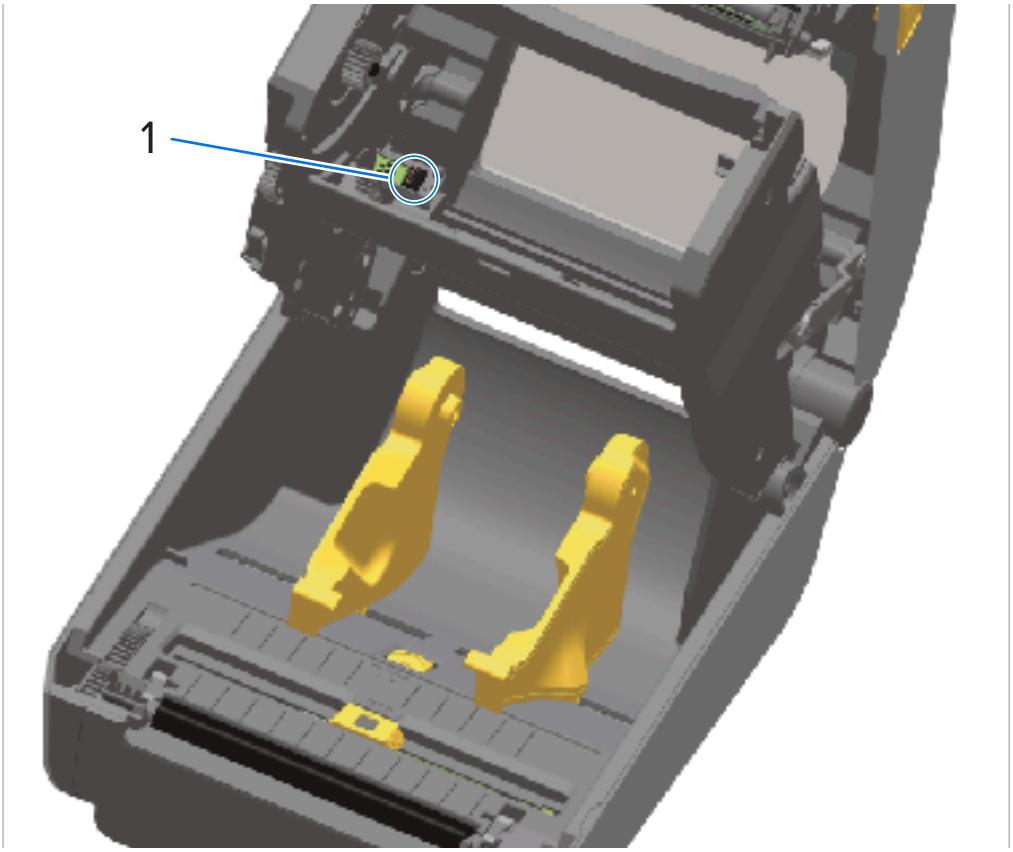
1. Pull the two release arms out to release the ribbon drive transport. For instructions on how to access the printhead, see Accessing the Printhead of the ZD421 Ribbon Cartridge Printer on page 36.
2. Swing the printhead actuator arm up until it touches the printer's top cover. Hold the actuator arm in this position for access to the area below the printhead.
3. Spray the upper web (gap) array sensor under the ribbon drive transport and the ribbon-out sensor on the underside of the printhead actuator arm with a can of compressed air. If necessary, use an alcohol-moistened swab to break up any accumulated debris.
4. Use a dry swab to remove any residue that may be left from the first cleaning.



1	Upper web (gap) array
2	Ribbon-out sensor

5. If the cartridges are not being detected, you may need to clean the ribbon cartridge sensor interface pins. Clean the pins using a clean swab or lint-free cloth lightly moistened with 99.7% pure isopropyl alcohol, using a gentle wiping motion from right to left.

CAUTION: Up and down motions may damage the pins. Wipe gently, ONLY left to right.



1	Ribbon cartridge sensor contact pins

Cleaning and Replacing the Platen

The platen is the print surface and drive roller for your media. Clean the platen (and media path) whenever the printer has significantly poorer performance, print quality or media handling. If sticking or jamming continues even after cleaning, you must replace the platen.

IMPORTANT: Contaminants on the platen roller can damage the printhead or cause the media to slip or stick when printing. Adhesive, dirt, general dust, oils and other contaminants should be cleaned PROMPTLY off the platen.

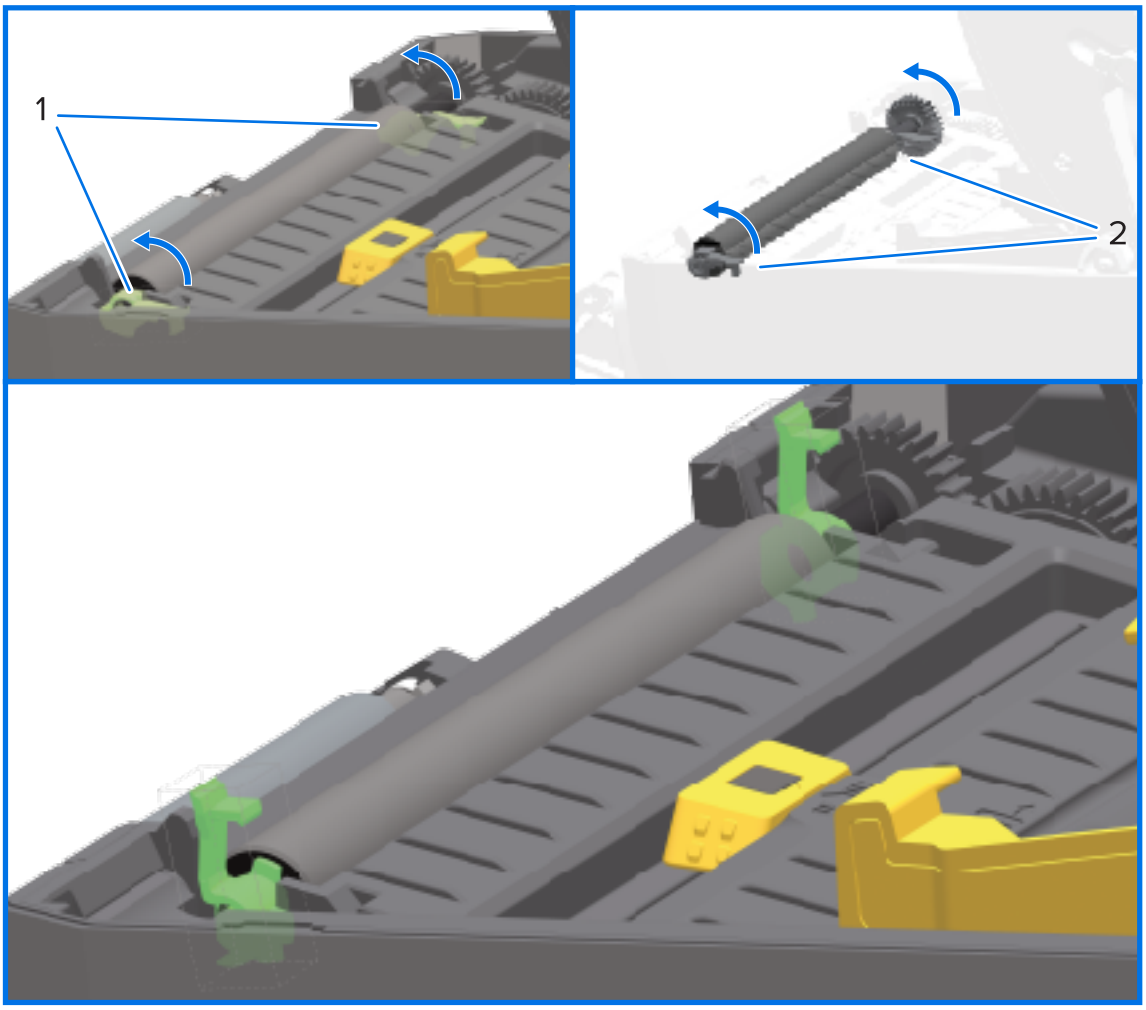
CAUTION:

When cleaning Linerless Platens, do NOT wash or scrub. Washing or scrubbing may damage the platen. Remove adhesive particles ONLY using the adhesive side of linerless media. Lightly touch the platen roller with a linerless label to lift particles off the exposed area of the platen roller and the media path areas.

For an additional cleaning, use a mild dish detergent with a neutral pH (Palmolive or Dawn) on the printer platen. Remove the platen as directed in the user guide. For a light cleaning, wipe it gently with a damp sponge and a small amount of detergent. For a deeper cleaning, remove the gear and bearings first. Then, soak the platen in hot water mixed with detergent (50:1 ratio) for 10–15 minutes. After the soaking, dry with a lint-free cloth and air dry before reinstalling.

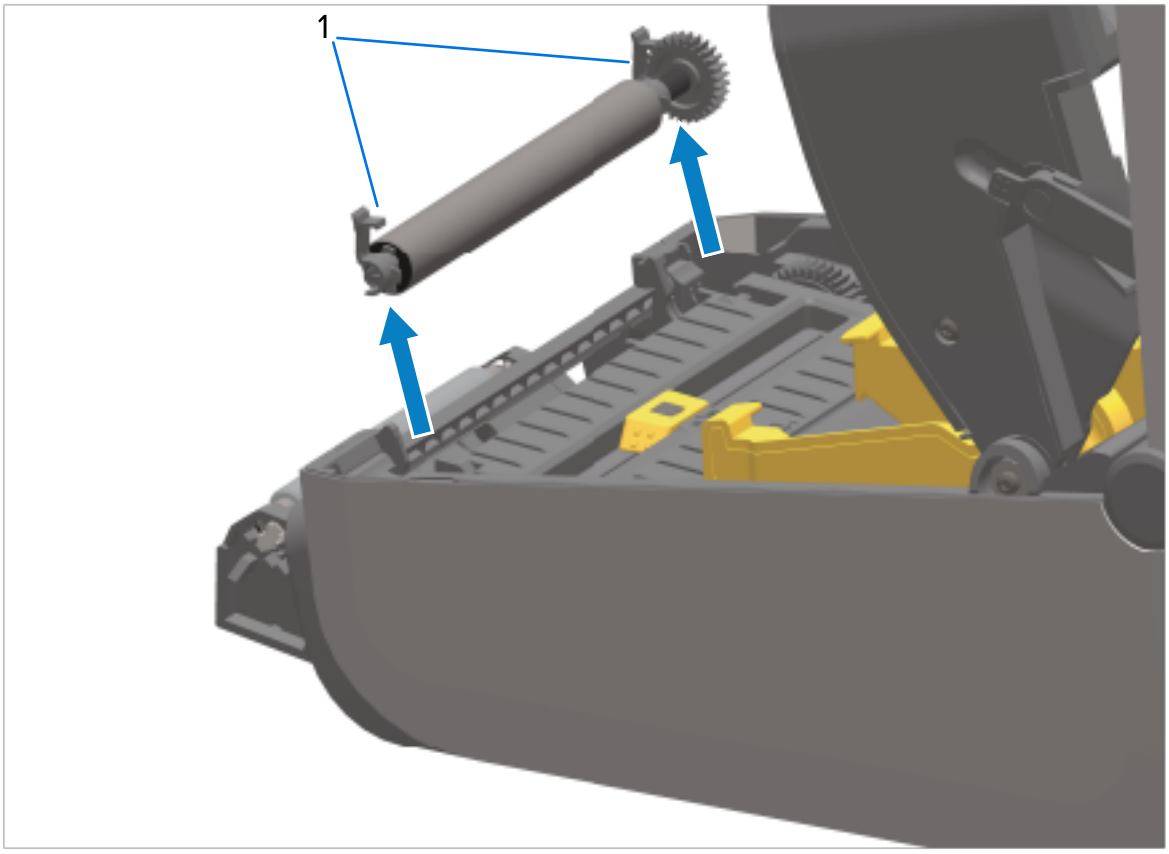
The platen can be cleaned with a fiber and lint free swab (such as a Texpad swab) or a lint-free, clean, damp cloth very lightly moistened with 99.7% pure. medical-grade isopropyl alcohol.

1. Open the cover (and if a label dispenser is installed. the dispenser door).
2. Remove media from platen area.
3. Pull the platen-bearing latch release tabs on the right and left sides towards the front of the printer and rotate them up.



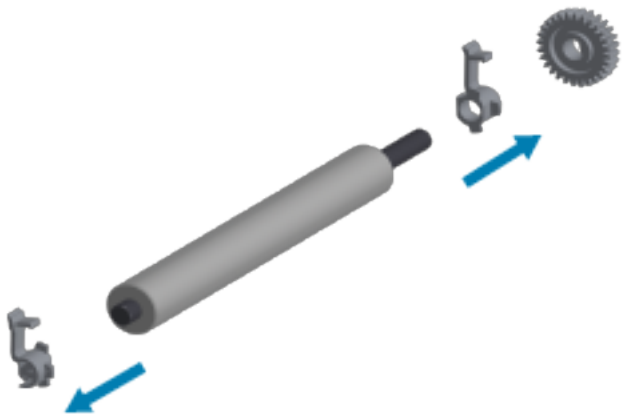
1	Platen bearings

4. Lift the platen out of the printer's bottom frame.



1	Platen bearings

5. Slide the gear and the two bearings off the shaft of the platen roller.



6. To clean a regular platen, use alcohol moistened swab or lint-free cloth very lightly moistened with 99.7% pure, medical-grade isopropyl alcohol using the steps below.

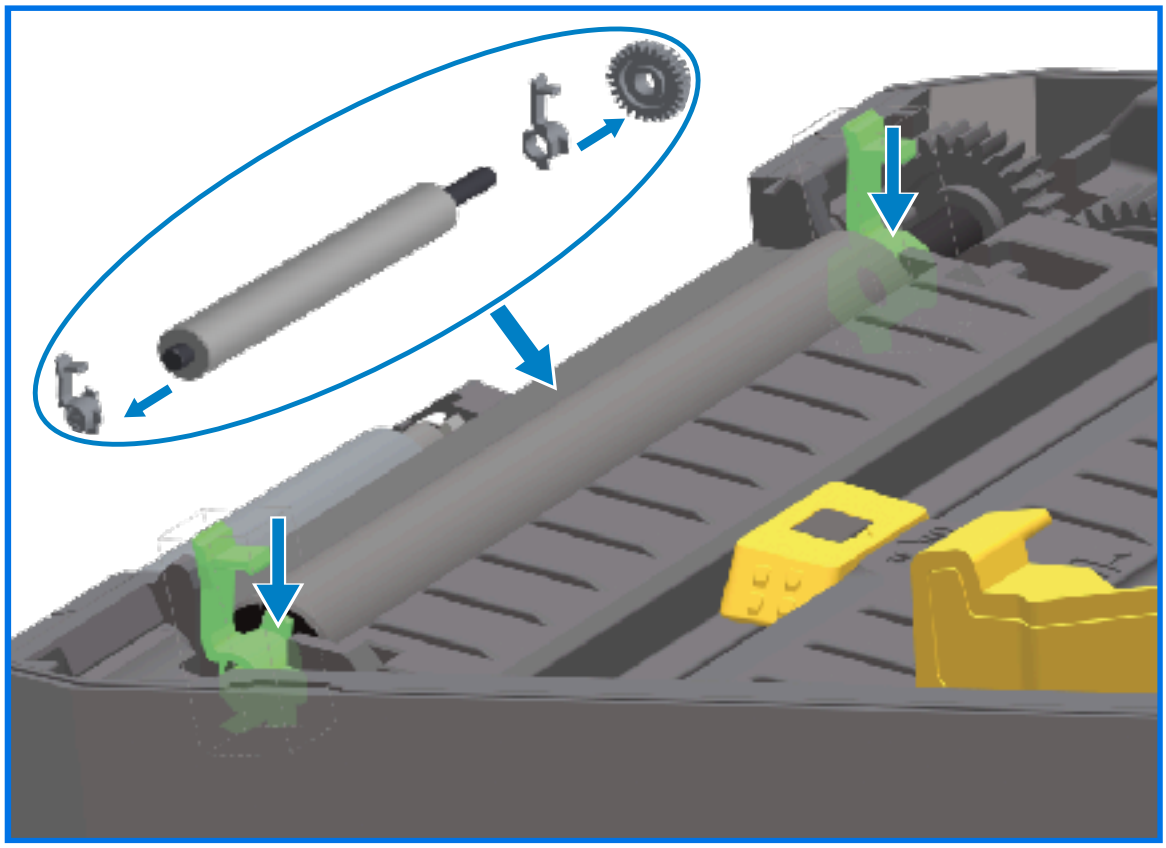
IMPORTANT: To clean a linerless platen, instead of using the substeps below, use ONLY the adhesive side of a piece of linerless media to gently lift the particles from the plater roller. The surface of a linerless platen may be damaged if it is washed or rubbed with a cleaning solution.

a) Clean from the center out. Discard the used swab or cloth.

b) Repeat this process until all of the roller surface has been cleaned.

c) If there has been heavy adhesive build-up or label jam, repeat with a new swab to remove residual contaminants. (Adhesives and oils, for example, may be thinned by the initial cleaning but not completely removed.)

7. Make sure the bearings and drive gear are on the shaft of the platen roller.



8. Align the platen with the gear to the left and lower it into the printer's bottom frame.

9. Rotate the platen bearing latch release tabs down on the right and left sides towards the rear of the printer and snap them into place.

10. Allow the printer to dry for one minute before closing the dispenser door and the media cover, and before loading labels.

Replacing the Printhead

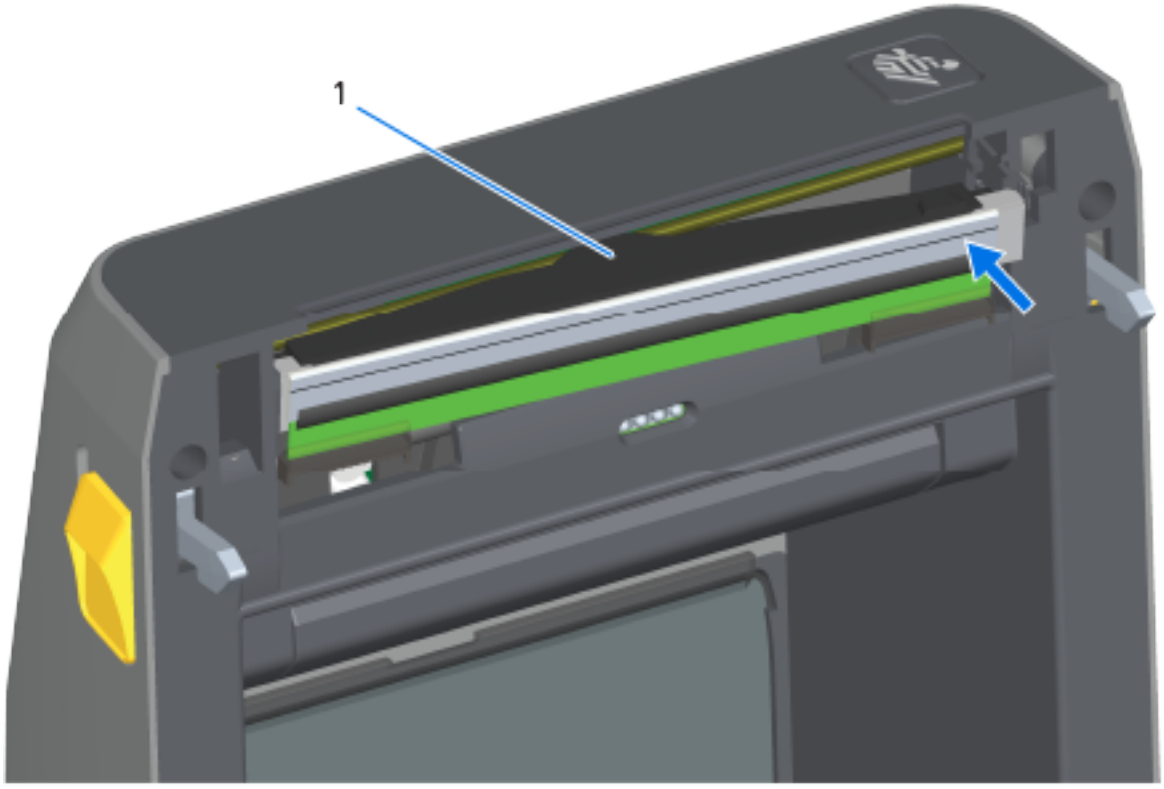
Review these printhead removal/installation steps before you proceed to replace the printhead.

CAUTION: Prepare your work area by protecting against static discharge. Your work area must be static-safe. You must use a properly grounded conductive cushioned mat to hold the printer and use a conductive wrist strap to protect yourself.

CAUTION: Unplug the printer from the power supply and allow the printer to cool to prevent injuries or damage to printer circuitry.

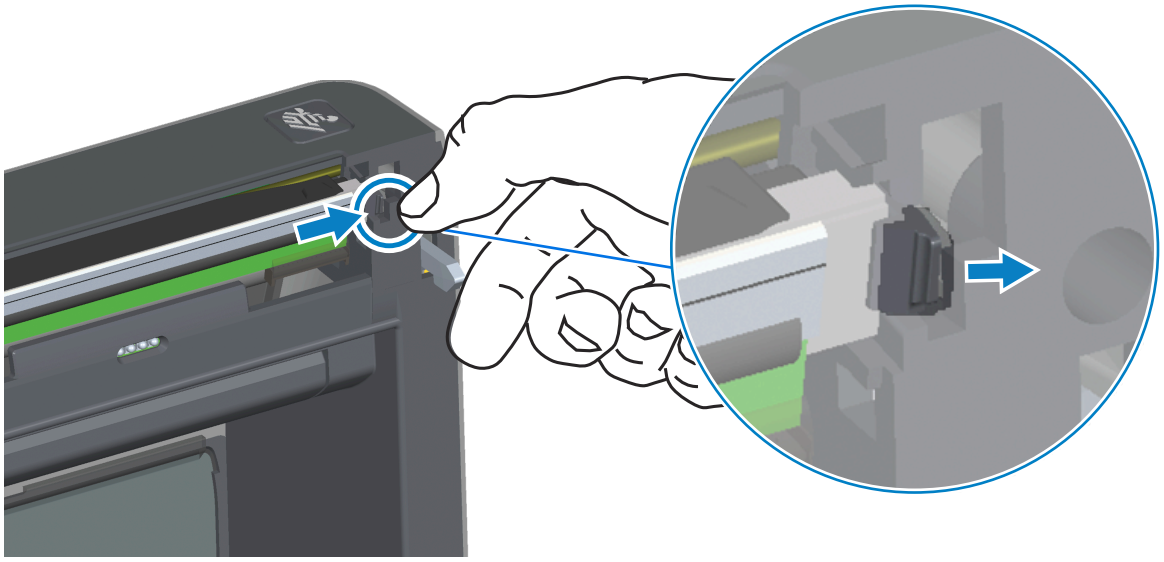
Replacing the Printhead – ZD421/ZD621 Direct Thermal Printer Models

1. Use these steps to remove the printhead:
   a) Turn printer power OFF.
   b) Open the printer cover.



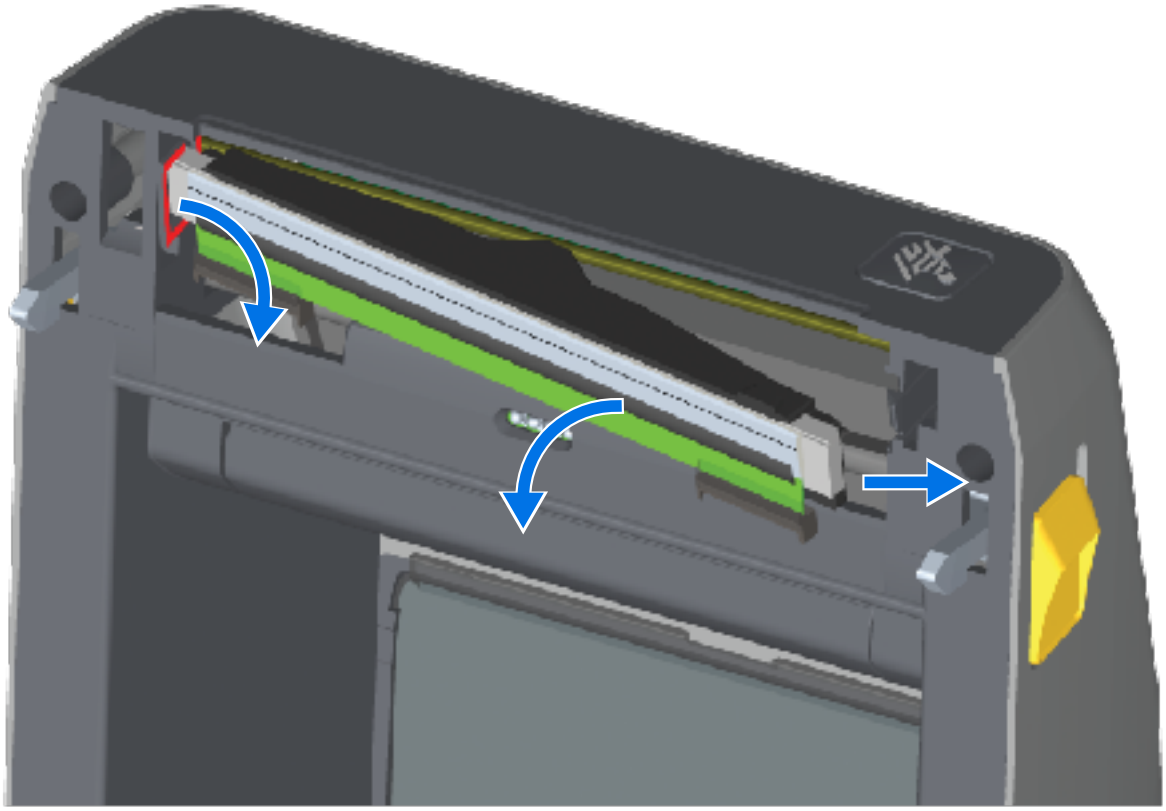
1	Printhead

   c) Push the printhead release latch away from the printhead. The right side of printhead releases.

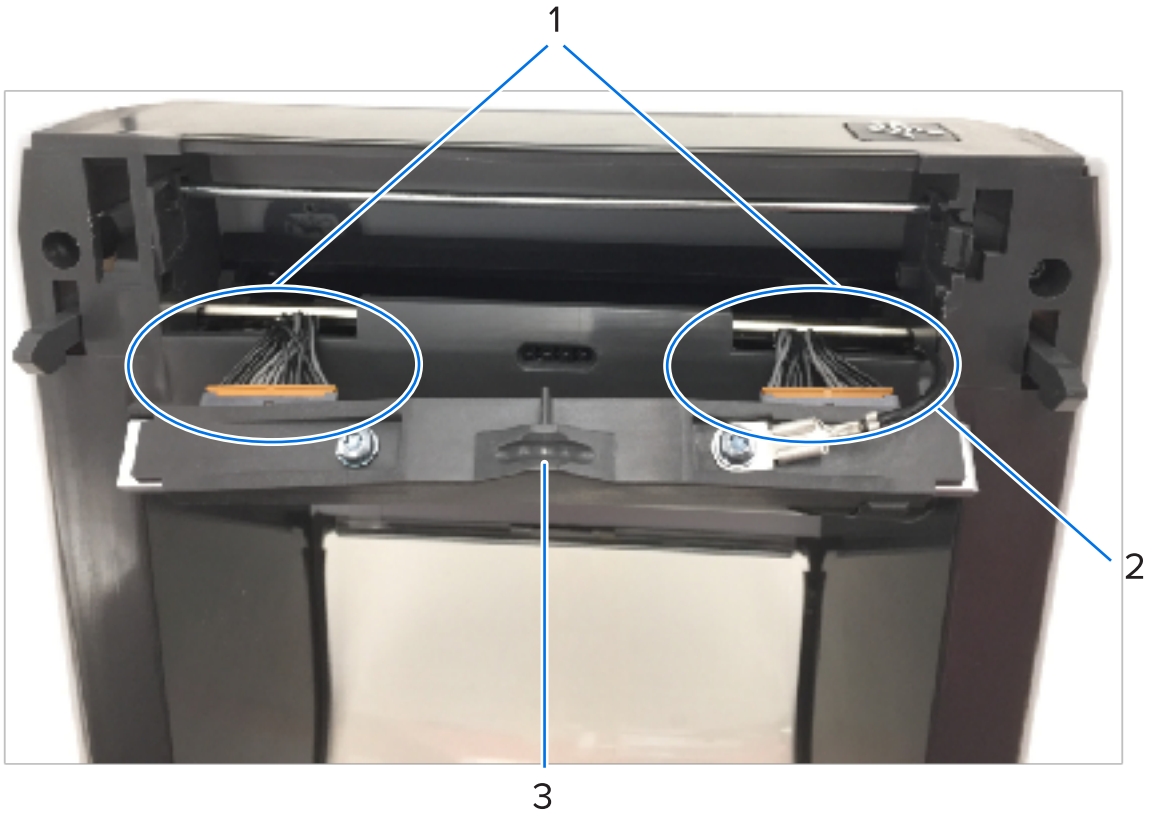


d) Swing the loose, right side of the printhead out of the printer. Pull it out and to the right a little to get the left side of the printhead clear.

e) Pull the printhead out and free of the top cover to gain access to its attached cables on the backside of the printhead. In the figure that follows, the red outline indicates the printhead retainer slot which is on the left side as you face the open printer.



f) Gently but firmly pull the two printhead cable bundle connectors off the printhead. Then pull the ground wire off the printhead.

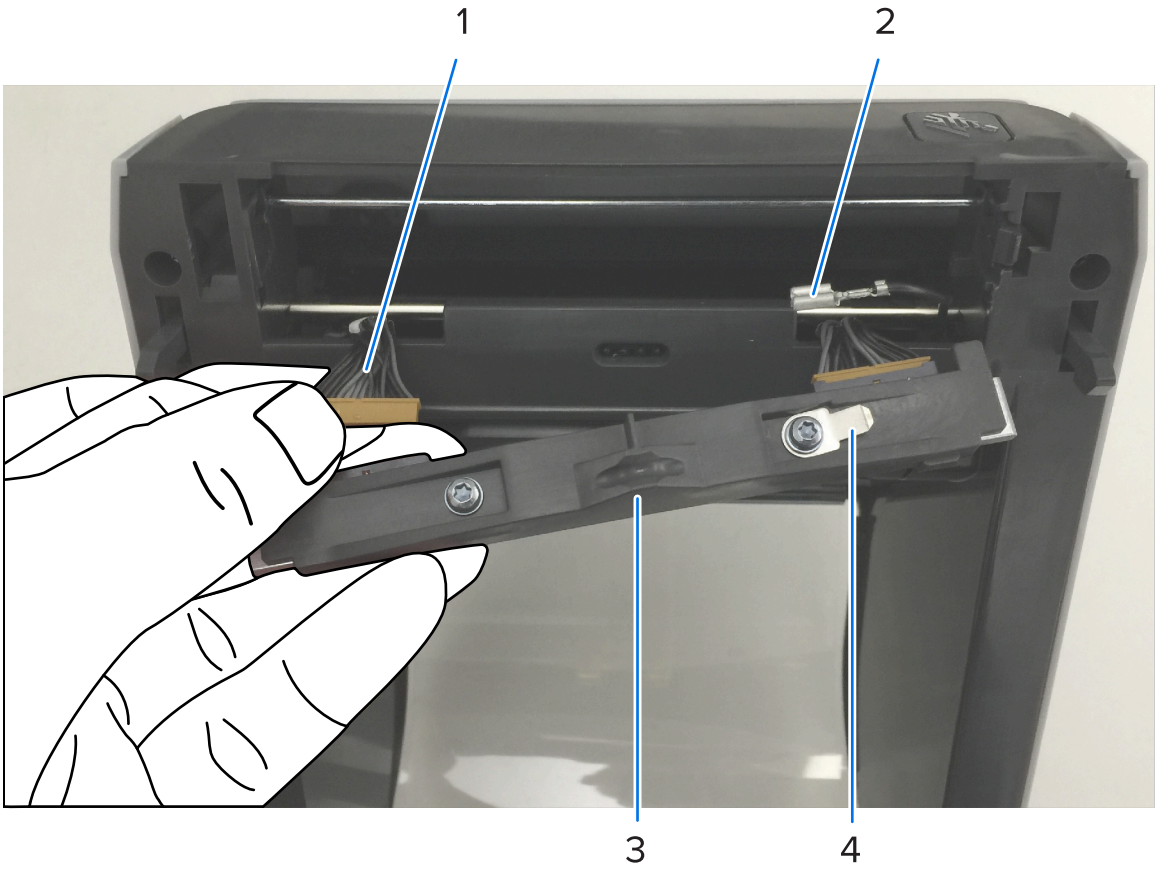


1	Connectors	3	Printhead assembly
2	Printhead ground wire		

2. To replace the printhead:
   a) Push the right-side printhead cable connector into the printhead.

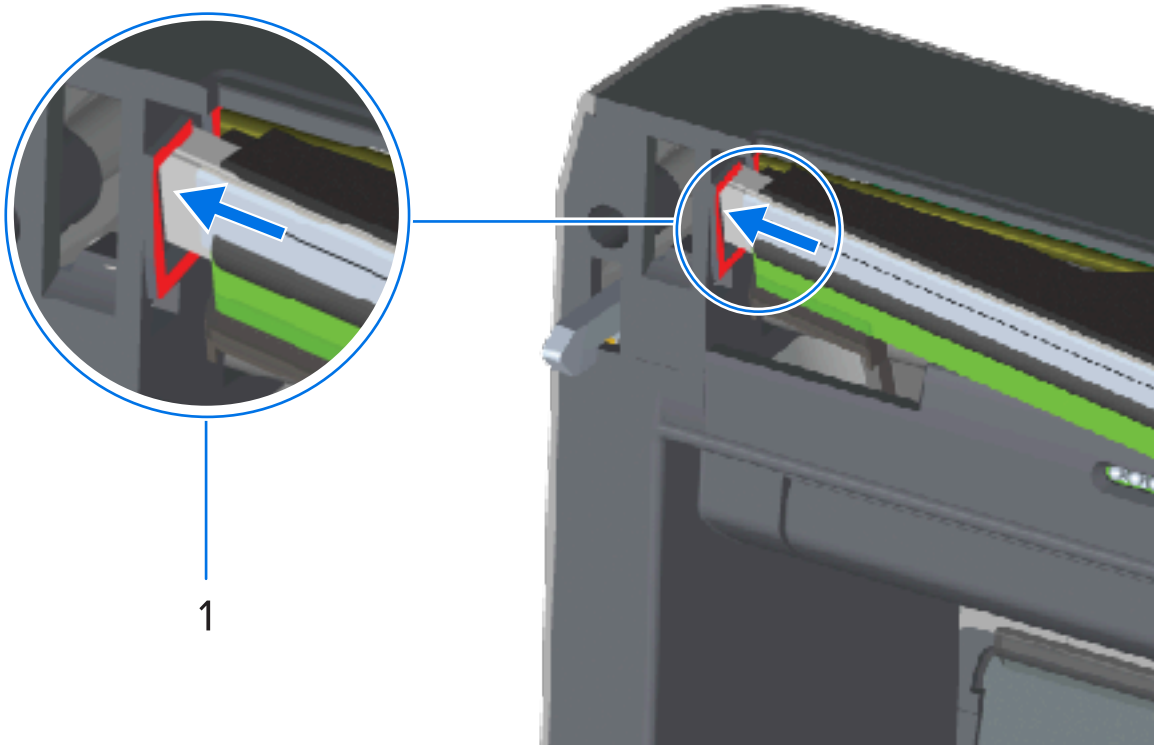
   NOTE: The connector is keyed to only insert one way.

   b) Attach the ground wire to the printhead's ground tab.
   c) Push the left-side printhead cable connector onto the printhead.



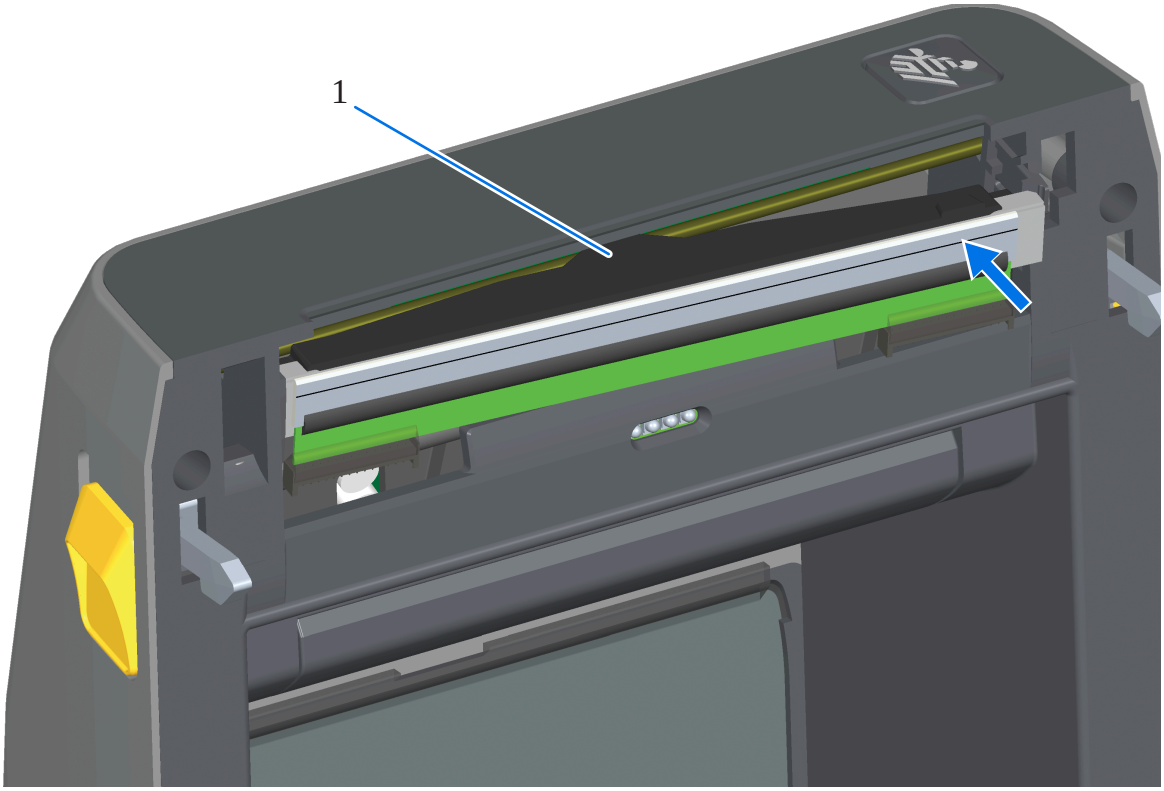
1	Connector with key	3	Printhead ground tab
2	Printhead ground wire	4	Spring wire notch

d) Insert the left side of the printhead assembly into the recessed slot (highlighted in red) on the left side of the printer.



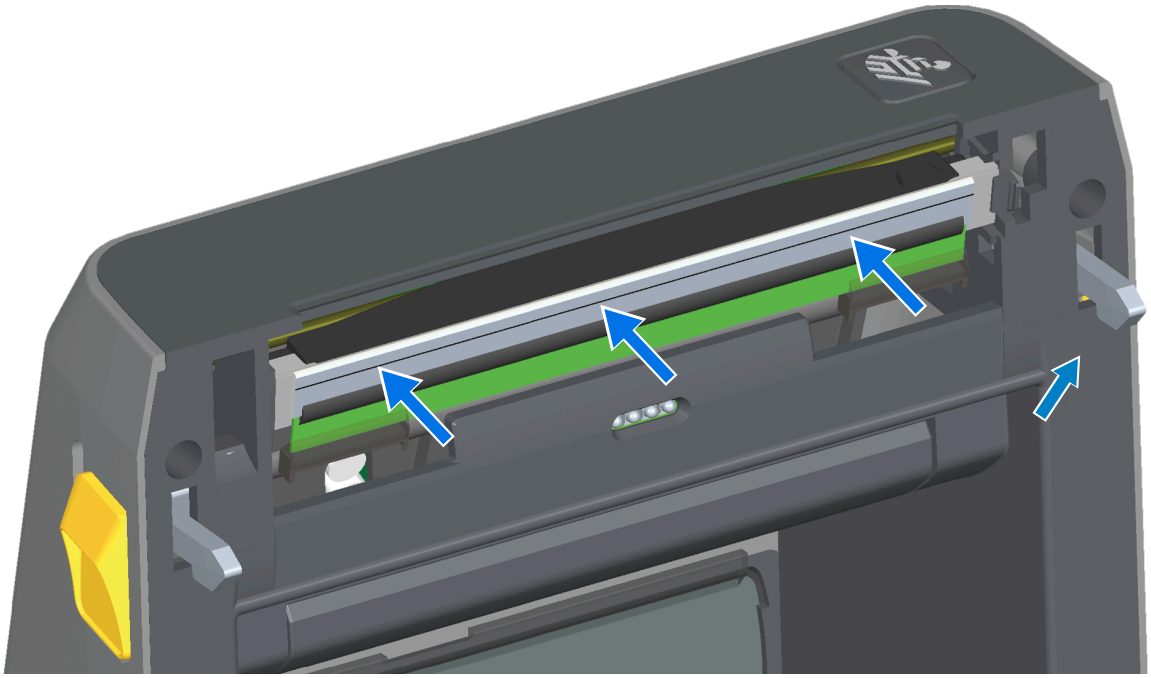
1	Slot

e) Align the spring wire notch on the backside of the printhead to the spring wire. Push the right side of the printhead into the printer until the latch locks the right side of the printhead into the printer.



1	Spring wire in notch

f) Verify that the printhead moves up and down freely when pressure is applied and remains locked when released.



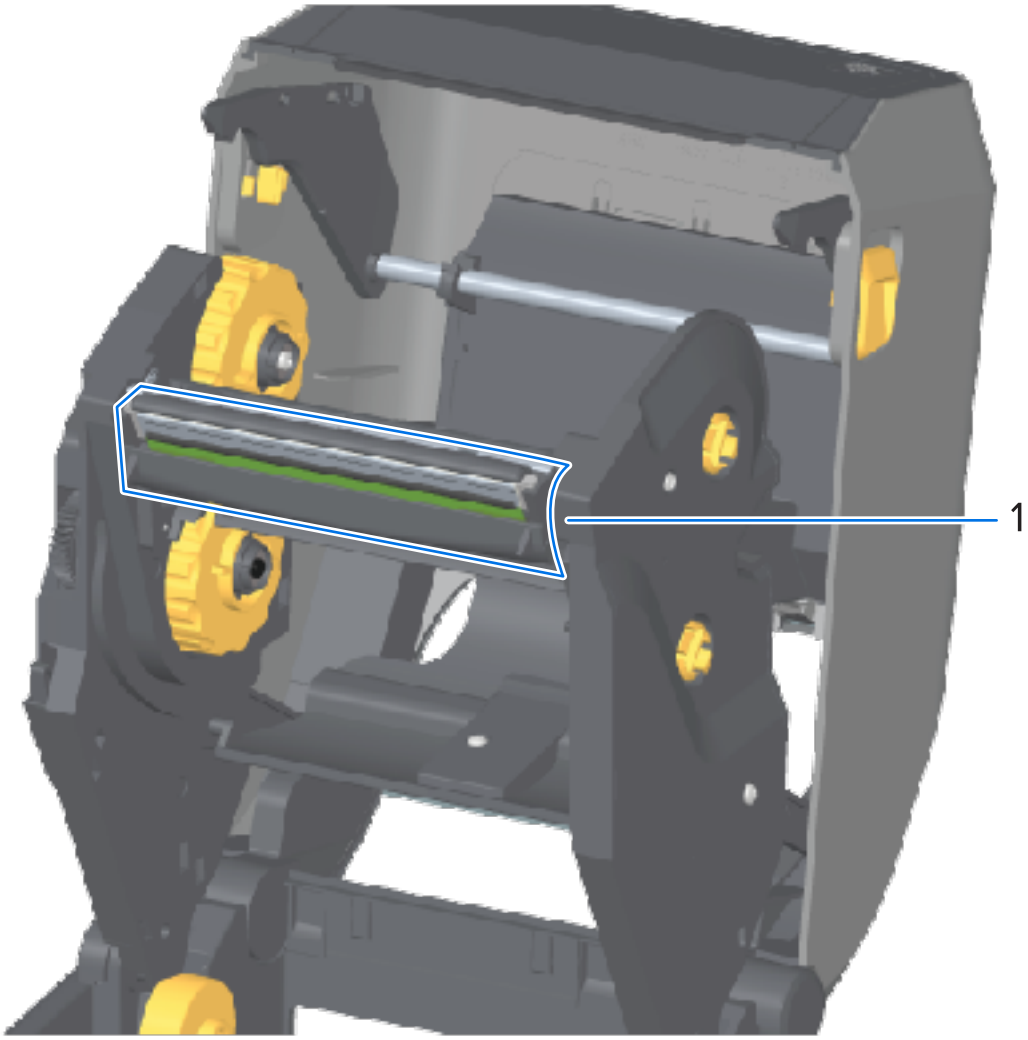
g) Clean the printhead. Use a new pen to wipe body oils (fingerprints) and debris of the printhead. Clean from the center of the printhead to the outside. See the detailed instructions for cleaning the printhead in the Maintenance section of this guide.

3. Reload media, plug in the power cord (if removed), turn printer power ON, and print a configuration report to ensure proper function. See Test Printing with a Configuration Report on page 164.

Replacing the Printhead – ZD421/ZD621 Thermal Transfer Ribbon Roll Printer Models

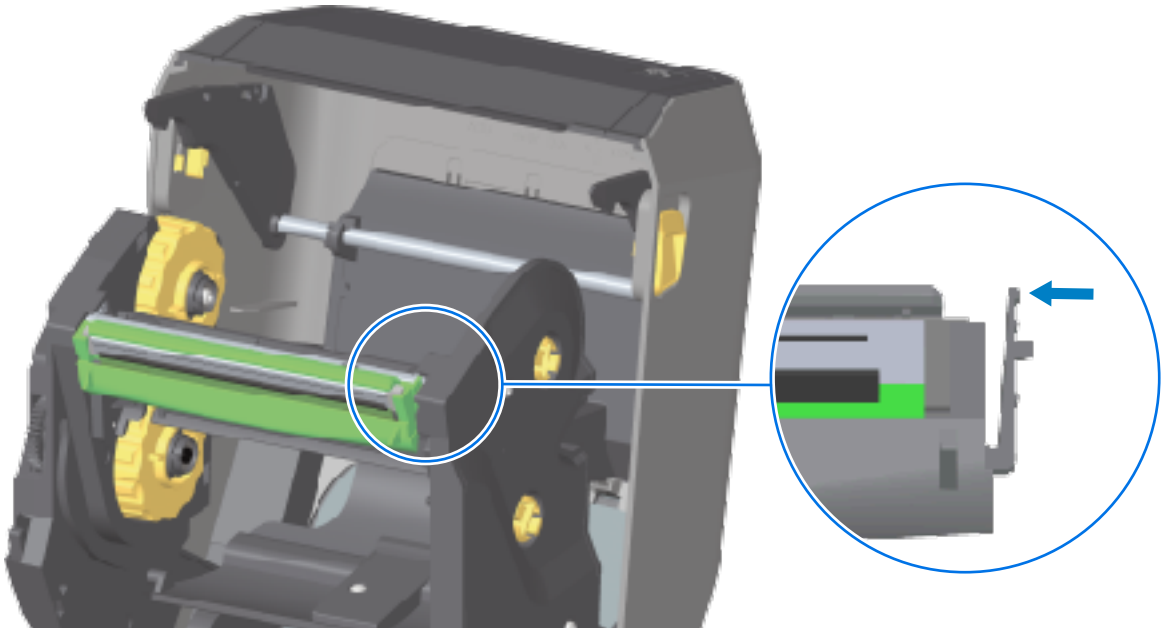
1. Use these steps to remove the printhead:

a) Turn printer power OFF and open the printer.



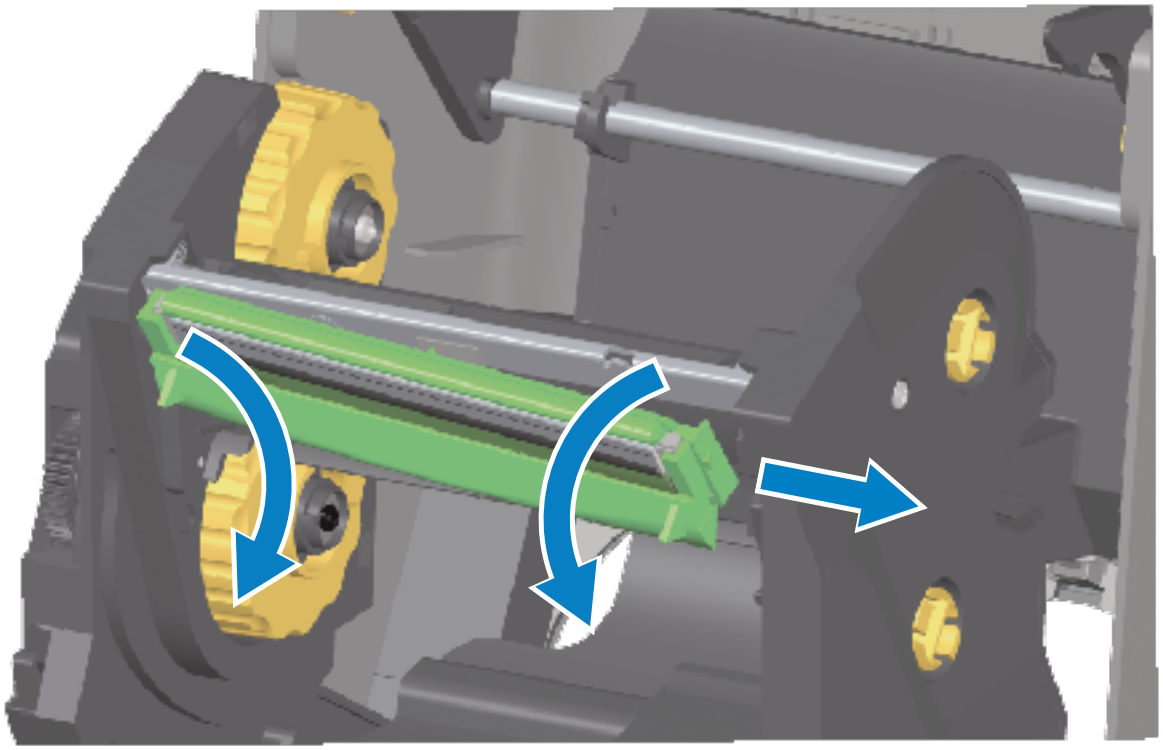
1	Printhead

b) Push the printhead release latch toward the printhead (shown in green for visibility in the following figure).

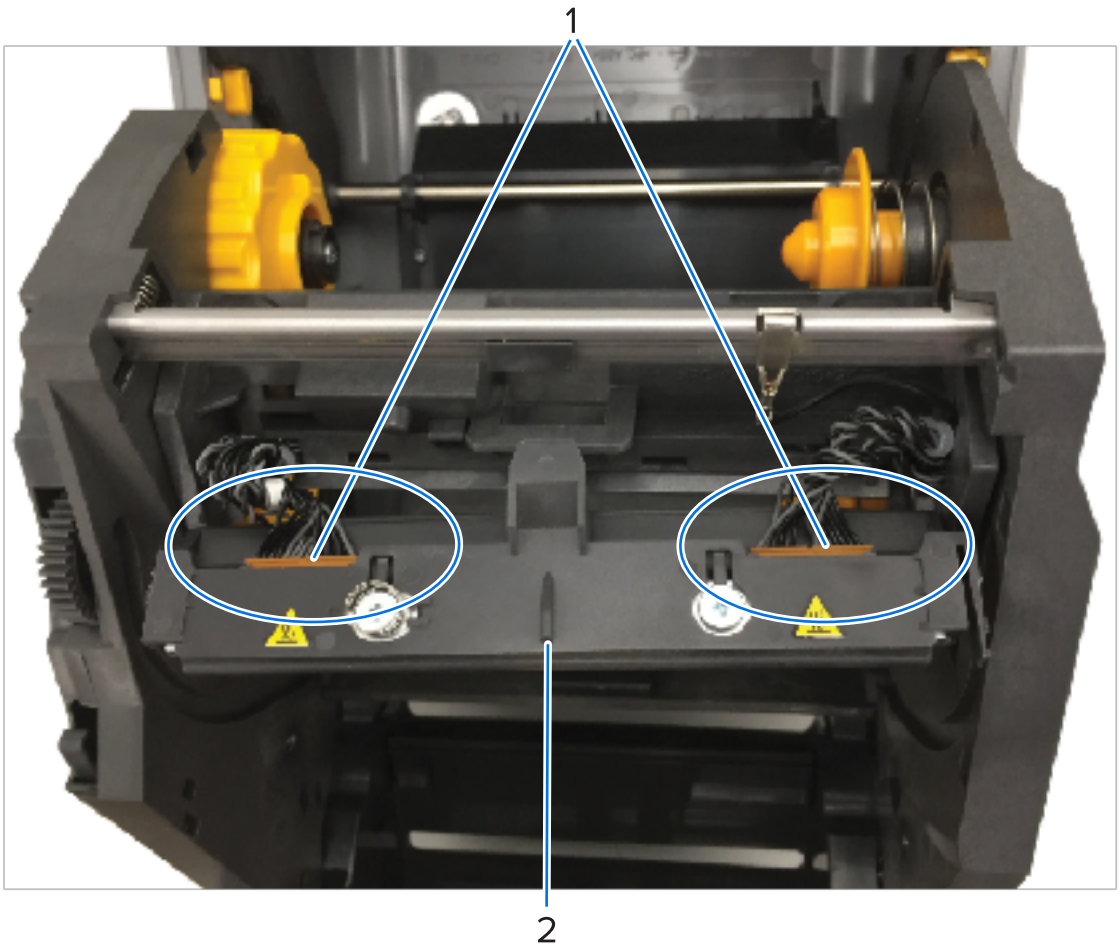


The right side of the printhead releases down and away from the printhead actuator arm.

c) Swing the loose right side of the printhead out of the printer. Pull it to the right a little to get the left side of the printhead clear. Pull the printhead down and free of the ribbon carriage to gain access to its attached cables.



d) Gently but firmly pull the two printhead cable bundle connectors off of the printhead.



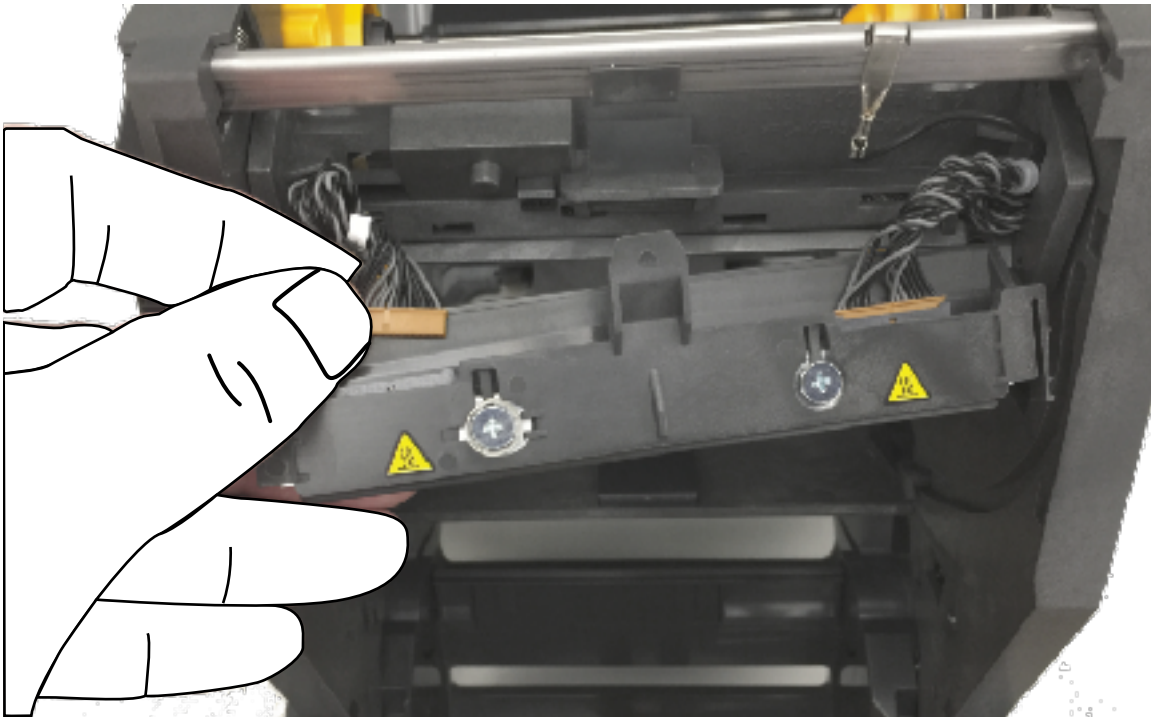
1	Connectors	2	Printhead assembly

2. To replace the printhead:

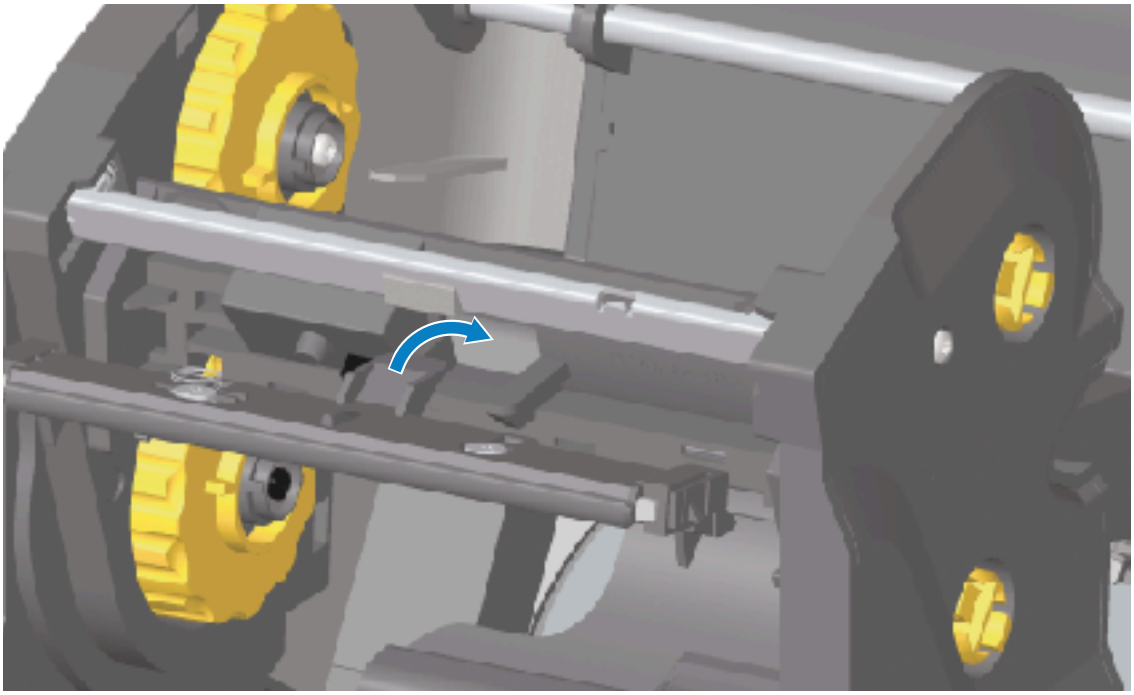
a) Push the right side printhead cable connector into the printhead.

NOTE: The connector is keyed to only insert one way.

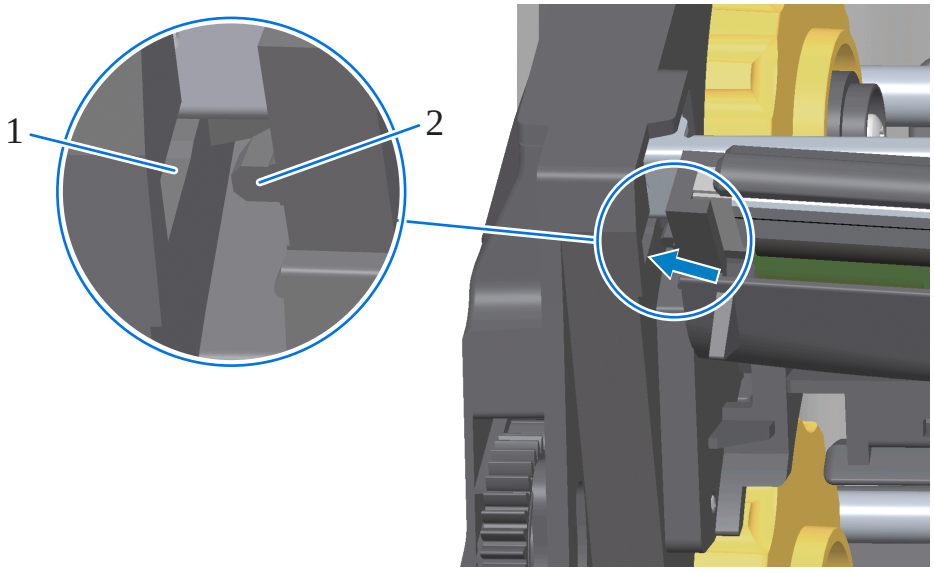
b) Push the left side printhead cable connector onto the printhead.



c) Insert the center tab on the printhead assembly into the center slot on the printhead actuator arm.

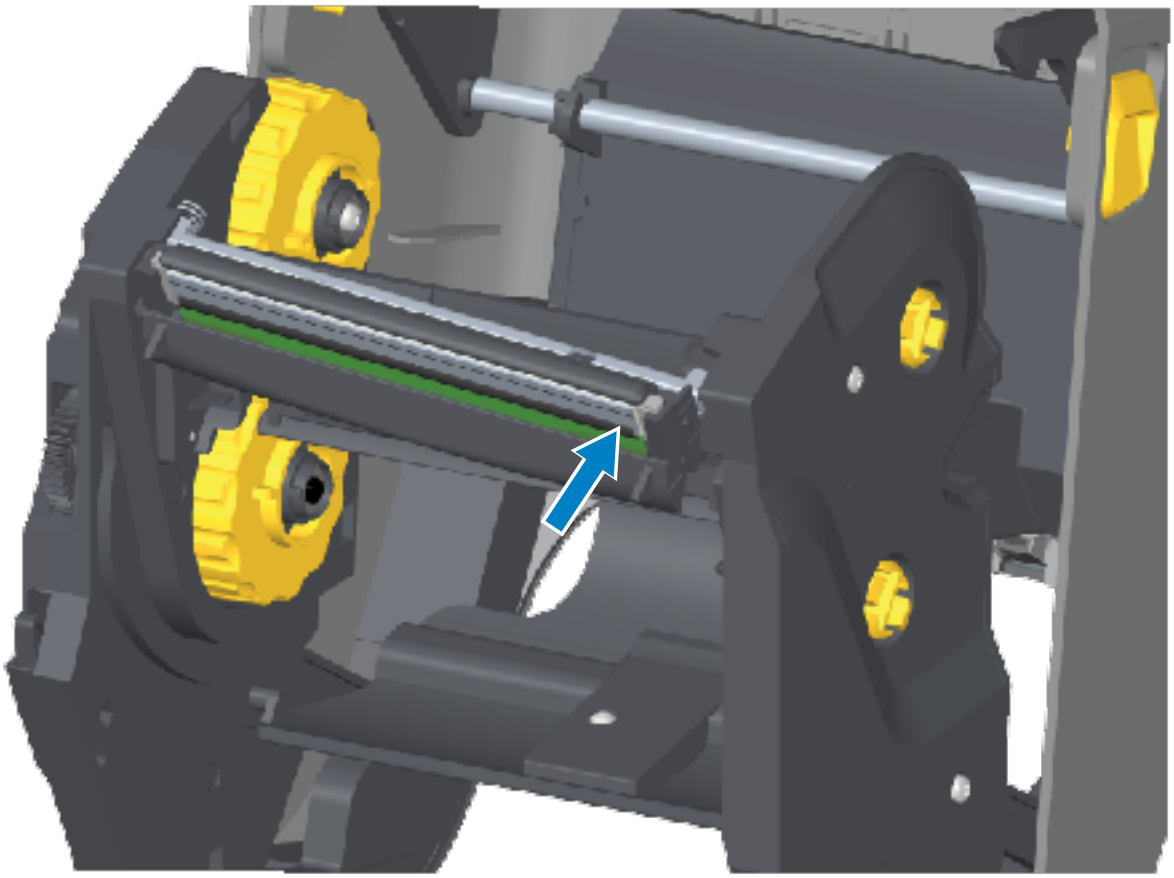


d) Insert the left side tab of the printhead assembly into the recessed slot on the left side of the printhead actuator arm.

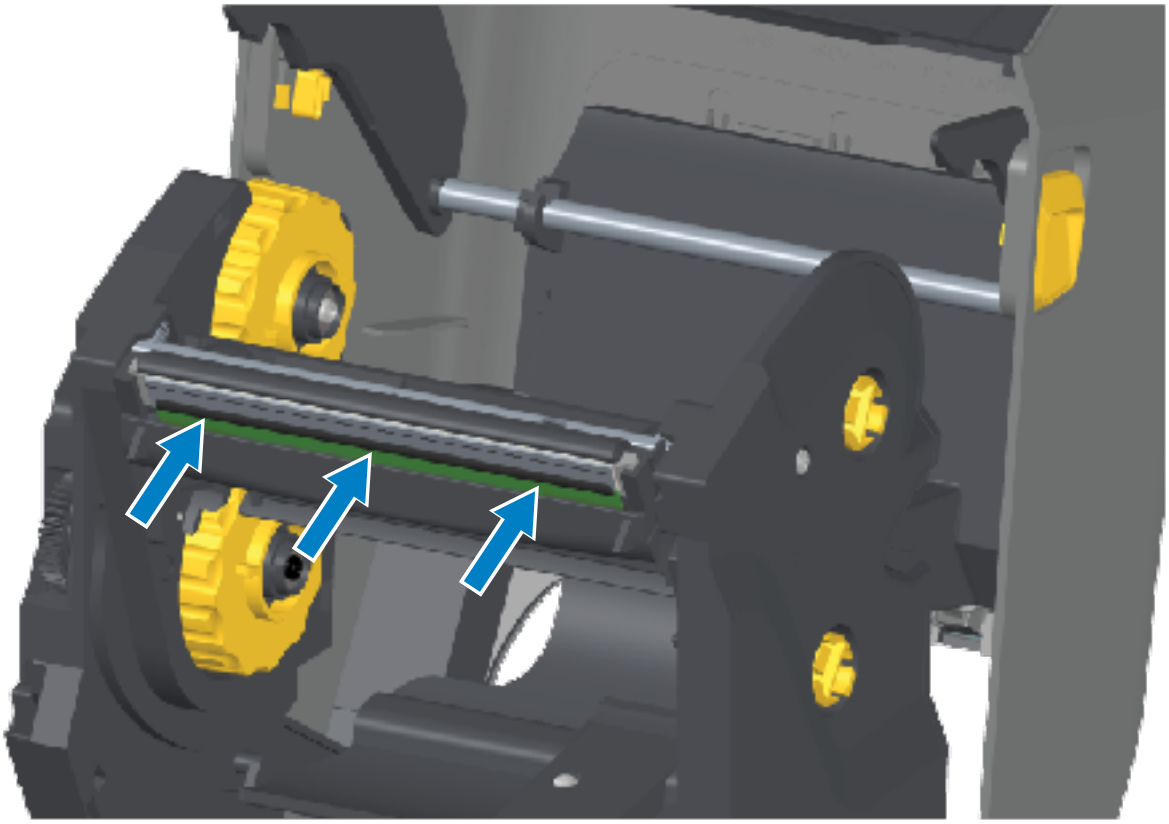


1	Slot	2	Tab

e) Push the right side of the printhead into the printer until the latch locks the right side of the printhead into the printer.



f) Verify that the printhead moves up and down freely when pressure is applied and remains locked when released.



g) Clean the printhead. Use a new pen to wipe body oils (fingerprints) and debris of the printhead. Clean from the center of the printhead to the outside to avoid damaging the printhead. See Cleaning the Printhead on page 237.

h) Reload media. Plug in the power cord, turn on the printer, and print a configuration report to ensure proper function. See Test Printing with a Configuration Report on page 164.

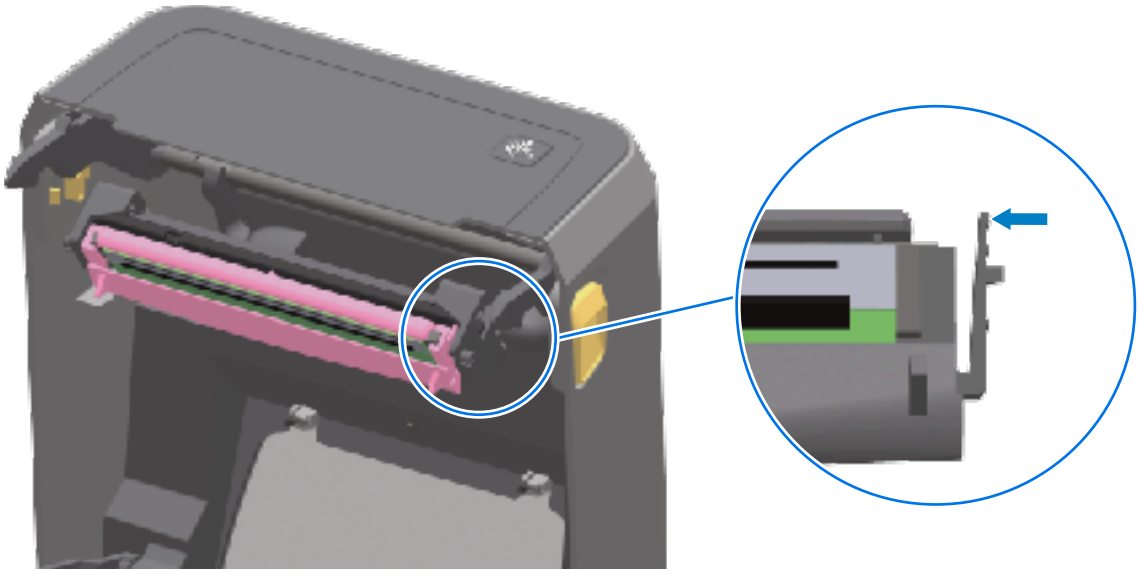
Replacing the Printhead – ZD421 Thermal Transfer Ribbon Cartridge Printer Models

1. To remove the printhead, follow these steps:

   a) Turn printer power OFF and open the printer.

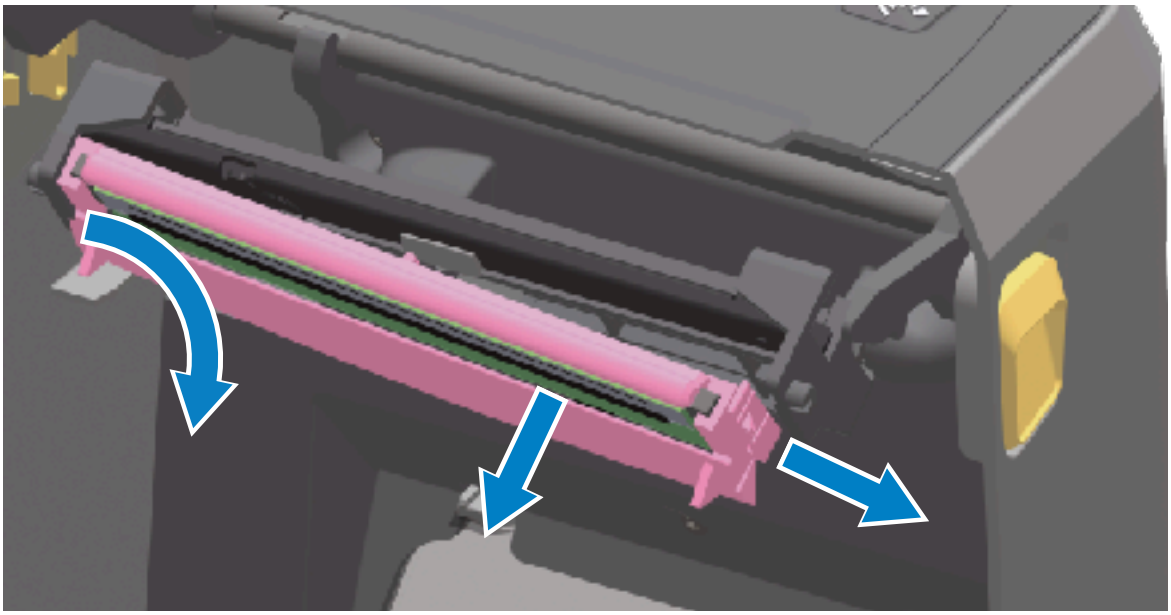
   b) Pull the two release arms out to release the ribbon drive transport. See Accessing the Printhead of the ZD421 Ribbon Cartridge Printer on page 36.

   c) Swing the printhead actuator arm up until it touches the printer's top cover. Hold it in the position shown below for access to the printhead, then push the printhead release latch toward the printhead (shown as pink for visibility in the image).

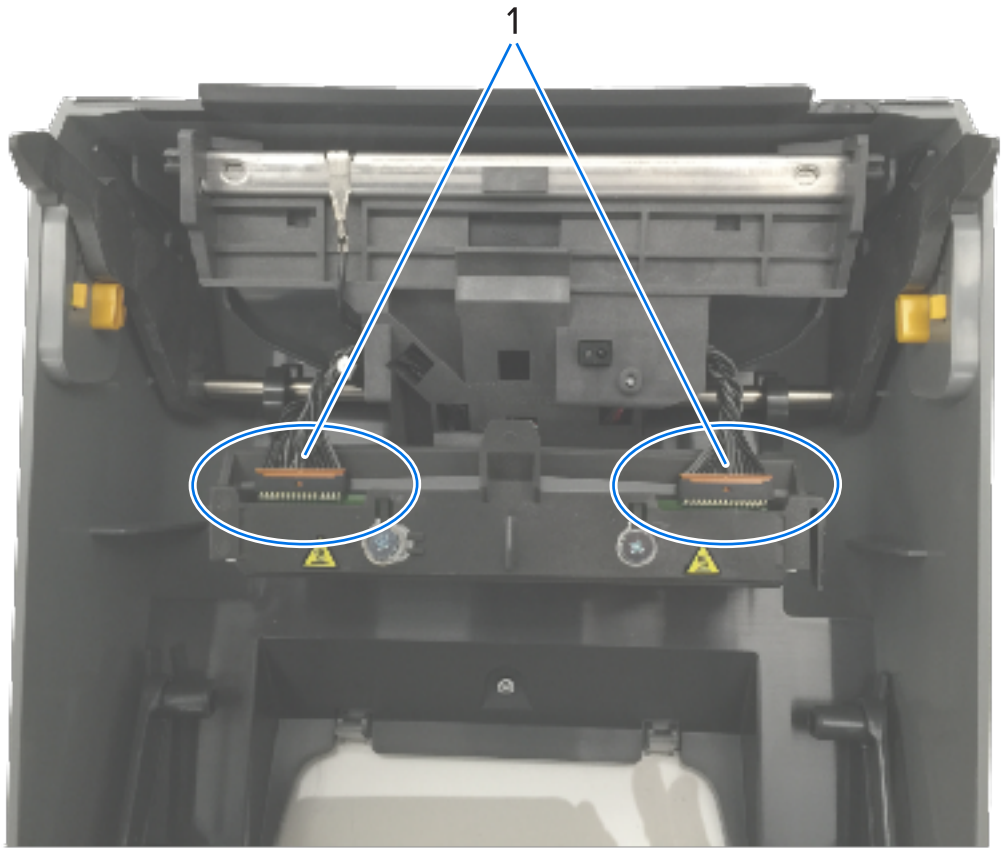


The right side printhead releases down and away from the printhead actuator arm.

d) Swing the loose right side of the printhead out of the printer. Pull it to the right a little to get the left side of the printhead clear. Pull the printhead down and free of the printhead actuator arm to gain access to its attached cables.

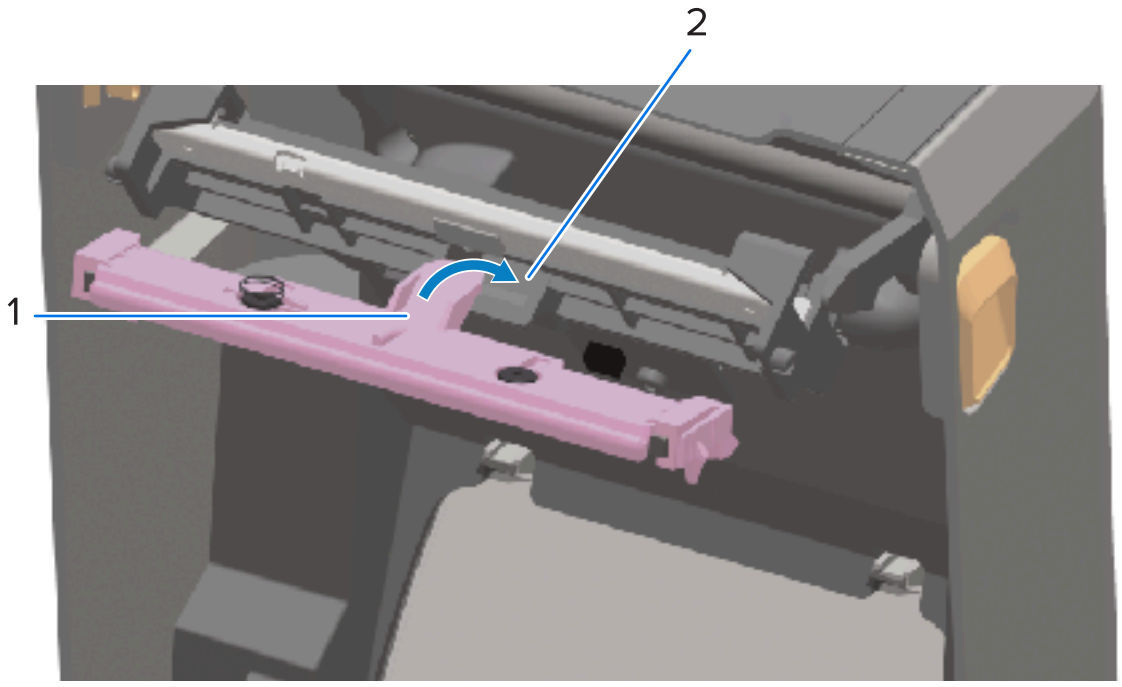


e) Gently but firmly pull the two printhead cable bundle connectors off of the printhead.



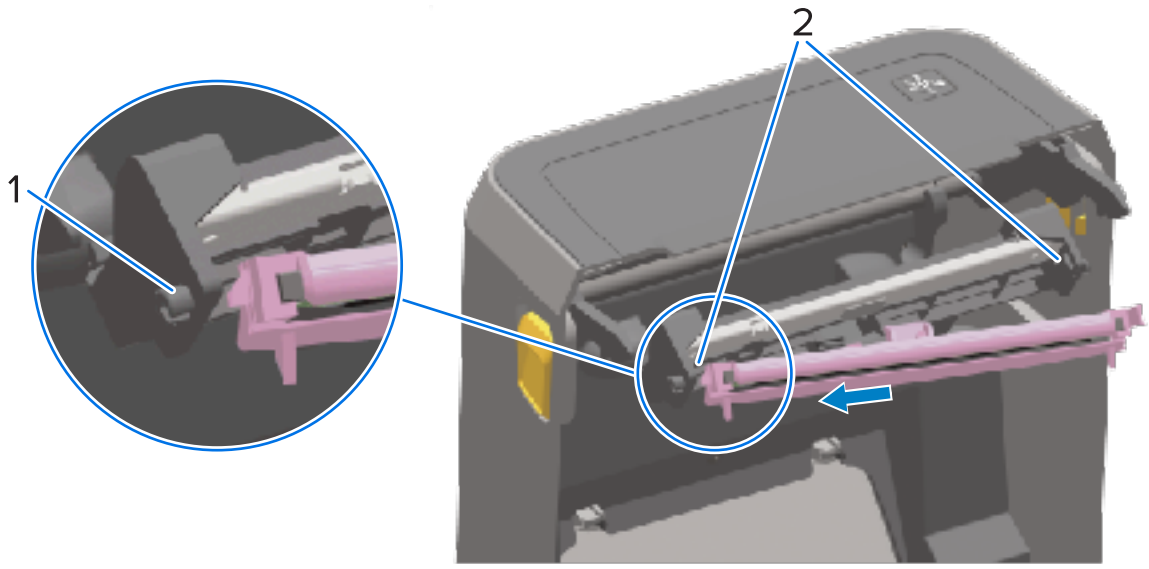
1	Connectors	2	Printhead assembly

2. Follow these steps to replace the printhead:
   a) Push the right side printhead cable connector into the printhead. The connector is keyed to only insert one way.
   b) Push the left side printhead cable connector onto the printhead.
   c) Insert the center tab on the printhead assembly into the center slot on the printhead actuator arm.



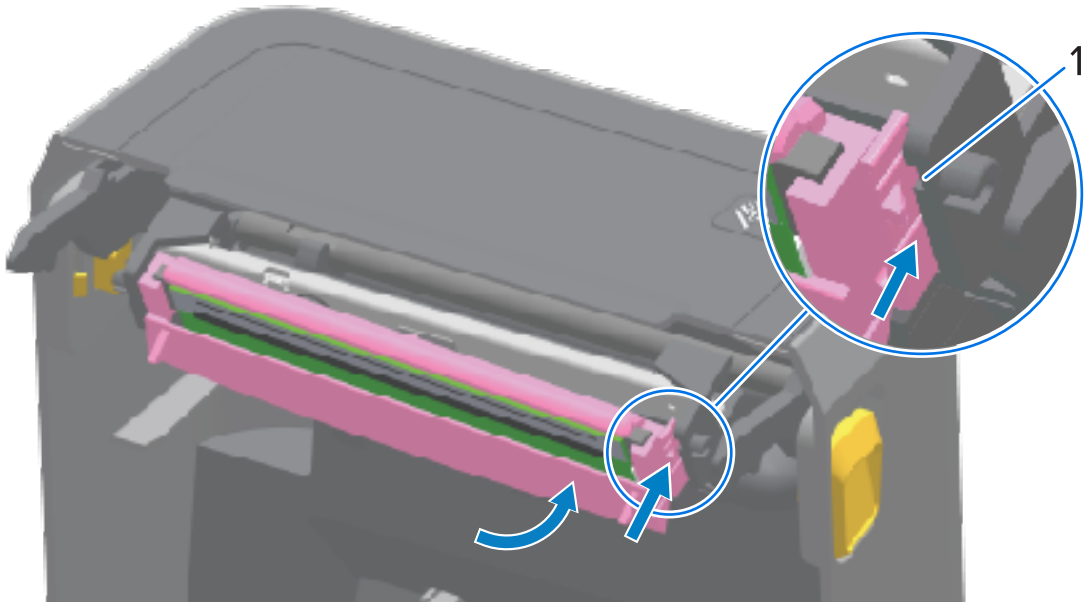
1	Tab	2	Slot

d) Insert the left side tab of the printhead assembly into the recessed slot on the left side of the printhead actuator arm.



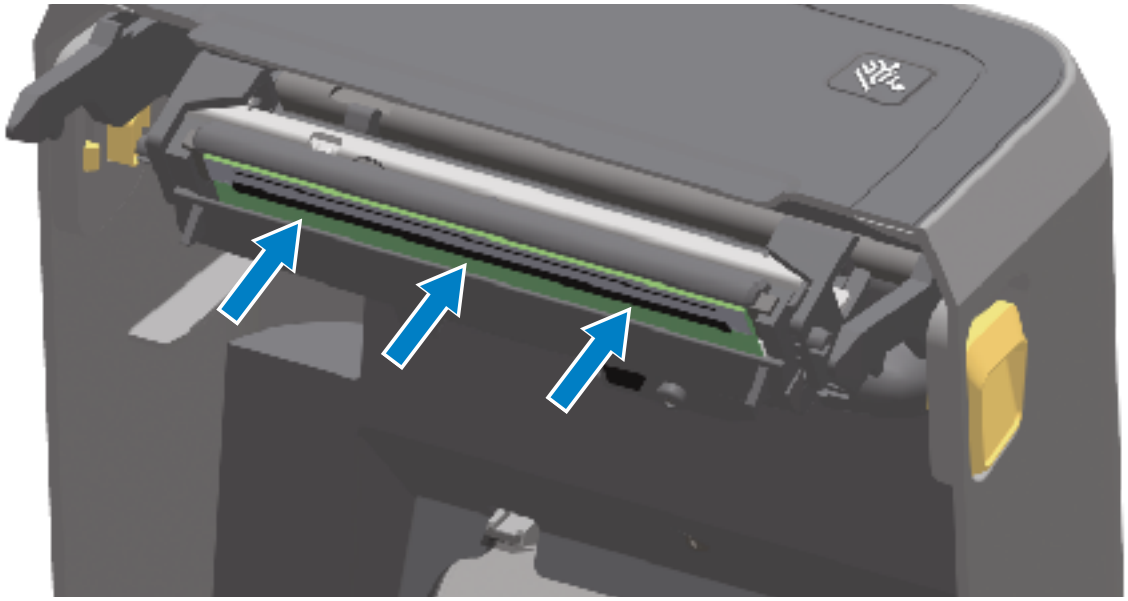
1	Tab	2	Slot – both sides

e) Push the right side of the printhead into the printer until the latch locks the right side of the printhead into the printer.



1	Slot guide

f) Verify that the printhead moves freely into the printer when pressure is applied (see arrow) and remains locked when pressure is released.



g) Clean the printhead by using a new cleaning pen to wipe body oils (finger prints) and debris off the printhead. See Cleaning the Printhead on page 237.

h) Reload media. Turn on the printer and print a status report to ensure proper function. See Test Printing with a Configuration Report on page 164.

Updating Printer Firmware

Zebra recommends that you periodically update the printer with the latest firmware to get new features, improvements, and printer upgrades for media handling and communications.

Download the firmware from the appropriate support page for your printer listed in the section titled 'About This Guide'.

Use Zebra Setup Utilities (ZSU) to load new firmware.

1. Open Zebra Setup Utilities.
2. Select your printer.
3. Click **Open Printer Tools**.

   The Tools window opens.
4. Click the **Action** tab.
5. Load media in the printer.
6. Click **Send file**.

   The lower half of the window displays a filename and path.
7. Click **Browse (...)** and select the latest firmware file you downloaded from the Zebra web site.
8. Observe the user interface and wait for the firmware update to complete.

   If the firmware version of the transferred file differs from the version installed on the printer, the firmware will download to the printer. The data indicator flashes green as firmware downloads. The printer then restarts with all indicators flashing.

   The firmware update is complete when the STATUS indicator turns solid green during firmware validation and installation. The printer also prints a printer configuration report.

Other Printer Maintenance

There are no user-level maintenance procedures beyond those detailed in this section.

Fuses

There are no replaceable fuses in the ZD Series printers or power supplies.

Troubleshooting

This section provides troubleshooting procedures and information.

Resolving Alerts and Errors

The printer uses alerts to notify you that the printer needs attention.

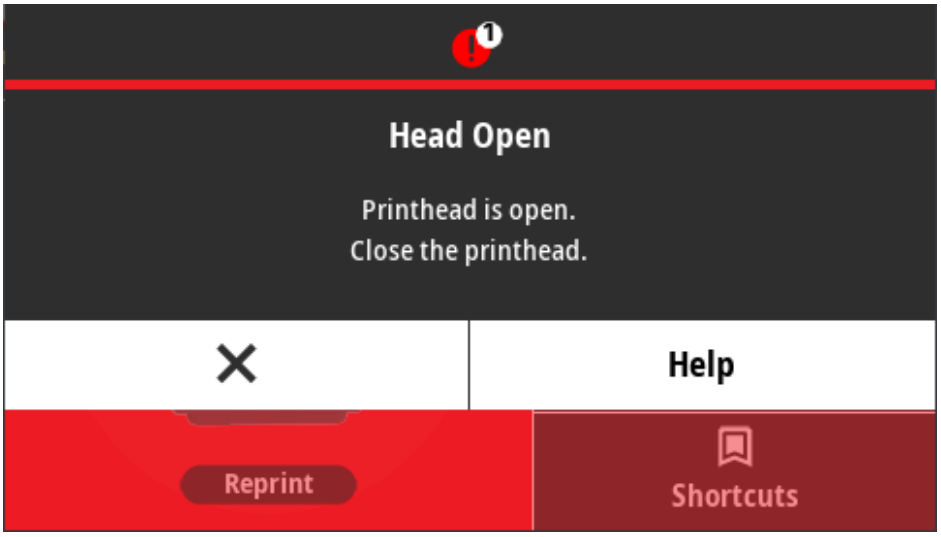
Alert: Printhead Open

The printer has received a print command or sensed a **FEED** button press, but it cannot proceed. The printhead (cover) may not be closed (or closed properly) or the printer's Head-Open switch needs service.

Status indicator alert:



Display alert:



Possible causes and resolutions:

- The cover is open or it has not been closed properly. Close the cover/printhead. Push down on the front top corners of the printer's cover. You should normally hear and feel the cover latches snap in place to lock the cover closed for printing.
- The printer's Head-Open switch needs service. Call a service technician.

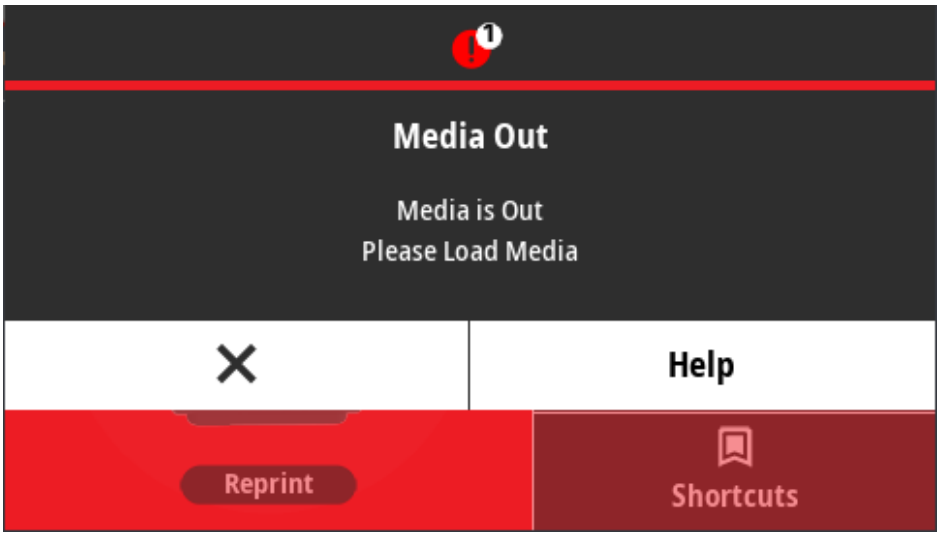
Alert: Media Out

A print command, **FEED** has been pressed, or a print job is in progress; but the printer cannot detect media in the print path.

Status indicator alert:



Display alert:



Possible causes and resolutions:

- No media (roll) in the printer. Load your chosen media in the printer and close the printer. See Roll Media Types and Loading on page 143. You may need to press **FEED** once or press **PAUSE** to get the printer to resume printing.
- The printer has detected a missing label on the roll. Open the printer: If there is a missing label on the roll between two labels at the end of a roll of labels, then this is a method used by the label roll manufacture to identify the end of the roll. See Detecting and Recovering from a Media-Out Condition on page 165. Replace the empty media roll and continue printing. Do not power the print off or you will lose your print job.
- Misaligned media sensor. Check the position of the media sensor. See Movable Sensor Adjustment on page 146. The printer may need to be calibrated for the media after the adjusting the sensor location. See Running a SmartCal Media Calibration on page 163 and Print Sensors Manual Calibration on page 123.
- The printer is set for non-continuous (labels or black mark) media, but continuous media is loaded. Check the position of the media sensor is in the center default location. See Movable Sensor

Adjustment on page 146. The printer may need to be calibrated for the media after the adjusting the sensor location. See Running a SmartCal Media Calibration on page 163.

- The media sensor is dirty. Clean the Upper Web (Gap) Sensor Array and the lower Movable Media sensors. See Cleaning the Sensor on page 246. Reload your media, adjust the Movable Media sensor's position for your media, and recalibrate the printer for the media. See Movable Sensor Adjustment on page 146, Roll Media Types and Loading on page 143, and Running a SmartCal Media Calibration on page 163.
- The printer is unable to sense the media due to possible data corruption of memory or faulty components. Reload the printer's firmware. See Updating Printer Firmware on page 272. If this does not fix this issue, call a service technician.

Alert: Ribbon In – ZD421 Ribbon Cartridge Printer Only

When you see this alert, a print command has been sent to the printer and it is in Direct Thermal mode with ribbon installed. The printer has two heat settings – one for Direct Thermal printing and another for Thermal Transfer printing. They are designed to have equivalent print density/darkness at the same setting level. Direct Thermal mode does not use ribbon.

Status indicator alert:



Possible causes and resolutions:

- There is a Ribbon Cartridge in the printer while the printer is set to Direct Thermal Mode (and printing on direct thermal media). Remove the ribbon cartridge from the printer without turning the printer OFF. Close the printer. You may need to press **FEED** once or **PAUSE** the get the printer to resume printing.
- The printer is incorrectly set to Direct Thermal mode when you are trying to print using transfer media and a ribbon cartridge to print. Change the PRINT METHOD to THERMAL TRANS (Thermal Transfer) mode. The print format (form) send for this print job may have Direct Thermal mode set with a `^MTD` set instead of `^MTT`. The ZPL Programming Guide is available at http://zebra.com/manuals.
- To change this setting:
  - Use the printer's color touch display user interface (if present) to change the setting. See Print Print Quality Print Type on page 117.
  - Use an Ethernet (LAN or WLAN) printer's Print Server web page to access and set the PRINT METHOD to THERMAL TRANS (Thermal Transfer) mode. See Print Print Quality Print Type on page 117 to learn how to navigate the print server user interface.

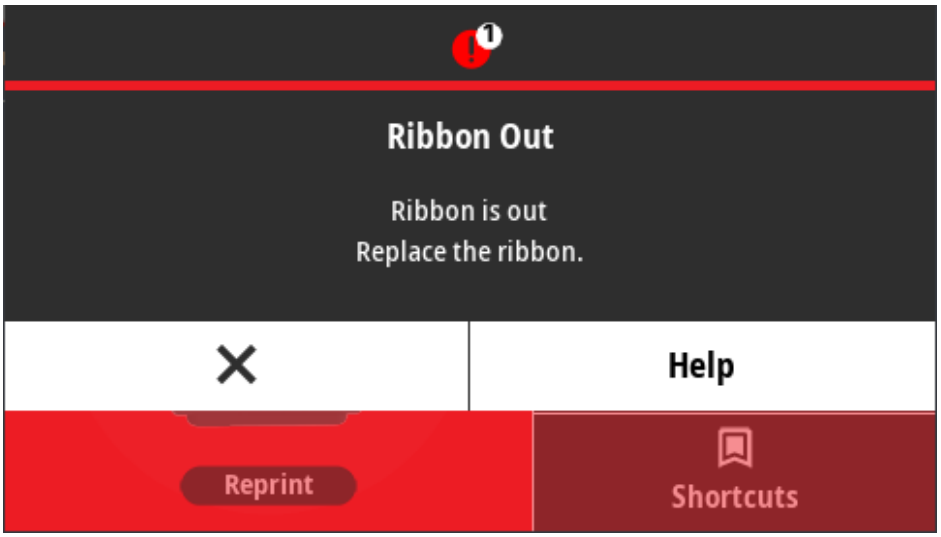
Alert: Ribbon Out

The printer is printing and stops while printing. Or, a print job has been sent to the printer and the printer immediately reports this alert.

Status indicator alert:



Display alert:



Possible causes and resolutions:

- The printer has detected the end of the ribbon. The ends of Genuine Zebra Transfer Ribbons have reflective trailers which the printer interprets as end of ribbon, meaning the ribbon supply has been used up. Remove the ribbon and replace the ribbon rolls or ribbon cartridge, then close the printer. You may need to press **FEED** one time or press **PAUSE** to get the printer to resume your print operation. See Detecting and Recovering from a Ribbon-Out Condition on page 167.
- For ZD421 Ribbon Cartridge printers: A ribbon cartridge must be loaded in the printer. The printer is set for Thermal Transfer mode. See Loading the Ribbon Cartridge – ZD421 Ribbon Cartridge Printers Only on page 162.
- For ZD421 Ribbon Cartridge Printers only: The printer is unable to sense media possibly because:
  - The ribbon cartridge data chip or cartridge sensor contacts is dirty.
  - Data in memory is corrupted.
  - The cartridge or printer components are faulty.

  To fix this problem:
  - Try another working ribbon cartridge if you have one.
  - Clean the ribbon cartridge chip with an alcohol-moistened swab.
  - Clean the ribbon cartridge sensor's contact pins. See Cleaning the Sensor – Upper Half of the ZD421 Ribbon Cartridge Printers on page 249 for cleaning instructions.
  - Reload the printer's firmware. See Updating Printer Firmware on page 272.
  - If this does not fix this issue, call a service technician.

Alert: Ribbon Low – ZD421 Ribbon Cartridge Printer Only

Status indicator alert:



Possible causes and resolutions:

The printer has calculated that the ribbon cartridge has only 10% of the ribbon left in the cartridge.

The ribbon low value can be changed using programming commands.

Check for the availability of ribbon cartridges. For information on changing the Ribbon Low warning point, see Ribbon Cartridge Programming Commands on page 217. See also the ZPL Programming Guide for details on printer programming. For links to the Zebra support pages for these and other manuals, see About This Guide on page 13.

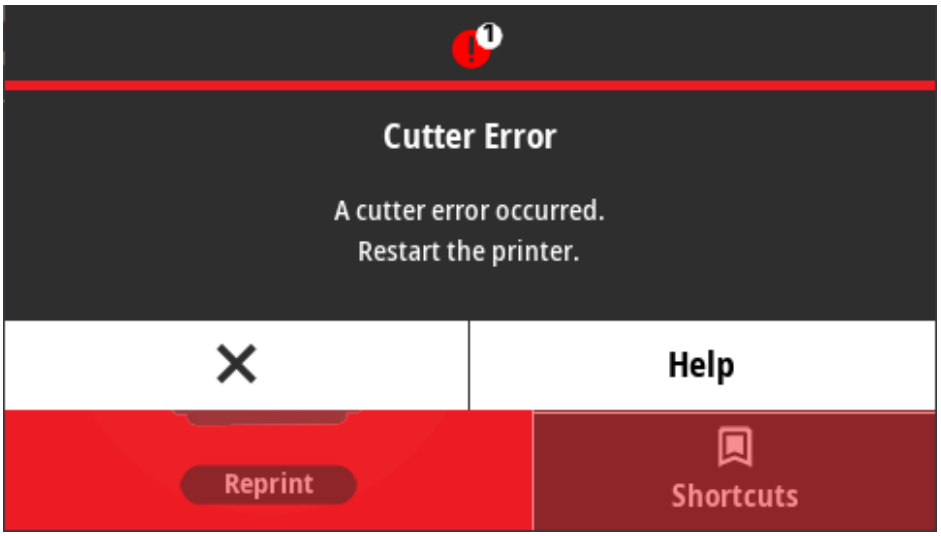
Alert: Cutter Error

The cutter blade is bound and is not moving properly.

Status indicator alert:



Display alert:



Possible causes and resolutions:

Media, adhesive, or a foreign object has stopped the cutter blade from operating. Turn printer power OFF by holding **POWER** down for five seconds. Wait for the printer to shut down completely, then turn printer power ON. If the printer does not recover from this error, call a service technician for assistance.

CAUTION: There are no operator serviceable parts in the cutter unit. Never remove the cutter cover (bezel). Never attempt to insert objects or fingers in to the cutter mechanism.

NOTE: Using unapproved tools, cotton swabs, solvents (including alcohol), etc. may damage or shorten the cutter's usable life or cause the cutter to jam.

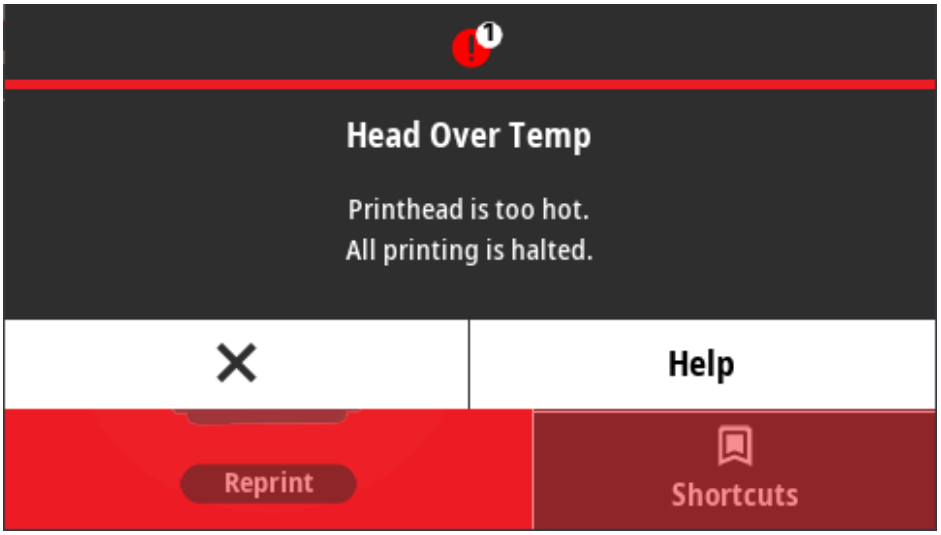
Alert: Printhead Over Temp

The printhead is over temperature and paused to allow the printhead to cool.

Status indicator alert:



Display alert:



Possible causes and resolutions:

- The printer is printing a large batch job, typically with large amounts of print. The print operation will resume after the printhead has cooled.
- The ambient temperature at the printer's location exceeds the specified operating range. Ambient temperatures in the printer can at times rise if it is in a location that receives direct sunlight. Move the printer to a different location, or cool the ambient temperature in the location where the printer is operating.

Alert: Printhead Shutdown

The printhead is below operating temperature for proper printing.

Status indicator alert:



The printhead has had a critical temperature or power failure. Turn printer power OFF by holding **POWER** down for five seconds. Wait for the printer to shutdown completely, then turn printer power ON. If the printer does not recover from this error, call a service technician. The printhead is not a operator-serviceable item.

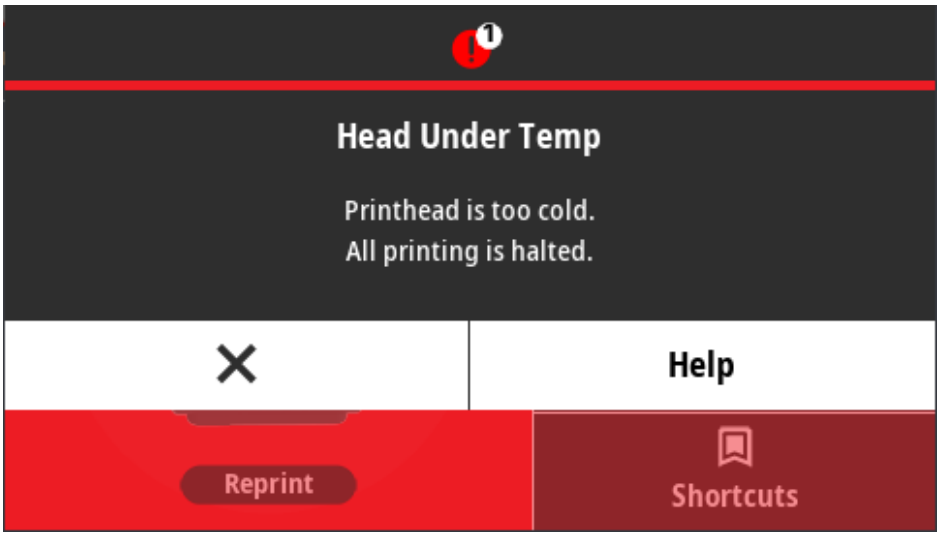
Alert: Printhead Under Temp

The printhead is below operating temperature for proper printing.

Status indicator alert:



Display alert:



Possible causes and resolutions:

- The ambient temperature at the printer's location is below the specified operating range. Turn printer power OFF, then move the printer to a warmer location and wait for it to warm naturally. Moisture may condense in and on the printer if the temperature changes too quickly.
- The printhead thermistor has failed. Turn printer power OFF by holding **POWER** down for five seconds. Wait for the printer to shut down completely and turn printer power ON. If the printer does not recover from this error, call a service technician.

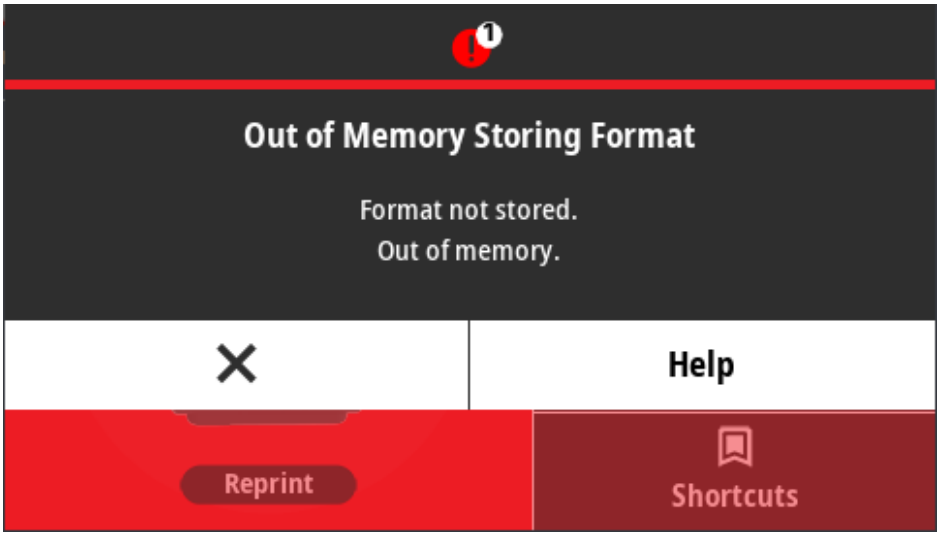
Alert: Out of Memory

Data can not be stored in the specified memory location. There are four types of storage memory: Graphic, Format, Bitmap and Font. There is not enough memory to perform the function specified on the second line of the error message.

Status indicators alert:



Display alert:



Possible causes and resolutions:

There is not enough memory to perform the function specified on the second line of the error message.

- Free up some of the printer's memory by adjusting the label format or printer parameters to make the print area smaller.
- Remove unused graphics, fonts, or formats.
- Ensure that the data is not directed to a device that is not installed or is unavailable.

Resolving Print Issues

This section helps you identify issues with printing or print quality, the possible causes, and the recommended solutions.

Issue: General Print Quality Issues

The printer image does not look right.

Possible cause and resolutions:

- The printer is set at an incorrect darkness level and/or print speed. Perform the Print Quality Report (FEED self test) to determine the ideal darkness and speed settings for your application. Do not set print speeds above the manufacturer's maximum rated speed for your media (print material and ribbons both). See Printing a Print Quality Report (FEED Self Test) on page 291 and Adjusting the Print Quality on page 208.
- The printhead is dirty. Clean the printhead. See Cleaning the Printhead on page 237.
- The platen roller is dirty or damaged. Clean or replace the platen. Platens can wear out or get damaged. See Cleaning and Replacing the Platen on page 252.
- The printhead has worn out. Replace the printhead. The printhead can wear out and be damaged. See Cleaning the Printhead on page 237.
- During thermal Transfer printing, printing looks fuzzy, has smudge marks, or has voids or holes in print with no particular pattern. The print material (wax, wax-resin, or resin) may not match the material (paper, media coating, or synthetics) in use. Set the printer for no higher than the maximum

recommended print speed of the ribbon cartridge. For information on reading ribbon cartridge features, see Ribbon Cartridge Programming Commands on page 217.

- You may be using the wrong power supply. Verify you are using the power supply that came with this printer.

Issue: No Print on the Label

The printed image does not look right.

Possible causes and resolutions:

- The media may not be direct thermal media (and is thermal media made for thermal transfer printers). See Determining Thermal Media Types on page 331.
- Media has been loaded incorrectly. The media printable surface must face up towards the printhead. See What You Will Need to Print on page 22 and Roll Media Types and Loading on page 143.

Issue: Labels Are Distorted in Size or Print Area Start Position Varies

Coincident with this issue, the printed image may skips between labels (mis-registration).

Possible causes and resolutions:

- Media has been loaded incorrectly or the movable media sensor is not set properly. Verify that the sensor is set and positioned correctly for your media type and sensing location. See the following:
  - Roll Media Types and Loading on page 143
  - Setting Media Sensing by Media type on page 143
  - Adjusting the Movable Sensor for Black Marks or Notches on page 147
  - Adjusting the Movable Sensor for Web (Gap) Sensing on page 147
- The media sensors are not calibrated for your media length, physical properties, or sensing type (gap/notch, continuous, or mark). See Running a SmartCal Media Calibration on page 163. If the printer still skips labels, try a manual media calibration. See Print Sensors Manual Calibration on page 123.
- The platen (drive) roller is slipping or damaged. Clean or replace the platen. Platens can wear out or get damaged. See Cleaning and Replacing the Platen on page 252.
- The printer has communication issues with cables or communication settings. See Communication Issues on page 284.

Printer Connectivity Issues

Issue	Possible Cause	Recommended Solution
My printer reassigns a new IP address to the print server after the printer has been off for a while.	The settings for your network are causing the network to reassign a new IP address.	If the changing IP addresses cause issues for you, follow these steps to assign a static IP address to the printer: 1. Find out what values need to be assigned to the IP address, subnet mask, and gateway for your print server (wired, wireless, or both). 2. Change the appropriate IP protocol value to PERMANENT. 3. Change the values for the IP address, subnet mask, and gateway for the appropriate print server to what you want them to remain. 4. Reset the network by touching **Menu** > **Connection** > **Networks** > **Reset Network** and then touching the check mark to save the changes.
My printer does not obtain an IP address while trying to connect via LAN/ Ethernet.	The cable is not plugged in correctly.	Check that both ends of the cable are connected properly.
	The printer is not configured correctly (usually for DHCP).	Check the Wired IP Protocol setting. It should match your network environment.
I cannot change the wired, wireless, or Bluetooth settings on my printer.	The printer is in Protected Mode, which prevents these settings from being updated without the Protected Mode password. You cannot change these settings through the front panel.	You will need the Protected Mode password to change the settings via JSON commands. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.
	For printers purchased in the EMEA region after August 1, 2025, many connectivity options are disabled by default.	For additional information and a configuration wizard, go to zebra.com/asr.

Issue	Possible Cause	Recommended Solution
I manually entered a wireless IP address, subnet, and gateway on my printer, but it won't connect to my wireless network. Protected Mode is not enabled.	The printer's network must be reset after values are changed.	Reset the network by touching **Menu** > **Connection** > **Networks** > **Reset Network** and then touching the check mark to save the changes.
	An ESSID value was not specified.	1. For a wireless connection, specify the ESSID value that matches the value used by your wireless router using the following Set/Get/Do command: `! U1 setvar "wlan.essid" "value"` where "value" is the ESSID (sometimes called a network SSID) for your router. You can look on the back of your router for a sticker with the router's default information. **NOTE:** If the information has been changed from the default, check with your network administrator for the ESSID value to use. 2. Reset the network by touching **Menu** > **Connection** > **Networks** > **Reset Network** and then touching the checkmark to save the changes.
	The ESSID or another value was incorrect.	1. Print a network configuration label and verify that your values are correct. 2. Make corrections as necessary. 3. Reset the network by touching **Menu** > **Connection** > **Networks** > **Reset Network** and then touching the check mark to save the changes.

Communication Issues

This section identifies problems with communications, the possible causes, and the recommended solutions.

Issue: Label Job Sent, No Data Transfer

A label format was sent to the printer but was not recognized. The DATA light does not flash.

The communication parameters are incorrect.

Possible causes and resolutions:

- Check the printer driver or software communications settings (if applicable).
- Serial Port only: Check the printer's handshake protocol and serial port settings. The setting used must match the one being used by the host computer. See Serial Port Interface on page 304 for the printer's default serial port settings.
- The serial cable you are trying to use may not be a standard DTE or DCE type cable, is damaged, or is too long per the RS-232 serial ports specifications. See Serial Port Interface on page 304.

Issue: Label Job Sent, Skips Labels or Prints Bad Content

A label format was sent to the printer. Several labels print, then the printer skips, misplaces, misses, or distorts the image on the label.

Possible cause and resolution:

The serial communication settings are incorrect. Check the printer driver or software communications settings (if applicable). Ensure that the flow control settings and other serial port handshake setting match the host system.

Issue: Label Job Sent, Data Transfers, But No Print

A label format was sent to the printer but was not recognized. The DATA light flashes but no printing occurs.

Possible causes and resolutions:

- The prefix and delimiter characters set in the printer do not match the ones in the label format. Verify the ZPL command prefix (COMMAND CHAR) and delimiter (DELIM./CHAR) characters. See Configuration Setting to Command Cross-reference on page 336.
- Incorrect data is being sent to the printer. Check the communication settings on the computer. Ensure that they match the printer settings.
- Incorrect data is being sent to the printer. Check the label format. Refer to the ZPL Programming Guide for details on printer programming. Links to the manual are available from the support pages for each printer model listed in About This Guide on page 13.

Miscellaneous Issues

This section identifies miscellaneous issues with the printer, the possible causes, and the recommended solutions for them.

Issue: Settings are Lost or Ignored

Some parameters are set incorrectly.

Possible causes and resolutions:

- Printer settings were changed without saving them. The ZPL ^JU command was not used to save your configuration before turning the printer off. Turn printer power OFF and back ON to verify settings have been saved.
- The label format/form commands or commands sent directly to the printer have syntax errors or have been used incorrectly.
  - A firmware command turned off the ability to change the parameter.
  - A firmware command changed the parameter back to default setting.

  Refer to the ZPL Programming Guide to verify command usage and syntax. The guide is available from the support pages listed in About This Guide on page 13.
- The prefix and delimiter characters set in the printer do not match the ones in the label format. Verify the ZPL programming settings of the Control, Command and Delimiter settings are correct for your system software environment. Print a Configuration Report or use the display Language Menu (if present) for these three menu items and compare it the commands in label format/form you are trying to print. See Test Printing with a Configuration Report on page 164, System Language on page 89, and ZPL Configuration on page 335.
- The Main Logic board may not be working properly. Firmware is corrupted or the printer needs service.
  - Reset the printer to factory defaults. See System Settings Restore Defaults on page 95 or use the Zebra Setup Utility and select **Open Printer Tools** > **Action** > **Load printer defaults**.
  - Reload printer firmware. See Updating Printer Firmware on page 272.
  - If the printer does not recover from this error, call a service technician. This is not a user-serviceable item.

Issue: Printer Prompting for Front Panel Password

The printer is prompting for a front panel password/PIN, but one was not set.

Possible causes and resolutions:

The front panel display can be locked, limiting access to the control panel parameters until the front panel password is entered. This value is initially undefined and must be set before it can be used. For more information about the front panel password, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

Issue: Non-continuous labels act as Continuous labels

The printer was not calibrated for the media being used, or the printer is configured for continuous media.

Possible causes and resolutions:

Set the printer for the correct media type (gap/notch, continuous, or mark) and calibrate the printer. See Running a SmartCal Media Calibration on page 163. if necessary use Print Sensors Manual Calibration on page 123 to manually calibrate the printer for the media type you are using.

On ZD621 printers with a color touch display, check and set the media type by accessing Print Print Quality Label Type on page 117.

Issue: Printer Locks Up

All indicator lights are on and the printer locks up or the printer locks up while restarting.

The printer memory has been corrupted by an unknown event.

Possible causes and resolutions:

- Reset the printer to factory defaults. See System Settings Restore Defaults on page 95 or use the Zebra Setup Utility and select **Open Printer Tools** > **Action** > **Load printer defaults**.
- Reload printer firmware. See Updating Printer Firmware on page 272.
- If the printer does not recover from this error, call a service technician. This is not a user-serviceable issue.

Issue: Erroneous Ribbon Cartridge Faults

Printer indicates a Ribbon Out warning, but a ribbon cartridge is installed. Or a Ribbon Cartridge Authentication error occurs even when a Genuine Zebra Ribbon Cartridge is installed and has not been refurbished or altered.

Possible causes and resolutions:

The ribbon cartridge sensor contact pins or the ribbon cartridge's smart chip's contacts may be dirty or the chip may be damaged. Clean the ribbon cartridge's smart chip contact, if the contacts look dirty or contaminated, clean with a lightly-moistened cotton dipped in 97.3% pure (medical-grade) alcohol. Try a different cartridge if this does not work.

Also clean the ribbon cartridge sensor contact pins. See the steps that explain how to clean the pins in Cleaning the Media Path – Upper Half of ZD421 Thermal Transfer Ribbon Cartridge Printers on page 243.

Issue: Battery Displays a Red Indicator

The battery has a fault.

Possible causes and resolutions:

- The battery is too hot or too cold. Let the battery cool down or warm up to ambient temperature and recheck the battery charge.
- The battery may have reached its usable life. Remove the battery from the printer and check charge status by charging the battery.
- A battery component may have failed. Replace the battery.

Tools

This section provides a variety of tools and utilities built into the printer. They are designed to assist you with setup, configuration, and debugging (printer and command programming).

Printer Diagnostics

A variety of diagnostic tools and procedures are available to help you operate your printer and diagnose problems. These include printer configuration and network configuration reports, diagnostic reports, calibration procedures, and the ability to restore the printer settings to their factory defaults if needed.

Diagnostic Testing Tips

IMPORTANT: When performing self-tests, use full-width media. If the media is not wide enough, the test labels may print on the platen (drive) roller.

To initiate a printer self test, you will need to press a specific user interface button or a combination of buttons while turning printer power ON. Keep the button(s) pressed until the first indicator light turns off. The selected self test automatically starts at the end of the normal power-up operation.

- When performing these self tests, do NOT send data to the printer from the central device.
- If your media is shorter than the label to be printed, the test label continues on the next label.
- If canceling a self test before it completes, always reset the printer by turning printer power OFF and then ON.
- If the printer is dispensing the printer reports and liner is being taken up by the applicator, manually remove the reports as they become available.

Power-On Self Test

The printer performs a Power-On Self Test (POST) each time printer power is turned ON.

During the Power-On Self Test, the control panel indicators turn on and off as the printer ensures readiness to operate and handle print jobs.

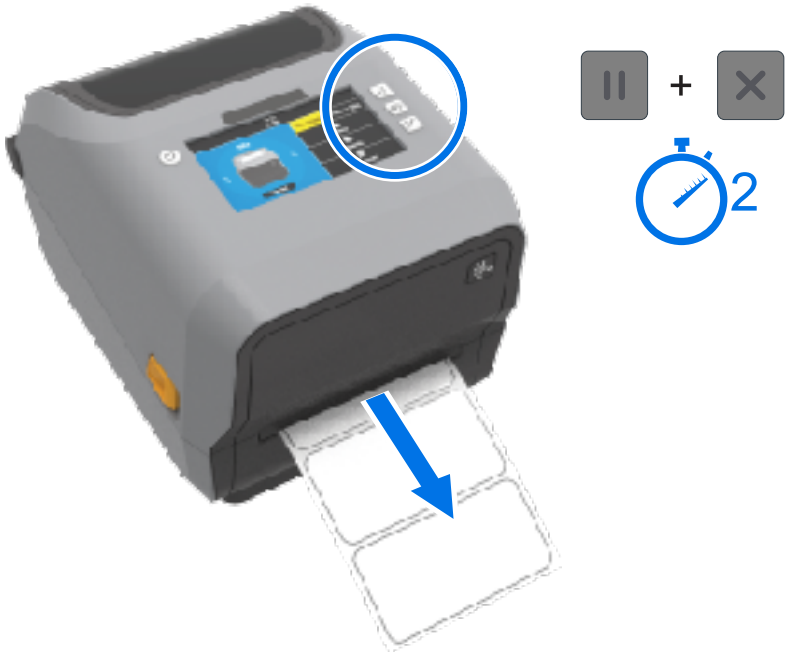
At the end of this self test, only the STATUS indicator remains lit.

Running a SmartCal Media Calibration

The printer must set media parameters for optimal operation prior to printing. To do this, it automatically determines the media type (web/gap, black mark/notch, or continuous) and the measure media characteristics for printing.

1. Make sure media is loaded (and also ribbon if you are using thermal transfer mode) properly in the printer and the top cover of the printer is closed.
2. Press **POWER** to turn printer power on and wait until the printer is in the Ready state.

   The STATUS Indicator lights solid green.
3. Press and hold **PAUSE** and **CANCEL** simultaneously for two seconds, then release.



The printer feeds and measures a few labels and adjusts media sensing levels. When it completes measuring, the STATUS indicator lights solid green.

NOTE: After initial calibration to a specific media, additional calibrations are not necessary for newly-loaded media as long as it is of the same type as the prior media used (media type, vendor, batch, size, etc.). The printer automatically measures the newly-loaded media and adjusts for any small changes in its characteristics when printing.

After you load a roll of new media from the same batch, you can synchronize the labels and get the media set for printing by simply pressing **FEED** (Advance) once or twice.

If the printer should fail to recognize and correctly calibrate to the media, see Manually Calibrating Media on page 299.

Printing the Printer and Network Configuration Reports (CANCEL Self Test)

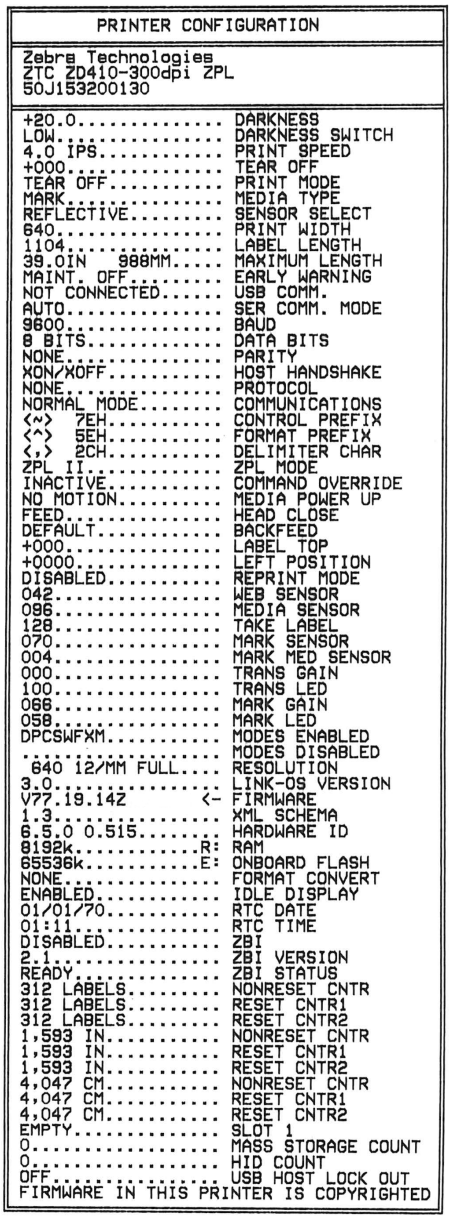
Use the Configuration Report diagnostic (also known as the CANCEL Self Test) to generate the printer and network configuration reports.

1. Make sure media is loaded, the printer cover is closed, and printer power is ON.

If printer power is OFF, press and hold **CANCEL** while turning printer power ON, until the STATUS indicator is the only indicator lit.

2. Press **FEED** + **CANCEL** for two seconds.

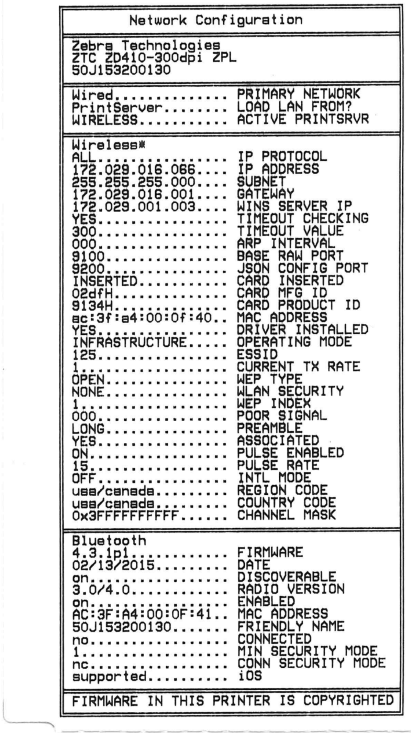
   The Printer and Network Configuration Reports will print and the printer will return to READY status. (The reports show here are samples. They may vary for your printer.)



```
PRINTER CONFIGURATION

Zebra Technologies
ZTC ZD410-300dpi ZPL
50J153200130

+20.0............. DARKNESS
LOW............... DARKNESS SWITCH
4.0 IPS........... PRINT SPEED
+000.............. TEAR OFF
TEAR OFF.......... PRINT MODE
MARK.............. MEDIA TYPE
REFLECTIVE........ SENSOR SELECT
640............... PRINT WIDTH
1104.............. LABEL LENGTH
39.0IN   988MM.... MAXIMUM LENGTH
MAINT. OFF........ EARLY WARNING
NOT CONNECTED..... USB COMM.
AUTO.............. SER COMM. MODE
9600.............. BAUD
8 BITS............ DATA BITS
NONE.............. PARITY
XON/XOFF.......... HOST HANDSHAKE
NONE.............. PROTOCOL
NORMAL MODE....... COMMUNICATIONS
<~>  7EH.......... CONTROL PREFIX
<^>  5EH.......... FORMAT PREFIX
<,>  2CH.......... DELIMITER CHAR
ZPL II............ ZPL MODE
INACTIVE.......... COMMAND OVERRIDE
NO MOTION......... MEDIA POWER UP
FEED.............. HEAD CLOSE
DEFAULT........... BACKFEED
+000.............. LABEL TOP
+0000............. LEFT POSITION
DISABLED.......... REPRINT MODE
042............... WEB SENSOR
096............... MEDIA SENSOR
128............... TAKE LABEL
070............... MARK SENSOR
004............... MARK MED SENSOR
000............... TRANS GAIN
100............... TRANS LED
066............... MARK GAIN
058............... MARK LED
DPCSWFXM.......... MODES ENABLED
.................. MODES DISABLED
 640 12/MM FULL... RESOLUTION
3.0............... LINK-OS VERSION
V77.19.14Z      <- FIRMWARE
1.3............... XML SCHEMA
6.5.0 0.515....... HARDWARE ID
8192k..........R: RAM
65536k.........E: ONBOARD FLASH
NONE.............. FORMAT CONVERT
ENABLED........... IDLE DISPLAY
01/01/70.......... RTC DATE
01:11............. RTC TIME
DISABLED.......... ZBI
2.1............... ZBI VERSION
READY............. ZBI STATUS
312 LABELS........ NONRESET CNTR
312 LABELS........ RESET CNTR1
312 LABELS........ RESET CNTR2
1,593 IN.......... NONRESET CNTR
1,593 IN.......... RESET CNTR1
1,593 IN.......... RESET CNTR2
4,047 CM.......... NONRESET CNTR
4,047 CM.......... RESET CNTR1
4,047 CM.......... RESET CNTR2
EMPTY............. SLOT 1
0................. MASS STORAGE COUNT
0................. HID COUNT
OFF............... USB HOST LOCK OUT
FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```



```
Network Configuration

Zebra Technologies
ZTC ZD410-300dpi ZPL
50J153200130

Wired............. PRIMARY NETWORK
PrintServer....... LOAD LAN FROM?
WIRELESS.......... ACTIVE PRINTSRVR

Wireless*
ALL............... IP PROTOCOL
172.029.016.066... IP ADDRESS
255.255.255.000... SUBNET
172.029.016.001... GATEWAY
172.029.001.003... WINS SERVER IP
YES............... TIMEOUT CHECKING
300............... TIMEOUT VALUE
000............... ARP INTERVAL
9100.............. BASE RAW PORT
9200.............. JSON CONFIG PORT
INSERTED.......... CARD INSERTED
02dfH............. CARD MFG ID
9134H............. CARD PRODUCT ID
ac:3f:a4:00:0f:40.. MAC ADDRESS
YES............... DRIVER INSTALLED
INFRASTRUCTURE.... OPERATING MODE
125............... ESSID
1................. CURRENT TX RATE
OPEN.............. WEP TYPE
NONE.............. WLAN SECURITY
1................. WEP INDEX
000............... POOR SIGNAL
LONG.............. PREAMBLE
YES............... ASSOCIATED
ON................ PULSE ENABLED
15................ PULSE RATE
OFF............... INTL MODE
usa/canada........ REGION CODE
usa/canada........ COUNTRY CODE
0x3FFFFFFFFFFF.... CHANNEL MASK

Bluetooth
4.3.1pi........... FIRMWARE
02/13/2015........ DATE
on................ DISCOVERABLE
3.0/4.0........... RADIO VERSION
on................ ENABLED
AC:3F:A4:00:0F:41.. MAC ADDRESS
50J153200130...... FRIENDLY NAME
no................ CONNECTED
1................. MIN SECURITY MODE
nc................ CONN SECURITY MODE
supported......... iOS

FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

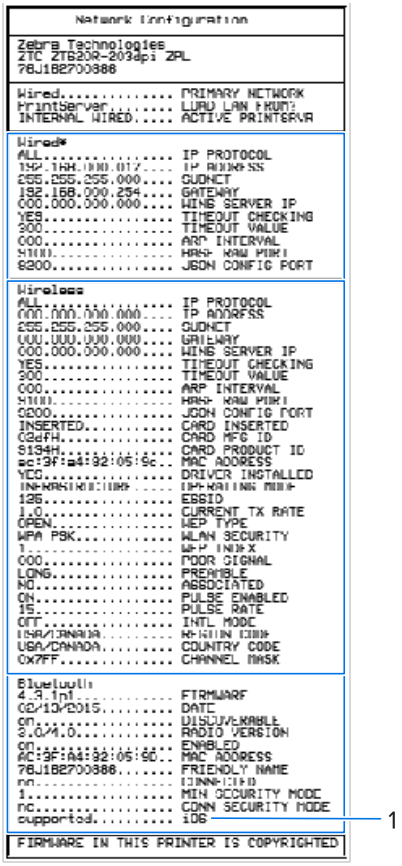
Network (and Bluetooth) Configuration Report

ZD Series printers that have wired or wireless connectivity options installed will print a network configuration report in addition to a printer configuration report during a CANCEL self-test.

You will need the information in this report to establish and troubleshoot Ethernet (LAN and WLAN), Bluetooth and Bluetooth LE network printing.

In addition to the CANCEL self test, you can also output this report by sending the ~WL ZPL command to the printer.

The report shown below is an example. The contents of the report may vary for your printer model.



1	iOS Support Setting

iOS devices have Bluetooth Classic 4.X (with 3.0 compatibility). When the Wi-Fi and Bluetooth Classic wireless connectivity option is installed in your printer, it is listed as `supported` at the end of the Network (and Bluetooth) Configuration report.

When the wireless connectivity option is NOT installed, the iOS setting is noted at the end of the Network (and Bluetooth) Configuration report as `not supported`.

Printing a Print Quality Report (FEED Self Test)

Different types of media may require different darkness settings. Use this simple but effective method for determining the ideal darkness for printing barcodes that are within specifications.

During the FEED self test, the printer prints a series of labels at different darkness settings at two different print speeds. The barcodes on these labels may be ANSI-graded to show print quality.

During this test, one set of labels is printed at low speed, and another set is printed at the high speed. The darkness value starts at three settings lower than the printer's current darkness value (relative darkness of -3) and increase until the darkness is three settings higher than the current darkness value (relative darkness of +3).

Each label shows the relative darkness and the print speed.

Figure 6 Print Quality Report



The speed at which labels are printed during this print quality test depends on the dot density of the printhead.

- 300 dpi printers: Prints 7 labels at 51mm/sec (2 ips) and 102 mm/sec (4 ips) print speeds
- 203 dpi printers: Prints 7 labels at 51mm/sec (2 ips) and 152 mm/sec (6 ips) print speeds

Printing a Print Quality Report

You can print a configuration report to use as a reference on the printer's current settings.

1. Press and hold **FEED** ( ) and **CANCEL** ( ) simultaneously for two seconds.
2. Turn printer power OFF.
3. Press and hold **FEED** ( ) while turning printer power ON. Release **FEED** when the status indicator is the only indicator lit.

   The printer prints a series of labels at various speeds and darkness settings that are higher and lower than the darkness value shown on the configuration label.
4. Inspect the test labels and determine which one has the best print quality for your application.

   a) If you have a barcode verifier, use it to measure bars and spaces and calculate the print contrast.

b) If you do not have a barcode verifier, use your eyes or the system scanner to choose the optimal darkness setting based on the labels printed in this self test.

Figure 7 Barcode Darkness Comparison

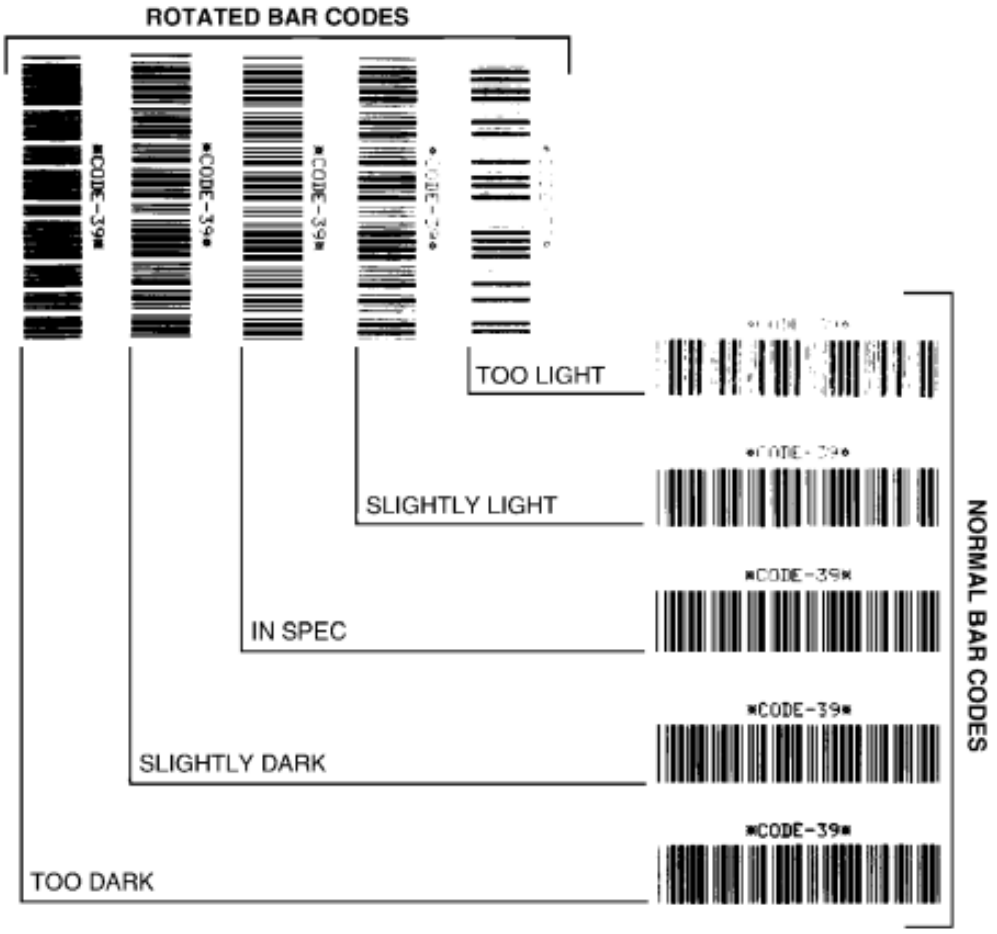


Table 11 Visual Darkness Descriptions

Print Quality	Description
Too dark	Labels that are too dark are fairly obvious. They may be readable but not 'in-spec.' The normal barcode bars increase in size. The openings in small alphanumeric characters may appear filled in. Rotated barcode have bars and spaces run together.
Slightly dark	Slightly dark labels are not as obvious. The normal barcode will be 'in-spec'. Small character alphanumeric characters will appear bold and could be slightly filled in. The rotated barcode spaces are small when compared to the 'in-spec' code, possibly making the code unreadable.

Table 11 Visual Darkness Descriptions (Continued)

Print Quality	Description
'In-spec'"	The 'in-spec' barcode can only be confirmed by a verifier, but it should exhibit the following visible characteristics. • The normal barcode will have complete, even bars and clear, distinct spaces. • The rotated barcode will have complete, even bars and clear, distinct spaces. Although it may not look as good as a slightly dark barcode, the barcode will be 'in-spec'. • In both normal and rotated styles, small alphanumeric characters look complete.
Slightly light	Slightly light labels are, in some cases, preferable to slightly dark ones for 'in-spec' barcodes. Slightly light labels are, in some cases, preferable to slightly dark ones for 'in-spec' barcodes. Both normal and rotated barcodes will be in spec, but small alphanumeric characters may not be complete.
Too light	Labels that are too light are obvious. Both normal and rotated barcodes have incomplete bars and spaces. Small alphanumeric characters are unreadable.

5. Note the relative darkness value and the print speed printed on the best test label.
6. Add or subtract the relative darkness value from the darkness value specified on the Printer Configuration label. The resulting numeric value is the best darkness value for that specific label and print speed combination.
7. If necessary, change the current darkness value of the printer to the darkness value on the best test label.
8. If necessary, change the current print speed to the speed value on the best test label. See two options for how to do this in Adjusting the Print Quality on page 208.

Resetting Defaults

Resetting can help to resolve persistent issues.

NOTE: For printers with Protected Mode enabled, you need to provide the Protected Mode password to change certain settings, and they cannot be modified by resetting the printer. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

Resetting Non-Network Printer Configuration Settings to their Factory Defaults

Use these instructions to reset the non-network printer settings to their factory defaults.

1. Turn printer power OFF.
2. Press and hold **PAUSE** ( ) and **FEED** ( ) simultaneously and turn printer power ON.
3. Continue holding these buttons until the STATUS indicator ( ) is the only indicator lit.

NOTE: The printer has a **RESET** button on its underside. See RESET Button Functions in this section for information on how to use this button.

After the non-network printer configuration settings are reset, calibrate the sensor. You can run a SmartCal Media Calibration or, if that is insufficient for your media, manually calibrate the printer for the media you loaded.

Resetting the Printer's Network Settings to Their Factory Defaults

Use this procedure to reset only the printer's network settings to their factory defaults.

1. Turn printer power OFF.
2. Press and hold **PAUSE** ( ) and **CANCEL** ( ) simultaneously and turn printer power ON.
3. Continue holding these buttons until the Status indicator ( ) is the only indicator that is lit.

The printer's network configuration is reset to factory defaults. The printer does NOT print the printer configuration report or the network configuration report at the end of the reset.

RESET Button Functions

Your printer has a dedicated **RESET** button on its lower surface which is pressed using a paper clip or similar small object.

Press this **RESET** button for the length of time specified below as needed to perform the listed functions.



1	Reset access aperture

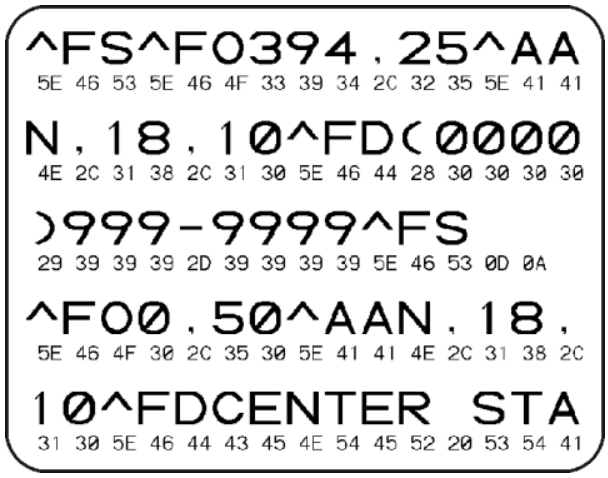
1 second or under	No effect.
1–5 seconds (printer reset)	The printer performs a factory reset, then prints a printer configuration report (and a network configuration report if it is configured to operate on a network).
6–10 seconds (network connection reset, for printers connected to a network)	The printer drops the network connection, resets its network settings to their factory defaults, and prints a printer configuration report and a network configuration report.
More than 10 seconds (reset mode exit)	The printer does NOT reset. The printer and network parameters are left unchanged.

Performing a Communication Diagnostics Test

This is a troubleshooting test used to check the connection between the printer and its host computer or device.

When the printer is in Diagnostics mode, it prints all data received from the host computer as straight ASCII characters, with the hex values printed below the ASCII text. The printer prints all the characters it receives. This includes control codes such as CR (carriage return). The test label prints upside-down as it exits the printer.

Figure 8 Typical Communications Diagnostics Test Label



To print this test label:

1. Ensure media is loaded and printer power is ON.
2. Set the print width equal to, or less than, the width of the label being used for the test.
3. Press and hold **PAUSE** ( ) and **FEED** ( ) simultaneously for two seconds.

   When active, the Status indicator ( ) alternately lights up Green and Yellow.

   The printer enters Diagnostics mode and prints any data received from the host computer or management device on a test label.
4. Check the test label for error codes. If any errors are shown, verify if the communication parameters are correctly set.

   Errors show on the test label as follows:

FE	Framing error
0E	Overrun error
PE	Parity error
NE	Noise

5. To exit the self-test and return to normal operations, press and hold **PAUSE** ( ) and **FEED** ( ) simultaneously for two seconds, or turn printer power OFF and back ON.

Sensor Profile

Use the sensor profile image—which typically prints across several labels or tags—for diagnostics if the printer is not accurately sensing gaps between labels, if it incorrectly identifies pre-printed areas on a label as gaps, or cannot detect ribbon.

With the printer in the Ready state, print a sensor profile in one of these ways:

- Using the printer buttons — Turn printer power OFF, then turn printer power ON while holding down **FEED** and **CANCEL** simultaneously. Continue pressing these buttons until the Status indicator is the only indicator lit.
- Using ZPL — Send a ~JG command to the printer. See the ZPL Programming Guide for more information on this command. The guide is available for download from zebra.com/manuals.

Compare your results to the examples shown in Performing a Communication Diagnostics Test on page 297. If sensor sensitivity must be adjusted, calibrate the printer. See Manually Calibrating Media on page 299.

Figure 9 Sensor Profile (Gap Media)

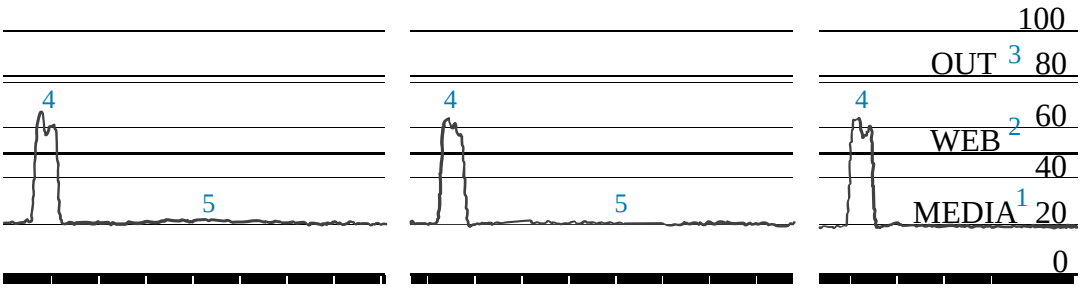
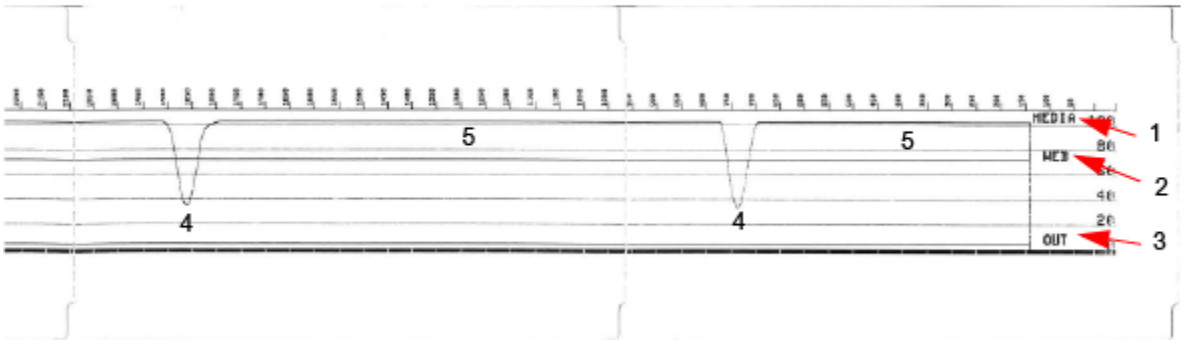


Figure 10 Sensor Profile (Black Mark Tag Media)



1	MEDIA (indicates media sensor readings line)
2	WEB (indicates media sensor threshold settings line)
3	OUT (indicates media out threshold line)
4	Upward spikes (indicate gaps between labels (the 'web')
5	Lines between the spikes (indicate where labels are located)

Compare the sensor profile printout to a length of one media form (ex., a label). The spikes should be the same distance apart as the gaps are on the media.

NOTE: If the gap distances are not the same, the printer is having difficulty determining where the gaps are located. Try calibrating the printer to the media that is loaded.

Activating Advanced Mode

Use Advanced mode to access the printer's manual adjustment modes.

1. Ensure media is loaded and printer power is turned ON.
2. Press **PAUSE** ( ) for two seconds.

   All indicators flash yellow. The Status indicator ( ) lights solid yellow, indicating Manual Media Calibration mode is selected.
3. To sequentially cycle through the available modes, press **FEED** ( ).
4. To activate the selected mode, press **PAUSE** ( ).
5. To exit Advanced mode, press **CANCEL** ( ).

Manually Calibrating Media

Use these steps to manually calibrate the printer for the loaded media.

This Advanced mode is typically used to calibrate the printer to media that is not correctly recognized during SmartCal media calibration.

You may have to perform manual calibration several times. This involves moving the media sensor each time until the printer completes the calibration process and returns to ready state.

1. Place the printer in Advanced Mode (see Activating Advanced Mode on page 299) and press **PAUSE** ( ) while the STATUS indicator ( ) is lit yellow.

   The SUPPLIES indicator ( ) flashes yellow, after which the PAUSE indicator ( ) flashes.

2. Open the printer and verify the media sensor is in the center position for label/gap (transmissive) sensing.

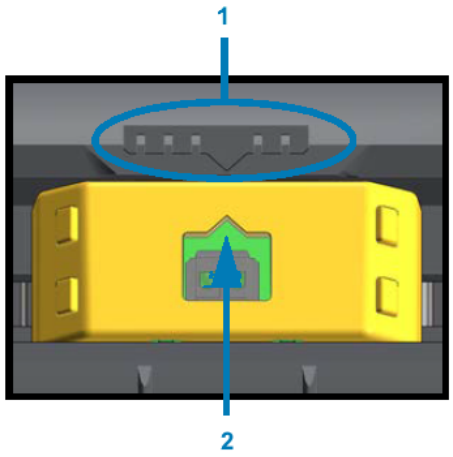


Figure 11

1	Sensor alignment key
2	Alignment arrow (default position)

NOTE: For black-mark or notch media, set the media sensor to the proper location to sense the mark or notch.

For pre-printed media with print located on the front of the label or on the back of the liner, position the sensor to a place where it will minimally sense/encounter the pre-print.

3. Remove 80 mm (3 in.) of labels from the liner, then place the label-free area of the liner over the platen (drive) roller such that the leading edge of the first label is under the media guides.
4. Close the printer and press **PAUSE** ( ) one time.

   The Media indicator ( ) flashes while the printer measures the media liner. When complete, the Pause indicator ( ) begins to flash.
5. Open the printer and reposition the media to locate a label directly above the movable sensor.
6. Close the printer.
7. Press **PAUSE** ( ) one time.

The printer feeds and measures several labels. If it is able to determine the correct media type (gap, black mark, or notch) and measure the media length, it returns to Ready state.

Manual Print Width Adjustment

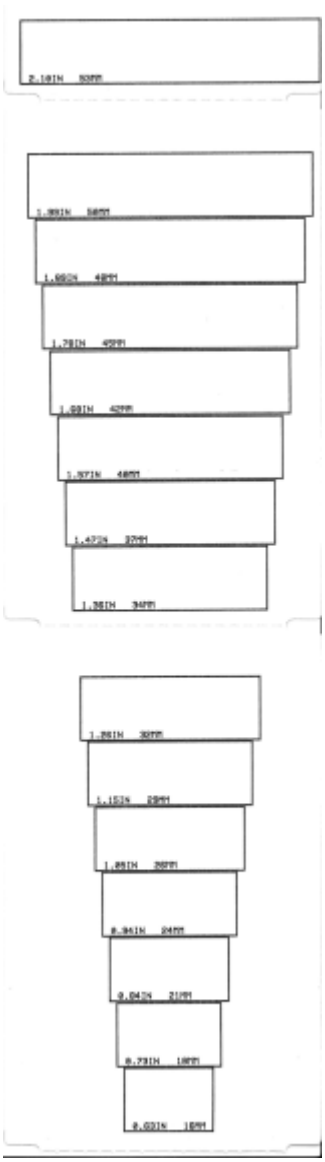
You can manually adjust the print width for your printer depending on your printing needs.

Place the printer in Advanced mode. See Activating Advanced Mode on page 299. Then press **PAUSE** ( ) while the PAUSE indicator ( ) lights up yellow.

The printer prints a 16 mm (0.63 in.) box, pauses momentarily, prints a slightly larger box, pauses again, and so on.

When you see the printer print a box that matches the width of your media, press **FEED** ( ) to select that print width and return the printer to Ready state for printing.

To return to the maximum print width setting, allow the printer to proceed until it reaches that width without pressing **FEED** ( ).



Manual Print Darkness Adjustment

To initiate a Manual Print Darkness Adjustment, press **PAUSE** ( ) while the DATA indicator ( ) is lit yellow.

The printer prints a test pattern showing the current darkness number and several barcode patterns and pauses momentarily. It repeats the pattern with the next darkness level and the next.

When the printer has finished printing a pattern that has solid, even black lines that conform to the requirements for your print job, press **FEED** ( ) to set the darkness to that value and return the printer to Ready state.



Factory Test Modes

When placed in these modes, the printer begins printing various test patterns which you can use to evaluate printer performance.

Your printer supports two print print modes which are intended for factory tests.

NOTE: These test modes consume a quite a bit of media.

Test mode 1	To initiate this mode, hold **PAUSE** ( ) as you turning printer power ON .
Test mode 2	To initiate this mode, hold **PAUSE** ( ), **FEED** ( ), and **CANCEL** ( ) simultaneously for two seconds with printer power ON.

To exit either mode, press and hold **POWER** down while switching printer power OFF. Release the button when the printer has fully powered down.

Interface Connector Wiring

This section details the connector wiring for the printer connector interface.

Universal Serial Bus (USB) Interface

IMPORTANT: When used with third-party cables, your printer requires USB cables—or USB cable packaging—that bears the Certified USB mark to guarantee USB 2.0 compliance. Visit usb.org for details.

Serial Port Interface

Your printer uses Zebra Auto-Detecting DTE and DCE for the 9-pin RS-232 interface.

The pinouts for this interface are as follows:

Pin	DTE	DCE	Description (DTE)
1	—	5V	Not used
2	RXD	TXD	RXD (receive data) input to the printer.
3	TXD	RXD	TXD (transmit data) output from the printer.
4	DTR	DSR	DTR (data terminal ready) output from the printer — controls when the host may send data.
5	GND	GND	Circuit ground.
6	DSR	DTR	DSR (data set ready) input to the printer.
7	RTS	CTS	RTS (request to send) output from the printer -- always in the ACTIVE condition when the printer is turned on.
8	CTS	RTS	CTS (clear to send) - Not used by the printer.
9	5V	—	+5 V @ 0.75 A - FET Circuit current limited.

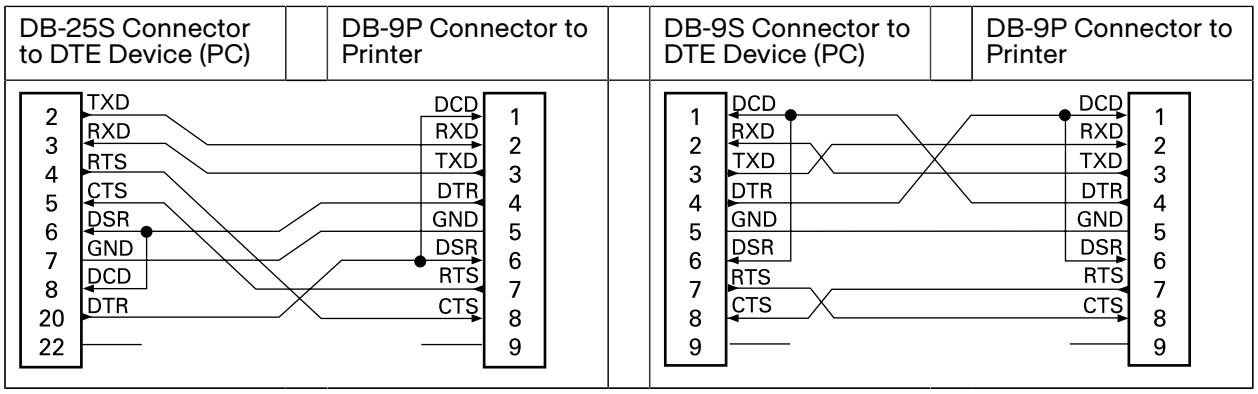
IMPORTANT: The maximum current available through the serial port, USB port or both will not exceed a total of 0.75 Amps.

When XON/XOFF handshaking is selected in the printer driver, data flow is controlled by the ASCII control codes DC1 (XON) and DC3 (XOFF). The DTR control lead will have no effect.

Interconnecting to DTE Devices

The printer is configured as data terminal equipment (DTE). To connect the printer to other DTE devices such as the serial port of a PC, use an RS-232 null modem (crossover) cable. Table 12 Connecting the Printer to a DTE Device on page 305 shows the required cable connections.

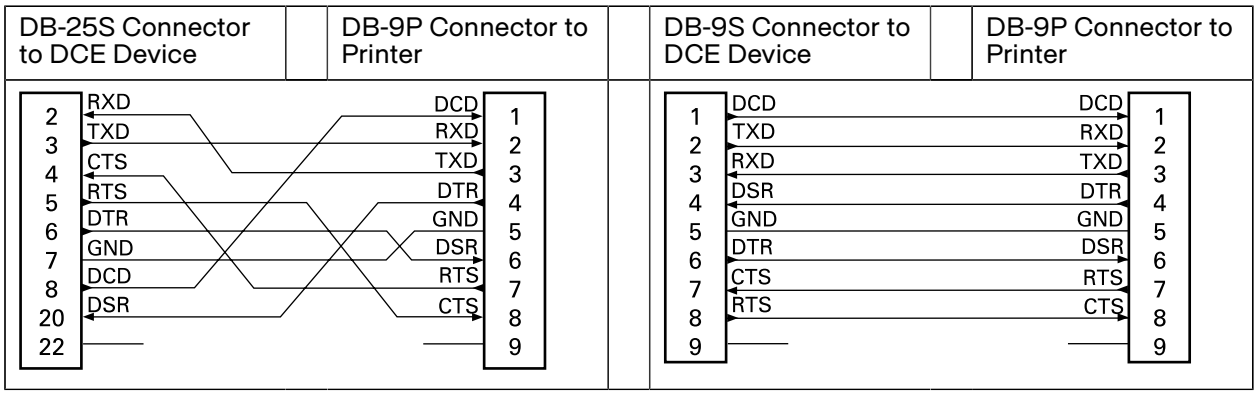
Table 12 Connecting the Printer to a DTE Device



Interconnecting to DCE Devices

When the printer is connected using its RS-232 interface to data communication equipment (DCE) such as a modem, you must use a standard RS-232 (straight-through) interface cable. The figure below shows the connections required for this cable.

Table 13 Connecting the Printer to a DCE Device



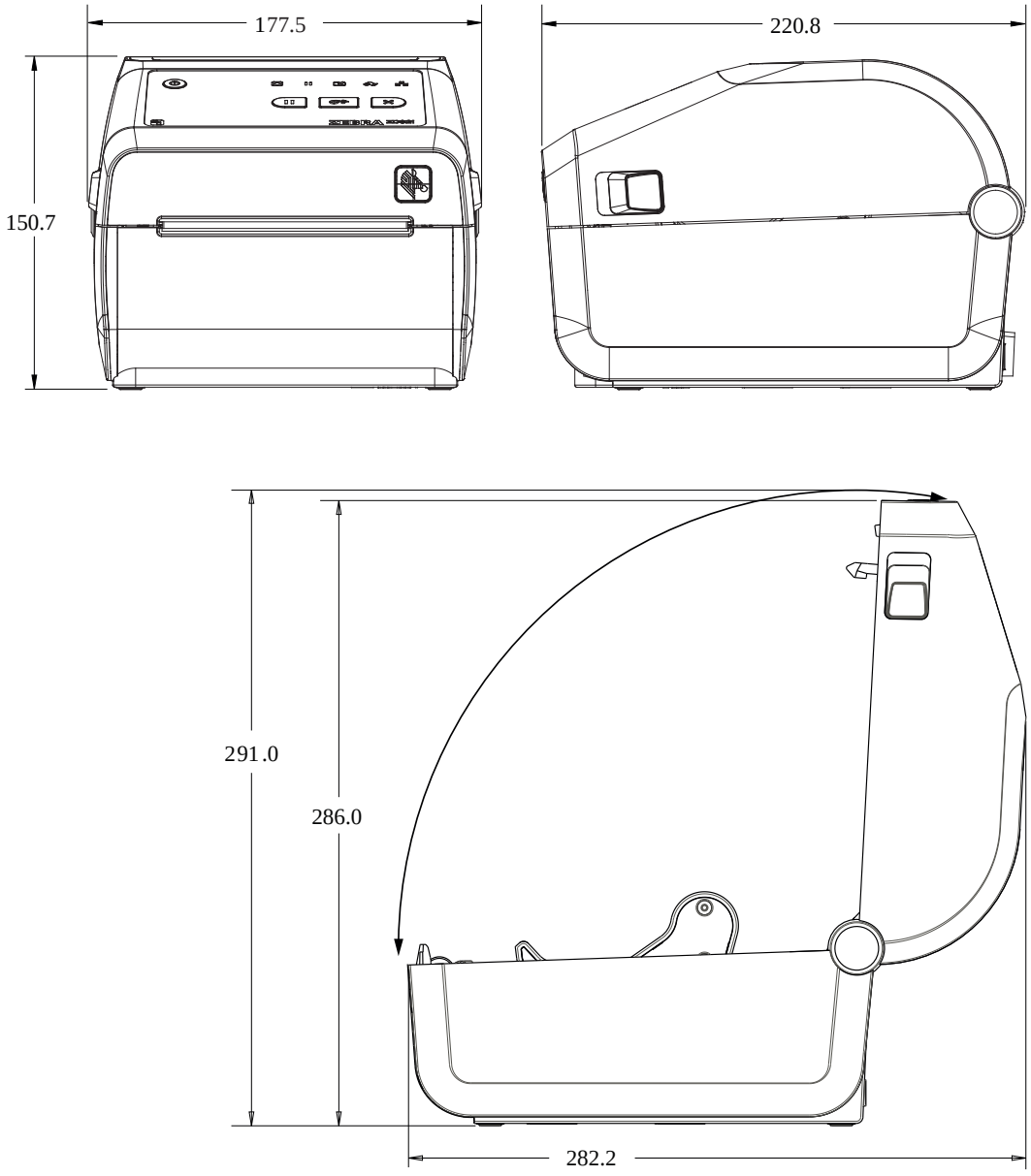
Dimensions

This section provides external printer dimensions for the printers, and many of the accessories that are available for the printers.

Dimensions – ZD421/ZD621 Direct Thermal Printer Models

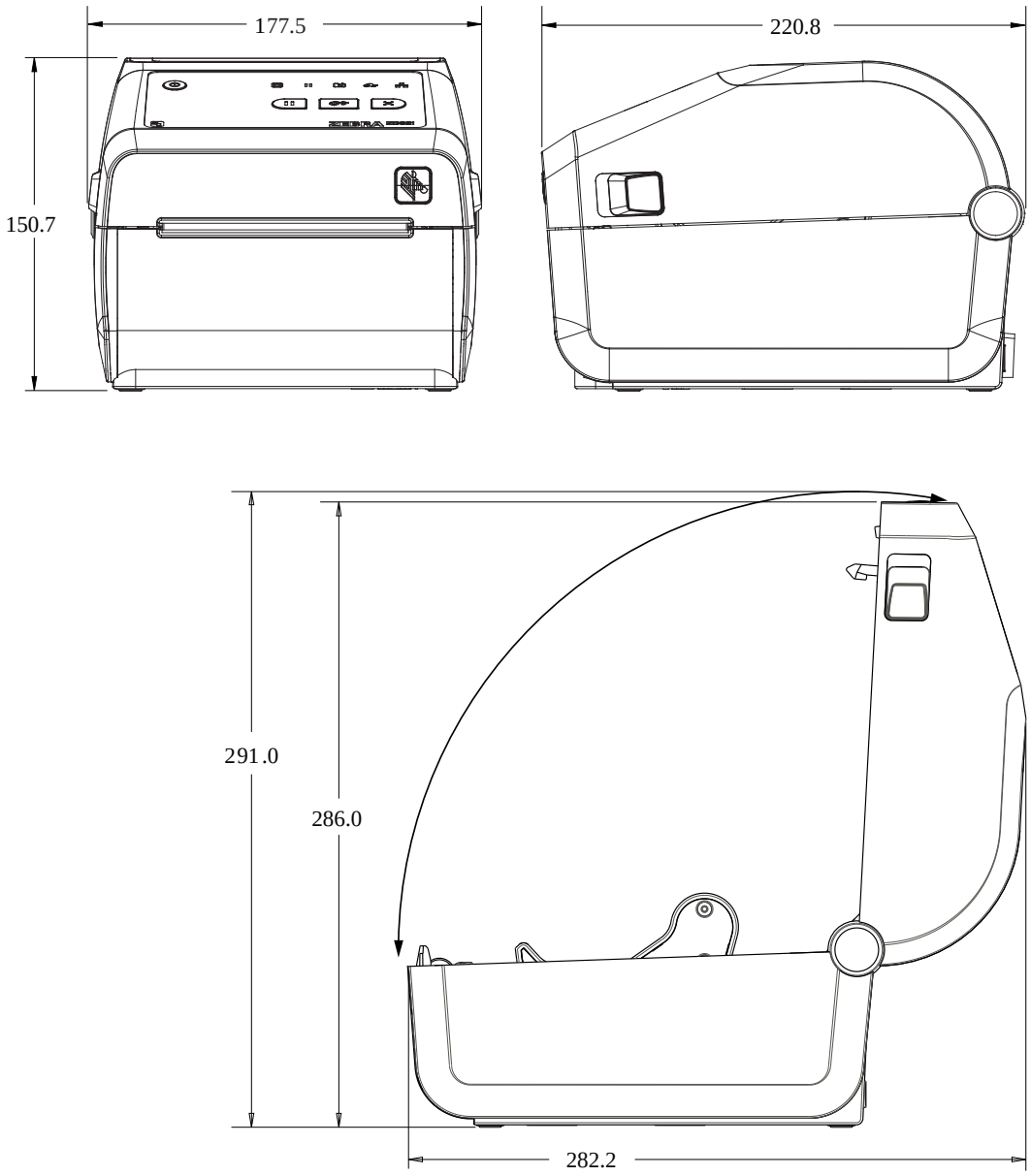
All dimension are in millimeters

Figure 12 ZD421/ZD621 Direct Thermal Printer Models – Dimensions of the Standard Printer



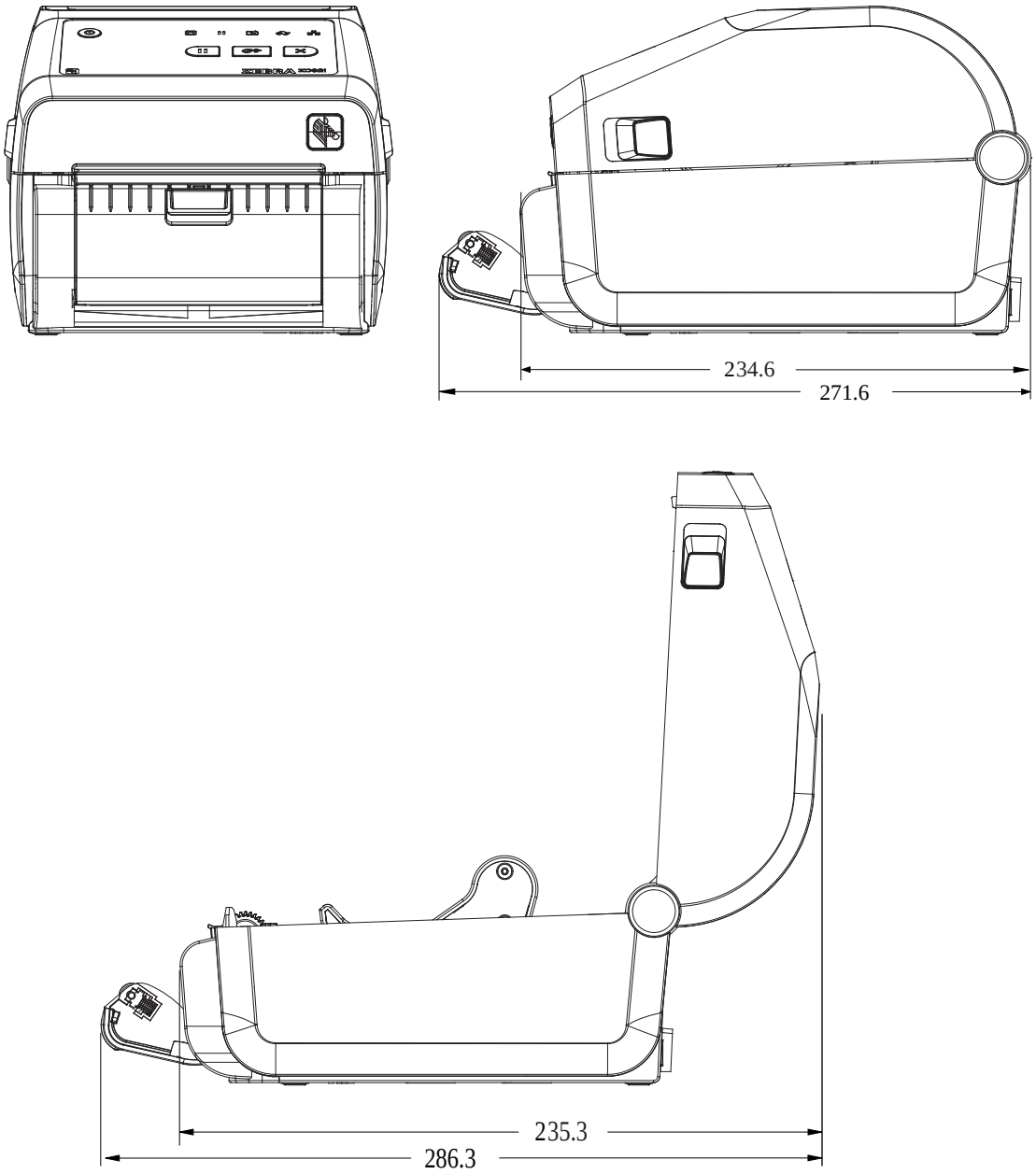
All dimensions are in millimeters.

Figure 13 ZD421/ZD621 Direct Thermal Printer Models – Dimensions of the Printer with the Label Dispenser Option Installed



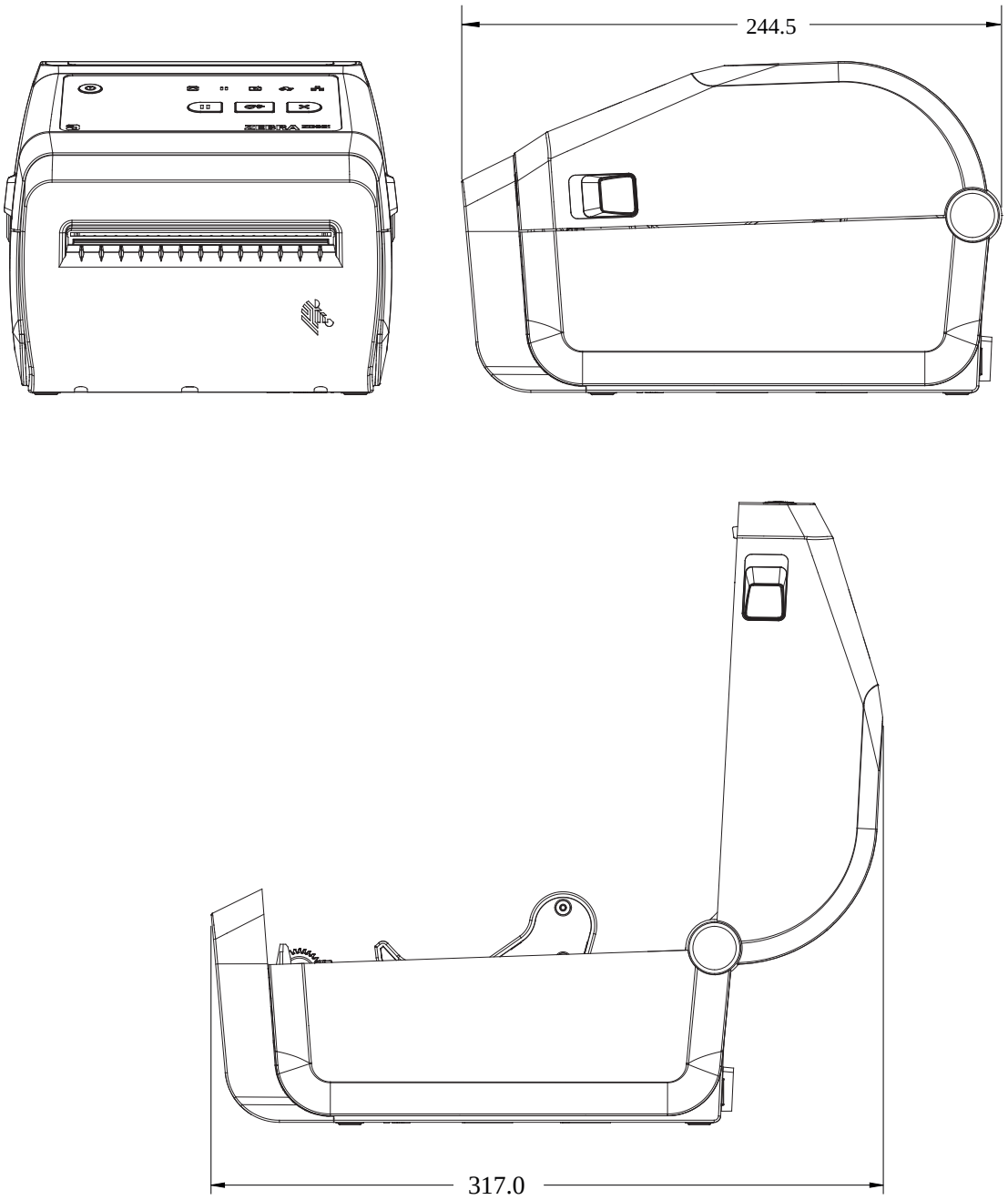
All dimensions are in millimeters.

Figure 14 ZD421/ZD621 Direct Thermal Printer Models – Dimensions of the Printer with the Label Dispenser Option Installed



All dimensions are in millimeters.

Figure 15 ZD421/ZD621 Direct Thermal Printer Models – Dimensions of the Printer with the Cutter Option Installed



All dimensions are in millimeters.

Figure 16 ZD421/ZD621 Direct Thermal Printer Models – Dimensions of the Printer with the Power Supply Base Plugged in

All dimensions are in millimeters.

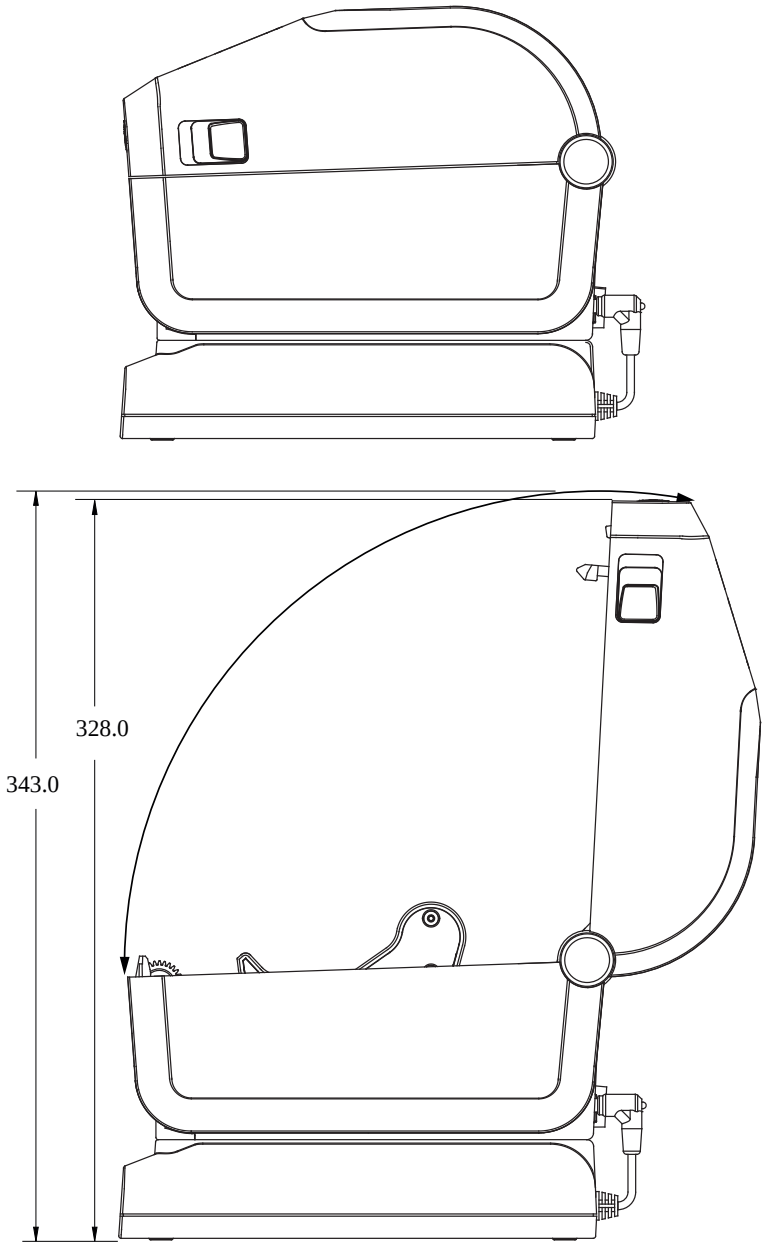
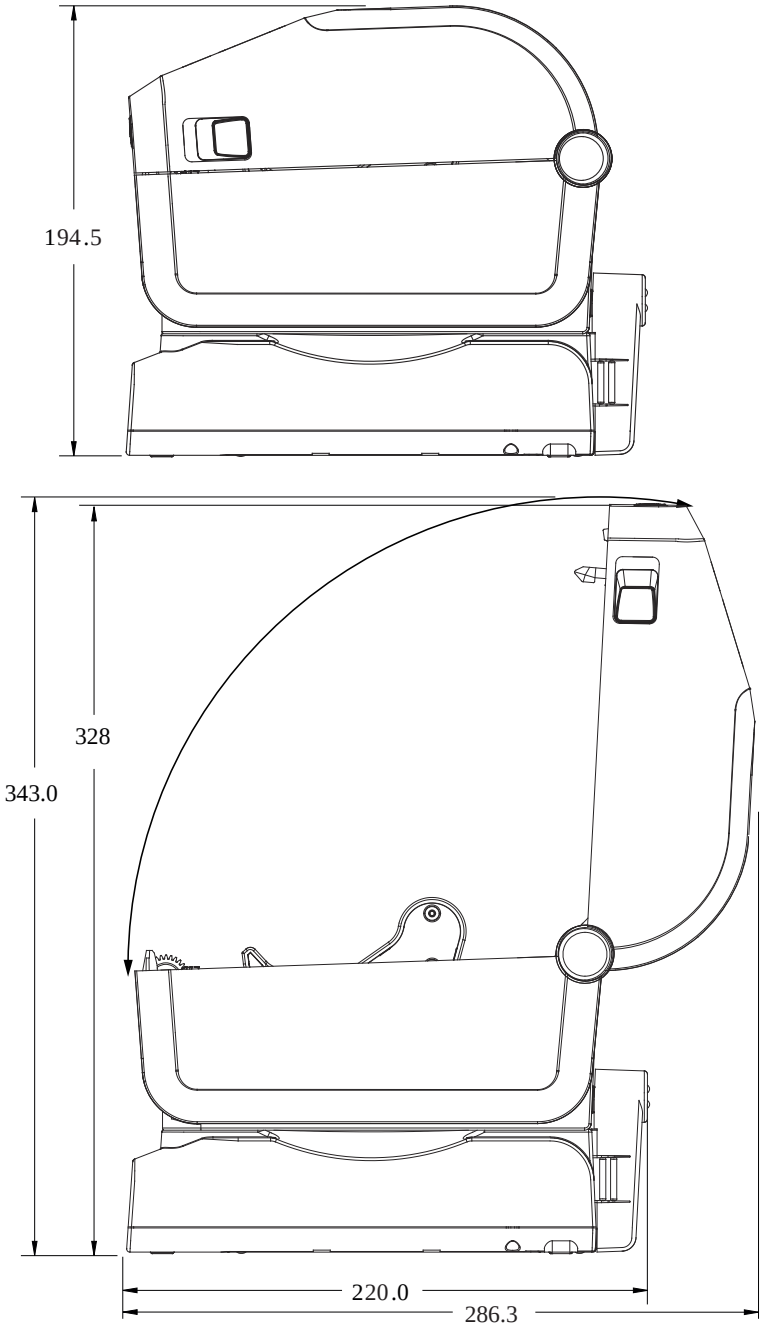
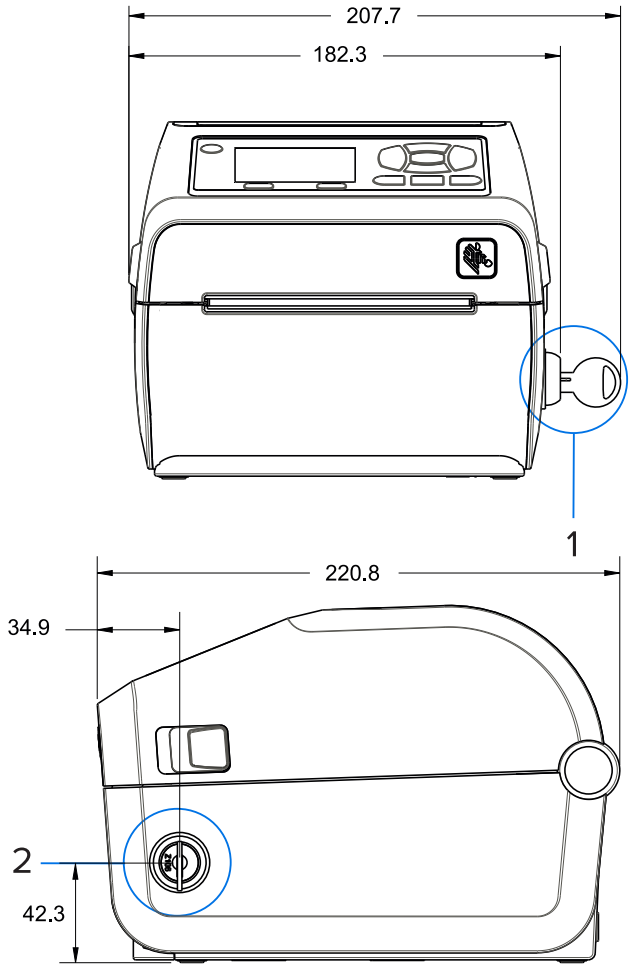

328.0
343.0

Figure 17 ZD421/ZD621 Direct Thermal Printer Models – Dimensions of the Printer with the Attached Battery Base and Battery



All dimensions are in millimeters.

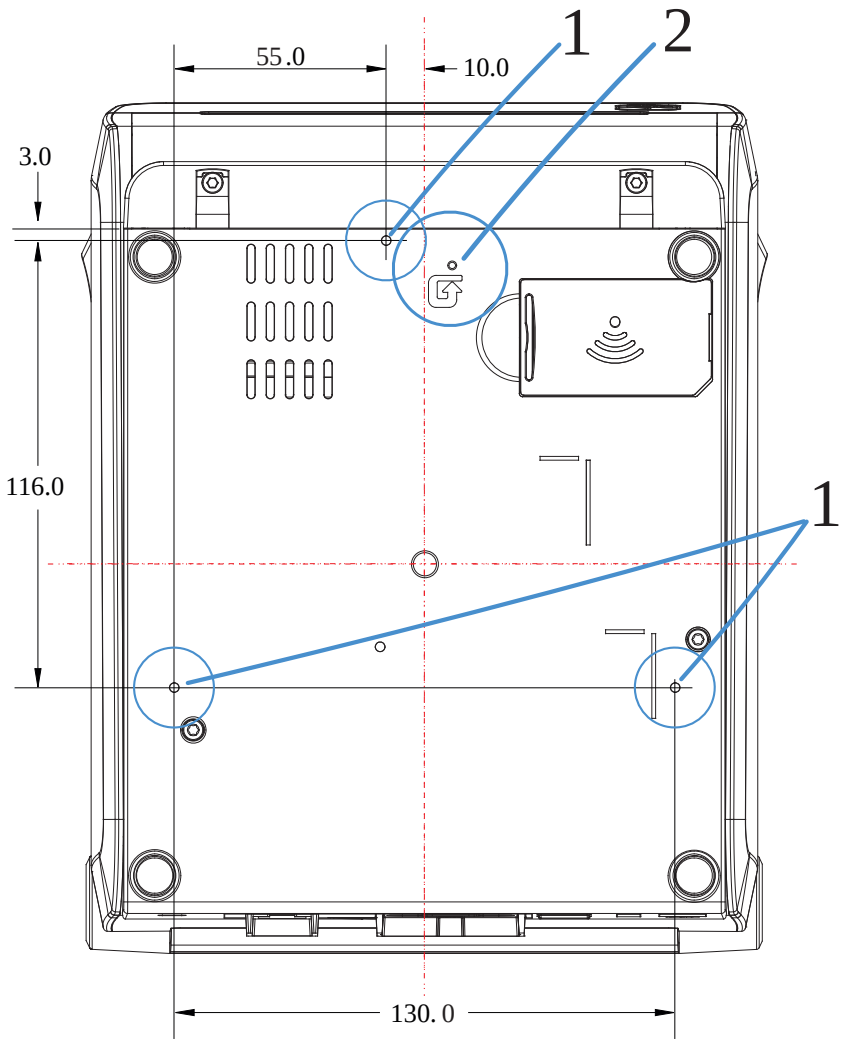
Figure 18 ZD621 Direct Thermal Printer (Healthcare Models Only) with Locking Media Cabinet – Dimensions



1 & 2	Locking media cabinet (shown with key in lock)

All dimensions are in millimeters.

Figure 19 ZD421/ZD621 Direct Thermal Printers – Mounting Screw Locations



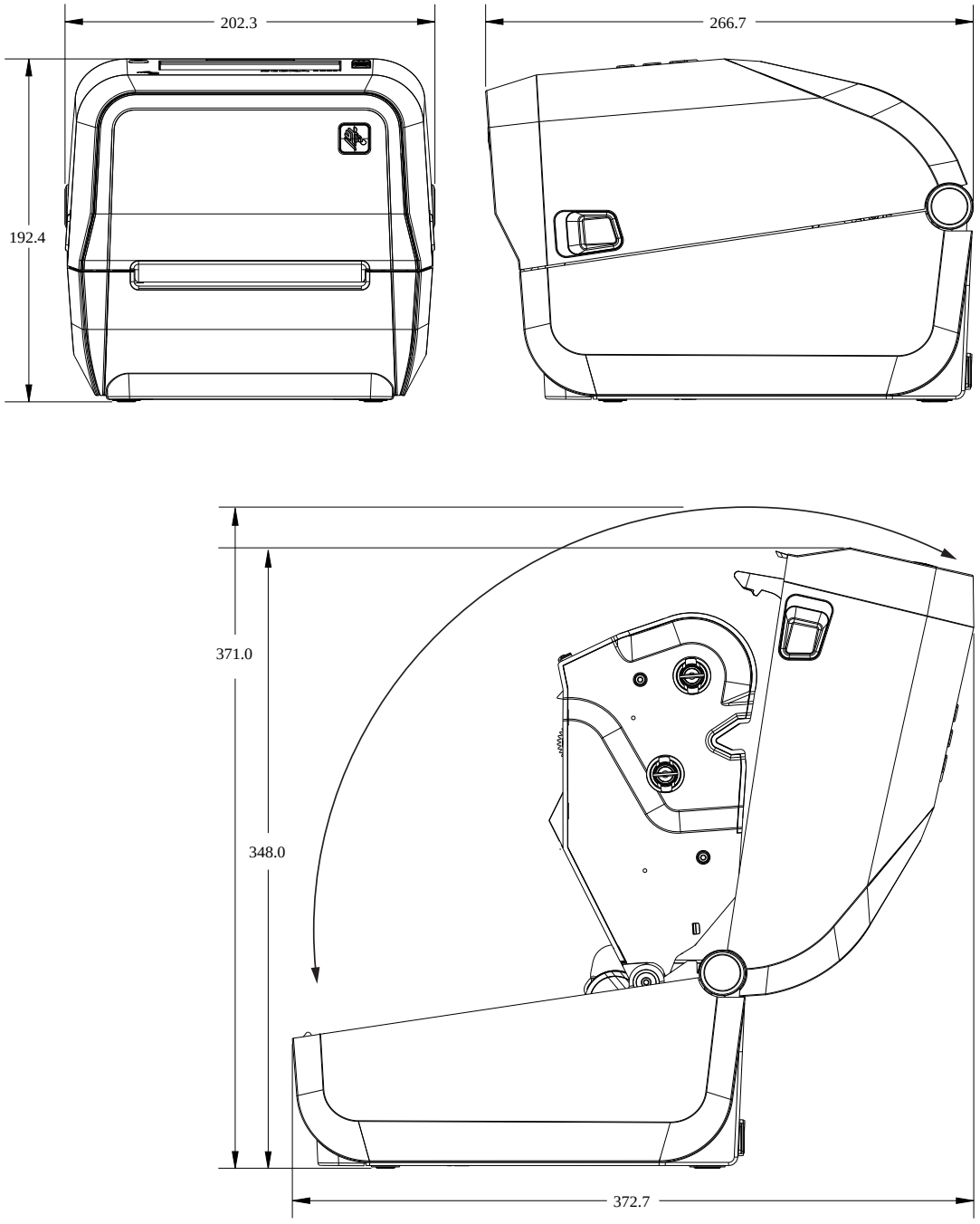
1	Mounting holes — Use M3 thread-forming screws that fit the maximum printer base hole depth of 6 mm.
2	Hardware reset access — Provide a 20-25 mm hole in the mounting plate or surface to retain accessibility after the printer is mounted.

NOTE: Do not remove the rubber feet. They are designed to prevent overheating.

Dimensions – ZD421/ZD621 Thermal Transfer Printer Models

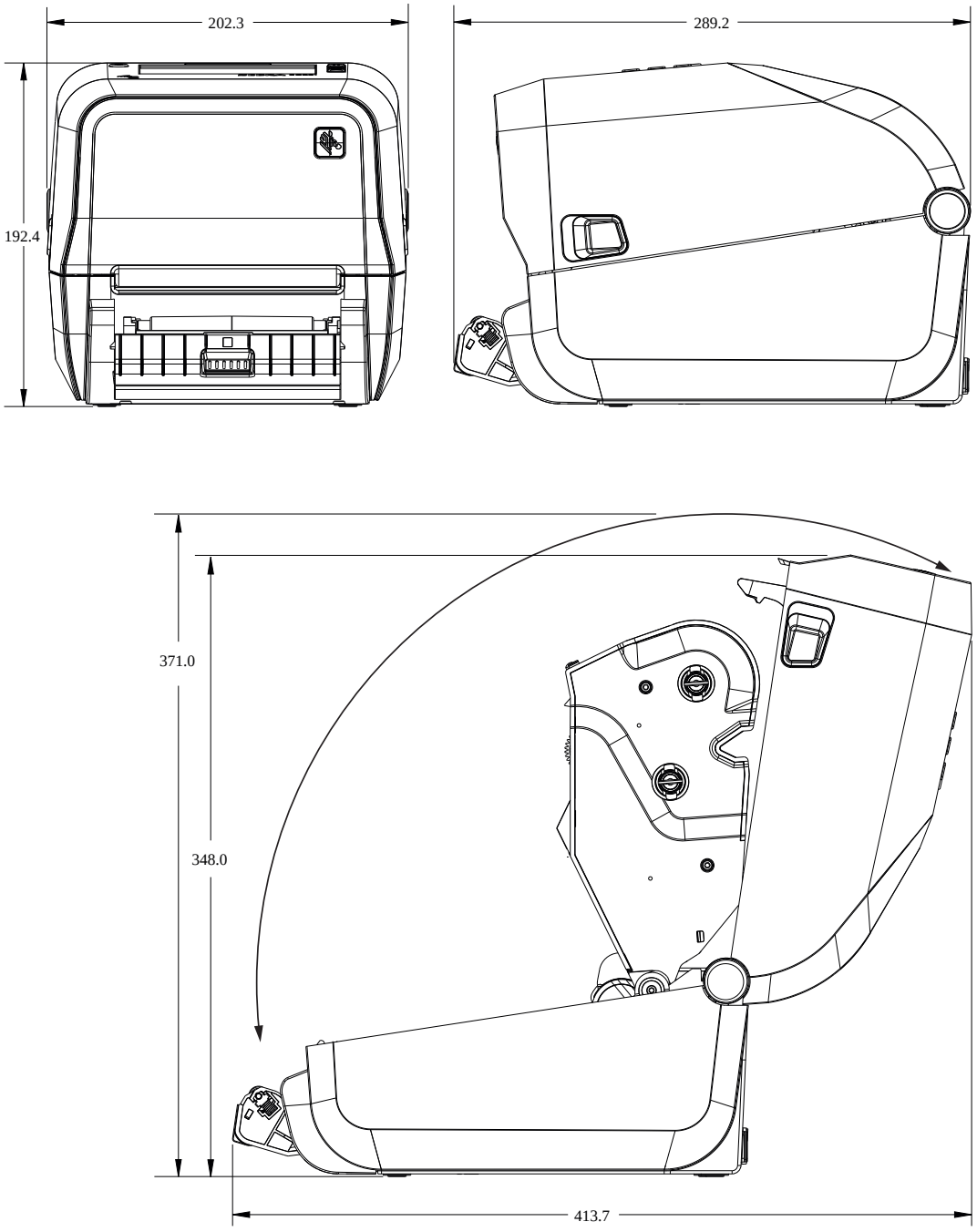
All dimensions are in millimeters.

Figure 20 ZD421/ZD621 Thermal Transfer Models – Dimensions for a Standard Printer



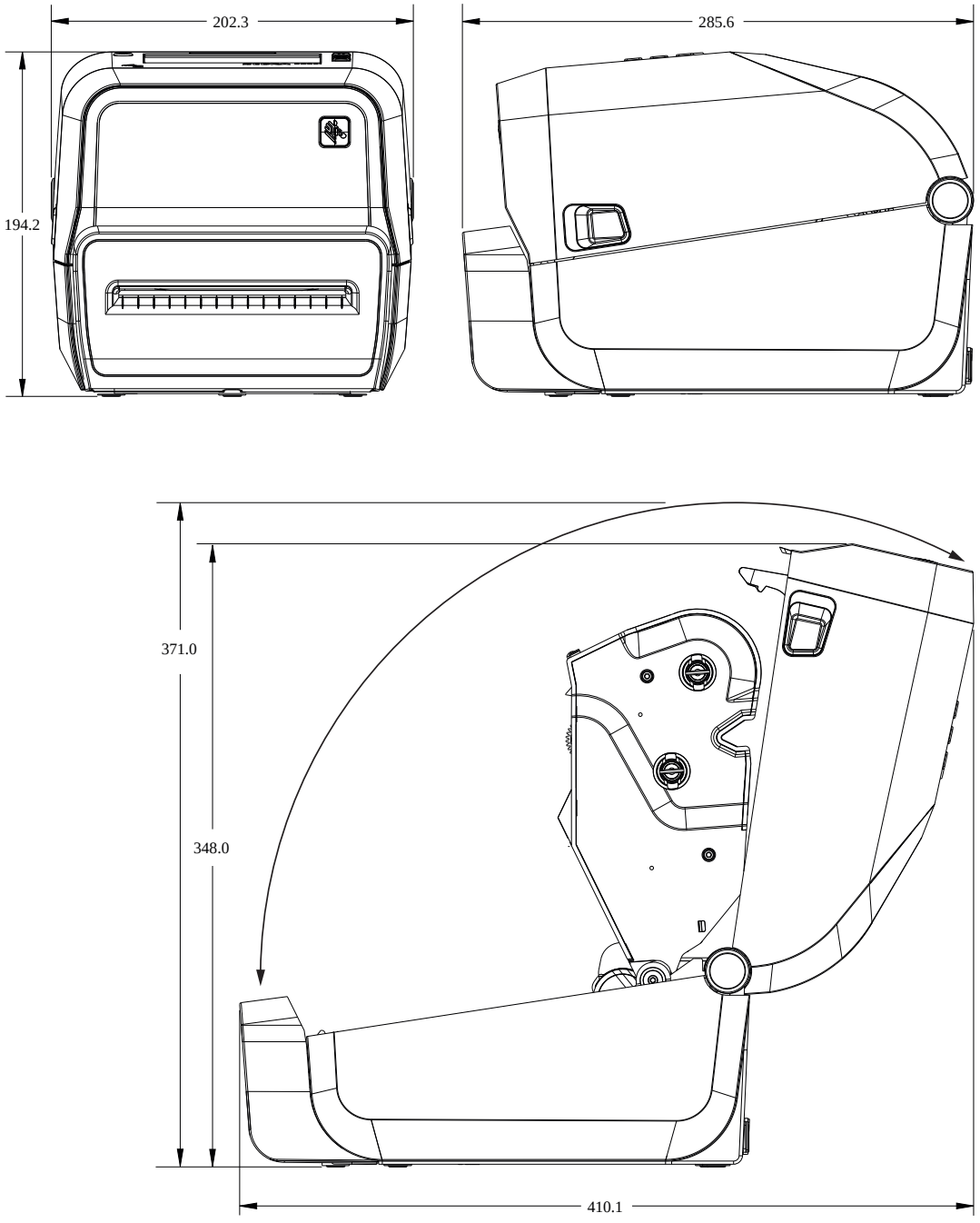
All dimensions are in millimeters.

Figure 21 ZD621 / ZD421 Thermal Transfer Models – Dimensions for Printer with the Label Dispenser Option Installed



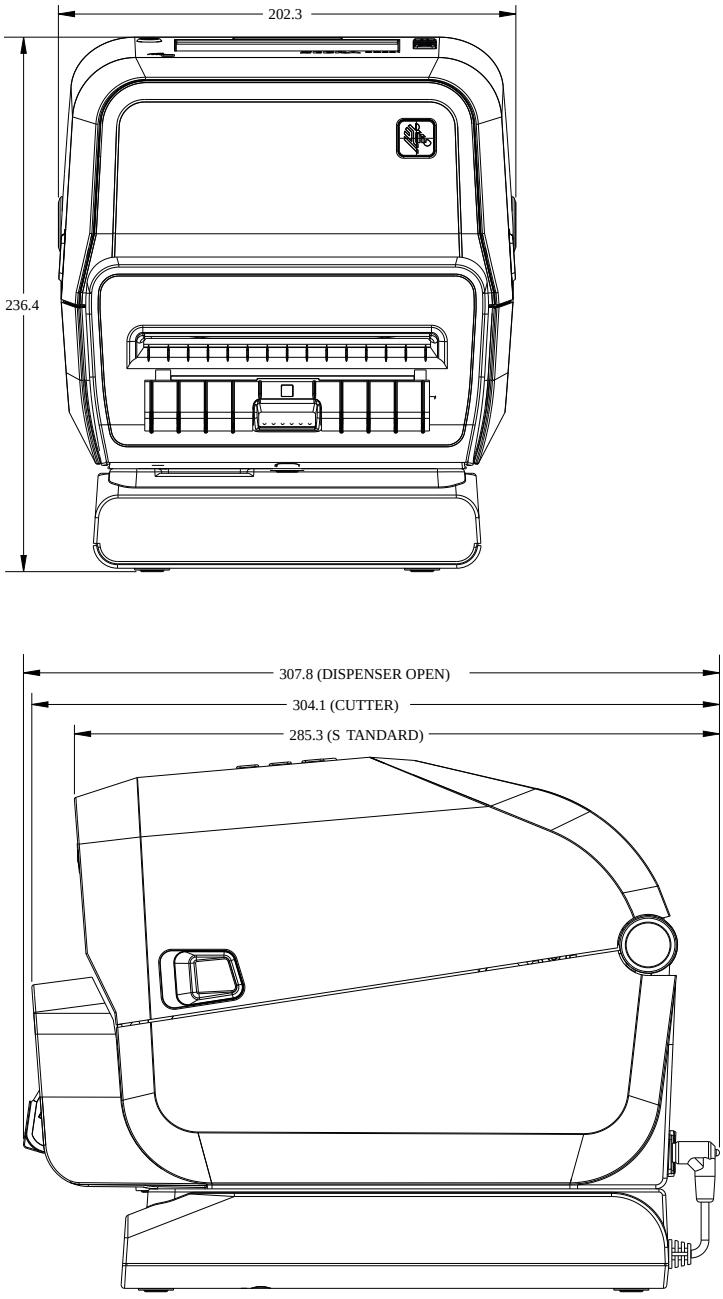
All dimensions are in millimeters.

Figure 22 ZD421 / ZD621 Thermal Transfer Models – Dimensions for Printer with Cutter Option Installed



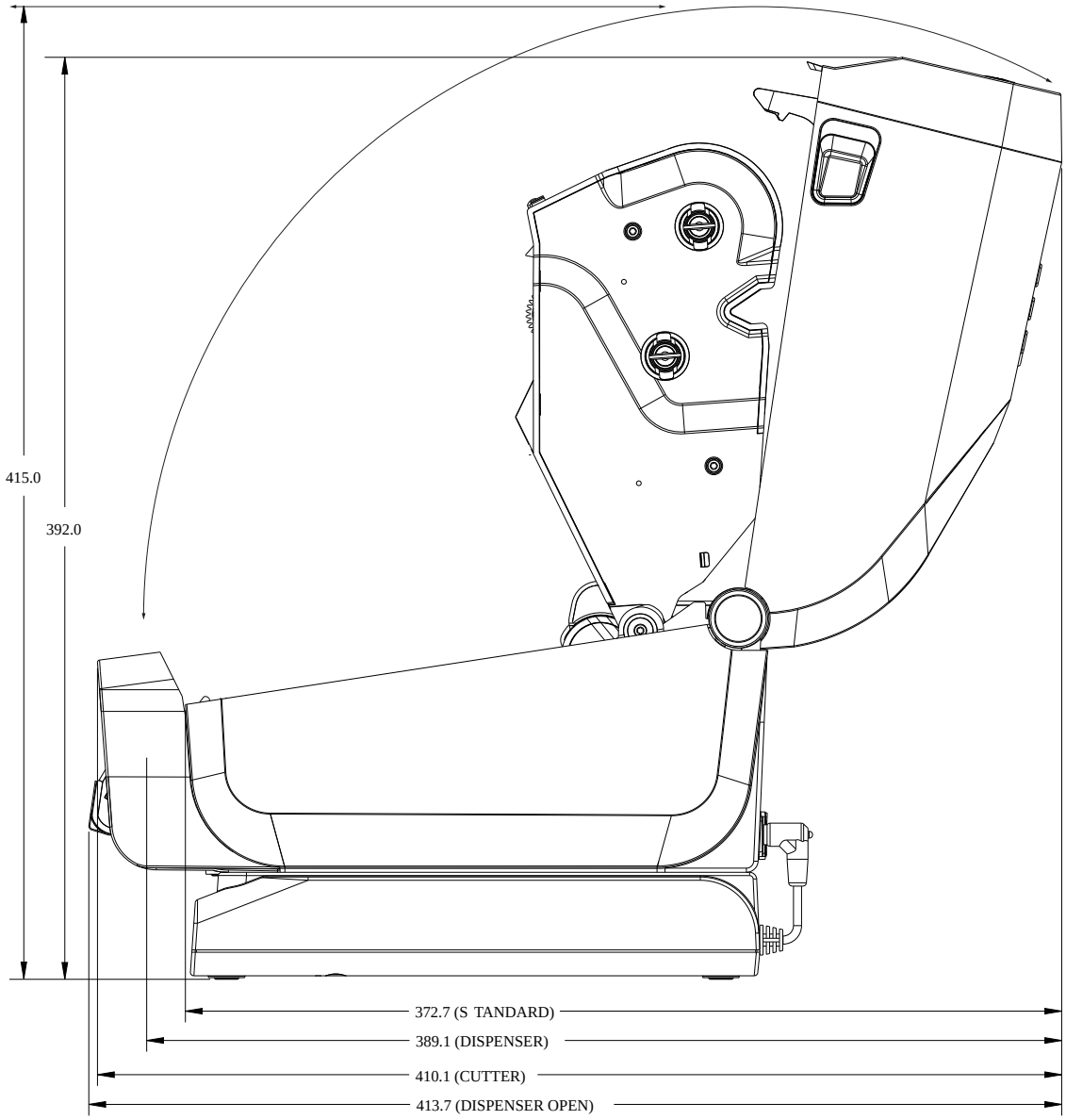
All dimensions are in millimeters.

Figure 23 ZD421 / ZD621 Thermal Transfer Models – Dimensions for Printer with the External Battery Plugged In



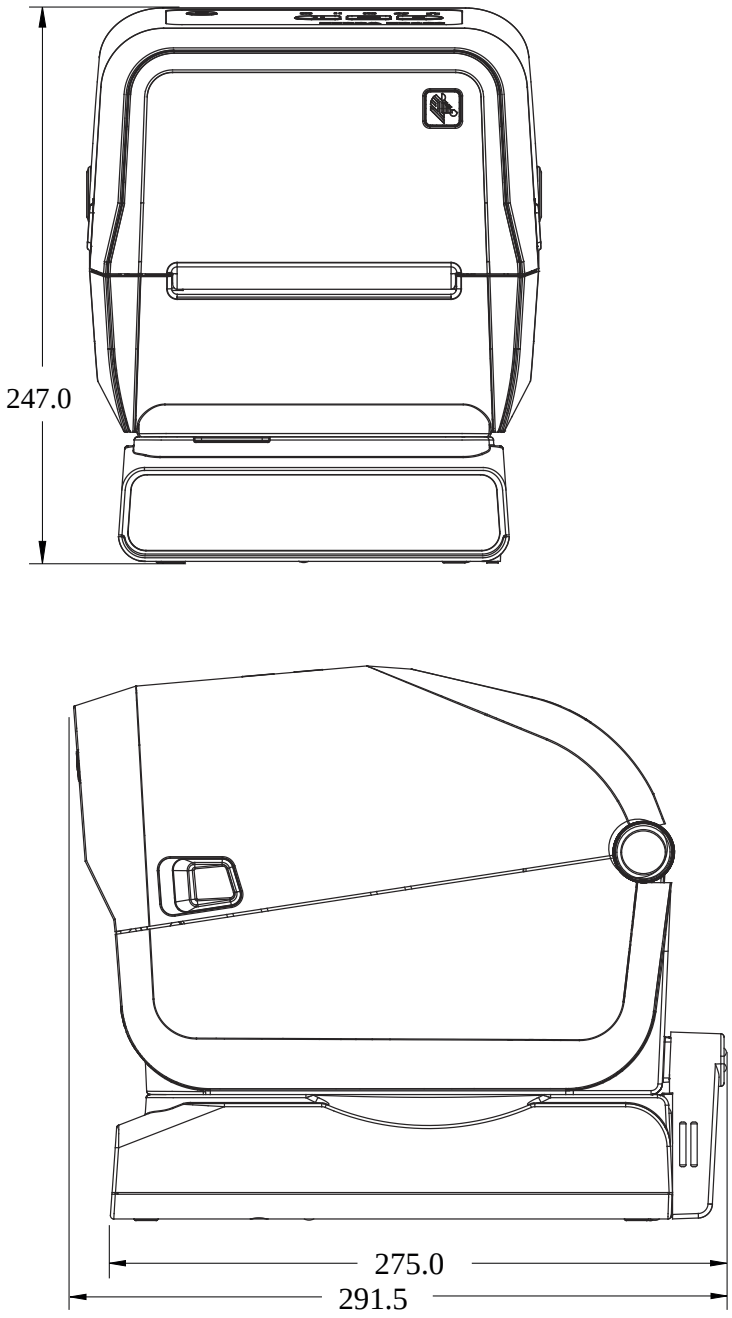
All dimensions are in millimeters.

Figure 24 ZD421 / ZD621 Thermal Transfer Models – Dimensions for Printer with External Battery Plugged In and with Printer Open



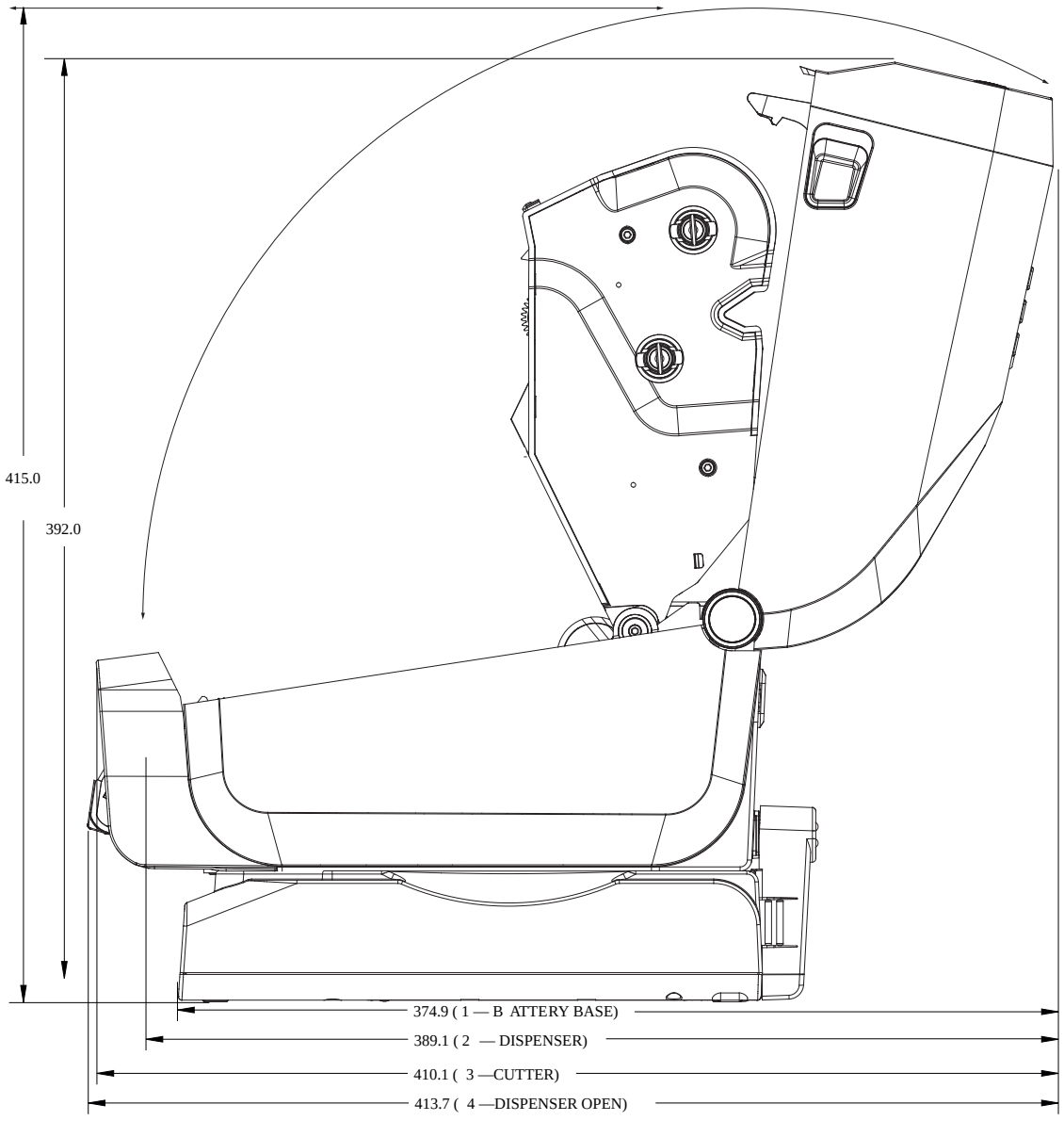
All dimensions are in millimeters

Figure 25 ZD421 / ZD621 Thermal Transfer Models – Dimensions for Printer with Power Supply Base Attached



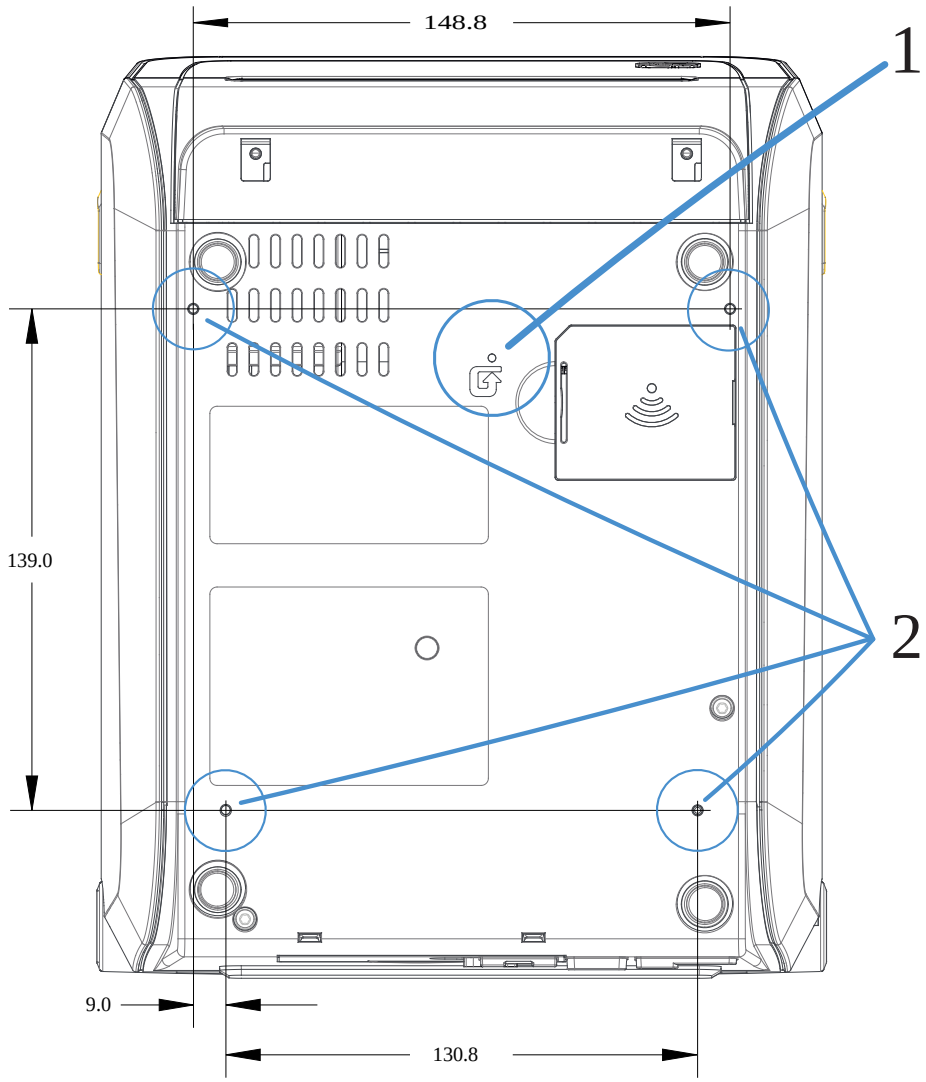
All dimensions are in millimeters.

Figure 26 ZD421 / ZD621 Thermal Transfer Models – Dimensions for Printer with Power Supply Base Attached and Printer Open



All dimensions are in millimeters.

Figure 27 ZD421 / ZD621 Thermal Transfer Models – Mounting Screw Locations



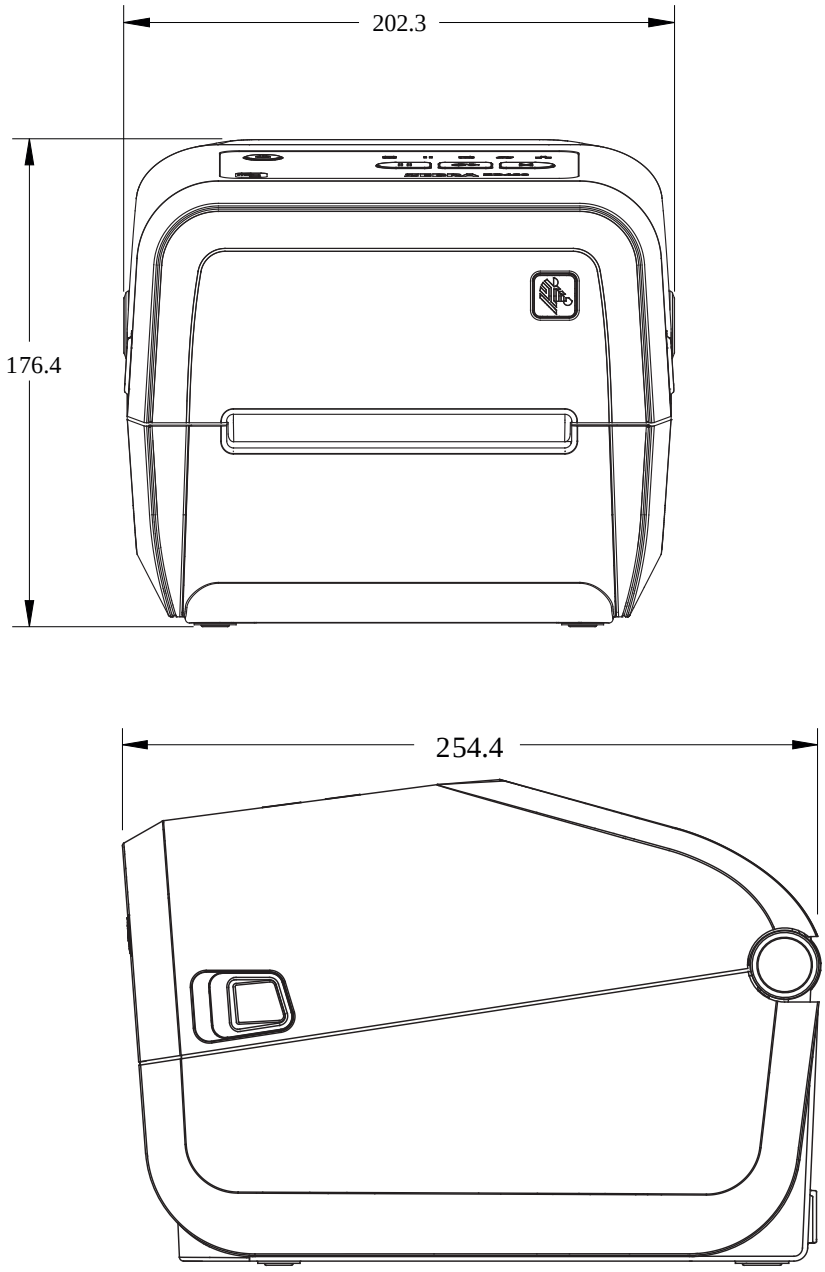
1	Hardware Reset Access – Provide a 20-25 mm hole in mounting plate or surface to keep this area accessible after the printer is mounted onto a surface.
2	Mounting screw locations – Use M3 thread-forming screws that will fit in the maximum printer base hole depth of 6 mm.

IMPORTANT: Do NOT remove the rubber feet located on the printer base. They are designed to keep the printer from overheating.

Dimensions – ZD421C (Ribbon Cartridge Thermal Transfer) Printer Models

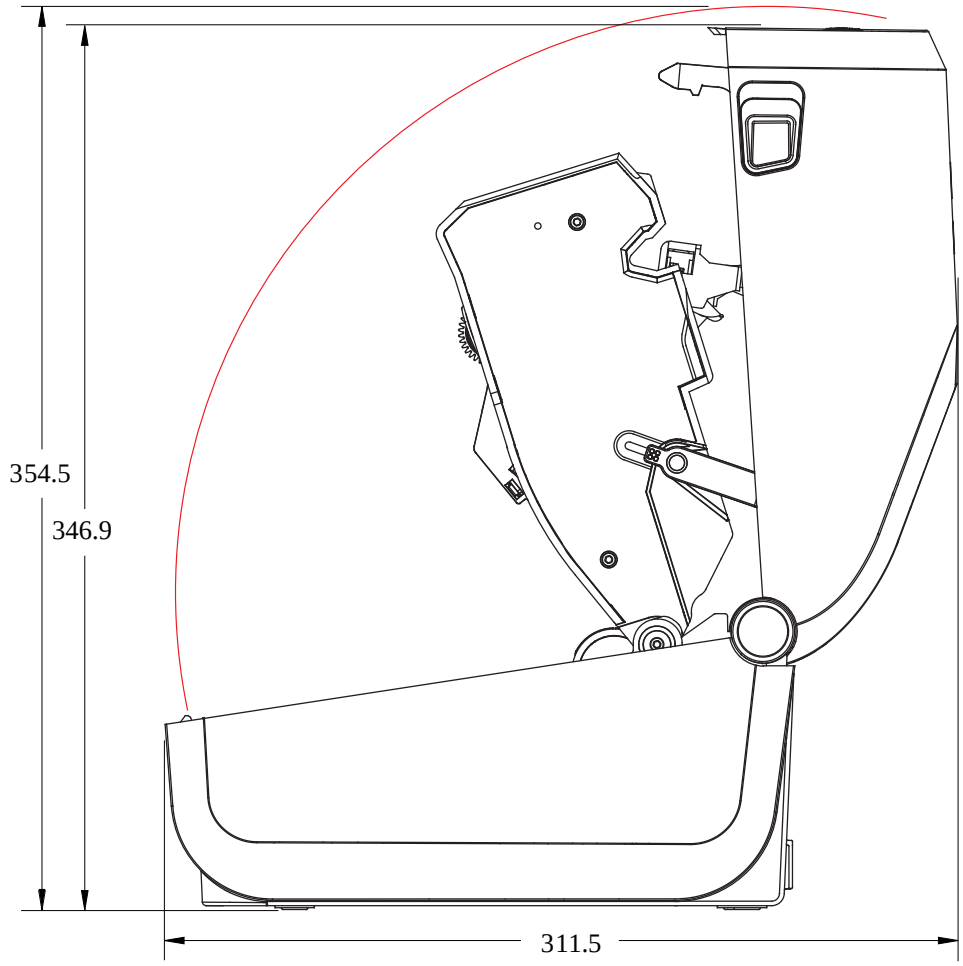
All dimensions are in millimeters.

Figure 28 ZD421C (Ribbon Cartridge Thermal Transfer) Printer Models – Dimensions of the Standard Printer



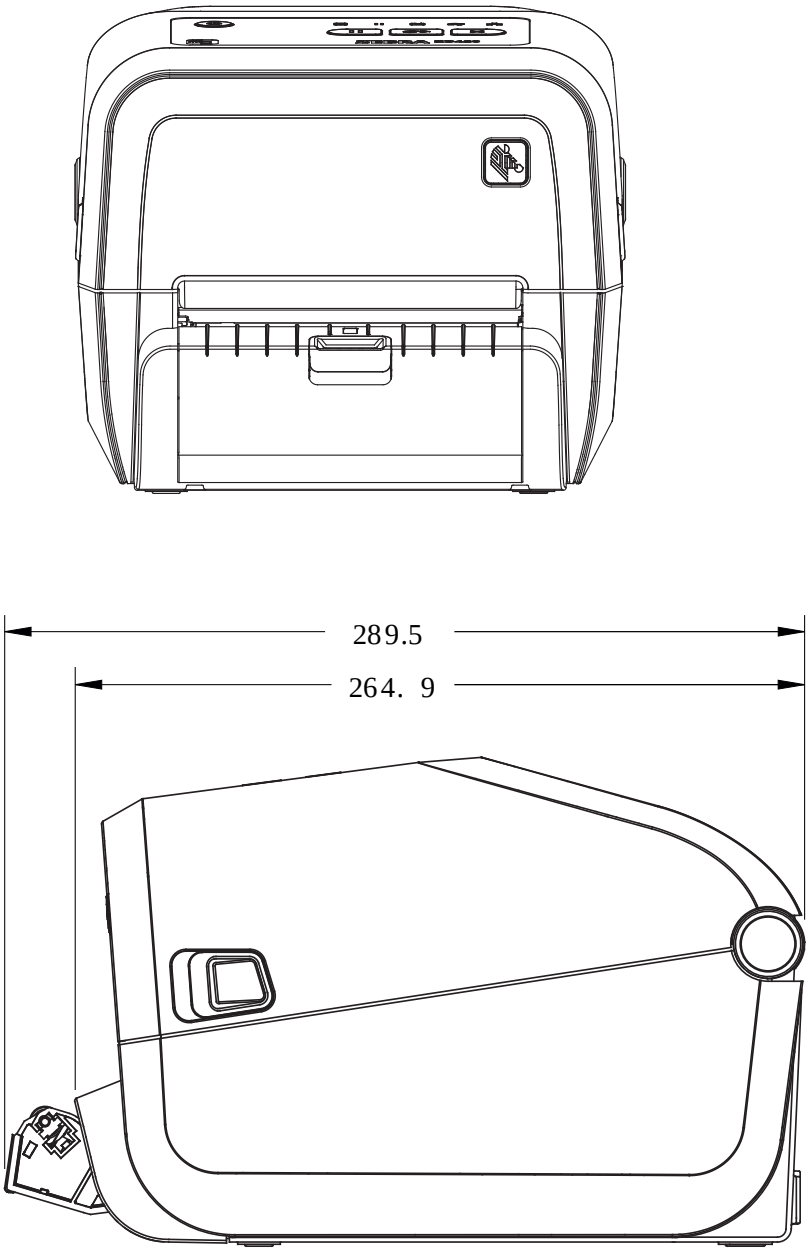
All dimensions are in millimeters.

Figure 29 ZD421C (Ribbon Cartridge Thermal Transfer) Printer Models – Dimensions of the Standard Printer with Cover Open



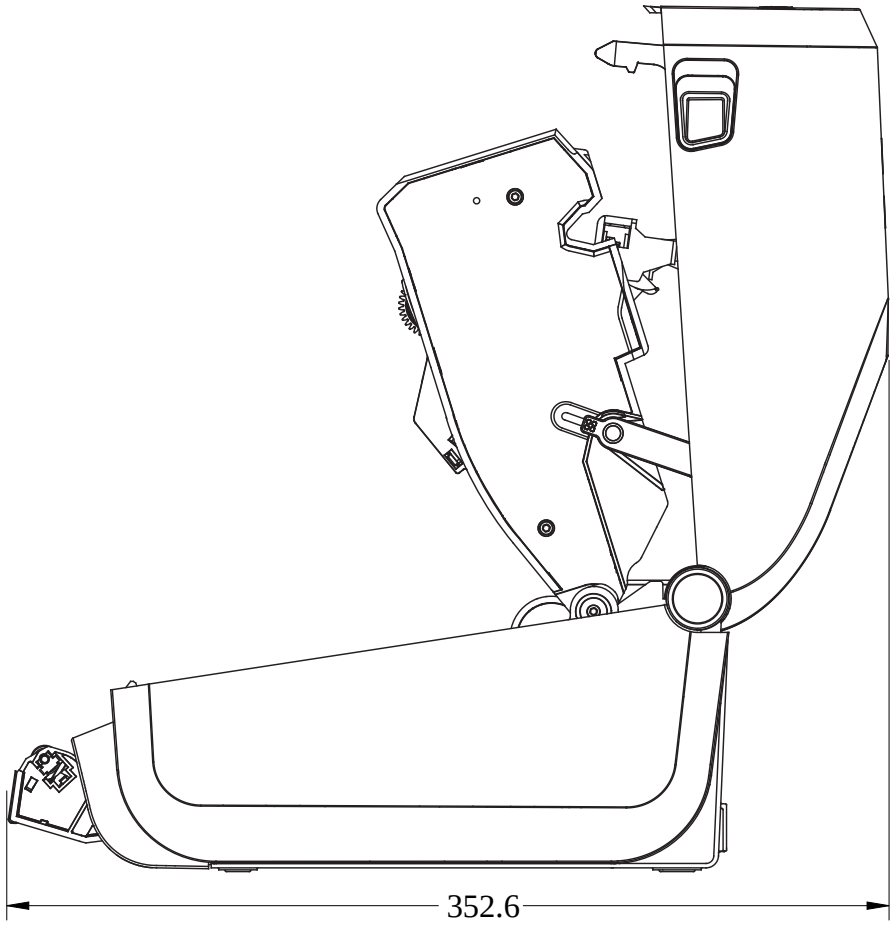
All dimensions are in millimeters.

Figure 30 ZD421C (Ribbon Cartridge Thermal Transfer) Printer Models – Dimensions of the Printer with the Label Dispenser Option Installed



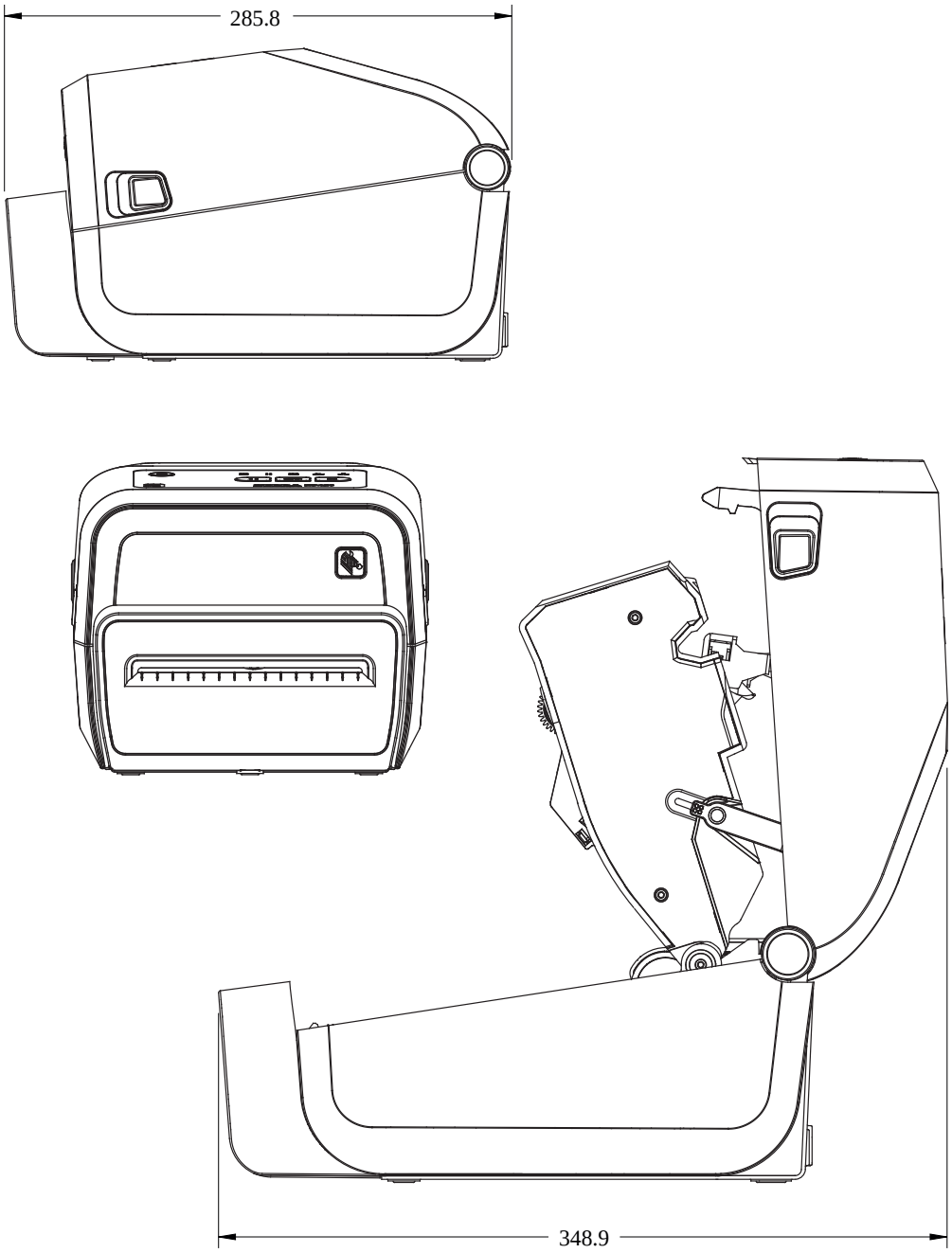
All dimensions are in millimeters.

Figure 31 ZD421C (Ribbon Cartridge Thermal Transfer) Printer Models – Dimensions of the Printer with the Label Dispenser Option Installed and Cover Open



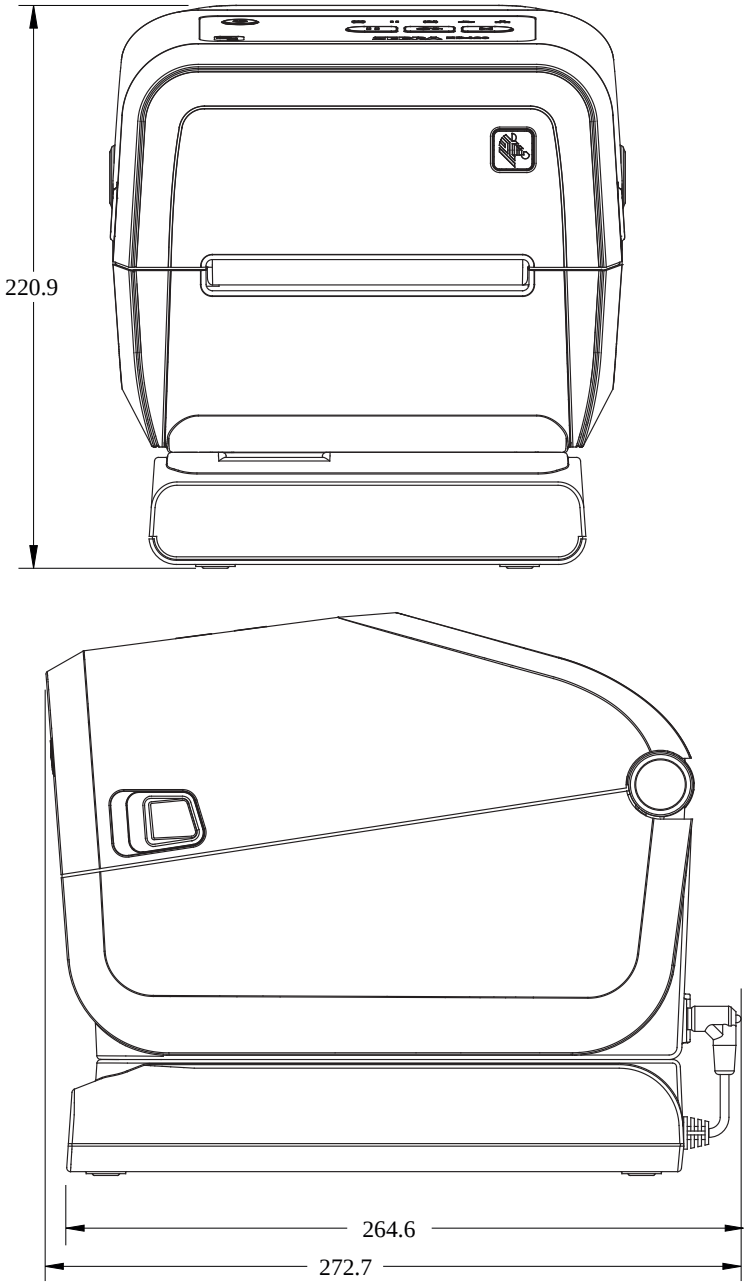
All dimensions are in millimeters.

Figure 32 ZD421C (Ribbon Cartridge Thermal Transfer) Printer Models – Dimensions of the Printer with the Cutter Option Installed



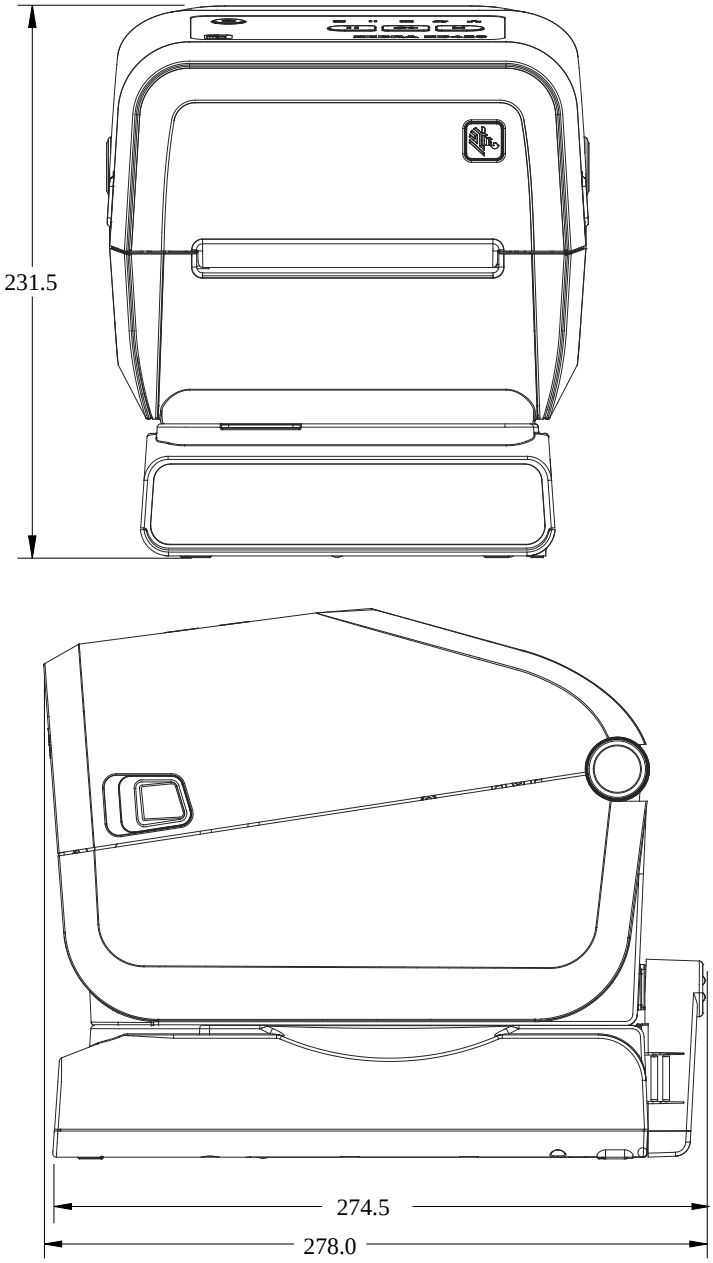
All dimensions are in millimeters.

Figure 33 ZD421C (Ribbon Cartridge Thermal Transfer) Printer Models – Dimensions of the Printer with Attached Power Supply Base



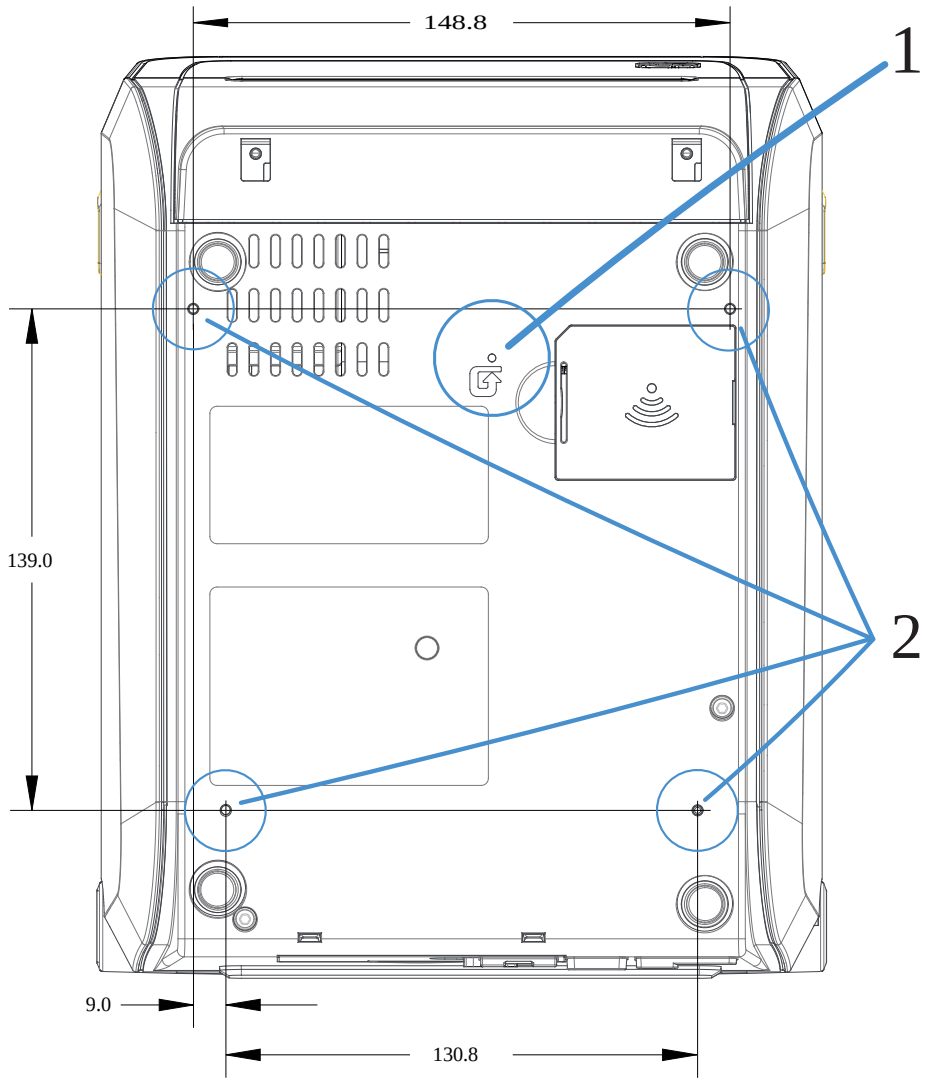
All dimensions are in millimeters.

Figure 34 ZD421C (Ribbon Cartridge Thermal Transfer) Printer Models – Dimensions of the Printer with Attached Power Supply Base and Battery



All dimensions are in millimeters.

Figure 35 ZD421C (Ribbon Cartridge Thermal Transfer) Printer Models – Mounting Screw Locations



1	Hardware Reset Access — Provide a 20-25 mm hole on the mounting plate or surface to retain accessibility after mounting.
2	Mounting screws – Use M3 thread-forming screws that fit the maximum printer base hole depth of 6 mm.

IMPORTANT: Do NOT remove the rubber feet. They are meant to keep the printer from overheating.

Media

This section provides a simple media overview for your printer.

Types of Thermal Media

IMPORTANT: Zebra strongly recommends the use of Zebra-brand supplies in order to ensure consistent high-quality printing. A wide range of paper, polypropylene, polyester, and vinyl stock has been specifically engineered to enhance the printing capabilities of the printer and to prevent premature printhead wear.

To purchase supplies, go to zebra.com/supplies.

Your printer can use various types of media:

- Standard media—Most standard (non-continuous) media uses an adhesive backing that sticks individual labels or a continuous length of labels to a liner.
- Continuous roll media—Most continuous roll media is direct thermal media (similar to fax paper) and is used for receipt or ticket style printing.
- Tag stock—Tags are usually made from a heavy paper (up to 0.19mm or 0.0075 in. thick). Tag stock does not have adhesive or a liner, and it is typically perforated between tags.

Whereas roll media is the most common type of media used, your printer can also use continuous media and fanfold media.

NOTE: The locking printer models can handle only media that is loadable within the printer's media compartment. They are not recommended for fanfold media printing.

Determining Thermal Media Types

Thermal transfer media requires ribbon for printing while direct thermal media does not. To determine if ribbon must be used with a particular media, perform a media scratch test.

To perform a media scratch test, scratch the print surface of the media with a fingernail or pen cap. Press firmly and quickly while dragging it across the media surface.

NOTE: Direct thermal media is chemically treated to print (expose) when heat is applied. This method of testing the media uses friction heat to help identify the media.

Did a black mark appear on the media?

If a black mark...	The media print mode is...
appears...	Direct Thermal. Your printer supports this media. You do NOT have to load ribbon.
does not appear...	Thermal Transfer. A ribbon is required. You will need to load ribbon.

General Media and Print Specifications

The printer has a wide variety of media and print handling variations. The range of basic media support is specified here.

NOTE: For supplies that meet these requirements and are designed to work with your printer, go to zebra.com/supplies.

- Max media width:
  - Direct Thermal printers: 108 mm (4.25 in.)
  - Thermal Transfer ZD621, ZD621R, and ZD421 Cartridge printers: 118 mm (4.65 in.)
  - Thermal Transfer ZD421, ZD421CN printers: 112 mm (4.41 in.)
- Min. Media width for all ZD421 and ZD621 models: 15 mm (0.585 in.)
- Media length:
  - Maximum: 991 mm (39 in.)
  - Minimum for Tear Off and Label options: 6.35 mm (0.25 in.) min. –
  - Minimum for Peel and Cutter options: 12.7 mm (0.50 in.) min. – Peel
- Media thickness:
  - Minimum (all requirements): 0.06 mm (0.0024 in.)
  - Maximum (all requirements): 0.1905 mm (0.0075 in.)
- Media Roll Outer Diameter (O.D.) max. – 127 mm (5.0 in.)
- Media Roll Core Inner Diameter (I.D.):
  - Standard roll configuration:
    - 12.7 mm (0.5 in.) I.D.
    - 25.4 mm (1 in.) I.D.
  - With optional media roll adapter:
    - 38.1 mm (1.5 in.) I.D.
    - 50.8 mm (2.0 in.) I.D.
    - 76.2 mm (3.0 in.) I.D.
- Ribbon Rolls (74 meter)
  - Ribbon length: 74 m (243 ft.)
  - Ribbon width max: 110 mm (4.33 in.)
  - Ribbon width min. (ZD421 Ribbon Cartridge printers): 33 mm (1.3 in.)
  - Ribbon core I.D.: 12.7 mm (0.5 in.)

- Wax, wax/resin, and resin transfer materials

- Ribbon Rolls (300 meter)
  - Ribbon length: 300 m (984 ft.)
  - Ribbon width max.: 110 mm (4.33 in.)
  - Ribbon width min. (ZD421 Ribbon Cartridge printers): 33 mm (1.3 in.)
  - Wax, wax/resin, and resin transfer materials

  IMPORTANT: Transfer ribbon should always cover the entire width of the media (and liner) to prevent damaging the printhead.

- ZD421C Ribbon Cartridges
  - Ribbon Length: 74 m (243 ft.)
  - Ribbon width max. – 110 mm (4.33 in.)
  - Ribbon width min.: 33 mm (1.3 in.)
  - Colors available in black: Wax, wax resin, and resin transfer materials

- Dot pitch:
  - 203 dpi: 0.125mm (0.0049 in.)
  - 300 dpi: 0.085mm (0.0033 in.)

- Barcode modulus x-dim:
  - 203 dpi: 0.005 – 0.050 in.
  - 300 dpi: 0.00327 – 0.03267 in.

Label Dispenser (Peeler)

The printer supports a field-installed label dispense option with a label-taken sensor for batch processing labels.

- Paper Thickness:
  - Min.: 0.06 mm (0.0024 in.)
  - Max.: 0.1905 mm (0.0075 in.)

- Media Width:
  - Min.: 15 mm (0.585 in.)
  - Max. for Direct Thermal printers: 108 mm (4.25 in.)
  - Max for Thermal Transfer ZD621, ZD621R, and ZD421 Cartridge printers: 118 mm (4.65 in.)
  - Max. for Thermal Transfer ZD421 and ZD421CN printers: 112 mm (4.41 in.)

- Label Length:
  - Max. for all printers (theoretical): 990 mm (39 in.)
  - Max. for Direct Thermal printers (tested): 330 mm (13 in.).
  - Max. for Thermal Transfer printers (tested): 279.4 mm (11 in.)
  - All Printers Min.: 12.7 mm (0.5 in.)

Standard (Media) Cutter

The printer supports a field-installed media cutter option for full-width cutting of label liner, tag or receipt media.

- Medium-duty cutter for cutting label liner and light tag media (LINER/TAG).

IMPORTANT: Do NOT use the cutter to cut through labels, adhesive, or embedded circuitry.

- Paper Thickness:
  - Min.: 0.06 mm (0.0024 in.)
  - Max.: 0.1905 mm (0.0075 in.)
- Cut Width:
  - Min.: 15 mm (0.585 in.)
  - Max. for Direct Thermal printers: 109 mm (4.29 in.)
  - Max. for Thermal Transfer ZD621, ZD621R, and ZD421 Cartridge printers: 118 mm (4.65 in.)
  - Max. for Thermal Transfer ZD421 and ZD421CN printers: 118 mm (4.65 in.)
- Min. distance between cuts (label length): 25.4 mm (1 in.).

IMPORTANT: Cutting shorter media lengths between the cuts may cause the cutter to jam or show error conditions.

NOTE: By design, the cutter is self-cleaning. The internal cutter mechanism does NOT require preventive maintenance.

Linerless (Media) Cutter – Direct Thermal only

The printer supports a field-installed media cutter option for full-width cutting of linerless media.

- A full width linerless media cutter (LINERLESS CUT).
- Paper thickness:
  - Min.: 0.06 mm (0.0024 in.)
  - Max.: 0.1905 mm (0.0075 in.)
- Cut width:
  - Min.: 15 mm (0.585 in.)
  - Max.: 109 mm (4.29 in.)

IMPORTANT: Cutting shorter media lengths between the cuts may cause the cutter to jam and show error conditions.

- Minimum distance between cuts (label length): 25.4 mm (1 in.).

NOTE: By design, the cutter is self-cleaning. The internal cutter mechanism does NOT require preventive maintenance. See Recommended Cleaning Schedule on page 236 and the following media path cleaning procedures in the Maintenance section of this guide to maintain optimal operation of the cutter.

ZPL Configuration

This section provides an overview of managing printer configuration, the Configuring Status Report, and Printer and Memory Printouts.

Managing the ZPL Printer Configuration

The ZPL printer is designed to allow you to change printer settings dynamically for fast first label out printing. Printer parameters that are persistent will be retained for future formats to use. Those settings will remain in effect until they are changed by subsequent commands, the printer is reset, power is cycled, or when you restore a parameter that has a factory default by resetting the printer to its factory defaults.

The ZPL Configuration Update command ^JU saves and restores printer configurations to initialize (or re-initialize) the printer with pre-configured settings.

- To keep settings after a power cycle or printer reset, a ^JUS can be sent to the printer to save all current persistent settings.
- The values are recalled with a ^JUR command to restore the last saved values to the printer.

ZPL stores all parameters at once with a single command mentioned above. The legacy EPL programming language (supported by this printer) changes and saves individual commands immediately. Most printer settings are shared between ZPL and EPL. For example, changing the speed setting with EPL will also change the speed set for ZPL operations. The changed EPL setting will persist even after a power cycle or reset issued by either printer language.

You can print a printer configuration report to determine the printer settings. It lists operating parameters, sensor settings and printer status. For instructions on printing the report, see Printing the Printer and Network Configuration Reports (CANCEL Self Test) on page 288. You can also use the Zebra Setup Utilities and the ZebraDesigner Windows driver to print this report and other printer reports to help you manage your printer.

ZPL Printer Configuration Format and Reusable Files

To set up and manage multiple printers that need the same configuration, create a printer configuration programming file to download to all of them. The other option is to use ZebraNet Bridge to clone many printers with the same file that you used to configure one printer.

For information on creating a programming file to send to one or more printers, see the ZPL programmer's guide and the Configuration Setting to Command Cross-reference on page 336. You can use Windows Notepad as the text editor to create programming files and Zebra Setup Utilities to send these files to the printer(s).

The figure below shows the basic recommended structure for a ZPL programming configuration file. This simple format makes the file reusable.

Figure 36 Configuration Parameter Format Structure

^XA — Start Format Command

Format Commands are order sensitive
a) General Print and command settings
b) Media handling and behaviors
c) Media print size
^ JUS command to save

^XZ — End Format Command

Configuration Setting to Command Cross-reference

The printer configuration report provides a listing of a majority of the printer configurations settings that can be set using ZPL commands.

Use the printer configuration report to understand the settings that influence printer behaviors and the majority of the configuration settings that can be set using ZPL or SGD commands.

Some of the sensor values in the middle of the report are used primarily used for service purposes.

NOTE: The label shown is a sample label. Your printer model's label may vary.

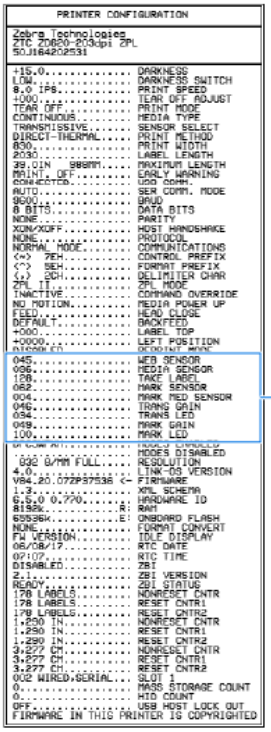


Table 14 ZPL Commands and Configuration Report Callout Cross-Reference

Command	Listing Name	Default (or description)
^SD	DARKNESS	10.0
—	DARKNESS SWITCH	LOW (Default), MEDIUM, or HIGH
^PR	PRINT SPEED	• 152 mm/s / 6 ips (max.): 203 dpi • 102 mm/s / 4 IPS (max.):300 dpi
^TA	TEAR OFF	+000
^MN	MEDIA TYPE	GAP/NOTCH
	SENSOR SELECT	AUTO (^MNA - Auto-Detect)
^MT	PRINT METHOD	THERMAL-TRANS or DIRECT-THERMAL
^PW	PRINT WIDTH	448 (dots for 203 dpi) or 640 (dots for 300 dpi)
^LL	LABEL LENGTH	1225 (dots) (dynamically updated while printing)
^ML	MAXIMUM LENGTH	989 mm (39.0 in.)
—	USB COMM.	Connection Status: Connected / Not Connected
^SCa	BAUD	9600
^SC,b	DATA BITS	8 BITS
^SC,,c	PARITY	NONE
^SC,,,,e	HOST HANDSHAKE	AUTO
^SC,,,,,f	PROTOCOL	NONE
— SGD —**	COMMUNICATIONS	NORMAL MODE
	SER COMM. MODE	AUTO (default)
^CT / ~CT	CONTROL CHAR	<~> 7EH
^CC / ~CC	COMMAND CHAR	<^> 5EH
^CD / ~CD	DELIM./CHAR	<,> 2CH
^SZ	ZPL MODE	ZPL II
— SGD —	COMMAND OVERRIDE **NOTE:** Not supported with a ZPL command. Uses the Set-Get-Do command listed in the ZPL manual. (See `device.command_override.xxxxx` in the ZPL Programming Guide.)	INACTIVE
^MFa	MEDIA POWER UP	NO MOTION

Table 14 ZPL Commands and Configuration Report Callout Cross-Reference (Continued)

Command	Listing Name	Default (or description)
^MF,b	HEAD CLOSE	FEED
~JS	BACKFEED	DEFAULT
^LT	LABEL TOP	+000
^^LS	LEFT POSITION	+0000
~JD / ~JE	HEXDUMP	NO (~JE)
	REPRINT MODE	DISABLED

From this point in the printer configuration report, listed are the sensor settings and values you can use to troubleshoot sensor and media operations. These are typically used by Zebra Technical Support to diagnose printer problems.

The configuration settings listed here are listed on the Printer Configuration Report after the TAKE LABEL sensor value. This listing includes commands that are:

- used to generate status information, or
- relate to printer features whose settings are seldom changed from their defaults.

Table 15 ZPL Commands and Configuration Report Callout Cross-Reference

Command	Listing Name	Description
^MP	MODES ENABLED	Default: CWF (See ^MP Command)
	MODES DISABLED	(No default set)
^JM	RESOLUTION	Default: 448 8/mm (203 dpi); 640 8/mm (300 dpi)
—	FIRMWARE	Lists ZPL Firmware Version
—	XML SCHEMA	1.3
—	HARDWARE ID	Lists Firmware Boot-block Version
	LINK-OS VERSION	
—	CONFIGURATION	CUSTOMIZED (after first use)
—	RAM	2104k..... R:
—	ONBOARD FLASH	6144k.....E:
^MU	FORMAT CONVERT	NONE
—	RTC DATE	Date Displayed
—	RTC TIME	Time Displayed
^JI / ~JI	ZBI	DISABLED (requires key to enable)
—	ZBI VERSION	2.1 (displayed if installed)
—	ZBI STATUS	READY

Table 15 ZPL Commands and Configuration Report Callout Cross-Reference (Continued)

Command	Listing Name	Description
^JH ^MA ~R0	LAST CLEANED	X,XXX IN
	HEAD USAGE	X,XXX IN
	TOTAL USAGE	X,XXX IN
	RESET CNTR1	X,XXX IN
	RESET CNTR2	X,XXX IN
	NONRESET CNTR0 (1, 2)	X,XXX IN
	RESET CNTR1	X,XXX IN
	RESET CNTR2	X,XXX IN
	SLOT1	EMPTY / SERIAL / WIRED
	MASS STORAGE COUNT	0
	HID COUNT	0
	USB HOST LOCK OUT	OFF / ON
—	SERIAL NUMBER	XXXXXXXXXXX
^JH	EARLY WARNING	MAINT. OFF

The printer can set a command or a group of commands at one (1) time for all receipts or labels that follow. Those settings remain in effect until:

- they are changed by subsequent commands
- the printer is reset, or
- you restore the printer to its factory defaults.

Printer Memory Management and Related Status Reports

The printer has various memory resources and storage for building and printing.

To help you manage printer resources, the printer supports a variety of format commands. You can use these commands to manage memory, transfer objects (between memory areas and import / export files), name object nams, test printer functions, and generate printer operating status reports. They are very similar to the old DOS commands such as DIR (directory listing) and DEL (delete file). The most common reports are also part of the Zebra Setup Utility and ZebraDesigner Windows driver.

It is recommended that a single command be processed within this type of format (form). A single command is easily reused as a maintenance and development tool.

Table 16 Printer Management and Format Program Structure

Command	Description
^XA	Start Format Command
Put your commands here	Use a single command to manage the printer, test functions, and reports.

Table 16 Printer Management and Format Program Structure (Continued)

Command	Description
^XZ	End Format Command

Many of the commands that transfer objects, manage, and report on memory are Control (~) commands. They do not need the be within a format (form). They will be processed immediately upon receipt by the printer whether in a format (form) or not.

ZPL Programming for Memory Management

PL has various printer memory locations that are used to run the printer, assemble the print image, and store formats (forms), graphics, fonts, and configuration settings.

The printer file-naming requirements as as follows:

- ZPL treats formats (forms), fonts, and graphics like files; and memory locations like disk drives in the DOS operating system environment:
  - Memory Object Naming: Up to 16 alphanumeric characters followed by a three alphanumeric character file extension, for example, 123456789ABCDEF.TTF.
  - Legacy ZPL printers with v60.13 firmware and earlier can only use the 8.3 filename format versus today's 16.3 filename format.
- Allows moving of objects between memory locations and deleting objects.
- Supports DOS-directory-style file list reports as printouts or status to the host.
- Allows use of wildcards (*) when accessing files.

Table 17 Object Management and Status Report Commands

Command	Name	Description
^WD	Print Directory Label	Prints a list of objects and resident barcodes and fonts in all addressable memory locations.
~WC	Print Configuration Report	Prints a configuration report report.
^ID	Object Delete	Deletes objects from printer memory.
^TO	Transfer Object	Used to copy an object or group of objects from one memory area to another.
^CM	Change Memory Letter Designation	Reassigns a letter designation to a printer memory area.
^JB	Initialize Flash memory	Similar to formatting a disk. Erases all objects from the specified memory locations B: or E:.
~JB	Reset Optional Memory	Similar to formatting a disk. Erases all objects from the B: memory (factory option).
~DY	Download Objects	Downloads and installs a variety of printer-usable programming objects: fonts (OpenType and TrueType), graphics, and other object data types. You can use ZebraNet Bridge to download graphics and fonts to the printer.

Table 17 Object Management and Status Report Commands (Continued)

Command	Name	Description
~DG	Download Graphic	Downloads an ASCII Hex representation of a graphic image. This is used by ZebraDesigner (label creation application) for graphics.
^FL	Font Linking	Appends secondary TrueType font or fonts to the primary TrueType font to add glyphs (characters).
^LF	List Font Links	Prints a list of the linked fonts.
^CW	Font Identifier	Assigns a single alphanumeric character as an alias to a font stored in memory.

IMPORTANT: Some ZPL fonts that are factory-installed in your printer cannot be copied, cloned, or restored to the printer by reloading or updating firmware. If these license-restricted ZPL fonts are removed using an explicit ZPL object delete command, they must be repurchased and reinstalled using a font activation and installation utility. EPL fonts do not have this restriction.

Glossary

alphanumeric

Indicating letters, numerals, and characters such as punctuation marks.

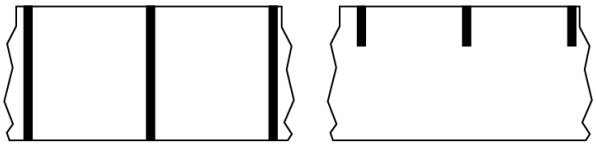
backfeed

When the printer pulls the media and ribbon (if used) backward into the printer so that the beginning of the label to be printed is properly positioned behind the printhead. Backfeed occurs when operating the printer in Tear-Off and Applicator modes.

barcode

A code by which alphanumeric characters can be represented by a series of adjacent stripes of different widths. Many different code schemes exist, such as the universal product code (UPC) or Code 39.

black mark media



Media with registration marks found on the underside of the print media that act as start-of-label indications for the printer. The reflective media sensor is the generally-selected option for use with black mark media.

Contrast this with continuous media on page 343 or gap/notch media on page 345.

calibration (of a printer)

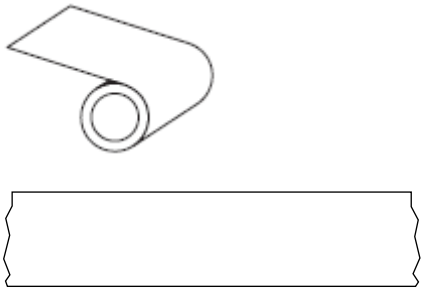
collection method

Select a media collection method that is compatible with your printer options. Selections include tear-off, peel-off, cutter, and rewind. The basic media and ribbon loading instructions are the same for all collection methods with some additional steps necessary for using any media collection options.

configuration

The printer configuration is a group of operating parameters specific to the printer application. Some parameters are user selectable, while others are dependent on the installed options and mode of operation. Parameters may be switch selectable, control panel programmable, or downloaded as ZPL II commands. A configuration label listing all the current printer parameters may be printed for reference.

continuous media



A transmissive (gap) sensor is typically used for the printer to detect when the media runs out.

Contrast this with black mark media on page 342 or gap/notch media on page 345.

core diameter

The inside diameter of the cardboard core at the center of a roll of media or ribbon.

diagnostics

Information about which printer functions are not working that is used for troubleshooting printer problems.

die-cut media

A type of label stock that has individual labels stuck to a media liner. The labels may be lined up against each other or separated by a small distance. Typically the material surrounding the labels has been removed. (See non-continuous media on page 347.)

direct thermal

A printing method in which the printhead presses directly against the media. Heating the printhead elements causes a discoloration of the heat-sensitive coating on the media. By selectively heating the

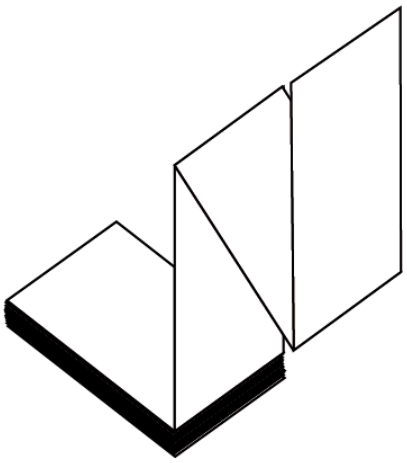
printhead elements as the media moves past, an image is printed onto the media. No ribbon is used with this printing method.

Contrast this with thermal transfer on page 351.

direct thermal media

Media that is coated with a substance that reacts to the application of direct heat from the printhead to produce an image.

fanfold media



Non-continuous media that comes folded in a rectangular stack and folded in a zigzag pattern. Fanfold media is either gap-notch media or black mark media, meaning it uses black marks or notches to track media format positioning.

Fanfold media can have the same label separations as non-continuous roll media. The separations fall either on or near the folds.

Contrast this with roll media on page 350.

firmware

This is the term used to specify the printer's operating program. This program is downloaded to the printer from a host computer and stored in flash memory. Each time the printer power is turned on, this operating program starts. This program controls when to feed the media forward or backward and when to print a dot on the label stock.

FLASH memory

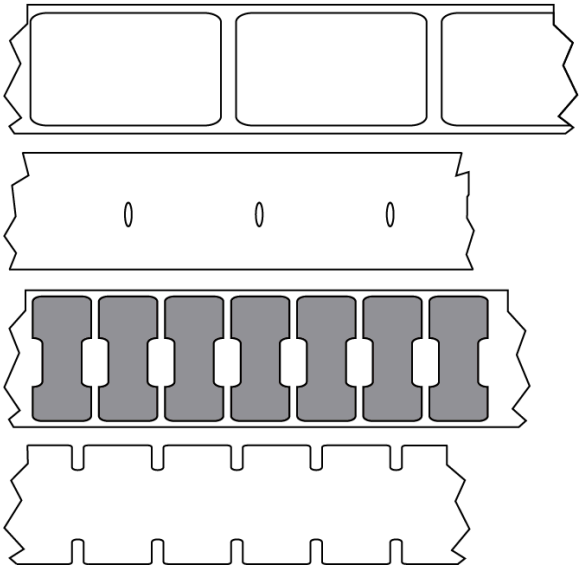
Non-volatile memory that maintains the stored information intact when power is off. This memory area is used to store the printer's operating program. Can also be used to store optional printer fonts, graphic formats, and complete label formats.

font

A complete set of alphanumeric characters in one style of type. Examples include CG Times™, CG Triumvirate Bold Condensed™.

gap/notch media

Media that contains a separation, notch, or hole, indicating where one label/printed format ends and the next begins.



Contrast this with black mark media on page 342 or continuous media on page 343.

ips (inches-per-second)

The speed at which the label or tag is printed. Many Zebra printers can print from 1 ips to 14 ips.

label

An adhesive-backed piece of paper, plastic, or other material on which information is printed. A non-continuous label has a defined length, as opposed to a continuous label or a receipt which can have a varying length.

label backing (liner)

The material on which labels are affixed during manufacture and which is discarded or recycled.

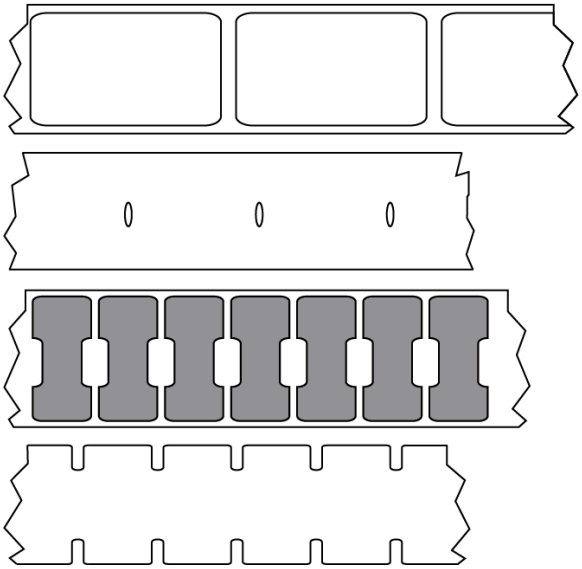
label type

The printer recognizes the following label types.

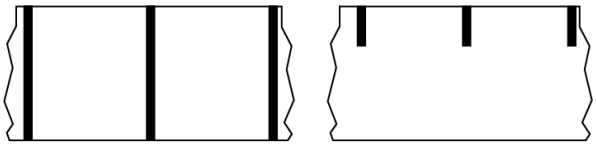
Continuous



Gap/Notch



Mark



void

A space on which printing should have occurred, but did not due to an error condition such as wrinkled ribbon or faulty print elements. A void can cause a printed barcode symbol to be read incorrectly or not at all.

LCD (liquid crystal display)

A backlit display that provides the user with either operating status during normal operation or option menus when configuring the printer to a specific application.

LED (light emitting diode)

Indicators of specific printer status conditions. Each LED is either off, on, or blinking depending on the feature being monitored.

linerless media

Linerless media does not use backing to keep the layers of labels on a roll from sticking to one another. It is wound like a roll of tape, with the sticky side of one layer in contact with the non-sticky surface of the one below it.

Depending on the printer, individual labels may be separated by perforations, or they can be cut apart with a linerless cutter. Because there is no liner, more labels can potentially fit on a roll, cutting down the need to change media as often.

Linerless media is considered an environmentally friendly option because no backing is wasted, and the cost per label can be less than that of standard labels.

Zebra recommends using Zebra ZeroLiner direct thermal linerless media.

mark media

See black mark media on page 342.

media

Material onto which data is printed by the printer. Types of media include: tag stock, die-cut labels, continuous labels (with and without media liner), non-continuous media, fanfold media, and roll media.

media sensor

This sensor is located behind the printhead to detect the presence of media and, for non-continuous media, the position of the web, hole, or notch used to indicate the start of each label.

media supply hangar

The stationary arm that supports the media roll.

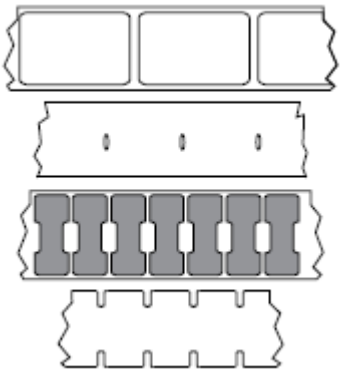
non-continuous media

Media that contains an indication of where one label/printed format ends and the next one begins. Types of non-continuous media include gap-notch media and black mark media. (Contrast this with continuous media.)

Non-continuous roll media usually comes in the form of labels with an adhesive backing on a liner. Tags (or tickets) are separated by perforations.

Individual labels or tags are tracked and position-controlled using one of these methods:

- Web media separates labels by gaps, holes, or notches.



- Black mark media uses pre-printed black marks on the back side of the media to indicate label separations.



- Perforated media has holes—to allow the labels or tags to be separated from each other easily—along with position-control marks, notches, or label gaps.



non-volatile memory

Electronic memory that retains data even when the power to the printer is turned off.

notched media

A type of tag stock containing a cutout area that can be sensed as a start-of-label indicator by the printer. This is typically a heavier, cardboard-like material that is either cut or torn away from the next tag. See gap/notch media on page 345.

peel-off mode

A mode of operation in which the printer peels a printed label away from the backing and allows the user to remove it before another label is printed. Printing pauses until the label is removed.

perforated media



Media with perforations that allow the labels or tags to be separated from each other easily. The media may also have black marks or other separations between labels or tags.

print speed

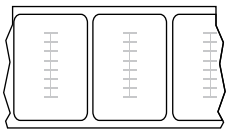
The speed at which printing occurs. For thermal transfer printers, this speed is expressed in terms of inches per second (ips).

print type

The print type specifies whether the type of media being used requires ribbon to print. Thermal transfer media requires ribbon while direct thermal media does not.

printhead wear

Radio frequency identification (RFID) "smart" media



Each RFID label has an RFID transponder (sometimes called an "inlay"), made of a chip and an antenna, embedded between the label and the liner. The shape of the transponder varies by manufacturer and is visible through the label. All "smart" labels have memory that can be read, and many have memory that can be encoded.

RFID media can be used in a printer that is equipped with an RFID reader/encoder. RFID labels are made from the same materials and adhesives as non-RFID labels.

receipt

A receipt is a variable length printout. One example of a receipt is in retail stores, where each purchased item occupies a separate line on the printout. Therefore, the more items purchased, the longer the receipt.

registration

Alignment of printing with respect to the top (vertical) or sides (horizontal) of a label or tag.

ribbon

Ribbon is a thin film that is coated on one side with wax, resin, or wax resin (usually called ink), which is transferred to the media during the thermal transfer process. Ink is transferred onto the media when heated by the small elements within the printhead.

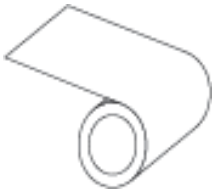
Ribbon is only used with the thermal transfer print method. Direct thermal media does not use ribbon. When ribbon is used, it must be as wide as or wider than the media being used. If the ribbon is narrower than the media, areas of the printhead are unprotected and subject to premature wear. Zebra ribbons have a coating on the back that protects the printhead from wear.

ribbon wrinkle

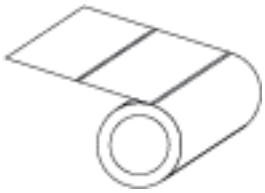
A wrinkling of the ribbon caused by improper alignment or improper printhead pressure. This wrinkle can cause voids in the print and/or the used ribbon to rewind unevenly. This condition should be corrected by performing adjustment procedures.

roll media

Media that comes supplied rolled onto a core (usually cardboard). It can be continuous (no separations between labels)



or non-continuous (some type of separation between labels).



Contrast this with fanfold media on page 344.

supplies

A general term for media and ribbon.

symbology

The term generally used when referring to a barcode.

tag stock

A type of media having no adhesive backing but featuring a hole or notch by which the tag can be hung on something. Tags are usually made of cardboard or other durable material and are typically

perforated between tags. Tag stock can come on rolls or in a fanfold stack. (See gap/notch media on page 345.)

tear-off mode

A mode of operation in which the user tears the label or tag stock away from the remaining media by hand.

thermal transfer

A printing method in which the printhead presses an ink or resin coated ribbon against the media. Heating the printhead elements causes the ink or resin to transfer onto the media. By selectively heating the printhead elements as the media and ribbon move past, an image is printed onto the media.

Contrast this with direct thermal on page 343.