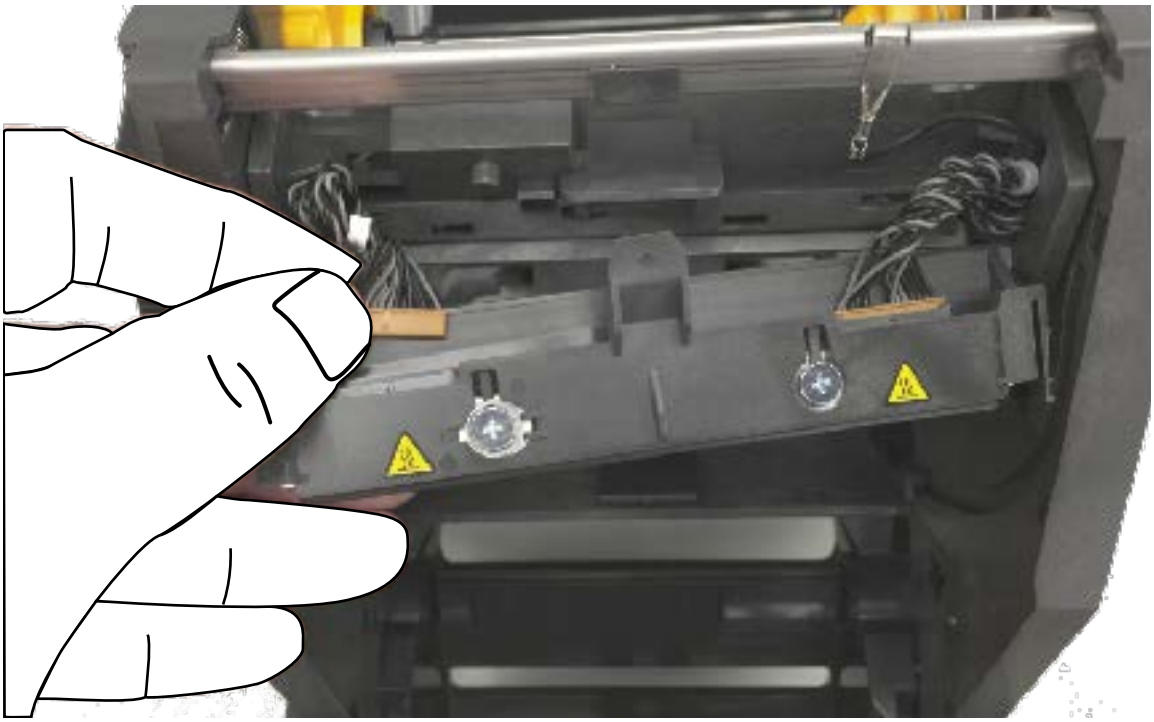
2. To replace the printhead:

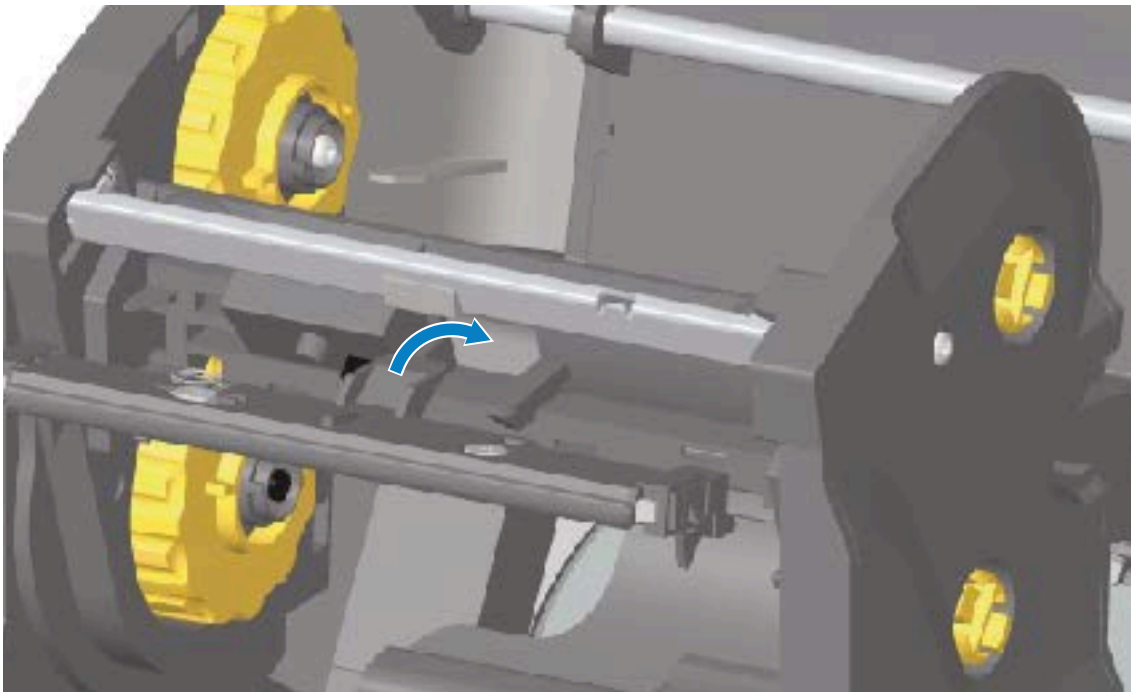
a) Push the right side printhead cable connector into the printhead.

NOTE: The connector is keyed to only insert one way.

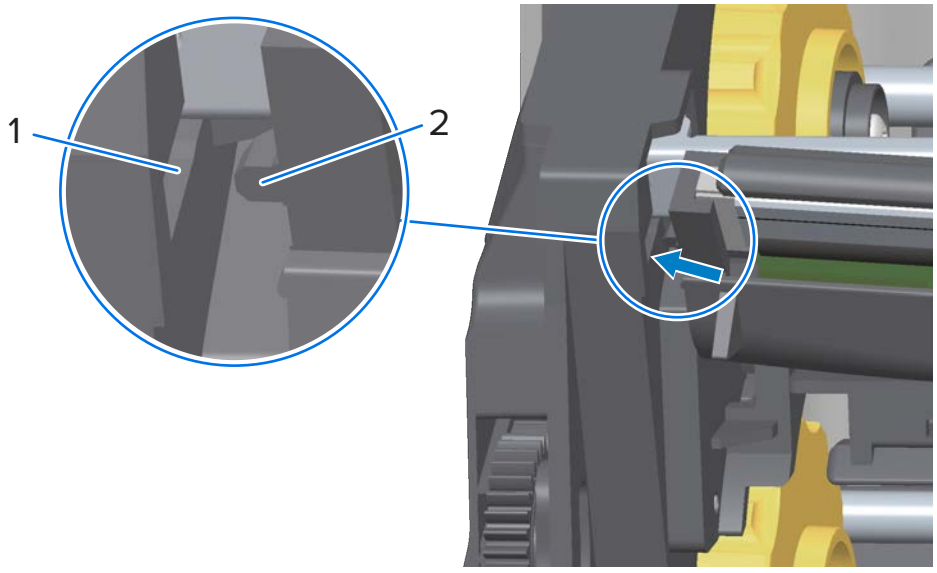
b) Push the left side printhead cable connector onto the printhead.



c) Insert the center tab on the printhead assembly into the center slot on the printhead actuator arm.

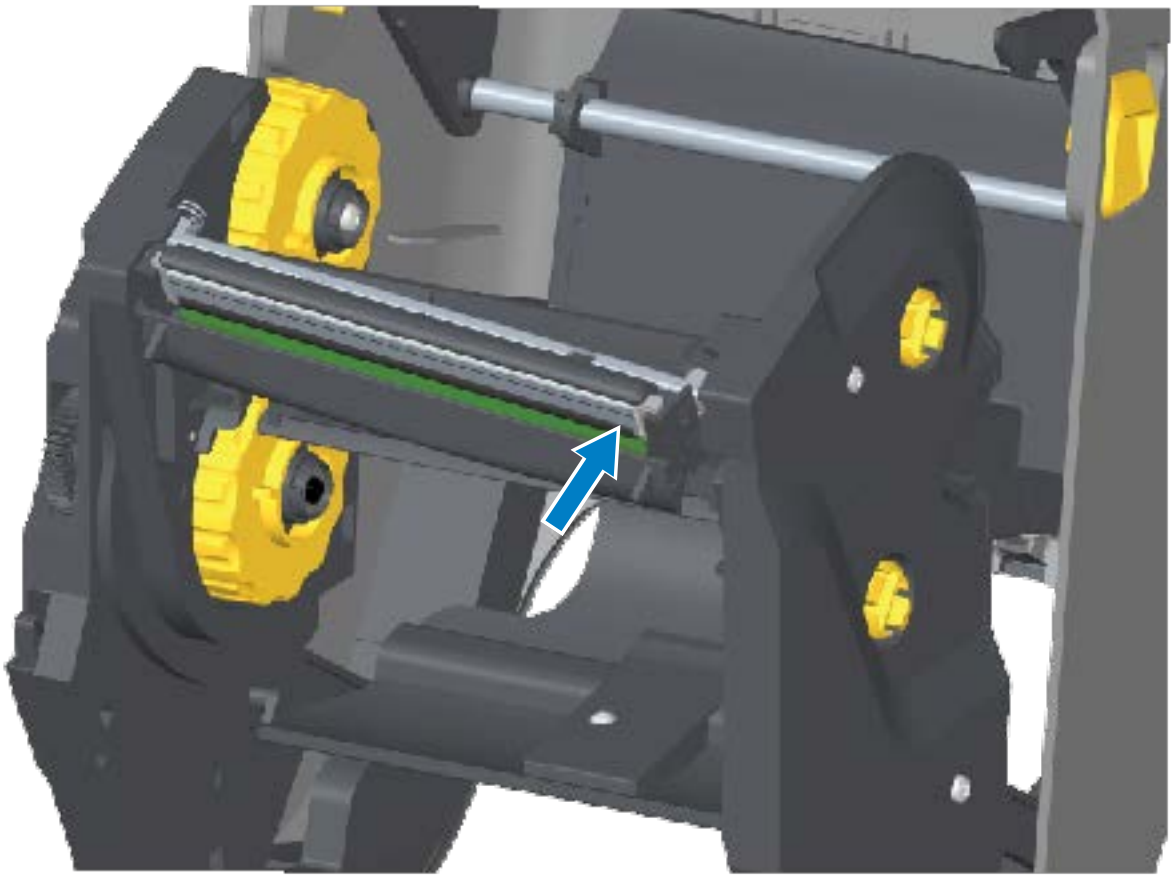


d) Insert the left side tab of the printhead assembly into the recessed slot on the left side of the printhead actuator arm.

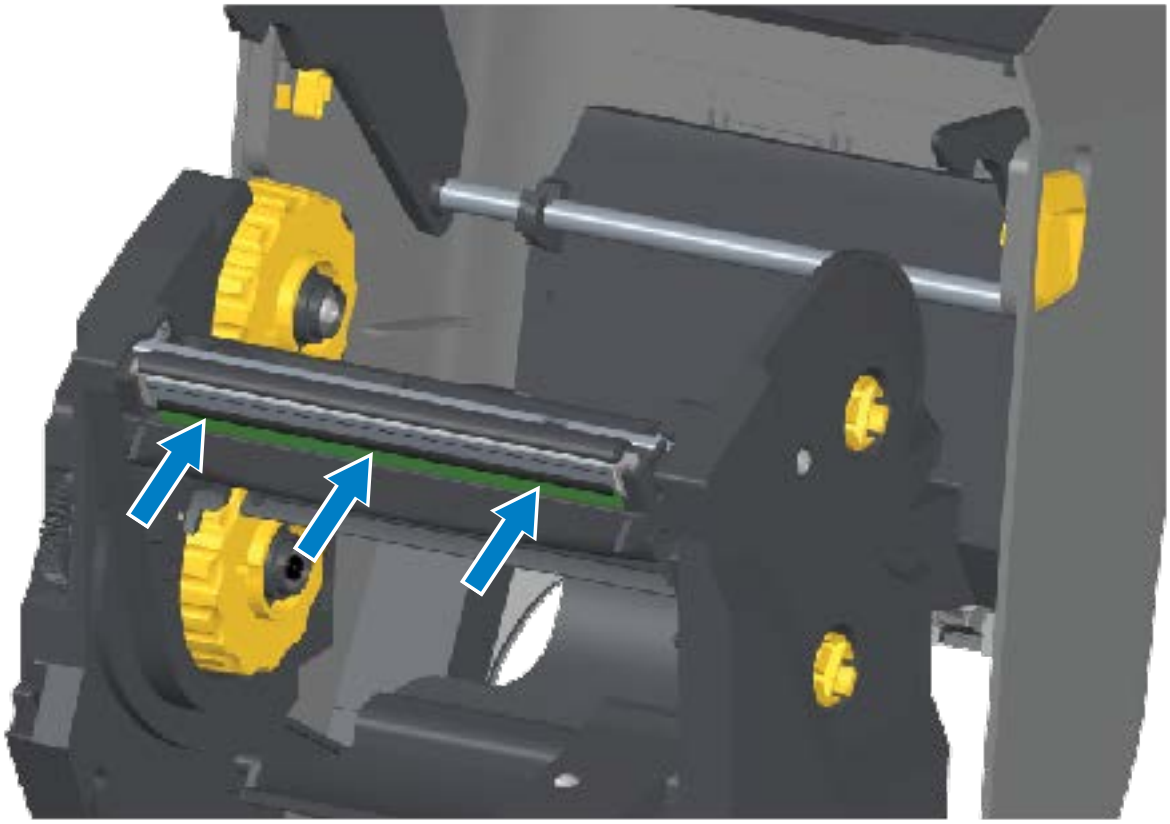


1	Slot
2	Tab

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 272.

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 200.

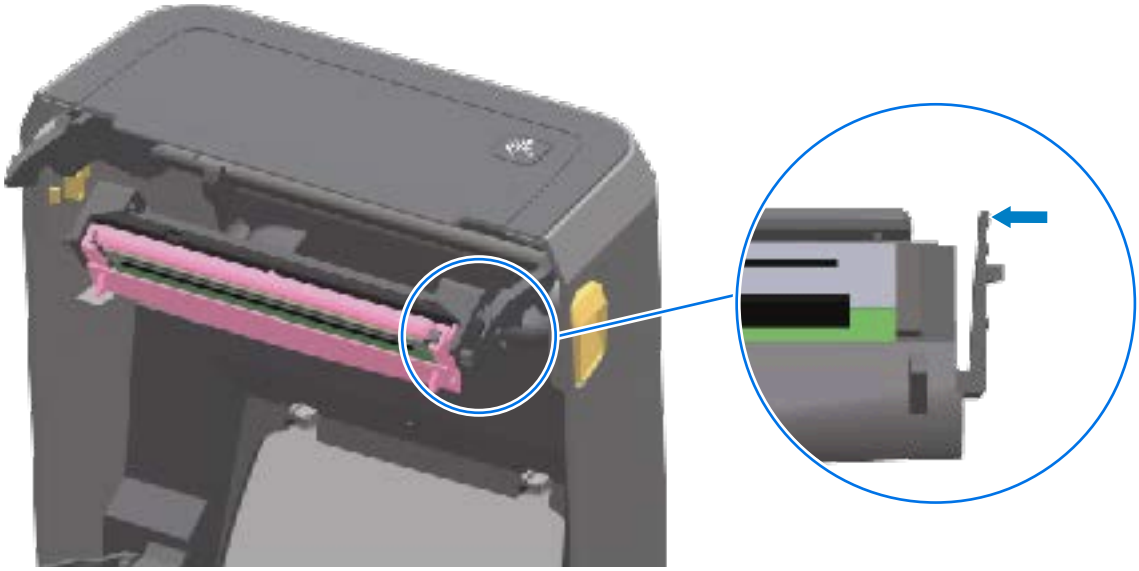
Replacing the Printhead – ZD421 Thermal Transfer Ribbon Cartridge Printer Models

1. To remove the printhead:, follow these steps:

   a) Turn printer power OFF and open the printer.

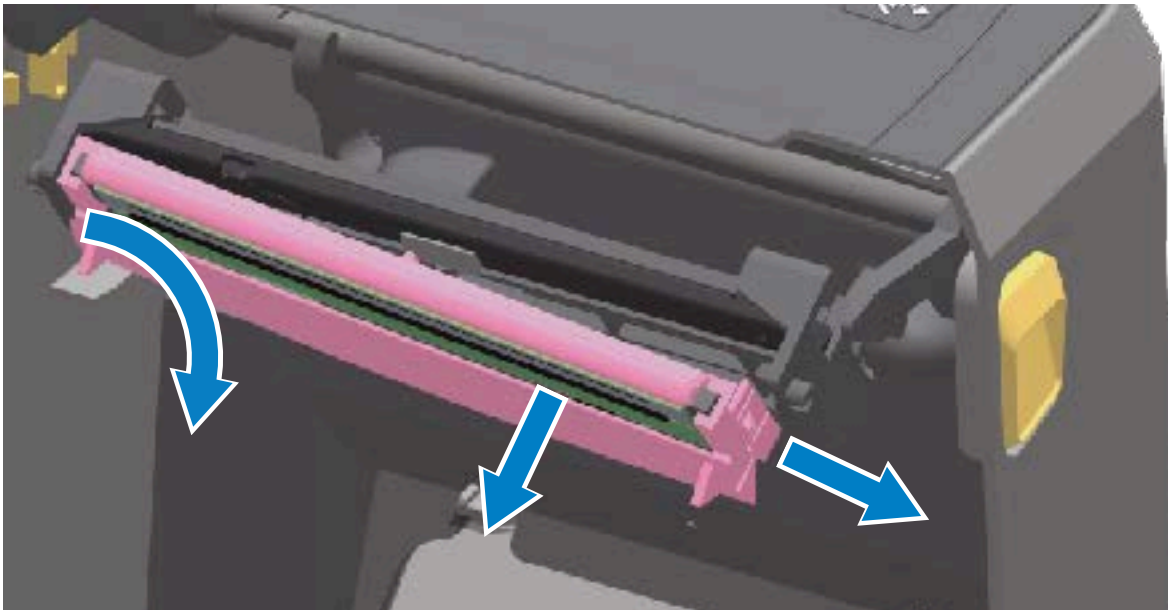
   b) Pull the two release arms out to release the ribbon drive transport. See Accessing the Printhead of the ZD421 Ribbon Cartridge Printer on page 35.

   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).

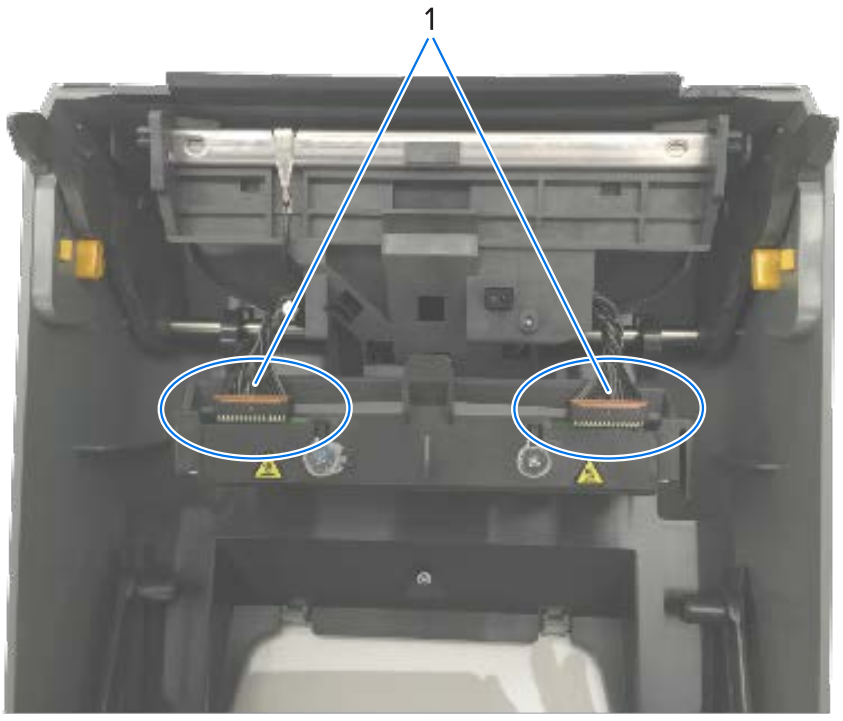


   The right side printhead releases down and away from the printhead actuator arm.

   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.



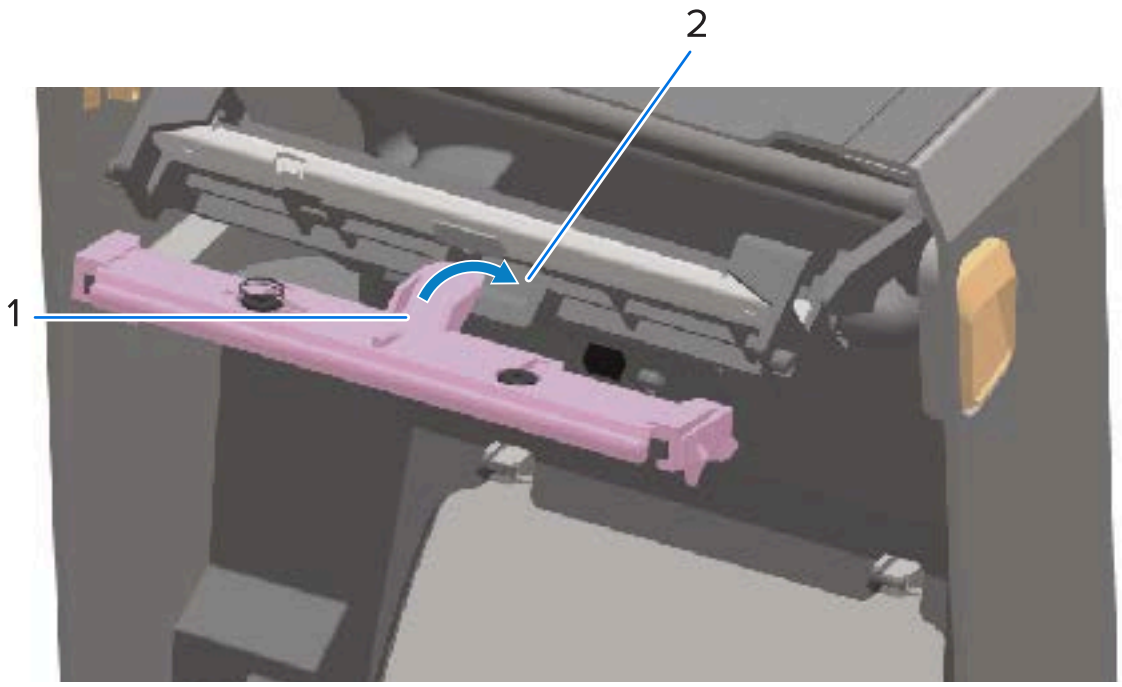
1	Connectors
2	Printhead assembly

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.

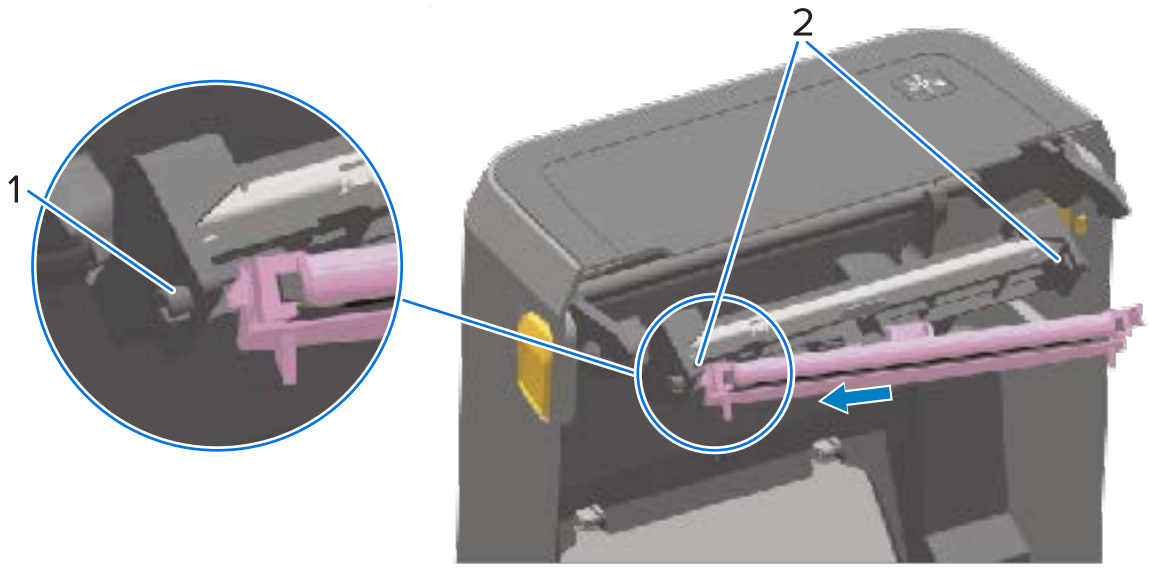
b) Push the left side printhead cable connector onto the printhead.

c) Insert the center tab on the printhead assembly into the center slot on the printhead actuator arm.



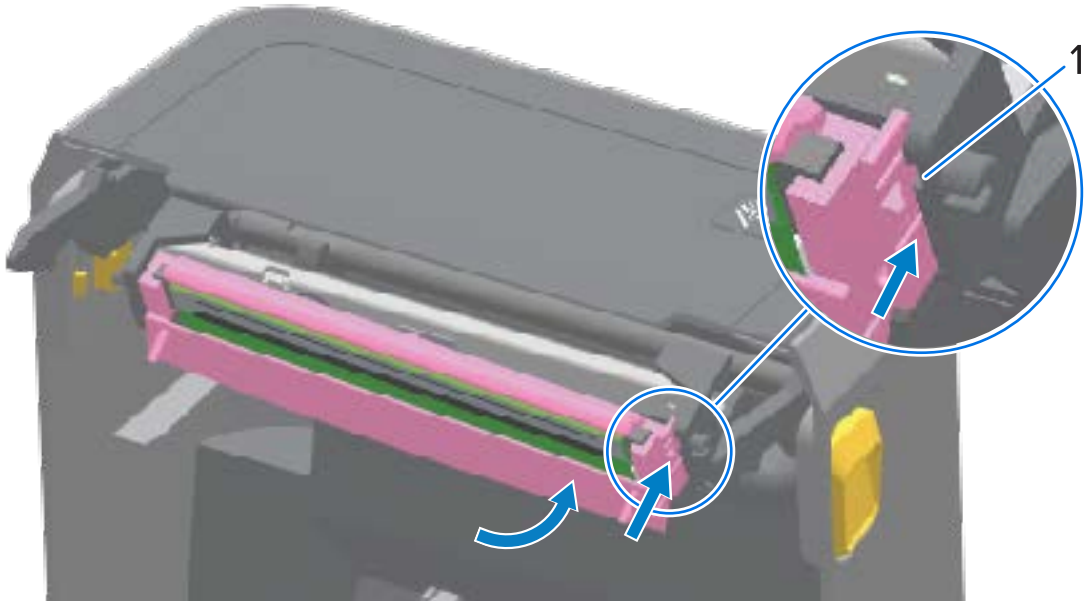
1	Tab
2	Slot

d) Insert the left side tab of the printhead assembly into the recessed slot on the left side of the printhead actuator arm.



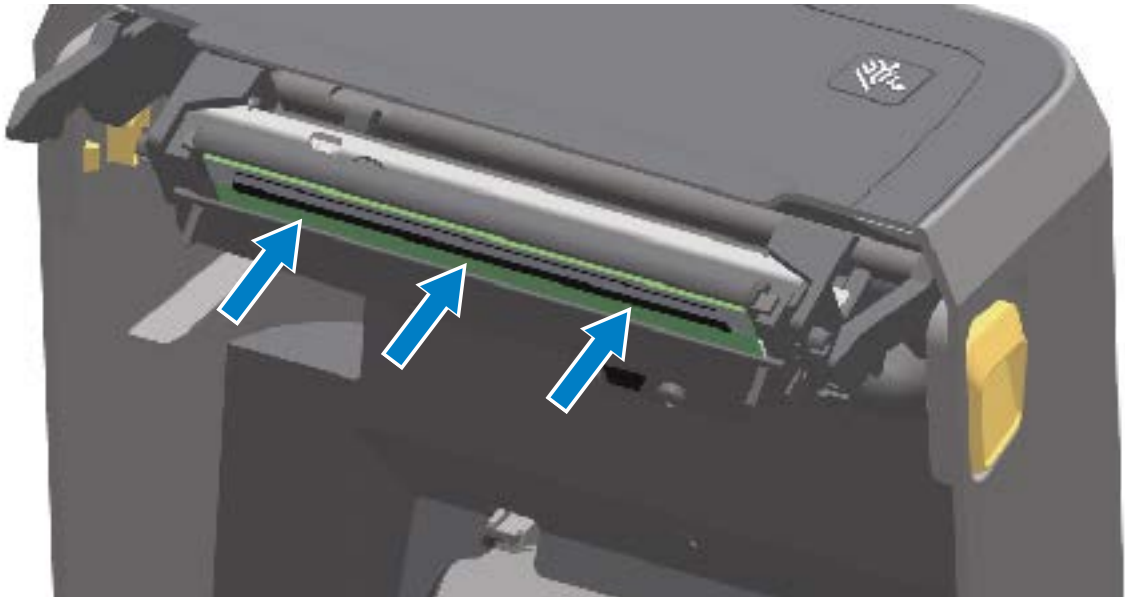
1	Tab
2	Slot – both sides

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 arrows) 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 272.

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 200.

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 in 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

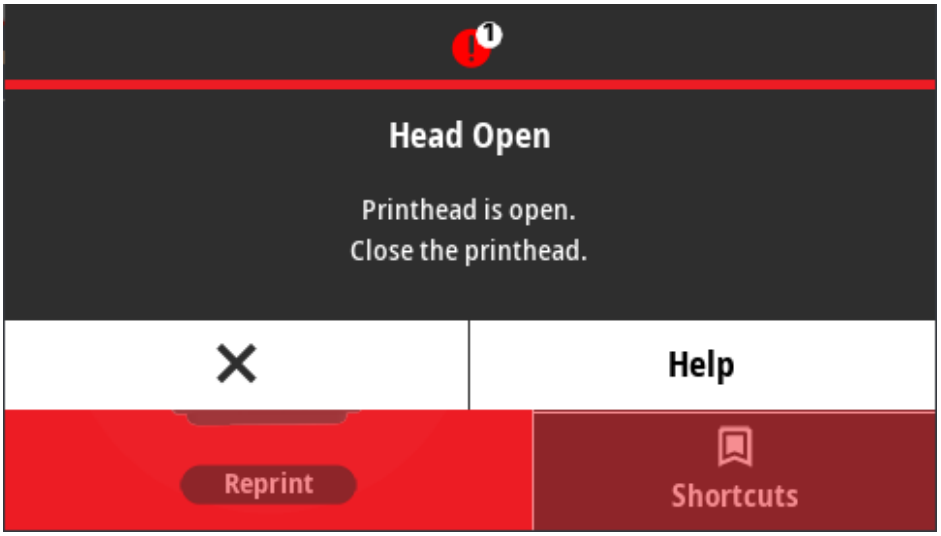
The printer uses alerts to notify you that the printer needs attention.

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:

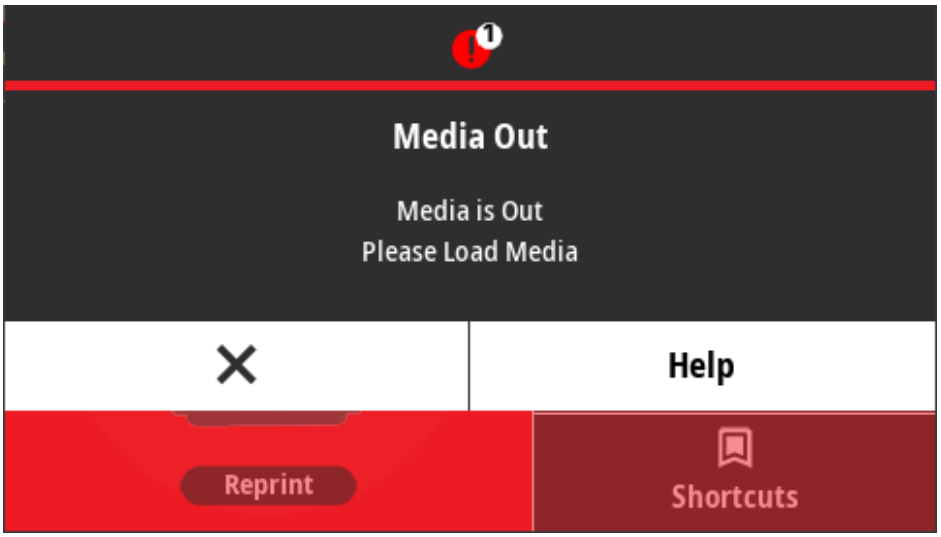
- The cover is open or it has not been closed properly. Close the cover/printhead. Push down on the front top corners of the printer's cover. You should normally hear and feel the cover latches snap in place to lock the cover closed for printing.
- The printer's Head-Open switch needs service. Call a 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 178. 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 201. Replace the empty media roll and continue printing. Do NOT turn printer power OFF. You will lose your print job if you do.
- Misaligned media sensor. Check the position of the media sensor. TThe printer may need to be calibrated for the media after the adjusting the sensor location. See Running a SmartCal Media Calibration on page 199.
- 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 182. The printer may need to be calibrated for the media after the adjusting the sensor location. See Running a SmartCal Media Calibration on page 199.

- The media sensor is dirty. Clean the Upper Web (Gap) Sensor Array and the lower Movable Media sensors. See Cleaning the Sensor on page 281. 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 182, Roll Media Types and Loading on page 178, and Running a SmartCal Media Calibration on page 199.
- 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 310. 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 or require ribbon.

Status indicator alert:

Possible causes and resolutions:

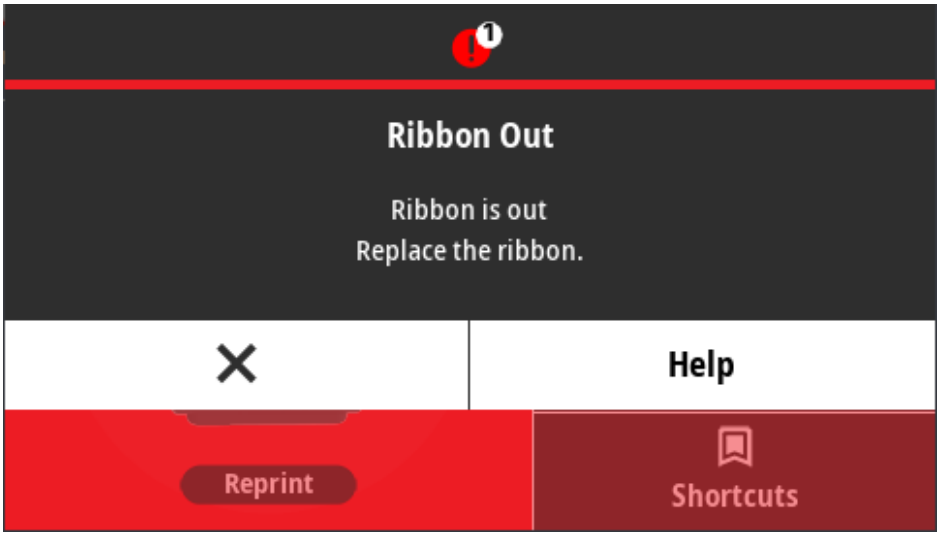
- There is a Ribbon Cartridge in the printer while the printer is set to Direct Thermal mode (and printing on direct thermal media). Remove the ribbon cartridge from the printer without turning the printer OFF. Close the printer. You may need to press **FEED** once or **PAUSE** the get the printer to 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 139.
  - 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 139 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 203.
- For ZD421 Ribbon Cartridge Printers only: A ribbon cartridge needs to 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 198.
- 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 284 for cleaning instructions.
  - Reload the printer's firmware. See Updating Printer Firmware on page 310.
  - If this does not fix this issue, call a service technician.

Alert: Ribbon Low – ZD421 Ribbon Cartridge Printer Only

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.

You can change the ribbon low value if needed using programming commands.

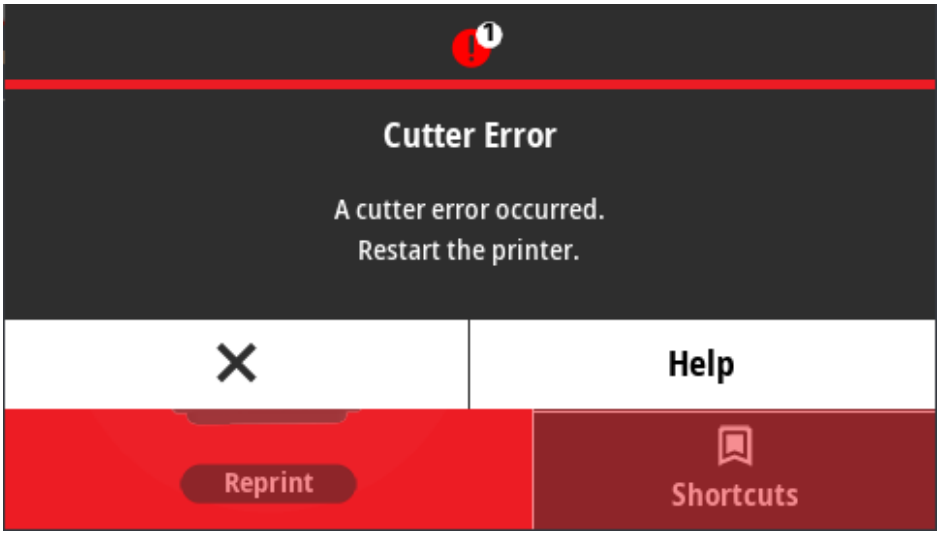
Check for the availability of ribbon cartridges. For information on changing the Ribbon Low warning point, see Ribbon Cartridge Programming Commands on page 251. See also the ZPL Programming Guide for details on printer programming. For links to the Zebra support pages for these and other manuals, see 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 an 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 shutdown 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.

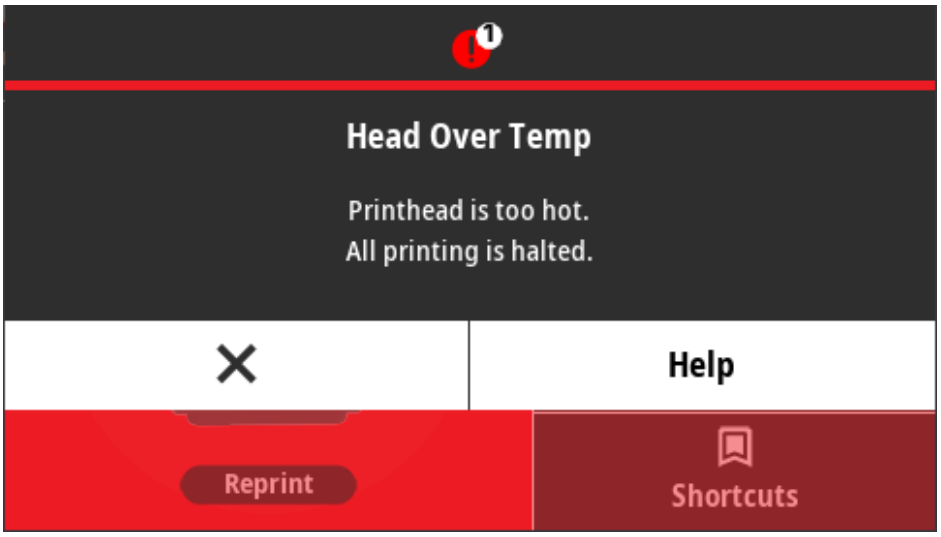
Alert: Printhead Over Temp

The printhead is over temperature and paused to allow the printhead to cool.

Status indicator alert:

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:

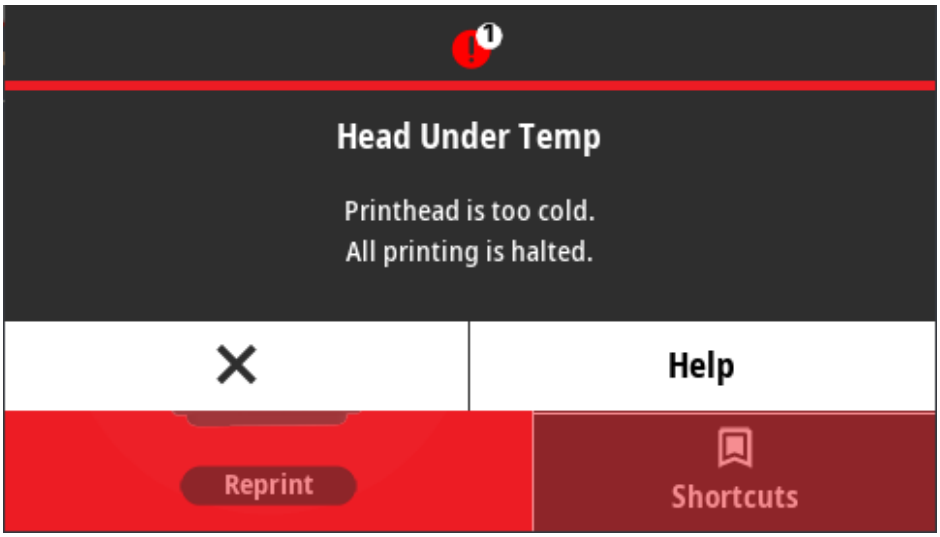
The printhead has had a critical temperature or power failure. Turn printer power OFF by holding **POWER** down for five seconds. Wait for the printer to shutdown completely, then turn printer power ON. If the printer does not recover from this error, call a service technician. The printhead is not a 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:

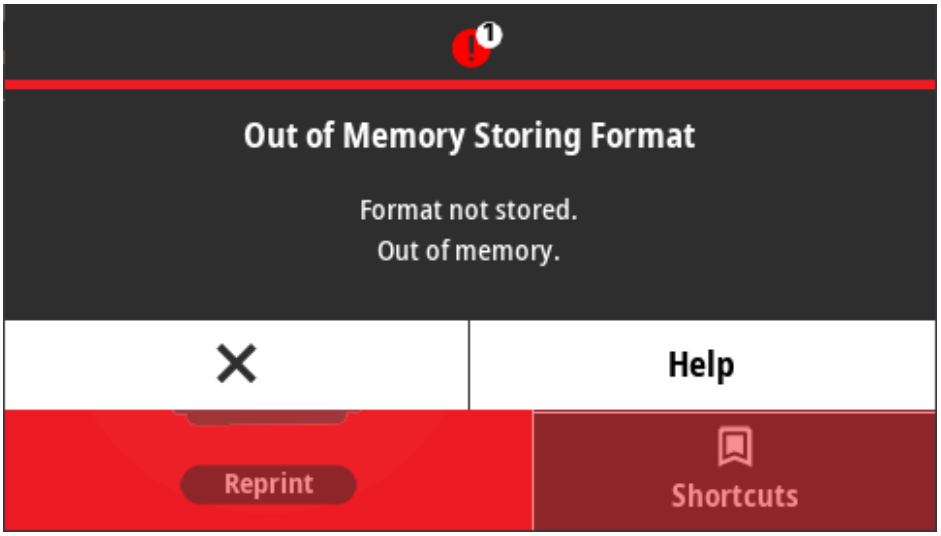
- The ambient temperature at the printer's location is below the specified operating range. Turn printer power OFF, then move the printer to a warmer location and wait for it to warm naturally. Moisture may condense in and on the printer if the temperature changes too quickly.
- The printhead thermistor has failed. Turn printer power OFF by holding **POWER** down for five seconds. Wait for the printer to shutdown 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 327 and Adjusting the Print Quality on page 242.
- The printhead is dirty. Clean the printhead. See Cleaning the Printhead on page 272.
- 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 286.
- The printhead has worn out. Replace the printhead. The printhead can wear out and be damaged. See Cleaning the Printhead on page 272.
- 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 251.

- 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 371.
- Media has been loaded incorrectly. The media printable surface must face up towards the printhead. See What You Will Need to Print on page 21 and Roll Media Types and Loading on page 178.

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).

- 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 topics:
  - Roll Media Types and Loading on page 178
  - Setting Media Sensing by Media type on page 179
  - Adjusting the Movable Sensor for Black Marks or Notches on page 183
  - Adjusting the Movable Sensor for Web (Gap) Sensing on page 183
- 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 199. If the printer still skips labels, try a manual media calibration. See Print > Sensors > Manual Calibration on page 147.
- 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 286.
- The printer has communication issues with cables or communication settings. See Communication Issues.

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.

- 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 342 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 342.

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.

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.

- 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 378.
- 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.

- 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 200, System > Language on page 93, and ZPL Configuration on page 376.

- 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 104 or use the Zebra Setup Utility and select **Open Printer Tools** > **Action** > **Load printer defaults**.
  - Reload printer firmware. See Updating Printer Firmware on page 310.
  - If the printer does not recover from this error, call a service technician. This is not a user-serviceable item.

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.

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 199. if necessary use Print > Sensors > Manual Calibration on page 147 to calibrate the printer for the media type you are using.

On ZD621 printers with color touch display, check and set the media type by accessing Print > Print Quality > Label Type on page 140.

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.

- Reset the printer to factory defaults. See System > Settings > Restore Defaults on page 104 or use the Zebra Setup Utility and select **Open Printer Tools** > **Action** > **Load printer defaults**.
- Reload printer firmware. See Updating Printer Firmware on page 310.
- If the printer does not recover from this error, call a service technician. This is not a user-serviceable item.

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.

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 they look contaminated, with alcohol and a lightly moistened cotton. 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 278.

Issue: Battery has a Red Indicator

The battery has a fault.

The battery has reached its usable life or has a general component failure. Or battery is too hot or too cold.

- Remove the battery from the printer and check charge status by charging the battery.
- Let the battery cool down or warm up to ambient temperature and recheck the battery charge.
- 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.

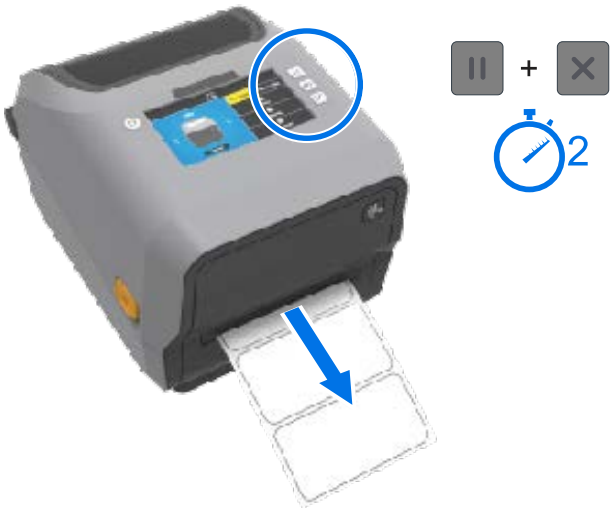
At the end of this self test, only the STATUS indicator remains lit.

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 simply press **FEED** (Advance) once or twice to synchronize the labels and get the media set for printing.

NOTE: If the printer should fail to recognize and correctly calibrate to the media, see Manually Calibrating Media on page 336.

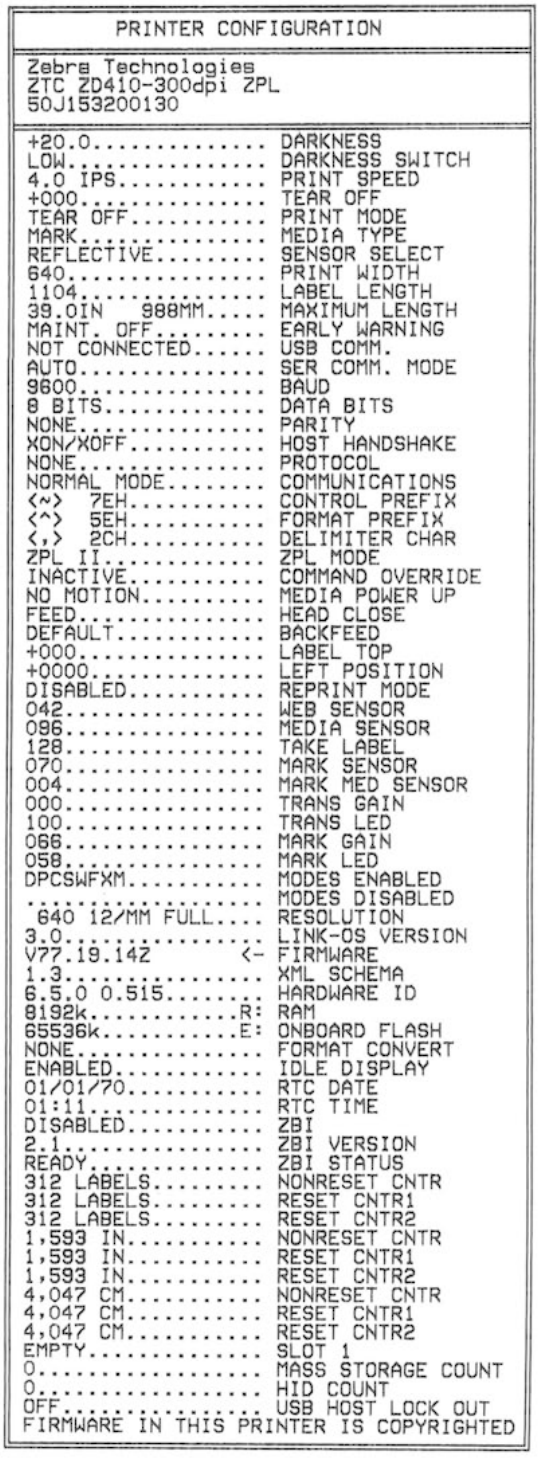
Printing the Printer and Network Configuration Reports (CANCEL Self Test)

To print the configuration report:

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
0x3FFFFFFFFFF..... CHANNEL MASK

Bluetooth
4.3.1p1........... 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
```

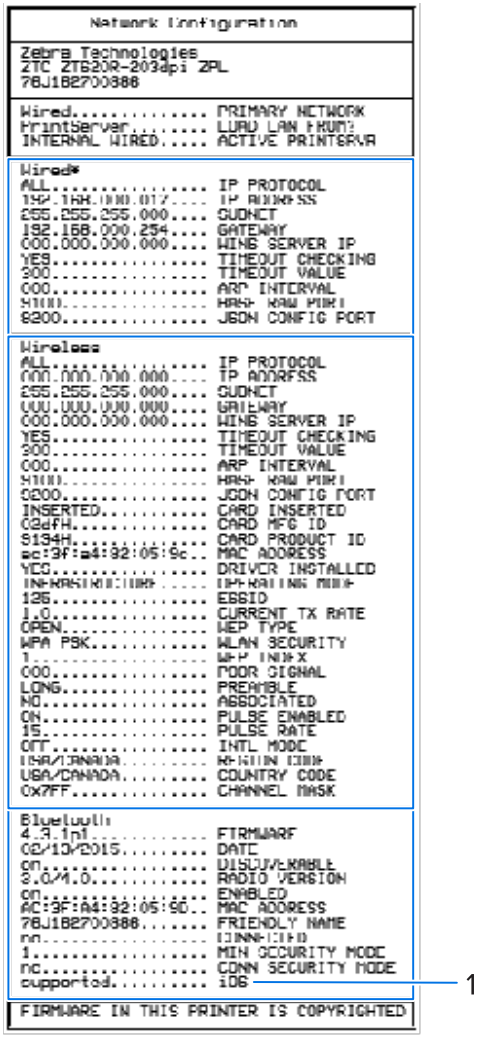
Network (and Bluetooth) Configuration Report

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 4.1 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 8 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.

Figure 9 Print Quality Report

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 10 Barcode Darkness Comparison

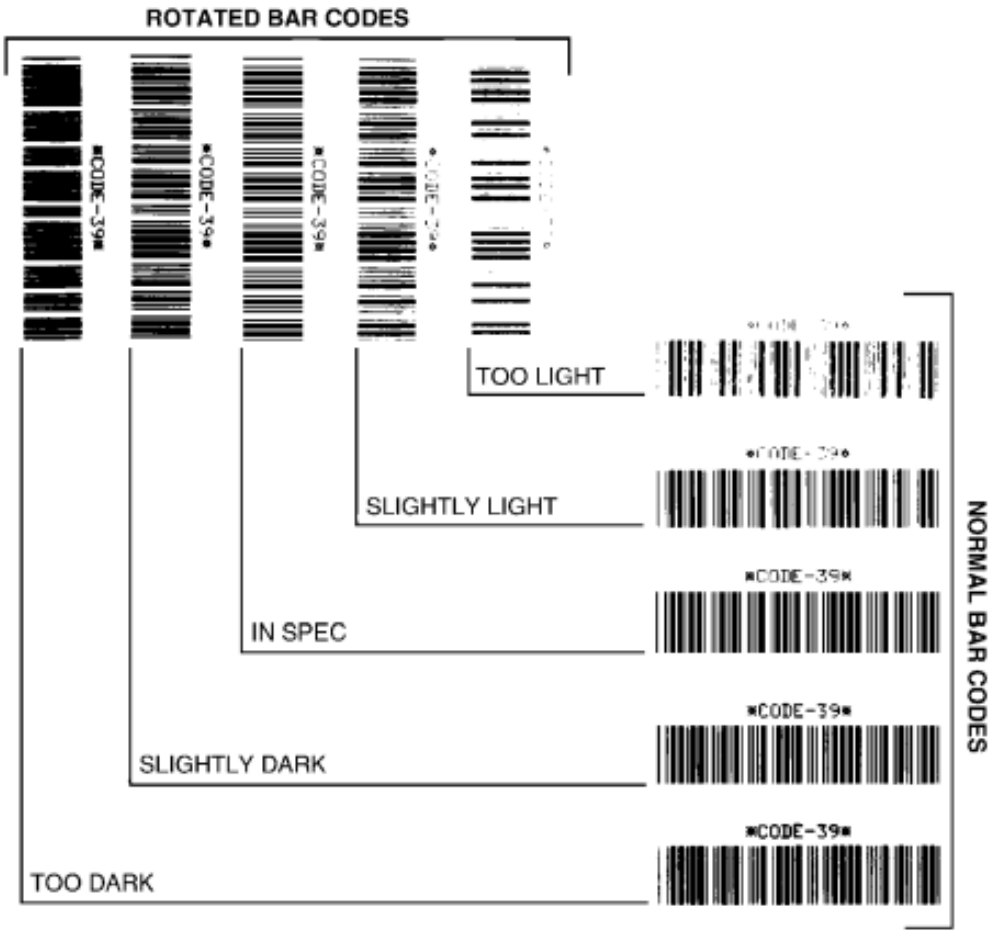


Table 11 Visual Darkness Descriptions

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.

Table 11 Visual Darkness Descriptions (Continued)

Print Quality	Description
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.
“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 242.

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 have 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

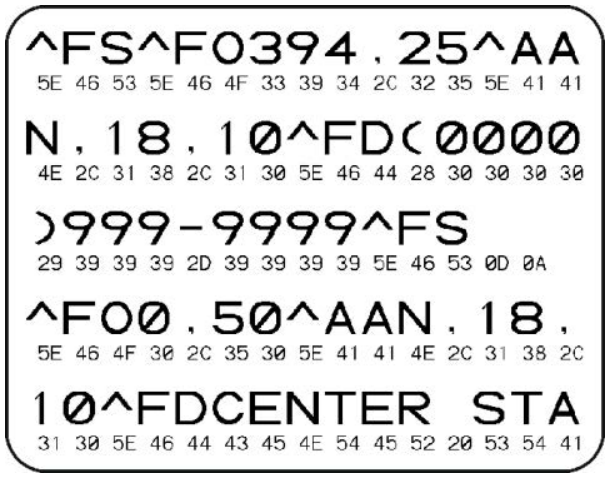
1 second or under	No effect.
1–5 seconds (printer reset)	The printer performs a factory reset, then prints a printer configuration report (and a network configuration report if it is configured to operate on a network).
6–10 seconds (network connection reset, for printers connected to a network)	The 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 11 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 334. If sensor sensitivity must be adjusted, calibrate the printer. See Manually Calibrating Media on page 336.

Figure 12 Sensor Profile (Gap Media)

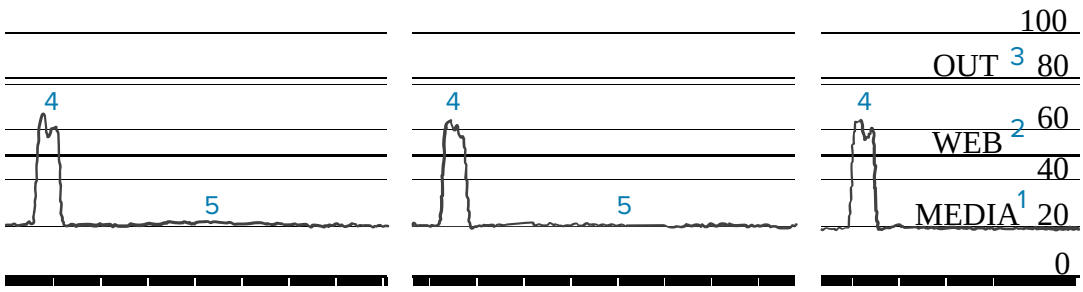
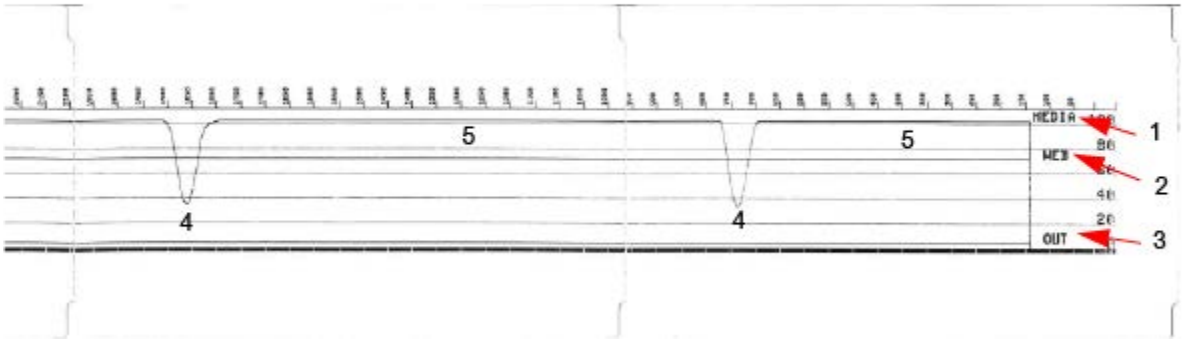


Figure 13 Sensor Profile (Black Mark Tag Media)



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.

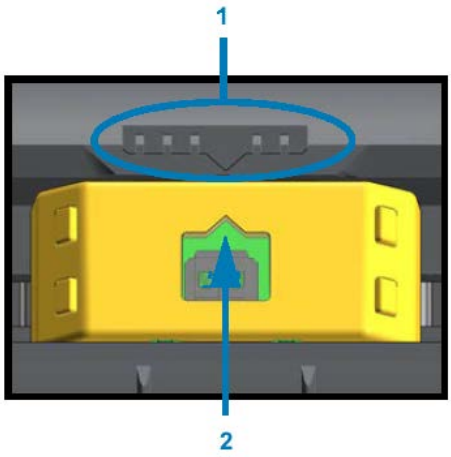
You may have to perform manual calibration several times. This involves moving the media sensor each time until the printer completes the calibration process and returns to ready state.

To manually calibrate the printer to the media:

1. Place the printer in Advanced Mode (see Activating Advanced Mode) 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.



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

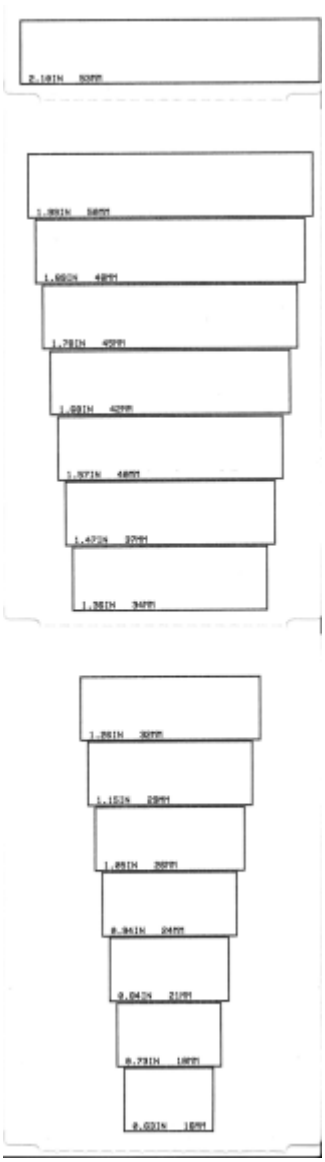
You can manually adjust the print width for your printer depending on your printing needs.

Place the printer in Advanced mode. See Activating Advanced Mode on page 336. 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.

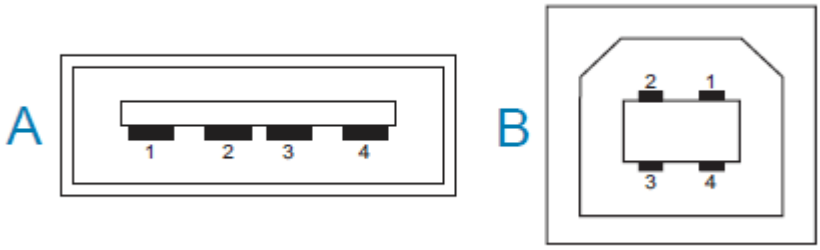
To exit either mode, press and hold **POWER** down while switching printer power OFF. Release the button when the printer has fully powered down.

Interface Connector Wiring

This section details the connector wiring for the printer connector interface.

Universal Serial Bus (USB) Interface

This figure shows the cable wiring required to use the printer's USB two interfaces.



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.

Type A and Type B connectors require different pinouts.

USB A style connector pinouts (A in the image shown)	Pin 1 — Vbus (+5 VDC). (Pin 2 — D- (Data Signal, Negative Side) Pin 3 — D+ (Data Signal, Positive Side) Pin 4 — Shell (Shield/Drain Wire)
USB B style connector pinouts (B in the image shown)	Pin 1 — Vbus (Not Connected) Pin 2 — D- (Data Signal, Negative Side) Pin 3 — D+ (Data Signal, Positive Side) Pin 4 — Shell (Shield/Drain Wire)

IMPORTANT: USB Host +5 VDC power source is shared with serial-port phantom power. It is limited to 0.5mA per USB Specification and with on-board current limiting. The maximum current available through the serial port and USB port should not exceed a total of 0.75 Amps.

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.

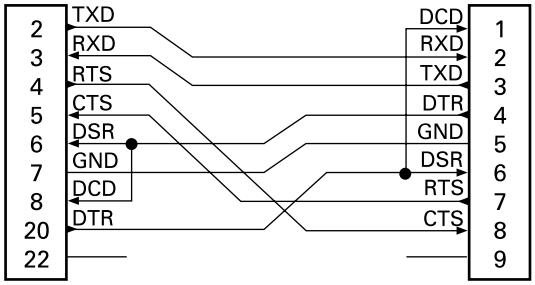
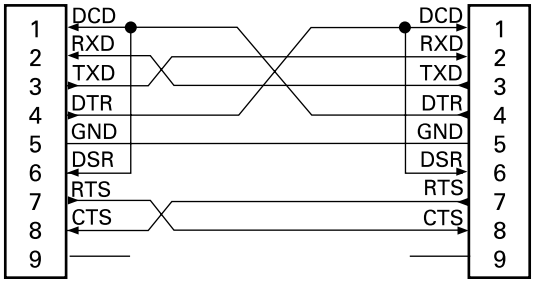
IMPORTANT: The maximum current available through the serial port, USB port or both will not exceed a total of 0.75 Amps.

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. This table shows the required cable connections.

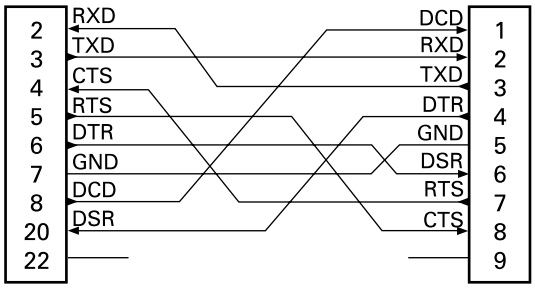
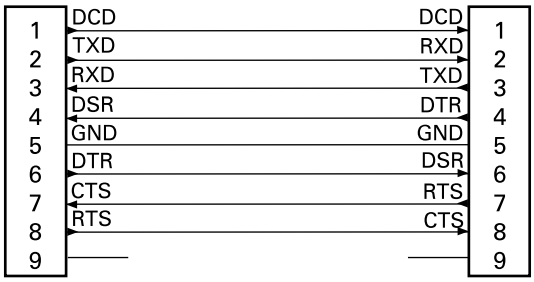
Table 12 Connecting the Printer to a DTE Device

DB-25S Connector to DTE Device (PC)	DB-9P Connector to Printer	DB-9S Connector to DTE Device (PC)	DB-9P Connector to Printer
			

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. Te figure below shows the connections required for this cable.

Table 13 Connecting the Printer to a DCE Device

DB-25S Connector to DCE Device	DB-9P Connector to Printer	DB-9S Connector to DCE Device	DB-9P Connector to Printer
			

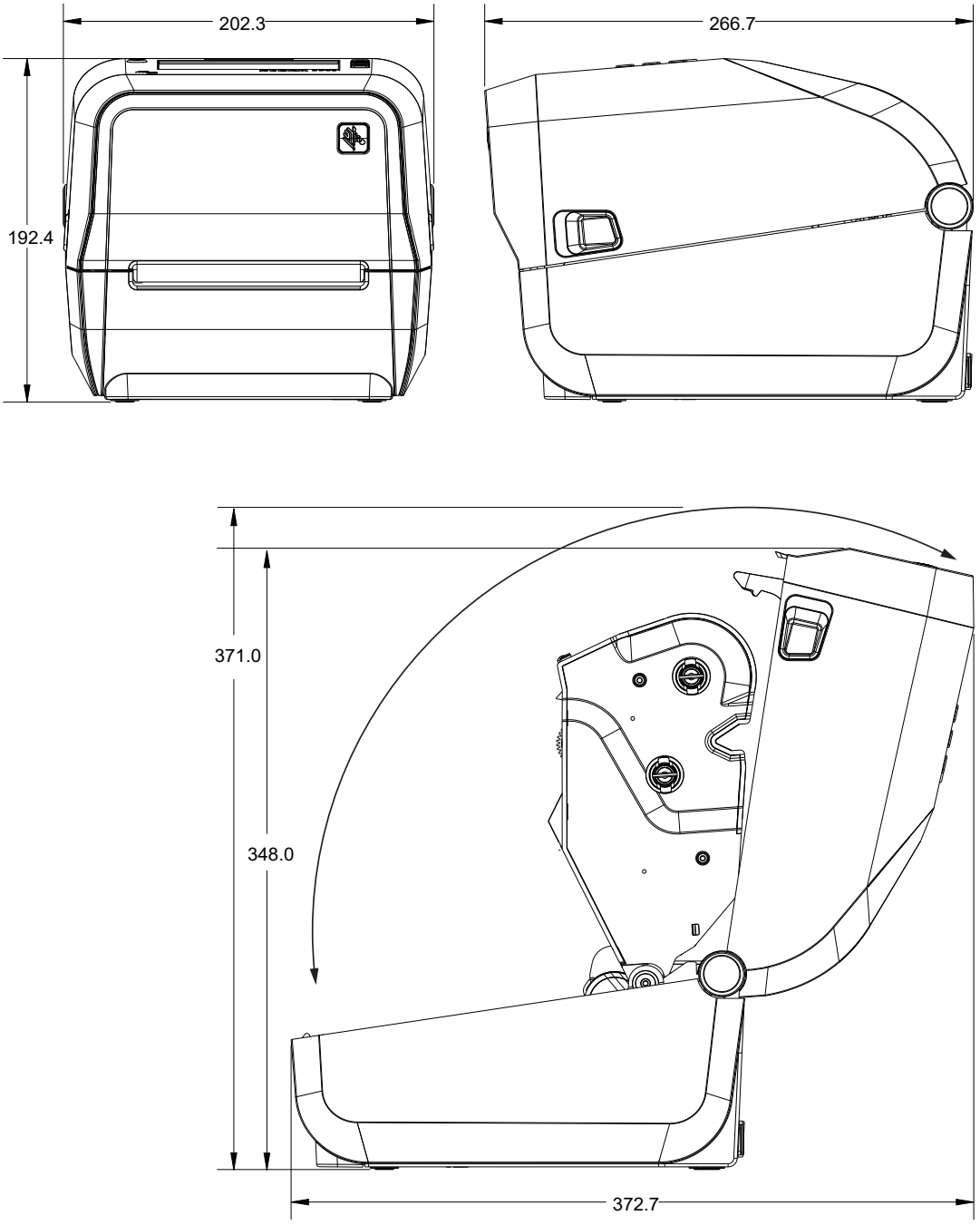
Dimensions

This section provides external printer dimensions for the printers, and many of the accessories that are available for the printers.

Dimensions – ZD421/ZD621 Thermal Transfer Printer Models

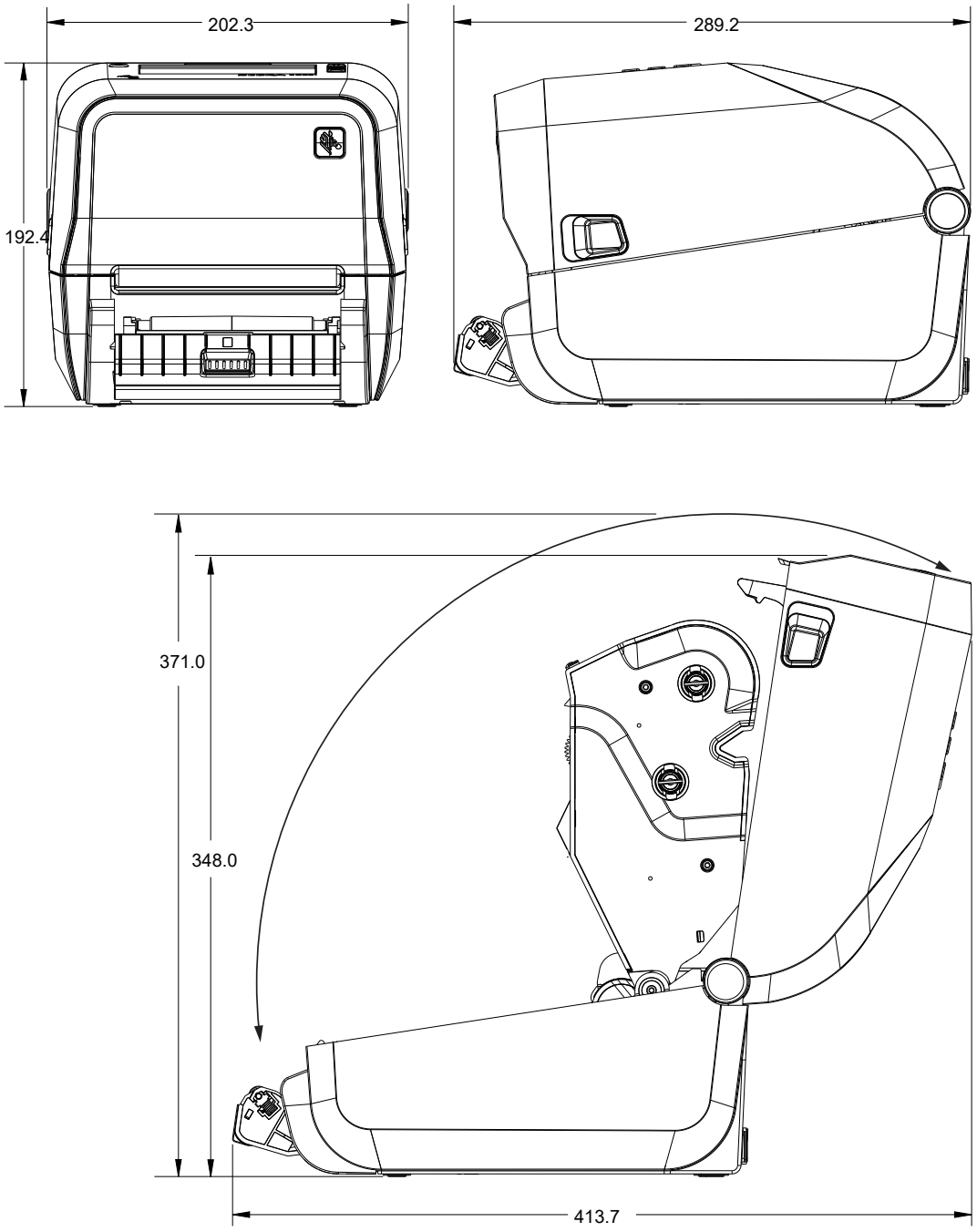
All dimensions are in millimeters.

Figure 15 ZD421/ZD621 Thermal Transfer Models – Dimensions for a Standard Printer



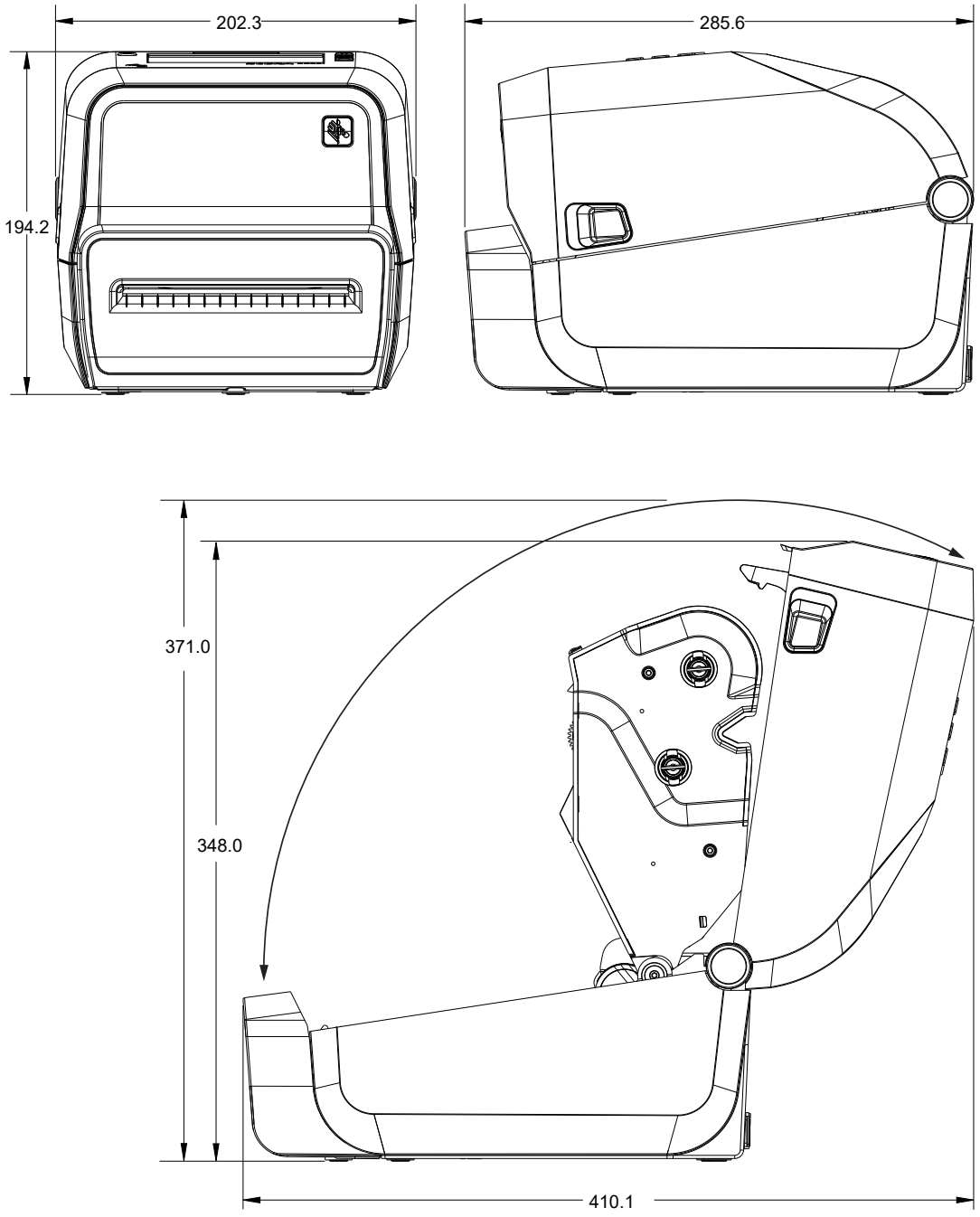
All dimensions are in millimeters.

Figure 16 ZD621 / ZD421 Thermal Transfer Models – Dimensions for Printer with the Label Dispenser Option Installed



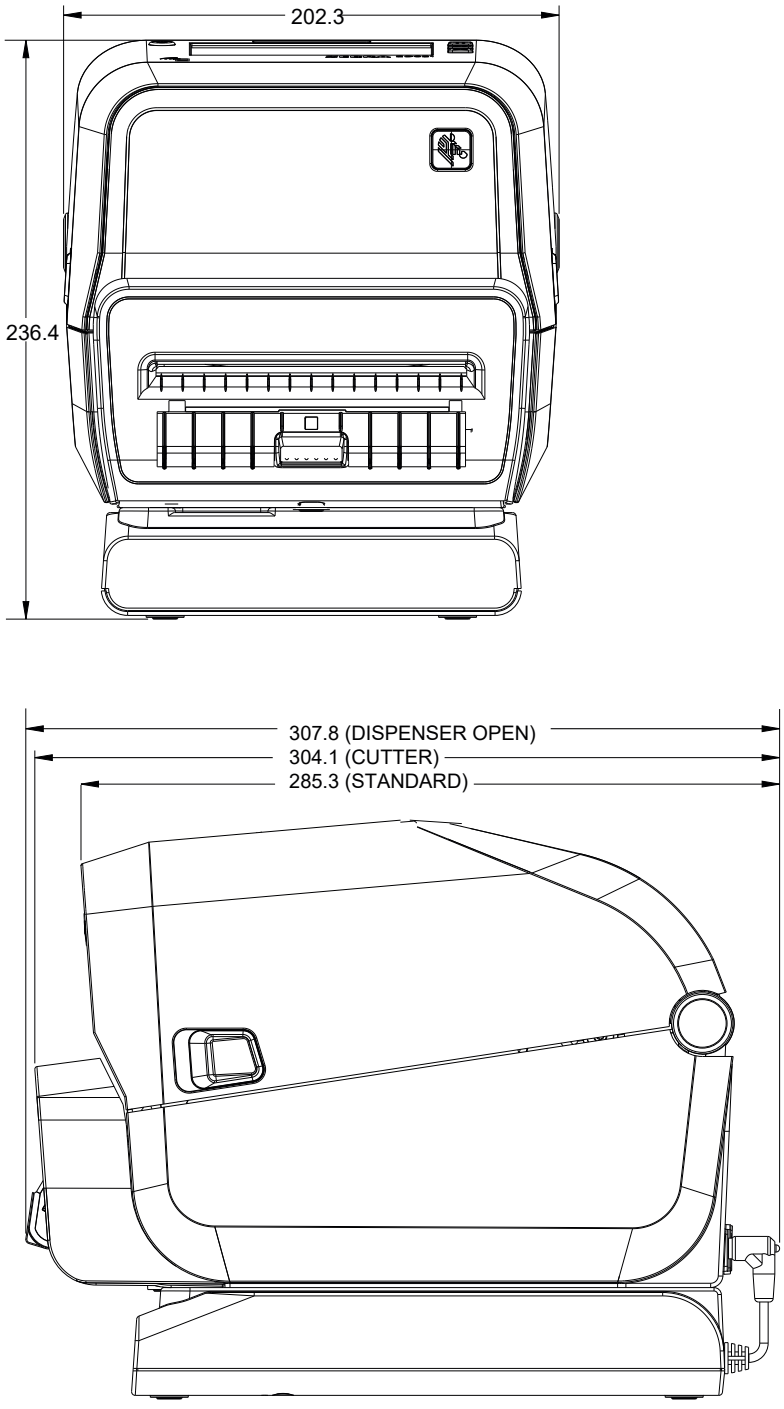
All dimensions are in millimeters.

Figure 17 ZD421 / ZD621 Thermal Transfer Models – Dimensions for Printer with Cutter Option Installed



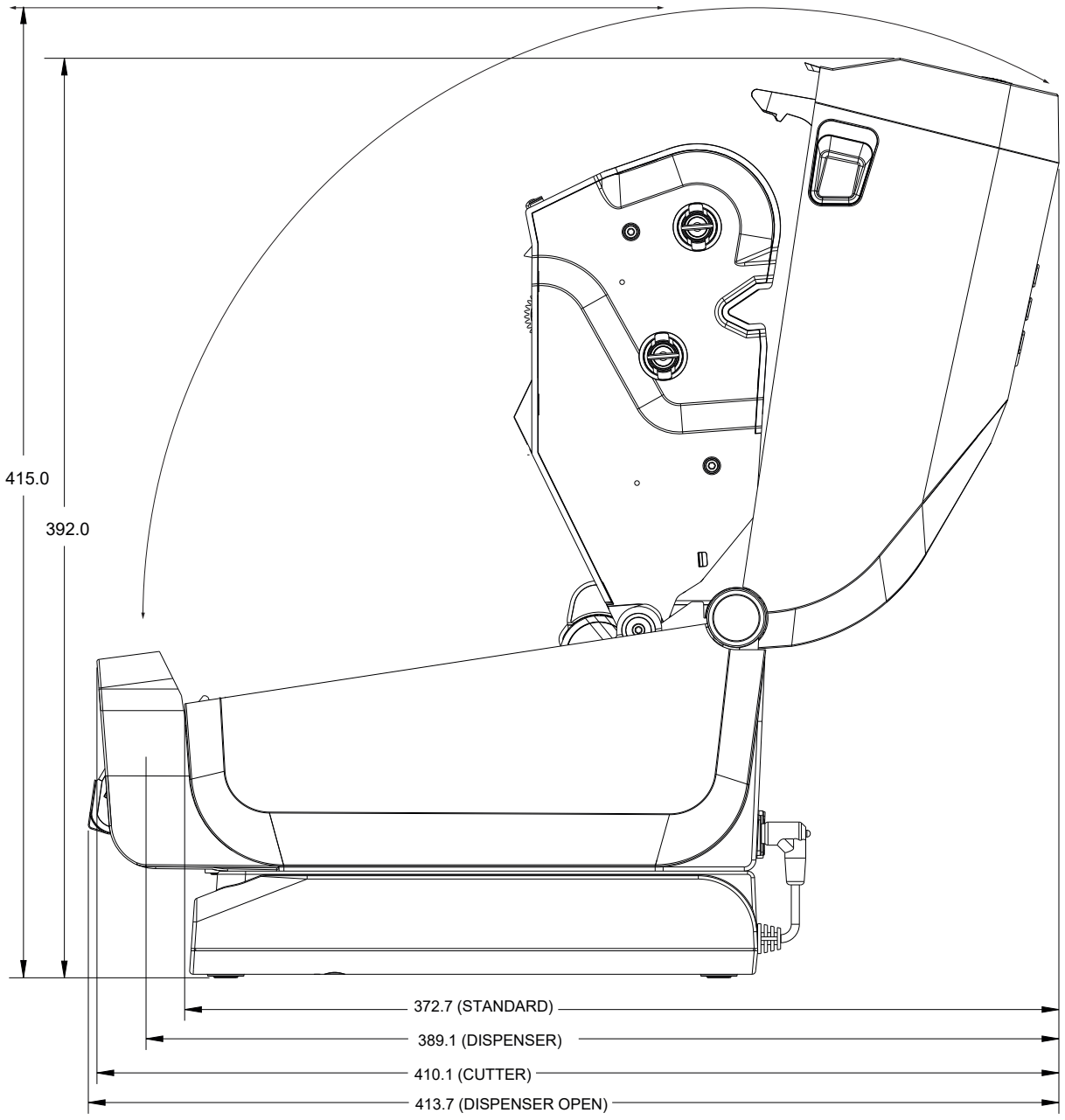
All dimensions are in millimeters.

Figure 18 ZD421 / ZD621 Thermal Transfer Models – Dimensions for Printer with the External Battery Plugged In



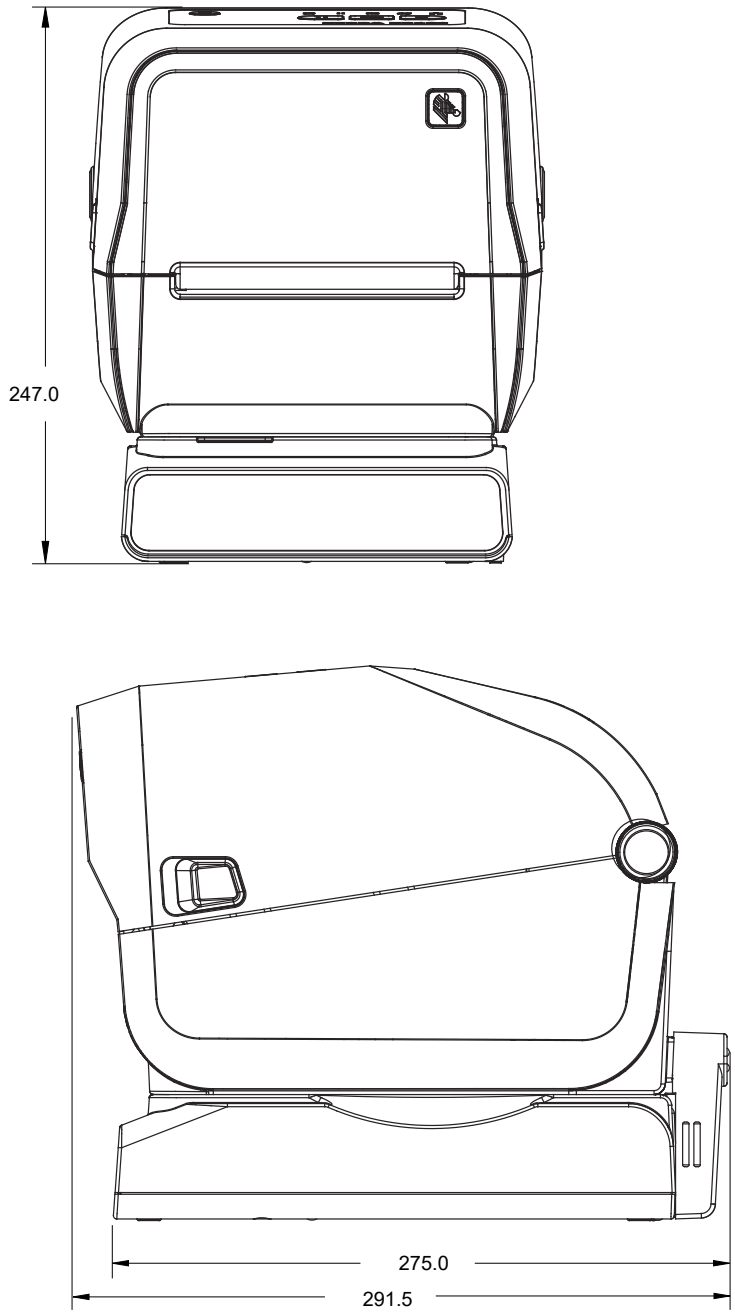
All dimensions are in millimeters.

Figure 19 ZD421 / ZD621 Thermal Transfer Models – Dimensions for Printer with External Battery Plugged In and with Printer Open



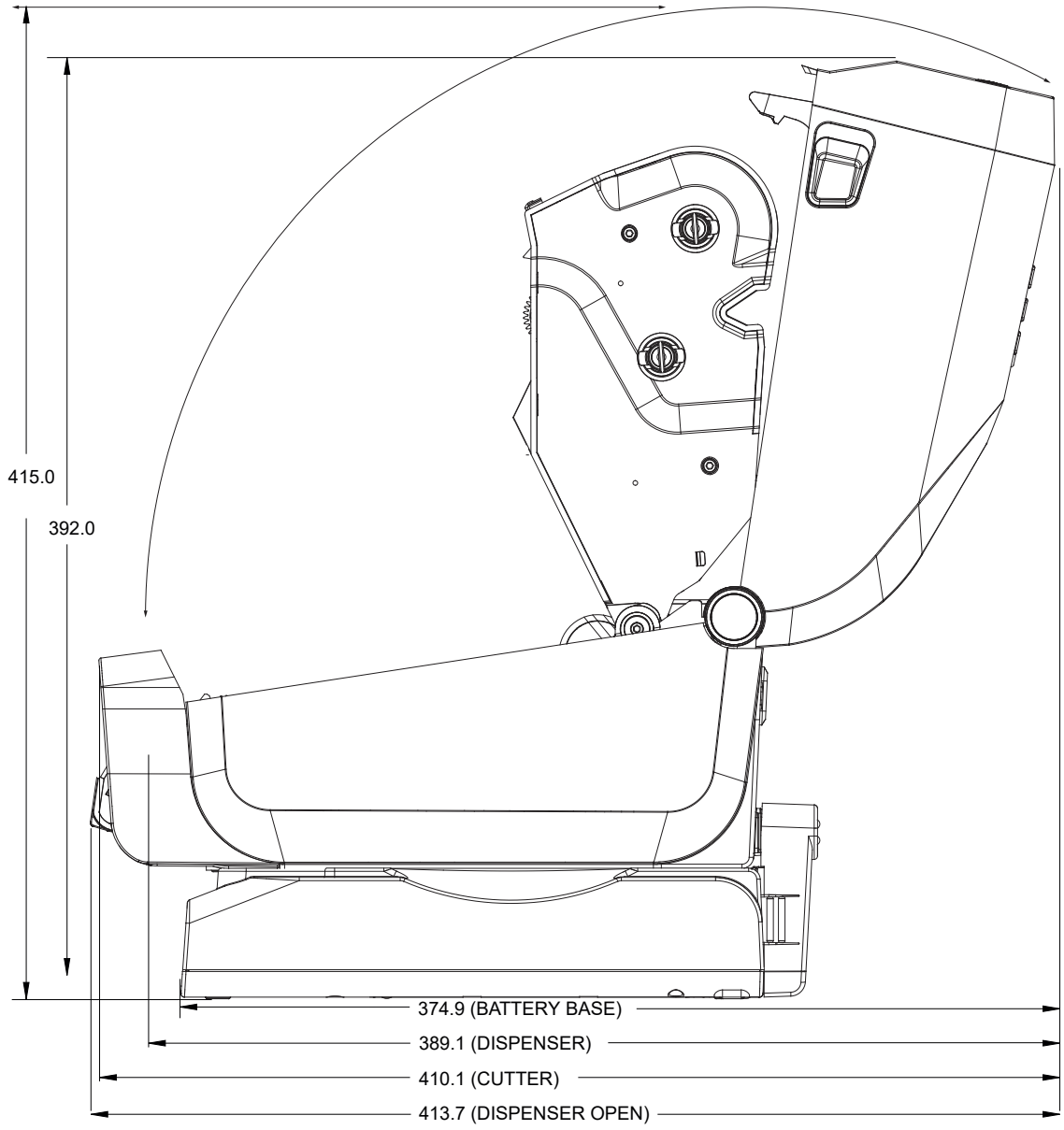
All dimensions are in millimeters

Figure 20 ZD421 / ZD621 Thermal Transfer Models – Dimensions for Printer with Power Supply Base Attached



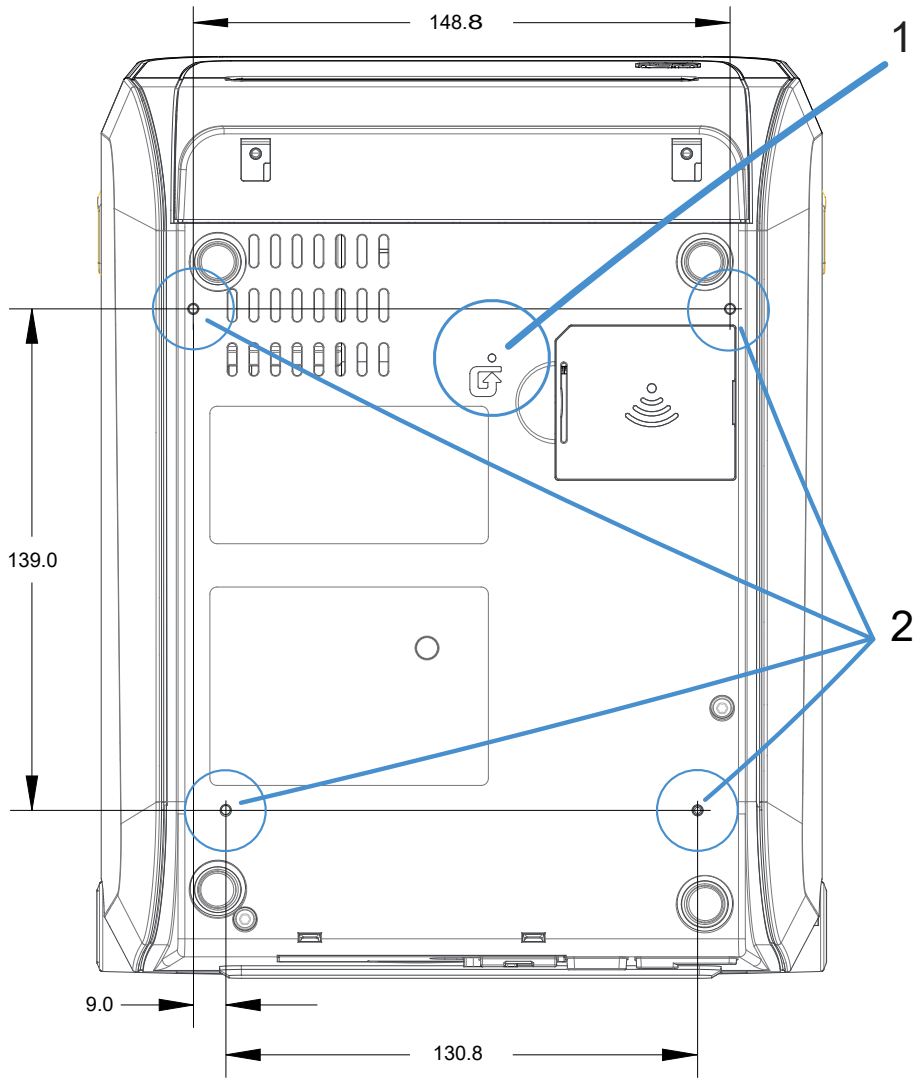
All dimensions are in millimeters.

Figure 21 ZD421 / ZD621 Thermal Transfer Models – Dimensions for Printer with Power Supply Base Attached and Printer Open



All dimensions are in millimeters.

Figure 22 ZD421 / ZD621 Thermal Transfer Models – Mounting Screw Locations



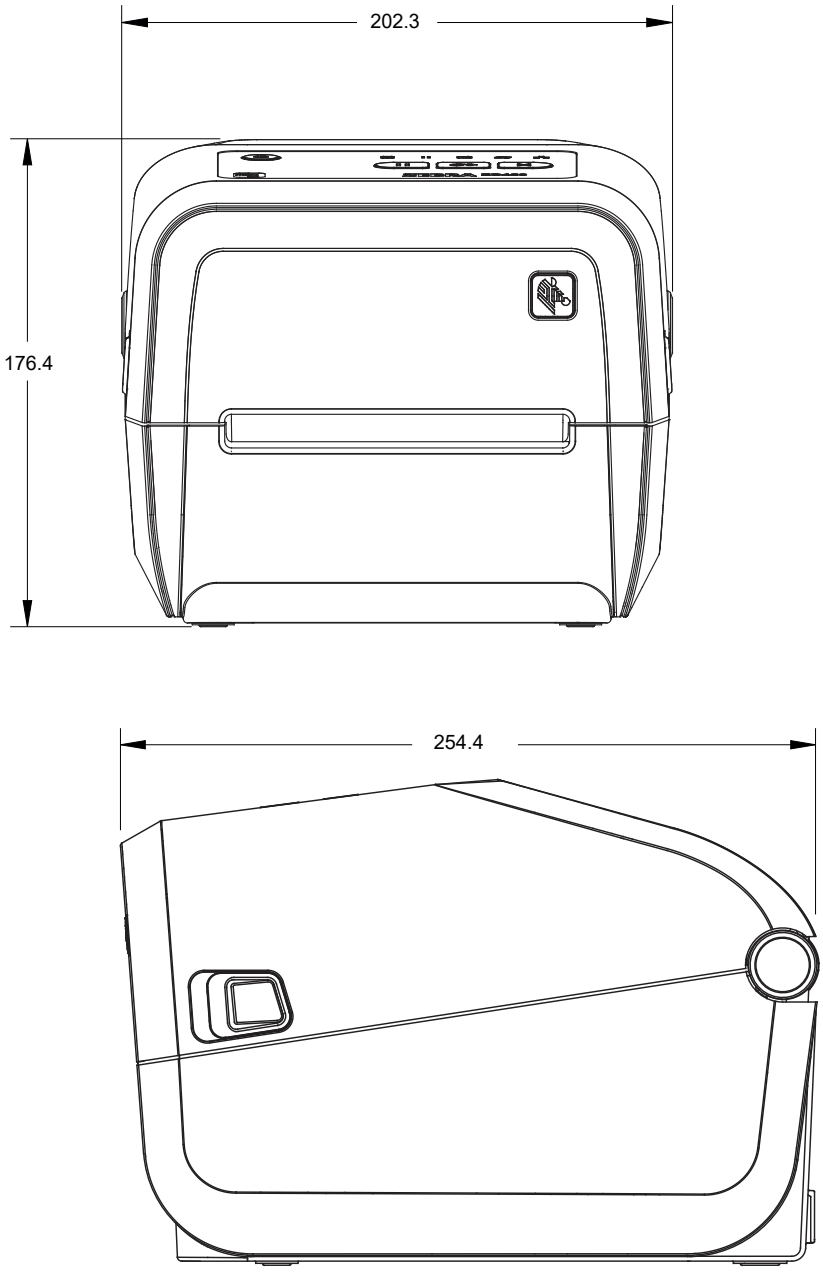
1	Hardware Reset Access – Provide a 20-25 mm hole in mounting plate or surface to keep this area accessible after the printer is mounted onto a surface.
2	Mounting screw locations – Use M3 thread-forming screws that will fit in the maximum printer base hole depth of 6 mm.

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

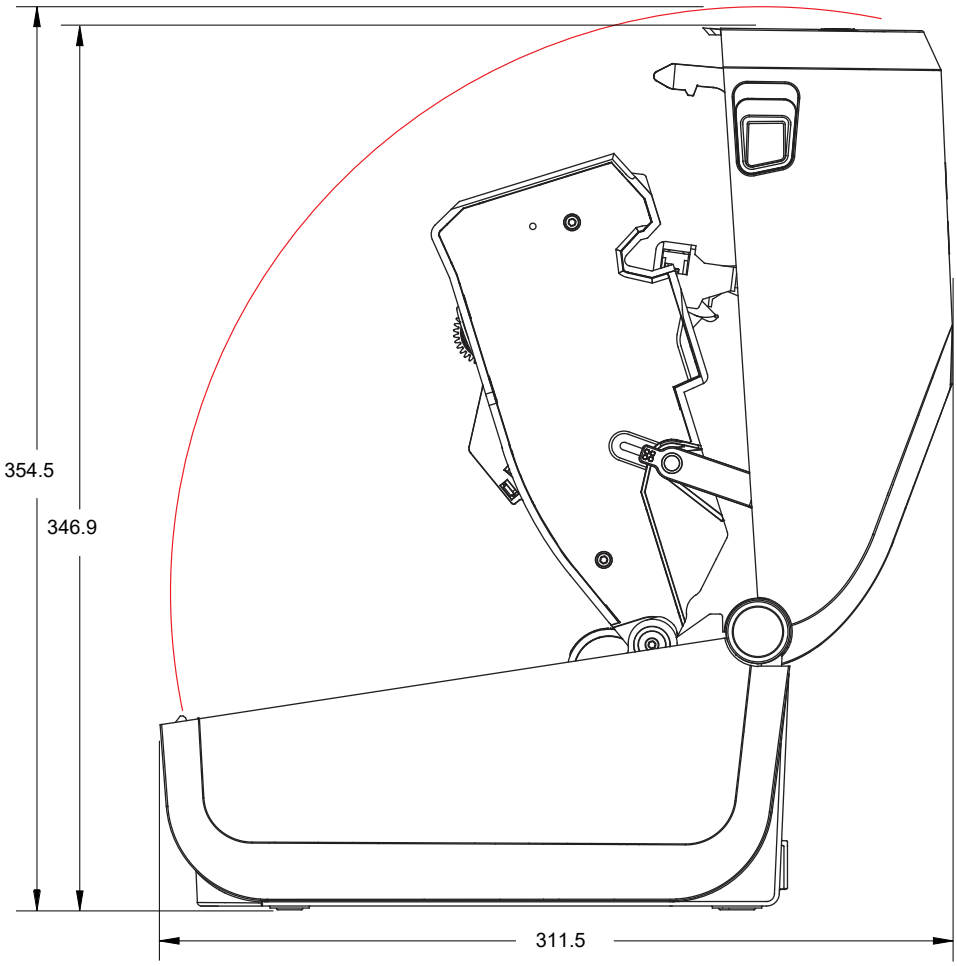
All dimensions are in millimeters.

Figure 23 ZD421C (Ribbon Cartridge Thermal Transfer) Printer Models – Dimensions of the Standard Printer



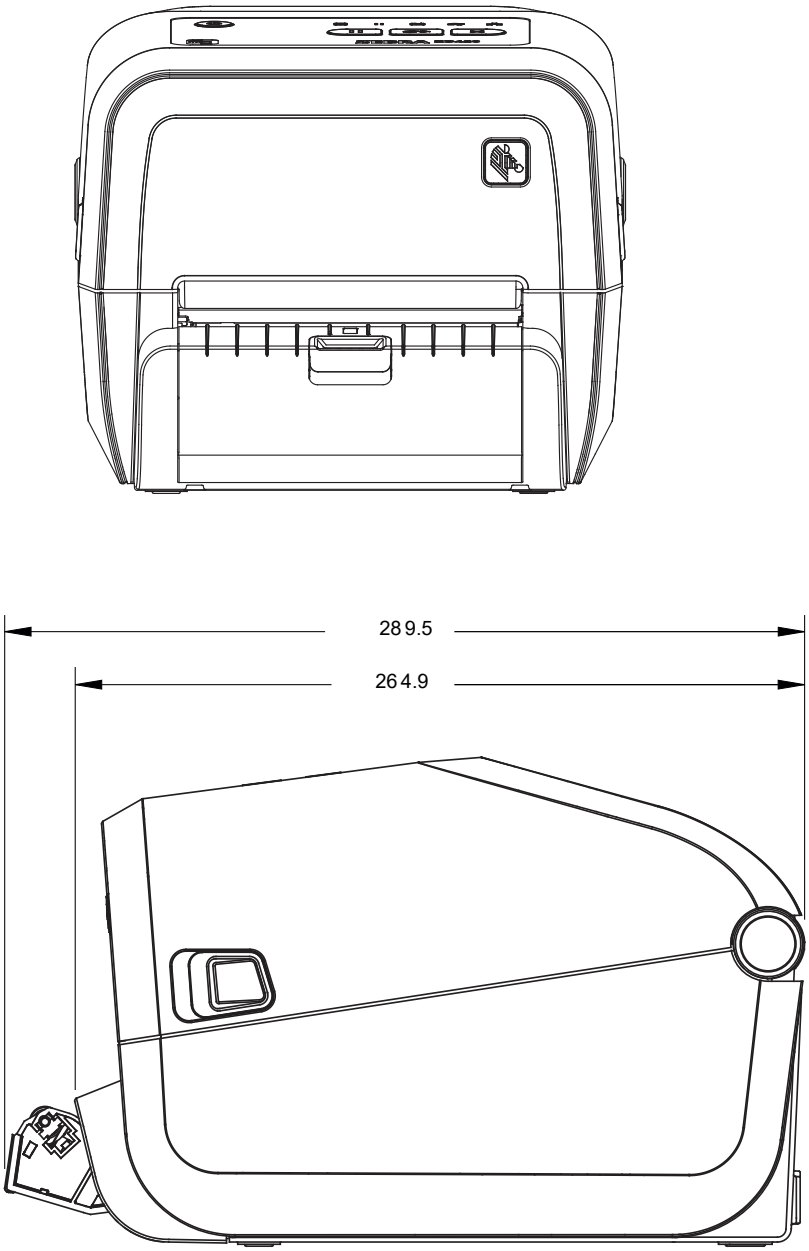
All dimensions are in millimeters.

Figure 24 ZD421C (Ribbon Cartridge Thermal Transfer) Printer Models – Dimensions of the Standard Printer with Cover Open



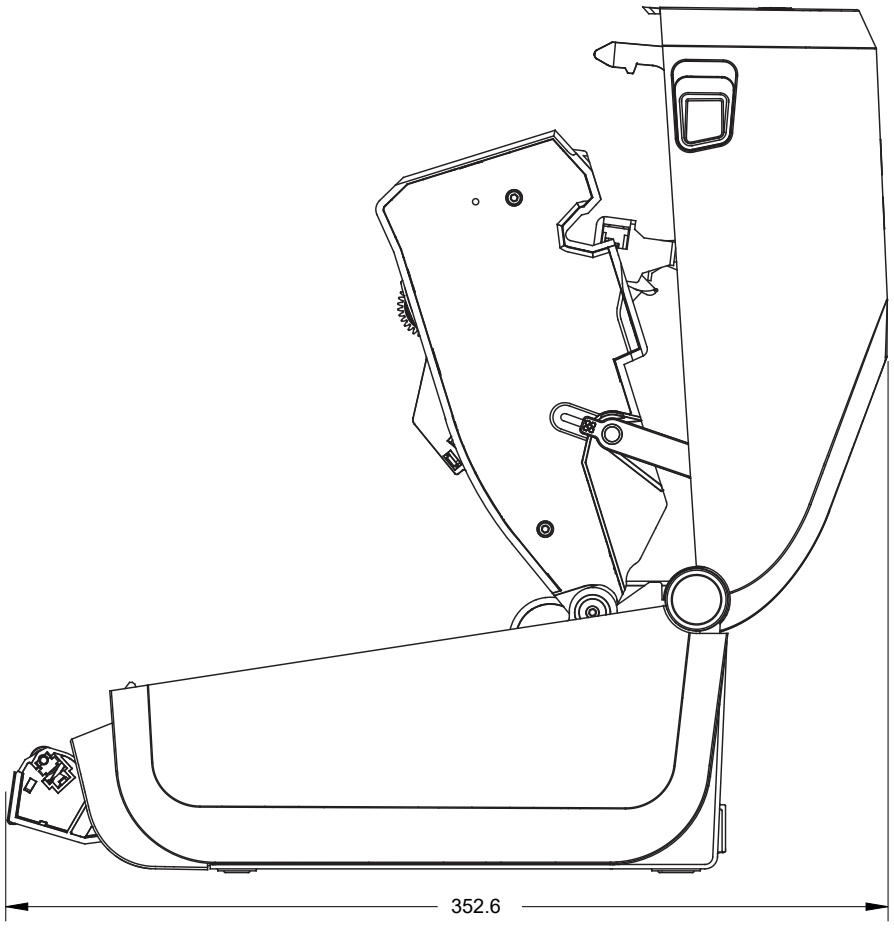
All dimensions are in millimeters.

Figure 25 ZD421C (Ribbon Cartridge Thermal Transfer) Printer Models – Dimensions of the Printer with the Label Dispenser Option Installed



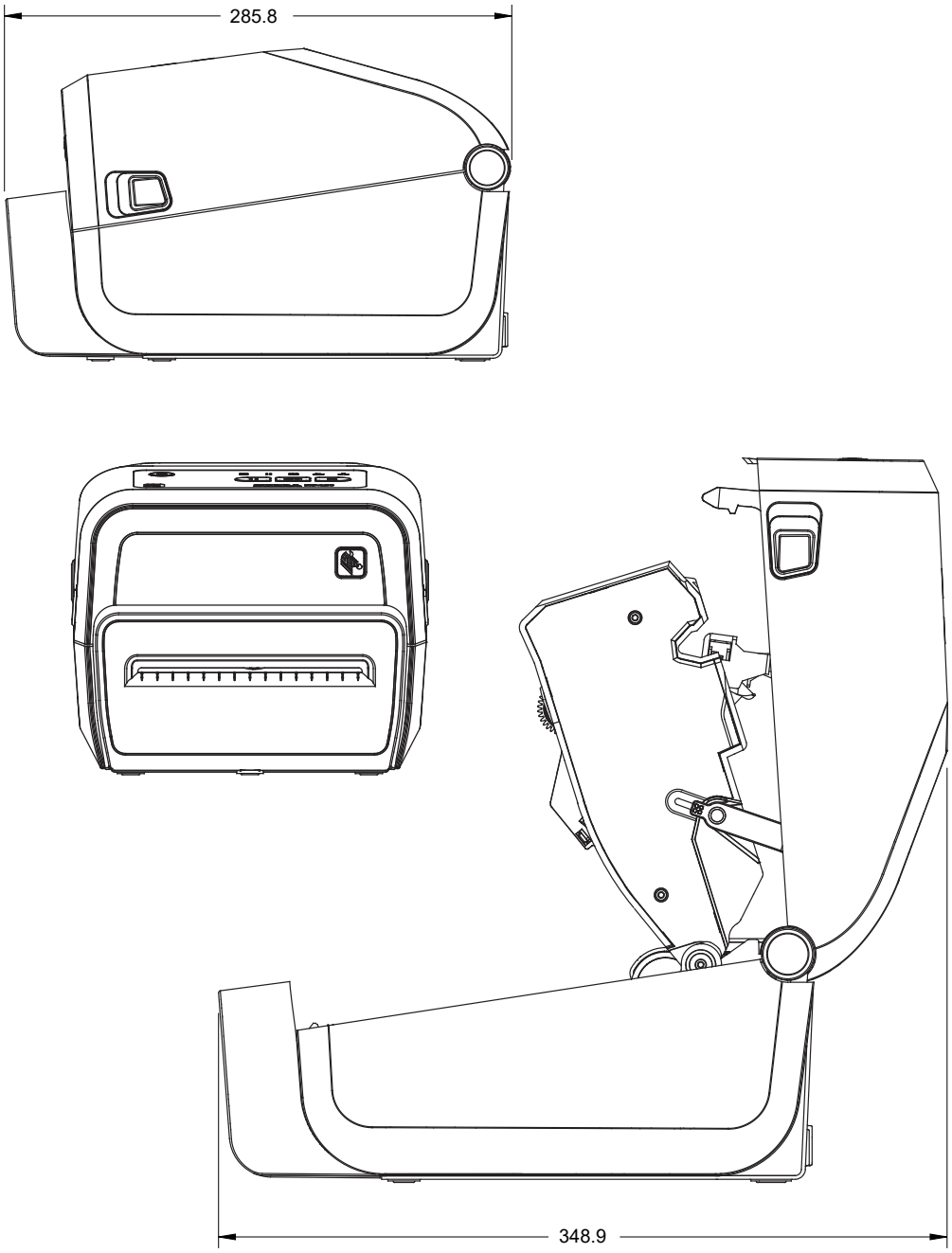
All dimensions are in millimeters.

Figure 26 ZD421C (Ribbon Cartridge Thermal Transfer) Printer Models – Dimensions of the Printer with the Label Dispenser Option Installed and Cover Open



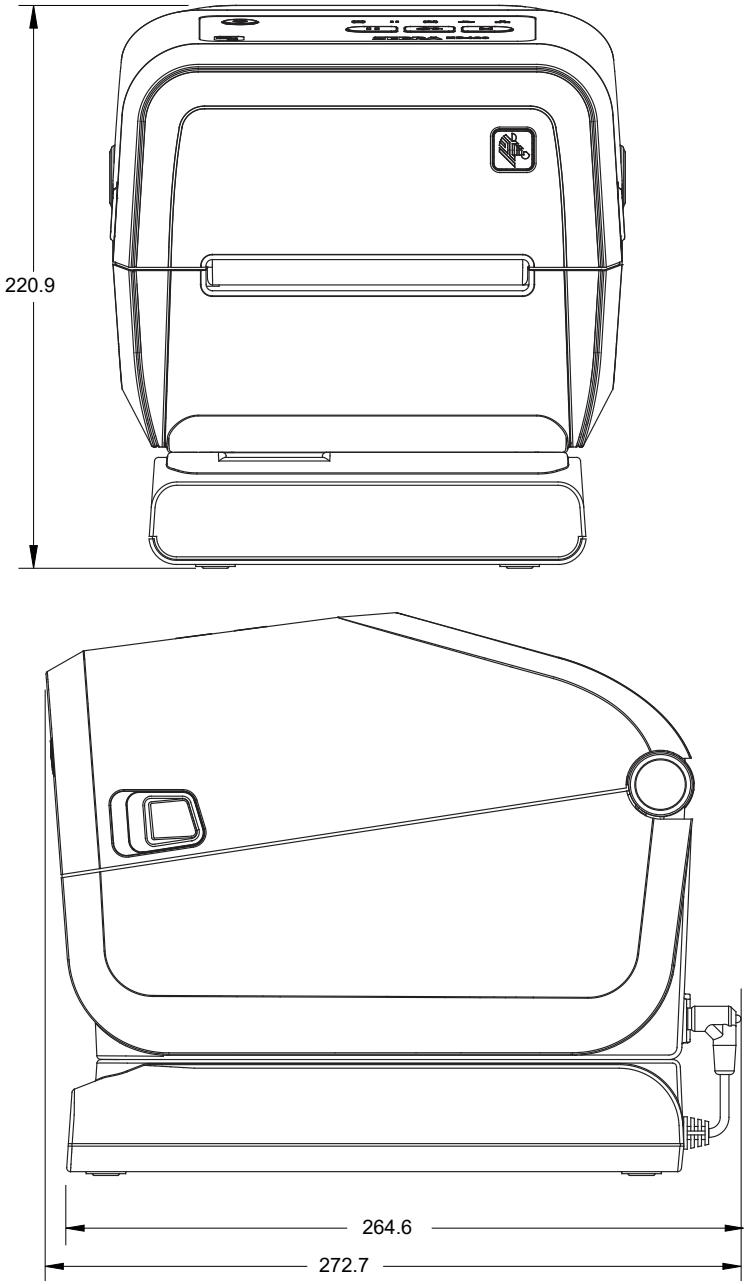
All dimensions are in millimeters.

Figure 27 ZD421C (Ribbon Cartridge Thermal Transfer) Printer Models – Dimensions of the Printer with the Cutter Option Installed



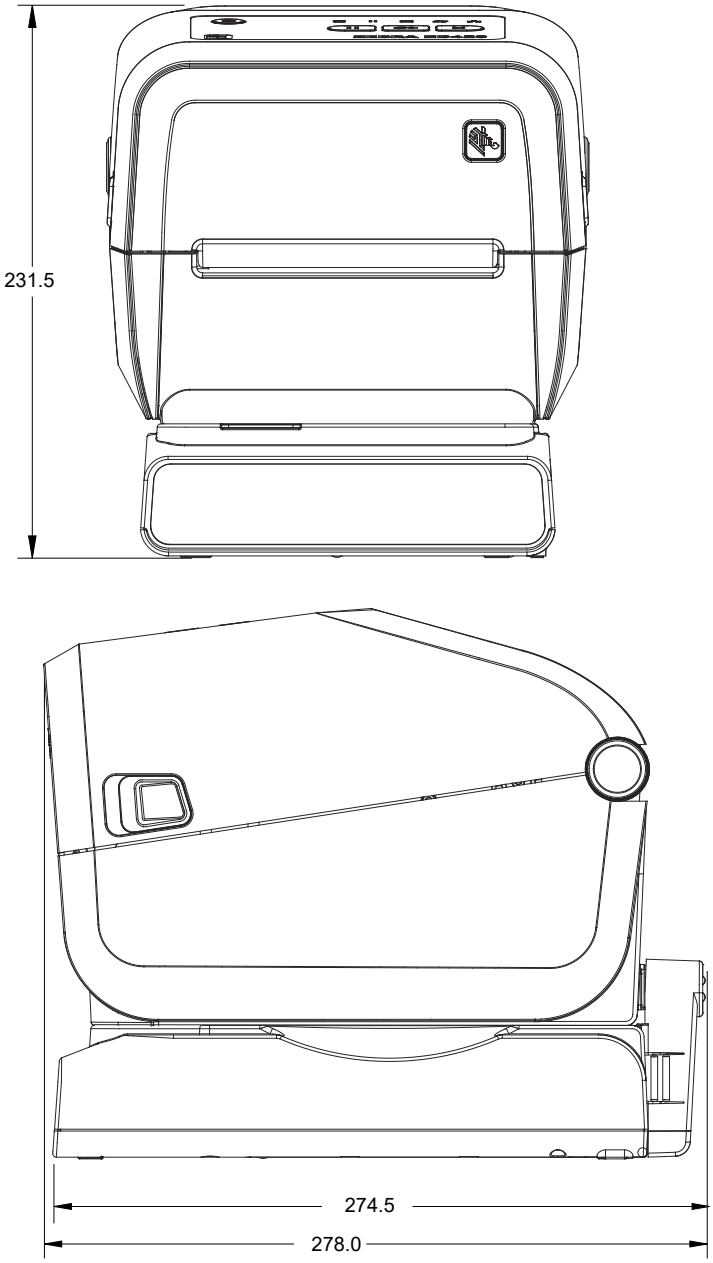
All dimensions are in millimeters.

Figure 28 ZD421C (Ribbon Cartridge Thermal Transfer) Printer Models – Dimensions of the Printer with Attached Power Supply Base



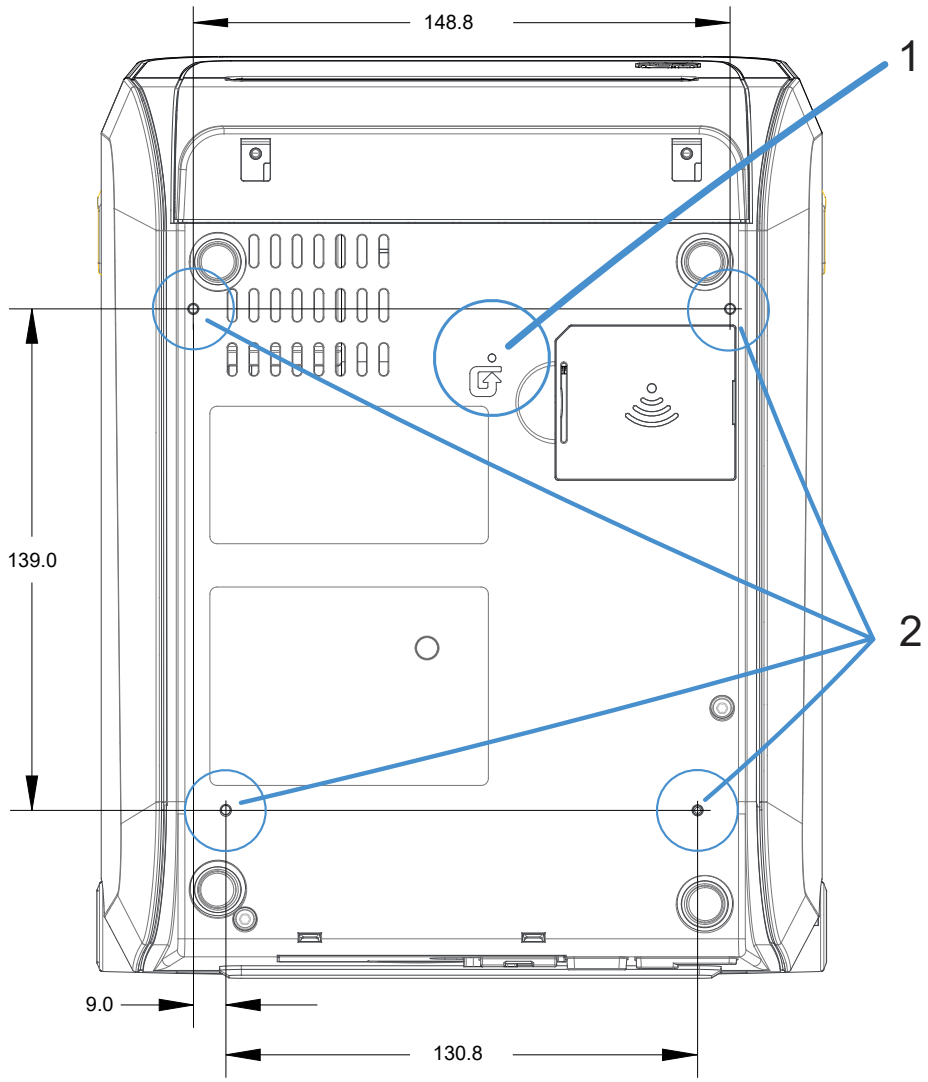
All dimensions are in millimeters.

Figure 29 ZD421C (Ribbon Cartridge Thermal Transfer) Printer Models – Dimensions of the Printer with Attached Power Supply Base and Battery



All dimensions are in millimeters.

Figure 30 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.

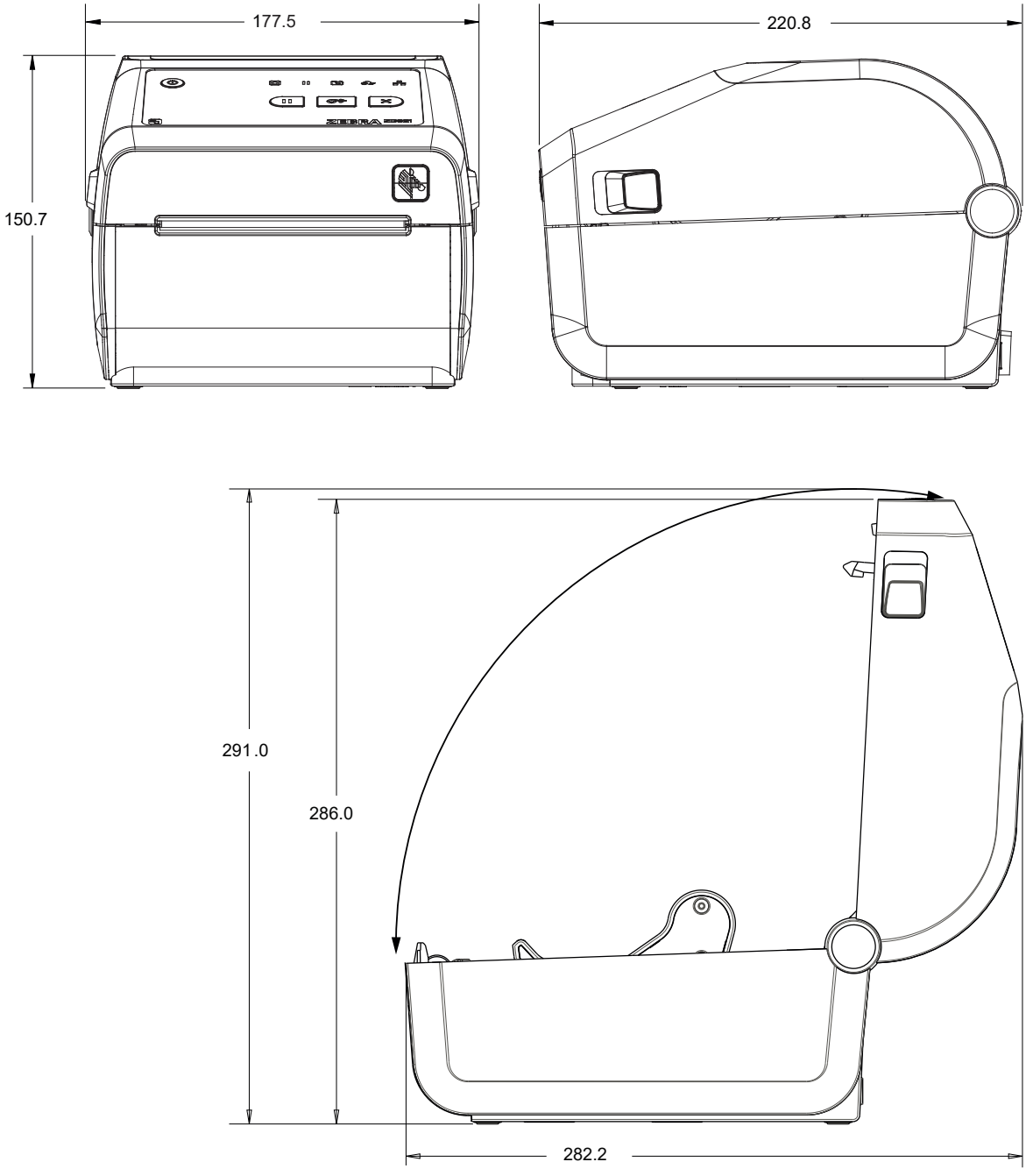
IMPORTANT: Do NOT remove the rubber feet. They are meant to keep the printer from overheating.

All dimensions are in millimeters.

Dimensions – ZD421/ZD621 Direct Thermal Printer Models

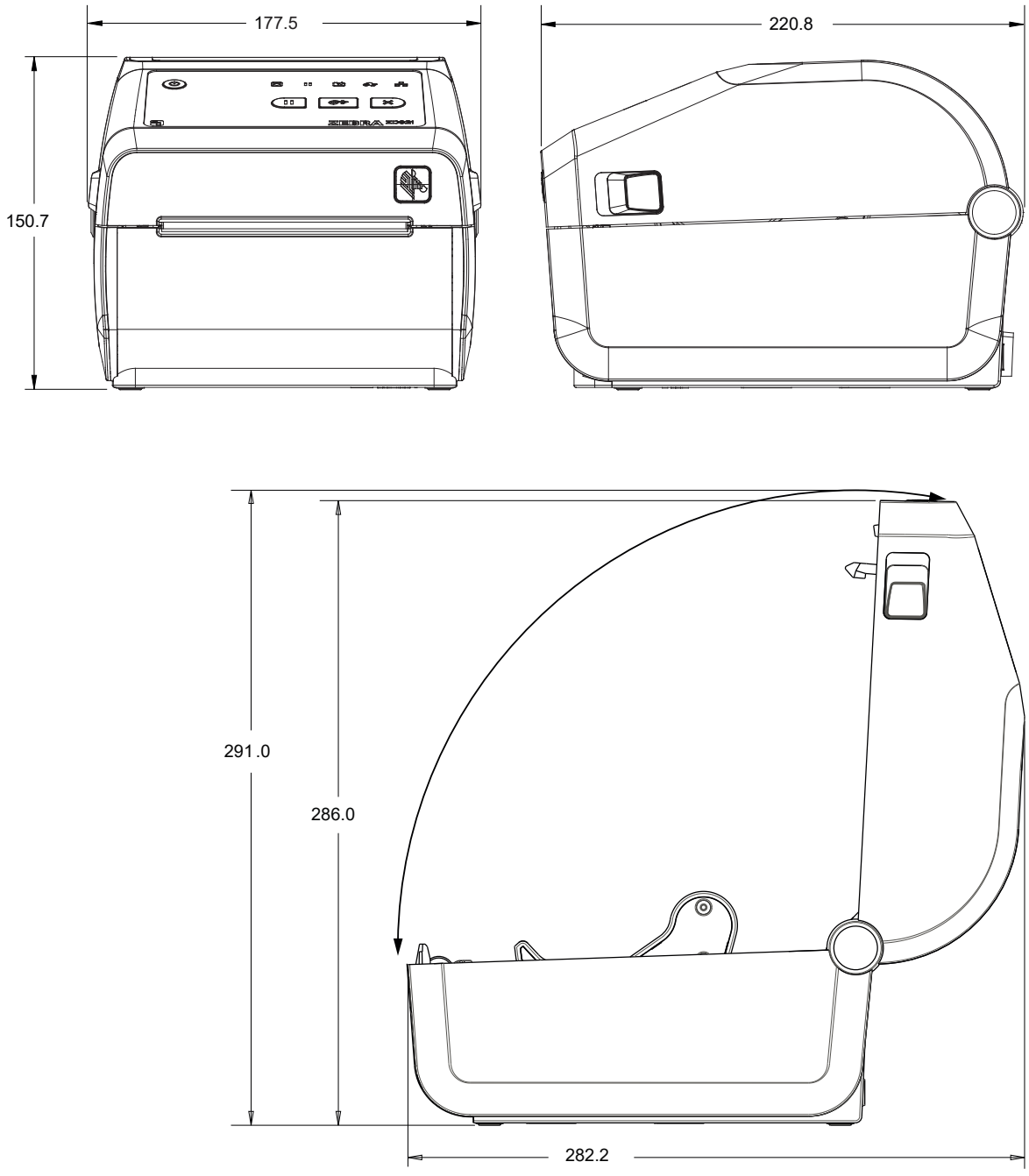
All dimension are in millimeters

Figure 31 ZD421/ZD621 Direct Thermal Printer Models – Dimensions of the Standard Printer



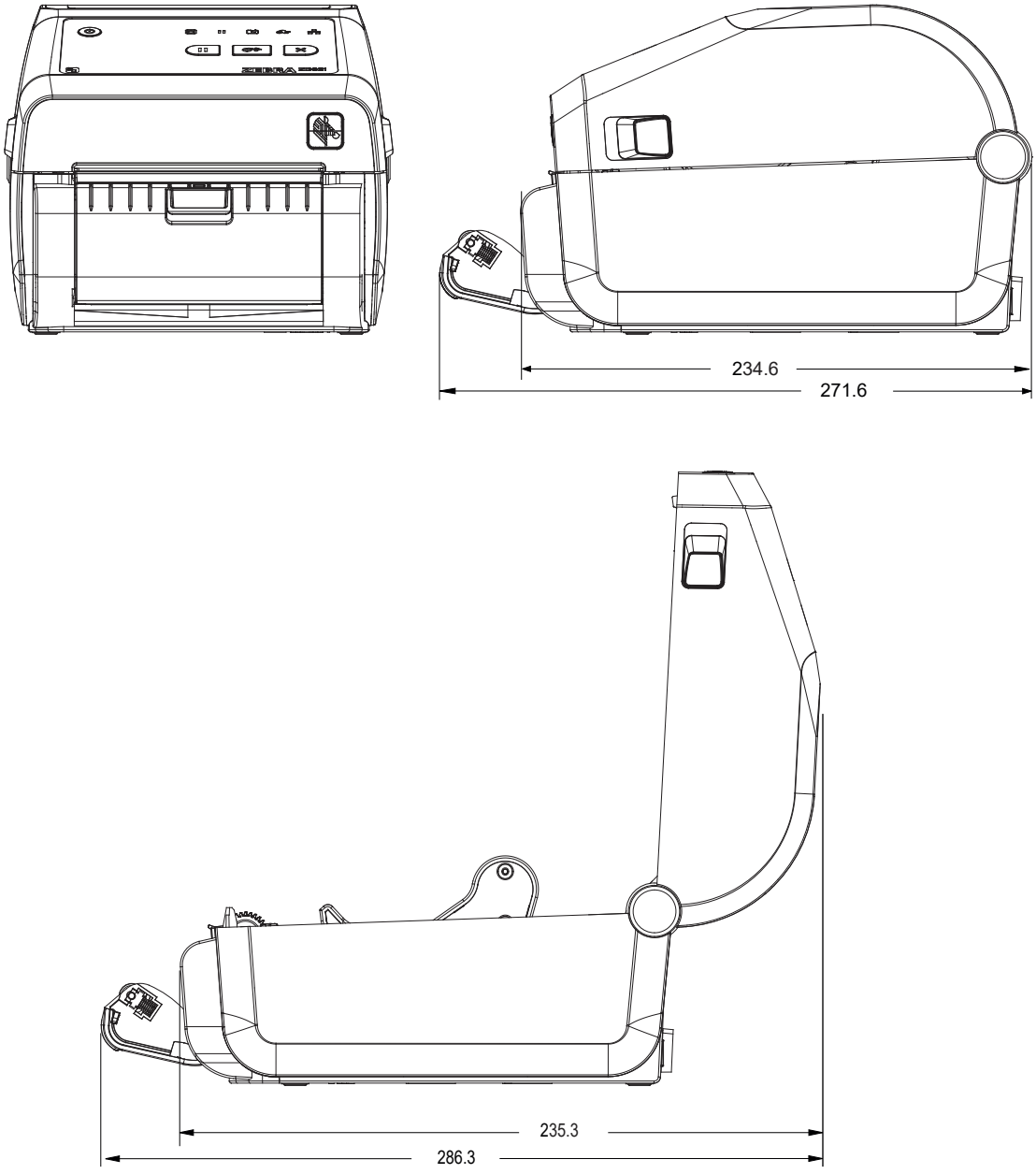
All dimensions are in millimeters.

Figure 32 ZD421/ZD621 Direct Thermal Printer Models – Dimensions of the Printer with the Label Dispenser Option Installed



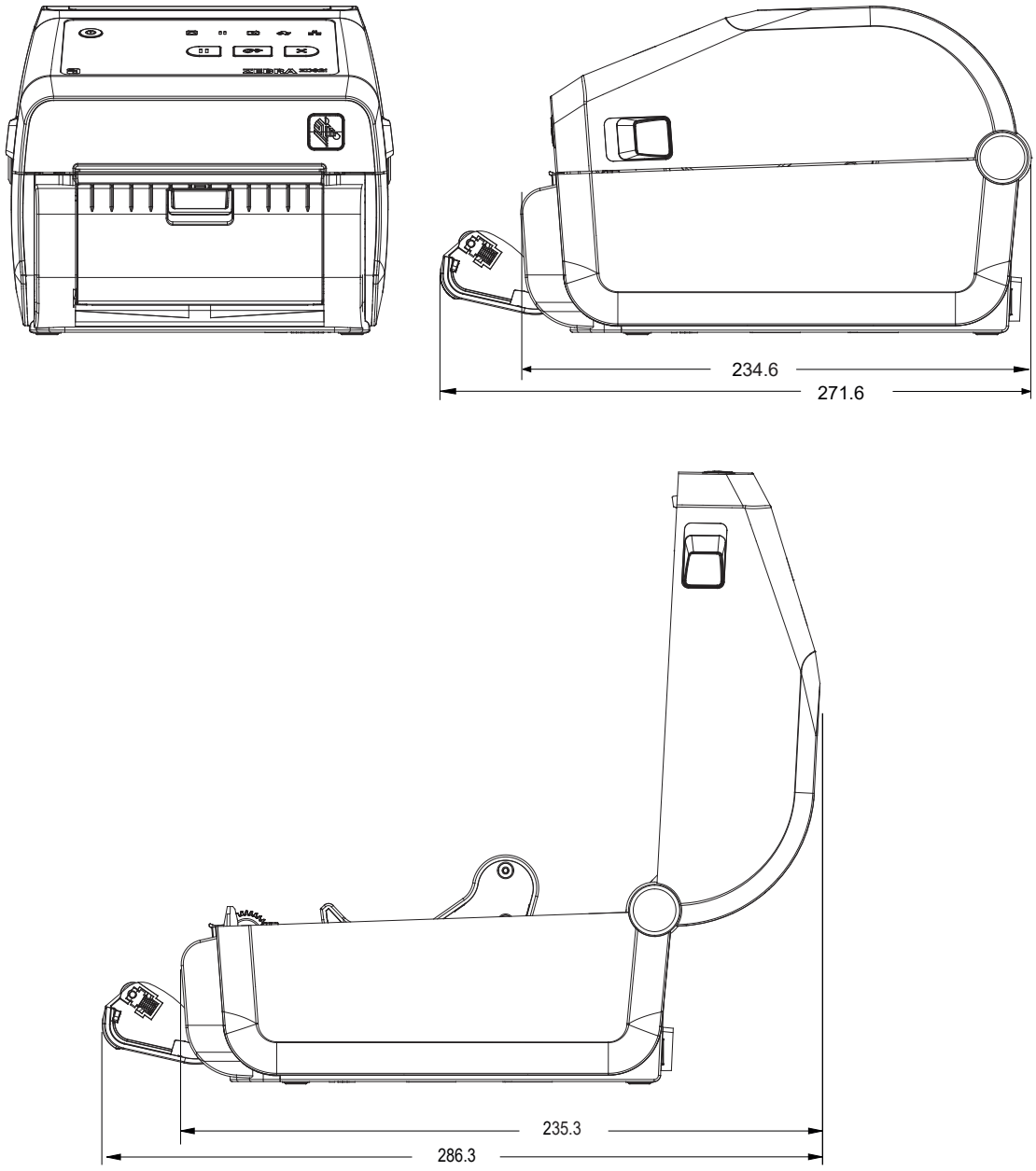
All dimensions are in millimeters.

Figure 33 ZD421/ZD621 Direct Thermal Printer Models – Dimensions of the Printer with the Label Dispenser Option Installed



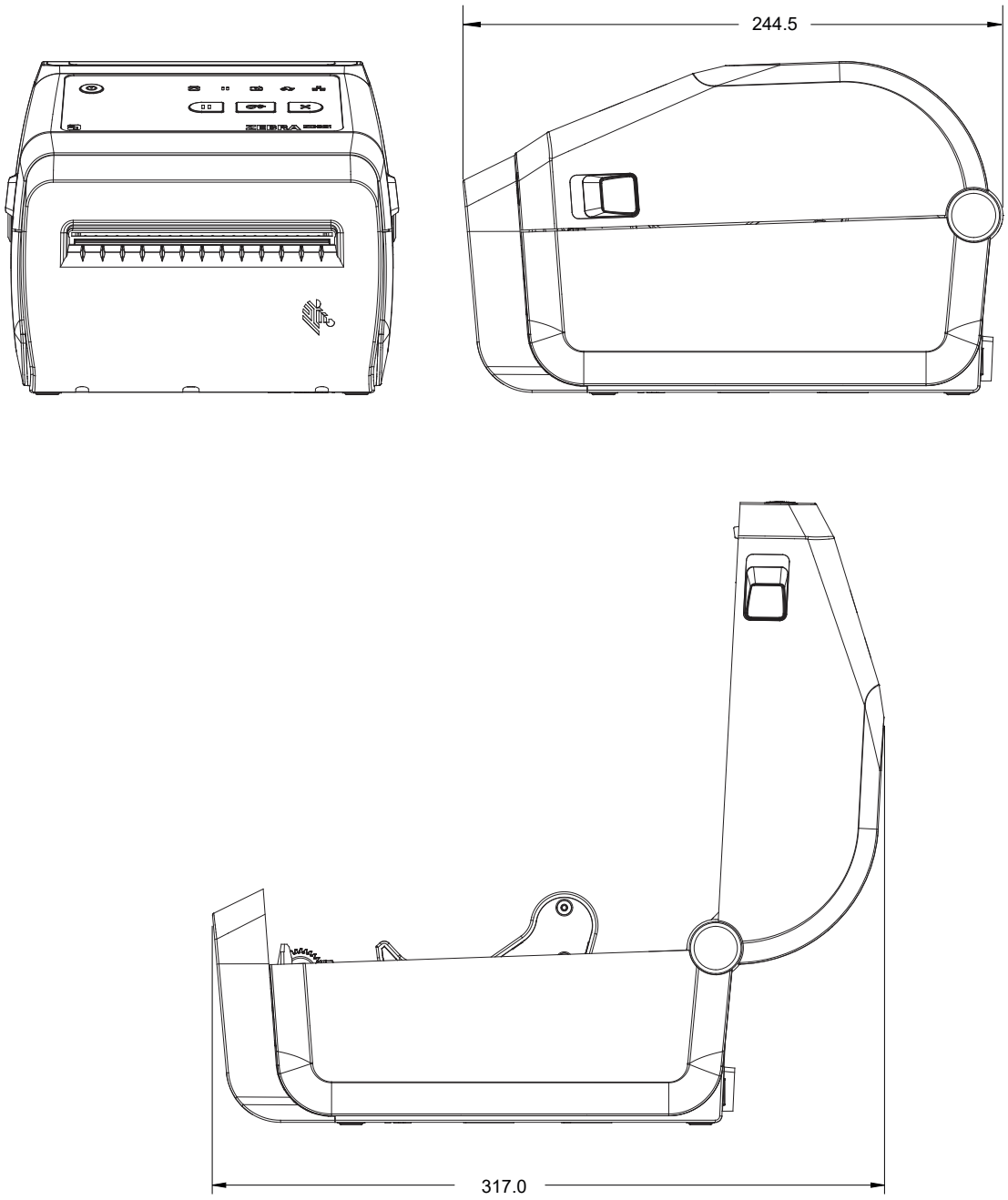
All dimensions are in millimeters.

Figure 34 ZD421/ZD621 Direct Thermal Printer Models – Dimensions of the Printer with the Label Dispenser Option Installed



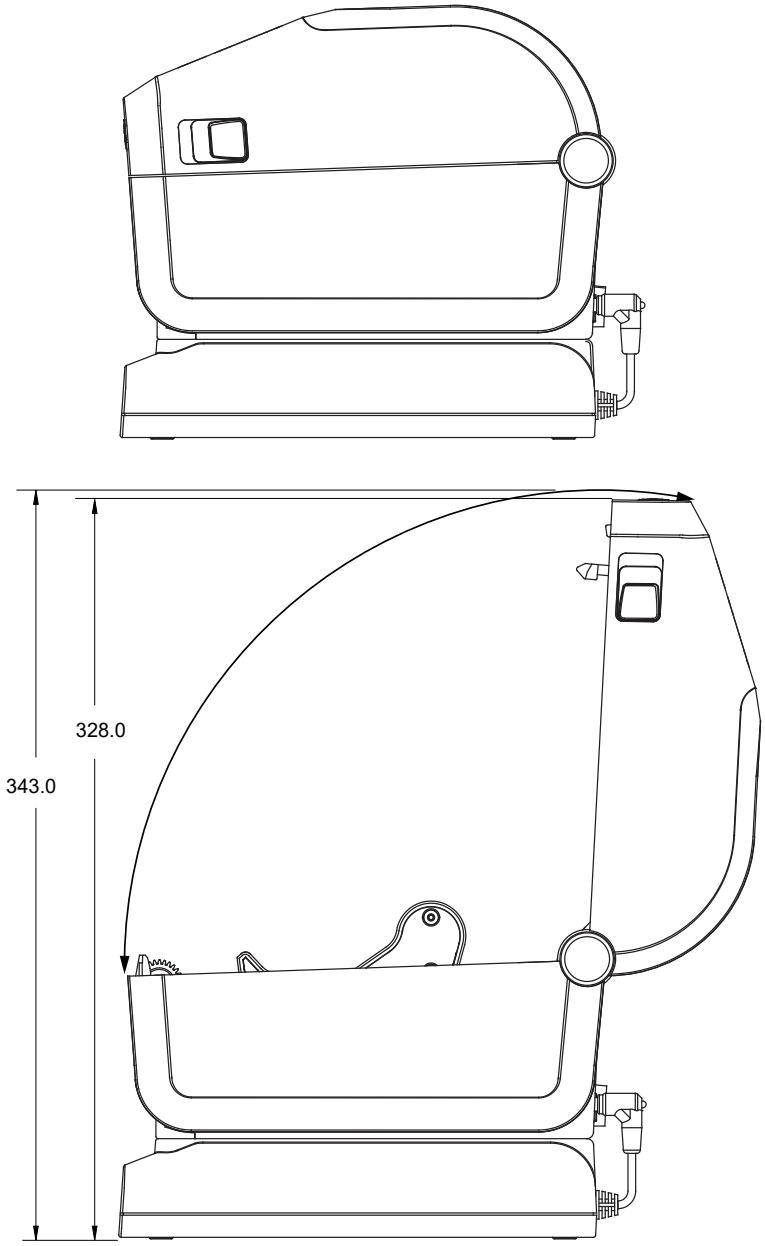
All dimensions are in millimeters.

Figure 35 ZD421/ZD621 Direct Thermal Printer Models – Dimensions of the Printer with the Cutter Option Installed



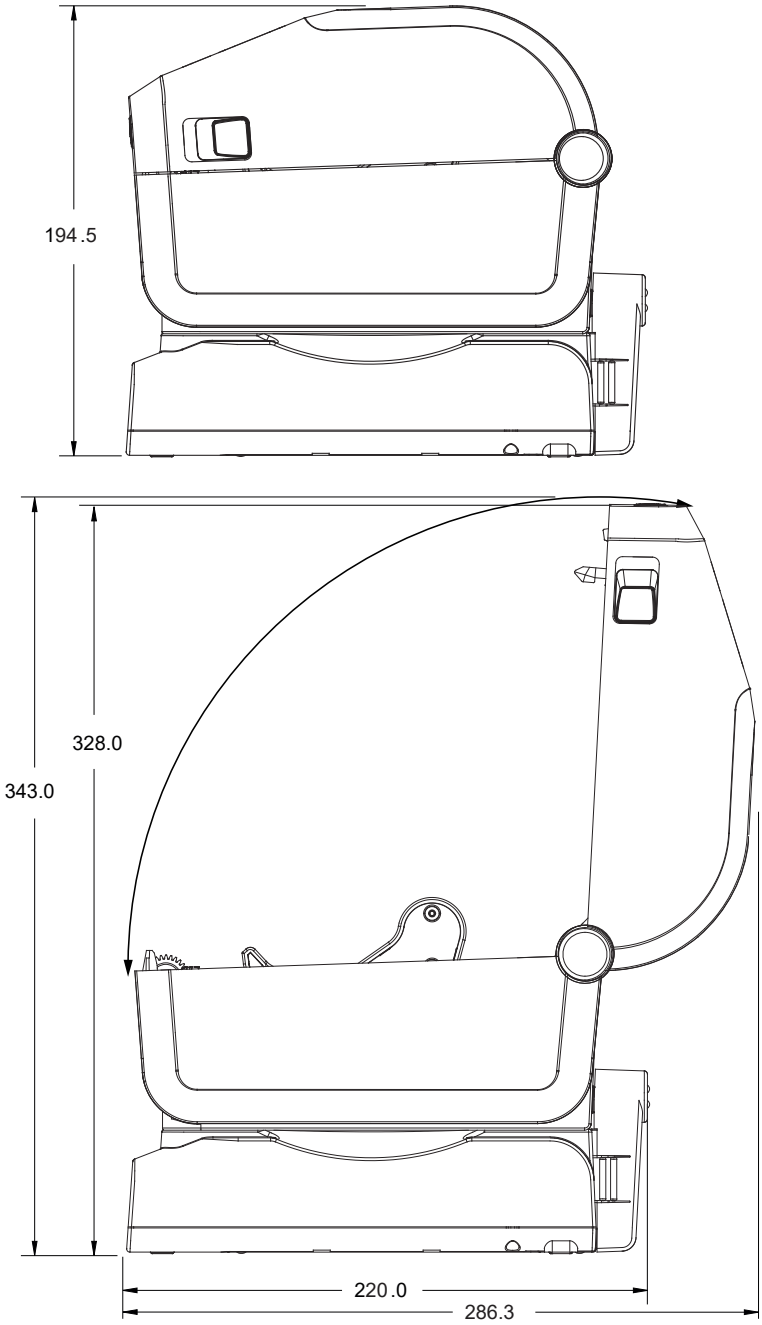
All dimensions are in millimeters.

Figure 36 ZD421/ZD621 Direct Thermal Printer Models – Dimensions of the Printer with the Power Supply Base Plugged in



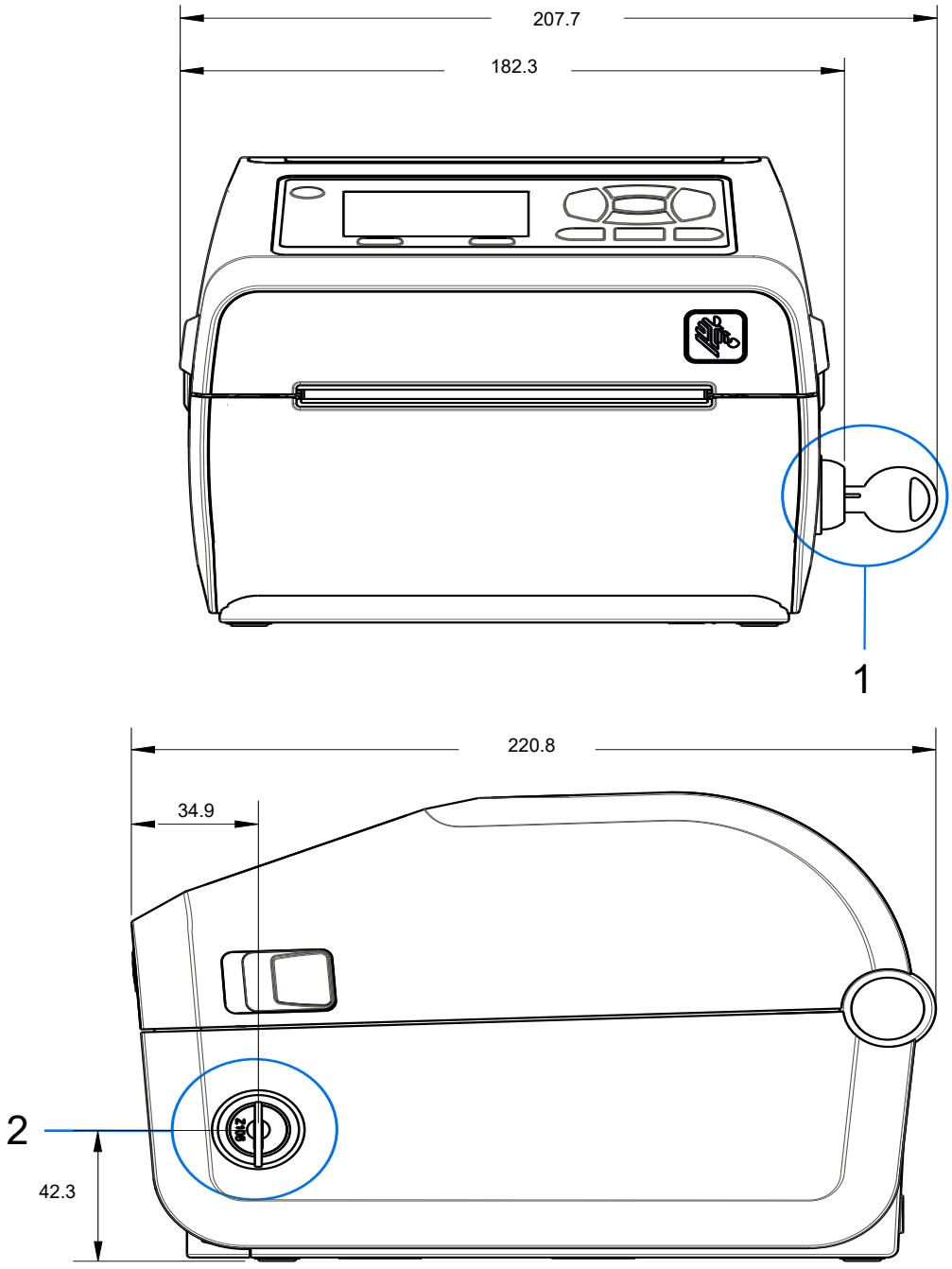
All dimensions are in millimeters.

Figure 37 ZD421/ZD621 Direct Thermal Printer Models – Dimensions of the Printer with the Attached Battery Base and Battery



All dimensions are in millimeters.

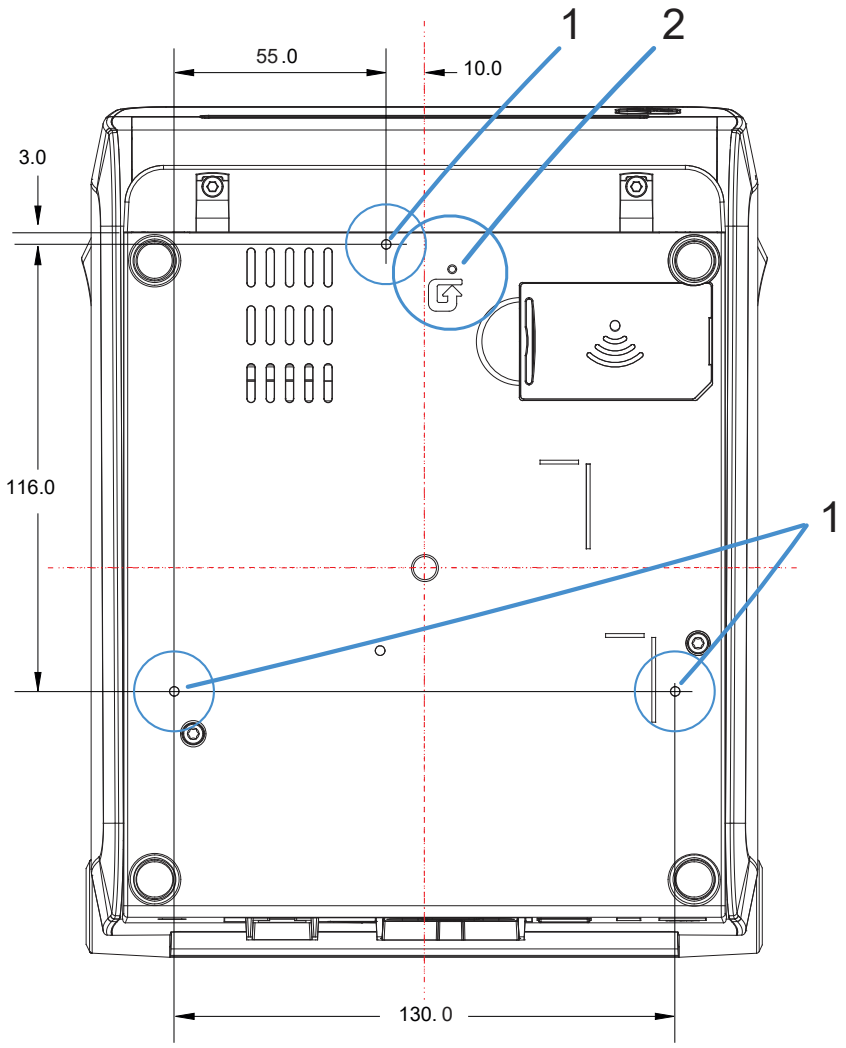
Figure 38 ZD621 Direct Thermal Printer (Healthcare Models Only) with Locking Media Cabinet – Dimensions



1 & 2	Locking media cabinet (shown with key in lock)

All dimensions are in millimeters.

Figure 39 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.

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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 271 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 324. 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.

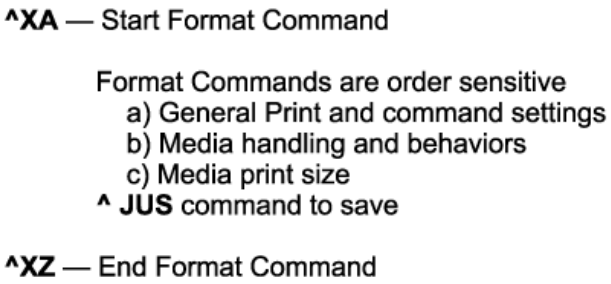
ZPL Printer Configuration Format and Reusable Files

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 378. 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).

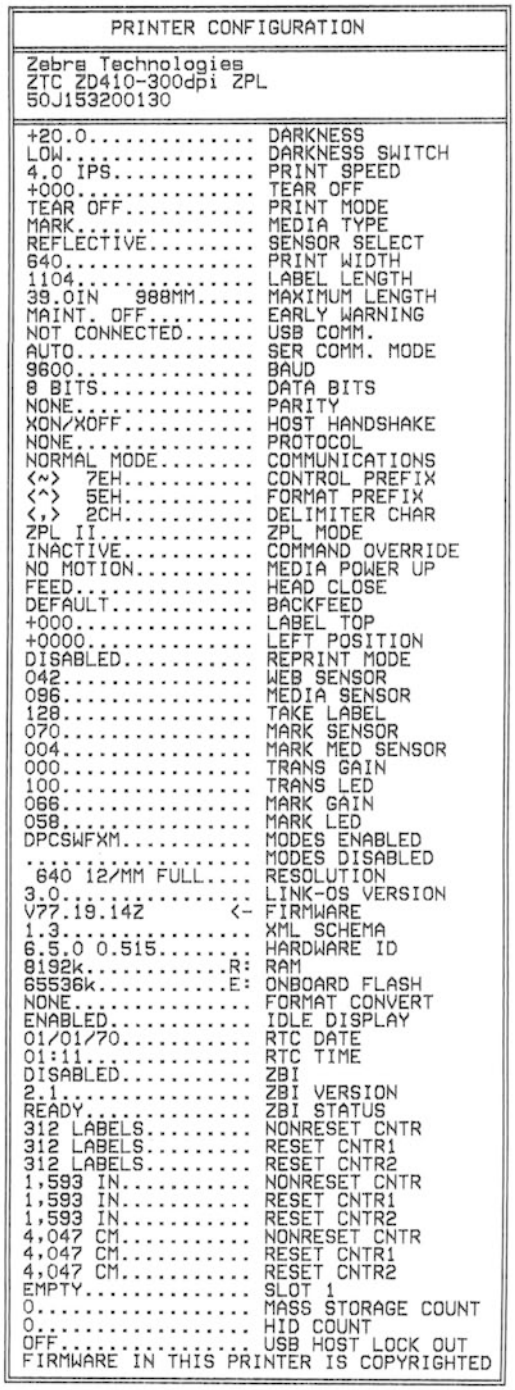
The figure below shows the basic recommended structure for a ZPL programming configuration file. This simple format makes the file reusable.

Figure 40 Configuration Parameter Format Structure



Configuration Setting to Command Cross-reference

The Printer Configuration Report, shown below, provides a listing of a majority of the configurations settings that can be set by ZPL command.



```
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
V77.19.142       <- 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
```

The sensor settings shown in this image, for example, are used for service purposes.

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
^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
^MF,b	HEAD CLOSE	FEED

Table 14 ZPL Commands and Configuration Report Callout Cross-Reference (Continued)

Command	Listing Name	Default (or description)
~JS	BACKFEED	DEFAULT
^LT	LABEL TOP	+000
^^LS	LEFT POSITION	+0000
~JD / ~JE	HEXDUMP	NO (~JE)
	REPRINT MODE	DISABLED

From this point in the Configuration Report, the printout lists sensor settings and values which can be used to troubleshoot sensor and media operations. These are typically used by Zebra Tech 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
^JH	LAST CLEANED	X,XXX IN
^MA	HEAD USAGE	X,XXX IN
~RO	TOTAL USAGE	X,XXX IN

Table 15 ZPL Commands and Configuration Report Callout Cross-Reference (Continued)

Command	Listing Name	Description
	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
	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

Programming for memory management and file naming is outlined here.

ZPL has various printer memory locations that are used to run the printer, assemble the print image, 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 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 (*) iwhen 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 Label	Prints a configuration Status Receipt (Label).Same as **FEED** button mode one flash routine.
^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).

Table 17 Object Management and Status Report Commands (Continued)

Command	Name	Description
~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.
~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.

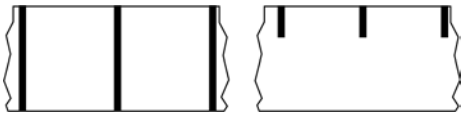
backfeed

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 385 or gap/notch media on page 387.

calibration (of a printer)

A process in which the printer determines some basic information needed to print accurately with a particular media and ribbon combination. To do this, the printer feeds some media and ribbon (if used) and senses whether to use the direct thermal or thermal transfer print method, along with (if using non-continuous media) the length of individual labels or tags.

collection method

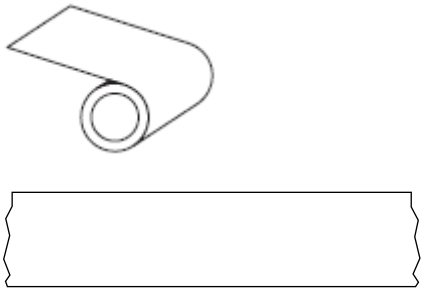
Select a media collection method that is compatible with your printer options. Selections include tear-off, peel-off, cutter, and rewind. The basic media and ribbon loading instructions are the same for all collection methods with some additional steps necessary for using any media collection options.

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

Label or tag-stock media that does not have gaps, holes, notches, or black marks to indicate label separations. The media is one long piece of material wound into a roll. This allows the image to be printed anywhere on the label. Sometimes a cutter is used to cut apart individual labels or receipts.



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 384 or gap/notch media on page 387.

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 389.)

direct thermal

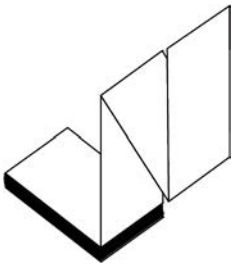
A printing method in which the printhead presses directly against the media. Heating the printhead elements causes a discoloration of the heat-sensitive coating on the media. By selectively heating the printhead elements as the media moves past, an image is printed onto the media. No ribbon is used with this printing method.

Contrast this with thermal transfer on page 392.

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 391.

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

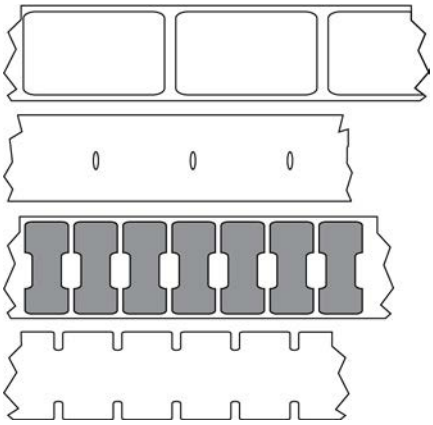
Non-volatile memory that maintains the stored information intact when power is off. This memory area is used to store the printer's operating program. Can also be used to store optional printer fonts, graphic formats, and complete label formats.

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 384 or continuous media on page 385.

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)

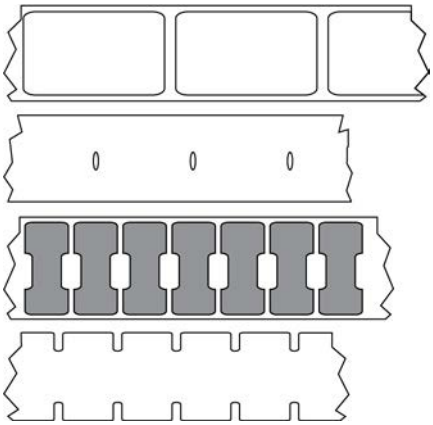
The material on which labels are affixed during manufacture and which is discarded or recycled.

label type

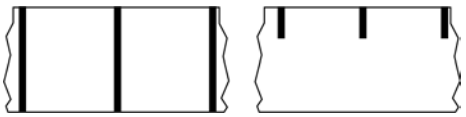
The printer recognizes the following label types.

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. Individual labels may be separated by perforations, or they can be cut apart. 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 considerably less than that of standard labels.

mark media

See black mark media on page 384.

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.

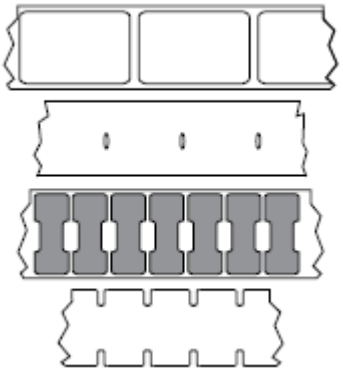
non-continuous media

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.

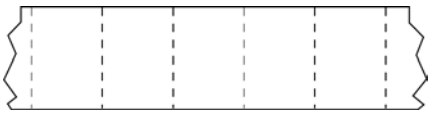
notched media

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 387.

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

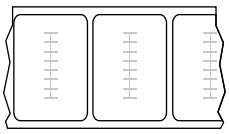
The print type specifies whether the type of media being used requires ribbon to print. Thermal transfer media requires ribbon while direct thermal media does not.

printhead wear

The degradation of the surface of the printhead and/or the print elements over time. Heat and abrasion can cause printhead wear. Therefore, to maximize the life of the printhead, use the lowest print darkness setting (sometimes called burn temperature or head temperature) and the lowest printhead pressure

necessary to produce good print quality. In the thermal transfer printing method, use ribbon that is as wide or wider than the media to protect the printhead from the rough media surface.

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.

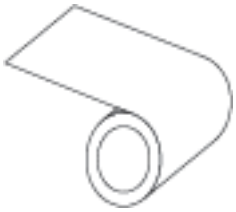
Ribbon is only used with the thermal transfer print method. Direct thermal media does not use ribbon. When ribbon is used, it must be as wide as or wider than the media being used. If the ribbon is narrower than the media, areas of the printhead are unprotected and subject to premature wear. Zebra ribbons have a coating on the back that protects the printhead from wear.

ribbon wrinkle

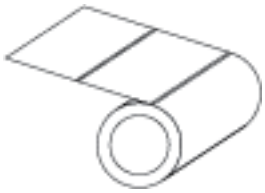
A wrinkling of the ribbon caused by improper alignment or improper printhead pressure. This wrinkle can cause voids in the print and/or the used ribbon to rewind unevenly. This condition should be corrected by performing adjustment procedures.

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 386.

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 387.)

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 386.

Innovation, Science, and Economic Development Canada (ISED) Warning
Le present appareil est conforme aux CNR d Industrie Canada applicables aux appareils radio exempts de licence. L exploitation est autorisee aux deux conditions suivantes: (1) appareil ne doit pas produire de brouillage, et (2) I utilisateur de l appareil doit accepter tout brouillage radioelectrique subi, meme si le brouillage est susceptible n compromettre le fonctionnement.
Énoncé d'exposition aux rayonnements: Cet équipement est conforme aux limites d'exposition aux rayonnements ioniques RSS-102 Pour un environnement incontrôlé. Cet équipement doit être installé et utilisé avec un Distance minimale de 20 cm entre le radiateur et votre corps.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) This device may not cause interference., (2) This device must accept any interference, including interference that may cause undesired operation of the device.
ISEDC Radiation Exposure Statement
This equipment complies with the IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and user body.

The end product must be labeled, in a visible area, with the following:
Contains IC: 3798B-WYSBHVDXP
Contains IC: 109AN-RE40

Operation in the band 5150–5350 MHz is only for indoor use
Les opérations dans la bande 5150-5350 MHz sont uniquement destinées à une utilisation à l'intérieur des bâtiments.

FCC Compliance Statement (USA)
This device complies with FCC rule. Operation is subject to the following two conditions:
1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with Class B Digital Devices, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the product manuals, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, the user is encouraged to employ one or more of the following measures:
• Reorient or relocate the receiving antenna
• Increase the separation between the equipment and receiver
• Connect the equipment to an outlet on a circuit different from that to which the receiver is connected
• Consult the dealer or an experienced RF service technician for help

The end product must be labeled, in a visible area, with the following:
Contains FCC ID: I28-WYSBHVDXP
Contains FCC ID: UZ7RE40

Modification Warning
The user is cautioned that any changes or modifications not expressly approved by Zebra Technologies could void the user's authority to operate the equipment. To ensure compliance, this printer must be used with fully shielded communication cables.

RF Exposure Statement
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must be at least 20 cm from the user and must not be co-located or operating in conjunction with any other antenna or transmitter.