

Zebra[®] 105SL*Plus*[™]

User Guide



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Declaration of Conformity

We have determined that the Zebra printers identified as the

105SL*Plus*[™]

manufactured by:

Zebra Technologies Corporation
333 Corporate Woods Parkway
Vernon Hills, Illinois 60061-3109 U.S.A.

Have been shown to comply with the applicable technical standards of the FCC

For Home, Office, Commercial, and Industrial use

If no unauthorized change is made in the equipment,
and if the equipment is properly maintained and operated.

Compliance Information

FCC Compliance Statement

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

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.



Note • This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, 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, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Canadian DOC Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Contents

Declaration of Conformity	3
Compliance Information	4
About This Document	9
Who Should Use This Document	10
How This Document Is Organized	10
Contacts	11
Document Conventions	12
1 • Introduction	13
Printer Components	14
Control Panel	15
Control Panel Display	17
Navigating in the Display	17
Changing Password-Protected Parameters	20
Default Password Value	20
Disable the Password Protection Feature	20
Operating Parameters on the Control Panel	21
2 • Printer Setup and Operation	37
Handling the Printer	38
Unpack and Inspect the Printer	38
To Store the Printer	38
To Ship the Printer	38
Select a Location for the Printer	39
Select a Data Communication Interface	40
Data Cables	42
Connect the Printer to a Power Source	43
Power Cord Specifications	44

Install the Control Panel Keypad Cover	46
Types of Media	47
Ribbon Overview.	49
When to Use Ribbon.	49
Coated Side of Ribbon	49
Select a Print Mode.	51
Load the Ribbon	54
Load the Media.	59
3 • Printer Configuration and Adjustment	81
Changing Printer Settings.	82
Print Settings	83
Maintenance and Diagnostic Tools	89
Network Settings.	96
Language Settings	100
Sensor Settings	102
Port Settings.	103
Calibrate the Ribbon and Media Sensors Manually	106
Remove Used Ribbon.	112
Remove Media or Liner from the Rewind Spindle.	113
Adjust Transmissive Media Sensors.	115
Upper Media Sensor.	115
Lower Media Sensor.	118
Adjust Printhead Pressure and Toggle Position	119
Toggle Position Adjustment	119
Printhead Pressure Adjustment	121
4 • Routine Maintenance	123
Replacing Printer Components	124
Ordering Replacement Parts	124
Recycling Printer Components	124
Lubrication	124
Cleaning Schedule and Procedures	125
Clean the Exterior.	125
Clean the Media Compartment.	126
Clean the Printhead and Platen Roller	126
Clean the Sensors	128
Clean the Snap Plate	130
Clean the Cutter	134
5 • Troubleshooting	135
Printing Issues	136
Error Messages.	139

- Calibration Problems 144
- Communications Problems 145
- Ribbon Problems 146
- Miscellaneous Issues 147
- Printer Diagnostics 148
 - Power-On Self Test 148
 - CANCEL Self Test 149
 - PAUSE Self Test 150
 - FEED Self Test 151
 - FEED + PAUSE Self Test 154
 - CANCEL + PAUSE Self Test 154
 - Communication Diagnostics Test 155
 - Sensor Profile 156
- 6 • Specifications 159**
 - Features 160
 - Standard Features 160
 - Optional Features 160
 - Zebra Programming Language (ZPL) 161
 - Bar Codes 161
 - General Specifications 162
 - Physical Specifications 162
 - Electrical Specifications 162
 - Environmental Conditions for Operation and Storage 162
 - Print Specifications 163
 - Media Specifications 164
 - Ribbon Specifications 165
- Glossary 167**
- Index 171**

About This Document

This section provides you with contact information, document structure and organization, and additional reference documents.

Contents

Who Should Use This Document	10
How This Document Is Organized	10
Contacts	11
Document Conventions	12

Who Should Use This Document

This User Guide is intended for use by any person who needs to perform routine maintenance, upgrade, or troubleshoot problems with the printer.

How This Document Is Organized

The User Guide is set up as follows:

Section	Description
<i>Introduction on page 13</i>	This section provides a high-level overview of the printer and its components.
<i>Printer Setup and Operation on page 37</i>	This section assists the technician with initial setup and operation of the printer.
<i>Printer Configuration and Adjustment on page 81</i>	This section assists you with configuration of and adjustments to the printer.
<i>Routine Maintenance on page 123</i>	This section provides routine cleaning and maintenance procedures.
<i>Troubleshooting on page 135</i>	This section provides information about errors that you might need to troubleshoot. Assorted diagnostic tests are included.
<i>Specifications on page 159</i>	This section provides the features of and specifications for this printer.
<i>Glossary on page 167</i>	The glossary provides a list of common terms.

Contacts

Technical Support via the Internet is available 24 hours per day, 365 days per year.

Web Site: www.zebra.com

E-mail Back Technical Library:

E-mail address: emb@zebra.com

Subject line: Emaillist

Self Service Knowledge Base: www.zebra.com/knowledgebase

Online Case Registration: www.zebra.com/techrequest

Which Department Do You Need?	The Americas	Europe, Middle East, and Africa	Asia Pacific and India
Regional Headquarters	Zebra Technologies Corporation 475 Half Day Road, Suite 500 Lincolnshire, IL 60069 USA T: +1 847 634 6700 Toll-free +1 866 230 9494 F: +1 847 913 8766	Zebra Technologies Europe Limited Dukes Meadow Millboard Road Bourne End Buckinghamshire, SL8 5XF United Kingdom T: +44 (0) 1628 556000 F: +44 (0) 1628 556001	Zebra Technologies Asia Pacific Pte. Ltd. 120 Robinson Road #06-01 Parakou Building Singapore 068913 T: + 65 6858 0722 F: +65 6885 0838
Technical Support For questions on the operation of Zebra equipment and software, please call your distributor. For additional assistance, contact us. <i>Please have your model and serial numbers available.</i>	T: +1 877 ASK ZEBRA (275 9327) F: +1 847 913 2578 Hardware: ts1@zebra.com Software: ts3@zebra.com <i>Kiosk printers:</i> T: +1 866 322 5202 E: kiosksupport@zebra.com	T: +44 (0) 1628 556039 F: +44 (0) 1628 556003 E: Tseurope@zebra.com	T: +65 6858 0722 F: +65 6885 0838 E: <i>China:</i> tschina@zebra.com <i>All other areas:</i> tsasiapacific@zebra.com
Repair Service Department For back-to-base service and repair.	T: +1 877 ASK ZEBRA (275 9327) F: +1 847 821 1797 E: repair@zebra.com To request a repair in the U.S., go to www.zebra.com/repair .	T: +44 (0) 1772 693069 F: +44 (0) 1772 693046 New requests: ukrma@zebra.com Status updates: repairupdate@zebra.com	T: +65 6858 0722 F: +65 6885 0838 E: <i>China:</i> tschina@zebra.com <i>All other areas:</i> tsasiapacific@zebra.com
Technical Training Department For Zebra product training courses.	T: +1 847 793 6868 T: +1 847 793 6864 F: +1 847 913 2578 E: ttamerica@zebra.com	T: +44 (0) 1628 556000 F: +44 (0) 1628 556001 E: Eurtraining@zebra.com	T: + 65 6858 0722 F: +65 6885 0838 E: <i>China:</i> tschina@zebra.com <i>All other areas:</i> tsasiapacific@zebra.com
Inquiry Department For product literature and distributor and dealer information.	T: +1 877 ASK ZEBRA (275 9327) E: inquiry4@zebra.com	T: +44 (0) 1628 556037 F: +44 (0) 1628 556005 E: mseurope@zebra.com	E: <i>China:</i> GCmarketing@zebra.com <i>All other areas:</i> APACChannelmarketing@zebra.com
Customer Service Department (US) Internal Sales Department (UK) For printers, parts, media, and ribbon, please call your distributor or contact us.	T: +1 877 ASK ZEBRA (275 9327) E: clientcare@zebra.com	T: +44 (0) 1628 556032 F: +44 (0) 1628 556001 E: cseurope@zebra.com	T: +65 6858 0722 F: +65 6885 0836 E: <i>China:</i> order-csr@zebra.com <i>All other areas:</i> csasiapacific@zebra.com

Key: T: Telephone
F: Facsimile
E: E-mail

Document Conventions

Table 1 shows the way that certain information is conveyed in this document.

Table 1 • Document Conventions

Alternate Color

If you are viewing this guide online, you can click the [blue text](#) used for cross-references or hyperlinks to jump directly to other sections in the guide or to web sites on the internet.

LCD Display Examples

Text from a printer's Liquid Crystal Display (LCD) appears in Arial font.

Command Line Examples, File Names, and Directories

Command line examples, file names, and directories appear in Courier New font. For example:

Type `ZTools` to get to the Post-Install scripts in the `/bin` directory.

Open the `Zebra<version number>.tar` file in the `/root` directory.

Icons and Advisory Words

The following icons and advisory words are used to draw your attention to certain areas of text.



Caution • Warns you of the potential for electrostatic discharge.



Caution • Warns you of a potential electric shock situation.



Caution • Warns you of a situation where excessive heat could cause a burn.



Caution • Advises you that failure to take or avoid a specific action could result in physical harm to you.

(No icon)

Caution • Advises you that failure to take or avoid a specific action could result in physical harm to the hardware.



Important • Advises you of information that is essential to complete a task.



Note • Indicates neutral or positive information that emphasizes or supplements important points of the main text.



Example • Provides an example, often a scenario, to better clarify a section of text.

Introduction

This section provides a high-level overview of the printer and its components.

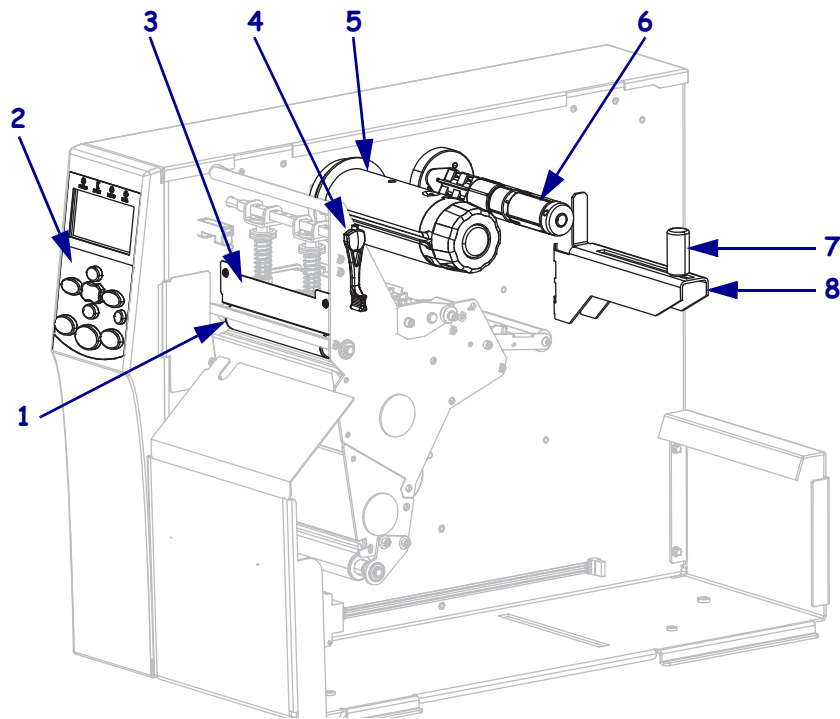
Contents

Printer Components	14
Control Panel	15
Control Panel Display	17
Types of Media	47
Ribbon Overview	49
When to Use Ribbon	49
Coated Side of Ribbon	49

Printer Components

Figure 1 shows the components inside the media compartment of your printer. Depending on printer model and the installed options, your printer may look slightly different. Familiarize yourself with these components before continuing with the printer setup procedure.

Figure 1 • Printer Components

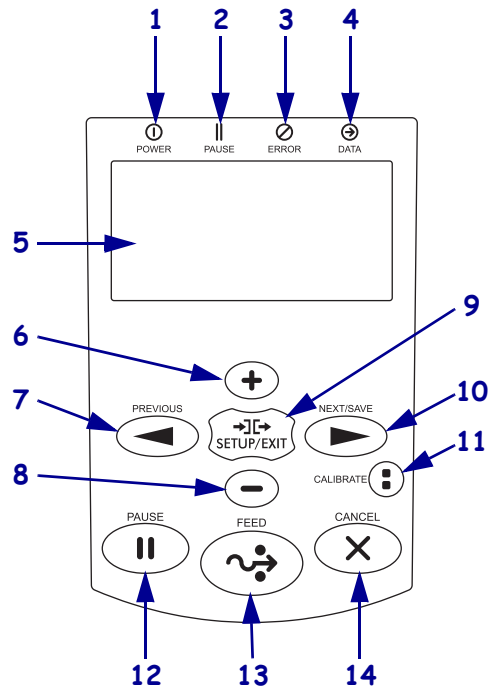


1	Platen roller
2	Control panel
3	Printhead assembly
4	Printhead-open lever
5	Ribbon take-up spindle
6	Ribbon supply spindle
7	Media supply guide
8	Media supply hanger

Control Panel

All controls and indicators for the printer are located on the control panel (Figure 2).

Figure 2 • Control Panel



1	POWER light	On when the printer is on.	
2	PAUSE light	On when the printer is paused.	
3	ERROR light	Off	Normal operation—no printer errors.
		On	A printer error exists. Check the display for more information.
4	DATA light	Off	Normal operation. No data being received or processed.
		On	The printer is processing data or is printing. No data is being received.
		Blinking	The printer is receiving data from or sending status information to the host computer.
5	The display shows the printer's operating status and allows the user to navigate the menu system.		
6	The PLUS (+) button changes the parameter values. Common uses are to increase a value, to scroll through choices, or to change values while entering the printer password.		
7	The PREVIOUS button navigates to the previous parameter in the menus.		
8	The MINUS (-) button changes the parameter values. Common uses are to decrease a value, to scroll through choices, or to change the cursor position while entering the printer password.		
9	The SETUP/EXIT button enters and exits configuration mode.		

10	The NEXT/SAVE button <ul style="list-style-type: none">• When in Setup Mode, the NEXT/SAVE button navigates to the next parameter in the menus.• When exiting Setup Mode, the NEXT/SAVE button initiates various options. (See <i>Exit Setup Mode</i> on page 19.)
11	The CALIBRATE button <ul style="list-style-type: none">• When the printer is paused and in non-continuous mode, the CALIBRATE button initiates a SHORT CAL calibration, which sets the media and web thresholds without adjusting sensor gain, determines the label length, and feeds the media to the next web.• If the printer is in continuous mode or is not paused, this button has no effect.
12	The PAUSE button starts or stops printer operation when pressed.
13	The FEED button forces the printer to feed one blank label each time the button is pressed.
14	The CANCEL button cancels print jobs when the printer is paused.

Control Panel Display

The control panel includes a display, where you can view the printer's status or change its operating parameters. In this section, you will learn how to navigate through the menu system and change values for menu items.

After the printer completes the power-up sequence, it moves to the Idle Display (Figure 3).

Figure 3 • Idle Display



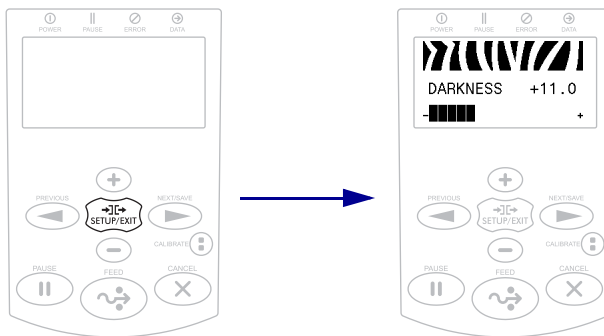
1	The printer's current status
2	Information that you set through <i>Idle Display</i> on page 95

Navigating in the Display

Table 2 shows the options available for navigating through the parameters in the display.

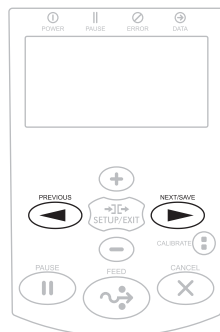
Table 2 • Navigation

Enter Setup Mode



At the Idle Display (Figure 3), press **SETUP** to enter Setup Mode. The printer displays the first parameter.

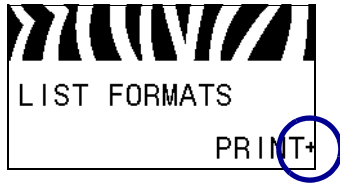
Scroll through the Parameters



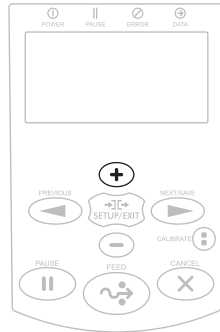
To scroll through the parameters, press **PREVIOUS** or **NEXT/SAVE**.

Table 2 • Navigation (Continued)

Perform an action



+ indicates that an action can be performed.

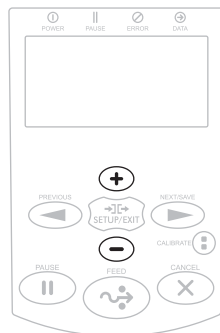


Press **PLUS (+)** to perform the specified action.

Change Parameter Values



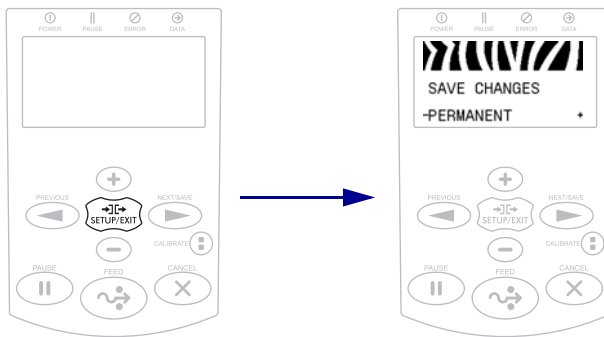
- and + indicate that a value can be changed.



Press **PLUS (+)** or **MINUS (-)** to scroll through the accepted values.

Table 2 • Navigation (Continued)

Exit Setup Mode



1. At the Idle Display (Figure 3), press **SETUP** to enter Setup Mode. The printer displays the first parameter.
2. While in Setup Mode, press **SETUP/EXIT** to exit the operating parameters.
The LCD displays **SAVE CHANGES**.
3. To return to the parameters, press **PREVIOUS**.
OR
Press **PLUS (+)** or **MINUS (-)** to scroll through the exit options:
 - **PERMANENT**—Stores values in the printer even when power is turned off.
 - **TEMPORARY**—Saves the changes until power is turned off.
 - **CANCEL**—This option cancels all changes made since you entered Setup mode, except for changes made to **DARKNESS**, **TEAR OFF**, **COMMUNICATION**, and **LANGUAGE** settings, which go into effect as soon as they are made.
 - **LOAD DEFAULTS**—Use this option to restore all settings other than the network settings back to the factory defaults. Use care when loading defaults because you will need to reload all settings that you changed manually.
 - **LOAD LAST SAVE**—Loads the values from the last permanent save.
 - **DEFAULT NET**—Use this option to restore all print server and network settings back to the factory defaults. Use care when loading defaults because you will need to reload all settings that you changed manually.
4. Press **NEXT/SAVE** to select the displayed choice and exit Setup Mode.

When the configuration and calibration sequence finishes, the printer returns to the Idle Display.

Changing Password-Protected Parameters

Certain parameters, including the communication parameters, are password-protected by factory default.

Caution • Do not change password-protected parameters unless you have a complete understanding of the parameters' functions. If the parameters are set incorrectly, the printer may function unpredictably.

The first time that you attempt to change a password-protected parameter, the printer displays **ENTER PASSWORD**. Before you can change the parameter, you must enter the four-digit numeric password. After you have entered the password correctly, you do not have to enter it again unless you leave Setup mode by pressing **SETUP/EXIT** or by turning off (●) the printer.

To enter a password for a password-protected parameter, complete these steps:

1. At the password prompt, use **MINUS (-)** to change the selected digit position.
2. When you have selected the digit that you wish to change, use **PLUS (+)** to increase the selected digit value. Repeat these two steps for each digit of the password.
3. After entering the password, press **SELECT**.

The parameter you selected to change is displayed. If the password was entered correctly, you can change the value.

Default Password Value

The default password value is **1234**. The password can be changed using the Zebra Programming Language (ZPL) command **^KP** (Define Password) or using the printer's web pages (ZebraNet wired or wireless print server required).

Disable the Password Protection Feature

You can disable the password protection feature so that it no longer prompts you for a password by setting the password to **0000** via the **^KP** ZPL command. To re-enable the password-protection feature, send the ZPL command **^KPx**, where **x** can be any number from 1 to 9999.

Operating Parameters on the Control Panel

Items in this menu are shown in the order in which they appear when you press the **RIGHT ARROW**. For more information about these settings, see [Print Settings on page 83](#).



Adjust the Print Darkness

Set the darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, bar codes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely.

See [Print Darkness on page 83](#) for more information.



Select the Print Speed

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

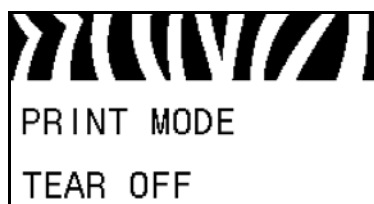
See [Print Speed on page 83](#) for more information.



Adjust the Tear-Off Position

If necessary, adjust the position of the media over the tear-off bar after printing.

See [Tear-Off Position on page 84](#) for more information.



Select the Print Mode

Select a print mode that is compatible with your printer options.

See [Print Mode on page 84](#) for more information.



Set the Media Type

Select the type of media that you are using.

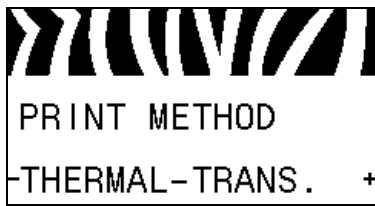
See [Media Type on page 85](#) for more information.



Select the Media Sensor

Select the media sensor that is appropriate for the media that you are using.

See [Sensor Type on page 102](#) for more information.



Select the Print Method

Specify if ribbon is being used. Thermal Transfer media requires ribbon for printing while Direct Thermal media does not.

To determine if you need to use ribbon, see [When to Use Ribbon on page 49](#).

See [Print Method on page 85](#) for more information.



Adjust the Print Width

Specify the width of the labels being used.

See [Print Width on page 85](#) for more information.



Set the Maximum Label Length

Set the maximum label length to a value that is at least 1.0 in. (25.4 mm) greater than the actual label length plus the interlabel gap. If you set the value to one that is smaller than the label length, the printer assumes that continuous media is loaded, and the printer cannot calibrate.

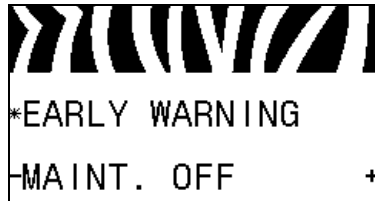
See [Maximum Label Length on page 86](#) for more information.



Set Supplies Low Warning

When this feature is enabled, the printer provides warnings when the media or ribbon is reaching near the end of the roll.

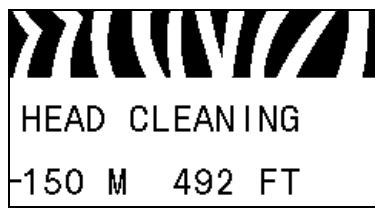
See [Supplies Low Warning on page 89](#) for more information.



Set Early Warning for Maintenance

When this feature is enabled, the printer provides warnings when the printhead needs to be cleaned.

See [Early Warning for Maintenance on page 89](#) for more information.



Set Printhead Cleaning Interval*

When Early Warning for Maintenance is enabled, set this value to the length of the media or ribbon roll that you are using.

See [Printhead Cleaning Interval on page 89](#) for more information.

* *This parameter appears only if Early Warning for Maintenance is enabled.*



Reset Printhead Cleaning Counter for Early Warning*

- If you received the message WARNING CLEAN PRINTHEAD, clean the printhead, and then press **PLUS** to select YES to reset the Early Warning for Maintenance printhead cleaning counter.
- If you have not cleaned the printhead, press **MINUS** to select NO.

* *This parameter appears only if Early Warning for Maintenance is enabled.*



Set Printhead Life Expectancy*

When Early Warning for Maintenance is enabled, set this value to the number of inches of media that the printhead is expected to print.

See [Printhead Life Expectancy on page 89](#) for more information.

* *This parameter appears only if Early Warning for Maintenance is enabled.*



Reset New Printhead Counter for Early Warning*

- If you received the message WARNING REPLACE HEAD, replace the printhead, and then press **PLUS (+)** to select YES to reset the Early Warning for Maintenance printhead replacement counter.
- If you have not replaced the printhead, press **MINUS (-)** to select NO.

* *This parameter appears only if Early Warning for Maintenance is enabled.*



View the Non-Resettable Counter

This parameter displays the total length of media that the printer has printed.

See [Non-Resettable Counter on page 90](#) for more information.



View User-Controlled Counter 1

This parameter displays the total length of media that the printer has printed since this counter was last reset.

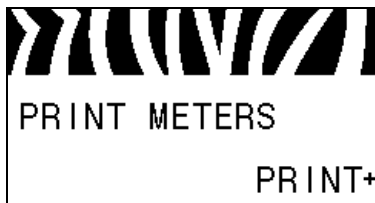
See [User-Controlled Counters on page 90](#) for more information.



View User-Controlled Counter 2

This parameter displays the total length of media that the printer has printed since this counter was last reset.

See [User-Controlled Counters on page 90](#) for more information.



Print Counter Readings

Prints a label that lists the odometer readings for the following:

- the non-resettable counter
- the two user-controlled counters
- the Early Warning for Maintenance counters, which indicate when the printhead was last cleaned and the printhead life (If the Early Warning for Maintenance feature is disabled, the counters related to it do not print.)

See [Print Counter Readings on page 90](#) for more information.



Print Font List

This option prints a label that lists the available fonts in the printer, including standard printer fonts plus any optional fonts. Fonts may be stored in RAM or Flash memory.

See [Print Information on page 91](#) for more information.



Print Bar Code List

This option prints a label that lists the available bar codes in the printer. Bar codes may be stored in RAM or Flash memory.

See [Print Information on page 91](#) for more information.



Print Image List

This option prints a label that lists the available images stored in the printer's RAM, Flash memory, or optional memory card.

See [Print Information on page 91](#) for more information.



Print Format List

This option prints a label that lists the available formats stored in the printer's RAM, Flash memory, or optional memory card.

See [Print Information on page 91](#) for more information.



Print Configuration Label

This option prints a configuration label (see [Figure 13 on page 149](#)), which lists the current printer configuration.

See [Print Information on page 91](#) for more information.



Print Network Configuration Label

This option prints a configuration label (see [Figure 14 on page 149](#)), which lists the settings for any print server that is installed.

See [Print Information on page 91](#) for more information.



Print All Labels

This option prints labels that list the available fonts, bar codes, images, formats, and the current printer and network configurations.

See [Print Information on page 91](#) for more information.



Initialize Flash Memory

This option erases all previously stored information from Flash memory.

1. If prompted for a password, enter the printer password. For instructions, see [Changing Password-Protected Parameters on page 20](#).

The display shows INITIALIZE FLASH?

2. Press PLUS (+) to select YES.

The display shows ARE YOU SURE?.

3. Do you want to continue?

- Press **MINUS** (-) to select NO to cancel the request and return to the INITIALIZE FLASH prompt.
- Press **PLUS** (+) to select YES and begin initialization. When initialization is complete, the control panel displays INITIALIZING COMPLETED.



Note • Initializing memory can take several minutes. See [Initialize Flash Memory on page 91](#) for more information.



Print a Sensor Profile

Use this menu item to print a sensor profile.

See [Print a Sensor Profile on page 91](#) for more information.



Calibrate the Media and Ribbon Sensors

Use this menu item to adjust the sensitivity of the media and ribbon sensors.

See [Media and Ribbon Sensor Calibration on page 94](#) for more information. For instructions on how to perform a calibration procedure, see [Calibrate the Ribbon and Media Sensors Manually on page 106](#).



Set Parallel Communications

Select the communications port that matches the one being used by the host computer.

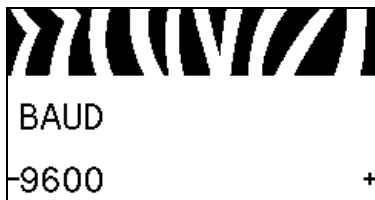
See [Parallel Communications on page 103](#) for more information.



Set Serial Communications

Select the communications port that matches the one being used by the host computer.

See [Parallel Communications on page 103](#) for more information.



Set the Baud Rate

Select the baud value that matches the one being used by the host computer.

See [Baud Rate on page 104](#) for more information.



Set the Data Bits Value

Select the data bits value that matches the one being used by the host computer.

See [Data Bits on page 104](#) for more information.



Set the Parity Value

Select the parity value that matches the one being used by the host computer.

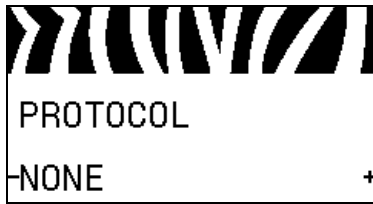
See [Parity on page 104](#) for more information.



Set the Host Handshake Protocol Value

Select the handshake protocol that matches the one being used by the host computer.

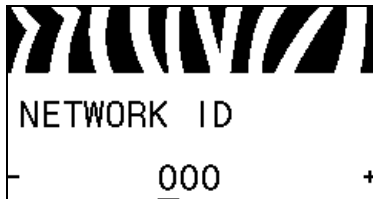
See [Host Handshake on page 105](#) for more information.



Set the Zebra Protocol Value

Protocol is a type of error checking system. Depending on the selection, an indicator may be sent from the printer to the host computer signifying that data has been received. Select the protocol that is requested by the host computer.

See [Protocol on page 105](#) for more information.



Set the Network ID

This parameter assigns a unique number to the printer when the printer is operating in an RS422/485 multi-drop network environment (an external RS422/485 adapter is required). This gives the host computer the means to address a specific printer. This does not affect TCP/IP or IPX networks. Set a unique network ID number for this printer.

See [Network ID on page 105](#) for more information.



Enable Communication Diagnostics Mode

Use this diagnostics tool to cause the printer to output the hexadecimal values for all data received by the printer.

See [Communication Diagnostics Mode on page 94](#) for more information.



Set the Control Character Value

Set the control prefix character to match what is used in your label formats.

See [Control Character on page 100](#) for more information.



Set the Format Command Prefix Value

Set the format command prefix character to match what is used in your label formats.

See [Command Character on page 101](#) for more information.



Set the Delimiter Character Value

Set the delimiter character to match what is used in your label formats.

See [Delimiter Character on page 101](#) for more information.



Set the ZPL Mode

Select the ZPL mode that matches what is used in your label formats.

See [ZPL Mode on page 101](#) for more information.



Set the Power-Up Action

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

See [Power-Up Action on page 92](#) for more information.



Set the Head-Close Action

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

See [Head-Close Action](#) on page 92 for more information.



Set the Backfeed Sequence

This parameter sets when label backfeed occurs after a label is removed in some print modes. It has no effect in Rewind mode.

This setting is superseded by ~JS when received as part of a label format.

See [Backfeed Sequence](#) on page 87 for more information.



Adjust the Label Top Position

This parameter adjusts the print position vertically on the label. Positive numbers adjust the label top position farther down the label (away from the printhead) by the specified number of dots. Negative numbers adjust the position up the label (toward the printhead).

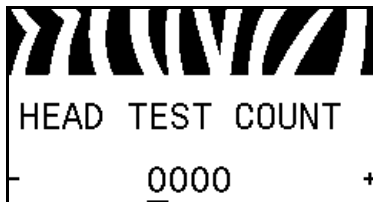
See [Label Top Position](#) on page 87 for more information.



Adjust the Label Left Position

If necessary, shift the print position horizontally on the label. Positive numbers move the left edge of the image toward the center of the label by the number of dots selected, while negative numbers move the left edge of the image toward the left edge of the label.

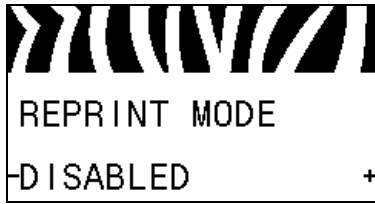
See [Label Left Position](#) on page 87 for more information.



Set the Head Test Count*

The printer periodically performs a test of the printhead functionality. This parameter establishes how many labels are printed between these internal tests.

See [Head Test Count](#) on page 87 for more information.



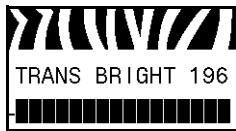
Set the Reprint Mode

When reprint mode is enabled, you can reprint the last label printed either by issuing certain commands or by pressing the **LEFT ARROW** on the control panel.

See [Reprint Mode on page 88](#) for more information.

View Sensor Settings

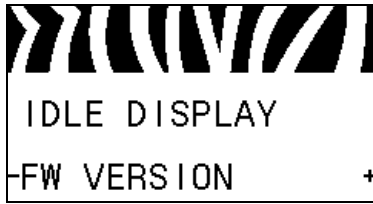
The following parameters are automatically set during the calibration procedure and should be changed only by a qualified service technician.



Select Format Conversion Scaling Factor

Selects the bitmap scaling factor. The first number is the original dots per inch (dpi) value; the second, the dpi to which you would like to scale.

See [Format Conversion on page 94](#) for more information.



Select the Idle Display

Select the information shown on the printer's display when the printer is idle.

See [Idle Display on page 95](#) for more information.



Set the Real-Time Clock (RTC) Date

This parameter allows you to set the date to display in the Idle Display.

See [RTC Date on page 95](#) for more information.



Set the Real-Time Clock (RTC) Time

This parameter allows you to set the date to display in the Idle Display.

See [RTC Time on page 95](#) for more information.



Run the Specified ZBI Program*

- To run the ZBI program selected by the previous menu item, press **PLUS (+)**.
- If you did not replace the ribbon, press **MINUS (-)** to select **CANCEL**, or press the **LEFT ARROW** or **RIGHT ARROW** to move to another parameter.

See [Run a ZBI Program on page 95](#) for more information.

* *This menu item appears only if ZBI is enabled on your printer and no ZBI program is running.*



Select the Primary Network Device

This parameter determines which device should be considered primary in the active device selection.

See [Primary Network on page 96](#) for more information.



View if IP Settings Are Loaded from the Printer or Print Server

This parameter tells whether to use the printer's or the print server's LAN/WLAN settings at power-up. The default is to use the printer's settings.

See [Load from External Device on page 96](#) for more information.



View the Active Print Server*

This menu item displays which print server is being used. This tells which device's settings such as IP protocol and IP address are being displayed under those menu items.

* *This menu item, which cannot be modified from the control panel, appears only if a wired or wireless print server is installed in your printer.*

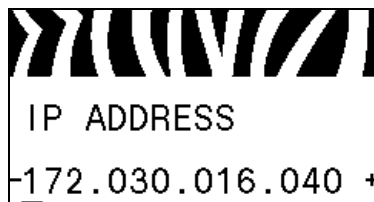


Set the IP Resolution Method*

This parameter tells if the user (permanent) or the server (dynamic) selects the IP address. If a dynamic option is chosen, this parameter tells the method(s) by which the wired or wireless print server receives the IP address from the server.

See [IP Protocol on page 97](#) for more information.

* *This menu item appears only if a wired or wireless print server is installed in your printer.*



Set the Printer's IP Address*

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

Changes are saved only if IP PROTOCOL is set to PERMANENT. To allow any saved changes to take effect, use [RESET NETWORK on page 35](#) to reset the print server.

See [IP Address on page 97](#) for more information.

* *This menu item appears only if a wired or wireless print server is installed in your printer.*



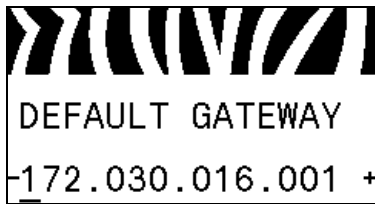
Set the Subnet Mask*

View and, if necessary, change the subnet mask.

Changes are saved only if IP PROTOCOL is set to PERMANENT. To allow any saved changes to take effect, use [RESET NETWORK on page 35](#) to reset the print server.

See [Subnet Mask on page 98](#) for more information.

** This menu item appears only if a wired or wireless print server is installed in your printer.*



Set the Default Gateway*

View and, if necessary, change the default gateway.

Changes are saved only if IP PROTOCOL is set to PERMANENT. To allow any saved changes to take effect, use [RESET NETWORK on page 35](#) to reset the print server.

See [Default Gateway on page 98](#) for more information.

** This menu item appears only if a wired or wireless print server is installed in your printer.*



View the MAC Address*

View the Media Access Control (MAC) address of the print server that is installed in the printer (wired or wireless).

See [MAC Address on page 98](#) for more information.

** This menu item, which cannot be modified from the control panel, appears only if a wired or wireless print server is installed in your printer.*



View the ESSID Value*

The Extended Service Set Identification (ESSID) is an identifier for your wireless network. This setting, which cannot be modified from the control panel, gives the ESSID for the current wireless configuration.

See [ESSID on page 99](#) for more information.

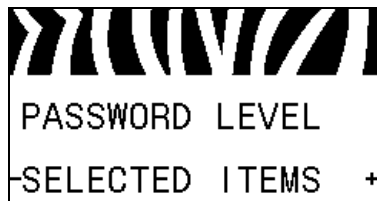
** This menu item, which cannot be modified from the control panel, appears only if a wireless print server is installed in your printer.*

**Reset the Network Settings***

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

See [Reset Network on page 99](#) for more information.

* *This menu item appears only if a wired or wireless print server is installed in your printer.*

**Specify the Password Level**

This parameter allows you to select whether certain factory-selected menu items or all menu items are password protected.

See [Password Level on page 95](#) for more information.



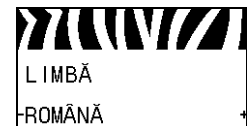
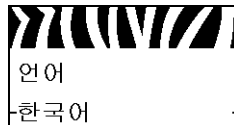
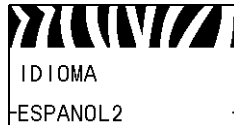
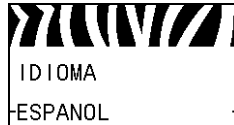
Select the Display Language

If necessary, change the language that the printer displays.

See [Language](#) on page 100 for more information.



Note • The selections for this parameter are displayed in the actual languages to make it easier for you to find one that you are able to read.



Printer Setup and Operation

This section assists the technician with initial setup and operation of the printer.

Contents

Handling the Printer	38
Unpack and Inspect the Printer	38
To Store the Printer	38
To Ship the Printer	38
Select a Location for the Printer	39
Select a Data Communication Interface	40
Data Cables	42
Connect the Printer to a Power Source	43
Power Cord Specifications	44
Install the Control Panel Keypad Cover	46
Select a Print Mode	51
Load the Ribbon	54
Load the Media	59

Handling the Printer

This section describes how to handle your printer.

Unpack and Inspect the Printer



Important • Zebra Technologies is not responsible for any damage incurred during the shipment of the equipment and will not repair this damage under warranty.

When you receive the printer, do the following:

1. Immediately unpack the printer.
2. Check all exterior surfaces for damage.
3. Raise the media door, and inspect the media compartment for damage to components.
4. If you discover shipping damage during inspection, do the following:
 - Immediately notify the shipping company, and file a damage report.
 - Keep all packaging material for shipping company inspection.
 - Notify your authorized Zebra reseller.

To Store the Printer

If you are not placing the printer into immediate operation, repackage it using the original packing materials. You may store the printer under the following conditions:

- Temperature: –40°F to 140°F (–40° to 60°C)
- Relative humidity: 5% to 85% non-condensing

To Ship the Printer

Save all packing materials in case you need to ship the printer in the future.

To ship the printer, do the following:

1. Turn off (O) the printer, and disconnect all cables.
2. Remove any media, ribbon, or loose objects from the printer interior.
3. Close the printhead.
4. Carefully pack the printer into the original container or a suitable alternate container to avoid damage during transit. A shipping container can be purchased from Zebra if the original packaging has been lost or destroyed.

Select a Location for the Printer

Select a location for the printer that meets these conditions:

- **Surface:** The surface where the printer will be located must be solid, level, and of sufficient size and strength to hold the printer.
- **Space:** The area where the printer will be located must include enough space for ventilation and for accessing the printer components and connectors. To allow for proper ventilation and cooling, leave open space on all sides of the printer.



Caution • Do not place any padding or cushioning material behind or under the printer because this restricts air flow and could cause the printer to overheat.

- **Power:** The printer should be within a short distance of an appropriate power outlet that is easily accessible.
- **Data communication interfaces:** The printer must be within range of your WLAN radio (if applicable) or within an acceptable range for other connectors to reach your data source (usually a computer). For more information on maximum cable lengths and configuration, see [Table 4 on page 41](#).
- **Operating conditions:** Your printer is designed to function in a wide range of environmental and electrical conditions, including a warehouse or factory floor. [Table 3](#) shows the temperature and relative humidity requirements for the printer when it is operating.

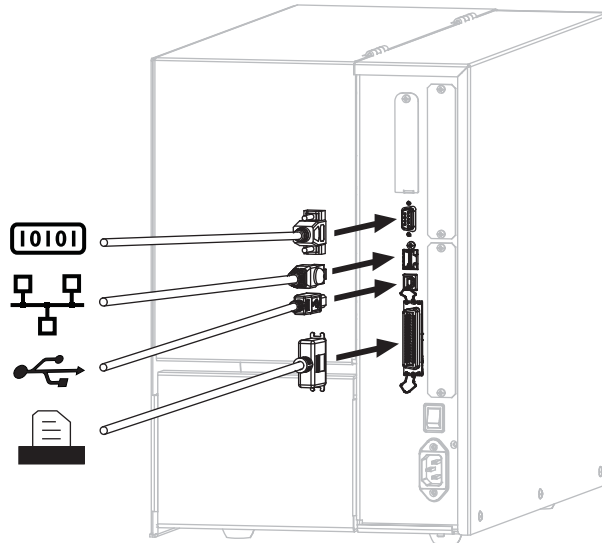
Table 3 • Operating Temperature and Humidity





Mode	Temperature	Relative Humidity
Thermal Transfer	41° to 104°F (5° to 40°C)	20 to 85% non-condensing
Direct Thermal	32° to 104°F (0° to 40°C)	

Select a Data Communication Interface

You may connect your printer to a computer using one or more of the available connections. The standard connections are shown in [Figure 4](#). A ZebraNet wired or wireless print server option or a parallel port may also be present on your printer.

Figure 4 • Communication Interfaces



	Serial port
	Internal wired Ethernet print server
	USB port
	Parallel port

[Table 4 on page 41](#) provides basic information about data communication interfaces that you can use to connect your printer to a computer. You may send label formats to the printer through any data communication interface that is available. Select an interface that is supported by both your printer and your computer or your Local Area Network (LAN).

Caution • Ensure that the printer power is off (O) before connecting data communications cables. Connecting a data communications cable while the power is on (I) may damage the printer.

Table 4 • Data Communication Interfaces


Interface	Standard or Option	Description
RS-232 Serial	Standard	<p>Limitations and Requirements</p> <ul style="list-style-type: none"> • Maximum cable length of 50 ft (15.24 m). • You may need to change printer parameters to match the host computer. • You need to use a null-modem adaptor to connect to the printer if using a standard modem cable. <p>Connections and Configuration The baud rate, number of data and stop bits, the parity, and the XON/XOFF or DTR control must match those of the host computer.</p>
USB	Standard	<p>Limitations and Requirements</p> <ul style="list-style-type: none"> • Maximum cable length of 16.4 ft (5 m). • No printer parameter changes required to match the host computer. <p>Connections and Configuration No additional configuration is necessary.</p>
8-bit Parallel data interface	Standard	<p>Limitations and Requirements</p> <ul style="list-style-type: none"> • Maximum cable length of 10 ft (3 m). • Recommended cable length of 6 ft (1.83 m). • No printer parameter changes required to match the host computer. • A wired or wireless print server (if installed) takes up this port on the printer. <p>Connections and Configuration No additional configuration is necessary.</p>
Wired Ethernet print server	Option	<p>Limitations and Requirements</p> <ul style="list-style-type: none"> • Can print to the printer from any computer on your LAN. • Can communicate with the printer through the printer's web pages. • The printer must be configured to use your LAN. • A parallel connection or a wireless print server (if installed) takes up this port on the printer. <p>Caution • Be careful not to plug a USB cable into a wired Ethernet print server connector on the printer because doing so will damage the Ethernet connector.</p> <p>Connections and Configuration Refer to the <i>ZebraNet Wired and Wireless Print Servers User Guide</i> for configuration instructions. A copy of this manual is available at http://www.zebra.com/manuals or on the user CD that came with your printer.</p> <p> Note • To use this connection, you may need to remove a factory-installed plug that is designed to keep someone from accidentally plugging a USB connector into this port.</p>

Table 4 • Data Communication Interfaces (Continued)

Interface	Standard or Option	Description
Wireless print server	Option	<p>Limitations and Requirements</p> <ul style="list-style-type: none"> • Can print to the printer from any computer on your Wireless Local Area Network (WLAN). • Can communicate with the printer through the printer’s web pages. • The printer must be configured to use your WLAN. • A parallel connection or a wired print server (if installed) takes up this port on the printer. <hr/> <p>Configuration Refer to the <i>ZebraNet Wired and Wireless Print Servers User Guide</i> for configuration instructions. A copy of this manual is available at http://www.zebra.com/manuals or on the user CD that came with your printer.</p>

Data Cables

You must supply all data cables for your application.

Ethernet cables do not require shielding, but all other data cables must be fully shielded and fitted with metal or metallized connector shells. Unshielded data cables may increase radiated emissions above the regulated limits.

To minimize electrical noise pickup in the cable:

- Keep data cables as short as possible.
- Do not bundle the data cables tightly with the power cords.
- Do not tie the data cables to power wire conduits.

Connect the Printer to a Power Source

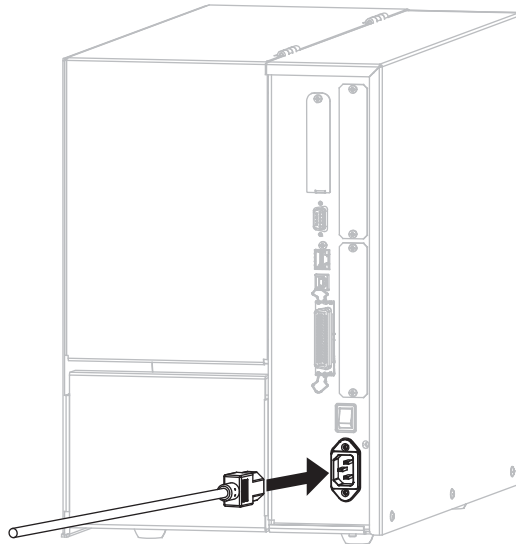
The AC power cord must have a three-prong female connector on one end that plugs into the mating AC power connector at the rear of the printer. If a power cable was not included with your printer, refer to *Power Cord Specifications* on page 44.



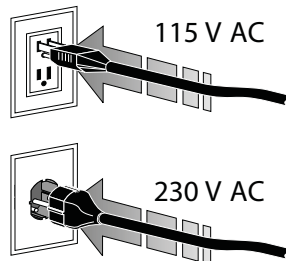
Caution • For personnel and equipment safety, always use an approved three-conductor power cord specific to the region or country intended for installation. This cord must use an IEC 320 female connector and the appropriate region-specific three-conductor grounded plug configuration.

To connect the printer to a power source, complete these steps:

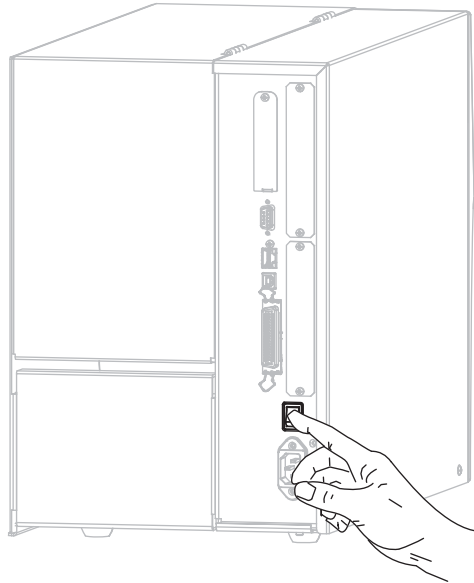
1. Plug the female end of the A/C power cord into the A/C power connector on the back of the printer.



2. Plug the male end of the A/C power cord into an appropriate power outlet.



3. Turn on (I) the printer.



The printer boots up and performs a self-test.

Power Cord Specifications

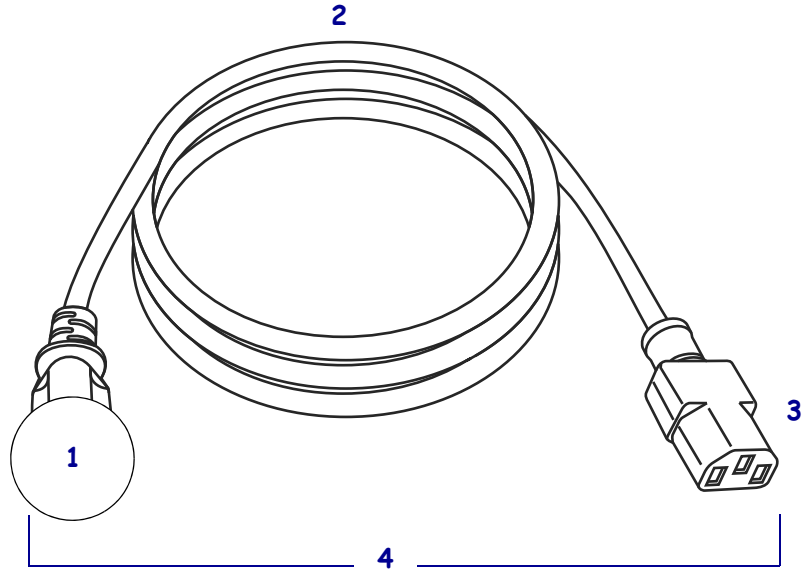


Caution • For personnel and equipment safety, always use an approved three-conductor power cord specific to the region or country intended for installation. This cord must use an IEC 320 female connector and the appropriate region-specific, three-conductor grounded plug configuration.

Depending on how your printer was ordered, a power cord may or may not be included. If one is not included or if the one included is not suitable for your requirements, see [Figure 5](#) and refer to the following guidelines:

- The overall cord length must be less than 9.8 ft. (3 m).
- The cord must be rated for a minimum of 10 A, 250 V.
- The chassis ground (earth) **must** be connected to ensure safety and reduce electromagnetic interference.

Figure 5 • Power Cord Specifications



1	AC power plug for your country—This should bear the certification mark of at least one of the known international safety organizations (Figure 6).
2	3-conductor HAR cable or other cable approved for your country.
3	IEC 320 connector—This should bear the certification mark of at least one of the known international safety organizations (Figure 6).
4	Length ≤ 9.8 ft. (3 m). Rating 10 Amp minimum, 250 VAC.

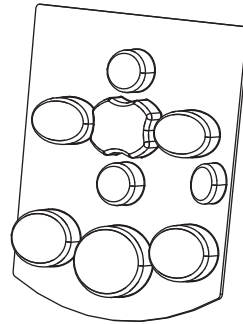
Figure 6 • International Safety Organization Certification Symbols



Install the Control Panel Keypad Cover

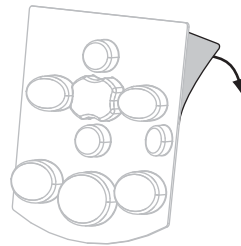
A protective cover for the control panel keypad is provided with your printer (Figure 7). Install this optional cover if your printer will operate in a moist or dirty environment. This will help to protect the keypad from damage.

Figure 7 • Control Panel Keypad Cover

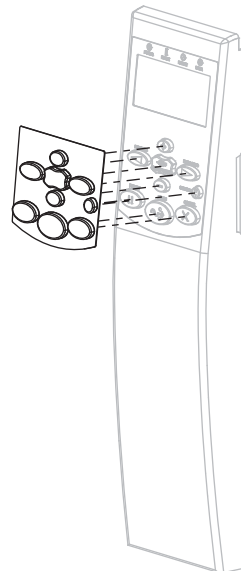


To install the control panel keypad cover, complete these steps:

1. Remove the paper backing from the control panel keypad cover to expose the adhesive.



2. Carefully align the cover over the keypad. Press to make the cover adhere to the printer.



Types of Media



Important • Zebra strongly recommends the use of Zebra-brand supplies for continuous 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 <http://www.zebra.com/howtobuy>.

Your printer can use various types of media:

- *Standard media*—Most standard media uses an adhesive backing that sticks individual labels or a continuous length of labels to a liner. Standard media can come on rolls or in a fanfold stack (Table 5).
- *Tag stock*—Tags are usually made from a heavy paper. Tag stock does not have adhesive or a liner, and it is typically perforated between tags. Tag stock can come on rolls or in a fanfold stack (Table 5).

Table 5 • Roll and Fanfold Media

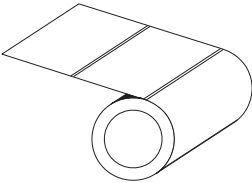
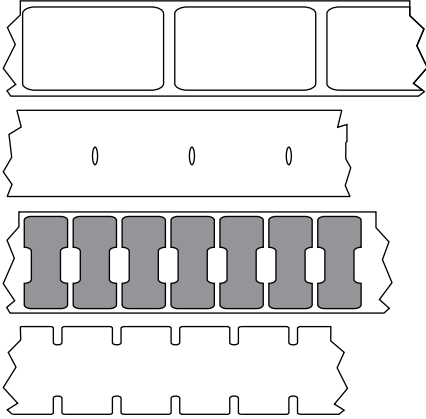

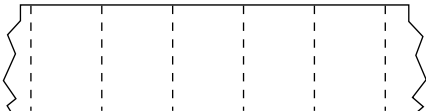
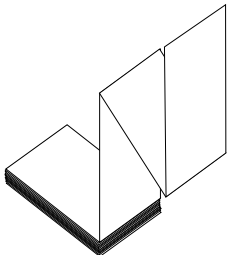
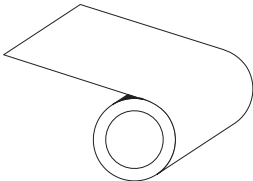
Media Type	How It Looks	Description
<p>Non-Continuous Roll Media</p>		<p>Roll media is wound on a 3-in. (76-mm) core. Individual labels or tags are separated by one or more of the following methods:</p> <ul style="list-style-type: none"> • <i>Web media</i> separates labels by gaps, holes, or notches. <div style="margin-left: 20px;">  </div> • <i>Black mark media</i> uses pre-printed black marks on the back side of the media to indicate label separations. <div style="margin-left: 20px;">  </div> • <i>Perforated media</i> has 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. <div style="margin-left: 20px;">  </div>

Table 5 • Roll and Fanfold Media (Continued)

Media Type	How It Looks	Description
Non-Continuous Fanfold Media		<p>Fanfold media is folded in a zigzag pattern. Fanfold media can have the same label separations as non-continuous roll media. The separations would fall on or near the folds.</p>
Continuous Roll Media		<p>Roll media is wound on a 3-in. (76-mm) core. Continuous roll media does not have gaps, holes, notches, or black marks to indicate label separations. This allows the image to be printed anywhere on the label. Sometimes a cutter is used to cut apart individual labels.</p>

Ribbon Overview

Ribbon is a thin film that is coated on one side with wax, resin, or wax resin, which is transferred to the media during the thermal transfer process. The media determines whether you need to use ribbon and how wide the ribbon must be.

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.

When to Use Ribbon

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, complete these steps:

1. Scratch the print surface of the media rapidly with your fingernail.
2. Did a black mark appear on the media?

If a black mark...	Then the media is...
Does not appear on the media	Thermal transfer. A ribbon is required.
Appears on the media	Direct thermal. No ribbon is required.

Coated Side of Ribbon

Ribbon can be wound with the coated side on the inside or outside (Figure 8). This printer can only use ribbon that is coated on the outside. If you are unsure which side of a particular roll of ribbon is coated, perform an adhesive test or a ribbon scratch test to determine which side is coated.

Figure 8 • Ribbon Coated on Outside or Inside





Adhesive Test

If you have labels available, perform the adhesive test to determine which side of a ribbon is coated. This method works well for ribbon that is already installed.

To perform an adhesive test, complete these steps:

1. Peel a label from its liner.
2. Press a corner of the sticky side of the label to the outer surface of the roll of ribbon.
3. Peel the label off of the ribbon.
4. Observe the results. Did flakes or particles of ink from the ribbon adhere to the label?



If ink from the ribbon...	Then...
Adhered to the label	The ribbon is coated on the outside and can be used in this printer. 
Did not adhere to the label	The ribbon is coated on the inside and cannot be used in this printer. To verify this, repeat the test on the other surface of the roll of ribbon. 

Ribbon Scratch Test

Perform the ribbon scratch test when labels are unavailable.

To perform a ribbon scratch test, complete these steps:

1. Unroll a short length of ribbon.
2. Place the unrolled section of ribbon on a piece of paper with the outer surface of the ribbon in contact with the paper.
3. Scratch the inner surface of the unrolled ribbon with your fingernail.
4. Lift the ribbon from the paper.
5. Observe the results. Did the ribbon leave a mark on the paper?

If the ribbon...	Then...
Left a mark on the paper	The ribbon is coated on the outside and can be used in this printer. 
Did not leave a mark on the paper	The ribbon is coated on the inside and cannot be used in this printer. To verify this, repeat the test on the other surface of the roll of ribbon. 

Select a Print Mode

Use a print mode that matches the media being used and the printer options available (Table 6).

Table 6 • Print Modes and Printer Options

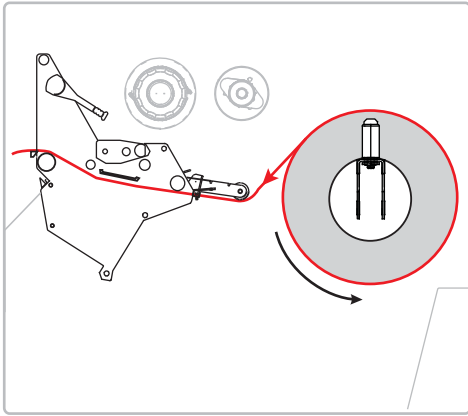
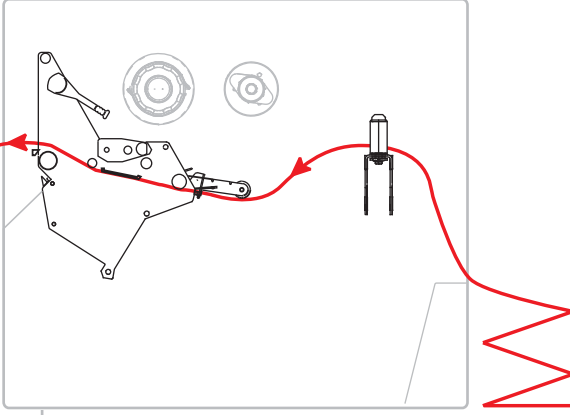
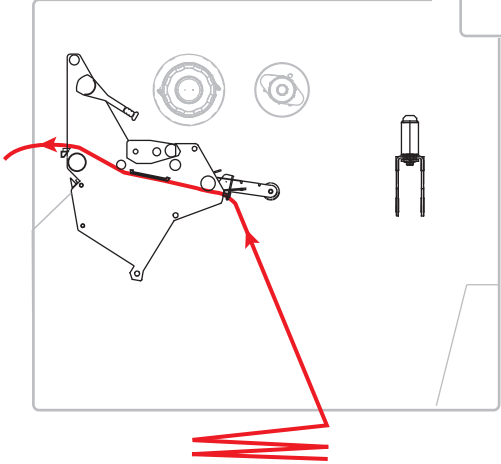
Print Mode	When to Use/Printer Options Required	Printer Actions
Tear-Off (default setting)	Use for most applications. This mode can be used with any printer options and most media types.	The printer prints label formats as it receives them. The printer operator can tear off the printed labels any time after they print.
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; justify-content: space-between; width: 100%;"> <div style="width: 45%;">  <p>roll media in Tear-Off mode</p> </div> <div style="width: 45%;">  <p>fanfold media in Tear-Off mode (rear feed)</p> </div> </div> <div style="display: flex; justify-content: space-between; width: 100%; margin-top: 20px;"> <div style="width: 45%;">  <p>fanfold media in Tear-Off mode (bottom feed)</p> </div> </div> </div>		

Table 6 • Print Modes and Printer Options

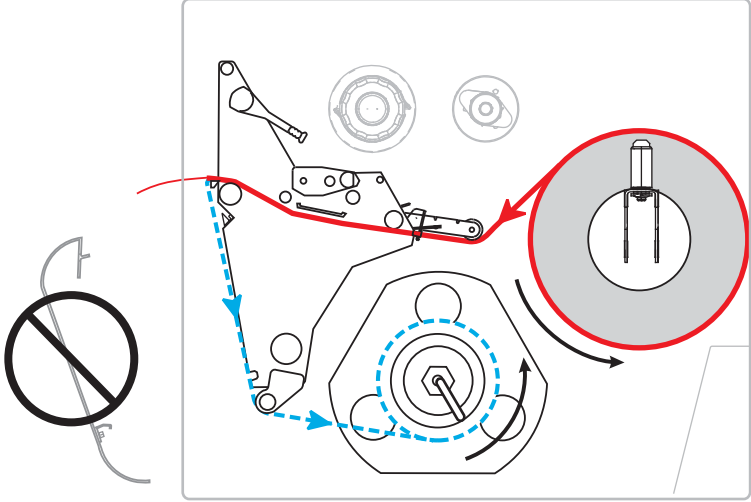
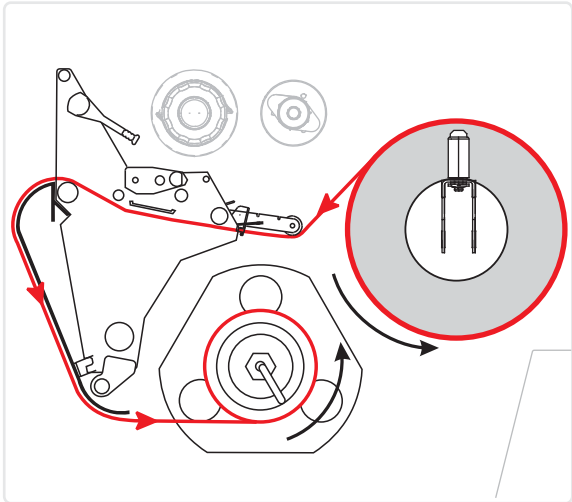
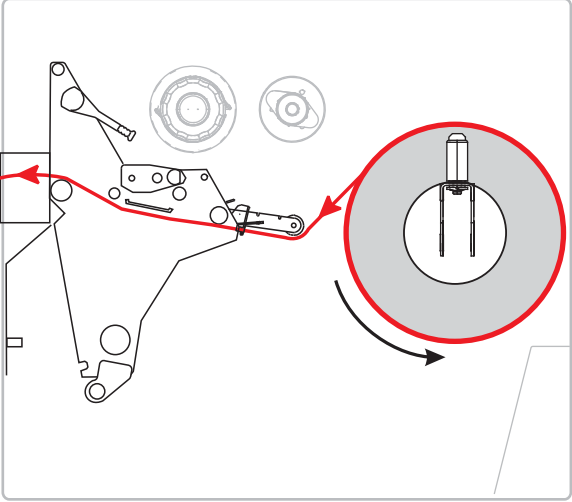
Print Mode	When to Use/Printer Options Required	Printer Actions
Peel-Off	Use when the printer has the Rewind option if you want to remove the labels from the liner one label at a time.	The printer peels the label from the liner during printing and then pauses until the label is removed. The liner winds onto the rewind spindle.
 <p data-bbox="402 1010 958 1041">Red solid lines = media, Blue dotted lines = backing only</p>		
Rewind	Use when the printer has the Rewind option if you want to save the labels without separating them or removing them from their backing.	The printer prints without pausing between labels. The media is wound onto the rewind spindle after printing.
		

Table 6 • Print Modes and Printer Options

Print Mode	When to Use/Printer Options Required	Printer Actions
Cutter	Use when the printer has a cutter option if you want the labels to be cut apart.	The printer prints a label and then cuts it free. 

Load the Ribbon

Use the instructions in this section to load ribbon (if used) in your printer. Ribbon is used only with thermal transfer labels. For direct thermal labels, do not load ribbon in the printer. To determine if ribbon must be used with a particular media, see [When to Use Ribbon on page 49](#).

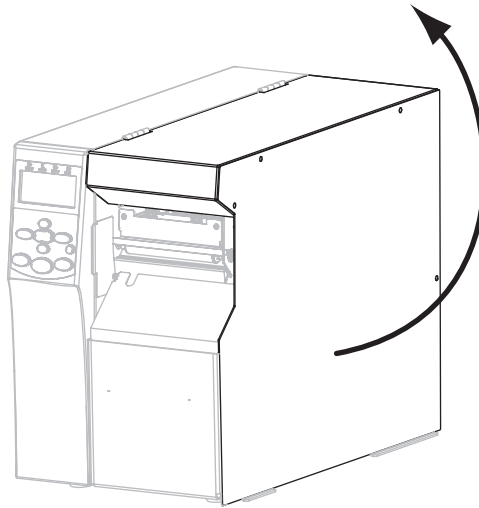
Caution • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.



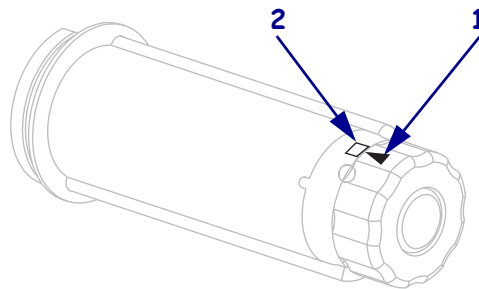
Important • Use ribbon that is wider than the media to protect the printhead from wear. Ribbon must be coated on the outside. See [Coated Side of Ribbon on page 49](#) for more information.

To load ribbon, complete these steps:

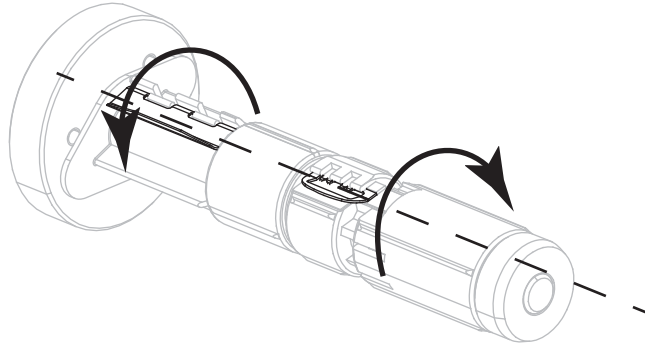
1. Raise the media door.



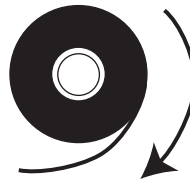
2. Align the arrow (1) on the ribbon take-up spindle knob with the notch (2) in the ribbon take-up spindle.



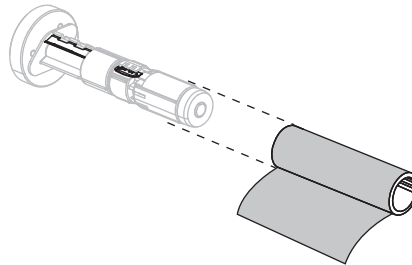
3. Align the segments of the ribbon supply spindle.



4. Position the ribbon with the loose end unrolling clockwise.



5. Place the roll of ribbon on the ribbon supply spindle. Push the roll back as far as it will go.



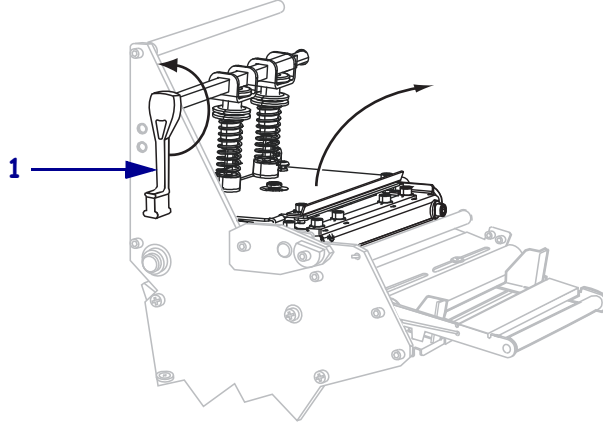
6. A ribbon leader makes ribbon loading and unloading easier. Does your roll of ribbon have paper or something else attached to the end to serve as a ribbon leader?

If...	Then...
Yes	Continue with the next step.
No	<p>a. Tear off a strip of media (labels and liner) about 6–12 in. (150–305 mm) long from the roll.</p> <p>b. Peel a label from the media strip.</p> <p>c. Use this label (1) to attach the end of the ribbon (2) to the media strip (3). The media strip acts as a leader.</p>

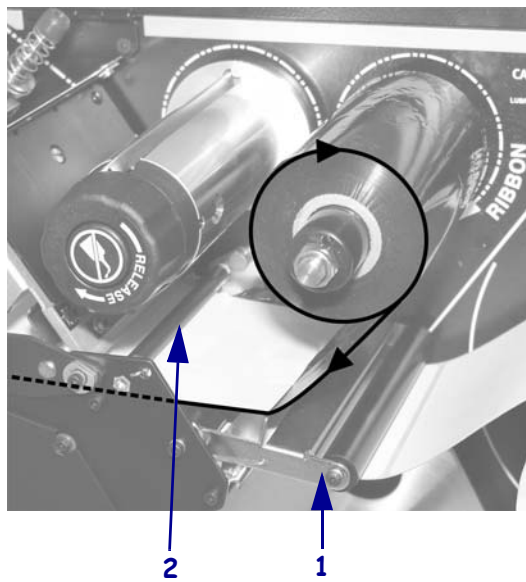


-
7. **Caution** • The printhead may be hot and could cause severe burns. Allow the printhead to cool.
-

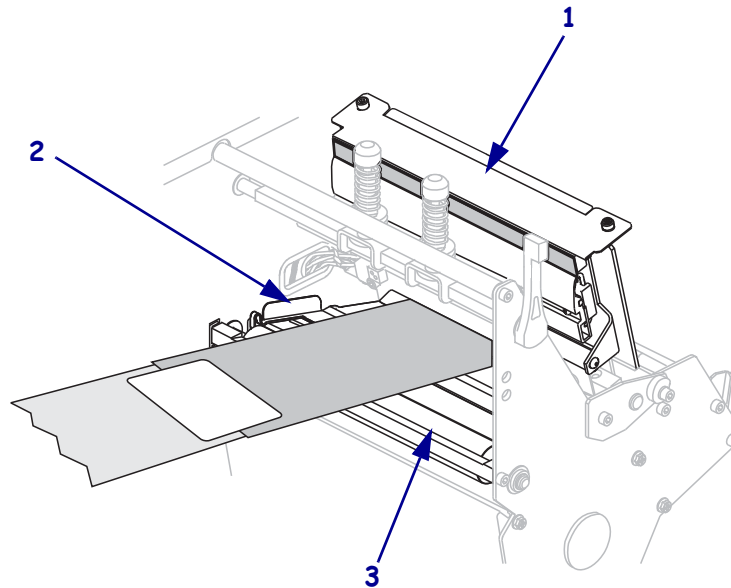
Rotate the printhead-open lever (1) to the open position.



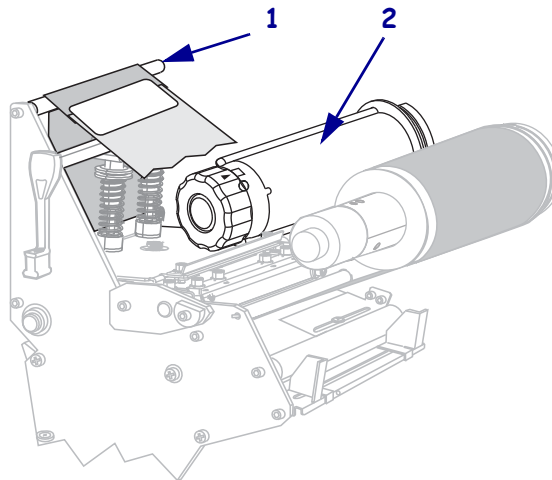
8. Thread the ribbon over the media dancer assembly (1) and under the ribbon guide roller (2).



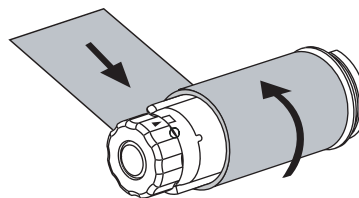
9. Push the ribbon leader forward until it passes under the printhead assembly (1), over the snap plate (2), and then over the platen roller (3).



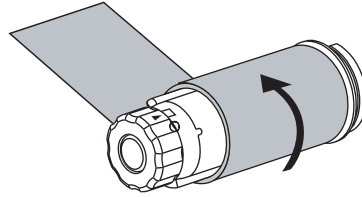
10. Bring the ribbon leader over the upper ribbon roller (1) and then toward the ribbon take-up spindle (2).



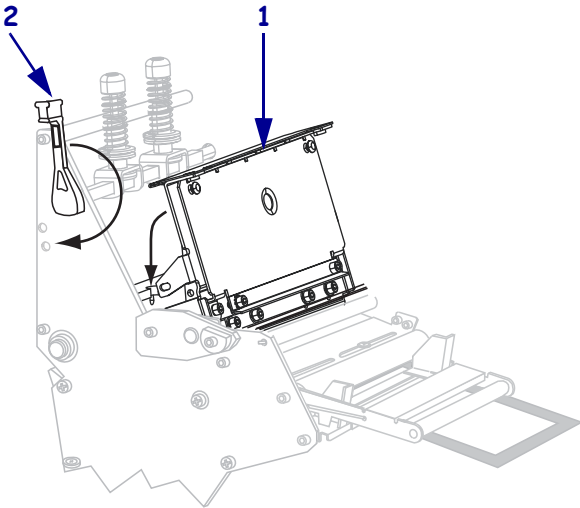
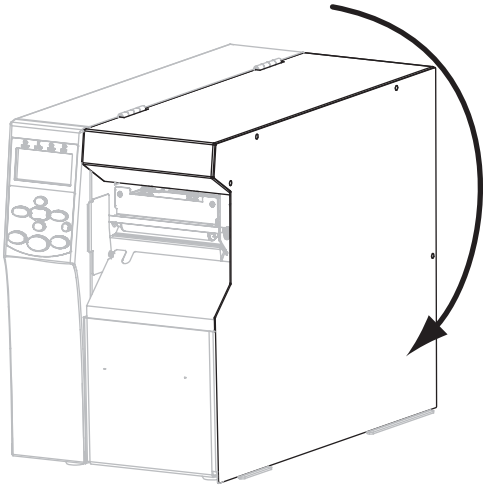
11. Wind the ribbon leader and attached ribbon counterclockwise around the ribbon take-up spindle.



12. Rotate the spindle counterclockwise several turns to wind the ribbon and remove any slack.



13. Is media already loaded?

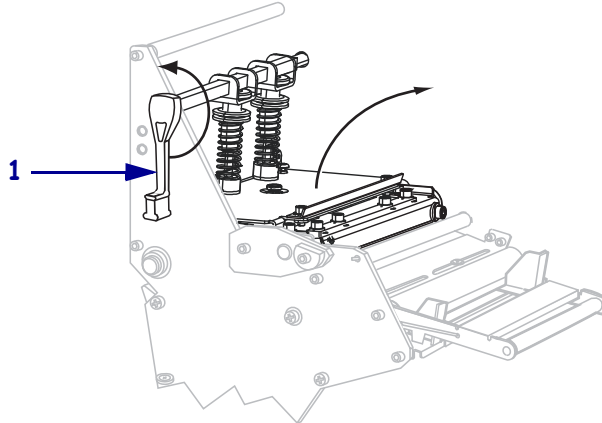
If...	Then...
No	a. Continue with <i>Load the Media</i> on page 59.
Yes	<p>a. Push down the printhead assembly (1), and then rotate the printhead-open lever (2) until it locks into place.</p>  <p>b. Close the media door.</p> 

Load the Media

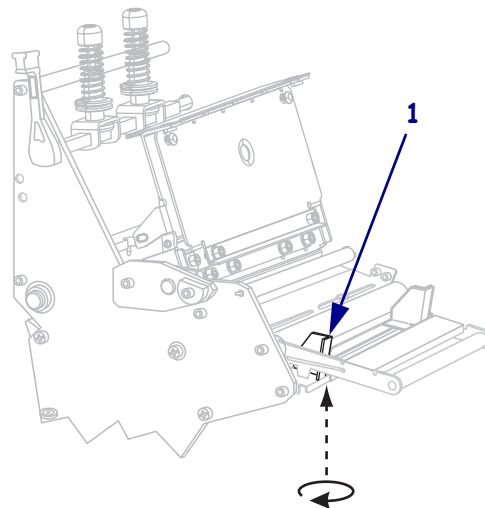


1. **Caution** • The printhead may be hot and could cause severe burns. Allow the printhead to cool.

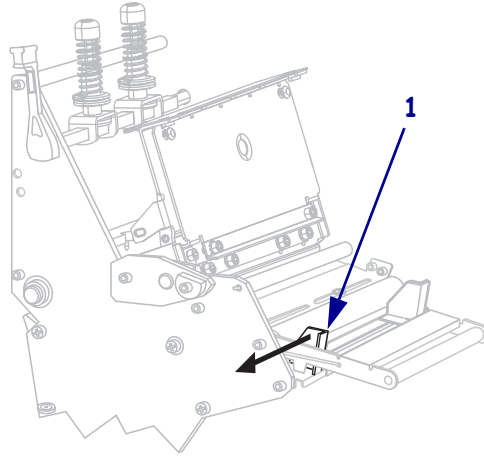
Open the printhead assembly by rotating the printhead-open lever (1).



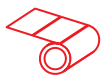
2. Loosen the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (1).



3. Slide the outer media guide **(1)** all the way out.

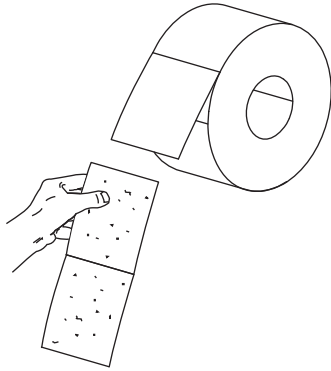


4. Insert media into the printer. Follow the instructions for roll or fanfold media, as appropriate.

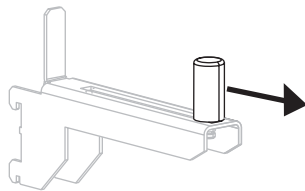


Roll Media

- a. Remove and discard any tags or labels that are dirty or that are held by adhesives or tape.



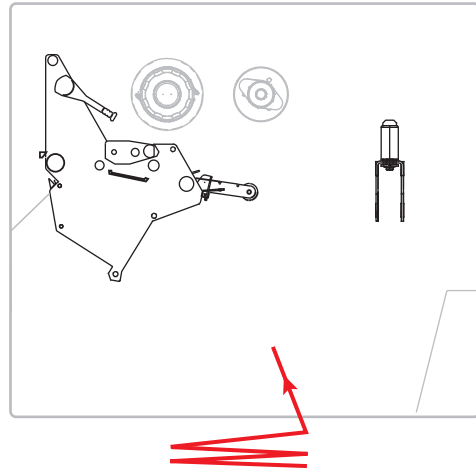
- b. Pull out the media supply guide as far as it goes.



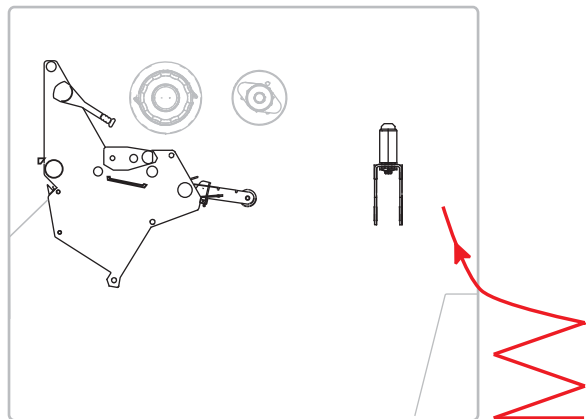
Fanfold Media

- a. Thread the fanfold media through the bottom or rear slot.

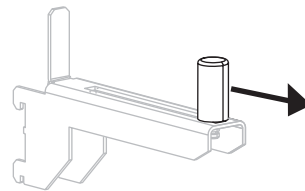
Bottom Feed

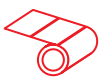


Rear Feed



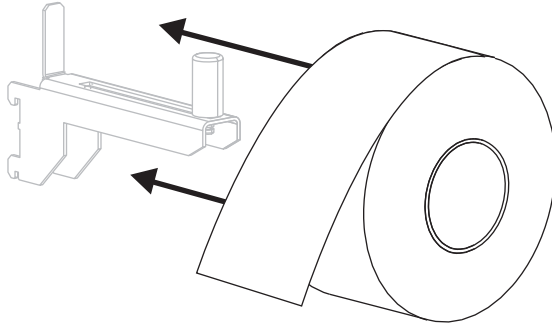
- b. Pull out the media supply guide as far as it goes.



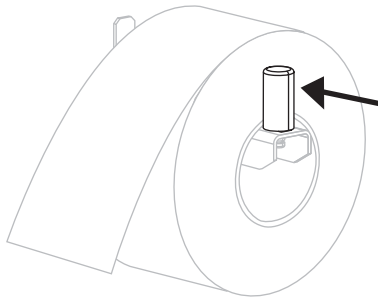


Roll Media (Continued)

- c. Place the roll of media on the media supply hanger. Push the roll back as far as it will go.

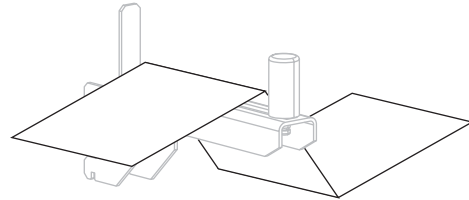


- d. Slide in the media supply guide until it touches the edge of the roll.

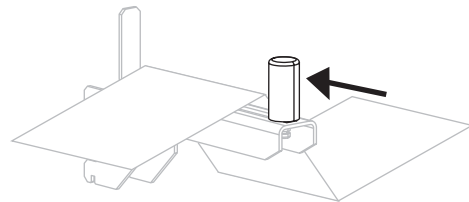


Fanfold Media (Continued)

- c. Drape the media over the media supply hanger.



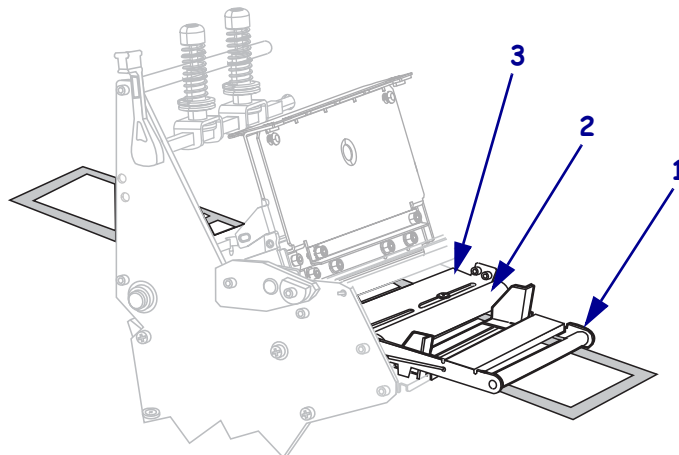
- d. Slide in the media supply guide until it touches the edge of the media.



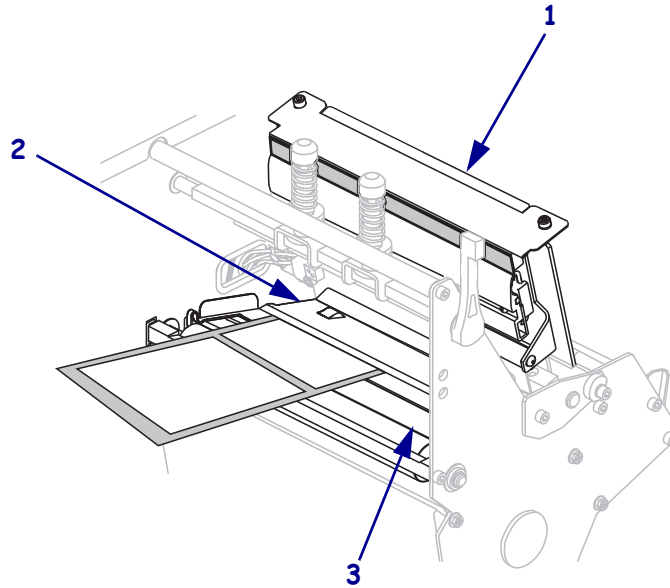
- 5. Thread the media under the media dancer assembly roller (1), the media guide roller (2), and then the upper media sensor (3).



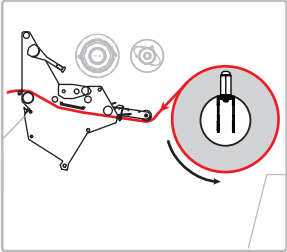
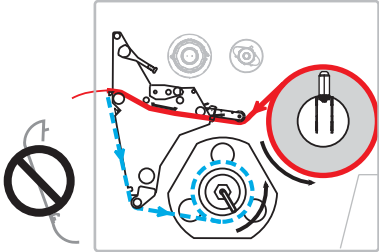
Important • Make sure that you thread the media under these components. If you thread the media over them, the media obstructs the ribbon sensor and causes a false **RIBBON OUT** error.

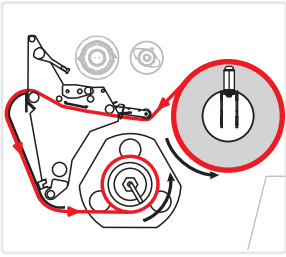
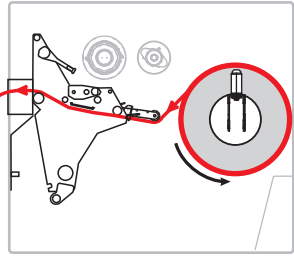


6. Push the media forward until it passes under the printhead assembly (1), under the snap plate (2), and then over the platen roller (3).

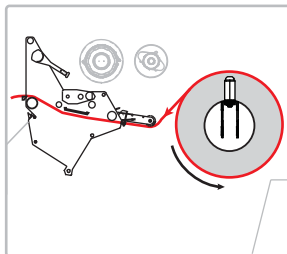


7. In which print mode will your printer be operating? (For more information on print modes, see [Select a Print Mode on page 51.](#))

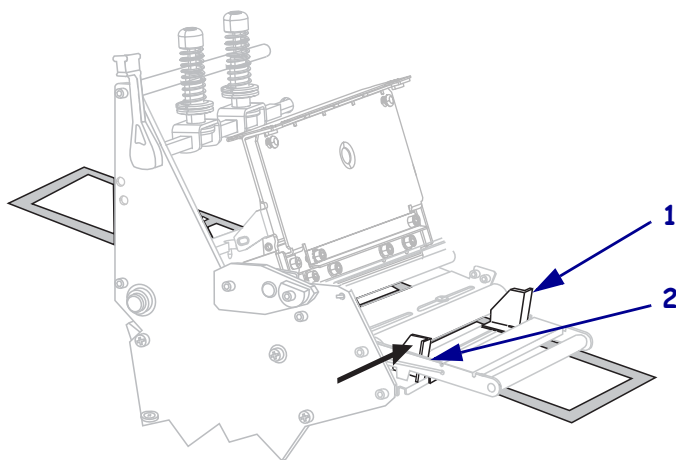
If using...	Then...
<p data-bbox="435 1066 602 1094">Tear-Off mode</p> 	<p data-bbox="1008 1066 1344 1129">Continue with <i>Final Steps for Tear-Off Mode</i> on page 65.</p>
<p data-bbox="435 1386 602 1413">Peel-Off mode</p> 	<p data-bbox="1008 1386 1409 1449">Continue with <i>Final Steps for Peel-Off Mode</i> on page 67.</p>

If using...	Then...
<p>Rewind mode</p>  <p>The diagram shows the internal media path for the Rewind mode. Red arrows indicate the path of the media from the left side, through a series of rollers and gears, and finally into a large circular spool on the right. The spool is highlighted with a red circle, and a curved arrow indicates its rotation direction.</p>	<p>Continue with <i>Final Steps for Rewind Mode</i> on page 72.</p>
<p>Cutter mode</p>  <p>The diagram shows the internal media path for the Cutter mode. Red arrows indicate the path of the media from the left side, through a series of rollers and gears, and finally into a large circular spool on the right. The spool is highlighted with a red circle, and a curved arrow indicates its rotation direction.</p>	<p>Continue with <i>Final Steps for Cutter Mode</i> on page 77.</p>

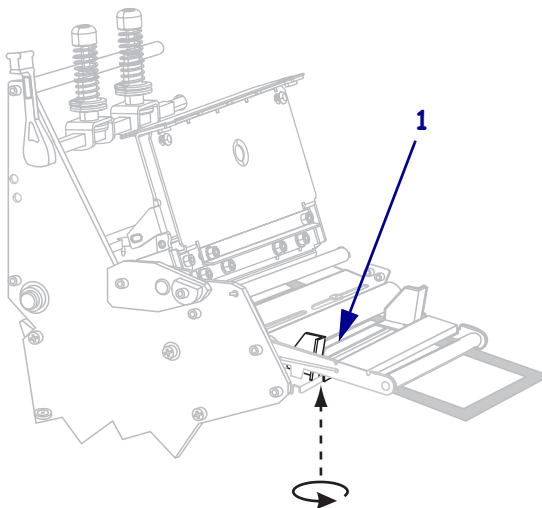
Final Steps for Tear-Off Mode



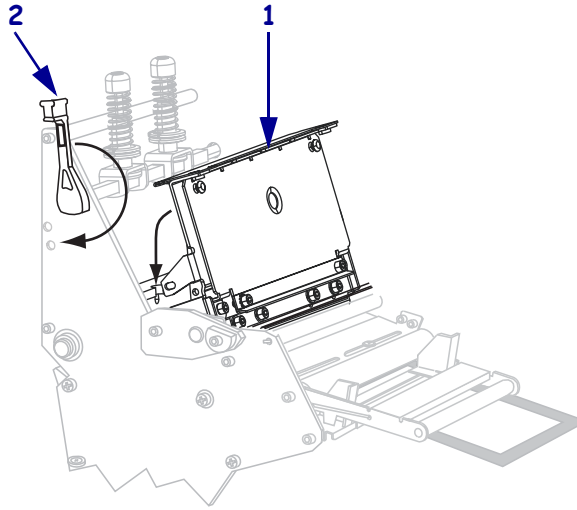
8. Align the media with the inner media guide (1). Slide in the outer media guide (2) until it just touches the edge of the media.



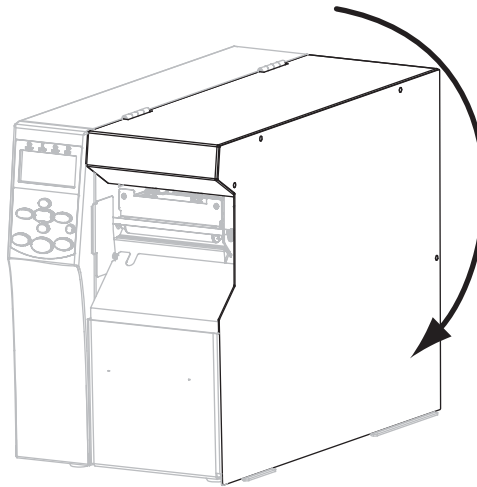
9. Tighten the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (1).



10. Push down the printhead assembly (1), and then rotate the printhead-open lever (2) until it locks into place.

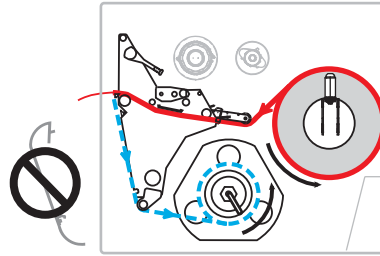


11. Close the media door.

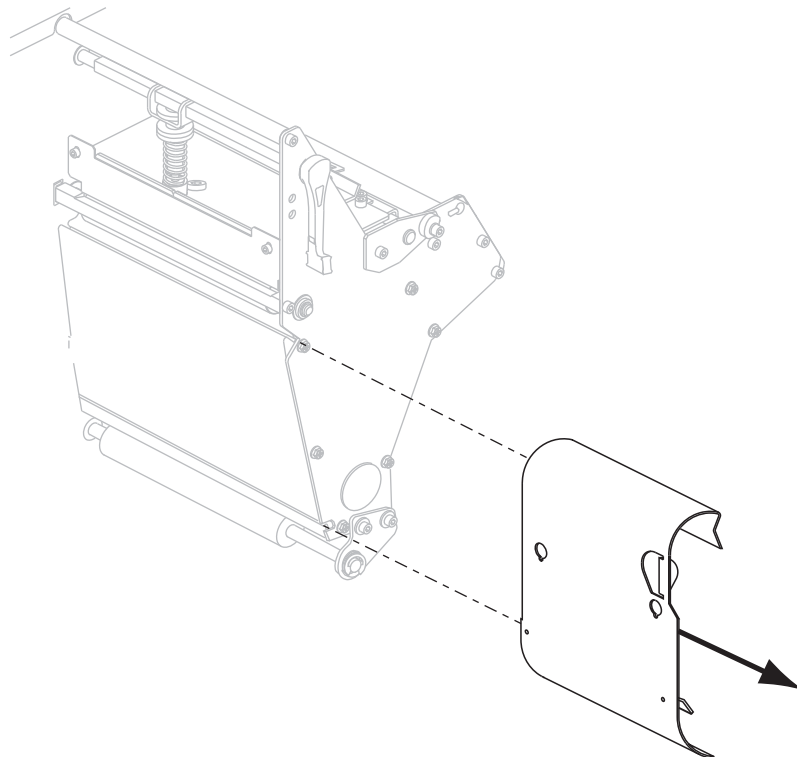


12. Set the printer to Tear-Off mode (for more information, see [Print Mode on page 84](#)).
13. If desired, perform the [CANCEL Self Test on page 149](#) to verify that your printer is able to print.

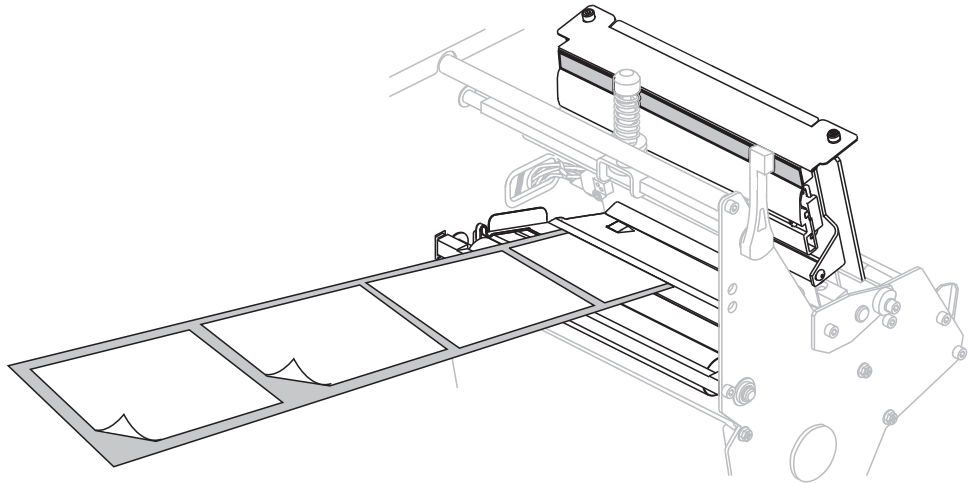
Final Steps for Peel-Off Mode



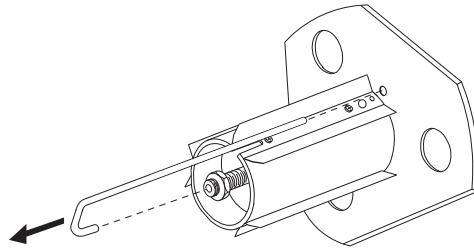
8. Remove the rewind plate (if installed) from the front of the printer. Store it on the two mounting screws on the inside of the printer base.



9. Extend approximately 36 in. (920 mm) of media out of the printer. Remove and discard the labels from this exposed media.



10. Remove the hook from the rewind spindle.

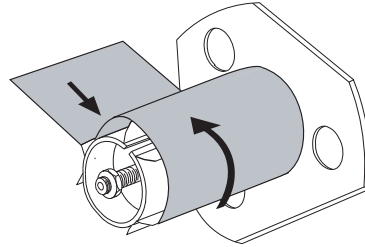


11. If you are using a core, slide it onto the rewind spindle until it is flush against the guide plate.

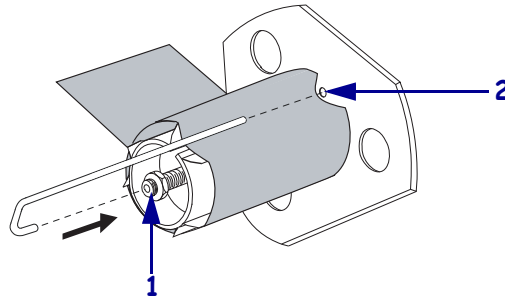


Note • A core is not required.

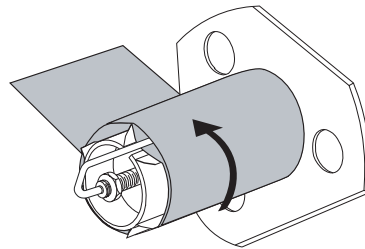
12. Wind the media liner counterclockwise around the rewind spindle.



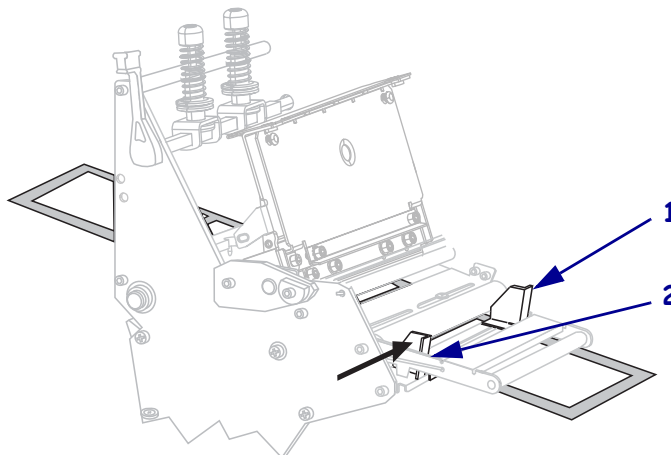
- a. Reinstall the hook. Insert the short end of the hook into the hole in the center of the adjusting nut (1). Insert the long end of the hook into the small hole on the guide plate (2).



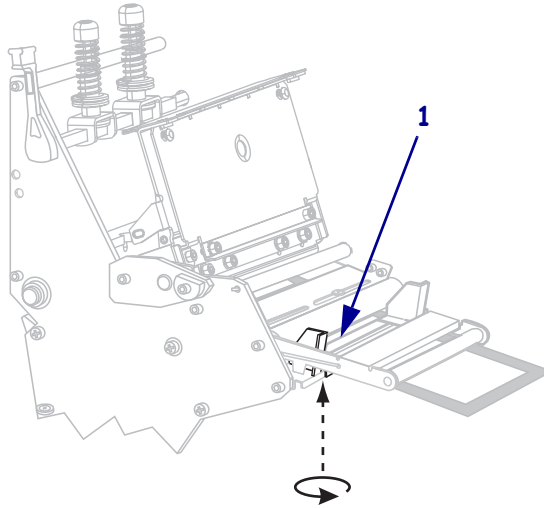
- b. Rotate the spindle counterclockwise several turns to wind the media liner over the hook and remove any slack.



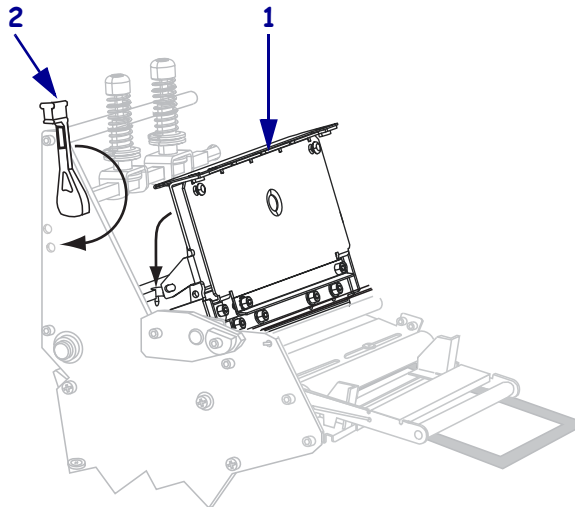
13. Align the media with the inner media guide (1). Slide in the outer media guide (2) until it just touches the edge of the media.



14. Tighten the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (1).

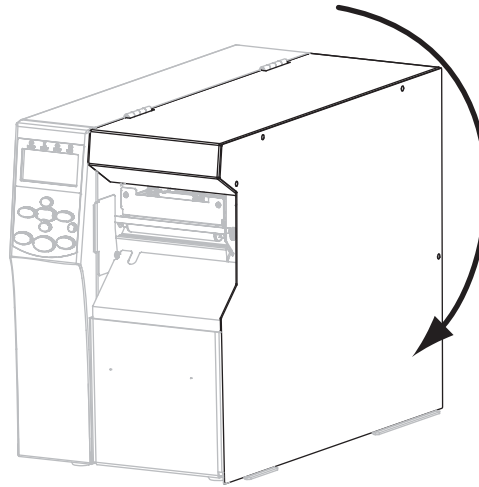


15. Push down the printhead assembly (1), and then rotate the printhead-open lever (2) until it locks into place.



The backing winds on the rewind spindle or core.

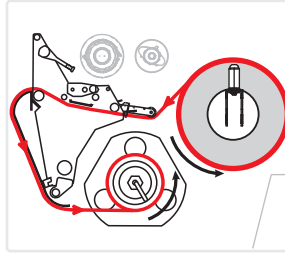
16. Close the media door.



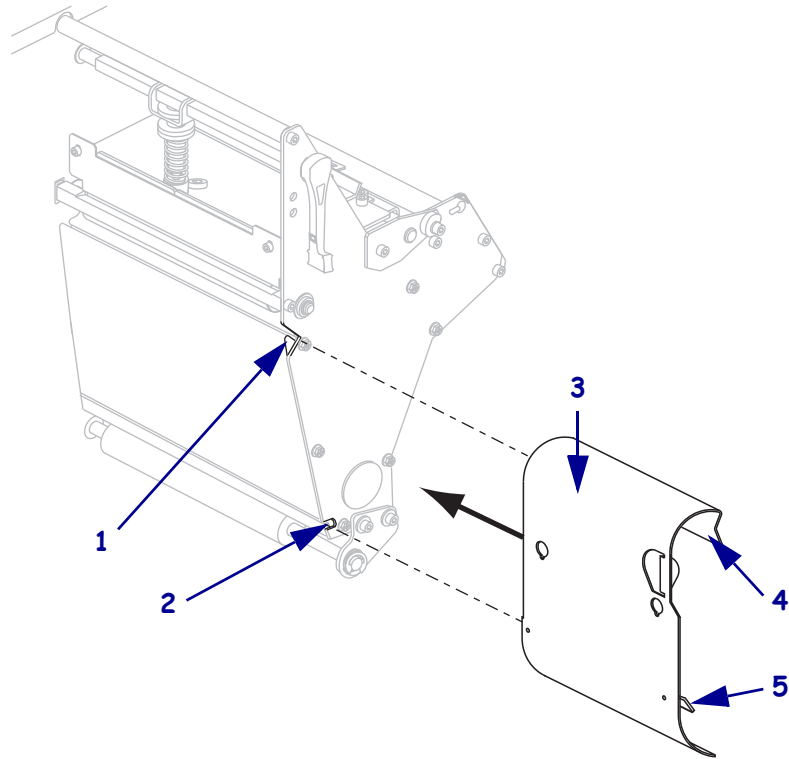
17. Set the printer to Peel-Off mode (for more information, see [Print Mode on page 84](#)).

18. If desired, perform the [CANCEL Self Test on page 149](#) to verify that your printer is able to print.

Final Steps for Rewind Mode



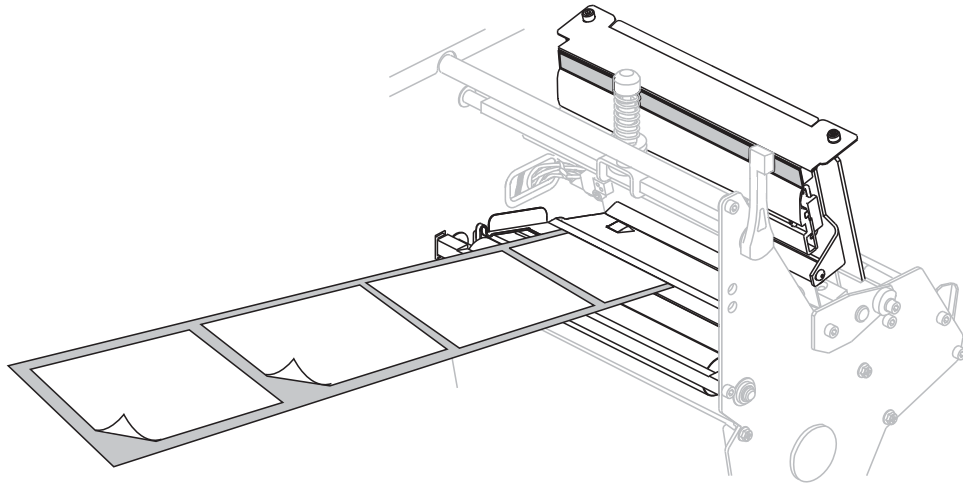
8. Remove the rewind plate from its storage location inside the printer.
9. Position the rewind plate so that the lip on the attached hook plate points down.



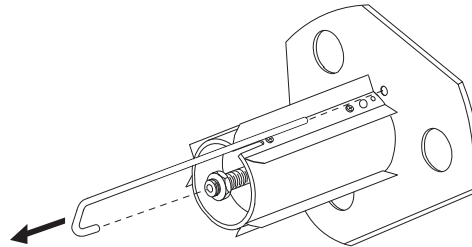
1	Upper slot
2	Lower slot
3	Rewind plate
4	Lip
5	Adjustable hook plate

10. Insert the hook plate lip 1/2 in. (13 mm) into the lower slot in the side plate.
11. Align the upper end of the rewind plate with the matching upper slot in the side plate.
12. Slide in the rewind plate until it stops against the printer's main frame.

13. Extend approximately 36 in. (920 mm) of media out of the printer. Remove and discard the labels from this exposed media.



14. Remove the hook from the rewind spindle.

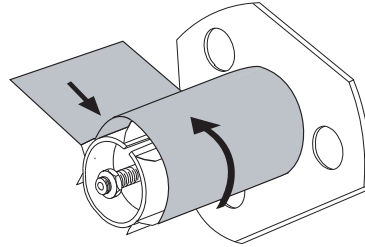


15. If you are using a core, slide it onto the rewind spindle until it is flush against the guide plate.

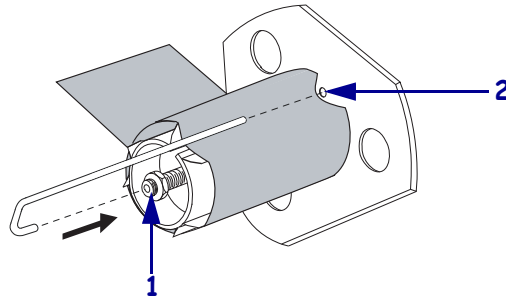


Note • A core is not required.

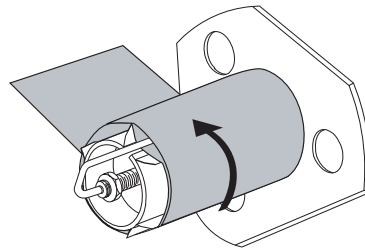
- 16.** Wind the media liner counterclockwise around the rewind spindle.



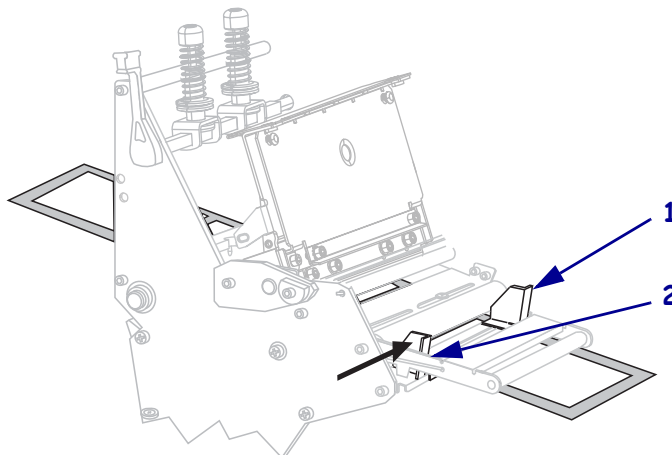
- a.** Reinstall the hook. Insert the short end of the hook into the hole in the center of the adjusting nut (**1**). Insert the long end of the hook into the small hole on the guide plate (**2**).



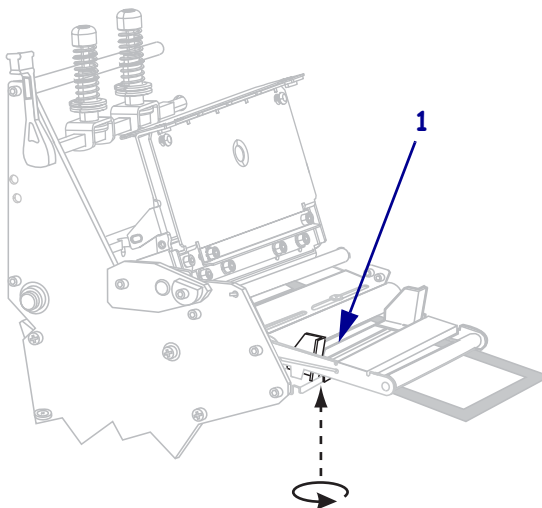
- b.** Rotate the spindle counterclockwise several turns to wind the media liner over the hook and remove any slack.



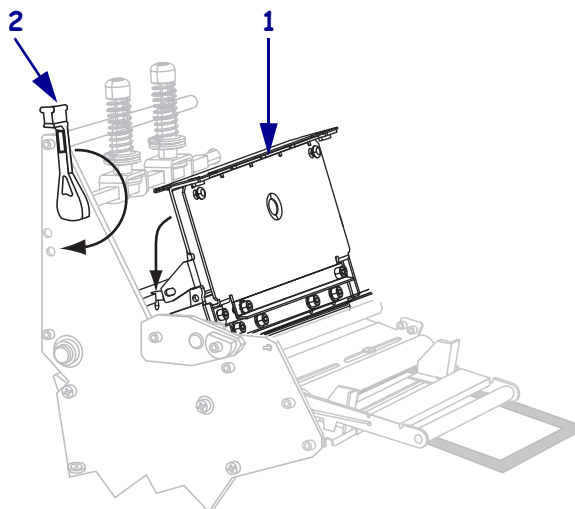
- 17.** Align the media with the inner media guide (**1**). Slide in the outer media guide (**2**) until it just touches the edge of the media.



18. Tighten the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (1).

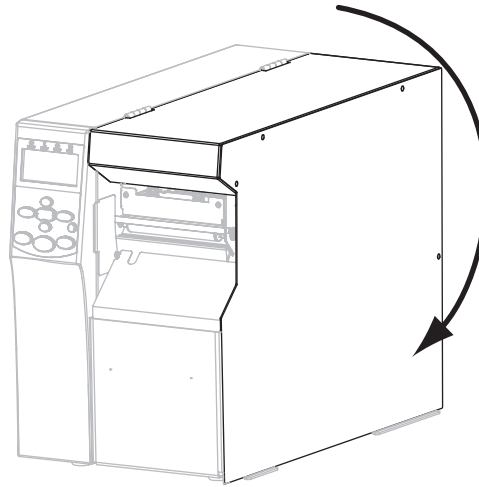


19. Push down the printhead assembly (1), and then rotate the printhead-open lever (2) until it locks into place.



The media winds on the rewind spindle or core.

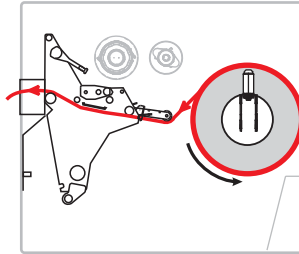
20. Close the media door.



21. Set the printer to Rewind mode (for more information, see [Print Mode on page 84](#)).

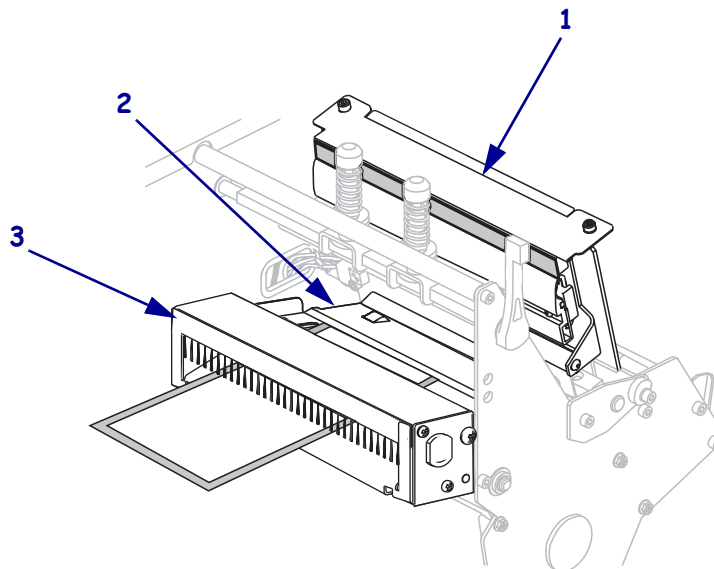
22. If desired, perform the [CANCEL Self Test on page 149](#) to verify that your printer is able to print.

Final Steps for Cutter Mode

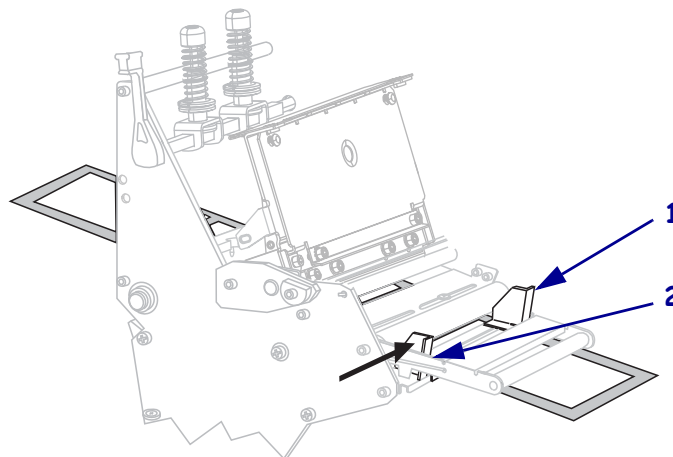


8. **Caution** • The cutter blade is sharp. Do not touch or rub the blade with your fingers.

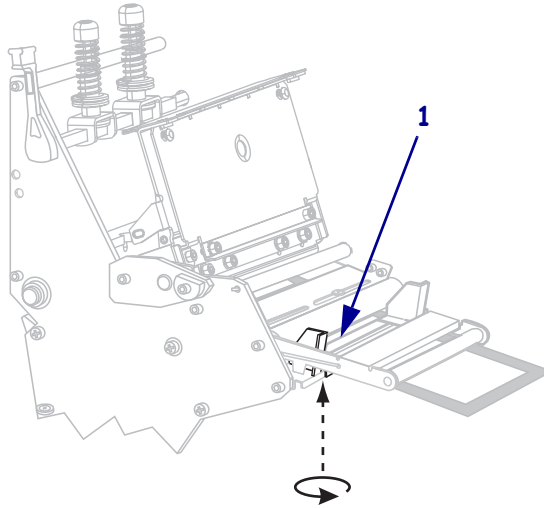
Thread the media forward until it passes under the printhead assembly (1), under the snap plate (2), and through the cutter assembly (3).



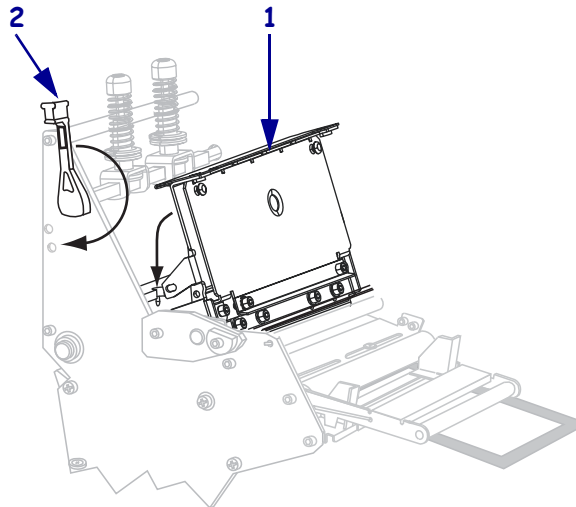
9. Align the media with the inner media guide (1). Slide in the outer media guide (2) until it just touches the edge of the media.



10. Tighten the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (1).

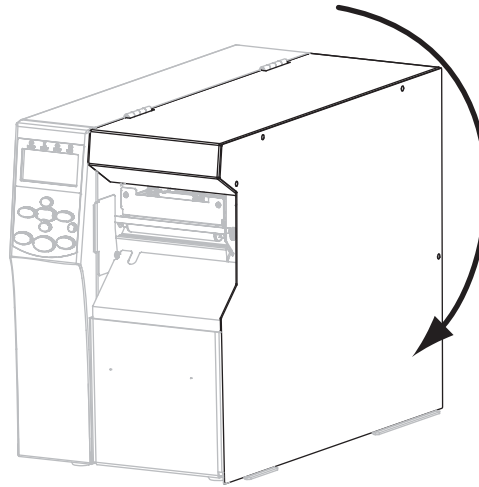


11. Push down the printhead assembly (1), and then rotate the printhead-open lever (2) until it locks into place.



The media winds on the rewind spindle or core.

12. Close the media door.



13. Set the printer to Cutter mode (for more information, see [Print Mode on page 84](#)).

14. If desired, perform the [CANCEL Self Test on page 149](#) to verify that your printer is able to print.



Notes • _____

Printer Configuration and Adjustment

This section assists you with configuration of and adjustments to the printer.

Contents

Changing Printer Settings	82
Print Settings	83
Maintenance and Diagnostic Tools	89
Network Settings	96
Language Settings	100
Sensor Settings	102
Port Settings	103
Calibrate the Ribbon and Media Sensors Manually	106
Remove Used Ribbon	112
Remove Media or Liner from the Rewind Spindle	113
Adjust Transmissive Media Sensors	115
Upper Media Sensor	115
Lower Media Sensor	118
Adjust Printhead Pressure and Toggle Position	119
Toggle Position Adjustment	119
Printhead Pressure Adjustment	121

Changing Printer Settings

This section presents the printer settings that you can change and identifies the tools for changing them. These tools include the following:

- ZPL and Set/Get/Do (SGD) commands (See the *Zebra® Programming Guide* for more information.)
- The printer's **control panel display** (See *Control Panel Display on page 17* for more information.)
- The printer's **web pages** when the printer has an active wired or wireless print server connection (See the *ZebraNet Wired and Wireless Print Servers User Guide* for more information.)

Copies of the referenced manuals are available at <http://www.zebra.com/manuals> or on the user CD that came with your printer.

This section contains the following subsections:

- *Print Settings on page 83*
- *Maintenance and Diagnostic Tools on page 89*
- *Network Settings on page 96*
- *Language Settings on page 100*
- *Port Settings on page 103*

Print Settings

Table 7 • Print Settings

<p>Print Darkness</p>	<p>Set the darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, bar codes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely.</p> <p>If desired, use the FEED Self Test on page 151 to determine the best darkness setting.</p> <p><i>Accepted values:</i> 0.0 – 30.0</p> <p><i>Related ZPL command(s):</i> ^MD, ~SD</p> <p><i>SGD command used:</i> print.tone</p> <p><i>Control panel menu item:</i> DARKNESS on page 21</p> <p><i>Printer web page:</i> View and Modify Printer Settings > General Setup > Darkness</p>
<p>Print Speed</p>	<p>Select the speed for printing a label (given in inches per second). Slower print speeds typically yield better print quality.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • 203 dpi: 2–12 ips • 300 dpi: 2–9 ips <p><i>Related ZPL command(s):</i> ^PR</p> <p><i>SGD command used:</i> media.speed</p> <p><i>Control panel menu item:</i> PRINT SPEED on page 21</p> <p><i>Printer web page:</i> View and Modify Printer Settings > General Setup > Print Speed</p>

Table 7 • Print Settings (Continued)

<p>Tear-Off Position</p>	<p>If necessary, adjust the position of the media over the tear-off bar after printing.</p> <ul style="list-style-type: none"> Higher numbers move the media out (the tear line moves closer to the leading edge of the next label). Lower numbers move the media in (the tear line moves closer to the edge of the label just printed). <div data-bbox="690 447 1128 768" data-label="Diagram"> </div> <table border="1" data-bbox="542 798 1269 873"> <tr> <td>1</td> <td>Media direction</td> </tr> <tr> <td>2</td> <td>Factory-set tear line location at position 000</td> </tr> </table> <p><i>Accepted values:</i> -120 to 120</p> <p><i>Related ZPL command(s):</i> ~TA</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> TEAR OFF on page 21</p> <p><i>Printer web page:</i> View and Modify Printer Settings > General Setup > Tear Off</p>	1	Media direction	2	Factory-set tear line location at position 000
1	Media direction				
2	Factory-set tear line location at position 000				
<p>Print Mode</p>	<p>Select a print mode that is compatible with your printer options.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> TEAR OFF—The printer prints label formats as it receives them. The printer operator can tear off the printed labels any time after they print. PEEL—The printer peels the label from the liner during printing and then pauses until the label is removed. The liner winds onto the rewind spindle. REWIND—The printer prints without pausing between labels. The media is wound onto the rewind spindle after printing. CUTTER—The printer prints a label and then cuts it free. <p><i>Related ZPL command(s):</i> ^MM</p> <p><i>SGD command used:</i> media.printmode</p> <p><i>Control panel menu item:</i> PRINT MODE on page 21</p> <p><i>Printer web page:</i> View and Modify Printer Settings > General Setup > Print Mode</p>				

Table 7 • Print Settings (Continued)


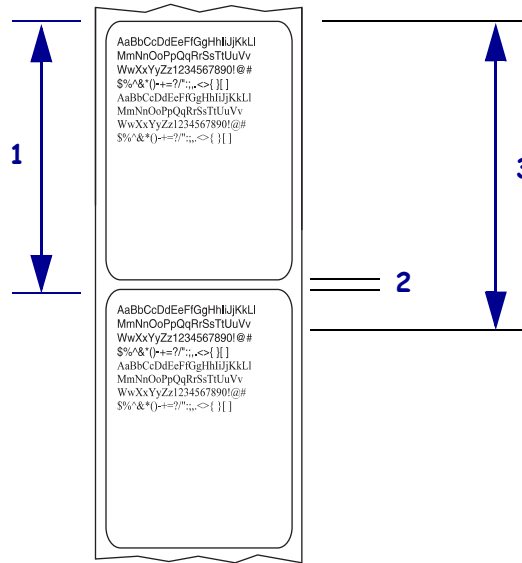
<p>Media Type</p>	<p>Select the type of media that you are using.</p> <ul style="list-style-type: none"> • If you select CONTINUOUS, you must include a label length in your label format (^LL if you are using ZPL). • If you select NON-CONTINUOUS for various non-continuous media, the printer feeds media to calculate the label length. <p>See Types of Media on page 47 for more information.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • CONTINUOUS • NON-CONTINUOUS <p><i>Related ZPL command(s):</i> ^MN</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> MEDIA TYPE on page 22</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Media Setup > Media Type</p>
<p>Print Method</p>	<p>Specify if ribbon is being used. Thermal Transfer media requires ribbon for printing while Direct Thermal media does not.</p> <p>To determine if you need to use ribbon, see When to Use Ribbon on page 49.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • THERMAL TRANS • DIRECT THERMAL <p><i>Related ZPL command(s):</i> ^MT</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> PRINT METHOD on page 22</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Media Setup > Print Method</p>
<p>Print Width</p>	<p>Specify the width of the labels being used.</p> <p> Note • Setting the width too narrow can result in portions of a label format not being printed on the media. Setting the width too wide wastes formatting memory and can cause the printer to print off of the label and onto the platen roller. This setting can affect the horizontal position of the label format if the image was inverted using the ^POI ZPL II command.</p> <p><i>Accepted values:</i> minimum: 2 dots maximum:</p> <ul style="list-style-type: none"> • 203 dpi: 832 dots • 300 dpi: 1248 dots <p><i>Related ZPL command(s):</i> ^PW</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> PRINT WIDTH on page 22</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Media Setup > Print Width</p>

Table 7 • Print Settings (Continued)

Maximum Label Length Set the maximum label length to a value that is at least 1.0 in. (25.4 mm) greater than the actual label length plus the interlabel gap. If you set the value to one that is smaller than the label length, the printer assumes that continuous media is loaded, and the printer cannot calibrate.

For example, if the label length is 6.0 inches (152 mm) including the interlabel gap, set the parameter for at least 7.0 inches (178 mm).



1	Label length (including interlabel gap)
2	Interlabel gap
3	Set the maximum label length to approximately this value

Accepted values: 0 to the maximum label length supported by the printer

Related ZPL command(s): ^ML

SGD command used: none

Control panel menu item: [MAXIMUM LENGTH on page 22](#)

Printer web page: [View and Modify Printer Settings > Media Setup > Maximum Length](#)

Table 7 • Print Settings (Continued)

<p>Backfeed Sequence</p>	<p>This parameter sets when label backfeed occurs after a label is removed in some print modes. It has no effect in Rewind mode. This setting is superseded by ~JS when received as part of a label format.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • AFTER (backfeed occurs immediately after the last label is completed) • OFF (no backfeed) • BEFORE (backfeed occurs before the forward motion of the first label) • DEFAULT <p><i>Related ZPL command(s):</i> ~JS</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> BACKFEED on page 30</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Advanced Setup > Backfeed</p>
<p>Label Top Position</p>	<p>This parameter adjusts the print position vertically on the label. Positive numbers adjust the label top position farther down the label (away from the printhead) by the specified number of dots. Negative numbers adjust the position up the label (toward the printhead).</p> <p><i>Accepted values:</i> -120 to 120</p> <p><i>Related ZPL command(s):</i> ^LT</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> LABEL TOP on page 30</p> <p><i>Printer web page:</i> View and Modify Printer Settings > General Setup > Label Top</p>
<p>Label Left Position</p>	<p>If necessary, shift the print position horizontally on the label. Positive numbers move the left edge of the image toward the center of the label by the number of dots selected, while negative numbers move the left edge of the image toward the left edge of the label.</p> <p><i>Accepted values:</i> -9999 to 9999</p> <p><i>Related ZPL command(s):</i> ^LS</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> LEFT POSITION on page 30</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Advanced Setup > Left Position</p>
<p>Head Test Count</p>	<p>The printer periodically performs a test of the printhead functionality. This parameter establishes how many labels are printed between these internal tests.</p> <p><i>Accepted values:</i> 0000 (disables the test) to 9999</p> <p><i>Related ZPL command(s):</i> ^JT</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> HEAD TEST COUNT on page 30</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Advanced Setup > Head Test Count</p>

Table 7 • Print Settings (Continued)

Reprint Mode	<p>When reprint mode is enabled, you can reprint the last label printed by pressing and holding PAUSE + CANCEL on the printer's control panel.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none">• ON• OFF <p><i>Related ZPL command(s):</i> ^JZ</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> REPRINT MODE on page 31</p> <p><i>Printer web page:</i> N/A</p>
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Maintenance and Diagnostic Tools

Table 8 • Maintenance and Diagnostic Tools

<p>Supplies Low Warning</p>	<p>When this feature is enabled, the printer provides warnings when the media or ribbon is reaching near the end of the roll.</p> <p><i>Accepted values:</i> MEDIA DISABLED, MEDIA ENABLED</p> <p><i>Related ZPL command(s):</i> ^JH</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> SUPPLIES WARNING on page 23</p> <p><i>Printer web page:</i> View and Modify Printer Settings > General Setup > Early Warning (Media)</p>
<p>Early Warning for Maintenance</p>	<p>When this feature is enabled, the printer provides warnings when the printhead needs to be cleaned.</p> <p><i>Accepted values:</i> MAINT. OFF, MAINT. ON</p> <p><i>Related ZPL command(s):</i> ^JH</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> EARLY WARNING MAINTENANCE on page 23</p> <p><i>Printer web page:</i> View and Modify Printer Settings > General Setup > Early Warning (Maintenance)</p>
<p>Printhead Cleaning Interval</p>	<p>When Early Warning for Maintenance is enabled, set this value to the length of the media or ribbon roll that you are using.</p> <p>When the printhead reaches the set length, WARNING CLEAN PRINTHEAD appears on the control panel display. If the alert function is enabled, the printer generates an alert.</p> <p><i>Accepted values:</i> 0 M/0 FT to 450M/1476 FT in 50 M increments</p> <p><i>Related ZPL command(s):</i> ^JH</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> HEAD CLEANING on page 23</p> <p><i>Printer web page:</i> View and Modify Printer Settings > General Setup > Head Cleaning</p>
<p>Printhead Life Expectancy</p>	<p>When Early Warning for Maintenance is enabled, set this value to the number of inches of media that the printhead is expected to print.</p> <p>When the printhead reaches the set length, WARNING REPLACE HEAD appears on the control panel display. If the alert function is enabled, the printer generates an alert.</p> <p><i>Accepted values:</i> 0 M/0 FT to 450M/1476 FT in 50 M increments</p> <p><i>Related ZPL command(s):</i> ^JH</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> HEAD LIFE on page 23</p> <p><i>Printer web page:</i> View and Modify Printer Settings > General Setup > Head Life</p>

Table 8 • Maintenance and Diagnostic Tools (Continued)

<p>Non-Resetable Counter</p>	<p>The non-resetable counter gives the total length of media that the printer has printed. You can use firmware commands to change the unit of measure for this counter.</p> <p><i>Related ZPL command(s):</i> ^MA (for changing unit of measure)</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> NONRESET CNTR on page 24</p> <p><i>Printer web page:</i> none</p>
<p>User-Controlled Counters</p>	<p>Two user-controlled counters give the total length of media that the printer has printed since the last time the counter was reset. You can use firmware commands to change the unit of measure and reset the counters.</p> <p><i>Related ZPL command(s):</i> ^MA (for changing unit of measure) ~RO (for resetting counters)</p> <p><i>SGD command used:</i> odometer.media_marker_count1 odometer.media_marker_count2</p> <p><i>Control panel menu item:</i> RESET CNTR1 on page 24 RESET CNTR2 on page 24</p> <p><i>Printer web page:</i> none</p>
<p>Print Counter Readings</p>	<p>Prints a label that lists the odometer readings for the following:</p> <ul style="list-style-type: none"> • the non-resetable counter • the two user-controlled counters • the Early Warning for Maintenance counters, which indicate when the printhead was last cleaned and the printhead life (If the Early Warning for Maintenance feature is disabled, the counters related to it do not print.) <p><i>Related ZPL command(s):</i> ~HQ</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> PRINT METERS on page 24</p> <p><i>Printer web page:</i> none</p>

Table 8 • Maintenance and Diagnostic Tools (Continued)

<p>Print Information</p>	<p>Print the specified information on one or more labels.</p> <ul style="list-style-type: none"> • FONTS—Prints the available fonts in the printer, including standard printer fonts plus any optional fonts. Fonts may be stored in RAM or Flash memory. • BAR CODES—Prints the available bar codes in the printer. Bar codes may be stored in RAM or Flash memory. • IMAGES—Prints the available images stored in the printer’s RAM, Flash memory, or optional memory card. • FORMATS—Prints the available formats stored in the printer’s RAM, Flash memory, or optional memory card. • SETUP—Prints the printer configuration label. • NETWORK—Prints the settings for any print server that is installed. • ALL—Prints the previous six labels. <p><i>Related ZPL command(s):</i> Printer configuration: ~WC Network: ~WL Others: ^WD</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> LIST FONTS on page 25 LIST BAR CODES on page 25 LIST IMAGES on page 25 LIST FORMATS on page 25 LIST SETUP on page 25 LIST NETWORK on page 26 LIST ALL on page 26</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Print Listings on Label</p>
<p>Print a Sensor Profile</p>	<p>Shows the sensor settings compared to actual sensor readings. To interpret the results of the sensor profile, see Sensor Profile on page 156.</p> <p><i>Related ZPL command(s):</i> ~JG</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> SENSOR PROFILE on page 26</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Print Listings on Label</p>
<p>Initialize Flash Memory</p>	<p>This option erases all previously stored information from Flash memory. Caution • This option completely erases the Flash memory.</p> <p><i>Related ZPL command(s):</i> ^JB</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> INIT FLASH MEM. on page 26</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Advanced Setup > Format Memory</p>

Table 8 • Maintenance and Diagnostic Tools (Continued)

<p>Power-Up Action</p>	<p>Set the Power-Up Action</p> <p>Set the action for the printer to take during the power-up sequence.</p> <ul style="list-style-type: none"> • CALIBRATE adjusts sensor levels and thresholds, determines the label length, and feeds the media to the next web. • FEED—feeds the labels to the first registration point. • LENGTH determines the label length using current sensor values, and feeds the media to the next web. • NO MOTION tells the printer not to move the media. You must manually ensure that the web is positioned correctly, or press feed to position the next web. • SHORT CAL sets the media and web thresholds without adjusting sensor gain, determines the label length, and feeds the media to the next web. <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • CALIBRATE • FEED • LENGTH • NO MOTION • SHORT CAL <p><i>Related ZPL command(s):</i> ^MF</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> MEDIA POWER UP on page 29</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Calibration</p>
<p>Head-Close Action</p>	<p>Set the Head-Close Action</p> <p>Set the action for the printer to take when you close the printhead.</p> <ul style="list-style-type: none"> • CALIBRATE adjusts sensor levels and thresholds, determines the label length, and feeds the media to the next web. • FEED—feeds the labels to the first registration point. • LENGTH determines the label length using current sensor values, and feeds the media to the next web. • NO MOTION tells the printer not to move the media. You must manually ensure that the web is positioned correctly, or press feed to position the next web. • SHORT CAL sets the media and web thresholds without adjusting sensor gain, determines the label length, and feeds the media to the next web. <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • CALIBRATE • FEED • LENGTH • NO MOTION • SHORT CAL <p><i>Related ZPL command(s):</i> ^MF</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> HEAD CLOSE on page 30</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Calibration</p>

Table 8 • Maintenance and Diagnostic Tools (Continued)

<p>Load Defaults</p>	<p>Load Printer or Print Server Defaults</p> <ul style="list-style-type: none"> • FACTORY—Restores all printer settings other than the network settings back to the factory defaults. Use care when loading defaults because you will need to reload all settings that you changed manually. • NETWORK—Reinitializes the printer’s wired or wireless print server. With a wireless print server, the printer will also reassociate with your wireless network. • LAST SAVED—Loads settings from the last permanent save. <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • FACTORY • NETWORK • LAST SAVED <p><i>Related ZPL command(s):</i> Factory: ^JUF Network: ^JUN Last saved: ^JUR</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> Available as options when exiting Setup Mode. See Exit Setup Mode on page 19.</p> <p><i>Control panel key(s):</i> Factory: Hold FEED + PAUSE during printer power-up to reset the printer parameters to factory values. Network: Hold CANCEL + PAUSE during printer power-up to reset the network parameters to factory values. Last saved: N/A</p> <p><i>Printer web page:</i> Factory: View and Modify Printer Settings > Restore Default Configuration Network: Print Server Settings > Reset Print Server Last saved: View and Modify Printer Settings > Restore Saved Configuration</p>
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Table 8 • Maintenance and Diagnostic Tools (Continued)


<p>Media and Ribbon Sensor Calibration</p>	<p>Calibrate the printer to adjust the sensitivity of the media and ribbon sensors. For complete instructions on how to perform a calibration procedure, see Calibrate the Ribbon and Media Sensors Manually on page 106.</p> <p><i>Accepted values:</i> N/A</p> <p><i>Related ZPL command(s):</i> ~JC</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> MEDIA AND RIBBON CALIBRATE on page 27</p> <p><i>Control panel key(s):</i> Hold PAUSE + FEED + CANCEL for 2 seconds to initiate calibration.</p> <p><i>Printer web page:</i> The calibration procedure cannot be initiated through the web pages. See the following web page for settings that are set during sensor calibration: View and Modify Printer Settings > Calibration</p> <p> Important • Do not change these settings unless you are told to do so by Zebra Technical Support or by an authorized service technician.</p>
<p>Communication Diagnostics Mode</p>	<p>Use this diagnostics tool to cause the printer to output the hexadecimal values for all data received by the printer. For more information, see Communication Diagnostics Test on page 155.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • DISABLED • ENABLED <p><i>Related ZPL command(s):</i> ~JD to enable, ~JE to disable</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> COMMUNICATIONS on page 28</p> <p><i>Printer web page:</i> N/A</p>
<p>Format Conversion</p>	<p>Selects the bitmap scaling factor. The first number is the original dots per inch (dpi) value; the second, the dpi to which you would like to scale.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • NONE • 150 → 300 • 150 → 600 • 200 → 600 • 300 → 600 <p><i>Related ZPL command(s):</i> none</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> FORMAT CONVERT on page 31</p> <p><i>Printer web page:</i> none</p>

Table 8 • Maintenance and Diagnostic Tools (Continued)

<p>Idle Display</p>	<p>Select the information shown on the printer's display when the printer is idle.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • FIRMWARE (FW) VERSION • MM/DD/YY 24 HR • M/DD/YY 12 HR • DD/MM/YY 24 HR • DD/MM/YY 12 HR <p><i>Related ZPL command(s):</i> none</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> IDLE DISPLAY on page 32</p> <p><i>Printer web page:</i> N/A</p>
<p>RTC Date</p>	<p>This parameter allows you to set the date to display in the Idle Display.</p> <p><i>Related ZPL command(s):</i> ^ST</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> RTC DATE on page 32</p> <p><i>Printer web page:</i> none</p>
<p>RTC Time</p>	<p>This parameter allows you to set the time to display in the Idle Display.</p> <p><i>Related ZPL command(s):</i> ^ST</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> RTC TIME on page 32</p> <p><i>Printer web page:</i> none</p>
<p>Password Level</p>	<p>This parameter allows you to select whether certain factory-selected menu items or all menu items are password protected.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • SELECTED ITEMS • ALL ITEMS <p><i>Related ZPL command(s):</i> none</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> PASSWORD LEVEL on page 35</p> <p><i>Printer web page:</i> none</p>
<p>Run a ZBI Program</p>	<p>If you have ZBI 2.0 installed, you may choose to run a ZBI program that you have downloaded to your printer.</p> <p><i>Accepted values:</i> N/A</p> <p><i>Related ZPL command(s):</i> ^JI, ~JI</p> <p><i>SGD command used:</i> zbi.control.run</p> <p><i>Control panel menu item:</i> Run the Specified ZBI Program* on page 32</p> <p><i>Printer web page:</i> Directory Listing</p>

Network Settings

Table 9 • Network Settings

<p>Primary Network</p>	<p>Select the Primary Network Device This parameter determines which device should be considered primary in the active device selection.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • WIRED • WIRELESS <p><i>Related ZPL command(s):</i> ^NC</p> <p><i>SGD command used:</i> ip.primary_network</p> <p><i>Control panel menu item:</i> PRIMARY NETWORK on page 32</p> <p><i>Printer web page:</i> none</p>
<p>Load from External Device</p>	<p>View if IP Settings Are Loaded from the Printer or Print Server This parameter tells whether to use the printer's or the print server's LAN/WLAN settings at power-up. The default is to use the printer's settings.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • YES • NO <p><i>Related ZPL command(s):</i> ^NP</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> LOAD FROM EXT? on page 33</p> <p><i>Printer web page:</i> none</p>
<p>Active Print Server</p>	<p>View the Active Print Server This menu item displays which print server is being used. This tells which device's settings such as IP protocol and IP address are being displayed under those menu items.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • WIRELESS indicates that the wireless print server is active. • INTERNAL WIRED indicates that the internal wired print server is active. • EXTERNAL WIRED indicates that an external wired print server is active. • NONE indicates that one of the network options is installed but is not active. When NONE is shown for this menu item, the device-specific items such as IP protocol and IP address will not display. <p><i>Related ZPL command(s):</i> none</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> ACTIVE PRINTSRVR on page 33</p> <p><i>Printer web page:</i> none</p>

Table 9 • Network Settings (Continued)

<p>IP Protocol</p>	<p>Set the IP Resolution Method</p> <p>This parameter tells if the user (permanent) or the server (dynamic) selects the IP address. If a dynamic option is chosen, this parameter tells the method(s) by which the wired or wireless print server receives the IP address from the server.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • ALL • GLEANING ONLY • RARP • BOOTP • DHCP • DHCP & BOOTP • PERMANENT <p><i>Related ZPL command(s):</i> ^ND</p> <p><i>SGD command used:</i> Wired: internal_wired.ip.protocol external_wired.ip.protocol Wireless: wlan.ip.protocol</p> <p><i>Control panel menu item:</i> IP PROTOCOL on page 33</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings > IP Protocol</p>
<p>IP Address</p>	<p>View or Set the Printer's IP Address</p> <p>View and, if necessary, change the printer's IP address.</p> <p>Changes to this setting are saved only if IP PROTOCOL is set to PERMANENT. To allow any saved changes to take effect, reset the print server (see Reset Network on page 99).</p> <p><i>Accepted values:</i> 000 to 255 for each field</p> <p><i>Related ZPL command(s):</i> ^ND</p> <p><i>SGD command used:</i> Wired: internal_wired.ip.addr external_wired.ip.addr Wireless: ip.addr, wlan.ip.addr</p> <p><i>Control panel menu item:</i> IP ADDRESS on page 33</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings > IP Address</p>

Table 9 • Network Settings (Continued)

<p>Subnet Mask</p>	<p>View or Set the Subnet Mask View and, if necessary, change the subnet mask. This menu item appears only if a wired or wireless print server is installed on your printer. To save changes to this setting, set IP PROTOCOL to PERMANENT, and then reset the print server (see Reset Network on page 99).</p> <p><i>Accepted values:</i> 000 to 255 for each field</p> <p><i>Related ZPL command(s):</i> ^ND</p> <p><i>SGD command used:</i> Wired: internal_wired.ip.netmask external_wired.ip.netmask Wireless: wlan.ip.netmask</p> <p><i>Control panel menu item:</i> SUBNET MASK on page 34</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings > Subnet Mask</p>
<p>Default Gateway</p>	<p>View or Set the Default Gateway View and, if necessary, change the default gateway. This menu item appears only if a wired or wireless print server is installed on your printer. To save changes to this setting, set IP PROTOCOL to PERMANENT, and then reset the print server (see Reset Network on page 99).</p> <p><i>Accepted values:</i> 000 to 255 for each field</p> <p><i>Related ZPL command(s):</i> ^ND</p> <p><i>SGD command used:</i> Wired: internal_wired.ip.gateway external_wired.ip.gateway Wireless: wlan.ip.gateway</p> <p><i>Control panel menu item:</i> DEFAULT GATEWAY on page 34</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings > Default Gateway</p>
<p>MAC Address</p>	<p>View the MAC Address View the Media Access Control (MAC) address of the print server that is installed in the printer (wired or wireless).</p> <p><i>Accepted values:</i> N/A</p> <p><i>Related ZPL command(s):</i> none</p> <p><i>SGD command used:</i> Wired: internal_wired.mac_addr external_wired.mac_addr Wireless: wlan.mac_addr</p> <p><i>Control panel menu item:</i> MAC ADDRESS on page 34</p> <p><i>Printer web page:</i> none</p>

Table 9 • Network Settings (Continued)

ESSID	<p>View the ESSID Value</p> <p>The Extended Service Set Identification (ESSID) is an identifier for your wireless network. This setting, which cannot be modified from the control panel, gives the ESSID for the current wireless configuration.</p> <p><i>Accepted values:</i> 32-character alphanumeric string (default 125)</p> <p><i>Related ZPL command(s):</i> none</p> <p><i>SGD command used:</i> wlan.essid</p> <p><i>Control panel menu item:</i> ESSID on page 34</p> <p><i>Printer web page:</i> none</p>
Reset Network	<p>This option resets the wired or wireless print server. You must reset the print server to allow any changes to the network settings to take effect.</p> <p><i>Accepted values:</i> N/A</p> <p><i>Related ZPL command(s):</i> ~WR</p> <p><i>SGD command used:</i> device.reset</p> <p><i>Control panel menu item:</i> RESET NETWORK on page 35</p> <p><i>Printer web page:</i> Print Server Settings > Factory Print Server Settings</p>

Language Settings

Table 10 • Language Settings



<p>Language</p>	<p>If necessary, change the language that the printer displays. This change affects the words shown on the following:</p> <ul style="list-style-type: none"> • status and error messages • the printer parameters • the printer configuration label, the network configuration label, and other labels that you can select to print through the user menus (This does not apply to Japanese, Korean, Simplified Chinese, or Traditional Chinese. Labels for those languages print in English.) <p> Note • The selections for this parameter are displayed in the actual languages to make it easier for you to find one that you are able to read.</p> <p><i>Accepted values:</i> ENGLISH, SPANISH, FRENCH, GERMAN, ITALIAN, NORWEGIAN, PORTUGUESE, SWEDISH, DANISH, SPANISH 2, DUTCH, FINNISH, JAPANESE, KOREAN, SIMPLIFIED CHINESE, TRADITIONAL CHINESE, RUSSIAN, POLISH, CZECH, ROMANIAN</p> <p><i>Related ZPL command(s):</i> ^KL</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> LANGUAGE on page 36</p> <p><i>Printer web page:</i> View and Modify Printer Settings > General Setup > Language</p>
<p>Control Character</p>	<p>Set the Control Prefix Character Value</p> <p>The printer looks for this two-digit hex character to indicate the start of a ZPL/ZPL II control instruction. Set the control prefix character to match what is used in your label formats.</p> <p><i>Accepted values:</i> 00 to FF</p> <p><i>Related ZPL command(s):</i> ^CT or ~CT</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> CONTROL PREFIX on page 29</p> <p><i>Printer web page:</i> View and Modify Printer Settings > ZPL Control</p>

Table 10 • Language Settings (Continued)

<p>Command Character</p>	<p>Set the Format Command Prefix Value</p> <p>The format command prefix is a two-digit hex value used as a parameter place marker in ZPL/ZPL II format instructions. The printer looks for this hex character to indicate the start of a ZPL/ZPL II format instruction.</p> <p>Set the format command prefix character to match what is used in your label formats.</p> <p> Important • You cannot use the same hex value for the format command prefix, control character, and delimiter characters. The printer must see different characters to work properly. If you are setting the value through the control panel, the printer will skip any value that is already in use.</p> <p><i>Accepted values:</i> 00 to FF</p> <p><i>Related ZPL command(s):</i> ^CC or ~CC</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> FORMAT PREFIX on page 29</p> <p><i>Printer web page:</i> View and Modify Printer Settings > ZPL Control</p>
<p>Delimiter Character</p>	<p>Set the Delimiter Character Value</p> <p>The delimiter character is a two-digit hex value used as a parameter place marker in ZPL/ZPL II format instructions.</p> <p>Set the delimiter character to match what is used in your label formats.</p> <p><i>Accepted values:</i> 00 to FF</p> <p><i>Related ZPL command(s):</i> ^CD or ~CD</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> DELIMITER CHAR on page 29</p> <p><i>Printer web page:</i> View and Modify Printer Settings > ZPL Control</p>
<p>ZPL Mode</p>	<p>Set the ZPL Mode</p> <p>Select the ZPL mode that matches what is used in your label formats.</p> <p>This printer accepts label formats written in either ZPL or ZPL II, eliminating the need to rewrite any ZPL formats that already exist. The printer remains in the selected mode until it is changed in one of the ways listed here.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • ZPL II • ZPL <p><i>Related ZPL command(s):</i> ^SZ</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> ZPL MODE on page 29</p> <p><i>Printer web page:</i> View and Modify Printer Settings > ZPL Control</p>

Sensor Settings

Table 11 • Sensor Settings

Sensor Type	<p>Select the Media Sensor</p> <p>Select the media sensor that is appropriate for the media that you are using.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none">• WEB• MARK <p><i>Related ZPL command(s):</i> ^JS</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> SENSOR TYPE on page 22</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Media Setup</p>
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Port Settings

Table 12 • Port Settings



<p>Parallel Communications</p>	<p>Set Parallel Communications Select the communications port that matches the one being used by the host computer.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • BIDIRECTIONAL • UNIDIRECTIONAL <p><i>Related ZPL command(s):</i> none</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> PARRALEL COMM. on page 27</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Serial Communications Setup</p>
<p>Serial Communications</p>	<p>Set Serial Communications Select the communications port that matches the one being used by the host computer.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • RS232 • RS422/485 • RS485 MULTIDROP <p> Note • Select RS232 if you are using an external adapter to enable RS422/485 operation.</p> <p><i>Related ZPL command(s):</i> none</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> SERIAL COMM. on page 27</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Serial Communications Setup > Serial Comm.</p>

Table 12 • Port Settings (Continued)

<p>Baud Rate</p>	<p>Set the Baud Rate Select the baud value that matches the one being used by the host computer.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • 115200 • 57600 • 38400 • 28800 • 19200 • 14400 • 9600 • 4800 • 2400 • 1200 • 600 • 300 <p><i>Related ZPL command(s):</i> ^SC</p> <p><i>SGD command used:</i> comm.baud</p> <p><i>Control panel menu item:</i> BAUD on page 27</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Serial Communications Setup > Baud</p>
<p>Data Bits</p>	<p>Set the Data Bits Value Select the data bits value that matches the one being used by the host computer.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • 7 • 8 <p><i>Related ZPL command(s):</i> ^SC</p> <p><i>SGD command used:</i> comm.data_bits</p> <p><i>Control panel menu item:</i> DATA BITS on page 27</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Serial Communications Setup > Data Bits</p>
<p>Parity</p>	<p>Set the Parity Value Select the parity value that matches the one being used by the host computer.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • NONE • EVEN • ODD <p><i>Related ZPL command(s):</i> ^SC</p> <p><i>SGD command used:</i> comm.parity</p> <p><i>Control panel menu item:</i> PARITY on page 28</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Serial Communications Setup > Parity</p>

Table 12 • Port Settings (Continued)

<p>Host Handshake</p>	<p>Set the Host Handshake Protocol Value</p> <p>Select the handshake protocol that matches the one being used by the host computer.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • XON/XOFF • RTS/CTS • DSR/DTR <p><i>Related ZPL command(s):</i> ^SC</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> HOST HANDSHAKE on page 28</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Serial Communications Setup > Host Handshake</p>
<p>Protocol</p>	<p>Protocol is a type of error checking system. Depending on the selection, an indicator may be sent from the printer to the host computer signifying that data has been received. Select the protocol that is requested by the host computer.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> • NONE • ZEBRA • ACK_NAK <p> Note • ZEBRA is the same as ACK_NAK, except that ZEBRA response messages are sequenced. If ZEBRA is selected, the printer must use DSR/DTR for host handshake protocol.</p> <p><i>Related ZPL command(s):</i> ^SC</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> PROTOCOL on page 28</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Serial Communications Setup > Protocol</p>
<p>Network ID</p>	<p>This parameter assigns a unique number to the printer when the printer is operating in an RS422/485 multi-drop network environment (an external RS422/485 adapter is required). This gives the host computer the means to address a specific printer. This does not affect TCP/IP or IPX networks. Set a unique network ID number for this printer.</p> <p><i>Accepted values:</i> 000 to 999</p> <p><i>Related ZPL command(s):</i> ^NI</p> <p><i>SGD command used:</i> none</p> <p><i>Control panel menu item:</i> NETWORK ID on page 28</p> <p><i>Printer web page:</i> View and Modify Printer Settings > Serial Communications Setup > Network ID</p>

Calibrate the Ribbon and Media Sensors Manually

Use the calibration procedure in this section when necessary to calibrate the printer based on the media and ribbon that you are currently using. Manual calibration is recommended whenever you are using pre-printed labels (or label backing) or if the printer will not correctly auto calibrate.

- For issues that may be resolved by sensor calibration, see [Printing Issues on page 136](#).
- For a summary of the options for initiating calibration, see [Media and Ribbon Sensor Calibration on page 94](#).



Important • Follow the calibration procedure exactly as presented. All of the steps must be performed even if only one of the sensors requires adjustment. You may press and hold CANCEL at any step in this procedure to cancel the process.

To perform sensor calibration, complete these steps:

1. With the printer in the Ready state, initiate media and ribbon calibration through the printer's display:
 - a. Navigate to the following parameter. See [Control Panel Display on page 17](#) for information about using the control panel.



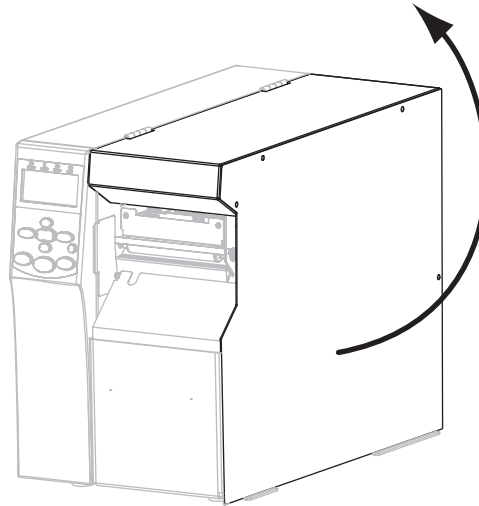
- b. Press **RIGHT SELECT** to select START.

The printer does the following:

- The **STATUS light** and **SUPPLIES light** flash yellow once.
- The **PAUSE light** blinks yellow.
- The control panel displays:

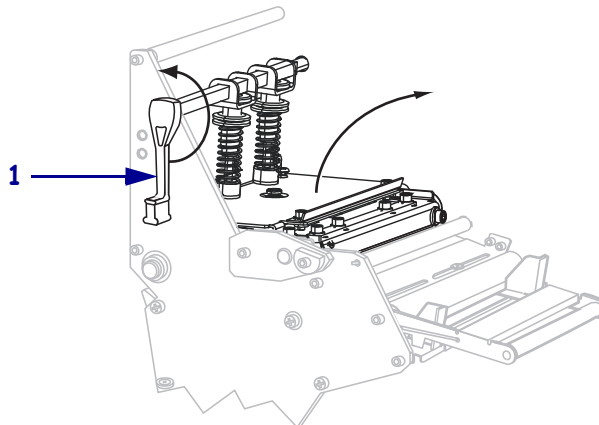
LOAD BACKING

2. Raise the media door.

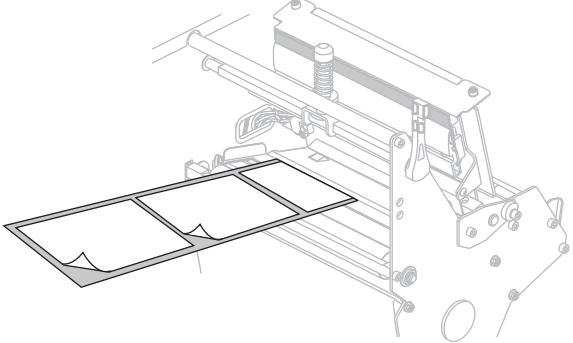
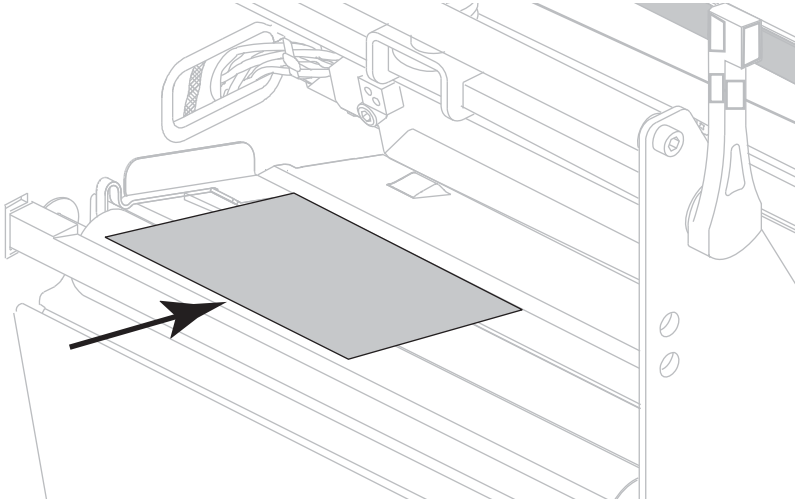


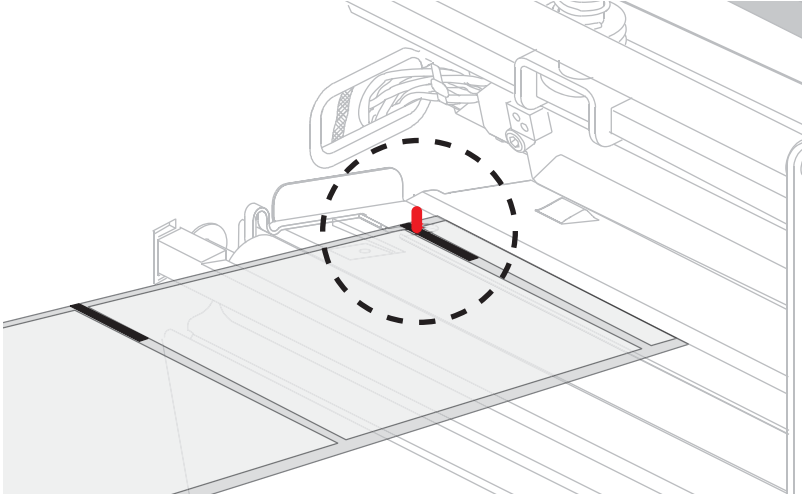
3. **Caution** • The printhead may be hot and could cause severe burns. Allow the printhead to cool.

Rotate the printhead-open lever (1) to the open position.



4. What type of media are you using? For more information, see [Types of Media](#) on page 47.

If you are using...	Then...
Media where labels are separated by gaps	<p data-bbox="625 331 1386 443">a. Set the sensor type to WEB. (See Sensor Type on page 102.) b. Extend approximately 8in. (203 mm) of media out of the printer. c. Remove and discard the labels from this exposed media.</p>  <p data-bbox="625 808 1024 842">d. Pull the backing into the printer.</p> 

If you are using...	Then...
Black mark media	<p>a. Set the sensor type to MARK. (See <i>Sensor Type</i> on page 102.)</p> <p>b. Position a black mark over the red light from the black mark media sensor.</p> 
Media where labels are separated by holes or notches	<p>a. Remove the media from between the media sensors.</p>

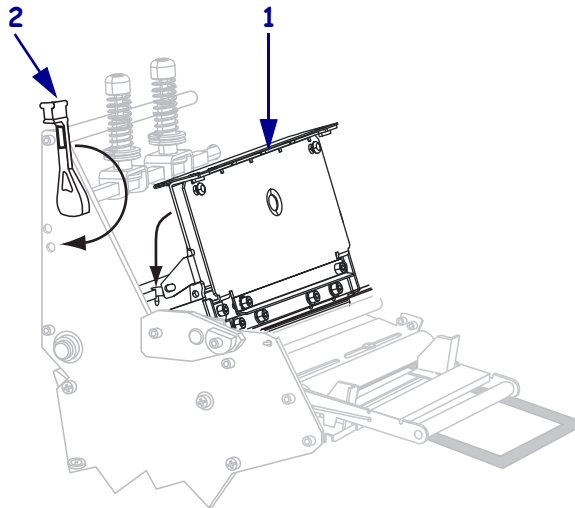
5. Press **PLUS (+)** to continue.

The control panel displays:

REMOVE RIBBON

6. Remove the ribbon (if used).

7. Push down the printhead assembly (**1**), and then rotate the printhead-open lever (**2**) until it locks into place.



8. Press **PAUSE** to begin the media calibration process.

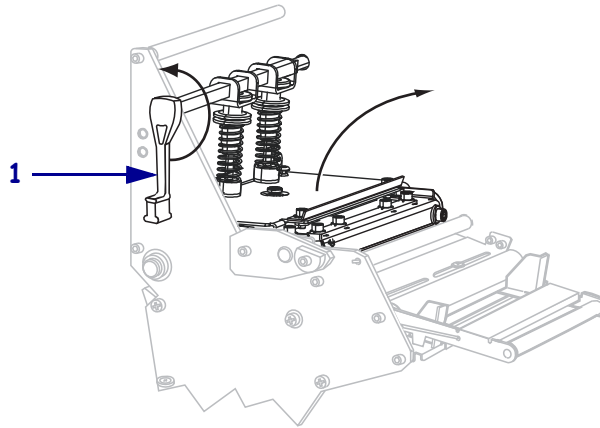
The control panel displays:

**CALIBRATING
PLEASE WAIT**

When the process is complete, the control panel displays:

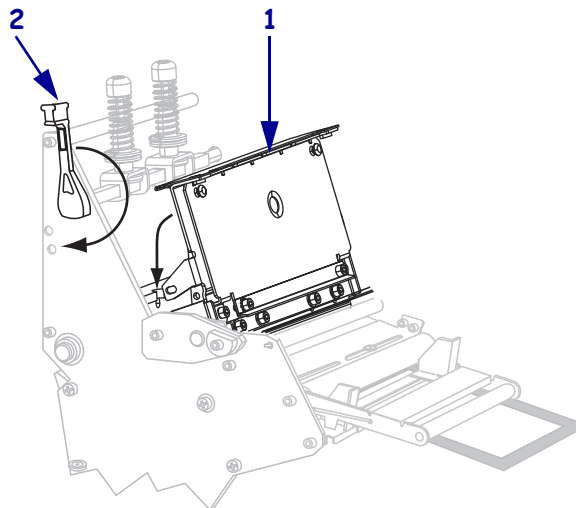
RELOAD ALL

9. Rotate the printhead-open lever (1) to the open position.

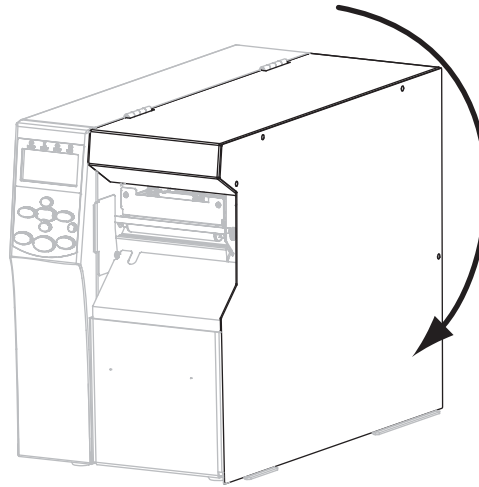


10. Reload the media and ribbon (if used). With preprinted or black mark media, make sure that an area without preprinting or without a black mark is over the media sensor.

11. Push down the printhead assembly (1), and then rotate the printhead-open lever (2) until it locks into place.



12. Close the media door.



The printer completes calibration and feeds labels until they come to rest in the appropriate spot for printing.

13. Press **PAUSE** to enable printing.

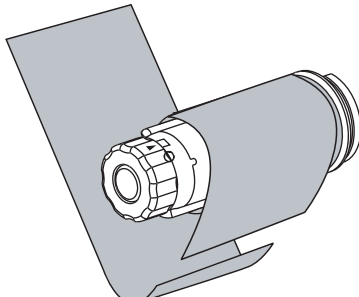
Remove Used Ribbon

Remove used ribbon from the ribbon take-up spindle each time you change the roll of ribbon.

To remove used ribbon, complete these steps:

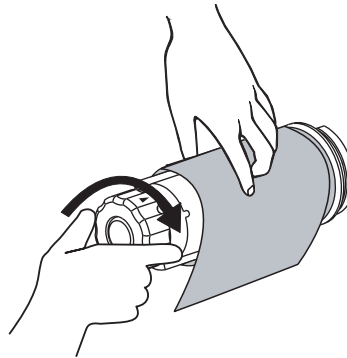
1. Has the ribbon run out?

If the ribbon...	Then
Ran out	Continue with the next step.
Did not run out	Cut or break the ribbon before the ribbon take-up spindle.

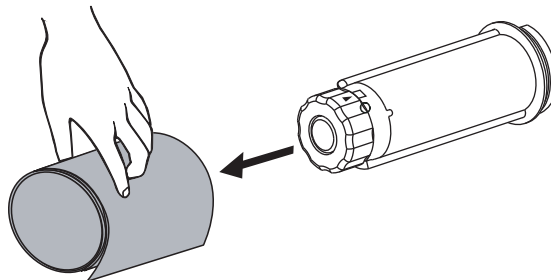
A technical illustration of a ribbon take-up spindle. It is a cylindrical component with a central hub and a gear-like structure. A roll of ribbon is partially unspooled and attached to the spindle. The ribbon is shown as a flat, greyish material.

2. While holding the ribbon take-up spindle, turn the ribbon release knob clockwise until it stops.

The ribbon release bars pivot down, easing the spindle's grip on the used ribbon.



3. Slide the used ribbon off of the ribbon take-up spindle and discard.



Remove Media or Liner from the Rewind Spindle

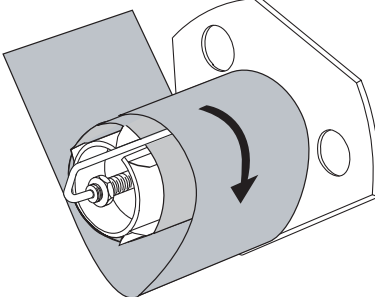
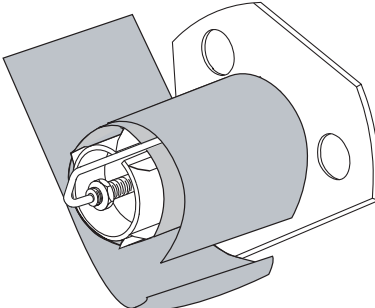
Rewind mode uses the rewind spindle to wind media, while Peel-Off mode uses the rewind spindle to wind used liner. Remove the media or the liner from the rewind spindle each time that you change media.



Important • It is **not** necessary to turn off the power to remove media or liner from the rewind spindle. If power is turned off, all label formats and images, as well as any temporarily saved parameter settings stored in the printer's internal memory, are lost. When power is turned back on, these items must be reloaded.

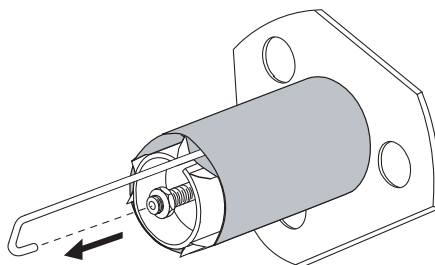
To remove media or liner from the rewind spindle, complete these steps:

1. Has the media run out?

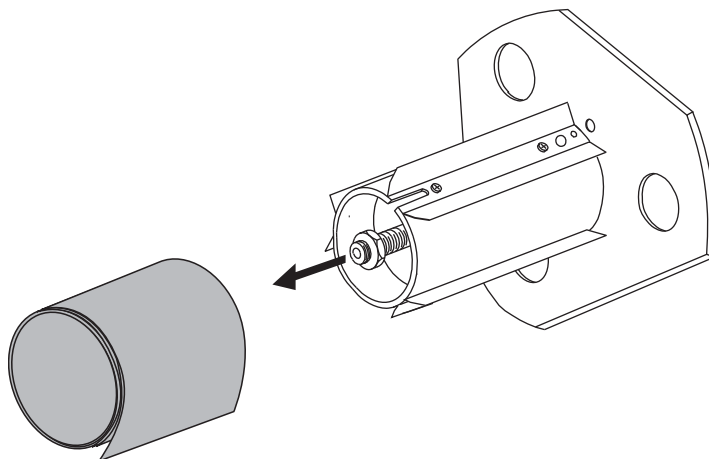
If...	Then...
No	<ol style="list-style-type: none"> <li data-bbox="592 747 1412 810">a. Create slack in the media or liner by rotating the rewind spindle slightly clockwise.  <ol style="list-style-type: none"> <li data-bbox="592 1163 1412 1194">b. Cut or tear the media or liner at the rewind spindle. 
Yes	Continue with the next step.

114 | **Printer Configuration and Adjustment**
Remove Media or Liner from the Rewind Spindle

2. Pull out the spindle hook.



3. Slide the media or liner off of the rewind spindle.



Adjust Transmissive Media Sensors

The transmissive media sensor assembly consists of two parts: a light source and a light sensor. The lower media sensor is the light source, and the upper media sensor is the light sensor. The media passes between the two parts.

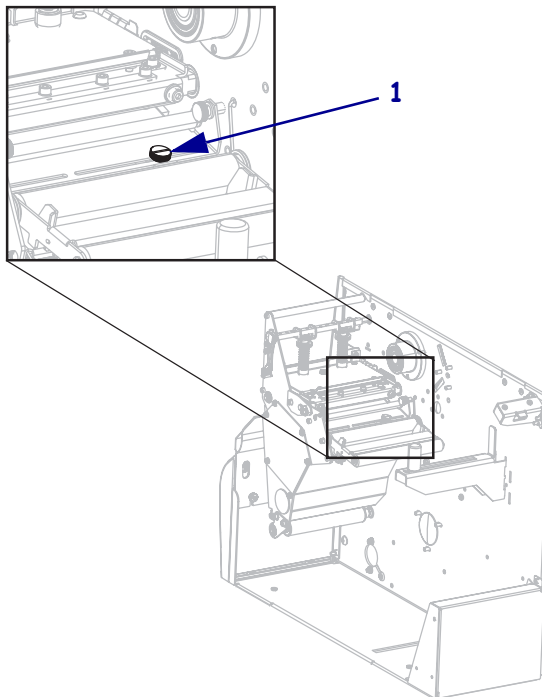
Adjust these sensors only when the printer cannot detect the top of the labels. In this situation, the control panel LCD displays **ERROR CONDITION PAPER OUT**, even though there are labels loaded in the printer. For non-continuous media with a notch or hole in the media, the sensor must be directly above the notch or hole.

Upper Media Sensor

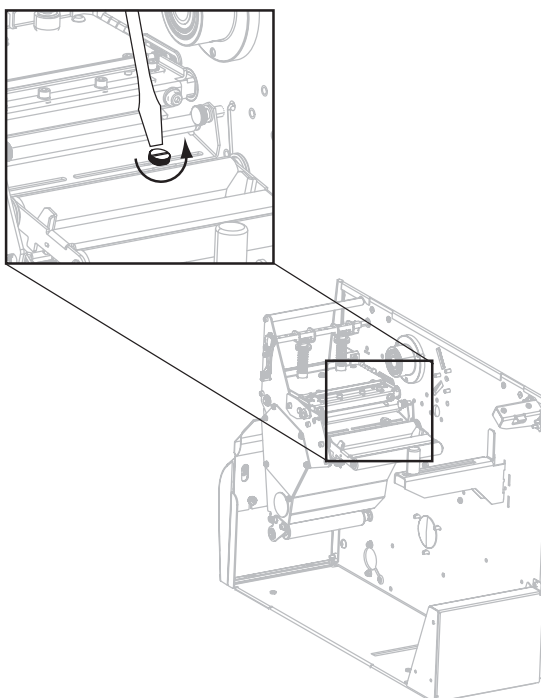
The upper media sensor can be positioned along the inner portion of the media (the side closest to the back frame of the printer) or the outer portion of the media (the side farthest from the back frame of the printer). Moving the media sensor to the outer portion of the media should be performed only by a qualified service technician.

To reposition the upper media sensor along the inside portion of the media, complete these steps:

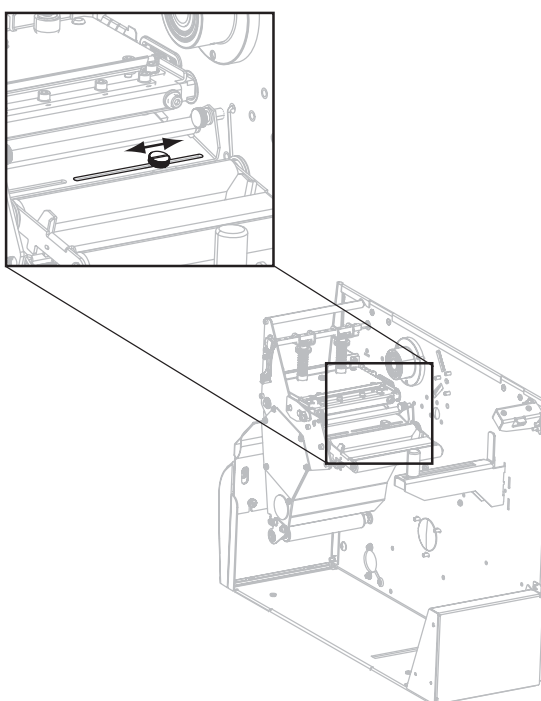
1. Remove the ribbon (if ribbon is used).
2. Locate the upper media sensor adjustment screw (1). The upper media sensor eye is directly below the adjustment screw head.



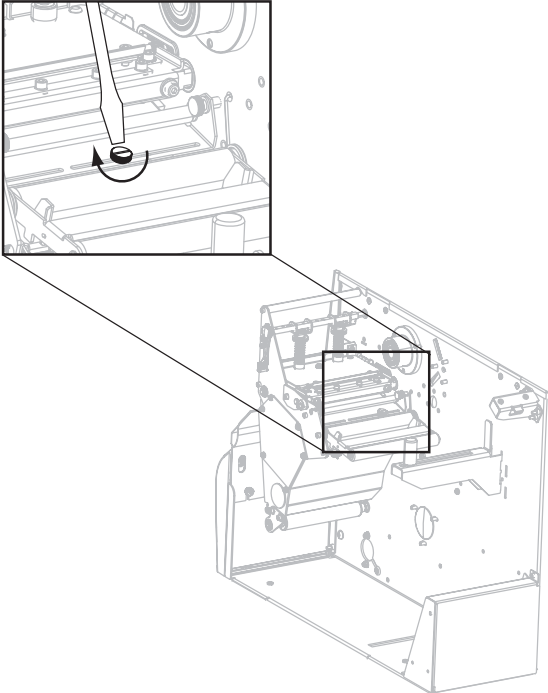
3. Using a thin, flat-blade screwdriver, loosen the upper media sensor adjustment screw.



4. Slide the upper media sensor along the slot to the desired position.



5. Tighten the adjustment screw to secure the upper media sensor in its new position.



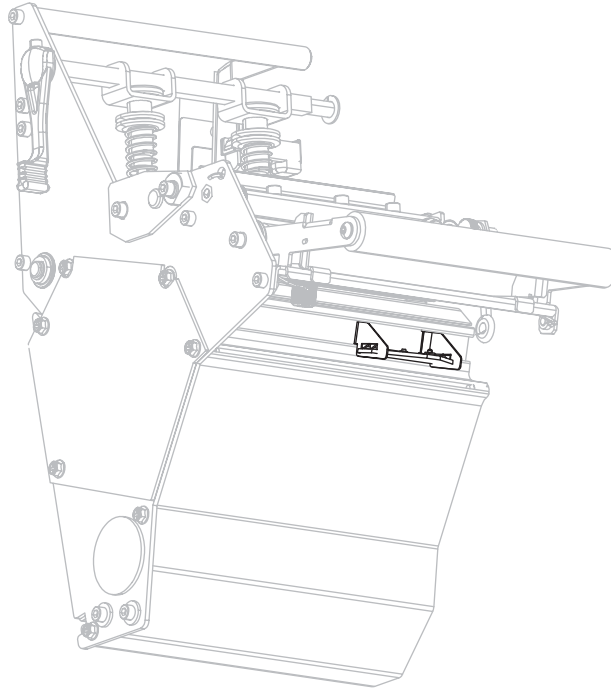
6. Adjust the lower media sensor to match the new position of the upper media sensor. See [Lower Media Sensor](#) on page 118.

Lower Media Sensor

After you adjust the upper media sensor, adjust the lower media sensor to match its new position.

To adjust the lower media sensor, complete these steps:

1. Locate the lower media sensor assembly under the rear roller. The sensor is a spring clip holding a circuit board.



2. Slide the lower sensor until it is under the upper media sensor. Use the light that shines from the lower sensor to help align it with the upper sensor. Gently pull the wires as needed (wires should have a little slack).


Adjust Printhead Pressure and Toggle Position

Print quality depends on the labels and ribbon used as well as the toggle pressure and position. Make sure that your labels and ribbon are acceptable for your application. If they are, check the toggle position and then the printhead pressure.

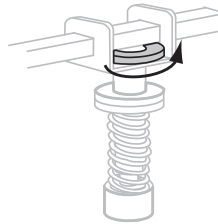
Toggle Position Adjustment

You may need to adjust the toggles if printing is too light on one side or if thick labels are used. If the toggle pressure is too light or uneven, the labels and ribbon may slip.

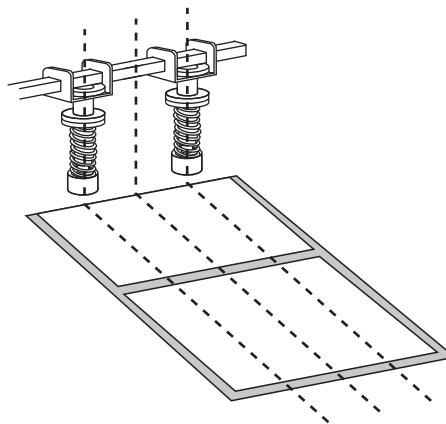
To position the toggles, complete these steps:

1. Print some labels at 2 in. (51 mm) per second by running the PAUSE Self Test (see [PAUSE Self Test on page 150](#)).
2. While printing labels, use the control panel to lower the darkness setting until the labels are printing gray instead of black (see [Print Darkness on page 83](#)).
3.  **Caution** • The printhead may be hot and could cause severe burns. Allow the printhead to cool.

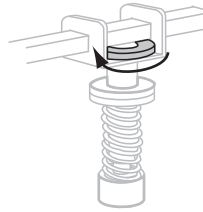
Loosen the locking nut at the top of each toggle assembly.



4. Position the toggles approximately 1/4 of the way in from each edge of the media. (For extremely narrow media, position one toggle over the center of the labels, and decrease the pressure on the unused toggle.)



5. Tighten the locking nuts.



6. Print additional labels at 2 in. (51 mm) per second by again running the PAUSE Self Test. (Press and hold PAUSE while turning on (I) the printer.)
7. Do both sides of the label print at the same level of gray?

If...	Then...
Yes	The toggles are positioned correctly. Increase the darkness setting to the optimum level for the media being used.
No	<ol style="list-style-type: none">Readjust the position of the toggle or toggles toward the side that printed lighter.Print additional labels at 2 in. (51 mm) per second by again running the PAUSE Self Test. (Press and hold PAUSE while turning on (I) the printer.)Repeat this step until both sides of the label print at the same level of gray.Increase the darkness setting to the optimum level for the media being used.

Printhead Pressure Adjustment

If positioning the toggles properly does not solve a print quality problem, try adjusting the printhead pressure. Maximize printhead life by using the lowest pressure that produces the desired print quality.



Caution • Observe proper electrostatic safety precautions when handling any static-sensitive components such as circuit boards and printheads.

To adjust printhead pressure, complete these steps:

Before adjusting the printhead pressure, check that the toggles are positioned correctly. See [Toggle Position Adjustment on page 119](#).

Printhead life and drive system life (belts and bearings) can be maximized by using the lowest pressure that produces the desired print quality without allowing the ribbon or media to slip. You may need to adjust the printhead pressure in the following instances:

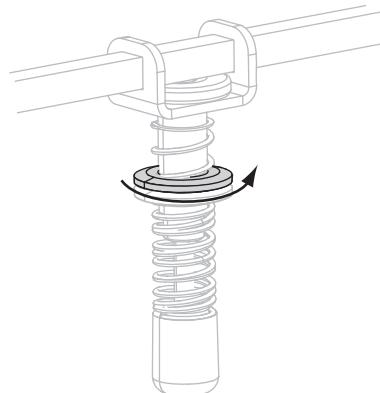
- if there is noticeable bleed or swelling in the printed image (too much pressure)
- if there are voids (too little pressure)
- if the darkness setting (burn duration) is set properly, but printing is too light (too little pressure)
- if the ribbon slips (too little pressure)



Caution • Observe proper electrostatic safety precautions when handling any static-sensitive components such as circuit boards and printheads.

To adjust printhead pressure, complete these steps:

1. As needed throughout this procedure, refer to the [PAUSE Self Test on page 150](#) to print test labels.
2. Refer to [Print Darkness on page 83](#) to set the darkness value (burn duration) appropriately for your media and ribbon.
3. Loosen the locking nut on the toggle assemblies.

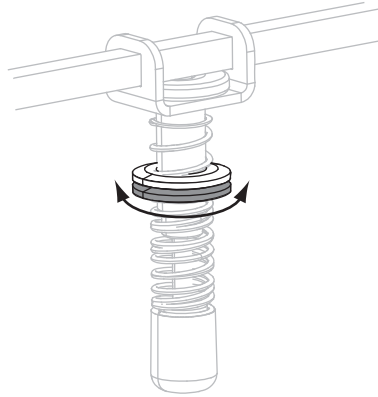




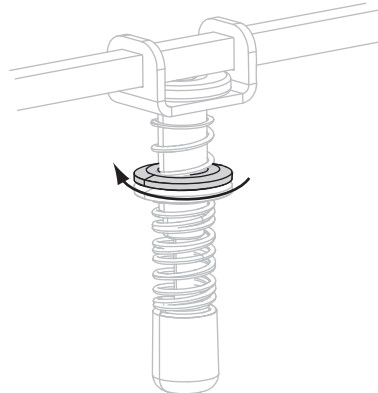
-
4. **Caution** • The printhead may be hot and could cause severe burns. Allow the printhead to cool.
-

Move the adjusting nut until the print quality is acceptable. Use the lowest pressure that provides the desired print quality.

- To increase printhead pressure, move the adjusting nut downward.
- To decrease printhead pressure, move the adjusting nut upward.



5. To lock the toggle pressure, tighten the locking nut against the adjusting nut.



Routine Maintenance

This section provides routine cleaning and maintenance procedures.

Contents

Replacing Printer Components	124
Ordering Replacement Parts	124
Recycling Printer Components	124
Lubrication	124
Cleaning Schedule and Procedures.	125
Clean the Exterior	125
Clean the Media Compartment	126
Clean the Printhead and Platen Roller.	126
Clean the Sensors	128
Clean the Snap Plate	130
Clean the Cutter.	134

Replacing Printer Components

Some printer components, such as the printhead and platen roller, may wear out over time and can be replaced easily. Regular cleaning may extend the life of some of these components. See [Cleaning Schedule and Procedures on page 125](#) for the recommended cleaning intervals.

Ordering Replacement Parts

For optimal printing quality and proper printer performance across our product line, Zebra strongly recommends the use of genuine Zebra™ supplies as part of the total solution.

Contact your authorized Zebra reseller for part ordering information, or see [Contacts on page 11](#) for contact addresses and telephone numbers.

Recycling Printer Components



The majority of this printer's components are recyclable. The printer's main logic board includes a battery that you should dispose of properly.

Do not dispose of any printer components in unsorted municipal waste. Please dispose of the battery according to your local regulations, and recycle the other printer components according to your local standards. For more information, see <http://www.zebra.com/environment>.

Lubrication

Other than lubricating the cutter blade after approximately 60,000 cuts, no lubrication is needed for this printer.



Caution • The cutter blade is sharp. Do not touch or rub the blade with your fingers.

Caution • Some commercially available lubricants will damage the finish and the mechanical parts if used inappropriately on this printer.

Cleaning Schedule and Procedures

Cleaning your printer regularly maintains print quality and may extend the life of the printer. The recommended cleaning schedule is shown in [Table 13](#). See the following pages for specific procedures.

Caution • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.

Caution • Use only the cleaning agents indicated. Zebra is not responsible for damage caused by any other fluids being used on this printer.

Table 13 • Recommended Printer Cleaning Schedule

Area	Method	Interval
Printhead	Solvent*	Perform these procedures at the following times: <ul style="list-style-type: none"> • When CLEAN HEAD NOW appears. • Direct Thermal Print Mode: After every roll of labels or 500 ft (150 m) of fanfold labels. • Thermal Transfer Print Mode: After every roll (1500 ft or 450 m) of ribbon.
Platen roller	Solvent*	
Transmissive (media) sensor	Air blow [†]	
Black mark sensor	Air blow [†]	
Media path	Solvent*	
Ribbon sensor	Air blow	
Label-available sensors	Air blow	
Tear-off/peel-off bar	Solvent*	As needed
Snap plate	Solvent*	
Cutter	Solvent*	

* Zebra recommends using Preventive Maintenance Kit (part number 47362). In place of this kit, you may use a clean swab dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%).

† If using canned air, it is recommended that you turn off the printer before cleaning.

Clean the Exterior

Clean the outside surfaces of the printer with a lint-free cloth. Use a mild detergent solution or desktop cleaner sparingly, as needed.

Caution • Do not use harsh or abrasive cleaning agents or solvents.

Clean the Media Compartment

After every four rolls of media, inspect the media compartment. Use a soft bristle brush or a vacuum cleaner to remove any dirt and lint from the interior of the printer.

Clean the Printhead and Platen Roller

If print quality does not improve after you perform this procedure, clean the printhead with *Save-a-Printhead* cleaning film. This specially coated material removes contamination buildup without damaging the printhead. Call your authorized Zebra reseller or distributor for more information.

Clean the printhead after every roll (1500 feet or 450 m) of thermal transfer ribbon or after every roll (500 feet or 150 m) of direct thermal labels or when **CLEAN HEAD NOW** appears on the LCD. Clean the printhead more often if you see inconsistent print quality, such as voids in the bar code or graphics.



Caution • The printhead may be hot and can cause severe burns. Allow the printhead to cool.

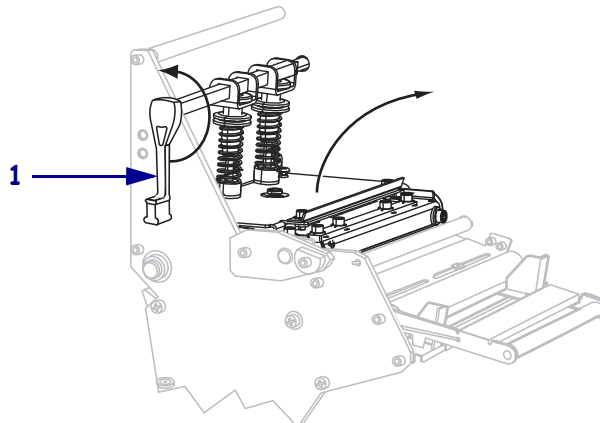


Caution • Before touching the printhead assembly, discharge any built-up static electricity by touching the metal printer frame or by using an anti-static wriststrap and mat.

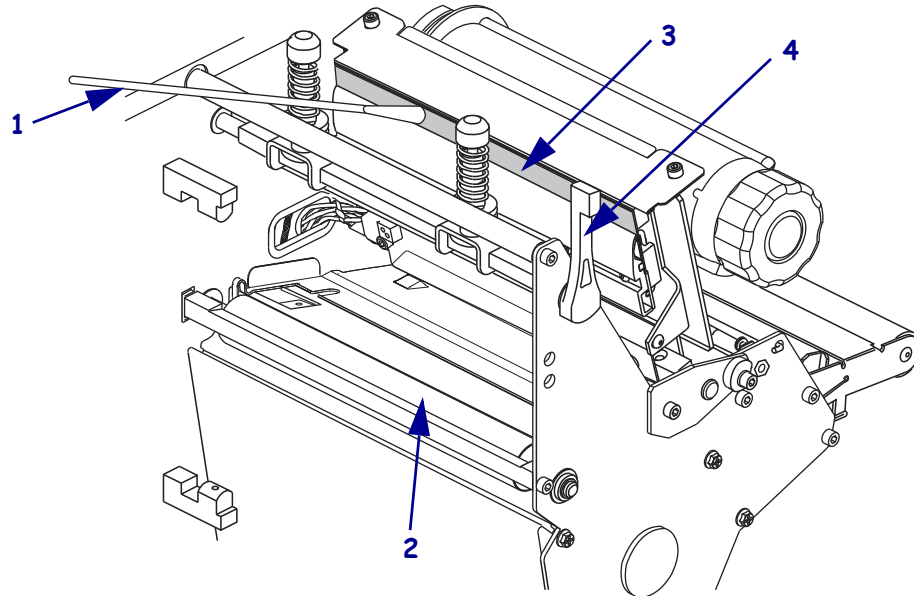
Caution • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.

To clean the printhead and platen roller, complete these steps:

1. Open the printhead assembly by rotating the printhead-open lever (1).

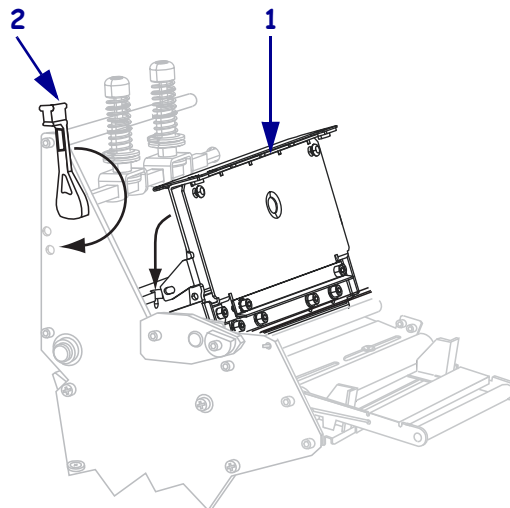


2. Remove the media and ribbon (if loaded).
3. Using the swab from the Preventive Maintenance Kit (part number 47362), wipe along the brown strip on the printhead assembly from end to end. In place of the Preventive Maintenance Kit, you may use a clean swab dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%). Allow the solvent to evaporate.



1	Swab
2	Platen roller
3	Printhead print elements
4	Printhead-open lever

4. While manually rotating the platen roller, clean it thoroughly with the swab. Allow the solvent to evaporate.
5. Reload the media and the ribbon (if required).
6. Push down the printhead assembly (1), and then rotate the printhead-open lever (2) until it locks into place.



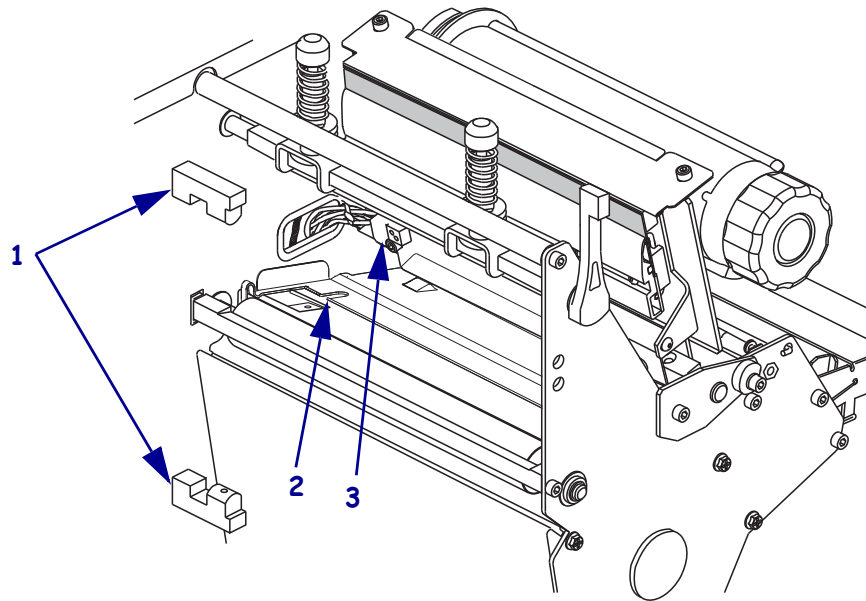
Clean the Sensors

Brush or vacuum any accumulated paper lint and dust off the sensors. Clean the sensors according to the recommendations in *Cleaning Schedule and Procedures* on page 125.

Ribbon and Label-Available Sensor Locations

The ribbon sensor and optional label-available sensor are shown in [Figure 9](#).

Figure 9 • Sensor Locations

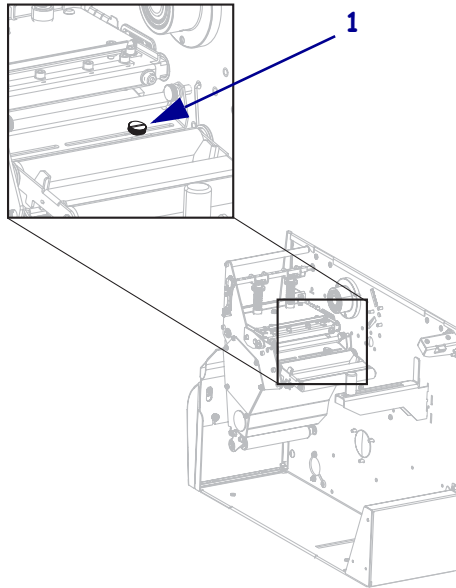


1	Label-available sensors
2	Black mark sensor
3	Ribbon sensor

Transmissive Media Sensor

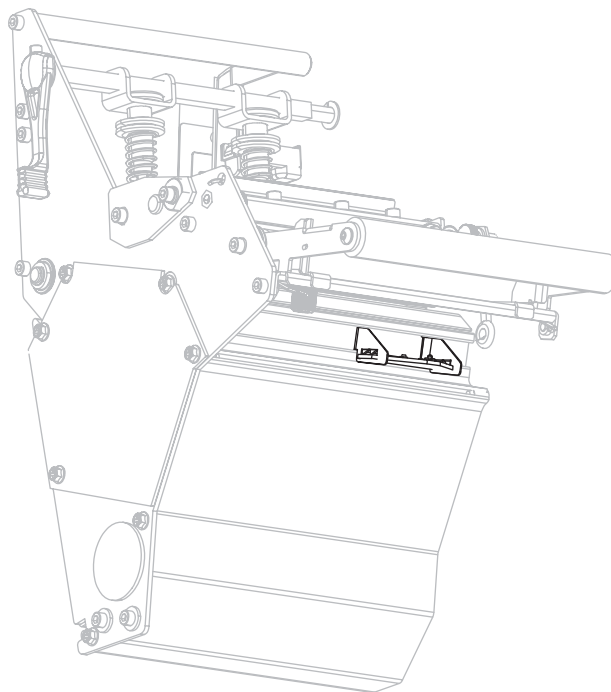
The upper and lower transmissive media sensors are show in [Figure 10](#) and [Figure 11](#).

Figure 10 • Upper Media Sensor



1	Upper media sensor adjustment screw
----------	-------------------------------------

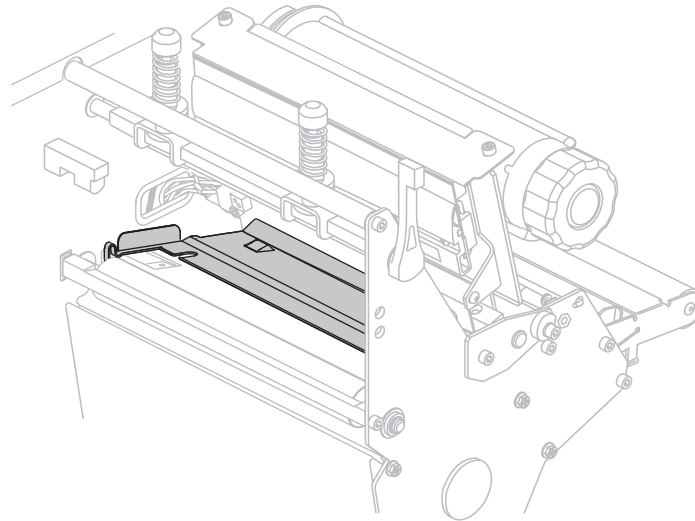
Figure 11 • Lower Media Sensor



Clean the Snap Plate

Clean the snap plate when label adhesive or a label is stuck to the underside. [Figure 12](#) shows the location of the snap plate.

Figure 12 • Snap Plate Location



Important • Be careful not to bend or twist the metal snap plate as you remove it from or insert it into the printer.

To clean the snap plate, complete these steps:



1. **Caution** • Turn off (O) the printer and disconnect it from the power source before performing the following procedure.

Turn off (O) the printer, and disconnect the AC power cord and all data cables.

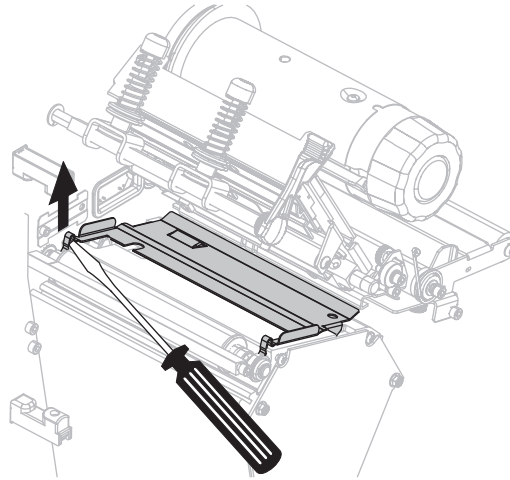
2. **Caution** • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead.

Open the printhead and remove the media and ribbon (if used).

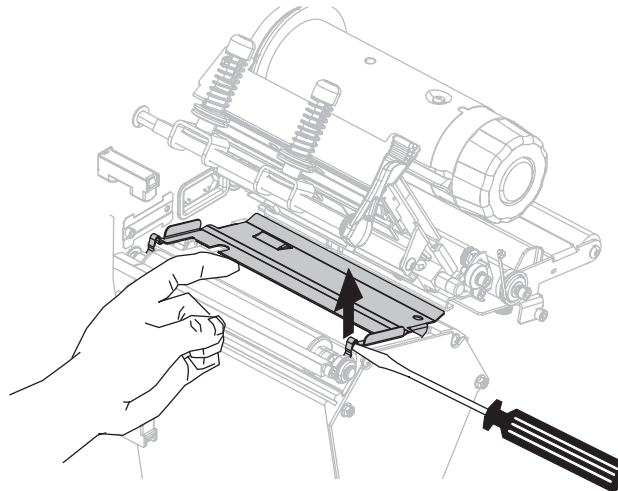
3. Insert a small-blade screwdriver or similar tool into the loop on the left side of the snap plate. Gently lift the left side of the snap plate slightly and, if necessary, support it with your left hand.



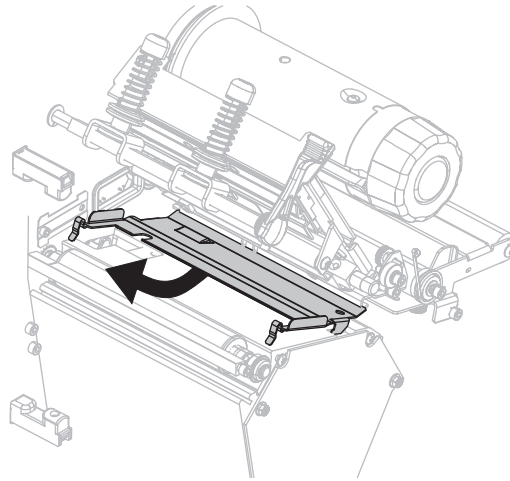
Important • Take care not to bend, twist, or otherwise deform the loops. If the snap plate is damaged in any way, you may need a new plate for proper ribbon sensing.



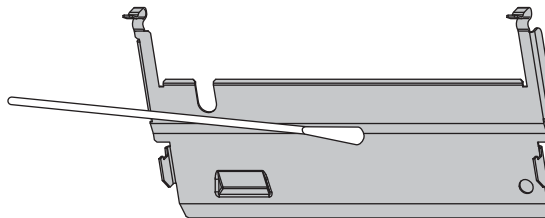
4. Insert the small-blade screwdriver or similar tool into the loop on the right side of the snap plate. Gently lift the right side of the snap plate.



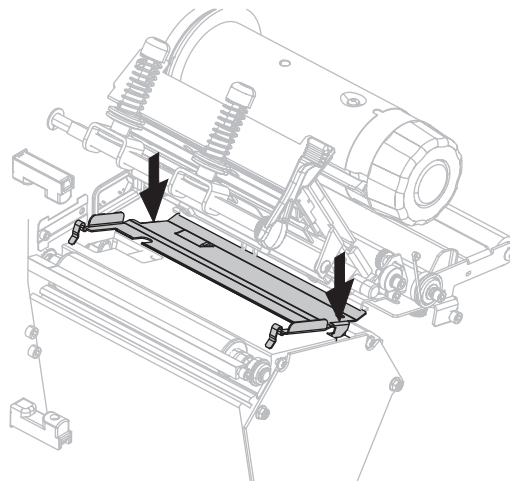
5. Remove the snap plate from the printer.



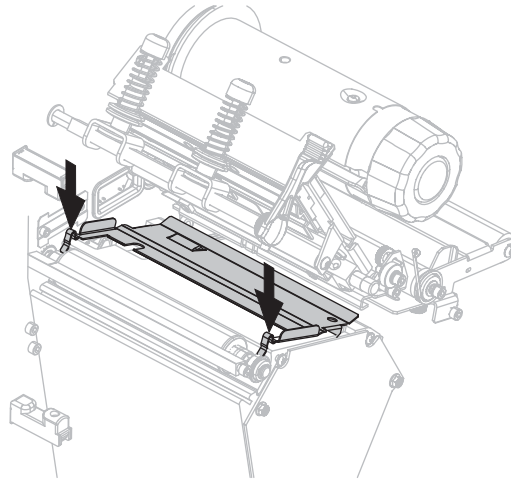
6. Using the swab from the Preventive Maintenance Kit (part number 47362), clean the back of the snap plate. In place of the Preventive Maintenance Kit, you may use a clean swab or soft cloth dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%). Allow the solvent to evaporate.



7. To reinstall the snap plate, insert the two tabs on the bottom of the snap plate into the two slots of the media path.



8. Press down on the loops to lock the snap plate into place.



9. Reinstall the media and ribbon (if used).
10. Reconnect the data cables and AC power cord, and turn on (I) the printer.

Clean the Cutter

If the cutter is not cutting the labels cleanly or if it jams with labels, clean the cutter.



Caution • The cutter blade is sharp. Do not touch or rub the blade with your fingers.

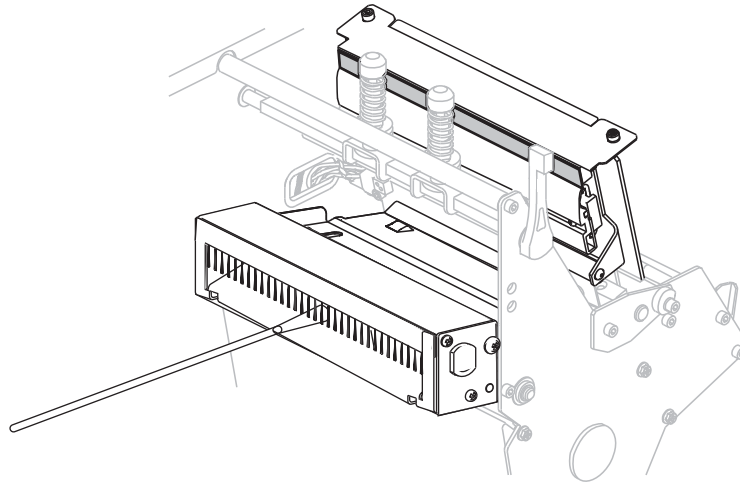
To clean the cutter, complete these steps:



1. **Caution** • Turn off (O) the printer and disconnect it from the power source before performing the following procedure.

Turn off (O) the printer, and disconnect the AC power cord and all data cables.

2. Using the swab from the Preventive Maintenance Kit (part number 47362), clean the stationary cutter blade. In place of the Preventive Maintenance Kit, you may use a clean swab dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%). Allow the solvent to evaporate.



3. If cleaning does not remove label fragments and adhesive, contact an authorized service technician.
4. Reconnect the data cables and AC power cord, and turn on (I) the printer.

Troubleshooting

This section provides information about errors that you might need to troubleshoot. Assorted diagnostic tests are included.

Contents

Printing Issues	136
Error Messages	139
Calibration Problems	144
Communications Problems	145
Ribbon Problems	146
Miscellaneous Issues	147
Printer Diagnostics	148
Power-On Self Test	148
CANCEL Self Test	149
PAUSE Self Test	150
FEED Self Test	151
FEED + PAUSE Self Test	154
Communication Diagnostics Test	155
Sensor Profile	156

Printing Issues

Table 14 identifies possible issues with printing or print quality, the possible causes, and the recommended solutions.

Table 14 • Printing Issues

Issue	Possible Cause	Recommended Solution
General print quality issues	The printer is set at an incorrect print speed.	For optimal print quality, set the print speed to the lowest possible setting for your application via control panel, the driver, or the software. You may want to perform the <i>FEED Self Test</i> on page 151 to determine the optimal settings for your printer. See <i>Print Speed</i> on page 83 for how to change the print speed.
	You are using an incorrect combination of labels and ribbon for your application.	<ol style="list-style-type: none"> 1. Switch to a different type of media or ribbon to try to find a compatible combination. 2. If necessary, consult your authorized Zebra reseller or distributor for information and advice.
	The printer is set at an incorrect darkness level.	For optimal print quality, set the darkness to the lowest possible setting for your application. You may want to perform the <i>FEED Self Test</i> on page 151 to determine the ideal darkness setting. See <i>Print Darkness</i> on page 83 for how to change the darkness setting.
	The printhead is dirty.	Clean the printhead. See <i>Clean the Printhead and Platen Roller</i> on page 126.
	Incorrect or uneven printhead pressure.	<ol style="list-style-type: none"> 1. Position the printhead toggles correctly. See <i>Toggle Position Adjustment</i> on page 119. 2. Set the printhead pressure to the minimum needed for good print quality. See <i>Printhead Pressure Adjustment</i> on page 121.
Loss of printing registration on labels. Excessive vertical drift in top-of-form registration.	The platen roller, pinch roller, or peel roller is dirty.	Clean the printhead and rollers. See <i>Clean the Printhead and Platen Roller</i> on page 126.
	Media guides are positioned improperly.	Ensure that the media guides are properly positioned. See <i>Load the Ribbon</i> on page 54.
	The media type is set incorrectly.	Set the printer for the correct media type (gap/notch, continuous, or mark). See <i>Media Type</i> on page 85.
	The media is loaded incorrectly.	Load media correctly. See <i>Load the Ribbon</i> on page 54.

Table 14 • Printing Issues (Continued)

Issue	Possible Cause	Recommended Solution
Long tracks of missing print on several labels	Print element damaged.	Call a service technician.
	Wrinkled ribbon.	See wrinkled ribbon causes and solutions in Ribbon Problems on page 146 .
Fine, angular gray lines on blank labels	Wrinkled ribbon.	See wrinkled ribbon causes and solutions in Ribbon Problems on page 146 .
Printing too light or too dark over the entire label	The media or ribbon is not designed for high-speed operation.	Replace supplies with those recommended for high-speed operation.
	You are using an incorrect combination of media and ribbon for your application.	<ol style="list-style-type: none"> 1. Switch to a different type of media or ribbon to try to find a compatible combination. 2. If necessary, consult your authorized Zebra reseller or distributor for information and advice.
	You are using ribbon with direct thermal media.	Direct thermal media does not require ribbon. To determine if you are using direct thermal media, perform the label scratch test in When to Use Ribbon on page 49 .
	Incorrect or uneven printhead pressure.	<ol style="list-style-type: none"> 1. Position the printhead toggles correctly. See Toggle Position Adjustment on page 119. 2. Set the printhead pressure to the minimum needed for good print quality. See Printhead Pressure Adjustment on page 121.
Smudge marks on labels	The media or ribbon is not designed for high-speed operation.	Replace supplies with those recommended for high-speed operation.
Misregistration/skips labels	The printer is not calibrated.	Calibrate the printer. See Calibrate the Ribbon and Media Sensors Manually on page 106 .
	Improper label format.	Check your label format and correct it as necessary.
Misregistration and misprint of one to three labels	The platen roller, pinch roller, or peel roller is dirty.	Clean the printhead and rollers. See Clean the Printhead and Platen Roller on page 126 .
	Media does not meet specifications.	Use media that meets specifications. See Media Specifications on page 164 .
Vertical drift in top-of-form position	The printer is out of calibration.	Calibrate the printer. See Calibrate the Ribbon and Media Sensors Manually on page 106 .
	The platen roller, pinch roller, or peel roller is dirty.	Clean the printhead and rollers. See Clean the Printhead and Platen Roller on page 126 .

Table 14 • Printing Issues (Continued)

Issue	Possible Cause	Recommended Solution
Vertical image or label drift	The printer is using non-continuous labels but is configured in continuous mode.	Set the printer for the correct media type (gap/notch, continuous, or mark—see Media Type on page 85) and calibrate the printer, if necessary (see Calibrate the Ribbon and Media Sensors Manually on page 106).
	The media sensor is calibrated improperly.	Calibrate the printer. See Calibrate the Ribbon and Media Sensors Manually on page 106 .
	The platen roller, pinch roller, or peel roller is dirty.	Clean the printhead and rollers. See Clean the Printhead and Platen Roller on page 126 .
	Incorrect or uneven printhead pressure.	<ol style="list-style-type: none"> 1. Position the printhead toggles correctly. See Toggle Position Adjustment on page 119. 2. Set the printhead pressure to the minimum needed for good print quality. See Printhead Pressure Adjustment on page 121.
	The media or ribbon is loaded incorrectly.	Ensure that the media and ribbon are loaded correctly. See Load the Ribbon on page 54 .
	Incompatible media.	You must use media that meets the printer specifications. Ensure that the interlabel gaps or notches are 2 to 4 mm and consistently placed (see Media Specifications on page 164).
The bar code printed on a label does not scan.	The bar code is not within specifications because the print is too light or too dark.	Perform the FEED Self Test on page 151 . Adjust the darkness or print speed settings as necessary.
	There is not enough blank space around the bar code.	Leave at least 1/8 in. (3.2 mm) between the bar code and other printed areas on the label and between the bar code and the edge of the label.
Auto Calibrate failed.	The media or ribbon is loaded incorrectly.	Ensure that the media and ribbon are loaded correctly. See Load the Ribbon on page 54 .
	The sensors could not detect the media or ribbon.	Calibrate the printer. See Calibrate the Ribbon and Media Sensors Manually on page 106 .
	The sensors are dirty or positioned improperly.	Ensure that the sensors are clean and properly positioned.
	The media type is set incorrectly.	Set the printer for the correct media type (gap/notch, continuous, or mark). See Media Type on page 85 .

Error Messages

The control panel displays messages when there is an error. See [Table 15](#) for LCD errors, the possible causes, and the recommended solutions.

Table 15 • Error Messages





Display/ Print Engine Condition	Possible Cause	Recommended Solution
 ERROR CONDITION INVALID HEAD The ERROR light flashes.	The printhead was replaced with one that is not a genuine Zebra™ printhead.	Install a genuine Zebra™ printhead.
 WARNING CLEAN PRINTHEAD	The Early Warning for Maintenance feature is enabled, and the printhead has reached the end of the specified interval for cleaning. See Early Warning for Maintenance on page 89 for more information.	<ol style="list-style-type: none"> 1. Clean the printhead. 2. On the control panel, go to the HEAD CLEANED? menu item. 3. Press PLUS to select YES to reset the Early Warning for Maintenance printhead cleaning counter.
 ERROR CONDITION HEAD OPEN The print engine stops; the ERROR light flashes.	The printhead is not fully closed.	Close printhead completely.
	The head open sensor is not working properly.	Call a service technician.
 ERROR CONDITION PAPER OUT The print engine stops; the MEDIA light is on; the ERROR light flashes.	The media is not loaded or is loaded incorrectly.	Load media correctly. See Load the Ribbon on page 54 .
	Misaligned media sensor.	Check position of the media sensor.
	The print engine is set for noncontinuous media, but continuous media is loaded.	Install proper media type, or reset print engine for current media type and perform calibration.

Table 15 • Error Messages (Continued)

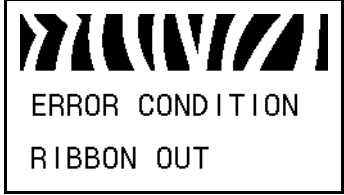
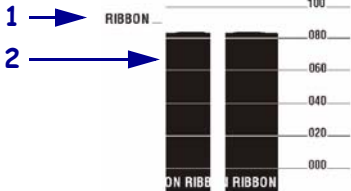
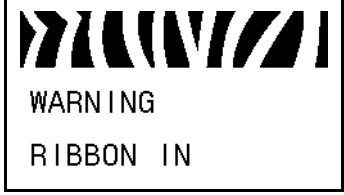
Display/ Print Engine Condition	Possible Cause	Recommended Solution
 <p>The print engine stops; the RIBBON light is on; the ERROR light flashes.</p>	<p>In thermal transfer mode, ribbon is not loaded or incorrectly loaded.</p> <p>In thermal transfer mode, the ribbon sensor is not detecting ribbon.</p> <p>In thermal transfer mode, media is blocking the ribbon sensor.</p> <p>In thermal transfer mode, the print engine did not detect the ribbon even though it is loaded correctly.</p> <p>If you are using direct thermal media, the print engine is waiting for ribbon to be loaded because it is incorrectly set for Thermal Transfer mode.</p>	<p>Load ribbon correctly. See Load the Ribbon on page 54.</p> <ol style="list-style-type: none"> Load ribbon correctly. See Load the Ribbon on page 54. Calibrate the print engine. See Calibrate the Ribbon and Media Sensors Manually on page 106. <ol style="list-style-type: none"> Load media correctly. See Load the Ribbon on page 54. Calibrate the print engine. See Calibrate the Ribbon and Media Sensors Manually on page 106. <ol style="list-style-type: none"> Print a sensor profile. See Print a Sensor Profile on page 91. The ribbon out threshold (1) is likely too high, above the black area that indicates where the ribbon is detected (2).  <ol style="list-style-type: none"> Calibrate the print engine (see Calibrate the Ribbon and Media Sensors Manually on page 106) or load print engine defaults (see options under Exit Setup Mode on page 19). <p>Set the print engine for Direct Thermal mode. See Print Method on page 85.</p>
 <p>The RIBBON light is on; the ERROR light flashes.</p>	<p>Ribbon is loaded, but the print engine is set for direct thermal mode.</p>	<p>Ribbon is not required with direct thermal media. If you are using direct thermal media, remove the ribbon. This error message will not affect printing.</p> <p>If you are using thermal transfer media, which requires ribbon, set the print engine for Thermal Transfer mode. See Print Method on page 85.</p>

Table 15 • Error Messages (Continued)






Display/ Print Engine Condition	Possible Cause	Recommended Solution
 THERMISTOR FAULT The ERROR light flashes.	The printhead has a faulty thermistor.	Call a service technician.
 WARNING HEAD COLD The print engine prints while the ERROR light flashes.	 Caution • An improperly connected printhead data or power cable can cause this error message. The printhead may be hot enough to cause severe burns. Allow the printhead to cool.	
The printhead temperature is approaching its lower operating limit.	Continue printing while the printhead reaches the correct operating temperature. If the error remains, the environment may be too cold for proper printing. Relocate the print engine to a warmer area.	
The printhead data cable is not properly connected.	Caution • Turn off (O) the print engine before performing this procedure. Failure to do so can damage the printhead. <ol style="list-style-type: none"> 1. Turn off (O) the print engine. 2. Disconnect and reconnect the data cable to the printhead. 3. Ensure that the cable connector is fully inserted into the printhead connector. 4. Turn on (I) the print engine. 	
The printhead has a faulty thermistor.	Call a service technician.	
 WARNING HEAD TOO HOT The print engine stops; the ERROR light flashes.	 Caution • The printhead may be hot enough to cause severe burns. Allow the printhead to cool.	
The printhead is over temperature.	Allow the print engine to cool. Printing automatically resumes when the printhead elements cool to an acceptable operating temperature.	

Table 15 • Error Messages (Continued)






Display/ Print Engine Condition	Possible Cause	Recommended Solution
 WARNING HEAD COLD	 Caution • An improperly connected printhead data or power cable can cause these error messages. The printhead may be hot enough to cause severe burns. Allow the printhead to cool.	
 THERMISTOR FAULT	The printhead data cable is not properly connected.	Caution • Turn off (O) the print engine before performing this procedure. Failure to do so can damage the printhead. <ol style="list-style-type: none"> 1. Turn off (O) the print engine. 2. Disconnect and reconnect the data cable to the printhead. 3. Ensure that the cable connector is fully inserted into the printhead connector. 4. Turn on (I) the print engine.
 ERROR CONDITION HEAD ELEMENT BAD The print engine stops; the ERROR light is on; the print engine cycles through these three messages.	The printhead has a faulty thermistor.	Call a service technician.
 DEFRAGMENTING DO NOT POWER OFF The print engine stops.	The print engine is defragmenting memory.	Caution • Do NOT turn off the print engine power during defragmenting. Doing so can damage the print engine. Allow the print engine to finish defragmenting. If you get this error message frequently, check your label formats. Formats that write to and erase memory frequently may cause the printer to defragment often. Using properly coded label formats usually minimizes the need for defragmenting. If this error message does not go away, contact Technical Support. The print engine requires service.

Table 15 • Error Messages (Continued)

Display/ Print Engine Condition	Possible Cause	Recommended Solution
 OUT OF MEMORY CREATING BITMAP	There is not enough memory to perform the function specified on the second line of the error message.	Free up some of the print engine's memory by adjusting the label format or print engine parameters. One way to free up memory is to adjust the print width to the actual width of the label instead of leaving the print width set to the default. See Print Width on page 85 .
 OUT OF MEMORY BUILDING FORMAT		Ensure that the device, such as a FLASH memory card, is installed and not write protected or full.
 OUT OF MEMORY STORING GRAPHIC		Ensure that the data is not directed to a device that is not installed or is unavailable.
 OUT OF MEMORY STORING FORMAT		Call a service technician.
 OUT OF MEMORY STORING BITMAP		
 OUT OF MEMORY STORING FONT		

Calibration Problems

Table 16 identifies problems with calibration, the possible causes, and the recommended solutions.

Table 16 • Calibration Problems

Problem	Possible Cause	Recommended Solution
Loss of printing registration on labels. Excessive vertical drift in top-of-form registration.	The platen roller is dirty.	Clean the platen roller according to the instructions in <i>Clean the Printhead and Platen Roller</i> on page 126.
	Media guides are positioned improperly.	Ensure that the media guides are properly positioned.
	The media type is set incorrectly.	Set the printer for the correct media type (non-continuous or continuous) See <i>Media Type</i> on page 85.
	The media is loaded incorrectly or the media sensor is positioned improperly.	Reload the media and ensure that the sensor in use is properly positioned. See <i>Adjust Transmissive Media Sensors</i> on page 115.
Auto Calibrate failed.	Media or ribbon is loaded incorrectly.	Ensure that media and ribbon are loaded correctly.
	The sensors could not detect the media or ribbon.	Calibrate the printer. See <i>Calibrate the Ribbon and Media Sensors Manually</i> on page 106.
	The sensors are dirty or positioned improperly.	Ensure that the sensors are clean and properly positioned.
	The media type is set incorrectly.	Set the printer for the correct media type (non-continuous or continuous) See <i>Media Type</i> on page 85.

Communications Problems

Table 17 identifies problems with communications, the possible causes, and the recommended solutions.

Table 17 • Communications Problems

Problem	Possible Cause	Recommended Solution
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).
		If you are using serial communication, check the serial port settings. See <i>Port Settings on page 103</i> .
		If you are using serial communication, make sure that you are using a null modem cable or a null modem adapter.
		Check the printer's handshake protocol setting. The setting used must match the one being used by the host computer. See <i>Set the Host Handshake Protocol Value on page 105</i> .
		If a driver is used, check the driver communication settings for your connection.
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.	Ensure that the flow control settings match.
		Check the communication cable length. See <i>Table 4 on page 41</i> for requirements.
		Check the printer driver or software communications settings (if applicable).
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 prefix and delimiter characters. See <i>Set the Control Prefix Character Value on page 100</i> and <i>Set the Delimiter Character Value on page 101</i> .
	Incorrect data is being sent to the printer.	Check the communication settings on the computer. Ensure that they match the printer settings.
		If the problem continues, check the label format.

Ribbon Problems

Table 18 identifies problems that may occur with ribbon, the possible causes, and the recommended solutions.

Table 18 • Ribbon Problems

Problem	Possible Cause	Recommended Solution
Broken or melted ribbon	Darkness setting too high.	<ol style="list-style-type: none"> 1. Reduce the darkness setting. See <i>Print Darkness on page 83</i> for how to change the darkness setting. 2. Clean the printhead thoroughly. See <i>Clean the Printhead and Platen Roller on page 126</i>.
	The ribbon is coated on the wrong side and cannot be used in this printer.	Replace the ribbon with one coated on the correct side. For more information, see <i>Coated Side of Ribbon on page 49</i> .
Wrinkled ribbon	Ribbon was loaded incorrectly.	Load the ribbon correctly. See <i>Load the Ribbon on page 54</i> .
	Incorrect burn temperature.	For optimal print quality, set the darkness to the lowest possible setting for your application. You may want to perform the <i>FEED Self Test on page 151</i> to determine the ideal darkness setting. See <i>Print Darkness on page 83</i> for how to change the darkness setting.
	Incorrect or uneven printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See <i>Printhead Pressure Adjustment on page 121</i> .
	Media not feeding properly; “walking” from side to side.	Make sure that media is snug by adjusting the media guide, or call a service technician.
	The printhead or platen roller may be installed incorrectly.	Call a service technician.
The printer does not detect when the ribbon runs out. In thermal transfer mode, the printer did not detect the ribbon even though it is loaded correctly.	The printer may have been calibrated without ribbon. Later, ribbon was inserted without the user recalibrating the printer or loading printer defaults.	Calibrate the printer, this time using ribbon, or load printer defaults. See <i>Calibrate the Ribbon and Media Sensors Manually on page 106</i> or <i>Load Defaults on page 93</i> .
The printer indicates that ribbon is out, even though ribbon is loaded correctly.	The printer was not calibrated for the label and ribbon being used.	Calibrate the printer. See <i>Calibrate the Ribbon and Media Sensors Manually on page 106</i> .

Miscellaneous Issues

Table 19 identifies miscellaneous issues with the printer, the possible causes, and the recommended solutions.

Table 19 • Miscellaneous Printer Problems

Problem	Possible Cause	Recommended Solution
The control panel display shows a language that I cannot read	The language parameter was changed through the control panel or a firmware command.	<ol style="list-style-type: none"> 1. On the control panel display, press SETUP. 2. Press the LEFT ARROW once to move to the LANGUAGE parameter. 3. Use PLUS (+) or MINUS (-) to scroll through the language selections. The selections for this parameter are displayed in the actual languages to make it easier for you to find one that you are able to read. 4. Select the language that you want to display.
The display is missing characters or parts of characters	The display may need replacing.	Call a service technician.
Changes in parameter settings did not take effect	Some parameters are set incorrectly.	<ol style="list-style-type: none"> 1. Check the parameters and change or reset if necessary. 2. Turn the printer off (O) and then on (I).
	A firmware command (such as <code>device.command_override</code>) turned off the ability to change the parameter.	Refer to the <i>Programming Guide for ZPL, ZBI, Set-Get-Do, Mirror, and WML</i> or call a service technician.
	A firmware command changed the parameter back to the previous setting.	
	If the problem persists, there may be a problem with the main logic board.	Call a service technician.
Non-continuous labels are being treated as continuous labels.	The printer was not calibrated for the media being used.	Calibrate the printer. See <i>Calibrate the Ribbon and Media Sensors Manually</i> on page 106.
	The printer is configured for continuous media.	Set the printer for the correct media type (gap/notch, continuous, or mark). See <i>Media Type</i> on page 85.
All indicator lights are on, nothing is on the display (if the printer has a display), and the printer locks up.	Internal electronic or firmware failure.	Call a service technician.
The printer locks up while running the Power-On Self Test.	Main logic board failure.	Call a service technician.

Printer Diagnostics

Self tests and other diagnostics provide specific information about the condition of the printer. The self tests produce sample printouts and provide specific information that helps determine the operating conditions for the printer.



Important • Use full-width media when performing self tests. If your media is not wide enough, the test labels may print on the platen roller. To prevent this from happening, check the print width, and ensure that the width is correct for the media that you are using.

Each self test is enabled by pressing a specific control panel key or combination of keys while turning on (I) the printer power. Keep the key(s) pressed until the first indicator light turns off. The selected self test automatically starts at the end of the Power-On Self Test.



Note •

- When performing these self tests, do not send data to the printer from the host.
- If your media is shorter than the label to be printed, the test label continues on the next label.
- When canceling a self test prior to its actual completion, always reset the printer by turning it off (O) and then on (I).

Power-On Self Test

A Power-On Self Test (POST) is performed each time the printer is turned on (I). During this test, the control panel lights (LEDs) turn on and off to ensure proper operation. At the end of this self test, only the STATUS LED remains lit. When the Power-On Self Test is complete, the media is advanced to the proper position.

To initiate the Power-On Self Test, complete these steps:

1. Turn on (I) the printer.

The POWER LED illuminates. The other control panel LEDs and the LCD monitor the progress and indicate the results of the individual tests. All messages during the POST display in English; however, if the test fails, the resulting messages cycle through the international languages as well.

CANCEL Self Test

The CANCEL self test prints a printer configuration label and a network configuration label. For other ways to print these labels, see [Print Information on page 91](#).

To perform the CANCEL Self Test, complete these steps:

1. Turn off (O) the printer.
2. Press and hold CANCEL while turning on (I) the printer. Hold CANCEL until the first control panel light turns off.

The printer prints a printer configuration label (Figure 13) and then a network configuration label (Figure 14).

Figure 13 • Sample Printer Configuration Label

PRINTER CONFIGURATION	
Zebra Technologies ZTC <PRINTER TYPE> ZBR3099332	
+0.0	DARKNESS
12 IPS	PRINT SPEED
+000	TEAR OFF
TEAR OFF	PRINT MODE
CONTINUOUS	MEDIA TYPE
WEB	SENSOR TYPE
DIRECT-THERMAL	PRINT METHOD
1024	PRINT WIDTH
2000	LABEL LENGTH
98.0IN 988MM	MAXIMUM LENGTH
MAINT. OFF	EARLY WARNING
BIDIRECTIONAL	PARALLEL COMM.
RS232	SERIAL COMM.
9600	BAUD
8 BITS	DATA BITS
NONE	PARITY
XON/XOFF	HOST HANDSHAKE
NONE	PROTOCOL
000	NETWORK ID
NORMAL MODE	COMMUNICATIONS
<^> 7EH	CONTROL PREFIX
<^> 7EH	FORMAT PREFIX
<^> 2CH	DELIMITER CHAR
ZPL II	ZPL MODE
CALIBRATION	MEDIA POWER UP
CALIBRATION	HEAD CLOSE
DEFAULT	BACKFEED
+020	LABEL TOP
+0000	LEFT POSITION
0000	HEAD TEST COUNT
0557	HEAD RESISTOR
OFF	VERIFIER PORT
OFF	APPLICATOR PORT
ENABLED	ERROR ON PAUSE
PULSE MODE	START PRINT SIG
FEED MODE	RESYNCH MODE
DISABLED	REPRINT MODE
066	WEB S.
066	MEDIA S.
072	RIBBON S.
100	TAKE LABEL
050	MARK S.
000	MARK MED S.
004	TRANS GAIN
034	TRANS BASE
196	TRANS BRIGHT
239	RIBBON GAIN
014	MARK GAIN
DPCSWFXM	MODES ENABLED
1024 9/PM FULL	MODES DISABLED
VS3.17.12 <-	RESOLUTION
1.2	FIRMWARE
V40	XML SCHEMA
CUSTOMIZED	HARDWARE ID
11008k	CONFIGURATION
59392k	RAM
NONE	ONBOARD FLASH
*** APPLICATOR	FORMAT CONVERT
007 POWER SUPPLY	P31 INTERFACE
FW VERSION	P32 INTERFACE
12/01/08	TWINAX/COAX ID
17:06	IDLE DISPLAY
DISABLED	RTC DATE
2	RTC TIME
268.983 IN	ZBI
268.983 IN	ZBI VERSION
268.983 IN	NONRESET CNTR
268.983 IN	RESET CNTR1
268.983 IN	RESET CNTR2
683.216 CH	NONRESET CNTR
683.216 CH	RESET CNTR1
683.216 CH	RESET CNTR2
SELECTED ITEMS	PASSWORD LEVEL
FIRMWARE IN THIS PRINTER IS COPYRIGHTED	

Figure 14 • Sample Network Configuration Label

Network Configuration	
Zebra Technologies PRINTER NAME-200dpi ZBR3051375	
Wired	PRIMARY NETWORK
NO	LOAD FROM EXT?
Internal Wired	ACTIVE PRINTSRVR
External Wired	
ALL	IP PROTOCOL
000.000.000.000	IP ADDRESS
255.255.255.000	SUBNET MASK
000.000.000.000	DEFAULT GATEWAY
000.000.000.000	WINS SERVER IP
YES	TIMEOUT CHECKING
300	TIMEOUT VALUE
000	ARP INTERVAL
9100	BASE RAW PORT
Internal Wired*	
ALL	IP PROTOCOL
010.003.004.098	IP ADDRESS
255.255.255.000	SUBNET MASK
010.003.004.001	DEFAULT GATEWAY
010.003.001.098	WINS SERVER IP
YES	TIMEOUT CHECKING
300	TIMEOUT VALUE
000	ARP INTERVAL
9100	BASE RAW PORT
00074d2e8f6f	MAC ADDRESS
Wireless	
ALL	IP PROTOCOL
000.000.000.000	IP ADDRESS
255.255.255.000	SUBNET MASK
000.000.000.000	DEFAULT GATEWAY
000.000.000.000	WINS SERVER IP
YES	TIMEOUT CHECKING
300	TIMEOUT VALUE
000	ARP INTERVAL
9100	BASE RAW PORT
NO	CARD INSERTED
0000H	CARD MFG ID
0000H	CARD PRODUCT ID
000000000000	MAC ADDRESS
YES	DRIVER INSTALLED
INFRASTRUCTURE	OPERATING MODE
125	ESSID
100	TX POWER
ON	1 Mb/s
ON	2 Mb/s
ON	5.5 Mb/s
ON	11 Mb/s
11 Mb/s	CURRENT TX RATE
DIVERSITY	RECEIVE ANTENNA
DIVERSITY	XMIT ANTENNA
OPEN	WEP TYPE
NONE	WLAN SECURITY
1	WEP INDEX
020	POOR SIGNAL
LONG	PREAMBLE
NO	ASSOCIATED
ON	PULSE ENABLED
IS	PULSE RATE
OFF	INTL. MODE
07FFH	CHANNEL MASK
FIRMWARE IN THIS PRINTER IS COPYRIGHTED	

PAUSE Self Test

This self test can be used to provide the test labels required when making adjustments to the printer's mechanical assemblies or to determine if any printhead elements are not working. Figure 15 shows a sample printout.

To perform a PAUSE self test, complete these steps:

1. Turn off (O) the printer.
2. Press and hold **PAUSE** while turning on (I) the printer. Hold **PAUSE** until the first control panel light turns off.
 - The initial self test prints 15 labels at the printer's slowest speed, and then automatically pauses the printer. Each time **PAUSE** is pressed, an additional 15 labels print. Figure 15 shows a sample of the labels.

Figure 15 • PAUSE Test Label



- While the printer is paused, pressing **CANCEL** alters the self test. Each time **PAUSE** is pressed, 15 labels print at 6 in. (152 mm) per second.
 - While the printer is paused, pressing **CANCEL** again alters the self test a second time. Each time **PAUSE** is pressed, 50 labels print at the printer's slowest speed.
 - While the printer is paused, pressing **CANCEL** again alters the self test a third time. Each time **PAUSE** is pressed, 50 labels print at 6 in. (152 mm) per second.
 - While the printer is paused, pressing **CANCEL** again alters the self test a fourth time. Each time **PAUSE** is pressed, 15 labels print at the printer's maximum speed.
3. To exit this self test at any time, press and hold **CANCEL**.

FEED Self Test

Different types of media may require different darkness settings. This section contains a simple but effective method for determining the ideal darkness for printing bar codes that are within specifications.

During the FEED self test, labels are printed at different darkness settings at two different print speeds. The relative darkness and the print speed are printed on each label. The bar codes on these labels may be ANSI-graded to check print quality.

During this test, one set of labels is printed at 2 ips, and another set is printed at 6 ips. 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).

To perform a FEED self test, complete these steps:

1. Print a configuration label to show the printer's current settings.
2. Turn off (O) the printer.
3. Press and hold **FEED** while turning on (I) the printer. Hold **FEED** until the first control panel light turns off.

The printer prints a series of labels (Figure 16) at various speeds and at darkness settings higher and lower than the darkness value shown on the configuration label.

Figure 16 • FEED Test Label



4. See Figure 17 and Table 20. Inspect the test labels and determine which one has the best print quality for your application. If you have a bar code verifier, use it to measure bars/spaces and calculate the print contrast. If you do not have a bar code verifier, use your eyes or the system scanner to choose the optimal darkness setting based on the labels printed in this self test.

Figure 17 • Bar Code Darkness Comparison

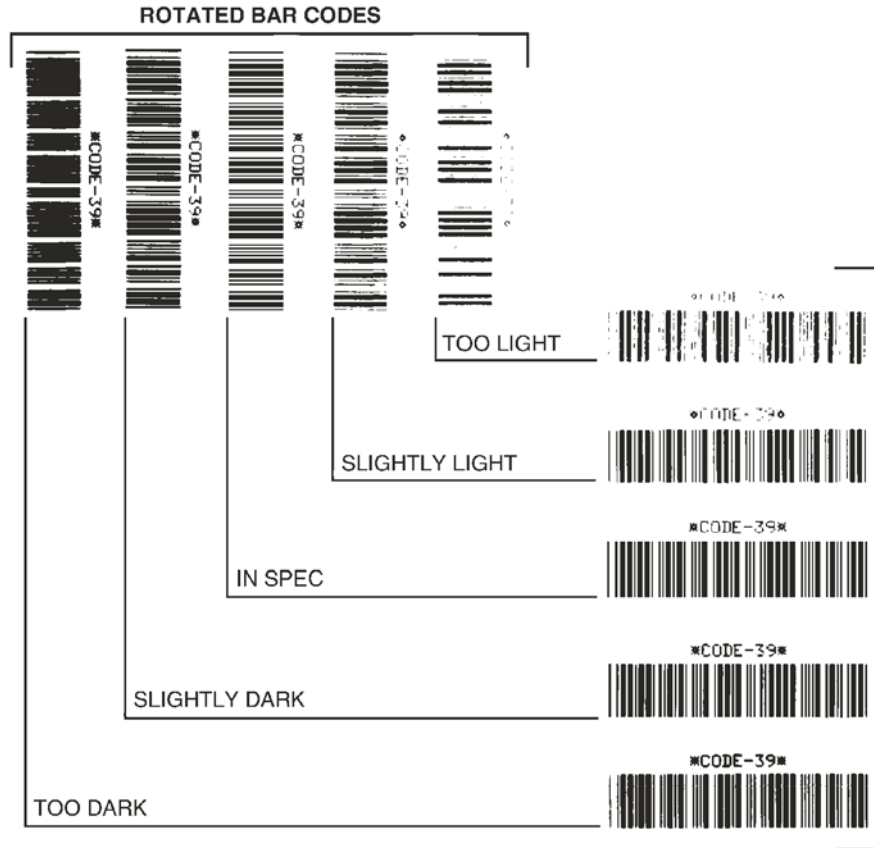


Table 20 • Judging Bar Code Quality

Print Quality	Description
Too dark	Labels that are too dark are fairly obvious. They may be readable but not “in-spec.” <ul style="list-style-type: none"> • The normal bar code bars increase in size. • The openings in small alphanumeric characters may fill in with ink. • Rotated bar code bars and spaces run together.
Slightly dark	Slightly dark labels are not as obvious. <ul style="list-style-type: none"> • The normal bar code will be “in-spec.” • Small character alpha numerics will be bold and could be slightly filled in. • The rotated bar code spaces are small when compared to the “in-spec” code, possibly making the code unreadable.

Table 20 • Judging Bar Code Quality (Continued)

Print Quality	Description
“In-spec”	<p>The “in-spec” bar code can only be confirmed by a verifier, but it should exhibit some visible characteristics.</p> <ul style="list-style-type: none"> • The normal bar code will have complete, even bars and clear, distinct spaces. • The rotated bar code will have complete, even bars and clear, distinct spaces. Although it may not look as good as a slightly dark bar code, the bar code will be “in-spec.” • In both normal and rotated styles, small alphanumeric characters look complete.
Slightly light	<p>Slightly light labels are, in some cases, preferred to slightly dark ones for “in-spec” bar codes.</p> <ul style="list-style-type: none"> • Both normal and rotated bar codes will be in spec, but small alphanumeric characters may not be complete.
Too light	<p>Labels that are too light are obvious.</p> <ul style="list-style-type: none"> • Both normal and rotated bar codes 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 configuration label. The resulting numeric value is the best darkness value for that specific label/ribbon combination and print speed.
7. If necessary, change the darkness value to the darkness value on the best test label.
8. If necessary, change the print speed to the same speed as on the best test label.

FEED + PAUSE Self Test

Performing this self test temporarily resets the printer configuration to the factory default values. These values are active only until power is turned off unless you save them permanently in memory. If the factory default values are permanently saved, a sensor calibration procedure must be performed. (See *Calibrate the Ribbon and Media Sensors Manually* on page 106.)

To perform a FEED and PAUSE self test, complete these steps:

1. Turn off (O) the printer.
2. Press and hold **FEED + PAUSE** while turning on (I) the printer.
3. Hold **FEED + PAUSE** until the first control panel light turns off.
The printer configuration is reset to the factory default values. No labels print at the end of this test.

CANCEL + PAUSE Self Test

Performing this self test temporarily resets the network configuration to the factory default values. These values are active only until power is turned off unless you save them permanently in memory.

To perform a CANCEL and PAUSE self test, complete these steps:

1. Turn off (O) the printer.
2. Press and hold **CANCEL + PAUSE** while turning on (I) the printer.
3. Hold **CANCEL + PAUSE** until the first control panel light turns off.
The printer's network configuration is reset to the factory default values. No labels print at the end of this test.

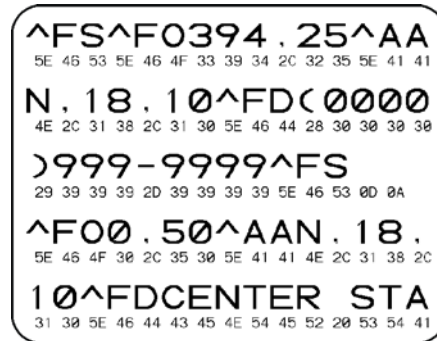
Communication Diagnostics Test

The communication diagnostics test is a troubleshooting tool for checking the interconnection between the printer and the host computer. When the printer is in diagnostics mode, it prints all data received from the host computer as straight ASCII characters with the hex values below the ASCII text. The printer prints all characters received, including control codes such as CR (carriage return). [Figure 18](#) shows a typical test label from this test.



Note • The test label prints upside-down.

Figure 18 • Communication Diagnostics Test Label



To use communication diagnostics mode, complete these steps:

1. Set the print width equal to or less than the label width being used for the test. See [Print Width on page 85](#) for more information.
2. Set the DIAGNOSTICS MODE option to ENABLED. For methods, see [Communication Diagnostics Mode on page 94](#).

The printer enters diagnostics mode and prints any data received from the host computer on a test label

3. Check the test label for error codes. For any errors, check that your communication parameters are correct.

Errors show on the test label as follows:

- FE indicates a framing error.
- OE indicates an overrun error.
- PE indicates a parity error.
- NE indicates noise.

4. Turn the printer off (O) and then back on (I) to exit this self test and return to normal operation.

Sensor Profile

Use the sensor profile image (which will extend across several actual labels or tags) to troubleshoot the following situations:

- The printer experiences difficulty in determining gaps (web) between labels.
- The printer incorrectly identifies preprinted areas on a label as gaps (web).
- The printer cannot detect ribbon.

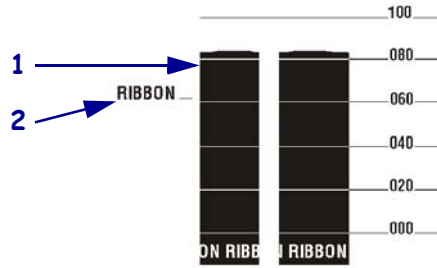
With the printer in the Ready state, print a sensor profile in one of these ways:

Using the buttons on the control panel	<ol style="list-style-type: none"> Turn off (O) the printer. Press and hold FEED + CANCEL while turning on (I) the printer. Hold FEED + CANCEL until the first control panel light turns off.
Using ZPL	<ol style="list-style-type: none"> Send the ~JG command to the printer. See the <i>Zebra Programming Guide</i> for more information about this command.
Using the control panel menu items	<ol style="list-style-type: none"> On the control panel display, navigate to the following item. See Control Panel Display on page 17 for information about using the control panel and accessing the menus. <div data-bbox="889 1031 1258 1226" data-label="Image"> </div> Press PLUS (+) to select PRINT.

Compare your results to the examples shown in this section. If the sensitivity of the sensors must be adjusted, calibrate the printer (see [Calibrate the Ribbon and Media Sensors Manually on page 106](#)).

Ribbon Sensor Profile (Figure 19) The bars (1) on the sensor profile indicate the ribbon sensor readings. The ribbon sensor threshold setting is indicated by the word RIBBON (2). If the ribbon readings are below the threshold value, the printer does not acknowledge that ribbon is loaded.

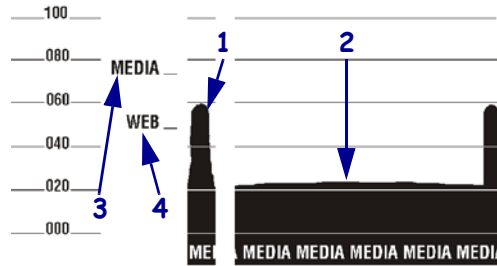
Figure 19 • Sensor Profile (Ribbon Section)



Media Sensor Profile (Figure 20) The media sensor readings are shown as bars and flat areas on the sensor profile (Figure 20). The bars (1) indicate gaps between labels (the web), and the low areas (2) indicate where labels are located. If you compare the sensor profile printout to a blank length of your media, the bars should be the same distance apart as the gaps on the media. If the distances are not the same, the printer may be having difficulty determining where the gaps are located.

The media sensor threshold settings are shown by the words MEDIA (3) for the media threshold and WEB (4) for the web threshold. Use the numbers to the left of the sensor readings to compare the numeric readings to the sensor settings.

Figure 20 • Sensor Profile (Media Section)





Notes • _____

Specifications

This section provides the features of and specifications for this printer.

Contents

Features	160
Standard Features	160
Optional Features	160
Zebra Programming Language (ZPL)	161
Bar Codes	161
General Specifications	162
Physical Specifications	162
Electrical Specifications	162
Environmental Conditions for Operation and Storage	162
Print Specifications	163
Media Specifications	164
Ribbon Specifications	165

Features

This section lists the standard and optional features for the printer.

Standard Features



Note • Printer specifications are subject to change without notice.

- Thermal transfer and direct thermal printing
- 16 MB SDRAM (12 MB user-available)
- ZebraNet 10/100 Print Server (internal)
- USB 2.0 Port
- RS-232 serial port
- Bidirectional parallel port
- 10/100 internal Ethernet
- Real-Time Clock
- Advanced Counter
- XML-enabled printing

Optional Features

- ZebraNet Wireless Print Server
- Full-width rotary knife cutter and catch tray
- Media rewind spindle
- Factory-installed 64 MB (61 MB user available) Flash memory option
- Additional fonts

Zebra Programming Language (ZPL)

ZPL II features include:

- Downloadable graphics, scalable and bitmap fonts, and label formats
- Object copying between memory areas
- (RAM, memory card, and internal Flash)
- Code page 850 character set
- Data compression
- Automatic virtual input buffer management
- Format inversion
- Mirror image printing
- Four-position field rotation (0°, 90°, 180°, 270°)
- Controlled via mainframe, mini-computer, PC, portable data terminal
- Programmable quantity with print, pause, and cut control
- Communicates in printable ASCII characters
- Error-checking protocol
- Status message to host upon request
- Serialized fields
- In-spec OCR-A and OCR-B
- UPC/EAN
- User-programmable password

Bar Codes

Types of bar codes include:

- Bar code ratios—2:1, 7:3, 5:2, 3:1
- Codabar (supports ratios of 2:1 up to 3:1)
- CODABLOCK
- Code 11
- Code 39 (supports ratios of 2:1 up to 3:1)
- Code 49 (two-dimensional bar code)
- Code 93
- Code 128 (with subsets A, B, and C and UCC case codes)
- Check digit calculation where applicable
- Data Matrix
- EAN-8, EAN-13, EAN extensions
- ISBT-128
- Industrial 2 of 5
- Interleaved 2 of 5 (supports ratios of 2:1 up to 3:1, Modulus 10 Check Digit)
- LOGMARS
- MaxiCode
- Micro PDF
- MSI
- PDF-417 (2-dimensional bar code)
- PLANET code
- Plessey
- POSTNET
- QR-Code
- RSS code
- Standard 2 of 5
- TLC 39
- UPC-A, UPC-E, UPC extensions

General Specifications

Physical Specifications

Dimensions	
Height	15.5 in (393.7 mm)
Width	10.31 in. (262 mm)
Depth	20.38 in. (517.5 mm)
Weight without options	50 lb. (22.7 kg)

Electrical Specifications

Power	
General	100 to 240 VAC; 47 to 63 Hz
Power consumption printing PAUSE test at slowest speed	121 W
Printer idle	20 W

Environmental Conditions for Operation and Storage

Environment	Mode	Temperature	Relative Humidity
Operation	Thermal Transfer	40° to 105°F (5° to 40° C)	20 to 85% non-condensing
	Direct Thermal	32° to 105°F (0° to 40° C)	
Storage	Thermal Transfer or Direct Thermal	-40° to 140°F (-40° to 60° C)	5 to 85% non-condensing

Print Specifications

Refer to the tables that follow for printer specifications.

Print Specifications	203 dpi	300 dpi
Printhead resolution	203 dots/inch (8 dots/mm)	300 dots/inch (12 dots/mm)
Dot size (width×length)	0.0049×0.0049 in. (0.125×0.125 mm)	0.0033×0.0039 in. (0.084×0.099 mm)
First dot location (measured from inside media edge)	0.10 ± 0.035 in. (2.5 ± 0.9 mm)	0.023 ± 0.035 in. (0.6 ± 0.9 mm)
Maximum print width	4.0 in. (102 mm)	4.0 in. (102 mm)
Maximum print length (non-continuous)	39 in. (991 mm)	39 in. (991 mm)
Maximum print length (continuous)	150 in. (3810 mm)	100 in. (3810 mm)
Selectable print speeds (inches per second)	2.4, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	2.4, 3, 4, 5, 6, 7, 8, 9
Bar code modulus (X) dimension:		
Ladder (rotated) orientation	4.9 mil to 49 mil	3.9 mil to 39 mil
Picket fence (nonrotated) orientation	4.9 mil to 49 mil	3.33 mil to 33 mil
Thin film printhead with Element Energy Equalizer (E ³) [®]	Yes	Yes

Media Specifications

Use the correct size and type of labels for best performance. Refer to the tables that follow for specifications.



Important • Media registration and minimum label length are affected by label type and width, ribbon type, print speed, and printer mode of operation. Performance improves as these factors are optimized. Zebra recommends qualifying any application with thorough testing.

Media Specifications		203 dpi	300 dpi
Minimum label length	Tear-Off	0.7 in. (18 mm)	0.7 in. (18 mm)
	Peel-Off	0.5 in. (13 mm)	0.5 in. (13 mm)
	Cutter	1.5 in. (38 mm)	1.5 in. (38 mm)
	Rewind	0.25 in. (6 mm)	0.25 in. (6 mm)
Total media width (label + backing, if any)	Minimum	0.79 in. (20 mm)	0.79 in. (20 mm)
	Maximum	4.5 in. (114 mm)	4.5 in. (114 mm)
Total thickness (includes backing, if any)		0.003 in. (0.076 mm)	0.003 in. (0.076 mm)
		0.012 in. (0.305 mm)	0.012 in. (0.305 mm)
Cutter maximum full-width media thickness		0.009 in. (0.23 mm)	0.009 in. (0.23 mm)
Roll media core inside diameter		3 in. (76 mm)	3 in. (76 mm)
Maximum roll diameter on 3 in. (76 mm) core		8.0 in. (203 mm)	8.0 in. (203 mm)
Interlabel gap	Minimum	0.079 in. (2 mm)	0.079 in. (2 mm)
	Preferred	0.118 in. (3 mm)	0.118 in. (3 mm)
	Maximum	No more than the calibrated length of the label.	No more than the calibrated length of the label.
Maximum internal fanfold media pack size (label + backing): L × W×H		8.0×4.5×4.5 in. (203×114×114 mm)	8.0×4.5×4.5 in. (203×114×114 mm)
Ticket/tag sensing notch: L × W		0.12×0.25 in. (3×6 mm)	0.12×0.25 in. (3×6 mm)
Ticket/tag sensing hole diameter		0.125 in. (3 mm)	0.125 in. (3 mm)
Label registration tolerance (vertical)		± 0.06 in. (± 1.5 mm)	± 0.06 in. (± 1.5 mm)
Label registration tolerance (horizontal)		± 0.06 in. (± 1.5 mm)	± 0.06 in. (± 1.5 mm)
Maximum media density		0.5 ODU	0.5 ODU

Black Mark Sensing

Media Specifications		203 dpi	300 dpi
Mark length (measuring parallel to label/tag edge)	Minimum	0.12 in. (3 mm)	0.12 in. (3 mm)
	Maximum	0.43 in. (11 mm)	0.43 in. (11 mm)
Mark width (measuring to perpendicular label/tag edge)	Minimum	0.43 in. (11 mm)	0.43 in. (11 mm)
	Maximum	Full media width	Full media width
Mark location		within 0.040 in. (1 mm) of the inside media edge	within 0.040 in. (1 mm) of the inside media edge
Mark density in Optical Density Unit (ODU)		>1.0	>1.0

Ribbon Specifications

Refer to the following tables for ribbon specifications.



Note • Consider the following when using ribbon:

- Match the ribbon to the label width and printhead width that you are using. The ribbon should be at least as wide as the labels to protect the printhead from excessive wear.
- Ribbon must be wound with the coated side out.

Ribbon Specifications	203 dpi	300 dpi
Printhead resolution	203 dots/inch (8 dots/mm)	300 dots/inch (12 dots/mm)
Ribbon width Minimum	0.79 in. (20 mm)	0.79 in. (20 mm)
Ribbon width Maximum	4.33 in. (110 mm)	4.33 in. (110 mm)
Maximum ribbon length	1476 ft (450 m)	1476 ft (450 m)
Ribbon core inside diameter	1.0 in. (25.4 mm)	1.0 in. (25.4 mm)
Maximum ribbon roll outside diameter	3.2 in. (81.3 mm)	3.2 in. (81.3 mm)



Notes • _____

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.

bar code 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 A registration mark found on the underside of the print media that acts as a start-of-label indication for the printer. (See *non-continuous media*.)

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) through the printer and senses whether to use the direct thermal or thermal transfer print method, and (if using non-continuous media) the length of individual labels or tags.

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 has no notch, gap, or web (media liner only) to separate the labels or tags. The media is one long piece of material.

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 either lined up against each other or separated by a small distance. Typically the material surrounding the labels has been removed. (See *non-continuous media*.)

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*.

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.

dynamic RAM The memory devices used to store the label formats in electronic form while they are being printed. The amount of DRAM memory available in the printer determines the maximum size and number of label formats that can be printed. This is volatile memory that loses the stored information when power is turned off.

fanfold media Media that comes folded in a rectangular stack. Contrast this with *roll media*.

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 FLASH memory is non-volatile and maintains the stored information intact when power is off. This memory area is used to store the printer's operating program. In addition, this memory can 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™.

ips (inches-per-second) The speed at which the label or tag is printed. Zebra printers can print from 1 ips to 12 ips.

label An adhesive-backed piece of paper, plastic, or other material on which information is printed.

label backing (liner) The material on which labels are affixed during manufacture and which is discarded or recycled by the end-users.

light emitting diode (LED) Indicators of specific printer status conditions. Each LED is either off, on, or blinking depending on the feature being monitored.

liquid crystal display (LCD) The LCD is a back-lit display that provides the user with either operating status during normal operation or option menus when configuring the printer to a specific application.

lock-up This is the term generally used to describe a fault condition that, for no apparent reason, causes the printer to stop working. THIS COMMAND IS NOT FOUND IN ZPL GUIDE.

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 hanger 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. Examples are die-cut labels, notched tag-stock, and stock with black mark registration marks.

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 *non-continuous media*.)

peel-off 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.

print speed The speed at which printing occurs. For thermal transfer printers, this speed is expressed in terms of ips (inches per second).

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. **THIS COMMAND IS NOT FOUND IN ZPL GUIDE.**

registration Alignment of printing with respect to the top (vertical) or sides (horizontal) of a label or tag.

ribbon A band of material consisting of a base film coated with wax or resin “ink.” The inked side of the material is pressed by the printhead against the media. The ribbon transfers ink onto the media when heated by the small elements within the printhead. 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). Contrast this with *fanfold media*.

supplies A general term for media and ribbon.

symbology The term generally used when referring to a bar code.

tag 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.

tear-off 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*.

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 bar code symbol to be read incorrectly or not at all.

Index

A

- active print server
 - how to interpret, 96
 - user menu item, 33
- adhesive test for ribbon coating, 50
- adjustments
 - label left position, 87
 - label top position, 87
 - lower media sensor, 118
 - maximum label length, 86
 - media sensors, 115
 - print darkness, 83
 - print width, 85
 - printhead toggle pressure, 119
 - tear-off position, 84

B

- backfeed sequence
 - how to change, 87
 - user menu item, 30
- backfeed speed
 - selection, 89
- backing removal, 113
- bar codes
 - bar code does not scan, 138
 - bar codes label, 91
 - darkness comparison during FEED self test, 151
 - types of codes, 161
 - user menu item, 25
- battery disposal, 124
- baud rate
 - user menu item, 27
 - ways to set, 104

- bitmap scaling factor, 94
- black mark media
 - black mark specifications, 165
 - described, 47
 - selecting media type, 85
 - setting media type through user menu, 22
 - when to clean sensor, 125
- broken ribbon, 146
- buttons on control panel, 15

C

- CALIBRATE button, 16
- calibration
 - Auto Calibrate failed, 138
 - how to set as head-close action, 92
 - how to set as power-up action, 92
 - media/ribbon cal
 - procedure, 106
 - user menu item, 27
 - SHORT CAL
 - how to set for head-close action, 92
 - troubleshooting problems, 144
 - ways to initiate, 94
- Canadian DOC compliance, 4
- CANCEL button
 - CANCEL self test, 149
 - location, 16

- cleaning
 - cutter, 134
 - exterior of printer, 125
 - media compartment, 126
 - printhead and platen roller, 126
 - recommended schedule, 125
 - sensors, 128
 - snap plate, 130
 - command character
 - user menu item, 29
 - ways to set, 101
 - communication diagnostics mode
 - how to initiate, 94
 - user menu item, 28
 - communication interfaces, 40
 - communications diagnostics mode
 - overview, 155
 - communications problems, 145
 - configuration label
 - network
 - ways to print, 91
 - printer
 - ways to print, 91
 - printing using CANCEL self test, 149
 - conformity declaration, 3
 - connect printer to computer or network, 40
 - connect printer to power source, 43
 - contacts, 11
 - continuous media
 - described, 48
 - selecting media type, 85
 - setting media type through user menu, 22
 - control character
 - user menu item, 29
 - ways to set, 100
 - control panel
 - button function, 15
 - display, 17
 - error messages, 139
 - keypad cover, 46
 - navigation, 17
 - counters
 - non-resettable
 - description, 90
 - user menu item, 24
 - print odometer readings, 90
 - how to print, 90
 - user menu item, 24
 - user-controlled
 - counter 1 menu item, 24
 - how to change, 90
 - customer service, 11
 - cutter
 - cleaning, 134
 - when to clean, 125
 - Cutter mode
 - description and media path, 53
 - how to select, 84
 - select print mode through user menu, 21
- ## D
- darkness
 - how to make adjustments, 83
 - print quality too light or too dark, 137
 - user menu item, 21
 - data bits
 - user menu item, 27
 - ways to set, 104
 - data cables, 42
 - data source
 - connections, 40
 - site selection considerations, 39
 - date setting, 32
 - declaration of conformity, 3
 - default gateway
 - user menu item, 34
 - ways to view or set, 98
 - default password, 20
 - default reset, 93
 - defragmenting message, 142
 - delimiter character
 - user menu item, 29
 - ways to set, 101
 - diagnostic mode
 - how to initiate, 94
 - user menu item, 28
 - diagnostics, 148
 - Direct Thermal mode
 - how to specify, 85
 - media scratch test, 49
 - disable password protection, 20
 - display
 - location, 15
 - missing characters, 147
 - display language
 - how to change from unfamiliar language, 147
 - user menu item, 36
 - ways to change, 100
 - disposal of printer parts, 124

E

- early warning
 - maintenance
 - how to enable or disable, 89
 - printhead life menu item, 23
 - reset new printhead counter, 24, 23
 - set printhead cleaning interval, 23
 - user menu item, 23
 - media and ribbon
 - how to enable or disable, 89
 - user menu item, 23
- electrical specifications, 162
- environmental specifications, 162
- error messages, 139
- ESSID
 - user menu item, 34
 - ways to view, 99
- Ethernet
 - characteristics of a wired connection, 41
 - characteristics of wireless connection, 42
- exterior cleaning, 125

F

- factory defaults
 - reload parameters, 19
 - restore network settings, 19
- fanfold media
 - described, 48
 - loading, 61
- FCC compliance, 4
- features, 160
- feed a label
 - how to set as head-close action, 92
 - how to set as power-up action, 92
- FEED button
 - FEED and PAUSE self test, 154
 - FEED self test, 151
 - location, 16
- flash memory initialization
 - how to start, 91
 - user menu item, 26
- fonts
 - fonts label, 91
 - user menu item, 25
- format convert
 - how to use, 94
 - user menu item, 31
- format prefix
 - user menu item, 29
 - ways to set format command prefix, 101

formats

- formats label, 91
- user menu item, 25

G

- gap/notch
 - illustrations, 47
 - selecting media type, 85
 - sensor selection through user menu, 22
 - setting media type through user menu, 22
 - ways to select media sensor type, 102
- gateway
 - user menu item, 34
 - ways to view or set, 98

H

- head test count
 - how to enable or disable, 87
 - user menu item, 30
- head-close action
 - how to change, 92
 - user menu item, 30
- host handshake
 - user menu item, 28
 - ways to set, 105

I

- idle display
 - described, 17
 - how to change what displays, 95
 - user menu item, 32
- images
 - images label, 91
 - user menu item, 25
- images distorted on labels, 145
- indicator lights
 - combined with error message on ZT230, 139
- initialize flash memory
 - how to start, 91
 - user menu item, 26
- initiate manual calibration, 94
- inspect for shipping damage, 38
- IP address
 - user menu item, 33
 - ways to view or set, 97
- IP protocol
 - how to change, 97
 - user menu item, 33
- IP protocol (IP resolution)
 - how to change, 97
 - user menu item, 33

L

- label backing removal, 113
- label left position
 - how to adjust, 87
 - user menu item, 30
- label length
 - how to adjust maximum value, 86
 - user menu item, 22
- label shift, 87
- label specifications, 164
- label top position
 - how to adjust, 87
 - user menu item, 30
- label width, 85
- label-available sensor
 - location, 128
 - when to clean, 125
- labels did not print, 145
- labels not printing, 145
- language
 - how to change from unfamiliar language, 147
 - user menu item, 36
 - ways to change display language, 100
- last saved settings, 93
- LCD error messages, 139
- LENGTH
 - how to set as head-close action, 92
 - how to set as power-up action, 92
- liability, 2
- Liner Take-Up mode
 - description and media path, 52
 - select print mode through user menu, 21
- list bar codes, 25
- list fonts, 25
- list formats, 25
- list images, 25
- list network, 26
- list setup, 25
- load defaults
 - how to load printer or print server defaults, 93
 - load factory defaults, 19
- load IP settings from external device
 - how to use, 96
 - user menu item, 33
- load network defaults, 93
- location for printer, 39
- lower media sensor adjustment, 118
- lubrication, 124

M

- MAC address
 - user menu item, 34
 - ways to view, 98
- manual calibration
 - media/ribbon cal user menu item, 27
 - procedure, 106
 - ways to initiate, 94
- maximum label length
 - how to change, 86
 - user menu item, 22
- media
 - black mark, 47
 - continuous roll media, 48
 - fanfold, 48
 - non-continuous roll media, 47
 - ordering, 11
 - perforated, 47
 - specifications, 164
 - tag stock, 47
 - types of media, 47
 - web, 47
- media compartment cleaning, 126
- media liner removal, 113
- media path cleaning, 125
- media power up
 - how to change, 92
 - user menu item, 29
- media scratch test, 49
- media sensor
 - adjustments, 115
 - sensor type user menu item, 22
 - ways to select, 102
- media sensor calibration
 - procedure, 106
 - user menu item, 27
 - ways to initiate, 94
- media type
 - how to select, 85
 - user menu item, 22
- melted ribbon, 146
- misregistration of labels, 137
- missing print on labels, 137

N

- navigation, 17
- network configuration label
 - user menu item, 26
 - ways to print, 91
- network ID
 - how to change, 105
 - user menu item, 28
- network settings
 - load defaults
 - ways to initiate, 93, 19
 - reset network
 - user menu item, 35
 - ways to reset, 99
- NO MOTION
 - how to set as head-close action, 92
 - how to set as power-up action, 92
- non-continuous media
 - described, 47
 - problem with labels, 147
 - selecting media type, 85

O

- odometers
 - non-resettable counter
 - description, 90
 - user menu item, 24
 - print readings
 - how to print, 90
 - user menu item, 24
 - print user-controlled counters, 90
 - user-controlled counters
 - counter 1 menu item, 24
 - how to change, 90
- operating conditions, 39
- optional features, 160
- ordering replacement parts, 124
- ordering ribbon and media, 11

P

- parallel communications
 - user menu item, 27
 - ways to set, 103
- parallel port
 - characteristics of parallel connection, 41
- parity
 - user menu item, 28
 - ways to set, 104

- password
 - default, 20
 - disable, 20
 - select password protection level
 - how to set, 95
 - user menu item, 35
- PAUSE button
 - FEED and PAUSE self test, 154
 - location, 16
 - PAUSE self test, 150
- Peel-Off mode
 - description and media path, 52
 - how to select, 84
 - select print mode through user menu, 21
- perforated media, 47
- physical specifications, 162
- platen roller
 - cleaning, 126
 - when to clean, 125
- power
 - connect to power source, 43
 - power cord specifications, 44
 - site selection, 39
- Power-On Self Test (POST), 148
- power-up action
 - how to change, 92
 - user menu item, 29
- primary network
 - how to select, 96
 - user menu item, 32
- print configuration label
 - CANCEL self test, 149
- print darkness setting, 83
- print information
 - how to print various printer information, 91
 - LIST ALL user menu item, 26
- print method
 - how to specify, 85
 - user menu item, 22
- print mode
 - how to select, 84
 - user menu item, 21
- print quality
 - bar code does not scan, 138
 - effect of printhead toggle pressure, 119
 - running FEED self test, 151
 - troubleshooting, 136

- print server
 - active print server
 - how to interpret, 96
 - user menu item, 33
 - characteristics of wired connection, 41
 - characteristics of wireless connection, 42
 - default gateway
 - user menu item, 34
 - ways to view or set, 98
 - ESSID
 - user menu item, 34
 - ways to view, 99
 - IP address
 - user menu item, 33
 - ways to view or set, 97
 - IP protocol
 - how to change, 97
 - user menu item, 33
 - MAC address
 - user menu item, 34
 - ways to view, 98
 - network configuration label
 - sample label, 149
 - ways to print, 91
 - primary network
 - user menu item, 32
 - reset network settings
 - user menu item, 35
 - ways to reset, 99
 - subnet mask
 - user menu item, 34
 - ways to view or set, 98
 - print specifications, 163
 - print speed
 - how to select, 83
 - user menu item, 21
 - print width
 - how to adjust, 85
 - user menu item, 22
 - printer configuration label
 - user menu item, 25
 - ways to print, 91
 - printer diagnostics, 148
 - printer locks up, 147
 - printer settings
 - darkness, 83
 - date, 32
 - label left position, 87
 - label top position, 87
 - maximum label length, 86
 - media type, 85
 - print method, 85
 - print mode, 84
 - print speed, 83
 - print width, 85
 - reprint mode, 88
 - settings not taking effect, 147
 - tear-off position, 84
 - time, 32
 - printhead
 - cleaning, 126
 - cleaning interval
 - how to specify, 89
 - user menu item, 23
 - life expectancy
 - how to specify, 89
 - user menu item, 23
 - pressure adjustment, 119
 - when to clean, 125
 - protocol
 - how to change, 105
 - user menu item, 28
- ## R
- Real-Time Clock (RTC)
 - date, 95
 - date setting on control panel, 32
 - time, 95
 - time setting on control panel, 32
 - recycling printer parts, 124
 - reflective sensor
 - selecting through user menu, 22
 - ways to select, 102
 - registration loss during printing, 136
 - registration problems, 144
 - relative humidity
 - operating, 39
 - storing the printer, 38
 - reload last saved settings, 93
 - remove media liner from rewind spindle, 113
 - replacement parts, 124
 - report shipping damage, 38
 - reprint mode
 - how to set and use, 88
 - user menu item, 31

- reset network settings
 - user menu item, 35
 - ways to reset, 99
 - reset printer to default values, 93
 - restore
 - factory default settings, 19
 - network settings, 19
 - printer or printer default values, 93
 - rewind spindle, 113
 - ribbon
 - adhesive test, 50
 - broken or melted ribbon, 146
 - determining coated side, 49
 - ordering, 11
 - removal, 112
 - ribbon not detected correctly, 146
 - scratch test, 50
 - setting print method to Thermal Transfer mode, 85
 - specifications, 165
 - when to use, 49
 - wrinkled ribbon, 146
 - ribbon sensor
 - cleaning, 128
 - location, 128
 - when to clean, 125
 - ribbon sensor calibration
 - procedure, 106
 - user menu item, 27
 - ways to initiate, 94
 - roll media, 47
 - loading, 61
 - routine maintenance, 123
 - run a ZBI program
 - START PROGRAM user menu item, 32
 - ways to run, 95
- S**
- sales, 11
 - schedule for cleaning, 125
 - scratch test
 - media type, 49
 - ribbon coated side, 50
 - self tests, 148
 - CANCEL, 149
 - communications diagnostics, 155
 - FEED, 151
 - FEED and PAUSE, 154
 - PAUSE, 150
 - Power-On Self Test (POST), 148
 - sensor profile
 - how to print, 91
 - user menu item, 26
 - sensor type
 - user menu item, 22
 - ways to select, 102
 - sensors
 - cleaning, 128
 - interpreting sensor profile, 156
 - label-available sensor location, 128
 - lower media sensor adjustment, 118
 - ribbon sensor location, 128
 - transmissive (media) sensor adjustment, 115
 - serial communications
 - user menu item, 27
 - ways to set, 103
 - serial port
 - characteristics of serial connection, 41
 - setup, 37
 - unpack the printer, 38
 - shipping
 - report damage, 38
 - reshipping the printer, 38
 - SHORT CAL
 - how to set as power-up action, 92
 - how to set for head-close action, 92
 - initiating through control panel, 16
 - site selection for printer, 39
 - smudge marks on labels, 137
 - snap plate
 - cleaning, 130
 - when to clean, 125
 - spacing requirements, 39
 - specification
 - print, 163
 - specifications
 - electrical, 162
 - environmental, 162
 - physical, 162
 - power cord, 44
 - ribbon, 165
 - standard features, 160
 - storing the printer, 38
 - subnet mask
 - user menu item, 34
 - ways to view or set, 98
 - surface for printer, 39

T

- tag stock, 47
- Tear-Off mode
 - description and media path, 51
 - how to select, 84
 - select print mode through user menu, 21
 - tear-off bar cleaning, 125
- tear-off position
 - how to adjust, 84
 - user menu item, 21
- technical support, 11
- temperature
 - operating, 39
 - storing the printer, 38
- Thermal Transfer mode
 - how to specify, 85
 - media scratch test, 49
- time setting, 32
- toggle pressure adjustment, 119
- transmissive (media) sensor
 - adjustment, 115
 - when to clean, 125
- transmissive sensor
 - selecting through user menu, 22
 - ways to select, 102
- troubleshooting
 - communications problems, 145
 - diagnostic tests, 148
 - error messages, 139
 - print quality problems, 136
 - ribbon problems, 146
- types of media
 - black mark media, 47
 - continuous roll media, 48
 - fanfold media, 48
 - how to specify, 85
 - non-continuous roll media, 47
 - perforated media, 47
 - setting on control panel, 22
 - tag stock, 47
 - web media, 47

U

- unpack the printer, 38
- USB port
 - characteristics of USB connection, 41

V

- ventilation requirements, 39
- vertical drift in top-of-form position, 137

W

- web media
 - described, 47
- wired print server
 - characteristics, 41
- wireless print server
 - characteristics, 42
- wrinkled ribbon causes, 146

Z

- Zebra Basic Interpreter (ZBI)
 - run a ZBI program
 - ways to run, 95
 - START PROGRAM user menu item, 32
- Zebra Programming Language (ZPL)
 - features, 161
- Zebra protocol, 105
- ZPL mode
 - user menu item, 29
 - ways to select, 101



Zebra Technologies Corporation

Zebra Technologies Corporation
475 Half Day Road, Suite 500
Lincolnshire, IL 60069 USA
T: +1 847 634 6700
Toll-free +1 866 230 9494
F: +1 847 913 8766

Zebra Technologies Europe Limited

Dukes Meadow
Millboard Road
Bourne End
Buckinghamshire, SL8 5XF, UK
T: +44 (0)1628 556000
F: +44 (0)1628 556001

Zebra Technologies Asia Pacific, LLC

120 Robinson Road
#06-01 Parakou Building
Singapore 068913
T: +65 6858 0722
F: +65 6885 0838

<http://www.zebra.com>