Desktop Barcode Printer

DH220E Series

Direct Thermal

Series Models

DH220E/ DH320E

Service Manual

www.tscprinters.com

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1 Introduction

Thank you very much for purchasing TSC bar code printer.

The DH220E series of thermal desktop barcode printers support more printing applications than any other printer in its class. The four-inch wide DH220E series can address everything from higher volume 4x6 shipping labels, higher resolution product marking and graphic solutions, to high resolution labels used in electronics marking applications.

The DH220E series features a user-friendly spring-loaded center-biased clamshell design for easy drop-in media loading of 5-inch rolls of media. The printer construction features a rugged double-wall design that is stronger and more durable than other direct thermal mechanisms on the market.

As with all TSC printers, the DH220E Series features the TSPL-EZD printer-control language, which is fully compatible with other TSC printer languages, while supporting TPLE (Translation Printer Language Eltron®), TPLZ (Translation Printer Language Zebra®) and TPLD (Translation Printer Language Datamax®). The languages automatically decipher and translate the format of each label as it is sent to the printer. TSPL-EZD also features internal scalable True Type fonts (based on the Monotype® font engine), which are typically found only in more expensive printers.

This document provides an easy reference for operating this printer. TSC printers include the Windows labeling software for creating your label template. For system integration, the TSPL/TSPL2 printer programming manual or SDKs can be found on TSC website at: https://www.tscprinters.com.

1.1 Printer Features

Front View

1. Media viewer window
2. Icon LEDs
3. LED Indicator
4. Reprint button
5. Pause button
6. Feed button
7. Cover release lever

Interior View

1. Printhead
2. Upper black mark sensor
3. Media holder
4. Media cover holder lock
5. Media holder lock
6. Black mark sensor
7. Platen roller
8. Lower front panel

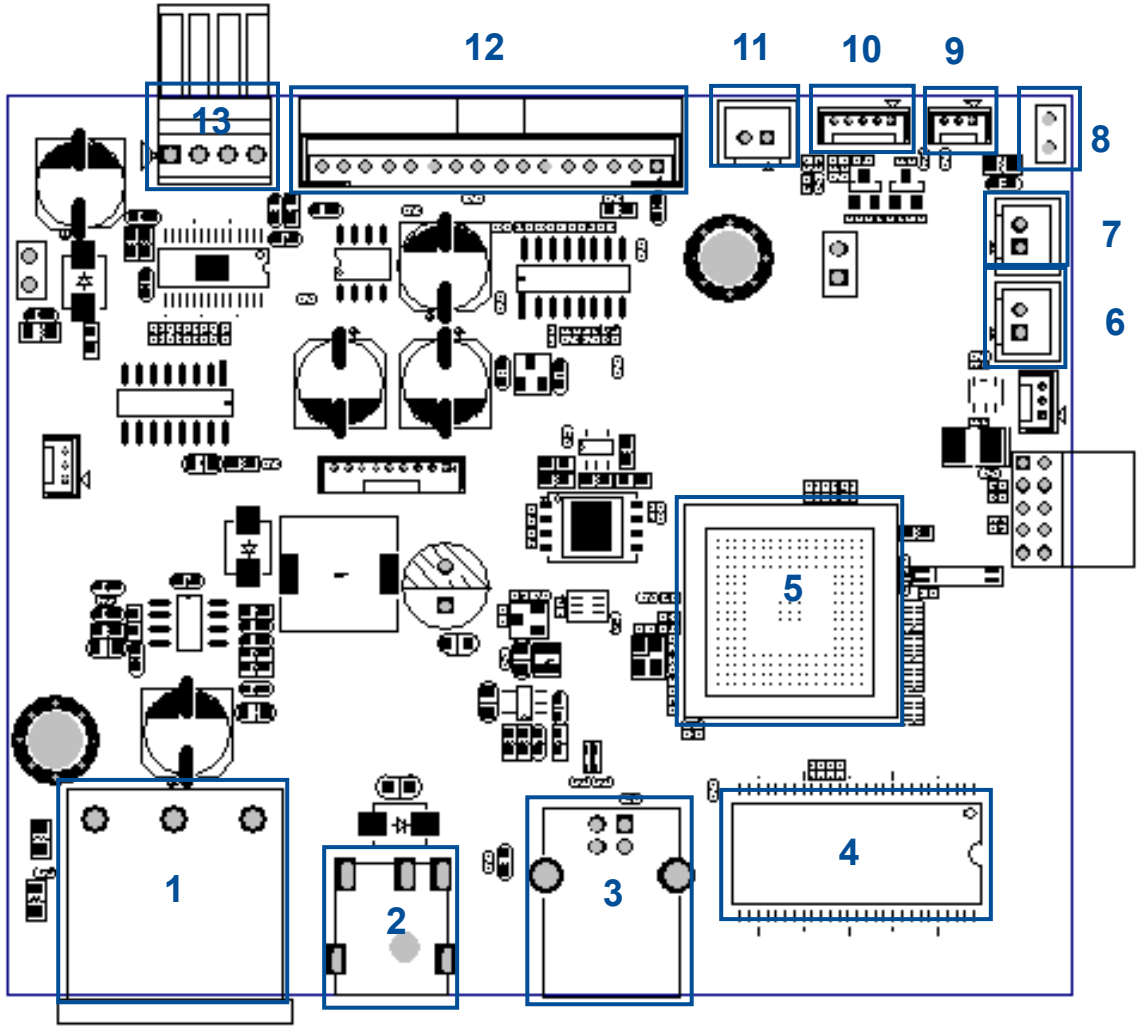
Rear View

1. Power switch
2. Power Jack
3. USB interface

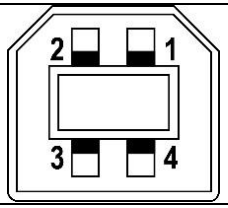
2 Electronics

2.1 Summary of the Board Connectors

Main board



1. Switch
2. DCIN
3. USB connector
4. SDRAM
5. MCU
6. Black mark sensor connector for print side (transmitter)
7. Black mark sensor connector for print side (receiver)
8. ESD cable connector (TPH)
9. Black mark sensor connector
10. Key & LED connector
11. Head open sensor connector
12. Printhead connector
13. Stepping motor connector

<table>
<tr><th>No.</th><th>Description</th></tr>
<tr><td>1</td><td>Switch</td></tr>
<tr><td>2</td><td>DCIN</td></tr>
<tr><td>3</td><td>USB device


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<tr><td>2</td><td>D-</td></tr>
<tr><td>3</td><td>D+</td></tr>
<tr><td>4</td><td>GND</td></tr>
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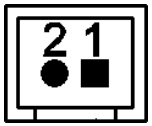
<tr><td>4</td><td>SDRAM</td></tr>
<tr><td>5</td><td>MCU</td></tr>
<tr><td>6</td><td>Black mark sensor connector for print side (transmitter)


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<tr><td>1</td><td>Power</td><td>3.3V</td></tr>
<tr><td>2</td><td>Gap sensor emitter</td><td>Emitter on: 2.1~2.3V
Emitter off: 2.6~2.8V</td></tr>
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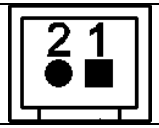
<tr><td>7</td><td>Black mark sensor connector for print side (receiver)


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<tr><th>Pin</th><th>Description</th><th>Voltage</th></tr>
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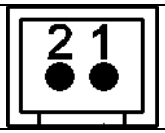

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<tr><th>Pin</th><th>Description</th><th>Voltage</th></tr>
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<tr><td>2</td><td>BM sensor emitter</td><td>2.1~2.2V: Emitter on
2.6~2.7V: Emitter off</td></tr>
<tr><td>3</td><td>BM sensor receiver</td><td>A/D : 0~3.3V</td></tr>
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<tr><td>10</td><td>Key & LED connector
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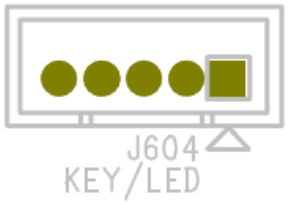
<tr><td> 
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<tr><td>2</td><td>LED Green</td><td>LED light on:1.1~1.4V
LED light off:1.6~1.9V</td></tr>
<tr><td>3</td><td>LED Red</td><td>LED light on:1.4~1.7V
LED light off:1.8~2.1V</td></tr>
<tr><td>4</td><td>KEY</td><td>0V: Push key
3.3V: Stand-by</td></tr>
<tr><td>5</td><td>GND</td><td>0V</td></tr>
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</table></td></tr>
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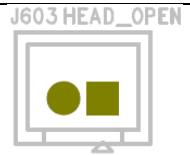
<tr><td> 
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3.3V: Head open</td></tr>
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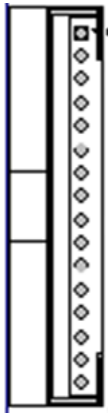
<tr><td>  </td><td>
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<tr><th>Pin</th><th>Description</th></tr>
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<tr><td>2</td><td>TPH 24V</td></tr>
<tr><td>3</td><td>Temperature sensor</td></tr>
<tr><td>4</td><td>TPH ID</td></tr>
<tr><td>5</td><td>Strobe2</td></tr>
<tr><td>6</td><td>GND</td></tr>
<tr><td>7</td><td>GND</td></tr>
<tr><td>8</td><td>GND</td></tr>
<tr><td>9</td><td>GND</td></tr>
<tr><td>10</td><td>3.3V</td></tr>
<tr><td>11</td><td>Strobe1</td></tr>
<tr><td>12</td><td>Latch</td></tr>
<tr><td>13</td><td>Clock</td></tr>
<tr><td>14</td><td>Data1</td></tr>
<tr><td>15</td><td>TPH 24V</td></tr>
<tr><td>16</td><td>TPH 24V</td></tr>
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<tr><td>13</td><td>Stepping motor connector
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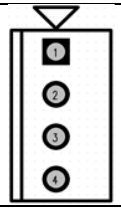
<tr><td>  </td><td>
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<tr><th>Pin</th><th>Description</th></tr>
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<tr><td>3</td><td>AOUT2</td></tr>
<tr><td>4</td><td>AOUT1</td></tr>
</table>
</td></tr>
</table>
</td></tr>
</table>

3 Replacing Parts

3.1 Before You Begin

WARNING:

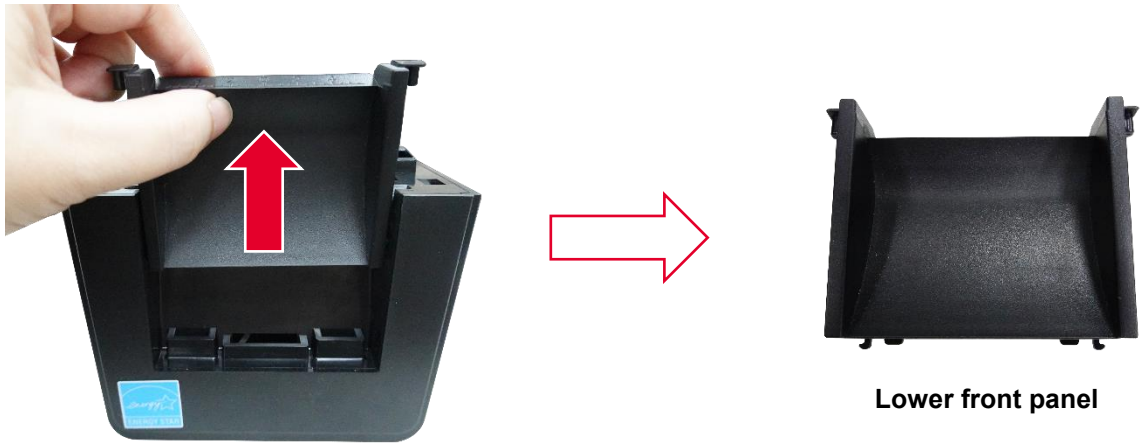
To avoid the risk of personal injury from electrical shock, before performing any replacement procedures, unplug the power cord from the printer or power outlet to ensure that power is removed.

To prepare the printer for the replacement or installation:

1. Protect yourself from ESD and wear protective gloves.
2. Place the printer on a flat surface.
3. Set the printer's power switch to the O (Off) position.
4. Remove the power adapter from the printer or unplug the power cord from the AC power outlet.
5. Disconnect interface cable from the rear panel of the printer.
6. Remove the media from the printer.
7. Read through the maintenance procedures.

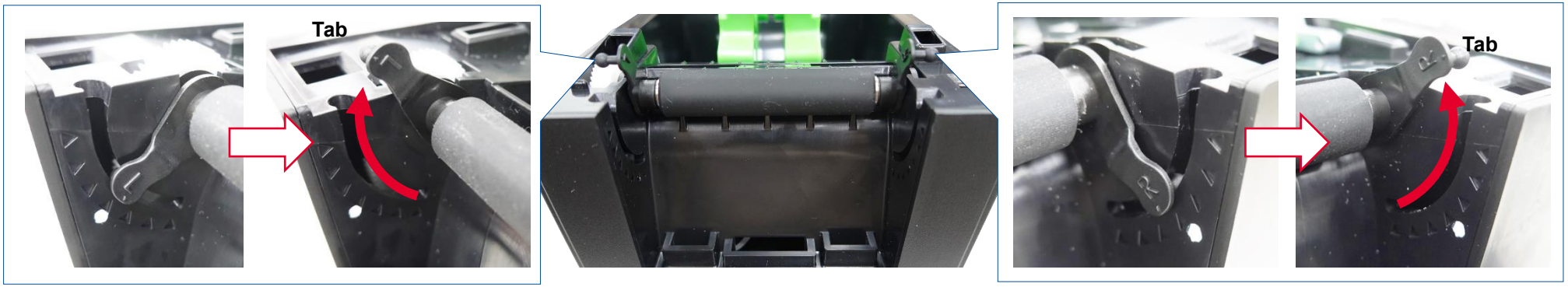
3.2 Replacing the Platen Roller Assembly

1. Follow the steps in Before You Begin to prepare the printer.
2. Open the printer cover by pulling the green levers, located on each side, toward the front of the printer, then lift the printer cover.
3. Remove the lower front panel as shown.

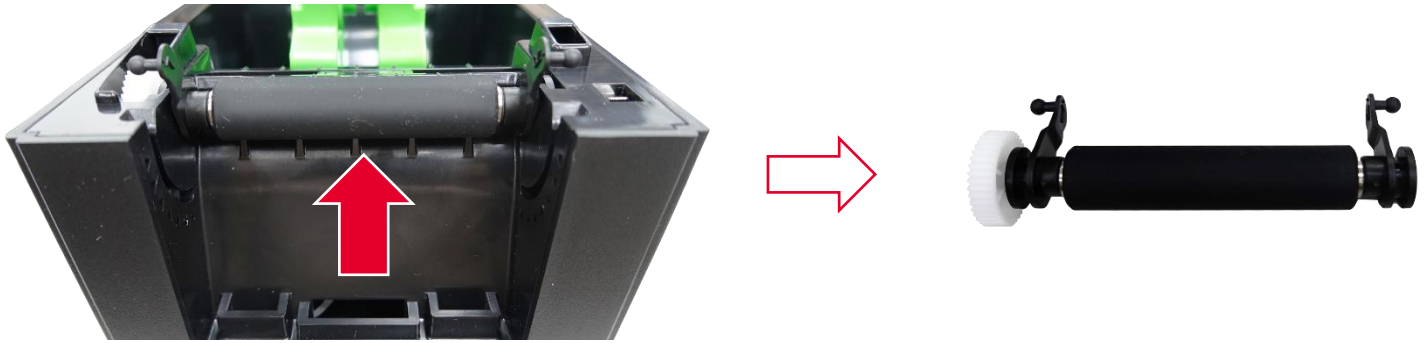


Lower front panel

4. Rotate the two tabs of the platen roller to the indicated position.



5. Pulling upward to remove/ replace the platen roller assembly.

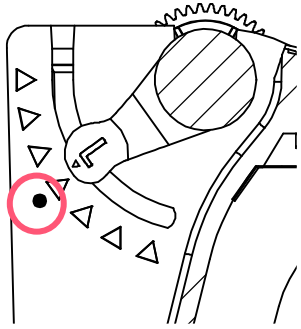


6. Reassemble the parts in the reverse procedure.

Note:

The default position of the platen roller tab is shown below (with a mark).

Default setting

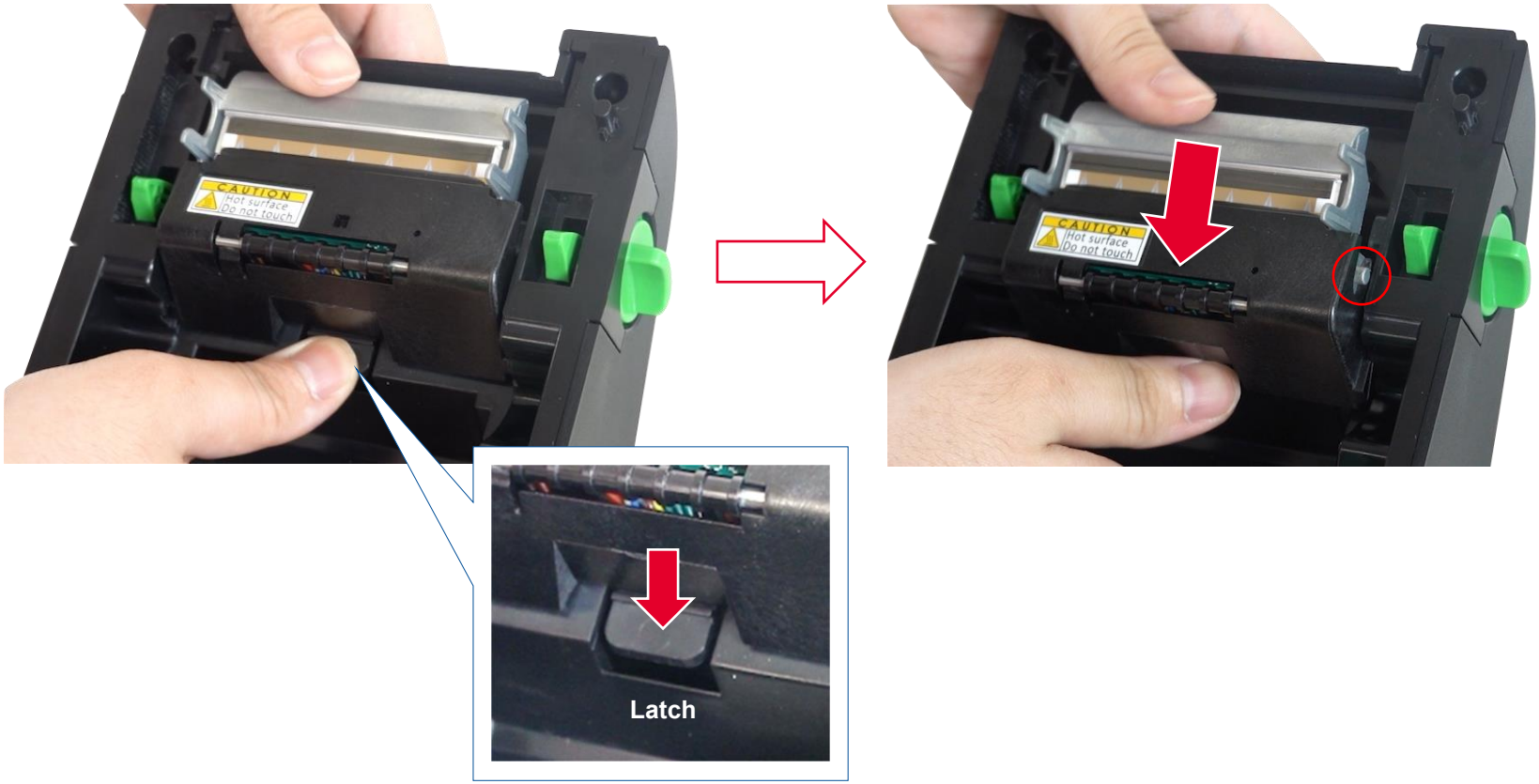


3.3 Replacing the Printhead & Upper Black Mark Sensor

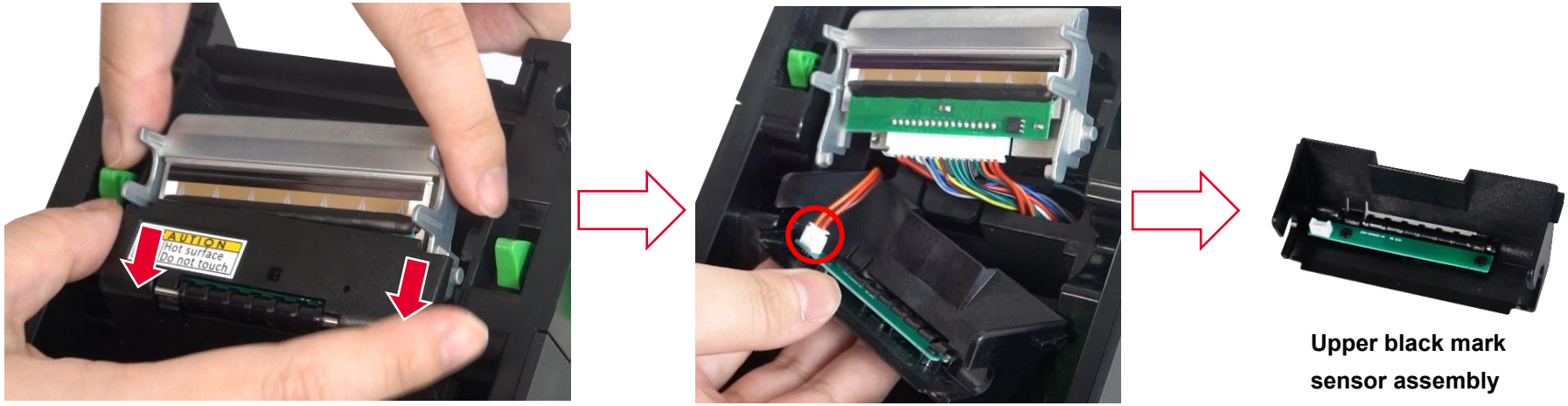
CAUTION:

To prevent electrostatic damage to electronic components, ground yourself by touching an unpainted part of the printer frame before removing or installing the printhead assembly.

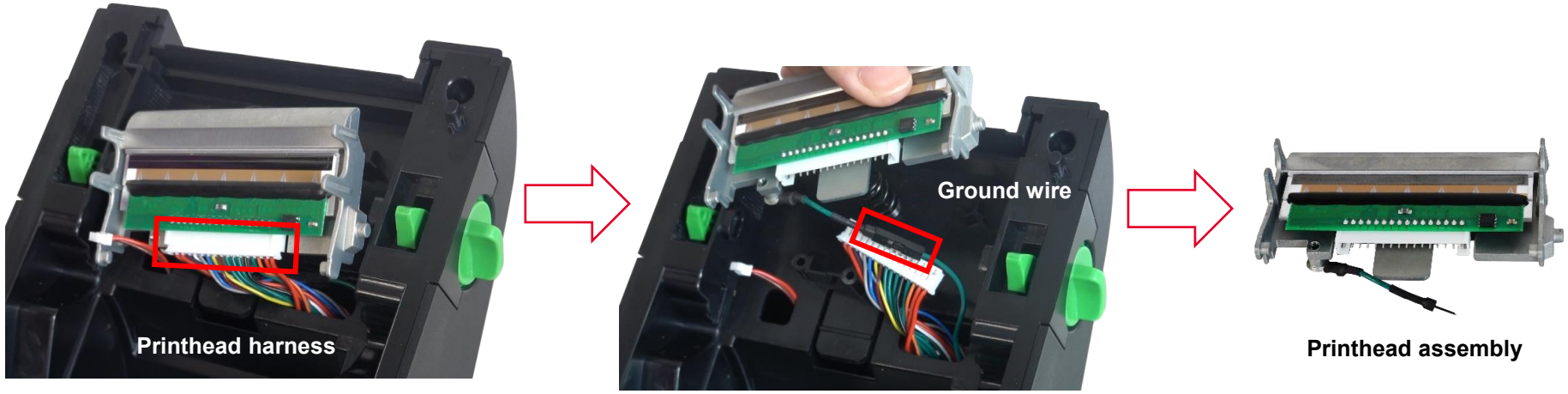
1. Follow the steps in Before You Begin to prepare the printer.
2. Open the printer cover by pulling the green levers, located on each side, toward the front of the printer, then lift the printer cover.
3. Slide the printhead assembly down while pressing and holding the latch to disengage it from inner cover.



4. Slide the cover down. Disconnect the upper black mark sensor connector to remove the cover.



5. Disconnect the printhead harness and the ground wire. Remove/ Replace the printhead assembly.



CAUTION:

Oils from your hands can damage the light brown area (heating elements) of the printhead. Do not touch the light brown area when you handle the printhead assembly.

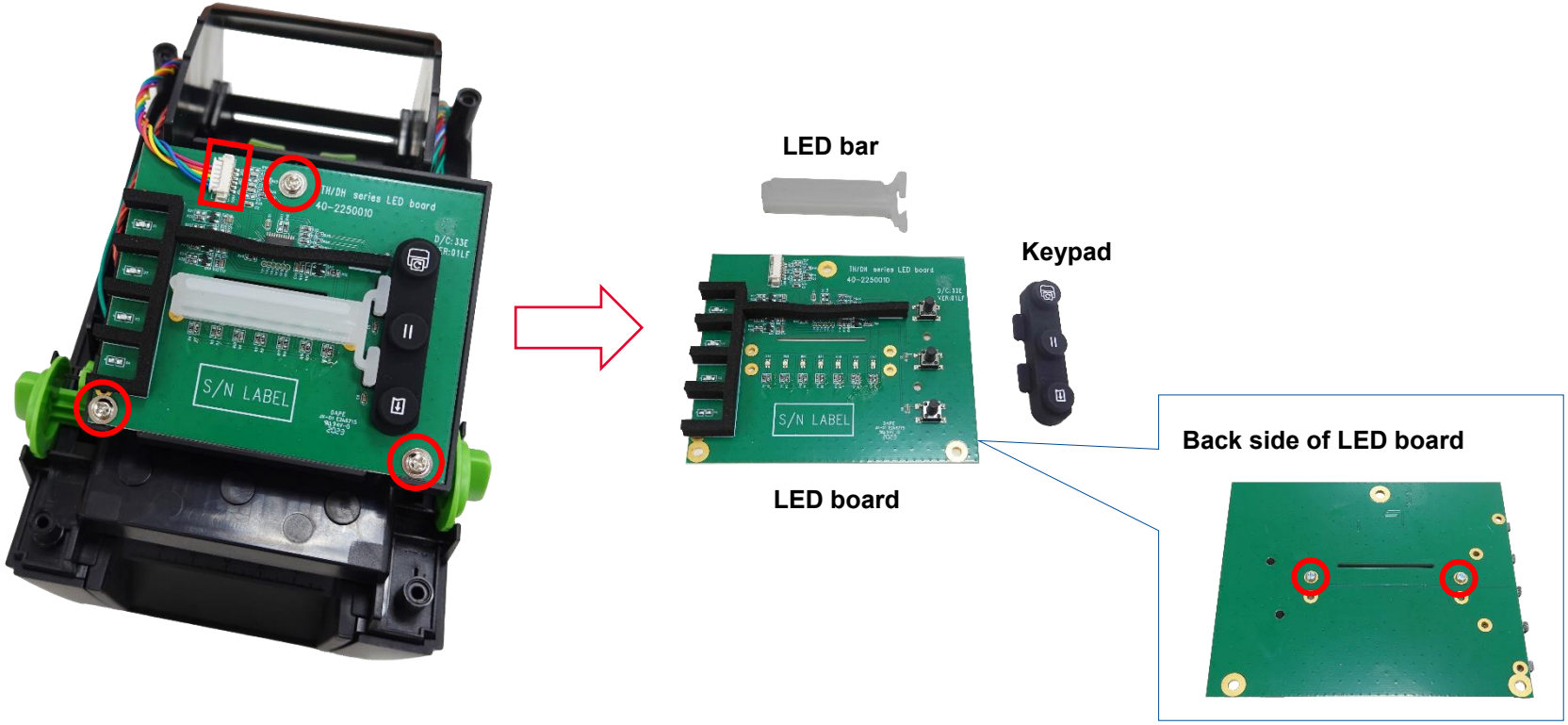
6. Reassemble the parts in the reverse procedures.

3.4 Replacing the Top Cover

1. Follow the steps in Before You Begin to prepare the printer.
2. Open the printer cover by pulling the green levers, located on each side, toward the front of the printer, then lift the printer cover.
3. Remove four screws on the printer top inner cover as shown below. Remove/replace the printer top cover. Reassemble the parts in the reverse procedures.

3.5 Replacing the Control Panel Assembly

1. Follow the steps in Before You Begin to prepare the printer.
2. Refer to Replacing the Top Cover to remove the printer top cover.
3. Remove three screws and one connector on LED board as shown below. Remove two screws on back of LED board to replace the LED bar and the keypad.



4. Reassemble the parts in the reverse procedures.

3.6 Replacing the Lower Cover

1. Follow the steps in Before You Begin to prepare the printer.
2. Put the printer upside down.
3. Remove four screws on the printer lower cover. Remove the lower cover to disconnect the power switch connector (blue).

4. Reassemble the parts in the reverse procedures.

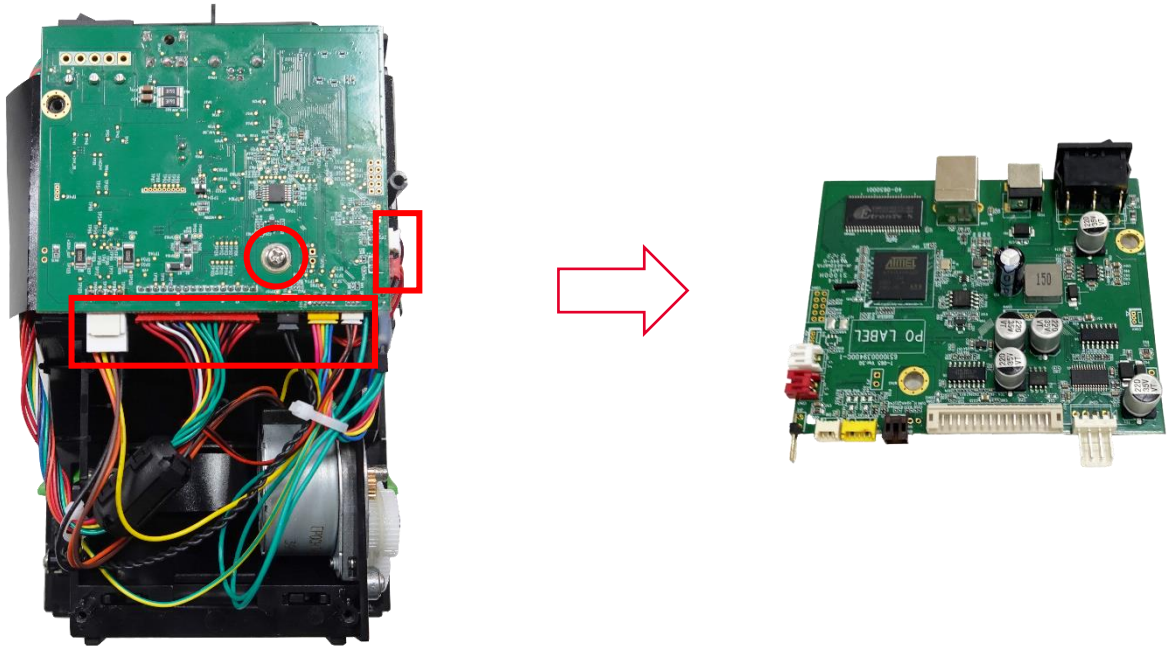
3.7 Replacing the Main Board

1. Follow the steps in Before You Begin to prepare the printer.
2. Refer to Replacing the Lower Cover to remove the printer lower cover.

CAUTION

To prevent electrostatic damage to electronic components, always wear a properly grounded static wrist strap when you handle circuit boards.

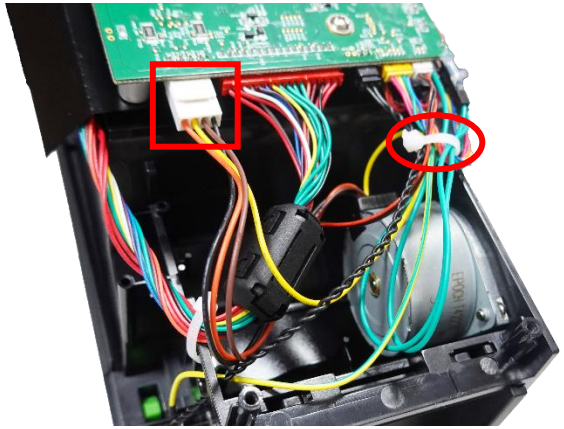
3. Remove one screw on main board. Unplug all cable assemblies from the main board. Remove/ Replace the main board.



4. Reverse the steps of the removal procedure.

3.8 Replacing the Stepping Motor

1. Follow the steps in Before You Begin to prepare the printer.
2. Refer to Replacing the Lower Cover to remove the printer lower cover.
3. Disconnect the stepping motor connector from the main board. Remove the cable tie as shown.

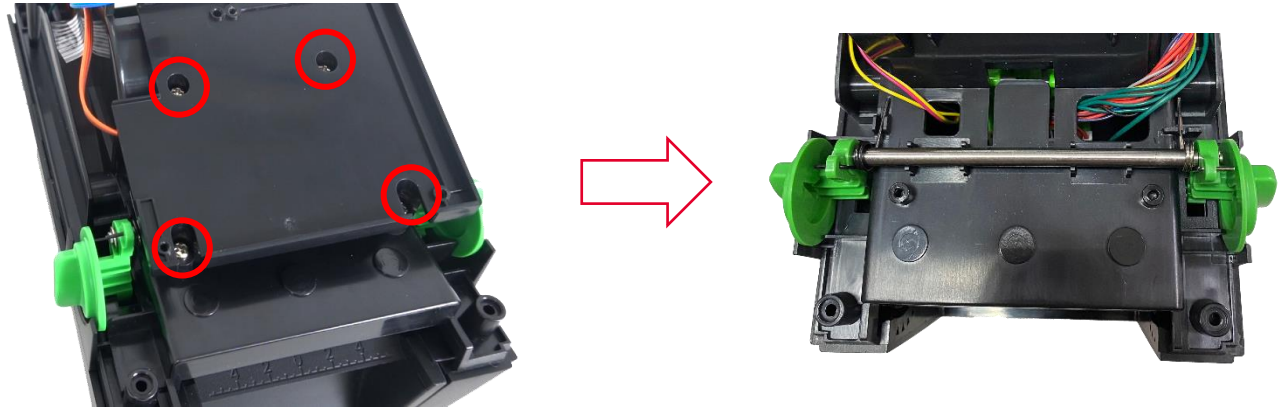


4. Remove two screws securing the stepping motor to the base of the printer frame. Remove/ Replace the stepping motor.

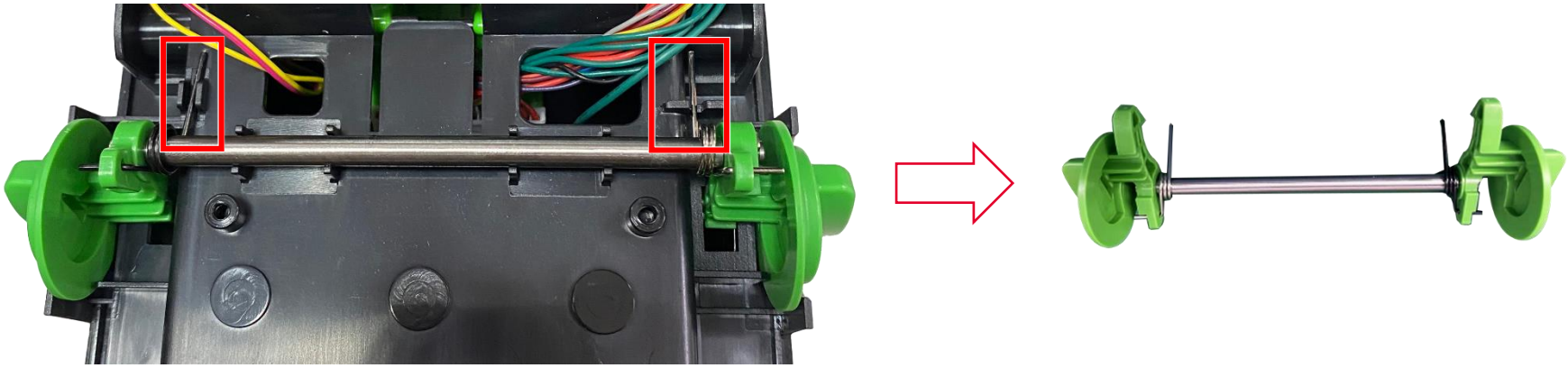
5. Reverse the steps of the removal procedure.

3.9 Replacing the Hook Assembly

1. Follow the steps in Before You Begin to prepare the printer.
2. Refer to Replacing the Top Cover to remove the printer top cover.
3. Remove the control panel assembly. For how to remove the control panel assembly, refer to Replacing the Control Panel Assembly.
4. Remove the four screws securing the hook assembly cover in place and then remove the hook assembly cover.

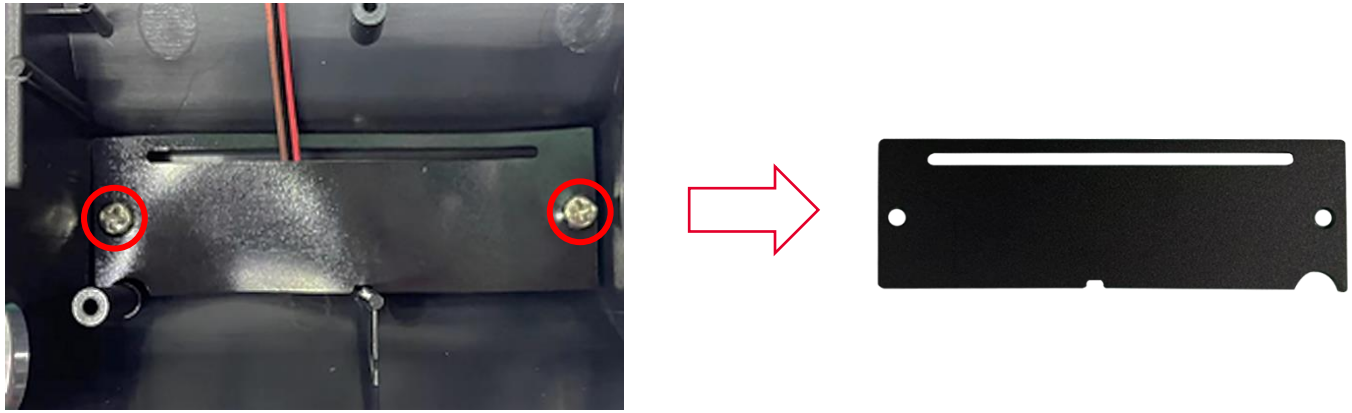


5. Release the two springs from their rib on the chassis and then remove the hook assembly from the printer. Reverse the steps of the removal procedure.

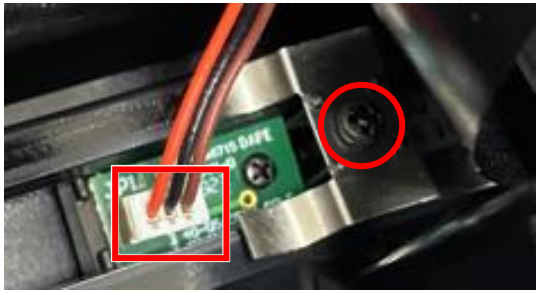


3.10 Replacing the Black Mark Sensor

1. Follow the steps in Before You Begin to prepare the printer.
2. Refer to Replacing the Stepping Motor to remove the stepping motor.
3. Remove two screws to remove the mylar.



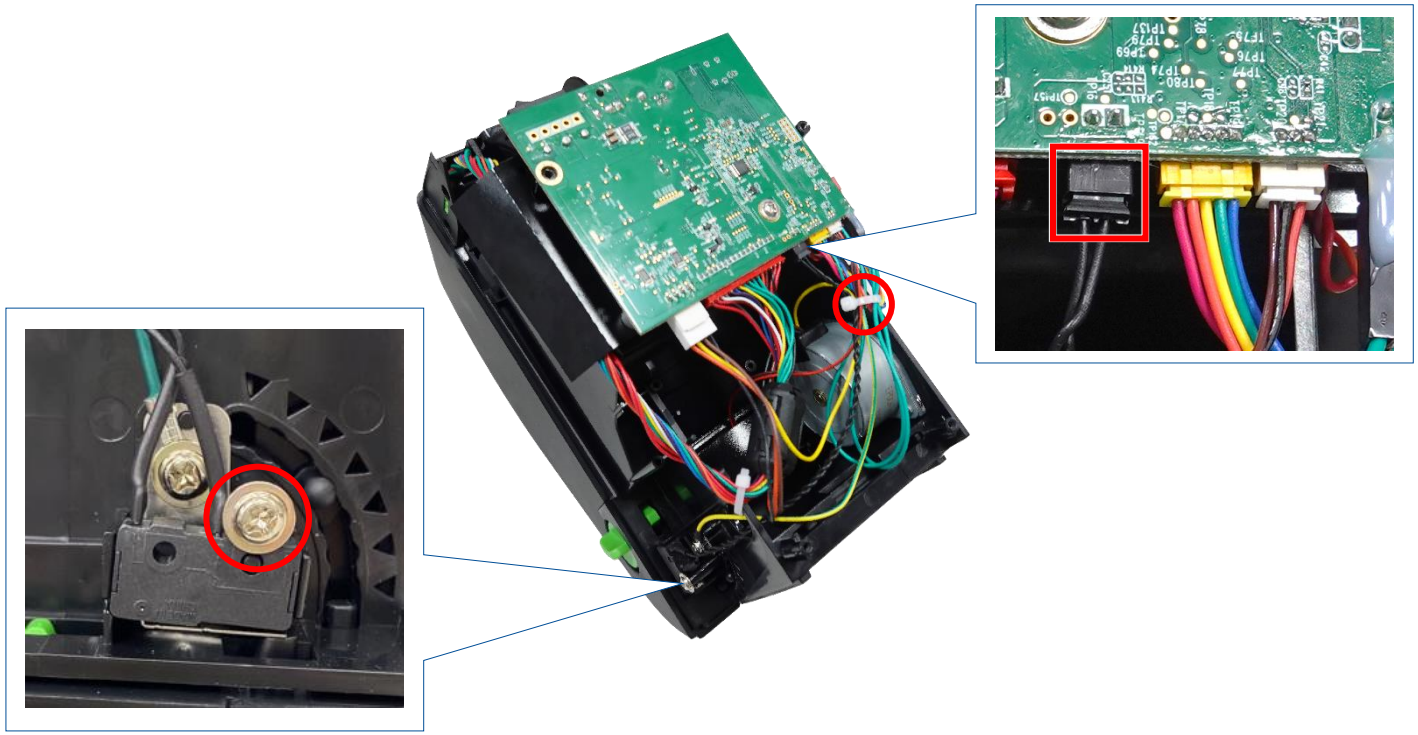
4. Disconnect the black mark sensor cable connector and remove one screw securing black mark sensor to the fixing plate.



5. Remove/ Replace the black mark sensor. Reverse the steps of the removal procedure.

3.11 Replacing the Head Open Sensor

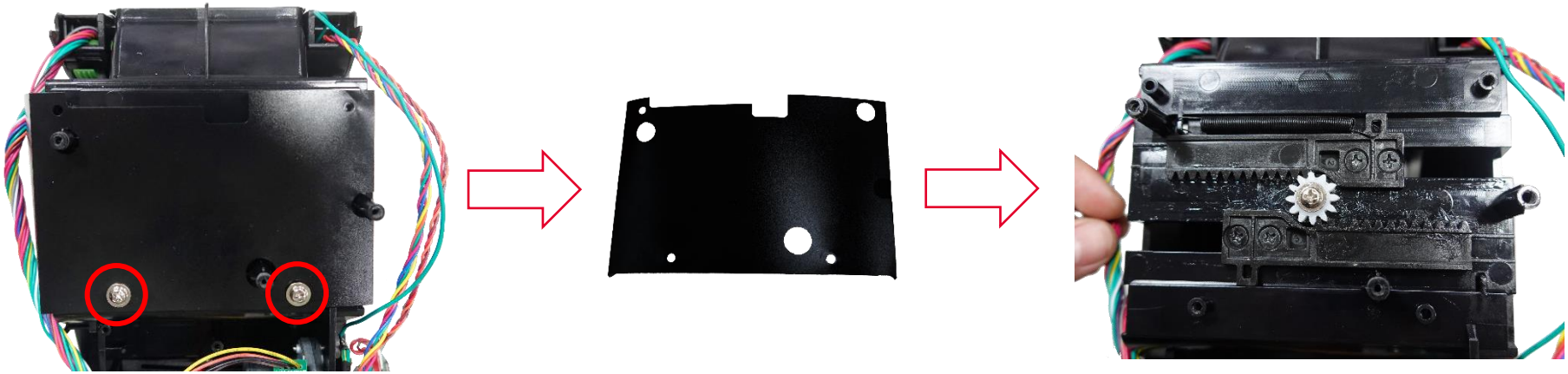
1. Follow the steps in Before You Begin to prepare the printer.
2. Refer to Replacing the Lower Cover to remove the printer lower cover.
3. Remove one screw securing head open sensor to the printer frame. Refer to the Replacing the Main Board to disconnect the head open sensor cable connector from main board. Remove cable tie as shown.



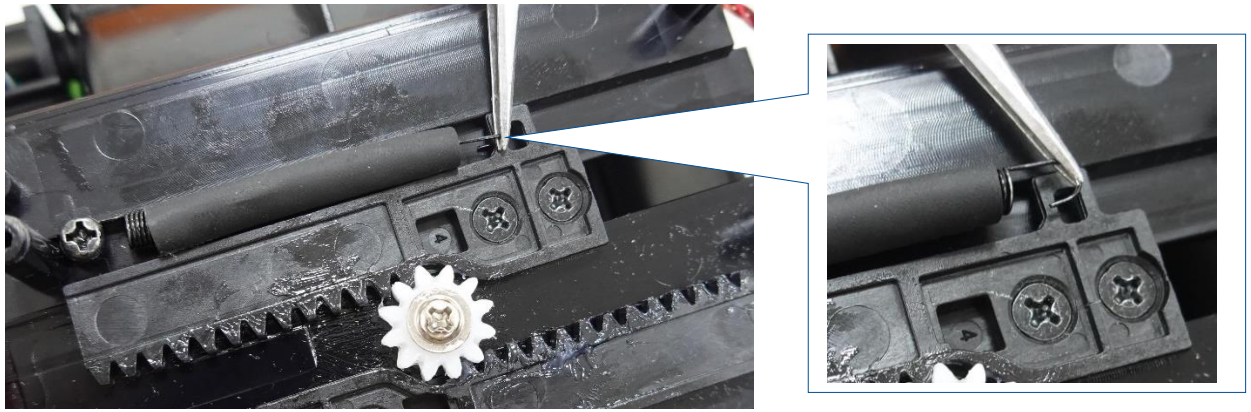
4. Remove/ Replace the head open sensor. Reverse the steps of the removal procedure.

3.12 Replacing the Media Holder

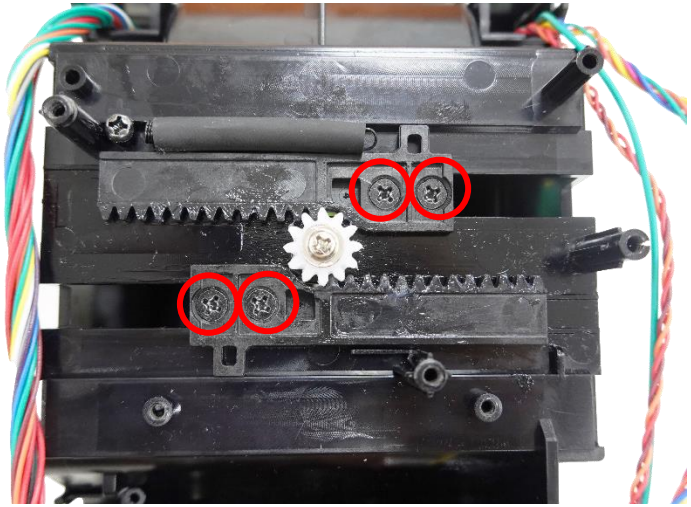
1. Follow the steps in Before You Begin to prepare the printer.
2. Refer to Replacing the Main Board to remove the main board.
3. Remove two screws to remove the mylar.



4. Use a tool to release the spring as shown below.



5. Remove the four screws securing the media holders in place and then replace the media holders. Reverse the steps of the removal procedure.

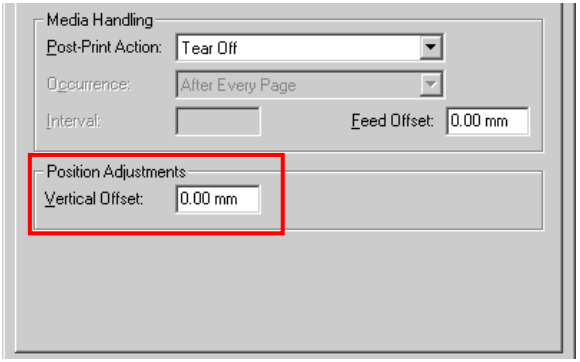


4 Troubleshooting

4.1 Common Problems

Problem	Possible Cause	Recovery Procedure
Power indicator does not illuminate	The power cord is not properly connected.	• Plug the power cord in printer and outlet. • Switch the printer on.
LED turn on (Carriage Open)	The printer head is open.	Please close the print carriages.
Not Printing	• Check if interface cable is well connected to the interface connector. • The port specified in the Windows driver is not correct.	• Re-connect cable to interface or change a new cable. • Select the correct printer port in the driver. • Print head's harness connector is not well connected with printhead. Turn off the printer and plug the connector again. • Check your program if there is a command PRINT at the end of the file and there must have CRLF at the end of each command line.
No Paper	• Running out of label. • The label is installed incorrectly. • Gap/black mark sensor is not calibrated.	• Supply a new label roll. • Reinstall the label roll. • Calibrate the gap/black mark sensor.
Paper jam	• Gap/black mark sensor is not set properly. • Make sure label size is set properly.	• Calibrate the media sensor. • Set media size correctly.

Problem	Possible Cause	Recovery Procedure
	• Labels may be stuck inside the printer mechanism.	• Remove the stuck label inside the printer mechanism.
Can’t downloading the file to memory (FLASH / CARD)	The space of memory is full.	Delete unused files in the memory.
Poor Print Quality	• Media is loaded incorrectly. • Dust or adhesive accumulation on the print head. • Print density is not set properly. • Print head element is damaged. • The print head pressure is not set properly.	• Reload the supply. • Clean the print head. • Clean the platen roller. • Adjust the print density and print speed. • Run printer self-test and check the print head test pattern if there is dot missing in the pattern. • The release lever does not latch the print head properly.
Missing printing on the left or right side of label	Wrong label size setup.	Set the correct label size.
Gray line on the blank label	• The print head is dirty. • The platen roller is dirty.	• Clean the print head. • Clean the platen roller.
Irregular printing	• The printer is in Hex Dump mode.	• Turn off and on the printer to skip the dump mode.
Label feeding is not stable (skew) when printing	The media guides do not touch the edge of the media.	• If the label is moving to the right side, please move the label guide to left.

Problem	Possible Cause	Recovery Procedure
		• If the label is moving to the left side, please move the label guide to right.
Skip labels when printing	• Label size is not specified properly. • Sensor sensitivity is not set properly. • The media sensor is covered with dust.	• Check if label size is setup correctly. • Calibrate the sensor by Auto Gap or Manual Gap options. • Clear the GAP/Black mark sensor by blower.
The left side printout position is incorrect	• Wrong label size setup. • The parameter Shift X in printer is incorrect.	Set the correct label size.
The printing position of small label is incorrect	• Media sensor sensitivity is not set properly. • Label size is incorrect. • The parameter Shift Y is incorrect. • The vertical offset setting in the driver is incorrect.	• Calibrate the sensor sensitivity again. • Set the correct label size and gap size. • Via TSC Console to fine tune the parameter of Shift Y. • If using the software BarTender, please set the vertical offset in the driver. 

5 Maintenance

This session presents the clean tools and methods to maintain the printer.

- **For Cleaning**

  Depending on the media used, the printer may accumulate residues (media dust, adhesives, etc.) as a by-product of normal printing. To maintain the best printing quality, you should remove these residues by cleaning the printer periodically. Regularly clean the print head and supply sensors once change a new media to keep the printer at the optimized performance and extend printer life.

- **For Disinfecting**

  Sanitize your printer to protect yourself and others and can help prevent the spread of viruses.

- **Important**
  - Set the printer power switch to O (Off) prior to performing any cleaning or disinfecting tasks. Leave the power cord connected to keep the printer grounded and to reduce the risk of electrostatic damage.
  - Do not wear rings or other metallic objects while cleaning any interior area of the printer.
  - Use only the cleaning agents recommended in this document. Use of other agents may damage the printer and void its warranty.
  - Do not spray or drip liquid cleaning solutions directly into the printer. Apply the solution on a clean lint-free cloth and then apply the dampened cloth to the printer.
  - Do not use canned air in the interior of the printer as it can blow dust and debris onto sensors and other critical components.
  - Only use a vacuum cleaner with a nozzle and hose that are conductive and grounded to drain off static build up.
  - All reference in these procedures for use of isopropyl alcohol requires that a 99% or greater isopropyl alcohol content be used to reduce the risk of moisture corrosion to the printhead.
  - Do not touch printhead by hand. If you touch it careless, please use 99% Isopropyl alcohol to clean it.

- Always taking personal precaution when using any cleaning agent.

Cleaning Tools:

- Cotton swab
- Lint-free cloth
- Brush with soft non-metallic bristles
- Vacuum cleaner
- 75% Ethanol (for disinfecting)
- 99% Isopropyl alcohol (for printhead and platen roller cleaning)
- Genuine printhead cleaning pen
- Mild detergent (without chlorine)

Cleaning Process:

Printer Part	Method	Interval
Print Head	I. Always turn off the printer before cleaning the printhead. II. Allow the printhead to cool for at least one minute. III. Use a cotton swab and 99% Isopropyl Alcohol or genuine print head cleaning pen to clean the print head surface.	Clean the print head when changing a new label roll.
Platen Roller	I. Turn off the printer. II. Rotate the platen roller and wipe it thoroughly with the lint-free 99% Isopropyl Alcohol.	Clean the platen roller when changing a new label roll
Peel Bar	Use the lint-free cloth with 99% Isopropyl Alcohol to wipe it.	As needed

Printer Part	Method	Interval
Sensor	Use brush with soft non-metallic bristles or a vacuum cleaner, to remove paper dust. Clean upper and lower media sensors to ensure reliable Top of Form and Paper Out sensing.	Monthly
Exterior	Clean the exterior surfaces with a clean, lint-free cloth (water-dampened cloth). If necessary, use a mild detergent or desktop cleaning solution then use the 75% Ethanol to wipe it.	As needed
Interior	Clean the interior of the printer by removing any dirt and lint with a vacuum cleaner, as described above, or use a brush with soft non-metallic bristles then use the 75% Ethanol to wipe it.	As needed

Revise History

Date	Content	Editor
2023/12/8	First release	Camille

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