Desktop Barcode Printer

DA210 Series

Direct Thermal

Series Models

DA210 / DA310

DA220 / DA320

DA220HC / DA320HC

Service Manual

www.tscprinters.com

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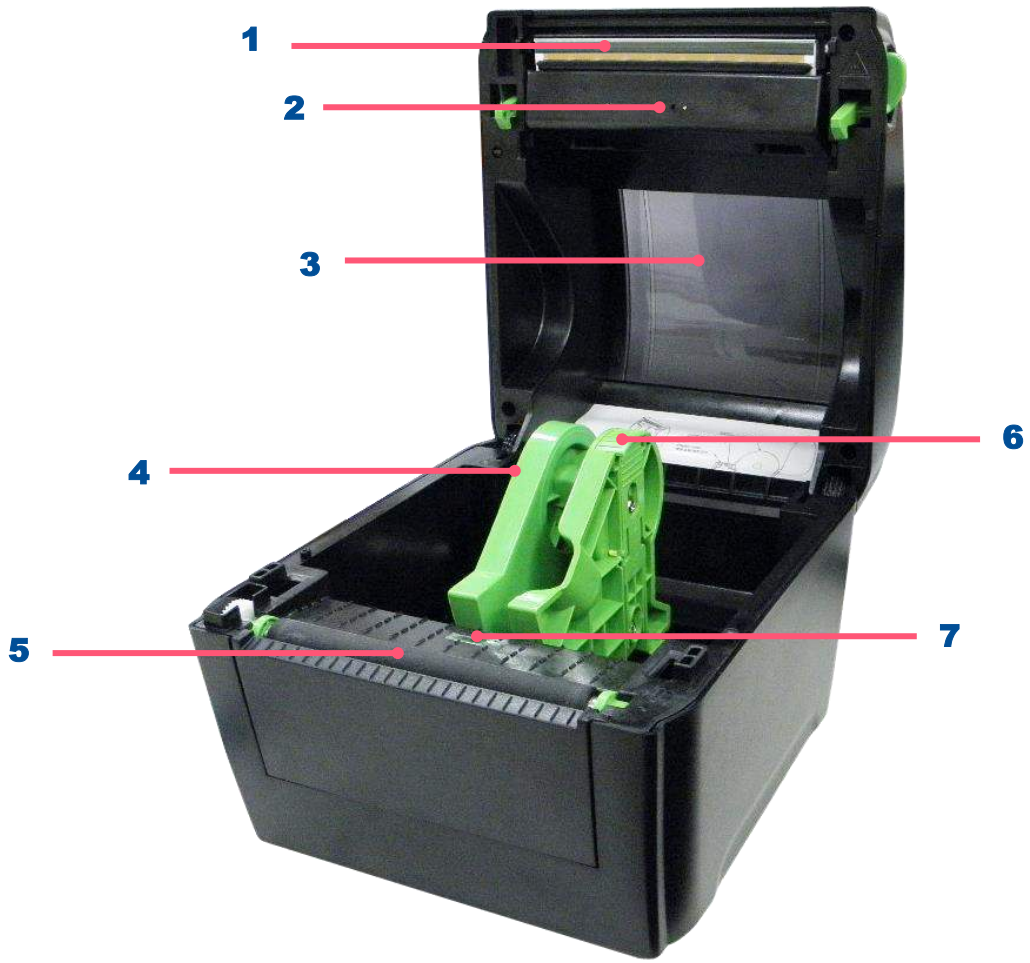
1. Fundamental of the System

1.1 Printer Overview

Front View

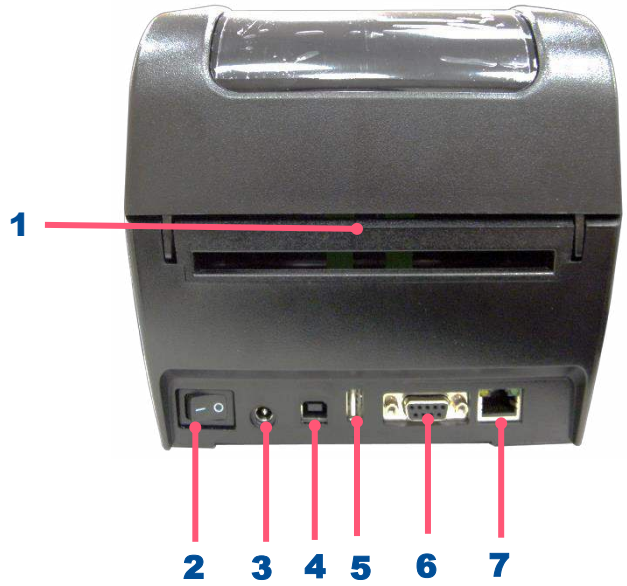
1. Top cover open lever
2. LED indicators
3. Feed/Pause button

Interior View



1. Print head
2. Gap sensor (transmitter)
3. Media viewer
4. Media holder
5. Platen roller
6. Media holder lock switch
7. Black mark sensor/ Gap sensor (receiver)

Rear View



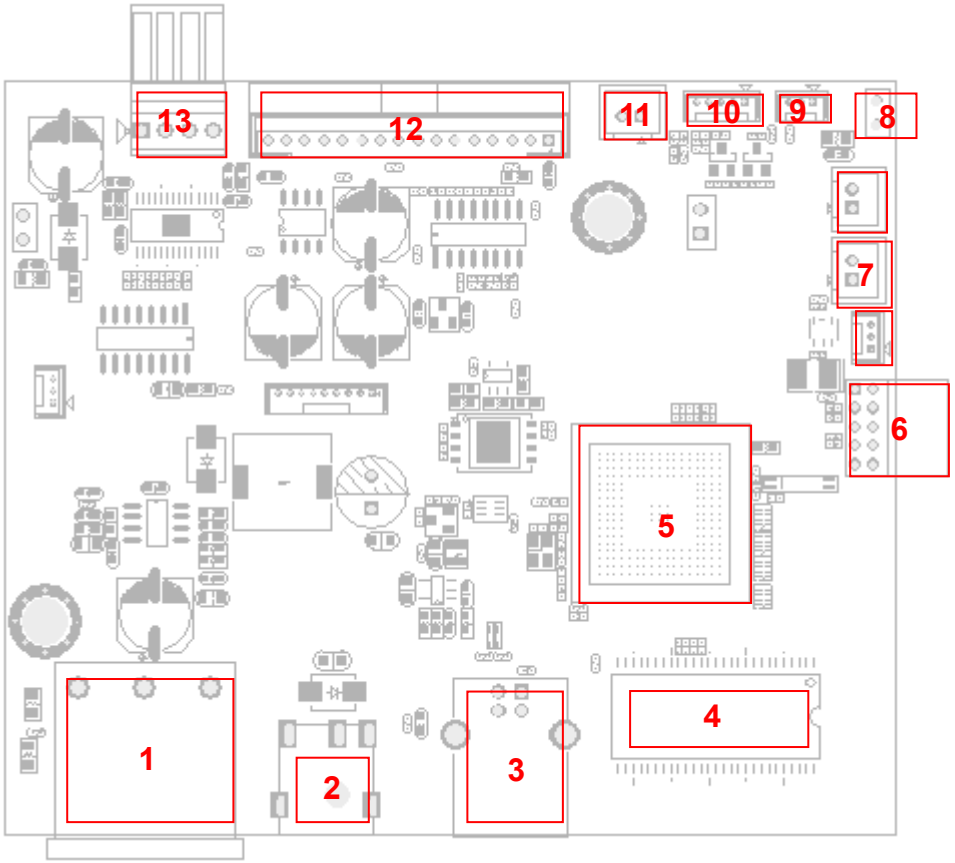
1. External label entrance chute
2. Power switch
3. Power jack socket
4. USB interface
5. USB host (For DA220 series)
6. RS-232 interface (For DA220 series)
7. Ethernet interface (For DA220 series)

Note: The interface picture here is for reference only. Please refer to the product specification for the interfaces availability.

2. Electronics

2.1 Summary of the Board Connectors

For DA210 Series



<table>
<tr><th>Connector</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 connector</td></tr>
<tr><td>4</td><td>SDRAM</td></tr>
<tr><td>5</td><td>MCU</td></tr>
<tr><td>6</td><td>BT connector</td></tr>
<tr><td>7</td><td>Gap sensor emit connector
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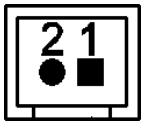
<tr><td> 
</td><th>Pin</th><th>Description</th><th>Voltage</th></tr>
<tr><td></td><td>1</td><td>Power</td><td>3.3V</td></tr>
<tr><td></td><td>2</td><td>Gap sensor emitter</td><td>Emitter on : 2.1~2.3V
Emitter off: 2.6~2.8V</td></tr>
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<tr><td>8</td><td>ESD_GND_PIN
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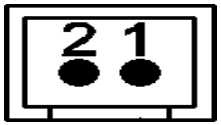
<tr><td> 
</td><th>Pin</th><th>Description</th><th>Voltage</th></tr>
<tr><td></td><td>1</td><td>GND</td><td>0V</td></tr>
<tr><td></td><td>2</td><td>GND</td><td>0V</td></tr>
</table></td></tr>
<tr><td>9</td><td>BM sensor connector
<table>
<tr><td>
</td><th>Pin</th><th>Description</th><th>Voltage</th></tr>
<tr><td></td><td>1</td><td>Power</td><td>3.3V</td></tr>
<tr><td></td><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></td><td>3</td><td>BM sensor receiver</td><td>A/D : 0~3.3V</td></tr>
</table></td></tr>
<tr><td>10</td><td>Key& LED connector</td></tr>
</table>

<table>
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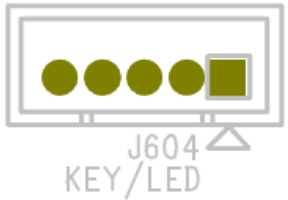

<table>
<tr><th>Pin</th><th>Description</th><th>Voltage</th></tr>
<tr><td>1</td><td>POWER</td><td>3.3V</td></tr>
<tr><td>2</td><td>LED Green</td><td>LED light on:1.1~1.4V
LED light off:1.6~1.9V</td></tr>
<tr><td>3</td><td>LED Red</td><td>LED light on:1.4~1.7V
LED light off:1.8~2.1V</td></tr>
<tr><td>4</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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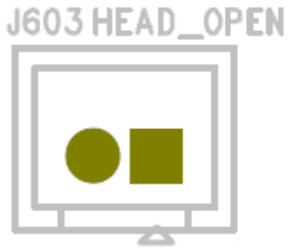
</td></tr>
<tr><td rowspan="2">11</td><td>Head open sensor connector</td></tr>
<tr><td>


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<tr><th>Pin</th><th>Description</th><th>Voltage</th></tr>
<tr><td>1</td><td>Head open switch</td><td>0V : Head close
3.3V : Head open</td></tr>
<tr><td>2</td><td>GND</td><td>0V</td></tr>
</table>
</td></tr>
<tr><td>12</td><td>TPH connector</td></tr>
<tr><td>13</td><td>Step motor connector</td></tr>
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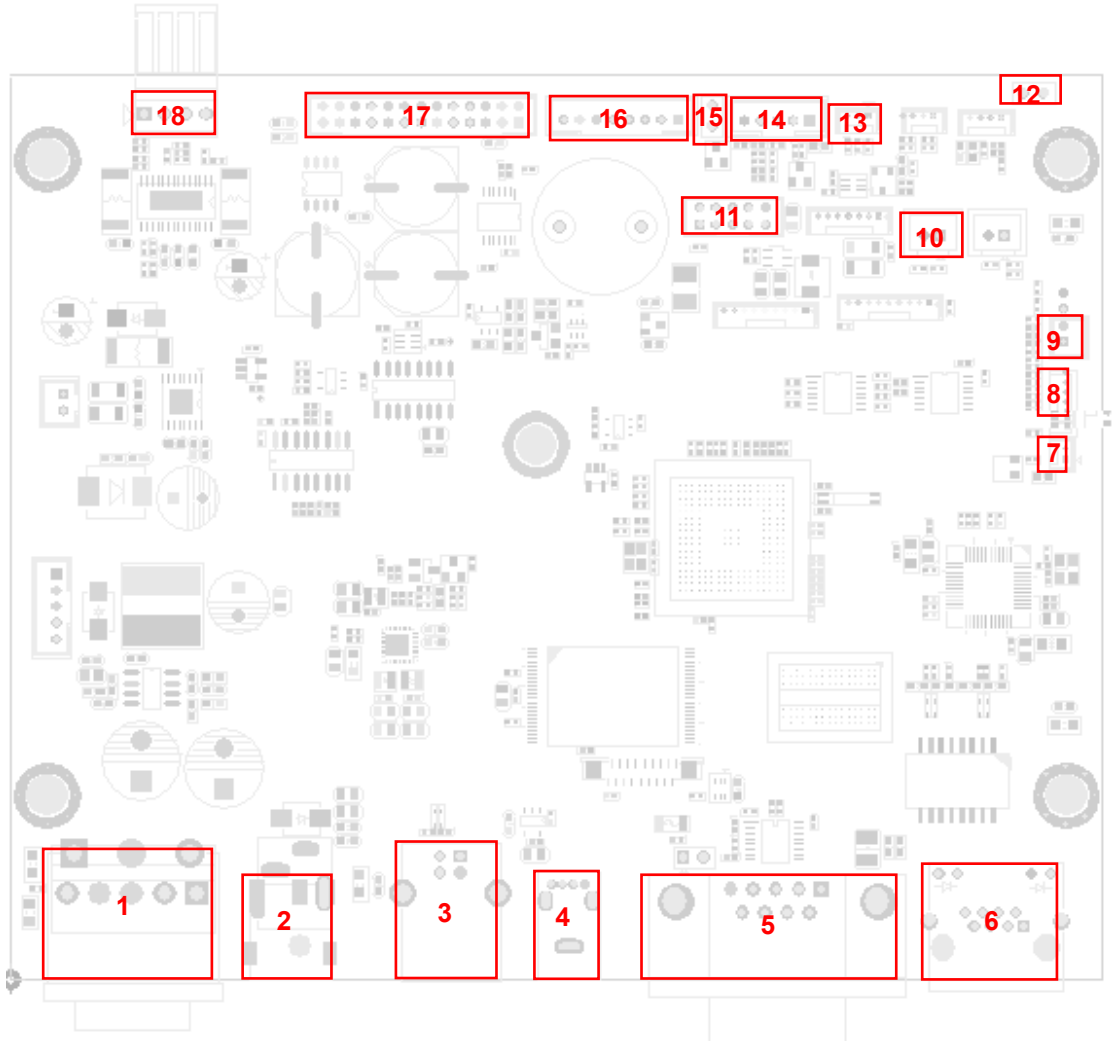
For DA220 series



<table>
<tr><th>Connector</th><th>Description</th><th>Remark</th></tr>
<tr><td>1</td><td>Power switch connector</td><td>SW1</td></tr>
<tr><td>2</td><td>Power supply (24V DC) connector</td><td>DCIN1</td></tr>
<tr><td>3</td><td>USB Device connector</td><td>USB1</td></tr>
<tr><td>4</td><td>USB Host connector</td><td>USB2</td></tr>
<tr><td>5</td><td>RS-232C connector</td><td>RS1</td></tr>
<tr><td>6</td><td>Ethernet connector</td><td>LAN1</td></tr>
<tr><td>7</td><td>RTC battery connector</td><td>BT1</td></tr>
<tr><td rowspan="2">8</td><td>LED & KEY connector</td><td>CON19</td></tr>
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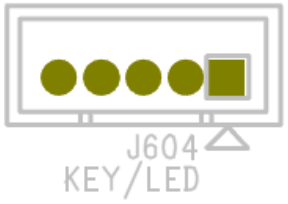

<table>
<tr><th>Pin</th><th>Description</th><th>Voltage</th></tr>
<tr><td>1</td><td>POWER</td><td>3.3V</td></tr>
<tr><td>2</td><td>LED Green</td><td>LED light on:1.1~1.4V
LED light off:1.6~1.9V</td></tr>
<tr><td>3</td><td>LED Red</td><td>LED light on:1.4~1.7V
LED light off:1.8~2.1V</td></tr>
<tr><td>4</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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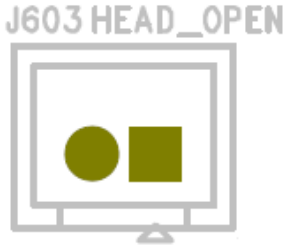

<table>
<tr><th>Pin</th><th>Description</th><th>Voltage</th></tr>
<tr><td>1</td><td>Head open switch</td><td>0V : Head close
3.3V : Head open</td></tr>
<tr><td>2</td><td>GND</td><td>0V</td></tr>
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<tr><td>10</td><td>GAP sensor connector (for Transmit signals)</td><td>CON20</td></tr>
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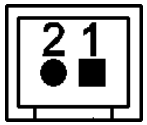

<table>
<tr><th>Pin</th><th>Description</th><th>Voltage</th></tr>
<tr><td>1</td><td>Power</td><td>3.3V</td></tr>
<tr><td>2</td><td>Gap sensor emitter</td><td>Emitter on : 2.1~2.3V
Emitter off: 2.6~2.8V</td></tr>
</table>
</td></tr>
<tr><td>11</td><td>Wi-Fi / Bluetooth connector
CON13</td></tr>
<tr><td rowspan="2">12</td><td>ESD_GND_PIN
JP1</td></tr>
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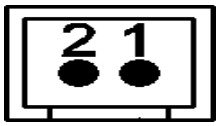

<table>
<tr><th>Pin</th><th>Description</th><th>Voltage</th></tr>
<tr><td>1</td><td>GND</td><td>0V</td></tr>
<tr><td>2</td><td>GND</td><td>0V</td></tr>
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<tr><td rowspan="2">13</td><td>BM sensor connector
CON21</td></tr>
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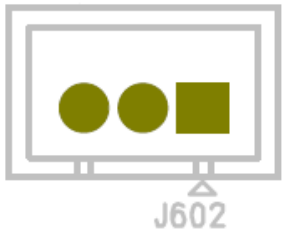

<table>
<tr><th>Pin</th><th>Description</th><th>Voltage</th></tr>
<tr><td>1</td><td>Power</td><td>3.3V</td></tr>
<tr><td>2</td><td>BM sensor emitter</td><td>2.1~2.2V: Emitter on
2.6~2.7V: Emitter off</td></tr>
<tr><td>3</td><td>BM sensor receiver</td><td>A/D : 0~3.3V</td></tr>
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<tr><td rowspan="2">14</td><td>PEEL sensor connector
CON10</td></tr>
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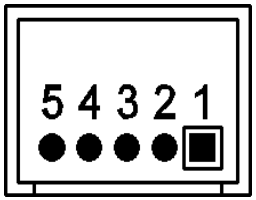

<table>
<tr><th>Pin</th><th>Description</th><th>Voltage</th></tr>
<tr><td>1</td><td>Power</td><td>3.3V</td></tr>
<tr><td>2</td><td>Reserved</td><td></td></tr>
<tr><td>3</td><td>Peel sensor emitter</td><td>Emitter on : 2.1~2.3V
Emitter off: 2.6~2.8V</td></tr>
<tr><td>4</td><td>Peel sensor receiver AD</td><td>0~3.3V</td></tr>
<tr><td>5</td><td>GND</td><td>0V</td></tr>
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JP2</td></tr>
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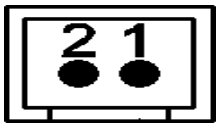

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<tr><td>16</td><td>Cutter connector
CON6</td></tr>
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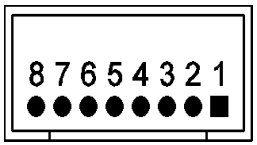

<table>
<tr><th>Pin</th><th>Description</th><th>Voltage</th></tr>
<tr><td>1</td><td>Cutter power</td><td>24V</td></tr>
<tr><td>2</td><td>GND</td><td>0V</td></tr>
<tr><td>3</td><td>Cutter direction</td><td>0V: Cutter positive cut
5V: Cutter negative cut</td></tr>
<tr><td>4</td><td>Cutter enable</td><td>0V: Cutter work
5V: Cutter stop</td></tr>
<tr><td>5</td><td>Cutter position sensor switch</td><td>0V: Cutter stop
3.3V: Cutter work</td></tr>
<tr><td>6</td><td>GND</td><td>0V</td></tr>
<tr><td>7</td><td>Logic power</td><td>5V</td></tr>
<tr><td>8</td><td>Reserved</td><td></td></tr>
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</td></tr>
<tr><td>17</td><td>Print head connector</td><td>CON24</td></tr>
<tr><td>18</td><td>STEP_MOTOR connector</td><td>CON16</td></tr>
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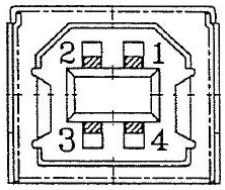
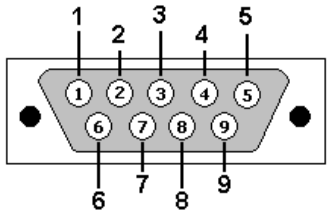
Pin Configuration

USB Device



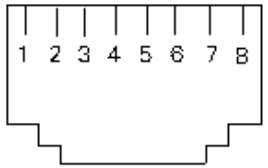
PIN	CONFIGURATION
1	N/C
2	D-
3	D+
4	GND

RS-232C (For DA220 series)



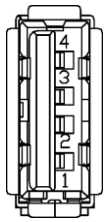
PIN	CONFIGURATION
1	+5 V
2	TXD
3	RXD
4	CTS
5	GND
6	RTS
7	N/C
8	RTS
9	N/C

Ethernet (For DA220 series)



PIN	CONFIGURATION
1	Tx+
2	Tx-
3	Rx+
4	N/C
5	N/C
6	Rx-
7	N/C
8	N/C

USB Host (For DA220 series)



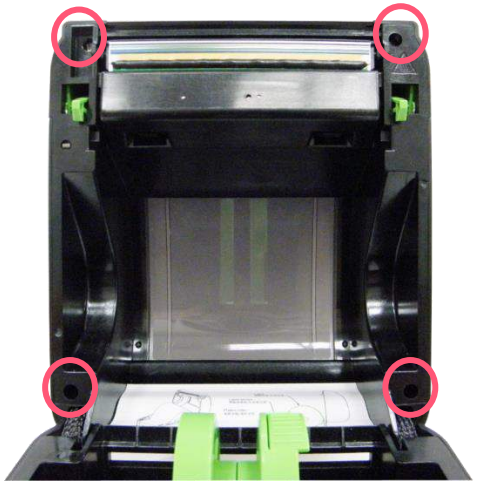
PIN	CONFIGURATION
1	5V
2	D-
3	D+
4	GND

3. Mechanism

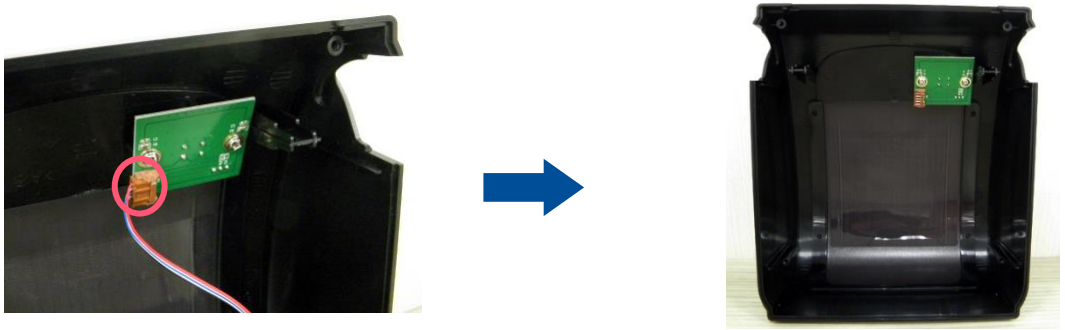
Please turn off the power and unplug the power adapter before replacing parts.

3.1 Replacing the Top Cover Assembly

1. Open the printer top cover then unscrew the 4 screws as shown.



2. Disconnect the connector on key pad assembly.

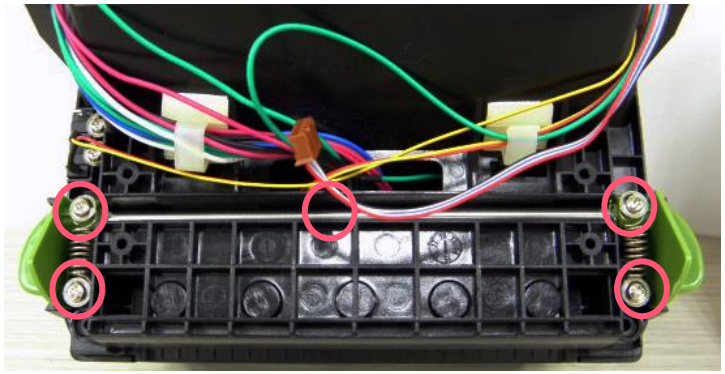


3. Reassemble the parts in the reverse procedure.

3.2 Replacing the Top Cover Open Lever

1. Refer to section 3.1 to remove the printer engine

2. Remove four screws on as picture shown on the levers.
3. Take out two springs.
4. Remove/Replace the top cover open lever assembly.

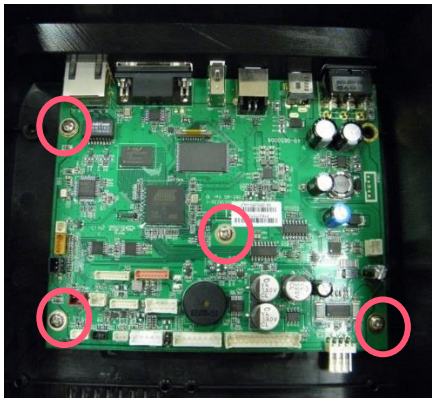


5. Reassemble the parts in the reverse procedure.

3.3 Replacing the Main Board Assembly

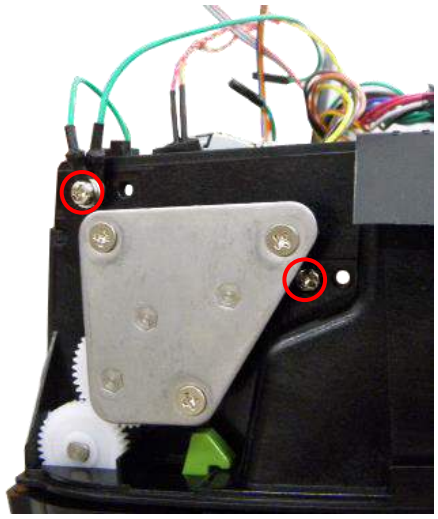
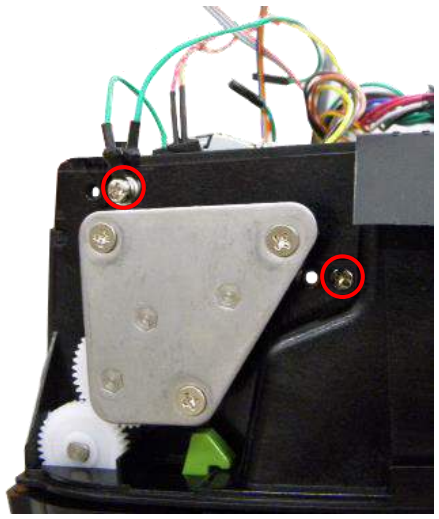
1. Remove 4 screws on the printer lower cover.
2. Turn the print engine mechanism upside down and the stepping motor is installed below as indicated.

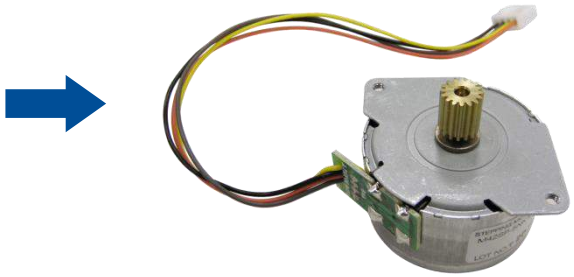
3. Disconnect all connectors on the main board.
   For DA210 series, remove one screw to replace the main board assembly.
   For DA220 series, remove four screws to replace the main board assembly.

DA210/DA310 series	DA220/DA320 series
	

3.4 Replacing the Stepping Motor Module

1. Please refer to the section 3.3 to remove the lower cover.
2. Remove 2 screws as shown to replace the stepping motor.

DA210/ DA220 (203 dpi)	DA310/ DA320 (300 dpi)
	

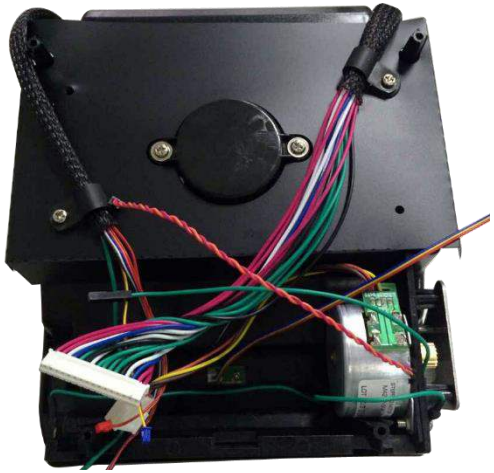


Please note that the screwed positions of 203 dpi and 300 dpi are different.
(The gear driver system of 203 dpi and 300 dpi is different.)

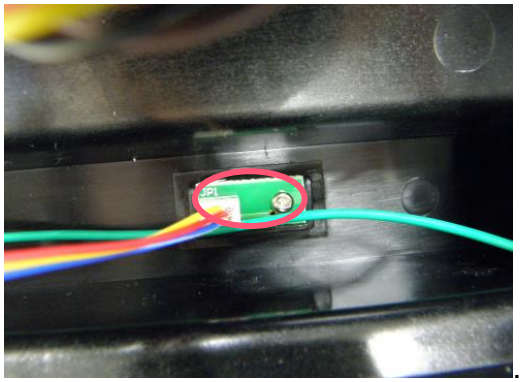
3. Reassemble the parts in the reverse procedure.

3.5 Replacing the Black Mark Sensor Module

1. Please refer to the section 3.3 to remove the lower cover.



2. Remove the screw and connector to replace the black-mark sensor board.

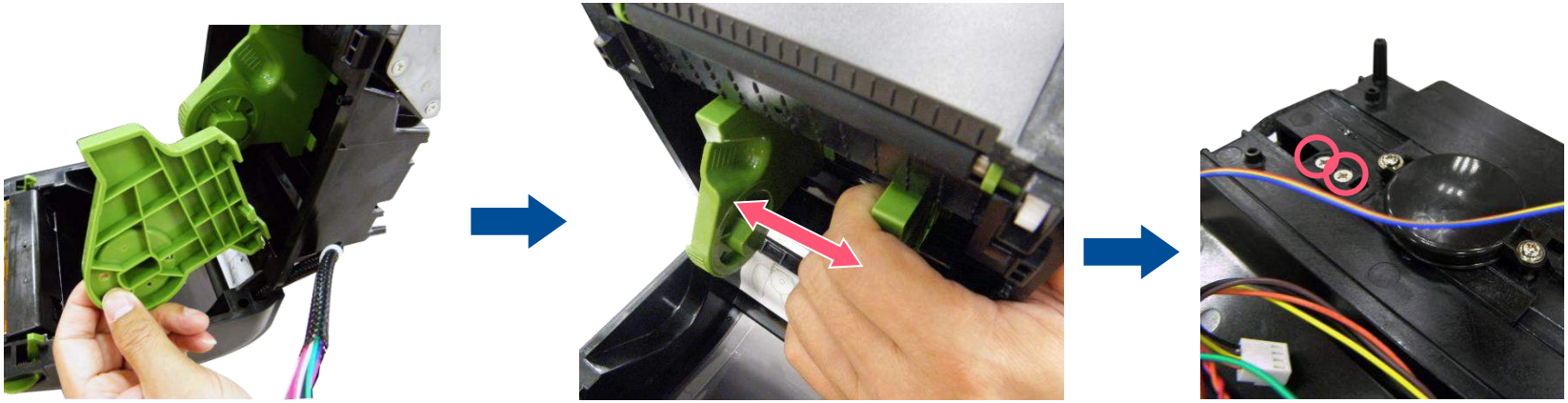


3. Reassemble the parts in the reverse procedure.

3.6 Replacing the Media Holder Assembly

1. Please refer to the section 3.3 to remove the lower cover.
2. Remove 2 screws to take off the black mylar.
3. Separate the media holders to the remove 2 screws on one side of media holder.

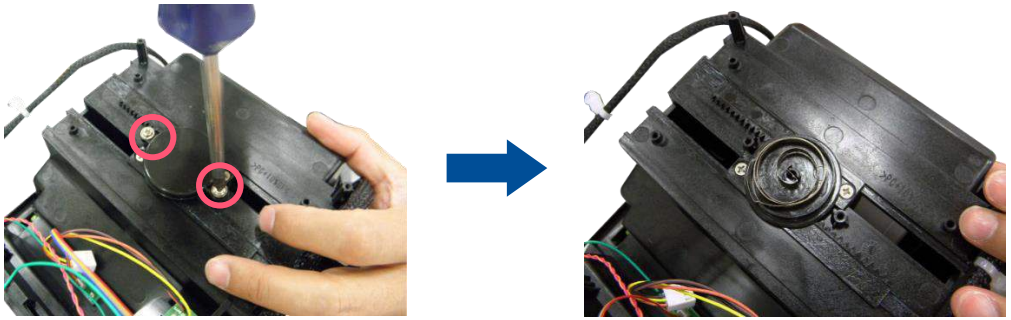
4. Replace one side of media holder.
5. use the same steps to replace another side for replacing media holder assembly.



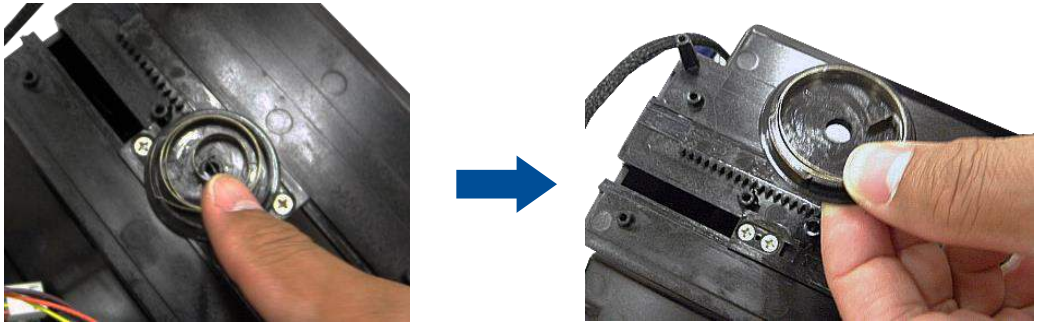
6. Reassemble the parts in the reverse procedure.

3.7 Replacing the Media Holder Base Assembly

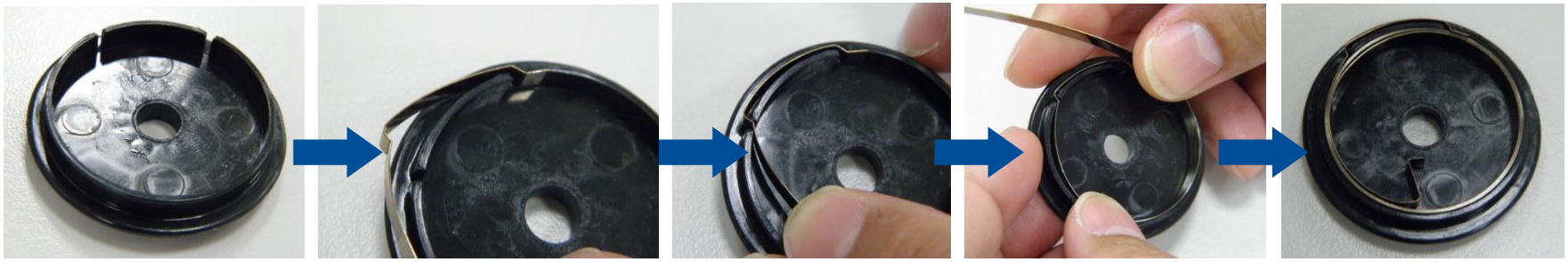
1. Please refer to the section 3.6 to remove the lower cover and black mylar.
2. Remove two screws to take off the upper circle cover as shown.



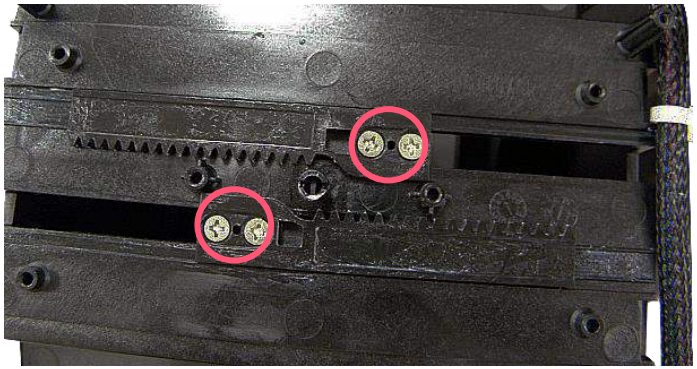
3. Press the spiral sprint then take off lower circle cover. The spiral spring will be loosed in the cover.



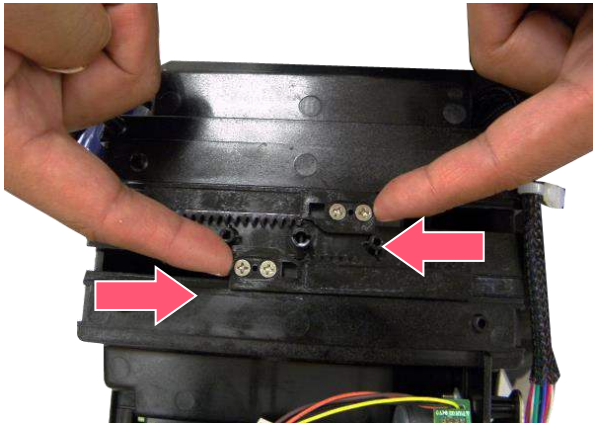
4. If the spiral spring be loosed from the cover, please install it back as shown below,



5. Remove four screws to replace the media holder base assembly.



6. Push the media holder base assembly to the end for installing the spiral sprint assembly back.



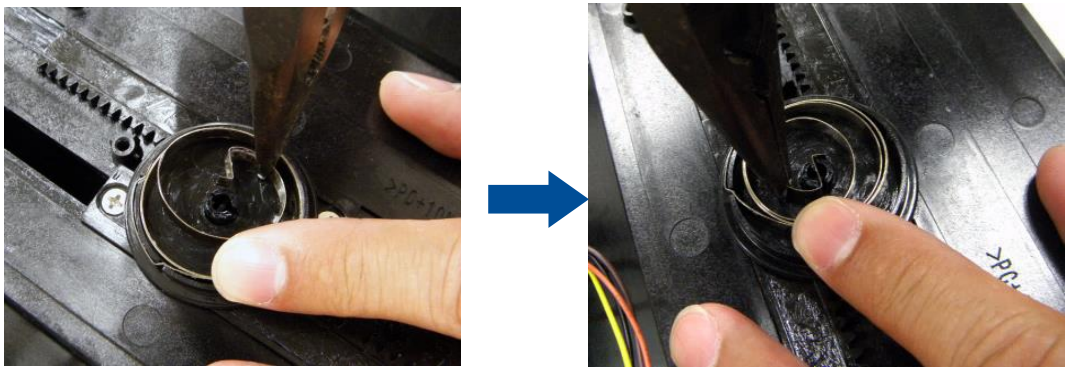
7. Install the lower cover that including spiral sprint.

8. Please make sure the lower cover has been installed into the media holder base.

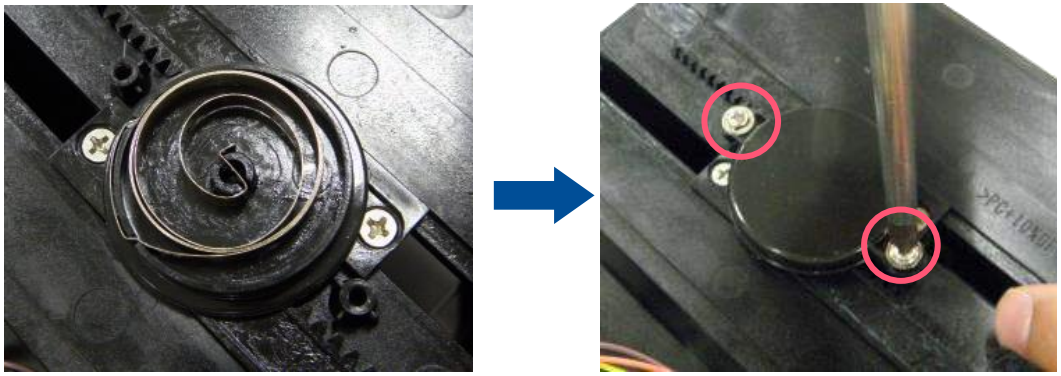
O

X

9. Use needle-nose pliers to install the spiral spring back.



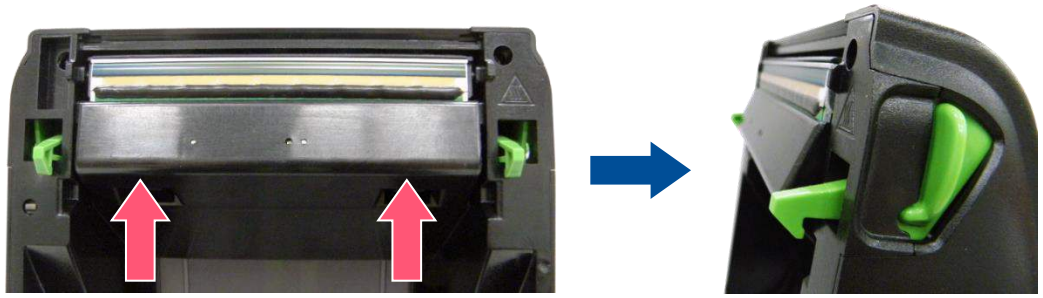
10. Screw two screws to replace the upper cover of spiral spring assembly. Reassemble the parts in the reverse procedure.



11. Reassemble the parts in the reverse procedures.

3.8 Replacing the Printhead Module

1. Press tabs of gap sensor cover to release from the printer. DO NOT let cover press the printhead module.

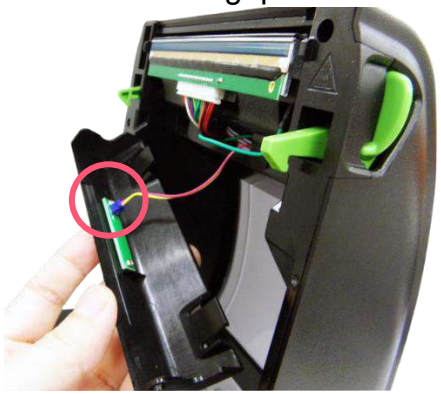


2. Drop down the cover as picture (O) shown. The cover CANNOT press the printhead module.

O

X

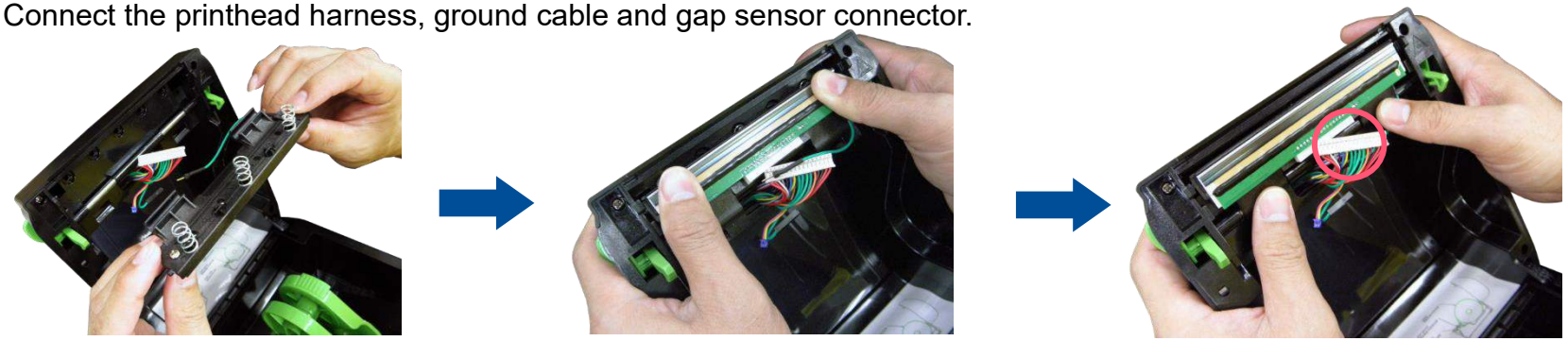
3. Disconnect the gap sensor connector to remove the cover.



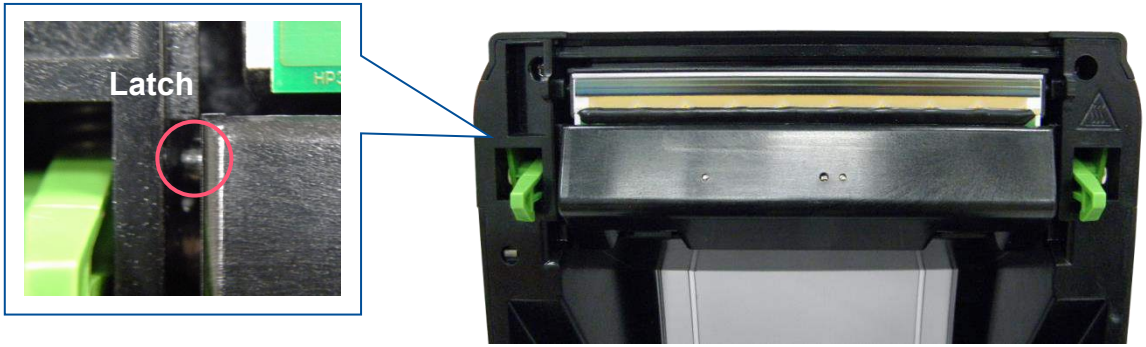
4. Disconnect the printhead harness and the ground cable connector.
5. Peel off the printhead module (with fixing cover). Please DON'T just peel the connector.

6. Press one side of the printhead module then drop down it to remove/replace it

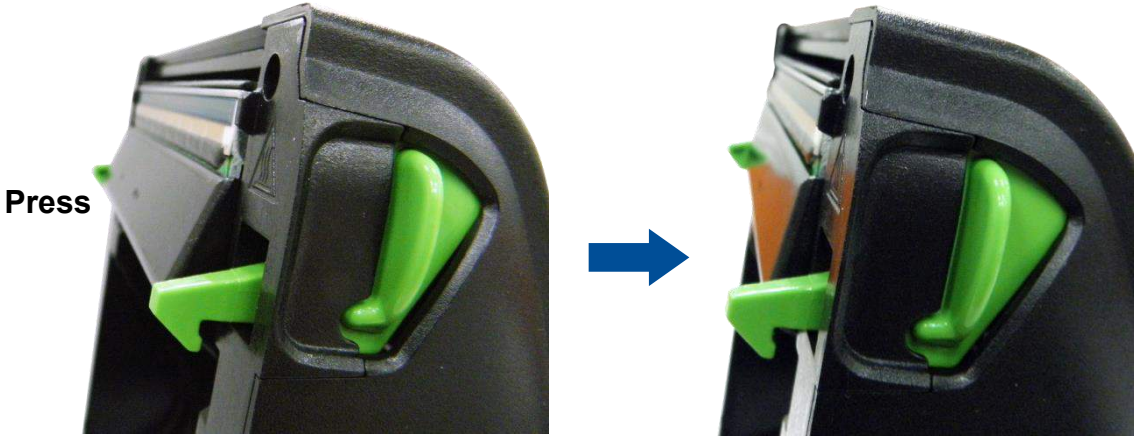
7. Install back three sprints onto the new printhead module.
8. Pressing both sides of printhead module let latches into the printer inner cover. Then lift up them, let latches into the socket.
9. Press down both tabs of printhead fixing cover into the printer inner cover.
10. Connect the printhead harness, ground cable and gap sensor connector.



11. Lift up both latches of gap sensor cover into the printer inner cover. (you can press the center of the printhead module for installing the cover easily) Please note that the gap sensor cover CANNOT press the printhead module.



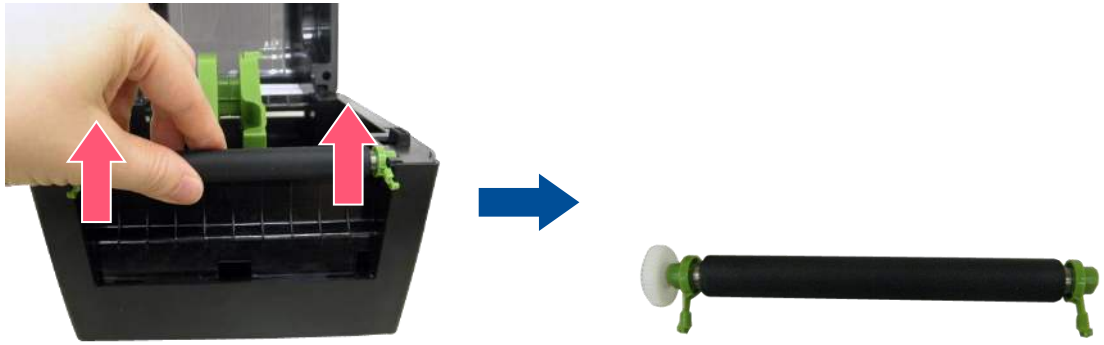
12. Press back the gap sensor cover tabs into the socket.



3.9 Replacing the Platen Roller Assembly

1. Open the printer top cover by pressing up the top cover open tabs located on each side of the printer.
2. Remove the lower front panel.
3. Disengage the platen holder tabs by pulling out the right side and left side tabs. Rotate the tabs into the forward position. (see picture below)

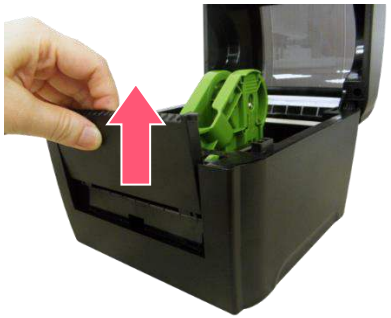
4. Take out the platen roller assembly.



5. Reassemble the parts in the reverse procedures.

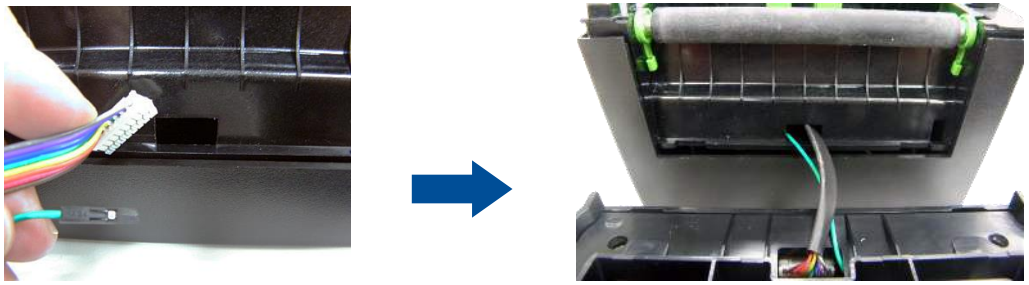
3.10 Cutter Module Installation (Option for DA220 Series)

1. Open the printer top cover by pressing up the top cover open tabs located on each side of the printer.
2. Remove the lower front panel.

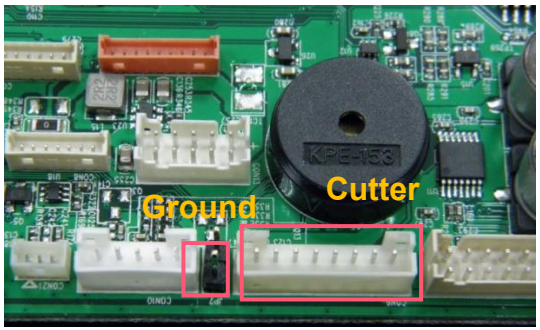


3. Remove four screws on the printer lower cover.

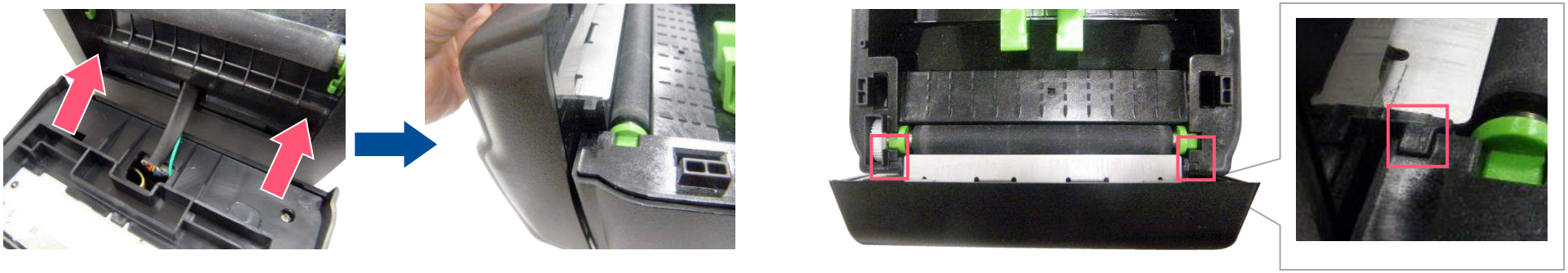
4. Thread the cutter module 8-pin harness and ground cable through the front slot of lower inner cover.



5. Connect the cutter module harness connector (8-pin white socket) and ground cable on the printer main board as shown.
6. Fasten four screws back on the printer lower cover.



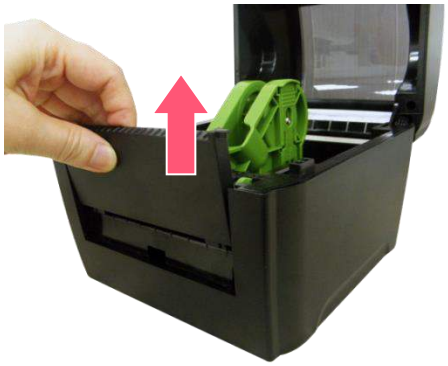
7. Place the cutter module into the both sides of notches on lower inner printer. Then push the cutter module to lock into the lower front printer. (see picture below)



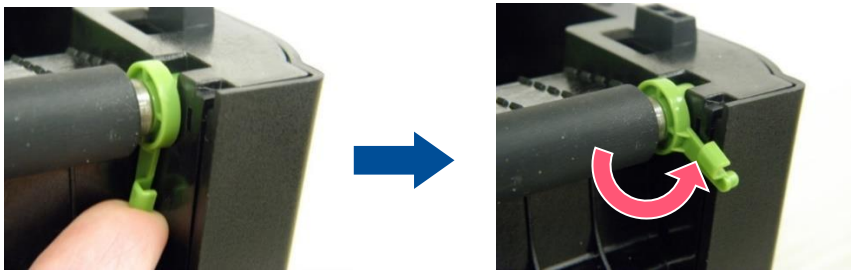
8. The cutter module is ready to use.

3.11 Linerless Cutter Module Installation

1. Open the printer top cover by pressing up the top cover open tabs located on each side of the printer. Remove the lower front panel.



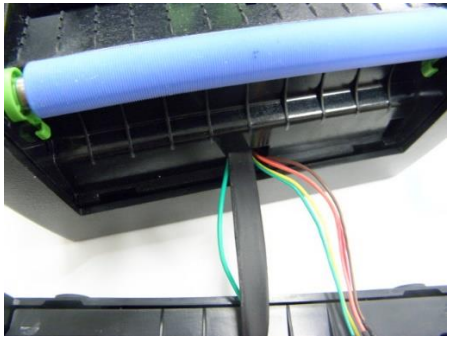
2. Disengage the platen holder tabs by pulling out the right side and left side tabs. Rotate the tabs into the forward position. (see picture below)



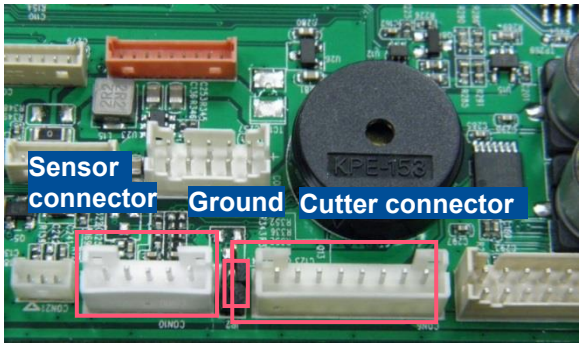
3. Take out the platen roller to install the linerless platen roller (blue).

4. Remove 4 screws on the printer lower cover.

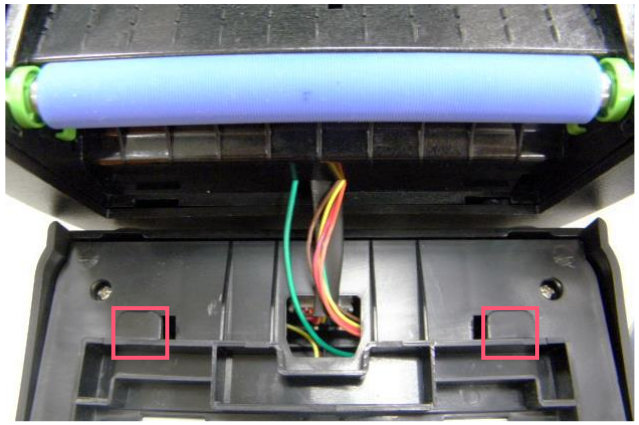
5. Thread the linerless cutter module 8-pin harness, sensor connector and ground cable through the front slot of lower inner cover.



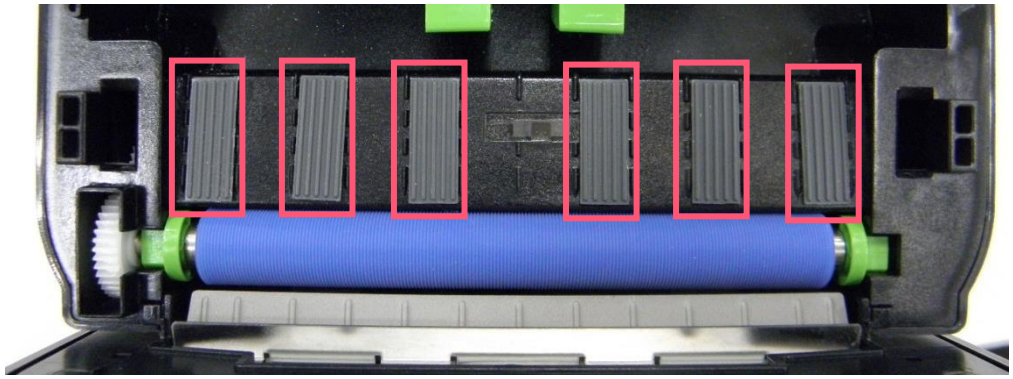
6. Connect the linerless cutter module harness connector (8-pin white socket), sensor connector & ground cable on the printer main board. Fasten 4 screws back on the printer lower cover.



7. Place the cutter module into the both sides of notches on lower inner printer. Then push the cutter module to lock into the lower front printer. (see picture below)



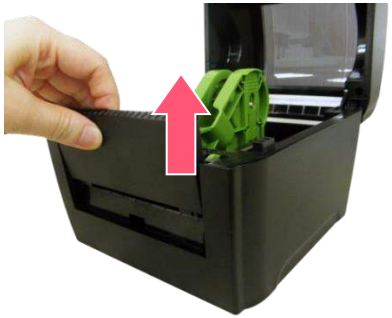
8. Apply 6 anti-sticky rubbers onto the printer inner cover above the linerless platen roller as shown.



9. Install the linerless front cover to the cutter. The linerless cutter module is ready to use.

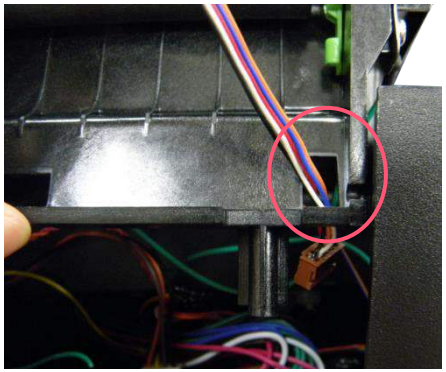
3.12 Peel-off Module Installation (Option for DA220 series)

1. Open the printer top cover by pressing up the top cover open tabs located on each side of the printer. Remove the lower front panel.

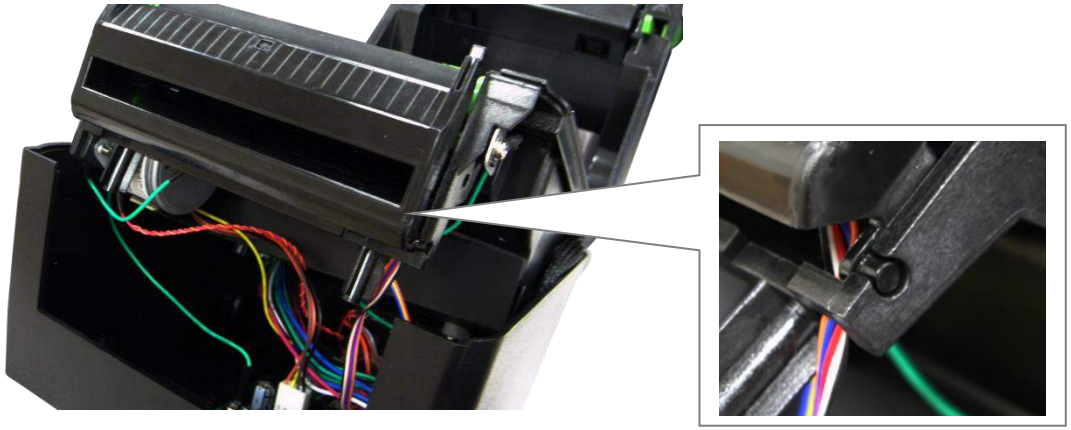


2. Remove four screws on the printer lower cover.

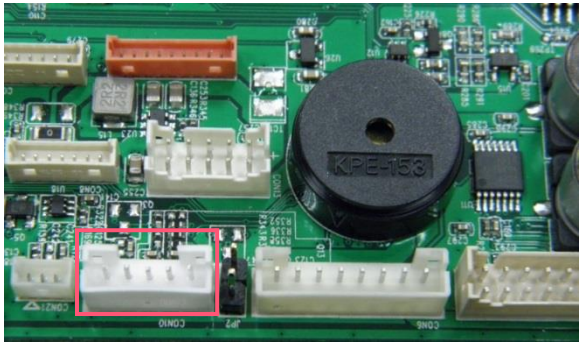
3. Thread the peel-off module 5-pin harness through the front slot of lower inner cover.



4. Embed the tenons into the both sides mortise of lower inner cover and close the peel-off cover.

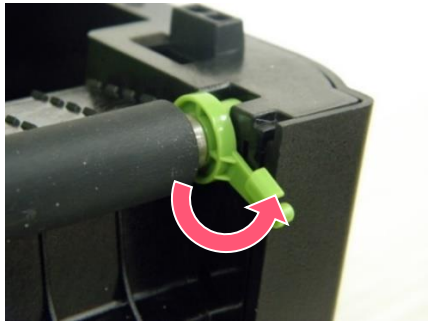


5. Connect the peel-off module harness connector to the 5-pin socket on the printer main board as shown.

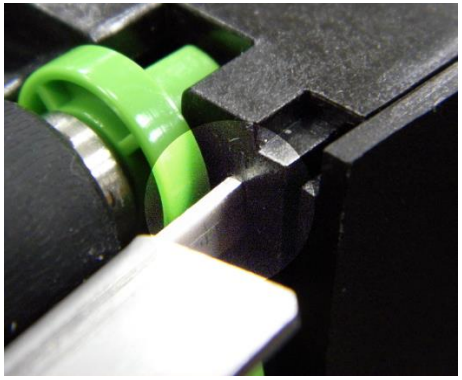


6. Fasten 4 screws back on the printer lower cover.

7. Open the peel-off cover. Disengage one of platen holder tab from lower inner cover as picture shown.



8. Install the peel-off bar into the both slots. Then install back the platen holder tab.

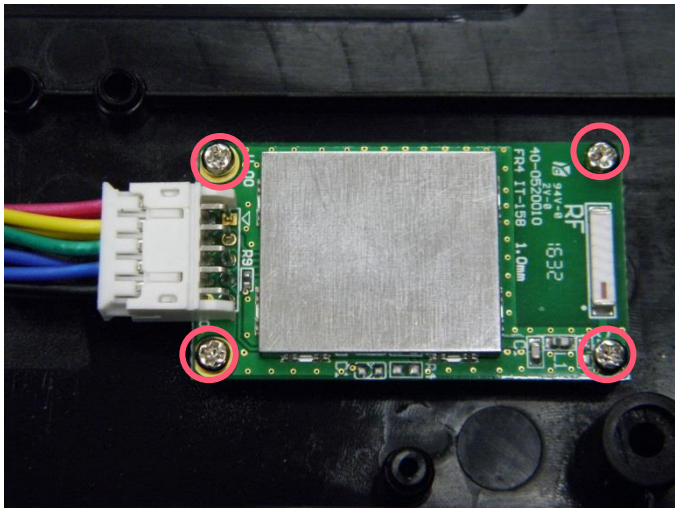


9. The peel-off module is ready to use.

3.13 Replacing the Bluetooth module (Option)

1. Turn the printer upside down and remove four screws on the printer lower cover.
2. Disconnect all connectors on the main board.

3. Disconnect the connector and remove the four screws on Bluetooth module to replace it.

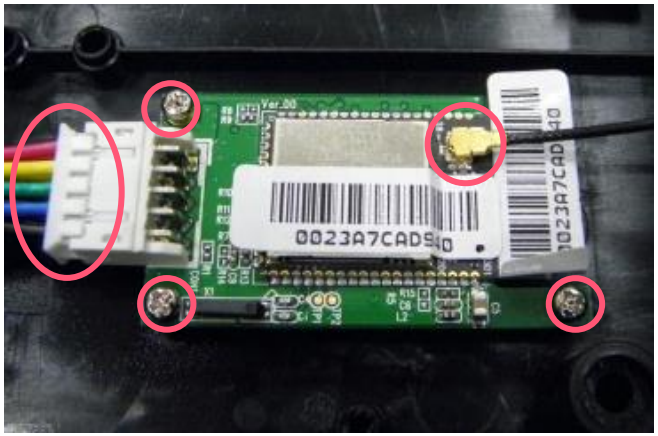


4. Reassemble the parts in the reverse order.

3.14 Replacing the Wi-Fi module (Option for DA220 Series)

1. Turn the printer upside down and remove four screws on the printer lower cover.
2. Disconnect all connectors on the main board.

3. Disconnect the antenna on Wi-Fi module carefully.
4. Disconnect the connector and remove the three screws on Wi-Fi module to replace it



5. Reassemble the parts in reverse order.

4. Troubleshooting

LED Status

LED Status / Color	Printer Status	Possible Cause	Recovery Procedure
OFF	No response	No power	* Turn on the power switch. * Check if the green LED is lit on power supply. If it is not lit on, power supply is broken. * Check both power connections from the power cord to the power supply and from the power supply to the printer power jack if they are connected securely.
Solid Green	ON	The printer is ready to use	* No action necessary.
Green with blinking	Pause	The printer is paused	* Press the FEED button to resume for printing.
Red with blinking	Error	The out of label or the printer setting is not correct	1. Out of label * Load a roll of label and follow the instructions in loading the media then press the FEED button to resume for printing. 2. Printer setting is not correct * Initialize the printer

Print Problem

Problem	Possible Cause	Recovery Procedure
Not Printing	Check if interface cable is well connected to the interface connector.	Re-connect cable to interface.

	The serial port cable pin configuration is not pin to pin connected.	Please replace the cable with pin to pin connected.
	The serial port setting is not consistent between host and printer.	Please reset the serial port setting.
	The port specified in the Windows driver is not correct.	Select the correct printer port in the driver.
	The Ethernet IP, subnet mask, gateway is not configured properly.	Configure the IP, subnet mask and gateway.
No print on the label	Label loaded not correctly.	Follow the instructions in loading the media.
Continuous feeding labels	The printer setting may go wrong.	Please do the initialization and gap/black mark calibration.
Paper Jam	Gap/black mark sensor sensitivity is not set properly (sensor sensitivity is not enough)	Calibrate the gap/black mark sensor.
	Make sure label size is set properly.	Set label size exactly as installed paper in the labeling software or program.
	Labels may be stuck inside the printer mechanism near the sensor area.	Remove the stuck label.
Poor Print Quality	Top cover is not closed properly.	Close the top cover completely and make sure the right side and left side levers are latched properly.
	Wrong power supply is connected with printer.	Check if 24V DC output is supplied by the power supply.
	Check if supply is loaded correctly.	Reload the supply.
	Check if dust or adhesives are accumulated on the print head.	Clean the print head.
	Check if print density is set properly.	Adjust the print density and print speed.
	Check print head test pattern if head element is damaged.	Run printer self-test and check the print head test pattern if there is dot missing in the pattern.

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.

5.1 Cleaning Supplies

- 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)

5.2 Cleaning Procedures

Component	Method	Recommended Cleaning Schedule
Printhead	1. Power off the printer before cleaning the printhead. 2. Leave the printhead to cool down for at least one minute. 3. Wet a cotton swab with the 99% Isopropyl alcohol and then wipe across the printhead head. You can also use the genuine printhead cleaning pen to clean the printhead.	Clean the printhead when you load new media.
Platen Roller	1. Power off the printer. 2. Use a piece of 99% Isopropyl alcohol saturated lint-free cloth to wipe the platen roller while rotating the platen roller.	Clean the platen roller when you load new media.
Peel Bar	Use a piece of 99% Isopropyl alcohol saturated lint-free cloth to wipe the peel bar.	Clean as needed.
Sensor	Use the brush with soft and non-metallic bristles or vacuum cleaner to remove the dust or particles in order to optimize the print quality or sensor calibration.	Clean the sensor monthly.
Exterior	Use a piece of water-dampened lint-free cloth to wipe the surface. If necessary, you can apply the chlorine free detergent. After finishing cleaning, use the 75% ethanol to disinfect the surface.	Clean as needed.
Interior	Use the brush with soft and non-metallic bristles or vacuum cleaner to remove the dust or particles. After finishing cleaning, use the 75% ethanol to disinfect the interior.	Clean as needed.
Linerless Printer	Please refer to Linerless Cleaning Kit User Manual for more information.	• Clean as needed or after printing every 1 km. • Please determine the maintenance intervals based on actual usage.

Revision History

Date	Content	Editor
2023/12/07	▪ Changed new cover according to the new brand guideline. ▪ Added “DA220HC” and “DA320HC” into the series models on the cover.	Peter Yao
2024/03/21	Added detailed information about how to clean a linerless printer, page 40.	Peter Yao

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