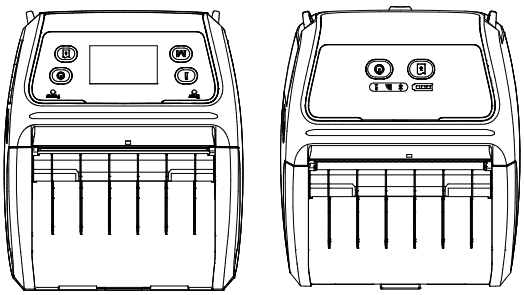
Alpha-4L

Direct Thermal Portable Printer

SERVICE MANUAL

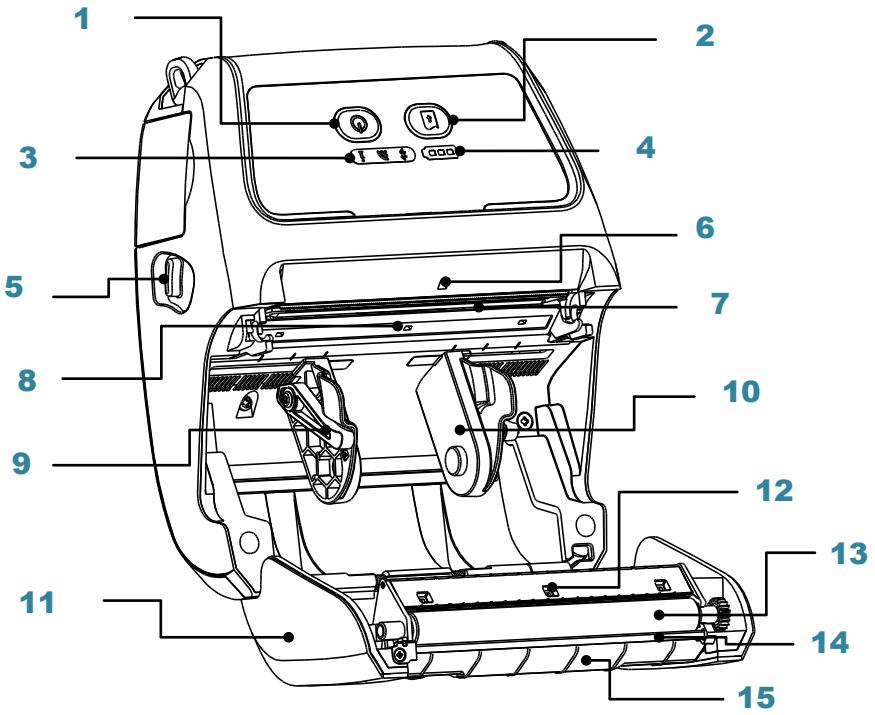


Contents

1. FUNDAMENTAL OF THE SYSTEM

1.1 Overview

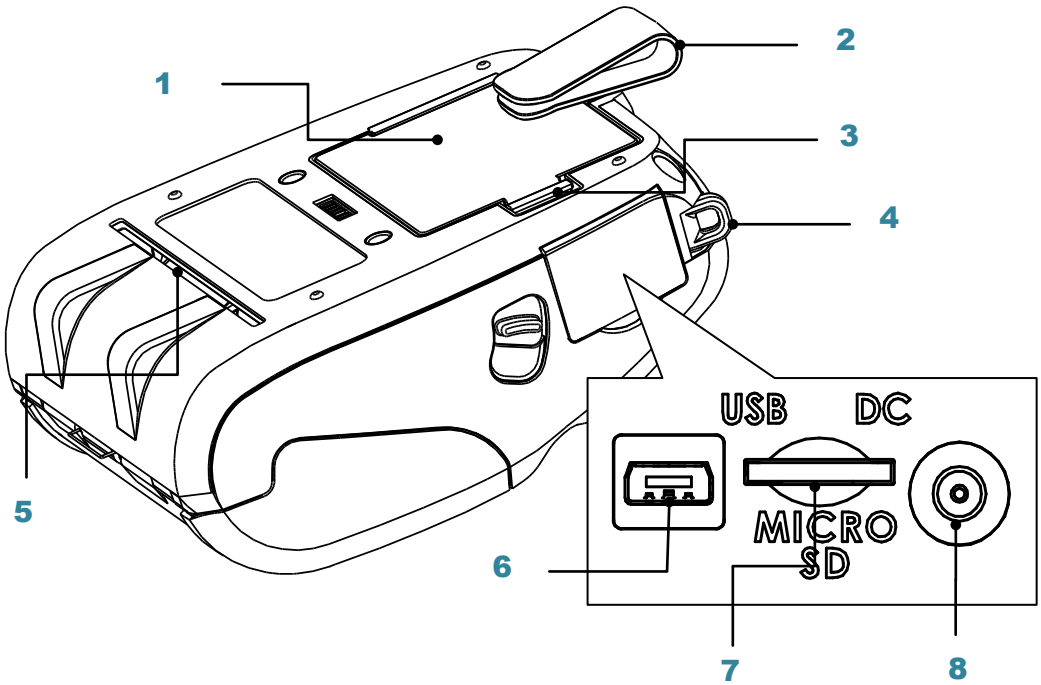
Front View



1. Power on/off button
2. Feed button
3. Printer status LED indicator
4. Battery status LED indicator
5. Media cover release button
6. Peel-off sensor (Without for linerless model)
7. Print head
8. Transmissive sensor – Gap sensor
9. Media holder lock switch
10. Media holder
11. Media cover
12. Reflective sensor – Black mark sensor
13. Platen roller
14. Tear/Peeler bar (Without for linerless model)
15. Peeler module

Note:
*** The media sensor position is selectable by factory adjustment. Please refer to this figure for default settings. (Default – center position, black mark in back side)**

Rear View



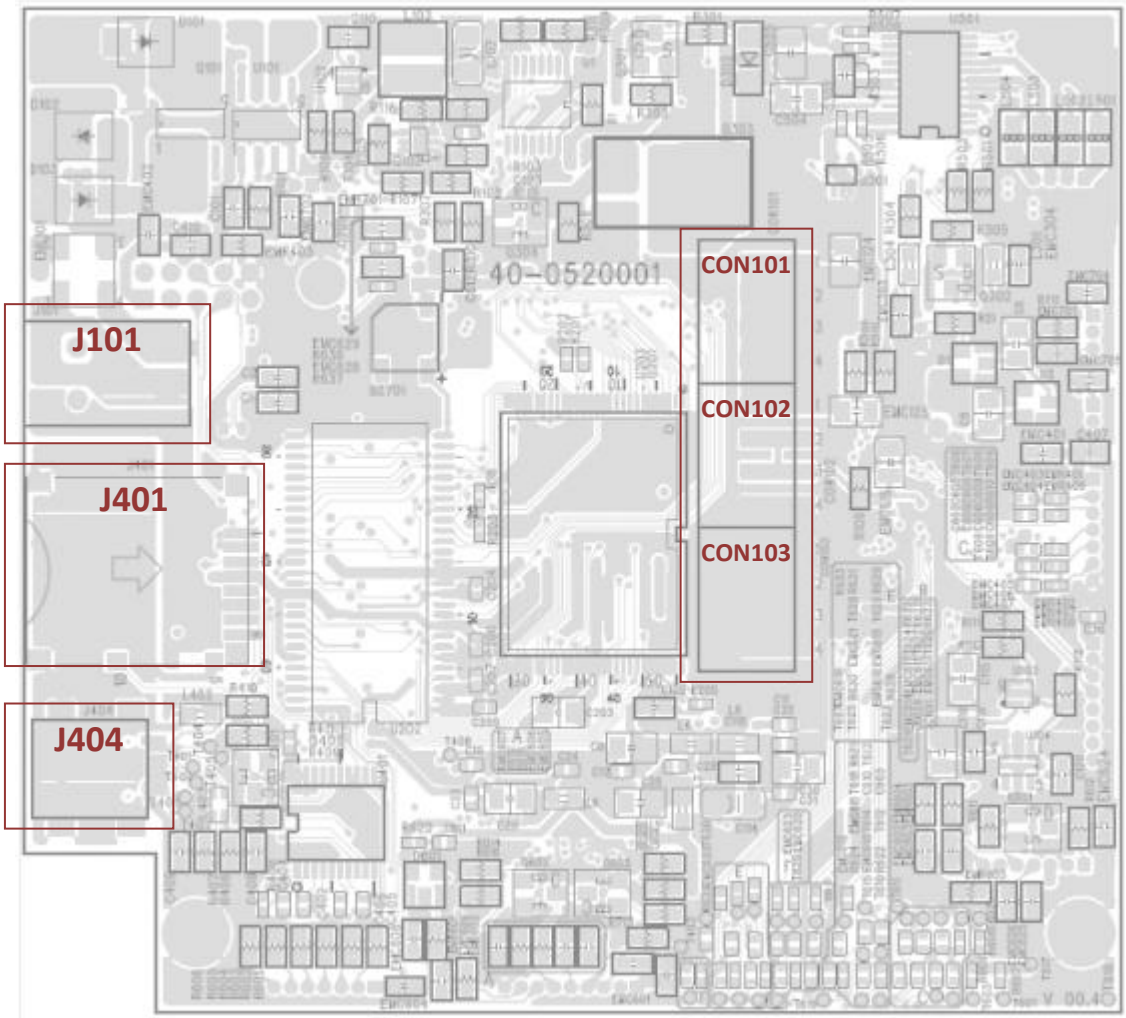
1. Li-ion battery
2. Belt chip
3. Battery open clasp
4. Hanger for shoulder strap
5. External label entrance chute
6. USB interface
7. * MicroSD card socket
8. Power jack

Note:
*** Recommended MicroSD card specification.**

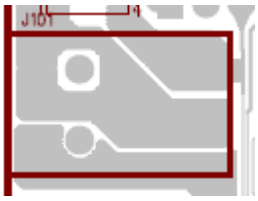
SD card spec	SD card capacity	Approved SD card manufacturer
V1.0, V1.1	MicroSD 128 MB	Transcend, Panasonic
V1.0, V1.1	MicroSD 256 MB	Transcend, Panasonic
V1.0, V1.1	MicroSD 512 MB	Transcend, Panasonic
V1.0, V1.1	MicroSD 1 GB	Transcend, Panasonic
V2.0 SDHC CLASS 6	MicroSD 4 GB	Transcend
- The DOS FAT file system is supported for the SD card. - Folders/files stored in the SD card should be in the 8.3 filename format		

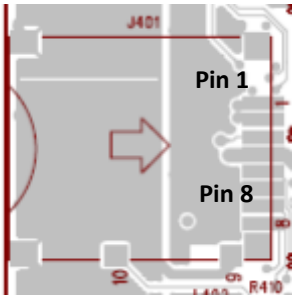
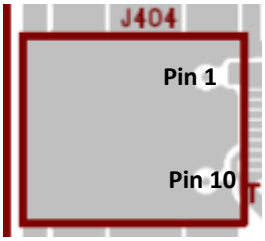
2. ELECTRONICS

2.1 Summary of Board Connectors

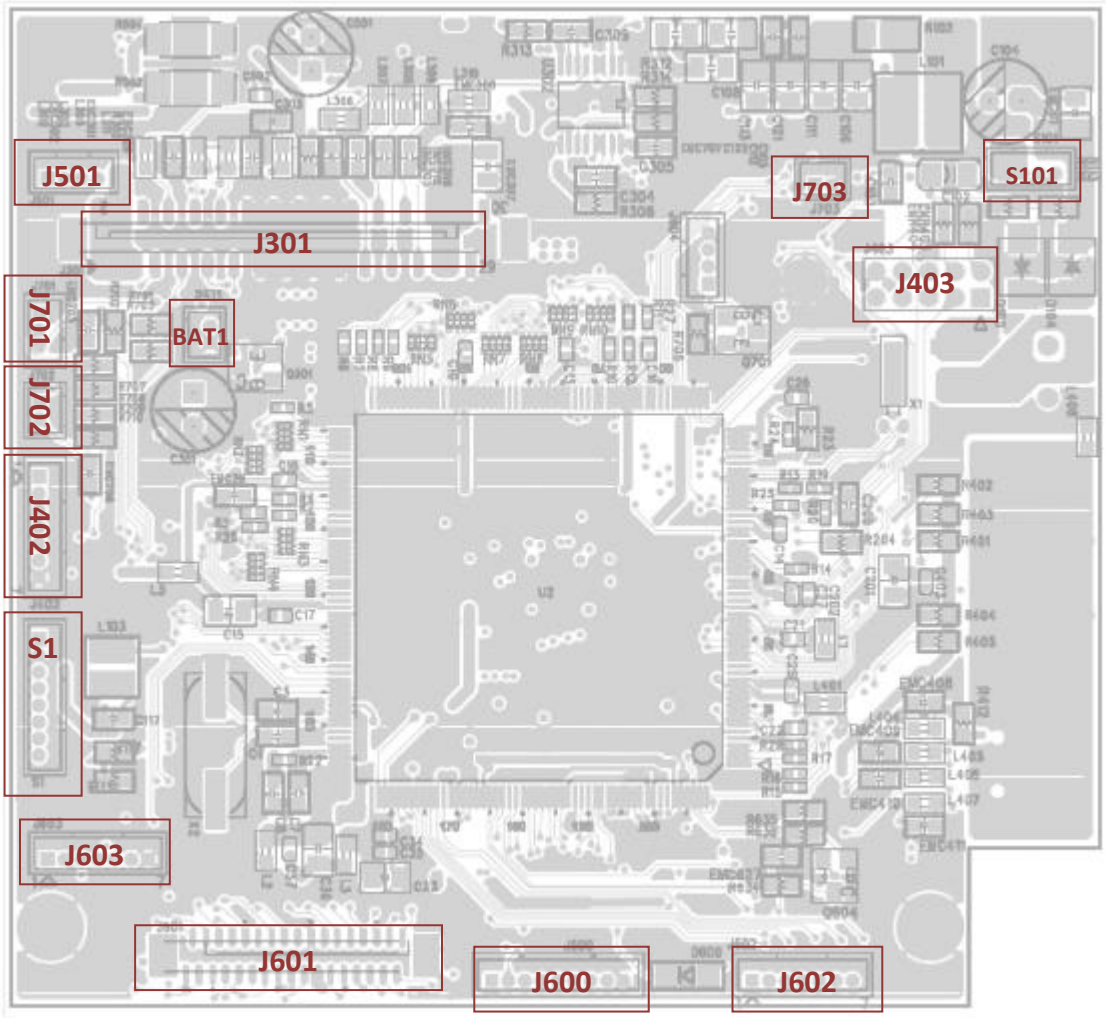


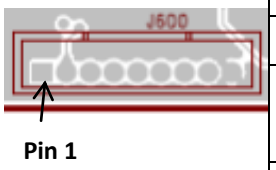
Main board top

Connector	Description
J101	DC Jack  12V DC IN

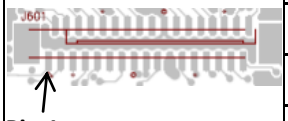
<table>
<tr><td>J401</td><td>Micro SD connector
<table>
<tr><td rowspan="11"> 
</td><td>Pin</td><td>Description</td></tr>
<tr><td>1</td><td>SD_Data2</td></tr>
<tr><td>2</td><td>SD_Data3</td></tr>
<tr><td>3</td><td>SD_CMD</td></tr>
<tr><td>4</td><td>3.3V</td></tr>
<tr><td>5</td><td>SD_CLK</td></tr>
<tr><td>6</td><td>GND</td></tr>
<tr><td>7</td><td>SD_Data0</td></tr>
<tr><td>8</td><td>SD_Data1</td></tr>
<tr><td>9</td><td>GND</td></tr>
<tr><td>10</td><td>GND</td></tr>
</table></td></tr>
<tr><td>J404</td><td>Micro USB
<table>
<tr><td rowspan="11"> 
</td><td>Pin</td><td>Description</td></tr>
<tr><td>1</td><td>NC</td></tr>
<tr><td>2</td><td>VBUS</td></tr>
<tr><td>3</td><td>TX</td></tr>
<tr><td>4</td><td>D+</td></tr>
<tr><td>5</td><td>RX</td></tr>
<tr><td>6</td><td>D-</td></tr>
<tr><td>7</td><td>RTS</td></tr>
<tr><td>8</td><td>GND</td></tr>
<tr><td>9</td><td>CTS</td></tr>
<tr><td>10</td><td>GND</td></tr>
</table></td></tr>
<tr><td>CON101
CON102
CON103</td><td>Battery
<table>
<tr><td> 
</td><td>• CON101 pin1~4 & CON102 pin1 for battery positive
• CON103 pin1~4 & CON102 pin4 for battery negative
• CON102 pin2~3 for NTC</td></tr>
</table></td></tr>
</table>

Main board bottom

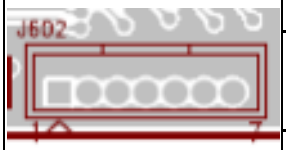
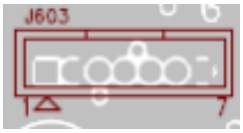
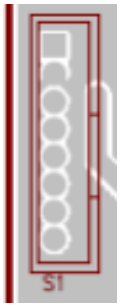
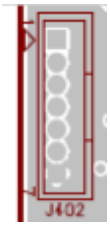


Connector	Description
J600	For LCD & LED board  Pin / Description 1 / 3.3V 2 / PEEL_E 3 / PEEL_R 4 / 8V battery 5 / LED_Charging off & low battery 6 / LED_Charging 7 / Power KEY 8 / Feed KEY 9 / GND

J601	LCD



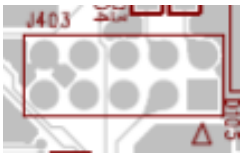
Pin	Description
1	IRS
2	/HPM
3	PS
4	C86
5	NC
6	V0
7	V1
8	V2
9	V3
10	V4
11	NC
12	NC
13	CAP2-
14	CAP2+
15	CAP1+
16	CAP1-
17	CAP3+
18	NC
19	VOUT
20	GND
21	3.3V
22	LCM_D7
23	LCM_D6
24	LCM_D5
25	LCM_D4
26	LCM_D3
27	LCM_D2
28	LCM_D1
29	LCM_D0
30	LCM_RD
31	LCM_WR
32	LCM_A0
33	/LCM_RST
34	/LCM_CS

<table>
<tr><td>J602</td><td>For LED Board
<table>
<tr><td rowspan="8"> 
</td><td>Pin</td><td>Description</td></tr>
<tr><td>1</td><td>3.3V</td></tr>
<tr><td>2</td><td>LED_STATUS</td></tr>
<tr><td>3</td><td>LED_ERROR</td></tr>
<tr><td>4</td><td>LED_FULL BATTERY</td></tr>
<tr><td>5</td><td>LED_HALF BATTERY</td></tr>
<tr><td>6</td><td>LED_BT</td></tr>
<tr><td>7</td><td>LED_WIFI</td></tr>
</table></td></tr>
<tr><td>J603</td><td>For LCD board
<table>
<tr><td rowspan="8"> 
</td><td>Pin</td><td>Description</td></tr>
<tr><td>1</td><td>A+</td></tr>
<tr><td>2</td><td>K-</td></tr>
<tr><td>3</td><td>GND</td></tr>
<tr><td>4</td><td>3.3V</td></tr>
<tr><td>5</td><td>LED_ERROR</td></tr>
<tr><td>6</td><td>MANUAL KEY</td></tr>
<tr><td>7</td><td>INFO KEY</td></tr>
</table></td></tr>
<tr><td>S1</td><td>Download port
<table>
<tr><td rowspan="8"> 
</td><td>Pin</td><td>Description</td></tr>
<tr><td>1</td><td>3.3V</td></tr>
<tr><td>2</td><td>GND</td></tr>
<tr><td>3</td><td>/RESET</td></tr>
<tr><td>4</td><td>BMS</td></tr>
<tr><td>5</td><td>/CS</td></tr>
<tr><td>6</td><td>MISO</td></tr>
<tr><td>7</td><td>MOSI</td></tr>
<tr><td>8</td><td>CLK</td></tr>
</table></td></tr>
<tr><td>J402</td><td>WiFi connector
<table>
<tr><td rowspan="5"> 
</td><td>Pin</td><td>Description</td></tr>
<tr><td>1</td><td>3.3V</td></tr>
<tr><td>2</td><td>/WIFI_RST</td></tr>
<tr><td>3</td><td>WIFI_RXD</td></tr>
<tr><td>4</td><td>WIFI_RST</td></tr>
</table></td></tr>
</table>

		5	WIFI_TXD
		6	WIFI_CTS
		7	GND

J403

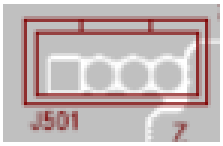
Bluetooth connector



Pin	Description
1	3.3V
2	BT_RST
3	BT_RXD
4	BT_RTS
5	BT_TXD
6	BT_CTS
7	BT_DISCON
8	BT_CON
9	NC
10	GND

J501

Stepping motor



Pin	Description
1	AOUT1
2	AOUT2
3	BOUT1
4	BOUT2

J701

Black mark sensor

Pin	Description
1	3.3V
2	BM_E
3	BM_R

J702

Gap sensor

Pin	Description
1	3.3V
2	GAP_R

J703	Hand open senor  Pin: 1 — HEAD Pin: 2 — GND
J301	Print head 

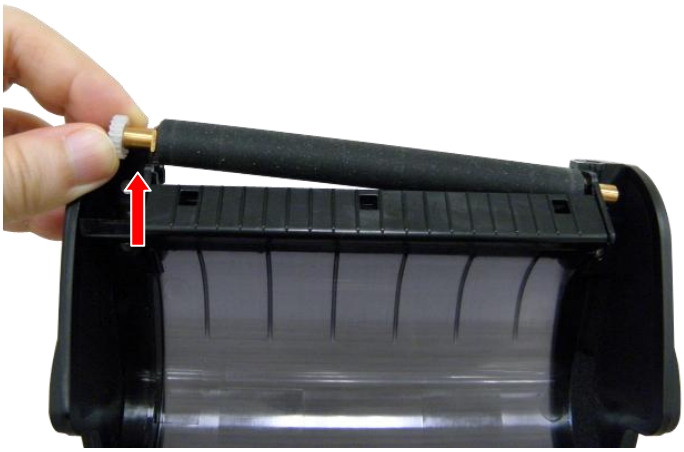
Pin	Description
1	VH
2	VH
3	VH
4	NC
5	/LAT
6	TPH_CLK
7	3.3V_TPH
8	STB1
9	STB2
10	STB3
11	TM
12	GND
13	GND
14	GND
15	GND
16	GND
17	GND
18	GND
19	GND
20	GND
21	STB4
22	STB5
23	STB6
24	STB7
25	DI
26	VH
27	VH
28	VH
29	GND
30	GND

<table>
<tr><td>S101</td><td>Charger station
<table>
<tr><td rowspan="5"> 
</td><td>Pin</td><td>Description</td></tr>
<tr><td>1</td><td>12V_IN</td></tr>
<tr><td>2</td><td>12V_IN</td></tr>
<tr><td>3</td><td>GND</td></tr>
<tr><td>4</td><td>GND</td></tr>
</table></td></tr>
<tr><td>BAT1</td><td>RTC battery
<table>
<tr><td rowspan="3"> 
</td><td>Pin</td><td>Description</td></tr>
<tr><td>1</td><td>GND</td></tr>
<tr><td>2</td><td>3V</td></tr>
</table></td></tr>
</table>

3. MECHANISM

3.1 Replacing the Platen Roller

1. Open the printer cover. Use a tool to take the platen roller off. Replace the platen roller.

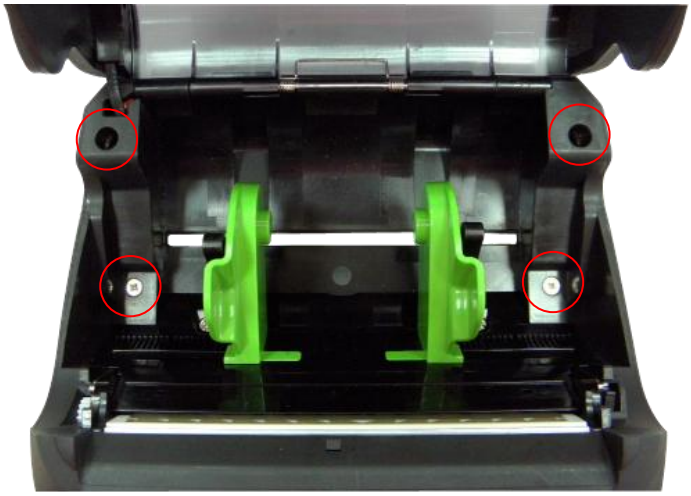


2. Reassemble the parts in the reverse procedures.

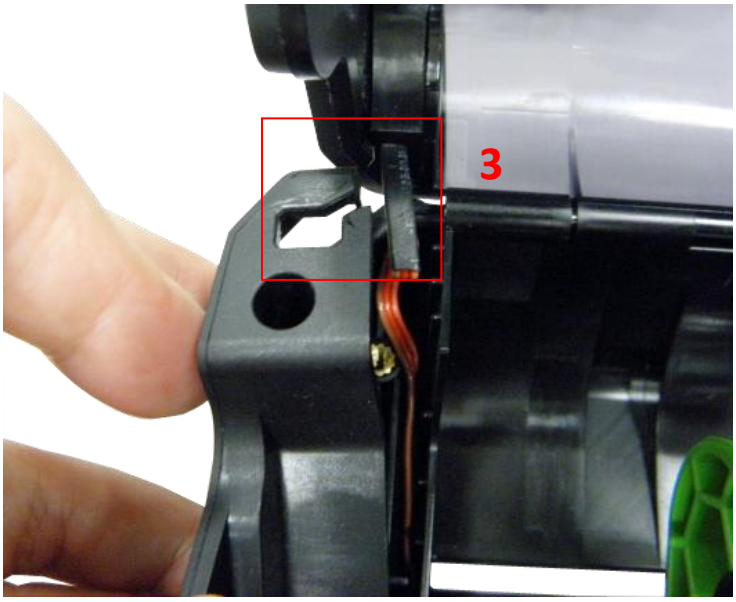
3.2 Replacing the Print Head Assembly

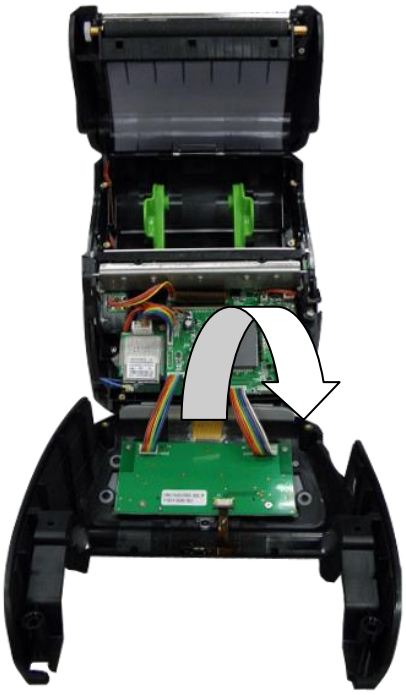
1. Use hex wrench (#2.5) to remove two screws on lower cover.

2. Open the printer cover. Remove four screws on lower inner cover.

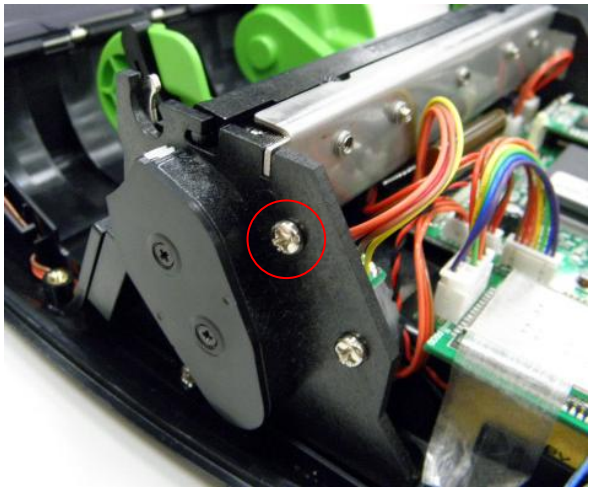


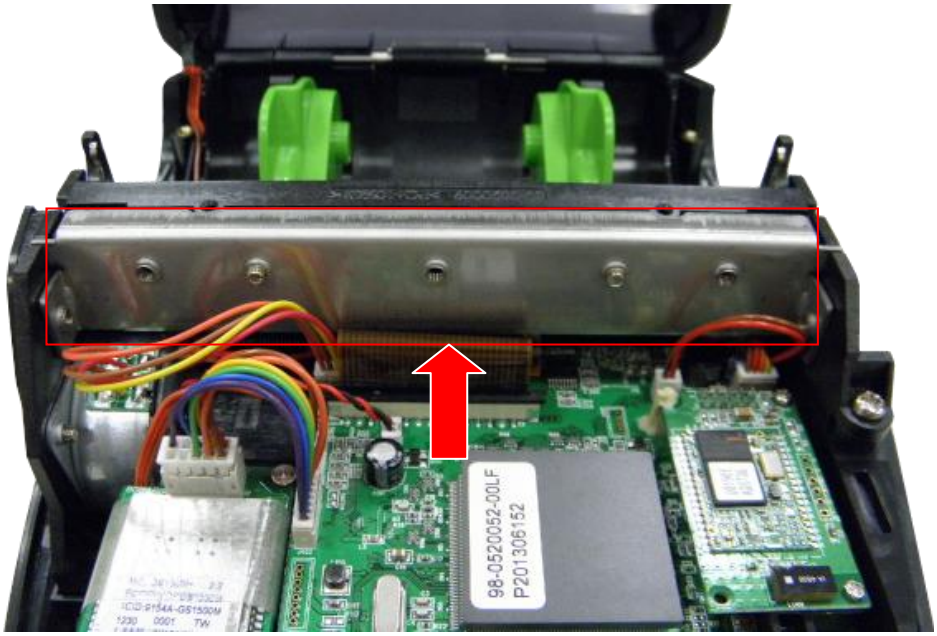
3. Remove the upper cover carefully.



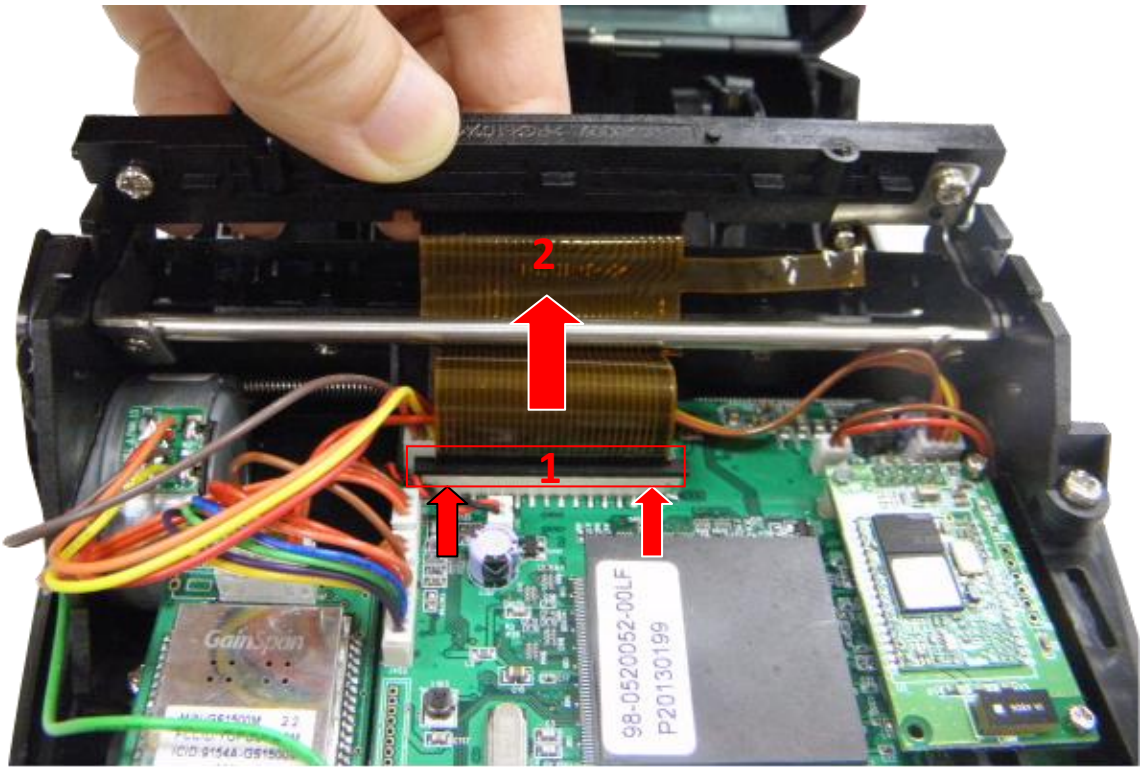


4. Remove 2 screws on the each side of lower inner cover to remove the print head spring fixture.

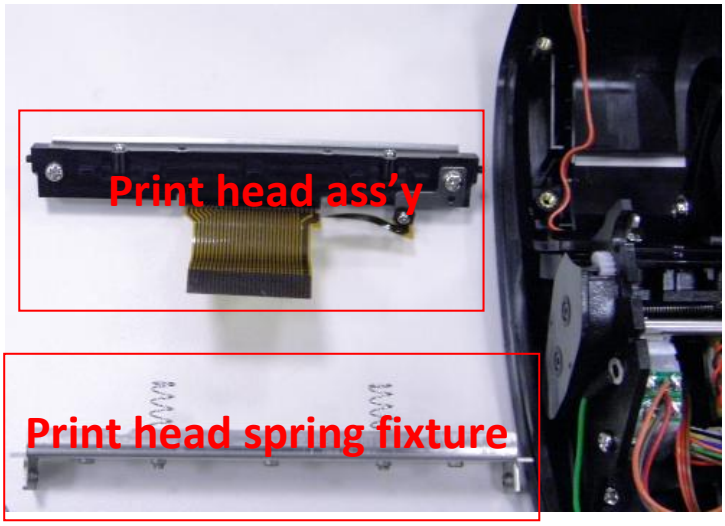




5. Loosen the connector lock (black) then disconnect the flat cable from the main board. Remove the print head assembly.



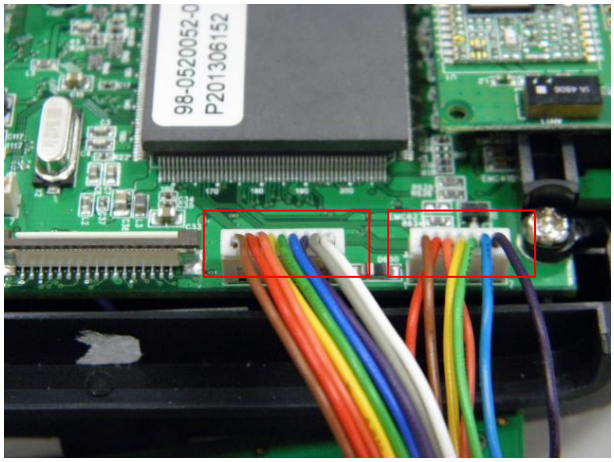
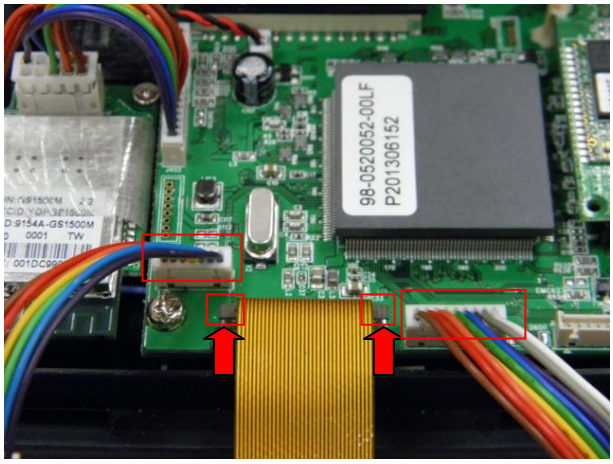
6. Replace the print head assembly.



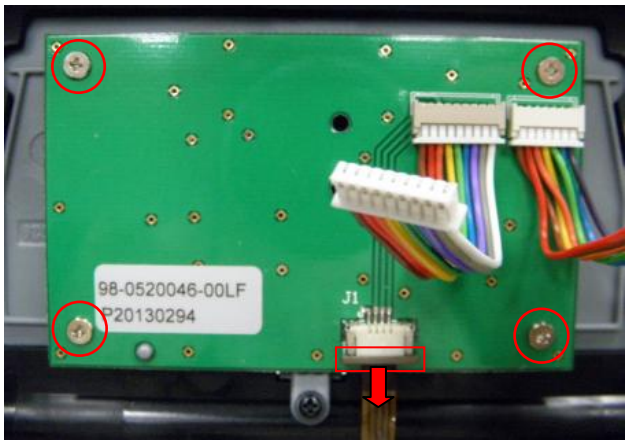
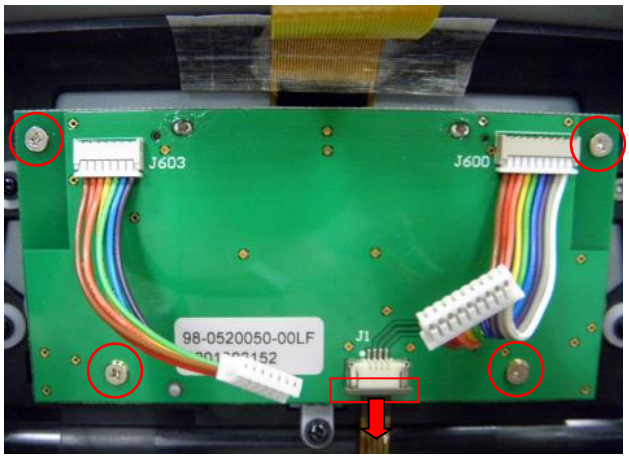
7. Reassemble the parts in the reverse procedures.

3.3 Replacing the Keys Control Board/ LCD Control Board

1. Refer to section 3.2 to remove the upper cover.
   Disconnect the cables from the main board.
   Note:
   For the flat cable (LCD control board), please loosen the connector lock (brown) then disconnect the cable.

Keys control board cable	LCD control board cable
	

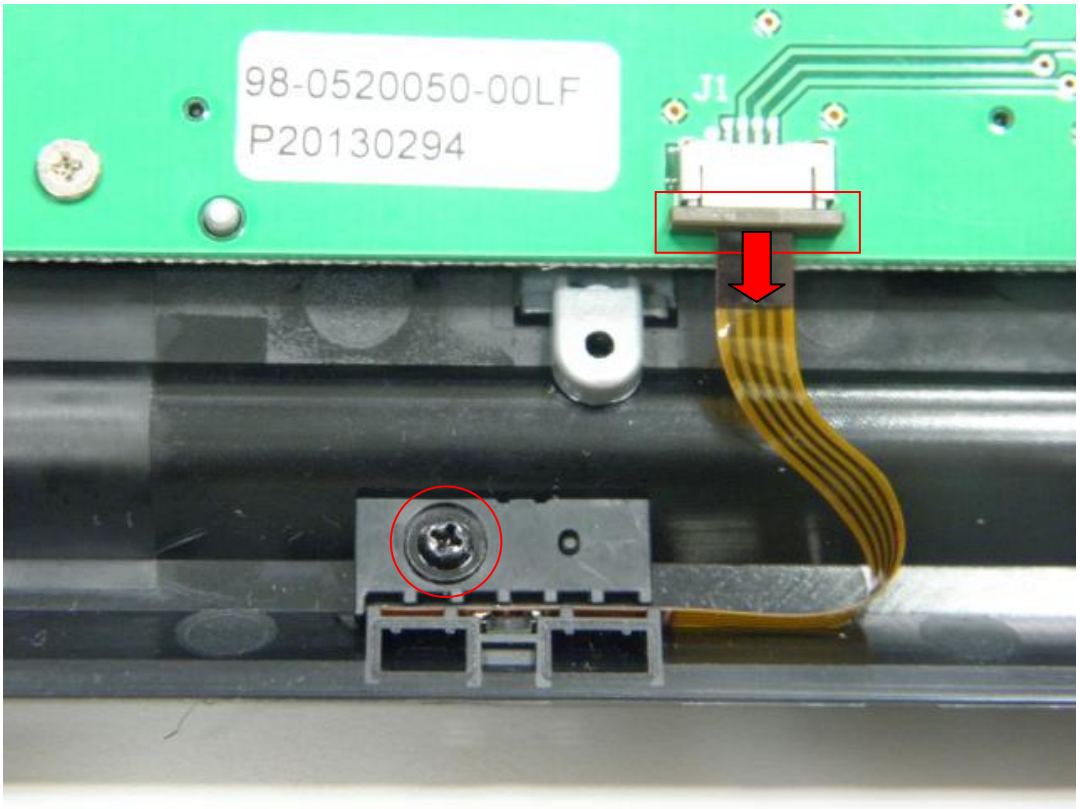
2. Remove 4 screws on the keys control board/ LCD control board and disconnect the peel-off sensor connector by loosen the connector lock (brown).

Keys control board	LCD control board
	

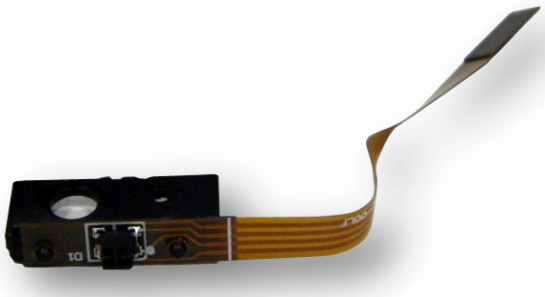
3. Replace the keys control board/ LCD control board assembly.
4. Reassemble the parts in the reverse procedures.

3.4 Replacing the Peel-off Sensor Module

1. Refer to section 3.2 to remove the upper cover.
2. Disconnect the peel-off sensor connector by loosen the connector lock for panel board. Remove 1 screw.



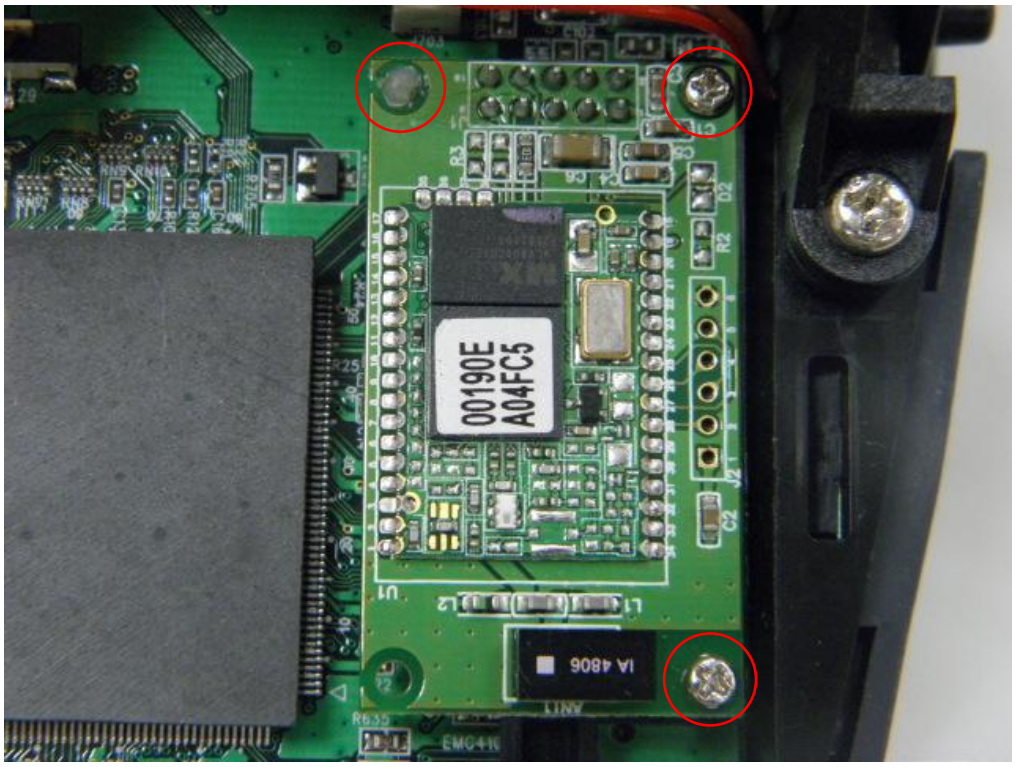
3. Replace the peel-off sensor module.



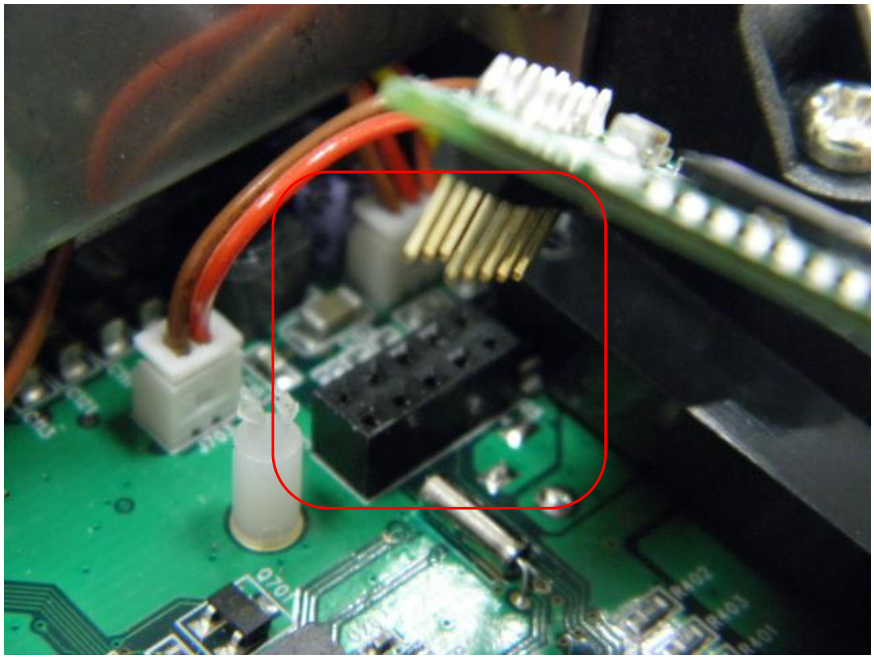
4. Reassemble the parts in the reverse procedures.

3.5 Replacing the Bluetooth Module

1. Refer to section 3.2 to remove the upper cover.
2. Remove 2 screws on the Bluetooth control board. Use a tool to remove the spacer support on the Bluetooth control board.



3. Disconnect the connector on the board. Replace the Bluetooth module.



4. Reassemble the parts in the reverse procedures.

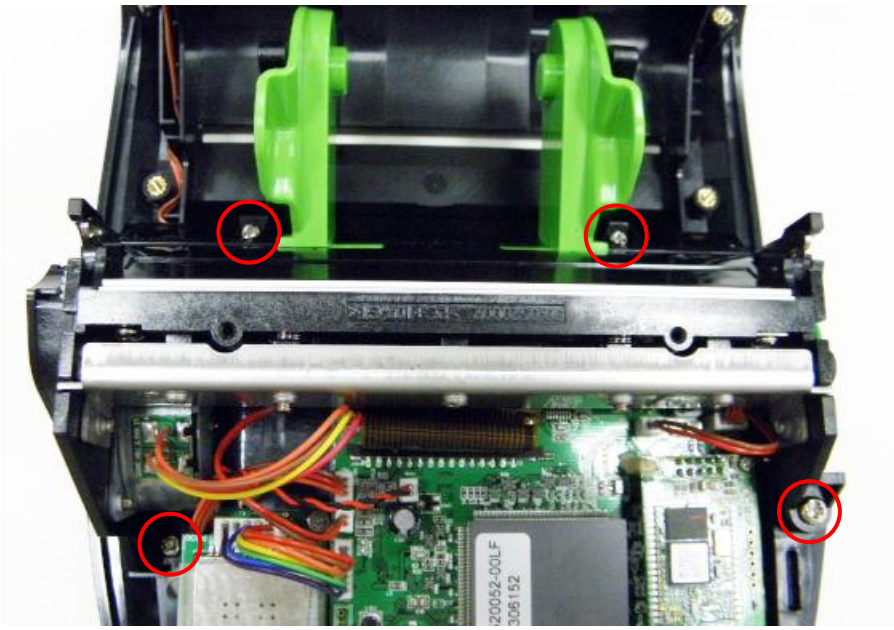
3.6 Replacing the Main Board Assembly

1. Refer to section 3.5 to remove the upper cover and Bluetooth control board.
2. Remove 2 screws on the main board. Disconnect all the connectors on the main board. Replace the main board.

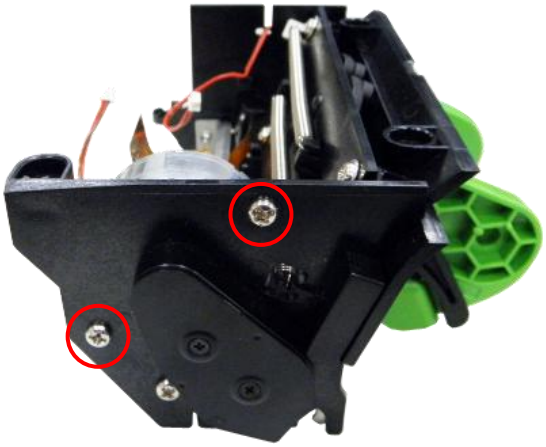
3. Reassemble the parts in the reverse procedures.

3.7 Replacing the Stepping Motor

1. Refer to section 3.2 to remove the upper cover.
2. Remove 5 screws. Disconnect the connectors on main board to take out the internal mechanism.



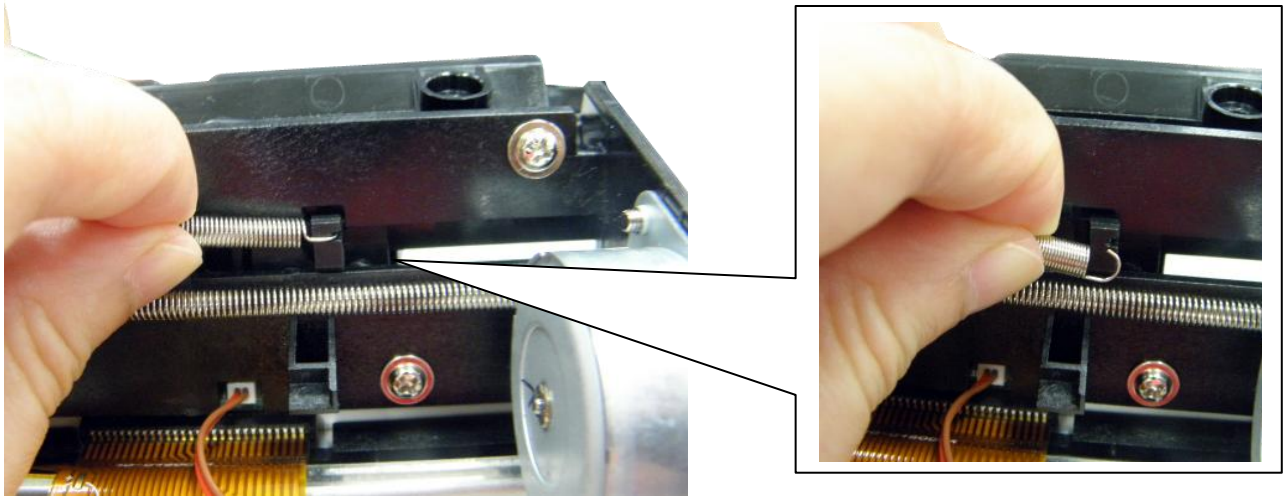
3. Remove 2 screws to replace the stepping motor.



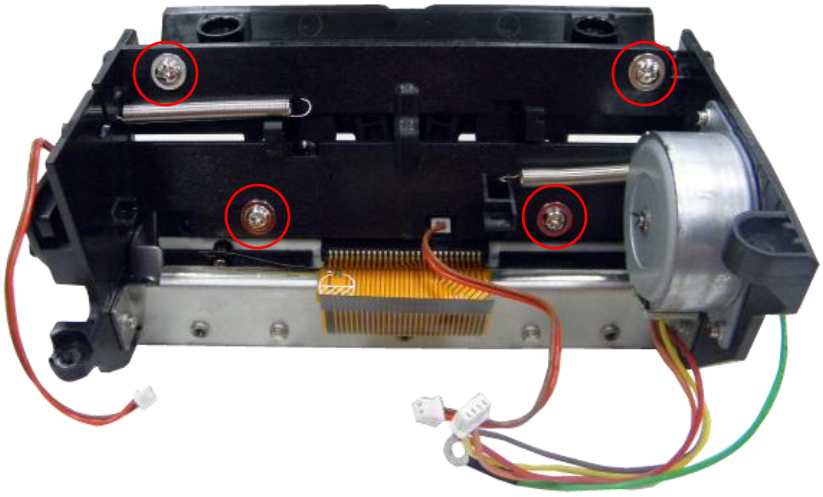
4. Reassemble the parts in the reverse procedures.

3.8 Replacing the Gap Sensor Assembly

1. Refer to section 3.7 to take out the internal mechanism.
2. Loosen 2 springs.



3. Remove 4 screws on the internal mechanism.



4. Replace the gap sensor assembly.

5. Reassemble the parts in the reverse procedures.

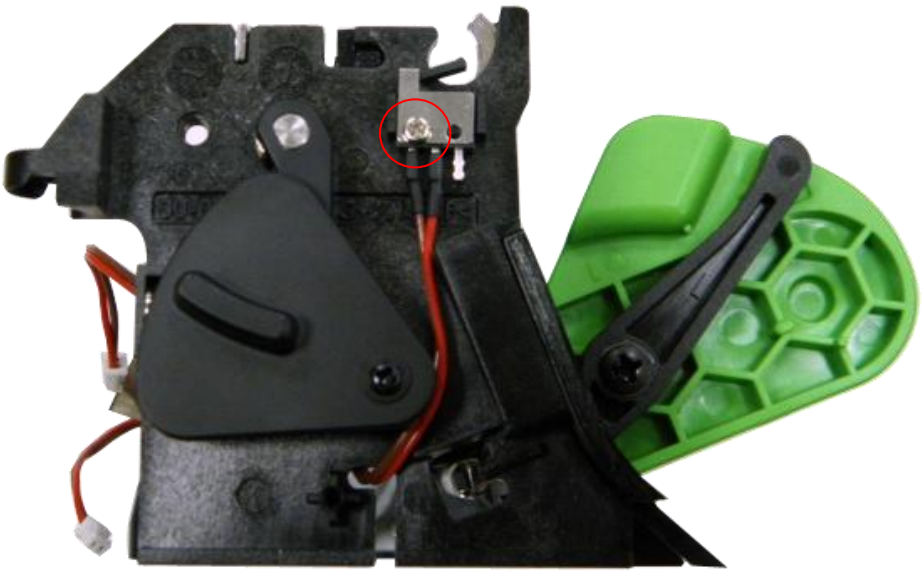
3.9 Replacing the Media Holder Assembly

1. Refer to section 3.8 to remove the gap sensor assembly.
2. Replace the media holder assembly.

3. Reassemble the parts in the reverse procedures.

3.10 Replacing the Hand Open Sensor Assemble

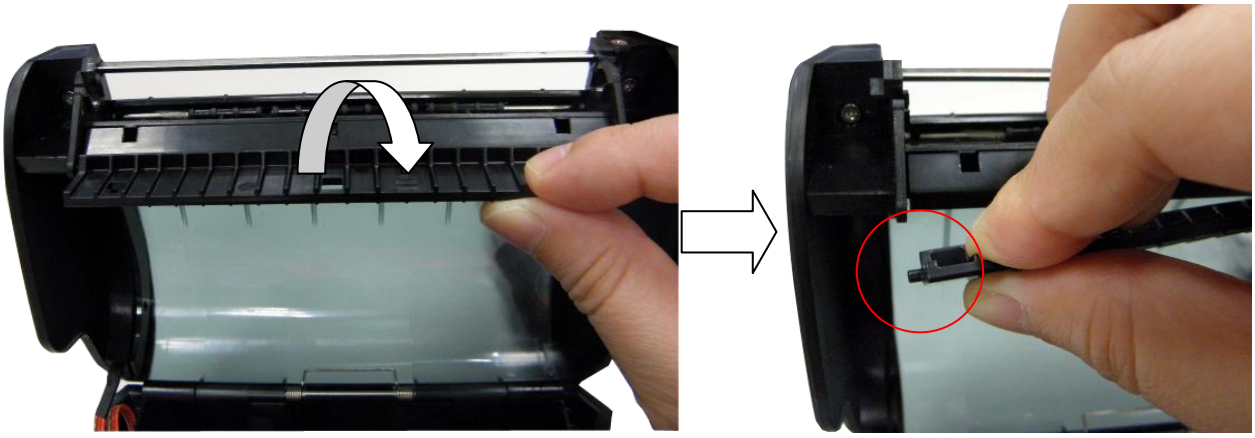
1. Refer to section 3.7 to take out the internal mechanism.
2. Remove 1 screw to replace the hand open sensor assembly.



3. Reassemble the parts in the reverse procedures.

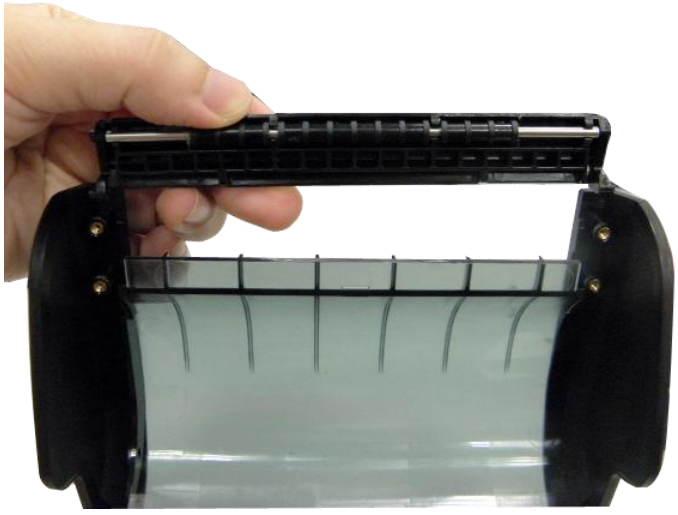
3.11 Replacing the Peel-off Module

1. Refer to sections 3.1 and 3.7 to remove the platen roller and take out the internal mechanism.
2. Remove the black mark sensor cover.



3. Remove 4 screws on upper cover to take out the black mark sensor module.

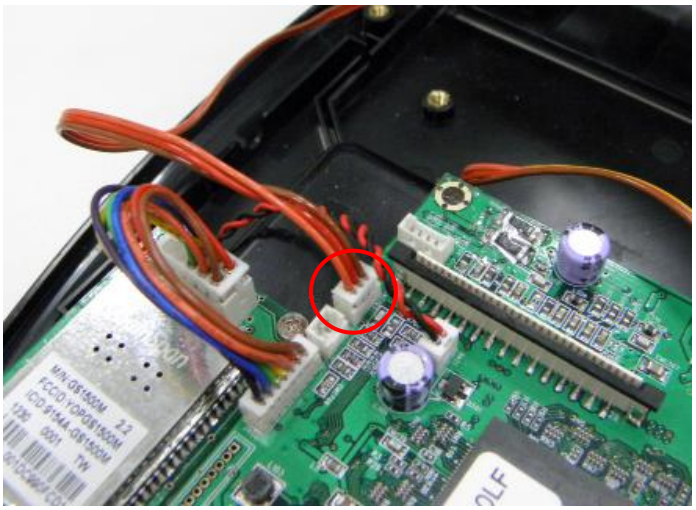
4. Replacing the Peel-off cover.



5. Reassemble the parts in the reverse procedures.

3.12 Replacing the Black Mark Sensor Assembly

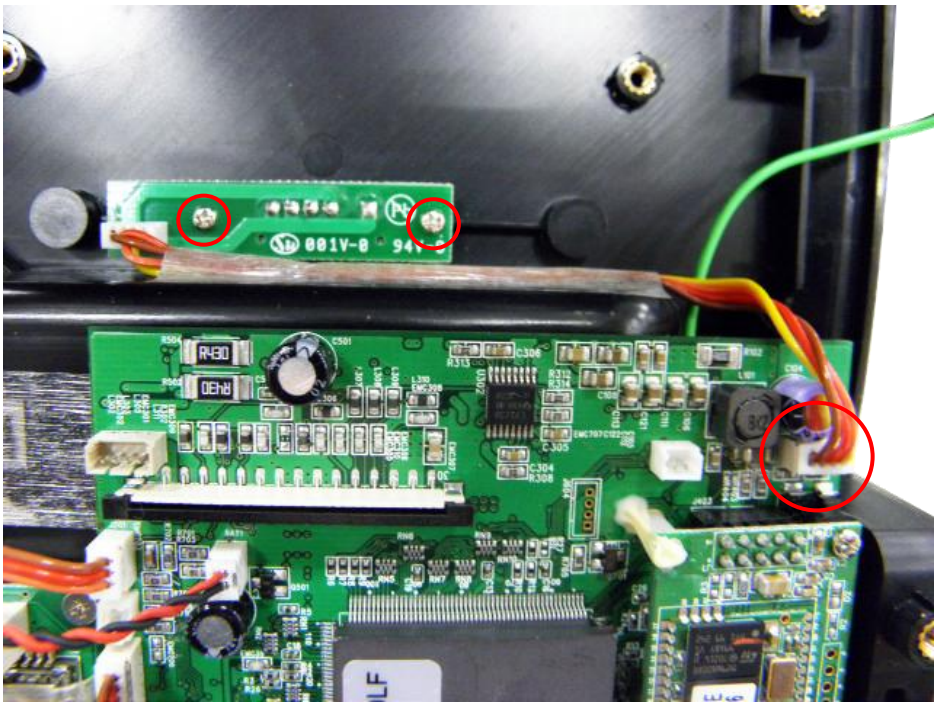
1. Refer to sections 3.11 to take out the black mark sensor assembly. Disconnect the black mark sensor connector from main board.



2. Reassemble the parts in the reverse procedures.

3.13 Replacing the Charger Board Assembly

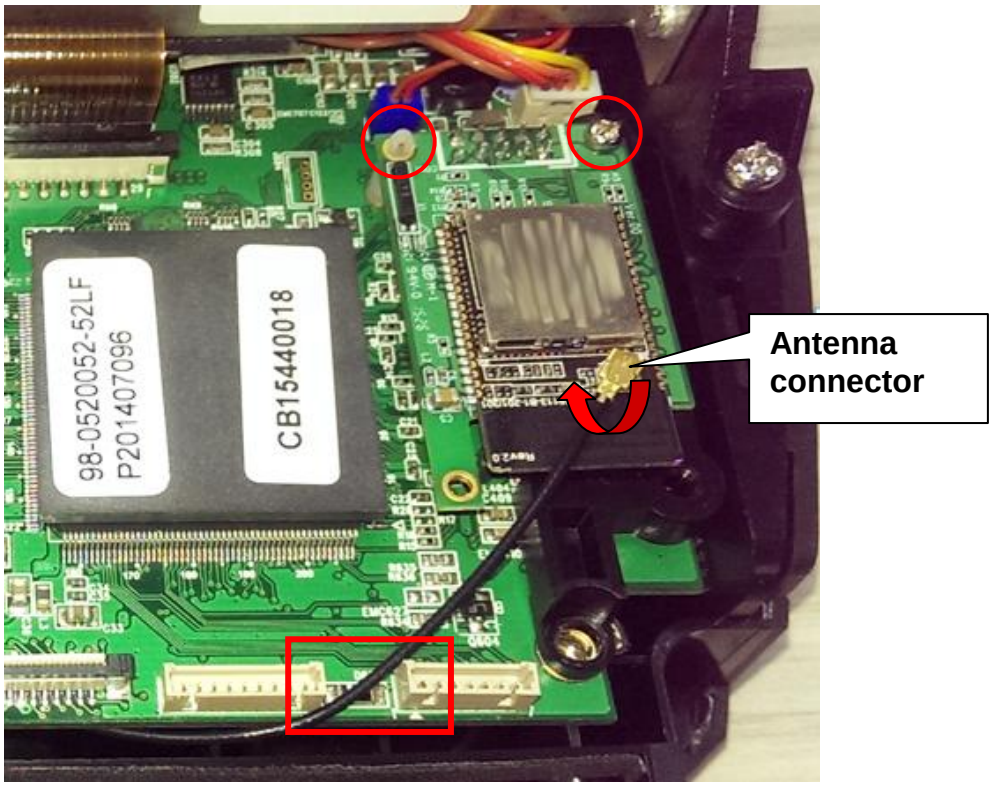
1. Refer to the section 3.7 to take out the internal mechanism.
2. Disconnect the connector on the main board. Remove 2 screws to replacing the charger board assembly.



3. Reassemble the parts in the reverse procedures.

3.14 Replacing the Wi-Fi Module (Option)

1. Refer to section 3.2 to remove the upper cover.
2. Disconnect the antenna connector gently.
3. Remove the screw and loose the spacer support on the Wi-Fi module.



4. Replace the Wi-Fi module board.
5. Arrange cable of antenna as indicated.
6. Reassemble the parts in the reverse procedures.

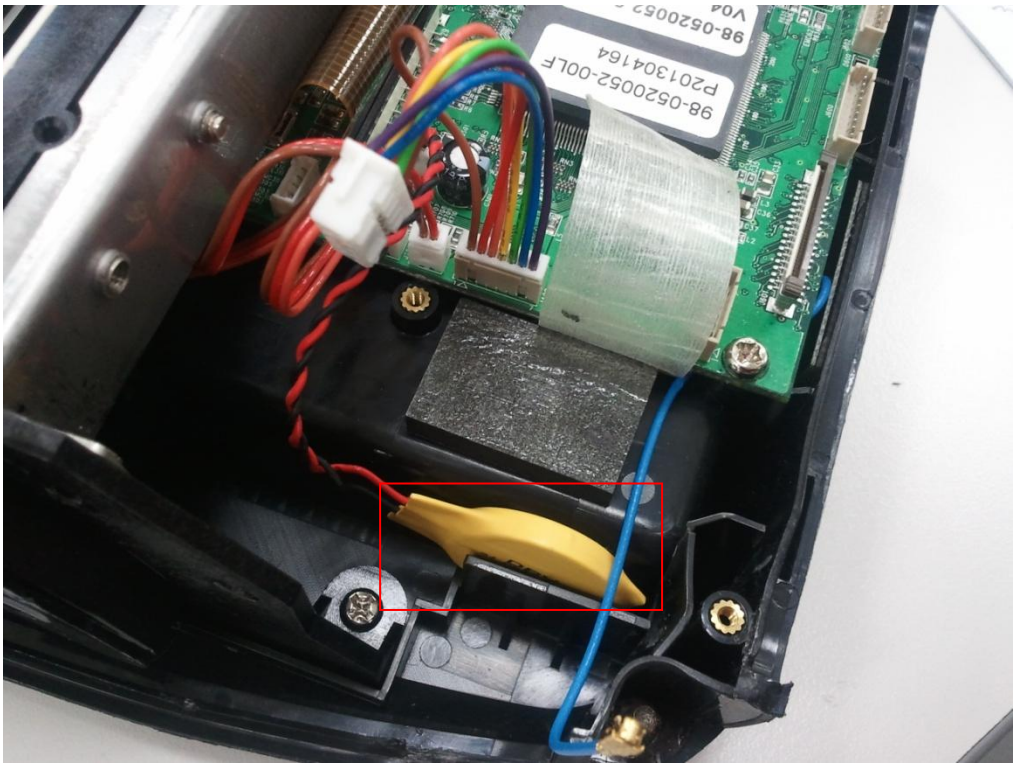
Note:

If you replace the main board, please check the Wi-Fi signal band on configuration page for your using region. If any questions, please contact the Customer Service Department of your purchased reseller or distributor for assistance.

US	EUR
******** WIFI VERSION: 1.3.1c WIFI MAC ADDRESS: 00-23-A7-65-19-30 WIFI Region: US WIFI MODE: INFRASTRUCTURE WIFI SSID: RD_AP24 WIFI DHCP ENABLED: YES WIFI IP ADDRESS: 0.0.0.0 WIFI SUBNET MASK: 0.0.0.0 WIFI DEFAULT GATEWAY: 0.0.0.0 WIFI PRINTER NAME: PS-651930 WIFI RAW PORT: 9100 ********	******** WIFI VERSION: 1.3.1c WIFI MAC ADDRESS: 00-23-A7-65-19-30 WIFI Region: EUR WIFI MODE: INFRASTRUCTURE WIFI SSID: RD_AP24 WIFI DHCP ENABLED: YES WIFI IP ADDRESS: 0.0.0.0 WIFI SUBNET MASK: 0.0.0.0 WIFI DEFAULT GATEWAY: 0.0.0.0 WIFI PRINTER NAME: PS-651930 WIFI RAW PORT: 9100 ********

3.15 Replacing the RTC Battery (Option)

1. Refer to section 3.14 to remove the WiFi module.



2. Disconnect the connector on the main board.

3. Replace the RTC battery.
4. Reassemble the parts in the reverse procedures.

4. TROUBLESHOOTING

4.1 Common Problems

The following guide lists the most common problems that may be encountered when operating this bar code printer. If the printer still does not function after all suggested solutions have been invoked, please contact the Customer Service Department of your purchased reseller or distributor for assistance.

Problem	Possible Cause	Recovery Procedure
Power indicator does not illuminate	* The battery is not properly installed. * The battery is dead.	* Reinstall the battery. * Switch the printer on. * Charge the battery.
- The printer status from DiagTool shows "**Head Open**".	* The printer carriage is open.	* Please close the print carriage.
- The printer status from DiagTool shows "**Out of Paper**"..	* Running out of media roll. * The media is installed incorrectly. * Black mark sensor is not calibrated.	* Supply a new media roll. * Please refer to the steps on section 3.4 to reinstall the media roll. * Calibrate the black mark sensor.
- The printer status from DiagTool shows "**Paper Jam**".	* Black mark sensor is not set properly. * Make sure media size is set properly. * Media may be stuck inside the printer mechanism.	* Calibrate the black mark sensor. * Set media size correctly.
Memory full (FLASH / DRAM)	* The space of FLASH/DRAM is full.	* Delete unused files in the FLASH/DRAM. * The max. numbers of DRAM is 256 files. * The max. user addressable memory space of DRAM is 256KB. * The max. numbers of file of FLASH is 256 files. * The max. user addressable memory space of FLASH is 2560KB.
Poor Print Quality	* Media is loaded incorrectly * Dust or adhesive accumulation on the print head. * Print density is not set properly. * Printhead element is damaged.	* 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. * Change proper media roll.
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. * The RS-232 setting is incorrect.	* Turn off and on the printer to skip the dump mode. * Re-set the Rs-232 setting.

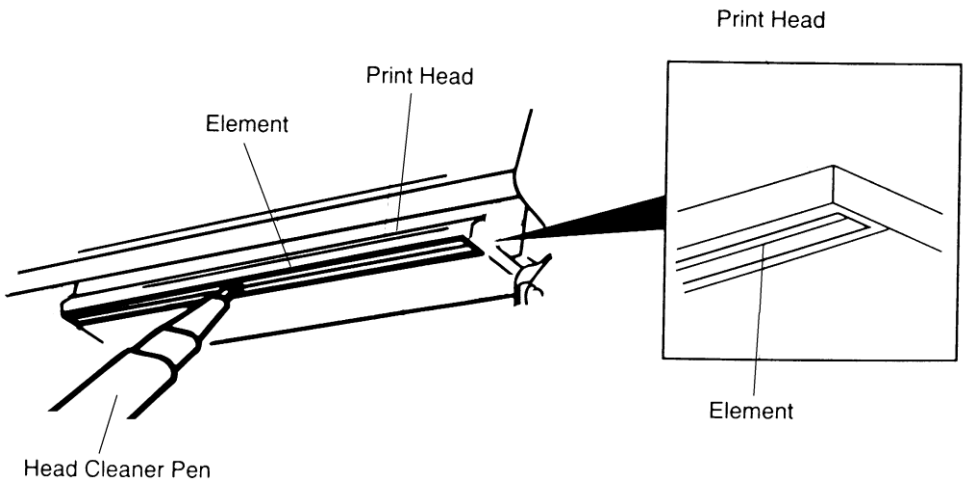
5. MAINTENANCE

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

1. Please use one of following material to clean the printer.

- Cotton swab
- Lint-free cloth
- Vacuum / Blower brush
- 100% ethanol

2. The cleaning process is described as following,

Printer Part	Method	Interval
Print Head	1. Always turn off the printer before cleaning the print head. 2. Allow the print head to cool for a minimum of one minute. 3. Use a cotton swab and 100% ethanol to clean the print head surface.	Clean the print head when changing a new label roll
		
Platen Roller	1. Turn the power off. 2. Rotate the platen roller and wipe it thoroughly with 100% ethanol and a cotton swab, or lint-free cloth.	Clean the platen roller when changing a new label roll
Tear Bar/Peel Bar	Use the lint-free cloth with 100% ethanol to wipe it.	As needed
Sensor	Compressed air or vacuum	Monthly
Exterior	Wipe it with water-dampened cloth	As needed
Interior	Brush or vacuum	As needed

Note:

- Do not touch printer head by hand. If you touch it careless, please use ethanol to clean it.
- Please use 100% Ethenol. DO NOT use medical alcohol, which may damage the printer head.
- Regularly clean the print head and supply sensors once change a new ribbon to keep printer performance and extend printer life.

Revise History

Date	Content	Editor
2016/4/6	Modify section 3.14 (Replacing the Wi-Fi Module)	Camille

TSC Auto ID Technology Co., Ltd.

Corporate Headquarters
9F., No.95, Minquan Rd., Xindian Dist.,
New Taipei City 23141, Taiwan (R.O.C.)
TEL: +886-2-2218-6789
FAX: +886-2-2218-5678
Web site: www.tscprinters.com
E-mail: printer_sales@tscprinters.com
tech_support@tscprinters.com

Li Ze Plant
No.35, Sec. 2, Ligong 1st Rd., Wujie Township,
Yilan County 26841, Taiwan (R.O.C.)
TEL: +886-3-990-6677
FAX: +886-3-990-5577