Labmate

ATP Hygiene Monitoring System

LMAHM-A100

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Index

1. Safety Measures

Symbols used in this manual that directly refer to the safe and proper operations of the portable ATP hygiene monitoring system.

Icon	Description
	**Warning** Warning operation personnel, pay attention to a certain operation. Operating the portable ATP hygiene monitoring system in any manner not specified in this manual may result in device damage or abnormal function.
	**Reminding** Providing important information that is critical to the success of the operation or use of the device, including the information explained in further detail elsewhere in this manual.
	**Prohibit** Prohibiting operation personnel from performing a certain dangerous operation. Otherwise, it may result in device damage or abnormal function.

1.1 General Precautions

- The portable ATP hygiene monitoring system is safely and reliably designed and manufactured. Personal injury can be avoided if the product is operated properly (as instructed in the manual) and the related precautions are strictly followed.
- Users shall be aware of hazards that may be caused by the portable ATP hygiene monitoring system and its accessories.
- All operators shall be familiar with the safety precautions and warnings described in this section before using the usage of portable ATP hygiene monitoring system.
- Non-observance of the instruction provided or performing any operations not stated in the manual may affect the safety protection provided by the portable ATP hygiene monitoring system.

1.2 Operation Environment Precautions

Icon	Description
	**Prohibit** Never run the portable ATP hygiene monitoring system in places with flammable and explosive gases.
	**Warning** Do not place the portable ATP hygiene monitoring system in an extreme temperature environment.

1.3 ATP Quickswab Precautions

Icon	Description
	**Warning** Kindly carefully read the related information and precautions of ATP Quickswab before using the detector.
	**Reminding** Kindly follow national and local environmental protection regulations and laws for the usage of ATP Quickswab.
	**Warning** Do not insert any other articles into the detector except the ATP Quickswab, and do not squeeze the ATP Quickswab while inserting.
	**Warning** Kindly make sure the outside surface of the ATP Quickswab is clean and dry before inserting it into the detector.

1.4 Battery Precautions

Icon	Description
	**Warning** Kindly use the supplied rechargeable lithium-ion battery and adaptor. The recharging voltage is limited to 4.2 V.
	**Warning** Kindly discard the used battery according to local regulations
	**Keyboard and Keys Precautions** **Warning** Do not continuously press the keys on the keyboard of the detector.
	**USB Interface Precautions** **Warning** The computer that is connected to the USB interface of the detector shall comply with BSEN60950/IEC950 standard**.**
	**Device Parts Precautions** Warning The detector is not provided with spare parts. Do not remove any part from the device without permission.

2. Introduction

ATP Hygiene Monitoring System LMAHM-A100 provides real-time monitoring with detection time of 10s/test. It ensures rapid ATP testing for surface cleanliness in various environments. It offers simple operations with immediate results to improve hygiene standards. Equipped with a user-friendly interface and easy-to-read display. Our System is designed for food safety, healthcare and other sectors requiring hygiene verification.

3. Features

- Highly portable
- Powerful memory capacity
- User-friendly operation
- Low consumption
- Fast results
- Pre-configured templates
- Open-reagents

4. Specifications

Model No	LMAHM-A100
Detection Limit	10-16 mol ATP
Detection Deviation	5% or ±5
Self-Calibration at Startup	15s or 60s
Real-Time Detection Time	10 s/test
Correlation Coefficient	≥0.99
Operating Temperature Range	5 ~ 40ºC
Relative Humidity	< 60%
Memory Capacity	255 test plans, 255 user IDs, 2000 test programs, 1000 results
Communication Interface	USB and Bluetooth
Running Time	Continuously work for > 8hrs, standby for > 600hrs
Power Supply	Rechargeable Battery
Dimension	189×70×36mm
Weight	≤ 300 g

5. Applications

ATP Hygiene Monitoring System LMAHM-A100 is ideal for ensuring cleanliness in food safety, healthcare, and pharmaceutical industries. It helps verify surface hygiene and sanitation in high-traffic areas, reducing contamination risks.

6. Instrument Introduction

The structure diagram of the ATP Quickswab is as shown in **Figure 1**

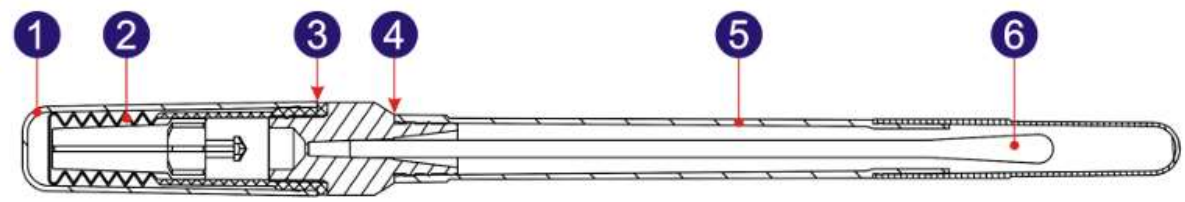


Figure-1

1) Cap
2) Spring Cap
3) Joint Port
4) Unplug the point
5) Test Tube
6) Swab tip

6.1 Structural Diagrams of Detector

The structural diagrams of the Detector are as shown in **Figure 2**.

Figure-2 Detector Structural Diagram

1) Test Chamber
2) Screen
3) Keyboard
4) Top Cover
5) Hang rope hole
6) USB interface

Figure-3

1) Battery Component
2) Label
3) Back Scaffold

6.2 Functions of the keys

The keyboard of the detector is as shown in **Figure 4**. The corresponding key functions are listed in Table 1.

Figure-4

Key	Icon	Function
Power		Power on/off. Standby mode.
OK		Confirm. Start the test.
Setting		Return. Switch between the test and the setting interface.
Up		Move the cursor up; Shortcut key for records.
Down		Move the cursor down, the Shortcut key for statistics.
Left		Move the cursor left; Shortcut key for plan
Right		Move the cursor right, Shortcut key for the program.

Table 1

7. Installation

7.1 Battery Installation

The detector battery is installed by opening the cover of the battery compartment, inserting the battery, and reinstalling the cover.

7.2 Power on self-test

Press the < Power > key to power on the detector. In non-Silent mode, the device will give the power-on alert (one 'beep' sound) to enter the initial interface, as shown in **Figure 5**. In case the detector is charging, kindly long-press the < Power > key (about 2 seconds) on the keyboard to enter the initial interface.

Figure-5 Initial Interface

Note:

- In case of low battery power, the detector may fail to power on, or you will be alerted with a low battery alert followed by the automatic shut. In this condition, kindly charge the detector or change its battery.
- If users are alerted with < Calibration is halted >, it indicates that the power-on self-test of the detector failed. Kindly eliminate the fault as instructed.
- For troubleshooting, kindly refer to Troubleshooting.

8. Working Principle

The portable ATP hygiene monitoring system adopts the inescence technique to convert invisible ATP concentration (ATP content in the sample) into visible light output, The basic working principle is as shown in **Figure 6**

Figure-6

The portable ATP hygiene monitoring system takes the light energy as a reference to output the test value and displays the test result in quantitative and qualitative form. The test result exhibits the cleanliness of the tested specimen, which should be between 0 and 999999 relative light units (RLU, 1 RLU = 1×10-16mol of ATP). According to the user-defined upper & lower limits, the detector will automatically offer the determination of the test result and display as < Pass >, < Fail > or < Caution >.

9. Operations

9.1 Quick Operation Instructions

The ATP Quickswab contains an exclusive high-sensitivity liquid stable integrative reagent. It can detect bacteria or other microorganisms on object surfaces and total ATP activities within food residues to quickly provide cleanliness test results. The ATP Quickswab should be used together with the portable ATP hygiene monitoring systems.

9.1.1 ATP Quickswab Operating Procedures

The operating procedures of the ATP Quickswab are shown in **Figure 7.**

1) **Preparing:** Take out the ATP Quickswab from the refrigerator. Wait about 10 to 15 minutes until the internal reagent reaches room temperature, as shown in **Figure 7a**.
2) **Sampling:** Hold the joint port of the ATP Quickswab and unplug the cap at the unplug point. Remove the test tube and pull out the pre-moistened swab tip. Keep 15 to 30 degrees of the swab tip and zigzag swab the sampling area, as shown in **Figure 7b**. Kindly remember to rotate the swab tip while swabbing to ensure close contact with the sampling area (The sampling area should be around 10×10 cm2, and it could be marked within the sampling card).
3) **Installation:** After sampling, kindly hold the joint port of the ATP Quickswab and insert the swab tip back into the test tube, as shown in **Figure 7c**. (The end face of the test tube should be aligned with the lower end face of the blue joint port).
4) **Injection:** Remove the cap of the ATP Quickswab, ensure it is griped in the upright position, and forcibly press down the spring cap several times, as shown in **Figure 7d**. Let the reagent fully flow into the bottom of the test tube and submerge the swab tip.
5) **Mixing:** Hold the upper spring cap of the ATP Quickswab and swing 30 degrees to the left and right (for five seconds), as shown in **Figure 7e**. Ensure the reagent is completely mixed with the sample.
6) **Insertion:** Insert the ATP Quickswab into the test chamber of the detector, which is on the Pre-test interface, as shown in **Figure 7f**. Close the top cover and start the test.

Figure- 7: Operational demonstration of ATP Quickswab

Warning:

- The swab tip shall not contact any other object surfaces to prevent the test result from being affected.
- The swab tip shall not contact any other object surfaces, to avoid the test result from being affected

9.1.2 ATP Quickswab Storage

- The ATP Quickswab test tube shall be stored under 2°C to 8°C, with a shelf life of 12 months.
- Direct sunshine shall be avoided. Kindly maintain the ATP Quickswab with an aluminized foil bag for storage. Do not use the reagent beyond the warranty period.

Biohazard:

- In case the internal reagent of ATP Quickswab comes into the eyes or onto skin, kindly flush eyes or skin with plenty of water. The material safety data sheet (MSDS) can be provided on demand.
- The used ATP Quickswab should be considered as biologically contaminated material. Users should comply with the local or national applicable regulations to dispose of the abandoned Quickswab.

10. Software Operations

10.1 Internal Calibration

10.1.1 Power on Calibration

After powering on and the initial interface is displayed, the detector will enter the calibration interface, as shown in **Figure 8.**

Figure-8 Calibration Interface

Two self-test modes are available, with the calibration time of 60s and 15s (< Fast boot > mode) accordingly. The difference is that with 60s calibration time, the detector will obtain more stable and accurate test results. It is recommended to choose the 60s self-test mode when the machine is powered on for the first time in the day.

Reminding:

- During the calibration time, the power-on self-test is counting down, and users could press < SET **Setting** > key to enter the setting interface.
- On the settings interface, users could select < Settings > to enter the system setting page, where the < Fast boot >is shown, select the < Fast boot >, the calibration time will be 15s; Unselect the < Fast boot >, the calibration time will be 60s.
- Press the < SET **Setting** > key again to return to the previous interface, and the calibration time counting down restarts. The detector will start the calibration, after which it will enter the test interface.

Reminding:

- The calibration pre-conditions of the detector are that there is no ATP Quickswab within its test chamber and its top cover is properly closed.

- If the icon and < Calibration is halted! > are displayed on the screen of the detector, as shown in **Figure 9**. Kindly take out the ATP Quickswab from the detector to continue the calibration process.
- If the icon and < Calibration is halted! > are displayed on the screen of the detector, as shown in **Figure 10**. Kindly close the top cover again to continue the calibration process.

Figure-9 Take out the ATP Quickswab

Figure-10 Close the top cover again

10.1.2 Recalibration

The user could recalibrate the detector if it is necessary. Kindly take out the ATP Quickswab and close the top cover, long press (about 3 sec) < **OK** > key on the test interface. After sounding a short 'beep', the detector will enter the calibration interface again for recalibration.

10.1.3 Auto Calibration

1) If the detector is on the test interface and all the calibration conditions are met, it will automatically perform the calibration process.
2) If the detector is not on the test interface, kindly press the < **Setting** > key to return to this interface, and the detector will automatically enter the calibration interface.

Reminding:

In case the detector has been continuously working for over 30 minutes, or the temperature change of the working environment is over 5℃. The device will automatically perform the calibration process to ensure the accuracy of test results.

10.2 Power-off

Press the < **Power** > key to display the power option menu on the screen of detector, as shown in **Figure 11**. Kindly select the icon and press < **OK** > key to power off the detector.

Figure-11 Power Off

10.3 Power Saving Mode on and Resuming

Two kinds of power saving modes are provided with the detector: Sleep mode and Manual mode.

1) **Sleep mode:** sleep power saving mode can be started automatically according to the user-defined sleep time. When the device is on, and no activity happens during the set time, the device will automatically on standby, and the screen will turn off. Users could press the < **Power** > key to resume.
2) **Manual mode:** manual power saving mode can be started by pressing the < **Power** > key to display the power option menu, where users can select the icon as shown in **Figure 12**. Press the < **OK** > key to put the detector on standby and press the < **Power** > key to resume.

Figure-12 Screen Locker

10.4 Low Battery Alert

The detector will display  icon on the status bar in case the electric quantity is low. Kindly charge the battery in this condition. When the status bar displays  icon, it indicates that the electric power is very low, and the device will shut off immediately. Users will be alerted with three 'beep' sounds before the automatic low battery power off.

Reminding:

If the battery low alert displays, kindly charge the detector as soon as possible. In case the device is unused for a long time, kindly remove the battery and place it in a cool and dry place.

10.5 Icons And Meanings

Icon	Meaning
	The top cover is not properly closed, close it again.
	Kindly insert the ATP Quickswab.
	Kindly take out the ATP Quickswab.
	The incline angle of the device is too large. (The incline angle of the device should be less than 30°)

	Ready, press the < OK > key to start the test.
	Pass, test result is lower than the lower limit.
	Caution, the test result is between the upper and lower limit.
	Fail, test result is higher than the upper limit.
	The USB cable is not connected.
	The USB cable is connected.
	Bluetooth is not connected.
	Bluetooth is connected.
	Charging.
	The electric quantity is low.
	The electric quantity is very low, charge or power off.

10.6 Setting and Operation

10.6.1 Setting Interface

On the test interface, press < SET **Setting**> key to enter the setting interface as shown in Figure-.

Figure-13 Setting Interface

Users could also enter the setting interface by pressing the < SET **Setting** > key while the power-on self-test. Press the < SET **Setting** > key again to restart the self-test and start counting down the calibration time. After the calibration, users will be directed to the test interface.

10.6.2 User

Select < User > on the setting interface and press the < OK **OK** > key to access the user select option, as shown in the **Figure 14**.

Figure-14 User Select

- Press < **Up** > key or < Down > key to view the existing users for selection.
- Press < **OK** > key to confirm the selection.
- Press < **setting** > key, users could return to the previous interface.

Reminding:

The device is configured by default. Users could also execute the same related operations via PC software. For details, kindly refer to 'Portable ATP Hygiene Monitoring System Software Specification'.

10.6.3 Program

Select < **Program** > on the setting interface and press the < **OK** > key to access the < **Set Program** > option, as shown in **Figure 15**.

Figure-15 Set Program

Press < Up > key or < Down > key to select the desired program.

Press < Left > key or < Right > key to view the < Location > and < Surface > of the selected program.

Reminding: The detector offers two kinds of programs:

1) One kind of program is written by computer and marked with an icon before the program number, and its upper and lower limits cannot be changed on the device.
2) The other kind of program is modified on the device and without the icon before the program number, and its upper and lower limits can be user-customized.
3) For a program not marked with the icon, users could press the < **Up** > key or < **Down** > key to select the procedure (as shown in **Figure 16**) and press < **OK** > for confirmation.
4) Move the cursor to the upper limit setting box (as shown in **Figure 17**), using the < **Up** > key or < **Down** > key to set the value (range: 1~9999) and press < **OK** > for confirmation.
5) Move the cursor to the lower limit setting box (as shown in **Figure 18**), using the < **Up** > key or < **Down** > key to set the value (range: 1~9999) and press < **OK** > for confirmation and return to the setting interface.
6) Press < **Setting** > key to quit settings and return to the previous interface.

Figure-16 Program Select

Figure-17 Upper limit Setting

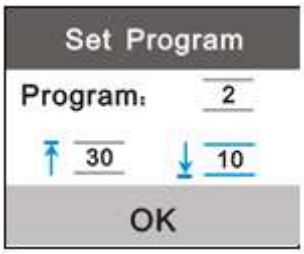


Figure-18: Lower Limit Setting

Reminding: If the detector is stored with programs. Users could press the < Right > key on the test interface to access the set program option.

10.6.4 Plan

Select < **Plan** > on the setting interface and press the < **OK** > key to access the < Plan Select > option, as shown in **Figure 19**.

- Press the < Up > key or < Down > key to select the desired plan.
- Press the < OK > key to confirm the selection.
- Press the < Setting > key to return to the previous interface.

Figure-19 Plan Select

Reminding: If the detector is stored with the plans. Users could press < **Left** > key on the test interface to access the set program option.

10.6.5 Records

Select < **Records** > on the setting interface and press the < **OK** > key to enter the test records interface, as shown in **Figure 20**.

Figure-20 Test Records Interface

- Press < **Left** > key or < Right > key to page up or down.
- Press < **Up** > key or < Down > to move the cursor and select test record.
- Press < **OK** > key to confirm the selection and enter the test record detail interface, as shown in **Figure 21**.
- Press < **Setting** > key to return to the previous interface.

Figure-21 Test Record Detail Interface

On the test record detail interface,  and  options are available. Press the < Down > key to move the cursor and select the  option as shown in **Figure 22**.

Figure-22 Test Record Deletion

Figure-23 Test Record Print

Press < **Left** > key or < Right > key to select and options for test record deletion or print.

Press < **Up** > key to cancel the selection, press < OK > key to confirm and execute the selection

Press < **Setting** > key to return to the previous interface.

Reminding:

- If the detector is stored with test records. Users could press < Up > key on the test interface to access the test records interface.
- Before printing the test records, kindly check whether the matched Bluetooth printer is connected and powered on.

10.6.6 Statistics

Select < **Statistics** > on the setting interface, and press < **OK** > key to access the < Statistics > option, where the statistical information about < Pass >, < Caution >, and < Fail > are displayed as shown in **Figure 24**.

Figure-24 Statistics

- Press the < Right > key to check the storage capacity of the detector, as shown in **Figure 25**
- Press the < **Le**ft > key to return to the < Statistics > option.
- Press the < **Down** > key to move the cursor and select for storage deletion, as shown in **Figure 26**.

Figure-25 Storage Capacity

Figure-26 Storage Deletion

- Press < **Up** > key to cancel the selection.
- Press < **OK** > key to confirm the selection and display the secondary confirmation for all test records deletion, as shown in **Figure 27**.

Figure-27 All Test Records Deletion

- Press < **Left** > key or < **Right** > key to select < Yes > or < No > (< No > is selected by default).
- Press < **OK** > key to confirm the selection.
- Press < **Setting** > to return to the previous interface.

Reminding: If the detector is stored with test records. Users could press < **Down** > key on the test interface to access the < Statistics > option, with other operations the same as the above-mentioned method.

10.6.7 System Settings

Select < **Settings** > on the settings interface, and press < **OK** > key to enter the system setting interface. The options on this interface and their corresponding functions are listed in the Table as follows. The options on the system setting interface.

Option	Function
Date & Time	Set the date and time and its format
Sleep time	Set the auto-standby duration
Save test	Save test results or not
Fast boot	15s and 60s calibration time selection
Silent Mode	Buzzer On / Off
Language	Select the display language
Factory reset	Clear all user information
Bluetooth	Bluetooth On / Off
Brightness	Adjust the screen brightness

10.6.8 Template

Select < **Template** > on the setting interface, and press < **OK** > key to enter the reference template interface, where the commonly used templates are provided. Users could select a certain reference template and press < **OK** > to confirm the selection and access the reference template for this industry. The template itself provides the test < Sites>, < Upper >, and < Lower > limits.

- Press < **Left** > key or < Right > key to page up or down.
- Press < **Up** > key or < Down > key for line feed.
- Press < **OK** > key to confirm the selection.
- Pess < **Setting** > to return to the test interface and the selected template will be automatically set as the test program.

10.6.9 Help

Select < **Help** > on the setting interface, and press < **OK** > key to enter the help interface where the < Company > name and < Website > information of the manufacturer are provided.

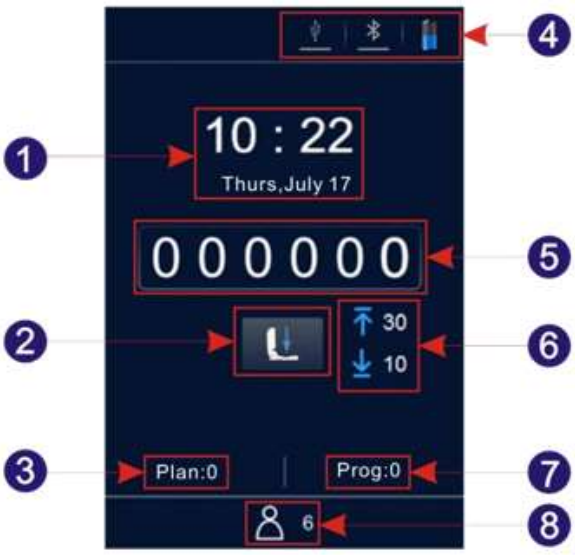
10.6.10 About

Select < **About** > on the settings interface, and press < **OK** > key to enter the about interface where the information of < Battery level >, < Temperature >, < Device name >, < Hardware version >, < Software version >, and < Serial number > is provided.

10.7 Test and Test Result

10.7.1 To-Be-Tested Interface

After power-on self-test and calibration, the detector will enter the To-be-tested interface, as shown in **Figure 29**.



1) Date and Time
2) Condition Prompt
3) Plan.No
4) Status Bar
5) Test Result
6) Upper and Lower limits
7) Program No
8) User No

Figure-29

10.7.2 Program Selection and Setting

There are three program selection methods, including calling of plan program, calling of template program, and a user-defined program.

10.7.2.1 Selection and Setting of User-defined program (Upper and Lower Limit)

1) User-defined programs are those not marked with the icon before the program number.
   - Press the < **Right** > key on the test interface to access the < Set Program > option.
   - Press the < **Up** > or < **Down** > key to select a program and press the < OK > key to confirm the selection.
   - Move the cursor to the upper limit setting box, press the < **Up** > key or < **Down** > key to set its value, and press the < **OK** > key to confirm the setting.
   - Move the cursor to the lower limit setting box and press the < **Up** > key or the < **Down** > key to set its value.
   - Press the < **OK** > key three times to confirm the setting and return to the test interface, whose current test program will be the one that has just been modified.
2) User could also select < Program > on the setting interface, and press < **OK** > key to access the < Set Program > option
   - Press < Up > key or < **Down** > key to select a program and press < OK > key to confirm the selection.
   - Move the cursor to the upper limit setting box, press < **Up** > key or < **Down** > key to set its value and press < **OK** > key to confirm the setting; Move the cursor to the lower limit setting box, press < **Up** > key or < **Down** > key to set its value.
   - Press < **OK** > key three times to confirm the setting and return to the test interface, whose current test program will be the one that has just been modified.

Reminding:

- The detector is stored with 1999 programs that are not marked with the icon by default, ranging from 1~1999 (0 is the default procedure and cannot be modified).

- In case a program is written by users from PC software, such a program will increase progressively from 1 and replace the original program with the same number on the detector. The information about the upper & lower limits, sites of the program can be freely set on PC software according to users' requirements.
- The programs written on the PC software whose program number is marked with an icon cannot be edited again on the detector. For details, kindly refer to 'Portable ATP Hygiene Monitoring System Software Specification'.

10.7.2.2 Plan To Set and Program Selection

The plan is written on PC software and imported into the detector via USB cable. One plan can contain several programs. For details, kindly refer to 'Portable ATP Hygiene Monitoring System Software Specification'.

1) Select < Plan > on the settings interface, and press < **OK** > key to access the < Plan Select > option.
   - Press < **Up** > key or < **Down** > key to select the desired plan.
   - Press < **OK** > key to lock the selected plan.
   - Press < **Up** > key or the < **Down** > key to select the desired program.
   - Press < Right > key to view the < Location > and < Surface > of the selected program.
   - Press < **Left** > key to return to the previous step.
   - Press < **OK** > key to confirm the selection and return to the setting interface.
   - Press < Setting > key to return to the test interface, and the selected program will be automatically set as the current test program.
2) Users could also press < **OK** > key to access the < Plan Select > option for the plans contained.
   - Press < **Up** > key or < **Down** > key to select the desired program within the selected plan.
   - Press < **Right** > key to view the < Location > and < Surface > of the selected program.
   - Press < **Left** > key to return to the previous step.
   - Press < **OK** > key to return to the test interface, and the selected program will be automatically set as the current test program.

10.7.2.3 Calling of Template Program

1) Select < **Template** > on the setting interface, and press < **OK** > key to enter the reference template interface, where the commonly used templates are provided.

2) Users could select a certain reference template and press < **OK** > to confirm the selection and access the reference template for this industry. The template itself provides the test < Sites >, < Upper >, and < Lower >limits.

Reminding: After selecting and confirming a certain template program, Kindly press the < Setting > key to return to the test interface, and the selected template program will be set as the current test program.

10.7.2.4 Start Test

After completing the program setting, users could open the top cover of the detector, insert the test ATP Quickswab, and properly close the top cover. Keep the detector upright and ensure its inclination angle is less than 30°during the test. The detector will display the test interface, as shown in **Figure 30**.

Figure-30

Figure-31 Test Interface

- Press <OK> **OK** > key to start the test and count down the test time (10s). After this, the detector will display the test result.
- The detector will automatically analyze the test result according to the program's upper and lower limits and offer the determination of the test result, displayed as <Pass >, <Caution >, or <Fail >.
- In non-silent mode, one beep will sound before the detector automatically returns to the test interface, where users could press <OK> **OK** > key again for a second or more tests.

10.7.3 Records Regarding Operations

10.7.3.1 View Records

1) Select <Records > on the setting interface, and press <OK> **OK** > key to enter the test records interface.
   - Press <**Left** > key or <**Right** > key to page up or down.
   - Press <**Up** > key or <**Down** > to move the cursor line feed.
   - Press <OK> **OK** > key to confirm the selection and enter the test record detail interface to view the test result.
   - Press <SET> **Setting** > key to return to the previous.
2) The user could also press <**Up** > key on the test interface to directly enter the test records interface.
   - Press <**Left** > key or <**Right** > key to page up or down.

- Press < **Up** > key or < **Down** > key to move the cursor line feed.
- Press < **OK** > key to confirm the selection and enter the test record detail interface to view the test result.
- Press < **Setting** > key to return to the previous.

10.7.3.2 Print records

On the test record detail interface, and options are available.

Press < **Down** > key to move the cursor to option.

Press < **Right** > key to select the option.

Press < **OK** > key to confirm the selection and print the current record.

Reminding: Before printing the test records, kindly check whether the matched Bluetooth printer is connected and powered on.

10.7.3.3 Delete Records

On the test record detail interface, and options are available.

- Press < **Down** > key to move the cursor and select option.
- Press **< OK >** key to confirm the selection and delete the current record.

10.8 Connect Detector to PC or other Terminals

10.8.1 Setup PC Software on PC

Install the supplied PC software CD into the control computer with Windows operating system as instructed.

10.8.2 Connect Detector to PC

- Open the PC software on the computer and use the provided USB cable to connect this computer with the detector while it is powered on.
- The **< USB >** icon on the status bar of the detector will be lit in blue, and a prompt **< Connected >** will pop up on the screen of the detector, reminding users that the device is successfully connected to the control computer.
- Click the **Connect** icon in the toolbar of the PC software. The screen of the detector will display a prompt **< Communicating… >**, reminding users that the device is communicating with the control computer to realize data exchange and other operations.

10.8.3 Disconnect Detector from Connected PC

After the detector is successfully connected to the control computer.

- Users could press < **OK** > key on the detector to disconnect the device from the connected computer.
- Users could also click the Disconnect icon in the toolbar of the PC software to disconnect the device from the connected computer.

10.8.4 Connect Detector to Bluetooth Printer

- Select < **Settings** > on the setting interface, and press < **OK** > key to enter the system setting interface.
- Open the < **Bluetooth** > option on this interface, and the < **Bluetooth** > icon on the status bar of the detector will be lit in blue (The device is named, and its password is 0000).
- After the Bluetooth is enabled, the device can be matched with the Bluetooth printer.
- After matching, the test result can be printed on paper.

10.9 Portable ATP Hygiene Monitoring System Software

10.9.1 Setup

- Open the included CD and locate 'setup.exe' to run the executable file.
- You will be automatically directed to the 'Installation Confirmation' interface, as shown in **Figure 32**.

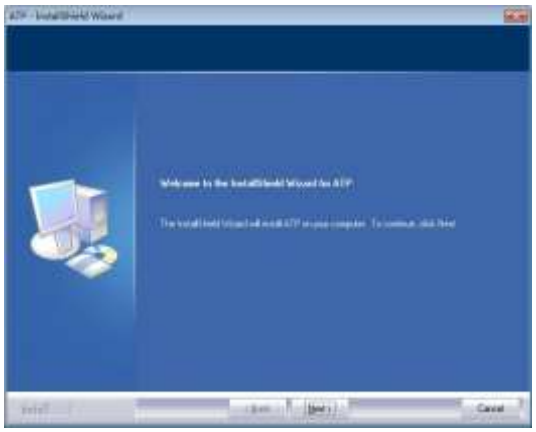


Figure-32 Installation Confirmation

Click the Next button to enter the 'Installation Directory Selection' interface, as shown in **Figure 33**.

Figure-33 Installation Directory Selection

Users could click the Change button to change the Installation directory. Click the Next button to enter the 'Software Installation' interface, as shown in **Figure 34**.

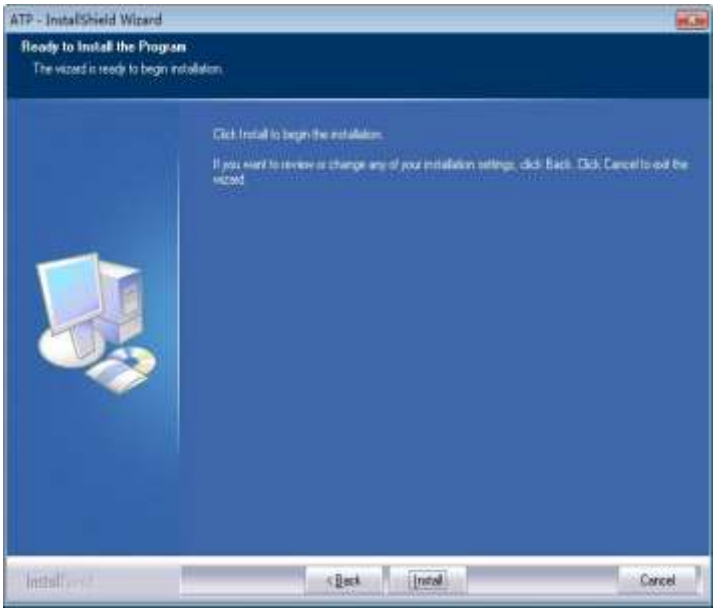


Figure-34 Setup

Click the Install button to enter the 'Installation Status' interface.
After the installation, you will be directed to the 'Installation Complete' interface, as shown in **Figure 35**. Kindly click Finish to confirm.

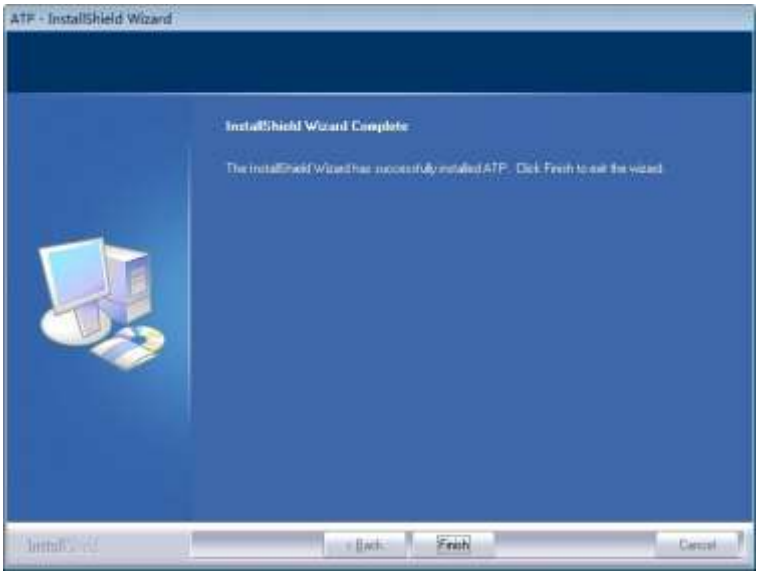


Figure-35 Software Installation

The software will run automatically upon completion of installation and generate a shortcut icon ' ' on the desktop for easy operation.

10.9.2 Remove

Users could find the ‘  uninstall’ icon in the Start menu of the Windows operating system, click it, and an uninstall dialog box will pop up, according to whose prompt, the uninstall operation can be done. Users could also uninstall the software from the ‘Control Panel - Programs and Features’ menu of the computer.

10.10 Software Interfaces and Features

10.10.1 Software Interfaces

The initial interface is as shown in **Figure 36**.

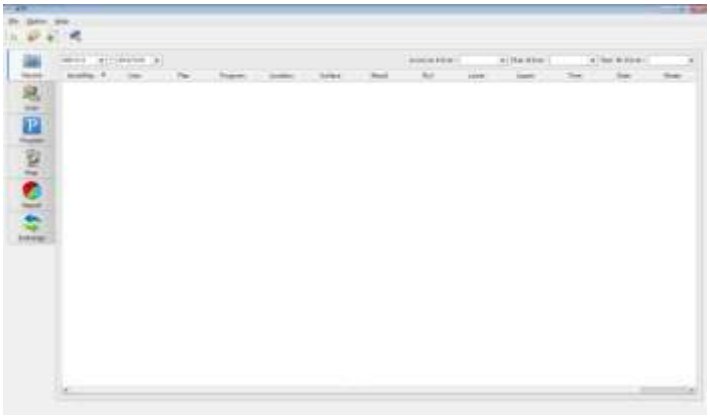


Figure-36 Initial Interface

10.10.2 Overview of Features

10.10.2.1 Menu Bar

File Pull-down Menu		
File	**Icon**	**Feature**
New...		Generate a statistical graph report according to test data
Open...		Open a statistical graph report from the disc.
Export...		Export list contents such as test records and templates to the disc.
Exit	/	Exit the software.
Option Pull-down Menu		
Option	**Icon**	**Feature**
Login…		Log in as an administrator.

Switch	/	Switch interface language.
Connect…		Connect the device.
Exit	/	Exit the software.
Help Pull-down Menu		
Help	**Icon**	**Feature**
Contents F1	/	Display help document information
About	/	Software Version Information

10.10.2.2 Tool Bar

This area contains shortcuts of  **New**,  **Open**,  **Export** and  **Connect**.

10.10.2.3 Function Options

Function Option	Icon	Feature
Record		View, sort, search, delete, and edit of uploaded test records.
User		Edit, add, or delete user templates.
Program		Edit, add, or delete procedure templates.
Plan		Edit, add, or delete plan templates
Report		View, print, or delete statistical graphs.
Exchange		Data sync with device, firmware update, and issue of control command.

10.11 Operating Guidance

10.11.1 Connect Device to PC

Start up the device and use the data cable to connect the device to the USB port of your PC.

10.11.2 Connect Device to Software

Open the software, select the connect icon  from the pull-down menu of the 'Option', or directly click the  icon on the toolbar. After the device is successfully connected to the software, the device interface is as shown in **Figure 37**, and the connect icon also changes to  icon.

Figure-37

10.11.3 Record

10.11.3.1 Description

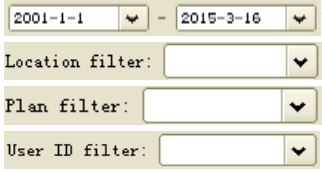
Click the <Record> from the function options on the main interface, the software will directly enter the record interface as shown in **Figure 38**.

Figure-38

After the device is successfully connected to the software and data synchronization is completed, the test record will be displayed in the record management section to display detailed record information.

Users could edit, delete, export, and generate statistical reports based on the test records, and analyze these data by time, location, user, or schedule.

Filter the displayed Options



Users could select the records within a certain period.

Displays the record of a certain location.

Displays the record of a certain schedule.

Displays the records of a certain user.

10.11.3.2 Records Editing

Administrator privilege is required for management of the test records. Under the administrator model, the **< User >**, **< Plan >**, **< Program >**, **< Location >,** and **< Surface >** information of these test records can be edited.

1) Log in as Administrator

From the pull-down menu of 'Option' on the menu bar, click the icon **Login...** to display the 'Input administrator password' dialogue box, as shown in **Figure 39.**

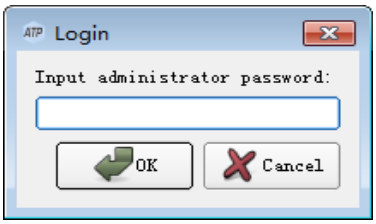


Figure-39 Input administrator password

In the 'Input administrator password' dialogue box, you can input the password '0000' to get the administrator privilege, and click *OK* to log in, as shown in **Figure 40.**

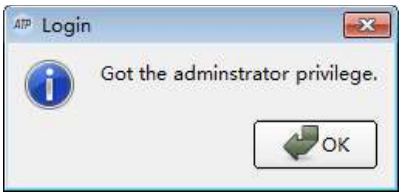


Figure-40 Login Successfully

You can double-click the cell to be edited to edit the related records.

2) Logoff

From the pull-down menu of 'Option' on the menu bar, click the icon Logoff to exit from the system.

10.11.3.3 Records Deletion

After logging as an administrator, users could select a certain record and right-click to delete the selected test records.

10.11.3.4 Records Export

Click the icon **Export** from the pull-down menu of 'File' on the menu bar or directly click the icon ( ) on the shortcut on the toolbar to display the Export dialogue box. Select the save position and enter the file name. Click **OK** to save the file in 'CSV' format that can be opened by Excel or in TXT format, which facilitates data entry of users.

10.11.4 User

10.11.4.1 New user

When the button **Add** in the work area is enabled, click it to add a new user. Input username and press the [Enter] key to confirm it, as shown in **Figure 41**.

Figure-41

10.11.4.2 Edit User

Double click the user entries to be edited to enter the Edit mode, after editing the user name, kindly press the [Enter] key to confirm the modification.

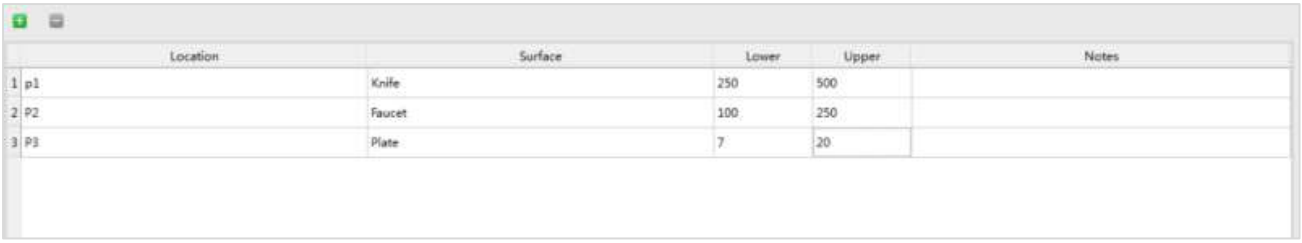
10.11.4.3 Delete User

After selecting the user entries to be deleted, the button ***Delete*** in the work area will be enabled. Press the button and click ***Yes*** in the displayed Confirm Delete dialogue box to delete the selected user entries.

10.11.5 Program

This module provides the feature to customize the test program, which essentially consists of test 'Location', 'Surface', 'Upper' reference limit, and 'Lower' reference limit.

Among them, the test 'Location' and 'Surface', have the maximum character length of 30 characters, and the range of 'Upper' and Lower' reference limit is 1 - 9999, while the upper limit is not less than the lower limit. Up to 1999, programs can be added, as shown in **Figure 42.**



	Location	Surface	Lower	Upper	Notes
1	p1	Knife	250	500	
2	P2	Faucet	100	250	
3	P3	Plate	7	20	

Figure-42

10.11.5.1 New Program

When the button Add in the work area is enabled, click it to add a new program. Input all the corresponding information of the new program and press the [Enter] key to confirm it.

10.11.5.2 Edit Program

Double-click the cell to be modified to enter Edit mode, edit the corresponding content, and press the [Enter] key to confirm the modification.

10.11.5.3 Delete Program

After selecting the program entries to be deleted, the **Delete** button in the work area will be enabled. Press the button and click **Yes** in the displayed Confirm Delete dialogue box to delete the selected program entries.

Reminding: Delete the program in the 'Program' module, and the corresponding program in the 'Plan' module will also be deleted.

10.11.6 Plan

This module provides the feature to customize a test plan that consists of several test programs. As shown in the above figure, the left section displays the t-test plan, while the right section displays test programs contained in the selected test plan.

Up to 255 test plans can be added, each of which contains up to 255 test programs, as shown in **Figure 43**.

Figure-44

10.11.6.1 New Plan

When the button **Add** in the schedule column in the work area is enabled, kindly press the Add button to add a new plan. Users could use the system's automatically generated plan name or manually customize the new plan name. After adding a new plan, the right program column will add the first test record of the current program template by default. Users are allowed to add or change program contents and sequence in the right program column.

Reminding: A plan can be added only when the test program is not null.

10.11.6.2 Edit Plan

Plan editing is to modify the program information of the selected plan. You can select the desired program from the pull-down list in the program column.

10.11.6.3 Delete Plan

After selecting the plan entries to be deleted, the button **Delete** in the work area will be enabled. Press the button and click 'Yes' in the displayed Confirm Delete dialogue box to delete the selected plan entries.

10.11.7 Report

The contents displayed are statistical graph reports generated and saved by New Wizard under the current 'Report' directory, As shown in **Figure 45**.

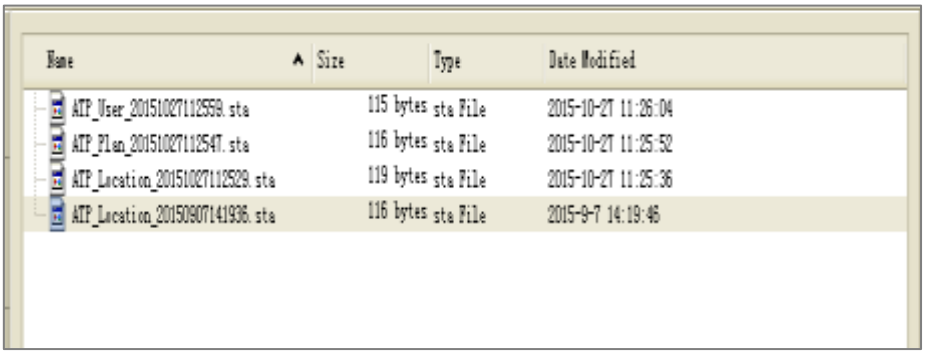


Figure-45 Report

Double-click a certain report to open it, the statistical graph is as shown in **Figure 46**. The user could also right-click it to display the Delete option.

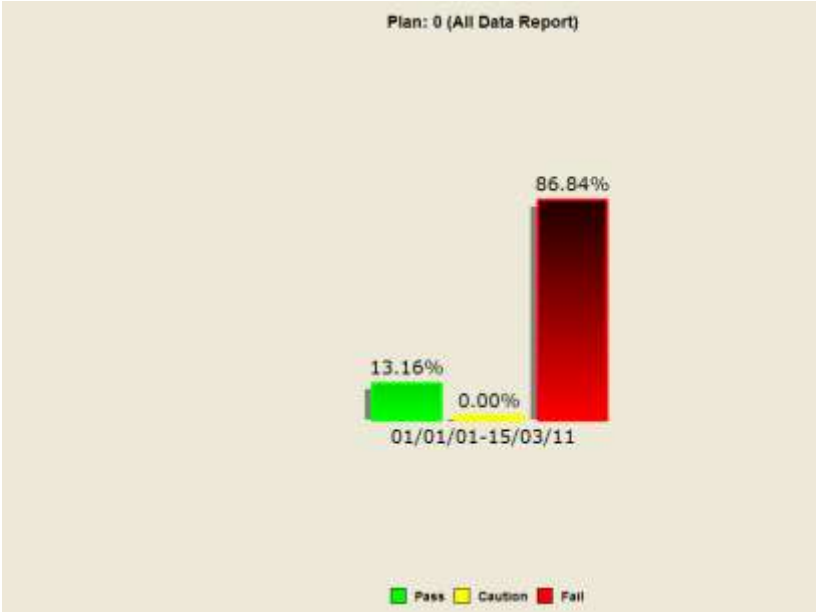


Figure-46 Statistical Graph

Right-click on the statistical graph to display the options menu, as shown in **Figure 47**.

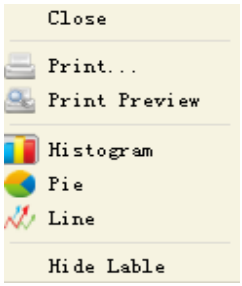


Figure-47 Options Menu

Functions	Description
Close	Close the current statistical graph
Print…	Print the current page
Print Preview	Preview the current page printing effect
Histogram	Display the histogram for the statistical report
Pie chart	Display the statistical report in form of a pie chart
Line chart	Display the statistical report in form of a pie chart
Hide/show Label	Hide/show the percent comment of charts

10.11.8 Exchange

10.11.8.1 Activation Method

- Check that the device is properly connected to your PC through the data cable.
- Click the button **Connect** on the toolbar. This button will change to after connection succeeds.
- If it is not properly connected, check if the device is reliably connected to your PC.
- After successfully connecting the device with PC, 'Device Firmware Upgrade', 'Synchronization' and 'Control Command' buttons will be enabled for data exchange between your PC and device, as shown in **Figure 48**.

Figure-48

10.11.8.2 Device Firmware Upgrade

This module is used to update the device firmware program. Kindly make sure the unit is successfully connected to a computer via the provided USB cable and update. Do not shut down the computer or the device during the update process.

10.11.8.3 Synchronization

This module is used to synchronize the data between the device and the PC. After successfully connecting the unit to the computer, kindly click **Synchronization** to upload the test results from the unit to the computer. After the completion of the upload, the software will automatically remind the users whether to clean all the data in the device?' Click **NO,** the data device will not be deleted; Click **YES,** the test data in the device and the downloaded template will be cleared, and the **< User >**, **< Program >,** and < Plan > templates created on the computer will be downloaded into the device in turn to complete data synchronization.

10.11.9 Command Send

This module is used to send control commands to the device, to realize the remote control of PC software on the device. There are two control commands: 'Single Test' and 'Shutdown'.

Single Test: place the swab and close the top cover to ensure the swab is being tested. Press the **Single Test** key to start the test.

Shutdown: Shot down the device.

11. Maintenance

Daily Precautions

- Kindly read this manual before using the detector.
- Kindly turn off the detector after the test. In case the device is unused for a long time, remove the battery and place it in a cool and dry place.
- The detector belongs to a high-precision optical device which shall be stored and used against damp as well as water and rain.
- The detector should not be operated in a dusty environment to ensure the test result is accurate.
- If the detector automatically powers off due to the low battery. Kindly change it as soon as possible, and do not forcibly start it again and again.
- The detector should not be operated in an environment with strong magnetic field interference.
- No person other than the qualified maintenance staff assigned by our company shall disassemble the detector.

12. Troubleshooting

The main possible errors during the self-test process of the detector and their possible causes.

Description	Possible Cause
Storage unit error	Memory storage fails.
File system error	Initialization of the file system fails.
Temperature test error	The temperature test module fails.
Temperature error	The environmental temperature is not within 5~40°C.
Incline angle test error	The incline angle sensor is invalid.
Battery error	The battery voltage is very low.
Background error	The background value of the test environment is out of specification.
Test module error	The test module fails.

Corrective instruction: For errors during the self-test process, the detector can be restarted on the condition that the battery has sufficient voltage, and the working environment meets the previously mentioned requirements.

Other possible errors and their corrective instructions

Error Description	Possible Cause	Corrective Instructions
Press the < Power > key while the detector cannot be powered on	1) Low battery. 2) The battery is loosened. 3) The device or keyboard is damaged.	1) Connect to an external power supply. If the device starts normally, charge the battery or reinstall the battery.
Press the < Power > key while the detector cannot be powered off	1) Improper operation. 2) The device or keyboard is damaged.	1) Replace the keyboard. 2) Restart or power restart.
Abnormal shutdown	1) Low battery. 2) The battery is loosened. 3) The device has been fell damaged or strongly vibrated. 4) The device is automatically powered off within the standby time. 5) The device is damaged or malfunctioned.	1) Re-install the battery. 2) Check the integrity of the device. 3) Restart the device.

The screen has no display or a partial display	1) The screen is damaged. 2) Auto power saving mode. 3) The device is automatically powered off due to low battery.	1) Wake up power saving mode. 2) Charge the battery.
The test records cannot be stored	1) The system has been set not to store the test records. 2) A certain part of the device is loosened or damaged.	1) Check if the system is enabled to store the test records. 2) Check the integrity of the device.
The test results always read 0 or a value lower or higher than the set limits	1) The ATP Quickswab is not properly used. 2) The ATP Quickswab is expired. 3) The test is performed in an unstable environment. 4) The device is contaminated.	1) Properly use a functional ATP Quickswab. 2) Recalibrate the instrument. 3) Operate the device in a compliant environment. 4) Clean the test chamber.

⚠ **Warning:** In case any of the following conditions occur, kindly immediately power off the device

1) Any liquid has entered the device.
2) Any abnormal sound or smell appears inside the device.
3) The device is soaked with water or rain.
4) Any housing damage caused by the accidental drop of the device.
5) Obvious functional changes of the device.

13. Replacement

13.1 Battery Charge or Replacement

- In case the low battery alert is displayed in the status bar of the detector, kindly charge the battery and be sure to use the supplied power adaptor.
- In case the discharge time of the provided battery is short, or the battery fails to recharge or discharge, replacement must be done by professional personnel

13.2 Test Chamber Clean or Replacement

The test chamber of the detector can be removed for cleaning or replacement.

- Users could open the top cover of the detector, insert one finger into the test chamber, and use the friction force between the finger and the test chamber to pull out the test chamber.
- As the acquisition channel for optical signal, the bottom structure of the test chamber is designed as a special transparent cap. To LMAHM-A100 ensure the optical performance, thus the performance of the detector, the test chamber cap shall be well protected during disassembly. If any part of it is damaged, kindly contact our service support or local distributor for test chamber replacement.
- Users could clean the test chamber interior with warm water or mild detergent. Let the test chamber air dry. After this, kindly insert it back into the detector till it reaches the bottom and is locked. Kindly pay attention to ensure the right direction.

⚠ **Warning:** Kindly power off the detector and remove the battery before cleaning or replacing the test chamber.

Prohibit: It is prohibited to clean the test chamber with strong detergent.

14. Accessories

Optional Accessories
Liqu Swab
Quick swab

Labmate Scientific Inc
Email: info@labmate.com | Website: www.labmate.com