Melting Point Apparatus

LMMA-104

Operational Manual

Index

1. Safety Measures

The instrument was designed using the newest technologies while adhering to recognised safety standards. However, if taken in the following ways, it can still be dangerous:

- Uninstructed staff members adhere to the guidelines.
- Test the samples using the devices for purposes other than determining their melting point.

Prioritizing Safety:

Any disregard for safety measures will result in normal work, property losses, instrument failure, and personal injury to the user.

Risk Prevention Guidelines:

1) A technical malfunction could endanger life; therefore, be sure the power cord is plugged into a grounded outlet.
2) Never handle the sample right out of the body, the cover, or the stove! It might get as high as 400°C.
3) Put the device in ventilation if the dangerous gas breaks down after the sample.
4) The paper should not be pushed against the instrument to avoid heat dissipation and instrument damage.
5) Use it in spaces with adequate ventilation.
6) Do not include the following effects on the environment:
   - When exposed to strong light
   - Excessive vibration
   - There is more than 80% humidity
   - High magnetic or electric field intensity
   - The outside temperature ranges from 5°C to 40°C
   - Volatile gases

2. Introduction

Melting Point Apparatus LMMA-104 utilizes a 420°C to room temperature automatic visual inspection detection method. The data can be sent using a network interface, USB port, RS-232 port, or SD port. With 80 map saves, around 1000 bytes can be stored. It features a heating rate of 0.1 to 20°C per minute and supports 32 GB of storage capacity.

3. Features

- Safe, simple, reliable, and easy-to-use
- Automatic HD visual inspection detection method
- USB, RS232, SD as data interface
- PID precise temperature control
- Temperature range from room temperature to 420°C
- Heating rate of 0.1 to 20°C/ min
- Can save up to 1000 data
- Storage capacity of 32 GB
- Used in food, pharmaceutical industries

4. Specifications

Model No.	LMMA-104
Temperature Range	Room Temperature - 420℃
Detection Method	Automatic/ HD Visual Inspection
Processing Capacity	4 pieces/ batch
Accuracy	± 0.3℃ (< 250℃); ± 0.5℃ (> 250℃)
Magnification	7
Repeatability	0.1℃/ min ± 0.1℃
Storage Capacity	32 GB
Heating Rate	0.1 – 20 ℃/min
Display Mode	TFT high-definition true color screen
Interface	USB/ RS232/ SD/ Network Port
Capillary Size	OD: Φ1.4 mm; ID: Φ1.0 mm
Data Save	1000
Number of User Management	20
Map Save	80
Experimental Program	100 sets
Power	120 W, 220 V 50 Hz

5. Applications

Melting point apparatus are used in food, pharmaceutical, biochemical, medical, mining, and water management industries to figure out the melting point of oil and fat.

6. Instrument Introduction

Instrument Structure:
The figure below depicts the instrument's structural composition:

Figure-1 Instrument appearance

1) Sample temporarily put the bucket
2) Heating furnace
3) 3.5-inch TFT color LCD screen, with image display
4) Key button area
5) The 5.6-inch TFT color LCD screen, a functional human-computer interface
6) SD card slot

Figure-2 Heating furnace

The capillary's dimensions are 120 mm in length, 0.9-1.1 mm in inner diameter, and 0.10-15 mm in wall thickness. The user can then put the capillary into two to three heating holes in the heating furnace. For a single test, there could be one to three samples.

Icon	Description
	Start the photo-taking function
	Start/stop the camera function
	System power switch

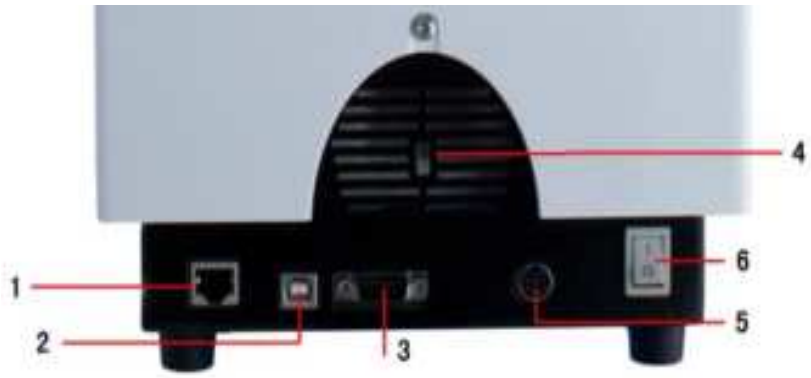

Figure-3 Instrument rear view

1) Network interface
2) USB joggle
3) Serial port
4) Heat dissipation vents
5) Power supply interface
6) Power supply master switch

7. Operations

7.1 Function Introduction

7.1.1 Opening Interface

Once activated, **Figure 4** displays the UI. "Labmate LOGO" is in the centre, and "Melting point apparatus" is below.

Figure-4

The login interface, depicted in **Figure 5**, will be brushed with the starting progress bar. Click the **"Login"** icon in the lower right corner to access the main interface after providing your username and password in the login interface. All users' initial passwords are **888888**.

Figure-5

7.1.2 Main interface

There are two components to the main interface:

Function key section: Setup, test, data, camera, help interface.

Parameter display section: Figure 6 displays the heating rate, current temperature, and preset temperature.

Figure-6

7.1.2.1 Test interface

To access the test interface, which is displayed in **Figure 7**, click **[Test]** at the main interface. Containing the [sample name], [preset temperature], [heating rate], [stop temperature], [initial], [range], and [final] parameter settings.

Figure-7

[Sample name]	It can contain up to 20 characters and be entered in either English or symbols.
[Start temperature]	The range of the input value is 0°C to 100°C.
[Heat-up rate]	The input value range is between 0.1°C and 20°C.
[Stop temperature]	To await the user's next action, the instrument will automatically cool down to the start temperature once the input value range of 5 to 100 hits the stop temperature.
[τ end]	The range of the optical signal intensity at the sample's ultimate melting, which also shows the melting degree, is 0–1200.
[Range]	The sample final melting time signal value's permissible deviation range is 0–1200.
[β]	Calculate the light signal value change after final melting, with a range of 1 to 10.
[τ initial]	The time difference between the automated and actual start melting is between 1 and 120 seconds.

[Default scheme]	Return the factory default optical signal setting scheme to the four [final], [range], and [initial] optical signal setting parameters.
[Scheme Save]	Save all the values that are now being entered, and if necessary, see or call them in the setting interface's [Experimental Scheme].
[Automatic detection]	Run the interface's automated test.
[Manual inspection]	The manual test interface is now available.
[Return]	Go back to the main interface.

An illustration of the significance of the parameter is as follows:
The **[final]** value can be set to 1000, as **Figure 8** displays the sample's melting curve.

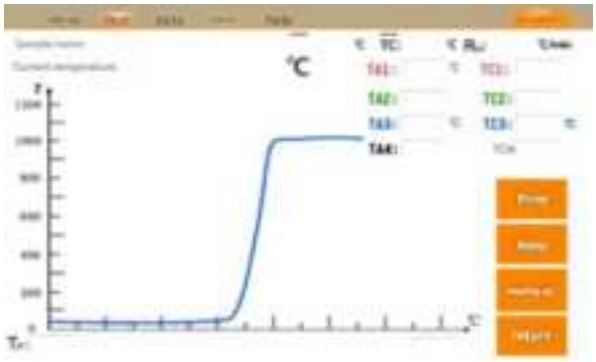

Figure-8

The lowest value, 800, and the highest value, 1150, for several samples are displayed in **Figure 9**. Then, by setting the **[end]** value to 1000 and the **[range]** value to ± 200, the parameter setting may account for all possible ranges that might arise during the sample's final melting, improving the accuracy of the instrument's detection.
Both **[end]** and **[range]** can generally be set to their default values, meaning that the entire range can decide the final melting outcome, and they typically do not need to be changed.

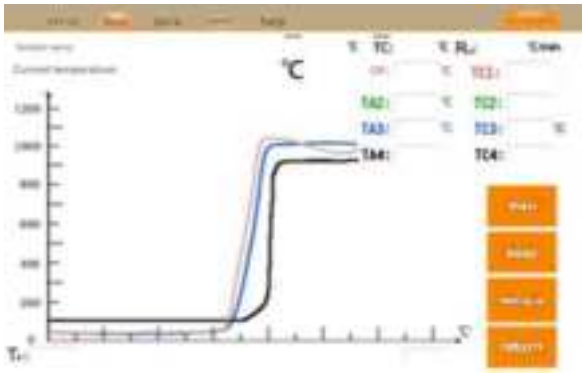

Figure-9

Figure 10 illustrates the sample melting curve, which is smooth after the final melting and allows the [] value to be changed to smaller values like 1 or 2. **Figure 11** shows a significant change in the melting curve trend, allowing the [] value to be set to bigger values like 4 or 5. For the real measurements, all values can be changed. To improve the accuracy of the melting point test results, choose the right value.

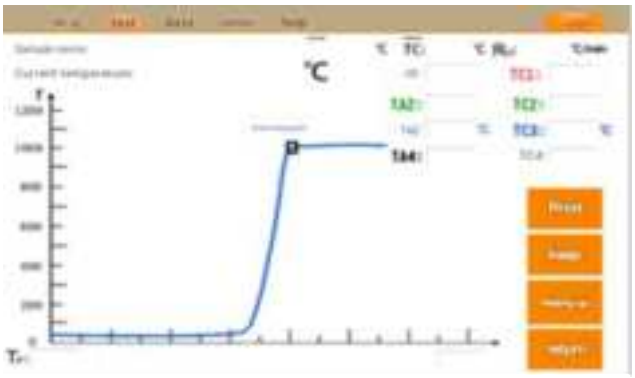

Figure-10

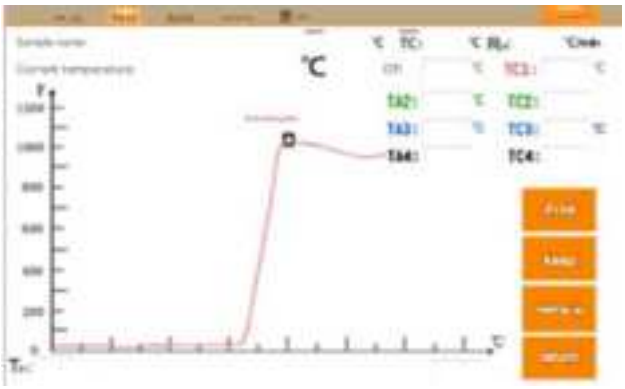

Figure-11

Note:

- To input the data, click on the right side of each parameter and then hit the digital key below.
- To avoid errors, only react to input in the numeric keyboard area while entering data. Press **Esc** to exit or Enter to confirm.

Automatic detection interface:

Click **[automatic detection]** to access the automated detection interface at the test interface after setting the parameters, such as the heating rate and beginning temperature. **Figure 12** shows the interface.

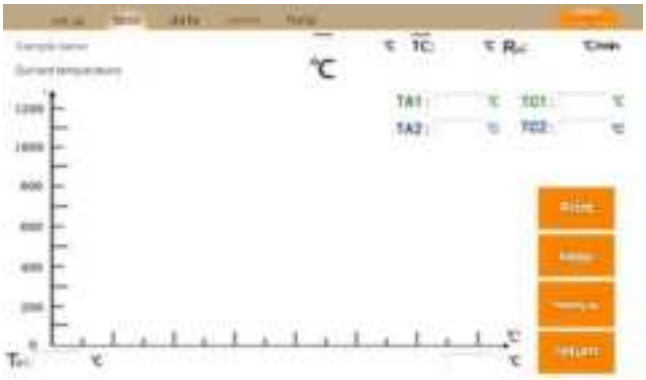

Figure-12

TA	The average of the investigated samples' initial melting temperatures
TC	Average of the examined samples' final melting temperatures
RH	Rate heating
TP	Starting temperature
TA1 to TA4	From right to left, indicate the appropriate samples' initial melting values.
TC1 to TC4	From right to left, indicate the appropriate sample's final melting value.
Horizontal axis	The value of the light passing's optical signal strength
Vertical axis °C	The current temperature of the sample
[Print]	The test results will be printed by the device (if a printer is attached).
[Heating up]	Start the test by heating up at the designated rate.
[Save]	The instrument will save the query and test results (i.e., TA TC value) in the data interface; the user must select the appropriate option in **[System settings]** to save the map displayed during the test procedure.
[Return]	To return to the parameter setting interface, exit the automatic interface.

Note:

- In non-exploration mode, the sample can only be automatically detected for a maximum of seven minutes; after that, the map will no longer display.
  It is advised to change the starting temperature if the sample does not melt completely within seven minutes of the test.
- Multiple samples can be tested for lengthy tests using the Discovery mode test (**[System Settings]** Discovery mode selection for establishing interface).
- After the actual temperature reaches the preset starting temperature (with a buzzer prompt), set it to be tested. Sample (if you put the sample first and then enter the automatic detection interface, it will cause automatic detection abnormalities), press the **[heating up]** button for sample melting point detection. At this time, the melting process of the tested sample can be observed through the video above the instrument, and the instrument will also automatically display the melting curve of the sample, and automatically record the initial melting and final melting value of the sample.

- Press **[Save]** when the test is finished if the system setting is "**Yes**". Because the test saves a lot of map data, ensure to wait for at least two seconds after pressing **[Save]** before doing anything else, like printing or returning; otherwise, the map will not save.

7.1.2.2 Manual detection interface

Once the initial temperature and heating rate have been established, select **[Manual Detection]** in the test interface to access the manual detection interface **(Figure 13)**.

Figure-13

TA	Average initial melting temperature of the examined samples
TC	Final melting temperature average of the tested samples
[Heating up]	Start the test by heating up at the designated rate.
[Save]	The instrument will save the test results (i.e., TA TC value), and if you need to check the test results, you can query them in the data interface
[Print]	The test results will be printed by the device (a printer is optional).
[Return]	Close the test interface and then re-enter it.

After the actual temperature reaches the pre-set starting temperature (prompted by the buzzer), put in the sample to be tested, and press **[Heating up]** to detect the sample's melting point. At this point, it can be viewed in the video above the instrument.

During the melting process of the measured sample, when the measured sample reaches the initial melting degree, click on the corresponding position in **Figure 11 [Initial melting]** key, that is, to record the initial melting value. When the measured sample reaches the final melting degree, click the **[final melting]** key in the corresponding position in **Figure 11**, that is, to record the final melting value.

7.2 Data interface

To access the data interface from the main interface, click **[Data]**. **Figure 14** shows the interface. This interface mostly shows the user-saved data. The stored data group's serial number is 001~, which is the total number of saved data.

Note: The most recent data saved is at the top, so the more recent the data presented, the greater the serial number value.

Figure-14

[Looking back]	Play the user-selected map and the video.
[Print]	Print the user-selected saved data.
[Previous page]	Flip up the page.
[Next page]	Turn down to the page
[Return]	Exit the test interface and return to the main interface

To print or see the data, click on any place in the line of data that has a "" at the head of the journey. To print the user-selected data, click the **[Print]** key; to view the user-selected map and movie, click **[Look Back]**.
Only when both the "**map**" and the "**video**" are shown after the peer data can the user view the pertinent information in the past.

Look back at the interface:
At the data interface, click **[Back]** to enter the lookback interface as shown in **Figure 15.**

Figure-15

[Mode]	Playback and preview modes can be switched between.
[OK]	The user can select the desired video and hit the direction button in **Figure 15** to begin playing it.
[Return]	Exit the back interface and return to the data interface

Operation declaration:
Step 1: Press the **[OK]** button to confirm and open the movie after the user has chosen it using the top, bottom, left, and right keys.
Step 2: The video starts playing when the user hits the **OK** key once more, and a red triangle shows up in the image display's lower left corner.
Step 3: Press **[OK]** to display the related map, **Figure 16**, when the red triangle appears. This step is crucial to ensuring that the video and the map are synchronised.

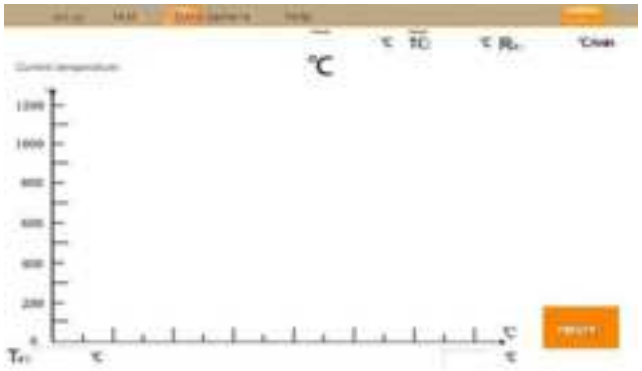

Figure-16

To switch the image display to the preview mode after finishing the callback action, press **[Return]**, navigate to the callback interface shown in **Figure 15**, and then press **[mode]**.

7.3 Set up the interface

To access the Settings interface from the main interface, click **[Settings]**, as illustrated in **Figure 15**. The [system setting], [time setting], [experiment scheme], [printing setting], [user password setting], and [correction] settings are all part of the setting interface.

Figure-17

7.3.1 System setup interface

As illustrated in **Figure 18**, click **[System Settings]** to access the system settings screen.

Figure-18

[Preset prompt]	A sound prompt is necessary when the instrument's real temperature exceeds the default beginning temperature.
[Heating prompt]	The heating indicator will appear after the real temperature (by default) once you click the heating key.
[Heatup camera]	Click the heating device during the test to simultaneously initiate the camera feature (the default is no).
[Save the map]	The device will automatically save the map once the test is over (by default, it doesn't).
[Exploration mode]	Unknown chemicals can be explored because, after the exploration option is chosen, the automatic detection duration can be much longer than seven minutes. [**Note:** 5°C per minute is the suggested heating rate.] (No is the default.)
[Overheat protection/alarm temperature]	The input ranges from 350 to 400. To ensure human-machine safety, the user can preset a temperature in advance, and the device will automatically turn off the continuous heating feature once it reaches that degree (the default is 350°C).
[Return]	Return to the setup interface after leaving the test interface.

7.3.2 Time setting interface

To access the time setting interface, click **[Time Settings]** at the settings interface, as seen in **Figure 19**. Press year-month-day-time-minute-second after clicking anywhere in the box. Then, click on the next digital interface to enter data, and hit Enter.

[Return]: Close the time setting window and go back to the settings window.

Figure-19

7.3.3 Experimental protocol interface

To access the experimental scheme interface, click **[Experimental Scheme]** at the configuration interface, as seen in **Figure 20**.

Figure-20

[Call]	When you click on any point in the single line of the necessary scheme, the "" in front of the trip, and then click **[Call]**, the instrument will automatically input the data of the scheme that the user called into the appropriate parameter items.
[Previous page]	Turn the page up
[Next page]	Turn down to the page
[Return]	Exit the experimental scheme interface and return to the setup interface

7.3.4 Print the setup interface

As illustrated in **Figure 21**, click **[Print Settings]** to open the Print Settings screen.

Figure-21

[Title content]	The printed report's title (by default, Melting Point Apparatus Report)
[Operator]	Printout Report Operator Name
[Return]	Return to the settings interface after leaving the print settings interface.

7.3.5 User password setting interface

To access the password setting interface, click **[Password Settings]** at the settings interface, as seen in **Figure 22**. Click the box next to the new password, type it in using the digital keyboard below, press **Enter**, then **[confirm]**, and restart the computer so that the new password can be used to log in.

Figure-22

[Return]: Return to the setup interface after leaving the test interface.
Note: Just alter the user's current password.

7.3.6 Correct the interface

To access the correction parameter input interface, click **[Correction]** at the configuration interface, as seen in **Figure 23**.

Figure-23

[Sample melting point]	Enter the standard sample's final melting value.
[Preset temperature]	The input values range from 5-100
[Heat-up rate]	The input values range from 0.1-20
[Stop temperature]	The instrument will automatically cool to the start temperature once the input value range of 0-400 reaches the stop temperature. Set the temperature while you wait for the user to do something else. Consider there to be no stop temperature when the stop temperature input is 0.
[Default scheme]	Return the four optical signal setting parameters [final], [range], and [initial] to the factory defaults.
[Restore factory]	Restore factory raw data
[Automatic detection]	Open the relevant rectification interface. It is displayed in **Figure 24**.
[Manual detection]	Open the relevant rectification interface. The user interface is displayed in **Figure 25**.
[Return]	Exit the correction interface and go back to the settings interface
[Correction]	The corrected test result can be saved by pressing the correction key if the test result is not abnormal.
[Heating up]	The detection starts when the temperature rises at a rate of heating.
[Return]	Return to the correction interface after leaving the correction test interface.

Figure-24

Figure-25

Note: To guarantee the correctness of the instrument test, it is advised to apply automatic detection correction for the functional oil melting point.

7.4 Camera interface

To access the camera interface, click **[Camera]** at the main interface, as illustrated in **Figure 26**.

Figure-26

[Mode]	Switch between playback mode and preview mode
[Menu]	To open the image display screen settings panel, click this button. Then, use the UP, DN, photo, and video keys in Figure 26 to adjust the settings as needed. To close the image display screen settings screen, press this key once more.
[UP], [DN], [Photo], [Video]	These four keys play different roles in different modes

Note:

- The external SD card supports 32GB, and the continuous recording time reaches 120 minutes.
- The SD card needs to be inserted properly to take photos and video, and if the SD card is not inserted or the SD card is loose, the screen will display "?"The icon, you need to turn off, plug in the SD card before turning on.

7.4.1 Operation instructions

7.4.1.1 Preview mode

1) To switch between preview and playback mode, press **[Mode]**.
2) To capture pictures, press the **[Photo]** key.
3) To begin recording, press **[Video];** to save and end the recording, press [Video].
   Note: The system will automatically save and stop the video recording when the continuous video file size reaches 4 GB, when the continuous video recording time reaches 60 minutes, or when the SD card is used for video recording.
4) After that, the complete screen will display the Memory complete Memory Full.
5) To configure the preview image to freeze or unfreeze and capture pictures while frozen, press OK.
6) Enter the digital zoom state by pressing [DN], zoom in on the image by pressing **[Video],** then shrink the image by pressing [Photo]. Then, without performing the operation, press **[DN]** or hold for two seconds.
7) To turn the OSD on or off, press the **[UP]** key. Note: OSD is the term for creating a unique glyph or graphics on the screen that gives the user access to information.

7.4.1.2 Menu

To access the View / Audio Settings menu, press **[Menu],** as illustrated in **Figure 27**. The red writing on the screen indicates the current setting, the [UP] / [DN] key chooses the setting item, and the [Photo] / [Video] key changes the option value. To save and close the View / Audio Settings menu, press **[Menu]** once more.

Figure-27

(1) The video settings menu

- **Photo Size (photo size):** VGA / 1.3M / 5M / 9M. It is set to 9M by default.
- **Photo Quality (photo quality):** Level 1 10. The state is set to level 10 by default.
- **Video Size (video size):** VGA / QVGA.V G A by default.form.
- **Video Quality (video quality):** Level 1 10. The state is set to level 10 by default.
- **Brightness (luminance):** Level 1 10. The state is set to level 4 by default.
- **Color (color temperature):** Manual, 6500K, 9300K, and Auto. automatic by default. You can manually set the RGB scale when it is set to Manual. Press OK to open the submenu for changing the colour setting.

- The Manual color sub-menu, as shown in Figure 28.

Red: Level 0-255	The state is set to 128 by default
Green: Level 0-255	The state is set to 128 by default
Blue: Level 0-255	The state is set to 128 by default

Figure-28

- Auto Calibrate White balance automatic calibration sub-menu:
  When the screen says, "Put a blank sheet of paper in front of the camera, press **[Photo]** button to confirm and start automatic calibration, press [Video] button to exit," press **[Photo]** button to confirm and exit, press [Photo] button to recalibrate, press **[Video]** button to cancel and exit," and the RGB scale will automatically calibrate. Press **OK** to enter the automatic calibration submenu.

- Level 1 and 10 are the contrasts. Level 8 is the default setting for the state.
- **Saturation:** Level 1 10 (colour saturation). Level 8 is the default status setting.
- **Sharpness (clarity):** Level 1 10. The state is set to level 8 by default.
- **Mirror (mirror):** Left/right mirror. Set to OFF by default.
- **Flip (flip):** Top/bottom flip. Set to OFF by default.
- **Time Lapse (timing photo):** At the predetermined interval, the module automatically takes a picture. Press OK to access the submenu that is set at the time interval when it is set to ON.
  The time interval when the photo was taken. Set to OFF by default.

- Time Lapse sub-menu, **Figure 29**.

Hour: 00 – 23. The setting is 00 by default.
Minute: 00 – 59. The setting is 00 by default.
Second: 00 – 59. It is set to 10 by default.

- Limit of time interval: the minimum time interval is 10 sec.

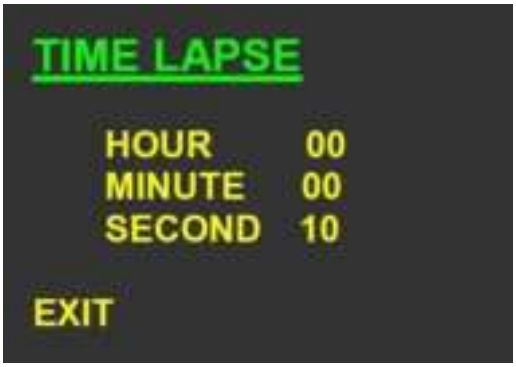

Figure-29

- **Time Sta (Time paste):** When obtaining the image in the photo and video files, you have the option to paste the date and time. By default, it is turned off.
- **Frequency (frequency):** Optional frequency of 50 / 60Hz.It is set to 50Hz by default.

(2) Audio setup menu (which is not supported by this instrument)

- Audio In
- Volume

7.4.1.3 Playback mode

1) To switch between preview and playback mode, press **[Mode]**.
2) As seen in **Figure 30**, the screen will show up to six thumbnails at once. To get to the last or next file, press [Photo] / [Video]. To go to the first or last three files, press [UP] / [DOWN]. To play the current file in full screen, press **OK**.
3) Press **[UP]** to turn on or off the OSD when the photo file is selected, and then [OK] or [mode] to enlarge or reduce the image. When the image scales, [UP] key up, [DN] down, LT key left, and [Video] right.
   Press **[UP]** to turn on or off the OSD when the photo file is selected, and then [OK] or [mode] to enlarge or reduce the image. When the image scales, [UP] key up, [DN] down, LT key left, and [Video] right.
   You can also make the picture smaller by using the keys [UP] up, [DN] down, LT left, and **[Video]** right when the image scales.
   After selecting the video file, you can press [UP] to turn off OSD, **[OK]** to start or stop the video, [Photo] or [Video] to move forward or backward, **[OK]** to stop the video, and **[DN]** to pause or continue.

Figure-30

Note:
All the files will be stored in a subfolder named after the xxxIMAGE.example.
For example: 100IMAGE, 101IMAGE, 102IMAGE, these subfolders are stored in the DCIM folder, each can save 1000 files, such as: PICT0001.JPG, PICT0002.AVI.

7.4.1.4 Key Operation

	Preview mode	Replay back (thumbnail) mode	Replay (individual speech piece) mode
[pattern]	Go to playback mode	Go to preview mode	Enter the Play (thumbnail) mode
[menu]	Enter the system settings		Go to the delete menu
UP	OSD open/close	The first three files	OSD open/close
DN	Enter the digital zoom state	The last three files	
LF	Take a picture	The previous file	The previous file
RT	Start/stop the video recording	Next file	Next file
OK	Freeze / thaw the images	Select and confirm the file	Video file: Start playing the video recording Photo file: enlarge the photos

	Back to the video	Menu Settings	Time Date Settings
[pattern]	Go to playback mode	Go to playback mode	Go to playback mode
[menu]		Save the current settings and exit the menu mode	Exit menu mode
UP	OSD open / close	Select Setup Project	Increase the number

DN	Pause the play/ continue playing	Select Setup Project	Reduce the number
LF	Back play	Select Set Parameters	Move to the previous settings option
RT	Forward Play (2)	Select Set Parameters	Move to the next setting option
OK	Start (1) / Stop playing	affirm	affirm

	Return of the video recording (playback mode)
[pattern]	reduce
[menu]	Full-screen display of the photo file/exit zoom mode
UP	shift up
DN	shift down
LF	left shift
RT	right shift
OK	amplify
	Return of the video recording (playback mode)

7.5 Help interface

To access the help interface from the main interface, click [Help]. Figure 31 shows the interface.

Figure-31

[Note]: To access the precautions interface, press the precautions key.
[Return]: To return to the main interface, exit the test interface.

7.6 Operations steps and use methods

7.6.1 Capillary test sample preparation

1) **Large capillary preparation**
First, fill the capillary's bottom with 0.2 mL of water. After cleaning the outside of the glass tube using paper towels, a large capillary is placed within the furnace body.

2) **Fine capillary mounting sample preparation**
Take out the double-opening capillary, submerge it in the completely melted sample until the oil is about 10 mm high, then store and harden it in accordance with national regulations.

7.6.2 Oil melting point test

1) **Automatic test paradigm palm oil: sample melting point 44.8-53.4°C**
Step 1: Turn on the power switch and preheat the instrument for 20 minutes.
Step 2: Enter the main interface, choose the test, enter the sample name (palm oil), as well as the end, range, and first light optical signal setting parameters, starting temperature (45°C), heating rate (1°C/min), stop temperature (55°C), and default scheme. Then, enter the appropriate interface based on [automatic detection].
Step 3: Once the actual temperature reaches 45°C (as indicated by the buzzer), set the sample's capillary to that temperature. The temperature in the boiler drops a little after the sample is placed, therefore, press the temperature button. When it achieves the final melting degree, the device will automatically show the initial melting value that was reached when the sample reached the initial melting degree.
Step 4: After all the findings are ready, you can either save the data or print it by pressing [print]. You only must do the third step if the sample is tested again. To modify the tested sample, press [Return] and go back to the test interface to adjust the relevant parameter.
2) **Manual test paradigm palm oil: sample melting point 44.8-53.4°C**
Step 1: Turn on the power switch and preheat the instrument for 20 minutes.
Step 2: Press **[manual detection]** to enter the appropriate interface after entering the main interface, choosing the test, entering the sample name (secondary acid), starting at 45°C, heating at a rate of 1°C per minute, stopping at 55°C, and choosing the test.
Step 3: Insert the test sample, press [heating up], and see the melting process of the test sample from the video above the instrument once the real temperature reaches 45°C (with buzzer prompts). Click the [primary melting] key in the appropriate location shown in Figure 13 once the test sample begins to glide up. Click the [final melting] key in the appropriate location shown in Figure 13 once the test sample has completely slipped out of view.
Step 4: You can either save the data or click [print] to print the data once all of the findings are ready. Only the third step needs to be repeated if the sample is tested again. Press [Return] to go back to the test interface for the relevant parameter setting if you wish to modify the tested sample.

7.6.3 Oil melting point correction

Correction paradigm:
The sample final melting point of 50.2°C standard oil correction:
Step 1: Press [Automatic detection] or [Manual detection] to access the appropriate interface after entering the calibration interface in the settings, setting the test parameters for the standard sample naphthalene, entering the sample melting point (50.2°C), start temperature (45.2°C), heating rate (1°C/min), and stop temperature (55.2°C).

The final, range, and beginning light signal setting parameters can be changed based on the samples if the correction technique is carried out by automatic detection (the correction samples are three standard samples, and the parameters can be chosen from the preset scheme).

Step 2: Using the test sample's third step.

Step 3: Click **[Correction]** to save the updated test results if there are no abnormalities. Then, click the third step to test again. The [Return] key can be used to close the correcting interface.

8. Troubleshooting

8.1 Common faults and treatment methods

Fault phenomenon	Cause	Solution
There is fog on the small screen, making it blurry.	Due of its high moisture content, the furnace body heats up rapidly and releases water vapour.	After some time of heating, the water vapour evaporates and immediately returns to its ideal state.
After turning on, the display screen does not reflect	The power supply for the instrument is not connected.	Turn on the power switch or insert the power plug.
Every operation function is unsuccessful.	The heating system's software is broken.	Examine and fix the heating system.
Atlas prevention failed	The save the profile option is not	The map save option is Yes
	Press [Save] to stay for less than two seconds	Press **[Save]** and stay for at least two seconds
Press the **[Heating Up]** key without the display	Lower the temperature setting below the initial value.	Reset the stop temperature
	The heating prompt option is No	The heating prompt option is Yes
Automatic detection of anomalies	Sundries have been present.	Clean up the furnace core debris
	The **[automatic detection]** button is already depressed on the front furnace capillary.	Remove the capillary and restart
	The parameters for automatic detection are not properly configured.	Adjust the automatic detection parameters based on the sample's actual circumstances or the default scheme.
The melting point result is not permitted.	No calibration for a long time	Calibrate the standard samples

	The position of the platinum resistance is loose.	Reconnect and tighten it
	There has sundries	
There is no preview mode on the image display.	No mode switch was made after reviewing the mode	Press **[mode]** to change the image display mode to the preview mode after entering [Camera].
To avoid accessing the main interface, press the Login key.	Wrong username or password input	Re-enter the correct username or password
Poor reproducibility	Inconsistent	Strict guidelines for installing the sample
	The capillary size is inconsistent	Strictly pick up the wool tube
	Low sample purity	The instrument's regular operation is confirmed by high-purity samples.
During the test procedure, it was not possible to monitor the melting process of the sample.	The bottom of the furnace body cannot be directly illuminated by the light source.	For observation, rotate or raise the capillary to a height of less than 2 mm.
	Samples were darker during melting	

8.2 Treatment method of capillary fracture in the furnace body

The following figure illustrates what happens if a capillary fracture happens in the furnace during the test:

Step 1: Hold the cover of the furnace.

Figure-32

Step 2: Rotate 90 degrees anticlockwise.

Figure-33

Step 3: Lift the cover.

Figure-34

Step 4: On the furnace core's support, release the snail.

Figure-35

Step 5: Remove the support for the furnace core.

Figure-36

Step 6: From the damaged capillary, extract the oven core.

Figure-37