User Guide of

CA Series Scientific-Research Grade Thermal Analyzer

English Version (V3.0)

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Contents

1 Introduction

DytSpectrumOwl CA Series Scientific-Research Grade Thermal Analyzer ("CA") integrates imaging, temperature measurement, analysis and data collection into one, and provides effective test data for education, scientific research and factory inspection. CA consists of hardware and software, and supports the use of micro-lenses. The software can be used on the Windows operating system. It not only has the function of independent module suitable for various application scenarios, but can also analyze pre-recorded full radiometric thermal video files.

2 Hardware Assembly

2.1 Accessories

Standard Components

No.	Item	Quantity	Remarks
1	Baseboard	1	
2	Main support frame	1	
3	Cross-bar and main machine of thermal imaging camera	1	
4	Standard lens	1	When the device leaves factory, the standard lens is already assembled onto the main machine of the thermal imager.
5	Macro-lens	1	Interchangeable with the standard lens.
6	USB type C power and data cable	1	
7	Screws for the baseboard	4	In which, 2 screws are spare ones.
8	Extension support rod	1	
9	USB cable bracket buckle	1	
10	High pressure fan	1	Dust and other impurities can be removed from the surfaces of the main machine of the thermal imager and lens.
11	USB flash disk	1	Including the thermal analyzer

			installation software, assembly video, etc.

Optional Accessories

1	Temperature sensor	1
2	Power meter	1

2.2 Assembly and Connection

2.2.1 Bracket Assembly

Open the USB flash disk supplied with the device and open the video "Assemble CA bracket.mp4" to watch the assembly steps.

2.2.2 Lens Installation

Open the USB flash disk supplied with the device and open the video "Install CA lens.mp4" to watch the installation steps.

Precautions:

1. **After the standard lens/macro-lens of the device is installed, the corresponding lens should be selected in the thermal analyzer software to ensure accurate temperature measurement.**

2. **When replacing the lens, it is necessary to make the lens of the device face down to avoid the entry of impurities such as dust, which will not be easy to clean and may cause defects in the image. Please watch the video for detailed guidance.**

2.3 Introduction to Function Keys and Device

①nterface of extension support rod

②Up/down fine-tuning knob

③Up/down adjustment knob

④USB cable to computer

⑤Device vertical tilting angle fine-tuning

⑥Front/back adjustment knob

⑦High temperature resistant anti-static mat

①Device On/Off

③Lens buckle

④Lens focusing barrel

⑤ Type C USB

②1/4" opening

⑤Standard lens

⑥Macro-lens
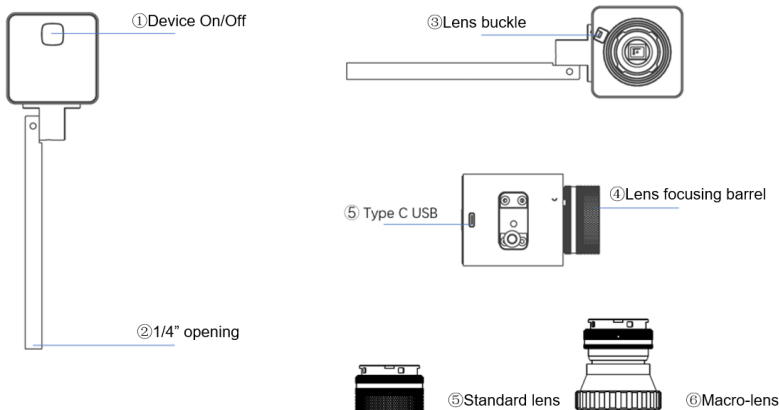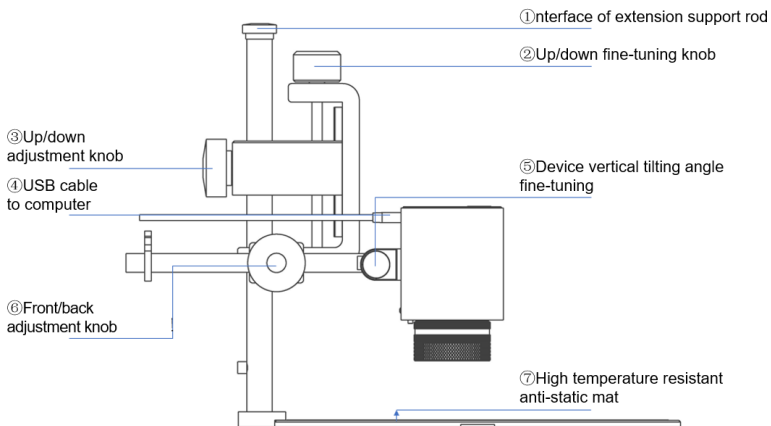
2.4   Precautions for Device Maintenance

1 Never direct high energy such as sunlight and laser at the lens to avoid permanent physical damage to the lens;

2 Never immerse the thermal analyzer in water;

3 Do not use alcohol, detergent and other organic cleaning agents to clean the main machine and lens;

7

4 Please use the high pressure fan to remove dust and other impurities from the main machine and lens;

5 When the analyzer is in a dry environment, it is best to ground the rack or baseboard to prevent the accumulation of static electricity;

6 Do not vigorously rotate the adjustable focus lens, in case of lens damage.

3 Software Installation and System Requirements

Open the USB flash disk supplied with the device, unzip DytSpectrumOwlSetup.zip and click DytSpectrumOwlSetup.exe to install the CA software (or download the software from the official website). The software is installed on the Windows operating system. The installation wizard guides you through the installation.

System Requirements:

Supported Operating Systems	Windows 10 and above
Hardware Requirements	Minimum: CPU I5, 4G RAM; Recommendation: CPU I7，8G RAM or above (A lot of data curves need to be run)

Note:

Software Download

http://dytspectrumowl.net:8080/dytfile/downloadGET?fileName=Software/CA30D/CA30D_3.0.0

4 Start CA Series Thermal Analyzer

4.1 Start

Connect the camera of CA Thermal Analyzer to your computer via the USB cable, and turn on the CA Thermal Analyzer switch. Double-click the Windows desktop icon, or click the Start menu icon

to run the CA thermal analysis software. The device can work when Camera connected is displayed on the upper right corner of the software interface.

Figure:

4.2 Display and Setup

The CA Thermal Analyzer software can adopt multi-window

layout. During use, it is recommended to set "Change the size of text, application and other items" in "Zoom and Layout" in "Display Setup" on Windows to 100%, otherwise, the software display may be incomplete.

Scale and layout

Change the size of text, apps, and other items

100% (Recommended)

Advanced scaling settings

Display resolution

1920 × 1080

Display orientation

Landscape

4.3 Preparation for Temperature Measurement

### 4.3.1 Selecting Lens Mode (Standard Lens/Macro-lens)

After the standard lens/micro-lens is installed, select the corresponding lens (standard lens/macro-lens) in the CA Thermal Analyzer software to ensure accurate temperature measurement.

4.3.2 Manual Focusing

When observing the target object through CA Thermal Analyzer, it is necessary to manually adjust the focal length till the image is clear to ensure accurate temperature measurement.
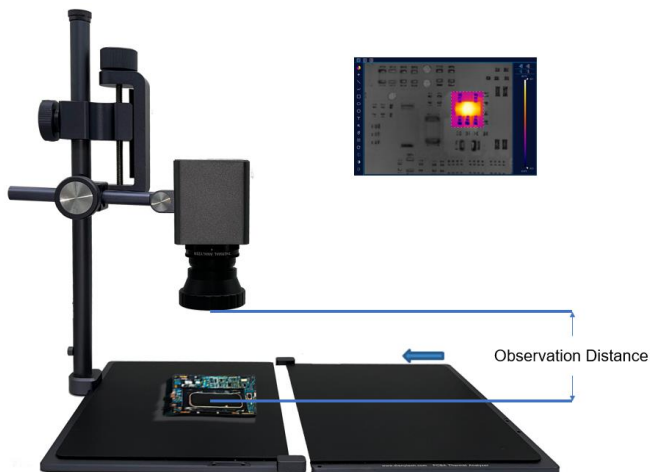
4.3.2.1 Standard Lens Focusing

Figure:
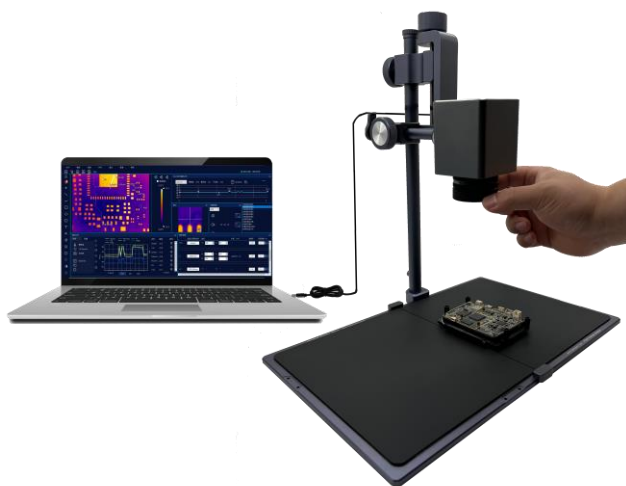
4.3.2.2 Macro lens Focusing

When using a macro-lens, pay attention to the observation distance (10cm~12cm, ±0.5cm), i.e. the distance from the lens to the surface of the object to be measured. Focusing is impossible outside this range.

Observation Distance

Detection Tips:

When detecting the target object, the surfaces of some objects are very smooth and will form reflection. For example, the reflection of some chips on the circuit board may interfere with the circuit diagnosis, causing false hot spots. Therefore, when detecting the circuit board, it is necessary to tilt the circuit board from time to time, or turn the camera of the CA analyzer to a certain angle. After eliminating the reflection, check whether the hot spot is in the same position.

5 Software Menu Description

5.1 Software Function List

| No.	Function	Function Description
1	Extended Device —> Temperature sensor	The temperature sensor is connected to the computer via the USB cable and, after enabled by the thermal analyzer, collects temperature data.
2	Extended Device —> Power meter / load meter	The power meter / load meter is connected to the computer via the USB cable and, after enabled by the thermal analyzer, collects voltage and current data. Voltage and current data can be analyzed in conjunction with temperature data.
3	Extended Device —> Standard lens /macro-lens	After installing the standard lens/micro-lens of the device, select the corresponding lens in the thermal analyzer software to ensure accurate temperature measurement.
4	File —> Full radiometric thermal video file	The thermal imaging video files with temperature data can be analyzed. Post-analysis can be conducted in the thermal analyzer software.
5	Template	An operation interface composed of multiple functional windows. You can save the personalized interface as a common type template in Template.
6	Image	Draw the area where temperature needs to be measured in the thermal imaging video window.

7	Switch —> Check inside the box	Dual palette mode. The background color is black and white, while the rectangular area displays the color of the current palette.
8	Window —> Curve analysis	It captures and displays extended device data and image temperature data from the thermal imaging video window that change over time.
9	Window —> Line real-time temperature	The temperature data of all points on the line are collected and displayed at the same time to effectively analyze the uniformity of the material.
10	Window —> Isotherm	Manually set the fixed measurement range of the color bar, and the minimum range of color change can be set to 0.1℃, which is often used for material analysis in universities.
11	Window —> Photographing and video recording —> Screenshot	It takes pictures and records videos of the entire interface of the thermal analyzer software. As long as it is the function window that has been opened, it can be photographed/recorded and opened using Windows tools.
12	Window —> Photographing and video recording —> Thermal graph	It takes pictures and records videos of the thermal imaging video window of the thermal analyzer software. The pictures taken and videos recorded are opened using Windows tools.
13	Window —> Photographing and video recording —> Full radiometric thermal video	Thermal imaging video files with temperature data are recorded, are opened in the CA thermal analyzer software, and

		can be analyzed.
14	Window —> Graph information	The window used to manage image information, including image name, coordinates and emissivity modification and deletion functions.
15	Window —> Alarm	If the temperature in the temperature measurement area is greater than or equal to the alarm threshold, the software generates an overtemperature alarm.
16	Configuration	It manages the system information of the thermal analyzer software, including language, temperature units, file storage paths, and software update settings.
17	Thermal analysis video window —> Dynamic temperature color bar	The color bar color is automatically displayed according to the temperature change. The color bar is automatically displayed as the temperature of the object changes.
18	Thermal analysis video window —> Fixed temperature color bar	Isotherm function. Manually set the temperature range, and the color bar color is displayed according to the range. This function has the most obvious thermal imaging effect in the testing of the thermal conductivity and heat dissipation performance of a material.
19	Thermal analysis video window —> Low temperature measurement	Low temperature measurement range of the target: (-10~120)℃.
20	Thermal analysis video window —> High temperature	High temperature measurement range of the target: (120~550)℃.

	measurement	

5.2 Software Interface

When the software is opened for the first time, the interface is as shown in the figure:
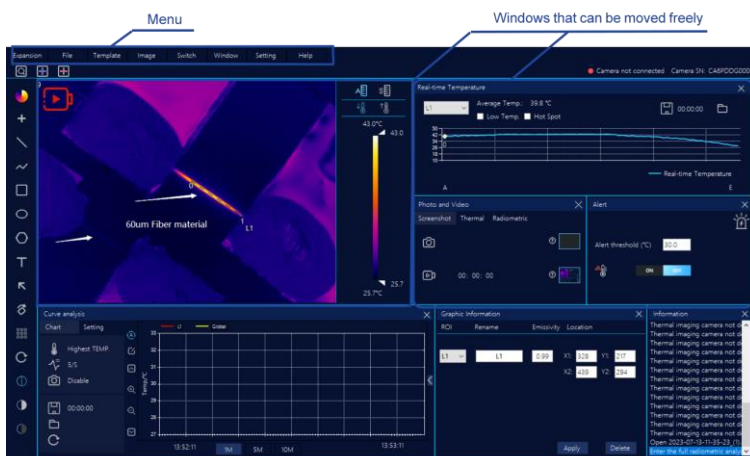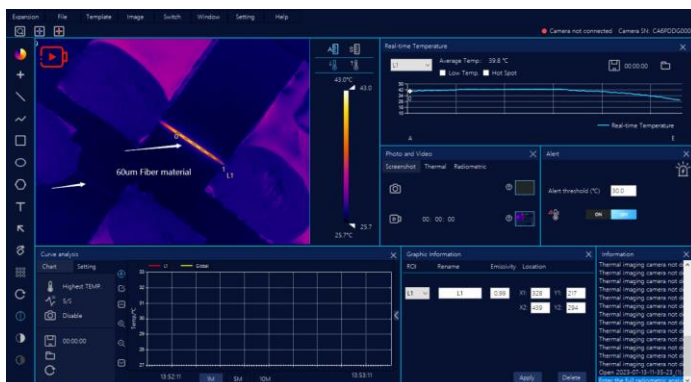
The software is mainly composed of two main defined parts, "Menu" and "Window":

(1) The menu items include:

| Expansion | File | Template | Image | Switch | Window | Setting | Help |

No.	Menu Item	Menu Description
1	Extended Device	Management of common extended devices. You can connect various devices on the management interface. When the devices are successfully connected, the data of each device (sensor temperature, voltage, and current) and temperature data can be comprehensively analyzed.
2	File	You are allowed to open picture or video files in any situation for offline analysis.
3	Template	The software adopts the module window design. You can arrange different windows on the main interface to meet different needs. You can save the personalized interface as a common type template in Template, so that you can directly use the template every time you use the thermal analysis software.
4	Image	In the infrared video window, the graph area where temperature measurement is needed is outlined by points, square boxes, circles, ellipses, irregular polygons, etc.
5	Switch	Switches commonly used for thermal imaging data and analysis. Turn on a type of switch, and the infrared video window will trigger a type of function.
6	Window	Each software function of the thermal analyzer adopts the module window design. You can open and execute the function through the window menu. The windows can be moved freely and enlarged and shrunk.
7	Configuration	The parameters of the thermal analyzer are configured to satisfy more professional applications.
8	Help	Including software instructions and application cases.

(2) Windows, independent functional modules in the form of

combined windows on the main interface, such as thermal imaging window, video recording and photographing window, isotherm definition window, enlarging function window and so on.
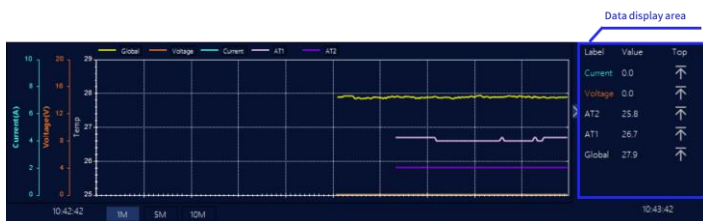
5.3 Software Menu—Extended Devices

### 5.3.1 External Temperature Sensor, Power Meter/DC Load Meter
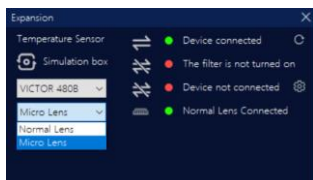
After connecting the external device to the computer through the USB interface, enter the expanded device management interface from the thermal analysis software, select the external device, and click the connection icon ![icon] to connect the device. The status of the connection icon will become ![icon], indicating that the connection is successful. Meanwhile, real-time device data (sensor temperature, voltage and current) will be displayed in the data display area of the curve analysis module and can be comprehensively analyzed in conjunction with the object surface temperature.
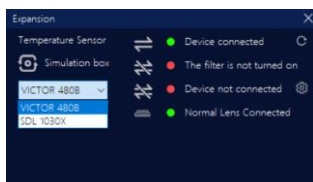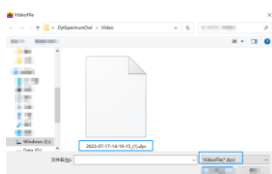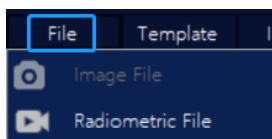
5.3.2 Standard Lens/Macro-lens
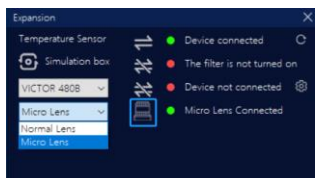
The standard lens for the camera of CA Thermal Analyzer. After installing the lens on the hardware device, enter the extended device management interface from the thermal analysis software and select the corresponding lens mode to ensure accurate temperature measurement.

5.4 Software Menu—File

Enter File Management, and open "Image File" or "Full

20

Radiometric Thermal Video File". Select a file in the file directory and open it. The video file operation menu will be displayed in the "Thermal Analysis Video" window, as shown below:
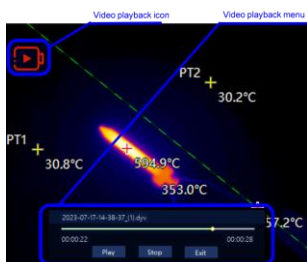
The current file name **.dyv is displayed in the operation menu. You can perform operations such as playing a file or suspending the playback. When the cursor is moved to the menu navigation bar and the cursor identifier changes from an arrow

 to a cross , you can move the menu bar. To exit the offline

analysis mode and enter the online analysis mode, click "Exit".
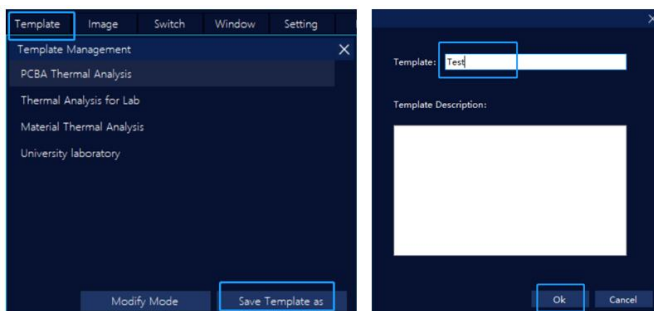
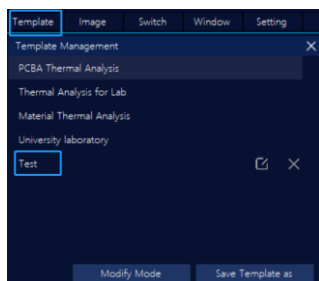## 5.5　Software Menu—Template
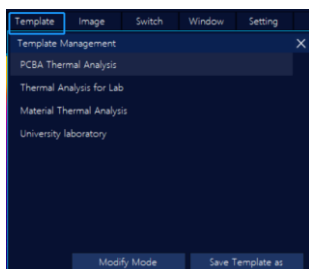
Enter Template Management. The system provides four default templates. After you click and select one, the current template combination window will be displayed on the main
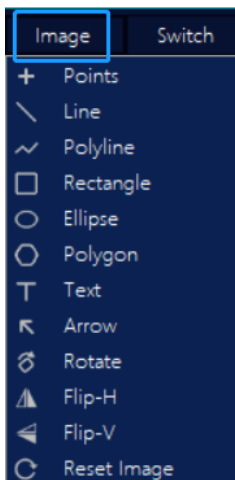
interface.

If you modify the window combination under the current template and want to save it as a personalized combination template, you need to click "Template" on the menu to enter Template Management. Click "Save Template As", modify the template name and description, and click "OK" to generate a new template.

After the new template is generated, each time the thermal analysis software is used, the new template can be used to complete the analytical measurement work.

## 5.6 Software Menu—Image (Draw points, lines, boxes, etc.)

Image	Switch
+ Points	
＼ Line	
∿ Polyline	
□ Rectangle	
○ Ellipse	
○ Polygon	
T Text	
↖ Arrow	
♂ Rotate	
◮ Flip-H	
◁ Flip-V	
C Reset Image	

Click Image and operate the functions from the drop-down menu in the thermal analysis video window.

No.	Image Name	Image Description
1	Draw Point	Anywhere in the thermal analysis window, draw a point for temperature measurement.
2	Draw Line	Anywhere in the thermal analysis window, draw a line to measure the highest temperature and lowest temperature positions of the line and the corresponding temperature values.
3	Draw Broken Line	Anywhere in the thermal analysis window, draw a broken line to measure the highest temperature and lowest temperature positions of the broken line and the corresponding temperature values.
4	Draw Rectangle	Anywhere in the thermal analysis window, draw a rectangle to measure the highest temperature and lowest temperature positions in the rectangle and the corresponding temperature values.
5	Draw	Anywhere in the thermal analysis window, draw an ellipse to

|		
	Ellipse	measure the highest temperature and lowest temperature positions in the ellipse and the corresponding temperature values.
6	Draw Polygon	Anywhere in the thermal analysis window, draw a polygon to measure the highest temperature and lowest temperature positions in the polygon and the corresponding temperature values.
7	Text	You can add a text description to the video screen of the thermal analysis window, as shown in the following figure.
8	Arrow	You can add arrows to the video screen of the thermal analysis window.
9	Rotate	The video screen of the thermal analysis window can be rotated 90 degrees counterclockwise.
10	Horizontal Flip	Horizontal mirror. Flip the thermal analysis window screen horizontally.
11	Vertical Flip	Vertical mirror. Flip the thermal analysis window screen vertically.
12	Reset Screen	Reset the video screen of the thermal analysis window and restore to the initial state.

5.7　Software Menu—Switch
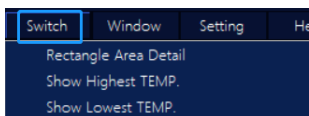
A universal switch for turning on/off for all types of thermal imaging data and analysis.

5.7.1 Switch in Double Palette Mode (Check Inside the Box)

✓ Rectangle Area Detail The rectangular area in the video of the

thermal imaging window is analyzed. The palette inside the rectangular area is effective, and the palette outside the rectangular area is black and white. The palette and color bar adjustments are effective inside the rectangular area only, but not outside the area.

If, after the "Check Inside the Box" switch is turned on, no rectangular area is drawn in the video screen, the software will automatically add a rectangular area in the middle, as shown below:
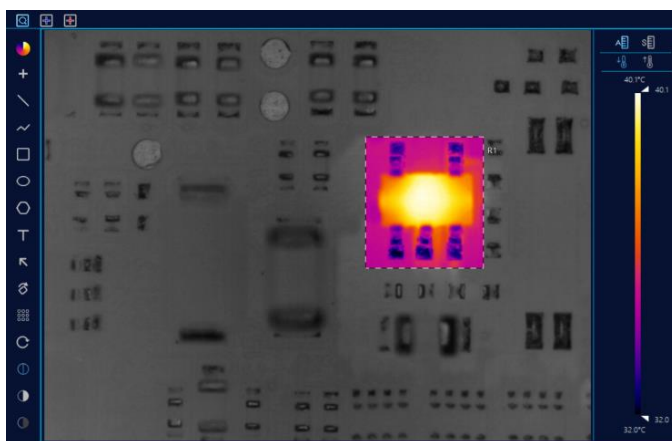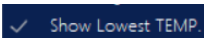
5.7.2 Highest Temperature and Lowest Temperature Measurement Switches

✓ Show Highest TEMP. After the high temperature switch is turned

on, the highest temperature point will be displayed in the video screen accordingly, including lines, rectangular areas, polygon areas, the highest temperature position in the whole screen and

temperature values.

 After the low temperature switch is turned on,

the lowest temperature point will be displayed in the video screen accordingly, including lines, rectangular areas, polygon areas, the lowest temperature position in the whole screen and temperature values.

5.8　Software Menu—Window
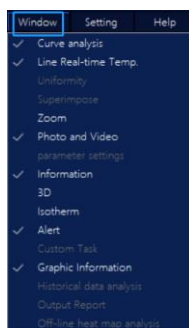
　　With the window function, different functional windows can be displayed on the interface. Except for the thermal analysis video window which is always present, other functional windows can be closed and opened (see the software function window description).

　　When the functional window has been opened and displayed on the main interface, the √ is displayed in front of the function menu item; otherwise, it is not displayed.

5.8.1 Thermal Analysis Video Window
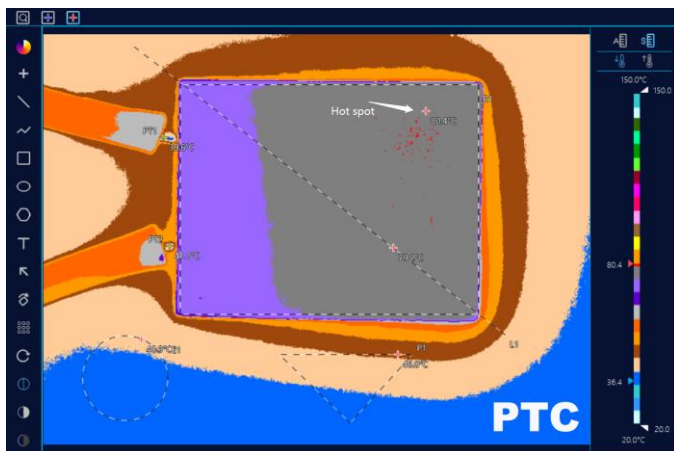
The thermal analysis video window is the most important analysis window and cannot be closed by default. The window is divided into four sections.
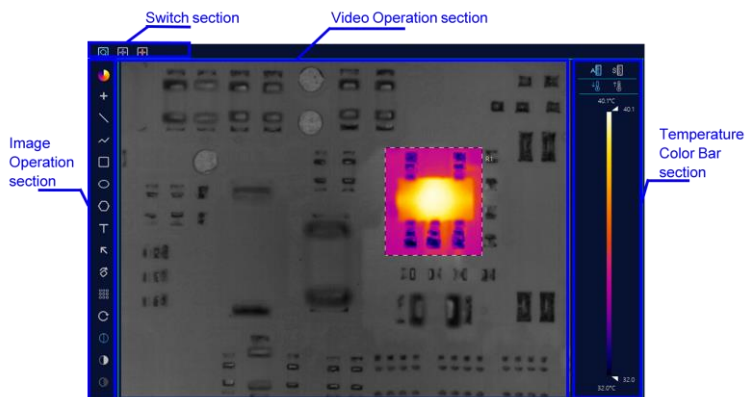

Image Operation section:

Various operations on real-time videos are performed, such as point temperature measurement, line temperature measurement, text marking and other actions.

Switch section:

Various switches are turned on, such as "Check Inside the

Box", "High and Low Temperature Tracking" switches, etc.

Temperature Color Bar section:
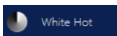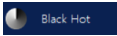
In low temperature measurement or high temperature measurement, the color bar is automatically/manually set as the temperature changes to show the distribution of the highest and lowest temperatures for thermal imaging.
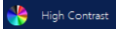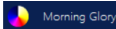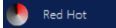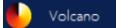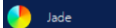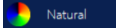
Video Operation section:
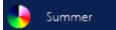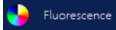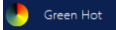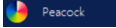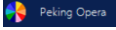
The thermal analysis detection video screen is displayed.

5.8.1.1 Image Operation Section (Palette, Graph, Image Enhancement)

(1) Palette

No.	Palette Name	Description
1	Iron	In high temperature areas, the red takes a large proportion and it is suitable for detecting scenes where high temperature areas account for the main proportion.
2	White Hot	The white indicates the high-temperature section. The whole screen is mainly in the transition from black to white, which is suitable for users liking the traditional mode of black and white.
3	Black Hot	The black indicates the high-temperature section. The whole screen is mainly in the transition from white to black, which is suitable for users liking the traditional mode of black and white.
4	Rainbow	The maximum temperature is indicated in red, the medium temperature is indicated in yellow, and the low temperature is mainly blue and black, which is suitable for scenes with distinct colors of high and low temperature.

5	High Contrast	In the whole temperature range, the whole temperature field is divided into different display areas with 10 fixed and different colors, which is suitable for the application of viewing distinct temperature distribution, such as plane material detection.
6	Morning Glory	Gradual transition of black, blue, red, yellow and white. The black indicates the minimum temperature and the white indicates the maximum temperature. It is suitable for scenes highlighting the high temperature during detection.
7	Red Hot	The main colors are red and black. From the minimum temperature to the maximum temperature, the color transits from black, white to red, which is suitable for the scene of attaching importance to high temperature.
8	Volcano	The whole main color bar is in red, which is similar to the fire red of lava combustion. The main color is in gradient ramp, and the background level is also relatively clear. It is mainly used in the detection environment where the sense of depth of the whole screen is expected to be reflected in red.
9	Jade	The medium low temperature, medium temperature and medium high temperature are indicated in red, yellow and white respectively. It focuses on the change from medium low temperature to medium high temperature. The low temperature section is indicated in light blue and white. It is often used in the scenes where the attention is paid to the change from medium low temperature to high temperature instead of the background, such as material detection.
10	Natural	The maximum temperature is indicated in red, the medium temperature is indicated in yellow, and the low temperature is mainly blue and black, which is suitable for scenes with distinct colors of high and low temperature.

11	Summer	The maximum temperature is indicated in white, the medium high temperature is indicated in the intermediate color of red, the medium low temperature is indicated in the intermediate color of yellow, and the minimum temperature is indicated in the intermediate color of blue and black. It is suitable for the scenes where the maximum and minimum temperature are indicated by two extreme colors.
12	Fluorescence	The red, orange, yellow, green, cyan, blue, purple and black are used on the color board to indicate the change from the minimum temperature to the maximum temperature, and the level of each temperature range is clear level. It is suitable for the scenes where the attention is paid to the overall temperature change and the indications of temperature ranges in distinct colors.
13	Green Hot	The main colors are red, yellow and black. The black, yellow and red are applied to indicate the change from the minimum temperature to the maximum temperature. The high-temperature section is highlighted in red, the medium temperature section in yellow, and the low temperature section in black. It is suitable for scenes where the attention is paid to the medium and high temperature.
14	Peacock	The key point is the medium temperature section, which is mainly in red and yellow. It is suitable for the detection scenes where the attention is paid to the temperature changes in the medium temperature section.
15	Iron Segment	The main body is in rust, but it is reflected by different color blocks in the whole temperature range. It is suitable for the scene of dividing the temperature distribution by isotherms.
16	Peking Opera	The display of color blocks is obvious. It is suitable for the scenes with similar temperature.

(2) Draw Temperature Measurement Graph ➕

No.	Image Name	Image Description
1	Draw Point	Anywhere in the thermal analysis window, draw a point for temperature measurement.
2	Draw Line	Anywhere in the thermal analysis window, draw a line to measure the highest temperature and lowest temperature positions of the line and the corresponding temperature values..
3	Draw Broken Line	Anywhere in the thermal analysis window, draw a broken line to measure the highest temperature and lowest temperature positions of the broken line and the corresponding temperature values.
4	Draw Rectangle	Anywhere in the thermal analysis window, draw a rectangle to measure the highest temperature and lowest temperature positions in the rectangle and the corresponding temperature values.
5	Draw Ellipse	Anywhere in the thermal analysis window, draw an ellipse to measure the highest temperature and lowest temperature positions in the ellipse and the corresponding temperature values.
6	Draw Polygon	Anywhere in the thermal analysis window, draw a polygon to measure the highest temperature and lowest temperature positions in the polygon and the corresponding temperature values.
7	Sudoku	The screen is divided into a number of equal rectangular areas for temperature measurement.

(3) Text 🔤

No.	Name	Description
1	Text	You can add a text description to the video screen of the

		thermal analysis window, as shown in the following figure.
2	Arrow	You can add arrows to the video screen of the thermal analysis window.

(4) Rotate and Mirror 🜨

No.	Name	Description
1	Rotate	The video screen of the thermal analysis window can be rotated 90 degrees clockwise.
2	Horizontal Flip	Horizontal mirror. Flip the thermal analysis window screen horizontally.
3	Vertical Flip	Vertical mirror. Flip the thermal analysis window screen vertically.

(5) Reset Screen ↻

No.	Name	Description
1	Rotate	Reset the video screen of the thermal analysis window, and restore to the initial state, which can remove all graphs drawn and temperatures measured.

(6) Image Enhancement

Three image modes are supported, i.e. universal, enhanced, and high contrast.

| No.	Name	Description
1	Universal 🌓	The Universal mode is selected to display images.
2	Enhanced 🌗	The Enhanced mode is selected to display images.
3	High Contrast ●	The High Contrast mode is selected to display images.

5.8.1.2 Switch Section (Shortcut)

🔍 Check Inside the Box:

The rectangular area in the video of the thermal imaging window is analyzed. The palette inside the rectangular area is effective, and the palette outside the rectangular area is

black and white. The palette and color bar adjustments are effective inside the rectangular area only, but not outside the area.

If, after the "Check Inside the Box" switch is turned on, no rectangular area is drawn in the video screen, the software will automatically add a rectangular area in the middle, as shown below:
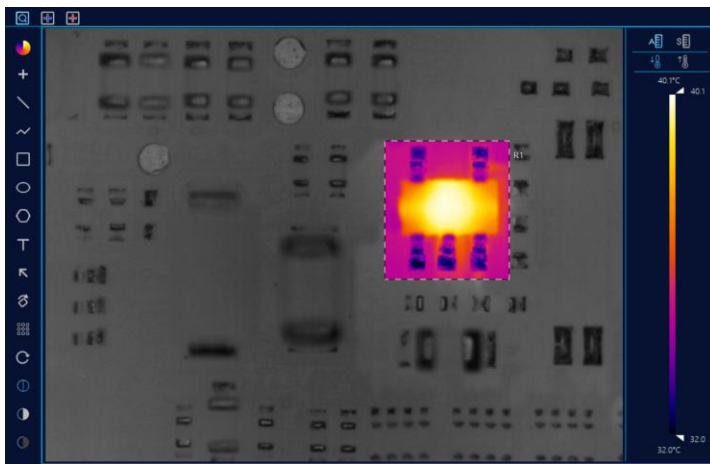
Lowest Temperature Tracking:

After the low temperature switch is turned on, the lowest temperature point will be displayed in the video screen accordingly, including lines, rectangular areas, polygon areas, the lowest temperature position in the whole screen and temperature values.

Highest Temperature Tracking:

After the high temperature switch is turned on, the highest temperature point will be displayed in the video

screen accordingly, including lines, rectangular areas, polygon areas, the highest temperature position in the whole screen and temperature values.

5.8.1.3 Temperature Measurement Mode (Low Temperature Measurement and High Temperature Measurement)

You should select the correct temperature measurement mode according to the temperature measurement requirements to ensure accurate temperature measurement.

No.	Name	Description
1	Low temperature measurement	Measurement Range: -20℃~120℃
2	High temperature measurement	Measurement Range: 120℃~550℃

5.8.1.4 Temperature Color Bar Section

Temperature bars indicate that, in thermal analysis video images, different temperatures are represented by different

colors.

(1) Palette Display Mode

The temperature bar area has two display modes:

(1.1) The temperature bar is displayed dynamically.

It can be selected with the icon . When the dynamic temperature bar is selected, the color distribution of the palette will change according to the highest temperature and lowest temperature of the thermal image. The meaning of the palette is as follows:
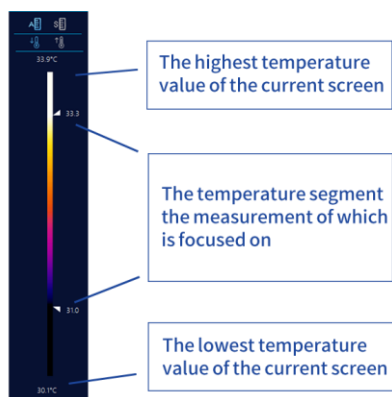
The temperature segment the measurement of which is focused on: You can adjust the temperature segment screen to focus on observation according to your needs. Adjust the data through the up and down arrows. A temperature higher than the highest observed temperature is displayed with white, and a temperature lower than the lowest temperature is displayed with black. For the temperature segment screen the measurement of which is focused on, the colors are distributed according to the palette.

(1.2) Fixed temperature bar (isotherm). It can be selected with the icon . It is defined as a fixed upper and lower temperature range, with the color being fixed in distribution according to the fixed temperature. When the temperature is beyond the range, it is not displayed. Therefore, when using a fixed temperature bar, it is necessary to consider that the temperature of the object to be tested should not exceed the set range. **(For the setting of isotherms, see the instructions in the isotherm window.)**
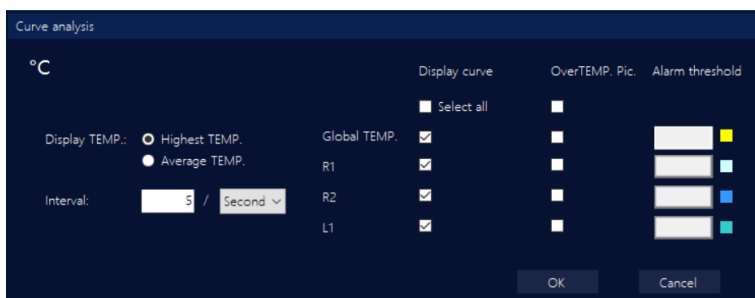
After selecting the fixed temperature bar, it is necessary to set the color in the isotherm palette and click "Apply", as shown below:
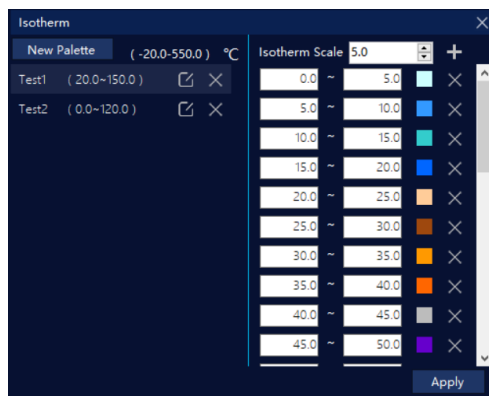
5.8.2 Curve Analysis Template Window

5.8.2.1 Configuration

No.	Name	Description
1	Display Temperature	The temperature shown in the curve is the highest temperature, or average temperature.
2	Sampling Interval	The number of times the temperature is collected per second or per minute, such as 5 times per second, i.e. once every 200ms.
3	Global Temperature	For the full screen, R1/R2 is the rectangle drawn by the user, and L1 is the line drawn by the user.
4	Overtemperature	Set the overtemperature photographing switch for each type of graph. When the highest temperature/average temperature of

	Photograph ing	the graph exceeds the alarm threshold, the system will automatically take pictures.
5	Alarm Threshold	Set the temperature threshold of overtemperature photographing for each type of temperature measurement graph.
6	Curve Color	For each temperature measurement graph drawn on the thermal image, the system will automatically assign different colors.

5.8.2.2 Chart—Display

(1) Operation for Curve Display

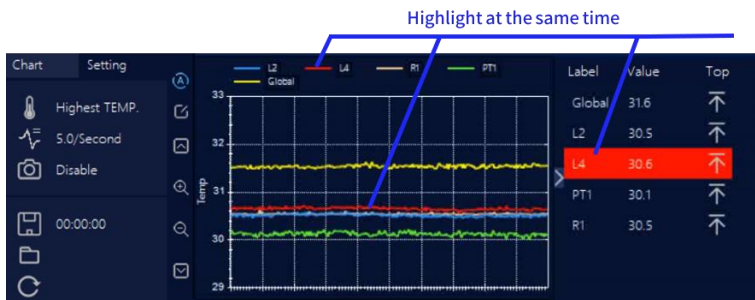| No.	Name	Description
1	Automatic Range	The display range of the measurement range is automatically adjusted.
2	Manual Range	The display range of the measurement range is manually adjusted.
3	Move Up Range	Move up range display
4	Move Down Range	Move down range display
5	Increase Range	Range spacing increase display
6	Decrease Range	Range spacing decrease display

(2) Curve Display Period.

1M 5M 10M   You can select a time display period

of 1 minute, 5 minutes, or 10 minutes.

(3) Real-time Data Display:

No.	Name		Description
1	Title	Label Value Top	To highlight the title. When the extended device is successfully connected, or when the extended device is being connected, re-open the curve analysis module, and the title of the data display area will be highlighted and blinking. When the connection is not successful, or the extended device is not connected, the title will not change.
2	Top	↑	Go to top. The topping operation corresponding to each datum
3	Data		Click "Data", and each observation object can be highlighted on the full video image and in the chart analysis. Right click to cancel the data selection state.

Highlight at the same time

1) The data displays the value on the position identified wih red;

The current data shows the data where the red line is located
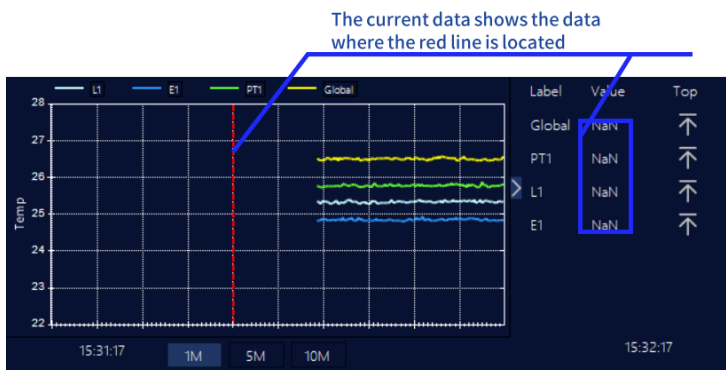
2) Real-time data display. The data displayed is the data at the current moment;

Right-click the mouse on the red line, the red line is cancelled, and the data is displayed as the current time data value.
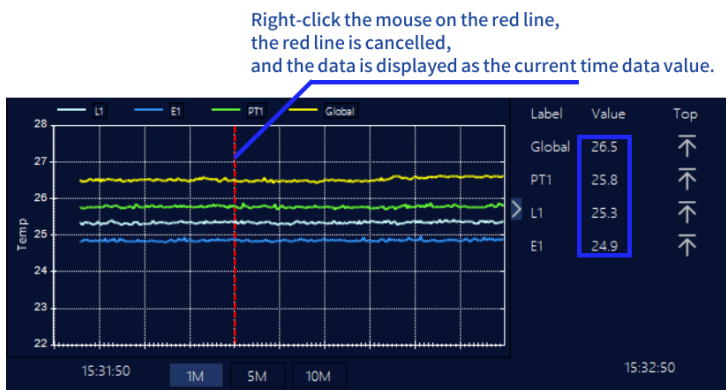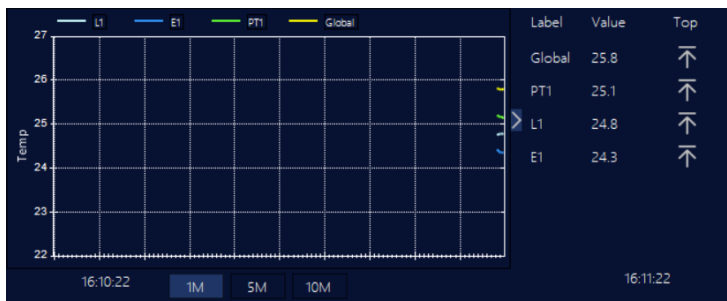
5.8.2.3 Chart—Data Record

No.	Name		Description
1	Record	💾 00:00:00	Start to record data in CSV format
2	Folder	📁	Location where the data CSV file is stored
3	Reset	↻	Refresh the curve chart and restart the display

5.8.2.4 Chart—Data Display of Extended Power Meter/Load Meter
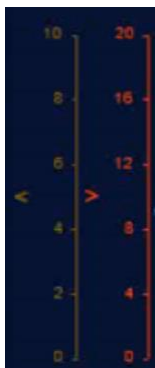
After the extended device is connected to the power meter successfully, the current and voltage coordinate axes will be displayed. If the power meter is not connected successfully or disconnected, the axes will not be displayed.

5.8.3 Line Real-time Temperature Template

Open the template, select the name of the line in the drop-down box, and the system will display the temperature curve and temperature values of all points on the line, as shown below.

5.8.3.1 Line Temperature Distribution Chart

The straight or broken line in the video window is analyzed on real-time basis, and the highest temperature, lowest temperature and average temperature data at the current moment on the line are displayed. A curve is used to show the temperature status of all points on the line at the current moment,

as shown in the figure below:
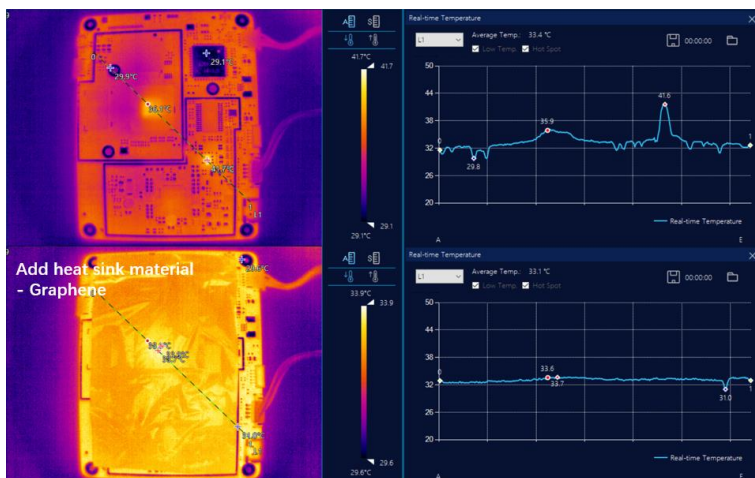
The line temperature distribution chart is often used to compare the temperatures of all points on the line at the same time to help judge the uniformity of the temperature of the measured object.

5.8.3.2 Temperature Display Operations

(1) If you click any point on the line on the right side, you can mark the corresponding point and temperature in the video on the left side, as shown below:

The corresponding point displayed   The point selected
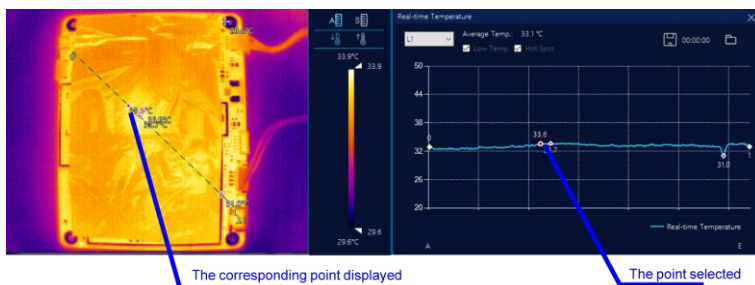
(2) Display of the highest temperature, lowest temperature and average temperature

The highest temperature and lowest temperature switches in the software menu are on, and the highest temperature and lowest temperature on the line are simultaneously tracked in the real-time analysis video window and the line temperature distribution window.

The highest temperature and lowest temperature switches in the software menu are off, and the line temperatures are tracked according to the highest temperature and lowest temperature switches in the line temperature distribution window.

No.	Name	Description
1	Highest Temperature Display	Check the highest temperature, and the highest temperature on the line will be simultaneously tracked in the real-time analysis video window and the line temperature distribution window.
2	Lowest Temperature Display	Check the lowest temperature, and the lowest temperature on the line will be simultaneously tracked in the real-time analysis video window and the line temperature distribution window.
3	Average Temperature Display	Select a line or broken line file name to display the average temperature value.

5.8.3.3 Recording Line Temperature Distribution Data

No.	Name	Description
1	Record 🖫 00:00:00	Record all temperature data on the line
2	Folder 📁	Location where the data CSV file is stored

5.8.4 3D Window of Thermal Field Analysis
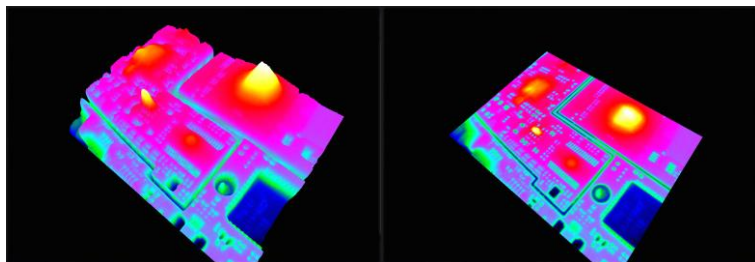
The thermal field state of an object's surface temperature is viewed in 3D mode. In 3D mode, the abnormal image of the circuit board can be clearly observed.

No.	Function	Description
1	Start 3D	Open the 3D window, and 3D picture in picture will be displayed in the middle of the thermal imaging video. At the same time, the picture in picture in 3D mode will be displayed in the 3D window.
2	Move 3D picture in picture	The cursor is placed in the 3D picture in picture displayed in the middle of the thermal imaging video. Hold down the left mouse button to move the 3D picture in picture at will.
3	Close 3D	When the 3D window is closed, the 3D picture in picture in the thermal imaging video will also be closed.

5.8.5 Enlarge Template Window

The function of the enlarge window is to enlarge small detection objects, which can be enlarged by 6 times.

5.8.6 Isotherm Template Window

The isotherm window is effective only when a fixed temperature color bar (isotherm) is selected, and can be selected with the icon , as shown below:
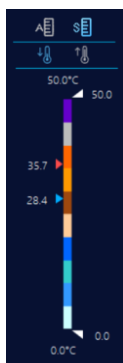
The minimum range of color change can be set to 0.1℃. In this mode, there is fixed correspondence between the temperature and color, which will not change with the temperature changes of the measured object. A variety of comparative tests can be done conveniently.

5.8.6.1 Add Isotherm Template

After selecting "Fixed Temperature Bar", in the isotherm window, you can operate as follows:

(1) Click "Add Isotherm Template"
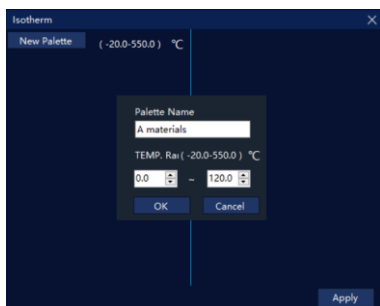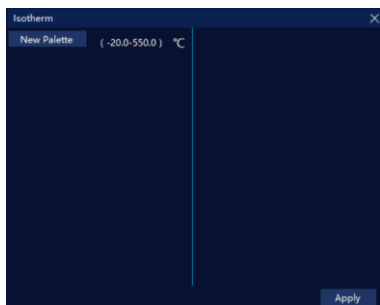
(2) Enter the name of the isotherm palette, and enter the fixed temperature segment of the isotherm palette. Press "OK" to save it as an isotherm template. Click "Apply" to work on the thermal analysis video.
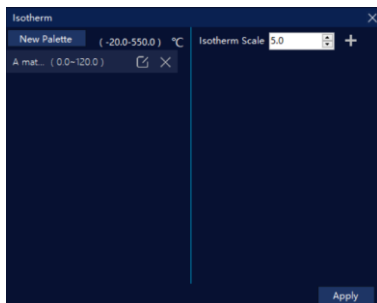
(3) On the right side, you can add isotherm color blocks. Click the + sign after the width of the temperature line to add different isotherm color blocks.
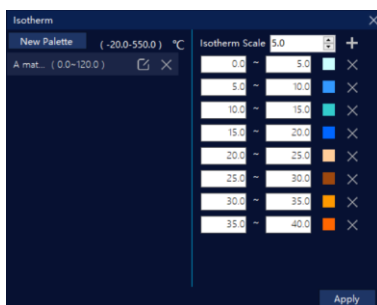
5.8.6.2 Enable Isotherm

In "Fixed Temperature Bar (Isotherm)" in "Color Bar Area", select the fixed temperature bar with the icon [icon]. Select the palette to be applied in the isotherm window, and click "Apply".

5.8.7 Photographing and Video Recording Template Window

Supporting global photographing and video recording of the

software, photographing and video recording of the thermal analysis video window, and photographing and video recording of full radiometric thermal video.

5.8.7.1 Global Photographing and Video Recording

The entire interface of the thermal analyzer software can be recorded and stored. As long as it is a function window that has been opened, it can be photographed/recorded, stored in any file path, and can be opened with Windows tools to record the configuration of each window at that time. Video teaching can also be conducted conveniently.
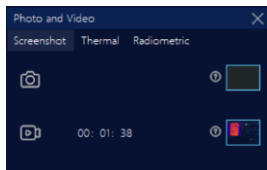
5.8.7.2 Photographing and Video Recording of the Thermal Analysis Video Window

The thermal analysis video window is photographed and recorded, and stored in any file path. The pictures taken and videos recorded can be opened and played with the universal picture and video software.

5.8.7.3 Photographing and Video Recording of Full Radiometric Thermal Video

Photographing and video recording of thermal images with temperature data are supported; the temperature data of each pixel in each frame of video can be recorded; and the pictures

taken and videos recorded can be played and analyzed with this software only.

5.8.8 Graph Information Window

The window used to manage graph information, including graph name, coordinates and emissivity modification and deletion functions.

5.8.8.1 Graph Information

When drawing a graph in the thermal analysis video window, the Graph Information Window displays the default name, emissivity, and current coordinate value of the graph.
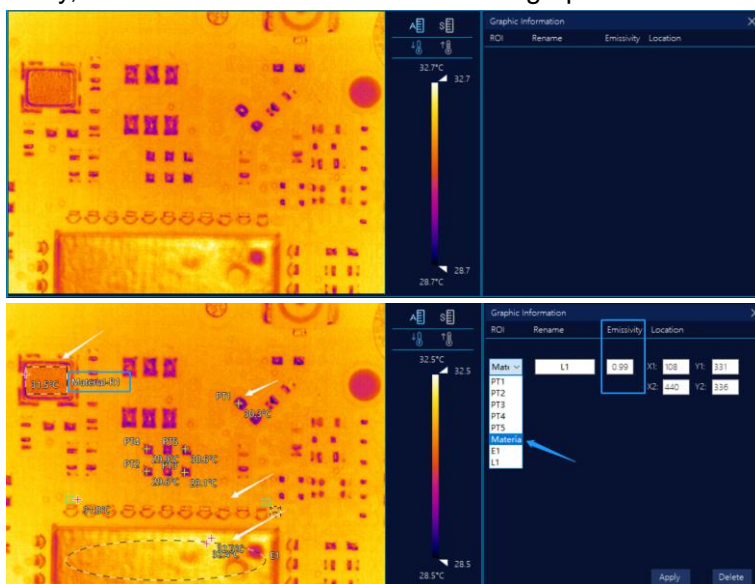
5.8.8.2 Modify Graph Name

Select the graph name, select the graph, and modify the graph name in the "Rename" bar. Click "Apply" to complete the

name modification, and the new name will be used in other windows.

5.8.8.3 Modify Graph Emissivity

Emissivity modification by area is supported. Select the graph name, select the graph, and modify the emissivity value (adjustable in the range of 0.1~1.0). Click "Apply" to complete the graph emissivity modification function. The emissivity values of objects can be queried in the "Common Material Emissivity Table".

5.8.8.4 Modify Graph Coordinates

After a graph is drawn, the system will automatically calculate the graph coordinates. Select the graph name, select the graph, and modify the coordinate value. Click "Apply", and the graph coordinates will be modified successfully.

5.8.8.5 Delete Graph

Select the graph name, select the graph, and click "Delete". The selected graph will be deleted.

5.9 Software Menu—Configuration
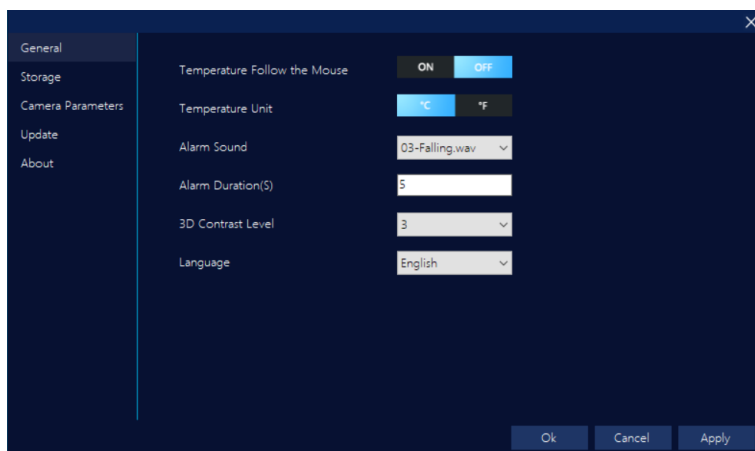
Configuration. The use parameters of CA Thermal Analyzer are configured.

No.	Setting Function	Description
1	Universal → Mouse temperature	Point the cursor to the thermal graph to see whether the temperature switch is displayed.
2	Universal → Temperature unit	The switch for setting the temperature unit to "°C" or "℉"
3	Universal → Alarm sound	Eight temperature alarm sounds are supported.
4	Universal → Alarm duration (S)	Setting the alarm duration, including the sound and the blinking time of the alarm icon.
5	Store → Picture storage location	Setting the location path for storing pictures taken.
6	Store → Video storage location	Setting the location path for storing videos recorded.
7	Store → Record storage location	Setting the path for storing data records of chart analysis and pictures of

		overtemperature photographing.
8	Update → Automatic detection	Setting the automatic software update detection switch
9	Update → Manual detection	Manual software update detection button
10	About	The company's official website

6 Specifications

Parameter	CA-30	CA-60
IR Resolution	384*288	640*512
NETD	<50mK@25℃，f#1.0	<50mK@25℃，f#1.0
Spectral Range	8~14um	8~14um
FOV	29.2°X21.7°	48.7°X38.6°
IFOV	1.3mrad	1.3mrad
Image Frequency	25Hz	25Hz
Focus mode	Manual focus	Manual focus
Working temperature	-10℃~+55℃	-10℃~+55℃
Macro-lens	Support	Support
Measurement and Analysis		
Object Temperature Range	-20℃~550℃	-20℃~550℃
Temperature measurement method	Highest Temp.,Lowest Temp. and Avg Temp.	Highest Temp.,Lowest Temp. and Avg Temp.
Temperature measurement accuracy	±2 or ±2% for -20℃ ~120℃, and ±3% for 120℃ ~550℃	±2 or ±2% for -20℃ ~120℃, and ±3% for 120℃ ~550℃
Measuring distance	（4～200）cm	（4～200）cm
Temperature correction	Automatic	Automatic
Emissivity setup by area	0.1~1.0 adjustable	0.1~1.0 adjustable
Image file	Full-temperature JPG thermogram (Radiometric-JPG)	Full-temperature JPG thermogram (Radiometric-JPG)
Video file	MP4	MP4

Full Radiometric Thermal Video file	dyv format, (opened with CA's software)	dyv format, (opened with CA's software)