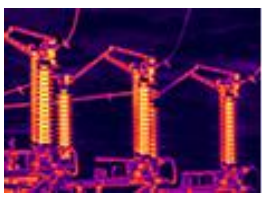
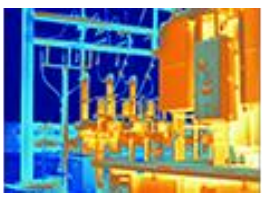
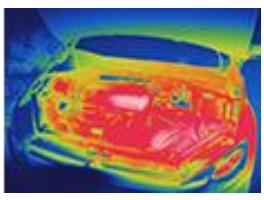
Handheld thermal imager camera

User Manual





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Company Statement

Our company is committed to providing customers with high-quality, high-performance infrared thermal imaging products. We have a professional R&D team and advanced production technology to ensure that each product meets strict quality standards. Our goal is to meet the needs of various industries for infrared thermal imaging technology through continuous innovation and improvement, and to bring customers a better and more convenient user experience. At the same time, we will continue to provide comprehensive after-sales service and technical support to ensure that any problems encountered by customers during use can be solved in a timely manner.

Product Declaration

This product is a handheld infrared thermal imager. We ensure that this product has undergone strict quality inspection and calibration before leaving the factory, and all performance parameters are in line with the description of the product specification. The software and applications installed in the product have been carefully designed and developed to ensure the accuracy and stability of its functions.

When using this product, please be sure to carefully read and follow the operating instructions and precautions in the user manual. Since the company cannot control the user's specific operating environment and methods, it is not responsible for any damage or data loss caused by improper use or unauthorized modification.

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1 Product Introduction

DP -09D infrared thermal imager is a new generation of professional temperature measurement thermal imaging product of Dianyang Technology Company. It supports 96*96 high-definition thermal imaging resolution, can capture the temperature of each pixel of the target object, and realize a variety of applications.

Currently widely used in

- **Electric power industry:** thermal status inspection of transmission lines and power equipment, and fault defect diagnosis.
- **Electrical and mechanical industries:** overheating and fault diagnosis of electrical and mechanical equipment.
- **Construction industry:** detection of moisture, air leakage and insulation defects.
- **Petrochemical industry:** oil pipeline status inspection, material interface detection, heat leakage and insulation structure, power equipment status inspection, etc.
- **Firefighting:** forest fire prevention and potential fire source search, special material spontaneous combustion prevention detection, electrical fire safety detection.
- **Medicine:** Human body surface temperature detection and temperature field distribution analysis.
- Other research and development industries, automation industries, preventive maintenance, etc.



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2 Product Features

Image aspect:

- Equipped with a 96*96 resolution infrared detector, the image is clearer.
- Using Dianyang's unique TisoView image technology, it realizes super-resolution, DDE enhancement, image saturation adjustment, gain adjustment and other algorithms to make the image clearer.

Structural aspects

- Built-in 8GB memory, can store more than 20,000 photos.
- Equipped with a 2600mAh lithium battery, it has a battery life of up to 8 hours, which is enough to meet most work needs.

Temperature measurement:

- Unique laser point temperature measurement mode, which can support temperature measurement at the laser point
- The temperature measurement range is -20℃~550℃, and reaches industrial-grade high-precision standards

Software:

- Dedicated analysis software enables full-frame thermal image analysis.
- Supports two recording modes: photo taking and video recording.

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3 Specifications

Parameter		Specification
Infrared thermal imaging	IR resolution	96x 96
	Wavelength	8~14um
	Pixel size	17um
	TisoView	Supports multiple technologies such as DDE enhancement, denoising, and super resolution, making the image clearer with a resolution of up to 192x192
	Frame rate	25Hz
	NETD	60mK@25℃
	FOV	38° x 50°
	Lens	2.3mmF1.1
	Measurement range	-20°C~550℃
	Measurement accuracy	±2°C or ±2% of reading, whichever is greater
	Temperature measurement	Supports full-screen highest point, lowest point, center point temperature measurement and regional temperature measurement
	Temperature compensation	Support distance compensation within 2 meters
	Color palette	Iron Red, White Hot, Black Hot, Rainbow, Red Hot, High Contrast, Lava, Arctic, Coldest
Image Display	Screen size	2.8 inches
	Image mode	Infrared
General	Language	Supports English, French, German, Spanish, Portuguese, Russian, Arabic, Japanese, Korean, Simplified and Traditional Chinese.
	Interface	USB Type-C (supports charging and data transfer)
	Laser pointer	support
	Flashlight	support
	Battery	2600mAh
	Working hours	When fully charged, the battery can be used for about 8 hours
	Operating temperature	-10°C~+60°C
	Storage temperature	-40°C~+85°C
storage	Capacity	8G built-in memory, actual usable storage 6.19G, can store more than 20,000 pictures
	Image storage mode	JPG
	Video format	MP4

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4 Thermal imager parts introduction



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NO.	Part	Description
①	Menu/ok button	● On the main interface, short press to enter the first level menu; ● In the first-level menu, short press to enter the second-level menu; ● Select the corresponding option on the setting interface and press short press to save the setting;
②	Custom button	● After setting the custom button function in the custom button function in the setting interface, you can perform shortcut operations
③	Power/return button	● Long press to turn on the device when it is powered off; ● Long press in the power-on state to shut down; ● Short press Return on the menu interface;
④	Album button	● Short press to enter the gallery
⑤	Arrow button	Up and down arrow button ● On the main interface, short press to switch the image mode; ● In the menu setting interface, short press up and down to move the selection; Left and right arrow button ● Short press on the main interface to switch the color palette; ● In the menu setting interface, short press to move left or right to select;
⑥	Flashlight	● Open or close via menu function
⑦	Type-C interface	● Users can connect to the PC through this interface to perform operations, including image export, deletion, formatting, etc.
⑧	Laser	● Open or close via menu function

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⑨	Lenses	● Detector original lens
⑩	Trigger	● When in the main interface, short press this button to take a photo. After taking the photo, you need to short press the OK button to save the photo, or short press the Back button to cancel the save. ● On the main interface, press and hold this button until the recording time appears in the upper left corner of the screen, indicating that the video has started. Press the button shortly to stop recording.

5 Function Introduction

5.1 Button Description

No.	Button	Description
1	Power/return button	● In the off state, press and hold for 1s to turn on the device; ● In the power-on state, press and hold for 3s to shut down; ● Short press Return on the menu interface;
2	Menu/OK button	● On the main interface, short press to enter the first level menu; ● In the first-level menu, short press to enter the second-level menu; ● Select the corresponding option on the setting interface and press short press to save the setting;
3	Up and down button	● In the menu setting interface, short press up and down to move the selection;
4	Left and right button	● Short press on the main interface to switch the color palette; ● In the menu setting interface, short press to move left or right to select;
5	Trigger	● When in the main interface, short press this button to take a photo. After taking the photo, you need to short press the OK button to save the photo, or short press the Back button to cancel the save.

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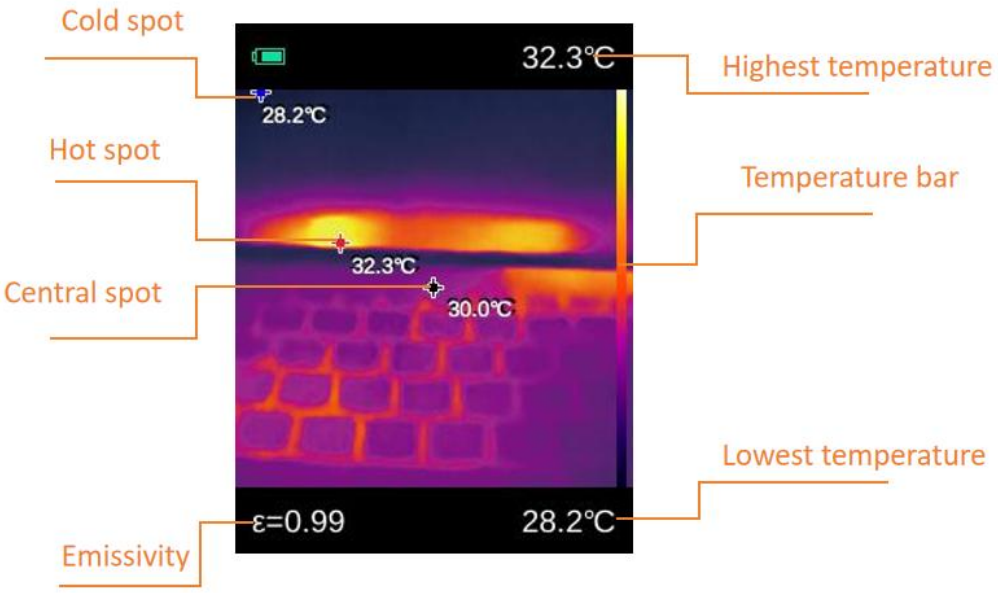
		● On the main interface, press and hold this button until the recording time appears in the upper left corner of the screen, indicating that the video has started. Press the button shortly to stop recording.
6	Album button	● On the main interface, short press the album button to enter the album
7	Custom button	● After setting the custom button function in the custom button function in the setting interface, you can perform shortcut operations

5.2 Main interface



5.2.1 Measurement

Select measure in the first-level menu to enter the second-level menu interface of the measurement function. The second-level menu interface of the measurement function is shown in the figure below:

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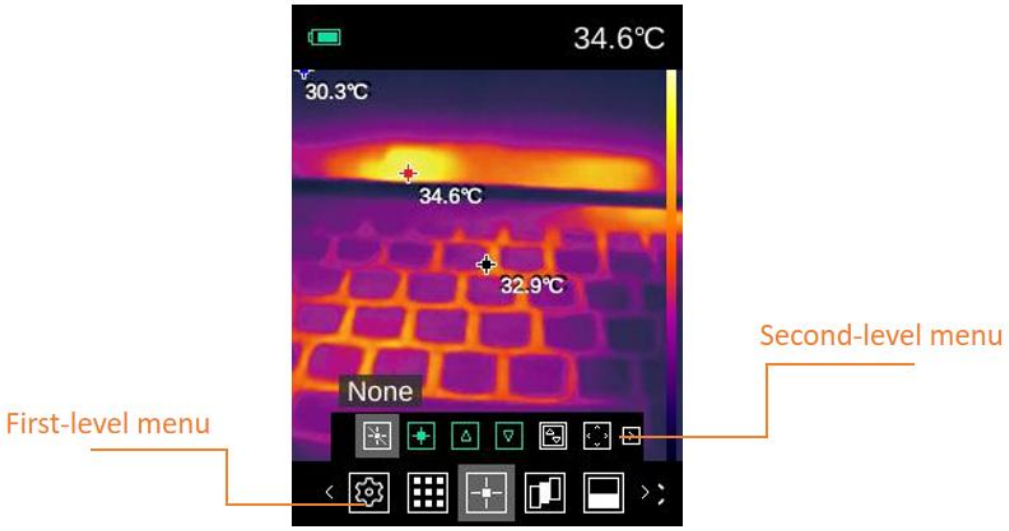
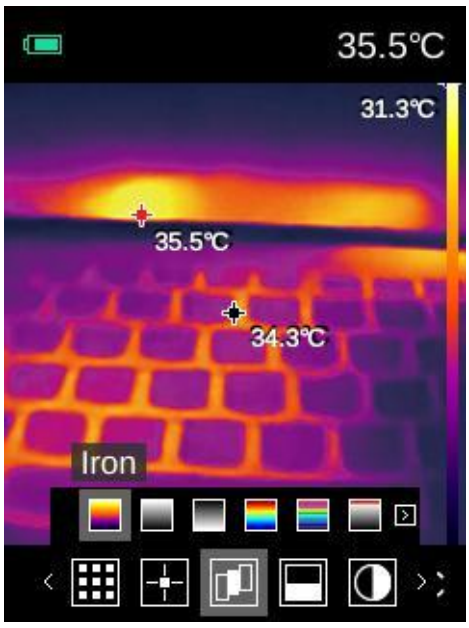


5.2.2 Color Palette

Select the color palette in the first-level menu to enter the second-level menu. The second-level menu interface of the color palette is as shown below:



No.	Function	Description
1	Iron	In high temperature areas, the red color accounts for a larger proportion, which is suitable for detecting scenes where high

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		temperature areas account for a large proportion.
2	White hot	In the high temperature range, white is used, and the whole screen is mainly black and white transition, which is suitable for users of traditional black and white mode.
3	Black hot	In the high temperature range, black is used, and the whole screen is mainly a transition between white and black, which is suitable for users of the traditional black and white mode.
4	Rainbow	The highest temperature is indicated by red; the medium temperature is indicated by yellow, and the low temperature is mainly blue and black, which is suitable for scenes with distinct low temperature colors.
5	Red hot	The main color is red, and the transition from the lowest temperature to the highest temperature is black, white and red, which is suitable for scenes that focus on high temperature conditions.
6	High contrast	Rich colors increase the contrast of the picture, and small temperature differences can be accurately identified, which is suitable for use in scenes with small temperature differences
7	Lava	Similar to Iron and Arctic, the Lava palette shows hotter objects in warm tones and cooler objects in blue, making it another good choice for quickly capturing body heat and other details in low-contrast environments.
8	Arctic	The Arctic palette combines the simply tinted Iron Red palette with the low-contrast performance of the Rainbow High Contrast palette, using gold to identify warm objects and blue to identify cooler objects. The different colors quickly detect heat sources, while the darker shades make it possible to distinguish slight temperature changes.
9	Coldest	Blue indicates lower temperatures and is suitable for use in scenarios such as air conditioning water leakage and air conditioning leakage.

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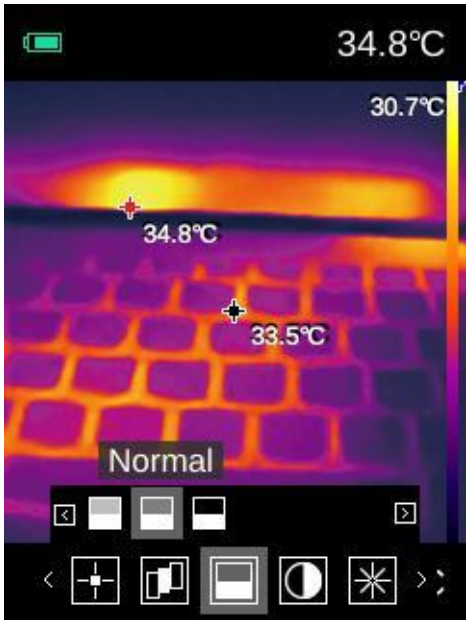
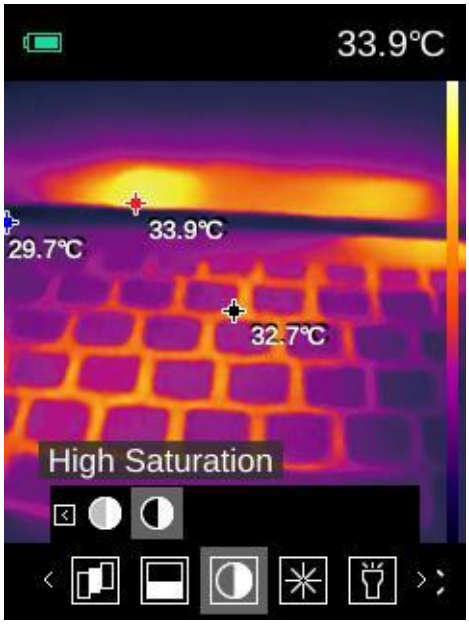
5.2.3 Infrared effect

Select Infrared effect in the first-level menu to enter the infrared effect second-level menu interface. The thermal effect includes three modes: "Soft", "Enhanced" and "High Contrast". The infrared effect second-level menu interface is shown in the figure below:



5.2.4 Saturation

Select saturation in the first-level menu to enter the second-level menu, which includes "Low Saturation" and "High Saturation".



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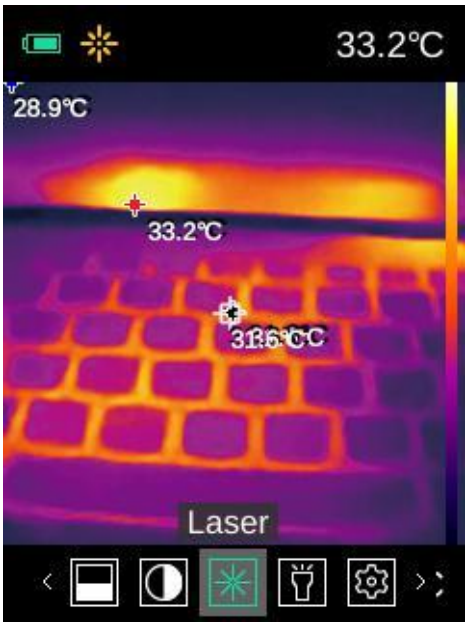
5.2.5 Laser

Select laser in the first-level menu, the laser icon turns green, and a laser icon appears in the upper right corner of the screen, indicating that the laser is turned on. After the laser is turned on, the temperature of the laser point will appear at the center of the screen, which can more intuitively understand the position and temperature of the object being measured. As shown in the figure below:



5.2.6 Flashlight

Select the flashlight in the first level menu, and the icon turns green to indicate that the flashlight is on. As shown below:

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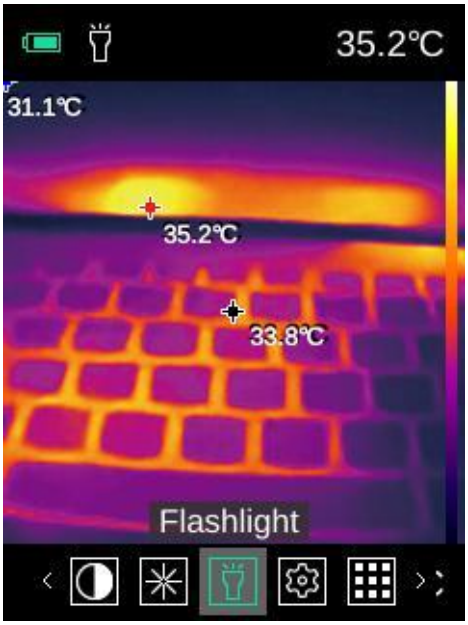
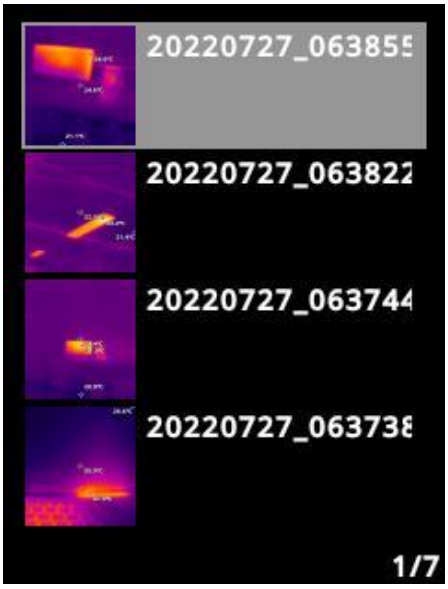


5.3 Album

In the first level menu, select Album, or enter the album through the Album button.



Use the up and down arrow button to select the corresponding photo, press the menu/ok button to enlarge the photo, and after the photo is enlarged, press the menu/ok button to choose whether to delete the photo.

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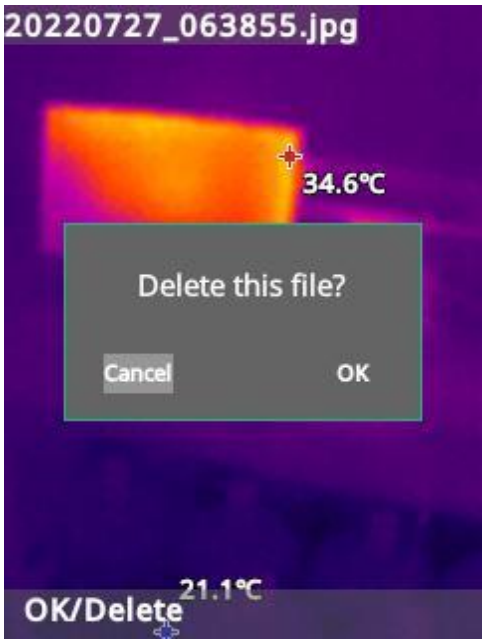
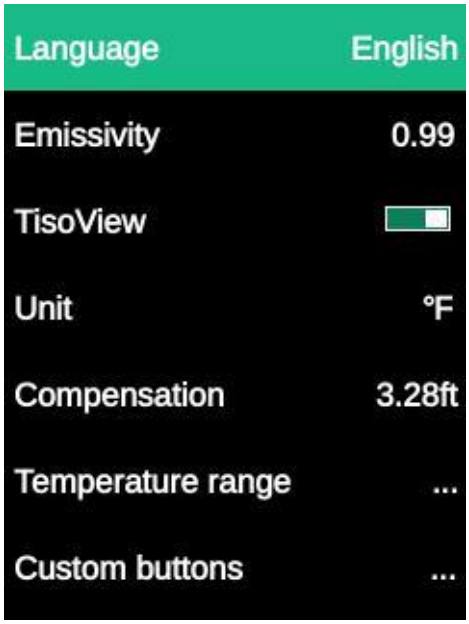


5.4 Settings

After entering the first level menu, select the settings function. The settings interface includes the following:



Options	Parameter
Language	Support English, French, German, Spanish, Russia, Portuguese, Arabic, Japanese, Korean and Chinese
Emissivity	0.01 to 0.99 adjustable
TisoView	Is the image enhancement algorithm function enabled

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Units	Celsius, Fahrenheit, Kelvin
Compensation	Compensation based on the distance of the object being measured
Temperature range	-20℃~550℃
Custom button	None, calibration, switch infrared effect, switch to the previous color palette, cycle through color palettes, switch temperature gears, switch all temperature measurement points, laser switch, light switch, all alarm switches
Date	Year/Month/Day Hour/Minute/Second
Storage	View or format the storage
Temperature alarm	Setting the temperature alarm threshold
Auto power off	Automatic shutdown time can be set after long period of inactivity
Distance units	Selectable in meters (m) or feet (ft)
Temperature bar	Turn it on or off
Brightness	10 level
Restore factory settings	Emissivity, TisoView, temperature alarm, temperature compensation, temperature gear, automatic shutdown, brightness, display color palette, measurement, palette, infrared effect, restore to initial state
Upgrades	For version upgrade
About	View device model, SN, firmware version, software version and website information

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6 Analysis Software

6.1 Overview

Infrared thermal imaging offline analysis software is a professional computer-based data analysis software that can perform secondary analysis and processing on images taken by specific infrared equipment.

6.2 Characteristic

- The software interface is easy for understanding and operation;
- The temperature can be displayed at all points on the entire screen;
- Multiple image modes can be switched;
- The processed images can generate corresponding reports;
- Available to integrate other related software or hardware cameras;

6.3 Details

6.3.1 Operation Environment

It is recommended to install this software on Windows 10 and above operating systems to ensure normal and stable operation of the software.

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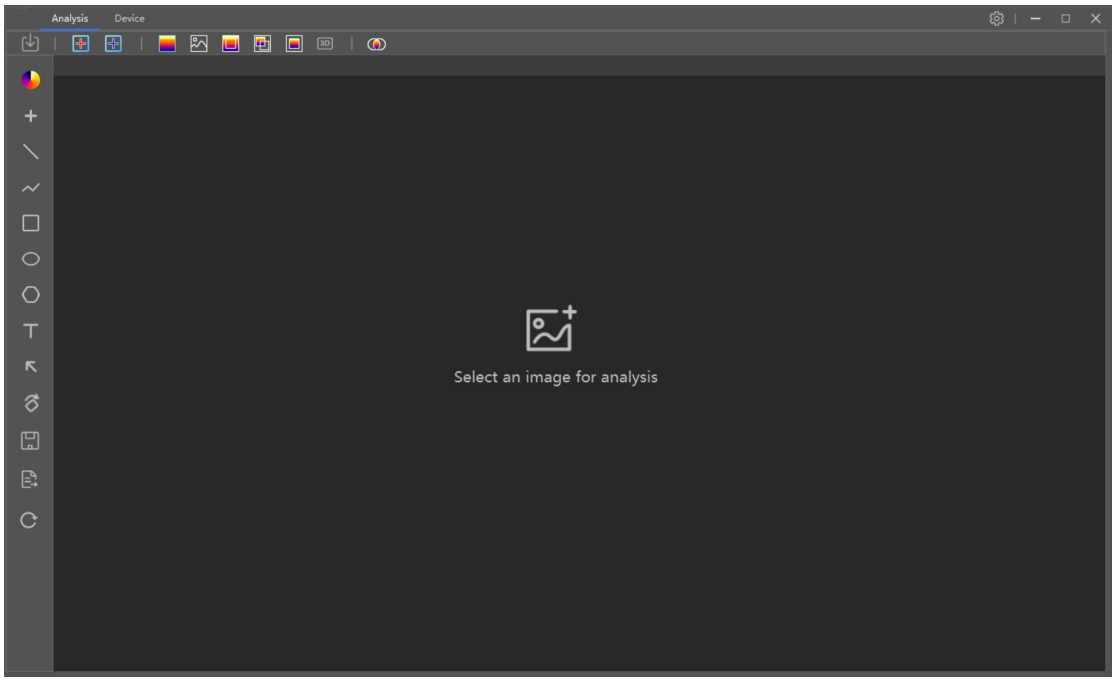
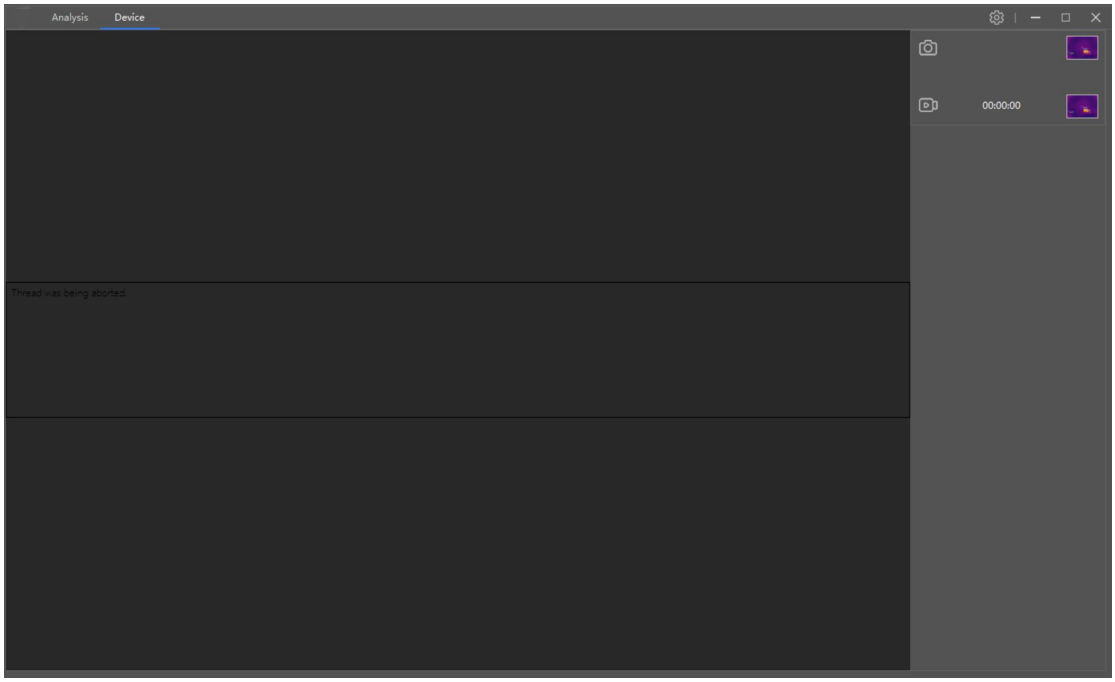
6.3.2 Main Interface

Open the software, which includes the thermal image analysis section and the camera import section. The interface is shown in the figure below.





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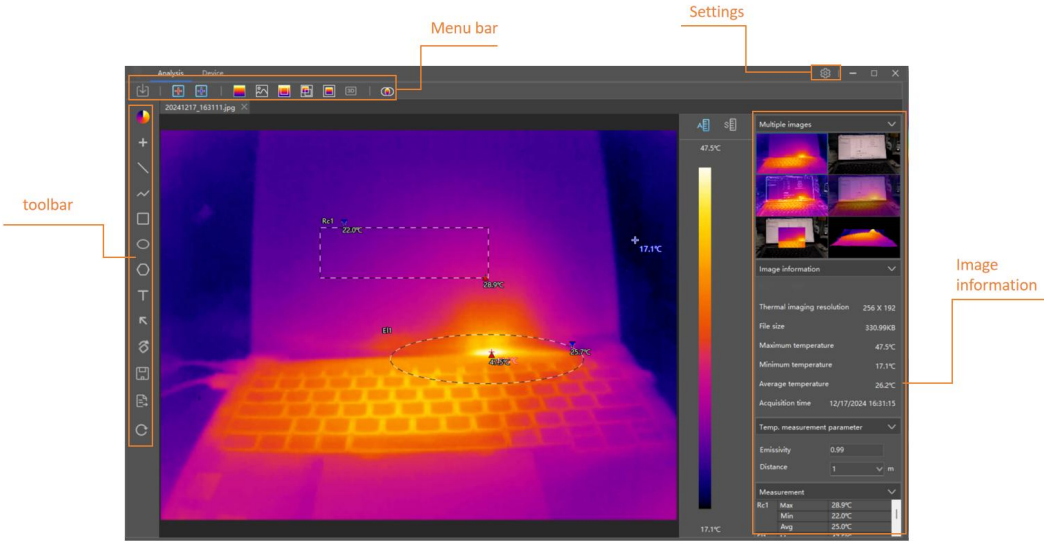
6.3.3 Radiometric Analysis

Import the picture in the radiometric analysis sector for analysis. The interface is shown in the figure below.



The toolbar contains the following functions:

No.	Function	Functional Description
1	Color Palette	Different color palettes can be replaced according to needs
2	Points	Select to view the temperature information of the corresponding point on the image
3	Line	Draw a line on the image and observe the highest and lowest temperatures on the line.
4	Polyline	Draw a polyline on the image and observe the highest and lowest temperatures on the line.
5	Rectangle	Draw a broken on the image and observe the highest and lowest temperatures on the line
6	Ellipse	Draw an ellipse on the image and observe the highest and lowest temperatures on the line

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7	Polygons	Draw a polygon on the image and observe the highest and lowest temperatures on the polygon.
8	Text	Annotate images with text
9	Arrow	Marking arrows on images
10	Rotate	Rotate the image 90° clockwise
	Horizontal mirror	Mirror the image horizontally
	Vertically mirror	Mirror image vertically
11	Save	Save the picture
12	Export report	Exporting graphical reports of analyses
13	Reset screen	Restore the graphics, rotation Angle and color temperature area drawn on the screen to the initial state

The menu bar contains the following functions:

No.	Function	Functional Description
1	File	File opening, closing, saving, exporting reports
2	High temperature	Cancel or enable high temperature display in the image
3	Low temperature	Cancel or enable low temperature display in the image
4	Thermal imaging	Switch to thermal imaging
5	Visible light (Single infrared device is not supported)	Switch to visible light image
6	Edge blending (Single infrared device is not supported)	Switch to edge fusion image

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7	Overlay fusion (Single infrared device is not supported)	Switch to overlay fusion image
8	Picture-in-Picture (Single infrared device is not supported)	Switch to picture-in-picture image
9	3D	Switch 3D image
10	Fusion alignment (Single infrared device is not supported)	Thermal and visible light images are not completely fusion, so they can be universally fusion, aligned and adjusted.

”in the upper right corner of the software is the setting options, which includes the following:

No.	Options	Description
1	Language settings	Support English, French, German, Spanish, Russian, Japanese, Korean and Chinese.
2	Temperature unit	Celsius, Fahrenheit, Kelvin
3	3D contrast level	Adjust image contrast in 3D mode
4	Mouse temperature	Enable or disable the function of displaying temperature on the image when the mouse is on
5	Storage path	Storage location for pictures, reports, and videos
6	Upgrade	For version upgrade
7	About	Software name, version number.

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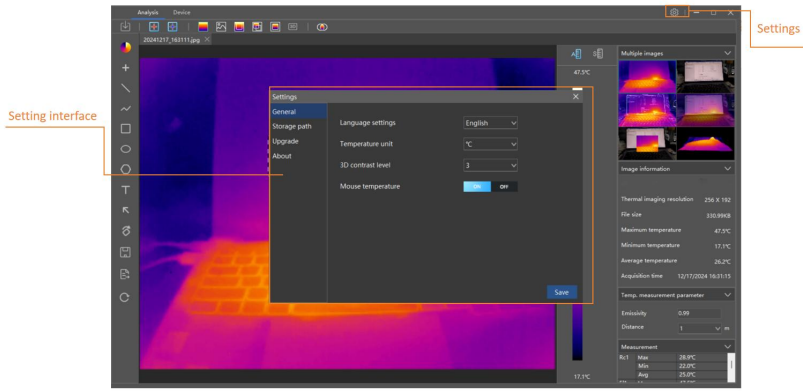
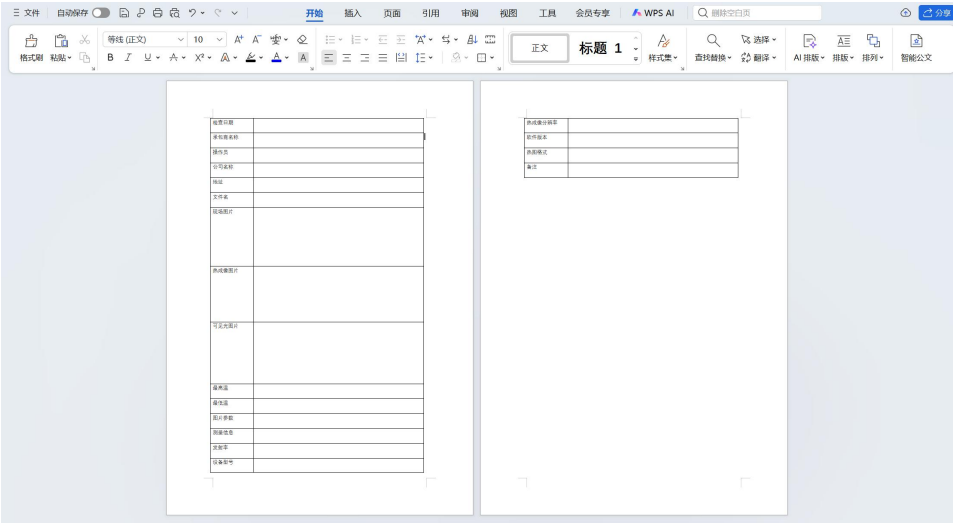


6.3.4 Report

6.3.4.1 Creating a Report Template

Step 1: Open Word or WPS and design your own template style, as shown in the image below:



Step 2: Click "Insert" in the Word navigation bar, place the cursor where you want to insert the data, for example, in the " Check Date " item, as shown in the image below:

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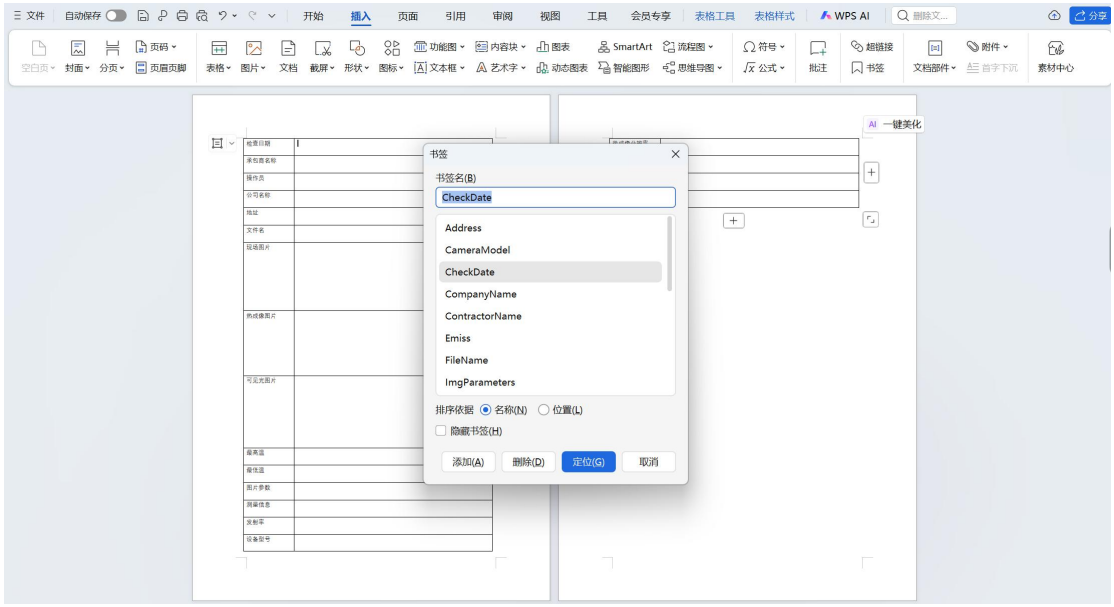
Step 3: Click "Bookmarks" in the toolbar, enter "CheckDate" and click "Add", as shown in the image below:



Step 4: The other items are the same as above. The corresponding bookmarks for each item are as follows (note the capitalization of the bookmarks):

Report output items	Book Signature	illustrate
Inspection date	CheckDate	Analysis date of the report
Contractor Name	ContractorName	When generating the report, the user can optionally

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		fill in the contractor's name.
Operator	Operator	When generating the report, the user can optionally fill in the operator.
Company Name	CompanyName	Users can optionally fill in the company name when generating the report.
address	Address	Users can optionally fill in the address when generating the report.
file name	FileName	Users can customize the file name or use the default name, which is named according to the date and time.
Photos from the scene	SceneImg	The image presented in the software includes points, lines, widths, and color bars drawn on the image.
Thermal imaging images	IRImg	Infrared image of the analyzed image
Visible light images	VIImg	Visible light image of the analyzed image
highest temperature	MaxTemp	The highest temperature of the analyzed image
lowest temperature	MinTemp	Lowest temperature of the image being analyzed
Image parameters	ImgParameters	Parameter information of the image being analyzed
Measurement information	Measurements	The measured information of the image being analyzed includes the highest and lowest temperatures, and the temperature information of the plotted points, lines, and frames.
Emission rate	Emiss	Emissivity of the image being analyzed
Equipment Model	CameraModel	Device model for capturing images
Thermal imaging resolution	IRSensorSize	Thermal imaging resolution of the analyzed image

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Software version	SoftwareVersion	Analysis software version number
Heatmap format	IRFormat	Image format type being analyzed
Remark	Remark	Users can add their own notes.

Step 5: Once the bookmarks are added, the system will output report data based on the bookmark locations.

The report template must be located in the root directory \report_template , and the file name must be set to "template_zh.docx " (_zh represents Chinese characters) . You can directly modify the content of this document or create a new document with the same name and replace it.

Users can also customize the template format according to their needs, for example:



检查日期		承包商名称	
操作员		公司名称	
地址		文件名	
最高温		图片参数	
热成像图片		最低温	
可见光图片		现场图片	
热成像分辨率		测量信息	
设备型号		发射率	

6.3.4.2 Export Report

Users can use the "Export Report" option in the toolbar to generate the desired report from the analyzed images according to the report template. The report types include " .doc " , " .docx " , and " .pdf " .

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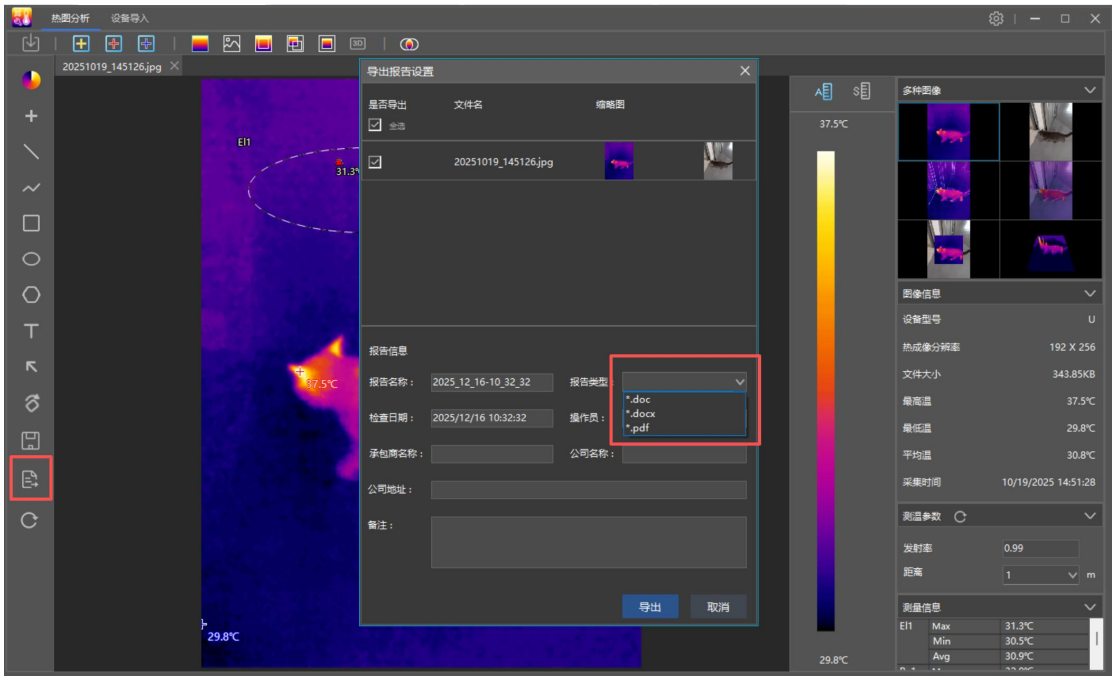
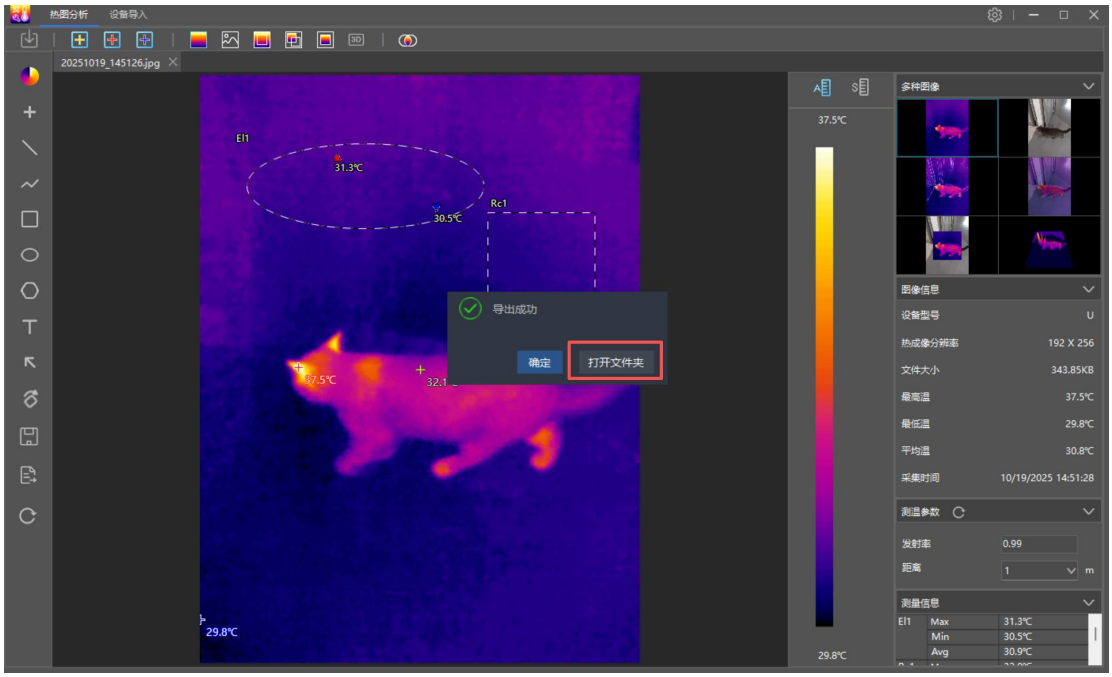


After the report is successfully exported, you can quickly access the report storage directory by opening the folder, or you can manually open it by going to the report's storage location (you can view the report storage path in the
settings).



Find the corresponding report name, open the report, and you will find that the generated report is consistent with the style of the template we created.

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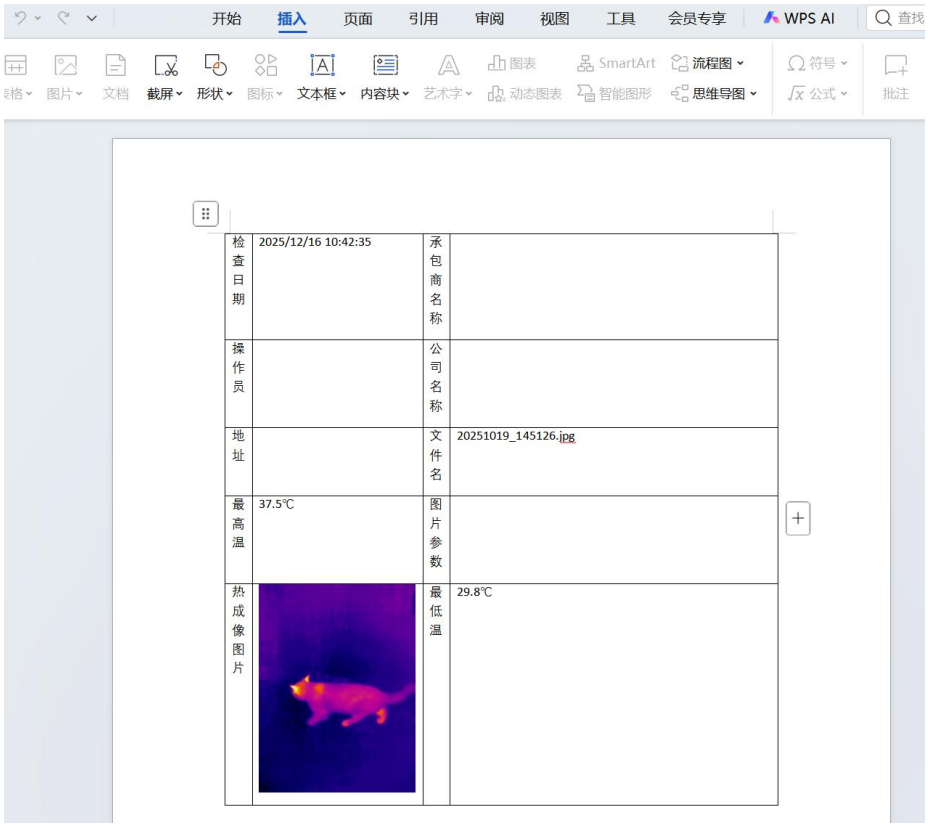

6.3.5 Camera Import (This model does not support device import function)

The camera import section requires the handheld camera to be connected to the computer via USB. After the connection is successful, the screen of the camera can be synchronized to the camera import section, and the photo/video operations can be completed in the upper left corner.

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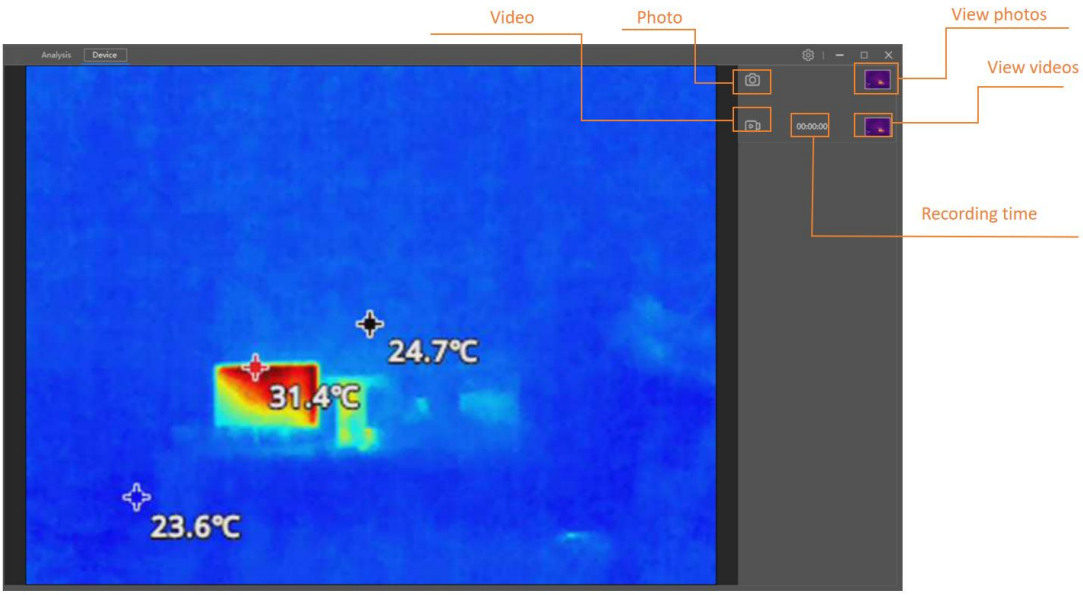

The camera import interface function contains the following content:

No.	Function	Functional Description
1	Photo	After the camera is successfully connected, click the camera to take photos.
2	Video	After the camera is connected successfully, click the record button with the mouse, the record icon turns red and the recording time on the right starts to change, indicating that the recording is successful. Click record again to complete the recording.
3	View photos	By clicking the mouse on photo to enter and see more details
4	View videos	By clicking the mouse on video to enter and see more details

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7 Precautions

- Do not expose this device to dust or moisture.
- Do not allow strong light sources such as sunlight and lasers to directly shine on the lens, otherwise it may cause permanent physical damage.
- Do not disassemble the device by yourself, otherwise it may cause damage to the device and invalidate your warranty rights.
- Do not attempt to open or disassemble the battery, and do not place the device in a high temperature environment or near high temperature objects.
- Do not use alcohol, detergent or other organic cleaners to clean the lens. It is recommended to wipe it with a soft object dampened with water.

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