



**9132-T400
INFRARED THERMAL IMAGING CAMERA
(BASIC TYPE)
OPERATION MANUAL**

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VIDEO OF PRODUCTS.



-CONTENTS -

01 Important Note 2

02 Safety Information 2

03 Precautions 2

04 User Notice 4

05 Product Introduction 4

06 Item List 5

07 Product Components 6

08 Product Parameters 7

09 Basic Operation 8

10 Structural Diagram 20

11 FAQ 21

12 Emissivity of Common Objects 22

01 Important Note

This manual is a general manual covering multiple models of thermal cameras in a product line, which means that some functions and instructions may not apply to the specific model of thermal camera.

02 Safety Information

1. Before using the cleaning solution, read all applicable material safety data sheets and warning labels on the containers.
2. Do not place the product in an environment above 70°C or below -40°C.
3. Do not disassemble or modify the infrared thermal camera at will.

03 Precautions

Please strictly follow the following precautions at all times:

1. Try to keep the device stable and avoid violent shaking when using it.
2. Do not use or store the device in an environment that exceeds the permitted working temperature or storage temperature.
3. Do not directly aim the device at high-intensity heat radiation sources such as the sun, lasers, and spot welders.
4. Do not expose the device to dusty or humid environments. When using in a wet environment, avoid splashing water on the instrument. Cover the lens when the device is not in use.
5. When not using this device, please place the instrument and all accessories in the dedicated packaging box.
6. Do not block the holes on the device.
7. Do not knock, throw, or shake the instrument and accessories, to avoid damage.
8. Do not disassemble the device by yourself, which may cause damage and void the warranty.
9. Avoid using the TF card for other purposes.
10. Please do not use the device in an environment that exceeds the working temperature, which may cause damage to the device.
11. Do not use soluble or similar liquids on the device or cables, which may cause damage to the device.
12. When wiping the device, please follow measures below:
 - Non-optical surfaces: Use a clean, soft cloth to wipe the non-optical surfaces of the thermal camera when necessary.
 - Optical surfaces: When using the thermal camera, avoid contaminating the optical surfaces of the lens, especially avoid touching the lens with hands as sweat on hands may leave marks on the lens glass and may corrode the optical coating on the glass surface. When the optical lens surface is contaminated, carefully wipe it with special lens paper.

04 User Notice

【Calibration】

To ensure temperature measurement accuracy, it is recommended to return the device to the factory for calibration once a year.

【Accuracy】

To obtain highly accurate results, it is recommended to wait for 5-10 min after turning on the thermal camera before measuring the temperature.

【Document Update】

The manual is updated multiple times every year, and notifications for key product changes will be regularly released. To access the latest manual and notifications, please visit the official website.

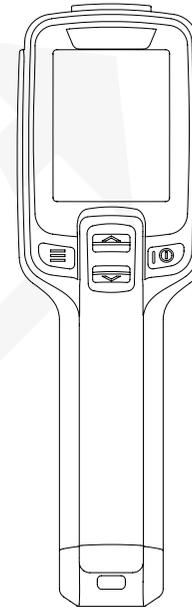
05 Product Introduction

This product is a tool-type handheld infrared thermal camera for temperature measurement, with resolutions: 256×192.

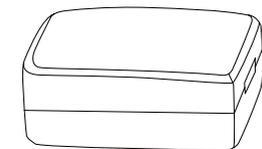
Besides, the lasers, lighting lamps, and visible light lens are provided, and the device can be connected to a PC, to meet the needs of different scenarios.

06 Item List

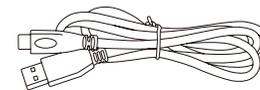
<input checked="" type="checkbox"/> Thermal camera (including battery)	1pc
<input checked="" type="checkbox"/> Charger	1pc
<input checked="" type="checkbox"/> USB data cable	1pc
<input checked="" type="checkbox"/> Wristband	1pc



Thermal camera
(including battery)



Charger

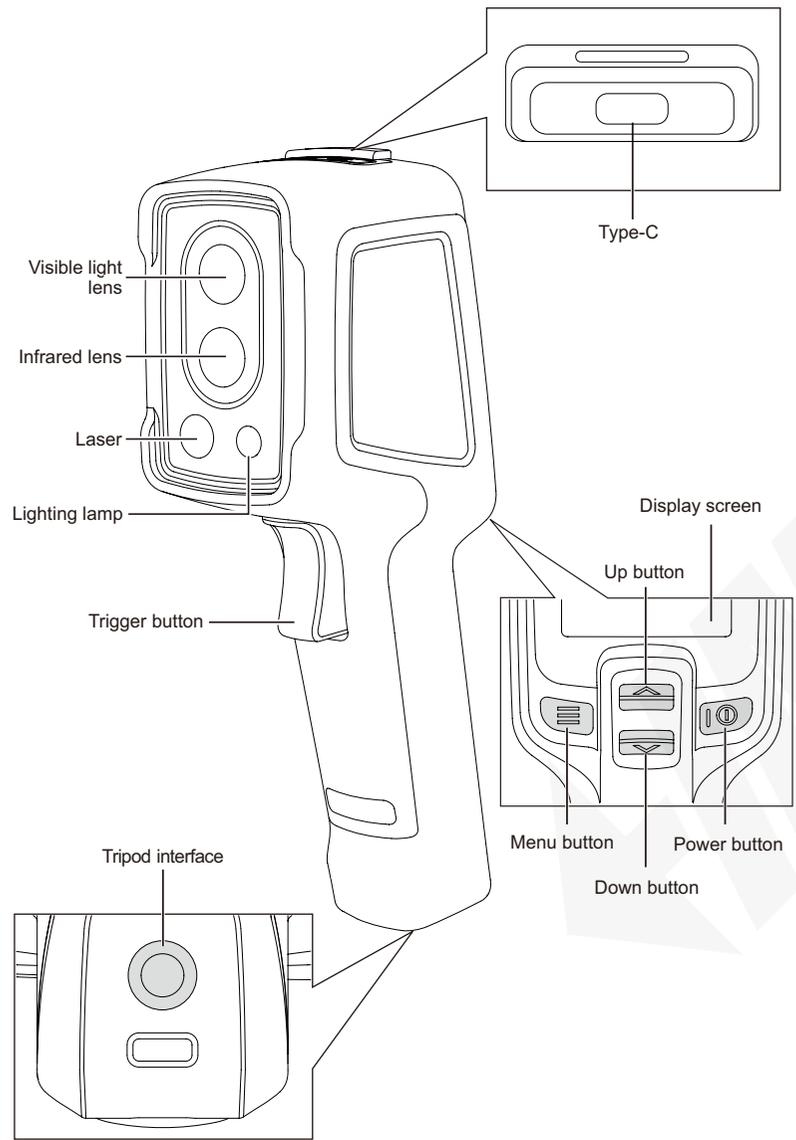


USB data cable



Wristband

07 Product Components



08 ProductParameters

Imaging and optics	detector type	unrefrigerated vanadium oxide, 7.5μm~14μm
	infrared resolution	256×192@12μm
	super resolution	upgrade to 512×384
	thermal sensitivity /NETD	45mK
	infrared frame rate	25Hz/9Hz
	focal length	3.2mm
	field of view	56°×48°
	spatial resolution/IFOV	3.75mrad
	minimum object distance	0.1m
	distance to spot size /D:S	266:1
focusing mode	focus-free	
Measurement and analysis	measurement range	support auto-switching: -20°C~150°C, 0°C~550°C
	measurement accuracy	±2°C or ±2%, whichever is greater
	analyzed target	center spot, fixed temperature measurement areas: small/medium/large
	temperature alarm	full screen temperature alarm with image and flash
Image display	temperature measuring parameter	emissivity, reflected temperature, target distance
	display screen	2.4" LCD
	image mode	IR, VIS, MIF, PIP
	color palette	6: iron red, white hot, arctic, rainbow 1, rainbow 2, hot iron
	image adjustment	level span mode: automatic, semi-automatic, manual
	digital camera	2MP
Function	laser	laser indication
	recording function	photo and video
Storage and transmission	storage	built-in 16GB
	image storage	JPG with temperature information
	video storage	support real-time video transmission, IRGD with temperature information
	external interface	TYPE-C, 1/4" tripod interface
	WIFI	can be connected to the mobile terminal for image and real-time video transmission
Power supply	battery type	rechargeable lithium-ion battery, non-removable
	operating time	11 hours
	charging mode	TYPE-C charging, capable of charging while using
	charging time	90% of full charge in 2.5 hours
Environmental parameter	operating temperature	-15°C~50°C
	protection	IP54, 2m drop test
Physical parameter	certification	CE, ROHS
	weight	375g
	dimension	194×61.5×76mm

09 Basic Operation

【Quick Start Guide】

Please follow the steps below:

Charging

Please use a 5V 1A or 5V 2A power adapter and USB cable to charge the device; Use the USB cable in the accessories to connect the device to the computer for charging;

When charging, open the protective cover on the top of the device, connect one end of the data cable to the USB Type-C interface of the device, and connect the other end to the adapter or computer.

Power on

Press and hold the power button to power on the device.

Find the target

Align the thermal camera with the object concerned.

Capture the image

Click the trigger button to capture the image.

PC analysis software

Download the software from the data card to the computer, connect the computer and the thermal camera with a USB cable, and import the data from the thermal camera for secondary analysis.

WiFi

In the "Menu - WiFi", turn on the WiFi switch to connect to the network.

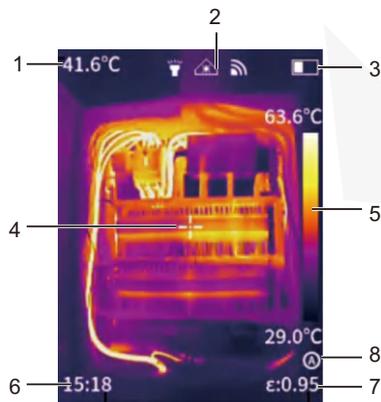
Local upgrade

If there is a new upgrade package for the device, after connecting to the wireless network, you can upgrade the device software in "Menu - OTA Upgrade".

AP mode

Create a WiFi hotspot with this device. After connecting your phone or computer to the hotspot, you can use analysis software to directly view the photos/videos inside the device, as well as control the device's observation and display in sync with the device's screen.

【User Interface】



	Name	Description
1	Center Point Temperature	Display the temperature of the center point
2	Status bar	Display the status of the lighting, laser, and wifi (supported by some models)
3	Battery	Display the remaining battery power
4	Center cursor	Indicate the target position of the cursor
5	Ribbon	The temperature range of the current displayed palette and image
6	Time	Display time
7	Emissivity	Display the current emissivity value
8	Auto dimming	Auto dimming

【Operation Instructions】

Power on and off

1. Long press the power button for 2 seconds to power on the device in the power-off state.
2. Long press the power button for 2 seconds to power off the device in the power-on state.
3. If the device crashes, force the shutdown by long pressing the power button.

Save image

In the real-time preview interface, click the trigger button to automatically save the picture.

Note: The automatic/manual mode can be switched by long pressing the menu button on the main preview interface.

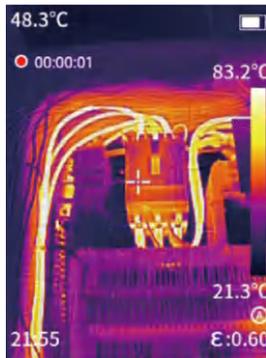
View/delete image

When a picture is taken and saved, it is stored in the memory of the device and can be viewed at any time by following the steps below:

1. Click the menu button to enter the gallery;
2. Use the directional keys on the navigation key to select the image to be viewed;
3. Press OK to view the picture in full screen;
4. When viewing the picture, press the menu button to choose to view the visible-light image or delete the picture. (If the picture is deleted, the visible light or infrared picture associated will be also deleted)
5. Click the backspace key to return to the thermal imaging interface;

Save video

In the real-time preview interface, long press the trigger button for 2s, to display a countdown for recording on the screen. At that time, the red dot will flash, indicating that the recording has been started. Press the trigger button or the backspace key to end the recording.



View/delete video

When a video is shot and saved, it is stored in the memory of the device and can be viewed at any time by following the steps below:

1. Click the menu button to enter the gallery;
2. Use the directional keys on the navigation key to select the video to be viewed;
3. Press OK to play the video;
4. During the video playback, press the menu key to bring up the edit menu and delete individual videos.

【Dimming Mode】

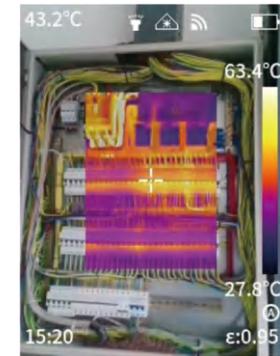
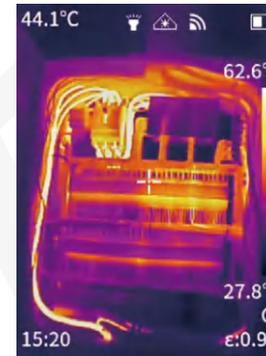
On the real-time observation interface, long press the “Menu” until that the symbol **【A】** is shown at the top left of screen for dimming mode setting. Three dimming modes are available in this machine, i.e. automatic dimming (A), semi-automatic dimming (S), and manual dimming (M).

1. After long pressing the “Menu” for dimming mode setting, switch A-S-M successively by short pressing the “Up/Down”.
2. The ΔT value is adjustable through S as the semi-automatic dimming mode. In the S mode, short press the “Up/Down” to select the value to be adjusted. Select the up arrow, and short press the “Menu” to increase the ΔT value. Select the down arrow, and short press the “Menu” to decrease the ΔT value.
3. The Tmax and Tmin values are adjustable through M as the semi-automatic dimming mode. In the M mode, short press the “Up/Down” to select the value to be adjusted. Select the up arrow, and short press the “Menu” to simultaneously increase the Tmax and Tmin value. Select the down arrow, and short press the “Menu” to simultaneously decrease the Tmax and Tmin value. Select the left arrow, and short press the “Menu” to increase the Tmin value and to decrease the Tmax value. Select the right arrow, and short press the “Menu” to increase the Tmax value and to decrease the Tmin value.
4. A is the automatic dimming mode. The value depends on the real-time scenario to be shot, and cannot be manually adjusted.
5. Short pressure the “Return” to save and quit.

【Image Mode】

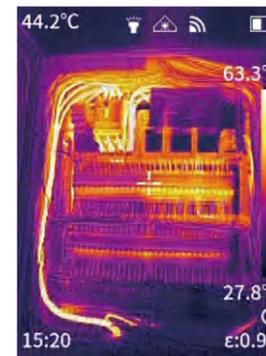
Infrared Mode (IR) - infrared image

Picture-in-Picture Mode (PIP) - picture-in-picture image The central area of the visible light is superimposed on the infrared thermal image, to help the user distinguish the target location.



Fusion Mode (MIF) - MIF image Visible light details are superimposed on the infrared thermal image, to help the user accurately distinguish the target location.

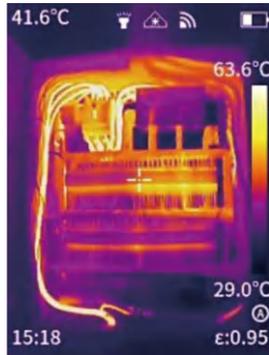
Visible Light Mode (VL) - visible light image



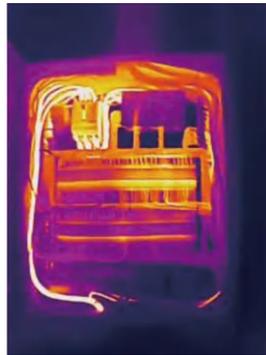
Steps of changing image mode In the real-time preview interface, switch between different modes by using the navigation up and down keys.

【Super-resolution Mode】

Super-resolution mode is a powerful image processing technique that helps the user convert the low-resolution images into the high-resolution images, thereby improving image definition and details. In the super-resolution mode, clearer images can be obtained.



Before the super resolution



After the super resolution

【Temperature Range】

The temperature range of the device includes the high-temperature mode, low-temperature mode, and automatic mode. The user needs to select the corresponding temperature mode according to the usage conditions, so as to ensure temperature accuracy.

【Emissivity】

To obtain accurate measurement results, set the emissivity based on the target location before each measurement. Emissivity refers to the ratio of the radiation ability of an object to the radiation ability of a black body at the same temperature, and is relative to the object reflectivity. At the same target temperature, a higher emissivity means that the target can radiate a higher proportion of energy outward.

For example, the emissivity of human skin is 0.98, and the emissivity of printed circuit boards is 0.91. For more information on emissivity, please refer to the "Emissivity of Common Objects" or consult other sources.

Emissivity settings:

1. On the thermal imaging interface, click OK to display the main menu toolbar.
2. In the toolbar, select the "Emissivity" option to set the emissivity.

【Palette】

Change the palette used in the thermal camera to distinguish different temperatures, which is helpful to analyze the image easily.

1. On the real-time preview interface, click the OK to display the main menu toolbar.
2. In the toolbar, select "Palette", click the "Menu" button to switch to different color bands.

【Center Point】

Enable or disable the center point on the screen.

【Temperature Unit】

1. On the thermal imaging interface, click the menu key to display the main menu toolbar.
2. In the toolbar, select the "Area Temperature Measurement" option, and click the menu key to display none, small area, medium area, and large area.
3. Set different areas according to user needs, and display the highest and lowest temperatures of the current area.

【High- and Low-Temperature Alarm】

The device supports high and low temperature alarm function, allowing the user to set the high-temperature alarm threshold and low-temperature alarm threshold, and to enable and disable the alarm function by selecting 'On' or 'Off'. After the high- and low-temperature alarm is triggered, an icon will appear in the screen for notification. If the 'LED Alarm' option is enabled, the LED light will flash to indicate the alarm.

【Reflection Temperature】

The reflection temperature is used to compensate or correct the thermal radiation reflected on the measured object. If the emissivity of the measured target is relatively low and the actual temperature is much lower than that of its reflection source, setting this parameter and compensating for the reflection temperature are conducive to accurately measuring the temperature.

The user can modify the parameters according to the actual situation.

【Target Distance】

Different distances have different effects on the measurement results. To accurately measure the temperature, the thermal camera needs the distance information of the object, so as to compensate the results.

1. On the thermal imaging interface, click OK to display the main menu toolbar.
2. In the toolbar, select the 'Target Distance' option, click OK to set the distance;

【Distance Unit】

The device supports two distance display modes: meters and yards.

【Auto Power Off】

The device supports the automatic shutdown, with options of 5min, 10min, 20min, and off.

【Screen Brightness】

The device supports three levels of brightness adjustment: low, medium, and high.

【Laser】

The laser indicator function is usually used to point, indicate, or aim at a target or area with a laser beam. During the real-time preview, the laser can be enabled by holding down the trigger button.

【Lighting Lamp】

The lighting lamp assists the user in capturing visible light images under poor light conditions.

【Date and Time】

The device supports the date and time setting.

【Language】

The device supports multiple languages, allowing the customer to set it based on actual needs.

【Reset Settings】

Resetting Settings refers to the process of restoring the device, software, or system settings to their initial or default states. In the process, the user-customized settings, configurations, and data will be cleared, and the device or system will returned to its initial installation or factory state.

【Formatting】

Formatting usually refers to the process of clearing and reinitializing the storage media of a device or system.

【Picture-in-Picture Transparency】

In Picture-in-Picture mode, the display effect of real-time images can be changed by adjusting the infrared image transparency of picture in picture, and thus helping the user analyze images intuitively.

【Infrared Video Format】

The device supports two video formats. The IRGD format is a video format with temperature data. The MP4 format is a video format without temperature data. If the local video needs to be imported to PC analysis software for temperature analysis, the video format should be set to IRGD for storage.

【Visible Light】

The device supports two visible light resolutions, which are 240×320 and 1200×1600, allowing the user to set either resolution according to actual needs. It is worth noting that when the device captures high-resolution images, the system resources occupied due to the large data volume will significantly increase. This not only makes the image processing process time-consuming, but also may prolong the overall shooting time.

【WiFi】

Some models support the device hotspot function, allowing to connect to the client for wireless projection when enabled. Please refer to the device interface for the username and password.

【USB Mode】

There are two main USB modes. The first method is to use the device as a storage card, and the computer can directly access the SD card in the device through a USB cable.

The second mode is UVC projection mode. In the UVC screen projection mode, the USB camera device is simulated by loading specific drivers (such as Potplayer). When the device is connected to the system, the driver will convert the device's video signal to the UVC standard format and transmit it to the system through the USB interface. After receiving the video signal, the system will decode it and display it on the screen, achieving the screen projection.

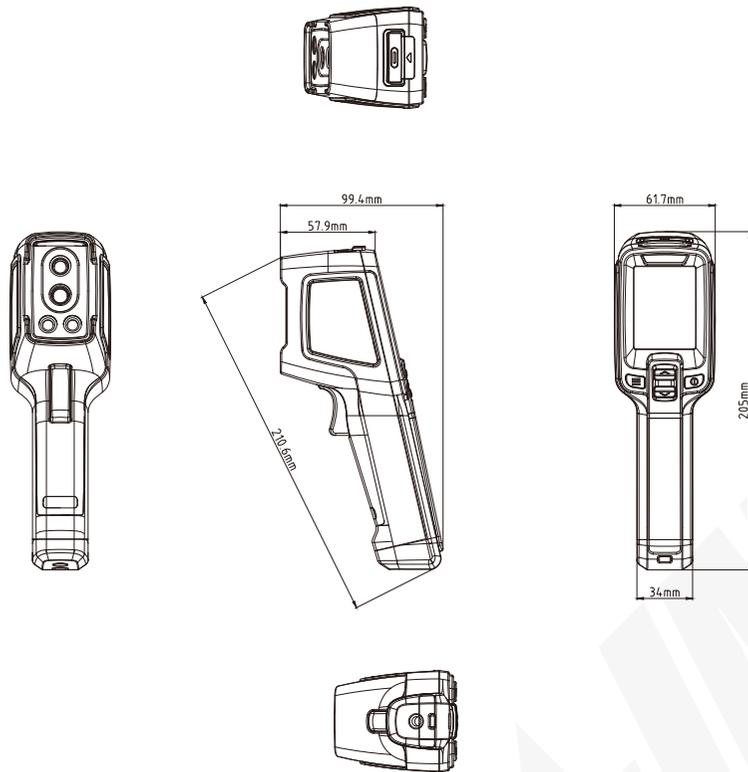
【Upgrade】

The device supports local upgrade and OTA upgrade (only supported by the device with WiFi function). Local upgrade refers to that the installation package is put under the specified file directory for upgrading by following the screen indications. In OTA upgrade mode, the software update is received and installed from remote servers via wireless networks.

【About the Device】

View the software version, firmware version, serial number, content capacity, and other information from "About the Device".

10 Structural Diagram



11 FAQ

- Why does the thermal camera make a 'clicking' sound?
The 'clicking' sound inside the instrument is caused by the automatic calibration of the thermal camera. This usually occurs when the thermal camera is moving quickly or just turned on. The thermal camera will automatically adjust it according to the changes in ambient temperature, to compensate for the impact of these changes on the accuracy of the detector. This usually lasts for 2-3 seconds, and the screen may experience a freeze.

- The thermal camera cannot be started.
It may be due to low battery power. Please use the original adapter to charge the device for 10 min before restarting it.
- The image of the thermal camera is unclear.
There are usually two possibilities. The device is in an autofocus mode and needs to be refocused. If it is still unclear, it may be caused by the incorrect temperature measurement range selected. Switch to the corresponding temperature measurement range.
- There is a large difference between the measured temperature and the actual temperature.
Answer: The measured target needs to correspond to the correct emissivity. The distance parameter set by the device should be consistent with the actual distance.
- The device will automatically shut down if idling for a long time.
Answer: The possible reason is that the automatic shutdown function is enabled, 5min, 10min, 20min, or never should be set according to the actual usage situation.

12 Emissivity of Common Objects

Material	Emissivity	Material	Emissivity
Wood	0.85	Black paper	0.86
Water	0.96	Polycarbonate	0.8
Brick	0.75	Concrete	0.97
Stainless steel	0.14	Copper oxide	0.78
Adhesive tape	0.96	Cast iron	0.81
Aluminum plate	0.09	Rust	0.8
Copper plate	0.06	Gypsum	0.75
Black aluminum	0.95	Paint	0.9
Human skin	0.98	Rubber	0.95
Asphalt	0.96	Soil	0.93
PVC plastic	0.93		