

C-series pocket thermal camera

User manual



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! Warnings, cautions and notes

Definition

- ! **Warning** Represents a dangerous situation or act that may result in personal injury or death.
- ! **Caution** Represents a situation or action that could result in damage to the camera or permanent loss of data.
- ! **NOTE** Indicates a useful hint for the user.

Important information – Please read before using the instrument

- ! **Caution** – As the camera uses a very sensitive thermal sensor, the lens must not be pointed directly at a strong source of radiation (e.g. sun, direct laser beam or reflection) under any circumstances (on or off) as this will cause permanent damage to the camera !
- ! **Caution** - The camera must be transported in its original box and must not be shaken or bumped strongly during use or transport.
- ! **Caution** –It is recommended that the camera be stored in its original case in a cool, dry, ventilated environment free from strong electromagnetic fields.
- ! **Caution** - Avoid staining the surface of the lens with oil and various chemicals and damaging the surface. Close the lens cap after use.
- ! **Caution** - To prevent the potential risk of data loss, always copy (back up) data to your computer.

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- ! **NOTE** - The camera may require a 3-5 minute warm-up process before accurate readings can be taken.
- ! **NOTE** - Every thermal imaging camera is factory calibrated for temperature and it is recommended that this be done annually.
- ! **Caution** - Do not open the case or make modifications without permission, repairs should only be carried out by authorized personnel.

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1 Introduction

Thank you for choosing C16/C25 series pocket Thermal Imaging Camera from Zhejiang Dali Technology Co.,Ltd.

Main features

Measurement of maximum temperature, minimum temperature and multiple movable points

Multiple movable area temperature measurement

Arbitrary line temperature measurement

6 color codes to choose

Infrared and visible image fusion

Temperature setting

Focus free

3.5-inch color LCD touch screen

Adjustable LCD brightness

LED fill light

WiFi wireless network

Gravity sensor

Enhanced Mode

Multiple language options

Applications:

Preventive maintenance

- Electric power industry: thermal state inspection of transmission lines and power equipment, fault diagnosis.
- Electrical system: Identifies circuit overloads in advance before they happen.
- Mechanical system: reduce downtime and prevent failure.

Building science

- Roof: Detect water leakage quickly and efficiently.
- Building structure: Infrared energy assessment survey for commercial buildings and residential buildings.
- Moisture detection: finds the root of dampness and mildew.
- Remediation: Evaluate remedies and make sure the area is completely dry.

Other applications

- Iron and steel industry: monitoring the process of steel-making and rolling, diagnosing the damage of hot blast stove, detecting the temperature of sheet and embryo.
- Fire protection: forest fire prevention and potential fire source search, special materials spontaneous combustion prevention and testing, electrical fire safety testing.
- Medical: human body surface temperature detection and temperature field distribution analysis.
- Petrochemical industry: oil pipeline status inspection, material interface inspection, heat leakage and insulation structure, power equipment status inspection, etc.

1.1 Standard configuration

- Pocket thermal camera
- TYPE-C data cable
- Packaging box
- Certificate

2 Thermal camera introduction

2.1 Key function

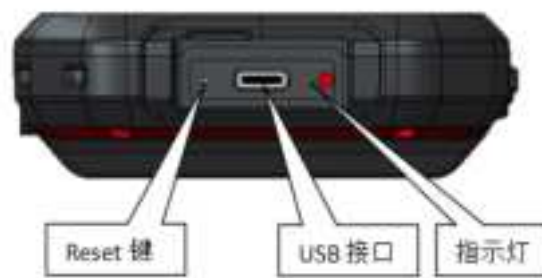


[1] power key

Used for thermal imager on and off, standby and wake up. Press this switch for more than three seconds to start/close the thermal imager; Short press to enter standby/wake up (any other key can also wake up).

! Note: After power off, it is recommended to wait at least ten seconds before starting up again to ensure the safety of the thermal imager.

2.2 Interface



[3] USB

For data transfer and charging

[4] Indicator

For charging indication

3 Basic operation

3.1 The battery cannot be replaced

3.2 Quick Start

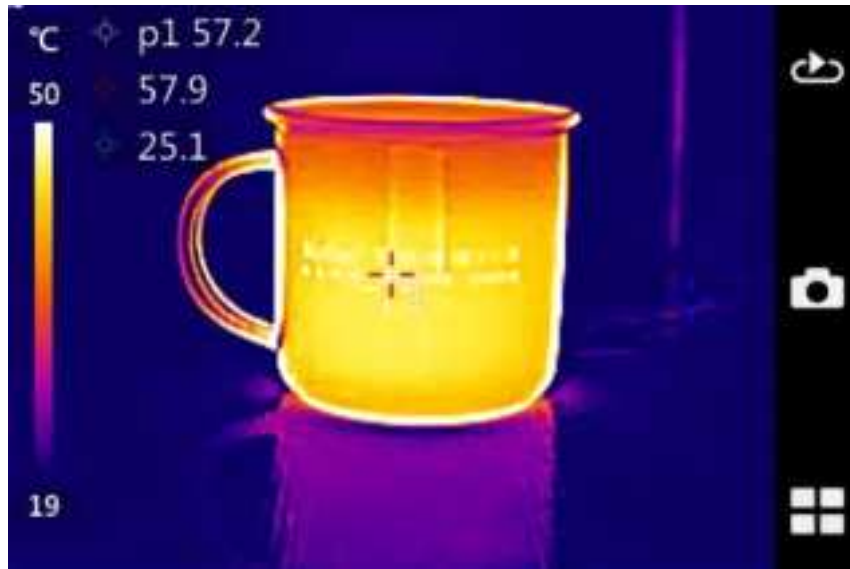
3.2.1 Obtaining thermal images

- Long press the power key (more than 3 seconds) until the power light turns green. About 10 seconds later, the device is initialized and enters the working state.
- The thermal imager is free of focusing and can make the target image clear without focusing operation.

3.2.2 Temperature measurement

- Move the cross temperature measuring point on the screen to the target object, and the "XX" displayed in the upper left corner of the screen is the temperature of the target.
- When the target temperature is greater or less than the upper or lower

limit of the temperature measured by the thermal imager, the screen temperature will display > XXX°C or < XXX°C to prompt the user.





Menu for setting temperature measurement area properties


Click to select the temperature measuring point, temperature measuring area and temperature measuring line, and drag the whole temperature measuring object. You can drag the angle of the temperature measurement area by holding down any point of the four corners of the area to change the size of the area. Hold down a section of the temperature line for extension.

3.2.3 Image storage

To store the current image, you can choose the following methods.

- Click the button  on the screen, and then click  to take photos for storage.

3.2.4 Image playback

- Click the playback button  to pop up the image library and select the folder to play back the image.

3.2.5 Image export

- USB data cable can be used to connect the computer to operate the stored data in the thermal imager, including image export, deletion, formatting and other operations.

3.2.6 LCD settings

- You can adjust the screen brightness by exhaling the drop-down menu and sliding the brightness.

3.2.7 Menu Operation Description

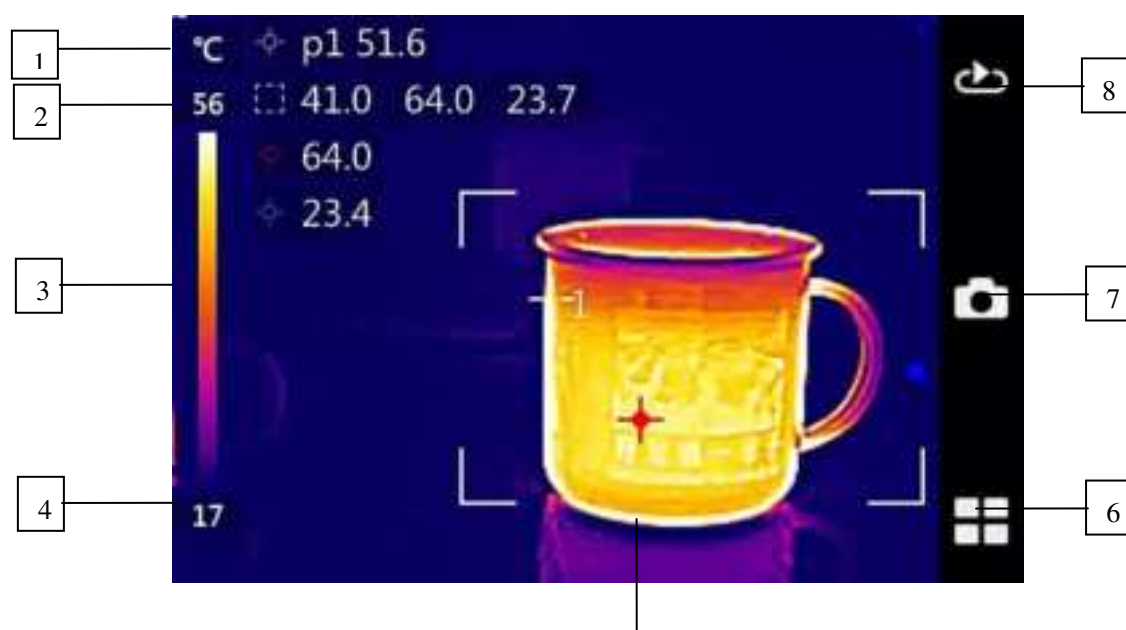
Touch screen operation :

- Click the icon at the bottom right of the touch screen and click each icon to perform corresponding operations. Enter the setting menu, click the menu item to set, enter the sub-menu of the next level, the last level menu for function switch, parameter setting, option selection and other operations; Click the arrow before the interface name to return to the previous menu.
- Click the touch screen drop-down shortcut menu to switch on and off WiFi and LED lights. Click the clear screen icon to clear the main interface UI, lock screen, and adjust the brightness.

4 Operation guide

4.1 Operation Interface Description

4.1.1 User interface of working state



User interface of working state of thermal imager

- [1] Temperature unit: A unit of temperature
- [2] Upper limit temperature: upper limit temperature value of color label.
- [3] Temperature color code: the color bar of the current image display
- [4] Lower limit temperature: lower limit temperature value of color label.
- [5] Temperature measurement object: you can choose point temperature measurement, line temperature measurement, region temperature measurement.
- [6] Menu buttons: the menu includes Settings, mode selection, color code selection, temperature measurement object selection, etc
- [7] Storage button: it can take photos and store.
- [8] Playback button: You can view stored photos.

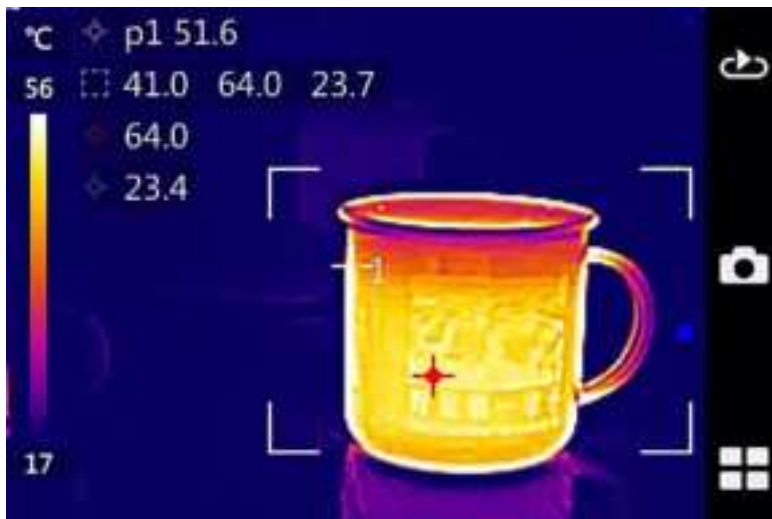
4.1.2 Drop-down menu



Drop-down menu interface

Drop-down menu interface: Click the corresponding icon to turn on/off WIFI, LED fill light, clear screen, lock screen. Adjust screen brightness by sliding.

4.1.3 Main menu




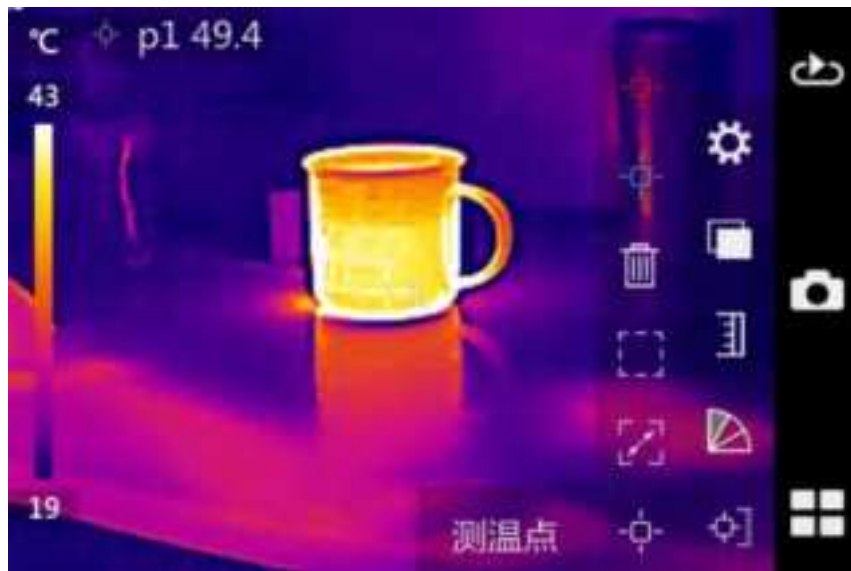
Main menu interface

Main menu interface: The ICONS of the main menu on the right are image playback, photo saving and menu button in sequence.


4.2 Temperature Measurement Mode

Add or delete a temperature measurement object, including a temperature measurement point, temperature measurement area, and temperature measurement line.

Tap the touch screen. Click the temperature measurement mode icon  on the touch screen, and the following interface appears.




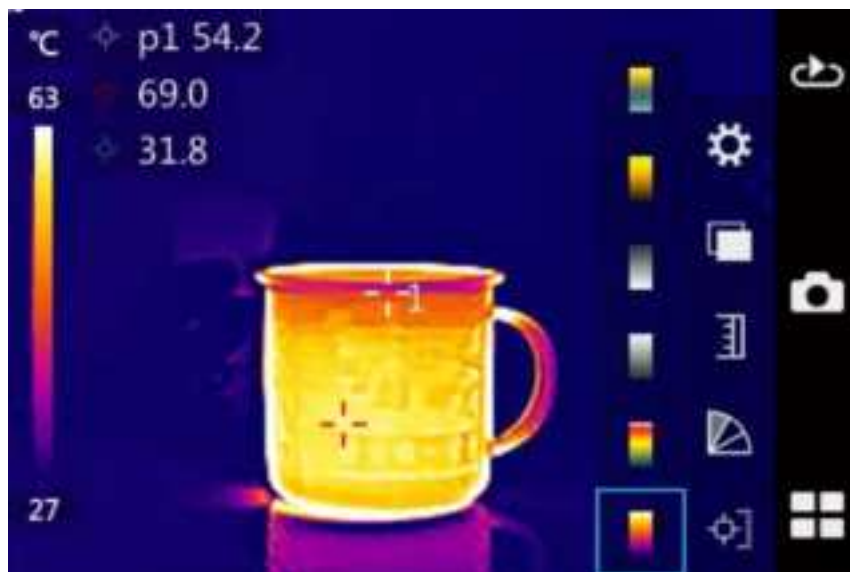
Temperature measurement mode interface

Click the ICONS of temperature measurement objects such as temperature measurement point, temperature measurement area, and temperature measurement line on the touch screen to add temperature measurement objects such as temperature measurement point, temperature measurement area, and temperature measurement line on the screen. Click the delete icon  on the far right to clear all the added temperature objects.

4.3 Color code switching

This function is used to select the color code of the image display. There are six color codes to choose from.

Click the touch screen to pop up the main menu. Click the color label  on the touch screen to pop up the following interface.





Color code switching interface

According to the display requirements of the target scene, directly click the corresponding color bar on the touch screen to switch to the selected color bar.

4.4 Image adjustment

This function is used for manual/automatic mode selection of image adjustment.

Click on the touch screen to pop up the main menu. Click on the touch screen to pop up the ICONS of automatic /manual mode  as shown below. Click the mode icon to select, and switch to the selected mode.

To adjust the mode manually, click to select the upper and lower temperature values of the color label and slide your finger on the right side of the color label to adjust the upper and lower temperature values of the color label separately or simultaneously. Click the selected temperature value again to deselect it.

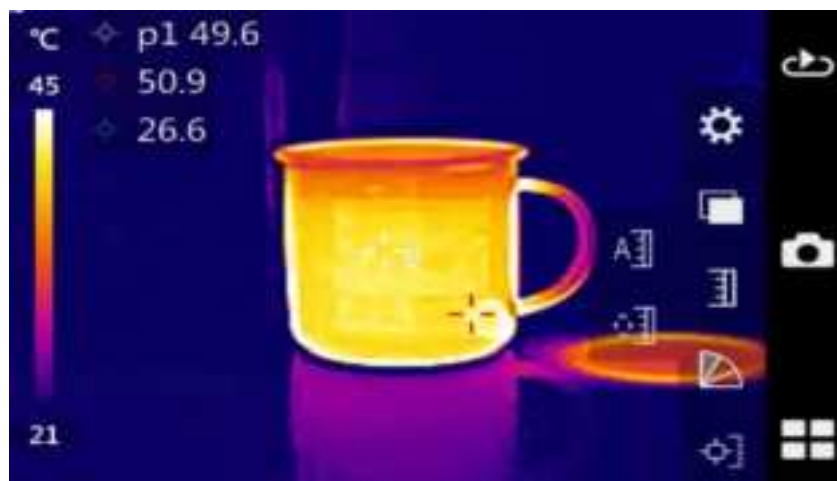




Image adjustment interface

4.5 Image Storage

This feature is used to save images in JPG format.

Tap the touch screen and tap the photo icon . Click  on the touch screen to save the current image directly.

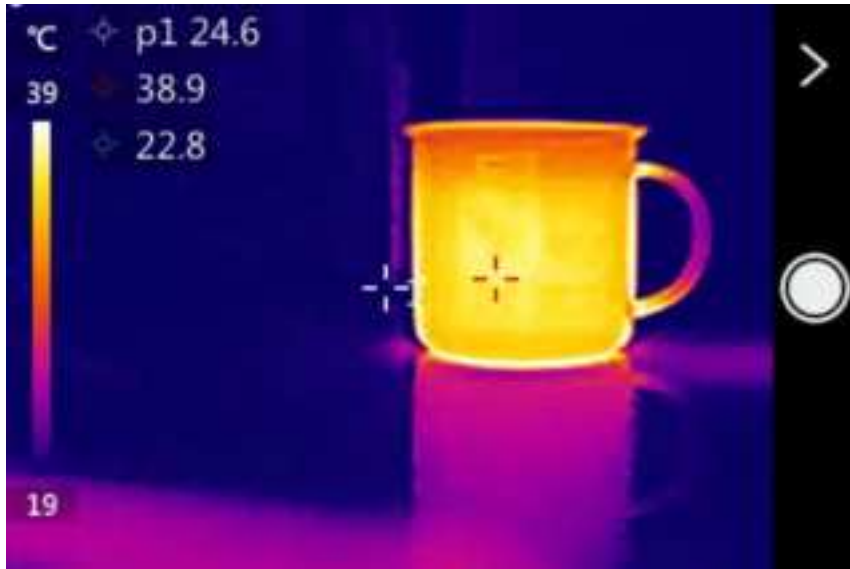


Photo interface

4.6 Image playback

This function is used to browse and play back the saved image file.




Click the playback icon  on the touch screen to pop up the picture library interface, as shown below. Click the corresponding folder to open the folder, click the icon  to delete the folder.



Photo gallery interface

4.7 System Settings

This function is used to set various parameters of thermal imager, including temperature measurement parameter setting, temperature measurement function setting, network setting, storage setting, alarm setting, device setting, etc.

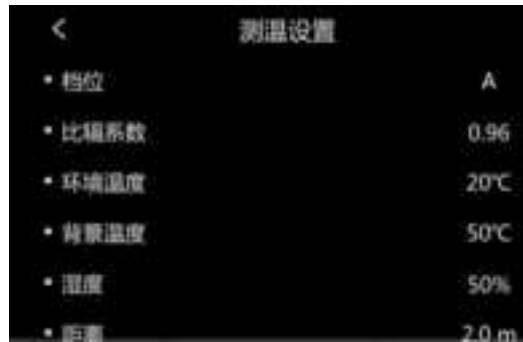
Click the touch screen to pop up the main menu. Click the setting icon  on the touch screen to pop up the system setting menu interface, as shown below.



System Setting interface

4.7.1 Temperature Measurement Parameters Settings

In the temperature measurement parameter setting menu, there are temperature measurement gear setting, specific emissivity setting, ambient temperature setting, background temperature setting, humidity setting, temperature measurement distance setting, and temperature correction setting.



Temperature measurement parameter setting menu

Temperature measurement gear setting: The temperature gear can be switched.

Radiation coefficient setting: You can select the emissivity value of the target through the touch screen.

Ambient temperature setting: You can select the ambient temperature by touching the screen.

Background temperature setting: You can select the desired background temperature value by touching the screen.

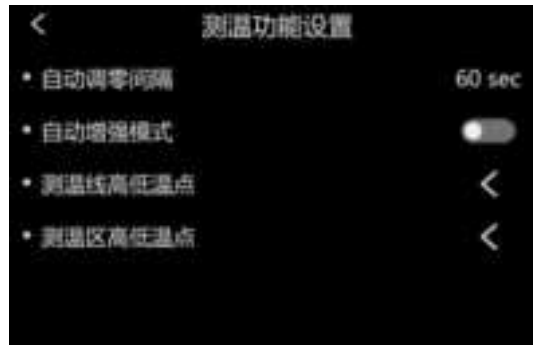
Humidity setting: You can select the relative humidity of the environment through the touch screen.

Distance setting: You can select the distance of the target by touching the screen.

Temperature correction : You can select the required correction temperature value by touching the screen.

4.7.2 Temperature measurement settings

In the temperature measurement setting menu, there are automatic zero adjustment interval, automatic enhancement mode, high and low temperature point settings of temperature measurement line and temperature measurement area.



Temperature measurement setting menu

Auto-zero interval: You can select the time interval to be zero-adjusted by touching the screen.

Auto Enhance Mode: On/Off can be selected via touch screen.

High and low temperature points of the temperature measurement line: You can set the display conditions of the high and low temperature points.

High and low temperature points in the temperature measurement area: You can set the display conditions of the high and low temperature points.

4.7.3 Network Settings

In the network settings menu, WIFI settings can be performed.



Network settings menu

WIFI setting: You can turn on/off WIFI through the touch screen. The default password of WIFI is 12345678, which can be connected through the mobile APP and realize remote monitoring and other functions.

4.7.4 Storage settings

In the storage settings menu, there are image storage format settings, memory card capacity display, and format settings.



Storage settings menu

Image storage settings: You can set a separate JPG format, or you can set an associated visible light format.

Memory Card Capacity: Displays the available memory capacity.

Format: You can format the memory card.

4.7.5 Alarm Settings

In the alarm setting menu, there are temperature alarm mode, high and low temperature alarm settings, alarm temperature settings, alarm linkage interval settings, and alarm buzzer settings.



Alarm Settings Menu

Temperature alarm mode: On/off can be selected by touch screen.

Alarm type: High /low temperature alarm can be selected by touch screen.

Alarm temperature: The alarm temperature threshold can be selected through the touch screen.

Alarm linkage interval: The alarm linkage interval can be selected by touching the screen.

Alarm buzzer: Alarm buzzer on/off can be selected by touch screen.

4.7.6 Device Settings

In the device settings menu, there are language and time settings, brightness settings, shutdown time settings, sleep time settings, screen rotation lock settings, color code bar display settings, update and upgrade settings, and restore factory settings.



Image settings menu

Language and time settings: you can choose the time system, you can choose the date system, time settings, distance units, temperature units.

Brightness setting: You can slide the screen to adjust the brightness.

Shutdown time setting: you can choose the shutdown time 5 minutes, 30 minutes, 60 minutes, and never.

Sleep time setting: you can choose the sleep time 5 minutes, 30 minutes, and never.

Screen rotation lock settings: Screen rotation lock can be selected to be on/off.

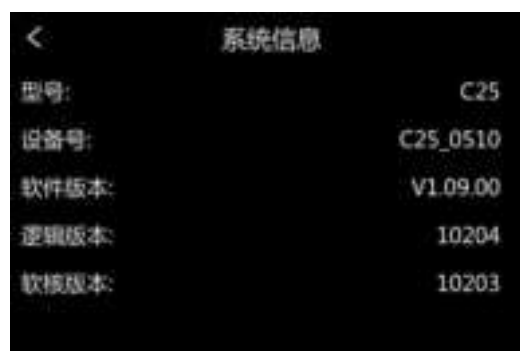
Color code bar display settings: Color code bar display can be selected on/off.

Update/upgrade settings: FPGA upgrade and ARM upgrade can be selected.

Restore factory settings: You can choose to confirm or cancel, the device will restart after confirmation.

4.7.7 System Information

System information includes device model, device number, software version, logical version, and soft-core version.



5 RFQ

If you encounter problems with the camera, use the table below for troubleshooting. If the problem cannot be solved, please disconnect the power and contact the maintenance department of our company.

fault phenomenon	Reasons and solutions
Thermal imager failed to start	<ul style="list-style-type: none">● The battery runs out of power. →Charge the device.
Thermal imager automatically shuts down	<ul style="list-style-type: none">● The battery runs out of power. →Charge the device.● The device is set to be powered off. →Select "never" here.
The battery is running down too fast	<ul style="list-style-type: none">● The ambient temperature is too low.● The charging cable is damaged, and the device failed to be charged. →Replace with a new data cable.
Thermal imager screen brightness dimmed	<ul style="list-style-type: none">● Check the brightness setting of the thermal imager screen. → Adjust the camera screen brightness setting.
Thermal image turns black and white	<ul style="list-style-type: none">● Black and white labels are selected. →Select the normal color code.

Appendix A

Emissivity of common materials (for reference only)

Material name	Surface condition	Temperature (°C)	Emissivity (ϵ)
aluminum	non-oxidizing	100	0.20
	oxidation	100	0.55
brass	polished brown	20	0.40
	matt	38	0.22
	oxidation	100	0.61
copper	severely oxidized	20	0.78
iron	oxidation	100	0.74
	rust	25	0.65
cast iron	oxidized	200	0.64
	not oxidized	100	0.21
wrought iron	hairy	25	0.94
	polished	38	0.28
nickel	oxidized	200	0.37
stainless steel	oxidation	60	0.85
steel	oxidation at 800°C	200	0.79
general brick	surface	20	0.93
concrete	surface	20	0.92
glass	polished flat	20	0.94
paint	white	100	0.92
	natural black	100	0.97
carbon	smoke black	25	0.95
	candle smoke	20	0.95
	graphite rough surface	20	0.98
paint	16 colors average	100	0.94
paper	white	20	0.93
sandy soil	surface	20	0.90
wood	planed	20	0.90
water	distilled water	20	0.96
skin	humanity	32	0.98
ceramics	thin	21	0.90
	thick	21	0.93

FCC Warning

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The SAR limit adopted by USA is 1.6 watts/kilogram (W/kg) averaged over one gram of tissue. The highest SAR value reported to the Federal Communications Commission (FCC) when it is tested for use at the body is 0.432 W/kg.

The device complies with the RF specifications when the device is used near your eye or at a distance of 5 mm from your body. Ensure that the device accessories such as a device case and a device holster are not composed of metal components.