



**Tianshu C Series
Handheld Thermal Camera
User Manual
V1.0.1**

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Historical Version

Version	Time	Remark
V1.0.0	2020-04	Initial version
V1.0.1	2021-02	Add descriptions for new functions

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1. User Notice

1.1 Calibration

Annual calibration to the thermal camera is recommended.

1.2 Manual Update

Our user manual will be updated from time to time. Please contact us to get the latest version of the manual.

1.3 Scope of Application

This manual is applicable to all products in C series, which means that some contents in this manual may not be applicable to a specific model.

2. Quick Start Guide

Please follow the below steps to get started:

1. Charging:

- Use 5V 1A or 5V 2A power adapter and USB cable to charge the device.
- The device can be charged by connecting to PC with the USB cable in the accessories. Note: the charging speed is slower than that of using the power adapter.

2. Power on

Press and hold the power key to start the camera.

3. Find the target

Aim the thermal camera at the object you are interested in.

4. Capture image

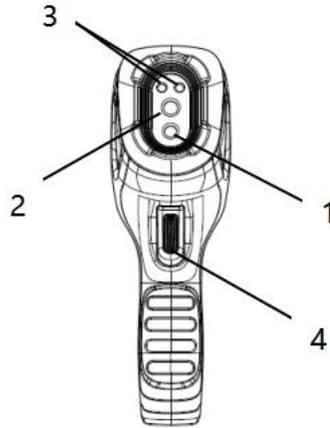
Click the trigger key to capture the image.

5. PC analysis

Download the PC client software of thermal camera, start the client, use USB cable or SD card, and import the data for detailed analysis.

3. Camera Introduction

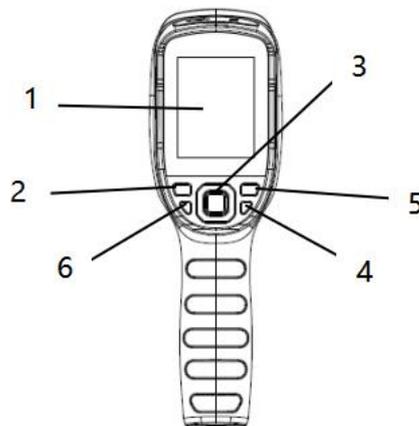
3.1 Camera



Components:

1. Digital Camera
2. Infrared Lens
3. LED
4. Trigger

3.2 Buttons



Components :

1. Screen

2. View Memory button: Press to View Saved Pictures.

3. Navigation button

- Press up/down/left/right button to move the cursor to navigate between Menu, Settings, Albums;
- Press the Center Button(Also called Confirm Button) to select.

4. Power Button

Long press to power on/off.

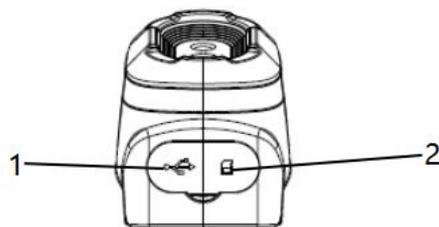
5. Back Button

Press to cancel operation or back to previous menu.

6. LED Button

Long press to turn on/off the LED light.

3.3 Connector & Memory Card



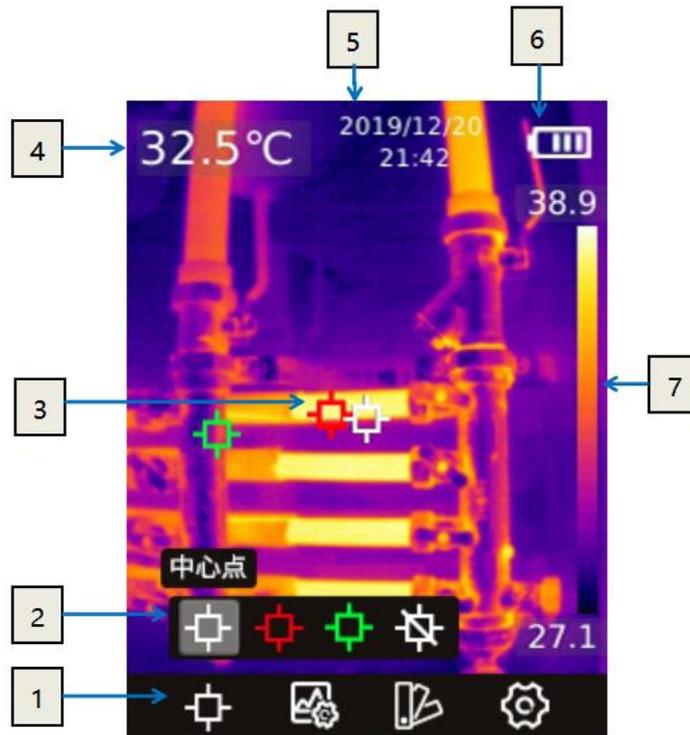
1. USB slot

- Use USB cable to connect power adapter for charging
- Use USB cable to connect computer for charging or data transmission

2. SD Card

- Standard microSD card, 16GB default, support up to 32GB
- The microSD card can be taken out to transmit data to PC or other equipment with card readers.

3.4 User Interface



Interface Introduction:

1. Main toolbar: measurement mode, image mode, color palette and settings can be set.
2. Secondary toolbar: detailed options can be set here, such as selecting color palette.
3. Temperature measurement point: it is divided into center spot, high temperature / low temperature spot tracing and closing measurement spot, user-defined measurement spot.
4. Center point temperature: display the temperature of the center point
5. Date and time: display date and time
6. Power: display the remaining power of the battery
7. Temperature range: display the temperature range in the current screen

4. Operating Instructions

4.1 Power On & Off

1. In the shutdown status, long press the power button to power on.
2. In the power-on status, long press the power button to power off.
3. If the device crashes, you can forcibly shut it down by pressing and holding the power button.

4.2 Saving Images

1. In the auto save mode, click the trigger to save the picture automatically
2. In the manual mode, click the trigger, then manually save images or cancel saving.

Note: the auto/manual mode can be switched in the "Settings - auto save" option.

4.3 View / Delete Pictures

When you take and save a picture, it will be stored in SD card, you can view the saved image at any time as follows:

1. Click the View Memory button to enter the library.
2. Use the direction button to select the picture you want to view.
3. Press confirm button to view the picture in full screen.
4. Click the View Memory button or the return button continuously to return to the thermal imaging interface.

4.4 Center Point Temperature Measurement

You can use point temperature measurement for temperature measurement. The measurement results will be displayed in the upper left corner of the screen, see Section 3.4

1. In the thermal imaging interface, press the center button to display the main toolbar

2. Select the measurement  icon on the toolbar, and press the center button to bring up the secondary toolbar
3. Select “Center Point”  icon on the secondary menu, and press the center button to enable the Center point temperature measurement (on by default), the temperature of the center point will be displayed in the upper left corner of the screen

4.5 Cold/Hot Spot Tracing

You can turn on cold point / hot spot tracking to identify the lowest/highest temperature on the screen by checking the moving cursor:

1. In the thermal imaging interface, click center button to display the main toolbar.
2. Select the measurement  icon on the toolbar, and press the center button to bring up the secondary toolbar.
3. Select “High Temperature”  or “Low Temperature”  icon on the secondary menu, and press the confirm button to enable tracking of high/low temperature point.

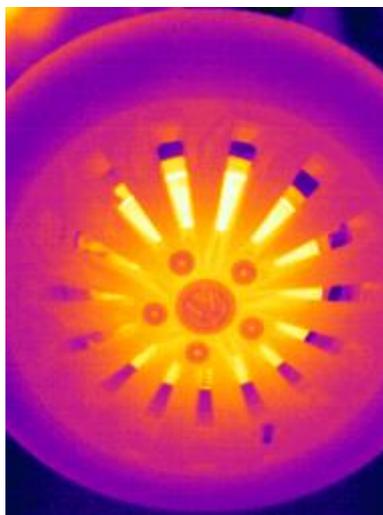
4.6 User-defined Spot Measurement

1. In the thermal imaging interface, click center button to display the main toolbar.
2. Select the measurement  icon on the toolbar, and press the center button to bring up the secondary toolbar.
3. In the toolbar, select the "User-defined Spot 1" option. The spot can be moved by the navigation key in the thermal imaging interface. Click the center button to confirm the placement, and the return button to cancel the placement. Select the "User-defined Spot 1" again to turn off the spot display. "User-defined Spot 2" and "User-defined Spot 3" can be set in the same way.

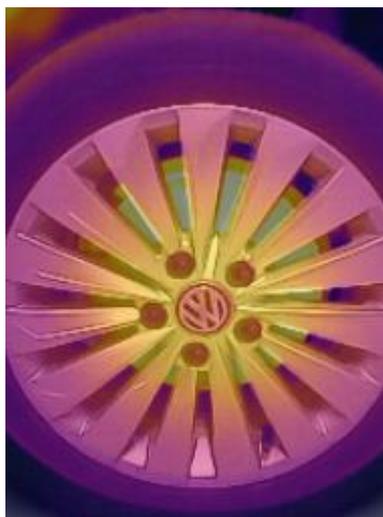
4.7 Imaging Modes

4.7.1 Imaging Mode Introduction

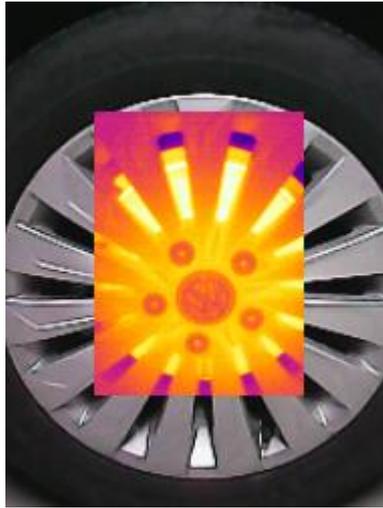
- Thermal image: Infrared images only



- Fusion: Fusion of infrared image and visual image in a certain scale. In the main interface, you can use the left and right navigation keys to adjust the fusion ratio of infrared and visible light.



- PIP(Picture in Picture): Thermal image is over-layed on the center of visual camera image.



- Digital Camera: Visual camera image only



Note: In order to achieve better overlay image effect, when using the picture in picture, and thermal fusion modes, you need to set the alignment distance, which is the approximate distance from the thermal camera to the target. In picture in picture / thermal fusion / digital camera mode, please make sure that the thermal image displayed on the screen is aligned with the target.

4.7.2 Steps of Changing Image Modes

1. In the thermal imaging interface, press the center button to display the main toolbar
2. select the “Image Mode” icon on the toolbar, and press the center button to bring up the secondary toolbar

3. Select the image mode you need on the secondary toolbar and press the confirm button to switch into the selected image mode.

4.8 Color Palette

You can change the color palette to distinguish temperature difference on the thermal camera. A appropriate color palette can help you analyze images more easily.

1. In the thermal imaging interface, press the center button to display the main toolbar
2. Select the “Color Palette”  icon on the toolbar, and press the center button to bring up the secondary toolbar
3. You can select a new palette and press the center button to switch into the selected palette.

4.9 Shutter Correction

4.9.1 Shutter Correction Introduction

Shutter correction is used to compensate for the non-uniformity of the detector pixels or the non-uniformity caused by other optical interference. When the picture effect is poor, you can perform shutter correction, which is common in situations where the ambient temperature changes rapidly.

4.9.2 Shutter Correction Operation

In the imaging interface, click the return button to perform a non-uniformity correction. During shutter correction, the screen will freeze for a short time, which is normal.

5. Settings

5.1 Measurement Parameters

5.1.1 Setting Emissivity

In order to get more accurate measurement results, you need to set the emissivity according to the target to be measured before each measurement, instead of using the default configuration. Emissivity refers to the ratio of the radiation ability of an object to that of a blackbody at the same temperature, which is relative to the reflectivity of the object. The lower the emissivity, the higher the percentage of energy reflected, and the higher the emissivity, the lower the percentage of energy reflected. For example, human skin emissivity is 0.98 and printed circuit board emissivity is 0.91. For more emissivity information, you can refer to the quick start guide in the package or inquire from other ways.

Emissivity Setting

1. In the thermal imaging interface, press the center button to display the main toolbar
2. select the “Settings”  icon on the toolbar, and press the center button to enter the settings menu.

5.1.2 Setting Ambient Temperature

1. In the thermal imaging interface, press the center button to display the main toolbar
2. Select the “Settings”  icon on the toolbar, and press the center button to enter the settings menu.
3. Select "measurement parameters" in the list, press the confirm key, and then select "ambient temperature" to set ambient temperature.

5.1.3 Setting Distance

Different distances will have different effects on the measurement results. For accurate temperature measurement, the distance information of the object is necessary for compensating for the result.

1. In the thermal imaging interface, click the OK button, and the main menu toolbar will be displayed.
2. In the toolbar, select the "Settings" option and click the OK button to enter "Settings".
3. Select "measurement" in the list, click the confirm button, and then select "distance" to set the distance.

5.2 Temperature Unit

The camera supports temperature displays in degrees Celsius, Fahrenheit, and Kelvin.

5.3 High/Low Temperature Alarm

The camera supports the high and low temperature alarm function. The user can set the high and low temperature alarm threshold. The alarm function can be turned on or off by setting the "on" and "off" options. After the high and low temperature alarm is triggered, a prompt icon will appear on the screen. If the "LED alarm" option is turned on, the LED light will flash promptly when an alarm occurs.

For alarm snapshot function, you can set the alarm snapshot time interval and the number of photos taken. Turn on this function, after triggering the high and low temperature alarm, it will take pictures according to the set time interval. When the set number of pictures is reached, the camera will stop taking photos and this function will be turned off automatically. It needs to be turned on again when it is used.

5.4 Photo-taking Settings

5.4.1 Automatically Save Photos

Turn on this function, the picture will be automatically saved after taking a picture.

5.4.2 Timed Photo

The camera supports the function of taking pictures at regular intervals, and users can independently set the time interval and number of pictures taken. If this function is turned on, photos will be taken at the set time interval. After the set number of photos is reached, the camera will stop taking photos and this function will be automatically turned off.

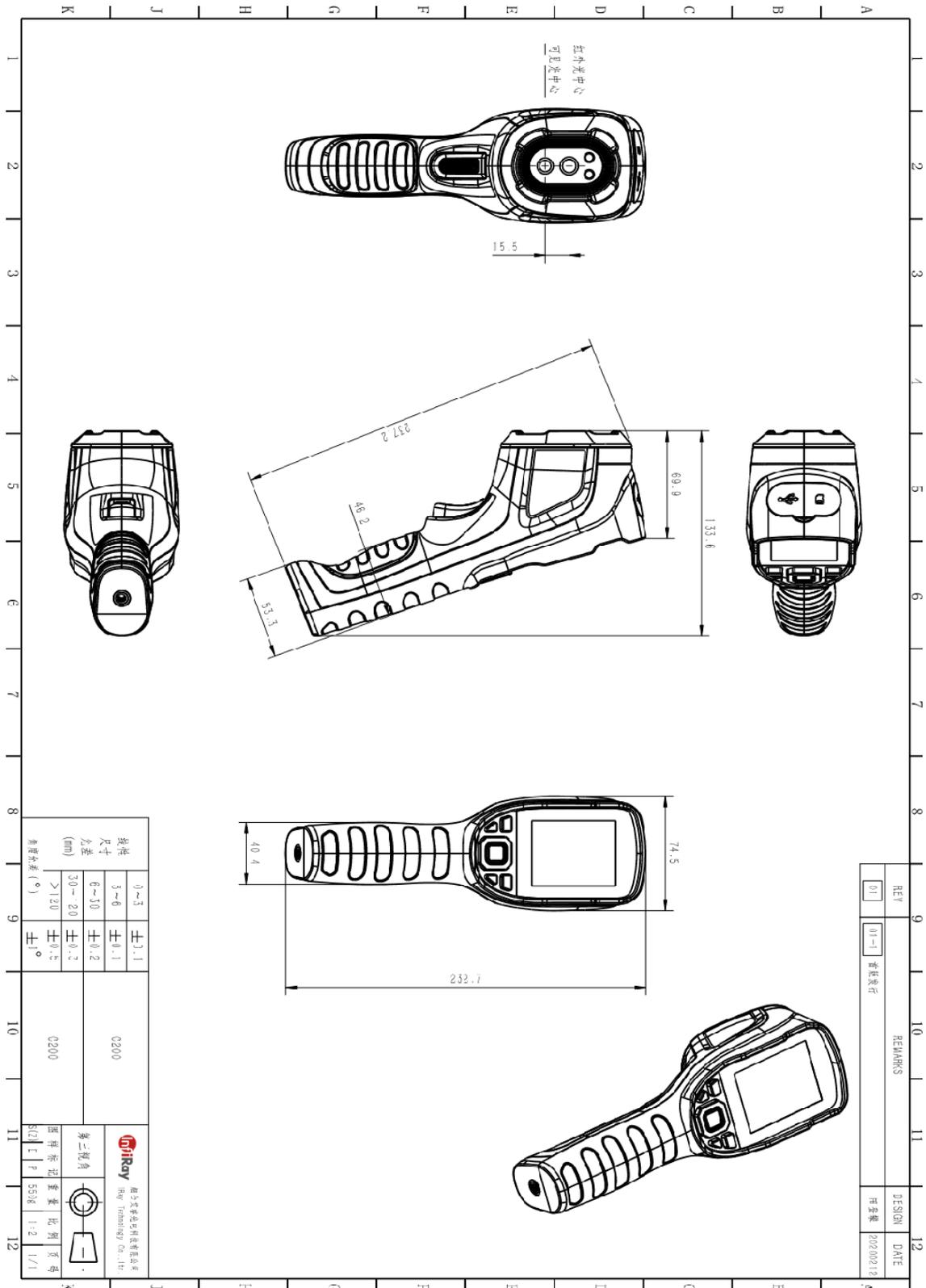
5.5 Temperature Measurement Gear

The temperature measurement range of the equipment is $-20\sim 550^{\circ}\text{C}$. In order to ensure the imaging effect and temperature measurement range, the temperature measurement range is divided into $-20\sim 150^{\circ}\text{C}$ and $100\sim 550^{\circ}\text{C}$. Users can choose different temperature measurement ranges independently according to the application conditions.

5.6 System Settings

In system settings, you can view the relevant information of this camera, and perform operations such as restoring factory default settings and formatting the SD card. In the "USB Mode" option, the default is U-disk mode, and the computer can directly access the SD card in the device through the USB cable. the option of "USB Camera" is provided in some models, which can synchronize the picture in the camera to the PC software for real-time display and analysis.

6. Structural Drawing



7. Precautions

To protect you and others from injury or damage to your device, please read all of the following information before using your device.

1. Do not point the lens directly to the sun or other high-intensity radiation sources.
2. Do not touch the lens with your hands or collide with other objects.
3. Do not touch the device with wet hands.
4. Do not use diluent to scrub your equipment.
5. Do not connect the attached connecting cable wrongly to avoid damaging the equipment.
6. Please pay attention to prevent static electricity.
7. Please do not disassemble the equipment. If there is any fault, please contact us, and our professional personnel will repair it.

8. Support and Services

8.1 Technical Supports

Systematic training could be provided to end-user technicians and operators.

8.2 After sales services

C series hand-held thermal camera is developed by IRay, we provide good after-sales service guarantee of our equipment maintenance and repair. If you need anything, please contact us.

9. Company Information

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