![infrared logo]

Mobile Phone Thermal Imaging App "Xtherm infrared" User Manual

Date: <u>August 23, 2023</u>

Contents

Scope of Use

The mobile phone thermal imaging app "Xtherm infrared" applies to T2S+ and T2L mobile phone plug-in thermal cameras produced by InfiRay Technologies Co., Ltd. This manual mainly introduces how to use the mobile phone app "Xtherm infrared". This mobile phone app has an iPhone version and an Android version. The software functions and operations of the two versions are basically the same, but they have slightly different operation commands according to the characteristics of the system software. This Manual is for users' reference. If software updates cause the operations to be different from the user manual, the actual operations shall prevail.
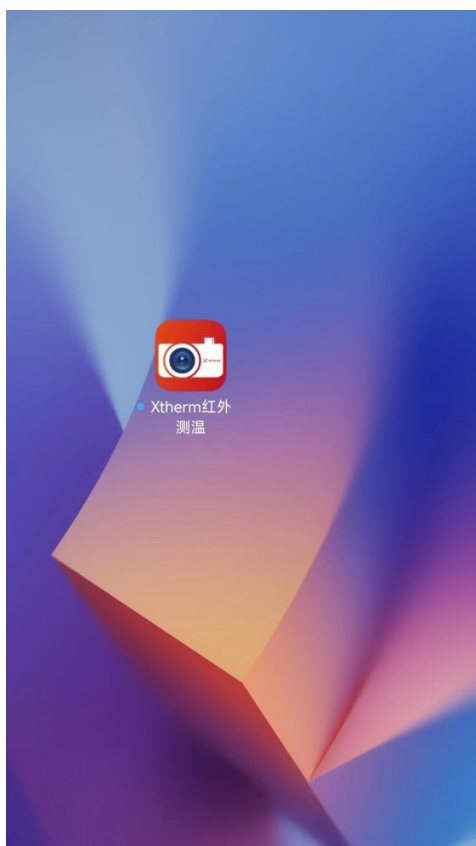
Preparations:

1. An iPhone installed with "Xtherm infrared" or an Android phone supporting the OTG function.

2. A T2S+ or T2L mobile phone plug-in thermal camera, which has iPhone and

Android versions.

1. Product Overview

1.1 Application Scenarios

To use the T2S+ or T2L mobile phone plug-in thermal camera, you need to download and install the mobile app "Xtherm infrared" on your mobile phone and use this app to realize infrared observation and thermographic functions.

1.2 Main Functions

The following main functions are realized:

(1) Turn on the infrared camera to realize infrared observation and palette mode switching;

(2) Conduct thermographic measurement based on the point, line, rectangle, and offline analysis of image temperature;

(3) Capture images, take videos, and generate temperature measurement reports;

(4) Measurement mode, shutter, image control, temperature measurement parameter setting, and so on of the thermal camera for smartphones.

2. Installation

2.1 Installing the App

In the app store for smartphones, search for "Xtherm infrared", and tap the installation package for download and installation.

3. Product Use

3.1 App Connection

Insert the mobile phone plug-in thermal camera into the mobile phone port. The mobile phone will automatically recognize the device and pop up a prompt (the prompts slightly differ for different mobile phone models), as shown in Figure 3.1. Tap OK, then the app will turn on the thermal camera for smartphones, and the infrared observation image will be displayed on the mobile phone screen.
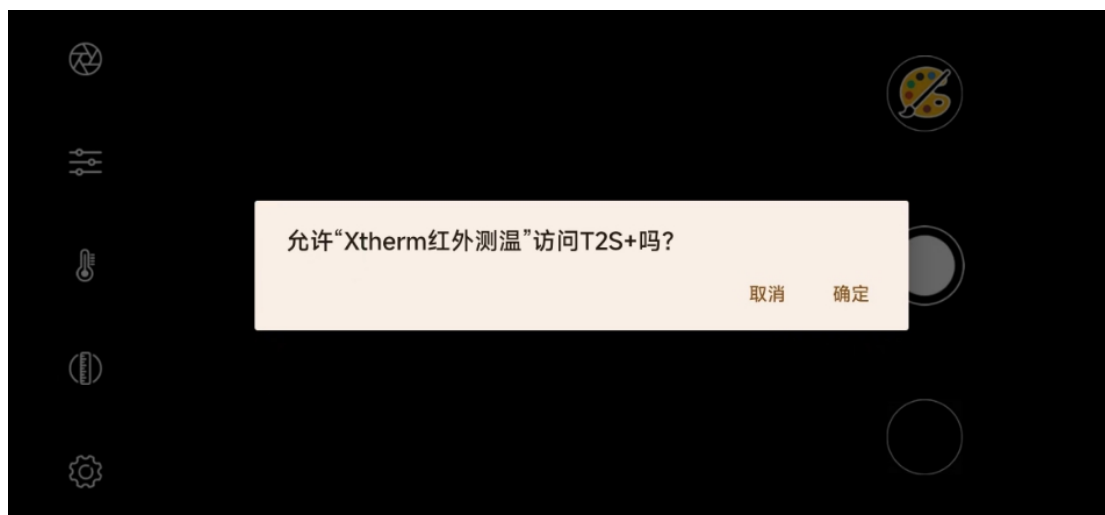

Figure 3.1 Pop-up Prompt

3.2 App Control Operation

This app has nine common functions, namely palette, video taking, image capture, album, shutter, image setting, measurement tool, isotherm scale, and settings, as shown in Figure 3.2.

Figure 3.2 Common Functions

快门	Shutter
图像设置	Image Setting
测温工具	Measurement Tool
等温尺	Isotherm Scale
设置	Settings
色板	Palette
录像	Video Taking
拍照	Image Capture
图库	Album

3.2.1 Palette Switch

Tap the **palette** button. The box for switching among the 7 palettes is displayed. Tap the buttons of different palettes to switch the palette for observation, as shown in Figure 3.2.1.
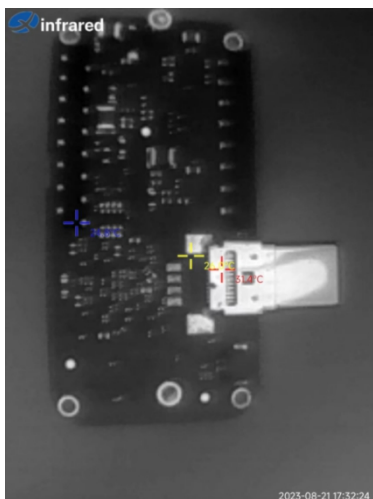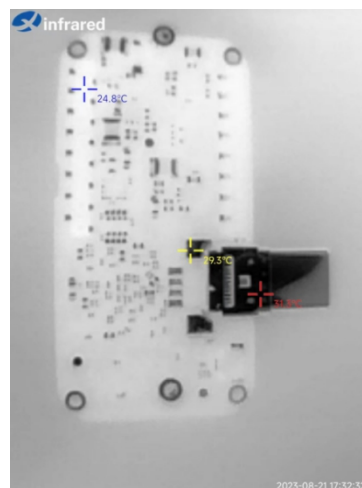
Figure 3.2.1 Palette Modes

The color of the image varies in different palette modes, as shown in the following figure.

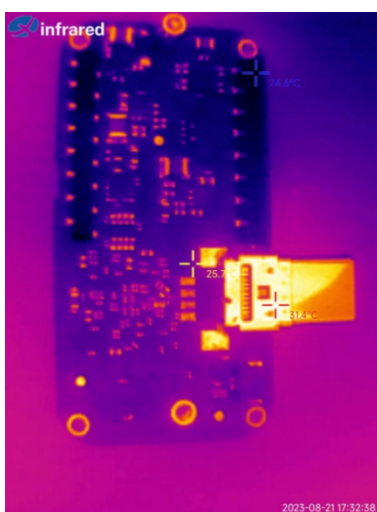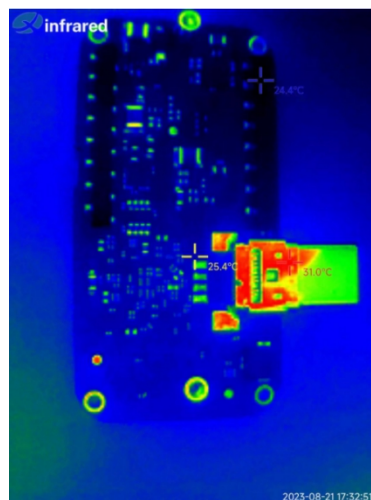Display Effect of the Five Palettes
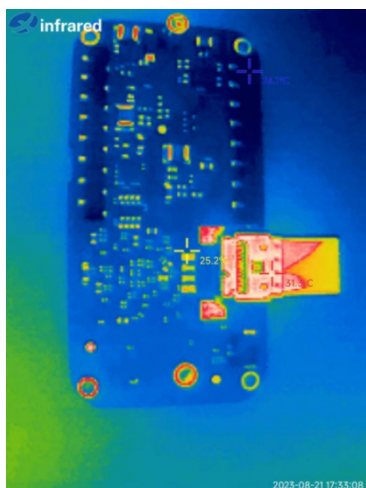

(a) White-hot

(b) Black-hot

(c) Iron Red

(d) Rainbow
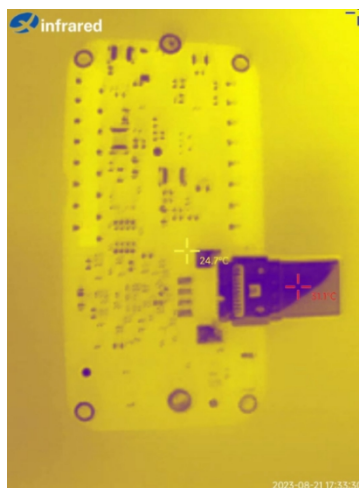
(e) Rainbow_HC   (f) Iron Gray
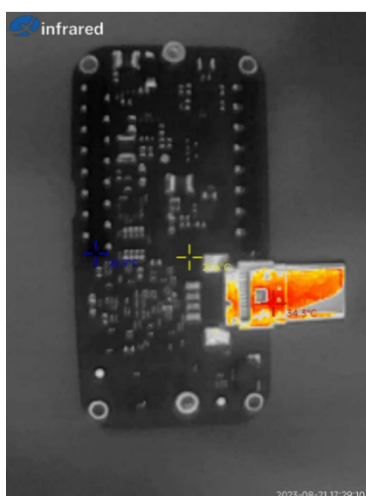
(g) Red-hot

3.2.2 Album, Image Capture and Video Taking
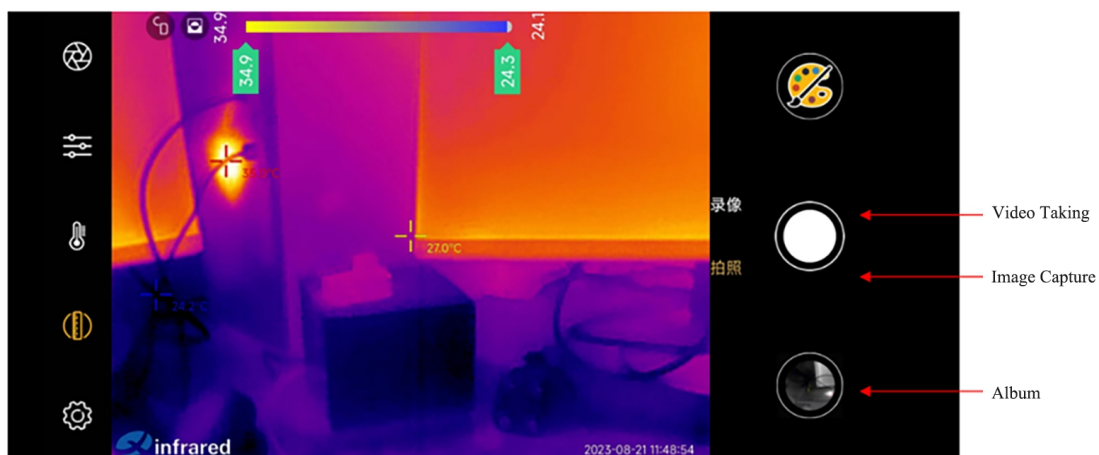
录像	Video Taking

拍照	Image Capture
图库	Album

1. Album: Tap it to view photos and videos stored in the mobile app.

2. Image Capture: Save the current image.

3. Video Taking: Tap it once to start taking videos, and tap it again to stop taking.

3.2.3 Shutter

Tap the shutter button to perform non-uniformity correction, as shown in the following figure.

Shutter Button

快门	Shutter

3.2.4 Image Setting

Tap the image setting button to open the image adjustment toolbar, which includes 6 tools, namely brightness adjustment, contrast adjustment, HD mode, image flip, mirroring, and PIP.

图像设置	Image Setting
画中画	PIP
图像镜像	Mirroring
图像旋转	Image Flip
高清模式	HD Mode
对比度调节	Contrast Adjustment
亮度调节	Brightness Adjustment

1. Brightness adjustment: Tap the brightness adjustment button. A brightness adjustment bar (0-100) will appear. Drag the adjustment bar to adjust the brightness;
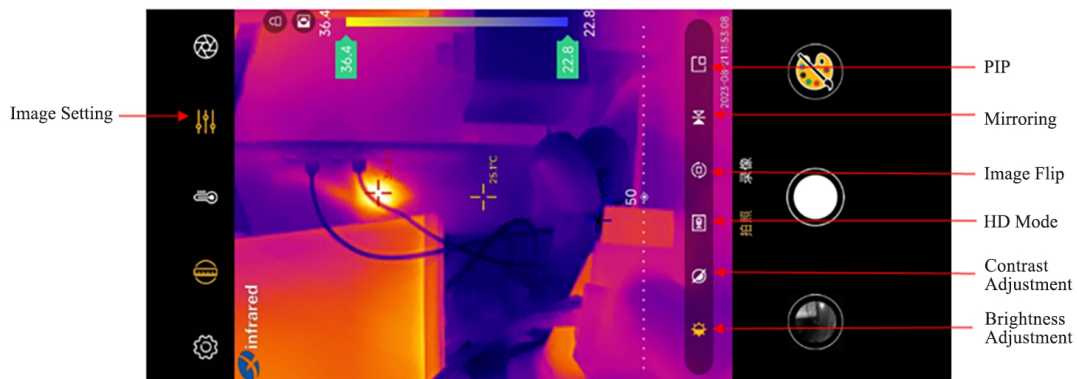
2. Contrast adjustment: Tap the contrast adjustment button. The contrast adjustment bar (0-100) will appear. Drag the adjustment bar to adjust the contrast;

3. HD mode: Tap the HD mode button to enable the HD mode. The image becomes clearer;

4. Image flip: Tap the image flip button, and the thermal image will rotate 180°. Tap it again to restore the image;

5. Mirroring: Tap the mirroring button, and the thermal image is mirrored. Tap it again to restore the image;

6. PIP: The visible light image captured by the rear camera of the mobile phone will be displayed at the upper left corner of the infrared image for dual-spectrum image comparison. Tap the button again and the PIP will disappear. See the following figure.
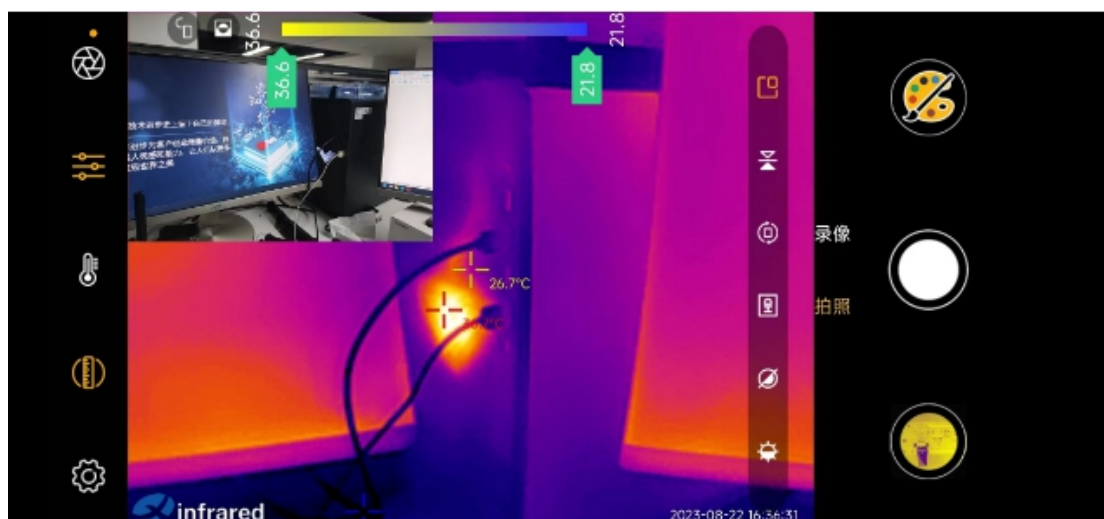
3.2.5 Measurement Tool

Tap the measurement tool button to open the measurement toolbar, which includes center temperature, high and low temperature, 3×3 grid, point temperature measurement, line temperature measurement, rectangle temperature measurement, and delete, as shown in Figure 2.2.5.1.

1. Center temperature: Display the temperature value of the middle position of the thermal image.

2. High and low temperature: Display the highest and lowest temperature positions and temperature values in the global thermal image.

3. 3x3 grid: Display a 3x3 grid. It facilitates confirming the position of the measured target and tools for drawing points, lines, and rectangles.

4. Point temperature measurement: After tapping the point temperature measurement button, you can tap on the infrared image. Then, the temperature measurement point and temperature value will be displayed. You can tap the point again to delete it. Up to three temperature measurement points can be displayed.

5. Line temperature measurement: After tapping the line temperature measurement button, you can draw a line on the infrared image. The highest temperature, lowest temperature, and average temperature will be displayed on the line. Tap the line again to cancel the measurement. Up to three lines for temperature measurement can be displayed.

6. Rectangle temperature measurement: After tapping the rectangle temperature measurement button, you can draw a rectangle on the infrared image. The highest temperature, lowest temperature, and average temperature in the rectangle will be displayed. Tap the rectangle again to cancel the measurement. Up to three rectangles can be displayed.

7. Delete: Delete all drawn points, lines, and rectangles to cancel measurements.
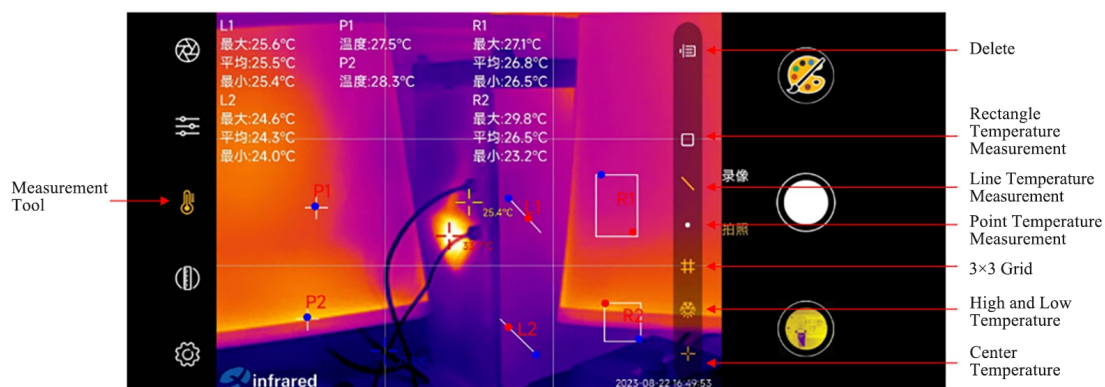
Temperature Display

测温工具	Measurement Tool
删除	Delete
矩形测温	Rectangle Temperature Measurement
线测温	Line Temperature Measurement
点测温	Point Temperature Measurement
九宫格	3×3 Grid
高低温	High and Low Temperature
中心点温度	Center Temperature

3.2.6 Isotherm Scale

Tap the isotherm scale tool button to open the isotherm scale toolbar, which includes the isotherm scale, high temperature quick check, and lock, as shown in the following figure.

1. Isotherm scale: Display the temperature distribution for thermal imaging, as well as the highest and lowest temperature values. You can manually adjust the range of temperature for the palette. The area within the temperature range is displayed in color, and the area outside the temperature range is displayed in gray. This facilitates distinguishing between different temperature ranges. (The isotherm scale does not apply to white-hot, black-hot, and red-hot palettes.)

2. High temperature quick check: Quickly find the highest temperature area globally in the thermal image.

3. Lock: Lock the status of the isotherm scale to disable the manual adjustment of the temperature range for the isotherm scale and the button for a high temperature quick check. After it is unlocked, you can use the isotherm scale and the high-temperature quick check button.
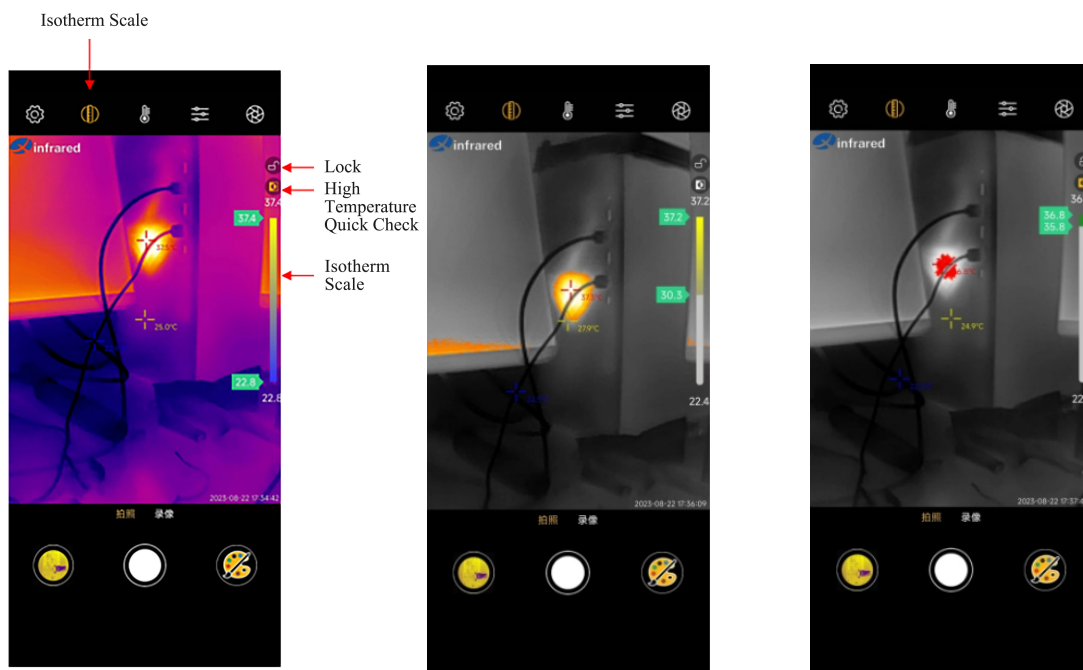
Isotherm Scale Tool Introduction   Manually Adjusting the Status of the Isotherm Scale   High Temperature Quick Check Status

等温尺	Isotherm Scale
锁	Lock
高温速查	High Temperature Quick Check
等温尺	Isotherm Scale

3.2.7 Settings

Tap the settings button to open the temperature measurement settings page, which includes login, temperature measurement and alarming, temperature unit, temperature measurement parameters, temperature range switching, automatic shutter, logo watermark, time watermark, positioning, language, help, privacy policy, and user agreement. See the following figure.
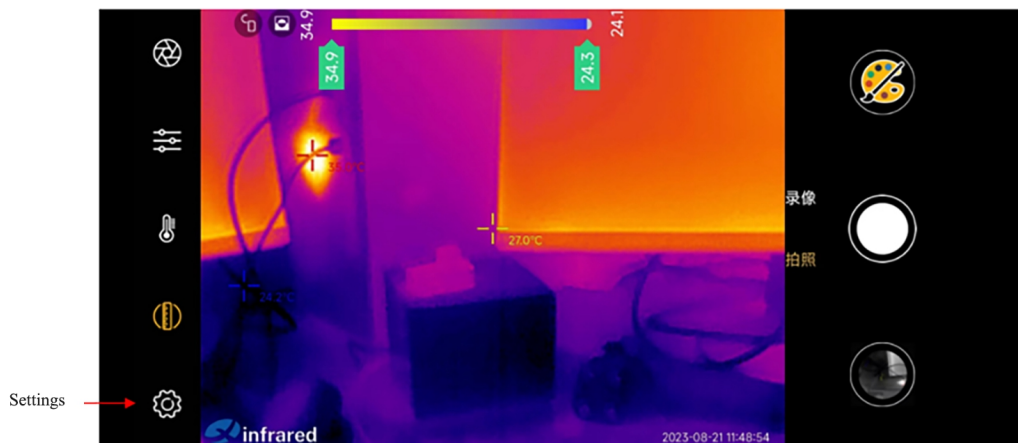
设置	Settings

Temperature Measurement Settings Page

1. **Login**: Log in with your mobile phone number. The first login time and device model can be recognized, and FAQ and customer service hotline are displayed.
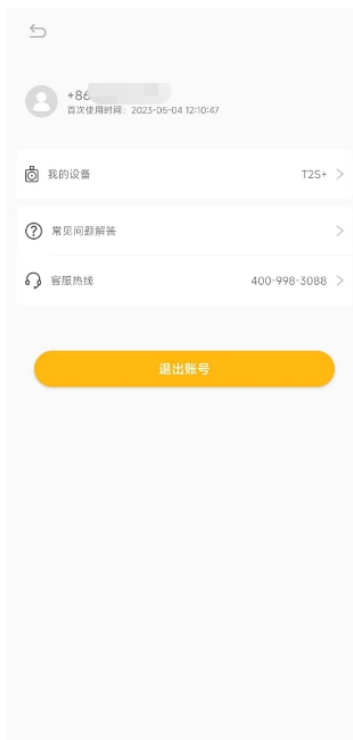
Login Screen

2. **Temperature measurement and alarming**: High temperature alarm threshold and low temperature alarm threshold can be set. When the temperature of the measured area exceeds the configured threshold, a temperature alarm is reported.

Temperature Alarm

3. **Temperature unit**: You can select Celsius, Fahrenheit or Kelvin.

Temperature Unit

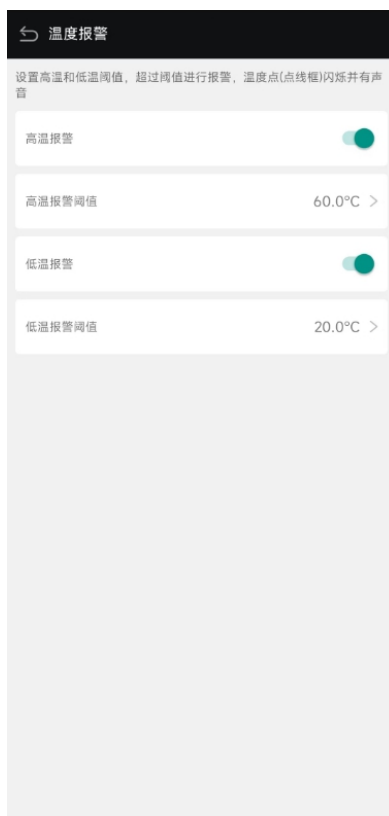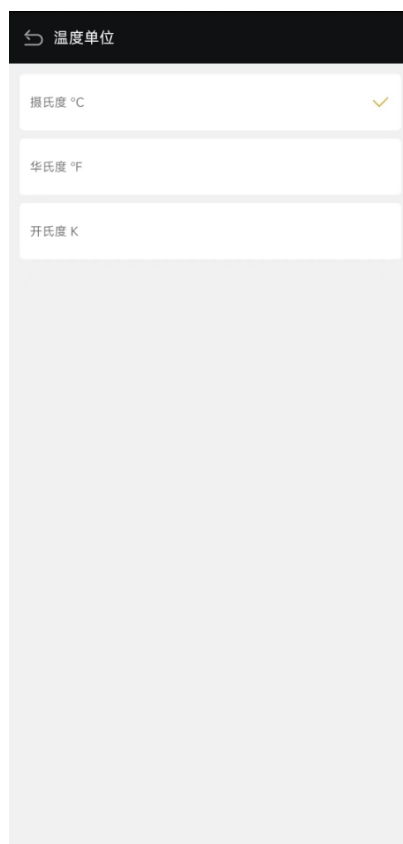4. Temperature measurement parameters: ① **Correction**: Correct measured temperature errors;

② **Reflected temperature**: The temperature reflected by the surrounding objects on the target object;

③ **Ambient temperature**: The ambient temperature of the environment in which the target object is located

④ **Humidity**: The atmospheric humidity of the environment in which the target object is located

⑤ **Observation distance**: The distance from the thermal camera for smartphones to the target object;

⑥ **Emissivity**: The emissivity of the target object;

⑦ **Restore default**: Restore the above adjustments to the default settings.

Measurement parameters

5. **Temperature range switching**: Switch between the normal mode (-20~120°C) and wide temperature range mode (120–450°C). When the temperature is greater than 120°C, you need to switch to wide temperature range mode.

6. **Automatic shutter**: When it is enabled, uniformity correction is performed at an interval. When it is disabled, the shutter is not automatically corrected and needs to be corrected manually.

7. **Logo watermark**: Enable and disable the logo watermark.

8. **Time watermark:** Enable and disable the time watermark.

9. **Positioning**: Record the geographic latitude and longitude of the image captured, which can be viewed in the image details.

10. **Language**: Switch among different languages.

11. **Help**: Software operation user manual.

12. **Privacy policy and User agreement**: The privacy policy and user agreement for the app.

3.2.8 Album

Tap the album button to open the album, which includes three folders, namely album, favorites, and report.

1. **Album**: After images are captured or videos are taken, the images and videos are saved in the album folder. You can share them, add them to favorites, or delete them. You can tap the upper right corner to select all or cancel an operation, and tap an image to open the image details page. You can perform offline analysis and generate the temperature measurement report for a single image.

2. **Favorites**: You can tap to add important images or videos in the album to the favorites folder for quick access.
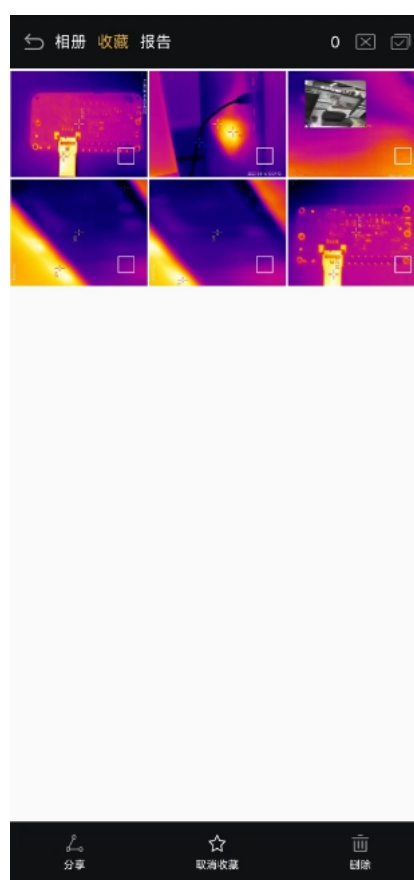
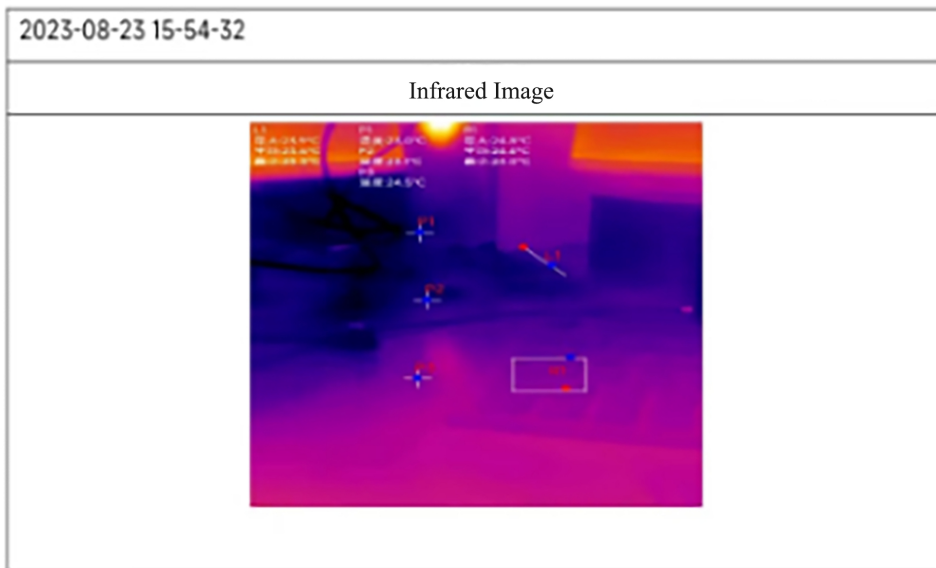Album Folder   Favorites Folder

3. **Report**: After a temperature measurement report for a single image is generated on the image details page, the report is saved in this folder. You can rename, share, and delete the report.

Temperature Measurement Report Folder

Temperature Measurement Report

2023-08-23 15-54-32
Infrared Image

Measurement Parameters	
Temperature Unit:	℃
Correction:	0.0℃
Reflected Temperature:	25.0℃
Ambient Temperature:	25.0℃
Humidity:	45.0
Emissivity:	0.98
Distance:	1

Measurement Tool	P1	P2	P3	L1	L2	L3	R1	R2	R3
Maximum Value	23.0 ℃	23.1℃	24.5 ℃	23.9 ℃			24.8 ℃		
Minimum Value	23.0 ℃	23.1℃	24.5 ℃	23.3 ℃			24.0 ℃		

Note: If the temperature alarm is set, the text of the temperature exceeding the high temperature will display red, and the text of the temperature below the low temperature will display blue.

Temperature Measurement Report Template

测温报告	Temperature Measurement Report
红外图像	Infrared Image
测温参数	Measurement Parameters
温度单位：	Temperature Unit:
校正：	Correction:
反射温度：	Reflected Temperature:
环境温度：	Ambient Temperature:
湿度：	Humidity:
发射率：	Emissivity:
距离：	Distance:
测温工具	Measurement Tool
最大值	Maximum Value
最小值	Minimum Value
PS：如果设置温度报警，超过高温的温度字体显示红色，超过低温的温度字体显示蓝色	Note: If the temperature alarm is set, the text of the temperature exceeding the high temperature will display red, and the text of the temperature below the low temperature will display blue.

4. **Image details page**: Tap the image to open the image details page. Tap the details button on the upper right corner to view the shooting time, file information, save path, and longitude and latitude. You can perform operations on the image, such as sharing, offline analysis, isotherm scale adjustment view, temperature measurement report generation, deletion, and so on.

5. **Offline analysis**: Tap the button below the image to open the offline analysis tools, including palette switching, emissivity adjustment, point, line, and rectangle temperature measurement, arrow indication labeling, text standard, and one-touch recovery. You can perform analysis on measured temperature again for the infrared image. After the analysis, save the image and generate a temperature measurement report.
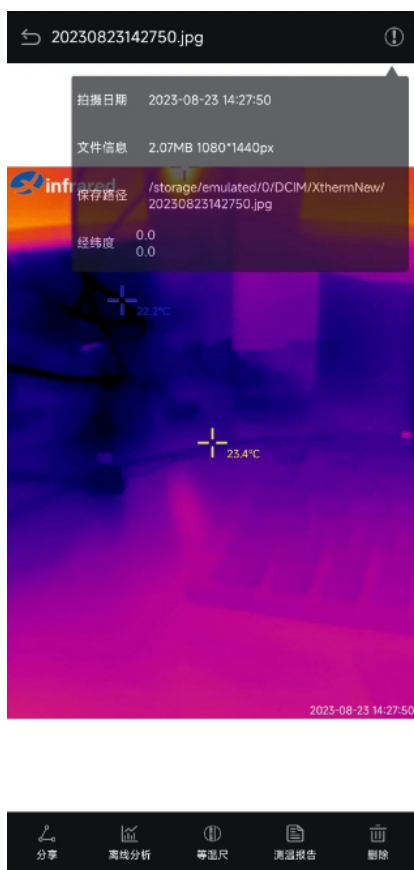
Image Details Page   Image Offline Analysis

3.2.9 Precautions

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

1. Do not expose the product to high-intensity radiation sources such as the sun;

2. Do not touch the detector window and lens with your hands or collide with them by using any objects;

3. Do not touch the device or USB interface with wet hands;

4. Do not bend or damage the cables;

5. Do not scrub your device with diluent;

6. Do not connect the attached cables in the wrong way to avoid damaging the device;

7. Take measures to prevent static electricity;

8. Do not dismantle the device. If there is any fault, please contact us to have it

repaired by professionals.

4. Product Service Specifications and Standards

4.1 Service Commitment

IRay promises to provide users with high-quality maintenance and technical support services. It continues to offer systems of the latest version and the best user experience.

4.2 After-Sales Services

- Address: No. 11, Guiyang Street, YEDA, Yantai, Shandong
- E-mail: sales@xinfrared.com
- Tel: 400-990-3900