

QIANLI 潜力®



IR EYE

红外火眼热成像

Infrared Fire Eye Thermal Camera

产品使用说明

User's Guide



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Windows

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一、产品简介 Product Overview -----

二、产品特性 Product Characteristics -----

三、产品规格 Product Specifications -----

四、外观与设备连接 Appearance and Equipment Connection -----

五、APP功能介绍 APP Function Introduction -----

5.1 界面简介 User Interface Introduction -----

5.2 功能介绍 Function Introduction -----

5.2.1 设置 Setting -----

5.2.2 关于 About -----

5.2.3 页面设置 Interface Reset -----

5.2.4 拍照 Photo Taking -----

5.2.5 录像 Video Recording -----

5.2.6 图库 Album -----

5.2.7 色板 Color Palette -----

5.2.8 区域测温 Regional Temperature Measurement -----

5.2.9 温度追踪 Temperature Tracking -----

5.2.10 框内详查 Highlight Rectangle Temperature -----

5.2.11 高温告警 High Temperature Alarm -----

5.2.12 高亮高温区域 Highlight High-temperature Regions -----

六、使用注意事项 Precautions for Use and Maintenance -----

七、附录 Appendix -----

7.1 常见材料反射率表 Table of Reflectivity of Common Materials -----

八、包装清单 Packing List -----

一、产品简介 Product Overview

手机式红外热成像仪采用像元间距小、高分辨率的工业级红外探测器，搭配3.2mm镜头，是一款高精度快响应的便携红外热成像分析仪。产品轻巧便携、即插即用，配合定制专业级热像分析APP，可以连接手机对目标物体进行红外成像，使随时随地进行多模式专业热图分析成为可能。

Mobile phone infrared thermal imager is a portable infrared thermal imaging analyzer with high precision and quick response, which adopts an industrial-grade infrared detector with small pixel spacing and high resolution ratio, and is equipped with a 3.2mm lens. The product is lightweight and portable, and can be used directly when plugged in. With the customized professional thermal image analysis APP, it can be connected to a mobile phone to carry out infrared imaging of the target object, making it possible to perform multi-mode professional thermal image analysis anytime and anywhere.



二、产品特性 Product Characteristics

- 优质光学镜头搭配高分辨率探测器, 成像效果出色;
 - 轻巧便携, 配合手机APP使用, 随时随地进行专业热成像分析;
 - 测温范围广: $-15^{\circ}\text{C} \sim 600^{\circ}\text{C}$;
 - 支持高温警报, 自定义警报门限值;
 - 支持显示自定义温度区间画面, 高温区域显示使用场景众多;
 - 支持高低温追踪;
 - 支持添加点、线、矩形框进行区域测温, 线和矩形框支持高低温追踪和高温报警;
 - 铝合金外壳, 坚固耐用。
-
- It has high-quality optical lens and high-resolution detector, with excellent imaging effect;
 - It is lightweight and portable, and can be used with mobile APP to perform professional thermal imaging analysis anytime and anywhere;
 - It has a wide temperature measurement range: $-15^{\circ}\text{C} - 600^{\circ}\text{C}$;
 - It supports high temperature alarm and customized alarm threshold;
 - It supports the display of user-defined temperature range screen, and has many use scenarios for the display of high-temperature regions;
 - It supports high and low temperature tracking;
 - It supports adding points, lines and rectangular boxes for regional temperature measurement, with lines and rectangular boxes supporting high and low temperature tracking and high temperature alarm;
 - It has an aluminum alloy shell, which is firm and durable.

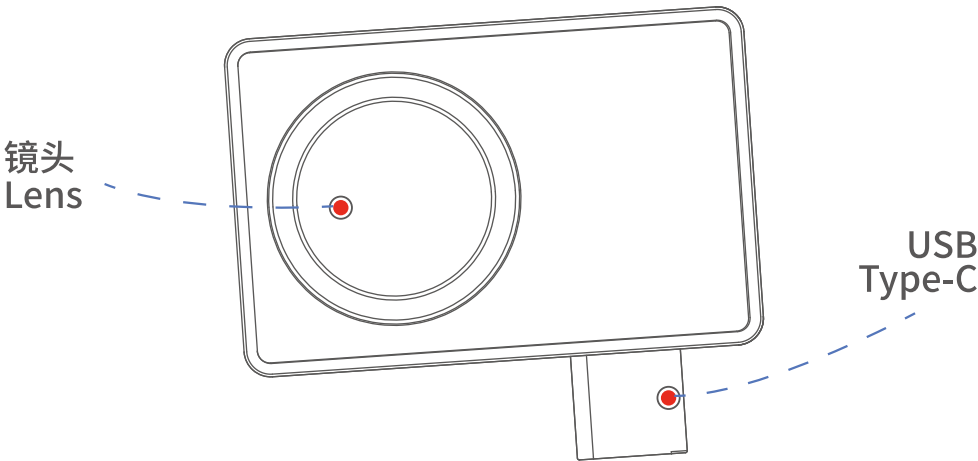
三、产品规格 Product Specifications

红外热成像 Infrared thermal imaging		
分辨率 Resolution	256x192	160x120
工作波长 Wavelength	8~14 μm	
帧率 Frame rate	25Hz	
NETD	<50mK @25°C	
镜头 Lens	3.2mm	
视场角 FOV	56° x 42°	35° x 27°
测温范围 Temperature Measurement Range	-15°C~600°C	
测温精度 Temperature Measurement Accuracy	±2°C或读数的±2% ±2°C or ±2% of reading data	
软件功能 (APP) Software Function (APP)		
温度测量 Temperature Measurement	支持高低温自动追踪、点测温、区域测温、线测温， 温度范围查看 Support high and low temperature automatic tracking, point temperature measurement, regional temperature measurement, line temperature measurement, temperature range view	
图像色板 Center Cross	铁红, 白热, 黑热, 彩虹, 红热, 冷蓝 Iron Red, White Hot, Black Hot, Rainbow, Red Hot, Cold Blue	
拍照录像 Languages	支持拍照录像, 照片和浏览回放浏览 Support taking photos and videos, Photo View and Playback	

设置 Remote	热成像参数配置, 温度单位, 语言, 高温告警设置 Thermal imaging parameter configuration, temperature unit, language, high temperature alarm settings
物理特性 Physical features	
工作温度 Line	-10°C ~ 75°C
存储温度 Center Cross	-45°C ~ 85°C
防水防尘 IP rating	IP54
产品尺寸 Dimensions	39mm * 33mm * 12mm
净重 Net weight	16.9g

四、外观与设备连接 Appearance and Equipment Connection

4.1、硬件外观与部件名称: Hardware Appearance and Part Name



五、APP功能介绍 APP Function Introduction

5.1、界面简介 User Interface Introduction

将热成仪连接安卓手机并运行App, 可以看到如图 5-1界面:
Connect device to an Android phone or tablet and run App, and you can see the interface as shown in Figure 5-1

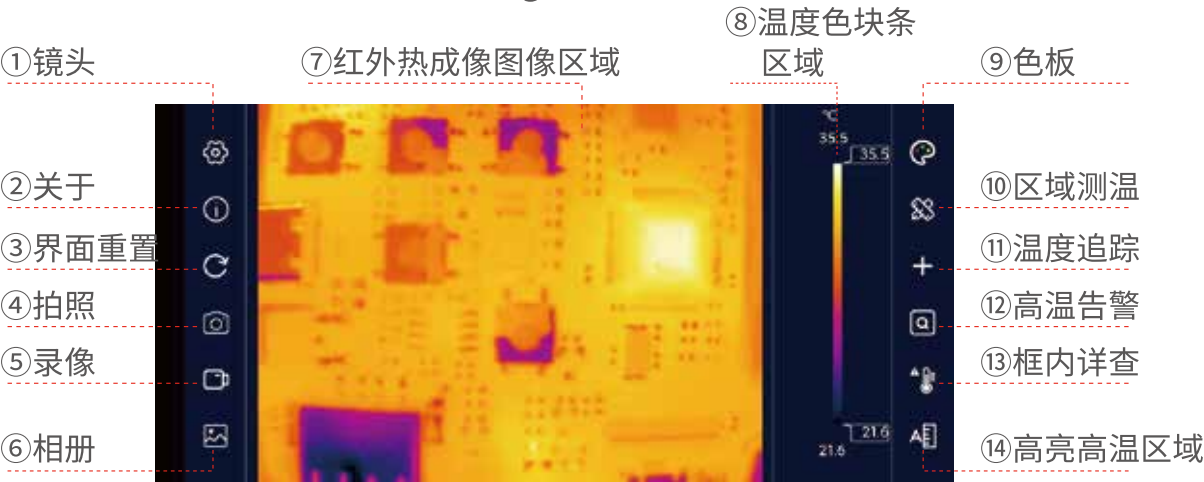


图 5 - 1手机APP界面
Figure 5 - 1

表格界面说明:

①	设置 Setting	提供App的界面和红外热成相机的参数设置 Provide App interface and parameter setting of infrared thermal imaging camera
②	关于 About	关于App的一些信息介绍 Some information about the App
③	界面重置 Reset	重置画面中的各种信息, 恢复到启动时的状态 Reset all information in the screen and restore it to the state at startup
④	拍照 Photo Taking	拍摄照片并存储在相册中 Take photos and store them in the Album
⑤	录像 Video Recording	视频录像并存储在相册中 Make a video recording and store it the Album
⑥	相册 Album	存储本应用的照片和录像 Store photos and videos

⑦	红外热成像 图像区域 Infrared thermal	显示红外热成像相机的画面 Display infrared thermal imaging
⑧	温度 色块条区域 Temperature color bar	用不同的色块条显示当前画面中的最高温和最低温 Display the maximum temperature and minimum temperature in the current screen with different color block bars
⑨	色板 Color palette	可以切换不同的色板来改变视频的配色 Different color palette can be switched to change the color of the video
⑩	区域测温 Regional Temperature Measurement	可以添加点、线和框来进行不同区域的测温 Points, lines and boxes can be added to measure temperature in different regions
⑪	温度追踪 Temperature Tracking	可以追踪画面中的当前最高温、最低温和中心点温度 The current maximum temperature, minimum temperature and center point temperature in the screen can be tracked
⑫	高温告警 Highlight Rectangle Temperature	可以突出显示当前所有矩形框内的温度, 如当前画面没有矩形框, 则会自动添加一个 The current temperature in all rectangular boxes can be highlighted. If the current screen does not have a rectangle, one will be added automatically
⑬	框内详查 High Temperature Alarm	可以设置高温告警门限值, 视频中如有温度超过门限值即会发出声音和画面报警 The high temperature alarm threshold can be set. If the temperature in the video exceeds the threshold value, a sound and screen alarm will be issued
⑭	高亮高温区域 Highlight High-temperature Regions	显示画面中的最高温部分区域 The maximum-temperature region in the screen can be displayed

5.2、功能介绍 Function Introduction

5.2.1 设置 Setting

点击【设置】按钮弹出如图 5-2设置面板。面板内各设置项说明详见表格
Click the [Settings] button to pop up the settings panel as shown in Figure 5-2. See Table 2 for the description of each setting item in the panel.



图 5 - 2

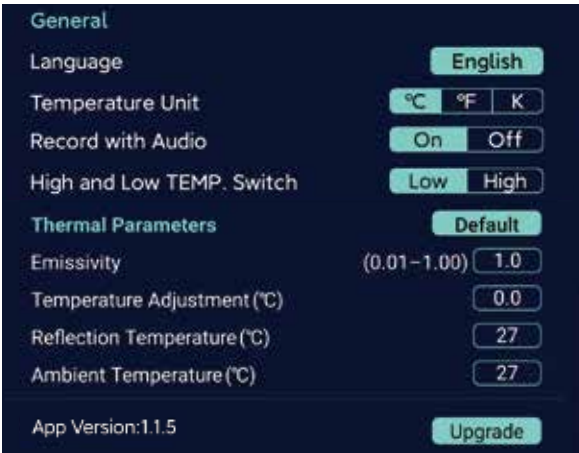


Figure 5 - 2

通用 General items	
语言 Language	支持中文和英文。 Support Chinese and English
温度单位 Center Cross	设置温度单位, 支持摄氏度 (°C)、华氏度 (°F) 和开尔文 (K) The temperature units can be set, with Celsius (°C), Fahrenheit (°F) and Kelvin (K) supported
录制声音 Sound recording	可以选择录制视频时, 是否录制声音。 Whether to record sound can be chosen when recording video.
参数 Parameter	
发射率 Emissivity	根据所测目标填写发射率参数值 Fill in the emissivity parameter value according to the measured target
校正 (°C) Remote	根据测温偏差, 填写校正参数 Fill in the correction parameters according to the temperature measurement deviation
反射温度 (°C) Reflect temperature (°C)	根据测试环境反射温度填写参数值 Fill in the parameter value according to the reflect temperature of the test environment
环境温度 (°C) Ambient temperature (°C)	根据测试环境温填写参数值 Fill in the parameter value according to the test environment temperature

5.2.2 关于 About

如图【5-3】所示

As shown in Figure 5-3.



图 5 - 3
Figure 5 - 3

5.2.3 页面重置 Interface Reset

界面重置按钮用来重置APP界面与APP设置,使APP恢复启动默认状态。

The interface reset button is used to reset the APP interface and APP settings and restore the APP to its default state at startup.

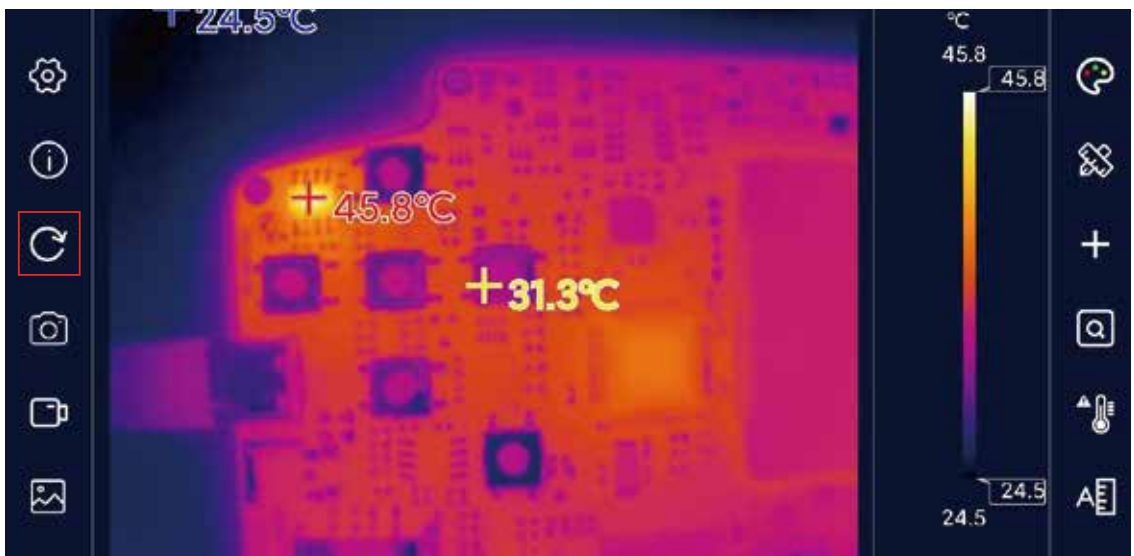


图 5 - 4
Figure 5 - 4

5.2.4 拍照 Photo Taking

点击【拍照】按钮可以拍摄当前红外画面，并自动保存。为防止误操作，拍照成功时，拍照按钮会变红1秒钟，同时出现热图窗口画面划进相册的动画展示。
Click the [Photo Taking] button to take the current infrared screen and save it into the album.

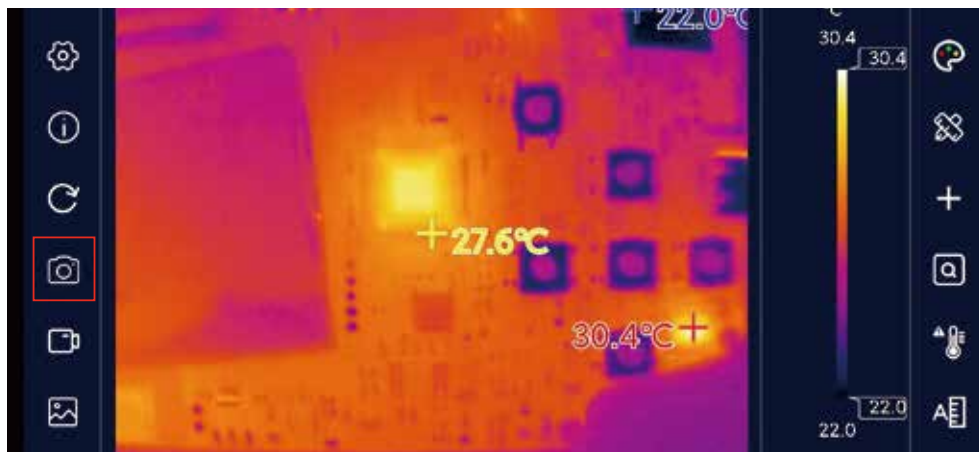


图 5 - 5
Figure 5 - 5

5.2.5 录像 Video Recording

点击【录像】按钮可以录制视频。当【录像】按钮被点击后，按钮变红进入录像状态，视频窗口左下角同时相应出现录制时间。再次点击【录像】按钮，即可停止录像。

Click the [Video Recording] button to record a video. When the [Video Recording] button is clicked, the button will turn red accordingly, and the recording time will be displayed correspondingly in the lower left corner of the video window at the same time. Click the [Video Recording] button again to stop video recording.

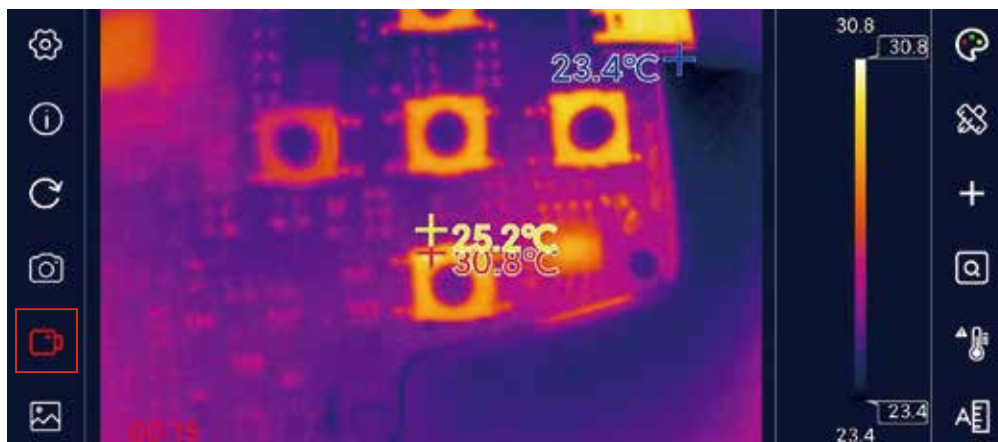


图 5 - 6
Figure 5 - 6

5.2.6 图库 Album

所有APP拍摄的照片与视频都可以点击【图库】便捷查看。图库界面见图 5-7，所有文件以时间降序排列。

All photos and videos taken by the APP can be conveniently viewed by clicking [Album]. The interface of the gallery is shown in Figure 5-7, with all files arranged in chronological descending order.



图 5 - 7
Figure 5 - 7

①	图库 Album	同时显示照片和视频文件 Photos and video files are displayed at the same time
②	照片 Photo	只显示照片文件 Only photo files are displayed
③	视频 Video	只显示视频文件, 预览图带有视频时长 Only video files are displayed
④	垃圾桶 Trash	选中文件后删除文件 Files are selected and then deleted

5.2.7 色板 Color Palette

色板面板共计有6种显示模式, 如图 5-8。
There are 6 display modes on the color palette, as shown in Figure 5-8.

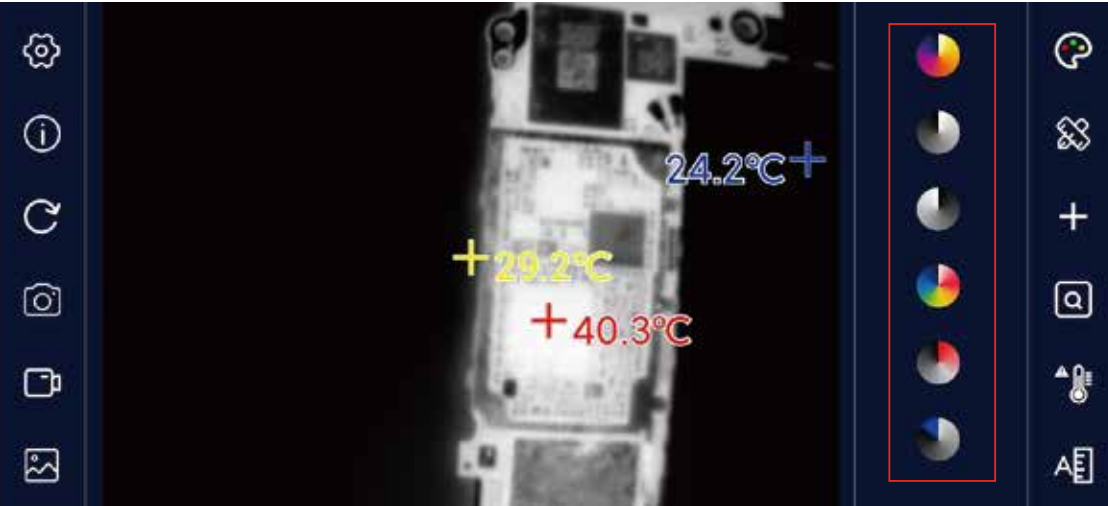


图 5 - 8
Figure 5 - 8

	铁红 Iron	在高温区域, 红色比重较大, 适合检测高温区域占主要比重的场景 In the high-temperature region, red has a large proportion, which is suitable for detecting the scenario where the high-temperature region occupies the main proportion
	白热 White hot	高温段, 采用白色, 全画面主要是黑白过度, 适合黑白传统模式的使用者 The high-temperature section adopts white, and the full screen mainly adopts white-and-black transition, which is suitable for users of black-and-white traditional mode
	黑热 Black hot	高温段, 采用黑色, 全画面主要是白黑过度, 适合黑白传统模式的使用者 The high-temperature section adopts black, and the full screen mainly adopts black-and-white transition, which is suitable for users of black-and-white traditional mode

	彩虹 Rainbow	最高温用红色表示, 中等温度用黄色, 低温采用蓝黑为主, 适合高低温颜色分明的场景 Red is used for displaying the maximum temperature, yellow is used for displaying the medium temperature, and blue and black are used for displaying the low temperature, which is suitable for scenarios with distinct colors of high and low temperature
	红热 Red heat	主色调红黑, 从最低温到最高温, 采用黑白红过度, 适合关注高温状态的场景 The main colors are red and black, and from the minimum temperature to the maximum temperature, the black, white and red transition mode is adopted, which is suitable for scenarios focusing on the high temperature state
	冷蓝 Cold blue	会用蓝色来标记比较冷的区域, 比较适合观测低温目标物体 Blue is used to mark the colder regions, which is more suitable for observing low-temperature target objects

通过调整画面右侧的色板条, 可以调整温宽, 让需要重点观测的区域更明显。
图 5 - 9对同一画面单纯调整色板条的对比图。

By adjusting the color palette bar on the right side of the screen, the temperature range can be adjusted to make the regions that need to be observed more obvious Figure 5 - 9 is a comparison diagram of simply adjusting the color palette bar on the same screen.

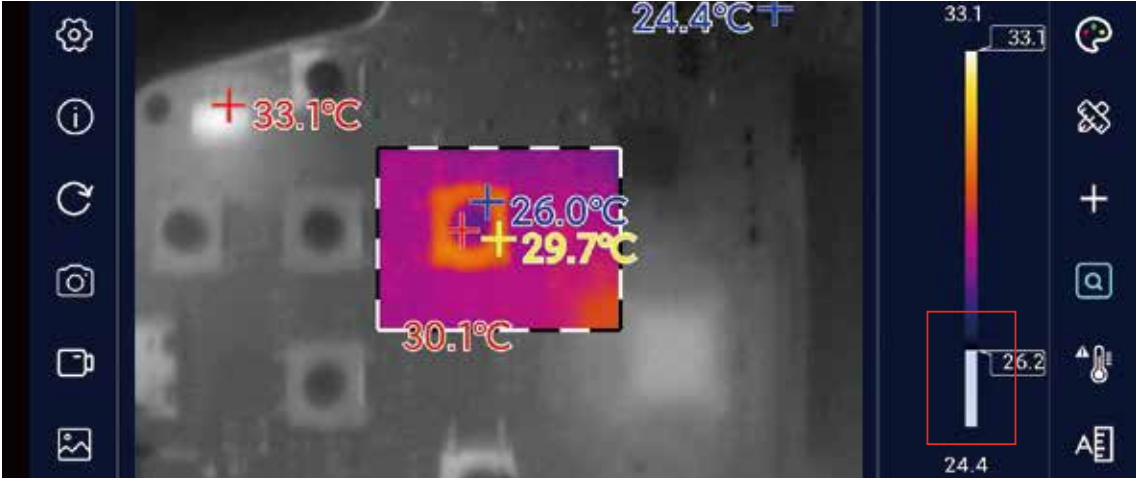


图 5 - 9 Figure 5 - 9

5.2.8 区域测温 Regional Temperature Measurement

点击右侧【区域测温】按钮，将会弹出如下界面，可以在视频上添加点、直线和矩形框测温，其中直线和矩形框将显示区域的实时最高温和最低温，长按每个新增的区域都会弹出删除图标，点击图标即可删除。

Click the [Regional Temperature Measurement] button on the right, and the following interface will pop up, allowing the temperature measurement of points, lines and rectangular boxes to be added to the video, in which the lines and rectangular boxes will display the real-time maximum temperature and minimum temperature of the region. By long pressing each region, the trash icon will pop up for deletion.

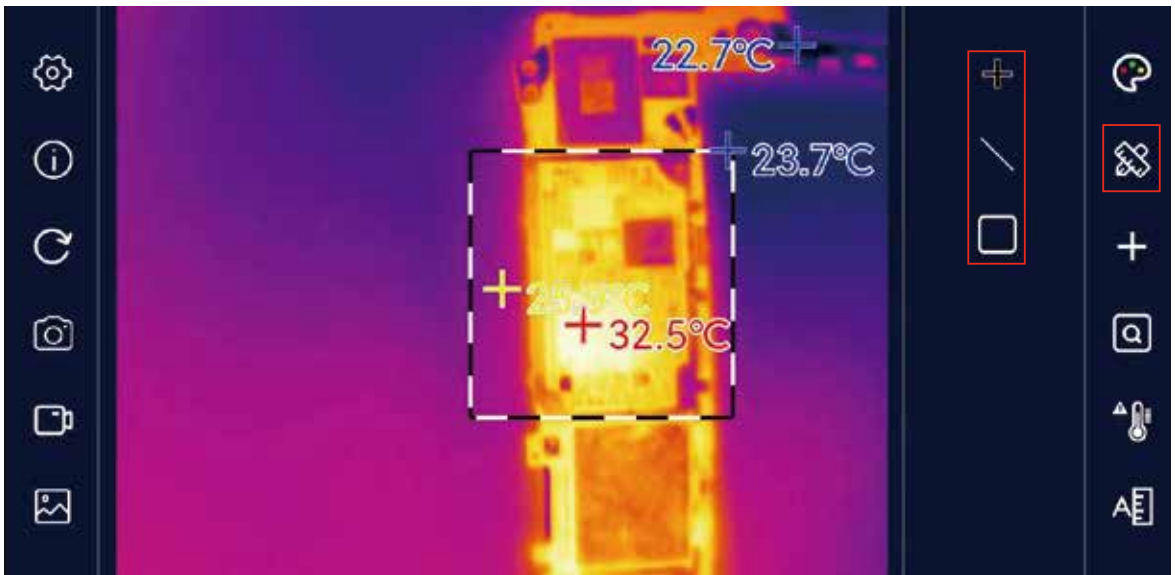


图 5 - 10 Figure 5 - 10

5.2.9 温度追踪 Temperature Tracking

点击右侧温度追踪按钮，可以选择开启或关闭实时画面中最高温、最低温和中心点测温。红色为最高温，蓝色为最低温，黄色为中心点温度。点击开启温度追踪，再次点击则关闭。

Click the temperature tracking button on the right to enable or disable the measurement of the maximum temperature, minimum temperature and center point temperature in the real-time screen. Red is the maximum temperature, blue is the minimum temperature, and yellow is the center point temperature. Click to turn on temperature tracking, and click again to turn it off.



图 5 - 11 Figure 5 - 11

5.2.10 框内详查 Highlight Rectangle Temperature

可以突出显示当前所有矩形框内的温度,如当前画面没有矩形框,则会自动在默认位置添加一个矩形框。长按矩形框可以调节大小以及拖动位置,也可以点击旁边的删除图标删除矩形框。

The current temperature in all rectangular boxes can be highlighted. If there is no rectangular box in the current screen, a rectangular box will be automatically added in the default position.

By long pressing the rectangular box, its size can be adjusted and its position can be dragged, and by clicking the delete icon next to it, the rectangular box can be deleted.

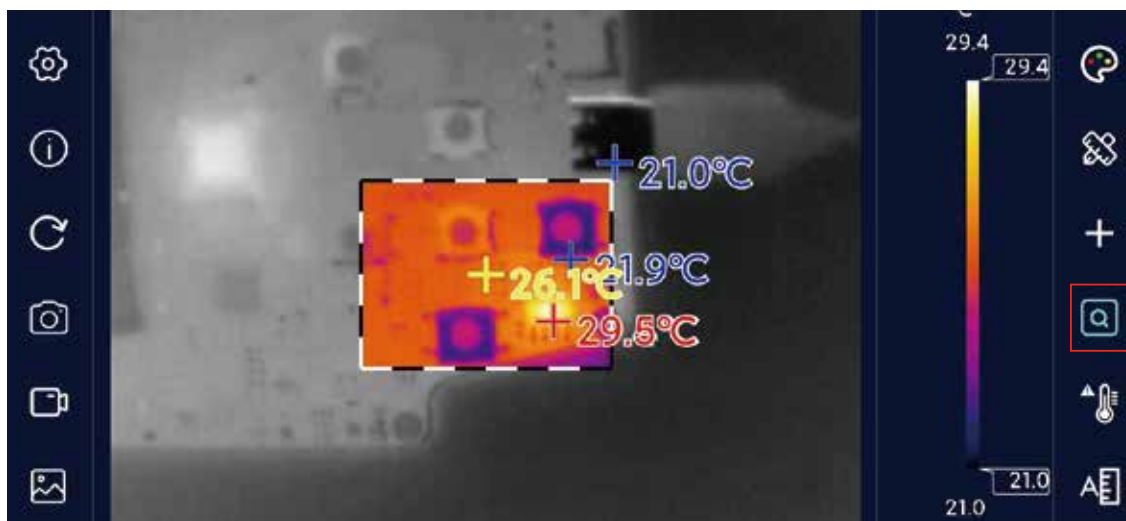


图 5 - 12 Figure 5 - 12

5.2.11 高温告警 High Temperature Alarm

点击【高温告警】开关图标，界面弹出高温报警门限值设定窗口，如下图所示。当画面中最高温度值超出报警门限值时（区域测温模式下，以区域内温度为基准，点测除外），系统会发出报警声，同时视频画面会闪烁红色告警。

Click the switch icon of [High temperature Alarm], and a window for setting the high temperature alarm threshold value pops up on the interface, as shown in the figure below. When the maximum temperature value in the screen is higher than the alarm threshold value (in the regional temperature measurement mode, the temperature in the region is taken as the benchmark, except point measurement), the system will sound an alarm, and the video screen will flash a red alarm.



图 5 - 13 Figure 5 - 13

5.2.12 高亮高温区域 Highlight High-temperature Regions

在该模式下，高温区域为当前色板显示，其他区域为白热，并且温度范围可通过色板条右侧滑块调节。高亮高温区域分析模式为单独关注高温区域温度值的大多数应用场景带来便利。

In this mode, the high temperature region is displayed on the current color palette, and the other regions are displayed as white hot, and the temperature range can be adjusted by the slider on the right side of the color board bar. The analysis mode of highlighted high-temperature regions facilitates most application scenarios that focus solely on temperature values of high-temperature regions.

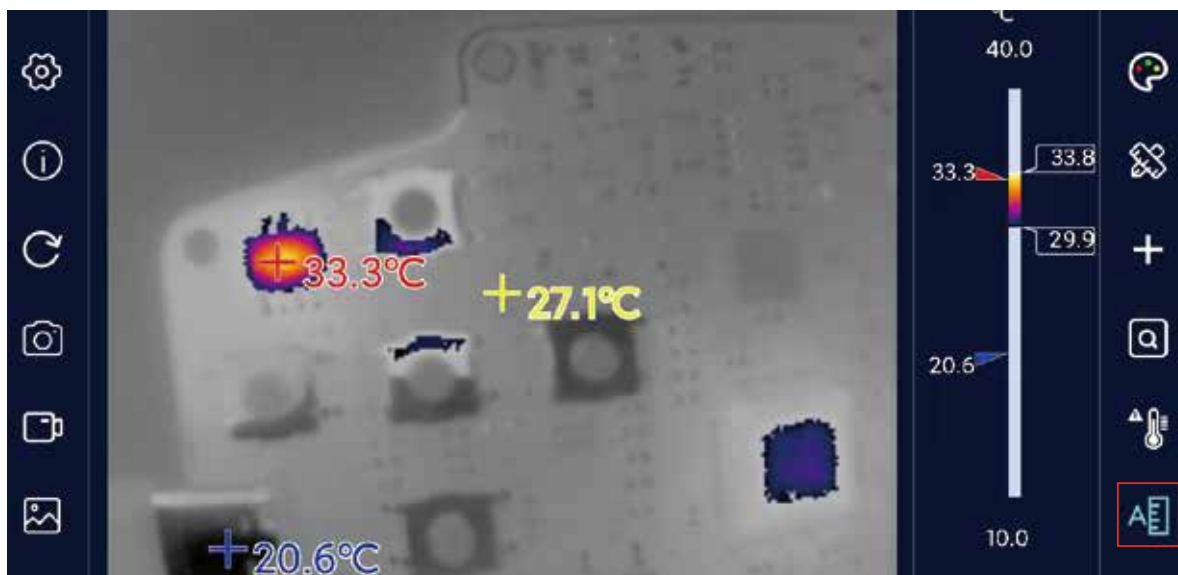


图 5 - 14
Figure 5 - 14

六、使用注意事项 Precautions for Use and Maintenance

1. 切忌使用酒精、洗洁剂等有机清洁剂清理镜头，建议使用柔软物品沾水擦拭；
2. 请勿让太阳光、激光等强光源直接照射镜头，否则将导致热像仪受到无法修复的物理损伤。
3. 需要在手机设置中开启OTG连接，方可正常运行APP (不同手机设置的位置不同，可以在设置中搜索OTG。部分手机型号默认OTG为开启状态)

1. Please don't use alcohol, detergent and other organic cleaners to clean the lens, it will destroy the coating of the lens.
2. Do not let sunlight, laser and other strong light sources directly direct shot the lens, otherwise the thermal imager will suffer irreparable physical damage.
3. Please enable the OTG features in the mobile phone settings to run the APP, please search OTG in settings, some mobile phone default enable OTG.

七、附录 Appendix

常见材料反射率表 Table of Reflectivity of Common Materials

材料 Material	发射率 Emissivity	材料 Material	发射率 Emissivity
沥青 Asphalt	0.90 to 0.98	布 (黑色) Cloth (black)	0.98
混凝土 Concrete	0.94	皮肤 (人体) Skin (human body)	0.98
水泥 Cement	0.96	皮革 Leather	0.75 to 0.80
沙子 Sand	0.9	木炭 (粉末) Charcoal (powder)	0.96
土 Soil	0.92 to 0.96	漆 Paint	0.80 to 0.95
水 Water	0.92 to 0.96	漆 (哑光) Paint (matte)	0.97
冰 Ice	0.96 to 0.98	橡胶 (黑色) Rubber (black)	0.94
雪 Snow	0.83	塑料 Plastic	0.85 to 0.95
玻璃 Glass	0.90 to 0.95	木材 Wood	0.9
陶器 Pottery	0.90 to 0.94	纸 Paper	0.70 to 0.94
大理石 Marble	0.94	氧化铬 Chromium oxide	0.81
石膏 Plaster	0.80 to 0.90	氧化铜 Copper oxide	0.78
灰泥 Mortar	0.89 to 0.91	氧化铁 Ferric oxide	0.78 to 0.82
砖 Brick	0.93 to 0.96	纺织品 Textile	0.9

八、包装清单 Packing List

名称 Name	数量 Quantity
热成像主机 Thermal imager	1 PCS
镜头清洁布 Lens cleaning cloth	1 PCS
布袋 Bag	1 PCS
说明书 User manual	1 PCS