TOOLTOP TT-ET14C+Macro lens

TOOLTOP ET14C Thermal Camera User Manual

Model: ET14C (TT-ET14C+Macro lens variant)

1. Introduction

The TOOLTOP ET14C Thermal Camera is an advanced infrared imaging device designed for various applications including electrical fault detection, PCB inspection, and general thermography. Featuring a 240x240 pixel ISR sensor and a 2.8-inch display, it provides clear and detailed thermal images. This manual provides essential information for the safe and effective operation and maintenance of your device.

2. Safety Information

- Read all instructions thoroughly before operating the device.
- Do not expose the camera to extreme temperatures, high humidity, or corrosive environments.
- Use only the specified 18650 Lithium-ion battery. Improper battery types may cause damage or safety hazards.
- Do not attempt to disassemble or modify the device. Repairs should only be performed by qualified personnel.
- Keep the device away from strong electromagnetic fields.

3. Product Overview and Components

The TOOLTOP ET14C Thermal Camera is designed for portability and ease of use. Familiarize yourself with the main components:

- **Thermal Imager:** Main unit with 2.8-inch display.
- **Macro Lens:** Optional accessory for detailed close-up thermal imaging.
- **Detachable 18650 Lithium-ion Battery:** Provides power to the device.
- **USB Type-C Cable:** For charging and data transfer.
- **Storage Bag:** For protecting and transporting the device.

Figure 3.1: Front and back view of the TOOLTOP ET14C Thermal Camera, highlighting its compact design and rear battery compartment.

Figure 3.2: Package contents for the ET14C, showing the thermal camera, optional macro lens, instrument storage bag, product manual, and data line.

4. Setup

4.1 Battery Installation and Charging

1. Locate the battery compartment on the rear of the device.
2. Insert the provided 18650 Lithium-ion battery, ensuring correct polarity.
3. Close the battery compartment cover securely.
4. Connect the USB Type-C cable to the camera's Type-C port and the other end to a suitable USB power adapter (not included) or computer for charging. The device supports up to 8 hours of continuous use on a full charge.

Figure 4.1: Illustration of the Type-C charging port and the detachable 18650 lithium battery compartment on the ET14C.

4.2 Macro Lens Attachment (Optional)

If your model includes the optional macro lens, it does not require installation. Simply move the macro lens left or right during use to engage or disengage it. The optimal working distance for the macro lens is approximately 2.5cm. For distances exceeding this, use the normal thermal imaging mode to avoid blurred images.

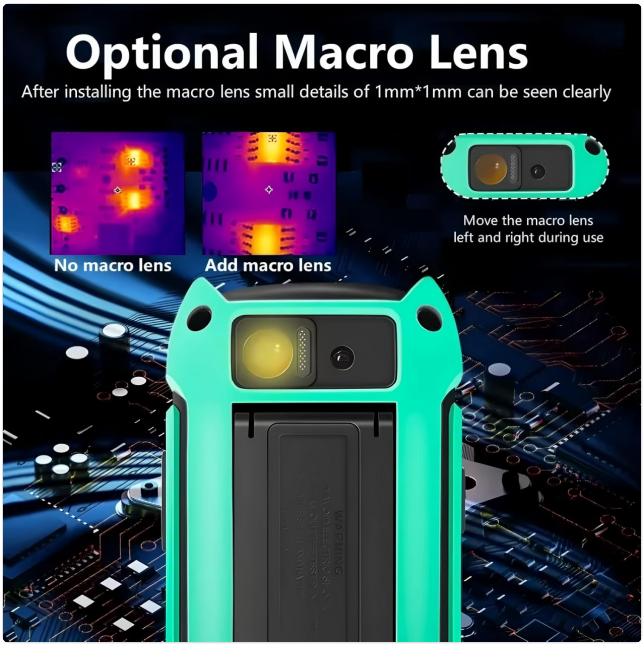

Figure 4.2: Visual comparison of thermal images without and with the macro lens, demonstrating the enhanced detail provided by the macro lens and its sliding mechanism.

5. Operating Instructions

5.1 Power On/Off

Press and hold the power button (location typically on the side or top) to turn the device on or off. The 2.8-inch display will illuminate.

5.2 Display Interface and Navigation

The 2.8-inch display (240x320 resolution) shows real-time thermal images and measurement data. Use the

navigation buttons (MEMU, MARK, REMOVE, HOLD, SAVE) to interact with the interface.

Figure 5.1: The ET14C display showcasing infrared thermal imaging with ISR 240x240 pixels at 25Hz, and options for multiple color palettes.

5.3 Thermal Imaging Parameters

- **Image Capture Frequency:** 25Hz, providing smooth real-time thermal video.
- **Thermal Imaging Pixels:** ISR 240x240, for clear and detailed thermal resolution.
- **Field of View (FOV):** 50.0°(H) × 50°(V) / 72.1°(D).
- **Temperature Range:** -20℃ to +550℃ (-4℉ to 1022℉).
- **Accuracy:** ±2℃ or ±2% (whichever is greater).
- **Measurement Resolution:** 0.1℃ / 0.1℉.
- **Gain Mode:** Auto Gain, automatically adjusts for optimal image quality.

5.4 Emissivity Adjustment

Emissivity can be adjusted from 0.1 to 0.99 (default is 0.95). Adjusting emissivity is crucial for accurate temperature measurements, as different materials emit infrared energy differently. Consult a material emissivity table for specific values.

5.5 Color Palette Selection

The camera offers several color palettes to visualize temperature differences:

- Iron Red
- Rainbow
- Fusion
- White Heat
- Red Heat

Select the palette that best highlights the temperature variations for your specific application.

5.6 Photo Taking and Viewing

The device supports taking and viewing photos. Images are stored in BMP format in the internal 7.5MB storage. Use the 'SAVE' button to capture an image and the 'MEMU' button to navigate to the image gallery for viewing.

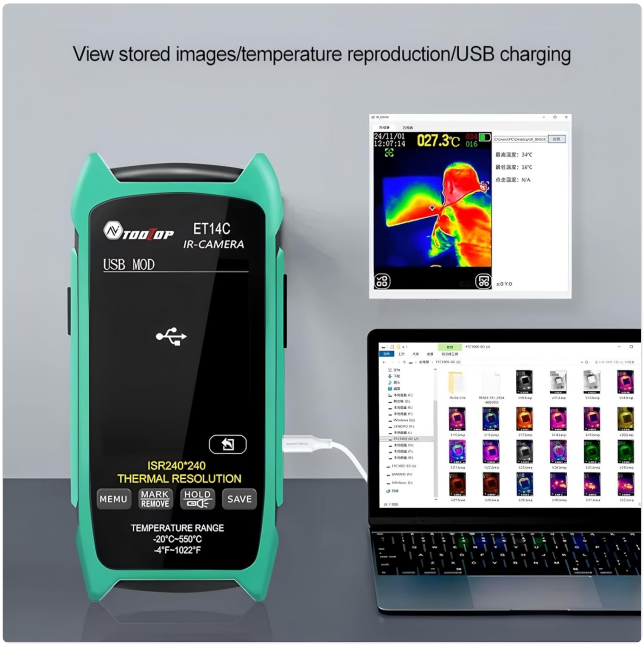

Figure 5.2: The ET14C in USB mode, demonstrating the ability to view stored images, reproduce temperature data, and charge via USB connection to a computer.

5.7 PC Software Analysis

Connect the camera to a computer via the USB Type-C cable. In USB Mode, you can transfer and analyze thermal images using compatible PC software (software not included, typically available for download from the manufacturer's website).

5.8 Temperature Excess Alert

The device features a temperature excess alert system, which can be configured with a specific alarm threshold. When the measured temperature exceeds this threshold, the device can provide a light alarm and/or an audible alarm.

Figure 5.3: The ET14C screen showing a temperature excess alert, indicating options for light alarm, audible alarm, and setting an alarm threshold.

6. Maintenance

6.1 Cleaning the Device

Wipe the camera body with a soft, dry cloth. For the lens, use a lens cleaning cloth and solution specifically designed for optical lenses. Do not use abrasive cleaners or solvents.

6.2 Battery Care

The detachable 18650 Lithium-ion battery should be charged regularly. If storing the device for an extended period, ensure the battery is partially charged (around 50%) and remove it from the device to prevent deep discharge.

6.3 Storage and Operating Conditions

- **Storage Temperature:** -20℃ to 60℃ (-4℉ to 140℉).
- **Operating Temperature:** 0℃ to 50℃ (32℉ to 122℉).
- **Operating Humidity:** <85%RH (non-condensing).

Store the device in its provided storage bag in a cool, dry place when not in use.

7. Troubleshooting

Problem	Possible Cause	Solution
Device does not power on.	Battery is low or not installed correctly.	Charge the battery or ensure it is installed with correct polarity.
Image is blurred when using macro lens.	Object is outside the optimal working distance.	Ensure the object is approximately 2.5cm from the macro lens. For further distances, disengage the macro lens.
Cannot transfer images to PC.	Incorrect USB mode or faulty cable.	Ensure the camera is in USB Mode. Try a different USB cable or port.
Inaccurate temperature readings.	Incorrect emissivity setting.	Adjust the emissivity setting to match the material being measured.

8. Specifications

Parameter	Value
Thermal Imaging Pixels	ISR 240x240
Image Capture Frequency	25Hz
Field of View (FOV)	50.0°(H) × 50°(V) / 72.1°(D)
Emissivity	0.1 – 0.99 adjustable (0.95 by default)
Temperature Range	-20℃ ~ +550℃ (-4℉ ~ 1022℉)
Accuracy	±2℃ or ±2%
Measurement Resolution	0.1℃ / 0.1℉

Parameter	Value
Display Type	2.8-inch, 240 * 320 resolution
USB Interface	Type-C USB
Storage Capacity	7.5MB
Image Storage Format	BMP
Battery Type	Detachable 18650 Lithium-ion battery
Battery Life	Up to 8 hours continuous use
Languages	Chinese, English, German
Operating Temperature	0℃ ~ 50℃ (32℉ ~ 122℉)
Storage Temperature	-20℃ ~ 60℃ (-4℉ ~ 140℉)
Operating Humidity	<85%RH (non-condensing)
Dimensions (L x W x H)	134 mm x 64mm x 28 mm
Host Weight (including battery)	180g
Package Weight	380g

9. Warranty and Support

This product comes with a standard warranty period. Please refer to your purchase documentation for specific warranty terms and conditions. The EU Spare Part Availability Duration is 1 Year.

For technical support, troubleshooting assistance, or warranty claims, please contact the retailer or manufacturer's customer service. Keep your purchase receipt as proof of purchase.