Quick Start Guide

Monocular Head-Mounted
Thermal Imager

- USER MANUAL -

Under no circumstances (on/off) do not look directly at high intensity radiation sources such as the sun

Do not touch the surface of the lens

Do not remove the battery cell

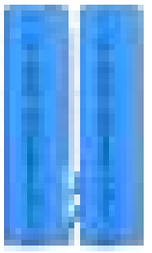
Do not touch the Type-C interface with wet hands

Do not bend or damage the connecting cables

Package Contents

Main Unit（x1）

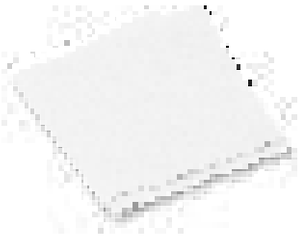
User Manual（x1）



18650 Lithium Battery（x2）

Helmet Adapter Bracket（x1）

Heavy-duty Spring Bracket (Optional) (x1)



Lens Cleaning Cloth（x1）

Protective Case（x1）

CONTENTS

Thank you for choosing us! To ensure you have the best user experience, we recommend reading this user manual carefully before use. If you have any questions, please feel free to contact us.

1 Product Overview

This product is a versatile monocular head-mounted thermal imager designed for observation and target searching in complex scenarios such as night, dim, lightless, and adverse weather conditions. It is compact and lightweight, with clear and continuous image quality, and a long battery life, making it suitable for head-worn or hand-held use. It is applicable in various fields including security enforcement, outdoor hunting, wilderness exploration, and search and rescue operations.

2 Functional Features

1. Real-time image noise reduction function to reduce image background noise;

2. Contrast, brightness, sharpening adjustable;

3. Pseudo-color: White Hot, Black Hot, Iron Red, Desert Yellow, Green Hot, Red Hot, Sky, Edge;

4. Image output resolution: OLED: 1024×768; CVBS(PAL): 768×576;

5. Bad pixel correction function;

6. Hot spot tracking function;

7. Wi-Fi image transmission，photo and video recording function;

8. Horizontal and pitch angle information can be displayed;

9. Picture-in-picture function;

10. Multiple reticles display;

11. Supports 1x, 2x, 4x digital zoom;

12. Default Chinese and English language display (customizable language);

13. Image inversion. Turned on for head-mounted, turned off by default.

3 Product Appearance

1. Diopter Adjustment

Used to match the best viewing acuity of different users, the adjustment range refer to the 'Eyepiece Diopter' in the specification. The adjustment would be fine when the date, battery level, Wi-Fi level or the sub-menu function icons display clearly on the main menu.

2. Focus Wheel

After powering on the product, align it with the observation target. If the distance to the observation target changes and the image becomes blurry, rotate the focus wheel to refocus until the target image is clear.

3. Bracket Installation Interface

For fixing to a mount, to install the device onto the helmet.

4. Type-C Interface

Used for picture and video data transmission and external analog display (PAL) output. Note: The external analog output displayer needs to be customized by the manufacturer.

4 Button Operation

4.1 Button Definition

Button	Long Press	Short Press
▲	In menu: / main interface: Switch Pseudo color	In menu: Move Upwards/Add One main interface: Digital Zoom
M	In menu: / main interface: Power On/Off	In menu: Confirm main interface: Enter Menu
▼	In menu: / main interface: Recording Video	In menu: Move Downwards/ Minus One main interface: Taking Picture

4.2 Quick Start

4.2.1 Power on/off

When powered off, long press the “ M ” button to start the device, and the startup screen will appear.
When powered on, long press the power button. The system will display a shutdown prompt, and then power off.

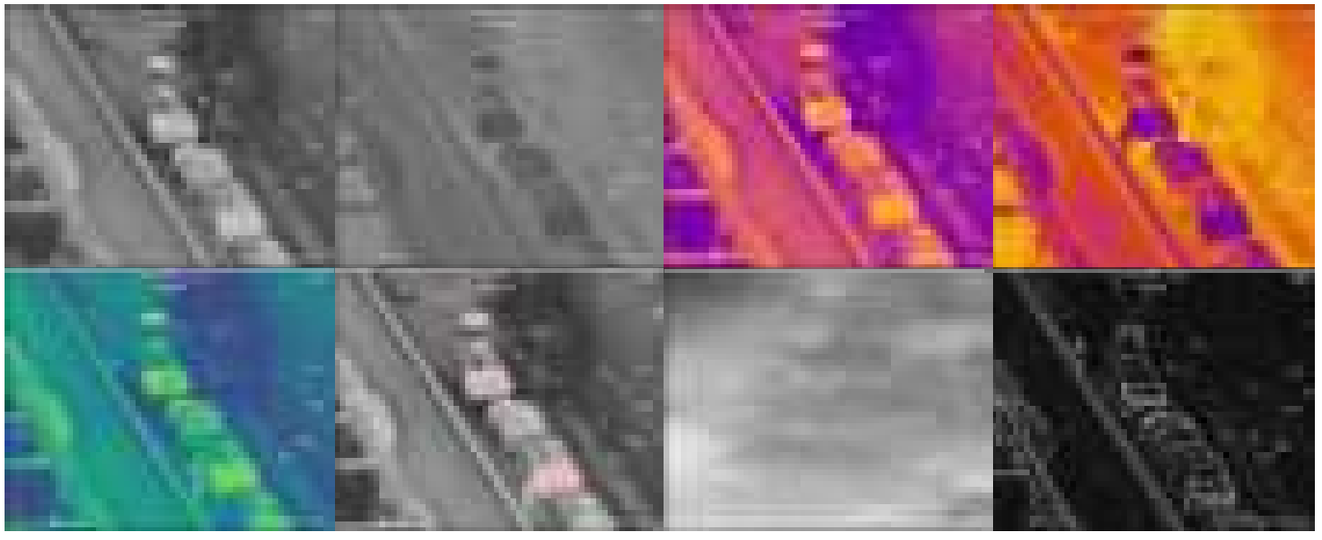
4.2.2 Digital Zoom

When powered on, short press "▲" on the main screen to cycle through digital zoom. The default is full screen enlargement, In PIP mode, using digital zoom will only magnify the small window screen.

1x image　　2x image　　4x image

4.2.3 Pseudo-color Mode

When powered on, long press the "▲" key to switch to pseudo color mode. Pseudo-color modes: White Hot, Black Hot, Iron Red, Desert Yellow, Green Hot, Red Hot, Sky, Edge.



4.2.4 Picture and Video

1) Picture

When powered on, press the "▼" key shortly for capturing picture. When capturing, a photo icon will be displayed in the center of the screen. The photo file is named and stored according to the current time.

2) Video

When powered on, long-press " ▼ " key to start recording a video. When recording, a video prompt icon will be displayed at the bottom of the screen. The video file is named and stored according to the current time.

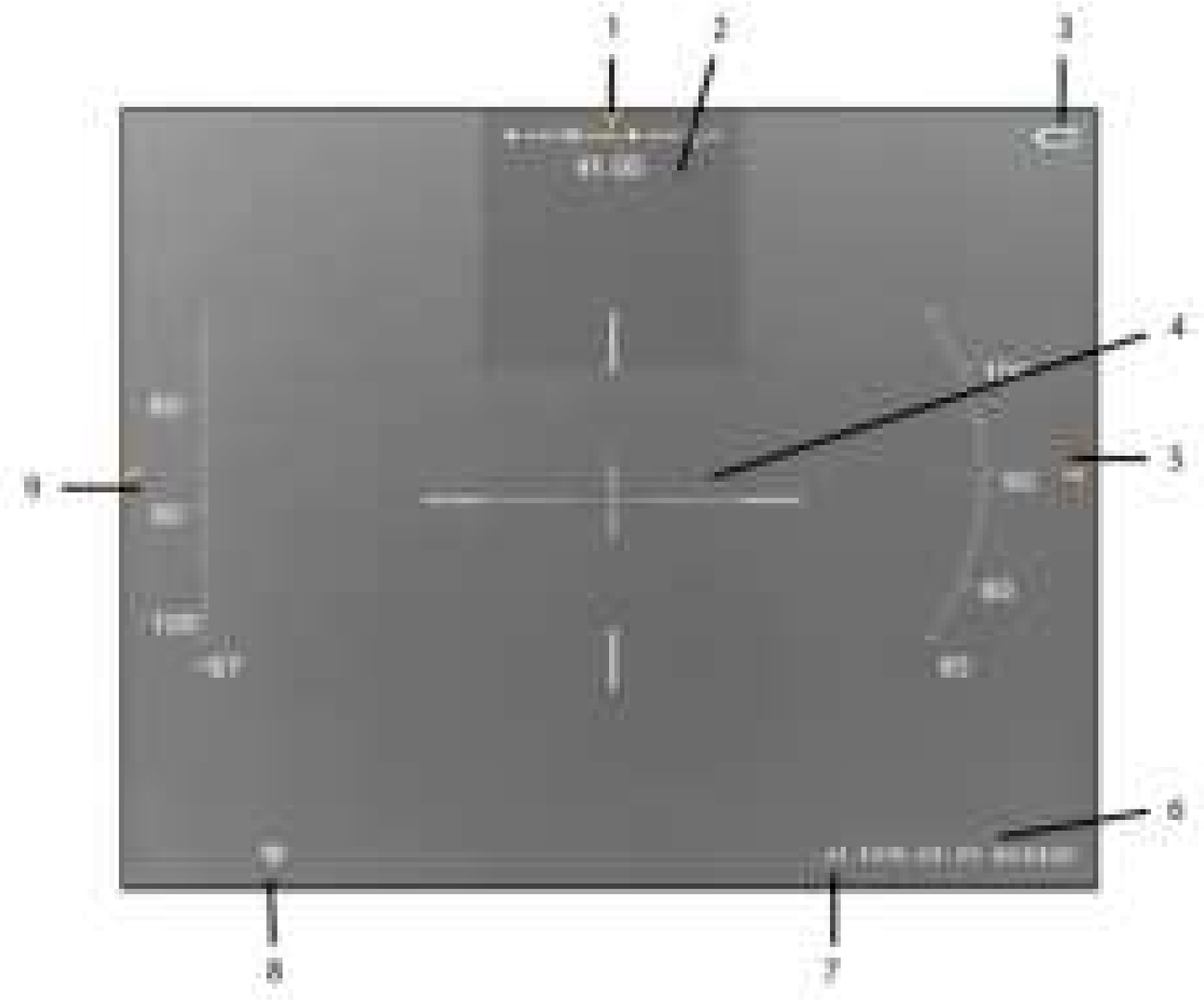
5 Product Parameter

Model	316	396	616	626
Resolution, pixels	384×288/12μm		640×512/12μm	
Detector	Uncooled VOx Microbolometer			
Objective Lens (F1.0)	16mm	9.6mm	16mm	26.7mm
Field of View	16.4° ×12.3°	27° ×20.4°	27° ×21.7°	16.4° ×13.1°
Visual Magnification	1-4x			
Spectral Band	8~14μm			
Frame Rate,Hz	50Hz			
NETD	≤ 35mk@300K			
Display	0.39" OLED 1024x768			
Digital Zoom	1-4x			
Eyepiece Diopter	-6~+3	-5~+5	-5~+5	-6~+3

Eye Relief	25mm			
Power Supply	One 18650 Li-ion Battery			
Standby Time （Without WiFi)	≥ 4h			
Weight (No Batt)	≤ 250g			
Dimensions	163x71x55mm(Including Eyepiece/Objective Lens Caps)			
Interface	Power Supply/Serial Port/Analog Video Output/Type-C			
Operation Temperature	-20℃ ~ +50℃			
Protection Rating	IP67			
Adaptability	All-weather			
Identification Range (Human)	16mm/370m	9.6mm/220m	16mm/370m	26.7mm/630m
Detection Range (object)	16mm/1500m	9.6mm/900m	16mm/1500m	26.7mm/2500m
Accessory Kit	Helmet Support, Well-matched Support, Carrying Bag, User Manual, Cleaning Cloth			

6 Main Interface

6.1 Display of the Screen



The information displayed on the main interface includes: infrared image, time, battery power, orientation information, WIFI icon, pitch Angle information, roll Angle information,

magnification, reticle (displayed in the menu), picture in picture (displayed after setting in the menu)

The menu introduction

No	Sign	Instruction
1	Azimuth Compass	Display the W、NW、N、NE、E、SE、S、SW Azimuth， With angular value
2	PIP Zoom	By default, the full-screen electronic zoom mode is displayed after you set it in the menu
3	Power Indicator	When the battery is fully charged, it is 5 bars, and when it is less than 10%, the low battery will pop up
4	Reticle	It is not displayed by default, You need to set it in the menu
5	Roll Angle	0° ~ 360°
6	Time	Display the current date and time
7	Digital Zoom	Display the current zoom ratio
8	WIFI	Wi-Fi indicator
9	Pitch Angle	-90° ~ 90°

7 Menu Introduction

Icon	Name	Instruction
	WIFI	Open / Close WIFI
	Red Dot	Open / Close Red Dot
	PIP	Open / Close PIP
	Heat Tracking	Open / Close Heat Tracking
	Brightness	Brightness Adjustment
	Contrast	Contrast Adjustment
	Sharpness	Sharpness Adjustment
	Digital Compass	Open / Close Digital Compass
	Compass Calibration	Digital Compass Switch、Calibration
	Time	date adjustment
	Video	Screen warm and cool hue adjustment/PAL Video Output
	Reset	Restore Default Settings

	Bad Pixels Compensation	Bad pixel appear during use, adjust the threshold, save, and the system will automatically eliminate bad pixels.
	Status Hidden	Hidden the icon in main screen
	Recticle	Recticle Settings
	Interface Flip	UI Interface Flip
	Version Information	Show the version Infomation

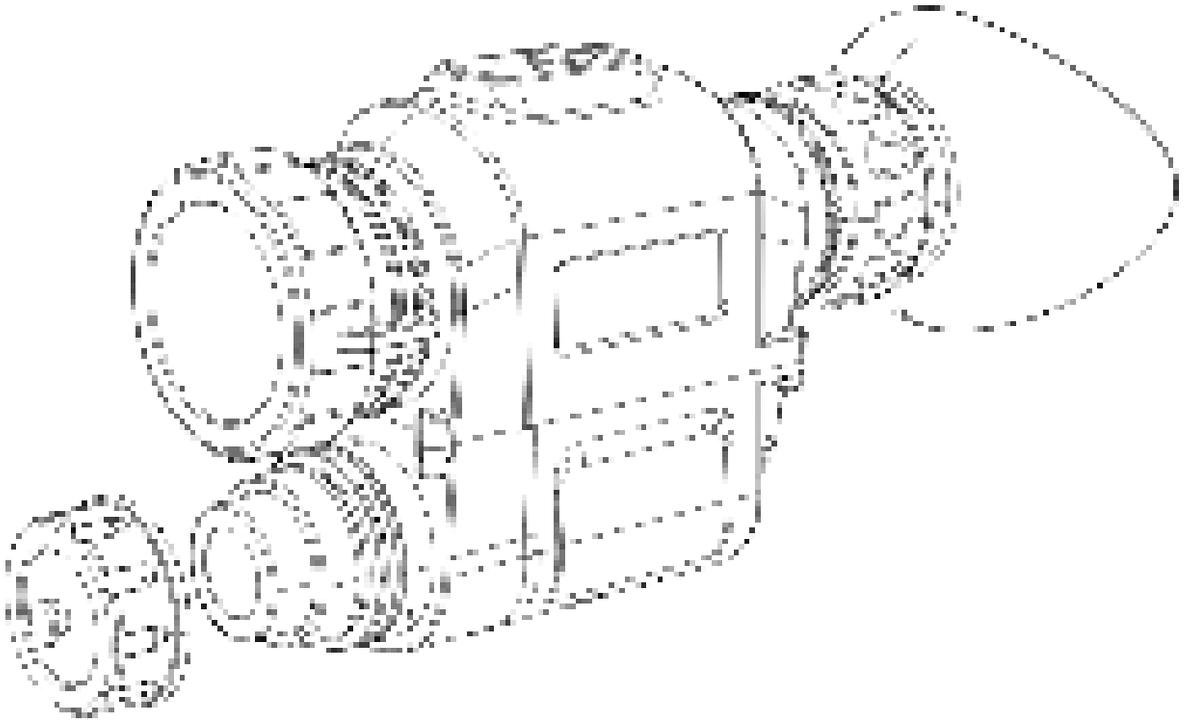
8 Product Assembly

8.1 Product Installation/Removal

There are two usage modes: handheld and head-mounted. Depending on the mode of use, corresponding accessories and installation methods are required.
Before using any mode, the battery must be installed first.

8.1.1 Battery Installation

Supports 18650 type batteries with a protective board (battery diameter: 18±0.5mm, length: 69±0.5mm).
Note: The device's battery installation does not differentiate between the positive and negative poles.



8.1 18650 Battery Installation Diagram

8.1.2 Handheld Use

For handheld use, no additional accessories are required. After installing the battery, the device can be used directly. The ND-IR is set to handheld use by factory default.

8.1.3 Head-Mounted Use

For head-mounted use, after installing the battery, the head-mounted adapter bracket needs to be installed. The installation steps are as follows:
1、Take out the head-mounted adapter bracket and install the fixing screws on the bracket into the central screw holes of the thermal imager's mounting interface;

2、Install the imager to the helmet with the mounted bracket;

3、Adjust the bracket and the adapter bracket to achieve the optimal viewing position.

Note: When using the device in a head-mounted configuration, you will need to operate the menu within the device to flip the interface.

Step 1 Step 2 Step 3

8.2 Head-Mounted Use Installation Diagram

9 Operation Introduction

9.1 Menu

After powering on, press and hold the "M" button to enter the menu. In menu mode, you can perform operations such as network settings, red dot adjustment, picture-in-picture, heat tracking, brightness, contrast, sharpening, digital compass, reticle, compass calibration, bad pixel correction, status hiding, language settings, time settings, video, factory reset, image inversion, and version information.

9.2 Exploring Through the App

Enable the Wi-Fi in the product's menu, with the Wi-Fi name set to Camera-IR. Turn on the Wi-Fi function on your phone and connect to 'IR-Camera', with the password '87654321'. Download a streaming player from the app store capable of creating streams. Taking VLC player APP as an example, open the VLC player APP, click on more options, and create a new stream (the software download can be found in the app store or browser).

The address is: rtsp://11.1.1.1:554/live

By entering the address and clicking “Connect”, live stream the image feed on to your smartphone with the app of the device.

Enter the address and click "Connect" to observe the camera core images in real-time on your mobile device.

9.3 Red Dot

Enable or disable the red dot function, and set the coordinates of the red dot.

9.4 Picture-in-Picture Settings

You can choose to enable or disable the picture-in-picture (PiP) function. Once the PiP function is enabled, a smaller window will be overlaid at the top of the display screen, and the digital zoom will only take effect within the picture-in-picture.

9.5 Hotspot Tracking

You can choose to enable or disable the hotspot tracking feature. Once enabled, the hottest source on the screen will be marked.

9.6 Brightness Adjustment

Brightness can be adjusted at levels 1 to 10, with a default recommended value of 6. The brightness value needs to be set separately for each pseudo-color mode.

9.7 Contrast Adjustment

Contrast can be adjusted at levels 1 to 10, with a default recommended value of 7. The contrast value needs to be set separately for each pseudo-color mode.

9.8 Sharpness

Sharpness can be adjusted at levels 0 to 4, with a default recommended value of 2. The sharpness value needs to be set separately for each pseudo-color mode.

9.9 Digital Compass

You can choose to enable or disable the display of the digital compass. When disabled, the azimuth, pitch, and roll angle information will be hidden. The digital compass is set to enabled by default.

9.10 Reticle

You can set the X and Y coordinates of the reticle, the type of reticle, and the color of the reticle.
Changing the X coordinate will move the reticle left or right.
Changing the Y coordinate will move the reticle up or down. There are seven types of reticles available, numbered 0 to 6, with the default being reticle 0 (i.e., no reticle). The reticle colors available are white, red, yellow, and blue, with the default being white.

Selecting the "Reset" function will restore all the above parameters to their default values.

9.11 Compass Calibration

After selecting the calibration function, the page will display a prompt saying "Calibrating, please rotate the device." The calibration process takes 2 minutes, during which the device will be paused. During calibration, you need to move the device in a figure “8” motion.

9.12 Defective Pixel Repair

Please make sure the lens cover is closed before using this function!

After entering this function, several options are displayed, including Threshold, Restore, Remove, Save, and Bad Pixel Number.

Threshold can be adjusted by up and down button, the threshold range is 20~32, the smaller the threshold, the more bad pixels can be cleared, it is recommended to set the threshold near 26.

When the option is on the Restore option, short press the Up or Down button to undo the last operation.

When the option is on the remove option, short press the Up or Down key, all the bad pixels of the screen will be eliminated. And the bad pixel number will show corresponding to the current threshold value. when the bad pixel number is greater than 1000, it is considered to be an over-calibration behavior, at this time, you should restore first, then adjust the threshold value to a greater value, and continue to clear, if the bad pixel number is still greater than 1000, repeat the above steps until the number is less than 1000. Be careful to carry out the save operation when the bad pixel number is greater than 1000.

When the option is on the save option, short press the up or down key to save all previous operations.

9.13 Status Hidden

You can choose to enable or disable status indicator on the main screen. When disabled, the display of time and date, digital magnification, Wi-Fi status, and battery level information will no longer be shown.

9.14 Language

Available in Chinese or English.

9.15 Time Setting

Use the up and down keys to adjust the time.

9.16 Video

There are two features to choose from: OLED and PAL.

OLED: Allows you to switch between warm and cool color tones on the screen.
PAL: Provides control over the external analog video output. By default, it is turned off. Once this option is enabled, you can connect the device's accessory cable to the Type-C port of the device, and the other end can be connected to a monitor to observe the device's image.
Notice: Enabling PAL video output will increase the device's power consumption.

9.17 Restore Factory Settings

Restore Default Settings.

9.18 Image Inversion

The setting is for displaying the interface in different usage modes. By default, it is set to handheld mode, meaning the interface is displayed correctly when the buttons are facing up. When using the device head-mounted, you need to enable the interface inversion feature, which is turned off by default.

9.19 Version Information

Check the device's software version, ISP, and SN information.

10 Precautions

1. The rated charging voltage for this product is 5V, please avoid over-voltage charging to prevent affecting the lifespan of the thermal imager. Please charge the device promptly when the battery is low to prevent over-discharge. When connecting plugs to the device interface, ensure proper alignment before insertion. Do not pull on the cable forcefully when plugging or unplugging.

2. This product supports external power supply with a voltage of 5V. Please avoid over-voltage supply.

3. Avoid using this product for extended periods in high-temperature environments. When the ambient temperature is too high, the thermal imager will automatically enter a high-temperature protection mode and shut down.

4. It is recommended to use this product in a temperature range of -20℃ to +50℃ .

5. When using this product in a humid environment, ensure that the Type-C interface cover is securely fastened.

6. Operators should only perform basic maintenance, such as replacing or checking cables, lens covers, daily cleaning, and functional checks to ensure the equipment remains in good technical condition.

7. If the thermal imager is not in use for a long period, charge it at least once every two months during storage and store it in a dry and ventilated environment.

8. If the device malfunctions, do not disassemble the module casually. otherwise will forfeit the warranty rights. Please contact the manufacturer for fault diagnosis before handling.

11 Storage and Transport

Here are methods for the product storage and transportation. To prevent potential dangers and property loss, please read carefully before use.

Storage:

1.Store the device in an environment of -45 ° C to 60 ° C, with relative humidity not exceeding 95%, free from corrosive gases, and with good indoor ventilation.

2.If you need to store it for a long time, please secure it in place.

3.Check if the battery is installed in the correct direction.

4.Remove the battery and recharge it once every two months.

Transport:

During transportation, avoid rain, water immersion, upsidedown positioning, and prevent severe vibration and impact. Handle with care during transportation, and strictly avoid dropping.

12 Malfunctions and Remedies

The following table lists common malfunctions of the ND-IR during its use, and checks and corrective actions should be carried out in the order shown in Table. If the issue is not resolved or not listed in the table, please contact the distributor or our company for solving.

No	Malfunction	Check Item	Solutions
1	The battery compartment cover cannot be tightened, or it cannot be opened when locked.	a. Check if the battery is installed in the correct direction. b. Check for any debris or particles around the battery cover knob. c. Inspect the battery cover for any damage, wear, or deformation. d. Examine the battery compartment for any damage or deformation. e. Verify that the battery dimensions meet the specifications (diameter 18±0.5mm, length 65±0.5mm).	a. Reinstall the battery. b. Clean the threads of the battery cover and the battery compartment. c. Proceed to a higher level of maintenance. d. Proceed to a higher level of maintenance. e. Replace with a standard 18650 battery that meets the specifications.
2	Device cannot be powered on	a. Check if the battery is installed and if it has sufficient charge. b. Verify that the power button can be pressed normally.	a. Replace with a new battery and install it correctly according to 8.1.1. b. Proceed to a higher level of maintenance.

3	No image is displayed on the main screen	a. Confirm whether the objective lens cover is open and if the focus is appropriate. Ensure that the objective lens is not obstructed during operation. b. Check for any damage to the lens.	a. Open the objective lens cover and adjust the focus wheel of the objective lens. Remove any obstructing objects. b. Proceed to a higher level of maintenance.
4	Blurry imaging during use		Turn the diopter wheel counterclockwise until you can clearly see the main interface date, time, Wi-Fi signal, battery level, or menu functions. Then manually turn the focus wheel to focus until the target is displayed clearly.
5	Device can't take photos/record videos		Internal storage is full. Transfer and format the memory.
6	Device displays incorrect time		Reset the product's time and date in the menu.

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 inte rference received, including interference that may cause undesired operation.

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 interferenceto 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.

Specific Absorption Rate (SAR) information

This device meets the government's requirements for FCC exposure limits set forth for an uncontrolled environment. This device was tested for typical body-worn operations with the back of the Uncooled Infrared Thermal Imager kept 0 mm from the body. To maintain compliance with FCC RF exposure requirements, use accessories that maintain an 0 mm separa tiondistance between the user's body and the back of the Uncooled Infrared Thermal Imager. The use of belt clips, holsters and similar accessories should not contain metallic components in its assembly.

The use of accessories that do not satisfy thes e requirements may not comply with FCC RF exposure requirements, and should be avoided.