



## Uncooled Handheld Infrared Observation Instrument Technical Specifications

Model:LRF6000F

### OVERVIEW



The multifunctional uncooled handheld thermal imager is a lightweight and compact intelligent observation device that integrates infrared, visible light and laser ranging. It has a built-in positioning module, electronic compass, laser ranging, red dot indication and image storage function, and image fusion function. It can be used for day and night observation and target

search. It is comfortable to use and easy to carry. It can be used for search and rescue, reconnaissance, surveillance, outdoor hunting and security protection, etc.

The multifunctional uncooled handheld device is a lightweight, portable, and powerful multifunctional handheld observation instrument. Utilizing infrared thermal imaging and visible light imaging technologies, along with deep fusion technology, it allows for searching, identifying, and aiming at targets. Equipped with a built-in laser rangefinder, it can accurately measure the distance to targets. It also incorporates GPS positioning and an electronic compass, providing self-positioning and target-positioning capabilities. Additionally, the product features ultra-long battery life, is waterproof and dustproof, and is robust and durable, ensuring excellent performance in any harsh environment.

### FUNCTION

- It features binocular display observation and can be used handheld or mounted on a stand.
- It incorporates power control (on/off), mode switching (visible light, infrared), contrast adjustment, brightness adjustment, image polarity conversion (infrared mode), as well as controls for image and video storage, playback, retrieval (by filename), and deletion. The video storage capacity is  $\geq 6$  hours, the image storage capacity is  $\geq 10,000$  images, and the video recording frame rate is  $\geq 25$ Hz.
- It has an under-voltage indication function.
- The images are stable, smooth, and clear.
- It features grid display and blanking functions.
- The image display includes real-time information such as azimuth angle, ranging results, and battery level.
- It has functions for unexpected power-off information and status backup.
- It includes a self-check function.
- Ranging is possible in both visible light and infrared modes.
- It features automatic continuous ranging.
- It can memorize target azimuth, distance, and time.
- The video and images have a continuous electronic zoom function ranging from 1.0 ~ 4.0.

### SYSTEM COMPOSITION

The main unit consists of an infrared thermal imaging system, a visible light imaging system, a laser rangefinder, an electronic compass, a positioning module (Beidou/GPS), circuit boards (main control board, power supply board, etc.), an 18650 battery pack, an OLED screen, an eyepiece, buttons, external interfaces (for data upgrade and communication), a wireless module, a lens cover,



and other components.

## TECHNICAL SPECIFICATIONS

Infrared Module		
Infrared reconnaissance detection distance	≥3km, identification distance: ≥2km (visibility 8km, humidity 60%, target-background temperature difference 6K, side of medium-sized vehicle 4.6m×2.3m)	
Field of View (FOV):	≥6.2°×5.0°	
Focal Length Adaptation Range:	20m~∞	
Function	Contrast and Brightness Adjustment, Image Polarity Conversion	
Detector Resolution	≥640×512	
Visible Light Module		
Laser wavelength	1535nm	
Eye safety rating	Class 1	
Visible light recognition distance	≥6km (visibility 8km, humidity 60%, side view of medium-sized vehicle (4.6m×2.3m))	
Field of view	≥4.1°×2.3°	
Resolution	≠1920×1080	
Focal length adjustment range	50m~∞	
Function	Equipped with contrast and brightness adjustment functions	
Laser Ranging Module		
Range range(Visibility 8km, humidity 40%, side of medium-sized vehicle (4.6m×2.3m) )	Minimum measuring range	≤50m
	Maximum measuring range	≥6km
Distance measurement error	≤2m	
Accuracy	≥98%	
Repetition frequency	1~5Hz adjustable	
Electronic Compass Accuracy		
Directional accuracy	≤1° (RMS, host inclination range -15°~15°)	
Main Technical Indicators of Beidou/GPS Accuracy		
Satellite system	GPS/GLONASS/BDS /Galileo/QZSS/NAVIC (IRNSS)	
Frequency	BDS B1I, B1C*, B2a/ GPS L1 C/A, L1C, L5/ GLONASS L1 configurable	
Horizontal positioning accuracy (CEP)	≤5m	
Elevation positioning accuracy	≤20m	
Eyepiece Display		
Eyepiece	Binocular observation	
Magnification	≥ 14 times	
Eyepiece diopter adjustment range	≥ -4SD ~ +4SD	
System Requirements		
Host weight	≤1.5kg (including battery)	
Dimension	≤ 225mm × 175mm × 94mm	
Continuous working time	≥4h (normal temperature)	
Ergonomics	Easy and accurate operation	
	Friendly human-machine interface	
	Comfortable to hold and easy to carry	
Battery requirements	Use 18650 battery	
	Battery can be replaced quickly	
Environmental Adaptability		
Storage temperature	-40°C~+70°C	
Working temperature	-20°C~+55°C	
Waterproof level	IP66	
Vibration	Can fall with packaging box.	

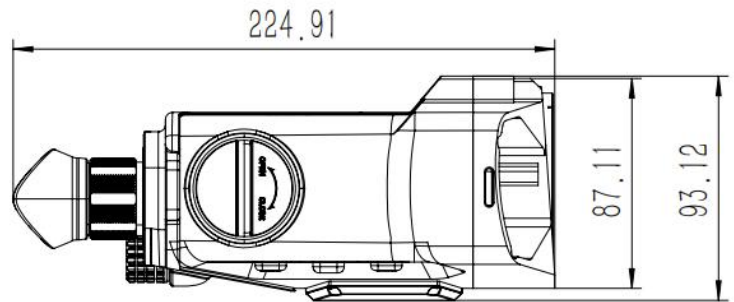
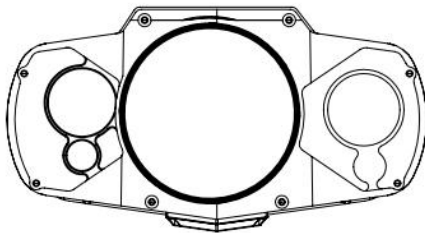
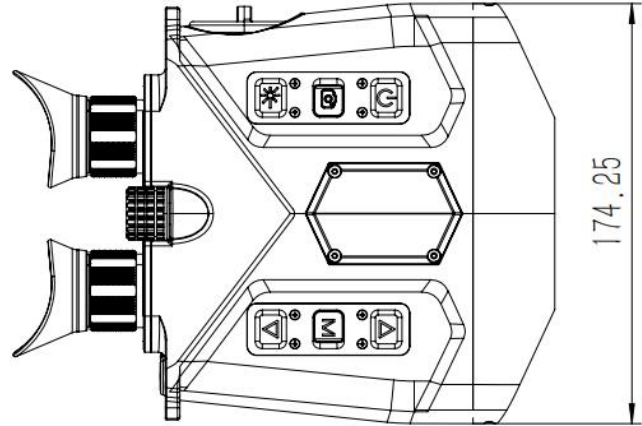
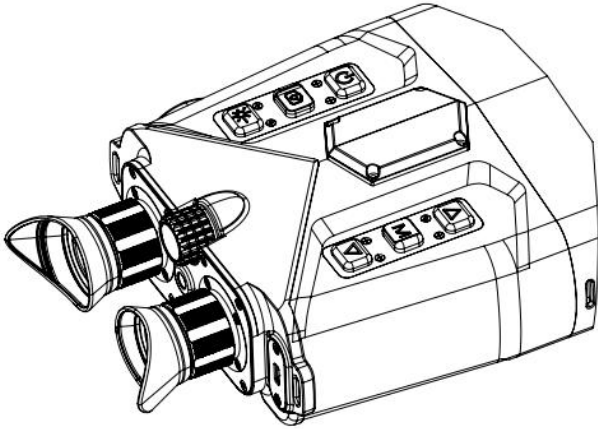
## INTERFACE REQUIREMENTS



- Data interface: can be connected to a general computer USB interface to transmit video and images;
- Video interface: standard SDI video interface;
- Mechanical interface: 1/4 inch tripod interface.
- Data interface: standard USB interface, can be connected to a general computer USB interface to read stored pictures and video files;
- The USB interface can also be connected to an external power bank to power the device;

## MECHANICAL DIMENSION( mm)

≤ 225mm X 175mm X 94mm

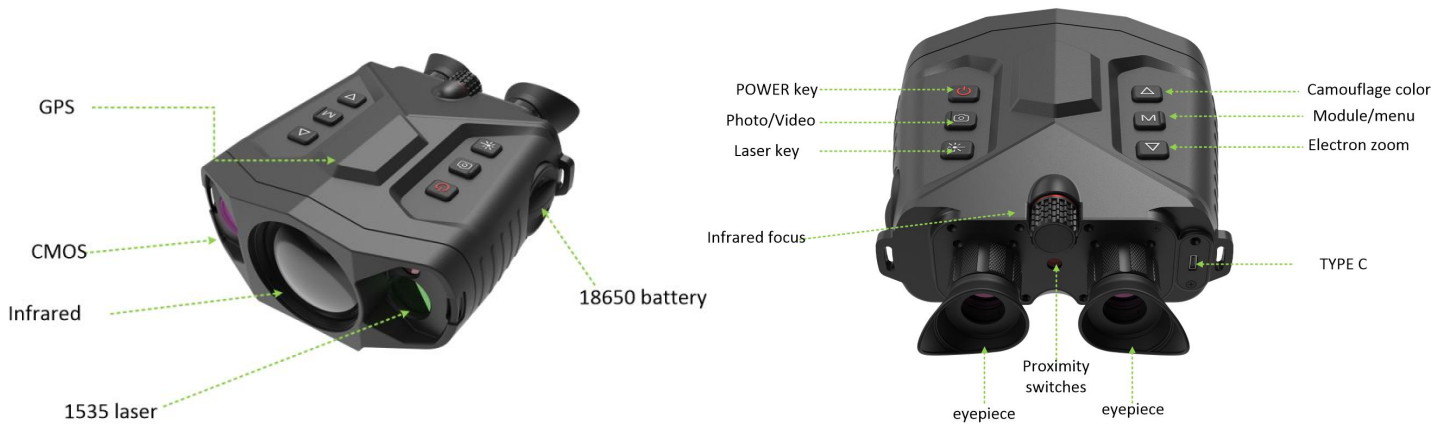


## Multifunctional non-cooled handheld unit user manual

### WORKING PRINCIPLE AND STRUCTURE

#### Product composition and button instructions

It consists of a host (black, including batteries, wrist strap, eye mask), charger (including power adapter), storage box, user and maintenance instructions, etc. The modules of the host product are as follows:



Product layout diagram

## The product works as follows:

- The product allows for real-time selection of visible light imaging, infrared imaging, or fused imaging based on the battlefield environment. In visible light imaging mode, the target object is converged onto a CMOS device through the optical system, converted into a high-definition, color digital image via photoelectric conversion, and then processed by the processing circuit before being displayed on the eyepiece display component. In infrared imaging mode, the infrared radiation emitted by the target object travels through the atmosphere to reach the infrared optical system, where it is focused onto the photosensitive surface of the detector. The detector then performs photoelectric conversion, and the high-performance infrared processing circuit conditions and performs A/D conversion on the infrared analog signal converted by the detector. The converted digital signal is then subjected to non-uniformity correction and image processing before being displayed on the eyepiece display component. Fused imaging involves a high degree of fusion of visible light and infrared images using a fusion algorithm, making it easier to identify and detect templates.
- This device features an advanced and effective focusing function. At this point, it can emit laser pulses toward the target through the built-in eye-safe active laser rangefinder, utilizing the echo to measure the target distance and display it. It can also use an electronic compass to measure its own azimuth angle and achieve precise positioning through the built-in GPS, with both azimuth angle and positional coordinate information displayed in real-time. Based on the target distance, observer's azimuth angle, and GPS coordinates, the target's coordinate position can be calculated and displayed. Depending on reconnaissance needs, real-time photography or video recording of the target scene can be performed, with data saved in the storage module.

## MAIN PERFORMANCE

- Binocular observation, handheld or mountable on a stand for use;
- Switching time between visible light and infrared is less than 1 second;
- Equipped with control functions such as power control, contrast adjustment, infrared polarity conversion, self-check, image and video storage, playback, retrieval, and deletion; storage capacity is not less than 4 hours of video and 10,000 BMP images;
- Possesses GPS positioning and target location functions;
- Compass has azimuth, elevation, and roll display functions;
- Features undervoltage indication and battery reverse connection protection;
- Has unexpected power-off information and status backup functions;
- Both infrared and visible light have continuous electronic zoom capabilities, with a zoom range of 1.0x to 4.0x;
- Provides reticle display and blanking functions;
- Can be powered by an external power bank;
- Supports WiFi video transmission.

## PRODUCT APPEARANCE INTERFACE DESCRIPTION



	Power Button	Press and hold to turn the device on/off. Short press to perform infrared calibration when in infrared mode.
	Capture/Record Button	Short press to take a photo, long press to start/stop video recording.
	Laser Button	Short press to perform a single laser ranging, long press to perform ranging at a set frequency.
	Up Button	In infrared mode, short press to switch color palettes (black hot, white hot, red hot, green hot, iron red, etc.). In visible light mode, short press to switch between black and white/color.
	M Button	Short press to switch between visible light and infrared modes, long press to enter the menu mode.
	Down Button	Short press to adjust the electronic zoom.

## POWER ON

Press and hold the power button to turn on the screen and start up the device. During the startup process, the system will automatically perform infrared image correction. Once the real-time image is displayed, users can manually adjust it as needed.

## SHUTDOWN

After using the main unit of the product, press and hold the power button. A "shutdown progress bar" will appear on the screen until the device shuts down completely.





## EYEPIECE DIOPTER ADJUSTMENT

- To accommodate users with different vision, the main unit is equipped with diopter adjustment for refractive power. When the interface icons or text on the screen appear blurry, it indicates that the eyepiece diopter does not match the user's vision, and diopter adjustment is required.
- Rotate the diopter adjustment ring until the icons and text on the screen are clearly visible. This indicates that the eyepiece has been adjusted to match the user's eye vision, and the diopter adjustment is complete.
- **Note:** When using the host to observe, your eyes must be completely close to the eyecup.

## USER INTERFACE

- After turning on, the main unit defaults to displaying an infrared image, with status information shown above and below the image. Upon any key operation, functional prompts for the keys will appear on the left and right sides of the screen, corresponding exactly to the positions of the keys on the device. If no operation is performed for a certain period, these key prompts will automatically disappear.
- Under various working conditions, the functions of the keys on the main unit differ. Please refer to the key functions displayed on the left and right sides of the image, as illustrated above.

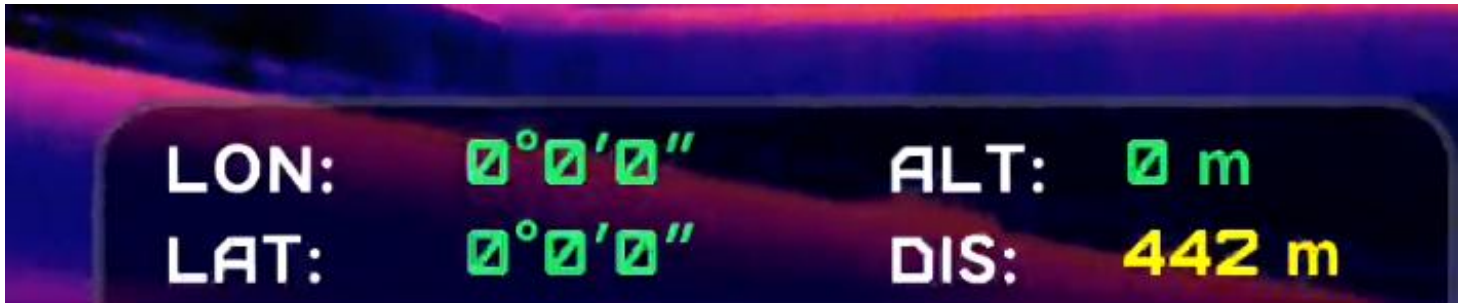
### 1. Status Information

In the main operation interface, the following status information is displayed above and below the image:  
The information above the status bar is as follows:



- Time: Displays the year, month, and day.
- Video Source Mode/Polarity: The current video source mode is displayed in the upper left corner of the image: /Visible Light/Infrared, and the polarity status of the infrared image: White Hot/Black Hot/Red Hot/Green Hot.
- Electronic Compass Information: The angle of the electronic compass is displayed directly above the image. The angle value represents the deviation from true north, with left and right indicating pitch and roll values, respectively.
- Electronic Zoom Level: The current electronic zoom level is displayed in the upper left corner of the image.
- Hotspot Tracking: In infrared mode, the hotspot tracking switch.
- WiFi Status: On or Off.
- Battery Level: When powered by a battery, a battery level icon is displayed in the upper right corner of the image. The icon shows full when the battery is fully charged; if the battery level is low, the user needs to replace the battery. When powered by an external power source, a power plug icon is displayed in the upper left corner of the image.

The information below the status bar is as follows:



- GPS Info: Displays the current status of internal/external Beidou connection.
- Local Status Info: Below the image, it displays the local latitude, longitude, and device elevation.

Press and hold the M key to enter the menu interface. Once inside, use the up and down keys to switch between menus, tap the M key to confirm, and use the up and down keys to select different values. Follow the on-screen button prompts for other operations.



## 2.Photo and Video Capture

Tap the photo key to take a photo, and press and hold the photo key to start recording a video. You can also take photos while recording a video. The status indicators for photo and video capture are shown in the figure below.



## 3.Laser Rangefinding

Tap the button for a single laser rangefinding measurement, or press and hold the button to perform measurements at a set frequency. The rangefinding information is displayed as shown in the figure.





#### 4. Electronic zoom



#### 5. Brightness Adjustment

The brightness has 10 adjustable levels. Tap the M key to enter the adjustment mode, then use the up and down keys to make changes. Observe the image in real-time and, once the desired effect is achieved, press the back key to return.





## 6. Contrast Adjustment

The contrast has 10 adjustable levels. After a quick press of the M key to enter, use the up and down keys to make changes while observing the image in real-time. Once the desired effect is confirmed, press the back key to return.








## 7.Enhanced Adjustment

There are 10 levels of enhancement adjustable. After a short press of the M key to enter, use the up and down keys to make changes. Observe the image in real-time, and once the desired effect is confirmed, press the back key to return.



## 8.WIFI Switch

After a short press of the M key to enter, use the up and down keys to toggle the switch. Observe the WIFI status  in the real-time status bar and press the back key to return after confirming the effect.



## 9.Picture-in-Picture (PIP) Switch

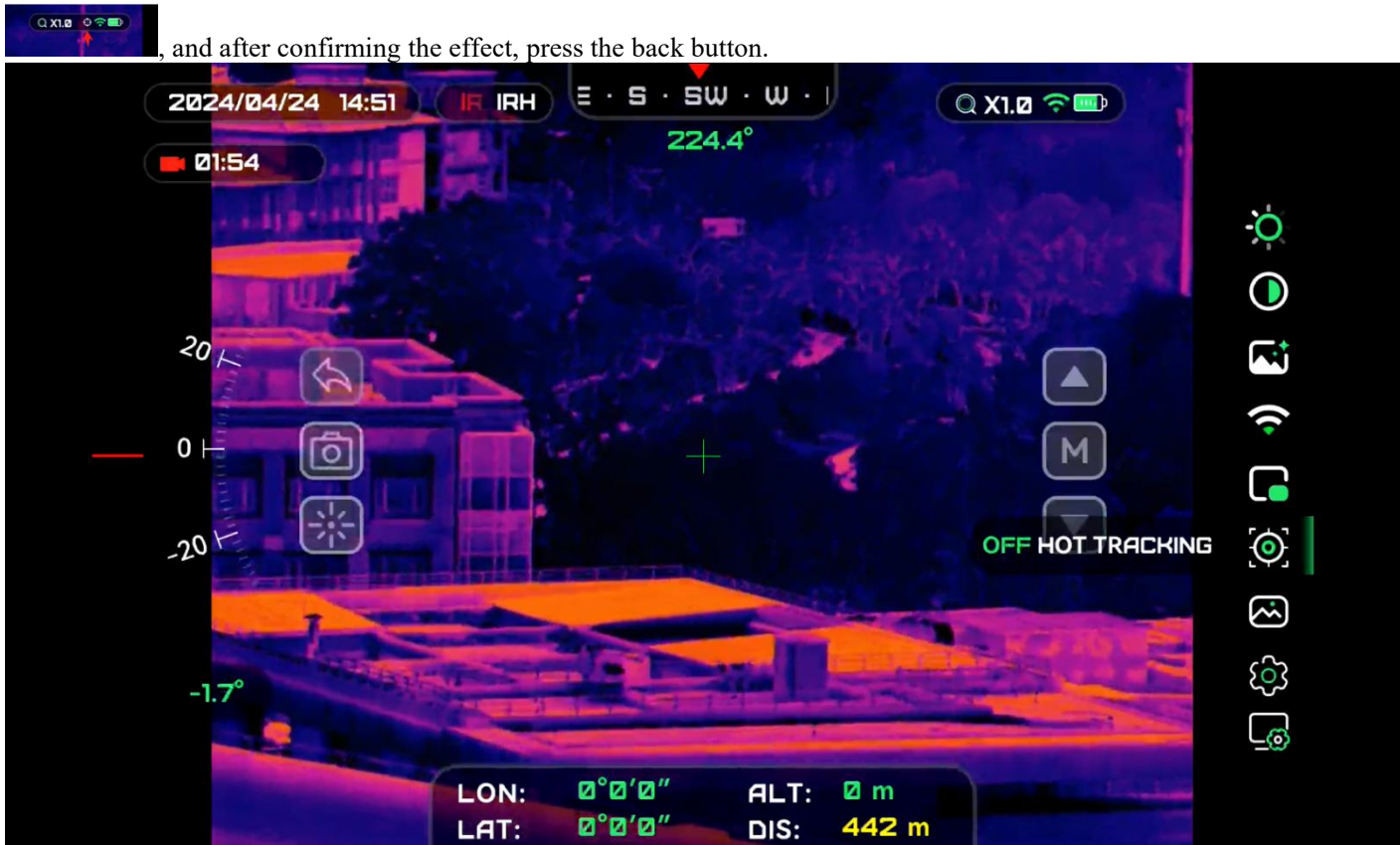


Press the up and down buttons to select and adjust the Picture-in-Picture feature. Observe the real-time PIP status of the image, and after confirming the effect, press the back button.



## 10.Hotspot Tracking Switch

Press the M key briefly to enter, then use the up and down buttons to adjust the switch. Observe the real-time status in the status bar







## 11. File Browsing

After entering the file browsing interface, use the up and down buttons to select the corresponding file, press the M button to confirm, and proceed to browse photos or play back videos.



## 12. Advanced Settings

Advanced settings include: Electronic Image Stabilization (EIS) switch, laser frequency settings, compass settings, WIFI settings, etc.



## 13. Compass Calibration





In the advanced menu, enter the compass settings interface. First, set the magnetic declination, and then follow the prompts to perform a quick calibration by rotating the device 360° up and down.



## 14. System Settings

System settings include: Device Information, Language Settings, Time Settings, Format, Factory Reset, Unit Switching, and Cursor Switch.

Device Information is displayed as follows:





The time settings are as follows:



## LENS CLEANING INSTRUCTIONS

- The surface of the main unit's lens is coated with an anti-reflective film to enhance transmittance. Cleaning is only necessary when it is visibly dirty, as frequent wiping may lead to wear and tear of the lens coating.
- Avoid direct contact with the lens surface, as the acidic substances left by fingerprints can damage the anti-reflective film and even the lens surface itself.
- Use professional lens cleaning paper for cleaning. Lens cleaning paper is a consumable item; when it is depleted or needs replacement, simply purchase a similar product.
- When using lens cleaning paper, be cautious of any hard substances (such as sand or grit) on the surface being cleaned. If present, use a brush to remove them first, otherwise scratches may be left after wiping.

## COMPREHENSIVE USER MANUAL

The comprehensive usage process of the product is as follows: Install and start up the device.

- After the self-check of the main unit is completed and it outputs a normal image, remove the lens cap. Select infrared imaging or visible light imaging as needed, and adjust the image sharpness through focusing operations. Adjust the image brightness, contrast, and polarity to the optimal state.
- Set the magnetic declination of the electronic compass based on the regional conditions of the observation point to calibrate the compass.
- If using a mount for target aiming, adjust the mount to the appropriate position, perform laser ranging, and record the target position coordinate information. Take photos or videos as needed. After observation, pack up the equipment and vacate the observation point.

## MAINTENANCE AND CARE

### 1. Maintenance

- When the product is not in use, as well as during transportation, please remove the battery and place the product in the factory storage box.
- After observation is completed or if the product is left on without observing the target for a long time, promptly cut off the



power supply to extend the effective usage time of the product.

- When the product is stored for a long period or not in use, it should be kept in a cool and dry environment.
- Pay attention to protecting various wires and cables connected to the product and external devices.
- Do not use chemical solvents, diluents, etc. to clean the product casing. Instead, use a clean, soft, and dry cloth for wiping.
- The lens of the main unit is coated with an anti-reflective, light-enhancing film. It only needs to be cleaned when it is visibly dirty. Frequently wiping the lens may cause wear to the lens coating. Avoid touching the lens surface, as the acidic substances left by fingerprints can damage the coating and the lens surface. Only use a dedicated lens cloth to clean the lens.
- The bracket should be avoided from being used in salt fog and damp heat environments.
- When not in use for a long time, it should be powered on and inspected at least once every three months.
- The battery should be charged and discharged for maintenance every three months.
- When the product needs to be used outdoors for a long time, the battery should be charged and discharged for maintenance.
- When the product is not in use for a long time, remove the battery and store it with half of its charge.

## **2. Care**

- Use a clean, soft, and dry cloth to wipe away dust and other debris from the surface of the instrument.
- Correctly connect all connecting cables, and after confirming that the connections are correct, power on the device for inspection.
- If the image quality is poor, refer to the user manual and perform image calibration again.
- If the issue cannot be resolved using the methods in the user manual, please contact the after-sales service provider.

## **3. Battery Maintenance**

When the 18650 battery is not used for a long time, it should be regularly charged and discharged once every three months to ensure good battery performance. For specific instructions on using the charger, please refer to the charger manual.

## **TRANSPORTATION**

The transportation method for the Uncooled Handheld Infrared Observation Device is as follows:

- The shipping quality and safety requirements during transportation shall comply with the relevant regulations of the international transportation management authorities;
- The following precautions shall be taken during the loading and unloading of the product:
  1. Regardless of the loading and unloading method, safety and reliability can be ensured;
  2. Strictly adhere to fire prevention, waterproofing, and moisture-proof regulations during shipment;
  3. Do not transport with flammable, explosive, or corrosive substances in the same vehicle;
  4. Avoid collisions during transportation.

## **STORAGE**

The product should be stored in a dry, ventilated environment without corrosive gases, with a temperature range of 0°C to +55°C and a relative humidity not exceeding 80%, whenever possible.

## **ACCOMPANYING DOCUMENTS AND ACCESSORIES**

- One Uncooled Handheld Infrared Observation Device;
- One Operation Manual;
- One Certificate of Conformity.