

# User Guide

## Eye safety Laser ranging handheld five-light binoculars

Model:LW6000



## Glossory

**IR:** Infrared

**LLL:** Low Light Level

**TV:**Television (visible light)

**FU:**Fusion

**DMC:** Digital Magnetic Compass

**GPS:** Global Positioning System

**BD:**Beidou Navigation and Positioning System

**LRF:** Laser Rangefinder

**LP:** Laser Pointer

**PAL:** Phase Alteration Line (A television format)

**USB:** Universal Serial Bus

**DC:**Direct Current

**OLED:** A kind of display screen

**PC:** Personal Computer

## 1. Introduction

### 1.1. Overview

Eye safety Laser ranging handheld five-light binoculars is a small intelligent observation device integrating infrared, low-light, visible light, laser rangefinder, and laser pointer. It has a built-in location module, a digital magnetic compass, and a laser rangefinder. It can be used for day and night observation and target search. Images and videos can be taken for targets. It is comfortable and portable to use.

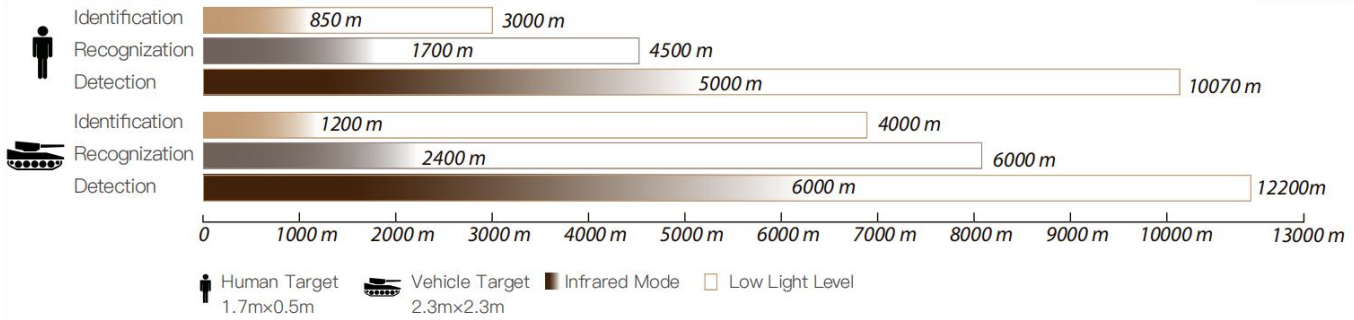
Basic components:

- Five Optical Channels Multi-function Binoculars;
- 1 set of batteries (6 nos.);
- Charger and power adapter;
- Quick start guide;
- User Manual;
- Data Cables;
- HDMI Cables;
- Packing list.

### 1.2. Performance

Infrared thermal imaging	
Resolution	640×512, 12 μm
Spectral band	8~14 μm
FOV	6.1°×4.8°
Low-light imaging	
Resolution	750×600
Low illumination capability	0.001 lux
FOV	6.8°×5.5°
Visible light imaging	
Resolution	4.6 megapixels
FOV	4.6°×3.7°
Laser rangefinder	
Wavelength	1535 nm
Maximum measurement range	≥6 km
Minimum measurement range	≤50 m

Measurement accuracy	2 m
<b>Location module</b>	
Location mode	BD, GPS
Horizontal location accuracy (CEP)	5 m
Elevation location accuracy (PE)	10 m
<b>Digital magnetic compass</b>	
Magnetic azimuth measurement range	0~360°
Magnetic azimuth measurement accuracy	1°
Pitch angle measurement range	-90°~+90°
Pitch angle measurement accuracy	1°
Inclination angle measurement range	-180°~+180°
Inclination angle measurement accuracy	1°
<b>Laser pointer</b>	
Wavelength	830 nm
Security level	5 mW, Class IIIA
<b>Display</b>	
Resolution	1280×1024
<b>External interface</b>	
Aviation	DC/USB/PAL/RS232
Display	HDMI
Wireless transmission	WIFI
<b>Overall device</b>	
Storage	64G
Ocular lens diopter	-4~+4
Weight	2.1 kg
Operating time	≥8 h
Operating temperature	-40°C~+55°C
Storage temperature	-55°C~+70°C
Waterproof grade	IP67



### 1.3. Composition

#### 1.3.1. Opening Case

Five Optical Channels Multi-function Binoculars are placed in a waterproof packing box filled with damping foam, as shown below:



Figure 1 Opening case

#### 1.3.2. Battery

The binoculars are provided with 6 18650 batteries. The specifications of a single battery are as below:

- Nominal voltage: 3.7 V;
- Voltage output range: 2.5 V~4.2 V;
- Capacity: 3000 mAh.

### 1.3.3. Binoculars

Components of binoculars:

#### Top

- (1) Battery holder;
- (2) 4 buttons;
- (3) Antenna housing of location module

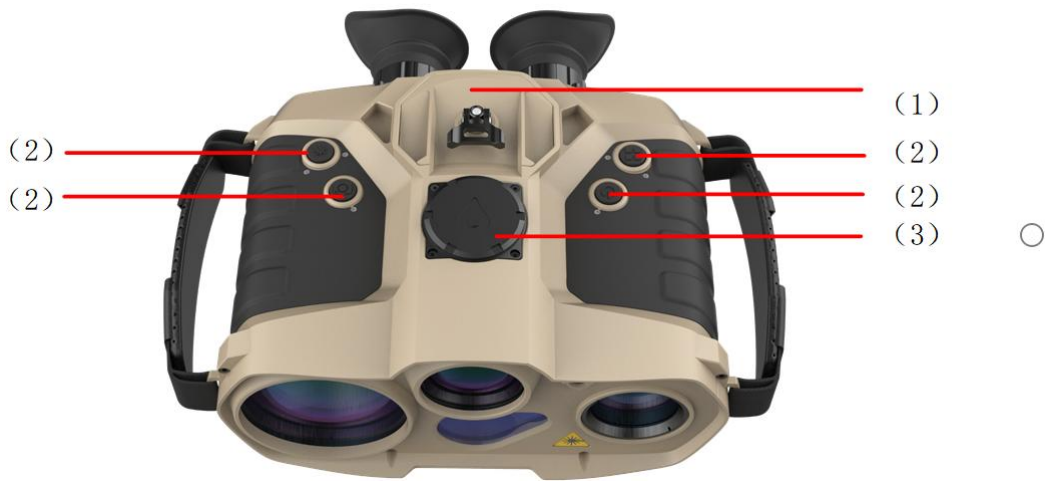


Figure 2 Top of binoculars

#### Front

- (4) Laser pointer;
- (5) Visible light objective lens;
- (6) Laser rangefinder window;
- (7) Low-light objective lens;
- (8) Infrared objective lens

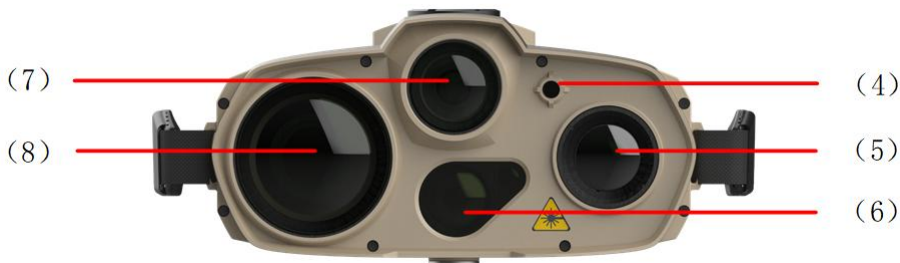


Figure 3 Front of binoculars

## Rear

- (9) HDMI port;
- (10) Button: focusing -
- (11) Button: focusing +
- (12) Approach light sensor;
- (13) Aviation interface: including DC/USB/PAL/RS232;
- (14) Ocular lens: two lens;
- (15) Knob;
- (16) Microphone.

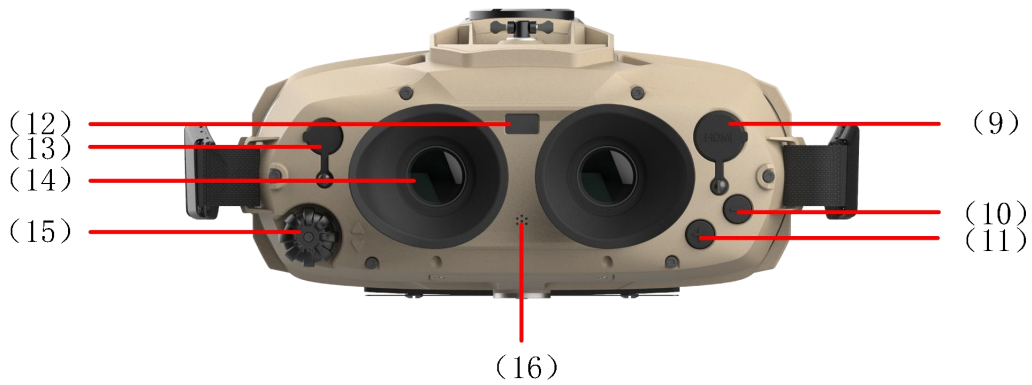


Figure 4 Rear of binoculars

## Bottom

- (17) Connecting base for standard 1/4" tripod
- (18) WiFi antenna

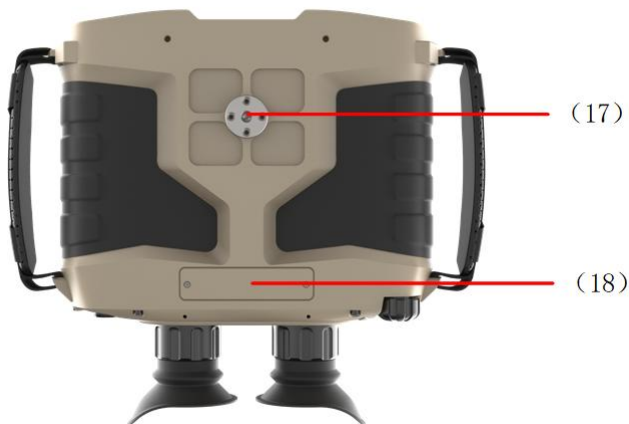


Figure 5 Bottom of binoculars

### 1.3.4. Plug-in connector

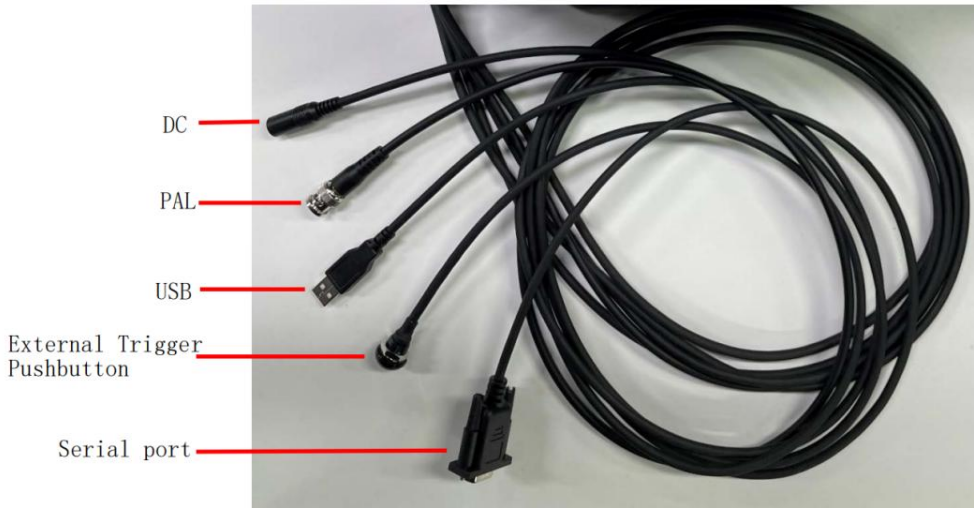


Figure 6 Aerial Plug Cables

## 2. Control and Display

### 2.1. Control

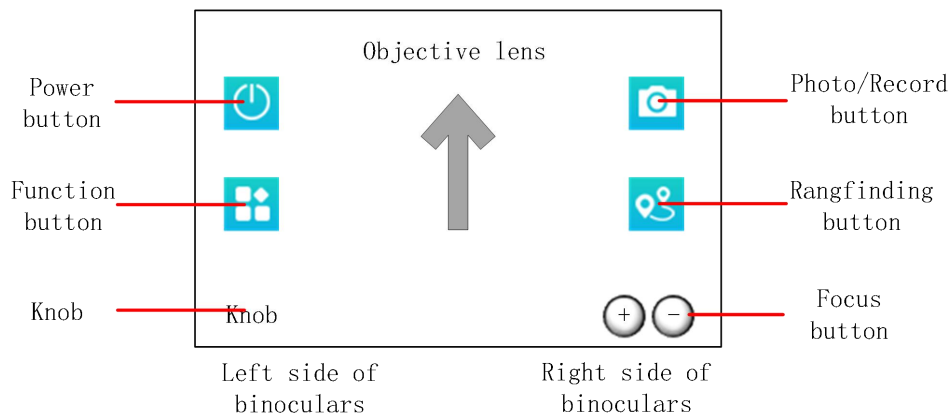


Figure 7 Buttons of binoculars

#### Functions of buttons:

Icon	Button	Operation	Function
	Power button	Short press	Shutter correction Back/Exit
		Long press	Power on/off
	Function button	Short press	Switch the image mode
		Long press	Go to the system menu
	Photo/Record button	Short press	Take photo
		Long press	Start/stop video recording
	Rangefinding button	Short press	Measure for one time
		Long press	Turn on/off laser rangefinder
	Focus +	Short press	One-step focusing +
		Long press	Continuous focusing +
	Focus-	Short press	One-step focusing -
		Long press	Continuous focusing -
	Knob	Short press	Go to the shortcut menu Confirm the selection in the menu/go to the submenu
		Clockwise	Increase the selected parameter Move parameter list to the left/up
		Anticlockwise	Decrease the selected parameter Move parameter list to the right/down



## 2.2. Display

The status and information of each module are displayed on the screen, as shown in the following figure:

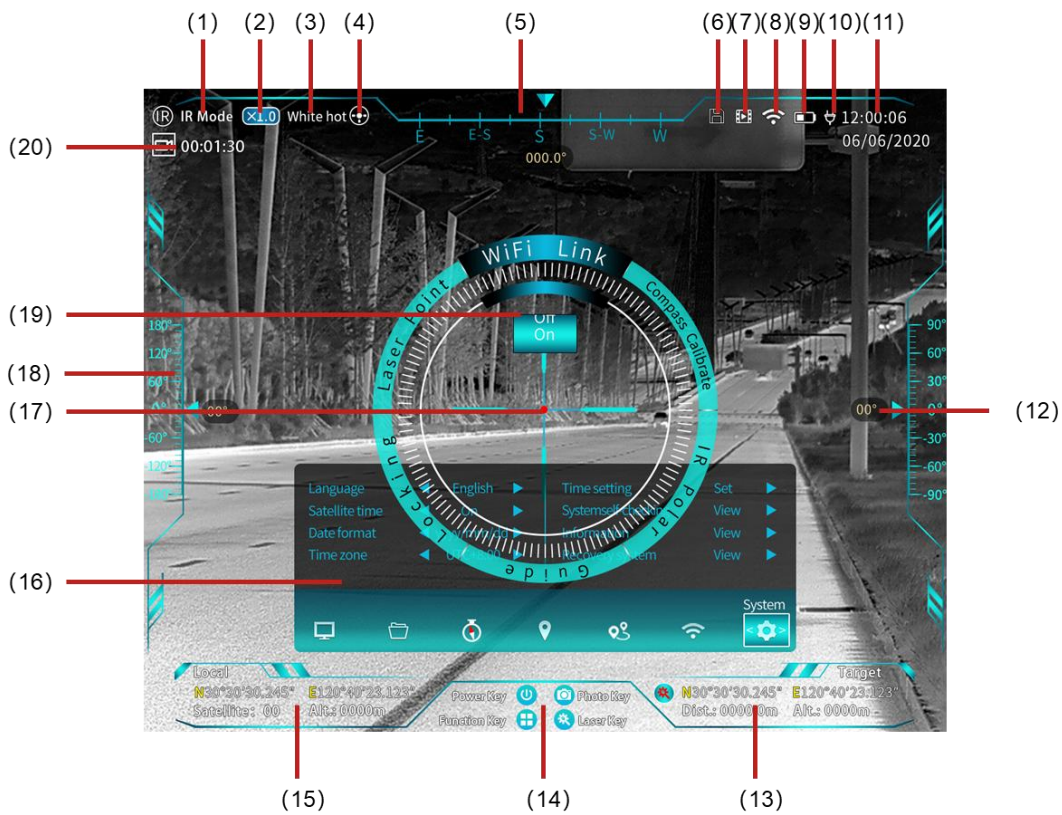




Figure 8 Observation interface

Item	Function or Information
1	Image modes:  infrared mode,  low light mode,  fusion mode,  TV mode
2	Image zoom: 1.0×~4.0× zooming
3	Image sub-modes: white-hot\black-hot\palette; Desert fusion\Forest fusion\Ocean fusion\City fusion\Snow field fusion; Penetrating fog on\ Penetrating fog off
4	Status of laser pointer:  ON,  OFF
5	Azimuth display
6	Residual storage capacity of binoculars:  sufficient,  less than 50%,  less than 20%
7	External output video:  HDMI digital video output,  PAL analog video output
8	WiFi status:  standby,  OFF,  in transmission. The digit in the lower right corner of WiFi icon indicates the number of connected users.
9	Current remaining power
10	External power supply indication
11	Current time display: system time or satellite time can be selected and set in the system menu
12	Pitch angle display
13	Location information of the target: to be updated after ranging
14	Button prompt: change according to the menu functions
15	The location information, coordinate system, and unit can be set in the system menu
16	System menu: include the binoculars' display and the module status settings
17	Reticle: indicates the aiming target in the current field of view
18	Inclination angle display

19	Shortcut menu: It contains 8 functions, which can be called quickly.
20	Shoot/film prompt:  photo,  00:01:30 film. The time indicates the current recorded time.

## 2.3. Menu

### 2.3.1. Shortcut Menu

The shortcut menu contains 6 key functions that need to be operated quickly.

Open the shortcut menu by pressing the knob, rotate the knob to select the required function, and then press the knob again to go to the function option. In the shortcut menu, press the power button to return to the previous page or exit the menu.



Figure 9 Shortcut menu interface

Shortcut menu	Submenu	Submenu	Description
Image polarity			IR Mode: White hot\Black hot\Colorize; Fusion Mode: Gray\Desert\Jungle\Ocean\City\Snow ; TV Model:Penetrating fog on\ Penetrating fog off
Compass calibrate	Spatial Plane		After selecting the calibration mode, enter the compass calibration interface.
Target guidance	Enter the target coordinates	Search Exit	Enter the latitude, longitude, and elevation of the target, select search, and quickly observe the target according to the indication on the screen.
Target locking	On		When the target locking is ON, the target location can be locked


	Off		(manually saved) in each rangefinding. During the rotation of binoculars, the indication cursor will prompt the relative position of the target, and up to 4 targets can be identified at the same time.
Laser pointer	On Off		Laser pointer allows observing the light spot in the low light mode (and partial fusion mode).
WiFi connect	On Off		Allow WiFi connect.


### 2.3.2. System Menu

The system menu contains all the setting functions of display parameters and module status in the binoculars. Open the system menu by pressing and holding the function button, rotate the knob to select the required function, and then press the knob again to go to the submenu. In the system menu, press the power button to return to the previous page or exit the menu.



Figure 10 System menu

System Menu	Submenu	Submenu	Description
Display	OLED bright	0~100	OLED brightness adjustment
Setting	Brightness	0~100	Current image brightness adjustment
	Contrast	0~100	Current image contrast adjustment
	OLED protect	On Off	Detect the face that is approaching or moving away. The screen will automatically display and go off.
	Video output	HDMI PAL	HD video output:  on the upper left of the screen indicates that HDMI is ON.

		Off	PAL video output:  on the upper left of the screen indicates that PAL is ON.  Video output off.
	Reticle style	Off Style 1 Style 2 Style 3	It is displayed in the center of the screen. You can choose the appropriate reticle style in different observation scenes.
	IR enhance	Off Level 1 Level 2 Level 3	Selection of infrared enhancement level: Enhance the details of infrared images according to the observation scene
	Background calibration	Calibration	In the thermal mode, background calibration can be performed to provide better display effect. Before background calibration, the lens cover should be closed or the infrared lens should be aligned with a surface with uniform temperature.

System Menu	Submenu	Submenu	Description
Media	File browsing	Run	Go to the file browsing interface to view the captured picture or video files, and manage these files.
	Useing help	Run	Go to the file browsing interface to view help files.
	OSD overlap	On Off	Turn the information overlay function on or off on a taken photo or video
DMC setting	Compass calibrate	Calibrate	Go to the calibration interface. See 2.5.16 for details.
	Declination	Auto	When the location module has location information output, the binoculars can retrieve the declination information of the corresponding location.
		Manual	Go to the interface of manually inputting the magnetic declination, as detailed 2.5.17 .
	Angle unit	Degree Mils Grads	Select an appropriate unit of angle.
System Menu	Submenu	Submenu	Description



Location setting	Locate mode	Dual mode GPS BDS	The location module supports GPS, BD, and GPS-BD hybrid mode.
	Coord. system	Geographic Gaussian	Select an appropriate coordinate system to calculate your location and the target location.
	Coord. unit	UTM MGRS Deg,Min,Sec Deg,Min	Select an appropriate location coordinate unit.
	Alt. Units	Meters Feet	Select an appropriate elevation unit.
LRF setting	First/last target	First target Last target	When multiple targets are returned from the rangefinder, the display of the first target or the last target is set on this basis.
	Distance unit	Meters Feet	Select an appropriate unit of distance.
	Picture	On Off	When this function is enabled, a photo will be taken at the same time as each ranging; if not, no photo will be taken.
WiFi	Name	TomB-XXXXXX	You can view the WiFi name.
	Encryption type	WPA2 None	Choose whether to use WPA2 for encryption.
	Password	View	You can view or modify the connection password.
	Frequency band	Auto	Auto select the WiFi frequency band to be used.
<b>System Menu</b>	<b>Submenu</b>	<b>Submenu</b>	<b>Description</b>
System	Language	Chinese English	Select the desired language
	Satellite time	On Off	Set whether to use satellite time to calibrate the system time. The system time is satellite time plus zone time
	Date format	YY/MM/DD DD/MM/YY MM/DD/YY	Select the date format according to your usage habit

	Time zone	UTC+8:00	It's validated when satellite timing is enabled. You can enter the local time zone to show the local time.
	Time setting	Set	Modifies the displayed time. It's validated when satellite timing is disabled. For details, see 2.5.18.
	System self-checking	View	System self-checking.
	Information	View	Views the indicators and operation information of the binoculars.
	Recovery system	Run	Restore all user settings of the system to factory settings. For details, see 2.5.21.

## 2.4. Startup and Shutdown

### 2.4.1. Startup

At the shutdown state, press and hold the power button for 3s. The boot page is displayed. Wait for about 30s. Then, you can use the device.

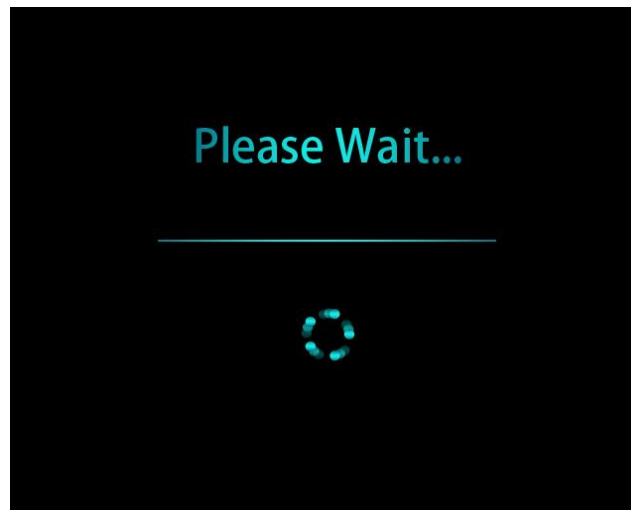


Figure 11 Boot page

### 2.4.2. Shutdown

On the observation interface (no shortcut menu or system menu displayed, the same below), press and hold the power button for 3s. The shutdown prompt page is displayed, showing the shutdown progress bar and a 3s countdown. Hold the button until the countdown is over to shut down the binoculars. You can cancel the operation by releasing the button before the countdown is over.

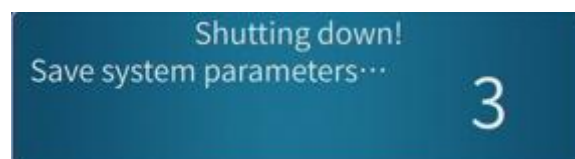


Figure 12 3-second countdown for shutdown

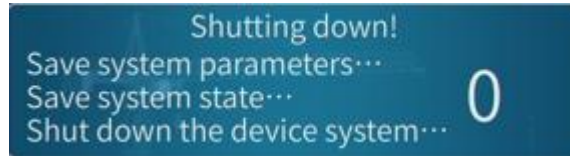


Figure 13 Countdown over

## 2.5. Usage

### 2.5.1. Focusing

On any interface, operate the focus button to focus the lens in current mode (focusing not available in low light mode; while in fusion mode, you should adjust the infrared lens), making the image clearer. You can press and hold the focus button for quick adjustment or press the focus button for single-step adjustment.

### 2.5.2. Shutter Correction

On the observation interface, press the power button for shutter correction. Shutter correction allows you to manually correct thermal images and is operable in both thermal mode and fusion modes.

### 2.5.3. Mode Switching


Under the observation interface, short press the function key to cycle through the following four image modes:


Infrared mode -> low light mode -> fusion mode -> visible light mode.

There are several sub-modes under each mode, which can be set in the image polarity in the shortcut menu, and the sub-modes of each mode are shown in the table below:

Image Mode	Sub-mode
Thermal mode	Sub-mode
	White-hot
	Black-hot
Fusion mode	Colorize
	Gray
	Desert
	Jungle
	Ocean
	City
TV mode	Snow
	Normal mode
	Penetrating fog mode

### 2.5.4. Shoot/Film Button

On any interface (except the file browsing interface), press the shoot/film button to take a picture. An icon () is displayed in the upper left corner and hides automatically after shooting. The picture is named by the shooting time and stored as a .jpg file.

On any interface (except the file browsing interface), press and hold the shoot/film button to record a video. An icon () is displayed in the upper left corner, and the last time of recording is also displayed. During video recording, you can press and hold the film button to stop recording. The recording icon and time hide automatically. The video is stored as an AVI file and named by the time the recording starts.

You can view and edit pictures and videos that have been taken on the file browsing interface. For details, see 3.2.17. You can also upload them to a computer for offline treatment through the USB of the data interface. For details, see 3.2.18.

### 2.5.5. Laser Rangefinding

For the avoidance of unintended touch of the button, after the device is booted, the laser rangefinder remains closed by default. You can press and hold the rangefinding button to manually enable/disable the laser rangefinding function. When this function is enabled, a red prompt is displayed on the screen, indicating "Rangefinder turn on!".

On the observation interface with the rangefinder enabled, you can press the rangefinding button for one-time distance measurement. The target distance is displayed in the lower right corner of the screen. If the location module receives a valid signal at the moment, the target's location information will also be figured out and updated in the lower right corner of the screen, as shown below.



Figure 14 Target distance information

### 2.5.6. Image Zooming

In the observation interface, rotate the knob, the image will be 1.0× ~ 4.0×stepless zoom, step 0.1.


### 2.5.7. Target Guiding

On the shortcut menu, select target guiding and press the knob. The target guiding setup interface is displayed. A page is popped up, asking you to enter the target coordinates, as shown below.





Figure 15 Input box of target coordinates

On this interface,  indicates the parameter currently adjustable. You can turn the knob to adjust its value or symbol. Press the function button to select the next adjustable parameter. After all coordinates are entered, press the knob to start target searching. The screen shows the searching progress, as shown below. During any process, you can press the power button to quit the current interface and go back to the shortcut menu.

The guiding process is shown below. The system figures out the target's azimuth against the binoculars shows on the screen the directions that the binoculars need to move (with arrows). You just move the binoculars following the directions (as shown in the picture, move the binoculars rightward and downward).

When the target appears in the center of the FOV within 1/2 scope, the screen shows a blue box to lock the target. It keeps locking the target as the device moves until you quit the target guiding operation.

During target guiding, you can press the power button to quit and go back to the observation interface.



Figure 16 Target guiding process

### 2.5.8. Locking

On the shortcut menu, select **Locking** and press the knob. The target locking setup interface is displayed. Then, turn the knob to select "On" or "Off".



Figure 17 Locking function

The locking function allows you to manually mark more than one target and keeps locking static targets when you move the device.

When the locking function is enabled, a target recording/indicating dial is displayed in the lower center of the screen, as shown in Figure 20 (1). Since then, every time you perform a rangefinding, a prompt box (2) will pop up over the reticle. If you press the knob (select locking), the target's relative position will be saved, and the target is locked by (3). Meanwhile, it's marked on the target recording/indicating dial.

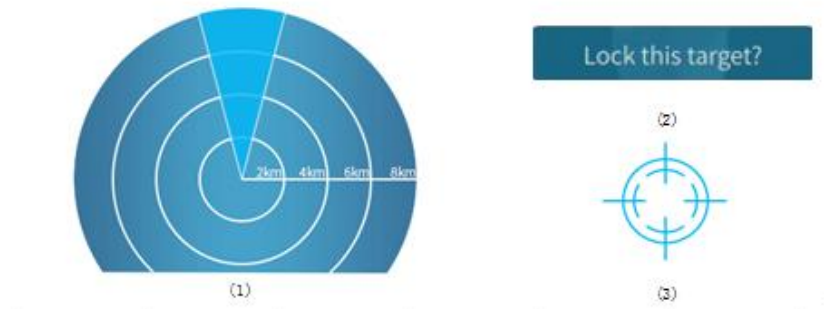


Figure 18 Icons for the locking function

The following figure shows a schematic with 3 locked targets.


This function allows you to lock up to 4 targets. If you continue to lock targets when there are already 4 targets, the earliest target will be replaced automatically and saved.



Figure 19 Marks of locked targets

**2.5.9. Laser Pointer**

On the shortcut menu, select laser pointer and press the knob. The laser pointer setting interface is displayed. Then, turn the knob to select "On" or "Off".

When the laser pointer is enabled, the laser pointer module starts to work, indicating the target based on the position of the reticle center. The laser pointer icon in the upper left corner of the screen changes to .

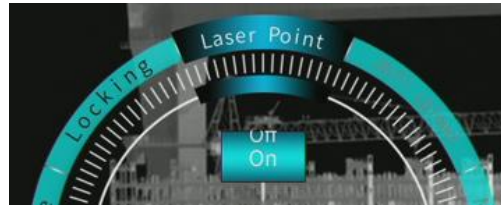


Figure 20 Laser pointing function

Note: The laser pointer has a Class IIIA energy level that may cause slight dizziness if pointing at eyes. Please pay attention to the environment and pointing direction during use.

### 2.5.10. WiFi Transmission

On the shortcut menu, select **WiFi** link, briefly press the knob to enter the WiFi connection interface, and rotate the knob to select "On" or "Off".


Select "On" to connect the image receiving device with the handheld through WiFi. The handheld image can be observed in real time and controlled wirelessly through the receiving device.




Figure 21 WiFi Transmission function

### 2.5.11. Video Output for Display

binoculars can be connected with an external video display unit and support PAL analog video and HDMI digital video.

Choose "System Menu" >> "Display" >> "Video out" and set the PAL output. You need to connect the BNC connector to the monitor with the aviation cable to watch videos. When the PAL is normally played, the  icon is displayed in the upper left corner of the screen.

Choose "System Menu" >> "Display" >> " Video out " and set the HDMI output. You need to connect to the display with the HDMI cable to watch videos. When the HDMI video is normally played, the icon  is displayed in the upper left corner of the screen.

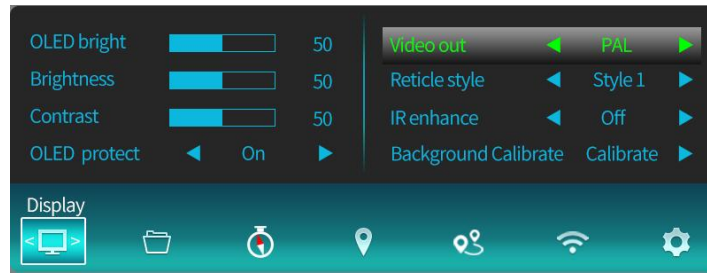


Figure 22 System menu-HDMI

Note: If the HDMI monitor is not connected or connected but not turned on, the HDMI display function will fail, and the system automatically switches back to the OLED display. PAL can be displayed simultaneously with OLED. HDMI videos cannot be displayed simultaneously with OLED or PAL. When an HDMI video is opened, OLED and PAL will be closed. When the HDMI video is closed, OLED will automatically display, and the PAL depends on the menu setting.

**2.5.12. Background Calibrate**

You can find this function by choosing "System menu" >>"Display" >> "Background calibrate".

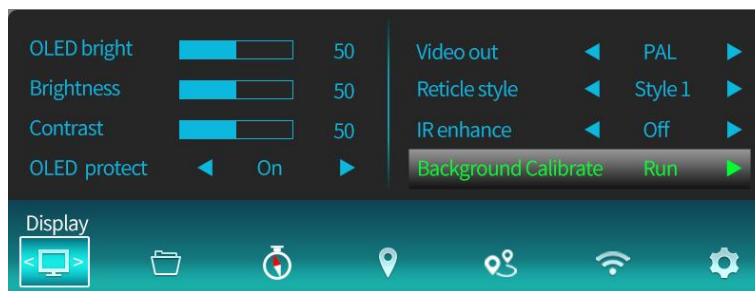


Figure 23 System menu - Background calibrate

When observing the thermal image under normal circumstances, you may find that the thermal image has unsatisfactory quality even if you use shutter correction. In this case, you may perform background correction once. When you select "Background Calibrate" from the system menu, the screen prompts: "Please cover lens before correction!" You need to operate follow this requirement. After the correction is done, the screen prompt: "Calibration complete". Then, you can open the lens and continue to use the device.

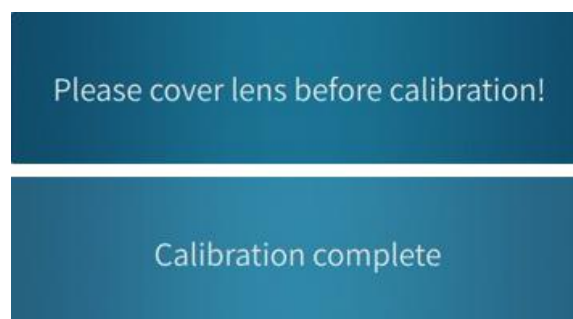


Figure 24 Prompt for background correction

**2.5.13. Penetrating Fog in TV Mode**

You can set this function by choosing "Quick Menu" >> "penetrating fog".

This function provides clear visible light imaging on rainy and foggy days, with a fog penetration ratio up to 1.5.



The fog-penetration effect is shown in the following figure.



Figure 25 Fog-penetration effect in TV mode (left: fog penetration off; right: fog penetration on)

### 2.5.14. File Browsing

Choose "System Menu" >> "Media" >> "File browsing". The file browsing interface is displayed, where you can edit recorded files.

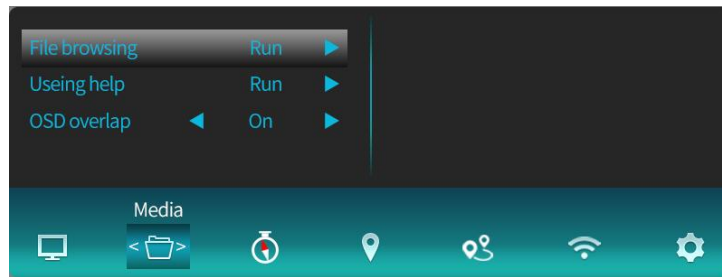








Figure 26 System Menu-File browsing

#### 2.5.14.1. File browsing interface



Go to the file browsing file, as shown below.



Figure 27 File browsing interface

No.	Function or Information
1	<b>List type:</b> types of files that the current file list contains. You can set this function on the playback menu. Options include the photo list (  ) , video list (  ) , and mixed list (   ).
2	<b>File No.:</b> number of the current file/total number of files.
3	<b>Page No.:</b> current page number/total number of pages.
4	<b>Sort order:</b> sort order of the file list, which can be set in the playback menu, with options including ascending order of name  or descending order of name  .
5	<b>Total number of recorded videos:</b> percentage of the total number of recorded videos in the file list against the expected number of 100; if the total number is greater than 100, the percentage will remain 100%.
6	<b>Storage:</b> displays used, free, and total capacity and the percentage of free capacity
7	<b>Keys:</b> change according to the menu functions.
8	<b>Current file:</b> displays the information of the current file, including type, size, and creation time.
9	<b>Playback menu:</b> for setting the attributes of the file list.
10	<b>Total number of photos taken:</b> percentage of the total number of photos in the file list against the expected number of 10,000; if the total number is greater than 10,000, the percentage will remain 100%.
11	<b>File preview:</b> 6 previews on one page at most.
12	<b>Play menu:</b> select a file to be played in full screen or deleted.

#### 2.5.14.2.File browsing control

Icon	button	Operation	Function
	Power button	Short press	Back/Exit
		Long press	Shutdown
	Function button	Long press	Go to the system menu
	Knob	Short press	Go to the play menu
		Clockwise	Select the previous file Move parameter list to the left/up
		Anticlockwise	Select the next file Move parameter list to the right/down

#### 2.5.14.3.Play menu

Select a file and then press the knob. The play menu pops up in the position of the current file, as shown in the figure below.

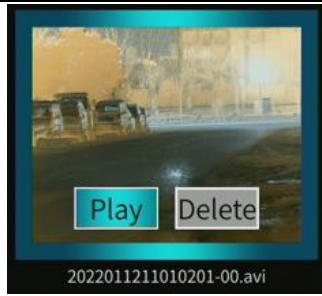


Figure 28 Play menu

To play a file in full screen, turn the knob to select "Play" and then press the knob. To delete a file, turn the knob to select "Delete". Press the knob to go to the confirmation menu. Select "Yes" and press the knob. If you select "No" and press the knob, you will return to the previous menu.



Figure 29 Play menu-deletion options

#### 2.5.14.4.Playback menu

On the file browsing page, press and hold the function button. The playback menu pops up, as shown in the figure below. Turn the knob to select the option to be set. Press the knob to go to the submenu.



Figure 30 Playback menu

- **Page jump:** Press the function button to select the next figure to be adjusted. Turn the knob to adjust the figure. After that, press the knob to confirm to go to the specified page.

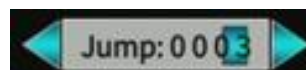


Figure 31 Page jump

- **List type:** Turn the knob to select the option to be set. Press the knob to confirm the selection and return to the previous menu. After the setting, the current list type is shown on the top of the screen.

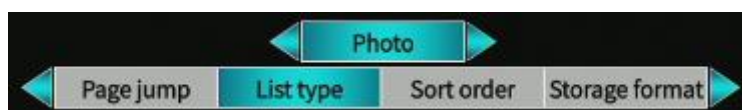


Figure 32 List type

- **Sort order:** Turn the knob to select the option to be set. Press the knob to confirm and return to the previous menu. After the setting, the current sort order is shown on the top of the screen.

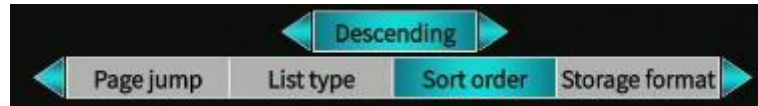


Figure 33 Sort order

- **Storage format:** Turn the knob to select the option to be set. To confirm the formatting, press the knob.

The confirmation menu pops up.

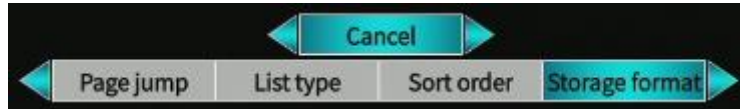


Figure 34 Storage format

#### 2.5.14.5.Photo play

On the file browsing page, go to the full-screen photo play page by using the play menu, as shown in the figure below. Turn the knob to select the previous or next photo. Press the power button to return to the file browsing page.



Figure 35 Photo play page

Press and hold the function button. The Delete menu pops up for you to select whether to delete the current photo. Turn the knob to select. Then press the knob to confirm your selection. When a file is deleted, the next file is automatically played.



Figure 36 Photo deletion

#### 2.5.14.6.Video play

On the file browsing page, go to the full-screen video play page by using the play menu, as shown in the figure below. Press the knob to pause or play the video. Turn the knob to fast forward or rewind the video. Press the



power button to return to the file browsing page.



Figure 37 Video play

Press and hold the function button. The Delete menu pops up for you to select whether to delete the current video. Turn the knob to select. Then press the knob to confirm your selection. When a file is deleted, the next file is automatically played.



Figure 38 Photo deletion

### 2.5.15. Portable Memory Function

The binoculars support using the whole device as a portable memory device (USB drive). The product can be connected to a general-purpose computer via the USB port of an aviation cable. Photos and videos in the binoculars can be deleted or backed up on the computer.

### 2.5.16. Compass Calibration Function

Select "System Menu >> DMC settings >> Compass Calibrate" to go to the following menu, You can also operate in the shortcut menu.

Spatial calibration or plane calibration can be selected in the calibration mode. After Spatial calibration, it has high calibration accuracy and convenient plane calibration operation. In particular, when the product is used for the first time or has a great impact on the magnetic field environment, the spatial calibration may not be carried out normally. It is necessary to carry out plane calibration first to converge the calibration data, and then carry out spatial calibration to improve the accuracy.

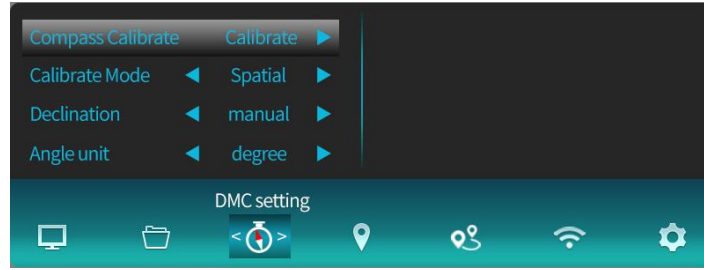


Figure 39 System Menu-Compass Calibrate

### 2.5.16.1.Spatial calibration

Short press the knob to enter the calibration interface. The compass calibration needs to rotate in three directions and hold it for one cycle. A total of 20 data points need to be collected and operated according to the prompts on the screen.

Firstly, rotate it at a uniform speed in the vertically direction for  $\geq 12$  seconds. A total of 8 points need to be collected in this direction, and the sampled points are displayed on the right. If the collection points are insufficient after one rotation, it can be rotated for another cycle.

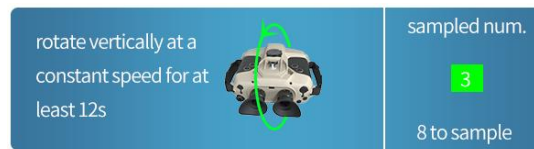


Figure 40 System Menu-Compass Calibrate

After that, rotate it at a uniform speed in the rolling direction for  $\geq 12$  seconds. A total of 7 points need to be collected in this direction, and the sampled points are displayed on the right. If the collection points are insufficient after one rotation, it can be rotated for another cycle.



Figure 41 System Menu-Compass Calibrate

Finally, rotate at a uniform speed in the horizontal direction for one cycle, and the rotation time is  $\geq 12$  seconds. A total of 5 points need to be collected in this direction, and the sampled points are displayed on the right. If the collection points are insufficient after one rotation, it can be rotated for another cycle.

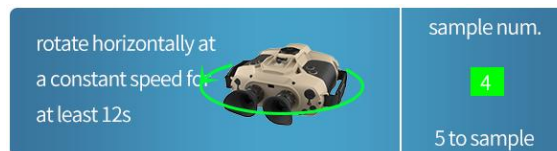


Figure 42 System Menu-Compass Calibrate

After all three directions are collected, the compass automatically calculates the calibration results for compensation and displays the calibration results at the same time. 80 ~ 100 indicate that the calibration results are good, 60 ~ 80 indicate that the calibration results are general, and recalibration is required below 60.



Figure 43 System Menu-Compass Calibrate

2.5.16.2.Plane calibration

Short press the knob to enter the calibration interface. The compass calibration needs to be rotated in two directions and held for one cycle. After the rotation is completed, short press the knob to complete the calibration, and operate according to the prompts on the screen.

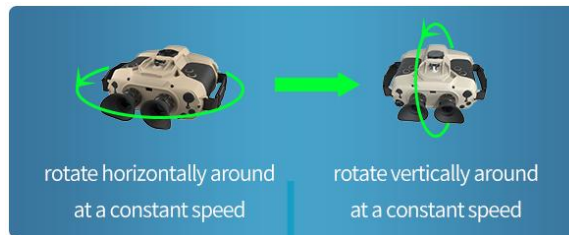


Figure 44 System Menu-Compass Calibrate

After the acquisition of two directions, the compass automatically calculates the calibration results for compensation and displays the calibration results at the same time.

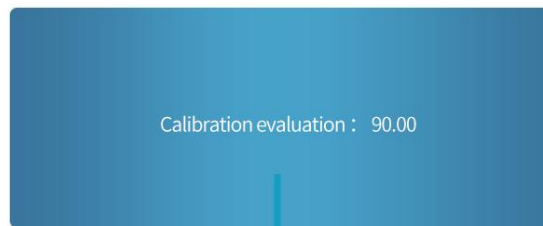


Figure 45 System Menu-Compass Calibrate

2.5.17. Magnetic Declination Input

Select "System Menu >> Compass Settings >> Declination" to go to the following page.

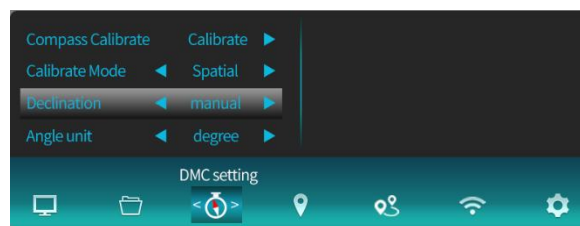


Figure 46 System Menu-Declination

Selecting "Manual" and pressing the knob will direct you to the page for adjusting the value. Press the function button to select the parameter to be adjusted. Turn the knob to increase or decrease the magnetic declination value. After that, press the knob to confirm the current value and then exit or press the power button to exit without saving the value.



Figure 47 Declination

Selecting "Auto" will make the binoculars automatically calculate the local magnetic declination according to the location information.

**2.5.18. System Time Settings**

Select "System Menu >> System Settings >> Time setting" to go to the following page.



Figure 48 System Menu-Time setting

Press the knob to go to the time setting page.

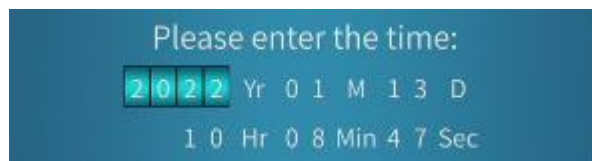


Figure 49 Time setting

On this page, turn the knob to adjust the value. Press the function button to select the next value. After that, press the knob to save the adjustment and exit or press the power button to exit without saving the adjustment.

**2.5.19. Online User Manual**

Select "Media menu >> Using help >> to go to the following page.



Figure 50 Using help

## 2.5.20. Viewing System Information

Select "System menu >> System Settings >> Information" to go to the following page.

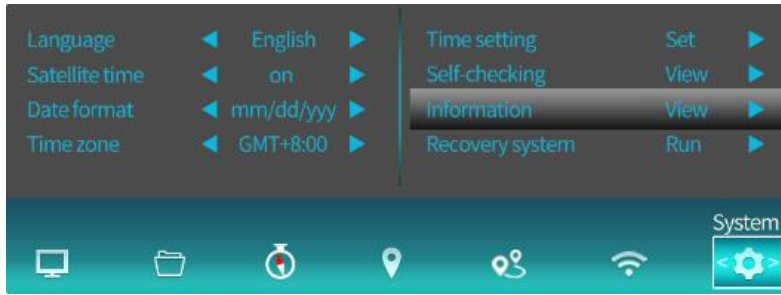


Figure 51 System Menu-Information

Press the knob again to open the system information page. The following information will be displayed. On this page, press the knob or power button to exit.

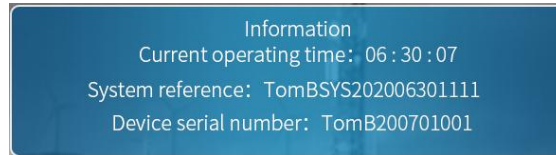


Figure 52 System Information

## 2.5.21. Recovering System Settings

This function can be set in "System Menu >> System Settings >> Recover system".

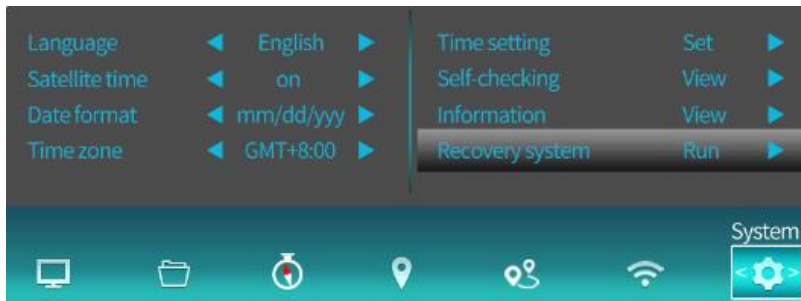


Figure 53 System Menu-Recover system

Press the knob. The warning page pops up. Press the function button to confirm the recovery or press the power button to cancel the recovery.

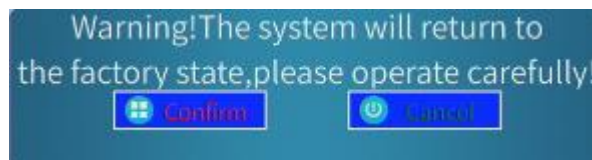


Figure 54 Warning page for system recovery

If you choose to confirm the recovery, all user-defined parameters of the binoculars will return to the factory state. This operation is irreversible so please operate carefully.



### 3. Preventative Maintenance

#### 3.1. Battery Level Detection

The real-time battery level of the binoculars is displayed in the upper right corner of the screen, as shown in the figure below. When the battery icon turns red, it indicates that the battery is low. In this case, please replace the battery timely. When the battery has died, the binoculars automatically shut down to protect the battery and save system parameters.



Figure 55 Battery icon illustration (full, half, and low)

#### 3.2. Replacing Batteries

To install batteries for the first time or remove the installed batteries, unscrew the clamp of the battery holder cover anticlockwise and then remove the battery holder cover. Make sure to put away the battery holder cover so that it will not be lost.



Figure 56 Unscrewing the battery holder cover anticlockwise

Install the batteries into the battery holder with their cathodes outward and anodes inward, as shown in the figure below.



Figure 57 Direction for installing batteries

Finally, put the battery holder cover in place and screw the clamp clockwise until the battery holder cover

completely settles in the slot and the clamp cannot be screwed further.

Caution: If the battery holder cover is not screwed completely tight, the waterproof performance of the binoculars may compromise. If water gets into the binocular, the binoculars or their batteries will be damaged easily.

### 3.3. Cleaning the Binoculars

If the binoculars have stains on the case, you may use a clean cloth to wipe the stains. It is recommended to use a clean cloth with some absolute ethyl alcohol on it to wipe stubborn stains. To clean the lenses (including the ocular lens and objective lens), please use a clean cloth with some absolute ethyl alcohol on it.

It is strictly forbidden to use any sharp object to scrape the binocular surface, as this operation can easily damage the protective layer on the binocular surface and the binocular appearance and render the product susceptible to damages due to dampness.

### 3.4. Regular Maintenance

If you will not use the binoculars for a long time, please remove the batteries in the product and put them away. It is recommended to place the batteries in the storage box together with the binoculars.

To maintain the good charging and discharging performance of batteries, it is recommended to charge unused batteries monthly and put them away after that.

In addition, the magnetic compass in the binoculars is susceptible to the magnetic field of the surrounding environment. It is therefore recommended to first calibrate the compass every time you use the binoculars. For specific calibration steps, please see Chapter 2.5.16.

## 4. Troubleshooting

The following table shows common symptoms that may arise during the use of the binocular. You may troubleshoot by following the solutions given in the table. For symptoms that are not listed in the table, please contact the manufacturer and do not disassemble the product on your own.

No.	Common Symptom	Cause	Solution
1	The binoculars cannot be turned on properly and the screen does not work.	Batteries are installed incorrectly. Battery died.	Check how the batteries are installed. Replace the batteries with new ones.
2	Images cannot be observed properly.	The lens covers are not opened. The lenses are blocked.	Open the lens covers. Pay attention to the environment where the product is used.
3	*The displayed	The focal length is	Turn the knob to adjust the focal length.

	images are unclear.	improperly set.	
4	The vision is unclear.	The ocular lens diopter is improperly set.	Turn the ocular lens to adjust the diopter until the vision is clear.
5	The screen goes off immediately after the binoculars are powered on.	*The OLED protect function has been enabled.	Observe by applying your eyes close to the ocular lens, or disable the OLED protect function.
6	The displayed azimuth angle is incorrect.	Compass calibration has not been performed.	In the system menu, enable the compass calibration function to perform the calibration.
7	Rangefinding cannot be performed when the rangefinding button has been pressed.	The laser rangefinder has not been turned on.	Press and hold the rangefinding button to turn on the laser rangefinder.
8	The laser indicating facula does not appear in low light mode.	The ambient light is too bright, thus covering the laser indicating facula.	The cross reticle position is the facula position.
9	Location data are all 0.	The location module receives no signals.	Use the binoculars in an outdoor open place.

- \*The observation range of the binoculars is 50 m to infinity. The binoculars may be unable to focus clearly if the observation range is small.
- \*The OLED protect function is to prevent light leakage. When it is enabled, if you cannot see clearly even if applying your eyes close to the ocular lens, please use the user host computer to adjust the parameters of the proximity light sensor in the binoculars.

## 5. Tactical Configuration and Accessories

### 5.1. Battery Charger

The Five Optical Channels Multi-function Binoculars are equipped with a battery charger, which can charge six batteries simultaneously and possesses the battery level detection function. The method is as follows:

- Place the batteries in the charger as indicated.
- Connect the charger to the power adapter. The plug uses a standard power source of AC 220 V.
- When the batteries are fully charged, the charger screen indicates so.



- Put the batteries away timely after they are fully charged and the power supply for the charger should be cut off.



Figure 58 Battery charger

## 5.2. Storage and Transportation

The binoculars are delivered along with a storage box, which should be kept properly. During long-distance transportation, the product must be placed in the storage box, in order to protect it from possible damages in the process.