

Thermal imaging device User Manual V1.3



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- **Warnings, Cautions and Notes**

Warnings, cautions, and notes may be found in this document. They are defined as follows:

- **Warnings**

Alert you to potentially hazardous situations, and conditions, practices, or procedures that users must follow, so as to avoid serious injury and death.

- **Cautions**

Alert you to potentially hazardous situations, and conditions, practices, or procedures that users must follow, so as to avoid moderate injury and equipment damage.

- **Notes**

Provide basic information that helps you better use or operate the product.

1. Device Information and Description

1.1 Device Information

Device model and name:

Thermal imaging device

Device use:

Featuring a compact size, light weight, low power consumption, long battery life, and 1,000m laser rangefinding function, the thermal imaging monocular (hereinafter referred to as the thermal imaging monocular) can be used for observation and shooting aiming at night, in dim environments, darkness, harsh weather, or complex scenes. It is suitable for security enforcement, outdoor hunting, wilderness exploration, and other fields.

Packaging components: thermal imaging monocular body (with eye cup), Picatinny rail adapter, screw, wrench, cable, user manual, lens cleaning cloth, certificate of qualification.

Table 1 Packaging Components

No.	Component
1	Thermal imaging device body (with eye cup)
2	Picatinny rail adapter
3	Six M5 screws
4	Wrench
5	Type-C cable
6	Lens cleaning cloth
7	Certificate of Qualification

The monocular body components and their functions:

Table 2 The Monocular Body Components and Their Functions

No.	Component	Functional Description
1	Lens cap	Lens protection
2	Objective lens focusing knob	Adjust the focal length of the objective lens.
3	Battery compartment	Compatible with 18650 battery
4	Wi-Fi antenna	Transmitting Wi-Fi signals
5	Button panel	Power button and other function buttons
6	Diopter adjustment knob	Adjust the diopter.
7	Eyepiece hood	Sunlight protection and collision protection
8	Type-C interface	Software upgrade port/Video output port/SD card reading port/External power supply port
9	Rangefinder	1,000m rangefinding
10	Long Picatinny rail connector	Fixed on Picatinny rail

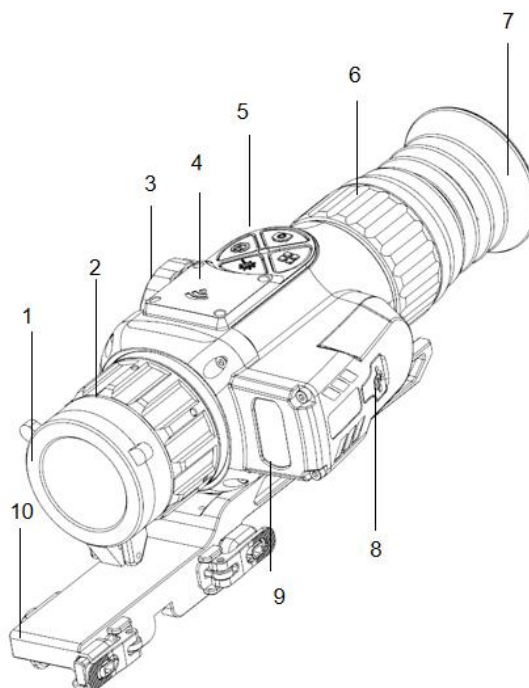


Figure 1 The Monocular Body Components

1.2 Device Specifications

Device Specifications:

Table 3 Device Specifications

	RIKANV MRS LRF	RIKANV HRS LRF
Microbolometer		
Type	Uncooled	
Resolution, pixels	384×288	640×512
Pixel Size, μm	12	
NETD, mk	≤ 30	
Frame Rate, Hz	50	
Optical Characteristics		
Objective Lens	F35mm/1.0	F50mm/1.0
FOV, degrees	7.5×5.7	8.8×6.6
Magnification,×	3.4	2.92
E-zoom,×	1,2,4	
Eye relief, mm	50	
Diopter Adjustment, D	± 5	
Detection Range, m (Target size: 1.7m×0.5m,P(n)=99%)	1818	2597
Display		
Type	AMOLED	
Resolution, pixels	1024×768	

2. Assembly and Power-on for Use

2.1 Assembly/Disassembly

The monocular supports 18650 batteries.

To install a battery, unscrew the battery cap first, put the battery into the battery compartment in the correct polarity, and tighten the battery cap.

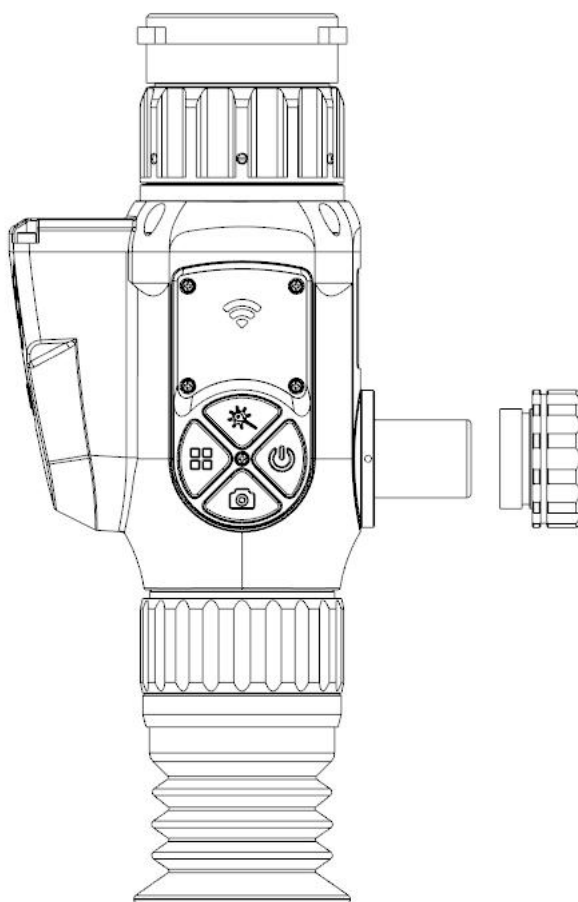


Figure 2 Battery Installation

2.2 Startup

Close the objective lens hood before startup. Press and hold the Power button for 3s. The screen lights up to display the startup page. After the startup LOGO disappears, open the objective lens hood to observe the image.

2.3 Shutdown

Press and hold the Power button for 3s to shut down the device until the screen goes off.

3. Operating Instructions

3.1 Home Screen Operations

3.1.1 Home Screen Display

The information displayed on the home screen: infrared image, battery level, Wi-Fi, zero position, digital zoom, image polarity, reticle, PIP, etc.;

Table 4 Home Screen Information

No.	Icon	Description
1	Zero position	Zero position type of the current reticle. For example, "A100" means that the center of the reticle points to the 100-meter position under group A.
2	Digital zoom multiple	1X/2X/4X
3	Image polarity	White-heat, black-heat, red-heat, rainbow
4	Image enhancement	Image detail enhancement
5	Photo/Video taking	Taking a photo or video
6	Image freezing	The image is frozen and cannot be observed
7	Laser rangefinder	Turning on/off rangefinder
8	WIFI	Turning on/off Wi-Fi
9	External power supply	With an external power supply
10	Storage fully occupied	SD card is fully occupied, so photos or videos cannot be taken
11	Clock	Time display
12	Battery level	Real-time battery level display
13	PIP	Turning on/off PIP
14	Rangefinding reticle	Indicating the position of the laser rangefinding and displaying the distance value
15	Reticle	Multiple reticle types and colors

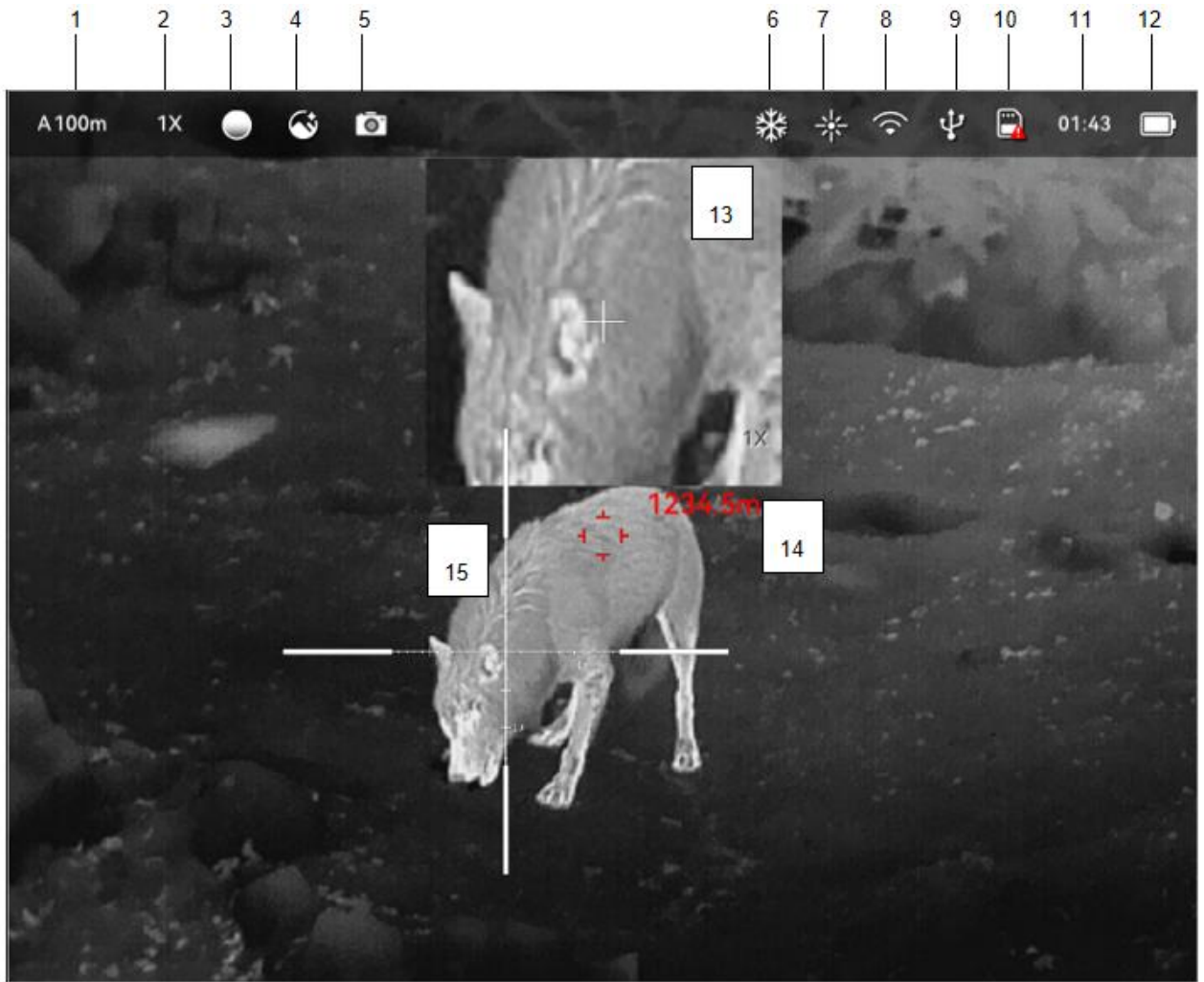


Figure 3 Home Screen Information

3.1.2 Button Description

Table 5 Button Description

Button	Device Status	Short Press	Press and Hold
Power	The device is off	-	Power on
	Power-on		Shutdown
	Observation interface	Screen off/on	
	Menu screen		Return to observation interface
Rangefinder button/Up	Observation	Distance measurement	Turning on/off rangefinder

	interface		
	Menu screen	Moving the cursor up and increasing the value	Fast-forward playback
Menu button	Observation interface	Unidirectional cyclic zoom	Displaying menu
	Menu screen	Confirming and entering the next menu	
Photo button/Down	Observation interface	Photo	Starting/Stopping video recording
	Menu screen	Moving the cursor down and decreasing the value	Fast-backward playback
Menu button + Photo button	Observation interface	Switching reticle zero position	
Rangefinder button + Photo button	Observation interface	Image correction(shutter)	Image correction(no shutter)
Rangefinder button + Photo button + Menu button	Menu screen	Reticle option On/Off	Reticle option On/Off

3.2 Quick-Access Functions

3.2.1 Standby

In observation interface, Short press the Power button to make the screen off. Short press the Power button again to turn on the screen.

3.2.2 Rangefinding

a. Press and hold the Rangefinding button to turn on the rangefinder. The status bar displays the laser symbol. Press and hold the button again to turn the rangefinder off.

b. After the rangefinder is turned on, the rangefinding reticle is displayed. Use the rangefinding reticle to aim at the target. Short press the Rangefinding button to measure the distance. At this time,

the laser symbol flashes once, and the current distance value is displayed next to the rangefinding reticle.

c. If the continuous range is on, short press the Rangefinding button to measure the distance. Short press the Rangefinding button again to stop.

d. Maximum measuring distance: 1,000m

3.2.3 Photo and Video Taking

a. Short press the Photo/Video button to take photos.

b. Press and hold the Photo/Video button to take videos. Taking photos is allowed during the recording process. Press and hold the Photo/Video button again to stop recording.

c. The maximum duration of one record is 30 minutes. The device will automatically stop recording if the duration exceeds this limit.

3.2.4 Zero Position

Short press the corresponding buttons to switch between different zero position values in the current group. Each group has a total of 5 zero positions, which can be switched sequentially via the button. During the switching process, the reticle zero point moves to the corresponding location, and the image returns to the 1× digital zoom state.

3.2.5 Zoom

a. When PIP is turned off, perform 1x/2x/4x unidirectional cyclic zoom.

b. When PIP is turned on, 1× zoom is adopted for full-screen images, and 2–4× unidirectional cyclic zoom for PIP images.

3.2.6 Image Correction

Image quality can be restored with the image correction function.

3.3 Menu Operations

On the home screen, press and hold the Menu button to enter the main menu. Through the main menu, you can set mode, image, view files, etc.

The first-level menu mainly includes seven options: **Mode**, **Image**, **File**, **Wi-Fi**, **Setting**, **Pixel defect correction** and **Reticle**. Short press the Up/Down button to switch options and short press the Menu button to enter or confirm the option.

3.3.1 Mode

There are four image modes: white-heat, black-heat, red-heat, rainbow, default white-heat.

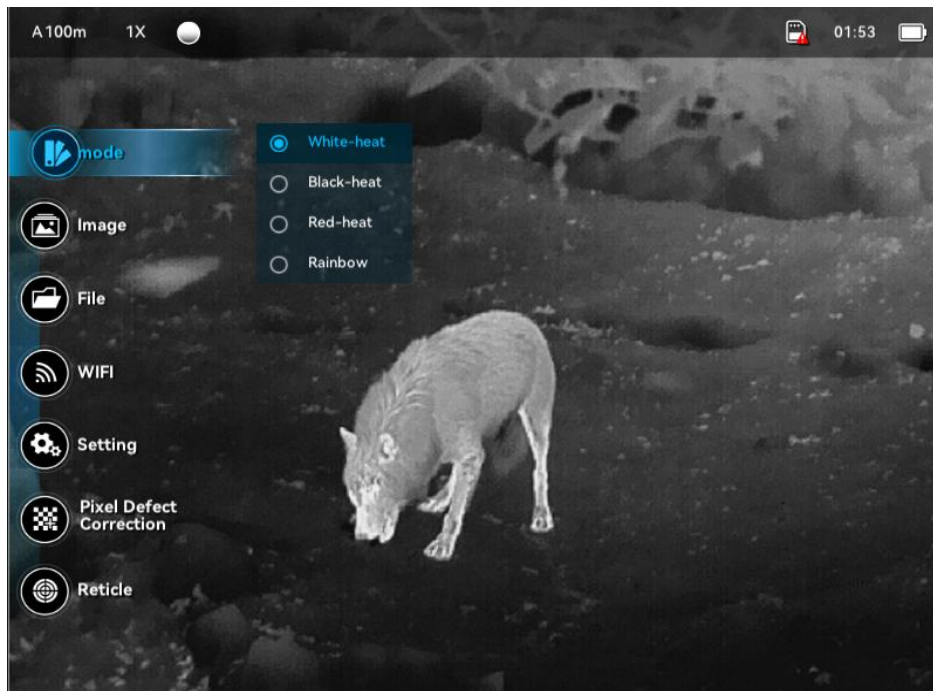


Figure 4 Mode

3.3.2 Image

Image settings cover brightness, contrast, threshold, and image enhancement.

Brightness: levels 1–5. Default: level 3.

Contrast: levels 1–5. Default: level 3.

(Red heat)Threshold:levels 1–5. Default: level 3.

Enhance: on/off. Default: off.

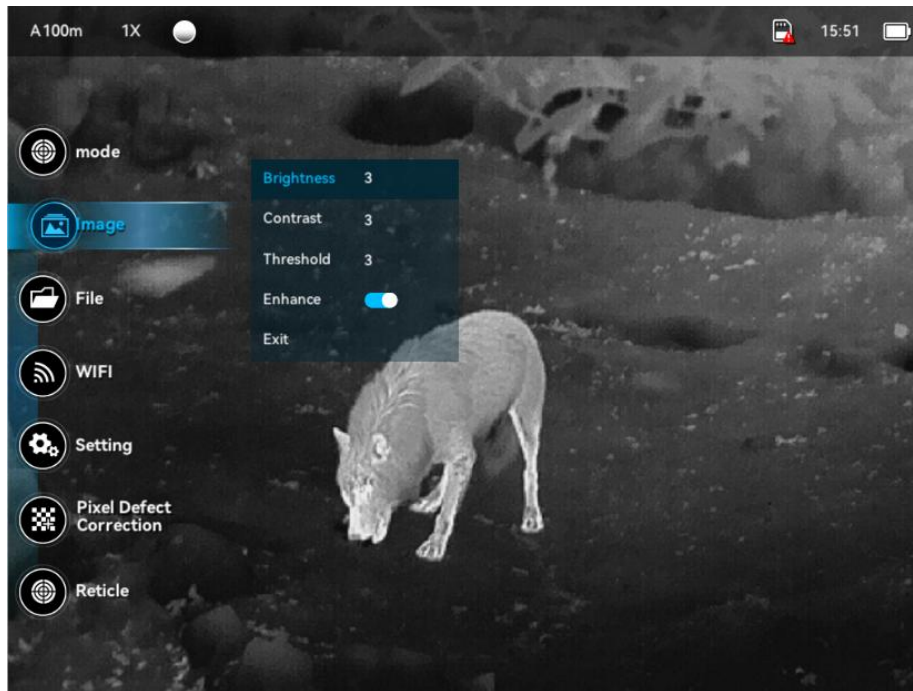


Figure 5 Image

3.3.3 File

a. After opening the file viewing screen, switch between the photo list and video list through the direction buttons. Short press the Menu button to open the list. Press and hold the Menu button to return to the previous level.

b. In the photo list, short press the Menu button to view a file in full screen, delete a file, and exit from the menu. Press and hold the direction buttons to switch between files.

c. In the video list, short press the Menu button to play or delete a file and exit from the menu. Press and hold the direction buttons to switch between files.

d. During video playback, short press the Menu button to pause/play the video; press and hold the Menu button to exit video playback; press and hold the direction buttons to fast forward/backward.

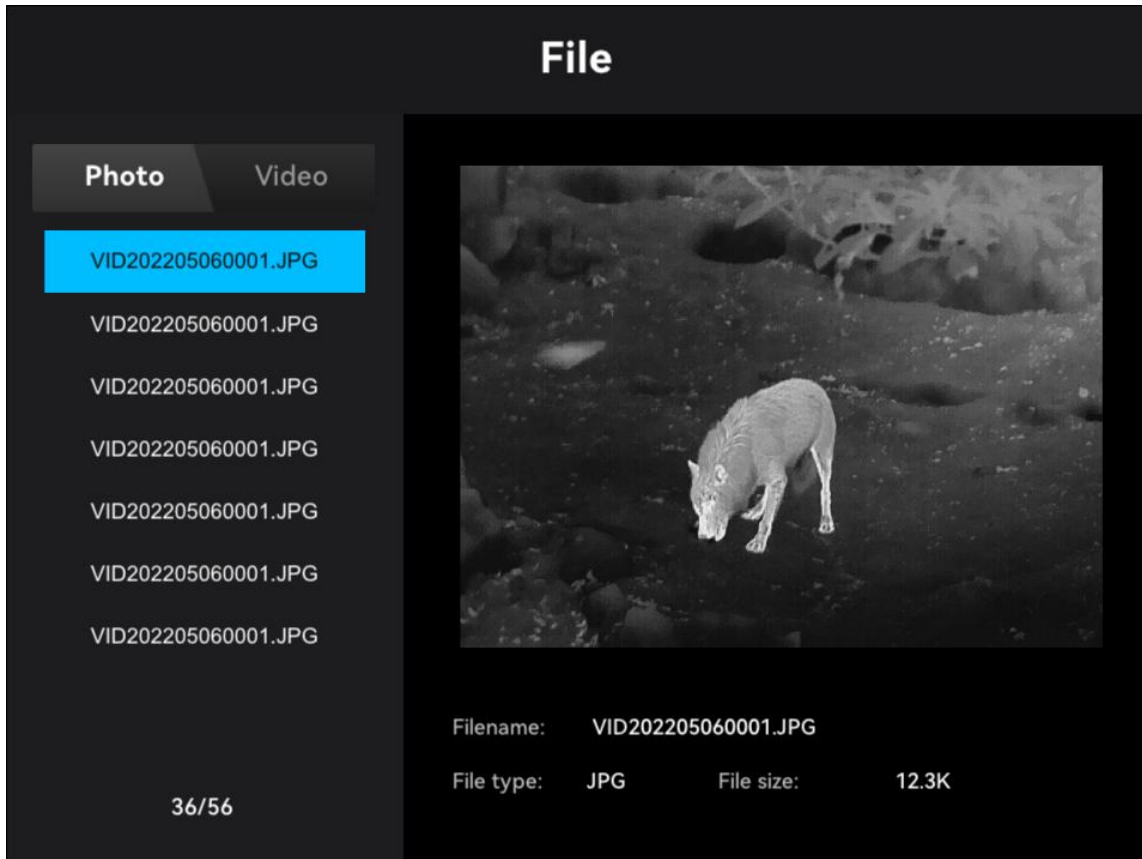


Figure 6 Photo List



Figure 7 Photo Viewing



Figure 8 Video Playback

3.3.4 WIFI

Turn on or off Wi-Fi. It is turned off by default.

Wi-Fi name: RIKANV_M+SN(for MRS)/RIKANV_H+SN(for HRS)

Wi-Fi password: 12345678

Mobile APP "IR Searcher" can be connected to the device for real-time image transmission, take photos or video at any time.

Android users please scan the QR code below to download. IOS users can search for "IR Searcher" directly in the App Store



Figure 9 Android user APP download QR code

3.3.5 Setting

3.3.5.1 PIP

Turn on or off PIP. It is turned off by default.

3.3.5.2 Video Out

It is used for image output. PAL is used.

3.3.5.3 Date&Time

Set the device's time and date, based on which photos and files are named.

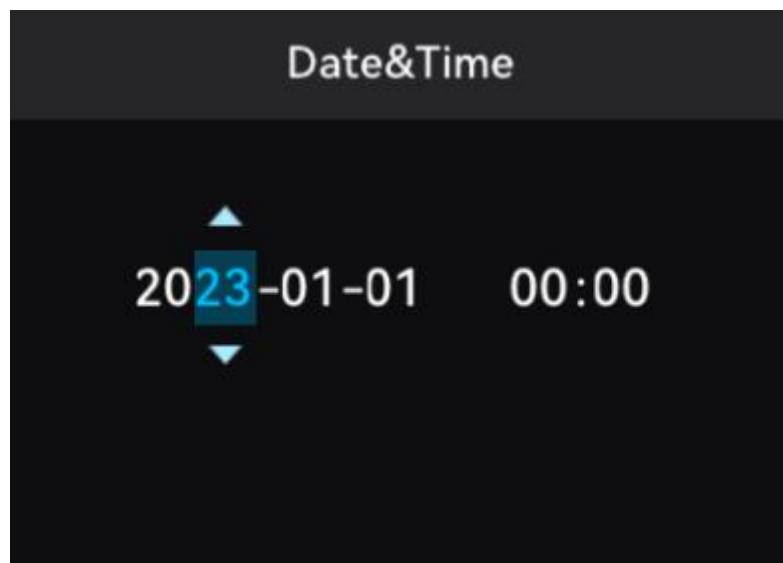


Figure 10 Time and Date Settings

3.3.5.4 Language

Switch between Russian and English. The default is Russian.

3.3.5.5 Memory space

You can check the remaining capacity of the SD card and perform formatting.

If you want to format it, do nothing else during the formatting process.

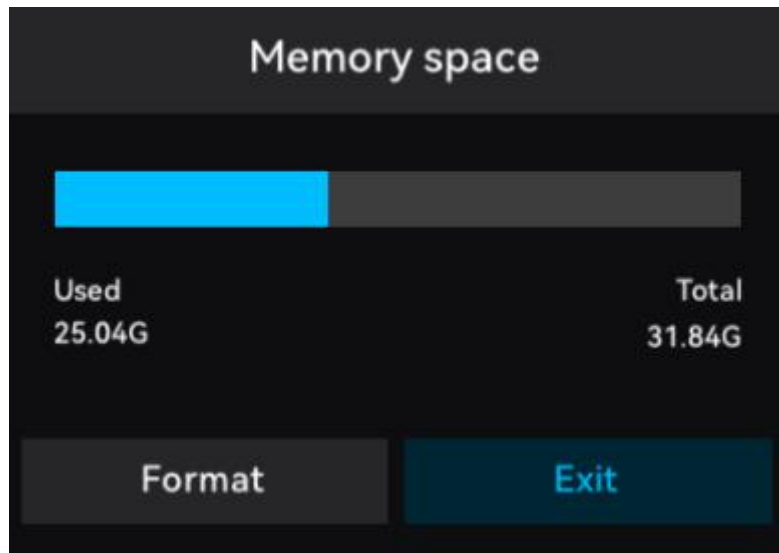


Figure 11 SD Card Status

3.3.5.6 USB

Default SD Card

SD Card: The files in the memory card can be viewed through a computer

USB1: developer maintenance port 1

USB2: developer maintenance port 2

3.3.5.7 Status

It displays the software version information of the device.

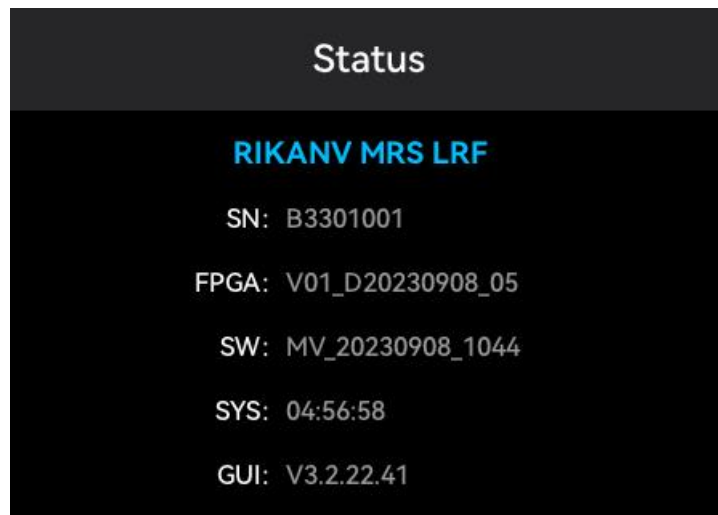


Figure 12 Device Status

3.3.5.8 Factory reset

After the factory reset, the following parameters are restored. The device restarts automatically after successful restoration:

- a. **Mode:** White-heat
- b. **Brightness:** 3; **Contrast:** 3; **Threshold:** 3 ; **Enhance:** off
- c. **Reticle Display:** off; **Type:** type 1; **Color:** white; **Bright:**3.
- d. Rangefinder(single), Wi-Fi, analog video, PIP, glare Protection: off

e.E-zoom:1X

3.3.5.9 Laser

Single/Continuous.Default:single.

3.3.5.10 Glare Protection

Turn on or off Glare Protection. It is turned off by default.

3.3.6 Pixel defect correction

An infrared scope may have pixel defects during use. This function can be used to correct the pixel defects. On the pixel defect correction screen, after the defective pixel reticle is turned on, the image returns to the 1× digital zoom state, and PIP, user reticle, and rangefinder are turned off. The operation steps are as follows:

Short press the direction buttons to move the defective pixel cursor, and press and hold the Menu button to change the movement orientation.

When the defective pixel cursor moves to the location of the pixel defect, short press the Menu button to perform corresponding actions.

Add: Correct the pixel defect.

Cancel: Cancel correction to prevent misoperation.

Save: When all pixel defects are processed, save and exit.

Reset: Cancel all corrections and restore pixel defects.

Auto:Can be scanned and corrected the pixel defect automatically.

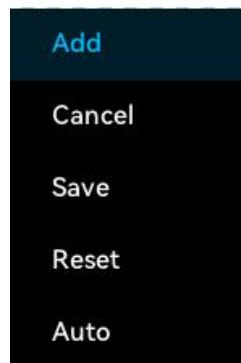


Figure 13 Defective Pixel Menu

3.3.7 Reticle

When using the device for the first time, press the rangefinder button + photo button + menu button at the same time to active the hidden functions about reticle and zeroing functions.

Type: types 1–4. Default: type 1.

Color: white, black, red, green. Default: white.

Bright:level 1-3.Default: level 3.

Groups: groups A, B, and C. Default: group A.

Zero: five zero positions. Switch between zero positions by shortcuts.



Figure 14 Reticle Menu

Reticle zero position adjustment method:

Distance: Select the distance value to be modified for distance adjustment. The adjustment range is 0–999m.

Movement: Enter the reticle movement menu to move the reticle, with a movement range of ± 100 pixels (MRS:1 pixel ≈ 0.13 mil/HRS:1 pixel ≈ 0.15 mil). To move it to the specified target position, you can use the image freezing function.



Figure 15 Zero Position Settings

4. Faults and Troubleshooting

The following table shows the common faults of the monocular during use. Please check and fix the faults according to the steps in Table 6. You need to check whether the faults are fixed after troubleshooting. Not all possible faults are listed in Table 6. If the unlisted faults occur or the faults cannot be fixed upon troubleshooting, please perform higher-level maintenance.

Table 6 Troubleshooting

No.	Faults	Test or Check	Troubleshooting
1	Unable to screw or open the cover of the battery holder	<p>(a) Check whether the battery is installed in the correct direction.</p> <p>(b) Check whether there are sundries or scraps around the knob of the battery cover.</p> <p>(c) Check whether the battery cover is damaged, worn, or deformed.</p> <p>(d) Check whether the battery holder is damaged or deformed.</p>	<p>(a) Reinstall the battery.</p> <p>(b) Clean the threads of the battery cover and battery holder.</p> <p>(c) Perform the higher level maintenance.</p> <p>(d) Perform the higher level maintenance.</p>
2	Unable to power on	<p>(a) Check whether the battery is installed, whether its direction is correct, and whether its power is sufficient.</p> <p>(b) Check whether the On/Off button can be pressed normally.</p>	<p>(a) Replace the old battery with a new one and install it correctly according to the instructions in Chapter 2.</p> <p>(b) Perform the higher level maintenance.</p>
3	Unable to display the image	<p>(a) Check whether the lens hood is removed and whether the focal length is appropriate.</p> <p>(b) Check whether the objective lens is blocked during operation.</p> <p>(c) Check whether the lens is damaged.</p> <p>(d) Perform manual shutter correction.</p>	<p>(a) Remove the lens hood and adjust the objective lens focusing knob.</p> <p>(b) Remove the barriers.</p> <p>(c) Perform the higher level maintenance.</p> <p>(d) Perform the higher level maintenance if the fault persists.</p>
4	Abnormal rangefinding value	<p>Check whether there is any obstruction in front of the rangefinder.</p> <p>Check whether the glass surface is clean.</p>	<p>Remove obstructions.</p> <p>Clean the glass surface with a clean cloth.</p>

5. Legal and Regulatory Information

5.1 WEEE:



The WEEE symbol on products and/or accompanying documents indicates that used electrical and electronic products must not be mixed with ordinary household waste. For proper treatment, recovery and recycling, take these products to the appropriate collection points where they will be accepted without charge. In some countries, it may also be possible to return these products to your local retailer when you purchase a corresponding new product. The proper disposal of this product serves to protect the environment and prevents possible harmful effects on human beings and their surroundings, which may arise as a result of incorrect handling of waste.

More detailed information on your nearest collection point is available from your local authority. In accordance with state legislation, penalties may be imposed for the improper disposal of this type of waste.

5.2 Wireless

WLAN: 2.4GHz

Wireless transmitter module power < 20dBm (only for EU)

5.3 CE



Frequency range of WLAN radio module: 2400-2483.5 MHz

IRay Technology Co., Ltd. declares that this product [RIKANV MRS LRF] is in compliance with Directive 2014/53/EU and 2011/65/EU. This device may be operated in all member states of the EU.

5.4 Laser Warning

Caution: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.



5.5 FCC

FCC ID: 2AYGT-TRTX

1. 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,
- (2) this device must accept any interference received, including interference that may cause undesired operation.

2. Any 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 A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

5.6 Body-worn Operation

To comply with RF exposure requirements, a minimum separation distance of 0 mm must be maintained from the head and extremity to this equipment, including the antenna.