PFN+ series

Multipurpose night-vision monocular user guide

Publisher’s note

The user manual details the multi-purpose use method and matters needing attention of multi-purpose night vision monocular, to ensure the personal safety of operators, as well as to the utility of monocular goggles reasonable and effective maintenance and use, at the same time in order to ensure the normal use of multi-purpose night vision monocular lifetime, the company requires the user to before using multi-purpose night vision monocular,The following code of practice must be carefully read and strictly followed.

Prior to the publication of the new user manual, the use and maintenance of the multi-purpose night vision monocular shall be subject to this reference. Other materials are for reference only.If any problem is found in use, please give feedback in time for study and modification.

The contents of this User's Manual are only for customers' reference and shall not be used as the criteria for judging product acceptance.

Contents

Ⅰ Overview

Multipurpose night-vision monocular is a handheld, helmet, clip-on, direct aim multi-purpose equipment, which is used for individual reconnaissance. Its multi-purpose use mode is shown in Figure 1.The night vision instrument is light in weight, small in size, easy to carry, and has the characteristics of long working time and good concealment.

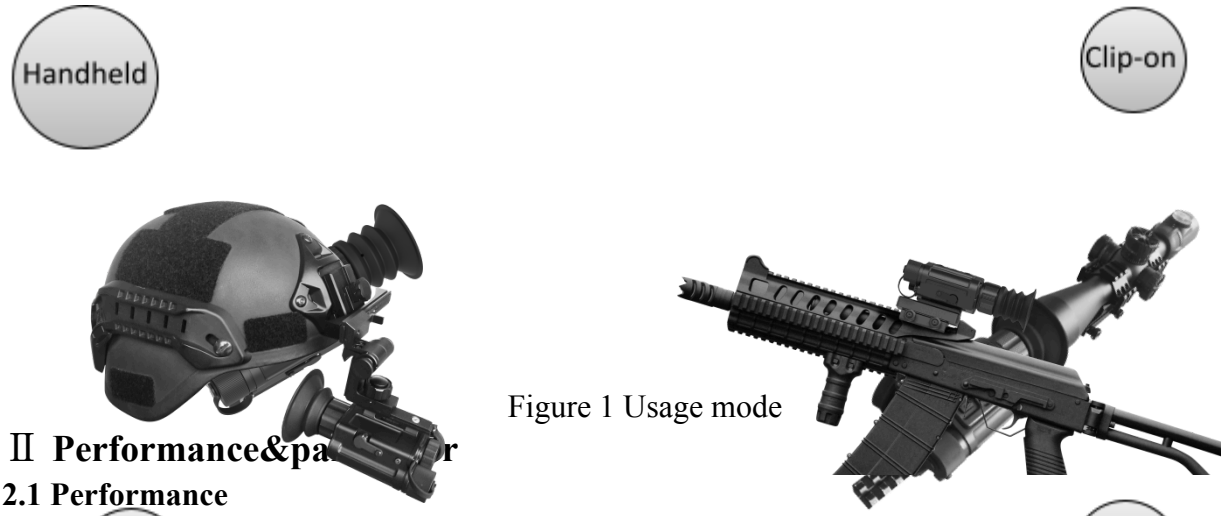

Figure 1 Usage mode

Ⅱ Performance&pa r

2.1 Performance

1) High performance vanadium oxide detectors provide clear image ght and in ha ther conditions;

2) Battery power detection;

3) 0.39inch OLED display, Excellent visual effect;

4) E-zoom;

5) Wi-Fi program update, transfer files;

6) Record storage function;

7) The vibration absorbing bracket is connected to absorb shock vibration, and the image is more stable;

8) Protection grade:IP67。

2.2 Parameter

Table 1 Technical parameters

	PFN384+	PFN640+
Detector	384×288/17μm	640×512/12μm
Lens	f25mm/F1.0	
Eyepiece	14^x	
Human recognition	420m	600m
Vehicle recognition	750m	1070m
NETD	≤40mK	
Frame rate	50Hz	
FOV	14.6°×10.9°	17.2°×13.7°
Exit pupil distance	15mm-35mm	
Diopter	-4～4	
Polarity	White、Black、Red、Color	
Mode	Handheld/Weapon mount/Helmet/Clip on	
E-zoom	1X/2X/4X	
Battery life	≥4h	
Battery type	1×18650/18700	
Display	1024×768,0.39”	
Storage	64G	
Interface	Picatinny rail, Helmet mount	
Weight	≤360g	
Dimensions（mm）	115×65×48	
IP rating	IP67	
Operating temperature	-40℃~60℃	
Storage temperature	-50℃~70℃	

Ⅲ Accessory

Table 2 Accessory

SN	Name	Number	Additional
1	Multipurpose night-vision monocuclar	1	
2	Charger	1	
3	Video output cable	1	
4	Eyepiece cup(Helmet)	1	
5	Eyepiece cup(Clip on)	1	
6	Vibration stents	1	
7	Soldier bag	1	
8	Cleanning cloth	1	
9	Helmet adaptor	1	
10	Allen Wrench 2.5	1	
11	Allen Wrench 3.0	1	
12	M4×6,hexagon socket head cap screws	2	
13	M4×8,hexagon countersunk head screws	2	

Ⅳ Operation

4.1 Warning

- Do not direct the multipurpose night vision monocular into the sun, carbon dioxide lasers, welding machines and other high-intensity radiation sources;
- The time interval between two switching machines should be greater than 20 seconds;
- multipurpose night vision monocular uses precise optical instruments and electronic equipment sensitive to static electricity. Please do not throw, knock or vibrate the multi-purpose monocular night vision apparatus and its accessories, to avoid deformation of structural parts or installation size, etc.
- Do not disassemble the multi-purpose monocular night vision instrument by yourself, otherwise it will affect the seal of the whole machine. If there is a fault, please contact the factory in time, otherwise it will not be guaranteed;
- When not in use and in transit, remove the battery and place the MNIV in a protective equipment box;
- When the battery is too low in the process of use, please replace the battery in time to avoid damage to the battery caused by over-discharge;
- Excessive use conditions specified in this manual may cause damage to the multi-purpose monocular night vision apparatus.

4.2 Attention

- When you need to clean the non-optical surface of the multipurpose night vision monocular, do not use chemical solvents, diluents and other scrubbing, you can use a clean, soft, dry flannelette to wipe the shell;
- multipurpose night vision monocular lens is coated with an anti-reflection film. It should be cleaned only when it is visibly soiled. Frequent wiping of the lens may cause wear and tear of the lens coating.Please avoid touching the lens surface. The acid on the skin left by fingerprints can damage the coating and lens surface.(Only use a dedicated lens cloth to clean the lens);
- If you do not observe the target for a long time after the observation is finished or the machine is turned on, please turn off the machine in time to extend the effective use time of the multi-purpose monocular night vision instrument.

4.3 Prepare

4.3.1 Unpark

Before using for the first time, please be sure to open the box to check whether the set is complete.

- Open the equipment box and check the uniformity according to the configuration table of multipurpose night vision monocular (Table 2);
- Check whether the lens, body, eyepiece, keys, dumper components and vibration absorber bracket components of the multi-purpose monocular night vision instrument are obviously damaged;
- Check the infrared lens and eyepiece for smudge. If there are obvious stains, wipe the infrared lens with lens cloth to ensure the lens is clean.

4.3.2 Install battery

- When installing the battery, please strictly follow the instructions on the label on the inner wall of the battery compartment and do not reverse install.
- Please be sure that the multipurpose night vision monocular is turned off before dismounting the battery. Otherwise, it will cause serious damage to the equipment

if the battery hatch is opened and the battery is removed under the boot state;Before using the multipurpose night vision monocular for the first time, be sure that the battery is charged;

- Do not disassemble, throw, or make the battery short circuit in case of accidents;
- If the battery is used, charged and stored for a long time, it should be stopped immediately if overheating, discoloration, deformation, odor or other abnormal phenomena are found.

Note: The product cannot be shut down when using USB external power supply.

4.3.3 Firmware update

If the firmware to be upgraded has been uploaded to the device through WiFi using the supporting software, the interface will prompt whether to upgrade the firmware when starting up, as shown in Figure 2. Users can choose whether to upgrade or not according to their needs.

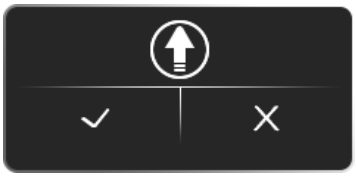

Figure 2 Upgrade prompt

4.3.4 USB connection

Connect to USB. You can choose to use USB as a mobile storage device or as a serial port, as shown in Figure 3.

Figure 3 USB connect

4.4 Keys function

The key diagram and function description of the multipurpose night vision monocular are shown in Table 3.

Table 3 Key principle

Key	Current	Short press	Long press
Power	Off	/	On
	Main Interface	E-zoom	Off
	Menu	Switch options	/
	Reticle/Blind pixel correction	Move 1 pixel in the positive direction	Move 10 pixels in the positive direction
Menu	Main Interface	Enter menu	Switch mode
	Menu	Select	Return
Photo	Main Interface	Photo	On/Off Record
	Menu	Switch options	/
	Reticle/Blind pixel correction	Move 1 pixel in the positive direction	Move 10 pixels in the positive direction
+	Main Interface	On/Off Standby	Adjust laser point
+	Main Interface	Shutter correction	Background correction
+	Main Interface	/	Move 10 pixel in the negative direction

Note: When performing image background correction, make sure lens cover is closed.
Laser point is optional, the position of laser point has been adjusted before leave factory.

4.5 On-Off

Long press“”button 3 seconds turn on, As shown in Figure 4, enter the observation interface as shown in Figure 6.Long press the power button in the power-on state to select shutdown according to the pop-up prompt, as shown in Figure 5.

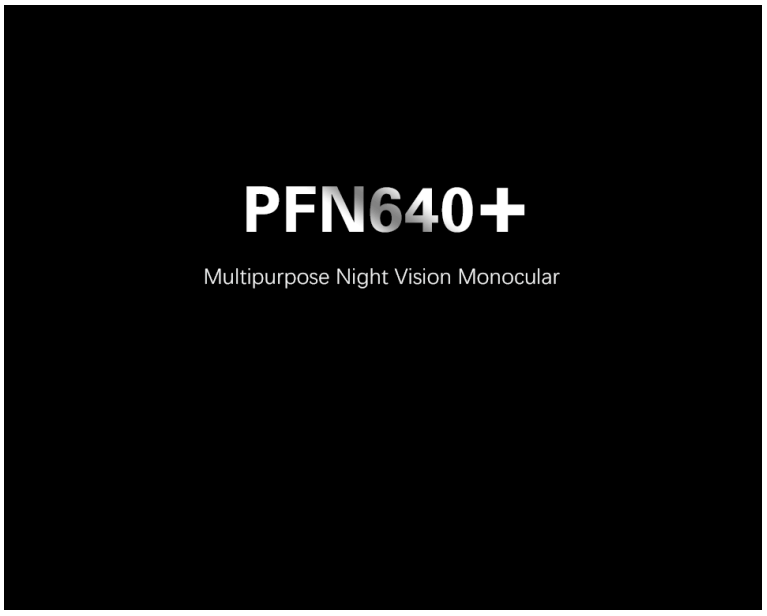

Figure 4 Boot screen

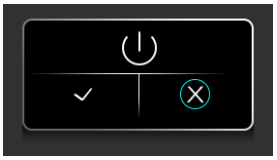

Figure 5 Shutdown prompt

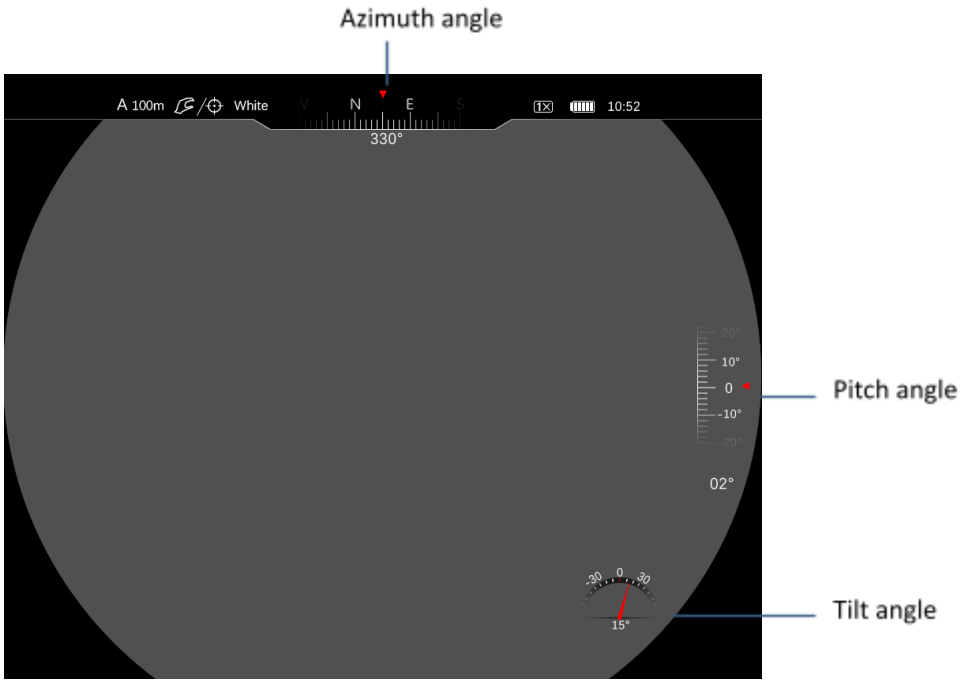

Figure 6 Obserbation interface

4.6 Diopter

The product is equipped with -4°～+4°visual adjustment.When the interface icon or text on the screen is blurred, it means that the eyepiece view does not match the user's view. Please adjust the eyepiece.

After startup, slowly turn the eyepiece viewability adjustment ring until the icon in the picture is clearly visible. Then the eyepiece has been adapted to the user's eye viewability and the adjustment is completed.

4.7 Infrared lens focus

Focus by rotating the objective adjusting ring.

4.8 Photo、Record

In the observation state, press "📷" to take a photo, and icon will appear on the left side of the screen. After the photo is taken, the icon will disappear;

Under the observation state, long press "📷" to record, and long press again to end the recording. When recording, a recording icon will appear on the left side of the screen and the recording will be timed;

All files will be saved to the built-in memory card.

Note: a) Photographic operation can still be carried out during the video recording.

b) The maximum length of a single video file is 5 minutes. When the recording time exceeds 5 minutes, it will be automatically recorded into the next new file.

4.9 Wi-Fi

Select the device from the list of Wi-Fi networks. The device will appear in the list as “INFRARED_XXXX”, where XXXX is four alphanumeric characters (numbers and letters).

Enter the Wi-Fi password. The default password is 123456789.

When Wi-Fi is successfully connected, the user may manipulate the device via the InfiRay Outdoor App.

Ⅴ Menu operation

Short press"☰" to enter the menu, and repeatedly press"⏻/📷" to switch the menu of "Working mode", "E-zoom", "Image polarity", "Brightness", "Contrast", "Screen Brightness", "File management","Reticle setting" and "Advanced settings" as shown in Figure 7.

Figure 7 menu

5.1 Mode

Select the option of working mode, short press the "⏻/📷" button to switch "Handheld mode", "Helmet mode" and "Clip-On mode" successively. The current mode icon is located in the upper left corner of the display screen, as shown in Figure 8.(Among them, the handheld mode is the factory default mode, and the mode of the last shutdown setting shall be maintained after startup.)

Figure 8 Work mode

By default, the length and width of the screen can be reduced to 70% in helmet mode and Clip on.

5.2 E-zoom

The product supports 1-4X image amplification to increase visual magnification.

Select the electronic doubling option, short press "☰" to confirm this option, short

press"⏻/📷" button to realize 1×, 2×, 4× electronic amplification switch.(where 1 times is the default multiple of boot).

5.3 Image of polarity

Select the image polarity option, short press "☰" to confirm this option, short press"⏻/📷" button to realize the four polarity cycle switch of White, Black, Red and false Color.(White hot polarity is the default polarity)

5.4 Image brightness

Select the image brightness option, short press "☰" to confirm this option, short press"⏻/📷" button to adjust the image brightness, the scout image brightness is 0-9 level brightness switch.(Level 5 is the factory default brightness, and the brightness set in the last shutdown should be maintained after the machine is turned on.)

5.5 Contrast

Select the contrast option, short press "☰" to confirm this option, short press"⏻/📷" button to adjust the contrast, the scout contrast is 0-9 grade contrast toggle.(Among them, 5 is the factory default contrast, and the contrast set in the last shutdown should be maintained after the machine is turned on).

5.6 Screen brightness

Select the screen brightness option, short press "☰" to confirm this option, short press"⏻/📷" button to adjust the screen brightness, the scout screen brightness is 0-9 level brightness switch.(Level 5 is the factory default brightness, and the brightness set in the last shutdown should be maintained after the machine is turned on.)

5.7 File management

After you enter file management, it is shown in Figure 9.

The file management interface consists of four areas: file list, file thumbnail, memory situation and operation menu.

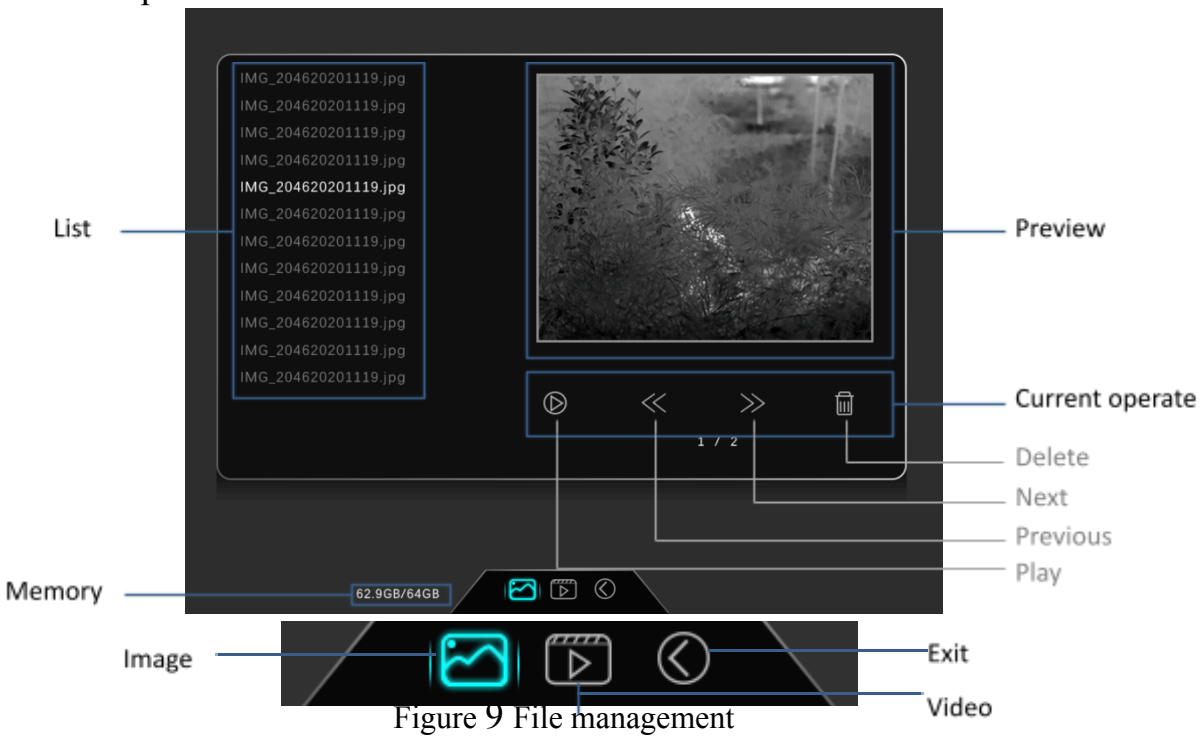

Figure 9 File management

Figure 10 Image preview

Figure 11 Video preview

5.8 Reticle settings

Under the Differentiation Settings menu, there are four function Settings to switch: "Reticle Style", "Reticle Brightness", "Reticle Color" , "Zeroing Profile" and "Position", as shown in Fig. 12.(After power on, keep the partition style, partition brightness, partition color and partition position set when last power off.)

Figure 12 reticle settings

5.8.1 Reticle style

The product has 7 types of partition styles for selection, as shown in Figure 13.

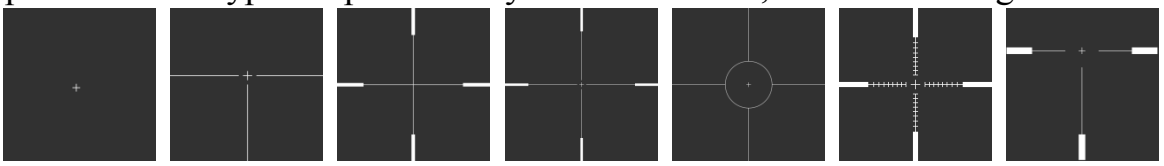

Figure 13 7 Reticle styles

5.8.2 Brightness

The product is equipped with 0-6, a total of 7 kinds of reticle brightness adjustable position.

5.8.3 Color

The product is equipped with White, Black, Red and Green, a total of 4 kinds of reticle colors can be adjusted.

5.8.4 Zeroing Distance

The zeroing distance is 100, 200, 300 optional by default.

5.8.5 Reticle position adjustment

The partition is adjusted in X direction and adjusted in Y direction.

Before entering the X/Y direction selection, long press + to freeze the screen. After entering the partition adjustment interface, select "X" for movement in the X direction and "Y" for movement in the Y direction. Click and click to move the partition in the corresponding direction by 1 pixel, as shown in Fig.14.

Figure 14 Position adjustment

5.9 Advance settings

In the observation state, long press "" to enter advanced Settings, as shown in Figure 15.

Short press "/" button to switch "Wi-Fi", "Video output", "NUC mode", "Unit", "Zero profile", "Compass On/Off", "Compass calibration", "Remove blindness", "Formatting", "Time settings", "Restore factory settings","Auto hide","Color temperature" and "Info", in turn.Short press "" to OK.Long press "" to exit advanced Settings.

Figure 15 Advance menu

5.9.1 Wi-Fi

Short press "" to enter WiFi settings.When it is turned on, there is an icon "" on the left side of the screen. When it is turned on, the Settings of the last shutdown

should be maintained. The factory default state is off;

5.9.2 Video output

Short press "" to enter video output settings.When it is turned on, there is an icon "" on the left side of the screen. When it is turned on, the Settings of the last shutdown should be maintained. The factory default state is off;

5.9.3 NUC mode

Short press "" to enter NUC mode. Short press"/" button to change the non-uniformity correction (NUC) mode: automatic (A) or manual (M). The default is automatic.

5.9.4 Unit

Short press "" to enter unit select. Short press"/" button to change m or yd. The default is m.

5.9.5 Zero distance

Short press "" to enter zero distance. Short press"/" button to change 100, 200 or 300 The default is 100.

5.9.6 Compass On/Off

Short press "" to enter compass On/Off settings.Short press"/" button to change compass On or Off. The default is On.

5.9.7 Compass calibration

This operation is to calibrate the electronic compass. When the location of use is changed or the surrounding magnetic field environment changes greatly, this operation is needed to ensure the accuracy of the electronic compass.

Enter the compass calibration interface, and rotate the product more than 360° along the arrows in X, Y and Z directions according to the icon on the screen to calibrate the compass, as shown in Figure 16.

Automatically exit the compass calibration interface after 15 seconds (the button cannot be operated to exit).

Note: a) The rotation direction is not limited b) The rotation sequence of X, Y and Z is not

limited, but the operation must be completed in all three directions c) The rotation axis is centered on the product itself d) The rotation range must be greater than 360°

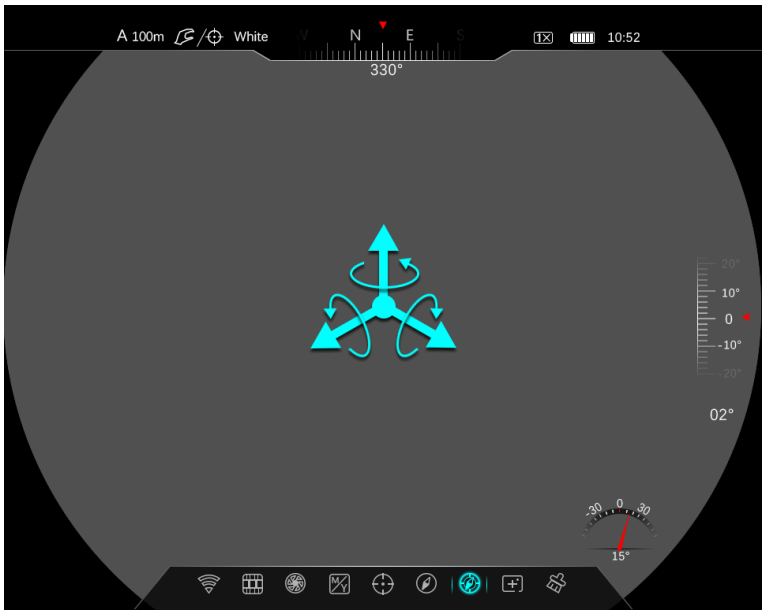

Figure 16 Compass calibration

5.9.8 Remove blindness

If the night vision monocular does not conform to the scene of the bright spots or dark spots (collectively referred to as blind elements), it can be operated to eliminate the blind elements.

Under the option of remove blindness, press "☰" to enter Blind Element Correction. Under the option of remove blindness, move the cursor by long press (move 10 pixels)/short press (move 1 pixel)"⏻/📷" key. After the cursor moves to the position of blind pixel, select the option of "Add" to confirm blind pixel typing, select the option of "CXL" to cancel blind element typing.Finally, select "√" to save and exit or select "×" to cancel the save and exit to end this operation.

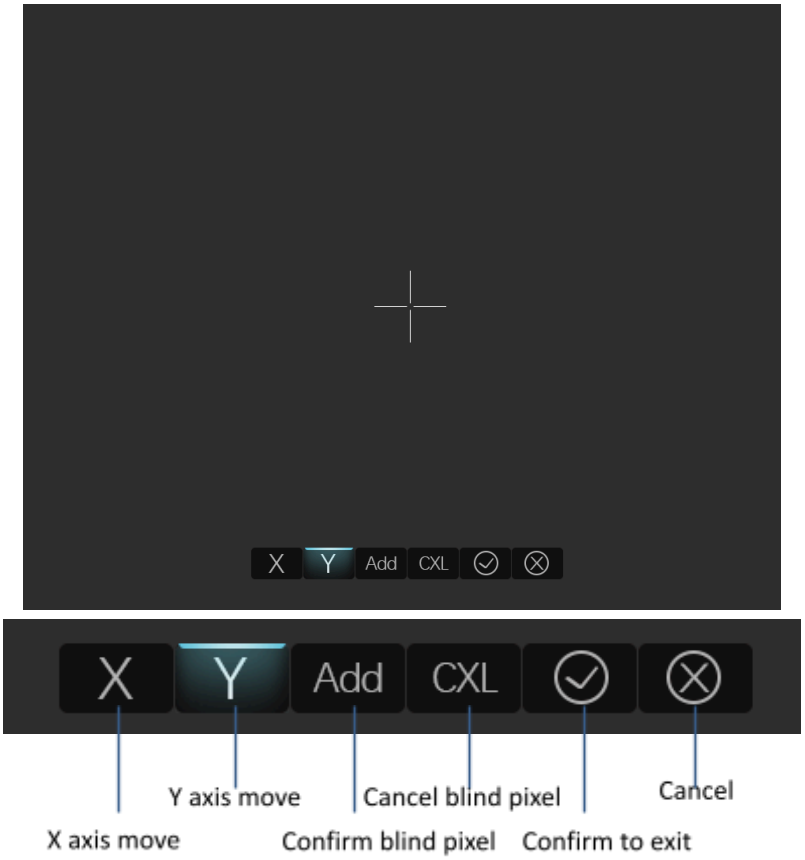

Figure 17 Remove blindness

5.9.9 Format

This function only formats the memory card.

After entering the formatting menu, a prompt box of whether to format will pop up, as shown in Fig. 18. Short press "⏻/📷" to select whether to format the memory card.

Note: Formatting operation is not reversible, please be careful.Do not perform other operations during formatting.

Figure 18 Format prompt box

5.9.10 Time setting

This action can be used to set the display time of the device.

Enter the time setting interface, select the contents to be set according to the contents in the pop-up window, as shown in Fig. 19, and press "⏻/📷" to adjust the value. After setting, you can choose to save and exit or cancel the exit.

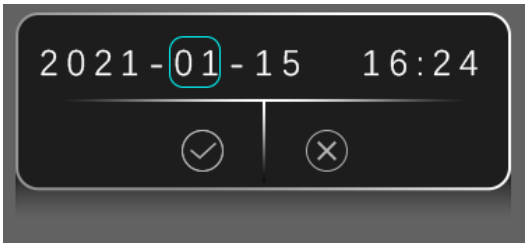

Figure 19 Time setting

5.9.11 Restore factory settings

When the factory default option is restored, press "☰" and a pop-up window for next operation appears on the interface, as shown in Fig. 20. The user can select to confirm or cancel the operation according to the prompts.

Figure 20 Restore factory settings

5.9.12 Auto-Hide

Short press "☰" to enter auto-hide.Short press"⏻/📷" button to change On or Off. The default is On.

5.9.13 Color Temperature

Short press "☰" to enter color temperature. Short press"⏻/📷" button to change cold or warm. The default is cold.

5.9.14 Info

Short press "☰" to enter info. Screen will show device information.

Ⅵ **Maintenance**

- After the observation is completed or the target is not observed for a long time after starting the machine, the machine should be shut down in time to extend the effective use time of the product.
- lens is an important optical component. During installation and use, avoid oil stains and various chemical substances to contaminate and damage the lens surface. After use, please cover the lens cap.
- When the product is not in use and in transit, please remove the battery and place the product in the equipment case.
- When long-term storage or not working, it should be stored in a cool and dry environment as far as possible.
- Do not use chemical solvents, diluents, etc. to scrub the machine case, you can use a clean, soft, dry flannelette to wipe.
- The lens should only be cleaned when it is obviously soiled. Please avoid touching the surface of the lens. The acid on the skin left by fingerprints will damage the coating and the surface of the lens.
- If not used for a long time, it should be electrified to check and calibrate once every six months.
-

Ⅶ **Trouble removal**

If there is a problem with the equipment, check and fix it according to the suggestions in the list.If the problem is not mentioned in the list, or cannot be repaired by yourself, please contact the supplier for repair.

Fault	Reason	Solution
Monocular can’t open.	Low power	Charge
External power no available.	USB line damage	Change another use line
The image is not clear, vertical lines appear, or the background is uneven.	Need calibration	Do background correction or shutter correction in the menu
Image too dark	Brightness too low	Adjustment brightness in the menu
Poor image quality or reduced detection range .	Operating in the harsh environment	
Can’t connect with phone or PC.	Wi-Fi code is wrong	Press the right code
	Disruptive by too much wifi net-work	Move the device far away from the area
Wi-Fi signal lost or interrupted .	Out of wifi coverage or there have obstruction	Reset the device where have wifi signal
When used at low temperatures, the image quality of the environment is worse than that at positive temperatures.	Under the temperature condition above zero, the observed object (environment and background) will heat up differently due to different thermal conductivity, resulting in high temperature contrast, so the image quality will be higher. At low temperatures, the object being observed (the background) usually cools down to roughly the same temperature because the temperature contrast is greatly reduced and the image quality (detail) is poor, which is a feature of thermal imaging equipment.	