

# Observation and aiming multi-function thermal imager

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## User Guide



Before using the machine, please read this manual carefully and keep it in a safe place for future reference.

# Catalogue

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## Overview

Thank you for purchasing our viewer type multi-functional thermal imager (with laser ranging function).

This product adopts vanadium oxide uncooled focal plane detector and real-time digital image processing circuit. It can work continuously during day and night, and also has the ability to penetrate particles such as fog, smoke and dust, and can complete search, reconnaissance, aiming and shooting actions simultaneously, which is your ideal assistant to complete anti-terrorism, law enforcement and hunting tasks.

## Features

- Advanced FPGA real-time image processing technology, ultra-low power consumption
- 300,000 pixels high resolution, built-in storage can record 400,000 photos or 40 hours of video recording.
- Non-baffle design, 50Hz real-time imaging display, fast moving without smear.
- Digital video image enhancement algorithm (DVIE), wide dynamic (HDR) image processing.
- Professional telephoto germanium lens, 1x, 2x, 4x digital zoom
- White heat/black heat/red heat/brown/iron red/rainbow colors are available.
- Standardized interface, with crosshair, automatic adjustment of dividing line color.

- 10 brightness controls and 4 contrast options.
- High definition OLED eyepiece system
- Manual or automatic image enhancement mode, which can find the target in extremely harsh environment.
- Very low power consumption, can work continuously for a long time.
- Convenient and easy-to-operate scrolling knob menu
- The system is reliable and has the ability of anti-falling and earthquake resistance.
- Standard 20mm leather rail fixture with laser red dot indication
- IP67 is waterproof and suitable for all-weather outdoor use.
- Equipped with high-precision laser ranging function

# User's Guide

## 一. Part name



1. Lens / lens focus ring
2. Digital menu knob
3. Laser red dot emission window
4. 3.5mm expansion socket, video/serial/ranging
5. Power switch, laser indication switch (on state, click to switch)
6. TYPE-C expansion socket, media/external charging, power supply
7. Rails for helmets
8. Rails for gun sights<sup>1</sup>
9. Battery compartment cover set screws

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<sup>1</sup> 7 and 8 helmet rail and gun sight rail, the user can exchange the position according to the use of habit

10. Eyepiece/diopter adjustment
11. Rubber eye protector goggles
12. Headwear Adaptador

## 二. Key functions and definitions



**Power switch:** Long press for 3 seconds to turn on the device, short press to turn on the laser red dot, long press for 3 seconds to turn off the device



## Menu knob:

### 1. **Shortcut function:** counterclockwise rotation digital zoom 1X~2X~4X

When media function is turned off: turn clockwise to switch the pseudo-color mode

When the media function is turned on: clockwise slow rotation to take pictures / clockwise fast rotation video<sup>2</sup>

Long press the knob to work once (**Optimize images once without blocking version**)

Short press the knob to enter the menu (see Table 1 on the next page for details)

### 2. **Adjustment of knob menu item: See Table 1 for the definition of knob menu function.**

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<sup>2</sup> The multimedia icon on the OLED screen flashes in the video state

tableoneKnob menu function list<sup>3</sup>

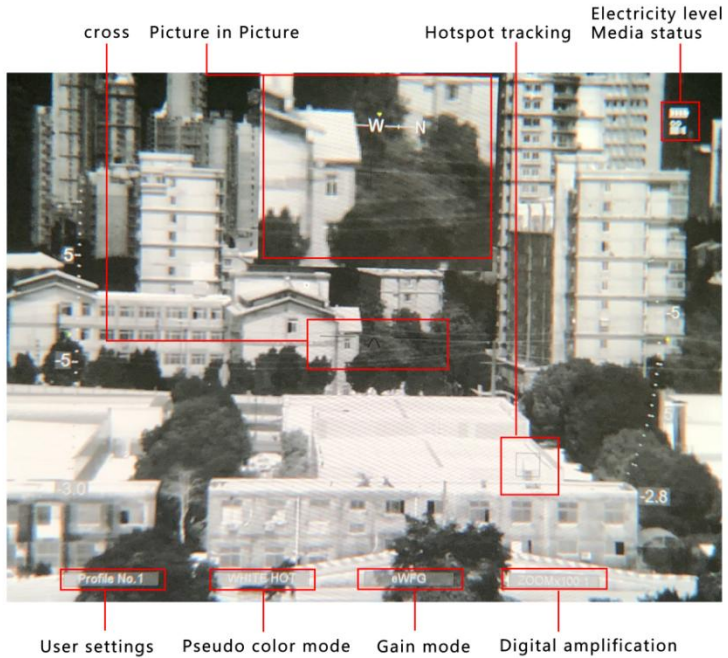
Knob key	Key definition	functional description
<p style="text-align: center;">&lt;</p> <p><b>Sinistral rotation</b></p>	<p><b>Options</b>/+Photo /Video pseudo color mode</p>	<p><b>LEFT&lt;Option+:</b></p> <p>See the <b>menu/activation</b> function first, after entering the menu mode, rotate left &lt;<b>option+</b>, menu items switch in order: Profile, Image, Luminance, Reticle, Ballistic, LRF, WIFI, Image Opt, Default , Other, Exit Menu, Bad point, DMC, Update; if you need to adjust the menu item settings, short press the knob to <b>activate</b> The menu item adjustment mode, rotate one frame &lt; option + corresponding menu item to increase one unit value. Restore the shortcut function after exiting the menu.</p> <p><b>Shortcut function:</b></p> <p style="padding-left: 40px;">Clockwise rotation to switch the pseudo-color mode when the media function is off;</p> <p style="padding-left: 40px;">Clockwise slow rotation for photo/clockwise fast rotation for video when media function is on;</p>

<sup>3</sup> Menu functions will be changed without notice.

<p><b>Short press</b></p> <p><b>Long press</b></p>	<p><b>Menu/Activation</b></p> <p>n</p> <p>Manual gear</p> <p>shift</p>	<p><b>Menu:</b></p> <p>In the initial state, short press to enter the menu, at this time the left knob &lt; for option + function, the right knob &gt; for option - function; after exiting the menu, knob &lt; to restore the photo/video or pseudo-color mode function, knob &gt; to restore the image zoom function;</p> <p><b>Activate:</b></p> <p>After entering the menu, turn right &gt; or left &lt; to browse the menu, switch to the menu item to be adjusted (<b>white on black</b>), short press the knob to <b>activate the</b> adjustment mode of the menu item (<b>black on white</b>), and then press the knob once to exit the adjustment mode of the menu item;</p> <p><b>Shortcut function:</b></p> <p>Press the knob for a long time in the initial state, and the baffle works once.</p>
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<p style="text-align: center;">&gt; <b>Right rotation</b></p>	<p style="text-align: center;"><b>Options/-</b> Digital amplification</p>	<p><b>Right &gt; options:</b></p> <p>See the <b>menu/activation</b> function first, after entering the menu mode, rotate right &gt; <b>option-</b> , menu items switch in order: Update, DMC, Bad point, Exit Menu, Other, Default , Image Opt, WIFI, LRF, Ballistic, Reticle, Luminance, Image, Profile; If you need to adjust the menu item settings, press the knob briefly to activate the menu item adjustment mode, and rotate one box &gt; Options &gt;-decrease the corresponding menu item by one unit value.</p> <p>Restore shortcut function after exiting the menu.</p> <p><b>Shortcut function:</b></p> <p>Digital image enlargement: 1x~2x~4x cycle</p>
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### 三. Screen information



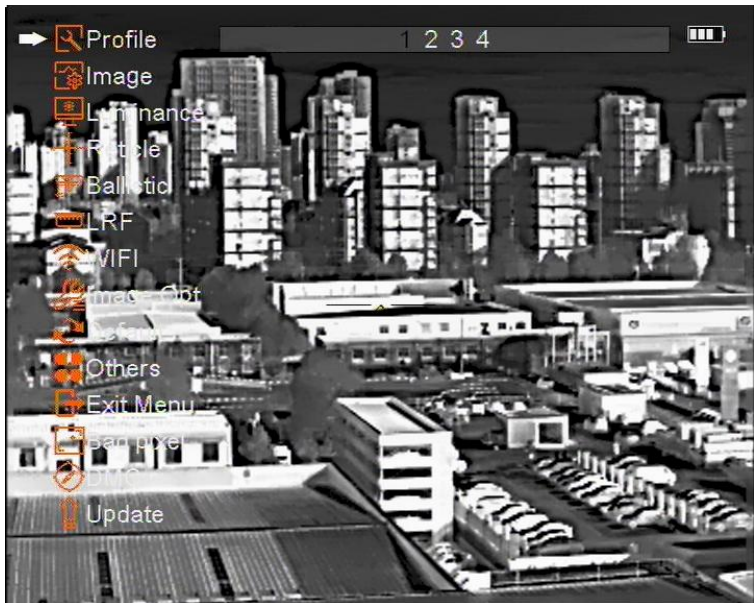
1. The battery will be protected and shut down when the power indicator is completely black, please replace the battery or use external power supply in time.
2. The media logo is on in white, blinks in black and white alternately for recording, and is on standby in gray.
3. Due to different equipment guide errors, the crosshairs may deviate from

the center of the screen after calibration. The digital zoom is enlarged with the cross as the center, and the calibration coordinates will not deviate.

4. The high-temperature tracking feature tracks hot objects instead of tracking animals or humans in summer or warmer temperatures.

#### 四. Menu description

##### Menu items



**Profile :** You can select/save 1/2/3/4 modes.

**Image:** You can select Zoom/AGG/Brightness/sharpness/Denoise/Color/Contrast.

**Luminance:** There are 1-10 brightness options available.

**Reticle:** You can enter to set the differentiated color/style/Position.

**Ballistic :**Short press to enter the menu, which can be set Switch/Bullet/Bullet BC/Velocity/Temperature/Sight Height/Zero Range/Number/Reset.

**LRF :**Short press to enter the menu, which can be set off/on/on+as required/Position .

**W I F I :** WiFi on/off

**Image Opt:** Long press the menu key to enter the execution optimization and save, then exit, restore the default, give up and exit.

**Default:** Restore to factory settings

**Others:** Info/PIP/HOT track/Media/Flip

**Exit menu:** Select to save the configuration or exit without saving after modifying the menu parameters.

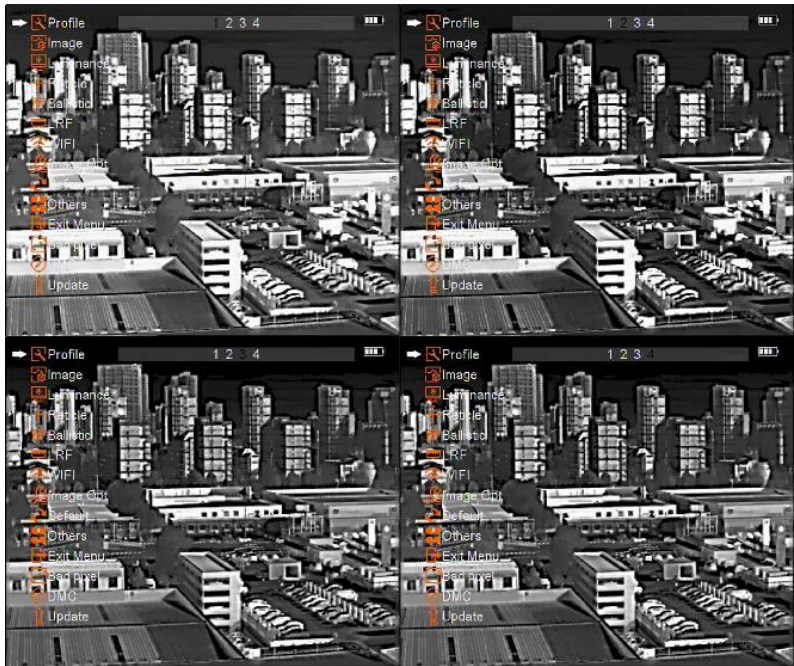
**Bad point:** Press and hold the menu key to enter the bad dot elimination mode (for details on eliminating invalid pixels on the screen, see Section 5.2 for examples of bad dot elimination).

**DMC:** short press the menu key to turn on or off the gyroscope for calibration, and then return after magnetic bias calibration and adjustment.

**Update:** Stop/Start (firmware upgrade)

## Examples of detailed descriptions of each mode

- 1) Profile: 1/2/3/4, please choose the best configuration mode according to the actual usage scenario.



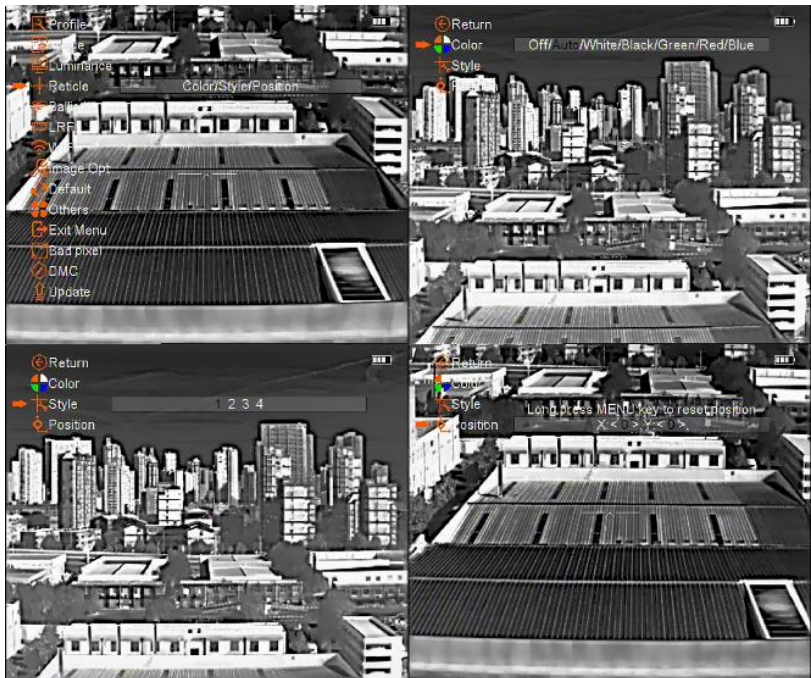
- 2) Image: Short press to enter menu choice color Enter the menu and select according to your needs white/black/brown/red heat/iron red/rainbow

**Key points: the false color display effect is related to the configuration and the setting of screen brightness.**



### 3) Reticle: color/style/Position

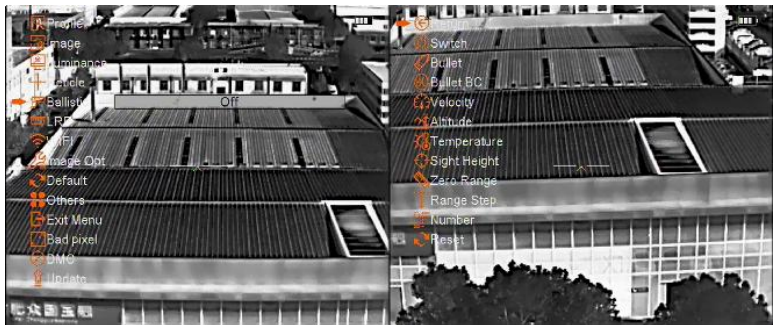
- Return: Return to the upper menu.
- Color: you can choose Differentiation Off/Auto/White/Black/Green/Red/Blue.
- Style: There are four styles to choose from.
- Position: You can set the coordinates of eight bullet drop points with a fixed distance.



### 4) Trajectory:Return/Switch/Bullet/Bullet BC /Velocity/Altitude/Temperature/

Sigh Height/Zero Range/Range Step/Number/Reset

- Return: Return to the superior menu.
- Switch: Turn the trajectory on or off.
- Bullet: G1, G2, G5, G6, G7, G8, G1, GS.
- Bullet BC: set the ballistic coefficient according to the shape of the bomb used.
- Velocity: Set the speed according to the gun used.
- Altitude: Set the altitude of this area.
- Temperature: set the temperature in the area when using.
- Sight Height: Set the sight height according to the fixture used.
- Zero Range: set the required calibration distance.
- Range Step: Set the required step size.
- Number: set the required ballistic number.
- Reset: Reset the above setting parameters.

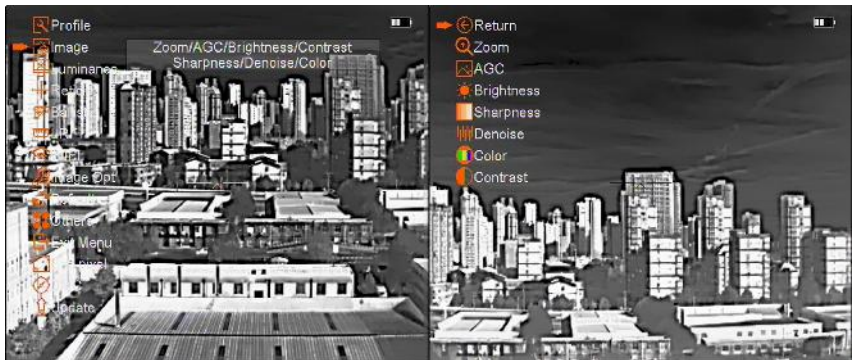


### 5) ranging: off/on/on+ /Position

- Off: Turn off ranging.
- On: Turn on ranging.
- On+: Turn on the ranging and display the ranging aiming point.
- Position: Adjusting ranging coordinates



6) Image :Zoom/AGG/Brightness/sharpness/Denoise/Color/Contrast



## 7) Others:

a) Info

Turn on/off menu information.

b) PIP

Turn the picture-in-picture function on/off.

c) HOT track

Turn on/off hotspot tracking function, automatically search and track the hottest hotspot in the video Media

d) Media

Off: When the media function is turned off, the photo/video recording is disabled, which can reduce power consumption and increase battery life.

On: When the camera/video recording is in working or standby state, the power consumption of the equipment will increase.

e) Flip:

You can choose whether to turn on automatic flipping according to the user's habits

f) Return

Choose the desired selection and return to the main menu interface



## 8) Electronic compass

- DMC: open or close
- Gyro Cal: put the aiming on a horizontal plane, click the knob and wait for 5 seconds to complete the calibration.
- Declination: set the magnetic deflection angle.
- Magnet Cal: use the three-axis rotation method or the figure-eight method for magnetic force calibration. If the calibration is not displayed after use, it can be increased several times to ensure the success rate of sampling.
- Return: click Return after adjustment to save.



## 五. Setting Example

### 5.1 Examples of differentiation settings:

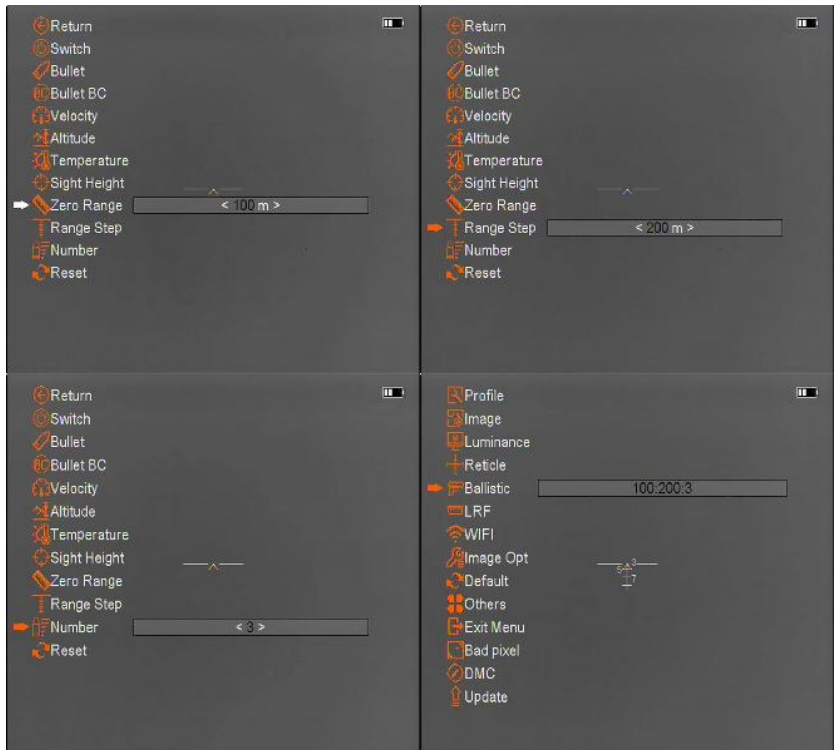
1. Press Menu/Activate to enter the menu, and rotate > or < to switch to the differentiation menu item;
2. Turn to the color selection level to directly turn off the display of differentiation, select automatic differentiation to automatically adjust the differentiation color according to the background color, and select white/black/green/red/blue

differentiation to change with the selected color;

3. There are four kinds of differentiation to choose from when rotating to the style, and the required differentiation style can be selected as required;
4. Rotate to coordinate short press menu/activate to enter menu, rotate > or < to switch to coordinate menu item;
5. Shoot at the target with a big cross and observe the position relationship between the impact point and the big cross;
6. Press and hold the menu/Activate to enter the adjustment mode of the cross X menu item. Turn the knob > or < to move the small cross in the horizontal direction, and move the small cross to the horizontal position of the impact point with reference to the big cross;
7. Press menu/activate to switch to the cross Y menu item, and move the small cross to the impact point vertically with the knob > or <, then aim the small cross at the target and shoot, and observe the position relationship between the impact point and the two crosses;
8. Repeat steps 3-4 to make the impact point coincide with the small cross and return to zero;
9. Press Menu/Activate for a long time, and submenu options will appear; Select group setting calibration distance, select update and continue/save to exit, and the big cross will be saved as the small cross position. (A total of 8 groups of data can be saved)

## 5.2 Example of trajectory setting:

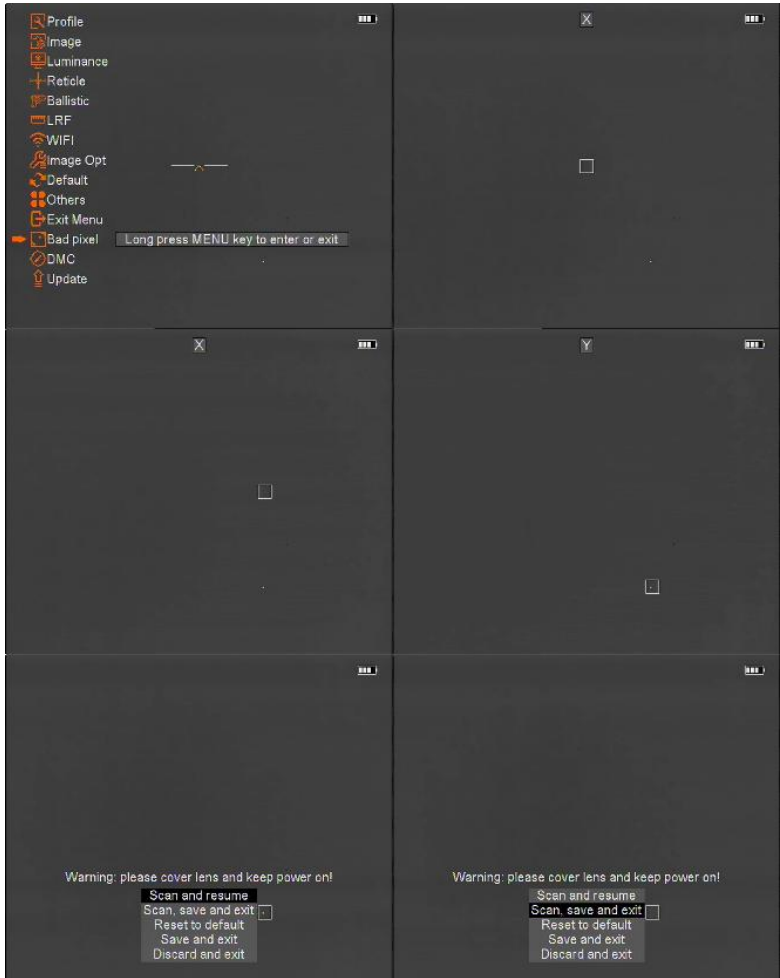
1. The calibration distance is set to 100m, the trajectory step is set to 200m, the trajectory number is set to 3, and other defaults remain unchanged.
2. Open the trajectory to display 300, 500 and 700m trajectories.



### **5.3 Example of bad spot elimination (warning: cover the lens cap and keep the power steady before performing this operation)**

Thermal imaging in the use of natural aging of the detector or strong vibration may appear invalid pixels (bad points) is not a quality problem, does not affect normal use but will affect the visual perception, the machine has developed a special bad point elimination function, the user can read this paragraph guide to eliminate bad points to achieve the best use of the results.

1. Press the **menu** key to activate the menu and turn the knob to select the **bad point** option.
2. Press the **menu** button for 3 seconds to activate the bad spot elimination function.
3. The **X** icon is displayed at the top of the screen, and the selection box can be moved horizontally by turning the knob.
4. Press the **menu** key to toggle the icon to **Y**. Press the vertical direction to move the selection box so that the bad point is inside the selection box.
5. Press the **Menu** key for 3 seconds to activate the submenu, select **Scan and continue** Press the **Menu/Activate** key to execute.
6. Repeat steps 1-6 to eliminate all bad spots and execute the **Save and Exit** option.



**Warning: Be sure to close the lens cap and keep the power steady before performing this operation.**

## technical parameter

<b>Infrared resolution</b>	<b>640 x 480 pixels, uncooled FPA</b>
<b>Pixel spacing</b>	<b>12 <math>\mu</math> m</b>
<b>spectral region</b>	<b>8~14 <math>\mu</math> m</b>
<b>Thermal sensitivity (NETD)</b>	<b>&lt;50mk@f/1.0</b>
<b>OLED resolution</b>	<b>0.39" AMOLED 1440x1080</b>
<b>digital zoom</b>	<b>2X (optical), 1-4X (digital)</b>
<b>Weight (including battery)</b>	<b>620g (including 35mm lens and anti-seismic fixture)</b>
<b>Visual field (degree)</b>	<b>12.5x9.4</b>
<b>battery</b>	<b>2*18350</b>
<b>Differentiation pattern</b>	<b>4</b>
<b>Electronic compass</b>	<b>support</b>
<b>Maximum endurance</b>	<b>6 hours @ basic system (25 degrees, off storage, WiFi, LRF)</b>
<b>make zero</b>	<b>support</b>
<b>trajectory</b>	<b>Support (according to the shape and ballistic coefficient setting)</b>
<b>range</b>	<b>Supported, up to 1200m</b>
<b>Warranty time</b>	<b>1 year</b>
	<b>DRI</b>
<b>D= detection</b>	<b>D:&gt;1000m (person, 2 pixels)</b>
<b>R= identification</b>	<b>R:&gt;480m (person, 6 pixels)</b>
<b>I= confirmation</b>	<b>I:&gt;240m (person, 12 pixels)</b>
<b>Pseudo color</b>	<b>6 (white /black /sepia/Iron/Fire/Rainbow)</b>

<b>store</b>	<b>Built-in 32G memory can store 400,000 photos or 40 hours of video.</b>
<b>Size (length * width * height)</b>	<b>185×65×107mm (including 35mm lens and anti-seismic fixture, excluding eyepiece rubber)</b>
<b>Working temperature</b>	<b>-30℃ ~ +60℃</b>
<b>storage temperature</b>	<b>-40℃ ~ +70℃</b>
<b>be shockproof</b>	<b>&lt;1200 g/1 ms</b>
<b>Earthquake protection grade</b>	<b>IP67</b>

Note: Discovery distance refers to a target of 1.7m x 1.2m in normal environment. The discovery distance is subject to change by humidity, temperature, weather and environment.

## **Precautions**

1. Do not put the camera detector in front of high radiation sources, such as the sun, CO2 laser, welding machine, etc.
2. Please do not look directly at the laser beam using the laser red dot indication to avoid damage to your eyesight.
3. Do not touch the infrared lens and the rangefinder window with your fingers or other objects.

4. Please do not use any chemical solvents, thinners to wipe the infrared lens and range window, use a clean, soft, dry flannel cloth to wipe.
5. Do not install the wrong positive and negative battery, the positive end of the battery is installed outward. The battery compartment cover screws are tightly screwed and closely fit the waterproof rubber ring, otherwise it will affect the shock resistance and waterproof performance.
6. Please do not disassemble this instrument, private disassembly will lose the warranty service.
7. To transport this camera, please use the original safety box and add sufficient cushioning material to avoid damage.

## **After Sales**

one year warranty and lifetime maintenance for this thermal imaging viewer from the date of purchase;

Free replacement within 7 days due to quality problems;

For failures caused by human factors and natural disasters, replacement parts will be charged according to the physical condition.