Observation and aiming multi-function thermal imager

User Guide

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

Catalogue

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 with ultra-low power consumption
- 300,000 pixel high resolution, built-in storage can record 10,000 photos or 10 hours of video footage
- No blocking / with blocking design, 50 / 60Hz real-time imaging display, fast moving without dragging shadow
- Digital Video Image Enhancement (DVIE) algorithm, wide dynamic (HDR) image processing
- Professional telephoto germanium lenses, 2x, 4x digital zooms
- White hot / black hot / red hot / brown / iron red / rainbow a variety of color can be selected

- Standardized interface with collimator cross and automatic color adjustment of the dividing line
- 100 levels of brightness control, 100 levels of contrast control
- High definition **OLED** eyepiece system
- Manual or fully automatic image enhancement mode for target detection in extremely harsh environments
- Very low power consumption for long continuous operation
- Easy-to-use scrolling knob menu
- Reliable system with anti-drop and anti-vibration capability
- Standard 20mm leather rail clamps with laser red dot indication
- IP67 waterproof performance, suitable for all-weather outdoor use
- Optional high-precision laser distance measurement function

User's Guide

I、Part Name

1. Rubber eye protection goggles
2. Eyepiece/diopter adjustment
3. TYPE-C expansion socket, media/external charging, power supply
4. Power switch, laser indication switch(on state, click to switch)
5. 3.5mm expansion socket, video/serial
6. Battery compartment cover set screws
7. Digital menu knob
8. Lens / lens focus ring
9. Laser red dot emission window
10. Picatinny rail
11. Picatinny rail[1]

[1] 10 and 11 helmet rail and gun sight rail, the user can exchange the position according to the use of habit

II、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[2]

   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] The multimedia icon on the OLED screen flashes in the video state

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

tableoneKnob menu function list[3]

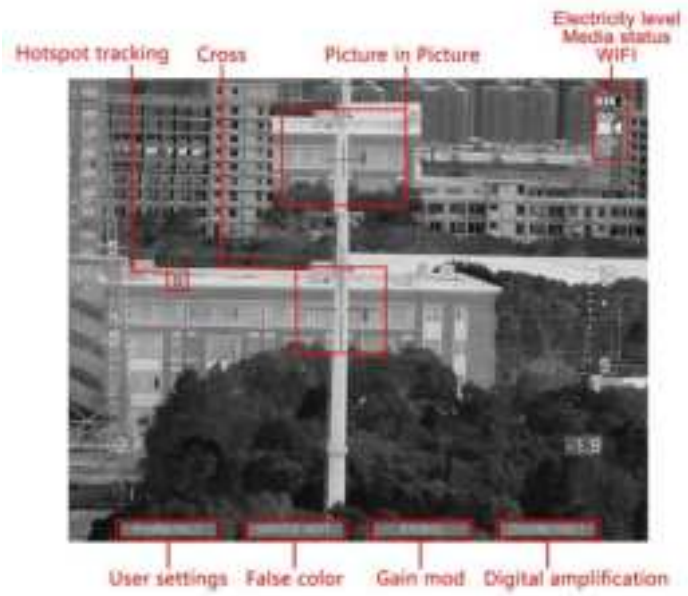
Knob key	Key definition	functional description
< **Sinistral rotation**	**Options**/+Photo/Video pseudo color mode	**LEFT<Option+**: See the **menu/activation** function first, after entering the menu mode, rotate left **<option+**, menu items switch in order: Profile, Image, Luminance, Reticle, Ballistic,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

[3] Menu functions will be changed without notice.

Short press **Long press**	**Menu/Activation** Manual gear shift	**Menu:** In the initial state, short press to enter the menu, at this time the left knob < for option + function, the right knob > for option - function; after exiting the menu, knob < to restore the photo/video or pseudo-color mode function, knob > to restore the image zoom function; **Activate:** After entering the menu, turn right > or left < **to** browse the menu, switch to the menu item to be adjusted (**white on black**), short press the knob to **activate the** adjustment mode of the menu item (**black on white**), and then press the knob once to exit the adjustment mode of the menu item; **Shortcut function:** Press the knob for a long time in the initial state, and the baffle works once.

> **Right** **rotation**	**Options/-** Digital amplification	**Right > options:** See the **menu/activation** function first, after entering the menu mode, rotate right **> option-** , menu items switch in order: Update, DMC, Bad point, Exit Menu, Others, Default , WIFI, Shutter, 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 > Options >-decrease the corresponding menu item by one unit value. Restore shortcut function after exiting the menu. **Shortcut function:** Digital image enlargement: 1x~2x~4x cycle

III、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.

IV、Menu description

Menu items

Profile : You can select/save 1/2/3/4/5 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 .

Shutter： automatic / start 10 minutes / 2 times after the start (optional without gear or with gear)

W I F I: WiFi on/off

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

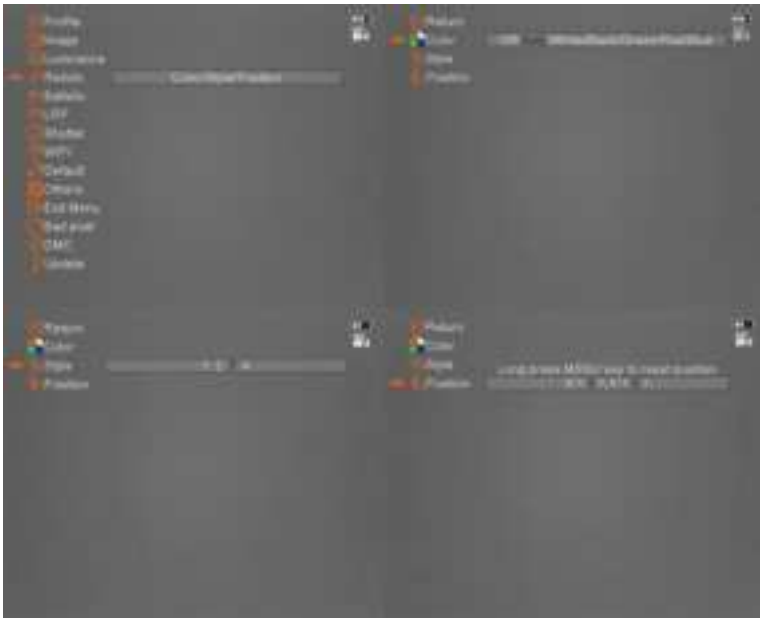
1) Profile: 1/2/3/4, please choose the best configuration mode according to the actual usage scenario.

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.

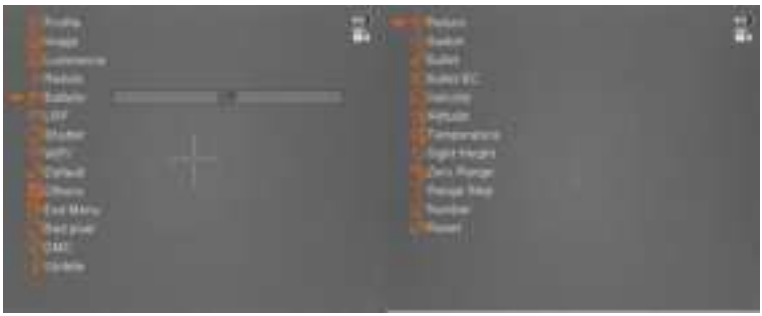


4) Ballistic:Return/Switch/Bullet/Bullet BC /Velocity/Altitude/Temperature/

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, GI, 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.
- Sigh 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) LRF: 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) Shutter：automatic / start 10 minutes / 2 times after the start (optional without gear or with gear)

- Automatic: Autocorrection calibration, Calibrate approximately every 5 minutes after the temperature stabilizes
- Start up 10 minutes: the blocker works automatically within 10 minutes after power on, after 10 minutes the user activates it manually
- 2 times after start-up: the stopper works 2 times at power-on and then waits for the user to activate it manually

7) Others：Info/PIP/HOT track/Media/Flip

- Info:Open/Close Menu Information
- PIP:Turn on/off picture-in-picture function
- HOT track:Turn on/off Hotspot tracking feature to automatically search for the hotspot with the highest temperature in the tracked video
- Media:Media selection to turn on or off the media function

Off: After choosing to turn off the media function, photo/video recording is disabled, which can reduce power consumption to increase the battery life.

On: The photo/video is in working or standby state, the power consumption of the device will increase.

Automatic: In the automatic state, video recording and taking pictures will automatically standby to save power when not in use.

- Flip: You can choose whether to turn on the automatic flip according to the habits of the user

V、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 Ballistic Use and Settings

1. Press the menu key to activate the menu and turn the knob to select the Ballistics option.
2. Select the matching resistance model, Bullet bc , and muzzle velocity based on the bullet model, and sequentially determine the altitude and temperature at this moment. Adjust the sight height according to the usage scenario, Zero Range ,and determine the Range Step and number of trajectories.
3. Once all the data is confirmed, open the trajectory, save the settings, and you can use it.(The type of bullet head is shown in Appendix 1 of the manual)

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.

Select Configuration 5 to enter prepose mode explain:

Profile： Select 1-4 normal mode, select 5 as prepose mode

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

Luminance: 1-10 brightness options available

Image position： Adjust coordinates X and Y, move internal images to meet aiming requirements, confirm and save

Shutter: Select automatic/start for 10 minutes/start twice according to needs

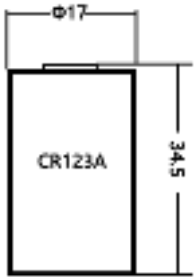
WiFi: WiFi OFF/ON

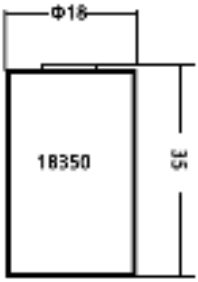
Default: Reset to default NO/YES

Others: Info/HOT track/Media/Return

Exit Menu： After modifying the menu parameters, choose to save the configuration or exit without saving

Battery model





Warning: The battery can only use the standard version of 18350. Although the CR123A/CR17245 battery can also be used for power supply, there may be power outage issues during shooting.

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.

Packing list

Standard Edition Packing List

Mainframe *1

Lens cap *1

Charger *1

20mm clamp (installed) *1

4 lithium batteries (2 in the machine, 2 spare)

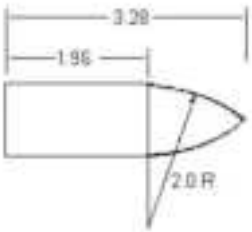
video serial port cable *1

Instruction manual *1

Bullet type(Appendix 1)

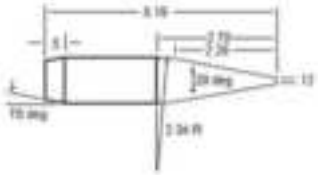
There are a total of 8 basic resistance models

1. G1 (Ingalls bullet): flat bottom, 2x tangent



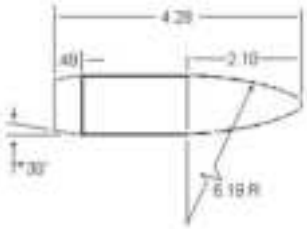
One of the oldest and most widely used models, suitable for pistol warheads. It can also be used for rifle warheads, but the calculation error is relatively large.

2. G2 (Aberdeen J-shaped): short stern, conical



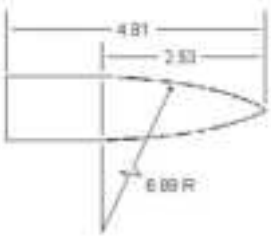
Generally used for automatic artillery.

3. G5: Short stern, 6.19 times tangent



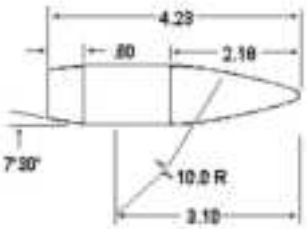
Partial subsonic projectile (such as 9 × 39mm SP6) uses this spring shape, but it is rarely used due to its close proximity to G7.

4. G6: Flat bottom, 6.99 times tangent



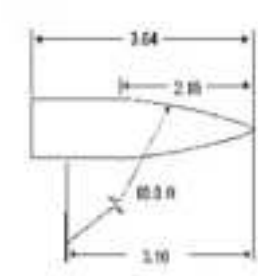
Suitable for early pointed bullets (such as 7.92×57mm Mauser S), but generally this type of warhead uses G1 or G7 as an approximation and is less commonly used.

5. G7: Long stern, 10x secant



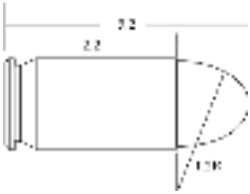
Utmost common model (second only to G1), with a typical low drag projectile shape, is more suitable for modern warheads than G1. Some flat bottomed warheads also use this model, although the calculation results are inaccurate.

6. G8: Flat bottom, 10x secant



Similar to G6, with few applications.

7. GI:Flat bottom, round head



Generally used for pistols

8. GS: Ball

Suitable for BB and smoothbore bullets, Almost not used