
Xsight SL35/SL50
Thermal Rifle Scope
User Manual

Publication notes

This user manual details the use of the thermal imager and the precautions. In order to protect the user's safety, as well as the reasonable and effective maintenance and use of the thermal imager, and also to guarantee the normal service life of the thermal imager, the company requires the user to read and strictly abide by the requirements of the following operating specifications before the use of the thermal imager.

Prior to the publication of the new user manual, the use and maintenance of the thermal imager should be subject to this manual, other materials only for reference.

Any problems during using, please give us feedback timely in order to research and modification.

The content of this "user manual" is only for the reference of customers, not as the judging criteria for the product delivery and acceptance.

Precautions



Warning

- Do not expose the thermal imager directly into sunlight, carbon dioxide lasers, welding machines and other high-intensity radiation sources;
- The time interval between the start-up and last shutdown should be longer than 20 seconds;
- The thermal imager combines sophisticated optical instruments and electrostatic-sensitive electronic equipment, please do not arbitrarily throw, beat or vibrate the thermal imager and its ancillary parts to avoid the deformation of the structural parts or installation size;
- In case of fault occurrence, do not disassemble the thermal imager by yourself, please get in touch with the manufacturer in time, otherwise no warranty;
- When the thermal imager is not in use or during the transportation, please remove the battery and place the thermal imager in protective packing box;
- Please replace the battery in time when the battery power is too low to

avoid the over discharge damage to the battery;

- If you need to connect the external power supply, please firstly confirm that the batteries are removed from the thermal imager.
- The use environment beyond the specifications of this manual may cause damage to the thermal imager.



Attention 1

- To clean the non-optical surface of the imager, do not scrub with chemical solvents, diluents, etc., please wipe the shell with clean, soft and dry flannel;
- The infrared lens of thermal imager is coated with a layer of anti-reflection film for prevention of reflection, only clean it when it is obviously dirty. The frequent wiping of the lens may cause the abrasion of the lens coating. Please avoid touching the lens surface, the acidic substances of skin left by fingerprints can damage the coating layer and lens surfaces. Clean the lens with special lens cloth only;
- Observation completed or no operation for a long time after start-up, please shut down in time to prolong the effective use of the thermal

imager.



Attention 2

- Before the first launch, please unpack and check if the thermal imager is complete.



Attention 3

- To install the battery, please put all the batteries positive outward, negative facing inside, cannot be reversed.
- Make sure that the thermal imager is switched off before the battery disassembly, otherwise opening the battery cover under the running condition will cause serious damage to the thermal imager;
- Before the device is launched for the first time, please make sure that the battery has Power;
- Please do not disassemble, throw or short-circuit the battery to avoid the accident;
- Battery during using, charging or storage, once overheating, discoloration, deformation, emitting smell or any other anomaly occurs, should be immediately stopped to use.



Attention 4

- Prior to the start-up interface, the colorful stripe testing interface shows firstly on the screen, this is the start prompt of the display, not the anomaly of thermal imager.



Attention 5

- Please make sure that the lens cover is closed before the image background calibration.
- During the calibration process, the image screen will have 1 second freeze, and that is not the thermal imager anomaly.



Attention 6

- Prior to the reticle operation, please make sure the reticle is turned on, otherwise, there will not be any response to the operations under the reticle menu.
- The factory default settings for reticle state is hide. The reticle state(hide or show) and the reticle type after start-up of each time are all determined by the reticle state before last shutdown.

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- When reticle function is turned on, the reticle type identification will be displayed on the upper-left corner of the screen.



Attention 7

- When resetting to the default, all zeroed data is lost and needs to be zeroed again.

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I. Overview

Xsight is an infrared sighting scope that can be mounted on various firearms for night hunting. It is lightweight, compact, portable; also it has the characteristics of long battery time, good concealment, and strong penetrating capability for smoke, dust or darkness. Product is as shown in Figure 1.



Fig.1 the thermal rifle scope

II. Structure and working principle

The working principle of the thermal imager: the infrared radiation of the target object is focused on the photosensitive surface of the infrared focal plane detector through infrared optical system, after photoelectric conversion, the optical signal is converted into electrical signal, the digital video signal is obtained by AD sampling, and then the infrared thermal image is output to the OLED screen after the image algorithm processing, and then the electronic reticle is supplemented to guide the

user to view the target. The schematic diagram of the thermal imager is shown in Figure 2.

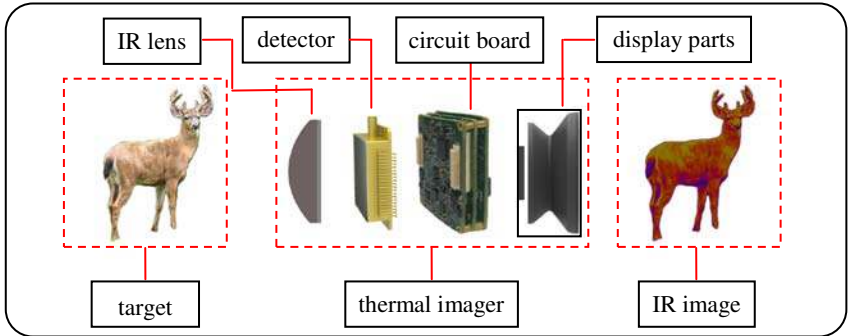


Fig.2 the schematic diagram of thermal imager

III. Performance and Parameters

3.1 Main performance

- High resolution uncooled infrared detector;
- 1024x768 high resolution OLED color display;
- Low-Power design, 4 x CR123 batteries can last for 7 hours;
- Optimized button operation, user-friendly interface, easy and convenient to use;
- Short start-up time with ability to rapid observe;
- PIP, E-zoom function to improve aiming accuracy;
- Light leak-proof eyepiece design, good concealment;
- 7 reticle styles, 4 reticle colors, 4 zeroing data for different guns;

- Protection level IP67, rain-proof, high reliability, sturdiness and durability.

3.2 Main Specifications

The specifications of the thermal imager as shown in Table 1.

Table 1. technical parameters of thermal imager

Model	Xsight SL35	Xsight SL50
Detector		
Detector type	uncooled focal plane array infrared detector	
Resolution	384×288	
Pixel pitch	17 μ m	
Band width	8~14 μ m	
Optical performance		
Focal length	35mm	50mm
FOV	10.5°×8°	7.5°×5.5°
Focusing	Manual focusing, from 10 meters to infinity	
Eyepiece	Color OLED	
Diopter adjustment	-6D~+4D	
Sighting performance		
Effective distance	Clear night, humidity is not higher than 70%, in the transparent scene, observe the upright person target, the person discovering distance ≥2000m, recognition distance ≥550m	Clear night, humidity is not higher than 70%, in the transparent scene, observe the upright person target, the person discovering distance ≥3000m, recognition distance ≥800m

Reticle style	7 reticle styles available	
Reticle color	Black, white, red, green 4 colors available	
Reticle adjustment range	$\geq \pm 15\text{mil}$	
Reticle adjustment accuracy	$\leq 0.5\text{mil}$	$\leq 0.35\text{mil}$
Graphic display		
Image Ribbons	White-hot, black-hot, red-hot, pseudo color	
E-zoom	$\times 2$ 、 $\times 4$	
Brightness	0-99 level adjustable	
Contrast	0-99 level adjustable	
Power		
Battery	4 x CR123 batteries	
Battery life	7h (@25°C)	
Interface		
Electrical interface	PAL analog video RS232 serial port DC12V external Power supply	
Firearms interfaces	adapts to the shotgun No. 12-32	
Environmental adaptability		
Storage temperature	$-45^{\circ}\text{C} \sim +55^{\circ}\text{C}$	
Working temperature	$-40^{\circ}\text{C} \sim +50^{\circ}\text{C}$	
Vibration	frequency 50hz~200hz~5hz, acceleration 2g, one scan in each of the 3 mutually perpendicular directions, with scanning time 15min for each	
Shock	Half-sine wave, acceleration 200g, duration 1ms, 100 times shocks in the positive optical axis direction	

Protection Level	IP67	
Reliability		
Life	≥ 3000 shoots	
MTBF(mean time between failure)	≥ 500 hours	
Life of press button	Failure free operation times of switch and press button ≥ 3000 times	
Physical feature		
Size	230mm×55mm×50mm	250mm×71mm×71mm
Weight	700g	800g

IV. Packing Configurations

The thermal imager configuration table is as shown in Table 2, the corresponding figure is as shown in Figure 3.

Table 2. the thermal imager configuration table

Serial No.	Name	Qty
①	Thermal imager	1
②	Video output cable	1
③	Packing box	1
④	Lens wiping cloth	1
⑤	User manual	1
⑥	Packing list	1



Fig.3 the packing configuration

V. Use and Operation

NOTE

- **Before use the imager, please read the precautions carefully.**

5.1 Introduction

The thermal imager parts as shown in Figure 4 and Figure 5.



Fig.4 the thermal imager parts diagram



Fig.5 the thermal imager parts diagram

5.2 Preparation Before Use

5.2.1 Unpacking

For the first time use of the thermal imager, please make sure to check the completeness firstly.

- Open the packing box, check the completeness according to the thermal imager configuration table (Table 2);
- Check the lens, body, eyepiece and press buttons of the imager and see if there is obvious damage;
- Check whether the lens is contaminated, if there is obvious stain; please use the lens cloth to wipe the lens to ensure it clean.

5.2.2 Battery Installation

The thermal imager uses 4 x CR123 batteries, install the batteries by following the steps:

- Open the battery cover counterclockwise as “OPEN” shows on the cover, as shown in Figure 6;
- Inserting the batteries, all batteries are positive facing out, as shown in Figure 7;
- Close the battery cover, tighten the battery compartment cover clockwise as CLOSE shows on the cover, as shown in Figure 8.



Fig. 6 open battery cover



Fig.7 insert the batteries



Fig.8 close batteries cover






Fig.9 opration buttons

5.3 Press Button Functions

The opration buttons of the thermal imager is as shown in Figure 9, the button function table is as shown in table 3.

Table 3. the thermal imager press button function table

Serial No.	Button	Icon	Function
①	Power		Switch on, Switch off, Sleep delay, Exit menu
②	Main menu		Enter into each level menu

③	Direction Butten	 :up :left :down :right	Operation button, function button
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5.4 Switch On and Switch Off

5.4.1 Switch On

When the power is off, long press the POWER button for 3 seconds, until the splash screen as shown in Figure 10 appears on the eyepiece screen, the thermal imager starts.



Fig.10 the splash screen

5.4.2 Switch Off

Under the condition of the imager being on, long press the POWER

button, the progress bar showing the turning off status appears on the display screen, as shown in Fig. 11, press the button until the progress bar is finished and the screen is off, the thermal imager shuts down, then release the POWER button.



Fig.11 the turning off screen

5.5 Adjustment and Testing

5.5.1 Eyepiece Diopter Adjustment

In order to adapt to the users with different sight, the thermal imager has $-6^{\circ} \sim +4^{\circ}$ diopter adjustment. When the interface icon or text in the screen is blurred, that means the eyepiece does not match with the user's sight, please adjust the eyepiece.

After the start-up, slowly rotate the eyepiece diopter adjustment ring, as shown in Figure 12, until the icon and text in the image are clearly visible, then the eyepiece has been fitted with the user's sight, the adjustment completed.



Fig.12 the eyepiece diopter adjustment ring

5.5.2 Focal Length Adjustment of IR Lens

The thermal imager is equipped with adjustable focus lens, located at the end of the lens.

After the thermal imager is powered on, aim the thermal imager to the observation target; rotate the lens focus adjustment ring as shown in Figure 13 to perform the focusing operation until the image is clear. When the target distance is changed, the image may become blurred, and need to rotate the focus ring to refocus, until the target image is clear.



Fig.13 the objective lens focus adjustment ring

5.6 The Interface of Thermal Imager

The image interface of the thermal imager without operation as

shown in Figure 14 .



Fig.14 the interface without operation

The thermal imager's current reticle type, calibration mode, image mode, E-zoom, power state are displayed on the top of the screen, the corresponding status bar as shown in Figure 15.

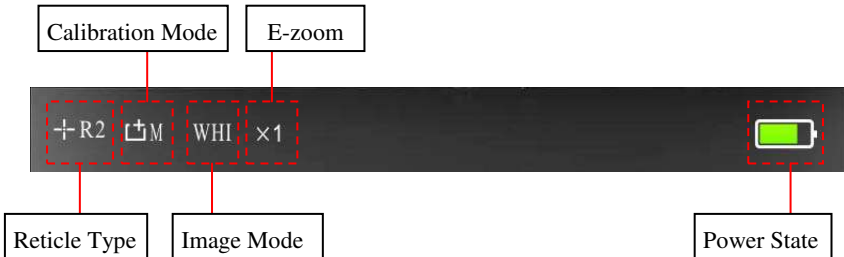


Fig.15 status bar

Reticle Type: by default the reticle is hidden, under the image interface, press the UP button and Down button simultaneously to control the display or hiding of the reticle type. The selection of the reticle type can be adjusted by the advanced menu, please see 5.9.3 for details.

Calibration Mode: the imager's current calibration mode

Image Mode: the imager's current image mode

E-zoom: the electronic zooming multiples of the thermal imager under current state

Power State: display the battery power of thermal imager, as shown in Fig.16, there are 4 displaying states totally.

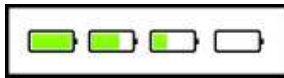


Fig.16 Power states

5.7 Image Adjustment

Short press the main menu button, enter into the main menu, the main menu interface as shown in Figure 17.

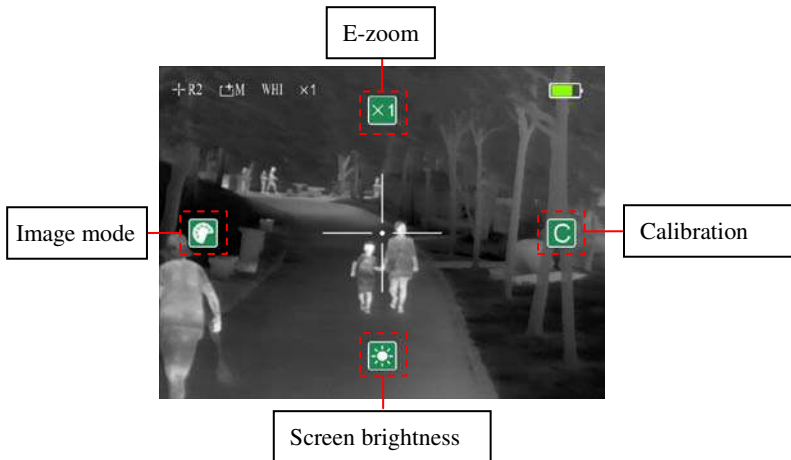


Fig.17 the main menu interface

Under the main menu, the four direction buttons UP, Down, LEFT,

RIGHT control the four function icons located on the interface of “UP, Down, LEFT, RIGHT” respectively.

Short press the POWER button to exit the main menu interface.

5.7.1 E-zoom

The E-zoom function can magnify the central zone of the IR image to display, so as to observe the target object more clearly.

There are 3 E-zoom solutions: $\times 1$, $\times 2$ and $\times 4$, representing the magnification of 1 time, 2 times and 4 times respectively, as shown in Figure 18. Each time when the thermal imager is turned on, the default E-zoom mode is x1, prompt information displayed on the upper-left corner of the screen.



Fig.18 the 3 E-zoom solutions

Modes selection

➤ " $\times 1$ " mode is recommended, when need to search target in a wide range, for the FOV is wide, and it is conducive to discover the

target.

➤ "×2" or "×4" mode is recommended when the target state needs to be identified(e.g. whether the target is human being, human posture, etc.).

➤ When aiming, “ ×2” or “ × 4” mode is recommended, for the target image is more conducive to the sighting of hit point.

Steps of E-zoom operation:

Under the main menu interface, as shown in Fig 20, the default mode is x1, short press the UP button to achieve the ×1 - ×2 - ×4 looping magnification display.

5.7.2 Screen Brightness Adjustment

Brightness adjustment can increase or decrease the brightness of OLED display.

The thermal imager has 4 adjustable brightness levels, as shown in Fig 19, the brightness from dark to bright. The default brightness level is 3, users could choose the appropriate brightness according to individual viewing habits and the current environment.



Fig.9 brightness levels

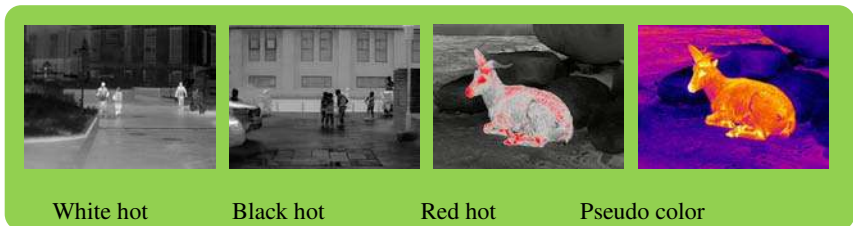
Steps of brightness operations:

Under the main menu interface, as shown in Fig 20, short press the Down button to control the switch of screen brightness to achieve the looping display of the 4 levels screen brightness.

5.7.3 Image Mode

The image mode adjustment can make IR image displayed on different color to facilitate the user to observe and recognize the target.

The thermal imager provides 4 image solutions for users, namely white-hot, black-hot, red-hot and pseudo color, as shown in Figure 20. The default image mode is "white-hot", and the current mode of the IR image is displayed on the upper-left corner of the screen.



WHI: white-hot, object with relatively high temperature in the scene will be displayed on black or gray;

BLC: black-hot, object with relatively high temperature in the scene will be displayed on black or dark gray;

Red: red-hot, object in relatively high temperature in the scene will be displayed on red, while the other objects in black and white;

CLR: pseudo color, a colorful mode. In this mode, objects with different temperatures in the scene are displayed with colors, easy to identify;

Steps of image mode adjustment

Under the main menu interface, as shown in Figure 16, short press the LEFT button to achieve the switch of image modes, and realize the looping display of the 4 image modes.

5.7.4 Calibration

Calibration can eliminate the snowflakes, jitter, stripes, etc.on the image, and make the image clearer.

During the use of thermal imager, due to the long working time, the imager parts get hot, which may cause the IR image to appear snowflakes, jitters, stripes, etc., and affect the viewing experience. Users can perform calibration function to eliminate the image abnormalities.

Steps of calibrations:

- Under the main menu interface, as shown in Figure 20, press the RIGHT button to control the calibration mode;

-
- Short press the RIGHT button to perform shutter calibration;
 - Long press the RIGHT button to perform background calibration;
 - During the background calibration, the words “ cover the lens cover lens when calibrating" will appear on the top of the screen. when the disappearance of the prompt information indicate that the calibration is completed, lens cover can be opened. The calibration interface is as shown in Fig 21.

The effect of background calibration is better than the shutter calibration, so recommend to use background calibration.



Fig. 21 the background calibration interface

5.8 Reticle Function

Under the main menu, short press the main menu button to switch to the secondary menu. The secondary menu is the reticle setting menu, controlling various reticle functions, the interface of secondary menu as

shown in Figure 22.



Figure 22 the interface of secondary menu

Before entering the secondary menu, make sure that the reticle is ON. The way to open the reticle function: exit the main menu interface to the image interface, and press the UP button and the Down button simultaneously, the reticle will appear on the image central zone, the icon representing the current reticle type will appear on the upper-left corner of the image interface, See 5.6 Figure 14 for details.

Under the secondary menu, the distribution of the interface is also corresponding to the four direction buttons, which shows the symmetrical distribution of up, down, left and right. Shot press the corresponding

directional key to complete the operation of each function on the menu.

Short press the POWER button to exit the menu,.

5.8.1 Reticle Color

The reticle color solutions can make the reticle displayed on different colors to facilitate the users to observe and recognize the target.

There are 4 reticle colors to choose--white, black, red and green respectively, users could select the appropriate reticle color according to the individual viewing habit and image mode.

Under the secondary menu interface, as shown in Figure 22, short press the UP button to control the reticle color switch, and achieve the looping display of white--black--green--red.

5.8.2 Reticle Pattern

The thermal imager is equipped with 7 reticle patterns, as shown in Figure 23.

Steps of reticle styles adjustment:

Under the secondary menu interface, as shown in Fig 22, short press the Down button, control the switch of reticle patterns, achieve the looping display of 7 reticle styles displayed on the center of the image. Besides, after zeroed, users could sight and aim by using the reticle

mid-point.

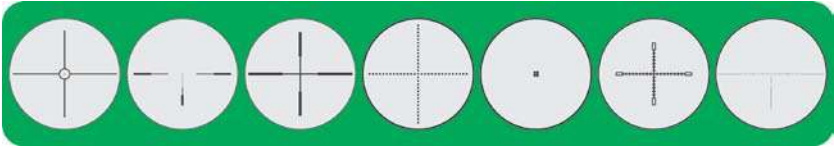


Fig. 23 7 reticle patterns

5.8.3 Reticle State

The reticle state function is mainly used to adjust the hide or show of the reticle and rangefinding function.

Under the secondary menu interface, short press the LEFT button to implement the loop control of three states: reticle display—reticle and rangefinder display – reticle and rangefinder hide.

The reticle and rangefinder display can realize the distance estimation function, simultaneously the rangefinder cursor appears on the lower-left corner of the screen, as shown in Figure 24.

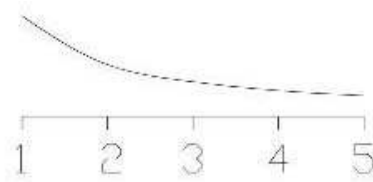


Fig.24 rangefinder cursor

The position of digit 1 on the horizontal axis in the Figure 24 indicates that the object of 180cm tall at 100m is located at the height of

the screen.

5.8.4 Zeroing

Turn on the reticle, under the secondary menu, short press the RIGHT button, enter into zeroing interface, as shown in Fig 25.



Fig 25. zeroing interface

Under the zeroing interface, the reticle is displayed as small crosshair cursor, so as to facilitate the position adjustment. Control the movement of reticle position in the direction of UP, Down, LEFT, RIGHT by the UP, Down, LEFT, RIGHT button, the reticle cursor moves 1 pixel per short press to the corresponding direction, while by long press, reticle cursor moves 40 pixels per second. The status bar on the top and right of the screen shows the cursor movement information. The digit in status bar changes by 2.4cm per 1 pixel move, the total length of status bar is 240 pixels, divided into 12 segments.

According to the display position of the actual impact point on the screen, the thermal imager provides two kinds of zeroing ways, the detailed steps are as follows.

Before zeroing, please determine the selection of the reticle type, see 5.9.3 for specific operation. The default reticle type is R1.

Steps of zeroing operation:

Zeroing mode 1(the actual impact point is displayed on the screen):

- Under the zeroing interface, use the reticle mid-point to aim the bull's-eye and shoot;
- Observe the location of actual impact point.
- If the actual location of the impact point can be seen on the screen of the thermal imager, keep aiming the reticle mid-point to the bull's eye, and short press the main menu button, the screen image is froze, at the same time the froze icon appears on the upper-left corner of the screen, as shown in Figure 26;
- Under the condition of image being frozen, move the crosshair cursor to the actual impact position by direction buttons;
- After moving the reticle to the actual impact point, long press the

main menu button until the prompt message for OK appears on the center of the screen, and then release the main menu button to save the current reticle state and exit the menu interface.

- Press the POWER button directly to exit without saving.



Fig.26 the image freeze icon

Zeroing mode 2(the actual impact point can't be observed on the screen):

- Under the zeroing interface, use the reticle mid-point to aim the bull's-eye and shoot;
- Observe the locations of actual impact point.
- If the actual impact point can't be observed on the screen, then keep aiming the reticle mid-point to the bull's eye steady, and measure the distance between the actual impact point and the bull's-eye;
- According to the measured distance, adjust the reticle position.

With the movement of the cross, the corresponding movement distance will be displayed on the status bar located on the top and the right of the screen. If the horizontal deviation from the

impact point to the bull's eye is 2cm, move 1 pixel horizontally that is 2.4cm (the default target range is 100 meters).

- After moving the reticle to the actual impact point, the zeroing is completed. Long press the main menu button, until the prompt message for OK appears in the center of the screen, then release the main menu button to save the current reticle state and exit the menu interface (After saving the reticle state, all the mid-points of the reticles are adjusted to be consistent with the small reticle cursor).
- To ensure the accuracy of the position, aim the reticle after adjustment to the bull's eye again, and shoot, then repeat the steps above, until the bull's eye is hit.
- Short press the POWER button to exit the interface without saving.

5.9 Advanced Menu

Under the image interface, long press the main menu button to enter into the advanced menu interface, as shown in Fig 27.

Switch the options in advanced menu by the UP and Down button, and set the option parameters through the LEFT and RIGHT button.

When an option is switched to, its background color is darker;

After the operation, short press the POWER button, exit the advanced menu interface. Also with no operation to the menu for 20 seconds, the thermal imager will automatically exit the advanced menu interface.



Figure 27 the advanced menu interface

5.9.1 Contrast

The image contrast adjustment can increase or decrease the contrast of the image, make the target more prominent.

The thermal imager has 0-99 level optional image contrast, with the corresponding contrast from weak to strong in turn. The default contrast level is "50", users can choose the appropriate contrast according to individual viewing habit and current circumstance.

Steps of image contrast adjustment:

Under the advanced menu, switch to the "contrast" option by UP and DOWN button. By default, enter into the advanced menu and directly select the "contrast" option;

- After switching to “contrast” option, adjust the contrast level by LEFT and RIGHT button.
- Short press the LEFT or RIGHT button, 1 level change per press; long press the LEFT or RIGHT button, 10 levels change per press.
- After operation, short press UP or Down button to enter into the settings of other menu options, or short press the POWER button to exit the advanced menu interface.

5.9.2 Brightness

Brightness adjustment could increase or decrease the image brightness.

Steps of image brightness adjustment:

- Under the advanced menu, switch to the brightness option by UP and Down button.
- After switching to brightness option, adjust the brightness level by LEFT or RIGHT button.

-
- Short press the LEFT or RIGHT button, 1 level change each time;
long press LEFT or RIGHT button, 10 levels change each time.
 - After the operation, short press the UP and Down button to enter into the settings of other menu options, or short press the POWER button, exit the advanced menu interface.

5.9.3 Reticle Type

The thermal imager is eqiped with 4 presets for zeroing positions. If the user has already stored the zeroing positions, first select the saved reticle type according to the current gun type, the thermal imager will automatically match the reticle position for the current reticle type, so as to ensure better sighting and aiming accuracy.

The reticle is hidden by default factory setting. After that the default reticle type after start-up is the selected reticle type before last shutdown.

The selection steps of reticle types:

- Under the advanced menu, switch to the "reticle type" option by the UP and Down button;
- After switching to the "Reticle Type" option, shot press the LEFT or RIGHT button to control the selection of reticle type R1, R2, R3, R4;

-
- After selection, short press the UP and Down button to enter into other menu options settings, or short press the POWER button to exit the advanced menu interface;
 - If none of the stored reticle types matches the current equipment, repeat 5.8.4 to reset the reticle position.

5.9.4 Calibration

The thermal imager has two optional calibration modes: mode "A" and mode "M".

A: auto calibration, the thermal imager will perform shutter calibration automatically according to the internal parameters aperiodically;

M: manual calibration, the thermal imager will not perform any calibration during use, if needed, the user is required to do it manually, and operation method sees 5.7.4.

Steps of calibration mode selection:

- Under the advanced menu, switch to the calibration mode option by the UP and Down button;
- After switching to the calibration mode option, select the automatic calibration "A" or manual calibration "M" through

-
- the LEFT or RIGHT button, and the calibration mode icon in the upper-left corner of the screen will also change accordingly;
- After the operation, short press UP and Down button to enter into other menu options settings, or short press the POWER button, to exit the advanced menu interface;

5.9.5 Sleep Delay

The thermal imager is equipped with the Sleep Delay function.

When the Sleep Delay setting is turned on, the thermal imager in running state will automatically fall into sleep when not being used for a long time.

The thermal imager has 4 Sleep delay options, namely OFF, 5, 15, 30.

OFF: turn off the Sleep delay function, i.e., no sleep.

5: the thermal imager will automatically fall into sleep after 5 minutes without any operation.

15: the thermal imager will automatically fall into sleep after 15 minutes with no operation

30: the thermal imager will automatically fall into sleep after 30 minutes without any operation.

After the thermal imager falls into sleep automatically, short press the POWER button, the thermal imager can be woke up, while long press the POWER button, the thermal imager will be switched off directly.

Steps of Sleep delay settings:

- Under the advanced menu, switch to the Sleep delay option by the UP and Down button;
- Then control the selection of the Sleep delay settings by the LEFT and RIGHT button.
- After the operation, short press UP or Down button to enter into the settings of other menu options, or short press the POWER button to exit the advanced menu interface;

5.9.6 PIP

The thermal imager provides picture-in-picture (PIP), a small window displaying function. When the PIP function is on, a small window will be displayed on the lower-right corner of the screen, which shows the magnified image of two times of certain zone with reticle as mid-point, as shown in Figure 28.



Fig. 28 PIP interface

PIP mode is recommended for sight, while target image is more conducive to aiming the hit point.

OFF: the PIP mode is turned off.

ON: the PIP mode is turned on.

Steps of PIP mode settings:

- Under the advanced menu, switch to the option PIP by the UP and Down button;
- Select the ON or OFF state of the PIP mode though shot press the LEFT or RIGHT button;
- When completing the operation, short press UP or Down button to enter into the settings of other menu options, or short press the POWER button to exit the advanced menu interface;

5.9.7 Pixel Correction

During using the thermal imager, in case of the occurrence of bright or dark spots not consistent with the scene(called blind pixel totally), pixel correction can be performed, specific operation is shown as bellow:

Steps of blind pixel correction:

- Under the advanced menu, switch to the "pixel correction" option by UP or DOWN button;
- Shot press the RIGHT button to enter into the pixel correction interface, as shown in Figure 29. At the lower-left corner of the interface, there will be a prompt message indicating that how many the bad points have been selected.
- Under the pixel correction interface, move the reticle to the position of blind pixel through the direction buttons. For each short press, move by 1 pixel, while 40 pixels for each long press;
- Aim the blind pixel mid-point, short press main menu button, add blind pixel;
- Repeat operations above until all the bright or dark spots on the image disappear;

-
- After adding the blind pixel, long press the main menu button to save the blind pixel and exit.



Fig.29 Blind pixel correction interface

5.9.8 Reset

After entering into the advanced menu, select “Reset” to recover the thermal imager to the factory default settings.

Steps of reset:

- Under the advanced menu, switch to the “Reset” options through UP or Down button.
- Short press the RIGHT button, the dialog box will appear as shown in Fig.30
- The dialog box will remind the user to confirm whether restoring to the factory default, select Yes or No by short pressing UP or Down button.

-
- After being selected, the background color of the selected option will change to dark gray with one arrow appearing on each side. By default, the selection is No.



Fig.30 Reset dialog box

5.9.9 Language

At present, the thermal imager provides two languages; user could select English or German according to the actual need.

EN: the current language is English.

DE: the current language is German.

Steps of language settings:

- Under the advanced menu, short press UP or Down button to switch options to the "language" option;
- Short press the LEFT or RIGHT button to set the language.
- Then short press UP or Down button to enter into other menu

options settings, or short press the POWER button to exit the advanced menu interface.

VI. Faults Analysis and Eliminations

In case of the fault occurrence on your device, first refer to table 4 for common faults, if the fault can not found in the table 4, please contact our company or seller as soon as possible.

Table 4. Fault detection, location and isolation

Fault detection	Fault locating	Solution
Long press the POWER button, imager does not start up.	Whether the battery installation is correct	Open the battery cover and check the batteries
	Whether the battery power is enough	Remove the battery and charge
	Battery cover is not tightened.	Tighten the battery cover
Image quality is poor and blur.	The lens is failed to focus.	Rotate the lens focus adjustment ring, until the image is clear.
The image appears the phenomenon of bright line, edge black or blurred screen.	No image correction	Press the main menu button to enter into the menu, and correct
The imaging is blur	The lens failed to focus	Rotate the lens focus adjustment ring, until the image is clear

	The IR lens is contaminated	Clean the lens by special lens cloth
The image is blurred when sighting different distances.	The lens is failed to focus.	Rotate the lens focus adjustment ring, until the image is clear
The interface is not clear	The eyepiece diopter is not proper	Adjust the diopter according to the user instructions
The imager shuts down suddenly during use	The battery cover may be loose.	Tighten the battery cover
Accuracy drops obviously during use	The mounting bracket may be loose.	Check if the mounting bracket is safely tightened.

VII. Maintenance

7.1 Maintenance and Calibration

After sighting or no operation for a long time after switch-on, please turn off the thermal imager timely to prolong the effective using time of.

The IR lens is an important optical component. In the process of installation and usage, please avoid the oil stains and various chemical substance contaminated to damage the lens surface. After use, please cover the lens cover.

When the thermal imager is not in use or during the transportation, please remove the battery and place the thermal imager in a packing box;

The thermal imager should be kept in a cool and dry environment as

long as it is for long-term storage or not work.

Do not use chemical solvents, thinner, etc. for scrubbing, wipe the shell with clean, soft and dry flannel.

The thermal imager lens only needs to be cleaned only when obviously dirty, please avoid touching the lens surface with skin. The acid substance on the skin can damage the coating layer and the lens surface. Please clean the lens only by the special lens cloth.

The thermal imager should be connected to the power supply and checked every half year when not in use over a long period of time.

Appendix A: Accessories table

A.1 Accessories table

No.	Name	Qty
①	Thermal imager	1
②	Video output cable	1
③	Packing box	1
④	Lens wiping cloth	1
⑤	User manual	1
⑥	Packing list	1