

MONOCULAR OUTDOOR THERMAL IMAGING TELESCOPE

INSTRUCTION MANUAL



- ☐ HA 201 ☐ HA 202 ☐ HA 203
- ☐ TA101 ☐ TA102 ☐ TA103

Note: Models HA 101, HA 102, and HA 103 come with distance measurement function.

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Preface

Respected users:

How are you! Thank you for purchasing our instrument. In order to use it in a better manner, we remind you to read the instruction for use carefully before use and keep it properly so as to look up in the future use.

Safety Instruction

Please ensure that you have read and understood the safety precautions described in the following text before using the product so that you can operate it correctly.

The safety precautions described in the following text guides you to operate the product and its accessories correctly and safely to avoid damage and loss to you, other people and the device.



Considerations

Please observe the following guide in order not to damage the product:

Don't assemble or dismantle the product without permission.

The product is a type of super precise equipment. Don't try to dismantle, assemble or remodel any part of the product. Repair of the product should be made by technical personnel designated by the company.

Avoid damage to probe of the product

Note: don't put the product close to strong heat source directly (such as electric iron). Otherwise, It may damage the probe of the product.

Product emits a clicking sound

When the product works, will make a slight clicking sound during , This is normal phenomenon that the lens captures images.



Warning

The warning describes the acts that may cause harm to users. Please observe the following operation in order to avoid electric shock or personal injury.

- **If the product case is damaged, don't use it continuously.**
Please contact the local distributors or agents of the company under such condition.
- **During the process of use, if the product is found with smoke,spark and the burnt smell, please stop using at once.**
In case of such condition, the product power supply should be powered off first.After the smoke and peculiar smell disappears completely, please contact the local distributors or agents of the company.
- **Don't weld the battery without permission.**
Such operation may damage the battery and result in leakage and explosion of the battery.
- **Avoid that the battery is impacted (such as collusion and falling, etc).**
Such condition may damage the battery case or result in that the battery leaks or explode.
- **Please pull off the adapter on the power socket when charging is not made.**

The adapter may get overheated if it is connected with power supply for a long time. This may cause overheating, deformation and fire.

- **Please ensure that the plug of the adapter is inserted into the specified power socket.**

The adapter plug may be different due to the regions. Please make confirmation whether the specification of the adapter is consist with the specification of electric appliances in your region. Otherwise, this may cause overheating of the equipment, electric shock, fire, chemical leakage inside the battery, explosion and other serious consequences.

- **When the plug of the adapter or wire is damaged, stop using immediately.**

Don't change the battery unless the plug of the charger is inserted into the socket completely.

- **Do not touch the electric wire with wet hands.**

It is possible to cause electric shock when touching the electric wire with wet hands. When pulling out the electric wire, hold the electric wire head rightly to pull out the wire. Don't pull off the electric wire directly. Otherwise, the electric wire may be broken, causing electric shock and fire.

- **Forbid dip the product into water caught in rain.**

If the case contact with any liquid, please wipe it dry immediately. If water or other liquid enters the inside of the instrument, please power off the power supply at once. Continuous use may result in product damage.

- **Clean the dust on the adapter plug and the data line.**

When it is exposed to dusty and dump environment for a long time, the dirt surrounding the electric equipment will accumulate moisture. This may cause short circuit and fire.

- **Don't use abradant, isopropanol or solvent to clean the enclosure of the device.**

Such operation may cause the product case to be damaged.

- **The product temperature may increase after a long time of charging.**

You may feel scorching heat when the hands touch the sensors.

- **Problem caused by water condensation**

Don't bring the instrument into low temperature environment from high temperature environment in a short time or from low temperature environment to high temperature environment. This may result in that the inside of the instrument and appearance produce water condensation. In such condition, the instrument should be placed into portable box or plastic bag. Before use, make it restore to the environmental temperature and take it out to use. If the product has water condensation inside, please power it off immediately. Otherwise, the instrument may be damaged. Operation is not allowed unless the water condensation disappears.

- **Avoid that the product is impacted (such as collision and falling, etc).**

Such operation may cause the product to be damaged. Please avoid such operation.

- **Long-time storage and regular charging.**

The product should be placed at a cool and dry environment if it not used for a long time. If the product installed with battery is stored for a long time, charging should be made regularly. Otherwise, the battery will run out and the service life will be shortened.

Preliminary Acquaintance with Infrared Thermal Imager

For a long time, infrared thermal imaging detection technology has become an important means to ensure Industrial safety in developed countries. The application field includes electric power, metallurgy, petro-chemistry, machinery, coal, traffic, fire control and national defense, etc. It can not only carries out real-time detection at high voltage, high current and high speed operation to perform real-time detection for production and instrument but also need not power off the power supply, stop the machine or stop the production to find the potential problems and prevent occurrence of malfunction. The “non contact” modern detection technology is safe, reliable and quick. It is a type of technical revolution compared with traditional contact detection method.

The infrared thermal imaging technology is widely used in the following fields:

- Power equipment, transmission, transformer line inspection;
- Hidden fire source search in fire protection;
- Personnel search and rescue in the fire, and fire command;
- Analyze the location and heat loss of leak points in heat pipes and heating equipment;

- Determining the location of the heating fault of the operating train;
- Security department night monitoring.

Overview

This product is a light and portable, simple operation, and extensive application scenario holding the infrared telescope. Comfortable perception, providing clear and delicate heat imaging, is an ideal equipment for outdoor.

Support a variety of pseudo -color patterns, one -click switching, you can distinguish the location of the target in the scene in time. Take the image to save the thermal imaging image into this device, read the image through USB or save it to the computer for generating reports and printing.

Cleaning of the Products

Please use damp cloth or weak soap to clean the enclosure of the device. Don't use abrasant, isopropanol or solvent to clean. The lens and screen should be cleaned with use of cleaning agents for professional optical glasses.

Lens Maintenance

Prevent damage of the infrared lens :

- Clean the infrared lens carefully. The lens is provided with refined anti-reflection coating.
- Don't clean with force to prevent damage of the anti-reflection coating. The selectable color palette.

- Use a cleaning solution for lens maintenance, such as alcohol-based commercial lens cleaners, alcohol, and a lint-free cloth or paper towel. Compressed air tanks can be used to remove loose particles.

Clean the lens:

- The compressed air tank or dry nitrogen ion gun (if applicable) may be used to blow the loose particles on the lens surface.
- Dip the lint free cloth in alcohol.
- Squeeze the excessive alcohol in the cloth or apply the lint free cloth on dry cloth lightly.
- Wipe the lens surface by making circular motion. Then discard the cloth.
- If it is necessary to repeat above step, please use new cloth to dip with the cleaning solution to wipe.

Instructions for Battery Charging

Use a USB cable to charge:

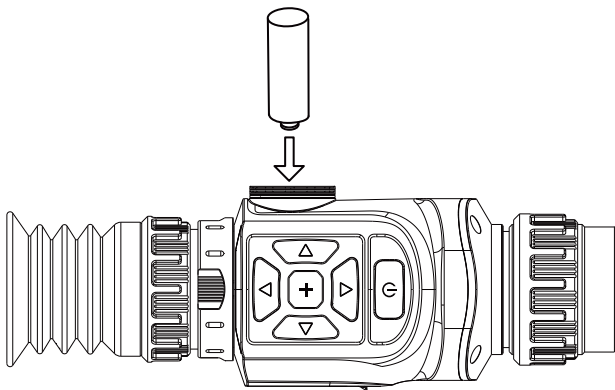
- This product has a built-in rechargeable battery.
- When the battery is low, “” will be displayed on the upper right of the screen. Please charge it through the Type-C USB interface in a timely manner.
- Unplug the USB cable after fully charging.

Battery Installation

- (1) Rotate the battery compartment knob counterclockwise to open the battery compartment cover;
- (2) Install the battery in strict accordance with the positive and negative electrode directions on the battery compartment cover;
- (3) Close the battery compartment cover and rotate the battery compartment knob clockwise until it locks tightly.

Note: 1. Do not use batteries with damaged insulation;

2. If the positive and negative electrodes of the battery are reversed, the device will not work.



Performance Index

Model			
NON LRF	HA 201	HA 202	HA 203
LRF	TA101	TA102	TA103
Sensor			
Detector type	Vanadium oxide VOx		
Resolution ratio	256×192	384×288	640×512
NETD	≤50mK @25°C, F#1.0	≤30mK @25°C, F#1.0	≤25mK @25°C, F#1.0
Pixel size	12μm		
Working band	8~14μm		
Frame rate	50Hz		
Objective lens			
Focal length	25mm	35mm	50mm
Basic magnification	3.1	3.1	2.4
Field angle	7.0°x5.4°	7.5°x5.7°	8.8°x7.0°
Focusing mode	Manual		
Lens aperture	1.0		
Close-up range	5m-∞		
Detection Distance			
Human	1180m	1653m	2361m
Vehicles	3125m	4375m	6250m
Identification Distance			
Human	295m	413m	590m
Vehicles	781m	1094m	1563m
Eyepiece			
Eye relief	23mm		
Dioptr adjustment	-6D~+4D		
Display			
Type	OLED		
Resolution	1024x768		
Display size	0.39inches		

Functions			
Language	Chinese,English		
Electronic zooming	1x/2x/4x	1x/2x/4x/8x	
False color	white hot, black hot, fire hot, rainbow, iron red, cold color.		
Photo	Supported		
Record	Supported		
PIP	Supported		
WIFI	Supported		
CVBS	Supported		
Hot trace	Supported		
Memoery type			
Capacity	Built-in 16G EMMC (the system occupies some space, and the actual size is about 13.8G)		
Photo/Video Type	JPG/MP4		
USB			
USB	TYPE-C		
General technical indicators			
Changeable Rechargeable Lithium Battery	3200mAh(model 18650)/2000mAh(model 18500)		
External power supply	5V (USB)		
Overall power consumption	≤1.1W	≤1.8W	≤2W
Operating time	≤5h		≤2.5h
Spatial resolution	0.48mrad	0.34mrad	0.24mrad
Working temperature	-20℃ ~ +60℃		
Storage temperature	-30℃ ~ +70℃		
Protection level	IP66		

Dimension/Weight

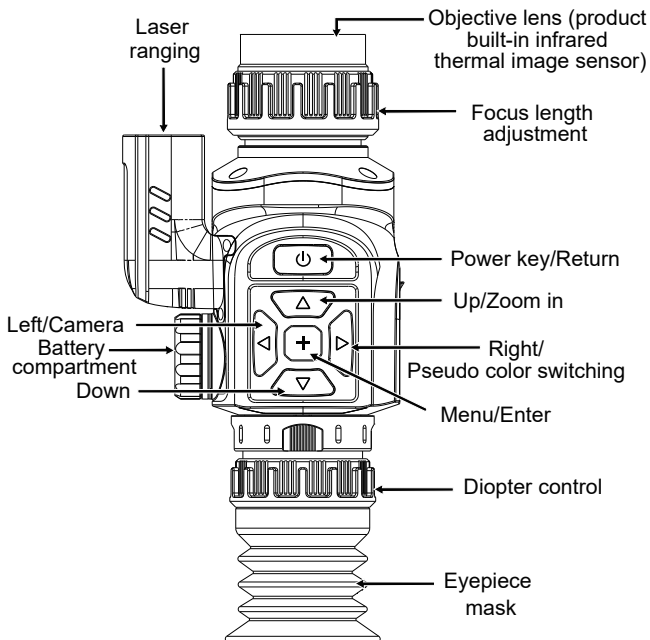
Model	TA201	TA202	TA203
Size(mm)	204x76x65	214x76x65	224x76x73
Weight(g)	530	570	610

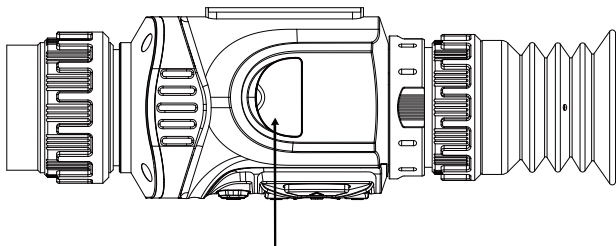
Model	TA101	TA102	TA103
Size(mm)	204x93x65	214x93x65	224x93x73
Weight(g)	625	665	705

Laser ranging

Transmitting aperture	6mm
Receiving aperture	17mm
Ranging range (building)	10m~1200m
Distance measurement accuracy(building)	<400m ±1m, >400m ±0.4%
Laser type	905nm

Introduction to Product Structure





Before use, open the safety cover first Type-C interface

Focus length adjustment: adjust the focus to make the image clearer.

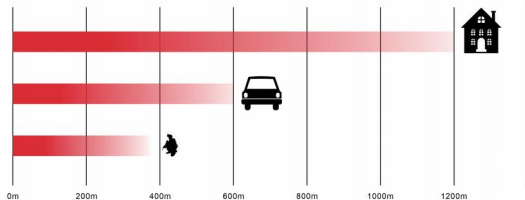
Type-C interface: used for charging batteries and connecting computers to view device photos and video files.

Diopter adjustment: adjust the visual acuity to suit you.

Introduction to Laser Ranging

Distance measurement: Measures the distance of the target object, where the distance value is displayed next to the distance icon.

The effective detection distance is between 10 meters and 1200 meters. The following is a schematic diagram of the effective detection distance of the target object.



The factors that affect ranging capability, ranging response speed, and speed measurement accuracy include:

Target reflectivity: Generally, the higher the target reflectivity, the better the ranging ability and the faster the ranging response speed. For example, for targets with medium reflectivity, it can be measured up to 1500 meters, for targets with high reflectivity, it can be measured up to 1800 meters, and for targets with low reflectivity, it may only be measured up to 600 meters (for targets that are difficult to form diffuse reflection, such as water surfaces, it may not be possible to measure);

Target shape: When the reflection surface area of the measured target is too small or uneven, the ranging ability and ranging response speed will correspondingly decrease;

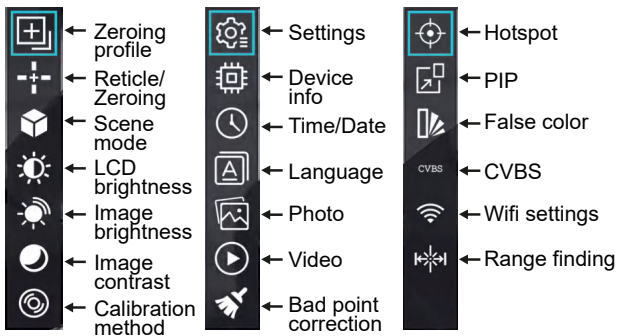
Measurement angle: When the laser angle is perpendicular to the reflection surface of the measurement target, the better the ranging ability, the faster the ranging response speed; otherwise, the ranging ability and ranging response speed will decrease; The use of extreme measurement angles cannot guarantee the range measurement capability and response speed specified in this manual;

Measurement environment: Factors that affect distance measurement capability and response speed also include sunlight intensity, concentration of water vapor and suspended particulate matter in the air, deviation from sunlight exposure angle, etc. (such as reducing measurement range in rainy, foggy, snowy, and hazy weather conditions).

Key Description

Key/status		Press	Hold down
 Power key	Main interface	It can be configure as screen off or freeze frame of picture through the menu.	A shutdown prompt box pops up for shutdown operation
	Menu interface	Return	——
 Menu key	Main interface	——	Enter the menu
	Menu interface	Enter	Return
 Down key	Main interface	LRF:Open distance measurement NON LRF:Brightness adjustment	Switch dividing lines
	Menu interface	Down	——
 Up key	Main interface	Zoom in (1x/2x/4x) or (1x/2x/4x/8x)	Turn on/off PIP
	Menu interface	Up	——
 Right key	Main interface	Pseudo color switching	Refresh shutter
	Menu interface	Right	——
 Left key	Main interface	Camera	Turn on/ off recording
	Menu interface	Left	——

Menu Description



Reticle Group: Set up a scoring group, which can be set to groups A, B, C, D, E, and F.

Reticle settings: Set the reticle, type, color, distance, freeze, and magnification, and set the position of the dashes through the X and Y axes, as shown in the following figure.

Operation method:

Press the up key or down button to select the reticle, type, color, distance, freeze, zoom, and line position, Press the menu key to enter settings. After setting up, press the power key to pop up a window, press the left/right keys to select whether to save parameters, then press the menu button to confirm and exit.

- **Reticle:** Select the scoring and press the menu key to set the scoring. There are 5 types of fixed dashes that can be set for the dashes.

If score 1 is selected, set the type, color and distance position of score. After setting, Hold down the power key to pop up "Save parameter window?" and select OK. At this time, the parameters of score 1 have been set, as shown in the following figure.

- Type: Select the type, press the menu key to set, and you can set 6 scoring types.
- Color: Select a color and press the menu key to set it. You can set six scoring colors: white, black, red, green, blue, cyan.
- Distance: Select the distance, press the menu key to enter, pass the left key or right key (select numbers left and right), press the up key (increase), down key (decrease), and once the setting is completed, press the menu key again to exit.
- Freezing: Select freezing and press the menu key to set on or off. When turning on freeze, the infrared image appears stationary.
- Zoom in: Select zoom in, press the menu key to set, and you can select zoom in 1x, 2x, 4x or 1x, 2x, 4x, 8x.
- X, Y axis: Press the menu key to enter, press the up key (increase) or the down key (decrease) to set the Y value, and press the right key (increase) or the left key (decrease) to set the X value.



← Dashes: Group A
Type: 1
Distance: 1m

Scene mode: Standard, City, Jungle, or Custom modes can be selected. In the custom mode, setting can be made for image detail intensity (1~10) and denoising intensity (1~15) according to the value. Set the image detail intensity (1-3) and noise intensity (1-5) for SR25 and SR25L.

LCD brightness: The display brightness can be adjusted to 1-10 levels.

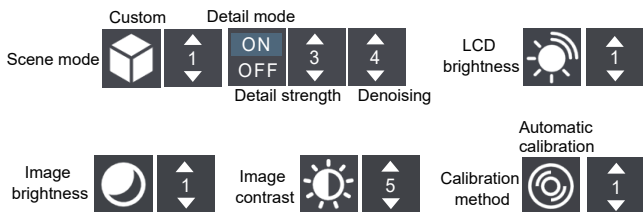
Image brightness: The image brightness can be adjusted by 1-10 levels.

Image contrast: The contrast of the image can be adjusted to 1-10 levels.

Calibration method: The image correction method can be set to manual correction, automatic correction, and scene correction. The calibration methods for SR25 and SR25L can be set to manual calibration or automatic calibration.

Operation method:

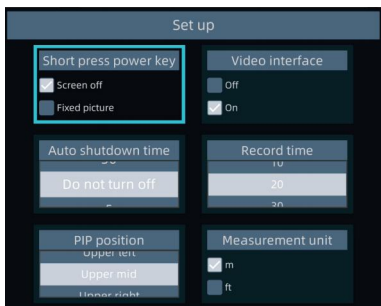
- Hold down the menu key to enter the menu;
 - Press the up key or down key to select the desired setting item, and press the menu key to enter the setting;
 - When setting a value, press the up key (increase) or down key (decrease). After the setting is completed, press the power key to return.
- When entering the scene mode and selecting the custom mode, press the menu key again to pop up the detail mode settings. Press the left key or right key to select the detail mode, detail intensity, or denoising intensity. After selecting it, press the up key(increase) or down key (decrease)to set the numerical value. After setting is completed, pass the power key to exit (when the detail mode is selected as off, it is edge mode setting), as shown in the following figure.



Settings: Set the power key short press function, recording interface, automatic shutdown time, recording duration, and picture in picture position.

- Short press the power key: Can be configure as screen off or freeze frame of picture;
- Video interface: Set whether to bring UI display information when recording;
- Automatic shutdown time: May set no shutdown, 5 minutes, 10 minutes, 20 minutes, 30 minutes.
- Recording duration: Set the duration of each video file, including 5 minutes, 10 minutes, 20 minutes and 30 minutes;
- Position of picture in picture: Set the position of picture in picture in the center, which can be set as upper right, upper mid, upper left, lower right, lower mid and lower left.
- measurement unit: Set the distance measurement unit, which can be set to meters and feet.

Operation method: Press the left key or right key to select the power key short press function, recording interface, automatic shutdown time, recording duration or picture in picture position, and then press the up key or down key to set it. After setting is completed, Pass the power key to exit the setting, as shown in the following figure.



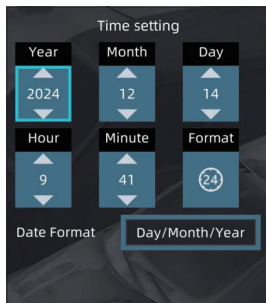
Device info: View the device model, hardware version, firmware version, application version, serial number, You can also update applications, reset parameters, and carry out format for the device as shown in the figure below.

- Application update: Update software.
- Reset parameters: restore the factory settings.
- Format: Clear disk memory (mainly stored images, videos).

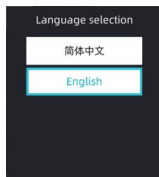


Time/Date: Set the date (year, month, day) and time (hour, minute), time format (12-hour, 24-hour), and date format (year/month/day, day/month/year, month/day/year).

Operation method: Press the left key or right key to select year, month, day, hour, minute, and then press the up key (increase) or down key (reduce) to set it. Press the menu key to convert the time format and press the power key to convert the date formats. After setting, Press the power key to exit the time setting, as shown in the following figure.



Language: The language of the device can be set to Chinese, English. After selecting the language, press the menu key to confirm and exit, as shown in the following figure.



Bad point correction: Manual bad point correction. After entering the bad point correction, press the left key or right key , press the up key or down key to adjust the cursor position, press the menu key to confirm the removal of bad points, and pass the power key to exit bad point correction.

Hotspot: The hot point tracking of infrared images can be set as on or off.

PIP: Set on or off for the picture in picture function.

CVBS: Set the on or off of external screen CVBS.

Display description of the external screen:

- 1.When connecting the external screen to the device, it is necessary to manually enter the device menu to open the CVBS function, and the external screen will only display the device imaging screen.
- 2.When the CVBS function is enabled, it does not support the device to view video files.

Distance measurement: Set the distance measurement mode, which can be set to single mode or scan mode.

Single mode: Short press the down key to measure once based on the target object;

Scan mode: The measurement value changes as the target object moves.

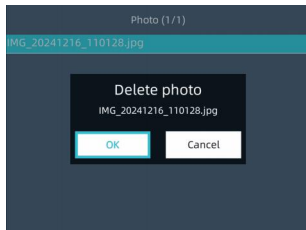
Photos and Videos

View photos: Select photos from the menu, open the photo list, and press the menu key to view the photos. When viewing a photo, press the up key to view the previous photo, and press the down key to view the next photo, press the power key to return.

Photo deletion: In the photo list, pressing the left key will prompt you to delete the photo. Select "OK" and press the menu key to delete the photo, as shown in the following figure.

View Video: Select Video from the menu, open the video list, and press the menu key to view the video.

Delete video: In the video list, press the left key to pop up a prompt to delete the video. Select "OK" and press the menu key to delete the video.



Introduction to the False Color

The false color can be used to change the pseudo color display of infrared images on the display screen. Some color palettes are more suitable for specific applications and can be set as needed. The color palette is divided into six types: white hot, black hot, fire hot, rainbow, iron red, cold color.

These color palettes work best with high thermal contrast, providing additional color contrast between high and low temperatures.

Choosing an appropriate palette can better display the details of the target object.

The following is a picture taken with the same object but different palettes selected:



White hot



Black hot



Red hot



Rainbow



Iron red

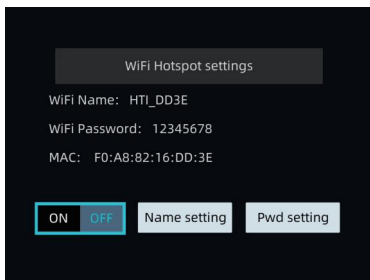


Cold color

WiFi Hotspot Settings

Find WiFi hotspot in the menu and pass the menu key to enter WiFi settings.

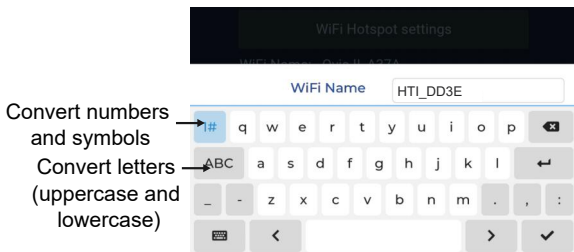
WiFi name, WiFi password, and MAC address can be found, when the hotspot is turned off, the name and password can also be set, as shown in the following figure.



Operation method: After entering WiFi hotspot settings, press the left key or right key to select WiFi on/off, name settings, and password settings.

WiFi on/off setting: Press the menu key to set on or off.

WiFi name and password settings: Press the menu key to enter, press the left key or right key, press up key or down key to select letters. Select and press the menu key to confirm. After the setting is completed, select "√" and press the menu key to confirm and exit the name settings, as shown in the following figure.



Connecting WIFI Hotspot

For Android system, please download the APP software. The name of the APP is ThermalViewer.

Connect the device hotspot after the device is powered on.

The default connection hotspot name for this device is HTI_XXXX (XXXX is the last four digits of the device MAC), password: 12345678.

Open the APP software to enter the interface, the interface is displayed as follows:



“” Gallery, view pictures and videos.

When entering the picture list/video list, check the picture/video and click “” at the top right to delete or share the picture/video.

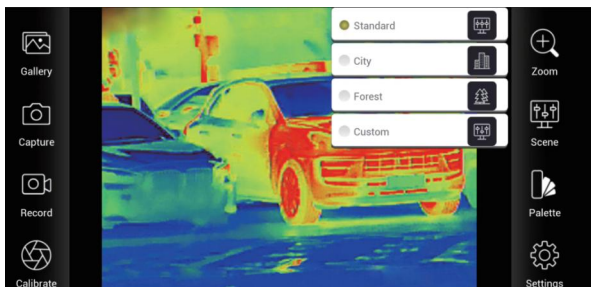
“” Snap the image.

“” Record, click this icon to record video, click again to end recording.

“” Refresh, refresh block.

“” Zoom, Can be enlarged 1x, 2x, 4X,8X.

Click the “” icon to replace the scene. It can be set to standard, city, forest, custom, As shown below.



Click the “” palette icon, which can be set to white hot, black hot, fire hot, rainbow, iron, cool six color palettes.



Click “” to set icons, search device, switch between Russian and English languages, view the version information, As shown below.



Search device: Search the current device and automatically connect.

Version information: View version information.

Note: When the default hotspot is used for the first time, connect the default hotspot.

FCC

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC

Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment

***RF warning for Mobile device:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Product Warranty Card

Product name
Product mode
Purchasing date
User
Contact
Postcode
Contact call
Failure description
Production license number:

Certificate of Quality

Upon inspection, this Product meets the national relevant technical standards. It is allowed to be delivered out of the factory.

Product name: _____

Product model: _____

Inspector: _____

Inspection date: _____

Executive standards: GB/T 19870-2018