

Handheld Thermal Monocular Camera

User Manual

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FCC Information

Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
FCC compliance: 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 equipment should be installed and operated with a minimum distance 20 cm between the radiator and your body.
FCC Conditions
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.
2. This device must accept any interference received, including interference that may cause undesired operation.

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This product and - if applicable - the supplied accessories too are marked with "CE" and comply therefore with the applicable harmonized European standards listed under the EMC Directive 2014/30/EU, the RoHS Directive 2011/65/EU

2012/19/EU (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info



2006/66/EC (battery directive): This product contains a battery that cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: www.recyclethis.info

Industry Canada ICES-003 Compliance

This device meets the CAN ICES-3 (B)/NMB-3(B) standards requirements.

1. This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: this device may not cause interference, and
2. this device must accept any interference, including interference that may cause undesired operation of the device.

1. Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radioexempts de licence. L'exploitation est autorisée aux deux conditions suivantes : l'appareil ne doit pas produire de brouillage, et
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

This equipment should be installed and operated with a minimum distance 20cm between the radiator and your body.

Cet équipement doit être installé et utilisé à une distance minimale de 20 cm entre le radiateur et votre corps.

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
Danger	Indicates a hazardous situation which, if not avoided, will or could result in death or serious injury.
Caution	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results.
Note	Provides additional information to emphasize or supplement important points of the main text.

Safety Instruction

These instructions are intended to ensure that user can use the product correctly to avoid danger or property loss.

Laws and Regulations

- Use of the product must be in strict compliance with the local electrical safety regulations.

Transportation

- Keep the device in original or similar packaging while transporting it.
- Keep all wrappers after unpacking them for future use. In case of any failure occurred, you need to return the device to the factory with the original wrapper. Transportation without the original wrapper may result in damage on the device and the company shall not take any responsibilities.
- DO NOT drop the product or subject it to physical shock. Keep the device away from magnetic interference.

Power Supply

- Please purchase the charger by yourself. Input voltage should meet the Limited Power Source (5 VDC, 2A) according to the IEC61010-1 standard. Please refer to technical specifications for detailed information.
- Make sure the plug is properly connected to the power socket.
- DO NOT connect multiple devices to one power adapter, to avoid over-heating or fire hazards caused by overload.
- The battery charger is included in the package. The input voltage for the supplied battery charger should meet the Limited Power Source (5 VDC, 2 A).

Battery

- Improper use or replacement of the battery may result in explosion hazard. Replace with the same or equivalent type only. The battery type is 18650 with the protection board, and the battery size should be within 19 mm × 70 mm. The rated voltage and capacity are 3.6 VDC/3.35 Ah (12.06 Wh). Dispose of used batteries in conformance with the instructions provided by the battery manufacturer.
- For long-term storage of the battery, make sure it is fully charged every half year to ensure the battery quality. Otherwise, damage may occur.
- Do not charge other battery types with the supplied charger. Confirm there is no flammable material within 2 m of the charger during charging.
- DO NOT place the battery near heating or fire source. Avoid direct sunlight.
- DO NOT swallow the battery to avoid chemical burns.
- DO NOT place the battery in the reach of children.
- The battery can not be charged with external power source directly.
- The device can not be charged, please use the supplied charger to charge the battery.
- Please purchase the adapter by yourself. The using environment of the adapter should be

consistent with that of the device.

Maintenance

- If the product does not work properly, please contact your dealer or the nearest service center. We shall not assume any responsibility for problems caused by unauthorized repair or maintenance.
- Wipe the device gently with a clean cloth and a small quantity of ethanol, if necessary.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the device may be impaired.
- Clean the lens with soft and dry cloth or wiping paper to avoid scratching it.

Using Environment

- Make sure the running environment meets the requirement of the device. The operating temperature shall be -30°C to 55°C (-22°F to 131°F), and the operating humidity shall be 95% or less.
- DO NOT expose the device to extremely hot, cold, dusty, corrosive, saline-alkali, or damp environments.
- This device can only be safely used in the region below 2000 meters above the sea level.
- Avoid equipment installation on vibratory surface or places subject to shock (neglect may cause equipment damage).
- DO NOT aim the lens at the sun or any other bright light.

Emergency

- If smoke, odor, or noise arises from the device, immediately turn off the power, unplug the power cable, and contact the service center.

Laser



When any laser equipment is in use, make sure that the device lens is not exposed to the laser beam, or it may burn out. The laser radiation emitted from the device can cause eye injuries, burning of skin or inflammable substances. Before enabling the light supplement function, make sure no human or inflammable substances are in front of the laser lens. Do not place the device where minors can fetch it.

Manufacture Address

Room 313, Unit B, Building 2, 399 Danfeng Road, Xixing Subdistrict, Binjiang District, Hangzhou, Zhejiang 310052, China
Hangzhou Microimage Software Co., Ltd.

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Chapter 1 Overview

1.1 Device Description

The handheld thermal monocular camera has both thermal observation function and target searching function, and adopts the thermal imaging technology, to get clear view in poor visibility or dark environment.
It helps to view the target, and measure the distance in outdoor condition. The device can be widely used for patrolling, searching and rescuing, hiking, and travel, etc.

1.2 Main Function

- Distance Measurement: The device can detect the distance between the target and the device.
- Highest Temperature Tracking: The device can detect the highest temperature in the scene and mark the spot.
- Client Software Connection: The device can capture snapshots, record videos, and set parameters by T-Vision App after being connected to your phone via hotspot.
- Image Correction: The device supports DPC (Defective Pixel Correction) and FFC (Flat Field Correction) which can optimize the image quality.
- Image Calibration: The device adjusts the thermal view to make it consistent with the optical view.
- Palette: The device supports multiple palettes, and you can set the palette mode according to the scene.
- Fusion: The device can display the fusion of thermal view and optical view.

Note

The distance measurement function is only supported by certain models.

1.3 Appearance

There are two types of handheld thermal monocular cameras. The appearance description of the two types are shown below. Please take the actual product for reference.

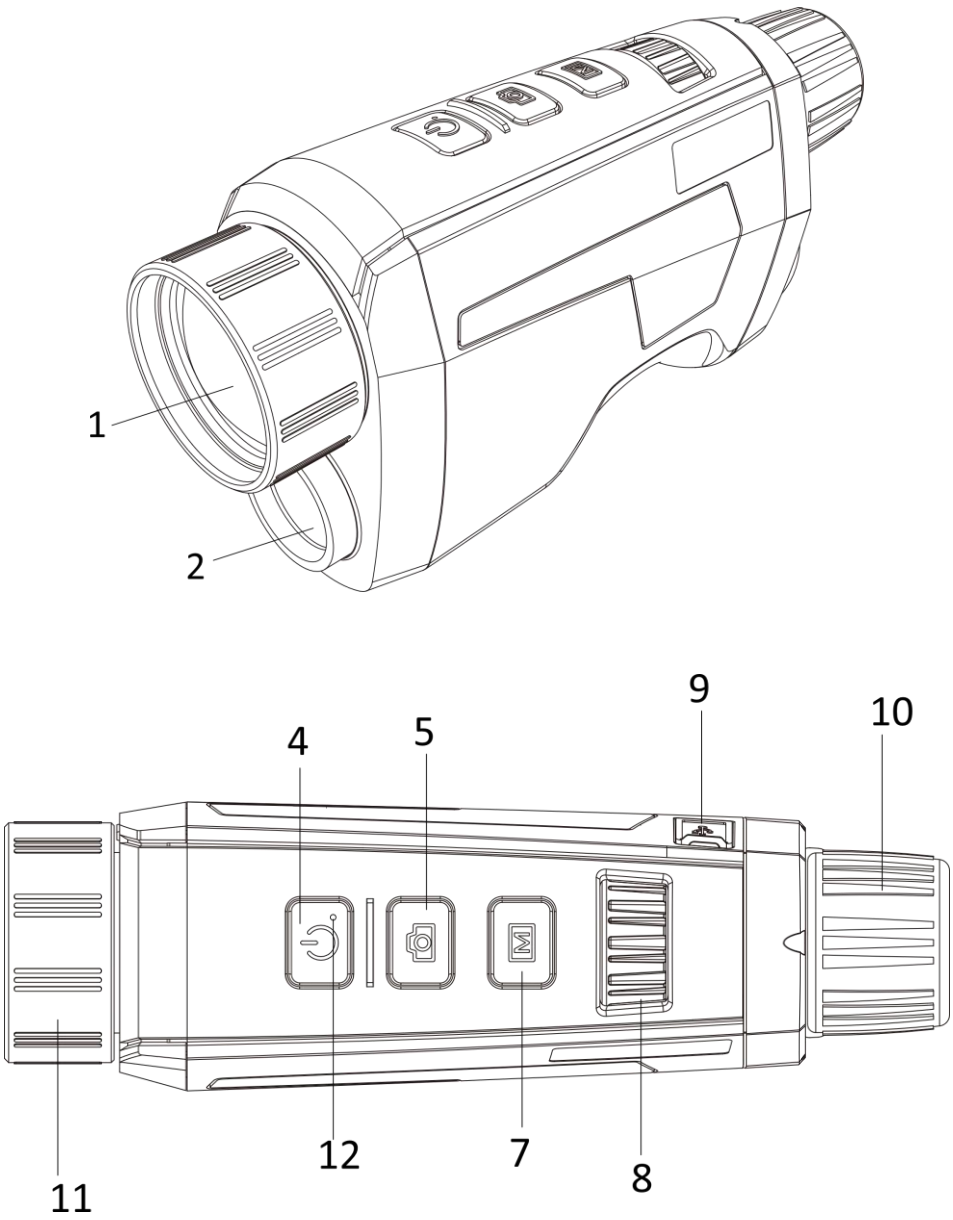


Figure 1-1 Appearance I of the Device

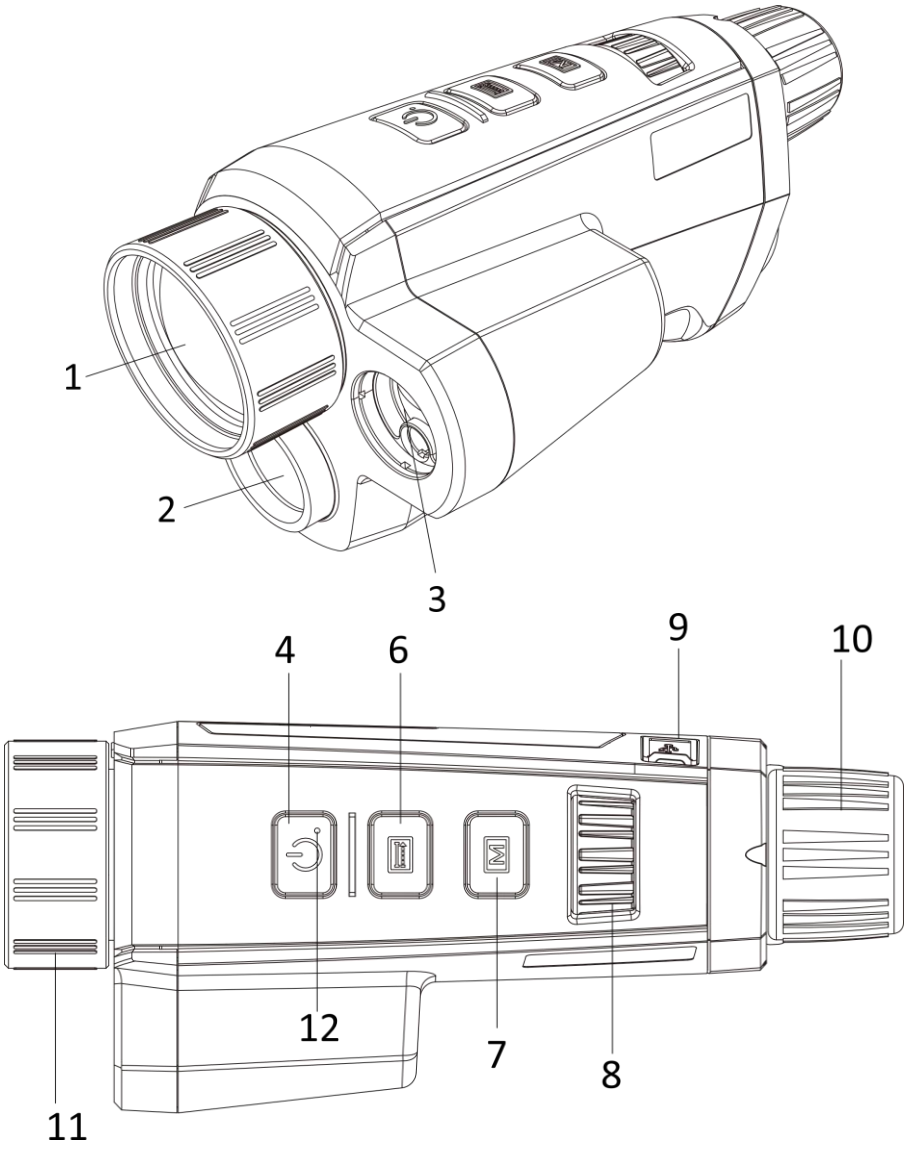


Figure 1-2 Appearance II of the Device

Table 1-1 Buttons and Component of Two Appearances

No.	Description	Function
1	Thermal Lens	● View the thermal image
2	Optical Lens	● View the optical image
3	Laser Range Finder	● Measure the distance with laser.
4	Power Key	● Press: Standby Mode/Wake up Device ● Hold: Power On/Off
5	Capture Key	● Press: Capture ● Hold: Trigger calibration

No.	Description	Function
6	Measure Key	● Press: Capture ● Hold: Measure the distance with laser
7	Menu Key	● Press: Palettes ● Hold: Enter/exit the menu
8	Wheel	● Adjust the digital zoom ● Select functions in menu mode
9	Type-C Interface	● Connect the device with the power adapter ● Connect the device with your PC to export files
10	Eyepieces	● View the target and, adjust the diopter
11	Focus Ring	● Adjust the sight view
12	Indicator	● Indicate the on/off mode of the device

Note

- Press the Measure Key/Capture Key and Menu Key at the same time to start or stop recording.
- Press the Power key, Measure Key/Capture Key and Menu Key at the same time to enter the hidden menu.

Chapter 2 Preparation

2.1 Connect Device

Before You Start

Turn on the device after connecting it to your PC, and keep the device on for 10 to 15 seconds before other operations.

Steps

1. Lift the cable interface cover.
2. Connect the device and power adapter with a Type-C cable to power on the device. Alternatively, connect the device and PC to export files.

2.2 Install Battery

Insert the batteries into the battery compartment.

Steps

1. Press and push the battery compartment lock (shown in the black frame), rotate the battery cover anticlockwise until the marks on the battery cover and the device are aligned, and disassemble the battery cover.

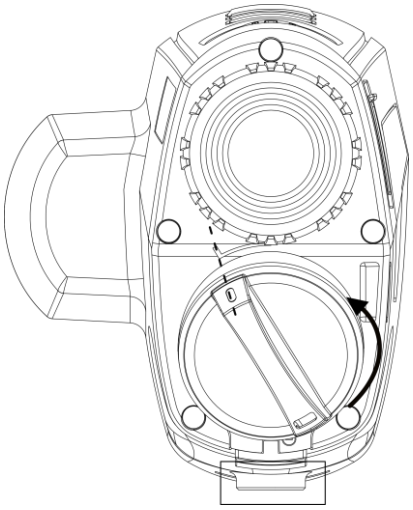


Figure 2-1 Disassemble the Battery Cover

2. Insert the battery into the battery compartment with the positive mark inward.

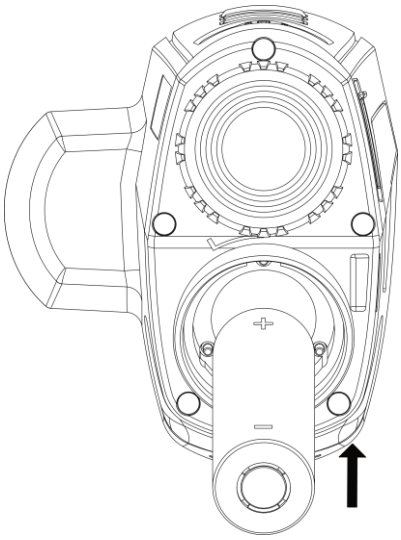


Figure 2-2 Install the Battery

3. Align the marks on the battery cover and the device, and put the battery cover on the battery.

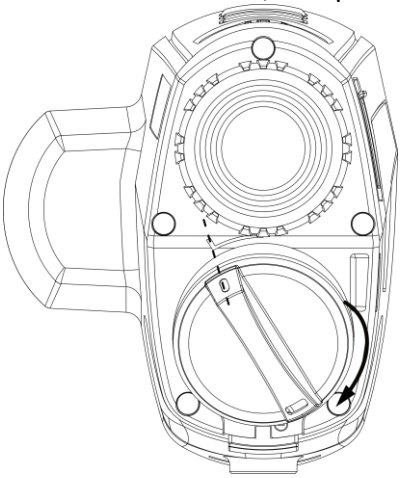


Figure 2-3 Install the Battery Cover

4. Rotate the battery cover clockwise to fix it.

Note

- Remove the battery from the battery compartment if the device is not used for a long time.
- The battery charger is not included in the package. Please purchase it by yourself.

2.3 Power On/Off

Power On

When the battery is enough, press ⏻ to power on the device.

Power Off

When the device is turned on, hold ⏻ for 2 seconds to power off the device.

Note

- See the battery icon for the electricity quantity. 🔋 means the battery is fully charged, and ▭ means that the battery is low.
- When the low power note shows, charge the battery.

2.4 Menu Description

When the device is turned on, hold [M] to show the menu.
In the menu, you can rotate the wheel to select functions, press [M] to configure the selected function, and hold [M] to exit the menu.



Figure 2-4 Menu Interface

Chapter 3 Image Settings

3.1 Set Focus

Steps

1. Power on the device.
2. Hold the device and make sure the eyepiece covers your eye.
3. Adjust the focus ring until the image is clear.

Note

When focusing, do not touch the surface of lens to avoid smearing the lens.

3.2 Adjust Brightness

In the menu mode, rotate the wheel to select and press M to adjust brightness. In white hot mode, the higher the value of brightness is, the brighter the image is. The image effect in white hot mode is showed as picture below and effect in black hot mode is opposite.



Figure 3-1 Adjust Brightness in White Hot Mode

3.3 Adjust Contrast

In the menu mode, rotate the wheel to select and press M to adjust image contrast.

3.4 Select Scene Mode

You can select proper scene mode according to actual using scene to improve the display effect.

Steps

1. Hold M to go to the menu.
2. Rotate the wheel to select and press M to switch scene mode.
   - refers to recognition mode and is recommended in normal scene.
   - refers to jungle mode and is recommended in hunting environment.

3. Hold [M] to save settings and exit.

3.5 Set Palettes

You can select different palettes to display the same scene in different effects. Press [M] in live view interface to switch palettes.

Optical

The image of optical channel is displayed in this mode.



White Hot

The hot part is light-colored in view. The higher the temperature is, the lighter the color is.



Black Hot

The hot part is black-colored in view. The higher the temperature is, the more black the color is.



Red Hot

The hot part is red-colored in view. The higher the temperature is, the redder the color is.



Fusion

From high temperature to low temperature, the image is colored in from white, yellow, red, pink to purple.



Image Fusion

Fuse the optical image with the thermal image. The fused image with clear edge is displayed in

this mode.



3.6 Set Fusion Level

When the palette is set as image fusion, you can adjust the fusion level according to the actual observation distance to obtain better image fusion effect.

Steps

1. Hold [M] to show the menu.
2. Rotate the wheel to select .
3. Press [M] to switch fusion level.

3.7 Adjust Digital Zoom

In the live view interface, rotate the wheel to switch the digital zoom of the device. The value of digital zoom can be set to 1×, 2×, 4×, and 8×.

3.8 Correct Defective Pixel

The device can correct the defective pixels on the screen which are not performed as expected.

Steps

1. Hold [M] to show the menu.
2. Rotate the wheel to select , and press [M] to enter the DPC setting interface.
3. Press [M] to switch the moving direction of the cursor, and rotate the wheel to move the cursor until it reaches the defective pixel.
4. Press [⏎] to correct the defective pixel.

Note

- When Holding [⏎] in the DPC interface, the menu at the bottom of the interface can be

mirrored to the top of the interface.

- The selected defective pixel can be magnified and displayed at the bottom right of the interface.



Figure 3-2 Correct Defective Pixel

3.9 Image Calibration

This function can correct non-uniformity of display.

Steps

1. Hold [M] to go to the menu.
2. Rotate the wheel to select and press [M] to switch the image calibration mode.
   - Manual FFC: Press [M] to correct the non-uniformity of display.
   - Auto FFC: The device performs FFC automatically according to the set schedule when switching on the camera.
   - External: Cover the lens cover, and the press [M] to correct the non-uniformity of display.
3. Hold [M] to exit.

3.10 Set OSD

This function can display or hide the ODS information on the live view interface.

Steps

1. Hold [M] to show the menu.
2. Rotate the wheel to select , and press [M] to enter the OSD setting interface.
3. Rotate the wheel to select the OSD information you want to display or hide.
4. Press [M] to enable or disable the selected OSD information.

3.10.1 Synchronize Time

Steps

1. Hold [M] to show the menu.
2. Rotate the wheel to select , and press [M] to enter the time setting interface.
3. Press [M] to switch the time system, and rotate the wheel to select the time and date to be synchronized.
4. Press [M] and rotate the wheel to set the time and date, and press [M] again to finish the setting.
5. Hold [M] to save settings and exit.

Chapter 4 Burning Prevention

This function can prevent the detector of the thermal channel from being burned. When enabling this function, the shield will close if the grey scale of the detector reaches a certain value.

Steps

1. Hold [M] to show the menu.
2. Rotate the wheel to select , and press [M] to enable or disable the burn-prevention function.

Note

When the burn-prevention function is disabled, the shield should be opened if it closes.

Chapter 5 Highest Temperature Tracking

The device can detect the highest temperature spot in the scene and mark it on display.

Steps

1. Hold [M] to show the menu.
2. Rotate the wheel to select , and press [M] to mark the spot of highest temperature.

Result

When the function is enabled, ⊹ displays in the spot of highest temperature. When the scene changes, the ⊹ moves.



Figure 5-1 Highest Temperature Tracking

Chapter 6 Measure Distance

The device can detect the distance between the target and the observation position with laser.

Before You Start

When measuring the distance, keep the hand and the position steady. Otherwise, the accuracy may be affected.

Steps

1. Hold [M] to show the menu.
2. Rotate the wheel to select , and press [M] to enable **Laser Ranging**.
3. Hold [M] to return to the live view interface.
4. Aim the cursor at the target and hold the [⌨] key to measure the target distance.

Result

The distance measurement result is displayed at the upper right of the image.



Figure 6-1 Distance Measurement Result

Note

The laser ranging function is only supported by certain models.

Chapter 7 Picture and Video

You can manually record video or capture picture when displaying live view.

7.1 Capture Picture

In the main live view interface, press to capture picture.

Note

When capturing succeeds, the image freezes for 1 second and a prompt shows on the display. For exporting captured pictures, refer to ***Export Files***.

7.2 Record Video

Steps

1. In the live view interface, press and M at the same time to start recording.



Figure 7-1 Start Recording

The left top of image displays the information of recording time.

2. Press and M at the same time again to stop recording.

What to do next

For exporting recording files, refer to ***Export Files***.

7.3 Export Files

This function is used to export recorded videos and captured pictures.

Before You Start

- Turn off the hotspot function.
- Turn on the device after connecting it to your PC, and keep the device on for 10 to 15 seconds before other operations.

Steps

1. Connect the device and PC with a Type-C cable.

Note

Make sure the device is turned on when connecting the cable.

2. Open computer disk and select the disk of device. Go to the **DCIM** folder and find the folder named after the capture year and month. For example, if you capture a picture or record a video on June 2021, go to **DCIM → 202106** to find the picture or video.
3. Select and copy the files to PC.
4. Disconnect the device from your PC.

Note

- The device displays images when you connect it to PC, but functions such as recording, capturing and hotspot are disabled.
- When you connect the device to PC for the first time, it installs the drive program automatically.

Chapter 8 Client Software Connection

Connect the device to the T-Vision App via hotspot, then you can capture picture, record video, or configure parameters on your phone.

Steps

1. Hold to show the menu of device.
2. Press to enable hotspot function.
3. Turn on the WLAN of your phone and connect to the hotspot.
   - Hotspot Name: Wlan-IPTS Serial No.
   - Hotspot Password: the last 9 digits of serial No.
4. Scan the QR code to download and install the App.

Android System

iOS System

5. Open the App and connect your phone with the device. You can view the interface of device on your phone.

Note

- The device can not connect to the App if entering wrong password several times. Refer to ***Restore Device*** to reset the device, and connect the App again.
- The device should be activated for the first use. The default password must be changed after the activation.

Chapter 9 CVBS Output

View the device image on the display unit for details.

Before You Start

Connect the device to the display unit via CVBS interface of the aviation plug. Refer to Section ***Cable Connection***.

Steps

1. Hold [M] to show the menu.
2. Select CVBS, and press [M] to switch on CVBS.

Note

The CVBS cable is not included in the package, please purchase it by yourself.

9.1 Cable Connection

Connect the device with the aviation cable, and you can connect the device to your PC via USB interface or the monitor via the BNC interface.

Caution

- DO NOT drag the cables when you do the connecting, or when it is connected to the device.
- To plug in/out the cable, hold the cable end and then plug in/out it. DO NOT twist the cables, or the pins inside may be damaged.

Chapter 10 Language Settings

You can select the device language in this function.

Steps

1. Hold [M] to show the menu.
2. Rotate the wheel to select , and press [M] to enter the language configuration interface.
3. Rotate the wheel to select the language as required, and press [M] to confirm.

Chapter 11 Maintenance

This part introduces the operation of checking device information, upgrading device, and restoring to defaults, etc.

11.1 View Device Information

Steps

1. Hold [M] to show the menu of device.
2. Select [i], and press [M]. You can view the device information such as version, and serial No.

11.2 Upgrade Device

Before You Start

- Please get the upgrade package (including Main Firmware and FPGA Firmware) first.
- Make sure the hotspot function is disabled.
- Turn on the device after connecting it to your PC, and keep the device on for 10 to 15 seconds before other operations.

Steps

1. Connect the device to your PC with cable, and then turn on the device.
2. Open the detected disk, copy the upgrade file and paste it to the root directory of the device.
3. Hold [⏻] to reboot the device, and the device upgrades automatically. The upgrading process will be displayed in the main interface.

> **Note**
>
> During the upgrade, make sure the device is connected to your PC. Otherwise, it may cause unnecessary upgrade failure, firmware damage, etc.

4. Repeat the above steps to upgrade all firmwares one by one.

11.3 Restore Device

Steps

1. Hold [M] to show the menu of device.
2. Select [⚙], and press [M] to restore the device to defaults according to the prompt.

Chapter 12 Frequently Asked Questions

12.1 Why is the monitor off?

Check whether the device is off-battery. Check the monitor after charging the device for 5 minutes.

12.2 The image is not clear, how to adjust it?

Adjust the diopter adjustment knob until the image is clear. Refer to section 3.1.

12.3 Capturing or recording fails. What's the problem?

Check the following items.

- Whether the device is connected to your PC. Capturing or recording is disabled in this status.
- Whether the storage space is full.
- Whether the device is low-battery.

12.4 Why the PC cannot identify the device?

Check the following items.

- Whether the device is connected to your PC with supplied USB cable.
- If you use other USB cables, make sure the cable length is no longer than 1 m.
- Whether the hotspot function is turned on. If so, go to device menu and turn off hotspot.

Chapter 13 Appendix

13.1 Device Command

Scan the following QR code to get device common serial port commands.
Note that the command list contains the commonly used serial port commands for HIKMICRO thermal cameras.

13.2 Device Communication Matrix

Scan the following QR code to get device communication matrix.
Note that the matrix contains all communication ports of HIKMICRO thermal cameras.

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