Thermal Handheld Thermography Camera

Quick Start Guide

V1.0.0

Foreword

General

This manual introduces the functions and operations of the thermal handheld thermography camera (hereinafter referred to as "the Camera").

Safety Instructions

The following categorized signal words with defined meaning might appear in the manual.

Signal Words	Meaning
DANGER	Indicates a high potential hazard which, if not avoided, will result in death or serious injury.
WARNING	Indicates a medium or low potential hazard which, if not avoided, could result in slight or moderate injury.
CAUTION	Indicates a potential risk which, if not avoided, could result in property damage, data loss, lower performance, or unpredictable result.
TIPS	Provides methods to help you solve a problem or save you time.
NOTE	Provides additional information as the emphasis and supplement to the text.
LASER RADIATION	Indicates a laser radiation hazard. Take care to avoid exposure to a laser beam.

Revision History

Version	Revision Content	Release Time
V1.0.0	First release.	July 2021

Privacy Protection Notice

As the device user or data controller, you might collect the personal data of others such as their face, fingerprints, and license plate number. You need to be in compliance with your local privacy protection laws and regulations to protect the legitimate rights and interests of other people by implementing measures which include but are not limited: Providing clear and visible identification to inform people of the existence of the surveillance area and provide required contact information.

About the Manual

- The manual is for reference only. Slight differences might be found between the manual and the product.
- We are not liable for losses incurred due to operating the product in ways that are not in

compliance with the manual.

- The manual will be updated according to the latest laws and regulations of related jurisdictions. For detailed information, see the paper user's manual, use our CD-ROM, scan the QR code or visit our official website. The manual is for reference only. Slight differences might be found between the electronic version and the paper version.
- All designs and software are subject to change without prior written notice. Product updates might result in some differences appearing between the actual product and the manual. Please contact customer service for the latest program and supplementary documentation.
- There might be errors in the print or deviations in the description of the functions, operations and technical data. If there is any doubt or dispute, we reserve the right of final explanation.
- Upgrade the reader software or try other mainstream reader software if the manual (in PDF format) cannot be opened.
- All trademarks, registered trademarks and company names in the manual are properties of their respective owners.
- Please visit our website, contact the supplier or customer service if any problems occur while using the device.
- If there is any uncertainty or controversy, we reserve the right of final explanation.

Important Safeguards and Warnings

This chapter introduces the content covering the proper handling of the product, hazard prevention, and prevention of property damage. Read these contents carefully before using the product, comply with them when using, and keep the manual safe for future reference.

Power Requirements

- All installation and operation must conform to your local electrical safety code.
- Make sure that the power supply is correct before operating the Camera.
- The power supply must conform to the requirements of ES1 in IEC 62368-1 standard and be no higher than PS2. Note that the power supply requirements are subject to the device label.
- Install an easy-to-use Camera for power off before installing wiring, which is for emergency power off when necessary.
- Prevent the line cord from being trampled on or squeezed, especially the plug, power socket and the junction from the Camera.

Application Environment Requirements

- Use the Camera within allowed temperature range to measure the objects.
- Use the Camera within allowed humidity (< 95% relative humidity) and altitude (< 3000 m).
- Do not use, store, or transport the Camera beyond the specific temperature and humidity range.
- Do not use the Camera in corrosive environment, such as high salt spray area, sea, coastal area, environment with acid gas, chemical plant, and others.
- Do not use the Camera in strong vibration environment, such as vehicle, ship, and others.

Contact the sales staff if you need to use the Camera in the above situation. Special models or specially customized Camera that meet your requirements will be provided for you. We are not responsible for any improper operation.

- Do not place the Camera in humid, dusty, extremely hot and cold sites with strong electromagnetic radiation or unstable illumination.
- Do not block the ventilation of the Camera to avoid heat accumulation.
- Do not install the Camera near a heat source such as a radiator, heater, and stove to avoid fire.
- Do not aim the lenses at an intense radiation source (such as sun, laser, and molten steel) to avoid damage to thermal detector and visual lens.
- Prevent liquid from flowing into the Camera to avoid damage to the internal components. In case the liquid enters the Camera, immediately stop using the Camera, cut off the power, and disconnect all the cables, and then contact the local customer service center.
- Do not stuff foreign materials into the Camera to prevent a short circuit which could result in Camera being damaged or people becoming injured.
- Use the factory default package or material with equal quality to pack the Camera when transporting the Camera.

- Do not tilt the package more than 30° in transit. There is a label on the surface of the package. That indicates if the tilted-angle is suitable. It is recommended to slowly carry or transfer the in a horizontal position.
- Do not press, vibrate or soak the Camera during the whole process of transportation, storage and installation. There are vibration-labels both on the package and Camera. If the vibration amplitude or frequency is exceeded, the Camera damaged. Please ensure the transportation condition and site environment is stable and follow the above requirements.
- The lens, potentiometer, pan-tilt unit and cooling unit are consumable components. To ensure their life expectancy, do not allow the Camera zoom or focus, pan-tilt unit and cooling unit to run uninterruptedly for a long time.

Operation and Maintenance Requirements

- Do not disassemble the Camera, for there are no components inside that can be repaired by yourself.
- An air blower can be used to clean the dust and filth on the lens.

- Use the accessories regulated by the manufacturer. The Camera must be installed and maintained by professionals.
- Contact the local dealer or the nearest service center if the Camera fails to work normally.

Do not aim the laser light at human eyes.

Table of Contents

1 Introduction

The thermal handheld thermography camera is used for measuring temperatures for industrial applications. It promotes non-contact and rapid temperature measurement of the targets and will alert you to any temperature anomalies. Extremely versatile and easy-to-use, it features the following functions:

- Simply point the laser light of the Camera at targets to view their temperature readings in seconds.
- Press the trigger once to get a temperature readout on the built-in LCD display. Press the trigger twice to capture images or three times to start recording.
- If an abnormal temperature is detected, the Camera can be programmed to notify you with its built-in buzzer.

2 Checklist

Check the package according to the following checklist. You need to purchase the tools or accessories not included in the package separately.

Figure 2-1 Checklist

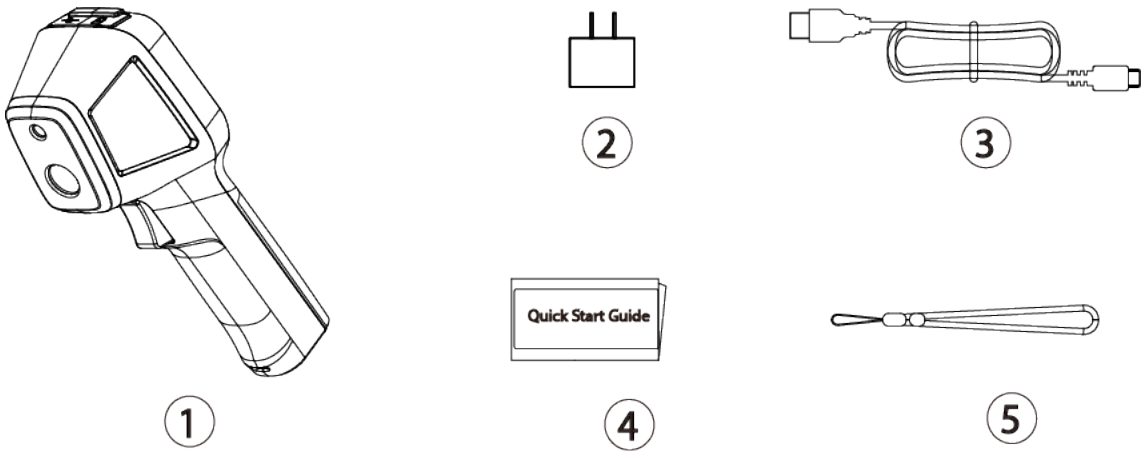


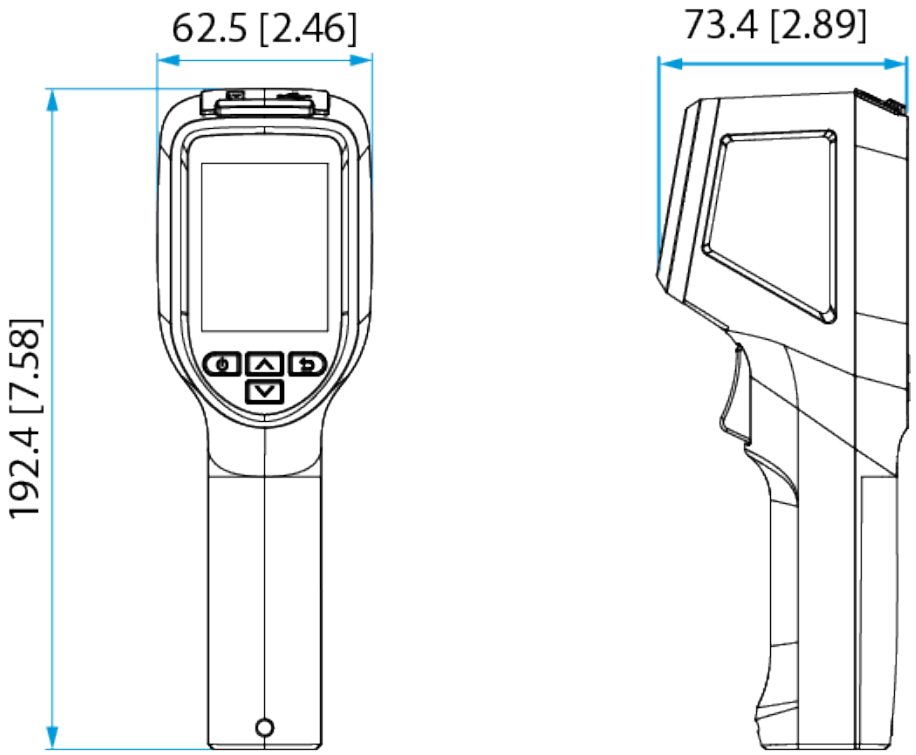
Table 2-1 Checklist

No.	Name	No.	Name
1	Camera	2	Adapter Five plugs are provided for Chinese, American, European, Australian, and British standards.
3	USB cable	4	Quick start guide
5	Wrist rope	—	—

3 Structure

3.1 Dimensions

Figure 3-1 Dimensions (mm [inch])



3.2 Appearance

Figure 3-2 Front interface

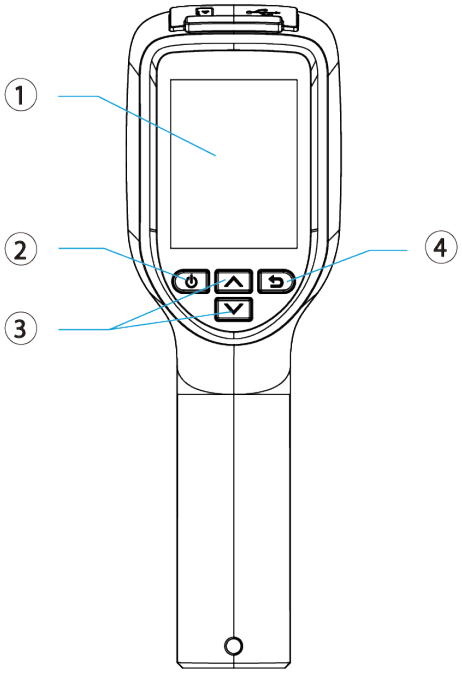


Table 3-1 Front interface introduction

No.	Component	Description
1	Display screen	Displays live interface and menu interface.
2		• Press and hold to power on or off the Camera. • On the live interface, press , and the Camera goes to the standby state; under standby state, press any button to wake up the Camera. • On the **Menu** interface, press to go to the submenu interface. When pressing and holding the power button, stop pressing it after a hearing ticking sound.
3	/	• On the live interface, press to go to the **Menu** interface. • On the **Menu** interface, press to go to different interfaces to configure parameters, including **Temp Settings** interface, **Temp Measurement** interface, **Picture Search** interface, **Video Search** interface, **System Settings** interface and **system Info** interface.
4		Exit or return to the previous menu.

Figure 3-3 Side interface

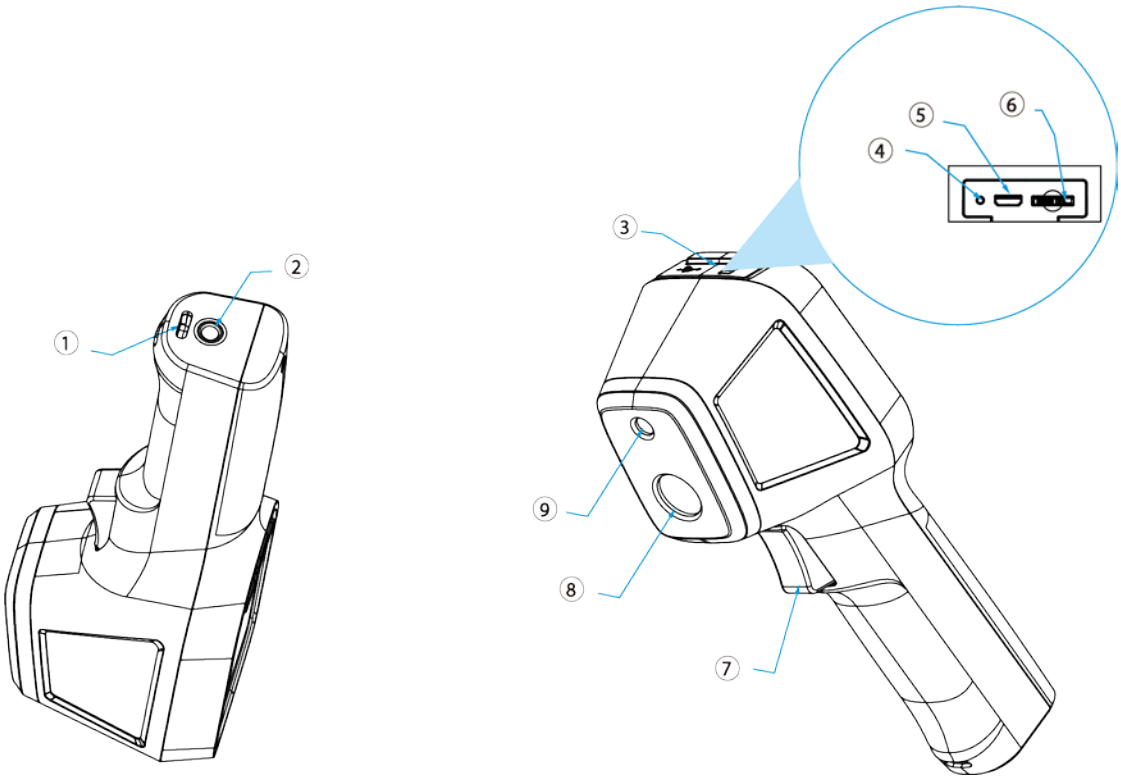


Table 3-2 Side interface introduction

No.	Component	Description
1	Wrist rope hole	Used for threading wrist rope.

No.	Component	Description
2	Tripod port	Used for installing a tripod.
3	Silicon plug	—
4	Charging indicator light	• Red light on: Charging. • Green light on: Full charged. The battery can be recharged repeatedly, but it is a wearable product. If the standby time of the Camera has been greatly reduced, contact the after-sales support to replace the battery.
5	USB port	Used for connecting the USB cable.
6	SD card slot	Used for installing a SD card.
7	Trigger button	• On the live interface, press the trigger button twice to capture images. • On the live interface, press the trigger button 3 times to start recording, and then press 3 times to stop recording. • On the **Menu** interface, press the trigger button to return to the live interface. • Under the standby state, press the trigger button to wake up the Camera.
8	View window	The detector inside the camera will analyze the target scene, and capture it in an image through the view window.
9	Laser light	Locate the target. The position of the light marks the center position of the target in the live view window.

4 Basic Operations

The Camera supports temperature measurement, image capturing and video recording during temperature measurement.

The manual is for reference only. Slight differences might be found between the manual and the product.

4.1 Installing SD card

Install an SD card before you can store images and record videos.

Step 1 Open the silicone plug on the top of the Camera.

Step 2 Face the label side of the SD card to the Camera screen, and then insert the SD card slowly until you hear a click sound.

Step 3 Cover the silicone plug.

The SD card does not support hot swapping during image capturing or recording.

4.2 Enabling Laser Light

Enable the laser light function first before you can use laser light to view temperature readings of the target.

Step 1 Press to wake up the Camera.

Step 2 On the live interface, press to enter the **Menu** interface.

Step 3 Press , select **System Settings**, and then press to enter the **System Settings** interface.

Step 4 Select **Laser Light**, and then press to enable **Laser Light**.

Step 5 Press to return to the **View** interface.

Press the Trigger button, point the Camera towards the targets with laser light, and the target temperature will be displayed.

4.3 Measuring Target Temperature

Configure alarm threshold and turn on the linkage buzzer. When the target temperature exceeds the defined threshold, an alarm will be triggered.

Step 1 Press to wake up the Camera.

Step 2 Align the Camera with the target.

Step 3 Press the Trigger button, and the target temperature will be displayed.

For details on operating alarm threshold and the linkage buzzer, see "5.2 Temperature Measurement Settings".

Figure 4-1 Measure target temperature

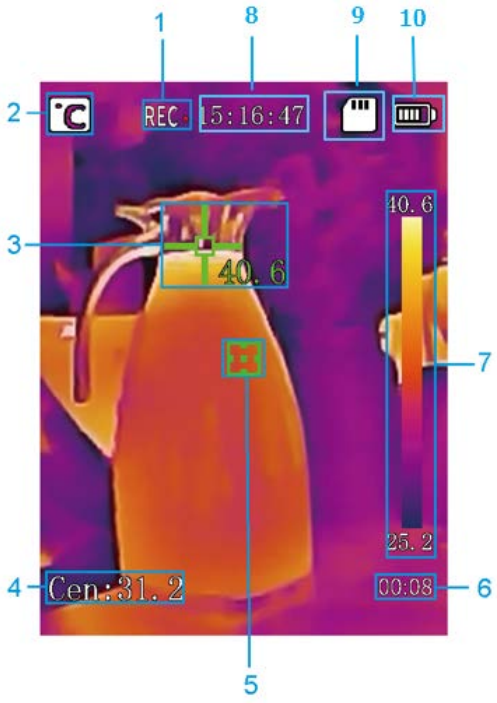


Table 4-1 Live interface

No.	Name	No.	Name
1	Recording videos	6	Record time
2	Unit	7	Color bar
3	Max temp point	8	Time
4	Center spot temperature	9	Memory card state
5	Center spot	10	Power usage

4.4 Capturing Images

You can capture images manually and record temperature measurement information.

Step 1 Press to wake up the Camera.

Step 2 On the live interface, press the trigger button twice to capture an image, or press to enter the **Menu** interface and then select **Picture Search** to start capturing.

If no SD card is installed, "No SD Card" will prompt.

4.5 Recording Videos

You can record videos manually.

Step 1 Press to wake up the Camera.

Step 2 On the live interface, press the Trigger button 3 times to start recording, or press to enter the **Menu** interface, and then select **Video Search** > **Video** to record videos.

If no SD card is installed, "No SD Card" will prompt.

Step 3 Press to finish the recording.

4.6 Exporting Images and Recorded Videos

You can export images and recorded videos locally by connecting the Camera to your PC with a USB cable.

Step 1 Press to wake up the Camera.

Step 2 On the live interface, press to enter the **Menu** interface. Select **System Settings** > **USB option** > **USB Flash Drive mode**.

Step 3 Open the silicone plug on the top of the Camera.

Step 4 Connect the Camera to your PC with the USB cable.

Step 5 Double-click to open **My Computer**, go to the folder where the images and recorded videos are stored, and then copy them to your PC.

Images can be viewed by image viewing software. Videos need to be played by a special video player.

Step 6 Disconnect the USB cable from your PC after copying the images.

4.7 Update

You can update the Camera using the SD card.

Prerequisites

- The upgrade program named "update.img" has been obtained and is saved in the root directory of the SD card.
- The SD card is installed on the Camera. See "4.1 Installing SD card."
- Make sure that the battery capacity exceeds 50% during the upgrade. You can charge the Camera by connecting it to a computer or charger.

Procedure

Step 1 Turn off the Camera.

If the Camera is on, press and hold to turn off the Camera.

Step 2 Press and hold and buttons at the same time to start upgrade.

- Be patient and do not perform other operations during the upgrade.
- Do not disconnect the power supply during the upgrade; otherwise the Camera might not be able to start.

Step 3 After the upgrade, the Camera will restart automatically, and then enter the live interface.

Step 4 Press and hold ⏻ to back up the new program. After hearing a ticking sound, the Camera will back up the program automatically. Wait until the Camera enters the live interface.

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- Do not perform any operation during the backup.
- The Camera will be automatically restored to the backup program if the upgrade fails.

5 Function Configuration

Supports configuring temperature parameters, temperature alarm, and viewing image and video files.

The battery life will decrease when you turn on head temperature measurement, alarm linkage, snapshot linkage, and video recording linkage.

5.1 Temperature Settings

The Camera supports measuring the real-time temperature of target objects in different scenarios. Because temperature measuring parameters affect the accuracy of measurement results, you need to configure the temperature measuring parameters before measurement.

Step 1 Press to wake up the Camera.

Step 2 On the live interface, press to enter the **Menu** interface, and then select **Temp Settings**.

Step 3 Configure temperature measurement parameters.

1) Press / to select parameters.
2) Press to confirm.
3) On the parameter configuration interface, press / to increase or decrease the parameter value.

Table 5-1 Temperature parameters description

Parameter	Description
Temperature range	The Camera supports low temperature range and high temperature range. It is recommended to prioritize the low temperature when measuring the temperature as this is more accurate.
Centre spot	(Optional) Press to turn on/off.
Color bar	The Camera can display the minimum and maximum temperature through the color bar. ● Turn on **Color Bar**, and the color bar will be displayed on the live interface. ● (Optional) Press to turn on/off.
Pseudo color	There are four pseudo color modes: White-hot, black-hot, ironbow, and rainbow. ● The Camera can display images in different colors if you select different pseudo color modes. ● It is recommended to configure pseudo color mode as ironbow. ● (Optional) Press to turn on/off.

Parameter	Description
Emissivity	The default value is 0.97.
Distance	The distance between the measuring target and the Camera. Make sure that the actual distance is consistent with this value, otherwise the accuracy will be affected.
Unit	Temperature unit: °C, °F and K. You can switch the temperature unit by pressing .

Step 4 Press to save your configurations and quit.

5.2 Temperature Measurement Settings

The Camera supports temperature measurement. An alarm will be triggered when the temperature of the measured target exceeds the alarm threshold.

Step 1 On the live interface, press to enter the **Menu** interface.

Step 2 Press **Temp Measurement**.

Step 3 Configure temperature measurement parameters.

1) Press / to select parameters.
2) Press to confirm.
3) On the parameter configuration interface, press / to increase or decrease the parameter value.

Table -5 -2 Parameter description of temperature measurement

Parameter	Description
Alarm Settings	• **Threshold**: An alarm will be triggered when the temperature of the measured target exceeds the defined alarm threshold. On the live interface, the temperature that exceeds the alarm threshold flashes and is displayed in red. • **Snapshot**: Whether to enable snapshot when an alarm is triggered. • **Buzzer**: Whether to beep when an alarm is triggered. Enabling snapshot or buzzer will reduce the battery life of the Camera.
Temp Correction	The measured temperature and the actual values might not be the same due to many factors. You can select multiple objects for testing, and then correct the temperature deviation according to the results. For example: • If the measured temperature is 0.5 °C (41 °F) lower than the actual temperature, the correction value is configured to 0.5 °C (41 °F); • If the measured temperature is 0.5 °C (31.1 °F) higher than the actual temperature, the correction value is configured to –0.5 °C (31.1 °F).

Step 4 Press to save your configuration and exit.

5.3 Viewing Images

SD Card has been installed. For details on installing SD card, see "4.1 Installing SD card."

Step 1 Press to wake up the Camera.

Step 2 On the live interface, press to enter the **Menu** interface. Select **Picture Search** > **View Picture** to view pictures.

Step 3 (Optional) Press to turn on/turn off **Save Temp Pic**.

The interface displays the folder named after the capture date.

Step 4 Press to view the image.

- On the **View Picture** interface, press / to switch images.
- Press to delete the selected images.

Step 5 Press to save the configuration and quit.

5.4 Viewing Recorded Video Files

SD Card has been installed. For details on installing an SD card, see "4.1 Installing SD card."

Step 1 Press to wake up the Camera.

Step 2 On the live interface, press to enter the **Menu** interface.

Step 3 Select **Video Search > View Video**.

The interface displays the folder named after the recording date. Press to view information on the recoding video.

- On the **View Video** interface, press / to select a video.
- On the **View Video** interface, press to delete the video.

Figure 5 -3 Video file information

Parameters	Parameters Description
Video Duration	Video length.
File Size	Unit: kb.
Encoding Format	Only H.265 is available.
Recording Time	The start time of the recording.

Step 4 Press to save your configuration and exit.

6 System Settings

You can configure the general system parameters of the Camera.

Step 1 Press to wake up the Camera.

Step 2 On the live interface, press to enter the **Menu** interface. Select **System Settings**, and then press to confirm.

Step 3 Configure system parameters.

1) Press / to select parameters.
2) Press to confirm.
3) On the parameter configuration interface, press / to increase or decrease the parameter value.

Figure 14-1 System settings parameters

Parameter	Description
USB Option	There are two ways to connect the Camera to PC: ● **PC Preview Mode**: Download DH Thermal to PC and connect the camera to the PC with the USB cable. The client interface will display the live interface of the Camera. For details on operating the client, see DH Thermal_User's Manual. ● **USB Flash Drive Mode**: Use a USB cable to connect camera and computer, and transfer image/video files to the computer. You can turn off the USB connection by pressing **off** to save electricity.
Laser Light	Point the laser light of the Camera at targets to view their temperature readings in seconds
Time and Date	Configure the current time (24-hour time system) and date.
Brightness	Press to configure the level (**Low**, **Medium**, **High**). The higher the level, the brighter the screen. Configuring higher brightness will reduce battery usage.
Auto Maintain	● **Auto Standby:** Press to switch the time. It can be configured to 5 minutes, 10 minutes, 15 minutes, and off. ● **Auto Shutdown**: Press and select auto turning off; press to switch the time. It can be configured to 15 minutes, 30 minutes, 45 minutes, 60 minutes, and off. The auto standby time must be less than or equal to the auto shutdown time.
Restore Defaults	(Optional) Press and then **Yes** to restore to factory settings. Press **No** to cancel this action. Press **Yes**, and the camera will be restored to its factory settings. Be cautious.

Parameter	Description
Reset Device	(Optional) Press and **Yes** to reset the Camera. Press **No** to cancel resetting.

7 System Information

You can view basic information on the Camera.

Step 1 Press ⏻ to wake up the Camera.

Step 2 On the live interface, press ⏶ to enter the **Menu** interface.

Step 3 Select **System Information**, press ⏻ to confirm, and then you can view system parameters, including device type, system version, thermal core version, S/N, battery information and storage information.

Appendix 1 Cybersecurity Recommendations

Mandatory actions to be taken for basic device network security:

1. **Use Strong Passwords**

   Please refer to the following suggestions to set passwords:

   - The length should not be less than 8 characters.
   - Include at least two types of characters; character types include upper and lower case letters, numbers and symbols.
   - Do not contain the account name or the account name in reverse order.
   - Do not use continuous characters, such as 123, abc, etc.
   - Do not use overlapped characters, such as 111, aaa, etc.

2. **Update Firmware and Client Software in Time**

   - According to the standard procedure in Tech-industry, we recommend to keep your device (such as NVR, DVR, IP camera, etc.) firmware up-to-date to ensure the system is equipped with the latest security patches and fixes. When the device is connected to the public network, it is recommended to enable the "auto-check for updates" function to obtain timely information of firmware updates released by the manufacturer.
   - We suggest that you download and use the latest version of client software.

"Nice to have" recommendations to improve your device network security:

1. **Physical Protection**

   We suggest that you perform physical protection to device, especially storage devices. For example, place the device in a special computer room and cabinet, and implement well-done access control permission and key management to prevent unauthorized personnel from carrying out physical contacts such as damaging hardware, unauthorized connection of removable device (such as USB flash disk, serial port), etc.

2. **Change Passwords Regularly**

   We suggest that you change passwords regularly to reduce the risk of being guessed or cracked.

3. **Set and Update Passwords Reset Information Timely**

   The device supports password reset function. Please set up related information for password reset in time, including the end user's mailbox and password protection questions. If the information changes, please modify it in time. When setting password protection questions, it is suggested not to use those that can be easily guessed.

4. **Enable Account Lock**

   The account lock feature is enabled by default, and we recommend you to keep it on to guarantee the account security. If an attacker attempts to log in with the wrong password several times, the corresponding account and the source IP address will be locked.

5. **Change Default HTTP and Other Service Ports**

   We suggest you to change default HTTP and other service ports into any set of numbers between 1024–65535, reducing the risk of outsiders being able to guess which ports you are using.

6. **Enable HTTPS**

   We suggest you to enable HTTPS, so that you visit Web service through a secure communication channel.

7. **MAC Address Binding**

   We recommend you to bind the IP and MAC address of the gateway to the device, thus reducing

the risk of ARP spoofing.

8. **Assign Accounts and Privileges Reasonably**

   According to business and management requirements, reasonably add users and assign a minimum set of permissions to them.

9. **Disable Unnecessary Services and Choose Secure Modes**

   If not needed, it is recommended to turn off some services such as SNMP, SMTP, UPnP, etc., to reduce risks.

   If necessary, it is highly recommended that you use safe modes, including but not limited to the following services:

   - SNMP: Choose SNMP v3, and set up strong encryption passwords and authentication passwords.
   - SMTP: Choose TLS to access mailbox server.
   - FTP: Choose SFTP, and set up strong passwords.
   - AP hotspot: Choose WPA2-PSK encryption mode, and set up strong passwords.

10. **Audio and Video Encrypted Transmission**

    If your audio and video data contents are very important or sensitive, we recommend that you use encrypted transmission function, to reduce the risk of audio and video data being stolen during transmission.

    Reminder: encrypted transmission will cause some loss in transmission efficiency.

11. **Secure Auditing**

    - Check online users: we suggest that you check online users regularly to see if the device is logged in without authorization.
    - Check device log: By viewing the logs, you can know the IP addresses that were used to log in to your devices and their key operations.

12. **Network Log**

    Due to the limited storage capacity of the device, the stored log is limited. If you need to save the log for a long time, it is recommended that you enable the network log function to ensure that the critical logs are synchronized to the network log server for tracing.

13. **Construct a Safe Network Environment**

    In order to better ensure the safety of device and reduce potential cyber risks, we recommend:

    - Disable the port mapping function of the router to avoid direct access to the intranet devices from external network.
    - The network should be partitioned and isolated according to the actual network needs. If there are no communication requirements between two sub networks, it is suggested to use VLAN, network GAP and other technologies to partition the network, so as to achieve the network isolation effect.
    - Establish the 802.1x access authentication system to reduce the risk of unauthorized access to private networks.
    - Enable IP/MAC address filtering function to limit the range of hosts allowed to access the device.