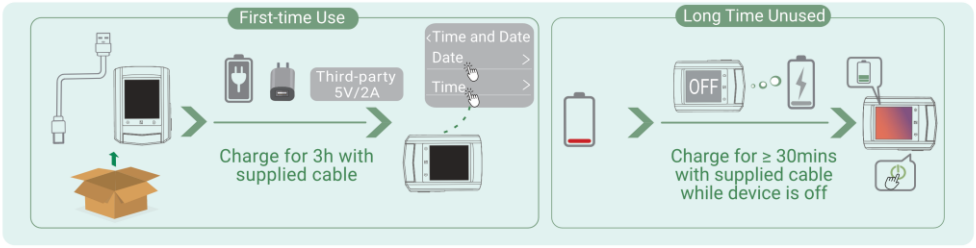
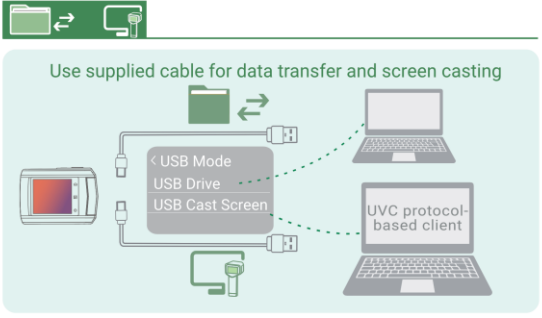
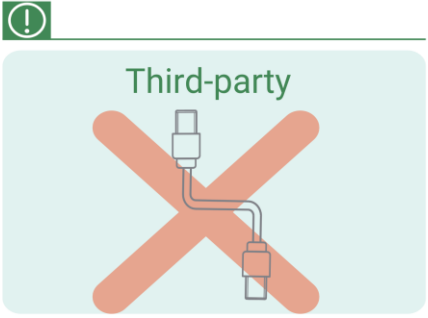
HSFTOOLS

Pocket Thermal Camera

User Manual


First-time Use
Third-party
5V/2A
Charge for 3h with
supplied cable
Time and Date
Date
Time
Long Time Unused
OFF
Charge for ≥ 30mins
with supplied cable
while device is off


Use supplied cable for data transfer and screen casting
USB Mode
USB Drive
USB Cast Screen
UVC protocol-
based client


Third-party

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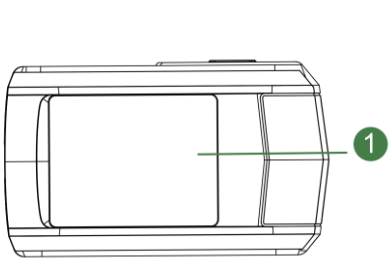
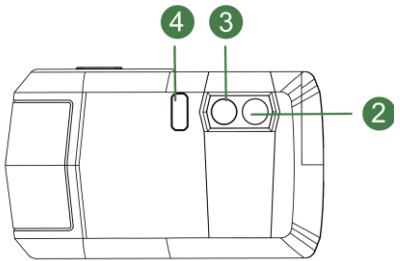
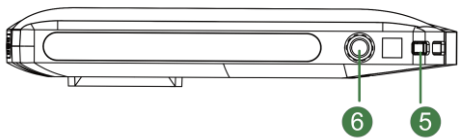
Chapter 1 GETTING STARTED

Appearance



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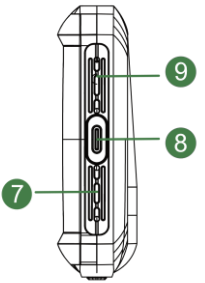
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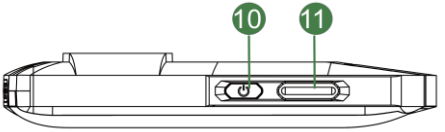

10
11

No.	Description	Function
1	Touch Control Screen	View image and operate device with touch control.
2	Visual Lens	View the visual image.
3	Thermal Lens	View the thermal image.
4	Flashlight	Fill light on objects and output flashing alarm.
5	Strap Attachment Point	Mount the wrist strap.
6	Tripod Mount	Mount the tripod.
7	Charging Indicator	Indicate the charging status of the device. ◆ Solid red: charging normally ◆ Flashing red: charging exception ◆ Solid green: fully charged

8	Type-C Interface	Charge the device, export files or cast screen with the supplied Type-C cable. Do not use third-party USB Type-c to Type-c cable.
9	Microphone	Record audio.
10	Power Button	Hold to power on/off.
11	Capture Button	◆ Press to capture a snapshot. ◆ Hold to start recording and press to stop.

Power On/Off

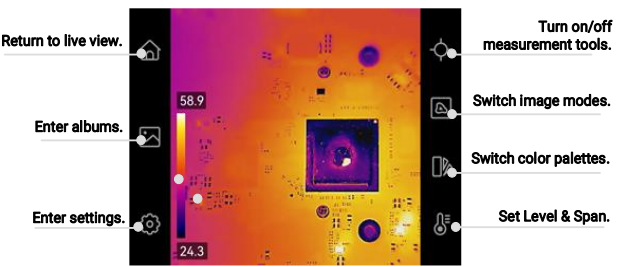
Hold ⏻ for over three seconds to turn on the device. It may take some time until the device is ready for using. Hold ⏻ for about three seconds to power off the device.

Select , and go to **Device Settings > Auto Power-off** to set the automatic shutdown time.

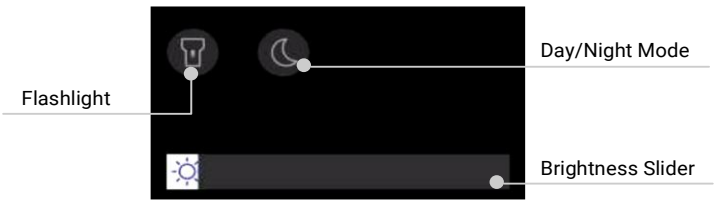
Short press to enter sleep mode, and press again to wake the device.

Menu Description

Live View



Swipe-down Menu



You can also go to **Local Settings** > **Display Settings** > **Screen Brightness** to adjust the screen brightness.

Chapter 2 SELECTING A SCENE MODE

To conduct fast anomaly detection, several preset templates are included in **Scene** mode for various detection scenarios. Users can choose an appropriate scene or customize a scene as per targets, and set high temperature alarms as needed.

Selecting a Scene Mode

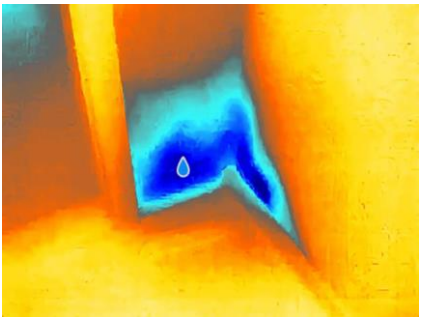
In live view, tap > **Scene** to choose an appropriate scene mode.

Default value of parameters work for most cases.

Water Leak

To inspect the water leak of building ceilings, walls and floors indoors.

IntellFault technology can assist in fast recognition for anomalies during water leak detection. When **IntellFault** is enabled and water leak anomalies are detected, *Suspect* will be displayed on top of live view.



- Missed or even wrong reporting emerges when temperature difference of the areas with leak anomalies is too subtle to be recognized, etc.
- It is recommended to give a second diagnosis based on IntellFault function. The algorithm of IntellFault function is being updated.
- Switching image modes is not supported in this mode.

Insulation

To detect indoor insulation deficiency of building walls, ceilings, common users can apply this scene.

IntellFault technology can assist in fast recognition for anomalies during insulation detection. When **IntellFault** is enabled and insulation anomalies are detected, *Suspect* will be displayed on top of live view.

- Missed or even wrong reporting emerges when temperature difference of the areas with leak anomalies is too subtle to be recognized, etc.
- It is recommended to give a second diagnosis based on IntellFault function. The algorithm of IntellFault function is being updated.

- Switching image modes is not supported in this mode.

Floor Heating

To detect and observe the faults of floor heating system.

Electrical Faults

To detect and observe the faults of wires, circuits, electrical components, terminators, etc.

Solar Panel

To detect and observe the faults of solar panels.

Custom

Users can customize a mode to save desired temperature measurement parameters for future use.

(Optional) Setting Scene Mode Parameters

To obtain a more precise detection results, users can fine-tune the related parameters through > **Scene.**

Parameters vary from the different scenes.

Parameters	*Description*
Emissivity	Set the emissivity according to your target.
Palettes	Thermal images are created by temperature difference. Palettes are colors standing for temperature. Users can choose a palette according to preferred colors.

Temperature Range	Select the temperature measurement range. The device can detect the temperature and switch temperature measurement range automatically in **Auto Switch** mode
Alarm	When the temperature of targets triggers the set alarm rule, users can be notified in the set ways.
Color Distribution	**Linear** and **Histogram** modes are selectable for different application scenes, so as to display more details. • **Linear**: Detect small high temperature targets in low temperature background to enhance and display more details of high temperature targets, such as cable connectors.

- **Histogram**: Detect small low temperature targets in high temperature areas to enhance temperature difference and remain details of low temperature objects, such as cracks.

Chapter 3 PRECISE TEMPERATURE MEASUREMENT

To get more precise and real-time temperature of the target, user can set spot tools and high temperature alarm as needed.

Setting Temperature Measurement Parameters

Adjust Distance

The distance between the camera and the observation target affects the accuracy of the temperature results. Before temperature measurement, users should set the distance first.

- If users desire for a predefined template according to the approximate distance between the camera and the target, there are **Near**/**Middle**/**Far** modes available.

- If users desire for more accurate results, there are **Custom** mode available.

1. In live view, tap ⚙ > **Temp Measurement Settings** > **Distance**.
2. Choose a distance mode.

Users can quick adjust temperature measurement distance in live view by scrolling the distance wheel.

Adjust Emissivity

Emissivity directly affects the measurement accuracy and it is necessary to be re-adjusted according to the characteristics of the target material.

1. Go to ⚙ > **Scene** to select a scene.
2. In scene setting interface, choose a recommended value or customize it.
3. Tap ‹ to save and exit.

(Optional) Adjust Other Parameters

To improve the accuracy of temperature measurement, fine-tune temperature measurement parameters through > **Temp Measurement Settings**.

Parameters	*Description*
Refl. Temp.	If any object (not the target) of high temperature is in the scene, and the target emissivity is low, the target would reflect the high temperature object, resulting in poor accuracy. Set Refl. Temp as the value of high temperature object to cancel the interference.
Humidity	Set the humidity of current environment the camera is in.

Setting Measurement Tools

You can set measurement tools to measure the min., max., and center temperatures of the current scene.

1. Tap  in live view.
2. Tap to select a temperature measurement tool as required. **Hot**  , **Cold**  , and **Center**  are selectable.
3. Tap any place on screen to save and exit.

- The min., max., and center temperatures are displayed on the top left of the screen. Tap the tool again to delete.
- If there is serious inaccuracy in temperature results, turn off **IntelliAccu** button by > **Temp Measurement Settings** > **IntelliAccu. IntelliAccu** function is ONLY supported by some models.

Clearing Measurement Tools

Users can clear all the set measurement tools via > **Device Settings** > **Device Initialization** > **Remove All Measurement Tools**. And a window pops up to prompt **Setting Succeed**.

The palette is also restored to the default settings.

Chapter 4 SETTING ALARMS

When the temperature of targets triggers the set high alarm rule, the device will perform configured actions, such as making audible warning and flashing alarm.

1. Select a scene mode via > **Scene.**
2. In **Scene** setting interface, tap **Alarm** to enter Alarm Settings interface.

ONLY some scenes support Alarm. Please refer to your actual device.

3. Enable Temperature Alarm button.
4. Tap Alarm Threshold to set the temperature upper limits by scrolling the wheel.
5. Tap < to save and exit.

If the target temperature exceeds the set value of **Alarm Threshold**, the Max. temperature row on the top left of live view will be marked in red.

Chapter 5 CAPTURING AND RECORDING

Capturing Snapshots

In live view, press capture button to start capturing. Enable flashlight via swipe-down menu in the dark environment.

You can set the following parameters in **Local Settings > Capture Settings** as needed.

Parameter	*Function*
Super Resolution	Enable to enhance object outlines.
Capture Mode	Capture One Image: Capture one image. Scheduled Capture: The device captures images after a set time interval. Set the time interval and the number of image that you want to capture.

Save Visual Image	Enable to save the corresponding visual image.
Filename Header	Custom filename header.
File Naming	The files can be named after **Time Stamp** or **Numbering** (filename header + sequence number).  In Numbering mode, it ranges from 00001 to 99999. No more files can be saved if it exceeds the upper limit. You can remove recently-saved files in the album or format the storage
Record Video	Enable to record audio during video recording.

Recording Videos

In live view, hold capture button to start recording, and press capture button to stop recording. The recording video will be saved automatically.

You can turn on/off the sound during video recording. Go to > **Capture Settings** > **Record Audio**.

Chapter 6 WORKING WITH FILES

Managing Files

1. Tap  in live view to enter albums.
2. Tap the file of interest to view it. You can also move, delete, edit the recorded files, and add text notes to the files.

Icon	Operations	Icon	Operations
	Select a file.		Cancel the selection.
	Delete a file or album.		Add a text note while viewing the file.
	Move a file to other albums.		Switch files while viewing.

	Select all files.		Set an album as default saving album.
	Rename an album.		View the detailed information of the file.

Exporting Files to PC

1. Connect the device to your PC with the supplied cable.
2. Select USB Drive mode, and open the detected disk.
3. Copy and paste the videos or snapshots to PC.
4. Disconnect the device from your PC.

Chapter 7 USING CAMERA WITH SOFTWARE

Casting Screen to PC

Before You Start

Contact our customer support team for *HSF Studio* installation package.

1. Download and install *HSF Studio*, a UVC protocol-based client software, on your PC.
2. Connect the device to your PC via the supplied cable.
3. Select **USB Cast Screen** as the USB mode.
4. Open the client on your PC, and you can view the real-time screen.

Chapter 8 UPGRADING DEVICE

1. Please contact the customer service or technical support on the official website (*www.hsftools.com*) to get the upgrade file.
2. Connect the device to your PC with supplied cable.
3. Select **USB Drive** as the USB mode in the prompt on the device.
4. Unzip the file, and copy the upgrade file and paste it to the root directory of the device.
5. Disconnect the device from your PC.
6. Reboot the device and then it will upgrade automatically.

After upgrading, the device reboots automatically. You can view the current version in **Local Settings > Device Settings > About**.

Chapter 9 SETTING IMAGE DISPLAY

Setting Live Super Resolution

The device adopts super resolution technology in live streaming, making live image clearer and with more details. Go to **Local Settings > Capture Settings > Super Resolution** to enable the function.

Setting Image Mode

Tap  in live view to switch image modes, and tap the screen to exit.

Image Mode	*Description*
 Thermal	Thermal object image only.

Fusion	Thermal object image with visual outlines.
PIP	Thermal object image inside the optical object image. You can adjust the size and distance of the PIP.
Blending	The mixture object image of thermal channel and optical channel. Adjust **Level** to change the optical-thermal ratio.
Visual	Visual object image only.

Setting Color Palettes

Tap in live view to switch image modes, and tap the screen to exit.

Palettes	*Description*
White Hot	The hot part is light-colored in view.
Black Hot	The hot part is black-colored in view.

Rainbow	The target displays multiple colors. It is suitable for scene without obvious temperature difference.
Ironbow	The target is colored as heated iron.
Rain	The hot part in the image are colored, and the else is blue.
Blue Red	The hot part in the image is colored red, and the else is blue.
Fusion	The hot part is yellow-colored and the cold part is purple-colored in view.
Red Hot	The hot part is red-colored in view.

Setting Color Distribution

Color distribution adjusts image effects. Go to **Local Settings > Capture Settings > Color Distribution** to select histogram or linear pattern.

- Histogram: suitable for scenarios with large temperature difference.
- Linear: suitable for scenarios with small temperature difference.

Setting Level & Span

Set a temperature range, and the palette only works for targets within the temperature range. Tap , and tap to select auto or manual adjustment.

Auto	The device adjusts the temperature range for display automatically.
Manual	1. Tap on an interest area of the screen, and the temperature range readjusts to show as many details of the area as possible. 2. Tap on the value on screen to lock or unlock a value. Scroll the adjustment wheel to fine-tune the max. temperature and the min. temperature respectively. 3. Tap **OK** to finish.

Setting On-Screen Info.

Tap and go to **Display Settings** to enable the information for on-screen display.

- Time and Date: Tap to select whether to display time and date on live view interface.
- Parameters: Temperature measurement parameters, e.g. emissivity.
- Palette Bar: Display the palettes bar and temperature range on the left side of the screen.
- Unit: Set the temperature and distance unit displayed on the live view interface.
- Screen Brightness: Set the screen brightness.

Chapter 10 SYSTEM SETTINGS

Viewing Device Information

Go to **Local Settings > Device Settings > About** to view the device information.

Setting Date and Time

Go to **Local Settings > Device Settings > Time and Date** to set the time and date, and press 〈 to save and exit.

Setting Language

Select , and go to **Device Settings > Language** to set the menu language.

Chapter 11 MAINTAINING CAMERA

Initializing Measurement Tools

Go to **Local Settings > Device Settings** > **Device Initialization** > **Remove All Measurement Tools** to initialize measurement tools such as max., min., center temperature measurement tools and palette.

Restoring Device

Go to **Local Settings > Device Settings** > **Device Initialization** > **Restore Device** to initialize the device and restore default settings.

Initializing Storage

Go to **Local Settings > Device Settings > Device Initialization > Format Storage** to initialize the storage.

If there are files, make sure that the files have been backed up before formatting. Once the storage is initialized, data and files cannot be recovered.

Saving Operation logs

The device can collect its operation logs and save in the storage only for troubleshooting. You can turn on/off this function in **Local Settings** > **Device Settings** > **Save Logs**.

When troubleshooting is necessary, you can connect the camera to PC using the supplied cable, and select **USB Drive** as the USB mode on camera to export the operation logs (.log files) in the top directory of the camera, then send them to the support team.

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.

Legal Information

About this Manual

The Manual includes instructions for using and managing the Product. Pictures, charts, images and all other information hereinafter are for description and explanation only. The information contained in the Manual is subject to change, without notice, due to firmware updates or other reasons. Please find the latest version of this Manual at the company website.
Please use this Manual with the guidance and assistance of professionals trained in supporting the Product.

Trademarks

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IN THE EVENT OF ANY CONFLICTS BETWEEN THIS MANUAL AND THE APPLICABLE LAW, THE LATTER PREVAILS.

Regulatory Information

These clauses apply only to the products bearing the corresponding mark or information.

FCC Compliance Statement

Note: This product 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 product 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 product 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.

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.

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.

Industry Canada ICES-003 Compliance

This device meets the CAN ICES-003 (B) / NMB-003 (B) standards requirements.

Safety Instruction

These instructions are intended to ensure that user can use the product correctly to avoid danger or property loss. Please read all the safety information carefully before using.

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

- Input voltage should meet the Limited Power Source. Please refer to technical specifications or device label 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.
- Use the power adapter provided by a qualified manufacturer. Refer to the product specification for detailed power requirements.

Battery

- CAUTION: Risk of explosion if the battery is replaced by an incorrect type.
- Improper replacement of the battery with an incorrect type may defeat a safeguard (for example, in the case of some lithium battery types).
- Dispose of used batteries according to the instructions.
- The built-in battery cannot be dismantled. Please contact the manufacture for repair if necessary.
- For long-term storage of the battery, make sure it is fully charged every three months to ensure the battery quality. Otherwise, damage may occur.
- Use the battery provided by a qualified manufacturer. Refer to the product specification for detailed battery requirements.
- Do not dispose of the battery into fire or a hot oven, or mechanically crush or cut the battery, which may result in an explosion.
- Do not leave the battery in an extremely high temperature surrounding environment, which may result in an explosion or the leakage of flammable liquid or gas.
- Do not subject the battery to extremely low air pressure, which may result in an explosion or the leakage of flammable liquid or gas.
- DO NOT swallow the battery to avoid chemical burns.

- DO NOT place the battery in the reach of children.
- When the device is powered off and the RTC battery is full, the time settings can be kept for 6 months.
- In the first use, charge the device for 3 hours in the power-off status.
- The lithium battery voltage is 3.85 V, and the battery capacity is 2100 mAh.
- The battery is certified by UL2054.

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.
- Please notice that the current limit of USB 3.0 PowerShare port may vary with the PC brand, which is likely to result in incompatibility issue. Therefore, it's advised to use regular USB 3.0 or USB 2.0 port if the USB device fails to be recognized by PC via USB 3.0 PowerShare port.
- Your camera will periodically perform a self-calibration to optimize image quality and measurement accuracy. In this process, the image will pause briefly and you will hear a "click" as a shutter moves in front of the detector. The self-calibration will be more frequent during start up or in very cold or hot environments. This is a normal part of operation to ensure optimum performance for your camera.

Using Environment

- Make sure the running environment meets the requirement of the device. The operating temperature shall be -10 °C to 50 °C (14 °F to 122 °F), and the operating humidity shall be 95% or less.
- Place the device in a dry and well-ventilated environment.
- DO NOT expose the device to high electromagnetic radiation or dusty environments.
- DO NOT aim the lens at the sun or any other bright light.

- 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 device is suitable for indoor and outdoor uses, but do not expose it in wet conditions.
- The level of protection is IP 54.
- The pollution degree is 2.

Emergency

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

Manufacture Address

No.5, VSIPII, Street 7, Vietnam-Singapore Industrial Park II Binh Duong, Hoa Phu ward, TDM Town, Binh Duong Province
CARVE VIET NAM TECHNOLOGY COMPANY LIMITED

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