Handheld Acoustic Camera
User Manual



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Revision

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Content

Revision 1
Content 2
1. Product introduction 1
1.1. Introduction 1
1.1.1. Main Functions 1
1.1.2. Technical features 1
1.2. Specifications 2
1.2.1. Appearance 2
1.2.2. Performance specifications 3
1.2.3. Package list 4
2. Functional instruction 5
2.1. Basic Hardware Function Description 5
2.1.1. Power On/Off 5
2.1.2. Charging 5
2.1.3. Spare battery 6
2.2. User Interface 6
2.2.1. Take Picture 8
2.2.2. Video Record 9
2.2.3. Acoustic & Thermal mode switch 9
2.3. Adjustment of parameters 9
2.3.1. Adjustment of frequency band 9
2.3.2. Threshold adjustment 11
2.4. Thermal Imaging Function (Only HZ-HA-271P supports) 12
2.5. Multiple Targets 12
2.6. System setting 13
2.6.1. Display 13
2.6.2. Acoustic 14
2.6.3. Photo 18
2.6.4. Cloud 21
2.6.5. WLAN 21
2.6.6. System 22
2.7. File Management 28
3. Operating Instructions 31
3.1. Partial Discharge Detection 31
3.1.1. PRPD Mode 31
3.1.2. PRPD Parameters 33
3.2. Leakage Detection 33
3.3. Thermal Imaging (Optional) 35
3.3.1. Emissivity function 35
3.3.2. Temperature measurement 35

3.3.3. Pseudo-Color Select function. 35
3.3.4. Thermal parameters settings 36
4. Q&A 36

1. Product introduction

1.1. Introduction

Hertzinno Acoustic Camera (HZ-HA-171P/HZ-HA-271P) is a specific device that uses microphone arrays to measure the sound field distribution within a certain range and can be used to measure the location of objects and the state of radiation and display an intuitive image in the form of a cloud map, i.e. acoustic imaging measurement.

The HZ-HA-271P not only has the functions of acoustic camera sound collection, image collection, and sound source positioning and visualization, but also is equipped with thermal imaging sensors to realize multiple detection and diagnosis of equipment failures.

The instrument supports audible sound and ultrasonic frequency bands, and can be used for sound source localization, abnormal sound testing, sound source trajectory tracking and positioning, etc. For steady-state or high-transient sound sources, static or moving objects, Hertzinno Industrial Imager can obtain excellent detection results. Currently, it is mainly used in scenarios such as high-pressure gas leakage detection and partial discharge detection of power systems.

1.1.1. Main Functions

- Acoustic Field Imaging
- Air Leak Detection
- Partial Discharge detection
- Parameter Adjustment
- Photo taking and video recording
- System self-test
- System setting
- File management
- Cloud Management functions
- Thermal Imaging （HZ-HA-271P only）

1.1.2. Technical features

The handheld acoustic camera adopts the world's leading ESR environmental sound

target recognition technology and sound source localization technology based on beamforming theory to measure the position of the sound emitted by the target and the state of sound radiation. The measured sound signals are visualized in a color contour map.

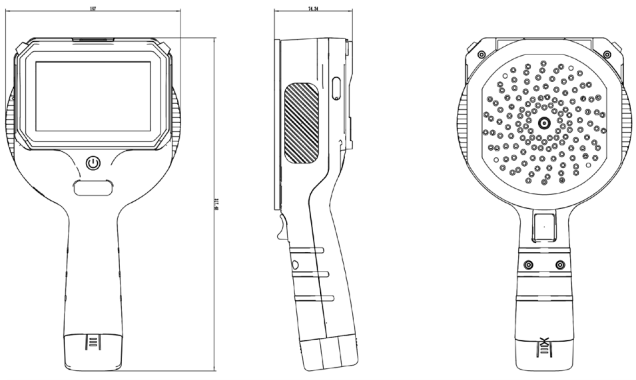
The industrial camera perfectly superimposes the measured sound field distribution, the sound field map and the video image of visible light, generating a visual detection result similar to the temperature measurement video of an object by a thermal imager. The device not only has the functions of traditional acoustic camera sound acquisition, image acquisition, and sound positioning visualization, but also detects and locates abnormal sound source in real time when the target device fails.

1.2. Specifications

1.2.1. Appearance



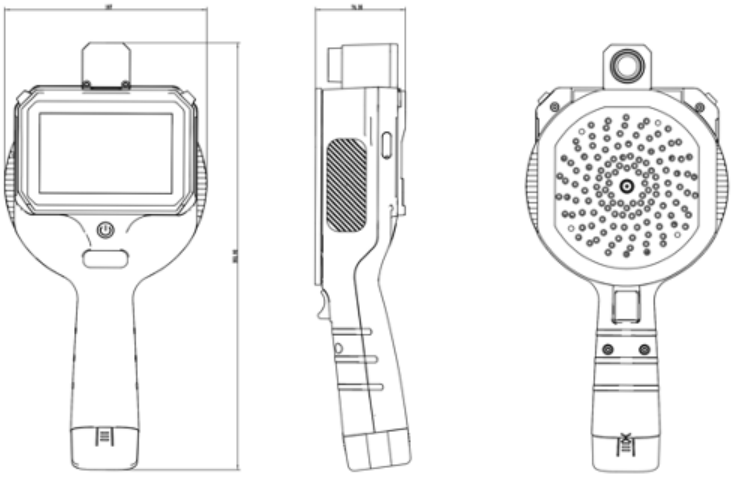
1-1. HZ-HA-171P Product Appearance



1-2. HZ-HA-171P Dimensional drawings



1-3. HZ-HA-271p Product Appearance



1-4. HZ-HA-271p Dimensional drawings

1.2.2. Performance specifications

1-1 Specifications

Item	Parameters	
	HZ-HA-171p	HZ-HA-271p
Microphones	128	128
Sensor type	MEMS Acoustic sensors	
Frequency band	Auto, low, Medium, High and Ultra	
Measure distance	0.3m ~ 200m	
Scenarios	Air Leak Detection, Partial Discharge Detection	
Dimension	314mm*167mm *89.9mm	
Weight	<1100g	<1200g
Protection level	IP54	
Touchable Screen	5-inch LCD (Capacitive)	
Charging Type	Type-C/ Replaceable battery/Charging docker	
Screen	1280*720p/1000nits	
Imaging Resolution	4k,1080P	

Video Frame rate	30fps	
Sound Imaging frame rate	30fps	
Optical Camera	13MP	
FOV of Camera	75°	
Date Transfer	USB/WIFI	
Internal storage	64GB	
Endurance	7 hours with a single battery	
Sensor self-test	YES	
Cloud System	Optional	
Thermal sensor	NO	YES

1.2.3. Package list

1-2Package list

Seq	Item	QTY	Note
1	Industrial Imager	1	
2	Replaceable Battery	2	One set is mounted on device
3	Type-C Cable	1	
4	Power Adaptor	1	
5	U disk	1	
6	Battery Docker	1	
7	Quick User Guide	1	Qualification card and warranty card
8	Test report from factory	1	

2. Functional instruction

2.1. Basic Hardware Function Description



2-1 Device Appearance

2.1.1. Power On/Off

Long-press the power switch button at the handle for about 1s to turn on the device. When the device is running, the operation indicator light stays on.

When the device is turn on, long-press the power button for 3s, the shutdown dialog window will pop up.

Long-press the power button for 6s, turn off the device directly.

2.1.2. Charging

The device has a replaceable and rechargeable battery.

Method 1

Use the Power adaptor charger that comes with the device to connect to the type-c port at the lift side of camera.

Method 2

Use the power adaptor charge that comes with the device to connect to the type-c port at the rear of charger dock.

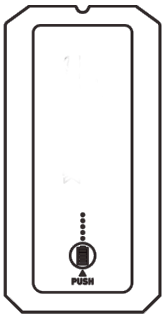
Put the battery on the charger dock, then charge the battery.

When the power is turned on, the charging indicator is red, indicating that it is charging; when the charging indicator turns green, indicating that the device is fully charged.

2.1.3. Spare battery

The purpose of using the spare battery is to increase the battery life of the device, you can replace the battery with spare battery.

The battery has an indicator with five LEDs (indicating 20%, 40%, 60%, 80%, 100% charge) and a test button. To check the battery level, press the test button. The LEDs will light up to indicate the battery level. If all five LEDs are on, the available battery level is 100%.



2.2. User Interface

The acoustic camera supports partial discharge mode and gas leak mode.

After the device is turned on, it shows Logo Page, and then it enters the main interface, and the video stream is displayed on the screen.



Figure 2.2.1 LOGO PAGE

As HZ-HA-271P supports thermal imaging function, the HZ-HA-271p show the main page likes



Figure 2.2.2 Thermal Acoustic Switch 1

figure 2.2.2, with acoustic & thermal switch button.

For HZ-HA-171p, The main page like figure 2.2.3.



Figure 2.2.3 HZ-HA-171p Page

The upper left corner is “LOGO”, “detection threshold”, “detection frequency range” and “distance settings information”.

Partial discharge detection mode:

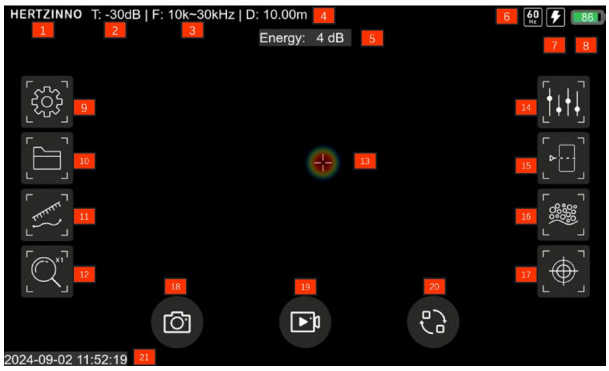


Figure 2.2.4 Partial Discharge Mode

1. LOGO
2. Threshold: The threshold setting of the sound field imaging (unit: dB)
3. Frequency band: Indicating the real-time frequency band setting range
4. Distance: The setting of measure distance.
5. Energy: Energy test result.
6. PRPD Reference Frequency: The frequency of the current PRPD-adapted AC current.
7. Partial discharge icon
8. Battery: Display battery level
9. Settings: Enter system setting page
10. File Management: Check video and photo
11. Distance: Input distance for a note.
12. Zoom: Magnify image for 2x, 4x and 8x zoom
13. Sound map icon: Calculated Sound Map and Real Sound Field

14. Frequency range adjustment:
15. Threshold Adjustment: Adjust the minimum energy level
16. PRPD function: Enable/disable PRPD Imaging
17. Multiple targets function: Switch camera from single targets to 3 targets
18. Photo: Click to take a photo
19. Video: Click to make a video record
20. Thermal mode
21. Date and time

Gas leak detection mode:



Figure 2.2.5 Gas leak Mode

22. Gas leak icon: Indicate the current model of the camera
23. Gas leak calculation: Enable/disable leak cost
24. Emissivity： Modify the measure thermal
25. Measurement Area： Temperature measurement setting
26. Pseudo color: Select different pseudo color type
27. Settings: System settings
28. Temperature: Real-time temperature
29. Emissivity parameters: Current parameter
30. Photo: Take a photo
31. Video: Make a video record
32. Acoustic mode switch: Back to acoustic mode

2.2.1. Take Picture

Tap the camera icon  to take a photo, The photo will be saved in jpg format. You can view the saved photo information in the file manager.

2.2.2. Video Record

Tap the icon  to take a video, The video will be saved in mp4 format. You can view the saved photo information in the file manager.

2.2.3. Acoustic & Thermal mode switch

When the device is turned on, it works in the acoustic detection mode by default. Click on the switch icon  to switch between acoustic detection mode and thermal imaging mode.

The camera and video recording functions support both working modes.

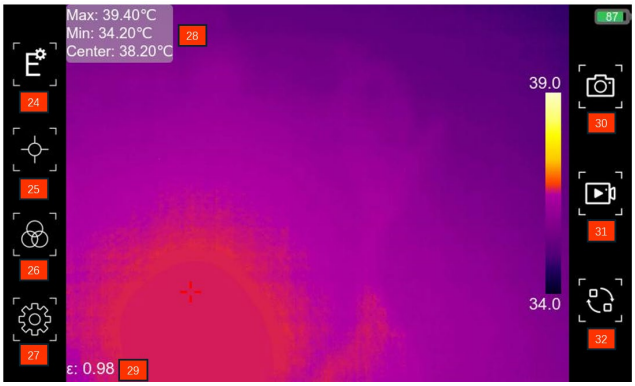


Figure 2.2.6 Thermal Imaging Mode

2.3. Adjustment of parameters

Clicking on different setting buttons to adjust the corresponding parameters to optimize the measurements.

2.3.1. Adjustment of frequency band

The frequency band adjustment function has two types: **Fast frequency mode** and **Advanced frequency mode**.

The default mode is **Fast frequency adjustment** mode.

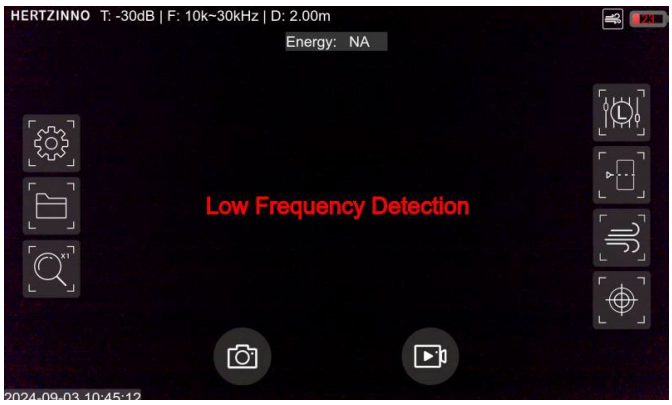


Figure 2.3.1 fast frequency mode

Users can enable the **Spectrum Display** function from acoustic setting to activate the **advanced frequency mode**.

The **Spectrum Display** function can be turned on or off in the Acoustic settings, refer to section 2.6.4 Spectrum Display.

Fast frequency mode

Users can select the following frequency bands in different modes to configure the range of sound bands measured by the current device.

Selectable Frequency Setting	Frequency Range	Application	Leakage Mode	PD mode
Low Frequency Level	10kHz-30kHz	It is mainly used to measure gas leakage within the audible range and is easily disturbed by environmental noise. It is suitable for situations where the background noise is small and can provide the best detection distance;	●	●
Mid Frequency Level	20kHz-40kHz	It can filter out most of the environmental noise and ensure a long detection distance, the recommended range.	●	●
High Frequency Level	30kHz-48kHz	It can filter out the influence of environmental noise to a great extent, and the detection distance is relatively short;	●	●
Ultra-High Frequency Level	45kHz-60kHz	It can basically filter out environmental noise interference, and is suitable for close-range detection.	●	●

Advanced frequency Mode

The advanced frequency mode (real-time frequency band display function) can be turned on or off in the imaging settings, see Figure 2.3.2 Imaging Settings.

Select the frequency band by sliding the frequency adjustment bar to set the acoustic range to be measured by the device.

press and hold the frequency band with two fingers to pinch and stretch to adjust the imaging frequency band width.

By adjusting the frequency band, you can select the sound of a specific frequency band, effectively

eliminating environmental interference and facilitating quick capture and location of the target sound source. (Minimum range is 2kHz, maximum range is 20kHz)

Note: The frequency band cannot be manually adjusted in Fast frequency Mode.

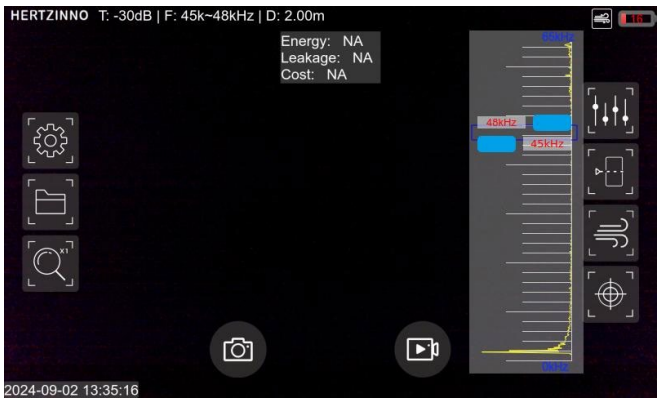


Figure 2.3.2 Real-time frequency band

2.3.2. Threshold adjustment

Click the Threshold button . Slide Threshold to adjust the threshold value. When the energy value of an object is above the threshold, the sound source is displayed on the screen.



Figure 2.3.2.1 Threshold button

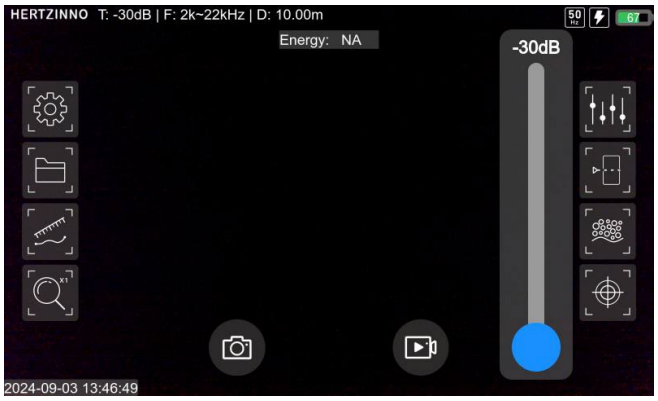


Figure 2.3.2.2 Threshold Adjustment

2.4. Thermal Imaging Function (Only HZ-HA-271P supports)

In the acoustic detection mode, click the Mode switch button to switch to thermal imaging mode.

It displays the temperature distribution of the target device and the surrounding environment in real time.

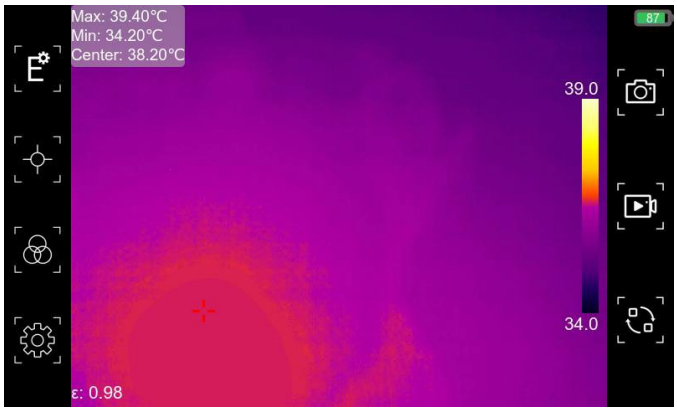


Figure 2.4.1 Thermal Imaging

2.5. Multiple Targets

The acoustic camera supports multiple targets function, Click the , the camera supports detect up to 3 targets at the same time.

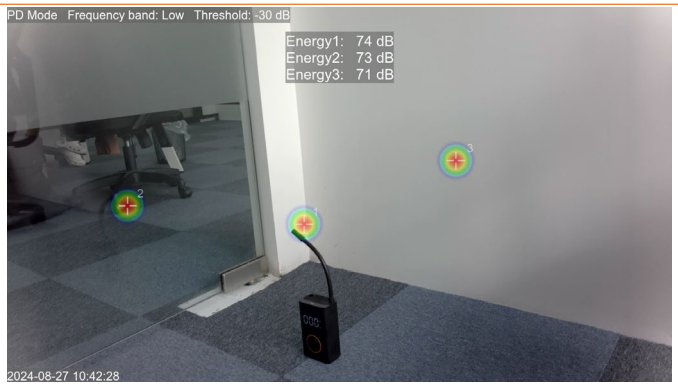


Figure 2.5.1 Multiple targets enabled

Note:

When the multi-target function is enabled, the camera only supports the calculation of the strongest signal information.

The Centre Focus mode and the Multi-Target feature are mutually exclusive.

2.6. System setting

Click Settings  button to enter the system settings interface.

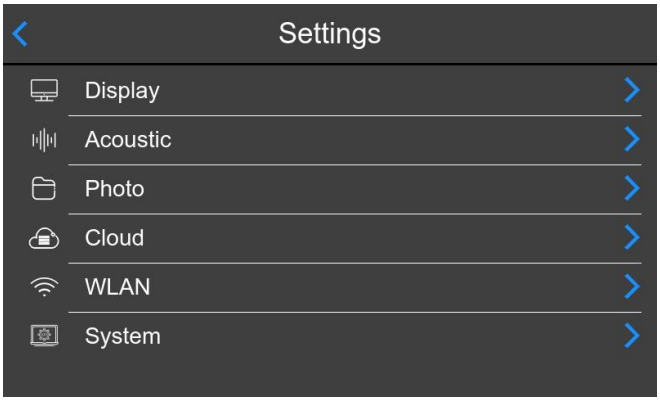


Figure 2.6. Settings interface

2.6.1. Display

The Display interface includes the brightness, watermark information and main page button Icon.



Figure 2.6.1.1 Display

The brightness, user can change the brightness of screen by select the number, 1 means the darkness, and 100 means the brightness.



Figure 2.6.1.2 Logo Enable Display



Figure 2.6.1.3 Logo disable Display

Date & Time: shows date and time on screen or not.

Acoustic details: shows threshold, frequency range and distance information on screen or not.

Icon Hide: Shows adjustments icon on screen or not.

2.6.2. Acoustic

Acoustic menu includes acoustic threshold adjustment, sound source type selects, center focus,

PD Parameters (PD mode only, refer figure 2.6.2.1), Leak Parameters (Leak mode only, refer figure 2.6.2.2), Spectrum Display, and Imaging enhancement.

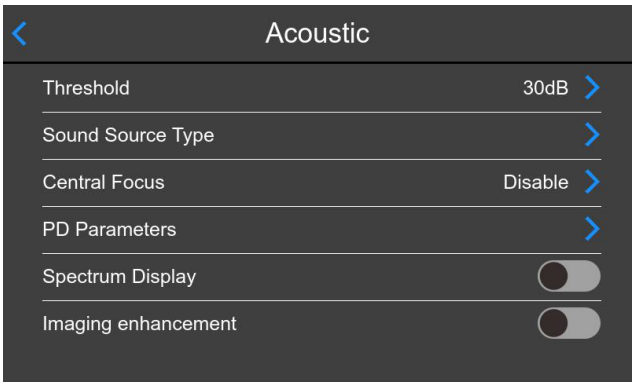


Figure 2.6.2.1 PD Parameters

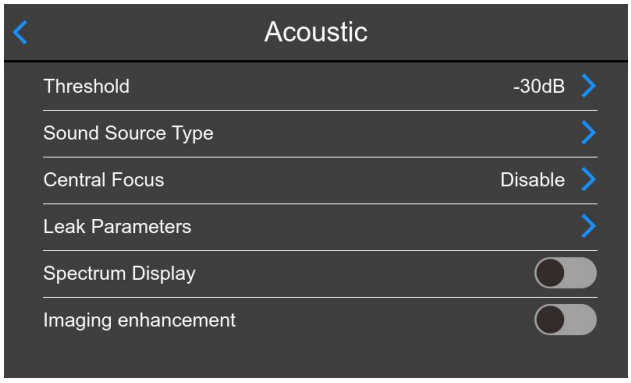


Figure 2.6.2.2 Leak Parameters

2.6.2.1. Threshold

The same function as 2.3.2, user can adjust the threshold to flit the small signal.

2.6.2.2. Sound source type

Hertzinno acoustic camera supports calculated sound field and Real sound field.

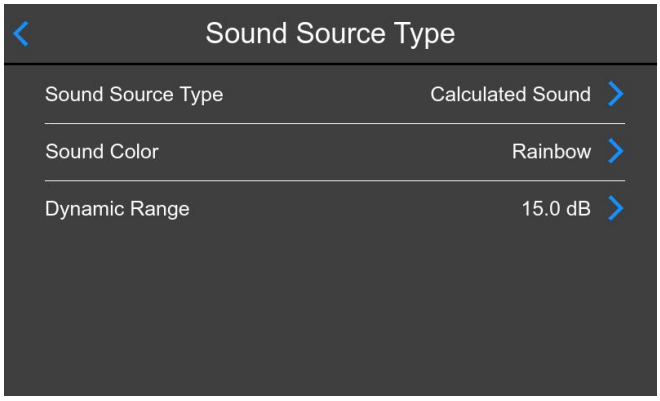


Figure 2.6.2.2.1 Sound Source Type

Calculated sound is a mode that presents a stable sound field effect based on the original sound field by filtering out extraneous signals through computation.

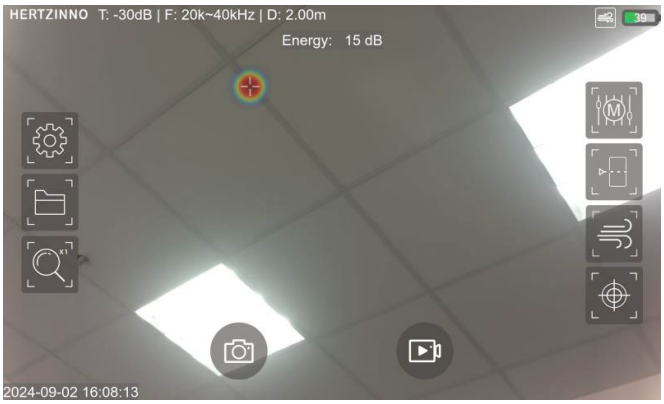


Figure 2.6.2.2.1 Calculated Sound Type

Real sound field, which is used to directly present the sound field received by the microphone array, with real sound field enable, the multiple targets function cannot be used. The camera supports adjust dynamic range to adjust the imaging result.

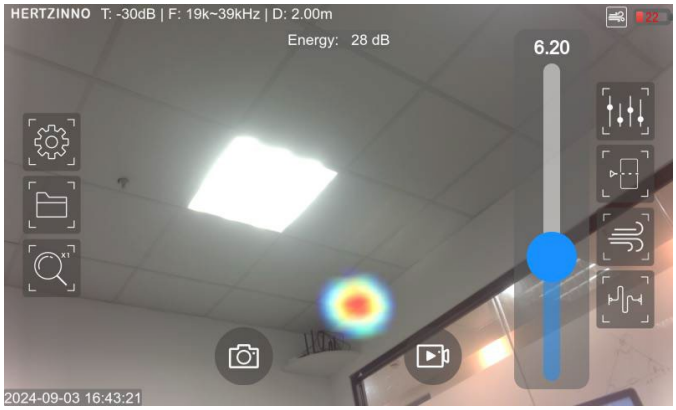


Figure 2.6.2.1.2 Real sound field and dynamic ran

The camera supports 3 different color of sound map.

Sound Color Select:

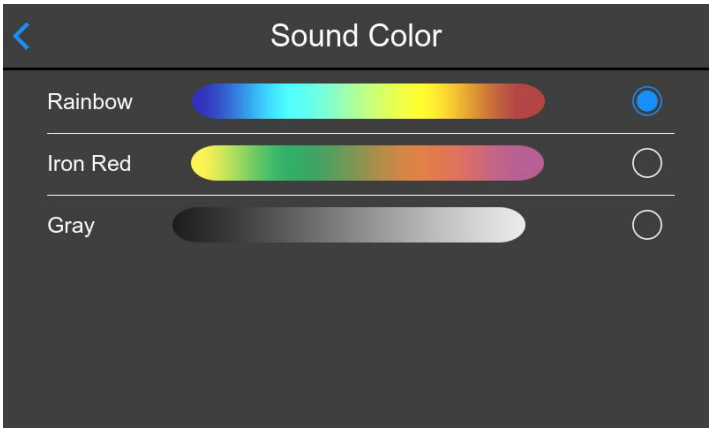


Figure 2.6.2.1.3 Sound Color

Dynamic Range: the dynamic range function just worked on real sound field mode; user can adjust dynamic range to change the sound field range.

2.6.2.3. Central Focus

User can filter signals outside the detection area through the function of central focus, and at the same time, centralize the arithmetic performance of the equipment to improve the sensitivity.

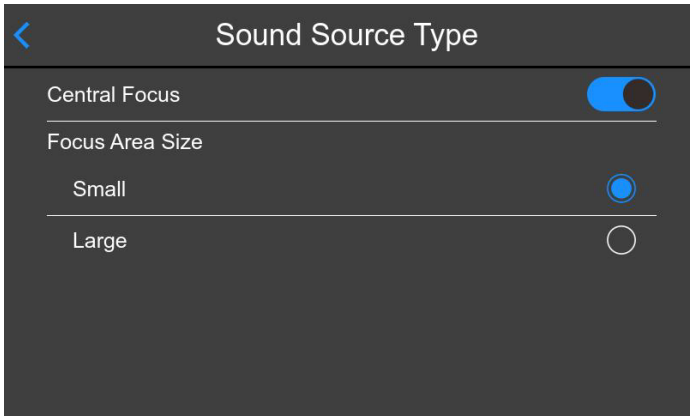


Figure 2.6.3.1 Central Focus

Enable central focus function, the multiple targets function and imaging enhancement function will be blocked.



Figure 2.6.3.2 Central Focus enabled with small area

Central focus function supports small and large focus area.



Figure 2.6.3.3 Central Focus enabled with large area

2.6.2.4. Spectrum Display

Users can enable the Spectrum Display function from acoustic setting to activate the advanced frequency mode, reference 2.3.1

2.6.2.5. Imaging enhancement

The imaging enhancement function, through the acquisition of the signal for progressive processing, used to enhance the stability of the image.

Refer the figure 2.6.4, press the button to blue to enable this function.

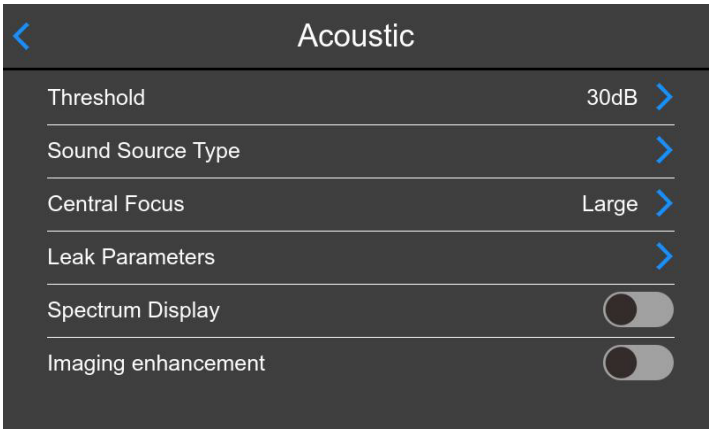


Figure 2.6.4 Spectrum Display

2.6.3. Photo

User can make photo settings under this function, such as photo resolution selection,

photo watermark, and text note function (Photo Annotation) after taking photos.

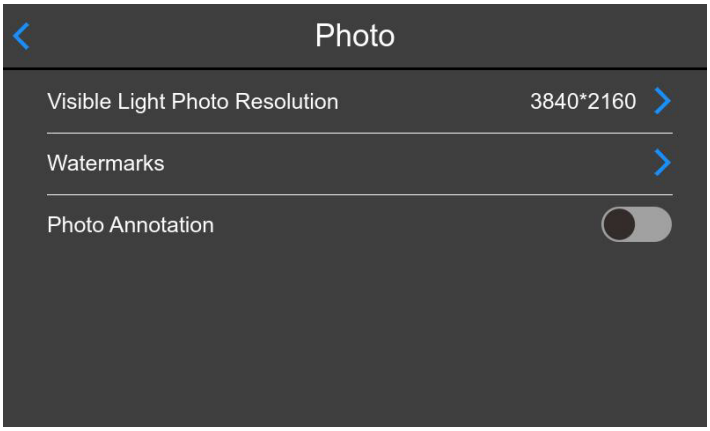


Figure 2.6.3 Photo function

2.6.3.1. Visible Light Photo Resolution

User can select the visible light photo resolution, 1080P and 4k.

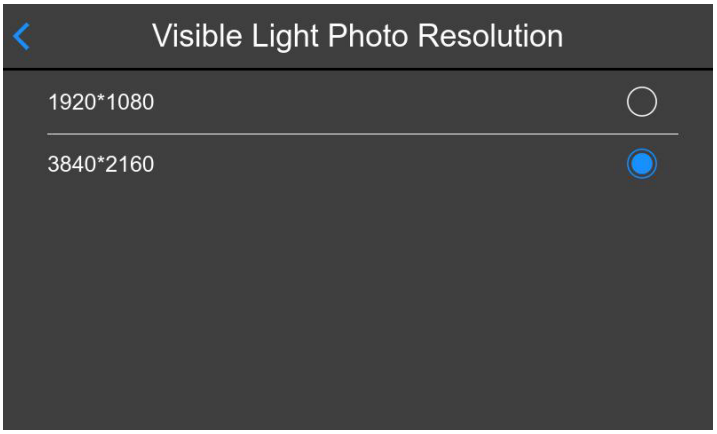


Figure 2.6.3.1 Photo resolution selection

2.6.3.2. Watermarks

User can choose these information needs to be saved on the captured photo, date and time, logo, and acoustic details.

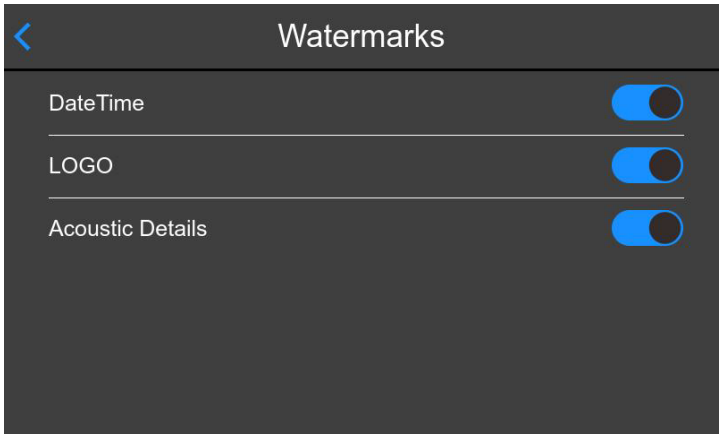


Figure 2.6.3.2 Watermarks

2.6.3.3. Photo Annotation

User can enable the photo annotation function to import a text note after take picture, the camera also supports picture annotation, refer the function 2.7



Figure 2.6.3.2 Text Annotation

2.6.4. Cloud

The device supports the private cloud service function, please contact your local agent for details.

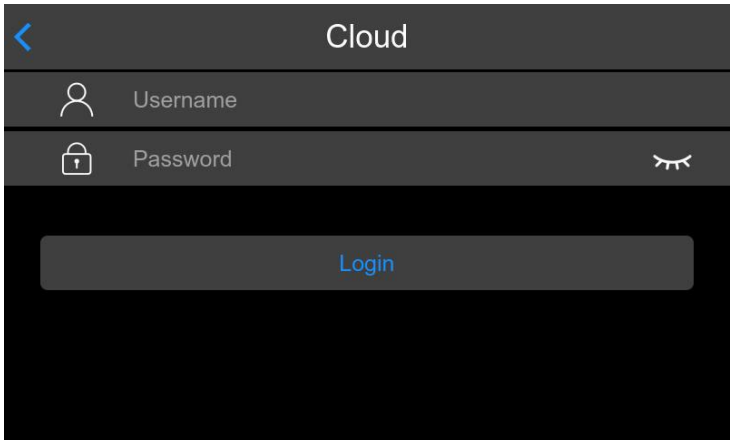


Figure 2.6.4.1 Cloud login

User can input a username and password to log into the cloud, after login, the device supports uploading acoustic files to cloud on file management page by clicking the icon

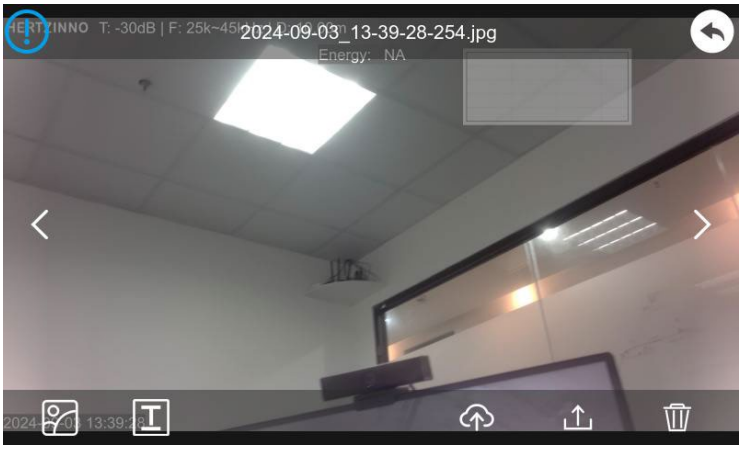




Figure 2.6.4.3 File upload feedback

2.6.5. WLAN

The camera supports 2.4GHz and 5G Wi-Fi, user can select the wireless signal to connect with. Enable the Wi-Fi function, the device will search signals automatically.



Figure 2.6.5.1 WIFI

Note: For cyber security, the device only supports the display of encrypted WIFI signals.



Figure 2.6.5.2 WIFI Searching

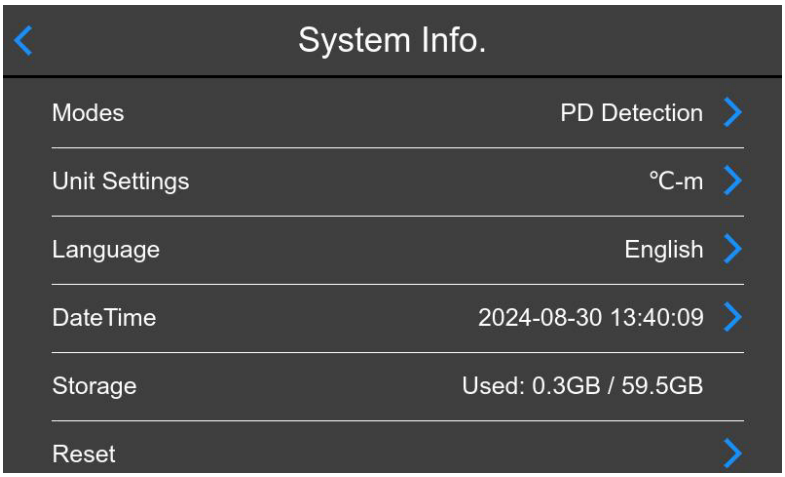
2.6.6. System

The camera system includes system information, system upgrade and about items, user can click these items to enter detail.



Figure 2.6.6 System page

2.6.6.1. System Info.



Mode

The acoustic camera supports partial discharge (PD) detection and gas leakage detection, in the system info. Menu, the user can choose the mode according to their own needs.

Mechanical mode refers real sound field function, both PD mode and Leak mode supports.

The camera presents different application functions according to different mode selections, such as PRPD function in PD mode, PRPD information setting.

Leakage calculation in LEAK mode, leak parameter setting.

Enter the modes to switch camera to Partial discharge detection or Leak detection mode.



Figure 2.6.6.2 Device Mode

The PD detection mode, camera supports Partial discharge Parameters in Acoustic Menu Page.

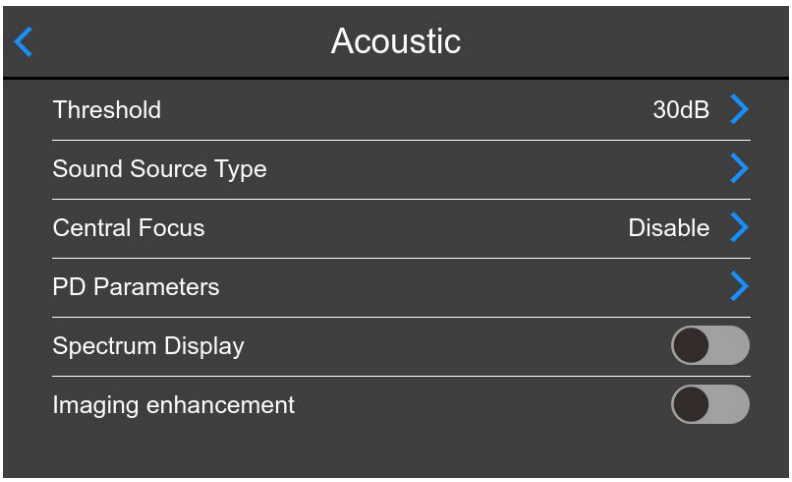


Figure 2.6.6.3 PD Parameters

The Leak detection mode, camera supports leakage parameters in Acoustic Menu Page.

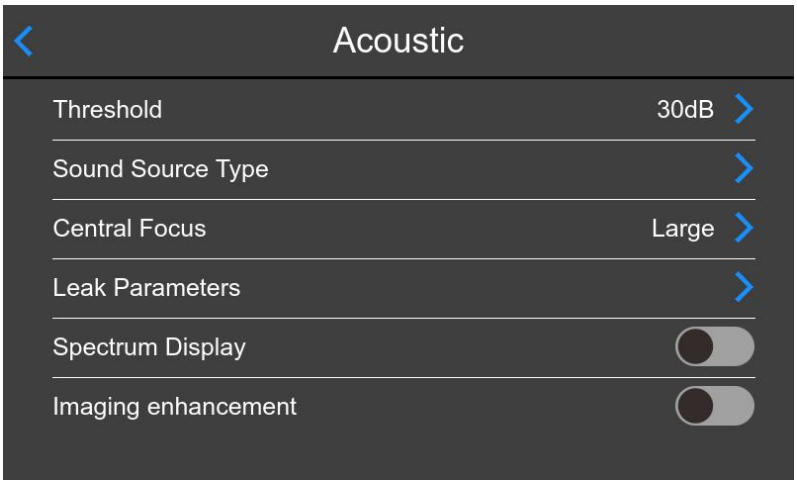


Figure 2.6.6.4 Leak Parameters

Unit Settings

The unit settings include temperature unit set and distance unit set.

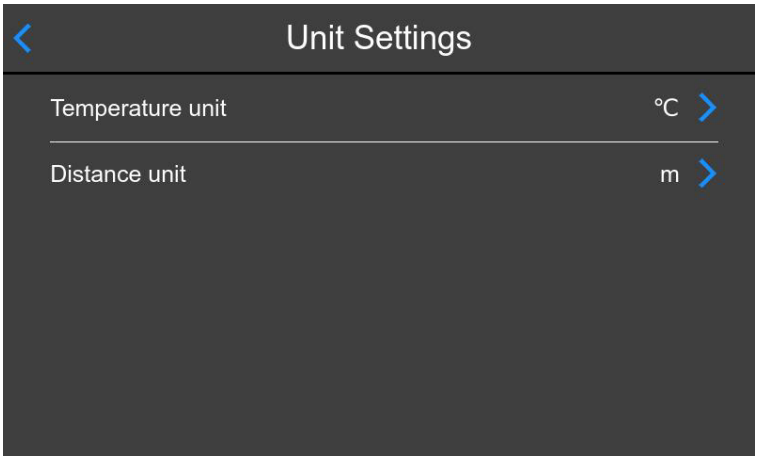


Figure 2.6.6.5 Temperature

Temperature Unit include ° C，° F and K.

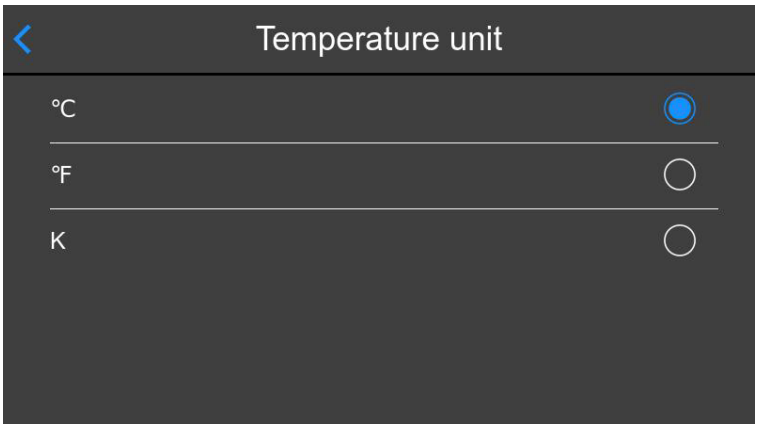


Figure 2.6.6.6 Temperature unit

Distance Unit includes m and ft.



Figure 2.6.6.7 Distance unit

Language

User can change the language of the camera on language menu.



Figure 2.6.6.8 Language

Date & Time

User can set the Date and Time with this function.

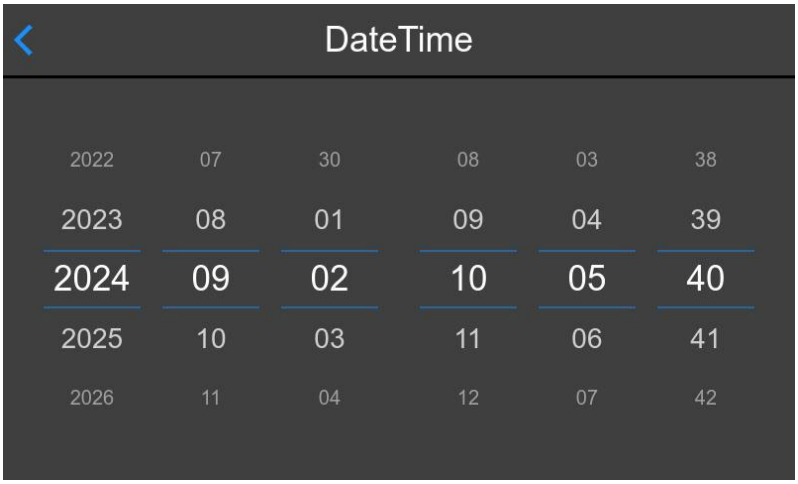


Figure 2.6.6.9 Date and Time

Storage

The default storage is 64 GB, and the system take part of space.

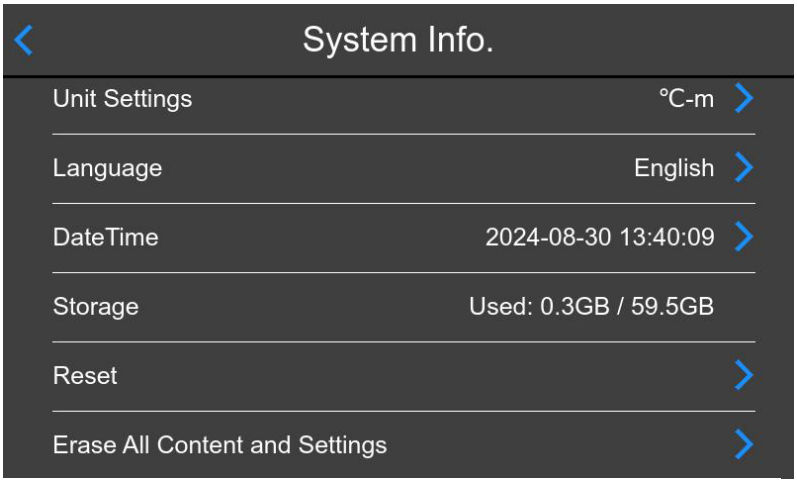


Figure 2.6.6.10 Storage

Reset

reset function will restore the device and clean up all information.

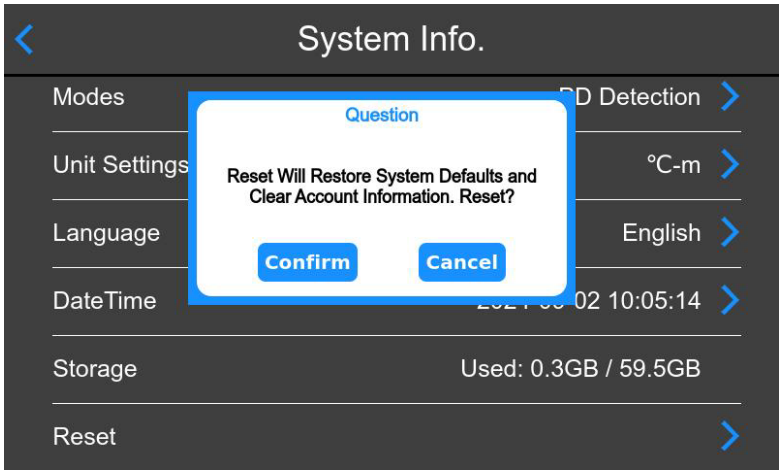


Figure 2.6.6.11 Reset

Erase all content and settings

this function will delete all photos and videos.

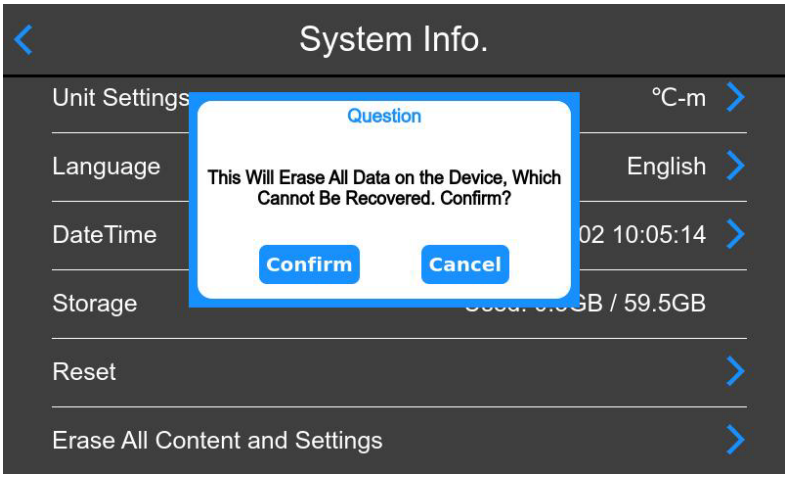


Figure 2.6.6.12 Erase all content and settings

2.6.6.2. System Upgrade

The camera supports OTA upgrade and local upgrade.

OTA upgrade based on cloud service, please contact local partner to get more information.

Local upgrade:

The camera support upgrade with U-disk, copy the package (.zip) directly to U-disk and connect the u-disk with camera, click start.

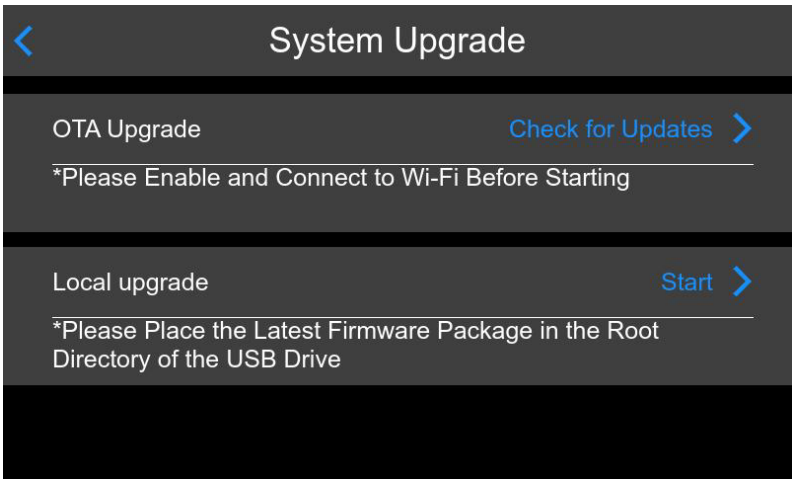


Figure 2.6.6.13 Upgrade

2.6.6.3. About

In the About page, you can get the device SN, software version, firmware version, driver version, Battery level and usage time of current battery.



Figure 2.6.6.14 About

2.7. File Management

User can click  to enter the file management page. On the file management page, user can check photo and videos.

The camera supports photo and video export, photo and video playback, photo information



Figure 2.7.1 Main Page

Enter the file management page, the camera supports search by date.

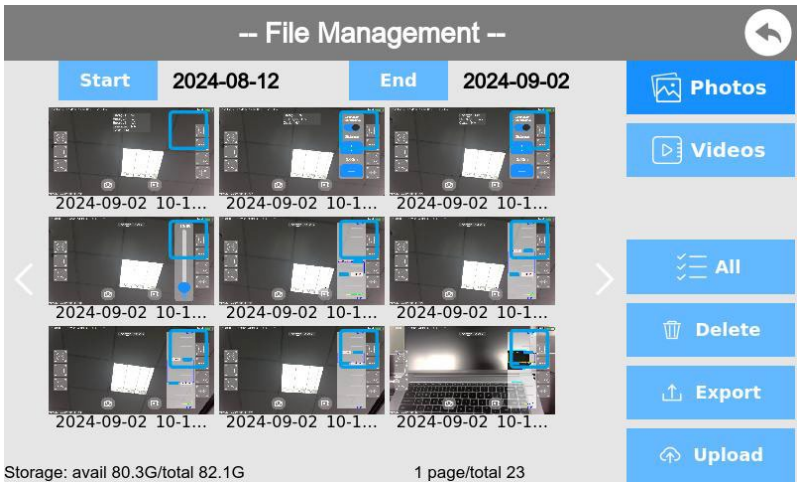


Figure 2.7.2 File Management

Camera supports photo note function, The device supports photo comment function, i.e., after taking photos of leakage and local release, the device supports the user to take auxiliary photos for content comment, such as the location information of the monitored equipment.

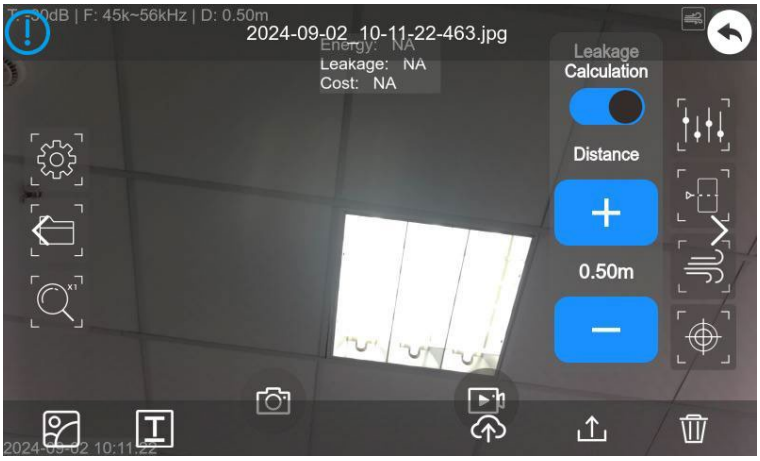


Figure 2.7.3 Photo information

Select the photo and click the screen, the camera shows photo comment , text comment , upload to cloud , export and delete icons.

User can click the Start Button and the End Button to select the dates of the file.

After opening up a photo, user can click the icon in the upper left corner of the photo to view information such as the time, frequency band, energy, and location of the photo.

Photo Annotation：

Users can add up to 4 photos as notes on a single image

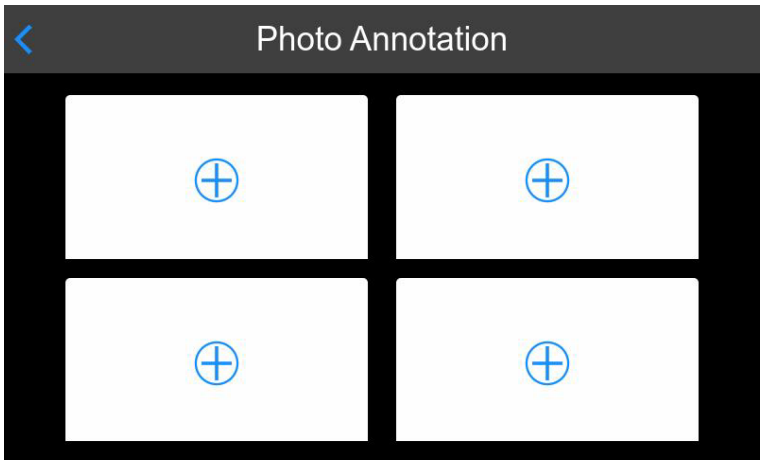


Figure 2.7.4 Photo Annotation

Text Annotation：

User can add or modify the text annotation with this function.

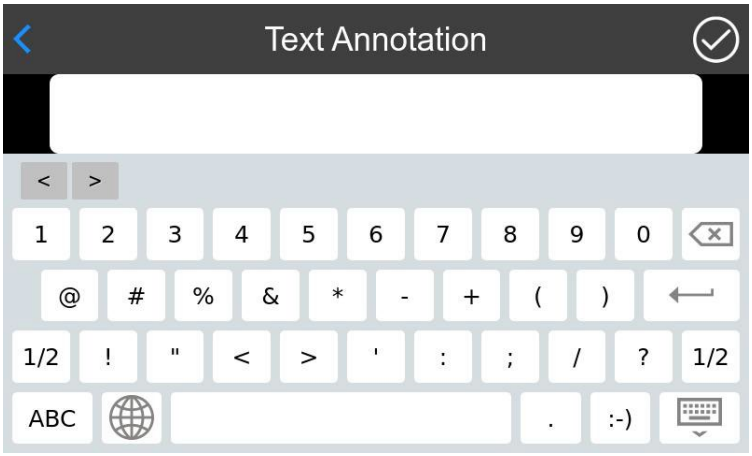


Figure 2.7.5 Text Annotation

Video management

User can click the video button to view all of the videos, and the device supports video playback function.

File Export

The device supports single photo export as well as multiple photo and video combination export. User can choose one or more photos to export according to the actual needs, The export

interface will remind you to export photos or data files. If you choose to export only photos and videos, then the content of the device exported will only be photos and videos.
Exporting a file means exporting a file with relevant acoustic data, which can be recognized by offline analysis software and support further data analysis functions and export reports.

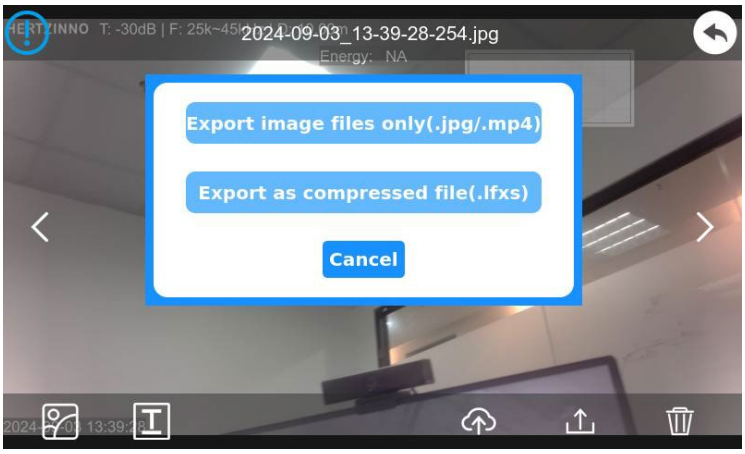


Figure 2.7.6 Export file remind

Upload

User can upload the photo to cloud, if the camera enables cloud function.
(Please contact your local dealer about this service)

3. Operating Instructions

3.1. Partial Discharge Detection

3.1.1. PRPD Mode

1. Switch to PD mode.

Please refer to 2.6.6.1 Imaging Mode Setting.

2. Point the camera to the equipment to be monitored. It is recommended to adjust the sound threshold value according to the on-site environment so that the threshold value is lower than the on-site energy value. The sound field appears on the screen. If there is only one anchor point on the sound field map, and the actual position corresponding to the anchor point does not change significantly and is relatively stable when the camera is rotated and observed from different angles, then this position is the partial discharge position.

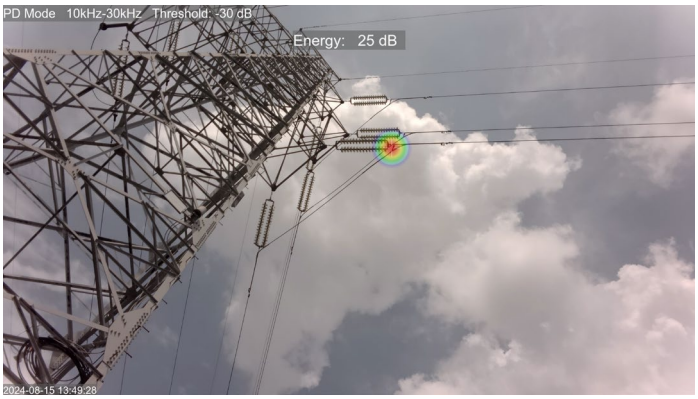


Figure 3.1.1 Partial Discharge

3. In the partial discharge detection mode, click the PRPD map button  to draw the PRPD plot of the PD position in real time, and user can judge the partial discharge type according to the map.

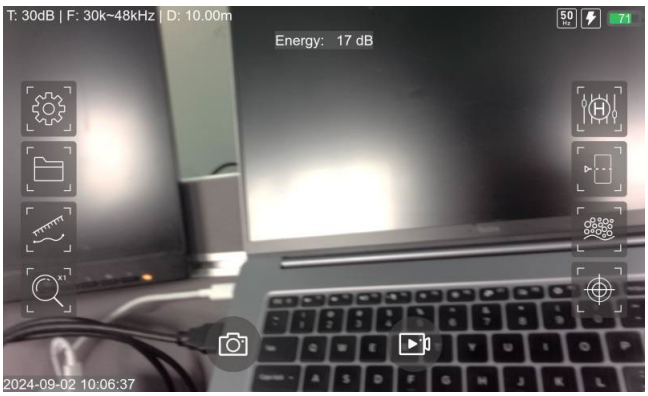


Figure 3.1.2 PRPD Function

When PRPD Function enabled, the camera will show an image of PRPD result on the screen. Click the PRPD image, user can get a larger image.

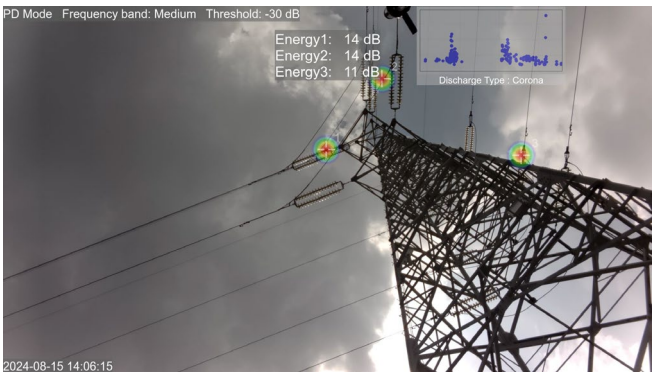


Figure 3.1.3 PRPD Function Enabled

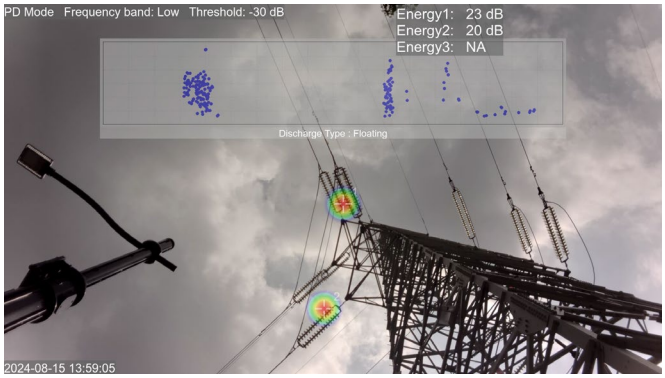


Figure 3.1.4 PRPD Function with Large image

4. Click the camera icon at the bottom of the screen to quickly take a picture and enter the file management to view the details of the photo.

5. Click the video icon at the bottom of the screen to start recording. The recording time will be displayed on the top of the screen. Click the video icon again to end the recording. Enter the file management to view the photos and videos taken.

3.1.2. PRPD Parameters

In PD mode, our devices support different frequency (50/60Hz) and partial discharge prediction functions.

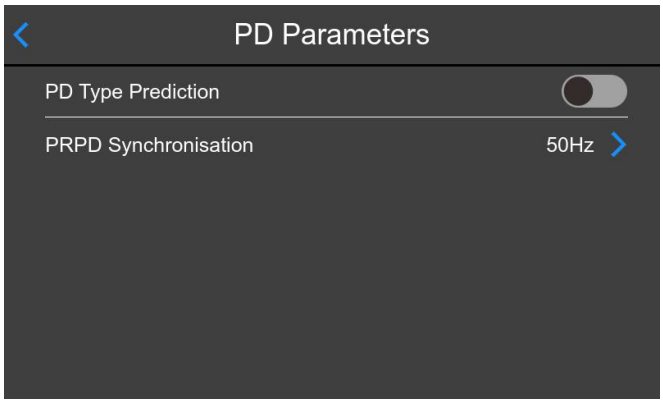


Figure 3.1.1.2.1 PD Parameters Setting

When the PD type prediction function is enabled, the device will display the PRPD type results in real time on the main interface.

3.2. Leakage Detection

1. Switch to Gas Leakage mode. Please refer to 2.6.6.1 Mode Setting. change the imaging mode to leak mode.

In the leakage detection mode, click the leakage estimation button to enable the leakage calculation function, set the current distance from the leakage point, and then calculate the leakage value of the leakage point.

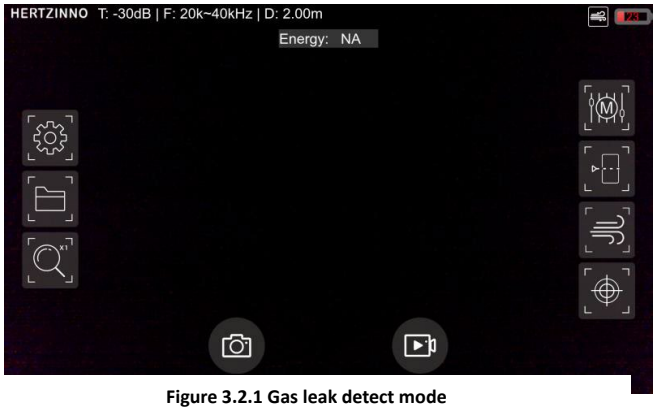


Figure 3.2.1 Gas leak detect mode

Enable leakage calculation button, and select the distance, and then the user can get the result on screen.

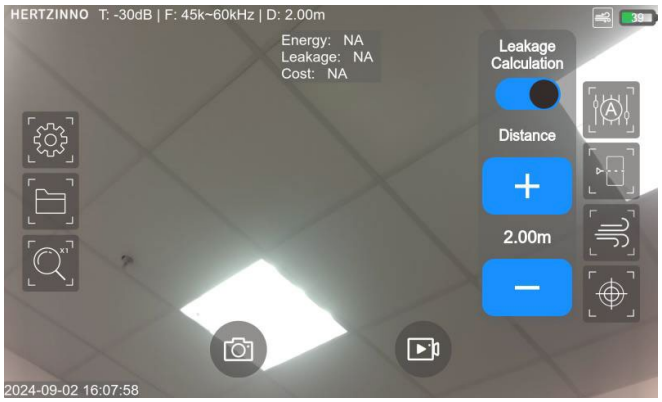


Figure 3.2.2 Leakage calculation

In the leak parameters page, user can set the price of gas, energy, working hours.

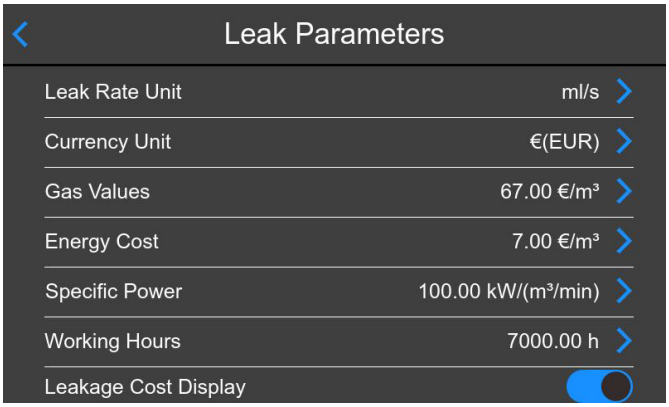


Figure 3.2.3 Leak Parameters

3.3. Thermal Imaging (Optional)

Switch the camera to thermal imaging mode.

The camera supports multiple emissivity options, detection area selection, pseudo-color mode selection, and temperature alarm settings.

3.3.1. Emissivity function



Figure 3.3.1 Emissivity options

3.3.2. Temperature measurement

User can use different tools to set the measurement area.

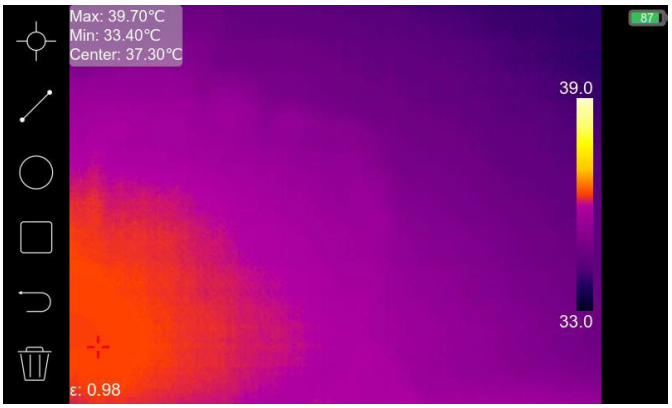


Figure 3.3.2 Temperature Measurement

3.3.3. Pseudo-Color Select function.

User can select different pseudo-color.

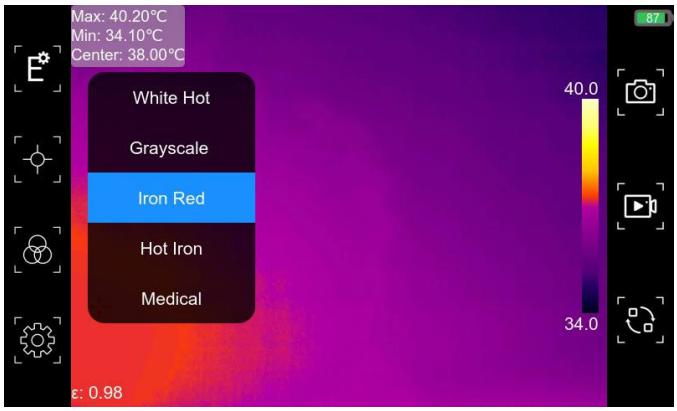


Figure 3.3.3 Pseudo-color select

3.3.4. Thermal parameters settings

user can select different temperature measurement range, Temperature unit, Alarm set, and other functions.

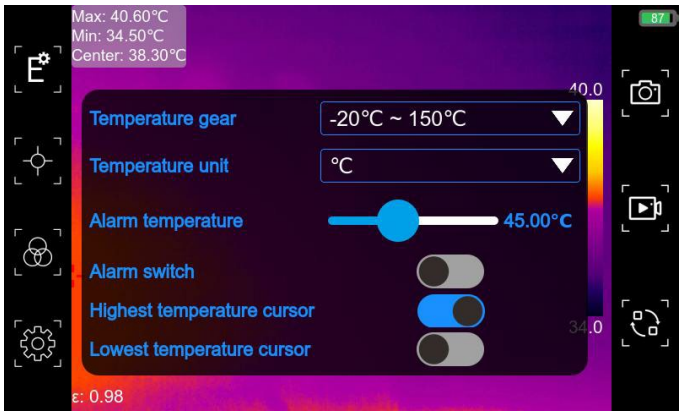


Figure 3.3.4 system settings

4. Q&A

Q: Why is the sound field positioning unstable?
A: It may be that the frequency band is not set correctly, and the imaging frequency band setting does not match with the ultrasonic frequency band of gas leakage/partial discharge, this would result in incorrect positioning and unfocused sound field.
Please modify the frequency band.

Q: Why are there 3 sound field points for single target positioning?
A: It may be caused by reflection when the strength of the reflected signal is equal to that of the direct signal.
User can rotate the device to different angles to remove the reflected signal.

Q: Why can't the infrared mode be turned on?
A: Please check whether the device is equipped with an infrared camera.
Only the HA-271P is equipped with the infrared camera. In addition, the battery may be insufficient, resulting in the infrared cannot be turned on normally. Please try again after charging the battery.

Q: Why cann’t the U disk be recognized
A: The format of the U disk should be FAT32, please confirm whether the format of the U disk is correct. You can also try another USB flash drive.

Q: Why is there no sound field positioning point?
A: It may be because the threshold is set too high. Try again after adjusting the threshold lower than the current energy value.

Contact us

Some of the features of this manual are subject to change, please contact us for the latest information.

