



**UNI-T®**

**UNI-TREND TECHNOLOGY (CHINA) CO., LTD.**

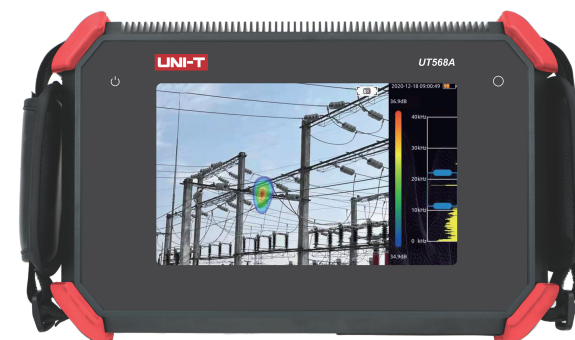
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Made in China



P/N:XXXXXXX  
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**UNI-T®**



**Acoustic Imager**

**UT568A**

**Operating Manual**



# UT568A Acoustic Imager User Manual

## Warranty and Calibration

Within two years from the purchase date of this product, Uni-Trend will provide free warranty service for the abnormal or fault caused by product quality problems. This free warranty service does not apply to problems caused by improper use and drop.

In case of product failure caused by improper use or accidental drop, Uni-Trend promises to provide maintenance service at cost price.

The product has been calibrated before leaving the factory. However, in the process of long-term use, it is recommended to send the product to the manufacturer every 2 years for calibration, detection and maintenance.

## Introduction

The acoustic imager supports ultrasonic frequency band. The product uses the microphone array beamforming technology to acquire the distribution data of sound sources, and collects videos and images in real time with the HD camera. By fusing the distribution data of sound sources with videos and images, the changing sound sources are dynamically shown on the display.

The acoustic imager can quickly detect possible pressurized gas leaks and vacuum leaks on noisy industrial sites. When the product is used in power system, it can rapidly identify potential partial discharge fault points.

The acoustic imager's housing is all aluminum alloys. So the product is rugged and can be used in complex and changeable operating environments.

The product is easy to operate. Most test requirements can be satisfied only by adjusting its frequency range and dynamic range. The product has image and video modes for data recording. It can be inserted into a large-capacity TF card to save and export the test results.

## Safety Information



**To prevent possible fire or personal injury:**

- Please read the safety information carefully before using the product.
- Use the product only for the purpose specified.
- Do not disassemble the product without permission.
- Please stop using the product if it is faulty or abnormally hot.
- Please contact the manufacturer to maintain the product.
- Do not put the product near heat sources and flame or store it in high temperature environments.

- Do not charge the product at a high temperature (exceeds 45°C).
- Please stop using the built-in lithium battery if it leaks.
- If the leakage gets into eyes, rinse with water and seek medical attention immediately.
- If the leakage gets on the skin, rinse immediately with water.

## Terminologies

### **USB Power Delivery (USB PD):**

USB PD is a power transfer protocol based on USB3.1 that can transmit higher power via USB interface.

### **Sound pressure level (SPL):**

A physical quantity used to express the size of a sound wave. Its unit is decibels (dB). Generally, it can be represented by dB SPL.

### **Audible frequency range:**

The range (20Hz to 20kHz) that human ear can perceive sounds.

### **Ultrasound:**

Ultrasound generally refers to the sound with a frequency higher than 20kHz that cannot be perceived by human ears.

### **Acoustic image:**

Acoustic image refers to the two-dimensional data table that represents the intensity distribution of sound sources in the spatial plane after the signal collected by the microphone array is calculated by the sound source location algorithm.

### **Color palette:**

Color palette is the color data used by the cloud image for color mapping.

### **Acoustic cloud image:**

The SPL data of each resolution point on the acoustic image is mapped to a certain color number on the color palette according to the conversion formula to form a color image, which is then fused with the visible image to form an image.

### **Test spectrum range:**

After selecting a frequency range supported by the product, the product will only measure and display the acoustic cloud images within the frequency range, and the sound outside the range will not be displayed.

### **Frequency spike:**

Spike in the spectrum graph that indicates a significant source of sound in this specific frequency.

### **Dynamic range:**









Dynamic range is the scale of the sound source intensity that can be displayed on an acoustic image.

### **Field of view:**

For a camera, field of view refers to the angle formed by two diagonal points

and the camera in the rectangular picture that the camera can shoot. For an acoustic image, field of view refers to the angle formed by the two diagonal points and the center point of the microphone array in the imaging rectangular picture.

## Product and Accessories


Appearance	Name	Description
	Acoustic imager	The product
	Hand strap	A hand strap that makes the product easy to hold
	Shoulder strap	A shoulder strap that makes the product easy to hold
	Charger	A power adapter for charging the product
	Charging cable	A cable for charging the product
	Portable power source	A backup power supply for the product
	Earphones	Connect the product to monitor ultrasound
	Protective case	A protective case for storing the product and its accessories

## Battery and Charging

### Battery:

Built-in lithium battery with nominal capacity of 6600mAh@7.2V

### To charge the product:

Charge the product via the USB Type-C interface (with the icon  ).The product supports USB PD fast charge protocol. It is recommended to use a power adapter or mobile power supply that supports 12V to 20V output with a minimum output power of at least 15W to charge the product.

### Instructions for charging and battery life:

1) If the charging indicator is on after the charger is plugged in, it indicates that

the product is being charged. If the indicator is off, the product is fully charged. Turn off the product before charging it.

- 2) When the battery is fully charged, the product displays 4 bars of power, which can be used for about 4 hours (3 bars: 2.5 to 3 hours; 2 bars: 1.5 to 2 hours; 1 bar: half an hour to an hour).
- 3) When the product prompts that the battery is too low, charge it in time.

**To use the product safely:**

- Do not put the product near heat sources and flame or use it in high temperature environments.
- Do not put or use the product in sunlight for a long time.
- Do not disassemble the product without permission.
- Do not charge the product at a high temperature (exceeds 45°C).
- Please stop using the product if it is faulty or abnormal.
- Please contact the manufacturer to maintain the product.

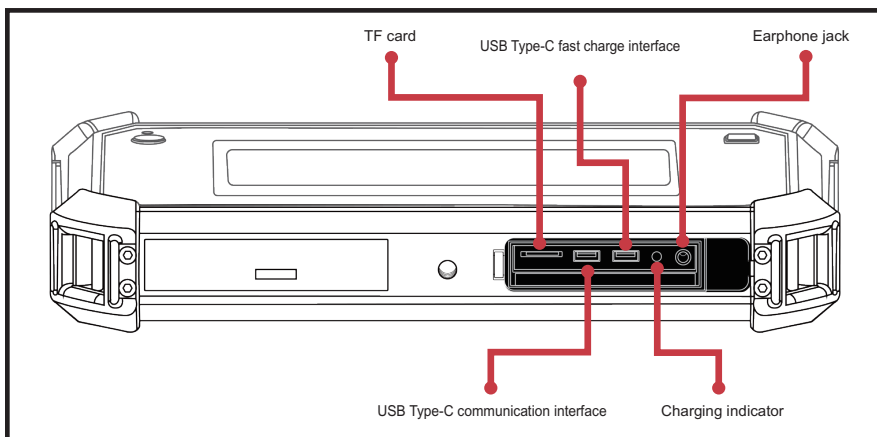
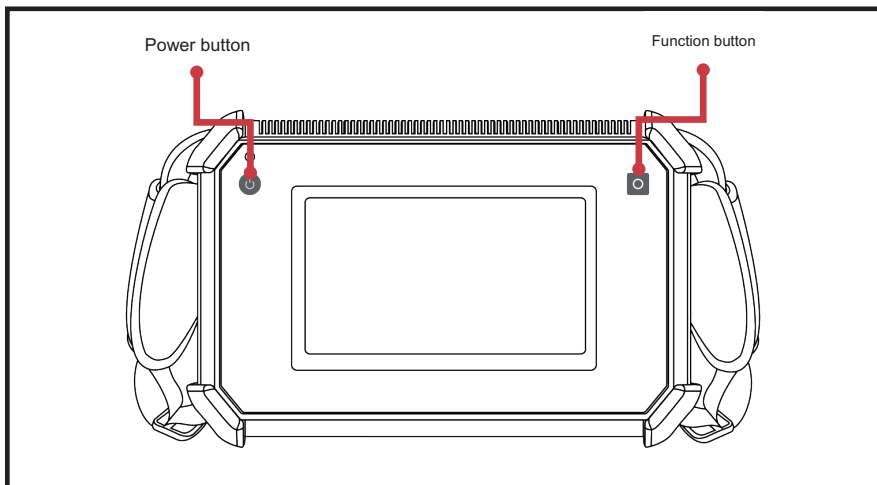
**To extend the battery life:**

- Do not charge the product for more than 24 hours.
- If the product is not used for a long time, please charge the battery regularly.
- Store the battery at -20°C to 40°C.

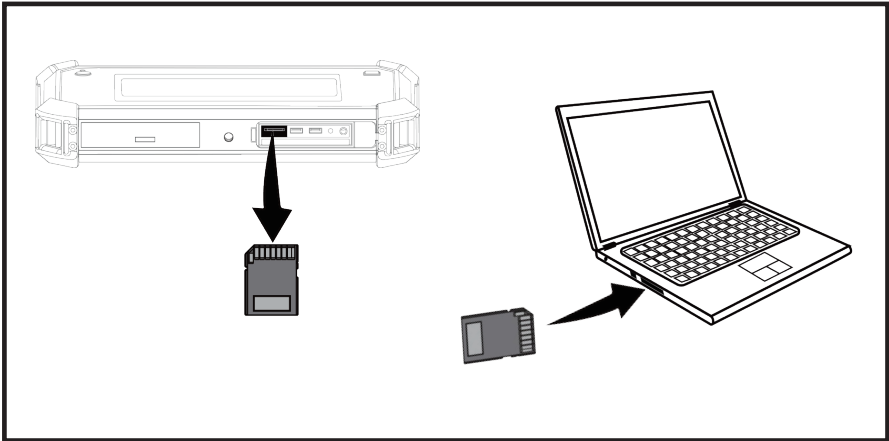


**Note: If the battery capacity is low, contact the manufacturer to replace it. Do not disassemble the product.**

# Features/Buttons



## Read Data in TF Card

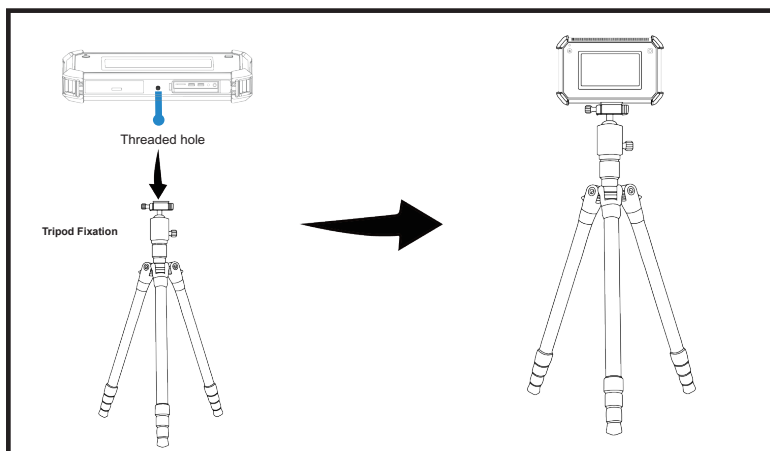


### Cautions for using the TF card:

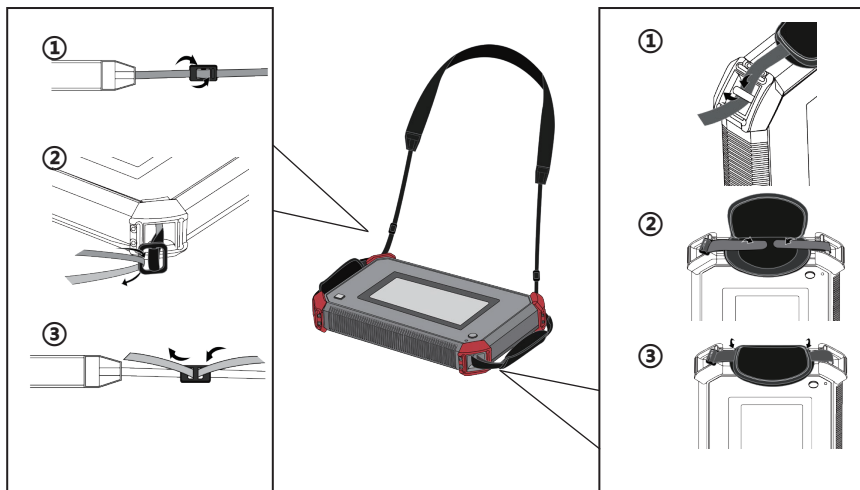
- Do not insert or remove the TF card when recording videos.
- When taking images and recording videos, insert and remove the TF card after the data is saved successfully.
- Do not insert or remove the TF card when browsing and annotating data in the playback menu.
- When reading TF card data on the PC, do not modify the names of files and folders in the TF card; otherwise, the test data may not be correctly

identified and displayed in the playback menu.

## Tripod Fixation (Optional)

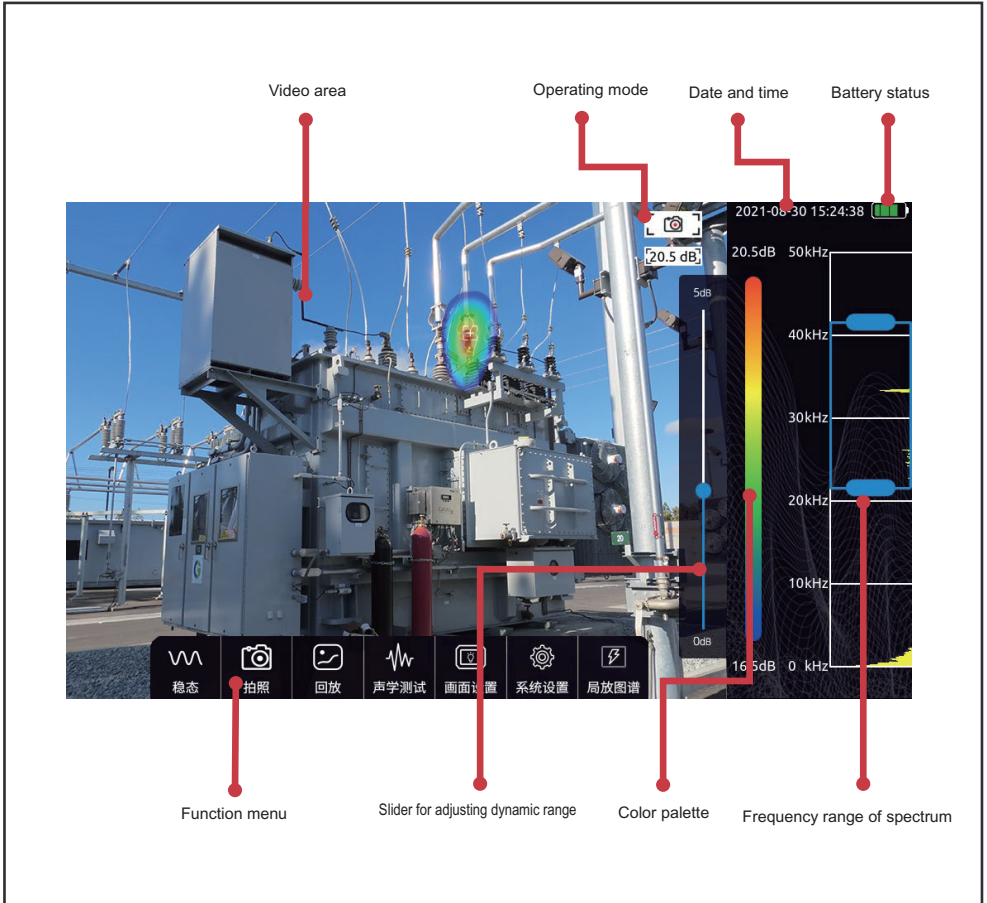


## Installation and Adjustment of Hand Strap/Shoulder Strap

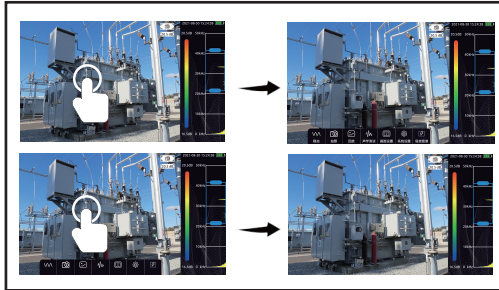




# Main Interface



## Function Menu

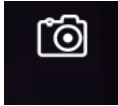


- To view the function menu, tap a finger on the video area.
- Tap anywhere on the display outside the menu or do not operate the product for a long time to hide the menu.

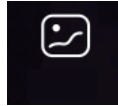
In the function menu, from left to right:



Steady/transient mode



Image/video mode



Playback



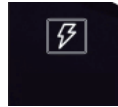
Acoustic testing



Image settings



System settings

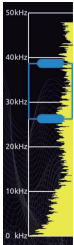


Partial discharge pattern



## Color Palette and Dynamic Range Adjustment

- To view the slider for adjusting the dynamic range, tap the color palette in the main interface.
- Tap anywhere on the display outside the slider to hide it.
- The slider for adjusting the dynamic range can be used to adjust dynamic range parameters quickly.



## Frequency Range of Spectrum

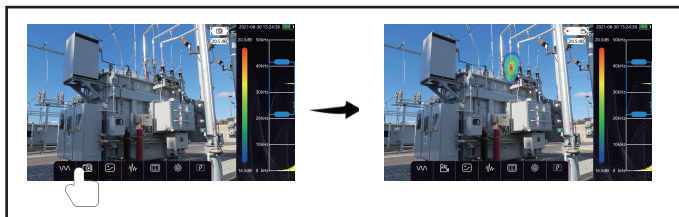
- Tap and hold the middle of the frequency selection box to move the entire box.
- Tap and hold one end of the selection box to adjust the upper limit or lower limit of the test frequency respectively.

## Transient and Steady Modes

Tap the Steady/Transient Mode menu to switch the product operating mode. In the transient mode, the product can quickly respond to transient signals and changes of sound sources. This mode is suitable for locating rapidly changing sound sources, such as partial discharge sources.

In the steady mode, the product will slow down the response speed to signals, and the cloud image display will be steadier. This mode is suitable for observing steady signals, such as gas leakage sound sources.

## Image Capturing and Video Recording



Tap the Image/Video Mode menu to switch between image capturing and video recording.



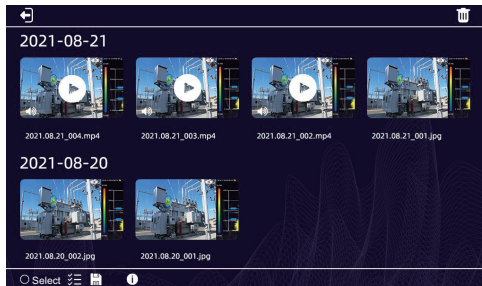
The icon in the top right corner of the video area changes as the mode changes. In the image mode, press the Function button on the right side of the product to capture an image.






In the video mode, press the Function button to start recording. If the recording duration exceeds 5 minutes or the Function button is pressed again, the recording will be stopped and the video will be saved automatically.

When recording a video, the icon in the top right corner of the video area displays the current recording duration.

## Playback

Images and videos can be viewed in the playback interface.



1.  Tap an image to expand it to full size or tap a video to play it.
2.  Tap Select to select videos or images for deletion.
3.  Tap Select All to select all images and videos.
4. Tap  in the upper right corner to delete selected images or videos.
5. Tap  to view the information of the current storage space.

## Image Playback



Double tap on an image to enlarge it. The enlarged image can be dragged with fingers. Double tap the image again to restore it to original size.

To step through images/videos, tap < or > or slide the screen left/right.

## Video Playback



Tap a video thumbnail to enlarge and play this video.

Tap ⏸ to pause or start playing the video.

To step through images/videos, tap < or > or slide the screen left/right.



Drag the progress bar below the video to adjust the playback progress.

## Image, Audio and Text Annotations

In the playback interface, tap a video or an image, six white flag icons will appear at the bottom of the screen. Tap the icons to add annotations to videos or images. There are three types of annotation: image, audio and text. A total of 6 annotations can be added.

An Image Annotation is an additional image attached to the file. Examples include an image of a label or character. After the Image Annotation is selected, press the Function button to capture an image, and then tap the icon in upper right corner to save the annotation. Tap the right icon to delete the captured image. Tap the bottom right corner to select the image resolution (1920\*1080, 1280\*720 or 640\*480).

An Audio Annotation is an additional audio attached to the file. Examples include a person's voice or any other voice on the scene. After the Audio Annotation is selected, press the Function button to use the microphone to record a single channel audio. To improve recording, the microphone array can be placed close to the sound source or the person who is speaking. Press the Function button again to stop recording. Tap the Save icon to save the audio.

A Text Annotation is an additional text attached to the file. Text annotations can be added by using the keyboard or scanning the QR code. After the Text Annotation is selected, tap the Keyboard icon, and then tap the input box to pop up the keyboard. Use the keyboard to input texts, symbols, letters, etc. Tap the Save icon to save the text annotation.

After the Text Annotation is selected, tap the QR code icon, and the product will activate the camera and scan the QR code. After the QR code is identified, the text information contained in it will be displayed. Tap the Save icon to save the text annotation. Tap "Reidentify" to reidentify the QR code.

## **Acoustic Testing**

### **Dynamic Range**

Adjust the dynamic range by sliding the slider or tapping the color palette bar to view the quick adjustment box.

### **Cursor and SPL**

The cursor function can be enabled or disabled.

When the cursor and SPL functions are enabled, the cursor will be displayed in the video area, and the cursor number is displayed below it. The acoustic image energy at the point of the cursor is displayed below the upper right image/video icon. If three cursors are set, the SPLs of the No.1, No.2, and No.3 cursors are displayed from top to bottom. The number of cursors can be set in System Settings->Tools->Number of Cursors. The maximum cursor number is 3.

### **Video Recording with Sound**

When this function is enabled, the product can record videos with sound.

### **Ultrasonic Monitoring**

The product can modulate the signal of ultrasonic frequency to the audible frequency range, and can monitor the signal with earphones.

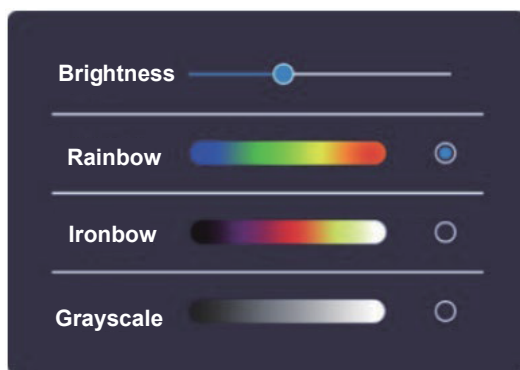
Ultrasonic modulation is realized by superheterodyne, and the reference frequency of modulation can be set. It is recommended to use the frequency band of about 38.6kHz for modulation and monitoring.

### **Focusing**

The focusing function is mainly used to eliminate interference noise, reflection noise, multi-sound source interference, etc. When the test environment is noisy and the cloud images are numerous, scattered and chaotic, the focusing function can be enabled. The acoustic cloud images will be focused to a circle to exclude other interference sources.

Double tap the circle in the middle of main interface to change the test range. Double tap it again to restore the initial range.

## **Image Settings**



**Brightness:** Adjust the backlight brightness. When the product is used outdoors, it is recommended to increase the backlight brightness to have better visual clarity. When used indoors, decrease the brightness to extend the battery life.

**Rainbow:** Set the color palette to Rainbow.

**Ironbow:** Set the color palette to Ironbow.

**Grayscale:** Set the color palette to Grayscale.

## **System Settings**

### **Languages**

The optional languages are Chinese, English, Korean and French.

### **Time**

The system time can be adjusted. After the change is made, tap "Confirm" to save the updated time.

## **Low Power Consumption**

The product can be set to low power consumption mode and enable the automatic sleep function.

If no operation is performed within the specified period, the product automatically enters the sleep mode. When the product is in the sleep mode, the power indicator will flash. Press the Power button or the Function button to quickly wake up the product and enter the test interface.

The auto power off function can be set only when the automatic sleep function is enabled.

After the auto power off time is set, the product will shut down automatically if it enters the sleep mode and does not wake up after the period of time.

## **Tools**

When the log export function is enabled, the product operating logs will be exported to the TF card. Operating logs are used by manufacturers to check product status and are not required by users.

Number of cursors is used to adjust the number of dynamic cursors that can be displayed. The maximum number is 3.

Sensitivity is used to set the minimum sensitivity of cloud image, which can limit the cloud image energy to be higher than the sensitivity. With this function enabled, the slider can set a sensitivity threshold.

## **About**

The product model, serial number, software version and manufacturer can be viewed.

Tap "Check for Updates" to install the new version of software. The product will check external storage (TF card) for available software packages. Select the software package to be installed to upgrade the software version.

## **Partial Discharge Pattern**

Tap the Partial Discharge Pattern menu to enable and display the partial discharge pattern. The AC frequency can be 50Hz or 60Hz. The partial discharge pattern is shown in the following figure. By observing the characteristics of the pattern, users can identify the discharge type.





## Tips on Operating Product

### Sound Source Capturing

- 1) Observe whether there are prominent spectral signals or frequency spikes in the spectrum graph. If there are, move the frequency selection box to include the frequency range where the prominent spectral signals or frequency spikes are located, and then see if a sound source appears in the image.
- 2) Adjusting the dynamic range to a relatively large value can simultaneously capture multiple sound sources with similar SPL in the image. When the SPL of sound sources in the image is very different, relatively small dynamic range may cause the large sound source to drown the small one.

### Elimination of Reflection Interference

When users are not sure whether the sound source in the image is the actual sound source or the reflected virtual image of the sound source, they can try to capture it from different angles. If it can be captured from different angles, it is generally the actual sound source. Because the reflected virtual image of the sound source may have position offset or may even disappear at different angles.

### Elimination of Interference Noise

- 1) It is easily disturbed by ambient noise in low frequency band. According to the actual situation of the sound source, it is recommended to use the middle or high frequency band to locate the sound source.
- 2) Selecting a relatively narrow frequency band to locate the sound source can eliminate the interference noise of other frequency bands.

### Maintenance

- 1) Keep the acoustic sensor hole clean. When the acoustic sensor hole has dust, please blow gently to clean, and do not use a wet cloth.
- 2) If the product is not used for a long time, put it in the protective case after charging and store it in a dry environment at room temperature.

- 3) Regular checking the battery power and charging the battery can effectively extend the battery life.

## Specifications

Microphone array		Display screen	
Microphone	128-channel MEMS digital microphone	Resolution	1024*600
Frequency band	2kHz-48kHz	Size	7 inches
Field of view of acoustic image	62°	Touchscreen	Capacitive
Frame rate of acoustic image	> 25FPS	Backlight brightness	Adjustable
SPL range	30dB-120dB	Battery and battery life	
Camera		Battery capacity	6600mAh@7.2V
Field of view	62°	Battery life	About 4 hours
Focus	Fixed lens 3.04mm	Charging	USB Type-C interface, USB PD protocol
Pixels	8 million	Power consumption	The maximum power consumption of the product is about 29W (charging power for battery protection), and the single-charge battery power is 16W
Data storage		Operating environment and others	
External storage	64G TF card	Operating conditions	-10℃ to +50℃, 10%-95% non-condensing
Internal storage	About 8G memory, for emergency storage only	Storage temperature	-20℃ to 40℃
Storage formats	.jpg (images) and .mp4 (videos)	Charging temperature	10℃ to 45℃
Communication interface		Size and weight	
USB interface	USB 3.0 Type-C	Product size	272mm x 174mm x 42mm
Earphone jack	3.5mm	Product weight	About 1.7kg (hand strap and shoulder strap are not included)

Note: The battery life may be reduced when the product operates at a low temperature.