



USER MANUAL

ACOUSTIC IMAGER

KUS-100



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Version 1.01 31.01.2024

Regulatory Information

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

FCC Compliance Statement

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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

EU/UK Conformity Statement



This product and - if applicable - the supplied accessories too are marked with "CE" and comply therefore with the applicable harmonized European standards listed under the Directive 2014/30/EU (EMCD), Directive 2014/35/EU (LVD), Directive 2011/65/EU (RoHS).



This product and - if applicable - the supplied accessories too are marked with "UKCA" and comply therefore with the following directives: Radio Equipment Regulations 2017, Electromagnetic Compatibility Regulations 2016, Electrical Equipment (Safety) Regulations 2016, the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012.

Restrictions in the 5 GHz band:

According to Article 10 (10) of Directive 2014/53/EU, when operating in the 5150 to 5350 MHz frequency range, this device is restricted to indoor use in: Austria (AT), Belgium (BE), Bulgaria (BG), Croatia (HR), Cyprus (CY), the Czech Republic (CZ), Denmark (DK), Estonia (EE), Finland (FI), France (FR), Germany (DE), Greece (EL), Hungary (HU), Iceland (IS), Ireland (IE), Italy (IT), Latvia (LV), Liechtenstein (LI), Lithuania (LT), Luxembourg (LU), Malta (MT), Netherlands (NL), Northern Ireland (UK(NI)), Norway (NO), Poland (PL), Portugal (PT), Romania (RO), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE), Switzerland (CH), and Turkey (TR).

In accordance with the Radio Equipment Regulations 2017 in the UK, the device working in the 5150 to 5350 MHz frequency range is restricted to indoor use in the United Kingdom.

Frequency Bands and Power (for CE/UKCA)

The frequency bands and modes and transmitting power (radiated and/or conducted) nominal limits applicable to the following radio equipment are as follows:

Wi-Fi: 2.4 GHz (2.4 GHz to 2.4835 GHz): 20 dBm; 5 GHz (5.15 GHz to 5.25 GHz): 23 dBm; 5 GHz (5.25 GHz to 5.35 GHz): 23 dBm; 5 GHz (5.47 GHz to 5.725GHz): 23 dBm; 5 GHz (5.725 GHz to 5.85 GHz): 14 dBm

Use the power adapter provided by a qualified manufacturer. Refer to the product specification for detailed power requirements.

Use the battery provided by a qualified manufacturer. Refer to the product specification for detailed battery requirements.



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

According to the Waste Electrical and Electronic Equipment Regulations 2013: Products marked with this symbol cannot be disposed of as unsorted municipal waste in the United Kingdom. For proper recycling, return this product to your local supplier

upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info.



Directive 2006/66/EC and its amendment 2013/56/EU (Battery Directive): This product contains a battery that cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: www.recyclethis.info.

According to the Batteries and Accumulators (Placing on the Market) Regulations 2008 and the Waste Batteries and Accumulators Regulations 2009: This product contains a battery that cannot be disposed of as unsorted municipal waste in the United Kingdom. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: www.recyclethis.info.

Industry Canada ICES-003 Compliance

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

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) this device may not cause interference, and
 - (2) this device must accept any interference, including interference that may cause undesired operation of the device.
- Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radioexempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
- (1) l'appareil ne doit pas produire de brouillage, et
 - (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

For this device, please pay attention to the following notes when the device is operating in 5 GHz:

- (i) The device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;
 - (ii) The maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall comply with the e.i.r.p. limit; and
 - (iii) The maximum antenna gain permitted for devices in the band 5725-5825 MHz shall comply with the e.i.r.p. limits specified for point-to-point and non point-to-point operation as appropriate.
- (i) Les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.
- (ii) Le gain d'antenne maximal autorisé pour les appareils dans les bandes 5250-5350 MHz et 5470-5725 MHz doivent respecter le pire limiter; et
 - (iii) Le gain d'antenne maximal autorisé pour les appareils dans la bande 5725-5825 MHz doivent respecter le pire limites spécifiées pour le point-à-point et l'exploitation non point à point, le cas échéant.

Users should also be advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices. Les utilisateurs de radars de haute puissance sont désignés utilisateurs principaux (c.-à-d., qu'ils ont la priorité) pour les bandes 5250-5350 MHz et 5650-5850 MHz et que ces radars pourraient causer du brouillage et/ou des dommages aux dispositifs LAN-EL.

KC

A 급 기기: 이 기기는 업무용(A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기바라며, 가정 외의 지역에서 사용하는 것을 목적으로 합니다.

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1 Safety

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

1.1 Laws and regulations

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

1.2 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.
-

1.3 Power supply

- Please purchase the charger by yourself. Input voltage should meet the Limited Power Source (5 V DC, 2 A) according to the IEC 61010-1 standard. Please refer to technical specifications for detailed information.
- Make sure the plug is properly connected to the power socket.
- DO NOT connect multiple devices to one power adapter, to avoid over-heating or fire hazards caused by overload.
-

1.4 Battery

- Improper use or replacement of the battery may result in explosion hazard. Replace with the same or equivalent type only. Dispose of used batteries in conformance with the instructions provided by the battery manufacturer.
- 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 half year to ensure the battery quality. Otherwise, damage may occur.
- DO NOT charge other battery types with the supplied charger. Confirm there is no flammable material within 2 m of the charger during charging.
- DO NOT place the battery near heating or fire source. Avoid direct sunlight.
- DO NOT swallow the battery to avoid chemical burns.
- DO NOT place the battery in the reach of children.
- The lithium battery voltage is 3.6 V, and the battery capacity is 6230 mAh.
- The battery is certified by UL2054.
-

1.5 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.
- A few device components (e.g., electrolytic capacitor) require regular replacement. The average lifespan varies, so periodic checking is recommended. Contact your dealer for details.
- 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.
- We recommend you send the device back for calibration once a year, and please contact the local dealer for the information on maintenance points.
- 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.
-

1.6 Using environment

- Make sure the running environment meets the requirement of the device. The operating temperature shall be -20°C to 50°C (-4°F to 122°F), and the operating humidity shall be 95% or less.
- 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.
-

1.7 Emergency

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

2 Overview

2.1 Device description

The KUS-100 acoustic imaging camera is a professional product for sound source localization. With 64 Low-noise MEMS microphones and adjustable bandwidth range from 2 kHz to 60 kHz, the device provides an easy and effective way to locate the pressurized air leaks in industrial environments or detecting partial discharge in high-voltage systems.

By using a large 4.3" LCD touch screen, the results presented on top of a digital picture allows you to quickly find the source of the problems. The maximum operating distance could reach 100 meters, which can ensure you stay at a safe distance to inspect the high-voltage equipment. Adopting this lightweight and easy-to-use tool, you can discover the potential safety risks, minimize troubleshooting, and save extra costs of equipment failures and downtime.

2.2 Main function

Acoustic Imaging. Device detects the real-time sound intensity of the sources, and locates the sources in the scene.

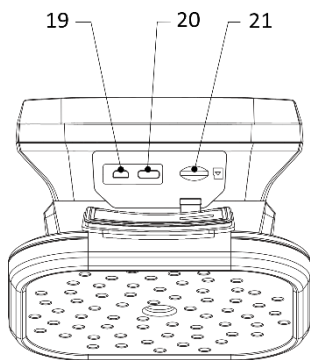
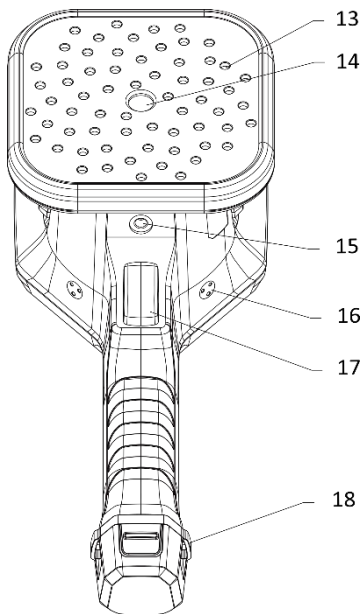
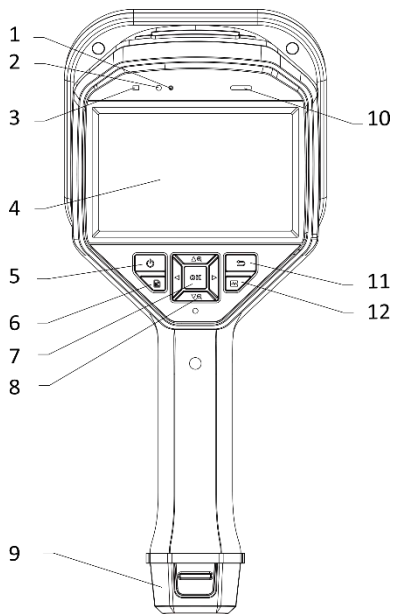
Partial Discharge Detection (PD). Device detects partial discharge activities and estimate their types based on sound frequency, and displays the real-time estimation in live view for your reference.














Gas Leakage Detection (LD). Device detects and estimates real-time gas leak rate, leak cost, and leak level for reference.

Palette. Device supports multiple palettes.

Record Videos & Capture Snapshots. Device supports recording videos, capturing snapshots, and managing albums.

2.3 Appearance



No.	Component	Function
1	Light Sensor	Senses the ambient brightness.
2	Microphone	Records voice remarks.
3	Power Indicator	Solid red: Charge normally Solid green: Fully charged
4	LCD Touch Screen	Allows live view and touch-screen operation.
5	Power Button	Hold  to power on/off.
6	File Button	Press  to access the albums.
7	Confirm Button	Non-Menu Mode: Press  to enter menu. Menu Mode: Press  to confirm.
8	Navigation Button	Non-Menu Mode: <ul style="list-style-type: none"> Press  or  to zoom in or zoom out by 0.1× continuously. Hold  or  to zoom in or zoom out by 1× continuously. Menu Mode: Press  ,  ,  , and  to select parameters.
9	Battery Compartment	For holding the battery.
10	Loudspeaker	Plays voice remarks.
11	Back Button	Press  to save the parameters and return to previous menu.
12	Frequency Button	Press to select the frequency range frame edges and configure the frequency parameters.
13	Microphone Array	Detects sound in the scene.
14	Optical Lens	Views the optical images.
15	Tripod Attachment Point	Mounts the tripod.
16	Hand Strap Attachment Points	Mounts the hand strap.
17	Trigger	Non-Menu Mode: <ul style="list-style-type: none"> Press: Capture snapshots. Hold: Record videos. Menu Mode: Press to return to live view interface.
18	Hand Strap Attachment Holes	Fixes the lower part of the hand strap to the device.
19	Micro HDMI Interface	Displays the image and menu interface via HDMI output.
20	Type-C Interface	Charges the device or exports files with supplied cable.
21	MicroSD Card Slot	For holding the MicroSD card.

3 Preparation

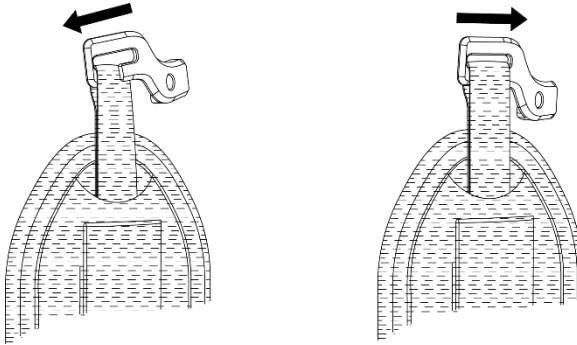
3.1 Mount hand strap

The hand straps aim at attaching to the device and stabilizing it. Please make sure wrap your hands with the hand straps to prevent the device from accidental falling or bumping.

The upper part of the hand strap is attached to the camera by a buckle. There are two buckle attachment points on both sides of the device. The lower part of the hand strap is threaded through the holes at the base of the device.

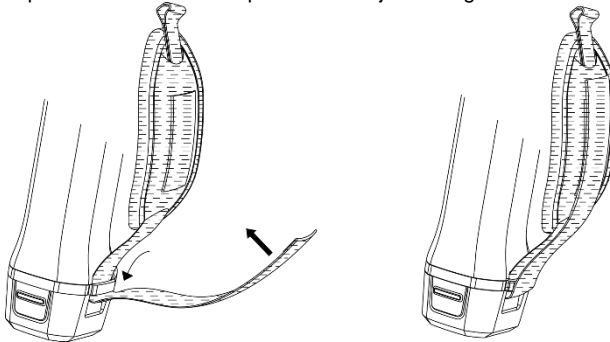
Steps

1. Insert the upper part of the hand straps into the buckles.



Insert upper part of hand strap

2. Fit the buckle on the device and tighten the screw with the supplied wrench.
3. Thread the lower part of the hand strap through the hole at the base of the device.
4. Secure the hand strap with the hook-and-loop fastener. Adjust the tightness according to your hands.



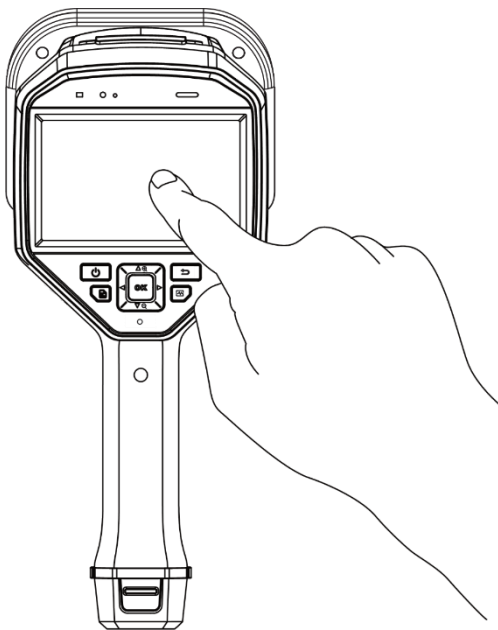
Secure lower part of hand strap

3.2 Operation method

The device supports both touch-screen control and button control.

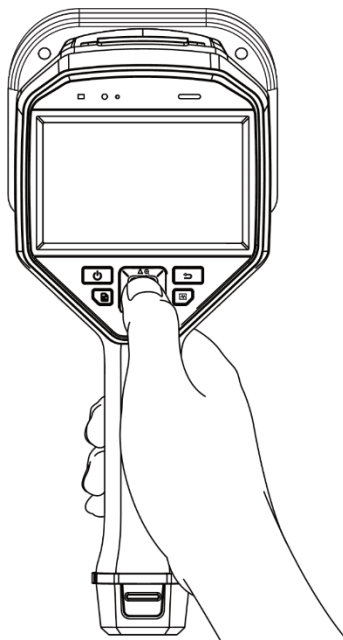
Touch-screen control

Tap on the screen to set parameters and configurations.



Button control

Press the navigation buttons to set parameters and configurations.



3.3 Charging the device

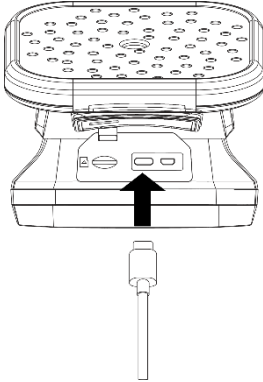
Please fully charge the device before it is used for the first time or when it is in low battery.

3.3.1 Charging the device via cable interface

Before you start

Please make sure the battery is installed before charging via cables.

Steps



1. Open the connector cover of the device.
2. Plug the type-C male connector of the charging cable to the device and the other type-A connector to power adapter.

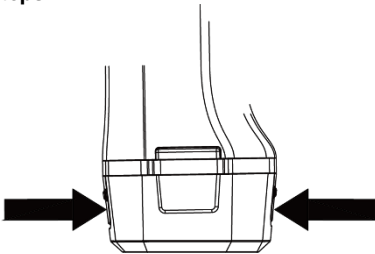
3.3.2 Charging the device via charging base

You can take out the battery and insert it into the charging base for fast charging.

Before you start

Please make sure the device is power off before removing the battery.

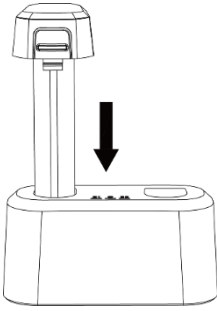
Steps



1. Hold the device, and press both battery lock catches of the device.
2. Hold the lock catches, and draw the battery base to take out the battery.
3. Insert the battery into the charging base. You can see the charging status via the pilot lamp on the charging base.




The red indicating light is on if the battery is charging properly, and the green indicating light is on if the battery is fully charged.



4. When the battery is fully charged, draw the battery from the charging base.
5. Insert the battery into the device and push it into the locked position.

3.4 Power On/Off


Power on

Hold  to turn on the device. You can observe the target when the live view interface is stable.






If the battery of the device is low, please charge it in time or replace it with a fully-charged standard battery, so as to ensure that the device functions normally.

Power off

When the device is turned on, hold  to power off the device.

3.4.1 Set Auto Power-Off countdown


Steps

1. Press  in the live view interface to show the menu.
2. Go to **Settings ► Device Settings ► Auto Off**.
3. Tap **Auto Off** or press  to enable auto power-off.
5. Set the automatic shutdown time for device as required.
4. Press  to save and return to previous menu.


3.5 Sleep and wake

Sleep and wake is used to save energy and increase battery time.

Sleep and wake manually


Press  to enter sleep mode and press again to wake device up.

Set Auto Sleep

In live view, press  to call the main menu. Go to **Settings ► Device Settings ► Auto Sleep** to set waiting time before auto sleep. When there is no button pressing or screen tapping operation on device for more than the set waiting time, device enters sleep mode automatically.

Device Sleep, Scheduled Capture and Video Recording

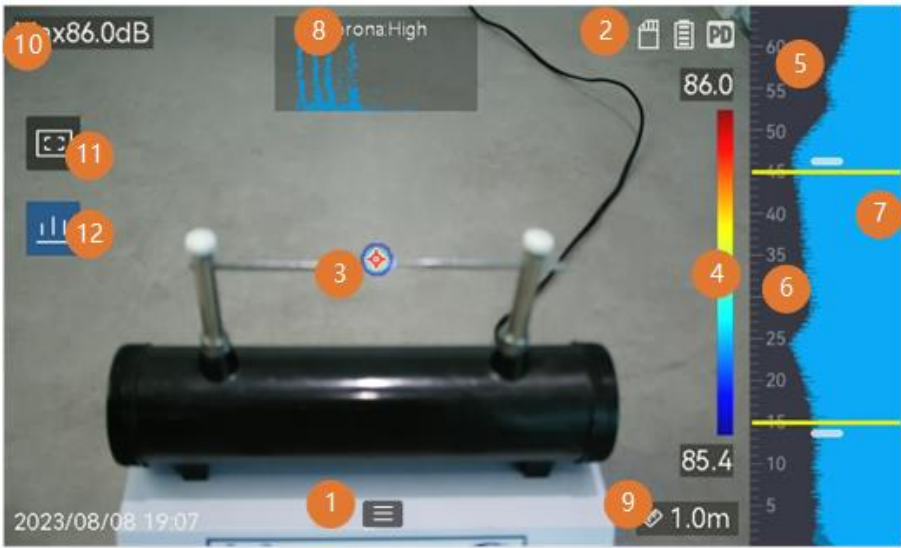
When the device is recording a video clip or on scheduled capturing, auto sleep will not be triggered.

However, press  will stop the video recording or scheduled capture and force the device into sleep mode.

4 Menu description

4.1 Live view



After starting up, device screen shows the live view interface with detected acoustic wave.

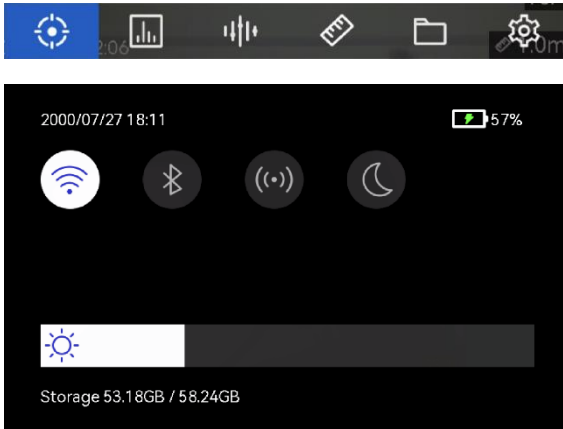













No.	Name	Function
1	Menu Icon	Tap on the icon to call the main menu.
2	Status Bar	Device working status icons are displayed in the bar. You can turn on/off the display from Settings ► Display Settings ► Status Icons .
3	Acoustic Palette	The location and intensity of detected sound source are converted to palette colors overlaying on the visual image for easy observation. The size of palette stands for the intensity of the sound source. Bigger acoustic palette means higher sound intensity.
4	Intensity Scale (Palette Bar)	Intensity scale (palette bar) show the relation between displayed color and sound intensity. The value at the ends of the bar stands for the maximum and minimum intensity of the set frequency range. See sec. 5.3.1 for setting instructions.
5	Frequency Band	Shows the supported frequency band of the device.
6	Selected Frequency Band / Target Frequency Range	Sound intensity of this frequency band is detected and converted to acoustic palette. See sec. 5.2 for instructions.
7	Dynamic Intensity of All Frequencies	Shows the intensity change of supported frequencies.
8, 12	PRPD and its Control Icon	Only available in PD mode. Tap on icon (12) to display phase resolved partial discharge (PRPD) diagram for better PD activity diagnosis. Tap on PRPD diagram (8) to enlarge the display.
9	Sound Source Distance	Shows the set distance of sound source. See sec. 5.5 for setting instructions.

No.	Name	Function
10	Maximum Intensity	Stands for the detected maximum intensity of the scene. See sec. 5.7 for setting instructions.
11	Regional Detection Frame	Tap on the icon to show a frame in the middle of the screen. The device only detects sound sources in the frame to reduce interference from less interested areas. See sec. 5.8 for more information.
13	Gas Leakage Info	Only available in LD mode. Shows detected gas leakage estimation. See sec. 5.1.2 for more information.

4.2 Menus

In the live view interface, tap  or press  to show the menu bar, and swipe down to call the drop-down menu.



Menu icon	Function
	Detection mode switch. Partial Discharge Detection (PD) and Gas Leakage Detection (LD) are supported.
	Adjusts detection sensitivity. Bigger value means higher sensitivity. See sec. 5.6 for setting instructions.
	Pre-defined target frequency ranges for quick switching.
	Distance to sound source.
	Local albums of captured images and videos. See sec. 7.3 for setting instructions.
	Settings of all device function.
	Tap to turn on/off device Wi-Fi. See sec. 8.1 for setting instructions.
	Tap to turn on/off device Bluetooth. See sec. 8.3 for setting instructions.
	Tap to turn on/off device hotspot. See sec. 8.2 for setting instructions.
	Tap to switch menu themes between dark and light.
	Swipe to adjust screen brightness.

5 Acoustic wave detection

The device supports acoustic wave detection. You can locate and mark the sound sources with acoustic images, and view the real-time sound intensities in the scene.

5.1 Set detection mode

The device supports partial discharge detection (PD) and gas leakage detection (LD).

Detection mode	Application
Partial Discharge (PD)	Often used in electrical equipment and facility inspection. It detects abnormal partial discharges faults and instructs maintenance activities.
Gas Leakage (LD)	Often used in gas leakage detection of gas pipelines, tanks, valves, etc.

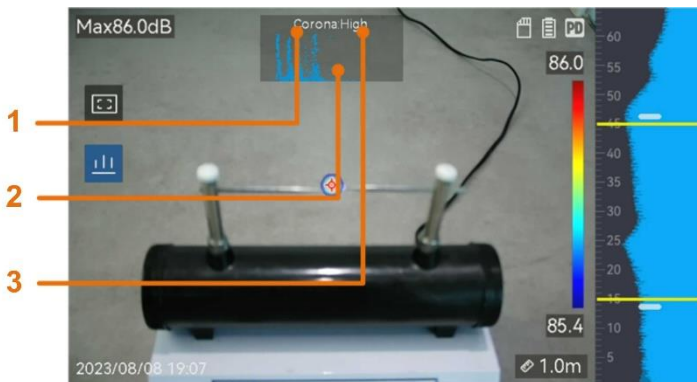
Steps

1. In the live view interface, tap  or press  to show the menu.
2. Select  to switch detection modes.



5.1.1 Partial discharge types and levels

When detecting a partial discharge sound source, device automatically identify the type and strength level, and display the result on screen.



1 – Partial discharge type. 2 – PRPD diagram. 3 – Partial discharge level

The explanation of screen display and the recommended handling are show in the following tables.

Partial discharge types	Explanation
Corona	Corona discharge occurs on the sharp surface of a conductor surrounded by gas. It usually happens in electrical systems like high-voltage power lines, transformers, or electrical motors.
Floating	Floating discharge (one of arcing discharges) happens when the electrical current flows through the conducting path created by voltage difference between two conductors. It might occur in various situations, such as high-voltage power transmission systems, electrical switches, circuit breakers, and welding equipment.
Surface	Surface discharge refers to the electrical discharge travels along the surface of insulation. It is primarily caused by the contamination and weather conditions like high humidity, of the insulator surface. It often occurs in high-voltage equipment, such as transformers, cables, switchgear, and motors.
Particle	Particle discharge refers to the partial discharge of electrical energy that interacts with metallic particles and debris present in the electrical systems. It can result from loose particles or particles generated by mechanical wear, corrosion, or degradation of insulation materials.
Noise	Other detected sound.

If different types of partial discharges coexist in the scene, the most prominent partial discharge type shows in live view.

Partial discharge severity	Recommended handling
Normal	No observable/measurable deterioration.
Low	Minor deterioration which requires attention. Shorten inspection period and take maintenance actions when necessary.
Medium	Moderate deterioration. Locate and clean the Item during routine maintenance, or carry out related electrical test of the item. Or use online monitor to monitor the discharge tendency.
High	Serious deterioration. Item cannot be returned to service without shut down or engineering advise.

5.1.2 Gas leakage estimation

Device estimates and displays leak rate, level and possible cost for reference according to the set time unit, unit price, and currency.

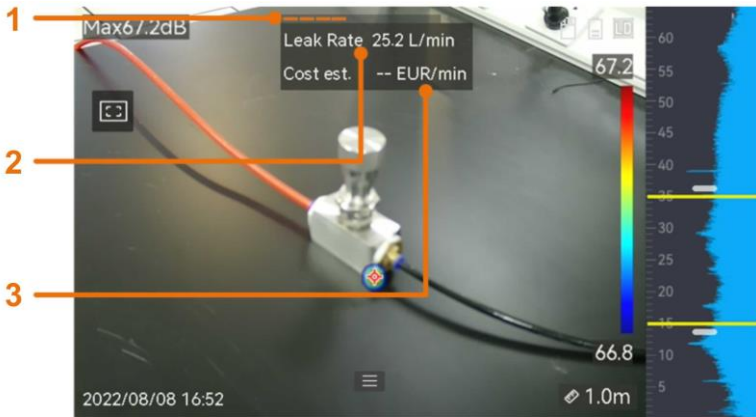


NOTE!

This product is designed to assess energy leakage to achieve energy savings. However, due to potential environmental factors that may impact detection accuracy, the estimations provided are approximate and for informational purposes only. It should be noted that the results presented by the devices are not a guarantee of actual energy savings or a recommendation, and may not accurately reflect the specific situation of your facilities.

Steps

1. In the live view interface, tap or press to show the menu.
2. Select and switch to LD.
3. Select and go to **Acoustic Settings** ► **Gas Leak Settings** to set Unit Price, Time Unit, and Currency.
4. Return to live view interface. Aim the device to a gas leak source, and the real-time estimation displays on screen.



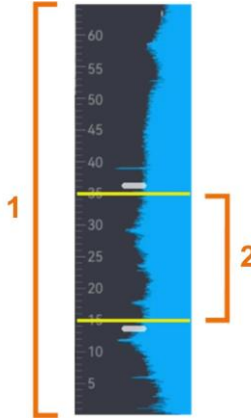
1 – Leak level. 2 – Leak rate. 3 – Cost estimation

5.2 Set frequency range

Steps

1. The device supports sound detection of two configurable frequency bands with different upper limit. Choose the one that better covers possible target frequencies from **Settings ► Acoustic Settings ► Frequency**.

2. Select a target frequency band, sound of which is visualized to acoustic palettes in the display for easy observation. You can switch among 3 pre-defined frequency ranges or adjust manually.





1 – Supported frequency band (configurable)

2 – Selected frequency range for visualization

5.2.1 Switch among pre-defined target frequency ranges

Steps


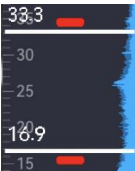



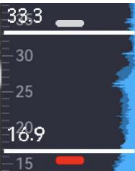
1. In the live view interface, tap  or press  to show the menu.

2. Select  and select a range option.


5.2.2 Set target frequency range manually

Steps

1. Select a subject for adjustment.

Objective	Operation	Operation result
Adjust the upper and lower limits together.	Press  once or tap the area between the yellow lines.	
Adjust the upper limit only.	Press  twice or tap on the upper yellow line.	
Adjust the lower limit only.	Press  three times or tap on the lower yellow line.	

2. Press/hold  and  to adjust values.

3. Press  to save and exit.

5.3 Set acoustic palettes

Acoustic palettes are the shaped colors overlaying on visual image indicating the location and strength of detected sound source. Palette color, opacity and intensity range of palettes are adjustable.

5.3.1 Set palette color

Steps

1. Press **OK** in the live view interface to show the menu.
2. Select **Settings** from the main menu, go to **Acoustic Settings ▶ Palettes**, and select a desired color combination.
3. Press **Return** to save and exit.

As a result, acoustic palette overlaid above the sound source and palette bar change to the selected palette.

5.3.2 Set opacity

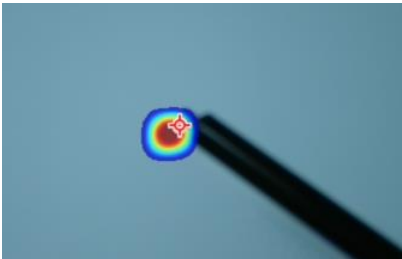
You can view the acoustic palette and the visual images at the same time if the opacity is properly set.

Steps

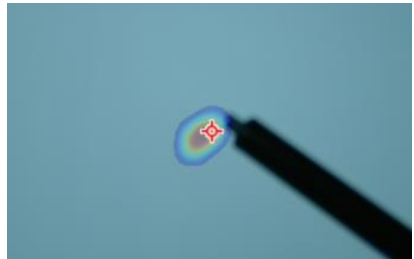
1. In the live view interface, tap **Menu** or press **OK** to show the menu.
2. Go to **Settings ▶ Acoustic Settings ▶ Level**, and choose the preferable opacity.
3. Press **Return** to save and exit.



The opacity ranges from 0% to 100%. The lower the value is, the more transparent the acoustic images are.



75% opacity










25% opacity

5.4 Set intensity range for palettes

Colors in palettes stand for different sound intensity values. Usually, device automatically calculates intensity range for palettes. You can also manually set a fixed range if the auto palette display is not satisfactory.

- **Auto (default):** Device calculates the upper limit, lower limit, and the intensity delta automatically.
- **Manual:** Device calculates the upper limit and lower limit of intensity according to the set intensity delta and actual intensity of target sound source.









Steps

1. In the live view interface, tap  or press  to show the menu.
2. Go to **Settings** ► **Acoustic Settings** ► **Intensity Range**, and press  to switch to **Manual**.
3. Select **Intensity Delta** and press .
4. Press/hold  and  to adjust values.
5. Press  to save and exit.

5.5 Set sound source distance

Distance to sound source helps to increase the acoustic wave detection accuracy.







Steps

1. In live view interface, tap  or press  to show the menu.
2. Select .
3. Adjust the distance value by pressing/holding  and  or tapping  and .
4. Press  to save and exit.


5.6 Set detection sensitivity

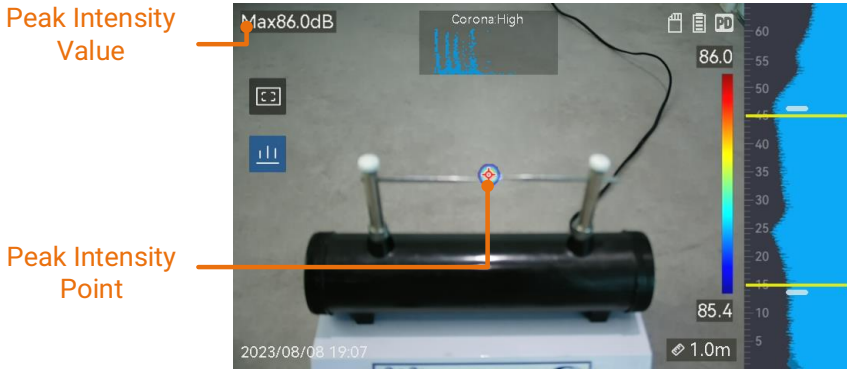
Higher sensitivity means that sound source of lower intensity can be detected. Higher sensitivity also means that interferences are more easily to be detected and displayed.

Steps



1. In the live view interface, tap  or press  to show the menu.
2. Select .
3. Press  and  or tapping on screen to select a level. Bigger number means higher sensitivity.
4. Press  to save and exit.

5.7 Mark and display peak intensity

Mark peak intensity point with  and display the peak intensity value on screen.




Steps

1. In live view interface, tap  or press  to show the menu.
2. Go to **Settings** ► **Acoustic Settings** ► **Sound Intensity Display**.
3. Enable **Peak**.
4. Press  to save and exit.

5.8 Regional detection frame

If the target sound source is small and there is sound interference around, enable the regional detection frame and aim the frame to the target. Sound detection only carries out in the framed area.

Tap  to turn on/off regional detection frame.





5.9 Show multiple sound sources

Usually, device only displays acoustic palettes at the strongest sound source. If you want to see the other sound sources in the scene, turn on **Multiple Sources** from **Settings** ► **Acoustic Settings** ► **Multiple Sources**.

6 Display settings

6.1 Set screen brightness

Steps

1. In the live view interface, tap  or press  to show the menu.
2. Go to **Settings ► Device Settings ► Screen Brightness**.
- Auto: The device adjusts screen brightness automatically according to the ambient brightness.
- Manually: Drag the brightness adjustment slider to the left or right to manually adjust screen brightness.



You can also manually adjust brightness from swipe-down menu.



6.2 Adjust digital zoom






The device supports 1× to 8× digital zoom.

- In the live view interface, hold  or  to zoom in or zoom out by 1× continuously.
- In the live view interface, press  or  to zoom in or zoom out by 0.1× precisely.

6.3 Display OSD info

OSD information informs you the status, time and date, and other information of the device in the live view interface.





Steps

1. In the live view interface, tap  or press  to show the menu.
2. Go to **Settings ► Display Settings**.
3. Tap  or press  to select the on-screen information.
4. Press  to save and exit.

6.4 Set grayscale of visual image

The colored live view image turns to black and white if grayscale image is enabled. The black and white image makes colored acoustic palettes more prominent for observation.

Steps

1. In the live view interface, tap  or press  to show the menu.
2. Go to **Settings ► Display Settings**.
3. Tap  to enable **Grayscale Image**.
4. Press  to save and exit.

7 Picture and video

Insert memory card into the device, and then you can record videos, capture images, and mark and save important data.



- Device does not support capturing or recording when the menu is shown.
- When the device is connected to your PC, it does not support capturing or recording.
- Go to **Settings ► Capture Settings ► Filename Header**, you can set the filename header for capturing or recording to distinguish the files recorded in a specific scene.
- Go to **Settings ► Device Settings ► Device Initialization** to initialize the memory card if needed.

7.1 Capture picture

Operate the device to capture live images and save the images in local albums.

Before you start

Make sure that there is a working memory card mounted in your device.

Steps

1. Set a capture mode and pull **Trigger** in live view interface to capture images.
2. Go to **Settings ► Capture Settings ► Capture Mode**.
3. Select a mode.
 - **Capture One Image.** Pull **Trigger** once to capture one image.
 - **Scheduled Capture.** Set the continuous capture amount after select this mode. Pull **Trigger** in live view, and device captures the set amount of images continuously.
 - **Continuous Capture.** Set the interval for scheduled capture after select this mode. Pull **Trigger** in live view, and the device captures images according to the set interval. Pull **Trigger** again or press ↶ to stop capturing.
4. Press ↶ to return to the live view interface.
5. Aim the lens to your target and pull **Trigger** to capture images.
6. **Optional:** After capturing, you can tap the thumbnail of the captured image at the right part of the interface to view and edit the image.

What to do next

- Go to albums to view and manage files and album folders.
- Edit saved images.
- You can connect your device to PC to export local files for further use.

7.2 Record video

You can record the target. The recorded video and the synchronous audio are saved in the memory card.

Steps

1. In the live view interface, hold the trigger to start recording. The recording status icon and time icon appear.
2. When you finish, pull the trigger again to stop recording. The recorded video will be saved automatically and exit.



You can also press  or  to stop recording.

3. Refer to **sec. 7.4** to export the snapshots.






The video format is MP4 format. You can play videos on the device or export to the compatible players to play.

7.3 View and manage local files

Device captured images and videos are saved in local albums. You can create, delete, rename and set an album as the default saving album. For files, operations, such as browsing, moving and deleting, are available.

Steps

1. Enter album.


- In live view, press  to enter albums.
- In live view, press  to call the main menu, and select  to enter albums.

2. To create, rename, delete and set an album as the default saving album, see **sec. 7.3.1** for instructions.









3. For file operations, such as, moving or deleting a file, see **sec. 7.3.2** for instructions.

4. To modify an image, for example, editing the text or voice notes saved with the images, see **sec. 7.3.3** for instructions.

7.3.1 Manage albums









You can create several albums to manage captured images and video files on your device. Newly captured images and videos are saved in the **Default Saving Album** .

Steps

1. Enter albums.
 - In live view, press  to enter albums.
 - In live view, press  to call the main menu, and select  to enter albums.
2. Create an album.
 - 1) Tap  in upper right corner to add an album.
 - 2) Edit the album name.
 - 3) Press  to save the album.
3. Rename, delete or set an album as the default saving album.
 - 1) Select an album and press .
 - 2) Tap  in upper right corner of the screen.
 - 3) Select **Set as Default Saving Album**, **Rename** or **Delete** as required.
 - 4) The album icon turns to  when it is set as the default saving album.








7.3.2 Manage files

Steps

1. Enter albums.
 - In live view, press  to enter albums.
 - In live view, press  to call the main menu, and select  to enter albums.
2. Select an album and press .
3. Browse the image and video files.
 - 1) Select a file and press .
 - 2) Press  and  to browse the previous or the next file.
 - 3) Press  to call the operation menu to check more available operations. File formats and their supported operations are shown below.

File formats and operations

File type	Format	Description
Images	File Name.pd.jpeg File Name.Id.jpeg	Editing text and voice notes, moving files, checking basic information, and deleting files are supported on device.
Videos	File Name.pd.mp4 File Name.Id.mp4	Playing, moving and deleting video files are supported on device.




4. Moving or deleting several files.
 - 1) In an album, tap  in the upper right corner of the screen.
 - 2) Press  and  to select a file and press . If you want to select all files, tap  in the upper right corner. If you want to cancel all selection, tap .
A selected file displays with a  in its upper right corner.
 - 3) Tap **Delete** or **Move**.
 - If you tap **Delete**, files are deleted after confirmation.
 - If you tap **Move**, select a target album to start moving.


7.3.3 Edit files


Editing the text or voice notes saved with the images.

Steps

1. Enter albums.











- In live view, press  to enter albums.
- In live view, press  to call the main menu, and select  to enter albums.

2. Select an album and press .

3. Select a file and press  to call the editing menu.

4. Select an option and complete corresponding operations.

Editing and managing images

Icon	Description
	Editing text note. Add a new text note or change the existed note, and press  to save the settings.
	Editing voice note. You can add a new voice note, play or delete an existed voice note. If the file already has a voice note, tap it to play or delete the note. If the file has no voice note attached, press  or tap  to record one.
	Move the file to other albums. Select a target album and press  to confirm the moving.
	Show basic information of the file, for example, the saving time and resolution.
	Delete file.
	Play video.

7.4 Export files

Connecting the device to your PC with USB cable, you can export the recorded videos and captured snapshots.



- Plug the type-C male connector of USB cable to the device and the other type-A connector to PC.
- You can export the files using USB cable while the device is turned off.
- You can export the files by inserting the memory card to your PC which has a card slot.

Steps

1. Open the cover of cable interface.

2. Connect the device to your PC with cable and open the detected disk.

3. Select and copy the videos or snapshots to PC to view the files.

4. Disconnect the device from your PC.





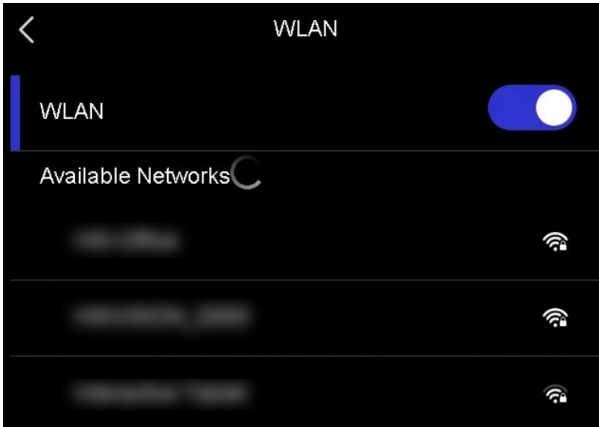
You can play the recorded videos using the default players.


8 Connect

8.1 Connect device to Wi-Fi

Steps

1. Enter Wi-Fi setting interface. Choose from the following ways.
 - Tap and hold  from the swipe-down menu.
 - Go to **Settings ► Connections ► WLAN**.
2. Tap  to enable Wi-Fi, and the searched Wi-Fi will be listed.



3. Select Wi-Fi to connect to and a soft keyboard is displayed.
4. Enter the password.
5. Tap  to hide the keypad and connect Wi-Fi.



- DO NOT tap space, or the password may be incorrect.
- Leaving the Wi-Fi setting interface does not interrupt the connection.

Result

A Wi-Fi icon  shows in the live view interface when the connection is completed.


8.2 Hotspot mode

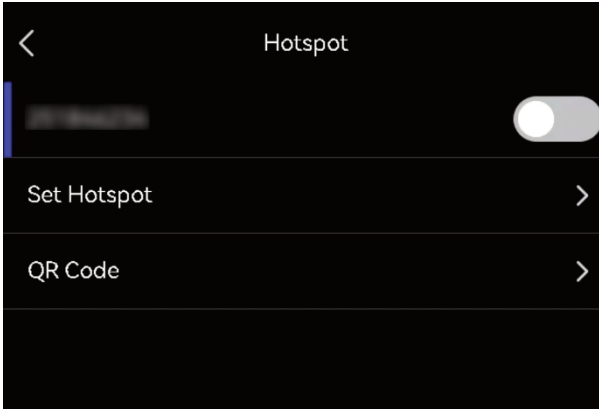
When the device's hotspot is on, other equipment with Wi-Fi function can join the device for data transmission.

Steps

1. Enter hotspot configuration interface. Choose from the following ways.


- Tap and hold  from swipe-down.
- Go to **Settings** ► **Connections** ► **Hotspot**.

2. Tap  to enable hotspot function.



3. Set and join the hotspot.

Using hotspot password

- Tap **Set Hotspot**. A soft keyboard is displayed.
- Set the password for the hotspot by tapping the screen.
- Tap  to save.
- Enable the Wi-Fi function of other equipment and search the device hotspot to join.

Using hotspot QR code

- Tap **QR Code**. A QR code is displayed.
- Scan the QR code to join the hotspot.





- When setting password, do not tap **space**, or the password may be incorrect.
- The password should be at least 8 digits, consisting of numbers and characters.
- Scanning function of some APP may fail to connect your phone to the device hotspot. Try other APPs.


8.3 Pair Bluetooth devices

Pair your device with an external Bluetooth player (speaker or headsets) to play the audio recorded together with the videos.

Steps

1. Enter Bluetooth configuration page. Choose from the following ways.

- Tap and hold  from swipe-down menu.
- Select  from the main menu. Go to **Settings** ► **Connections** ► **Bluetooth**.

2. Tap on  to enable the Bluetooth. The device searches and displays available nearby Bluetooth devices. Make sure the external Bluetooth device is in discoverable mode.

3. Tap to select an external Bluetooth device to start automatic pairing and connecting.



The Bluetooth function is for audio play only. If you want to exporting local files, see **sec. 7.4** for instructions.

9 Maintenance

9.1 View device information

Go to **Settings ► Device Information** to view the device information.

9.2 Set language

Go to **Settings ► Device Settings ► Language** to set system language.

9.3 Set date and time

1. Press **OK** to show the menu in the live view interface.
2. Go to **Settings ► Device Settings ► Time and Date**.
3. Set the date and time.
4. Press **↶** to save and exit.



Go to **Settings ► Display Settings** to enable or disable time and date on-screen display.

9.4 Upgrade device

Before you start

- Please contact the customer service and technical support to get the upgrade file first.
- Make sure that the device battery is fully charged.
- Make sure that Auto Power-off function is turned-off to avoid accidental suspension during upgrading.
- Make sure that a memory card has been installed to device.

Steps

1. Connect the device to your PC with cable and open the detected disk.
2. Copy the upgrade file and paste it to the root directory of the device.
3. Disconnect the device from your PC.
4. Reboot the device and then it will upgrade automatically. The upgrading process will be displayed in the main interface.



After upgrading, the device reboots automatically. You can view the current version in **Settings ► Device Information**.

9.5 Restore device

You can default the device to the factory settings.



NOTE!

This function should be used with caution.

Steps

1. Press **OK** to show the menu in the live view interface.
2. Go to **Settings ► Device Settings ► Device Initialization**.
3. Select **Restore Device**. A prompt appears.
 - **OK**: Tap **OK** to initialize the device.
 - **Cancel**: Tap **Cancel** to exit and return to the previous menu.

10 Cleaning and maintenance



NOTE!

- Use the below specified methods of maintenance only.
- The product does not comprise any parts serviceable by the user. Do not attempt to dismantle or modify the camera on your own. **Opening the instrument voids the warranty.**

Camera enclosure - all surfaces, except for optical elements of the camera, can be cleaned with a soft and moist cloth with generally available mild detergents. Do not use any solvents or cleaning agents that could scratch the enclosure (powder, paste, etc.). During cleaning, the camera must be turned off.

Due to the applied anti-reflective coating, optical lens are the most sensitive and at the same time the most expensive part of the camera (the lens is of key importance to radio-metric capabilities of the infrared system). Therefore it is important to close the protective lens cover after each use of the camera. Optical surfaces should be cleaned only, when they are visibly fouled. Do not touch exposed surfaces of optical lens with fingers, because fouling left with fingerprints can be harmful to coatings and glass of the lens.

Chemical agents must not be used for cleaning the optical viewfinder, and particularly op-tics and accessories of the camera. Use a clean, dry and soft cloth for cleaning the body of the viewfinder; for cleaning the lens, use only the supplied lens cleaning cloth.

11 Storing

When storing the instrument, observe the following guidelines:

- make sure the camera and its accessories are dry,
- when storing the camera for a prolonged time, remove the batteries,
- allowed are storage temperatures specified in technical specifications,
- in order to avoid complete discharging of rechargeable batteries during prolonged storage, charge them once in a while.

12 Dismantling and disposal

- Used-up electrical or electronic equipment must be collected selectively, i.e. must not be mixed with waste of other types.
- Used-up electronic equipment must be delivered to an appropriate collection centre in accordance with regulations related to used-up electrical or electronic equipment.
- Before delivering the equipment to the collection centre do not attempt to dismantle any of its parts.



NOTE!

Follow local regulations related to disposing of packaging, used-up batteries and rechargeable batteries.

13 Specifications

Acoustic parameters	
Number of microphones	64
Bandwidth	2 kHz...65 kHz
Distance	0.3 m...100 m (1.0 ft...328 ft)
Camera FOV	51.8° x 36.4°
Sound intensity display	Peak Point, Center Point
Acoustic image frame rate	25 fps
Signal noise ratio	70 dB
Acoustic image resolution	800 x 480
Acoustic image palette	8
Leak rate	>0.008 l/min @ 6 bar from 0.5 m (1.64 ft) >0.013 l/min @ 5 bar from 1 m (3.28 ft)
Image display	
Display	800 x 480 px, 4.3" LCD, touchscreen
Digital zoom	1.0x...8.0x
Screen brightness	Manual / Auto
Memory	
Storage media	Removable 64 GB SD card
Image storage capacity	20 000 images
Video storage capacity	60 hours
Video file format	MP4
Annotations	Voice note: max. 60 seconds Text note: max. 200 characters
Power supply system	
Power supply	5 V DC / 2 A (charging via USB)
Battery type	Dismountable and rechargeable Li-Ion battery
Battery operating time	Approx. 3.5 hours
Battery charging time	5 hours to full charge
Communication	
Wi-Fi	802.11 b/g/n (2.4 GHz and 5 GHz)
Bluetooth	Bluetooth 4.1
USB interface	USB Type-C
HDMI interface	HDMI-D
Environmental conditions	
Protection level	IP40
Operating temperature	-20°C...50°C (-4°F...122°F)
Storage temperature	-20°C...60°C (-4°F...140°F)
Relative humidity	<95% without condensation
Drop test height	1.2 m (3.94 ft)
Safety	IEC 61010-1
EMC	EN 55032, EN 50130-4, EN IEC 61000-3-2, EN 61000-3-3
Weight	approx. 940 g (2.07 lb)
Dimensions	292 x 127 x 111 mm (11.5" x 5.0" x 4.4")
Tripod mounting	UNC ¼"-20

14 Manufacturer

The manufacturer and provider of warranty and post-warranty services for this instrument is:

SONEL S.A.

Wokulskiego 11

58-100 Świdnica

Poland

tel. +48 74 884 10 53 (Customer Service)

e-mail: customerservice@sonel.com

web page: www.sonel.com



NOTE!

Only the manufacturer is authorized to perform service repairs.



SONEL S.A.

Wokulskiego 11
58-100 Świdnica
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