acoustic imaging camera Operating Manual - Beijing Garexon Technology Co., Ltd.



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Within one year of the date of purchase of this product, we will respond to anomalies or malfunctions caused by the quality of the product.

Free quality assurance services are provided.

If you are in a situation of falling, impacting, etc., the failure of the non-product quality.

After the sale of the telephone: 400-040-1978

The calibration process was completed at the time the plant was released, and 5 was not required to be calibrated again during the year of normal use.

The site should be contacted in a timely manner in cases where the off-the-shelf point clearly deviates from the actual acoustic point (which can be verified by a human blow or a speech)

Home, under the direction of the manufacturer, to conduct positioning calibration.

Guidelines for the treatment of equipment damage or end-of-life

When the equipment in your hands is damaged or reaches its useful life due to various factors, it is recommended that it be properly handled as follows:

In the event of damage to equipment or end-of-life conditions, the relevant environmental regulations and electronic waste disposal regulations should be followed.

Please do not abandon or self-dismantling, but deliver them to e-wastes with professional qualifications and processing capabilities

Institutions. These institutions have advanced technology and equipment that enable scientific, safe dismantling and classification of equipment.

and treatment to minimize potential environmental hazards and achieve efficient resource recovery and reuse.

acoustic imaging camera, using high sensitivity digital microphone arrays, is used mainly to detect gas leaks with pressure and electricity

partial discharge for insulation equipment, which also expands functional detection, including infrared thermal imaging, internal leakage or other detection

Measurement function.

It has a light patch for detection of the weak light environment and has an external sensor function.

Shells to increase the durability of the equipment and to take into account blast-proof requirements in structural and circuit design, hence partial

The number can be used in blast-proof environments (please ensure that the product purchased is of blast-proof type).

Before using the product, this note needs to be read carefully

Do not use non-explosive devices in blast-proof scenes.

Please do not dismantle this facility without permission. The anti-dismantling device will not be repaired if it is damaged

If the equipment is malfunctioning, stop using it and contact the relevant plant personnel

• Do not place equipment near heat sources, flames or at high temperatures

Please do not charge the equipment at high temperatures (over 45°C)

Please use the equipment at -25°C ~ +50°C

Do not plug in mobile power in blast-proof scenes.

Serial number	Name	Picture	Remarks
1	**Host**		
2	**Shoulders.**		**10kg.**
3	**Charge Head**		**Output power 65W, output 5V-21V**
4	**Charge wire**		Transfer rate 480Mbps@Max to support 5A charge **Electricity**
5	**Card Reader**		
6	**Mobile power**		Direct connection to the mainframe in a non-explosive scenario **Measure**
7	**Incoming Listener** **(selection)**		After inserting the host through a serial entry, call the corresponding function directly **Available**
8	**Boxes.**		The box is a two-storey structure. First level, the mainframe. Second layer placement attachments (charging, mobile power etc.)

Mike array:

The microphone arrays are a particular combination of microphones with space-directed sound picks and enhanced voice mail.

Nodes, noise inhibitions, etc. It's fine by analysing differences in the reception of signals from different microphones.

Picking up sound in a given direction and reducing noise interference can also enhance the weak sound signal and use algorithms to remove the environment

Noise.

Filter:

Filtering is a signal processing technique designed to process input signals through specific methods to remove them.

or reduce the required frequency composition, and retain a useful signal within a given frequency range.

SPL:

SPL, Sound Pressure Level is an indicator used to measure the intensity of the sound, indicating that it's in a special position.

The weight of the sound pressure is higher in dB. 20 Pa

The more loud the sound, it can also be called the dB value.

Dynamic scope:

Dynamic range is the gap between the strongest and weakest parts of the sound signal.

The widest range you can capture when you signal, from the smallest detail to the strongest signal. The larger the dynamic range, the more the device is processed.

The greater the ability to change by sections and extremes, the greater the range of imaging points.

Image point (sound cloud):

Image point (Acoustic Cloud Chart) is a spatial map of the acoustic field, formed by multiple sources or sound signals.

Helping to analyse and understand the location, direction and impact of sound sources by showing the distribution and intensity of sound in 3D space

Area, i.e., gas leaks or partial discharge failure point detected on site.

Hearing:

Hearings are the range of sounds that people can sense in their ears. 20 Hz

To 20,000 Herz (Hz). The audio frequency range of this device is displayed on the right side of the device screen from 2kHz

To 20kHz.

Ultrasound:

Ultrasound is a sound wave with a frequency higher than 20kHz, which corresponds to 20kHz-65kHz on the right side of the device screen.

The rate of acoustic decline in air is closely related to the frequency. In general, the higher the frequency, the faster the decay.

Test frequency range:

Select a specific frequency range (i.e., band) within the full frequency range supported by the device (i.e. 2kHz-65kHz)

When the width is 2kHz, or 10kHz, the device only measures the sound within the frequency range and

Displays the corresponding acoustic cloud map and the sound outside this frequency band will not appear in the display results.

Frequency/energy peak:

In the spectrum map on the right of the device, the more concentrated peaks represent a greater acoustic energy fraction at a given frequency.

Brush. With this energy distribution, you can judge the distribution of the audio in the environment.

Peaks, which means there's an partial discharge failure around.

Smart noise reduction:

Smart noise reduction is a way to use advanced technology to reduce environmental noise. It's through the microphone array.

Sound signals captured are analysed and processed to identify noise components and target inhibitions or eliminations from

And keep a useful sound signal.

Debit threshold:

Debit threshold is the specific sound intensity measure in dB. When the sound intensity is within the environment

The sound is captured by the device's microphone array when this is set or exceeded.

To enable the device to respond to voices above a certain level of intensity in a targeted manner, ensuring that priority is given to many voices

Pay attention to the more visible sound signals, thereby increasing the efficiency of equipment for the detection and processing of specific sound.

Speculation:

partial discharge is the visualized expression of the partial discharge phenomenon.

For example, the instantaneous discharge of electricity in local areas.

Batteries and chargers

Battery information:

A chargeable lithium ion cell with a nominal capacity of 5000mAh@11.1V. Some types of batteries may be larger.

Charge information:

Mark with device . The device supports 12V-20V power USB Type-C

A pressure-out PD protocol fast-charge source adapter or mobile power source to charge the equipment.

Charging, renewal description:

When 1 inserts charger, the charger indicates that the red light is on and is charging; the charger indicates that the red light is flashing and when

The front charge environment is not sufficiently voltage; charge-up signal red light is extinguished, indicating that the charge has been completed; please keep the device down

Charge the equipment down.

2) does not contain infrared equipment, which displays 100% power, using approximately 4 hours; and with infrared equipment, which shows the size of the equipment

When showing 100% power, you can use about 3 hours; when you have infrared and internal leaks, you can use 100%.

You can use about 2 for half an hour.

When 3 is low, the device will signal a low amount, so charge the device in a timely manner.

4 (if the device is unused for long periods of time, the screen brightness will automatically be reduced to the minimum, thereby extending the equipment)

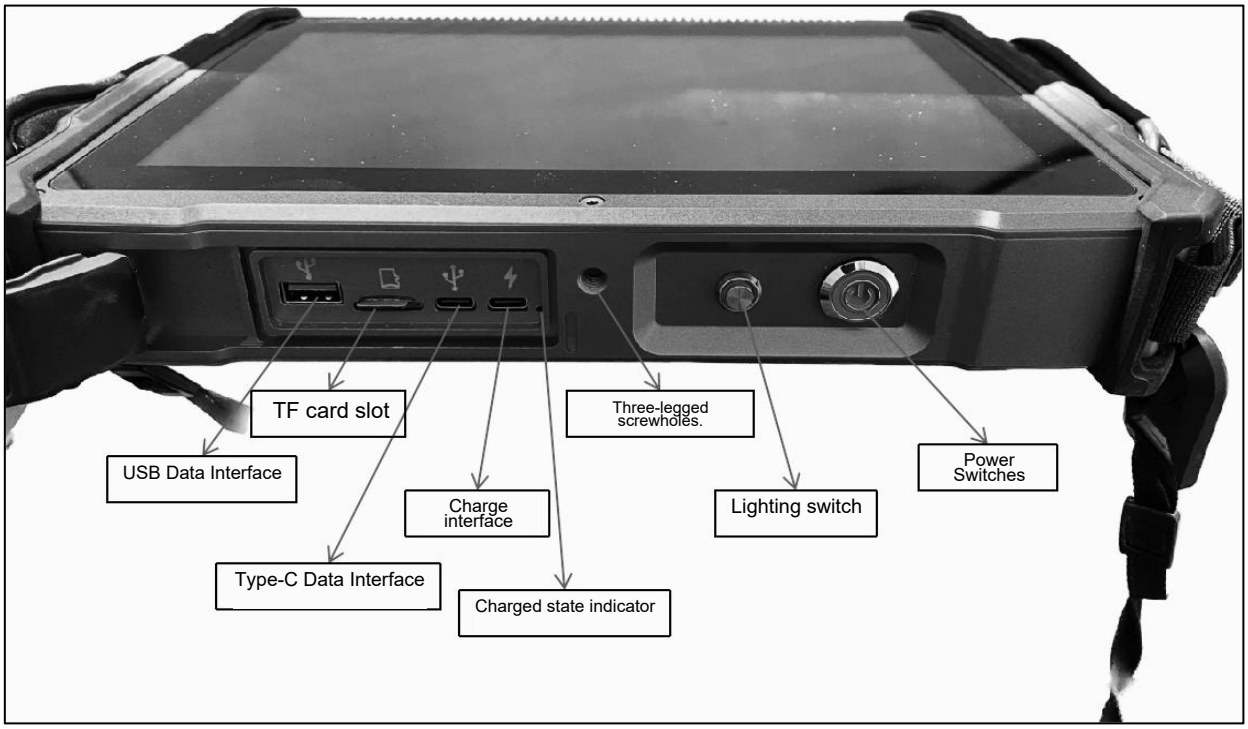
Re-open.

In order to extend the useful life of the battery, you are provided with the following recommendations:

The charge time of the equipment should not exceed 24 hours.

If the equipment is not used for a long period of time, batteries shall be recharged periodically, ensuring, to the extent possible, that at least 1 is recharged per 15 day.

The temperature of the equipment is recommended to be between -25°C and +50°C.



Switches:

The power is about 1 at the lower right corner of the pressure device, and the device is activated after about 27s has been turned off.

When the device is running, the running indicator light (i.e., the power switch is frequently lighted and the green indicator light is green) is frequently lit.

In the open state, open the key 1 at the lower right corner of the pressurized device and select "Power Off" on the device

Press the key, the device is shut down. The chief press the power switch button 5s until the running signal light is out.

Battery backup:

The purpose of the use of backup batteries is to increase the equipment ' s re-carrying capacity, which can be charged or supplied directly to the equipment.

Electricity. When you use a backup battery, the 15V that connects the equipment to each end of the power link to the backup battery is exported and

The device charge interface is sufficient.

When the backup battery is charged, the 15V charger, which is supported by the equipment, will be sufficient to access the INPUT interface for the backup battery.

Note: In blast-proof environments, the use of backup power-charged connections is prohibited!

Lighting lamps:

In an open environment, the recharge light is activated by pressing the patchlight button, and the recharge light is closed by pressing the button again.

TF Data Read

Removes the TF memory card from the device, inserts the accompanying card reader and connects it to the computer.

Select the files you want to export using the date folder.

Attention to use of TF memory card:

Do not insert TF cards in the photograph or video recording.

When photo and video recording is completed, the TF card will have to be inserted until data preservation is successful.

TF cards may not be inserted while data browsing and tagging under the Data Interactive menu.

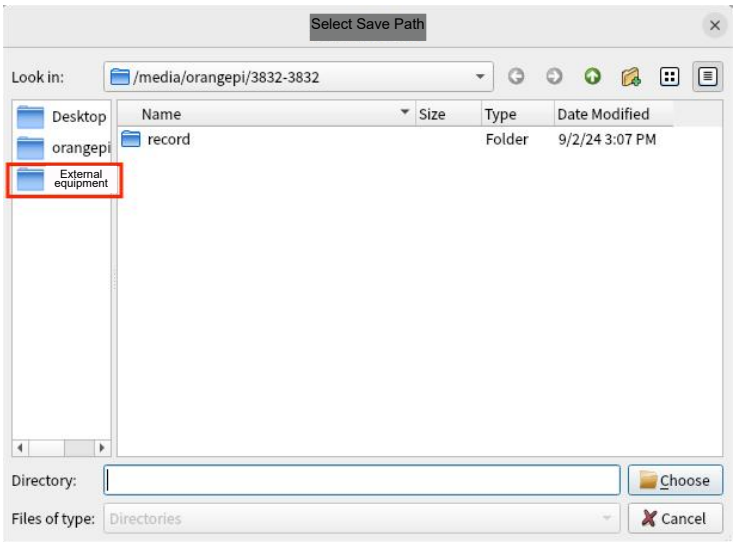
Do not modify the name of the TF card and folders to avoid testing PC TF

It is not possible to be correctly identified and displayed in the data interactive menu.

Read data using U

Insert U disk into the device, open the data interface, select the picture to export, click a key to export, by

Pops out of the window, select the " external device " option below which you can save the picture on the U disk.



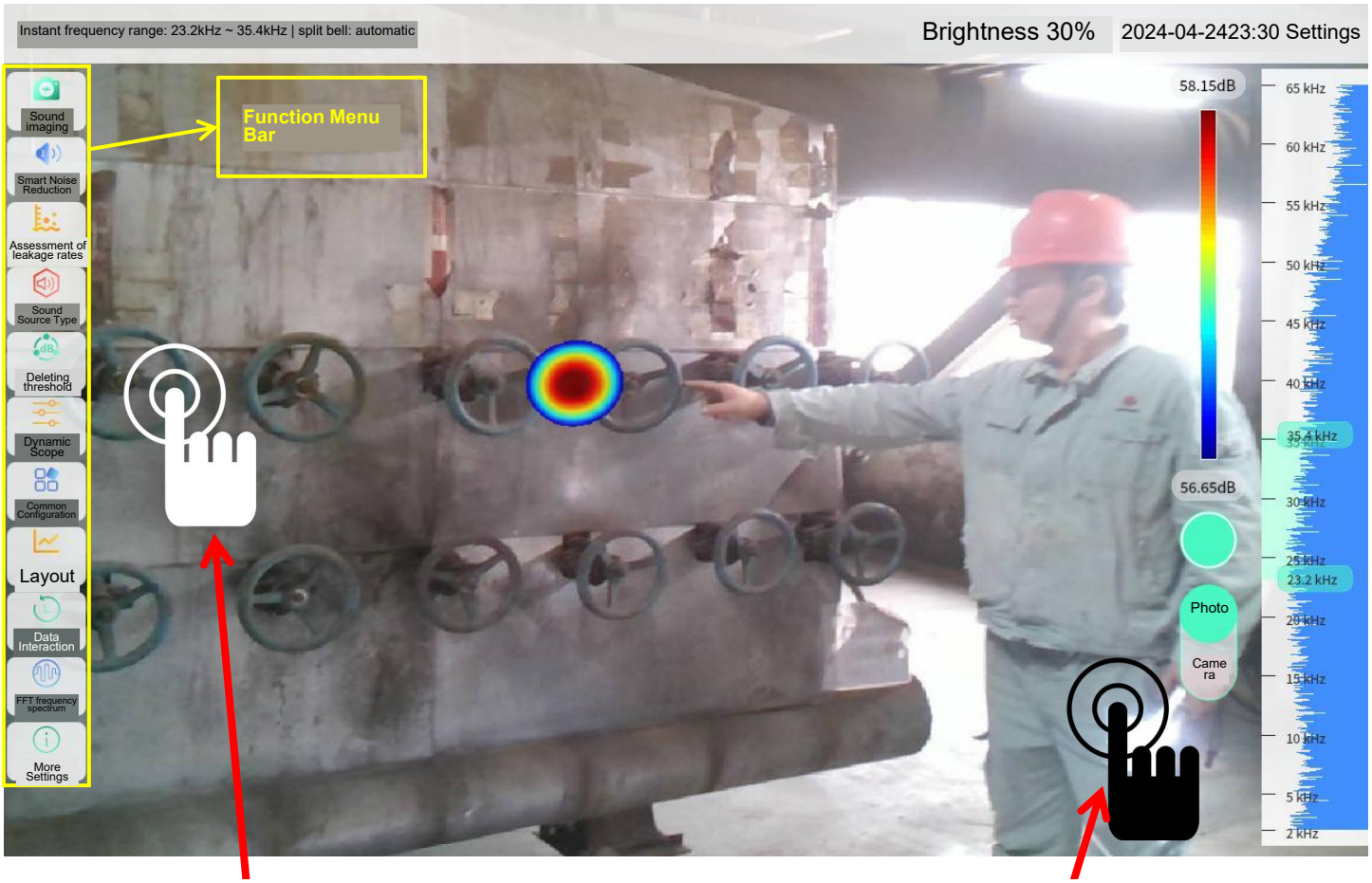
Read data notes with U:

During file transfer or data reading and writing, do not insert U discs.

When the file transfer is completed, the transfer progress bar must be verified to disappear or the system hint transfer is successful before the U is safely inserted

The plate.

Main interface description



Click on the left side of the device screen to call out the device function menu.

||

Click on the right side of the device screen to hide the device function menu.

Name	Functional description
Top Status Bar	Displays current test frequency ranges, deutsche thresholds, power status and current time information.
Sound imaging	This display shows the mode of detection in which the current device is being tested. The different models of the device show different patterns. There are three detection models: Acoustic imaging, Heat imaging, and Internal Leak Detection.
Smart Noise Reduction	Open or close the focus box, filter noise outside the focus frame, and manually edit the focus frame size, bit **And shapes.**
Assessment of leakage rates	On/off-take real-time leakage assessment of imaging points, only the maximum current leak location is shown on the device **Small leakage rate**
Sound Source Type	**Toggle two types of acoustic source: steady state and instantaneous**
Deleting threshold	The gate limit for the control device to capture sound signals, in dB

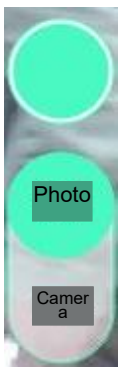
Dynamic Scope	**Reconciliation of the dynamic range of device imaging points**
Common Configuration	Toggle both gas leaks and partial discharge detection patterns
Layout	PRPD spectrum on/off to identify partial discharge failure type
Data Interaction	You can look back at photos or videos and export them
FFT spectrum	**View the sound signal distribution in the current environment**
More Settings	View equipment hardware serial numbers, models and software versions; change equipment time and switch equipment **Use of languages**
Photos/videos	**Toggle photo or video functions**

Show sound pressure level



The maximum and minimum volume of sound pressure, which indicates the current device imaging point, can be judged by the sound pressure level.

Severity.





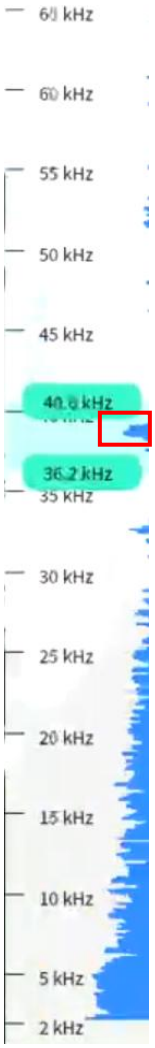
The camera or camera gate, which is clicked to allow the photo or camera function, is automatically kept in the device.

Click to switch the photo or video mode, which is the current when the green background appears under the photograph

Device status press the fast door for photo mode, and when green background appears under camera, table

Displays the current state of the device by pressing the fast door as the camera mode.

Test frequency range



Description of use (gases leak detection is normally transferred to 20-30kHz and partial discharge is normally transferred to 40kHz-50kHz)

The left test frequency green box is the test frequency box, which is in the 2-10kHz range and is manual

Adjustment.

Long is the mid-point of the frequency check box and moves up and down, and adjusts the frequency check box as a whole.

The upper limit of the frequency frame can be adjusted separately by length by moving above and above the frequency frame.

Long is the upper and lower part of the frequency frame, and the lower limit of the frequency frame can be adjusted separately.

Usage techniques

In less noised environments, such as power distribution rooms, the blue frequency peaks in the spectrum are observed. Normal conditions

Under 30kHz and above the base noise is usually small, and it appears to be blank in the spectrum.

When there's a steady blue frequency peak in the spectrum, there's a high probability that partial discharge is present in the environment.

In this case, the equipment can be used to patrol around and observe whether the energy at the peak of the frequency is increasing.

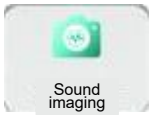
Or do you have an image point on the device?

The frequency is peaked. Therefore, users need to know in advance about the operation of the fan in the distribution cabinet.

It can also open the device's own distribution map to see if there is a visible discharge feature map, and thus

(b) Determines the existence of partial discharge malfunctions in the distribution cabinet.

Test Mode Switch



The device is defaulted in Acoustic Imaging mode when it is on. The first of the left-hand menubars on the screen is shown in real time.

The pre-test mode can be switched to another test mode by clicking on it.

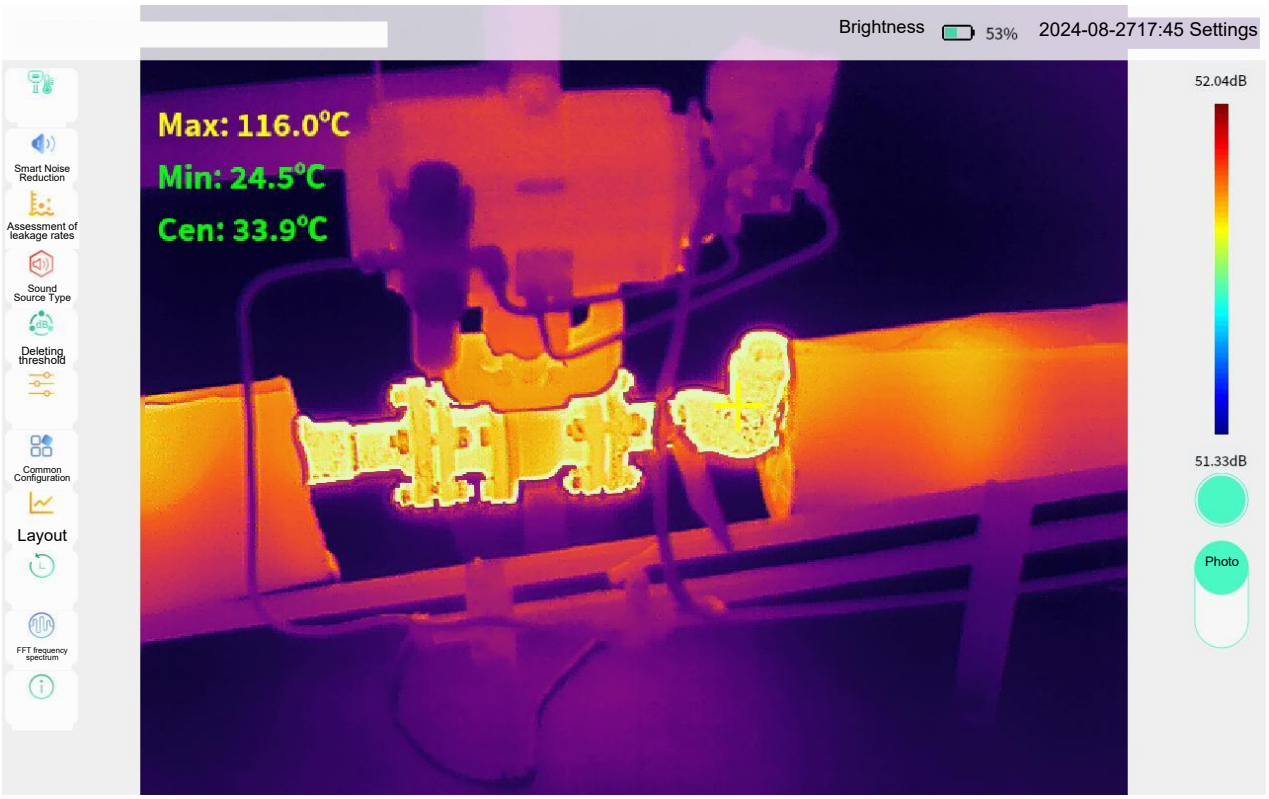


Click on the Acoustic Imaging mode to quickly switch to the Heat Imaging mode. Note: Part Type

Match!

Thermal imaging

Mode



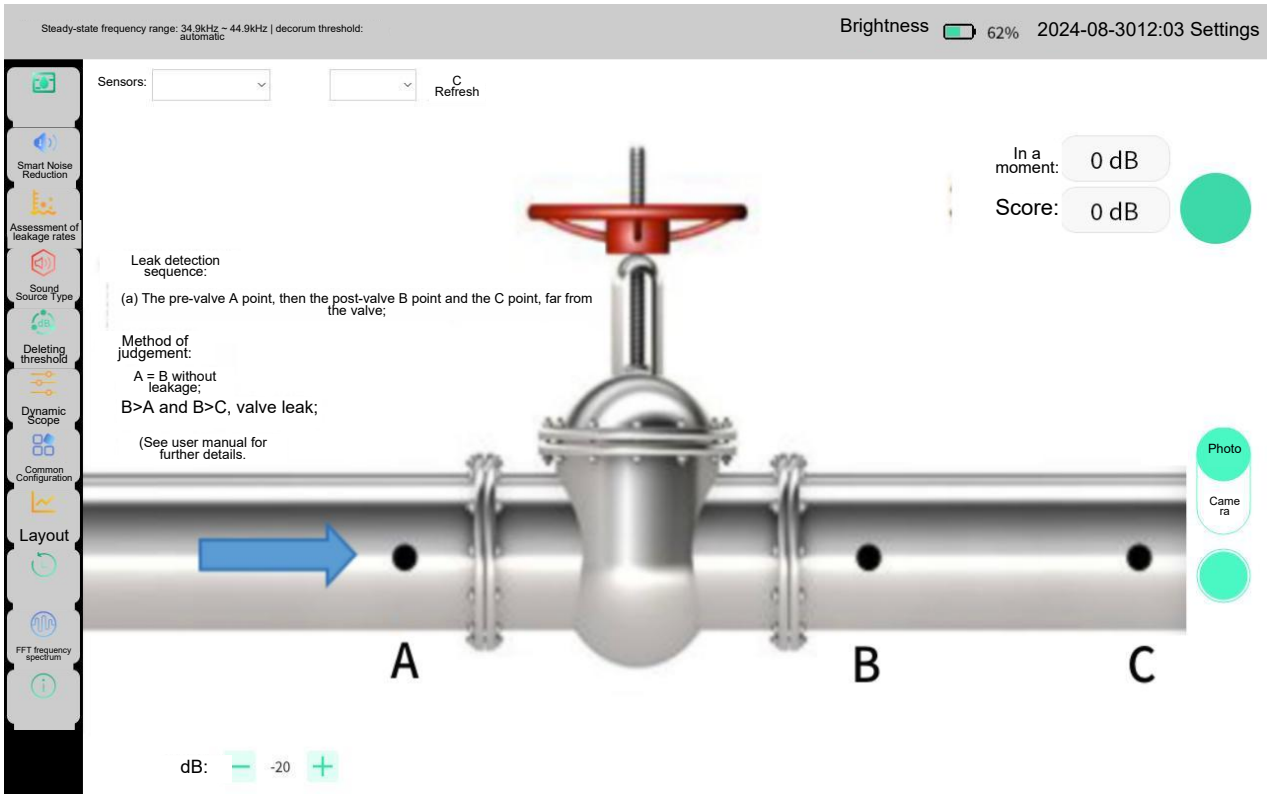


Click the Thermal Image mode to quickly switch to the Internal Leak Detection mode. Note: Some types

Match!

Internal Leak Check

Mode of measurement



How to use the leak-in-heart device

Under the device to access the leak-in-the-dialogue device with " , the Type-C data interface for the icon (part of machine-type listening)

The diagnostic interface is USB2.0, which converts the device to an internal leak detection mode.

Higher gas valves, such as safety valves, hydrophobic valves, etc., do not apply to by-pass valves and regulating valves, which are always moving.

1. Test Method

1.1. Two elements need to be identified before leakage detection in valves:

1) tested valves are closed;

2) Fluid flow (measured by three points).

1.2.

First step: Placing a needle sensor on the upper tube line of the valve (e.g., in figure A) to determine the environmental ultrasound of X1.

Second step: The ultrasound value X2 after the needle sensor is held at the lower tube line of the valve (as in figure B).

Third step: The needle sensor will be held at the lower tube line of the valve (e.g., in figure C) to measure the lower ultrasound value X3.

The leakage determination is then made as follows:

If X1≥X2, the valve does not have an in-house leak.

If X1<X2 and X2≥X3, the valve has an internal leak.

If X1<X2, but X2<X3, the tube vibration behind the valve is severe, and only a preliminary determination can be made at this time.

There are leaks in the doors, but joint judgements should be made in conjunction with infrared thermal imaging or other means.

When the measurements are unstable, they should be recorded after they have stabilized.

Multiple measurements help to exclude artificial measurement errors and reading errors.

Attention!

(a) When a needle sensor is used for detection, a small, hard contact with the pipe is sufficient and cannot be excessive to avoid damage to the sensor;

It is recommended that the thrust be vertically downward, with a steady level of strength and that the sensor not be struck during the detection process.

2. Examples of tests

2.1.

Information on the location of the measurement point	**1**
A point-pressure level	39dB
B point-pressure level	52dB
C point-pressure level	51dB
Test Point Information Analysis	**X2>X1; and X2>X3**
Conclusions	**1 leak**

2.2.

Information on the location of the measurement point	**2**
A point-pressure level	50dB
B point-pressure level	32dB
C point-pressure level	31dB
Test Point Information Analysis	**X1>X2; and X1>X3**
Conclusions	**Security valve 2 no leaks**

2.3.

Information on the location of the measurement point	**3**
A point-pressure level	18dB
B point-pressure level	18dB
C point-pressure level	19dB
Test Point Information Analysis	**No gas flow in the pipe**
Conclusions	**Safety valve 3 is inactive**

3 Usage Techniques

1) Ensures a pressure difference (greater than 0.08MPa) upstream/downstream of the test valve, a valve that is linked to the pipe before and after the valve

The door, should be completely opened.

2) The measurement point shall be appropriately adjacent to the valve if:

If the a. is linked to the French before and after the test valve, the measurement point shall be appropriately close to the valve;

b. is tested for co-pipes to avoid and connect valve flow signals to the detected valve

(a) a door detector, where the measurement point shall be properly adjacent to the valve;

c. For vertically installed valves and fluids moving upstream through the valve by the lower pipe, the measurement point shall be used

Appropriate proximity to valves;

d. is subject to a pipe variation before and after the detection valve, to avoid the transmission of fluid flow signals to the detection valve.

(b) The detection point, which shall be properly adjacent to the valve.

3) Creates internal leak account management for valves

a.'s different tube and valve vibrations are not consistent and may result in different values for each.

The valves should remain the same at different times, so a test table should be set up when the valves are shipped to observe

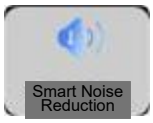
(b) Trends in the leakage of valves;

b. Establishment Method: At first run, each valve will be run by a valve (A point), a valve (B point) and a valve (C)

(d) Ultrasound detection data at three locations are recorded and marked with location and time.

c. conducts periodic reviews to see whether there is a significant trend in the increase of values, such as the small change in the A point values.

A large variation in B and C points indicates that the valve has already been leaked.

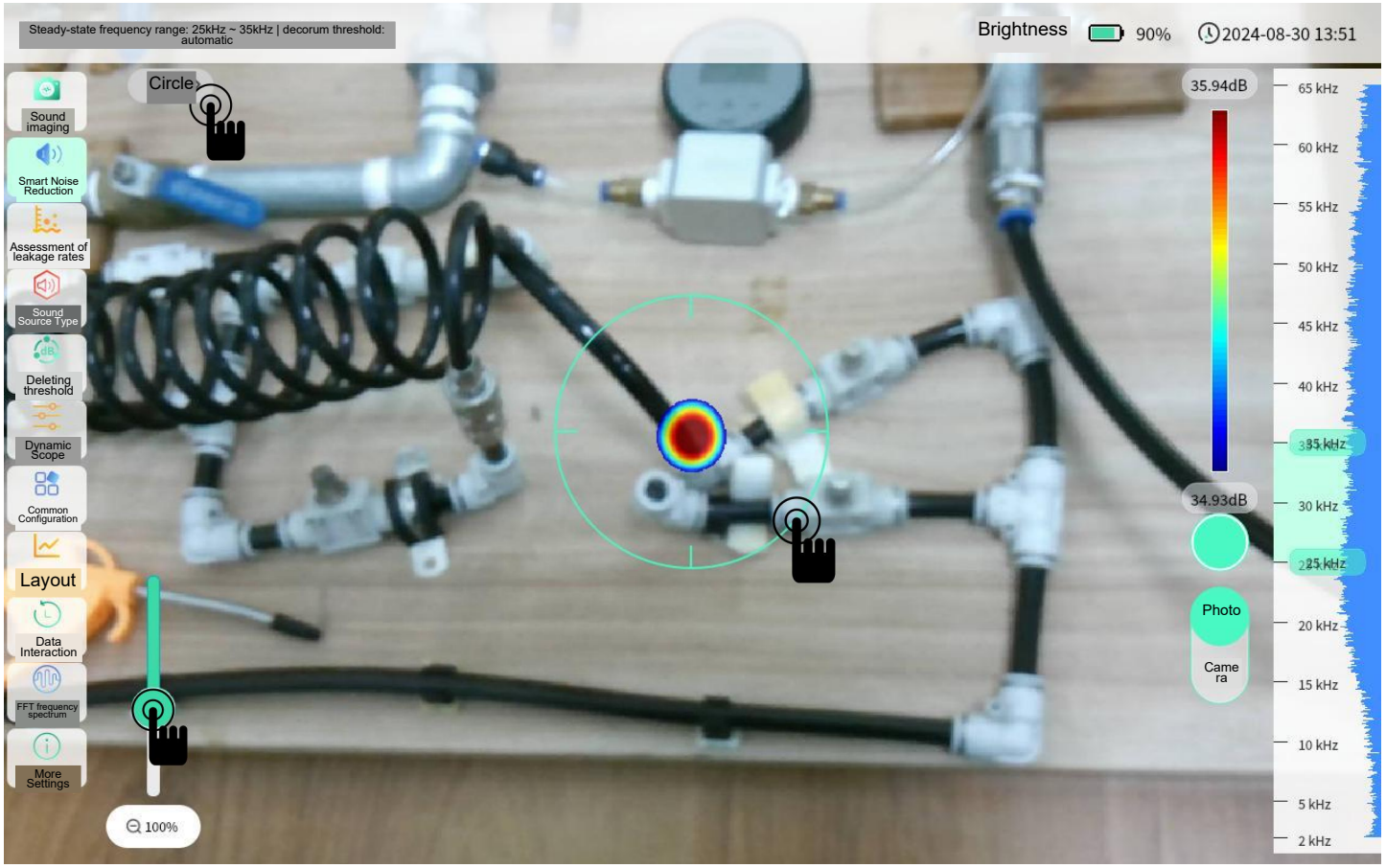


Click the Smart Noise Reduction button in the menubar to open the Smart Noise Reduction Focus Box with one click.

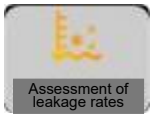
There are circles and squares that can be converted, can be zoomed or reduced and can be modified by drag

Focus position. If the field environment is very noisy and disturbed, it is recommended that this function be activated to assist.

Testing.



Assessment of leakage rates

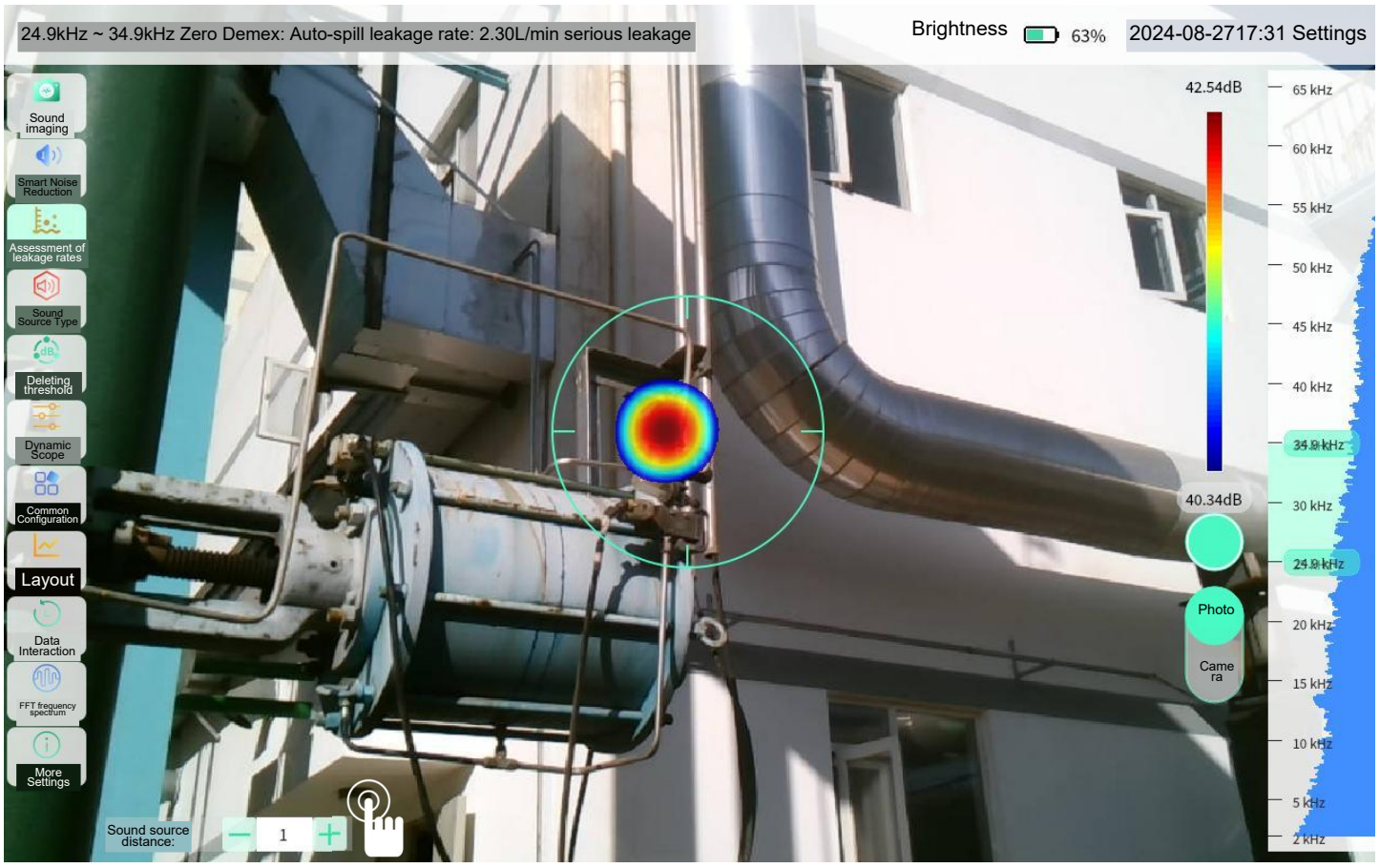


Click the Leak Rate Assessment button in the menubar to start the leakage rate assessment function with one key.

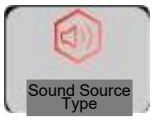
It will automatically open the smart noise focus box, and will allow real-time leakage analysis of current imaging points and thus assess leakage

Level of severity of failure. In conducting the leakage rate assessment, the lower left angle is to be adjusted as far as possible.

Close to physical distance, in metres (m).



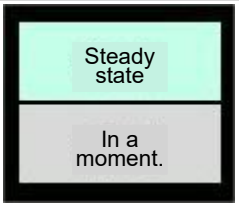
Acoustic Source Type Switch



The device itself contains two types of acoustic sources, both stable and instantaneous, and is automatically in a steady-state type when it is activated.

Click the word "in a moment" to switch the sound source type to the instantaneous source type. During the test, build

Use the stable-state acoustic source type.



Instant imaging applies to static scenes, using time differentials and range information to create images, in which

On the screen it is expressed as drifting image; steady-state imaging applies to dynamic scenes, using phase and band

, which is used to generate high-resolution images, which are shown on the screen as stable imaging.



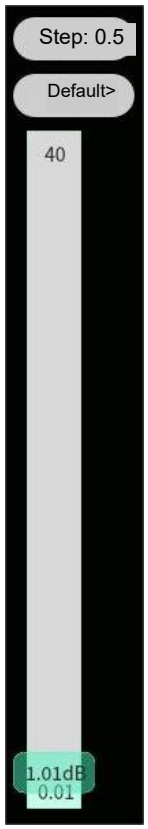


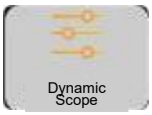
Click the Deleting Threshold button in the menubar to open the Deleting Threshold Bar and move it up

Adjusts the size of the debunk threshold. The debunk threshold has both automatic and manual modes, and the device is defaulted on to automole

formula. During testing, automatic mode is recommended. When the environment is too noisy, you can use the splits.

The threshold is adjusted to 10 - 20dB.





Click the Dynamic Range button in the menubar to open the dynamic range bar. Here you can switch

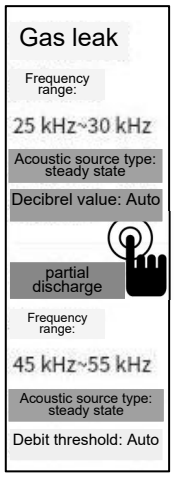
Image point colour with three colours: rainbow (default), grey steps and iron red available; also adjust dynamics

Range reconciliation step, with 0.1, 0.5 and 1.0. You can adjust dynamics by moving up.

Range size. It is recommended that it be moved to the 1.0dB range at the time of testing, where there may be multiple images

When a failure point is created, the dynamic range can be slowly increased (general recommendation moved to 6dB) to capture more at the same time

An image point.





Click the Common Configuration button in the menubar to see the embedded two test modules on the right side of the device

Form, i.e. gas leak and partial discharge. Double-click "gas leak" or "partial discharge" test module

formula, which sets the measurement parameters for frequency ranges, acoustic source types and deutsche thresholds.

Note: Users can be contacted for custom addition common configurations.

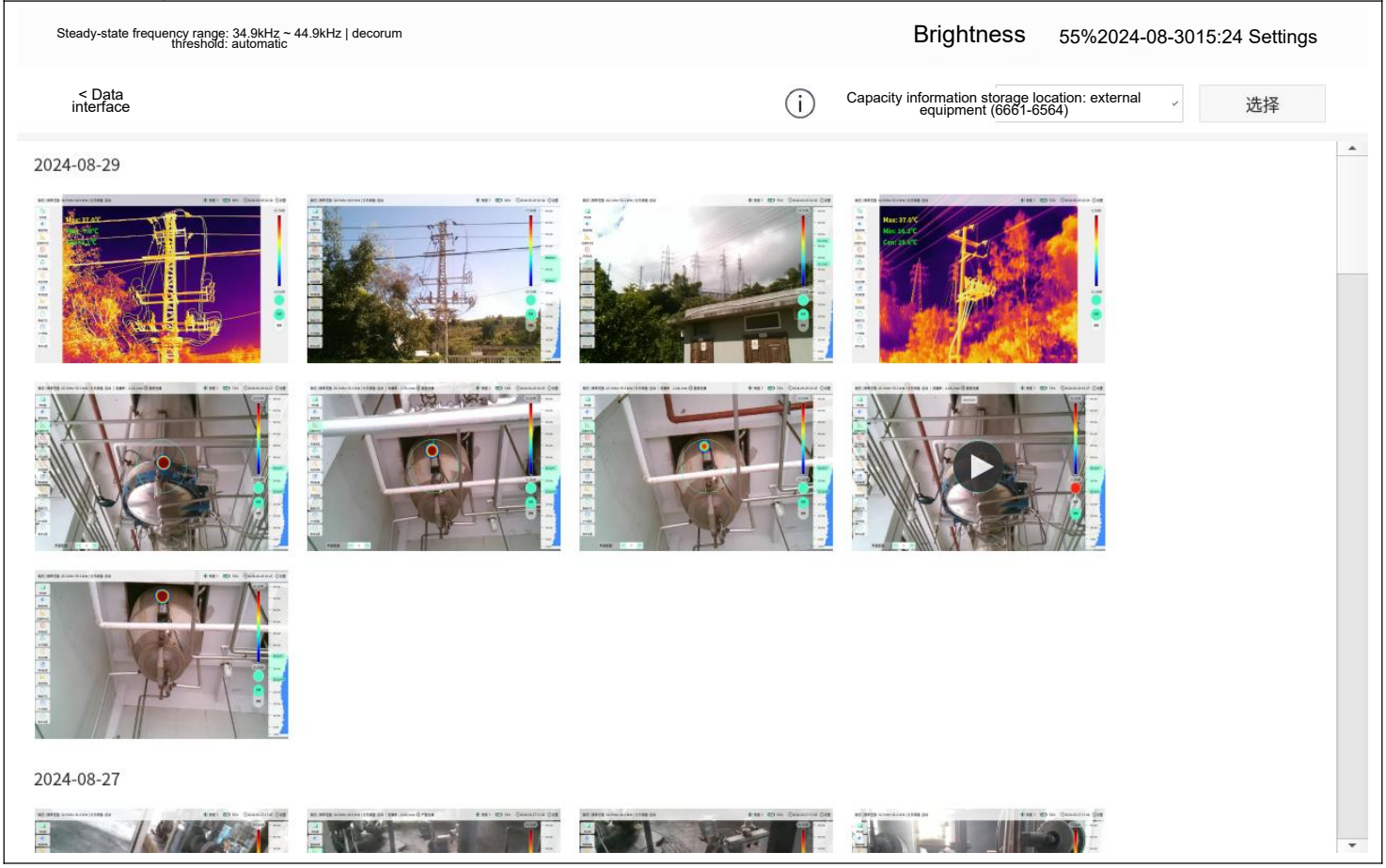


Click on the Data Interactive button in the menubar to view photographs or images saved by photographs or cameras

Frequency. These photographs and videos are managed by classification according to date and are easily accessible to users.

In addition, you can export photos or videos with one key. Details can be found in the "TF memory card" in this manual.

Data Reader and the " Read data using U " module.



Layout

Click on the `Build Spectrometry ' button in the menubar, which will automatically open the focus box for the current image point

The device identifies three common partial discharge types, which are electrons.

(b) Power discharges (at the tip of the line), suspension discharges (fissilence) and discharges (flitter flashes) along the lines.

Note: In some cases, the characteristics of the pattern are not continuous, so it is recommended to capture the results and capture them.

Video mode used for follow-up.

Note: When internal discharges (e.g., distribution cabinets) are detected, the characteristics of the distribution pattern will not be obvious, and yes

If the conditions are met and if need be, the door is opened to confirm the type of placement.



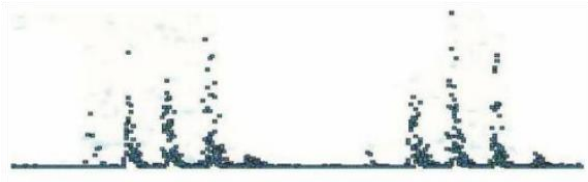


Electromagnetic discharge (at the cutting edge):

Insulation material (including insulation) if field strength exceeds penetration strength

In the event that the current is stopped, the current will no longer be effectively prevented.

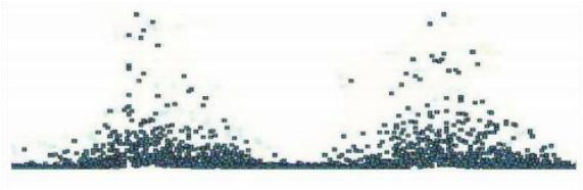
(c) The occurrence of electro-shock discharge (at the cutting edge).



Suspended discharge (fault):

It means that in the gas gap between two or more electrodes, the field is strong.

The discharge occurs when the penetration intensity of the gas exceeds.



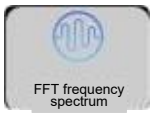
Electron discharge along the line (flash):

It usually occurs in an insulated part of the surface of the material, or in a defective or defiled condition.

In the case of obscenity areas, these areas form a concentration of electric fields.

It's causing the discharge.

FFT spectrum



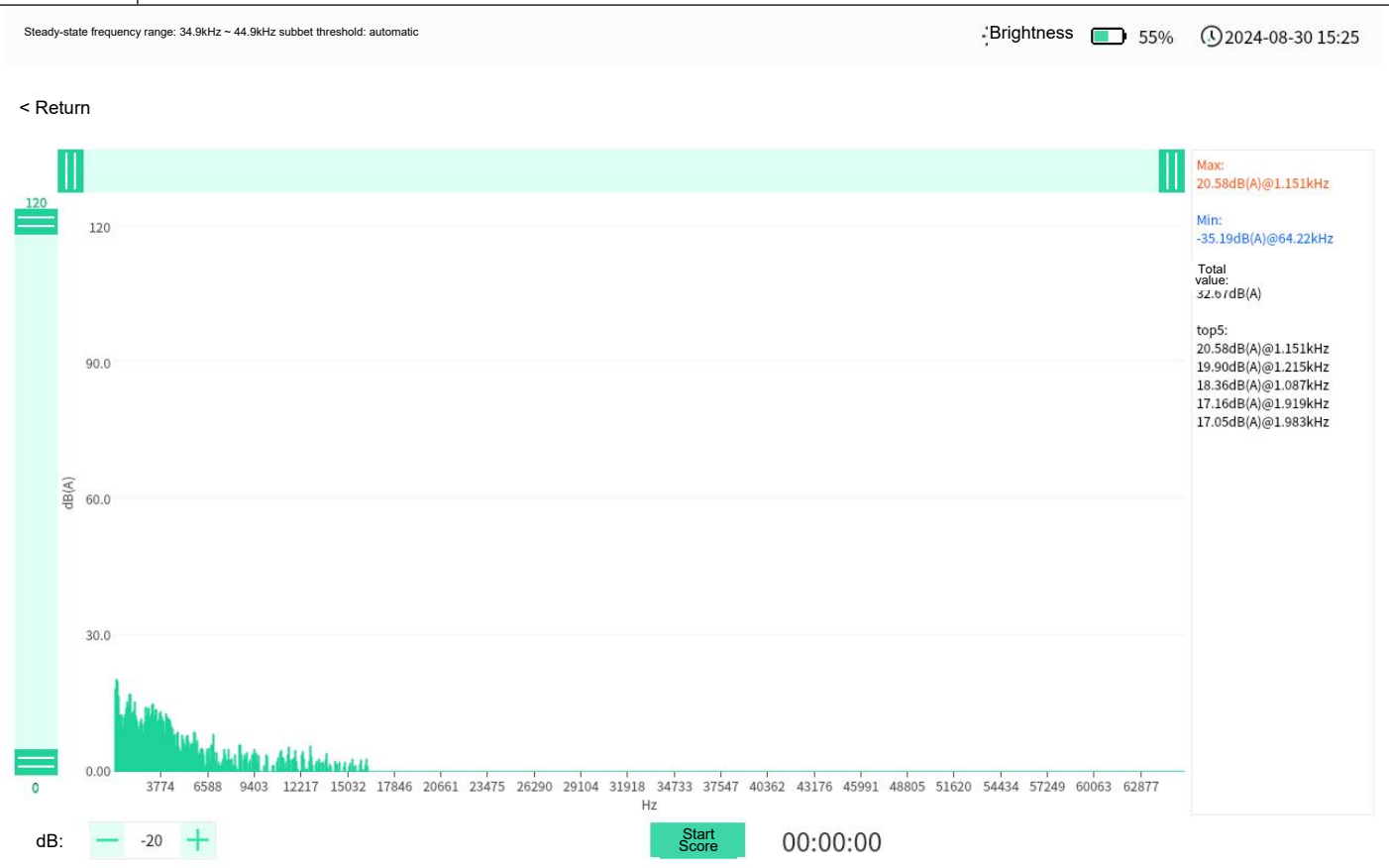
Click on the FFT spectrum button to observe a real-time FFT spectrum.

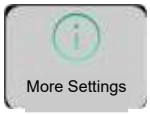
Cop: FFT frequency spectrum (Quick Fourier Conversion) is used to convert time-area signals to frequency-area tables

An algorithm. This algorithm helps us to develop a spectrum by deciphering the signal into components of different frequencies.

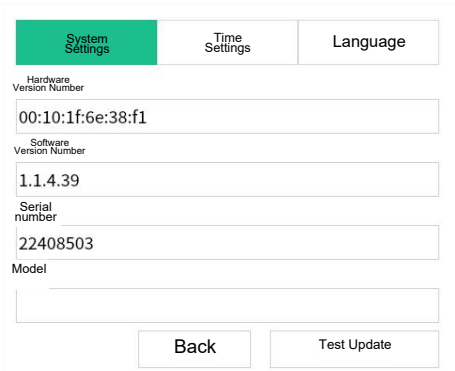
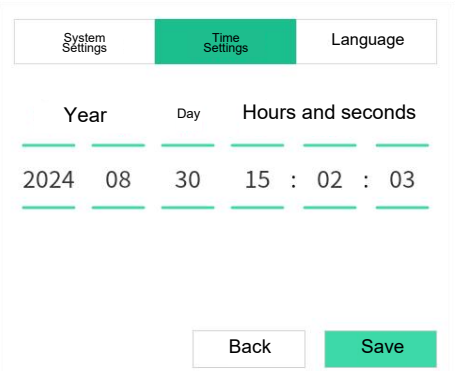
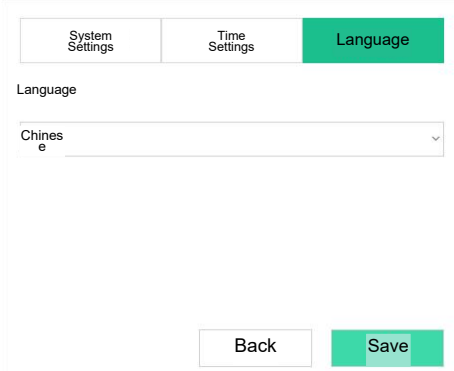
Analysis. In it, cross-axis represent frequency, vertical axis indicates energy of the signal.

The spectrum allows for understanding the low-frequency distribution of signals and their impact on the overall signal.





Click the " More Settings " button in the menubar where you can view the basic information of the device and you can to change the time of the device and the language in which the current device is used.

Basic information	Time Settings	Language Settings
		
In Basic Information, see **Hardware version number, soft** **Version number, serial number and model.** **Also, you can do a key here.** **Updates the operation of the device software version.**	**"Time Settings": may be used for equipment** **Time of the year, time and seconds before the time is shown** **Make changes, move through upward** **Line adjustment, click Save** **Entry into force.**	**Language Settings: Standard Equipment Expenditure** **In Chinese and English** **Ben. Some customized machines support others** **Language.**

[redacted]

If 1 does not use the equipment for a long period of time, it must ensure that the equipment is recharged at least once a 15 day and should be charged after it is fully charged

In accompanying packagings and stored in a warm and dry environment.

2 regularly inspects and replenishs the power of the equipment, which can effectively extend the life of the battery.

3 is recommended to use the accompanying cleaning tool on a monthly basis to ensure that the equipment remains in good working condition

Areas such as perforated eyes, handshakes and dispersants are cleaned to maintain their cleanness.

4 does not itself require regular calibration, but if the imaging point clearly deviates from the actual acoustic source (applicable person)

(b) The location calibration shall be performed under the direction of the manufacturer in contact with the manufacturer.

The 5 device has a long-term storage temperature of -20°C ~40°C.

[redacted]

Excludes reflective interference:

When it is not possible to determine whether the sound source in the picture is actual or reflected, try to capture it from different angles.

Acoustic source. If it captures the image of the same point from multiple angles, the sound source is usually the actual sound source.

, and the reflection interference points will move with the angle.

Debarment noise:

1 is vulnerable to environmental noise.

(25kHz above) to capture the sound source position.

2 can select a relatively narrow band range to locate the acoustic sources and remove interference noise from other bands.

Switch off:

1) If the device is unable to turn on or off after more than about 30 seconds, you can press switch buttons for approximately 5 seconds until the device

Run the signal lights out and force the switch off. Just wait for 10 to turn it on again in seconds.

2 can access the power supply to the equipment before attempting to turn it on if the equipment is not in use for a long time.

3) When the equipment is overheated, it may not be operational, and then the equipment will be placed in the cool space of 10-15 in the second minute.

4) is used for long periods of time in high temperatures, which will result in the operation of the equipment in Carden, when the equipment can be shut down and the 15 cooled

Minutes will be fine.

Instability of the imaging point - When the imaging point blinks or jumps, try to:

1 can be adapted to a “stable state” mode by adapting the type of acoustic source;

2) jumps the test frequency range to the right-hand energy peak concentration;

3) changes the angle of the test;

4) is within safe limits close to the detected site.

If you have any other problems in your use, you can contact us.

Vendor contact: 400-040-1978.