GAZELLE®

G9801

Water Leak Detector
User Manual

Preface

First of all, thank you for your trust in our company. Our company has long been committed to the research of water, electricity and natural gas testing equipment, and has a high reputation in the field of water, electricity and natural gas testing.

Our company will make unremitting efforts in product improvement and improvement, and constantly introduce new products with more advanced technology, better performance and more perfect functions. We will provide you with solid material basis and strong technical support in the field of water, electricity and natural gas testing. At the same time, we hope that users can give more valuable suggestions.

To ensure safe and smooth operation of this instrument and to maximize its functionality, please read this manual carefully before use. Operators must complete safety and operational training. Do not operate without proper training.

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Chapter 1 Introduction

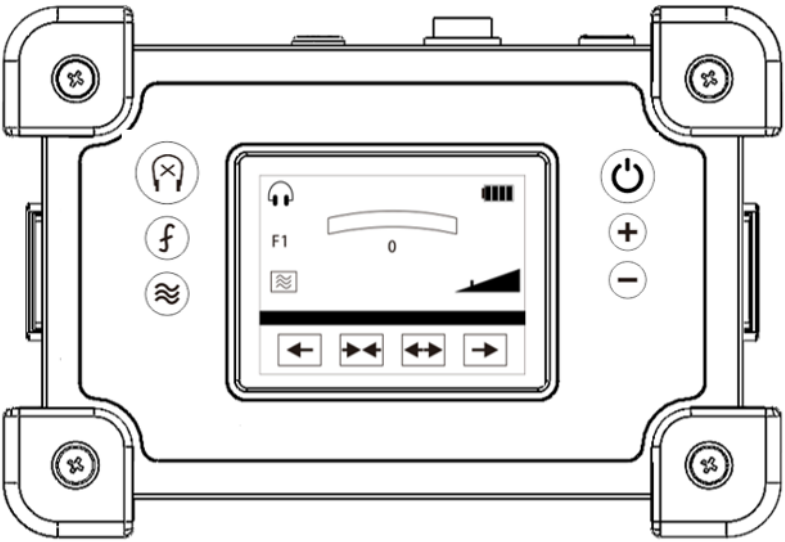


Figure 1 Electronic leak detector host

An electronic leak detector is an advanced ground microphone that amplifies the noise generated by water leakage from pressurized water pipes. By identifying the location with the highest leakage noise, it determines the actual position of the leak.

The advanced features and ease of use of the electronic leak detector enable operators to determine the exact location of the leak point more efficiently than ever before.

1.1 Features and Technical Specifications

1.1.1 Advantages and Features

- Backlit LCD multi-function display
- Graphical and digital noise intensity
- Dynamic sensitivity (signal strength)
- Settings and mode selection
- Leakage noise intensity can be recorded and compared
- Lightweight and portable
- Power button (all-weather protection)
- All-in-one pickup sensor configuration
- Waterproof sealed probe
- Spacecraft specification connector

- High strength material suitable for all kinds of environment
- Rechargeable battery (up to 25 hours of use per charge)
- Smart hearing protection filter settings, fully protect the user's hearing
- Bandwidth adjustable
- Central frequency adjustable

1.1.2 Technical Parameters

- Processor: 144 MHz 32-bit
- Input impedance: 1 MΩ
- Output impedance: 6 to 16
- Magnification: 140dB adjustable
- Frequency range: 50 ~ 5000 Hz
- Distortion: less than 1%
- Power supply: Rechargeable lithium battery, minimum 15 hours (background light mode), maximum 25 hours (power saving mode)
- Battery charging: 2-4 hours
- Charger: Universal 110-240V AC battery with 8.4V DC output
- Weight: 0.85Kg
- Dimensions: 200mm x 135mm x 72mm
- Operating temperature: -20°C to +70°C
- Operating humidity: 0-95% without condensation
- Connection: Space-grade specification connection
- Display: LCD screen
- Signal strength display: 0-99

1.1.3 Application Scope

The portable electronic leak detector, designed for easy handheld or belt-worn use, features injection-molded construction ensuring long-term durability in various environments. It is suitable for harsh conditions and is used to locate and precisely identify underground water pipe leaks. Equipped with the latest high-sensitivity sensors, it delivers superior acoustic performance compared to conventional leak detection devices and offers enhanced noise suppression capabilities.

1.2 Equipment Composition

Name	Features and Functions
main engine 	The host is a low-noise, high-gain amplifier, which can be adjusted for gain, and has a variable frequency filter to filter out interfering sounds .
probe 	For receiving ground leakage noise.
earphone 	Connect wired headphones to the host for monitoring.
Grounding stake	Use it to increase sensitivity.
Mute handle 	Connect the host and probe (via the probe interface).
strong magnet 	Adsorption on the pipe for testing
charger 	The 8.4V 1A charger powers the main unit

Chapter 2: Features

2.1 Host Introduction

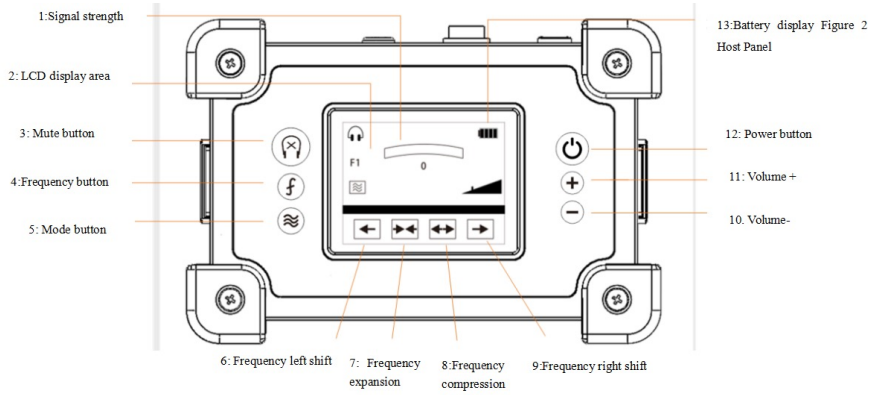


Figure 1 Electronic leak detector host

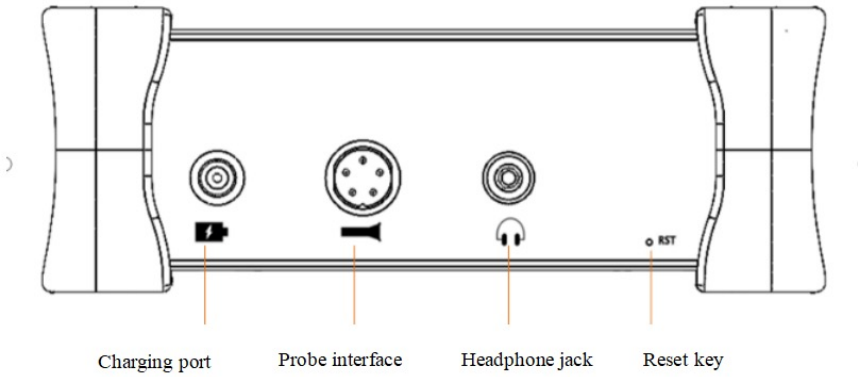
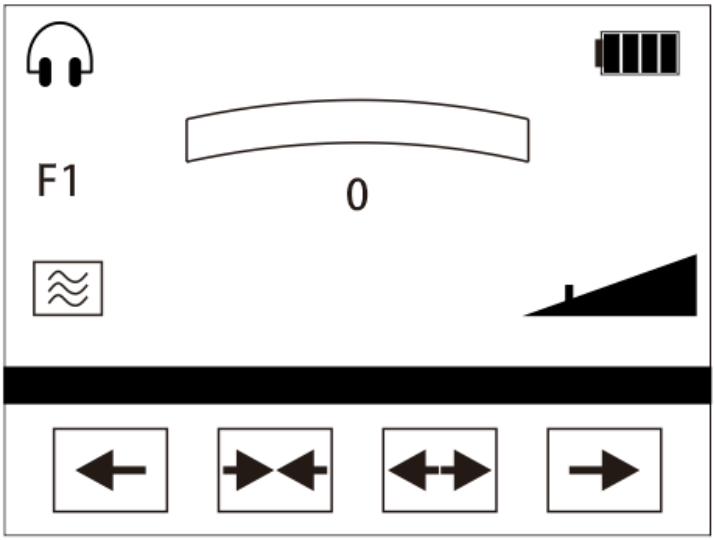


Figure 1 Electronic leak detector host

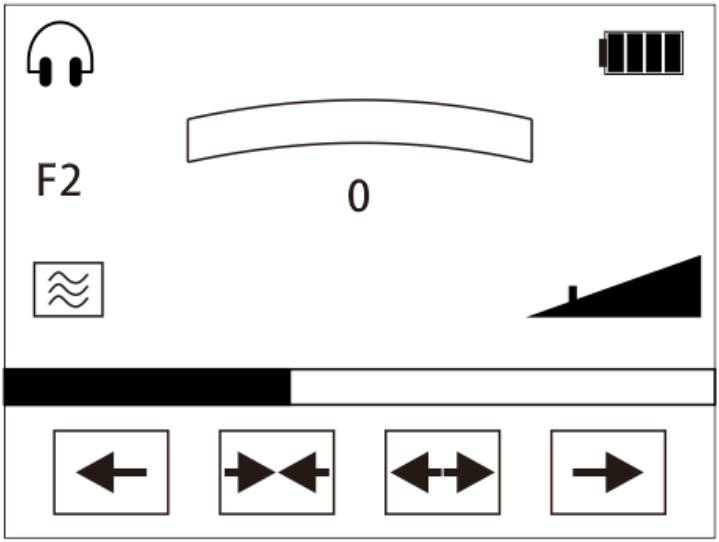
2.2 Listening Mode Settings

The device defaults to frequency selection mode. Press the frequency key to access four preset levels: F1/F2/F3/F4.

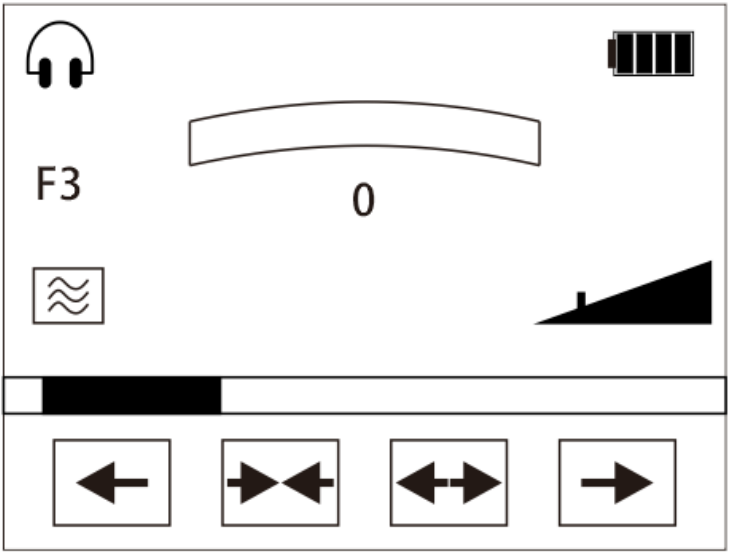
F1: full-frequency mode, 48.9Hz-2.53K;



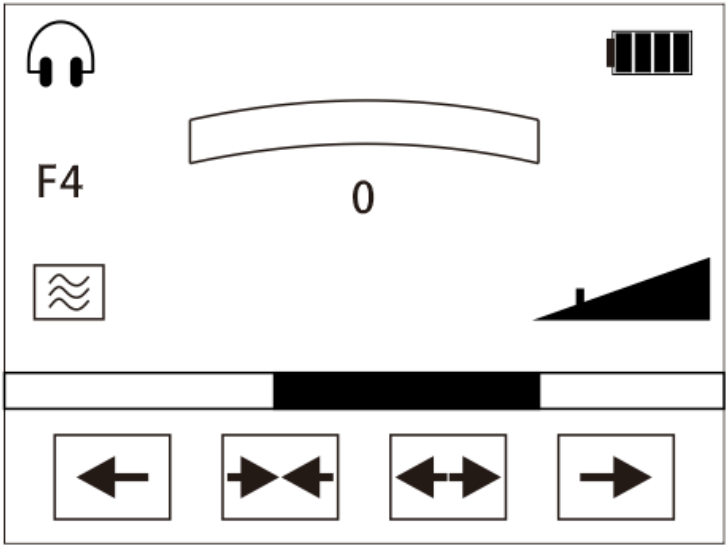
F2: Low frequency mode, 48.9Hz-1K;



F3: Medium frequency mode (200-800Hz);

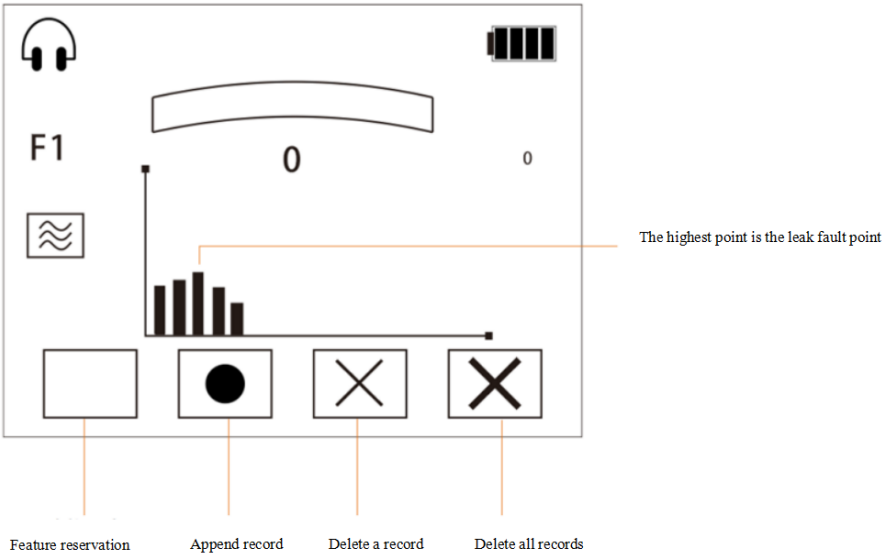


F4: High-frequency mode, 1K-2K;



2.3 Record Mode Settings

The default startup mode is listening mode. Press the mode key to switch to recording mode, which can record the minimum leakage noise within 3 seconds.



Chapter 3: Operation Instructions

3.1 Leak noise analysis

3.1.1 Causes of leakage noise

All acoustic leak detection methods require that normal water flow through the pipeline generates no noise. When the flow is disturbed, noise occurs. Common causes include: partial blockages, sudden diameter changes, abrupt directional shifts, installed pumps and water meters, user consumption patterns, and pipeline damage. Pipeline damage types include: perforations, cracks or ruptures, complete bursts, leakage at joints or valves, etc.

Careful use of leak detection technology enables operators to distinguish between noise caused by poor pipeline design and noise caused by user water use, so as to identify noise caused by pipeline damage.

3.1.2 Factors affecting the intensity and characteristics of leakage noise

The factors affecting the intensity and characteristics of water leakage noise include: pipe water pressure, the shape and size of the leak hole, the type of soil around the pipe, the type of soil covered above the pipe, the diameter of the pipe, the thickness of the pipe wall, the material of the pipe and the amount of water leakage.

Small leakage holes and high water pressure usually produce high frequency leakage noise. Because partial blockage of the pipeline will cause water pressure to increase and further interference to the water flow, so the noise intensity is generally high at the valve, pipeline elbow, tee and pipeline end.

3.1.3 Transmission path of leakage noise

Leakage noise can propagate through water in pipelines, via pipe walls, or into surrounding soil. Noise travels more effectively through "hard" materials, meaning metal pipes allow sound to travel significantly farther than asbestos cement pipes, which in turn allow sound to travel farther than plastic pipes. Soil generally performs worse than the pipes themselves in sound transmission, with loose sandy soil being even less effective than compacted soil covered with hard bricks.

The intensity and pitch of the noise transmitted through the soil or pipe wall vary. The noise is weaker the deeper the pipe is buried and the softer the soil.

When metal pipes leak, the resulting noise travels efficiently through the piping system. Plastic pipes, however, transmit the sound less effectively. This means you can hear the leak noise from farther away in metal pipes than in plastic ones. Another key point to remember: the farther you are from the leak source, the harder it becomes to pinpoint the exact location of the noise.

3.1.4 Influence of background noise on leak detection by acoustic listening

Background noise can interfere with leak detection. Traffic and machinery noise can travel long distances through air or soil and often share the same frequency band as leak noise. Sometimes, leak detection may require nighttime when interference is less.

When employing any instrument for leak detection through acoustic monitoring, adopting systematic methodologies is crucial. Practicing leak detection techniques is equally essential, enabling practitioners to distinguish various sounds, identify background noise or interference, and effectively eliminate them. Prior to excavation, conducting a rational analysis of site conditions to rule out other noise sources (non-leakage-related) is equally vital, such as water-related noise or partially open valves.

3.2 Operation Steps

3.2.1 Connect Probe and Headphones

Screw the grounding pin into the threaded hole at the bottom of the probe and tighten the nut;

Connect the probe to the host's probe interface.

Plug the earphone jack into the host's "earphone" port.

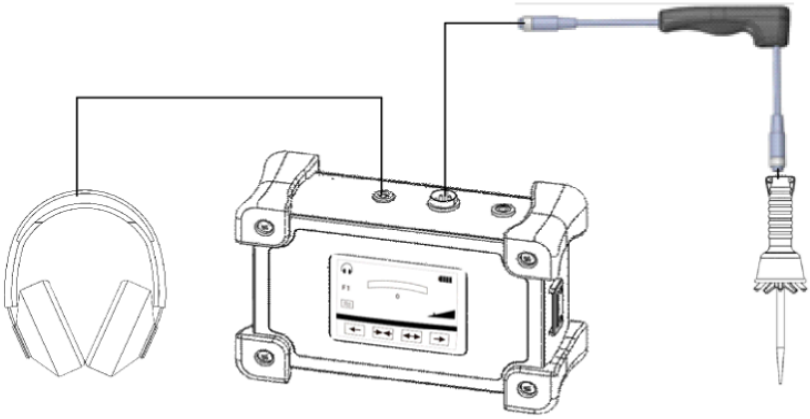


Figure 4 Connection relationship during use

3.2.2 Select Location

To narrow down the location of leaks, listen at accessible points such as water meters, fire hydrants, valves, and faucets—especially in metal pipes. Use a handheld probe and a grounding probe to listen at these locations.

When inspecting pipelines without accessible inspection points or using non-metallic materials, employ a handheld probe with a tripod base. Position the probe above suspected leak areas and conduct systematic listening along the pipeline route. Perform periodic sound detection at each accessible joint or ground level, continuing until the zone with the highest noise intensity is identified.

Note: When listening at pipe joints, the location of maximum noise doesn't necessarily indicate the leak point—it simply means the joint is closest to the leak. Noise intensity may also be higher in areas with thinner soil layers or soil components that allow better sound propagation. Leakage noise travels along the path of least resistance.

3.2.3 Precise location of leakage point

The precise identification of leak locations involves comparing noise intensity across multiple points. Use a handheld probe and adjust the headset's "volume +/-" buttons for optimal comfort. After monitoring noise from one point through the headset, mute the headset and move the probe to the next detection point.

Repeat the above process by conducting sound detection at each monitoring point. As you follow the pipeline route, if the detected noise intensity increases, it indicates you are approaching the leak point. If the noise intensity decreases, it means you have passed the leak point. In this case, you should return and conduct detection at smaller intervals. The location with the highest noise intensity corresponds to the leak point. Additionally, pay attention to the soil conditions mentioned earlier.

Appendix 1 Quality assurance and after-sales service

Thank you for your trust in our company. In order to improve the service to users, our company has set up a technical support department, which provides the following services:

1. Under normal use, the warranty period of the equipment is 1 year, and the warranty period of the battery used in the equipment is 6 months. The products sold during the warranty period are free of charge and maintained for life;

2. Provide free training and field fault service for equipment management, operation and maintenance personnel on site according to user requirements, so as to ensure that equipment users master the skills of equipment operation and maintenance;

3. Use of the reset button: If the device fails to shut down or other abnormalities occur, press the reset button to restore normal operation.

4. After the equipment fails, the company guarantees to respond within 2 hours after receiving the notice; if necessary, the service personnel will arrive at the site within 48 hours to solve the problem on site. If the technical service is not satisfied, the service will not stop.

The following are not covered by warranty:

1. The whole machine and parts have exceeded the warranty period;

2. Equipment failure or damage caused by disassembly of machines and parts by non-professional service personnel;

3. Equipment failure or damage caused by accidental factors or human factors: operation error, scratches, handling, bumps, mains voltage does not meet the standard, foreign objects (water or other items) enter the equipment, etc.;

4. Fault or damage caused by force majeure such as natural disasters (such as earthquake, fire);

5. Non-electrical parts such as equipment housing;

6. In case of any dispute, the relevant national laws and regulations shall prevail.

Appendix 2 Equipment Usage Notes and Maintenance

Equipment maintenance:

1. It is best to keep and use the instrument by a special person; after the instrument is used, pay attention to keep it clean and tidy, and put the test line in order and box.

2. If it is dry battery power supply, the battery should be replaced regularly to prevent battery leakage from damaging the instrument; if it is lithium battery power supply, when not used for a long time, the battery should be fully charged before storage, and the equipment should be recharged after 3 ~ 6 months.

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