PQWT Hunan Puqi Geologic Exploration Equipment Institute(Common partnership)

Operation Manual for Latest PQWT-CL200/300/400/500/600 Water Pipe Leak Detector

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First Edition, 2025

■ Foreword

Hunan Puqi Geologic Exploration Equipment Institute is a professional institution in china who engaged in the R & D, manufacturing and selling of Geophysical Prospecting Instruments, Pipeline leak detector, Underground metal detector and Borehole inspection equipment. More than 200 staffs, including 16 senior engineers, 49 intermediate engineers.

Over the years, Puqi focuses on Hydrogeological exploration, Intelligent data-capture technology and Application of special technique, carrying out Scientific research, Technical services and Marketing application. We have completed more than 65 items including National ministries, Sino-foreign cooperation and major scientific research projects. Having the honour to win a number of national research awards, with more than 117 national patents.

Meanwhile, Puqi has established long term cooperation relationship with many scientific research institutes in Germany, US, Australia, Hong Kong and other countries and regions. Number of geological data laboratories has been established at multiple places in china, using our own unique software to carry out long term data collection, analysis and detection for different geologic structure, and set up the differential database of different geologic structure area.

■ Caution

1. The instrument early in the design has been fully taken into account the use of the extreme environments. But still have to pay attention to the correct method of operation, please do not fall equipment deliberately, proper use will extend the life of the instrument.

2. The instrument is not waterproof, please do not immerse the instrument in water or operate in the rain.

3. Please do not strike LCD screen, do not expose the monitor for a long time in direct sunlight, if there is a touch faulty, please shutdown and restart.

4. To ensure the high sensitivity of the sensor, please gently, do not beat;

5. After using, please clean the instrument and load it into special box, please place the parts into the corresponding position, do not crush the screen.

6. The instrument should be placed in a cool and dry space.

7. Please do not disassemble the instrument, otherwise it will cause the sensor failure and system crashes.

8.The battery internal circuit will turns off the output when charging, You don’t need to take out the battery for charging

■ Technical Parameters

Model No.	Depth	Frequency Range	Frequency Binning	Audio Amplifier gain	Operation Mode	LCD	Live Record	Power Supply	Working Temperature	Stand-by Time
PQWT-CL200	2 meter	1-5000Hz	31 central frequencies and Common frequencies	Adjustable within 100 levels	Spectrum Analysis、Filter Analysis、Point Measurement and Precise Measurement	7-inch capacitive touch screen（800x480）	The device has long-term recording storage and playback functions. The data will not be lost when the device is turned off.the data can be deleted and recorded repeatedly	3.7V/4000mAh Lithium Battery	-10℃-+50℃	10 Hours
PQWT-CL300	3 meter	1-6000Hz								
PQWT-CL400	4 meter	1-7000Hz								
PQWT-CL500	5 meter	1-8000Hz								
PQWT-CL600	6 meter	1-9000Hz								

■ Instrument picture

- PQWT-CL200/300/400/500/600



Headset Instructions

1 Button Instructions

1) < : Volume increase (when the headphone volume is at the maximum or least, the headset will produce a short fine tuning)

2) > : Volume reduction

3) : MFB function button (ON/OFF)

4) AUX-IN: 3.5 mm interface

5) Micro USB charging interface

6) Noise reduction switch indicator light

7) ANR: Noise reduction switch button (To open the Noise control, hold down the ANR button till green light on. To shut down the Noise control, hold down the ANR button till green light off)

2 Charging Instructions

Attention: Please charge it to full electricity before first using.

Connect the USB socket on the headphone shell with any device with USB port via the USB charging line, and the LED indicator becomes red light indicate charging. The first charge time is 2-3 hours, then 1-2 hours each time for charging. When the charging indicator shows the green light, it is full of electricity.

3 Operation instructions for Power switch

1) Turn on the machine: Press and hold the switch button until you hear the prompt, then the LED is blue and the button can be loosened.

2) Shut down the machine: Press and hold the switch button, until you hear the shutdown prompt, the blue LED flashing 2 seconds then go out, you can release the button.

4 Noise reduction function description

1) When you open the ANR the switch button is to open the noise reduction function, at this time you can hear the hissing noise, which belongs to the normal phenomenon of switching function, and the indicator light is green. If the light does not shine, you need to charge it before using.

2) Noise reduction function is mainly to eliminate low-frequency noise, but it does not mean totally noise reduction.

3) The effect of noise reduction depends on the way you wear headphones. Please wear them correctly.

4) If you are in a very quiet environment, you should not open the noise reduction function.

5 Data specification

1) Headphone data

2) Battery data

Horn unit: Φ4*1.5mm
Magnet: 0mni-directional
S.P.L:-42 + 3DB S.P.L at 1KHz
Impedance: ≤ 2.2KΩ
Frequency response: 100Hz - 10000Hz
Operating voltage: 2V
Battery type: 360mah polymer
Charging mode: Micro USB
Stand-by: more than 480 hours
Charging time: 1-2 hours.
Running temperature: -10℃ - 70℃
Storage temperature: -25 - 60

6.Common fault description

A1. Why can't turn on the machine?

Answer: If headset has no power, please use USB charging.

A2. Why does the noise reduction function not work?

Answer: Please check whether the noise reduction function is turned on. If the green light is on, the noise reduction function is turned on. If not, please turn on or charge the machination.

A3. Why the noise reduction function is so bad?

Answer: Maybe the ear cap is aging or loose. Please check the ear cap or replace it.

■ Introduction and how to use

● Function Overview

PQWT-CL200,300,400,500,600 series type pipeline leak detector is high performance leak detection equipment, has powerful anti-jamming and data processing capabilities, you can make your work easier. It has the following main features.

1. The use of latest digital signal processing chip and a digital filter chip, 16M cache controller integrated, more responsive. In particular, it can filter with the interference of environmental noise, screening out the leakage noise, allowing the operator to lock leakage points quickly.

2. 7-inch high-definition digital color LCD touch screen with a resolution of 800 * 480, provide 12 display pages, can show the measurement parameters more clearly and intuitively, and full touch screen design, simple operation.

3. Each has 1 ~ 5000Hz, 1 ~ 6000Hz, 1 ~ 7000Hz, 1 ~ 8000Hz, 1 ~ 900Hz, frequency range (spectrum analysis) , can be displayed the distribution of the noise signal at each frequency in real time.

4. Automatic drawing continuous noise curve (Location Mode) within a certain time, so that the leakage point position is determined more quickly.

5. Sensor is built-in preamp circuit, using a rubber ring seal and cushion, and the application of professional acoustic methods, making the ability to capture the noise is higher than similar products.

6. Adopt latest noise detecting element, sounds clear.

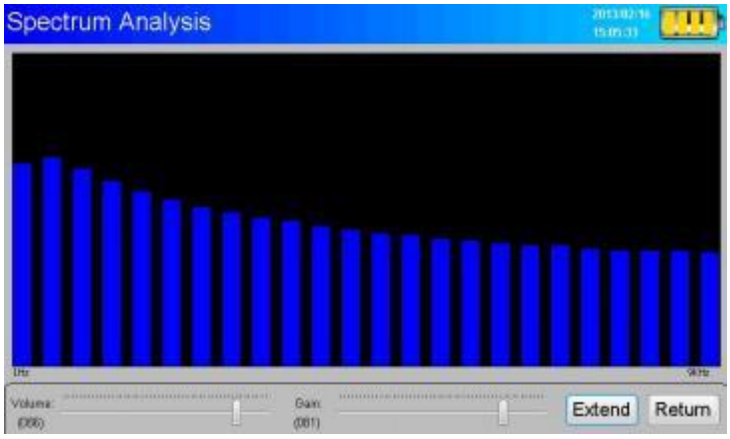
7. The number and time of recordings is unlimited, which is not lost after shut down, could be analyzed at any time.

8. Using a large capacity battery, can work for more than ten hours , and can be removed charging and online charging.

9. Super anti-jamming circuit design, digital signal and analog signal effectively isolate and eliminate the noise generated by the digital circuit.

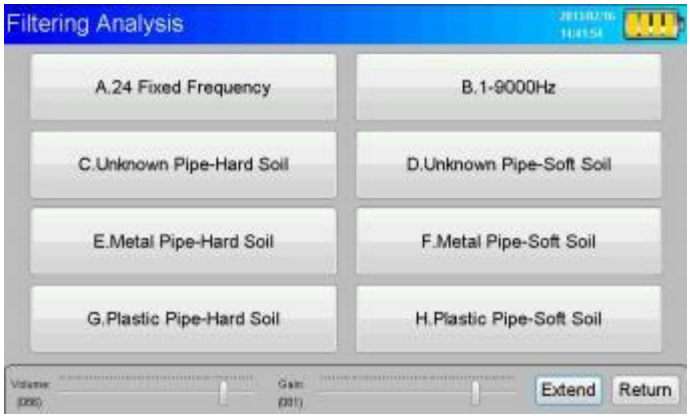
- **Function Introduction**

■ Spectrum Analysis



It can display the corresponding instantaneous noise signal in corresponding frequency range.

■ Filtering Analysis



Choose to display corresponding transient noise signal within a frequency range.

Model No.	Frequency Range
PQWT-CL200	1-5000HZ
PQWT-CL300	1-6000HZ
PQWT-CL400	1-7000HZ
PQWT-CL500	1-8000HZ
PQWT-CL600	1-9000HZ

NOTE: Above is the corresponding frequency range table to each model No.

■ Live Recording



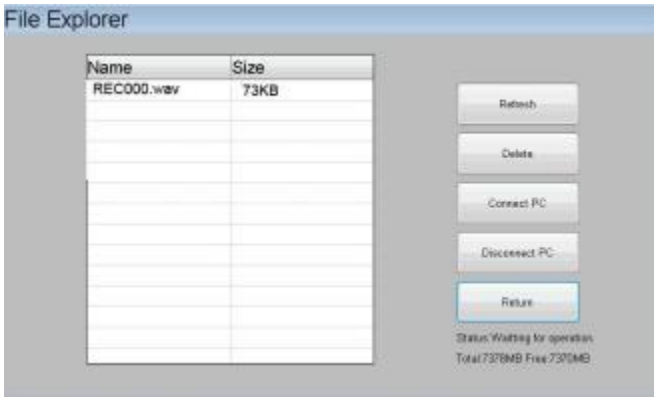
The number and time of recordings is unlimited, which is not lost after shut down, could be analyzed at any time.

■ Settings



Brightness adjustment and calibration of the touch screen(To adjust brightness large to observe easyly in bright light, turn down brightness in point measurement mode or without viewing screen to reduce power consumption, extend the single-use time)

■ File Explorer



You can always view the saved noise file to facilitate the late positioning of the leak, and use the USB to connect the computer to save the noise file

■ About



■ How to use

Assembly

Before starting work, need to assemble the various components according to the following requirements to ensure work properly.

(1) Plug five core cable into the host sensor interface and screw locking

(2) Plug four-core cable into the interface of sensor and mounting screws ;

(3) Headphone into the headphone jack and make sure the connection is correct .

2. Operation (PQWT-CL600 as example)

■ Turn on the power switch into the boot interface

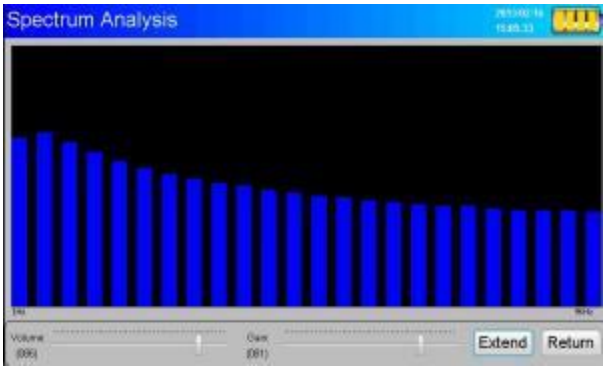


■ System enters standby screen after a successful start

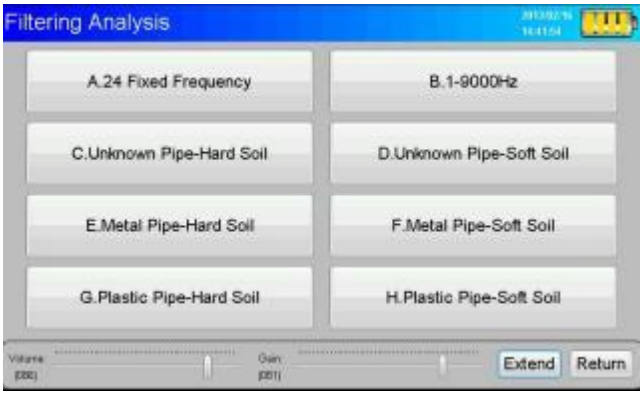


In the standby interface can see the current battery power and six function menu, click one of them can be selected, double click can enter into directly.

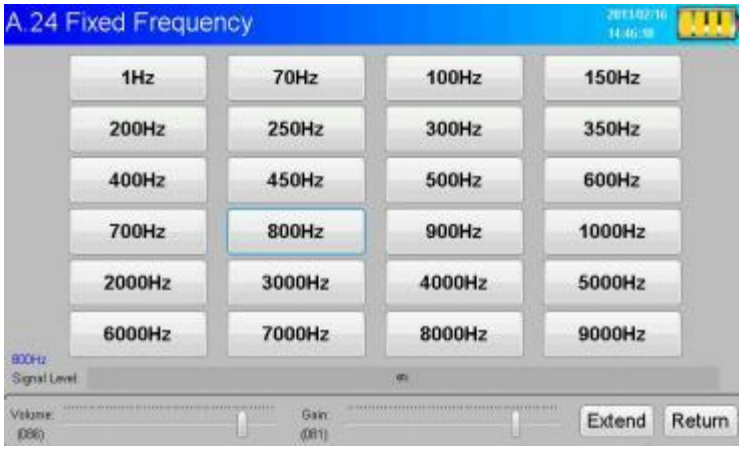
- Enter the " Spectrum Analysis "



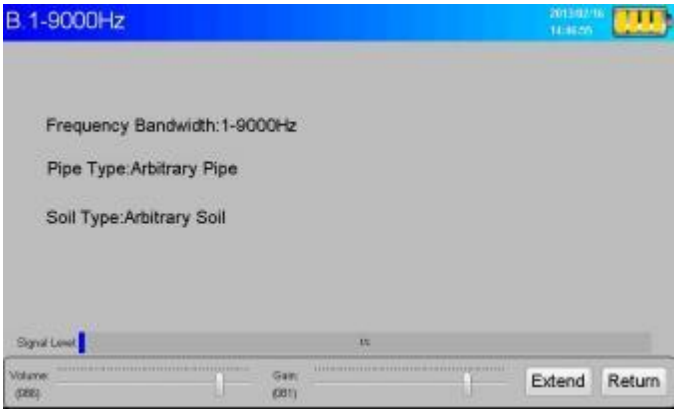
- Enter into the " Filter Analysis ", the eight options, click into the item respectively.



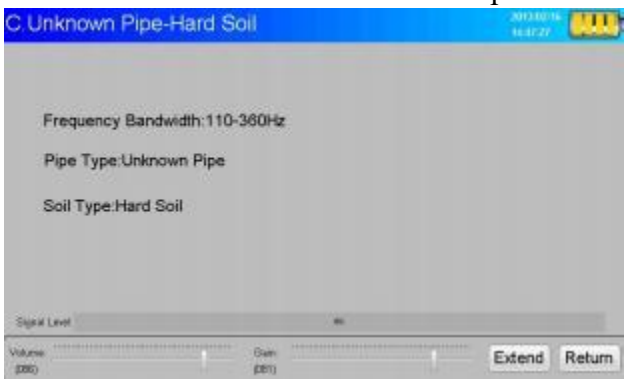
- Select and enter "A. 24 fixed frequency ", you can see there are 24 center frequency within the menu, click to select one of the center frequency. The center frequency of each model as shown below:



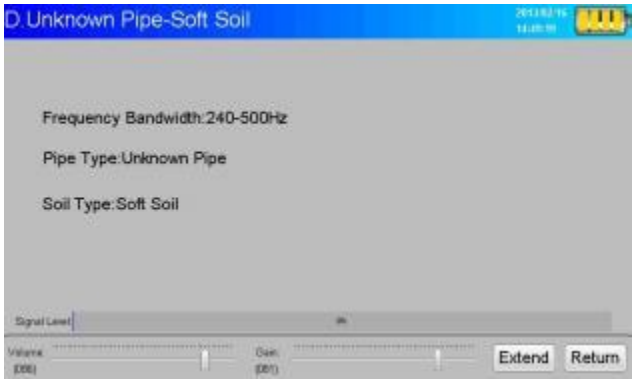
- Select and enter " B. 1-9000Hz "



■ Select and enter " C. Unknown Pipe - Hard Soil "



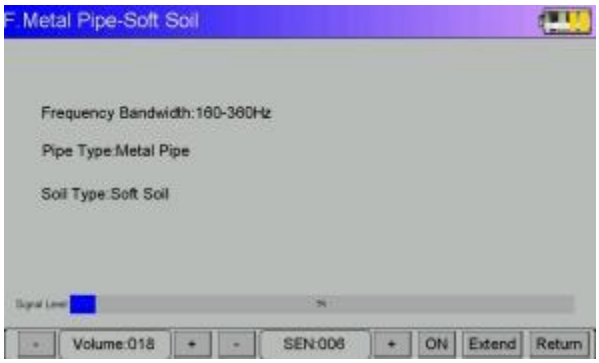
■ Select and enter " D. Unknown Pipe - Soft Soil "



■ Select and enter " E. Metal Pipe - Hard Soil "



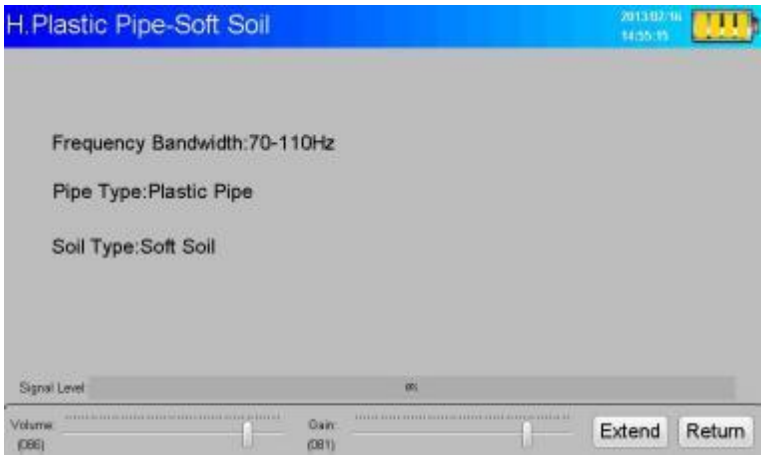
■ Select and enter " F. Metal Pipes - Soft Soil "



■ Select and enter " G. Plastic Pipe - Hard Soil "



■ Select and enter " H. Plastic Pipes - Soft Soil "



■ Select and enter into the " Live Recording "



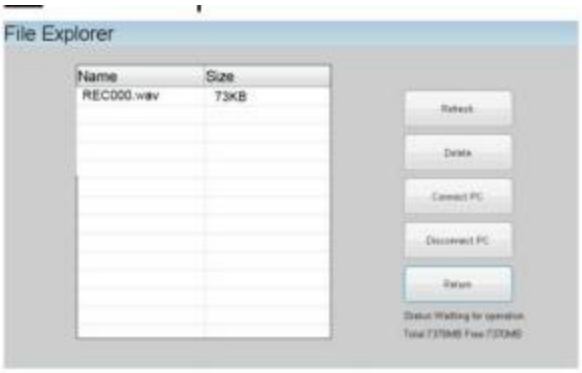
After entering, it can Save the recording of noise, Click 

start recording.

Click 

, the operator can record voice, it is convenient to distinguish the location later. Click “Stop”,the recording information will be saved to the SD card.

Selecting “ Files Management”, you can intuitively see their own stored files can also be connected to the computer to view.



Selecting “ settings”, you can see two function selection, click to enter separately.



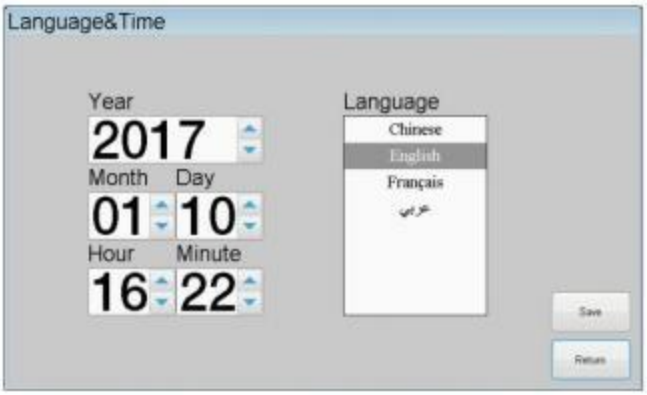
■ Click to enter “Display” for brightness adjustment.



■ Click into Touch Calibrate.

After entering the calibration interface, follow the prompts on the interface to calibrate the screen (you can also press and hold the screen for several seconds with your fingers until you enter the screen).

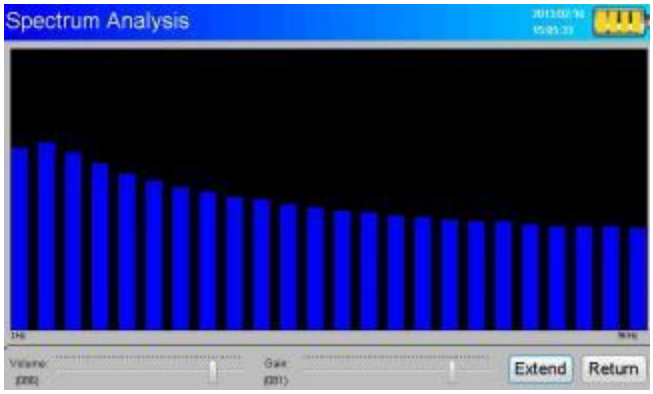
■ Click and enter into the " Time & Language"



You can set " Time & Language" in there

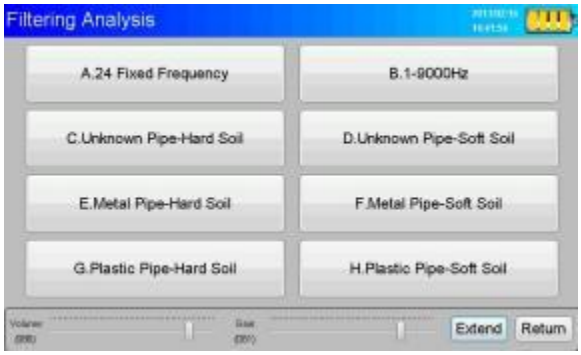
■ Instrument Working Mode

● Spectrum Analysis Mode



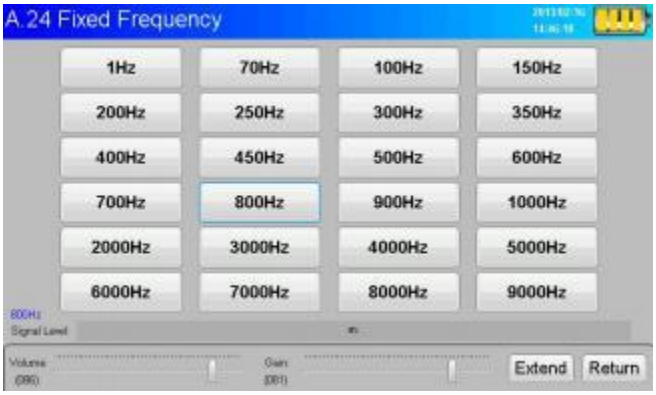
Screen display instantaneous noise signal within 1-9000Hz range. Scroll bars indicate the noise intensity corresponding to the band. Volume and sensitivity default is 100 , through the "+ - " to adjust. **(The volume is according to the demand like 35, and the regular the Gain is around 10)**

- Filtering Analysis Mode

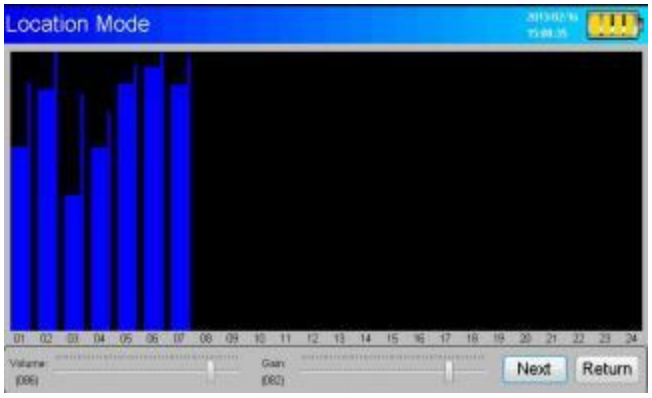


A ~ H screen display total of 8 select buttons , this options is the eight test conditions were based on the actual frequency corresponding configuration. Click to select one of the options, once again click to enter the option.

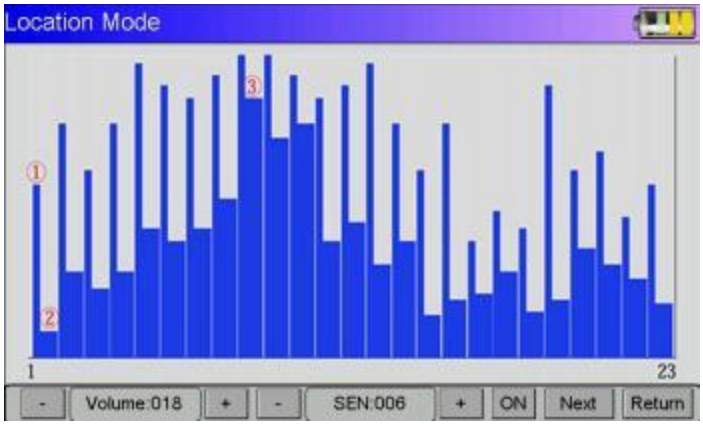
PQWT-CL600 as a example, "A. 24 Fixed Frequency ", you can see the 24 selection buttons, click to select one which indicates the center frequency of the band-pass filter. Scroll bar on-screen indicates the instantaneous intensity of the center frequency of the noise signal , and the right side of the scroll bar represents the corresponding value of the noise signal . **(Regular choose the frequency at 200-1000Hz)**



◆ Location Mode

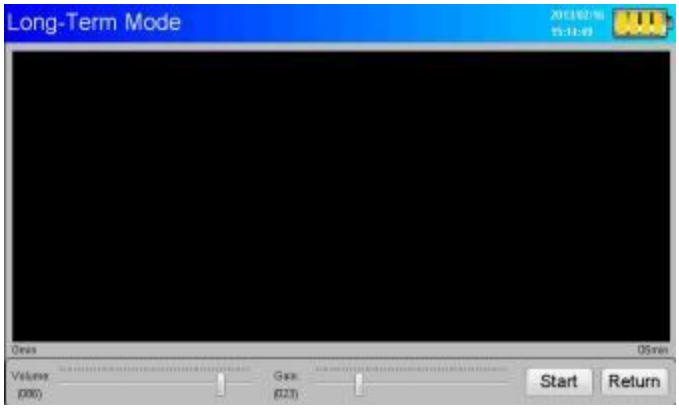


Location mode refers to the precise detection mode. It is designed for detecting in a noisy environment. Don't need to wear headphones while using this mode, it can eliminate the interference of environmental noise, capture suspected leak signal by software automatically. The following diagram as example :



instantaneous Value (The slimline is Ambient Noise)
2. The Minimum Value (The thick line is Leak Noise)
3. Suspected Leakage Point (The high spectrum indicate the leaking point)

◆ Long-Term Mode



Long-Term Mode refers to conduct further analysis to determine the suspicious leakage points detected in preliminary investigation. It is in order to exclude

suspected leak but is actually three direct links, noise impact sound of water at the valve or other underground facilities issued in order to find the true leakage points and design. Also you don't need to wear headphones while using this mode.

Using point measurement mode, the sensor must be fixed at a certain suspicious leakage point, choose a good monitor time (5 minutes, 10 minutes, 15 minutes, 20 minutes, 25 minutes, 30 minutes) to record the minimum value of each segment of the noise signal within a given time automatically.

Long-Term Mode can be divided into the following two conditions:

(1) The sensor direct contact with the pipe for continuous monitoring

- Pipeline flow is small: whether to raise or lower the sensitivity, the curve volatility is not big, **can judge where is not the leakage point**. (See Figure 1, Figure 2)

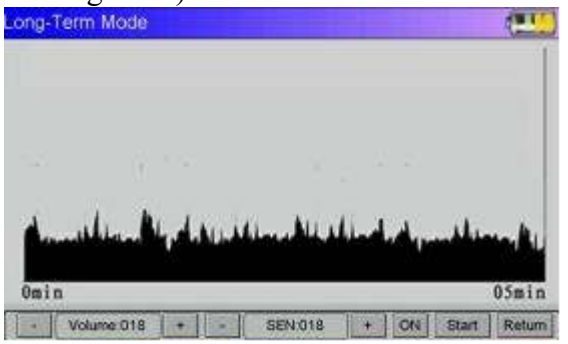


Figure 1

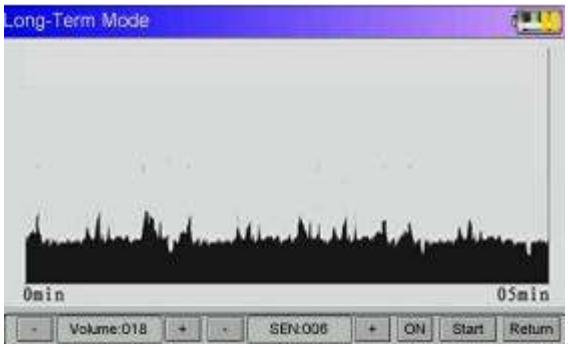


Figure 2

Whether to raise or lower the sensitivity, the curve volatility is big, can judge where leaks . (See Figure 3, Figure 4)

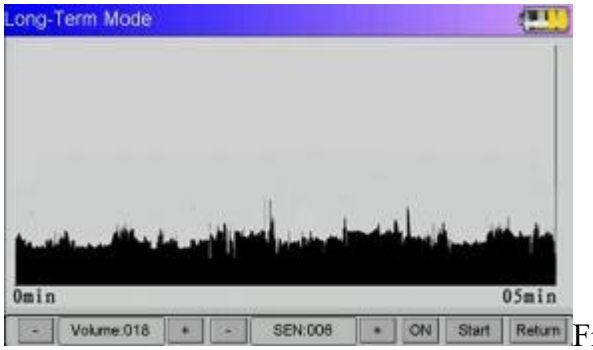


Figure 3

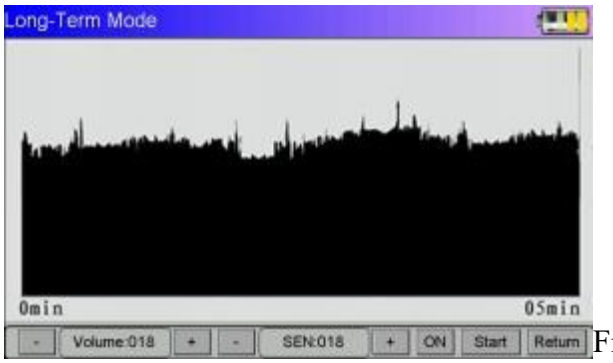


Figure 4

- Intermittent increase and decrease in water pipes and a larger amplitude: whether to raise or lower the sensitivity, the recess amplitude of increase and decrease is not big, **can judge where no leaking**. (See Figure 5 , Figure 6）

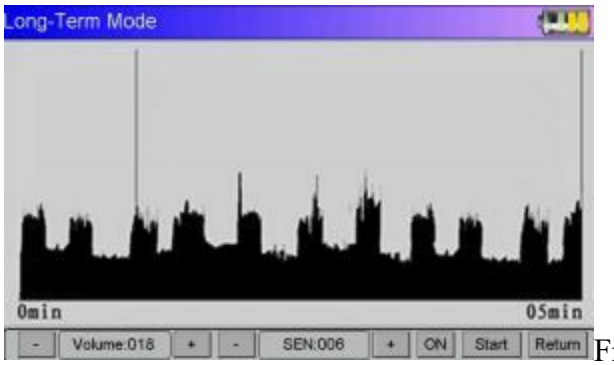


Figure 5

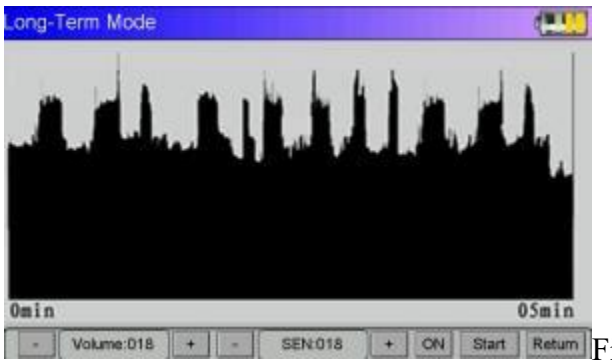


Figure 6

Whether to raise or lower the sensitivity, the recess amplitude of increase and decrease is big, can judge where is the leakage point. (See Figure 7, Figure 8）

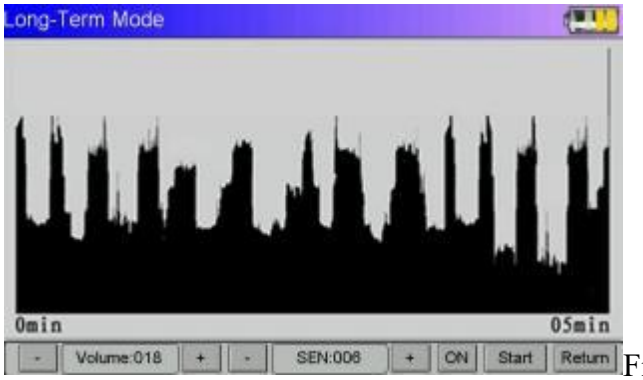


Figure 7

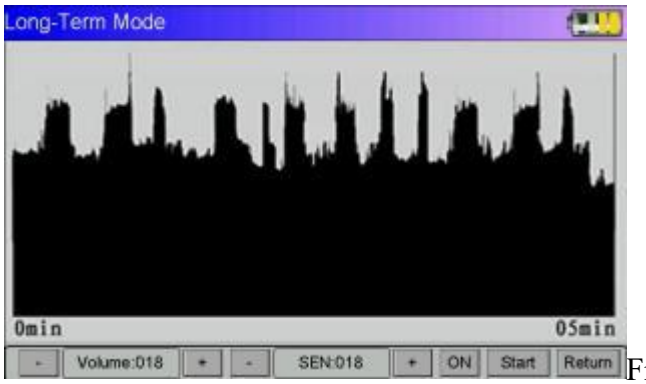


Figure 8

■ Pipeline Flow is Larger

Whether the sensitivity is raised or lowered, curve magnitude has been higher in value, can't judge the leakage point, should find another time monitoring. (See Figure 9)

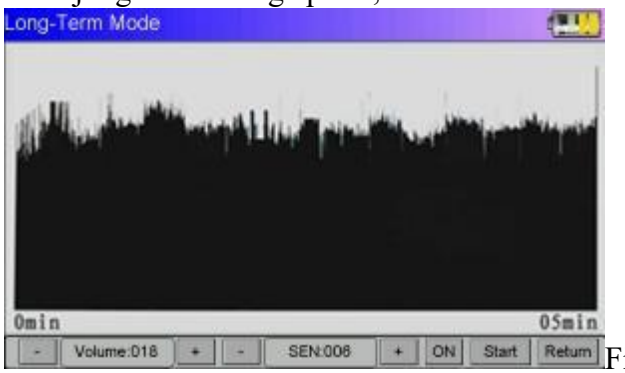


Figure 9

(2) The sensor is placed on the ground above the water leakage point, carrying out the continuous monitoring of two different periods of peak water and low peak. In this case, the value of the sensitivity should be set to the same value.

In the same suspected leakage point, curve amplitude is high in peak water while the curve is at the low peak showed higher amplitude. Proving low water peak, because the water pressure increased, leakage noise enhance, resulting in the amplitude of curve increased, can judge where leaks. (See Figure 10 , Figure 11)

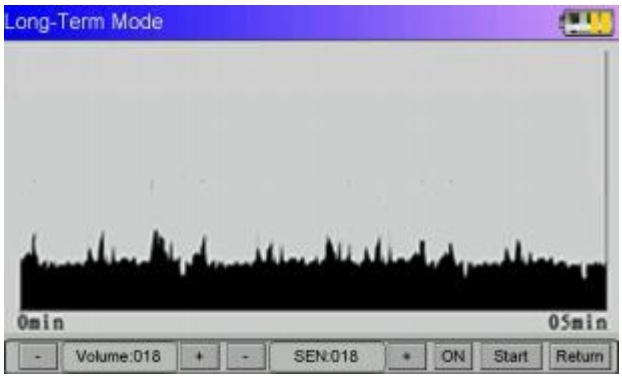


Figure 10

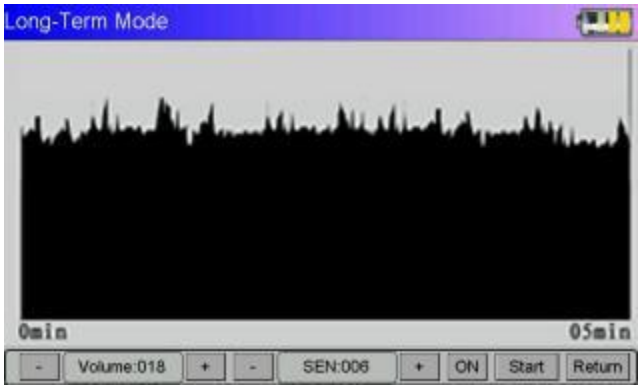


Figure 11

■ In the same suspected leakage point, curve amplitude is higher in peak water while the curve amplitude reduce at the low water peak. (See Figure 12, Figure 13）

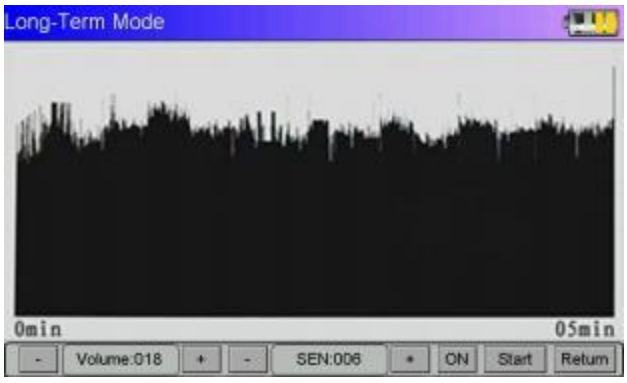


Figure 12

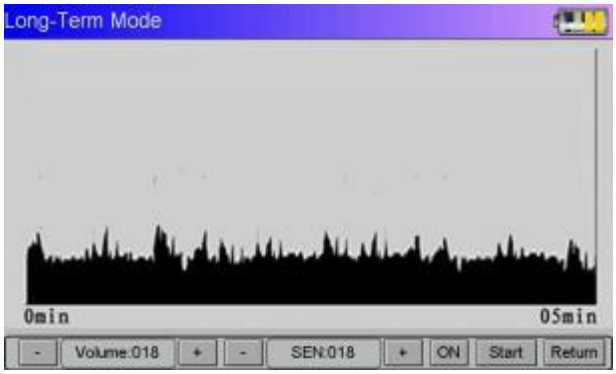


Figure 13

Proving in water peak, the monitored noise is the sound of water or other external causes, it can judge where is not the leakage point.

■ Faults and Diagnostics

Fault Description	Caused Reason	Method of Exclusion
Booth No Display	● Low battery ● Test takes about 5 seconds ● The internal circuit close when charging status	● Charge the battery or replace ● Waiting for self-test ● Unplug the charger
Instruments Boot No Reaction	● Sensor poor contact ● Low battery	● Check the sensor cable ● Charge the battery or replace
No Sound From Headphones	● No signal output from main interface ● Headphones failure	● Click into work mode ● Replace the headset
Headphones Too Loud	Volume or sensitivity is too high	Turn down volume or sensitivity
Touch Unresponsive	● Operation Error ● Equipment failure	● Press the power key to restart ● Contact vendor to inspect

■ Guide for After-sale Services

- Within two years of the purchase date, if instrument quality problems, please send us the photos, we will send the required part or repair for you. Each of us shall take care of the corresponding shipping cost on each side.
- Instrument warranty does not cover the accident, misuse, neglect, alteration, modification, magnetized, unauthorized service and damage caused by prolonged exposure in corrosive salt mixture.
- If need to purchase related accessories, you can contact Hunan Puqi Geologic Exploration Equipment Institute customer service.

■ Copyright Notice

1. Hunan Puqi Geologic Exploration Equipment Institute has the final interpretation of the operating instructions.
2. Hunan Puqi Geologic Exploration Equipment Institute reserves right to modify equipment specification without any advance notice.
3. All pictures for reference only in operation manual, please in kind prevail.
4. Please observe local laws and regulations, Hunan Puqi Geologic Exploration Equipment Institute will not be responsible for any legal issues which caused by the instrument.

5. The products of Hunan Puqi Geologic Exploration Equipment Institute are patented products, If anyone imitates, we would investigate his legal liability.

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