

# ST-2000

## Water Leak Detector



# User's Guide





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# CAUTION!



## GENERAL SAFETY PRECAUTIONS

People who use hand and power tools and who are exposed to the hazards of falling, flying, abrasive and splashing objects, or exposed to harmful dusts, fumes, mists, vapors, or gases must be provided with the appropriate personal protective equipment (e.g., safety goggles, gloves, appropriate safety footwear, etc.). The work area should be kept as clean and dry as possible to prevent accidental slips.

## SAFETY INSTRUCTIONS

- Avoid possible damage to your hearing by always starting out with the volume control at the lowest setting (counter-clockwise).
- Use the Safety Switch to protect your hearing. Release the push button when you experience sudden loud noises.
- Do not press the Safety Switch push button while sensor is in motion. Wait to press the push-button until sensor is in place.

## POWER TOOL PRECAUTIONS

Power tools can be hazardous when improperly used. The following general precautions should be observed by power tool users:

- Operate electric tools within their design limitations.
- Use gloves and appropriate safety footwear when using electric tools.

- Store electric tools in a dry place when not in use.
- Do not use electric tools in damp or wet locations unless they are approved for that purpose.
- Keep work areas well lighted when operating electric tools.
- Ensure that cords from electric tools do not present a tripping hazard.
- Never carry a tool by the cord or hose.
- Keep cords and hoses away from heat, oil, and sharp edges.
- Keep all people not involved with the work at a safe distance away from the work area.
- Maintain tools with care. They should be kept clean for the best performance.
- Follow instructions in the user's manual for changing accessories.
- Be sure to keep good footing and maintain good balance when operating power tools.
- Remove all damaged electric tools from use and tag them "Do Not Use."
- Turn off the power when not in use.

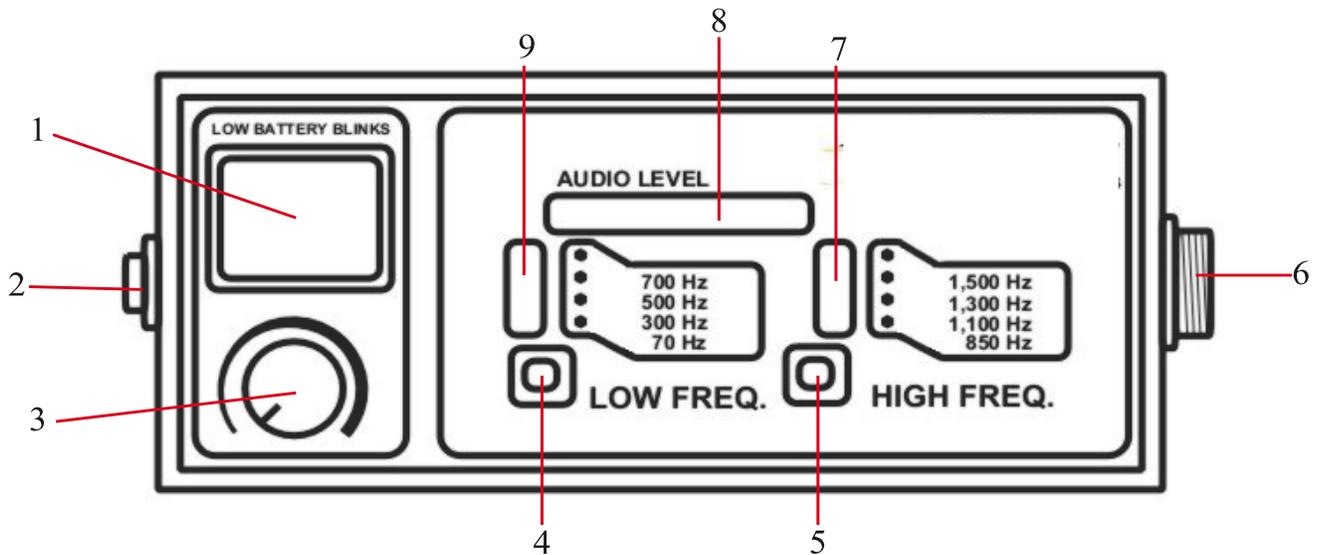
## Five basic safety rules can help prevent hazards associated with the use of tools:

1. Keep all tools in good condition with regular maintenance.
2. Use the right tool for the job.
3. Examine each tool for damage before use and do not use damaged tools.
4. Operate tools according to the manufacturer's instructions.
5. Provide and use properly the right protective equipment.

## Standard Equipment

1. Digital Spectrum Analyzer (Includes neck strap and six "AA" batteries)
2. Headphones
3. Handle with Safety Switch
4. Ground Sensor
5. Probe Sensor
6. Probe Bars — Three
7. Probe Bar Extension
8. Carrying Case
9. Air Manifold — helps to amplify hard to hear leaks by pressurizing the water line with air.





### Panel and Connector Description:

1. Power On/Off button - turns the unit on and off. NOTE: Indicator light flashes on and off when batteries are low
2. 1/4" Headphone Jack
3. Volume Control Knob
4. Low Frequency Cutoff Selection Button
5. High Frequency Cutoff Selection Button
6. Probe Handle Connector
7. High Frequency Cutoff Indicator
8. Audio Level Indicator
9. Low Frequency Cutoff Indicator

## Analyzer Assembly and Setup

Plug the headphones into 1/4" phone jack on the Analyzer. NOTE: The unit will not work unless Headphones are plugged in.

Turn the unit on with the on/off switch. NOTE: When the light blinks, the batteries are low. Replace with 6 "AA" alkaline batteries by unscrewing the side screws and removing the back plate at the rear of the Analyzer.

## Filter Adjustment

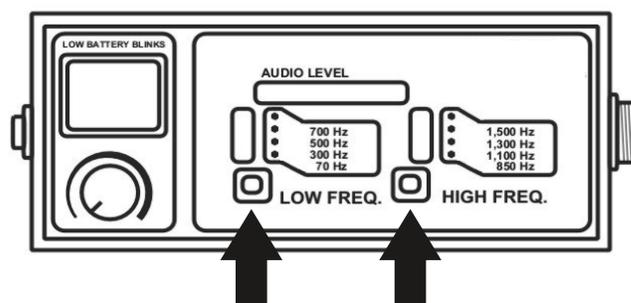
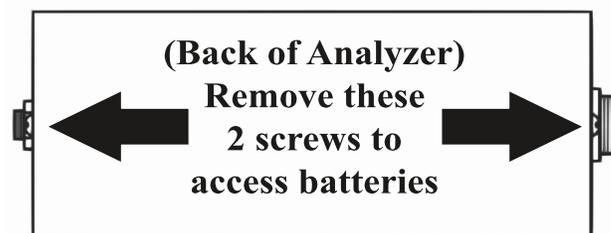
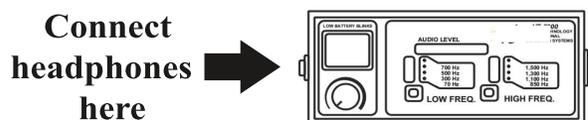
Select the Low and High frequency by pressing each button. An indicator light will alert you to which frequency is selected. Choose the best frequency for each particular site.

## Audio Level Indication and Adjustment

The LED display indicates noise response to the leak. NOTE: If the light goes all the way to the right, turn down the volume at the control knob until light is back on scale, or try selecting another frequency.

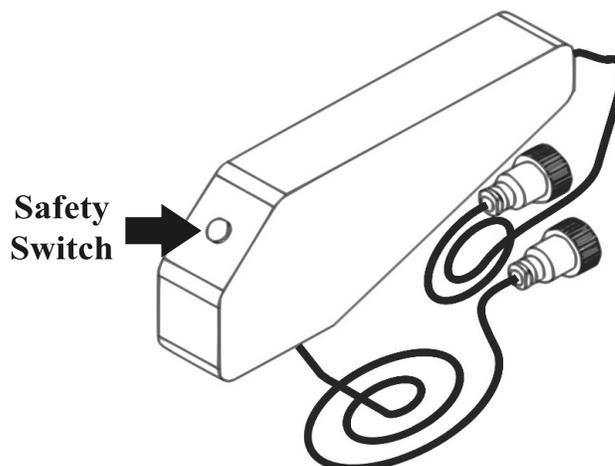
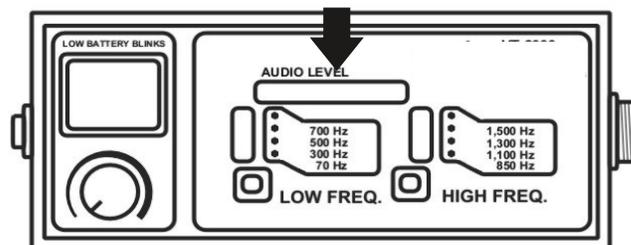
## Handle/Safety Switch

Press the safety switch to listen for sound when using the Sensors. CAUTION: Do not press the safety switch while Sensor is in motion. NOTE: Wait to press the safety switch until the Sensor is in place.



Select cutoff frequencies (selection indicated by LEDs above buttons)

Graph indicates noise level

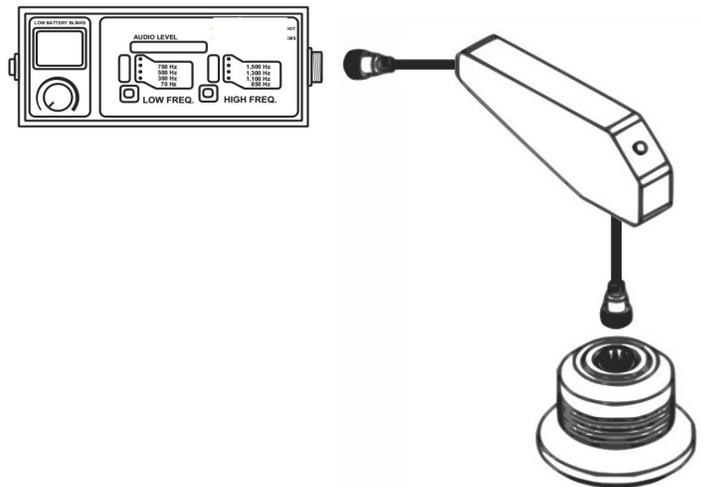


## Ground Sensor Installation

The ground sensor is hooked up by attaching the cable from the Handle to the top of the Ground Sensor connection.

NOTE: Disconnect the sensor cable from the ground or probe sensor before placing it back in the carry case.

Attach cable from the handle to the right side of the Analyzer.

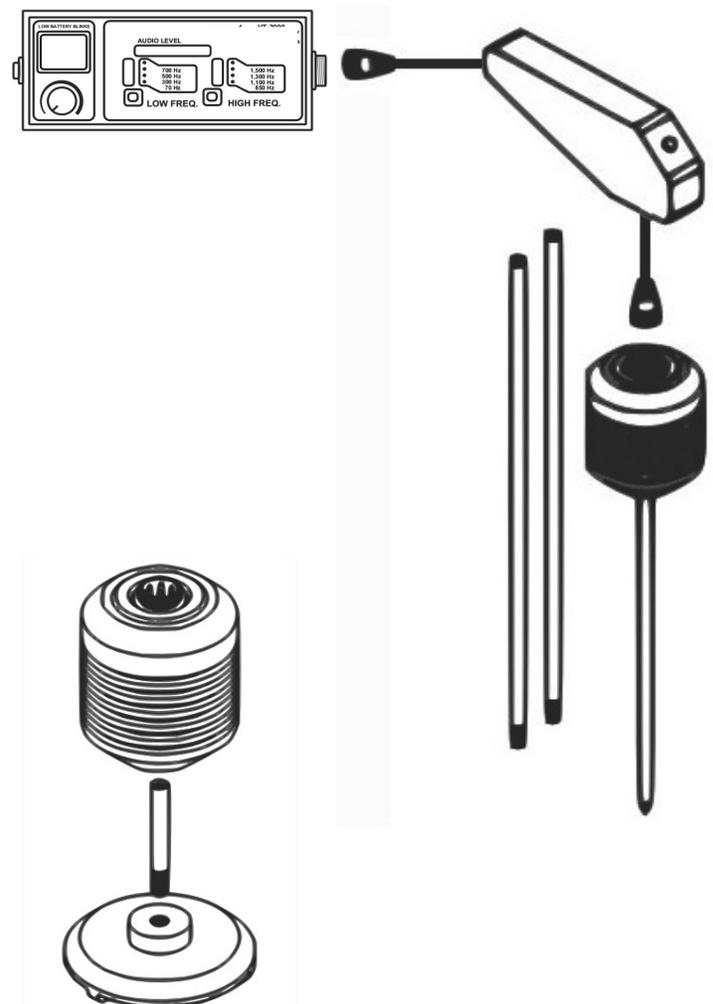


## Probe Sensor Installation

The Probe Sensor is hooked up by attaching the cable from the Handle to the top of the Probe Sensor connection.

The Probe Bars are attached together and inserted into the Probe Sensor.

The Probe Extension is used to replace the Probe Bars with the Ground Sensor Plate, making both Sensors interchangeable.



## PINPOINTING A LEAK

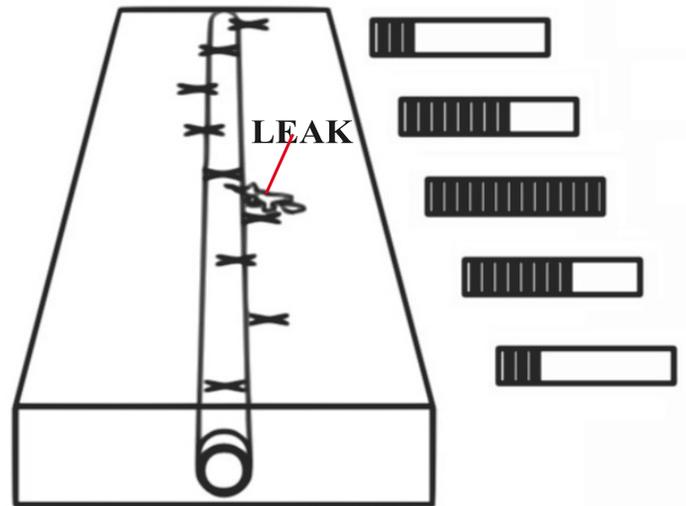
Choose the right combination of low-end filtering and high-end filtering to remove the extraneous noises of equipment, wind, traffic, etc.

Listen to leaks in PVC pipe in the range of 70 HZ low end to 850 HZ high end, filtering out all higher and lower frequencies.

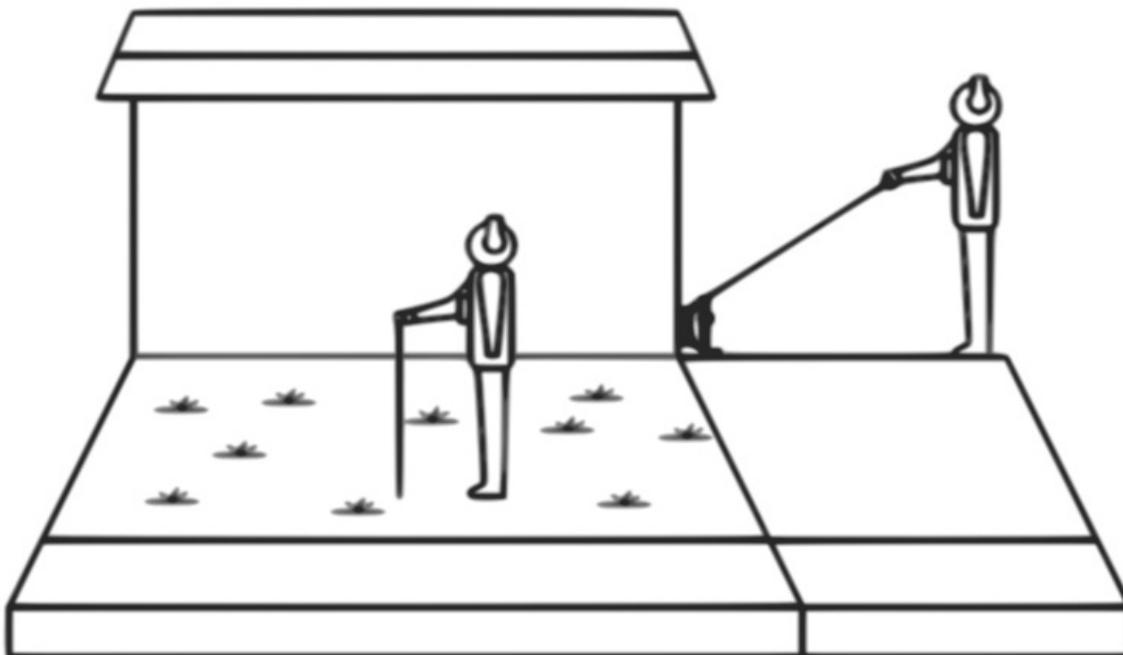
Listen to leaks in Cast Iron pipe in the range of 500 HZ low end to 1500 HZ high end, filtering out all higher and lower frequencies.

Start listening in a grid pattern over the pipe. Check for Audio Levels, adjusting volume to keep level about 50% on scale.

Move the Sensor along, side to side of the pipe, searching for the strongest signal on the Audio Level and the strongest noise signal through the Headphones.



As you get closer to the leak source, the Audio Level will peak on scale and in the Headphones. NOTE: Always keep readings by either writing them down or marking the surface while searching for a leak to avoid having to repeat search patterns. This practice also helps to avoid extraneous noises created by sounds other than the leak.



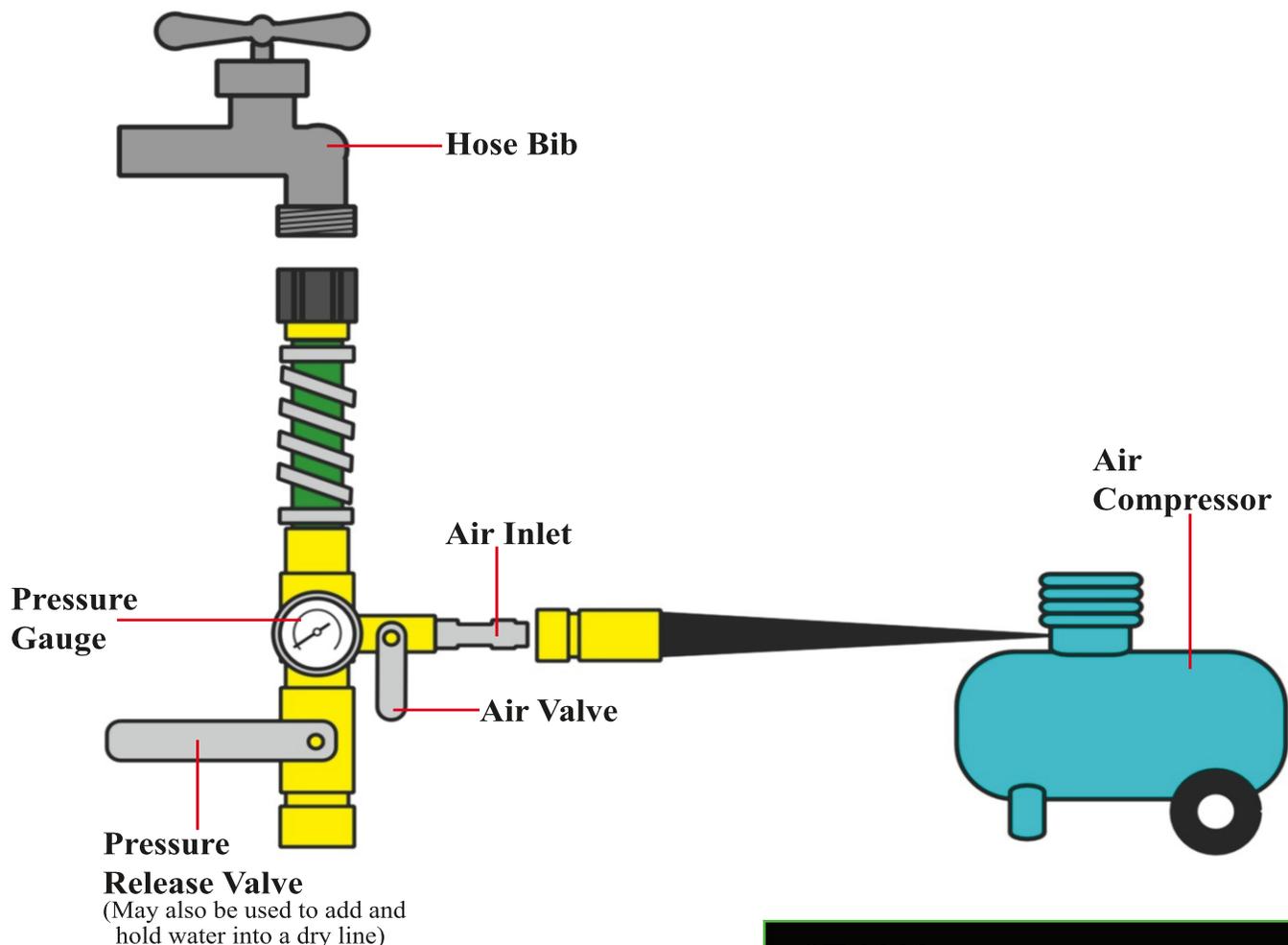
Probe Sensor, used for searching in soft area's such as soil. Use the same search pattern as above.

Probe Sensor for listening to direct contact's to water lines, Such as water riser's at the house.

### Increasing the Leak Sound

Whenever the leak sounds are not easily detected, you may use the Air Manifold and an air compressor to increase the amplitude of the leak sound:

1. Attach the Air Manifold to the water line.
2. Make sure that both the air valve and pressure release valve are closed.
3. Open the hose bib to allow water into the Manifold
4. Take note of the pressure on the Manifolds gauge.
5. Attach your air compressor to the air valve on the Manifold.
6. Adjust the air compressor output pressure to at least 5 to 10 lbs over the water pressure.
7. Open the air valve to allow the air to travel through the water line. This extra pressure will increase the leak sound and make pinpointing much quicker, and provide greater accuracy.



### Troubleshooting Guide

#### Unit will not power up

- Check that headphones are plugged in.
- Check that on/off switch is in the on position
- Check that batteries are not dead

#### No sound from sensor

- Check all connections
- Check that sensor foot (metal piece at bottom of sensor) is tight

### Service and Repair

For service or repair, unit should be returned to an authorized repair center or the factory. If you have any questions regarding service or repair, or for the name and address of your nearest Authorized Repair Center please contact:

**Subtech Design & Manufacturing INC.**  
**3221 Liberty Square Parkway**  
**Turlock, CA 95380**  
**209-668-5840**  
**repairs@subtechmfg.com**

## Specifications

### Amplifier

Input Impedance:	200K
Output Impedance:	16 OHM
Power:	6 AA Alkaline Batteries (1.5V DC x 6)
Power Consumption:	60 mA Standby (20 hours)
Amplification:	69 dB= $\pm$ 3.5 dB
Distortion:	Less than 1% @1mV
Size:	6.0" x 2.4" x 5.0"
Weight:	41.0 Ounces

### General

Ground Microphone Sensitivity:	0.75 V/G @1KHz
Probe Microphone Sensitivity:	0.75 V/G @1 KHz
Headphone Impedance:	32 OHM
Headphone Sensitivity:	102 dB/mW @1KHz
Carry Case:	High Density Polyethylene, 20.0" x 13.5" x 9.0"
Weight:	13.1 lbs.

### Filter Characteristics

16 Programmable Settings:	8th order/ $-60$ dB Fstop Max 0.025 dB Max ripple 70 Hz - 500 Hz Bandpass
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