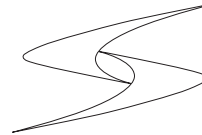




Scan for Digital Version

# AQUA TRAC<sup>300</sup>

## Water Leak Detector



SUBSURFACE  
INSTRUMENTS, INC.



# User Manual

**Instructions, Functions and Warranty Information**

## COPYRIGHT

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## INTRODUCTION

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Congratulations on the purchase of your new SubSurface Instruments, Inc. AquaTrac™300 Water Leak Detector. The AquaTrac™300 is specially designed to detect water leaks on buried pipes & conducts. This device will detect water leaks through its highly sensitive microphone and its control board advanced technology. You have chosen a quality product that is designed for years of field use without the need for annual or periodic calibration and service.

The basic principle of the Water Leak Detector's operation is as follows:

The MICROPHONE/SENSOR is placed over the ground surface or directly over the pipe, the sound created by the water leak frequency is detected and interpreted by the CONTROL BOARD and displayed on the screen for the operator to determine the course of action.

To help ensure the best locating results, please read & understand the manual in its entirety before using the product.

## DISCLAIMER OF LIABILITY

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SubSurface Instruments, Inc. shall not be liable to Distributor, Re-Seller, or any other person for any incidental, indirect, special, exemplary or consequential damages, or injury of any type whatsoever, either caused directly or indirectly by products sold or supplied by SubSurface Instruments, Inc..

This manual contains basic advice for the operation of the AquaTrac™300. It is essential that the manual is available for the trained operator to use as a reference. You must read this manual carefully.

- Do not drop the device, the electronic components might get damaged with strong impacts.
- Limits set in the technical data sheet must not be exceeded.
- Original accessories ensure the safe operation of the equipment. The use of non-original accessories are not allowed and Void the warranty if used with this unit.
- Maintenance and repairs can only be performed by service centers authorized by SubSurface Instruments, Inc.

## IMPORTANT NOTICES

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- ⚠ **WARNING!** Failure to follow these warnings could result in serious injury or death.
- ⚠ **WARNING!** Only qualified and trained personnel should operate this water leak detector.
- ⚠ **WARNING!** Follow appropriate safety procedures, your company's policies and applicable safety codes and/or laws.
- ⚠ **WARNING!** Do not connect to utilities, cables or pipes without authorization and training.
- ⚠ **WARNING!** Use this tool for intended purpose only as described in this manual
- ⚠ **WARNING!** Do not expose to hazardous chemicals, hazardous gases or explosive environments.
- ⚠ **WARNING!** This tool is designed to detect sound emitted from buried pipes and utilities. There might be water leaks on buried pipes, and utilities that this instrument CANNOT detect.
- ⚠ **WARNING!** LOCATING is not an exact science. The only certain way to be sure of the existence, location, or depth of buried utilities is to carefully expose (dig up) the utility.

## PREPARE FOR USE

---

Unpack your new AquaTrac™300 Water Leak Detector. Make sure there is no shipping damage and that all parts have been included.

This unit has a rechargeable Li-Ion battery, please charge for at least 5 hours before use.

Note: For longer battery life and reliable operation under adverse conditions, use only supplied charger and accessories provided by SubSurface Instruments, Inc.

Connect the Sensor/Microphone into the unit and ensure — by screwing the connector until the nut is secure against the unit— that the connection was successfully made.

Be aware of the headphones volume, the level is set to medium each time you re-start the unit. Avoid loud noises or hard bangs when using the unit on higher volume levels, failure to do so may result in permanent hearing damage.

## REGISTER WARRANTY

---

THIS INSTRUMENT IS UNDER WARRANTY FOR 1 YEAR (5 YEAR\*) FROM THE DATE OF DELIVERY AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP. WE WILL REPAIR OR REPLACE PRODUCTS THAT PROVE TO BE DEFECTIVE DURING WARRANTY PERIOD.



\*BY REGISTERING YOUR UNIT ONLINE AT [HTTP://WWW.SSILOCATORS.COM/WARRANTY-REGISTRATION](http://www.ssilocators.com/warranty-registration) WITHIN ONE MONTH (30 DAYS) OF PURCHASE, SUBSURFACE INSTRUMENTS, INC. WILL EXTEND THE WARRANTY PERIOD FROM 1 YEAR TO 5 YEARS.

THIS WARRANTY IS VOID IF, AFTER HAVING RECEIVED THE INSTRUMENT IN GOOD CONDITION, IT IS SUBJECTED TO ABUSE, UNAUTHORIZED ALTERATIONS OR CASUAL REPAIR.

NO OTHER WARRANTY IS EXPRESSED OR IMPLIED. THE WARRANTY DESCRIBED IN THIS PARAGRAPH SHALL BE IN LIEU OF ANY OTHER WARRANTY, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SUBSURFACE INSTRUMENTS, INC. WILL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES.

## SCAN THE QR CODE TO REGISTER ONLINE

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Please Fill out all of the fields on our online registration to keep better track of your warranty and allow us to help you with any further questions or concerns.

SubSurface Instruments, Inc. Team

### VERSION SUMMARY

The AquaTrac™300 has all the necessary functions for the acoustic detection of water leaks in buried pipes. Through its potent ground microphone, the sounds can be detected directly from the pipe as well as on the ground surface. The sound level is displayed on the equipment's screen in graphical form, as well as numerically. The unit identifies frequency of the audio collected which is then transmitted into the headset, this process is an intrinsic part of the whole system. The headphones are equipped with noise isolating features to allow the user to acquire the best audio possible to pinpoint the water leak location.

The AquaTrac™300 features several specific functions for the interpretation of the results:

- The filters can be customized to limit the bandwidth by setting high frequency and low-frequency parameters (Ex: 100 Hz to 1200 Hz or 101 Hz to 2550 Hz)
- The sound level indicator represents the live audio with a graph and a numeric value on the screen
- The screen also displays the Battery Life indicator
- 15 memories to record current reading and recall it later for further consultation.

### AQUATRAC™300 STRUCTURE

The Leak Detector's circuitry is housed in a highly resistant engineered grade plastic box. The monitor features a backlit LCD touch screen with a clear display, even in extremely sunny conditions.

The connections to the ground microphone and headset are within easy access and the unit can be easily turned ON and OFF with a switch located on the front side of the box.

### BASIC INFORMATION

The AquaTrac™300 Water Leak Detector is an electroacoustic sound listening device, the equipment registers the vibrations of an object or pipe where a water leak is presumed to be found, the AquaTrac™300 reproduce a specific frequency that can be interpreted by a trained operator.

Some of the applications are locating leaks in water distribution networks and locating leaks in service and utility pipes.

### SAFETY WARNINGS

- Do not use the equipment at excessive volume, this may result in permanent hearing damage.
- Do not drop the equipment, the circuitry and components inside of the casing can get damaged. The sensor/microphone is also a delicate piece of electronic equipment, do not drop it or hit it, this can cause damage to the microphone and internal connections and will not be covered under warranty. NEVER open the housing of the unit, this will also automatically void the warranty.
- The unit leaves our facility in the original factory configuration, no need for calibration or special settings besides options available on the menu.

## TECHNICAL DESCRIPTION

### TECHNICAL DATA SHEET

Type:	Electronic water leak detector with electronic sensor attached to the amplifier to find water leaks on buried pipes or above ground meters & hydrants
Operating frequency:	0-5120 Hz (others on request)
Filters:	6 noise filters are pre-set in the unit and also can be customized by the user, allowing infinite combinations
Amplifier:	65dB provides high performance
Ingress Protection Class:	IP65 rated (unit & attachments)
Battery:	Li-Ion Rechargeable, charger included
Battery Life:	Up to 20 hours of continuous use (others on request), with multi-voltage charger jack
Display:	Touch Screen LCD, back-lit display, color identification of filters, sound readings, operation buttons and access to the equipment settings
Geophone Sensor:	Piezo electronic sensor, high sensitivity and resistance with protection against wind and weather. 5 feet (1.5 meters) contact cable, rubber protected sensor base for unpaved ground and impacts
Activation of Sensor:	Activates by pressing the "trigger" button on the handle attached to the sensor cable, press the button to transmit audio to the headphones, depress to mute the audio.
Sensor sensitivity:	0,7 V / g
Headset:	Professional stereo headset with full over the ears soft pads. Impedance of 60 ohms
Headset Volume control:	Press the UP and DOWN arrows on the unit's touch screen
Microphone Sensitivity control:	Press the UP and DOWN arrows on the unit's touch screen
Contact rod:	3 section rod, screw the three 16" sections together to have get a 48" rod.
Distortion:	Less than 1% (1 mV)
Operating temperature:	0° F to 140° F (-17.8° C to 60° C)
Carrying Case:	Padded case for shock and weather protection. Neck strap for field operation

## INTRODUCTION

### IDENTIFYING THE AQUATRAC™300'S PHYSICAL FEATURES

The AquaTrac™300's electronic components and control board are inclosed inside of an engineer grade plastic box. It is equipped with an advanced and extremely responsive Color Touch Screen LCD and connections that are easily identifiable, allowing a very quick setup time. The unit has connections on the left, front and right side of the box, leaving the top face of the instrument exclusively to the LCD touch screen. Our engineers eliminated the extra malfunction/damage related to physical buttons on this unit, making it almost maintenance free.





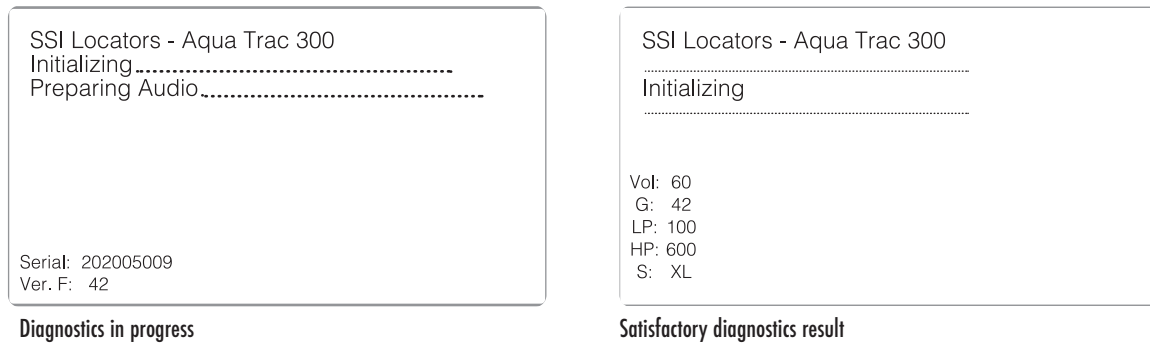
## OPERATION

Follow this suggested steps to get your AquaTrac™300 ready for use in the field:

- Connect the Ground Microphone to the trigger handle and the unit's main box and secure the connection by tightening the threaded washers
- If you need to use the extension rod, thread it to the bottom of the sensor
- Plug-in the 3.5mm headphone jack to the unit, use the converter jack for 1/4" headphone plug
- Turn the power on with the ON/OFF button located at the front of the unit.

### INITIALIZING

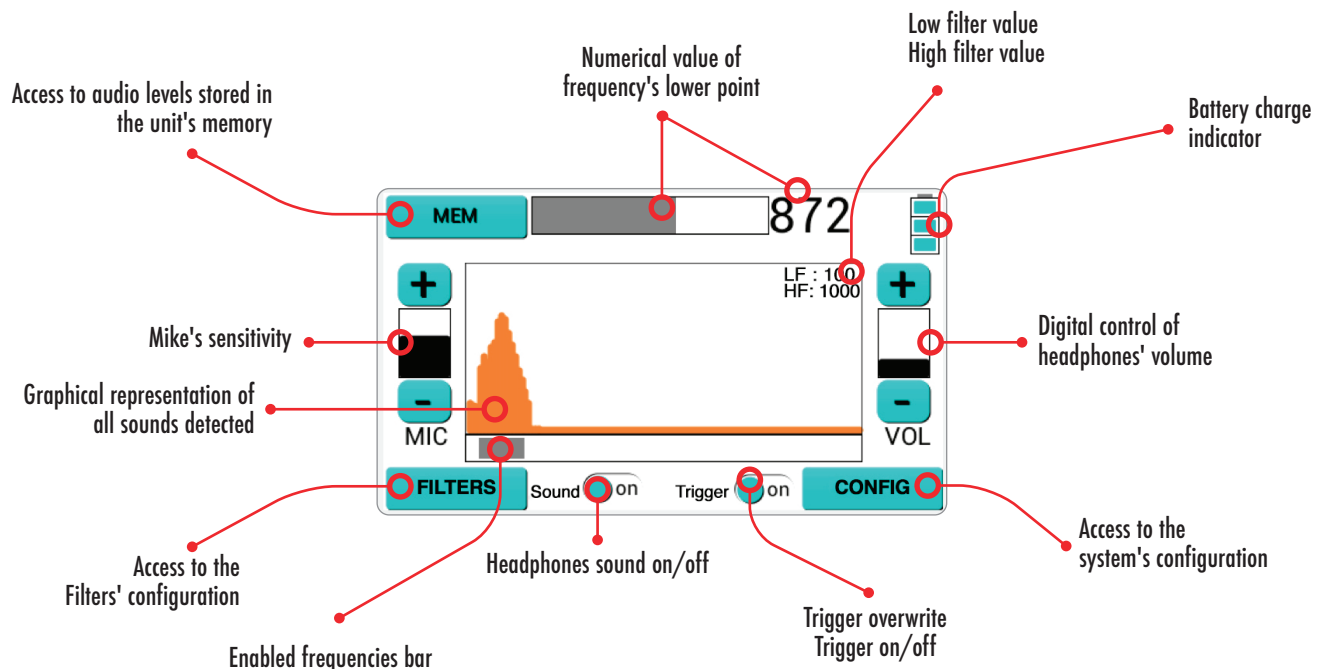
At power up the AquaTrac™300 will perform a self-diagnostic and will show the following screens:



If the screen displays a fail diagnostics message, you must re-start the equipment to run diagnostics again and clear the error.

### MAIN SCREEN DESCRIPTION

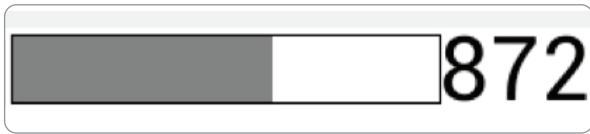
The main screen shows the sound graph, and its frequency numerical high value representation, enabled frequencies and frequency limits defined by filters, memory access, as well as the access points to the instrument's main controls.



## MAIN SCREEN FUNCTIONS

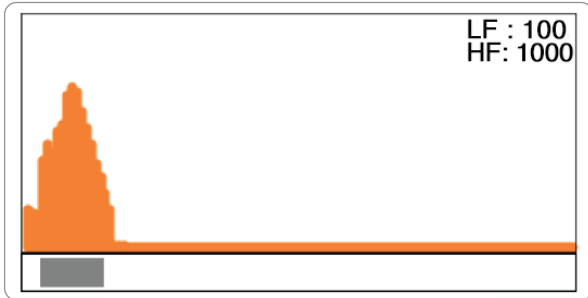
### INFORMATION ON THE MAIN SCREEN

The main screen displays all the information needed for the operator to successfully locate water leaks.



#### NUMERIC VALUES

At the top of the screen, there is a bar that constantly moves left and right, at the same time that the numeric value located next to it changes accordingly. This bar is an indicator of the measured minimum noise level, used by the operator to find the exact point of the leak.



#### EXPLODED GRAPH

In the center of the main screen is the exploded graphic analysis of the captured sound. From left to right, the graph represents the intensity of the captured sound displayed as frequency range levels. The analysis of this graph allows the user to select the best filter to muffle unwanted noise during operation.



#### FILTERS

The AquaTrac™300 electronic geophone allows infinite combinations of filters. Generally, in the case of tubes made of hard material, such as cast iron, the tendency is to have the sound at a high frequency, and in tubes made of soft material, such as PVC, the sound is most likely to be found at a low frequency.

Choosing the right combinations of filters increases the ability to accurately detect water leaks, so it is advisable that the operator has knowledge of the pipe's material to accurately choose the correct filter.



#### MEMORY

This button gives you access to the AquaTrac™300's database. You can record up to 15 frequency levels and create a graph on the screen to facilitate the interpretation of the data acquired.



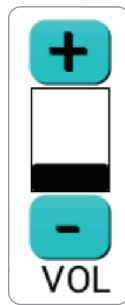
#### MICROPHONE'S SENSITIVITY

Adjust the sensitivity of the microphone by pressing the plus and minus buttons on the left side of the screen, the bar in-between shows the current sensitivity level. The user must adjust the instrument's sensitivity to a comfortable hearing level.

Adjusting the sensitivity allows the default fixed gain of the instrument to be modified by different gain values that vary between 40 to 65 dB.

Caution: Sensitivities that are too high can lead to sound distortion.

## MAIN SCREEN FUNCTIONS



### HEADPHONES VOLUME

Adjust the value of the headphones by pressing the plus and minus buttons on the right of the screen, the bar in-between shows the current volume level. The volume varies the amplitude with which the sound is sent to the headphones, when turning the equipment ON, the volume is reset to a default level, adjusting the volume so that it is safe for the user's hearing.



### TOGGLE BUTTONS

**Mute ON/OFF** button allows the user to enable/disable the headphones' sound, but it still allows the sound picked up by the microphone to be displayed on the screen.



**Trigger** control allows the user to enable or disable the external handheld trigger.

### BATTERY CHARGE INDICATOR

Gives the user a readout of the unit's remaining charge by percentages.  
4 charge indicators:



76% to 100%



26% to 75%



06% to 25%



Charge below 5%

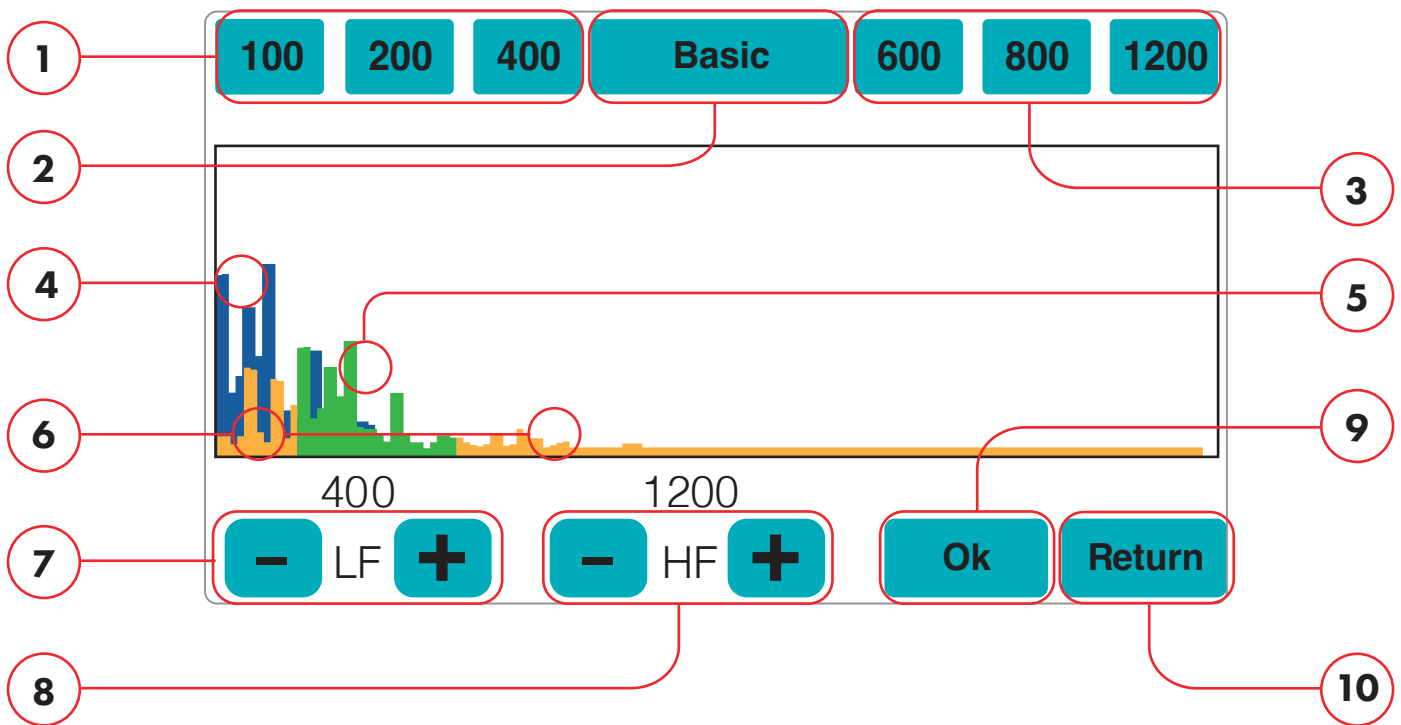
### ABOUT THE FILTERS

The audio filters are electronic circuits designed to amplify or attenuate a certain range of frequency components. This helps eliminate the unwanted noise from the audio signal and improves the tone of the output audio. Filters play a major role in the accurate detection of the water leak, meanwhile improving the time of the locate.

### FILTERS SCREEN

While on this screen the user chooses the predetermined filters for the Low and High Frequency filters, as well as makes custom changes to either side of the frequency. The amplification of the noise produced by the filters is reproduced instantaneously, providing the most accurate sampling of the sound, and facilitating this way the timely detection of the leak.

In addition, the central graphic is also tactile and multi-touch allowing the user to select using the pinch movement.

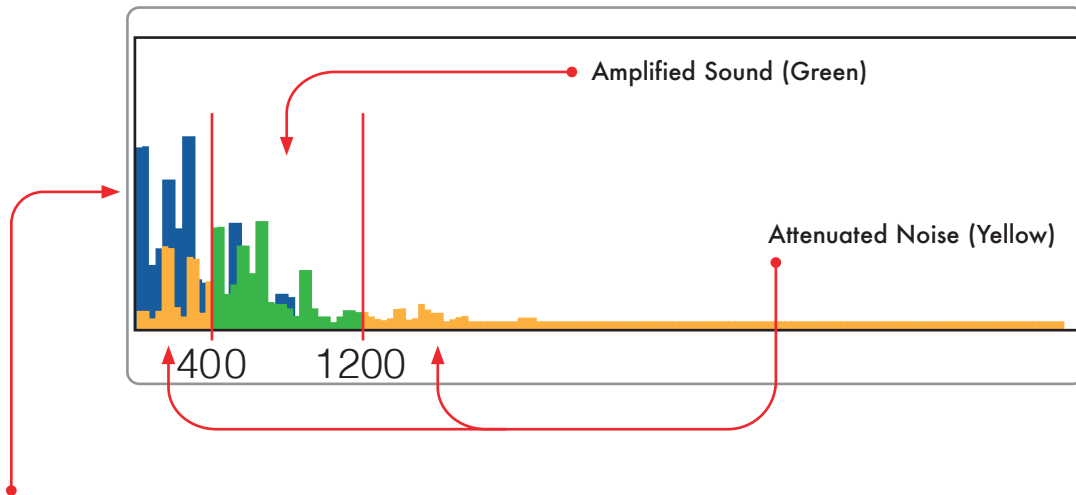


1. Low Frequency predetermined filters
2. Basic/Advance Filtering System
3. High Frequency predetermined filters
4. Blue: Advanced filtration system especially for leaks that generate little noise and in places with greater external noise.
5. Green: Amplified Sound
6. Yellow: Attenuated Sound
7. Custom Low Frequency Filters
8. Custom High Frequency Filters
9. Saves your selection and returns to the main screen
10. Returns to the main screen without saving changes

## FREQUENCY FILTERS

### ANALYZING THE FILTER'S MAIN GRAPH

Inside of the filters screen, the middle graph gives the user a great deal of information about the noise that is being amplified and the one being attenuated.




In the **ADVANCED** filters option, in addition to applying a greater amount of digital filters, an extra gain is also applied only to the Amplified Sound (green band), thus altering the audio levels and creating a highlight in the sounds heard. Adjust the Advanced Gain sensitivity by going into the system's configuration, through the main screen CONFIG access, choose the gain levels from 1 to 10.

### SELECTING PREDEFINED FILTER SHORTCUTS

The AquaTrac™300 Leak Detector allows you to have multiple custom frequency configurations. However, it's recommended for beginners to take advantage of the **PREDEFINED FILTERS** offered with the unit. The next table can be used as a reference depending on the job and conditions.

FREQUENCY	LOWER BAND			HIGHER BAND		
	100	200	400	600	800	1200
UTILITY TYPE						
Iron Pipes & Carbon Steel		↑	↑	↑	↑	↑
PVC Pipes	↑	↑	↑	↑	↑	↑
Service Pipe in HDPE		↑	↑	↑	↑	↑
Service Pipe in CI			↑	↑	↑	↑

 **AMPLIFIED SOUND**

## RECOMMENDATIONS

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### FACTORS THAT CAN INFLUENCE THE SOUND QUALITY

- Whenever possible, perform the detection at a time when there is little external noise that may interfere with the detection  
(e.g. footsteps, machines that emit vibrations, people's conversations, road traffic, etc.)
- Do not move the ground microphone during measurements.
- Always take several measurements to better qualify the suspected point of the water leak.
- Check the pressure of the water network, using a manometer, the minimum pressure required with this equipment is 55 psi (plastic pipes) and 20 psi (metal pipes), because you won't be able to hear any distinctive sound from a water leak without this minimum pressure. Very important, the greater the pressure on the water network, the deeper a water leak can be found in the supply network and the easier it is to find its location.

Note: Make some test measurements to get used to the outside or external noises and repeat the process several times at the point where a suspected leak is located, this will give you a better understanding of the sound that the leak produces against external unrelated sounds.

### USING THE GROUND MICROPHONE

The AquaTrac™300 can capture the noise collected by the ground microphone.

It is advisable to know the location of the pipe underneath the pavement or floor where you suspect there is a water leak, this will shorten the time to locate the leak and will eliminate the need to have other locators on hand (e.g. Pipe and Cable Locator).

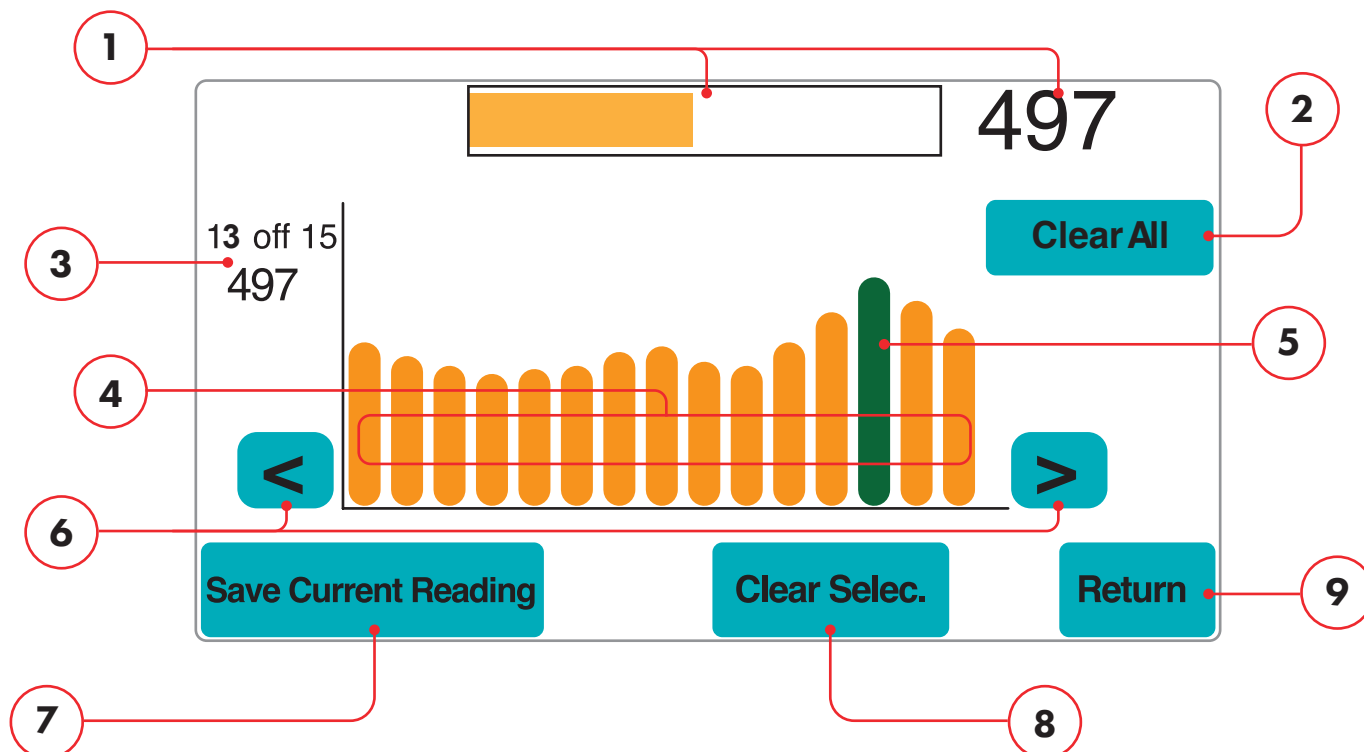
If it is necessary to use a listening rod, or there is the need for a greater range of detection; it's possible to extend the tip of the sensor and work the same as if it was an electronic listening stick. Screw the three collapsible extension rods provided with equipment to the bottom of the ground microphone.

## COLLECTING DATA INTO THE UNIT'S MEMORY

### FACTORS THAT CAN INFLUENCE THE SOUND QUALITY

The AquaTrac™300, has memory positions for the smallest hidden noise values, and it is possible to build a graph of minimum values to identify the exact location of the leak.

The screen below is an example:



- |                                  |  |
|----------------------------------|--|
| 1. Live feed from the microphone | 6. Previous/Next memory position                         |
| 2. Clear all the memory          | 7. Save the current live value and move to next position |
| 3. Current memory position       | 8. Clear the selected memory position                    |
| 4. Graph with 15 entries         | 9. Return to the main screen                             |
| 5. Current memory position graph |  |

The example in the graph shows that the highest reading was taken at position 13, with an intensity of 497.

However, it is important to note that this is just an indicator, soil conditions, pavement and pipe position may lead to different readings.

For example, when leaving the asphalt and going to concrete, we are comparing the sound on two different floor materials, therefore with different noise intensities.

The same happens with pipe extensions, as they normally leave the network at a depth and become shallower until reaching the customer's easel, this causes the signal strength to unevenly vary from point to point

### CONFIG. SCREEN

The AquaTrac™300 allows the user to change advanced settings under the configuration menu, some of these settings control how the unit's sound performs, so please be aware of the changes you make on this screen.

The available settings are:

#### Brightness

The brightness control has a direct impact on the equipment's battery consumption, with the backlight at minimum the equipment has approximately 15 hours of battery life, and with the light at most 7 hours. The AquaTrac™300's display is able to be read even in direct sunlight, adjust the brightness as needed.

#### Auto-mute

The AquaTrac™300 has built-in feature in its electronic circuit that attenuates loud noises that could cause harm to the operator's hearing. But in addition to this feature, the equipment also has a digital auto-mute function, which turns off the audio in case of very loud sounds, and keeps it off until these sounds disappear, regardless of the trigger or sound control. The auto-mute is disabled by default, and can be enabled through this menu. With auto-mute activated, in case of a loud sound, the equipment is completely muted, only enabling the sound again after the noise returns to safe levels

#### Advance Gain

As explained in the filters section, the AquaTrac™300 has the advanced filters function, this function applies a new amplification to the post-filtering sounds, enhancing the noises heard. This control changes the intensity of this highlight, the value varies from 1 to 10, multiplying the sound by the corresponding value.

### Config

Backlight

Auto-mute

off

Sensor

XL

Adv Gain.

2

Serial: 202005009

Ver. F: 42

Return



### CHARGING THE LI-ION BATTERY

The AquaTrac™300 uses a rechargeable battery. To recharge the battery, simply plug the charger that is supplied with the equipment in the unit's AC power input, located on the side of the plastic enclosure. Contact SubSurface Instruments, Inc. if you have any problems re-charging the Li-Ion Battery

The total charging time is between 7-9 hours.



#### **WARNING!**

#### **Attention:**

Never leave the charger connected to the device for longer than 12 hours due to the risk of equipment damage, battery damage and loss of warranty.

The SubSurface Instruments, Inc. AquaTrac™300 was designed for dependable operation without periodic adjustment and/or calibration. If, however, your Detection Unit is not working properly, return it to the factory for repair. A RMA (Return Material Authorization) is not required, but there is some necessary information needed to ensure your unit is repaired and returned properly. The required information may be obtained by phone, e-mail, fax or through our website.

Telephone: 920.347.1788 or 855.422.6346  
Fax: 920.347.1791  
E-mail: [info@ssilocators.com](mailto:info@ssilocators.com)  
Web: <http://www.ssilocators.com/service>

#### **SEND IT PREPAID TO:**

SubSurface Instruments Inc.  
Attn.: Service Department  
1230 Flightway Dr.  
De Pere, WI 54115 USA

We will repair and ship the instrument back, or advise you if the instrument is irreparable.

**NOTE:** There is a minimum charge for repair and handling for units not under warranty.

When shipping your instrument, be sure to include:

1. Your contact information: name, address, e-mail and phone number.
2. A brief description of the problem.
3. A return shipping address & billing mail address & any special shipping instructions.

#### **PACKING INSTRUCTIONS:**

Place the unit to be repaired in the original shipping carton, or equivalent sturdy container. Add packing material around all sides of the unit. Seal the shipping container with strong tape. Failure to package the equipment properly may result in a voided warranty. Mark the shipping container:

**FRAGILE ELECTRONIC EQUIPMENT**

## WHAT'S INCLUDED

The AquaTrac™300 ships inside of a hard padded case for shock and weather protection.

Includes:

- The "AquaTrac™300" Amplifier
- Koss Headphones with 3.5mm jack
- Hand-held Trigger
- Li-Ion battery Charger
- User Manual
- Electronic sensor with 5' (1.5m) of cable
- Collapsible contact rod (3 pieces)
- Magnet
- Shoulder strap



## WHAT'S INCLUDED



AQUATrac™300  
COMPLETE SYSTEM

**AQUA  
TRAC** 300



Hard IP68 Certified ABS custom  
carrying case included.



David Clark Headphones  
*\*Optional - Sold Separately*

## **AN INNOVATIVE DESIGN FORCE IN SUBSURFACE DETECTION & LOCATION**

SubSurface Instruments is an innovating force that engineers, manufactures and distributes high-frequency and magnetic locators, pipe and cable locators, water leak detectors, leak correlators, bore hole gradiometers, pipe inspection cameras and specialty locators.

SSI's most recent innovation, the AML or All Materials Locator, locates buried PVC pipes, PE Pipes, plastic or nearly any other subsurface object more efficiently than ever before. Using patent-protected technology re-engineered by SSI, the AML detects buried PVC pipes and almost every object that other locators can't find.

SSI features a vast line of professional underground and underwater locator products for every need including surveying, construction, ordnance removal, excavation and exploration. Our customers from the petroleum, water, sewer, power, telecom, cable and gas industries rely on SSI's high quality and dependability to make crucial measurements in the world's most challenging conditions. SubSurface Instruments' products are proudly made in the U.S.A. and offer an industry-leading warranty.



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