



Scan for Digital Version

AQUA TRAC³⁰⁰

Water Leak Detector



User Manual

Instructions, Functions and Warranty Information

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INTRODUCTION

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

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 will 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

-  **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 3 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



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 provides all the necessary features for detecting water leaks in buried pipes using acoustics. It includes a powerful ground microphone that can detect sounds directly from the pipe and on the ground surface. The equipment's screen displays the sound level in graphical and numerical form. The system identifies the frequency of the audio, which is then transmitted to the headset. The headphones have noise-isolating features that allow the user to get the best possible audio to locate the water leak accurately.

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 circuitry of the Leak Detector is located in a sturdy box made of EGP Engineer Grade Plastic. The monitor has a backlit LCD touchscreen that displays clearly, even in bright sunlight. The connections for the ground microphone and headset are easily accessible, and the unit can be powered on and off with a switch located on the front of the box.

BASIC INFORMATION

The AquaTrac™300 Water Leak Detector is an advanced acoustic sound listening device. It detects the vibrations of an object or pipe where a water leak is suspected and reproduces a specific frequency that can be interpreted by a trained operator.

This cutting-edge equipment is useful for various applications such as locating leaks in water distribution networks and 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:	This is an electronic water leak detector with an electronic sensor. It can be used to identify water leaks on buried pipes or above-ground meters and hydrants
Operating frequency:	10-5120 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 that 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, recharge with multi-voltage charger jack
Display:	Touch Screen LCD, back-lit display, color identification of filters, sound readings, operation screens 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:	Touch the UP and DOWN arrows on the unit's main screen, Right side
Microphone Sensitivity control:	Touch the UP and DOWN arrows on the unit's main screen, Left side
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 carrying case for shock and weather protection Amplifier neck strap for handsfree field operation

PRODUCT DESCRIPTION

IDENTIFYING THE AQUATRAC™300'S PHYSICAL FEATURES

The AquaTrac™300 is built with an engineer-grade plastic box that encloses its electronic components and control board. It boasts an advanced and highly responsive Color Touch Screen LCD and connections that can be easily identified, making setup time very quick. It has connections on its left, front, and right sides, leaving the top face of the instrument solely for the LCD touchscreen.

Our engineers have done away with the extra malfunction or damage that could be caused by physical buttons on this unit, making it almost maintenance-free.



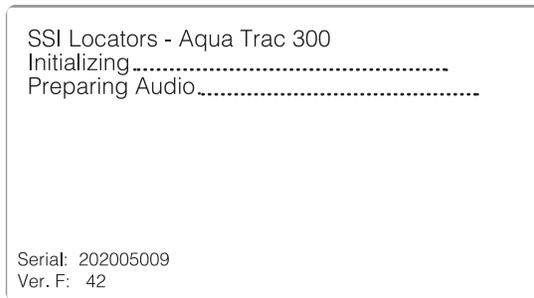
OPERATION

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

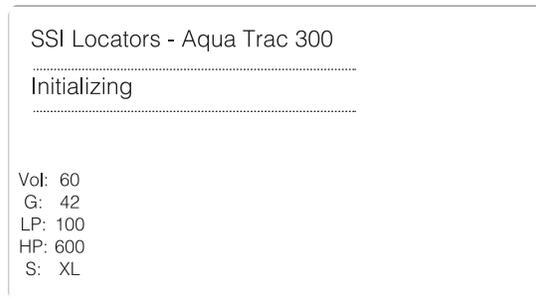
- To connect the Ground Microphone, attach it to the trigger handle and the trigger cable to the unit's main box. Make sure the connections is secure by tightening the threaded washers
- If you need to use the extension rod, thread it to the bottom of the sensor, use the same thread for the magnet
- Plug-in the 3.5mm headphone jack to the unit, use a 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:



Diagnostics in progress

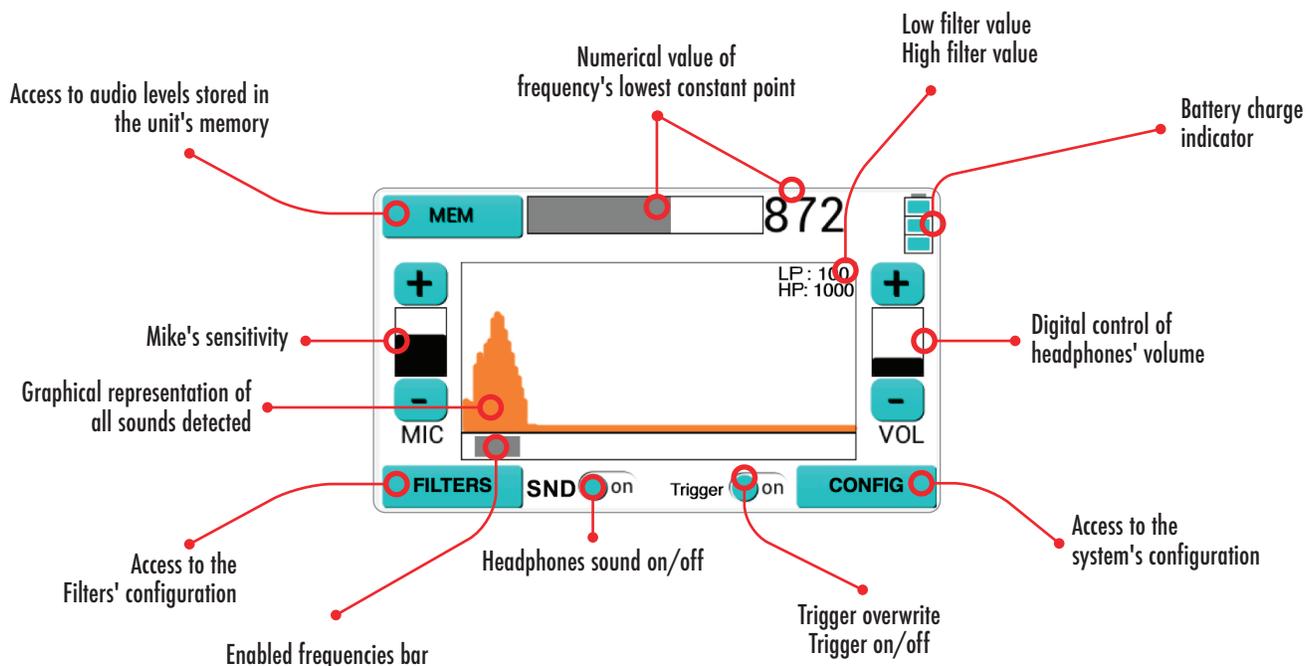


Satisfactory diagnostics result

If the screen displays a fail diagnostics message, you must re-start the equipment to run diagnostics again and clear the error. If the problem persist, contact SubSurface Instruments, Inc. repair department at info@ssilocators.com

MAIN SCREEN DESCRIPTION

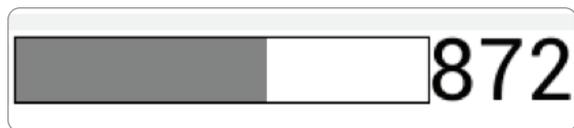
The primary display grants you access to all the necessary controls for the unit, including adjusting the volume for your headset, regulating your microphone sensitivity, managing filters, storage memory, and configuring settings. Within the display, you'll see an illustrative representation of all detected frequencies by the sensor, along with a battery status indicator, filtered frequencies, and general functions of the water leak detector.



MAIN SCREEN FUNCTIONS

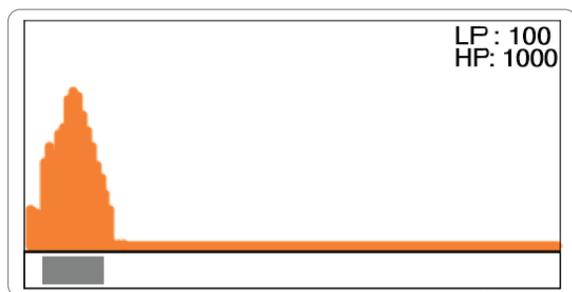
INFORMATION ON THE MAIN SCREEN

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 constant noise level, used by the operator to find the exact point of the leak. ***This is not to be confused with a maximum level. External noise could cause higher peaks, but those do not represent the constant noise produced by a water leak.***



EXPLODED GRAPH

On the main screen, there is a live graphic analysis of the captured sound that appears as an exploded view. The graph displays the intensity of the sound from low to high, with frequency range levels from left to right. This analysis helps the user choose the most effective filter to reduce any unwanted noise during operation. There is a gray bar under the graph, that represents the enabled frequencies defined by the low and high filters.



FILTERS

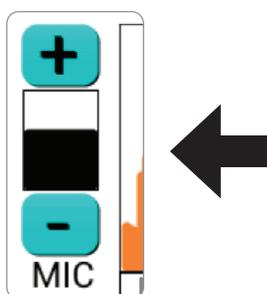
The AquaTrac™300 electronic geophone allows infinite combinations of filters. Generally, in the case of tubes made of hard material, such as cast iron, the tendency is to have the sound at a high frequency, and in tubes made of soft material, such as PVC, the sound is most likely to be found at a low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



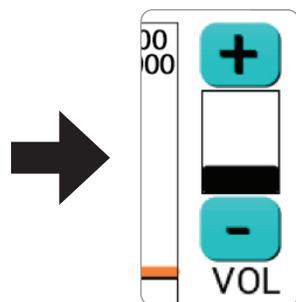
MICROPHONE'S SENSITIVITY

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 dB 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.



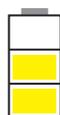
Trigger The trigger control feature enables the user to turn on or off the external handheld trigger. This is a safety precaution to prevent accidental activation of the trigger.

BATTERY CHARGE INDICATOR

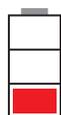
Gives the user a readout of the unit's remaining charge by percentages. 4 charge indicators:



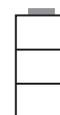
76% to 100%



26% to 75%



06% to 25%



Charge below 5%

AUDIO FREQUENCY FILTERS

ABOUT THE FILTERS

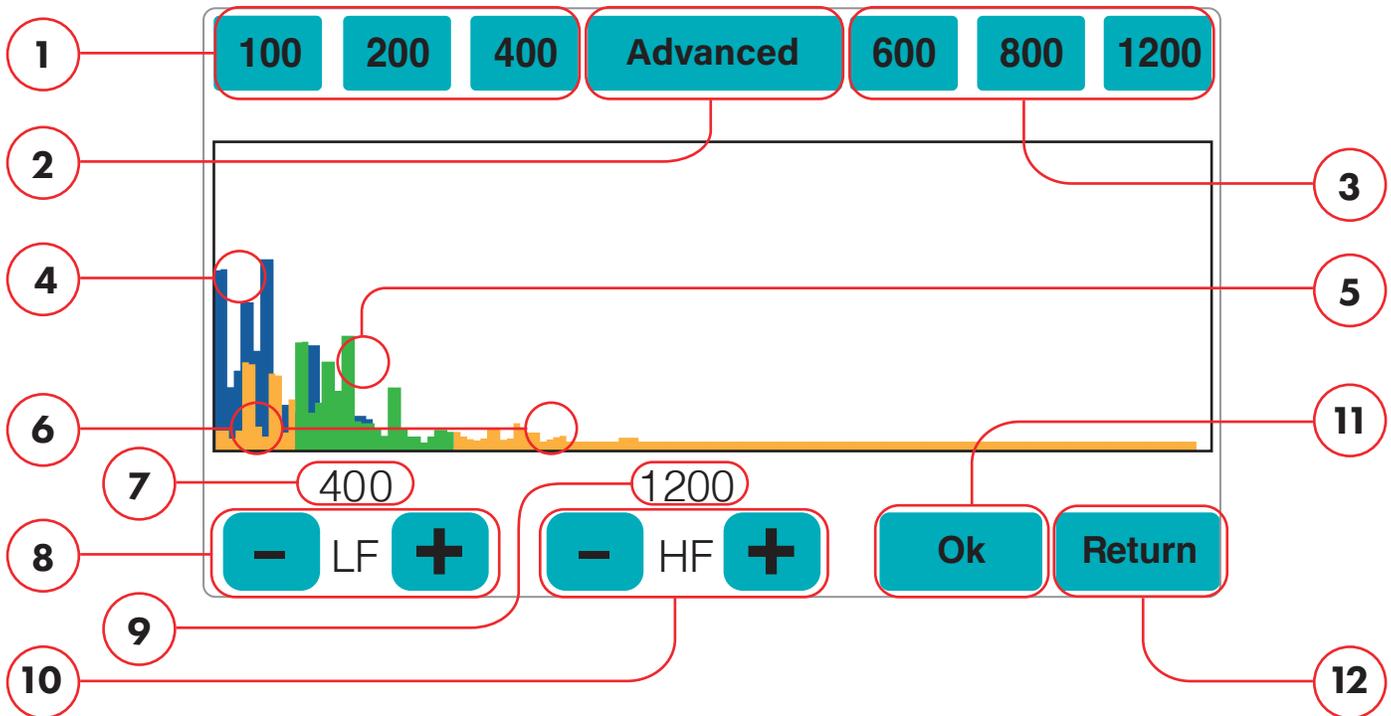
Audio filters are circuits that enhance or reduce specific frequency components. They aid in removing unwanted noise from the audio signal, resulting in better audio quality. Additionally, filters are crucial in detecting water leaks accurately and reducing the time it takes to locate them.

FILTERS SCREEN

When on the filters screen, the user can select predetermined filters for low and high frequencies and also make custom adjustments to either side of the frequency (low or high). When the filters are applied, the noise from the frequencies outside of the low and high parameters get instantly reduced, and the gain for the area inside of parameters is improved, providing accurate sampling of the sound and enabling timely detection of any leaks.

Moreover, the filters screen is interactive and supports multi-touch gestures, enabling the user to make filter selections by pinching the screen.

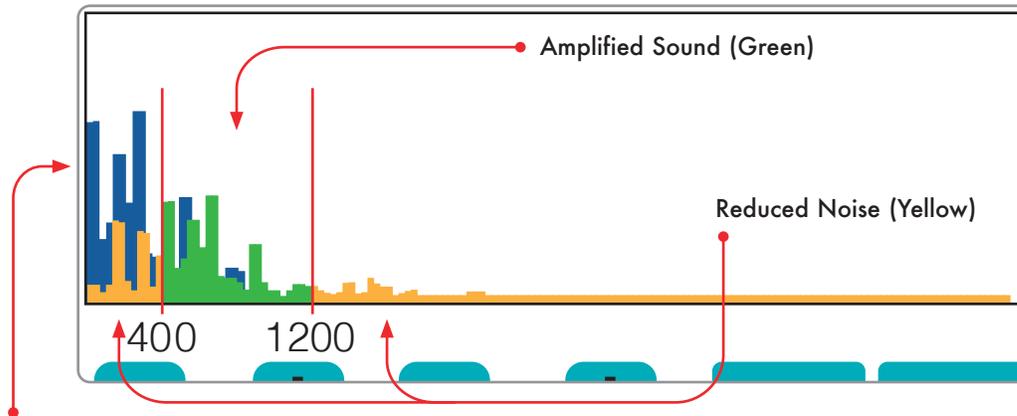
AUDIO FREQUENCY FILTERS



- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Low frequency predetermined filters (choose 100Hz - 200Hz - 400Hz) 2. Basic/Advance filtering system 3. High frequency predetermined filters (choose 600Hz - 800Hz - 1200Hz) 4. Blue: Advanced filtration system especially for leaks that generate little noise and in places with greater external noise (see page 13) 5. Green: Amplified sound | <ol style="list-style-type: none"> 6. Yellow: Reduced sound 7. Currently selected low frequency filter 8. Custom low frequency filters (LF) manually increase or decrease the filter value in Hz 9. Currently selected high frequency filter 10. Custom high frequency filters (HF) manually increase or decrease the filter value in Hz 11. Saves your selection and returns to the main screen 12. Returns to the main screen without saving any changes |
|---|---|

ANALYZING THE FILTER'S MAIN GRAPH

The graph in the middle presents the user with a vast amount of information on the amplified and reduced noise.

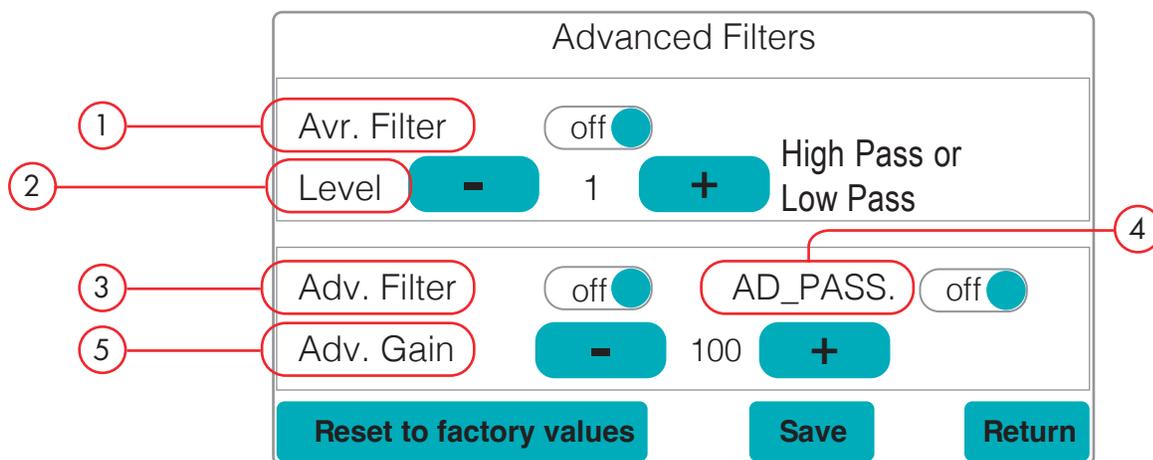


When using **advanced** filters, extra digital filters are applied along with an amplification of the sound in the green band. This alters the audio levels and highlights the sounds heard. The improved graph is displayed in blue on the screen, but the user will only notice the difference within the Low and High parameters. Adjust the Advanced Gain sensitivity by going into the system's configuration, through the main screen CONFIG access.

NOTE: Please use this screen only as a last resort. It is designed to apply higher digital filters to the frequencies. Most situations encountered in the field can be resolved by adjusting the normal filters on the main filter screen. These advanced features are rarely used in conventional Water Leak Detection and are intended for audio professionals to have additional control over the sounds being collected.

ADVANCED FILTERS CONFIGURATION

Custom configuration of acoustic filters involves adjusting their parameters to optimize the detector's performance for the specific environment in which it's deployed. This customization is necessary because the acoustic properties of different environments (e.g., residential buildings, industrial facilities) can vary significantly, leading to variations in background noise levels, reverberations, and other acoustic factors.



1. Avr. Filter

When looking for a water leak, professionals listen into a pipe to identify the specific group of frequencies that the sound of the leak produces. This sound is made up of several frequencies, some of which are easier to identify than others. The Avr. Filter, also known as the Average Frequency Filter, helps to isolate and amplify those common/average frequencies from all the other groups of frequencies. This results in a final filtered sound that is played onto the headphones, making it easier for the professional to identify the leak.

Below are some explanations about the different filters and advanced filter settings available on AquaTrac300:

2. Level 1 (Low-pass):

This filter type allows frequencies that are below a certain cutoff frequency to pass through while attenuating higher frequencies.

2. Level 2 (High-pass):

This filter type allows frequencies that are above a certain cutoff frequency to pass through while attenuating lower frequencies.

3. Adv. Filter:

When this feature is activated, it applies an advanced filter to the sound that is collected by the microphone. It uses all the adjustments selected on this screen, including the "Level" setting to filter out low or high frequencies, and applies the average filter to reproduce only the adjusted sound into the headphones.

4. Ad_Pass:

This toggle switch allows you to activate or deactivate the Level option.

5. Adv. Gain:

This setting adjusts the amount of advanced filtering that is applied to the sound. You can adjust the value from 100 to 300. Set it to the highest value to apply the maximum filtering capabilities of the AquaTrac300.

Once you have made the desired adjustments, **Save** your values and **Return** to the "Filters" screen.

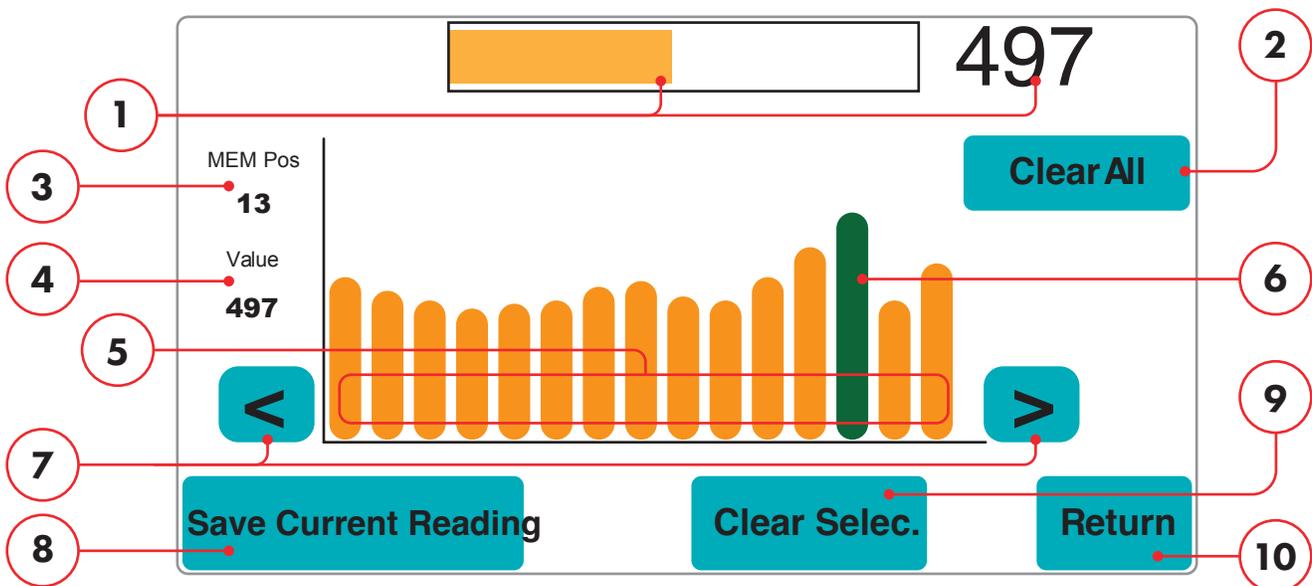
WHY TO USE THE AQUATRAC™300 MEMORY

In order to successfully pinpoint the location of a water leak, it is essential to gather information from multiple points along the pipe. By closely analyzing the noise levels at each of these points, one can identify the section with the highest and most continuous noise.

Throughout this process, it is important to remain vigilant for any loud noise peaks that may arise. However, the most critical piece of information is the constant noise level, also known as the "frequencies' minimum constant value," which can be saved to the device memory.

The system has the capacity to store up to 15 of these values, starting with position 0. they can then be used to create a graph. This graph will allow you to determine which section of the pipe is experiencing the highest levels of constant noise, ultimately enabling you to locate the potential source of the water leak.

The screen below is an example:



- | | |
|---|---|
| <ol style="list-style-type: none"> 1. frequencies' minimum "constant" value
Live feed from the microphone 2. Clear all the memory 3. Current memory position 4. Current Value 5. Graph with 15 entries | <ol style="list-style-type: none"> 6. Current memory position graph different color 7. Move to the previous or next memory position 8. Saves the current live value and moves to the next position 9. Clear the selected memory position 10. Return to the main screen |
|---|---|

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 the same depth and become shallower until reaching the customer's easel, this causes the signal strength to unevenly vary from point to point.

ADVANCE SETTINGS

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

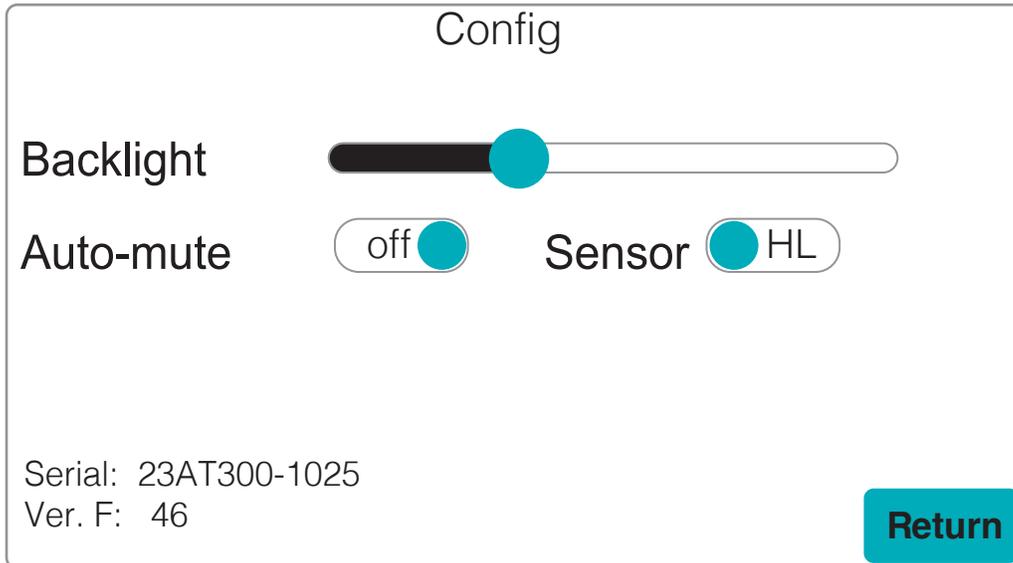
The level of brightness on the AquaTrac™300 device affects its battery life directly. When the backlight is set to a minimum, the device has a lifespan of around 20 hours. However, when it is set to the maximum, it only lasts for a maximum of 7 hours. Rest assured, the device's display can be read with ease even in direct sunlight by adjusting the brightness accordingly.

Auto-mute

The AquaTrac™300 has a safety feature in its electronic circuit which reduces loud noises that could harm the operator's hearing. Along with this feature, the equipment has an auto-mute function that turns off the audio if there are very loud sounds and keeps it off until the noise disappears, regardless of the source or sound control. The auto-mute is not activated by default but can be enabled through the menu. When the auto-mute is on, the equipment will be completely muted during loud sounds and will only enable sound again when the noise returns to safe levels.

Sensor (HL)

If you own an older model of AquaTrac™, you can use this feature to connect an older microphone or sensor. With this switch on, the unit will automatically adjust the input audio to compensate for the older configuration. To prevent incorrect configuration, this option is password protected. AquaTrac™300 users do not have to worry about this feature. If you want to use your older microphone with this unit, please contact SubSurface Instruments, Inc. to get access to this feature.



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 4-6 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 repair service department can be contacted by phone, e-mail, or through our website.

Telephone: 920.347.1788 or 855.422.6346
E-mail: 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 quote you with an estimate of repairs outside of warranty.

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:

For optimal handling and to prevent any issues with the warranty, kindly place the equipment that requires repair in either its original shipping box or a similarly sturdy container. Fill all sides of the container with appropriate packing material and ensure it is securely sealed with strong tape. It is also important to label the container as "**Fragile Electronic Equipment**" to indicate its delicate nature.

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

AQUATRAC™300
COMPLETE SYSTEM



WHAT'S INCLUDED

**AQUA
TRAC**₃₀₀



Hard IP68 Certified, shock proof
ABS custom carrying case.



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.



SubSurface Instruments, Inc.

1230 Flight Way Drive

De Pere, WI 54115 USA

855.422.6346 toll free

info@ssilocators.com

www.ssilocators.com