SonicSens Installation Guide

Version 2

Warning: This manual contains important safety and operating information.
Please read, understand and follow the instructions in the manual.

Contents

1. SONICSENS KEY POINTS

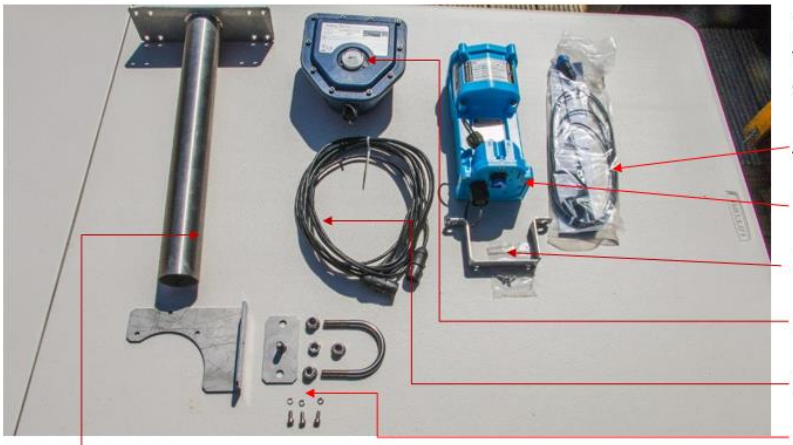
This guide specifically deals with the installation of SonicSens in an ATEX environment using an Intelligens logger. SonicSens can be used in non ATEX applications where an alternate logger may be used, however, the set up would be as described.

- Rigid plastic case
- Stainless steel mounting bracket
- Bubble spirit level to ease installation
- Military connector for cable to logger
- 5 year battery life
- Temperature Compensated
- 2 different models 2.5m and 5m range

2. FEATURES

- Internal batteries > 5 year battery life.
- Very low power consumption.
- ATEX - Intrinsically Safe
- Range up to 5m (Resolution +/- 1mm)
- Bubble spirit level to ease installation
- Digital serial output / No Calibration required

3. EQUIPMENT OVERVIEW



In this picture we can see the main install components.

Antenna

Logger

Logger Bracket

SonicSens

Sonic to Logger Cable

Sonic install Brackets

Sonic Install Pole Mount

PLEASE NOTE YOUR SUPPLIED BRACKET MAY DIFFER TO THE ABOVE

4. Connecting to the SonicSens

The SonicSens is connected to a PC via a logger and a communication cable, part number COMMS USB/IS shown below.

5. SONICSENS INSTALLATION GUIDELINES

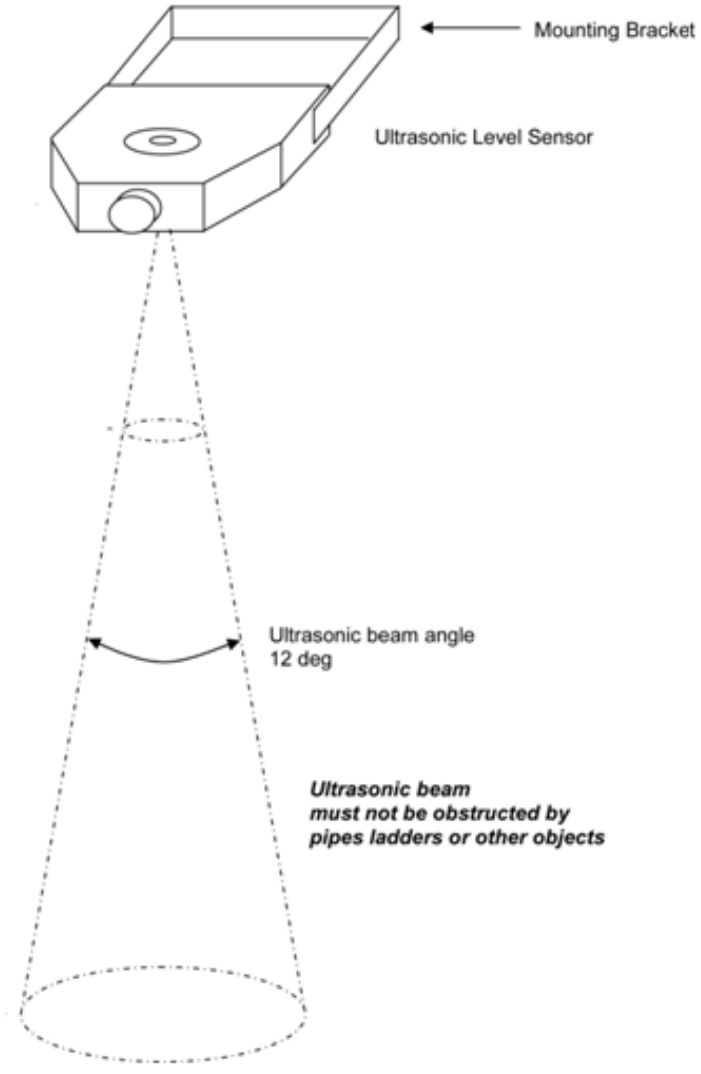
It is always advised to do a survey of the potential site prior to ordering equipment, as cable lengths etc can be stated on the order. The initial survey also allows you to check locations where the logger, antenna and the SonicSens is to be sited.

SonicSens location is important, as the ultrasonic wave requires an uninterrupted beam and level surface to bounce off.

This means the ultrasonic signal must have no obstacles in its path and the surface that it has to be bounced off of must be level and non-turbulent. If there is benching or curved channels the signal will not be returned to the sensor.

Ultrasonic Beam width has also to be taken into account.
Before committing to a complete install there are some quick tests that can be carried out to determine if the Ultrasonic location is good or not.

6. SONICSENS BEAM ANGLE

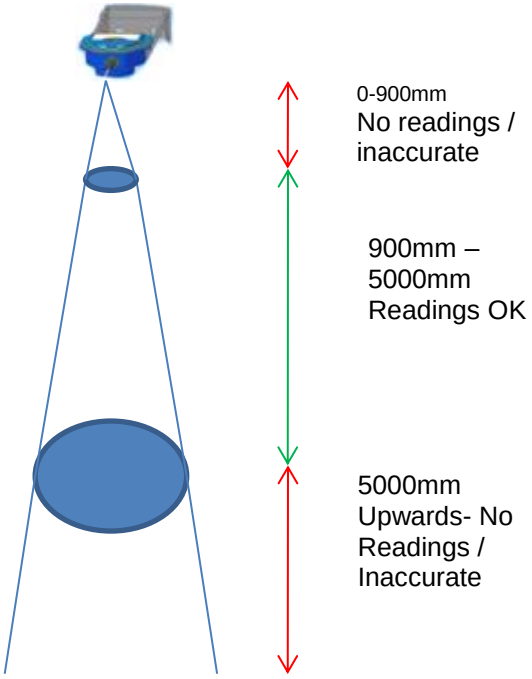


7. SONIC DEADBANDS EXPLAINED

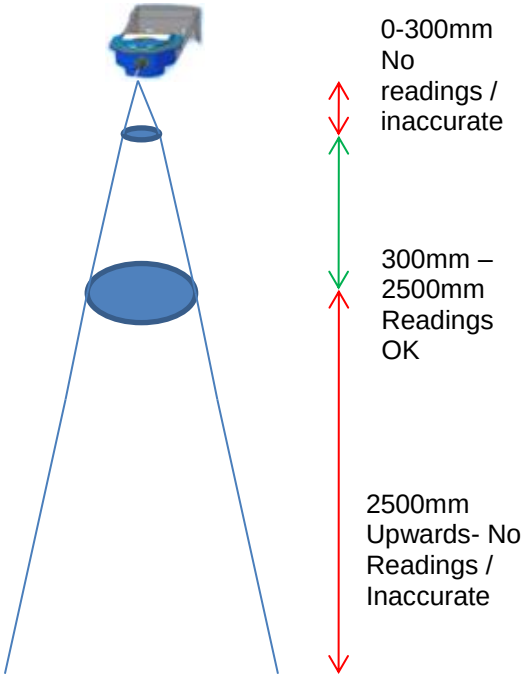
Two types of Ultrasonic Sonicsens are available. A 5mts maximum range and a 2.5mts maximum range. Each head has its own measuring range with an inner and outer deadband where measurements will not be taken or may be measured inaccurately.

On the 5mts head we have a usable range of 900mm to 5000mm, and on the 2.5mts head we have a usable range of 300mm to 2500mm.

5mts Range Ultrasonic

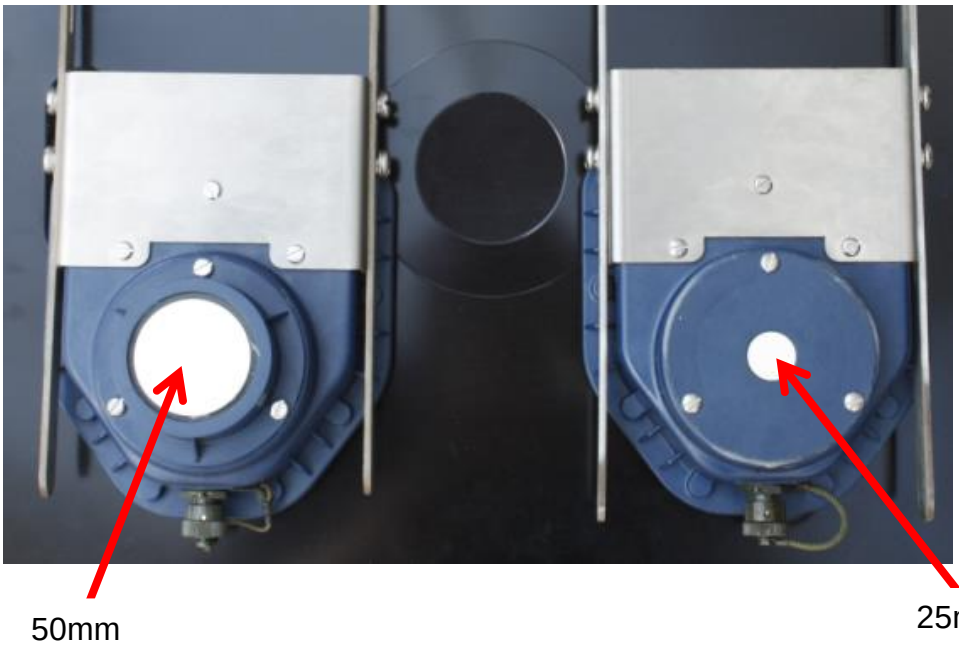


2.5mts Range Ultrasonic



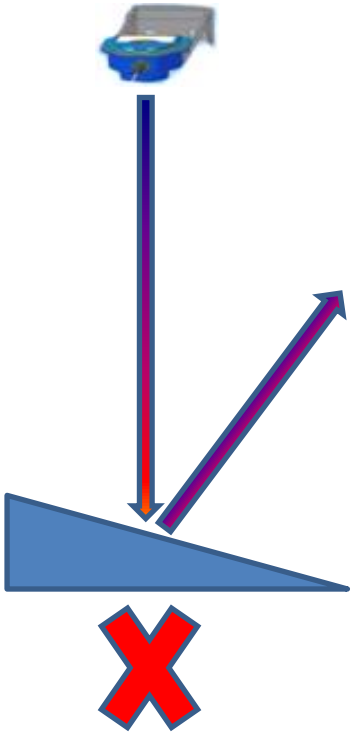
8. SONICSENS TYPE RECOGNITION

- The 5mts and 2.5mts ultrasonic can be easily recognised by the part number, and visually even more easily.
- Part number for the 5mts head is SONIC/5/IS
- Part Number for the 2.5mts head is SONIC/2.5/IS
- An easier way to quickly recognise the differences is by looking at the underside of the ultrasonic.
- The underside of the 5mts head has a large white disc (50mm), whilst the 2.5mts has a small white disc (25mm) as shown below.

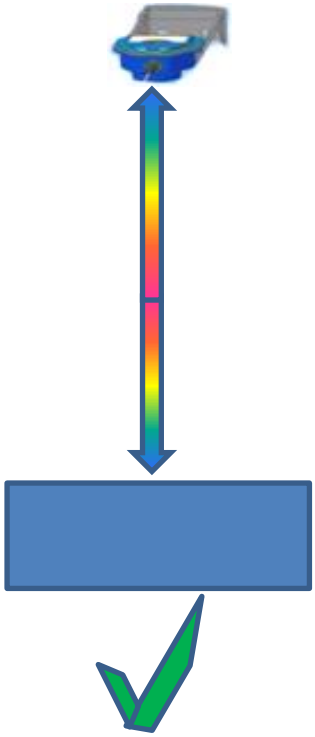


Other ways to recognise the difference is the longer sensor head on the 5mts head as shown below

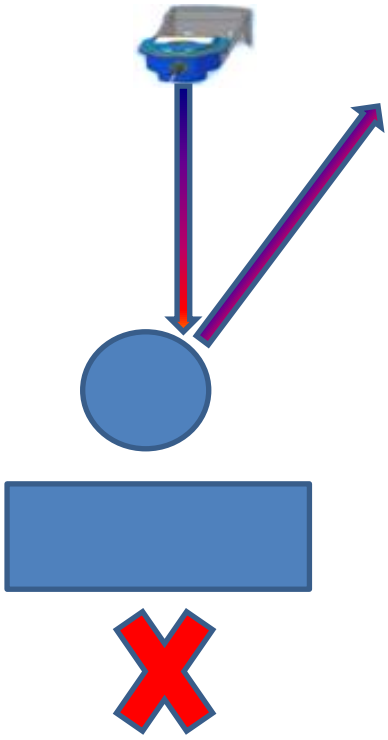
9. PROBLEMS WITH OBSTRUCTIONS



SonicSens is looking at a sloping (Benched) surface causing the signal to bounce away

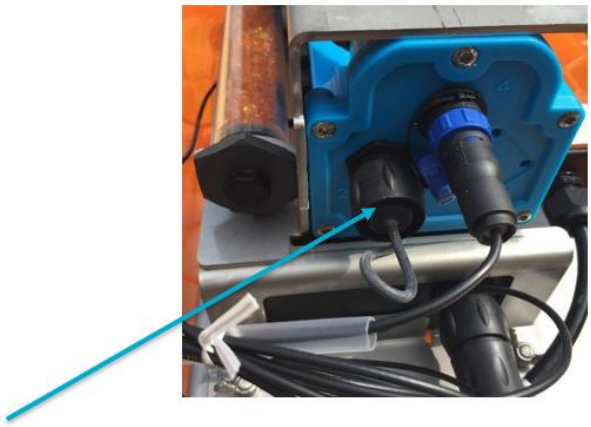


100% The signal has a good flat surface to bounce straight back from



The signal has struck an object in its path causing the signal to bounce away

10. LAUNCHING THE APPLICATION

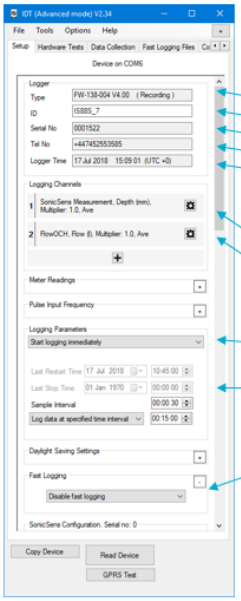


Plug the USB of the programming connector to your laptop and the Mil spec connector to this port of the logger

Simply connect the sonic to the logger with the supplied cable and then connect to the logger with your programming cable.
Then launch the Installation and Diagnostic Tool (IDT) Program. Press the windows start button, then select “All Programs”, Then select the “HWM” folder, then the “IDT” folder and finally the IDT program icon. This will open the program displayed below.

Click the button labelled “Read Device” – the logger will now be interrogated as to its current configuration. Be patient as it may take a few minutes.

You will get a message shown above telling you the device has been successfully read. If you get an error message, wait a few minutes before trying to read the device again. Click the OK button to proceed.



The options within the IDT software are;

This is the logger type and firmware version as well as its logging status
This is where you can insert a unique 7 digit ID for your device
Check this serial number matches what is printed on the label of the logger
Confirm this telephone number matches what is printed on the label of the logger
This is the current date and time stored within the logger. If this is incorrect, the current date and time will be automatically updated by the IDT.

On this particular type of set up we will be recording 2 channels of information.

Channel 1 is recording the depth of fluid measured by the SonicSens
Channel 2 is used to calculate flow derived from the depth measurement

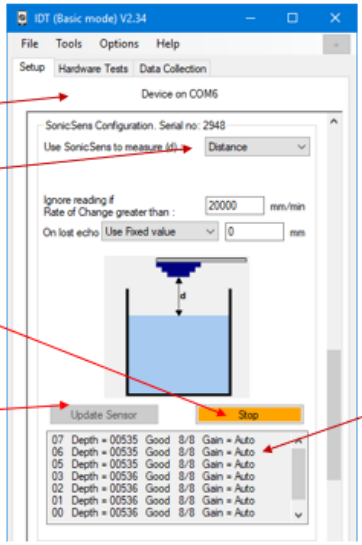
Make sure this box is set to “start logging immediately” – if not, then change it.

Make sure both of these boxes are set as specified in the install report sheet.

Ignore the fast logging section as this should be disabled.

11. THE POSITION MOUNTING TEST

It is advised that, prior to doing a permanent install, a handheld test of the unit is done to check that good return signal “bounce” is obtained at the proposed install location. This is easily done with IDT.



Scroll down the page until you see this section in the picture to the right.

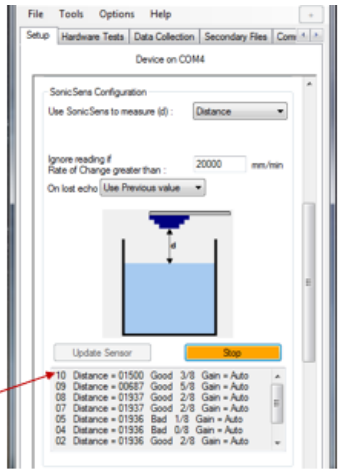
Make sure the SonicSens is set to distance.

Hold the SonicSens in the proposed install location and click the Measure button

A good reflection will give you a display with between 5/8 and 8/8 valid samples and a good result. The distance can be verified by measurement

A Poor reflection will give 0/8

ONCE FINISHED TESTING HIT THE STOP BUTTON TO STOP THE SONIC



Another example of a poor location. The SonicSens has only received 3 out of the 8 samples fired. The reading is accurate due to internal algorithms but it is not recommend to use this install location as any waves on the fluid may cause further loss of samples and potentially no readings at all at a later date.

12. INSTALLING THE SONICSENS

After the best location for the SonicSens has been found, mark it. Then proceed to drill and fix it to this location.

It is recommended to remove the rear bracket and mount it first, using a spirit level to make sure it is kept level – this will aid in levelling the remaining pieces.

When fixing the unit to the wall it is recommended that heavy duty fixings are used to remove any possibility of movement after it is installed.

Now build the full unit. Repeat the position mounting test described previously, to confirm the install is correct.

13. Using the Software

13.1. Sensor Set up and Channel Description

A number of installation configurations can be selected for the SonicSens.

The Options available are as follows:

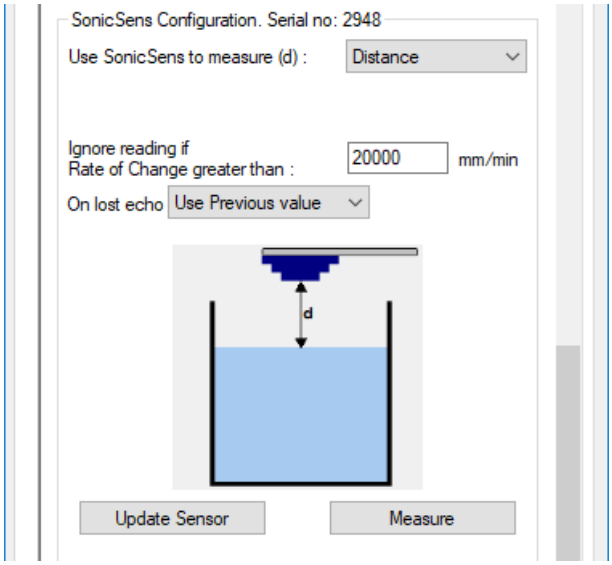
- Measure distance
- Measure depth
- Rectangular weir
- Constricted rectangular weir
- V-Notch Weir

In each case you need to make your selection, enter information (if required) and select the ‘Update Sensor’ button to configure the SonicSens head.

For some instances you will need to configure an additional setting in the Open Channel Flow Set-up panel.

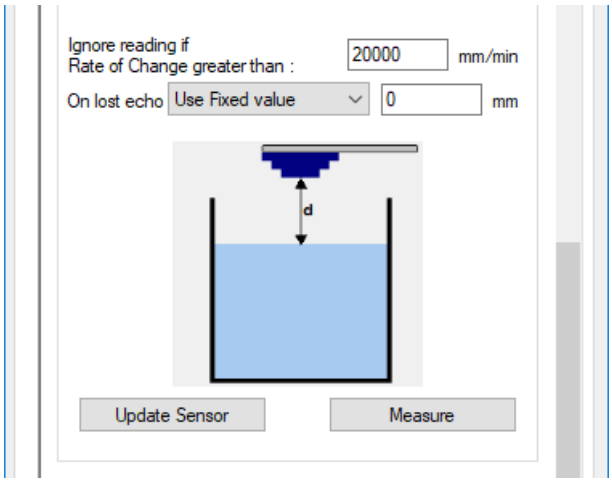
13.2 DISTANCE MEASUREMENT

This enables the SonicSens to measure the distance down to the surface below. In the screenshot below the measured distance is depicted by “d”.



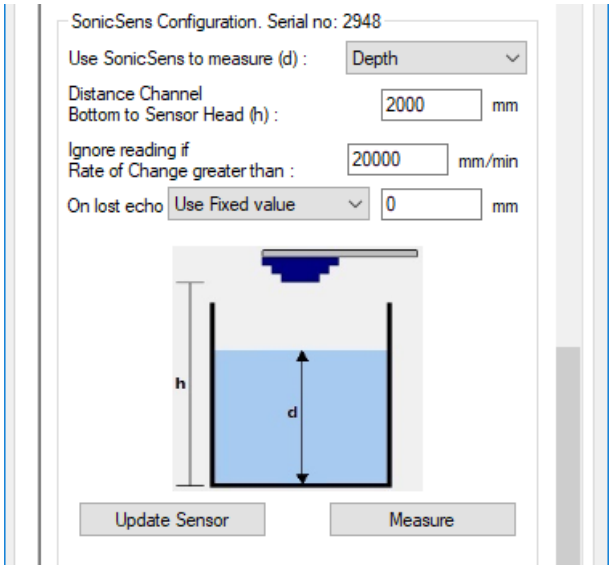
A rate of change greater than 20000mm/min is set as a default value. This is editable; however, the default value is recommended.

Two options exist to determine the response of the SonicSens when an echo is lost. Either the previous value or a user defined fixed value can be used as shown below.



13.3 DEPTH MEASUREMENT

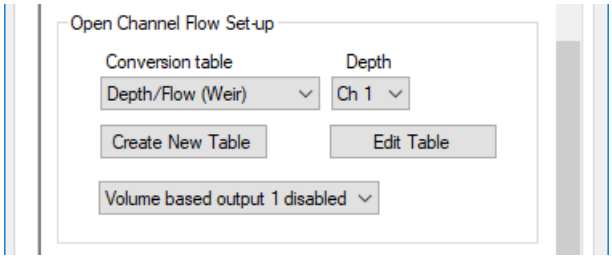
This enables the SonicSens to measure the depth from the bottom of the channel to the surface of the water. In the screenshot below the measured distance is depicted by “d”.



In this mode the distance from the bottom of the channel to the SonicSens head must be known. The ignore rate of change and lost echo options are as mentioned previously.

13.4 WEIR MEASUREMENT

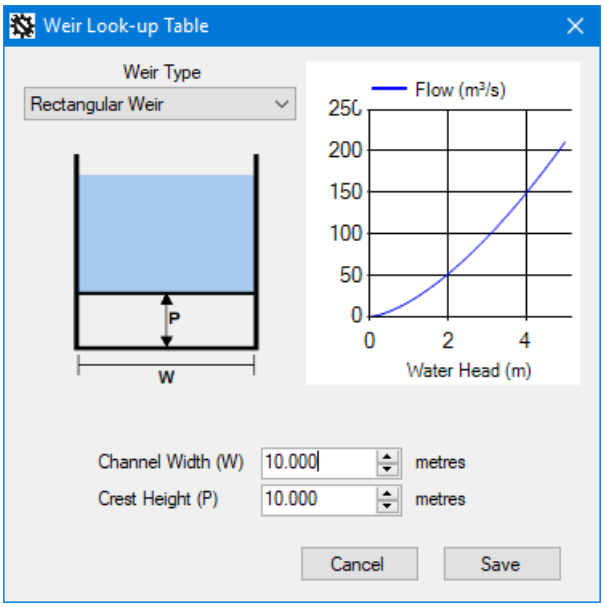
With the SonicSens set to measure Depth as described previously, additional settings can be configured within the Open Channel Flow Set-up panel.



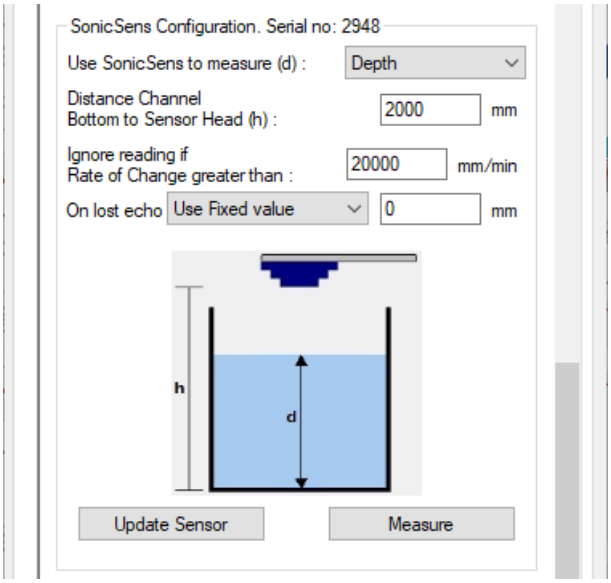
In order to enter the details of the weir and allow the system to convert the depth measurement into a flow reading over the weir in cubic meters per second ensure the option for Depth/Flow (Weir) is selected, as shown above. This is limited to 2 decimal places or 100 litres per sec minimum.

13.5 RECTANGULAR WEIR

Click on the Create New Table button and the window below will open. Select rectangular Weir from the drop-down menu.



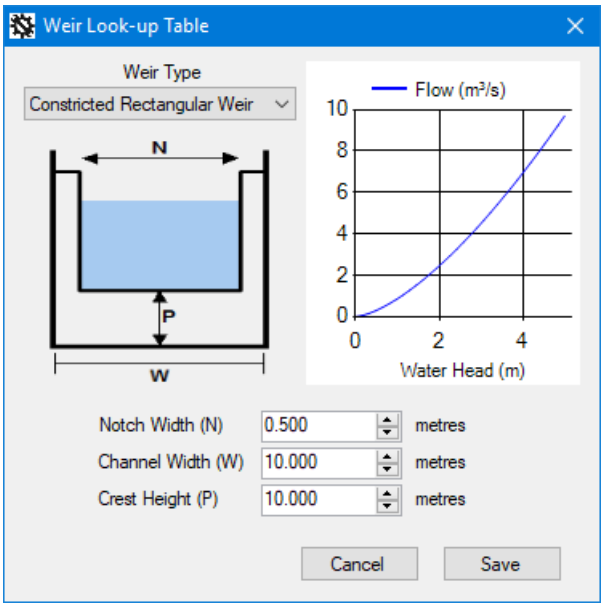
The height of the crest (top) of the weir channel ‘p’ and the width of the weir need to be measured and the details entered.
Then click Save.



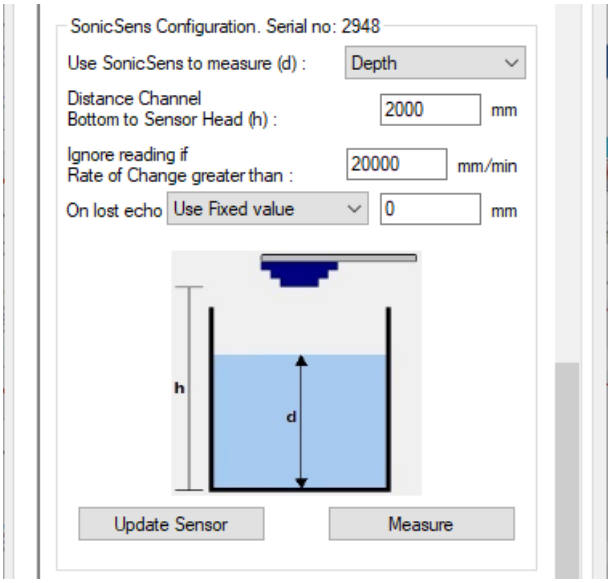
Click Update Sensor.

13.6 CONSTRICTED RECTANGULAR WEIR

This is set in the same way as the rectangular weir, however, Constricted Rectangular Weir needs to be selected from the drop-down menu.



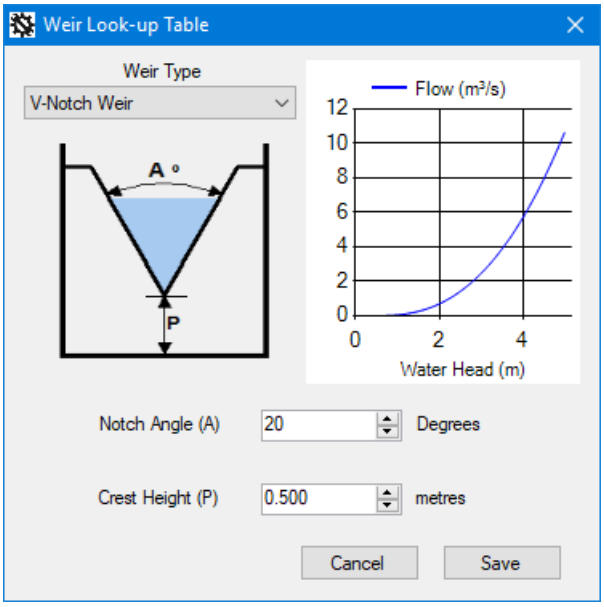
As before, take measurements of the crest height and weir width, enter these into the table along with the width of the weir notch.
Then click Save.



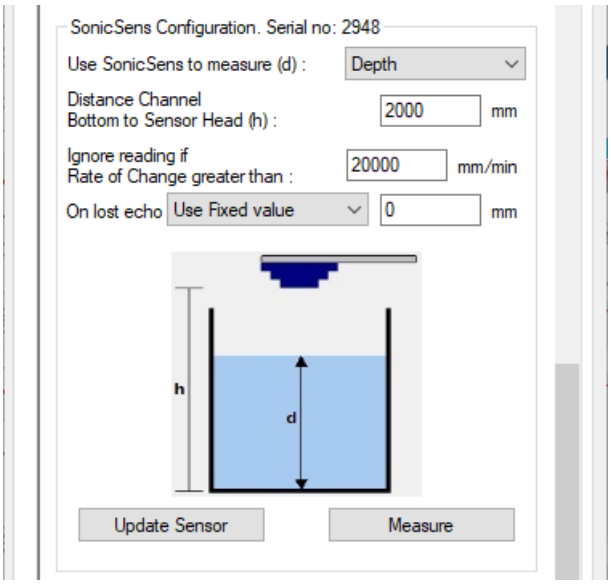
Click Update Sensor.

13.7 V – NOTCH WEIR

This is set in the same way as the previous weirs, however, V-Notch Weir needs to be selected from the drop-down menu.



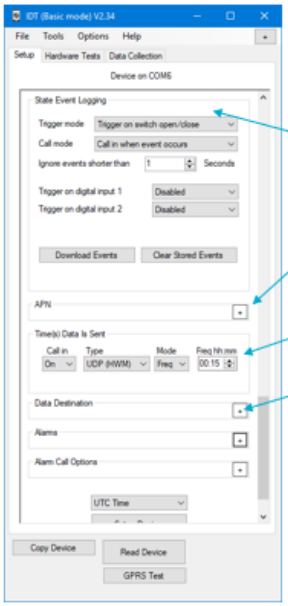
The angle of the notch needs to be known and input into the table along with the crest height.
Then click Save.



Click Update Sensor.

14. PROGRAMMING THE DATA LOGGER

Connect the logger to the PC as previously described.

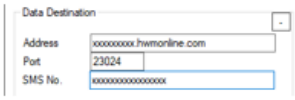


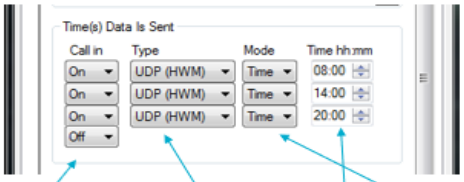
Ignore this section as it is not required with SonicSens.

Open this box and make sure it is set as shown here

Time data is sent . The logger needs programming when and how often the data stored is sent in

Open this box and make sure it is set with the server address and SMS No which can be obtained from the system administrator



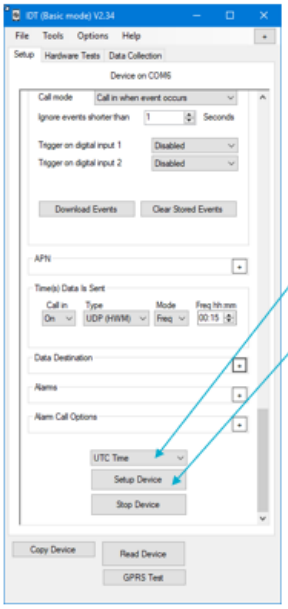


Select one of the buttons below call in that says “OFF” and change it to “ON”. Do this until you have the required amount of line set to “ON” as shown above.

Type must be set to UDP (HWM) and the mode set to time.

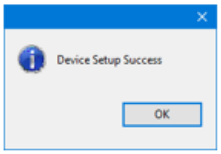
The times can be edited to enable calls to be made at multiple pre-set times.

This example programmes the logger to send its data 3 times per day at the specified times to the HWM datagate server

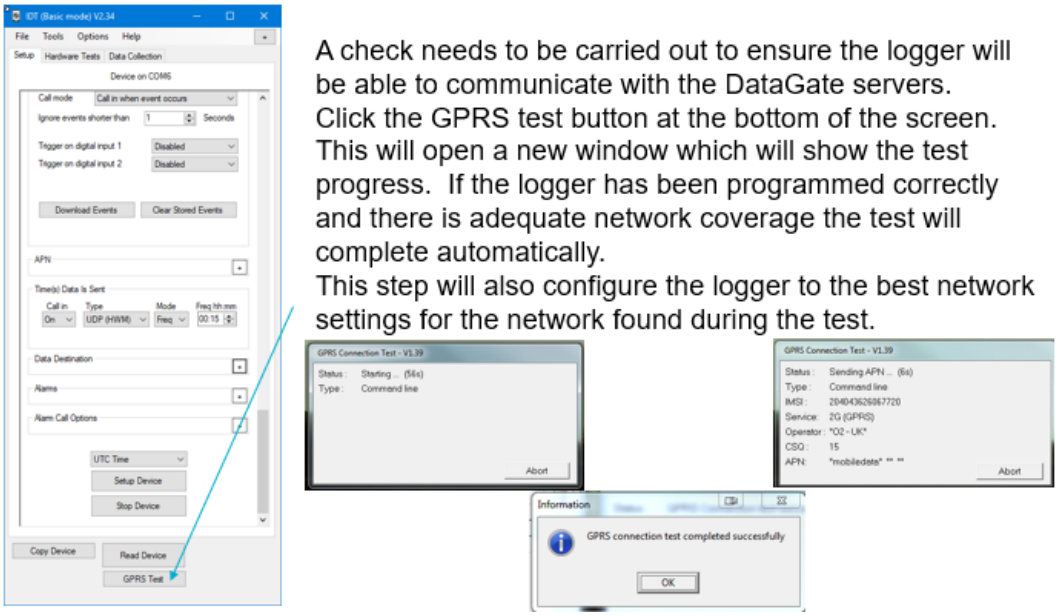


Ensure UTC time is displayed here

Click Setup Device. You will get a device setup successfully message if all Is ok

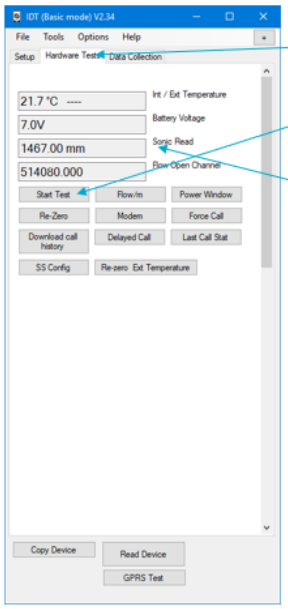


15. SIGNAL TEST



A check needs to be carried out to ensure the logger will be able to communicate with the DataGate servers.
Click the GPRS test button at the bottom of the screen. This will open a new window which will show the test progress. If the logger has been programmed correctly and there is adequate network coverage the test will complete automatically.
This step will also configure the logger to the best network settings for the network found during the test.

16. HARDWARE TEST



Select the Hardware Test Tab

Click Start Test

The SonicSens “live” reading along with other logger hardware readings can be viewed and confirmed.

SIMPLIFIED DECLARATION OF CONFORMITY

This simplified EU declaration of conformity referred to in article 10(9) shall be provided as follows:

Hereby, HWM Ltd declares that the radio equipment type transceiver is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at www.hwmglobal.com

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