Sensor Access Website

User Guide

Revision A.0

Contents

Welcome to the Sensor Access system

This guide will provide a brief overview of the Sensor Access Website and its menus. The guide is brief because most of the pages in the Sensor Access system include documentation.

Thank you for purchasing a cellular enabled remote sensor unit. Your sensor will automatically connect to the Sensor Access system updating the system with measurements and downloading any new configuration changes you may have added. From the Sensor Access Website you can see the latest measurement, lists of historical measurements, graphs and diagnostic information. To get started you will need to create an account which can be done from our login page.

Sensor Access Website Login

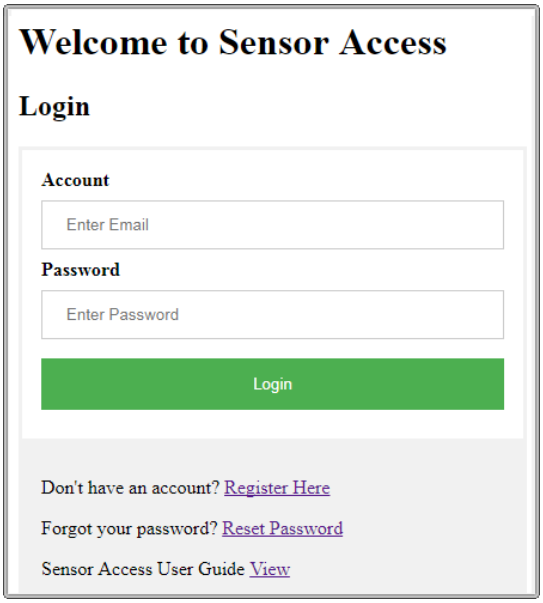

Figure 1 The Sensor Access login page provides access to the Sensor Access system.

To access the Sensor Access Website click here.

To use the Sensor Access Website you must create an account. If you do not have account see the registration section below. To login to the Sensor Access Website enter your email address and your password and click the login button (see Figure 1). Once you have logged in you will be at the main menu. Click here to see an overview of the Website menus, or click here to go the main menu in this document.

Registering (Creating an Account)

You can create an account by clicking on registration link "Register Here" as seen in Figure 1. Clicking the "Register Here" link on the login screen will open the new user registration page. To complete the registration process you will need the Sensor Access Code that came with your sensor.

Password Reset

If you have forgotten your password you can use the "Reset Password" link. An email will be sent with instructions.

Sensor Access User Guide

A copy of this guide is available from the Login page by clicking on the "View" link.

Sensor Access Website Menus

The following diagrams and text will help you navigate through the Sensor Access Website. Figure 2 shows a partial schematic of the Sensor Access Website. The login form has links to the *Registration Form* to create an account, the *Password Reset Form* is available if you forgot your password and the *Main Menu* is the screen you will see after you login.

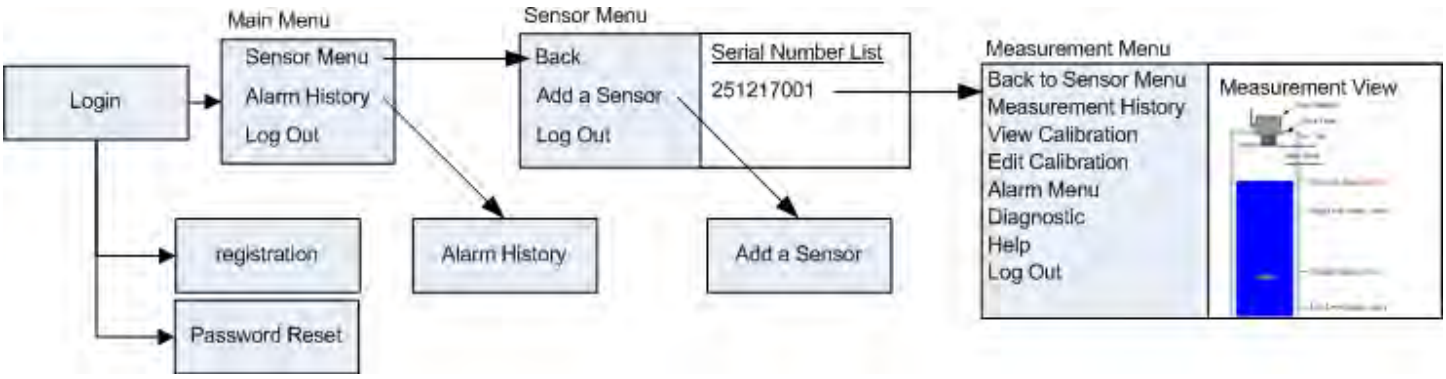

Figure 2 Login Form and Menus

Main Menu

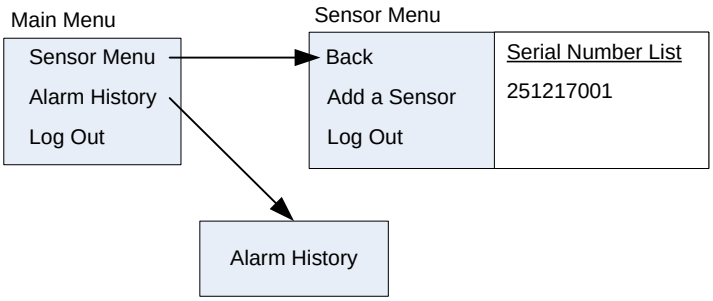

Figure 3 Main menu shown in the upper left provides access to the sensor menu and the alarm history menu.

After you have logged in you will see the "Main Menu" as shown in Figure 3. The top of the tab in your browser window will be titled "Main Menu". From the main menu you can chose to log out, move to the "Sensor Menu" or view "Alarm History".

Sensor Menu

The sensor menu provides access to each of the sensor you have registered to your account. Click this menu if you want to view or add a sensor. (Click here to jump to Sensor Menu)

Alarm History

If you have enabled alarms with any of your sensors and an alarm event has occurred you will be able to view historical alarm events using this menu item.

Log Out

Clicking on Log Out will log you out of the Sensor Access system. You should always click the log out menu item when you are done working with your account.

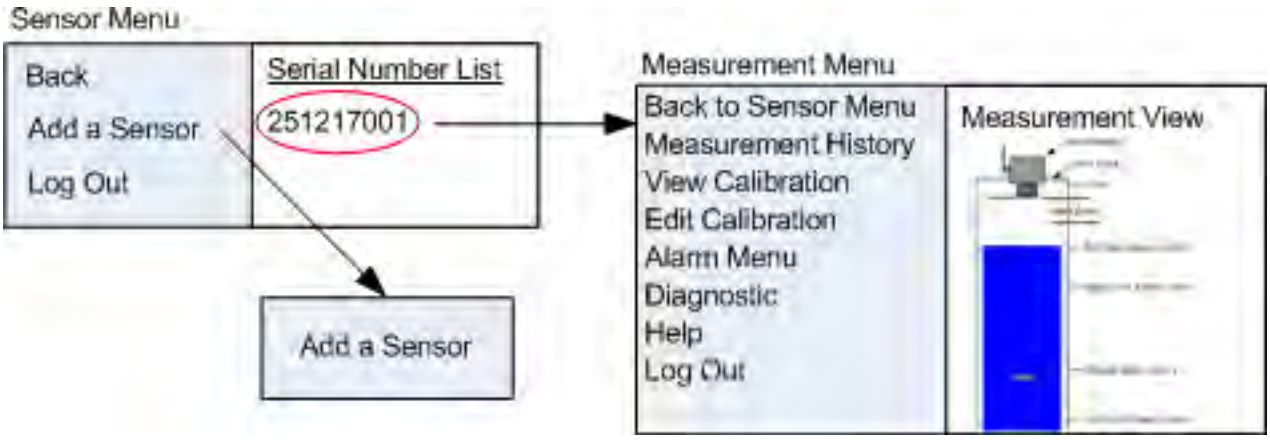

Figure 4 The sensor menu provides access to each of your sensors.

Sensor Menu

From the "Sensor Menu" you can navigate back to the "Main Menu" by clicking the "Back" link (see Figure 4), add another sensor to your account, or click on one of the listed serial numbers to view that sensors measurements and configuration.

Adding a Sensor

If you purchase another sensor you can add it to your account by clicking on the "Add a Sensor" link. The "Add a Sensor" form will request the Sensor Access Code that came with your sensor. Enter the code and click the add sensor button. Your new sensor's serial number will now be listed along with your other sensors. (Note: After adding a sensor, you may need to click the refresh button on your browser to make your new sensor's serial number appear).

Serial Number List

A list of serial numbers registered to your account are shown to the right hand of the sensor menu. The serial numbers shown are clickable links. Clicking on a serial number will take you to the "Measurement Menu" for that serial number.

Measurement Menu

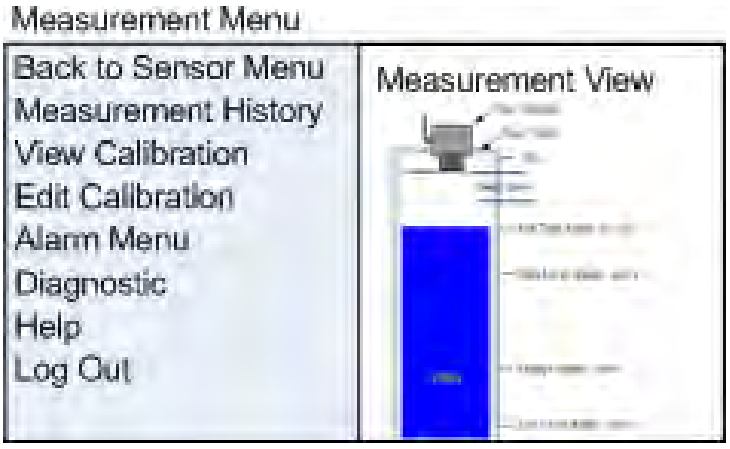

Figure 5 The measurement menu provides all tools you need to configure and use your sensor.

Measurement Menu

The "Measurement Menu" (Figure 5) provides the tools you need to configure your sensor, see the latest measurement and to view historical measurements. The "Measurement Menu" has 6 submenu items listed here, click on a sub menu item for more information.

1. Measurement History
2. View Calibration
3. Edit Calibration
4. Alarm Menu
5. Diagnostic
6. Help

Measurement History

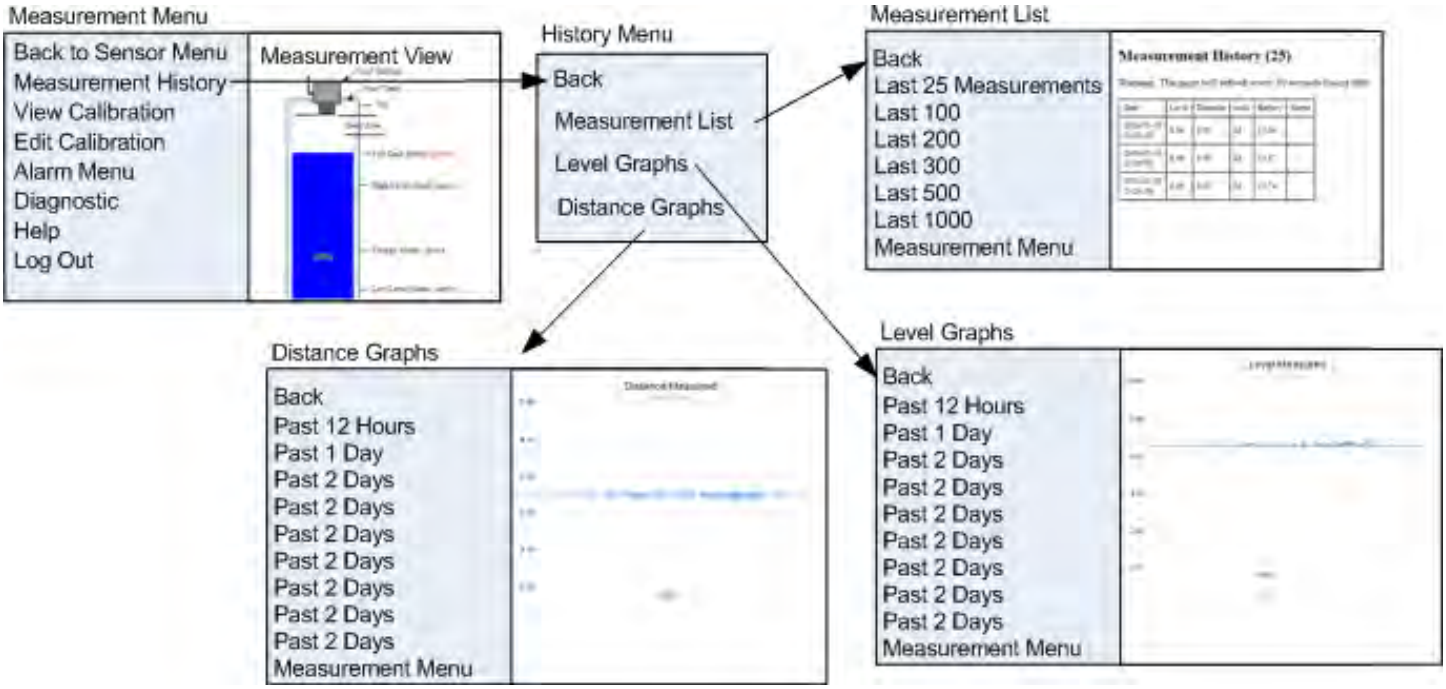

Figure 6 The history menu provides historical measurements in list form or graphs.

History Menu

The history menu items (Figure 6 right side) allow you to view measurement history in one of three formats as show in **Error! Reference source not found.**. The measurement list provides historical measurements data formatted in a tabular layout. There are two options to view historical data as a graph based on distance or level.

Level Graphs

The "level" graph shows the level of the material in the tank measured from the bottom of the tank. The "level" value is a calculated value based on the tank size. For accurate level information see the "Level and Distance Graphs" section below.

Distance Graphs

The distance graph shows the distance of the material in the tank as measured from the sensor. For accurate distance information see the "Level and Distance Graphs" section below.

Level and Distance Graphs

When viewing a graph you can use your mouse to click on the graph line to see the actual reading. For an accurate level calculations and percent full calculations you should use the "set tank range" form, found in "Calibration Menu" or the "sensor range" form found in the "Alarm Menu" to setup your tank size parameters.

View Calibration

The calibration view page shows your sensor current configuration (Figure 7). The full tank and empty tank distances can be configured to match your application. Please note that changes made to the sensors configuration will not appear until the sensor connects to the access server and downloads the changes.

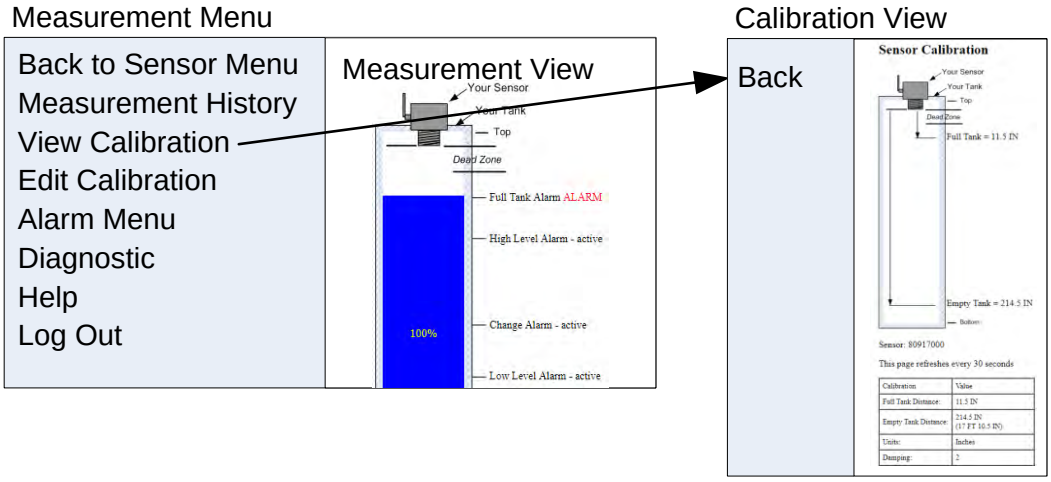

Figure 7 The calibration view page shows the current configuration of your sensor.

Edit Calibration

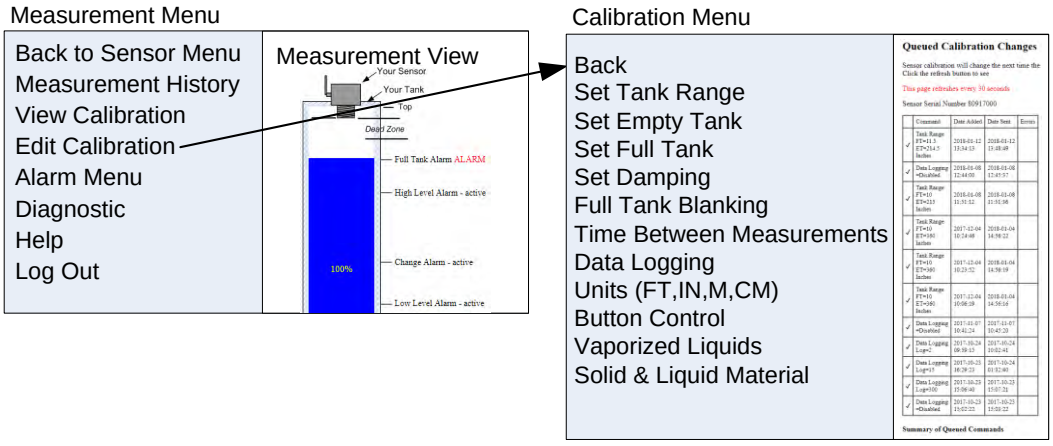

Figure 8 Sensor configuration can be changed at anytime using the Edit Calibration menu.

Clicking on the Edit Calibration menu item will display the Calibration menu. The calibration menu will allow you to change the configuration of your sensor. Click here to move to the Calibration Section of this guide.

Alarm Menu

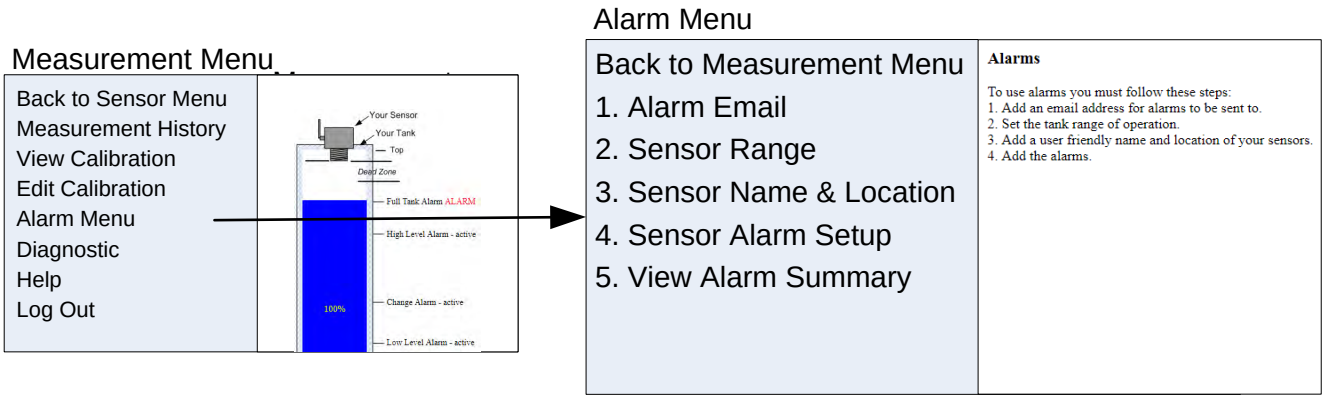

Figure 9 The Sensor Access system allows you to define alarm levels and to receive an alarm email when an alarm condition occurs.

The alarm menu (Figure 9) has menus to setup an alarm email address, configure the sensor range (tank size), defined the high and low levels and to activate a change alarm. To learn more about alarms click here to jump to the Alarm Section of this guide.

Diagnostic

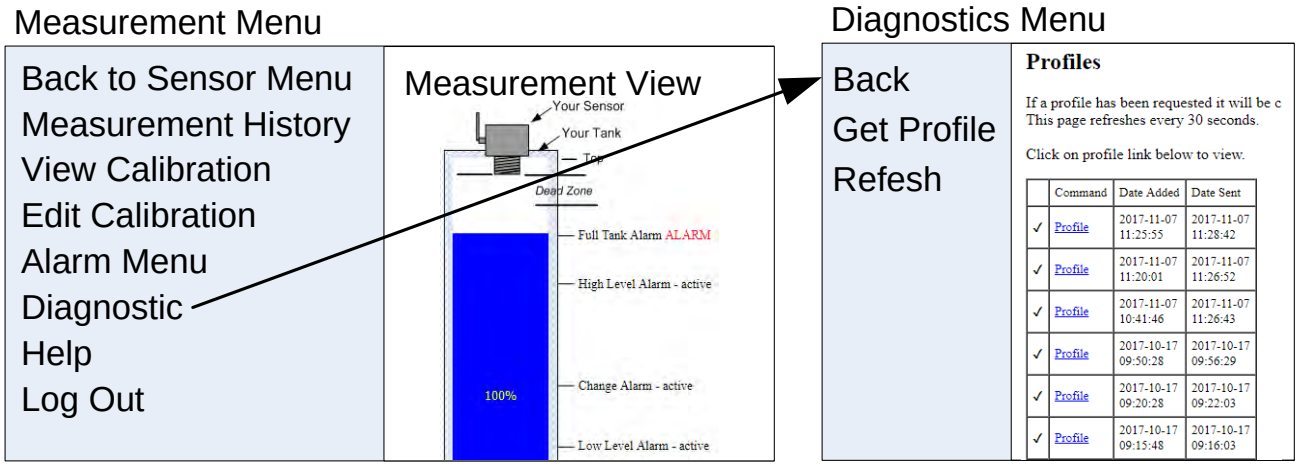

Figure 10 The diagnostic menu is used to collect and view echo profiles.

Your sensor has the ability to collect diagnostic information in the form of an echo profile. An echo profile is a snapshot of the sensor's transmission pulse and the echo marker received. For more information on diagnostics go to the diagnostic's section.

Help

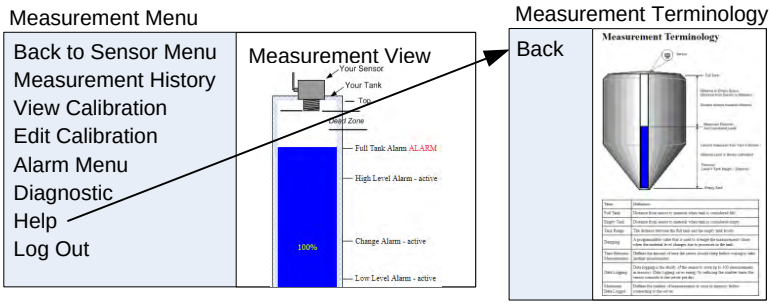

Figure 11 The help menu provides information and definitions for the terminology used with tanks and sensors.

The help menu provides diagrams and definitions for the commonly used sensor and tank terminology.

Alarm Section

Quick Alarm Setup

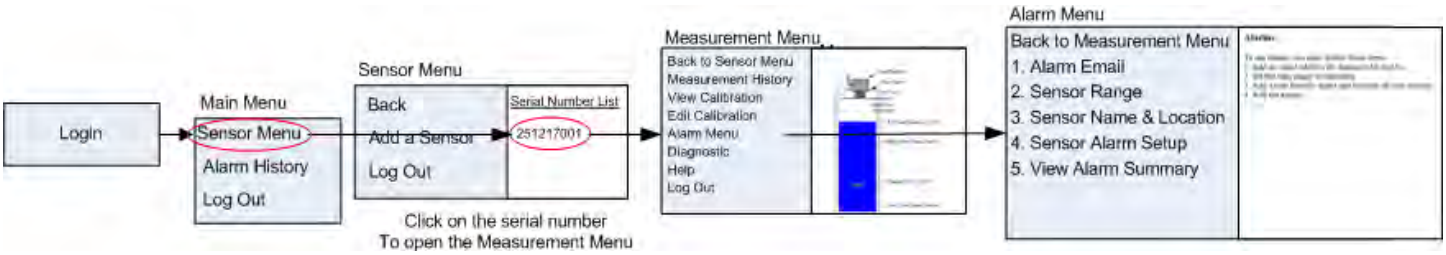

Figure 12 A quick navigation guide to get to the alarm menu.

Alarms and Documentation

Figure 12 show the menu selections required to get to the alarm menu. There are 5 menu items available once you have setup an alarm email address. The alarm menus descriptions provided in this guide are very brief. You will find the alarm menu pages are well documented.

Alarm Email

The first step to setting up alarms is to add an alarm email address. When an alarm occurs an email is generated and sent to the registered alarm email address. The alarm email address will require validation before it can be made active. After adding the email address the Sensor Access system will send a validation email to this address. Follow the instructions in the validation email to complete the email registration.

Sensor Range

For accurate reporting you should configure your sensors range. The range values you enter tell the sensor when your tank is full and when your tank is empty.

Sensor Name & Location

The sensor name and location fields allow you to name your sensor and provide location information. When alarm conditions occurs both the name and location information you provide will be in the email.

Time zone – By default your sensor uses eastern standard time (EST). All measurements will be reported with an EST timestamp. You can configure your sensor to report time in any time zone you desire.

Sensor Alarm Setup

This menu item will not appear until you have added an email address to the system. The alarm setup menu allows you to select the alarms notifications you would to receive.

There are 5 alarms:

Full Tank alarm – Sends an alarm message when the material in your tank reach the full tank point.

High Level Alarm – The high level point can be configured for any level that is between the full tank level and low level level. When the material in your tank crosses the high level point an alarm condition will occur.

Low Level Alarm – The low level point can be configured for any level that is between the high level and the empty tank level. When the material in your tank crosses the low level point an alarm condition will occur.

Empty Tank alarm – Sends an alarm message when the material in your tank reach the empty tank level.

Change Alarm – The change alarm system monitors your tank for changes after your office closes.

View Alarm Summary

You can view your alarm configuration at any time by using the View Alarm Summary menu item.

Calibration Section

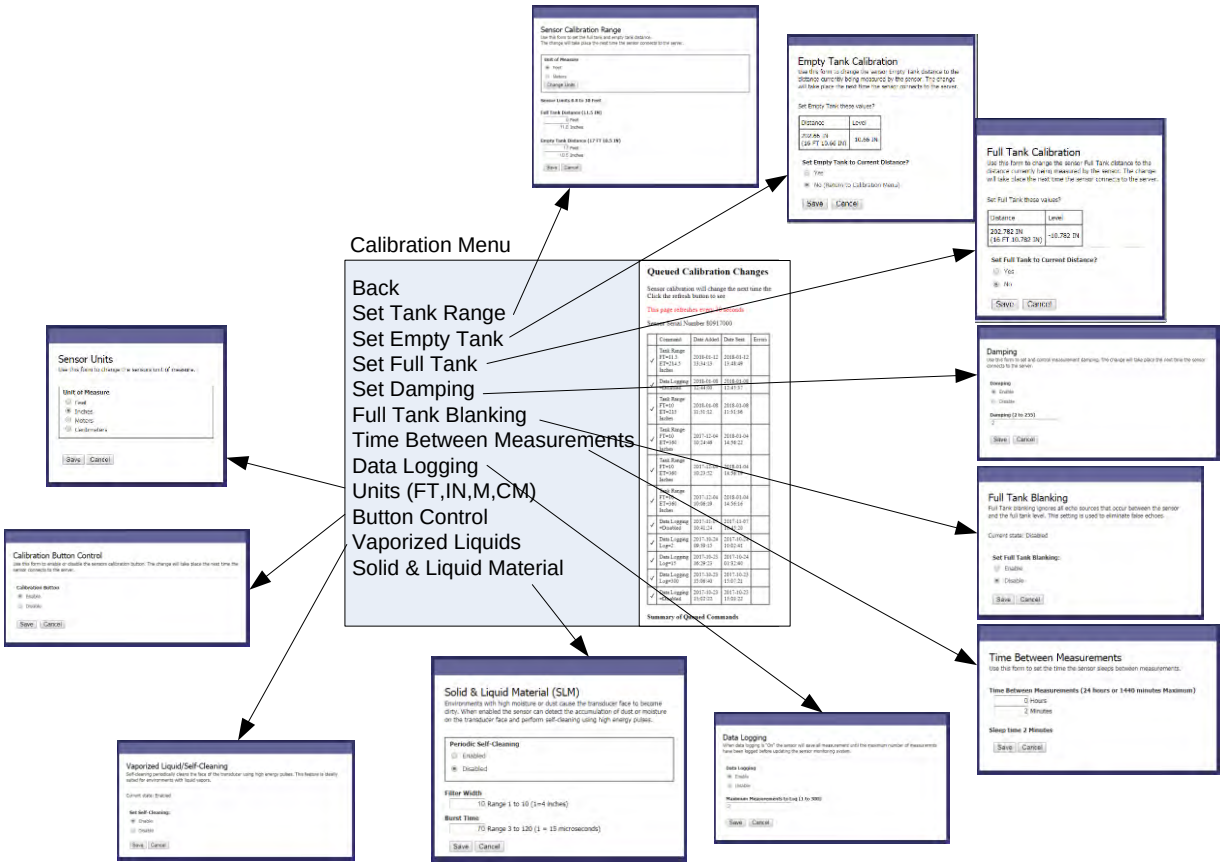

Figure 13 Overview of the Calibration Menu

Calibration Menu

Your sensor has many programmable features as show in Figure 13. The calibration menus allow you to configure these different configuration items to match your needs.

Configuration Items

- How to setup your tank
- Tank Range
- Set Empty Tank Distance to current tank level
- Set Full Tank Distance to current tank level
- Set Damping to average out the level of material that shift or move due to waves.
- Use Full Tank Blanking to ignore unwanted echoes near the full tank level.
- Time between Measurements
- Data Logging
- Units of measure
- Button Control
- Vaporized Liquids
- Solid & Liquid Material

How To Setup Your Tank

Your sensor can be configured to match your tank's full and empty levels. There are two ways to configure both the full tank and empty tank distances. If you tank is currently at the full level you can use the sensor's latest measurement using "Set Full Tank Distance". If you tank is currently at the empty level you can use the sensor's latest measurement using "Set Empty Tank Distance". You can add the full tank and empty tank distances manually using the simple "Tank Range Form" below or the more descriptive "Sensor Range Form" in the alarm section.

Tank Range or Sensor Calibration Range

Set Tank Range (also referred to as sensor range) allows you to define the distances when you consider your tank to be full and when you consider it to be empty see Figure 14. The distances you provide must be measured from the ultrasonic transducer's face (this is your reference zero distance point) see Figure 15. Your sensor should be mounted on the top of your tank. When the tank is full the material in the tank will be close to the top of the tank and your sensor. When the tank is empty the level of the material is near or at the bottom of the tank, and far away from your sensor. Your sensor measures the distance from its transducer to the material. Using this distance your sensor can calculate the level of the material in the tank. See understanding distance versus level.

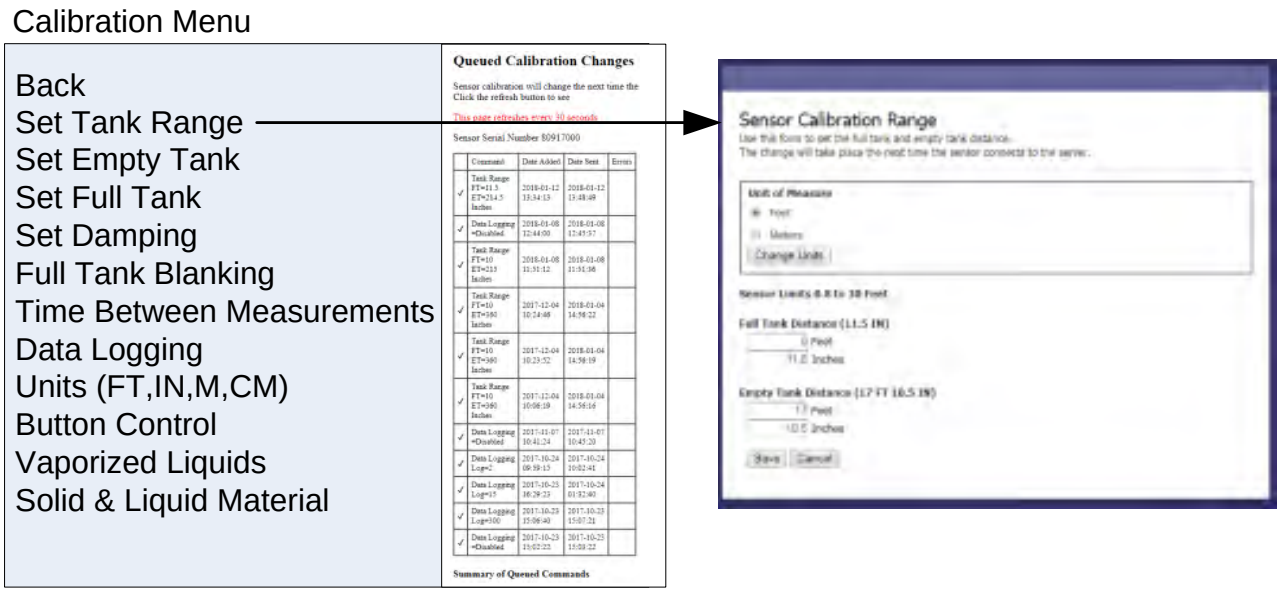

Figure 14 The tank range/sensor range form allows you to enter in the full and empty tank distance.

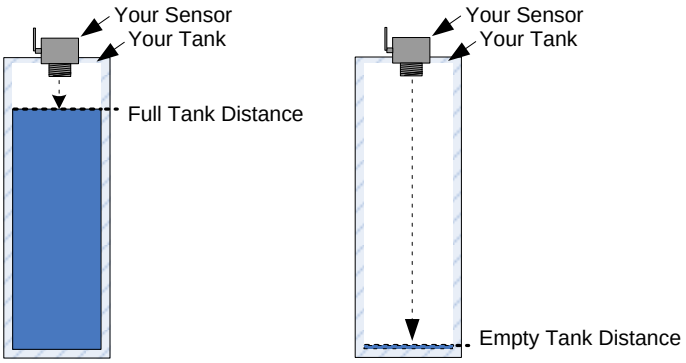

Figure 15 Full tank and empty distance is measured from the ultrasonic transducer face.

Set Empty Tank

The empty tank distance can be programmed to use the current target distance by clicking on the “Set Empty tank” menu item and selecting yes and save from the empty tank calibration form shown in Figure 16 (right side). The empty tank calibration will occur the next time the sensor connects to the access server and downloads the configuration change.

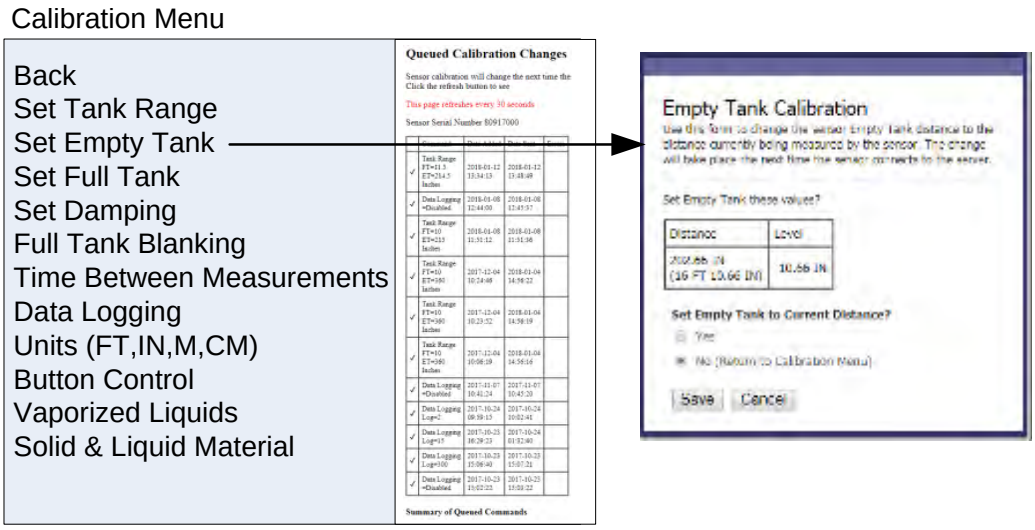

Figure 16 Set empty tank provides a simple way to set the empty tank distance using the sensor's current distance.

Set Full Tank

The full tank distance can be programmed to use the current target distance by clicking on the “Set Full Tank” menu item and selecting yes and save from the full tank calibration form shown in Figure 17 (right side). The full tank calibration will occur the next time the sensor connects to the access server and downloads the configuration change.

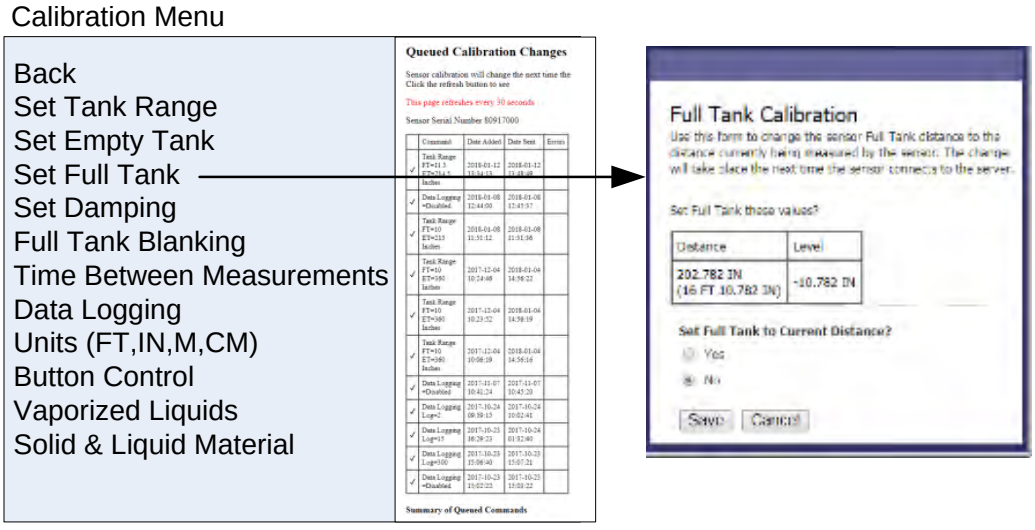

Figure 17 The set full tank calibration form provides a simple way to set the full tank distance using the sensor's current distance.

Damping

In some applications the material being sensed changes in position or shape due to the process being applied or the environment where the material is stored. Liquid material can be disturbed by waves and solid materials can shift. If the surface of the material being sensed changes frequently then the distance being measured by the sensor will fluctuate frequently. Set damping to average out the level of the material that shift's or moves due to waves. Using the lowest damping factor of 2 seconds provides the fastest response and helps reduce measurement fluctuations. A damping factor of 10 provides a relatively stable reading. Entering higher values will reduce the sensor response time.

To change the sensor's damping factor click the "Set Damping" link. The damping form will appear as shown in Figure 18 (right side). Damping can be turned off by unchecking the "Damping Enabled" box. If damping is enabled a value in the range of 2 to 255 can be entered. Recall that the higher the damping value the slower the response. After entering a damping factor click the "Save" button.

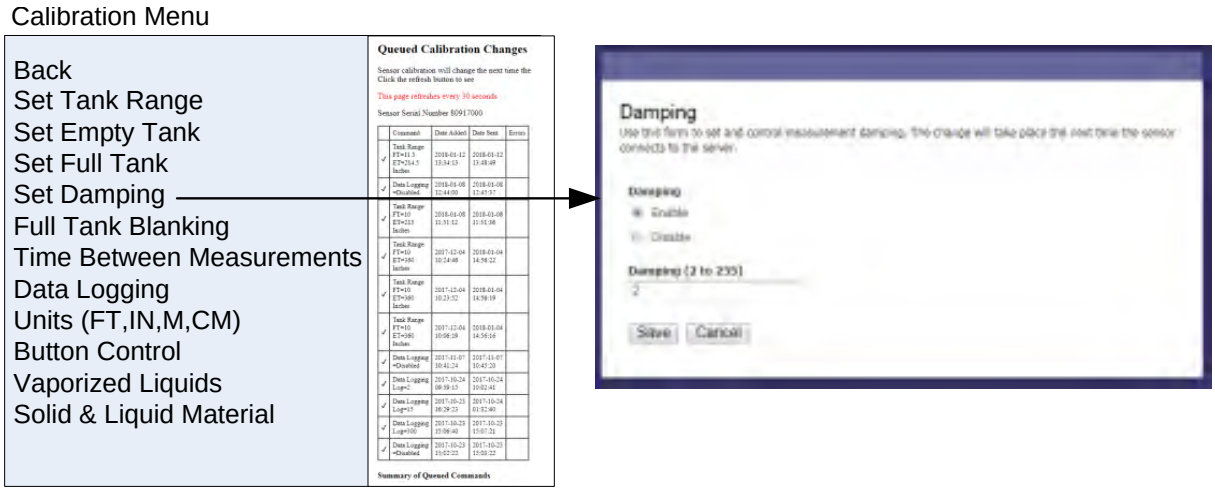

Figure 18 Damping allows the sensor to average measurements over time.

Full Tank Blanking

Full Tank Blanking must be used with some caution. The blanking feature is used to ignore unwanted echoes which are closer than the full tank calibration minus 3 inches. As shown in Figure 19 the feature can be accessed by clicking on the "Full Tank Blanking". The blanking feature must not be used when calibrating the sensor using the sensor push button.

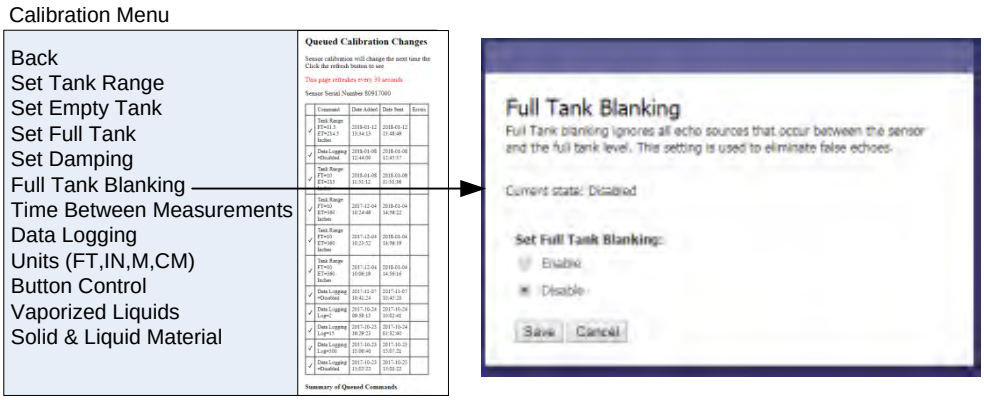

Figure 19 Full Tank Blanking control page shows the current state and allows the feature to be turned on or off.

Time Between Measurements

Your sensor has been designed to operate for long periods from a battery. The largest power consumption occurs when the embedded cellular modem is powered on and communicating with the Sensor Server. To save battery power your sensor switches to a low power mode and sleeps between measurements.

The sensor's normal operation is to:

1. Wake from sleep.
2. Take a measurement.
3. Save the measurement to data logger memory
4. Check if it should connect to the Sensor Server
    a. Connect to Sensor Server
    b. Transfer measurement data
5. Go back to sleep.

How long your sensor sleeps between measurements is controlled by the value you enter in to the "Time Between Measurements" setting see Figure 20. As shown in Figure 20 the sensor can be configure to sleep from 2 minutes to 24 hours. How often the sensor connects to the Sensor Server using the cellular modem is a combination data logging and the time between measurements.

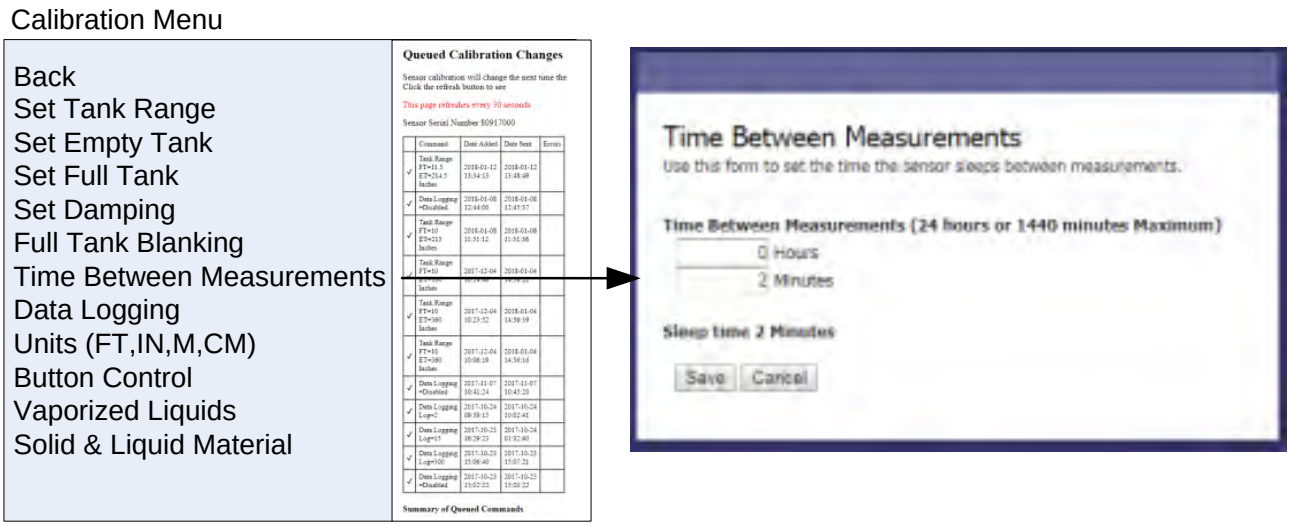

Figure 20 Time Between Measurements defines how often your sensor will wake up and take a measurement.

Data Logging

Your sensor has been designed to operate for long periods off of a battery. The largest power consumption occurs when the embedded cellular modem is powered on and communicating with the Sensor Server. Using data logging combined with Time Between Measurements you can control how often the cellular modem connects to the Sensor Server. Your sensor can be configured to log up to 300 measurements before powering on the cellular modem and connecting to the Sensor Server. With data logging enabled and set to 5 (see Figure 21) your sensor will sleep in a low power mode for period of time you define (see Time Between Measurements) then wake up and take a measurement, save that measurement to memory and return to sleep. This will occur 5 times before the sensor powers on the cellular modem and sends the measurement results to the Sensor Server.

Figure 21 Data logging defines how many measurements will be saved in memory before the sensor connects to the server.

Units of Measure

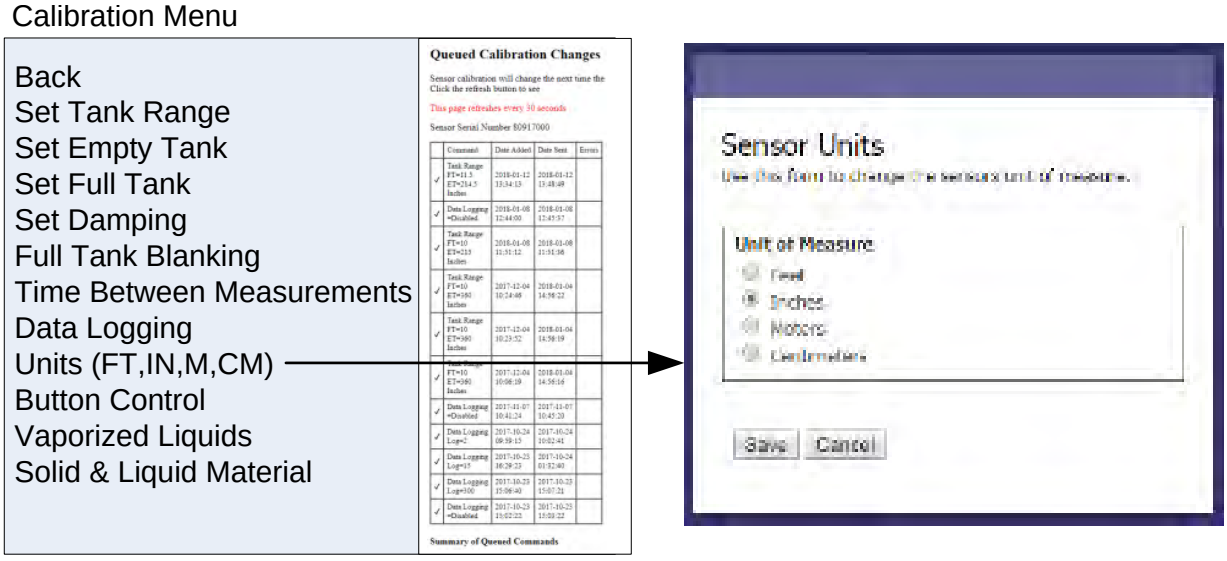

Figure 22 Measurements can be reported in inches, feet, centimeters or meters.

Your Sensor can be programmed to report measurements in feet, meters, inches or centimeters as shown in Figure 22. The default value is feet.

Button Control

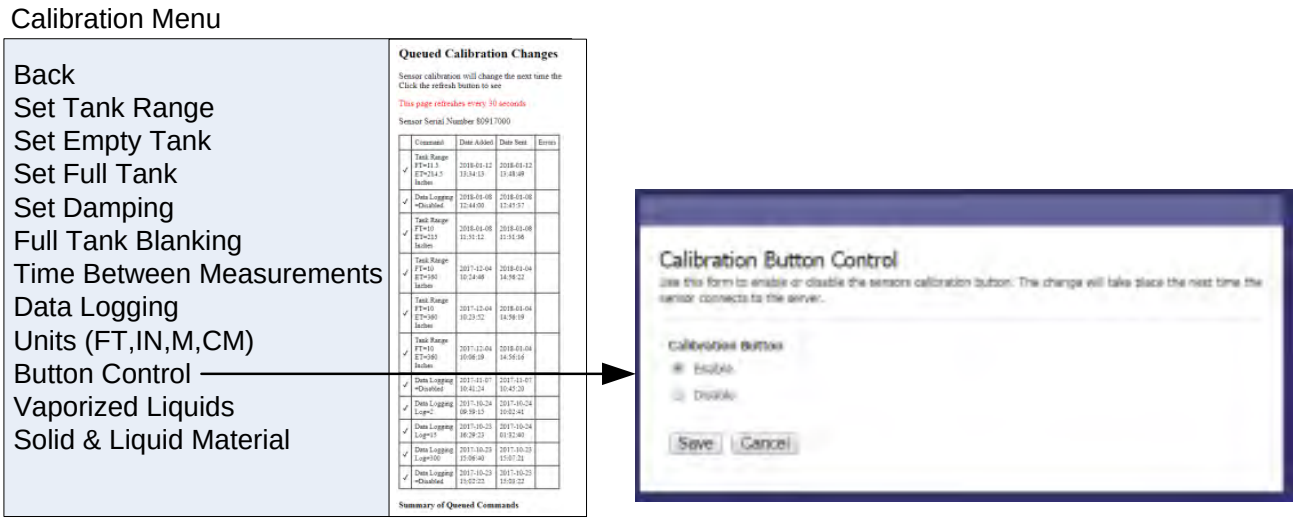

Figure 23 The calibration button on your sensor can be enable or disabled.

Your sensor is equipped with a calibration button that can be used to calibrate the sensor's range. For remote locations the button should be disabled to prevent tampering. To change the button settings click the "Button Control" menu and select enable or disable from the button control form that appears as shown in Figure 23.

To access the calibration button on the sensor remove the sensors lid by unscrewing it. To make calibration changes to the sensor using the button, power must be supplied to the sensor and the button must be pressed for time specified in Table 1. Press the button until the LED turns the desired color and then release the button.

Table 1 Calibration Button

Button Timing of the Remote Ultrasonic Sensor.		
Seconds Pressed	LED Color	Description
< 2	Off	If the button is pressed for less than 2 seconds it is ignored and no action is taken.
> 2	Green	Take a measurement and connect to the server now.
> 7	Yellow	Program the full tank distance equal to the current distance.
> 12	Red	Program the empty tank distance equal to the current distance.
> 17	Off	Button pressed for greater than 17 seconds are ignored and no action is taken

Where: < means less than and > means greater than.

Vaporized Liquid/Self Cleaning (Ultrasonic Sensors)

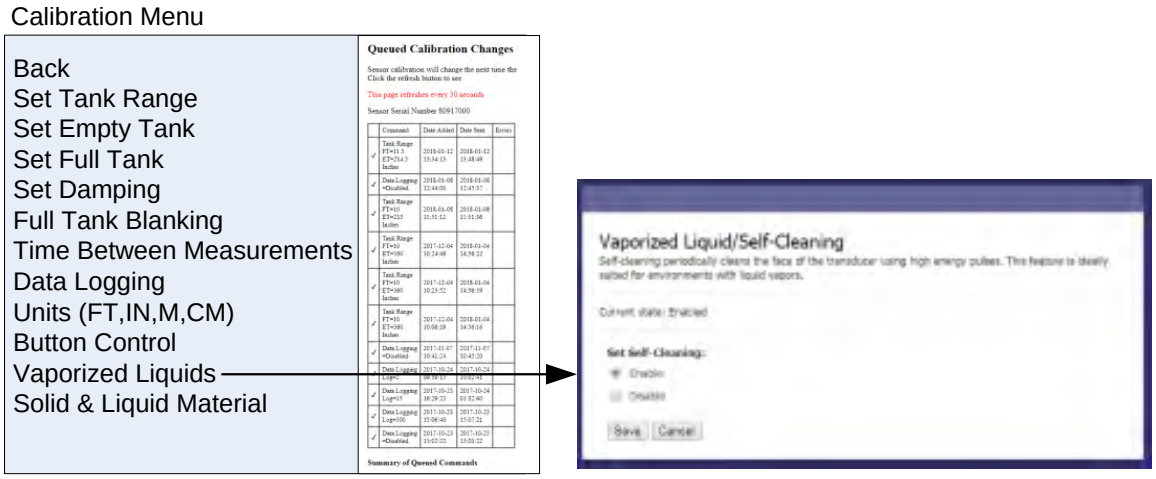

Figure 24 Self-Cleaning / Vaporized Liquids feature provides periodic cleaning to the transducer face. This feature is ideally suited for applications in environments with high moisture.

The self-cleaning / vaporized liquids feature provides periodic cleaning of the ultrasonic transducer. This feature is highly recommended for applications where the ultrasonic sensor is exposed to vaporized liquids that cause condensation on the transducer's face. The vaporized /self-cleaning feature can be enabled or disabled as shown in Figure 24.

Solid & Liquid Material (Ultrasonic Sensors)

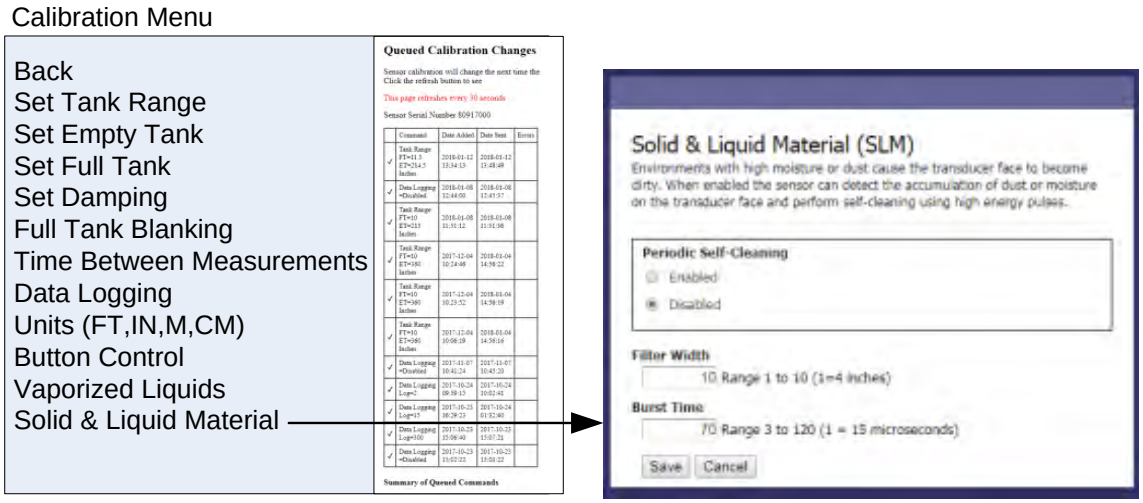

Figure 25 High energy pulses can be enabled to propagate through dust and moisture.

In dusty, high moisture environments it is recommended that the "Solid/Liquid Material" feature be turned on.

When enabled the sensor can detect the accumulation of dust or moisture on the transducer face and transmit high energy pulses that propagate through dust and moisture and clean the transducer face. The self-cleaning feature is turned off by default. To turn on the self-cleaning feature the "Solid & Liquid Material" feature must be enabled using the "Solid & Liquid Material" menu as shown in Figure 25.

Diagnostic Section

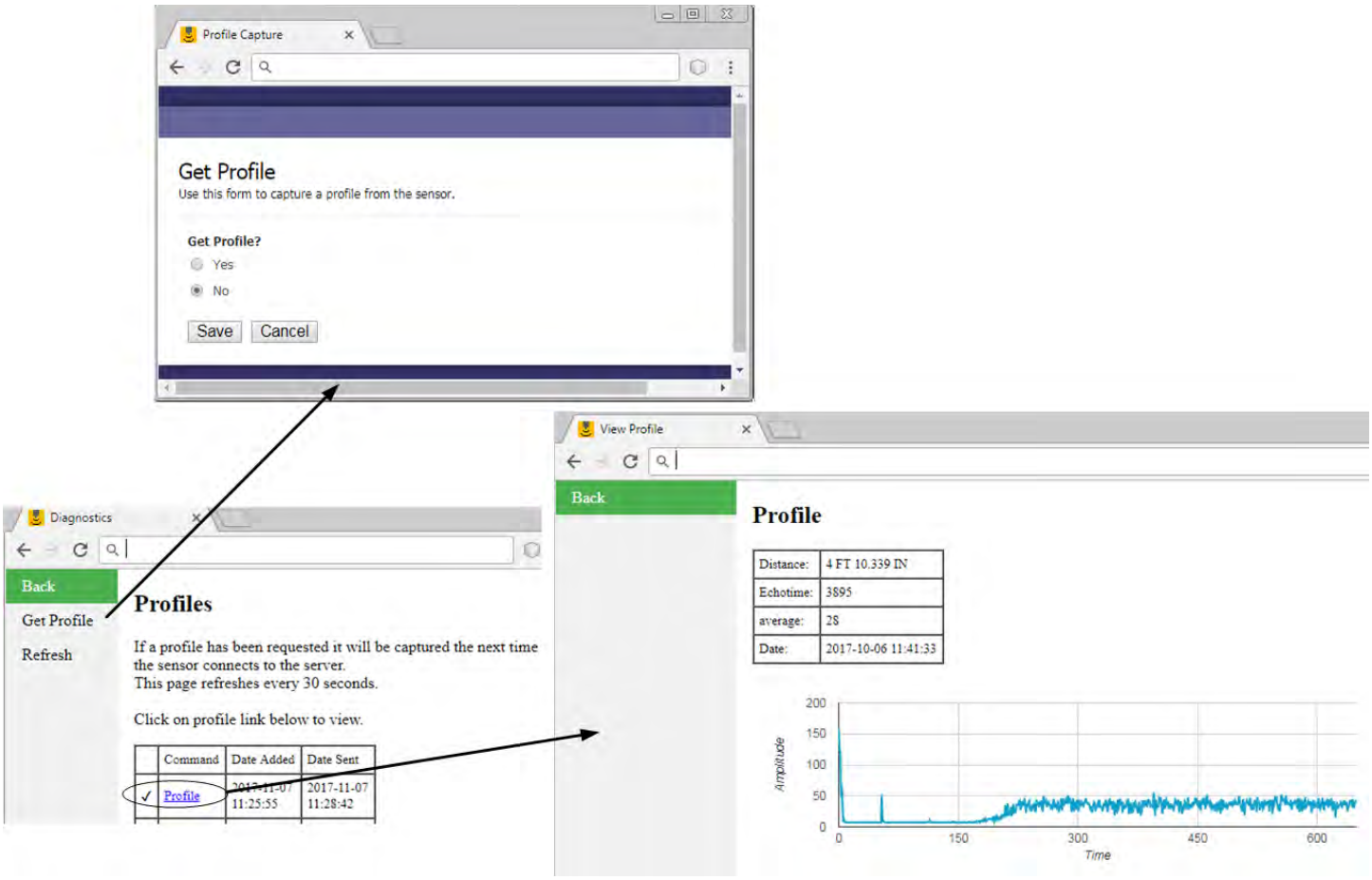

Figure 26 The Diagnostic menu provides tools to collect and view ech profiles. As profiles are collected they are listed to the right of the menus.

Diagnostics

As shown in Figure 26 the diagnostic menu provides the ability to have the sensor collect an echo profile. When a profile has been requested the request will be queued until the sensor connects to the server. When the sensor connects to the server the sensor will download the queued command, gather an echo profile, update the sensor server and the profile will be available for viewing by clicking the "Profile" of your choice.

Distance versus Level Section

Understanding Distance and Level

When looking at a tank like the one in Figure 27 there are two distance values used to describe the material in the tank. The “distance from the sensor” to the material is the actual “distance” measured by the sensor. In this document and on the Sensor Access Website distance always refers to the distance from the sensor to the material. The distance can be thought of as the empty space above the material. This value is useful when you want to know how much room is available in the tank for filling purposes.

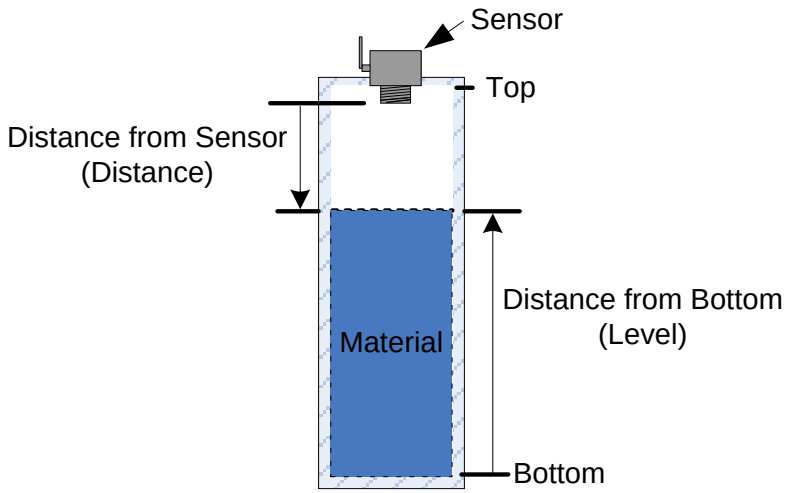

Figure 27 Distances used to describe tank material position.

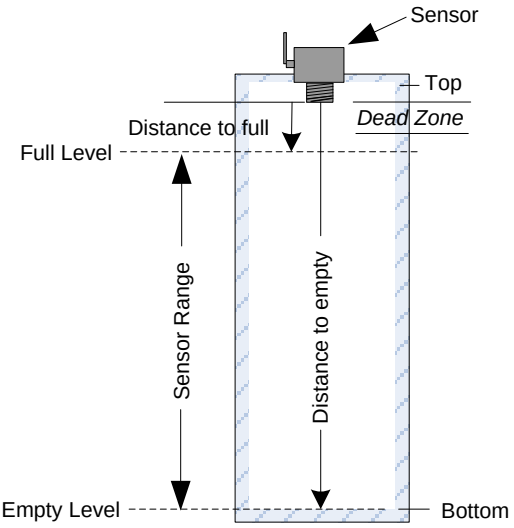

Figure 28 Tank properties, full and empty tank levels.

Tank Properties

Figure 28 shows a tank with the top, bottom, full level, empty level and the dead zone marked.

The dead zone is a small zone below the sensor face where material cannot be detected.

The tank height is the distance from the ultrasonic transducer face to the bottom of the tank. This distance can be used as the empty level.

The full level is the distance from the sensor to the level considered full. The full level must be below the dead zone.

The full level and the empty level are both programmable.

Level

Level is always measured from the bottom of the tank. Level is used to describe how full a tank is. The level of a tank is a simple calculation.

Level = (Distance to empty) minus (current distance)

If the level displayed on the Sensor Access Website is high or low in comparison with the actual level in the tank then the tank range needs to be corrected.